



Wood Buffalo Environmental Association

MARCH 2017 MONTHLY REPORT

CONTINUOUS MONITORING
INTEGRATED MONITORING
April 27, 2017

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



Table of Contents

Continuous Monitoring Summaries

Summary Letter	1
Network Summary	11
Bertha Ganter	1-1
Station Summaries	1-2
Station Percentiles	1-3
Station Downtime	1-4
Data Summaries	1-5
Calibrations	1-106
Mildred Lake	2-1
Station Summaries	2-2
Station Percentiles	2-3
Station Downtime	2-4
Data Summaries	2-5
Calibrations	2-40
Lower Camp Meteorology	3-1
Station Summaries	3-2
Station Percentiles	3-3
Station Downtime	3-4
Data Summaries	3-5
Buffalo Viewpoint	4-1
Station Summaries	4-2
Station Percentiles	4-3
Station Downtime	4-4
Data Summaries	4-5
Calibrations	4-40
Mannix	5-1
Station Summaries	5-2
Station Percentiles	5-3
Station Downtime	5-4
Data Summaries	5-5
Calibrations	5-99
Patricia McInnes	6-1
Station Summaries	6-2
Station Percentiles	6-3
Station Downtime	6-4
Data Summaries	6-5



Calibrations	6-94
Athabasca Valley	7-1
Station Summaries	7-2
Station Percentiles	7-3
Station Downtime	7-4
Data Summaries	7-5
Calibrations	7-96
Fort Chipewyan	8-1
Station Summaries	8-2
Station Percentiles	8-3
Station Downtime	8-4
Data Summaries	8-5
Calibrations	8-69
Barge Landing	9-1
Station Summaries	9-2
Station Percentiles	9-3
Station Downtime	9-4
Data Summaries	9-5
Calibrations	9-33
Lower Camp	11-1
Station Summaries	11-2
Station Percentiles	11-3
Station Downtime	11-4
Data Summaries	11-5
Calibrations	11-40
Fort McKay South	13-1
Station Summaries	13-2
Station Percentiles	13-3
Station Downtime	13-4
Data Summaries	13-5
Calibrations	13-73
Anzac	14-1
Station Summaries	14-2
Station Percentiles	14-3
Station Downtime	14-4
Data Summaries	14-5
Calibrations	14-96
CNRL Horizon	15-1
Station Summaries	15-2
Station Percentiles	15-3



Station Downtime	15-4
Data Summaries	15-5
Calibrations	15-71
Shell Muskeg River	16-1
Station Summaries	16-2
Station Percentiles	16-3
Station Downtime	16-4
Data Summaries	16-5
Calibrations	16-62
Wapasu	17-1
Station Summaries	17-2
Station Percentiles	17-3
Station Downtime	17-4
Data Summaries	17-5
Calibrations	17-76
Stony Mountain	18-1
Station Summaries	18-2
Station Percentiles	18-3
Station Downtime	18-4
Data Summaries	18-5
Calibrations	18-96
Firebag	19-1
Station Summaries	19-2
Station Percentiles	19-3
Station Downtime	19-4
Data Summaries	19-5
Calibrations	19-62
Brion Mackay River	20-1
Station Summaries	20-2
Station Percentiles	20-3
Station Downtime	20-4
Data Summaries	20-5
Calibrations	20-65
Conklin Community	21-1
Station Summaries	21-2
Station Percentiles	21-3
Station Downtime	21-4
Data Summaries	21-5
Calibrations	21-90
Janvier	22-1



Station Summaries	22-2
Station Percentiles	22-3
Station Downtime	22-4
Data Summaries	22-5
Calibrations	22-87
Cenovus Christina Lake	500-1
Station Summaries	500-2
Station Percentiles	500-3
Station Downtime	500-4
Data Summaries	500-5
Calibrations	500-55
Conocophillips Surmont	502-1
Station Summaries	502-2
Station Percentiles	502-3
Station Downtime	502-4
Data Summaries	502-5
Calibrations	502-55
<i>Integrated Monitoring Summaries</i>	
Passive Measurements	INT-3
Metadata	INT-4
Remote Summary	INT-5
Local Summary	INT-6
Volatile Organic Compounds	INT-7
Metadata	INT-8
Lab Results	INT-9
Monthly Data Summary	INT-25
Monthly Data Statistics	INT-32
Particulate Matter – PM 2.5 Ions	INT-35
Metadata	INT-36
Lab Results	INT-37
Monthly Data Summary	INT-45
Monthly Data Statistics	INT-49
Particulate Matter – PM 10 Ions	INT-50
Metadata	INT-51
Lab Results	INT-52
Monthly Data Summary	INT-68
Monthly Data Statistics	INT-75
Particulate Matter – PM 2.5 Metals	INT-78
Metadata	INT-79



Lab Results	INT-80
Monthly Data Summary	INT-88
Monthly Data Statistics	INT-92
Particulate Matter – PM 10 Metals	INT-93
Metadata.....	INT-94
Lab Results	INT-95
Monthly Data Summary	INT-110
Monthly Data Statistics	INT-117
Polycyclic Aromatic Hydrocarbons	INT-118
Metadata.....	INT-119
Lab Results	INT-120
Monthly Data Summary	INT-128
Monthly Data Statistics	INT-132
Precipitation Chemistry	INT-133
Metadata.....	INT-134
Lab Results	INT-135



April 27, 2017

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

Enclosed is the March 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 - CNRL Horizon
AMS 16 - Shell Muskeg River
AMS 17 - Wapasu
AMS 18 - Stony Mountain
AMS 19 - Firebag
AMS 20 - Brion MacKay River
AMS 21 - Conklin
AMS 22 - Janvier
AMS 500 - Cenovus Christina Lake
AMS 502 - ConocoPhillips Surmont



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
Brion Energy	254465-00-00
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
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
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

Christina River Dene Nation Council

Fort McKay First Nation

Fort McKay Métis Local 63

Fort McMurray First Nation 468

Fort McMurray Métis Local 1935



Figure 1: Map of WBEA Continuous Monitoring Network.

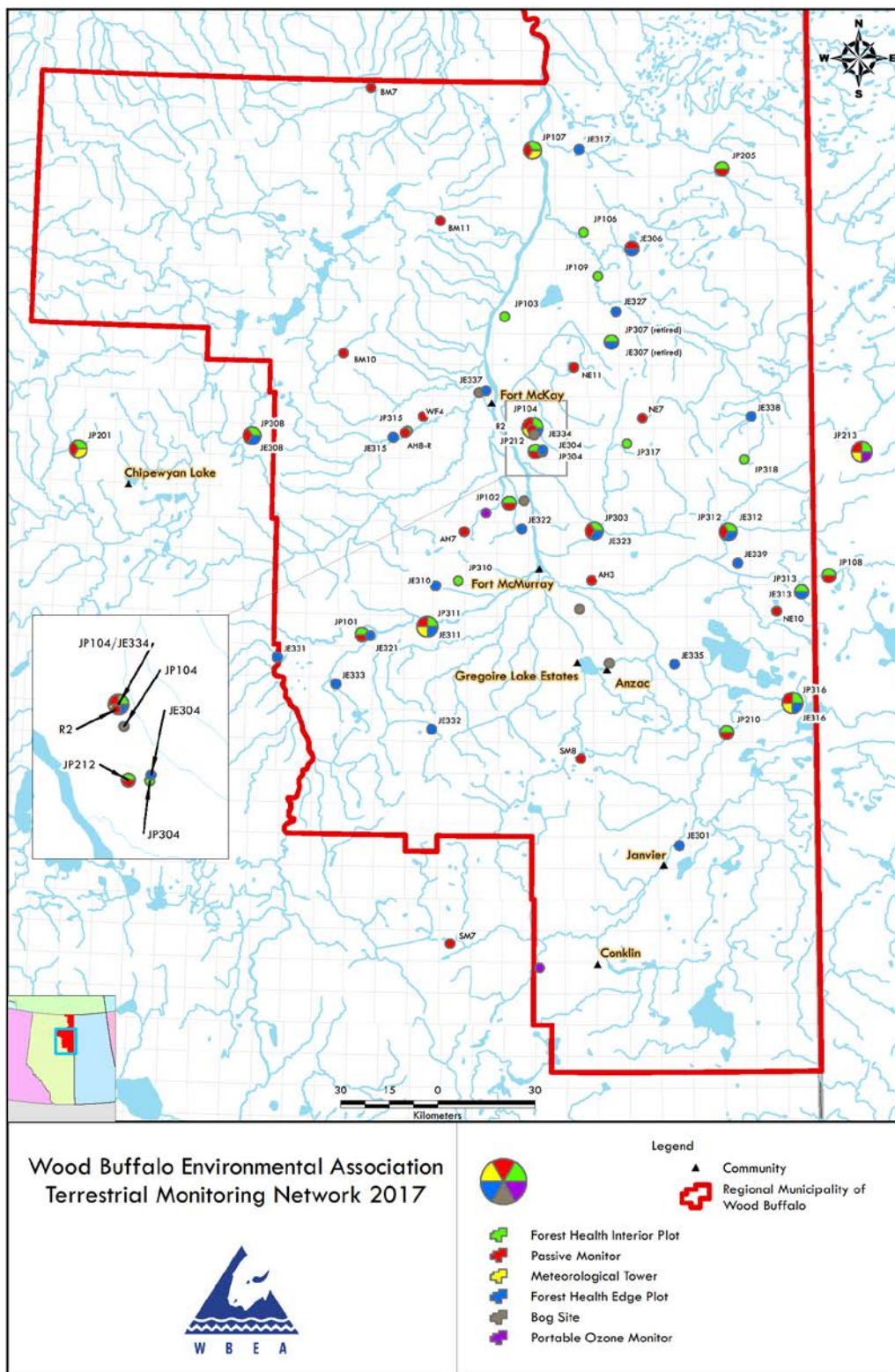


Figure 2: Map of WBEA Terrestrial Monitoring Network.

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, H₂S, NH₃, NO₂, PM_{2.5}, O₃, and SO₂.

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

There were no revisions to historical data stored at the AEP Airdata Warehouse with this monthly report.

2.0 Operational Status

Continuous Monitoring

In March 2017, there were no instances of a compliance monitoring instrument operating less than 90% of the time.

In March 2017, there were no instances of a non-compliance monitoring instrument operating less than 90% of the time.

Intermittent Monitoring

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

3.0 Monitoring Notes

General Network Notes

The Ammonia (NH₃) analyzer currently operates on a 0 to 1000 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 30 hours this month.

Unstable operation due to baseline drift on March 7 and March 10 affected the normal operations of the NH₃, O₃, and THC analyzers for 3, 1, and 4 hours respectively.

Maintenance and cleaning of the sample manifold on March 13 interrupted the normal operations of the NH₃, NO_x, O₃ and TRS analyzers for 1 hour.

A data logger program update on March 15 interrupted data collection of the PM_{2.5} analyzer for 20 hours this reporting period.

The normal operations of the NO_x analyzer was interrupted on March 17 for 2 hours to confirm analyzer responses to in-situ calibrator O₃ concentrations. These O₃ concentration responses were used in subsequent calibration of the O₃ analyzer at the station.

Flat-lines in the output signal of the wind sensor resulted in 12 hours of invalid data this reporting period.

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

Station operator activities on March 1 affected the normal operation of the THC analyzer for 2 hours. Maintenance and replacement of the sample pump and a follow-up calibration on March 8 affected the operation of the THC analyzer for 38 hours.

Flat-lines in the output signal of the wind sensor resulted in 7 hours of invalid data this reporting period.

Station 3, Lower Camp B - Meteorology

Flat lines in the output signals of the sonic wind sensors at the 100 m elevation resulted in 1 hour of downtime.

Station 4, Buffalo Viewpoint

Flat-lines in the output signal of the wind sensor resulted in 9 hours of invalid data this reporting period.

Station 5, Mannix

An internal WBEA audit on March 1 interrupted the normal operations of all air quality analyzers for 2 to 6 hours.

Maintenance to the data acquisition system on March 27 interrupted the routine operations of all air quality analyzers for 1 hour.

Maintenance to reinitiate the daily zero/span check on March 25 and 26 interrupted the routine operation of all air quality analyzers for 2 to 5 hours.

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

Flat lines in the output signals of the wind sensors at the 75 m elevation resulted in 8 hours of invalid data this reporting period.

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 to 2 hours following each daily span has been reported as invalid for a total of 30 hours this month.

Maintenance to replace the power supply cable on the NH₃ analyzer on March 2 resulted in 34 hours of downtime.

Maintenance and cleaning of the sample manifold on March 9 interrupted the normal operations of all air quality analyzers for 1 hour.

Four instances of unstable operation due to baseline drift on March 17 and 23 interrupted the normal operation of the THC analyzer for a total of 4 hours. Maintenance on March 24 to replace the carrier gas actuator affected the routine operation of the THC analyzer for 6 hours.

Station 7, Athabasca Valley

Maintenance and cleaning of the sample manifold on March 3 interrupted the normal operations of the TRS, O₃, and CO analyzers for 1 hour.

Maintenance to the data acquisition system on March 21 interrupted the routine operations of all parameters for 1 hour.

Replacement of the carrier gas cylinder at the station on March 21 affected the normal operation of the THC analyzer for 2 hours.

Two instances of unstable operation due to baseline drift on March 15 affected the normal operation of the PM_{2.5} analyzer for 6 hours.

Station 8, Fort Chipewyan

Maintenance to the data acquisition system on March 27 interrupted the routine operations of all air quality analyzers for 1 hour.

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

Station 9, Barge Landing

Flat-lines in the output signal of the wind sensor resulted in 13 hours of invalid data this reporting period.

Station 11, Lower Camp

Station operator activities on March 31 interrupted the normal operation of the THC analyzer for 2 hours.

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

Station 13, Fort McKay South

Unstable operation due to baseline drift on March 15 affected the normal operation of the PM_{2.5} analyzer for 2 hours.

Two instances of intermittent unstable operation on March 31 interrupted the normal operation of the O₃ analyzer for 2 hours.

Station 14, Anzac

Replacement of the carrier gas cylinder at the station on March 17 affected the normal operation of the THC analyzer for 1 hour.

Flat-lines in the output signal of the wind sensor resulted in 3 hours of invalid data this reporting period.

Station 15, CNRL Horizon

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

Station 16, Shell Muskeg River

Station temperature fluctuations affected analyzer stability and performance during a routine NO_x analyzer calibration on March 1; as a result, 6 hours of data was flagged as maintenance and a follow up calibration was conducted on March 3.

Station 17, Wapasu

Following the March 10 calibration, the PM_{2.5} analyzer required an additional 1 hour of stabilization time.

A data logger program update on March 21 interrupted data collection of the THC analyzer for 1 hour this reporting period.

Flat-lines in the output signal of the PM_{2.5} analyzer following maintenance to the data acquisition system on March 14 resulted in 2 hours of invalid data this reporting period.

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

Station 18, Stony Mountain

Depletion and replacement of the fuel cylinder at the station on March 10 affected the normal operation of the THC analyzer for 3 hours.

The automated daily zero/span response of the O₃ analyzer did not meet operational criteria on March 2. On site investigation, repairs, and calibration interrupted the normal operation of the O₃ analyzer for 33 hours. Maintenance to adjust analyzer response and re-calibrate on March 4 interrupted the routine operation of the O₃ analyzer for 3 hours. Maintenance to replace the ozone scrubber and solenoids on March 24 interrupted the routine operation of the O₃ analyzer for 25 hours.

A new data collection program and revision uploads to the data logger on March 14 interrupted the normal data collection of the PM_{2.5} analyzer for 2 hours.

Flat-lines in the output signal of the wind sensor resulted in 10 hours of invalid data this reporting period.

Station 19, Firebag

The zero air generator failed and required replacement on March 6 interrupting the normal operation of the THC analyzer for 5 hours.

Station 20, Brion MacKay River

A data logger program update on March 18 interrupted data collection of the precipitation collector for 1 hour this reporting period.

Flat-lines in the output signal of the wind sensor resulted in 10 hours of invalid data this reporting period.

Station 21, Conklin Community

Unstable operation due to baseline drift on March 5 affected the normal operation of the THC analyzer for 1 hour. Replacement of the carrier gas cylinder at the station on March 17 affected the normal operation of the THC analyzer for 2 hours.

Maintenance to the on-site PC on March 10 interrupted routine calibrations of the TRS and PM_{2.5} analyzers resulting in 2 to 3 hours of invalid data.

Negative baseline drift on March 2 affected the normal operation of the PM_{2.5} analyzer for 1 hour.

Flat-lines in the output signal of the wind sensor resulted in 18 hours of invalid data this reporting period.

Station 22, Janvier

An internal WBEA audit on March 21 and 22 interrupted the normal operations of all air quality analyzers for 2 to 4 hours.

Flat-lines in the output signal of the PM_{2.5} analyzer resulted in 62 hours of invalid data this reporting period.

Replacement of the fuel gas cylinder at the station on March 10 affected the normal operation of the THC analyzer for 2 hours.

Station 500, Cenovus Christina Lake

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

Station 502, ConocoPhillips Surmont

Unstable operation due to fluctuating station temperature on March 4 interrupted the normal operation of the SO₂ analyzer for 24 hours.

Flat-lines in the output signal of the wind sensor resulted in 3 hours 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

Sanjay Prasad
Air Quality Scientist

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

MARCH 2017
 page 1 of 2

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APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	3	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
224816-00-00	SO2(ppm)	1	100.00	0.064	0	0.009	0
189942-00-00	SO2(ppm)	2	100.00	0.041	0	0.009	0
206355-00-00	SO2(ppm)	4	100.00	0.023	0	0.003	0
46586-00-00	SO2(ppm)	5	98.92	0.101	0	0.033	0
73203-02-00	SO2(ppm)	6	99.87	0.048	0	0.009	0
216466-01-00	SO2(ppm)	7	99.87	0.040	0	0.005	0
137467-01-00	SO2(ppm)	8	99.87	0.007	0	0.003	0
236394-00-00	SO2(ppm)	11	100.00	0.083	0	0.022	0
20809-01-00	SO2(ppm)	13	100.00	0.047	0	0.009	0
094-02-00	SO2(ppm)	14	100.00	0.010	0	0.003	0
305529-00-00	SO2(ppm)	15	100.00	0.030	0	0.006	0
026-02-00	SO2(ppm)	16	100.00	0.036	0	0.006	0
228044-00-00	SO2(ppm)	17	100.00	0.012	0	0.004	0
	SO2(ppm)	18	100.00	0.008	0	0.003	0
	SO2(ppm)	19	100.00	0.010	0	0.002	0
	SO2(ppm)	20	100.00	0.014	0	0.004	0
	SO2(ppm)	21	100.00	0.007	0	0.002	0
	SO2(ppm)	22	99.73	0.004	0	0.001	0
	SO2(ppm)	500	100.00	0.025	0	0.004	0
	SO2(ppm)	502	96.77	0.010	0	0.004	0
	H2S(ppm)	2	100.00	0.007	0	0.001	0
	H2S(ppm)	4	100.00	0.006	0	0.001	0
	H2S(ppm)	5	98.66	0.005	0	0.002	0
	H2S(ppm)	11	100.00	0.007	0	0.001	0
	H2S(ppm)	17	100.00	0.001	0	0.000	0
	H2S(ppm)	19	100.00	0.001	0	0.000	0
	H2S(ppm)	20	100.00	0.001	0	0.001	0
	H2S(ppm)	500	100.00	0.003	0	0.001	0
	H2S(ppm)	502	100.00	0.004	0	0.001	0
	TRS(ppm)	1	99.87	0.003	0	0.001	0
	TRS(ppm)	6	100.00	0.001	0	0.001	0
	TRS(ppm)	7	99.73	0.004	0	0.001	0
	TRS(ppm)	9	100.00	0.003	0	0.001	0
	TRS(ppm)	13	100.00	0.004	0	0.001	0
	TRS(ppm)	14	100.00	0.002	0	0.001	0
	TRS(ppm)	15	100.00	0.006	0	0.001	0
	TRS(ppm)	18	100.00	0.000	0	0.000	0
	TRS(ppm)	21	99.60	0.001	0	0.000	0
	TRS(ppm)	22	99.60	0.001	0	0.000	0
	THC(ppm)	1	99.46	4.2	-	2.5	-
	THC(ppm)	2	94.62	5.1	-	2.7	-
	THC(ppm)	4	100.00	6.2	-	2.9	-
	THC(ppm)	5	98.79	5.7	-	3.2	-
	THC(ppm)	6	98.52	2.3	-	2.0	-
	THC(ppm)	7	99.73	2.7	-	2.1	-
	THC(ppm)	9	100.00	6.0	-	2.9	-
	THC(ppm)	11	99.73	3.9	-	3.0	-
	THC(ppm)	13	100.00	4.2	-	3.1	-
	THC(ppm)	14	99.87	2.2	-	2.0	-
	THC(ppm)	15	100.00	4.0	-	2.6	-
	THC(ppm)	16	100.00	6.4	-	3.3	-
	THC(ppm)	17	99.87	2.5	-	2.3	-
	THC(ppm)	18	99.60	2.2	-	2.1	-
	THC(ppm)	19	99.33	2.5	-	2.3	-
	THC(ppm)	20	100.00	2.7	-	2.4	-
	THC(ppm)	21	99.60	2.3	-	2.1	-
	THC(ppm)	22	99.33	2.1	-	2.0	-
	O3(ppm)	1	99.73	0.050	0	0.041	-
	O3(ppm)	6	99.87	0.052	0	0.041	-
	O3(ppm)	7	99.73	0.049	0	0.039	-

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

MARCH 2017

page 2 of 2

Prepared: Apr 25 2017 09:50

APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	3	2017					
254465-00-00	CONTINUOUS AMBIENT MONITORING						
149968-00-01			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
48522-01-00	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
240008-00-03	O3(ppm)	8	99.87	0.054	0	0.043	-
48263-00-00	O3(ppm)	13	99.73	0.049	0	0.040	-
224816-00-03	O3(ppm)	14	100.00	0.051	0	0.042	-
189942-00-02	O3(ppm)	17	100.00	0.048	0	0.044	-
206355-00-00	O3(ppm)	18	91.80	0.062	0	0.054	-
46586-00-00	O3(ppm)	21	100.00	0.056	0	0.046	-
216466-00-04	O3(ppm)	22	100.00	0.058	0	0.049	-
137467-00-00	NO2(ppm)	1	99.60	0.042	0	0.023	-
20809-01-00	NO2(ppm)	6	99.87	0.029	0	0.011	-
241311-00-02	NO2(ppm)	7	99.87	0.045	0	0.017	-
094-02-00	NO2(ppm)	8	99.87	0.013	0	0.003	-
305529-00-00	NO2(ppm)	13	100.00	0.039	0	0.019	-
026-02-00	NO2(ppm)	14	100.00	0.022	0	0.007	-
228044-00-00	NO2(ppm)	15	100.00	0.039	0	0.018	-
73203-01-00	NO2(ppm)	16	99.19	0.052	0	0.022	-
236394-00-00	NO2(ppm)	17	100.00	0.020	0	0.006	-
	NO2(ppm)	18	100.00	0.010	0	0.003	-
	NO2(ppm)	19	100.00	0.036	0	0.010	-
	NO2(ppm)	20	100.00	0.032	0	0.013	-
	NO2(ppm)	21	100.00	0.016	0	0.005	-
	NO2(ppm)	22	99.46	0.013	0	0.005	-
	NO2(ppm)	500	100.00	0.020	0	0.007	-
	NO2(ppm)	502	100.00	0.019	0	0.007	-
	CO(ppm)	7	99.73	0.5	0	0.2	-
	NH3(ppm)	1	95.43	0.000	0	0.000	-
	NH3(ppm)	6	91.26	0.011	0	0.000	-
	PM2.5(ug/m3)	1	97.31	62.1	-	12.4	0
	PM2.5(ug/m3)	6	100.00	30.0	-	7.9	0
	PM2.5(ug/m3)	7	99.06	61.8	-	12.8	0
	PM2.5(ug/m3)	8	100.00	36.7	-	7.2	0
	PM2.5(ug/m3)	13	99.73	68.9	-	12.4	0
	PM2.5(ug/m3)	14	100.00	59.5	-	9.5	0
	PM2.5(ug/m3)	15	100.00	33.8	-	10.1	0
	PM2.5(ug/m3)	16	100.00	77.9	-	17.6	0
	PM2.5(ug/m3)	17	99.60	17.1	-	7.3	0
	PM2.5(ug/m3)	18	99.73	13.3	-	7.1	0
	PM2.5(ug/m3)	21	99.60	71.8	-	13.8	0
	PM2.5(ug/m3)	22	91.67	25.9	-	7.6	0
	WIND	1	98.39	-	-	-	-
	WIND	2	99.06	-	-	-	-
	WIND	4	98.79	-	-	-	-
	WIND	5	100.00	-	-	-	-
	WIND	6	100.00	-	-	-	-
	WIND	7	99.87	-	-	-	-
	WIND	8	99.33	-	-	-	-
	WIND	9	98.25	-	-	-	-
	WIND	11	99.87	-	-	-	-
	WIND	13	100.00	-	-	-	-
	WIND	14	99.60	-	-	-	-
	WIND	15	99.73	-	-	-	-
	WIND	16	100.00	-	-	-	-
	WIND	17	99.73	-	-	-	-
	WIND	18	98.66	-	-	-	-
	WIND	19	100.00	-	-	-	-
	WIND	20	98.66	-	-	-	-
	WIND	21	97.58	-	-	-	-
	WIND	22	100.00	-	-	-	-
	WIND	500	99.87	-	-	-	-
	WIND	502	99.60	-	-	-	-
							
SIGNATURE OF ASSOCIATION REPRESENTATIVE				FOR ALBERTA ENVIRONMENT USE ONLY			



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 1
BERTHA GANTER FORT MCKAY
MARCH 2017

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT McKAY - BERTHA GANTER (AMS 1)
MARCH 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	64	0	9	0
TRS(ppb) Average	707	36	37	99.87	3	0	1	0
THC(ppm) Average	705	35	39	99.46	4.2	-	2.5	-
NMHC(ppm) Average	705	35	39	99.46	2.178	-	0.167	-
CH4(ppm) Average	705	35	39	99.46	3.1	-	2.3	-
O3 (ppb) Average	708	34	36	99.73	50	0	41	-
NO2 (ppb) Average	705	36	39	99.6	42	0	23	-
NO (ppb) Average	705	36	39	99.6	43	-	13	-
NOX (ppb) Average	705	36	39	99.6	69	-	35	-
NH3 (ppb) Average	664	46	80	95.43	0	0	0	-
PM2.5 (ug/m3) Average	722	2	22	97.31	62.1	-	12.4	0
Wind Speed 10 m (km/h) Average	732	0	12	98.39	33	-	21	-
Wind Direction 10 m (deg) Average	732	0	12	98.39	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100	13.8	-	7.2	-
Temperature 10 m (C) Average	744	0	0	100	13.7	-	7.2	-
Relative Humidity (%) Average	744	0	0	100	97	-	88	-
Precipitation (mm) Total	744	0	0	100	0.9	-	1.9	-
Leaf Wetness (% of range) Average	744	0	0	100	31	-	3	-
Global Solar Radiation (W/m2) Average	744	0	0	100	632	-	178	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER FORT McKAY (AMS 1)
MARCH 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	2.1	6	-	0	0	0	0	2	5	64
TRS (ppb) Average	707	0.6	0	-	0	0	0	0	1	1	3
THC (ppm) Average	705	2.13	0.2	-	1.9	2	2	2.1	2.2	2.4	4.2
NMHC(ppm) Average	705	0.038	0.12	-	0	0	0	0	0	0.1	2.178
CH4(ppm) Average	705	2.09	0.1	-	1.9	2	2	2.1	2.1	2.3	3.1
O3 (ppb) Average	708	24.9	12	-	0	8	16	26	35	39	50
NO2 (ppb) Average	705	9.4	7	-	0	2	4	8	13	18	42
NO (ppb) Average	705	2.8	5	-	0	0	0	1	3	8	43
NOX (ppb) Average	705	12.2	10	-	0	2	5	10	16	26	69
NH3 (ppb) Average	664	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	722	8.16	5	-	0.3	3.5	4.9	7	10.2	14.2	62.1
Wind Speed 10 m (km/h) Average	732	7.8	5	-	0	2	4	7	11	16	33
Wind Direction 10 m (deg) Average	732	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-8.56	10.9	-	-33.9	-23.9	-17.9	-7	0.4	3.9	13.8
Temperature 10 m (C) Average	744	-8.23	10.7	-	-32.7	-23.2	-17.8	-7.1	0.6	4	13.7
Relative Humidity (%) Average	744	65.5	16	-	25	44	54	66	76	87	97
Precipitation (mm) Total	744	-	-	5.52	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	744	0.1	2	-	-1	-1	0	0	0	1	31
Global Solar Radiation (W/m2) Average	744	113.9	166	-	0	0	0	5	195	398	632

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
O3	07 Mar 2017 08:00	07 Mar 2017 08:00	1	Unstable operation - excessive baseline drift
THC	10 Mar 2017 05:00	10 Mar 2017 06:00	2	Unstable operation - excessive baseline drift
PM2.5	13 Mar 2017 13:00	14 Mar 2017 08:00	20	DAS collection error - data not recorded
NH3	10 Mar 2017 05:00	10 Mar 2017 05:00	1	Unstable operation - excessive baseline drift
NH3	01 Mar 2017 10:00	31 Mar 2017 10:00	30	Stabilization after daily span
NO2, NO, NOX	17 Mar 2017 10:00	17 Mar 2017 11:00	2	Maintenance - confirmed calibration points for Ozone
NH3, THC	07 Mar 2017 07:00	07 Mar 2017 08:00	2	Unstable operation - excessive baseline drift
NH3,NO2, NO, NOX,O3,TRS	13 Mar 2017 11:00	13 Mar 2017 11:00	1	Maintenance - manifold cleaning
Wind Speed, Wind Direction	26 Mar 2017 23:00	27 Mar 2017 10:00	12	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Fort McKay - Bertha Ganter - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 64 ppb on Mar 2 12:00	Maximum Daily Average: 9.4 ppb on Mar 2		Hours of Data:	709
Minimum Value: 0 ppb on Mar 1 01:00	Minimum Daily Average: 0.0 ppb on Mar 7		Hours of Missing Data:	35
Maximum Diurnal Average: 7.6 ppb at hour 12	Minimum Diurnal Average: 0.4 ppb at hour 7		Hours of Calibration:	35
Monthly Average: 2.1 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 2 P ₉₀ = 5 P ₉₉ = 29		Percent Operational Time:	100.0

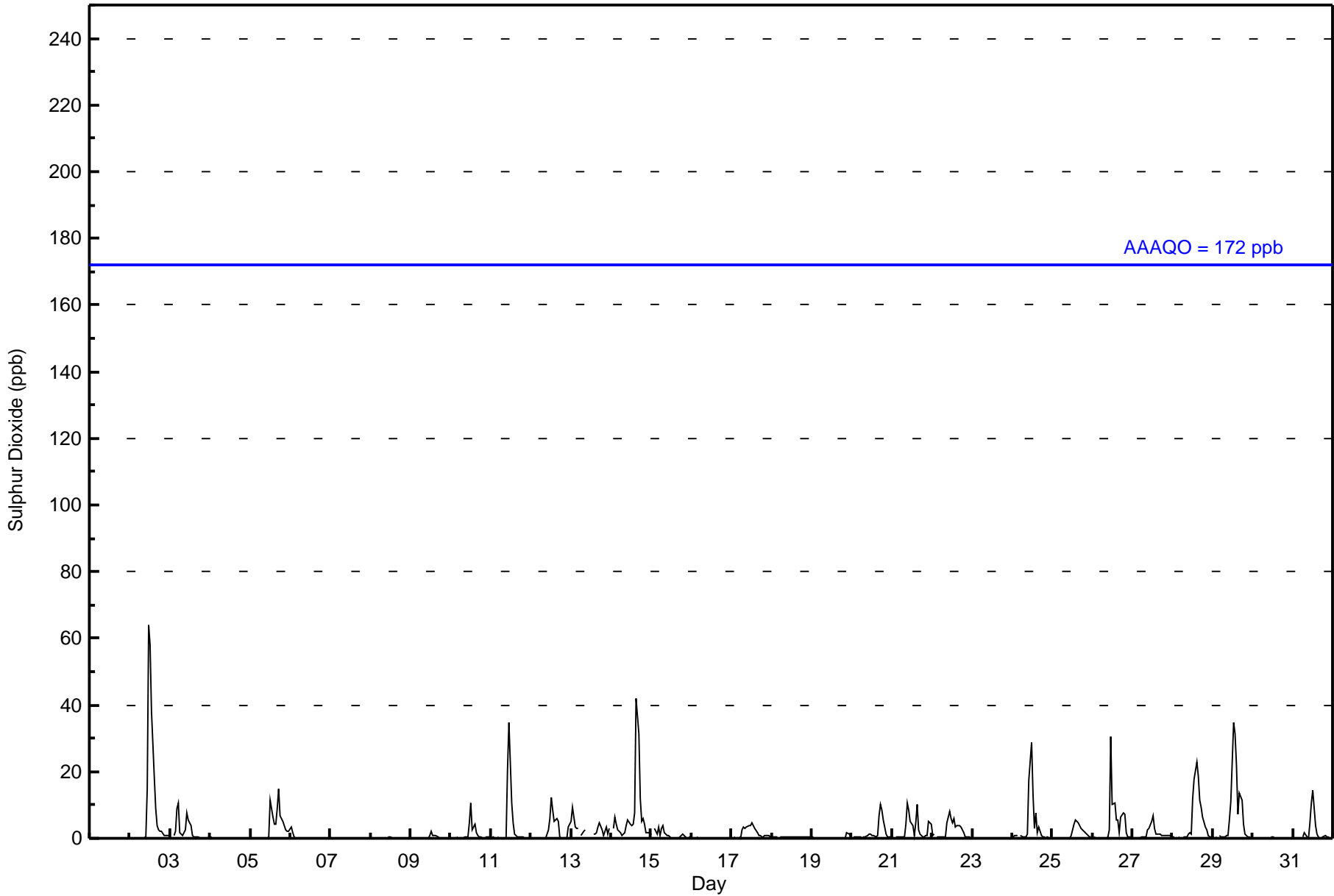
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Mar	Z	0	0	0	0	0	0	0	0	1	15	64	58	38	18	9	4	3	2	2	1	1	1	1	9.4	64
3-Mar	1	Z	1	2	9	11	2	1	2	3	7	6	4	1	1	0	1	0	0	0	0	0	0	2.2	11	
4-Mar	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	
5-Mar	0	0	0	Z	0	0	0	0	0	0	1	12	6	4	4	9	15	7	5	4	2	2	2	3.2	15	
6-Mar	3	2	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3	
7-Mar	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	
8-Mar	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	
9-Mar	0	Z	0	0	0	0	0	0	0	0	1	2	1	1	1	1	1	0	0	0	0	0	0	0.3	2	
10-Mar	0	0	Z	0	0	0	0	0	0	0	5	11	3	4	2	1	0	0	0	0	0	0	0	1.2	11	
11-Mar	0	0	0	Z	0	0	0	0	0	0	20	35	11	5	1	1	0	0	0	0	0	0	0	3.3	35	
12-Mar	0	0	0	0	Z	0	0	0	0	0	2	6	12	8	5	6	5	1	0	0	0	3	4	2.3	12	
13-Mar	5	9	3	3	3	Z	1	2	3	C	C	C	C	1	1	2	3	5	3	1	2	3	1	2.8	9	
14-Mar	Z	3	6	4	3	2	1	1	1	4	5	4	4	4	7	42	31	12	5	6	4	2	2	6.7	42	
15-Mar	1	Z	3	1	4	1	3	4	2	1	1	0	0	0	0	0	0	1	1	0	0	0	0	1.1	4	
16-Mar	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	
17-Mar	0	0	0	Z	0	0	2	3	3	3	4	4	5	4	3	2	1	1	1	1	1	1	1	1.7	5	
18-Mar	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
19-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0.2	2	
20-Mar	Z	0	1	0	0	0	0	0	0	1	1	1	1	1	1	1	7	10	9	6	1	1	0	1.9	10	
21-Mar	1	Z	1	1	1	0	0	1	4	10	9	5	4	1	5	10	2	1	0	0	1	1	5	4	2.9	10
22-Mar	1	1	Z	0	0	0	0	0	1	5	8	6	5	6	3	4	4	3	2	2	0	0	0	2.3	8	
23-Mar	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	
24-Mar	0	1	1	1	Z	1	0	0	0	1	17	29	13	3	8	2	3	1	0	0	0	0	0	3.6	29	
25-Mar	0	0	0	0	0	Z	0	0	0	0	1	3	4	5	5	4	3	2	2	1	1	1	1	1.4	5	
26-Mar	Z	0	0	0	0	0	0	0	0	0	3	31	10	10	5	5	2	6	8	7	2	1	0	4.0	31	
27-Mar	0	Z	0	0	0	0	0	0	0	2	3	5	7	3	1	1	1	1	1	1	1	1	1	1.4	7	
28-Mar	1	0	Z	0	0	0	0	0	0	1	2	1	12	18	23	19	11	9	6	4	3	1	0	4.9	23	
29-Mar	0	0	0	Z	1	0	0	1	1	1	6	11	35	31	22	7	13	11	4	1	1	0	0	6.5	35	
30-Mar	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	
31-Mar	0	0	0	0	0	Z	0	2	0	0	4	10	15	4	1	0	0	0	0	1	0	0	0	1.8	15	
	0.6	0.7	0.7	0.6	0.8	0.7	0.4	0.5	0.6	1.2	3.6	7.6	7.4	4.9	3.9	4.0	3.4	2.7	1.7	1.3	0.8	0.6	0.7	0.7	Diurnal Average	
	5	9	6	4	9	11	3	4	4	10	20	64	58	38	23	42	31	15	9	7	4	3	5	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 - Bertha Ganter - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	677	95.49	95.49
11 - 20	20	2.82	98.31
21 - 60	11	1.55	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: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - March 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	190	46	21	17	9	17	29	86	59	16	11	8	14	38	44	61	666
11 - 20	1	0	0	1	1	1	0	12	2	1	0	0	0	0	1	0	20
21 - 60	0	0	0	2	0	0	0	5	3	1	0	0	0	0	0	0	11
61 - 110	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	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	191	46	21	20	10	18	29	104	64	18	11	8	14	38	45	61	698

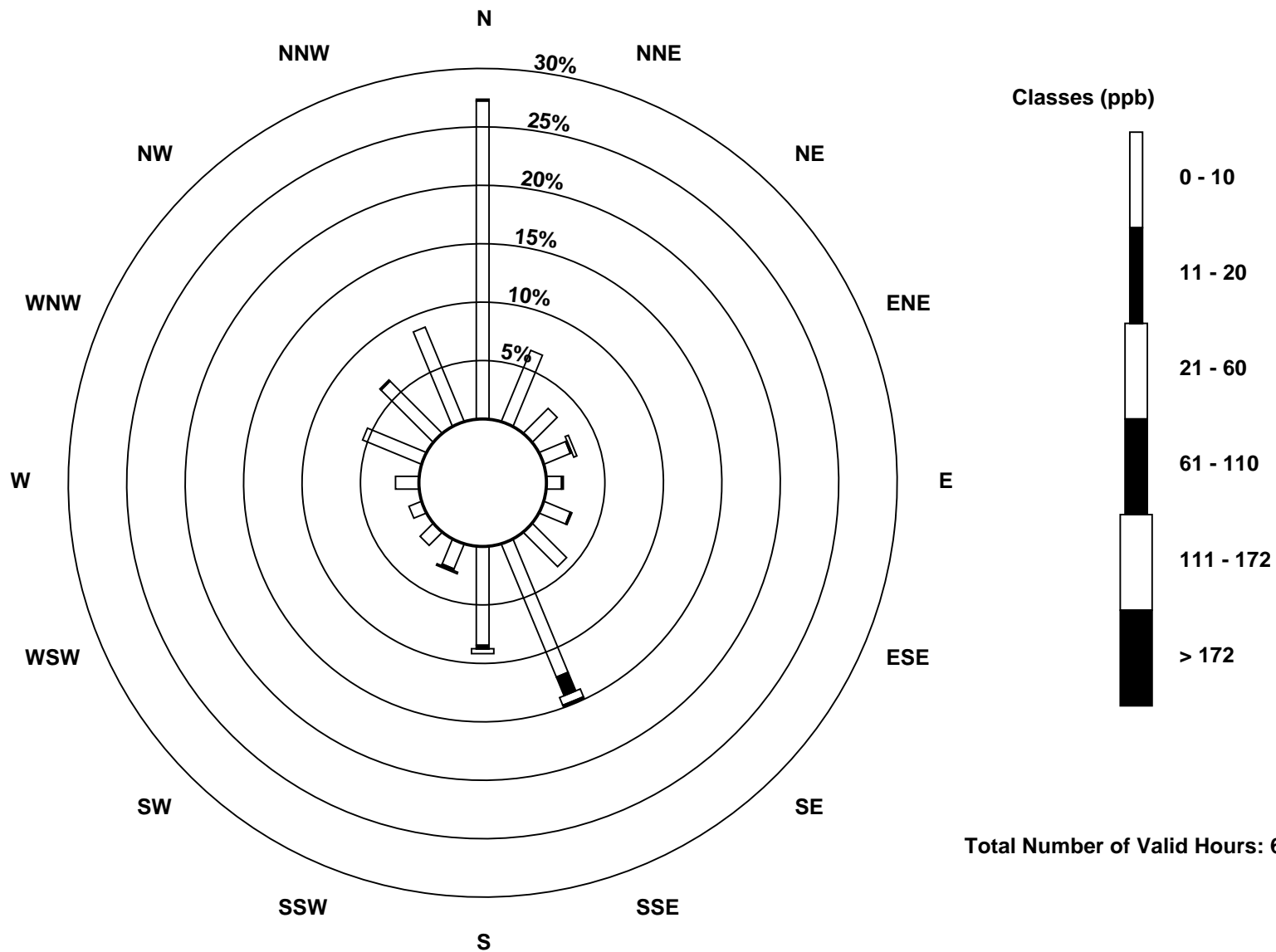
Total Number of Valid Hours: 698

Total Number of Hours: 744

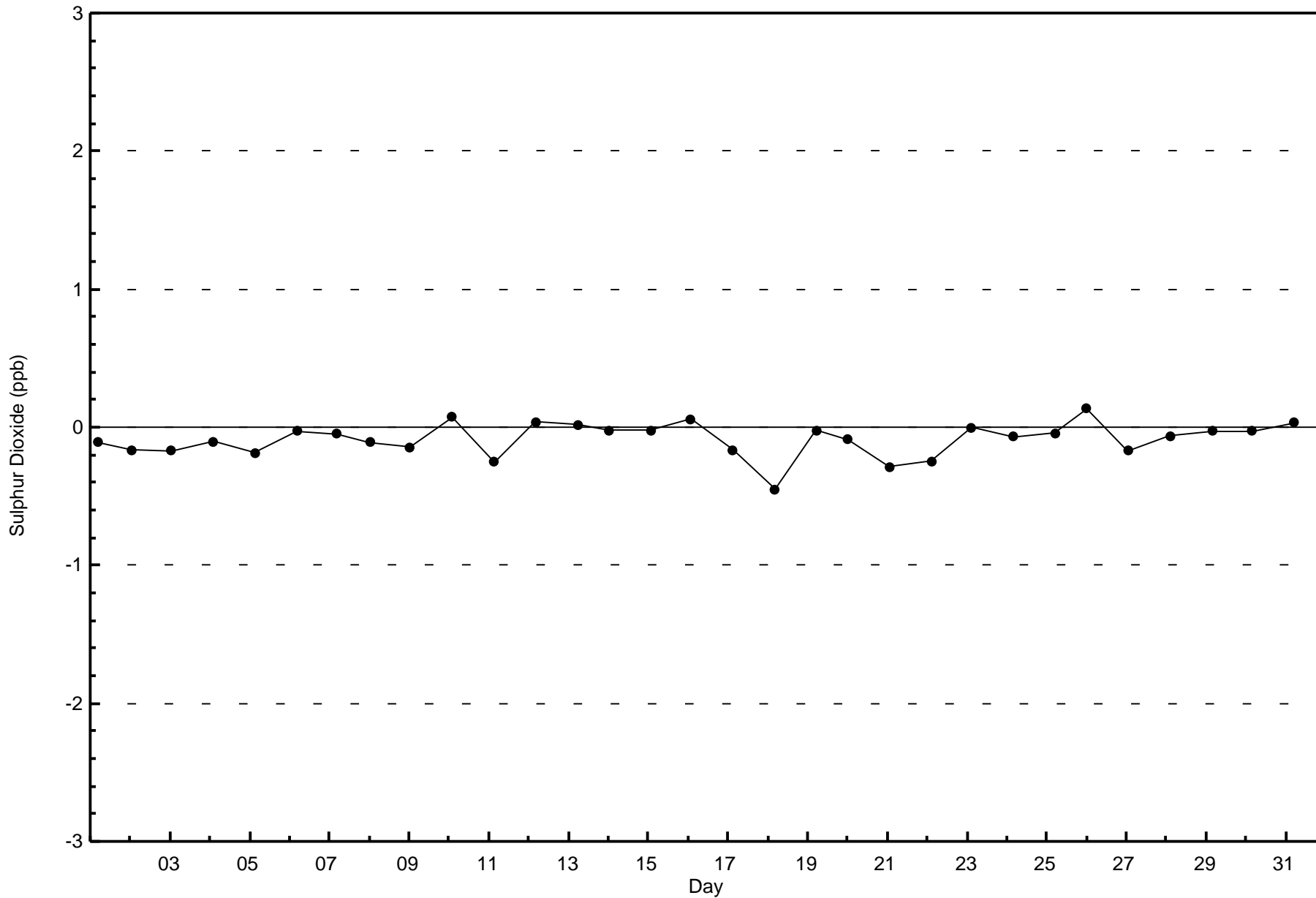


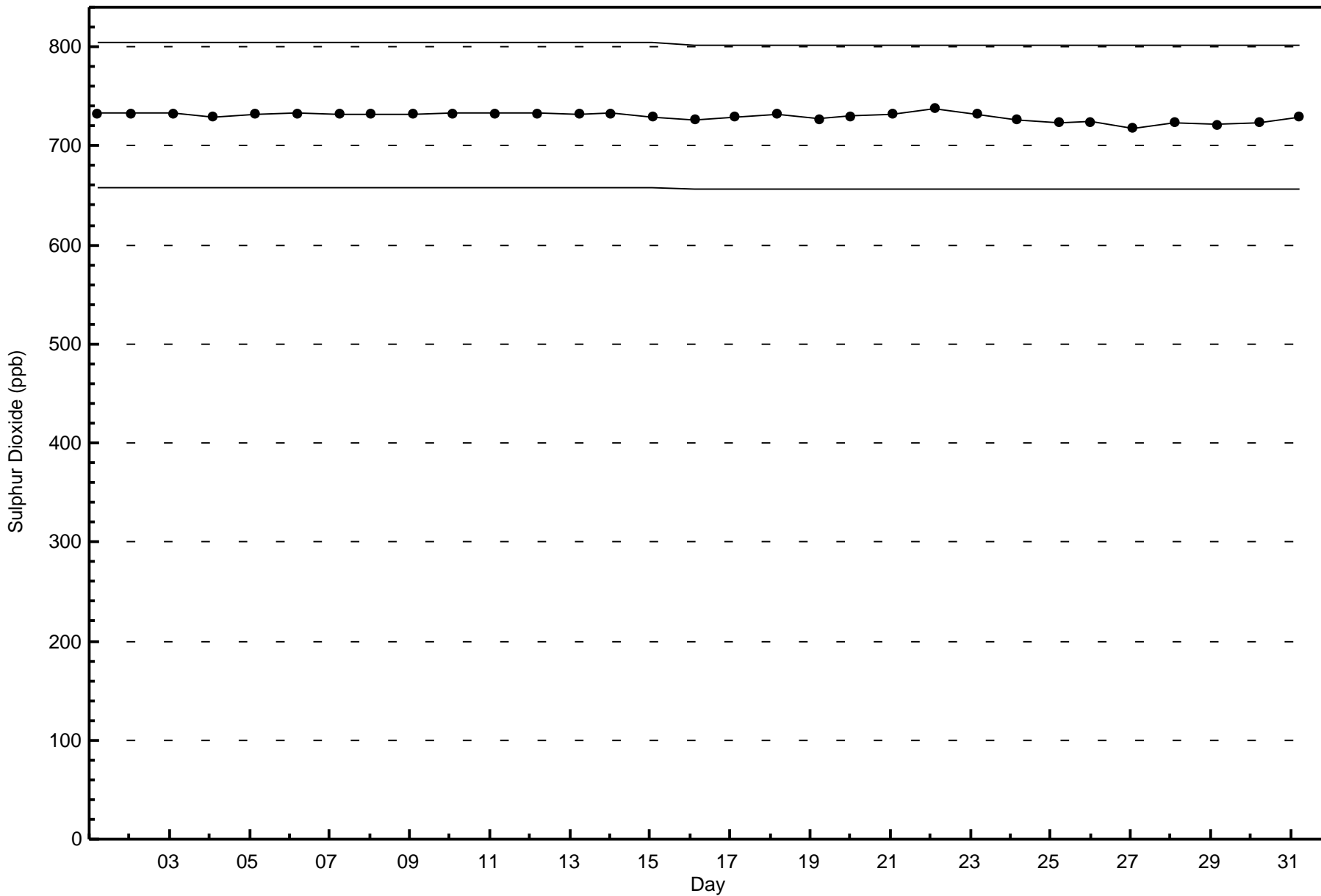
Wood Buffalo Environmental Association
Wind Rose Mar 2017

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



Total Number of Valid Hours: 698







Wood Buffalo Environmental Association

Summary of Hour Averages

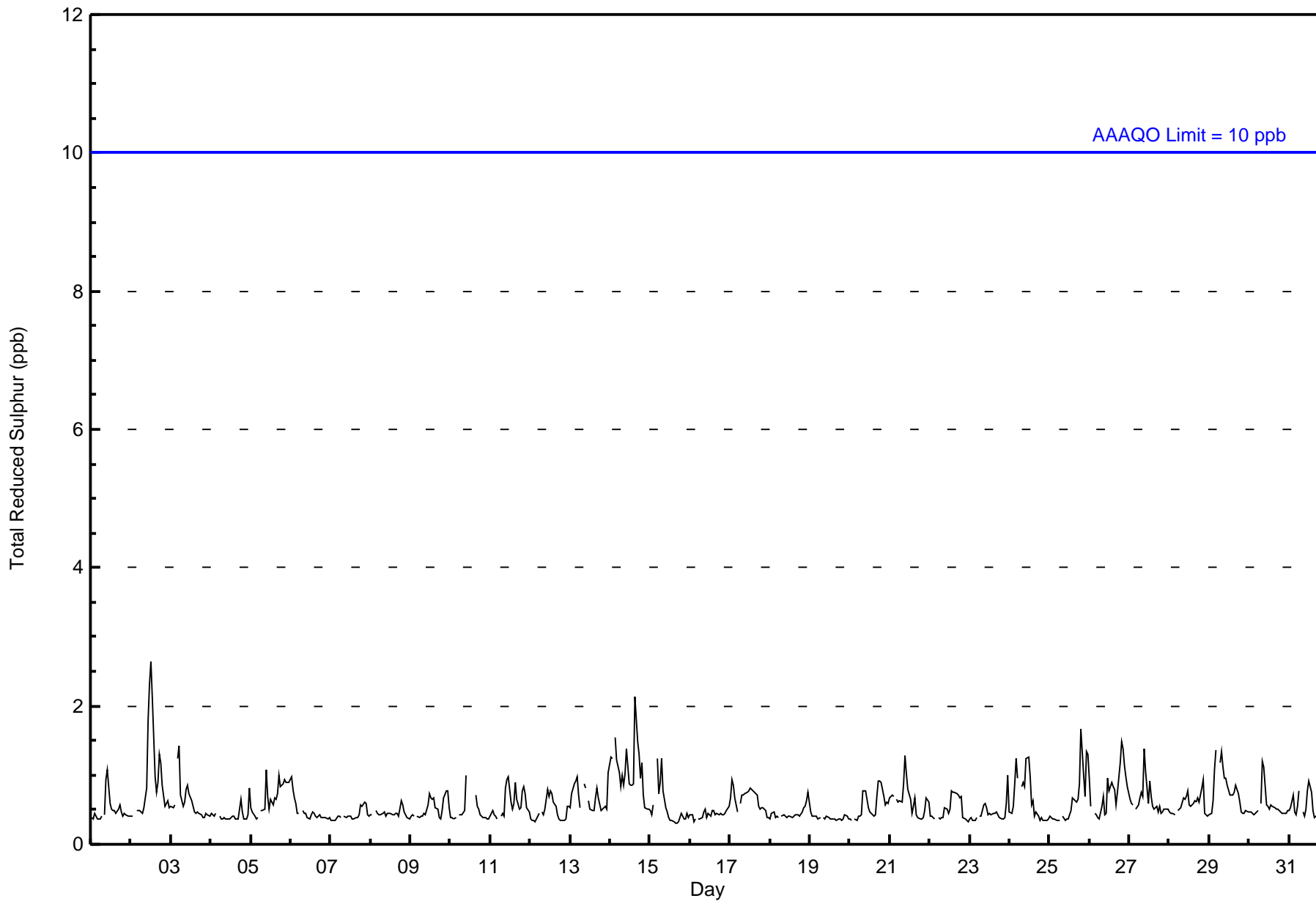
Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3 ppb on Mar 2 13:00 Maximum Daily Average: 1.0 ppb on Mar 14		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 Mar 15 16:00 Maximum Diurnal Average: 0.7 ppb at hour 11 Monthly Average: 0.6 ppb		Minimum Daily Average: 0.4 ppb on Mar 19 Minimum Diurnal Average: 0.5 ppb at hour 3 Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 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-Mar	0	0	0	0	0	0	0	Z	0	1	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0.5	1
2-Mar	0	0	Z	0	0	0	0	0	1	1	2	2	3	2	1	1	1	1	1	1	1	1	1	1	0.9	3
3-Mar	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.6	1	
4-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.4	1	
5-Mar	1	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1	
6-Mar	1	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
7-Mar	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0.4	1	
8-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.4	1	
9-Mar	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	1	1	1	0.5	1	
10-Mar	0	0	0	0	Z	0	0	0	0	1	C	C	C	C	C	1	1	1	0	0	0	0	0	0.5	1	
11-Mar	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
12-Mar	0	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0.5	1	
13-Mar	1	1	1	1	1	1	1	Z	1	1	M	1	1	0	0	1	1	1	0	1	1	1	0	0.7	1	
14-Mar	1	1	Z	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1.0	2	
15-Mar	0	0	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
16-Mar	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
17-Mar	1	1	1	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.7	1	
18-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1	
19-Mar	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	
20-Mar	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	0.6	1	
21-Mar	1	1	1	Z	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	1	0.6	1	
22-Mar	0	0	0	0	Z	0	0	0	0	1	1	0	1	1	1	1	1	1	1	1	0	0	0	0.5	1	
23-Mar	0	0	0	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0.5	1	
24-Mar	0	0	1	1	1	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.7	1	
25-Mar	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	2	1	1	0.6	2	
26-Mar	1	1	Z	0	0	0	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1	
27-Mar	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	1	0.6	1	
28-Mar	0	0	0	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.6	1	
29-Mar	0	0	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.8	1	
30-Mar	0	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6	1	
31-Mar	0	1	1	0	0	1	1	Z	0	0	1	1	1	1	0	0	0	0	0	1	1	0	0	0.5	1	
																								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

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	706	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: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - March 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	191	45	21	19	9	17	29	105	65	18	11	7	13	38	48	59	695
3 - 4	0	0	0	0	0	0	0	1	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	191	45	21	19	9	17	29	106	65	18	11	7	13	38	48	59	696

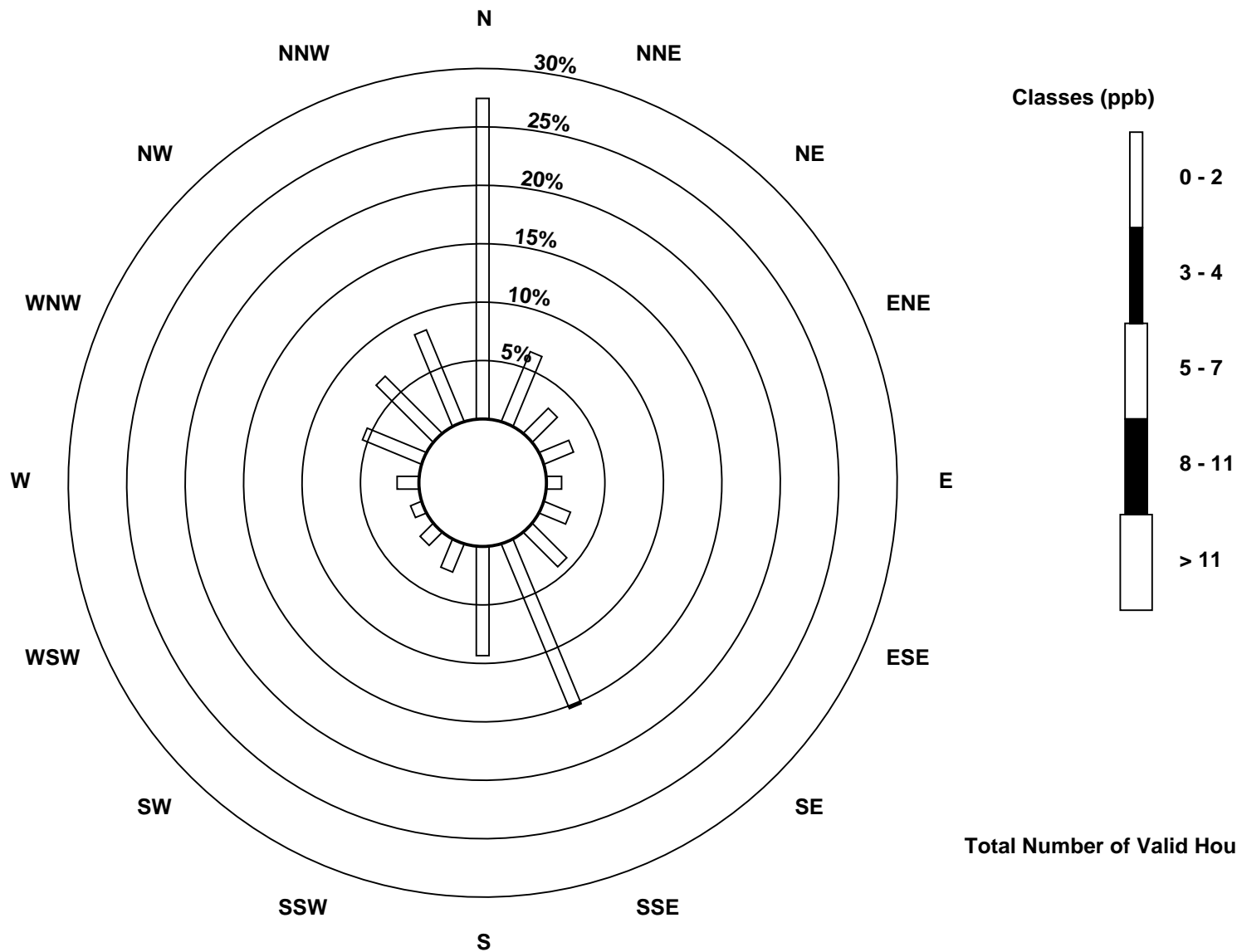
Total Number of Valid Hours: 696

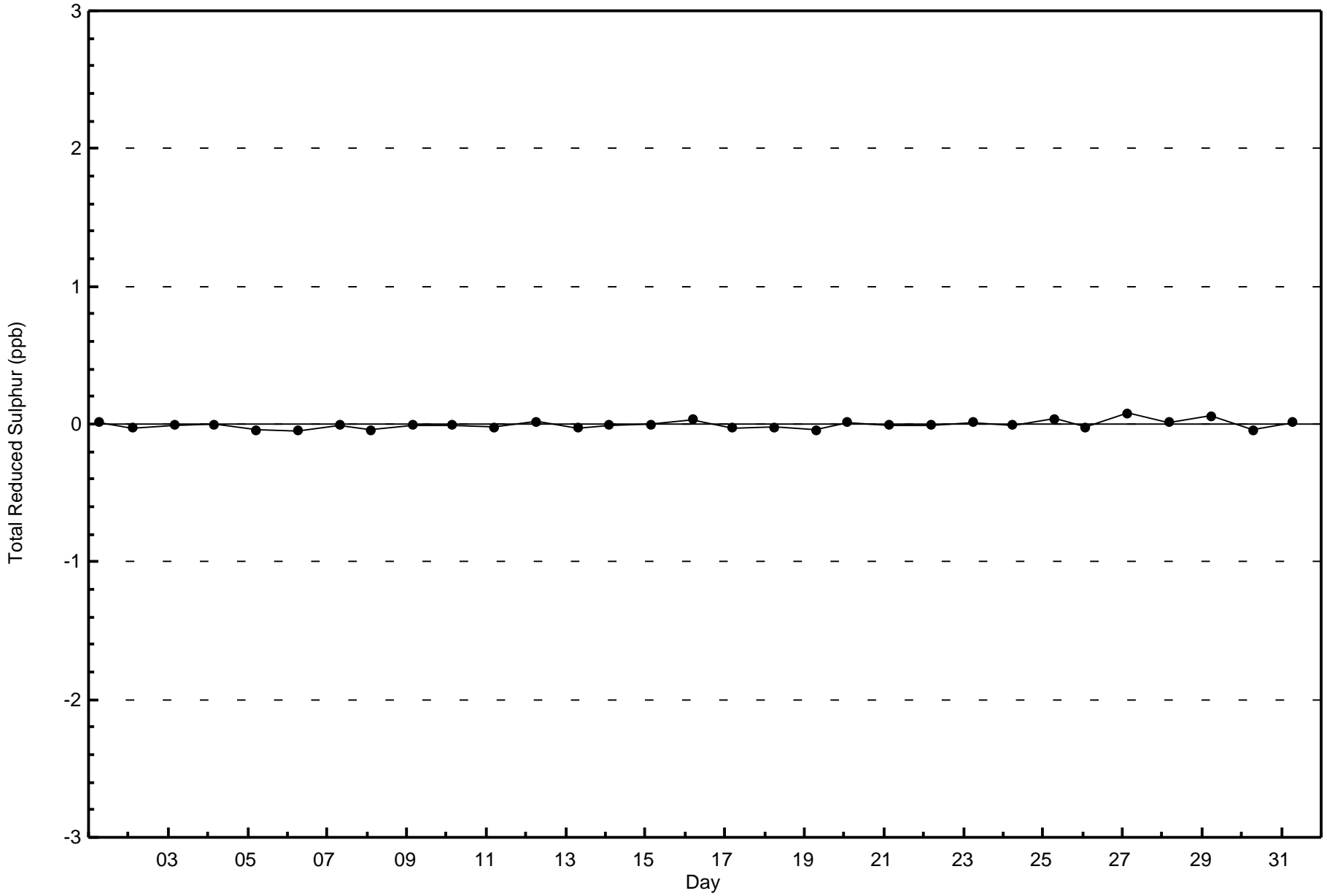
Total Number of Hours: 744

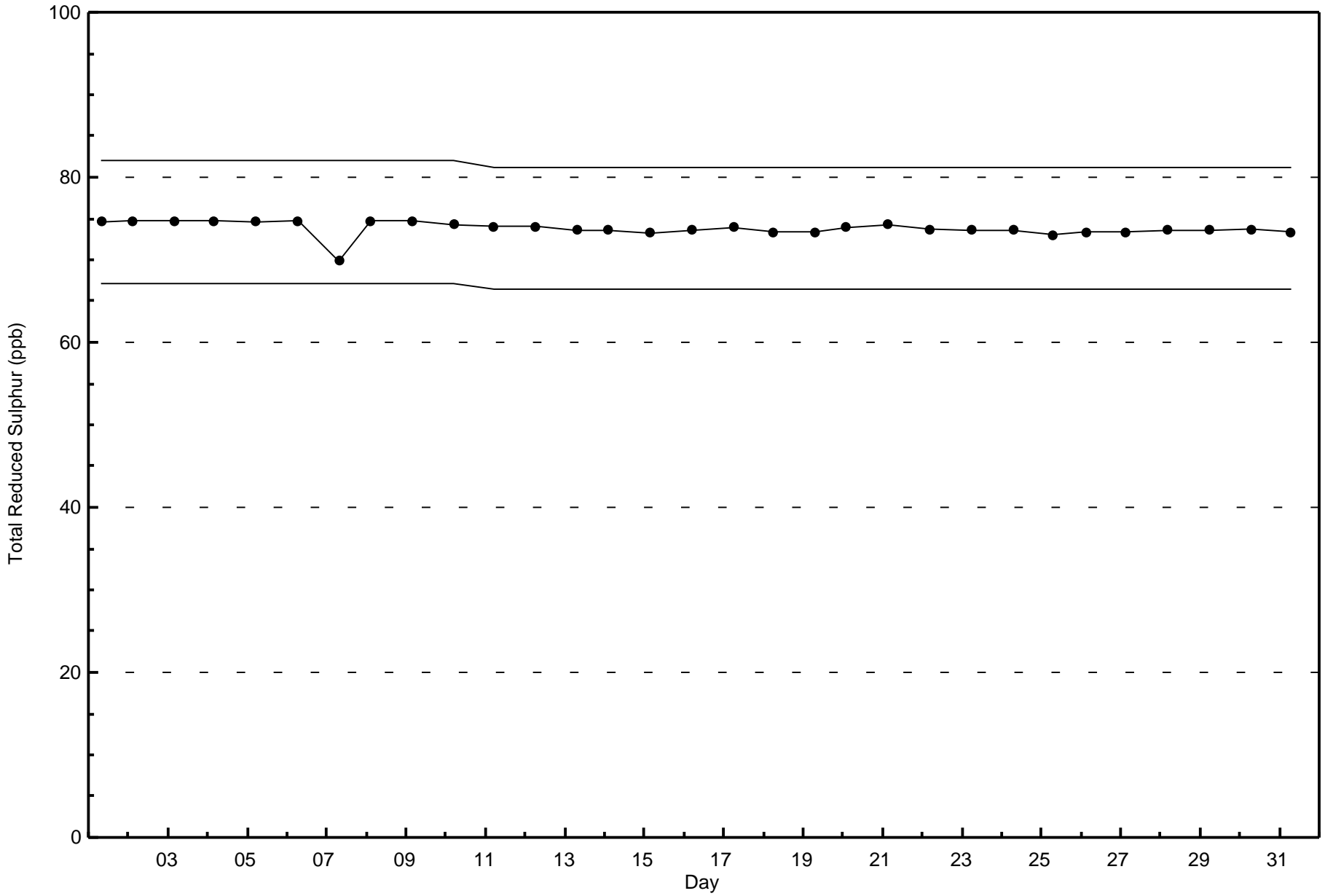


Wood Buffalo Environmental Association
Wind Rose Mar 2017

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









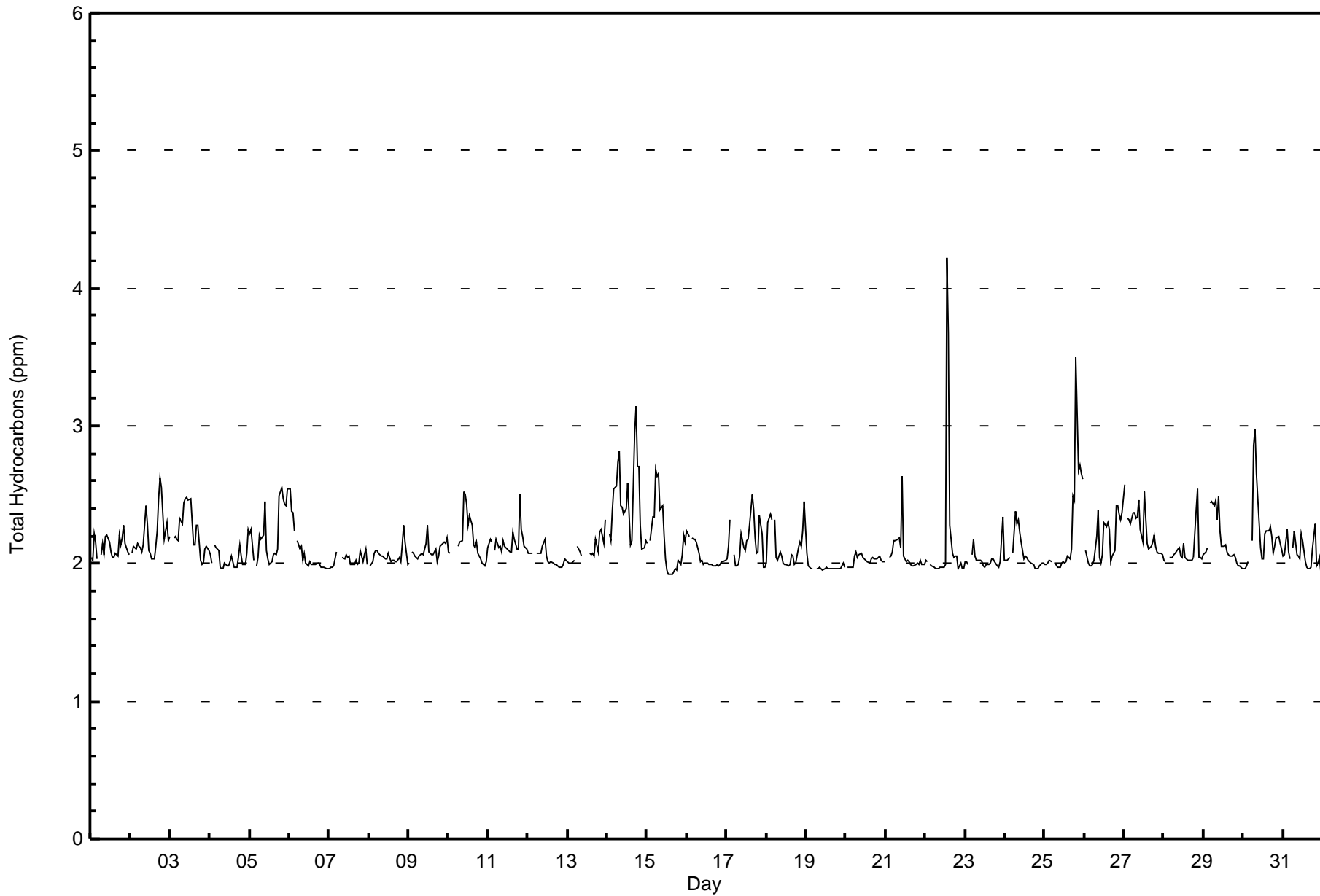
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter - March 2017

Maximum Value: 4.2 ppm on Mar 22 14:00																	Maximum Daily Average: 2.5 ppm on Mar 14									Hours in Service: 744	
Minimum Value: 1.9 ppm on Mar 15 15:00																	Minimum Daily Average: 2.0 ppm on Mar 19									Hours of Data: 705	
Maximum Diurnal Average: 2.2 ppm at hour 20																	Minimum Diurnal Average: 2.1 ppm at hour 2									Hours of Missing Data: 39	
Monthly Average: 2.13 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 = 2.8									Hours of Calibration: 35	
																										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-Mar	2.0	2.0	2.2	2.2	2.0	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.0	2.0	2.1	2.0	2.2	2.1	2.2	2.3	2.1	2.1	2.1	2.1	2.3	
2-Mar	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.3	2.1	2.1	2.0	2.0	2.1	2.2	2.5	2.6	2.6	2.2	2.2	2.3	2.2	2.2	2.6	
3-Mar	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.5	2.5	2.5	2.5	2.3	2.1	2.1	2.3	2.3	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.5	
4-Mar	2.1	2.0	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.2	2.2	2.0	2.2	
5-Mar	2.2	2.2	2.0	Z	2.0	2.0	2.2	2.2	2.2	2.4	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.5	2.6	2.5	2.4	2.4	2.5	2.2	2.6
6-Mar	2.5	2.4	2.4	2.2	Z	2.2	2.1	2.1	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	2.5	
7-Mar	2.0	2.0	2.0	2.0	2.1	Z	UO	UO	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.0	2.0	2.1	
8-Mar	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.2	2.0	2.1	2.3	
9-Mar	2.0	Z	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.2	2.1	2.2	2.1	2.3	
10-Mar	2.1	2.1	Z	2.1	UO	UO	2.1	2.2	2.2	2.5	2.5	2.4	2.3	2.3	2.3	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.2	2.5	
11-Mar	2.1	2.2	2.2	Z	2.1	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.5	2.2	2.2	2.1	2.1	2.2	2.5	
12-Mar	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	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	2.2	
13-Mar	2.0	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.1	C	C	C	C	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.3	2.1	2.1	2.3	
14-Mar	Z	2.2	2.2	2.4	2.5	2.6	2.7	2.8	2.4	2.4	2.4	2.4	2.6	2.4	2.1	2.2	2.9	3.1	2.7	2.3	2.1	2.1	2.2	2.2	2.5	3.1	
15-Mar	2.1	Z	2.2	2.3	2.3	2.7	2.6	2.7	2.4	2.4	2.2	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.7	
16-Mar	2.2	2.2	Z	2.2	2.2	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	2.0	2.0	2.0	2.0	2.1	2.2	
17-Mar	2.0	2.1	2.3	Z	2.1	2.0	2.0	2.0	2.1	2.2	2.1	2.1	2.2	2.2	2.3	2.5	2.4	2.2	2.1	2.1	2.3	2.2	2.0	2.0	2.1	2.5	
18-Mar	2.0	2.3	2.4	2.3	Z	2.3	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.2	2.1	2.2	2.4	2.1	2.4	
19-Mar	2.1	2.0	2.0	2.0	2.0	Z	2.0	2.0	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	2.1	
20-Mar	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	
21-Mar	2.0	Z	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.6	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	2.6	
22-Mar	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	4.2	3.7	2.3	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.2	4.2	
23-Mar	2.0	2.0	2.0	Z	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	2.0	2.2	2.3	2.0	2.0	2.3	
24-Mar	2.0	2.0	2.0	2.0	Z	2.1	2.4	2.3	2.3	2.2	2.2	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	2.1	2.4	
25-Mar	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	2.0	2.0	2.1	2.0	2.1	2.5	2.5	3.5	2.7	2.7	2.6	2.2	3.5	
26-Mar	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.2	2.4	2.0	2.0	2.1	2.3	2.3	2.3	2.2	2.0	2.1	2.1	2.4	2.4	2.4	2.3	2.4	2.2	2.4	
27-Mar	2.6	Z	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.5	2.3	2.2	2.5	2.3	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.3	2.6	
28-Mar	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.4	2.5	2.0	2.0	2.0	2.1	2.5	
29-Mar	2.1	2.1	2.1	Z	2.4	2.5	2.4	2.5	2.3	2.5	2.2	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	2.2	2.5	
30-Mar	2.0	2.0	2.0	2.0	Z	2.2	2.9	3.0	2.7	2.5	2.1	2.0	2.0	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.2	3.0	
31-Mar	2.1	2.1	2.2	2.1	2.0	Z	2.1	2.2	2.1	2.1	2.0	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.0	2.0	1.9	2.1	2.3	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerspan						C - Calibration						UO - Unstable Operation															





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	305	43.26	43.26
2.1 - 3.0	396	56.17	99.43
3.1 - 10.0	4	0.57	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
Fort McKay - Bertha Ganter - March 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	90	27	9	3	5	11	21	55	13	4	2	2	6	17	19	21	305
2.1 - 3.0	98	19	12	16	5	7	8	48	50	14	9	6	8	20	25	40	385
3.1 - 10.0	1	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	4
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	189	46	21	20	10	18	29	104	64	18	11	8	14	37	44	61	694

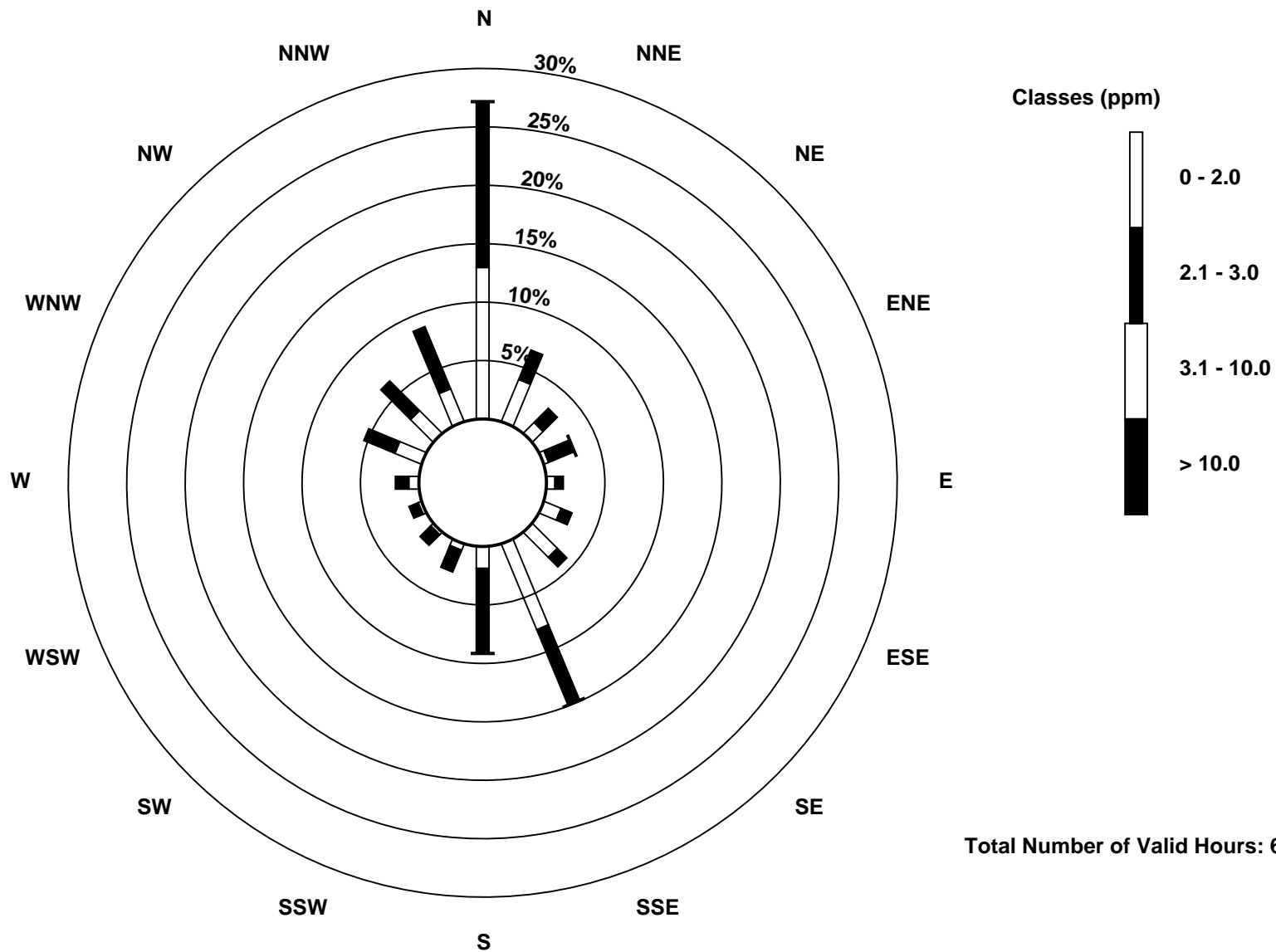
Total Number of Valid Hours: 694

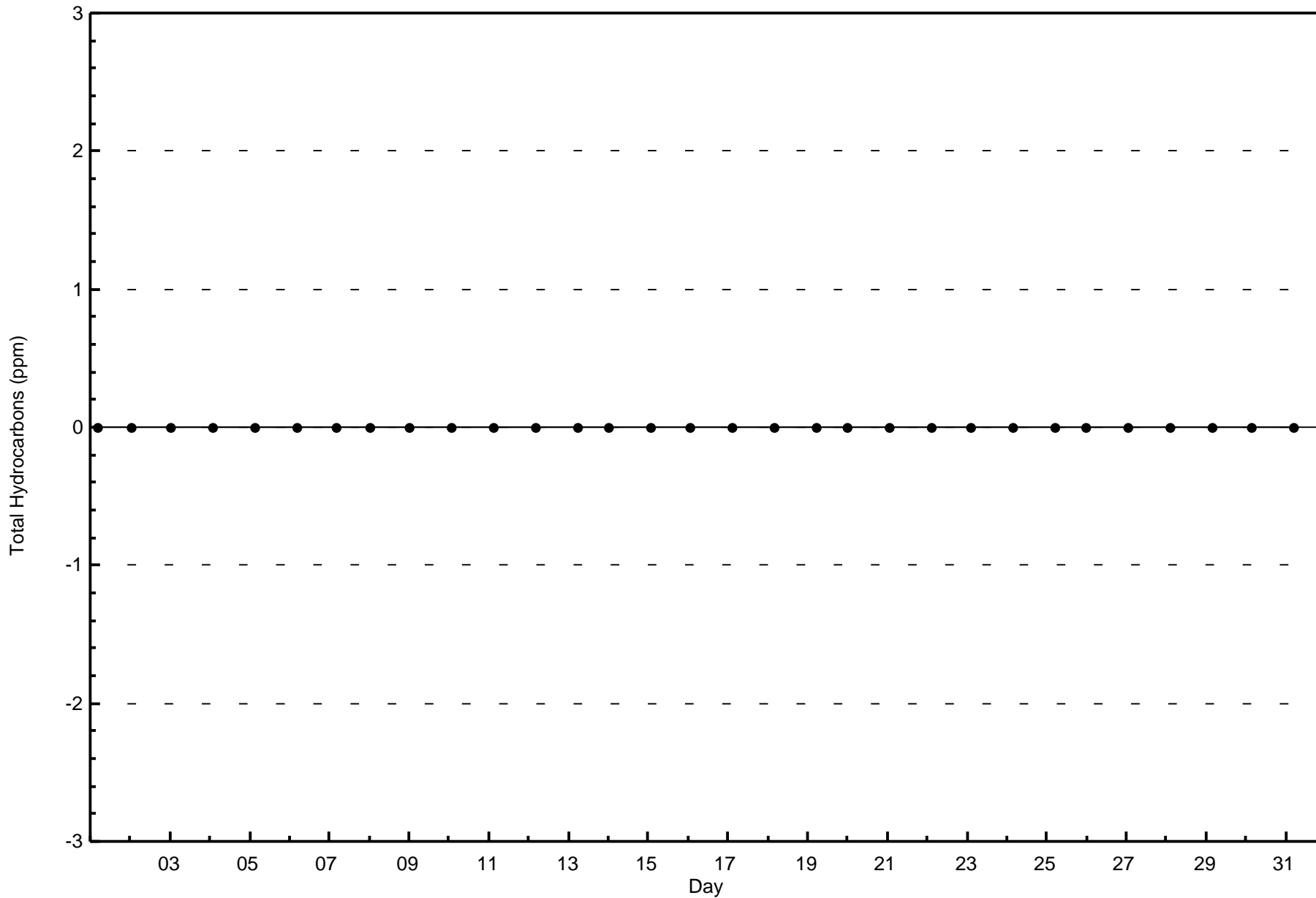
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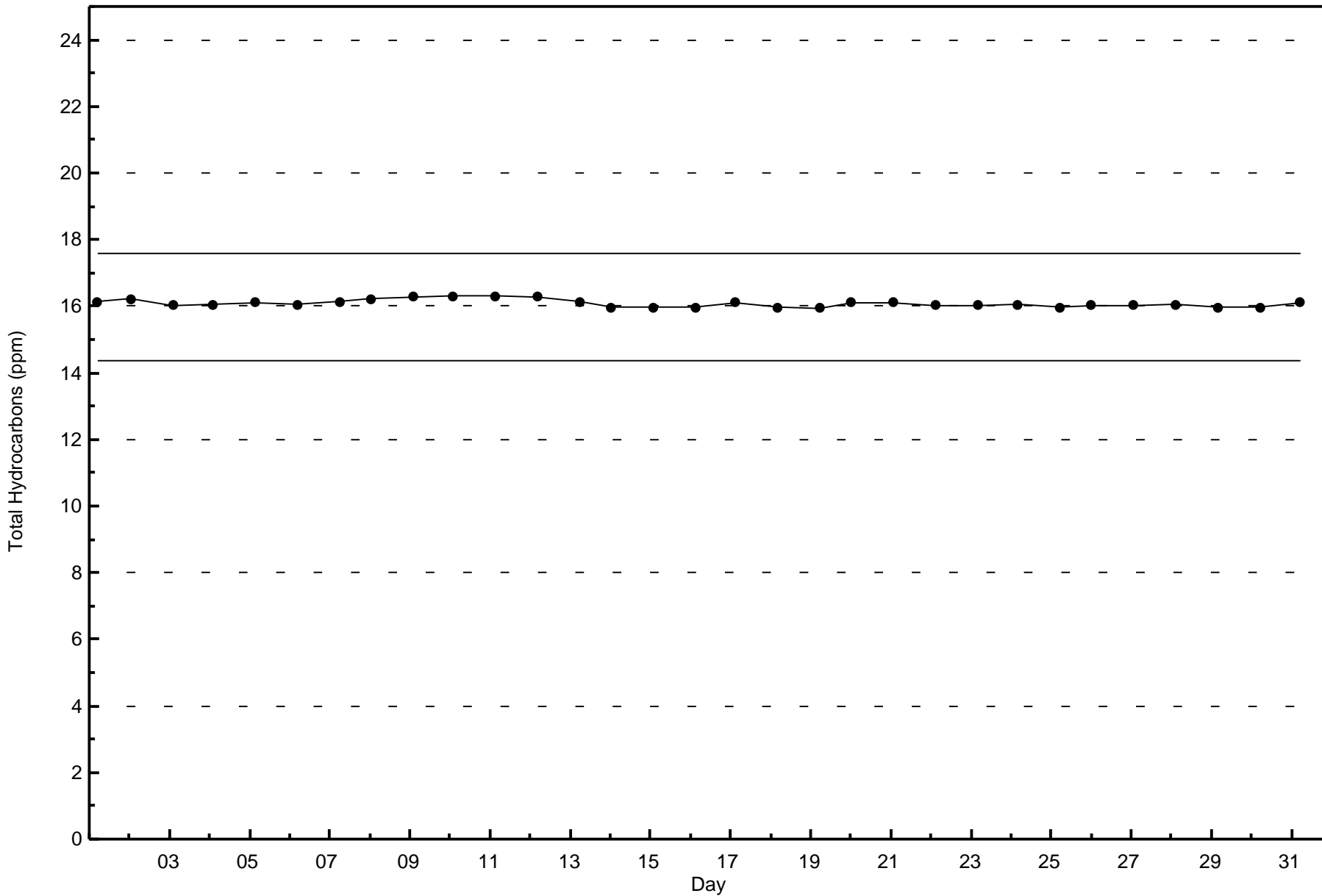


Wood Buffalo Environmental Association
Wind Rose Mar 2017

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



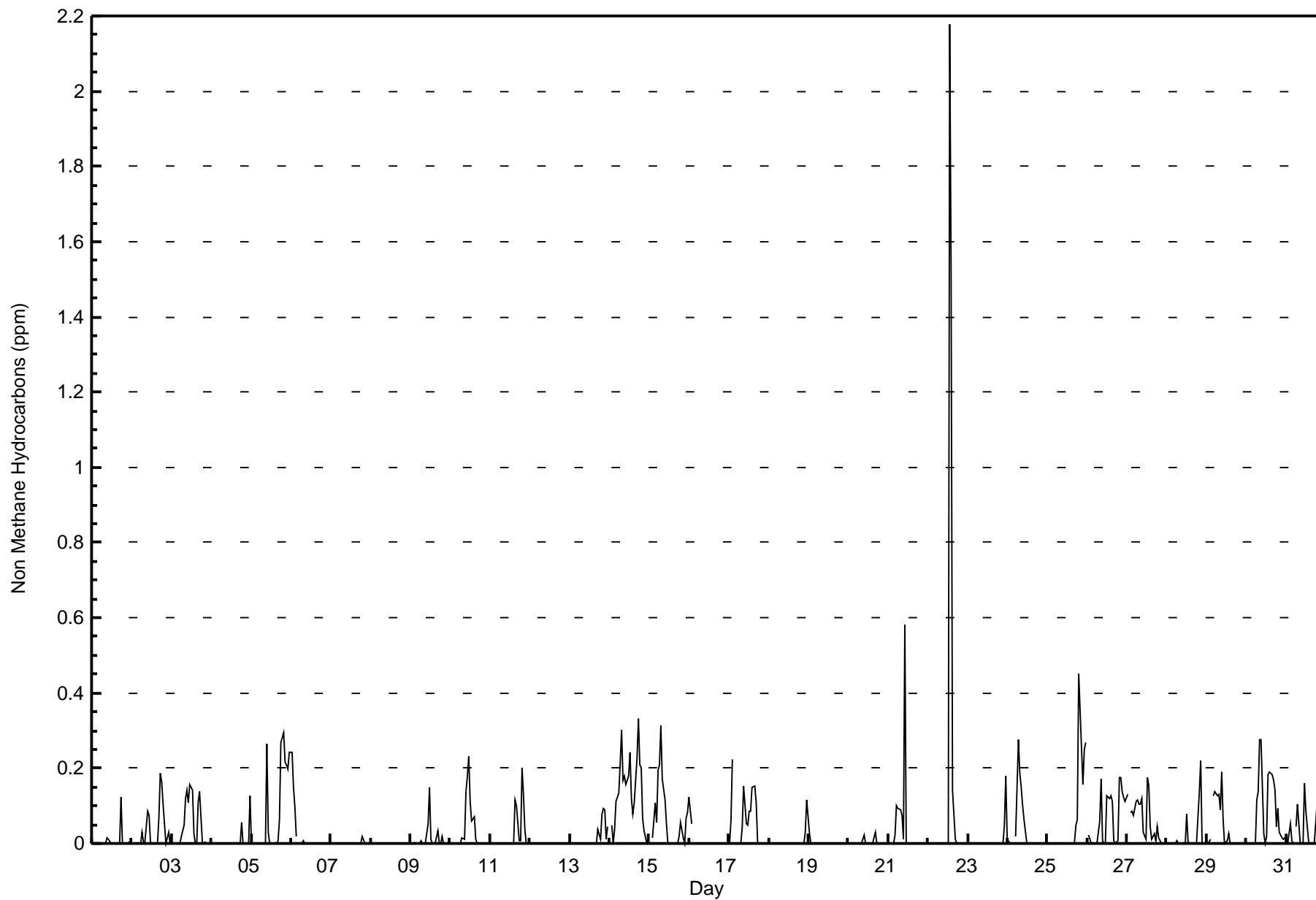






Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	481	68.23	68.23
0.006 - 0.05	80	11.35	79.57
0.06 - 0.1	82	11.63	91.21
> 0.1	62	8.79	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - March 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	139	33	13	7	6	16	22	74	28	11	6	5	10	28	36	47	481
0.006 - 0.05	22	5	3	3	1	2	4	8	12	4	3	3	1	1	4	4	80
0.06 - 0.1	12	8	3	2	2	0	1	12	16	1	1	0	2	7	0	4	71
> 0.1	16	0	2	8	1	0	2	10	8	2	1	0	1	1	4	6	62
Totals	189	46	21	20	10	18	29	104	64	18	11	8	14	37	44	61	694

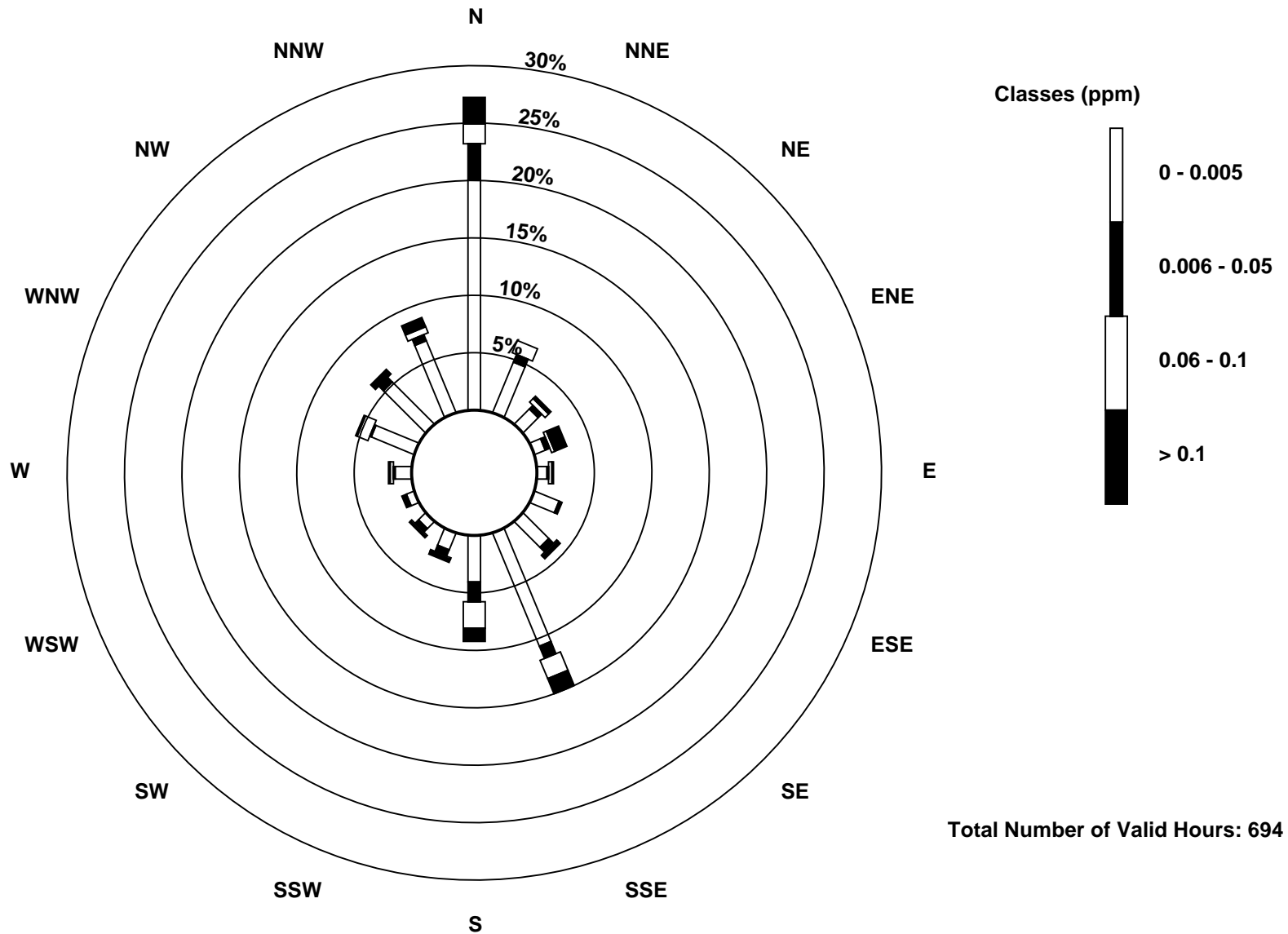
Total Number of Valid Hours: 694

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

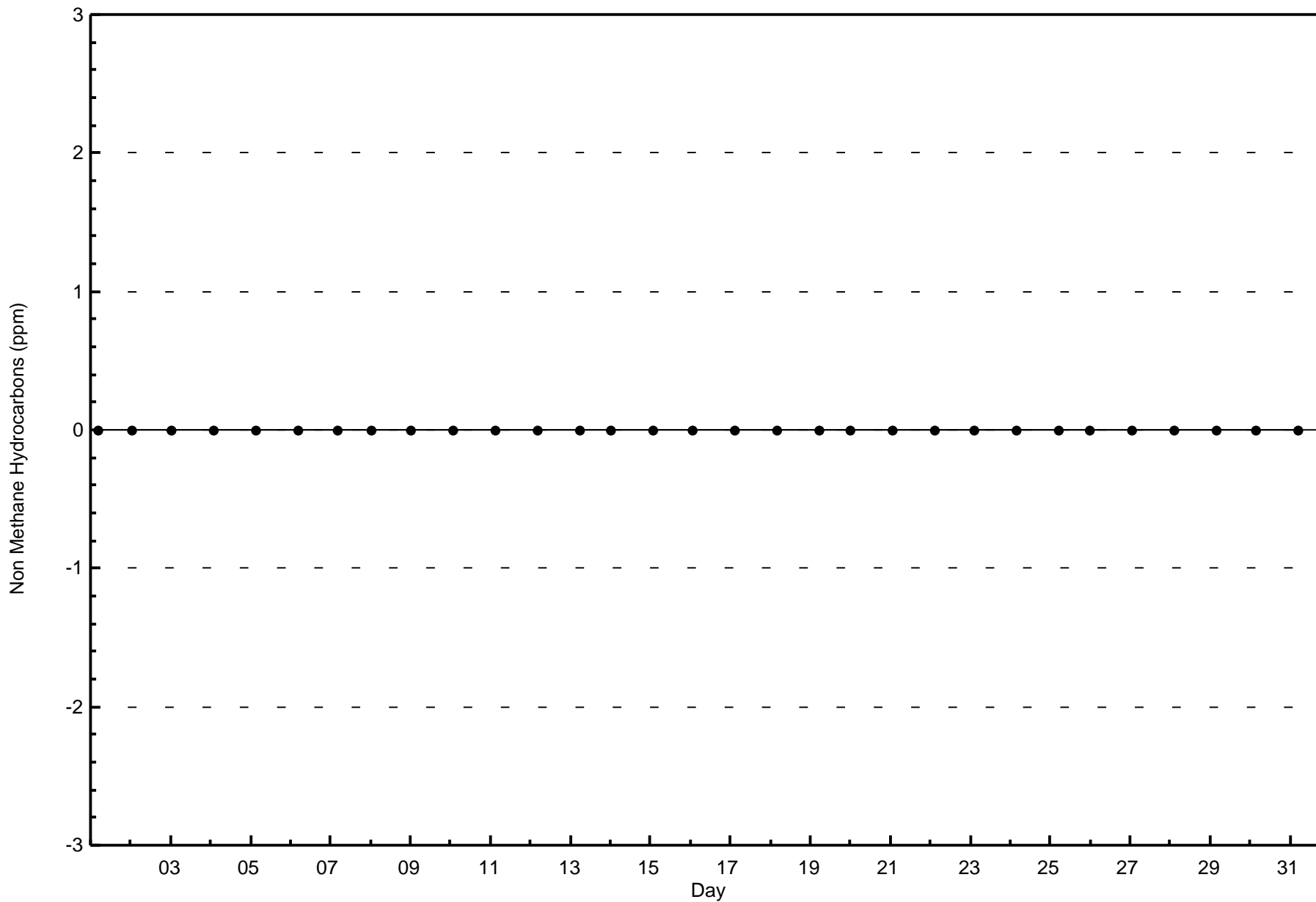
Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter (AMS 1)





Wood Buffalo Environmental Association
Zero Responses

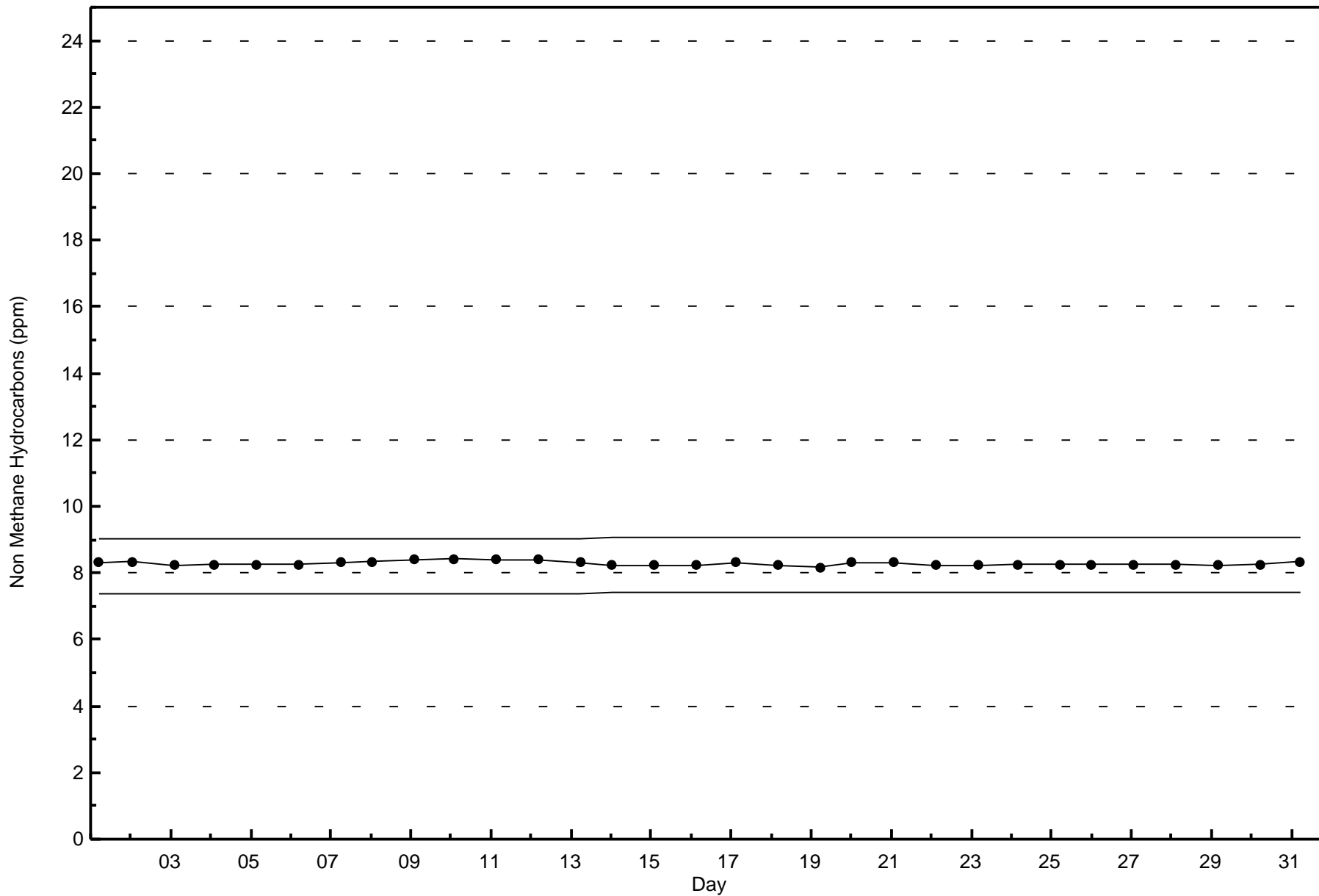
Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - March 2017





Wood Buffalo Environmental Association
Span Responses

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





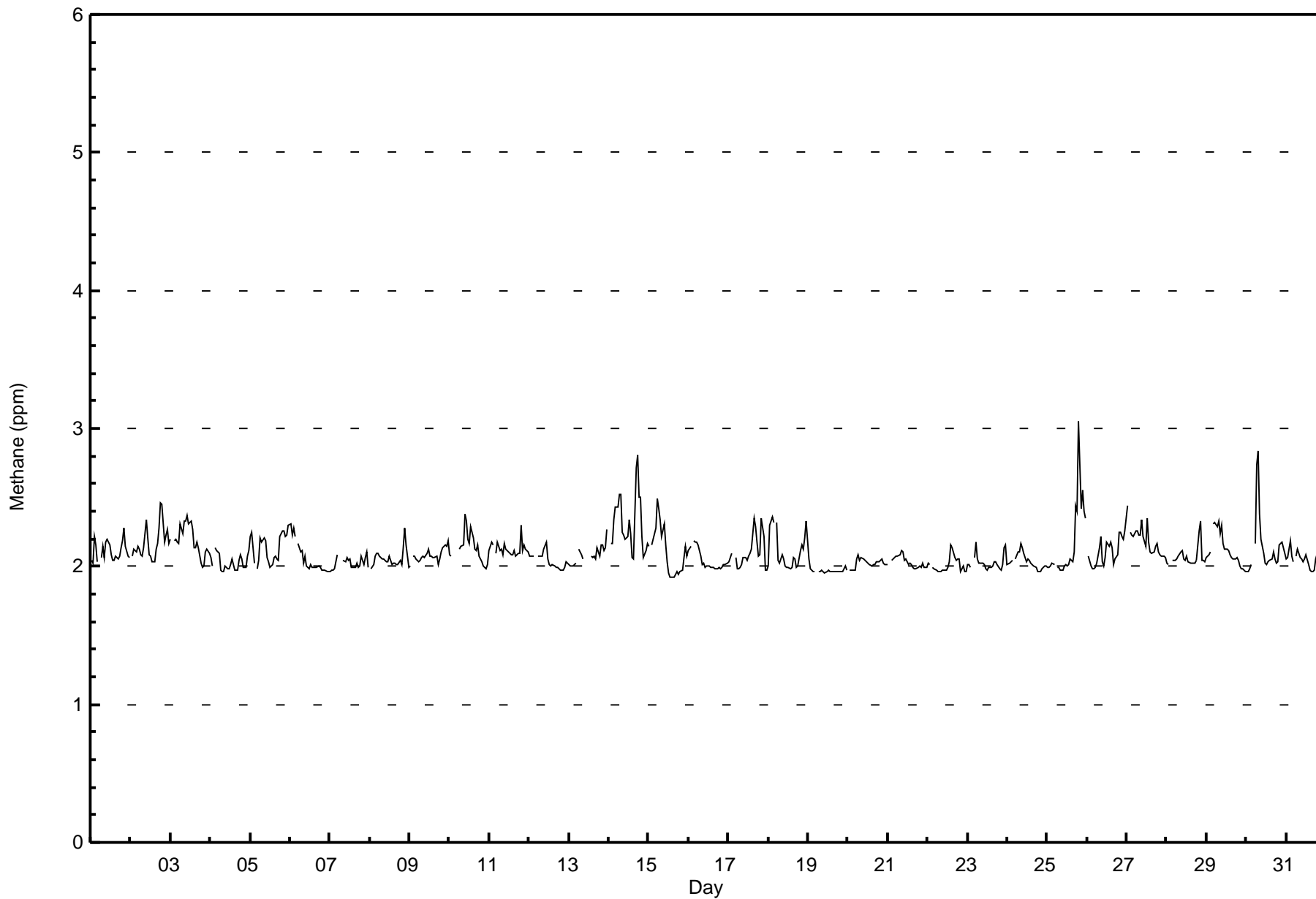
Wood Buffalo Environmental Association Summary of Hour Averages

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

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 3.1 ppm on Mar 25 20:00	Maximum Daily Average: 2.3 ppm on Mar 14		Hours of Data:	705
Minimum Value: 1.9 ppm on Mar 15 15:00	Minimum Daily Average: 2.0 ppm on Mar 19		Hours of Missing Data:	39
Maximum Diurnal Average: 2.1 ppm at hour 6	Minimum Diurnal Average: 2.0 ppm at hour 15		Hours of Calibration:	35
Monthly Average: 2.09 ppm	Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.1 P ₉₀ = 2.3 P ₉₉ = 2.5		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-Mar	2.0	2.0	2.2	2.2	2.0	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.2	2.3	2.1	2.1	2.1	2.1	2.1	2.3	2.5																								
2-Mar	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.1	2.1	2.0	2.0	2.1	2.2	2.3	2.5	2.4	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.2																								
3-Mar	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.4	2.3	2.3	2.3	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1																								
4-Mar	2.1	2.0	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1																								
5-Mar	2.2	2.2	2.0	Z	2.0	2.0	2.2	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.2	2.3	2.3	2.2	2.2	2.3	2.1	2.1	2.1	2.1	2.3																								
6-Mar	2.3	2.2	2.3	2.2	Z	2.2	2.1	2.1	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	2.0	2.0	2.0	2.0	2.0																								
7-Mar	2.0	2.0	2.0	2.0	2.1	Z	UO	UO	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0																								
8-Mar	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.2	2.0	2.1	2.1	2.1	2.1	2.1																								
9-Mar	2.0	Z	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	2.1	2.0	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.2																								
10-Mar	2.1	2.1	Z	2.1	UO	UO	2.1	2.1	2.2	2.4	2.3	2.2	2.2	2.3	2.2	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.4																								
11-Mar	2.1	2.2	2.2	Z	2.1	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.3																								
12-Mar	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	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	2.0	2.0	2.0	2.0																								
13-Mar	2.0	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.1	C	C	C	C	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.3	2.1	2.1	2.1	2.3	2.1																								
14-Mar	Z	2.2	2.2	2.3	2.4	2.4	2.5	2.5	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.7	2.8	2.5	2.5	2.2	2.1	2.1	2.2	2.2	2.3	2.3	2.2	2.8																								
15-Mar	2.1	Z	2.2	2.2	2.3	2.5	2.4	2.3	2.2	2.3	2.2	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.5																								
16-Mar	2.1	2.1	Z	2.2	2.2	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2																								
17-Mar	2.0	2.1	2.1	Z	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.3	2.3	2.2	2.1	2.1	2.3	2.2	2.0	2.0	2.1	2.1	2.1	2.1	2.3																								
18-Mar	2.0	2.3	2.4	2.3	Z	2.3	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.2	2.1	2.2	2.3	2.1	2.1	2.1	2.1	2.4																								
19-Mar	2.1	2.0	2.0	2.0	2.0	Z	2.0	2.0	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	2.1																								
20-Mar	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																								
21-Mar	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	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	2.0	2.0	2.0	2.1																							
22-Mar	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	2.2	2.1	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	2.2																							
23-Mar	2.0	2.0	2.0	Z	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	2.0	2.0	2.0	2.1	2.2	2.0	2.0	2.0	2.2																								
24-Mar	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.2	2.1	2.1	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	2.0	2.0	2.2																							
25-Mar	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	2.0	2.0	2.1	2.0	2.1	2.4	2.4	3.1	2.4	2.6	2.4	2.3	2.2	2.2	2.2	3.1																								
26-Mar	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.0	2.0	2.1	2.2	2.1	2.2	2.1	2.0	2.1	2.1	2.2	2.3	2.2	2.2	2.3	2.1	2.1	2.1	2.1	2.3																								
27-Mar	2.4	Z	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.3	2.2	2.1	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4																							
28-Mar	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.3	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.3																								
29-Mar	2.1	2.1	2.1	Z	2.3	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.3																								
30-Mar	2.0	2.0	2.0	2.0	Z	2.2	2.7	2.8	2.4	2.2	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.8																								
31-Mar	2.1	2.1	2.2	2.1	2.0	Z	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	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	2.0	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	Diurnal Average
																								2.4	2.3	2.4	2.3	2.4	2.5	2.7	2.8	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.3	2.7	2.8	2.5	3.1	2.4	2.6	2.4	2.3	2.0	2.0	2.0	2.0	2.3	Diurnal Maximum

Z - zerospan C - Calibration UO - Unstable Operation





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	315	44.68	44.68
2.1 - 3.0	389	55.18	99.86
3.1 - 10.0	1	0.14	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**

**Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - March 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	91	28	11	4	6	11	21	57	13	4	2	3	6	17	20	21	315
2.1 - 3.0	98	18	10	15	4	7	8	47	51	14	9	5	8	20	24	40	378
3.1 - 10.0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	189	46	21	20	10	18	29	104	64	18	11	8	14	37	44	61	694

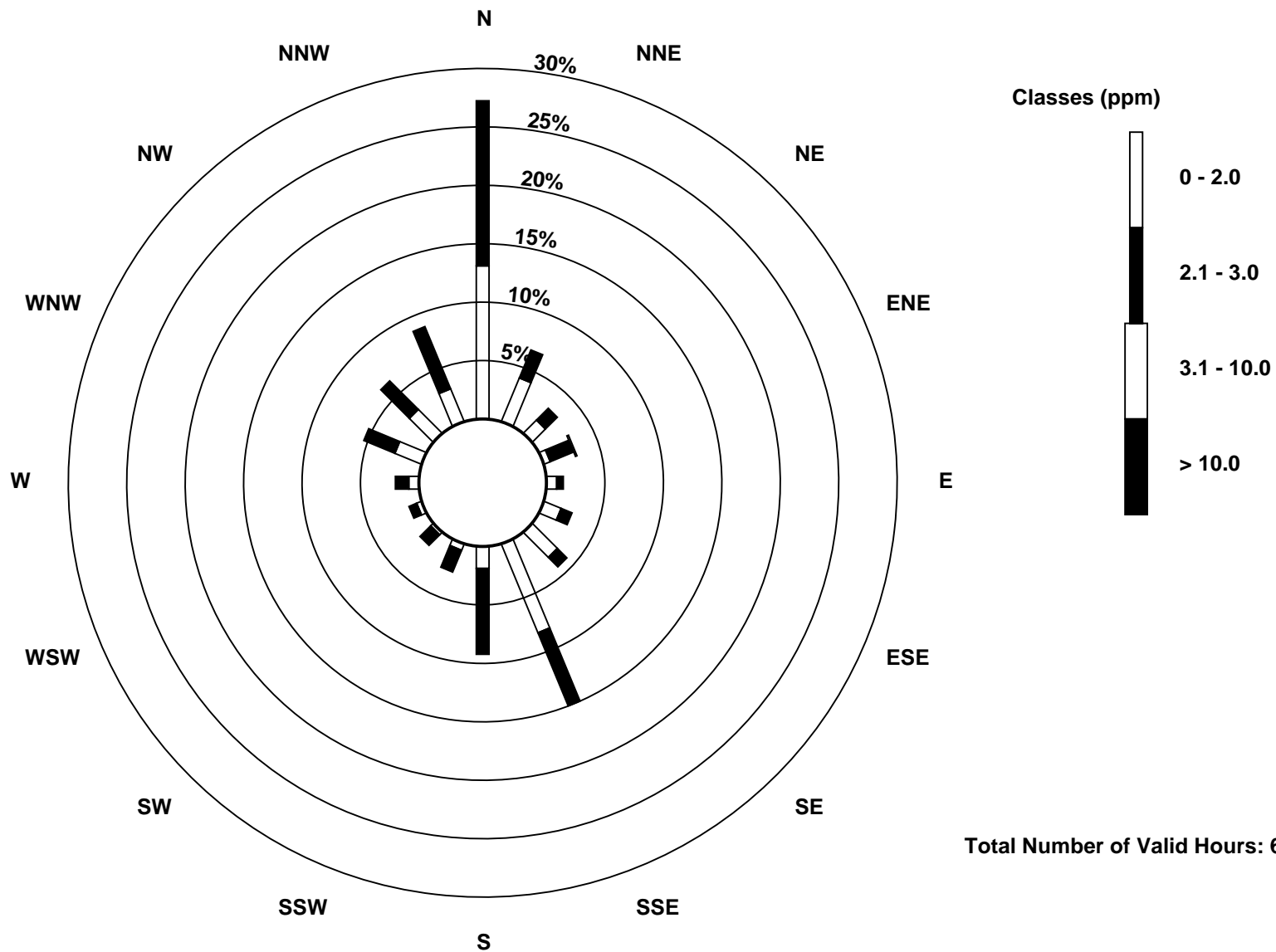
Total Number of Valid Hours: 694

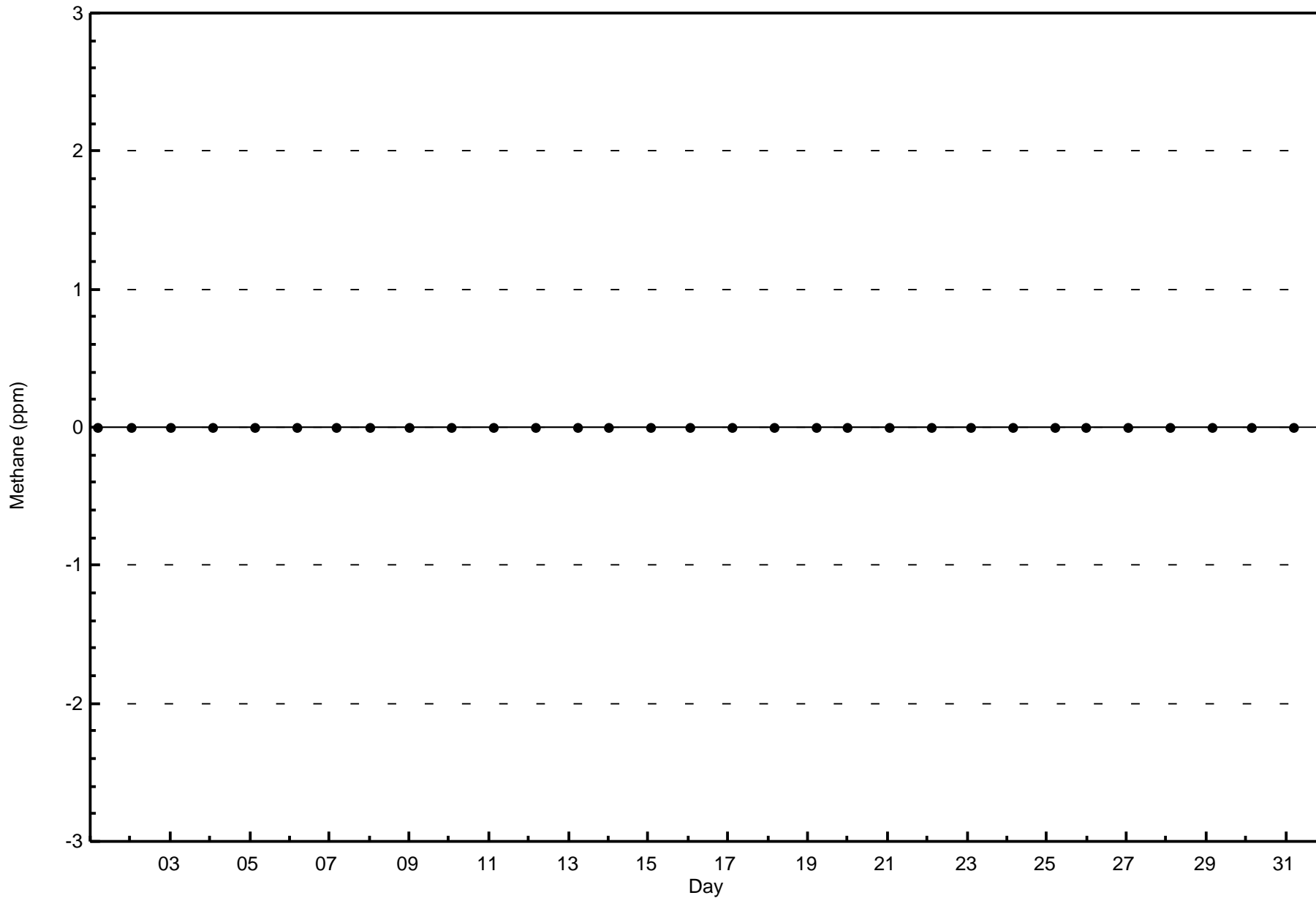
Total Number of Hours: 744

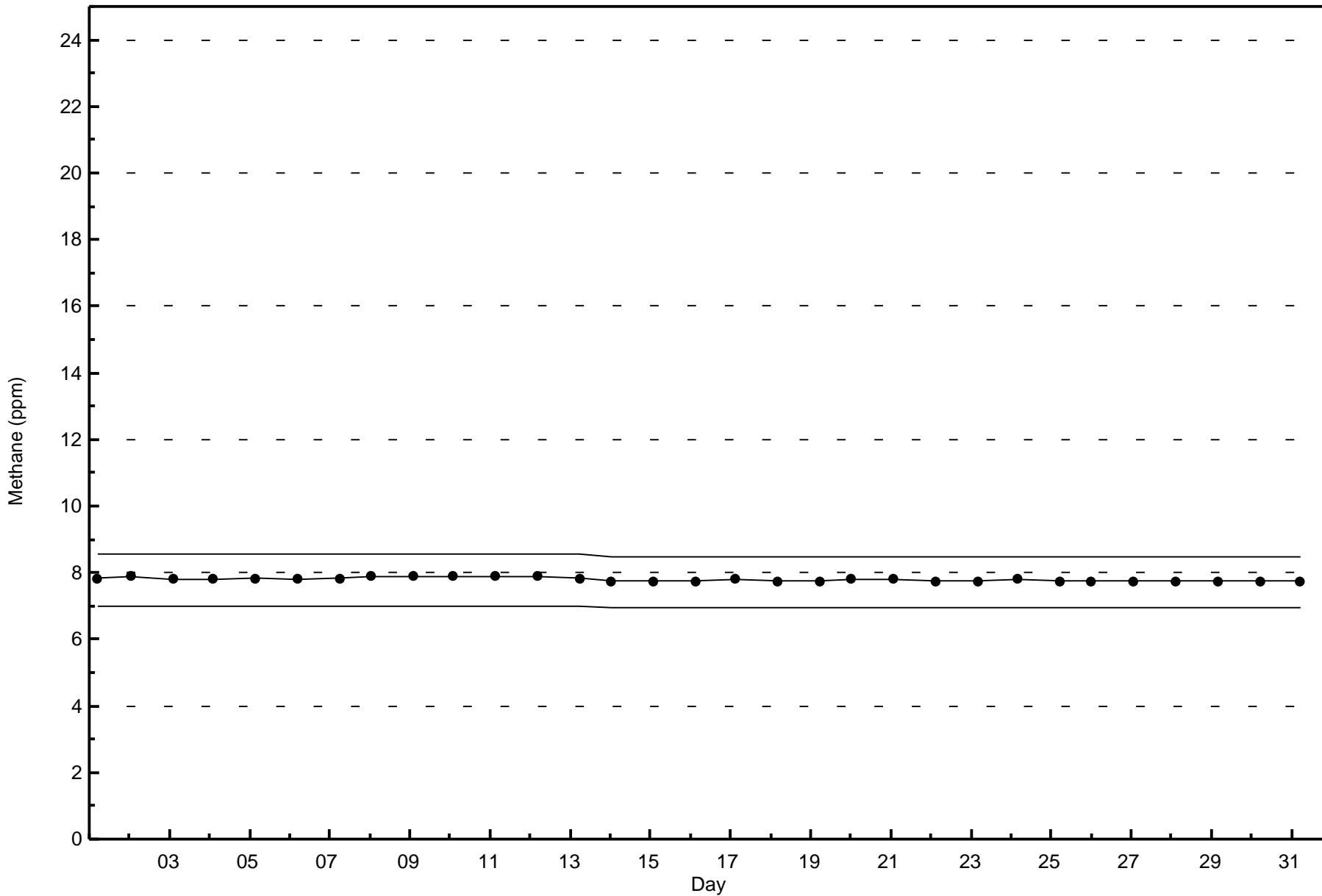


Wood Buffalo Environmental Association
Wind Rose Mar 2017

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









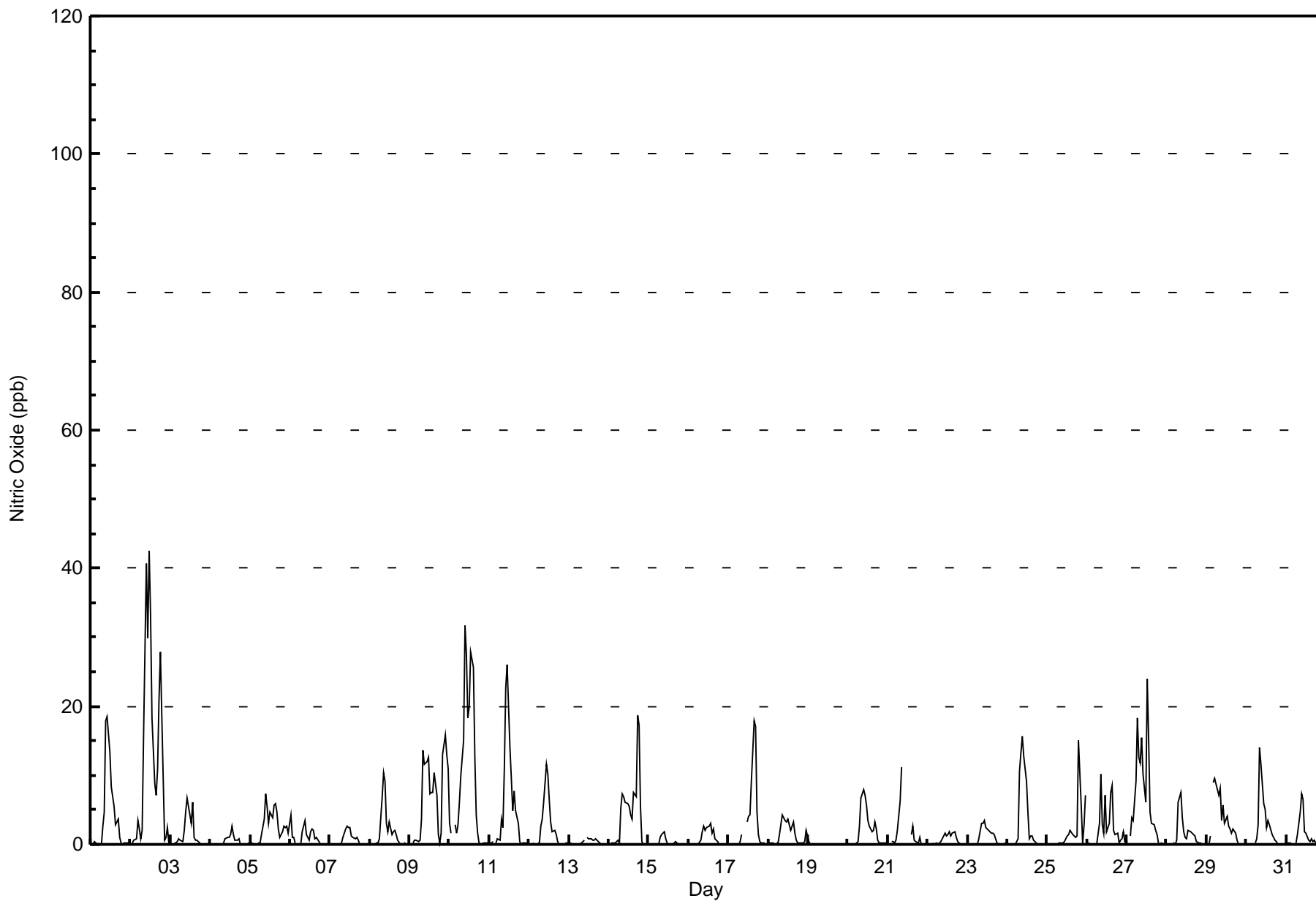
Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Fort McKay - Bertha Ganter - March 2017

Maximum Value: 43 ppb on Mar 2 12:00																		Maximum Daily Average: 12.6 ppb on Mar 2																		Hours in Service: 744																															
Minimum Value: 0 ppb on Mar 15 15:00																		Minimum Daily Average: 0.1 ppb on Mar 19																		Hours of Data: 705																															
Maximum Diurnal Average: 8.1 ppb at hour 10																		Minimum Diurnal Average: 0.2 ppb at hour 2																		Hours of Missing Data: 39																															
Monthly Average: 2.8 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 3 P ₉₀ = 8 P ₉₉ = 28																		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-Mar	0	0	0	0	0	Z	0	3	5	18	18	13	8	7	5	3	4	1	0	0	0	0	0	0	3.8	18																																									
2-Mar	Z	0	1	1	3	2	1	2	16	41	30	43	33	18	9	7	11	21	28	18	1	1	3	0	12.6	43																																									
3-Mar	0	Z	0	0	0	1	1	0	2	5	7	5	3	6	1	1	1	0	0	0	0	0	0	0	1.5	7																																									
4-Mar	0	0	Z	0	0	0	0	0	0	1	1	1	1	3	1	1	1	1	0	0	0	0	0	0	0.5	3																																									
5-Mar	0	0	0	Z	0	0	0	2	4	7	6	3	5	4	6	6	5	2	1	2	3	2	3	2	2.7	7																																									
6-Mar	4	1	1	0	Z	0	0	2	3	3	1	1	2	2	2	1	1	0	0	0	0	0	0	0	1.1	4																																									
7-Mar	0	0	0	0	0	Z	0	0	1	2	3	2	2	1	1	1	1	1	0	0	0	0	0	0	0.7	3																																									
8-Mar	Z	0	0	0	0	0	1	7	10	9	3	2	3	1	2	2	1	1	0	0	0	0	0	0	1.9	10																																									
9-Mar	0	Z	0	1	1	0	1	4	14	12	12	13	7	8	8	10	7	1	0	2	13	16	13	11	6.6	16																																									
10-Mar	3	2	Z	3	2	3	6	10	15	32	28	18	20	28	26	13	4	2	0	0	0	0	0	0	9.3	32																																									
11-Mar	0	0	0	Z	0	1	1	4	2	11	23	26	14	10	5	8	5	3	0	0	0	0	0	0	4.9	26																																									
12-Mar	0	0	0	0	Z	0	0	3	4	6	12	10	7	3	2	2	2	0	0	0	0	0	0	0	2.2	12																																									
13-Mar	0	0	0	0	0	Z	0	0	0	1	M	1	1	1	1	1	1	1	0	0	0	0	0	0	0.3	1																																									
14-Mar	Z	0	0	0	0	1	0	5	7	7	6	6	5	4	4	8	7	19	17	5	0	0	0	0	4.5	19																																									
15-Mar	0	Z	0	0	0	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																																									
16-Mar	0	0	Z	0	0	0	0	1	2	3	2	2	3	3	2	2	1	0	0	0	0	0	0	0	0.9	3																																									
17-Mar	0	0	0	Z	0	0	0	1	1	M	M	3	4	4	9	18	17	5	1	0	0	0	0	0	3.1	18																																									
18-Mar	0	0	0	0	Z	0	0	1	4	4	3	3	4	2	3	3	2	1	0	0	0	0	0	2	1.5	4																																									
19-Mar	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-Mar	Z	0	0	0	0	0	0	3	7	8	7	6	3	3	2	2	3	2	1	0	0	0	0	0	2.1	8																																									
21-Mar	0	Z	0	0	0	1	2	6	11	C	C	C	C	C	1	3	1	0	0	1	0	0	0	0	1.5	11																																									
22-Mar	0	0	Z	0	0	0	0	0	0	1	2	1	1	2	1	2	2	1	0	0	0	0	0	0	0.6	2																																									
23-Mar	0	0	0	Z	0	0	0	1	3	3	3	2	2	2	2	2	1	1	0	0	0	0	0	0	1.0	3																																									
24-Mar	0	0	0	0	Z	0	1	11	13	16	13	9	5	1	1	1	1	0	0	0	0	0	0	0	3.1	16																																									
25-Mar	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	2	1	1	1	1	15	5	0	3	7	1.8	15																																									
26-Mar	Z	0	0	0	0	0	0	3	10	3	2	7	2	3	7	9	2	1	2	0	1	1	2	0	2.4	10																																									
27-Mar	0	Z	1	4	4	9	18	13	12	15	10	6	24	15	5	3	3	2	1	0	0	0	0	0	6.4	24																																									
28-Mar	0	0	Z	0	0	0	1	6	7	4	2	1	1	2	2	2	1	1	0	0	0	0	0	0	1.4	7																																									
29-Mar	0	0	1	Z	9	10	8	7	8	3	6	3	4	3	2	2	2	2	1	0	0	0	0	0	3.1	10																																									
30-Mar	0	0	0	0	Z	0	1	3	14	12	6	5	2	3	3	1	1	1	0	0	0	0	0	0	2.3	14																																									
31-Mar	0	0	0	0	0	Z	0	2	5	7	6	2	2	1	0	1	0	1	0	0	0	0	1	0	1.2	7																																									
																		0.4		0.2		0.3		0.4		0.8		1.1		1.4		3.2		5.9		8.1		7.6		6.6		5.7		4.7		3.7		3.6		2.9		2.3		1.8		1.5		0.8		0.7		0.8		0.8		Diurnal Average	
																		4		2		1		4		9		10		18		13		16		41		30		43		33		28		26		18		17		21		28		18		13		16		13		11		Diurnal Maximum	
Z - zerospan			C - Calibration			M - Maintenance																																																													





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	692	98.16	98.16
21 - 40	11	1.56	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: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter - March 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	186	45	20	17	10	17	29	100	63	18	11	8	14	38	44	61	681
21 - 40	4	1	1	2	0	1	0	2	0	0	0	0	0	0	0	0	11
11 - 80	0	0	0	1	0	0	0	1	0	0	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	190	46	21	20	10	18	29	103	63	18	11	8	14	38	44	61	694

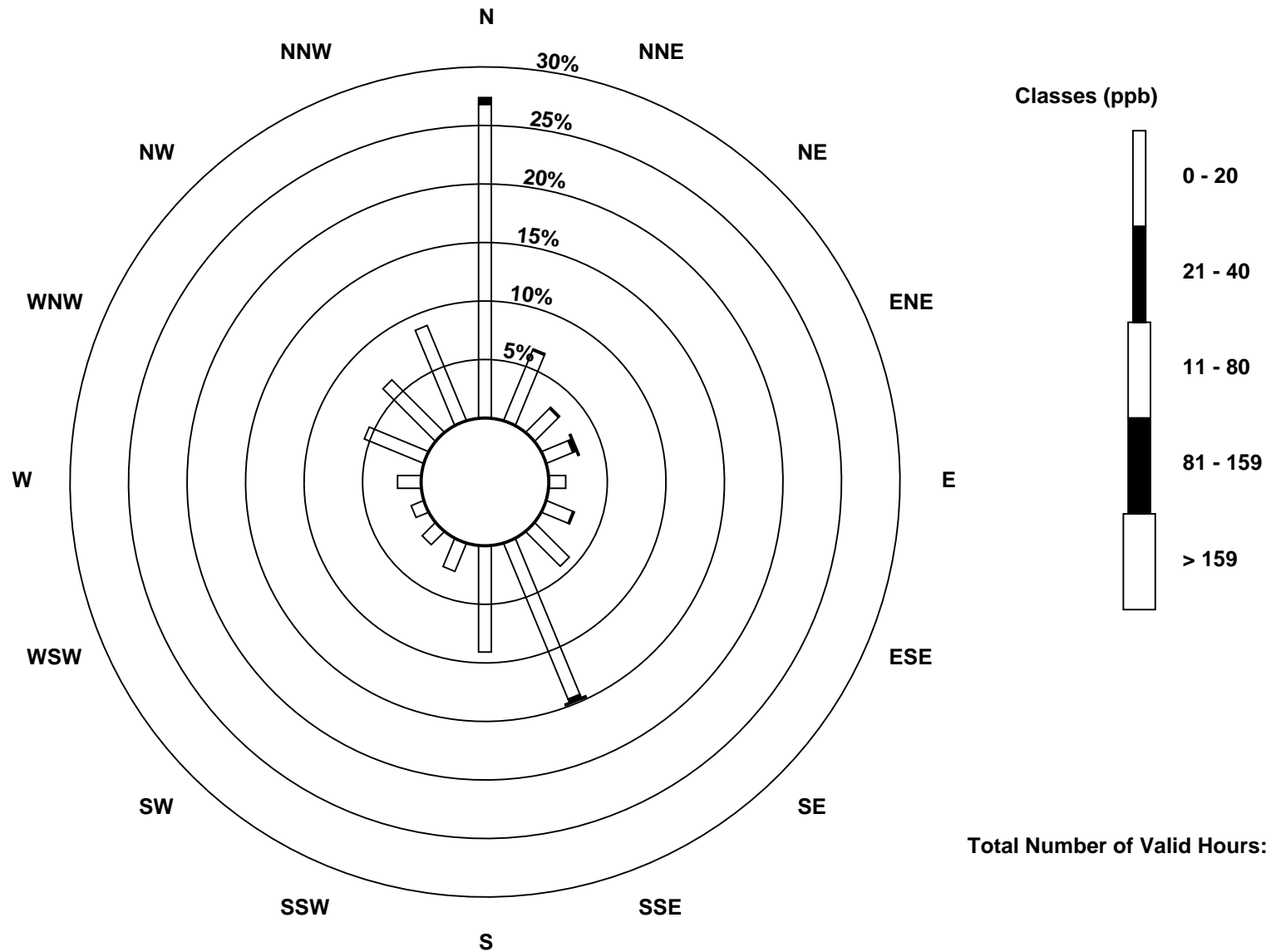
Total Number of Valid Hours: 694

Total Number of Hours: 744

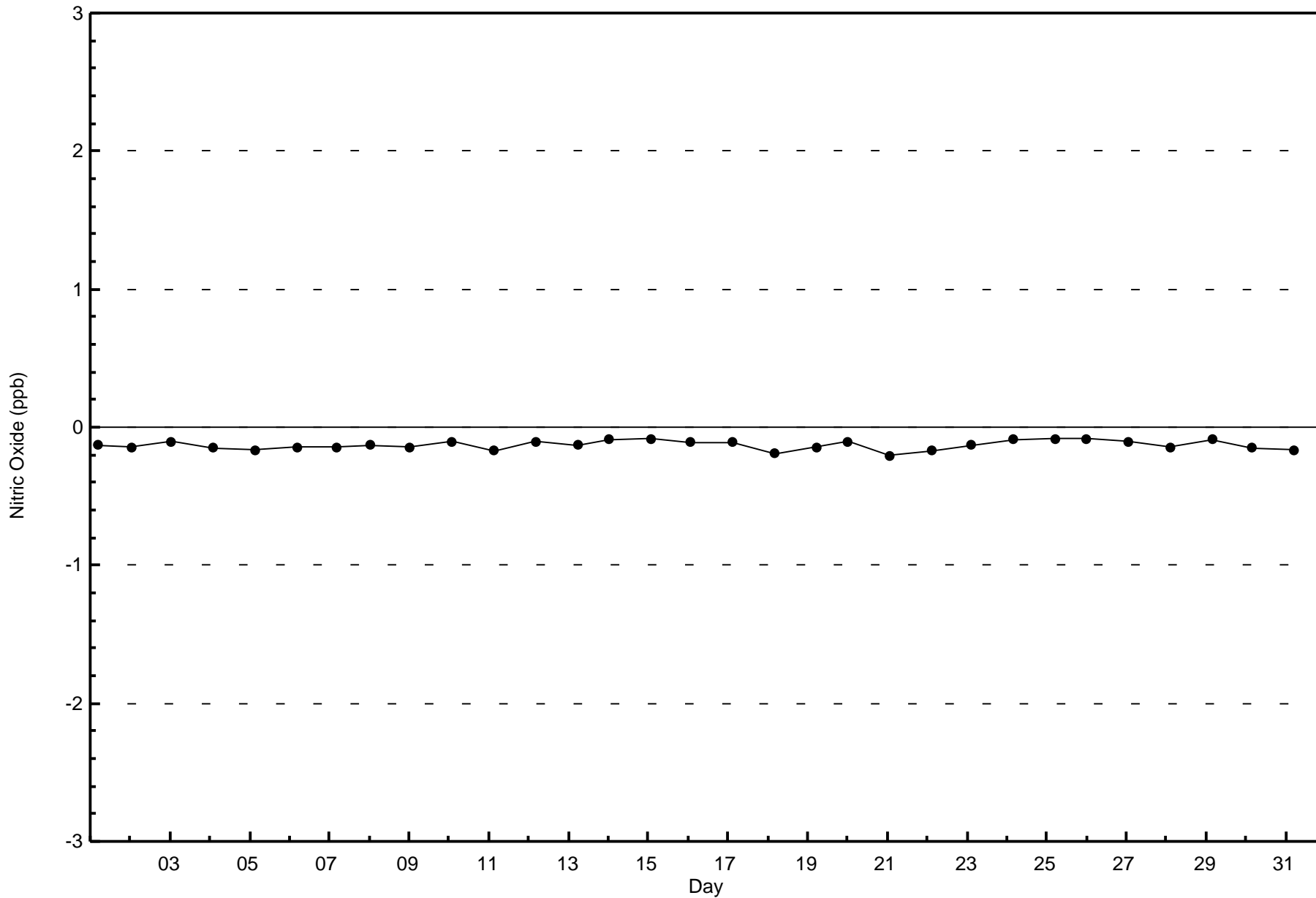


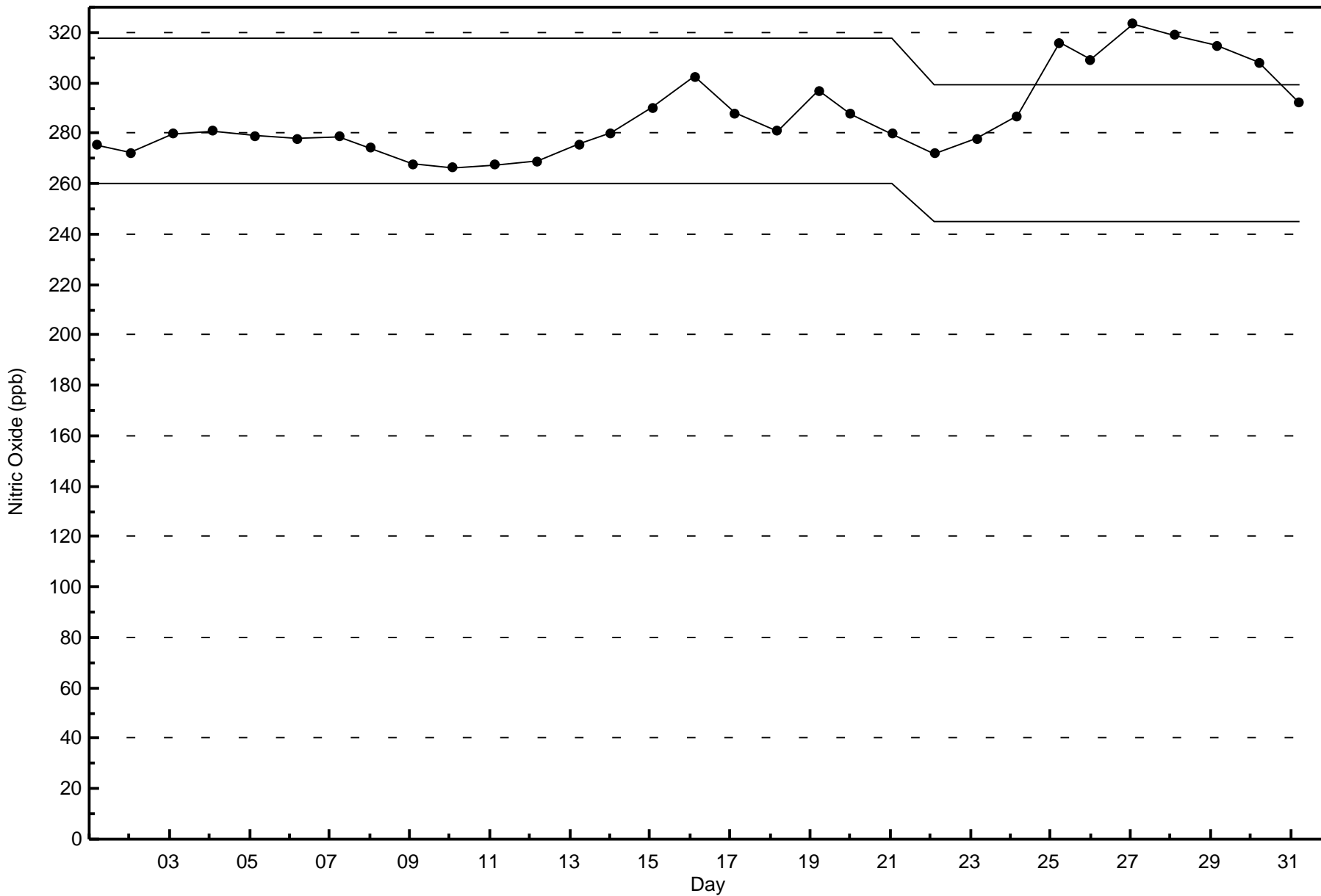
Wood Buffalo Environmental Association
Wind Rose Mar 2017

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



Total Number of Valid Hours: 694







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Fort McKay - Bertha Ganter - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 42 ppb on Mar 14 19:00	Maximum Daily Average: 22.8 ppb on Mar 2		Hours of Data:	705
Minimum Value: 0 ppb on Mar 19 16:00	Minimum Daily Average: 0.6 ppb on Mar 19		Hours of Missing Data:	39
Maximum Diurnal Average: 11.9 ppb at hour 20	Minimum Diurnal Average: 6.5 ppb at hour 15		Hours of Calibration:	36
Monthly Average: 9.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 8 Q ₃ = 13 P ₉₀ = 18 P ₉₉ = 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-Mar	12	12	22	19	14	Z	13	18	11	18	17	13	9	9	8	6	12	12	11	11	17	15	13	12	13.1	22
2-Mar	Z	12	21	21	28	23	19	17	18	24	21	27	24	18	13	13	22	35	39	37	21	25	30	20	22.8	39
3-Mar	20	Z	20	19	25	29	16	12	10	13	14	13	10	13	5	5	8	11	3	2	3	10	10	6	11.9	29
4-Mar	8	6	Z	9	11	8	2	1	1	3	3	2	2	5	4	2	3	9	7	6	3	4	5	18	5.2	18
5-Mar	27	23	9	Z	7	10	18	23	18	17	11	7	9	7	11	10	13	18	30	37	38	35	35	34	19.3	38
6-Mar	36	32	31	23	Z	13	9	13	9	7	3	1	3	4	3	2	4	4	3	1	1	1	1	1	8.9	36
7-Mar	1	1	1	2	6	Z	6	4	4	4	3	2	2	1	1	1	3	5	9	12	14	17	8	3	4.8	17
8-Mar	Z	3	4	9	12	13	15	19	14	9	4	3	4	2	3	4	4	3	3	7	11	14	12	4	7.6	19
9-Mar	5	Z	12	11	11	10	10	10	11	8	5	4	3	3	4	6	7	3	3	9	12	14	16	15	8.3	16
10-Mar	11	11	Z	11	11	16	11	8	6	12	10	9	10	14	16	13	10	11	7	7	7	7	5	7	9.9	16
11-Mar	12	15	16	Z	13	17	12	12	4	8	13	14	10	8	6	11	11	14	12	14	22	23	17	13	12.8	23
12-Mar	10	8	8	10	Z	11	10	8	5	5	10	10	8	5	3	5	5	3	2	2	1	3	14	16	7.0	16
13-Mar	15	12	6	3	4	Z	4	4	4	4	M	3	3	3	3	7	7	7	10	5	7	4	5	5.5	15	
14-Mar	Z	20	19	14	22	27	13	23	17	13	11	11	11	10	9	18	24	34	42	40	23	9	8	9	18.5	42
15-Mar	9	Z	7	6	7	6	7	12	9	7	3	1	1	0	0	1	2	2	1	2	3	8	12	8	4.9	12
16-Mar	11	12	Z	7	8	7	7	6	6	6	4	4	4	5	3	4	4	4	6	4	6	7	12	13	6.5	13
17-Mar	13	17	16	Z	12	3	4	6	6	M	M	9	11	13	16	23	24	16	23	26	15	13	3	2	12.9	26
18-Mar	4	17	16	13	Z	14	8	8	12	8	6	5	6	3	5	9	8	6	6	9	14	14	21	22	10.1	22
19-Mar	4	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	4	1	0.6	4
20-Mar	Z	1	0	1	1	11	10	10	11	9	7	4	4	3	3	4	9	11	14	15	16	11	12	9	7.6	16
21-Mar	8	Z	13	13	14	18	19	15	16	C	C	C	C	C	5	8	4	4	6	5	4	2	8	9	9.4	19
22-Mar	6	6	Z	4	3	4	3	2	2	3	4	4	5	9	8	10	14	12	14	13	2	3	1	1	5.8	14
23-Mar	4	5	4	Z	7	11	5	5	9	7	7	5	5	6	6	8	10	10	6	4	3	7	19	28	7.8	28
24-Mar	7	8	11	8	Z	5	9	16	14	16	14	12	9	4	5	6	7	5	3	2	1	1	1	1	7.2	16
25-Mar	1	1	1	1	2	Z	4	4	3	2	3	4	5	7	11	8	8	10	17	34	24	16	25	27	9.5	34
26-Mar	Z	9	2	2	2	3	2	10	15	5	4	15	13	15	16	13	7	11	16	17	15	12	10	8	9.5	17
27-Mar	6	Z	5	5	5	7	10	10	9	12	11	9	21	16	9	10	12	14	18	13	16	15	14	13	11.3	21
28-Mar	6	2	Z	2	5	4	3	12	22	18	11	6	4	5	5	5	6	9	10	18	25	4	4	3	8.2	25
29-Mar	4	7	11	Z	21	21	18	14	11	7	8	5	7	7	6	6	11	13	11	6	3	2	2	1	8.9	21
30-Mar	2	1	1	1	Z	9	11	15	18	14	12	13	10	13	13	10	10	10	11	6	5	5	6	9	9.0	18
31-Mar	9	9	11	9	7	Z	8	9	13	11	7	5	6	3	2	4	4	9	9	3	8	13	25	4	8.1	25

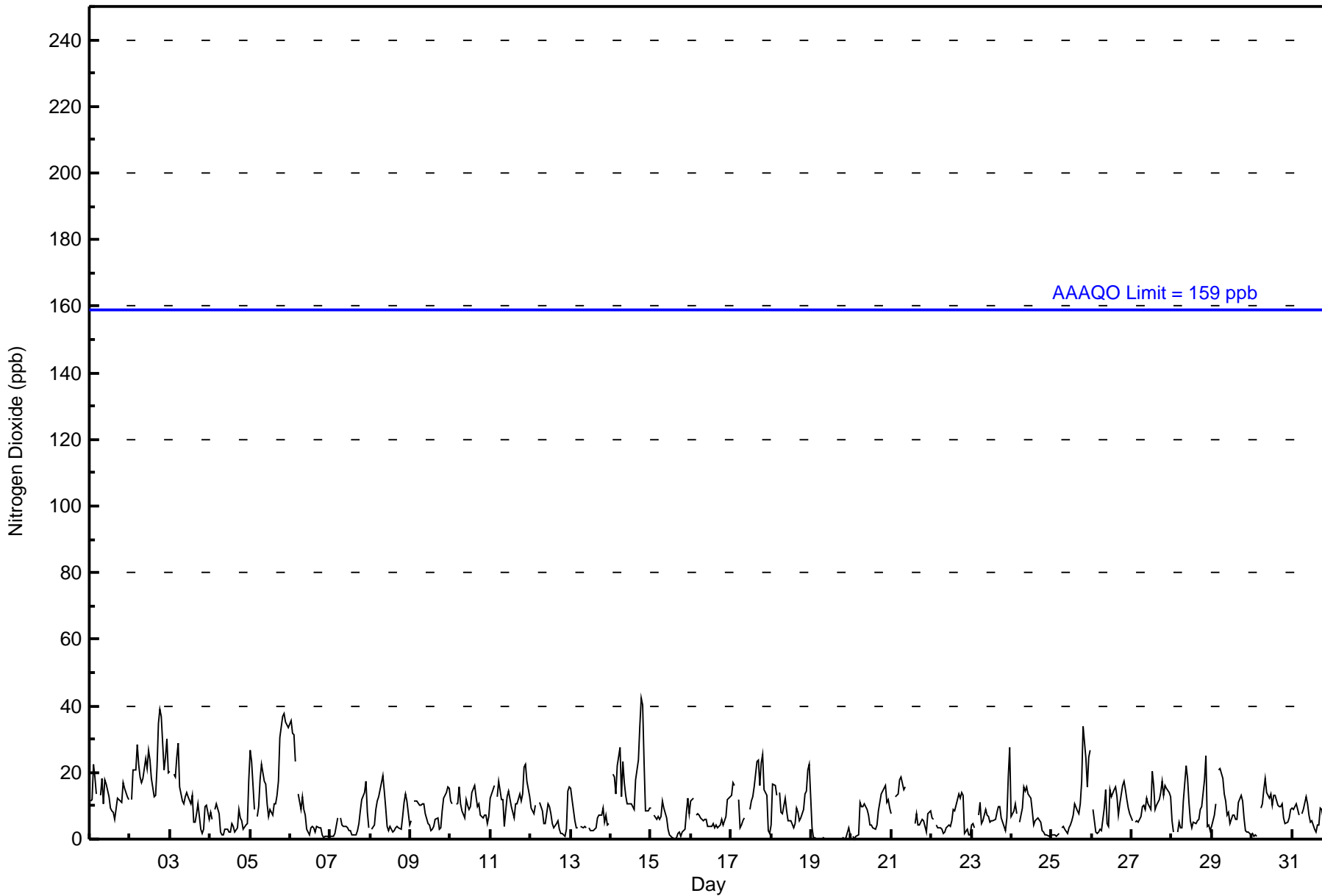
9.7	9.6	10.2	8.6	9.8	11.9	9.2	10.4	10.0	9.3	8.0	7.3	7.2	7.0	6.5	7.4	8.7	10.1	11.2	11.9	10.8	10.2	11.4	10.3	Diurnal Average
36	32	31	23	28	29	19	23	22	24	21	27	24	18	16	23	24	35	42	40	38	35	35	34	Diurnal Maximum

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 - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	647	91.77	91.77
21 - 40	57	8.09	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: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - March 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	174	45	19	17	10	18	29	96	54	17	9	8	13	35	42	50	636
21 - 40	15	1	2	3	0	0	0	7	9	1	2	0	1	3	2	11	57
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	190	46	21	20	10	18	29	103	63	18	11	8	14	38	44	61	694

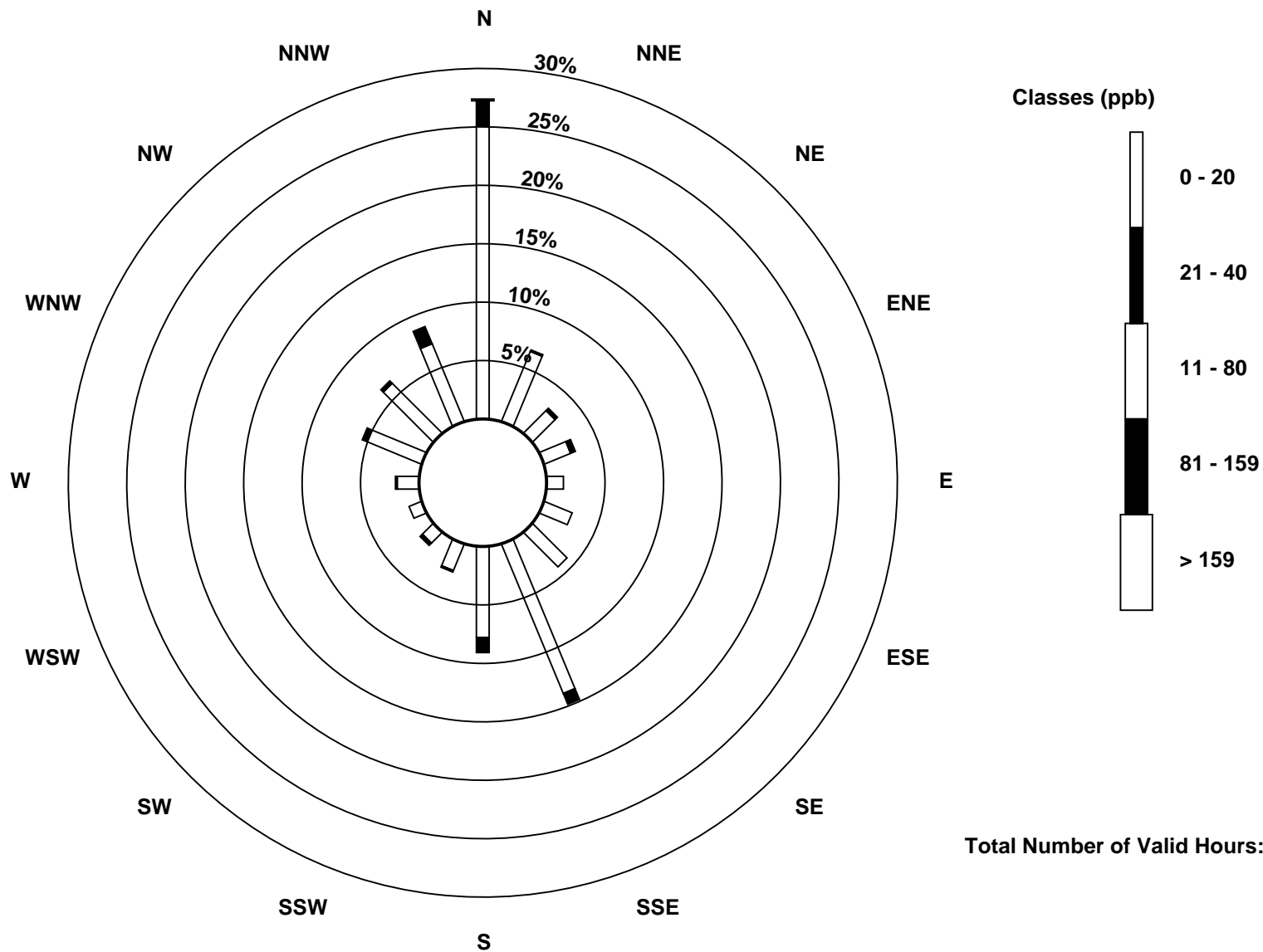
Total Number of Valid Hours: 694

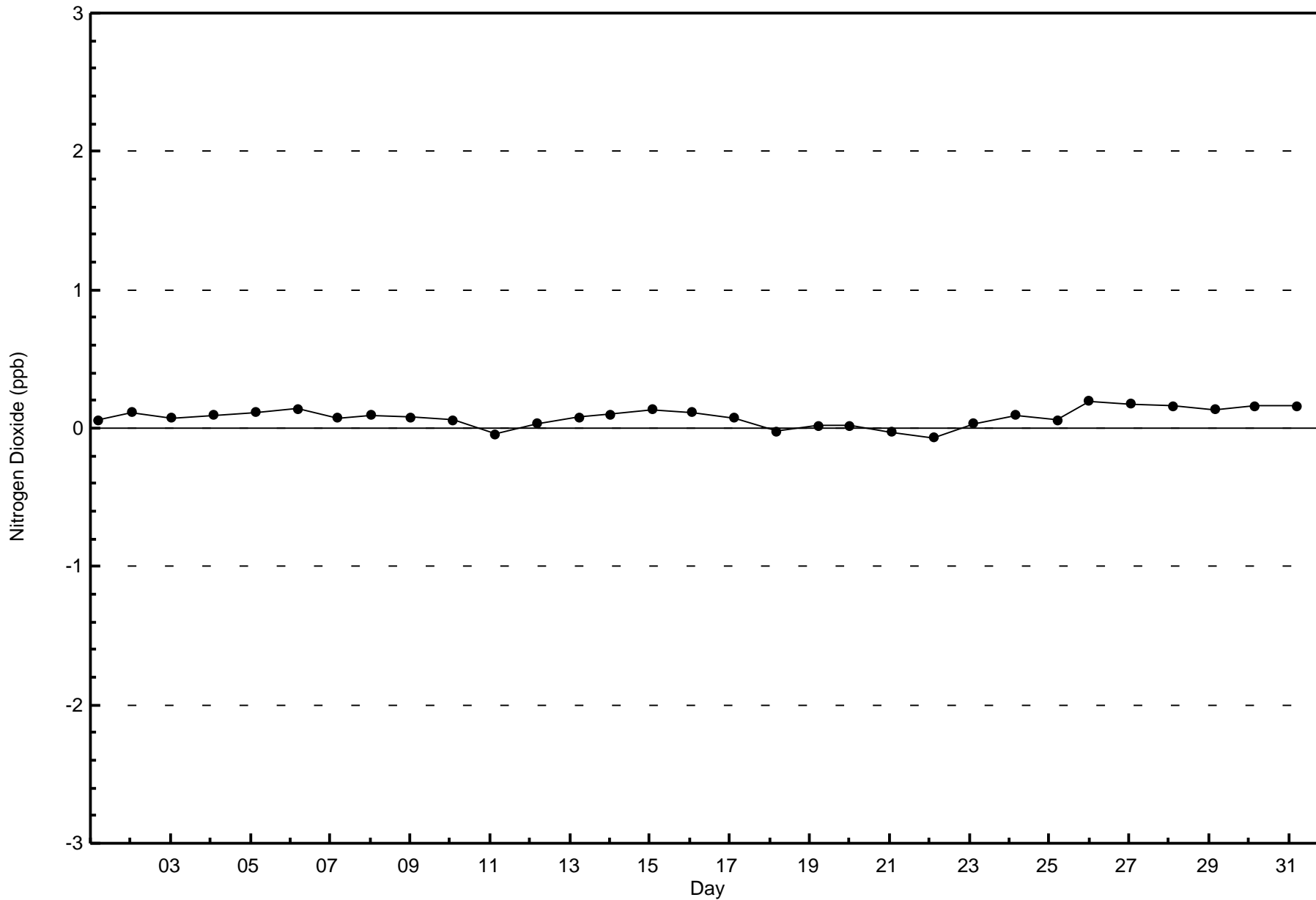
Total Number of Hours: 744

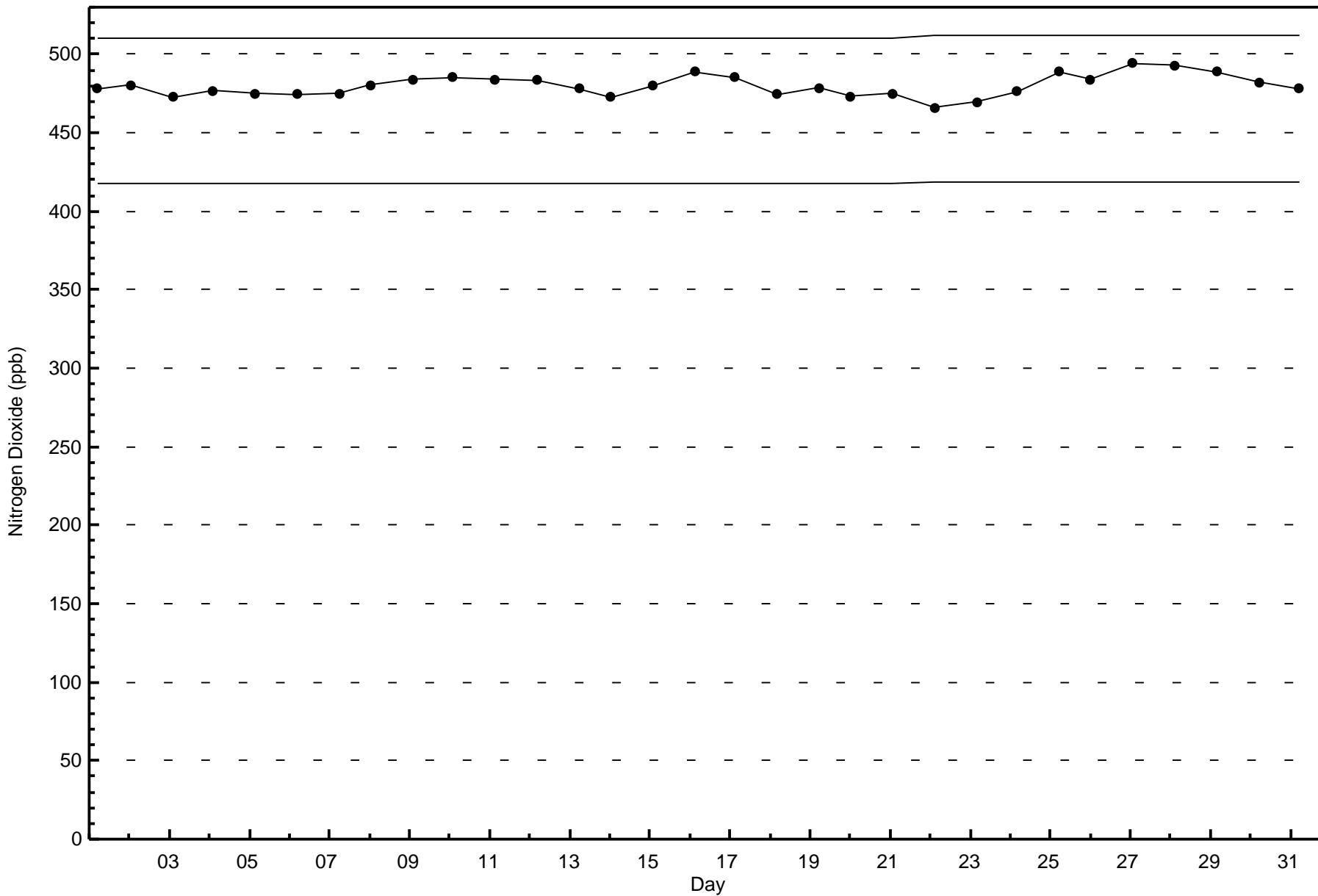


Wood Buffalo Environmental Association
Wind Rose Mar 2017

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







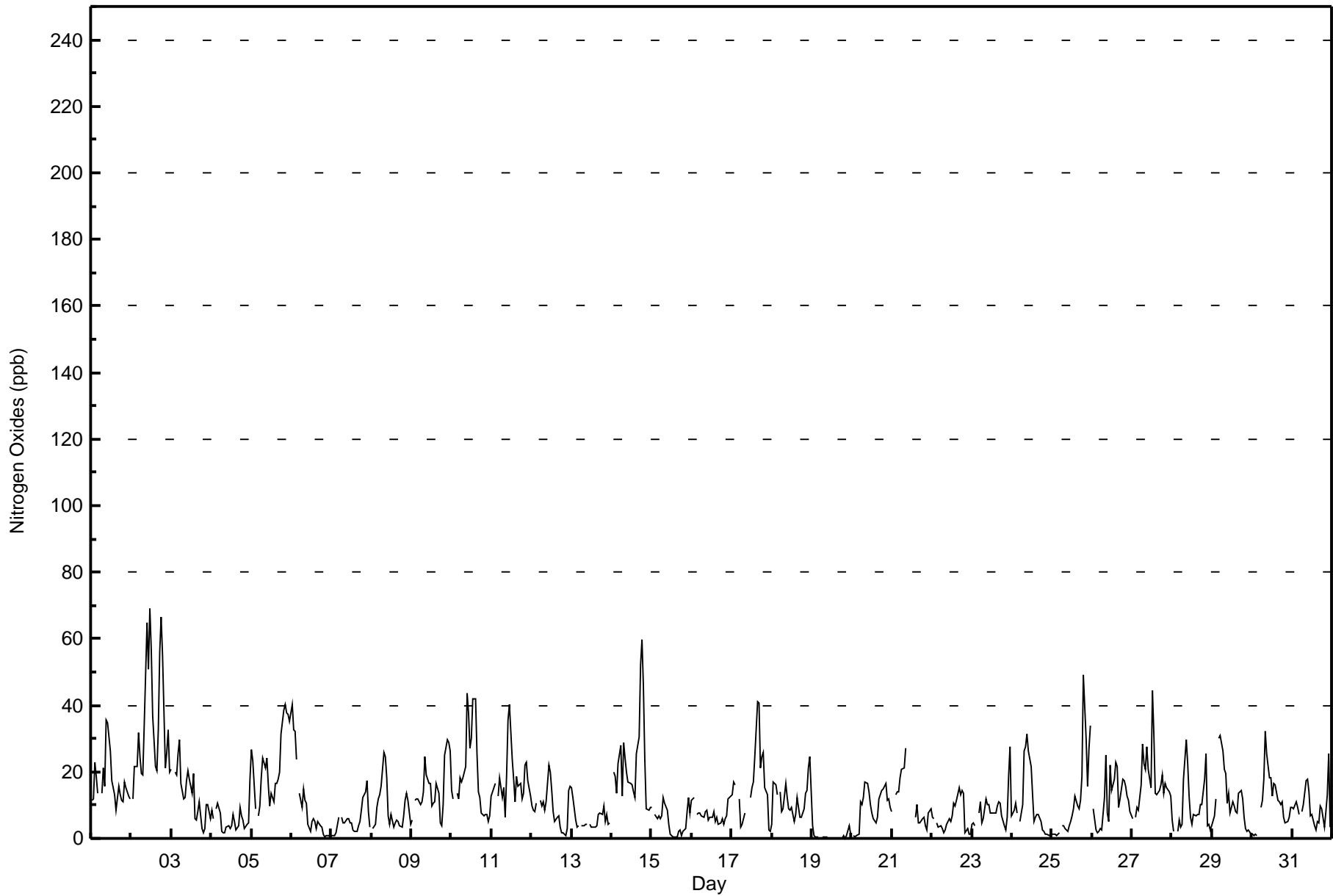


Maximum Value: 69 ppb on Mar 2 12:00																		Maximum Daily Average: 35.4 ppb on Mar 2																		Hours in Service: 744	
Minimum Value: 0 ppb on Mar 19 18:00																		Minimum Daily Average: 0.6 ppb on Mar 19																		Hours of Data: 705	
Maximum Diurnal Average: 17.4 ppb at hour 10																		Minimum Diurnal Average: 9.0 ppb at hour 4																		Hours of Missing Data: 39	
Monthly Average: 12.2 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 5 Median = 10 Q ₃ = 16 P ₉₀ = 26 P ₉₉ = 55																		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-Mar	12	12	23	19	14	Z	13	21	16	36	35	26	18	15	13	9	16	13	11	11	17	15	13	12	16.9	36											
2-Mar	Z	12	22	21	32	25	20	19	34	65	51	69	57	37	21	20	33	56	67	55	21	26	33	20	35.4	69											
3-Mar	21	Z	20	19	25	29	16	12	12	17	20	18	13	19	6	6	8	11	3	2	3	10	10	6	13.3	29											
4-Mar	8	6	Z	9	11	8	2	1	2	4	4	3	4	7	5	3	4	9	7	6	3	4	5	18	5.7	18											
5-Mar	27	23	9	Z	7	10	18	24	21	24	16	10	14	11	17	16	18	20	31	39	40	38	37	35	21.9	40											
6-Mar	40	33	32	24	Z	14	9	15	11	11	4	2	5	6	5	3	5	4	3	1	1	1	1	1	10.0	40											
7-Mar	1	1	1	2	6	Z	6	5	5	6	6	5	5	2	2	2	4	5	9	12	14	17	8	3	5.5	17											
8-Mar	Z	3	4	9	12	13	16	26	24	18	7	4	7	4	5	5	5	4	3	7	11	14	12	4	9.5	26											
9-Mar	5	Z	12	12	12	10	11	14	25	19	17	17	10	11	11	17	14	5	4	10	25	30	29	26	14.9	30											
10-Mar	14	12	Z	14	12	18	17	18	22	44	38	27	30	42	42	26	14	12	7	7	7	7	5	7	19.2	44											
11-Mar	13	15	17	Z	13	18	12	15	7	19	35	40	24	18	11	19	16	17	12	14	22	23	17	13	17.7	40											
12-Mar	10	9	8	11	Z	11	10	11	9	11	22	20	14	8	5	7	7	4	2	2	1	3	14	16	9.2	22											
13-Mar	15	12	6	4	4	Z	4	4	4	4	M	4	4	3	4	7	8	7	10	5	7	4	5	5.8	15												
14-Mar	Z	20	19	14	22	28	13	29	24	20	17	16	16	14	12	26	31	52	60	46	24	9	9	9	23.0	60											
15-Mar	9	Z	7	6	7	6	7	12	11	8	4	1	1	1	0	1	2	2	1	2	3	8	12	8	5.2	12											
16-Mar	12	12	Z	7	8	7	7	6	8	9	6	6	6	8	5	6	4	5	6	4	6	7	12	13	7.4	13											
17-Mar	13	17	16	Z	12	3	4	6	8	M	M	12	15	17	25	41	41	21	24	26	15	13	3	2	15.9	41											
18-Mar	4	17	16	13	Z	14	8	9	16	12	9	9	9	5	7	12	10	6	7	9	14	14	21	24	11.6	24											
19-Mar	4	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	4	1	0.6	4											
20-Mar	Z	1	0	1	1	11	10	12	17	17	14	10	8	6	5	6	12	13	14	15	16	11	12	10	9.7	17											
21-Mar	8	Z	13	14	14	18	21	21	27	C	C	C	C	C	6	10	5	5	6	6	4	2	8	9	11.0	27											
22-Mar	6	6	Z	4	3	4	3	2	2	4	6	5	7	10	10	11	15	13	14	13	2	3	1	1	6.4	15											
23-Mar	4	5	4	Z	7	11	5	6	12	10	10	8	8	8	8	10	11	11	7	4	3	7	19	28	8.8	28											
24-Mar	7	8	11	8	Z	5	10	26	27	31	26	22	13	5	7	7	5	3	2	1	1	1	1	1	10.3	31											
25-Mar	1	1	1	1	2	Z	4	4	3	2	4	5	7	9	13	10	9	11	19	49	30	16	27	34	11.3	49											
26-Mar	Z	9	2	2	2	3	2	12	25	7	5	22	14	18	23	22	9	12	18	18	15	13	11	8	11.9	25											
27-Mar	6	Z	6	9	9	16	28	23	21	28	21	15	45	31	14	13	15	16	19	13	16	15	14	13	17.6	45											
28-Mar	6	2	Z	2	5	4	4	18	30	22	13	7	4	7	7	7	7	10	10	18	26	4	4	3	9.5	30											
29-Mar	4	7	12	Z	30	31	26	21	19	11	14	8	11	10	8	8	13	15	12	7	3	2	2	1	11.9	31											
30-Mar	1	1	1	1	Z	9	11	18	32	26	18	18	13	17	16	12	11	10	11	6	5	5	6	9	11.2	32											
31-Mar	10	9	11	9	7	Z	8	10	18	18	14	7	7	4	3	5	5	10	9	3	8	13	25	3	9.4	25											
10.0																		9.7																		Diurnal Average	
40																		33																		Diurnal Maximum	
10.5																		9.0																			
10.6																		13.1																			
10.5																		13.6																			
15.9																		17.4																			
15.6																		13.9																			
12.9																		11.7																			
10.1																		11.0																			
11.5																		12.4																			
13.1																		13.4																			
11.6																		10.9																			
12.2																		11.0																			
Z - zerospan																		C - Calibration																		M - Maintenance	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	591	83.83	83.83
21 - 40	97	13.76	97.59
41 - 80	17	2.41	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 Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - March 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	161	42	17	11	9	16	25	92	47	14	8	8	13	33	40	48	584
21 - 40	21	3	2	7	1	2	4	8	16	4	3	0	1	5	4	12	93
11 - 80	8	1	2	2	0	0	0	3	0	0	0	0	0	0	0	1	17
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	190	46	21	20	10	18	29	103	63	18	11	8	14	38	44	61	694

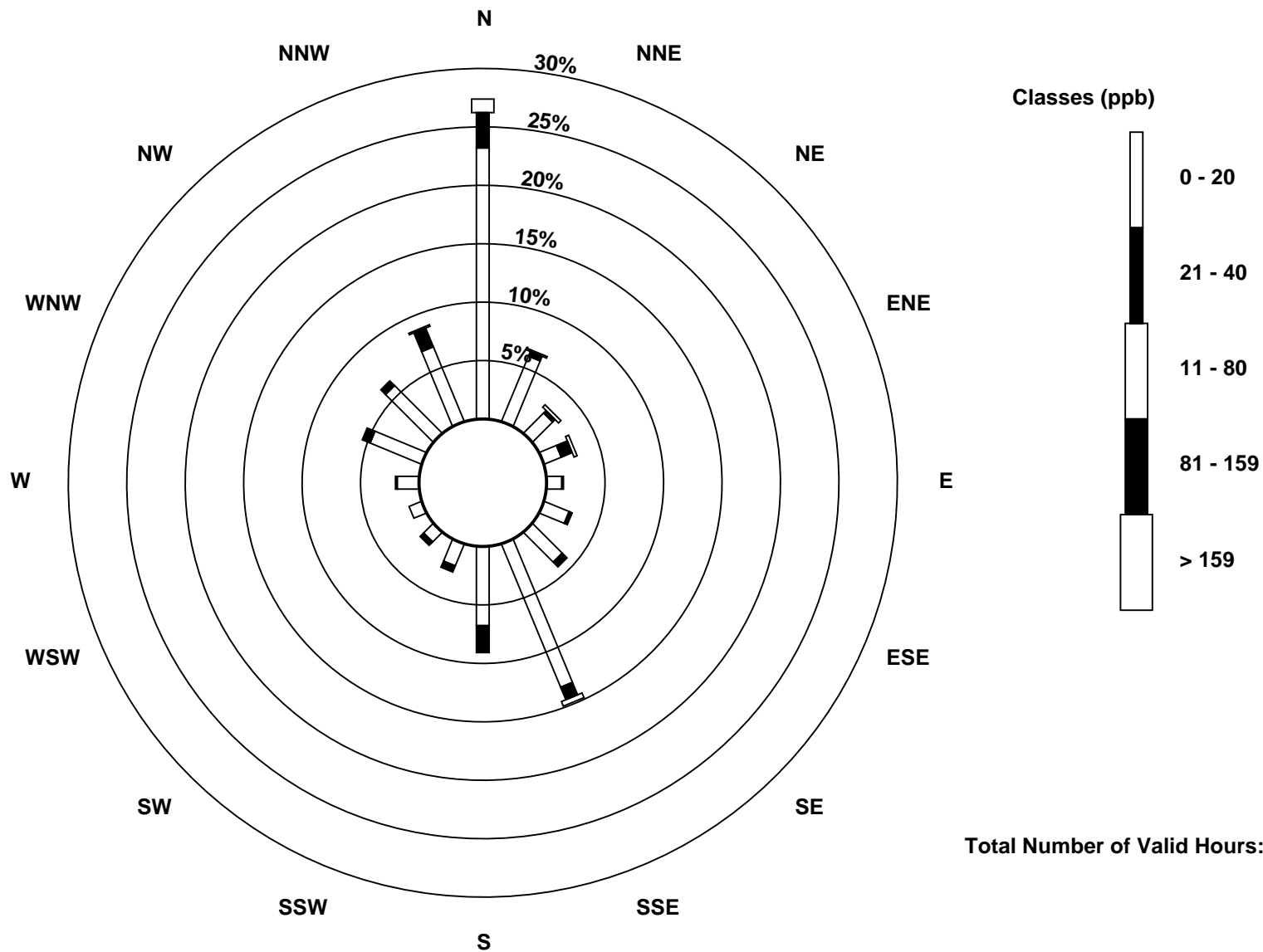
Total Number of Valid Hours: 694

Total Number of Hours: 744

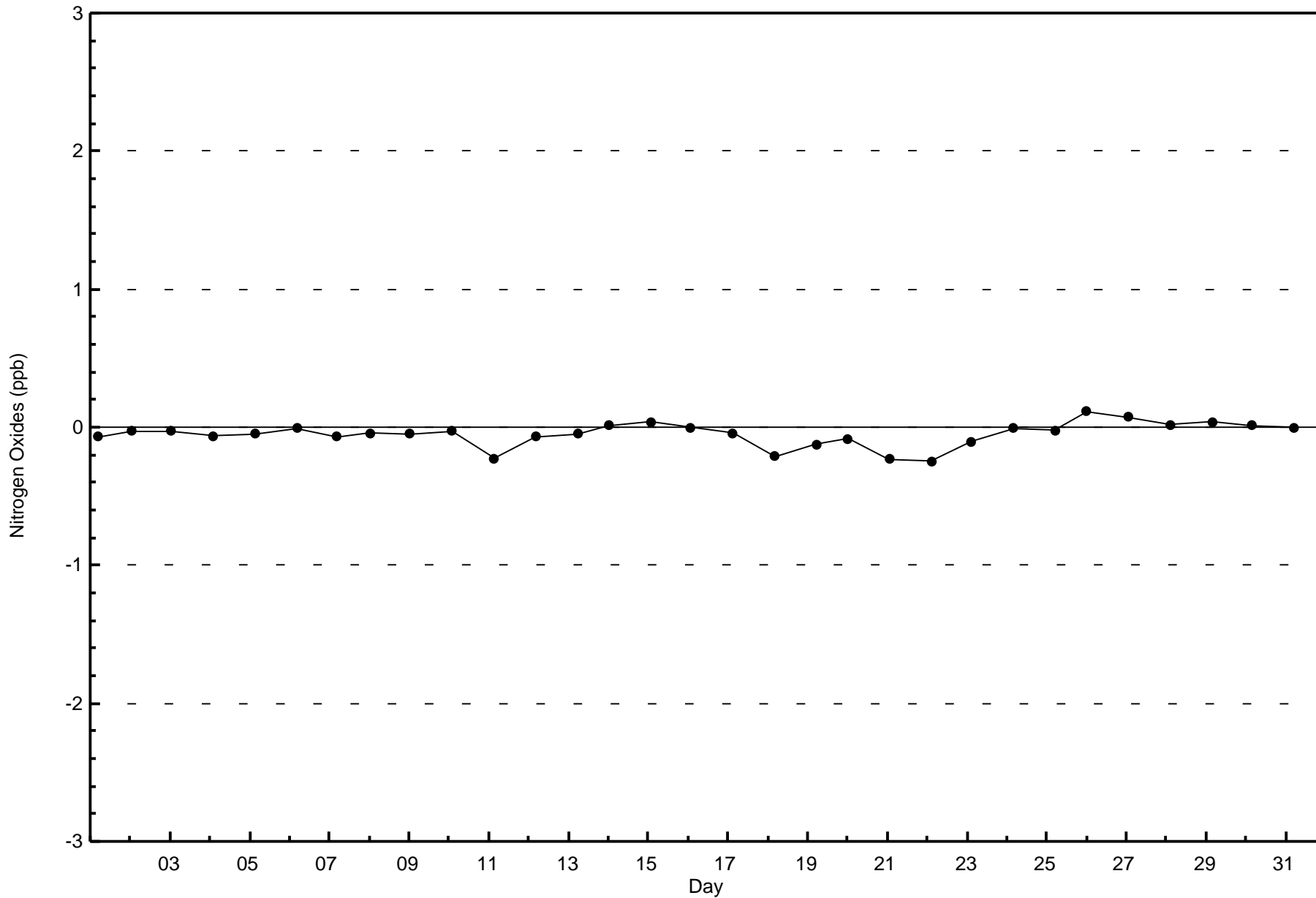


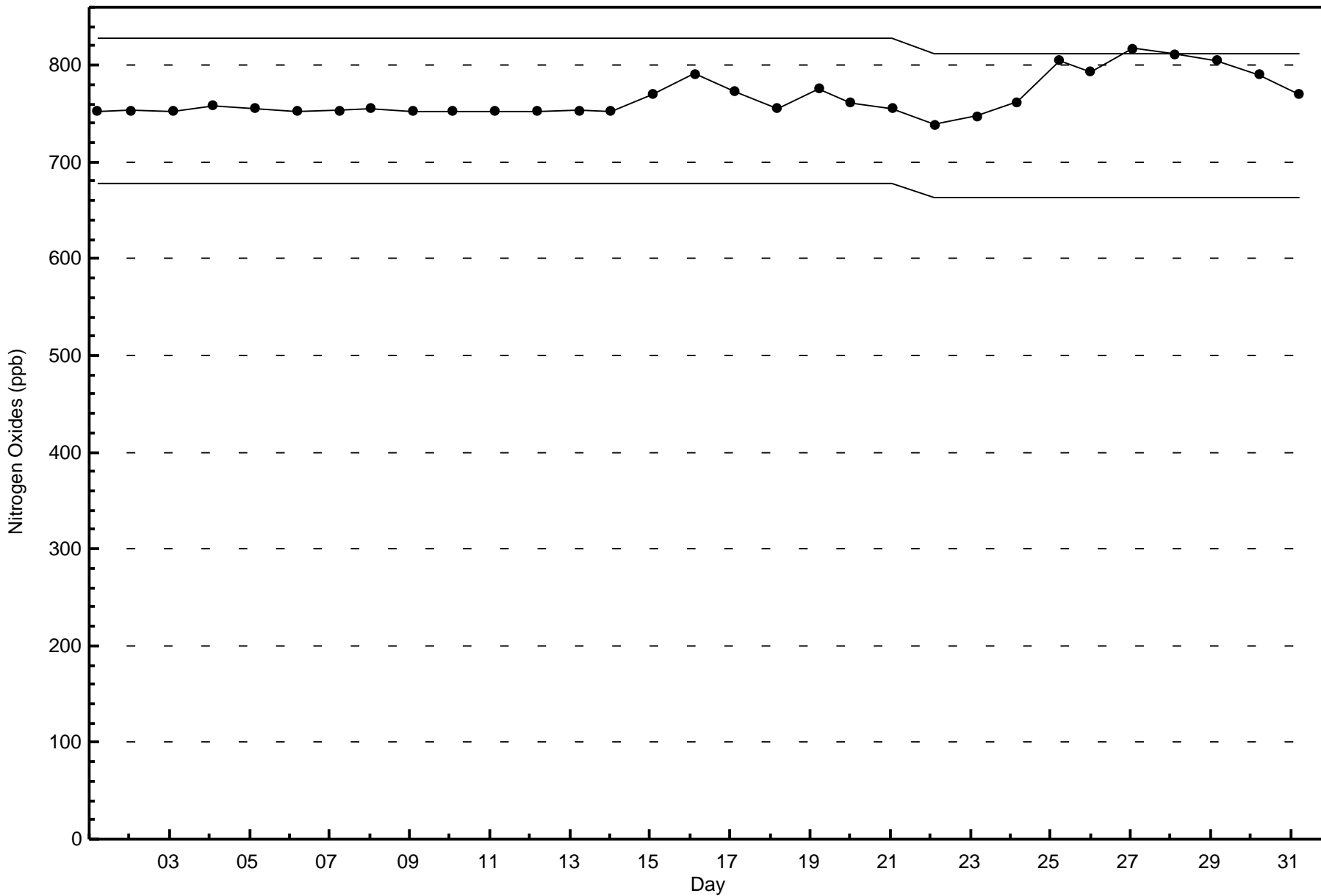
Wood Buffalo Environmental Association
Wind Rose Mar 2017

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



Total Number of Valid Hours: 694







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

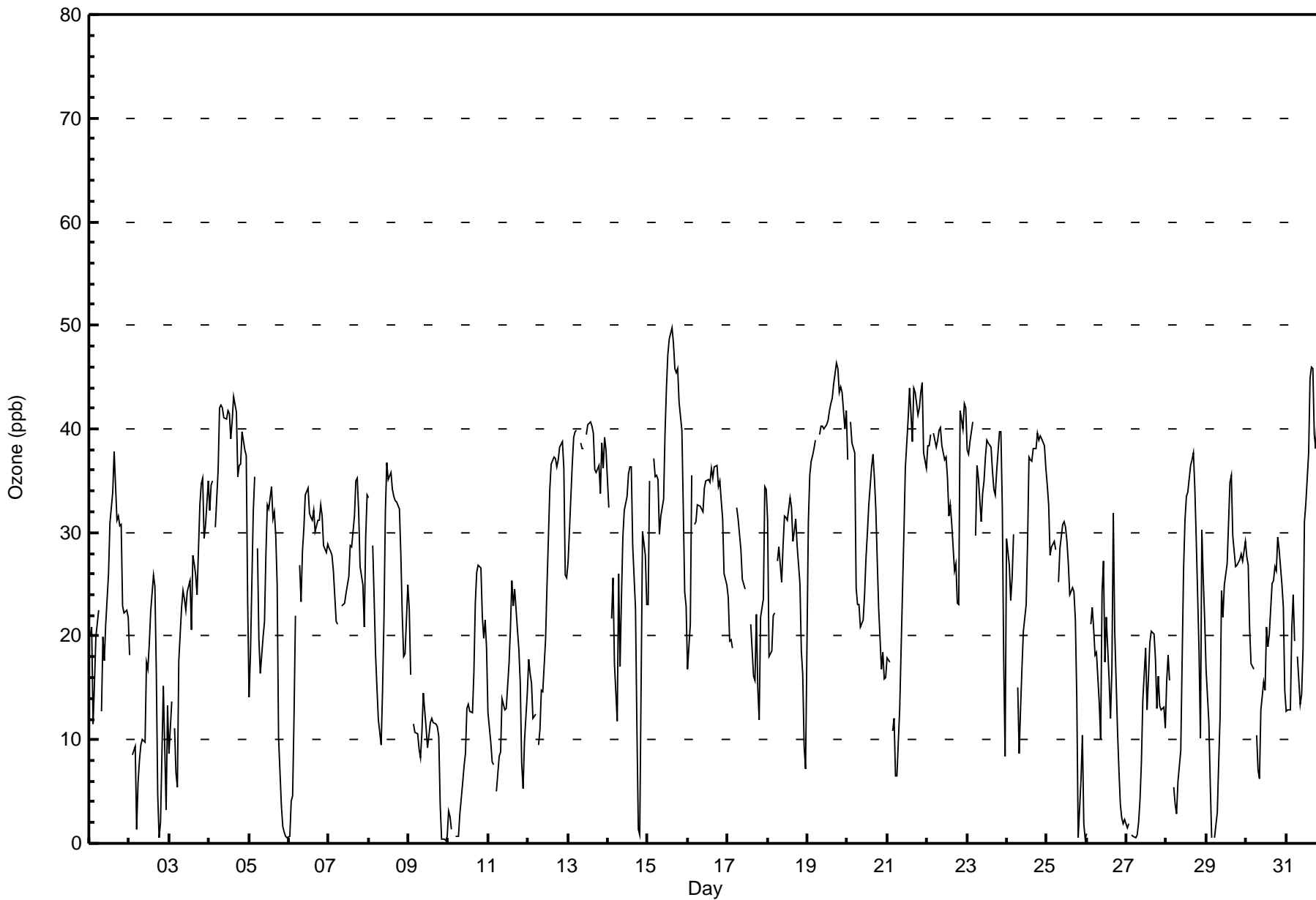
Fort McKay - Bertha Ganter - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 50 ppb on Mar 15 15:00	Maximum Daily Average: 40.7 ppb on Mar 19		Hours of Data:	708
Minimum Value: 0 ppb on Mar 9 23:00	Minimum Daily Average: 9.5 ppb on Mar 9		Hours of Missing Data:	36
Maximum Diurnal Average: 31.5 ppb at hour 15	Minimum Diurnal Average: 18.5 ppb at hour 7		Hours of Calibration:	34
Monthly Average: 24.9 ppb	Percentiles: P ₁ = 1 P ₁₀ = 8 Q ₁ = 16 Median = 26 O ₃ = 35 P ₉₀ = 39 P ₉₉ = 46		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-Mar	20	21	11	15	20	23	Z	13	20	18	21	26	31	32	34	38	31	32	31	31	23	22	22	22	24.2	38
2-Mar	18	Z	8	9	1	6	8	10	10	10	17	17	19	22	26	25	17	5	1	2	15	9	3	13	11.8	26
3-Mar	9	14	Z	11	7	5	18	23	24	24	23	24	25	21	28	27	26	24	33	35	35	29	31	35	23.0	35
4-Mar	32	35	35	Z	31	36	42	42	42	41	41	42	42	39	41	43	42	35	36	37	40	38	37	23	37.9	43
5-Mar	14	18	32	35	Z	28	20	16	20	21	28	33	32	34	31	32	30	25	10	4	2	1	1	1	20.4	35
6-Mar	1	4	5	12	22	Z	27	23	28	30	34	34	32	31	31	32	30	31	31	33	32	29	28	29	25.6	34
7-Mar	28	28	28	26	21	21	Z	UO	23	23	24	25	26	29	29	32	35	35	32	27	25	21	30	34	27.3	35
8-Mar	33	Z	29	24	18	15	12	9	15	22	32	37	35	36	34	34	33	33	32	28	22	18	18	25	25.8	37
9-Mar	23	16	Z	12	11	11	9	8	11	14	11	9	10	12	12	12	11	11	10	4	0	0	0	1	9.5	23
10-Mar	3	3	1	Z	1	1	1	3	6	7	9	13	13	13	13	17	23	26	27	27	22	20	22	19	12.5	27
11-Mar	13	10	8	8	Z	5	8	9	14	13	13	13	17	21	25	23	25	21	19	15	8	5	10	15	13.7	25
12-Mar	18	16	15	12	13	Z	9	11	15	15	20	25	29	34	37	37	37	36	37	38	39	36	26	26	25.3	39
13-Mar	27	30	37	39	40	40	Z	39	38	38	M	39	40	41	40	40	36	36	36	34	39	36	39	38	37.4	41
14-Mar	32	Z	22	26	17	12	26	17	24	30	32	34	36	36	29	23	11	1	1	15	30	28	23	23.5	36	
15-Mar	23	35	Z	37	35	36	35	30	32	33	40	44	47	49	50	48	46	45	46	43	40	32	24	23	37.9	50
16-Mar	17	21	35	Z	31	31	33	33	32	32	34	35	35	35	36	35	36	36	34	35	33	31	26	25	31.9	36
17-Mar	24	19	20	19	Z	32	31	30	28	25	24	C	C	C	21	16	16	22	15	12	22	24	34	34	23.5	34
18-Mar	31	18	19	22	22	Z	27	29	25	29	32	31	31	33	32	29	30	31	29	25	19	16	9	7	25.1	33
19-Mar	31	36	37	37	38	39	Z	40	40	40	40	40	41	42	42	43	44	46	46	44	44	44	40	42	40.7	46
20-Mar	37	Z	41	39	38	25	23	23	21	22	24	27	30	33	36	38	35	32	27	23	17	18	16	16	27.8	41
21-Mar	18	17	Z	11	12	7	6	13	19	24	30	36	41	44	42	39	44	43	41	42	43	44	38	36	30.1	44
22-Mar	38	38	39	Z	40	38	39	40	40	38	37	37	35	32	33	31	26	27	23	23	42	40	43	42	35.7	43
23-Mar	38	38	39	41	Z	30	37	35	31	34	35	37	39	39	38	36	34	34	36	40	40	32	18	8	34.2	41
24-Mar	29	27	24	26	30	Z	15	9	13	17	21	23	29	37	37	37	38	38	40	39	39	39	38	36	29.6	40
25-Mar	35	33	28	29	29	28	Z	25	28	31	31	31	29	27	24	25	24	22	14	1	6	10	2	0	22.2	35
26-Mar	1	Z	21	23	21	18	18	14	10	24	27	18	22	16	12	17	32	21	11	7	4	2	2	2	14.9	32
27-Mar	2	2	Z	1	1	1	1	2	4	8	14	19	13	16	19	21	20	18	13	16	13	13	13	11	10.4	21
28-Mar	16	18	16	Z	5	4	3	6	9	18	26	31	34	34	36	37	38	34	29	19	10	30	25	22	21.8	38
29-Mar	17	12	6	1	Z	1	3	8	12	24	22	25	27	31	35	35	30	27	27	27	27	28	27	29	20.9	35
30-Mar	28	27	21	17	17	Z	10	7	6	13	16	15	21	19	20	25	25	27	26	30	28	25	23	15	20.0	30
31-Mar	13	13	13	21	24	20	Z	18	13	14	19	31	33	38	45	46	46	39	38	44	38	33	21	44	28.8	46

21.5	21.1	22.6	21.2	20.9	19.6	18.5	19.4	21.1	23.7	25.9	28.4	29.9	30.8	31.5	31.5	31.1	29.2	26.9	25.2	25.2	24.5	22.4	22.4	Diurnal Average	
38	38	41	41	40	40	42	42	42	41	41	44	47	49	50	48	46	46	46	44	44	44	43	44	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	242	34.18	34.18
21 - 50	466	65.82	100.00
51 - 82	0	0.00	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 - Bertha Ganter - March 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	56	7	9	16	4	5	5	12	21	8	9	6	9	13	21	30	231
21 - 50	132	38	13	6	6	12	24	96	43	9	3	2	5	20	28	29	466
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	188	45	22	22	10	17	29	108	64	17	12	8	14	33	49	59	697

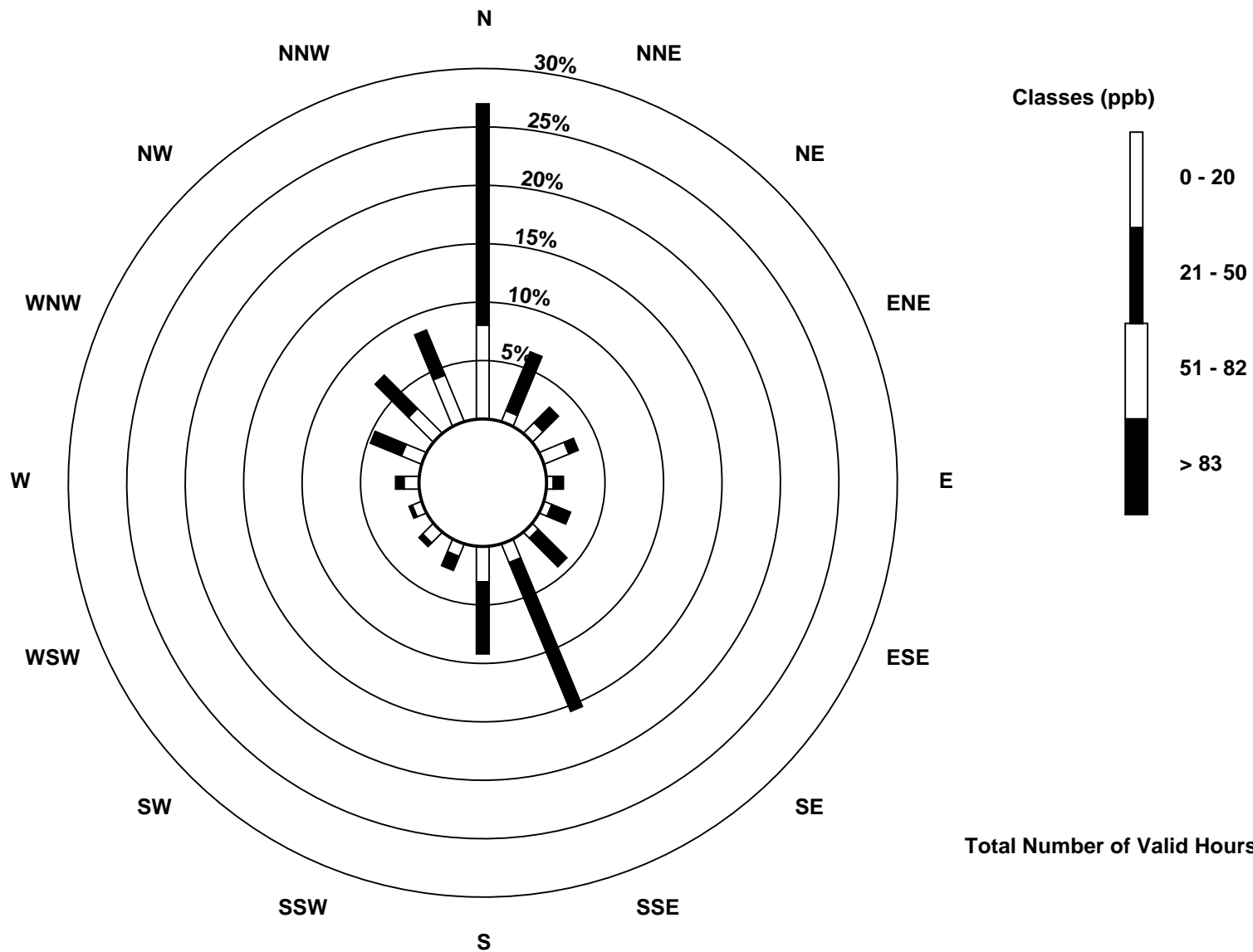
Total Number of Valid Hours: 697

Total Number of Hours: 744

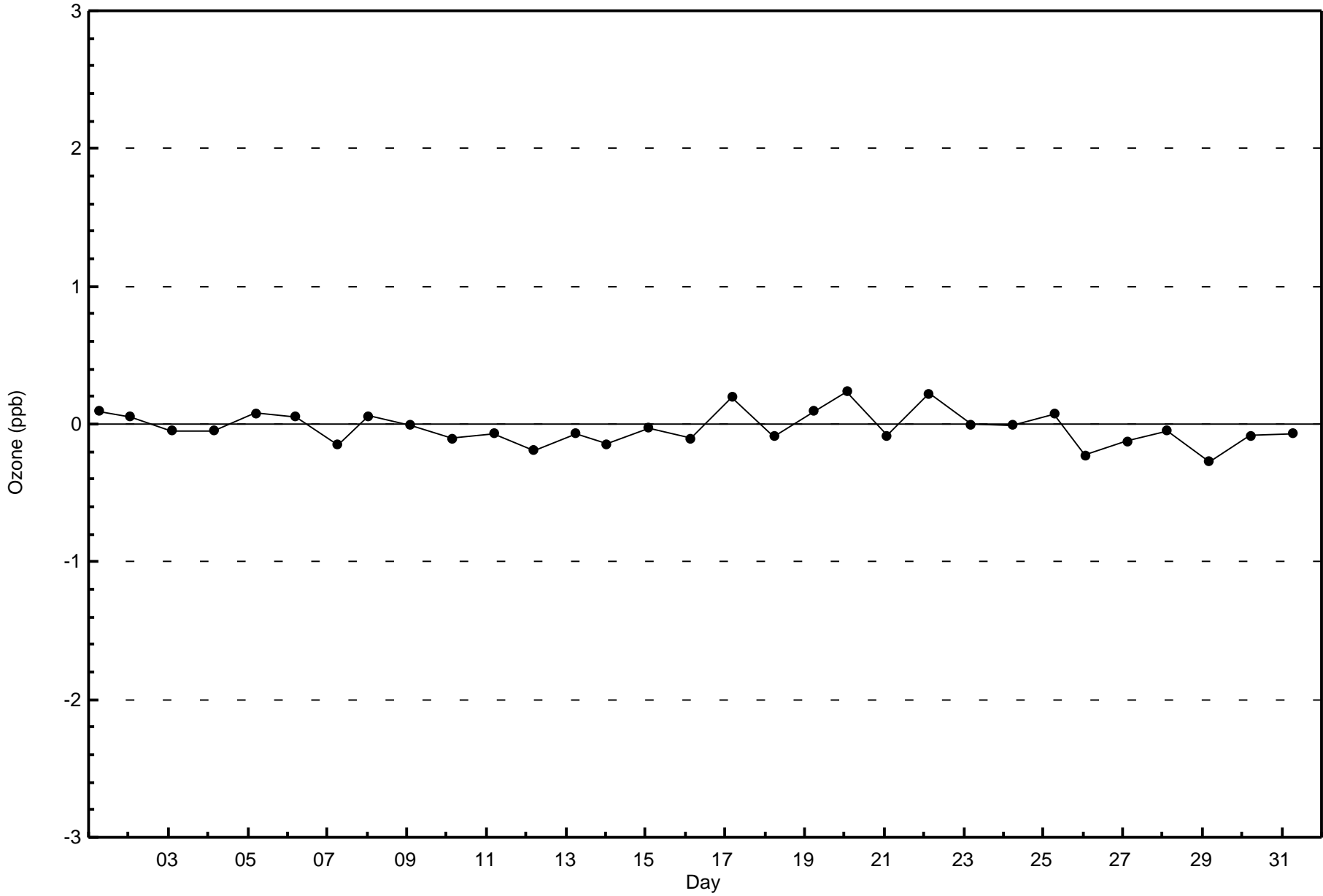


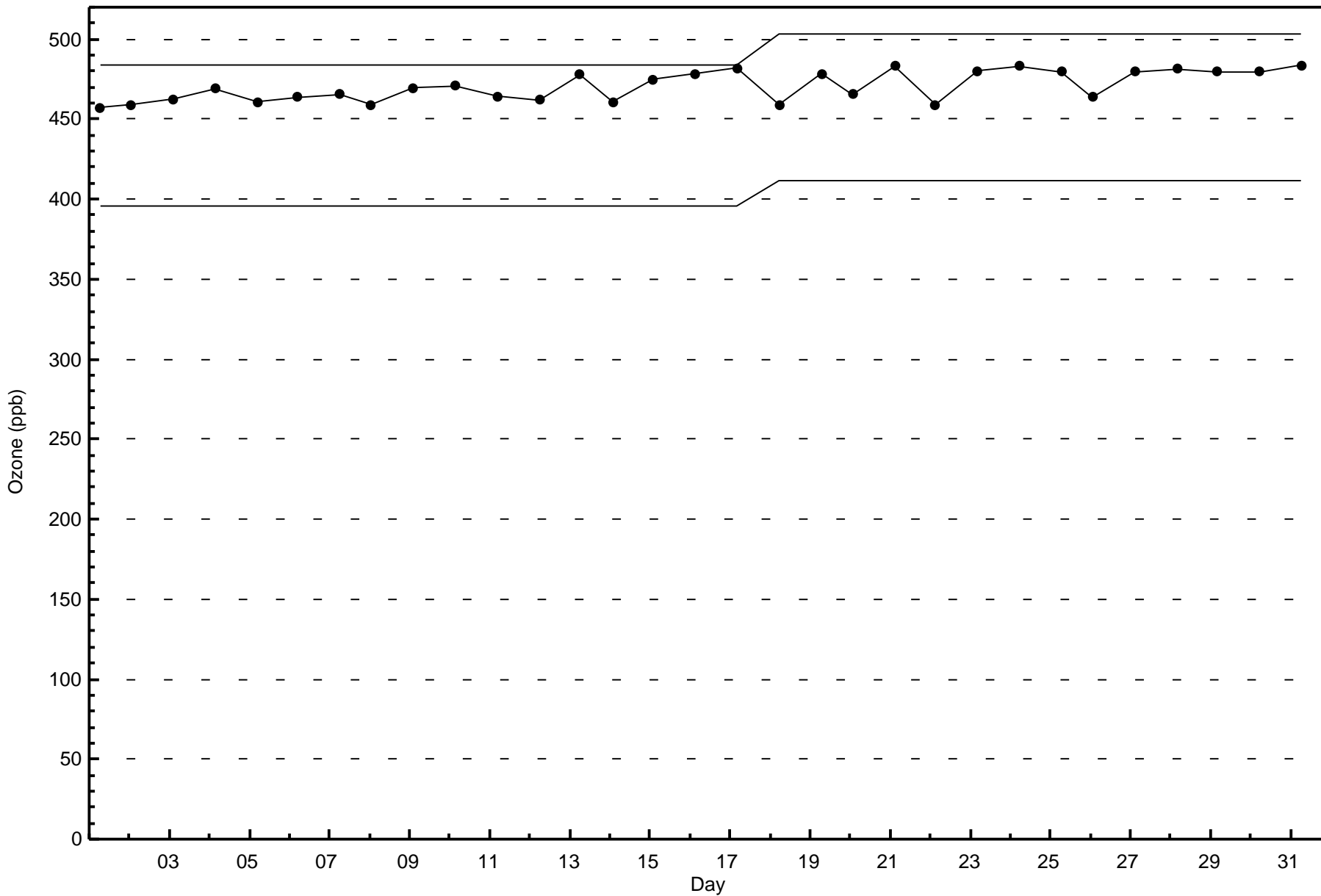
Wood Buffalo Environmental Association
Wind Rose Mar 2017

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



Total Number of Valid Hours: 697







Wood Buffalo Environmental Association

Summary of Hour Averages

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

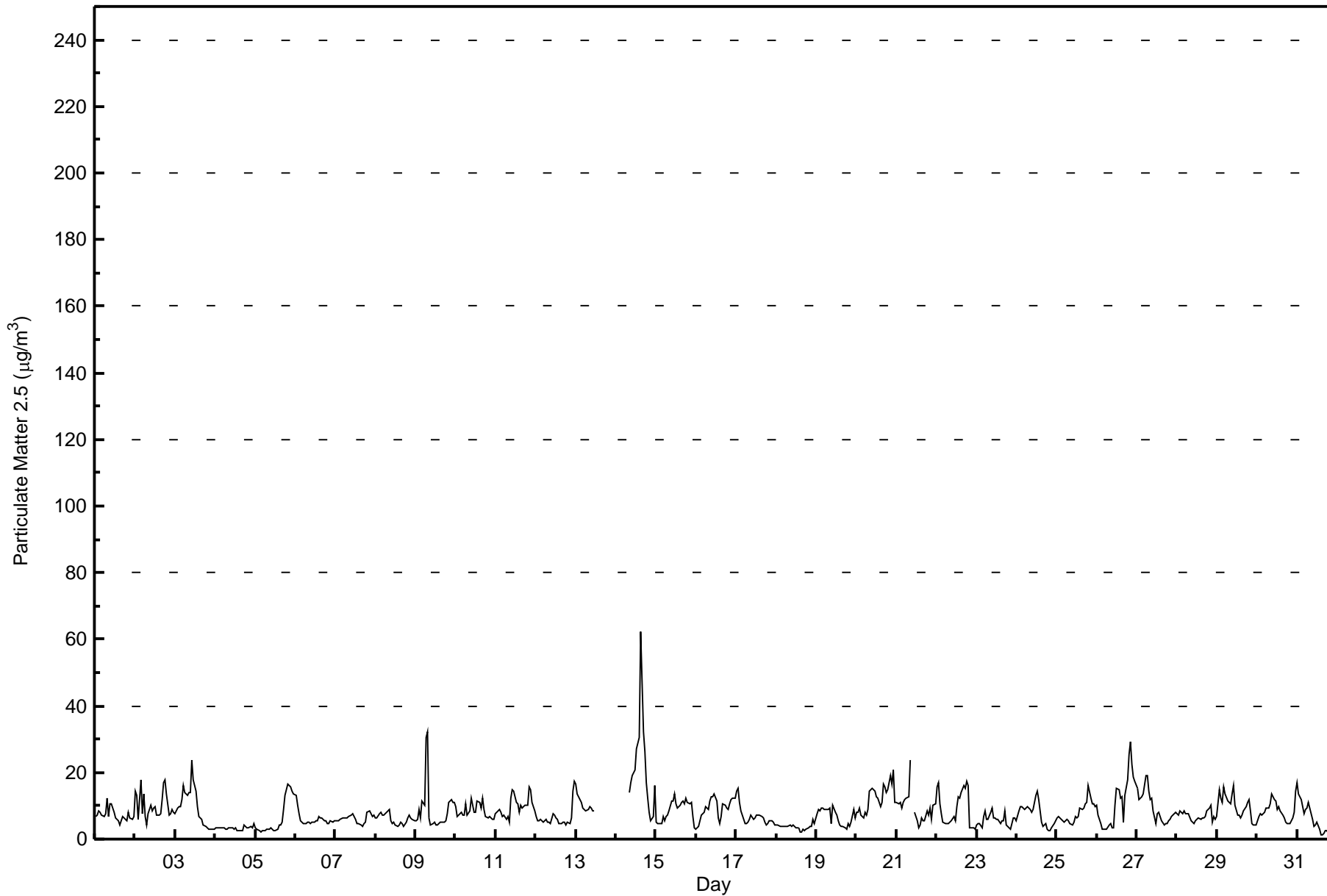
Fort McKay - Bertha Ganter - March 2017

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 744																									
Maximum Value: 62.1 µg/m ³ on Mar 14 16:00		Maximum Daily Average: 12.4 µg/m ³ on Mar 20																									
Minimum Value: 0.3 µg/m ³ on Apr 1 00:00		Hours of Data: 722																									
Maximum Diurnal Average: 8.9 µg/m ³ at hour 11		Hours of Missing Data: 22																									
Monthly Average: 8.16 µg/m ³		Hours of Calibration: 2																									
Minimum Daily Average: 3.3 µg/m ³ on Mar 4		Percent Operational Time: 97.3																									
Minimum Diurnal Average: 7.3 µg/m ³ at hour 15		Percentiles: P ₁ = 2.2 P ₁₀ = 3.5 Q ₁ = 4.9 Median = 7.0 Q ₃ = 10.2 P ₉₀ = 14.2 P ₉₉ = 28.3																									
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-Mar	6.6	7.2	8.5	8.0	7.2	7.0	7.5	12.4	6.6	10.7	10.8	8.1	6.3	6.0	5.5	4.3	6.6	6.3	5.8	5.3	7.9	6.2	5.8	6.8	7.2	12.4	
2-Mar	14.3	13.3	5.7	17.7	7.8	13.4	6.8	4.1	7.8	10.3	8.5	9.5	9.7	7.1	7.1	7.4	11.8	17.1	17.6	13.7	7.2	7.7	9.1	8.1	10.1	17.7	
3-Mar	7.6	9.3	9.8	9.5	12.0	15.9	13.8	13.3	14.2	14.0	23.6	17.8	14.2	9.7	6.7	6.5	5.8	4.4	3.9	3.2	3.1	3.2	3.0	3.0	9.5	23.6	
4-Mar	3.2	3.5	3.3	3.5	3.4	3.5	3.1	3.1	3.3	3.5	3.4	2.8	3.4	2.7	2.6	2.4	2.7	4.2	3.8	3.5	3.2	3.7	3.5	4.6	3.3	4.6	
5-Mar	3.6	3.0	2.4	2.3	2.3	2.4	2.7	3.0	2.9	3.3	2.9	2.7	2.8	2.9	4.0	4.3	5.2	9.1	13.0	16.4	16.1	15.7	14.2	13.4	6.3	16.4	
6-Mar	12.9	10.3	7.8	5.6	5.0	4.8	4.8	5.1	5.0	4.6	4.9	5.1	5.5	5.4	7.0	6.5	6.4	5.6	5.3	4.6	4.5	5.4	5.3	5.4	5.9	12.9	
7-Mar	5.6	5.6	5.6	5.7	6.2	6.2	6.3	6.3	7.0	7.4	7.5	6.8	6.1	4.8	4.5	4.0	4.0	4.5	5.2	8.1	8.4	7.6	6.6	7.3	6.1	8.4	
8-Mar	6.3	6.5	7.6	7.9	7.1	7.1	7.6	8.5	9.1	5.7	4.8	5.2	4.2	3.8	4.2	4.9	4.6	3.9	5.0	6.5	7.4	6.4	6.0	5.4	6.1	9.1	
9-Mar	5.5	6.1	9.0	6.3	11.3	10.1	30.4	32.3	6.5	4.4	4.6	5.1	4.2	4.1	4.5	5.1	5.2	5.0	5.3	7.6	10.8	11.9	11.1	11.2	9.1	32.3	
10-Mar	9.8	6.9	7.4	8.1	7.1	7.0	10.4	7.1	8.6	12.4	10.1	8.1	8.2	11.3	11.2	9.4	12.3	8.7	6.9	6.2	6.6	6.4	5.7	6.0	8.4	12.4	
11-Mar	7.5	8.6	8.8	7.9	6.6	7.4	6.1	6.8	5.2	12.4	15.0	14.3	10.9	10.8	7.9	10.1	9.3	10.3	10.1	10.4	15.7	15.0	11.0	8.4	9.9	15.7	
12-Mar	6.7	5.6	5.5	6.0	5.2	5.5	5.7	5.1	5.1	4.7	7.8	7.3	6.2	5.9	4.6	4.5	5.2	5.1	4.2	5.0	4.5	6.4	14.6	17.4	6.4	17.4	
13-Mar	16.7	13.4	11.8	11.0	9.1	8.8	8.4	9.1	9.8	9.4	8.4	8.4	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	16.7	
14-Mar	DF	DF	DF	DF	DF	DF	DF	DF	14.1	16.8	18.9	20.8	27.0	28.7	30.4	62.1	32.0	26.4	17.0	12.4	8.2	5.3	6.9	15.9	--	62.1	
15-Mar	5.2	4.6	4.6	4.8	6.7	5.4	6.7	7.4	8.5	11.3	11.6	13.4	10.6	9.4	10.0	11.0	11.6	10.7	12.3	11.1	10.4	11.1	6.8	3.5	8.7	13.4	
16-Mar	3.1	3.6	5.4	7.3	7.6	8.2	9.7	9.1	11.4	12.6	12.8	13.6	11.4	6.5	4.8	6.6	10.5	10.0	9.2	9.0	10.4	11.7	12.2	12.1	9.1	13.6	
17-Mar	14.3	15.3	11.0	8.5	5.9	4.6	4.5	4.9	6.1	7.3	5.9	6.2	7.2	7.3	7.2	6.7	6.3	5.0	4.4	4.8	5.3	5.6	5.1	4.2	6.8	15.3	
18-Mar	4.2	4.2	4.0	3.8	3.9	3.7	3.8	4.0	4.1	3.7	4.1	3.7	3.6	3.5	2.3	2.3	2.9	2.7	3.0	3.5	3.8	3.7	6.1	4.8	3.7	6.1	
19-Mar	7.5	8.7	8.6	9.5	9.3	8.8	8.8	9.0	9.1	4.8	10.2	8.2	7.3	5.7	4.4	3.8	3.7	3.3	3.2	4.5	3.8	5.2	8.8	6.2	6.8	10.2	
20-Mar	7.8	8.0	9.1	7.1	6.4	8.0	7.4	9.1	14.4	15.1	15.0	14.5	12.9	12.3	9.6	11.1	16.6	15.7	14.1	14.9	19.1	16.5	20.6	11.2	12.4	20.6	
21-Mar	10.9	10.5	10.9	9.5	10.8	11.9	12.2	12.9	23.9	C	C	8.1	5.4	3.6	4.1	6.2	5.4	5.5	8.7	7.4	9.4	6.0	10.1	10.5	9.3	23.9	
22-Mar	15.6	17.1	10.5	7.5	5.0	4.8	4.7	4.7	5.1	5.4	6.6	5.7	9.7	12.7	12.4	14.2	16.2	15.3	17.2	16.2	3.4	3.3	3.3	3.0	9.2	17.2	
23-Mar	4.4	4.7	4.5	3.6	6.9	8.7	5.7	6.1	8.1	9.3	6.5	6.3	6.1	6.1	4.9	5.4	5.4	8.4	4.1	3.4	3.2	4.5	6.2	6.3	5.8	9.3	
24-Mar	5.4	8.3	9.8	9.6	9.5	9.0	10.0	9.4	8.7	8.2	8.7	13.1	14.4	11.7	8.3	5.0	4.0	4.5	3.1	2.7	2.7	3.2	4.6	5.5	7.5	14.4	
25-Mar	6.4	6.7	6.5	6.0	5.0	5.3	5.8	5.4	4.5	4.3	5.1	6.7	6.3	6.8	9.5	8.9	9.5	10.8	10.8	15.9	12.5	10.4	10.6	9.8	7.9	15.9	
26-Mar	10.2	7.2	4.5	3.1	2.9	2.9	2.8	4.1	4.7	3.3	3.4	10.2	15.1	14.6	12.4	12.9	5.2	13.2	17.9	25.4	29.4	22.5	18.8	17.4	11.0	29.4	
27-Mar	15.1	12.0	12.4	12.8	13.4	18.9	19.2	14.3	12.0	12.4	8.3	4.6	7.7	7.9	6.8	5.3	4.4	4.7	4.8	5.4	5.9	6.8	7.7	8.2	9.6	19.2	
28-Mar	7.8	7.0	8.5	7.5	8.3	7.4	7.5	7.8	5.3	5.2	4.7	5.5	6.1	6.4	5.7	6.2	6.5	7.0	8.3	9.3	10.0	5.3	7.0	6.0	6.9	10.0	
29-Mar	6.8	15.0	12.1	10.9	15.7	13.6	11.4	10.8	10.6	13.7	16.3	10.0	7.1	7.0	6.2	7.3	8.4	9.7	11.0	11.8	8.6	4.7	4.3	4.4	9.9	16.3	
30-Mar	5.5	6.9	7.5	7.2	8.1	9.3	9.5	9.4	10.7	13.7	11.7	11.5	9.1	9.8	8.6	7.0	6.5	5.1	4.8	4.8	4.8	6.2	7.9	14.3	8.3	14.3	
31-Mar	16.8	13.7	11.9	9.6	7.5	8.8	9.5	10.9	7.8	5.9	3.9	4.4	5.0	3.0	1.1	1.2	1.9	2.5	2.4	1.5	1.1	1.2	2.2	0.3	5.6	16.8	
																								Diurnal Average			
																								Diurnal Maximum			
8.4 8.4 7.8 7.6 7.4 7.9 8.4 8.5 8.4 8.5 8.9 8.6 8.5 7.9 7.3 8.4 7.9 8.2 8.1 8.5 8.2 7.6 8.2 8.0																								Diurnal Average			
16.8 17.1 12.4 17.7 15.7 18.9 30.4 32.3 23.9 16.8 23.6 20.8 27.0 28.7 30.4 62.1 32.0 26.4 17.9 25.4 29.4 22.5 20.6 17.4																								Diurnal Maximum			
C - Calibration				DF - DAS 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}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - March 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 - March 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	240	33.24	33.24
6 - 15	433	59.97	93.21
16 - 25	39	5.40	98.62
26 - 80	9	1.25	99.86
> 81.0	0	0.00	99.86

Total Number of Valid Hours: 722

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 - March 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	87	23	9	5	6	11	15	23	15	2	0	0	1	5	19	19	240
6 - 15	106	23	13	15	4	7	12	64	34	12	10	7	12	32	31	43	425
16 - 25	5	0	0	1	0	0	2	12	6	2	2	1	1	2	1	0	35
26 - 80	1	0	0	1	0	0	1	2	1	1	0	1	1	0	0	0	9
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	199	46	22	22	10	18	30	101	56	17	12	9	15	39	51	62	709

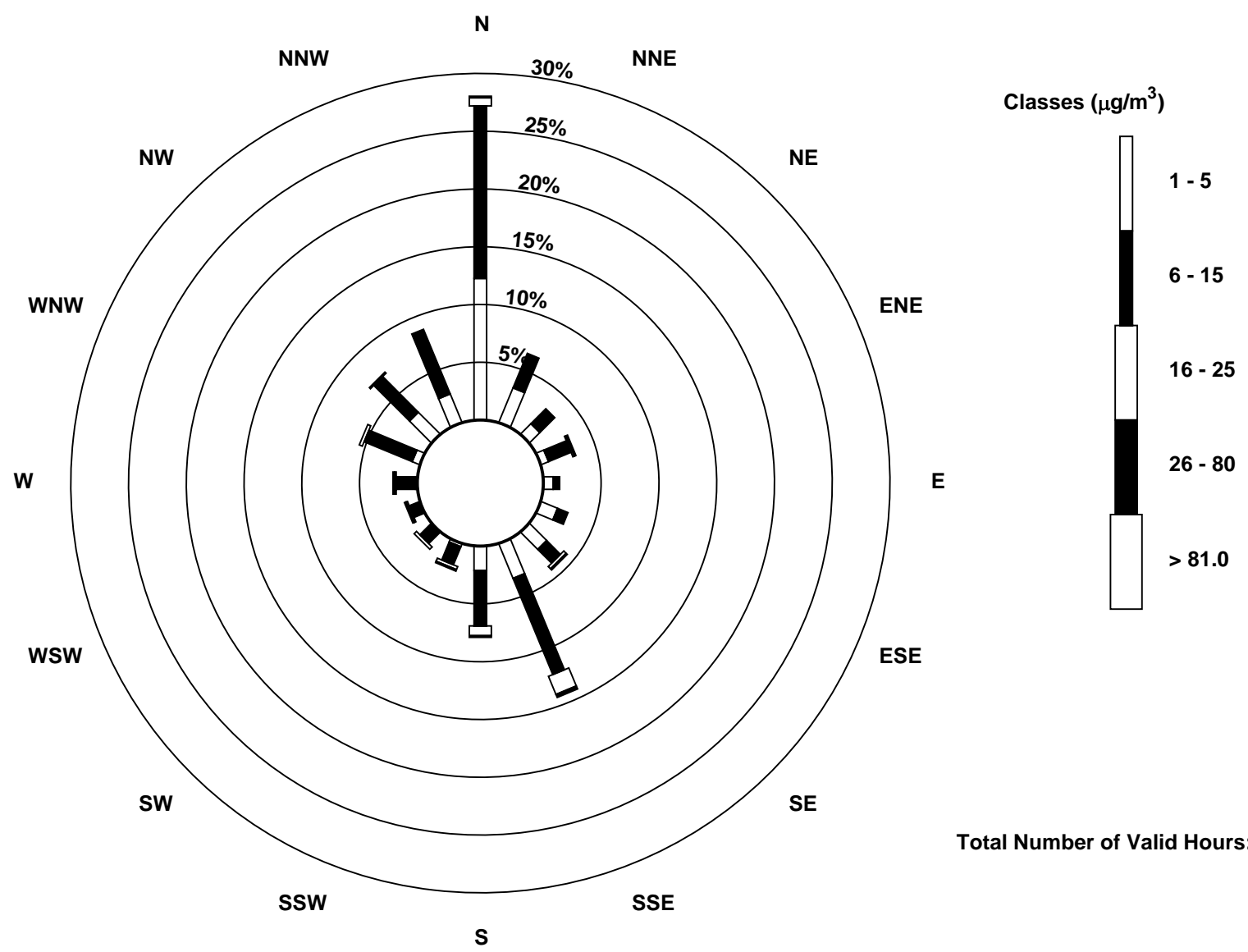
Total Number of Valid Hours: 710

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

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





Summary of Hour Averages

Fort McKay - Bertha Ganter - March 2017

Number of Exceedences (AAAQO): 1-hr: 0	Maximum Value: 0 ppb on Mar 1 01:00	Maximum Daily Average: 0.0 ppb on Mar 1	Hours in Service: 744
Minimum Value: 0 ppb on Mar 1 01:00	Maximum Diurnal Average: 0.0 ppb at hour 1	Minimum Daily Average: 0.0 ppb on Mar 1	Hours of Data: 664
Monthly Average: 0.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 0	Minimum Diurnal Average: 0.0 ppb at hour 1	Hours of Missing Data: 80
			Hours of Calibration: 46
			Percent Operational Time: 95.4

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-Mar	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
2-Mar	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
3-Mar	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
4-Mar	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	0
5-Mar	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
6-Mar	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
7-Mar	0	0	0	0	0	0	UO	UO	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
8-Mar	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
9-Mar	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
10-Mar	0	0	0	0	UO	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
11-Mar	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
12-Mar	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
13-Mar	0	0	0	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
14-Mar	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
15-Mar	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
16-Mar	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	0
17-Mar	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
18-Mar	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
19-Mar	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
20-Mar	0	0	0	Z	RE	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
21-Mar	0	0	0	0	Z	RE	0	0	C	C	C	C	C	C	C	C	C	C	C	0	0	0	0	0	0	--	0
22-Mar	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	0
23-Mar	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
24-Mar	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
25-Mar	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
26-Mar	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
27-Mar	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
28-Mar	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	0
29-Mar	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
30-Mar	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
31-Mar	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

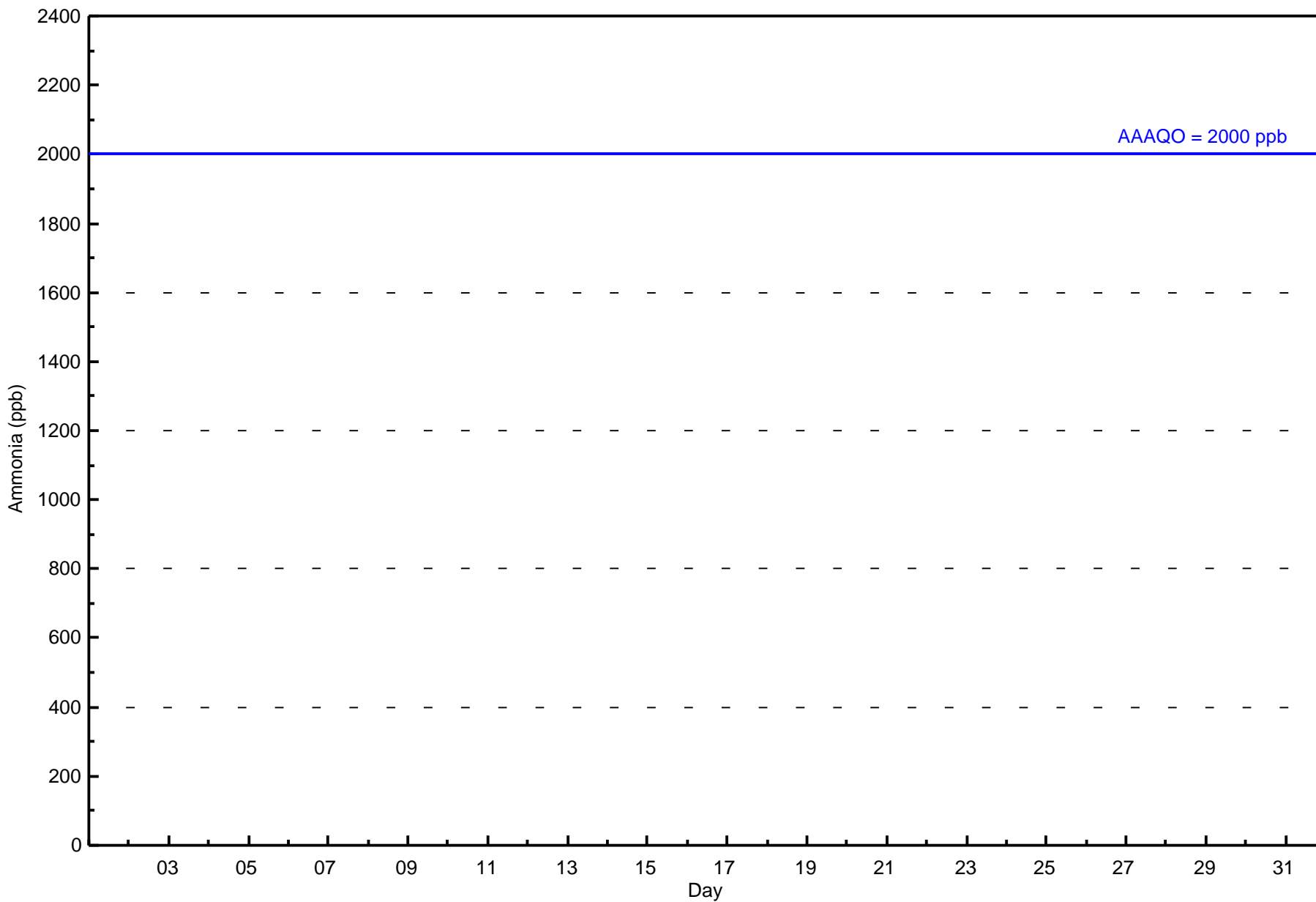
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum

Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation 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 - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	664	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: 664

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - March 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	179	45	20	17	8	14	26	100	59	16	10	9	10	34	49	58	654
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	179	45	20	17	8	14	26	100	59	16	10	9	10	34	49	58	654

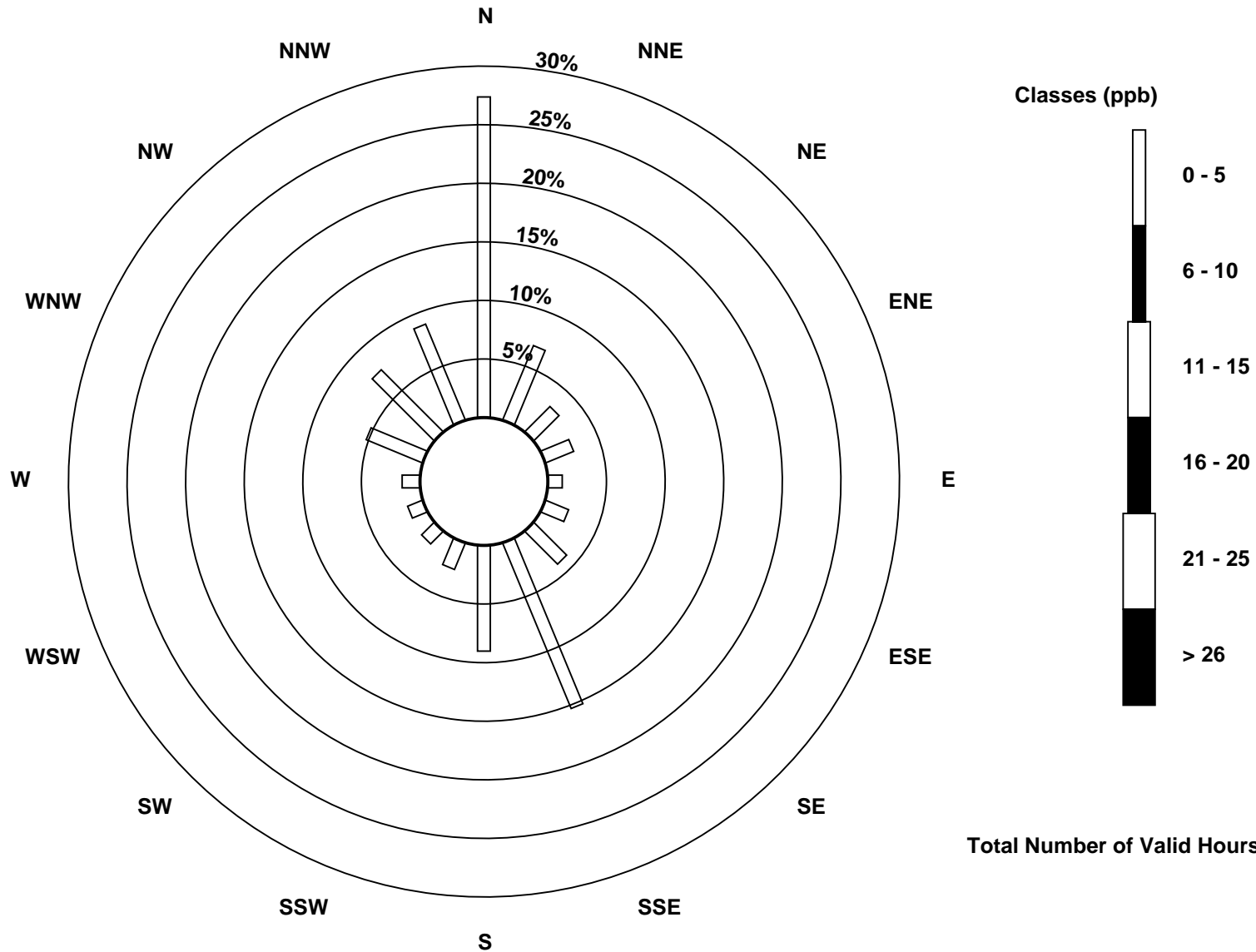
Total Number of Valid Hours: 654

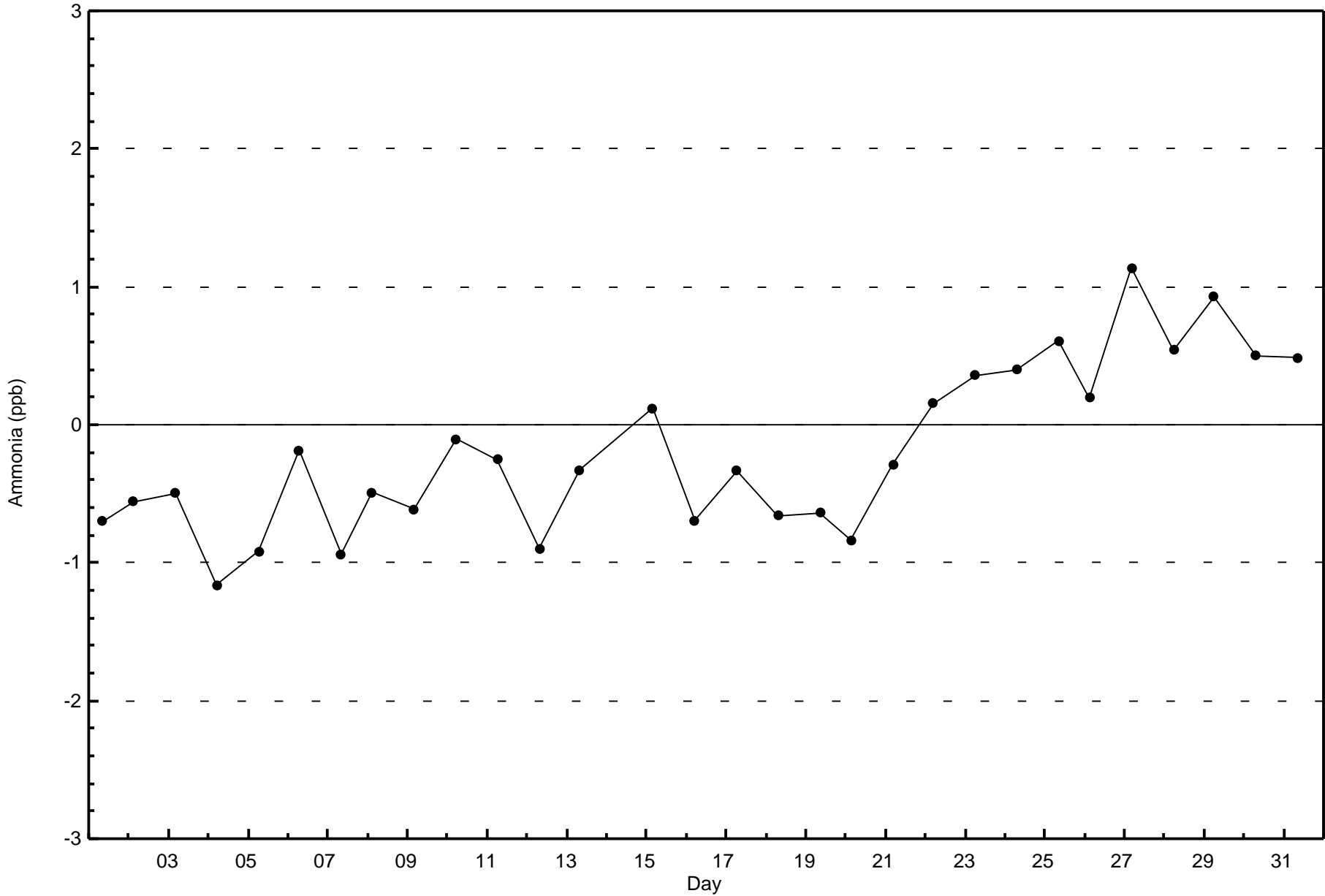
Total Number of Hours: 744

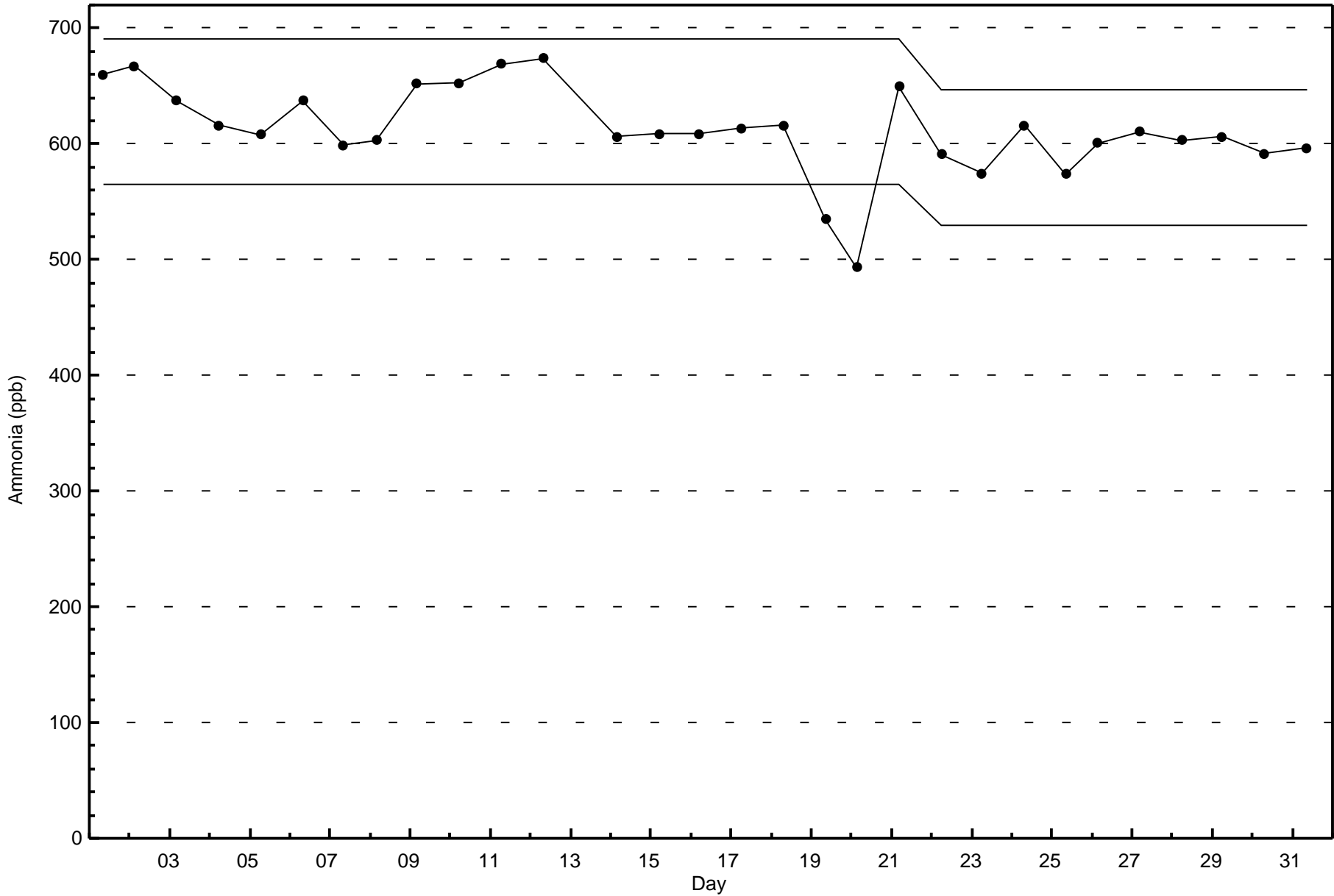


Wood Buffalo Environmental Association
Wind Rose Mar 2017

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









Wood Buffalo Environmental Association
Summary of Hour Averages

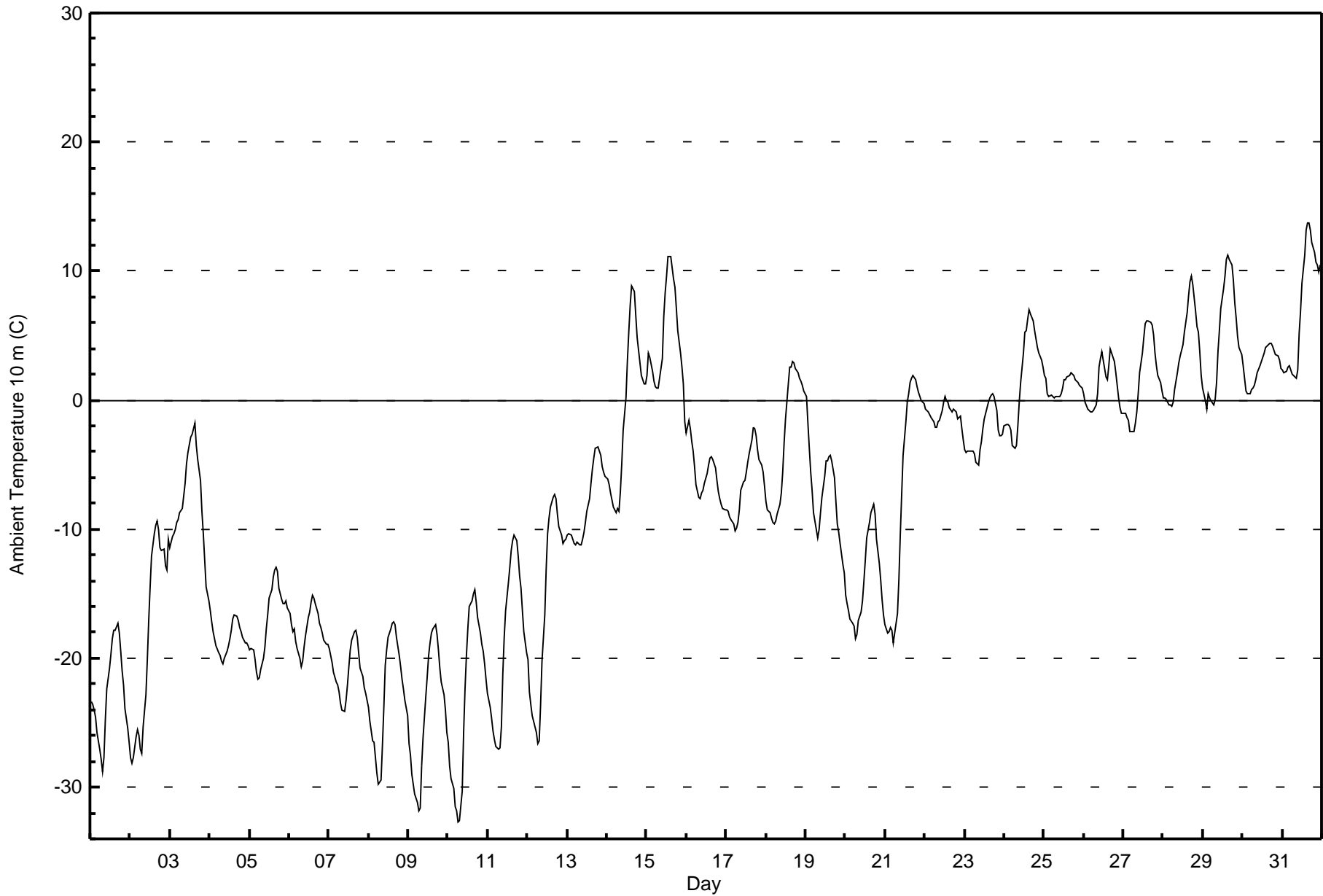
Ambient Temperature 10 m (AT 10m) - C
Fort McKay - Bertha Ganter - March 2017

Maximum Value: 13.7 C on Mar 31 16:00 Maximum Daily Average: 7.2 C on Mar 31																							Hours in Service: 744 Hours of Data: 744			
Minimum Value: -32.7 C on Mar 10 07:00 Minimum Daily Average: -24.2 C on Mar 9 Maximum Diurnal Average: -3.4 C at hour 17 Minimum Diurnal Average: -12.8 C at hour 7 Monthly Average: -8.23 C Percentiles: P ₁ = -30.6 P ₁₀ = -23.2 Q ₁ = -17.8 Median = -7.1 Q ₃ = 0.6 P ₉₀ = 4.0 P ₉₉ = 11.0																							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-Mar	-23.4	-23.6	-24.0	-24.5	-25.7	-27.1	-27.8	-28.8	-27.7	-24.8	-22.4	-20.8	-19.7	-18.5	-17.8	-17.8	-17.3	-18.0	-19.5	-21.0	-22.0	-23.9	-25.4	-26.5	-22.8	-17.3
2-Mar	-27.7	-28.2	-27.7	-26.1	-25.6	-26.0	-27.1	-27.3	-25.3	-22.9	-20.2	-17.1	-14.4	-12.1	-10.3	-9.7	-9.4	-10.0	-11.5	-11.6	-11.5	-12.9	-13.1	-10.8	-18.3	-9.4
3-Mar	-11.5	-10.6	-10.3	-10.0	-9.5	-9.2	-8.7	-8.5	-7.4	-6.5	-5.0	-4.1	-2.8	-2.7	-2.2	-1.8	-3.5	-4.6	-6.3	-8.6	-10.3	-12.4	-14.5	-15.6	-7.8	-1.8
4-Mar	-16.4	-17.1	-18.0	-18.5	-19.0	-19.5	-19.7	-20.3	-20.4	-20.0	-19.5	-19.1	-18.5	-17.9	-17.0	-16.7	-16.7	-17.1	-17.6	-17.9	-18.4	-18.8	-18.8	-19.0	-18.4	-16.4
5-Mar	-19.4	-19.2	-19.4	-20.1	-21.1	-21.6	-21.5	-20.9	-20.1	-19.2	-17.8	-16.7	-15.4	-14.6	-13.8	-13.2	-13.0	-13.3	-14.6	-15.5	-15.8	-15.7	-15.6	-16.1	-17.2	-13.0
6-Mar	-16.5	-17.4	-18.0	-17.7	-18.7	-19.3	-20.0	-20.7	-20.2	-19.1	-18.3	-16.9	-16.4	-15.7	-15.2	-15.3	-15.7	-16.6	-17.3	-17.6	-18.0	-18.6	-18.9	-18.9	-17.8	-15.2
7-Mar	-19.3	-19.8	-20.4	-21.1	-21.8	-22.1	-22.7	-23.5	-24.0	-24.2	-23.2	-22.1	-20.7	-19.3	-18.6	-18.0	-17.8	-18.3	-19.6	-20.8	-21.4	-22.3	-22.8	-23.3	-21.1	-17.8
8-Mar	-23.8	-24.9	-26.4	-26.6	-27.7	-28.9	-29.7	-29.5	-26.7	-23.8	-20.5	-19.3	-18.4	-17.7	-17.3	-17.2	-17.4	-18.4	-19.8	-20.7	-21.7	-22.4	-23.2	-24.5	-22.8	-17.2
9-Mar	-26.6	-27.5	-29.0	-29.7	-30.6	-31.1	-31.8	-31.6	-28.3	-26.2	-22.9	-21.4	-19.8	-18.8	-18.1	-17.7	-17.4	-18.1	-19.4	-20.8	-21.9	-22.8	-24.0	-25.7	-24.2	-17.4
10-Mar	-26.5	-28.3	-29.3	-30.1	-31.5	-31.9	-32.7	-32.6	-30.3	-25.7	-22.4	-19.8	-17.7	-16.0	-15.6	-15.0	-14.7	-15.7	-16.8	-18.0	-18.9	-19.4	-20.4	-21.6	-23.0	-14.7
11-Mar	-22.7	-23.8	-24.6	-25.7	-26.3	-26.8	-27.1	-26.9	-25.3	-21.2	-18.4	-16.3	-14.1	-13.0	-11.7	-10.9	-10.4	-10.9	-12.1	-13.6	-14.6	-16.4	-18.0	-19.6	-18.8	-10.4
12-Mar	-20.1	-22.6	-23.6	-24.5	-25.3	-25.8	-26.6	-26.4	-23.5	-20.3	-16.7	-13.1	-10.4	-9.1	-8.3	-7.5	-7.3	-7.7	-8.8	-9.8	-10.5	-11.1	-10.9	-10.8	-15.9	-7.3
13-Mar	-10.5	-10.4	-10.5	-10.8	-11.1	-11.2	-11.1	-11.2	-11.2	-10.8	-10.2	-9.5	-8.6	-7.6	-6.4	-5.3	-4.5	-3.7	-3.7	-3.9	-4.3	-5.1	-5.5	-5.9	-8.0	-3.7
14-Mar	-6.1	-6.5	-7.2	-7.8	-8.3	-8.7	-8.4	-8.6	-7.1	-4.9	-2.3	0.2	2.9	5.3	7.3	8.8	8.4	6.6	4.9	3.9	2.9	1.9	1.3	1.2	-0.8	8.8
15-Mar	1.9	3.7	3.4	2.2	1.4	1.0	0.9	0.9	1.7	3.2	6.4	8.3	9.6	11.1	11.1	10.3	9.4	8.8	7.1	5.3	3.6	2.5	1.2	-1.7	4.7	11.1
16-Mar	-2.6	-1.6	-2.2	-3.1	-4.0	-5.2	-6.6	-7.6	-7.7	-7.3	-7.0	-6.4	-5.6	-5.0	-4.5	-4.4	-4.6	-5.3	-6.3	-7.1	-7.7	-8.1	-8.4	-8.5	-5.7	-1.6
17-Mar	-8.5	-8.6	-9.0	-9.3	-9.6	-10.1	-9.9	-9.5	-8.5	-7.0	-6.4	-6.3	-5.5	-4.8	-4.1	-3.1	-2.2	-2.2	-2.8	-3.8	-4.6	-5.1	-5.6	-6.7	-6.4	-2.2
18-Mar	-7.9	-8.5	-8.7	-9.2	-9.5	-9.6	-9.3	-8.8	-8.0	-7.2	-5.5	-3.3	-1.4	1.3	2.6	2.6	3.0	2.9	2.4	2.1	1.7	1.5	1.2	0.7	-3.1	3.0
19-Mar	0.3	-1.8	-3.8	-5.5	-7.0	-8.7	-10.0	-10.7	-10.0	-8.7	-7.5	-5.9	-4.8	-4.7	-4.4	-4.2	-4.7	-6.0	-7.8	-9.6	-10.3	-11.1	-12.7	-13.4	-7.2	0.3
20-Mar	-15.1	-15.8	-16.3	-17.0	-17.3	-17.6	-18.5	-18.1	-17.1	-16.5	-15.6	-14.1	-12.4	-10.7	-9.4	-8.7	-8.4	-8.1	-8.8	-10.8	-12.6	-13.9	-15.4	-16.6	-13.9	-8.1
21-Mar	-17.4	-18.0	-18.0	-17.7	-17.8	-18.8	-18.0	-16.6	-13.9	-10.4	-7.3	-4.3	-1.6	-0.2	0.5	1.4	1.7	1.9	1.6	1.1	0.6	0.2	0.0	-0.2	-7.1	1.9
22-Mar	-0.7	-0.8	-0.9	-1.1	-1.4	-1.7	-2.1	-2.1	-1.7	-1.6	-0.8	-0.2	0.2	-0.1	-0.2	-0.6	-0.9	-0.7	-0.9	-0.9	-1.4	-1.3	-2.2	-3.0	-1.1	0.2
23-Mar	-3.8	-4.1	-4.0	-3.9	-3.9	-3.9	-4.1	-4.8	-5.0	-3.9	-3.2	-2.3	-1.4	-1.0	-0.2	0.2	0.4	0.5	0.3	-0.8	-2.3	-2.8	-2.8	-2.7	-2.5	0.5
24-Mar	-2.0	-1.9	-1.9	-2.0	-2.4	-3.6	-3.8	-3.5	-2.0	-0.2	1.3	3.7	5.3	5.3	6.2	7.0	6.7	6.1	5.4	4.7	4.0	3.6	3.1	2.6	1.7	7.0
25-Mar	2.0	1.7	0.5	0.3	0.4	0.3	0.2	0.3	0.3	0.3	0.5	0.9	1.6	1.6	1.8	1.9	2.1	2.0	1.9	1.6	1.3	1.2	1.1	1.0	1.1	2.1
26-Mar	0.5	-0.2	-0.7	-0.8	-0.9	-1.0	-0.8	-0.3	0.5	2.6	3.2	3.7	3.1	1.8	1.6	2.7	4.0	3.6	3.0	2.1	1.1	0.2	-0.6	-1.0	1.1	4.0
27-Mar	-1.0	-1.0	-1.3	-1.5	-2.4	-2.4	-2.4	-1.8	-0.9	0.5	2.1	3.6	4.8	5.9	6.1	6.2	6.1	5.8	5.0	3.6	2.6	1.9	1.4	0.7	1.7	6.2
28-Mar	0.2	0.1	0.1	-0.4	-0.4	-0.5	-0.2	0.9	2.2	2.9	3.4	3.9	4.3	5.3	6.8	8.1	9.1	9.6	9.0	6.9	5.7	5.3	3.8	2.0	3.7	9.6
29-Mar	0.9	-0.1	-0.7	0.5	0.2	-0.1	-0.4	0.0	1.4	3.8	5.4	7.1	8.7	9.6	11.0	11.2	10.9	10.5	9.3	7.6	6.3	5.0	4.1	3.6	4.8	11.2
30-Mar	2.7	1.7	0.7	0.4	0.5	0.8	0.9	1.2	1.6	2.2	2.6	3.0	3.3	3.7	4.0	4.3	4.4	4.4	4.2	3.9	3.5	3.4	3.1	2.5	2.6	4.4
31-Mar	2.3	2.1	2.2	2.5	2.7	2.3	2.0	2.0	1.7	2.4	5.2	6.8	9.0	11.2	13.2	13.7	13.7	13.1	12.2	11.5	10.7	10.5	10.0	10.5	7.2	13.7
	-10.3	-10.7	-11.3	-11.6	-12.0	-12.5	-12.8	-12.8	-11.7	-10.1	-8.5	-7.0	-5.7	-4.8	-4.0	-3.5	-3.4	-3.8	-4.8	-5.8	-6.6	-7.3	-8.0	-8.6	Diurnal Average	
	2.7	3.7	3.4	2.5	2.7	2.3	2.0	2.0	2.2	3.8	6.4	8.3	9.6	11.2	13.2	13.7	13.7	13.1	12.2	11.5	10.7	10.5	10.0	10.5	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	121	16.26	16.26
-20 - 0	406	54.57	70.83
0 - 10	200	26.88	97.72
10 - 20	17	2.28	100.00
> 20	0	0.00	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

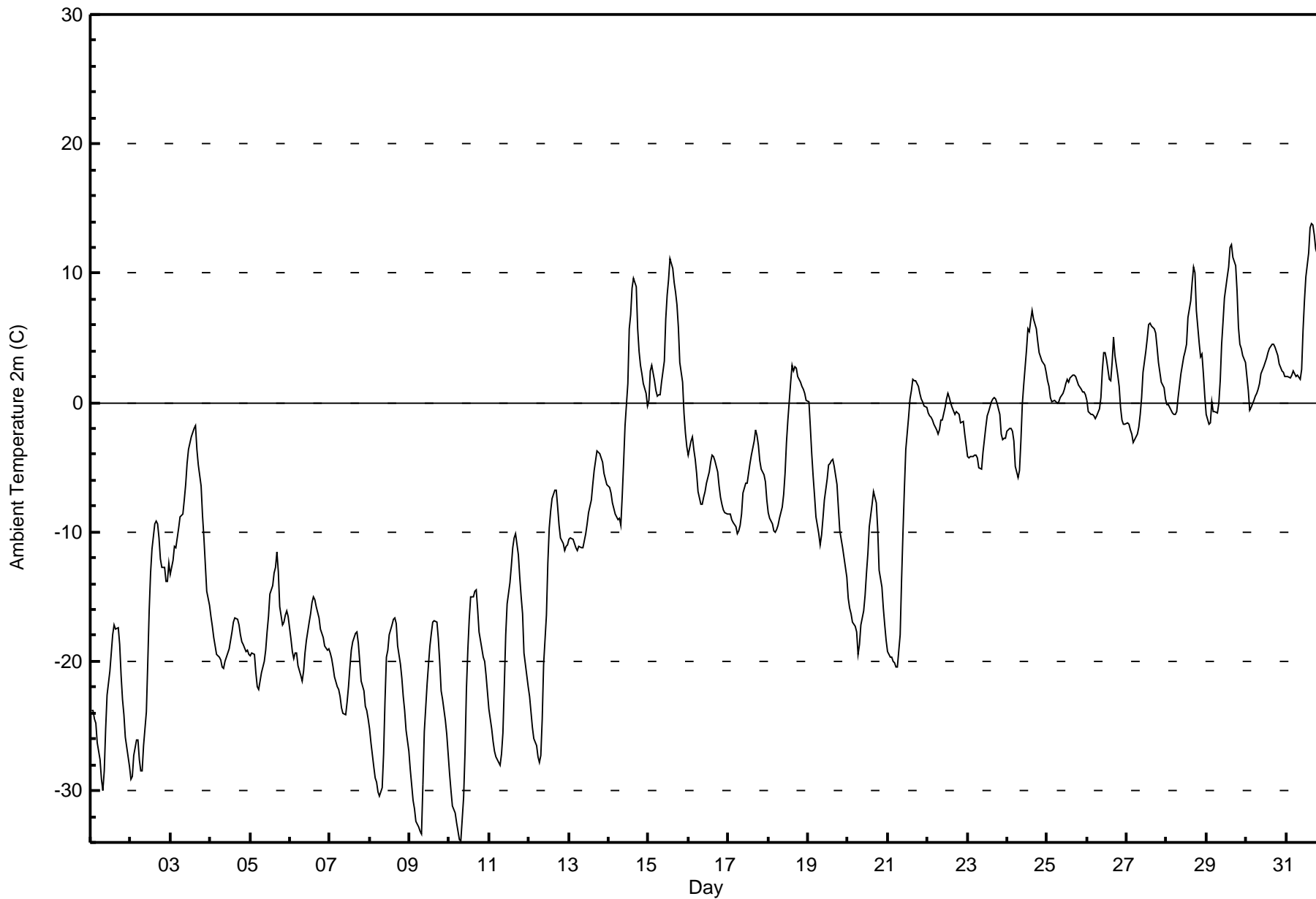
Fort McKay - Bertha Ganter - March 2017

Maximum Value: 13.8 C on Mar 31 16:00																								Hours in Service:		744																							
Minimum Value: -33.9 C on Mar 10 08:00																								Hours of Data:		744																							
Maximum Diurnal Average: -3.2 C at hour 16																								Hours of Missing Data:		0																							
Monthly Average: -8.56 C																								Hours of Calibration:		0																							
Percentiles: P ₁ = -32.4 P ₁₀ = -23.9 Q ₁ = -17.9 Median = -7.0 Q ₃ = 0.4 P ₉₀ = 3.9 P ₉₉ = 11.9																								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-Mar	-23.8	-23.8	-24.5	-24.8	-26.3	-27.6	-29.1	-30.0	-28.5	-25.2	-22.6	-20.8	-19.4	-18.0	-17.2	-17.5	-17.4	-18.7	-21.1	-23.0	-24.1	-25.9	-27.4	-28.1	-23.5	-17.2																							
2-Mar	-29.1	-28.9	-27.3	-26.0	-26.1	-27.6	-28.5	-28.5	-26.5	-23.9	-20.1	-16.1	-13.1	-11.3	-9.4	-9.2	-9.4	-10.4	-12.1	-12.7	-12.7	-13.8	-13.8	-12.4	-18.7	-9.2																							
3-Mar	-13.3	-12.2	-11.1	-11.2	-10.5	-9.7	-8.9	-8.6	-7.5	-6.3	-4.7	-3.6	-2.6	-2.4	-2.0	-1.8	-3.6	-4.8	-6.4	-8.8	-10.5	-12.5	-14.6	-15.7	-8.0	-1.8																							
4-Mar	-16.5	-17.2	-18.2	-18.8	-19.5	-19.7	-19.9	-20.4	-20.5	-20.0	-19.4	-19.0	-18.4	-17.7	-16.9	-16.6	-16.8	-17.2	-18.0	-18.4	-18.7	-19.2	-19.2	-19.4	-18.6	-16.5																							
5-Mar	-19.6	-19.4	-19.5	-20.8	-21.9	-22.2	-21.5	-20.9	-20.1	-19.1	-17.7	-16.5	-14.8	-14.1	-13.1	-12.7	-11.5	-13.0	-15.8	-17.2	-16.9	-16.4	-16.1	-16.5	-17.4	-11.5																							
6-Mar	-18.2	-19.2	-19.8	-19.3	-19.4	-20.3	-21.1	-21.5	-20.7	-19.4	-18.4	-16.9	-16.3	-15.4	-15.0	-15.2	-15.7	-16.7	-17.5	-17.8	-18.2	-18.8	-19.1	-19.1	-18.3	-15.0																							
7-Mar	-19.4	-19.8	-20.4	-21.2	-21.9	-22.1	-22.7	-23.5	-24.0	-24.1	-23.2	-22.0	-20.5	-19.1	-18.5	-17.8	-17.7	-18.6	-20.0	-21.5	-22.3	-23.4	-23.8	-24.4	-21.3	-17.7																							
8-Mar	-25.2	-26.3	-28.1	-29.0	-29.3	-30.1	-30.5	-29.8	-27.1	-23.0	-19.7	-19.2	-18.0	-17.2	-16.7	-16.6	-17.1	-18.8	-20.3	-21.3	-22.7	-23.9	-25.3	-26.9	-23.4	-16.6																							
9-Mar	-28.3	-29.5	-30.7	-31.4	-32.3	-32.8	-33.2	-33.4	-29.6	-25.5	-21.8	-20.2	-18.8	-17.8	-17.0	-16.8	-17.0	-18.3	-20.1	-22.2	-23.0	-24.6	-25.7	-27.2	-24.9	-16.8																							
10-Mar	-28.7	-30.0	-31.2	-31.7	-32.5	-33.1	-33.8	-33.9	-30.5	-27.0	-22.2	-19.1	-16.8	-15.0	-15.0	-14.5	-14.5	-16.0	-17.7	-19.1	-19.6	-20.0	-21.1	-22.3	-23.6	-14.5																							
11-Mar	-23.7	-25.3	-26.2	-27.0	-27.4	-27.6	-28.0	-27.2	-25.5	-21.8	-17.9	-15.6	-13.9	-12.6	-11.2	-10.4	-10.1	-11.8	-13.6	-15.0	-16.4	-19.3	-20.2	-21.9	-19.6	-10.1																							
12-Mar	-22.7	-23.9	-25.1	-25.9	-26.6	-27.3	-27.9	-27.3	-24.5	-20.2	-16.4	-12.4	-9.7	-8.4	-7.4	-6.7	-6.8	-8.1	-9.5	-10.5	-10.9	-11.4	-11.2	-11.0	-16.3	-6.7																							
13-Mar	-10.6	-10.5	-10.6	-10.9	-11.3	-11.4	-11.1	-11.3	-11.2	-10.7	-10.1	-9.4	-8.5	-7.5	-6.4	-5.3	-4.5	-3.8	-3.9	-4.3	-4.7	-5.5	-5.9	-6.3	-8.1	-3.8																							
14-Mar	-6.5	-7.0	-7.7	-8.2	-8.6	-9.1	-9.0	-9.5	-7.2	-4.6	-1.7	1.5	5.7	6.8	8.9	9.6	9.0	5.7	3.9	2.9	2.2	1.5	0.7	-0.2	-0.9	9.6																							
15-Mar	0.2	2.4	2.9	1.7	0.9	0.5	0.6	0.6	1.6	3.2	6.5	8.3	9.5	11.1	10.3	9.3	8.5	7.5	5.8	3.1	1.5	-0.8	-2.3	-3.4	3.7	11.1																							
16-Mar	-4.0	-3.0	-2.6	-3.6	-4.4	-5.5	-6.8	-7.8	-7.9	-7.3	-6.9	-6.2	-5.3	-4.6	-4.1	-4.1	-4.5	-5.3	-6.5	-7.3	-7.8	-8.2	-8.5	-8.6	-5.9	-2.6																							
17-Mar	-8.6	-8.7	-9.1	-9.3	-9.6	-10.1	-9.9	-9.5	-8.6	-7.0	-6.3	-6.2	-5.4	-4.7	-4.0	-3.0	-2.1	-2.6	-3.3	-4.5	-5.2	-5.6	-6.1	-7.5	-6.5	-2.1																							
18-Mar	-8.5	-9.0	-9.4	-9.9	-10.1	-9.9	-9.5	-8.9	-8.1	-7.1	-5.4	-3.1	-1.3	1.6	2.9	2.5	2.8	2.7	2.0	1.6	1.3	1.0	0.7	0.1	-3.4	2.9																							
19-Mar	0.1	-1.9	-3.9	-5.7	-7.2	-8.9	-10.2	-11.0	-10.3	-8.9	-7.6	-6.0	-4.8	-4.7	-4.5	-4.3	-4.9	-6.4	-8.2	-9.9	-10.6	-11.2	-12.8	-13.5	-7.4	0.1																							
20-Mar	-15.1	-15.8	-16.4	-17.0	-17.3	-17.7	-19.5	-18.7	-17.2	-16.1	-14.9	-13.2	-11.6	-9.6	-7.9	-6.9	-7.3	-7.8	-9.8	-12.9	-14.2	-15.9	-17.1	-18.4	-14.1	-6.9																							
21-Mar	-19.3	-19.7	-19.7	-20.0	-20.1	-20.4	-20.4	-17.9	-13.7	-10.0	-6.7	-3.7	-1.1	0.2	0.9	1.8	1.7	1.7	1.3	0.8	0.3	0.0	-0.2	-0.4	-7.7	1.8																							
22-Mar	-0.8	-1.0	-1.1	-1.3	-1.7	-2.1	-2.4	-2.1	-1.4	-1.3	-0.3	0.3	0.7	0.4	0.0	-0.4	-0.9	-0.7	-0.8	-1.0	-1.6	-1.5	-2.4	-3.3	-1.1	0.7																							
23-Mar	-4.1	-4.3	-4.1	-4.1	-4.1	-4.1	-4.3	-5.0	-5.1	-3.8	-2.9	-1.9	-1.0	-0.7	0.1	0.3	0.3	0.3	0.0	-1.0	-2.4	-2.9	-2.8	-2.8	-2.5	0.3																							
24-Mar	-2.2	-1.9	-2.0	-2.2	-3.0	-4.9	-5.8	-5.3	-3.0	-0.2	1.4	4.1	5.8	5.5	6.3	7.1	6.5	5.7	4.7	3.8	3.5	3.2	2.9	2.4	1.3	7.1																							
25-Mar	1.7	1.2	0.4	0.1	0.2	0.1	0.0	0.1	0.4	0.7	1.0	1.5	1.8	1.6	1.9	2.1	2.2	2.0	1.7	1.4	1.0	0.9	0.8	0.6	1.1	2.2																							
26-Mar	0.2	-0.7	-0.9	-0.9	-1.0	-1.3	-1.1	-0.5	0.4	2.5	3.8	3.8	3.3	1.8	1.7	3.1	5.1	3.6	2.1	1.2	-0.4	-1.4	-1.6	-1.7	0.9	5.1																							
27-Mar	-1.6	-1.7	-2.1	-2.5	-3.1	-2.6	-2.4	-1.9	-0.9	0.4	2.4	4.0	5.0	6.0	6.1	5.9	5.8	5.3	4.3	3.1	2.3	1.6	1.1	0.3	1.4	6.1																							
28-Mar	-0.1	-0.2	-0.3	-0.9	-0.9	-0.9	-0.7	0.4	2.2	2.9	3.5	4.0	4.5	6.5	7.9	9.3	10.5	10.0	7.2	4.6	3.5	3.7	2.3	0.5	3.3	10.5																							
29-Mar	-0.9	-1.7	-1.5	0.1	-0.7	-0.7	-0.8	-0.1	1.7	4.5	6.3	8.1	9.7	10.5	12.0	12.2	11.2	10.6	8.7	5.8	4.6	4.2	3.7	3.1	4.6	12.2																							
30-Mar	2.0	0.9	-0.6	-0.3	0.2	0.5	0.7	1.0	1.5	2.2	2.7	3.1	3.4	3.8	4.2	4.5	4.5	4.3	4.0	3.6	2.9	2.4	2.4	2.0	2.3	4.5																							
31-Mar	2.0	2.0	1.9	2.1	2.5	2.2	2.0	2.1	1.8	2.5	5.6	7.9	9.7	11.5	13.5	13.8	13.7	13.0	11.9	11.2	9.9	10.1	9.6	10.2	7.2	13.8																							
																								-11.1	-11.5	-11.9	-12.3	-12.7	-13.1	-13.4	-13.2	-11.9	-10.1	-8.2	-6.6	-5.2	-4.3	-3.5	-3.2	-3.2	-4.1	-5.4	-6.6	-7.4	-8.2	-8.8	-9.4	Diurnal Average	
																								2.0	2.4	2.9	2.1	2.5	2.2	2.0	2.1	2.2	4.5	6.5	8.3	9.7	11.5	13.5	13.8	13.7	13.0	11.9	11.2	9.9	10.1	9.6	10.2	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	131	17.61	17.61
-20 - 0	406	54.57	72.18
0 - 10	189	25.40	97.58
10 - 20	18	2.42	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



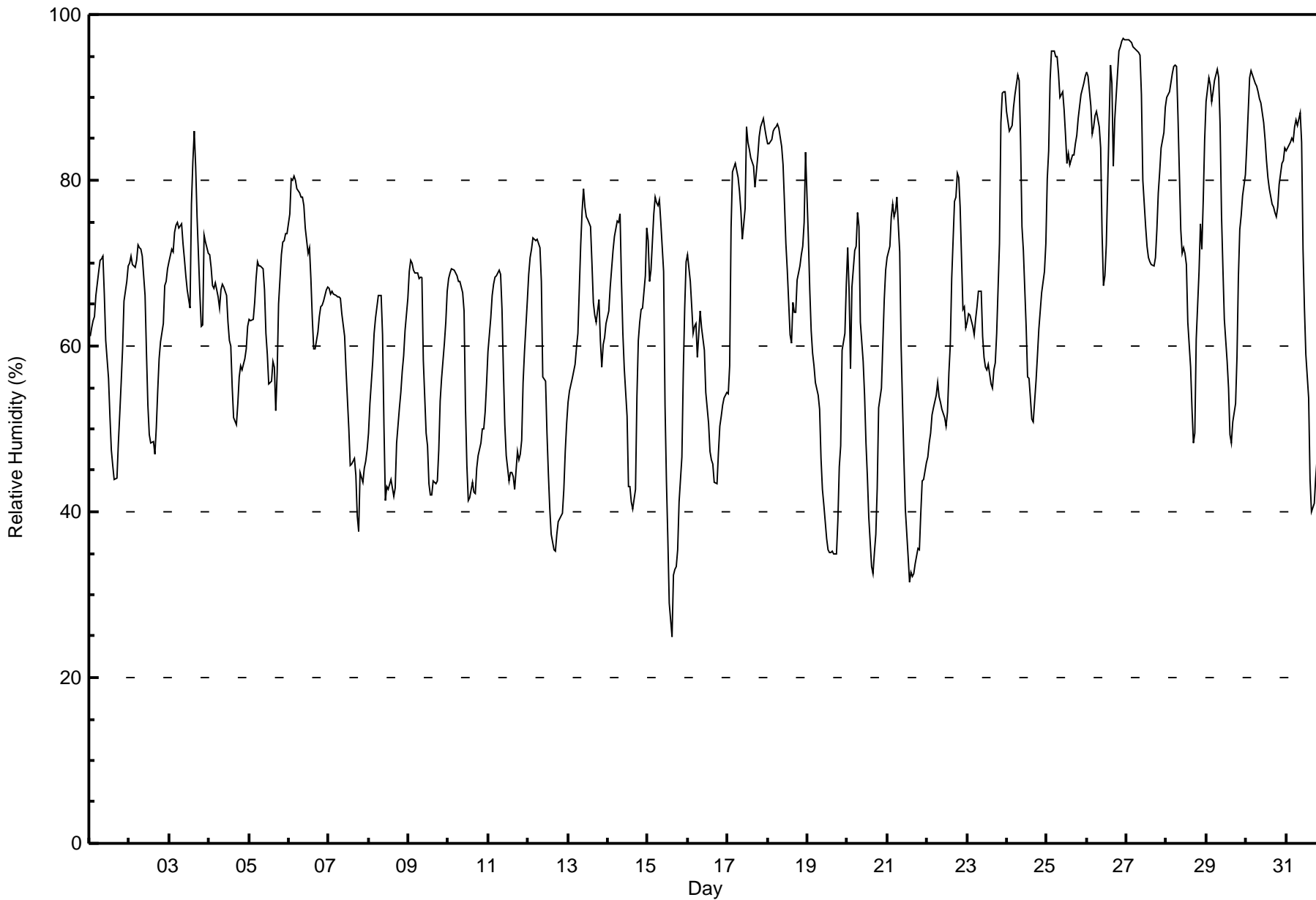
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Fort McKay - Bertha Ganter - March 2017

Maximum Value: 97 % on Mar 26 23:00		Maximum Daily Average: 88.3 % on Mar 25		Hours in Service: 744																							
Minimum Value: 25 % on Mar 15 15:00		Minimum Daily Average: 49.1 % on Mar 19		Hours of Data: 744																							
Maximum Diurnal Average: 75.6 % at hour 7		Minimum Diurnal Average: 53.4 % at hour 17		Hours of Missing Data: 0																							
Monthly Average: 65.5 %		Percentiles: P ₁ = 33 P ₁₀ = 44 Q ₁ = 54 Median = 66 Q ₃ = 76 P ₉₀ = 87 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-Mar	61	62	63	64	66	69	70	71	71	66	61	56	52	48	46	44	44	48	52	56	60	65	68	70	59.6	71	
2-Mar	70	71	70	69	70	72	72	72	71	66	59	53	49	48	49	47	50	55	58	61	63	67	68	69	62.5	72	
3-Mar	70	72	71	74	75	75	74	75	72	71	69	67	65	77	82	86	82	76	66	62	63	73	73	71	72.5	86	
4-Mar	71	69	67	67	68	66	65	67	67	66	63	61	60	55	51	50	53	56	58	57	59	60	62	62	61.9	71	
5-Mar	63	63	63	65	68	70	70	70	69	67	61	59	55	56	58	57	52	57	65	71	73	73	74	73	64.7	74	
6-Mar	76	80	80	81	80	79	79	78	78	77	74	71	72	68	63	60	60	62	64	65	65	65	67	67	71.2	81	
7-Mar	67	66	67	66	66	66	66	66	64	61	57	54	50	46	46	46	44	39	38	45	44	45	46	48	54.3	67	
8-Mar	50	53	58	62	63	65	66	66	61	50	41	43	43	44	43	42	43	48	52	54	57	59	62	66	53.8	66	
9-Mar	69	70	70	69	69	69	68	68	68	58	49	48	43	42	42	44	43	44	47	53	56	60	63	67	57.6	70	
10-Mar	68	69	69	69	69	68	68	68	67	64	53	46	41	42	44	42	42	45	47	48	50	50	52	55	55.7	69	
11-Mar	59	63	66	67	68	69	69	69	64	57	50	47	44	45	45	44	43	47	46	47	49	56	59	65	55.8	69	
12-Mar	69	71	72	73	73	73	72	72	68	56	56	49	45	40	37	35	35	37	39	39	40	43	47	51	53.8	73	
13-Mar	53	55	56	57	58	60	62	72	76	79	77	76	75	74	70	65	64	63	66	61	58	60	61	63	64.9	79	
14-Mar	64	67	69	71	73	75	75	76	68	61	57	52	43	43	41	40	43	54	61	63	64	65	68	74	61.2	76	
15-Mar	73	68	69	76	78	77	77	78	75	69	53	44	37	29	25	32	33	33	35	41	47	57	65	70	55.8	78	
16-Mar	71	68	65	61	62	63	59	64	62	61	60	54	51	47	46	46	43	43	47	50	52	53	54	54	55.7	71	
17-Mar	54	58	74	81	82	81	80	79	76	73	77	86	85	84	83	82	79	81	83	85	87	87	86	85	79.5	87	
18-Mar	84	84	85	86	86	86	87	86	84	82	77	72	69	61	60	65	64	64	68	70	71	72	75	83	76.0	87	
19-Mar	73	67	62	59	58	56	54	52	46	43	41	37	35	35	35	35	35	35	39	45	48	59	62	67	49.1	73	
20-Mar	72	67	57	67	72	72	76	74	63	58	54	48	44	39	33	32	35	37	43	53	55	60	66	69	56.2	76	
21-Mar	71	72	76	77	76	76	78	71	60	53	46	40	35	32	33	32	33	34	36	35	40	44	44	46	51.6	78	
22-Mar	47	48	50	52	53	54	56	54	53	52	51	50	52	57	60	68	77	78	81	80	77	64	65	62	60.1	81	
23-Mar	63	64	64	62	61	63	65	67	67	61	59	57	57	58	55	55	57	58	62	72	87	90	91	91	66.1	91	
24-Mar	88	86	86	87	89	90	93	92	85	74	71	62	56	56	54	51	51	56	59	62	64	66	69	72	71.7	93	
25-Mar	80	84	92	96	96	95	95	93	90	91	89	85	82	83	82	83	83	84	85	87	90	91	92	92	88.3	96	
26-Mar	93	93	89	86	87	88	88	86	84	74	67	68	72	87	94	92	82	87	93	96	96	97	97	97	87.2	97	
27-Mar	97	97	97	97	96	96	96	95	95	90	80	74	72	71	70	70	70	71	74	79	81	84	86	89	84.4	97	
28-Mar	90	90	91	93	94	94	94	88	74	71	72	71	70	63	57	52	48	50	61	69	75	72	78	85	75.0	94	
29-Mar	90	92	92	90	91	92	93	92	87	76	69	63	58	55	49	48	51	53	59	68	74	76	78	81	74.0	93	
30-Mar	84	88	92	93	92	92	91	91	90	89	87	85	82	80	79	77	77	76	76	77	80	82	82	84	84.5	93	
31-Mar	84	84	85	85	85	86	87	87	88	85	72	65	59	54	44	40	40	41	44	49	55	47	47	44	64.8	88	
		71.8	72.3	73.1	74.2	74.9	75.4	75.6	75.4	72.4	67.8	63.1	59.6	56.6	55.6	54.2	53.8	53.4	55.2	58.1	61.3	63.7	65.9	67.8	70.1	Diurnal Average	
		97	97	97	97	96	96	96	95	95	91	89	86	85	87	94	92	83	87	93	96	96	97	97	97	Diurnal Maximum	





Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

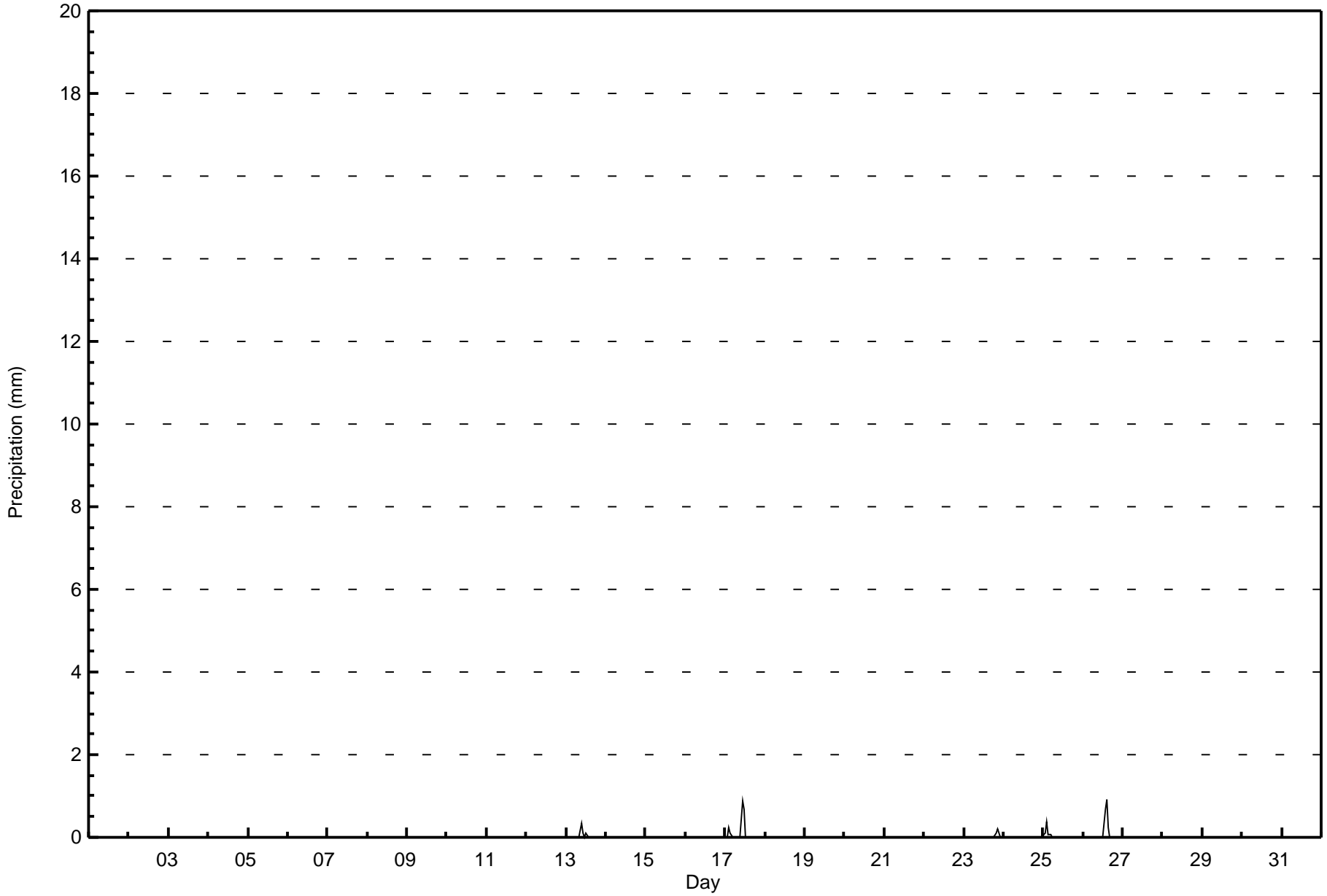
Fort McKay - Bertha Ganter - March 2017

Maximum Value: 0.9 mm on Mar 26 15:00		Maximum Daily Total: 1.9 mm on Mar 17		Hours in Service: 744																							
Minimum Value: 0.0 mm on Mar 1 01:00		Minimum Daily Total: 0.0 mm on Mar 1		Hours of Data: 744																							
Maximum Diurnal Total: 1.0 mm at hour 11		Minimum Diurnal Total: 0.0 mm at hour 6		Hours of Missing Data: 0																							
Monthly Total: 5.52 mm		Percentiles: P₁ = 0.0 P₁₀ = 0.0 Q₁ = 0.0 Median = 0.0 Q₃ = 0.0 P₉₀ = 0.0 P₉₉ = 0.2		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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.1	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
14-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.7	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.1	0.1	0.4	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
26-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.9	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
27-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.6	0.2	0.1	0.0	0.0	0.0	0.2	0.3	1.0	0.7	0.1	0.7	0.9	0.3	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	Diurnal Average		
	0.1	0.1	0.4	0.1	0.1	0.0	0.0	0.0	0.2	0.3	0.9	0.7	0.1	0.7	0.9	0.3	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	739	99.33	99.33
0.4 - 0.5	1	0.13	99.46
0.6 - 0.7	2	0.27	99.73
0.8 - 1.4	2	0.27	100.00
1.5 - 10	0	0.00	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) - %

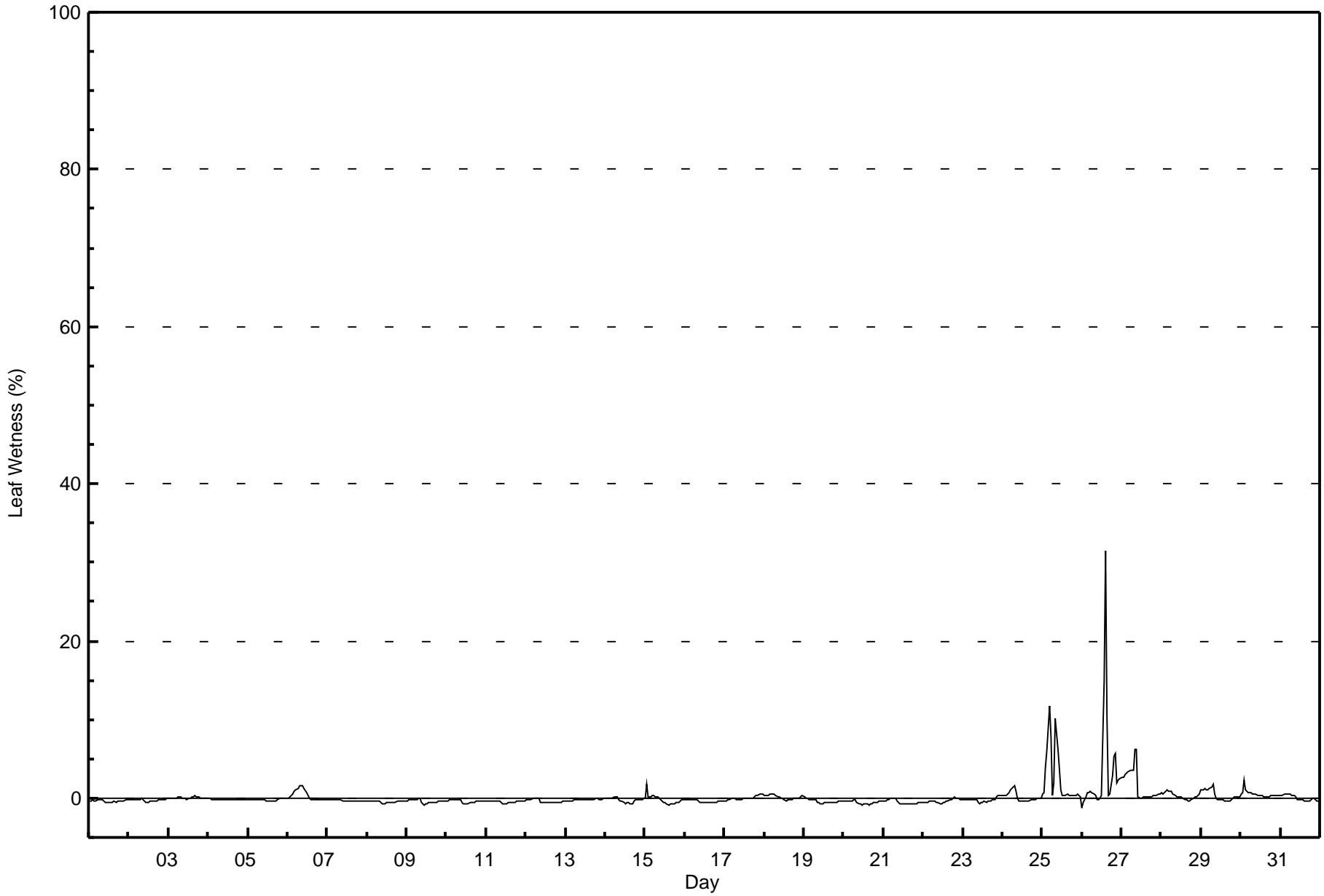
Fort McKay - Bertha Ganter - March 2017

Maximum Value: 31 % on Mar 26 15:00																	Maximum Daily Average: 3.4 % on Mar 26																	Hours in Service: 744			
Minimum Value: -1 % on Mar 26 01:00																	Minimum Daily Average: -0.5 % on Mar 20																	Hours of Data: 744			
Maximum Diurnal Average: 0.7 % at hour 15																	Minimum Diurnal Average: -0.3 % at hour 13																	Hours of Missing Data: 0			
Monthly Average: 0.1 %																	Percentiles: P ₁ = -1 P ₁₀ = -1 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 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-Mar	0	0	0	0	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	-0.4	0											
2-Mar	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	0	-0.3	0											
3-Mar	0	0	0	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-Mar	0	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-Mar	0	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-Mar	0	0	0	0	1	1	1	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2											
7-Mar	0	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											
8-Mar	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	-0.5	0											
9-Mar	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	-0.4	0											
10-Mar	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	-0.4	0											
11-Mar	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	-0.5	0											
12-Mar	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	-0.4	0											
13-Mar	0	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											
14-Mar	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	-0.2	0											
15-Mar	0	2	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	-0.2	2											
16-Mar	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	-0.4	0											
17-Mar	0	0	0	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-Mar	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1											
19-Mar	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	-0.4	0											
20-Mar	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	-0.5	0											
21-Mar	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-0.5	0											
22-Mar	-1	-1	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	-0.4	0											
23-Mar	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	0	-0.2	0											
24-Mar	0	0	0	0	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	2											
25-Mar	1	1	4	6	12	8	0	2	10	6	4	1	0	0	0	0	0	0	0	0	0	0	0	0	2.4	12											
26-Mar	-1	-1	0	1	1	1	1	1	0	0	0	0	0	15	31	10	0	0	3	5	6	2	2	3	3.4	31											
27-Mar	3	3	3	3	3	4	4	4	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1.7	6											
28-Mar	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1											
29-Mar	1	1	1	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2											
30-Mar	1	1	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2											
31-Mar	0	0	0	0	0	0	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 0.3 0.4 0.6 0.5 0.3 0.3 0.5 0.2 -0.2 -0.3 -0.3 0.1 0.7 0.0 -0.3 -0.3 -0.1 0.0 0.0 -0.1 0.0 0.0																	Diurnal Average																				
3 3 4 6 12 8 4 4 10 6 4 1 0 15 31 10 0 0 3 5 6 2 2 3																	Diurnal Maximum																				



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

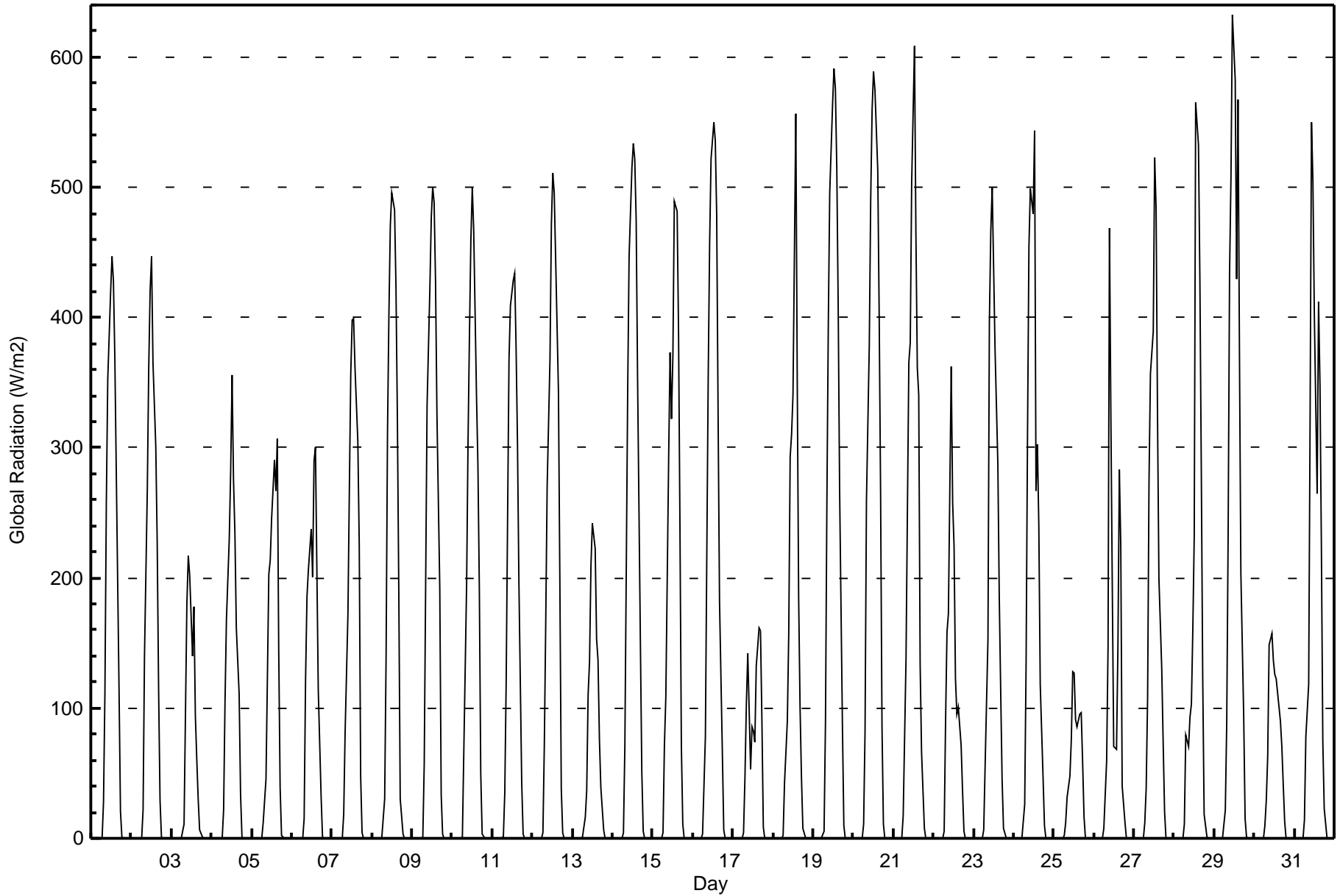
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	92	42.20	42.20
0.4 - 0.5	50	22.94	65.14
0.6 - 0.7	19	8.72	73.85
0.8 - 1.4	22	10.09	83.94
1.5 - 10	29	13.30	97.25
> 10	5	2.29	99.54

Total Number of Valid Hours: 218

Total Number of Hours: 744



Maximum Value: 632 W/m2 on Mar 29 12:00		Maximum Daily Average: 177.6 W/m2 on Mar 19		Hours in Service: 744																						
Minimum Value: 0 W/m2 on Mar 1 01:00		Minimum Daily Average: 36.2 W/m2 on Mar 25		Hours of Data: 744																						
Maximum Diurnal Average: 382.2 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 3		Hours of Missing Data: 0																						
Monthly Average: 113.9 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 5 Q ₃ = 195 P ₉₀ = 398 P ₉₉ = 575		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-Mar	0	0	0	0	0	0	0	28	113	259	352	419	447	428	370	284	113	21	1	0	0	0	0	0	118.2	447
2-Mar	0	0	0	0	0	0	0	22	140	268	361	421	446	366	301	227	114	29	1	0	0	0	0	0	112.4	446
3-Mar	0	0	0	0	0	0	0	11	95	180	217	201	140	177	95	61	30	7	1	0	0	0	0	0	50.6	217
4-Mar	0	0	0	0	0	0	0	22	105	168	230	282	356	276	234	162	111	33	1	0	0	0	0	0	82.5	356
5-Mar	0	0	0	0	0	0	0	12	46	124	203	214	247	290	267	307	145	39	2	0	0	0	0	0	79.0	307
6-Mar	0	0	0	0	0	0	0	15	121	185	206	237	201	290	300	207	114	32	1	0	0	0	0	0	79.6	300
7-Mar	0	0	0	0	0	0	0	18	82	172	268	357	398	399	362	305	226	47	4	0	0	0	0	0	109.9	399
8-Mar	0	0	0	0	0	0	1	31	139	312	402	470	496	483	423	322	189	30	3	0	0	0	0	0	137.5	496
9-Mar	0	0	0	0	0	0	1	57	195	332	423	478	500	488	427	325	192	33	4	0	0	0	0	0	144.1	500
10-Mar	0	0	0	0	0	0	2	66	195	304	386	459	500	467	339	286	192	49	4	0	0	0	0	0	135.4	500
11-Mar	0	0	0	0	0	0	1	34	121	246	368	409	429	434	377	303	197	43	3	0	0	0	0	0	123.6	434
12-Mar	0	0	0	0	0	0	4	72	166	270	367	472	511	496	446	343	197	38	4	0	0	0	0	0	141.1	511
13-Mar	0	0	0	0	0	0	1	16	37	110	135	210	242	222	153	136	76	39	6	0	0	0	0	0	57.6	242
14-Mar	0	0	0	0	0	0	4	70	206	344	446	515	534	522	475	353	150	51	5	0	0	0	0	0	153.2	534
15-Mar	0	0	0	0	0	0	4	71	109	291	373	322	371	490	481	388	239	71	11	0	0	0	0	0	134.2	490
16-Mar	0	0	0	0	0	0	3	79	218	355	457	521	550	536	479	324	182	66	6	0	0	0	0	0	157.4	550
17-Mar	0	0	0	0	0	0	4	46	103	143	53	86	83	74	132	161	160	91	9	0	0	0	0	0	47.7	161
18-Mar	0	0	0	0	0	0	3	42	90	158	293	310	341	556	355	185	100	46	8	0	0	0	0	0	103.6	556
19-Mar	0	0	0	0	0	0	5	90	260	395	495	563	592	576	515	408	268	86	10	0	0	0	0	0	177.6	592
20-Mar	0	0	0	0	0	0	11	82	259	378	491	560	589	575	513	403	266	85	10	0	0	0	0	0	175.9	589
21-Mar	0	0	0	0	0	0	18	138	253	366	380	503	608	465	362	340	134	66	8	0	0	0	0	0	151.7	608
22-Mar	0	0	0	0	0	0	6	91	158	172	362	258	225	122	95	101	72	37	6	0	0	0	0	0	71.1	362
23-Mar	0	0	0	0	0	0	7	57	153	395	467	500	438	376	288	186	114	45	7	0	0	0	0	0	126.4	500
24-Mar	0	0	0	0	0	0	26	136	310	454	499	479	543	266	302	240	118	47	10	0	0	0	0	0	143.0	543
25-Mar	0	0	0	0	0	0	2	12	32	48	76	128	127	91	86	95	96	59	16	0	0	0	0	0	36.2	128
26-Mar	0	0	0	0	0	0	8	59	148	469	324	193	71	68	148	283	224	40	12	0	0	0	0	0	85.3	469
27-Mar	0	0	0	0	0	0	12	39	108	275	357	390	523	484	326	199	131	73	20	0	0	0	0	0	122.4	523
28-Mar	0	0	0	0	0	0	11	79	70	94	103	161	232	565	532	428	284	123	18	1	0	0	0	0	112.6	565
29-Mar	0	0	0	0	0	0	22	89	235	434	507	632	582	430	567	374	204	94	15	1	0	0	0	0	174.4	632
30-Mar	0	0	0	0	0	0	10	30	63	148	157	137	126	123	111	90	70	41	13	0	0	0	0	0	46.7	157
31-Mar	0	0	0	0	0	0	14	79	119	322	550	504	402	265	412	348	224	75	23	0	0	0	0	0	139.1	550
		0.0	0.0	0.0	0.0	0.0	0.1	5.9	54.6	143.5	263.6	332.7	367.5	382.2	367.7	331.4	263.8	159.1	52.8	7.8	0.1	0.0	0.0	0.0	0.0	Diurnal Average
		0	0	0	0	0	0	26	138	310	469	550	632	608	576	567	428	284	123	23	1	0	0	0	0	Diurnal Maximum





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	407	54.70	54.70
21 - 100	85	11.42	66.13
101 - 300	123	16.53	82.66
301 - 600	127	17.07	99.73
601 - 900	2	0.27	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

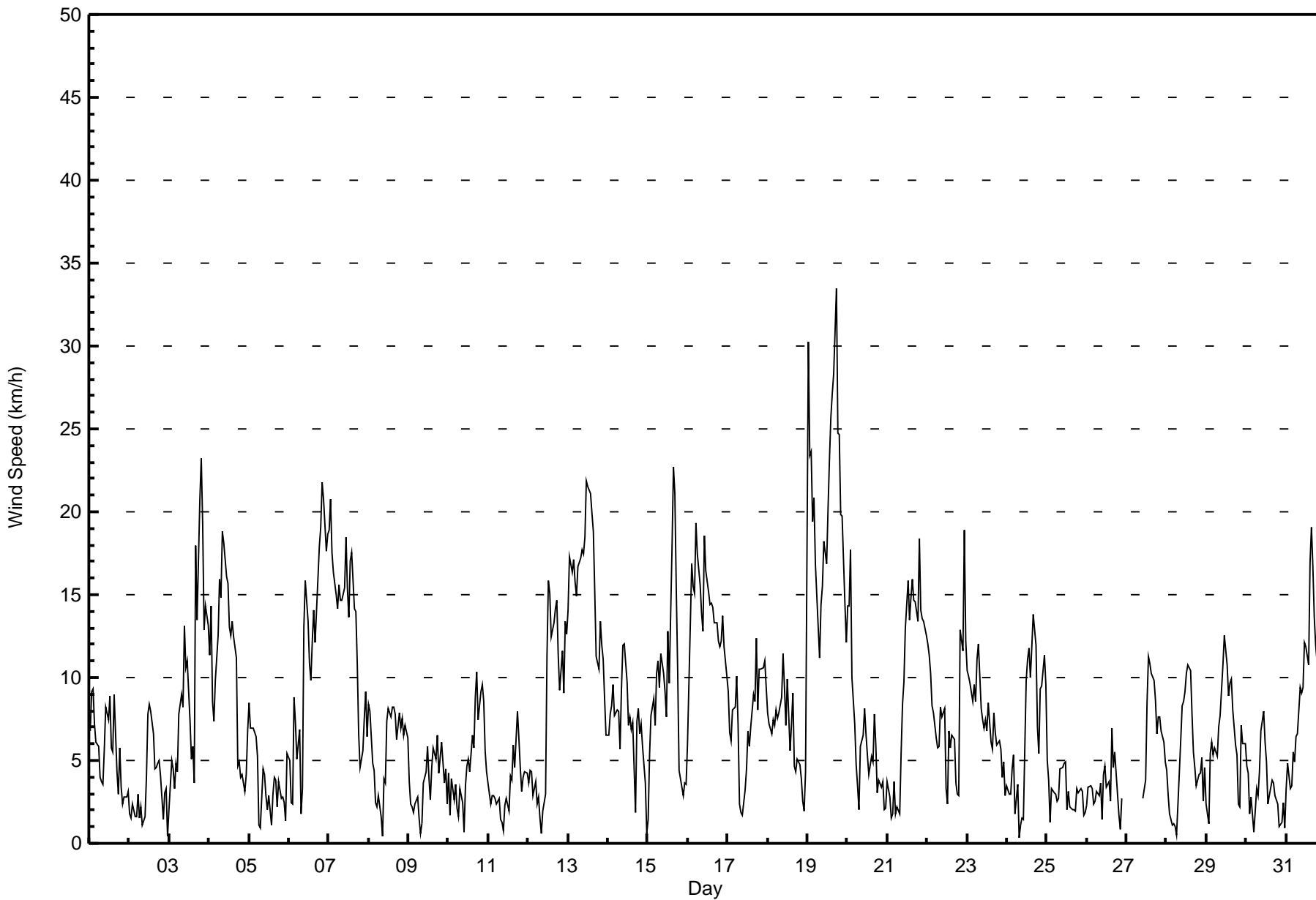


Maximum Speed: 33 km/h on Mar 19 18:00	Maximum Daily Speed Average: 20.0 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 24 08:00	Minimum Daily Speed Average: 0.7 km/h on Mar 26	Hours of Data: 732
Maximum Diurnal Speed Average: 3.5 km/h at hour 1	Minimum Diurnal Speed Average: 0.7 km/h at hour 15	Hours of Missing Data: 12
Monthly Average Velocity: 1.6 km/h 358.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 11 P ₉₀ = 16 P ₉₉ = 25	Percent Operational Time: 98.4

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-Mar	NNW7	N9	NNW9	N7	N6	N6	NW4	NNW4	N4	N6	N8	N7	N9	NNE6	NNE6	NNW9	NNE4	NNE3	NNW6	NNW3	W2	WNW3	WNW3	WNW3	N5.1	NNW9
2-Mar	WSW2	SSW2	SSE2	SW2	S2	SW3	SW2	SSW2	SSE1	ENE2	SSE4	SSE8	SSE8	S8	SSE7	N4	NNE5	N5	N5	NE4	N1	N3	NNW3	WSW0	SSE0.8	SSE8
3-Mar	NNE2	SSE5	SSE4	SSE3	SSE5	S4	S8	S9	S8	SSE13	SSE11	SSE11	S7	SSW5	S6	NW4	NNW18	NNW13	NW21	NW23	NW19	N13	N14	N13	WNW1.9	NW23
4-Mar	N11	N14	N9	N7	N10	N13	N16	N15	N19	N18	N16	N16	N13	N13	N13	N12	N11	NNE5	N5	NNE4	NE4	NNE3	NNE4	N7	N10.6	N19
5-Mar	N8	NNW7	NNW7	NW7	NNW6	NNW5	E1	NNW1	N5	N4	NW3	WNW2	SSE3	N1	S3	NW4	SSE4	E2	NNW4	S3	S3	SSW2	WNW1	NNW5	NNW2.1	N8
6-Mar	NNW5	NW2	WNW2	N9	N7	NNW5	N7	NNE2	N3	N13	N16	N13	N11	NNE10	N12	N14	N12	N16	N18	N19	N22	N21	N18	N19	N11.3	N22
7-Mar	N19	N21	N18	N16	N15	N14	N16	N15	N15	N15	N18	N15	N14	N17	N18	N14	N14	NNE11	NNE7	NNE5	N6	N8	NNW9	NNW6	N13.4	N21
8-Mar	NW8	WNW8	WNW5	WNW4	W2	WNW2	SSW3	S2	SSW0	SE4	ENE4	NNE7	NNE8	NNE8	NNE8	NNE8	NE8	NE6	NNE8	NNE7	NNW8	NNW7	NW7	NW6	N3.9	NW8
9-Mar	WNW4	W2	WNW2	WSW2	SW2	WNW3	WSW2	SSW1	ESE1	ESE4	ESE4	E6	E4	ENE3	ENE5	NE6	NE5	ENE7	NNE4	N5	N6	NNW4	NW4	WNW2	NNE1.5	ENE7
10-Mar	WNW4	NW2	NW4	WNW3	NW4	WNW2	W2	NW3	SE2	N1	ENE3	ENE5	ENE5	NE4	NNE7	NNE6	N9	N10	NNW7	NNW9	NNW10	N9	N6	N4	N3.8	N10
11-Mar	N4	NNW2	NNW3	NW3	NW3	NNW2	NNW3	N1	NNE1	NE1	ESE2	ENE3	NW2	NNW4	NNE4	NNE6	NNE5	N8	N6	N5	N3	NNW4	N4	NNW4	N3.1	N8
12-Mar	NNW4	NNW4	NNW4	NW3	NW4	WNW2	NW3	NW2	ENE1	ESE2	SE3	S11	SSE16	SSE15	SSE12	SSE13	SSE14	SE15	SE11	SE9	SSE12	SSE9	SSE13	SSE13	SSE5.9	SSE16
13-Mar	SSE14	SSE17	SSE16	SSE17	SSE16	SSE15	SSE17	SSE17	SSE18	SSE17	SSE18	SSE22	SSE22	SSE21	SSE20	SSE19	SSE15	SSE11	S10	S13	S12	S11	S9	S7	SSE15.5	SSE22
14-Mar	S7	S8	S8	S10	S8	SSE8	S8	SSE6	SSE9	SSE12	SSE10	SE7	SSE8	SSE7	S7	ENE2	N7	N8	NNW7	NNW7	NNW6	NW4	S1	SSE3.9	SSE12	
15-Mar	ESE1	ESE5	S8	SSE9	S7	S10	S11	S9	S11	S10	SSW9	SW8	SSW13	SW10	WNW18	NW23	NW21	NNW15	NNW10	NNW4	N3	WSW3	WNW4	WNW4	WSW3.8	NW23
16-Mar	N6	N13	N17	N16	N15	N19	N17	N16	NNE14	NNE13	N19	N16	N15	NNE14	N15	N14	N13	N13	N12	N12	N14	N12	N10	N10	N14.0	N19
17-Mar	N9	N7	N6	NNW8	NNW8	NW10	NW7	NNW2	NW2	NW2	N3	N5	N7	N6	N7	N9	N9	N12	N8	N10	N10	N11	N11	N9	N7.2	N12
18-Mar	N8	N7	N7	N7	N7	N8	N8	N8	N9	NNW11	N9	N7	N10	NNE6	N7	NNW9	N5	N4	NNW5	WNW5	NNW4	N3	W2	WNW4	N6.4	NNW11
19-Mar	NW30	WNW23	WNW24	WNW19	WNW21	WNW17	WNW13	W11	W14	W16	WNW18	W17	WNW20	WNW23	NW26	NW27	NW28	NW33	NW25	NW25	WNW20	NW20	NNW15	NNW12	WNW20.0	NW33
20-Mar	N14	N14	N18	N10	N7	N5	NW4	NE2	NE6	ENE7	E8	ENE7	NE5	E4	SSE5	SSE5	SSE8	SSE6	SSE3	NNW4	WNW3	W4	WSW2	NW2	NNE2.9	N18
21-Mar	NNW4	NW3	W2	W2	WNW4	W2	SW2	WNW2	SE5	SSE8	SSE10	SSE13	SSE16	S14	SSE15	SSE16	SSE15	SSE15	SE13	SE18	SSE14	SSE14	SSE13	SSE13	SSE8.2	SE18
22-Mar	SSE12	SSE11	SSE10	SE8	SE8	ESE6	ESE6	E6	SE8	SSE8	SSE8	S3	SE2	SSE7	S6	S7	SSW6	SSW4	SE3	N3	NNW13	N12	N19	N12	SE2.8	N19
23-Mar	N10	N10	N10	N9	N10	N9	N11	N12	NNE8	NE7	NE7	NNE7	NNE7	N8	NNE6	N6	N8	N7	NW6	NNW6	N6	N4	N5	N3	N7.2	N12
24-Mar	SE4	SSE3	SE3	SSE5	S5	WSW2	SW4	SE0	ENE1	E2	SSW1	S10	S11	SSE12	SSE10	SSE12	SSE14	SE12	SE7	ESE5	SE9	SE10	SSE11	SSE10	SSE6.2	SSE14
25-Mar	ESE5	ESE4	N1	NNE3	NNE3	NE3	NNE3	E3	ESE5	SE5	SE5	SE5	S2	NW3	NW2	NE2	NE2	NNE2	NNE3	ENE3	N3	NNW3	NW2	NNW2	ENE1.5	ESE5
26-Mar	ENE2	ESE3	ESE3	ESE3	NE2	N3	N3	NNW3	N4	NNE1	SSE4	SSW5	S3	W4	NE3	SSE7	SSE5	S6	SW3	NW2	W1	WNW3	AF	AF	SSE0.7	SSE7
27-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	ENE3	NE4	N9	N11	N11	N10	N10	N9	N7	N8	NNW7	NNW6	NW5	----	N11
28-Mar	NW4	NW3	SW2	WNW1	WSW1	WNW1	ENE1	S2	S6	S8	SSE9	SSE9	SSE10	SSE11	SSE10	SSE8	SSE5	SSE5	ESE4	N4	NE4	E5	SSE3	NNW5	SSE3.0	SSE11
29-Mar	NW2	SW1	S5	S6	S5	S6	S5	S7	SSE8	SSE9	SSE11	SSE13	SSE11	SSE9	SSE10	SSE10	SSE8	SSE6	SSE5	SSE2	SSE2	SE7	SE6	SE6	SSE6.4	SSE13
30-Mar	ESE5	ESE4	NNW2	N3	ENE1	N2	N3	N3	N4	N7	N8	N6	N5	NE2	ENE3	ENE4	ENE4	NNE3	NE3	NNE2	N1	SE1	WSW2	SE1	NNE2.3	N8
31-Mar	S3	S5	S3	SW3	SSW6	S5	S6	S7	SSW9	SSW9	S9	SSE12	SSE12	SSE11	S17	S19	S17	S14	S12	SSW10	S5	S10	S9	SSW10	S9.0	S19

NNW3.5	NNW2.5	NNW2.4	NNW2.0	NNW2.0	NNW2.0	NNW1.4	N0.9	ENE0.8	E1.2	ENE1.1	ESE1.7	ESE1.3	E0.8	NE0.7	N1.6	N2.1	N2.6	N3.1	NNW3.5	NNW3.4	N2.7	NNW2.6	NNW2.4	Diurnal Average
NNW30	WNW23	WNW24	WNW19	WNW21	N19	N17	SSE17	N19	N18	N19	SSE22	SSE22	WNW23	NW26	NW27	NW28	NW33	NW25	NW25	N22	N21	N19	N19	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
Fort McKay - Bertha Ganter - March 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	309	42.21	42.21
6 - 11	257	35.11	77.32
12 - 19	141	19.26	96.58
20 - 28	23	3.14	99.73
29 - 38	2	0.27	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay - Bertha Ganter - March 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	43	22	16	19	7	16	15	22	20	10	10	9	11	26	32	31	309
6 - 11	85	20	6	3	3	2	11	44	40	7	2	0	1	1	6	26	257
12 - 19	68	4	0	0	0	0	4	41	8	1	0	0	3	6	1	5	141
20 - 28	3	0	0	0	0	0	0	4	0	0	0	0	0	6	10	0	23
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	199	46	22	22	10	18	30	111	68	18	12	9	15	39	51	62	732

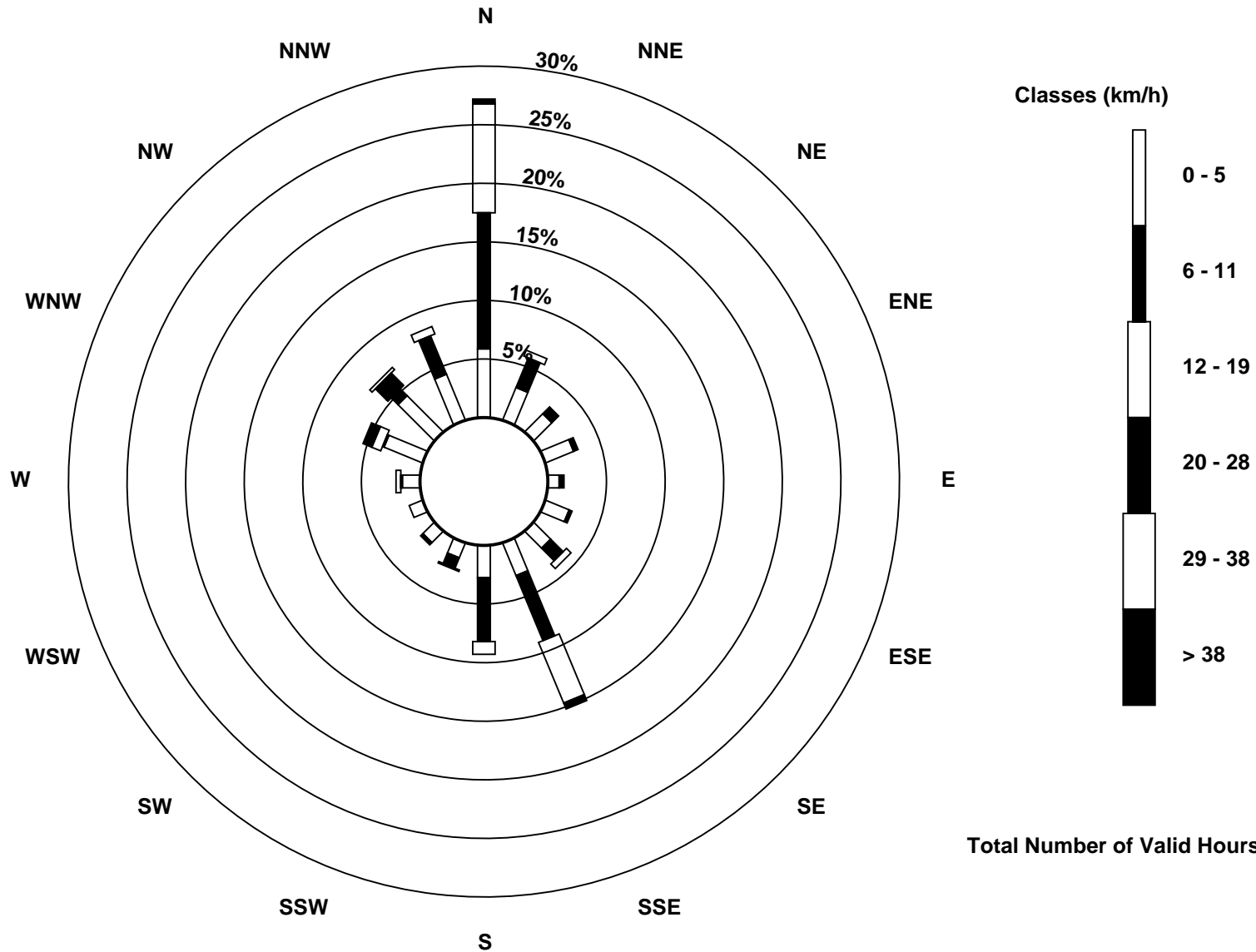
Total Number of Valid Hours: 732

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 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 - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Mar 19 03:00	Hours in Service: 744 Hours of Data: 732 Hours of Missing Data: 12 Hours of Calibration: 0 Percent Operational Time: 98.4
Minimum Value: 0 km/h on Mar 11 04:00	
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-Mar	1	1	1	2	2	2	1	1	1	2	2	2	3	2	2	3	2	1	1	1	1	2	1	2	3
2-Mar	1	1	1	1	1	1	1	1	1	1	3	2	2	2	2	1	1	1	1	1	2	1	1	1	3
3-Mar	1	2	2	2	2	2	2	2	3	3	3	2	2	2	2	3	4	3	5	4	5	3	4	3	5
4-Mar	3	4	3	2	3	3	4	3	4	4	5	4	4	4	4	4	3	2	1	1	2	1	2	1	5
5-Mar	1	1	1	1	1	2	1	1	1	1	1	1	2	2	2	1	1	1	2	1	1	1	1	2	2
6-Mar	2	1	2	2	1	1	2	2	3	3	4	4	4	3	5	4	4	5	4	4	5	4	3	4	5
7-Mar	4	5	4	4	4	4	4	4	5	4	4	4	4	5	5	4	4	3	3	2	1	1	2	1	5
8-Mar	1	1	2	1	1	1	1	1	1	1	3	3	3	3	4	3	3	3	3	2	1	1	1	1	4
9-Mar	2	2	2	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	2
10-Mar	1	1	2	1	1	1	2	1	1	1	1	2	2	2	2	2	3	2	1	2	2	2	1	1	3
11-Mar	1	1	1	0	1	1	1	1	1	1	2	1	1	1	2	2	2	2	2	2	2	2	1	1	2
12-Mar	1	1	1	1	1	1	1	1	1	1	2	4	4	3	3	3	4	3	3	2	3	3	3	3	4
13-Mar	3	4	3	3	3	3	4	4	4	4	4	5	5	5	4	4	3	2	2	4	3	2	2	1	5
14-Mar	1	1	1	2	1	1	2	1	2	2	2	2	1	2	2	2	1	2	1	2	2	2	2	1	2
15-Mar	1	2	2	2	1	2	3	2	3	3	3	3	4	5	6	5	4	3	3	2	2	1	2	2	6
16-Mar	2	5	5	4	4	4	4	4	5	5	5	5	4	4	5	5	4	4	3	3	3	3	3	2	5
17-Mar	2	2	2	1	1	2	2	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2
18-Mar	1	1	1	1	1	1	1	1	2	2	2	2	3	2	3	2	2	1	1	2	1	1	2	3	3
19-Mar	7	6	8	6	7	6	5	4	5	6	6	7	7	7	5	5	6	6	5	5	6	6	7	5	8
20-Mar	3	3	4	3	3	2	1	1	2	2	2	2	2	2	3	3	2	1	2	2	1	2	1	1	4
21-Mar	1	1	1	1	1	1	1	1	2	2	2	4	3	3	3	3	4	4	3	4	3	4	4	3	4
22-Mar	2	2	3	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1	1	5	3	3	5	3	5
23-Mar	3	3	2	2	2	2	3	3	3	3	3	3	2	3	2	2	2	1	1	2	1	1	1	1	3
24-Mar	1	1	1	1	1	1	1	1	1	1	3	2	3	3	2	3	3	3	3	2	3	3	3	3	3
25-Mar	3	3	1	1	1	1	1	2	1	1	1	1	2	1	0	1	1	1	1	1	1	1	1	1	3
26-Mar	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	1	1	2	1	1	1	2	AF	AF	2
27-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1	1	3	3	2	2	2	2	1	2	2	1	2	2	3
28-Mar	1	1	1	1	1	1	1	1	2	2	2	2	3	2	2	2	2	1	1	1	1	1	2	1	3
29-Mar	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	1	2	3	1	2	2	3
30-Mar	2	2	2	1	1	1	1	1	2	1	2	2	2	1	1	1	1	1	1	2	1	1	1	1	2
31-Mar	1	1	1	1	2	1	2	2	3	3	3	2	2	3	4	6	6	3	3	5	5	3	2	3	6
Diurnal Maximum																									
7 6 8 6 7 6 5 4 5 6 6 7 7 7 6 6 6 6 5 5 6 6 7 5																									

AF - Analyzer Failure



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Fort McKay - Bertha Ganter - March 2017

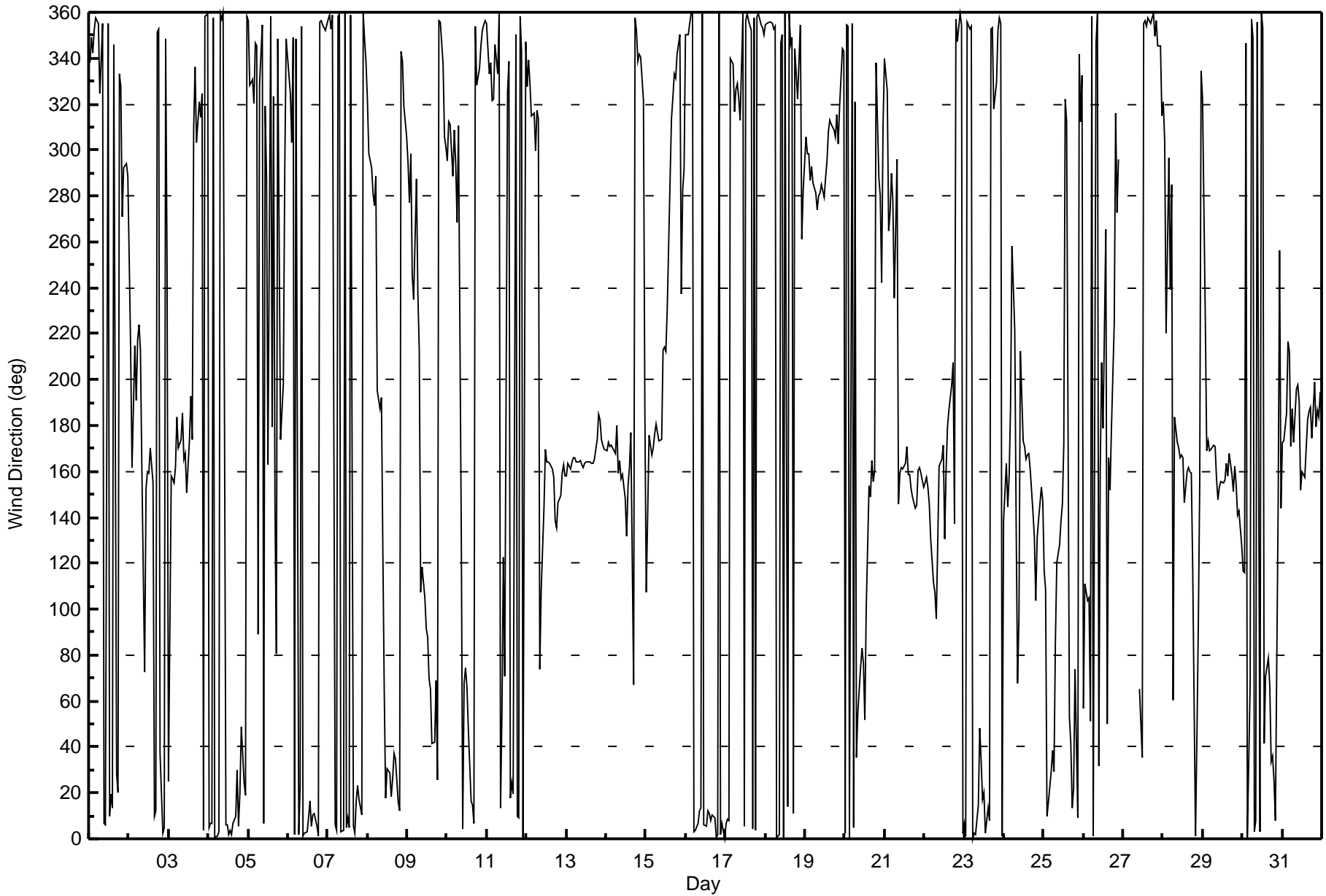
Direction of Maximum Speed: 309 deg on Mar 19 18:00															Hours in Service: 744											
Direction of Maximum Daily Speed Average: 301.2 deg on Mar 19															Hours of Data: 732											
Direction of Minimum Speed: 137 deg on Mar 24 08:00															Hours of Missing Data: 12											
Direction of Minimum Daily Speed Average: 0.7 deg on Mar 26															Percent Operational Time: 98.4											
Monthly Average Direction: 324.8 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-Mar	338	349	342	352	358	355	324	339	355	7	6	355	10	19	13	346	28	20	333	328	271	292	294	288	350.1
2-Mar	252	213	161	215	191	217	224	213	163	73	153	160	159	170	155	10	12	352	352	37	3	5	348	249	151.7
3-Mar	25	158	157	155	162	184	170	174	185	165	168	150	174	193	174	309	336	303	321	314	324	3	358	359	295.6
4-Mar	5	7	7	358	0	1	3	359	357	360	6	6	2	4	2	7	10	30	6	20	49	24	19	358	4.8
5-Mar	356	328	331	320	346	345	89	328	354	6	319	288	163	358	180	324	147	81	348	174	186	199	291	348	337.6
6-Mar	332	325	303	349	2	348	2	23	354	1	2	3	9	17	5	10	11	5	1	356	356	355	352	354	359.4
7-Mar	357	359	352	359	6	4	358	359	3	4	360	5	9	5	359	6	3	17	23	17	10	359	348	338	1.8
8-Mar	322	298	292	282	276	289	195	187	192	126	65	17	30	29	18	26	37	34	16	12	343	339	319	306	355.9
9-Mar	294	277	298	246	235	287	237	213	107	118	105	91	88	70	65	41	42	69	26	357	355	337	306	301	26.9
10-Mar	295	313	311	289	309	294	268	311	132	4	68	74	67	48	17	15	7	354	329	335	346	352	354	356	353.3
11-Mar	355	333	338	322	322	346	333	359	14	55	123	71	325	339	17	24	20	350	10	9	358	343	1	347	358.8
12-Mar	328	339	329	315	316	300	318	314	74	108	144	170	164	164	163	161	157	139	136	146	149	160	163	158	157.9
13-Mar	158	163	161	164	166	166	164	164	164	163	161	163	164	164	163	164	166	174	185	182	174	171	169	165.7	
14-Mar	169	173	171	171	171	168	180	159	165	157	158	148	132	154	162	177	67	358	352	338	342	340	322	188	161.8
15-Mar	107	141	176	167	170	176	181	177	173	174	213	214	212	231	287	314	322	333	332	342	351	238	282	292	242.6
16-Mar	350	350	355	359	359	3	3	7	12	13	359	6	6	12	11	8	11	9	1	2	360	2	7	0	3.8
17-Mar	6	9	8	340	337	317	326	329	323	313	359	6	356	360	357	352	4	358	4	358	359	354	353	350	352.4
18-Mar	354	355	356	356	355	353	354	1	2	347	350	1	360	14	359	346	349	11	344	322	338	354	261	283	351.8
19-Mar	305	299	299	287	293	285	282	274	280	281	285	280	288	295	308	313	311	309	306	316	303	319	344	343	301.2
20-Mar	3	355	354	0	355	5	321	35	55	75	83	76	52	101	153	149	165	156	160	338	288	280	242	310	24.5
21-Mar	340	326	265	273	290	277	236	296	146	159	162	161	164	171	159	159	153	149	144	145	160	162	159	153	159.8
22-Mar	155	157	153	146	131	112	107	96	128	162	165	171	131	161	180	187	198	207	138	357	347	359	354	2	131.2
23-Mar	6	1	356	352	354	0	2	2	14	48	34	17	20	2	13	8	352	353	318	330	352	358	355	1	2.6
24-Mar	138	163	145	158	189	258	221	137	67	97	212	173	171	165	167	168	161	142	131	104	131	139	153	147	155.9
25-Mar	116	108	10	16	29	38	29	86	120	128	139	146	172	322	312	53	42	13	22	74	9	341	313	333	64.5
26-Mar	57	111	104	105	51	358	1	347	359	32	161	207	179	265	50	166	152	179	225	316	273	296	AF	AF	147.4
27-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	65	36	355	356	354	357	355	357	360	350	356	345	345	315	--
28-Mar	321	304	220	297	239	285	61	183	173	170	166	167	166	147	160	162	160	159	118	1	45	93	154	334	159.4
29-Mar	323	226	169	173	169	170	171	171	157	148	153	156	155	156	163	158	168	159	151	163	155	141	143	127	158.1
30-Mar	117	116	346	0	68	357	349	3	8	356	3	360	354	42	71	78	66	33	36	26	8	146	256	144	24.4
31-Mar	172	173	186	217	213	171	187	172	196	198	190	152	160	158	170	183	186	188	175	199	180	187	183	195	181.2

346.9 344.1 335.8 331.5 334.2 335.7 333.9 2.4 67.1 86.2 78.5 110.1 112.5 92.1 42.1 6.0 9.9 3.8 353.9 345.8 347.0 351.6 346.5 345.7
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
Fort McKay - Bertha Ganter - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																			Hours in Service: 744						
Maximum Value: 95 deg on Mar 22 20:00																			Hours of Data: 732						
Minimum Value: 6 deg on Mar 5 04:00																			Hours of Missing Data: 12						
Percentiles: P ₁ = 10 P ₁₀ = 12 Q ₁ = 14 Median = 19 Q ₃ = 37 P ₉₀ = 56 P ₉₉ = 91																			Hours of Calibration: 0						
																			Percent Operational Time: 98.4						
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-Mar	10	10	10	18	18	12	17	17	12	16	17	27	28	41	48	20	38	52	10	13	30	41	19	24	52
2-Mar	43	29	19	34	44	25	49	15	70	69	88	19	18	23	44	31	29	26	15	36	75	46	36	91	91
3-Mar	62	19	33	34	22	33	15	17	26	14	16	12	36	47	26	75	17	14	13	11	18	14	17	14	75
4-Mar	16	15	18	12	12	15	16	15	14	16	19	20	20	18	18	20	20	54	17	29	48	47	55	14	55
5-Mar	11	12	12	6	14	13	66	86	20	26	51	78	66	92	73	34	43	46	57	50	18	15	54	13	92
6-Mar	14	40	21	10	11	20	15	78	65	14	15	21	24	27	28	20	22	18	16	14	15	15	15	15	78
7-Mar	16	15	15	18	16	15	15	14	17	17	15	20	22	20	17	18	19	22	34	57	18	11	11	16	57
8-Mar	10	11	19	14	13	50	27	42	86	10	58	37	38	39	39	41	43	51	24	21	14	14	12	13	86
9-Mar	17	14	42	64	42	18	39	75	50	13	29	32	49	85	59	41	48	39	34	15	12	19	13	34	85
10-Mar	14	79	26	35	12	33	56	22	51	78	42	50	37	50	43	41	26	13	11	9	10	13	15	14	79
11-Mar	22	22	23	13	23	21	19	56	54	84	85	63	85	35	47	37	44	16	13	22	48	32	23	12	85
12-Mar	17	19	17	38	30	17	19	26	63	33	74	18	15	16	19	17	15	14	13	14	13	14	13	12	74
13-Mar	13	13	12	12	12	12	13	13	13	12	12	12	13	13	13	12	12	14	13	14	16	11	12	10	16
14-Mar	10	10	11	10	10	10	12	13	14	11	13	12	10	12	15	18	79	14	13	23	16	20	53	92	92
15-Mar	81	24	25	14	13	15	15	12	14	21	45	44	28	50	20	16	11	14	14	22	80	36	33	55	81
16-Mar	23	12	16	16	15	17	16	18	24	25	19	21	20	23	25	23	20	18	16	15	15	14	16	16	25
17-Mar	16	18	19	11	15	11	14	31	42	64	54	24	14	16	15	13	20	15	15	13	12	13	11	11	64
18-Mar	12	11	12	11	11	12	12	14	15	13	14	17	17	33	28	12	33	17	17	36	29	36	79	33	79
19-Mar	11	12	16	21	17	21	26	29	26	29	22	29	25	19	14	14	13	11	15	12	15	19	22	19	29
20-Mar	17	15	15	16	20	21	28	56	41	37	22	32	48	65	52	64	18	16	52	44	28	46	37	49	65
21-Mar	14	35	42	35	18	24	29	61	17	18	17	15	13	16	14	16	14	14	12	13	14	13	13	14	61
22-Mar	14	14	15	16	14	16	22	23	22	17	19	77	82	25	22	22	23	38	32	95	15	14	15	17	95
23-Mar	19	16	15	15	15	16	16	15	26	39	44	38	39	30	39	34	16	17	15	22	15	13	15	32	44
24-Mar	23	22	20	20	14	63	13	91	78	81	19	18	13	14	13	14	15	18	20	16	18	19	15	15	91
25-Mar	35	53	80	39	43	42	36	59	22	20	19	20	76	11	33	49	76	47	20	40	35	30	44	68	80
26-Mar	45	27	19	29	45	51	45	41	21	89	68	47	75	46	64	15	27	17	26	70	74	34	AF	AF	89
27-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	54	50	22	18	15	15	13	13	12	13	15	15	21	33	54
28-Mar	14	41	32	40	55	43	92	50	13	13	12	14	16	15	16	20	35	17	38	20	37	14	64	14	92
29-Mar	38	60	13	11	10	11	13	11	13	16	16	16	16	14	17	17	18	15	14	61	78	21	14	18	78
30-Mar	16	14	93	55	80	55	21	21	17	14	16	19	26	69	45	32	39	51	50	66	77	75	44	87	93
31-Mar	21	18	39	48	30	38	24	24	21	29	28	19	15	15	17	17	18	17	13	35	66	18	17	18	66
81 79 93 64 80 63 92 91 86 89 88 78 85 92 73 75 79 54 57 95 80 75 79 92																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	March 13, 2017	Last Calibration	February 14, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	13:10
Gas Cert Reference	EY0000683	Station temp.	21 Deg C
Cal Gas Concentration	49.3 ppm	Cal Gas Exp Date	11/04/2019
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
ZAG Make/Model	API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-614	-614
Analyzer IP address	192.168.1.43		Lamp voltage	821	824
Calculated slope	0.995165	0.998796	Chamber temp	44.9	45.1
Calculated intercept	1.362961	0.990078	Pressure	682.2	686.3
Analyzer Background	14.9	14.9	Flow	0.503	0.506
Analyzer Coefficient	0.948	0.948	Intensity	91	91

Analyzer make Thermo 43i Analyzer serial # JC1501301448

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.0	-0.3	----
as found span	5500	83.0	744.0	741.1	1.004
calibrator zero	5500	0.0	0.0	0.1	----
high point	5500	83.0	744.0	744.2	1.000
second point	5500	46.5	416.8	416.7	1.000
third point	5500	23.3	208.9	206.4	1.012
as left zero	5500	0.0	0.0	0.2	----
as left span	5500	83.0	744.0	741.0	1.004
Average Correction Factor					1.004

Corrected As found 741.4 Previous response 746.2 % change 0.7%

Notes:

No maintenance completed. No adjustments made.

Calibration Performed By: Devin Russell



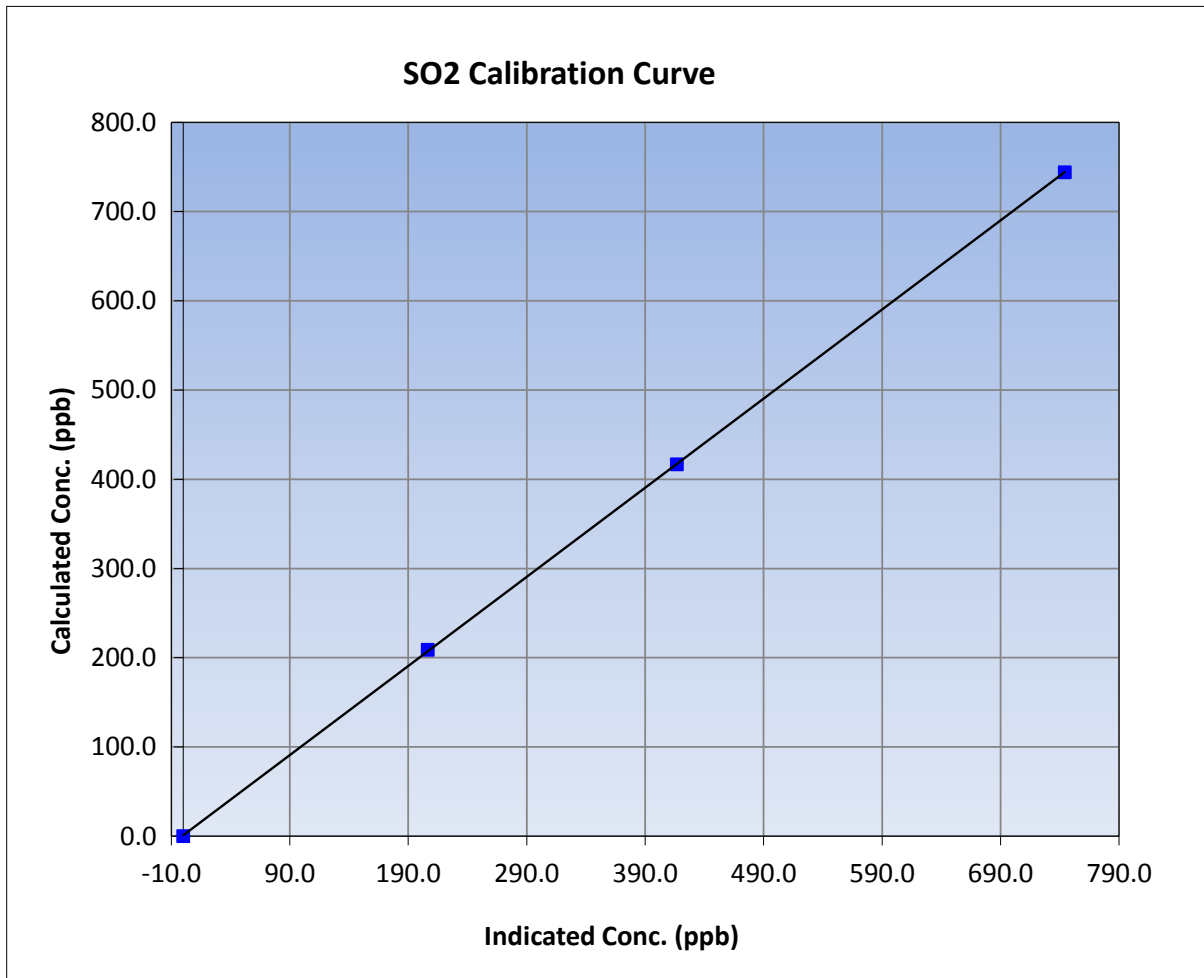
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 13, 2017	Previous Calibration	February 14, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	13:10
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301448

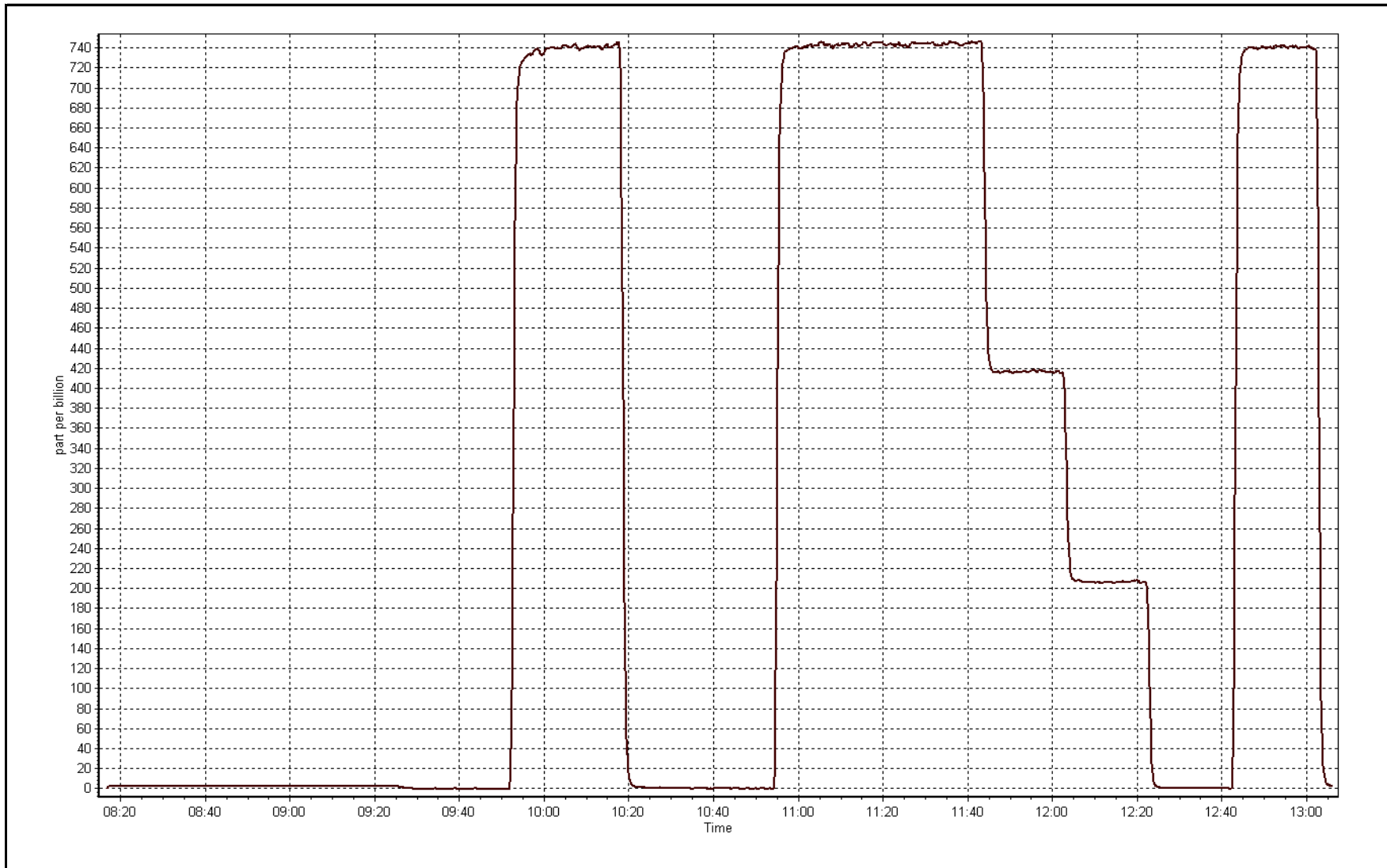
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999985
744.0	744.2	0.9998		
416.8	416.7	1.0002	Slope	0.998796
208.9	206.4	1.0120		
			Intercept	0.990078



SO2 Calibration Plot

Date: March 13, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	March 10, 2017	Last Calibration	February 21, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	10:25	End Time (MST)	14:45
Gas Cert Reference	ET0005004	Station temp.	21 Deg C
Cal Gas Concentration	4.94 ppm	Cal Gas Exp Date	2/12/2019
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
Dil air Make/Model	API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036
SO2 gas concentration	49.7 ppm	SO2 gas cert/exp	LL107945 8/Sep/18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-860	-860
Analyzer IP address	192.168.1.44		Lamp voltage	1153	1157
Calculated slope	0.996837	0.997469	Chamber temp	45	45
Calculated intercept	-0.066012	-0.174736	Pressure	669.3	692.6
Analyzer Background	1.74	1.68	Flow	0.438	0.455
Analyzer Coefficient	0.937	0.925	Intensity	79	78
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153461	
Converter make/model	CDN-101		Converter serial #	470	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.0	----
as found span	6000	91.1	75.0	75.6	0.992
SO2 scrubber check	6000	23.2	192.2	0.7	----
calibrator zero	6000	0.0	0.0	0.2	----
high point	6000	91.1	75.0	75.3	0.996
second point	6000	48.6	40.0	40.4	0.990
third point	6000	24.3	20.0	20.1	0.994
as left zero	6000	0.0	0.0	0.3	----
as left span	6000	91.1	75.0	75.4	0.995
Average Correction Factor					0.993

Corrected As found	75.7	Previous response	75.3	% change	-0.5%
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Notes:

Inlet filter changed after as founds. Scrubber check completed after as founds. Span adjusted.

Calibration Performed By:

Devin Russell



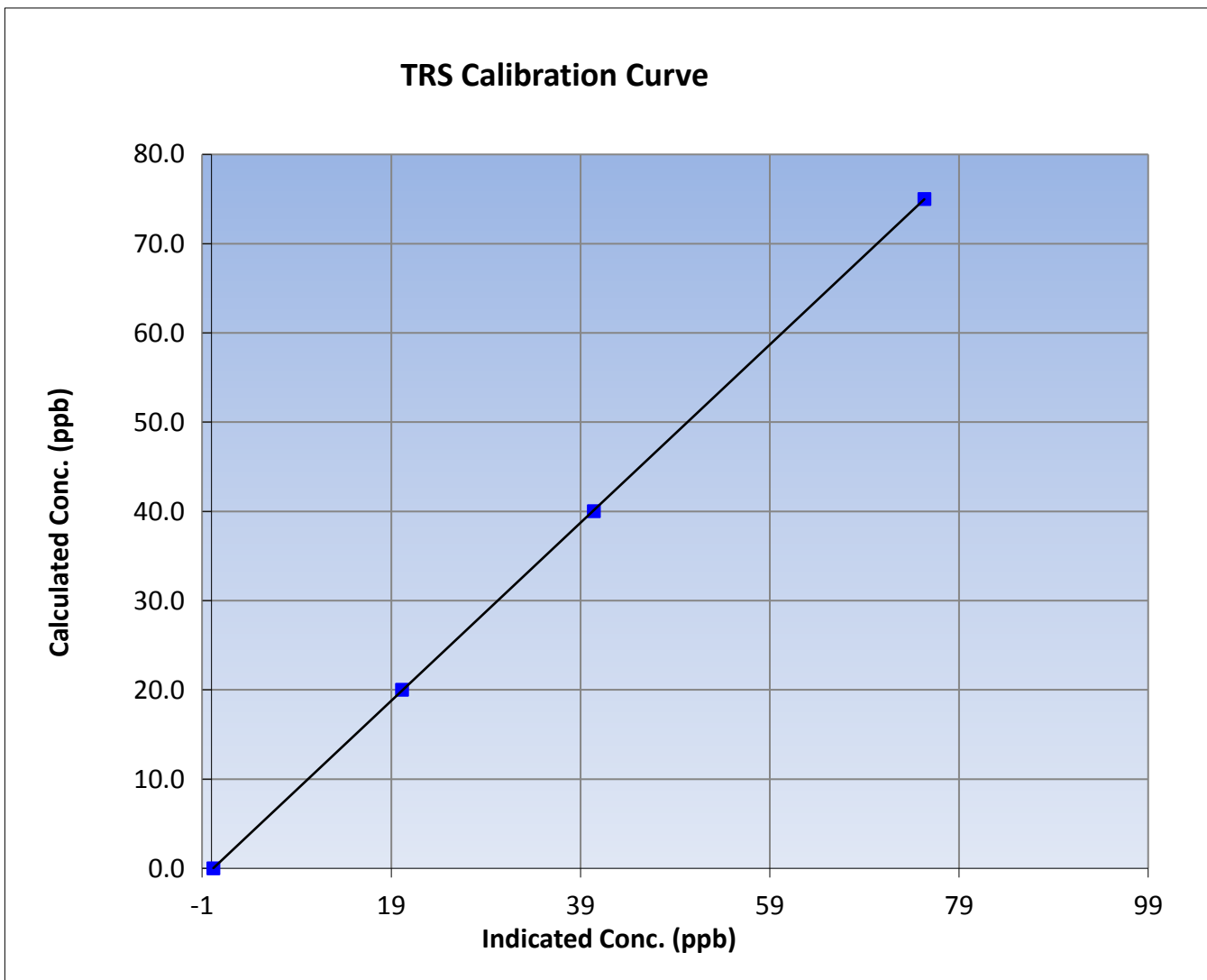
Wood Buffalo Environmental Association TRS Calibration Report

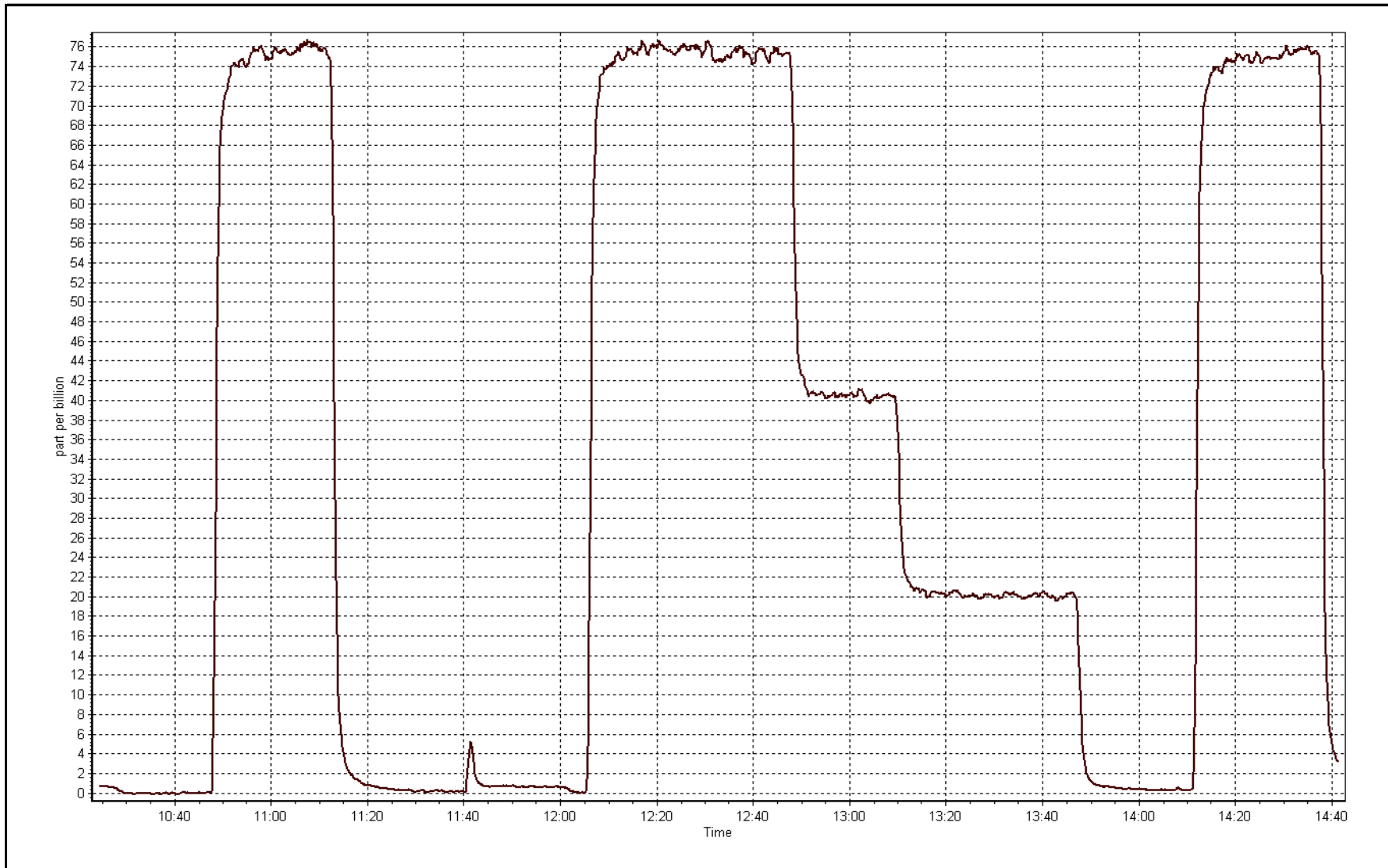
Station Information

Calibration Date	March 10, 2017	Previous Calibration	February 21, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:25	End Time (MST)	14:45
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999992
75.0	75.3	0.9956		
40.0	40.4	0.9904	Slope	0.997469
20.0	20.1	0.9939		
			Intercept	-0.174736







Wood Buffalo Environmental Association

THC / NMHC Calibration Report

version 02-2017

Station Information

Calibration Date	March 13, 2017	Last Calibration	February 14, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	13:10
Gas Cert Reference	EY0000683	Cal Gas Expiry Date	November 4, 2019
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	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	9036

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.4
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.992543	0.998833	Carrier Pressure	36.7	36.7
THC Calc intercept	0.057804	0.053869	Fuel Pressure	47.7	47.7
NMHC Calc slope	0.991864	0.999264	Air Pressure	38.9	38.9
NMHC Calc intercept	0.019420	0.016189			

Analyzer make Thermo 55i Analyzer serial # 1152430012

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.00	0.00	----
as found span	5500	83.0	16.03	16.14	0.993
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	83.0	16.03	16.03	1.000
second point	5500	46.5	8.98	8.90	1.009
third point	5500	23.3	4.50	4.40	1.023
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	83.0	16.03	16.02	1.001
Average Correction Factor					1.011

Corrected As found 16.14 Previous response 16.09 % change -0.3%

Notes:

H2 and N2 cylinder changed after as founds. Span adjusted slightly.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	83	8.26	8.29	0.996
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	83.0	8.26	8.26	1.000
second point	5500	46.5	4.63	4.60	1.006
third point	5500	23.3	2.32	2.29	1.012
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	83.0	8.26	8.25	1.001
Average Correction Factor					1.006

Corrected As found 8.29 Previous response 8.31 % change 0.2%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	83	7.77	7.84	0.991
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	83.0	7.77	7.77	1.000
second point	5500	46.5	4.35	4.29	1.015
third point	5500	23.3	2.18	2.11	1.034
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	83.0	7.77	7.77	1.000
Average Correction Factor					1.016

Corrected As found 7.84 Previous response 7.79 % change -0.7%



Wood Buffalo Environmental Association

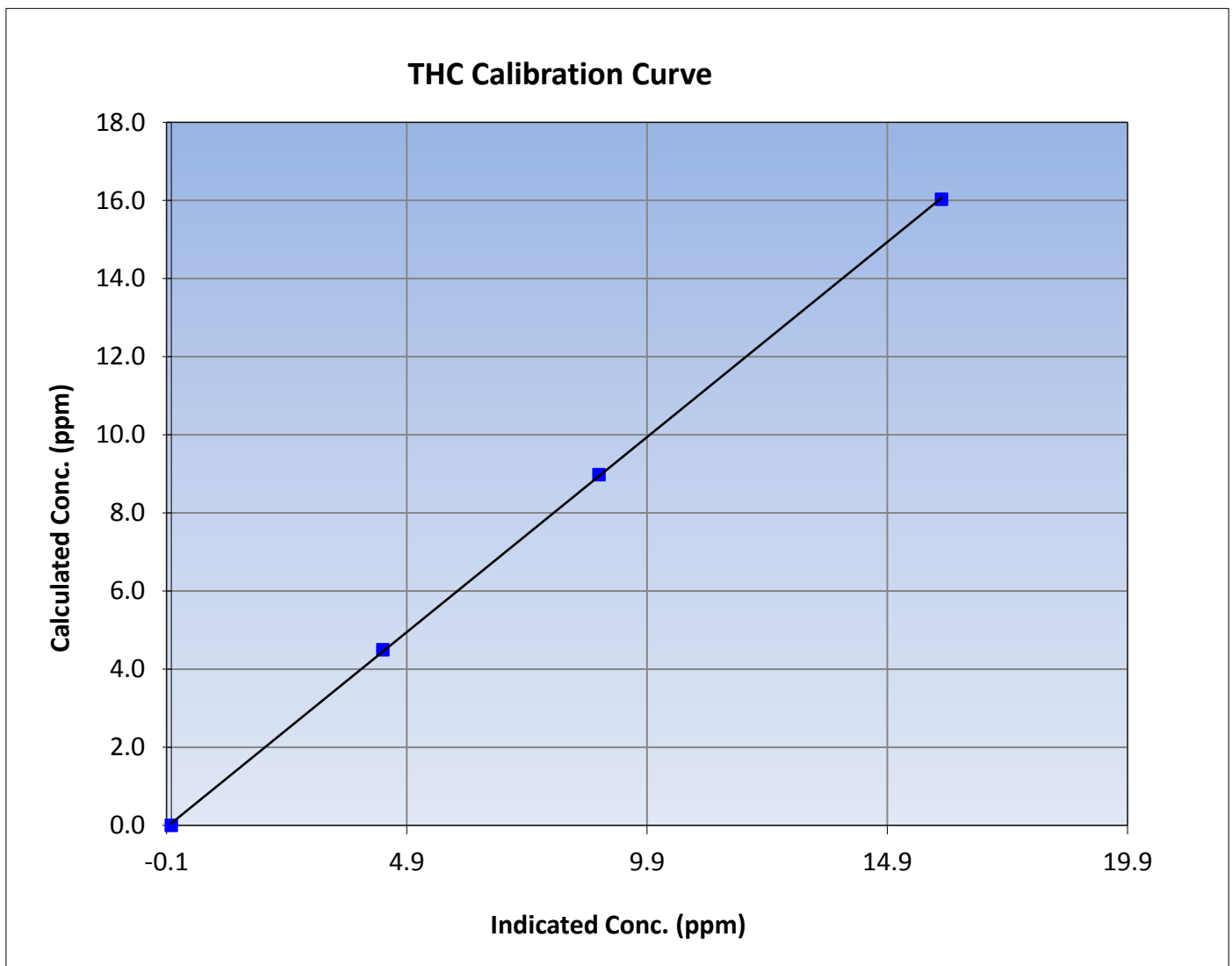
THC Calibration Summary

Station Information

Calibration Date	March 13, 2017	Previous Calibration	February 14, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	13:10
Analyzer make	Thermo 55i	Analyzer serial #	1152430012

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999942
16.03	16.03	1.0000		
8.98	8.90	1.0091	Slope	0.998833
4.50	4.40	1.0227		
			Intercept	0.053869





Wood Buffalo Environmental Association

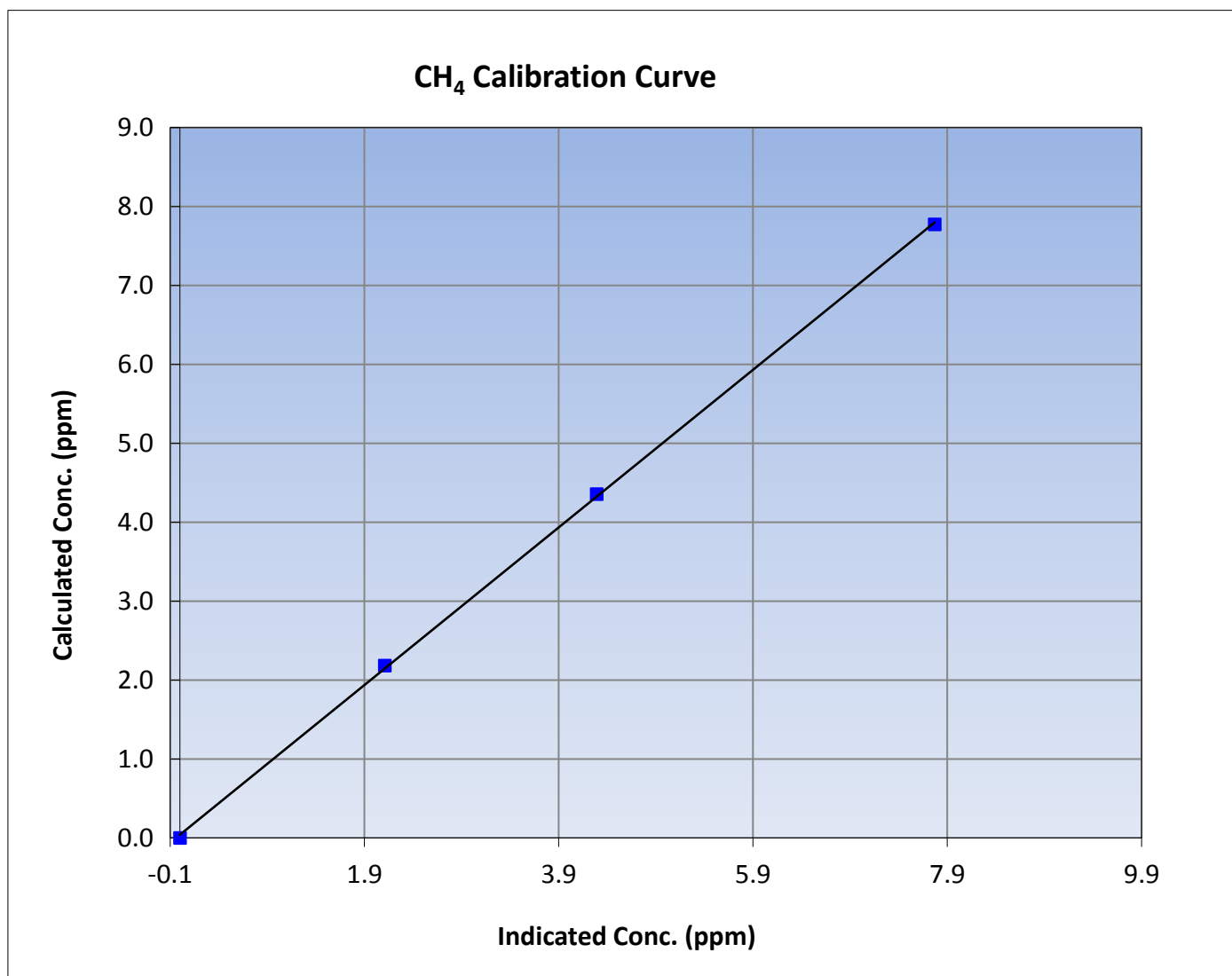
CH₄ Calibration Summary

Station Information

Calibration Date	March 13, 2017	Previous Calibration	February 14, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	13:10
Analyzer make	Thermo 55i	Analyzer serial #	1152430012

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999865
7.77	7.77	1.0002		
4.35	4.29	1.0149	Slope	0.998572
2.18	2.11	1.0340		
			Intercept	0.039466





Wood Buffalo Environmental Association

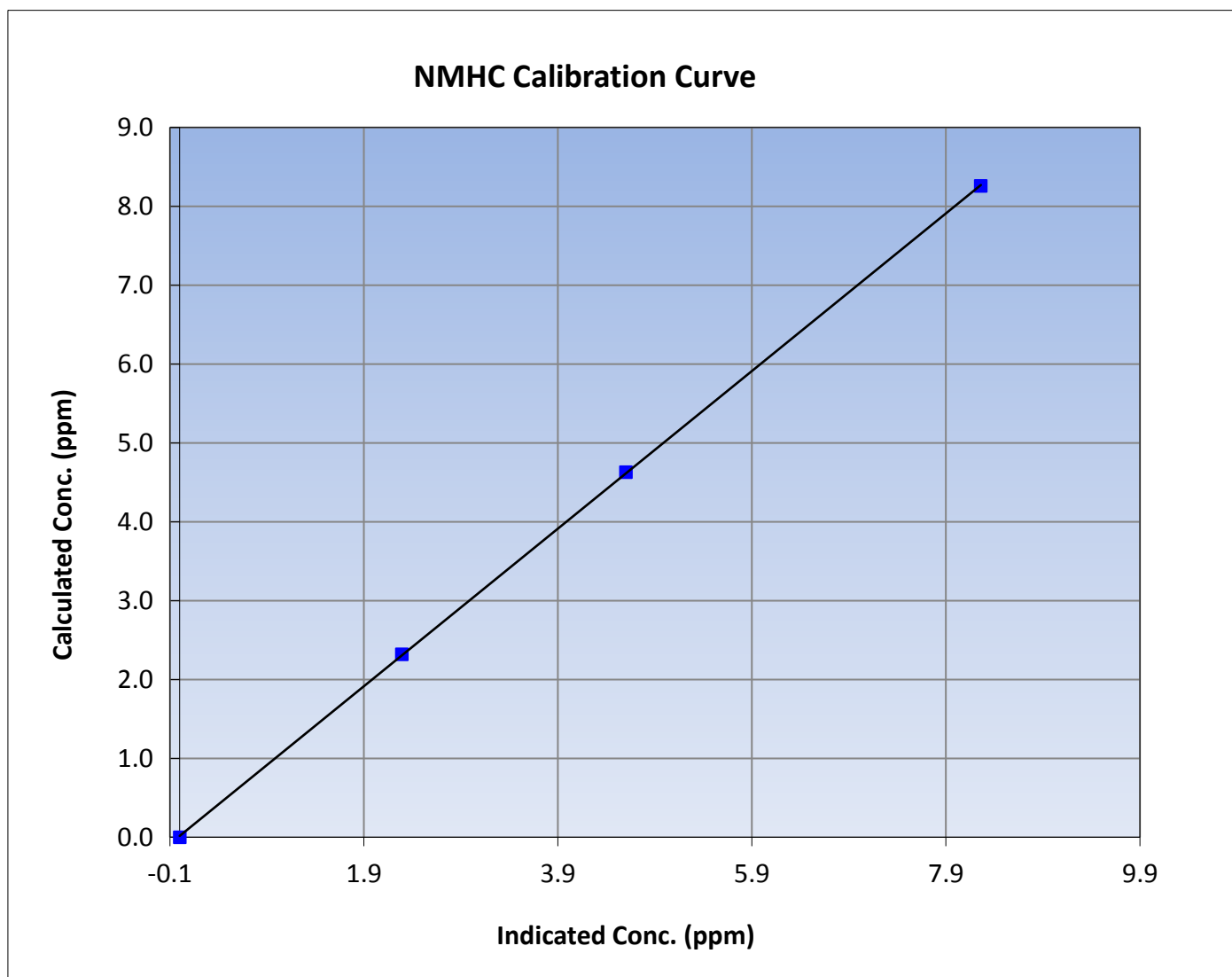
NMHC Calibration Summary

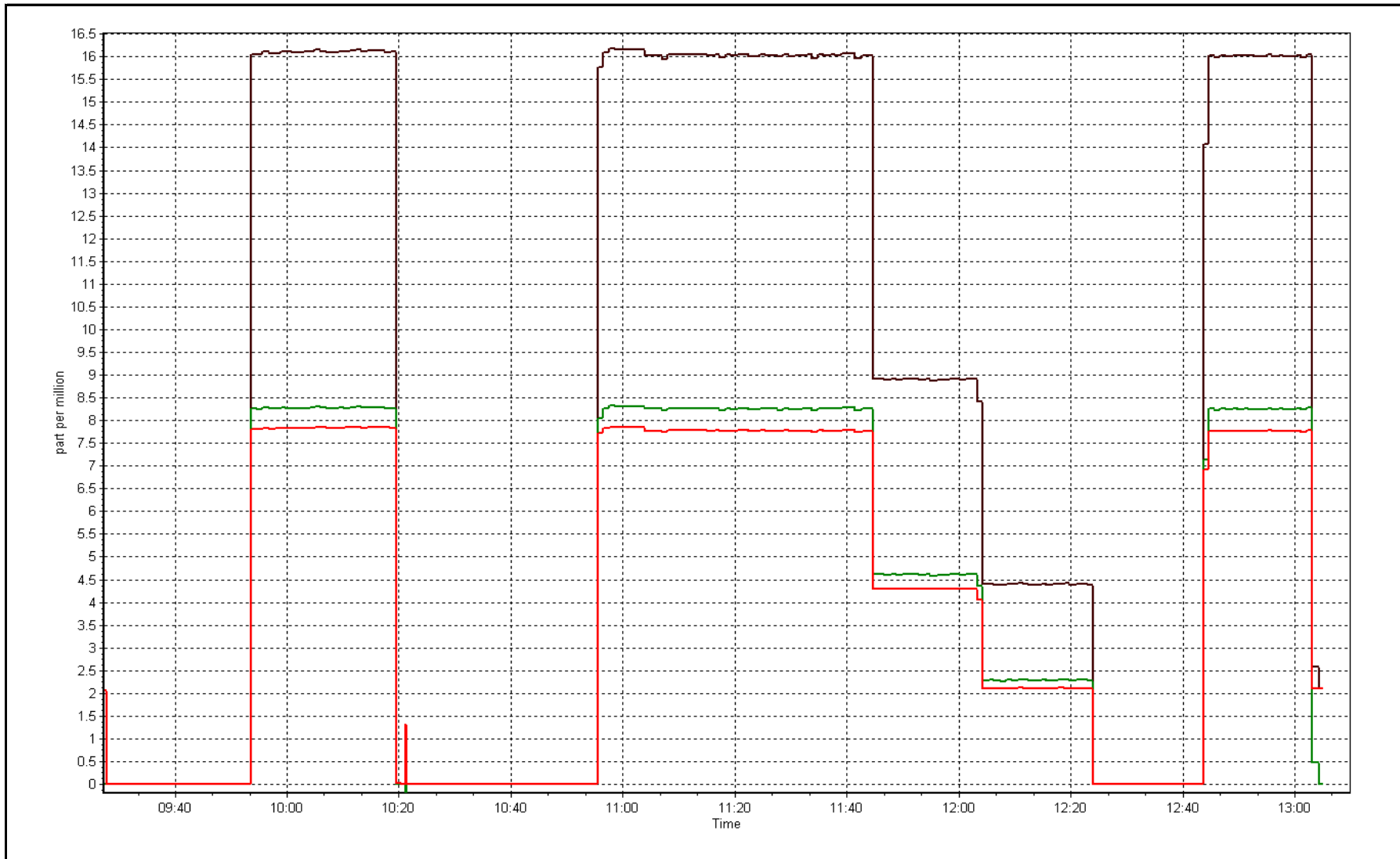
Station Information

Calibration Date	March 13, 2017	Previous Calibration	February 14, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	13:10
Analyzer make	Thermo 55i	Analyzer serial #	1152430012

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999979
8.26	8.26	0.9998		
4.63	4.60	1.0058	Slope	0.999264
2.32	2.29	1.0124		
			Intercept	0.016189







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 17, 2017	Previous Calibration	February 16, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	13:55
NO2 GPT Ref date	February-15-17	Transfer Standard	GPT
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	1730512
DACS make/model	Campbell Scientific CR3000	Serial Number	587
		Serial Number	9036

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	26.6	24.9
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	0.996734	0.997657	Pressure	26.0	27.0
Calculated intercept	-0.567425	-1.503586	Flow cell A	734.000	782.0
Analyzer Background	0.4	0.4	Flow cell B	734.000	782.0
Analyzer Coefficient	1.048	1.060	O3 Measure	4239.6	4185.2
			O3 Reference	4256.6	4203.8

Analyzer make	API T400	Analyzer serial #	1107
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.00	0.0	0.0	----
as found span	5000	0.88	447.5	442.9	1.010
calibrator zero	6000	0.00	0.0	0.4	----
high point	5000	0.88	447.5	448.8	0.997
second point	5000	0.56	264.1	268.1	0.985
third point	5000	0.34	136.5	138.8	0.983
As Left Zero	6000	0.00	0.0	0.1	----
As Left Span	5000	0.88	447.5	462.8	0.967
Average Correction Factor					0.989

Corrected As found	442.9	Previous response	449.5	% change	1.5%
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Notes:

Inlet filter changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell



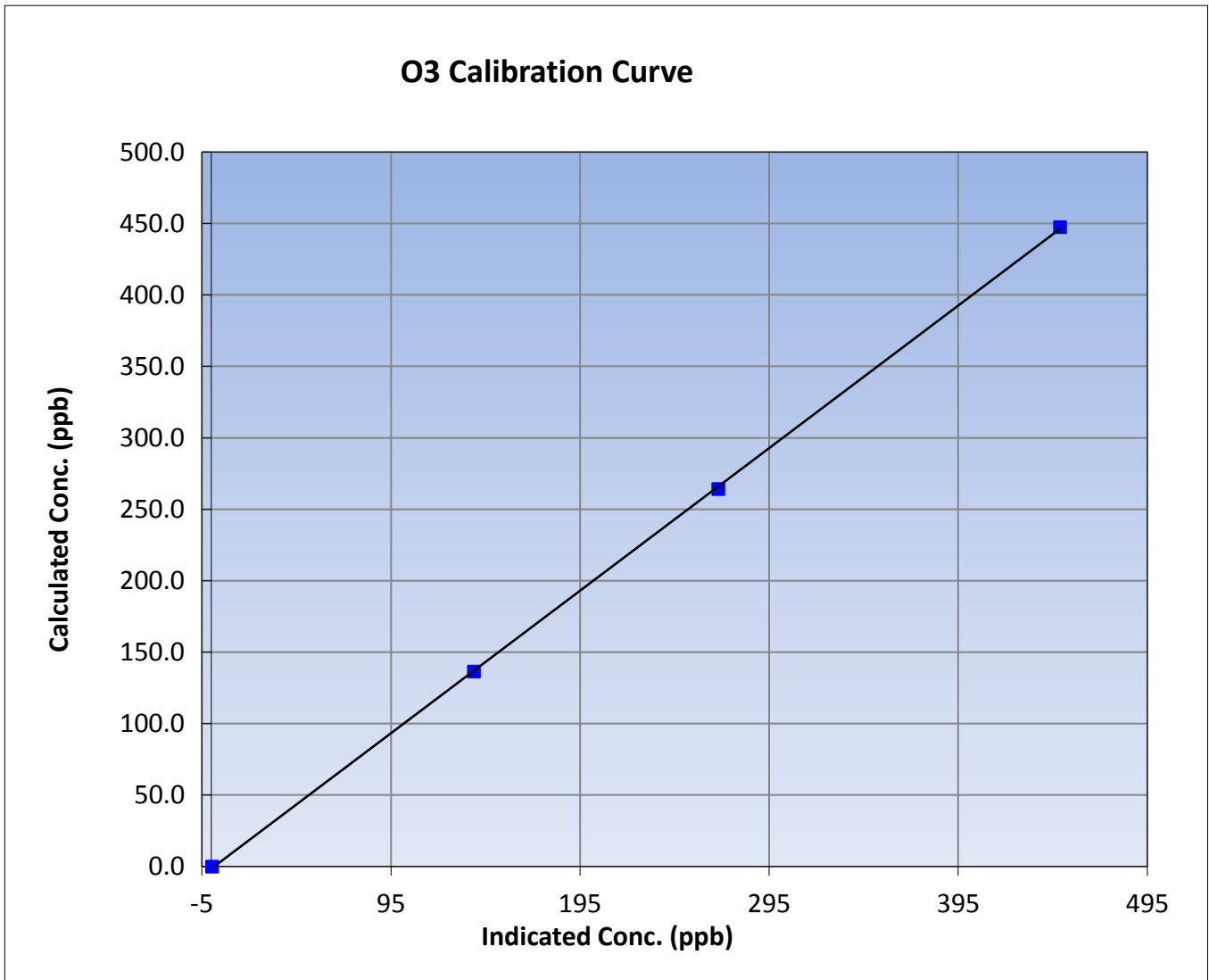
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	March-17-17	Previous Calibration	February-16-17
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	11:00	End Time (MST)	13:55
Analyzer make	API T400	Analyzer serial #	1107

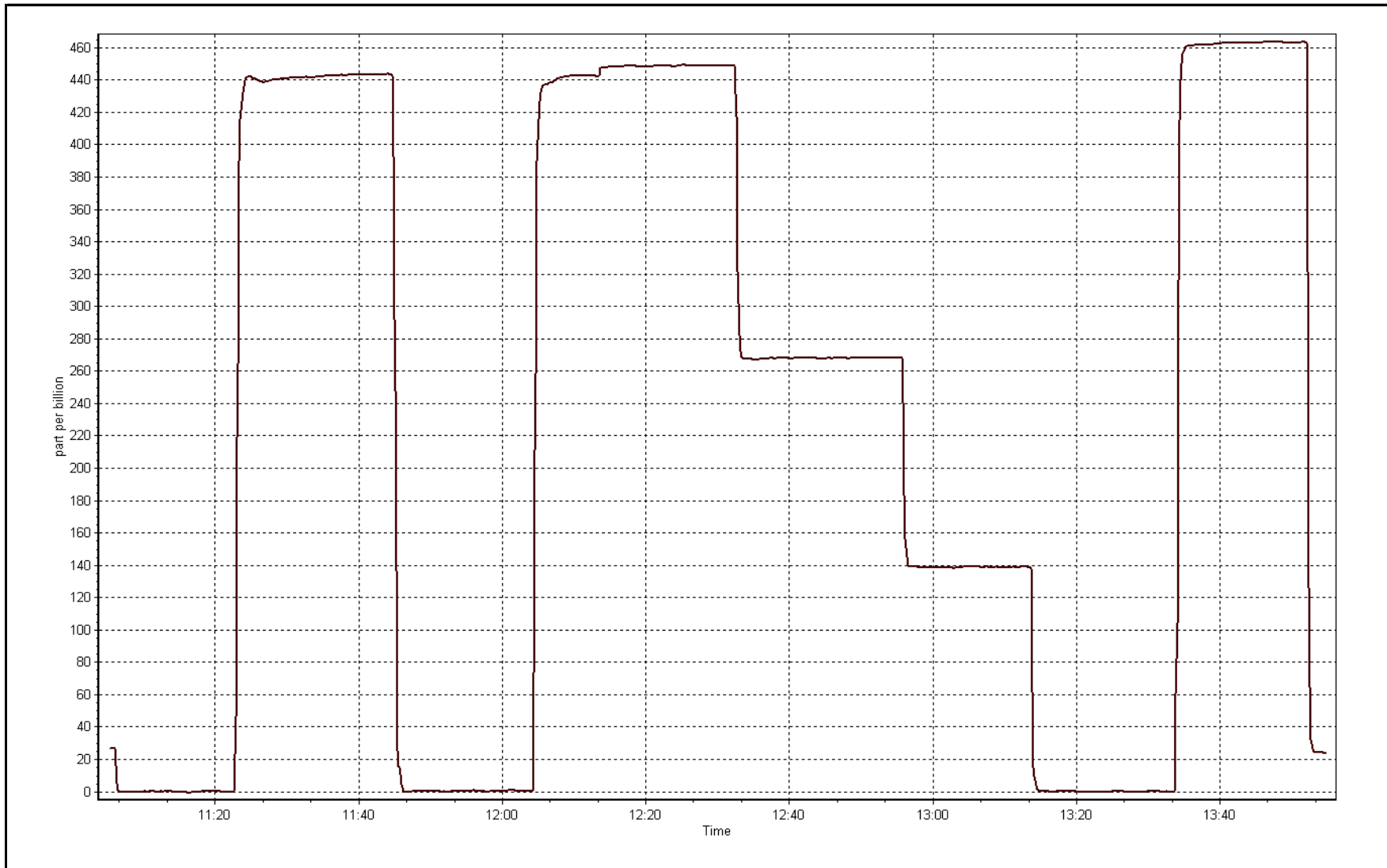
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999941
447.5	448.8	0.9971		
264.1	268.1	0.9852	Slope	0.997657
136.5	138.8	0.9833		
			Intercept	-1.503586



O3 Calibration Plot

Date: March 17, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 21, 2017	Previous Calibration	February 15, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	8:46	End Time (MST)	13:50
NO Cal Gas Conc	49.7 ppm	Gas Cert Reference	EY0000683
NOX Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	11/04/2019
Calibrator	Sabio 4010	Serial Number	1730512
Zero air Generator	Teledyne API T701	Serial Number	587

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9036
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998240	0.997145	1.005039
	Data Offset	1.047106	1.262192	0.413716
Current Calibration	Data Slope	0.999580	0.999374	0.998818
	Data Offset	1.792295	1.915413	-0.422058

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153357
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.166		1.149	
NOX coefficient	0.999		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	5.9		5.8	
NOX bkgrnd	6.1		5.9	
Chamber Temp	50.4	Deg C	50.4	Deg C
Moly Temp	323.9	Deg C	326.3	Deg C
PMT voltage	-791.1	V	-791.4	V
PMT Temp	-2.9	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	170.8	mmHg	172.9	mmHg
R Cell Press Nox	170.8	mmHg	172.9	mmHg
NO sample flow	0.589	lpm	0.595	lpm
Nox sample Flow	0.589	lpm	0.595	lpm

Notes:

Span adjusted. Second High NO point used as GPT reference. As lefts not completed.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

March 21, 2017

Station Number:

AMS 1

Calibration Data

Set Point	Routine	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
as found span	5500	83.0	750.0	750.0	0.0	762.8	763.1	-0.3	0.9833	0.9829
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.3	-0.2	0.0	----	----
high point	5500	83.0	750.0	750.0	0.0	748.9	749.0	-0.1	1.0015	1.0013
second point	5500	46.4	419.3	419.3	0.0	418.3	418.2	0.1	1.0023	1.0027
third point	5500	23.3	210.5	210.5	0.0	206.3	206.1	0.2	1.0204	1.0216
as left zero	5500									
as left span	5500									
Average Correction Factor									1.0081	1.0085

Corrected As found NO_x= 762.8 NO= 763.2 Percent Change NO_x= -1.6% NO= -1.6%

Previous Response NO_x= 750.3 NO= 750.9

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 83.00 ccm NOx ref calc conc = 750.0 ppb NO ref calc conc = 750.0 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	739.9	739.8	0.0	1.0137	1.0138	----	----
1st NO2 (300)	306.9	432.9	740.2	306.9	433.3	1.0133	----	0.9991	100.1%
2nd NO2 (200)	484.2	255.6	741.3	484.2	257.1	1.0118	----	0.9942	100.6%
3rd NO2 (100)	608.5	131.3	740.6	608.5	132.1	1.0127	----	0.9940	100.6%
2nd NO ref point	----	0.0	744.8	744.7	0.0	1.0071	1.0071	----	----
Average Correction Factor						1.0112		0.9957	100.4%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

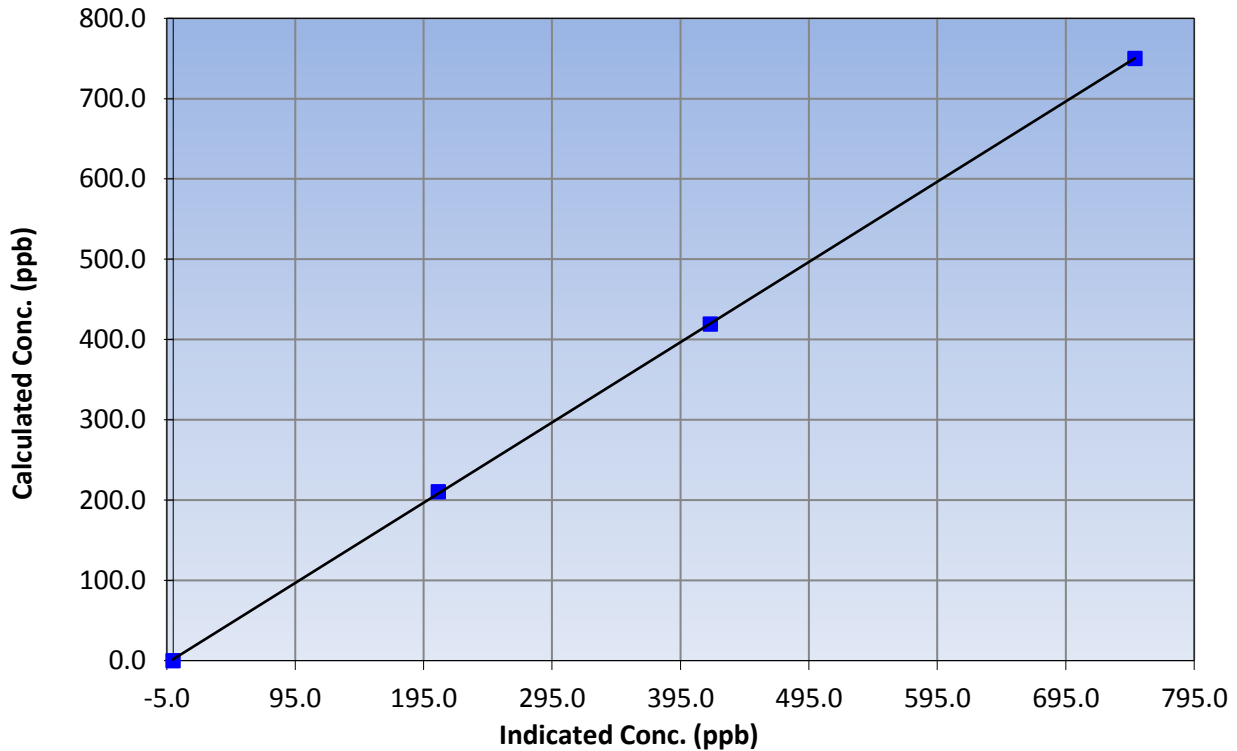
Station Information

Calibration Date	March 21, 2017	Previous Calibration	February 15, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:46	End Time (MST)	13:50
Analyzer make	Routine	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999970
750.0	748.9	1.0015		
419.3	418.3	1.0023	Slope	0.999580
210.5	206.3	1.0204		
			Intercept	1.792295

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

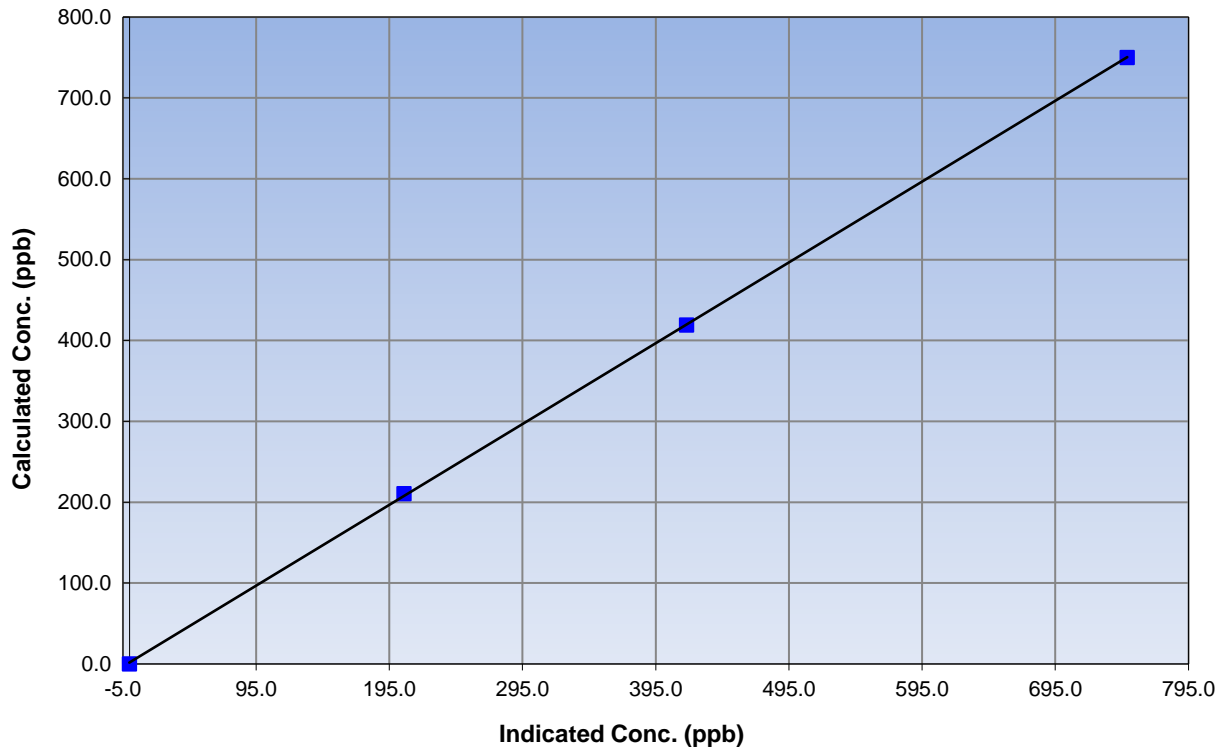
Station Information

Calibration Date	March 21, 2017	Previous Calibration	February 15, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:46	End Time (MST)	13:50
Analyzer make	Routine	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999966
750.0	749.0	1.0013		
419.3	418.2	1.0027	Slope	0.999374
210.5	206.1	1.0216		
			Intercept	1.915413

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

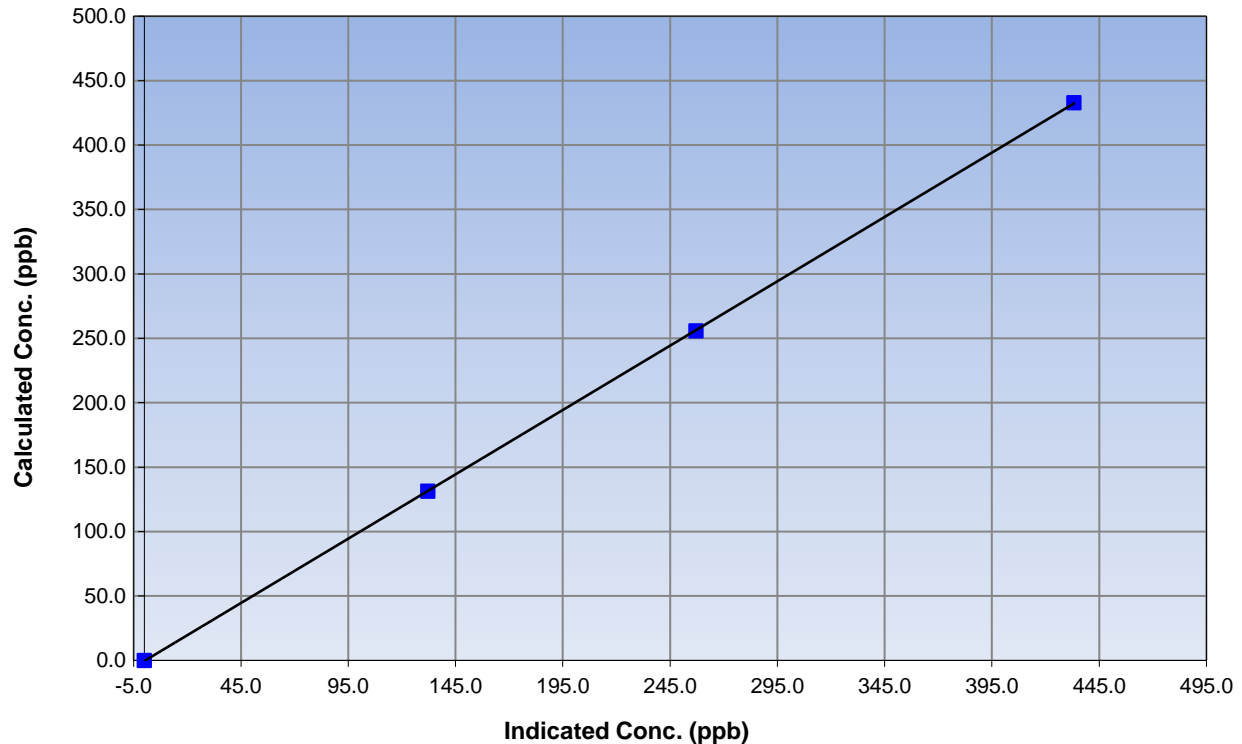
Station Information

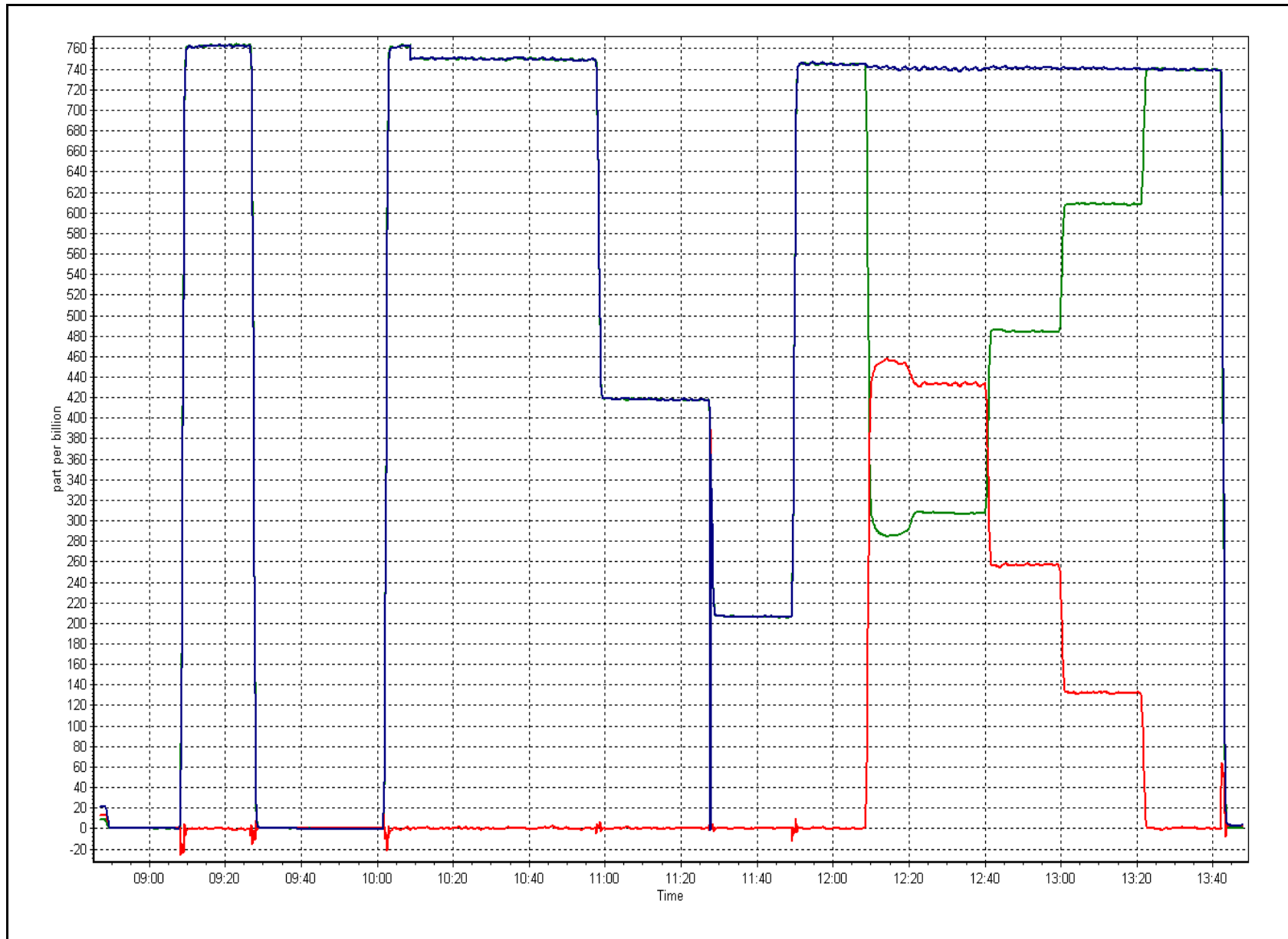
Calibration Date	March 21, 2017	Previous Calibration	February 15, 2017
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:46	End Time (MST)	13:50
Analyzer make	Routine	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999989
432.9	433.3	0.9991		
255.6	257.1	0.9942	Slope	0.998818
131.3	132.1	0.9940		
			Intercept	-0.422058

NO₂ Calibration Curve







Wood Buffalo Environmental Association

N_t-NO_x-NH₃ Calibration Report

Station Information

Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
NOX Calibration Date	March 20, 2017	NOX Previous Cal Date	February 15, 2017
NH3 Calibration Date	March 20, 2017	NH3 Previous Cal Date	February 17, 2017
Reason:	<input type="checkbox"/> Other <input type="checkbox"/> As Found Check		
Start Time (MST)	8:40	End Time (MST)	11:00
Calibrator	Sabio 4010	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	95.5 ppm	Serial Number	14300410
NOx Cal Gas Conc	49.7 ppm	NH3 Expiry Date / SN	24/May/2017 LL23123
NO Cal Gas Conc	49.7 ppm	NO Expiry Date / SN	4/Nov/2019 EY0000683

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9036
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Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	1.000252	0.982427	0.999905	1.000094	1.005674
	Data Offset	-1.868671	-3.8920114	-1.656392	-0.851974	-0.394332
Cal Stats After	Data Slope					
	Data Offset					
IP address		192.168.1.77				

Analyzer Information

Analyzer make/model	API T201	Analyzer serial #	152
Converter	API 501 NH3	Converter serial #	147

Test Point	before		after	
NH3 Conc range	0-2500	ppb	2500	ppb
NOx Conc range	0-1000	ppb	1000	ppb
NO BKG	0.9		0.9	
NOx BKG	-0.8		-0.8	
Nt BKG	-0.6		-0.6	
NO coefficient	1.134		1.134	
NO2 coefficient	1.000		1.000	
NOx coefficient	1.278		1.278	
NH3 coefficient	0.865		0.865	
Nt coefficient	1.281		1.281	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	315.9	Deg C	314.9	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	84.0	ccm	84.0	ccm
R Cell Press	6.8	mmHg	6.0	mmHg
PMT Voltage	645.0	v	645.0	v
Sample Flow 1 NO	566.0	ccm	541.0	ccm
Sample Flow 2 Nox	529.0	ccm	516.0	ccm
Sample Flow 3 Nt	537.0	ccm	508.0	ccm

Notes:

AS Found Check due to nightly span being 10% out



Wood Buffalo Environmental Association

NH₃ Calibration Report

Station Information

Calibration Date:

March 20, 2017

Station Number:

AMS 1

NH₃ Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NOx conc (ppb)	Calculated NH ₃ conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH ₃ conc (ppb)	Nt Correction factor	NH ₃ Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	15.8	15.6	0.2	----	----
as found NO	5500	83.0	750.0	750.0	----	765.6	765.9	-0.4	0.980	----
calibrator zero										
high NO point										
NO/O ₃ point										
as found NH ₃	5000	41.9	800.3	NA	800.3	659.2	13.3	645.9	1.214	1.239
first NH ₃										
second NH ₃										
third NH ₃										
Average Correction Factor										

Nt Corrected As Found Nt = 749.8 ppb
 NOx Corrected As Found NOx = 750.3 ppb
 NH₃ Previous Converter Efficiency = 86.5 %

Previous Response Nt = 767.3 ppb
 Previous Response NOx = 751.7 ppb
 NH₃ Current Converter Efficiency = 86.5 %

Nt percent change 2.3%
 NOx percent change 0.2%
 NH₃ percent change 0.0%



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date: March 20, 2017 Station Number: AMS 1

NO_x / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	15.6	5.5	15.8	----	----
as found span	5500	83.0	750.0	750.0	750.0	765.9	767.5	765.6	0.9793	0.9772
calibrator zero										
high point										
second point										
third point										
Average Correction Factor										

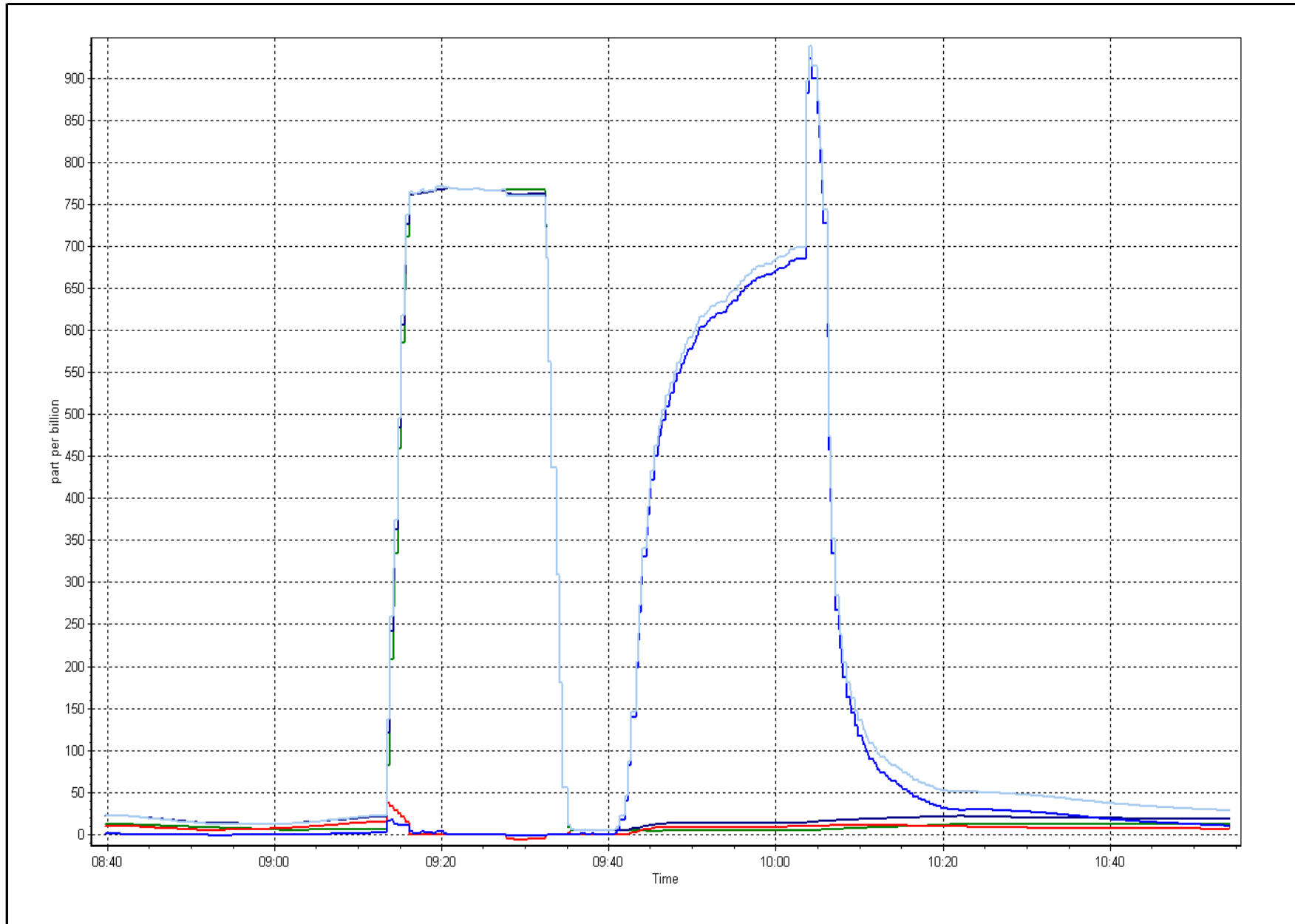
	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	749.8	750.3	762.0	----
Previous Response	767.3	751.7	750.8	----
Percent Change	2.3%	0.2%	-1.5%	1.7%

GPT Calibration Data

Dilution Flow (total) _____ ccm Source Gas Flow _____ ccm NO_x ref calc conc = _____ ppb NO ref calc conc = _____ ppb

O ₃ Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
1st NO ref point									
1st NO ₂ (300)									
2nd NO ₂ (200)									
3rd NO ₂ (100)									
2nd NO ref point									
Average Correction Factor									

Calibration Performed By: Melissa Lemay





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Bertha Ganter - Fort McKay	Station number:	AMS 1
Calibration Date:	March 21, 2017	Last Cal Date:	February 17, 2017
Start time (MST):	9:12	End time (MST):	11:00
Sharp Model:	Thermo 5030 SHARP	S/N:	E-1486
Particulate Fraction:	PM2.5	C14 Source S/N:	5691
Flow Standard Model:	Delta-Cal	S/N:	1451
Temp/RH standard:	Delta-Cal	S/N:	1451

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	-11	-10.9	-11	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	992	990.31	992	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1006.2	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	1.4	-----	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"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

				Tolerance
Leak Test:	Date of check:	_____	Last Cal Date:	January 13, 2017
	Flow w/o adaptor:	16.9	Flow w/ adaptor:	16.55
				0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass:	_____	S/N:	_____
	Date of check:	_____	Last Cal Date:	November 17, 2016
	New Correction Factor:	_____	Previous Correction Factor:	_____

Parameter	As found	Measured	As left	Adjusted	Tolerance
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: Cyclone head cleaned.No adjustments to T1, RH or P3. Nephelometer adjusted.

Calibration by: Devin Russell



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 2 MILDRED LAKE MARCH 2017

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
MARCH 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	41	0	9	0
H2S (ppb) Average	709	35	35	100	7	0	1	0
THC (ppm) Average	671	33	73	94.62	5.1	-	2.7	-
Temperature (C) Average	744	0	0	100	12.5	-	6.5	-
Relative Humidity (%) Average	744	0	0	100	99	-	90	-
Wind Speed 10 m (km/h) Average	737	0	7	99.06	30	-	20	-
Wind Direction 10 m (deg) Average	737	0	7	99.06	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
MARCH 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	2.4	5	-	0	0	0	0	2	7	41
H2S (ppb) Average	709	0.6	1	-	0	0	0	0	1	1	7
THC (ppm) Average	671	2.36	0.3	-	1.9	2.2	2.2	2.3	2.4	2.6	5.1
Temperature 2 m (C) Average	744	-8.17	10.4	-	-30.6	-22.8	-17.9	-7	0.4	4	12.5
Relative Humidity (%) Average	744	67.3	15	-	28	47	56	67	78	89	99
Wind Speed 10 m (km/h) Average	737	9.9	5	-	0	4	6	9	13	17	30
Wind Direction 10 m (deg) Average	737	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	01 Mar 2017 11:00	01 Mar 2017 12:00	2	Maintenance - Station operator on site
THC	07 Mar 2017 02:00	08 Mar 2017 11:00	34	Analyzer Failure - sample pump failed
THC	08 Mar 2017 12:00	08 Mar 2017 15:00	4	Maintenance - replaced sample pump
Wind Speed, Wind Direction	27 Mar 2017 03:00	27 Mar 2017 09:00	7	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

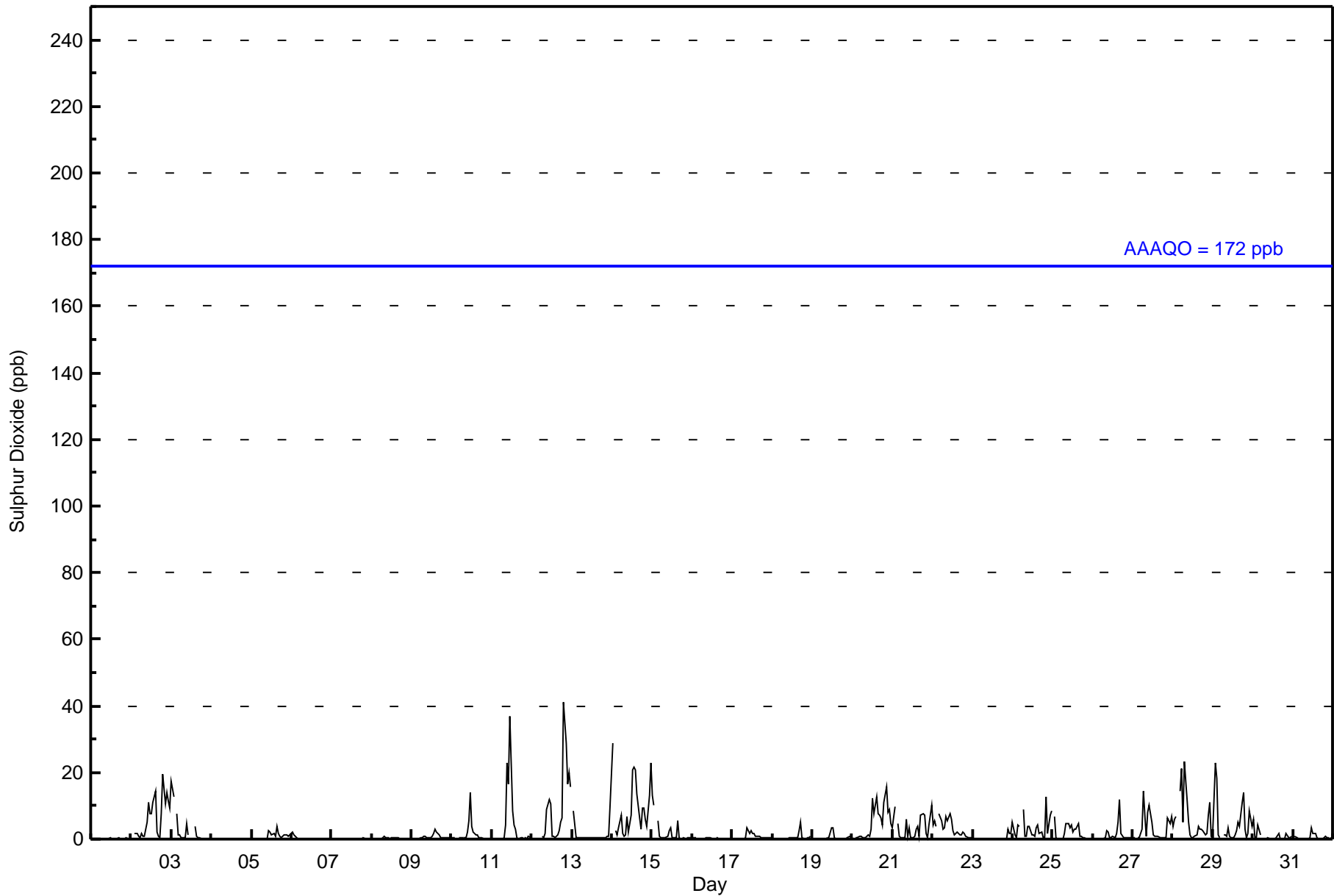
Mildred Lake - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 41 ppb on Mar 12 20:00										Maximum Daily Average: 9.3 ppb on Mar 14										Hours of Data: 710																												
Minimum Value: 0 ppb on Mar 1 02:00										Minimum Daily Average: 0.1 ppb on Mar 4										Hours of Missing Data: 34																												
Maximum Diurnal Average: 3.9 ppb at hour 12										Minimum Diurnal Average: 1.3 ppb at hour 4										Hours of Calibration: 34																												
Monthly Average: 2.4 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 2 P ₉₀ = 7 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-Mar	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																						
2-Mar	0	Z	2	2	1	1	2	1	1	5	11	8	8	11	14	2	1	0	8	19	11	14	11	10	6.1	19																						
3-Mar	18	13	Z	8	1	1	0	0	0	5	1	C	C	C	4	1	0	0	0	0	0	0	0	0	2.7	18																						
4-Mar	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																						
5-Mar	0	0	0	0	Z	0	0	0	0	0	3	2	1	2	1	4	2	1	0	1	1	1	1	1	1.0	4																						
6-Mar	2	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2																						
7-Mar	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																						
8-Mar	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																						
9-Mar	0	0	Z	0	0	0	1	1	1	1	1	1	1	2	3	2	1	1	0	0	0	0	0	0	0.7	3																						
10-Mar	0	0	0	Z	0	0	0	0	0	2	5	14	4	2	1	1	1	1	0	0	0	0	0	0	1.5	14																						
11-Mar	0	0	0	0	Z	0	0	0	4	23	16	37	9	4	3	0	0	0	0	0	0	0	1	0	4.3	37																						
12-Mar	0	0	0	0	0	Z	1	1	2	9	12	11	1	1	1	1	3	5	6	41	29	17	20	15	7.6	41																						
13-Mar	Z	8	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	10	1.3	10																						
14-Mar	29	Z	3	1	3	7	2	1	1	7	2	7	21	22	21	14	6	3	9	9	6	4	13	23	9.3	29																						
15-Mar	13	10	Z	6	1	0	0	0	1	1	2	4	0	0	0	6	0	0	0	0	0	0	0	0	2.0	13																						
16-Mar	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																						
17-Mar	0	0	0	0	Z	0	0	0	0	3	2	3	2	2	1	1	1	1	0	0	0	0	0	0	0.8	3																						
18-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	3	5	0	0	0	0	1	1	0.6	5																						
19-Mar	Z	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	1	0	0.5	3																					
20-Mar	0	Z	0	0	1	1	0	0	0	1	1	3	12	7	13	7	7	6	4	11	16	8	9	5	5.0	16																						
21-Mar	3	10	Z	5	1	1	0	1	6	1	3	1	0	1	3	4	1	7	8	7	2	1	4	10	3.4	10																						
22-Mar	4	5	4	Z	8	5	3	4	7	6	8	6	3	1	2	2	1	1	2	2	1	0	0	0	3.3	8																						
23-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	2	0.4	3																						
24-Mar	5	1	0	4	4	Z	9	1	1	4	4	1	1	1	3	4	2	2	1	0	13	2	7	8	3.5	13																						
25-Mar	Z	7	0	0	0	0	0	2	4	5	3	4	2	3	3	5	1	1	0	0	0	0	0	0	1.8	7																						
26-Mar	0	Z	0	0	0	0	0	0	2	2	1	0	1	1	2	5	12	2	0	0	1	0	0	0	1.3	12																						
27-Mar	0	0	Z	0	0	3	14	7	1	8	10	5	1	1	1	1	1	0	0	0	0	6	5	7	3.2	14																						
28-Mar	4	6	7	Z	14	21	5	23	12	5	1	1	1	1	1	4	3	3	2	1	2	7	11	1	5.9	23																						
29-Mar	1	23	18	1	1	Z	1	1	1	3	1	1	1	1	3	5	4	11	14	3	1	2	9	4	4.7	23																						
30-Mar	6	0	1	4	1	Z	0	0	0	0	0	0	0	0	1	2	0	0	0	0	2	1	1	1	0.9	6																						
31-Mar	Z	1	0	0	0	0	0	0	0	0	0	3	2	2	0	0	0	0	0	1	1	0	0	0	0.5	3																						
																								3.5	3.4	1.4	1.3	1.4	1.7	1.3	1.5	1.5	3.0	2.9	3.9	2.5	2.2	2.6	2.4	1.7	1.7	1.9	3.2	2.8	2.2	3.2	3.3	Diurnal Average
																								29	23	18	8	14	21	14	23	12	23	16	37	21	22	21	14	12	11	14	41	29	17	20	23	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
Mildred Lake - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	666	93.80	93.80
11 - 20	32	4.51	98.31
21 - 60	12	1.69	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
Mildred Lake - March 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	110	139	41	16	13	29	41	102	57	26	15	8	7	15	13	29	661
11 - 20	0	0	0	0	0	0	8	20	2	0	0	0	0	1	0	0	31
21 - 60	0	0	0	0	0	0	3	9	0	0	0	0	0	0	0	0	12
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	110	139	41	16	13	29	52	131	59	26	15	8	7	16	13	29	704

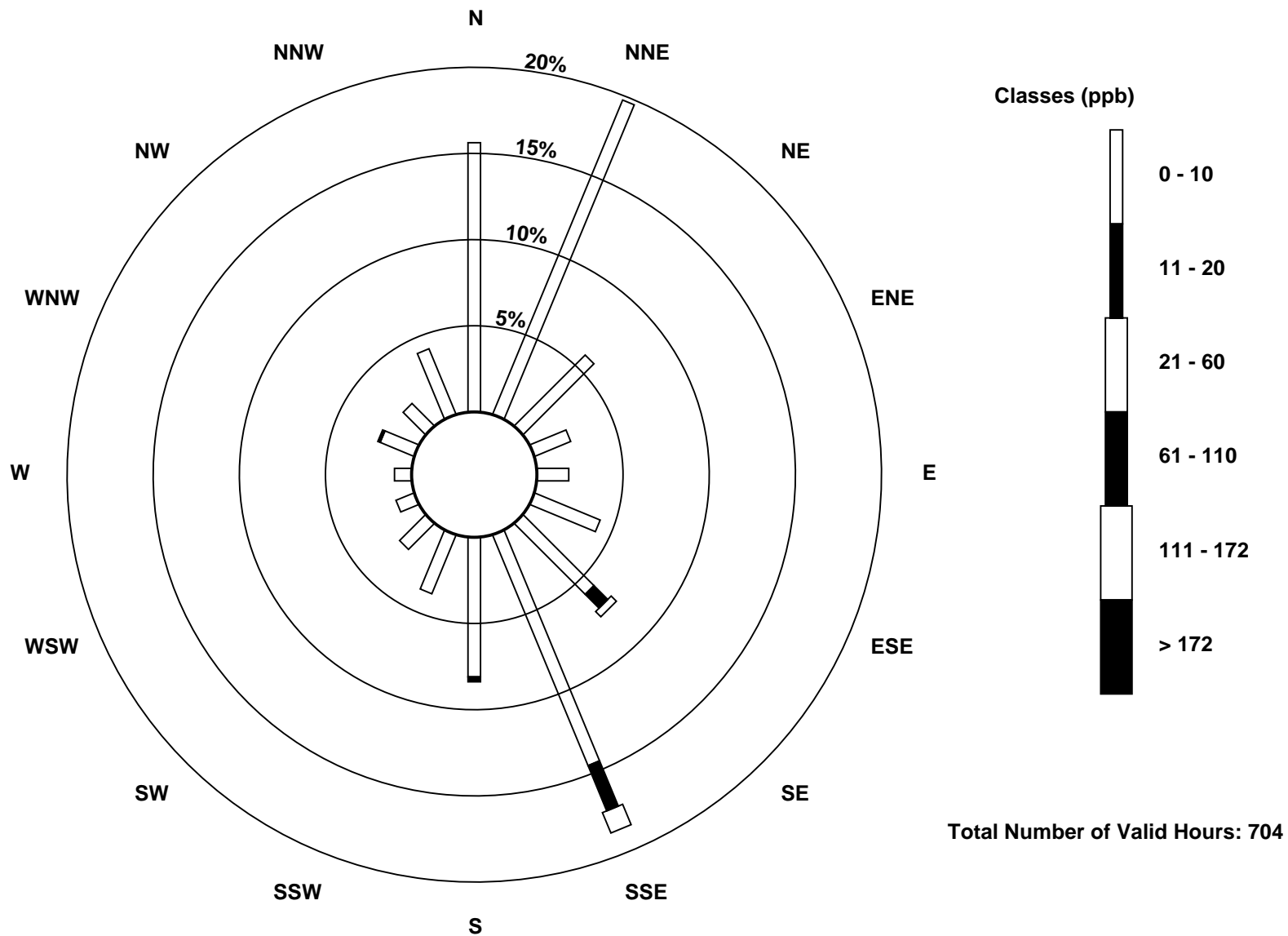
Total Number of Valid Hours: 704

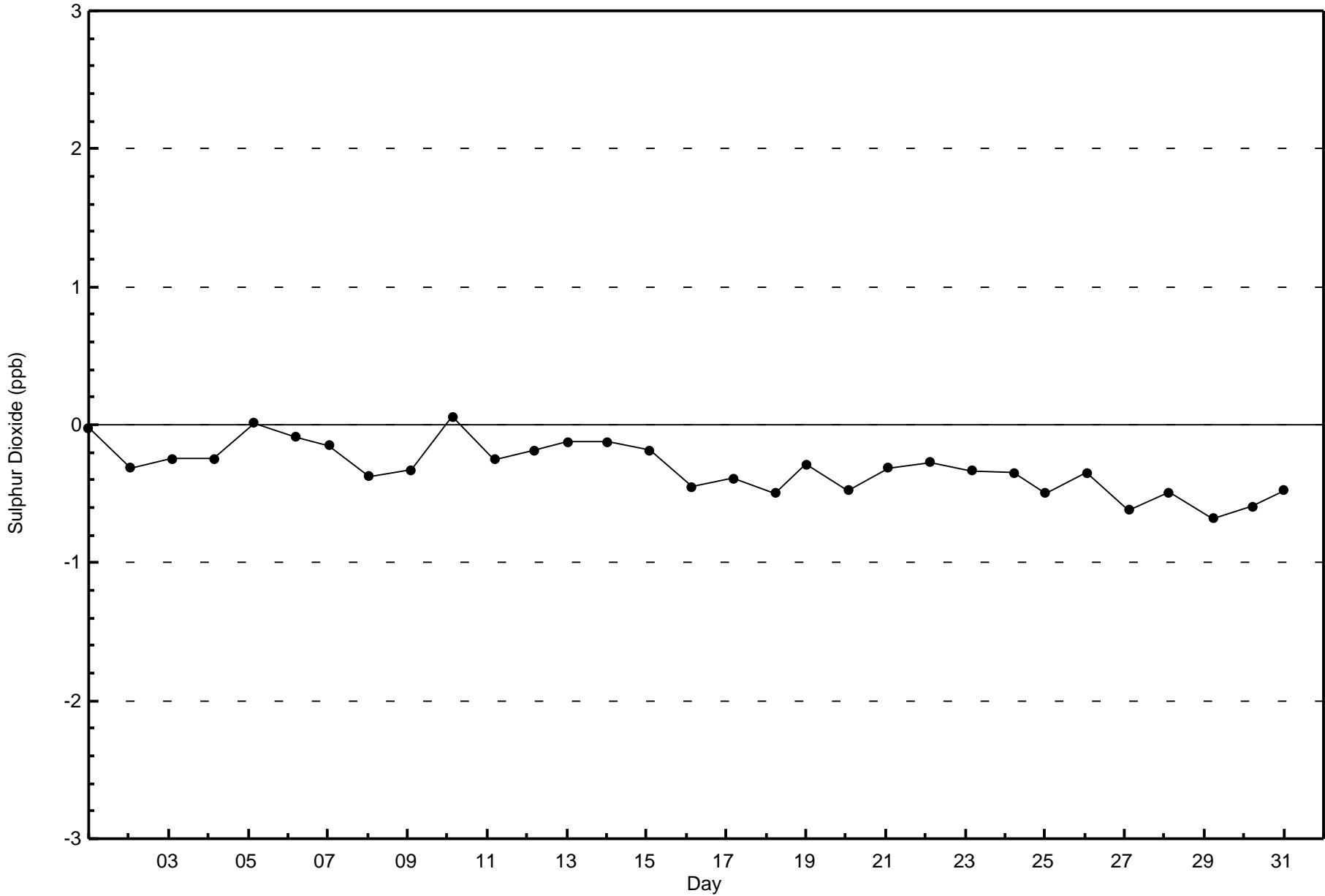
Total Number of Hours: 744

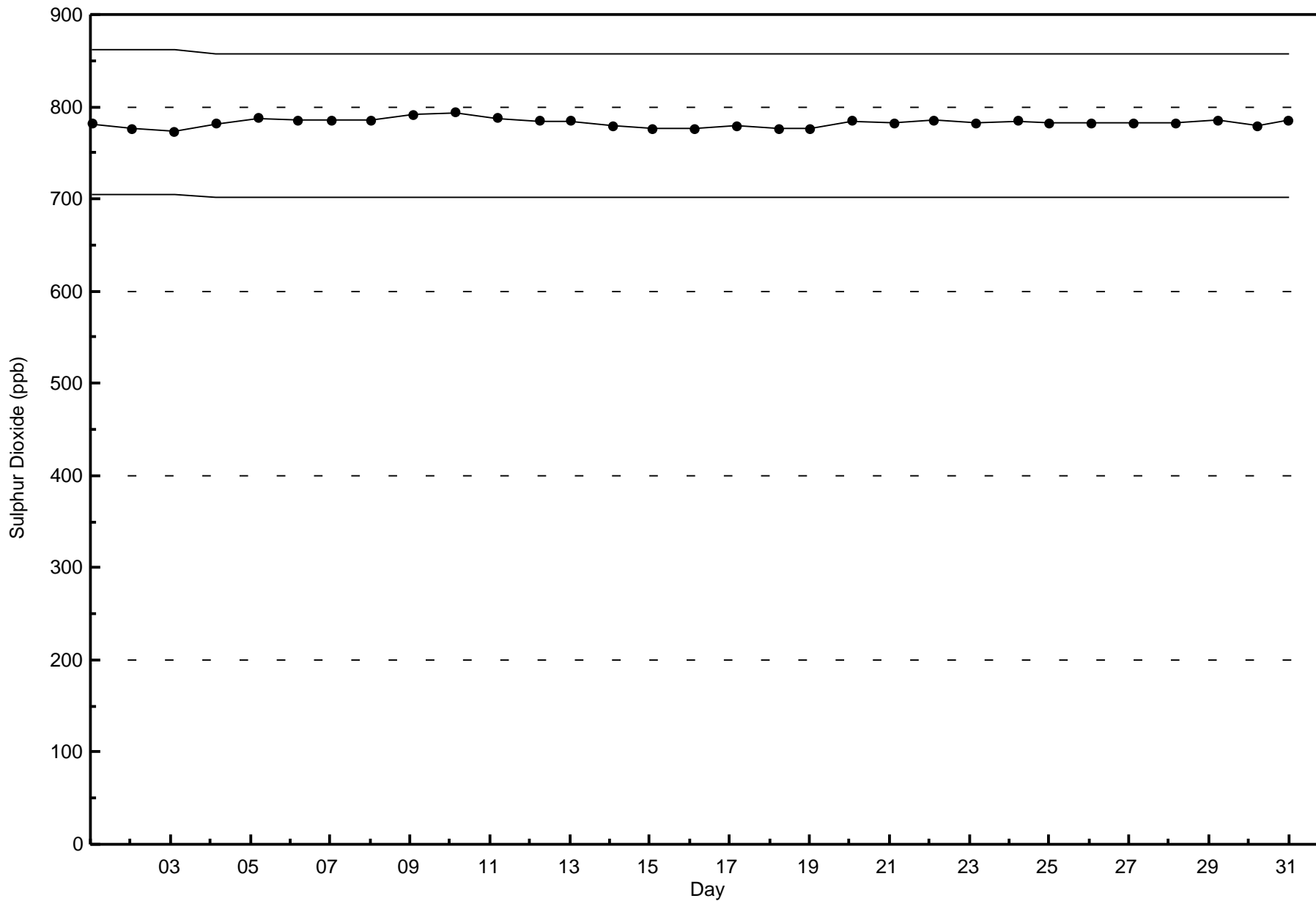


Wood Buffalo Environmental Association
Wind Rose Mar 2017

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







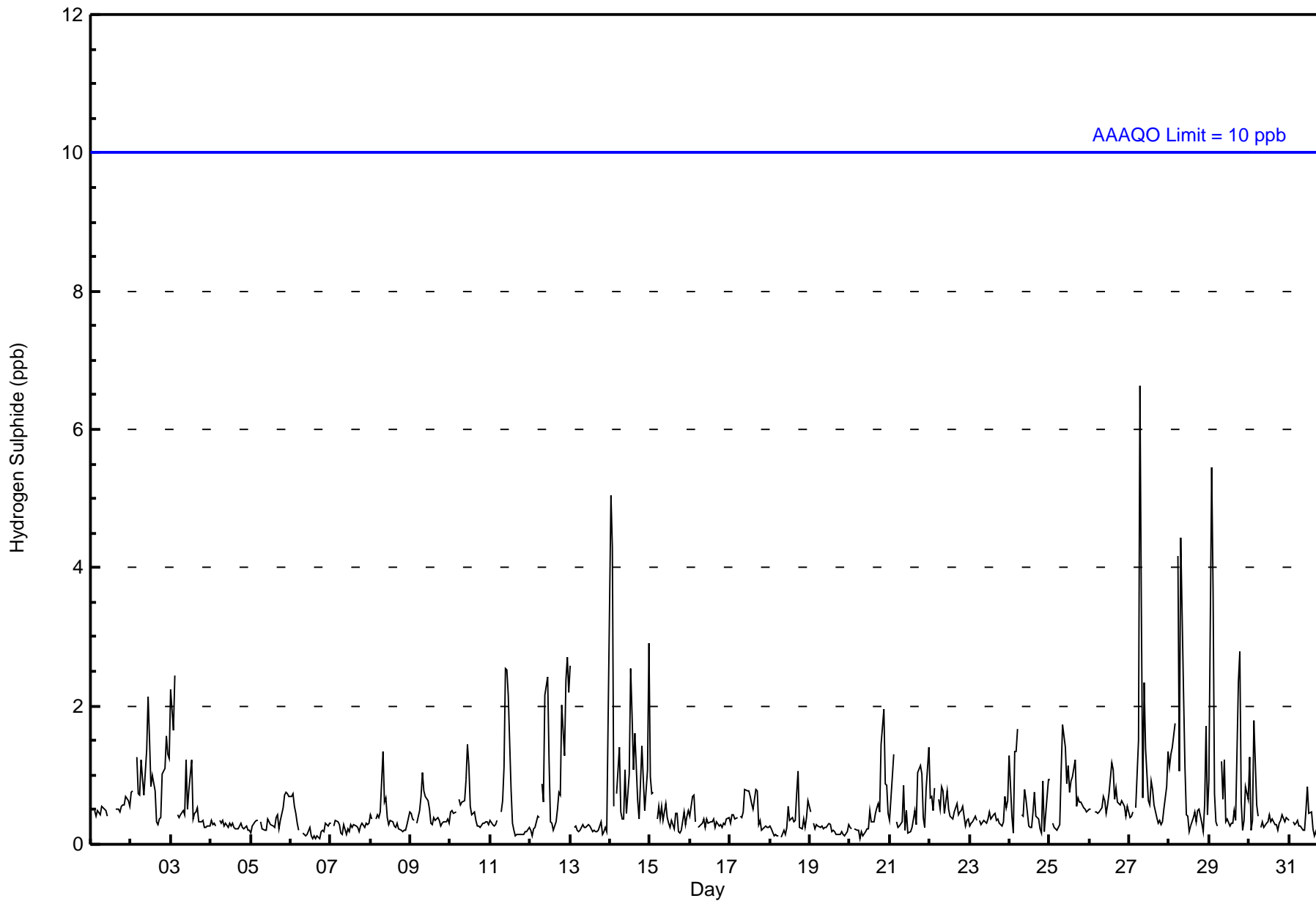


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744										Daily Average	Daily Maximum										
Maximum Value: 7 ppb on Mar 27 07:00										Maximum Daily Average: 1.4 ppb on Mar 14												Hours of Data: 709									
Minimum Value: 0 ppb on Mar 31 22:00										Minimum Daily Average: 0.2 ppb on Mar 19												Hours of Missing Data: 35									
Maximum Diurnal Average: 0.9 ppb at hour 2										Minimum Diurnal Average: 0.4 ppb at hour 17										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 = 3										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-Mar	0	Z	0	0	0	0	1	1	1	0	0	C	C	C	C	1	1	0	1	1	1	1	1	1	0.5	1					
2-Mar	1	1	Z	1	1	1	1	1	1	1	2	2	1	1	1	0	0	0	0	1	1	2	1	1	1.0	2					
3-Mar	2	2	2	Z	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0.7	2					
4-Mar	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					
5-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1					
6-Mar	1	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1					
7-Mar	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					
8-Mar	0	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1					
9-Mar	0	0	0	Z	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1					
10-Mar	0	0	0	0	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1					
11-Mar	0	0	0	0	0	Z	0	1	1	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0.6	3					
12-Mar	0	0	0	0	0	0	Z	1	1	2	2	1	0	0	0	0	1	1	1	2	1	2	3	2	1.0	3					
13-Mar	3	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.4	3					
14-Mar	5	4	1	Z	1	1	0	0	1	0	1	3	2	1	2	1	0	1	1	1	1	0	1	3	1.4	5					
15-Mar	1	1	1	Z	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1					
16-Mar	0	1	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					
17-Mar	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1					
18-Mar	0	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0.3	1					
19-Mar	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					
20-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	2	1	1	0	0.5	2					
21-Mar	0	1	1	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	0.6	1					
22-Mar	1	1	0	1	Z	1	1	1	1	0	1	1	0	0	0	0	1	0	0	0	1	0	0	0	0.5	1					
23-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1					
24-Mar	1	0	0	1	1	2	Z	0	0	1	1	0	0	0	0	1	0	0	0	0	1	0	1	1	0.6	2					
25-Mar	1	Z	0	0	0	0	0	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.7	2					
26-Mar	1	1	Z	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	0.6	1					
27-Mar	0	0	0	Z	1	2	7	3	1	2	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1.1	7					
28-Mar	1	1	1	2	Z	4	1	4	2	1	0	0	0	0	0	0	0	0	1	0	0	1	2	0	1.1	4					
29-Mar	1	5	4	1	0	0	Z	1	1	1	0	0	0	0	0	0	0	2	3	1	0	0	1	1	1.1	5					
30-Mar	1	0	0	2	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2					
31-Mar	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1					
0.8 0.9 0.7 0.6 0.4 0.6 0.7 0.7 0.6 0.8 0.7 0.6 0.5 0.5 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.6 0.7																								Diurnal Average							
5 5 4 2 1 4 7 4 2 3 3 2 3 2 1 2 1 2 3 2 2 2 2 3 3																								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
Mildred Lake - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	694	97.88	97.88
3 - 4	12	1.69	99.58
5 - 7	3	0.42	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 - March 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	112	137	42	17	12	29	52	119	58	27	15	9	7	16	13	25	690
3 - 4	0	0	0	0	0	0	1	10	0	0	0	0	0	0	0	0	11
5 - 7	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
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	112	137	42	17	12	29	53	131	58	27	15	9	7	16	13	25	703

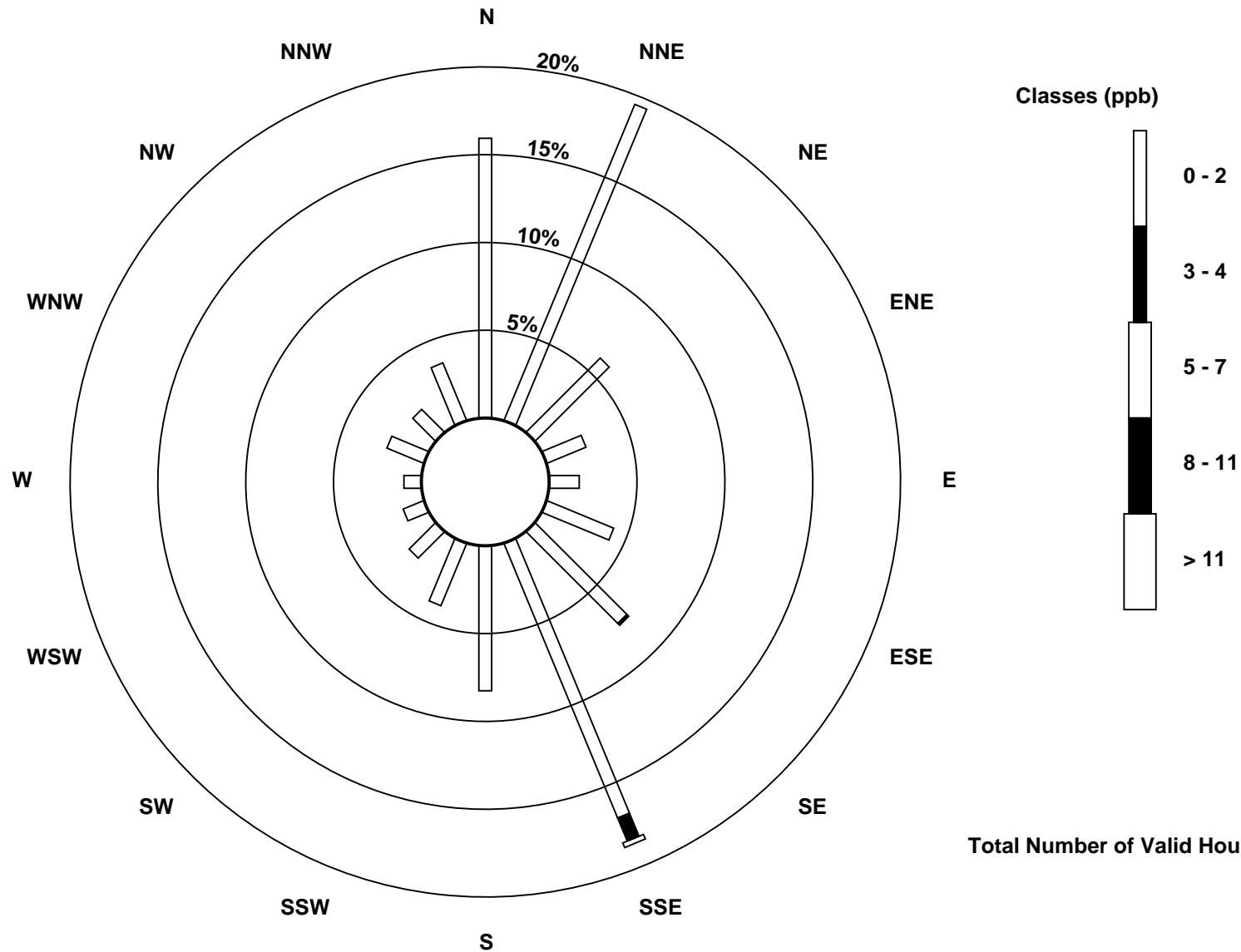
Total Number of Valid Hours: 703

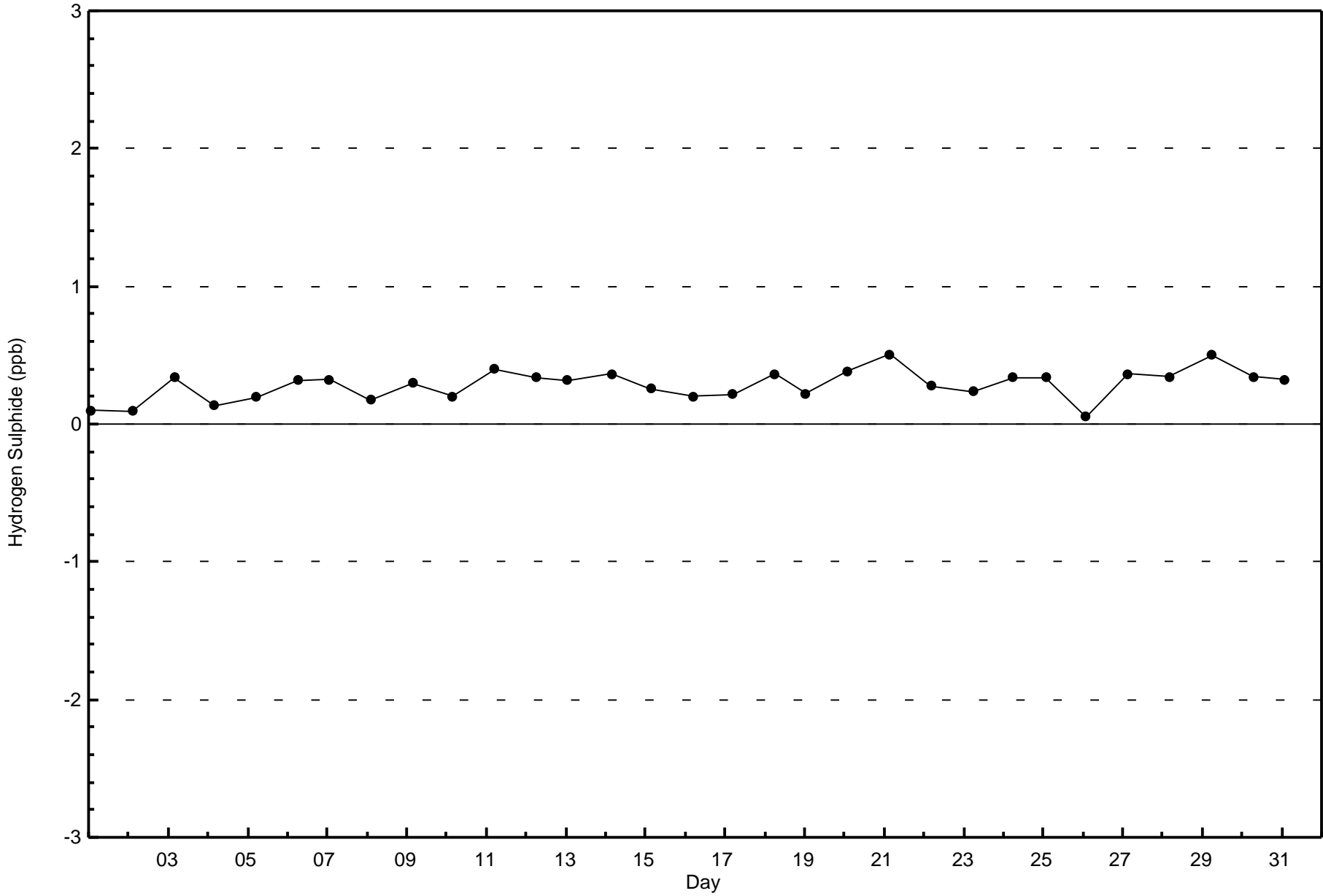
Total Number of Hours: 744

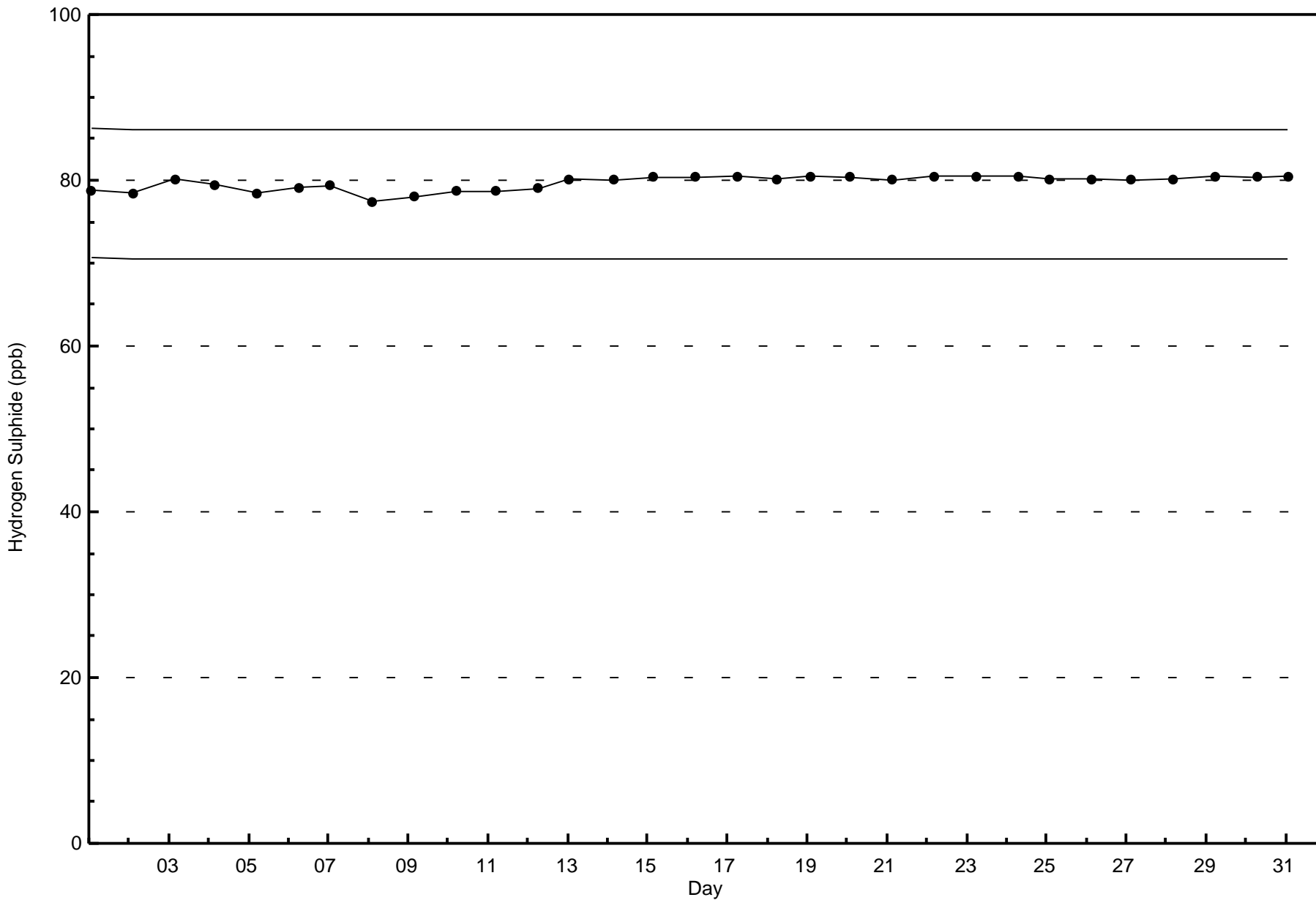


Wood Buffalo Environmental Association
Wind Rose Mar 2017

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









Wood Buffalo Environmental Association

Summary of Hour Averages

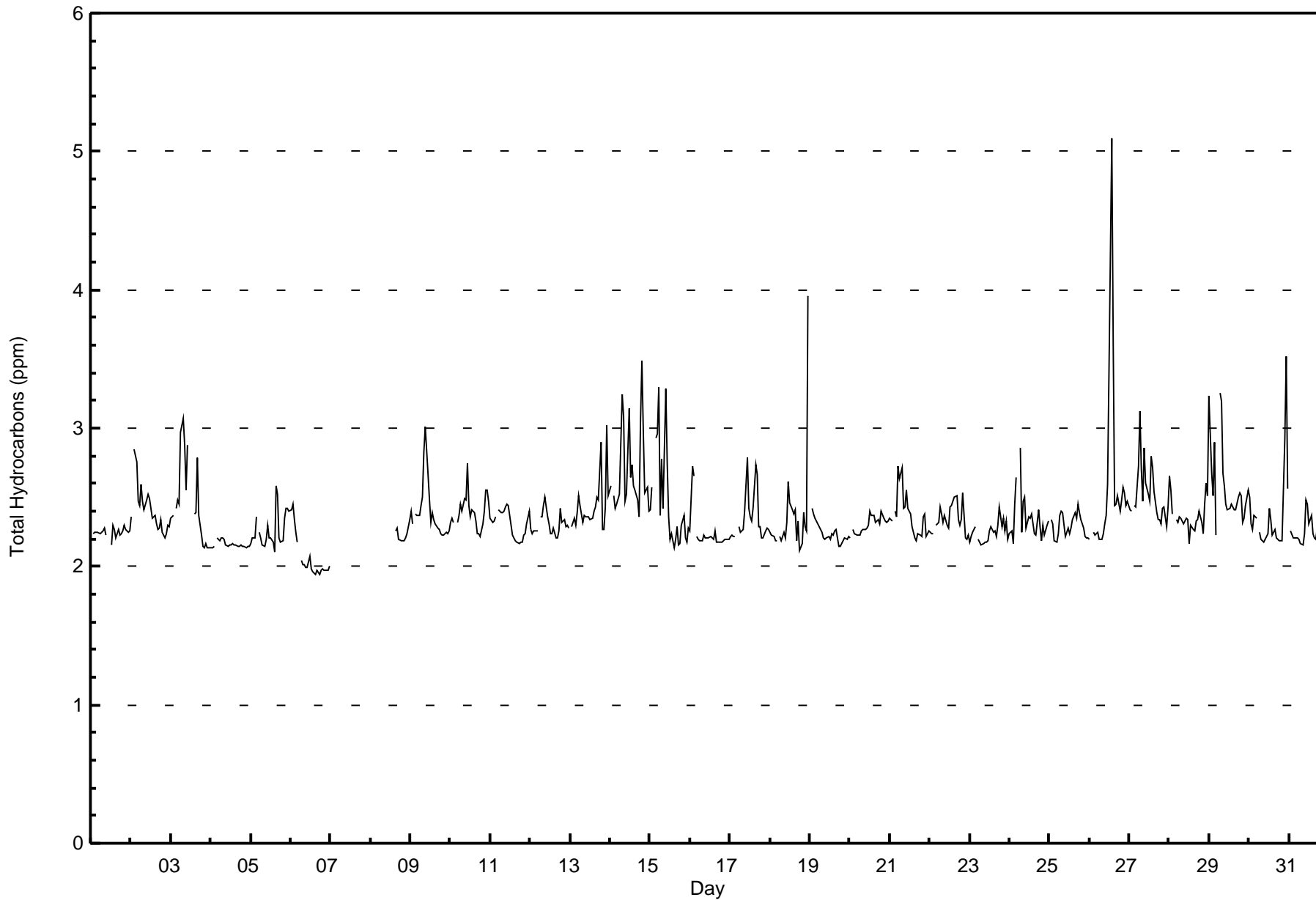
Total Hydrocarbons (THC) - ppm

Mildred Lake - March 2017

Maximum Value: 5.1 ppm on Mar 26 14:00	Maximum Daily Average: 2.7 ppm on Mar 14	Hours in Service: 744
Minimum Value: 1.9 ppm on Mar 6 16:00	Minimum Daily Average: 2.1 ppm on Mar 6	Hours of Data: 671
Maximum Diurnal Average: 2.4 ppm at hour 7	Minimum Diurnal Average: 2.3 ppm at hour 18	Hours of Missing Data: 73
Monthly Average: 2.36 ppm	Percentiles: P ₁ = 2.0 P ₁₀ = 2.2 O ₁ = 2.2 Median = 2.3 O ₃ = 2.4 P ₉₀ = 2.6 P ₉₉ = 3.3	Hours of Calibration: 33
		Percent Operational Time: 94.6

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-Mar	Z	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.2	AF	AF	2.2	2.3	2.3	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.2	2.3
2-Mar	2.4	Z	2.8	2.8	2.5	2.4	2.6	2.5	2.4	2.5	2.5	2.5	2.4	2.3	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.4	2.8	
3-Mar	2.3	2.4	Z	2.4	2.5	2.4	3.0	3.1	2.9	2.6	2.9	C	C	C	2.4	2.4	2.8	2.4	2.2	2.1	2.1	2.2	2.1	2.1	3.1	
4-Mar	2.1	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	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	
5-Mar	2.2	2.2	2.2	2.4	Z	2.3	2.2	2.2	2.1	2.2	2.3	2.2	2.2	2.2	2.1	2.6	2.5	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.6	
6-Mar	2.4	2.4	2.3	2.2	2.2	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.4	
7-Mar	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
8-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	
9-Mar	2.4	2.3	Z	2.4	2.4	2.4	2.4	2.5	2.8	3.0	2.7	2.5	2.3	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	3.0	
10-Mar	2.3	2.3	2.3	Z	2.3	2.4	2.5	2.4	2.5	2.5	2.7	2.4	2.4	2.4	2.4	2.3	2.2	2.2	2.2	2.3	2.4	2.6	2.6	2.5	2.7	
11-Mar	2.3	2.3	2.3	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.5	
12-Mar	2.3	2.2	2.3	2.3	2.3	Z	2.4	2.4	2.4	2.5	2.4	2.3	2.2	2.2	2.3	2.2	2.2	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.5	
13-Mar	Z	2.3	2.3	2.3	2.4	2.5	2.4	2.3	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.5	2.5	2.9	2.3	2.3	2.4	3.0	2.5	2.4	3.0	
14-Mar	2.6	Z	2.5	2.4	2.4	2.5	2.9	3.2	3.1	2.5	2.5	3.1	2.6	2.7	2.6	2.6	2.5	2.4	3.0	3.5	3.0	2.5	2.6	2.4	3.5	
15-Mar	2.4	2.6	Z	2.9	3.0	3.3	2.4	2.8	2.4	3.3	2.7	2.4	2.2	2.2	2.1	2.2	2.3	2.2	2.2	2.3	2.4	2.2	2.2	2.3	3.3	
16-Mar	2.3	2.7	2.7	Z	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.7	
17-Mar	2.2	2.2	2.2	2.2	Z	2.3	2.2	2.3	2.3	2.4	2.8	2.4	2.4	2.3	2.4	2.7	2.7	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.8	
18-Mar	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.6	2.5	2.4	2.4	2.4	2.2	2.3	2.1	2.2	2.4	2.3	2.3	4.0	4.0	
19-Mar	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	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.4	
20-Mar	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.4	
21-Mar	2.3	2.3	Z	2.4	2.4	2.7	2.6	2.7	2.4	2.4	2.5	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.2	2.3	2.7	
22-Mar	2.3	2.2	2.2	Z	2.3	2.3	2.4	2.4	2.3	2.4	2.3	2.3	2.4	2.4	2.5	2.5	2.5	2.3	2.3	2.3	2.5	2.2	2.2	2.2	2.5	
23-Mar	2.2	2.2	2.2	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.2	2.3	2.4	2.3	2.4	2.3	2.3	2.2	2.4	
24-Mar	2.2	2.3	2.2	2.5	2.6	Z	2.9	2.3	2.5	2.5	2.3	2.4	2.4	2.4	2.3	2.2	2.2	2.4	2.3	2.2	2.3	2.2	2.3	2.3	2.9	
25-Mar	Z	2.3	2.3	2.2	2.2	2.2	2.4	2.4	2.4	2.2	2.2	2.3	2.2	2.3	2.3	2.4	2.3	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.5	
26-Mar	2.2	Z	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.4	2.6	3.4	5.1	3.6	2.4	2.5	2.5	2.4	2.5	2.6	2.5	2.4	2.5	5.1	
27-Mar	2.4	2.4	Z	2.4	2.4	2.7	3.1	2.7	2.5	2.9	2.6	2.5	2.5	2.8	2.7	2.5	2.4	2.3	2.3	2.3	2.4	2.4	2.3	2.4	3.1	
28-Mar	2.7	2.6	2.4	Z	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.2	2.5	2.6	2.7	
29-Mar	3.2	2.7	2.5	2.9	2.2	Z	3.3	3.2	2.7	2.6	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.3	2.3	2.4	2.6	3.3	
30-Mar	2.5	2.3	2.3	2.4	2.3	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.4	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.9	3.5	2.6	3.5	
31-Mar	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.5	2.3	2.4	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.4	2.2	2.1	2.5	

2.4	2.3	2.3	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	Diurnal Average
3.2	2.7	2.8	2.9	3.0	3.3	3.3	3.2	3.1	3.3	2.9	3.1	3.4	5.1	3.6	2.7	2.8	2.5	3.0	3.5	3.0	2.9	3.5	4.0		Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure																									





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	17	2.53	2.53
2.1 - 3.0	638	95.08	97.62
3.1 - 10.0	16	2.38	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 671

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Mildred Lake - March 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	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
2.1 - 3.0	93	108	38	15	13	29	52	128	53	25	15	8	7	13	11	25	633
3.1 - 10.0	1	0	0	1	0	0	0	3	6	1	0	0	0	2	1	0	15
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	94	125	38	16	13	29	52	131	59	26	15	8	7	15	12	25	665

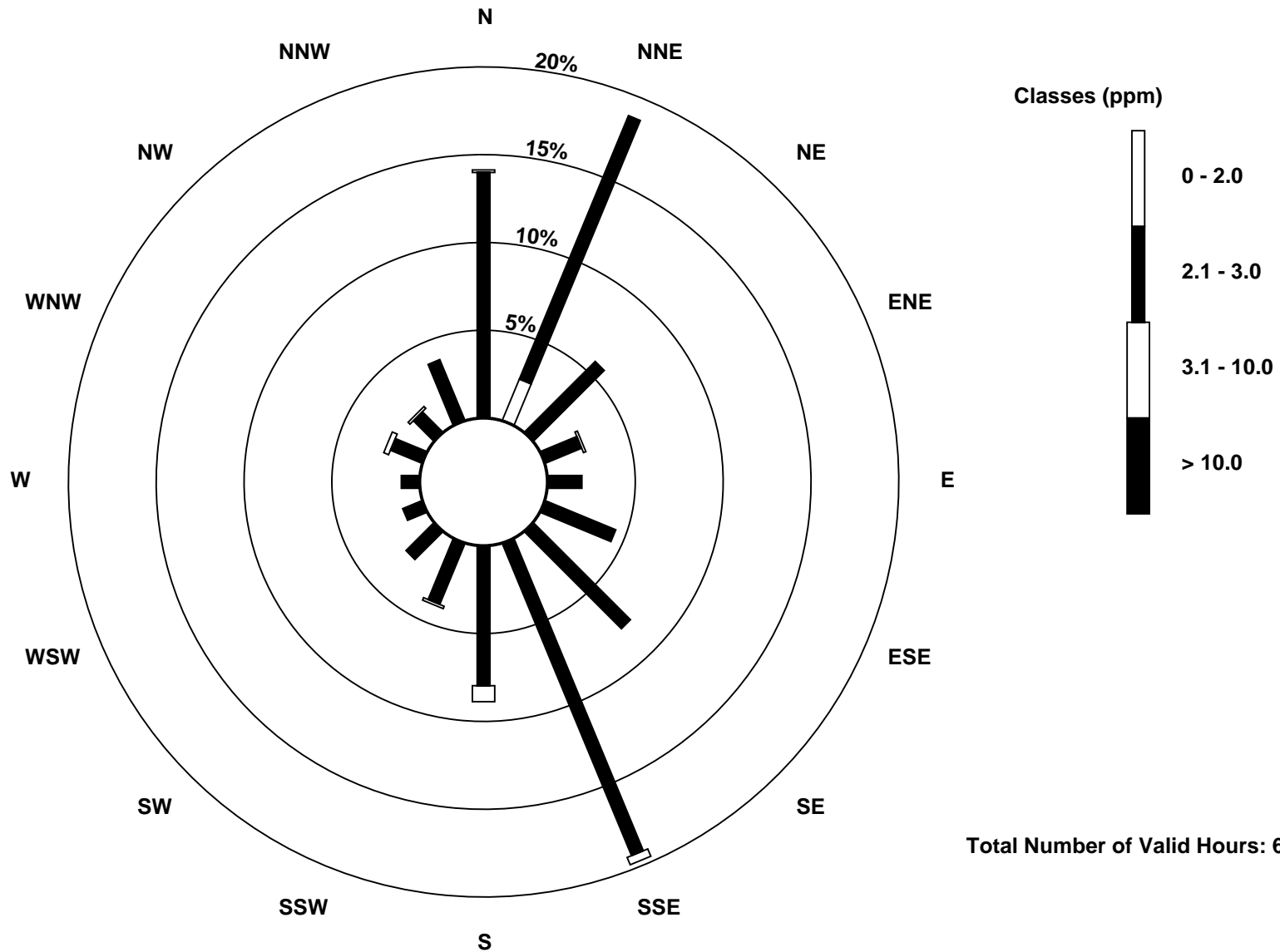
Total Number of Valid Hours: 665

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

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

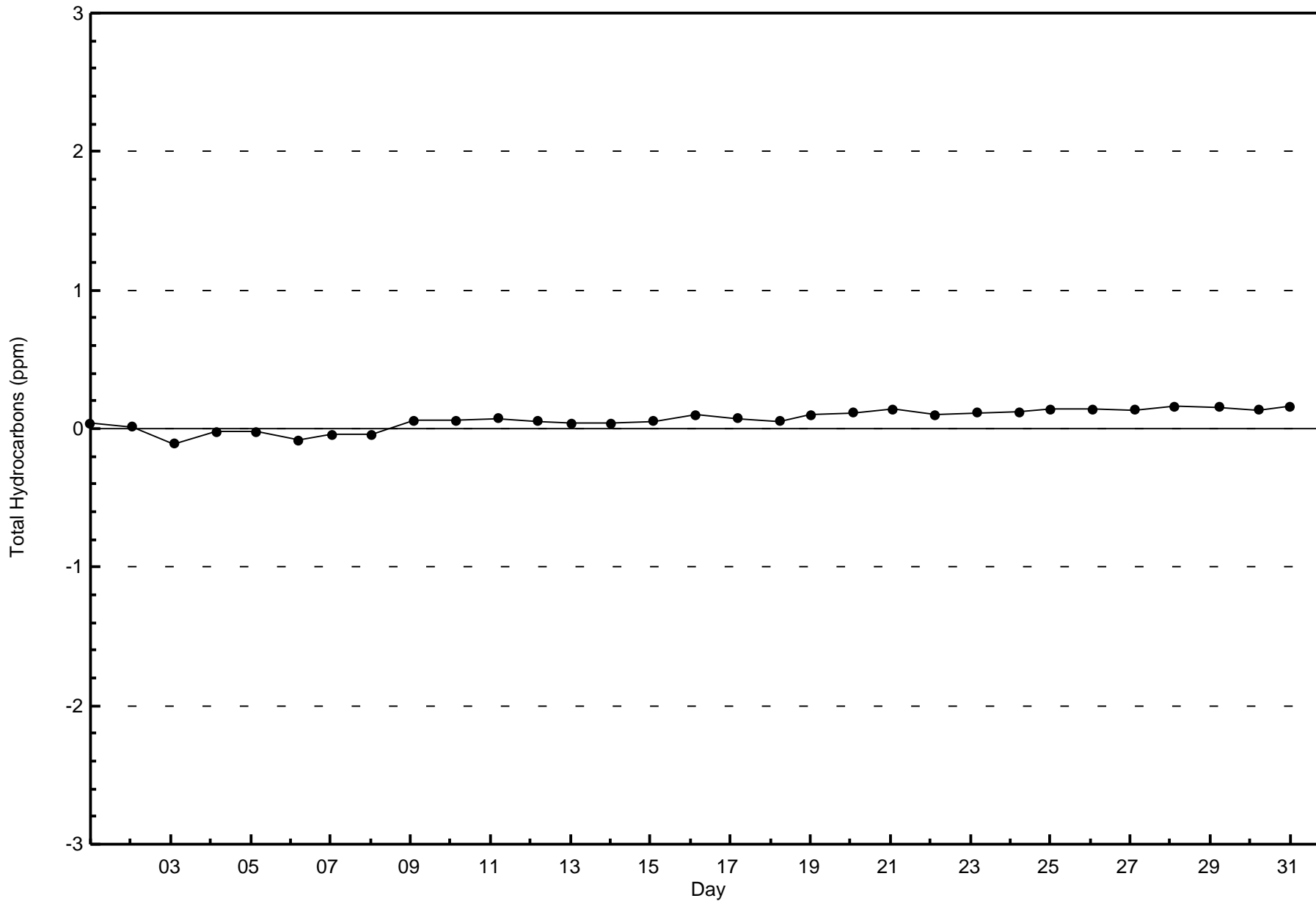


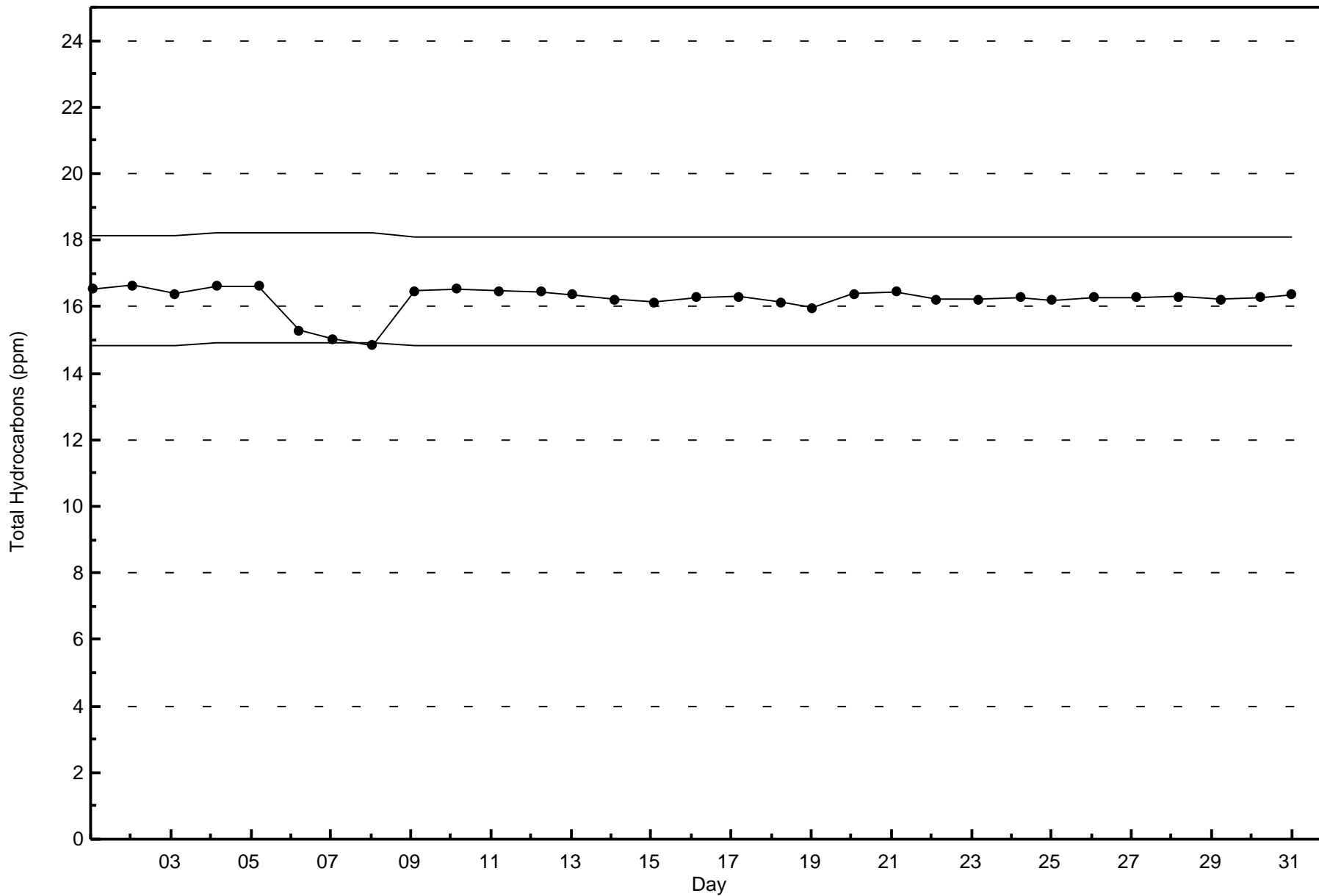
Total Number of Valid Hours: 665



Wood Buffalo Environmental Association
Zero Responses

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







Wood Buffalo Environmental Association
Summary of Hour Averages

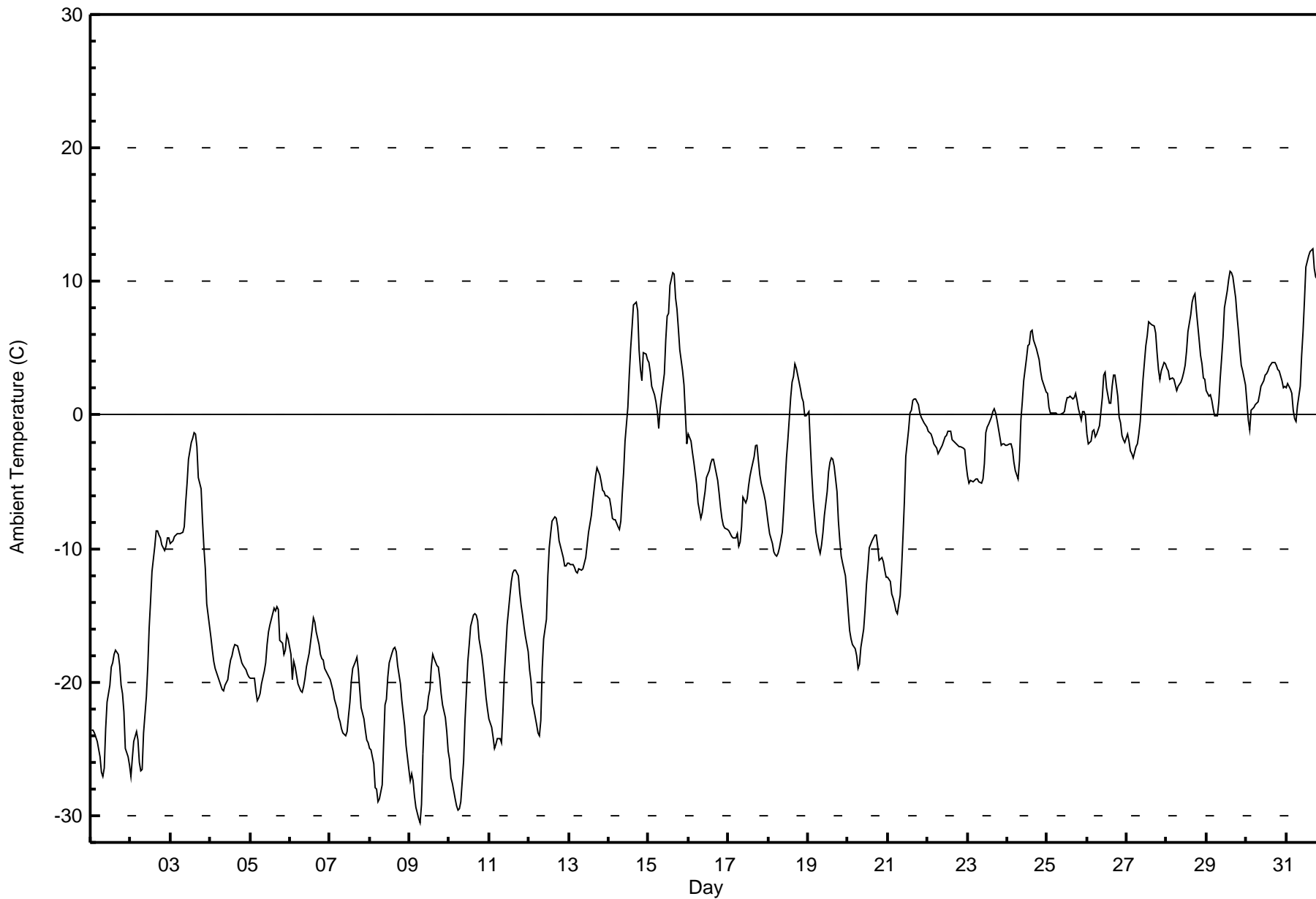
Ambient Temperature (AT) - C
Mildred Lake - March 2017

Maximum Value: 12.5 C on Mar 31 17:00 Maximum Daily Average: 6.5 C on Mar 31																						Hours in Service:	744			
Minimum Value: -30.6 C on Mar 9 07:00 Minimum Daily Average: -23.6 C on Mar 9																						Hours of Data:	744			
Maximum Diurnal Average: -3.7 C at hour 16 Minimum Diurnal Average: -12.6 C at hour 7																						Hours of Missing Data:	0			
Monthly Average: -8.17 C Percentiles: P ₁ = -29.0 P ₁₀ = -22.8 Q ₁ = -17.9 Median = -7.0 Q ₃ = 0.4 P ₉₀ = 4.0 P ₉₉ = 10.5																						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-Mar	-23.6	-23.5	-23.8	-24.1	-24.5	-25.6	-26.7	-27.0	-26.4	-23.5	-21.5	-20.3	-18.9	-18.6	-17.9	-17.6	-17.9	-18.7	-20.2	-20.9	-22.2	-25.0	-25.6	-26.2	-22.5	-17.6
2-Mar	-27.1	-25.6	-24.4	-23.7	-24.3	-26.1	-26.6	-26.5	-23.8	-21.0	-18.9	-16.0	-13.9	-11.7	-9.9	-8.7	-8.6	-8.9	-9.2	-9.7	-10.2	-9.8	-9.2	-9.1	-16.8	-8.6
3-Mar	-9.6	-9.4	-9.1	-9.0	-8.9	-8.9	-8.9	-8.7	-8.3	-6.6	-5.1	-3.3	-2.1	-1.7	-1.4	-1.4	-2.3	-4.7	-5.5	-7.9	-9.9	-11.5	-14.2	-15.8	-7.3	-1.4
4-Mar	-16.7	-17.6	-18.4	-19.0	-19.3	-19.9	-20.3	-20.6	-20.7	-20.3	-19.8	-19.0	-18.3	-18.0	-17.5	-17.2	-17.3	-17.7	-18.1	-18.5	-18.8	-19.1	-19.4	-19.6	-18.8	-16.7
5-Mar	-19.7	-19.7	-19.7	-20.7	-21.4	-21.2	-20.9	-20.1	-19.2	-18.6	-17.1	-16.3	-15.7	-14.9	-14.4	-14.6	-14.4	-14.6	-16.8	-17.1	-17.9	-17.6	-16.4	-16.8	-17.7	-14.4
6-Mar	-17.9	-19.8	-18.5	-18.9	-19.5	-20.1	-20.6	-20.8	-20.3	-19.8	-18.8	-17.8	-17.0	-16.2	-15.2	-15.5	-16.3	-17.2	-17.9	-18.2	-18.3	-18.9	-19.4	-19.6	-18.4	-15.2
7-Mar	-19.8	-20.2	-20.7	-21.2	-22.0	-22.6	-23.0	-23.5	-23.8	-24.0	-23.7	-22.6	-21.5	-20.0	-19.0	-18.5	-18.1	-19.1	-20.6	-21.9	-22.8	-23.5	-24.3	-24.5	-21.7	-18.1
8-Mar	-25.0	-25.1	-26.1	-27.9	-28.0	-29.0	-28.7	-27.7	-24.7	-21.7	-21.3	-19.6	-18.5	-17.9	-17.5	-17.4	-17.7	-18.8	-20.1	-21.4	-22.4	-23.2	-24.8	-26.5	-23.0	-17.4
9-Mar	-27.4	-26.9	-27.4	-28.5	-29.4	-30.2	-30.6	-29.2	-25.4	-22.5	-22.1	-21.1	-20.6	-18.9	-17.9	-18.2	-18.7	-18.9	-19.7	-20.9	-21.7	-22.6	-23.7	-25.2	-23.6	-17.9
10-Mar	-25.8	-27.1	-27.6	-28.8	-29.3	-29.6	-29.4	-29.0	-25.9	-22.8	-20.7	-18.5	-17.1	-15.8	-14.9	-14.9	-15.0	-15.4	-16.8	-18.0	-19.0	-20.1	-21.2	-22.0	-21.9	-14.9
11-Mar	-22.7	-23.4	-24.1	-24.9	-24.6	-24.2	-24.3	-24.5	-22.3	-19.5	-17.6	-15.7	-13.5	-12.4	-11.8	-11.6	-11.6	-12.1	-13.3	-14.2	-15.0	-15.8	-16.5	-17.7	-18.1	-11.6
12-Mar	-19.1	-19.9	-21.6	-22.0	-23.1	-23.8	-24.0	-22.9	-19.0	-16.8	-15.3	-12.0	-9.9	-8.9	-8.0	-7.6	-7.8	-8.4	-9.4	-9.9	-10.7	-11.3	-11.3	-11.1	-14.7	-7.6
13-Mar	-11.1	-11.2	-11.1	-11.4	-11.7	-11.8	-11.5	-11.6	-11.5	-11.1	-10.7	-9.7	-8.8	-7.6	-6.4	-5.5	-4.6	-4.0	-4.5	-5.0	-5.6	-5.8	-6.1	-6.0	-8.5	-4.0
14-Mar	-6.2	-6.9	-7.7	-7.8	-7.9	-8.3	-8.6	-7.9	-6.0	-4.3	-2.0	0.6	3.0	5.0	6.5	8.2	8.4	7.9	4.9	3.5	2.6	4.7	4.6	4.1	-0.4	8.4
15-Mar	3.9	3.2	2.2	1.5	1.0	0.2	-1.0	0.4	1.5	3.1	5.6	7.4	7.6	9.7	10.6	10.5	8.8	7.9	6.5	4.9	3.3	2.3	0.1	-2.2	4.1	10.6
16-Mar	-1.5	-2.0	-2.8	-3.6	-4.3	-5.2	-6.6	-7.7	-7.3	-6.5	-5.7	-4.7	-4.1	-3.7	-3.3	-3.3	-3.8	-4.9	-5.9	-6.9	-7.7	-8.2	-8.5	-8.5	-5.3	-1.5
17-Mar	-8.6	-8.9	-9.1	-9.2	-9.2	-8.9	-9.9	-9.5	-8.3	-6.1	-6.5	-6.3	-5.3	-4.6	-4.0	-3.1	-2.3	-2.3	-3.4	-4.4	-5.1	-5.9	-6.5	-7.3	-6.4	-2.3
18-Mar	-8.2	-8.9	-9.6	-10.3	-10.5	-10.5	-10.4	-10.0	-8.8	-7.1	-5.1	-3.2	-1.8	1.3	2.5	2.9	3.8	3.5	3.0	2.0	1.3	1.0	-0.1	-0.1	-3.5	3.8
19-Mar	0.2	-2.1	-4.3	-6.2	-7.5	-8.8	-9.9	-10.3	-9.7	-8.8	-7.5	-5.7	-4.3	-3.5	-3.2	-3.3	-3.9	-5.8	-7.9	-9.4	-10.6	-11.0	-12.1	-13.3	-7.0	0.2
20-Mar	-14.8	-16.2	-16.8	-17.2	-17.5	-18.0	-18.9	-18.7	-17.4	-16.0	-14.6	-12.7	-11.4	-10.0	-9.4	-9.2	-9.0	-9.0	-9.8	-10.8	-10.6	-11.0	-11.6	-12.1	-13.4	-9.0
21-Mar	-12.2	-12.4	-13.4	-13.8	-14.1	-14.7	-14.9	-13.5	-11.5	-9.1	-6.4	-3.1	-1.1	0.2	0.4	1.1	1.2	1.2	0.8	0.2	-0.2	-0.4	-0.6	-0.8	-5.7	1.2
22-Mar	-1.2	-1.3	-1.4	-1.7	-2.2	-2.5	-2.9	-2.7	-2.5	-2.2	-1.6	-1.5	-1.2	-1.2	-1.2	-1.8	-2.1	-2.2	-2.2	-2.4	-2.3	-2.4	-2.6	-3.7	-2.1	-1.2
23-Mar	-4.5	-5.1	-4.9	-5.0	-4.8	-4.8	-4.8	-5.0	-5.1	-4.8	-3.7	-1.3	-0.9	-0.7	-0.2	0.3	0.5	0.1	-0.4	-1.7	-2.2	-2.2	-2.2	-2.3	-2.7	0.5
24-Mar	-2.3	-2.1	-2.1	-2.6	-3.5	-4.2	-4.7	-3.4	-0.4	1.0	2.6	4.3	5.1	5.3	6.3	6.3	5.7	5.0	4.5	4.1	3.3	2.7	2.0	1.7	1.4	6.3
25-Mar	1.6	0.6	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.3	0.9	1.3	1.4	1.4	1.2	1.3	1.6	1.1	0.5	-0.4	0.3	0.3	-0.1	0.6	1.6
26-Mar	-1.4	-2.2	-1.9	-1.2	-1.2	-1.7	-1.4	-0.8	0.2	1.3	3.0	3.2	2.0	0.9	0.9	2.1	3.0	3.0	1.4	-0.2	-0.5	-1.5	-1.8	-2.0	0.1	3.2
27-Mar	-1.5	-1.9	-2.6	-2.9	-3.2	-2.4	-2.1	-1.4	-0.4	1.1	2.7	5.2	5.9	7.0	6.9	6.8	6.7	6.1	4.7	3.4	2.7	3.4	4.0	3.8	2.2	7.0
28-Mar	3.6	3.3	2.7	2.8	2.7	2.2	1.8	2.2	2.5	2.7	3.2	3.7	4.8	6.3	7.5	8.4	8.9	9.1	7.8	5.6	4.5	3.8	2.7	2.7	4.4	9.1
29-Mar	1.8	1.5	1.5	1.1	0.4	-0.1	-0.1	1.0	2.8	4.2	5.8	8.1	9.3	10.2	10.7	10.7	10.4	8.8	7.4	6.2	4.9	3.7	3.4	2.3	4.8	10.7
30-Mar	1.0	-0.4	-1.1	0.4	0.6	0.8	0.9	1.0	1.5	2.2	2.6	3.0	3.1	3.4	3.7	4.0	4.0	3.9	3.8	3.4	3.3	2.6	2.0	2.1	2.1	4.0
31-Mar	2.0	2.4	2.0	1.6	0.4	-0.3	-0.4	0.7	2.1	4.5	6.3	8.6	11.1	12.0	12.2	12.4	12.5	11.0	10.4	10.1	9.3	8.5	8.8	8.1	6.5	12.5
																						Diurnal Average				
																						Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	123	16.53	16.53
-20 - 0	413	55.51	72.04
0 - 10	194	26.08	98.12
10 - 20	14	1.88	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

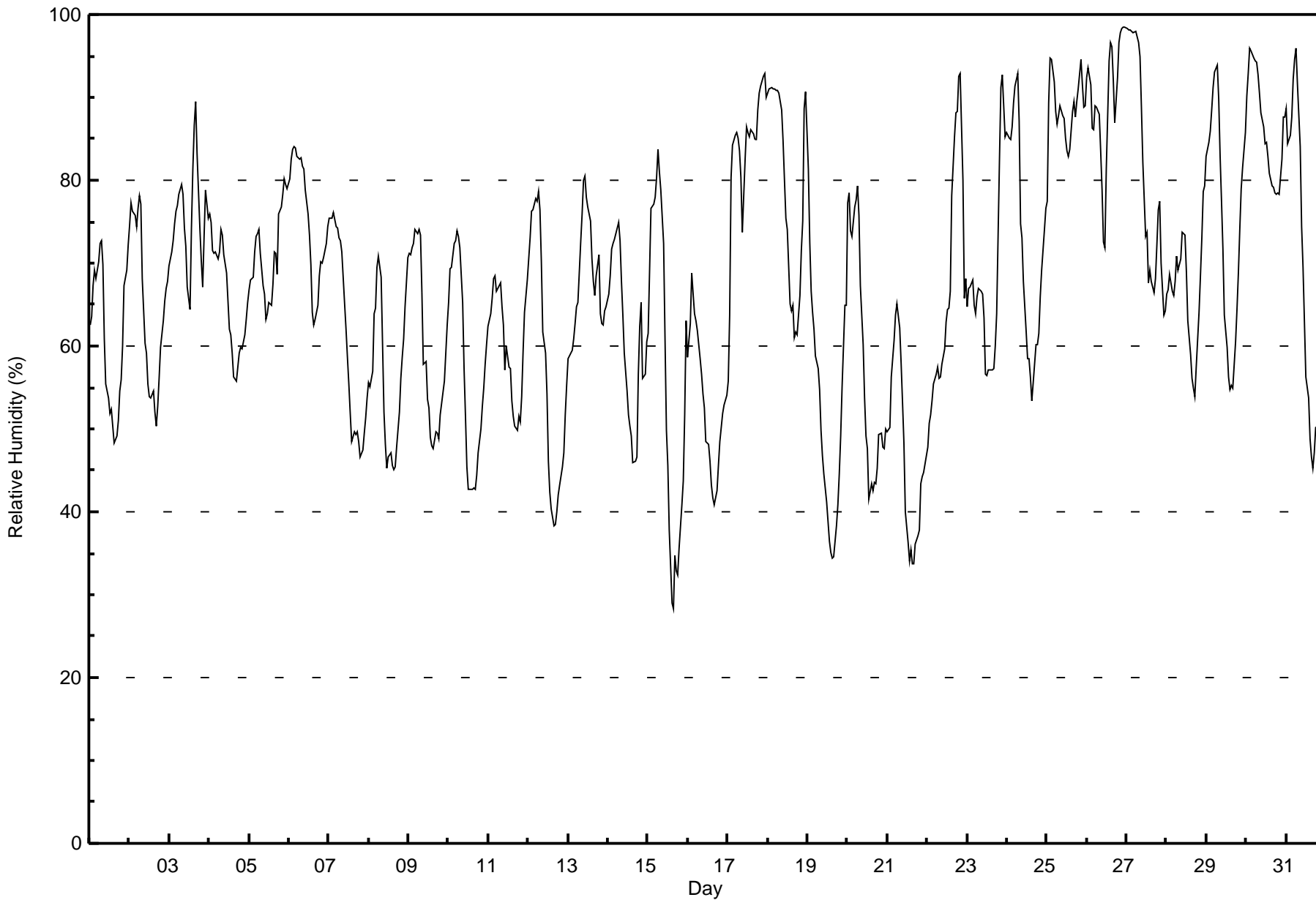
Mildred Lake - March 2017

Maximum Value: 99 % on Mar 26 23:00 Maximum Daily Average: 89.7 % on Mar 26																			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 Mar 15 16:00 Minimum Daily Average: 47.1 % on Mar 21 Maximum Diurnal Average: 77.5 % at hour 7 Minimum Diurnal Average: 57.3 % at hour 16 Monthly Average: 67.3 % Percentiles: P ₁ = 34 P ₁₀ = 47 Q ₁ = 56 Median = 67 Q ₃ = 78 P ₉₀ = 89 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-Mar	63	64	67	69	68	70	72	73	70	61	55	54	52	52	50	48	49	51	55	56	60	67	69	72	61.2	73
2-Mar	75	77	76	76	74	77	78	77	68	60	59	55	54	54	55	52	50	53	56	60	63	65	67	68	64.6	78
3-Mar	70	71	73	75	76	77	78	80	78	74	72	67	64	74	81	87	89	83	74	70	67	73	79	75	75.4	89
4-Mar	76	75	71	71	71	71	71	74	73	71	69	65	62	61	59	56	56	58	59	60	60	61	63	65	65.8	76
5-Mar	67	68	68	71	73	74	74	71	67	66	63	64	65	65	67	71	71	69	76	77	78	80	79	79	71.1	80
6-Mar	80	83	84	84	84	83	83	83	82	81	79	76	73	70	64	63	63	65	68	70	70	71	72	74	75.2	84
7-Mar	75	75	76	76	74	74	73	73	71	65	62	59	55	52	49	50	49	50	48	47	47	50	51	54	60.6	76
8-Mar	56	55	57	64	65	69	71	68	60	52	48	45	47	47	46	45	45	48	52	56	59	61	65	71	56.3	71
9-Mar	71	71	72	72	74	74	74	73	66	58	58	54	53	49	48	48	50	50	49	52	53	56	59	63	60.2	74
10-Mar	65	69	69	72	73	74	73	72	65	57	51	45	43	43	43	43	43	44	47	50	53	55	58	60	57.0	74
11-Mar	62	64	66	68	68	67	67	68	65	63	57	60	57	57	53	51	50	50	52	51	54	59	64	68	60.1	68
12-Mar	70	73	76	77	78	77	79	76	70	62	59	54	46	42	40	38	39	40	42	43	45	47	52	55	57.6	79
13-Mar	58	59	59	61	63	65	65	73	76	80	80	78	77	75	71	68	66	69	71	64	63	63	64	65	68.0	80
14-Mar	66	69	72	72	73	74	75	73	68	64	59	55	52	50	49	46	46	47	57	62	65	56	57	61	61.1	75
15-Mar	62	69	77	77	78	80	84	81	79	72	61	50	46	38	29	28	35	33	32	36	41	44	52	63	56.0	84
16-Mar	59	63	69	66	64	63	62	58	57	54	52	48	48	46	43	42	41	42	46	48	50	52	53	54	53.4	69
17-Mar	56	64	80	84	85	86	85	84	80	74	82	87	86	85	86	86	85	85	88	91	91	93	93	90	83.6	93
18-Mar	90	91	91	91	91	91	91	90	89	85	80	75	74	65	64	65	61	62	61	66	72	75	89	91	79.2	91
19-Mar	81	73	67	64	62	59	57	55	50	47	44	41	39	36	35	34	35	38	41	45	49	55	65	65	51.5	81
20-Mar	77	78	74	73	77	78	79	76	67	60	54	49	48	42	43	43	44	43	45	49	49	48	48	50	58.1	79
21-Mar	50	50	56	58	61	64	65	62	58	53	48	40	36	34	35	34	34	36	37	38	43	44	45	47	47.1	65
22-Mar	48	51	52	53	55	57	57	56	56	58	60	63	64	65	67	78	85	88	88	93	93	80	66	68	66.7	93
23-Mar	65	67	67	68	65	64	66	67	67	66	63	57	56	57	57	57	57	60	64	82	91	93	89	85	68.0	93
24-Mar	86	85	85	86	89	91	93	87	75	73	68	62	58	58	56	53	56	60	60	61	66	69	74	77	72.1	93
25-Mar	77	89	95	95	92	88	87	88	89	88	88	85	83	83	84	88	90	88	90	91	94	91	89	89	88.3	95
26-Mar	92	94	91	86	86	89	89	88	84	79	73	72	81	94	97	96	92	87	92	97	98	98	99	98	89.7	99
27-Mar	98	98	98	98	98	98	97	97	95	89	82	73	74	68	69	68	66	68	72	76	77	70	64	64	81.6	98
28-Mar	66	67	69	67	66	68	71	69	71	74	74	73	69	63	59	56	55	54	57	64	69	73	79	79	67.1	79
29-Mar	83	85	86	89	91	93	94	90	83	77	72	64	60	56	55	55	55	61	64	69	74	79	82	86	75.0	94
30-Mar	90	93	96	96	95	94	94	93	90	88	86	84	85	83	81	79	79	79	78	78	78	83	88	88	86.6	96
31-Mar	89	84	85	88	92	95	96	92	84	74	69	63	56	54	49	47	45	47	50	50	53	53	51	58	67.7	96
	71.7	73.3	75.0	75.7	76.2	76.8	77.5	76.3	72.7	68.6	65.5	61.9	60.1	58.7	57.6	57.3	57.5	58.2	60.4	63.0	65.4	66.6	68.4	70.4	Diurnal Average	
	98	98	98	98	98	98	97	97	95	89	88	87	86	94	97	96	92	88	92	97	98	98	99	98	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Maximum Speed: 30 km/h on Mar 19 19:00	Maximum Daily Speed Average: 19.4 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 9 07:00	Minimum Daily Speed Average: 1.7 km/h on Mar 26	Hours of Data: 737
Maximum Diurnal Speed Average: 4.3 km/h at hour 20	Minimum Diurnal Speed Average: 0.5 km/h at hour 14	Hours of Missing Data: 7
Monthly Average Velocity: 2.1 km/h 77.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 13 P ₉₀ = 17 P ₉₉ = 24	Percent Operational Time: 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-Mar	N7	NNE5	N7	NNE7	NNE8	N10	N10	N9	N9	N8	N8	NNW11	NNW12	NNW14	NNW14	N11	N10	N6	N7	NNE7	NNE6	ENE3	NNE4	W2	N7.6	NNW14	
2-Mar	SW1	SSW4	SSE3	SSW4	SSW4	SSW3	S4	SSW5	SSW4	S5	SSE8	S7	SSE9	SSE9	SSE10	SE12	SE13	SE14	SE14	SE17	SSE23	SSE17	SSE15	SSE21	SSE8.9	SSE23	
3-Mar	SSE18	SSE17	SSE20	SSE17	S15	S14	S10	S10	S9	SSE16	S12	SSE8	S10	WSW2	WNW2	W7	NNW16	NNW16	NNW15	N18	N19	N14	NNE14	NNE14	SSE2.3	SSE20	
4-Mar	NNE12	NNE14	NNE12	NNE8	NNE9	NNE13	NNE14	NNE14	NNE15	NNE15	NNE16	NNE13	NNE16	N16	NNE14	NNE14	NNE12	NNE9	NE7	ENE8	ENE10	NE8	NE6	NNE7	NNE11.4	N16	
5-Mar	N7	N7	N7	NNE7	NNE8	NNE6	NE4	E5	ESE6	ESE8	S5	SSW5	SW5	WSW5	WNW6	NNW8	N8	NNE5	NNE3	NNE5	ENE5	ESE2	NNW1	N6	NNE2.6	NNE8	
6-Mar	N8	NE3	NNE7	N9	N11	N11	NNE10	NNE12	NNE14	NNE12	NNE16	NNE14	NNE12	NE14	NNE14	NNE17	NNE20	NNE19	NNE20	NNE16	NNE17	NNE17	NNE16	NNE13	NNE13.3	NNE20	
7-Mar	NNE13	NNE16	N16	N15	N15	NNE13	NNE12	NNE15	NNE14	N18	NNE18	N20	NNE16	N18	N18	NNE16	NNE15	NNE11	NE8	NE7	NE6	NNE5	N6	N7	NNE13.0	N20	
8-Mar	N7	N9	N5	NNE5	N4	NW3	NNW5	N3	NNW4	WNW2	NNW10	N11	N12	N9	NNE8	NNE10	NE11	NE11	NE11	NE10	NNE7	NNE7	N5	N4	NNE6.5	N12	
9-Mar	N6	N7	N7	N3	NNW2	NW1	NNW0	ESE2	NE1	W1	SW5	WSW6	WSW6	SW7	SW6	SW5	SW2	NE5	NNE7	NE7	NE10	NNE8	NNE6	NNE5	N1.9	NE10	
10-Mar	N9	NNE7	NNE7	N6	NNE4	NNE4	N7	NNE5	N3	SSW3	SW4	WNW2	NNW8	N10	N10	N12	N11	N9	N7	NNE10	N12	N10	N8	N7	N6.5	N12	
11-Mar	N6	N6	N6	NNE5	N4	N5	N3	N3	ENE2	SSE2	SSE4	SE8	SSE9	SE10	SE12	SE9	ESE9	ESE8	E8	E9	ESE9	ESE9	SE7	ESE5	ESE4.3	SE12	
12-Mar	ESE8	E5	ENE5	NE4	NE3	NE1	SSW3	N3	NNE1	SSE6	SSE10	SSE13	SSE16	SSE14	S12	SSE16	SSE17	SE14	SE13	SE14	SSE17	SSE22	SSE16	SSE16	SSE9.1	SSE22	
13-Mar	SSE16	SSE18	SSE20	SSE20	SSE19	SSE18	SSE19	SSE21	SSE22	SSE21	SSE23	SSE23	SSE21	S24	SSE24	SSE22	SSE20	S17	S15	S11	SSW15	S13	SSE12	SSE14	SSE13	SSE18.2	S24
14-Mar	SSE11	SSE11	SSE10	S12	S13	SSE13	SSE13	S12	SSE12	SSE13	S11	SSE11	SSE10	SSE12	SE10	SE10	E7	ENE5	N10	N10	NNE4	SE11	SE12	SSE13	SSE8.3	SSE13	
15-Mar	SE13	SE10	S11	SSE11	S12	S10	S7	S8	S10	SSE12	S8	SW6	SW11	SW9	WSW12	W11	NNW14	N11	N10	NNE8	NE6	NE5	NE1	W1	S3.1	NNW14	
16-Mar	N9	N9	N15	NNE18	NNE18	NNE19	NNE21	NNE19	NE19	NE17	NE17	NE15	NNE18	NNE18	NNE17	NNE16	NNE15	NNE15	NNE13	NNE15	NNE17	NNE16	NNE13	NNE10	NNE15.7	NNE21	
17-Mar	NNE11	NE8	NNE8	N10	N8	N9	N10	N5	NNW5	WNW3	NNE4	NNW11	N10	N12	N12	N12	N12	N12	NNE11	NNE12	NNE14	NNE15	NNE14	NNE13	N9.8	NNE15	
18-Mar	NNE11	NNE10	NNE9	NNE9	NNE9	NNE9	N9	NNE10	NNE9	N10	N8	NNW10	NNW10	N7	N8	N9	SSE10	ESE6	E6	NNE4	N8	NE3	NNW4	NW7	NNE6.5	NNE11	
19-Mar	NW20	NW24	NW26	NW25	NW22	NW19	NW17	NW15	WNW14	WNW16	WNW16	WNW15	WNW17	NW20	WNW19	WNW20	WNW20	NNW28	NNW30	NNW28	NNW24	NW21	N19	N12	NW19.4	NNW30	
20-Mar	NNE13	NNE13	NNE14	N13	N11	NNE7	NE6	NE7	NNE8	N7	N6	W3	S2	WSW1	S8	SSE8	SSE11	SE10	SE7	SE7	SSE10	SSE13	SSE15	SSE13	E2.9	SSE15	
21-Mar	SSE16	SSE11	SSE6	SSE13	S8	S9	S8	S7	S11	SSE13	SSE12	SSE13	S13	SSE14	SSE17	SSE19	SSE19	SSE17	SSE18	SSE21	SSE16	SSE17	SSE14	SSE14	SSE13.5	SSE21	
22-Mar	SE13	SSE16	SSE20	SSE17	SSE14	SE12	SE13	SE12	SE11	SE10	SSE11	SSE10	S9	S8	SSW6	SSW5	SW4	WSW4	WSW3	WSW3	NNW7	N10	NNE17	NNE12	SSE5.8	SSE20	
23-Mar	NNE12	NNE11	NNE11	N7	NNE9	NNE8	NNE9	NE11	NNE10	NNE10	NNE8	NNW8	NW11	NNW13	N9	N8	N8	NNW8	N7	NNE6	ENE5	ESE8	SE10	SE12	NNE6.5	NNW13	
24-Mar	SSE10	SSE8	SSE9	SSE8	SSE6	SSE7	S4	SSW6	S5	SSE9	SSE10	S13	S12	SSE10	SSE12	SSE16	SSE14	SE12	ESE11	ESE14	SE15	SE18	SE15	SE12	SSE10.1	SE18	
25-Mar	SE11	SE9	E8	E8	ESE8	ESE8	SE9	SSW6	SSE11	SSE10	SSE9	SSE8	SE5	ESE3	E4	ESE4	ESE3	NE5	NE5	NE3	ENE4	ENE4	ENE4	ENE4	ESE5.7	SSE11	
26-Mar	ENE4	ENE3	ESE6	ESE5	E5	NE3	NE4	NNE3	ESE6	SSE8	SSW5	WNW3	WNW9	WNW5	ENE4	SSW3	SE7	S6	S3	NE4	NNE5	ENE5	NE4	NE3	E1.7	WNW9	
27-Mar	N3	NNE2	AF	AF	AF	AF	AF	AF	AF	SSE3	ESE6	W0	N10	N9	N11	N12	N12	N9	N11	N7	NNE2	SE5	ESE6	SSE7	----	N12	
28-Mar	SE8	SE6	SE6	SE8	SSE10	SSE10	SSE7	SSE9	SSE11	SSE11	SSE10	S9	S10	SSE10	SSE11	SSE11	SE10	SE10	SE8	E7	ESE8	SE7	SSE9	SSE12	SSE8.7	SSE12	
29-Mar	S7	SSE9	SSE10	S8	S7	S7	S7	S7	SSE8	SSE10	SSE11	S13	SSE12	SSE9	SSE9	SSE11	SSE11	SSE8	SE7	SE10	ESE9	SE8	SE9	SSE4	SSE8.5	S13	
30-Mar	ESE5	E4	SE4	ESE3	ESE3	ESE5	E4	NNE3	NNE5	NNE4	N6	N6	N8	N6	NNE8	NE6	NE4	NE3	NNE2	NE6	NE5	SW2	SSW3	SSW3	NE2.7	NNE8	
31-Mar	SSW4	S6	S5	SSW4	S5	S5	SSW8	SSW8	SSW7	S7	SSE9	SE11	S14	S15	SSW17	SSW18	SSW17	SW12	S12	SSW10	SSW11	SW11	SSW12	S13	SSW9.6	SSW18	

ENE2.9	ENE2.6	ENE2.3	ENE1.8	ENE1.9	ENE1.9	ENE1.7	ENE1.9	E2.1	SE2.7	SE2.1	SSE1.1	S0.5	NE0.5	ENE0.7	ENE1.4	ENE2.6	NE3.3	NE4.0	NE4.3	ENE3.7	E3.4	E3.1	ESE3.0	Diurnal Average
NW20	NW24	NW26	NW25	NW22	NW19	NNE21	SSE21	SSE22	SSE21	SSE23	SSE23	S24	SSE24	SSE22	WNW20	WNW20	NNW28	NNW30	NNW28	NNW24	SSE22	N19	SSE21	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

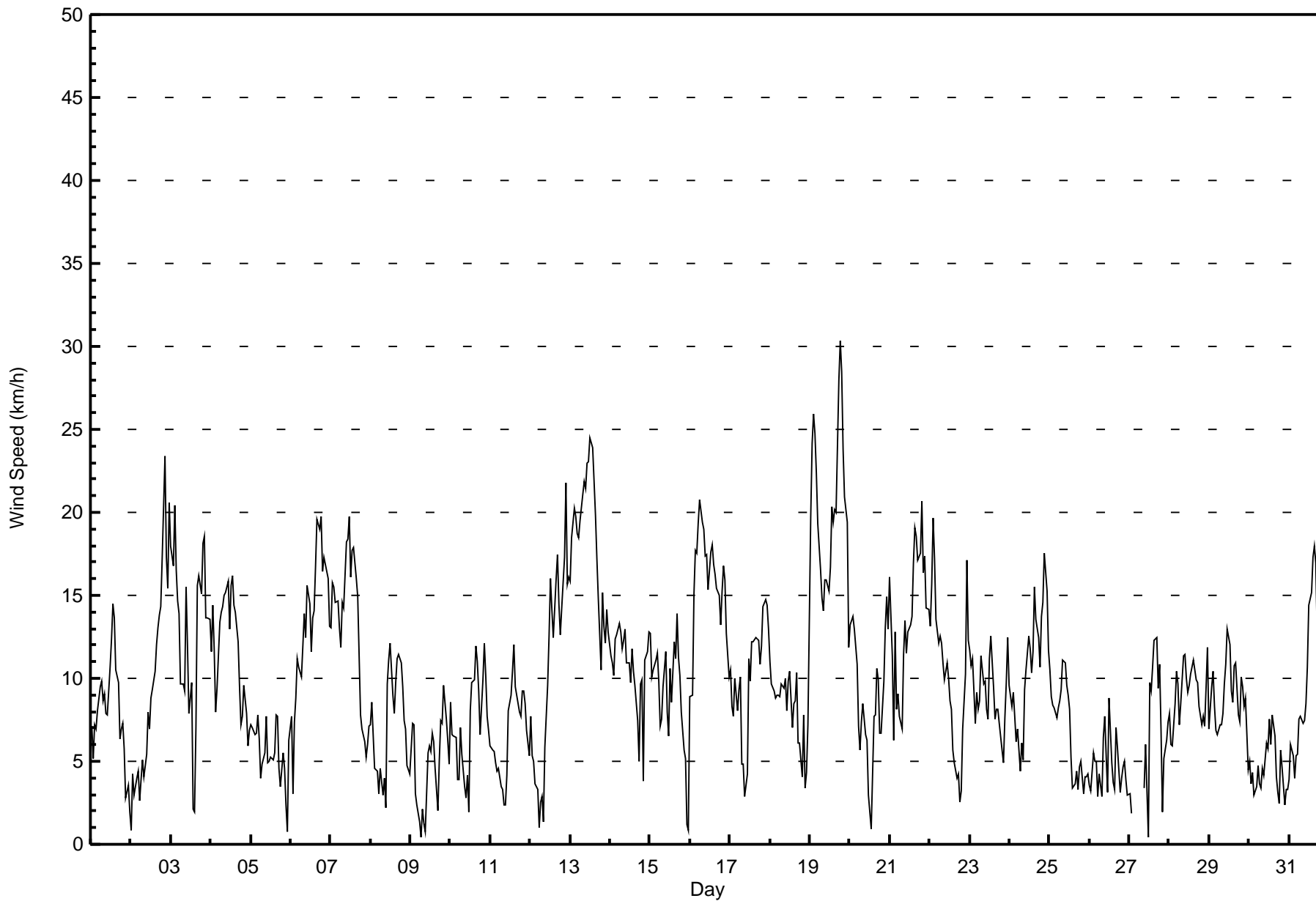
Wind Speed (WS) - km/h
Mildred Lake - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Mar 19 01:00 Minimum Value: 1 km/h on Mar 30 07:00 Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 2 Median = 2 O ₃ = 3 P ₉₀ = 4 P ₉₉ = 6																	Hours in Service: 744 Hours of Data: 737 Hours of Missing Data: 7 Hours of Calibration: 0 Percent Operational Time: 99.1								
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-Mar	1	1	1	2	2	2	1	1	1	1	2	3	3	3	3	2	2	1	1	1	1	1	1	1	3
2-Mar	1	1	1	1	2	1	1	1	1	2	2	2	3	2	3	3	3	3	4	4	5	4	4	4	5
3-Mar	4	4	4	4	3	3	2	2	2	4	3	2	2	3	2	4	5	4	3	4	4	3	4	3	5
4-Mar	3	4	3	2	3	4	4	4	4	4	4	4	4	4	4	3	3	3	2	2	2	2	1	1	4
5-Mar	1	2	1	1	2	2	1	1	2	2	2	2	1	2	2	1	1	1	1	2	1	2	1	2	2
6-Mar	2	1	1	2	2	2	2	3	3	4	4	4	3	4	4	5	5	5	5	4	4	4	5	3	5
7-Mar	3	4	4	4	4	4	3	4	5	5	5	5	4	4	4	4	4	3	3	2	2	1	1	1	5
8-Mar	2	2	2	1	1	1	1	1	1	2	3	4	4	4	4	3	3	3	2	2	2	1	1	1	4
9-Mar	1	1	1	3	1	1	1	1	1	1	1	1	2	2	2	1	1	2	1	1	2	2	1	2	3
10-Mar	2	1	1	3	3	2	1	1	1	1	1	2	3	3	3	3	3	2	1	3	2	2	1	1	3
11-Mar	2	1	1	1	1	1	1	2	1	1	2	2	3	3	3	3	2	1	1	2	1	1	1	2	3
12-Mar	2	2	1	1	1	1	1	1	1	3	2	3	4	3	3	4	4	4	3	4	6	4	3	3	6
13-Mar	3	3	3	3	3	3	3	4	4	4	4	5	5	5	4	4	4	4	3	3	4	2	2	3	5
14-Mar	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	3	3	4	4	4
15-Mar	3	2	2	2	2	2	2	1	2	2	3	5	3	3	4	4	3	2	3	2	1	1	2	1	5
16-Mar	2	2	3	4	4	4	5	5	5	5	4	4	5	4	4	4	4	4	3	3	3	4	3	2	5
17-Mar	2	2	2	2	2	3	3	2	1	2	3	2	2	2	2	3	3	2	2	2	3	3	3	3	3
18-Mar	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	2	1	2	1	1	1	2	3
19-Mar	9	6	7	7	7	6	5	4	4	5	5	5	5	5	6	6	6	6	6	6	6	5	5	3	9
20-Mar	4	3	3	4	3	3	1	2	2	2	3	2	2	2	3	2	2	2	2	2	2	2	2	2	4
21-Mar	3	3	2	2	2	2	3	2	3	2	2	3	3	3	4	4	4	4	4	5	4	3	3	3	5
22-Mar	3	4	4	4	4	4	3	3	3	2	2	2	2	2	1	1	1	1	1	1	3	3	4	4	4
23-Mar	3	3	2	2	2	2	2	4	3	2	2	3	2	3	2	2	2	1	1	1	1	2	4	3	4
24-Mar	2	2	2	2	1	1	1	2	2	2	2	3	3	2	3	4	3	4	3	3	4	4	4	4	4
25-Mar	3	3	1	1	2	2	2	2	3	3	2	2	2	1	1	1	1	1	1	1	2	1	1	1	3
26-Mar	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	2	1	2	1	2	1	1	1	2
27-Mar	2	1	AF	AF	AF	AF	AF	AF	AF	1	2	1	2	2	2	2	2	3	2	2	1	3	1	3	3
28-Mar	2	1	1	2	2	2	1	2	2	2	2	2	2	3	2	2	2	2	2	1	2	2	2	4	4
29-Mar	1	2	2	3	1	1	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	3
30-Mar	2	1	1	2	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	2	2	2	1	2
31-Mar	1	2	2	1	1	1	2	1	1	2	2	3	3	3	4	4	4	3	3	4	4	3	3	3	4
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	157	21.30	21.30
6 - 11	331	44.91	66.21
12 - 19	215	29.17	95.39
20 - 28	33	4.48	99.86
29 - 38	1	0.14	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
Mildred Lake - March 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	14	24	20	14	6	11	3	5	10	16	8	6	5	6	2	7	157
6 - 11	79	51	18	3	7	18	31	61	32	7	6	2	2	2	2	10	331
12 - 19	23	68	4	0	0	1	20	56	19	5	1	1	0	6	3	8	215
20 - 28	1	3	0	0	0	0	0	16	1	0	0	0	0	2	7	3	33
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	117	146	42	17	13	30	54	138	62	28	15	9	7	16	14	29	737

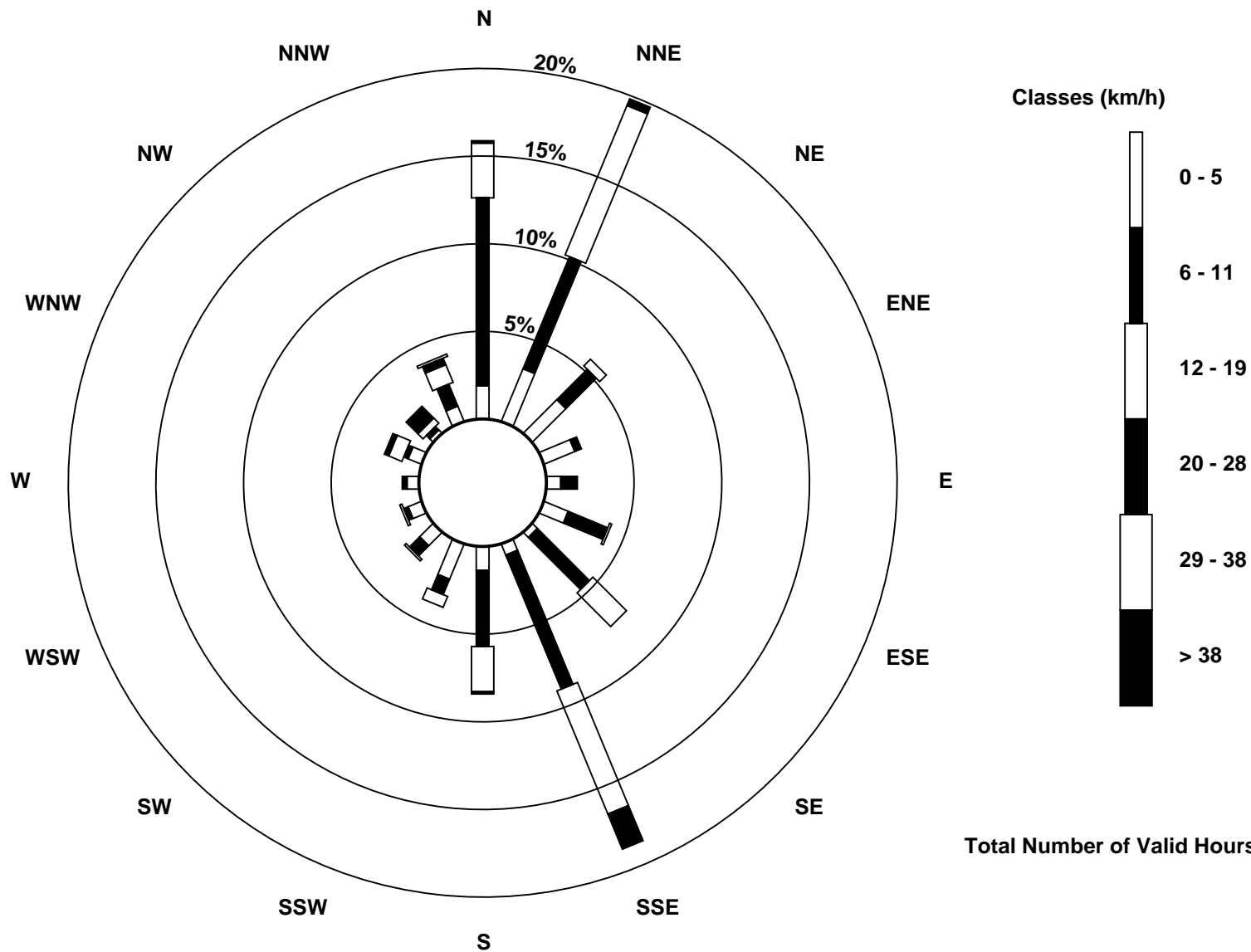
Total Number of Valid Hours: 737

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

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



Total Number of Valid Hours: 737



Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 334 deg on Mar 19 19:00															Hours in Service: 744						
Direction of Maximum Daily Speed Average: 315.8 deg on Mar 19															Hours of Data: 737						
Direction of Minimum Speed: 342 deg on Mar 9 07:00										Direction of Minimum Daily Speed Average: 1.7 deg on Mar 26										Hours of Missing Data: 7	
Monthly Average Direction: 177.9 deg															Percent Operational Time: 99.1						

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-Mar	9	33	11	15	24	11	11	9	8	7	352	342	346	336	345	355	358	5	7	16	27	63	16	280	2.3
2-Mar	225	203	160	202	210	193	176	201	197	172	162	178	161	163	157	144	132	128	135	145	159	158	156	161	158.0
3-Mar	161	157	166	167	170	171	187	175	185	168	171	160	171	241	289	272	345	340	341	354	351	9	32	27	159.7
4-Mar	28	21	30	19	16	21	19	15	18	23	21	26	12	6	18	15	17	27	41	58	73	56	35	21	23.7
5-Mar	5	357	9	15	16	19	52	95	108	112	171	206	224	247	284	338	350	18	24	32	75	121	348	7	19.9
6-Mar	3	49	25	9	6	11	18	25	18	19	20	16	29	34	19	17	27	22	19	19	15	13	12	17	18.6
7-Mar	13	17	8	5	7	24	22	13	14	11	15	10	17	5	8	12	17	31	45	39	36	18	3	6	14.7
8-Mar	358	2	10	33	3	315	333	356	341	288	339	359	8	10	19	26	36	48	47	46	26	19	4	357	13.8
9-Mar	3	6	6	4	328	314	342	110	34	280	215	253	250	231	233	218	223	39	33	34	42	33	32	12	359.5
10-Mar	7	31	16	10	22	21	8	14	6	212	216	283	343	350	2	5	7	7	11	14	10	11	9	6	5.9
11-Mar	3	8	8	16	3	6	11	7	57	161	160	144	153	139	136	125	112	113	97	100	117	117	128	107	105.0
12-Mar	102	101	76	37	50	46	203	0	27	165	151	158	160	158	170	156	155	142	133	141	148	160	159	155	147.9
13-Mar	156	161	166	165	167	168	168	166	167	167	168	168	169	168	168	167	170	180	176	195	184	168	163	156	168.2
14-Mar	157	161	167	169	169	163	168	169	168	161	175	161	149	154	144	146	101	58	3	9	14	127	140	149	151.7
15-Mar	138	141	171	164	169	177	190	180	170	162	173	234	236	234	246	264	339	357	8	17	35	56	47	271	188.0
16-Mar	4	9	11	17	18	21	23	30	38	37	36	38	22	19	19	24	24	24	16	15	13	23	24	19	22.7
17-Mar	14	36	16	2	11	351	350	4	343	298	32	347	358	357	8	8	9	11	15	12	15	16	17	27	8.3
18-Mar	27	18	18	18	20	17	10	16	13	8	3	336	339	7	352	357	156	122	92	19	3	38	346	321	12.2
19-Mar	323	317	317	309	312	311	314	305	299	291	296	288	293	306	298	301	302	335	334	335	329	320	350	4	315.8
20-Mar	18	15	13	11	8	29	45	48	27	351	352	261	176	250	184	163	147	142	131	137	149	157	158	161	83.9
21-Mar	162	163	167	167	175	174	187	190	170	168	166	168	171	166	153	154	161	157	155	152	165	165	157	149	162.9
22-Mar	143	155	159	157	151	142	130	136	138	143	151	163	182	183	192	212	235	249	239	238	348	7	13	13	149.0
23-Mar	21	12	12	4	13	18	22	37	31	25	12	333	325	339	355	7	1	345	358	30	74	119	144	146	16.7
24-Mar	150	166	167	160	160	164	187	207	172	155	163	170	169	166	151	153	157	134	123	121	133	135	140	144	151.9
25-Mar	138	143	95	95	107	123	132	147	160	156	148	151	149	134	115	87	117	109	38	46	51	71	77	59	123.2
26-Mar	63	71	109	110	83	55	48	16	106	150	206	299	299	302	75	193	146	180	178	42	31	60	42	50	90.7
27-Mar	357	31	AF	AF	AF	AF	AF	AF	AF	149	108	264	1	359	351	6	7	1	5	5	23	127	122	149	--
28-Mar	135	129	144	142	153	154	149	151	161	167	167	176	188	152	157	150	132	141	127	100	121	145	166	167	151.0
29-Mar	172	153	165	179	182	173	176	182	168	148	159	170	163	163	163	151	157	159	140	124	123	141	142	147	157.7
30-Mar	121	82	126	120	112	103	93	32	20	32	353	2	351	3	23	37	44	34	32	34	38	221	205	201	42.9
31-Mar	211	180	188	212	171	180	205	200	203	182	165	145	174	169	199	201	208	220	188	209	193	218	212	191	193.4
69.8	73.1	70.5	72.6	65.2	71.6	62.2	74.6	92.4	128.2	130.2	153.8	180.8	47.8	71.4	73.7	67.0	52.7	46.7	50.7	62.0	91.8	92.9	105.9		
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

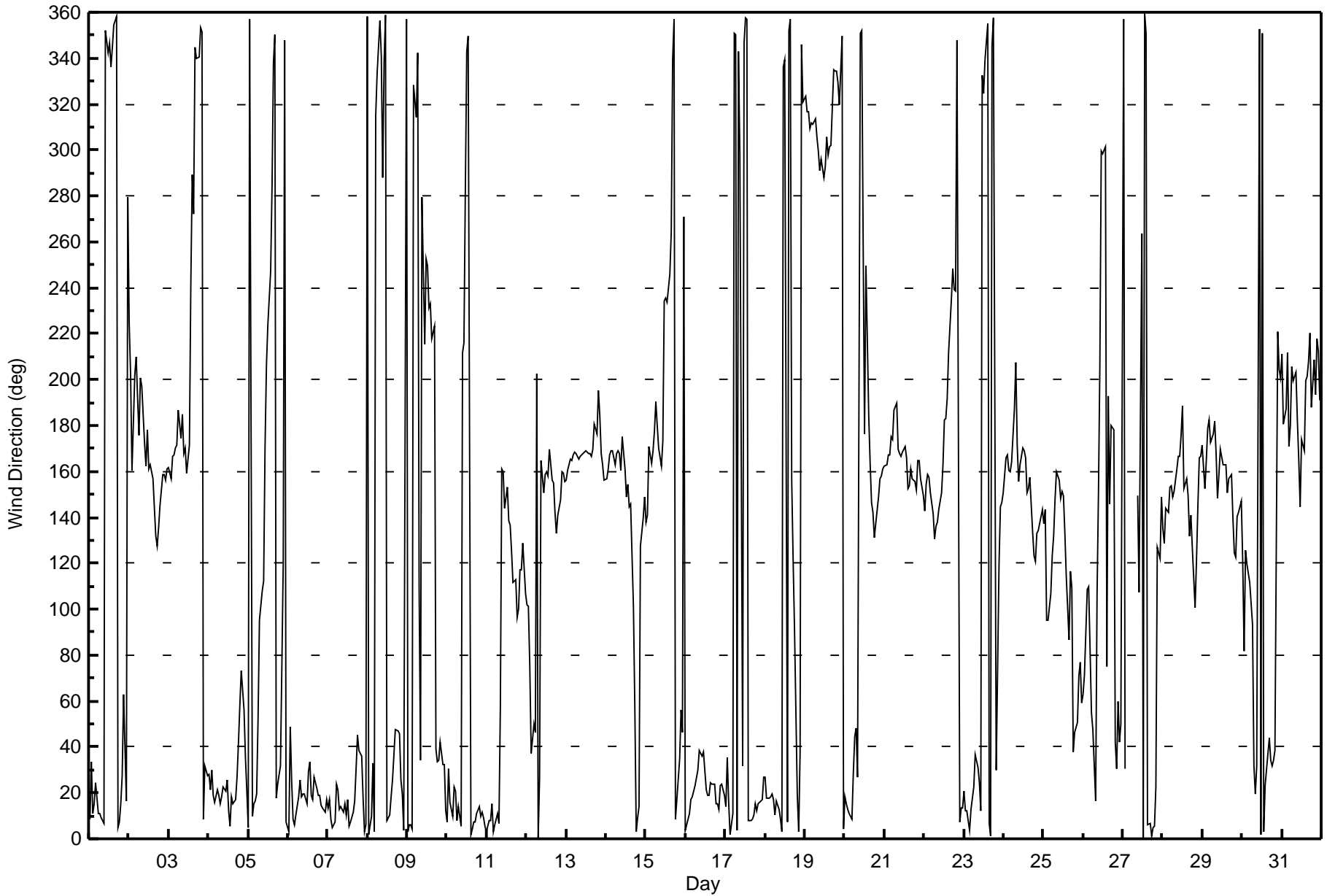
Wind Direction (WD) - deg
Mildred Lake - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Mar 27 12:00 Minimum Value: 6 deg on Mar 11 05:00 Percentiles: P ₁ = 9 P ₁₀ = 11 Q ₁ = 14 Median = 17 Q ₃ = 21 P ₉₀ = 31 P ₉₉ = 79																			Hours in Service: 744 Hours of Data: 737 Hours of Missing Data: 7 Hours of Calibration: 0 Percent Operational Time: 99.1						
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-Mar	11	19	11	13	14	14	11	11	9	11	17	20	20	15	16	19	13	10	7	9	11	28	17	41	41
2-Mar	81	12	23	26	24	34	25	12	24	26	17	24	27	21	24	20	18	16	17	19	13	13	13	13	81
3-Mar	13	14	12	11	13	15	16	15	19	14	15	23	23	85	70	29	21	15	13	14	14	20	18	17	85
4-Mar	17	17	17	16	16	17	17	15	18	18	18	22	20	17	19	18	16	17	16	17	14	18	18	13	22
5-Mar	14	14	12	16	12	12	24	21	16	17	39	44	30	32	29	11	18	17	27	22	20	26	74	10	74
6-Mar	10	33	12	15	12	12	15	16	16	18	19	19	23	22	24	18	17	16	14	17	15	17	17	17	33
7-Mar	16	16	15	15	15	19	18	16	18	18	18	19	19	17	18	19	22	23	22	19	21	21	12	10	23
8-Mar	10	12	12	20	13	20	12	18	37	69	15	30	28	38	46	31	22	17	14	14	16	14	12	13	69
9-Mar	8	10	10	54	16	45	86	35	55	90	21	25	29	29	30	34	42	20	13	14	14	15	14	24	90
10-Mar	15	13	9	9	17	26	11	12	23	46	28	81	45	36	29	19	15	14	16	15	12	11	10	9	81
11-Mar	9	8	7	13	6	10	13	13	39	57	49	25	31	30	26	30	22	14	9	10	10	8	13	15	57
12-Mar	11	9	12	14	23	81	15	15	48	25	17	18	18	20	21	16	16	18	16	17	18	12	12	14	81
13-Mar	14	12	10	11	11	11	12	11	11	12	11	13	12	12	12	15	16	14	11	14	11	11	14	14	16
14-Mar	13	11	12	11	10	10	10	11	13	16	16	18	16	13	20	20	10	27	10	10	60	18	19	18	60
15-Mar	19	25	12	13	11	16	23	15	14	13	24	61	23	25	25	26	19	14	15	13	19	25	82	80	82
16-Mar	10	12	14	15	15	16	15	17	18	19	20	22	22	17	19	19	19	17	18	15	14	15	16	19	22
17-Mar	17	18	20	11	12	17	12	18	15	50	47	13	15	14	14	14	14	13	13	13	15	14	14	15	50
18-Mar	17	15	14	14	14	15	14	15	17	15	24	12	11	27	20	28	18	29	13	49	13	42	25	15	49
19-Mar	15	15	14	16	17	17	17	17	20	19	19	21	21	18	20	18	21	10	10	11	12	13	20	16	21
20-Mar	21	16	15	15	16	21	17	15	23	34	31	65	90	95	36	27	19	19	12	17	13	11	11	11	95
21-Mar	11	14	22	11	19	13	17	22	14	13	16	15	17	20	16	16	14	15	14	16	14	13	14	15	22
22-Mar	17	14	13	14	18	19	15	18	20	20	21	20	18	18	22	20	22	24	35	40	15	18	17	18	40
23-Mar	18	15	14	13	16	16	17	17	24	21	25	37	25	13	24	23	21	13	19	19	16	23	20	16	37
24-Mar	15	14	12	14	13	11	24	18	25	18	21	14	16	14	19	16	17	17	13	14	17	19	19	17	25
25-Mar	18	18	13	10	19	13	16	17	17	16	18	18	19	24	23	22	31	36	12	12	48	12	15	16	48
26-Mar	17	20	20	15	20	31	36	57	24	30	28	56	16	20	54	30	24	18	26	17	21	12	19	56	57
27-Mar	30	60	AF	AF	AF	AF	AF	AF	AF	38	26	101	16	18	12	13	11	48	11	23	77	55	15	21	101
28-Mar	16	12	14	16	14	14	14	16	13	12	11	16	22	25	21	20	20	20	18	12	26	14	17	13	26
29-Mar	18	11	11	16	12	11	14	22	17	20	19	15	18	25	28	21	17	14	17	12	12	16	17	35	35
30-Mar	23	28	33	49	22	14	15	18	22	34	22	30	19	34	18	28	33	59	51	14	51	69	30	30	69
31-Mar	24	18	17	21	17	12	18	13	18	21	20	27	21	18	16	13	17	21	14	26	21	22	21	13	27
81 60 33 54 24 81 86 57 55 90 49 101 90 95 70 34 42 59 51 49 77 69 82 80																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 3, 2017	Last Calibration	February 9, 2017
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	10:54	End Time (MST)	13:30
Gas Cert Reference	LL107930	Station temp.	22 Deg C
Cal Gas Concentration	51.2 ppm	Cal Gas Exp Date	2/19/2018
Calibrator Make/Model	API T700	Serial Number	1185
ZAG Make/Model	API 701	Serial Number	4767
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-653	-653
Analyzer IP address	192.168.1.43		Lamp voltage	811	809
Calculated slope	0.999129	0.997532	Chamber temp	45.1	45.2
Calculated intercept	0.959536	1.418434	Pressure	688.5	682.8
Analyzer Background	21.4	21.7	Flow	0.490	0.486
Analyzer Coefficient	0.971	0.977	Intensity	91	90

Analyzer make TEI 43i Analyzer serial # JC1404901075

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	76.4	782.3	776.0	1.008
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	76.4	782.3	783.6	0.998
second point	5000	38.3	392.2	390.7	1.004
third point	5000	19.2	196.6	194.7	1.010
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	76.4	782.3	785.2	0.996
Average Correction Factor					1.004

Corrected As found 776.2 Previous response 782.1 % change 0.8%

Notes:

Changed inlet filter after as founds. Adjusted Span.

Calibration Performed By: Aswin Sasi Kumar



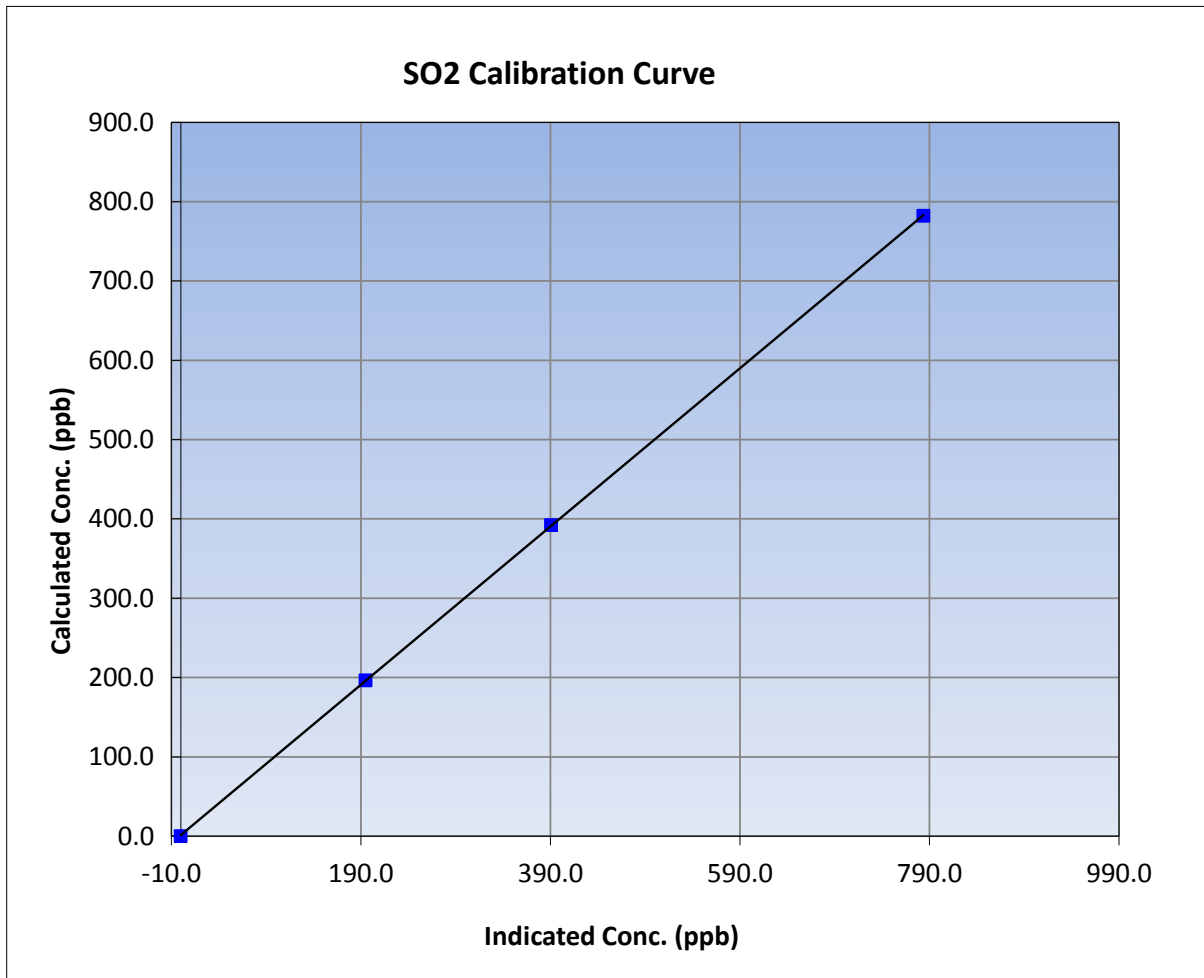
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 3, 2017	Previous Calibration	February 9, 2017
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	10:54	End Time (MST)	13:30
Analyzer make	TEI 43i	Analyzer serial #	JC1404901075

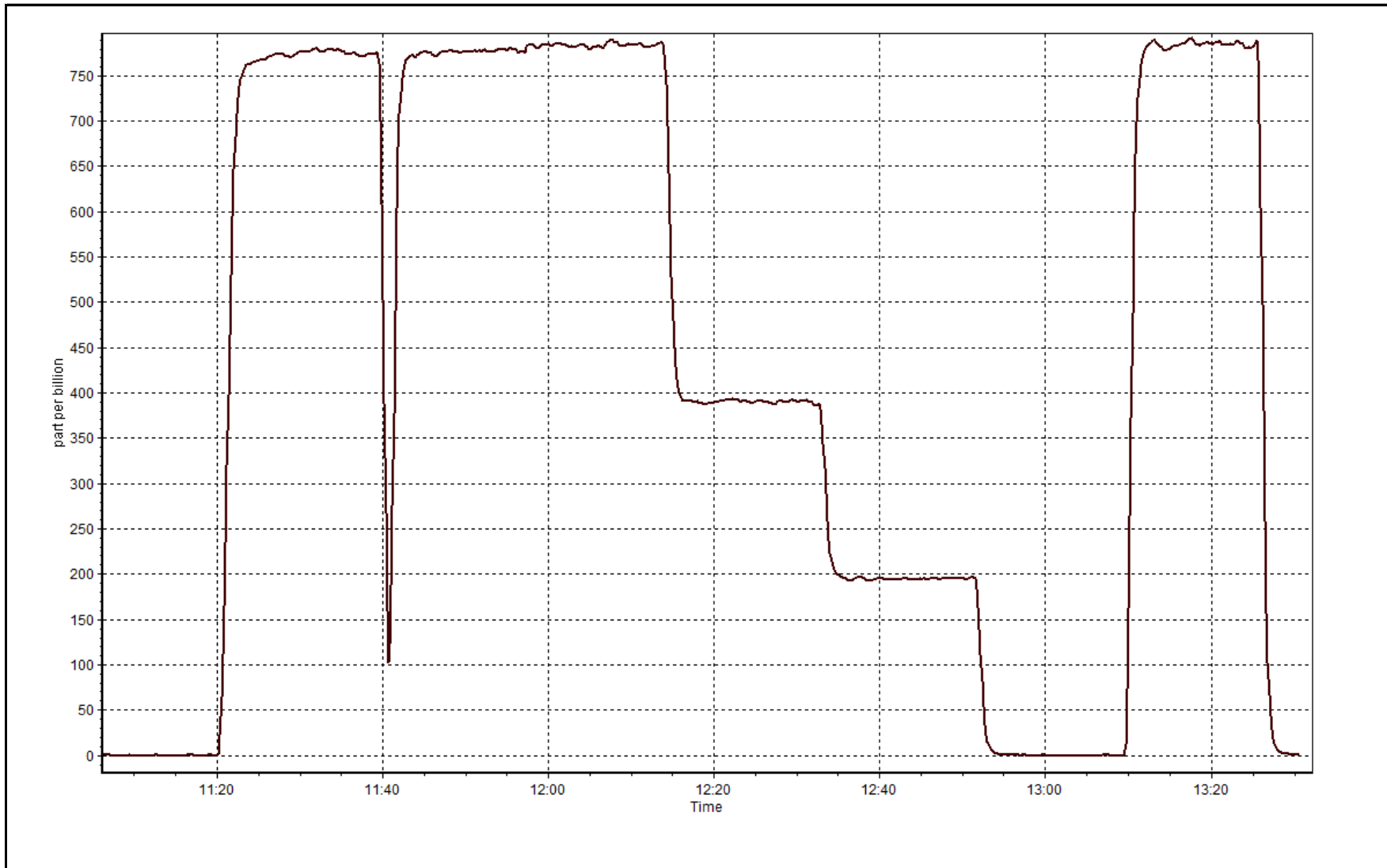
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999988
782.3	783.6	0.9984		
392.2	390.7	1.0038	Slope	0.997532
196.6	194.7	1.0096		
			Intercept	1.418434



SO2 Calibration Plot

Date: March 3, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	March 1, 2017	Last Calibration	February 10, 2017
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	11:35	End Time (MST)	14:28
Gas Cert Reference	ALM028262	Station temp.	22 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	September 9, 2017
Calibrator Make/Model	API T700	Serial Number	1185
ZAG air Make/Model	API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	Serial Number	8790
SO2 gas concentration	51.2 ppm	SO2 gas cert/exp	LL107930 19-Feb-18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-601	-601
Analyzer IP address	192.168.1.45		Lamp voltage	790	790
Calculated slope	0.996880	1.003006	Chamber temp	45	45
Calculated intercept	-0.071035	0.089905	Pressure	570.1	569.1
Analyzer Background	17	16.7	Flow	0.972	0.970
Analyzer Coefficient	0.976	0.976	Intensity	87	87
			Converter temp.	324	327

Analyzer make/model	TEI 450i	Analyzer serial #	815129107
Converter make/model	NA	Converter serial #	NA

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	80.1	80.7	79.8	1.012
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	80.1	80.7	80.5	1.003
second point	5000	40.1	40.4	40.1	1.007
third point	5000	20.1	20.3	19.8	1.022
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	80.1	80.7	81.5	0.991
Average Correction Factor					1.011

Corrected As found	79.5	Previous response	81.1	% change	2.0%
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Notes:

Changed inlet filter after as founds. No scrubber check done, will be done quarterly going forward. No adjustments made.

Calibration Performed By: Aswin Sasi Kumar



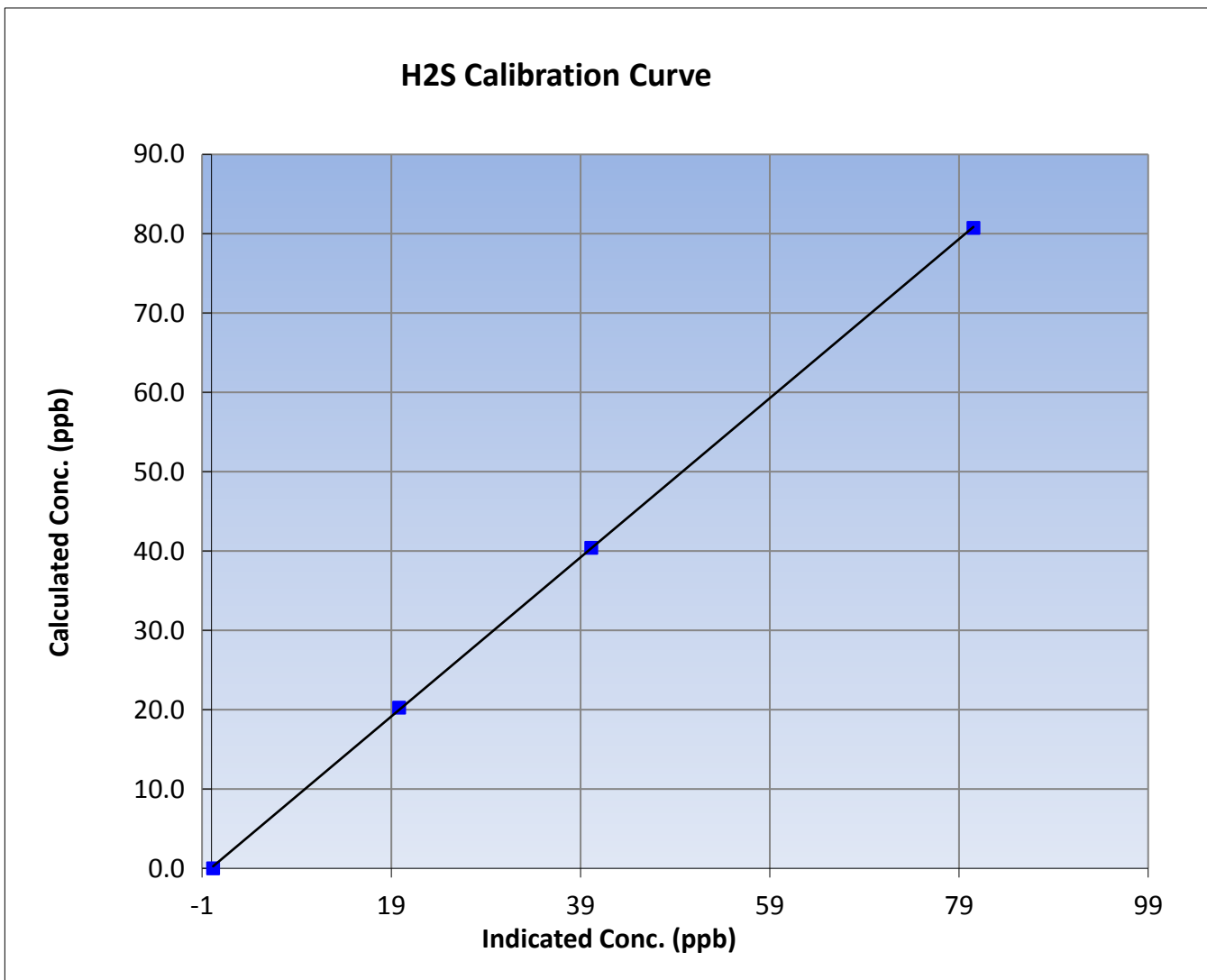
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	March 1, 2017	Previous Calibration	February 10, 2017
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	11:35	End Time (MST)	14:28
Analyzer make	TEI 450i	Analyzer serial #	815129107

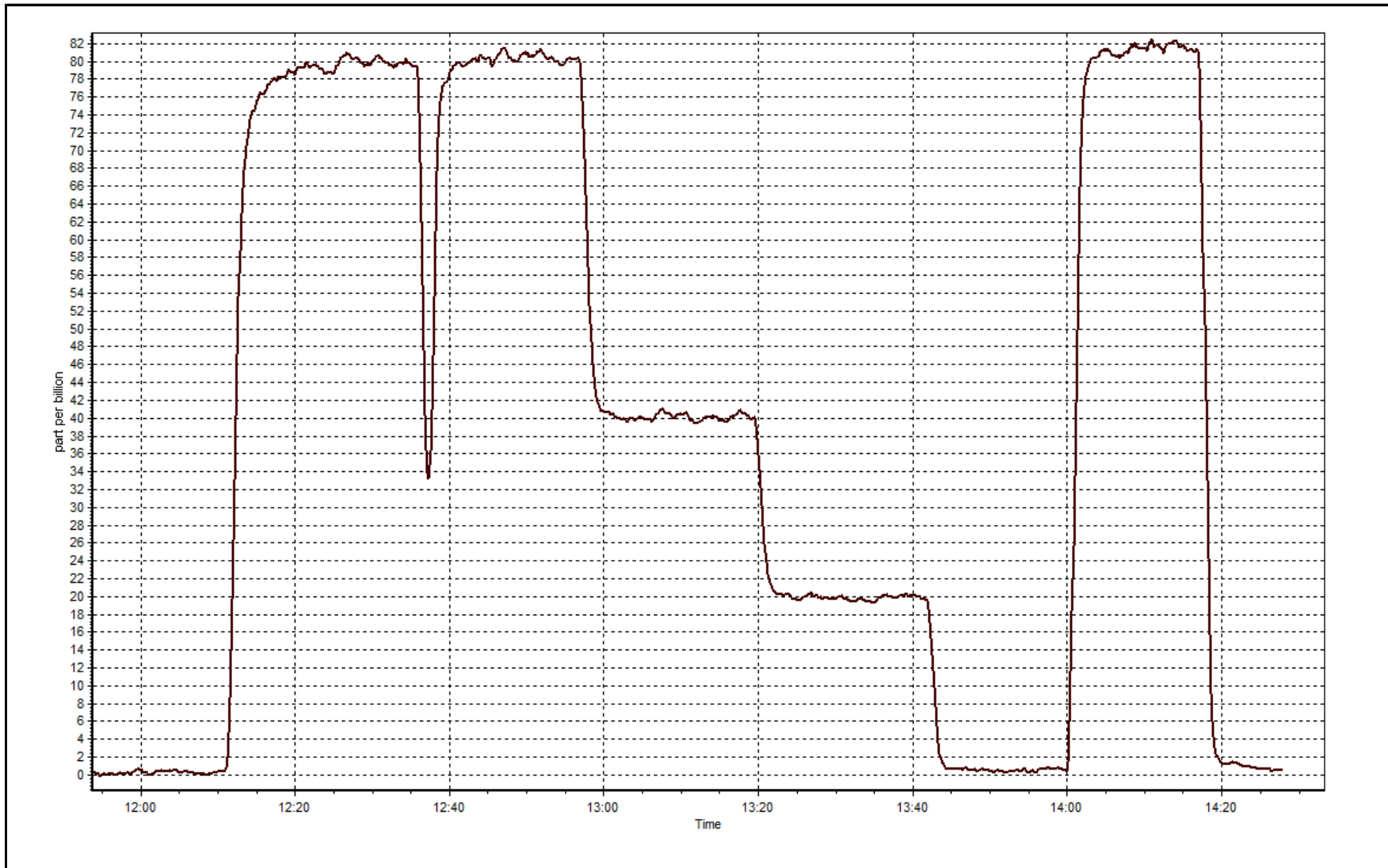
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999952
80.7	80.5	1.0027		
40.4	40.1	1.0072	Slope	1.003006
20.3	19.8	1.0222		
			Intercept	0.089905



H2S Calibration Plot

Date: March 1, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	March 3, 2017	Last Calibration	February 9, 2017
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	10:54	End Time (MST)	13:30
Gas Cert Reference	LL107930	Cal Gas Expiry Date	2/9/2018
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
DACS make/model	Campbell Scientific CR3000	Serial Number	8790

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.1	8.1
Analyzer IP address	192.168.1.51		Air or Bypass Press	40.1	40.1
Calculated slope	0.999907	0.996661	Fuel Pressure	25.8	25.8
Calculated intercept	0.002970	0.108675	Analyzer Coeff	5.022	5.022
			Analyzer BKG	1.61	1.61

Analyzer make Thermo 51i-LT Analyzer serial # 1300156231

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.11	----
as found span	5000	76.4	16.52	16.47	1.003
calibrator zero	5000	0.0	0.00	-0.11	----
high point	5000	76.4	16.52	16.47	1.003
second point	5000	38.3	8.28	8.18	1.012
third point	5000	19.2	4.15	4.07	1.020
as left zero	5000	0.0	0.00	-0.09	----
as left span	5000	76.4	16.52	16.33	1.011
Average Correction Factor					1.012

Corrected As found 16.58 Previous response 16.52 % change -0.4%

Notes:

Changed out inlet filter after as founds. No adjustments made.

Calibration Performed By:

Aswin Sasi Kumar



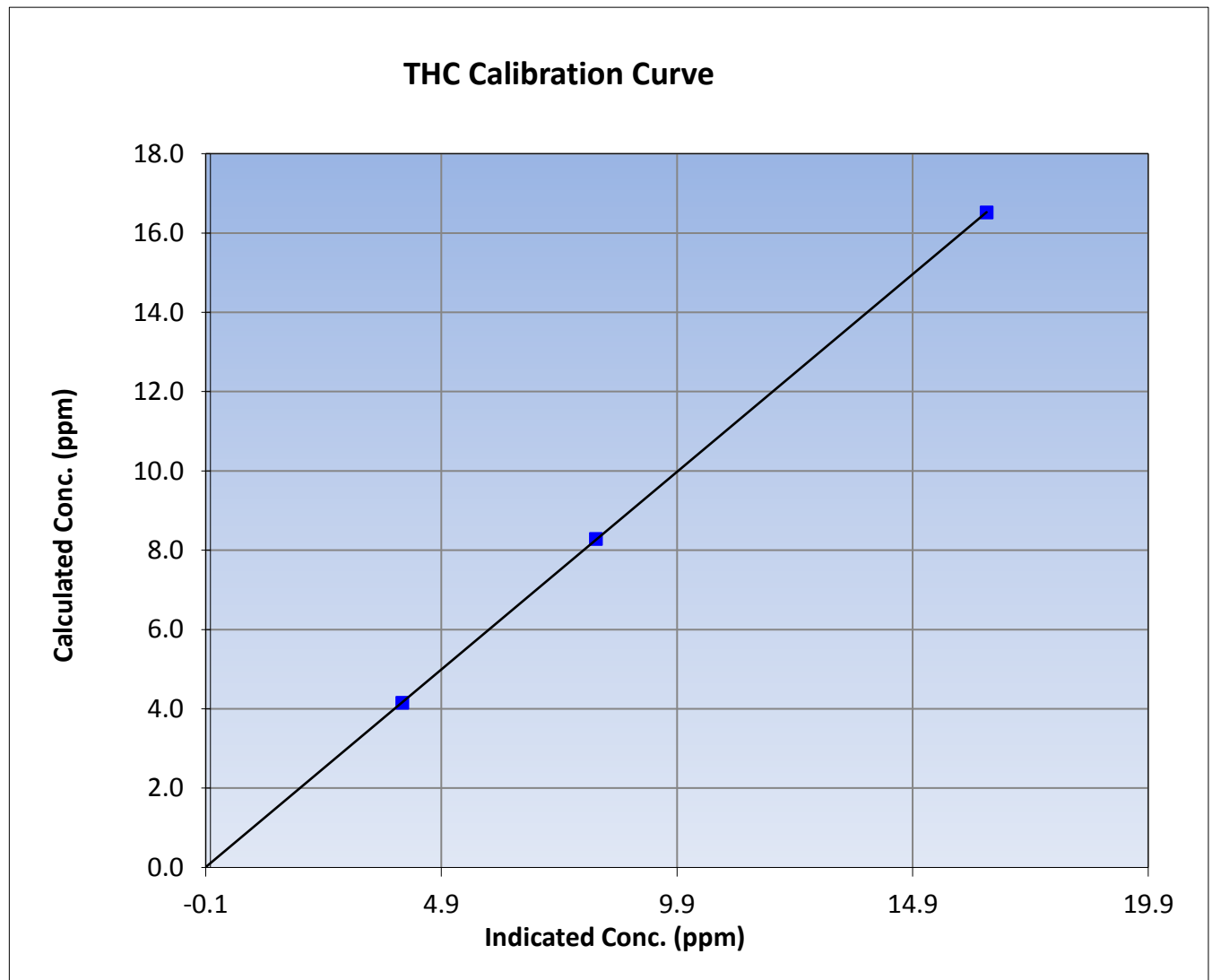
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	March 3, 2017	Previous Calibration	February 9, 2017
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	10:54	End Time (MST)	13:30
Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231

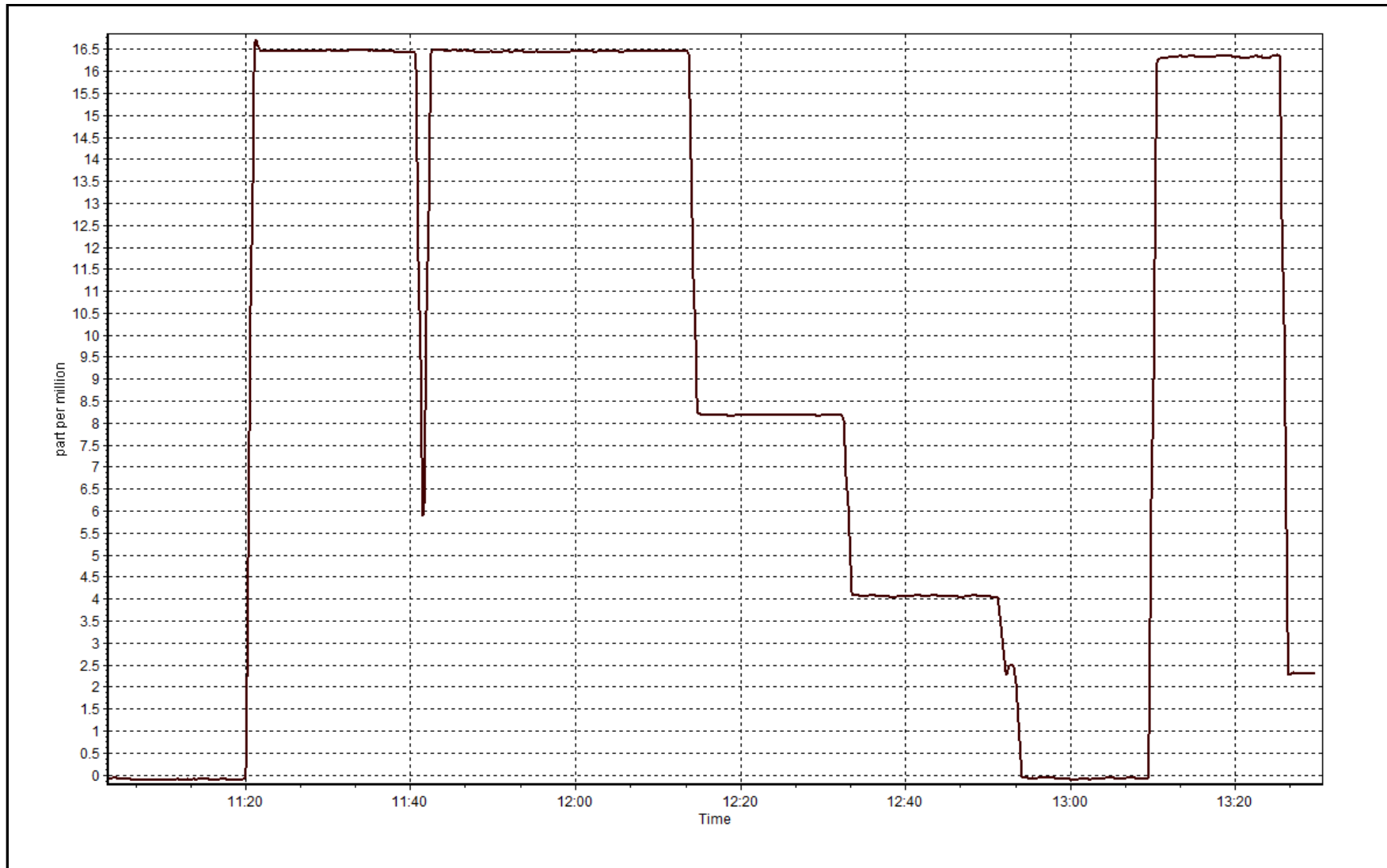
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.11	----	Correlation Coefficient	0.999996
16.52	16.47	1.0029		
8.28	8.18	1.0123		
4.15	4.07	1.0199		
			Slope	0.996661
			Intercept	0.108675



THC Calibration Plot

Date: March 3, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	March 8, 2017	Last Calibration	March 3, 2017
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Other: Drifting sensitivity check		
Start Time (MST)	10:57	End Time (MST)	15:00
Gas Cert Reference	LL107930	Cal Gas Expiry Date	2/9/2018
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
DACS make/model	Campbell Scientific CR3000	Serial Number	8790

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.1	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	40.1	33.1
Calculated slope	0.996661	1.001053	Fuel Pressure	25.8	21.8
Calculated intercept	0.108675	-0.018380	Analyzer Coeff	5.022	3.776
			Analyzer BKG	1.61	0.56

Analyzer make: Thermo 51i-LT Analyzer serial #: 1300156231

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.01	----
as found span	5006	76.4	16.50	14.68	1.124
calibrator zero	5000	0.0	0.00	0.01	----
high point	5006	76.4	16.50	16.50	1.000
second point	5005	38.3	8.27	8.27	1.000
third point	5005	19.2	4.15	4.18	0.992
as left zero	5000	0.0	0.00	0.08	----
as left span	5006	76.4	16.50	16.36	1.008
Average Correction Factor					0.997

Corrected As found: 14.69 Previous response: 16.44 % change: 11.9%

Notes:

As found was done with 3 cal points, all of which were approximately 11% +/- 1% low from calculated input. Relaced pump and maximized flame via lowering H2 and Air pressures.

Calibration Performed By:

Kelly Baragar



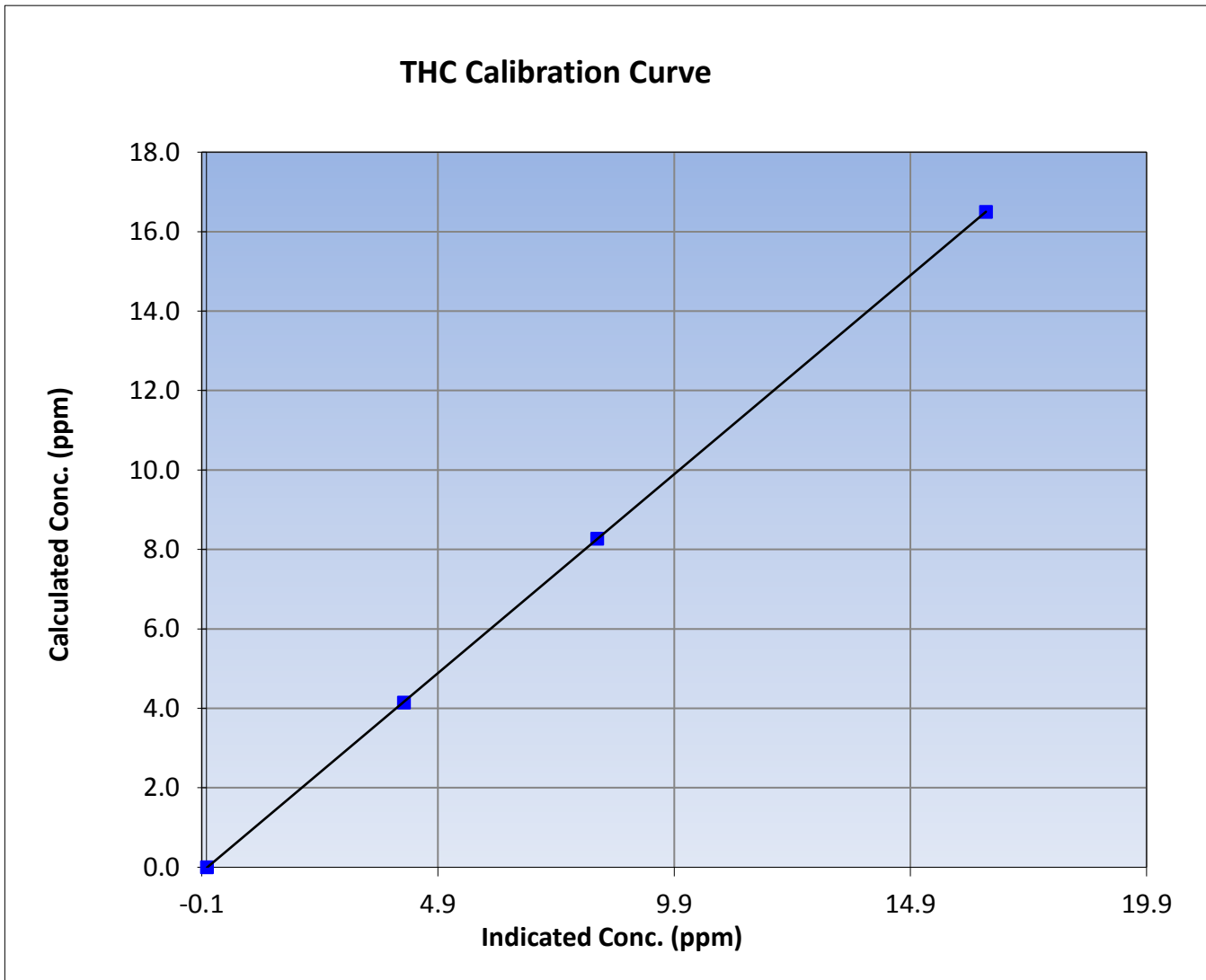
Wood Buffalo Environmental Association THC Calibration Report

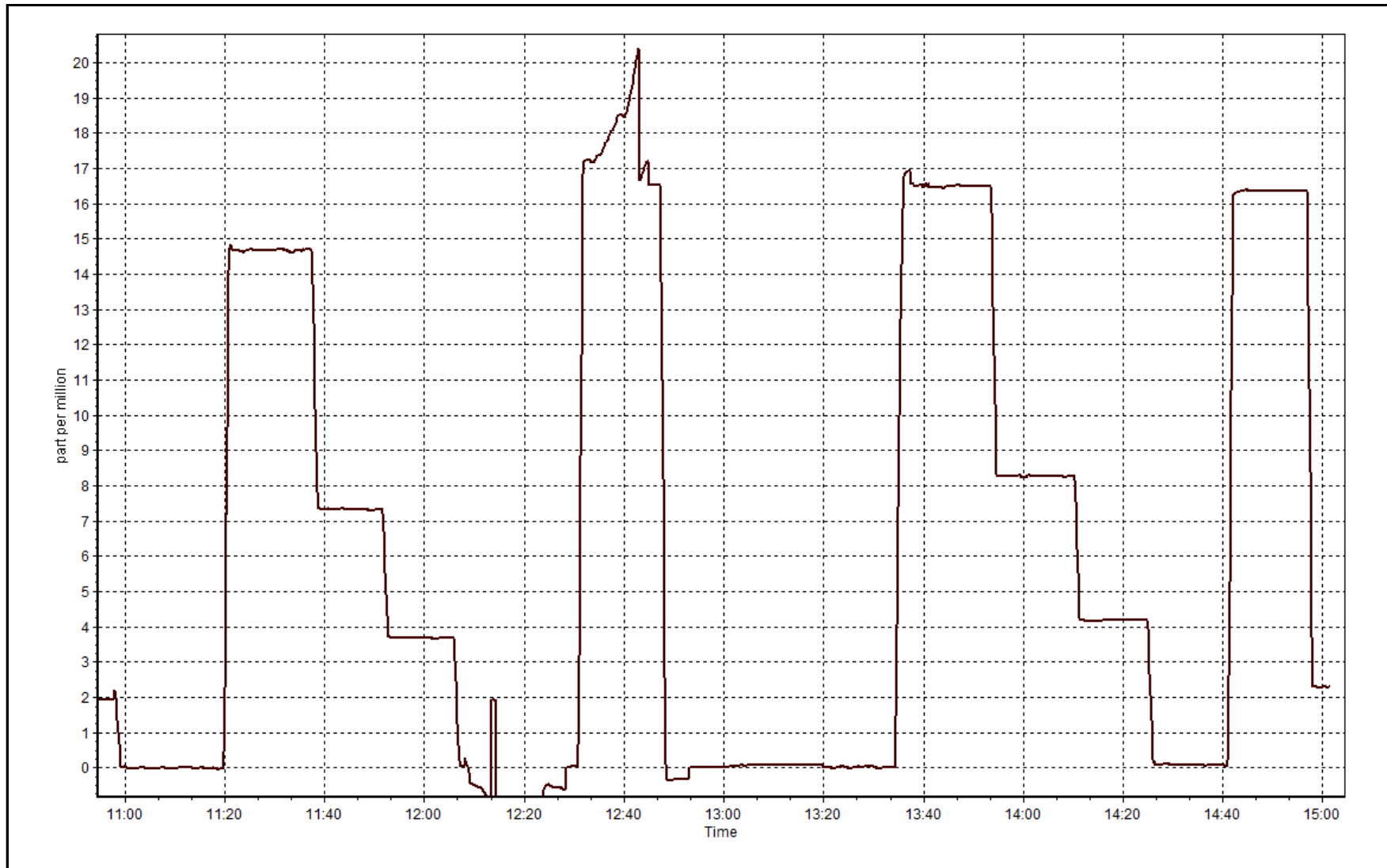
Station Information

Calibration Date	March 8, 2017	Previous Calibration	March 3, 2017
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	10:57	End Time (MST)	15:00
Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999996
16.50	16.50	0.9999		
8.27	8.27	1.0003		
4.15	4.18	0.9921		
			Slope	1.001053
			Intercept	-0.018380







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 3 LOWER CAMP METEOROLOGY MARCH 2017

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)
MARCH 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	13.7	-	7.3	-
Temperature 45 m (C) Average	744	0	0	100	13.7	-	7.4	-
Temperature 100 m (C) Average	744	0	0	100	13.2	-	7.2	-
Temperature 167 m (C) Average	744	0	0	100	12.6	-	6.9	-
Relative Humidity 20 m (%) Average	744	0	0	100	98	-	86.0	-
Relative Humidity 45 m (%) Average	744	0	0	100	97	-	84.0	-
Relative Humidity 100 m (%) Average	744	0	0	100	96	-	85.0	-
Relative Humidity 167 m (%) Average	744	0	0	100	96	-	86.0	-
Wind Speed 20 m (km/h) Average	744	0	0	100	23	-	19.0	-
Wind Speed 45 m (km/h) Average	744	0	0	100	30	-	22.0	-
Wind Speed 100 m (km/h) Average	743	0	1	99.87	41	-	30.0	-
Wind Speed 167 m (km/h) Average	744	0	0	100	47	-	34.0	-
Wind Direction 20 m (deg) Average	744	0	0	100	-	-	-	-
Wind Direction 45 m (deg) Average	744	0	0	100	-	-	-	-
Wind Direction 100 m (deg) Average	743	0	1	99.87	-	-	-	-
Wind Direction 167 m (deg) Average	744	0	0	100	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	0	0	100	0.5	-	0.1	-
Vertical Wind Speed 45 m (km/h) Average	744	0	0	100	1.3	-	0.9	-
Vertical Wind Speed 100 m (km/h) Average	743	0	1	99.87	4.9	-	1.8	-
Vertical Wind Speed 167 m (km/h) Average	744	0	0	100	8.1	-	1.7	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)
MARCH 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	-7.96	10.8	-	-33.6	-23.3	-17.4	-6.7	0.8	4.4	13.7
Temperature 45 m (C) Average	744	-7.92	10.7	-	-32.3	-23.2	-17.5	-6.8	1	4.5	13.7
Temperature 100 m (C) Average	744	-7.88	10.4	-	-29.1	-22.4	-17.8	-6.7	1.2	4.5	13.2
Temperature 167 m (C) Average	744	-8.05	10.2	-	-26.8	-22.2	-18.2	-6.9	0.8	4.5	12.6
Relative Humidity 20 m (%) Average	744	65.5	16	-	31	44	54	66	77	86	98
Relative Humidity 45 m (%) Average	744	64.3	15	-	29	43	54	65	76	85	97
Relative Humidity 100 m (%) Average	744	64.4	16	-	23	43	53	64	76	87	96
Relative Humidity 167 m (%) Average	744	64.7	16	-	23	44	53	64	77	87	96
Wind Speed 20 m (km/h) Average	744	7.8	5	-	0	2	4	7	11	15	23
Wind Speed 45 m (km/h) Average	744	10.5	7	-	0	3	5	9	15	20	30
Wind Speed 100 m (km/h) Average	743	15	9	-	1	4	8	14	21	27	41
Wind Speed 167 m (km/h) Average	744	17.4	9	-	1	6	10	16	24	30	47
Wind Direction 20 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	-0.08	0.2	-	-0.8	-0.3	-0.2	-0.1	0	0.1	0.5
Vertical Wind Speed 45 m (km/h) Average	744	0.11	0.5	-	-1.8	-0.4	-0.2	0	0.4	0.8	1.3
Vertical Wind Speed 100 m (km/h) Average	743	0.43	0.8	-	-1.6	-0.3	0	0.2	0.7	1.5	4.9
Vertical Wind Speed 167 m (km/h) Average	744	0.65	0.9	-	-1.7	-0.2	0.1	0.4	1	1.8	8.1

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction, Vertical Wind Speed 100 m	25 Mar 2017 04:00	25 Mar 2017 04:00	1	Flat line in sensor output signal - Sensor frozen

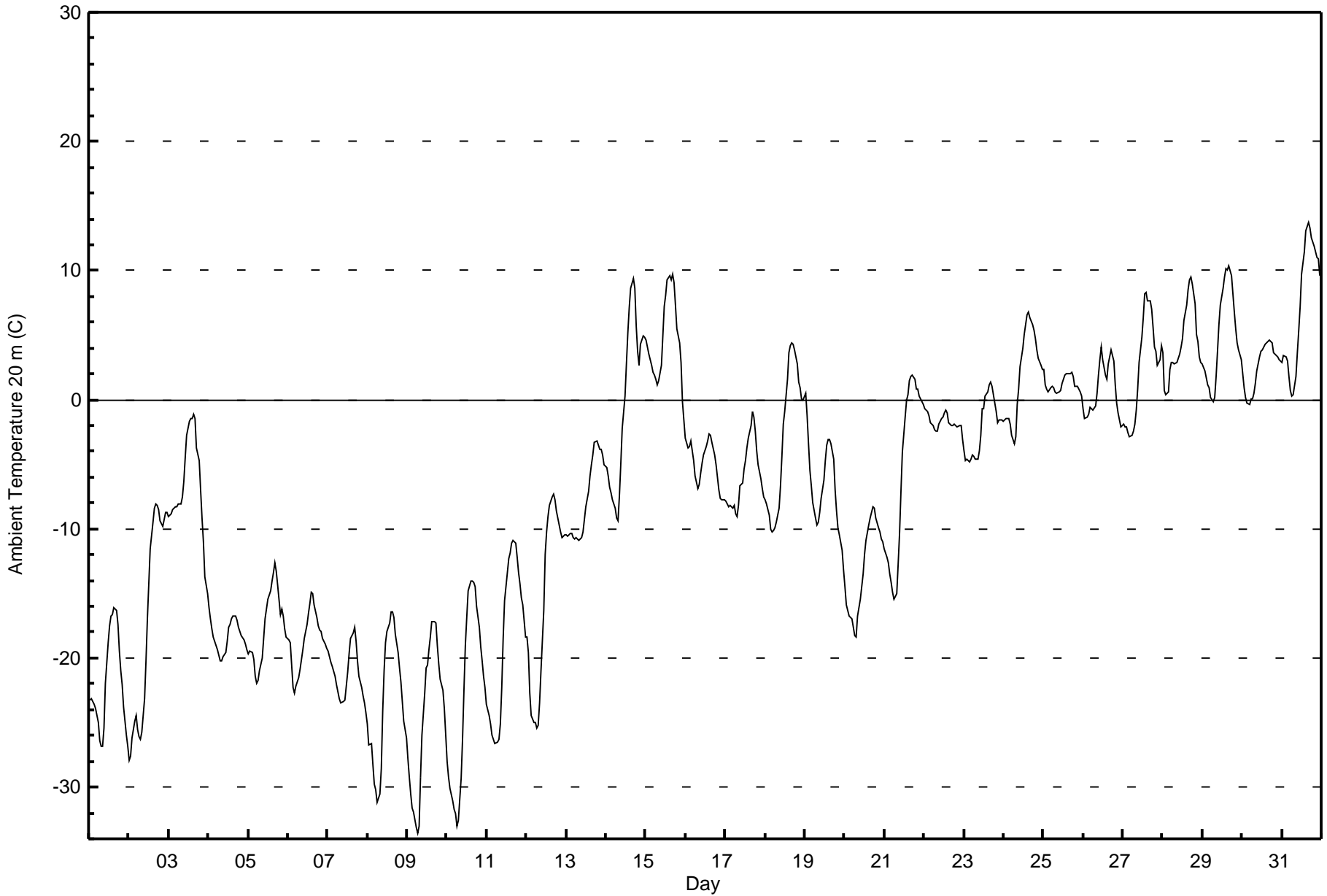


Maximum Value: 13.7 C on Mar 31 17:00 Maximum Daily Average: 7.3 C on Mar 31																						Hours in Service: 744 Hours of Data: 744				
Minimum Value: -33.6 C on Mar 9 07:00 Minimum Daily Average: -24.7 C on Mar 9 Maximum Diurnal Average: -3.0 C at hour 17 Minimum Diurnal Average: -12.6 C at hour 7 Monthly Average: -7.96 C Percentiles: P ₁ = -31.7 P ₁₀ = -23.3 Q ₁ = -17.4 Median = -6.7 Q ₃ = 0.8 P ₉₀ = 4.4 P ₉₉ = 11.0																						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-Mar	-23.2	-23.2	-23.3	-23.6	-23.9	-24.9	-26.4	-26.8	-26.8	-25.4	-22.0	-18.8	-17.5	-16.8	-16.6	-16.1	-16.3	-17.4	-19.4	-21.0	-22.1	-23.8	-25.9	-26.9	-22.0	-16.1
2-Mar	-27.9	-27.6	-26.2	-24.9	-24.5	-25.5	-26.1	-26.3	-25.7	-23.2	-20.2	-16.9	-14.3	-11.5	-9.4	-8.4	-8.0	-8.2	-8.6	-9.4	-9.8	-9.2	-8.7	-8.8	-17.1	-8.0
3-Mar	-9.1	-8.8	-8.5	-8.4	-8.2	-8.3	-8.0	-8.0	-7.5	-6.3	-4.5	-2.7	-1.6	-1.5	-1.5	-1.2	-1.5	-3.7	-4.7	-7.0	-9.2	-11.0	-13.7	-15.0	-6.7	-1.2
4-Mar	-16.1	-16.9	-17.8	-18.4	-18.7	-19.3	-19.8	-20.2	-20.3	-19.9	-19.5	-18.7	-17.7	-17.4	-17.0	-16.7	-16.8	-17.1	-17.6	-18.0	-18.3	-18.6	-19.0	-19.4	-18.3	-16.1
5-Mar	-19.6	-19.4	-19.5	-20.1	-21.5	-22.0	-21.7	-21.0	-20.0	-18.5	-16.9	-16.2	-15.5	-14.8	-14.0	-13.4	-12.6	-13.3	-14.4	-16.7	-16.2	-16.8	-17.7	-18.4	-17.5	-12.6
6-Mar	-18.6	-18.8	-20.6	-22.3	-22.7	-22.2	-21.5	-20.9	-20.1	-19.4	-18.5	-17.4	-16.6	-15.8	-14.9	-15.0	-15.9	-16.8	-17.5	-17.8	-17.9	-18.5	-18.9	-19.3	-18.7	-14.9
7-Mar	-19.4	-19.9	-20.3	-20.7	-21.4	-22.1	-22.6	-23.2	-23.5	-23.4	-23.3	-22.2	-21.1	-19.7	-18.5	-18.0	-17.6	-18.7	-20.2	-21.4	-22.3	-22.9	-23.5	-24.2	-21.3	-17.6
8-Mar	-25.1	-26.7	-26.6	-28.3	-29.7	-30.2	-31.1	-30.5	-28.6	-24.1	-21.0	-18.8	-18.0	-17.3	-16.4	-16.4	-16.9	-18.1	-19.6	-20.8	-21.8	-23.4	-24.8	-26.2	-23.4	-16.4
9-Mar	-27.9	-29.3	-30.5	-31.6	-32.0	-33.1	-33.6	-33.0	-29.2	-25.9	-22.7	-20.8	-20.6	-19.4	-18.3	-17.2	-17.2	-17.3	-19.0	-20.4	-21.6	-22.5	-23.9	-26.0	-24.7	-17.2
10-Mar	-28.0	-29.2	-30.0	-31.1	-31.7	-32.0	-33.0	-32.6	-29.3	-26.3	-22.6	-19.0	-16.9	-14.8	-14.0	-14.1	-14.1	-14.5	-16.0	-17.6	-19.2	-20.2	-21.4	-22.2	-22.9	-14.0
11-Mar	-23.6	-24.4	-25.1	-26.0	-26.3	-26.6	-26.5	-26.3	-25.1	-22.2	-18.5	-15.5	-13.4	-12.3	-11.9	-11.1	-10.9	-11.1	-12.2	-13.4	-14.3	-15.3	-15.9	-18.3	-18.6	-10.9
12-Mar	-18.4	-19.6	-22.7	-24.4	-24.9	-25.0	-25.4	-25.2	-23.5	-21.0	-16.3	-12.0	-10.2	-9.1	-8.1	-7.5	-7.3	-7.8	-8.6	-9.2	-10.3	-10.7	-10.6	-10.4	-15.3	-7.3
13-Mar	-10.4	-10.6	-10.3	-10.4	-10.6	-10.8	-10.7	-10.9	-10.8	-10.6	-10.3	-9.3	-8.3	-7.1	-5.9	-5.1	-4.2	-3.3	-3.2	-3.5	-3.8	-3.8	-4.2	-5.0	-7.6	-3.2
14-Mar	-5.3	-5.9	-6.7	-7.2	-7.8	-8.4	-9.1	-9.4	-7.4	-4.9	-2.2	0.2	2.8	5.2	7.1	8.7	9.4	8.6	5.7	3.8	2.6	4.2	4.9	4.9	-0.3	9.4
15-Mar	4.6	4.1	3.5	2.7	2.2	1.9	1.6	1.2	1.5	2.7	4.9	7.2	8.1	9.2	9.6	9.3	9.8	9.1	7.3	5.5	4.4	2.9	-0.2	-1.5	4.6	9.8
16-Mar	-2.9	-3.7	-3.6	-3.2	-3.9	-4.7	-5.9	-6.8	-6.5	-5.7	-5.0	-4.3	-3.7	-3.2	-2.6	-2.8	-3.3	-4.3	-5.1	-6.1	-7.0	-7.6	-7.7	-7.8	-4.9	-2.6
17-Mar	-7.9	-8.1	-8.3	-8.2	-8.3	-8.2	-8.8	-9.1	-8.1	-6.7	-6.4	-5.4	-4.8	-3.7	-2.9	-2.0	-0.9	-1.3	-2.4	-3.9	-5.0	-6.1	-6.9	-7.5	-5.9	-0.9
18-Mar	-7.7	-8.1	-8.9	-10.0	-10.3	-10.1	-9.9	-9.5	-8.4	-6.7	-4.4	-1.9	-0.9	1.6	3.6	4.2	4.4	4.3	3.9	2.8	1.3	1.0	0.1	-0.1	-2.9	4.4
19-Mar	0.5	-1.3	-3.4	-5.5	-6.7	-8.0	-9.2	-9.7	-9.5	-8.7	-7.7	-6.2	-4.7	-3.5	-3.1	-3.1	-3.4	-4.6	-7.0	-8.6	-9.9	-10.4	-11.7	-13.2	-6.6	0.5
20-Mar	-14.5	-15.9	-16.3	-16.8	-17.0	-17.6	-18.2	-18.4	-16.8	-15.4	-14.5	-13.5	-11.9	-10.9	-9.7	-9.1	-8.8	-8.3	-8.4	-9.1	-9.9	-10.2	-10.8	-11.0	-13.0	-8.3
21-Mar	-11.6	-12.2	-12.7	-13.5	-14.2	-14.9	-15.5	-15.0	-12.7	-10.3	-7.1	-4.1	-1.3	-0.1	0.4	1.5	1.8	1.9	1.5	0.8	0.8	0.2	0.1	-0.4	-5.7	1.9
22-Mar	-0.7	-0.8	-1.0	-1.3	-1.8	-2.0	-2.3	-2.4	-2.4	-1.9	-1.4	-1.4	-1.0	-0.8	-1.0	-1.8	-2.0	-2.0	-1.9	-2.0	-2.1	-2.0	-2.0	-3.1	-1.7	-0.7
23-Mar	-4.0	-4.7	-4.6	-4.8	-4.6	-4.3	-4.3	-4.6	-4.6	-4.0	-2.8	-0.7	-0.7	0.3	0.6	1.1	1.4	1.0	0.4	-0.9	-1.8	-1.6	-1.5	-1.6	-2.1	1.4
24-Mar	-1.7	-1.5	-1.5	-1.5	-1.9	-2.7	-3.5	-2.9	-0.4	0.8	2.5	4.0	5.0	5.8	6.5	6.7	6.3	5.9	5.4	4.7	3.8	3.2	2.7	2.4	2.0	6.7
25-Mar	2.3	1.1	0.8	0.6	0.9	1.0	0.9	0.6	0.5	0.6	0.7	1.2	1.5	1.9	2.0	2.0	2.0	2.1	1.8	1.0	1.0	0.9	0.6	0.2	1.2	2.3
26-Mar	-0.7	-1.4	-1.3	-1.1	-0.6	-0.6	-0.8	-0.5	0.5	1.9	3.1	4.1	3.1	1.9	1.6	2.8	3.3	3.9	3.0	1.1	-0.3	-1.0	-1.6	-2.1	0.8	4.1
27-Mar	-1.9	-2.1	-2.1	-2.5	-2.8	-2.8	-2.5	-1.8	-0.9	0.8	2.9	4.8	6.3	8.2	8.3	7.7	7.7	7.0	5.6	4.1	3.8	2.7	3.1	4.2	2.4	8.3
28-Mar	3.6	0.7	0.3	0.6	2.3	2.9	2.9	2.8	2.9	3.2	3.5	4.1	4.7	6.1	7.3	8.5	9.3	9.5	8.9	7.5	5.1	4.5	3.3	2.8	4.5	9.5
29-Mar	2.7	2.2	1.6	1.2	1.0	0.2	-0.2	0.2	1.8	3.7	5.8	7.3	8.6	9.5	10.2	10.0	10.3	9.6	8.2	6.8	5.5	4.4	3.9	3.1	4.9	10.3
30-Mar	2.0	0.9	0.2	-0.2	-0.4	0.0	0.1	0.5	1.3	2.2	3.3	3.8	3.8	4.1	4.3	4.5	4.6	4.5	4.4	3.7	3.5	3.3	3.2	3.0	2.5	4.6
31-Mar	2.9	3.4	3.4	3.0	1.8	0.7	0.3	0.3	1.8	3.6	5.4	7.3	9.7	11.4	13.1	13.4	13.7	13.2	12.5	11.9	11.4	11.0	11.0	9.6	7.3	13.7
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	124	16.67	16.67
-20 - 0	400	53.76	70.43
0 - 10	207	27.82	98.25
10 - 20	13	1.75	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

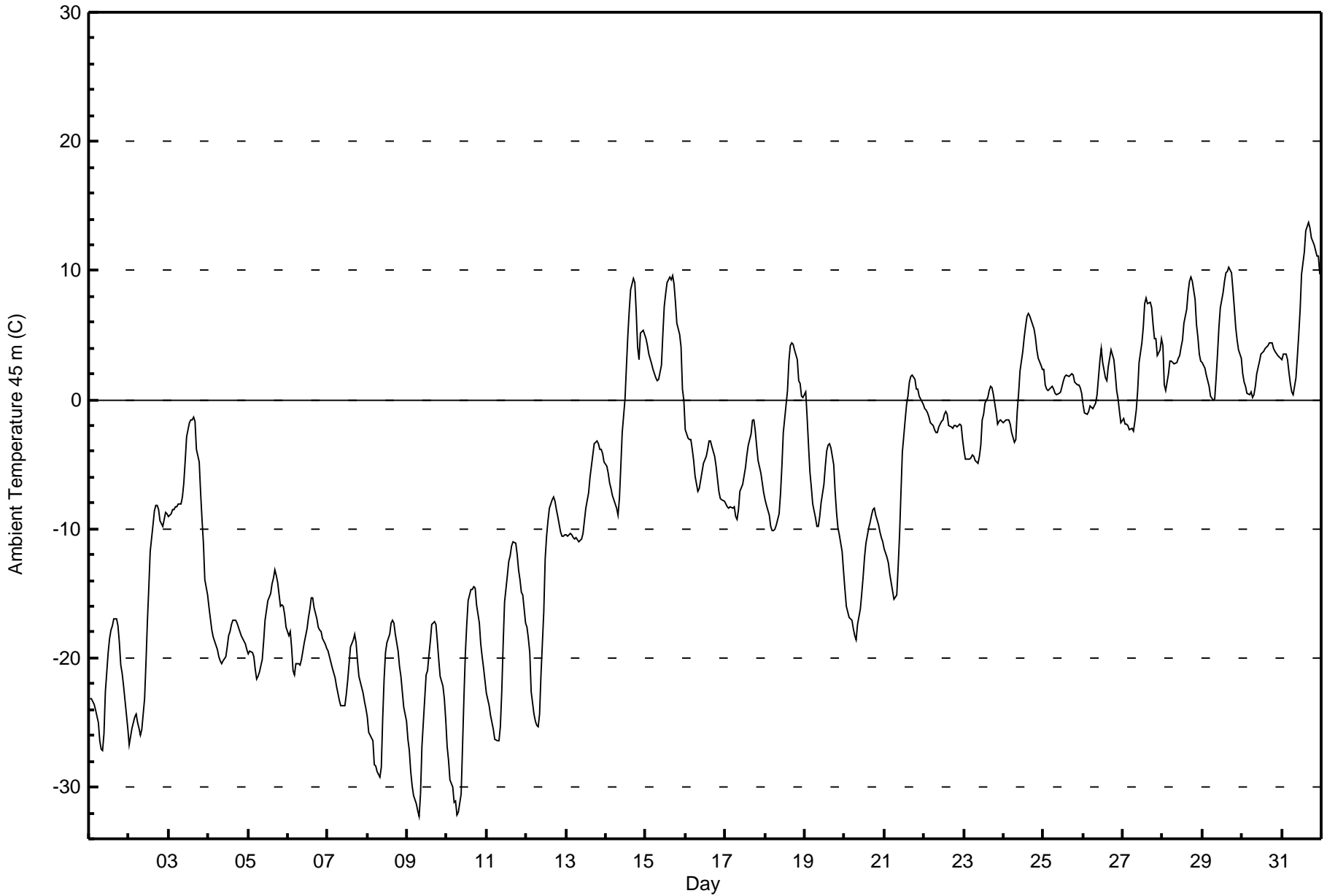


Maximum Value: 13.7 C on Mar 31 17:00 Maximum Daily Average: 7.4 C on Mar 31																						Hours in Service: 744 Hours of Data: 744				
Minimum Value: -32.3 C on Mar 9 08:00 Minimum Daily Average: -24.2 C on Mar 9 Maximum Diurnal Average: -3.2 C at hour 17 Minimum Diurnal Average: -12.5 C at hour 8 Monthly Average: -7.92 C Percentiles: P ₁ = -30.7 P ₁₀ = -23.2 Q ₁ = -17.5 Median = -6.8 Q ₃ = 1.0 P ₉₀ = 4.5 P ₉₉ = 11.1																						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-Mar	-23.2	-23.2	-23.3	-23.6	-24.0	-25.0	-26.4	-27.0	-27.2	-25.8	-22.6	-19.6	-18.5	-17.8	-17.5	-16.9	-17.0	-17.5	-18.8	-20.5	-21.3	-22.2	-24.4	-25.4	-22.0	-16.9
2-Mar	-26.8	-26.1	-25.5	-24.6	-24.4	-25.0	-25.4	-25.9	-25.5	-23.2	-20.3	-17.2	-14.5	-11.7	-9.7	-8.6	-8.2	-8.2	-8.5	-9.4	-9.8	-9.2	-8.7	-8.8	-16.9	-8.2
3-Mar	-9.1	-8.8	-8.6	-8.5	-8.3	-8.3	-8.1	-8.0	-7.5	-6.5	-4.7	-2.9	-1.8	-1.6	-1.6	-1.3	-1.6	-3.8	-4.8	-7.2	-9.3	-11.2	-13.9	-15.1	-6.8	-1.3
4-Mar	-16.1	-17.0	-17.8	-18.4	-18.7	-19.4	-19.9	-20.3	-20.4	-20.2	-19.9	-19.2	-18.3	-17.9	-17.4	-17.1	-17.0	-17.2	-17.6	-18.0	-18.3	-18.7	-19.0	-19.4	-18.5	-16.1
5-Mar	-19.6	-19.5	-19.6	-19.9	-20.9	-21.6	-21.4	-21.1	-20.1	-18.7	-17.1	-16.4	-15.6	-15.0	-14.3	-13.9	-13.2	-13.6	-14.1	-15.9	-15.9	-16.0	-16.7	-17.6	-17.4	-13.2
6-Mar	-18.2	-17.9	-19.2	-21.0	-21.3	-20.5	-20.4	-20.5	-20.1	-19.5	-18.8	-17.7	-16.9	-16.2	-15.3	-15.3	-16.1	-16.9	-17.6	-17.9	-18.0	-18.5	-19.0	-19.3	-18.4	-15.3
7-Mar	-19.4	-19.9	-20.4	-20.8	-21.5	-22.2	-22.7	-23.3	-23.7	-23.7	-22.8	-21.8	-20.4	-19.1	-18.5	-18.1	-18.9	-20.2	-21.4	-22.3	-22.8	-23.3	-23.9	-23.9	-21.4	-18.1
8-Mar	-24.6	-25.7	-26.2	-26.4	-28.3	-28.4	-28.8	-29.2	-28.5	-24.7	-21.7	-19.6	-18.8	-18.1	-17.3	-17.1	-17.3	-18.2	-19.5	-20.7	-21.5	-22.6	-23.8	-24.9	-23.0	-17.1
9-Mar	-26.3	-27.1	-28.8	-29.9	-30.7	-31.3	-31.8	-32.3	-30.6	-26.8	-23.1	-21.3	-20.9	-19.8	-18.7	-17.4	-17.2	-17.4	-18.7	-20.1	-21.4	-22.2	-23.2	-24.8	-24.2	-17.2
10-Mar	-26.8	-27.9	-29.4	-30.0	-31.2	-31.1	-32.2	-31.9	-30.6	-26.9	-23.1	-19.7	-17.4	-15.6	-14.7	-14.6	-14.5	-14.6	-15.9	-17.3	-18.9	-19.9	-20.8	-21.7	-22.8	-14.5
11-Mar	-22.7	-23.7	-24.4	-25.0	-25.6	-26.3	-26.4	-26.4	-25.3	-22.6	-18.9	-15.7	-13.6	-12.5	-12.1	-11.3	-11.1	-11.1	-12.0	-13.2	-14.0	-14.9	-15.1	-17.3	-18.4	-11.1
12-Mar	-17.6	-18.5	-19.5	-22.6	-24.3	-24.9	-25.2	-25.3	-24.3	-21.3	-16.5	-12.3	-10.6	-9.4	-8.4	-7.8	-7.5	-7.8	-8.5	-9.1	-10.2	-10.6	-10.6	-10.4	-15.1	-7.5
13-Mar	-10.5	-10.6	-10.4	-10.4	-10.7	-10.8	-10.7	-11.0	-10.9	-10.8	-10.4	-9.4	-8.4	-7.3	-6.0	-5.2	-4.3	-3.4	-3.2	-3.4	-3.8	-3.8	-4.2	-4.8	-7.7	-3.2
14-Mar	-5.1	-5.7	-6.4	-6.9	-7.4	-8.0	-8.4	-8.9	-7.6	-5.2	-2.6	0.0	2.6	4.9	6.9	8.5	9.4	9.0	6.7	4.1	3.1	5.2	5.4	5.0	-0.1	9.4
15-Mar	4.7	4.2	3.5	2.8	2.3	2.0	1.7	1.4	1.6	2.6	5.1	7.3	8.2	9.1	9.5	9.3	9.7	9.0	7.5	5.9	5.0	4.1	0.8	-0.1	4.9	9.7
16-Mar	-2.3	-3.0	-3.0	-3.1	-3.9	-4.7	-5.9	-7.1	-6.9	-6.2	-5.6	-5.0	-4.4	-3.9	-3.2	-3.2	-3.6	-4.4	-5.1	-6.1	-7.1	-7.7	-7.8	-7.9	-5.0	-2.3
17-Mar	-8.0	-8.3	-8.4	-8.3	-8.4	-8.3	-9.0	-9.3	-8.5	-7.1	-6.6	-5.9	-5.3	-4.3	-3.5	-2.7	-1.6	-1.6	-2.4	-3.7	-4.7	-5.7	-6.4	-7.2	-6.0	-1.6
18-Mar	-7.7	-8.2	-9.0	-9.8	-10.2	-10.2	-10.0	-9.7	-8.8	-7.3	-5.2	-2.6	-1.4	0.7	2.9	4.2	4.4	4.3	3.9	3.1	1.5	1.2	0.3	0.2	-3.1	4.4
19-Mar	0.6	-1.4	-3.5	-5.6	-6.8	-8.0	-9.2	-9.8	-9.8	-9.0	-8.0	-6.6	-5.1	-3.9	-3.5	-3.4	-3.7	-5.0	-7.1	-8.7	-9.9	-10.5	-11.8	-13.3	-6.8	0.6
20-Mar	-14.6	-16.0	-16.4	-16.9	-17.0	-17.7	-18.2	-18.6	-17.4	-16.2	-15.0	-13.8	-12.2	-11.2	-9.9	-9.4	-9.0	-8.5	-8.4	-9.0	-9.8	-10.2	-10.7	-11.0	-13.2	-8.4
21-Mar	-11.5	-12.2	-12.7	-13.5	-14.1	-14.8	-15.4	-15.1	-12.9	-10.4	-7.2	-4.1	-1.5	-0.3	0.2	1.4	1.8	1.9	1.6	0.8	0.8	0.2	0.1	-0.4	-5.7	1.9
22-Mar	-0.7	-0.8	-1.0	-1.3	-1.8	-2.0	-2.3	-2.5	-2.6	-2.1	-1.7	-1.6	-1.2	-1.0	-1.1	-2.0	-2.1	-2.2	-2.0	-2.0	-2.1	-1.9	-2.0	-3.1	-1.8	-0.7
23-Mar	-3.9	-4.6	-4.6	-4.6	-4.5	-4.3	-4.4	-4.7	-4.9	-4.4	-3.6	-1.6	-1.2	-0.3	0.1	0.7	1.1	0.9	0.4	-1.0	-1.9	-1.7	-1.5	-1.7	-2.3	1.1
24-Mar	-1.8	-1.5	-1.5	-1.5	-1.9	-2.6	-3.3	-3.1	-1.0	0.5	2.3	3.7	4.9	5.8	6.4	6.7	6.4	5.9	5.5	4.8	3.8	3.2	2.6	2.4	1.9	6.7
25-Mar	2.3	1.1	0.8	0.7	1.0	1.0	0.9	0.5	0.4	0.5	0.6	1.1	1.4	1.8	1.9	1.8	1.9	2.0	1.9	1.4	1.1	1.2	0.9	0.5	1.2	2.3
26-Mar	-0.3	-1.1	-1.1	-0.9	-0.5	-0.6	-0.7	-0.3	0.4	1.7	2.9	3.9	2.9	1.7	1.4	2.6	3.2	3.8	3.1	2.0	0.7	0.1	-1.0	-1.7	0.9	3.9
27-Mar	-1.4	-1.9	-1.9	-2.0	-2.3	-2.2	-2.5	-1.7	-0.8	0.7	2.9	4.4	5.6	7.4	7.8	7.4	7.5	7.1	5.8	4.7	4.7	3.4	3.8	4.8	2.6	7.8
28-Mar	4.2	1.1	0.8	2.1	3.0	3.0	2.9	2.8	2.9	3.2	3.5	4.0	4.6	5.9	7.0	8.3	9.1	9.5	9.1	7.8	5.8	4.8	3.5	3.0	4.7	9.5
29-Mar	2.9	2.4	1.9	1.5	1.0	0.3	-0.1	0.1	1.7	3.5	5.6	7.1	8.3	9.2	9.9	9.9	10.3	9.8	8.5	7.1	5.6	4.6	3.9	3.3	4.9	10.3
30-Mar	2.1	1.4	1.0	0.5	0.4	0.6	0.2	0.4	1.0	2.0	3.0	3.5	3.6	3.7	4.0	4.2	4.4	4.4	4.4	3.9	3.7	3.5	3.3	3.2	2.6	4.4
31-Mar	3.1	3.5	3.5	3.1	2.2	1.3	0.6	0.4	1.7	3.4	5.1	7.0	9.8	11.4	13.0	13.4	13.7	13.3	12.5	12.0	11.5	11.1	11.1	9.8	7.4	13.7
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	123	16.53	16.53
-20 - 0	396	53.23	69.76
0 - 10	214	28.76	98.52
10 - 20	11	1.48	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

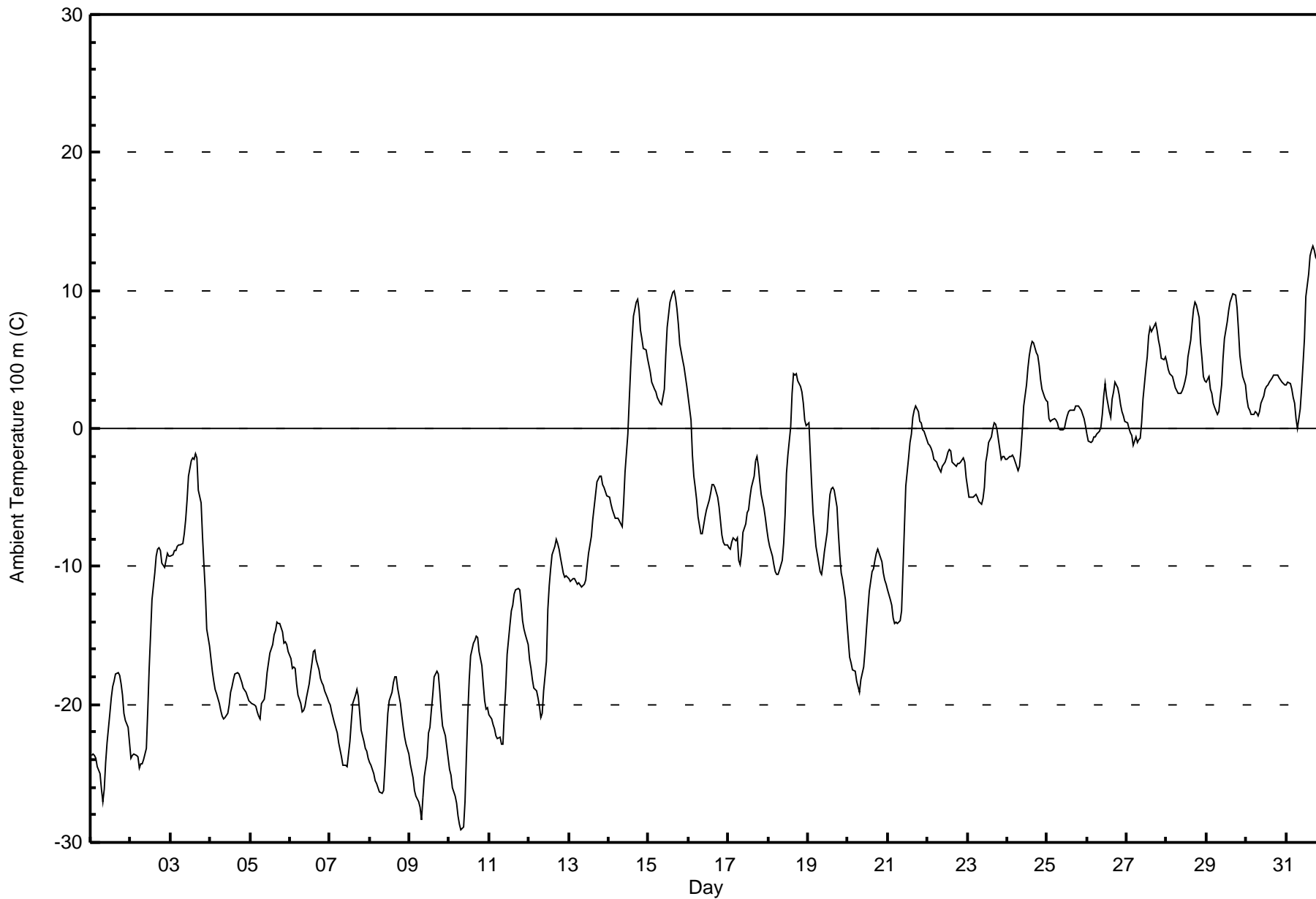


Maximum Value: 13.2 C on Mar 31 17:00 Maximum Daily Average: 7.2 C on Mar 31																						Hours in Service:	744			
Minimum Value: -29.1 C on Mar 10 08:00 Minimum Daily Average: -23.0 C on Mar 9																						Hours of Data:	744			
Maximum Diurnal Average: -3.8 C at hour 17 Minimum Diurnal Average: -11.9 C at hour 8																						Hours of Missing Data:	0			
Monthly Average: -7.88 C Percentiles: P ₁ = -27.1 P ₁₀ = -22.4 Q ₁ = -17.8 Median = -6.7 Q ₃ = 1.2 P ₉₀ = 4.5 P ₉₉ = 11.3																						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-Mar	-23.7	-23.6	-23.7	-23.9	-24.5	-25.0	-26.1	-27.0	-26.1	-24.2	-22.8	-20.7	-19.5	-18.7	-18.3	-17.7	-17.7	-17.9	-18.5	-19.4	-20.6	-21.2	-21.7	-22.7	-21.9	-17.7
2-Mar	-23.9	-23.7	-23.6	-23.7	-23.8	-24.6	-24.3	-24.3	-24.0	-23.2	-20.4	-17.4	-15.0	-12.4	-10.4	-9.2	-8.7	-8.6	-8.9	-9.7	-10.1	-9.5	-9.1	-9.2	-16.6	-8.6
3-Mar	-9.3	-9.1	-8.9	-8.8	-8.6	-8.5	-8.5	-8.3	-7.7	-6.6	-5.2	-3.5	-2.3	-2.2	-2.2	-1.9	-2.2	-4.5	-5.4	-7.8	-9.9	-11.8	-14.5	-15.7	-7.2	-1.9
4-Mar	-16.7	-17.6	-18.4	-18.9	-19.3	-19.9	-20.4	-20.8	-21.1	-20.9	-20.6	-20.0	-19.1	-18.7	-18.2	-17.8	-17.7	-17.8	-18.1	-18.4	-18.8	-19.1	-19.4	-19.7	-19.1	-16.7
5-Mar	-19.9	-19.9	-20.1	-20.2	-20.5	-20.9	-21.0	-20.0	-19.7	-18.8	-17.7	-17.0	-16.3	-15.7	-14.9	-14.6	-14.0	-14.1	-14.1	-14.7	-15.5	-15.5	-15.7	-16.1	-17.4	-14.0
6-Mar	-16.7	-17.4	-17.3	-17.4	-18.5	-19.3	-20.0	-20.5	-20.4	-20.1	-19.5	-18.5	-17.7	-17.0	-16.1	-16.1	-16.8	-17.5	-18.1	-18.4	-18.6	-19.1	-19.5	-19.8	-18.3	-16.1
7-Mar	-20.0	-20.5	-21.0	-21.4	-22.1	-22.8	-23.3	-23.8	-24.4	-24.4	-24.5	-23.6	-22.7	-21.3	-20.0	-19.4	-18.9	-19.5	-20.7	-21.8	-22.7	-23.1	-23.4	-23.9	-22.0	-18.9
8-Mar	-24.2	-24.4	-25.0	-25.5	-25.8	-26.1	-26.3	-26.4	-26.2	-24.5	-22.5	-20.6	-19.7	-19.1	-18.4	-18.0	-18.0	-18.8	-19.9	-20.8	-21.7	-22.4	-22.9	-23.6	-22.5	-18.0
9-Mar	-24.3	-24.8	-25.3	-26.3	-26.6	-27.1	-27.5	-28.4	-26.8	-25.2	-23.8	-22.1	-21.6	-20.4	-19.3	-18.0	-17.6	-17.8	-19.1	-20.4	-21.5	-22.3	-23.1	-23.9	-23.0	-17.6
10-Mar	-24.7	-25.1	-26.0	-26.7	-27.2	-28.1	-28.7	-29.1	-28.9	-27.0	-23.7	-20.7	-18.3	-16.5	-15.5	-15.4	-15.1	-15.1	-16.2	-17.2	-18.5	-19.7	-20.3	-20.3	-21.8	-15.1
11-Mar	-20.7	-21.0	-21.4	-21.7	-22.2	-22.4	-22.3	-22.9	-22.9	-20.7	-18.8	-16.4	-14.2	-13.3	-12.8	-12.0	-11.7	-11.5	-11.7	-12.7	-13.9	-14.5	-14.9	-15.6	-17.2	-11.5
12-Mar	-16.8	-17.4	-18.2	-18.9	-19.0	-19.5	-20.1	-20.9	-20.6	-19.0	-16.8	-13.1	-11.4	-10.2	-9.1	-8.5	-8.1	-8.3	-8.8	-9.3	-10.5	-10.7	-10.7	-10.8	-14.0	-8.1
13-Mar	-10.9	-11.0	-10.9	-10.9	-11.1	-11.3	-11.2	-11.5	-11.4	-11.3	-10.9	-10.0	-9.0	-7.8	-6.6	-5.7	-4.8	-3.9	-3.5	-3.5	-4.1	-4.3	-4.6	-4.8	-8.1	-3.5
14-Mar	-5.0	-5.5	-5.9	-6.2	-6.5	-6.5	-6.7	-6.9	-7.1	-5.4	-3.2	-0.5	2.1	4.4	6.4	8.2	9.2	9.3	8.6	7.1	6.5	5.8	5.7	5.1	0.5	9.3
15-Mar	4.5	4.1	3.3	2.8	2.6	2.2	2.0	1.8	1.7	2.9	5.3	7.3	8.3	9.2	9.9	10.0	9.5	8.6	7.5	6.1	4.9	4.4	3.7	3.0	5.2	10.0
16-Mar	2.3	0.6	-1.9	-3.4	-4.3	-5.2	-6.4	-7.7	-7.7	-7.0	-6.4	-5.9	-5.2	-4.7	-4.1	-4.0	-4.3	-5.0	-5.7	-6.7	-7.7	-8.3	-8.4	-8.5	-5.2	2.3
17-Mar	-8.6	-8.8	-8.3	-7.9	-8.2	-7.9	-9.5	-9.9	-9.0	-7.6	-6.9	-6.1	-5.9	-5.0	-4.2	-3.4	-2.3	-2.0	-2.8	-3.9	-4.8	-5.8	-6.5	-7.3	-6.4	-2.0
18-Mar	-8.0	-8.5	-9.3	-9.8	-10.4	-10.6	-10.5	-10.3	-9.6	-8.3	-6.3	-3.3	-2.0	0.1	2.6	4.0	3.9	4.0	3.5	3.1	2.7	1.8	0.6	0.2	-3.4	4.0
19-Mar	0.4	-1.9	-4.2	-6.2	-7.3	-8.6	-9.7	-10.4	-10.5	-9.9	-8.9	-7.5	-6.0	-4.8	-4.3	-4.2	-4.5	-5.7	-7.7	-9.2	-10.5	-11.0	-12.4	-13.9	-7.5	0.4
20-Mar	-15.3	-16.6	-17.0	-17.5	-17.6	-18.3	-18.7	-19.2	-18.2	-17.3	-16.1	-14.5	-13.1	-11.8	-10.3	-10.1	-9.5	-9.1	-8.7	-9.0	-9.6	-10.4	-10.9	-11.2	-13.8	-8.7
21-Mar	-11.7	-12.4	-12.8	-13.7	-14.1	-14.1	-14.1	-14.0	-13.2	-10.3	-7.2	-4.2	-2.2	-1.0	-0.4	0.8	1.4	1.6	1.2	0.5	0.4	-0.1	-0.2	-0.8	-5.9	1.6
22-Mar	-1.1	-1.2	-1.4	-1.8	-2.3	-2.5	-2.8	-3.0	-3.2	-2.7	-2.4	-2.1	-1.7	-1.6	-1.7	-2.4	-2.7	-2.7	-2.6	-2.5	-2.5	-2.2	-2.5	-3.5	-2.3	-1.1
23-Mar	-4.3	-5.0	-5.0	-4.9	-4.9	-4.8	-4.9	-5.3	-5.5	-5.1	-4.3	-2.5	-1.9	-1.0	-0.6	0.0	0.4	0.3	-0.1	-1.5	-2.2	-2.1	-2.0	-2.2	-2.9	0.4
24-Mar	-2.3	-2.0	-2.0	-1.9	-2.1	-2.4	-3.1	-2.8	-1.7	-0.1	1.6	3.2	4.3	5.3	5.9	6.3	6.2	5.5	5.3	4.5	3.5	2.8	2.2	2.0	1.6	6.3
25-Mar	1.9	0.8	0.5	0.6	0.7	0.6	0.4	0.0	-0.1	-0.1	0.0	0.5	0.9	1.2	1.4	1.3	1.3	1.6	1.6	1.7	1.4	1.0	0.7	0.2	0.8	1.9
26-Mar	-0.4	-0.9	-1.0	-1.0	-0.6	-0.6	-0.4	-0.2	0.1	1.1	2.4	3.2	2.4	1.2	0.8	2.1	2.6	3.4	3.0	2.4	1.7	1.3	0.9	0.5	1.0	3.4
27-Mar	0.4	0.0	-0.3	-0.5	-1.2	-0.6	-1.0	-0.8	-0.7	0.4	2.1	4.3	5.2	6.7	7.4	7.0	7.4	7.6	7.1	6.4	5.9	5.1	5.0	5.2	3.3	7.6
28-Mar	4.8	4.3	3.9	3.7	3.4	2.9	2.8	2.5	2.5	2.8	3.1	3.5	4.0	5.2	6.4	7.7	8.6	9.1	8.9	8.0	6.2	5.1	3.8	3.5	4.9	9.1
29-Mar	3.3	3.8	2.9	2.5	1.8	1.6	1.0	1.2	2.2	3.2	5.1	6.5	7.8	8.5	9.2	9.5	9.8	9.7	8.7	7.1	5.3	4.5	3.8	3.2	5.1	9.8
30-Mar	2.1	1.5	1.3	1.1	1.0	1.2	1.2	0.9	1.2	1.8	2.4	2.9	3.0	3.1	3.3	3.6	3.8	3.9	3.9	3.9	3.7	3.4	3.2	3.1	2.5	3.9
31-Mar	3.1	3.3	3.2	2.8	2.2	1.8	0.7	0.0	1.4	2.9	4.6	6.5	9.6	11.2	12.5	12.9	13.2	13.0	12.4	12.0	11.6	11.2	11.1	10.0	7.2	13.2
																						Diurnal Average				
																						Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	122	16.40	16.40
-20 - 0	398	53.49	69.89
0 - 10	213	28.63	98.52
10 - 20	11	1.48	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

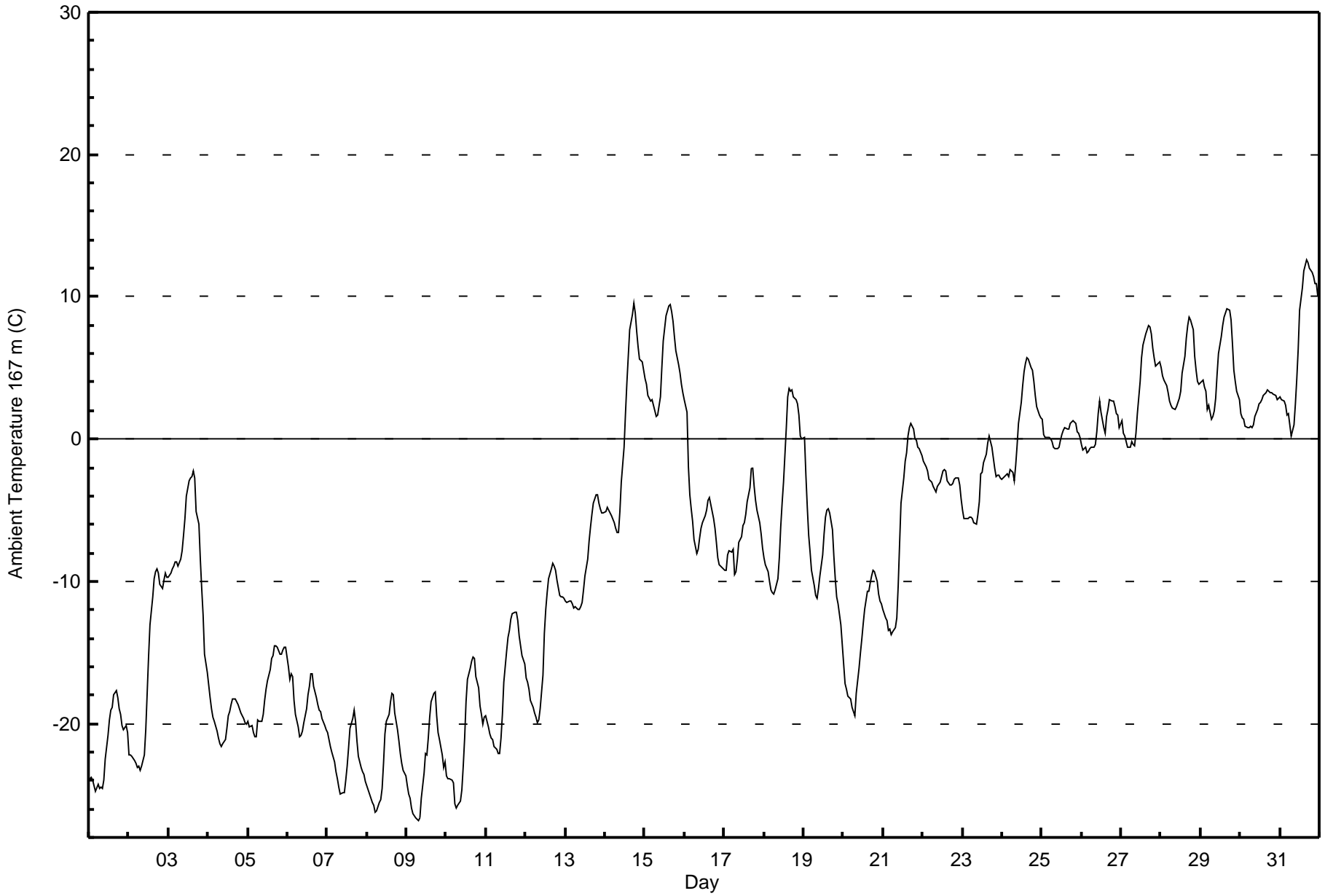


Maximum Value: 12.6 C on Mar 31 17:00 Maximum Daily Average: 6.9 C on Mar 31																						Hours in Service: 744 Hours of Data: 744				
Minimum Value: -26.8 C on Mar 9 08:00 Minimum Daily Average: -22.9 C on Mar 9 Maximum Diurnal Average: -4.2 C at hour 17 Minimum Diurnal Average: -11.6 C at hour 8 Monthly Average: -8.05 C Percentiles: P ₁ = -26.0 P ₁₀ = -22.2 Q ₁ = -18.2 Median = -6.9 Q ₃ = 0.8 P ₉₀ = 4.5 P ₉₉ = 11.1																						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-Mar	-23.8	-23.8	-24.0	-24.3	-24.7	-24.2	-24.6	-24.5	-24.6	-24.0	-22.4	-20.8	-19.7	-19.1	-18.9	-17.9	-17.7	-18.2	-19.0	-19.4	-20.1	-20.4	-20.1	-20.6	-21.5	-17.7
2-Mar	-22.2	-22.2	-22.3	-22.6	-22.8	-23.1	-22.9	-23.3	-23.0	-22.2	-20.4	-17.8	-15.3	-13.1	-11.1	-9.8	-9.4	-9.2	-9.4	-10.2	-10.5	-9.9	-9.4	-9.7	-16.3	-9.2
3-Mar	-9.7	-9.5	-9.1	-9.0	-8.7	-8.6	-8.9	-8.4	-7.8	-6.8	-5.6	-4.0	-2.9	-2.8	-2.7	-2.3	-2.7	-5.1	-6.0	-8.5	-10.5	-12.4	-15.1	-16.4	-7.6	-2.3
4-Mar	-17.3	-18.2	-19.0	-19.6	-19.9	-20.6	-21.1	-21.4	-21.6	-21.4	-20.4	-19.5	-19.1	-18.6	-18.3	-18.2	-18.4	-18.7	-18.9	-19.3	-19.7	-20.0	-20.1	-19.6	-17.3	-17.3
5-Mar	-19.9	-20.2	-20.2	-20.6	-20.9	-20.9	-19.8	-19.8	-19.9	-19.3	-18.3	-17.6	-16.9	-16.2	-15.5	-15.2	-14.6	-14.5	-14.6	-15.1	-15.2	-14.9	-14.6	-14.7	-17.5	-14.5
6-Mar	-16.0	-16.9	-16.5	-16.7	-18.3	-19.4	-20.2	-20.9	-20.9	-20.5	-20.0	-19.0	-18.0	-17.4	-16.5	-16.5	-17.3	-18.1	-18.7	-19.0	-19.2	-19.7	-20.1	-20.4	-18.6	-16.0
7-Mar	-20.6	-21.1	-21.6	-22.0	-22.7	-23.4	-23.9	-24.4	-24.9	-24.9	-24.8	-24.0	-23.0	-21.7	-20.4	-19.7	-19.0	-19.8	-21.2	-22.3	-23.0	-23.4	-23.6	-24.1	-22.5	-19.0
8-Mar	-24.4	-24.6	-25.2	-25.5	-25.7	-26.2	-26.2	-25.6	-25.3	-24.5	-22.8	-20.7	-19.8	-19.3	-18.5	-17.9	-18.0	-19.3	-20.4	-21.2	-22.1	-22.8	-23.3	-23.7	-22.6	-17.9
9-Mar	-24.3	-24.9	-25.3	-26.0	-26.4	-26.6	-26.7	-26.8	-26.7	-25.2	-23.4	-22.1	-22.2	-21.0	-19.5	-18.5	-17.9	-17.8	-19.5	-20.6	-21.1	-22.2	-23.1	-22.7	-22.9	-17.8
10-Mar	-23.7	-23.9	-23.9	-24.0	-24.2	-25.6	-25.9	-25.8	-25.4	-24.6	-23.0	-21.0	-18.4	-16.9	-16.1	-15.6	-15.3	-15.5	-16.7	-17.5	-18.8	-19.4	-20.0	-19.6	-20.9	-15.3
11-Mar	-19.4	-20.2	-20.7	-21.1	-21.2	-21.6	-21.8	-22.1	-22.1	-21.0	-19.4	-17.1	-14.9	-13.9	-13.4	-12.7	-12.3	-12.1	-12.2	-12.8	-13.8	-14.5	-15.2	-15.8	-17.1	-12.1
12-Mar	-16.8	-17.1	-17.6	-18.3	-18.9	-19.2	-19.5	-19.9	-19.8	-19.0	-16.6	-13.6	-12.0	-10.8	-9.8	-9.2	-8.7	-8.9	-9.3	-9.9	-11.0	-11.1	-11.1	-11.2	-14.1	-8.7
13-Mar	-11.3	-11.5	-11.4	-11.4	-11.6	-11.8	-11.8	-12.0	-11.9	-11.8	-11.5	-10.6	-9.6	-8.5	-7.2	-6.2	-5.3	-4.5	-4.0	-3.9	-4.5	-4.9	-5.2	-5.2	-8.6	-3.9
14-Mar	-5.1	-4.8	-5.0	-5.1	-5.4	-5.8	-6.3	-6.5	-6.6	-5.0	-3.0	-0.6	1.7	4.0	5.8	7.7	8.7	9.6	8.9	7.6	6.5	5.6	5.4	4.8	0.7	9.6
15-Mar	4.3	3.9	3.0	2.7	2.8	2.4	2.0	1.6	1.7	3.0	5.1	6.9	7.8	8.7	9.4	9.4	9.0	8.3	7.2	6.2	5.2	4.7	3.8	3.3	5.1	9.4
16-Mar	2.8	1.9	-2.0	-4.0	-4.9	-5.8	-7.1	-8.0	-7.8	-6.9	-6.3	-5.9	-5.4	-5.0	-4.3	-4.1	-4.6	-5.6	-6.3	-7.3	-8.3	-8.9	-9.0	-9.1	-5.5	2.8
17-Mar	-9.2	-9.3	-8.1	-7.9	-8.0	-7.8	-9.5	-9.4	-8.5	-7.3	-6.8	-6.0	-5.9	-5.3	-4.4	-3.4	-2.1	-2.0	-3.3	-4.3	-5.0	-5.9	-6.6	-7.6	-6.4	-2.0
18-Mar	-8.3	-8.8	-9.4	-10.0	-10.6	-10.8	-10.9	-10.6	-9.8	-8.4	-6.2	-4.5	-3.0	0.8	2.9	3.5	3.3	3.4	3.0	2.7	2.4	1.6	0.2	0.0	-3.6	3.5
19-Mar	0.1	-2.6	-4.8	-6.8	-7.9	-9.2	-10.3	-11.0	-11.2	-10.5	-9.6	-8.1	-6.7	-5.5	-5.0	-4.9	-5.2	-6.4	-8.3	-9.8	-11.1	-11.6	-13.0	-14.5	-8.1	0.1
20-Mar	-15.8	-17.2	-17.6	-18.1	-18.2	-18.8	-19.1	-19.4	-17.9	-16.1	-15.0	-14.1	-13.0	-11.9	-10.7	-10.7	-10.1	-9.7	-9.2	-9.3	-10.0	-10.9	-11.4	-11.6	-14.0	-9.2
21-Mar	-12.0	-12.6	-12.8	-13.4	-13.3	-13.8	-13.5	-13.2	-12.5	-10.3	-7.4	-4.5	-2.7	-1.6	-1.0	0.2	0.8	1.1	0.7	0.0	-0.1	-0.6	-0.6	-1.2	-6.0	1.1
22-Mar	-1.6	-1.7	-1.9	-2.3	-2.8	-3.0	-3.3	-3.6	-3.8	-3.3	-3.0	-2.7	-2.2	-2.1	-2.3	-3.0	-3.2	-3.2	-3.1	-2.9	-2.8	-2.7	-3.2	-4.2	-2.8	-1.6
23-Mar	-5.0	-5.6	-5.6	-5.6	-5.5	-5.5	-5.6	-5.9	-5.9	-5.3	-4.4	-2.4	-2.3	-1.7	-1.1	-0.2	0.2	-0.1	-0.6	-2.0	-2.6	-2.5	-2.5	-2.8	-3.4	0.2
24-Mar	-2.8	-2.6	-2.6	-2.5	-2.6	-2.2	-2.3	-2.9	-1.9	-0.5	1.1	2.6	3.8	4.7	5.4	5.7	5.7	5.0	4.8	4.0	3.0	2.3	1.7	1.5	1.2	5.7
25-Mar	1.4	0.3	0.1	0.1	0.2	0.0	-0.2	-0.6	-0.7	-0.7	-0.6	-0.1	0.3	0.6	0.8	0.7	0.7	1.1	1.2	1.3	1.1	0.6	0.4	0.2	0.3	1.4
26-Mar	-0.4	-0.7	-0.6	-1.0	-0.9	-0.7	-0.5	-0.6	-0.4	0.5	1.8	2.7	1.9	0.8	0.4	1.6	2.1	2.8	2.6	2.6	2.3	1.8	1.7	0.8	0.9	2.8
27-Mar	1.3	0.4	0.2	-0.2	-0.6	-0.5	-0.1	-0.3	-0.4	0.4	1.7	4.1	5.7	6.6	7.0	7.4	8.0	7.9	7.4	6.4	5.7	5.2	5.3	5.5	3.5	8.0
28-Mar	5.0	4.5	4.1	3.8	3.2	2.6	2.4	2.1	2.1	2.3	2.6	2.8	3.4	4.6	5.8	7.1	8.0	8.6	8.4	7.7	5.8	4.8	4.0	3.9	4.6	8.6
29-Mar	3.9	4.2	3.7	3.3	2.1	2.3	1.4	1.5	2.0	2.8	4.6	6.0	7.2	8.0	8.6	8.9	9.2	9.1	8.3	6.7	4.8	4.0	3.4	2.7	4.9	9.2
30-Mar	1.8	1.5	1.4	0.9	0.8	0.8	0.9	0.8	1.0	1.6	2.1	2.5	2.6	2.7	3.0	3.3	3.4	3.3	3.3	3.3	3.2	3.1	2.8	2.8	2.2	3.4
31-Mar	2.9	2.7	2.6	2.4	1.7	1.8	1.0	0.2	1.0	2.5	4.3	6.3	9.1	10.7	11.8	12.2	12.6	12.4	12.0	11.7	11.4	10.9	10.9	10.1	6.9	12.6
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	125	16.80	16.80
-20 - 0	402	54.03	70.83
0 - 10	206	27.69	98.52
10 - 20	11	1.48	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



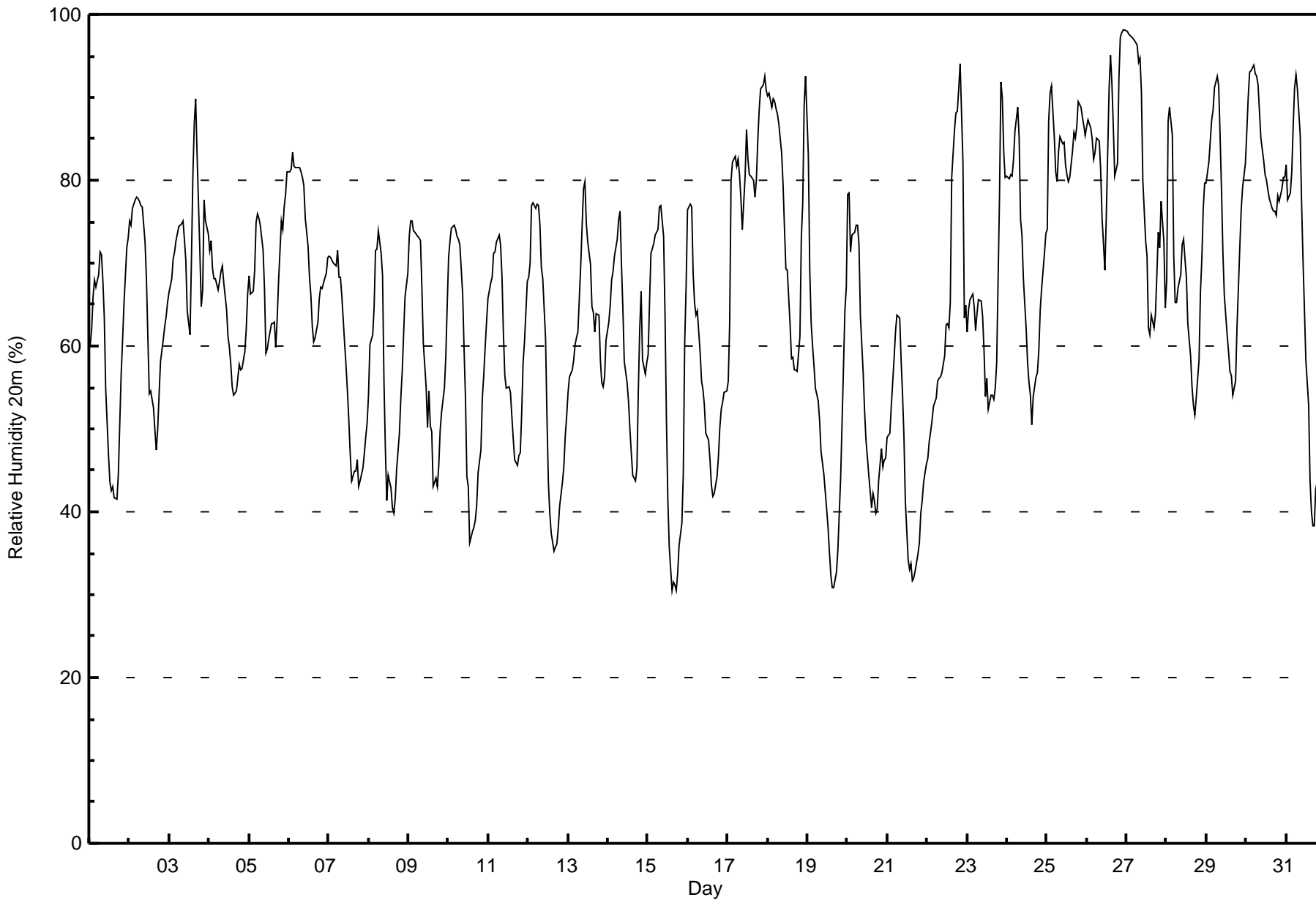
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 20m (RH20m) - %

Lower Camp Met Tower - March 2017

Maximum Value: 98 % on Mar 27 00:00 Maximum Daily Average: 86.1 % on Mar 26																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 31 % on Mar 15 18:00 Minimum Daily Average: 45.7 % on Mar 21 Maximum Diurnal Average: 75.4 % at hour 7 Minimum Diurnal Average: 54.0 % at hour 17 Monthly Average: 65.5 % Percentiles: P ₁ = 32 P ₁₀ = 44 Q ₁ = 54 Median = 66 Q ₃ = 77 P ₉₀ = 86 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-Mar	60	62	66	68	67	69	71	71	68	63	55	47	43	42	43	42	41	45	51	57	61	65	72	73	58.4	73
2-Mar	75	75	77	78	78	78	77	77	77	73	68	61	54	55	53	50	47	50	54	58	61	62	64	65	65.2	78
3-Mar	66	68	70	71	73	74	74	75	75	73	70	64	61	70	80	87	90	83	71	65	67	78	75	74	73.2	90
4-Mar	72	73	69	68	68	67	68	69	70	68	64	61	60	58	55	54	55	56	58	57	57	59	62	66	63.1	73
5-Mar	69	66	67	69	75	76	75	75	72	67	59	60	61	63	63	63	60	63	68	75	74	77	78	81	68.9	81
6-Mar	81	81	83	82	82	82	81	81	80	79	75	72	68	66	62	61	61	63	66	67	67	68	69	71	72.9	83
7-Mar	71	71	70	70	70	71	68	68	66	60	58	55	51	47	44	45	45	46	43	44	45	47	49	51	56.4	71
8-Mar	54	60	61	65	72	72	74	71	68	56	48	41	44	43	40	40	41	45	49	54	57	62	66	69	56.4	74
9-Mar	73	75	75	74	74	73	73	73	67	60	55	50	55	50	50	43	44	43	46	50	52	55	59	65	59.7	75
10-Mar	71	73	74	75	74	73	73	72	66	60	54	44	43	36	38	38	39	41	45	47	54	56	60	63	57.0	75
11-Mar	66	68	68	71	71	73	73	72	68	62	56	55	55	54	52	49	46	46	47	47	52	58	61	68	59.9	73
12-Mar	68	70	77	77	77	77	77	75	70	68	61	51	44	40	37	35	36	36	38	41	44	45	49	52	56.0	77
13-Mar	54	56	57	58	60	61	62	70	74	79	80	75	72	70	65	64	62	64	64	58	56	55	56	61	63.9	80
14-Mar	63	65	68	69	71	73	75	76	70	65	58	56	53	50	47	44	44	45	55	62	67	58	57	58	60.3	76
15-Mar	59	65	71	72	73	74	74	77	77	73	64	51	41	36	31	31	31	31	33	36	39	45	60	67	54.6	77
16-Mar	76	77	77	69	65	64	64	59	56	55	53	49	49	46	43	42	42	44	47	50	52	53	54	55	55.9	77
17-Mar	56	63	80	82	83	82	83	81	78	74	81	86	83	81	81	80	78	80	85	88	91	91	93	91	81.2	93
18-Mar	90	90	89	90	90	89	88	87	83	80	74	69	69	63	59	59	57	57	57	61	73	77	89	93	76.3	93
19-Mar	83	69	63	60	58	55	53	51	47	46	45	40	38	35	32	31	31	33	35	40	44	51	64	67	48.8	83
20-Mar	78	79	71	73	74	75	75	72	64	57	52	49	47	44	40	42	41	40	40	44	48	45	46	46	55.9	79
21-Mar	49	50	53	56	58	62	64	63	58	54	49	41	34	33	34	32	32	33	35	36	40	41	44	46	45.7	64
22-Mar	46	49	50	51	53	54	56	56	56	57	59	63	63	62	65	80	86	88	88	91	94	82	63	65	65.7	94
23-Mar	62	64	66	66	65	62	64	66	65	64	60	54	56	52	54	54	55	58	78	92	90	84	80	80	65.1	92
24-Mar	81	80	81	81	83	86	89	85	75	73	68	62	58	56	54	51	54	56	57	60	64	67	71	74	69.3	89
25-Mar	74	87	91	91	85	81	80	83	85	84	85	82	81	80	80	84	86	85	86	90	89	88	87	86	84.5	91
26-Mar	87	87	86	85	83	83	85	85	81	75	72	69	76	91	95	92	87	81	82	92	97	98	98	98	86.1	98
27-Mar	98	98	97	97	97	97	96	94	95	91	80	73	71	62	61	64	62	64	69	74	72	77	72	65	80.2	98
28-Mar	68	87	89	85	71	65	65	67	69	72	73	71	68	63	59	55	53	52	54	58	67	71	77	80	68.2	89
29-Mar	80	82	85	87	88	91	93	91	85	79	71	66	61	59	57	56	54	56	62	67	72	77	79	82	74.2	93
30-Mar	86	90	93	93	94	93	93	92	88	85	82	81	80	79	78	77	76	76	76	78	78	79	80	80	83.6	94
31-Mar	82	78	78	81	87	91	93	91	86	77	70	64	58	53	44	40	38	38	43	44	45	44	44	55	63.5	93
	70.9	72.8	74.3	74.7	74.7	74.8	75.4	75.0	72.3	68.6	64.5	60.1	58.0	56.1	54.7	54.3	54.0	54.7	56.8	60.3	63.5	65.2	67.1	69.2	Diurnal Average	
	98	98	97	97	97	97	96	94	95	91	85	86	83	91	95	92	90	88	88	92	97	98	98	98	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	39	5.24	5.24
40 - 60	232	31.18	36.42
60 - 80	327	43.95	80.38
80 - 100	146	19.62	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) - %

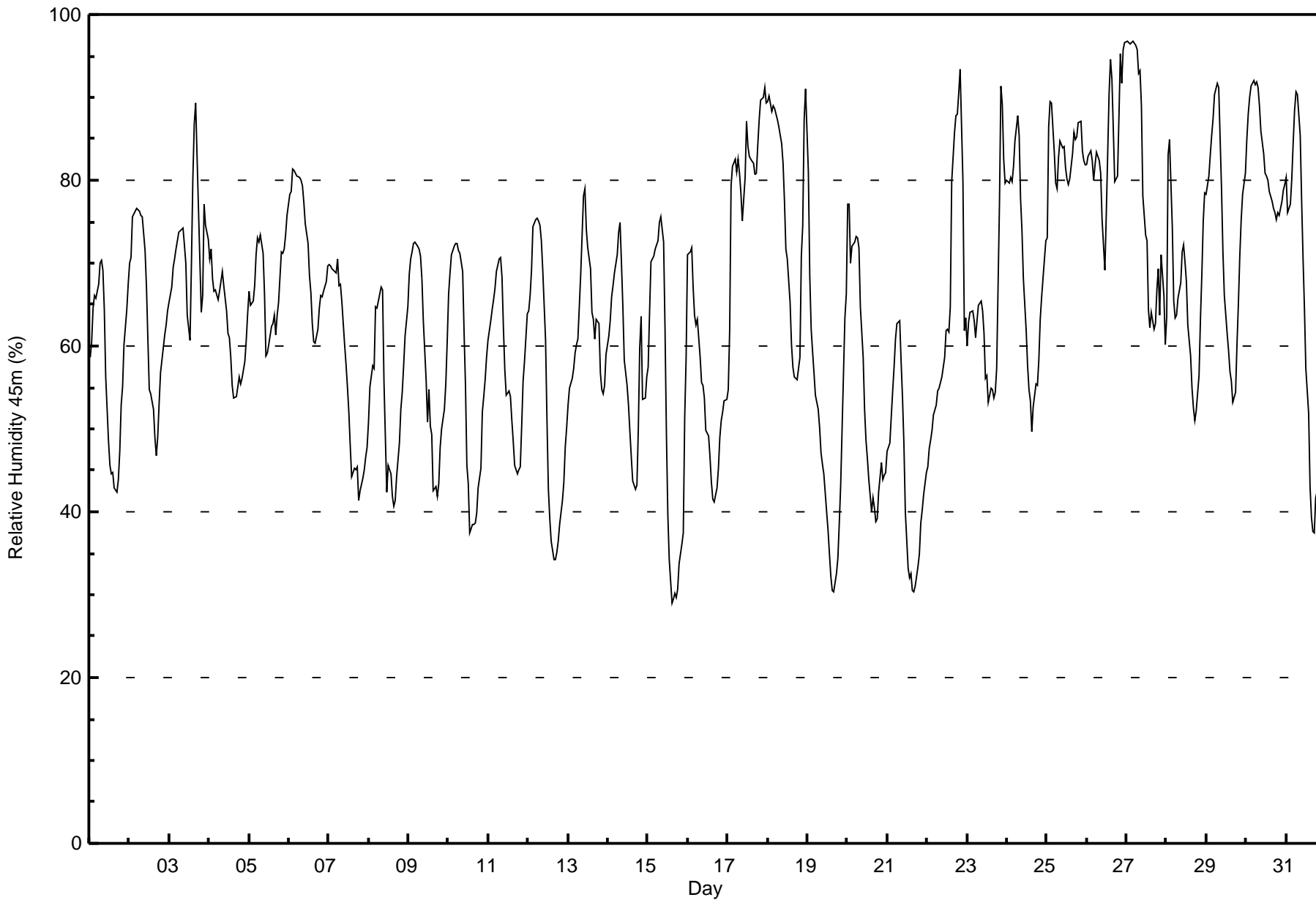
Lower Camp Met Tower - March 2017

Maximum Value: 97 % on Mar 27 01:00 Maximum Daily Average: 84.3 % on Mar 26																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 29 % on Mar 15 15:00 Minimum Daily Average: 44.6 % on Mar 21 Maximum Diurnal Average: 74.0 % at hour 8 Minimum Diurnal Average: 53.6 % at hour 17 Monthly Average: 64.3 % Percentiles: P ₁ = 30 P ₁₀ = 43 Q ₁ = 54 Median = 65 Q ₃ = 76 P ₉₀ = 85 P ₉₉ = 96																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	59	60	65	66	66	67	70	70	69	64	56	48	46	45	45	43	42	44	47	53	55	60	64	68	57.2	70
2-Mar	70	71	76	76	77	76	76	76	76	72	67	61	55	54	52	49	47	49	53	57	60	61	63	64	64.0	77
3-Mar	65	67	69	71	72	73	74	74	74	72	70	64	61	70	80	87	89	83	70	64	66	77	74	73	72.5	89
4-Mar	70	72	68	67	67	66	67	68	69	67	64	62	61	59	55	54	54	55	56	55	56	58	61	64	62.3	72
5-Mar	67	65	65	67	71	73	72	73	71	66	59	59	60	62	63	64	61	64	65	71	71	72	73	76	67.2	76
6-Mar	78	79	81	81	81	80	80	80	79	77	75	72	69	66	63	60	60	62	65	66	66	67	68	70	71.9	81
7-Mar	70	70	69	69	69	71	67	67	65	60	58	55	52	48	44	45	45	45	41	42	44	45	47	48	55.8	71
8-Mar	51	55	58	57	65	65	65	67	67	56	49	42	46	44	42	41	41	44	48	52	54	58	61	65	53.9	67
9-Mar	69	70	71	72	72	72	72	71	68	63	56	51	55	50	49	43	43	42	43	48	50	52	55	61	58.3	72
10-Mar	66	69	71	72	72	72	72	71	69	62	55	46	43	37	38	39	39	40	43	45	52	54	56	59	55.9	72
11-Mar	61	63	64	66	67	69	71	71	68	62	57	54	55	54	51	48	46	45	45	45	50	56	58	64	57.9	71
12-Mar	64	66	69	74	75	75	75	75	73	69	61	51	43	39	37	34	34	35	37	39	41	44	48	50	54.5	75
13-Mar	53	55	56	57	59	60	61	69	73	78	79	74	72	69	64	63	61	63	63	57	55	54	55	59	62.9	79
14-Mar	61	63	66	67	69	71	74	75	70	65	58	55	53	50	47	44	43	43	50	60	64	53	54	56	58.7	75
15-Mar	58	64	70	71	72	72	73	75	76	73	62	49	40	34	29	29	30	30	31	34	36	38	51	59	52.3	76
16-Mar	71	71	72	67	64	63	63	59	56	55	54	50	49	47	44	42	41	43	45	49	51	52	53	54	54.7	72
17-Mar	55	62	79	82	82	81	82	81	79	75	80	87	84	83	82	82	81	81	84	87	90	90	91	89	81.2	91
18-Mar	90	90	88	89	89	88	87	87	84	82	77	72	71	65	60	58	56	56	56	59	71	75	87	91	76.1	91
19-Mar	81	68	62	59	57	54	52	50	47	46	45	40	38	35	32	30	30	32	34	39	43	50	63	66	48.2	81
20-Mar	77	77	70	72	73	73	73	72	65	59	52	49	46	44	40	42	40	39	39	42	46	44	44	45	55.1	77
21-Mar	47	48	52	55	57	61	63	63	58	54	48	40	33	32	33	30	30	31	33	35	39	40	42	45	44.6	63
22-Mar	45	48	49	50	52	53	55	55	56	56	59	62	62	62	65	80	86	88	88	91	93	80	62	63	64.9	93
23-Mar	60	63	64	64	63	61	63	65	65	64	61	56	56	53	55	55	54	54	57	77	91	89	83	80	64.8	91
24-Mar	80	80	80	80	82	85	88	85	78	74	68	62	58	55	53	50	53	55	55	58	63	66	70	73	68.8	88
25-Mar	73	86	89	89	83	80	79	83	85	84	84	82	80	80	80	83	86	85	85	87	87	84	82	82	83.3	89
26-Mar	82	83	84	82	80	82	83	82	81	75	72	69	76	91	95	92	86	80	81	88	95	92	96	97	84.3	97
27-Mar	97	97	96	97	97	96	96	93	93	89	78	73	73	64	62	64	62	63	67	69	64	71	66	60	78.6	97
28-Mar	64	83	85	74	65	63	64	66	68	71	72	70	68	63	59	55	53	51	52	56	63	69	75	78	66.1	85
29-Mar	78	80	83	85	87	90	92	91	85	79	71	66	62	59	57	56	53	54	60	65	71	75	78	81	73.4	92
30-Mar	85	88	90	91	92	91	92	91	89	86	83	81	80	80	79	77	77	76	75	76	76	77	79	79	83.0	92
31-Mar	80	76	77	80	85	88	91	90	85	78	71	65	57	52	43	39	38	37	42	43	44	43	42	54	62.5	91
																		68.6						Diurnal Average		
																		97						Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	44	5.91	5.91
40 - 60	238	31.99	37.90
60 - 80	328	44.09	81.99
80 - 100	134	18.01	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 100m (RH100m) - %

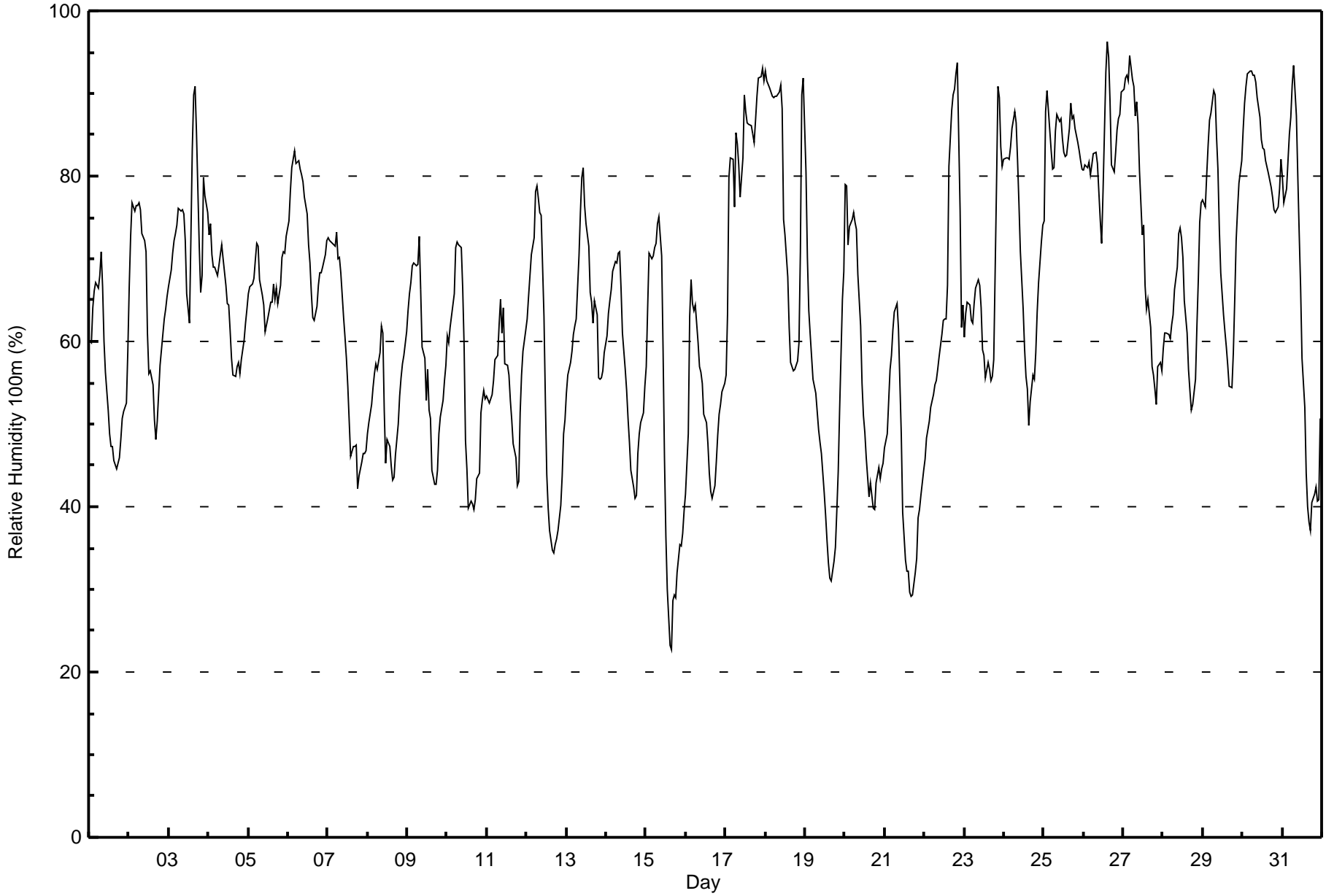
Lower Camp Met Tower - March 2017

Maximum Value: 96 % on Mar 26 15:00																			Maximum Daily Average: 84.7 % on Mar 30						Hours in Service: 744																								
Minimum Value: 23 % on Mar 15 16:00																			Minimum Daily Average: 44.7 % on Mar 21						Hours of Data: 744																								
Maximum Diurnal Average: 74.1 % at hour 8																			Minimum Diurnal Average: 54.7 % at hour 18						Hours of Missing Data: 0																								
Monthly Average: 64.4 %																			Percentiles: P ₁ = 30 P ₁₀ = 43 Q ₁ = 53 Median = 64 Q ₃ = 76 P ₉₀ = 87 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-Mar	60	60	64	66	67	67	68	71	67	60	56	52	49	47	47	46	45	45	46	48	51	52	53	59	56.0	71																							
2-Mar	67	73	77	76	76	76	77	76	73	72	71	61	56	57	55	50	48	50	54	57	61	63	64	65	64.8	77																							
3-Mar	67	69	71	72	73	74	76	76	76	75	72	66	62	72	83	90	91	85	71	66	68	80	78	76	74.5	91																							
4-Mar	73	74	70	69	69	68	69	71	72	70	67	65	64	61	58	56	56	57	57	56	58	60	62	64	64.4	74																							
5-Mar	66	67	67	68	70	72	71	67	66	64	61	62	63	65	65	67	65	66	65	67	70	71	71	73	67.0	73																							
6-Mar	75	78	81	82	83	82	82	81	80	79	78	75	72	70	66	63	63	64	67	68	68	69	70	72	73.6	83																							
7-Mar	73	72	72	72	71	73	70	70	68	63	61	58	55	50	46	47	47	48	42	44	45	46	47	47	57.8	73																							
8-Mar	49	50	52	54	56	57	57	59	62	61	52	45	48	47	45	43	44	46	50	53	56	57	58	61	52.7	62																							
9-Mar	64	66	67	69	70	69	69	73	66	59	58	53	57	52	51	44	43	43	44	49	51	53	55	57	57.5	73																							
10-Mar	61	60	62	64	66	71	72	72	71	66	60	48	45	40	41	40	40	41	43	44	51	53	54	53	54.9	72																							
11-Mar	53	53	53	54	55	58	58	62	65	61	64	57	57	56	53	51	48	46	42	43	51	56	59	61	54.8	65																							
12-Mar	63	65	68	71	72	78	79	77	76	75	63	53	44	40	37	35	34	35	36	37	40	44	49	51	55.1	79																							
13-Mar	54	56	57	59	61	62	63	70	76	80	81	76	74	71	66	65	62	65	63	56	55	56	59	59	64.3	81																							
14-Mar	61	63	65	66	69	70	69	71	71	66	61	57	54	51	48	44	42	41	41	47	49	50	51	55	56.7	71																							
15-Mar	57	64	71	70	70	71	72	74	75	70	59	46	36	30	23	23	29	29	29	32	35	35	37	39	49.1	75																							
16-Mar	42	49	63	67	65	64	64	60	57	56	55	51	50	48	44	42	41	42	45	49	51	52	54	55	52.8	67																							
17-Mar	56	63	80	82	82	76	85	84	81	77	82	90	88	86	86	86	85	84	87	90	92	92	93	92	83.3	93																							
18-Mar	93	92	91	90	90	90	90	90	90	91	88	75	73	68	62	57	57	56	57	58	60	71	90	92	77.8	93																							
19-Mar	81	70	64	61	58	55	54	52	49	48	46	42	39	36	33	31	31	33	35	40	44	52	65	69	49.5	81																							
20-Mar	79	79	72	74	75	76	74	74	68	62	55	51	49	46	41	43	41	40	40	43	45	43	45	45	56.6	79																							
21-Mar	47	49	53	57	58	61	63	65	62	55	49	39	34	32	32	30	29	29	32	34	39	40	41	44	44.7	65																							
22-Mar	46	48	49	50	52	53	55	55	57	58	61	62	63	63	67	81	88	90	91	92	94	76	62	64	65.7	94																							
23-Mar	60	63	65	64	63	62	65	66	67	67	64	59	58	56	57	55	55	56	58	79	91	90	84	81	66.1	91																							
24-Mar	82	82	82	82	84	86	88	86	82	77	71	64	59	56	54	50	53	56	55	59	64	67	72	74	70.2	88																							
25-Mar	75	88	90	88	83	81	81	85	88	87	87	85	83	82	83	86	89	87	87	86	84	83	82	81	84.5	90																							
26-Mar	81	81	81	82	80	81	83	83	82	78	75	72	78	93	96	94	89	81	81	83	86	87	87	90	83.5	96																							
27-Mar	91	92	92	92	95	92	91	87	89	86	81	73	74	67	64	65	62	57	56	54	52	57	57	56	74.2	95																							
28-Mar	59	61	61	61	60	62	63	66	69	73	74	73	70	65	61	57	54	52	52	55	62	67	74	77	63.7	77																							
29-Mar	77	76	80	84	87	88	90	90	85	81	74	68	63	61	59	57	55	54	59	65	72	76	79	82	73.4	90																							
30-Mar	86	89	91	92	93	93	92	92	91	89	87	84	83	83	82	80	79	79	77	76	76	76	78	82	84.7	93																							
31-Mar	80	77	79	82	85	87	91	93	87	80	73	67	58	52	44	40	38	37	41	42	42	41	41	51	62.8	93																							
																								66.8	68.7	70.6	71.6	72.2	72.7	73.6	74.1	73.1	70.6	67.2	62.2	60.0	58.1	56.4	55.5	54.9	54.7	55.0	57.1	60.1	61.7	63.5	65.4	Diurnal Average	
																								93	92	92	92	95	93	92	93	91	91	88	90	88	93	96	94	91	90	91	92	94	92	93	92	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	44	5.91	5.91
40 - 60	255	34.27	40.19
60 - 80	295	39.65	79.84
80 - 100	150	20.16	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) - %

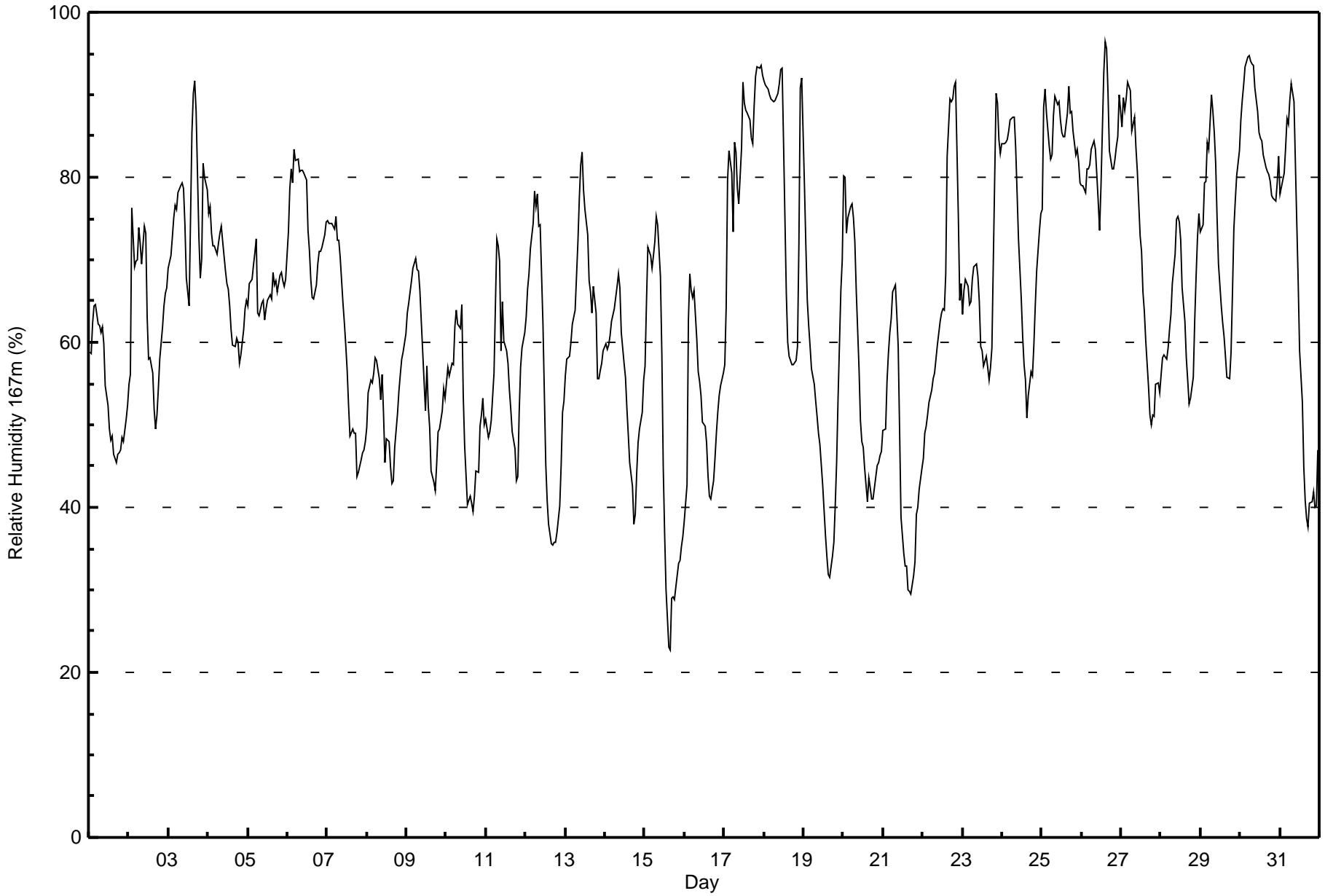
Lower Camp Met Tower - March 2017

Maximum Value: 96 % on Mar 26 15:00														Maximum Daily Average: 86.0 % on Mar 30														Hours in Service: 744	
Minimum Value: 23 % on Mar 15 16:00														Minimum Daily Average: 45.9 % on Mar 21														Hours of Data: 744	
Maximum Diurnal Average: 73.8 % at hour 8														Minimum Diurnal Average: 55.4 % at hour 18														Hours of Missing Data: 0	
Monthly Average: 64.7 %														Percentiles: P ₁ = 30 P ₁₀ = 44 Q ₁ = 53 Median = 64 Q ₃ = 77 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-Mar	59	59	62	64	65	62	62	61	62	60	55	52	49	48	49	46	45	47	47	47	49	48	51	52	54.2	65			
2-Mar	55	56	76	69	70	70	74	72	69	74	73	63	58	58	56	52	49	51	54	58	62	64	66	67	63.3	76			
3-Mar	69	71	73	75	77	76	78	79	79	79	74	68	64	75	85	90	92	88	73	68	70	82	80	78	76.8	92			
4-Mar	76	77	73	72	72	71	72	73	74	72	69	67	67	64	62	60	60	60	60	57	58	62	64	65	66.9	77			
5-Mar	64	67	68	69	71	73	64	63	65	65	63	64	65	66	65	68	67	68	66	68	68	67	67	68	66.6	73			
6-Mar	73	79	81	79	83	82	82	81	81	81	81	80	74	71	68	65	65	67	70	71	71	72	73	75	75.1	83			
7-Mar	75	74	74	74	74	75	72	72	70	65	62	60	57	52	49	50	49	49	44	44	46	47	47	48	59.5	75			
8-Mar	50	54	55	55	56	58	58	56	53	56	51	45	48	48	45	43	43	47	51	54	56	58	59	61	52.6	61			
9-Mar	64	65	66	68	69	70	69	69	66	63	55	52	57	52	50	44	43	42	45	49	50	52	54	53	56.9	70			
10-Mar	55	57	56	57	57	62	64	62	62	65	54	47	44	40	41	40	40	41	44	44	50	51	53	50	51.6	65			
11-Mar	51	49	49	51	53	56	73	72	70	59	65	60	59	57	54	52	49	47	43	44	52	57	59	61	55.9	73			
12-Mar	63	66	68	71	74	78	76	78	74	74	62	54	45	41	38	36	35	36	36	37	40	45	52	53	55.6	78			
13-Mar	56	58	58	60	62	63	64	72	77	82	83	78	76	73	67	66	64	67	63	56	56	57	59	59	65.6	83			
14-Mar	60	59	60	61	62	64	66	67	68	67	61	57	56	52	49	45	43	38	39	44	48	49	51	55	55.1	68			
15-Mar	57	65	71	70	69	70	72	75	74	68	59	45	37	30	23	23	29	29	29	30	33	34	35	36	48.5	75			
16-Mar	38	43	63	68	66	65	66	60	57	55	54	50	50	48	44	41	41	43	46	49	52	53	55	56	52.7	68			
17-Mar	57	64	80	83	81	73	84	83	79	77	84	92	89	88	88	87	85	84	89	92	93	93	94	92	83.8	94			
18-Mar	92	91	91	90	89	89	89	89	90	91	93	93	84	66	60	58	58	57	57	58	60	72	91	92	79.2	93			
19-Mar	79	72	65	62	59	57	55	53	51	49	48	43	40	37	34	32	31	34	36	40	46	53	66	70	50.4	79			
20-Mar	80	80	73	75	76	77	75	72	66	57	51	48	47	45	41	44	42	41	41	42	45	45	46	47	56.6	80			
21-Mar	49	49	55	59	61	63	66	67	63	59	49	39	34	33	33	30	30	29	32	33	39	40	42	45	45.9	67			
22-Mar	46	49	50	51	53	54	56	56	58	60	62	64	64	64	68	83	90	89	90	91	92	75	65	67	66.5	92			
23-Mar	63	66	68	67	65	65	68	69	69	68	65	60	59	57	58	57	56	57	59	80	90	89	85	83	67.6	90			
24-Mar	84	84	84	85	86	87	87	87	84	78	73	65	61	57	55	51	54	56	56	60	64	69	74	76	71.5	87			
25-Mar	76	88	91	88	84	82	83	87	90	89	89	87	85	85	85	88	91	88	88	86	83	83	82	79	85.7	91			
26-Mar	79	79	78	81	81	82	83	84	83	80	77	73	79	93	96	96	90	83	81	81	82	84	85	90	83.4	96			
27-Mar	86	90	88	90	92	91	86	86	87	84	81	73	71	66	64	60	55	51	50	51	51	55	55	54	71.5	92			
28-Mar	56	58	58	58	59	62	63	67	71	75	75	75	72	67	63	58	55	53	53	56	63	68	73	76	63.9	76			
29-Mar	73	74	79	80	84	83	90	88	85	82	75	70	64	62	61	58	56	56	59	66	74	77	80	83	73.3	90			
30-Mar	87	89	91	93	95	95	94	94	93	91	88	85	85	84	83	81	81	80	79	78	77	77	79	83	86.0	95			
31-Mar	78	79	81	84	87	86	89	91	89	82	74	67	59	53	45	41	39	38	40	41	42	40	40	47	63.0	91			
														66.1 68.1 70.5 71.3 72.0 72.3 73.6 73.8 73.0 71.1 67.9 63.8 61.3 59.1 57.4 56.3 55.7 55.4 55.5 57.3 60.0 61.9 63.9 65.2														Diurnal Average	
														92 91 91 93 95 95 94 94 93 91 93 93 89 93 96 96 92 89 90 92 93 93 94 92														Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	41	5.51	5.51
40 - 60	267	35.89	41.40
60 - 80	280	37.63	79.03
80 - 100	156	20.97	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 - March 2017

Maximum Speed: 23 km/h on Mar 19 04:00	Maximum Daily Speed Average: 19.2 km/h on Mar 13	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 28 23:00	Minimum Daily Speed Average: 0.4 km/h on Mar 26	Hours of Data: 744
Maximum Diurnal Speed Average: 2.3 km/h at hour 24	Minimum Diurnal Speed Average: 0.5 km/h at hour 4	Hours of Missing Data: 0
Monthly Average Velocity: 1.0 km/h 115.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 11 P ₉₀ = 15 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-Mar	NNW2	N2	N3	N3	N6	N7	N8	N7	N7	N8	NNE5	N4	N6	NNW7	NNW11	N8	NNW7	N5	N3	NNW3	NW2	NNW2	NNW3	NNW3	N5.0	NNW11
2-Mar	NW2	SE1	SSE1	SSE2	SSE1	NNW1	S1	SSE2	SSE4	SSE4	SSE4	SSE6	SSE6	SSE7	SE10	SSE12	SE12	SE11	SE12	SSE17	SE16	SE13	SE15	SE17	SSE7.0	SSE17
3-Mar	SE16	SE16	SE16	SE13	SSE11	SE9	S6	S10	S9	SSE15	SSE11	SSE9	SSE10	SSW4	WSW3	W5	NNW9	NNW13	NNW10	NNW16	N13	NNE8	NNE9	N11	SE2.9	SE16
4-Mar	N11	N9	NNE7	N4	N7	NNE10	N9	N12	N10	NNE12	NNE13	NNE10	N10	N12	NNE11	NNE10	NNE9	NNE7	N5	NE5	ENE5	NNE3	N3	N5	NNE8.1	NNE13
5-Mar	N3	NNW3	N4	NNE2	NNW2	N4	N3	NNW3	N3	NNW2	SSE4	S4	S3	WSW6	W6	WNW5	NNW4	N4	WNW2	NNW3	W2	S1	NNW2	NNW3	NW1.7	WSW6
6-Mar	NNW2	NW1	NNW4	N4	NNW4	N4	NNW7	NNW6	N10	N7	N13	N10	NNE8	NNE10	NNE11	N14	NNE14	N15	N12	N11	N11	N11	N11	N10	N8.5	N15
7-Mar	N11	N14	N12	N12	N11	N10	N12	N12	N11	N15	N14	N13	N12	N12	N12	N11	N9	NE9	NNE7	NNE2	N1	NW4	NW4	NW4	N9.5	N15
8-Mar	NNW3	NNW3	W4	NNW3	NNW3	NNW3	NNW3	NNW2	NW2	N1	NW4	N6	N10	N9	N6	NNE7	NNE9	NE9	NNE7	NNE7	NNW4	NNW4	NNW2	NW2	N4.2	N10
9-Mar	NNW3	NNW3	NNW3	NNW2	NNW2	NNW3	NW2	NNW2	NW1	NW2	NW3	WNW3	WSW8	WSW7	WSW8	SW4	S3	N2	N4	N4	N3	NNW3	NNE3	NNW4	NW2.2	WSW8
10-Mar	NW2	NNW3	NW3	NW4	NW4	NNW3	NW4	NW4	N1	NNW2	NW2	NNW4	WNW4	NNW6	NW9	NNW9	N7	N6	N6	N7	N6	N5	NNW3	NW4	NNW4.1	NNW9
11-Mar	NW4	NW5	NW4	NW5	NNW4	NW4	NW3	NNW3	N3	N2	NNW1	SSE3	SSE8	SE10	SSE11	SE8	E8	E6	E5	ESE3	SE6	ESE2	SE7	NNW2	ESE1.5	SSE11
12-Mar	NNE1	N1	NNW2	N2	NNW3	NW3	NW3	NNW4	NNW2	NW2	SW1	SSE10	SSE17	SSE15	SSE15	SE16	SSE17	SE15	SE12	SSE17	SSE19	SE18	SSE16	SSE17	SSE7.6	SSE19
13-Mar	SSE21	SSE21	SSE20	S19	S20	S20	S21	SSE22	S19	SSE22	SSE22	S21	S22	S22	S21	SSE19	SSE19	S16	SSE15	S11	S15	S19	SSE20	SSE17	SSE19.2	S22
14-Mar	SSE16	SSE15	SSE14	SSE16	SSE15	SSE17	SSE17	SSE15	SSE7	SSE12	SSE10	SSE11	SSE9	SSE8	SSE8	SSE8	SE3	NW1	N5	N6	NW5	ESE4	SE14	SSE18	SSE9.1	SSE18
15-Mar	SE16	SSE15	SSE14	SSE13	SSE14	SSE15	SSE12	SSE15	SSE15	SSE15	SSE12	S6	WSW15	WSW12	WSW16	W16	WNW7	NNW7	N7	NNW4	N0	NW2	NW3	N1	S5.6	WSW16
16-Mar	NNW4	NNW4	N7	N9	N9	N12	N13	N12	NNE11	N11	N14	N13	N14	N13	N14	N13	NNE12	N9	N12	N11	N8	N6	N7	N10.5	N14	
17-Mar	N6	N4	N4	NNW5	N5	NNW5	N6	N4	N4	NNW3	NNE4	NNW7	NNW8	NNW8	NNW6	NNW6	N8	N10	N8	N5	N4	N5	N5	N5	N5.6	N10
18-Mar	N6	NNW5	NNW4	N3	NNW4	NNW4	NNW4	NNW4	NNW4	N5	N6	N4	N6	N6	N5	SE7	SE12	ESE7	E5	NE3	N5	NW2	NNW3	NNW2	N2.8	SE12
19-Mar	NW12	NW21	NW22	NW23	NW22	NW18	NW13	NW16	NW15	NNW16	W16	W16	W17	NNW17	NNW19	NW21	NW22	NNW18	NNW20	NNW19	NNW19	NW18	NNW14	N10	NW16.7	NW23
20-Mar	NNE10	NNE9	N10	N10	N8	NNE5	NNE4	NNE3	NNE3	N4	NNE6	ENE4	ENE4	E3	SE3	SSE8	SSE11	SSE9	SE6	E2	SSE5	SSE8	SSE12	SSE14	E2.6	SSE14
21-Mar	SSE4	SE4	SSE8	SE5	SE6	SSE7	SSE7	SE6	SE5	SSE9	SSE7	SSE11	S12	SSE14	SSE15	SSE18	SSE16	SSE18	SE16	SE17	S19	SSE15	SSE16	SE9	SSE10.9	S19
22-Mar	SE12	SE10	SE15	SE14	SE14	SE13	SE10	SSE9	SE8	SE8	SE10	SSE11	SSE7	SSE6	SSE5	SSE5	WSW4	W5	W2	W2	NW3	N6	N13	N10	SE5.1	SE15
23-Mar	N7	N6	N6	N4	NNW4	N6	N8	N8	N8	N7	NNW6	NNW6	W10	NW9	NNW7	NNW6	N6	NNW6	NNW7	NNE4	NNE1	SE7	SE8	SE10	N4.1	W10
24-Mar	SSE8	SSE5	SSE4	SSE12	SSE7	SSE5	SE3	S1	SE1	SSE8	SSE9	SSE10	SSE10	SSE10	SE13	SSE15	SSE15	SE12	SE8	SE10	SE15	SE17	SE14	SE13	SSE9.1	SE17
25-Mar	SE11	SE7	E4	ENE3	ESE6	SE8	SE13	SE12	SE9	SE7	SSE8	SSE8	SE7	SE4	SE2	NE1	ESE1	ENE1	N2	N3	NW2	N2	NNE2	NNE2	SE4.0	SE13
26-Mar	NNE3	N2	NNW1	NW2	NE2	NW3	NNW3	N3	SE3	SE9	SSE7	WSW4	WNW8	NW5	NNE2	SW3	SSE6	SSE4	SE3	N4	NNW2	NNW3	NNW3	NNW2	WNW0.4	SE9
27-Mar	N2	NNW3	WNW2	NNW1	NW0	SSE5	SSE5	SSE5	SSW0	NNW1	SSE1	NNE3	NNE5	N4	N4	N7	N6	N5	N6	N7	NNE5	N6	SE1	SSE8	N1.7	SSE8
28-Mar	SE4	N5	NNW3	N1	SSE6	SSE11	SSE11	SE10	SSE12	SSE12	SSE11	S11	S9	S9	SSE10	SSE11	SSE7	SE9	SE8	E3	SE5	SE6	W0	SE5	SSE6.4	SSE12
29-Mar	SE4	SSE10	SE10	SE7	SE3	SE6	SSE5	SSE7	SSE10	SSE9	SSE10	SSE12	SSE11	SSE10	SSE11	SSE10	SSE12	SSE9	SSE4	SE6	SSE7	SE8	ESE5	SE3	SSE7.7	SSE12
30-Mar	SSE2	NNW3	NNE1	N4	NNW3	NNW3	NNW3	NNW3	N3	N2	NNW2	N1	N4	N5	N6	N5	N5	NNE5	NNE3	N3	NNW3	W1	S1	NE1	N2.6	N6
31-Mar	NE2	S5	S6	S5	SSE7	SSE10	S7	S5	S7	SSE11	SSE11	SE12	SSE18	SSE17	SSW15	SSW13	SSW16	SW12	S13	SSW11	S13	SSW10	SSW13	S14	S9.7	SSE18

E1.6	E0.9	ESE0.5	ESE0.5	ESE0.5	ESE1.2	ESE0.8	ESE1.0	E1.1	SE2.0	SE1.7	SSE1.9	S1.9	S0.8	S0.8	SSE0.9	ESE1.4	ENE2.0	NE1.9	NE1.7	ESE0.9	ESE1.3	SE2.1	SE2.3	Diurnal Average
SSE21	SSE21	NW22	NW23	NW22	S20	S21	SSE22	S19	SSE22	SSE22	S21	S22	S22	S21	NW21	NW22	NNW18	NNW20	NNW19	SSE19	SSE19	SSE20	SSE18	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

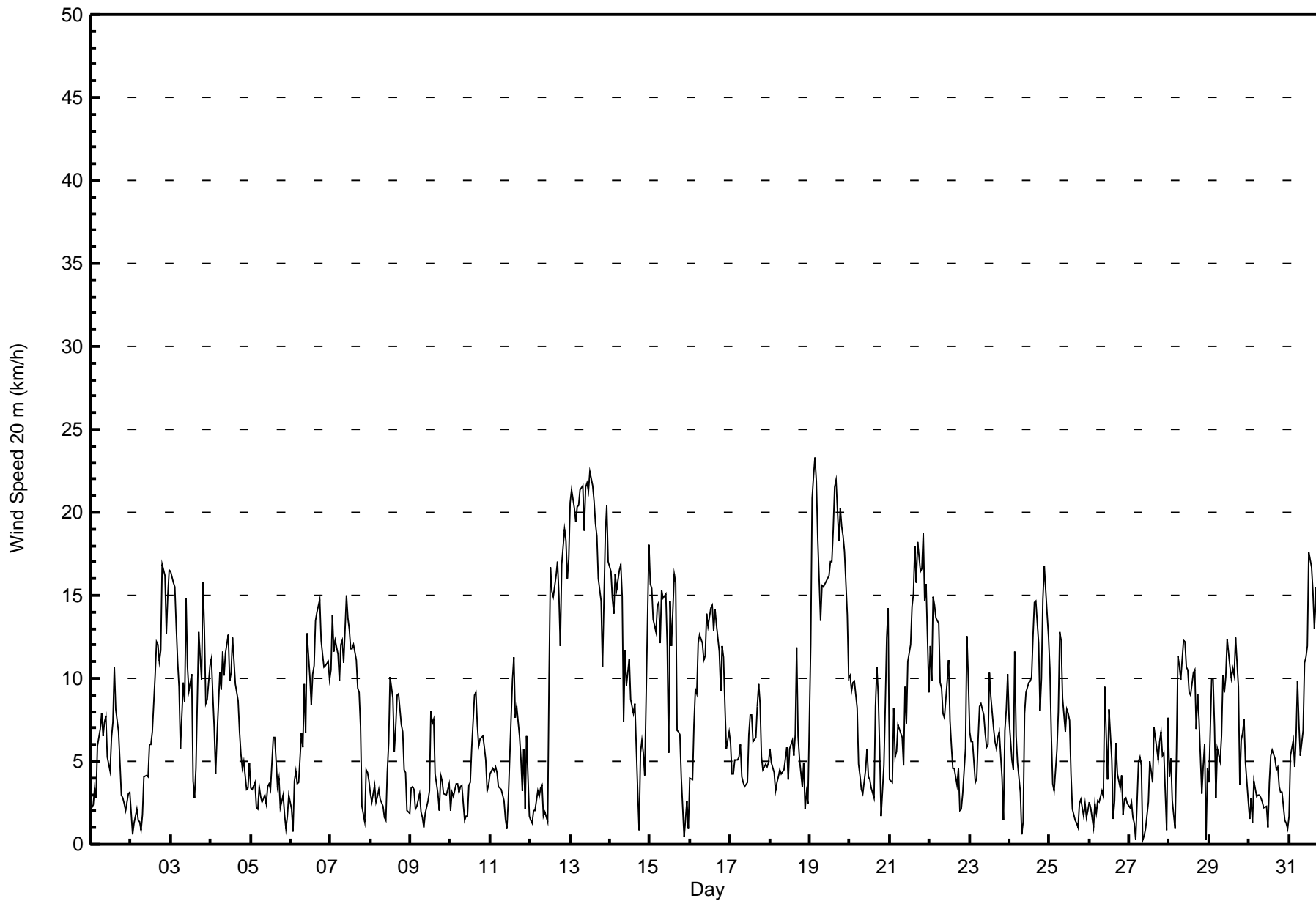
Wind Speed 20 m (WS20m) - km/h
Lower Camp Met Tower - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Mar 19 01:00 Minimum Value: 0 km/h on Mar 9 08:00 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-Mar	1	1	1	1	2	2	2	2	2	2	2	3	3	4	3	2	1	1	1	1	1	1	1	1	4
2-Mar	1	1	1	1	1	1	1	1	2	1	1	2	2	2	4	4	4	4	5	5	5	5	6	5	6
3-Mar	5	5	5	5	5	5	2	4	4	5	3	3	3	2	3	4	4	4	5	5	4	4	4	5	
4-Mar	4	4	3	2	3	4	4	5	5	5	4	4	4	5	4	4	4	3	2	2	2	1	1	5	
5-Mar	2	1	1	1	1	1	1	1	1	1	2	2	2	2	3	2	2	2	1	2	1	1	1	3	
6-Mar	2	1	1	2	1	2	2	2	4	3	5	4	4	4	5	6	5	5	4	4	4	4	3	6	
7-Mar	4	5	4	5	4	3	5	5	5	6	6	5	4	5	4	4	4	4	4	2	1	2	1	6	
8-Mar	1	1	1	1	1	1	1	1	1	1	2	3	5	4	3	3	4	4	3	3	2	1	1	5	
9-Mar	1	1	1	1	1	1	1	0	1	1	2	3	3	3	2	2	1	1	2	1	2	1	1	3	
10-Mar	2	2	1	1	1	1	1	1	1	1	1	2	3	3	4	3	3	2	2	2	2	1	1	4	
11-Mar	1	1	1	1	1	1	1	1	1	1	1	2	5	4	4	4	3	2	2	1	2	1	3	5	
12-Mar	1	1	1	2	1	1	1	1	1	1	1	5	6	5	5	5	5	5	3	5	6	5	4	6	
13-Mar	6	5	5	5	6	6	6	5	5	5	5	6	5	5	5	5	5	4	3	3	5	5	3	6	
14-Mar	2	3	3	3	3	3	5	5	4	3	3	3	3	2	3	4	2	1	2	2	1	3	6	6	
15-Mar	5	5	5	3	3	2	3	3	4	4	4	4	4	4	5	4	5	3	3	2	1	2	2	5	
16-Mar	2	2	3	3	3	4	5	4	4	4	5	5	5	5	5	5	4	3	4	4	4	2	3	5	
17-Mar	3	2	2	2	2	2	2	2	1	2	2	3	3	3	2	2	3	3	3	2	2	2	2	3	
18-Mar	2	2	2	1	1	2	2	2	2	2	2	2	2	2	3	7	4	3	2	2	3	2	1	7	
19-Mar	9	8	8	8	8	7	6	6	5	6	6	6	6	7	7	7	7	7	7	7	6	6	5	9	
20-Mar	4	4	4	4	3	2	2	2	2	2	3	2	2	2	2	3	3	3	3	2	4	4	4	6	
21-Mar	3	3	2	2	2	2	2	2	2	3	2	3	4	5	6	6	6	6	6	6	5	4	5	6	
22-Mar	5	4	5	5	5	4	4	4	3	3	4	4	2	2	2	2	1	2	1	2	2	3	5	5	
23-Mar	3	2	2	1	2	2	3	3	3	3	2	2	4	3	3	2	2	2	2	2	1	4	3	4	
24-Mar	3	3	3	3	3	2	2	1	2	3	3	3	3	3	5	5	4	2	3	5	5	4	4	5	
25-Mar	4	4	2	1	2	3	4	4	4	3	3	3	2	2	1	1	1	1	1	1	1	1	1	4	
26-Mar	1	1	1	1	1	1	2	2	4	4	3	2	4	2	1	1	2	2	1	2	2	1	2	4	
27-Mar	2	1	1	1	1	1	1	2	1	1	1	2	2	2	2	2	2	2	2	2	2	3	2	3	
28-Mar	3	2	1	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	3	3	1	3	
29-Mar	2	4	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	2	3	2	2	3	3	4	
30-Mar	1	1	1	2	2	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	2	1	1	2	
31-Mar	1	2	2	1	2	2	3	2	2	3	3	4	4	4	5	5	6	5	4	3	4	4	4	6	
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	313	42.07	42.07
6 - 11	253	34.01	76.08
12 - 19	157	21.10	97.18
20 - 28	21	2.82	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

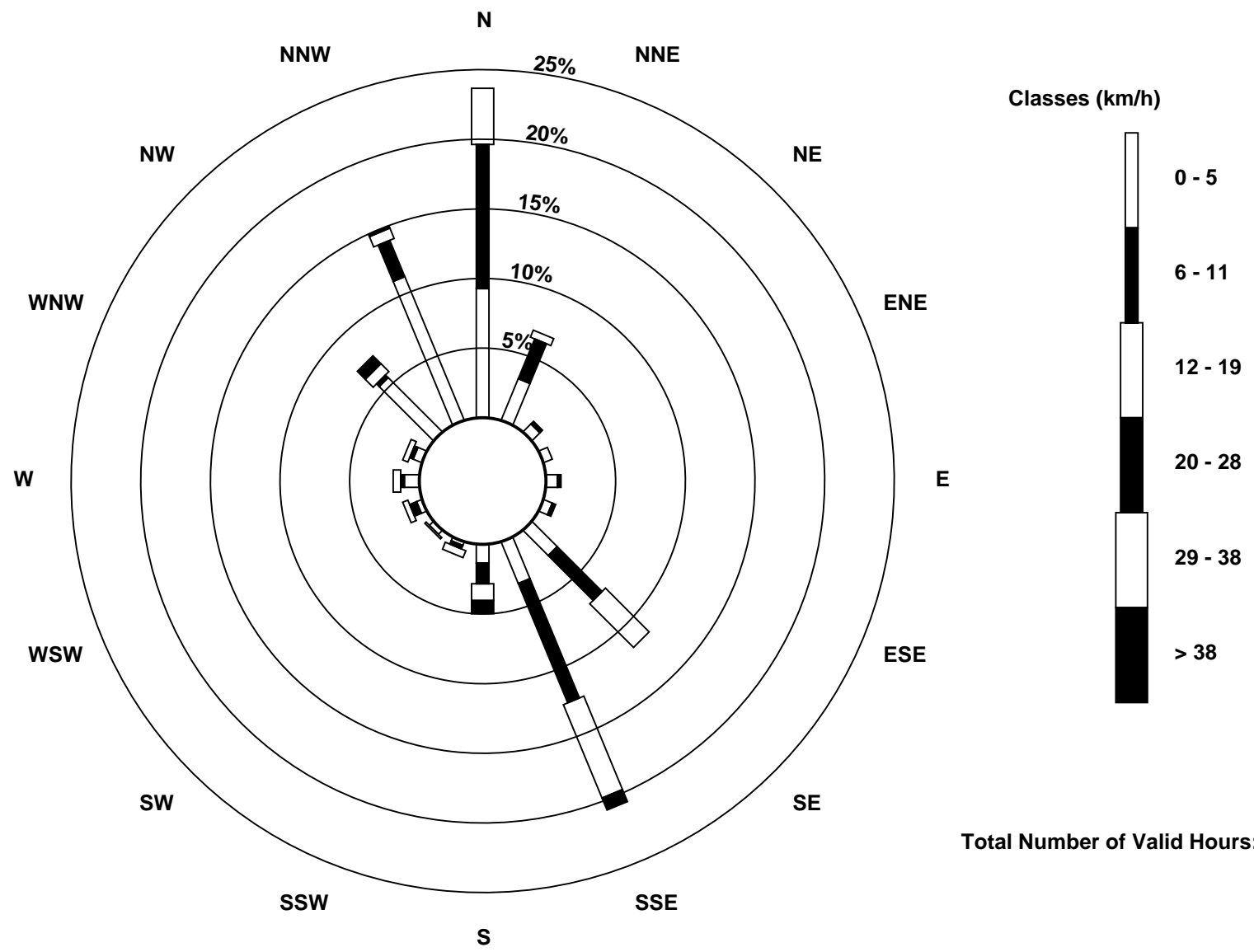
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 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 - March 2017

Maximum Speed: 30 km/h on Mar 19 04:00	Maximum Daily Speed Average: 21.8 km/h on Mar 13	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 27 09:00	Minimum Daily Speed Average: 0.2 km/h on Mar 26	Hours of Data: 744
Maximum Diurnal Speed Average: 3.5 km/h at hour 24	Minimum Diurnal Speed Average: 0.3 km/h at hour 14	Hours of Missing Data: 0
Monthly Average Velocity: 1.7 km/h 85.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 9 Q ₃ = 15 P ₉₀ = 20 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-Mar	NNW3	N4	NNW5	NNW5	N8	N10	N12	NNW9	N9	N9	N7	NNW5	NNW8	NNW9	NW13	NNW11	NNW9	N7	N6	NNW5	NW3	NNW1	NNW5	NW4	NNW6.9	NW13
2-Mar	NNW3	SSE3	SSE5	SSE5	SSE3	SW1	SSE4	SSE5	SSE7	SSE5	SE5	SE7	SE7	SE8	SE13	SE15	SE16	SE15	SE16	SE24	SE22	SE17	SE21	SE23	SE9.9	SE24
3-Mar	SE23	SE21	SE22	SE18	SE16	SE13	SSE7	SSE12	SSE11	SE19	SSE13	SSE11	SSE12	SSW4	WSW3	W6	NNW12	NNW17	NW13	NNW21	N19	N13	NNE14	N16	ESE4.1	SE23
4-Mar	N17	N13	N10	N6	N10	N15	N14	N18	N16	N18	NNE19	NNE15	N14	N17	N16	N15	N13	N11	N9	NNE7	ENE8	NNE5	N5	N7	N12.1	NNE19
5-Mar	N6	NNW5	N5	N4	NNW5	N6	NNW5	NNW3	NNW4	NNW3	SSE4	SSE4	S3	SW7	WSW7	WNW6	NNW4	N5	NW3	NNW5	NW1	ESE1	N2	NNW4	NNW2.6	WSW7
6-Mar	NNW4	W2	NNW5	NNW8	NNW8	NNW7	NNW11	NNW9	N14	N11	N18	N14	NNE12	N15	N16	N20	NNE22	N22	N19	N17	N16	N16	N15	N14	N12.8	N22
7-Mar	N15	N20	N16	N17	N16	N14	N18	N17	N16	N21	N19	N19	N16	N17	N17	N15	N13	NNE14	NNE12	NNE4	N2	NW6	NW6	NW6	N13.7	N21
8-Mar	NNW7	NNW5	WNW3	NW2	NW5	NNW4	NNW3	WNW3	NW2	N2	NW5	N8	N14	N11	N7	N10	NNE13	NE14	NNE11	NNE12	NNW8	NNW8	NNW5	NNW3	N6.1	N14
9-Mar	NW4	NW5	NW4	NNW4	NW3	NW4	NNW3	NW2	NW1	NW2	NW3	WNW4	WSW9	WSW8	WSW8	SW5	SSE3	N3	N7	N6	N5	NNW5	N5	NNW6	NW2.9	WSW9
10-Mar	NNW3	NNW6	NNW5	NW6	NW5	NNW5	NW5	NNW5	NNW2	NNW2	NW2	NW4	WNW4	NW7	NW11	NNW12	N10	N9	N10	N11	N10	N9	N6	NW5	NNW6.0	NNW12
11-Mar	NNW6	NNW7	NNW7	NW7	NNW7	NNW6	NW5	NNW4	NNW3	NNW2	NNW1	SSE3	SE9	SE12	SE14	SE9	E12	E10	E9	ESE6	SE9	ESE5	SE11	E3	E2.7	SE14
12-Mar	E4	E1	NNW3	NNW5	NNW6	NW5	NNW5	NNW5	NW2	NW2	S1	SE12	SE21	SE18	SE18	SE21	SE23	SE19	SE17	SE24	SE26	SE25	SE21	SE23	SE10.0	SE26
13-Mar	SE27	SSE26	SSE23	SSE21	SSE23	SSE22	SSE24	SSE25	SSE22	SSE26	SSE26	SSE24	SSE24	SSE23	SSE22	SSE22	SSE21	SSE17	SSE16	S13	SSE16	SSE20	SSE23	SSE20	SSE21.8	SE27
14-Mar	SSE19	SE19	SE19	SE19	SE20	SE21	SE20	SE11	SE16	SE12	SE13	SE11	SE11	SE10	SE11	ESE5	E1	N7	N10	NNW7	SE8	SE21	SE27	SE12.1	SE27	
15-Mar	SE22	SE21	SE16	SE17	SE18	SSE16	SSE15	SSE18	SE19	SE20	SE14	SSW7	WSW21	WSW17	WSW23	WSW22	WNW10	NNW10	N11	NNW7	N2	NNW1	NNW3	NW2	S6.7	WSW23
16-Mar	NNW7	NNW6	NNW11	N14	NNW13	N18	N18	N18	N16	N16	N19	N19	N20	N20	N18	N20	N20	N18	N14	N17	N16	N13	N9	N10	N15.3	N20
17-Mar	N9	N6	N6	NNW7	N7	NNW7	NNW8	N5	NNW5	NNW4	N5	NNW8	NNW9	NNW10	NNW8	NNW9	NNW11	N14	N13	NNW9	NNW7	NNW8	NNW8	NNW8	NNW7.9	N14
18-Mar	N9	NNW7	NNW6	NNW5	NNW6	NNW6	NNW6	NNW6	NNW6	NNW7	NNW7	N5	N7	N7	N7	SE11	SE16	ESE10	E8	NE5	N8	NNW2	NNW5	NW4	N3.8	SE16
19-Mar	NW16	NW25	WNW28	WNW30	WNW28	WNW23	NW17	WNW19	WNW19	W20	W21	W21	W22	WNW22	WNW24	WNW27	WNW28	NW24	NW26	NW25	NW23	NW21	NNW19	N14	WNW21.0	WNW30
20-Mar	N15	N14	N14	N14	N11	NNE7	NNE7	NNE5	NNE4	N6	NNE7	NE5	NE4	E3	SE3	SSE9	SE13	SE11	SE8	ESE4	SE8	SE12	SE18	SE20	ENE3.9	SE20
21-Mar	SE7	SE6	SE11	SE7	SE7	SE8	SE8	SE8	SE5	SSE12	SE9	SSE12	SSE14	SE17	SE20	SE24	SE22	SE26	SE22	SE23	SSE22	SSE17	SE19	SE12	SE14.0	SE26
22-Mar	SE16	ESE14	SE19	SE19	SE19	SE17	SE14	SE14	SE11	SE10	SE12	SE14	SE9	SSE7	SSE6	SSE5	WSW4	W6	W2	WSW3	NW4	N9	N18	N15	SE6.8	SE19
23-Mar	N11	NNW9	N9	NNW6	NNW6	N9	N12	N13	N11	N9	NNW8	NNW7	W13	NW11	NNW9	NNW8	NNW8	NW8	NW9	NNE6	NNE2	SE9	SE11	SE14	N5.8	SE14
24-Mar	SE10	SSE6	SE6	SE15	SSE9	SE7	SE6	SE2	SE2	SE10	SE11	SSE12	SSE12	SSE12	SE17	SE20	SE20	SE16	SE12	SE14	SE20	SE23	SE18	SE17	SE12.3	SE23
25-Mar	SE15	SE9	E6	E5	ESE9	ESE11	SE17	SE17	SE12	SE9	SE11	SE10	SE10	SE5	SE3	NE2	E2	ENE2	NNE4	NNE5	N1	NNE3	ENE2	NE2	ESE6.1	SE17
26-Mar	NE2	NNE2	E1	WNW2	ENE3	NW2	NNW3	NNW4	ESE4	SE13	SSE8	WSW5	W11	WNW6	N2	SW2	SE7	SSE5	SE5	N5	NNW3	NNE4	NNW4	NNW5	NE0.2	SE13
27-Mar	NNW3	NNW4	NW2	NNW3	NW1	SSE7	SE7	SE5	ENE0	N1	SE1	N4	N8	N6	N6	NNW10	NNW9	NNW8	NNW9	NNW9	NNE5	NNE6	SE5	SE12	N2.4	SE12
28-Mar	SE8	NNW7	NNW4	ESE3	SSE9	SSE14	SE14	SE13	SE16	SSE14	SSE12	S12	S10	SSE10	SSE12	SSE13	SE9	SE13	SE11	E6	SE10	SE12	SSE2	SE7	SE8.8	SE16
29-Mar	SE6	SE14	SE14	SE12	SE5	SE9	SE7	SE10	SE13	SE12	SSE12	SSE14	SSE12	SE12	SE13	SE13	SE16	SE14	SE6	SE10	SE10	SE12	ESE9	ESE6	SE10.9	SE16
30-Mar	SE3	N2	ESE2	NNW3	NNW3	N3	NNW4	NNW4	NNW4	NNW3	NNW3	N2	NNW5	N8	N8	N7	N7	NNE7	NNE5	NNE5	NNW5	W2	S2	NNE0	N3.3	N8
31-Mar	E1	S7	S8	S6	S7	SSE10	S9	S6	SSE8	SSE13	SE14	SE15	SSE21	SSE20	S18	SSW18	SSW21	SSW16	S15	S13	S15	SSW14	S16	S16	S12.0	SSE21

E2.7 ENE1.7	E1.2 ENE1.1	ENE1.0	E1.6 ENE1.5	E1.7	E1.8 ESE2.7	ESE2.2	SE2.0	S1.7	SE0.3	SSE0.4	ESE1.2	E2.3	NE3.5	NE3.5	NE3.1	ENE2.0	E2.4	ESE3.1	ESE3.5	Diurnal Average							
SE27	SSE26	WNW28	WNW30	WNW28	WNW23	SSE24	SSE25	SSE22	SSE26	SSE26	SSE24	SSE24	SSE23	WNW24	WNW27	WNW28	SE26	NW26	NW25	SE26	SE25	SSE23	SE27	Diurnal Maximum			

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

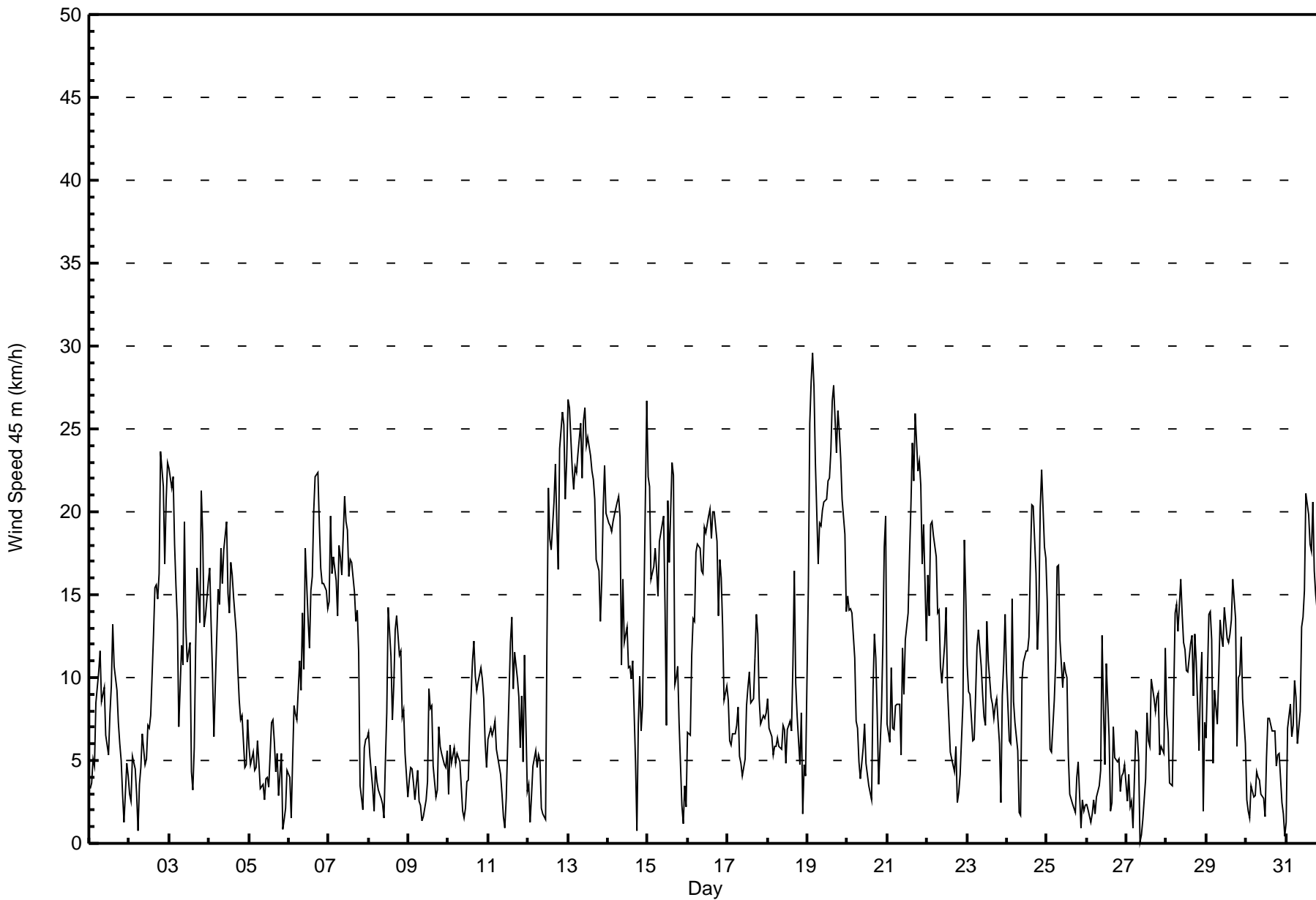
Wind Speed 45 m (WS45m) - km/h
Lower Camp Met Tower - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Mar 19 01:00 Minimum Value: 1 km/h on Mar 10 08:00 Percentiles: P ₁ = 1 P ₁₀ = 1 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-Mar	1	1	2	2	2	2	3	2	2	2	2	3	3	3	4	3	2	2	1	1	1	1	1	1	1	4
2-Mar	2	2	1	1	1	1	1	1	2	1	2	2	2	2	4	4	5	4	5	6	6	5	6	5	6	6
3-Mar	5	4	6	6	6	6	2	4	5	7	4	4	4	3	2	4	5	5	4	6	6	4	5	4	7	
4-Mar	4	4	4	2	4	5	5	5	5	6	6	5	5	5	5	4	4	3	2	2	2	2	2	1	6	
5-Mar	2	1	1	1	1	1	1	1	1	1	3	2	2	2	2	2	2	1	1	3	1	1	1	1	3	
6-Mar	3	1	2	2	2	3	2	2	4	4	5	4	5	5	5	6	7	6	6	4	5	4	4	4	7	
7-Mar	4	6	4	5	5	4	5	5	5	6	6	5	4	5	5	4	5	4	5	3	2	2	1	1	6	
8-Mar	1	1	1	1	1	1	1	1	1	1	2	5	5	5	4	4	4	3	3	3	2	1	2	1	5	
9-Mar	1	1	1	1	1	1	1	1	1	1	1	3	2	2	2	2	1	2	2	2	2	1	1	1	3	
10-Mar	2	1	1	1	1	2	1	1	1	1	1	2	3	3	4	3	3	3	2	1	1	1	2	1	4	
11-Mar	1	1	1	1	1	1	1	1	2	1	1	2	6	4	4	4	3	2	2	2	2	2	4	3	6	
12-Mar	2	2	1	3	2	1	1	1	1	1	1	6	7	5	5	6	6	5	3	5	5	5	5	6	7	
13-Mar	6	5	5	5	6	6	6	6	6	6	6	6	6	6	6	5	5	4	4	3	5	5	5	3	6	
14-Mar	3	2	2	2	2	2	2	5	6	4	4	3	3	2	3	4	2	1	3	2	2	4	7	6	7	
15-Mar	5	5	5	4	3	2	4	2	3	4	4	5	3	3	4	3	6	3	3	3	1	2	3	1	6	
16-Mar	2	3	4	4	4	5	5	5	5	5	5	4	5	5	5	5	5	5	4	4	4	4	3	3	5	
17-Mar	3	2	2	2	2	2	2	2	1	2	2	3	3	3	3	2	3	3	3	2	2	2	2	2	3	
18-Mar	2	2	2	1	1	2	2	2	2	2	2	2	3	2	3	10	5	3	2	2	4	1	1	2	10	
19-Mar	10	8	8	8	9	7	6	6	5	6	5	6	6	7	7	7	7	7	7	7	6	6	6	4	10	
20-Mar	4	4	4	4	3	3	2	2	2	2	3	2	2	2	2	2	3	3	3	2	5	5	5	7	7	
21-Mar	4	4	3	2	2	2	2	2	2	3	2	3	4	5	6	7	6	6	6	6	7	4	6	6	7	
22-Mar	5	5	5	5	5	4	4	3	3	3	4	3	2	3	2	2	1	1	1	2	2	3	7	5	7	
23-Mar	3	2	2	2	2	2	3	3	3	3	2	2	4	3	3	2	2	2	2	2	1	5	3	5	5	
24-Mar	4	3	3	3	3	2	2	2	3	3	3	4	3	3	5	6	5	4	3	4	5	5	5	4	6	
25-Mar	4	5	2	2	3	3	4	4	4	4	4	3	2	2	2	1	1	1	1	2	1	1	1	1	5	
26-Mar	1	1	1	1	2	2	2	2	5	4	4	2	4	2	1	1	3	2	1	2	2	1	1	3	5	
27-Mar	2	1	1	1	1	3	1	2	1	1	1	3	3	3	3	2	2	3	2	2	3	3	3	3	3	
28-Mar	4	1	2	2	2	3	3	3	2	3	3	3	3	3	3	3	3	3	4	1	3	4	2	3	4	
29-Mar	3	4	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	2	2	4	3	3	4	3	4	
30-Mar	2	1	2	3	2	1	1	1	1	1	1	1	3	2	2	2	1	2	2	2	2	1	1	1	3	
31-Mar	1	2	2	2	2	3	3	3	2	3	2	4	4	4	6	5	6	5	3	3	4	5	4	3	6	
Diurnal Maximum																										
10 8 8 8 9 7 6 6 6 7 6 6 7 7 7 10 7 7 7 7 7 6 7 7																										



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	207	27.82	27.82
6 - 11	242	32.53	60.35
12 - 19	205	27.55	87.90
20 - 28	89	11.96	99.87
29 - 38	1	0.13	100.00
> 38	0	0.00	100.00

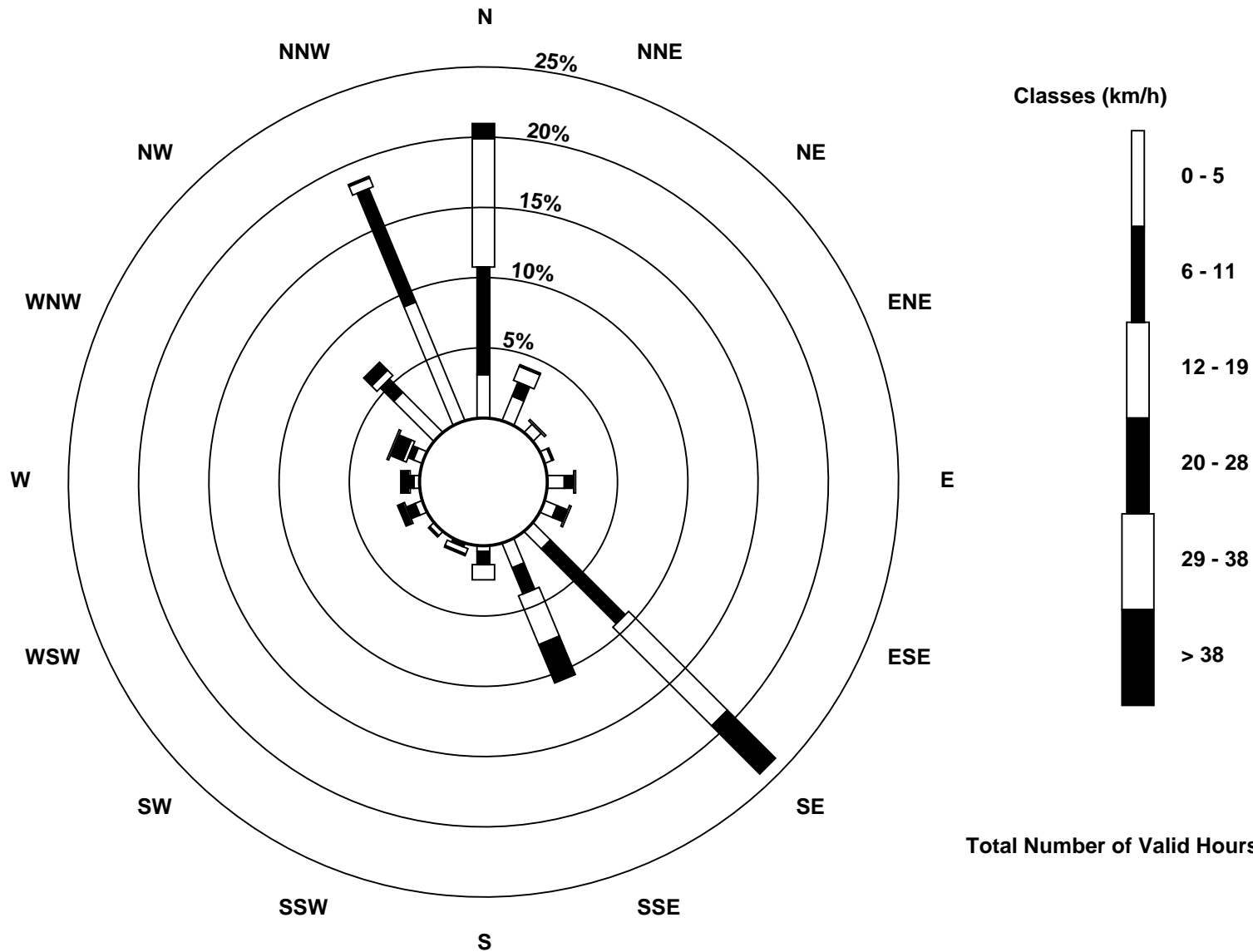
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 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 - March 2017

Maximum Speed: 41 km/h on Mar 19 04:00	Maximum Daily Speed Average: 28.5 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 1 km/h on Mar 9 09:00	Minimum Daily Speed Average: 2.6 km/h on Mar 5	Hours of Data: 743
Maximum Diurnal Speed Average: 7.0 km/h at hour 24	Minimum Diurnal Speed Average: 0.7 km/h at hour 14	Hours of Missing Data: 1
Monthly Average Velocity: 3.7 km/h 100.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 8 Median = 14 Q ₃ = 21 P ₉₀ = 27 P ₉₉ = 38	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-Mar	N6	NNE6	N9	N8	NNE9	NNE11	NNE12	N11	NNE9	N5	NW5	NNW7	NNW10	NNW11	NW16	NNW13	NNW12	N11	N10	N10	NNE8	NNE3	NNE4	NNW5	N8.1	NW16
2-Mar	NW1	SSE4	SE9	S3	SE4	ESE4	SE5	SSE7	SSE7	SE8	SE9	SSE8	SE9	SE12	SE17	SE19	SE21	SE23	SE27	SE34	SE34	SE29	SE32	SE34	SE14.7	SE34
3-Mar	SE34	SE31	SE33	SE30	SE28	SE25	SE12	SE21	SSE19	SE26	SSE16	SSE12	SSE14	SW5	WSW5	W10	NNW18	NNW24	NNW21	NNW30	N26	NNE17	NNE18	N21	ESE6.3	SE34
4-Mar	N22	N19	NNE14	N10	N15	NNE22	N21	N24	N22	N25	NNE25	NNE20	N18	N21	N20	N19	N17	NNE14	NNE13	NE13	ENE14	NE8	NNE6	NNE10	NNE17.0	NNE25
5-Mar	N10	NNW7	NNW9	N11	N10	NNE6	E5	ESE8	ESE5	ESE4	SE6	SSE5	SSE4	SW7	WSW7	WNW7	NNW5	NNW6	NNE6	NNE9	ENE7	E7	ENE1	NNW7	NNE2.6	N11
6-Mar	N12	N6	NNE13	N17	N17	N14	N18	N17	N21	N16	N24	N19	NNE15	N20	N21	N26	NNE30	N31	N28	N24	N23	N22	N22	N21	N19.8	N31
7-Mar	N21	N28	N24	N23	N22	N19	N25	N24	N23	N28	N25	N25	N21	N22	N22	N21	N17	NNE17	NNE17	NE9	NNE7	N9	N11	N14	N19.4	N28
8-Mar	NNW14	NNW15	N11	N8	N8	NNW4	NW5	WNW3	WNW2	WSW5	NW6	N10	N18	N14	N10	N12	NNE16	NE18	NE17	NNE21	N13	N11	N12	N10	N9.9	NNE21
9-Mar	N8	N8	N10	NNW9	NW4	NW5	WNW2	NW1	WSW1	NNW1	NNW3	WNW3	WSW8	WSW7	WSW7	SW4	SSE2	NNE5	NNE11	NNE11	NE13	NNE9	NNE6	NNE7	N3.9	NE13
10-Mar	N11	NE5	NE4	N3	N7	NNW8	NNW12	NNW10	NNW6	NW3	WNW3	NW4	NNW5	NW8	NW13	NNW15	N13	NNE13	N13	N17	N16	N10	N8	NNE2	N8.1	N17
11-Mar	N4	NNE2	N4	NNE3	N3	N2	N2	N3	N3	WNW1	SE3	ESE5	SE13	SE16	SE17	SE12	E14	E14	ESE18	ESE20	SE18	SE17	SE21	SE18	ESE7.8	SE21
12-Mar	SE14	SE14	ESE9	SE2	SE2	SE4	SE3	NNE1	NNE2	SSE2	SE9	SE20	SE28	SE24	SE22	SE27	SE30	SE27	SE26	SE32	SE36	SE38	SE32	SE35	SE18.0	SE38
13-Mar	SE37	SSE33	SSE27	SSE27	SSE29	SSE29	SSE29	SSE32	SSE29	SSE32	SSE34	SSE29	SSE29	SSE28	SSE27	SSE26	SSE24	SSE21	SSE18	S20	S22	SSE24	SSE28	SSE23	SSE27.3	SE37
14-Mar	SSE22	SSE21	SSE22	SSE23	SSE23	SSE25	SSE26	SSE26	SSE20	SSE20	SE15	SE15	SE13	SE13	SE14	SE14	ESE11	ESE8	E7	ENE6	SE8	SE19	SE34	SE40	SE17.8	SE40
15-Mar	SE34	SE31	SSE23	SE26	SSE24	SSE22	SSE23	SSE20	SSE19	SSE18	S10	SW12	WSW27	WSW23	WSW30	WSW28	NW14	NNW17	N18	N16	NE7	ENE6	NE4	ENE1	S8.3	SE34
16-Mar	N12	NNE16	N22	N21	N20	N25	N26	N23	NNE22	NNE21	N24	N23	N25	N26	N24	N26	N27	N24	N19	N23	N22	N19	NNE13	N13	N21.4	N27
17-Mar	N12	NNE8	E5	NE3	NNE4	N5	NNW9	NNW5	NW5	WNW5	N4	NNW6	NNW12	NNW12	NNW10	N12	N15	N17	N18	N16	N15	N15	N15	N14	N9.5	N18
18-Mar	N13	N10	N11	N10	N11	N10	NNW10	N10	NNW8	NNW9	NNW7	NNW4	NNW7	NNW7	N5	SE19	SE24	ESE16	ESE13	E7	N10	E5	N4	NW8	NNE4.6	SE24
19-Mar	NW25	NW35	WNW38	WNW41	WNW38	WNW31	NW24	WNW26	WNW24	W26	W27	W27	W28	WNW27	WNW29	WNW34	WNW36	NW33	NW38	NW37	NW33	NW28	NNW26	N17	WNW28.5	WNW41
20-Mar	N19	N19	N20	N18	N15	NNE10	NNE10	NNE10	NNE5	N7	NNE9	NE5	NE4	ENE3	SE3	SE10	SE13	SE15	SE13	SE10	SE19	SE25	SE28	SE31	E5.7	SE31
21-Mar	SE24	SE15	SE18	SE14	SE16	SSE16	SSE17	SSE16	SE13	SSE18	SSE11	SSE16	SSE17	SE21	SE29	SE34	SE32	SE38	SE35	SE36	SSE27	SSE22	SE30	SE24	SE22.4	SE38
22-Mar	SE27	SE23	SE28	SE29	SE29	SE25	SE21	SE19	SE15	SE13	SE16	SE16	SE10	SE12	SE7	SSE4	WSW4	WSW6	W3	WSW6	NW8	N15	N27	N23	SE9.6	SE29
23-Mar	N17	N15	N15	N12	N12	N13	N17	N18	N13	N10	NNW8	NNW8	W14	NW13	NNW10	NNW10	N9	NNW11	NNW13	NNE9	ENE6	SE17	SE17	SE22	N7.9	SE22
24-Mar	SE18	SSE10	SE11	SE19	SSE14	SSE14	SE14	SSE11	SE6	SE12	SE14	SSE13	SSE13	SE17	SE25	SE31	SE30	SE25	SE20	SE21	SE31	SE30	SE27	SE26	SE18.7	SE31
25-Mar	SE21	SE15	ESE13	AF	SE16	SE18	SE24	SE24	SE19	SE17	SE16	SE14	SE12	SE7	SE6	E4	ESE4	ESE4	ENE6	ENE10	E8	ESE4	ESE5	ESE6	SE11.3	SE24
26-Mar	ESE6	SE5	ESE11	ESE6	ESE9	ESE6	ESE6	ESE2	SE11	SE18	SSE10	SW4	W15	WNW10	NNE3	SE1	SE9	SSE8	SE12	E6	E5	E2	ESE6	NE1	SE4.5	SE18
27-Mar	ESE3	N2	ENE2	ESE2	ESE1	SSE9	SE14	SE11	SSE6	SSE4	ESE6	WNW1	NNW8	NNW6	NNW7	NNW13	N13	N9	NNE7	E4	SE14	SE13	SE20	SSE21	ESE3.5	SSE21
28-Mar	SE18	SE13	SE14	SE18	SE21	SE22	SSE20	SE19	SE20	SSE17	SSE13	S12	S12	SSE12	SE14	SE14	SE13	SE19	SE16	SE10	SE18	SE24	SE14	SE19	SE16.0	SE24
29-Mar	SE19	SE23	SE22	SSE19	SSE15	SSE16	SSE16	SSE15	SSE15	SSE14	SSE12	SSE16	SSE13	SE13	SE15	SE16	SE17	SE19	SE14	SE18	SE16	SE23	SE21	SE16	SE16.5	SE23
30-Mar	SE13	ESE9	SE11	SE5	ESE7	ESE9	ESE6	NE3	NE5	N3	NNW3	N2	NNW6	N8	N8	N8	NNE7	NNE8	NNE5	NE8	N9	NNW2	S3	S3	ENE3.1	SE13
31-Mar	S5	S10	S11	SSW10	S10	S14	SSW14	SSW8	S7	SSE12	SE14	SE18	SSE23	SSE21	S20	SSW20	SSW25	SSW23	S21	S19	S23	SW24	SSW24	S24	S15.6	SSW25

E5.6	E4.3	E4.3	E2.9	ESE3.4	ESE3.9	ESE3.6	ESE3.5	ESE3.5	ESE3.9	ESE3.1	SE2.4	SSE1.7	ESE0.7	ESE1.0	ESE2.0	E3.6	ENE5.1	ENE5.9	ENE5.8	E5.3	ESE6.2	ESE6.9	ESE7.0	Diurnal Average
SE37	NW35	WNW38	WNW41	WNW38	WNW31	SSE29	SSE32	SSE29	SSE32	SSE34	SSE29	SSE29	SSE28	WSW30	WNW34	WNW36	SE38	NW38	NW37	SE36	SE38	SE34	SE40	Diurnal Maximum

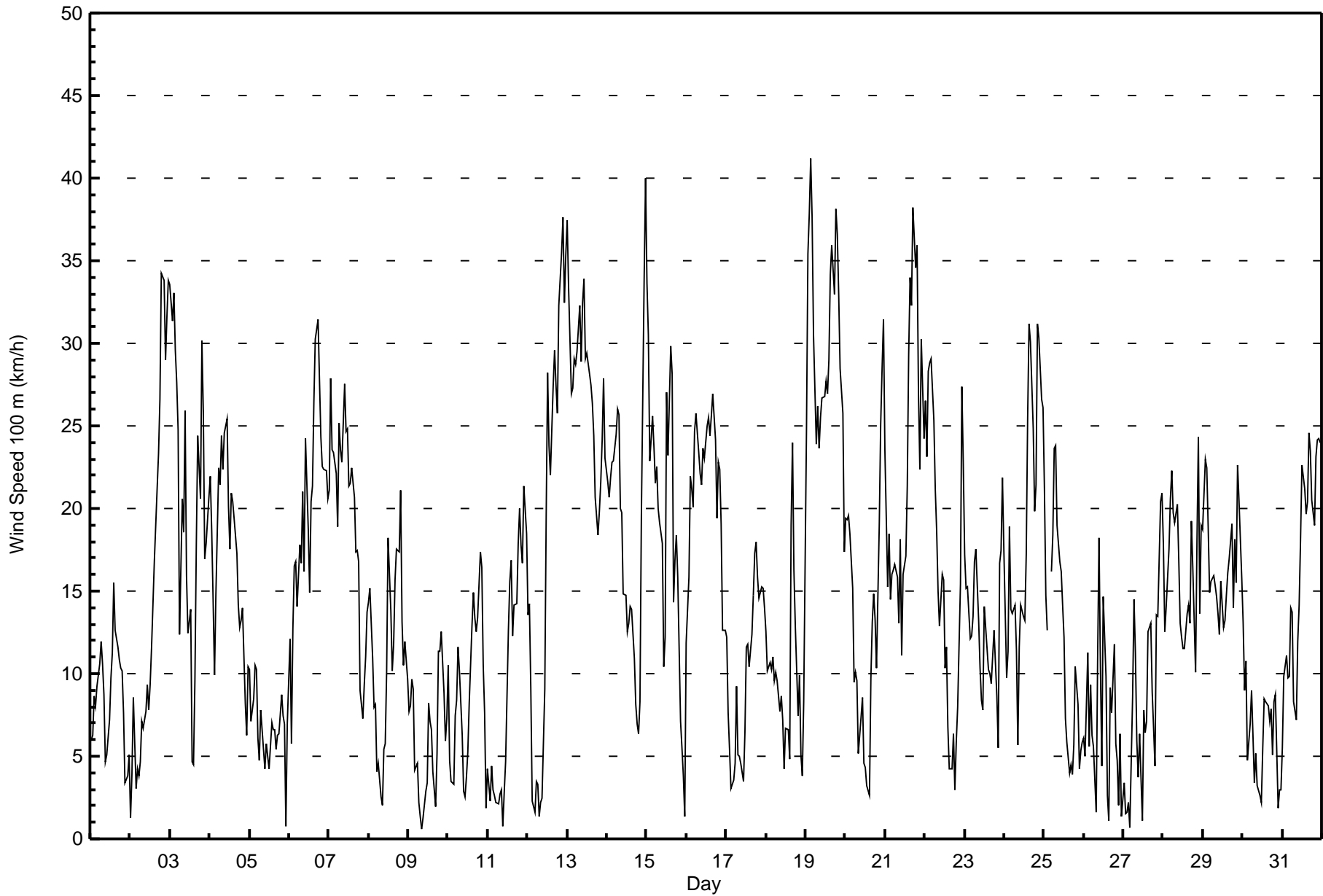
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 13 km/h on Mar 19 01:00 Minimum Value: 0 km/h on Mar 1 23:00 Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 2 Median = 3 O ₃ = 4 P ₉₀ = 5 P ₉₉ = 8																		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-Mar	2	2	1	1	1	1	1	1	1	1	1	3	3	3	3	2	2	1	1	1	2	1	0	1	3
2-Mar	1	2	2	1	2	1	2	2	1	1	1	2	3	3	3	3	4	4	5	4	5	5	5	4	5
3-Mar	3	3	5	4	5	5	3	6	9	8	6	4	4	2	2	5	5	4	4	5	5	3	4	3	9
4-Mar	3	4	4	2	4	4	4	4	4	3	4	4	4	2	3	3	3	3	2	2	3	2	1	1	4
5-Mar	2	1	1	1	1	2	2	2	2	2	3	2	2	2	3	2	2	1	1	2	2	1	1	3	3
6-Mar	4	2	4	2	2	2	2	2	3	3	4	4	4	3	3	4	5	4	4	4	3	3	3	3	5
7-Mar	4	4	3	3	4	2	4	4	4	5	5	4	3	4	3	4	3	3	5	5	4	2	1	1	5
8-Mar	2	1	3	1	1	1	2	1	0	2	2	5	3	4	4	3	3	3	3	4	2	1	2	1	5
9-Mar	1	1	1	2	1	1	1	1	1	1	2	3	2	2	2	2	1	4	2	3	3	3	1	2	4
10-Mar	2	1	1	2	1	2	2	1	2	1	1	2	2	3	3	3	2	2	1	1	1	2	1	1	3
11-Mar	2	1	1	1	1	2	1	2	1	1	2	3	7	3	3	3	3	2	2	3	2	4	4	3	7
12-Mar	2	2	3	2	2	2	1	1	1	1	3	4	5	4	4	4	4	4	3	3	4	4	4	4	5
13-Mar	4	5	6	6	7	7	7	6	7	6	6	7	7	7	6	5	6	6	4	4	5	5	5	4	7
14-Mar	3	2	2	2	2	3	3	3	4	2	3	2	2	2	3	3	2	2	2	2	4	5	5	3	5
15-Mar	4	5	7	4	3	4	5	4	4	3	4	9	3	3	3	4	6	3	3	4	2	3	2	1	9
16-Mar	5	2	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	2	2	2	4	3	5
17-Mar	3	3	3	3	2	4	2	1	1	2	3	4	2	2	2	2	2	2	2	2	2	2	2	2	4
18-Mar	2	2	1	1	1	1	2	2	1	1	2	2	2	1	3	12	5	4	3	3	3	2	2	2	12
19-Mar	13	9	8	8	10	8	7	5	5	5	5	4	5	7	7	6	6	8	6	7	6	6	5	3	13
20-Mar	4	3	3	3	2	3	2	3	2	2	2	2	2	2	2	2	3	2	2	3	4	3	3	3	4
21-Mar	4	6	4	2	3	2	2	2	3	2	3	4	4	5	4	5	4	4	5	4	8	5	5	5	8
22-Mar	5	5	4	4	3	4	3	2	3	3	2	3	2	2	2	2	1	2	1	2	4	4	6	4	6
23-Mar	3	2	2	2	2	2	2	2	2	2	2	3	4	3	3	2	2	2	2	2	2	6	3	5	6
24-Mar	3	3	3	2	3	2	2	3	3	2	3	3	4	5	3	4	5	4	3	4	4	4	4	4	5
25-Mar	3	4	2	AF	2	3	3	3	3	3	3	2	2	1	1	1	1	1	1	1	4	2	3	2	4
26-Mar	2	2	3	2	2	2	3	2	7	3	4	2	4	3	2	1	3	3	2	2	3	2	2	1	7
27-Mar	3	1	1	2	1	3	2	2	2	1	2	1	2	3	3	2	2	4	2	3	4	4	3	3	4
28-Mar	3	2	3	3	2	3	3	2	2	4	3	3	3	3	2	2	3	3	4	2	5	3	6	3	6
29-Mar	3	2	2	2	2	2	1	2	2	3	3	3	3	2	2	2	1	3	3	3	3	2	2	3	3
30-Mar	3	3	4	4	3	2	2	1	1	1	1	1	2	1	1	1	1	2	2	2	2	1	1	2	4
31-Mar	2	2	2	3	2	3	3	5	3	3	2	3	4	4	6	6	7	6	5	5	5	5	7	4	7
																		Diurnal Maximum							
AF - Analyzer Failure																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	117	15.75	15.75
6 - 11	180	24.23	39.97
12 - 19	221	29.74	69.72
20 - 28	165	22.21	91.92
29 - 38	58	7.81	99.73
> 38	2	0.27	100.00

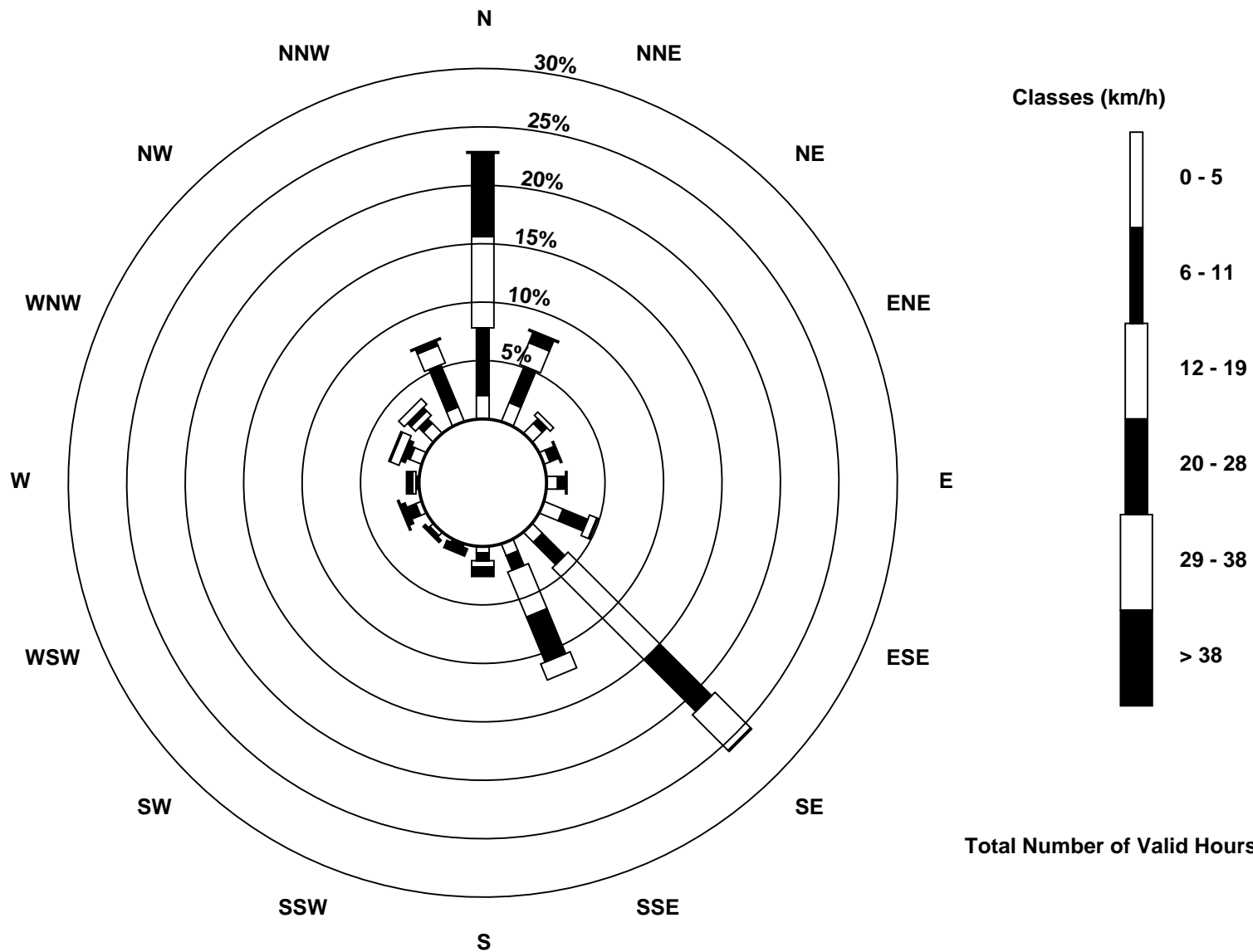
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Maximum Speed: 47 km/h on Mar 19 04:00 Minimum Speed Value: 1 km/h on Mar 17 09:00 Maximum Diurnal Speed Average: 9.2 km/h at hour 22 Monthly Average Velocity: 5.1 km/h 111.5 deg		Maximum Daily Speed Average: 32.1 km/h on Mar 19 Minimum Daily Speed Average: 3.8 km/h on Mar 5 Minimum Diurnal Speed Average: 0.6 km/h at hour 14 Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 10 Median = 16 Q ₃ = 24 P ₉₀ = 30 P ₉₉ = 40		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-Mar	NE10	ENE12	NE13	NNE9	NE10	E12	ENE15	ENE16	ENE12	ENE7	NNW4	NNW8	NNW10	NNW11	NNW16	NNW13	N12	N11	NNE11	NNE11	NE14	NE10	NE7	E2	NNE8.6	NNW16
2-Mar	WNW5	SSW3	SSE5	S7	S6	SSW7	S7	S10	S10	SSE12	SSE11	SSE9	SE12	SE14	SE18	SE20	SE22	SE28	SE32	SE38	SE41	SE36	SE36	SE38	SE16.8	SE41
3-Mar	SE37	SE37	SE37	SE31	SSE29	SE30	SSE17	SSE23	SSE20	SSE22	SSE14	SSE12	SSE12	SW7	W9	W16	NW21	NNW27	NNW24	NNW34	NNW28	NNE18	NNE18	N21	SE6.0	SE37
4-Mar	NNE23	N21	NNE16	N12	NNE18	NNE26	N24	N26	N23	NNE25	NNE27	NNE21	N17	N21	N21	NNE20	NNE18	NNE14	NNE15	NE18	ENE20	NE14	NE9	NE13	NNE18.6	NNE27
5-Mar	NE12	N6	N7	N11	N10	ENE10	E16	ESE16	ESE11	ESE9	SE7	SSE5	SSW7	WSW5	W6	NW6	NNW6	NNE5	NNE8	NE12	E8	E4	NNE8	ENE3.8	E16	
6-Mar	N13	NE16	NE26	NNE28	NNE26	NNE20	NNE24	NNE21	NNE25	NNE17	N24	N19	NNE15	NNE21	NNE22	N27	NNE32	N32	N30	N28	N25	N25	N25	N23	NNE23.1	N32
7-Mar	N24	N30	N26	N25	N24	N20	N27	N26	N24	N29	N25	N26	N22	N23	N23	N21	N18	NNE19	NNE20	NE17	NNE18	NNE20	N19	NNE21	N22.2	N30
8-Mar	N22	N17	NNE15	NNE13	NNE14	N7	NW5	WNW6	NW9	WNW7	NW7	NNW11	N18	N15	N10	N12	NNE15	NE19	NE23	NNE27	NNE20	NNE15	NNE14	NNE18	N13.1	NNE27
9-Mar	NNE14	NNE12	NNE11	N9	N6	NNW4	NW6	NNW6	NW6	NNW3	NNW4	WNW4	W8	W6	W5	SSW3	ESE2	NNE6	NE17	NE19	NE24	NE16	NE9	ENE6	NNE6.1	NE24
10-Mar	ENE6	ENE6	E9	E3	NE1	NNE5	NE8	E6	SE8	SE5	NNW3	NW5	NNW6	NW8	NNW13	N15	N14	NNE13	N14	N20	N19	ENE8	ESE4	SE10	NNE5.8	N20
11-Mar	SE10	ESE10	ESE8	ESE9	SSE10	SSE8	SSE4	SSE3	SE4	SE4	SE7	SE9	SE14	SE16	SE17	SE12	E15	ESE15	ESE18	ESE26	SE28	SE23	SE27	SE25	SE13.1	SE28
12-Mar	SE21	SE22	SE19	SE13	SE10	SSE9	SSE12	SSE7	SSE8	SSE8	SE19	SE22	SE29	SE23	SSE22	SE29	SE31	SE31	SE31	SE37	SE40	SSE41	SSE33	SSE38	SE23.0	SSE41
13-Mar	SSE38	SSE32	SSE29	SSE31	SSE32	SSE34	SSE33	SSE32	SSE28	SSE32	SSE31	SSE30	SSE31	SSE31	SSE29	SSE26	SSE25	S25	S21	S25	S30	S27	SSE28	SSE23	SSE29.2	SSE38
14-Mar	S23	S24	S22	S25	S27	S29	S30	S28	S20	SSE17	SSE12	SSE13	SE13	SE13	SE15	SE14	SE13	ESE15	ESE15	ESE13	SE16	SE27	SE38	SSE41	SSE19.7	SSE41
15-Mar	SE38	SE34	SSE24	SSE27	SSE26	SSE27	S27	S23	S18	S14	SSW13	WSW20	WSW32	WSW28	WSW35	WSW32	NW16	NNW21	N23	N26	NE19	ENE16	E8	ESE8	S8.6	SE38
16-Mar	NE7	NNE19	NNE28	NNE25	N24	N27	N27	NNE24	NNE23	NNE21	NNE22	NNE23	N25	NNE25	NNE24	NNE25	NNE26	NNE24	NNE22	N24	N24	NNE20	NNE15	NNE13	NNE22.2	NNE28
17-Mar	N13	NE9	ESE15	E8	SE6	SE5	NW7	W1	S1	SSW2	N9	NNE4	N11	N12	N13	N13	N15	N17	N20	NNE21	NNE21	NNE21	NNE20	NNE17	NNE9.1	NNE21
18-Mar	NNE13	N10	NNE12	NNE11	NNE13	NNE12	N13	N11	N8	N8	N7	NW5	NW6	N5	E5	SE23	SE26	SE19	ESE16	ESE9	NNE6	ESE7	N3	WNW13	NE5.1	SE26
19-Mar	NW33	NW41	WNW43	WNW47	WNW43	WNW35	WNW28	WNW29	WNW25	W28	W28	W29	W31	WNW29	WNW32	WNW37	WNW38	NW36	NW42	NW42	NW36	NW33	NNW29	N19	WNW32.1	WNW47
20-Mar	N21	N20	N22	N21	N17	N12	NNE13	NE15	NNE7	N7	NNE7	NE3	NE4	ENE3	SSE2	SE9	SE12	SE15	SE14	SSE15	SSE21	SSE25	SSE26	SSE31	E5.2	SSE31
21-Mar	SSE26	SE25	SSE23	SSE21	SSE20	SSE20	SSE20	SSE20	SSE21	SSE18	SSE16	SSE19	SSE18	SSE21	SE30	SE36	SE34	SSE41	SE39	SE41	SSE30	SSE25	SSE31	SE31	SSE25.9	SE41
22-Mar	SE34	SE29	SE33	SE33	SE34	SE30	SE24	SE21	SE17	SE14	SE16	SE14	SE9	SE11	SE7	S4	WSW4	WSW5	W5	W6	NNW13	N20	N30	N25	SE10.6	SE34
23-Mar	N20	N19	N18	N15	N16	N16	N17	NNE17	NNE12	N10	NNW8	NNW8	NNW13	NW13	NNW11	N10	N9	NNW10	N11	NNE10	E9	SE21	SE21	SE26	NNE8.5	SE26
24-Mar	SE21	SSE13	SSE13	SSE17	SSE15	SSE14	SSE15	S15	SSE11	SSE10	SE14	SSE13	SSE12	SSE18	SE27	SE33	SE33	SE30	SE25	SE26	SE36	SE35	SE32	SE30	SE20.9	SE36
25-Mar	SE25	SE19	ESE18	ESE18	SE20	SE21	SE26	SE26	SE21	SE19	SE17	SE14	SE12	SE7	SE7	ESE5	ESE5	SE4	E6	E11	ESE12	ESE9	SE8	SE8	SE13.8	SE26
26-Mar	SE9	SE13	SE14	SE11	SE11	SE12	SE13	SE7	SE15	SE20	SSE10	SW4	W14	WNW12	N5	E4	SE11	SSE9	SE15	ESE12	ESE13	SE10	SE12	SE4	SE8.1	SE20
27-Mar	SE13	SSE6	SE7	SSE3	WSW1	SSE8	SE18	SSE13	SE11	SE9	ESE10	ENE3	NNW5	NNW5	NNW6	NNE10	NE9	E7	ESE9	SE12	SE22	SE24	SSE25	SSE25	SE7.9	SSE25
28-Mar	SSE20	SSE18	SSE19	SE25	SE26	SSE26	SSE18	SSE19	SSE20	SSE19	S14	S14	S13	SSE12	SE13	SE14	SE14	SE21	SE19	SE15	SE22	SE29	SE26	SSE25	SSE18.9	SE29
29-Mar	SSE18	SSE18	SSE18	S20	SSE15	S18	SSE17	SSE17	S13	SSE13	S13	SSE14	SSE12	SE12	SE14	SE15	SE17	SE19	SE19	SE23	SE18	SE25	SE25	SE19	SSE16.5	SE25
30-Mar	SE18	SE17	SE19	SE12	SE13	SE12	ESE11	SE6	E5	NE3	N3	N2	NNW6	N8	N8	NNE8	NNE7	NNE8	NNE6	NE8	N8	ESE1	S3	SSW7	E4.3	SE19
31-Mar	SSW10	S11	S12	SSW11	S11	S15	SSW15	SSW12	S9	S11	SSE12	SSE17	S22	S22	SSW24	SSW25	SSW31	SSW29	S25	SSW24	S26	SW29	SSW34	SSW27	SSW18.5	SSW34
ESE7.4 ESE6.5 ESE6.4 ESE5.4 ESE5.0 SE6.3 ESE5.6 SE5.2 SE4.8 SE4.6 SE3.1 SSE2.4 S1.8 SE0.6 ESE1.0 ESE2.4 E4.0 E5.8 ENE7.1 ENE7.9 E8.6 ESE9.2 ESE9.1 SE8.9																								Diurnal Average		
SSE38 NW41WNW43WNW47WNW43WNW35 SSE33 SSE32 SSE28 SSE32 SSE31 SSE30WSW32 SSE31WSW35WNW37WNW38 SSE41 NW42 NW42 SE41 SSE41 SE38 SSE41																								Diurnal Maximum		

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

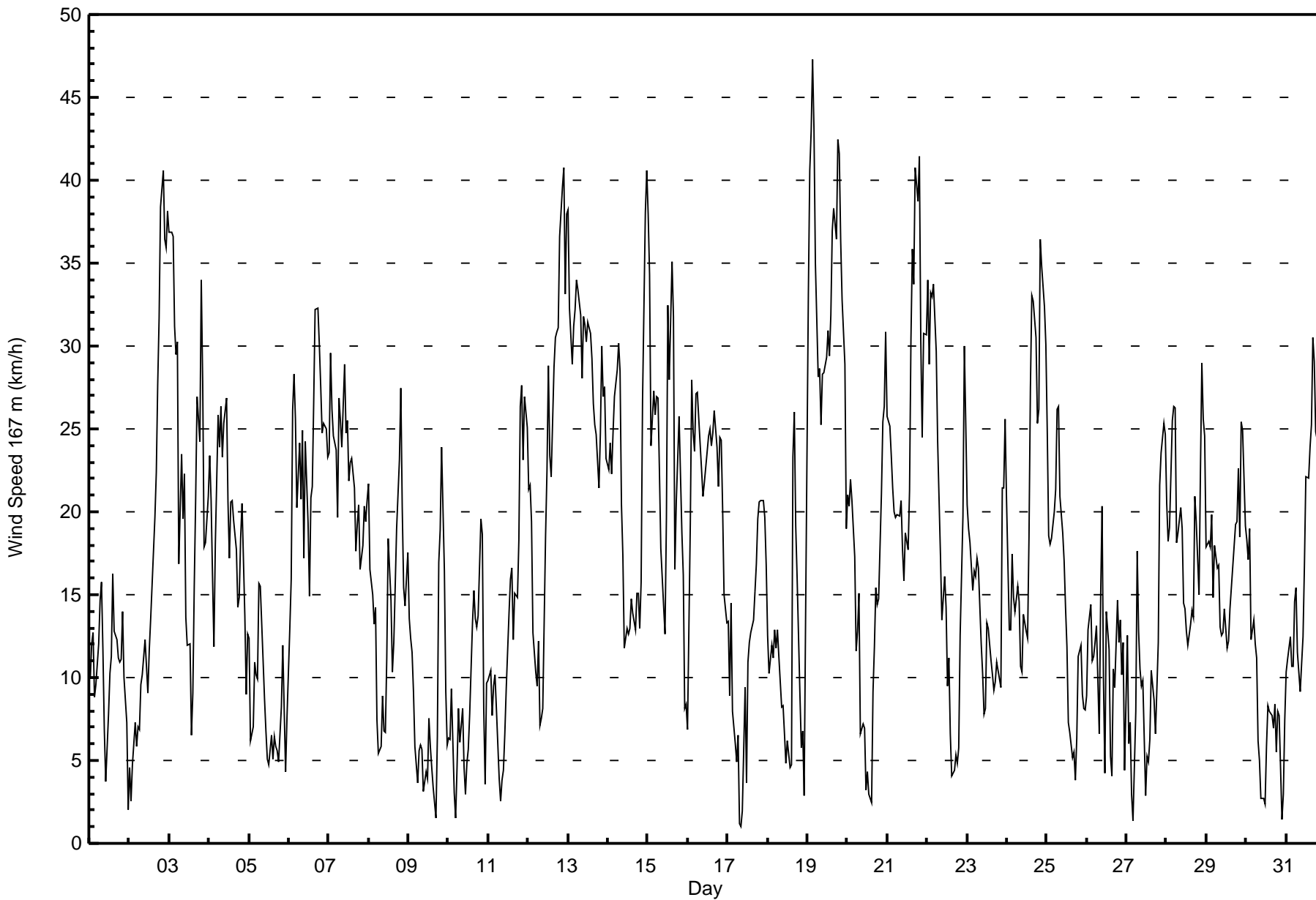
Wind Speed 167 m (WS167m) - km/h
Lower Camp Met Tower - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 37 km/h on Mar 17 11:00 Minimum Value: 0 km/h on Mar 8 08:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 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-Mar	3	1	2	1	1	1	1	1	2	2	1	3	3	3	3	3	2	1	1	1	2	1	1	2	3		
2-Mar	1	1	1	1	1	1	1	2	1	3	3	2	5	3	3	3	4	4	5	4	4	5	4	3	5		
3-Mar	3	4	4	3	4	4	4	4	7	6	4	3	3	3	2	4	5	4	3	4	5	3	4	3	7		
4-Mar	3	4	5	2	5	4	4	4	4	4	4	3	3	3	3	3	3	3	2	3	3	3	2	1	5		
5-Mar	1	2	2	1	1	1	2	1	3	2	2	2	2	2	2	2	2	1	1	2	1	2	1	2	3		
6-Mar	2	4	3	3	3	3	3	3	4	4	4	4	3	4	4	4	5	4	5	4	4	4	3	3	5		
7-Mar	4	4	3	3	3	2	5	4	4	5	5	4	3	3	3	4	3	4	4	6	6	3	2	2	6		
8-Mar	2	1	3	2	2	2	1	0	1	1	2	5	4	3	3	3	3	3	4	3	2	1	2	2	5		
9-Mar	1	1	1	2	1	1	1	1	1	1	2	2	2	2	3	2	1	4	2	4	3	4	2	2	4		
10-Mar	2	1	1	2	1	1	1	1	1	3	2	1	2	3	3	3	2	2	1	3	2	3	2	1	3		
11-Mar	2	2	2	2	2	1	2	2	1	2	2	2	6	3	3	3	3	2	2	3	3	3	3	2	6		
12-Mar	2	1	3	2	3	3	3	3	2	3	2	4	4	4	5	4	4	3	3	4	5	4	5	3	5		
13-Mar	4	6	5	6	6	6	6	6	6	6	6	6	6	5	5	5	4	4	3	2	4	3	3	3	6		
14-Mar	2	2	2	2	2	2	2	2	3	3	3	2	2	2	2	2	2	3	2	4	4	4	4	6	6		
15-Mar	3	4	7	4	4	3	2	2	3	3	3	8	3	3	3	4	6	3	3	3	3	4	2	2	8		
16-Mar	3	4	3	4	3	3	4	4	4	3	4	3	3	3	3	3	3	3	3	2	2	3	5	3	5		
17-Mar	3	3	4	5	4	4	2	1	2	2	37	5	2	2	2	1	2	2	2	2	2	2	2	2	37		
18-Mar	2	2	2	3	3	3	5	3	2	1	1	2	2	2	4	9	4	4	3	4	2	2	2	4	9		
19-Mar	10	9	9	8	10	8	7	5	5	4	4	3	4	6	7	6	5	8	5	7	6	6	5	3	10		
20-Mar	4	3	4	3	3	2	2	3	3	1	2	2	2	2	2	2	3	2	2	3	4	3	3	4	4		
21-Mar	3	4	3	2	3	2	3	2	3	2	4	4	4	5	3	4	4	4	4	3	8	5	5	4	8		
22-Mar	4	4	2	2	2	3	4	3	3	3	2	3	1	2	2	2	1	1	1	1	4	3	6	4	6		
23-Mar	4	2	2	2	2	2	2	2	3	2	2	2	3	2	3	2	2	1	2	1	3	5	3	3	5		
24-Mar	3	3	3	3	3	2	2	3	2	3	3	3	4	6	3	4	4	3	3	4	4	4	4	4	6		
25-Mar	3	3	2	2	2	2	2	2	3	3	2	2	1	1	1	1	1	2	1	1	2	2	1	1	3		
26-Mar	1	2	2	2	2	2	3	4	7	3	5	2	4	2	2	2	2	3	1	1	3	2	2	4	7		
27-Mar	5	2	2	2	1	4	1	4	2	2	2	2	1	2	2	3	3	3	4	4	3	4	4	4	5		
28-Mar	3	3	3	3	2	3	3	3	3	4	3	3	3	3	2	3	3	2	4	3	5	2	4	3	5		
29-Mar	3	2	2	2	2	3	3	3	2	2	3	3	3	3	2	2	2	3	2	3	3	3	2	3	3		
30-Mar	2	2	3	5	2	2	1	3	1	1	1	1	2	1	1	1	1	2	2	2	2	1	1	3	5		
31-Mar	1	2	2	2	1	1	2	3	3	2	2	3	3	4	6	6	6	4	3	4	4	4	6	4	6		
																	10 9 9 8 10 8 7 6 7 6 37 8 6 6 7 9 6 8 5 7 8 6 6 6 6										
Diurnal Maximum																											



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	64	8.60	8.60
6 - 11	162	21.77	30.38
12 - 19	224	30.11	60.48
20 - 28	194	26.08	86.56
29 - 38	87	11.69	98.25
> 38	13	1.75	100.00

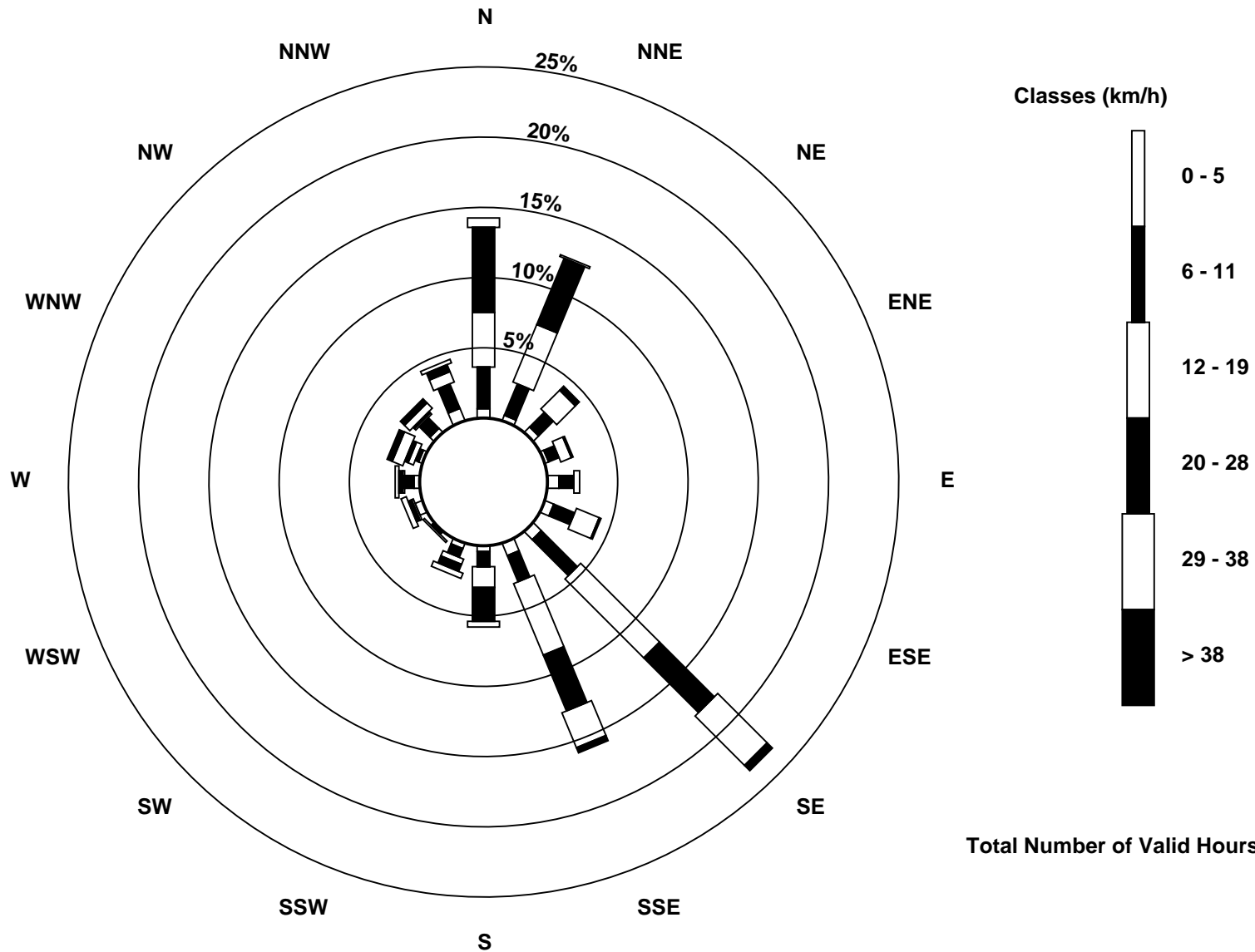
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 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 - March 2017

Direction of Maximum Speed: 307 deg on Mar 19 04:00															Hours in Service: 744											
Direction of Maximum Daily Speed Average: 167.9 deg on Mar 13															Hours of Data: 744											
Direction of Minimum Speed: 278 deg on Mar 28 23:00															Hours of Missing Data: 0											
Direction of Minimum Daily Speed Average: 0.4 deg on Mar 26															Percent Operational Time: 100.0											
Monthly Average Direction: 337.0 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-Mar	335	358	353	358	4	4	358	356	4	11	12	349	351	343	331	354	348	353	349	331	306	345	340	345	352.0
2-Mar	312	134	168	163	148	330	174	165	160	164	155	150	156	158	142	151	140	136	146	151	143	139	137	143	146.4
3-Mar	140	138	142	144	149	141	170	174	177	156	162	166	163	211	244	277	339	335	334	346	356	14	28	5	136.5
4-Mar	7	4	12	355	2	15	11	10	9	15	23	19	6	4	14	15	13	16	10	38	68	17	2	1	12.7
5-Mar	358	337	358	12	347	357	359	347	358	339	163	171	181	242	267	296	334	358	303	342	265	176	337	329	319.3
6-Mar	327	307	333	349	347	351	341	340	360	10	2	0	25	14	14	10	20	8	8	3	3	358	355	360	3.0
7-Mar	358	359	355	357	357	359	8	1	5	3	7	1	358	358	357	359	8	37	30	18	357	316	308	319	0.7
8-Mar	341	336	273	337	333	344	328	337	314	355	320	5	10	6	1	13	23	45	33	24	347	346	327	325	1.2
9-Mar	335	340	334	346	336	342	322	333	314	324	307	292	254	253	248	224	177	353	1	351	357	341	18	335	308.3
10-Mar	323	343	318	323	310	341	316	318	350	345	316	333	295	327	322	344	1	11	358	359	9	8	343	312	339.8
11-Mar	322	322	322	307	331	320	317	328	350	356	333	164	148	137	150	140	91	88	91	122	144	114	130	346	109.6
12-Mar	30	11	344	351	329	325	316	330	336	315	218	147	149	156	159	143	149	135	141	152	154	146	154	151	148.9
13-Mar	155	159	167	170	171	171	171	166	169	165	165	170	173	172	172	165	167	172	168	186	172	169	167	158	167.9
14-Mar	157	155	154	156	154	155	153	152	150	149	148	157	154	150	148	150	139	305	358	351	323	109	139	149	150.3
15-Mar	143	149	168	156	157	161	168	154	150	151	148	189	247	257	258	262	302	348	7	345	0	316	312	349	181.0
16-Mar	338	345	356	357	354	0	4	6	15	11	4	8	6	5	9	7	11	13	4	3	1	2	2	355	4.3
17-Mar	358	2	351	345	358	347	351	7	352	348	12	341	337	341	343	346	352	0	357	351	349	358	355	359	351.8
18-Mar	359	338	337	350	347	340	337	343	346	351	349	359	355	6	6	136	141	113	89	39	360	309	332	340	8.2
19-Mar	325	317	309	307	309	306	319	309	308	286	276	279	277	291	299	305	305	332	332	333	327	317	348	3	310.6
20-Mar	12	14	7	5	355	30	24	21	16	11	33	69	61	100	137	159	157	148	138	96	152	162	158	155	86.0
21-Mar	164	137	147	131	133	148	153	142	142	158	153	164	169	155	147	148	151	150	143	144	170	164	162	142	152.6
22-Mar	134	130	138	141	142	139	146	148	141	141	146	155	157	168	165	158	249	266	281	263	312	358	1	4	141.8
23-Mar	5	357	360	350	345	357	2	9	2	360	339	344	270	326	345	344	350	328	328	19	25	141	141	141	352.5
24-Mar	150	161	154	159	168	147	144	181	131	151	156	163	164	159	145	147	150	139	138	141	144	144	144	146	149.5
25-Mar	144	157	97	74	115	127	136	140	142	152	154	152	153	146	142	39	105	66	5	358	305	3	23	22	133.1
26-Mar	24	4	342	311	35	315	333	354	133	145	167	247	290	309	26	230	156	156	144	353	347	348	334	336	300.7
27-Mar	359	327	289	332	318	150	156	151	208	348	147	17	15	8	7	351	349	349	359	351	12	356	136	158	8.8
28-Mar	137	354	341	351	154	158	154	146	153	166	165	183	184	173	159	159	151	135	144	98	129	130	278	130	154.5
29-Mar	135	150	146	144	143	137	149	149	151	153	164	160	158	151	156	149	156	147	160	140	148	128	111	127	149.0
30-Mar	154	347	12	349	337	336	330	330	350	350	338	349	356	359	4	359	10	22	14	356	334	262	178	38	353.8
31-Mar	52	189	188	188	164	154	180	180	170	156	152	145	157	160	193	209	210	215	177	192	178	210	193	180	179.5

93.6 80.0 112.3 102.0 102.9 110.6 107.7 106.3 101.2 130.0 135.1 153.7 186.0 183.8 191.1 151.8 108.4 66.7 50.7 34.5 108.7 120.1 126.6 125.1
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

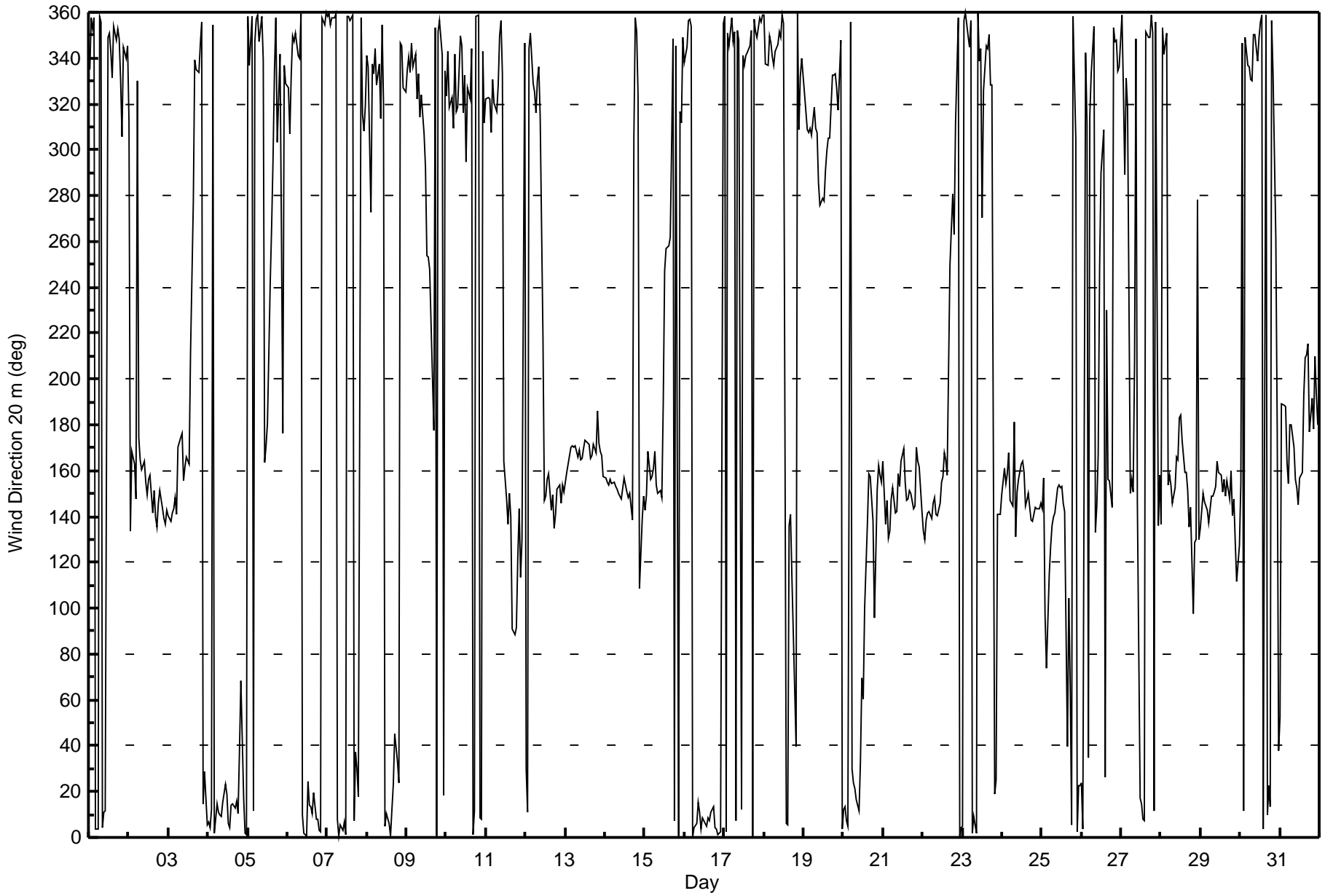
Wind Direction 20 m (WD20m) - deg
Lower Camp Met Tower - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 111 deg on Mar 27 23:00 Minimum Value: 6 deg on Mar 14 01:00 Percentiles: P ₁ = 8 P ₁₀ = 13 Q ₁ = 16 Median = 20 Q ₃ = 29 P ₉₀ = 53 P ₉₉ = 93																			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-Mar	36	21	21	23	14	15	14	15	13	15	18	47	35	28	17	21	17	14	19	19	16	29	16	18	47
2-Mar	53	70	65	23	43	58	83	27	20	18	22	16	27	28	21	17	19	17	17	15	16	19	18	16	83
3-Mar	15	14	17	19	24	30	20	17	25	15	14	19	20	39	52	29	27	18	18	17	21	26	24	18	52
4-Mar	19	22	22	24	21	22	22	22	22	23	22	25	22	20	25	22	25	24	19	28	21	39	19	12	39
5-Mar	21	27	21	31	26	18	21	31	27	40	60	33	35	27	23	32	50	17	38	51	64	72	60	24	72
6-Mar	59	84	16	24	30	41	18	18	19	26	19	21	27	24	24	21	21	19	20	18	20	18	17	18	84
7-Mar	18	18	17	17	18	18	22	18	21	20	22	23	21	24	21	22	26	22	25	62	84	21	11	15	84
8-Mar	23	27	15	30	18	11	16	20	22	50	35	40	27	26	35	33	24	21	18	17	19	20	42	43	50
9-Mar	18	15	16	18	25	19	47	39	49	30	57	65	18	25	17	35	37	66	19	27	36	25	14	23	66
10-Mar	62	29	22	11	16	25	14	12	37	35	62	39	69	46	26	20	23	22	12	12	14	11	22	13	69
11-Mar	16	10	15	10	15	14	14	26	34	44	80	53	54	26	17	32	21	17	16	35	20	47	34	50	80
12-Mar	48	63	42	37	27	19	16	15	47	33	65	27	17	16	16	17	15	15	14	13	12	13	14	14	65
13-Mar	13	10	10	11	11	11	12	12	12	11	11	12	11	12	12	13	11	11	10	14	11	10	9	8	14
14-Mar	6	7	9	6	8	6	9	16	59	17	17	11	13	15	18	16	23	60	16	18	18	54	19	15	60
15-Mar	14	20	13	16	8	8	19	8	11	12	11	48	12	16	13	13	40	17	17	29	94	76	64	98	98
16-Mar	22	30	14	17	19	17	18	21	23	22	20	21	20	20	22	21	21	20	21	16	18	24	28	21	30
17-Mar	30	28	22	26	24	19	18	24	30	40	51	50	25	19	19	19	18	17	16	20	19	18	19	18	51
18-Mar	17	20	19	14	17	20	20	25	26	25	25	72	30	23	35	68	16	26	20	51	44	57	19	42	72
19-Mar	24	16	19	18	17	16	18	17	18	22	21	19	21	24	20	18	18	15	16	16	16	15	21	17	24
20-Mar	25	22	21	19	19	20	21	33	46	37	32	45	50	55	60	17	13	19	46	87	42	23	17	19	87
21-Mar	65	86	15	17	20	12	11	16	23	12	16	11	16	20	18	17	17	15	17	16	13	10	14	26	86
22-Mar	21	22	15	16	17	15	18	18	20	20	20	14	21	23	34	19	23	20	38	60	19	22	19	21	60
23-Mar	22	17	17	19	23	17	19	21	21	22	22	34	32	23	25	18	21	15	14	22	67	49	16	20	67
24-Mar	25	27	33	11	21	18	24	98	102	20	18	17	19	17	18	16	16	15	19	15	15	15	15	15	102
25-Mar	15	16	28	28	24	16	15	16	22	25	20	20	15	19	27	51	56	74	31	29	68	32	54	33	74
26-Mar	25	25	73	37	61	37	59	43	95	21	21	35	24	23	68	33	20	22	36	15	82	33	33	81	95
27-Mar	71	33	40	76	81	14	12	22	94	85	76	82	24	34	39	17	15	54	13	20	28	42	111	17	111
28-Mar	61	11	17	82	14	9	11	12	11	12	12	19	20	22	15	14	20	17	16	23	23	38	100	39	100
29-Mar	50	17	9	14	45	23	19	18	11	14	17	12	17	16	17	15	11	13	67	20	16	28	40	83	83
30-Mar	64	37	87	53	45	28	14	22	27	33	31	74	51	21	18	21	18	20	31	29	37	44	53	67	87
31-Mar	59	23	18	27	18	8	34	27	23	14	14	16	10	13	23	12	13	12	14	17	12	16	16	11	59
	71	86	87	82	81	58	83	98	102	85	80	82	69	55	68	68	56	74	67	87	94	76	111	98	
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 297 deg on Mar 19 04:00		Hours in Service: 744
Direction of Maximum Daily Speed Average: 157.2 deg on Mar 13		Hours of Data: 744
Direction of Minimum Speed: 75 deg on Mar 27 09:00	Direction of Minimum Daily Speed Average: 0.2 deg on Mar 26	Hours of Missing Data: 0
Monthly Average Direction: 343.2 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-Mar	334	353	348	348	358	356	352	345	349	356	358	344	344	335	324	347	342	351	353	341	324	327	328	325	345.0
2-Mar	330	150	152	154	148	221	150	151	148	147	139	140	144	144	132	140	130	127	136	141	135	131	129	135	137.2
3-Mar	133	132	135	134	135	132	156	158	159	143	148	153	151	203	245	267	331	329	326	339	351	10	22	1	116.2
4-Mar	2	359	8	350	360	10	6	5	6	11	16	14	1	1	9	10	9	11	8	29	63	17	356	353	8.3
5-Mar	356	330	350	7	346	350	347	339	346	331	152	159	174	234	257	289	336	352	320	347	309	116	349	333	328.0
6-Mar	340	275	329	345	341	327	332	334	355	5	359	356	15	9	9	4	14	5	5	359	359	354	349	355	357.7
7-Mar	354	354	350	353	353	354	5	357	2	359	2	357	353	352	351	353	3	31	23	17	10	321	314	326	356.9
8-Mar	336	341	283	314	310	329	343	303	315	359	310	356	5	2	355	5	15	38	26	17	341	333	339	328	355.5
9-Mar	313	325	316	331	315	325	333	315	310	323	311	286	248	248	244	219	166	358	3	358	6	342	9	337	310.7
10-Mar	328	332	334	324	324	347	318	329	332	330	308	326	298	320	313	339	356	10	351	355	358	358	349	318	339.0
11-Mar	328	330	331	317	336	334	323	332	336	333	334	147	138	126	138	129	86	88	91	107	132	115	128	93	91.6
12-Mar	92	82	333	339	338	326	331	327	310	322	175	134	139	143	146	134	139	127	134	141	142	139	141	140	136.5
13-Mar	143	147	157	160	161	161	161	153	156	151	151	158	163	163	162	154	157	164	160	176	164	161	159	148	157.2
14-Mar	148	145	142	145	143	144	145	143	137	139	138	143	140	139	135	138	121	94	354	353	329	125	135	139	138.6
15-Mar	135	139	156	142	145	151	158	148	143	142	141	195	238	247	249	253	298	342	5	347	8	341	327	321	173.1
16-Mar	337	342	347	351	348	355	0	2	10	7	0	3	2	360	4	3	7	8	359	358	358	358	358	352	359.6
17-Mar	355	358	351	341	351	340	344	359	343	335	8	335	332	335	339	342	346	357	354	344	339	344	343	346	345.7
18-Mar	352	335	334	334	337	338	333	339	341	346	342	352	355	359	354	129	132	109	89	44	353	327	328	325	4.7
19-Mar	317	307	298	297	299	297	309	298	298	274	268	268	267	282	290	296	295	325	325	326	318	309	342	358	301.5
20-Mar	8	9	3	2	349	21	17	17	15	7	18	49	47	83	127	147	145	138	128	120	141	141	143	142	72.3
21-Mar	142	126	137	127	129	142	141	133	132	150	145	154	157	144	137	138	140	140	135	136	159	152	146	129	141.6
22-Mar	127	122	130	133	135	131	136	137	132	131	136	143	145	149	150	151	244	259	279	256	307	352	357	3	129.4
23-Mar	3	348	353	344	343	350	356	4	360	354	335	336	262	319	339	339	346	321	325	12	25	131	130	130	349.6
24-Mar	137	152	144	146	154	138	135	140	124	140	145	151	152	147	135	137	139	129	128	132	135	134	135	137	138.8
25-Mar	136	143	101	90	111	122	129	131	132	138	141	140	142	136	129	45	95	72	15	18	355	20	65	53	122.4
26-Mar	56	30	97	289	75	321	332	343	122	133	154	240	281	301	8	227	142	151	135	353	338	15	336	346	42.5
27-Mar	331	339	320	328	313	149	145	144	75	355	137	1	358	353	350	342	339	339	345	347	33	12	140	143	4.4
28-Mar	132	348	345	123	148	147	143	138	143	155	155	173	174	161	148	148	137	127	131	100	125	128	153	133	142.6
29-Mar	130	142	138	137	138	137	136	138	138	141	153	148	148	141	145	139	145	136	131	128	137	126	116	117	138.2
30-Mar	129	356	105	344	338	357	330	327	334	331	331	351	348	352	359	356	3	12	18	13	341	263	172	21	352.8
31-Mar	99	180	176	178	169	157	183	179	160	147	142	136	150	152	186	197	199	206	170	183	170	202	185	173	173.1

81.2 66.9 81.4 72.5 65.2 80.4 67.4 81.9 81.6 109.7 108.0 127.4 171.7 126.5 154.6 111.2 81.3 55.7 42.7 35.3 77.1 101.2 106.3 106.7
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

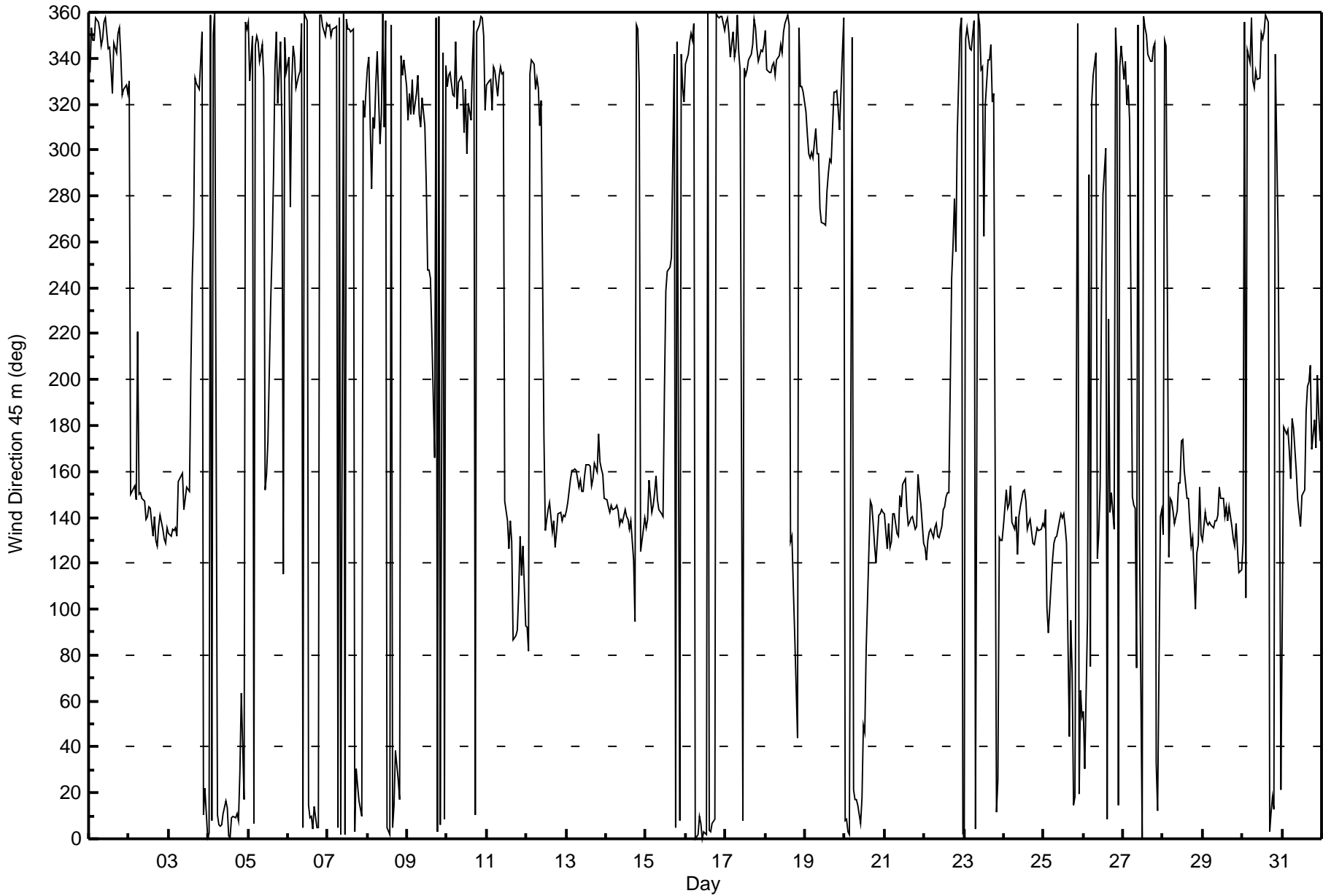
Wind Direction 45 m (WD45m) - deg
Lower Camp Met Tower - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 97 deg on Mar 27 09:00 Minimum Value: 3 deg on Mar 14 06:00 Percentiles: P ₁ = 5 P ₁₀ = 9 Q ₁ = 12 Median = 15 Q ₃ = 22 P ₉₀ = 45 P ₉₉ = 83																	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-Mar	28	16	16	14	10	9	11	10	9	9	13	41	29	23	15	16	14	15	11	14	16	53	8	23	53
2-Mar	32	49	6	9	16	67	10	10	14	14	17	12	19	25	18	12	15	12	12	10	11	13	12	9	67
3-Mar	10	9	10	14	17	22	18	16	24	12	12	16	19	42	51	28	26	17	15	13	18	20	15	13	51
4-Mar	15	18	17	20	18	16	16	15	15	17	14	17	17	15	16	16	18	16	13	21	16	34	16	8	34
5-Mar	22	21	12	11	11	9	13	22	20	43	58	37	38	25	18	24	41	12	30	42	73	45	42	14	73
6-Mar	47	75	12	18	12	20	10	13	15	17	15	17	22	18	17	16	15	14	15	13	15	14	13	13	75
7-Mar	14	14	14	13	15	14	16	13	15	15	16	17	16	18	17	18	20	15	17	54	74	20	9	9	74
8-Mar	11	9	28	44	8	17	17	19	23	45	30	34	21	22	30	27	19	15	13	11	11	10	19	19	45
9-Mar	18	8	10	12	21	11	26	18	31	39	52	60	13	18	16	36	38	67	16	23	25	19	15	22	67
10-Mar	34	12	13	12	13	13	7	6	29	44	49	31	71	39	22	16	18	17	9	6	7	5	17	13	71
11-Mar	13	10	9	9	9	10	11	19	34	39	88	58	44	21	15	27	15	10	8	28	12	20	12	63	88
12-Mar	29	83	33	19	16	14	9	11	30	42	79	23	13	14	15	13	10	11	10	8	8	9	11	11	83
13-Mar	10	8	9	10	9	10	10	11	11	10	10	11	10	10	10	12	11	10	8	8	9	9	8	7	12
14-Mar	5	5	5	4	5	3	4	8	38	11	13	9	11	11	14	13	15	72	13	11	17	36	11	9	72
15-Mar	9	15	13	14	7	8	15	7	7	8	8	47	7	12	8	7	37	14	13	19	44	85	52	43	85
16-Mar	14	17	10	13	14	13	14	14	16	17	15	14	15	14	16	15	15	14	16	11	13	16	20	17	20
17-Mar	25	21	17	21	22	16	14	16	26	35	46	55	22	14	14	14	14	12	12	13	13	11	11	11	55
18-Mar	12	14	13	9	13	15	15	17	18	19	20	46	27	16	33	62	11	19	15	52	14	66	13	31	66
19-Mar	22	15	16	15	14	13	16	14	16	16	15	13	15	20	16	15	13	14	13	13	13	13	19	12	22
20-Mar	21	16	16	14	15	16	14	22	36	26	24	38	43	56	68	14	11	14	22	32	23	20	12	14	68
21-Mar	39	66	11	14	17	11	9	11	22	8	11	8	14	17	13	12	12	11	12	12	12	9	13	22	66
22-Mar	16	16	12	10	11	10	12	11	14	14	16	9	16	20	28	18	17	16	31	46	14	18	14	16	46
23-Mar	16	12	13	12	16	13	14	15	15	16	17	30	26	19	21	12	17	13	12	17	60	42	12	15	60
24-Mar	18	23	25	7	16	12	14	83	97	14	14	15	17	14	11	11	12	10	10	14	10	11	11	10	97
25-Mar	11	11	20	17	14	10	10	11	15	18	15	16	9	14	22	35	39	58	30	18	89	33	47	36	89
26-Mar	37	31	69	54	68	65	64	52	82	15	17	31	14	19	62	47	19	18	12	45	59	21	19	68	82
27-Mar	78	19	29	27	70	11	9	29	97	80	63	80	14	26	24	12	10	47	9	11	45	49	28	8	97
28-Mar	45	11	27	54	9	7	8	9	6	11	11	16	16	18	10	10	17	11	10	14	15	19	81	21	81
29-Mar	30	10	4	8	26	10	10	9	7	8	15	10	15	12	13	11	5	8	26	12	10	15	22	37	37
30-Mar	59	54	87	85	52	43	11	16	14	22	21	58	39	16	13	14	12	19	31	24	28	34	46	87	87
31-Mar	81	14	12	23	11	12	30	25	20	12	9	10	8	11	22	11	14	12	11	14	8	15	13	7	81
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 295 deg on Mar 19 04:00															Hours in Service: 744											
Direction of Maximum Daily Speed Average: 300.8 deg on Mar 19															Hours of Data: 743											
Direction of Minimum Speed: 255 deg on Mar 9 09:00															Hours of Missing Data: 1											
Direction of Minimum Daily Speed Average: 2.6 deg on Mar 5															Percent Operational Time: 99.9											
Monthly Average Direction: 13.9 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-Mar	9	28	11	2	15	24	22	5	31	10	312	338	342	337	324	341	347	5	10	7	22	24	18	328	0.1
2-Mar	316	165	141	183	142	117	144	149	150	130	142	154	135	134	131	138	131	131	138	141	140	138	136	139	138.2
3-Mar	139	139	139	138	138	138	145	146	150	146	150	152	152	214	258	262	328	330	327	338	349	12	23	4	122.9
4-Mar	6	4	12	2	7	12	8	7	7	10	17	12	4	4	9	11	10	13	16	35	61	39	23	12	12.3
5-Mar	10	334	347	354	356	25	90	123	116	112	142	153	158	224	257	283	335	348	29	23	64	96	71	340	20.3
6-Mar	349	8	20	7	357	359	1	360	7	8	0	357	17	10	10	5	13	6	4	1	1	358	355	360	3.8
7-Mar	357	358	354	355	356	358	6	360	2	359	2	356	352	354	352	355	6	29	25	38	24	7	349	352	0.8
8-Mar	348	339	354	3	10	335	316	299	296	254	314	351	6	359	354	3	18	39	34	26	4	360	355	359	2.1
9-Mar	6	349	355	333	313	319	296	312	255	346	335	302	251	255	253	215	147	20	27	27	37	24	18	17	350.7
10-Mar	1	54	53	4	6	332	344	347	327	305	300	312	328	317	320	344	3	15	2	358	350	357	352	23	350.3
11-Mar	3	24	354	24	358	1	2	354	0	297	130	121	133	124	137	128	93	101	105	108	127	125	137	131	114.3
12-Mar	128	129	123	133	124	146	132	28	23	157	136	134	140	141	144	136	140	130	135	141	142	143	146	143	138.4
13-Mar	145	148	156	158	158	159	158	152	153	151	150	156	159	160	159	154	157	164	163	183	169	162	159	156	157.0
14-Mar	156	154	151	152	153	155	157	157	150	149	145	141	129	130	134	138	118	106	86	70	132	133	142	144	143.8
15-Mar	139	140	153	146	153	158	163	164	160	157	171	227	238	244	247	252	307	345	8	9	37	58	36	58	177.9
16-Mar	352	19	2	2	358	2	3	8	15	13	8	8	5	5	7	7	10	11	6	3	2	5	14	2	6.3
17-Mar	2	19	79	43	23	360	340	333	309	294	11	345	338	338	348	350	351	4	3	357	352	352	351	359	354.1
18-Mar	6	351	352	353	349	353	347	350	348	346	339	330	330	344	2	135	135	122	104	88	351	82	3	313	20.1
19-Mar	311	305	299	295	296	296	304	296	293	276	267	267	267	283	290	295	294	323	322	323	317	308	342	357	300.8
20-Mar	9	6	1	0	353	16	20	32	20	10	14	47	50	68	135	140	141	136	130	136	142	141	144	145	83.3
21-Mar	142	139	145	140	144	150	152	152	143	147	155	150	151	144	137	140	142	143	139	140	157	149	146	134	144.2
22-Mar	134	130	135	136	137	134	134	134	130	129	135	139	142	139	139	165	246	258	279	255	314	355	0	3	127.7
23-Mar	7	356	356	352	354	357	1	7	6	359	338	337	273	322	338	345	353	331	337	17	69	133	135	134	0.8
24-Mar	138	155	145	144	149	148	145	150	139	143	141	151	151	144	137	139	141	131	129	130	137	132	136	139	139.7
25-Mar	135	137	118	AF	125	129	133	134	134	137	139	138	139	136	130	85	107	111	61	69	89	116	122	110	126.2
26-Mar	117	134	119	112	111	106	112	118	126	133	147	234	279	298	20	133	136	152	133	83	87	95	118	42	127.5
27-Mar	120	4	67	109	110	147	136	141	148	148	123	297	335	342	339	348	356	8	24	81	130	128	143	147	109.4
28-Mar	141	134	140	136	141	144	149	141	144	152	161	175	175	158	144	143	132	129	130	126	135	138	143	146	143.1
29-Mar	140	143	145	151	147	149	148	152	153	148	160	150	153	139	140	137	143	135	125	126	132	135	133	130	141.8
30-Mar	125	121	135	136	121	120	110	56	35	0	342	356	346	349	357	6	14	18	32	38	358	339	190	183	56.6
31-Mar	188	180	178	194	184	180	209	211	176	155	143	141	158	160	189	202	204	212	180	190	179	217	201	184	185.3

97.6 97.9 100.2 98.8 102.5 111.2 103.6 106.0 102.1 120.4 116.3 129.7 166.8 103.9 114.9 107.2 79.7 67.9 64.1 64.5 91.9 112.4 118.1 117.5
 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 100 m (WD100m) - deg
Lower Camp Met Tower - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 97 deg on Mar 26 16:00	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9
Minimum Value: 3 deg on Mar 29 02:00	
Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 7 Median = 10 Q ₃ = 15 P ₉₀ = 33 P ₉₉ = 84	

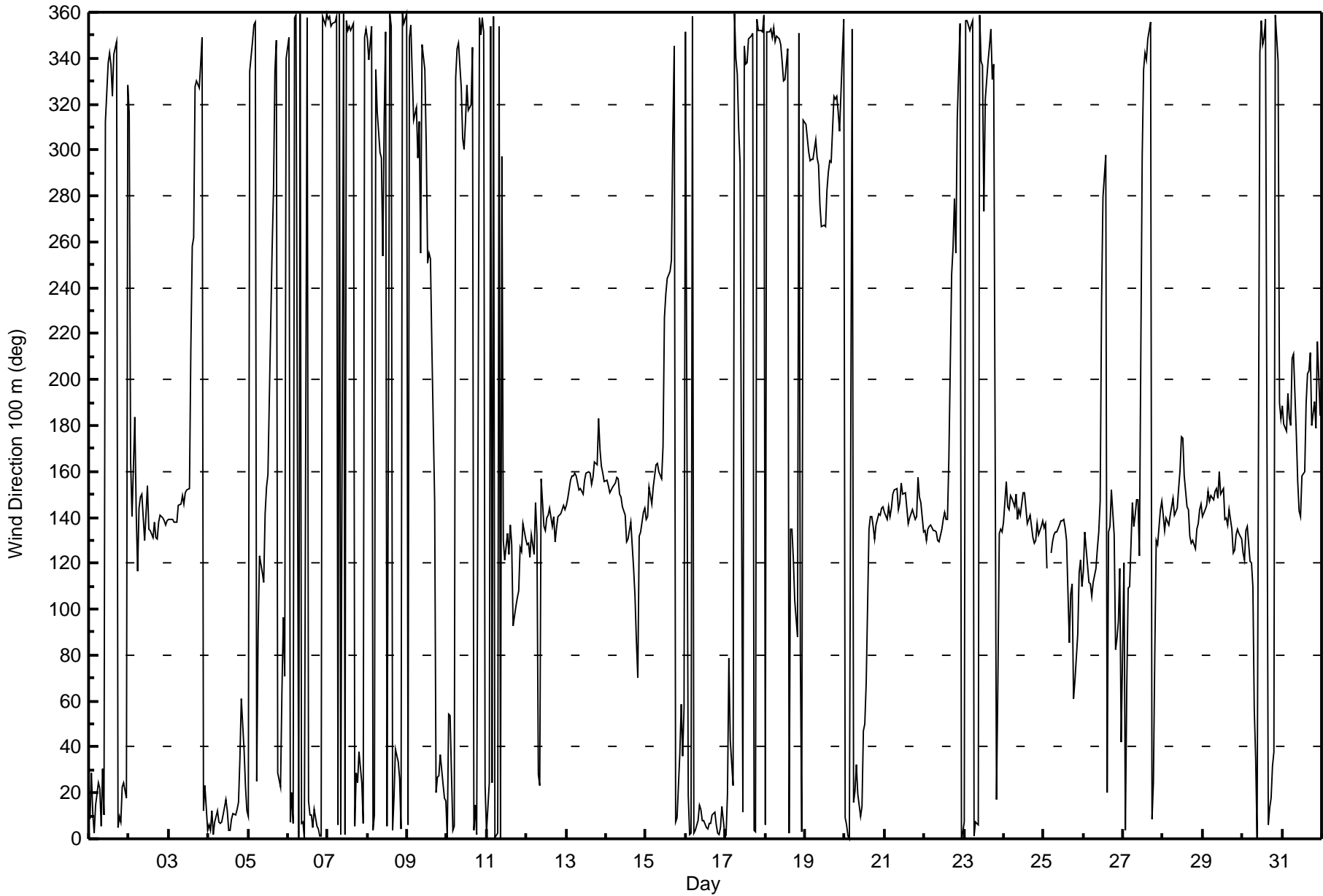
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	14	10	13	6	7	14	15	8	11	36	14	33	22	19	11	12	9	12	10	8	12	16	20	18	36
2-Mar	70	28	8	26	23	18	14	11	11	10	9	10	10	13	8	6	8	7	6	4	5	7	5	4	70
3-Mar	4	3	3	4	4	5	9	7	13	6	9	13	18	34	34	18	24	13	11	9	13	17	11	6	34
4-Mar	10	13	13	13	12	9	8	7	8	9	9	9	11	8	9	10	11	10	10	14	11	21	13	6	21
5-Mar	10	17	4	3	3	16	34	10	12	35	27	28	28	19	24	19	31	11	13	27	14	10	86	6	86
6-Mar	6	15	7	13	7	9	9	9	8	9	7	10	17	9	10	9	8	7	7	7	8	8	7	7	17
7-Mar	9	7	8	7	8	7	8	8	8	10	9	10	10	10	9	11	15	9	12	31	28	16	7	4	31
8-Mar	4	3	7	8	9	21	13	16	29	12	24	25	14	16	18	17	13	12	9	7	11	7	6	7	29
9-Mar	7	7	8	10	10	11	33	52	93	49	44	58	16	19	23	33	54	79	12	15	14	18	11	11	93
10-Mar	11	27	24	34	13	10	8	3	11	29	37	34	38	26	17	12	14	11	7	4	4	6	10	50	50
11-Mar	20	35	14	27	26	61	45	31	43	85	42	41	25	14	9	19	10	6	4	8	7	6	5	5	85
12-Mar	6	6	9	67	73	30	19	57	37	35	12	9	6	8	10	6	5	6	6	4	4	3	5	4	73
13-Mar	4	6	8	8	8	8	9	8	9	8	7	10	9	9	8	9	9	8	8	7	8	6	5	7	10
14-Mar	6	5	7	6	5	5	4	4	9	5	7	7	5	6	8	10	9	8	17	28	25	9	4	3	28
15-Mar	4	11	10	9	7	7	8	7	7	9	17	28	4	8	5	6	32	9	9	8	19	33	38	58	58
16-Mar	20	14	6	7	8	7	7	9	10	10	9	9	9	10	9	9	8	7	11	5	5	8	14	13	20
17-Mar	17	15	47	64	55	65	9	12	18	19	53	58	14	10	11	9	7	7	6	7	7	6	6	9	65
18-Mar	8	8	6	7	7	8	8	9	11	9	16	36	19	13	54	41	5	10	10	38	14	37	35	10	54
19-Mar	12	10	10	10	9	9	12	9	12	12	10	9	10	18	14	10	9	9	8	9	9	9	16	8	18
20-Mar	17	9	8	7	10	12	10	12	25	12	14	33	33	54	63	12	8	7	6	14	6	5	3	4	63
21-Mar	5	15	5	7	7	6	6	6	8	5	14	9	14	13	5	6	5	4	5	5	11	9	7	9	15
22-Mar	7	8	5	5	4	5	5	6	7	9	7	6	10	9	18	23	13	15	25	24	16	10	8	9	25
23-Mar	9	7	5	6	9	7	7	8	11	11	13	26	20	12	15	11	12	9	11	10	53	28	6	7	53
24-Mar	7	17	13	4	9	6	7	11	29	7	9	12	17	13	5	4	8	6	6	10	5	8	7	5	29
25-Mar	6	7	8	AF	6	5	5	4	6	6	6	6	6	9	5	20	15	36	14	9	20	24	14	13	36
26-Mar	10	17	7	17	9	15	38	89	53	7	11	35	8	13	52	97	15	16	10	22	25	71	11	68	97
27-Mar	75	55	60	70	86	10	7	11	14	27	15	88	9	16	14	9	12	31	32	60	13	18	7	9	88
28-Mar	5	7	7	5	5	5	6	5	4	11	11	14	14	15	9	8	10	5	6	7	6	4	25	6	25
29-Mar	4	3	3	3	4	6	4	6	7	7	14	11	15	9	8	6	4	4	7	7	7	4	5	6	15
30-Mar	6	14	14	42	23	9	17	27	23	31	24	29	20	10	9	14	13	16	24	10	13	69	39	38	69
31-Mar	22	10	10	16	10	4	16	19	15	12	7	9	7	9	20	10	12	9	10	14	7	8	13	7	22
	75	55	60	70	86	65	45	89	93	85	53	88	38	54	63	97	54	79	32	60	53	71	86	68	
	Diurnal Maximum																								

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

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





Maximum Value: 0.5 km/h on Mar 20 14:00 Maximum Daily Average: 0.1 km/h on Mar 31																								Hours in Service:	744	
Minimum Value: -0.8 km/h on Mar 19 15:00 Minimum Daily Average: -0.5 km/h on Mar 19																								Hours of Data:	744	
Maximum Diurnal Average: 0.0 km/h at hour 24 Minimum Diurnal Average: -0.1 km/h at hour 14																								Hours of Missing Data:	0	
Monthly Average: -0.08 km/h Percentiles: P ₁ = -0.6 P ₁₀ = -0.3 Q ₁ = -0.2 Median = -0.1 Q ₃ = 0.0 P ₉₀ = 0.1 P ₉₉ = 0.4																								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-Mar	-0.1	0.0	-0.1	0.1	-0.1	-0.3	-0.4	-0.3	-0.6	-0.7	-0.4	0.2	-0.1	0.0	-0.3	-0.3	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	-0.2	0.2
2-Mar	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.1	0.0	-0.1	0.0	0.1	-0.1	0.0	-0.2	-0.2	-0.2	-0.1	-0.3	-0.3	-0.2	-0.2	0.0	0.2
3-Mar	-0.3	-0.3	-0.4	-0.2	-0.2	-0.1	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	-0.1	-0.1	-0.2	0.0	0.0	-0.1	-0.1	-0.1	-0.2	0.0	0.0	-0.1	0.0
4-Mar	-0.1	0.0	-0.1	-0.1	0.0	0.0	0.0	-0.2	0.0	0.1	-0.1	0.0	-0.5	-0.6	-0.3	0.0	-0.1	0.1	0.0	-0.1	0.0	-0.1	0.0	-0.1	0.0	0.1
5-Mar	-0.1	0.1	0.0	0.0	-0.1	0.0	-0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.2	-0.1	0.1	0.2	-0.1	0.0	-0.1	0.1	0.0	0.1	0.0	0.0	0.2
6-Mar	-0.1	0.1	-0.1	-0.2	-0.1	-0.1	-0.3	0.0	-0.1	0.0	-0.5	-0.4	-0.3	-0.1	0.1	-0.3	0.1	-0.3	-0.2	-0.5	-0.1	-0.2	-0.3	-0.1	-0.2	0.1
7-Mar	-0.4	-0.2	-0.3	-0.3	-0.3	-0.4	-0.2	-0.4	-0.2	-0.6	-0.3	-0.4	-0.4	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.1
8-Mar	-0.1	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	-0.1	0.2	0.1	0.2	-0.1	-0.3	0.4	0.0	-0.2	-0.1	-0.1	0.0	-0.1	-0.2	-0.1	0.0	0.0	0.4
9-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	-0.1	-0.2	-0.3	-0.3	-0.1	0.0	0.0	-0.1	-0.1	0.0	-0.1	-0.1	-0.1	0.0	0.2
10-Mar	0.0	-0.1	0.0	-0.1	-0.1	0.0	-0.1	-0.1	-0.1	0.0	0.1	0.2	0.1	-0.2	0.0	-0.1	-0.1	0.0	0.0	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	0.2
11-Mar	-0.1	-0.2	-0.2	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.2	-0.1	-0.1	-0.2	-0.2	0.1	-0.2	-0.2	-0.2	0.0	0.0	0.1	0.1	0.1	-0.1	0.2
12-Mar	0.1	0.1	0.1	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.1	0.1	0.1	-0.1	-0.4	-0.1	-0.3	-0.2	-0.5	-0.3	-0.3	-0.1	-0.1	0.1	0.1	-0.1	0.1
13-Mar	-0.2	-0.3	0.0	0.2	0.1	0.2	0.1	-0.1	0.0	-0.5	-0.3	-0.1	0.2	0.3	0.2	-0.2	0.0	0.2	0.2	0.0	0.2	0.2	0.1	-0.2	0.0	0.3
14-Mar	-0.2	-0.1	-0.1	-0.2	-0.1	-0.2	-0.3	-0.3	-0.2	-0.2	0.0	-0.1	0.0	0.0	-0.2	-0.2	0.0	0.1	-0.2	-0.2	-0.2	0.0	-0.1	-0.1	-0.1	0.1
15-Mar	-0.1	-0.3	0.1	0.0	-0.2	-0.1	0.2	0.0	-0.3	-0.3	-0.1	0.0	-0.2	-0.4	-0.5	-0.4	-0.2	-0.1	-0.2	-0.1	0.1	0.0	-0.1	0.1	-0.1	0.2
16-Mar	-0.1	-0.1	-0.2	-0.1	-0.2	0.0	-0.1	-0.2	-0.1	-0.2	-0.2	-0.3	-0.4	-0.6	-0.1	-0.4	0.0	0.0	0.0	-0.3	-0.1	0.0	-0.1	-0.1	-0.2	0.0
17-Mar	-0.1	-0.1	-0.2	-0.3	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.3	-0.1	0.0	0.1	0.1	-0.2	-0.3	-0.1	0.0	-0.1	0.0	-0.1	0.0	-0.1	0.1
18-Mar	-0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1	-0.3	-0.1	-0.4	-0.5	-0.1	-0.2	-0.2	-0.1	-0.1	-0.2	-0.1	0.0	-0.1	-0.1	-0.1	0.1
19-Mar	-0.4	-0.5	-0.6	-0.5	-0.6	-0.6	-0.1	-0.5	-0.4	-0.3	-0.5	-0.7	-0.6	-0.4	-0.8	-0.7	-0.6	-0.3	-0.3	-0.3	-0.5	-0.7	-0.2	-0.4	-0.5	-0.1
20-Mar	-0.1	0.0	-0.1	-0.3	-0.2	-0.1	0.0	-0.1	0.1	0.3	0.2	-0.1	0.5	0.5	0.0	0.1	-0.1	0.1	-0.1	0.1	0.0	0.3	0.1	0.0	0.0	0.5
21-Mar	0.1	0.0	-0.2	-0.3	-0.2	-0.2	0.0	-0.1	-0.2	0.0	0.1	-0.1	0.1	-0.2	0.0	0.0	0.1	0.1	0.0	-0.1	0.2	-0.1	-0.1	0.0	0.0	0.2
22-Mar	-0.3	-0.2	-0.3	-0.3	0.0	-0.4	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.2	0.0	0.0	0.0	-0.1	-0.2	-0.1	-0.1	0.1
23-Mar	-0.1	-0.1	0.0	0.0	-0.1	-0.2	-0.1	-0.1	-0.2	-0.2	0.0	-0.2	-0.2	-0.1	-0.2	-0.2	-0.1	0.0	-0.1	0.1	0.0	0.0	-0.2	0.0	-0.1	0.1
24-Mar	0.1	0.1	0.1	-0.2	0.0	0.0	0.0	0.1	0.0	-0.2	0.0	0.0	0.0	0.1	0.0	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.3	-0.2	-0.1	0.0	0.1
25-Mar	-0.2	0.0	-0.1	-0.1	-0.1	-0.2	-0.2	-0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.1	0.0	0.1	0.0	0.1
26-Mar	0.0	0.0	0.0	-0.1	0.0	-0.1	-0.2	-0.1	-0.1	0.1	0.0	0.1	-0.1	0.0	0.1	0.1	-0.1	0.0	0.0	-0.1	0.0	0.0	0.0	-0.1	0.0	0.1
27-Mar	0.0	-0.1	0.0	0.0	0.0	0.2	0.0	0.1	0.1	0.0	0.3	0.4	0.4	0.1	0.2	-0.1	0.1	-0.1	-0.2	-0.3	-0.2	0.0	0.2	0.3	0.1	0.4
28-Mar	0.1	-0.1	0.1	0.0	0.2	-0.1	0.0	0.0	-0.1	0.2	0.0	0.2	0.0	0.0	-0.1	-0.1	0.1	-0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.2
29-Mar	-0.1	-0.2	-0.1	-0.4	-0.1	-0.3	-0.1	-0.2	-0.2	-0.1	0.0	-0.1	-0.1	0.1	0.1	0.0	-0.2	-0.1	0.1	0.0	0.0	-0.1	0.1	0.0	-0.1	0.1
30-Mar	0.1	-0.1	0.1	-0.1	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.5	0.0	-0.1	-0.3	-0.1	0.0	-0.1	-0.2	-0.1	-0.1	0.0	0.0	0.0	0.0	0.5
31-Mar	0.1	0.2	0.1	0.1	0.2	0.4	0.3	0.1	0.0	0.0	0.0	-0.1	-0.1	0.0	0.1	0.0	0.0	-0.1	0.2	0.1	0.3	-0.1	0.2	0.4	0.1	0.4
																								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 - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.5 km/h on Mar 19 04:00 Minimum Value: 0.1 km/h on Mar 2 02:00 Percentiles: P ₁ = 0.1 P ₁₀ = 0.3 Q ₁ = 0.7 Median = 1.4 Q ₃ = 2.1 P ₉₀ = 2.8 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-Mar	0.5	0.5	0.6	0.5	1.1	1.3	1.4	1.1	1.1	1.6	1.4	1.8	2.0	2.1	2.2	1.9	1.5	0.8	0.4	0.5	0.2	0.1	0.2	0.2	2.2
2-Mar	0.1	0.1	0.2	0.3	0.3	0.2	0.1	0.3	0.6	0.8	1.0	1.4	1.3	1.5	2.1	2.2	2.4	2.1	2.4	3.3	3.2	2.6	3.0	3.1	3.3
3-Mar	3.0	2.7	3.1	2.9	2.6	2.0	1.0	1.5	1.5	2.7	1.8	1.6	1.7	1.0	0.9	1.1	2.0	2.4	2.0	3.2	2.9	2.1	2.3	2.2	3.2
4-Mar	2.3	2.1	1.8	1.0	1.5	2.6	2.2	2.7	2.6	2.9	3.2	2.8	2.5	2.8	2.8	2.5	2.1	1.7	1.1	1.1	1.2	0.9	0.6	0.8	3.2
5-Mar	0.7	0.7	0.7	0.3	0.3	0.4	0.5	0.6	0.9	0.9	1.0	1.1	1.1	1.5	1.6	1.5	1.2	0.8	0.2	0.5	0.2	0.2	0.1	0.2	1.6
6-Mar	0.4	0.3	0.3	0.8	0.6	0.5	1.0	1.0	2.1	2.0	2.7	2.3	2.2	2.7	2.8	3.2	3.6	3.5	3.0	2.5	2.5	2.3	2.2	2.2	3.6
7-Mar	2.3	2.8	2.3	2.5	2.5	2.1	2.9	2.6	2.5	3.3	3.2	3.0	2.7	2.8	2.7	2.6	2.3	2.2	1.8	1.0	0.8	0.7	0.4	0.4	3.3
8-Mar	0.3	0.2	0.2	0.2	0.1	0.2	0.1	0.2	0.3	0.9	1.5	2.0	2.7	2.3	2.0	2.0	2.1	2.2	1.5	1.5	0.7	0.4	0.3	0.2	2.7
9-Mar	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.5	0.9	1.5	1.7	1.8	1.9	1.7	1.2	0.7	0.6	0.7	0.9	0.9	0.6	0.3	0.2	1.9
10-Mar	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.5	0.8	1.2	1.6	1.6	1.9	2.0	2.0	1.7	1.4	1.0	0.9	0.9	0.7	0.3	0.2	2.0
11-Mar	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.7	0.9	0.8	1.0	1.1	1.8	2.1	2.0	1.7	1.9	1.3	0.8	0.7	0.8	0.7	1.0	0.5	2.1
12-Mar	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.6	0.8	0.9	2.4	3.3	2.7	2.5	3.1	3.3	2.6	1.9	2.9	3.2	3.3	2.9	3.2	3.3
13-Mar	3.4	3.0	2.5	2.4	2.6	2.7	2.8	3.0	2.7	3.0	3.0	2.6	2.7	2.7	2.5	2.6	2.3	1.9	1.6	1.4	1.7	2.1	2.1	1.5	3.4
14-Mar	1.4	1.5	1.5	1.2	1.4	1.4	1.6	1.7	1.9	2.4	2.2	1.8	1.5	1.6	1.6	1.4	0.7	0.2	0.8	0.9	0.6	1.1	2.6	3.4	3.4
15-Mar	2.8	2.7	1.9	1.9	1.6	1.3	1.4	1.5	1.8	2.2	1.5	1.3	1.9	1.9	2.4	2.3	1.6	1.4	1.3	0.8	0.3	0.5	0.6	0.3	2.8
16-Mar	0.5	0.7	1.4	2.0	2.0	2.6	2.8	2.8	2.8	2.8	3.1	3.2	3.2	3.1	3.1	3.2	3.2	2.8	2.2	2.4	2.4	2.1	1.6	1.5	3.2
17-Mar	1.6	1.1	0.9	0.9	1.0	1.0	1.3	1.2	1.2	1.2	1.2	1.5	1.8	1.7	1.5	1.6	1.8	1.9	1.7	1.1	0.8	0.8	0.8	0.8	1.9
18-Mar	1.1	1.0	0.8	0.5	0.6	0.9	0.9	1.0	1.2	1.5	1.6	1.8	1.6	1.7	1.5	2.3	2.3	1.4	1.0	0.6	0.9	0.4	0.4	0.4	2.3
19-Mar	2.8	3.7	4.2	4.5	4.0	3.2	2.6	2.8	2.8	3.1	3.1	3.1	3.3	3.4	3.5	3.8	3.9	3.4	3.8	3.7	3.3	3.0	2.8	2.1	4.5
20-Mar	2.6	2.3	2.2	2.1	1.7	1.2	0.9	0.9	1.3	1.7	2.0	1.9	2.0	1.7	1.5	1.7	1.7	1.6	1.1	0.7	1.5	2.3	2.7	2.9	2.9
21-Mar	1.8	1.3	1.5	1.0	1.0	1.0	0.9	1.1	1.3	1.5	1.4	1.4	1.9	2.5	3.3	3.6	3.2	3.6	3.3	3.4	2.5	1.9	2.6	2.4	3.6
22-Mar	2.6	2.4	2.9	2.8	2.9	2.4	2.0	2.0	1.8	1.7	2.2	1.9	1.4	1.3	1.0	0.9	0.8	0.9	0.6	0.6	0.5	1.4	2.7	2.4	2.9
23-Mar	1.6	1.3	1.3	0.7	0.9	1.3	1.8	2.0	1.8	1.7	1.5	1.8	2.2	2.0	1.7	1.4	1.2	1.2	1.1	1.0	0.6	1.6	1.5	2.1	2.2
24-Mar	1.9	1.2	1.3	1.6	1.1	0.7	0.6	0.9	1.6	1.8	1.8	1.7	1.7	1.7	2.6	3.0	2.6	2.3	1.5	1.9	2.7	2.8	2.5	2.4	3.0
25-Mar	1.9	1.1	0.9	0.7	1.2	1.5	2.3	2.5	2.1	1.8	1.8	1.7	1.3	0.8	0.6	0.5	0.5	0.4	0.3	0.4	0.4	0.4	0.4	0.3	2.5
26-Mar	0.4	0.2	0.4	0.4	0.5	0.5	0.5	0.6	1.2	2.2	1.4	1.2	1.7	1.1	0.9	0.9	1.1	0.9	0.5	0.4	0.3	0.3	0.4	0.6	2.2
27-Mar	0.3	0.3	0.1	0.2	0.1	0.6	0.7	0.5	0.4	0.7	0.8	1.3	1.7	1.5	1.1	1.2	1.0	1.1	0.9	1.0	1.2	1.4	0.8	1.0	1.7
28-Mar	0.9	0.6	0.4	0.4	0.7	1.2	1.6	1.5	1.6	1.4	1.4	1.3	1.4	1.6	1.6	1.7	1.5	1.8	1.2	0.4	1.0	1.7	0.7	1.4	1.8
29-Mar	1.1	1.3	1.1	1.1	0.7	1.2	0.9	1.3	1.5	1.7	1.8	1.9	1.9	2.0	2.0	1.7	1.6	1.3	0.6	1.1	1.3	1.7	1.6	1.0	2.0
30-Mar	0.5	0.4	0.6	0.7	0.5	0.5	0.4	0.4	0.6	0.6	0.8	0.8	1.1	1.3	1.2	1.2	1.0	0.9	0.8	0.6	0.6	0.2	0.2	0.4	1.3
31-Mar	0.6	0.6	0.8	0.7	0.5	0.9	1.0	0.7	1.1	1.8	2.0	2.4	2.2	2.2	1.9	1.9	2.0	1.7	1.4	1.3	1.5	1.4	1.8	1.5	2.4
3.4 3.7 4.2 4.5 4.0 3.2 2.9 3.0 2.8 3.3 3.2 3.2 3.3 3.4 3.5 3.8 3.9 3.6 3.8 3.7 3.3 3.3 3.0 3.4																									
Diurnal Maximum																									



Maximum Value: 1.3 km/h on Mar 21 17:00																				Maximum Daily Average: 0.9 km/h on Mar 13					Hours in Service: 744	
Minimum Value: -1.8 km/h on Mar 19 16:00																				Minimum Daily Average: -1.1 km/h on Mar 19					Hours of Data: 744	
Maximum Diurnal Average: 0.2 km/h at hour 11																				Minimum Diurnal Average: 0.0 km/h at hour 20					Hours of Missing Data: 0	
Monthly Average: 0.11 km/h																				Percentiles: P ₁ = -1.3 P ₁₀ = -0.4 Q ₁ = -0.2 Median = 0.0 Q ₃ = 0.4 P ₉₀ = 0.8 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-Mar	-0.2	-0.1	-0.1	-0.1	-0.2	-0.3	-0.6	-0.4	-0.5	-0.6	-0.4	0.5	0.0	0.0	-0.7	-0.3	-0.2	-0.1	-0.1	-0.2	-0.1	0.1	-0.1	0.0	-0.2	0.5
2-Mar	0.0	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.5	0.3	0.1	0.2	0.3	0.6	0.6	0.8	0.7	0.4	0.7	1.0	0.7	0.6	0.8	0.8	0.4	1.0
3-Mar	0.8	0.8	0.8	0.9	0.9	0.6	0.1	0.5	0.5	0.8	0.6	0.3	0.4	-0.2	-0.2	-0.1	-0.4	-0.5	-0.5	-0.6	-0.5	0.0	0.3	-0.4	0.2	0.9
4-Mar	-0.2	-0.1	-0.1	-0.1	-0.1	0.0	0.1	-0.5	0.0	0.1	-0.1	0.1	-0.3	-0.6	-0.3	-0.1	0.0	0.1	-0.1	0.2	0.3	0.0	-0.2	-0.2	-0.1	0.3
5-Mar	-0.1	-0.1	-0.1	0.0	-0.1	-0.1	-0.3	-0.1	-0.1	-0.1	0.1	-0.1	0.0	-0.1	0.0	0.0	0.3	-0.1	0.0	-0.1	0.0	0.1	0.0	-0.1	-0.1	0.3
6-Mar	-0.1	0.1	-0.2	-0.4	-0.3	-0.5	-0.6	-0.3	0.0	0.0	-0.5	-0.3	0.0	0.1	-0.1	-0.4	0.0	0.0	-0.2	-0.4	-0.3	-0.4	-0.4	-0.3	-0.2	0.1
7-Mar	-0.5	-0.4	-0.3	-0.4	-0.4	-0.3	-0.2	-0.6	-0.2	-0.8	-0.5	-0.6	-0.5	-0.5	-0.4	-0.3	-0.1	0.2	0.1	-0.1	0.0	-0.2	-0.3	-0.3	-0.3	0.2
8-Mar	-0.3	-0.2	-0.1	0.0	-0.1	-0.1	0.0	0.0	-0.1	0.3	0.1	0.4	-0.2	-0.2	0.3	0.0	-0.1	0.1	0.1	0.0	-0.3	-0.4	-0.2	0.0	0.0	0.4
9-Mar	-0.1	-0.1	-0.1	0.0	0.0	-0.1	0.0	0.0	-0.1	0.0	0.4	0.2	-0.5	-0.4	-0.7	-0.2	0.1	-0.1	-0.1	-0.2	0.0	-0.2	-0.1	-0.3	-0.1	0.4
10-Mar	-0.1	-0.2	-0.2	-0.3	-0.2	-0.1	-0.3	-0.2	-0.1	0.0	0.4	0.3	0.3	-0.2	0.0	-0.5	-0.2	0.0	-0.2	-0.2	-0.3	-0.2	-0.2	-0.2	-0.1	0.4
11-Mar	-0.3	-0.4	-0.4	-0.4	-0.5	-0.3	-0.2	0.0	0.0	0.0	0.3	-0.1	0.5	0.5	0.5	0.6	0.3	0.2	0.2	0.3	0.4	0.3	0.7	0.3	0.1	0.7
12-Mar	0.3	0.2	0.0	-0.1	-0.2	-0.3	-0.4	-0.3	-0.2	0.0	0.0	0.8	1.1	0.8	0.8	0.9	0.9	0.6	0.6	1.1	1.2	1.1	1.0	1.2	0.5	1.2
13-Mar	1.1	0.9	0.9	1.0	0.8	1.0	0.9	1.2	1.1	1.1	1.3	1.1	1.1	1.2	1.0	0.8	0.8	0.6	0.8	-0.2	0.5	0.6	0.8	0.9	0.9	1.3
14-Mar	0.9	1.0	0.9	0.8	1.0	0.9	1.0	1.0	0.2	0.6	0.6	0.5	0.6	0.5	0.4	0.4	0.3	0.1	-0.2	-0.4	-0.4	0.4	0.9	1.3	0.6	1.3
15-Mar	1.0	0.7	0.7	0.8	0.7	0.6	0.7	0.9	0.8	0.8	0.6	0.3	-0.2	-0.5	-0.6	-0.8	-0.4	-0.1	-0.1	-0.2	0.0	-0.1	-0.1	0.0	0.2	1.0
16-Mar	-0.3	-0.2	-0.4	-0.2	-0.3	-0.4	-0.1	-0.2	-0.2	-0.1	-0.3	-0.5	-0.5	-0.4	-0.2	-0.4	0.1	0.0	-0.2	-0.4	-0.2	0.0	0.0	-0.2	-0.2	0.1
17-Mar	-0.1	-0.2	-0.3	-0.5	-0.3	-0.2	-0.1	-0.2	-0.2	-0.1	-0.1	-0.4	-0.3	-0.3	-0.1	0.0	-0.3	-0.2	-0.2	-0.2	-0.1	-0.1	-0.2	-0.1	-0.2	0.0
18-Mar	-0.1	-0.1	0.0	-0.1	-0.1	-0.1	0.0	-0.1	0.0	-0.1	-0.3	0.2	-0.1	-0.2	-0.1	0.4	0.7	0.4	0.2	-0.1	-0.1	0.0	-0.4	-0.2	0.0	0.7
19-Mar	-0.9	-1.3	-1.6	-1.3	-1.5	-1.3	-0.7	-1.2	-1.1	-1.0	-0.9	-1.1	-1.1	-0.8	-1.5	-1.8	-1.6	-0.9	-1.2	-1.3	-1.1	-1.5	-0.4	-0.3	-1.1	-0.3
20-Mar	-0.1	0.0	-0.2	-0.3	-0.3	0.1	-0.1	0.0	0.1	0.4	0.4	0.0	0.7	0.8	0.2	0.5	0.4	0.4	0.4	0.1	0.3	1.0	0.8	0.9	0.3	1.0
21-Mar	0.6	0.0	0.2	-0.2	0.0	0.0	0.3	0.1	0.0	0.5	0.4	0.2	0.6	0.7	1.0	1.3	1.3	1.3	1.2	0.9	0.7	0.5	1.1	0.8	0.6	1.3
22-Mar	0.6	0.7	0.6	0.7	0.7	0.5	0.6	0.8	0.5	0.5	0.7	0.6	0.5	0.3	0.2	0.3	-0.1	-0.3	0.0	0.0	-0.1	-0.1	-0.2	-0.2	0.3	0.8
23-Mar	-0.2	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.1	-0.2	-0.3	-0.2	-0.2	-0.2	-0.4	-0.2	-0.4	-0.2	-0.3	-0.4	0.1	0.1	0.4	0.5	0.7	-0.1	0.7
24-Mar	0.5	0.3	0.4	0.6	0.1	0.4	0.3	0.2	0.2	0.5	0.6	0.5	0.5	0.7	0.9	0.9	0.8	0.6	0.4	0.6	0.9	0.9	0.9	0.8	0.6	0.9
25-Mar	0.5	0.4	0.2	0.1	0.3	0.4	0.5	0.6	0.5	0.7	0.6	0.5	0.4	0.3	0.2	0.1	0.1	0.0	-0.1	0.0	-0.1	0.0	0.1	0.0	0.3	0.7
26-Mar	0.1	0.0	0.0	-0.1	0.1	-0.1	-0.2	-0.1	0.2	0.6	0.2	0.2	-0.4	-0.1	0.2	0.2	0.2	0.2	0.2	-0.2	-0.1	0.0	-0.1	-0.3	0.0	0.6
27-Mar	-0.1	-0.2	0.0	0.0	0.0	0.6	0.2	0.2	0.1	-0.1	0.4	0.3	0.3	0.1	0.1	-0.1	-0.1	-0.3	-0.4	-0.5	-0.2	0.0	0.7	1.1	0.1	1.1
28-Mar	0.6	-0.3	0.1	0.3	0.7	0.4	0.7	0.7	0.7	0.7	0.5	0.2	-0.1	0.1	0.4	0.4	0.6	0.5	0.7	0.3	0.7	0.6	0.1	0.4	0.4	0.7
29-Mar	0.1	0.6	0.8	0.2	0.1	0.1	0.3	0.4	0.5	0.4	0.6	0.6	0.5	0.8	0.8	0.8	0.9	0.8	0.4	0.6	0.4	0.6	0.4	0.5	0.5	0.9
30-Mar	0.3	0.0	0.2	-0.3	-0.1	0.0	-0.2	-0.2	-0.1	0.0	0.1	0.6	0.1	-0.2	-0.2	-0.1	0.0	-0.1	-0.3	0.0	-0.1	0.0	0.1	0.1	0.0	0.6
31-Mar	0.1	0.0	0.1	0.3	0.4	1.0	0.6	0.3	0.3	0.6	0.7	0.7	1.0	1.0	0.0	-0.6	-0.4	-0.4	0.2	-0.1	0.3	-0.3	-0.2	0.2	0.2	1.0
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 1 Maximum Value: 5.0 km/h on Mar 19 04:00 Minimum Value: 0.1 km/h on Mar 27 05:00 Percentiles: P ₁ = 0.1 P ₁₀ = 0.4 Q ₁ = 0.8 Median = 1.4 Q ₃ = 2.2 P ₉₀ = 2.8 P ₉₉ = 4.1																								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-Mar	0.5	0.5	0.6	0.6	1.0	1.1	1.2	1.0	0.9	1.2	1.2	1.9	2.2	2.2	2.4	2.0	1.5	1.0	0.4	0.5	0.2	0.1	0.1	0.2	2.4
2-Mar	0.1	0.2	0.2	0.4	0.4	0.2	0.2	0.4	0.8	0.8	0.9	1.2	1.3	1.7	1.9	2.0	2.3	2.0	2.4	3.0	2.9	2.8	2.8	2.7	3.0
3-Mar	2.5	2.3	2.7	2.8	2.7	1.9	1.1	1.7	1.7	2.3	1.8	1.5	1.6	1.1	1.0	1.2	2.2	2.8	2.4	3.7	3.1	2.2	2.3	2.1	3.7
4-Mar	2.4	2.1	2.0	1.1	1.6	2.7	2.5	2.8	2.7	3.1	3.1	2.7	2.3	2.6	2.5	2.5	2.1	1.8	1.2	1.3	1.4	1.1	0.6	0.6	3.1
5-Mar	0.7	0.8	0.7	0.3	0.2	0.3	0.4	0.6	0.8	0.8	1.2	1.1	1.3	1.7	1.8	1.7	1.5	0.7	0.2	0.4	0.4	0.2	0.2	0.2	1.8
6-Mar	0.3	0.5	0.5	0.9	0.7	0.7	1.3	1.4	2.2	2.1	2.8	2.5	2.1	2.6	2.8	3.2	3.6	3.5	3.2	2.5	2.6	2.3	2.4	2.2	3.6
7-Mar	2.3	3.0	2.6	2.5	2.5	2.0	2.9	2.5	2.7	3.3	3.2	3.0	2.8	2.8	2.9	2.7	2.3	2.3	1.7	1.2	1.0	0.9	0.5	0.6	3.3
8-Mar	0.4	0.2	0.4	0.2	0.1	0.1	0.1	0.1	0.2	0.9	1.7	2.2	2.7	2.4	2.1	2.1	2.1	2.0	1.5	1.5	0.8	0.5	0.3	0.2	2.7
9-Mar	0.2	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.4	0.9	1.7	1.8	1.8	1.9	1.6	1.3	0.7	0.7	0.9	1.1	1.1	0.7	0.4	0.3	1.9
10-Mar	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.4	0.8	1.4	1.7	1.8	2.2	2.3	2.0	1.9	1.4	1.0	0.7	0.6	0.4	0.2	0.3	2.3
11-Mar	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.7	0.9	0.8	1.0	1.1	1.9	2.0	1.9	1.8	1.8	1.3	0.8	0.9	0.9	1.0	1.1	0.7	2.0
12-Mar	0.4	0.5	0.4	0.4	0.6	0.5	0.4	0.3	0.6	0.8	1.0	2.5	3.0	2.7	2.5	2.9	2.8	2.3	1.7	2.4	2.6	2.8	2.8	3.1	3.1
13-Mar	3.3	2.8	2.9	2.9	3.2	3.1	3.2	3.1	2.8	3.0	3.2	3.1	3.3	3.2	2.8	2.6	2.4	2.2	1.7	1.5	2.0	2.4	2.3	1.4	3.3
14-Mar	1.1	1.1	1.1	1.0	1.1	1.1	1.1	1.2	1.8	2.3	2.0	1.5	1.3	1.4	1.5	1.1	0.7	0.3	0.8	0.9	1.0	1.4	2.3	3.1	3.1
15-Mar	2.4	2.4	2.2	2.0	1.5	1.4	1.5	1.4	1.4	1.8	1.4	1.3	1.7	1.8	2.0	1.9	1.8	1.6	1.3	1.0	0.5	0.6	0.6	0.4	2.4
16-Mar	0.6	0.7	1.4	2.1	2.1	2.7	2.8	2.8	2.9	2.9	3.1	3.0	3.1	3.2	3.1	3.1	3.2	2.9	2.2	2.3	2.4	2.3	1.7	1.6	3.2
17-Mar	1.6	1.1	1.0	1.0	1.2	1.2	1.3	1.1	1.2	1.1	1.1	1.4	1.8	1.9	1.6	1.7	1.8	1.9	1.7	1.4	1.1	1.0	1.1	0.9	1.9
18-Mar	1.2	1.1	1.0	0.6	0.8	1.1	1.1	1.2	1.3	1.6	1.6	1.9	1.6	1.8	1.4	2.1	2.0	1.4	1.0	0.6	0.8	0.4	0.4	0.4	2.1
19-Mar	3.0	4.3	4.6	5.0	4.5	3.4	3.0	3.0	3.0	3.5	3.3	3.5	3.5	3.7	3.8	4.1	4.2	4.1	4.3	4.3	3.9	3.3	3.1	1.9	5.0
20-Mar	2.6	2.3	2.3	2.1	1.7	1.2	0.9	1.0	1.5	1.8	2.2	2.1	2.2	1.9	1.8	1.5	1.4	1.5	1.1	1.0	1.8	2.6	2.7	3.1	3.1
21-Mar	2.3	1.4	1.5	1.1	1.2	1.2	1.0	1.0	1.4	1.2	1.2	1.2	2.0	2.4	2.9	3.5	3.0	3.4	3.2	3.0	2.6	2.0	2.8	2.6	3.5
22-Mar	2.6	2.3	2.6	2.5	2.7	2.1	2.0	1.8	1.7	1.6	2.1	1.6	1.4	1.4	1.0	0.8	0.7	0.9	0.6	0.7	0.6	1.4	2.9	2.6	2.9
23-Mar	1.8	1.4	1.4	0.8	1.1	1.4	1.7	2.0	1.7	1.6	1.6	2.0	2.1	2.2	1.8	1.4	1.3	1.4	1.3	1.0	0.5	1.6	1.5	2.3	2.3
24-Mar	2.1	1.4	1.4	1.3	1.3	0.7	0.8	0.8	0.9	1.5	1.7	1.7	1.6	1.8	2.5	2.9	2.5	2.0	1.4	1.7	2.4	2.5	2.3	2.1	2.9
25-Mar	1.8	1.0	1.0	0.9	1.2	1.5	2.0	2.3	1.9	2.0	1.7	1.5	1.1	0.8	0.6	0.4	0.5	0.3	0.4	0.4	0.5	0.4	0.5	0.4	2.3
26-Mar	0.4	0.3	0.6	0.5	0.5	0.5	0.7	0.7	1.3	2.1	1.3	1.4	1.9	1.2	0.9	1.0	1.1	0.9	0.5	0.4	0.3	0.3	0.5	0.8	2.1
27-Mar	0.4	0.3	0.1	0.2	0.1	0.7	0.7	0.5	0.4	0.7	1.0	1.4	1.7	1.5	1.1	1.3	1.3	1.4	0.9	1.2	1.3	1.8	1.2	1.1	1.8
28-Mar	1.0	0.8	0.7	0.6	1.0	1.3	1.5	1.3	1.2	1.4	1.5	1.5	1.8	1.7	1.5	1.6	1.5	1.5	1.1	0.5	0.9	1.9	1.1	1.5	1.9
29-Mar	1.4	1.2	0.7	1.0	0.9	1.1	0.8	1.1	1.1	1.4	1.8	1.7	1.8	1.8	1.8	1.5	1.1	1.1	0.6	1.2	1.3	1.7	1.8	1.2	1.8
30-Mar	0.7	0.7	0.8	0.8	0.8	0.6	0.6	0.4	0.5	0.6	0.8	0.9	1.1	1.3	1.2	1.1	0.9	0.9	0.9	0.7	0.7	0.2	0.2	0.5	1.3
31-Mar	0.6	0.6	0.9	0.8	0.6	0.9	1.1	0.7	1.1	1.5	1.6	2.0	2.0	2.2	2.4	2.3	2.5	1.8	1.5	1.4	1.7	1.6	2.0	1.7	2.5
Diurnal Maximum																									
3.3 4.3 4.6 5.0 4.5 3.4 3.2 3.1 3.0 3.5 3.3 3.5 3.5 3.7 3.8 4.1 4.2 4.1 4.3 4.3 3.9 3.3 3.1 3.1																									



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.6 km/h on Mar 19 03:00 Minimum Value: 0.1 km/h on Mar 8 07:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.9 Median = 1.5 Q ₃ = 2.1 P ₉₀ = 2.6 P ₉₉ = 3.9																								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-Mar	0.6	0.7	0.6	0.4	0.6	0.7	0.6	0.7	0.4	0.4	0.9	2.4	2.8	2.9	3.0	2.6	1.4	0.9	0.3	0.2	0.6	0.3	0.2	0.2	3.0
2-Mar	0.2	0.3	0.4	0.5	0.4	0.3	0.4	0.6	0.7	0.7	0.6	0.7	1.2	1.7	2.1	1.8	2.3	2.3	2.2	2.2	2.5	3.1	2.3	2.0	3.1
3-Mar	1.8	1.5	1.6	1.8	1.5	1.6	1.4	2.2	2.1	1.9	1.9	1.8	2.0	1.3	0.9	1.2	2.2	2.3	2.2	3.2	2.8	2.3	2.4	1.7	3.2
4-Mar	2.3	2.3	2.2	1.4	2.0	2.9	2.7	2.6	2.4	3.0	2.9	2.3	2.3	2.1	2.2	2.2	1.8	1.6	1.1	1.5	1.9	1.5	0.8	0.5	3.0
5-Mar	0.5	0.5	0.4	0.3	0.2	0.4	0.5	0.6	0.6	0.8	1.5	1.3	1.7	1.8	2.1	1.8	1.7	0.5	0.3	0.4	0.6	0.7	0.3	0.2	2.1
6-Mar	0.3	0.8	1.1	1.5	1.1	1.1	1.8	1.7	2.2	2.0	2.2	2.1	2.4	2.5	2.6	2.5	3.3	2.8	2.7	2.4	2.4	2.3	2.1	1.8	3.3
7-Mar	2.2	2.4	2.2	2.0	2.2	1.6	2.4	2.3	2.5	3.0	2.7	2.6	2.6	2.5	2.6	2.2	2.5	2.5	1.9	1.7	1.7	1.4	0.5	0.6	3.0
8-Mar	0.4	0.3	0.4	0.4	0.2	0.2	0.1	0.2	0.2	0.6	2.1	2.6	2.9	2.3	2.5	2.6	2.5	2.3	1.8	1.4	1.1	0.6	0.3	0.5	2.9
9-Mar	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.3	1.9	2.2	1.8	2.0	2.0	1.3	0.6	1.0	1.2	1.9	2.0	1.5	0.7	0.4	2.2
10-Mar	0.4	0.3	0.4	0.2	0.3	0.3	0.4	0.3	0.3	0.3	1.0	1.5	2.1	3.0	3.0	2.3	1.7	1.4	0.7	0.4	0.5	0.5	0.5	0.5	3.0
11-Mar	0.4	0.6	0.3	0.5	0.3	0.3	0.3	0.3	0.4	0.3	0.8	1.3	2.6	2.4	2.4	2.1	1.7	0.9	0.4	1.0	1.2	1.3	1.4	1.1	2.6
12-Mar	0.9	1.0	1.0	0.4	0.7	0.5	0.5	0.3	0.5	0.3	1.0	2.3	3.0	2.7	2.8	2.6	2.5	2.5	1.8	2.3	2.4	2.4	2.7	2.4	3.0
13-Mar	2.6	2.9	3.4	3.6	3.8	3.8	4.0	3.5	3.4	3.2	3.4	4.0	4.0	3.9	3.5	3.0	2.9	2.3	2.0	1.6	2.1	2.3	2.2	2.0	4.0
14-Mar	1.5	1.4	1.3	1.4	1.4	1.4	1.5	1.5	1.6	1.5	1.2	1.2	1.1	1.2	1.4	1.2	0.8	0.8	0.8	1.0	1.4	1.7	2.0	1.9	2.0
15-Mar	1.9	1.7	2.4	1.8	1.9	2.1	1.7	1.6	1.5	1.6	1.6	1.5	1.6	1.2	1.2	1.1	1.9	1.7	1.3	1.3	1.2	1.4	0.9	0.4	2.4
16-Mar	0.4	0.6	1.1	1.9	1.8	2.4	2.5	2.6	2.9	2.6	2.6	2.5	2.7	2.6	2.7	2.7	2.7	2.4	2.0	1.5	1.6	1.6	1.9	1.4	2.9
17-Mar	1.4	1.0	1.2	1.3	1.2	1.4	1.2	0.6	0.9	1.0	0.6	1.1	1.7	2.0	1.8	1.5	1.5	1.2	1.4	1.3	1.3	1.2	1.2	1.1	2.0
18-Mar	1.0	0.8	0.7	0.5	0.7	0.8	0.9	1.0	1.2	1.3	1.6	1.6	1.4	0.8	1.6	2.1	1.5	1.2	1.1	0.5	0.4	0.7	0.2	0.6	2.1
19-Mar	2.9	4.3	4.6	4.5	3.9	3.2	3.4	2.8	2.8	3.5	2.8	2.8	3.3	3.6	4.0	3.7	3.6	3.8	3.8	3.8	3.7	3.3	3.1	1.3	4.6
20-Mar	2.4	1.8	2.2	1.8	1.5	1.3	0.8	1.2	1.6	1.3	1.5	1.8	2.1	2.3	2.0	1.4	1.6	1.5	1.1	1.6	1.8	2.0	2.1	2.2	2.4
21-Mar	1.7	2.5	1.7	1.6	1.8	1.3	1.1	1.0	1.4	1.3	1.3	1.6	2.3	2.6	2.4	3.0	2.6	2.7	2.6	2.5	3.3	2.6	2.7	2.7	3.3
22-Mar	2.5	2.4	2.3	2.2	2.2	2.0	1.8	1.7	1.6	1.8	2.0	1.0	1.1	1.2	1.2	0.6	0.6	0.7	0.6	1.1	0.7	1.6	2.3	2.1	2.5
23-Mar	1.8	1.2	1.1	0.9	1.4	1.3	1.4	1.7	1.5	1.4	1.6	2.3	2.3	2.5	2.2	1.4	1.1	0.9	1.0	0.6	0.7	1.7	1.5	2.0	2.5
24-Mar	1.9	1.9	1.6	1.3	2.0	1.2	1.1	1.3	1.1	1.3	1.8	2.1	2.0	2.0	2.0	2.0	2.3	1.9	1.5	2.0	2.1	2.4	2.4	2.0	2.4
25-Mar	1.8	1.0	1.1	AF	1.3	1.3	1.8	1.8	1.6	1.5	1.3	1.3	0.9	0.8	0.5	0.4	0.6	0.4	0.4	0.4	0.9	0.9	0.7	0.7	1.8
26-Mar	0.8	0.8	1.0	1.0	0.8	0.9	1.3	1.0	1.2	1.8	1.5	1.6	1.5	1.1	0.8	1.0	0.9	1.3	0.7	0.6	0.7	0.5	0.8	0.4	1.8
27-Mar	0.6	0.3	0.2	0.3	0.2	0.7	0.7	0.6	0.7	0.5	0.8	0.9	0.9	1.3	1.1	1.2	1.2	2.0	1.5	1.5	1.7	2.2	2.1	1.8	2.2
28-Mar	1.3	1.2	1.2	1.2	1.4	1.7	1.7	1.5	1.5	1.8	2.0	1.7	2.0	2.3	1.9	1.8	1.6	1.3	1.3	0.9	1.3	1.4	1.9	1.6	2.3
29-Mar	1.6	1.2	1.2	0.9	1.0	1.0	0.9	1.0	1.0	1.4	1.8	2.0	2.0	1.8	2.0	1.7	1.0	0.9	0.9	1.5	1.5	1.2	1.3	1.0	2.0
30-Mar	0.9	1.3	1.7	1.3	1.2	0.9	0.9	0.5	0.5	0.4	0.7	1.1	1.3	1.1	0.8	1.0	0.9	1.3	1.3	0.9	0.4	0.3	0.4	0.9	1.7
31-Mar	1.0	0.9	1.2	1.2	0.8	0.7	1.1	1.1	1.2	1.6	1.5	1.6	2.2	2.5	2.9	2.6	2.9	2.1	1.6	1.7	1.8	1.8	2.4	1.7	2.9
Diurnal Maximum																									
AF - Analyzer Failure																									



Maximum Value: 8.1 km/h on Mar 17 11:00																				Maximum Daily Average: 1.7 km/h on Mar 13					Hours in Service: 744	
Minimum Value: -1.7 km/h on Mar 19 17:00																				Minimum Daily Average: -0.6 km/h on Mar 19					Hours of Data: 744	
Maximum Diurnal Average: 1.1 km/h at hour 24																				Minimum Diurnal Average: 0.4 km/h at hour 13					Hours of Missing Data: 0	
Monthly Average: 0.65 km/h																				Percentiles: P ₁ = -1.0 P ₁₀ = -0.2 Q ₁ = 0.1 Median = 0.4 Q ₃ = 1.0 P ₉₀ = 1.8 P ₉₉ = 4.3					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-Mar	-0.4	-0.1	0.0	0.0	-0.2	0.4	0.5	0.7	0.0	0.3	-0.2	1.6	0.6	0.5	0.2	0.3	-0.1	0.4	0.5	0.3	0.4	0.1	0.1	0.1	0.2	1.6
2-Mar	0.0	0.2	0.4	-0.1	0.2	0.4	0.2	0.0	0.4	0.2	0.4	0.3	0.7	1.2	1.0	0.7	1.4	1.7	1.9	1.9	1.6	2.3	2.6	1.4	0.9	2.6
3-Mar	1.5	1.6	1.5	2.9	3.8	2.8	1.1	1.6	2.0	1.1	1.1	0.8	0.4	0.1	0.2	0.6	0.1	-0.4	-0.4	-0.6	-0.6	0.5	0.0	0.2	0.9	3.8
4-Mar	-0.2	-0.3	0.2	0.2	0.5	0.5	0.7	0.0	0.2	0.4	-0.6	-0.3	0.1	-0.7	-0.9	-0.2	0.0	0.3	0.1	0.1	0.2	-0.1	0.1	0.0	0.0	0.7
5-Mar	0.3	0.2	0.1	0.0	0.2	0.1	1.0	1.0	0.7	1.0	-0.1	-0.6	0.3	0.6	0.4	0.4	0.8	0.1	0.0	0.2	0.0	0.3	0.2	0.1	0.3	1.0
6-Mar	0.2	0.3	0.3	-0.3	0.0	-0.1	-0.4	0.0	-0.2	0.7	0.3	1.1	0.3	0.3	0.4	0.2	0.1	0.1	0.3	0.4	0.3	0.4	0.3	0.2	0.2	1.1
7-Mar	0.3	0.0	0.5	0.6	0.7	0.4	0.6	0.1	0.4	-0.3	-0.5	-0.2	0.0	0.1	-0.1	0.1	0.1	0.5	0.2	0.4	0.3	-0.2	-0.2	-0.2	0.1	0.7
8-Mar	-0.2	0.0	0.3	0.3	0.2	0.1	0.0	-0.1	-0.1	0.0	0.4	0.9	-0.3	-0.9	-0.1	-0.1	0.0	-0.2	0.4	0.2	-0.3	-0.2	0.2	0.1	0.0	0.9
9-Mar	0.1	0.3	0.3	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.6	-0.1	-0.4	0.0	0.2	-0.2	0.1	0.6	0.8	1.7	1.3	0.0	0.1	0.2	1.7
10-Mar	0.1	0.2	0.4	0.1	0.1	0.1	0.3	0.3	0.5	0.4	0.2	-0.2	0.3	0.7	0.9	-0.1	0.6	0.3	0.2	0.0	0.2	0.1	0.1	0.6	0.3	0.9
11-Mar	0.7	0.8	0.4	0.5	0.5	0.3	0.2	0.2	0.2	0.1	0.3	0.6	0.1	1.0	0.5	1.2	0.2	0.3	1.1	1.6	1.5	1.5	1.0	2.0	0.7	2.0
12-Mar	1.0	1.6	1.4	0.9	0.0	0.1	0.2	0.2	0.3	0.3	1.6	3.0	1.0	3.0	2.4	1.4	1.5	1.5	1.6	1.6	1.9	1.4	3.0	3.2	1.4	3.2
13-Mar	3.7	2.9	1.2	1.1	1.4	0.7	1.0	4.4	4.5	4.7	4.8	2.6	1.9	0.9	1.1	1.6	0.8	0.0	0.4	0.7	-0.4	0.0	-0.1	0.6	1.7	4.8
14-Mar	1.0	0.7	0.2	0.5	0.4	0.7	1.0	1.3	1.4	1.2	0.6	0.8	0.3	0.7	0.7	0.6	1.3	1.0	1.1	0.5	0.6	0.7	1.8	2.3	0.9	2.3
15-Mar	1.8	1.4	2.3	2.1	1.5	1.2	0.2	0.0	0.4	0.8	0.5	1.1	1.2	0.9	1.0	0.7	0.4	0.2	0.6	0.4	-0.3	-0.1	0.3	0.4	0.8	2.3
16-Mar	0.2	0.3	0.5	0.5	0.5	0.0	0.5	0.5	0.2	0.8	0.3	-0.6	-0.1	0.1	0.2	0.4	0.5	0.6	0.3	0.0	0.6	1.0	0.4	0.0	0.3	1.0
17-Mar	0.2	-0.1	1.1	0.9	0.2	0.1	-0.3	0.1	0.1	0.2	8.1	0.3	-0.2	-0.3	0.0	0.1	0.2	0.0	0.1	0.3	0.3	0.3	0.1	0.3	0.5	8.1
18-Mar	0.3	0.3	0.8	1.3	1.4	1.3	1.8	0.7	0.4	0.1	0.3	0.5	0.1	-0.2	0.4	1.9	1.3	1.0	0.3	0.3	0.1	0.3	0.0	-0.2	0.6	1.9
19-Mar	-0.2	-0.8	-0.8	-1.2	-1.0	-0.8	-0.3	-0.9	-0.6	0.7	0.3	-0.4	0.1	0.0	0.1	-1.3	-1.7	-0.7	-1.4	-1.1	-1.0	-0.9	0.4	0.0	-0.6	0.7
20-Mar	0.3	0.0	-0.3	-0.1	-0.2	0.0	0.3	0.5	-0.1	-0.7	-0.2	-0.9	-0.8	0.8	-0.4	0.1	0.4	0.3	0.9	1.1	2.7	3.9	2.9	3.1	0.6	3.9
21-Mar	4.4	1.1	-0.2	-1.4	-1.2	-0.4	0.2	0.2	1.0	1.5	1.0	0.6	1.5	2.2	1.9	2.3	3.4	2.1	2.6	2.1	2.3	2.1	5.2	4.7	1.6	5.2
22-Mar	3.2	2.9	1.8	1.3	1.8	1.3	1.2	0.8	0.9	0.7	1.1	0.4	1.0	2.7	1.2	0.1	0.1	0.3	0.0	0.1	-0.1	0.4	0.4	0.6	1.0	3.2
23-Mar	0.5	0.3	0.4	0.0	0.1	0.2	0.0	0.2	0.2	0.1	-0.6	0.5	0.9	-0.5	0.3	-0.2	0.2	-0.1	-0.1	0.2	0.7	2.2	1.7	2.9	0.4	2.9
24-Mar	2.6	1.0	1.5	1.2	-0.4	0.5	0.9	0.3	0.4	0.3	0.7	1.3	1.2	2.3	1.5	2.1	2.5	1.8	1.3	1.1	2.2	1.5	1.6	1.4	1.3	2.6
25-Mar	1.4	0.5	0.6	0.8	1.0	1.0	1.0	1.4	1.8	2.6	1.7	1.4	0.7	0.0	0.4	0.4	0.4	0.1	0.4	0.6	0.9	0.6	0.8	0.6	0.9	2.6
26-Mar	0.8	1.1	1.1	1.1	0.9	1.2	0.8	0.2	1.2	1.4	0.3	0.7	0.3	0.3	0.0	0.4	0.5	0.5	1.0	0.8	0.9	0.7	0.8	0.2	0.7	1.4
27-Mar	0.9	0.3	0.5	0.2	0.1	0.8	0.9	0.6	0.8	0.6	0.6	-0.2	-0.4	0.3	0.3	-0.2	-0.2	0.4	0.3	0.3	0.5	1.4	2.3	1.8	0.5	2.3
28-Mar	1.6	1.1	1.2	1.7	1.6	1.0	1.3	0.4	0.7	1.1	0.9	0.1	-0.1	0.4	-0.2	0.0	1.3	1.1	1.4	0.9	1.8	2.2	3.6	2.6	1.2	3.6
29-Mar	1.0	0.4	0.8	0.8	0.7	0.7	1.3	1.1	0.3	0.5	1.1	1.0	0.8	0.3	1.2	0.7	0.4	1.3	2.0	1.9	1.0	1.9	2.3	2.1	1.1	2.3
30-Mar	2.3	1.5	1.5	1.2	1.6	0.8	0.8	0.6	0.5	0.3	-0.3	0.3	0.3	-0.1	-0.4	-0.3	-0.4	-0.5	-0.7	0.5	0.2	0.3	0.2	0.7	0.5	2.3
31-Mar	1.0	0.3	0.3	1.1	0.7	0.4	1.7	1.3	0.4	0.1	0.1	0.5	-0.2	-0.2	0.8	1.6	1.8	2.1	0.7	1.6	1.2	2.2	2.2	2.5	1.0	2.5
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 1 24-hr: 0 Maximum Value: 19.2 km/h on Mar 17 11:00 Minimum Value: 0.1 km/h on Mar 9 09:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 0.9 Median = 1.5 Q ₃ = 2.2 P ₉₀ = 2.9 P ₉₉ = 4.0																							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-Mar	0.8	0.8	0.8	0.5	0.6	0.7	0.7	0.6	0.4	0.5	0.9	2.6	3.2	3.1	3.0	2.9	1.5	1.0	0.2	0.2	0.6	0.3	0.2	0.3	3.2
2-Mar	0.2	0.2	0.4	0.4	0.4	0.6	0.4	0.6	0.6	0.7	0.7	0.8	1.3	1.8	2.3	2.0	2.4	1.9	2.0	1.9	2.2	3.1	2.6	1.9	3.1
3-Mar	2.1	1.9	1.9	2.1	1.9	2.0	1.6	2.3	2.1	1.6	1.8	1.7	1.7	1.5	0.8	0.9	2.2	1.7	1.7	2.3	2.7	2.1	2.4	1.9	2.7
4-Mar	2.2	2.4	2.6	1.8	2.1	3.2	2.9	2.9	3.1	3.5	2.6	2.6	2.5	2.4	2.6	2.5	2.1	1.8	1.1	1.4	1.6	1.7	0.9	0.4	3.5
5-Mar	0.4	0.5	0.3	0.3	0.3	0.6	0.6	0.6	0.6	1.1	1.7	1.6	1.7	1.5	1.6	1.8	2.0	0.7	1.3	0.5	0.6	0.5	0.3	0.2	2.0
6-Mar	0.5	1.0	0.9	1.2	1.3	1.3	2.1	2.1	2.5	2.3	2.5	2.2	2.6	2.9	2.9	2.9	3.1	3.1	3.1	2.8	2.8	2.9	2.3	2.1	3.1
7-Mar	2.5	2.6	2.3	2.1	2.3	1.8	2.6	2.4	2.7	3.3	3.1	2.8	2.6	2.9	2.5	2.3	2.8	2.4	1.8	1.6	1.9	1.3	0.6	0.9	3.3
8-Mar	0.5	0.4	0.5	0.3	0.2	0.3	0.2	0.2	0.2	0.6	1.9	3.2	3.4	2.7	2.8	2.9	2.9	2.2	1.4	0.9	0.9	0.8	0.7	0.5	3.4
9-Mar	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.3	0.1	0.2	1.2	2.3	2.1	2.0	1.9	1.1	0.6	1.0	0.8	1.9	1.9	1.9	0.9	0.3	2.3
10-Mar	0.3	0.2	0.3	0.2	0.3	0.3	0.4	0.3	0.2	0.3	0.7	1.4	1.9	3.0	3.0	2.5	1.9	1.5	0.7	0.5	0.6	0.5	0.5	0.8	3.0
11-Mar	0.7	0.9	0.7	1.0	0.9	0.5	0.5	0.6	0.6	0.5	0.6	1.6	3.0	2.8	2.8	2.4	1.6	1.1	0.5	0.7	1.0	1.3	1.5	1.1	3.0
12-Mar	1.0	0.9	1.0	0.7	1.2	1.1	1.2	0.6	1.1	0.8	0.9	2.3	3.2	2.8	3.0	3.0	2.8	2.0	1.7	2.4	2.5	2.9	2.9	2.6	3.2
13-Mar	2.7	3.3	3.1	3.8	3.7	3.6	4.0	3.8	3.8	3.6	3.8	3.9	3.8	3.6	3.1	3.1	2.5	1.8	1.4	1.2	1.3	1.5	1.6	1.6	4.0
14-Mar	1.0	0.7	0.8	0.8	0.8	0.9	0.7	0.8	1.0	1.3	1.0	1.0	1.2	1.0	1.6	1.6	0.8	0.8	1.0	1.4	2.0	1.7	2.2	2.3	2.3
15-Mar	1.9	1.8	2.5	2.2	1.8	1.7	1.1	1.0	1.1	1.2	1.6	1.3	1.4	1.3	1.2	1.1	2.2	1.6	1.3	1.0	1.1	1.4	1.4	0.7	2.5
16-Mar	0.4	0.6	1.3	2.3	2.3	2.7	2.8	3.0	3.3	2.8	2.9	2.9	3.0	3.1	3.2	2.9	2.9	2.6	2.3	1.5	1.7	1.9	2.2	1.4	3.3
17-Mar	1.2	1.1	1.2	1.7	1.6	1.8	0.6	0.6	0.8	0.9	19.2	1.1	1.4	1.6	1.3	1.1	1.2	1.5	1.6	1.4	1.5	1.2	1.2	1.4	19.2
18-Mar	1.1	0.9	1.4	1.8	1.7	1.5	2.6	1.3	1.2	0.8	1.1	1.6	1.3	0.8	1.9	2.0	1.3	1.2	1.0	0.6	0.6	1.1	0.3	0.5	2.6
19-Mar	3.0	4.2	4.4	4.2	3.7	3.3	3.6	3.1	3.0	3.5	2.8	2.6	3.1	4.1	4.4	4.2	3.3	3.5	3.4	3.6	3.8	3.3	3.1	1.5	4.4
20-Mar	2.4	1.9	2.1	1.8	1.4	1.3	0.8	1.0	1.6	1.1	1.5	1.4	1.9	2.6	1.6	1.5	2.0	1.6	1.2	1.7	2.0	2.3	2.4	2.4	2.6
21-Mar	1.9	2.7	1.6	1.8	1.5	1.2	1.1	1.1	1.3	1.3	1.4	1.9	2.5	2.5	2.5	3.2	3.3	3.1	2.6	2.3	3.3	2.9	3.2	2.6	3.3
22-Mar	2.1	2.3	1.7	1.7	1.6	1.6	2.1	1.9	1.8	2.0	2.0	1.0	1.5	1.4	1.5	0.6	0.5	0.5	0.7	0.8	0.9	1.5	2.7	2.2	2.7
23-Mar	2.0	1.5	1.1	0.9	1.5	1.4	1.6	1.9	1.7	1.5	1.6	2.6	2.6	2.4	2.2	1.3	1.0	0.8	1.4	0.8	1.4	1.7	1.8	1.8	2.6
24-Mar	1.9	1.8	1.8	1.7	2.0	1.3	1.2	1.1	1.0	1.2	1.9	2.3	2.0	2.2	2.1	2.2	2.3	1.6	1.6	2.2	1.8	2.4	2.1	1.9	2.4
25-Mar	1.6	1.2	1.1	1.1	1.3	1.3	1.5	1.5	1.5	1.4	1.3	1.4	1.1	0.9	0.5	0.6	0.5	0.4	0.4	0.3	1.1	1.3	0.9	0.7	1.6
26-Mar	0.6	1.0	0.6	1.0	0.7	0.9	1.6	1.6	1.5	1.7	1.6	1.4	1.0	1.1	0.8	1.0	0.8	1.4	0.5	0.4	0.7	0.8	0.9	0.7	1.7
27-Mar	1.0	0.5	0.4	0.4	0.3	0.8	0.7	0.7	0.9	0.7	0.7	1.0	1.0	1.5	1.1	1.2	1.5	2.2	1.7	2.0	1.7	2.4	2.1	1.7	2.4
28-Mar	1.4	1.6	1.5	1.4	1.6	1.8	1.5	1.5	1.7	1.5	1.5	1.3	1.5	2.1	2.1	2.1	1.8	1.2	1.3	1.4	1.5	1.5	1.7	1.7	2.1
29-Mar	2.0	1.1	1.1	0.8	0.9	0.9	0.9	0.9	0.8	1.1	1.8	2.0	1.9	1.9	2.1	2.0	1.1	0.9	0.9	1.5	1.8	1.2	1.0	1.0	2.1
30-Mar	0.8	0.9	1.4	1.6	1.5	1.1	0.9	0.7	0.6	0.3	0.9	0.9	1.2	1.2	1.0	1.2	1.0	1.7	1.7	1.0	0.5	0.4	0.3	1.0	1.7
31-Mar	0.8	0.7	0.9	1.2	0.7	0.6	1.1	1.2	1.0	1.2	1.3	1.5	1.7	1.8	2.7	2.2	2.6	1.9	1.3	1.8	1.4	1.9	2.7	1.3	2.7
3.0 4.2 4.4 4.2 3.7 3.6 4.0 3.8 3.8 3.6 19.2 3.9 3.8 4.1 4.4 4.2 3.3 3.5 3.4 3.6 3.8 3.3 3.2 2.6 Diurnal Maximum																									



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 4 BUFFALO VIEWPOINT MARCH 2017

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)
MARCH 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	23	0	3	0
H2S (ppb) Average	710	34	34	100	6	0	1	0
THC (ppm) Average	710	34	34	100	6.2	-	2.9	-
Temperature (C) Average	744	0	0	100	13.2	-	7	-
Relative Humidity (%) Average	744	0	0	100	98	-	88	-
Wind Speed 10 m (km/h) Average	735	0	9	98.79	32	-	25	-
Wind Direction 10 m (deg) Average	735	0	9	98.79	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)
MARCH 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	0.8	2	-	0	0	0	0	1	1	23
H2S (ppb) Average	710	0.3	0	-	0	0	0	0	0	1	6
THC (ppm) Average	710	2.42	0.3	-	2.2	2.2	2.3	2.3	2.4	2.7	6.2
Temperature 2 m (C) Average	744	-8.15	10.5	-	-30.5	-23	-17.5	-7.1	0.4	4.3	13.2
Relative Humidity (%) Average	744	67.2	16	-	26	45	56	68	79	90	98
Wind Speed 10 m (km/h) Average	735	10.7	6	-	0	4	6	9	14	20	32
Wind Direction 10 m (deg) Average	735	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	27 Mar 2017 01:00	27 Mar 2017 09:00	9	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

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

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 23 ppb on Mar 10 12:00	Maximum Daily Average: 2.6 ppb on Mar 10		Hours of Data:	710
Minimum Value: 0 ppb on Mar 15 17:00	Minimum Daily Average: 0.1 ppb on Mar 16		Hours of Missing Data:	34
Maximum Diurnal Average: 1.8 ppb at hour 13	Minimum Diurnal Average: 0.2 ppb at hour 7		Hours of Calibration:	34
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 = 9		Percent Operational Time:	100.0

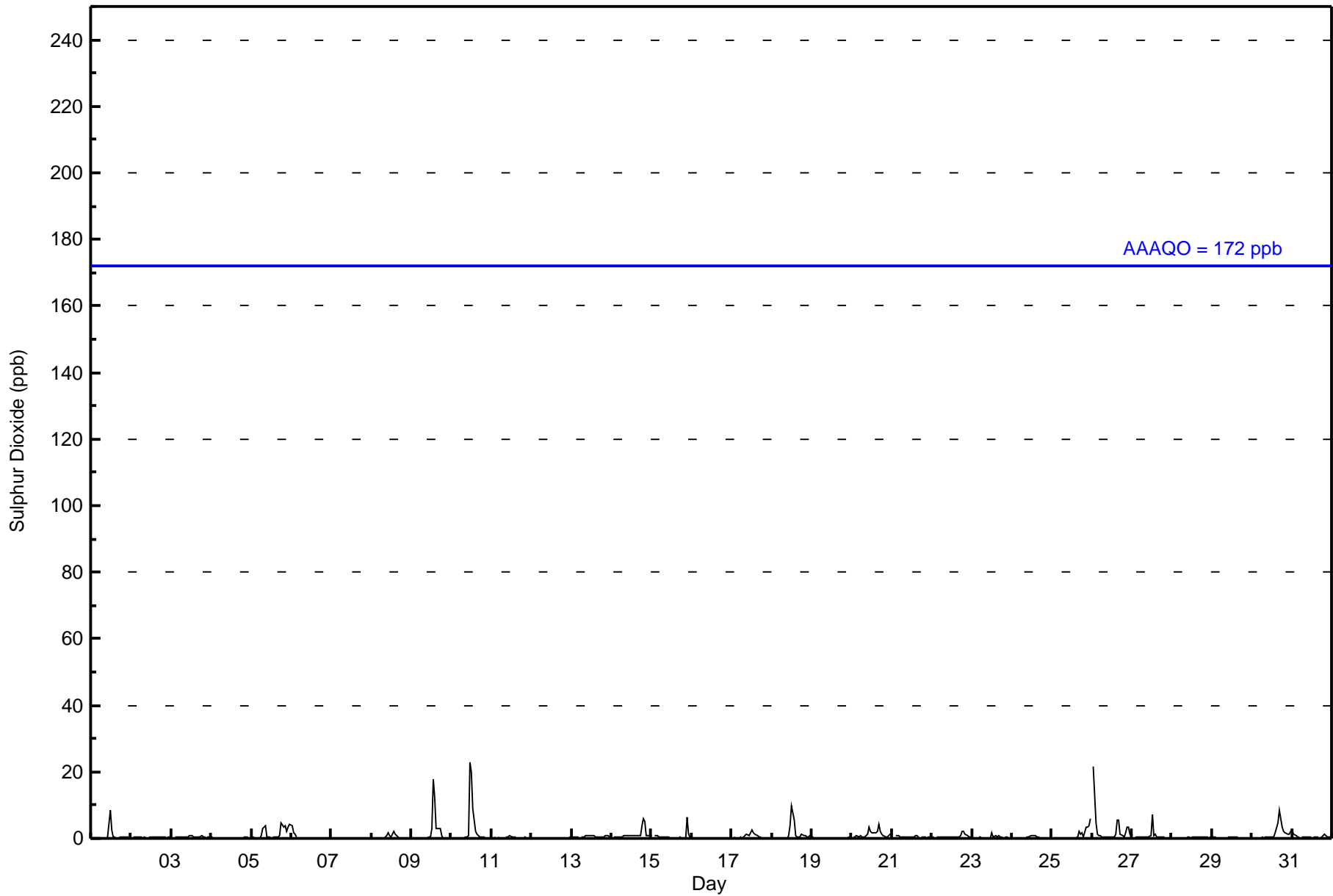
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	0	0	0	0	0	Z	0	0	0	0	0	8	3	0	0	0	0	0	0	0	0	0	0	0	0	0.7	8
2-Mar	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	1
3-Mar	0	Z	1	1	0	0	0	0	0	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0.4	1
4-Mar	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
5-Mar	0	0	0	Z	0	0	1	3	4	0	0	0	0	0	0	0	0	1	5	4	4	2	4	4	1.5	5	
6-Mar	4	2	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4
7-Mar	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
8-Mar	Z	0	0	0	0	0	0	0	0	1	2	1	0	2	1	1	0	0	0	0	0	0	0	0	0	0.5	2
9-Mar	0	Z	0	0	0	0	0	0	0	0	1	0	3	18	12	3	3	3	1	0	0	0	0	0	2.0	18	
10-Mar	0	0	Z	0	0	0	0	0	0	0	1	23	20	9	2	1	1	1	0	0	0	0	0	0	2.6	23	
11-Mar	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
12-Mar	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	
13-Mar	0	0	0	0	0	Z	1	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	0.6	1	
14-Mar	Z	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	4	6	5	1	1	1	1.3	6	
15-Mar	1	Z	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	6	1	0	0.6	6	
16-Mar	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-Mar	0	0	0	Z	0	0	0	0	1	1	1	2	2	2	1	1	1	0	0	0	0	0	0	0	0.6	2	
18-Mar	0	0	0	0	Z	0	0	0	0	0	1	4	10	6	1	0	0	0	1	1	1	1	0	1	1.2	10	
19-Mar	1	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	1	
20-Mar	Z	0	0	1	1	1	0	0	0	1	3	2	2	2	2	2	4	2	1	1	1	1	1	1	1.3	4	
21-Mar	1	Z	1	1	1	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.5	1	
22-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	1	0	0	0.5	2	
23-Mar	0	0	0	Z	0	0	0	C	C	C	0	0	2	1	1	0	1	0	0	0	0	0	0	0	0.4	2	
24-Mar	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1	
25-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	2	1	2	0	3	3	4	6	1.0	6	
26-Mar	Z	22	5	1	1	1	1	0	0	0	1	0	0	0	1	6	5	1	1	1	2	3	3	1	2.5	22	
27-Mar	1	Z	1	0	1	0	0	0	0	0	0	1	7	1	1	1	0	0	0	0	0	0	0	0	0.7	7	
28-Mar	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-Mar	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	
30-Mar	0	0	0	0	Z	0	0	0	0	0	1	0	1	1	2	5	9	6	3	2	2	1	1	2	1.6	9	
31-Mar	2	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0.5	2	
	0.5	1.1	0.5	0.3	0.3	0.3	0.2	0.3	0.4	0.4	0.5	1.6	1.8	1.5	1.0	0.8	1.0	0.7	0.8	0.7	0.8	0.8	0.7	0.7		Diurnal Average	
	4	22	5	1	1	1	1	3	4	1	3	23	20	18	12	6	9	6	5	6	5	6	4	6		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
Buffalo Viewpoint - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	705	99.30	99.30
11 - 20	3	0.42	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: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - March 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	142	91	25	6	9	43	122	124	23	6	3	13	13	24	28	25	697
11 - 20	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3
21 - 60	1	0	0	1	0	0	0	0	0	0	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	143	93	25	7	9	43	122	124	23	6	3	13	13	24	28	26	702

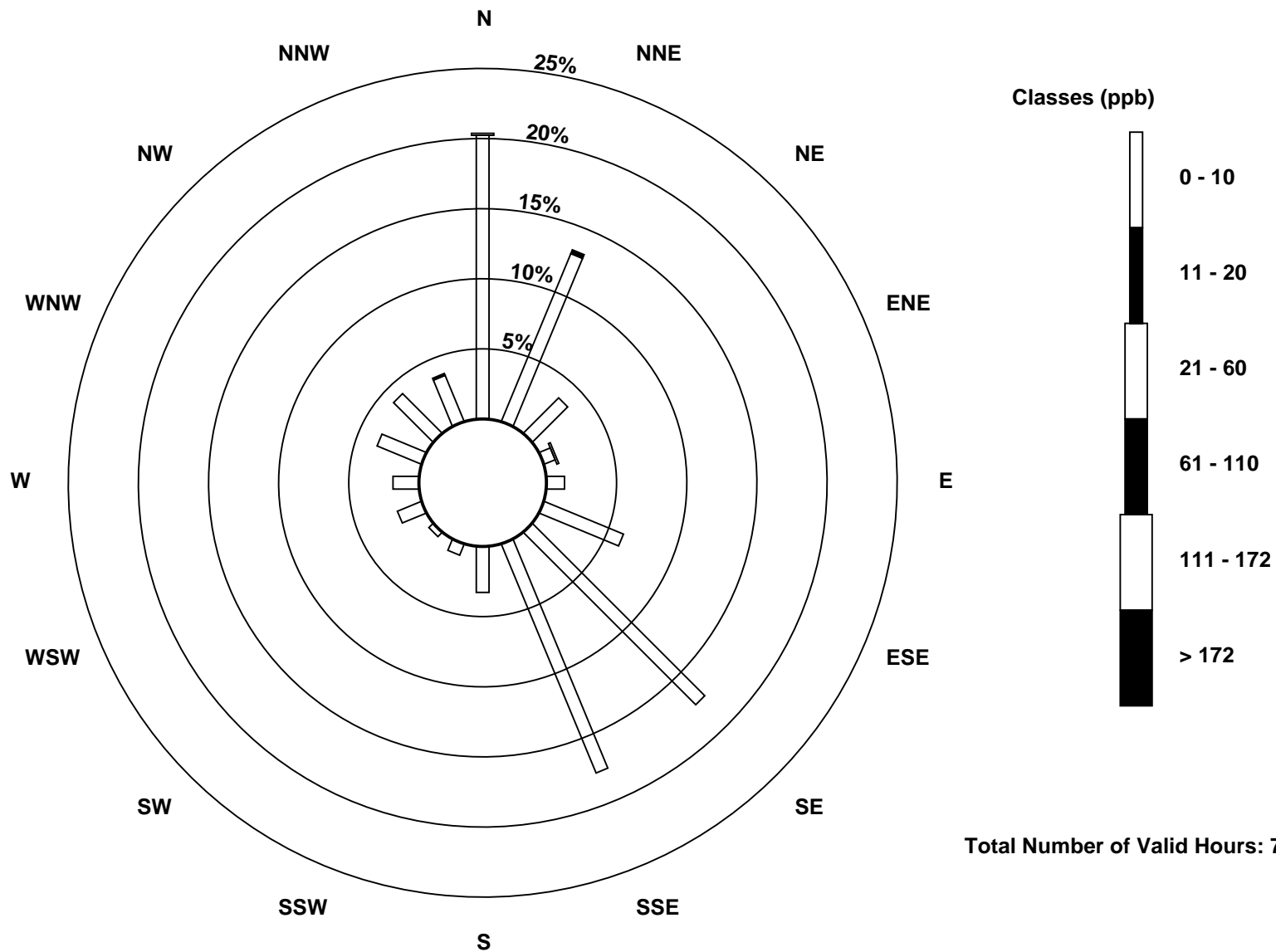
Total Number of Valid Hours: 702

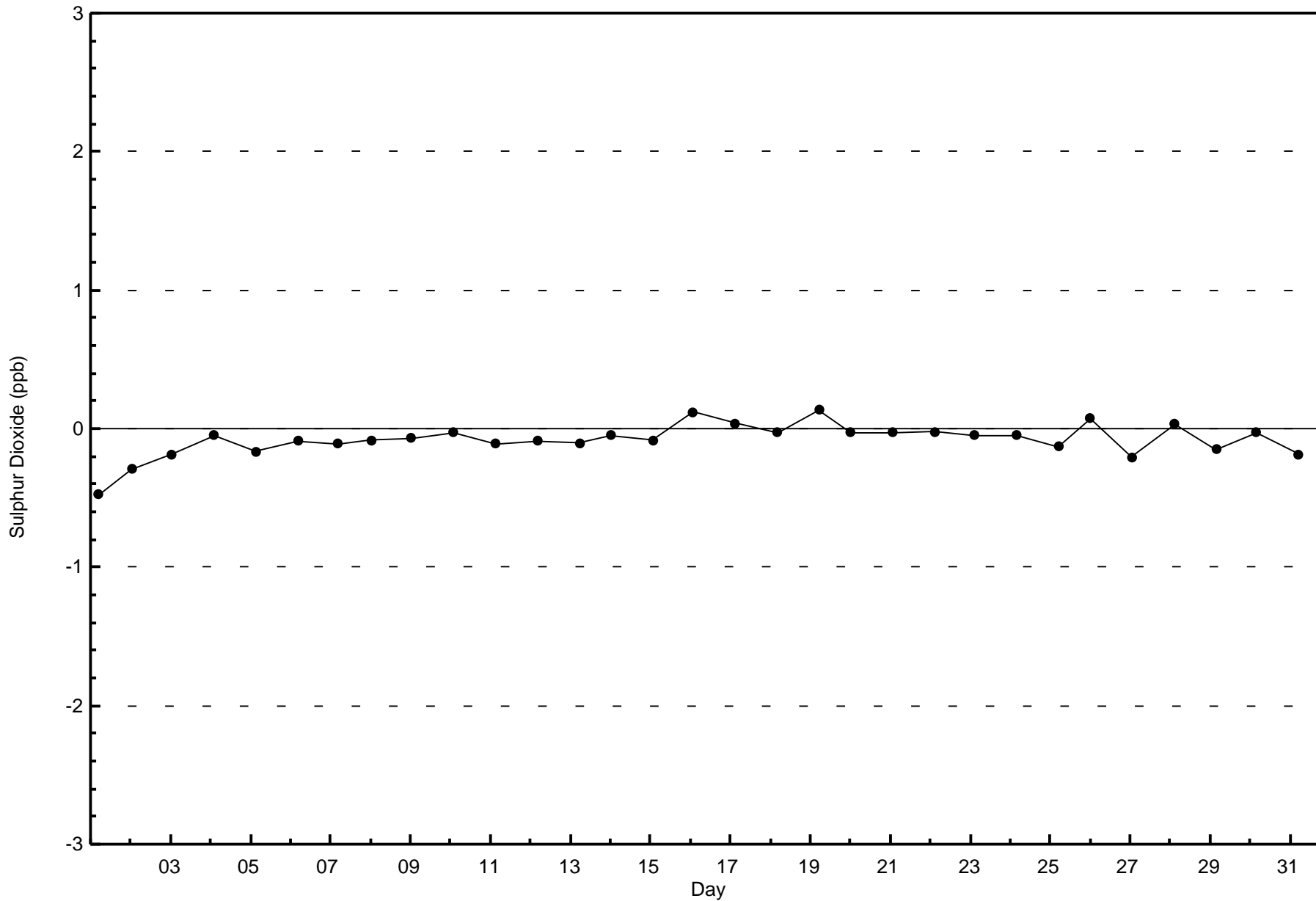
Total Number of Hours: 744

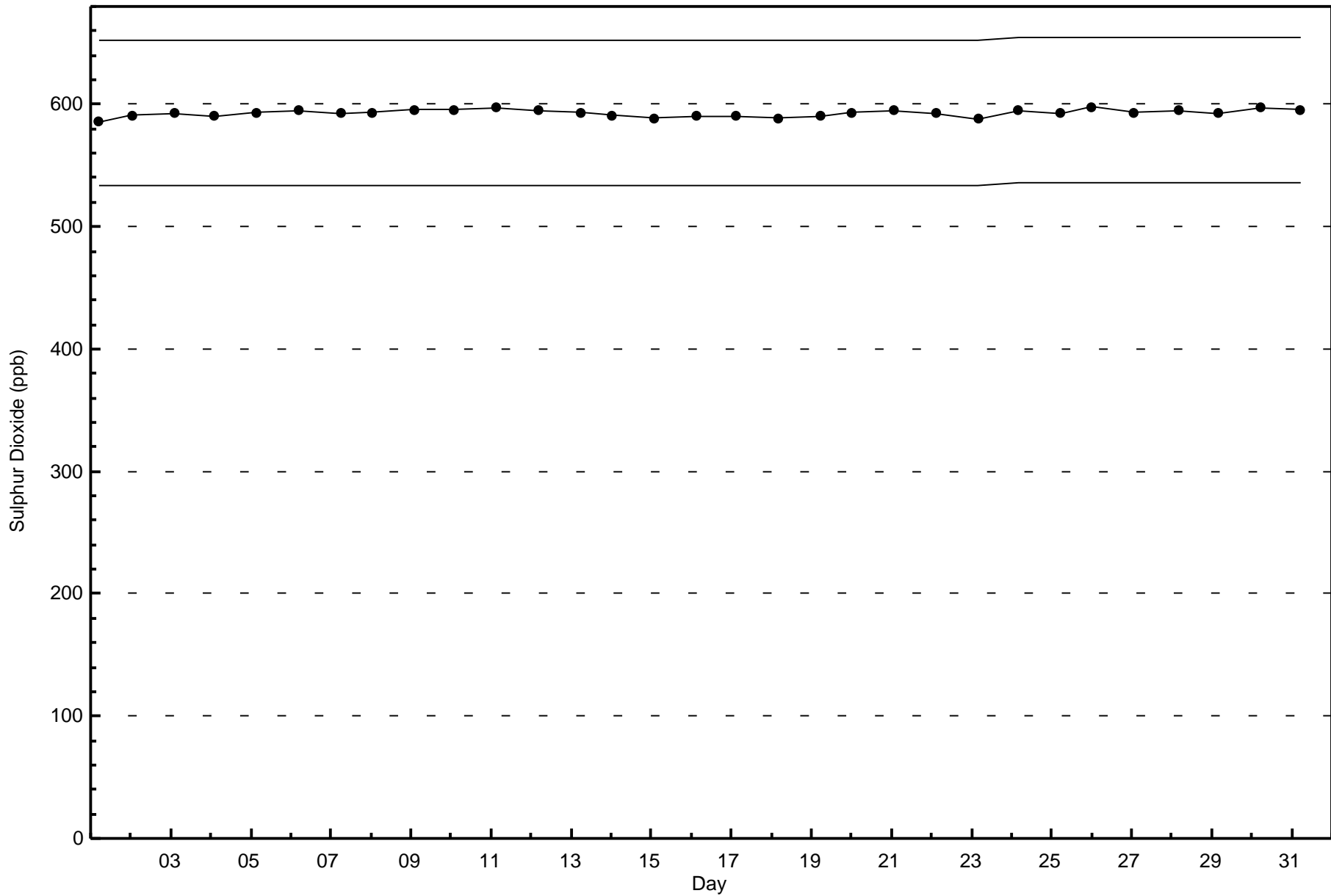


Wood Buffalo Environmental Association
Wind Rose Mar 2017

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









Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

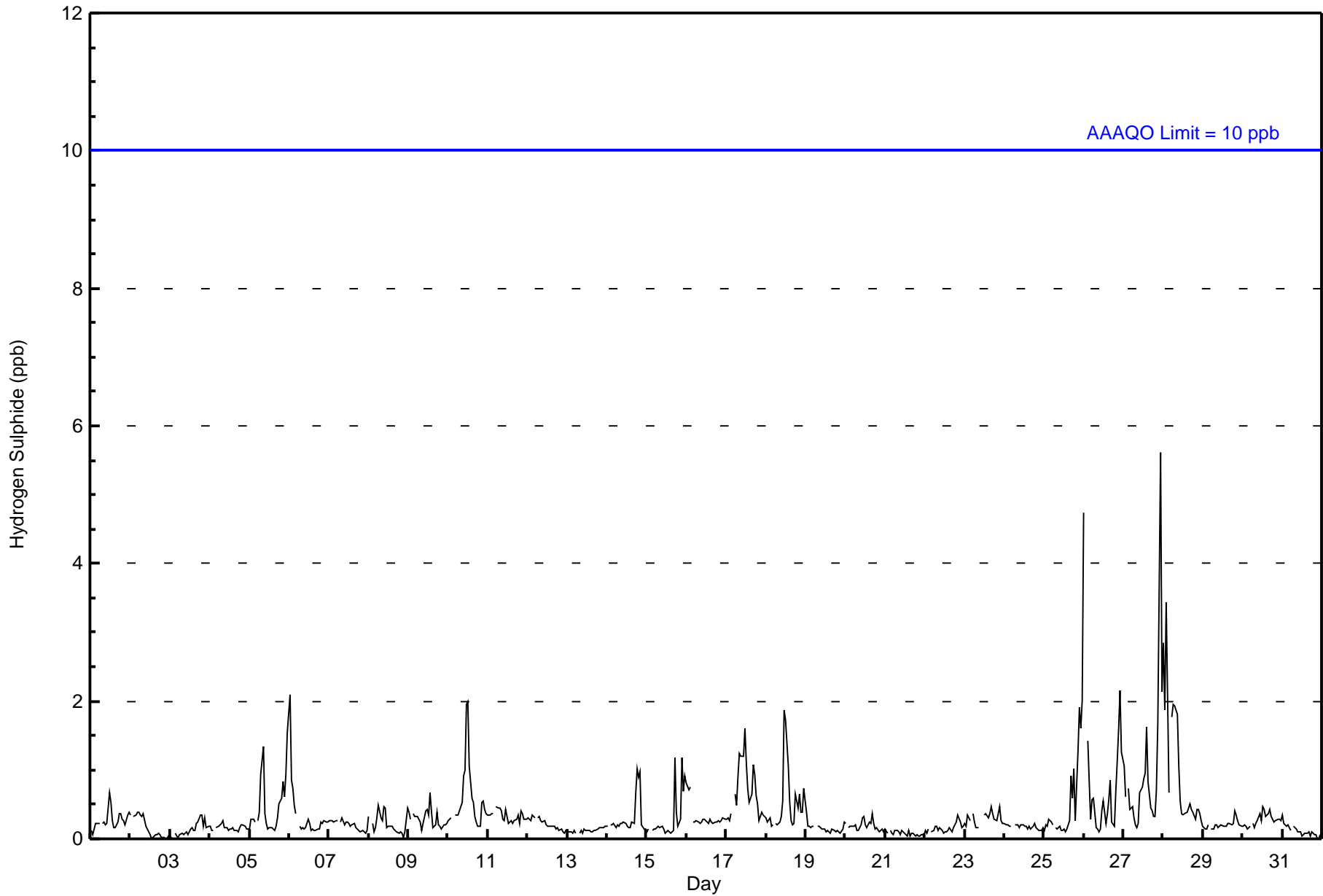
Buffalo Viewpoint - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 ppb on Mar 27 23:00 Maximum Daily Average: 1.0 ppb on Mar 28										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 Mar 2 14:00 Maximum Diurnal Average: 0.6 ppb at hour 1 Monthly Average: 0.3 ppb										Minimum Daily Average: 0.1 ppb on Mar 21 Minimum Diurnal Average: 0.2 ppb at hour 5 Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q 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-Mar	0	0	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
2-Mar	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																							
3-Mar	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																							
4-Mar	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																							
5-Mar	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	0.5	2																							
6-Mar	2	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																							
7-Mar	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																							
8-Mar	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																							
9-Mar	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	0.3	1																							
10-Mar	0	0	0	Z	0	0	0	0	1	1	1	2	2	1	1	1	0	0	0	0	1	1	0	0	0	0.6	2																							
11-Mar	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	0.3	0																							
12-Mar	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																							
13-Mar	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																							
14-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0.3	1																							
15-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0.3	1																							
16-Mar	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
17-Mar	0	0	0	0	Z	1	0	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0.7	2																							
18-Mar	0	0	0	0	0	Z	0	0	0	0	1	2	2	1	1	0	0	0	1	0	1	0	0	1	0	0.5	2																							
19-Mar	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																							
20-Mar	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																							
21-Mar	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																							
22-Mar	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																							
23-Mar	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	0.3	0																							
24-Mar	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																							
25-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	2	2	2	0.5	2																							
26-Mar	5	Z	1	1	0	1	1	0	0	0	0	0	1	0	0	1	1	0	0	1	1	2	2	1	0	0.8	5																							
27-Mar	1	1	Z	1	0	0	0	0	0	0	1	1	1	1	2	1	0	0	0	0	0	1	2	6	2	0.9	6																							
28-Mar	3	2	3	1	Z	2	2	2	2	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1.0	3																							
29-Mar	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																							
30-Mar	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																							
31-Mar	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																							
																								0.6	0.3	0.4	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.4	Diurnal Average		
																								5	2	3	1	0	2	2	2	2	1	1	2	2	1	2	1	1	1	1	1	1	1	2	6	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

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	706	99.44	99.44
3 - 4	2	0.28	99.72
5 - 7	2	0.28	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
Buffalo Viewpoint - March 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	141	97	25	6	9	43	123	119	24	6	3	13	12	24	28	25	698
3 - 4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
5 - 7	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2
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	141	97	25	7	9	43	123	122	24	6	3	13	12	24	28	25	702

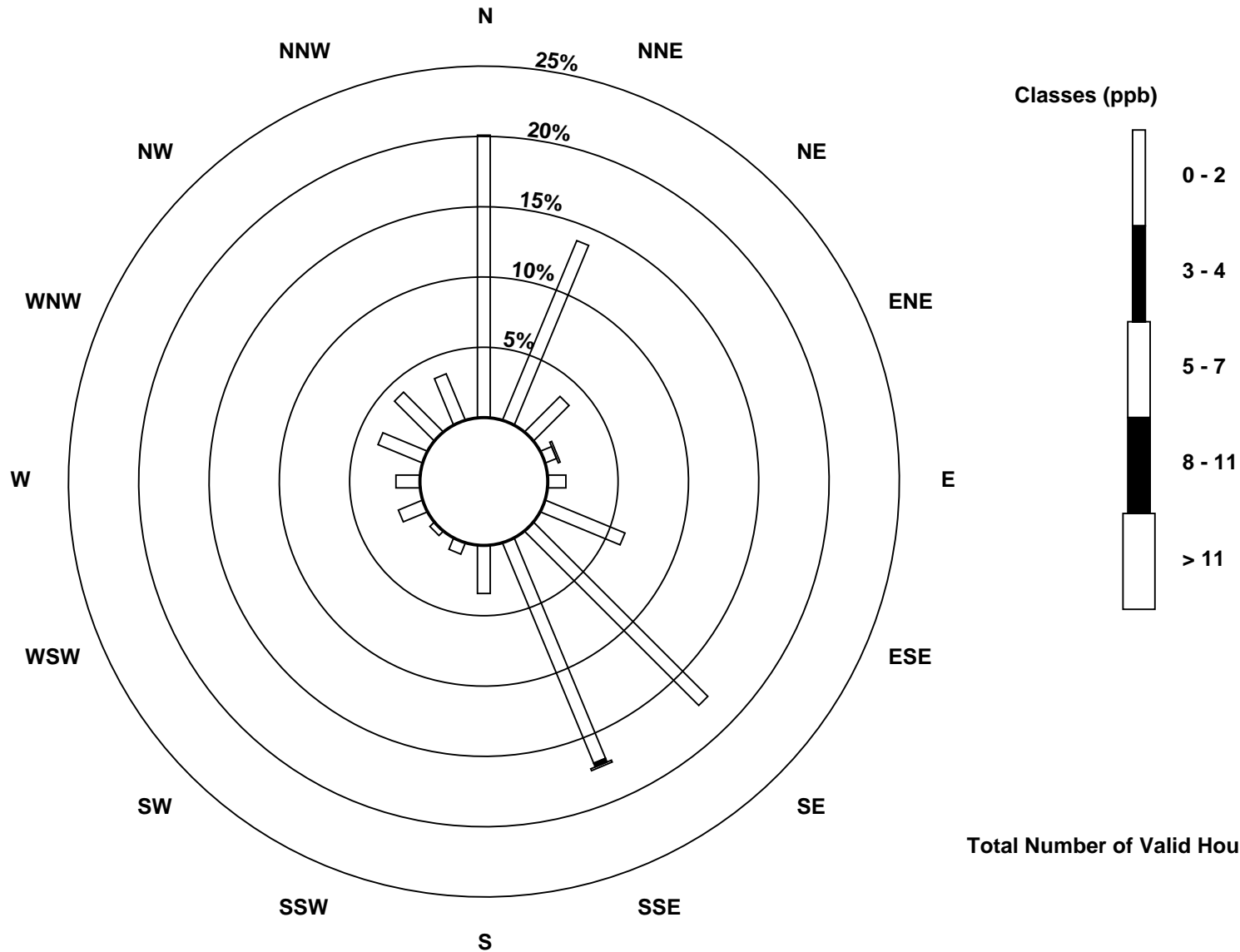
Total Number of Valid Hours: 702

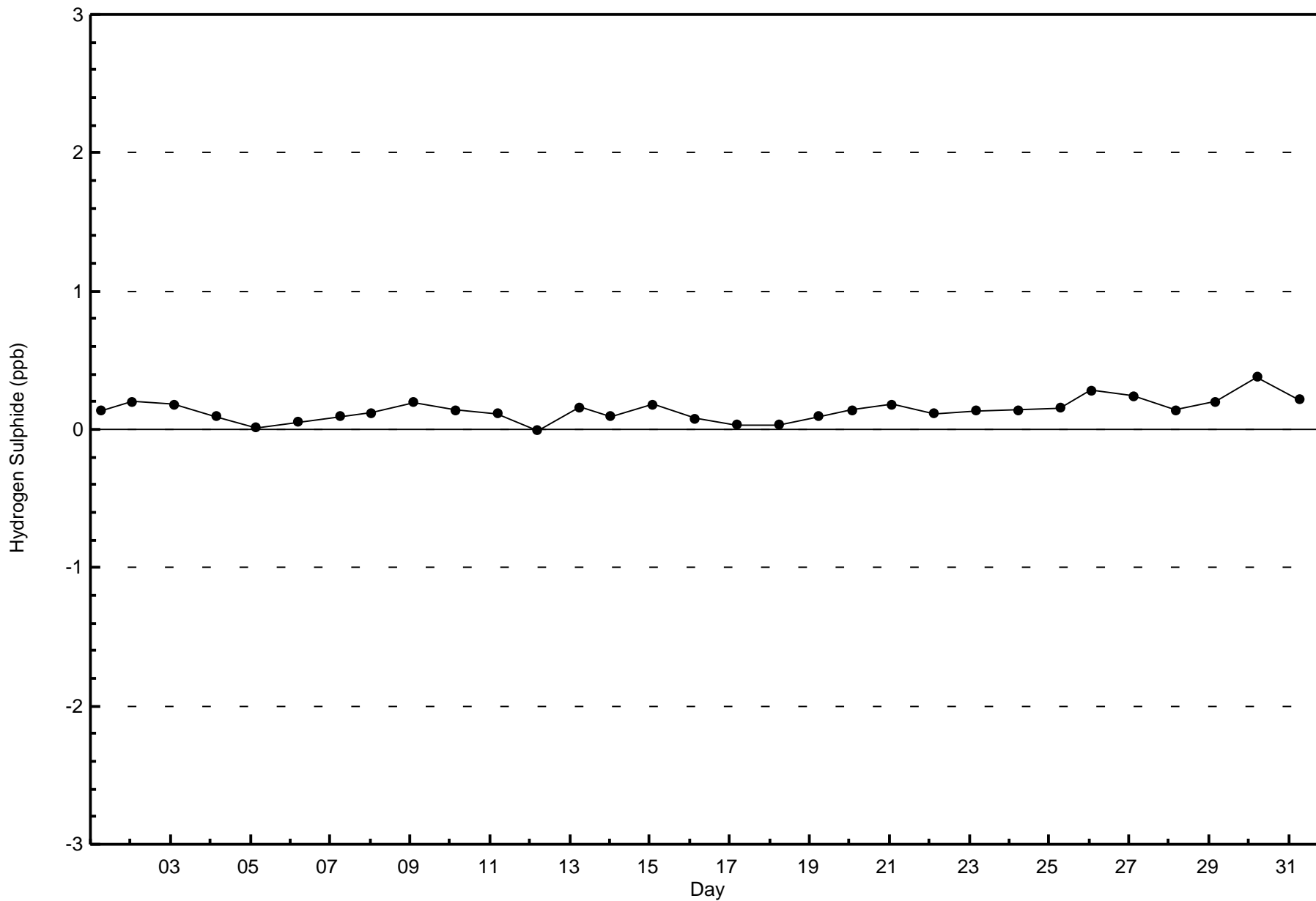
Total Number of Hours: 744

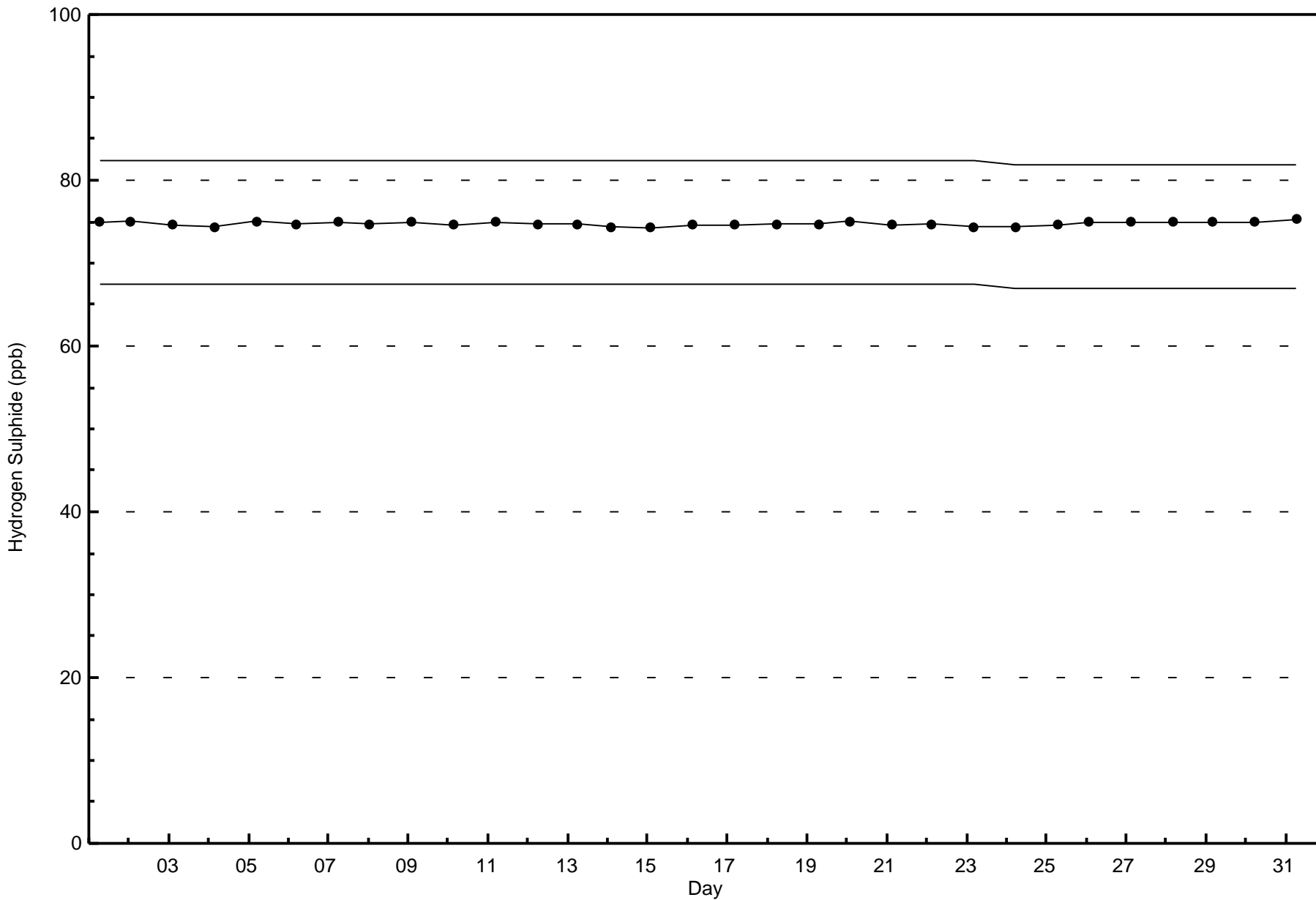


Wood Buffalo Environmental Association
Wind Rose Mar 2017

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









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

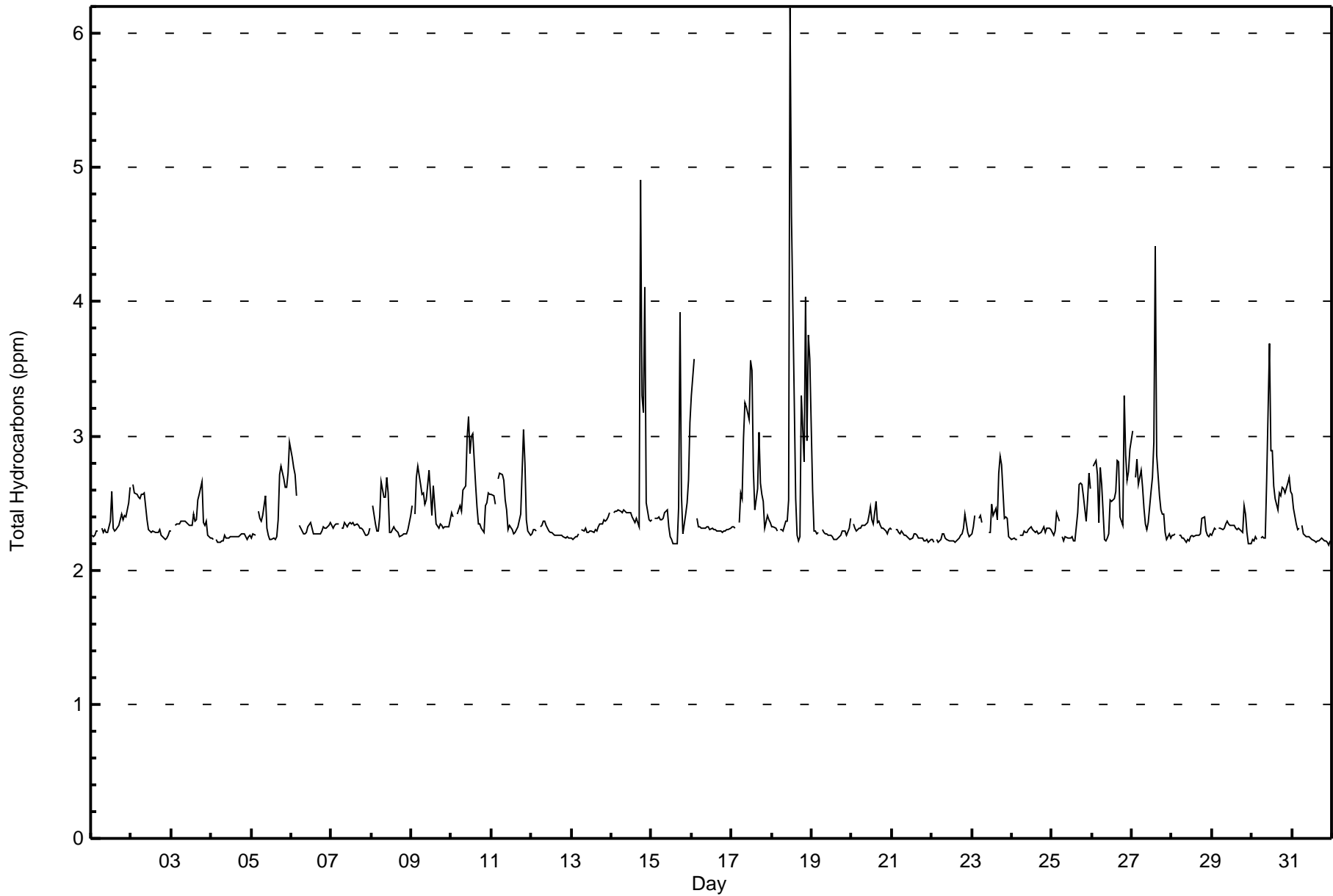
Buffalo Viewpoint - March 2017

Maximum Value: 6.2 ppm on Mar 18 12:00																		Maximum Daily Average: 2.9 ppm on Mar 18																		Hours in Service: 744			
Minimum Value: 2.2 ppm on Mar 31 23:00																		Minimum Daily Average: 2.2 ppm on Mar 4																		Hours of Data: 710			
Maximum Diurnal Average: 2.5 ppm at hour 12																		Minimum Diurnal Average: 2.3 ppm at hour 16																		Hours of Missing Data: 34			
Monthly Average: 2.42 ppm																		Percentiles: P ₁ = 2.2 P ₁₀ = 2.2 Q ₁ = 2.3 Median = 2.3 Q ₃ = 2.4 P ₉₀ = 2.7 P ₉₉ = 3.9																		Hours of Calibration: 34			
																																				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-Mar	2.3	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.6	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.5	2.6	2.4	2.6													
2-Mar	Z	2.6	2.6	2.6	2.5	2.5	2.6	2.6	2.6	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.4	2.6													
3-Mar	2.3	Z	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.6	2.7	2.4	2.3	2.4	2.3	2.2	2.4	2.7														
4-Mar	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.3														
5-Mar	2.2	2.3	2.3	Z	2.4	2.4	2.4	2.4	2.6	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.4	2.7	2.8	2.7	2.6	2.6	2.7	2.9	2.4	2.9													
6-Mar	2.8	2.8	2.7	2.6	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.8													
7-Mar	2.3	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.4	2.3	2.3	2.4	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4													
8-Mar	Z	2.5	2.3	2.3	2.3	2.4	2.7	2.5	2.5	2.7	2.6	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.7													
9-Mar	2.5	Z	2.4	2.7	2.8	2.6	2.6	2.6	2.5	2.5	2.7	2.6	2.4	2.6	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.8													
10-Mar	2.4	2.4	Z	2.4	2.4	2.5	2.4	2.6	2.6	3.0	3.1	2.9	3.0	3.0	2.6	2.5	2.3	2.3	2.3	2.3	2.5	2.5	2.6	2.6	2.6	3.1													
11-Mar	2.6	2.6	2.5	Z	2.7	2.7	2.7	2.7	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.7	3.0	2.8	2.4	2.3	2.3	2.5	3.0													
12-Mar	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.4													
13-Mar	2.2	2.2	2.2	2.3	2.3	Z	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	2.4	2.4	2.4	2.4	2.4	2.3	2.4													
14-Mar	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.4	2.3	4.9	3.3	3.2	4.1	2.5	2.4	2.4	2.7	4.9													
15-Mar	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.5	3.9	2.6	2.3	2.4	2.5	2.7	3.1	2.5	3.9													
16-Mar	3.3	3.6	Z	2.4	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	2.3	2.3	2.3	2.3	2.3	2.4	3.6													
17-Mar	2.3	2.3	2.3	Z	2.4	2.6	2.5	3.0	3.2	3.2	3.1	3.6	3.5	2.7	2.4	2.6	3.0	2.6	2.6	2.5	2.3	2.4	2.4	2.4	2.7	3.6													
18-Mar	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.4	2.4	2.5	6.2	4.6	3.3	2.5	2.3	2.2	2.2	2.2	3.3	2.8	4.0	3.0	3.8	3.6	2.9	6.2												
19-Mar	2.6	2.3	2.3	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	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.6													
20-Mar	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.4	2.3	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.5													
21-Mar	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	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													
22-Mar	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.2	2.3	2.2	2.4													
23-Mar	2.3	2.3	2.4	Z	2.4	2.4	2.4	C	C	C	2.3	2.3	2.5	2.4	2.5	2.4	2.7	2.9	2.8	2.4	2.4	2.4	2.3	2.2	2.4	2.9													
24-Mar	2.2	2.2	2.2	2.2	Z	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	2.3	2.3	2.3	2.3	2.3	2.3													
25-Mar	2.3	2.3	2.3	2.4	2.4	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.6	2.6	2.6	2.6	2.4	2.5	2.7	2.6	2.4	2.7													
26-Mar	Z	2.8	2.8	2.7	2.4	2.8	2.6	2.2	2.2	2.2	2.3	2.5	2.5	2.5	2.6	2.8	2.8	2.4	2.3	3.3	2.9	2.7	2.7	2.9	2.6	3.3													
27-Mar	3.0	Z	2.7	2.8	2.6	2.7	2.6	2.5	2.3	2.3	2.4	2.6	2.7	3.0	4.4	2.9	2.6	2.4	2.4	2.4	2.3	2.2	2.3	2.2	2.6	4.4													
28-Mar	2.3	2.3	2.3	Z	2.3	2.3	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	2.4	2.4	2.3	2.3	2.2	2.3	2.3	2.4												
29-Mar	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.5	2.4	2.3	2.2	2.2	2.3	2.5													
30-Mar	2.2	2.2	2.3	2.2	Z	2.2	2.3	2.2	2.2	2.7	3.7	2.9	2.9	2.6	2.5	2.4	2.6	2.6	2.6	2.6	2.6	2.7	2.7	2.6	2.5	3.7													
31-Mar	2.6	2.5	2.3	2.3	2.3	Z	2.3	2.3	2.3	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	2.2	2.2	2.3	2.6													
																								Diurnal Average															
																								Diurnal Maximum															
Z - zerospan C - Calibration																																							



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	686	96.62	96.62
3.1 - 10.0	24	3.38	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
Buffalo Viewpoint - March 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	137	90	24	6	7	43	122	124	23	5	3	13	13	23	25	20	678
3.1 - 10.0	6	3	1	1	2	0	0	0	0	1	0	0	0	1	3	6	24
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	143	93	25	7	9	43	122	124	23	6	3	13	13	24	28	26	702

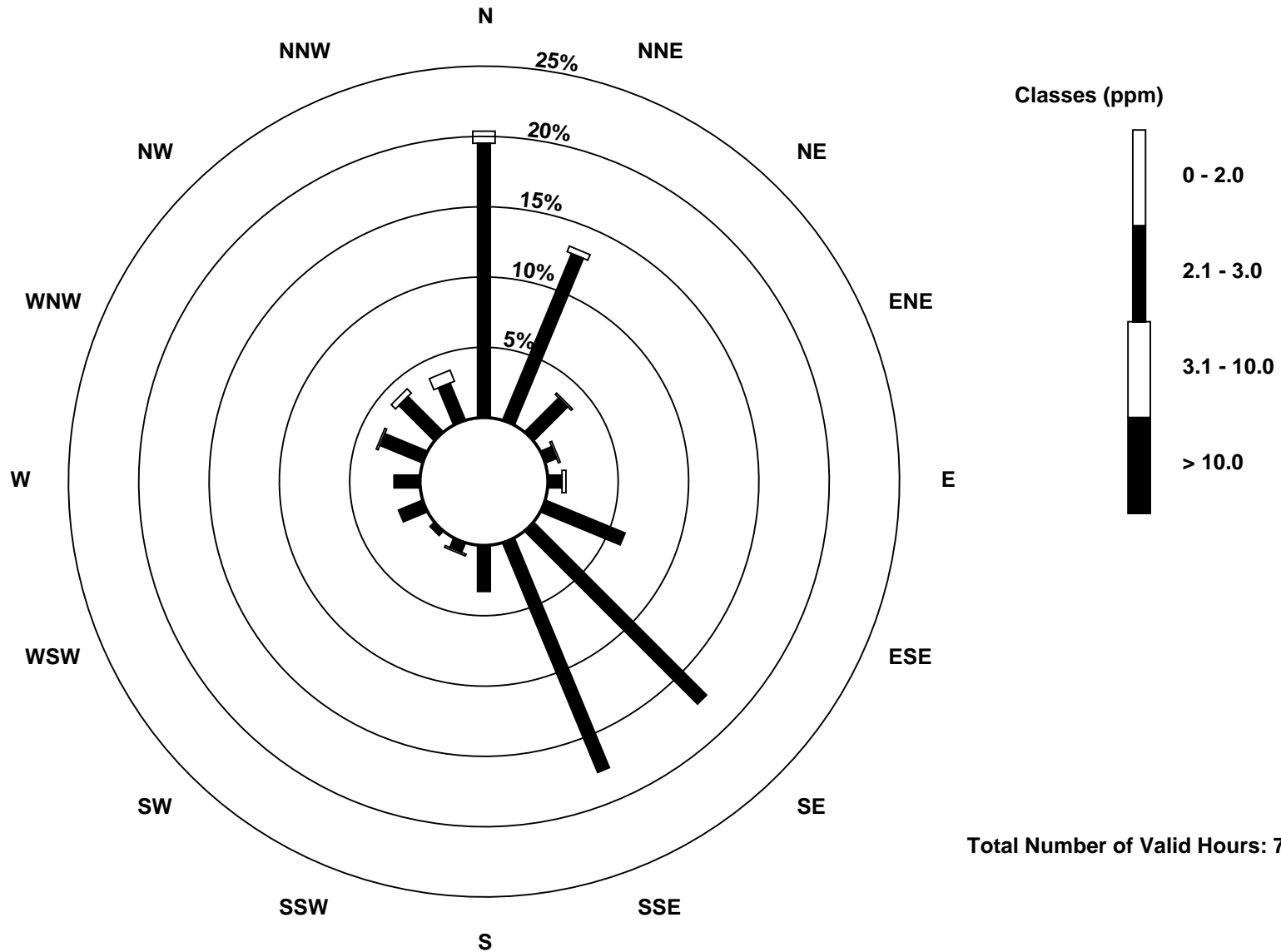
Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

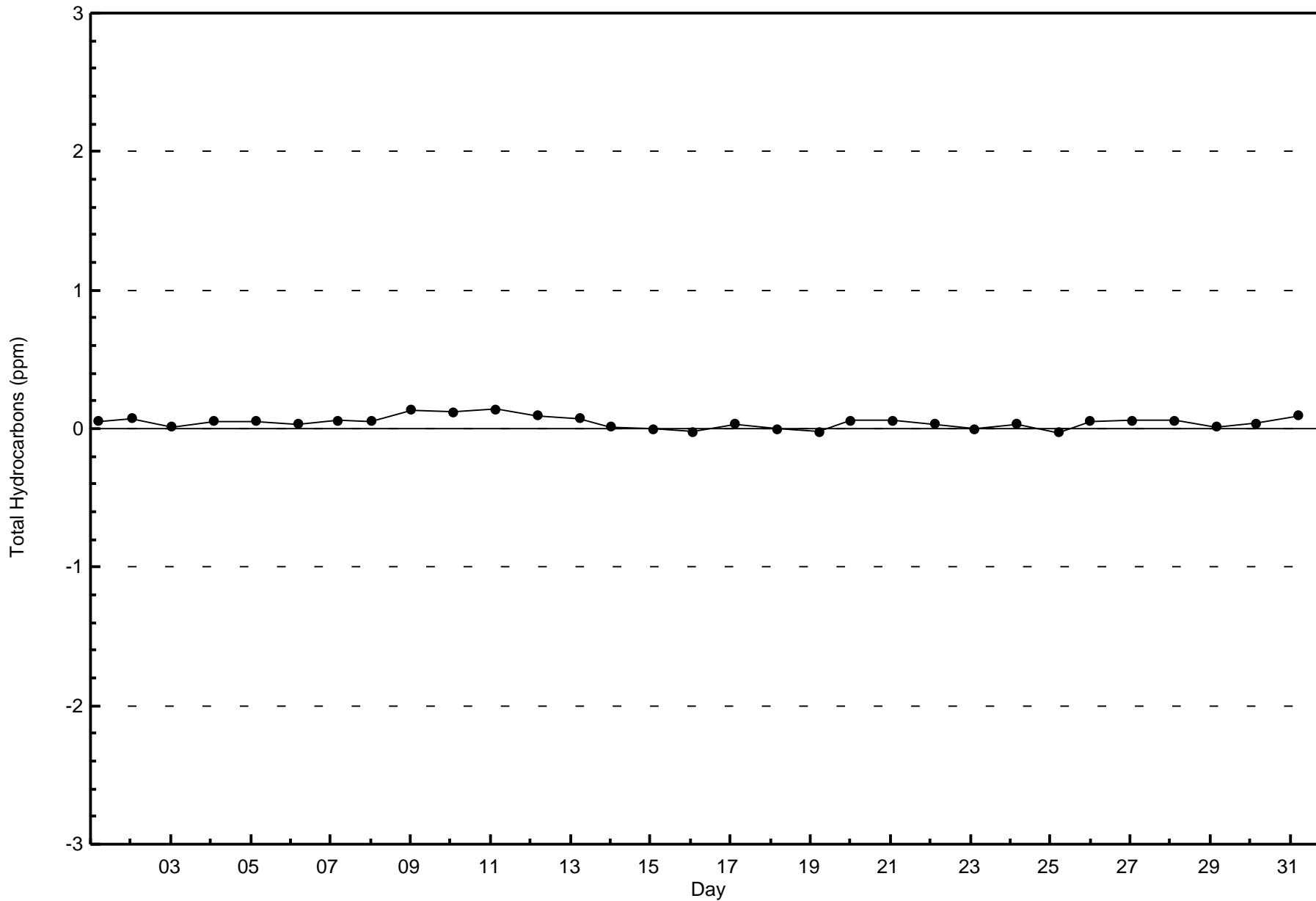
Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint (AMS 4)

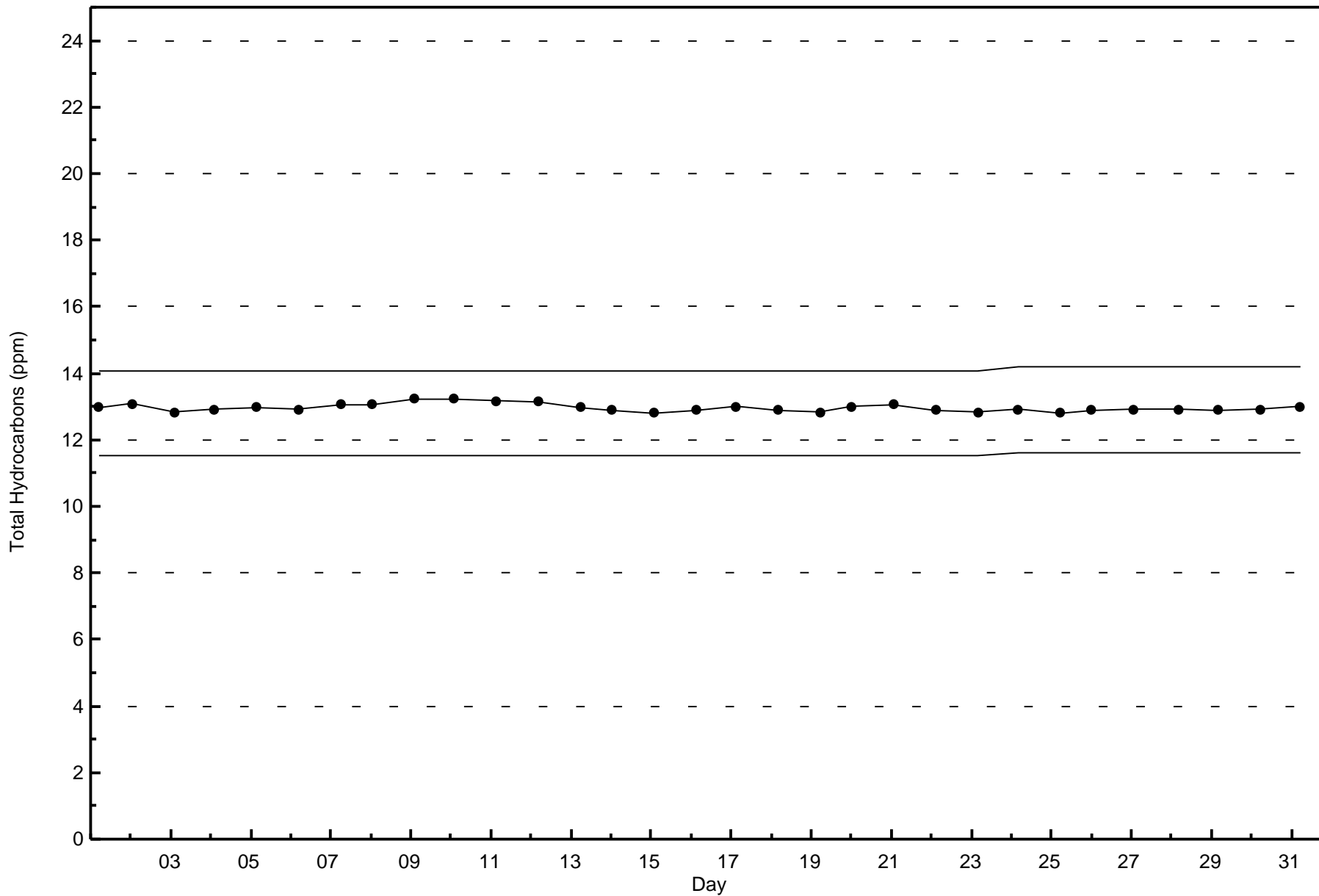




Wood Buffalo Environmental Association
Zero Responses

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







Wood Buffalo Environmental Association
Summary of Hour Averages

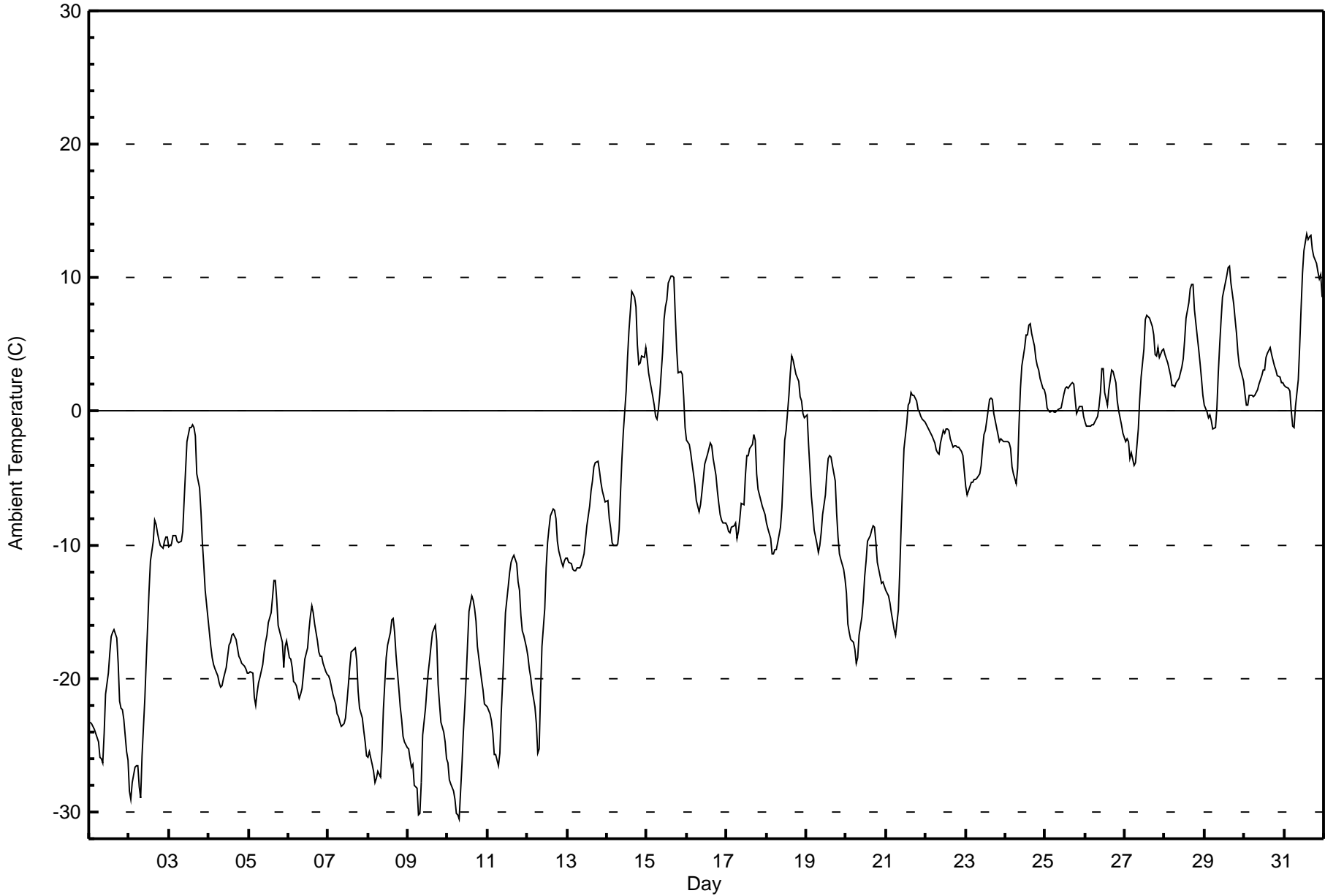
Ambient Temperature (AT) - C
Buffalo Viewpoint - March 2017

Maximum Value: 13.2 C on Mar 31 14:00		Maximum Daily Average: 7.0 C on Mar 31		Hours in Service:	744																						
Minimum Value: -30.5 C on Mar 10 08:00		Minimum Daily Average: -23.4 C on Mar 9		Hours of Data:	744																						
Maximum Diurnal Average: -3.1 C at hour 16		Minimum Diurnal Average: -12.9 C at hour 7		Hours of Missing Data:	0																						
Monthly Average: -8.15 C		Percentiles: P ₁ = -29.0 P ₁₀ = -23.0 Q ₁ = -17.5 Median = -7.1 Q ₃ = 0.4 P ₉₀ = 4.3 P ₉₉ = 11.2		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-Mar	-23.2	-23.4	-23.6	-23.8	-24.1	-24.8	-25.9	-26.1	-26.3	-24.1	-21.2	-19.6	-18.1	-16.8	-16.6	-16.4	-17.0	-18.8	-21.7	-22.3	-22.4	-23.1	-25.5	-26.1	-22.1	-16.4	
2-Mar	-28.4	-29.0	-27.8	-26.6	-26.5	-26.6	-28.1	-28.9	-25.8	-21.5	-18.7	-16.0	-13.4	-11.2	-9.7	-8.2	-8.5	-9.1	-9.6	-10.1	-10.3	-9.7	-9.4	-9.5	-17.6	-8.2	
3-Mar	-10.2	-10.0	-9.3	-9.3	-9.3	-9.7	-9.9	-9.7	-9.7	-9.0	-6.7	-4.5	-2.3	-1.2	-1.2	-1.0	-1.2	-1.8	-4.6	-5.7	-7.5	-9.9	-11.5	-13.4	-15.5	-7.3	-1.0
4-Mar	-16.5	-17.6	-18.5	-19.0	-19.3	-19.8	-20.3	-20.6	-20.6	-20.1	-19.2	-18.3	-17.5	-17.3	-16.8	-16.7	-17.0	-17.7	-18.3	-18.6	-18.8	-19.1	-19.3	-19.6	-18.6	-16.5	
5-Mar	-19.6	-19.5	-19.6	-21.4	-22.0	-21.0	-20.3	-19.9	-18.9	-18.0	-17.3	-16.8	-15.8	-15.1	-13.9	-12.7	-12.7	-14.1	-16.0	-16.9	-17.3	-19.2	-17.6	-17.2	-17.6	-12.7	
6-Mar	-18.4	-18.6	-19.2	-20.2	-20.3	-20.6	-21.5	-21.2	-20.8	-19.7	-18.6	-17.7	-16.3	-15.3	-14.6	-15.1	-16.0	-17.2	-18.0	-18.4	-18.3	-18.9	-19.5	-19.7	-18.5	-14.6	
7-Mar	-19.8	-20.1	-20.6	-21.2	-21.9	-22.6	-22.8	-23.2	-23.6	-23.3	-23.0	-21.8	-20.6	-19.2	-18.0	-17.8	-17.7	-18.7	-20.9	-22.2	-23.0	-23.9	-24.8	-25.8	-21.5	-17.7	
8-Mar	-25.9	-25.5	-26.4	-27.0	-27.8	-27.5	-26.9	-27.4	-25.3	-22.4	-20.3	-18.4	-17.4	-16.5	-15.6	-15.5	-16.5	-18.2	-20.7	-22.2	-23.0	-24.4	-24.8	-25.2	-22.5	-15.5	
9-Mar	-25.3	-26.0	-26.6	-26.5	-28.0	-28.2	-30.2	-30.1	-27.8	-24.2	-22.2	-20.7	-19.5	-18.6	-17.5	-16.5	-16.0	-17.2	-20.5	-21.9	-23.2	-24.0	-24.8	-26.0	-23.4	-16.0	
10-Mar	-26.4	-27.6	-27.9	-28.5	-29.0	-30.1	-30.2	-30.5	-26.4	-24.1	-22.1	-19.9	-17.4	-15.0	-13.8	-14.1	-14.8	-15.7	-17.6	-19.3	-20.1	-20.8	-21.9	-22.0	-22.3	-13.8	
11-Mar	-22.1	-22.6	-23.1	-24.2	-25.7	-25.7	-26.6	-25.6	-22.5	-20.3	-17.7	-15.1	-13.1	-12.0	-11.3	-10.9	-10.8	-11.4	-12.8	-13.4	-15.3	-16.5	-16.8	-17.7	-18.0	-10.8	
12-Mar	-18.4	-19.3	-19.9	-20.9	-22.1	-23.4	-25.6	-25.2	-21.1	-17.6	-14.7	-11.7	-9.8	-8.8	-7.8	-7.3	-7.4	-8.0	-9.7	-10.4	-11.3	-11.6	-11.2	-11.0	-14.8	-7.3	
13-Mar	-11.0	-11.3	-11.4	-11.8	-12.0	-11.9	-11.7	-11.7	-11.5	-11.1	-10.7	-9.6	-8.6	-7.1	-6.0	-5.2	-4.1	-3.9	-3.8	-4.5	-5.3	-5.9	-6.3	-6.7	-8.5	-3.8	
14-Mar	-6.7	-8.0	-8.8	-9.9	-10.0	-10.1	-10.0	-8.9	-6.0	-3.5	-1.5	1.5	4.1	6.1	7.5	9.0	8.6	7.8	5.0	3.5	3.6	4.2	4.1	4.8	-0.6	9.0	
15-Mar	3.9	2.9	2.2	1.1	0.4	-0.4	-0.6	0.2	1.4	4.4	6.9	7.8	8.4	9.7	10.2	10.2	10.0	7.2	4.7	2.9	3.0	2.7	1.1	-1.3	4.1	10.2	
16-Mar	-2.2	-2.5	-3.1	-3.9	-4.7	-5.5	-6.7	-7.5	-7.0	-6.1	-4.9	-3.9	-3.2	-2.8	-2.3	-2.5	-3.5	-4.8	-5.9	-6.9	-7.7	-8.1	-8.4	-8.4	-5.1	-2.2	
17-Mar	-8.6	-9.0	-9.1	-8.7	-8.6	-8.4	-9.5	-9.0	-8.0	-6.9	-7.0	-4.7	-3.3	-3.3	-2.8	-2.4	-1.8	-2.2	-4.6	-5.9	-6.3	-7.1	-7.4	-7.7	-6.3	-1.8	
18-Mar	-8.3	-8.8	-9.5	-10.7	-10.7	-10.4	-10.4	-9.9	-8.7	-7.2	-4.8	-2.1	-1.4	1.3	2.9	4.2	3.8	3.3	2.8	2.3	1.1	0.8	-0.2	-0.5	-3.4	4.2	
19-Mar	-0.2	-2.4	-4.4	-6.3	-7.5	-8.8	-9.9	-10.6	-10.1	-9.1	-7.8	-6.2	-4.6	-3.5	-3.3	-3.4	-4.0	-5.2	-7.7	-9.4	-10.7	-11.1	-11.9	-12.6	-7.1	-0.2	
20-Mar	-13.7	-15.9	-16.5	-17.1	-17.3	-17.8	-18.8	-18.4	-16.7	-15.4	-14.1	-12.4	-11.2	-9.7	-9.3	-8.9	-8.5	-8.7	-9.8	-11.3	-12.3	-12.9	-12.8	-13.0	-13.4	-8.5	
21-Mar	-13.4	-13.8	-14.3	-15.1	-15.7	-16.3	-16.7	-14.9	-11.9	-8.5	-5.6	-2.8	-0.9	0.4	0.7	1.4	1.2	1.2	0.8	0.1	-0.1	-0.3	-0.6	-0.8	-6.1	1.4	
22-Mar	-1.0	-1.2	-1.4	-1.6	-1.8	-2.3	-2.9	-3.1	-3.2	-2.4	-1.4	-1.6	-1.3	-1.3	-1.4	-2.0	-2.7	-2.6	-2.6	-2.7	-2.6	-3.0	-3.3	-4.4	-2.2	-1.0	
23-Mar	-5.6	-6.3	-6.0	-5.3	-5.4	-5.1	-5.1	-5.0	-4.7	-4.1	-2.8	-1.7	-1.4	-0.7	0.9	1.0	0.9	-0.2	-0.7	-1.7	-2.2	-2.0	-2.2	-2.3	-2.8	1.0	
24-Mar	-2.3	-2.3	-2.3	-2.8	-4.1	-4.7	-5.4	-4.3	-0.9	1.8	3.5	4.8	5.7	5.7	6.4	6.5	5.8	4.9	3.9	3.4	3.1	2.5	1.8	1.6	1.3	6.5	
25-Mar	1.2	0.2	0.0	-0.1	0.0	0.0	-0.1	0.0	0.1	0.3	0.7	1.3	1.7	1.8	1.8	2.0	2.1	2.0	0.9	-0.2	0.4	0.4	0.3	-0.4	0.7	2.1	
26-Mar	-0.8	-1.1	-1.1	-1.1	-1.0	-1.0	-0.8	-0.3	0.3	1.4	3.2	3.2	1.4	0.5	1.6	2.3	3.1	2.9	2.2	0.7	0.0	-0.4	-1.0	-1.7	0.5	3.2	
27-Mar	-2.3	-2.0	-2.3	-3.5	-3.1	-4.1	-3.9	-2.6	-1.3	0.9	2.6	4.6	6.8	7.2	7.1	7.0	6.4	5.7	4.3	4.2	4.8	4.0	4.5	4.7	2.1	7.2	
28-Mar	4.3	3.9	3.6	2.7	1.9	1.9	1.9	2.2	2.4	2.9	3.3	4.0	5.3	6.9	8.2	9.1	9.6	9.5	7.6	5.7	4.7	3.6	2.5	1.2	4.5	9.6	
29-Mar	0.5	-0.1	-0.5	-0.3	-0.7	-1.3	-1.2	0.3	2.9	5.0	6.9	8.5	9.6	10.2	10.8	10.9	9.6	8.0	6.9	5.8	4.3	3.4	3.1	2.3	4.4	10.9	
30-Mar	1.3	0.5	0.5	1.2	1.2	1.1	1.2	1.4	1.6	2.0	2.7	3.1	3.1	4.0	4.4	4.7	4.3	3.8	3.5	3.1	2.7	2.5	2.1	2.1	2.4	4.7	
31-Mar	1.9	1.8	1.7	1.5	0.1	-1.1	-1.2	0.4	2.3	4.9	7.8	10.4	12.0	13.2	12.9	13.1	13.2	12.1	11.6	11.1	10.5	9.9	10.2	8.6	7.0	13.2	
																								Diurnal Average			
																								Diurnal Maximum			
																								Diurnal Minimum			



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

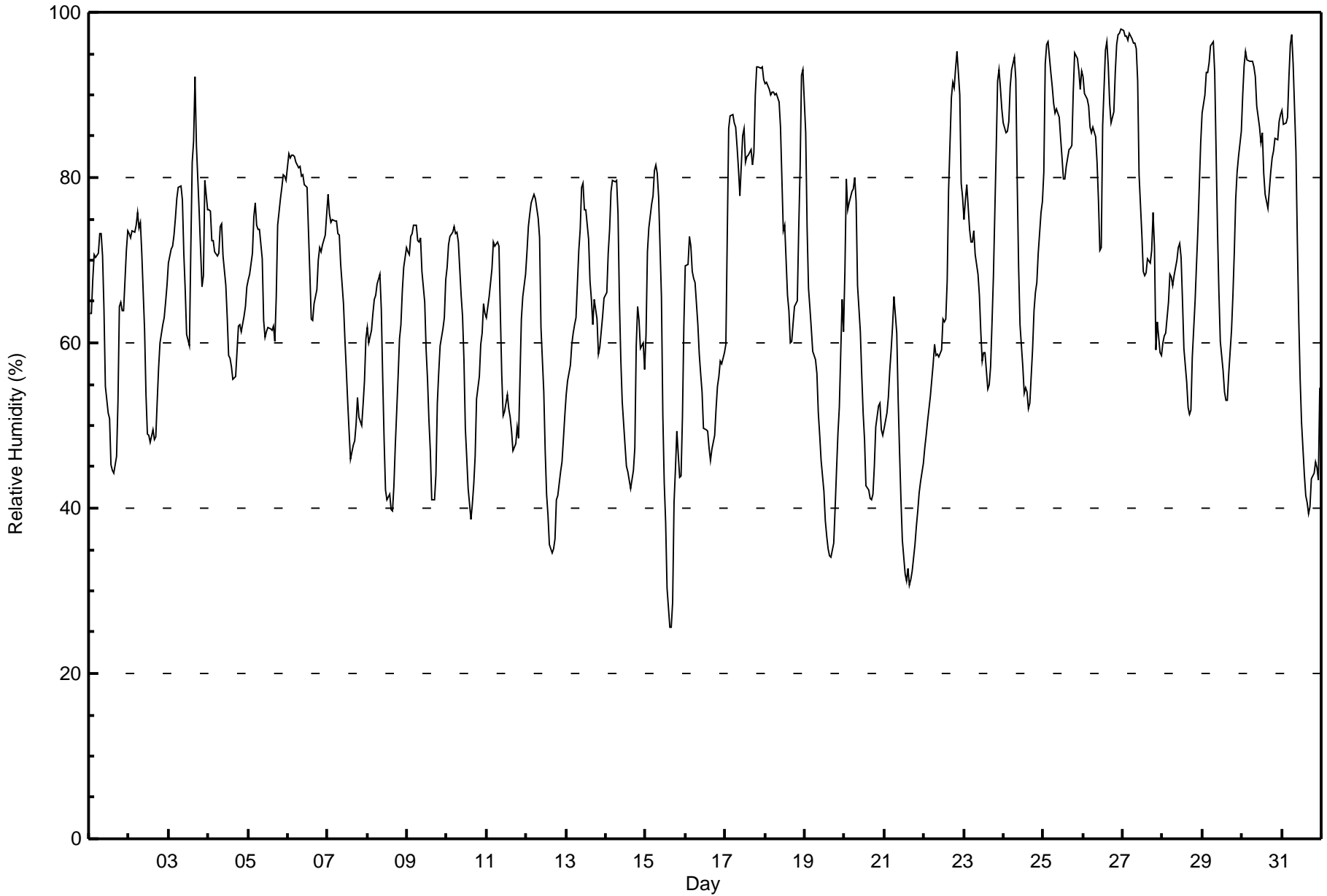
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	125	16.80	16.80
-20 - 0	416	55.91	72.72
0 - 10	186	25.00	97.72
10 - 20	17	2.28	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 98 % on Mar 27 00:00														Maximum Daily Average: 88.4 % on Mar 26														Hours in Service: 744	
Minimum Value: 26 % on Mar 15 15:00														Minimum Daily Average: 44.6 % on Mar 21														Hours of Data: 744	
Maximum Diurnal Average: 77.8 % at hour 7														Minimum Diurnal Average: 54.6 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 67.2 %														Percentiles: P ₁ = 32 P ₁₀ = 45 Q ₁ = 56 Median = 68 Q ₃ = 79 P ₉₀ = 90 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-Mar	64	64	68	71	70	71	73	73	70	64	55	52	51	45	45	44	46	53	64	65	64	64	71	73	61.7	73			
2-Mar	73	73	74	73	74	76	74	75	71	62	54	49	49	48	49	48	49	53	57	60	62	63	65	67	62.3	76			
3-Mar	70	71	72	73	75	78	79	79	77	71	66	61	60	71	82	84	92	84	76	71	67	68	80	76	74.3	92			
4-Mar	76	76	72	72	71	70	71	74	74	70	67	63	59	58	57	56	56	59	62	62	61	63	64	67	65.9	76			
5-Mar	68	68	71	75	77	74	74	74	70	63	61	61	62	62	62	62	66	66	74	78	79	80	80	80	70.0	80			
6-Mar	83	82	83	83	83	82	81	81	80	80	79	79	74	68	63	63	65	67	70	71	71	72	73	76	75.3	83			
7-Mar	78	76	75	75	75	75	73	73	69	65	61	57	53	49	46	48	48	50	53	51	50	53	55	60	61.1	78			
8-Mar	62	60	62	64	65	66	67	68	64	56	48	42	41	42	40	40	43	48	56	61	62	66	69	72	56.8	72			
9-Mar	71	71	73	73	74	74	72	72	73	69	65	59	56	51	47	41	41	44	53	56	60	62	63	68	62.0	74			
10-Mar	69	72	73	73	74	73	73	72	66	63	58	50	46	42	39	41	43	46	53	56	60	61	65	64	59.7	74			
11-Mar	63	66	67	69	72	72	72	72	64	56	51	52	54	52	51	49	47	48	50	48	56	63	66	68	59.4	72			
12-Mar	71	74	76	77	78	77	76	75	73	62	54	47	42	39	36	35	35	36	41	41	44	46	48	51	55.6	78			
13-Mar	54	55	57	60	61	62	63	71	74	79	79	76	76	72	67	65	62	65	63	59	60	61	63	65	65.5	79			
14-Mar	66	71	74	78	80	79	80	76	65	58	53	48	45	44	43	42	45	47	60	64	63	59	60	57	60.7	80			
15-Mar	61	71	74	77	78	81	82	80	78	66	51	43	38	30	26	26	29	41	45	49	44	44	51	62	55.2	82			
16-Mar	69	70	73	72	69	68	67	62	59	56	54	50	49	49	47	46	47	49	52	55	56	58	57	59	58.0	73			
17-Mar	60	73	86	87	88	87	86	84	81	78	85	86	82	83	83	83	82	83	90	93	93	93	93	92	84.6	93			
18-Mar	91	91	91	90	90	90	90	90	89	86	80	74	74	66	64	60	60	62	64	65	74	81	92	93	79.6	93			
19-Mar	85	74	67	64	62	59	58	56	52	49	46	42	39	37	35	34	34	36	40	45	49	52	65	61	51.7	85			
20-Mar	69	80	76	77	78	79	80	77	67	61	56	51	48	43	42	41	41	42	45	50	52	53	50	49	58.6	80			
21-Mar	50	51	53	57	59	62	66	61	53	47	41	36	32	31	33	31	31	32	36	38	40	42	43	45	44.6	66			
22-Mar	47	49	51	52	54	58	60	58	59	58	59	63	63	63	67	79	90	91	91	93	95	90	79	78	68.6	95			
23-Mar	75	77	79	74	72	74	71	68	66	61	58	59	59	54	55	57	62	68	83	92	93	91	88	88	71.2	93			
24-Mar	87	85	86	87	91	93	95	92	79	69	62	57	54	55	54	52	53	59	64	66	67	71	76	77	72.1	95			
25-Mar	81	94	96	96	93	91	89	88	88	87	85	82	80	80	81	83	84	84	90	95	94	93	91	93	88.3	96			
26-Mar	92	90	89	89	86	85	86	85	82	77	71	71	86	95	96	94	89	87	88	93	96	97	98	98	88.4	98			
27-Mar	98	97	97	97	97	97	96	96	96	92	80	73	69	68	68	70	70	71	76	71	59	62	59	58	79.9	98			
28-Mar	60	61	61	65	68	68	67	68	70	72	72	70	65	59	55	52	51	52	58	65	69	74	79	84	65.3	84			
29-Mar	88	90	93	93	94	96	96	93	83	74	66	60	57	54	53	53	56	62	66	71	77	81	83	86	75.9	96			
30-Mar	90	94	95	94	94	94	94	93	92	89	86	84	85	80	78	76	79	81	82	83	85	85	87	88	87.0	95			
31-Mar	88	86	87	87	92	96	97	94	83	72	63	56	50	44	42	41	39	40	43	44	46	45	43	55	63.9	97			
	72.8	74.6	75.7	76.6	77.3	77.6	77.8	76.9	73.2	68.2	63.6	59.8	57.9	56.1	55.0	54.6	55.6	58.0	62.3	64.6	66.0	67.6	69.7	71.3	Diurnal Average				
	98	97	97	97	97	97	97	96	96	92	86	86	86	95	96	94	92	91	91	95	96	97	98	98	Diurnal Maximum				





Maximum Speed: 32 km/h on Mar 19 03:00	Maximum Daily Speed Average: 23.7 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 11 05:00	Minimum Daily Speed Average: 1.3 km/h on Mar 30	Hours of Data: 735
Maximum Diurnal Speed Average: 4.8 km/h at hour 20	Minimum Diurnal Speed Average: 0.9 km/h at hour 13	Hours of Missing Data: 9
Monthly Average Velocity: 2.7 km/h 46.0 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 14 P ₉₀ = 20 P ₉₉ = 27	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-Mar	NNE9	NNE10	NNE10	NNE10	NNE11	NNE11	NNE10	NNE11	NNE10	NNE7	N7	NW5	NW7	N9	N13	N12	N10	NNW7	N7	N7	N4	N3	WSW2	W4	N7.5	N13
2-Mar	SSW2	SSE7	SE7	SSE5	SSE6	S2	S7	SSE7	SSE6	SE7	SE8	SE7	SE10	ESE10	SE11	SE12	ESE13	ESE13	SE15	SE12	SE12	SSE12	SE12	SE10	SE8.5	SE15
3-Mar	SSE8	SE8	SE12	SSE10	SSE8	SSE7	S4	SSE6	SSE4	SE11	SSE9	SSE7	S6	NW5	W6	W10	NW16	NW20	NNW19	NNW23	NW22	NNW19	NNE19	NNE19	NW2.5	NNW23
4-Mar	NNE17	N22	NNE20	N12	N17	N21	N25	N23	N21	N23	N21	N17	N21	N21	N19	N19	N17	N15	NNE11	NNE10	NE10	NE10	NE8	NNE9	N16.6	NNE25
5-Mar	NNE9	N6	N5	NNE7	NNE10	NNE10	NE3	WNW2	SE2	SE8	SE7	S5	SSW5	S2	W3	NW6	N7	NNE6	NE6	N5	ENE4	SSE4	WSW4	NW4	NNE2.3	NNE10
6-Mar	NNE8	NNE8	N6	N9	N11	NNE14	NNE14	NNE17	N14	N14	N21	N20	N16	NNE14	N18	N26	N25	N26	N22	N22	N24	N24	N23	N20	N17.2	N26
7-Mar	N23	N25	N25	N26	N24	N20	N21	N23	N24	N24	N24	N23	N22	N18	N20	N21	N20	N17	NNE13	NNE14	NNE14	NNE11	N10	NNE9	N19.5	N26
8-Mar	NNW7	N10	NNE9	NNE9	NNE7	NW5	W5	SW4	WSW3	WNW6	NNW6	N11	N11	N8	NNE7	NNE10	NNE12	NNE12	NNE11	NNE12	NNE11	N10	N8	NNE6	N7.1	NNE12
9-Mar	NNE4	NNW5	NNW5	NW5	NW1	W4	WSW4	W4	W3	NNE3	N5	N6	NNE8	NNE8	N6	NNE6	NE5	NE4	NNE9	NE11	NNE12	NNE12	N4	N7	N4.7	NNE12
10-Mar	NNE4	NNE7	NNE4	N6	N5	NNE4	NNE6	N3	NNE2	N3	N6	N6	NNW6	NNW7	NNW8	N13	N12	N9	NNE13	NNE12	NNE12	NNE8	NNE7	NNE6	N6.9	N13
11-Mar	N4	NNE5	N4	NNW3	W0	SE3	SE2	ESE4	SE4	SSE5	ESE6	E5	ESE9	ESE9	ESE11	ESE10	ESE9	E8	E9	E11	SE9	SE9	SE10	SE10	ESE5.4	E11
12-Mar	SE7	SE6	SSE6	SE6	SSE5	SSE7	SSE8	SSE7	SSE6	SE5	SE9	SSE16	SSE14	SSE14	SSE11	SE14	SE15	SE14	SE12	SE15	SE14	SE13	SSE15	SSE15	SE10.5	SSE16
13-Mar	SSE16	SSE16	SSE16	SSE14	SSE13	SSE15	SSE16	SSE17	SSE18	SSE17	SSE20	SSE19	SSE19	SSE16	SSE15	SSE15	SSE13	S12	S13	SSE14	SSE11	SE11	SE10	SSE15.1	SSE20	
14-Mar	SE9	SE6	SE6	SSE6	SSE7	SSE7	SSE8	SSE9	SSE10	SE9	ESE9	SE7	SE9	SE10	SE10	ESE9	ESE7	E5	NNE6	NNE6	E5	SE10	SE14	SE14	SE7.2	SE14
15-Mar	SE11	SE12	SE10	SE10	SE10	SE10	SE11	SE11	SE10	SSE9	WSW12	WSW15	WSW14	WSW17	WSW20	WSW17	WNW11	NNW10	N14	NNE11	NE8	ENE3	WNW3	SSW1	SSW3.9	WSW20
16-Mar	NNW7	NNE11	N16	N21	NNE20	NNE26	NNE27	NNE22	NNE21	NNE22	N22	NNE20	N21	N22	N21	N22	NNE24	NNE24	N20	N20	N21	NNE20	NNE18	N15	N20.0	NNE27
17-Mar	N14	NNE12	NNE8	N6	NNW5	WNW8	NW8	NNW3	NNW5	NW5	N3	NNW8	N8	N13	N12	N13	N14	N13	N12	N13	N18	N18	N18	N18	N10.1	N18
18-Mar	N16	N12	N12	N10	N12	N12	N13	N12	N10	N9	N8	NNW7	NW8	N9	N9	ESE11	ESE11	ESE7	ENE6	NE4	N5	NE6	NW5	NW11	N6.9	N16
19-Mar	NW25	WNW29	WNW32	WNW31	WNW27	WNW24	WNW20	WNW18	WNW19	WNW19	W19	W19	WNW20	WNW23	WNW25	WNW24	WNW25	NW28	NW30	NW30	NW27	NW27	NW24	NNW23	WNW23.7	WNW32
20-Mar	N22	N21	N19	N19	N16	N12	NNE7	NE7	NNE5	NNE5	NE5	N6	NNE7	NNE8	ESE7	ESE10	ESE11	SE10	SE9	SSE7	SSE9	SSE12	SSE12	SSE13	NE5.0	N22
21-Mar	SSE13	SSE12	SSE11	SSE11	SSE12	SSE10	SSE10	SSE10	SSE11	SSE11	SSE11	SSE10	SSE13	SE14	SE14	SE19	SSE18	SE18	SE18	SE18	SSE19	SSE17	SSE16	SE16	SSE13.9	SSE19
22-Mar	SE16	SE16	SE15	SE12	SE11	SE9	ESE10	ESE11	ESE12	ESE11	ESE11	ESE10	SE8	SE8	ESE5	SSE3	WSW3	W4	WSW3	SW3	NNW9	N17	N22	N22	ESE4.8	N22
23-Mar	N15	N13	N10	N14	NNW12	N10	N10	NNE14	NNE12	N10	N10	NNW5	WNW9	WNW9	NNW8	NNW8	NW6	NW7	N9	NNE8	NE6	ESE7	SE8	SE10	N7.0	N15
24-Mar	SSE10	SSE8	SSE8	SSE8	SE8	SE9	SSE8	SSE5	SSE7	SE8	SE10	SSE11	SSE12	SSE13	SE11	SE13	SE13	SE10	ESE10	SE12	SE17	SE17	SE14	SE14	SE10.5	SE17
25-Mar	SE11	SE8	ESE6	ESE5	ESE7	SE8	SE9	SE8	SE10	SE9	SE9	SE8	SE7	ESE5	SE4	NNE4	NE5	NE3	NE6	NE8	ENE4	NE4	ENE2	NE5	ESE5.2	SE11
26-Mar	ENE5	ENE4	ESE3	SE4	E5	E3	ESE6	SE7	ESE8	SE7	N5	NW8	WNW9	WNW5	NE3	E2	SE7	SSE6	SE4	NE5	NE7	NE5	NE3	N2	E2.3	WNW9
27-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	SE5	SE8	ESE5	N9	NNW8	NNW6	N10	NNE9	NNE7	NNE6	ENE4	ESE8	SE8	SSE10	SSE11	----	SSE11
28-Mar	SSE9	SSE7	SSE7	SE7	SE6	SSE8	SSE8	SE7	SE7	SE10	SSE10	S8	SSE10	SE9	SE10	SE9	SE9	ESE10	ESE9	SE7	SE8	SE9	SE11	SSE8	SE8.3	SE11
29-Mar	SSE8	SSE7	SSE6	SSE7	SSE7	SSE8	SSE8	SSE8	SSE7	SE8	SE9	SSE9	S9	SSE5	SE8	SE12	SE10	SE9	SE8	ESE8	SE11	SE8	SE10	SE10	SE8.2	SE12
30-Mar	SE8	SE5	SE10	SE10	SE9	SE8	SE7	SE5	ESE4	NNE5	N4	NNW5	WNW6	N5	N6	NNW6	NW4	NW4	W2	NW2	W3	SW2	S4	SSE3	ESE1.3	SE10
31-Mar	S4	SSE4	SSE5	S4	SE6	S6	S6	S6	S7	SSE7	SSE9	S10	S15	S15	S16	S15	SSW16	SSW13	S12	S10	S12	SSW11	S14	SSE11	S9.4	S16

NE3.1 NE3.5 NE2.8 NNE2.5 NE2.7 NE2.5 NE2.0 ENE2.2 ENE2.1 ENE2.6 ENE2.4 NE1.1 NNE0.9 NNE2.0 NNE2.3 NE2.8 NE3.2 NNE3.8 NE4.6 NE4.8 NE4.2 ENE3.1 ENE2.6 ENE2.8	Diurnal Average
NW25 WNW29 WNW32 WNW31 WNW27 NNE26 NNE27 N23 N24 N24 N24 N23 N22 WNW23 WNW25 N26 N25 NW28 NW30 NW30 NW27 NW27 NW24 NNW23	Diurnal Maximum

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



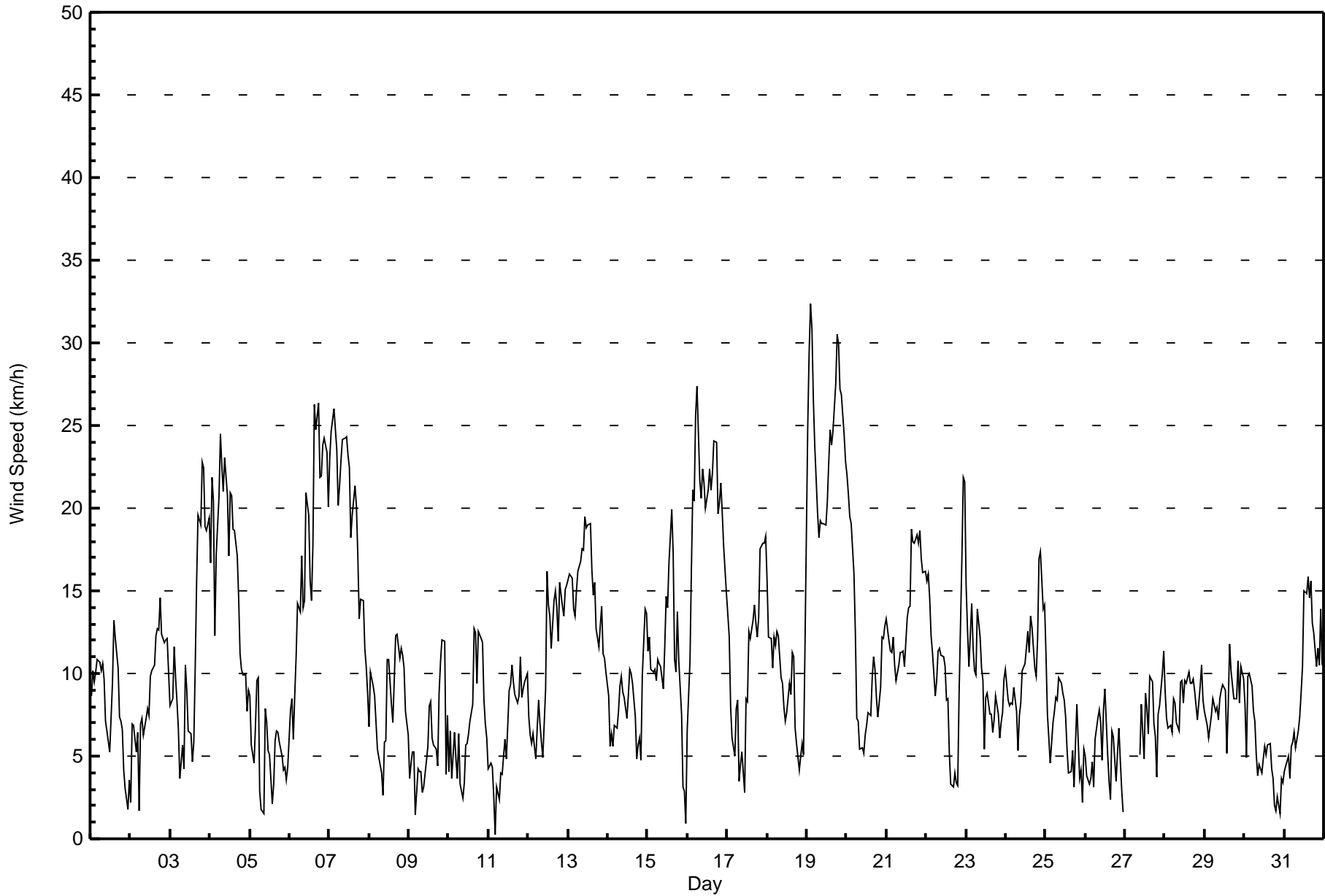
Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Mar 19 01:00	Hours in Service: 744 Hours of Data: 735 Hours of Missing Data: 9 Hours of Calibration: 0 Percent Operational Time: 98.8
Minimum Value: 0 km/h on Mar 11 02:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 2 Median = 2 O 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-Mar	2	2	2	2	2	2	1	1	1	2	1	1	2	2	2	2	2	1	1	1	1	1	1	2	2
2-Mar	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	3	4	3	3	3	3	3	4
3-Mar	2	3	3	3	3	2	1	2	2	4	3	2	2	2	3	3	7	5	3	4	4	4	4	4	7
4-Mar	3	4	5	3	3	4	5	4	5	4	4	3	3	4	3	4	3	3	2	2	3	2	2	2	5
5-Mar	1	1	2	2	1	2	3	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	3
6-Mar	1	2	1	1	3	2	2	3	2	3	4	5	3	4	5	4	5	5	4	4	4	4	4	4	5
7-Mar	5	4	4	4	4	4	4	4	4	5	5	4	4	3	4	3	3	4	3	3	3	2	2	2	5
8-Mar	2	2	2	1	1	1	1	0	1	2	2	4	3	2	3	3	3	3	2	2	3	3	1	2	4
9-Mar	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	3	1	3
10-Mar	1	2	1	1	1	3	1	2	1	1	2	1	2	2	2	2	2	2	2	2	1	2	1	1	3
11-Mar	1	0	0	1	1	1	1	1	1	2	2	2	3	3	3	3	3	2	2	2	2	2	2	1	3
12-Mar	1	1	1	1	1	1	1	1	1	2	3	5	4	4	4	4	4	4	3	4	3	4	4	4	5
13-Mar	4	4	4	3	4	4	4	4	5	5	5	5	5	5	4	4	5	4	4	3	3	3	2	2	5
14-Mar	2	1	2	1	1	2	1	2	3	2	2	3	2	2	2	2	2	1	1	1	2	2	3	3	3
15-Mar	3	3	2	2	2	2	2	2	3	3	4	5	4	4	5	4	3	2	3	2	2	1	1	1	5
16-Mar	3	2	3	4	4	5	5	5	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	3	5
17-Mar	3	2	2	1	2	4	2	1	1	2	2	2	2	2	2	2	2	2	1	1	2	1	2	3	4
18-Mar	3	2	2	1	2	2	2	2	2	2	1	2	2	2	2	4	3	2	1	2	1	2	2	2	4
19-Mar	10	7	8	8	8	7	5	4	4	5	5	5	5	6	6	6	6	6	6	6	6	6	5	5	10
20-Mar	5	4	4	3	3	4	2	2	2	2	2	2	2	2	3	3	3	2	2	1	2	2	2	3	5
21-Mar	3	2	2	2	3	2	1	3	3	3	3	3	4	4	4	5	5	5	5	5	6	4	4	4	6
22-Mar	4	4	4	3	3	2	2	3	3	3	3	3	2	2	2	2	1	1	1	1	5	3	4	4	5
23-Mar	3	3	2	2	2	2	2	3	3	2	2	2	2	2	2	2	2	1	2	2	1	2	2	2	3
24-Mar	2	2	2	2	1	1	1	1	3	3	3	3	4	3	3	4	4	2	2	3	4	5	3	4	5
25-Mar	3	2	2	1	2	2	2	2	3	3	2	2	2	1	1	1	1	1	1	1	2	1	1	1	3
26-Mar	1	1	1	1	1	2	3	2	2	2	1	2	2	2	2	1	2	2	1	1	1	1	2	1	3
27-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	2	2	2	2	2	2	2	1	1	1	2	2	3	2	3
28-Mar	2	1	1	1	1	2	2	2	2	3	2	2	3	3	3	3	2	2	2	1	2	2	2	1	3
29-Mar	1	1	1	1	1	1	1	2	2	2	2	3	3	2	2	3	2	2	1	1	2	3	3	3	3
30-Mar	2	1	2	3	3	2	2	1	2	1	1	2	1	1	1	1	1	1	1	1	1	2	1	1	3
31-Mar	1	2	1	1	1	1	1	2	2	2	3	4	4	5	5	5	5	4	3	3	3	3	5	3	5
Diurnal Maximum																									
10 7 8 8 8 7 5 5 5 5 5 5 5 6 6 6 6 7 6 6 6 6 6 5 5																									

AF - Analyzer Failure





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	134	18.23	18.23
6 - 11	348	47.35	65.58
12 - 19	169	22.99	88.57
20 - 28	79	10.75	99.32
29 - 38	5	0.68	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 735

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Buffalo Viewpoint - March 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	12	13	7	6	8	8	14	6	3	3	7	9	3	11	8	134
6 - 11	41	52	12	1	3	32	88	75	9	2	0	0	2	8	7	16	348
12 - 19	45	24	0	0	0	3	34	38	9	2	0	5	2	3	1	3	169
20 - 28	48	12	0	0	0	0	0	1	0	0	0	1	0	8	7	2	79
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0	5
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	150	100	25	8	9	43	130	128	24	7	3	13	13	25	28	29	735

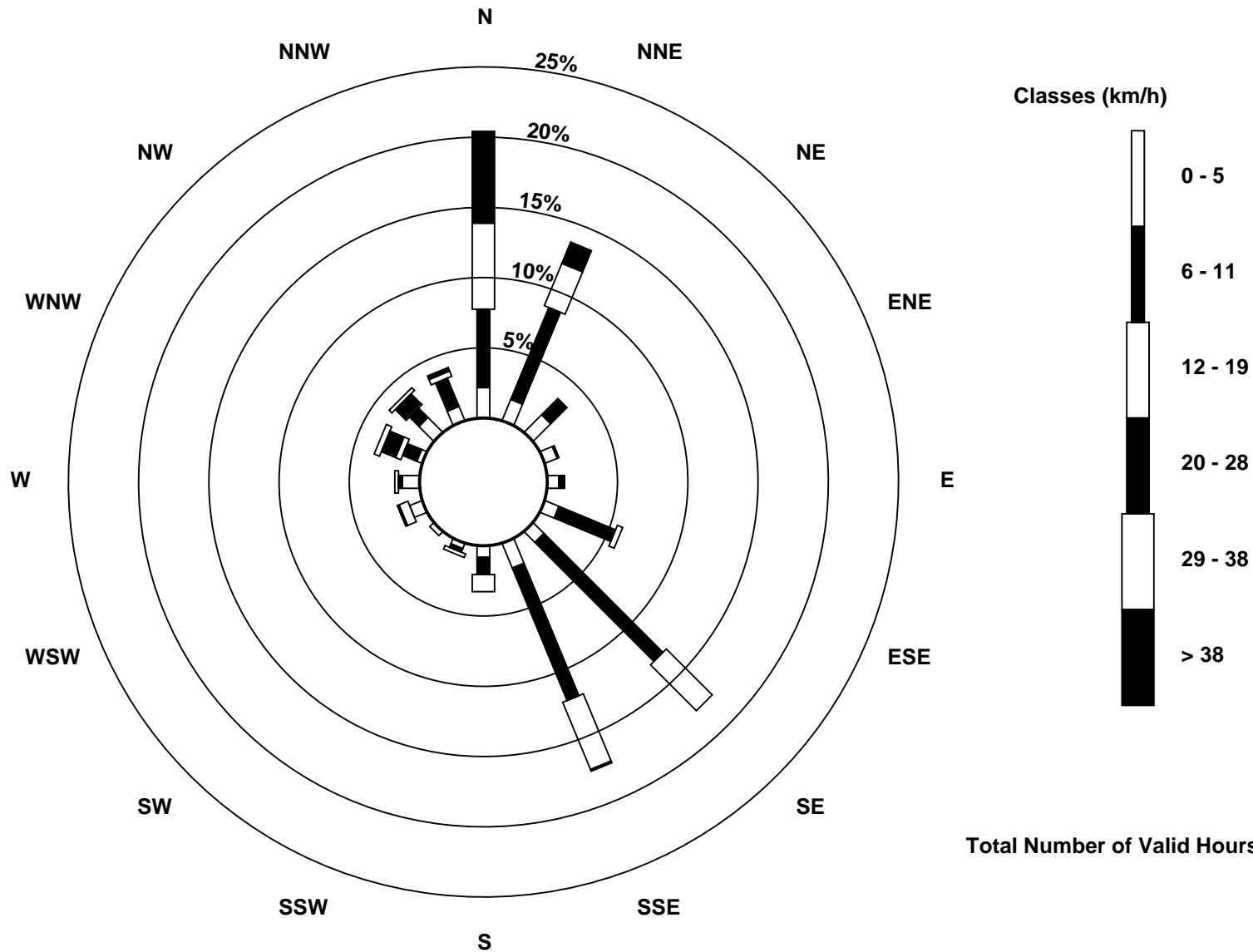
Total Number of Valid Hours: 735

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

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



Total Number of Valid Hours: 735



Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 303 deg on Mar 19 03:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 300.2 deg on Mar 19		Hours of Data:	735
Direction of Minimum Speed: 273 deg on Mar 11 05:00		Hours of Missing Data:	9
Direction of Minimum Daily Speed Average: 1.3 deg on Mar 30		Percent Operational Time:	98.8
Monthly Average Direction: 25.7 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-Mar	23	27	18	21	26	19	22	30	17	26	2	325	321	356	359	356	353	348	349	8	354	355	257	281	6.2
2-Mar	205	148	143	163	154	175	181	164	157	134	130	124	129	117	124	124	122	121	130	133	142	151	145	141	137.9
3-Mar	148	142	145	151	157	157	180	158	168	145	165	160	176	318	271	264	321	323	331	328	326	327	20	15	326.1
4-Mar	12	9	17	11	9	11	10	6	7	7	9	8	357	356	359	1	3	6	15	33	52	40	35	18	9.9
5-Mar	23	9	7	23	26	23	53	296	142	124	143	190	203	171	274	312	5	21	39	8	58	151	250	326	27.5
6-Mar	12	23	350	2	8	18	16	12	1	359	359	357	5	12	360	358	5	4	4	358	359	355	354	360	2.7
7-Mar	357	359	356	356	356	3	360	357	359	1	358	359	1	1	359	359	3	9	28	33	32	18	11	16	3.0
8-Mar	342	360	14	26	21	312	262	232	248	297	331	2	5	2	22	19	15	31	26	20	20	1	354	18	5.0
9-Mar	25	337	339	314	305	259	255	266	276	12	5	6	15	18	11	33	37	42	30	34	31	26	9	354	8.4
10-Mar	13	20	17	357	350	19	14	3	15	355	8	1	336	341	342	355	352	353	17	13	13	13	17	23	3.9
11-Mar	3	14	4	342	273	127	137	122	126	151	118	99	120	115	112	106	109	98	95	94	124	139	141	142	111.9
12-Mar	139	128	156	140	147	152	159	167	154	136	126	149	148	153	150	138	138	137	130	135	135	144	152	150	143.9
13-Mar	150	151	149	149	155	156	155	152	154	153	152	155	153	152	147	164	160	174	171	164	157	145	137	154.4	
14-Mar	143	137	142	150	156	152	165	159	155	132	122	128	128	124	124	119	122	96	31	13	84	125	136	145	131.6
15-Mar	135	141	159	154	157	168	163	156	150	150	243	248	237	244	252	252	299	344	5	14	37	75	290	202	207.5
16-Mar	340	13	11	10	12	14	15	15	13	12	9	12	4	3	2	5	12	12	11	10	11	17	21	10	10.4
17-Mar	9	30	28	349	346	302	318	335	332	310	355	327	349	4	2	360	354	350	355	359	4	5	7	9	357.0
18-Mar	9	358	356	356	1	3	358	7	359	0	1	341	314	2	3	117	123	113	68	50	359	56	310	304	7.0
19-Mar	311	300	303	295	295	296	292	288	291	282	280	267	286	290	291	285	286	310	322	320	319	307	321	330	300.2
20-Mar	349	7	6	359	4	11	27	35	24	22	44	358	27	30	110	118	122	124	141	152	153	150	156	155	47.9
21-Mar	157	158	161	155	157	158	162	156	154	154	162	157	156	144	137	146	148	143	145	138	155	152	150	145	150.9
22-Mar	144	145	142	142	140	126	119	117	120	117	121	118	129	134	123	164	250	267	249	221	336	353	357	1	113.4
23-Mar	8	3	0	354	348	0	6	14	14	10	356	331	290	287	348	348	325	314	357	16	48	122	132	142	0.2
24-Mar	152	161	160	154	142	141	150	161	157	141	142	153	149	153	128	142	146	127	123	126	132	132	133	135	141.5
25-Mar	127	124	120	117	119	126	139	139	140	144	136	125	127	118	124	33	42	50	46	49	65	48	67	46	110.6
26-Mar	70	67	115	146	100	92	115	125	119	127	11	319	298	284	39	95	133	157	140	42	44	41	48	359	85.1
27-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	146	129	103	1	346	336	9	22	12	19	61	123	137	152	157	--
28-Mar	155	152	154	142	144	151	148	144	138	146	155	170	152	135	128	126	125	122	122	125	131	141	146	152	141.6
29-Mar	156	150	150	163	150	148	162	157	154	146	144	158	173	162	137	127	129	128	127	119	131	135	135	137	143.5
30-Mar	131	129	142	142	138	137	140	129	107	19	355	334	298	358	2	348	325	308	276	321	273	222	173	162	118.2
31-Mar	175	157	167	169	144	178	191	173	189	160	150	173	172	180	187	183	194	199	169	183	176	200	190	167	179.0
47.2 42.9 41.5 29.9 43.4 42.4 53.0 65.6 69.3 75.5 64.7 42.1 21.0 26.9 27.9 38.9 35.5 29.9 36.4 36.5 47.8 57.5 72.2 66.1																									
Diurnal Average																									

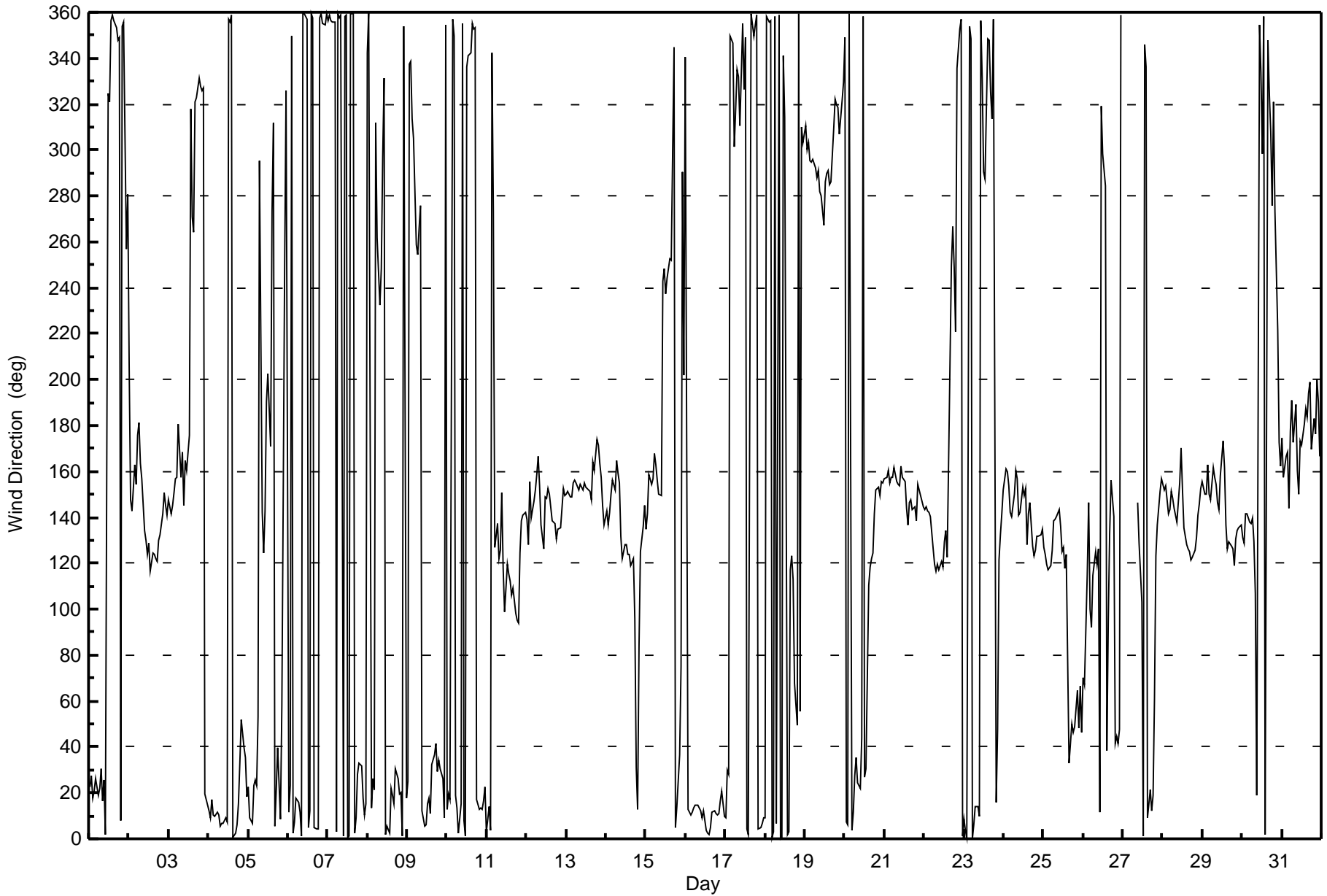
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 91 deg on Mar 11 05:00 Minimum Value: 6 deg on Mar 12 07:00 Percentiles: P ₁ = 7 P ₁₀ = 13 Q ₁ = 16 Median = 19 Q ₃ = 23 P ₉₀ = 32 P ₉₉ = 72																	Hours in Service: 744 Hours of Data: 735 Hours of Missing Data: 9 Hours of Calibration: 0 Percent Operational Time: 98.8									
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-Mar	12	12	12	12	14	13	9	10	10	18	22	35	30	24	23	21	19	16	15	13	19	19	49	27	49	
2-Mar	48	10	8	10	13	68	6	20	15	21	20	24	21	24	20	20	17	17	17	18	19	20	18	19	68	
3-Mar	19	18	19	19	21	31	35	20	49	22	22	36	37	45	57	23	27	16	19	17	13	22	17	14	57	
4-Mar	15	17	14	14	14	16	15	16	16	17	16	18	20	20	19	19	18	16	13	17	18	16	15	13	20	
5-Mar	14	16	21	10	7	12	82	38	78	23	33	48	47	84	67	28	23	12	18	21	31	25	28	18	84	
6-Mar	20	9	21	16	14	10	11	13	17	17	19	20	16	20	20	21	18	20	17	20	20	21	21	19	21	
7-Mar	21	21	21	20	22	20	22	22	21	22	24	22	22	21	20	22	20	21	14	13	14	12	10	13	24	
8-Mar	18	18	9	10	7	28	21	16	36	21	42	20	21	25	32	21	16	15	13	13	14	18	17	12	42	
9-Mar	26	18	12	21	61	16	26	17	30	36	21	19	17	21	22	29	26	27	8	7	8	7	47	19	61	
10-Mar	17	9	30	15	17	58	8	28	38	33	17	23	35	27	25	21	19	19	13	17	10	17	10	10	58	
11-Mar	15	7	24	18	91	36	29	7	21	27	43	62	28	32	26	28	29	20	13	15	13	11	13	11	91	
12-Mar	8	10	12	10	31	18	6	8	14	30	23	22	24	25	27	22	20	18	17	16	17	18	18	20	31	
13-Mar	18	18	18	18	19	19	19	19	20	20	19	21	20	19	19	19	21	19	21	17	16	18	17	13	21	
14-Mar	16	17	17	15	14	15	13	15	20	20	20	22	21	17	19	18	15	22	30	17	44	16	17	18	44	
15-Mar	16	21	18	15	17	18	18	16	16	22	30	16	17	18	14	16	40	19	18	19	9	48	36	74	74	
16-Mar	22	13	14	15	15	14	15	16	15	17	17	17	21	19	21	19	17	15	15	16	16	14	12	20	22	
17-Mar	19	14	19	20	29	20	17	31	36	28	74	25	25	18	21	22	21	18	19	24	22	22	15	14	74	
18-Mar	20	24	27	30	27	24	27	25	27	27	25	32	28	26	27	34	17	22	19	38	30	27	28	12	38	
19-Mar	13	15	15	15	17	16	17	17	16	19	21	20	19	18	17	18	17	20	13	14	15	14	23	16	23	
20-Mar	27	21	21	22	20	22	18	16	29	33	41	36	31	25	37	23	19	16	16	13	13	13	15	16	41	
21-Mar	15	15	16	15	15	14	12	17	20	23	22	24	23	24	23	20	19	19	20	18	20	18	18	19	24	
22-Mar	18	19	20	19	19	19	18	17	18	19	20	18	20	19	29	45	29	23	19	33	25	23	23	20	45	
23-Mar	16	20	20	20	18	19	15	15	16	19	21	38	20	19	28	24	31	15	20	21	14	25	17	19	38	
24-Mar	19	18	18	16	10	11	13	18	24	28	26	27	23	22	21	21	20	17	15	16	18	18	17	18	28	
25-Mar	18	17	18	15	17	16	19	17	20	20	21	19	19	19	22	31	22	40	10	8	39	12	48	8	48	
26-Mar	23	21	41	56	16	37	25	20	19	21	45	25	16	25	55	58	23	21	29	27	13	14	58	73	73	
27-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	24	45	20	48	21	28	37	16	16	14	13	49	16	18	17	17	49
28-Mar	16	15	16	14	14	14	15	21	19	20	19	28	29	31	27	23	20	17	13	12	16	17	17	14	31	
29-Mar	11	11	12	10	12	10	14	18	21	23	26	34	30	46	40	18	16	14	14	12	15	20	18	18	46	
30-Mar	17	22	15	18	19	17	19	22	46	23	23	33	20	27	22	24	31	28	28	53	41	73	43	28	73	
31-Mar	28	27	22	19	20	10	18	19	26	33	27	35	24	23	20	21	22	21	17	20	19	21	22	18	35	
Diurnal Maximum																										
AF - Analyzer Failure																										





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 23, 2017	Last Calibration	February 9, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	7:10	End Time (MST)	9:25
Gas Cert Reference	LL107929	Station temp.	21 Deg C
Cal Gas Concentration	49.7 ppm	Cal Gas Exp Date	08-Spet-2018
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2635

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-593	-593
Analyzer IP address	192.168.1.43		Lamp voltage	841	841
Calculated slope	1.008932	0.992837	Chamber temp	45.0	45.0
Calculated intercept	0.468199	1.895956	Pressure	693.4	693.4
Analyzer Background	11.6	11.7	Flow	0.498	0.498
Analyzer Coefficient	0.819	0.827	Intensity	85	85

Analyzer make TEI 43i Analyzer serial # JC1327300932

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	60.4	600.4	591.0	1.016
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	60.4	600.4	603.7	0.994
second point	5000	30.2	300.2	299.4	1.003
third point	5000	15.1	150.1	147.7	1.016
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	60.4	600.4	602.2	0.997
Average Correction Factor					1.004

Corrected As found 591.2 Previous response 594.6 % change 0.6%

Notes:

No maintenance done, filter changed out, span adjusted

Calibration Performed By: Melissa Lemay



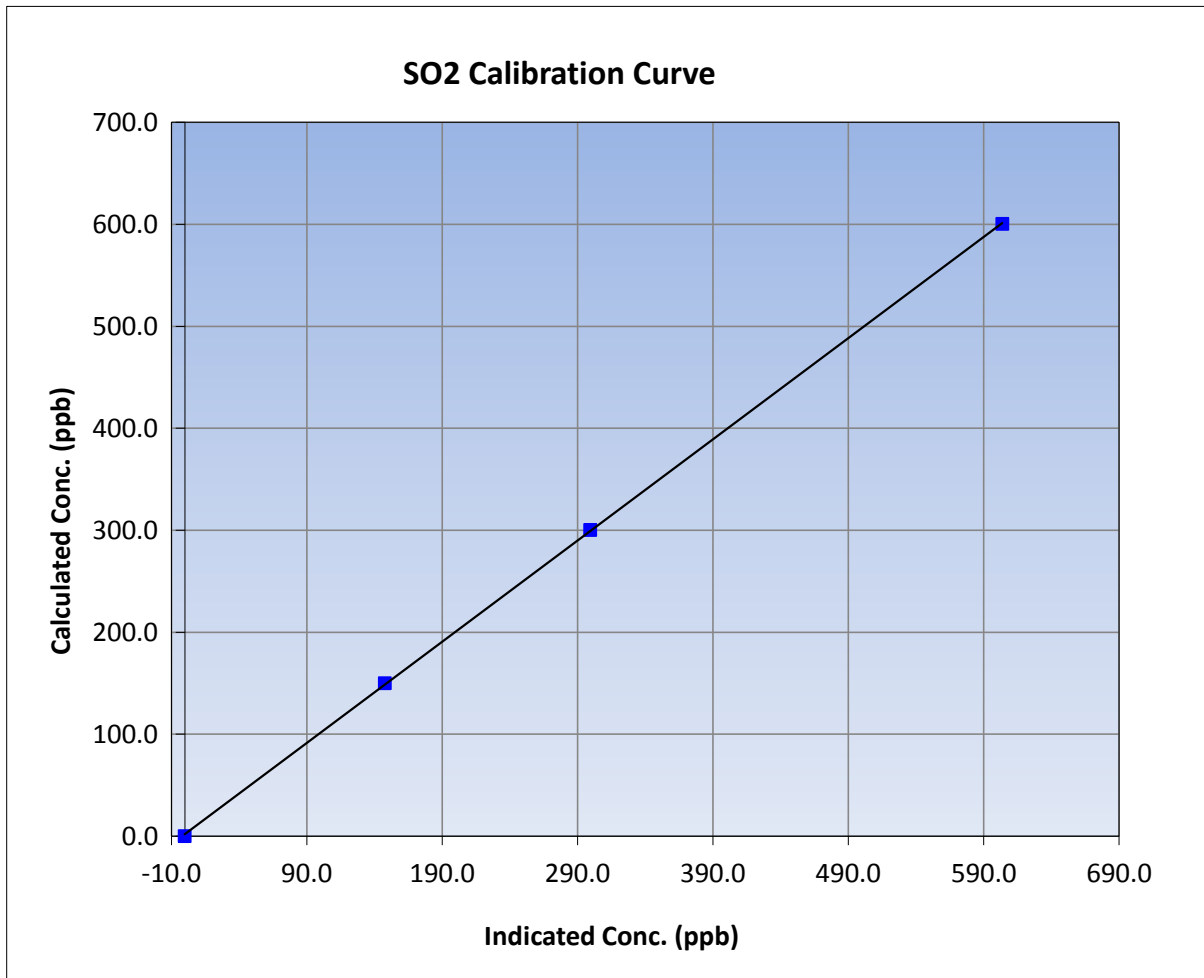
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 23, 2017	Previous Calibration	February 9, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	7:10	End Time (MST)	9:25
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

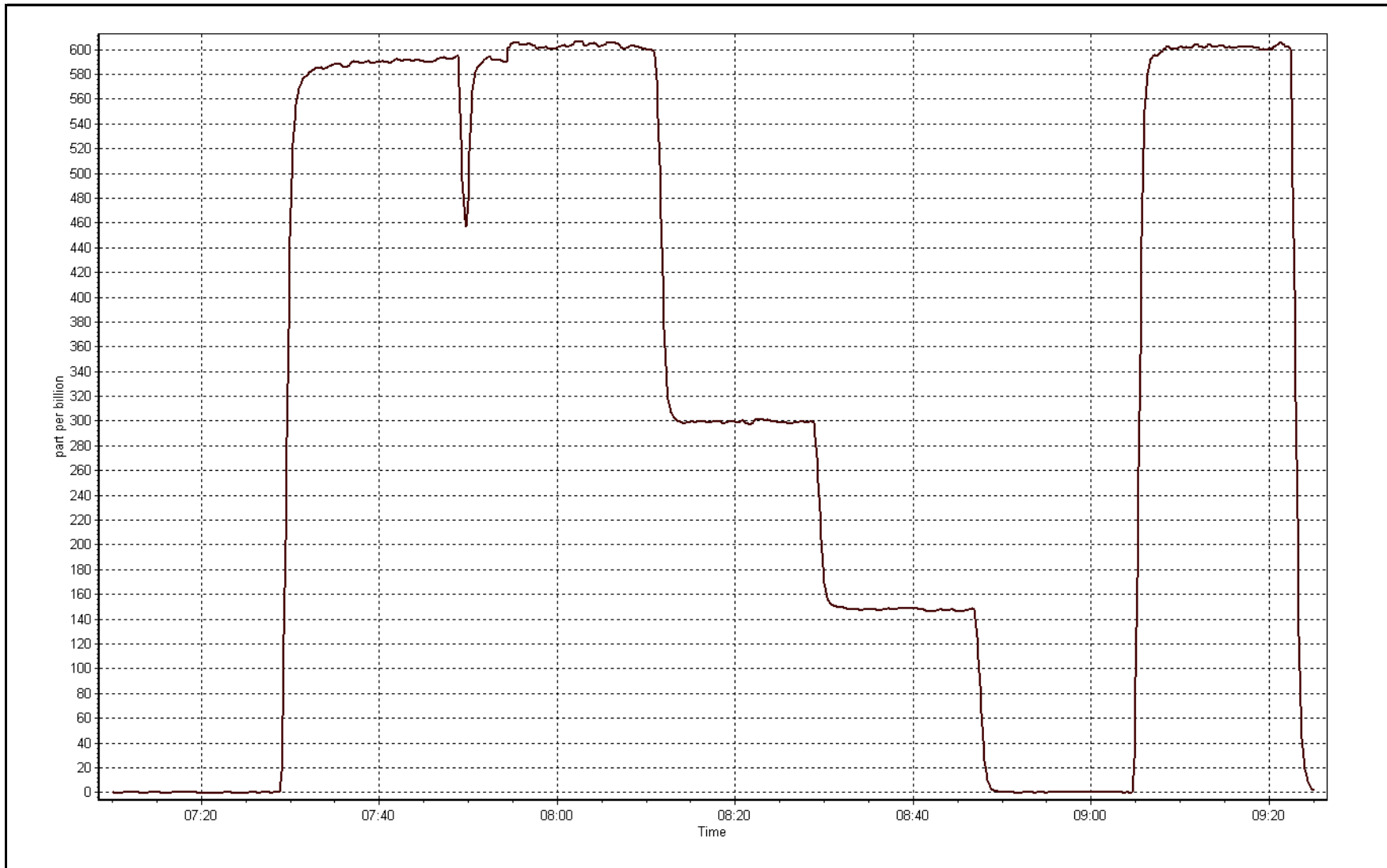
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999964
600.4	603.7	0.9945		
300.2	299.4	1.0026	Slope	0.992837
150.1	147.7	1.0162		
			Intercept	1.895956



SO2 Calibration Plot

Date: March 23, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	March 23, 2017	Last Calibration	February 9, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	9:23	End Time (MST)	11:55
Gas Cert Reference	LL55546	Station temp.	22 Deg C
Cal Gas Concentration	5.11 ppm	Cal Gas Exp Date	December 2, 2019
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG air Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	Serial Number	2635
SO2 gas concentration	49.7 ppm	SO2 gas cert/exp	08/09/2018 Praxair

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-616	-616
Analyzer IP address	192.168.1.42		Lamp voltage	881	881
Calculated slope	0.997633	0.998282	Chamber temp	45	45
Calculated intercept	-0.068754	-0.116853	Pressure	545.4	545.4
Analyzer Background	13.7	13.7	Flow	1.048	1.048
Analyzer Coefficient	0.806	0.806	Intensity	94	94
			Converter temp.	330	330
Analyzer make/model	TEI 450i		Analyzer serial #	1336160094	
Converter make/model	na		Converter serial #	na	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	88.1	75.0	74.8	1.003
SO2 scrubber check	5000	15.1	150.1	1.4	----
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	88.1	75.0	75.3	0.996
second point	6000	49.2	41.9	42.0	0.998
third point	6000	29.3	25.0	25.2	0.990
as left zero	6000	0.0	0.0	0.2	----
as left span	6000	88.1	75.0	75.2	0.998
Average Correction Factor					0.995

Corrected As found 74.7 Previous response 75.3 % change 0.8%

Notes:

No maintenance or adjustments done, filter changed out

Calibration Performed By:

Melissa Lemay



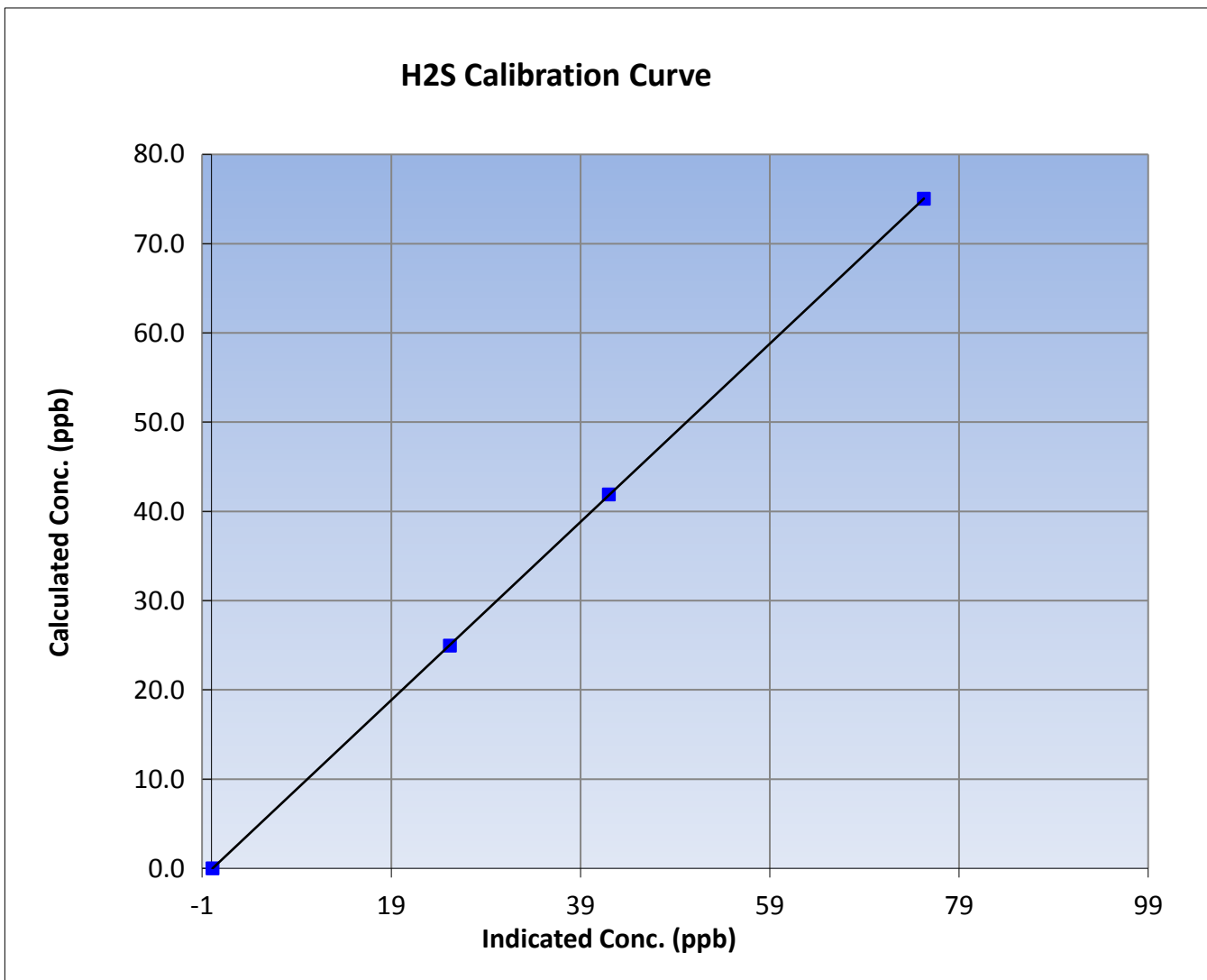
Wood Buffalo Environmental Association H2S Calibration Report

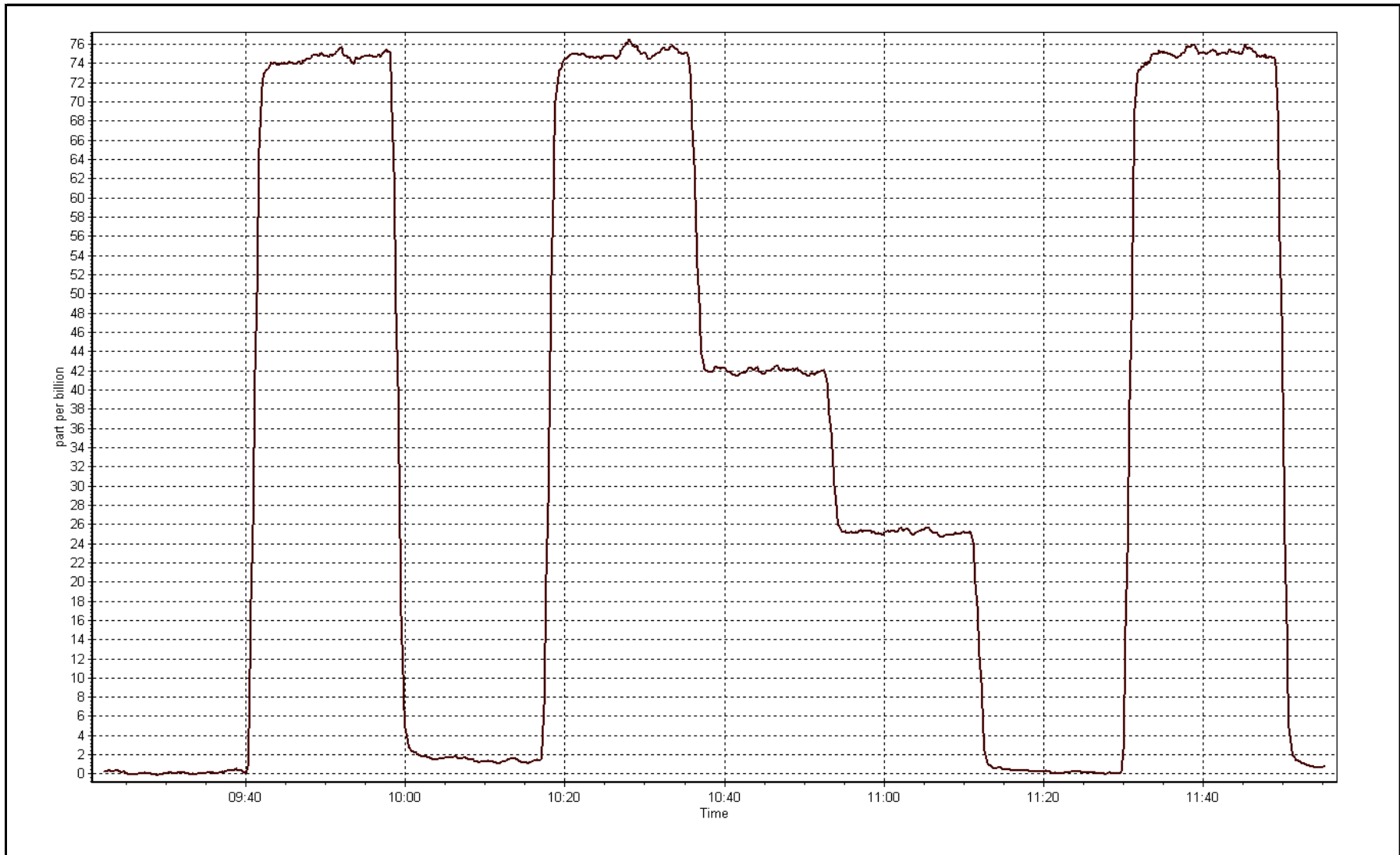
Station Information

Calibration Date	March 23, 2017	Previous Calibration	February 9, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	9:23	End Time (MST)	11:55
Analyzer make	Routine	Analyzer serial #	1336160094

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999994
75.0	75.3	0.9964		
41.9	42.0	0.9977	Slope	0.998282
25.0	25.2	0.9902		
			Intercept	-0.116853







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	March 23, 2017	Last Calibration	February 9, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	7:10	End Time (MST)	9:24
Gas Cert Reference	LL107929	Cal Gas Expiry Date	September 8, 2018
CH4 Cal Gas Conc.	514 ppm	CH4 Equiv Conc.	1061.3 ppm
C3H8 Cal Gas Conc.	199 ppm	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG make/model	Teledyne API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	Serial Number	2635

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	30.4	30.4
Calculated slope	1.000383	1.002524	Fuel Pressure	19.9	19.9
Calculated intercept	0.014065	-0.027984	Analyzer Coeff	4.285	4.285
			Analyzer BKG	0.750	0.750

Analyzer make TEI 51i-LT Analyzer serial # 1201650671

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.01	----
as found span	5000	60.4	12.82	12.80	1.002
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	60.4	12.82	12.80	1.002
second point	5000	30.2	6.41	6.45	0.994
third point	5000	15.1	3.20	3.23	0.992
as left zero	5000	0.0	0.00	0.04	----
as left span	5000	60.4	12.82	13.00	0.986
Average Correction Factor					0.996

Corrected As found 12.79 Previous response 12.80 % change 0.1%

Notes:

No Maintenance or adjustments done, filter changed out

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association THC Calibration Report

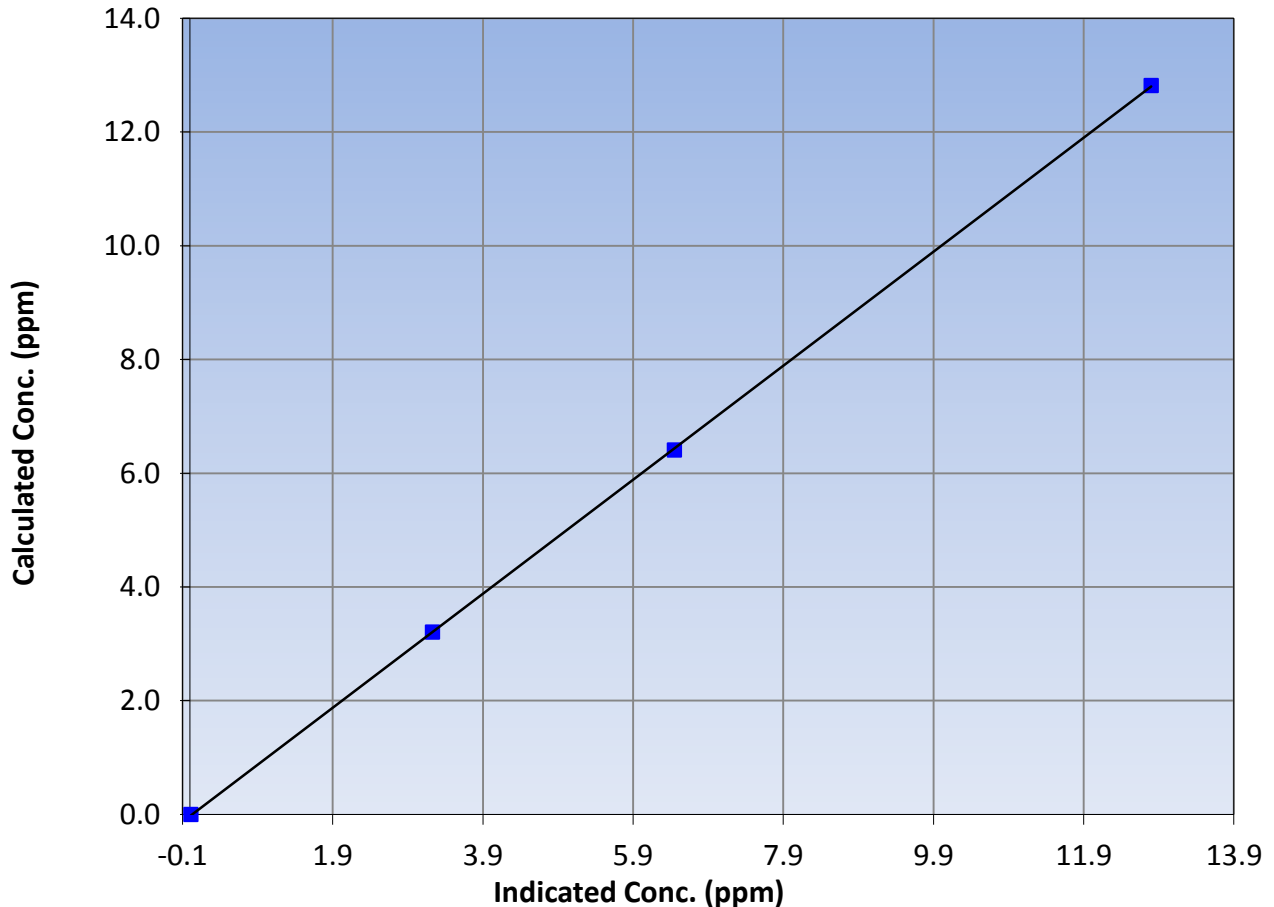
Station Information

Calibration Date	March 23, 2017	Previous Calibration	February 9, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	7:10	End Time (MST)	9:24
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999984
12.82	12.80	1.0016		
6.41	6.45	0.9938	Slope	1.002524
3.20	3.23	0.9923		
			Intercept	-0.027984

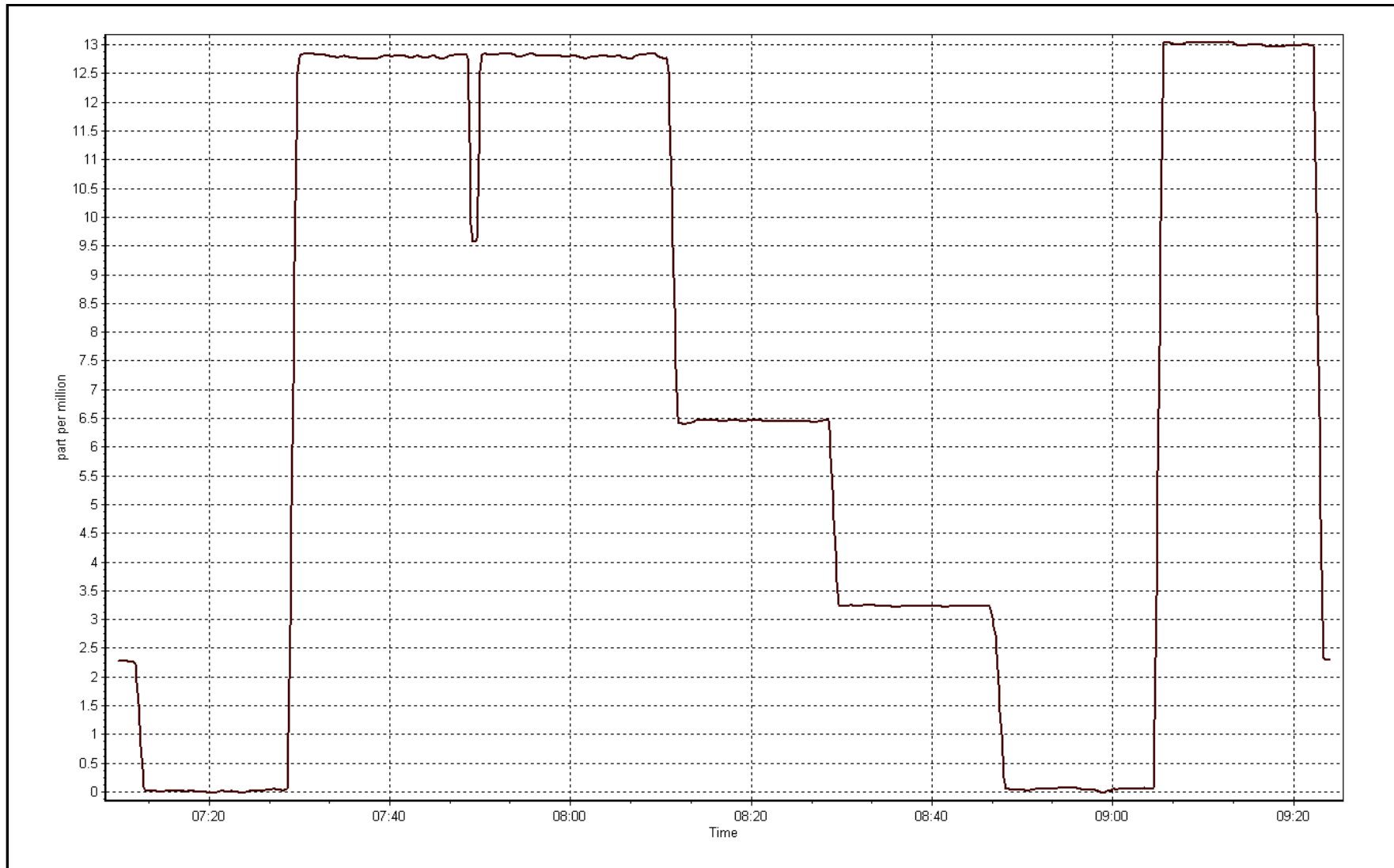
THC Calibration Curve



THC Calibration Plot

Date:

March 23, 2017





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 5 MANNIX MARCH 2017

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
MARCH 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	702	34	42	98.92	101	0	33	0
H2S (ppb) Average	696	38	48	98.66	5	0	2	0
THC (ppm) Average	701	34	43	98.79	5.7	-	3.2	-
Temperature 2 m (C) Average	744	0	0	100	13.8	-	6.5	-
Temperature 20 m (C) Average	744	0	0	100	13.2	-	6.7	-
Temperature 45 m (C) Average	744	0	0	100	12.9	-	6.7	-
Temperature 75 m (C) Average	744	0	0	100	12.6	-	6.6	-
Temperature 90 m (C) Average	744	0	0	100	12.4	-	6.5	-
Relative Humidity 2 m (%) Average	744	0	0	100	95	-	86	-
Relative Humidity 20 m (%) Average	744	0	0	100	95	-	86	-
Relative Humidity 45 m (%) Average	744	0	0	100	96	-	87	-
Relative Humidity 75 m (%) Average	744	0	0	100	96	-	87	-
Relative Humidity 90 m (%) Average	744	0	0	100	97	-	88	-
Wind Speed 20 m (km/h) Average	744	0	0	100	34	-	27	-
Wind Speed 45 m (km/h) Average	744	0	0	100	43	-	33	-
Wind Speed 75 m (km/h) Average	736	0	8	98.92	47	-	35	-
Wind Speed 90 m (km/h) Average	744	0	0	100	50	-	37	-
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	736	0	8	98.92	-	-	-	-
Wind Direction 90 m (deg) Average	744	0	0	100	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	0	0	100	1.4	-	1	-
Vertical Wind Speed 45 m (km/h) Average	744	0	0	100	2.1	-	1.6	-
Vertical Wind Speed 75 m (km/h) Average	736	0	8	98.92	1.4	-	0.5	-
Vertical Wind Speed 90 m (km/h) Average	744	0	0	100	2.1	-	0.9	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
MARCH 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	702	4.1	10	-	0	0	0	1	2	11	101
H2S (ppb) Average	696	0.5	1	-	0	0	0	0	1	1	5
THC (ppm) Average	701	2.4	0.3	-	2.1	2.2	2.2	2.3	2.5	2.7	5.7
Temperature 2 m (C) Average	744	-7.72	10.2	-	-29.6	-21.6	-17.5	-6.2	0.9	4.6	13.8
Temperature 20 m (C) Average	744	-7.81	10.2	-	-28	-21.9	-17.8	-6.7	0.9	4.6	13.2
Temperature 45 m (C) Average	744	-7.94	10.2	-	-27.1	-21.8	-18.1	-6.8	0.9	4.6	12.9
Temperature 75 m (C) Average	744	-8.1	10.2	-	-26.8	-22	-18.4	-6.8	0.8	4.6	12.6
Temperature 90 m (C) Average	744	-8.14	10.2	-	-26.7	-21.9	-18.4	-6.8	0.7	4.4	12.4
Relative Humidity 2 m (%) Average	744	66.1	15	-	27	47	56	66	77	87	95
Relative Humidity 20 m (%) Average	744	65	15	-	23	45	54	65	76	86	95
Relative Humidity 45 m (%) Average	744	65	16	-	21	44	54	65	77	86	96
Relative Humidity 75 m (%) Average	744	65.3	16	-	21	44	54	65	78	86	96
Relative Humidity 90 m (%) Average	744	65.5	16	-	21	45	54	65	78	87	97
Wind Speed 20 m (km/h) Average	744	11.6	6	-	0	5	7	11	15	20	34
Wind Speed 45 m (km/h) Average	744	14.6	8	-	1	6	9	14	20	25	43
Wind Speed 75 m (km/h) Average	736	15.9	9	-	0	6	9	14	22	28	47
Wind Speed 90 m (km/h) Average	744	17.2	9	-	0	6	10	16	24	30	50
Wind Direction 20 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	736	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	0.3	0.4	-	-1.1	-0.2	-0.1	0.3	0.7	0.9	1.4
Vertical Wind Speed 45 m (km/h) Average	744	0.26	0.8	-	-1.7	-0.8	-0.4	0.3	0.9	1.2	2.1
Vertical Wind Speed 75 m (km/h) Average	736	0.12	0.4	-	-1.2	-0.4	-0.1	0.1	0.4	0.6	1.4
Vertical Wind Speed 90 m (km/h) Average	744	0.29	0.4	-	-1.1	-0.2	0.1	0.3	0.6	0.8	2.1

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	01 Mar 2017 12:00	01 Mar 2017 13:00	2	Maintenance - WBEA audit
H2S	01 Mar 2017 10:00	01 Mar 2017 15:00	6	Maintenance - WBEA audit
H2S	15 Mar 2017 09:00	15 Mar 2017 09:00	1	Maintenance - sample manifold cleaned
H2S	25 Mar 2017 12:00	25 Mar 2017 12:00	1	Maintenance - automated daily zero response verified
H2S	26 Mar 2017 09:00	26 Mar 2017 09:00	1	Maintenance - automated daily zero response verified
THC	01 Mar 2017 13:00	01 Mar 2017 15:00	3	Maintenance - WBEA audit
SO2, THC	25 Mar 2017 06:00	25 Mar 2017 06:00	1	Maintenance - automated daily zero response verified
SO2, THC	25 Mar 2017 11:00	25 Mar 2017 12:00	2	Maintenance - automated daily zero response verified
SO2, THC	26 Mar 2017 07:00	26 Mar 2017 08:00	2	Maintenance - automated daily zero response verified
AIR QUALITY ANALYZERS	27 Mar 2017 11:00	27 Mar 2017 11:00	1	Maintenance - station router replaced
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	18 Mar 2017 04:00	18 Mar 2017 11:00	8	Flat line in sensor output signal - Sensor frozen



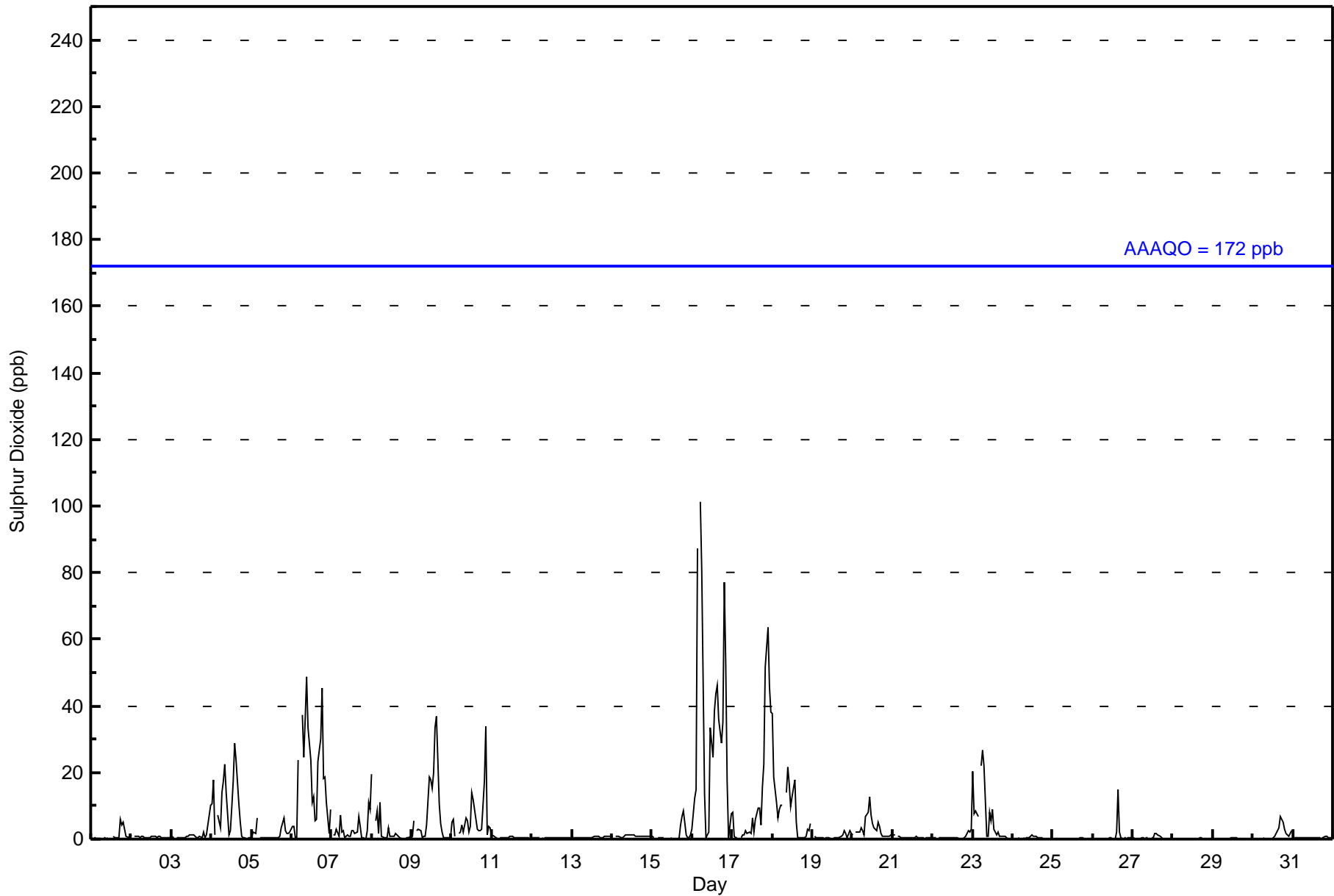
Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Mannix - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 ppb on Mar 16 06:00 Maximum Daily Average: 33.0 ppb on Mar 16														Hours in Service: 744 Hours of Data: 702 Hours of Missing Data: 42 Hours of Calibration: 34 Percent Operational Time: 98.9													
Minimum Value: 0 ppb on Mar 25 03:00 Minimum Daily Average: 0.1 ppb on Mar 25 Maximum Diurnal Average: 6.5 ppb at hour 6 Minimum Diurnal Average: 2.0 ppb at hour 3 Monthly Average: 4.1 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 11 P ₉₉ = 51																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	Z	0	0	0	0	0	0	0	0	0	0	M	M	1	0	0	0	6	4	5	3	1	1	1	1.2	6	
2-Mar	1	Z	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0.6	1	
3-Mar	1	1	Z	1	0	0	0	1	0	1	1	1	1	1	1	0	1	1	2	0	1	4	10	1.3	10		
4-Mar	11	18	1	Z	7	4	14	17	23	14	1	3	10	17	29	24	11	5	1	0	0	0	0	0	9.1	29	
5-Mar	0	2	2	6	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	4	6	2	2	2	1.4	6		
6-Mar	4	4	1	0	24	Z	37	25	36	49	34	24	11	13	6	6	23	30	45	18	19	11	2	9	18.6	49	
7-Mar	Z	1	1	3	1	7	2	2	1	1	1	1	3	2	2	2	7	4	1	0	0	3	11	9	2.8	11	
8-Mar	20	Z	6	8	2	11	1	1	1	1	3	1	1	1	2	1	1	0	0	0	0	0	0	1	2.6	20	
9-Mar	1	6	Z	3	3	3	1	1	1	4	19	18	15	20	34	37	11	5	2	0	0	0	1	1	7.9	37	
10-Mar	5	6	1	Z	2	2	4	2	6	6	2	4	14	12	6	3	3	3	3	17	34	1	4	3	6.2	34	
11-Mar	1	1	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
12-Mar	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-Mar	Z	0	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
14-Mar	1	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	
15-Mar	1	1	Z	0	0	0	0	0	0	C	C	C	0	0	0	0	0	4	7	8	1	0	1	1	1.4	8	
16-Mar	3	12	15	88	Z	101	81	14	1	1	2	34	25	38	44	46	36	29	35	77	53	18	1	8	33.0	101	
17-Mar	8	1	0	0	Z	0	1	1	3	2	2	2	6	2	6	9	9	4	16	22	52	64	46	38	12.8	64	
18-Mar	38	19	11	6	9	10	10	Z	14	21	16	10	13	18	5	0	0	0	0	0	1	3	3	5	9.2	38	
19-Mar	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	0	3	2	0.7	3	
20-Mar	1	Z	2	2	2	3	3	1	7	8	13	7	5	4	3	5	4	2	1	1	1	1	1	1	3.3	13	
21-Mar	1	1	Z	1	1	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.5	1	
22-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	2	3	0.6	3	
23-Mar	20	8	8	7	Z	22	27	22	1	1	8	6	9	3	1	2	1	1	1	1	0	0	0	0	6.4	27	
24-Mar	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1	
25-Mar	Z	0	0	0	0	M	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
26-Mar	0	Z	0	0	0	0	M	M	0	0	0	0	0	0	2	15	2	0	0	0	0	0	0	0	1.1	15	
27-Mar	0	0	Z	0	0	0	0	0	0	0	0	M	0	0	2	2	1	1	0	0	0	0	0	0	0.4	2	
28-Mar	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	
29-Mar	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	
30-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	2	3	7	6	5	3	2	1	2	3	1.6	7
31-Mar	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	0.4	1
																								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
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	626	89.17	89.17
11 - 20	37	5.27	94.44
21 - 60	34	4.84	99.29
61 - 110	5	0.71	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - March 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	41	55	18	12	15	57	192	67	17	5	3	9	34	25	22	54	626
11 - 20	14	8	0	1	0	0	1	0	0	0	0	0	2	4	3	4	37
21 - 60	28	2	0	0	0	1	0	0	0	0	0	0	0	1	1	1	34
61 - 110	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
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	88	65	18	13	15	58	193	67	17	5	3	9	36	30	26	59	702

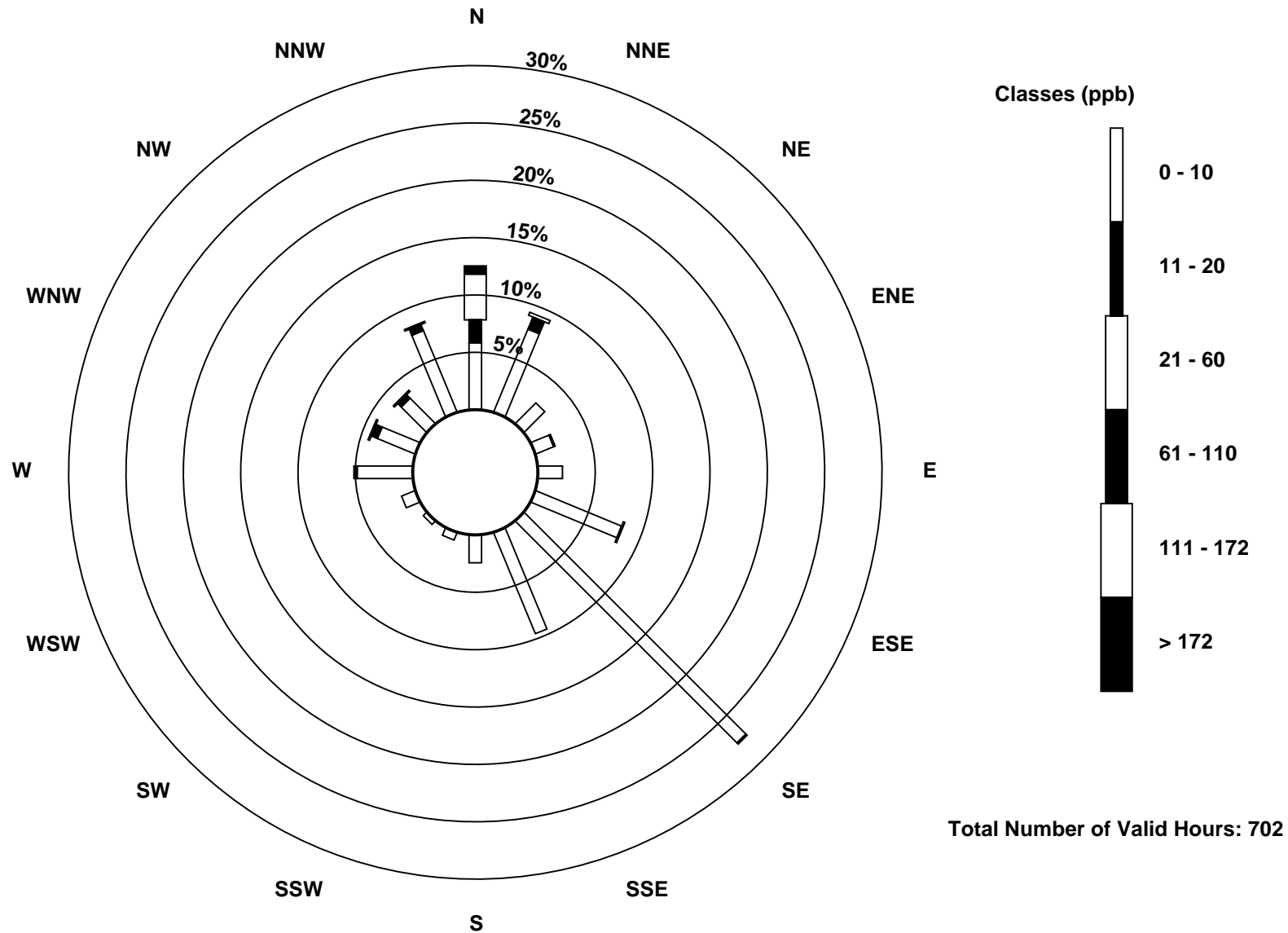
Total Number of Valid Hours: 702

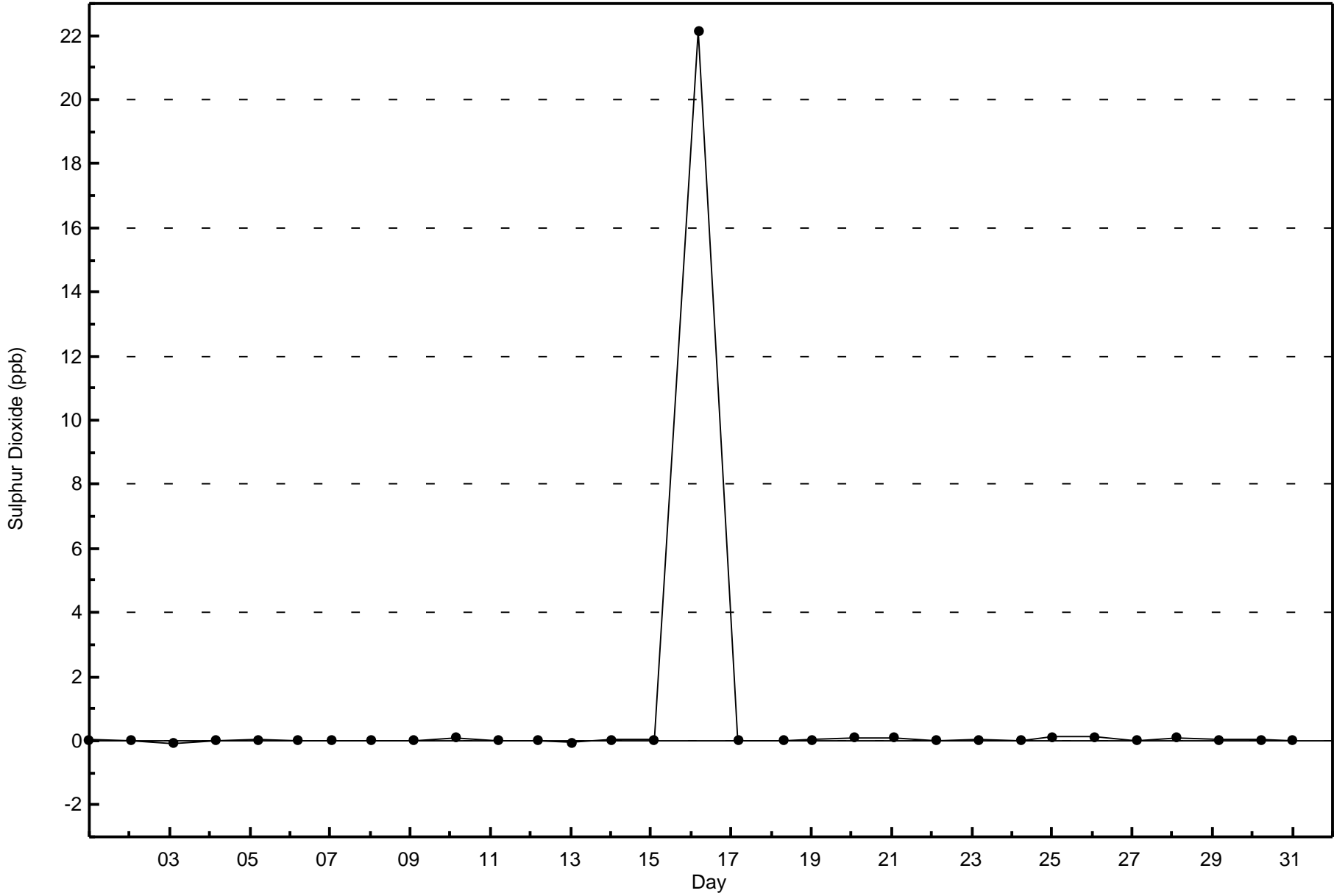
Total Number of Hours: 744

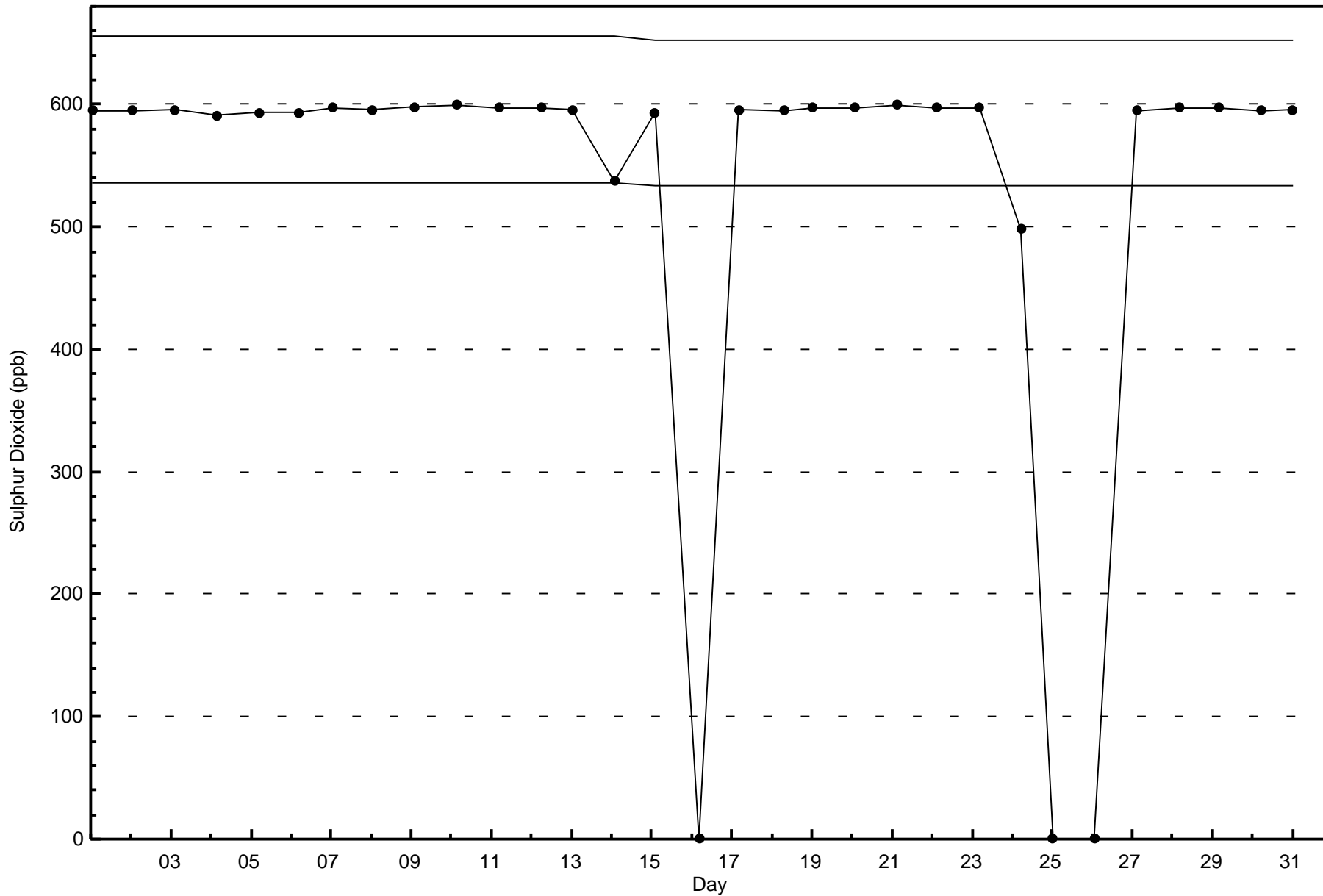


Wood Buffalo Environmental Association
Wind Rose Mar 2017

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







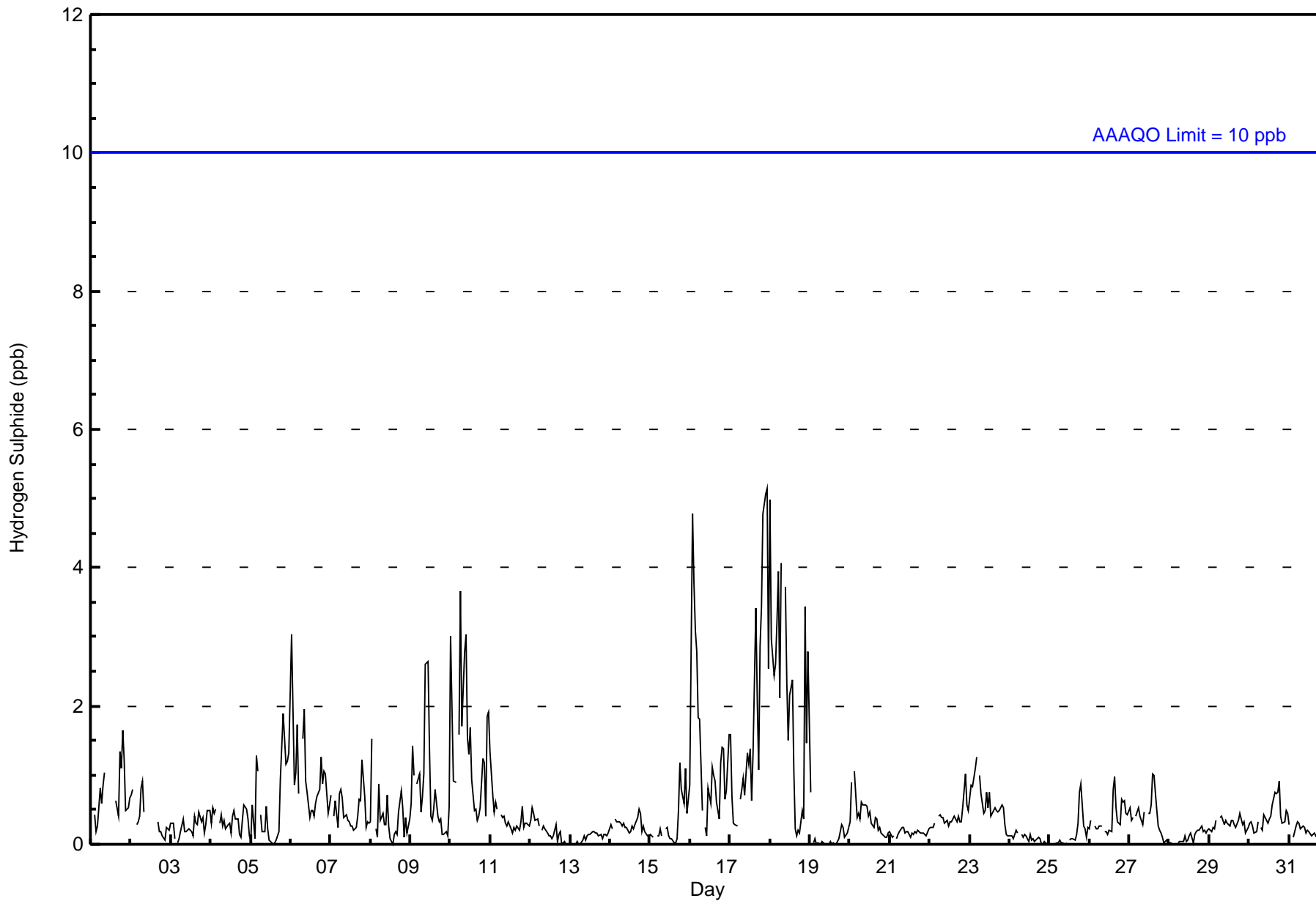


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 5 ppb on Mar 17 23:00	Maximum Daily Average: 2.1 ppb on Mar 18
Minimum Value: 0 ppb on Mar 12 20:00	Hours of Data: 696
Maximum Diurnal Average: 0.9 ppb at hour 2	Hours of Missing Data: 48
Monthly Average: 0.5 ppb	Hours of Calibration: 38
Minimum Daily Average: 0.1 ppb on Mar 24	Percent Operational Time: 98.7
Minimum Diurnal Average: 0.4 ppb at hour 17	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 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-Mar	0	Z	0	0	0	1	1	1	1	M	M	M	M	M	M	1	0	1	1	2	1	0	1	1	--	2
2-Mar	1	1	Z	0	0	0	1	1	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	1
3-Mar	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
4-Mar	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1
5-Mar	0	1	0	1	1	Z	0	0	0	1	0	0	0	0	0	0	0	0	1	2	2	1	1	1	0.6	2
6-Mar	3	2	1	1	2	1	Z	2	2	1	1	0	0	0	0	1	1	1	1	1	1	1	0	1	1.0	3
7-Mar	1	Z	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0.5	1
8-Mar	0	2	Z	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0.4	2
9-Mar	1	1	1	Z	1	1	0	1	1	3	3	1	0	0	1	1	0	0	0	0	0	0	0	1	0.8	3
10-Mar	3	2	1	1	Z	2	4	2	3	3	2	1	2	1	0	1	0	0	1	1	1	0	2	2	1.5	4
11-Mar	1	1	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.4	1
12-Mar	0	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
13-Mar	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-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
15-Mar	0	0	0	Z	0	0	0	0	M	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0.3	1
16-Mar	1	5	4	3	3	2	2	0	Z	0	0	1	1	1	1	1	1	0	1	1	1	1	1	2	1.4	5
17-Mar	2	1	0	0	0	Z	1	1	1	1	1	1	1	1	1	3	2	1	3	3	5	5	5	3	1.8	5
18-Mar	5	3	2	3	3	4	2	4	Z	4	2	1	2	2	1	0	0	0	0	0	0	3	1	3	2.1	5
19-Mar	1	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	1
20-Mar	0	1	Z	1	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
21-Mar	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
22-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.4	1
23-Mar	1	1	1	1	1	Z	1	1	0	0	1	1	1	0	0	1	0	0	0	1	1	0	0	0	0.6	1
24-Mar	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
25-Mar	0	Z	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	1	1	0	0	0	0	0.2	1
26-Mar	0	0	Z	0	0	0	0	0	M	0	0	0	0	0	1	1	1	0	0	1	1	1	0	0	0.4	1
27-Mar	1	0	0	Z	0	1	0	0	0	0	M	0	0	1	1	1	0	0	0	0	0	0	0	0	0.4	1
28-Mar	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-Mar	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
30-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0.4	1
31-Mar	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

0.7	0.9	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.6	0.6	0.6	0.6	0.5	0.6	Diurnal Average
5	5	4	3	3	4	4	4	4	3	4	3	1	2	2	1	3	2	1	3	3	5	5	5	3	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
Mannix - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	669	96.12	96.12
3 - 4	22	3.16	99.28
5 - 7	5	0.72	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Mannix - March 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	74	63	17	12	15	58	193	65	17	5	3	9	34	29	21	54	669
3 - 4	8	1	1	1	0	0	0	0	0	0	0	0	1	1	2	7	22
5 - 7	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
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	87	64	18	13	15	58	193	65	17	5	3	9	35	30	23	61	696

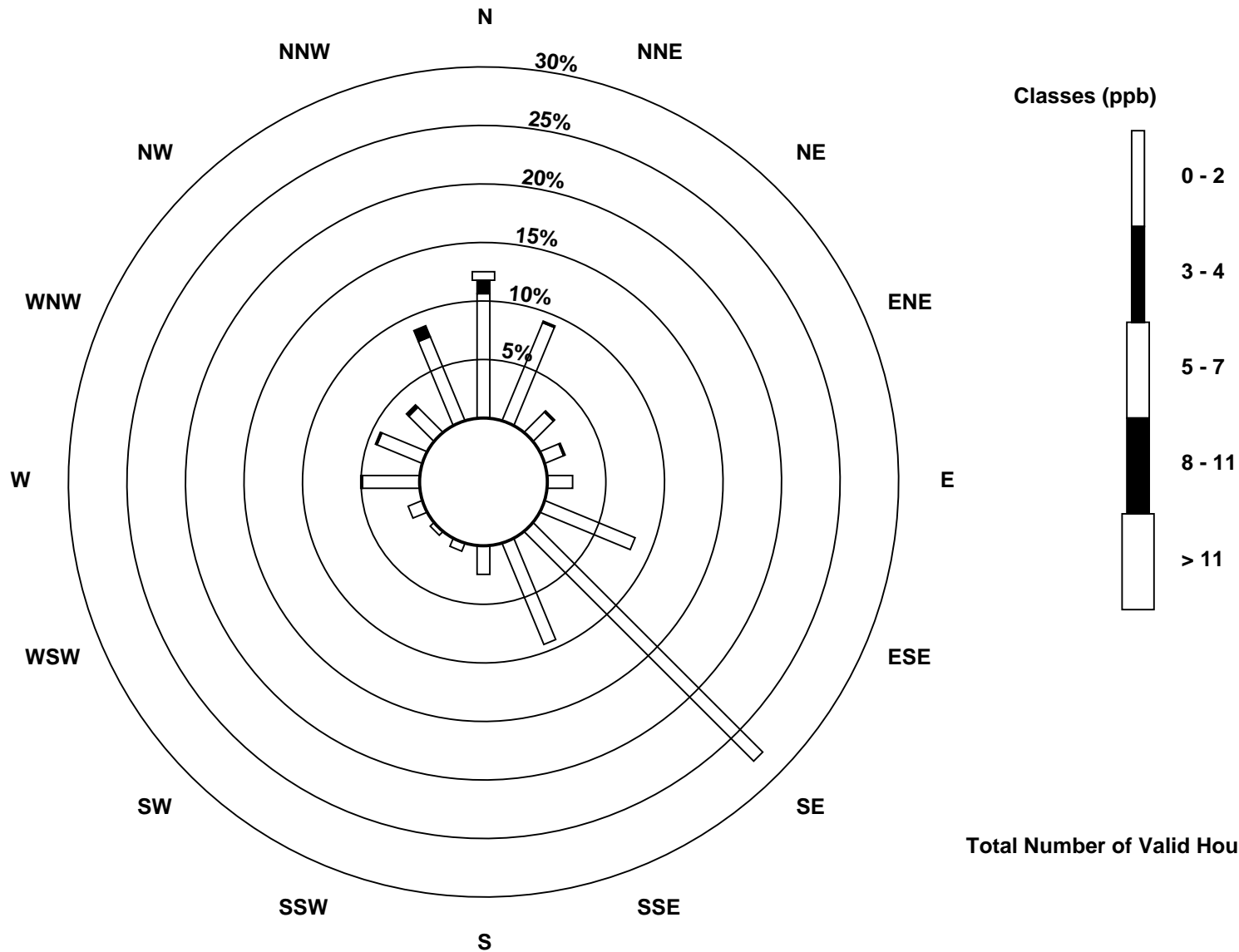
Total Number of Valid Hours: 696

Total Number of Hours: 744

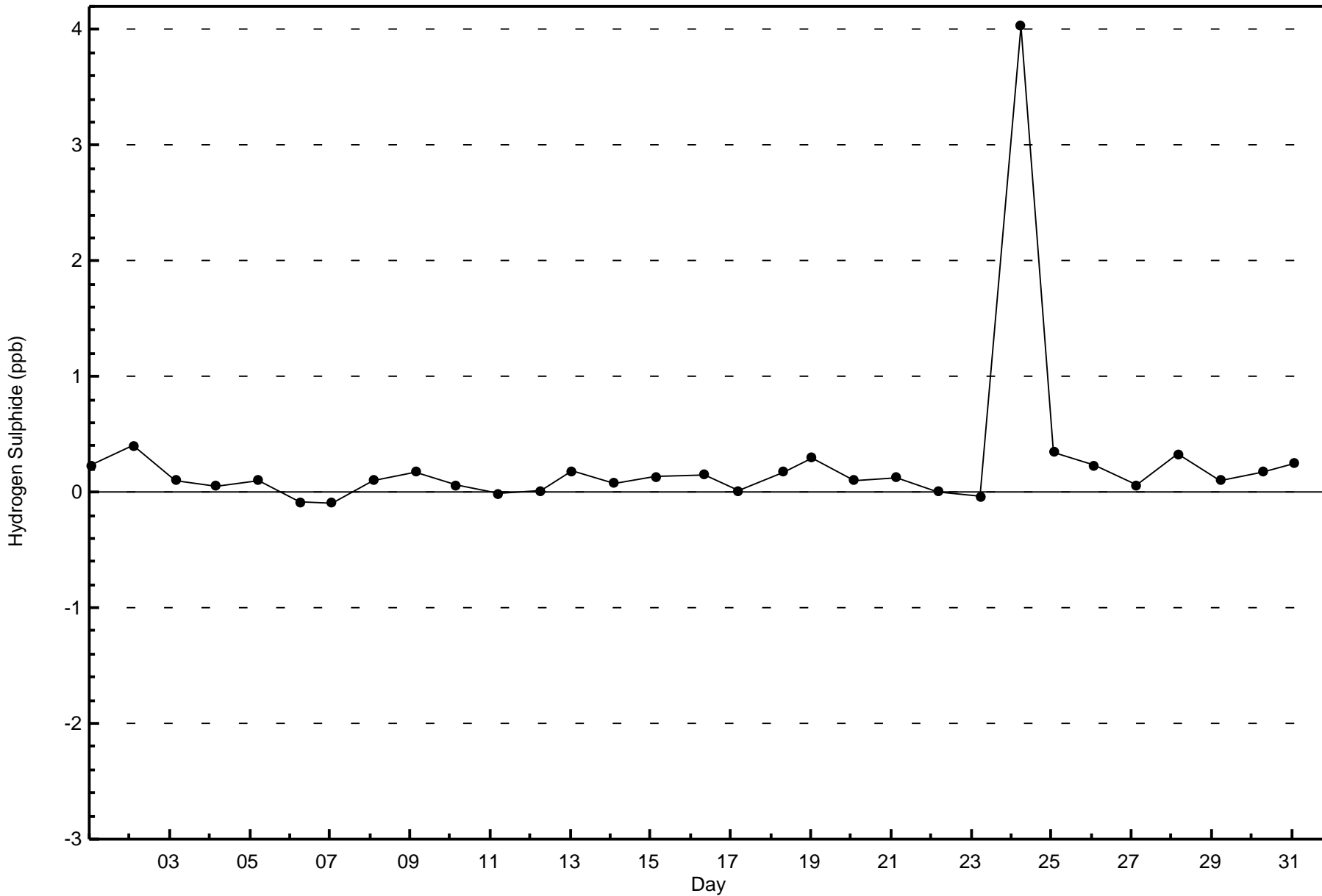


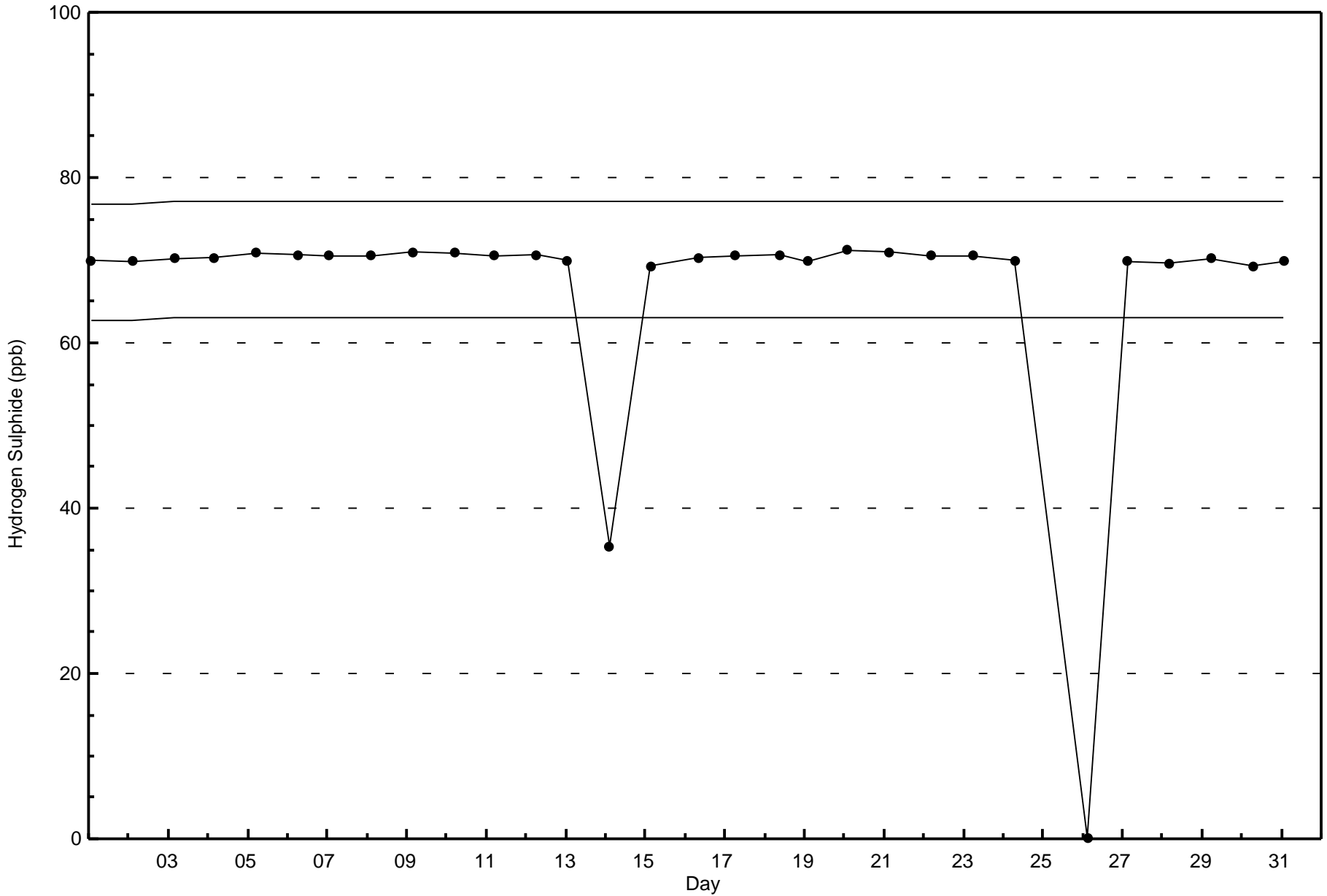
Wood Buffalo Environmental Association
Wind Rose Mar 2017

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



Total Number of Valid Hours: 696







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

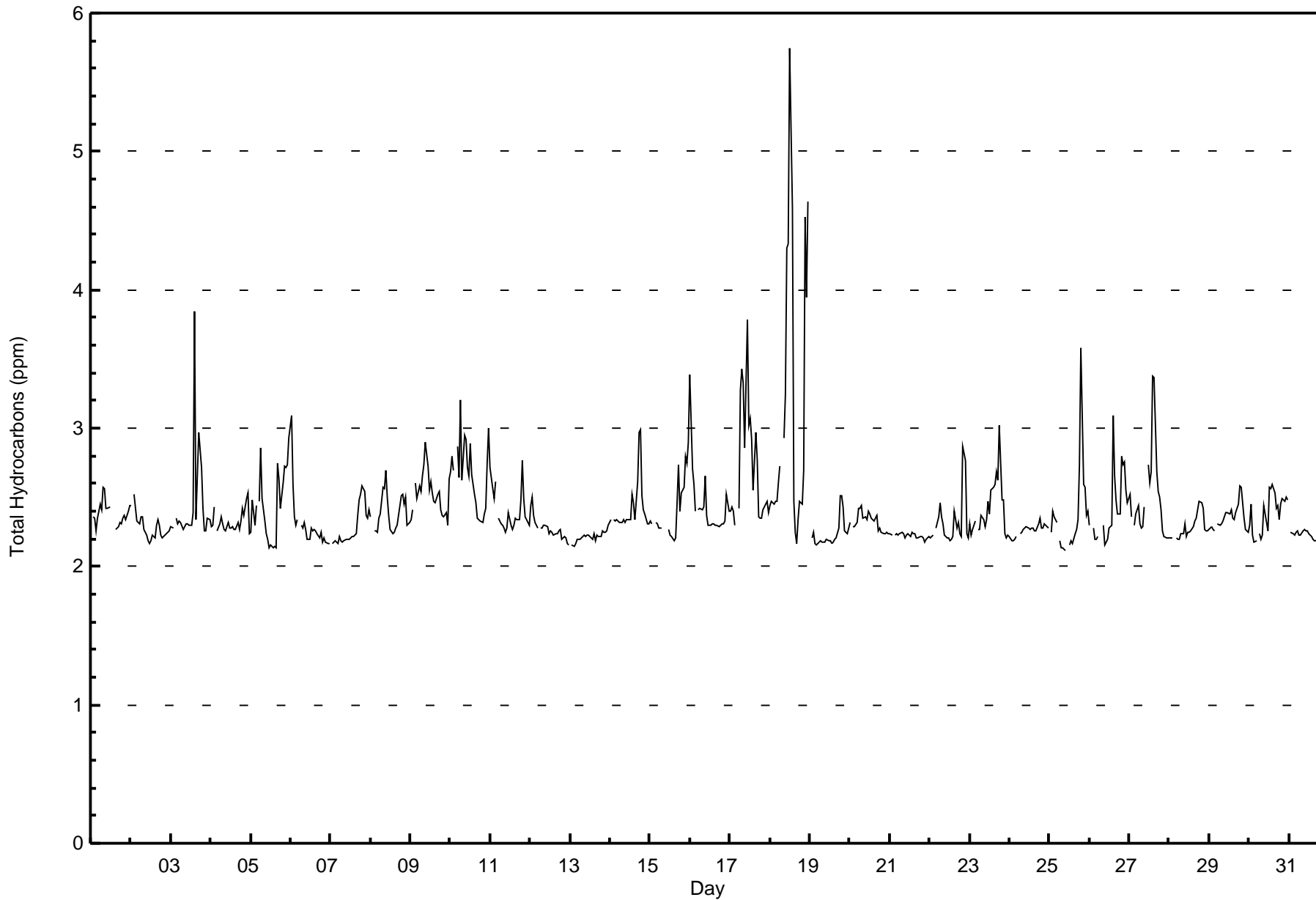
Mannix - March 2017

Maximum Value: 5.7 ppm on Mar 18 13:00																			Maximum Daily Average: 3.2 ppm on Mar 18						Hours in Service: 744		
Minimum Value: 2.1 ppm on Mar 25 10:00																			Minimum Daily Average: 2.2 ppm on Mar 31						Hours of Data: 701		
Maximum Diurnal Average: 2.5 ppm at hour 13																			Minimum Diurnal Average: 2.3 ppm at hour 5						Hours of Missing Data: 43		
Monthly Average: 2.40 ppm																			Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.5 P ₉₀ = 2.7 P ₉₉ = 3.8						Hours of Calibration: 34		
																									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-Mar	Z	2.4	2.4	2.3	2.3	2.5	2.4	2.6	2.6	2.4	2.4	2.4	M	M	M	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.6
2-Mar	2.4	Z	2.5	2.3	2.3	2.3	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.5	
3-Mar	2.3	2.3	Z	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	3.8	2.3	2.6	3.0	2.7	2.4	2.3	2.3	2.3	2.3	2.4	3.8	
4-Mar	2.3	2.3	2.4	Z	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.5	2.2	2.3	2.5	
5-Mar	2.3	2.5	2.3	2.4	Z	2.5	2.9	2.5	2.3	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.7	2.6	2.4	2.6	2.7	2.7	2.7	2.9	2.4	2.9	
6-Mar	3.1	2.6	2.4	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.2	2.2	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	3.1	
7-Mar	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	2.4	2.5	2.5	2.6	2.5	2.4	2.3	2.4	2.3	2.6	
8-Mar	2.4	Z	2.3	2.3	2.3	2.4	2.4	2.6	2.6	2.7	2.5	2.4	2.3	2.2	2.2	2.3	2.3	2.4	2.5	2.5	2.5	2.5	2.3	2.3	2.4	2.7	
9-Mar	2.3	2.4	Z	2.6	2.5	2.6	2.5	2.7	2.7	2.9	2.7	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.6	2.5	2.9	
10-Mar	2.7	2.8	2.7	Z	2.9	2.6	3.2	2.6	2.9	2.9	2.7	2.7	2.9	2.7	2.5	2.5	2.4	2.3	2.3	2.3	2.4	2.4	2.8	3.0	2.7	3.2	
11-Mar	2.7	2.6	2.5	2.6	Z	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.5	2.8	2.5	2.4	2.3	2.3	2.4	2.8	
12-Mar	2.4	2.5	2.4	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.5	
13-Mar	Z	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	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.2	2.3	
14-Mar	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.5	2.5	2.3	2.6	3.0	3.0	2.5	2.4	2.4	2.3	2.3	2.4	3.0	
15-Mar	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	C	C	C	2.3	2.2	2.2	2.2	2.2	2.5	2.7	2.4	2.5	2.6	2.8	2.7	2.9	2.4	2.9
16-Mar	3.4	2.7	2.6	2.4	Z	2.4	2.4	2.4	2.4	2.6	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.5	2.4	2.4	3.4	
17-Mar	2.4	2.4	2.4	2.3	Z	2.4	3.3	3.4	3.3	2.9	3.8	3.0	3.1	2.9	2.6	3.0	2.8	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.7	3.8	
18-Mar	2.4	2.5	2.5	2.5	2.5	2.6	2.7	Z	2.9	3.2	4.3	4.3	5.7	4.6	2.5	2.2	2.2	2.3	2.5	2.5	2.7	4.5	3.9	4.6	3.2	5.7	
19-Mar	Z	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	2.2	2.2	2.2	2.3	2.5	2.5	2.4	2.3	2.2	2.3	2.2	2.5	
20-Mar	2.3	Z	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.4	2.4	2.3	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.4	
21-Mar	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	2.2	2.2	2.2	2.2
22-Mar	2.2	2.2	2.2	Z	2.3	2.4	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.3	2.3	2.2	2.2	2.9	2.8	2.2	2.2	2.3	2.9	
23-Mar	2.3	2.2	2.3	2.3	Z	2.3	2.3	2.4	2.3	2.3	2.3	2.5	2.4	2.6	2.6	2.6	2.7	2.6	3.0	2.5	2.5	2.2	2.2	2.2	2.4	3.0	
24-Mar	2.2	2.2	2.2	2.2	2.2	Z	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	2.3	2.3	2.3	2.3
25-Mar	Z	2.2	2.4	2.4	2.3	M	2.2	2.1	2.1	2.1	2.1	M	M	2.2	2.2	2.2	2.2	2.3	2.3	2.7	3.6	2.6	2.6	2.4	2.4	2.4	3.6
26-Mar	2.3	Z	2.3	2.2	2.2	2.2	M	M	2.3	2.2	2.2	2.2	2.3	2.3	3.1	2.7	2.5	2.4	2.4	2.8	2.7	2.8	2.5	2.5	2.4	3.1	
27-Mar	2.5	2.4	Z	2.3	2.4	2.4	2.3	2.3	2.3	2.4	M	2.7	2.6	2.7	3.4	3.4	2.7	2.5	2.5	2.4	2.3	2.2	2.2	2.2	2.5	3.4	
28-Mar	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.5	2.4	2.3	2.3	2.3	2.5	
29-Mar	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.4	2.5	2.6	2.6	2.5	2.3	2.3	2.2	2.4	2.6
30-Mar	2.3	2.5	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.4	2.3	2.3	2.6	2.6	2.6	2.5	2.4	2.4	2.3	2.4	2.5	2.5	2.5	2.5	2.4	2.6	
31-Mar	Z	2.3	2.2	2.2	2.2	2.3	2.2	2.2	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	2.3	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Mannix - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - March 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	680	97.00	97.00
3.1 - 10.0	21	3.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Mannix - March 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	86	63	17	12	15	58	193	67	17	5	3	9	34	22	23	56	680
3.1 - 10.0	2	2	1	1	0	0	0	0	0	0	0	0	1	8	3	3	21
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	88	65	18	13	15	58	193	67	17	5	3	9	35	30	26	59	701

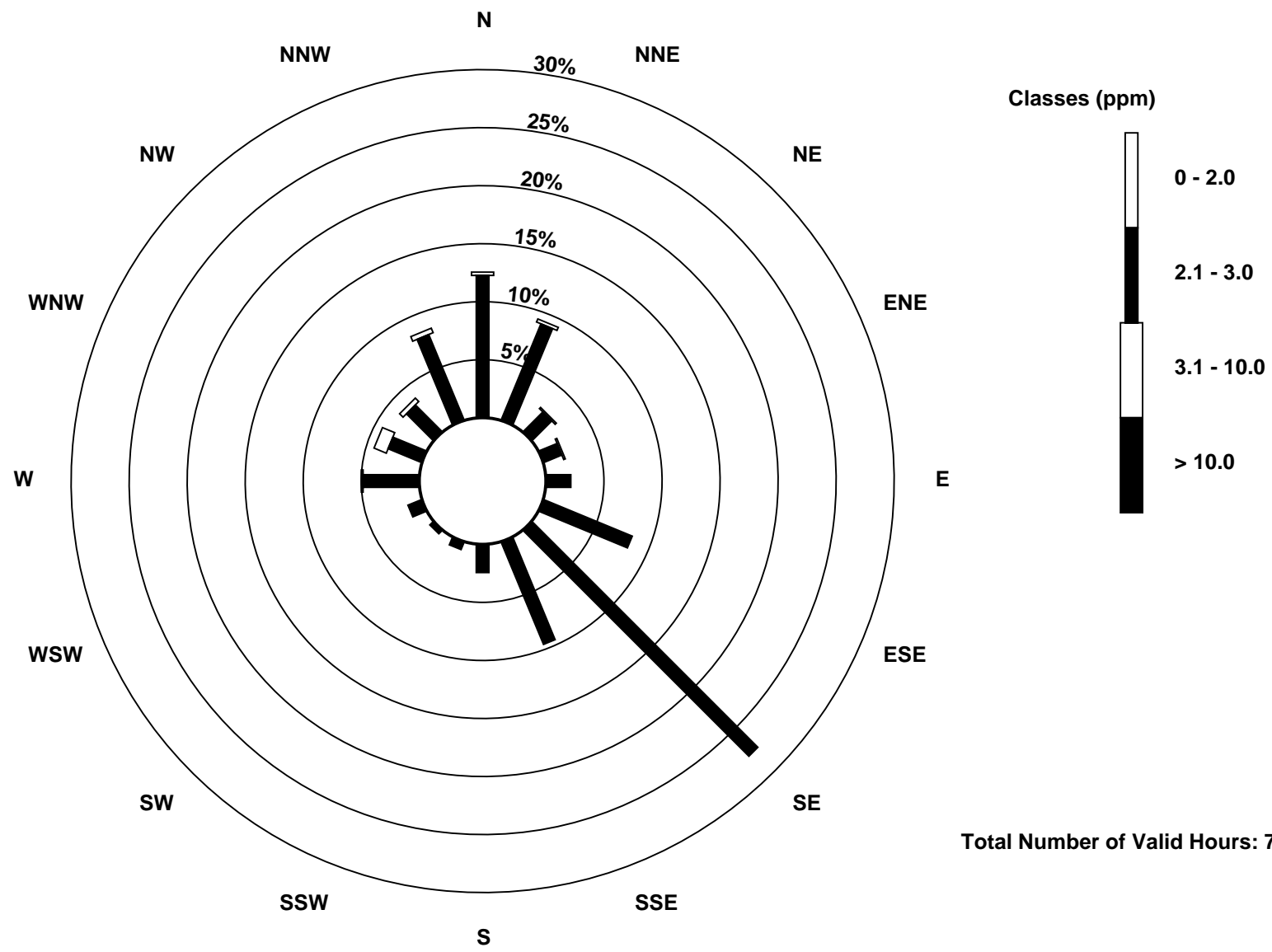
Total Number of Valid Hours: 701

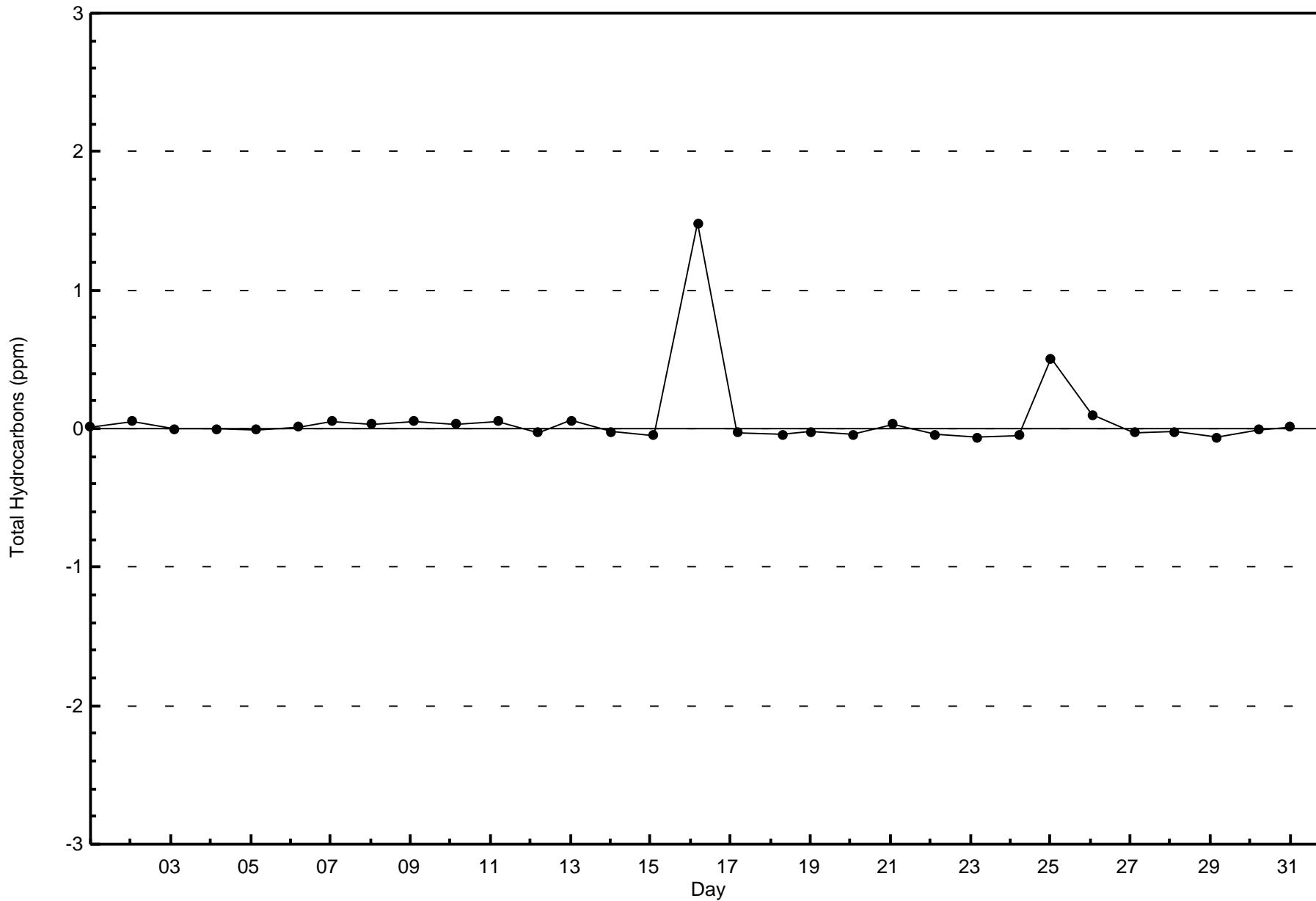
Total Number of Hours: 744

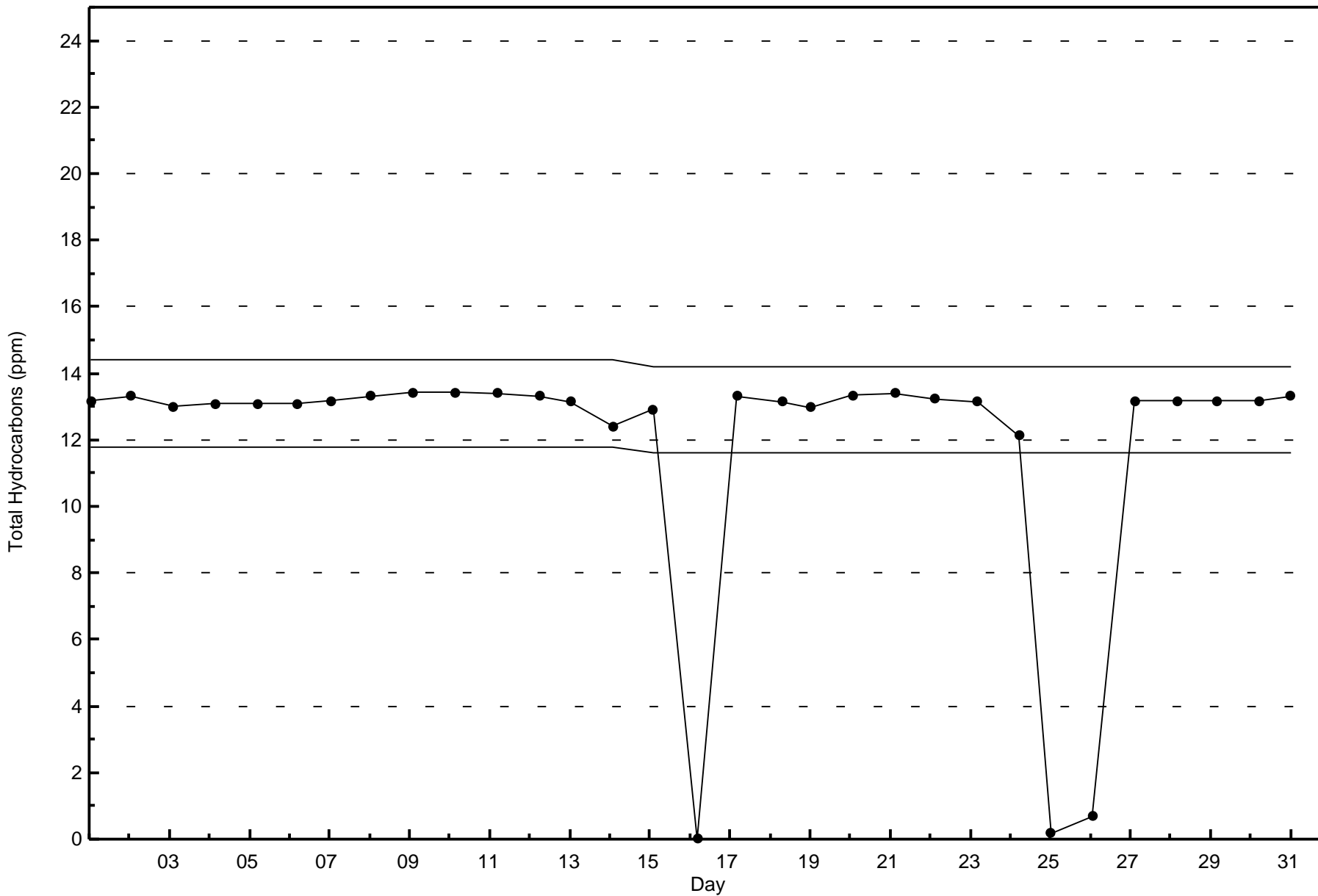


Wood Buffalo Environmental Association
Wind Rose Mar 2017

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







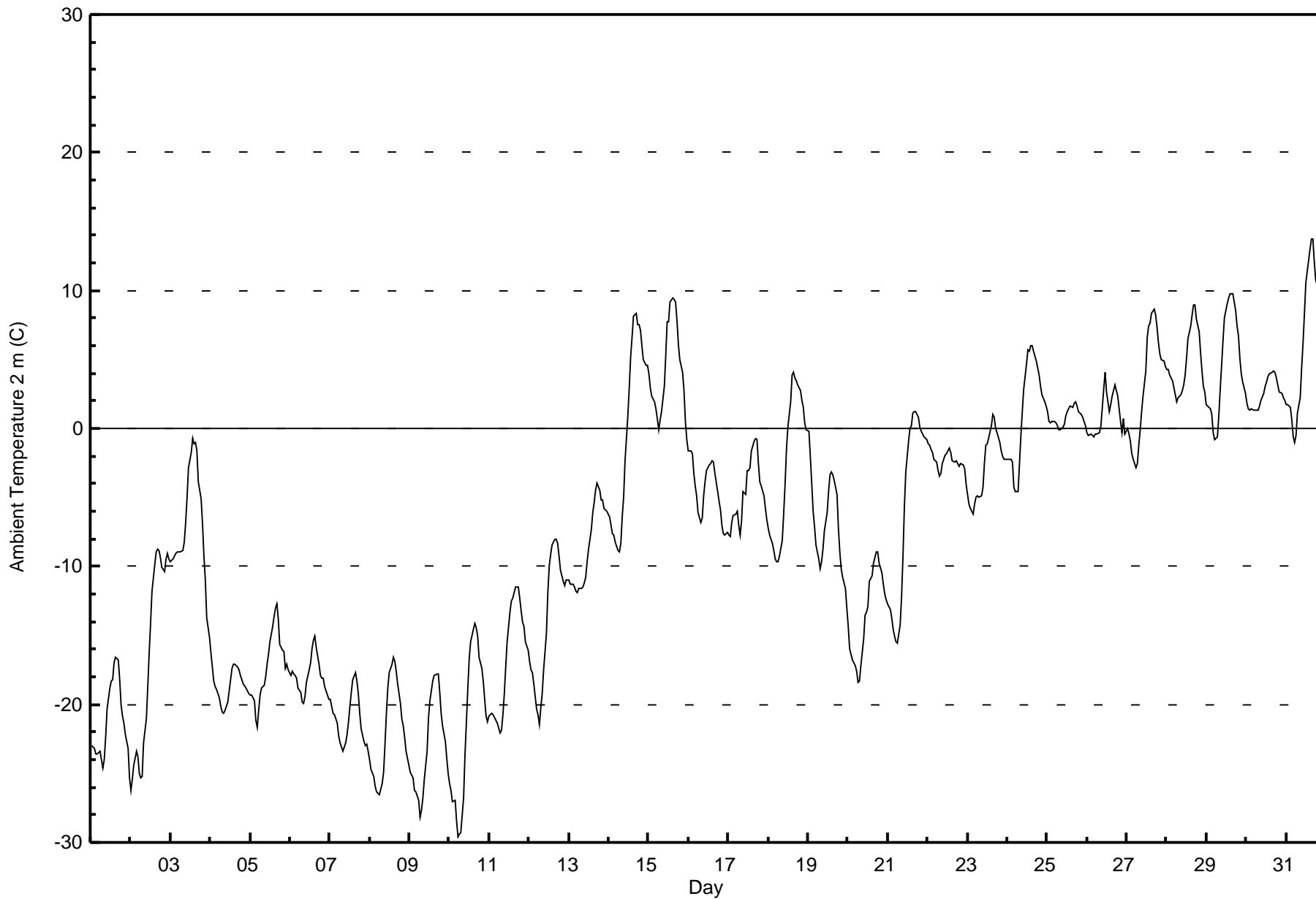


Maximum Value: 13.8 C on Mar 31 17:00		Maximum Daily Average: 6.5 C on Mar 31		Hours in Service: 744																						
Minimum Value: -29.6 C on Mar 10 06:00		Minimum Daily Average: -23.0 C on Mar 9		Hours of Data: 744																						
Maximum Diurnal Average: -3.4 C at hour 16		Minimum Diurnal Average: -11.9 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -7.72 C		Percentiles: P ₁ = -26.9 P ₁₀ = -21.6 Q ₁ = -17.5 Median = -6.2 Q ₃ = 0.9 P ₉₀ = 4.6 P ₉₉ = 10.3		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-Mar	-23.0	-23.1	-23.2	-23.6	-23.6	-23.4	-24.0	-24.6	-24.0	-22.3	-20.4	-18.8	-18.3	-18.2	-17.0	-16.6	-16.8	-18.2	-20.0	-20.8	-21.3	-22.2	-23.2	-25.3	-21.3	-16.6
2-Mar	-26.2	-25.5	-24.4	-23.4	-23.8	-25.0	-25.4	-25.2	-22.7	-21.1	-18.7	-16.3	-14.1	-11.8	-9.9	-8.9	-8.7	-8.8	-9.3	-10.1	-10.3	-9.4	-9.0	-9.5	-16.6	-8.7
3-Mar	-9.7	-9.4	-9.3	-9.0	-9.0	-9.0	-9.0	-8.8	-8.3	-6.8	-4.9	-2.9	-1.8	-0.7	-1.1	-1.0	-1.6	-3.9	-5.0	-6.9	-9.2	-11.0	-13.7	-15.2	-7.0	-0.7
4-Mar	-16.2	-17.3	-18.3	-18.7	-19.0	-19.5	-20.1	-20.6	-20.7	-20.4	-19.9	-19.1	-18.2	-17.4	-17.1	-17.1	-17.3	-17.5	-17.9	-18.2	-18.6	-18.8	-19.0	-19.2	-18.6	-16.2
5-Mar	-19.4	-19.3	-19.8	-21.1	-21.7	-20.4	-19.3	-18.8	-18.7	-18.0	-17.1	-16.4	-15.5	-14.3	-13.6	-13.1	-12.7	-13.8	-15.7	-16.0	-16.2	-17.4	-17.1	-17.5	-17.2	-12.7
6-Mar	-17.9	-17.6	-17.8	-17.9	-18.1	-18.8	-19.1	-19.8	-20.0	-19.4	-18.4	-17.5	-16.9	-16.0	-15.3	-15.0	-15.9	-17.1	-17.9	-18.1	-18.2	-18.8	-19.3	-19.6	-17.9	-15.0
7-Mar	-19.7	-20.2	-20.6	-20.8	-21.4	-22.3	-22.8	-23.1	-23.4	-22.8	-22.2	-21.3	-20.2	-19.1	-18.2	-17.7	-18.3	-19.2	-20.7	-21.7	-22.7	-23.0	-22.9	-23.4	-21.1	-17.7
8-Mar	-24.0	-24.7	-25.2	-25.9	-26.4	-26.5	-26.6	-25.8	-24.9	-22.9	-20.7	-18.8	-17.7	-17.1	-16.5	-16.9	-17.6	-18.5	-19.9	-21.0	-21.6	-22.4	-23.4	-24.4	-22.1	-16.5
9-Mar	-25.0	-25.1	-25.3	-26.3	-26.4	-26.9	-28.1	-27.7	-26.8	-25.5	-23.4	-21.0	-19.7	-19.0	-18.3	-17.9	-17.8	-17.8	-19.2	-20.7	-21.6	-22.7	-23.9	-25.0	-23.0	-17.8
10-Mar	-25.7	-26.2	-27.0	-26.9	-28.5	-29.6	-29.4	-29.3	-26.8	-23.6	-21.2	-18.8	-16.7	-15.5	-14.6	-14.2	-14.4	-15.0	-16.5	-17.4	-18.3	-19.6	-20.9	-21.2	-21.6	-14.2
11-Mar	-20.9	-20.6	-20.8	-20.9	-21.2	-21.3	-22.1	-21.8	-20.8	-19.2	-17.3	-15.4	-13.4	-12.5	-12.3	-11.9	-11.5	-11.5	-12.3	-13.3	-14.0	-14.3	-15.4	-16.0	-16.7	-11.5
12-Mar	-16.9	-17.4	-17.7	-18.5	-20.3	-20.8	-21.5	-20.2	-19.2	-17.4	-14.9	-11.9	-10.0	-9.2	-8.4	-8.1	-8.0	-8.3	-9.2	-10.3	-11.1	-11.4	-11.0	-10.9	-13.9	-8.0
13-Mar	-11.0	-11.3	-11.3	-11.5	-11.8	-11.9	-11.6	-11.6	-11.5	-11.2	-10.8	-9.7	-8.7	-7.3	-6.1	-5.4	-4.5	-4.0	-4.5	-5.2	-5.2	-5.8	-5.9	-6.0	-8.5	-4.0
14-Mar	-6.5	-7.0	-7.7	-7.7	-8.3	-8.8	-8.9	-8.3	-6.4	-4.9	-2.3	0.9	3.0	5.2	6.6	8.2	8.4	7.5	7.5	7.1	6.0	5.0	4.6	4.6	-0.1	8.4
15-Mar	4.0	3.0	2.4	1.9	1.5	0.7	-0.1	0.6	1.2	3.0	5.3	7.7	7.8	9.2	9.4	9.4	9.2	7.8	6.1	5.0	4.0	2.8	0.5	-0.8	4.2	9.4
16-Mar	-1.6	-1.7	-1.9	-3.3	-4.2	-4.9	-6.1	-6.9	-6.5	-4.9	-3.9	-3.1	-2.6	-2.5	-2.3	-2.5	-3.3	-4.5	-5.3	-5.9	-7.0	-7.7	-7.8	-7.5	-4.5	-1.6
17-Mar	-7.7	-7.8	-6.8	-6.3	-6.2	-6.0	-7.0	-7.7	-6.7	-4.6	-4.8	-3.1	-3.1	-2.8	-1.6	-1.0	-0.7	-0.8	-2.6	-3.9	-4.2	-4.9	-5.8	-6.6	-4.7	-0.7
18-Mar	-7.3	-7.7	-8.3	-8.9	-9.4	-9.6	-9.6	-9.3	-8.1	-6.2	-4.1	-1.6	0.1	1.9	3.9	4.0	3.6	3.4	3.1	2.7	2.0	1.6	0.5	-0.1	-2.6	4.0
19-Mar	-0.2	-2.0	-4.0	-6.0	-7.2	-8.5	-9.5	-10.1	-9.6	-8.7	-7.4	-6.1	-4.6	-3.4	-3.1	-3.4	-3.7	-4.7	-7.2	-8.9	-10.2	-10.8	-11.6	-13.0	-6.8	-0.2
20-Mar	-14.4	-16.0	-16.4	-16.8	-17.2	-17.6	-18.4	-18.3	-17.2	-15.3	-13.5	-13.3	-12.9	-11.0	-10.6	-9.8	-9.4	-8.9	-8.9	-9.7	-10.5	-11.3	-12.0	-12.4	-13.4	-8.9
21-Mar	-12.7	-13.1	-13.7	-14.5	-15.1	-15.5	-15.6	-14.2	-12.2	-9.3	-5.7	-3.2	-1.0	0.0	0.2	1.2	1.2	1.2	0.8	0.1	-0.2	-0.4	-0.6	-0.8	-6.0	1.2
22-Mar	-1.1	-1.3	-1.5	-1.8	-2.2	-2.4	-3.1	-3.4	-3.2	-2.5	-2.0	-1.8	-1.6	-1.5	-1.7	-2.4	-2.4	-2.3	-2.5	-2.7	-2.6	-2.6	-3.0	-4.1	-2.3	-1.1
23-Mar	-4.8	-5.5	-5.8	-6.2	-5.5	-5.0	-4.9	-4.9	-4.9	-4.3	-2.6	-1.2	-1.1	-0.7	0.3	1.0	0.8	0.0	-0.3	-1.0	-1.6	-2.0	-2.3	-2.2	-2.7	1.0
24-Mar	-2.2	-2.2	-2.3	-2.4	-4.3	-4.6	-4.6	-2.5	-0.5	1.2	2.9	4.6	5.7	5.6	6.0	6.0	5.6	4.9	4.4	3.9	3.1	2.4	1.9	1.6	1.4	6.0
25-Mar	1.2	0.5	0.4	0.5	0.5	0.4	0.2	-0.1	-0.1	0.1	0.3	0.9	1.2	1.5	1.6	1.5	1.8	1.9	1.6	1.2	1.0	0.8	0.5	0.2	0.8	1.9
26-Mar	-0.3	-0.5	-0.4	-0.5	-0.6	-0.4	-0.4	-0.3	0.2	1.5	2.8	4.1	2.7	1.2	1.7	2.3	2.8	3.1	2.3	1.4	0.5	-0.3	0.7	-0.4	1.0	4.1
27-Mar	0.0	-0.4	-0.9	-1.8	-2.2	-2.8	-2.6	-1.2	-0.1	1.3	2.3	4.2	6.7	7.4	7.6	8.4	8.7	8.3	7.3	6.3	5.4	5.0	4.9	4.5	3.2	8.7
28-Mar	4.2	4.3	3.9	3.4	2.9	2.4	1.9	2.2	2.4	2.8	3.2	3.9	5.0	6.5	7.5	8.3	8.9	8.9	8.0	7.0	5.5	4.2	3.0	2.6	4.7	8.9
29-Mar	1.7	1.6	1.5	1.0	-0.3	-0.8	-0.6	0.9	2.8	4.6	6.5	8.1	9.1	9.4	9.8	9.8	9.8	8.5	7.4	6.7	5.1	4.0	3.3	2.5	4.7	9.8
30-Mar	1.8	1.5	1.4	1.4	1.3	1.4	1.3	1.3	1.6	2.0	2.6	3.0	3.3	3.8	4.0	4.1	4.2	4.1	3.7	3.1	2.7	2.5	2.3	2.1	2.5	4.2
31-Mar	1.7	1.7	1.6	0.6	-0.6	-1.0	-0.6	1.1	2.3	4.4	6.2	8.3	10.5	12.3	13.1	13.7	13.8	12.1	10.8	10.0	9.5	8.7	8.5	8.0	6.5	13.8
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 2 m (AT2m) - C
Mannix - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	110	14.78	14.78
-20 - 0	422	56.72	71.51
0 - 10	205	27.55	99.06
10 - 20	7	0.94	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

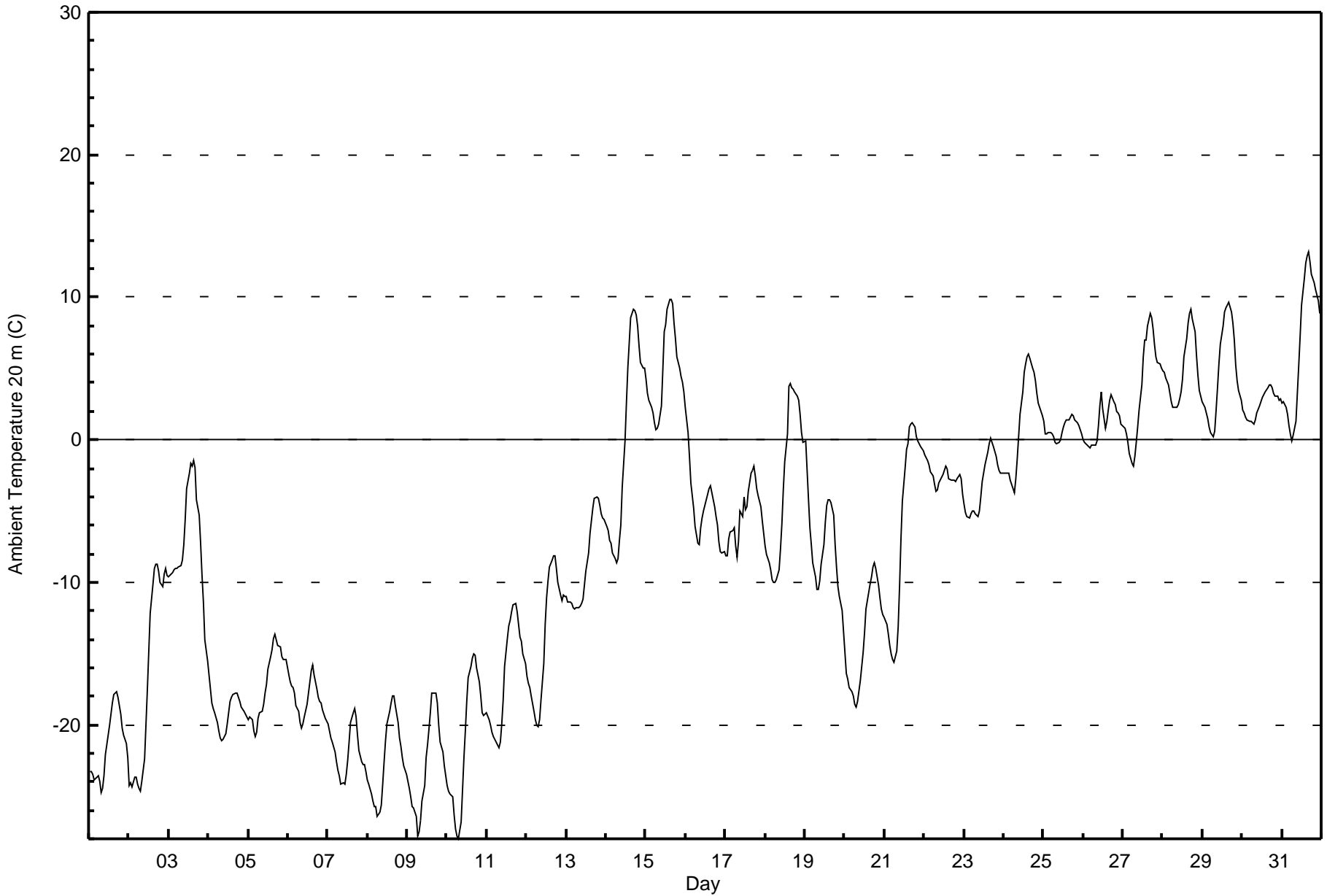
Mannix - March 2017

Maximum Value: 13.2 C on Mar 31 17:00 Maximum Daily Average: 6.7 C on Mar 31																								Hours in Service:	744	
Minimum Value: -28.0 C on Mar 10 08:00 Minimum Daily Average: -22.8 C on Mar 9																								Hours of Data:	744	
Maximum Diurnal Average: -3.7 C at hour 17 Minimum Diurnal Average: -11.7 C at hour 8																								Hours of Missing Data:	0	
Monthly Average: -7.81 C Percentiles: P ₁ = -26.5 P ₁₀ = -21.9 Q ₁ = -17.8 Median = -6.7 Q ₃ = 0.9 P ₉₀ = 4.6 P ₉₉ = 10.8																								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-Mar	-23.3	-23.3	-23.4	-23.8	-23.8	-23.6	-23.9	-24.7	-24.5	-23.6	-22.1	-20.7	-20.1	-19.3	-18.5	-17.9	-17.6	-18.0	-18.6	-19.3	-20.2	-20.8	-21.3	-22.3	-21.4	-17.6
2-Mar	-24.2	-24.0	-24.4	-23.7	-23.7	-24.2	-24.5	-24.7	-24.0	-22.4	-20.0	-17.5	-14.8	-12.1	-10.1	-9.0	-8.8	-8.7	-9.2	-10.0	-10.3	-9.4	-9.0	-9.5	-16.6	-8.7
3-Mar	-9.6	-9.5	-9.3	-9.1	-9.0	-9.0	-9.0	-8.9	-8.4	-7.4	-5.6	-3.5	-2.3	-1.7	-1.8	-1.4	-1.9	-4.2	-5.2	-7.2	-9.5	-11.4	-14.1	-15.5	-7.3	-1.4
4-Mar	-16.5	-17.5	-18.5	-18.9	-19.1	-19.8	-20.4	-20.9	-21.1	-21.0	-20.6	-20.0	-19.1	-18.4	-18.0	-17.9	-17.7	-17.8	-18.1	-18.4	-18.8	-19.0	-19.2	-19.5	-19.0	-16.5
5-Mar	-19.6	-19.5	-19.6	-20.4	-20.8	-20.5	-19.6	-19.2	-19.0	-18.5	-17.7	-17.2	-16.1	-15.3	-14.7	-14.0	-13.6	-14.0	-14.5	-14.5	-15.3	-15.5	-15.4	-15.4	-17.1	-13.6
6-Mar	-16.5	-17.0	-17.3	-17.4	-17.8	-18.6	-19.1	-19.9	-20.2	-20.0	-19.4	-18.5	-17.8	-17.0	-16.3	-15.8	-16.5	-17.5	-18.1	-18.4	-18.5	-19.0	-19.5	-19.8	-18.2	-15.8
7-Mar	-20.0	-20.5	-21.0	-21.2	-21.9	-22.6	-23.2	-23.6	-24.2	-24.1	-24.2	-23.5	-22.5	-21.3	-19.9	-19.2	-18.9	-19.5	-20.7	-21.8	-22.6	-22.8	-22.8	-23.3	-21.9	-18.9
8-Mar	-23.8	-24.2	-24.8	-25.4	-25.8	-25.8	-26.5	-26.1	-25.7	-24.1	-22.6	-21.1	-19.9	-19.1	-18.5	-17.9	-18.0	-18.7	-19.8	-20.9	-21.5	-22.3	-22.8	-23.5	-22.4	-17.9
9-Mar	-24.0	-24.4	-25.0	-25.8	-25.9	-26.4	-27.8	-27.5	-26.7	-25.4	-24.2	-22.3	-21.4	-20.4	-19.2	-17.7	-17.8	-17.8	-18.5	-20.1	-21.2	-21.9	-22.9	-23.6	-22.8	-17.7
10-Mar	-24.2	-24.7	-24.9	-25.1	-26.3	-27.3	-27.8	-28.0	-26.8	-24.6	-22.3	-20.4	-18.4	-16.7	-15.9	-15.3	-15.0	-15.1	-16.0	-17.0	-18.0	-19.1	-19.4	-19.2	-21.2	-15.0
11-Mar	-19.2	-19.6	-20.0	-20.5	-20.8	-21.0	-21.5	-21.6	-21.2	-20.0	-18.2	-15.9	-13.9	-13.1	-12.7	-12.1	-11.6	-11.5	-12.1	-13.0	-13.8	-14.1	-15.0	-15.7	-16.6	-11.5
12-Mar	-16.6	-17.1	-17.4	-17.9	-19.1	-19.6	-20.0	-20.2	-19.7	-18.2	-15.7	-13.0	-11.1	-9.9	-8.9	-8.5	-8.1	-8.2	-9.0	-10.0	-10.9	-11.3	-10.9	-10.9	-13.8	-8.1
13-Mar	-11.0	-11.4	-11.4	-11.5	-11.7	-11.9	-11.7	-11.8	-11.7	-11.5	-11.2	-10.2	-9.2	-7.9	-6.6	-5.7	-4.8	-4.1	-4.0	-4.1	-4.6	-5.2	-5.5	-5.6	-8.5	-4.0
14-Mar	-6.1	-6.4	-7.0	-7.3	-7.9	-8.4	-8.6	-8.3	-7.0	-6.0	-3.3	0.0	2.6	5.1	6.8	8.6	9.2	9.1	8.8	8.0	6.6	5.4	5.0	5.0	0.2	9.2
15-Mar	4.3	3.3	2.7	2.3	1.9	1.2	0.7	0.8	1.1	2.4	4.9	7.6	8.1	9.2	9.8	9.8	9.6	8.2	7.1	5.8	5.0	4.4	4.1	3.3	4.9	9.8
16-Mar	2.3	0.5	-1.2	-3.0	-4.0	-4.8	-6.1	-7.2	-7.4	-6.2	-5.5	-5.0	-4.3	-3.8	-3.4	-3.2	-3.7	-4.8	-5.4	-6.0	-7.1	-7.9	-8.0	-7.9	-4.7	2.3
17-Mar	-8.1	-8.1	-7.0	-6.5	-6.4	-6.2	-7.4	-8.2	-7.1	-5.0	-5.4	-4.0	-4.9	-4.7	-3.7	-2.4	-2.2	-1.8	-2.6	-3.4	-4.0	-4.7	-5.6	-6.6	-5.3	-1.8
18-Mar	-7.4	-8.0	-8.6	-9.1	-9.8	-10.0	-10.0	-9.8	-9.2	-7.7	-5.9	-3.5	-1.5	0.4	3.8	4.0	3.6	3.6	3.4	3.1	2.8	1.8	0.5	-0.2	-3.1	4.0
19-Mar	-0.1	-2.2	-4.2	-6.2	-7.3	-8.6	-9.6	-10.5	-10.5	-9.9	-8.7	-7.4	-5.8	-4.6	-4.2	-4.2	-4.4	-5.3	-7.3	-8.9	-10.3	-11.0	-12.0	-13.5	-7.4	-0.1
20-Mar	-14.9	-16.4	-16.8	-17.4	-17.7	-17.9	-18.5	-18.8	-18.3	-16.9	-15.9	-14.9	-13.6	-11.9	-10.7	-10.1	-9.6	-9.0	-8.6	-9.1	-10.2	-11.1	-11.8	-12.2	-13.8	-8.6
21-Mar	-12.5	-13.0	-13.7	-14.5	-15.0	-15.4	-15.6	-14.8	-13.2	-10.3	-6.9	-4.3	-2.0	-0.7	-0.2	0.9	1.1	1.2	0.9	0.2	-0.1	-0.3	-0.5	-0.8	-6.2	1.2
22-Mar	-1.1	-1.2	-1.5	-1.8	-2.3	-2.5	-3.1	-3.6	-3.5	-3.0	-2.7	-2.4	-2.2	-1.9	-2.1	-2.8	-2.9	-2.8	-2.9	-2.9	-2.7	-2.5	-2.7	-3.8	-2.5	-1.1
23-Mar	-4.5	-5.1	-5.3	-5.5	-5.2	-5.0	-5.0	-5.2	-5.3	-5.0	-4.0	-2.9	-2.3	-1.7	-0.9	-0.2	0.1	-0.2	-0.5	-1.2	-1.8	-2.2	-2.3	-2.3	-3.1	0.1
24-Mar	-2.4	-2.3	-2.3	-2.3	-2.9	-3.1	-3.7	-2.7	-1.4	0.2	1.8	3.4	4.7	5.3	5.8	6.0	5.7	5.1	4.8	4.1	3.2	2.5	2.0	1.7	1.4	6.0
25-Mar	1.3	0.5	0.4	0.5	0.5	0.4	0.2	-0.2	-0.3	-0.2	0.0	0.5	0.9	1.2	1.4	1.4	1.6	1.8	1.7	1.4	1.2	1.0	0.7	0.4	0.8	1.8
26-Mar	0.0	-0.2	-0.3	-0.5	-0.6	-0.4	-0.4	-0.4	-0.1	1.0	2.4	3.4	2.2	0.8	1.3	2.1	2.8	3.2	2.7	2.5	2.0	1.9	1.7	1.1	1.2	3.4
27-Mar	0.9	0.8	0.4	-0.1	-1.0	-1.7	-1.8	-1.2	-0.2	0.9	2.1	3.9	5.8	7.0	7.0	8.0	8.8	8.5	7.8	6.7	5.8	5.4	5.4	5.0	3.5	8.8
28-Mar	4.9	4.7	4.3	3.8	3.2	2.7	2.2	2.2	2.3	2.5	2.9	3.4	4.3	5.8	7.1	8.1	8.8	9.1	8.5	7.6	5.9	4.5	3.5	3.1	4.8	9.1
29-Mar	2.6	2.3	1.9	1.5	0.9	0.5	0.2	0.6	2.1	3.6	5.3	6.7	8.0	8.9	9.3	9.5	9.6	9.0	8.2	6.9	5.3	4.1	3.5	2.8	4.7	9.6
30-Mar	2.1	1.8	1.6	1.4	1.3	1.3	1.2	1.1	1.4	1.9	2.4	2.7	3.0	3.2	3.4	3.6	3.9	3.9	3.7	3.3	3.1	3.0	2.8	2.8	2.5	3.9
31-Mar	2.6	2.7	2.3	1.8	1.0	0.4	-0.1	0.3	1.3	3.3	5.2	7.3	9.5	11.3	12.4	12.9	13.2	12.5	11.6	11.1	10.6	10.2	9.7	8.8	6.7	13.2
																								Diurnal Average	-9.2	
																								Diurnal Maximum	4.9	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 20 m (AT20m) - C
Mannix - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	112	15.05	15.05
-20 - 0	414	55.65	70.70
0 - 10	209	28.09	98.79
10 - 20	9	1.21	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

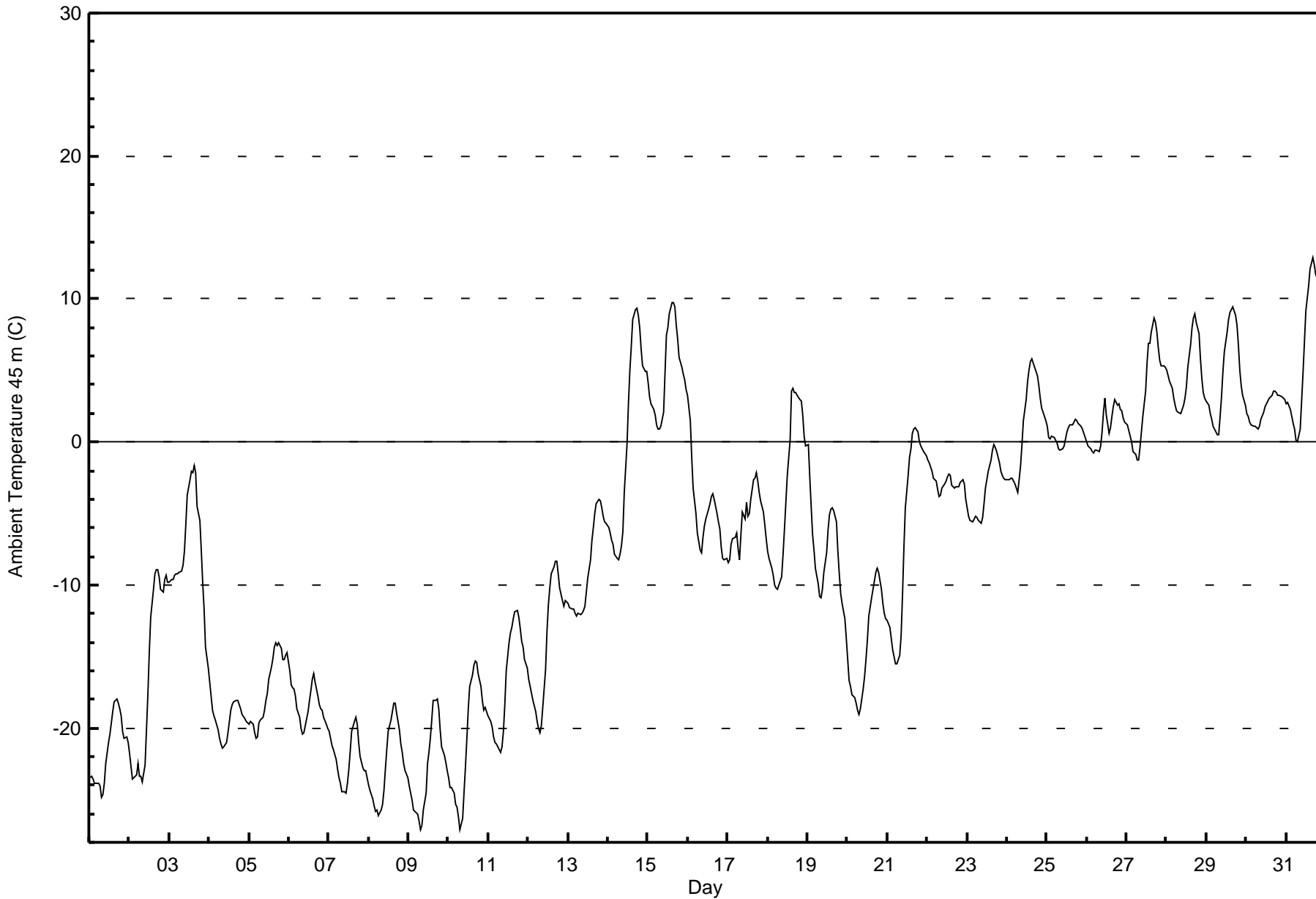
Mannix - March 2017

Maximum Value: 12.9 C on Mar 31 17:00 Maximum Daily Average: 6.7 C on Mar 31																								Hours in Service:	744	
Minimum Value: -27.1 C on Mar 10 08:00 Minimum Daily Average: -22.8 C on Mar 9																								Hours of Data:	744	
Maximum Diurnal Average: -4.0 C at hour 17 Minimum Diurnal Average: -11.8 C at hour 8																								Hours of Missing Data:	0	
Monthly Average: -7.94 C Percentiles: P ₁ = -26.0 P ₁₀ = -21.8 Q ₁ = -18.1 Median = -6.8 Q ₃ = 0.9 P ₉₀ = 4.6 P ₉₉ = 10.6																								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-Mar	-23.5	-23.4	-23.6	-23.9	-23.9	-23.8	-24.1	-24.9	-24.6	-23.9	-22.5	-21.0	-20.4	-19.6	-18.8	-18.2	-18.0	-18.2	-18.7	-19.2	-20.3	-20.7	-20.6	-21.0	-21.5	-18.0
2-Mar	-21.8	-22.7	-23.6	-23.4	-23.2	-22.5	-23.4	-23.4	-23.8	-22.6	-20.2	-17.7	-14.7	-12.3	-10.3	-9.3	-9.0	-8.9	-9.4	-10.3	-10.5	-9.7	-9.3	-9.8	-16.3	-8.9
3-Mar	-9.8	-9.7	-9.6	-9.3	-9.2	-9.2	-9.1	-9.0	-8.6	-7.6	-5.8	-3.7	-2.6	-2.1	-2.1	-1.7	-2.2	-4.5	-5.5	-7.5	-9.8	-11.7	-14.4	-15.8	-7.5	-1.7
4-Mar	-16.8	-17.7	-18.7	-19.1	-19.4	-20.1	-20.7	-21.2	-21.4	-21.4	-21.0	-20.3	-19.5	-18.8	-18.4	-18.2	-18.0	-18.1	-18.4	-18.6	-19.0	-19.3	-19.5	-19.7	-19.3	-16.8
5-Mar	-19.8	-19.6	-19.7	-20.3	-20.7	-20.6	-19.7	-19.5	-19.3	-18.8	-18.1	-17.6	-16.6	-15.7	-15.1	-14.3	-14.0	-14.2	-14.1	-14.4	-15.2	-15.2	-15.0	-14.7	-17.2	-14.0
6-Mar	-16.0	-17.0	-17.2	-17.3	-17.7	-18.7	-19.2	-20.1	-20.4	-20.3	-19.8	-18.9	-18.1	-17.4	-16.6	-16.2	-16.8	-17.7	-18.3	-18.6	-18.8	-19.2	-19.8	-20.0	-18.3	-16.0
7-Mar	-20.2	-20.7	-21.2	-21.5	-22.2	-22.9	-23.4	-23.9	-24.5	-24.4	-24.5	-23.9	-22.9	-21.7	-20.2	-19.5	-19.3	-19.8	-21.0	-22.0	-22.8	-23.0	-22.9	-23.4	-22.2	-19.3
8-Mar	-24.0	-24.3	-25.0	-25.4	-25.8	-25.7	-26.1	-25.8	-25.4	-24.4	-22.9	-21.5	-20.3	-19.5	-18.9	-18.3	-18.3	-19.0	-20.1	-21.1	-21.7	-22.5	-22.9	-23.5	-22.6	-18.3
9-Mar	-24.1	-24.5	-25.1	-25.7	-25.9	-26.0	-26.5	-27.1	-26.8	-25.8	-24.5	-22.4	-21.7	-20.7	-19.5	-18.1	-18.1	-18.0	-18.7	-20.2	-21.4	-21.9	-22.4	-23.0	-22.8	-18.0
10-Mar	-23.5	-24.2	-24.1	-24.5	-25.4	-25.6	-26.2	-27.1	-26.3	-24.5	-22.7	-20.7	-18.7	-17.1	-16.3	-15.6	-15.3	-15.4	-16.2	-17.1	-18.1	-18.7	-18.6	-18.9	-20.9	-15.3
11-Mar	-19.2	-19.5	-20.0	-20.6	-21.0	-21.2	-21.5	-21.7	-21.4	-20.3	-18.4	-16.1	-14.1	-13.3	-13.0	-12.4	-11.9	-11.8	-12.2	-13.1	-14.0	-14.3	-15.2	-15.8	-16.7	-11.8
12-Mar	-16.6	-17.1	-17.6	-18.0	-18.9	-19.5	-20.0	-20.3	-19.8	-18.6	-15.9	-13.2	-11.3	-10.2	-9.2	-8.7	-8.3	-8.4	-9.2	-10.2	-11.1	-11.4	-11.1	-11.2	-14.0	-8.3
13-Mar	-11.3	-11.6	-11.7	-11.7	-11.9	-12.2	-12.0	-12.0	-11.8	-11.5	-10.5	-9.6	-8.2	-6.9	-6.0	-5.0	-4.4	-4.1	-4.1	-4.6	-5.2	-5.6	-5.7	-5.7	-8.7	-4.1
14-Mar	-6.0	-6.4	-6.9	-7.2	-7.8	-8.2	-8.3	-7.8	-7.2	-6.3	-3.5	0.0	2.7	5.0	6.7	8.5	9.3	9.4	8.9	8.0	6.5	5.4	4.9	4.9	0.2	9.4
15-Mar	4.2	3.1	2.7	2.2	1.8	1.2	0.9	0.9	1.1	2.1	4.9	7.5	8.0	9.0	9.8	9.7	9.4	8.1	7.2	5.9	5.2	4.7	4.3	3.7	4.9	9.8
16-Mar	3.2	1.5	-1.1	-3.2	-4.1	-5.0	-6.3	-7.5	-7.7	-6.6	-5.9	-5.4	-4.7	-4.3	-3.8	-3.6	-4.1	-5.0	-5.6	-6.1	-7.3	-8.1	-8.3	-8.1	-4.9	3.2
17-Mar	-8.4	-8.3	-7.2	-6.7	-6.6	-6.4	-7.5	-8.2	-6.5	-4.9	-5.4	-4.2	-5.2	-5.0	-4.0	-2.7	-2.5	-2.2	-2.8	-3.6	-4.1	-4.9	-5.8	-6.7	-5.4	-2.2
18-Mar	-7.6	-8.2	-8.8	-9.3	-10.0	-10.2	-10.3	-10.0	-9.4	-7.9	-6.1	-4.2	-2.4	0.1	3.6	3.8	3.4	3.4	3.2	2.9	2.8	1.9	0.4	-0.3	-3.3	3.8
19-Mar	-0.2	-2.4	-4.5	-6.4	-7.6	-8.9	-9.9	-10.8	-10.9	-10.3	-9.1	-7.8	-6.2	-5.1	-4.7	-4.6	-4.8	-5.6	-7.6	-9.2	-10.6	-11.2	-12.3	-13.8	-7.7	-0.2
20-Mar	-15.2	-16.7	-17.0	-17.7	-17.9	-18.2	-18.8	-19.1	-18.6	-17.3	-16.4	-15.2	-13.8	-12.1	-10.9	-10.3	-9.7	-9.1	-8.8	-9.2	-10.3	-11.3	-12.0	-12.3	-14.1	-8.8
21-Mar	-12.5	-13.0	-13.8	-14.6	-15.1	-15.5	-15.5	-15.0	-13.5	-10.7	-7.4	-4.6	-2.3	-1.0	-0.5	0.6	0.9	1.0	0.7	0.0	-0.2	-0.5	-0.7	-1.0	-6.4	1.0
22-Mar	-1.3	-1.5	-1.7	-2.0	-2.5	-2.7	-3.3	-3.9	-3.7	-3.3	-3.0	-2.7	-2.5	-2.2	-2.4	-3.1	-3.2	-3.1	-3.1	-3.1	-2.9	-2.6	-2.9	-4.0	-2.8	-1.3
23-Mar	-4.6	-5.2	-5.5	-5.6	-5.4	-5.2	-5.2	-5.5	-5.6	-5.3	-4.3	-3.2	-2.7	-2.1	-1.3	-0.6	-0.2	-0.4	-0.6	-1.4	-2.0	-2.4	-2.6	-2.6	-3.3	-0.2
24-Mar	-2.6	-2.6	-2.6	-2.5	-2.7	-2.9	-3.5	-2.7	-1.7	-0.2	1.5	3.0	4.3	5.0	5.6	5.8	5.5	4.9	4.7	4.0	3.1	2.3	1.8	1.5	1.2	5.8
25-Mar	1.1	0.3	0.3	0.4	0.3	0.1	-0.1	-0.5	-0.5	-0.4	-0.2	0.3	0.7	1.0	1.2	1.1	1.4	1.6	1.5	1.3	1.1	0.9	0.6	0.3	0.6	1.6
26-Mar	0.0	-0.3	-0.5	-0.7	-0.8	-0.5	-0.6	-0.7	-0.3	0.7	2.1	3.1	1.9	0.6	1.0	1.7	2.5	3.0	2.6	2.6	2.3	2.2	1.7	1.4	1.0	3.1
27-Mar	1.2	0.8	0.4	0.0	-0.6	-0.9	-1.3	-1.2	-0.4	0.7	1.8	3.6	5.5	6.9	6.9	7.7	8.7	8.4	7.7	6.6	5.7	5.3	5.3	5.2	3.5	8.7
28-Mar	5.0	4.7	4.3	3.8	3.1	2.6	2.2	2.1	2.0	2.2	2.6	3.1	3.8	5.3	6.8	8.0	8.6	9.0	8.4	7.6	5.8	4.4	3.4	3.1	4.7	9.0
29-Mar	2.9	2.5	1.9	1.6	1.1	0.9	0.5	0.5	1.8	3.2	4.9	6.3	7.6	8.6	9.0	9.2	9.5	8.9	8.2	6.8	5.1	3.9	3.3	2.6	4.6	9.5
30-Mar	2.0	1.8	1.4	1.2	1.1	1.1	1.0	0.9	1.1	1.6	2.1	2.4	2.7	2.9	3.1	3.3	3.6	3.6	3.4	3.3	3.3	3.1	3.0	3.0	2.3	3.6
31-Mar	2.7	2.7	2.3	1.8	1.2	0.9	0.1	0.0	0.9	2.8	4.8	7.0	9.2	10.9	12.1	12.5	12.9	12.4	11.7	11.2	10.8	10.4	9.9	8.9	6.7	12.9
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	122	16.40	16.40
-20 - 0	409	54.97	71.37
0 - 10	204	27.42	98.79
10 - 20	9	1.21	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

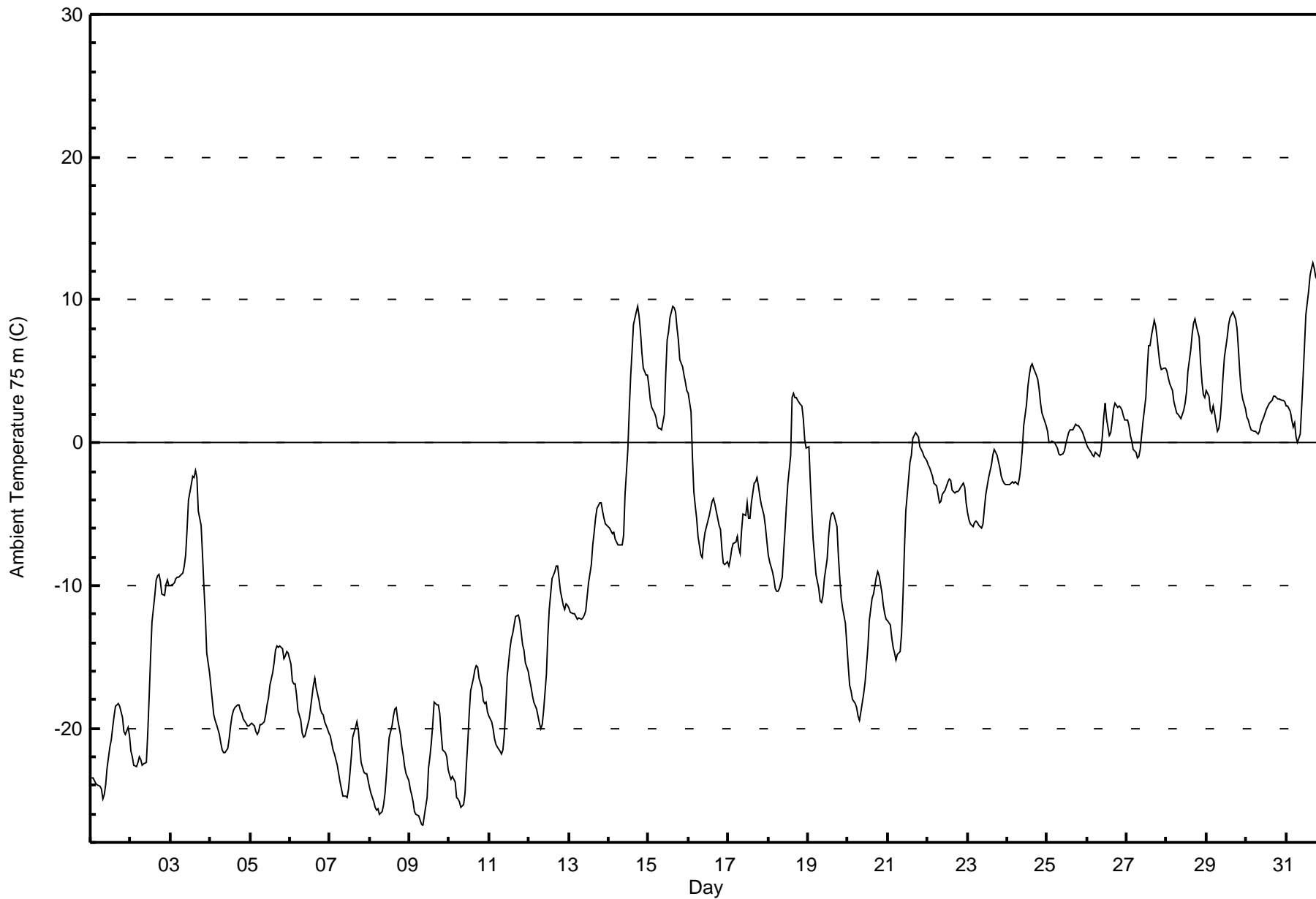
Mannix - March 2017

Maximum Value: 12.6 C on Mar 31 17:00 Maximum Daily Average: 6.6 C on Mar 31																								Hours in Service:	744	
Minimum Value: -26.8 C on Mar 9 09:00 Minimum Daily Average: -23.0 C on Mar 9																								Hours of Data:	744	
Maximum Diurnal Average: -4.2 C at hour 17 Minimum Diurnal Average: -11.7 C at hour 8																								Hours of Missing Data:	0	
Monthly Average: -8.10 C Percentiles: P ₁ = -25.8 P ₁₀ = -22.0 Q ₁ = -18.4 Median = -6.8 Q ₃ = 0.8 P ₉₀ = 4.6 P ₉₉ = 10.3																								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-Mar	-23.5	-23.5	-23.7	-23.9	-24.0	-24.1	-24.2	-24.9	-24.7	-24.0	-22.8	-21.4	-20.8	-19.9	-19.1	-18.5	-18.2	-18.5	-18.9	-19.2	-20.2	-20.4	-20.0	-20.5	-21.6	-18.2
2-Mar	-21.6	-22.0	-22.6	-22.7	-22.4	-22.0	-22.2	-22.6	-22.5	-22.4	-20.3	-17.8	-15.0	-12.6	-10.7	-9.6	-9.3	-9.2	-9.7	-10.6	-10.7	-9.9	-9.6	-10.1	-16.2	-9.2
3-Mar	-10.0	-9.9	-9.8	-9.6	-9.4	-9.4	-9.3	-9.1	-8.7	-7.8	-6.1	-4.0	-2.9	-2.4	-2.4	-2.0	-2.4	-4.8	-5.8	-7.9	-10.2	-12.1	-14.7	-16.1	-7.8	-2.0
4-Mar	-17.1	-18.1	-19.1	-19.5	-19.7	-20.4	-21.0	-21.5	-21.7	-21.7	-21.4	-20.7	-19.9	-19.1	-18.8	-18.5	-18.4	-18.4	-18.7	-19.0	-19.4	-19.7	-19.8	-19.9	-19.6	-17.1
5-Mar	-19.8	-19.7	-19.8	-20.2	-20.4	-20.2	-19.7	-19.8	-19.6	-19.1	-18.4	-17.9	-17.0	-16.1	-15.4	-14.5	-14.2	-14.4	-14.2	-14.5	-15.2	-15.0	-14.7	-14.7	-17.3	-14.2
6-Mar	-15.5	-16.7	-16.9	-16.9	-17.7	-18.7	-19.4	-20.3	-20.6	-20.6	-20.1	-19.3	-18.6	-17.8	-17.0	-16.5	-17.1	-18.1	-18.7	-18.9	-19.1	-19.6	-20.1	-20.3	-18.5	-15.5
7-Mar	-20.5	-21.0	-21.6	-21.8	-22.6	-23.2	-23.8	-24.2	-24.8	-24.8	-24.9	-24.3	-23.2	-22.0	-20.6	-19.9	-19.6	-20.1	-21.3	-22.4	-23.1	-23.1	-23.1	-23.6	-22.5	-19.6
8-Mar	-24.2	-24.6	-25.1	-25.5	-25.8	-25.7	-26.1	-25.8	-25.4	-24.6	-23.2	-21.8	-20.6	-19.8	-19.2	-18.6	-18.6	-19.3	-20.4	-21.3	-21.9	-22.7	-23.2	-23.7	-22.8	-18.6
9-Mar	-24.2	-24.7	-25.1	-25.8	-26.0	-26.2	-26.4	-26.7	-26.8	-26.2	-24.8	-22.8	-22.0	-21.0	-19.7	-18.1	-18.3	-18.3	-18.9	-20.4	-21.5	-21.7	-22.0	-22.9	-23.0	-18.1
10-Mar	-23.3	-23.6	-23.4	-23.8	-24.9	-24.9	-25.1	-25.5	-25.4	-24.6	-22.6	-21.0	-19.0	-17.4	-16.5	-15.9	-15.6	-15.7	-16.5	-17.2	-18.0	-18.3	-18.1	-18.9	-20.6	-15.6
11-Mar	-19.2	-19.6	-20.0	-20.7	-21.1	-21.4	-21.6	-21.8	-21.5	-20.4	-18.7	-16.4	-14.5	-13.7	-13.3	-12.8	-12.2	-12.1	-12.5	-13.2	-14.2	-14.6	-15.4	-16.0	-17.0	-12.1
12-Mar	-16.6	-17.1	-17.7	-18.1	-18.7	-19.2	-19.6	-20.1	-19.8	-18.7	-16.2	-13.5	-11.6	-10.6	-9.5	-9.0	-8.7	-8.7	-9.5	-10.4	-11.4	-11.7	-11.3	-11.4	-14.1	-8.7
13-Mar	-11.6	-11.9	-12.0	-12.0	-12.2	-12.4	-12.3	-12.4	-12.3	-12.1	-11.8	-10.8	-9.9	-8.5	-7.2	-6.3	-5.3	-4.6	-4.2	-4.2	-4.8	-5.3	-5.7	-5.8	-9.0	-4.2
14-Mar	-6.0	-6.2	-6.3	-6.3	-6.8	-7.1	-7.1	-7.1	-7.1	-6.4	-3.7	-0.4	2.3	4.7	6.4	8.3	9.2	9.5	8.8	7.8	6.4	5.3	4.7	4.7	0.3	9.5
15-Mar	3.9	3.0	2.5	2.1	1.8	1.2	1.0	1.0	0.9	2.0	4.8	7.2	7.8	8.7	9.5	9.5	9.2	8.1	7.1	5.8	5.4	4.8	4.2	3.6	4.8	9.5
16-Mar	3.4	2.2	-1.0	-3.4	-4.4	-5.3	-6.6	-7.9	-8.0	-7.0	-6.3	-5.8	-5.1	-4.6	-4.2	-3.9	-4.3	-5.3	-5.8	-6.1	-7.5	-8.4	-8.5	-8.3	-5.1	3.4
17-Mar	-8.6	-8.1	-7.4	-7.0	-6.9	-6.6	-7.3	-7.7	-6.2	-5.0	-5.1	-4.2	-5.2	-5.3	-4.2	-2.9	-2.8	-2.4	-3.0	-3.7	-4.3	-5.1	-5.9	-6.9	-5.5	-2.4
18-Mar	-7.8	-8.4	-9.0	-9.5	-10.2	-10.4	-10.4	-10.2	-9.5	-7.7	-6.1	-4.3	-2.8	-0.9	3.1	3.5	3.1	3.2	3.0	2.7	2.6	1.7	0.2	-0.4	-3.5	3.5
19-Mar	-0.3	-2.7	-4.8	-6.8	-7.9	-9.2	-10.2	-11.1	-11.2	-10.7	-9.5	-8.2	-6.6	-5.5	-5.0	-4.9	-5.1	-5.9	-8.0	-9.5	-10.9	-11.6	-12.7	-14.1	-8.0	-0.3
20-Mar	-15.6	-17.0	-17.3	-18.0	-18.2	-18.5	-19.1	-19.4	-18.9	-17.6	-16.8	-15.6	-14.3	-12.5	-10.9	-10.6	-10.0	-9.4	-9.0	-9.4	-10.5	-11.4	-12.0	-12.4	-14.4	-9.0
21-Mar	-12.4	-12.8	-13.6	-14.4	-14.7	-15.2	-14.8	-14.6	-13.4	-10.8	-7.5	-4.8	-2.5	-1.4	-0.9	0.3	0.5	0.7	0.4	-0.3	-0.5	-0.7	-1.0	-1.3	-6.5	0.7
22-Mar	-1.6	-1.8	-2.0	-2.3	-2.8	-3.0	-3.6	-4.2	-4.1	-3.6	-3.3	-3.1	-2.8	-2.5	-2.7	-3.4	-3.5	-3.5	-3.4	-3.3	-3.1	-2.8	-3.1	-4.2	-3.1	-1.6
23-Mar	-4.9	-5.4	-5.7	-5.8	-5.6	-5.5	-5.5	-5.8	-6.0	-5.6	-4.6	-3.6	-3.0	-2.4	-1.6	-0.9	-0.5	-0.7	-0.9	-1.7	-2.3	-2.6	-2.9	-2.9	-3.6	-0.5
24-Mar	-2.9	-2.9	-2.8	-2.8	-2.8	-2.8	-3.0	-2.5	-1.7	-0.5	1.2	2.6	4.0	4.8	5.3	5.5	5.2	4.7	4.5	3.7	2.8	2.1	1.5	1.2	1.0	5.5
25-Mar	0.8	0.0	0.0	0.2	0.0	-0.1	-0.4	-0.8	-0.9	-0.8	-0.6	-0.1	0.3	0.7	0.9	0.9	1.1	1.3	1.2	1.2	0.9	0.7	0.4	0.1	0.3	1.3
26-Mar	-0.1	-0.4	-0.6	-0.9	-1.0	-0.7	-0.7	-1.0	-0.6	0.4	1.8	2.8	1.7	0.5	0.7	1.5	2.4	2.7	2.4	2.6	2.5	2.3	1.9	1.5	0.9	2.8
27-Mar	1.6	1.2	0.5	0.1	-0.5	-0.7	-1.1	-0.9	-0.4	0.5	1.5	3.2	5.2	6.8	6.8	7.5	8.5	8.2	7.4	6.4	5.5	5.2	5.3	5.2	3.5	8.5
28-Mar	5.1	4.6	4.2	3.6	2.9	2.5	2.1	2.0	1.7	1.9	2.3	2.7	3.5	5.0	6.5	7.6	8.4	8.7	8.1	7.4	5.6	4.2	3.3	3.2	4.5	8.7
29-Mar	3.7	3.3	2.2	2.1	2.5	2.1	0.8	1.0	1.7	3.0	4.6	6.0	7.4	8.3	8.8	9.0	9.2	8.7	8.0	6.5	4.8	3.7	3.0	2.3	4.7	9.2
30-Mar	1.8	1.6	1.2	0.9	0.8	0.8	0.7	0.6	0.8	1.3	1.8	2.1	2.4	2.5	2.7	3.0	3.3	3.3	3.2	3.1	3.1	3.0	3.0	2.9	2.1	3.3
31-Mar	2.6	2.6	2.2	1.6	1.1	1.3	0.4	0.0	0.7	2.5	4.5	6.7	8.9	10.6	11.8	12.2	12.6	12.2	11.6	11.3	10.8	10.4	9.9	8.9	6.6	12.6
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	124	16.67	16.67
-20 - 0	408	54.84	71.51
0 - 10	203	27.28	98.79
10 - 20	9	1.21	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

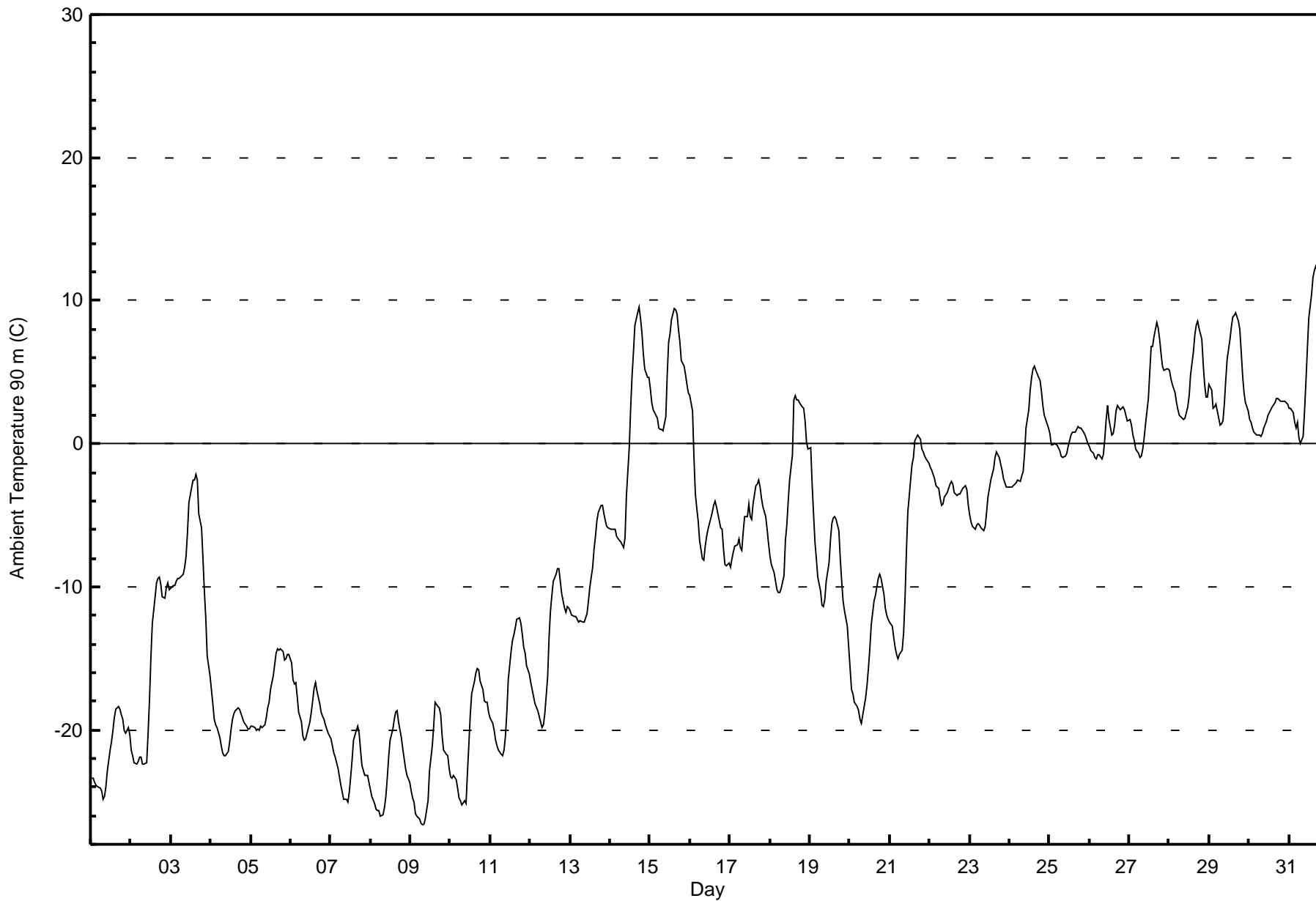
Mannix - March 2017

Maximum Value: 12.4 C on Mar 31 17:00 Maximum Daily Average: 6.5 C on Mar 31																								Hours in Service:	744	
Minimum Value: -26.7 C on Mar 9 09:00 Minimum Daily Average: -23.0 C on Mar 9																								Hours of Data:	744	
Maximum Diurnal Average: -4.3 C at hour 17 Minimum Diurnal Average: -11.7 C at hour 8																								Hours of Missing Data:	0	
Monthly Average: -8.14 C Percentiles: P ₁ = -25.9 P ₁₀ = -21.9 Q ₁ = -18.4 Median = -6.8 Q ₃ = 0.7 P ₉₀ = 4.4 P ₉₉ = 10.3																								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-Mar	-23.4	-23.4	-23.6	-23.9	-24.0	-24.1	-24.3	-24.9	-24.7	-24.0	-22.9	-21.4	-20.8	-20.0	-19.2	-18.6	-18.3	-18.6	-19.0	-19.2	-20.1	-20.3	-19.9	-20.3	-21.6	-18.3
2-Mar	-21.4	-21.8	-22.3	-22.4	-22.2	-22.0	-21.9	-22.4	-22.4	-22.3	-20.3	-17.9	-14.9	-12.5	-10.7	-9.7	-9.4	-9.4	-9.8	-10.7	-10.7	-10.0	-9.7	-10.2	-16.1	-9.4
3-Mar	-10.1	-9.9	-9.9	-9.6	-9.5	-9.4	-9.3	-9.1	-8.6	-7.8	-6.2	-4.1	-3.0	-2.5	-2.5	-2.1	-2.5	-4.9	-5.9	-8.0	-10.3	-12.2	-14.8	-16.2	-7.9	-2.1
4-Mar	-17.2	-18.2	-19.2	-19.6	-19.8	-20.5	-21.1	-21.6	-21.8	-21.5	-20.8	-19.3	-18.9	-18.7	-18.5	-18.5	-18.8	-18.5	-18.8	-19.1	-19.5	-19.8	-19.9	-19.9	-19.8	-17.2
5-Mar	-19.8	-19.7	-19.8	-20.0	-19.9	-20.0	-19.7	-19.9	-19.7	-19.2	-18.5	-18.1	-17.1	-16.2	-15.4	-14.6	-14.3	-14.4	-14.3	-14.5	-15.1	-15.0	-14.7	-14.7	-17.3	-14.3
6-Mar	-15.4	-16.5	-16.8	-16.7	-17.7	-18.7	-19.5	-20.4	-20.7	-20.6	-20.2	-19.4	-18.7	-18.0	-17.1	-16.7	-17.3	-18.2	-18.8	-19.1	-19.2	-19.7	-20.2	-20.5	-18.6	-15.4
7-Mar	-20.7	-21.1	-21.7	-21.9	-22.7	-23.3	-23.9	-24.3	-24.9	-24.9	-25.0	-24.4	-23.3	-22.1	-20.7	-20.1	-19.7	-20.2	-21.4	-22.5	-23.2	-23.2	-23.2	-23.7	-22.6	-19.7
8-Mar	-24.2	-24.6	-25.2	-25.6	-25.7	-25.6	-26.1	-25.9	-25.4	-24.6	-23.4	-21.9	-20.7	-19.9	-19.3	-18.7	-18.7	-19.5	-20.5	-21.4	-22.0	-22.7	-23.2	-23.7	-22.9	-18.7
9-Mar	-24.3	-24.7	-25.1	-25.8	-26.1	-26.2	-26.5	-26.6	-26.7	-26.2	-24.9	-22.9	-22.0	-21.1	-19.8	-18.1	-18.4	-18.4	-19.0	-20.4	-21.4	-21.7	-21.8	-22.7	-23.0	-18.1
10-Mar	-23.3	-23.4	-23.2	-23.5	-24.1	-24.7	-24.9	-25.2	-25.0	-25.1	-22.9	-21.0	-19.0	-17.5	-16.6	-16.0	-15.7	-15.8	-16.6	-17.2	-18.0	-18.1	-18.0	-18.8	-20.6	-15.7
11-Mar	-19.2	-19.6	-20.0	-20.7	-21.1	-21.4	-21.7	-21.8	-21.5	-20.4	-18.8	-16.5	-14.5	-13.7	-13.4	-12.8	-12.3	-12.2	-12.6	-13.3	-14.2	-14.7	-15.6	-16.1	-17.0	-12.2
12-Mar	-16.6	-17.1	-17.7	-18.1	-18.6	-19.1	-19.4	-19.8	-19.6	-18.9	-16.3	-13.6	-11.7	-10.6	-9.6	-9.1	-8.7	-8.8	-9.6	-10.5	-11.5	-11.8	-11.3	-11.5	-14.2	-8.7
13-Mar	-11.7	-12.0	-12.1	-12.1	-12.3	-12.5	-12.4	-12.5	-12.4	-12.2	-11.9	-11.0	-10.0	-8.7	-7.4	-6.5	-5.4	-4.8	-4.3	-4.3	-4.9	-5.4	-5.8	-5.9	-9.1	-4.3
14-Mar	-5.9	-6.0	-6.0	-6.0	-6.5	-6.8	-6.9	-7.1	-7.2	-6.6	-3.7	-0.3	2.5	4.7	6.4	8.2	9.1	9.5	8.8	7.8	6.3	5.2	4.7	4.7	0.4	9.5
15-Mar	3.9	2.9	2.4	2.0	1.8	1.1	1.0	1.0	0.9	1.9	4.8	7.1	7.7	8.6	9.4	9.3	9.1	8.0	7.1	5.8	5.4	4.8	4.2	3.5	4.7	9.4
16-Mar	3.4	2.3	-1.0	-3.5	-4.5	-5.4	-6.7	-8.0	-8.2	-7.1	-6.4	-6.0	-5.2	-4.8	-4.3	-4.0	-4.4	-5.4	-5.9	-6.0	-7.4	-8.5	-8.6	-8.3	-5.2	3.4
17-Mar	-8.6	-8.0	-7.5	-7.2	-7.0	-6.7	-7.3	-7.5	-6.2	-5.1	-5.1	-4.2	-5.1	-5.3	-4.2	-2.9	-2.9	-2.5	-3.1	-3.8	-4.4	-5.1	-5.9	-6.9	-5.5	-2.5
18-Mar	-7.9	-8.4	-9.1	-9.6	-10.2	-10.4	-10.4	-10.1	-9.2	-6.8	-5.7	-4.1	-2.5	-0.8	3.1	3.3	3.0	3.1	2.9	2.6	2.5	1.6	0.1	-0.4	-3.5	3.3
19-Mar	-0.3	-2.8	-4.9	-6.9	-8.0	-9.3	-10.3	-11.3	-11.3	-10.8	-9.6	-8.3	-6.7	-5.6	-5.2	-5.1	-5.3	-6.1	-8.1	-9.6	-11.0	-11.7	-12.8	-14.2	-8.1	-0.3
20-Mar	-15.7	-17.1	-17.5	-18.1	-18.4	-18.6	-19.2	-19.6	-19.0	-17.8	-16.8	-15.7	-14.3	-12.6	-11.0	-10.6	-10.1	-9.4	-9.1	-9.5	-10.5	-11.4	-12.0	-12.3	-14.4	-9.1
21-Mar	-12.4	-12.8	-13.5	-14.2	-14.7	-15.0	-14.7	-14.4	-13.2	-10.9	-7.6	-4.8	-2.6	-1.4	-0.9	0.2	0.4	0.6	0.3	-0.4	-0.6	-0.8	-1.1	-1.4	-6.5	0.6
22-Mar	-1.7	-1.9	-2.1	-2.4	-2.9	-3.1	-3.8	-4.3	-4.2	-3.7	-3.4	-3.2	-2.9	-2.6	-2.8	-3.5	-3.6	-3.5	-3.5	-3.4	-3.2	-2.9	-3.2	-4.3	-3.2	-1.7
23-Mar	-5.0	-5.5	-5.8	-5.9	-5.7	-5.6	-5.7	-5.9	-6.1	-5.8	-4.8	-3.7	-3.1	-2.5	-1.7	-1.0	-0.6	-0.8	-1.0	-1.8	-2.4	-2.7	-3.0	-3.0	-3.7	-0.6
24-Mar	-3.1	-3.0	-3.0	-2.9	-2.7	-2.5	-2.6	-2.3	-1.9	-0.7	1.1	2.4	3.8	4.6	5.2	5.4	5.1	4.6	4.4	3.6	2.7	1.9	1.4	1.1	0.9	5.4
25-Mar	0.7	0.0	-0.1	0.1	-0.1	-0.3	-0.5	-0.9	-1.0	-0.9	-0.7	-0.2	0.2	0.6	0.8	0.8	1.0	1.2	1.1	1.1	0.8	0.6	0.3	0.0	0.2	1.2
26-Mar	-0.2	-0.5	-0.7	-1.0	-1.0	-0.8	-0.8	-1.1	-0.7	0.3	1.7	2.7	1.7	0.6	0.7	1.3	2.3	2.6	2.3	2.5	2.5	2.3	2.0	1.6	0.8	2.7
27-Mar	1.7	1.3	0.6	0.3	-0.4	-0.7	-1.0	-0.8	-0.4	0.4	1.4	3.1	5.0	6.8	6.8	7.5	8.5	8.1	7.3	6.3	5.4	5.1	5.2	5.2	3.4	8.5
28-Mar	5.1	4.5	4.1	3.6	2.8	2.4	2.0	1.9	1.6	1.8	2.2	2.6	3.4	4.8	6.4	7.5	8.3	8.6	8.0	7.3	5.5	4.2	3.3	3.3	4.4	8.6
29-Mar	4.1	3.7	2.5	2.6	2.7	2.3	1.3	1.4	1.5	2.7	4.4	5.9	7.3	8.2	8.8	8.9	9.1	8.6	7.9	6.4	4.7	3.6	2.9	2.2	4.8	9.1
30-Mar	1.7	1.5	1.1	0.8	0.6	0.7	0.6	0.5	0.7	1.1	1.6	2.0	2.2	2.4	2.6	2.9	3.1	3.2	3.1	3.0	3.0	3.0	2.9	2.8	2.0	3.2
31-Mar	2.5	2.5	2.2	1.5	1.1	1.5	0.4	0.0	0.5	2.3	4.3	6.6	8.8	10.4	11.6	12.1	12.4	12.1	11.6	11.2	10.8	10.4	9.9	8.9	6.5	12.4
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	124	16.67	16.67
-20 - 0	412	55.38	72.04
0 - 10	199	26.75	98.79
10 - 20	9	1.21	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

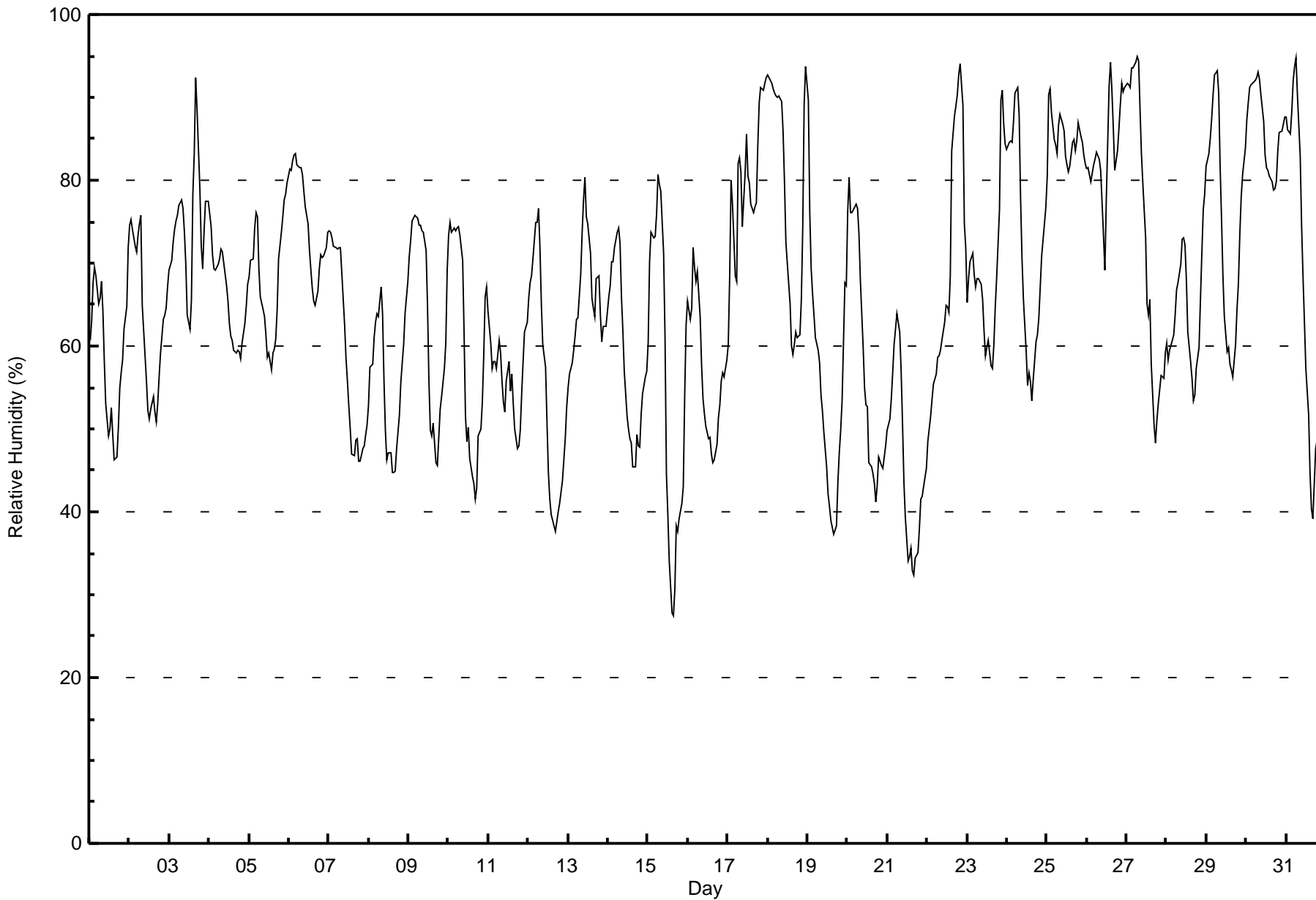
Mannix - March 2017

Maximum Value: 95 % on Mar 27 07:00																			Maximum Daily Average: 86.3 % on Mar 30						Hours in Service: 744																			
Minimum Value: 27 % on Mar 15 16:00																			Minimum Daily Average: 45.8 % on Mar 21						Hours of Data: 744																			
Maximum Diurnal Average: 75.7 % at hour 7																			Minimum Diurnal Average: 55.9 % at hour 17						Hours of Missing Data: 0																			
Monthly Average: 66.1 %																			Percentiles: P ₁ = 34 P ₁₀ = 47 Q ₁ = 56 Median = 66 Q ₃ = 77 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-Mar	61	63	68	69	68	65	66	68	64	58	53	49	50	53	49	46	47	50	55	57	58	62	65	72	59.0	72																		
2-Mar	75	75	74	72	71	73	75	76	65	59	56	52	51	52	54	52	51	53	56	59	63	64	65	67	62.9	76																		
3-Mar	69	70	73	74	75	76	77	78	77	74	70	64	62	66	78	83	92	88	79	72	69	74	78	77	74.8	92																		
4-Mar	76	74	71	69	69	70	71	72	71	70	67	65	63	61	61	60	59	59	59	58	60	63	65	67	65.9	76																		
5-Mar	68	70	70	74	76	76	69	66	64	64	61	59	59	57	59	60	61	64	70	74	76	78	80	68.1	80																			
6-Mar	81	81	82	83	83	82	81	82	81	79	77	75	72	69	67	65	65	67	69	71	71	71	72	74	75.0	83																		
7-Mar	74	74	73	72	72	72	72	72	69	63	59	56	53	50	47	47	49	49	46	46	48	48	49	50	58.6	74																		
8-Mar	53	57	58	61	63	64	64	67	64	56	50	46	47	47	45	45	45	48	52	56	58	60	64	68	55.7	68																		
9-Mar	71	73	75	75	76	75	75	75	74	74	71	65	56	50	49	51	46	46	49	52	54	57	60	69	63.2	76																		
10-Mar	73	75	74	74	74	74	74	73	70	62	51	48	50	47	44	43	42	43	49	50	53	59	66	67	59.9	75																		
11-Mar	64	60	57	58	58	57	61	59	56	53	52	56	58	55	57	53	50	48	48	50	54	58	62	63	56.1	64																		
12-Mar	66	68	68	70	75	75	77	72	65	60	58	51	45	42	40	38	38	39	40	41	44	46	49	52	54.9	77																		
13-Mar	55	57	58	59	61	63	63	69	74	78	80	76	75	71	66	65	63	68	69	64	60	62	62	62	65.8	80																		
14-Mar	66	67	70	70	72	74	74	72	66	62	57	52	50	49	48	45	45	49	48	48	52	54	56	57	58.5	74																		
15-Mar	60	70	74	73	73	76	81	80	79	71	61	45	40	34	28	27	31	38	38	39	41	43	54	63	54.9	81																		
16-Mar	65	63	65	72	70	68	69	64	58	54	52	50	49	49	47	46	46	48	51	53	56	57	56	58	56.9	72																		
17-Mar	60	68	80	77	68	68	82	83	81	74	81	86	80	80	77	76	77	77	84	89	91	91	92	92	79.8	92																		
18-Mar	93	92	92	91	90	90	90	90	90	86	80	73	70	65	60	59	60	62	61	61	66	74	89	94	78.2	94																		
19-Mar	90	76	69	66	64	61	59	58	54	52	50	45	42	41	39	38	37	38	43	47	50	53	68	67	54.6	90																		
20-Mar	76	80	76	76	77	77	77	74	68	60	55	53	53	46	45	45	43	41	43	47	46	45	47	48	58.2	80																		
21-Mar	50	51	53	57	60	62	64	62	57	51	44	39	34	35	36	33	32	34	35	38	42	42	43	45	45.8	64																		
22-Mar	48	50	52	54	55	57	59	59	59	61	63	65	65	64	68	84	88	89	90	93	94	89	75	72	68.8	94																		
23-Mar	65	68	70	71	69	67	68	67	66	62	59	60	61	58	57	60	65	68	76	90	91	87	84	69.1	91																			
24-Mar	84	85	85	84	87	91	91	88	78	71	66	59	55	57	56	53	56	60	61	63	67	71	75	77	71.7	91																		
25-Mar	81	90	91	88	85	84	83	87	88	87	86	83	82	81	82	85	85	84	85	87	85	85	83	82	84.9	91																		
26-Mar	81	82	80	81	82	83	83	83	81	77	73	69	78	91	94	91	86	81	84	86	89	92	91	91	83.7	94																		
27-Mar	92	92	91	94	94	94	95	94	89	83	80	73	65	64	66	58	50	48	51	53	55	56	56	59	73.0	95																		
28-Mar	60	58	59	61	61	64	67	68	70	73	73	72	68	62	58	56	53	54	57	60	66	71	76	78	64.4	78																		
29-Mar	82	83	85	87	90	93	93	90	82	75	69	64	59	60	58	57	56	60	64	67	73	78	81	84	74.7	93																		
30-Mar	87	89	91	91	92	92	92	93	92	90	87	83	82	81	80	80	79	79	80	83	86	86	87	88	86.3	93																		
31-Mar	88	86	86	88	92	94	95	90	83	74	68	63	57	52	45	40	39	43	48	50	52	53	53	61	66.7	95																		
																			71.4	72.6	73.2	74.0	74.3	74.7	75.7	75.1	72.1	68.2	64.9	61.1	59.0	57.7	56.8	56.1	55.9	57.2	59.2	61.0	63.5	65.6	67.8	70.0	Diurnal Average	
																			93	92	92	94	94	94	95	94	92	90	87	86	82	91	94	91	92	89	90	93	94	92	92	94	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Mannix - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Mannix - March 2017

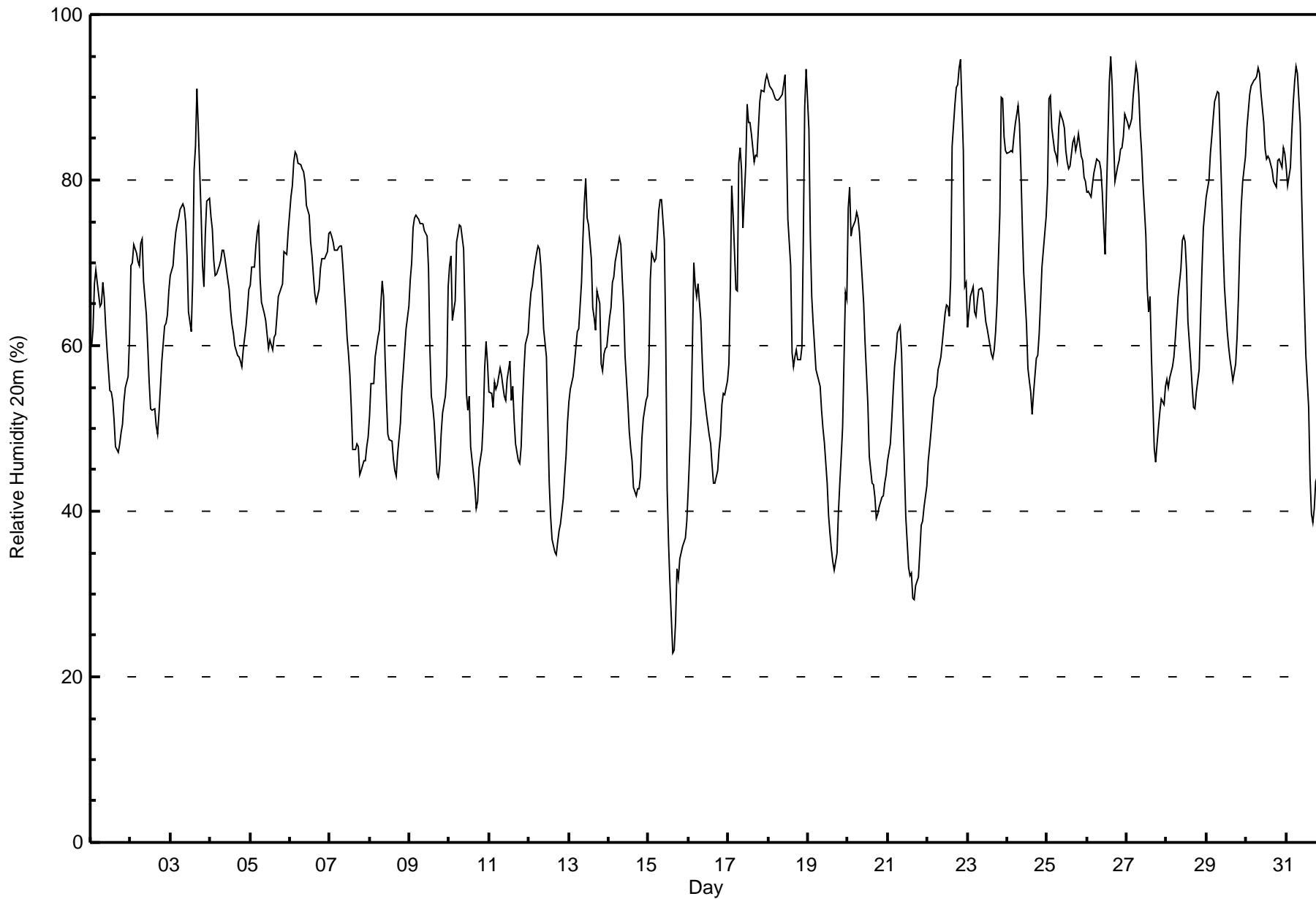
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	26	3.49	3.49
40 - 60	242	32.53	36.02
60 - 80	324	43.55	79.57
80 - 100	152	20.43	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 95 % on Mar 26 15:00																		Maximum Daily Average: 85.9 % on Mar 30																		Hours in Service: 744							
Minimum Value: 23 % on Mar 15 15:00																		Minimum Daily Average: 43.8 % on Mar 21																		Hours of Data: 744							
Maximum Diurnal Average: 74.5 % at hour 8																		Minimum Diurnal Average: 54.9 % at hour 17																		Hours of Missing Data: 0							
Monthly Average: 65.0 %																		Percentiles: P ₁ = 32 P ₁₀ = 45 Q ₁ = 54 Median = 65 Q ₃ = 76 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-Mar	60	62	67	69	68	65	65	68	66	62	59	55	54	53	51	48	47	48	49	50	53	55	56	61	58.0	69																	
2-Mar	70	70	72	71	70	70	72	73	68	64	60	56	52	52	52	50	49	52	55	58	62	63	64	67	62.2	73																	
3-Mar	68	70	72	74	75	75	76	77	77	75	71	64	62	68	81	84	91	86	76	70	67	74	77	78	74.5	91																	
4-Mar	76	74	70	69	69	70	70	72	71	71	68	67	64	63	62	60	59	59	58	57	60	62	64	67	65.8	76																	
5-Mar	67	70	69	72	74	75	68	65	64	63	61	60	61	59	61	61	64	66	66	67	71	71	71	74	66.7	75																	
6-Mar	78	79	82	83	83	82	82	81	81	80	77	76	73	71	69	66	65	67	69	71	71	70	71	74	75.0	83																	
7-Mar	74	73	73	72	72	72	72	72	70	64	61	59	56	52	48	47	48	48	44	45	46	46	48	49	58.8	74																	
8-Mar	52	55	55	59	60	61	62	68	66	59	54	49	49	48	46	45	44	47	51	55	57	59	62	65	55.3	68																	
9-Mar	68	70	74	75	76	75	75	75	75	74	73	69	60	54	53	51	45	44	46	49	52	54	56	67	62.9	76																	
10-Mar	70	71	63	65	73	74	75	74	72	64	54	52	54	48	45	43	40	41	45	47	51	57	61	58	58.2	75																	
11-Mar	54	54	52	56	55	55	57	56	55	54	53	56	58	53	55	51	48	46	46	48	53	57	60	61	54.0	61																	
12-Mar	64	66	67	69	71	72	72	70	66	62	59	51	43	39	37	35	35	36	38	39	42	44	47	51	53.1	72																	
13-Mar	53	55	56	58	60	62	62	68	73	77	80	75	75	71	65	63	62	67	65	58	57	59	60	60	64.1	80																	
14-Mar	63	65	68	68	70	72	73	72	68	65	59	53	50	48	46	43	42	43	43	44	49	51	53	54	56.7	73																	
15-Mar	58	68	71	70	71	73	76	78	78	73	61	43	36	31	23	23	27	33	32	34	36	36	37	39	50.2	78																	
16-Mar	43	51	60	70	67	66	67	63	58	55	53	52	49	48	46	43	43	45	48	49	53	54	54	56	53.9	70																	
17-Mar	58	67	79	76	67	67	82	84	81	74	82	89	87	87	86	82	83	83	86	90	91	91	92	93	81.5	93																	
18-Mar	92	91	91	90	90	90	90	90	90	92	93	84	75	70	59	57	59	59	58	58	60	73	89	93	78.9	93																	
19-Mar	86	73	66	63	60	57	56	55	52	50	48	43	39	37	35	34	33	35	40	43	47	50	66	66	51.5	86																	
20-Mar	77	79	73	74	75	76	76	74	71	65	60	57	53	47	43	43	42	39	40	41	42	42	43	44	57.3	79																	
21-Mar	46	48	51	54	58	59	62	62	59	52	45	39	33	32	33	30	29	31	32	35	38	39	41	43	43.8	62																	
22-Mar	46	48	50	52	54	55	57	58	59	60	64	65	65	64	68	84	89	91	92	93	95	83	67	68	67.7	95																	
23-Mar	62	64	66	67	64	63	65	67	67	66	65	63	62	61	59	58	60	62	65	76	90	90	85	84	68.0	90																	
24-Mar	83	83	84	83	85	87	89	87	81	75	69	63	57	56	54	52	54	58	59	61	65	69	74	76	71.0	89																	
25-Mar	79	90	90	86	83	83	82	86	88	87	86	84	82	81	82	85	85	84	84	86	83	82	80	80	84.2	90																	
26-Mar	78	79	78	80	81	82	83	82	81	78	74	71	79	92	95	92	85	80	82	82	84	84	85	88	82.2	95																	
27-Mar	87	86	87	87	90	94	93	90	86	83	80	73	67	64	66	59	48	46	48	50	52	54	53	55	70.7	94																	
28-Mar	56	55	56	57	59	61	63	66	69	73	73	73	69	63	58	55	53	52	54	57	63	69	74	76	62.7	76																	
29-Mar	78	80	83	85	87	89	91	90	85	79	72	67	62	60	58	57	56	58	61	66	72	77	80	83	74.0	91																	
30-Mar	86	88	90	91	92	92	93	93	93	91	87	84	83	83	83	81	80	79	79	82	83	81	84	83	85.9	93																	
31-Mar	82	79	82	86	89	92	94	93	87	78	71	65	59	53	44	40	39	40	44	45	47	46	48	57	64.9	94																	
																		68.2	69.8	70.9	72.0	72.4	73.1	74.2	74.5	72.8	69.8	66.9	63.1	60.2	58.3	56.8	55.6	54.9	55.7	56.6	58.3	61.0	62.7	64.6	66.7	Diurnal Average	
																		92	91	91	91	92	94	94	93	93	92	93	89	87	92	95	92	91	91	92	93	95	91	92	93	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	41	5.51	5.51
40 - 60	254	34.14	39.65
60 - 80	300	40.32	79.97
80 - 100	149	20.03	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



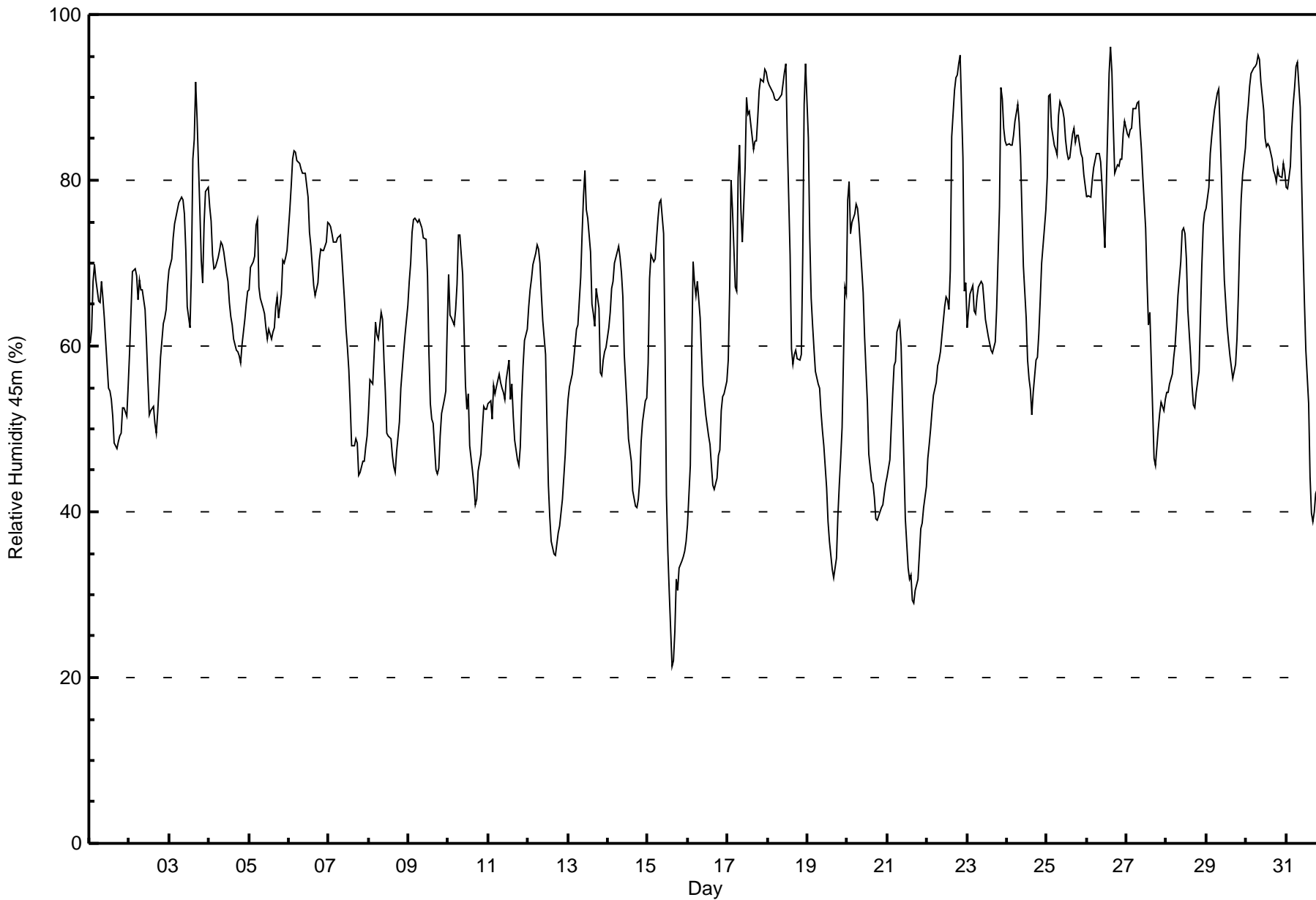
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 45m (RH45m) - %

Mannix - March 2017

Maximum Value: 96 % on Mar 26 15:00														Maximum Daily Average: 86.6 % on Mar 30														Hours in Service: 744	
Minimum Value: 21 % on Mar 15 15:00														Minimum Daily Average: 43.6 % on Mar 21														Hours of Data: 744	
Maximum Diurnal Average: 74.5 % at hour 8														Minimum Diurnal Average: 55.3 % at hour 17														Hours of Missing Data: 0	
Monthly Average: 65.0 %														Percentiles: P ₁ = 30 P ₁₀ = 44 Q ₁ = 54 Median = 65 Q ₃ = 77 P ₉₀ = 86 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-Mar	60	62	68	70	68	65	65	68	66	63	60	55	55	53	51	48	48	48	49	49	53	53	52	55	57.7	70			
2-Mar	59	64	69	69	68	66	68	67	67	64	61	56	52	52	53	51	50	52	55	59	63	63	64	67	60.8	69			
3-Mar	69	71	73	75	76	76	77	78	78	76	71	65	62	69	83	85	92	87	76	70	68	75	79	79	75.4	92			
4-Mar	77	75	71	69	70	71	71	73	72	71	69	68	65	64	63	61	60	59	59	58	60	63	65	67	66.6	77			
5-Mar	67	70	70	71	75	75	67	66	65	64	62	61	62	61	62	62	65	66	63	66	70	70	71	71	66.7	75			
6-Mar	76	79	82	84	83	82	82	81	81	81	81	78	74	72	70	67	66	68	70	72	72	72	73	75	75.9	84			
7-Mar	75	74	74	73	73	73	73	73	71	65	62	60	57	53	48	48	49	48	44	45	46	46	48	49	59.5	75			
8-Mar	52	56	55	59	63	61	61	64	63	58	54	50	49	49	47	45	45	47	51	55	57	59	61	65	55.3	65			
9-Mar	68	70	74	75	75	75	75	75	74	73	73	68	59	53	51	51	45	45	45	49	52	54	55	62	62.3	75			
10-Mar	69	64	63	63	64	67	73	73	69	62	55	52	54	48	45	43	41	42	45	47	50	53	52	52	56.1	73			
11-Mar	53	53	51	55	54	55	57	56	55	54	54	56	58	54	55	51	49	46	46	48	54	58	61	62	54.0	62			
12-Mar	65	67	68	70	71	72	72	70	66	63	59	51	43	39	36	35	35	36	37	38	42	44	47	51	53.2	72			
13-Mar	53	55	57	58	60	62	63	68	74	78	81	76	75	71	65	64	62	67	65	57	56	58	59	60	64.4	81			
14-Mar	62	64	67	68	70	71	72	71	69	66	59	53	49	47	46	43	41	41	42	44	48	51	53	54	56.2	72			
15-Mar	58	68	71	70	70	73	75	77	78	74	60	42	35	30	21	22	26	32	30	33	34	35	35	36	49.5	78			
16-Mar	38	46	59	70	68	66	68	63	59	55	54	52	49	48	46	43	43	44	47	47	52	54	54	56	53.4	70			
17-Mar	58	67	80	76	67	67	80	84	76	73	81	90	88	88	87	84	85	85	88	91	92	92	93	93	81.9	93			
18-Mar	92	91	91	90	90	90	90	90	90	92	93	94	85	71	60	58	59	59	58	58	59	71	89	94	79.8	94			
19-Mar	85	73	66	63	60	57	55	55	52	50	48	43	39	36	35	33	32	34	39	43	46	50	67	66	51.2	85			
20-Mar	78	80	74	75	76	77	77	75	72	66	61	57	53	47	44	43	42	39	39	39	41	41	42	43	57.5	80			
21-Mar	44	46	50	54	58	58	62	63	60	53	46	39	33	32	32	29	29	31	32	35	38	39	41	43	43.6	63			
22-Mar	46	48	50	52	54	56	58	58	59	61	65	66	66	64	69	85	91	92	93	94	95	83	67	68	68.3	95			
23-Mar	62	64	66	67	64	64	66	67	68	67	66	63	62	61	60	59	60	61	65	77	91	90	86	85	68.4	91			
24-Mar	84	84	84	84	85	87	89	87	83	76	70	63	58	56	55	52	54	58	59	61	66	70	74	76	71.6	89			
25-Mar	80	90	90	86	84	84	83	88	89	88	88	85	83	83	83	86	86	85	85	85	83	83	81	79	84.9	90			
26-Mar	78	78	78	80	81	82	83	83	82	79	76	72	79	93	96	93	86	81	82	82	83	83	86	87	82.6	96			
27-Mar	86	85	86	86	89	89	89	89	86	84	80	74	68	63	64	58	46	46	48	50	52	53	52	54	69.9	89			
28-Mar	54	54	55	57	59	60	63	66	70	74	74	74	70	64	59	55	53	53	54	57	64	70	75	76	62.9	76			
29-Mar	77	79	83	85	87	88	90	91	86	80	73	68	62	60	59	58	56	58	61	66	73	78	81	84	74.3	91			
30-Mar	87	89	91	93	94	94	94	95	95	92	88	85	84	84	84	83	81	81	80	81	80	80	82	81	86.6	95			
31-Mar	79	79	82	86	89	91	94	94	89	80	72	65	60	53	44	40	39	40	42	43	45	44	47	56	64.8	94			
														67.5 69.3 71.0 72.1 72.4 72.8 74.0 74.5 73.0 70.5 67.6 63.9 61.0 58.7 57.1 56.0 55.3 55.8 56.4 58.1 60.8 62.3 64.2 66.1														Diurnal Average	
														92 91 91 93 94 94 94 95 95 92 93 94 88 93 96 93 92 92 93 94 95 92 93 94														Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

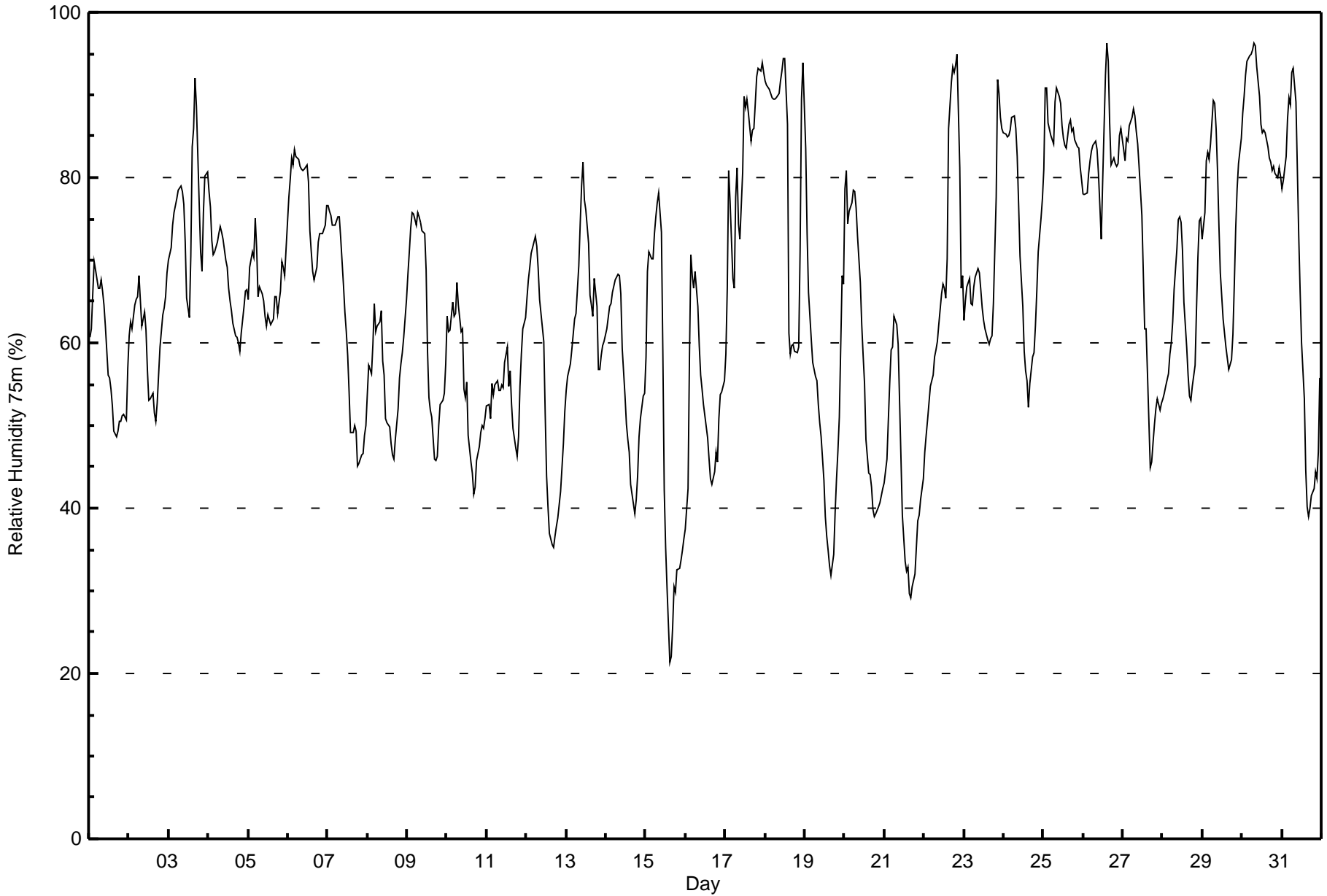
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	44	5.91	5.91
40 - 60	246	33.06	38.98
60 - 80	295	39.65	78.63
80 - 100	159	21.37	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 96 % on Mar 26 15:00																			Maximum Daily Average: 87.5 % on Mar 30						Hours in Service: 744																								
Minimum Value: 21 % on Mar 15 15:00																			Minimum Daily Average: 43.9 % on Mar 21						Hours of Data: 744																								
Maximum Diurnal Average: 74.1 % at hour 8																			Minimum Diurnal Average: 55.9 % at hour 17						Hours of Missing Data: 0																								
Monthly Average: 65.3 %																			Percentiles: P ₁ = 30 P ₁₀ = 44 Q ₁ = 54 Median = 65 Q ₃ = 78 P ₉₀ = 86 P ₉₉ = 95						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-Mar	61	62	66	70	69	67	67	68	66	65	62	56	56	54	52	49	49	49	51	51	51	51	51	57	58.3	70																							
2-Mar	61	63	62	65	65	66	68	65	62	64	62	57	53	53	54	52	50	53	56	59	63	64	66	68	60.4	68																							
3-Mar	70	72	74	76	77	77	78	79	78	77	72	65	63	70	84	86	92	89	77	71	69	76	80	81	76.4	92																							
4-Mar	78	76	72	71	71	72	73	74	73	73	70	69	67	65	64	62	61	61	60	59	61	64	66	67	67.9	78																							
5-Mar	65	69	71	70	75	72	66	67	66	65	63	62	63	62	63	63	66	66	64	66	70	69	68	71	66.7	75																							
6-Mar	78	80	82	82	83	83	82	81	81	81	81	82	79	74	71	69	68	69	72	73	73	73	74	77	77.0	83																							
7-Mar	77	76	75	74	74	75	75	75	73	67	64	61	59	54	49	49	50	49	45	45	46	47	49	50	60.8	77																							
8-Mar	54	57	56	60	65	61	62	62	64	58	56	51	50	50	48	46	46	48	52	56	58	59	61	65	56.0	65																							
9-Mar	68	71	74	76	76	74	76	75	75	74	73	69	59	53	52	51	46	46	46	50	53	53	54	57	62.5	76																							
10-Mar	63	61	62	65	63	64	67	65	61	62	54	53	55	49	46	44	42	42	46	47	49	50	50	51	54.7	67																							
11-Mar	52	53	51	55	54	55	56	54	54	55	55	58	60	55	57	53	50	47	46	49	55	59	62	63	54.3	63																							
12-Mar	66	68	69	71	72	73	72	69	65	63	60	52	44	40	37	36	35	37	38	39	42	45	48	52	53.8	73																							
13-Mar	54	56	58	59	61	63	64	69	74	79	82	77	76	72	66	65	63	68	64	57	57	58	60	60	65.1	82																							
14-Mar	62	63	64	65	66	68	68	68	68	66	59	54	50	48	47	43	40	39	41	44	49	51	54	54	55.4	68																							
15-Mar	58	69	71	70	70	73	75	77	78	73	59	42	35	30	21	22	26	30	30	33	33	34	35	36	49.2	78																							
16-Mar	37	42	58	71	68	67	69	64	60	56	54	53	50	49	46	44	43	44	47	46	51	54	54	55	53.4	71																							
17-Mar	59	67	81	77	68	67	78	81	74	73	81	90	88	89	88	84	86	86	89	92	93	93	94	93	82.1	94																							
18-Mar	92	91	91	90	90	90	90	90	90	92	93	94	94	86	61	59	60	60	59	59	60	71	89	94	81.0	94																							
19-Mar	84	73	66	63	60	58	56	56	53	50	49	43	39	37	35	33	32	34	39	44	47	51	68	67	51.5	84																							
20-Mar	79	81	74	76	77	79	78	76	73	67	62	59	55	48	44	44	42	40	39	39	40	41	42	42	58.2	81																							
21-Mar	43	46	51	55	59	60	63	62	60	53	46	39	33	32	33	30	29	31	32	35	38	39	41	44	43.9	63																							
22-Mar	47	49	51	53	55	56	58	59	60	62	66	67	67	65	70	86	92	93	93	94	95	81	67	68	68.9	95																							
23-Mar	63	65	67	68	65	65	67	68	69	68	67	64	63	62	60	60	61	65	78	92	90	87	86	69.1	92																								
24-Mar	86	85	85	85	86	87	87	86	82	77	70	64	59	57	55	52	55	58	59	62	66	71	75	77	72.0	87																							
25-Mar	81	91	91	87	85	85	84	89	91	90	89	86	85	84	84	87	87	86	86	85	84	84	81	80	85.7	91																							
26-Mar	78	78	78	80	82	83	84	84	83	81	77	73	79	92	96	94	87	81	82	82	81	82	85	86	82.9	96																							
27-Mar	83	82	85	84	86	87	88	87	86	84	81	75	69	62	62	56	45	46	48	50	52	53	52	53	69.1	88																							
28-Mar	53	54	55	56	59	60	63	66	71	75	75	75	71	65	59	56	54	53	55	57	64	70	75	75	63.2	75																							
29-Mar	73	76	82	83	82	84	89	89	86	81	74	69	63	61	59	58	57	58	61	67	74	79	82	85	73.8	89																							
30-Mar	88	90	92	94	95	95	95	96	96	93	90	86	85	86	85	84	82	82	81	81	80	80	81	80	87.5	96																							
31-Mar	79	80	82	87	90	89	93	93	89	81	73	66	60	53	45	40	39	40	42	42	44	44	47	56	64.7	93																							
																								67.4	69.2	70.9	72.2	72.5	72.6	73.9	74.1	73.0	71.1	68.4	64.9	62.3	60.0	57.8	56.6	55.9	56.3	56.9	58.4	61.0	62.4	64.4	66.1	Diurnal Average	
																								92	91	92	94	95	95	95	96	96	93	93	94	94	92	96	94	92	93	93	94	95	93	94	94	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

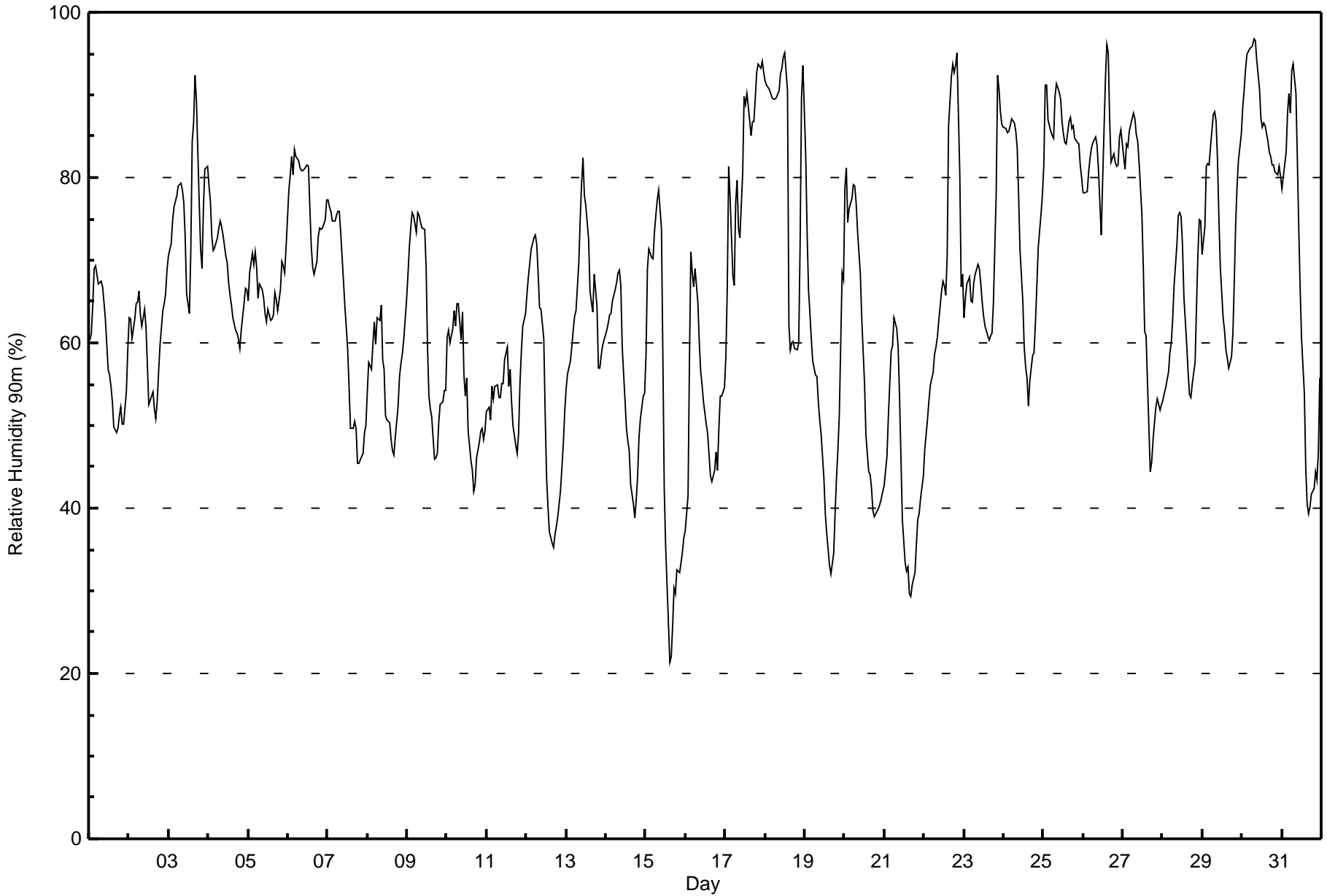
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	42	5.65	5.65
40 - 60	240	32.26	37.90
60 - 80	297	39.92	77.82
80 - 100	165	22.18	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 97 % on Mar 30 08:00																			Maximum Daily Average: 88.1 % on Mar 30						Hours in Service: 744																			
Minimum Value: 21 % on Mar 15 15:00																			Minimum Daily Average: 44.0 % on Mar 21						Hours of Data: 744																			
Maximum Diurnal Average: 74.1 % at hour 8																			Minimum Diurnal Average: 56.2 % at hour 17						Hours of Missing Data: 0																			
Monthly Average: 65.5 %																			Percentiles: P ₁ = 31 P ₁₀ = 45 Q ₁ = 54 Median = 65 Q ₃ = 78 P ₉₀ = 87 P ₉₉ = 95						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-Mar	60	61	65	69	69	67	67	67	67	65	63	57	56	55	53	50	49	50	51	52	50	50	54	59	58.6	69																		
2-Mar	63	63	61	63	65	65	66	63	62	64	62	57	52	53	54	52	51	53	56	60	64	65	66	69	60.4	69																		
3-Mar	71	72	75	76	77	78	79	79	78	77	73	66	63	71	84	87	92	89	77	71	69	76	81	81	76.8	92																		
4-Mar	79	77	73	71	72	73	74	75	74	73	70	70	67	66	65	63	62	61	60	59	62	65	67	66	68.4	79																		
5-Mar	65	69	71	69	71	69	66	67	66	65	64	63	64	63	63	63	66	65	64	66	70	69	68	72	66.6	72																		
6-Mar	78	80	82	80	83	83	82	81	81	81	81	82	81	76	72	69	68	70	73	74	74	74	75	77	77.4	83																		
7-Mar	77	76	76	75	75	75	76	76	73	67	64	62	59	55	50	50	50	50	45	45	46	47	49	50	61.2	77																		
8-Mar	54	58	57	60	62	60	63	63	65	58	57	51	51	50	48	47	46	49	52	56	58	59	60	65	56.2	65																		
9-Mar	68	71	74	76	75	73	76	75	75	74	74	69	60	54	52	51	46	46	47	50	53	53	54	54	62.5	76																		
10-Mar	61	62	60	62	64	62	65	65	60	64	56	54	56	49	46	45	42	43	46	48	49	50	48	49	54.3	65																		
11-Mar	52	52	51	55	53	55	55	53	53	55	55	58	59	55	57	53	50	48	47	49	55	59	62	64	54.3	64																		
12-Mar	66	68	70	71	73	73	72	68	64	64	61	51	44	40	37	36	35	37	38	39	42	45	48	52	53.9	73																		
13-Mar	55	56	58	60	61	63	64	70	75	79	82	78	77	73	66	65	64	68	64	57	57	59	60	60	65.4	82																		
14-Mar	62	62	63	64	65	67	67	68	69	67	60	53	50	48	47	43	40	39	41	44	49	51	54	54	55.2	69																		
15-Mar	59	69	71	70	70	73	75	77	78	74	59	42	35	31	21	22	26	30	30	32	32	33	35	36	49.3	78																		
16-Mar	37	42	58	71	69	67	69	65	60	57	55	53	50	49	46	44	43	45	47	45	50	53	54	55	53.4	71																		
17-Mar	58	67	81	78	68	67	77	80	74	73	81	90	89	90	89	85	87	87	90	93	94	93	94	93	82.3	94																		
18-Mar	92	91	91	90	90	90	90	90	91	92	93	95	95	91	62	59	60	60	59	59	60	72	90	94	81.4	95																		
19-Mar	83	73	67	63	61	58	56	56	53	51	49	44	39	37	35	33	32	35	39	44	47	51	68	68	51.7	83																		
20-Mar	79	81	75	76	77	79	79	77	74	68	63	59	55	49	44	44	42	40	39	39	40	40	41	42	58.5	81																		
21-Mar	43	46	51	55	59	60	63	62	60	53	46	39	33	32	33	30	29	31	32	36	39	39	41	44	44.0	63																		
22-Mar	47	49	51	53	55	56	59	60	61	63	66	67	67	66	71	86	92	94	93	94	95	80	67	68	69.1	95																		
23-Mar	63	65	67	68	65	65	67	68	69	69	67	65	63	62	61	60	61	61	65	78	92	91	88	86	69.5	92																		
24-Mar	86	86	86	86	86	87	87	86	84	78	71	65	60	57	56	52	55	58	59	62	67	71	76	78	72.4	87																		
25-Mar	82	91	91	87	86	85	85	90	91	90	90	87	85	84	84	87	87	86	86	85	84	84	81	80	86.2	91																		
26-Mar	78	78	78	81	82	84	84	85	84	81	77	73	80	92	96	95	87	82	83	82	81	82	85	86	83.2	96																		
27-Mar	82	81	84	84	86	87	88	87	85	84	82	76	69	61	61	55	44	46	48	50	52	53	52	53	68.8	88																		
28-Mar	53	54	55	56	59	60	63	67	72	75	76	75	72	66	60	56	54	53	55	58	64	71	75	75	63.5	76																		
29-Mar	71	74	81	82	82	84	88	88	87	82	75	69	63	62	59	58	57	58	61	68	74	79	82	85	73.7	88																		
30-Mar	88	90	93	95	96	96	96	97	97	94	91	87	86	87	86	84	83	83	82	82	81	80	81	80	88.1	97																		
31-Mar	79	80	83	88	90	88	93	94	90	82	74	67	61	54	45	40	39	40	42	42	44	43	47	56	65.0	94																		
																			67.4	69.2	70.9	72.0	72.4	72.5	73.8	74.1	73.3	71.6	68.9	65.2	62.6	60.5	58.1	56.9	56.2	56.6	57.1	58.7	61.1	62.5	64.6	66.2	Diurnal Average	
																			92	91	93	95	96	96	96	97	97	94	93	95	95	92	96	95	92	94	93	94	95	93	94	94	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	42	5.65	5.65
40 - 60	235	31.59	37.23
60 - 80	299	40.19	77.42
80 - 100	168	22.58	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 34 km/h on Mar 19 03:00	Maximum Daily Speed Average: 26.2 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 9 16:00	Minimum Daily Speed Average: 1.6 km/h on Mar 5	Hours of Data: 744
Maximum Diurnal Speed Average: 4.6 km/h at hour 22	Minimum Diurnal Speed Average: 0.4 km/h at hour 15	Hours of Missing Data: 0
Monthly Average Velocity: 2.6 km/h 93.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 5 Q ₁ = 7 Median = 11 Q ₃ = 15 P ₉₀ = 20 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-Mar	NNE8	N8	N8	N7	NNE8	NE9	NE8	NNE8	NE9	NNE5	N4	NW5	WNW9	W13	NW13	NW12	NW10	NW9	N7	N5	NNE7	NNE5	NNW2	W4	NNW5.9	W13
2-Mar	WNW1	SSE2	S4	S7	SSE7	S7	S7	S8	S8	SSE8	SSE9	SSE10	SE8	SE9	ESE11	ESE12	ESE13	ESE14	SE20	SE23	SE17	SE21	SE18	SE17	SE10.1	SE23
3-Mar	SE16	SE17	SE18	SE16	SE17	SE17	SE11	SE10	SE13	SE14	SSE12	SE9	SSE13	SW4	WNW2	WSW9	WNW15	NW19	NW16	NNW19	NNW20	N15	NNE18	NNE15	ESE2.6	NNW20
4-Mar	N16	NNE22	NNE21	NNE18	N19	NNE17	NNE21	NNE23	N22	N20	NNE20	NNE17	NNE17	NNE15	N13	N14	NNE14	NNE13	NNE14	NNE13	NE13	NE12	NE8	N10	NNE16.2	NNE23
5-Mar	N7	W4	WNW3	N6	N8	NNE9	ENE8	E8	ESE7	SE9	SSE9	SSE7	S3	SW5	W7	WNW6	NW6	NNW5	NNW5	NNE5	NNE6	NE2	NNW1	NNW4	NNE1.6	SSE9
6-Mar	N3	N9	N12	N14	N16	N19	N19	N19	NNE22	N21	N16	N13	NNE14	N15	NNE16	N17	N23	N21	N18	N15	N14	NNW18	NNW17	N13	N15.8	N23
7-Mar	NNW16	NNW18	NNW17	NNW17	NNW15	N15	NNW16	NNW16	NNW21	NNW21	NNW21	NNW20	NNW15	NNW15	NNW14	NNW14	NNE16	NNE16	NNE15	NNE11	NNE10	NNE14	N18	NNE17	N15.4	NNW21
8-Mar	N13	N10	N9	N10	N11	N7	W7	WNW6	W6	W5	NNW6	NW11	NNW14	NNW12	NW10	NNW8	NNE10	NE13	NNE11	NNE16	NNE19	NNE13	N8	N7	N8.4	NNE19
9-Mar	N9	N7	NNW6	NW4	NW3	WNW4	W5	WNW1	NE1	ENE2	NE4	NNW1	W6	W5	WNW5	ESE0	ENE6	E5	NNE7	NNE11	NNE12	NNE9	NNE10	N5	N3.7	NNE12
10-Mar	N5	NNE7	NE6	NNE5	N3	N2	N2	W1	NW1	W2	NE2	NNW3	WNW5	WNW6	WNW7	NW9	N9	N6	N10	N13	N13	NNE8	NNE3	NE3	N4.6	N13
11-Mar	ESE2	E5	ESE5	ESE6	SE8	SE8	SE8	SE9	SE8	SSE8	SE7	E5	SE8	ESE12	E12	E13	E11	ESE10	E8	E9	ESE9	ESE12	SE11	SE12	ESE7.9	E13
12-Mar	ESE10	ESE8	SE11	SE9	SSE11	SSE10	SSE9	SSE9	SE10	SE9	SE8	SE13	SE17	SE14	SE15	SE17	SE19	SE16	SE16	SE18	SE22	SE20	SE20	SE17	SE13.3	SE22
13-Mar	SE18	SE19	SE18	SE19	SE19	SSE19	SE20	SE22	SE22	SE24	SE24	SSE25	SSE23	SE19	SSE18	SSE18	SSE13	S15	SSE21	SSE20	SSE16	SE12	SE12	SSE19.6	SSE25	
14-Mar	SE10	SE11	SE11	SE13	SE13	SE13	SE15	SE14	SE13	SE13	SE12	SE9	ESE9	SE10	ESE9	SE8	ESE7	E9	ESE10	ESE10	ESE14	ESE16	SE22	SE20	SE11.8	SE22
15-Mar	SE17	SE15	SE16	SE14	SE15	SSE14	SSE13	SSE13	SE12	SSE6	WSW12	WSW19	WSW16	W26	WSW22	W15	NNW13	N13	N12	NNE9	NE6	ENE3	ENE3	ENE3	S4.3	W26
16-Mar	NNW6	N12	N17	N19	N18	N25	N26	NNE20	NNE19	N16	N18	N18	N19	N20	N21	N21	N21	N24	N20	N22	N17	N18	NNE14	N12	N18.3	N26
17-Mar	N8	NNE9	ESE11	SE11	ESE11	SE6	WNW7	WNW4	W4	S2	NW4	N4	NW10	NW13	NNW12	NNW9	NNW9	NNW9	N10	NNW9	N14	N14	N12	N10	N5.3	N14
18-Mar	N8	NNW7	NW7	NNW5	NNW7	NNW6	NNW7	NNW5	NW6	NW6	WNW6	WNW7	WNW8	NNW6	SE11	SE15	SE13	ESE9	E9	ESE5	N4	NE5	NNW5	WNW11	N2.2	SE15
19-Mar	WNW22	WNW33	WNW34	WNW34	W33	W29	WNW25	W26	W26	W26	W21	W24	W27	W27	W28	W30	W32	WNW27	NW29	NW29	NW30	WNW25	NW23	NNW15	WNW26.2	WNW34
20-Mar	N17	N17	NNW17	NNW15	NNW12	N10	NNE9	NNE8	NNE6	NNW3	NW7	N3	ENE6	NE2	E3	SE9	SE9	SE10	SE10	SE11	SSE14	SSE17	SE13	SE13	ENE3.3	N17
21-Mar	SE13	SE13	SE13	SE11	SSE11	SSE13	SSE12	SSE12	SE12	SSE11	SSE8	SSE11	SE13	SE15	SE19	SE20	SE21	SE18	SE21	SE23	SSE21	SE17	SE19	SE18	SE15.0	SE23
22-Mar	SE17	SE19	SE18	SE17	SE17	SE14	ESE12	SE12	SE12	SE13	SE13	SE11	SE10	SE7	SE5	SSW3	SW4	WSW4	WSW5	WNW5	NNW13	NNW17	NNW13	SE17	SE6.7	SE19
23-Mar	N14	NNW13	NNW10	NNW6	NNW8	N8	N9	NNE12	NNE10	NNE8	NNW6	WNW7	W10	W12	WNW8	NW8	W9	W9	NW7	NNE7	E8	SE10	SE13	SE12	NNW4.3	N14
24-Mar	SE13	SSE10	SSE10	SSE11	SSE10	SE8	SSE8	SSE11	SSE12	SE10	SE11	SSE12	SSE11	SE12	SE15	SE17	SE15	SE12	ESE11	ESE15	ESE16	ESE18	ESE15	SE14	SE11.9	ESE18
25-Mar	SE14	SE12	ESE11	ESE11	ESE10	SE11	SE14	SE15	SE13	SE11	SE11	SE11	SE7	SE6	SE6	ESE3	ESE4	ESE3	ENE5	ENE7	ESE6	ESE4	E5	E5	ESE8.2	SE15
26-Mar	ESE5	ESE4	ESE8	ESE6	ESE6	ESE7	SE9	SE11	SE12	SE9	SE7	W5	W13	W11	NNE4	SE1	SE7	SE7	E8	ENE7	NE6	E4	ESE6	ESE2	ESE3.8	W13
27-Mar	ESE6	SE7	SE4	SE8	S4	SSE6	SE6	SSE6	SE7	SE5	ESE6	ENE6	NNE6	WNW3	WNW6	NNE3	ESE6	SE12	ESE10	ESE13	SE14	SE15	SE14	SSE13	SE6.1	SE15
28-Mar	SE12	SE12	SE9	SE14	SE13	SE11	SE9	SE10	SE11	SE11	SSE10	SSE14	SSE11	SSE10	SE10	ESE9	SE11	ESE11	ESE8	ESE10	SE14	SE17	SE14	SE11	SE11.1	SE17
29-Mar	SE9	SE10	SE11	SE11	SSE10	SSE10	SSE10	SSE10	SE11	SE11	SSE12	SSE15	SE11	SE9	SE11	SE11	SE12	SE10	SE10	ESE12	ESE12	SE15	SE16	SE14	SE11.1	SE16
30-Mar	SE11	SE9	SE12	SE13	SE11	ESE8	SE9	SSE8	SE5	ENE3	ENE4	NE7	NE4	NW3	W4	WNW4	NNE2	NNW4	NNW4	WSW4	W6	WSW2	SSW6	SSE8	SE3.0	SE13
31-Mar	SSE7	SSE6	SSE8	S7	SSE8	SSE10	S7	SSE7	SSE10	SE9	SE10	SE11	SE13	SSE16	S17	SSW18	S18	SSW15	SSE14	S13	S17	SSW12	S14	S14	S11.2	S18

E3.7	ENE3.0	E3.2	E3.1	ESE2.7	ESE3.1	ESE2.4	ESE3.1	ESE3.5	ESE3.4	ESE2.4	SE1.7	S1.1	SW1.0	SSE0.4	ESE0.9	E2.0	ENE2.9	NE4.1	ENE4.4	ENE4.5	E4.6	E4.2	E4.0	Diurnal Average
WNW22	WNW33	WNW34	WNW34	W33	W29	N26	W26	W26	W26	SE24	SSE25	W27	W27	W28	W30	W32	WNW27	NW29	NW29	NW30	WNW25	NW23	SE20	Diurnal Maximum

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



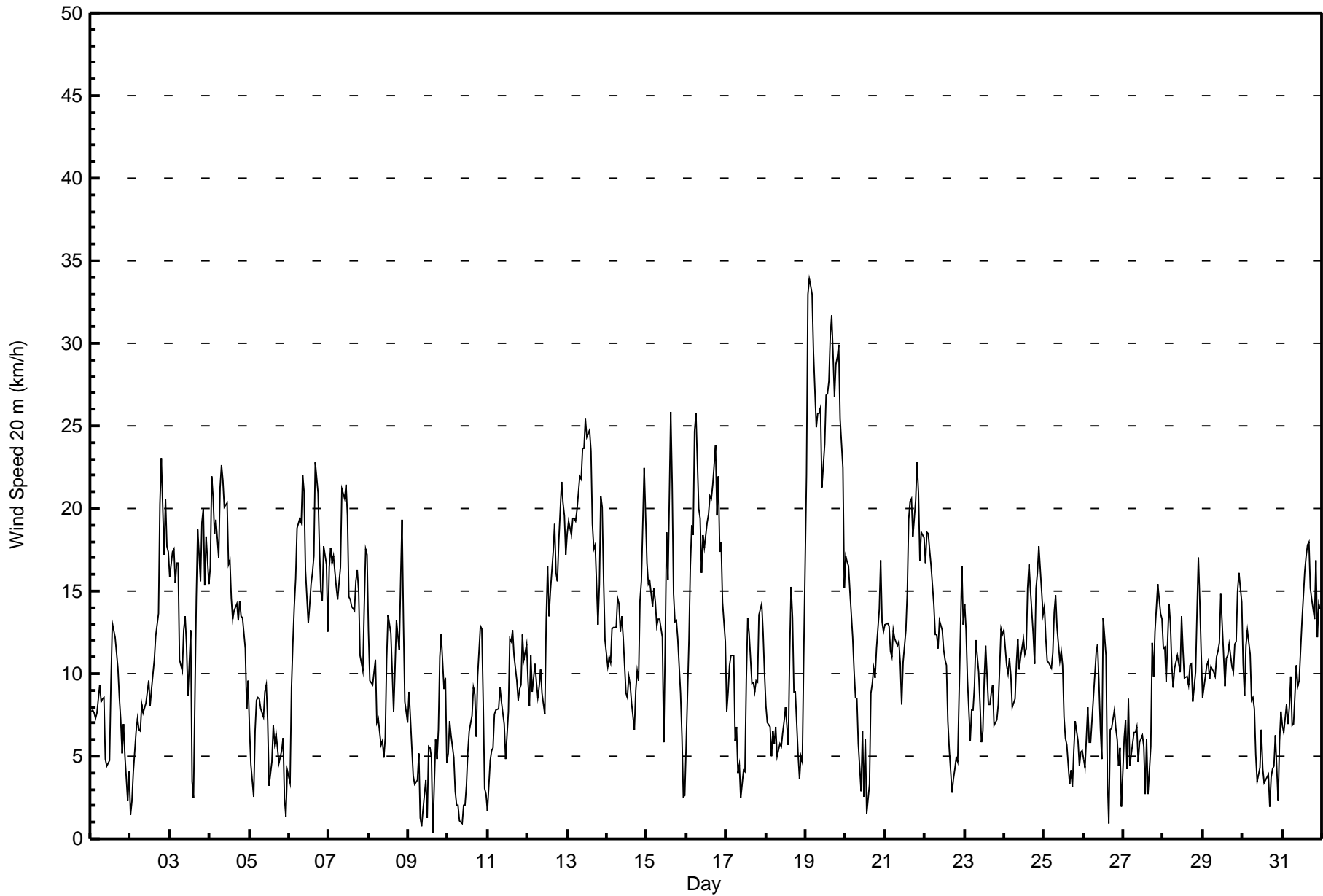
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed 20 m (WS20m) - km/h

Mannix - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Mar 19 01:00 Minimum Value: 1 km/h on Mar 5 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-Mar	2	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	2	2	1	2	2	1	1	2	3
2-Mar	1	1	2	2	2	1	2	2	2	1	2	2	3	3	3	4	4	4	5	6	6	5	5	5	6
3-Mar	5	4	5	3	4	4	3	4	4	4	3	3	3	2	6	4	5	4	5	5	5	4	4	6	
4-Mar	5	7	5	4	4	5	6	5	5	5	5	4	4	4	4	3	3	3	4	3	3	2	2	7	
5-Mar	2	2	1	2	1	2	2	2	3	3	3	3	2	2	2	2	1	1	2	3	2	1	1	3	
6-Mar	2	2	4	3	5	5	6	6	6	5	6	4	3	5	5	5	7	6	5	5	5	6	6	4	7
7-Mar	5	5	5	6	5	5	5	6	6	6	6	5	5	4	4	4	4	4	4	3	3	5	5	4	6
8-Mar	3	3	3	2	2	3	1	2	1	1	3	3	4	4	3	3	3	3	3	4	4	4	3	2	4
9-Mar	2	2	2	1	1	1	2	1	1	1	2	2	2	3	3	1	2	1	2	2	2	2	1	2	3
10-Mar	1	1	1	1	2	1	2	1	1	1	2	2	2	3	2	3	3	2	3	3	3	2	2	1	3
11-Mar	1	1	2	1	3	2	2	2	2	2	3	2	4	4	4	4	3	3	2	2	3	4	3	3	4
12-Mar	3	2	4	3	2	2	1	2	2	2	2	4	5	5	4	5	5	5	4	5	6	6	5	4	6
13-Mar	4	4	4	5	5	4	5	6	5	5	5	6	5	6	6	5	4	4	3	4	5	5	3	3	6
14-Mar	3	2	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	2	3	3	5	5	6	6	6
15-Mar	5	4	4	3	3	3	3	3	3	3	4	4	4	5	5	6	4	3	4	3	2	2	1	1	6
16-Mar	2	2	4	6	5	6	6	6	5	4	4	4	5	5	5	5	5	5	5	5	4	4	4	4	6
17-Mar	3	2	3	4	4	3	2	1	2	3	2	3	2	3	3	3	3	3	3	3	4	4	4	3	4
18-Mar	2	2	2	2	2	2	2	2	2	2	2	2	4	2	6	5	4	3	2	3	3	2	1	4	6
19-Mar	11	8	8	8	7	6	7	5	5	5	4	4	6	6	6	6	7	6	7	8	7	6	7	5	11
20-Mar	5	5	5	4	4	3	3	2	2	2	2	3	2	2	2	3	3	2	2	3	3	4	3	3	5
21-Mar	3	3	3	3	2	2	2	2	2	2	3	3	3	5	5	6	5	5	5	6	5	5	5	5	6
22-Mar	4	4	4	4	4	5	4	4	4	4	4	3	3	3	2	1	1	1	1	1	4	4	5	5	5
23-Mar	6	5	3	2	3	3	3	4	3	3	2	3	2	2	2	2	2	1	2	2	2	3	3	4	6
24-Mar	3	2	2	2	2	2	2	2	3	3	4	4	3	3	4	5	4	5	3	5	5	5	4	4	5
25-Mar	5	4	3	3	3	4	4	4	3	3	3	3	2	2	1	1	1	2	1	1	2	1	2	2	5
26-Mar	2	2	3	2	2	3	3	4	4	3	3	2	5	3	2	1	2	2	2	1	1	1	2	2	5
27-Mar	2	2	2	2	1	2	2	2	2	2	3	2	2	3	2	1	3	4	3	4	4	4	3	3	4
28-Mar	2	3	2	4	3	2	2	3	3	3	3	4	4	4	3	3	3	3	3	3	4	4	3	3	4
29-Mar	2	2	2	2	1	1	1	2	3	3	3	4	3	3	3	3	3	3	3	3	4	5	4	3	5
30-Mar	3	3	3	3	3	3	2	2	2	1	2	2	2	1	1	2	1	2	2	1	1	2	1	1	3
31-Mar	2	2	1	1	1	1	2	4	3	3	3	3	3	4	5	6	6	5	3	3	3	3	4	4	6
Diurnal Maximum																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	109	14.65	14.65
6 - 11	298	40.05	54.70
12 - 19	262	35.22	89.92
20 - 28	65	8.74	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 20 m (WS20m) - km/h
Mannix - March 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	9	7	6	7	11	5	2	3	1	3	4	10	11	6	14	109
6 - 11	28	25	8	7	7	35	86	41	7	1	0	1	9	13	12	18	298
12 - 19	41	27	3	0	1	16	100	25	7	3	0	3	4	1	5	26	262
20 - 28	14	7	0	0	0	0	18	6	0	0	0	1	9	4	1	5	65
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	4	3	3	0	10
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	93	68	18	13	15	62	209	74	17	5	3	9	36	32	27	63	744

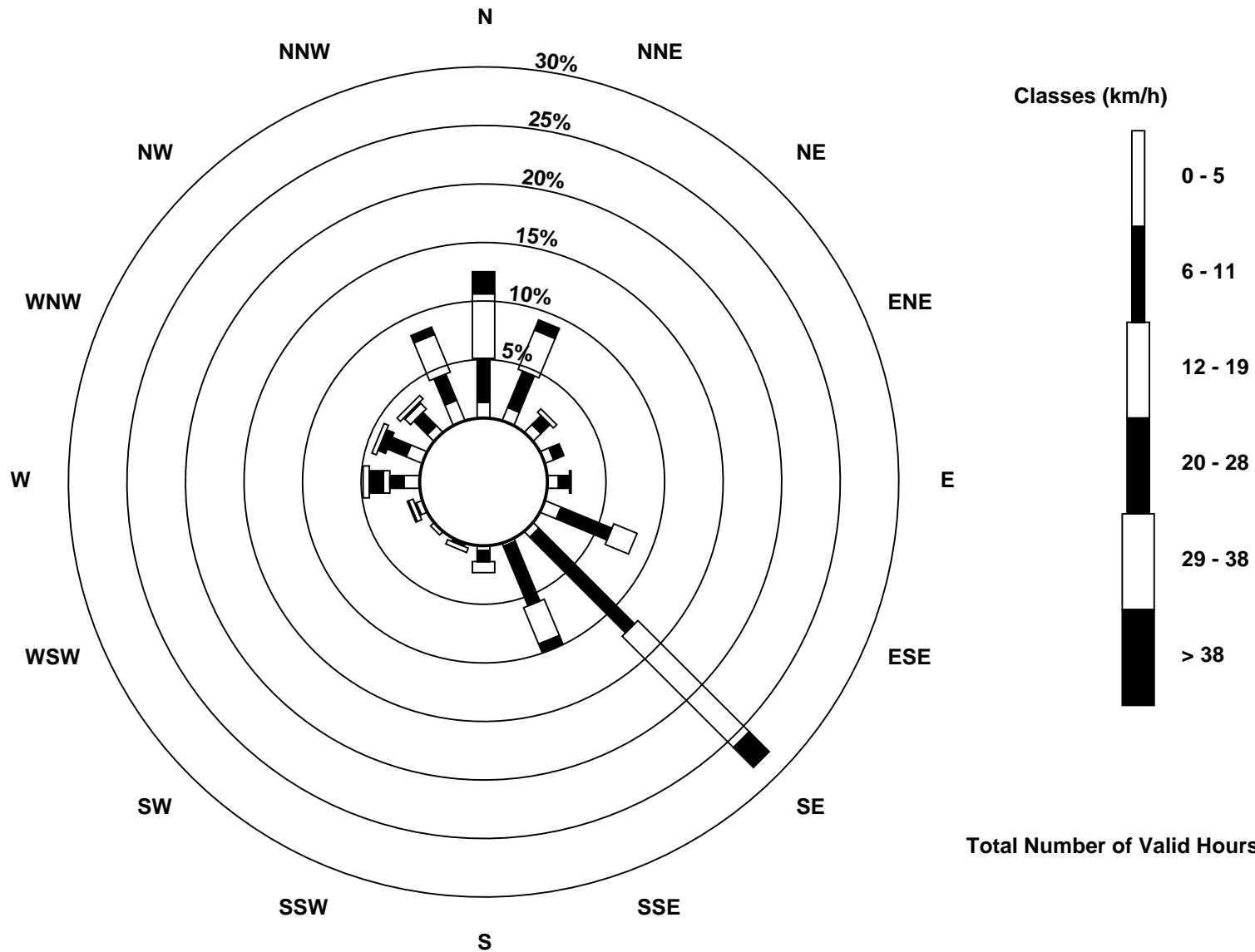
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

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





Maximum Speed: 43 km/h on Mar 19 03:00	Maximum Daily Speed Average: 31.3 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 1 km/h on Mar 26 16:00	Minimum Daily Speed Average: 2.6 km/h on Mar 5	Hours of Data: 744
Maximum Diurnal Speed Average: 6.0 km/h at hour 21	Minimum Diurnal Speed Average: 0.2 km/h at hour 15	Hours of Missing Data: 0
Monthly Average Velocity: 3.5 km/h 83.1 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 9 Median = 14 Q ₃ = 20 P ₉₀ = 25 P ₉₉ = 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-Mar	NNE8	NNE9	N9	N8	NNE8	NE11	NE11	NNE11	NE11	NNE6	N5	NW5WNW11	W14WNW15	NW14	NW12	NW11	N10	N10	N11	NNE8	NE4	N1		N7.1	WNW15	
2-Mar	NNW2	SE3	SSE8	SSE11	SSE12	SSE10	SSE11	SSE13	SSE12	SE9	SE10	SE10	SE9	SE10	ESE12	ESE14	ESE15	ESE17	ESE23	ESE26	ESE22	SE25	SE21	ESE20	SE12.8	ESE26
3-Mar	SE21	SE22	SE21	SE20	SE22	SE21	SE15	SE14	SE16	SE14	SE10	SE15	SW5	WNW4WSW10WNW18	NW23	NW20	NW26	NNW26	NNW20	N23	N20		E3.3	NNW26		
4-Mar	N22	N28	N26	N23	N25	N21	N28	N29	N28	N25	N25	N21	N20	N18	N16	N17	N17	N16	N18	NNE17	NE17	NE14	NNE9	N12	N20.4	N29
5-Mar	N9	WNW5	NW3	N10	N13	NNE12	ENE10	E9	ESE8	SE10	SE11	SSE8	S4	SW5	W7	W6	NW7	NNW7	NW9	N6	NE8	NE5	ENE3	N7	NNE2.6	N13
6-Mar	NNW7	N14	N19	N22	N24	N26	N27	N26	N29	N27	NNW20	N17	N17	N19	N20	N21	N29	N28	N24	NNW19	N20	NNW23	NNW22	NNW18	N21.4	N29
7-Mar	NNW21	NNW23	NNW22	NNW23	NNW20	NNW19	NNW20	NNW22	NNW28	NNW27	NNW28	NNW25	NNW18	NNW18	NNW17	NNW17	N19	NNE20	NNE20	NNE15	NNE14	N19	N23	N23	NNW20.1	NNW28
8-Mar	N17	N14	N14	N15	N15	N11	W8	WNW7	WNW5	WNW5	NW7	NW13	NW17	NW15	NW12	NNW10	N12	NNE17	NNE15	NNE21	N26	NNE18	N12	N10	N11.7	N26
9-Mar	N12	N11	N10	NNW7	NNW6	NNW6	WNW5	NW3	NW2	N1	N4	NW2	W6	WNW6	W5	ENE1	ENE6	ENE5	NNE9	NNE14	NNE15	NNE10	NNE8	NNE5	N5.3	NNE15
10-Mar	NNE4	NE8	ENE7	NE7	NNE6	NNE5	N6	N3	NE2	SW1	NNE1	NNW4	WNW6	WNW7	WNW8	WNW11	N11	N8	N14	N18	N18	NNE8	E5	ESE4	N5.5	N18
11-Mar	ESE3	E6	E7	ESE7	SE10	SE10	SE10	SE12	SE9	SE8	SE7	E5	ESE8	ESE13	E14	E15	E13	E11	E11	ENE11	E11	ESE14	SE13	SE14	ESE9.6	E15
12-Mar	ESE10	ESE10	SE14	SE11	SE14	SE12	SE12	SE12	SE13	SE10	SE8	SE15	SE19	SE16	SE17	ESE19	SE23	SE19	ESE18	SE22	SE26	SE26	SE25	SE21	SE16.1	SE26
13-Mar	SE23	SE23	SE23	SE24	SE25	SE24	SE24	SE26	SE27	SE29	SE28	SE30	SE29	SE30	SE28	SE23	SE21	SE21	SSE17	S25	SSE28	SSE26	SE21	SE16	SE24.4	SE30
14-Mar	SE16	SE16	SE15	SE19	SE18	SE19	SE22	SE14	SE17	SE16	SE14	SE10	ESE8	ESE11	ESE10	SE10	E9	E13	E13	E13	ESE17	ESE18	SE28	SE26	SE15.3	SE28
15-Mar	ESE20	SE19	SE21	SE19	SE21	SE20	SSE19	SSE19	SSE16	SE15	S8	SW15WSW24WSW20WSW30WSW27	W18	NNW20	N20	N17	NNE15	NE12	ENE7	ENE7					S5.2	WSW30
16-Mar	N8	N20	N24	N27	N26	N33	N34	N26	N24	N20	N22	N22	N24	N25	N26	N26	N29	N32	N27	N29	N24	N23	NNE18	N15	N24.3	N34
17-Mar	N10	NNE11	E13	ESE13	ESE12	SE7	WNW6	NW2	SE1	SE5	NNW4	NNE5	NW10	NW15	NW15	NNW11	NNW11	NNW12	N14	NNW14	N20	N21	N19	N14	N7.2	N21
18-Mar	N11	NW8	NW8	NNW7	NNW9	NNW7	NW8	NNW7	NW6	NW6	WNW6	WNW7	WNW8	N6	ESE13	ESE17	SE16	ESE11	E11	E7	NNE4	NE7	NNW5WNW13		N3.0	ESE17
19-Mar	WNW29WNW42WNW43	W40	W38	W34	W30	W29	W29	W30	W24WSW27WSW30	W31	W31	W34	W36WNW33	NW37	NW37	WNW38	WNW33	WNW29	NNW20						WNW31.3	WNW43
20-Mar	N22	N21	NNW22	NNW20	NNW16	N13	N11	NNE10	NNE6	NNW4	NW8	N4	ENE7	NNE2	E3	SE9	ESE10	SE12	SE12	SE15	SE19	SE22	SE19	SE18	NE4.2	SE22
21-Mar	SE19	SE20	SE18	SE16	SE16	SE18	SE17	SE15	SE15	SE12	SSE10	SE12	SE14	SE17	SE22	SE24	SE25	SE23	SE25	SE28	SE26	SE21	SE23	SE22	SE18.9	SE28
22-Mar	SE20	SE23	SE22	SE21	ESE19	ESE16	ESE14	ESE14	ESE13	ESE14	SE14	SE13	SE12	SE12	SE8	SE6	SSW3	SW4	WSW5	WSW7	WNW7	NNW17	NNW23	NNW19	ESE7.3	NNW23
23-Mar	N20	NNW18	NNW14	NNW9	NNW11	NNW11	NNW12	N16	NNE12	N9	NNW7	W7	W10	W12	WNW9	NW9	W10	W10	WN9	NNE9	E10	ESE12	ESE15	SE15	NNW6.0	N20
24-Mar	SE15	SSE13	SSE13	SSE14	SSE15	SE12	SE14	SSE15	SE15	SE11	SE12	SSE15	SSE14	SE13	ESE17	SE20	SE18	ESE15	ESE12	ESE18	ESE18	ESE21	ESE17	ESE16	SE14.6	ESE21
25-Mar	ESE16	ESE13	E13	E13	ESE12	ESE13	ESE16	ESE17	ESE15	SE13	ESE12	SE11	ESE8	SE7	SE6	ESE3	ESE4	E4	NE6	ENE10	E8	E5	E6	E7	ESE9.4	ESE17
26-Mar	E7	ESE6	ESE10	ESE7	ESE9	SE11	ESE13	ESE12	SE10	SE7	WSW5	W15	W13	N4	S1	SE7	SE8	E10	ENE9	ENE8	ESE7	ESE8	ESE5		ESE5.1	W15
27-Mar	ESE8	SE12	ESE6	SE13	SSE9	SE10	SE9	SE9	ESE5	ESE7	ENE7	N6	NW2	WNW6	NNE3	ESE7	ESE12	E13	ESE14	ESE17	SE21	SE19	SE20		ESE8.5	SE21
28-Mar	SE17	SE17	SE14	SE20	SE17	SE15	SE13	SE14	SE14	SE12	SE11	SSE16	SSE14	SE12	SE11	ESE10	SE12	ESE12	ESE10	ESE12	ESE15	SE21	SE18	SE16	SE14.1	SE21
29-Mar	SE14	SE15	SE16	SE16	SE13	SE15	SE15	SSE13	SE13	SE13	SE14	SE17	SE13	ESE10	SE12	SE12	SE13	SE13	SE12	ESE14	ESE14	ESE16	ESE19	SE17	SE13.8	ESE19
30-Mar	ESE13	ESE12	SE16	SE15	SE14	ESE10	SE10	SE9	SE6	ENE4	NE5	NE7	NNE5	NW4	W4	WNW5	NNE2	NNW5	NNW6	W4	WNW5	W2	S8	SSE12	ESE3.8	SE16
31-Mar	SSE10	SSE10	SSE12	S11	SSE11	SSE15	S13	SSE9	SSE12	SE11	SE11	SE13	SE15	SSE19	S24	SSW26	S26	S23	SSE22	S22	SSE25	SSW21	S23	S23	SSE16.2	SSW26

ENE4.9	ENE4.2	E4.6	E4.3	E4.0	E4.7	E3.8	ESE4.4	ESE4.5	ESE3.9	ESE2.6	SE1.8	S1.1	SW0.8	SE0.2	ESE0.9	ENE2.4	NE3.8	NE5.6	NE5.9	ENE6.0	E5.8	E5.9	E5.6		Diurnal Average
WNW29	WNW42	WNW43	W40	W38	W34	N34	W29	N29	W30	SE28	SE30	WSW30	W31	W31	W34	W36	WNW33	NW37	NW37	WNW38	WNW33	WNW29	SE26		Diurnal Maximum

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



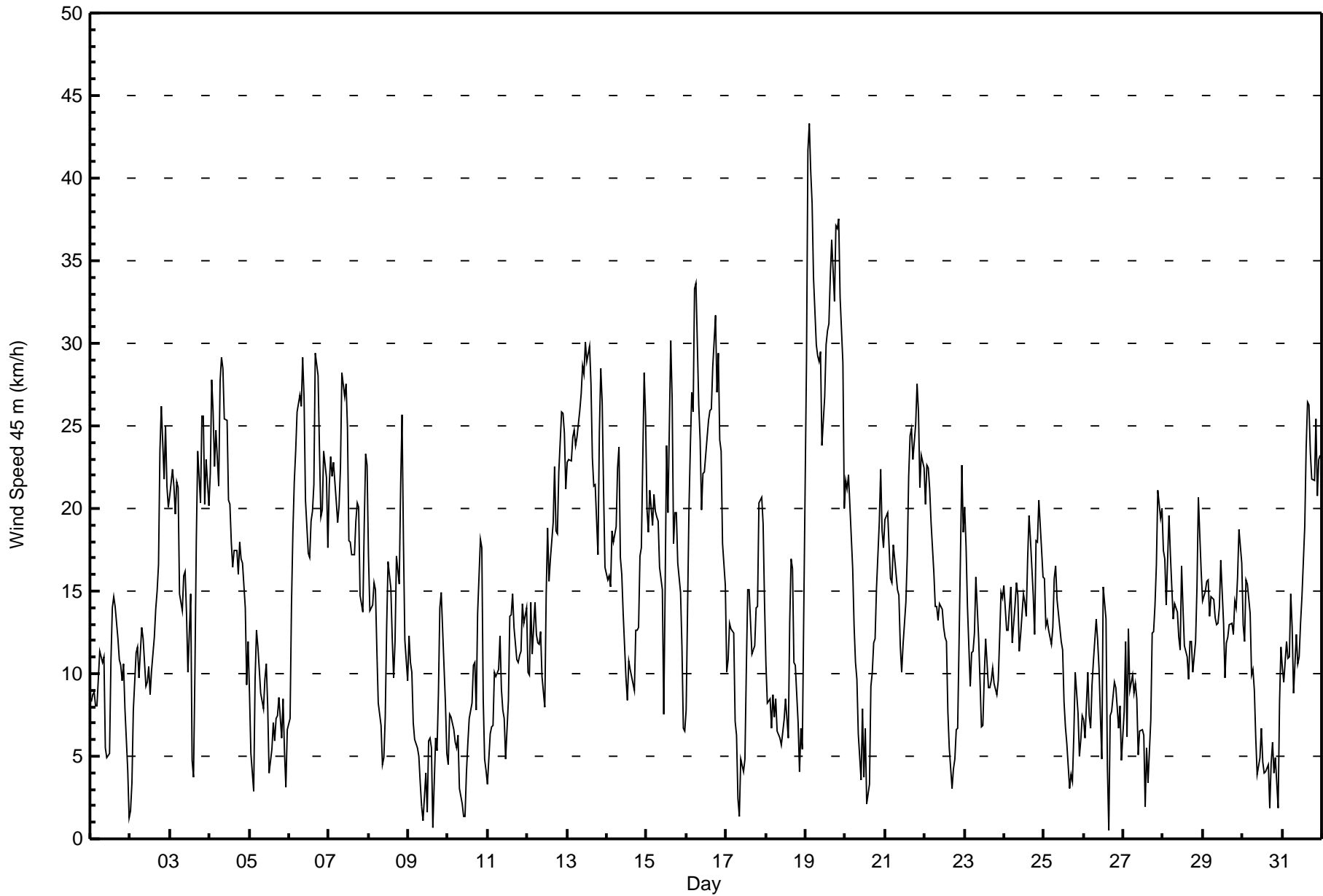
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed 45 m (WS45m) - km/h

Mannix - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 12 km/h on Mar 19 01:00 Minimum Value: 1 km/h on Mar 2 08:00 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-Mar	1	1	1	1	1	2	2	2	2	2	2	3	2	2	3	2	2	2	1	2	2	1	2	1	3
2-Mar	1	2	1	2	3	2	1	1	2	2	2	2	3	3	3	4	4	4	6	6	6	6	5	6	6
3-Mar	5	5	5	4	4	4	4	4	4	4	4	3	3	3	2	7	3	4	4	5	4	4	4	3	7
4-Mar	5	7	6	4	4	5	6	5	4	4	5	4	3	4	4	3	3	3	3	4	3	3	2	1	7
5-Mar	1	1	1	3	1	3	2	2	3	3	2	3	2	2	2	2	1	1	2	3	2	2	1	2	3
6-Mar	2	3	5	3	4	4	5	6	6	5	6	5	3	5	5	4	6	6	6	5	5	5	6	4	6
7-Mar	5	5	5	6	4	5	5	6	5	6	5	5	4	4	3	4	4	4	4	3	3	5	4	4	6
8-Mar	3	4	3	2	2	5	2	2	1	1	3	3	4	4	3	3	4	3	3	4	4	3	3	2	5
9-Mar	2	2	2	1	1	1	2	1	1	1	2	2	2	3	3	1	2	1	4	2	2	2	2	2	4
10-Mar	1	1	1	1	2	2	1	1	1	2	2	2	2	3	2	3	2	2	4	2	3	3	1	1	4
11-Mar	1	2	2	2	4	3	3	3	3	2	3	2	4	4	4	3	3	3	2	2	3	5	4	3	5
12-Mar	2	3	4	4	3	2	1	2	3	3	3	4	5	4	4	5	5	5	4	5	6	6	5	5	6
13-Mar	4	4	4	5	5	4	5	6	5	5	5	6	6	6	5	5	3	4	3	3	4	5	4	3	6
14-Mar	2	2	3	2	3	3	2	2	3	4	2	3	3	3	3	2	1	3	4	5	5	7	6	6	7
15-Mar	6	4	4	3	3	3	2	3	3	3	4	5	4	6	5	5	4	3	3	4	2	2	2	1	6
16-Mar	5	2	3	5	5	5	5	6	4	4	4	3	3	3	3	4	3	4	4	3	4	3	5	3	6
17-Mar	3	2	4	4	4	3	2	2	2	3	3	3	2	2	3	3	2	2	3	3	4	4	3	3	4
18-Mar	2	2	1	1	2	2	1	2	1	1	2	2	3	2	7	5	4	3	2	3	2	2	2	4	7
19-Mar	12	6	7	7	6	5	6	4	4	4	4	4	6	6	5	5	6	6	6	7	6	5	8	5	12
20-Mar	5	4	4	4	3	4	2	2	2	2	2	2	2	2	2	3	3	2	2	3	3	3	3	3	5
21-Mar	2	2	3	3	1	3	2	2	2	2	2	3	3	5	5	6	6	5	6	7	4	5	5	5	7
22-Mar	4	4	4	4	4	5	4	4	4	3	3	3	2	3	2	2	1	1	1	1	4	4	6	5	6
23-Mar	6	5	4	2	3	3	3	4	3	3	2	3	2	2	2	2	2	1	1	2	3	3	4	3	6
24-Mar	3	2	2	3	2	2	1	2	2	3	4	4	3	3	5	5	4	5	4	5	5	5	4	4	5
25-Mar	6	4	3	3	3	4	4	4	3	3	3	3	3	2	1	1	1	2	2	2	2	2	2	2	6
26-Mar	3	3	3	2	2	3	3	4	4	3	4	2	5	2	2	2	2	2	2	1	1	2	2	4	5
27-Mar	2	3	2	2	1	1	3	2	3	2	3	2	2	2	1	1	3	4	4	4	5	4	3	3	5
28-Mar	2	3	2	3	3	2	2	2	3	3	3	3	4	4	3	3	3	3	3	4	5	5	3	3	5
29-Mar	2	2	2	2	1	1	1	2	2	2	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4
30-Mar	3	3	3	3	3	3	2	2	2	1	2	2	2	2	1	2	1	2	2	1	1	2	2	2	3
31-Mar	1	2	1	1	1	1	3	4	3	2	2	3	3	4	5	6	5	4	3	3	3	4	3	3	6
												Diurnal Maximum													





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	73	9.81	9.81
6 - 11	211	28.36	38.17
12 - 19	268	36.02	74.19
20 - 28	158	21.24	95.43
29 - 38	31	4.17	99.60
> 38	3	0.40	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 - March 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	7	10	4	4	5	6	3	0	2	1	4	2	4	7	8	6	73
6 - 11	23	16	9	11	14	27	43	11	3	0	0	2	7	15	13	17	211
12 - 19	32	13	3	0	10	52	103	22	1	0	1	0	5	3	7	16	268
20 - 28	49	4	0	0	0	6	57	4	7	2	0	4	1	0	3	21	158
29 - 38	8	0	0	0	0	0	4	0	0	0	0	2	10	5	2	0	31
> 38	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	3
Totals	119	43	16	15	29	91	210	37	13	3	5	10	28	32	33	60	744

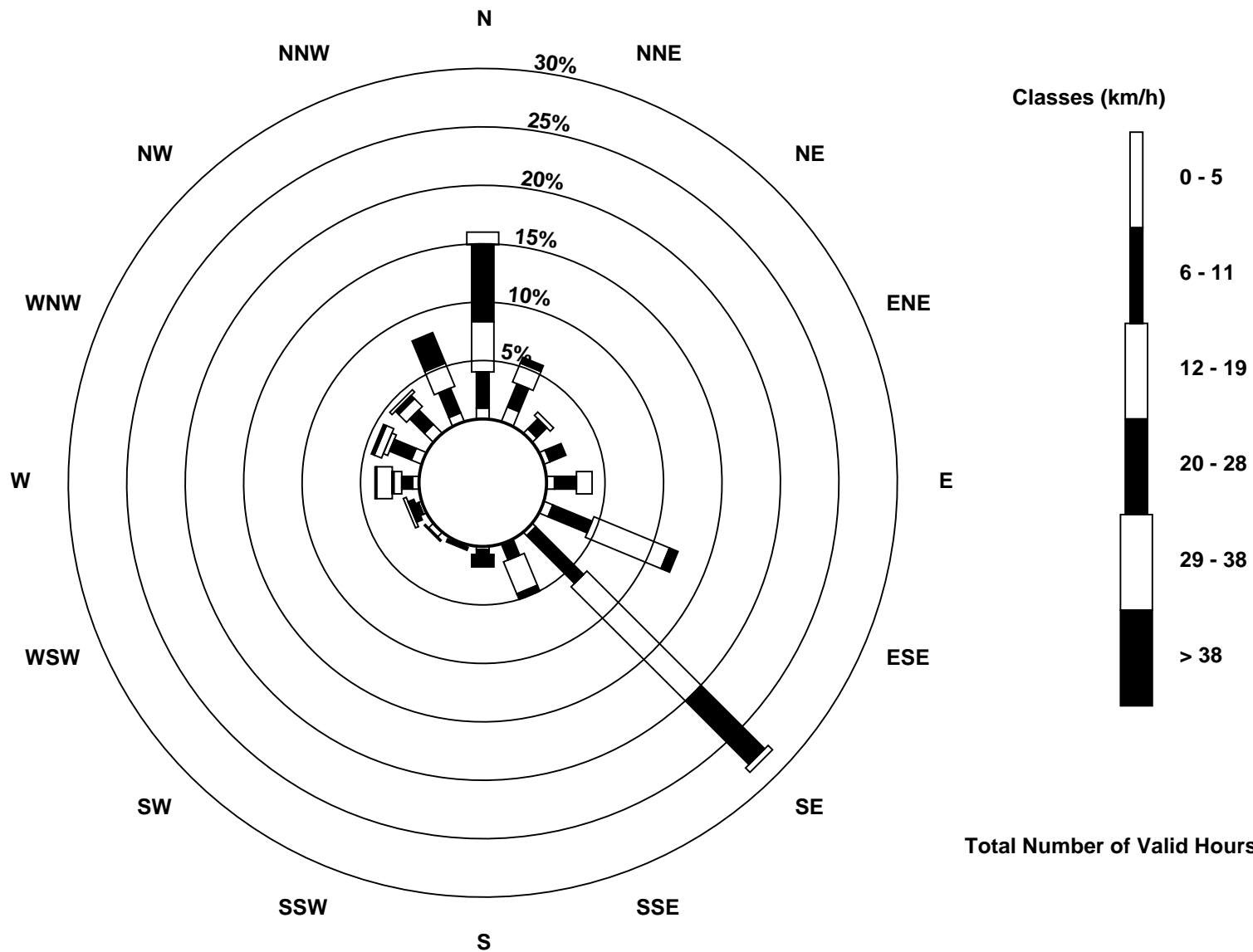
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

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





Maximum Speed: 47 km/h on Mar 19 03:00	Maximum Daily Speed Average: 33.3 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 26 16:00	Minimum Daily Speed Average: 3.2 km/h on Mar 5	Hours of Data: 736
Maximum Diurnal Speed Average: 6.8 km/h at hour 20	Minimum Diurnal Speed Average: 0.5 km/h at hour 15	Hours of Missing Data: 8
Monthly Average Velocity: 4.1 km/h 81.1 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 9 Median = 14 Q ₃ = 22 P ₉₀ = 28 P ₉₉ = 40	Percent Operational Time: 98.9

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-Mar	NE8	NE10	NNE10	NNE9	NE10	NE12	ENE12	NE14	NE13	ENE6	NNE5	NW5WNW11	W14	NW15	NW14	NW12	NNW11	N12	N12	NNE15	NNE12	NE8	E2	N7.7	NNE15	
2-Mar	NNW1	SE2	SE7	SE10	SE14	SE9	SE10	SE12	SE14	SE11	SE10	SE11	SE8	SE9	ESE10	ESE11	ESE11	ESE13	SE21	SE23	SE21	SE27	SE22	ESE19	SE12.4	SE27
3-Mar	SE23	SE25	SE22	SE22	SE25	SE25	SE18	SE17	SE19	SE18	SE16	SE11	SE16	SW5	WNW5WSW11	WNW20	NW26	NW24	NNW29	NNW28	NNW23	N25	N23	E4.0	NNW29	
4-Mar	N26	N31	NNE29	NNE25	N27	N24	N31	N33	N31	N28	NNE28	N22	N22	N20	N18	N19	NNE19	N18	NNE20	NNE20	NE16	NE11	NNE11	NNE22.6	N33	
5-Mar	NNE9	NW5	NNW3	N10	N13	NNE15	ENE12	E8	ESE6	SE9	SE10	SSE8	S4	SSW5	W7	W6	NW7	NNW7	NW9	N6	NE10	ENE6	NE5	N8	NNE3.2	NNE15
6-Mar	N11	NNE19	NNE25	NNE28	N29	N31	N32	N30	N34	N30	N23	N20	NNE19	N22	N22	N24	N32	N32	N27	N22	N22	NNW26	NNW25	N20	N24.9	N34
7-Mar	NNW24	NNW27	NNW25	NNW25	NNW23	N22	NNW23	NNW26	NNW32	NNW30	NNW30	NNW27	NNW19	NNW19	NNW18	NNW18	N21	NNE23	NNE24	NNE19	NNE19	N24	N27	N28	N23.0	NNW32
8-Mar	N21	N17	N18	N19	N20	N15	WNW6	NW7	NNW5	NW7	NW8	NW13	NNW17	NNW16	NW13	NNW10	NNE13	NNE20	NNE20	NNE28	NNE30	NNE23	NNE15	N12	N14.2	NNE30
9-Mar	N14	N13	N14	NNW8	N7	N7	NNW4	NW6	NNW5	N3	N4	NW2	W6	WNW6	W6	E1	ENE6	ENE6	NNE10	NNE17	NNE18	NE13	NE9	NE7	N6.4	NNE18
10-Mar	NE4	NE7	E7	ENE5	NE5	NE4	NE6	ENE7	E3	SE2	NE2	N4	NW5	NW7	WNW8	NW10	N11	N8	N15	N21	N19	NE6	ESE4	SE7	NNE5.2	N21
11-Mar	ESE4	E5	E6	ESE5	SE12	SE11	SE13	SE15	SE9	SE7	ESE6	ESE4	ESE8	ESE11	E12	E14	E12	E9	E11	E13	ESE9	ESE12	SE12	ESE12	ESE9.2	SE15
12-Mar	ESE8	ESE11	SE15	SE11	SE16	SE10	SE10	SE12	SE13	SE10	SE7	SE15	SE18	SE15	SE16	SE16	SE21	SE17	ESE16	SE22	SE25	SE29	SE28	SE24	SE16.0	SE29
13-Mar	SE26	SE26	SE26	SE27	SE29	SE28	SE28	SE29	SE31	SE31	SE31	SE33	SE31	SE32	SE29	SE26	SE23	SE24	SSE20	S30	SSE34	SSE31	SSE26	SE21	SE27.6	SSE34
14-Mar	SE20	SE22	SE21	SE25	SE26	SE28	SSE30	SSE30	SSE21	SE18	SE14	SE10	ESE6	ESE9	ESE7	SE10	ESE6	E9	E11	E12	ESE13	ESE14	SE30	SE28	SE17.0	SE30
15-Mar	SE19	SE18	SE26	SE23	SE26	SE25	SSE25	SSE25	SSE19	SSE17	S9	WSW17	WSW27	WSW22	WSW32	WSW29	W19	NNW24	N24	N20	NNE21	NE17	ENE10	E8	S5.9	WSW32
16-Mar	NNE6	N22	N27	N32	N31	N38	N38	N30	N27	N22	N24	N23	N26	N27	N28	N28	N30	N34	N30	N31	N28	N26	NNE22	N17	N26.8	N38
17-Mar	N12	NE12	E11	ESE11	ESE10	SE8	WNW2	ENE3	ESE5	ESE6	NE4	NE6	NW9	NW15	NNW17	NNW11	NNW12	NNW14	N17	N18	N26	N26	N24	N17	N8.5	N26
18-Mar	N12	NNW9	NNW9	AF	AF	AF	AF	AF	AF	AF	AF	AF	NW6	NW6	NNE5	ESE13	ESE13	SE15	ESE9	E9	E7	NE4	NE7	NNW4WNW15	----	SE15
19-Mar	WNW33	WNW45	WNW47	W43	W41	W35	W32	W31	W30	W31	W25	WSW28	W32	W32	W32	W35	W38	WNW35	NW41	NW40	WNW40	WNW35	NW32	NNW23	WNW33.3	WNW47
20-Mar	N24	N23	NNW26	NNW23	NNW19	N15	N12	NNE11	NNE7	NNW4	NW8	N4	NE7	NE3	ESE3	ESE8	ESE9	SE11	SE13	SE18	SE24	SE27	SE25	SE24	ENE5.0	SE27
21-Mar	SE26	SE24	SE22	SE18	SE19	SE21	SE19	SE18	SE18	SE14	SSE11	SE12	SE15	SE17	SE20	SE25	SE26	SE26	SE27	SE28	SE29	SE24	SE27	SE24	SE21.1	SE29
22-Mar	SE22	SE24	SE22	SE21	SE17	ESE14	ESE11	ESE11	ESE11	ESE11	ESE11	SE12	SE12	SE12	SE7	SE5	SSW3	SW4	WSW5	W8	NW9	NNW20	NNW27	NNW22	ESE6.2	NNW27
23-Mar	N24	NNW21	NNW17	NNW12	NNW13	N13	N14	N18	NNE13	NNE10	NNW7	WNW6	W9	W12	WNW9	NW9	WNW9	WNW10	NNW10	NNE10	E10	ESE10	SE14	SE15	N7.2	N24
24-Mar	SE17	SSE15	SSE15	SSE17	SSE19	SE16	SE20	SSE21	SSE17	SE12	SE12	SSE15	SSE15	SE14	ESE14	SE20	SE18	ESE13	ESE10	ESE13	ESE14	ESE16	ESE13	ESE13	SE14.9	SSE21
25-Mar	ESE12	ESE10	E10	ESE10	ESE9	ESE10	ESE13	SE14	SE13	SE12	ESE9	SE10	ESE7	SE6	SE5	ESE2	ESE3	E4	ENE7	ENE12	E6	E4	ESE5	E5	ESE7.8	SE14
26-Mar	E6	ESE6	ESE8	ESE7	ESE6	ESE9	ESE9	ESE12	ESE9	SE9	SE7	SW4	W15	W15	N5	W0	SE7	SE7	E7	ENE10	E8	ESE6	ESE7	SE8	ESE4.6	W15
27-Mar	SE10	SE15	ESE5	SE15	SE13	SE10	ESE7	SE11	SE8	ESE4	ESE6	ENE7	NNE7	N2	NW3	NE5	ESE8	ESE10	E11	ESE11	ESE15	SE24	SE25	SSE26	ESE9.4	SSE26
28-Mar	SE24	SE22	SE20	SE22	SE21	SE20	SE18	SE16	SE16	SE13	SE12	SSE18	SSE15	SE13	SE10	ESE8	SE10	ESE9	ESE9	ESE10	ESE12	SE19	SE21	SE19	SE15.3	SE24
29-Mar	SE22	SE21	SE18	SE22	SE21	SE19	SE18	SSE19	SSE15	SE14	SE14	SE17	SE13	SE8	SE11	SE11	ESE10	ESE11	ESE9	E11	ESE11	ESE12	ESE15	ESE14	SE14.5	SE22
30-Mar	ESE10	ESE10	SE17	SE16	SE14	ESE8	SE10	SE10	SE6	ENE5	NE5	NE7	NE5	NNW4	WNW4	NW4	NNE2	NNW5	N6	WNW3	WNW4	WNW1	S9	SSE13	ESE4.0	SE17
31-Mar	SSE12	SSE11	SSE15	S14	S13	SSE18	S16	SSE12	SSE14	SSE11	SE12	SE14	SE15	SSE20	S26	SSW29	S29	S27	SSE27	S28	S31	SSW25	S28	S29	S19.1	SSE31

E5.5	ENE5.2	E5.4	E5.5	E5.6	E6.3	E5.6	ESE6.1	E5.6	E4.6	E3.2	ESE2.1	SSE0.8	WSW0.5	NNW0.5	ENE0.6	ENE2.3	NE4.4	NE6.3	NE6.8	ENE6.7	ENE6.4	E6.6	E6.3	Diurnal Average
WNW33	WNW45	WNW47	W43	W41	N38	N38	N33	N34	SE31	SE31	SE33	W32	SE32	W32	W35	W38	WNW35	NW41	NW40	WNW40	WNW35	NW32	S29	Diurnal Maximum

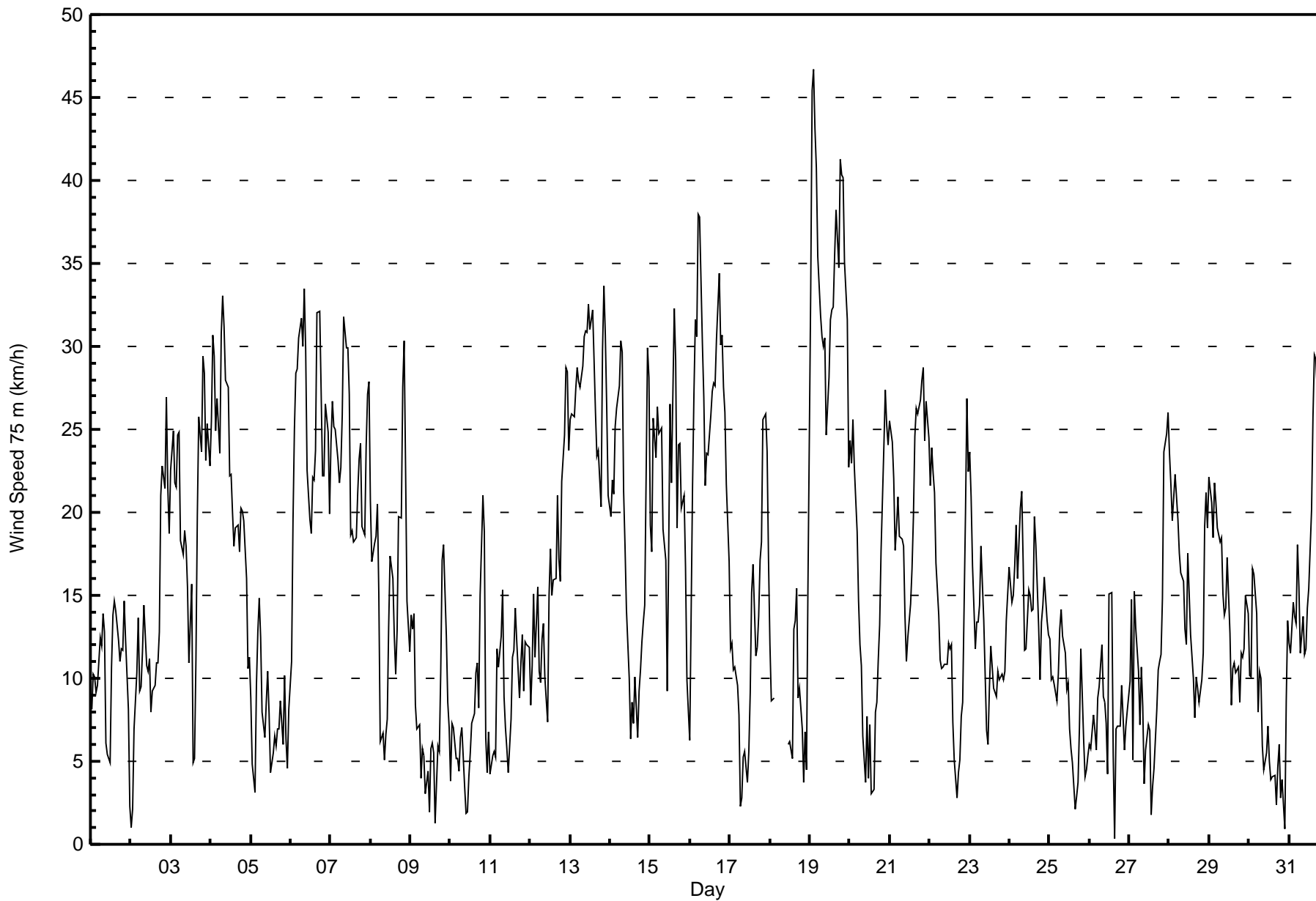
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 12 km/h on Mar 19 01:00 Minimum Value: 0 km/h on Mar 5 23:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 8																		Hours in Service: 744 Hours of Data: 736 Hours of Missing Data: 8 Hours of Calibration: 0 Percent Operational Time: 98.9									
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-Mar	1	1	1	1	2	1	1	2	2	2	2	3	2	2	2	2	2	2	1	1	1	1	2	1	3		
2-Mar	1	2	2	1	1	4	4	2	1	3	2	2	3	4	4	4	4	5	8	9	8	7	7	8	9		
3-Mar	6	6	7	4	5	5	5	5	4	5	4	4	3	4	2	7	3	5	4	5	4	4	3	3	7		
4-Mar	5	7	5	4	4	5	6	4	3	4	5	4	3	4	3	3	3	3	3	3	2	3	2	1	7		
5-Mar	2	1	1	3	1	2	3	2	2	3	3	3	2	2	2	2	1	1	2	3	2	1	0	2	3		
6-Mar	2	3	5	3	4	4	5	5	5	5	7	5	3	5	5	5	6	6	6	5	5	5	5	5	7		
7-Mar	5	5	5	6	5	6	5	7	5	6	6	5	4	4	4	4	4	4	4	3	3	5	4	4	7		
8-Mar	3	4	3	2	2	5	1	1	1	1	3	3	4	4	3	3	4	3	3	4	3	3	2	2	5		
9-Mar	1	2	2	1	1	2	1	1	1	1	1	2	2	2	3	2	2	2	5	2	2	3	1	1	5		
10-Mar	1	1	1	1	1	1	1	1	1	2	2	2	2	3	2	3	2	2	4	2	3	3	2	2	4		
11-Mar	2	2	2	2	5	3	3	4	5	3	2	2	4	4	4	4	4	3	3	3	3	5	6	5	6		
12-Mar	4	5	5	5	4	4	3	3	4	4	3	5	6	5	5	6	7	7	7	7	9	6	6	6	9		
13-Mar	5	4	5	4	5	4	5	6	5	6	5	5	6	6	5	3	4	3	3	3	5	4	3	6	6		
14-Mar	2	2	3	2	1	2	1	1	4	4	2	3	3	4	3	3	2	2	4	4	5	6	9	7	9		
15-Mar	8	7	4	3	2	2	3	3	3	3	4	5	4	6	5	4	4	3	4	3	2	3	2	2	8		
16-Mar	3	4	3	5	4	4	4	5	4	3	3	3	3	3	3	3	3	3	3	2	3	3	5	3	5		
17-Mar	3	2	4	5	4	4	2	2	2	3	4	4	2	3	3	3	3	2	2	3	4	3	3	2	5		
18-Mar	2	2	1	AF	AF	AF	AF	AF	AF	AF	AF	2	3	2	7	6	6	3	3	3	2	2	2	4	7		
19-Mar	12	6	7	6	6	5	6	4	4	4	4	4	5	6	5	5	5	7	6	7	6	5	7	4	12		
20-Mar	5	5	4	4	4	5	2	2	2	2	2	2	2	2	2	3	3	3	3	4	2	3	3	2	5		
21-Mar	2	2	2	4	3	2	3	3	2	2	3	4	4	6	7	8	6	6	7	9	5	5	5	6	9		
22-Mar	6	6	6	6	6	6	4	4	4	4	4	4	3	3	2	1	1	1	2	4	4	6	5	6	6		
23-Mar	6	5	4	3	3	3	2	4	2	3	2	3	2	2	2	1	2	1	1	1	3	4	5	5	6		
24-Mar	3	2	2	3	2	2	2	2	2	4	5	4	3	4	6	7	7	4	5	6	6	5	6	7	7		
25-Mar	6	4	3	3	3	4	5	5	4	4	3	3	3	2	2	1	1	2	2	3	2	2	2	2	6		
26-Mar	2	2	2	3	2	4	4	5	4	3	3	2	5	2	2	2	3	3	2	1	2	2	4	5	5		
27-Mar	4	4	2	5	2	2	4	3	5	2	3	2	2	2	1	1	4	4	4	4	6	5	3	2	6		
28-Mar	2	3	2	4	3	2	1	2	3	4	3	3	4	4	4	3	4	3	3	4	4	6	4	3	6		
29-Mar	2	2	3	1	1	2	2	2	3	2	3	3	3	3	3	3	4	4	4	4	4	5	6	5	6		
30-Mar	4	4	4	4	4	3	3	2	3	1	2	2	2	1	1	2	1	2	2	1	1	1	3	1	4		
31-Mar	2	2	1	2	1	1	4	3	2	2	2	3	3	4	6	6	5	4	3	4	3	4	3	3	6		
																		Diurnal Maximum									
AF - Analyzer Failure																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	74	10.05	10.05
6 - 11	210	28.53	38.59
12 - 19	206	27.99	66.58
20 - 28	175	23.78	90.35
29 - 38	64	8.70	99.05
> 38	7	0.95	100.00

Total Number of Valid Hours: 736

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed 75 m (WS75m) - km/h
Mannix - March 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	4	10	3	7	11	4	0	1	2	3	1	1	6	6	10	74
6 - 11	9	11	15	9	17	62	43	4	2	0	0	1	6	8	14	9	210
12 - 19	27	13	7	3	5	27	75	20	3	0	0	1	5	1	6	13	206
20 - 28	43	16	1	0	0	1	72	9	4	1	0	3	1	1	2	21	175
29 - 38	21	2	0	0	0	0	12	5	3	1	0	2	10	3	1	4	64
> 38	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	0	7
Totals	105	46	33	15	29	101	206	38	13	4	3	8	25	22	31	57	736

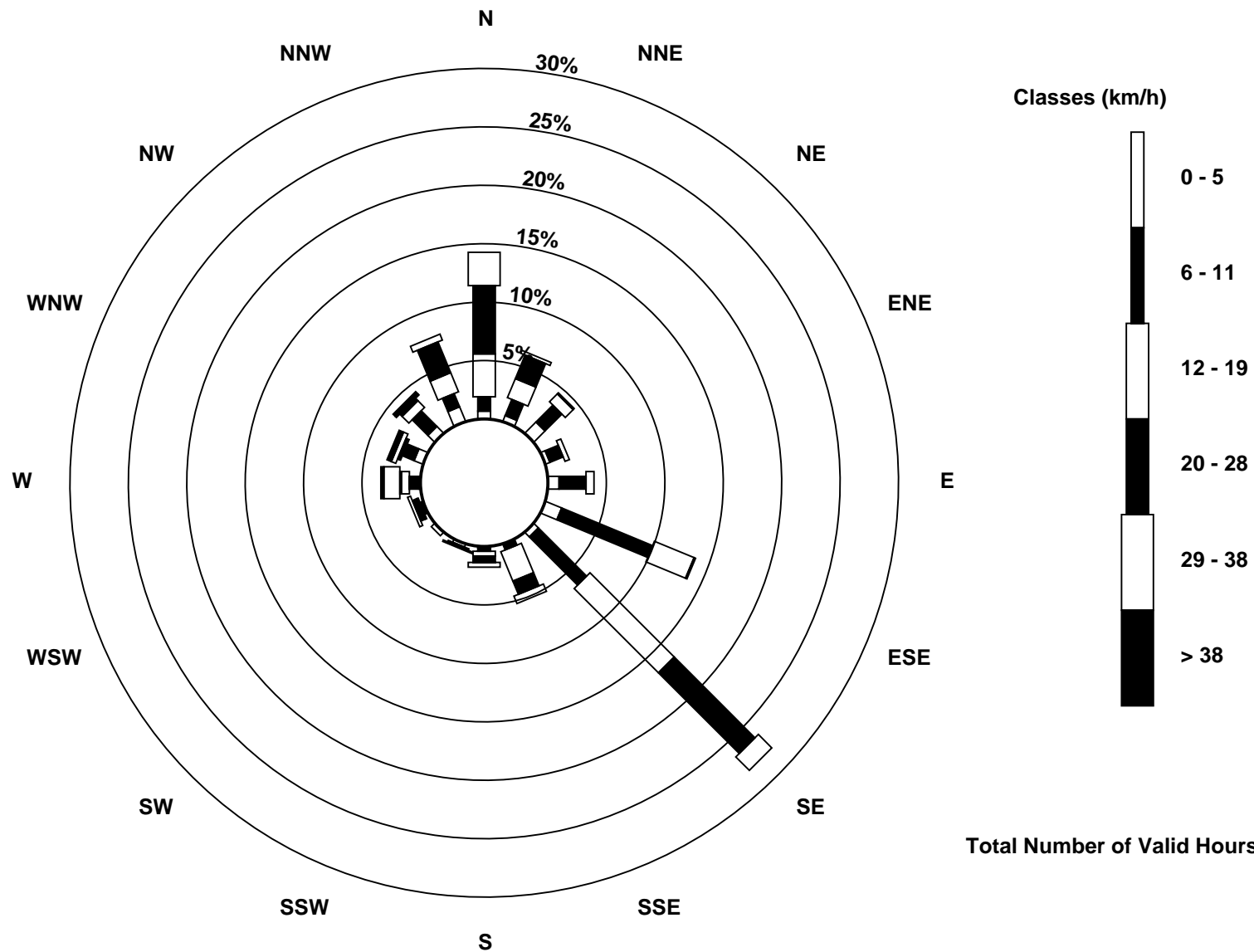
Total Number of Valid Hours: 736

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

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





Maximum Speed: 50 km/h on Mar 19 03:00	Maximum Daily Speed Average: 35.3 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 2 01:00	Minimum Daily Speed Average: 2.7 km/h on Mar 5	Hours of Data: 744
Maximum Diurnal Speed Average: 7.9 km/h at hour 21	Minimum Diurnal Speed Average: 0.3 km/h at hour 15	Hours of Missing Data: 0
Monthly Average Velocity: 4.7 km/h 88.6 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 10 Median = 16 Q ₃ = 24 P ₉₀ = 30 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-Mar	ENE8	NE11	NNE10	NNE9	NE10	ENE12	ENE12	NE14	ENE13	ENE6	NNE5	NW5WNW11WNW14	NW15	NW14	NW13	NNW11	N12	N12	NNE15	NNE12	NE7	E3	NNE7.3	NNE15			
2-Mar	S0	SSE3	SE6	SE9	SE13	SSE10	SE11	SE13	SE14	SE13	SE12	SE12	SE10	SE11	ESE13	ESE15	ESE17	ESE21	ESE25	ESE28	SE27	SE30	SE25	SE23	SE14.7	SE30	
3-Mar	SE26	SE29	SE25	SE24	SE27	SE28	SE20	SE20	SE21	SE20	SE17	SE12	SSE16	SW5	W6WSW12WNW21	NW27	NW26	NNW32	NNW30	NNW24	N26	N23	ESE4.6	NNW32			
4-Mar	N27	N32	NNE30	NNE26	N28	N25	N32	N34	N32	N29	NNE28	N23	N23	N20	N18	N19	NNE20	N18	NNE21	NNE21	NE17	NE11	NNE11	NNE23.2	N34		
5-Mar	NNE8	WNW4	NNW3	N8	N10	NNE15	ENE13	E9	ESE8	SE10	SE11	SSE8	S5	SSW6	W6	W6	NW7	NNW7	NW8	NNW6	NE10	ENE6	NE4	N9	NE2.7	NNE15	
6-Mar	N12	NNE22	NNE27	NNE31	N31	N33	N34	N32	N35	N31	N24	N20	NNE19	N23	N22	N25	N33	N33	N29	N24	N23	N28	NNW27	N21	N26.3	N35	
7-Mar	N26	NNW29	NNW27	NNW26	NNW25	N23	N24	NNW28	NNW34	NNW32	NNW32	NNW28	NNW19	NNW20	NNW19	NNW20	NNE22	NNE24	NNE26	NNE21	NNE21	N26	N29	N30	N24.6	NNW34	
8-Mar	N22	N19	N19	N20	N23	N17	NW6	NW7	NNW6	NW7	NNW8	NW14	NNW18	NNW17	NW13	NNW11	NNE13	NNE20	NNE21	NNE30	NNE32	NNE24	NNE15	N13	N15.3	NNE32	
9-Mar	N14	N14	N15	N9	N8	N8	NNW5	NNW5	NNW7	N4	N4	NW2	W6	WNW6	W6	ESE1	ENE6	ENE6	NNE11	NNE18	NNE20	NE13	ENE8	NE8	NNE6.8	NNE20	
10-Mar	NE4	ENE7	E8	E5	ENE3	ENE3	NE6	ENE8	ESE4	SSE3	NE2	N4	NW5	NW7	WNW8	NW11	N11	N8	N15	N22	NNE18	E7	ESE8	SE10	NNE4.7	N22	
11-Mar	ESE6	ESE8	ESE7	ESE8	SE13	SE13	SE14	SE18	ESE10	SE8	ESE7	ESE5	ESE9	ESE14	E15	E16	E14	ESE13	E14	E16	ESE15	ESE18	SE14	ESE15	ESE11.7	SE18	
12-Mar	ESE13	SE15	SE18	SE14	SE17	ESE11	ESE9	SE11	SE15	SE11	SE9	SE16	SE20	SE16	SE17	ESE20	SE23	SE20	ESE20	SE25	SE29	SE31	SE31	SE26	SE18.1	SE31	
13-Mar	SE27	SE28	SE27	SE29	SE30	SE29	SE29	SE30	SE32	SE32	SE32	SE34	SE32	SE33	SE30	SE27	SSE24	SSE25	SSE22	S31	SSE35	SSE32	SSE28	SSE23	SSE28.8	SSE35	
14-Mar	SE22	SE24	SSE23	SSE27	SSE29	SSE30	SSE32	SSE30	SSE23	SE19	SE15	SE11	ESE9	ESE11	ESE10	SE12	ESE9	ESE14	ESE17	ESE19	ESE21	ESE22	SE34	SE30	SE19.5	SE34	
15-Mar	SE23	SE21	SE28	SE25	SE28	SE27	SSE27	S27	S20	SSE18	SSW11	WSW18	WSW28	WSW23	WSW34	WSW30	W20	NNW25	N26	N22	NNE23	NE19	ENE11	E10	S6.4	WSW34	
16-Mar	NE6	N21	N28	N34	N33	N40	N39	N32	NNE28	N22	N24	N24	N26	N28	N28	N28	N31	N35	N31	N31	N28	N27	NNE23	N17	N27.4	N40	
17-Mar	N12	ENE13	ESE16	ESE14	ESE13	SE10	SW1	E6	ESE8	ESE7	E5	ENE7	NW9	NW16	NNW19	NNW12	NNW13	N15	N18	N20	N28	N28	N26	N18	NNE8.7	N28	
18-Mar	N13	NNW9	NNW9	N9	N10	N9	NNW10	N9	NNW5	NNE4	NW4	NW5	NNW4	NNE4	ESE15	ESE18	SE18	ESE13	E12	ESE9	ENE3	ENE7	NNW4	NNW17	NE4.0	SE18	
19-Mar	WNW37	WNW48	WNW50	WNW46	W44	W37	W34	W32	W31	W32	W25	W29	W33	W34	W34	W37	W40	WNW37	NW44	NW43	NW43	WNW37	NW34	NNW24	WNW35.3	WNW50	
20-Mar	N26	N24	N27	NNW24	NNW20	N15	N12	NNE11	NNE6	NNW3	NW8	N4	ENE7	NE3	ESE3	ESE9	SE10	SE12	SE15	SE19	SE26	SE29	SSE28	SE27	ENE4.9	SE29	
21-Mar	SE28	SE25	SE23	SE20	SE21	SE22	SE21	SE21	SE20	SE15	SSE12	SE14	SE15	SE19	SE23	SE26	SE28	SE28	SE29	SE31	SSE30	SE26	SE28	SE27	SE22.9	SE31	
22-Mar	SE24	SE26	SE25	SE24	ESE20	ESE18	ESE16	ESE15	ESE14	ESE14	ESE13	SE13	SE12	SE13	SE8	SE5	SSW3	SW5	WSW5	W8	NW10	NNW22	NNW29	NNW24	ESE7.5	NNW29	
23-Mar	N25	N23	NNW18	NNW13	NNW14	N14	N15	N19	NNE14	NNE10	NNW7	WNW6	W9	W12	NNW10	NW9	WNW9	WNW11	NNW10	NNE10	ESE12	ESE13	SE16	SE17	N7.4	N25	
24-Mar	SE18	SSE15	SSE16	SSE18	SSE21	SSE18	SSE23	SSE24	SSE18	SE12	SE13	SSE16	SSE15	SE15	ESE17	SE22	SE21	ESE18	ESE15	ESE22	ESE21	ESE23	ESE20	ESE17	SE17.4	SSE24	
25-Mar	ESE16	ESE14	ESE16	ESE15	ESE12	ESE14	ESE16	SE17	SE15	SE13	ESE12	SE11	SE9	SE7	SE5	ESE3	ESE4	ESE4	ENE7	ENE13	ESE9	ESE6	ESE6	ESE8	ESE10.2	ESE17	
26-Mar	ESE9	ESE9	ESE12	ESE10	ESE9	ESE12	ESE12	SE15	ESE12	SE10	SE8	SW4	W15	W15	N6	WSW1	SE8	SE8	ESE10	E10	E11	ESE9	ESE11	SE10	ESE6.7	ESE15	
27-Mar	SE13	SE17	ESE7	SE17	SE14	SE9	ESE10	SE12	ESE10	ESE6	ESE8	ENE8	NNE7	NNE2	NW3	ENE5	SE10	ESE15	ESE16	ESE18	ESE19	SE26	SE27	SSE29	SE11.6	SSE29	
28-Mar	SSE26	SE24	SE22	SE24	SE23	SE21	SE19	SE18	SE18	SE14	SSE13	SSE18	SSE15	SSE13	SE11	ESE10	ESE12	ESE12	ESE12	ESE12	ESE16	ESE17	SE22	SE23	SE20	SE17.1	SSE26
29-Mar	SSE25	SE22	SE22	SE23	SSE22	SSE21	SE21	SSE22	SSE16	SSE14	SSE14	SSE17	SE13	SE10	SE11	SE12	ESE12	ESE13	ESE12	ESE18	ESE17	ESE16	ESE18	ESE16	SE16.3	SSE25	
30-Mar	ESE13	ESE14	SE18	SE18	SE15	ESE11	SE11	SE11	SE7	ENE5	NE5	NE7	NE5	NNW4	WNW4	NW4	NNE2	N5	N6	NW2	NW4	WSW1	S9	SSE14	ESE4.8	SE18	
31-Mar	SSE13	SSE12	SSE15	S14	S14	SSE19	S16	SSE13	SSE14	SSE12	SSE12	SSE15	SSE16	SSE21	S26	SSW30	S30	SSW28	S28	S29	S33	SSW27	S29	S30	S19.9	S33	

E6.3	E5.9	E6.3	E6.0	E6.0	E6.6	ESE5.9	ESE6.6	ESE6.0	ESE4.9	ESE3.3	SE2.4	SSE1.1	SW0.5	NE0.3	E1.1	ENE2.7	NE4.8	NE6.9	ENE7.7	ENE7.9	E7.5	E7.6	ESE7.3	Diurnal Average
WNW37	WNW48	WNW50	WNW46	W44	N40	N39	N34	N35	SE32	SE32	SE34	W33	W34	W34	W37	W40	WNW37	NW44	NW43	NW43	WNW37	NW34	SE30	Diurnal Maximum

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



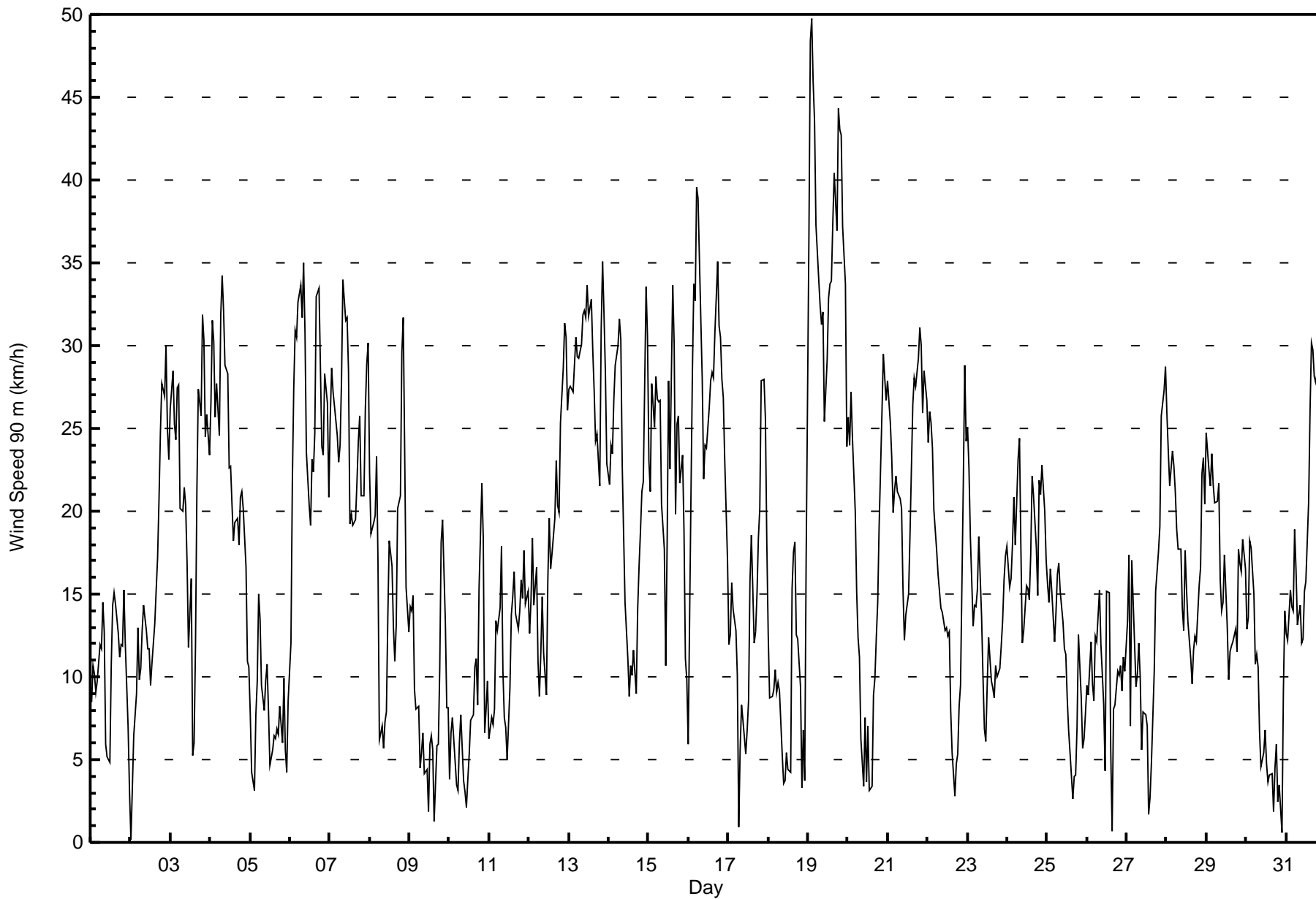
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed 90 m (WS90m) - km/h

Mannix - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 12 km/h on Mar 19 01:00 Minimum Value: 1 km/h on Mar 2 01:00 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-Mar	1	1	1	1	2	1	1	2	2	2	2	3	2	2	2	2	2	2	1	1	1	1	2	1	3
2-Mar	1	2	1	1	1	3	3	1	1	2	2	2	3	3	4	4	4	4	6	7	7	6	5	6	7
3-Mar	4	4	6	3	4	4	4	5	4	5	4	3	2	3	3	7	3	4	4	5	4	5	3	2	7
4-Mar	4	7	5	4	4	5	6	4	3	4	5	4	3	4	3	3	3	3	3	3	2	3	2	1	7
5-Mar	2	1	1	2	2	1	1	2	2	2	2	3	2	2	2	2	1	1	1	2	1	1	1	2	3
6-Mar	2	4	4	4	4	4	5	5	5	5	7	5	3	4	5	5	6	6	6	6	5	5	6	5	7
7-Mar	6	5	5	6	5	6	5	7	5	7	6	5	5	4	4	4	4	4	3	3	3	5	4	4	7
8-Mar	4	4	3	3	1	5	1	1	1	1	3	3	4	4	3	4	4	3	3	4	3	2	2	2	5
9-Mar	1	2	2	2	2	2	1	1	1	1	2	1	2	3	3	2	2	1	5	2	2	3	2	1	5
10-Mar	1	2	1	1	1	1	1	1	1	2	2	2	2	3	2	3	3	2	4	2	3	2	2	2	4
11-Mar	3	2	1	2	5	2	2	3	4	2	2	2	4	3	4	3	3	3	3	2	3	5	4	4	5
12-Mar	4	4	4	4	3	3	2	3	3	3	3	4	5	4	4	5	5	5	5	5	7	5	5	5	7
13-Mar	4	4	4	4	4	4	5	6	5	5	5	5	6	6	5	3	4	3	3	3	5	3	3	6	6
14-Mar	2	1	2	1	1	2	1	1	4	3	1	2	3	3	2	3	2	2	4	5	6	5	7	6	7
15-Mar	6	5	4	3	2	2	3	3	3	3	4	5	4	6	5	4	4	3	4	3	2	3	2	2	6
16-Mar	3	4	4	5	4	4	4	5	4	4	3	3	3	2	3	3	3	3	3	1	2	2	5	3	5
17-Mar	3	3	4	4	3	3	2	2	3	3	5	5	3	3	3	3	3	2	2	3	4	3	3	2	5
18-Mar	2	2	2	3	2	2	2	3	1	1	2	2	2	2	7	5	5	3	2	3	2	2	2	5	7
19-Mar	12	7	7	7	6	5	6	5	4	4	4	4	5	6	5	5	6	7	6	7	6	5	8	4	12
20-Mar	5	5	4	4	4	5	2	3	3	2	2	2	2	2	2	3	3	2	3	3	2	3	2	2	5
21-Mar	1	2	1	4	1	1	2	2	2	2	2	3	3	5	5	6	5	5	6	7	5	5	4	5	7
22-Mar	5	5	5	5	4	5	4	3	3	3	3	3	2	3	2	2	1	1	1	1	5	4	6	6	6
23-Mar	6	5	4	3	3	2	2	4	2	3	2	3	2	2	2	1	2	1	1	1	3	3	4	4	6
24-Mar	3	2	2	2	1	2	2	2	3	3	4	3	3	3	4	5	5	6	4	5	5	5	5	4	6
25-Mar	4	4	3	3	3	3	4	4	3	3	2	2	2	2	1	1	1	2	2	1	2	2	2	2	4
26-Mar	2	3	3	3	3	4	3	5	3	2	3	2	5	2	3	1	2	2	1	1	2	2	4	4	5
27-Mar	3	4	2	4	2	2	3	2	4	1	4	2	2	2	1	1	4	4	4	4	5	4	3	2	5
28-Mar	2	2	2	3	2	2	1	1	2	3	3	3	4	4	3	3	3	3	3	4	4	5	3	3	5
29-Mar	1	2	1	1	1	1	2	3	3	2	3	3	3	3	3	2	3	3	3	4	4	4	4	4	4
30-Mar	3	3	3	3	3	3	2	2	3	1	2	2	2	2	1	2	1	2	2	1	1	1	3	2	3
31-Mar	2	2	2	2	1	1	2	3	2	2	2	3	3	4	6	6	5	4	3	4	3	4	3	3	6
Diurnal Maximum																									





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	64	8.60	8.60
6 - 11	165	22.18	30.78
12 - 19	225	30.24	61.02
20 - 28	193	25.94	86.96
29 - 38	87	11.69	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 90 m (WS90m) - km/h
Mannix - March 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	6	6	5	3	7	2	2	2	1	3	4	0	2	9	8	64
6 - 11	14	10	9	14	7	37	32	2	1	2	0	0	7	7	11	12	165
12 - 19	24	10	4	6	6	63	57	29	3	0	0	2	2	3	6	10	225
20 - 28	46	20	1	0	0	12	67	19	4	2	0	2	2	1	2	15	193
29 - 38	23	4	0	0	0	0	22	8	6	1	0	2	10	3	1	7	87
> 38	2	0	0	0	0	0	0	0	0	0	0	0	2	3	3	0	10
Totals	113	50	20	25	16	119	180	60	16	6	3	10	23	19	32	52	744

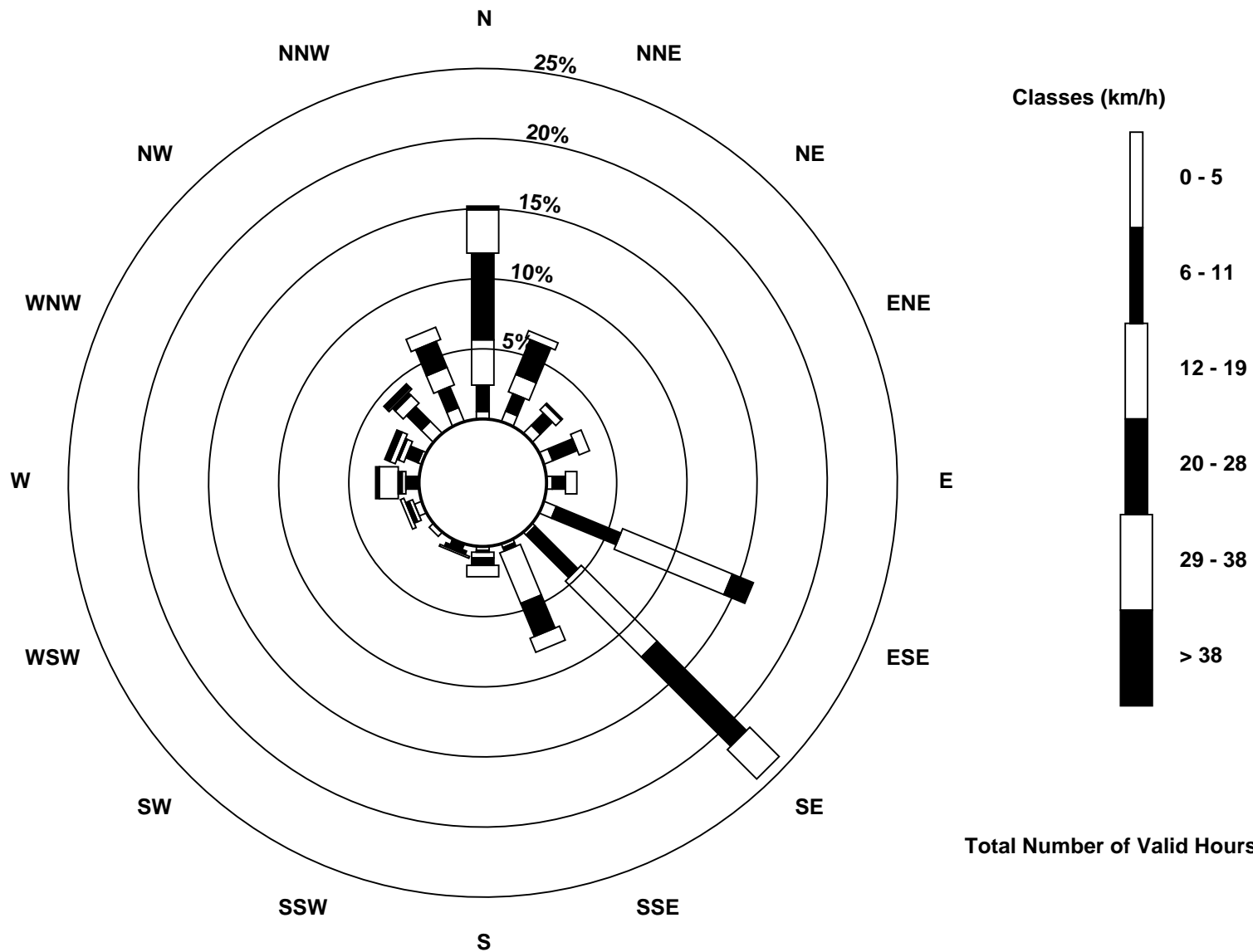
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 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 - March 2017

Direction of Maximum Speed: 293 deg on Mar 19 03:00																						Hours in Service: 744			
Direction of Maximum Daily Speed Average: 286.5 deg on Mar 19																						Hours of Data: 744			
Direction of Minimum Speed: 103 deg on Mar 9 16:00											Direction of Minimum Daily Speed Average: 1.6 deg on Mar 5											Hours of Missing Data: 0			
Monthly Average Direction: 335.4 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-Mar	14	11	10	6	15	44	39	24	38	25	354	307	290	276	307	312	323	326	352	349	12	13	331	276	347.5
2-Mar	299	151	169	169	165	185	173	175	171	154	154	152	134	131	116	109	112	117	131	129	125	134	131	128	136.9
3-Mar	132	132	132	135	137	137	140	143	143	137	148	139	150	224	293	253	297	315	326	330	332	350	16	13	111.0
4-Mar	9	12	18	18	11	13	14	12	11	10	15	13	13	7	11	16	13	16	20	44	45	36	8	15.5	
5-Mar	7	275	301	7	6	23	68	88	118	136	151	168	181	218	274	286	312	338	342	20	32	55	327	342	23.1
6-Mar	352	8	8	8	6	7	4	9	13	11	350	353	17	8	13	6	7	4	5	349	356	347	340	350	2.9
7-Mar	348	339	338	346	339	351	347	343	340	341	339	338	335	333	339	341	15	21	20	32	23	14	9	12	351.7
8-Mar	9	357	3	356	356	350	263	287	270	265	330	311	329	327	319	339	19	34	28	21	17	20	7	356	352.4
9-Mar	1	1	347	307	323	286	270	297	53	64	34	334	267	281	282	103	72	80	20	17	16	18	12	11	358.3
10-Mar	1	20	36	25	357	356	355	265	322	269	41	344	300	292	290	304	3	357	3	8	9	14	19	55	354.2
11-Mar	117	97	103	109	137	136	142	142	143	155	141	99	124	120	101	89	88	105	87	79	105	120	138	135	116.9
12-Mar	104	109	130	137	156	156	154	154	139	142	133	146	140	143	138	130	132	130	131	137	131	134	138	134	136.1
13-Mar	137	141	142	142	143	147	143	141	145	144	143	147	144	147	150	143	148	151	157	173	166	157	151	142	147.2
14-Mar	129	132	131	136	140	138	142	144	145	139	143	135	122	128	116	131	103	88	107	110	117	122	132	131	129.5
15-Mar	129	135	145	140	139	148	160	158	154	146	164	239	241	243	261	252	268	337	358	6	27	42	69	64	185.1
16-Mar	347	359	357	0	360	9	10	13	14	11	7	3	5	5	5	5	6	7	3	7	4	10	21	2	6.2
17-Mar	353	23	103	129	123	140	290	289	272	180	324	7	310	317	328	346	328	339	351	346	356	359	360	3	350.8
18-Mar	5	329	326	334	332	334	328	337	314	315	292	285	295	348	124	127	132	111	90	103	7	36	327	289	354.2
19-Mar	293	291	293	284	279	278	282	276	276	276	269	263	264	275	276	276	280	297	313	310	306	294	307	346	286.5
20-Mar	5	2	347	341	340	6	16	25	24	347	313	353	69	37	99	132	129	133	138	142	147	147	143	141	61.2
21-Mar	146	143	146	144	148	149	151	150	146	149	160	149	143	136	132	137	137	139	136	132	148	143	139	137	141.9
22-Mar	133	134	133	132	129	126	123	125	125	130	132	136	140	141	142	146	212	233	254	256	296	332	338	347	130.9
23-Mar	7	346	343	339	343	349	350	12	26	19	331	287	269	265	290	317	278	276	318	22	94	126	130	131	343.4
24-Mar	136	154	158	151	156	138	150	161	149	142	141	160	162	144	129	133	134	126	118	118	123	118	117	126	137.3
25-Mar	127	125	106	105	110	124	129	131	130	130	129	132	127	130	138	118	107	106	60	63	103	104	96	101	118.2
26-Mar	111	105	111	119	118	107	138	129	127	133	139	271	278	279	15	142	137	132	98	57	54	91	113	107	119.4
27-Mar	117	138	127	144	176	164	145	161	139	138	109	66	17	293	297	14	110	128	108	118	128	133	141	149	130.0
28-Mar	144	140	137	131	137	139	141	130	134	138	149	159	156	151	136	122	132	120	113	120	124	133	140	132	136.0
29-Mar	136	133	133	146	156	153	153	148	144	145	147	151	144	126	133	136	133	138	139	112	115	127	131	132	137.6
30-Mar	131	125	136	137	138	119	142	151	140	73	68	54	43	325	275	291	27	345	330	253	274	249	202	164	135.3
31-Mar	167	160	155	170	162	161	179	160	154	141	141	134	141	154	179	199	190	195	165	173	169	198	179	174	169.2
79.5	76.1	87.4	99.2	105.5	101.6	106.3	112.2	112.9	117.0	114.8	143.9	178.4	218.8	168.1	120.2	79.6	60.1	54.6	60.1	73.1	88.6	97.4	98.6		
Diurnal Average																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									

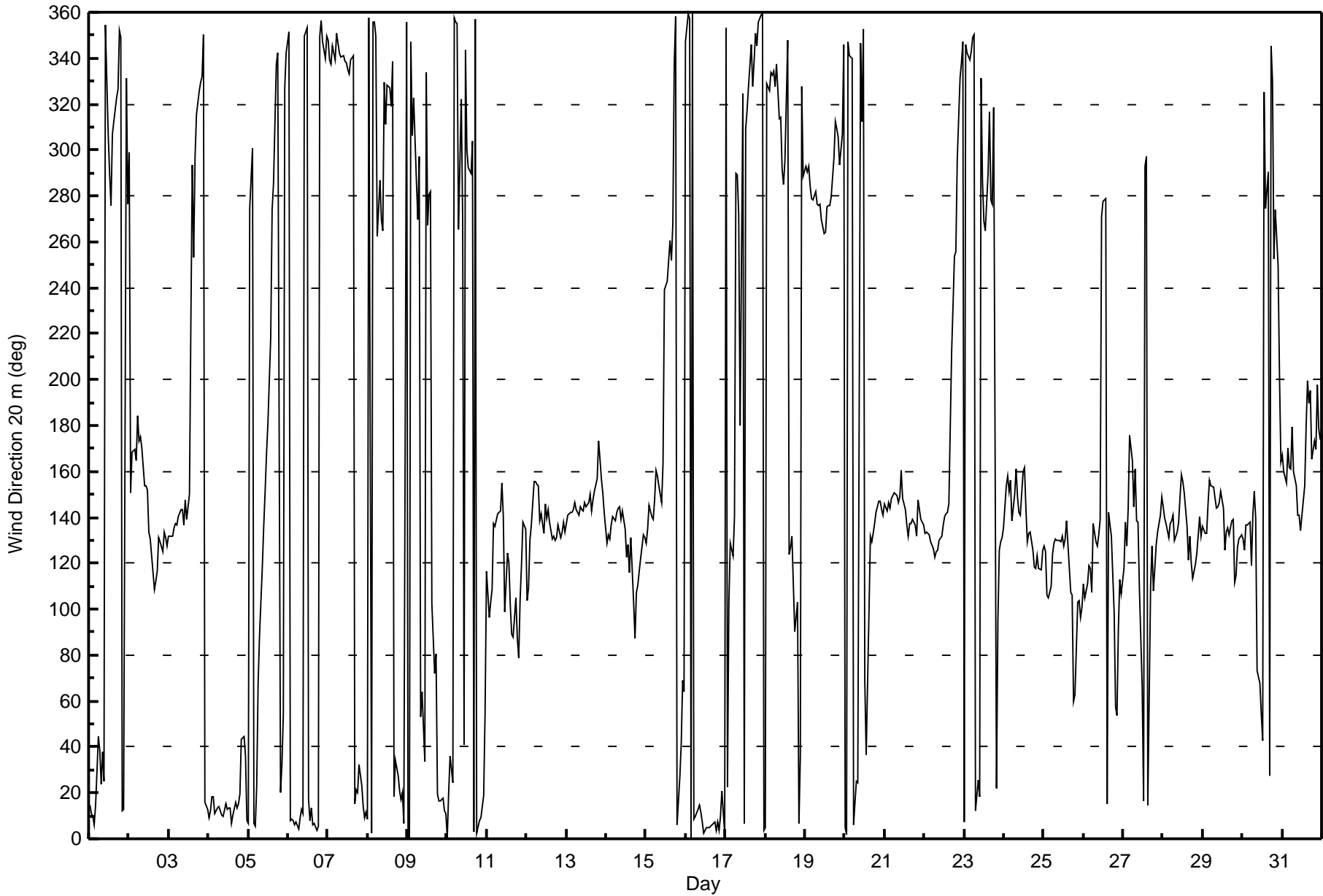


Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 20 m (WD20m) - deg

Mannix - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 100 deg on Mar 9 16:00 Minimum Value: 4 deg on Mar 29 05:00 Percentiles: P ₁ = 6 P ₁₀ = 8 Q ₁ = 9 Median = 12 Q ₃ = 17 P ₉₀ = 30 P ₉₉ = 75																	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-Mar	9	10	8	7	9	10	10	10	11	32	32	50	19	14	12	12	12	12	9	18	13	22	50	33	50
2-Mar	75	23	14	11	8	14	19	11	15	8	9	9	14	15	17	15	13	11	8	8	10	9	9	10	75
3-Mar	8	8	9	8	9	9	10	13	12	10	11	14	15	58	58	48	23	15	14	16	12	21	12	11	58
4-Mar	11	11	11	10	10	12	12	11	10	12	12	13	11	14	17	14	12	12	10	11	13	11	14	8	17
5-Mar	14	30	41	8	8	13	11	11	18	15	16	20	52	40	22	17	15	12	20	18	24	32	57	18	57
6-Mar	57	11	9	9	11	10	13	14	13	11	20	19	13	14	11	15	12	13	15	16	16	16	13	16	57
7-Mar	17	14	14	14	13	16	13	14	12	14	12	13	18	18	17	18	13	13	12	12	12	12	11	10	18
8-Mar	11	13	12	9	8	35	13	13	11	24	30	22	17	21	19	40	18	13	12	10	10	10	16	12	40
9-Mar	8	9	23	19	22	30	17	70	63	46	33	78	30	34	45	100	18	22	24	7	6	8	5	14	100
10-Mar	16	15	7	9	65	62	67	38	64	60	72	48	27	24	20	21	21	20	11	9	9	6	39	29	72
11-Mar	31	20	9	8	15	10	9	10	10	9	18	34	24	22	19	17	16	15	17	13	12	12	11	10	34
12-Mar	10	10	11	11	7	9	6	7	11	13	13	12	17	24	17	12	9	9	10	10	9	8	9	8	24
13-Mar	8	9	9	8	9	9	9	9	9	9	9	10	10	10	10	10	9	8	11	12	10	7	8	9	12
14-Mar	7	6	7	7	8	8	7	7	11	8	8	13	13	14	17	11	23	9	15	12	14	11	8	7	23
15-Mar	9	14	10	10	8	9	13	9	9	12	47	14	12	17	9	13	27	12	17	11	14	14	42	34	47
16-Mar	18	9	10	12	13	11	10	12	11	13	11	12	11	11	10	11	10	10	11	8	10	9	11	14	18
17-Mar	24	16	16	10	12	53	14	21	24	76	45	51	16	10	13	23	15	14	13	13	14	13	13	13	76
18-Mar	12	18	13	16	16	20	19	19	18	14	14	17	20	35	35	13	9	17	19	33	48	37	26	9	48
19-Mar	11	9	10	10	9	9	9	9	9	9	15	13	12	13	12	11	9	18	11	12	12	10	24	14	24
20-Mar	19	15	14	13	14	19	14	16	21	62	25	81	33	87	53	18	14	9	9	8	8	8	9	7	87
21-Mar	7	8	8	8	8	7	7	8	9	8	19	11	11	14	10	11	9	10	9	8	10	11	9	9	19
22-Mar	9	8	7	8	8	11	12	10	12	11	10	11	12	13	20	16	38	16	18	11	45	18	13	15	45
23-Mar	15	15	14	17	19	17	14	14	16	21	42	45	10	9	23	15	20	9	29	25	32	9	8	8	45
24-Mar	9	8	8	7	6	9	16	11	8	13	17	16	20	11	9	9	9	11	12	13	11	15	13	12	20
25-Mar	9	11	9	9	11	11	9	8	8	9	8	9	12	10	12	22	22	32	13	14	18	17	13	14	32
26-Mar	15	17	14	12	15	26	16	10	11	11	23	41	11	8	48	83	23	16	9	13	7	30	11	68	83
27-Mar	17	13	12	8	18	12	12	18	14	24	19	20	28	77	19	44	23	11	12	12	9	8	8	9	77
28-Mar	9	8	9	7	8	8	8	8	8	10	14	13	19	25	21	16	12	15	14	13	12	8	9	7	25
29-Mar	8	7	7	8	4	7	8	7	11	10	18	12	16	24	12	11	10	11	12	12	13	10	8	8	24
30-Mar	9	16	9	10	9	15	11	9	18	27	27	20	26	34	40	40	56	32	23	18	5	82	17	7	82
31-Mar	12	14	10	9	7	8	22	24	14	14	13	12	11	13	21	15	16	14	11	12	9	12	15	13	24
Diurnal Maximum																									





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 45 m (WD45m) - deg

Mannix - March 2017

Direction of Maximum Speed: 287 deg on Mar 19 03:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 281.9 deg on Mar 19		Hours of Data:	744
Direction of Minimum Speed: 172 deg on Mar 26 16:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 2.6 deg on Mar 5		Percent Operational Time:	100.0
Monthly Average Direction: 2.3 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-Mar	17	18	9	10	25	42	40	26	40	32	355	307	284	272	302	310	318	326	352	353	9	20	44	5	353.0
2-Mar	327	138	151	160	153	157	165	162	156	138	142	144	127	126	109	103	108	111	123	121	119	128	125	120	130.3
3-Mar	125	126	125	129	131	130	133	134	135	130	141	135	144	214	288	249	292	312	319	325	327	345	9	7	99.2
4-Mar	3	5	11	11	5	6	7	5	4	3	9	7	6	7	2	5	9	8	10	13	34	35	30	5	8.8
5-Mar	6	293	326	355	0	20	69	83	110	128	144	164	186	215	263	281	306	332	324	8	34	56	59	356	19.0
6-Mar	346	3	7	4	0	2	359	2	4	5	345	350	11	2	7	0	0	358	359	346	351	343	336	345	357.5
7-Mar	344	335	334	341	335	347	343	339	337	338	334	334	330	329	333	335	9	14	12	22	16	7	2	4	346.8
8-Mar	1	352	357	354	354	349	276	297	297	283	322	308	325	323	316	333	11	25	20	13	9	14	8	353	350.2
9-Mar	355	357	354	329	329	335	297	319	323	354	10	324	266	282	275	78	64	68	15	14	14	24	22	17	356.4
10-Mar	20	37	59	41	33	26	7	10	43	231	23	340	300	293	285	302	358	352	358	1	3	20	79	109	2.4
11-Mar	105	94	96	106	131	126	128	130	131	140	128	97	117	114	95	83	80	99	83	78	101	113	128	125	109.2
12-Mar	105	114	125	125	141	143	143	144	129	135	127	139	131	138	132	122	126	124	123	129	124	129	134	130	129.7
13-Mar	133	137	138	138	139	140	139	137	140	138	138	141	139	142	143	138	143	145	153	169	160	153	146	139	142.7
14-Mar	129	131	128	132	133	132	139	144	144	136	134	130	116	120	108	127	100	87	100	101	109	114	127	127	125.3
15-Mar	122	128	140	135	135	142	156	156	155	143	171	236	237	237	254	246	263	333	354	360	20	37	66	72	174.7
16-Mar	0	356	354	356	355	1	2	6	8	5	1	358	359	359	358	359	0	1	359	1	358	4	15	357	0.4
17-Mar	350	26	98	120	115	131	292	320	139	139	342	17	308	312	326	342	329	338	349	346	354	354	355	357	355.6
18-Mar	356	326	324	337	335	335	325	339	315	316	291	292	295	349	119	118	125	106	87	98	20	40	331	286	0.9
19-Mar	289	285	287	279	273	272	276	271	270	270	264	257	258	269	271	270	274	292	308	304	301	288	302	340	281.9
20-Mar	358	356	344	338	336	359	9	19	14	340	310	357	57	25	99	124	122	127	131	134	140	141	139	137	54.5
21-Mar	141	138	140	135	139	142	142	140	138	141	154	139	137	131	125	132	132	134	131	125	143	138	135	131	135.8
22-Mar	128	129	126	126	121	119	115	117	118	122	124	130	133	134	134	142	211	230	250	254	301	330	334	343	121.1
23-Mar	1	341	339	332	340	346	348	4	16	11	329	281	264	261	289	311	278	277	320	18	92	119	123	126	342.3
24-Mar	131	148	153	147	153	134	146	153	145	137	137	156	158	137	121	127	127	118	110	109	114	111	110	118	132.1
25-Mar	119	115	100	100	104	117	121	123	122	124	121	125	123	124	130	111	103	100	54	61	97	96	95	94	110.6
26-Mar	101	105	102	114	110	105	126	122	117	125	133	255	274	273	1	172	128	125	93	61	72	102	106	123	112.8
27-Mar	116	131	123	135	149	143	125	146	130	123	104	60	8	321	298	20	111	116	101	109	121	128	137	145	123.3
28-Mar	141	137	134	128	134	134	136	126	128	131	143	153	151	146	131	114	125	112	105	109	115	125	132	128	130.7
29-Mar	135	127	125	138	145	143	141	148	144	141	143	146	139	122	128	128	124	126	125	103	107	117	123	124	130.9
30-Mar	122	117	129	130	130	112	132	140	131	63	53	47	31	319	277	295	15	336	337	267	282	264	186	155	123.2
31-Mar	161	157	150	169	168	161	177	159	153	141	137	134	139	149	176	192	184	189	163	169	166	195	177	171	168.0

75.0 72.3 80.6 90.0 95.0 91.6 98.1 102.9 101.6 104.5 101.6 131.5 174.6 220.3 141.4 102.6 70.3 46.6 42.4 50.8 63.2 80.0 92.6 93.7
Diurnal Average

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



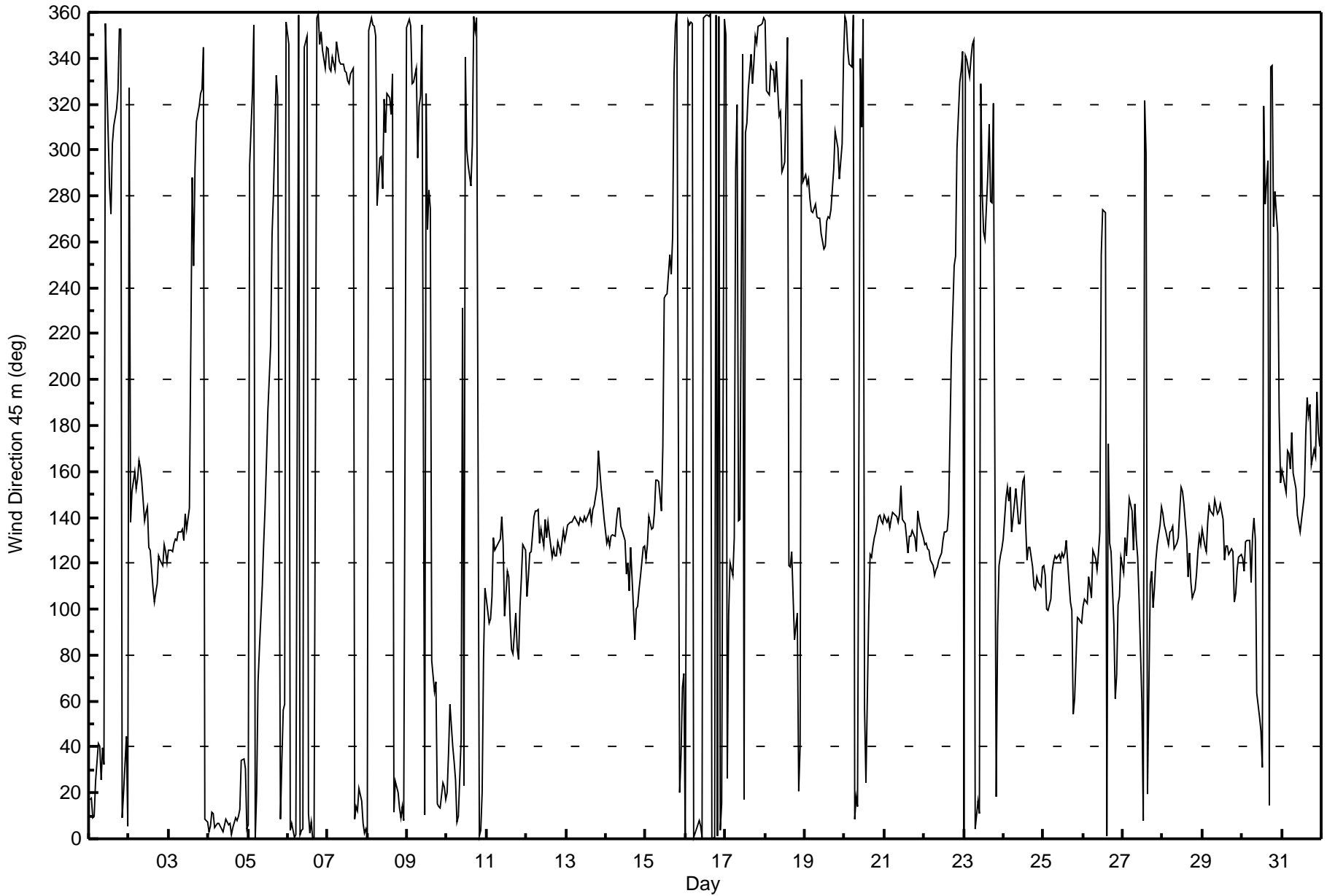
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction 45 m (WD45m) - deg

Mannix - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 100 deg on Mar 9 16:00 Minimum Value: 3 deg on Mar 29 05:00 Percentiles: P ₁ = 4 P ₁₀ = 6 Q ₁ = 8 Median = 10 Q ₃ = 15 P ₉₀ = 24 P ₉₉ = 72																	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-Mar	6	7	8	10	9	8	8	8	7	26	24	50	16	12	9	9	9	11	4	6	9	18	29	47	50
2-Mar	47	61	5	5	8	11	4	5	8	12	9	8	14	14	16	14	12	11	7	7	9	8	8	9	61
3-Mar	6	6	7	6	7	7	7	9	9	8	9	13	13	56	40	55	22	13	12	13	11	19	9	8	56
4-Mar	7	8	7	8	7	10	9	8	6	8	9	9	8	10	12	10	9	8	7	8	12	8	10	4	12
5-Mar	9	23	32	7	4	13	12	10	18	14	14	18	41	32	24	16	13	9	6	18	15	19	14	17	41
6-Mar	12	7	5	5	7	6	9	9	8	7	17	16	10	10	8	12	9	10	11	13	12	12	11	13	17
7-Mar	14	10	11	11	10	12	10	10	9	11	9	10	13	14	14	15	10	9	9	10	10	9	8	7	15
8-Mar	9	10	6	6	5	15	10	8	9	26	24	18	15	17	16	35	15	9	10	8	6	7	8	9	35
9-Mar	5	6	9	9	9	14	22	29	37	72	32	69	28	31	31	100	15	23	18	6	6	8	9	13	100
10-Mar	9	11	12	7	22	28	17	13	40	95	92	39	26	23	19	19	19	19	8	5	6	13	19	20	95
11-Mar	28	14	6	8	10	7	7	8	9	10	15	31	24	19	17	15	15	15	13	11	12	11	11	9	31
12-Mar	11	11	8	9	6	5	4	7	9	10	11	11	15	21	16	10	8	9	9	9	8	6	7	7	21
13-Mar	7	8	7	7	7	7	8	8	8	7	7	7	8	8	8	9	7	7	11	6	7	5	6	8	11
14-Mar	5	5	5	5	5	5	4	4	9	7	6	9	10	13	15	10	18	6	12	12	11	10	8	6	18
15-Mar	8	15	8	8	6	6	10	7	8	10	45	11	9	14	7	11	28	8	14	7	10	6	16	12	45
16-Mar	30	6	6	8	9	6	6	8	8	9	7	7	6	7	7	7	5	5	6	4	6	6	8	10	30
17-Mar	20	17	14	11	12	53	19	71	78	47	44	51	19	8	10	16	12	10	9	10	9	8	7	8	78
18-Mar	7	14	11	12	12	17	15	14	15	15	14	15	24	31	31	12	7	15	17	24	45	30	30	9	45
19-Mar	8	7	8	9	8	8	8	7	8	8	14	11	11	13	11	9	8	18	9	10	10	8	24	9	24
20-Mar	17	12	9	10	10	15	10	12	23	59	19	55	29	71	54	17	13	7	7	6	6	6	6	5	71
21-Mar	4	4	5	6	6	5	4	7	6	7	16	10	9	13	9	10	8	9	8	7	8	9	8	8	16
22-Mar	8	7	6	6	7	9	11	9	11	11	8	9	9	10	18	19	35	12	15	9	31	15	10	12	35
23-Mar	10	11	11	15	15	12	11	9	12	15	35	42	9	8	20	12	20	9	25	21	32	8	7	8	42
24-Mar	8	7	6	6	4	9	7	6	7	13	18	12	17	9	9	9	9	10	11	11	11	13	11	10	18
25-Mar	9	11	8	9	10	10	8	7	7	7	7	7	10	8	9	21	20	31	11	13	17	18	16	11	31
26-Mar	14	13	11	12	13	19	10	10	10	10	26	38	8	8	42	97	20	16	7	10	9	17	10	29	97
27-Mar	14	10	9	5	8	9	8	14	12	18	16	24	21	75	21	35	21	11	12	11	10	6	6	6	75
28-Mar	6	6	6	5	6	5	5	5	6	8	12	10	15	21	20	15	11	15	13	12	11	6	6	5	21
29-Mar	5	4	4	6	3	7	7	4	11	9	16	10	15	24	9	10	10	9	9	11	13	10	8	7	24
30-Mar	7	15	7	8	7	14	8	8	17	21	28	18	22	30	30	31	61	29	16	21	8	81	15	5	81
31-Mar	10	12	6	8	4	7	15	18	12	13	11	11	10	10	18	10	11	9	9	7	6	9	13	8	18
Diurnal Maximum																									





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 75 m (WD75m) - deg
Mannix - March 2017

Direction of Maximum Speed: 289 deg on Mar 19 03:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 283.9 deg on Mar 19	Hours of Data: 736
Direction of Minimum Speed: 273 deg on Mar 26 16:00	Hours of Missing Data: 8
Direction of Minimum Daily Speed Average: 3.2 deg on Mar 5	Percent Operational Time: 98.9
Monthly Average Direction: 48.7 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-Mar	42	36	24	21	41	53	58	43	56	59	15	311	289	277	307	317	323	337	358	2	19	29	37	81	9.1
2-Mar	345	140	137	146	146	145	135	135	133	131	136	142	126	125	109	105	110	113	124	124	124	130	128	123	127.8
3-Mar	128	129	127	129	131	130	132	131	132	129	140	139	145	216	286	250	295	317	321	328	329	347	11	10	96.2
4-Mar	7	7	14	12	8	9	9	7	7	6	12	10	8	9	4	8	12	10	12	16	36	37	38	17	11.6
5-Mar	14	304	343	356	6	25	73	87	109	126	140	159	179	211	262	278	310	341	319	354	42	57	50	1	25.9
6-Mar	359	12	15	12	6	8	4	5	6	7	349	352	14	6	10	3	2	1	1	351	354	348	341	350	1.9
7-Mar	347	341	339	345	338	352	347	344	342	342	339	338	334	332	335	339	11	15	13	23	18	9	4	6	351.0
8-Mar	3	357	2	0	2	357	302	314	338	315	326	313	329	327	321	337	17	26	21	16	12	19	15	360	357.5
9-Mar	2	2	3	346	353	355	329	320	333	349	7	319	270	289	280	96	67	65	24	21	23	44	55	43	7.9
10-Mar	40	44	80	63	49	55	38	66	87	145	37	352	316	305	291	308	4	357	2	6	9	56	110	128	17.6
11-Mar	113	97	93	106	130	126	127	127	125	128	123	102	114	114	95	83	82	98	85	84	104	116	125	122	109.4
12-Mar	116	123	127	124	130	128	127	131	126	133	127	137	132	140	133	124	127	125	123	128	126	131	137	133	129.4
13-Mar	135	138	139	139	139	141	140	137	140	139	139	141	140	142	143	138	145	146	156	170	161	155	149	143	143.8
14-Mar	137	138	137	138	139	140	149	151	150	139	134	133	118	119	109	131	105	94	101	99	111	115	129	131	132.7
15-Mar	125	131	140	136	136	142	157	162	162	148	191	237	238	238	255	246	264	338	358	4	26	41	63	79	171.0
16-Mar	29	4	359	360	359	3	4	9	11	9	4	1	2	2	1	1	3	4	4	6	4	8	20	4	4.5
17-Mar	0	49	101	121	116	135	295	64	108	122	54	48	318	316	333	347	339	346	356	355	359	360	360	0	6.3
18-Mar	359	338	337	AF	AF	AF	AF	AF	AF	AF	AF	315	313	13	120	119	126	106	89	101	40	54	342	290	--
19-Mar	292	286	289	280	275	274	278	273	272	271	265	258	259	270	272	272	275	294	311	307	303	290	305	342	283.9
20-Mar	1	358	348	343	340	2	11	21	16	346	317	7	55	42	107	121	122	128	131	134	140	143	142	139	60.7
21-Mar	141	134	134	129	130	134	129	130	133	137	148	136	135	132	126	133	133	135	133	128	143	140	136	132	134.2
22-Mar	130	130	127	127	124	122	115	116	119	120	123	129	133	132	133	138	208	234	255	264	314	337	339	346	116.9
23-Mar	4	347	345	337	345	353	354	7	19	16	337	287	270	266	297	319	287	285	330	26	95	122	125	129	349.7
24-Mar	132	148	153	149	156	139	145	151	147	138	138	155	155	136	123	129	129	120	112	110	116	114	113	120	135.8
25-Mar	120	114	101	102	111	118	122	124	124	126	122	124	123	124	127	109	111	98	62	71	99	100	103	96	111.7
26-Mar	100	108	104	119	111	113	123	122	116	124	133	234	276	274	10	273	128	125	94	75	88	108	113	129	116.5
27-Mar	127	130	119	131	136	132	119	138	127	110	106	65	15	8	310	44	119	114	101	109	122	131	139	147	123.2
28-Mar	144	138	137	131	135	136	138	131	130	132	143	153	151	146	132	116	124	111	105	108	114	126	130	131	133.1
29-Mar	143	136	129	137	145	143	136	150	150	143	143	145	139	124	128	127	122	122	117	101	107	117	122	123	133.7
30-Mar	121	117	129	129	128	112	128	134	126	63	51	48	34	328	286	306	21	347	350	294	301	292	174	155	115.6
31-Mar	160	157	154	170	170	160	179	161	155	147	141	141	142	152	177	192	184	189	167	172	169	198	180	174	170.2

80.3	76.4	79.4	91.5	98.3	94.1	98.0	102.5	99.4	99.6	95.6	121.4	152.4	247.7	338.2	76.3	59.2	36.0	35.5	45.7	58.3	76.8	92.2	96.1
Diurnal Average																							

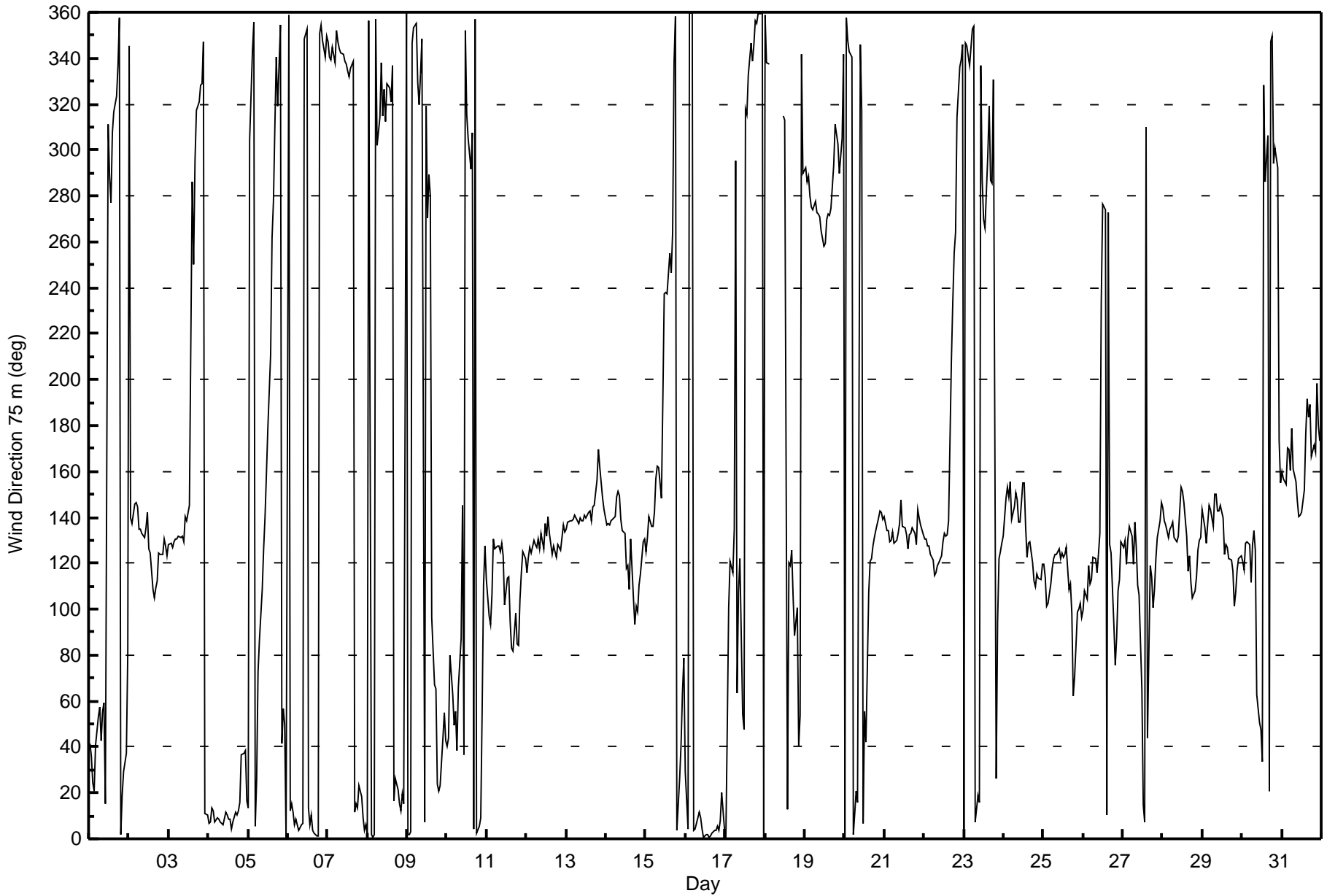
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 75 m (WD75m) - deg
Mannix - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 99 deg on Mar 30 22:00 Minimum Value: 2 deg on Mar 14 08:00 Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 7 Median = 10 Q ₃ = 15 P ₉₀ = 22 P ₉₉ = 55																	Hours in Service: 744 Hours of Data: 736 Hours of Missing Data: 8 Hours of Calibration: 0 Percent Operational Time: 98.9								
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-Mar	9	7	9	10	7	8	9	7	7	24	24	52	14	11	10	9	8	13	4	4	7	8	3	37	52
2-Mar	59	18	7	4	6	9	9	9	6	8	10	8	15	14	17	16	15	14	9	9	9	8	10	11	59
3-Mar	7	6	8	6	6	6	7	6	7	6	9	13	12	56	30	22	22	12	10	12	10	19	9	7	56
4-Mar	6	7	6	7	6	9	7	6	5	7	8	7	6	9	12	8	7	7	5	6	10	7	8	4	12
5-Mar	5	24	23	12	5	13	13	13	18	14	13	18	38	29	26	15	15	12	12	27	10	12	13	7	38
6-Mar	7	6	4	3	6	5	7	7	7	7	15	15	8	9	7	10	8	9	10	12	11	12	9	11	15
7-Mar	13	9	10	10	8	11	9	9	7	10	8	8	12	12	13	15	8	7	7	7	8	8	7	6	15
8-Mar	8	8	4	6	3	8	15	8	12	15	24	17	15	15	15	33	13	7	7	5	4	5	4	9	33
9-Mar	5	5	5	9	9	17	10	9	9	37	22	60	24	33	33	84	17	20	13	5	6	8	9	8	84
10-Mar	10	20	11	9	9	9	4	16	15	57	81	38	27	21	19	19	20	19	7	4	5	30	16	12	81
11-Mar	22	16	14	16	8	8	7	8	12	12	17	27	25	19	17	14	14	17	13	11	15	14	13	13	27
12-Mar	15	12	8	10	6	8	7	7	9	11	13	10	14	21	17	12	9	11	12	10	9	6	7	7	21
13-Mar	7	7	6	6	6	6	7	6	6	6	6	6	6	7	7	7	7	6	12	5	6	4	5	7	12
14-Mar	5	3	4	4	3	3	3	2	6	6	6	10	14	15	16	12	18	13	15	15	14	13	8	5	18
15-Mar	10	16	6	7	4	5	7	6	7	9	42	11	9	14	7	10	29	6	12	8	9	5	10	12	42
16-Mar	37	6	6	6	7	5	4	6	7	8	6	5	5	5	5	6	4	4	5	3	4	5	6	10	37
17-Mar	18	19	16	13	14	41	66	50	24	28	54	48	27	8	10	11	13	9	6	7	7	5	5	5	66
18-Mar	6	12	10	AF	AF	AF	AF	AF	AF	AF	AF	21	42	37	24	14	9	17	17	21	42	26	40	7	42
19-Mar	6	7	7	8	7	7	7	7	7	7	13	10	11	12	11	9	7	18	8	10	10	7	23	8	23
20-Mar	17	12	8	9	8	13	8	11	17	50	20	51	24	56	59	18	14	8	7	6	4	4	4	3	59
21-Mar	3	4	5	6	6	5	5	6	6	7	14	10	9	13	9	9	7	8	8	8	8	8	7	8	14
22-Mar	8	7	8	7	9	11	14	13	13	14	11	9	9	9	15	17	35	11	14	13	23	13	8	10	35
23-Mar	9	10	9	13	14	10	8	8	9	13	32	47	9	8	19	12	21	12	26	18	31	11	10	9	47
24-Mar	7	6	5	4	4	7	5	4	6	12	18	10	14	9	11	9	11	13	14	15	14	16	15	13	18
25-Mar	13	14	14	15	14	13	10	10	10	9	11	10	13	11	10	19	19	29	11	12	18	19	18	15	29
26-Mar	16	15	15	14	16	18	13	12	14	12	21	38	10	5	36	93	17	18	13	8	12	17	16	10	93
27-Mar	11	8	13	6	5	7	16	12	14	17	18	24	19	80	36	29	20	15	15	15	12	7	5	5	80
28-Mar	5	4	5	5	5	4	4	5	6	8	12	9	14	18	20	15	12	16	16	15	14	9	6	6	20
29-Mar	4	6	5	4	5	11	6	5	10	8	15	9	14	21	10	11	13	12	14	14	15	13	12	11	21
30-Mar	12	16	7	8	8	16	10	7	17	16	19	17	19	33	26	33	49	31	14	25	12	99	14	5	99
31-Mar	9	9	6	6	5	4	11	12	11	13	10	12	9	10	17	9	9	8	8	7	6	9	12	7	17
																	59 24 23 16 16 41 66 50 24 57 81 60 42 80 59 93 49 31 26 27 42 99 40 37								
Diurnal Maximum																									
AF - Analyzer Failure																									



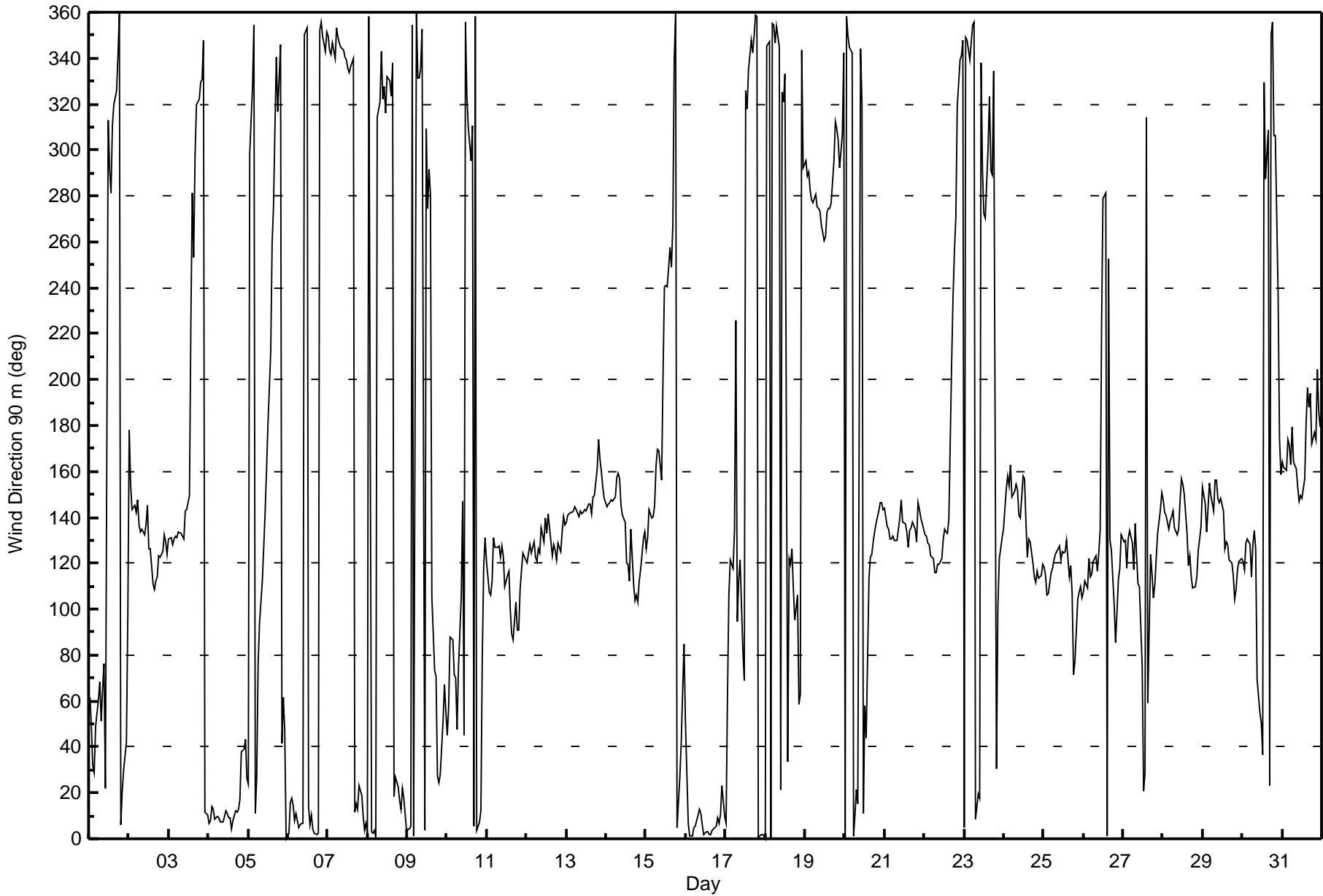


Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 90 m (WD90m) - deg

Mannix - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Mar 17 07:00 Minimum Value: 2 deg on Mar 21 07:00 Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 6 Median = 8 Q ₃ = 12 P ₉₀ = 22 P ₉₉ = 70																	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-Mar	9	6	10	11	6	10	10	7	7	24	26	57	13	11	10	9	8	13	4	4	6	5	7	27	57
2-Mar	96	14	14	6	5	10	9	7	4	7	9	8	13	12	12	12	9	8	7	6	7	7	7	7	96
3-Mar	5	4	6	4	5	5	6	5	5	5	8	13	12	53	26	16	22	12	9	11	10	19	8	6	53
4-Mar	6	7	6	6	6	9	6	6	5	6	7	7	6	9	11	8	7	6	5	6	10	7	8	5	11
5-Mar	8	29	22	14	6	12	14	10	14	11	12	18	35	28	25	14	15	12	15	29	10	12	14	8	35
6-Mar	5	5	3	3	6	5	7	7	6	7	14	15	8	9	7	10	8	8	9	11	10	11	9	11	15
7-Mar	12	9	9	9	8	10	8	8	6	9	7	8	12	12	12	15	8	7	6	6	7	8	6	6	15
8-Mar	7	8	3	5	2	7	17	8	12	14	25	18	15	15	14	31	13	7	6	4	4	4	4	10	31
9-Mar	5	4	4	8	7	18	10	11	7	28	20	70	25	33	37	80	19	18	13	4	7	8	10	6	80
10-Mar	15	27	13	8	24	22	9	12	18	31	75	41	29	22	19	19	20	19	7	3	7	34	7	6	75
11-Mar	15	11	9	9	5	5	4	5	8	10	14	25	22	16	14	12	12	13	11	8	9	10	11	9	25
12-Mar	9	8	6	7	5	7	6	6	7	10	11	10	13	20	16	9	8	8	8	9	7	6	6	7	20
13-Mar	6	7	6	6	5	6	7	7	6	6	6	6	6	7	7	7	7	6	12	5	6	5	5	6	12
14-Mar	4	3	3	4	3	3	3	2	6	5	6	9	9	10	11	11	11	5	8	10	10	8	7	5	11
15-Mar	8	15	6	6	3	4	6	5	6	9	38	10	8	14	7	9	29	5	11	7	8	6	10	10	38
16-Mar	39	6	6	6	6	4	4	6	7	8	6	5	5	4	5	6	4	4	5	3	5	5	5	10	39
17-Mar	17	21	11	9	9	34	103	35	15	19	35	48	30	8	9	10	12	7	6	7	6	4	4	4	103
18-Mar	5	9	15	10	7	11	10	8	19	35	30	31	50	47	18	9	6	11	14	17	43	26	46	6	50
19-Mar	5	6	6	8	7	6	7	7	7	7	13	10	11	12	10	8	6	17	8	9	9	7	22	7	22
20-Mar	16	11	7	8	8	13	9	11	21	54	20	54	26	56	59	16	12	7	6	5	3	4	3	3	59
21-Mar	2	5	3	4	2	3	2	4	4	5	14	10	10	12	8	9	7	7	8	6	8	8	7	7	14
22-Mar	7	6	6	6	6	7	8	8	9	10	9	8	8	8	13	17	33	10	14	15	20	12	7	9	33
23-Mar	9	9	8	13	13	10	8	8	8	12	32	46	10	9	19	12	21	13	26	19	29	7	7	7	46
24-Mar	6	6	5	4	4	7	4	4	6	12	17	10	14	8	8	10	9	9	8	9	11	8	9	9	17
25-Mar	8	8	7	8	10	8	7	7	7	7	7	7	9	8	9	13	13	28	12	11	12	14	11	8	28
26-Mar	8	10	9	8	10	12	10	8	9	10	20	34	11	9	38	82	14	16	6	7	6	9	9	8	82
27-Mar	8	6	8	4	4	7	10	9	10	10	12	23	18	86	45	28	17	10	10	10	10	7	4	5	86
28-Mar	5	3	4	4	4	3	3	5	4	7	11	9	14	17	19	13	10	11	11	10	9	7	4	5	19
29-Mar	6	8	3	3	5	12	7	6	9	8	14	9	14	20	9	10	10	8	10	9	10	8	8	8	20
30-Mar	9	12	6	6	6	11	8	6	14	16	18	19	21	35	28	34	55	34	14	29	19	87	11	5	87
31-Mar	9	8	6	6	5	3	8	10	10	14	11	12	9	10	17	8	9	8	8	7	6	9	12	7	17
Diurnal Maximum																									





Summary of Hour Averages

Mannix - March 2017

Maximum Value: 1.4 km/h on Mar 13 12:00 Maximum Daily Average: 1.0 km/h on Mar 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: -1.1 km/h on Mar 19 21:00 Minimum Daily Average: -0.5 km/h on Mar 19 Maximum Diurnal Average: 0.4 km/h at hour 22 Minimum Diurnal Average: 0.2 km/h at hour 15 Monthly Average: 0.30 km/h Percentiles: P ₁ = -0.7 P ₁₀ = -0.2 Q ₁ = -0.1 Median = 0.3 Q ₃ = 0.7 P ₉₀ = 0.9 P ₉₉ = 1.2																										
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-Mar	0.1	0.0	0.0	-0.2	0.1	0.5	0.4	0.4	0.5	0.6	0.5	0.1	0.2	0.0	-0.2	-0.4	-0.2	-0.1	-0.1	-0.1	0.0	0.0	0.0	-0.1	0.1	0.6
2-Mar	0.0	0.2	0.1	0.1	0.2	-0.2	0.0	0.0	0.2	0.2	0.2	0.3	0.4	0.6	0.8	1.1	1.1	0.9	0.9	1.0	1.0	0.9	0.7	0.8	0.5	1.1
3-Mar	0.9	0.9	0.9	0.8	0.7	0.9	0.7	0.6	0.7	0.8	0.6	0.6	0.5	0.0	-0.1	-0.2	-0.4	-0.4	-0.3	-0.3	-0.7	-0.1	0.0	0.0	0.3	0.9
4-Mar	0.1	-0.2	0.2	0.2	-0.1	0.0	0.0	-0.1	-0.1	-0.3	0.0	0.1	0.0	0.3	0.2	0.1	0.2	-0.1	-0.1	0.2	0.4	0.4	0.2	0.0	0.1	0.4
5-Mar	0.1	0.1	0.1	0.0	-0.1	0.0	0.4	0.6	0.8	0.7	0.4	0.3	0.7	0.2	-0.1	-0.3	0.0	0.1	-0.1	0.1	0.2	0.1	0.0	-0.1	0.2	0.8
6-Mar	0.0	-0.1	-0.1	-0.1	-0.2	-0.3	-0.3	-0.2	-0.2	-0.2	-0.3	0.1	0.0	0.0	0.1	0.0	-0.2	-0.1	0.0	-0.1	0.2	-0.2	-0.2	0.1	-0.1	0.2
7-Mar	-0.3	-0.3	-0.2	-0.2	-0.1	-0.2	-0.3	-0.2	-0.6	-0.3	-0.5	-0.4	-0.1	0.0	-0.2	-0.1	0.1	0.3	0.3	0.5	0.1	0.0	-0.1	0.1	-0.1	0.5
8-Mar	0.0	0.0	-0.1	-0.2	-0.3	-0.1	-0.1	-0.1	-0.2	-0.3	0.3	-0.1	0.0	-0.1	-0.2	0.4	0.3	0.5	0.4	0.3	0.1	0.1	-0.1	-0.2	0.0	0.5
9-Mar	-0.2	-0.1	0.0	0.0	-0.1	-0.2	-0.2	0.1	0.2	0.1	0.1	-0.1	-0.1	-0.4	-0.4	0.0	0.3	0.3	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.3
10-Mar	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.2	-0.2	-0.1	0.0	-0.3	0.0	0.0	-0.1	-0.1	-0.1	0.0	0.1	0.3	0.0	0.3
11-Mar	0.1	0.2	0.4	0.4	0.6	0.6	0.5	0.5	0.8	0.2	0.3	0.5	0.5	0.9	0.8	0.9	1.0	0.8	0.7	0.8	0.7	1.1	0.7	0.6	0.6	1.1
12-Mar	0.9	0.8	0.8	0.8	0.4	0.5	0.4	0.3	0.5	0.6	0.5	0.7	0.8	0.5	0.7	0.8	0.8	0.8	0.7	0.6	1.1	1.0	0.9	0.9	0.7	1.1
13-Mar	0.8	1.1	1.0	0.8	1.2	1.1	1.1	1.1	1.2	1.2	1.1	1.4	1.3	1.4	1.2	1.1	1.0	0.9	0.6	0.1	0.5	1.0	0.9	0.7	1.0	1.4
14-Mar	0.7	0.8	0.7	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.7	0.7	0.6	0.7	0.8	0.6	0.6	0.6	0.7	0.6	1.0	1.1	1.1	1.0	0.8	1.1
15-Mar	0.9	0.8	0.8	0.7	0.9	0.8	0.5	0.6	0.8	0.7	0.4	-0.3	-0.6	-0.4	-0.7	-0.7	-0.4	-0.3	-0.1	-0.1	0.1	0.1	0.2	0.2	0.2	0.9
16-Mar	-0.1	-0.2	-0.5	-0.2	-0.2	-0.2	-0.3	0.2	-0.1	0.2	-0.3	-0.1	-0.3	-0.3	-0.5	-0.3	-0.3	-0.3	-0.1	-0.3	-0.1	-0.1	0.3	-0.3	-0.2	0.3
17-Mar	0.0	0.1	0.9	0.8	1.0	0.6	0.0	-0.1	-0.1	0.2	0.1	0.3	-0.2	-0.3	-0.4	0.3	0.0	0.0	-0.1	-0.2	-0.1	-0.2	-0.2	0.0	0.1	1.0
18-Mar	-0.1	-0.1	-0.2	0.1	0.0	-0.2	-0.2	-0.1	-0.2	0.0	0.1	0.0	0.0	-0.1	0.5	1.1	0.6	0.8	0.7	0.4	0.0	0.3	0.0	-0.2	0.1	1.1
19-Mar	-0.6	-0.8	-0.7	-0.7	-0.3	-0.5	-0.3	-0.5	-0.4	-0.4	-0.3	-0.5	-0.5	-0.3	-0.5	-0.5	-0.6	-0.7	-0.7	-0.7	-1.1	-0.5	-0.7	-0.4	-0.5	-0.3
20-Mar	0.0	-0.2	-0.4	-0.2	-0.2	0.1	0.2	0.5	0.3	0.2	0.2	-0.2	0.3	-0.1	0.2	0.5	0.6	0.2	0.7	0.6	0.7	0.8	0.8	0.8	0.3	0.8
21-Mar	0.8	0.6	0.6	0.5	0.4	0.5	0.5	0.5	0.5	0.4	0.1	0.6	0.6	0.9	0.8	1.1	1.0	1.2	1.1	1.0	1.1	1.0	1.0	1.0	0.7	1.2
22-Mar	0.8	1.0	0.9	0.9	0.7	0.7	1.1	0.8	0.9	0.8	0.5	0.8	0.7	0.7	0.6	0.3	0.1	0.1	0.0	-0.2	0.0	-0.3	-0.3	-0.1	0.5	1.1
23-Mar	0.0	-0.2	-0.1	-0.1	-0.2	-0.1	-0.2	0.1	0.2	0.0	0.1	-0.2	-0.4	-0.1	0.0	-0.2	-0.2	-0.1	-0.2	0.2	0.5	0.5	0.5	0.5	0.0	0.5
24-Mar	0.7	0.6	0.5	0.7	0.6	0.6	0.4	0.4	0.6	0.6	0.7	0.5	0.4	0.6	0.8	0.7	0.8	0.9	1.0	1.0	0.7	1.0	1.1	0.9	0.7	1.1
25-Mar	0.8	0.9	0.6	0.9	1.3	0.8	0.6	0.6	0.6	0.7	0.5	0.5	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.4	0.4	0.3	0.6	1.3
26-Mar	0.4	0.7	0.7	0.6	0.6	0.7	0.4	0.5	0.9	0.5	0.3	0.1	-0.1	-0.2	0.3	0.3	0.3	0.6	0.7	0.3	0.3	0.3	0.3	0.3	0.4	0.9
27-Mar	0.5	0.6	0.3	0.4	0.1	0.3	0.4	0.2	0.2	0.5	0.7	0.3	0.2	0.2	0.0	0.2	0.4	0.8	0.8	1.0	0.8	0.9	0.7	0.8	0.5	1.0
28-Mar	0.6	0.7	0.6	0.9	0.8	0.6	0.6	0.6	0.7	0.6	0.4	0.5	0.6	0.7	0.7	0.6	0.6	0.9	0.8	0.8	1.2	0.8	0.6	0.6	0.7	1.2
29-Mar	0.6	0.6	0.7	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.4	0.5	0.5	0.8	0.3	0.6	0.6	0.8	0.8	0.8	1.0	0.9	0.7	0.8	0.6	1.0
30-Mar	0.9	0.7	0.6	0.7	0.6	0.7	0.6	0.4	0.6	0.4	0.5	0.3	0.3	0.3	0.2	0.2	0.2	0.0	0.0	0.0	0.1	0.2	-0.1	0.3	0.4	0.9
31-Mar	0.2	0.3	0.4	0.1	0.3	0.4	0.1	0.4	0.6	0.6	0.6	0.8	0.7	0.7	0.1	-0.3	-0.2	-0.2	0.5	0.2	0.2	-0.2	0.0	0.2	0.3	0.8
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.5 km/h on Mar 19 03:00 Minimum Value: 0.1 km/h on Mar 10 08:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 1.0 Median = 1.4 Q ₃ = 2.0 P ₉₀ = 2.5 P ₉₉ = 3.2																				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-Mar	0.8	0.7	0.7	0.6	0.7	1.2	0.9	0.9	1.1	1.1	1.5	1.3	1.5	1.4	1.6	1.4	1.3	1.0	0.5	0.5	0.7	0.3	0.3	0.4	1.6
2-Mar	0.2	0.2	0.4	0.7	0.5	0.5	0.5	0.8	1.1	0.8	1.0	1.1	1.3	1.5	1.8	1.8	2.1	2.3	2.3	2.8	2.5	2.4	2.4	2.4	2.8
3-Mar	2.1	2.1	2.3	1.8	1.8	2.0	1.3	1.2	1.5	1.5	1.4	1.2	1.5	1.2	0.8	1.0	1.5	2.2	2.1	2.6	2.6	2.3	2.2	2.0	2.6
4-Mar	2.3	2.7	2.5	2.2	2.2	2.3	2.9	2.9	2.7	2.6	2.6	2.3	2.2	2.2	2.0	2.0	1.9	1.6	1.7	1.8	1.6	1.6	1.0	1.0	2.9
5-Mar	0.7	0.4	0.3	0.4	0.7	1.0	0.9	1.0	1.2	1.3	1.3	1.3	1.3	1.5	1.2	1.0	0.9	0.7	0.5	0.3	0.5	0.3	0.2	0.2	1.5
6-Mar	0.4	0.9	1.2	1.6	2.0	2.3	2.9	2.7	2.9	2.7	2.4	2.4	2.0	2.3	2.2	2.5	3.0	2.9	2.9	2.6	2.5	2.6	2.5	2.2	3.0
7-Mar	2.4	2.6	2.6	2.6	2.4	2.4	2.3	2.6	3.0	3.0	2.9	2.7	2.3	2.4	2.3	2.2	2.3	2.3	2.1	1.7	1.5	2.0	2.3	2.2	3.0
8-Mar	1.7	1.5	1.2	1.2	1.0	0.9	0.7	0.6	0.6	0.9	1.4	1.7	2.0	2.0	1.6	1.6	1.7	1.9	1.7	2.1	2.3	1.5	0.9	0.6	2.3
9-Mar	0.9	0.7	0.8	0.4	0.3	0.5	0.7	0.3	0.4	0.7	1.0	1.1	1.3	1.3	1.2	1.3	1.1	0.8	0.8	0.9	1.0	0.6	0.5	0.3	1.3
10-Mar	0.3	0.4	0.3	0.2	0.3	0.2	0.3	0.1	0.4	0.8	1.1	1.4	1.2	1.5	1.4	1.3	1.4	0.8	1.0	1.3	1.3	0.6	0.3	0.4	1.5
11-Mar	0.4	0.6	0.7	0.7	1.0	1.0	1.0	1.3	1.3	0.9	1.3	1.3	1.6	2.0	2.0	1.8	1.6	1.5	1.0	1.0	1.5	2.1	1.5	1.3	2.1
12-Mar	1.1	1.1	1.4	1.2	0.7	0.7	0.6	0.8	1.3	1.3	1.4	1.7	2.2	2.0	2.0	2.2	2.3	2.0	2.0	2.2	2.6	2.4	2.4	1.9	2.6
13-Mar	2.1	2.2	2.1	2.2	2.1	2.1	2.4	2.4	2.4	2.6	2.5	2.7	2.7	2.5	2.3	2.4	1.8	1.8	1.2	2.1	2.1	1.7	1.5	1.3	2.7
14-Mar	1.1	1.1	1.1	1.4	1.5	1.5	1.5	1.5	1.4	1.6	1.2	1.2	1.1	1.2	1.2	1.0	0.8	0.7	1.3	1.6	2.2	2.2	2.6	2.3	2.6
15-Mar	2.1	1.8	1.8	1.5	1.6	1.4	1.1	1.1	1.0	1.2	1.2	1.5	2.2	1.9	2.2	2.3	1.6	1.7	1.8	1.4	1.0	0.6	0.5	0.3	2.3
16-Mar	0.4	1.0	2.1	3.1	3.1	3.3	3.3	2.8	2.6	2.3	2.4	2.5	2.6	2.7	2.6	2.7	2.9	3.0	2.5	2.4	2.4	2.1	2.0	1.4	3.3
17-Mar	1.2	1.0	1.5	1.6	1.7	1.4	0.7	0.6	0.5	1.0	0.8	1.1	1.1	1.5	1.7	1.7	1.5	1.4	1.3	1.5	2.3	2.2	2.1	1.5	2.3
18-Mar	1.2	0.9	1.0	0.8	1.0	1.0	1.0	0.9	0.8	0.9	1.2	1.2	1.2	1.2	1.9	2.1	1.6	1.3	1.1	0.9	0.6	0.8	0.4	0.7	2.1
19-Mar	2.5	3.4	3.5	3.3	3.0	2.5	2.4	2.2	2.2	2.2	2.2	2.5	2.7	2.7	2.6	2.7	2.8	3.0	3.2	3.3	3.2	2.8	2.9	2.2	3.5
20-Mar	2.5	2.3	2.5	2.2	1.9	1.5	1.3	1.4	1.4	1.5	1.6	1.5	1.7	1.5	1.4	1.6	1.5	1.2	1.1	1.1	1.5	1.8	1.5	1.4	2.5
21-Mar	1.3	1.5	1.4	1.2	1.0	1.1	1.0	1.2	1.4	1.1	1.4	1.5	1.6	2.0	2.2	2.5	2.4	2.3	2.5	2.6	2.2	2.2	2.3	2.3	2.6
22-Mar	2.0	2.2	2.1	2.0	2.0	1.9	1.9	1.8	1.8	1.7	1.6	1.5	1.3	1.4	1.0	0.9	0.8	0.7	0.5	0.5	0.7	1.9	2.3	2.1	2.3
23-Mar	2.2	2.3	1.6	1.0	1.4	1.4	1.5	1.6	1.3	1.4	1.3	1.6	1.2	1.3	1.3	1.1	1.0	0.6	0.8	0.9	1.3	1.4	1.5	1.6	2.3
24-Mar	1.5	0.9	0.9	1.0	0.6	0.7	0.8	1.0	1.2	1.5	1.6	1.8	1.8	1.2	1.9	2.0	1.8	1.9	1.6	2.1	2.4	2.3	2.2	2.0	2.4
25-Mar	1.7	1.8	1.5	1.4	1.5	1.6	1.8	1.7	1.6	1.4	1.4	1.3	1.2	0.9	0.6	0.6	0.7	0.6	0.6	0.8	0.8	0.6	0.7	0.8	1.8
26-Mar	0.8	0.9	1.2	0.9	0.9	1.2	1.2	1.7	1.7	1.3	1.1	1.2	1.2	0.7	1.2	0.9	1.1	1.0	0.7	0.5	0.4	0.5	0.7	0.5	1.7
27-Mar	0.6	0.8	0.5	0.8	0.4	0.4	0.5	0.8	0.9	0.8	1.2	1.4	1.5	1.0	0.7	0.9	0.9	1.8	1.7	1.9	1.9	1.8	1.6	1.3	1.9
28-Mar	1.2	1.4	1.2	1.5	1.5	1.2	1.0	1.2	1.3	1.2	1.2	1.5	1.7	1.9	1.7	1.5	1.4	1.5	1.2	1.6	1.7	1.9	1.5	1.3	1.9
29-Mar	1.0	1.0	1.1	0.9	0.3	0.5	0.6	0.8	1.2	1.4	1.8	1.7	1.7	1.8	1.5	1.4	1.4	1.3	1.3	1.8	1.9	1.9	2.0	1.5	2.0
30-Mar	1.3	1.2	1.4	1.5	1.3	1.3	1.0	0.8	0.8	0.8	1.0	1.1	1.1	1.0	0.9	1.0	0.8	0.7	0.6	0.3	0.2	0.4	0.5	0.5	1.5
31-Mar	0.5	0.4	0.6	0.3	0.3	0.5	0.7	1.0	1.4	1.5	1.6	1.7	1.5	1.9	2.4	2.6	2.7	2.2	1.5	1.7	1.7	1.5	1.8	1.8	2.7
Diurnal Maximum																									



Summary of Hour Averages

Mannix - March 2017

Maximum Value: 2.1 km/h on Mar 13 09:00		Maximum Daily Average: 1.6 km/h on Mar 13		Hours in Service: 744																							
Minimum Value: -1.7 km/h on Mar 7 09:00		Minimum Daily Average: -1.1 km/h on Mar 16		Hours of Data: 744																							
Maximum Diurnal Average: 0.4 km/h at hour 9		Minimum Diurnal Average: 0.1 km/h at hour 20		Hours of Missing Data: 0																							
Monthly Average: 0.26 km/h		Percentiles: P ₁ = -1.5 P ₁₀ = -0.8 Q ₁ = -0.4 Median = 0.3 Q ₃ = 0.9 P ₉₀ = 1.2 P ₉₉ = 1.8		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-Mar	0.0	-0.2	-0.3	-0.5	-0.1	0.2	0.2	0.2	0.2	0.5	0.6	0.2	0.4	0.2	-0.4	-0.8	-0.5	-0.4	-0.4	-0.3	-0.4	-0.1	0.1	0.1	-0.1	0.6	
2-Mar	0.0	0.3	0.6	0.6	0.6	0.4	0.5	0.5	0.7	0.5	0.2	0.4	0.4	0.6	0.7	1.1	1.2	0.9	1.2	1.1	0.9	1.2	0.9	1.1	0.7	1.2	
3-Mar	1.3	1.2	1.1	1.1	1.2	1.3	1.0	0.9	1.0	1.0	1.0	0.7	0.9	0.0	-0.1	-0.1	-0.7	-0.8	-0.7	-1.1	-1.5	-1.1	-0.6	-0.7	0.3	1.3	
4-Mar	-0.6	-1.0	-0.6	-0.7	-1.2	-0.8	-1.0	-1.4	-1.5	-1.4	-1.1	-0.6	-0.8	-0.3	-0.2	-0.6	-0.4	-0.6	-0.8	-0.3	-0.1	-0.1	-0.3	-0.4	-0.7	-0.1	
5-Mar	-0.2	0.1	0.0	-0.3	-0.4	-0.1	0.3	0.5	1.2	1.0	0.8	0.7	1.0	0.6	-0.1	-0.6	-0.2	-0.2	-0.3	-0.1	0.0	0.0	0.1	-0.2	0.2	1.2	
6-Mar	-0.2	-0.7	-0.7	-0.9	-1.2	-1.4	-1.2	-1.3	-1.3	-1.4	-0.9	-0.7	-0.5	-0.5	-0.5	-0.8	-1.0	-1.1	-0.6	-0.2	-0.3	-0.6	-0.8	-0.5	-0.8	-0.2	
7-Mar	-0.8	-1.2	-0.9	-0.9	-0.9	-0.5	-1.1	-0.9	-1.7	-1.3	-1.7	-1.2	-0.6	-0.2	-0.5	-0.6	-0.7	-0.2	-0.4	0.1	-0.4	-0.8	-0.7	-0.6	-0.8	0.1	
8-Mar	-0.6	-0.3	-0.7	-0.7	-1.1	-0.6	0.0	-0.1	-0.1	-0.3	0.1	-0.3	-0.3	-0.6	-0.8	0.4	0.2	0.0	-0.2	-0.6	-0.9	-0.6	-0.3	-0.5	-0.4	0.4	
9-Mar	-0.7	-0.5	-0.3	-0.3	-0.3	-0.3	-0.1	-0.1	0.0	-0.2	0.0	-0.3	0.0	-0.6	-0.7	-0.2	0.2	0.1	-0.1	-0.5	-0.6	-0.2	-0.1	-0.1	-0.2	0.2	
10-Mar	0.0	-0.1	0.1	0.0	0.1	0.0	-0.1	0.0	0.1	0.1	0.5	0.2	-0.1	-0.3	-0.2	-0.4	-0.3	-0.3	-0.6	-0.8	-0.7	-0.2	0.2	0.3	-0.1	0.5	
11-Mar	0.4	0.1	0.3	0.3	0.8	0.7	0.6	0.8	1.1	0.2	0.3	1.0	0.6	0.7	0.6	0.5	0.9	0.7	0.6	0.6	0.5	1.4	0.8	0.6	0.6	1.4	
12-Mar	0.7	0.7	1.1	1.1	0.8	0.9	0.7	0.5	0.6	0.8	0.6	1.1	1.2	0.7	0.9	0.8	1.0	1.0	0.8	0.7	1.0	1.3	1.5	1.4	0.9	1.5	
13-Mar	1.3	1.5	1.6	1.5	1.9	1.8	1.7	1.7	2.1	1.8	1.8	1.9	2.0	2.1	1.8	1.7	1.6	1.3	1.2	0.9	1.5	1.8	1.5	1.2	1.6	2.1	
14-Mar	1.3	1.3	1.2	1.4	1.4	1.4	1.8	1.8	1.3	1.2	1.0	1.0	0.5	0.7	0.9	0.6	0.7	0.4	0.7	0.7	0.9	1.2	1.5	1.6	1.1	1.8	
15-Mar	1.1	1.0	1.6	1.3	1.5	1.3	1.2	1.2	1.2	1.3	0.6	-0.2	-0.4	-0.1	-0.5	-0.5	-0.4	-1.3	-1.0	-0.9	-0.3	-0.1	0.2	0.2	0.3	1.6	
16-Mar	-0.1	-0.9	-1.3	-1.1	-1.1	-1.4	-1.7	-0.6	-1.0	-0.3	-1.3	-1.2	-1.5	-1.4	-1.5	-1.0	-1.3	-1.6	-1.1	-1.4	-0.8	-1.0	-0.2	-0.8	-1.1	-0.1	
17-Mar	-0.3	-0.1	0.9	0.8	1.4	1.1	0.0	0.0	0.2	0.4	0.0	0.4	-0.4	-0.5	-0.7	-0.1	-0.1	-0.5	-0.6	-0.6	-0.8	-0.7	-0.9	-0.5	-0.1	1.4	
18-Mar	-0.5	-0.4	-0.4	0.0	-0.2	-0.4	-0.4	-0.2	-0.2	-0.2	0.1	0.2	-0.1	-0.3	0.7	1.1	0.7	1.1	0.5	0.5	0.0	0.3	-0.1	-0.5	0.1	1.1	
19-Mar	-1.1	-1.4	-1.2	-0.9	-0.4	-0.7	-0.4	-0.6	-0.7	-0.5	-0.2	-0.6	-0.5	-0.6	-0.7	-0.6	-0.8	-1.0	-1.3	-1.2	-1.7	-1.0	-1.3	-1.3	-0.9	-0.2	
20-Mar	-0.7	-0.9	-1.1	-0.9	-0.9	-0.3	-0.3	0.2	0.2	0.2	0.1	-0.2	0.1	-0.4	0.0	0.7	0.6	-0.1	0.9	1.0	1.2	1.5	1.4	1.3	0.2	1.5	
21-Mar	1.5	1.2	1.0	0.9	0.7	0.9	0.8	0.8	0.8	0.5	0.4	0.9	0.5	1.0	0.9	1.6	1.5	1.8	1.6	1.2	1.6	1.4	1.5	1.5	1.1	1.8	
22-Mar	1.2	1.2	1.0	1.1	0.6	0.8	1.4	0.7	1.0	0.8	0.4	1.0	0.8	0.9	1.0	0.5	0.2	0.2	0.0	-0.2	-0.1	-0.7	-1.3	-0.6	0.5	1.4	
23-Mar	-0.6	-0.7	-0.5	-0.5	-0.7	-0.4	-0.6	-0.6	-0.3	-0.6	0.1	-0.1	-0.5	-0.2	-0.1	-0.5	-0.4	-0.2	-0.5	-0.1	0.3	0.6	0.5	0.7	-0.2	0.7	
24-Mar	0.9	0.9	0.9	1.1	1.2	1.0	0.9	0.9	0.9	0.8	0.9	1.3	1.1	1.2	0.6	1.0	0.9	1.0	1.2	0.6	0.8	1.0	1.0	0.8	1.0	1.3	
25-Mar	1.1	1.2	0.4	0.7	1.7	0.9	0.6	0.4	0.4	0.7	0.3	0.3	0.2	0.1	0.3	0.2	0.3	0.2	0.3	0.3	0.6	0.5	0.5	0.4	0.5	1.7	
26-Mar	0.5	0.8	1.0	0.6	0.7	0.6	0.7	0.5	1.1	0.4	0.2	0.0	-0.3	-0.2	0.1	0.5	0.3	0.7	0.5	0.2	0.2	0.3	0.3	0.5	0.4	1.1	
27-Mar	0.5	0.9	0.3	0.7	0.5	0.8	0.7	0.7	0.5	0.6	0.9	-0.1	0.0	0.1	-0.1	0.2	0.4	0.9	0.5	1.3	1.0	1.5	1.1	1.5	0.6	1.5	
28-Mar	1.2	1.2	1.1	1.4	1.2	1.1	0.9	0.9	1.0	0.9	0.8	0.9	1.3	0.9	1.0	0.7	0.6	1.5	1.2	1.3	1.5	0.9	0.9	1.1	1.1	1.5	
29-Mar	1.1	1.1	1.1	1.0	0.8	0.9	1.0	0.9	0.9	1.1	0.7	0.7	0.6	1.2	0.0	0.6	0.7	1.0	1.2	0.4	1.1	1.1	0.6	0.9	0.9	1.2	
30-Mar	1.2	1.0	0.9	0.8	0.7	0.9	0.9	0.5	1.0	0.3	0.7	0.0	0.3	0.3	0.6	0.2	0.2	0.0	-0.2	0.0	0.0	0.2	0.2	0.7	0.5	1.2	
31-Mar	0.6	0.5	0.8	0.4	0.4	0.7	0.4	0.5	1.0	0.8	0.8	1.1	1.1	1.4	0.8	0.2	0.8	0.5	1.2	1.0	1.0	0.2	0.8	1.0	0.8	1.4	
		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.3	0.3	0.3	Diurnal Average		
		1.5	1.5	1.6	1.5	1.9	1.8	1.8	1.8	2.1	1.8	1.8	1.9	2.0	2.1	1.8	1.7	1.6	1.8	1.6	1.3	1.6	1.8	1.5	1.6	Diurnal Maximum	



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.9 km/h on Mar 19 19:00 Minimum Value: 0.1 km/h on Mar 10 08:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 1.0 Median = 1.6 Q ₃ = 2.2 P ₉₀ = 2.7 P ₉₉ = 3.3																							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-Mar	0.7	0.6	0.7	0.6	0.7	1.0	0.8	0.9	1.0	1.1	1.5	1.7	1.7	1.7	2.1	1.8	1.7	1.1	0.5	0.4	0.7	0.4	0.2	0.2	2.1
2-Mar	0.3	0.3	0.5	0.6	0.6	0.4	0.3	0.4	0.7	1.0	1.2	1.3	1.5	1.9	2.1	2.3	2.6	2.7	2.5	3.1	2.9	2.8	2.5	2.7	3.1
3-Mar	2.0	2.0	2.4	1.9	1.8	2.1	1.5	1.4	1.6	1.7	1.7	1.5	1.6	1.3	0.8	1.1	1.7	2.5	2.4	3.1	2.9	2.4	2.2	1.9	3.1
4-Mar	2.2	2.6	2.6	2.4	2.4	2.6	2.9	2.9	2.4	2.6	2.5	2.3	2.1	2.3	2.4	1.9	2.0	1.7	1.7	2.1	1.6	1.6	1.0	0.5	2.9
5-Mar	0.6	0.4	0.4	0.4	0.4	0.9	1.0	1.0	1.5	1.8	1.7	1.6	1.8	1.9	1.5	1.1	1.1	0.5	0.2	0.3	0.5	0.3	0.2	0.2	1.9
6-Mar	0.5	0.9	1.1	1.3	1.8	2.1	2.9	2.6	2.9	2.6	2.7	2.6	2.2	2.5	2.2	2.6	2.8	2.9	3.2	3.0	3.0	3.0	3.0	2.7	3.2
7-Mar	2.9	3.1	3.1	3.1	2.6	2.6	2.4	3.0	3.1	3.5	3.3	3.2	2.8	3.0	2.7	2.5	2.5	2.5	2.4	2.0	1.9	2.3	2.6	2.4	3.5
8-Mar	1.9	1.8	1.2	0.9	0.9	1.1	0.3	0.3	0.4	0.9	1.8	2.2	2.8	2.6	2.2	2.1	2.1	1.9	2.0	2.2	2.2	1.5	0.9	0.8	2.8
9-Mar	0.8	0.7	0.7	0.5	0.4	0.4	0.4	0.3	0.3	0.6	1.2	1.3	1.6	1.6	1.4	1.4	1.4	1.0	0.9	1.1	1.0	0.7	0.4	0.3	1.6
10-Mar	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.1	0.3	0.7	1.3	1.7	1.5	1.6	1.7	1.6	1.6	0.8	0.8	1.1	0.9	0.5	0.6	0.7	1.7
11-Mar	0.7	0.7	0.6	0.8	1.2	1.2	1.3	1.7	1.5	1.1	1.6	1.5	2.1	2.3	2.2	2.0	1.8	1.7	1.2	1.4	1.7	2.6	1.9	1.8	2.6
12-Mar	1.4	1.5	1.5	1.5	0.8	0.8	0.6	0.8	1.6	1.7	1.8	2.3	2.8	2.3	2.6	2.5	2.6	2.3	2.4	2.7	3.1	2.7	2.8	2.2	3.1
13-Mar	2.3	2.7	2.4	2.6	2.6	2.6	2.8	3.1	3.1	3.2	3.1	3.0	3.1	2.9	2.9	2.2	2.1	1.3	1.8	2.1	1.8	1.9	1.5	3.2	
14-Mar	1.1	1.2	1.1	1.4	1.6	1.4	1.2	1.1	1.6	1.6	1.2	1.3	1.3	1.5	1.4	1.2	1.0	0.7	1.8	2.2	2.7	2.7	2.8	2.2	2.8
15-Mar	2.3	2.2	2.1	1.6	1.7	1.5	1.0	1.3	1.1	1.3	1.5	1.8	2.3	2.1	2.4	2.3	1.7	1.5	1.9	1.3	1.1	0.6	0.9	0.5	2.4
16-Mar	0.5	0.6	1.7	2.8	3.1	2.9	2.8	2.7	2.8	2.5	2.1	2.2	2.2	2.4	2.3	2.4	1.9	2.1	1.9	1.5	1.9	1.7	2.0	1.3	3.1
17-Mar	1.2	0.9	2.0	2.1	2.0	1.9	0.7	0.6	0.9	1.4	0.6	1.3	1.1	1.8	2.0	1.8	2.0	1.6	1.3	1.7	2.5	2.2	1.9	1.5	2.5
18-Mar	1.1	1.0	1.0	0.8	1.0	0.9	0.9	1.0	0.9	0.9	1.2	1.4	1.0	1.2	2.3	2.4	1.9	1.6	1.4	1.2	0.7	1.0	0.3	0.7	2.4
19-Mar	2.5	3.6	3.6	3.5	3.2	2.7	2.5	2.5	2.4	2.4	2.5	2.8	2.9	3.1	3.0	3.1	3.1	3.3	3.9	3.8	3.4	3.0	3.0	2.3	3.9
20-Mar	2.8	2.4	2.8	2.4	2.2	1.7	1.3	1.8	1.8	1.8	2.1	2.0	2.2	1.6	2.0	2.1	2.0	1.4	1.3	1.2	1.5	2.0	1.8	1.4	2.8
21-Mar	1.2	1.2	1.4	1.2	0.9	1.1	0.9	1.3	1.5	1.4	1.4	1.9	2.1	2.6	2.7	2.9	3.0	2.8	3.0	3.0	2.7	2.8	2.9	2.7	3.0
22-Mar	2.3	2.5	2.4	2.1	2.0	2.1	2.4	2.2	2.1	2.0	1.9	1.9	1.8	1.6	1.3	1.1	0.9	0.7	0.5	0.5	1.0	2.4	2.6	2.6	2.6
23-Mar	2.3	2.6	1.9	1.4	1.7	1.6	1.6	1.7	1.4	1.4	1.6	2.0	1.3	1.4	1.7	1.4	1.0	0.5	0.7	1.0	1.3	1.6	1.6	1.8	2.6
24-Mar	1.7	1.1	1.0	1.1	0.6	0.6	0.5	1.0	1.3	1.7	1.9	1.8	2.1	1.5	2.2	2.2	2.1	2.2	2.1	2.5	2.7	2.5	2.6	2.3	2.7
25-Mar	2.0	2.1	1.7	1.7	1.9	2.1	1.9	1.9	1.7	1.5	1.6	1.6	1.5	1.2	0.8	0.6	0.8	0.8	0.6	0.8	0.9	0.8	0.8	0.8	2.1
26-Mar	1.0	1.1	1.3	1.0	1.1	1.5	1.4	1.9	2.0	1.6	1.4	1.4	0.9	0.5	1.2	1.1	1.3	1.3	0.8	0.4	0.4	0.7	1.0	0.7	2.0
27-Mar	0.8	0.8	0.8	0.8	0.5	0.4	0.7	0.8	1.0	0.8	1.5	1.4	1.8	1.1	0.8	1.0	1.2	2.3	2.2	2.4	2.5	1.8	1.8	1.4	2.5
28-Mar	1.3	1.5	1.3	1.4	1.7	1.2	1.0	0.9	1.4	1.4	1.5	1.7	2.1	2.3	2.3	1.9	1.6	1.9	1.7	2.0	2.2	2.0	1.7	1.2	2.3
29-Mar	0.9	0.9	1.0	1.0	0.4	0.4	0.5	0.8	1.3	1.6	2.0	2.2	2.1	2.4	2.1	1.9	1.7	1.5	1.7	2.2	2.3	2.2	2.2	1.8	2.4
30-Mar	1.5	1.4	1.5	1.7	1.5	1.6	1.2	0.9	1.1	0.9	1.5	1.4	1.4	1.2	1.2	1.3	1.0	0.9	0.5	0.4	0.2	0.5	0.4	0.6	1.7
31-Mar	0.5	0.5	0.6	0.4	0.2	0.3	0.4	1.1	1.6	1.7	1.8	1.9	1.8	2.1	2.5	2.6	2.7	2.1	1.4	1.7	1.4	1.5	1.7	1.6	2.7
Diurnal Maximum																									



Maximum Value: 1.4 km/h on Mar 25 05:00		Maximum Daily Average: 0.5 km/h on Mar 13		Hours in Service: 744																							
Minimum Value: -1.2 km/h on Mar 4 09:00		Minimum Daily Average: -0.4 km/h on Mar 16		Hours of Data: 736																							
Maximum Diurnal Average: 0.2 km/h at hour 14		Minimum Diurnal Average: 0.0 km/h at hour 20		Hours of Missing Data: 8																							
Monthly Average: 0.12 km/h		Percentiles: P ₁ = -0.9 P ₁₀ = -0.4 Q ₁ = -0.1 Median = 0.1 Q ₃ = 0.4 P ₉₀ = 0.6 P ₉₉ = 1.2		Hours of Calibration: 0																							
				Percent Operational Time: 98.9																							
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-Mar	0.1	0.0	-0.2	-0.3	0.0	0.4	0.5	0.3	0.5	0.7	0.9	0.5	1.2	0.9	0.4	-0.3	-0.1	-0.1	-0.3	0.0	-0.1	0.0	0.1	0.1	0.2	1.2	
2-Mar	0.1	0.1	0.3	0.3	0.4	0.2	0.1	0.1	0.3	0.1	-0.2	-0.1	0.0	0.1	0.4	1.1	0.8	0.3	-0.4	-0.4	-0.4	-0.1	-0.1	-0.1	0.1	1.1	
3-Mar	-0.1	-0.2	-0.2	0.0	-0.1	-0.1	0.1	0.1	0.0	0.0	0.3	0.3	0.4	0.1	-0.1	0.1	0.1	0.0	0.0	-0.1	-0.4	-0.3	-0.2	-0.2	0.0	0.4	
4-Mar	0.1	-0.3	-0.2	-0.4	-0.9	-0.1	-0.3	-0.9	-1.2	-0.8	-0.4	-0.2	-0.5	0.0	0.2	-0.1	-0.1	-0.3	-0.4	-0.1	-0.1	-0.1	-0.2	0.0	-0.3	0.2	
5-Mar	0.1	0.4	0.1	0.1	-0.1	0.1	0.1	0.2	1.1	0.6	0.4	0.4	1.0	0.8	0.1	-0.6	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.2	1.1	
6-Mar	0.0	-0.3	-0.1	-0.3	-0.5	-0.7	-0.6	-0.8	-0.7	-0.9	-0.2	0.0	-0.1	0.1	-0.2	-0.1	-0.1	0.0	0.6	0.7	0.9	0.5	0.0	0.4	-0.1	0.9	
7-Mar	0.0	-0.2	0.0	-0.2	-0.2	0.4	-0.1	-0.1	-1.0	-0.4	-0.8	-0.7	0.3	0.5	0.3	0.0	-0.2	-0.1	0.2	0.0	-0.2	-0.6	0.0	-0.1	-0.1	0.5	
8-Mar	-0.1	0.2	-0.2	-0.2	-0.8	-0.4	0.2	0.1	0.0	-0.2	0.5	0.5	0.4	-0.3	-0.6	0.9	0.3	0.2	-0.1	-0.2	-0.7	-0.3	-0.1	-0.3	0.0	0.9	
9-Mar	-0.4	-0.2	-0.1	0.0	0.0	-0.1	0.0	0.0	-0.1	-0.3	0.1	-0.3	0.1	-0.3	-0.7	-0.2	0.0	-0.1	0.1	-0.2	-0.5	-0.2	0.0	0.0	-0.1	0.1	
10-Mar	0.1	0.0	0.0	0.2	0.2	0.0	0.1	0.1	0.1	0.5	0.4	0.3	0.2	-0.1	0.1	-0.1	0.0	0.0	-0.2	-0.3	-0.3	0.0	0.1	0.1	0.1	0.5	
11-Mar	0.4	0.1	0.3	0.4	0.2	-0.1	-0.2	-0.2	0.3	-0.1	-0.1	1.0	0.2	0.2	0.1	0.1	0.5	0.6	0.2	0.2	0.4	0.7	0.1	-0.5	0.2	1.0	
12-Mar	0.2	0.2	0.4	0.4	-0.1	0.0	0.0	0.0	-0.4	0.2	0.1	0.6	0.4	0.0	0.2	-0.4	-0.4	-0.2	-0.4	-0.9	-0.7	-0.4	0.3	0.1	0.0	0.6	
13-Mar	-0.1	0.1	0.3	0.2	0.5	0.3	0.4	0.3	0.5	0.1	0.2	0.2	0.6	0.6	0.5	0.4	0.8	0.5	0.7	0.6	1.2	1.3	0.8	0.5	0.5	1.3	
14-Mar	0.3	0.2	0.1	0.2	0.3	0.3	1.2	1.3	0.8	0.4	0.2	0.1	0.1	0.3	0.6	0.0	0.4	0.4	0.3	0.5	0.3	-0.1	0.0	0.4	0.4	1.3	
15-Mar	0.1	0.2	0.6	0.2	0.2	0.5	0.8	0.8	0.7	0.7	0.5	0.1	0.1	0.3	0.2	0.2	0.1	-0.6	-0.3	-0.5	0.0	0.0	0.1	0.1	0.2	0.8	
16-Mar	0.1	-0.3	-0.6	-0.2	-0.2	-0.7	-0.9	-0.1	-0.3	0.1	-0.7	-0.9	-1.0	-0.8	-0.9	-0.4	-0.5	-0.8	-0.4	-0.7	-0.1	-0.2	0.0	-0.4	-0.4	0.1	
17-Mar	-0.1	0.1	0.7	0.1	0.9	0.6	0.3	0.1	0.3	0.2	0.2	0.5	0.1	0.2	-0.1	0.2	0.3	-0.1	-0.2	-0.1	-0.2	-0.3	-0.1	-0.1	0.1	0.9	
18-Mar	-0.1	-0.1	-0.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.3	0.2	0.0	0.1	0.2	-0.4	0.9	0.4	0.3	0.2	0.3	0.1	0.1	--	0.9
19-Mar	0.2	0.3	0.6	1.0	1.0	0.9	0.8	0.5	0.5	0.5	0.7	0.1	0.4	0.6	0.7	0.5	0.7	0.6	0.3	0.4	0.1	0.3	-0.2	-0.6	0.4	1.0	
20-Mar	-0.2	-0.1	-0.5	-0.2	-0.5	0.0	-0.1	0.3	0.3	0.2	0.3	-0.3	0.0	-0.6	0.0	0.4	0.1	-1.0	0.0	0.1	0.2	0.4	0.6	0.4	0.0	0.6	
21-Mar	0.6	0.1	0.1	0.0	-0.1	-0.1	-0.1	-0.1	0.2	-0.1	0.1	0.2	-0.2	0.1	-0.3	0.4	0.0	0.3	0.1	-0.4	0.4	0.2	0.2	-0.1	0.1	0.6	
22-Mar	0.0	-0.1	-0.4	-0.4	-0.6	-0.2	0.6	0.0	0.3	-0.2	-0.3	0.1	0.1	0.2	0.6	0.3	0.4	0.2	0.0	0.0	0.3	0.1	-0.6	0.3	0.0	0.6	
23-Mar	0.0	0.2	0.3	0.0	-0.3	0.1	-0.2	-0.4	-0.1	-0.6	0.6	0.2	-0.2	0.0	0.5	-0.2	0.0	0.1	-0.1	0.0	-0.1	-0.3	-0.5	-0.3	-0.1	0.6	
24-Mar	-0.1	0.5	0.6	0.8	1.0	0.5	0.6	0.6	0.4	0.4	0.4	1.1	0.8	0.5	-0.5	-0.2	-0.2	0.1	0.9	0.3	-0.2	0.3	0.3	-0.2	0.4	1.1	
25-Mar	0.1	0.6	0.2	0.4	1.4	0.2	-0.4	-0.6	-0.4	-0.2	-0.6	-0.5	-0.5	-0.4	0.0	0.1	0.1	0.0	0.2	0.3	0.5	0.6	0.6	0.4	0.1	1.4	
26-Mar	0.6	0.8	1.1	0.3	0.6	0.3	0.0	-0.4	0.6	-0.2	-0.2	-0.1	0.2	0.2	0.4	0.6	-0.2	0.3	0.4	0.0	-0.1	0.1	0.3	0.2	0.2	1.1	
27-Mar	0.1	0.2	0.0	-0.1	0.1	0.2	0.0	0.2	0.0	0.4	0.9	-0.1	-0.2	0.2	0.2	0.2	0.0	0.6	0.2	0.9	-0.1	0.1	0.3	0.9	0.2	0.9	
28-Mar	0.6	0.3	0.3	0.0	0.3	0.2	0.2	0.0	-0.1	0.1	0.4	0.2	0.8	0.4	0.6	0.4	0.0	1.2	1.3	0.9	0.7	-0.3	-0.2	0.0	0.4	1.3	
29-Mar	0.6	0.2	0.1	0.1	0.4	0.4	0.1	0.6	0.6	0.7	0.0	0.0	-0.2	1.2	-0.7	-0.2	0.1	0.2	0.5	-0.2	0.8	0.3	-0.5	-0.2	0.2	1.2	
30-Mar	0.4	0.6	-0.1	-0.1	-0.4	0.7	0.2	-0.1	0.7	0.4	0.7	-0.1	0.4	0.7	0.9	0.4	0.4	0.1	0.0	0.2	0.1	0.3	0.2	0.5	0.3	0.9	
31-Mar	0.4	0.4	0.6	0.3	0.3	0.6	0.3	0.3	0.8	0.5	0.3	0.4	0.4	0.6	0.5	-0.1	0.6	0.3	0.7	0.6	0.5	0.1	0.5	0.5	0.4	0.8	
																								Diurnal Average			
																								Diurnal Maximum			
AF - Analyzer Failure																											



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 75 m (VW75m) - km/h
Mannix - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.6 km/h on Mar 14 21:00		Hours in Service: 744 Hours of Data: 736 Hours of Missing Data: 8 Hours of Calibration: 0 Percent Operational Time: 98.9																								
Minimum Value: 0.1 km/h on Mar 1 23:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 1.1 Median = 1.7 Q ₃ = 2.4 P ₉₀ = 2.8 P ₉₉ = 3.4																										
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-Mar	0.5	0.6	0.6	0.6	0.6	0.8	0.9	0.9	0.8	1.1	1.6	2.0	1.9	1.8	2.2	2.0	1.8	1.0	0.4	0.3	0.5	0.3	0.1	0.2	2.2	
2-Mar	0.1	0.2	0.4	0.3	0.4	0.3	0.4	0.6	0.6	1.0	1.1	1.2	1.7	2.0	2.8	3.0	3.2	3.3	2.8	3.1	3.0	2.9	2.6	2.8	3.3	
3-Mar	2.2	2.2	2.5	1.9	1.7	2.0	1.3	1.5	1.5	1.7	1.5	1.4	1.4	1.4	0.8	1.0	1.7	2.1	2.0	2.6	2.4	2.1	1.9	1.4	2.6	
4-Mar	1.8	2.6	2.5	2.4	2.4	2.6	2.8	2.7	2.3	2.4	2.4	2.3	2.0	2.4	2.5	1.9	1.8	1.6	1.4	1.8	1.4	1.4	0.9	0.4	2.8	
5-Mar	0.4	0.5	0.5	0.3	0.3	0.7	1.0	1.5	1.9	2.0	1.9	1.7	2.0	2.1	1.5	1.3	1.1	0.4	0.3	0.4	0.3	0.2	0.2	0.2	2.1	
6-Mar	0.5	0.7	0.8	0.8	1.6	1.9	2.6	2.4	2.5	2.4	2.6	2.4	2.3	2.3	2.0	2.5	2.8	2.9	3.3	3.2	2.9	3.1	2.9	2.7	3.3	
7-Mar	3.0	2.8	3.2	3.0	2.3	2.6	2.4	2.9	2.8	3.5	3.0	3.0	2.9	3.0	2.8	2.6	2.3	2.3	2.2	1.9	1.9	2.3	2.4	2.1	3.5	
8-Mar	2.0	2.0	0.8	0.9	0.8	1.2	0.3	0.3	0.4	0.8	2.0	2.6	3.0	2.9	2.6	2.3	2.3	1.6	1.7	1.5	1.7	1.1	0.7	0.8	3.0	
9-Mar	0.9	0.7	0.6	0.6	0.6	0.5	0.2	0.2	0.3	0.6	1.0	1.3	1.8	1.8	1.4	1.6	1.5	1.1	0.7	0.9	0.9	0.6	0.4	0.3	1.8	
10-Mar	0.2	0.3	0.7	0.3	0.4	0.2	0.2	0.3	0.6	0.7	1.3	1.7	1.6	1.7	1.8	1.7	1.7	0.9	0.7	0.7	0.8	0.8	1.2	1.0	1.8	
11-Mar	1.0	1.4	1.3	1.5	1.1	1.3	1.4	1.7	1.6	1.2	1.6	1.7	2.4	2.6	2.8	2.6	2.4	2.4	1.9	1.9	2.6	3.1	2.1	2.1	3.1	
12-Mar	1.9	1.9	1.8	1.6	1.1	1.1	1.1	0.9	1.7	1.7	1.8	2.5	3.1	2.5	2.9	2.7	2.7	2.4	2.6	3.2	3.3	2.8	2.7	2.4	3.3	
13-Mar	2.3	2.6	2.4	2.4	2.5	2.5	2.8	3.1	2.8	3.2	2.9	2.9	2.9	3.1	2.8	2.6	2.1	2.0	1.2	1.6	2.0	1.7	1.6	1.5	3.2	
14-Mar	0.9	0.8	0.6	0.7	0.7	0.8	0.8	0.7	1.3	1.2	0.9	1.2	1.4	1.9	1.9	1.4	1.5	2.1	2.9	3.2	3.6	3.3	2.9	2.1	3.6	
15-Mar	2.7	2.4	2.0	1.4	1.1	1.2	1.0	1.2	1.1	1.1	1.7	1.8	2.3	2.2	2.5	2.2	1.7	0.8	1.7	1.5	0.8	0.7	1.1	0.9	2.7	
16-Mar	0.8	0.5	1.6	2.7	3.0	2.5	2.2	2.5	2.7	2.4	2.0	1.9	2.0	2.0	2.0	2.2	1.6	1.6	1.7	1.0	1.3	1.3	1.7	1.1	3.0	
17-Mar	1.0	1.1	2.7	2.3	2.5	2.1	0.8	1.0	1.5	1.6	0.7	1.5	0.8	1.6	1.9	1.9	2.1	1.6	1.2	1.7	2.2	1.8	1.5	1.1	2.7	
18-Mar	0.9	0.8	0.8	AF	AF	AF	AF	AF	AF	AF	AF	1.1	0.8	1.2	2.6	2.9	2.0	2.4	2.1	1.7	0.8	1.1	0.2	0.6	2.9	
19-Mar	2.4	3.4	3.4	3.5	3.0	2.7	2.4	2.5	2.5	2.6	2.6	2.9	2.9	3.0	3.2	3.2	3.0	3.1	3.4	3.6	3.2	2.9	2.6	1.9	3.6	
20-Mar	2.5	2.4	2.4	2.3	2.0	1.6	1.2	1.6	1.8	1.8	2.2	2.3	2.4	1.8	2.2	2.3	2.3	1.5	1.2	1.1	1.1	1.6	1.4	1.0	2.5	
21-Mar	0.9	0.8	0.9	1.2	1.0	0.7	1.1	1.3	1.2	1.2	1.3	1.9	2.1	2.7	2.8	3.1	3.1	2.8	3.0	3.1	2.8	2.8	2.9	2.7	3.1	
22-Mar	2.4	2.6	2.4	2.3	2.3	2.4	2.9	2.6	2.4	2.2	2.0	2.0	2.0	1.8	1.4	1.1	0.9	0.5	0.3	0.5	1.1	2.4	2.1	2.5	2.9	
23-Mar	2.3	2.6	2.0	1.6	1.8	1.6	1.5	1.5	1.3	1.4	2.0	1.9	1.1	1.3	1.8	1.3	0.9	0.5	0.7	0.9	1.5	1.8	1.8	1.9	2.6	
24-Mar	1.7	1.0	0.9	1.0	0.5	0.6	0.5	0.9	1.2	1.6	2.1	2.0	2.3	1.7	2.3	2.3	2.2	2.6	2.8	3.5	3.2	3.6	3.2	2.6	3.6	
25-Mar	2.6	2.6	2.9	2.7	2.5	2.5	2.2	2.0	1.9	1.7	1.6	1.7	1.4	1.1	0.9	0.6	0.8	0.9	0.6	1.0	1.4	1.2	1.2	1.5	2.9	
26-Mar	1.6	1.7	2.1	1.4	1.7	2.1	1.6	2.1	2.4	1.7	1.6	1.3	0.8	0.2	1.2	1.3	1.4	1.6	1.8	0.7	1.4	1.4	1.7	0.9	2.4	
27-Mar	1.1	1.2	1.0	1.0	0.5	0.7	1.3	0.7	1.1	1.0	1.9	1.5	1.8	1.1	0.8	1.2	1.4	2.7	3.2	3.2	2.8	1.9	1.5	1.3	3.2	
28-Mar	1.1	1.2	1.1	1.3	1.5	1.0	0.7	0.9	1.3	1.4	1.6	1.8	2.3	2.4	2.6	2.3	2.0	2.5	2.5	2.9	2.9	2.4	1.6	1.0	2.9	
29-Mar	0.5	0.8	1.2	0.6	0.5	0.7	0.7	0.7	1.2	1.5	1.9	2.2	2.1	2.6	2.2	2.1	2.1	2.0	2.1	3.2	3.3	2.8	2.5	2.1	3.3	
30-Mar	2.0	2.2	1.7	1.8	1.5	2.1	1.4	1.1	1.2	1.1	1.6	1.6	1.5	1.3	1.4	1.4	1.2	1.0	0.5	0.4	0.2	0.5	0.5	0.7	2.2	
31-Mar	0.6	0.6	0.7	0.3	0.2	0.2	0.4	1.1	1.6	1.6	1.7	1.8	1.8	2.2	2.6	2.7	2.7	2.0	1.4	1.6	1.2	1.4	1.6	1.5	2.7	
	3.0	3.4	3.4	3.5	3.0	2.7	2.9	3.1	2.8	3.5	3.0	3.0	3.1	3.1	3.2	3.2	3.2	3.3	3.4	3.6	3.6	3.6	3.2	2.8		
	Diurnal Maximum																									
AF - Analyzer Failure																										



Maximum Value: 2.1 km/h on Mar 6 21:00		Maximum Daily Average: 0.9 km/h on Mar 6		Hours in Service: 744																						
Minimum Value: -1.1 km/h on Mar 20 18:00		Minimum Daily Average: -0.1 km/h on Mar 12		Hours of Data: 744																						
Maximum Diurnal Average: 0.4 km/h at hour 3		Minimum Diurnal Average: 0.2 km/h at hour 15		Hours of Missing Data: 0																						
Monthly Average: 0.29 km/h		Percentiles: P ₁ = -0.8 P ₁₀ = -0.2 Q ₁ = 0.1 Median = 0.3 Q ₃ = 0.6 P ₉₀ = 0.8 P ₉₉ = 1.3		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-Mar	0.3	0.3	0.1	0.1	0.2	0.7	0.7	0.8	0.8	0.8	1.1	0.5	1.3	0.9	0.5	-0.1	0.0	0.2	0.1	0.6	0.5	0.4	0.3	0.1	0.5	1.3
2-Mar	0.1	0.1	0.1	0.2	0.3	0.2	0.2	0.2	0.6	0.5	-0.1	-0.2	0.0	0.1	0.3	1.0	0.7	0.1	-0.8	-1.0	-0.7	0.2	0.2	-0.2	0.1	1.0
3-Mar	0.3	0.2	0.0	0.2	0.3	0.3	0.6	0.5	0.2	0.3	0.3	0.2	0.3	0.0	0.0	0.0	0.1	0.5	0.4	0.5	0.2	0.3	0.7	0.7	0.3	0.7
4-Mar	1.1	0.8	0.9	0.4	-0.1	0.9	0.9	0.1	-0.4	0.1	0.5	0.6	0.2	0.6	0.7	0.6	0.6	0.2	0.3	0.6	0.6	0.4	0.1	0.3	0.5	1.1
5-Mar	0.4	0.4	0.2	0.4	0.3	0.5	0.3	0.3	1.3	0.5	0.3	0.2	1.0	0.7	-0.1	-0.7	0.1	0.2	0.3	0.3	0.2	0.1	0.2	0.3	0.3	1.3
6-Mar	0.3	0.4	0.9	0.8	0.6	0.4	0.4	0.2	0.4	0.0	0.6	0.9	0.6	0.8	0.7	1.0	1.2	1.2	2.0	1.7	2.1	1.4	0.9	1.2	0.9	2.1
7-Mar	0.9	0.7	0.8	0.7	0.5	1.4	0.7	0.8	-0.1	0.5	0.0	0.0	0.8	0.9	0.8	0.7	0.7	0.8	1.2	0.7	0.6	0.4	1.0	1.0	0.7	1.4
8-Mar	0.7	0.8	0.4	0.6	-0.2	0.2	0.3	0.2	0.2	-0.1	0.7	0.7	0.8	-0.1	-0.5	1.3	0.8	0.9	0.6	0.8	0.3	0.5	0.5	0.2	0.4	1.3
9-Mar	0.1	0.3	0.5	0.3	0.2	0.2	0.1	0.1	0.1	-0.1	0.3	-0.3	0.1	-0.2	-0.7	-0.4	0.2	0.0	0.4	0.4	0.0	0.1	0.1	0.2	0.1	0.5
10-Mar	0.2	0.1	0.1	0.2	0.3	0.1	0.2	0.2	0.2	0.5	0.3	0.4	0.4	0.0	0.0	0.0	0.5	0.2	0.4	0.4	0.3	0.0	-0.1	0.3	0.2	0.5
11-Mar	0.3	0.1	0.2	0.2	0.4	-0.1	-0.2	-0.3	0.2	0.0	-0.1	1.2	0.1	0.2	0.2	0.2	0.8	0.4	0.5	0.4	0.3	0.6	0.0	-0.8	0.2	1.2
12-Mar	0.0	0.1	0.6	0.6	0.2	-0.2	-0.4	-0.1	-0.6	0.1	0.0	0.5	0.3	0.1	0.2	-0.6	-0.3	-0.3	-0.7	-1.0	-0.9	0.0	0.7	0.3	-0.1	0.7
13-Mar	0.2	0.3	0.5	0.4	0.6	0.3	0.5	0.4	0.6	0.3	0.4	0.2	0.7	0.4	0.3	0.4	0.6	0.2	0.4	-0.1	0.2	0.6	0.5	0.4	0.4	0.7
14-Mar	0.6	0.6	0.5	0.5	0.7	0.6	0.6	0.5	0.4	0.4	0.5	0.1	0.0	0.1	0.5	0.0	0.3	0.3	0.2	0.2	0.3	0.1	0.3	0.7	0.4	0.7
15-Mar	0.1	-0.1	0.6	0.6	0.8	0.6	0.0	0.2	0.1	0.4	0.3	0.0	-0.2	0.0	-0.1	-0.2	0.0	0.0	0.8	0.3	0.8	0.5	0.3	0.3	0.3	0.8
16-Mar	0.3	0.5	0.4	0.9	0.8	0.5	0.5	1.0	0.8	1.0	0.2	-0.3	-0.2	0.0	0.1	0.6	0.5	0.2	0.6	0.3	1.1	0.8	0.8	0.3	0.5	1.1
17-Mar	0.4	0.5	0.6	0.0	0.7	0.5	0.3	0.1	0.3	0.1	0.5	0.7	0.3	0.4	0.3	0.6	0.6	0.3	0.5	0.6	0.6	0.7	0.7	0.5	0.4	0.7
18-Mar	0.4	0.2	0.1	0.1	0.4	0.0	0.0	0.2	0.1	0.2	0.2	0.2	0.3	0.0	0.1	0.1	-0.6	0.8	0.5	0.3	0.3	0.4	0.2	0.3	0.2	0.8
19-Mar	0.6	0.5	0.8	0.9	0.8	0.7	0.7	0.3	0.3	0.2	0.5	-0.1	0.3	0.4	0.7	0.2	0.4	0.7	0.8	1.0	0.5	0.4	0.3	0.1	0.5	1.0
20-Mar	0.6	0.8	0.2	0.4	-0.1	0.6	0.3	0.7	0.5	0.4	0.4	-0.2	0.1	-0.6	0.1	0.5	0.1	-1.1	0.1	0.4	0.5	0.4	0.6	0.7	0.3	0.8
21-Mar	0.8	0.7	0.9	0.3	0.3	0.4	0.3	0.2	0.7	0.0	0.0	0.3	-0.3	-0.1	-0.3	0.6	0.3	0.5	0.4	-0.2	0.2	0.2	0.5	0.2	0.3	0.9
22-Mar	0.2	0.2	-0.3	-0.3	-1.0	-0.4	0.2	-0.3	0.0	-0.4	-0.5	0.1	0.1	0.3	0.6	0.3	0.4	0.1	0.0	0.0	0.5	0.6	0.2	1.3	0.1	1.3
23-Mar	1.0	0.9	1.0	0.5	0.3	0.6	0.2	0.2	0.3	-0.3	0.9	0.1	-0.3	-0.1	0.5	0.0	0.1	0.2	0.1	0.3	0.1	-0.5	-0.4	-0.1	0.2	1.0
24-Mar	0.2	0.2	0.2	0.6	0.4	0.6	0.5	0.1	0.1	0.2	0.2	0.9	0.6	0.6	-0.6	-0.1	-0.3	-0.1	0.7	-0.2	-0.4	0.0	0.0	-0.2	0.2	0.9
25-Mar	-0.2	0.4	-0.1	0.1	1.1	-0.1	-0.7	-0.9	-0.6	-0.1	-0.8	-0.7	-0.5	-0.5	0.0	0.1	0.0	0.0	0.3	0.5	0.6	0.6	0.5	0.3	0.0	1.1
26-Mar	0.3	0.6	0.9	0.2	0.6	0.4	0.1	-0.5	0.6	-0.3	-0.4	-0.2	0.2	0.4	0.7	-0.2	0.3	0.1	0.1	0.0	0.1	0.2	0.3	0.2	0.2	0.9
27-Mar	0.2	0.2	0.1	0.2	0.4	0.2	-0.1	0.2	0.1	0.3	0.8	-0.1	0.1	0.2	0.2	0.4	0.1	0.6	0.0	0.7	-0.2	0.4	0.4	0.5	0.2	0.8
28-Mar	0.5	0.6	0.6	0.6	0.7	0.6	0.5	0.4	0.3	0.2	0.3	-0.2	0.6	0.2	0.6	0.2	0.0	1.2	1.2	0.8	0.7	-0.4	0.1	0.4	0.4	1.2
29-Mar	0.6	0.5	0.6	0.4	0.2	0.3	0.4	0.2	0.4	0.7	0.0	-0.2	-0.3	1.1	-0.8	-0.2	0.1	0.3	0.5	-0.4	0.6	0.1	-0.8	-0.5	0.2	1.1
30-Mar	0.4	0.5	-0.1	0.0	-0.3	0.6	0.2	0.0	0.8	0.5	0.7	0.1	0.6	0.8	1.1	0.4	0.5	0.2	0.2	0.3	0.1	0.3	0.1	0.1	0.3	1.1
31-Mar	0.2	0.1	0.2	0.0	0.1	0.0	0.0	0.1	0.5	0.5	0.3	0.5	0.4	0.2	-0.2	-0.9	-0.1	-0.4	0.0	0.0	-0.2	-0.4	0.0	-0.1	0.0	0.5
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.7 km/h on Mar 19 04:00 Minimum Value: 0.1 km/h on Mar 5 23:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 1.0 Median = 1.6 Q ₃ = 2.3 P ₉₀ = 2.8 P ₉₉ = 3.4																								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-Mar	0.6	0.5	0.6	0.5	0.5	0.7	1.0	0.8	0.8	1.1	1.5	1.9	2.0	1.9	2.3	2.0	1.8	1.0	0.4	0.4	0.4	0.3	0.2	0.2	2.3
2-Mar	0.2	0.2	0.3	0.3	0.3	0.2	0.4	0.4	0.4	0.8	1.1	1.3	1.7	2.1	2.3	2.6	2.6	2.7	2.6	2.9	2.6	3.0	2.5	2.5	3.0
3-Mar	1.9	1.7	2.2	1.5	1.3	1.6	1.1	1.2	1.1	1.4	1.5	1.3	1.4	1.4	0.8	1.0	1.6	2.0	1.8	2.3	2.2	1.9	1.9	1.4	2.3
4-Mar	1.8	2.6	2.4	2.5	2.6	2.6	2.9	2.8	2.4	2.6	2.4	2.3	2.0	2.4	2.6	1.9	1.9	1.6	1.3	1.7	1.4	1.5	0.9	0.5	2.9
5-Mar	0.5	0.5	0.5	0.4	0.4	0.6	0.7	1.2	1.8	2.0	2.0	1.7	2.0	2.1	1.5	1.3	1.1	0.4	0.3	0.4	0.3	0.2	0.1	0.3	2.1
6-Mar	0.6	0.6	0.8	0.7	1.7	2.0	2.6	2.4	2.6	2.4	2.7	2.4	2.3	2.3	2.0	2.5	3.0	3.0	3.4	3.3	3.2	3.2	2.9	2.7	3.4
7-Mar	3.0	2.8	3.0	3.2	2.2	2.6	2.4	2.8	2.8	3.4	2.9	3.0	2.8	2.9	2.8	2.6	2.3	2.3	2.1	1.8	1.9	2.3	2.5	2.1	3.4
8-Mar	2.1	2.2	0.8	0.9	0.7	1.2	0.4	0.3	0.5	0.8	2.1	2.7	3.1	2.9	2.6	2.4	2.4	1.7	1.5	1.2	1.6	0.8	0.6	0.9	3.1
9-Mar	0.9	0.7	0.7	0.7	0.6	0.6	0.2	0.2	0.3	0.6	1.1	1.3	1.9	1.9	1.4	1.4	1.5	1.1	0.7	0.8	0.9	0.7	0.4	0.4	1.9
10-Mar	0.2	0.3	0.2	0.3	0.5	0.2	0.2	0.3	0.3	0.7	1.2	1.6	1.6	1.7	1.8	1.8	1.8	1.0	0.7	0.8	0.8	0.8	1.0	0.9	1.8
11-Mar	1.0	1.1	0.8	0.9	0.9	1.0	1.0	1.4	1.4	1.2	1.6	1.7	2.4	2.6	2.6	2.2	2.1	1.8	1.2	1.4	2.1	2.9	2.2	2.1	2.9
12-Mar	1.9	2.0	1.6	1.5	1.1	1.1	0.9	0.9	1.4	1.7	1.8	2.6	3.2	2.6	3.0	2.7	2.7	2.3	2.5	3.3	3.3	2.7	2.8	2.5	3.3
13-Mar	2.4	2.7	2.5	2.4	2.6	2.6	3.0	3.2	2.9	3.2	3.1	3.1	3.1	3.2	3.1	2.7	2.3	2.1	1.4	1.6	2.2	1.8	1.7	1.5	3.2
14-Mar	1.0	0.6	0.6	0.6	0.5	0.8	0.8	0.7	1.2	1.1	0.8	1.0	1.2	1.7	1.8	1.3	1.3	0.8	2.3	2.6	3.1	3.1	2.7	2.0	3.1
15-Mar	2.5	2.3	2.0	1.4	1.0	1.1	1.0	1.1	1.1	1.1	1.8	2.0	2.4	2.3	2.7	2.4	1.7	0.8	1.9	1.8	0.8	0.8	1.1	0.7	2.7
16-Mar	0.9	0.5	1.6	2.9	2.9	2.5	2.3	2.5	2.7	2.4	2.1	2.0	2.0	2.2	2.1	2.3	1.7	1.7	1.7	0.9	1.2	1.2	1.5	1.1	2.9
17-Mar	1.0	1.1	2.1	2.3	2.5	2.0	1.0	1.0	1.4	1.6	2.1	1.3	0.8	1.4	1.8	1.9	2.0	1.5	1.2	1.8	2.2	1.7	1.5	1.0	2.5
18-Mar	0.8	0.7	1.3	1.7	1.0	0.7	0.6	1.1	0.6	0.6	0.8	1.2	0.9	1.1	2.6	2.5	1.8	2.1	1.8	1.5	0.9	1.1	0.3	0.5	2.6
19-Mar	2.4	3.4	3.4	3.7	3.0	2.7	2.3	2.4	2.6	2.6	2.7	3.0	3.2	3.1	3.5	3.3	3.1	3.1	3.2	3.4	3.3	3.0	2.5	1.9	3.7
20-Mar	2.4	2.5	2.3	2.3	1.9	1.7	1.3	1.6	1.9	1.8	2.2	2.4	2.4	1.9	2.3	2.4	2.4	1.4	1.1	1.0	1.0	1.6	1.3	1.0	2.5
21-Mar	0.8	0.6	0.9	0.9	0.5	0.5	0.5	0.8	1.0	1.1	1.4	1.9	2.2	2.7	2.7	3.2	3.1	2.8	3.1	3.0	2.8	3.0	3.0	2.7	3.2
22-Mar	2.6	2.5	2.2	2.0	1.9	2.3	2.8	2.6	2.5	2.2	2.1	2.0	2.0	1.8	1.5	1.1	0.9	0.5	0.3	0.5	1.2	2.5	2.0	2.3	2.8
23-Mar	2.4	2.7	2.0	1.6	1.8	1.7	1.6	1.6	1.2	1.5	2.1	2.0	1.1	1.3	1.8	1.3	1.0	0.5	0.8	0.8	1.4	1.6	1.7	2.0	2.7
24-Mar	1.7	1.1	1.0	1.0	0.5	0.5	0.4	0.9	1.2	1.6	2.2	2.2	2.4	1.8	2.2	2.3	2.3	2.5	2.6	2.6	2.9	2.7	2.6	2.4	2.9
25-Mar	2.4	2.4	1.9	1.9	2.3	2.3	2.0	1.8	1.7	1.6	1.4	1.5	1.3	1.0	0.9	0.5	0.8	0.9	0.6	0.7	1.1	1.0	1.1	0.9	2.4
26-Mar	1.1	1.5	1.5	1.2	1.5	1.9	1.5	1.8	2.4	1.7	1.5	1.2	0.8	0.4	1.1	1.4	1.4	1.6	0.8	0.5	0.6	1.0	1.3	1.0	2.4
27-Mar	1.1	0.9	0.9	0.7	0.4	0.5	0.8	0.6	0.9	0.9	1.6	1.4	1.8	1.3	0.8	1.2	1.4	2.8	2.7	2.9	2.8	1.8	1.5	1.3	2.9
28-Mar	1.0	1.1	1.0	1.2	1.5	1.0	0.8	0.7	1.0	1.4	1.7	2.0	2.4	2.5	2.8	2.3	1.9	2.2	2.2	2.5	2.8	2.3	1.4	0.7	2.8
29-Mar	0.6	0.5	0.6	0.5	0.4	0.4	0.3	0.8	1.2	1.6	2.1	2.5	2.3	2.8	2.3	2.2	2.1	2.1	2.0	2.5	2.8	2.7	2.4	2.1	2.8
30-Mar	2.1	1.8	1.5	1.7	1.4	2.0	1.4	1.0	1.3	1.1	1.7	1.6	1.5	1.4	1.4	1.4	1.1	1.0	0.5	0.5	0.2	0.6	0.6	0.8	2.1
31-Mar	0.7	0.7	0.8	0.2	0.2	0.2	0.3	1.2	1.5	1.8	1.7	2.0	1.9	2.3	2.8	2.8	2.9	2.0	1.5	1.7	1.3	1.6	1.7	1.5	2.9
	3.0	3.4	3.4	3.7	3.0	2.7	3.0	3.2	2.9	3.4	3.1	3.1	3.2	3.2	3.5	3.3	3.1	3.1	3.4	3.4	3.3	3.2	3.0	2.7	
	Diurnal Maximum																								



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	March 15, 2017	Last Calibration	February 3, 2017
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	8:20	End Time (MST)	11:07
Gas Cert Reference	EY0000646	Station temp.	22 Deg C
Cal Gas Concentration	49.2 ppm	Cal Gas Exp Date	November 4, 2019
Calibrator Make/Model	API T700	Serial Number	746
ZAG Make/Model	API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-634	-634
Analyzer IP address	192.168.1.43		Lamp voltage	829	827
Calculated slope	0.992666	0.997209	Chamber temp	44.9	45.0
Calculated intercept	1.219865	0.769451	Pressure	686.1	685.8
Analyzer Background	6.8	6.9	Flow	0.462	0.461
Analyzer Coefficient	0.907	0.911	Intensity	90	91

Analyzer make TEI 43i Analyzer serial # 1008841399

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	61.0	600.2	597.7	1.004
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	61.0	600.2	601.7	0.998
second point	5000	30.5	300.1	299.2	1.003
third point	5000	15.2	149.6	148.9	1.005
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	61.0	600.2	602.0	0.997
Average Correction Factor					1.002

Corrected As found 597.7 Previous response 603.5 % change 1.0%

Notes:

Inlet filter changed out after asfinds. Slightly adjusted the span.

Calibration Performed By: Jayne Marcoux



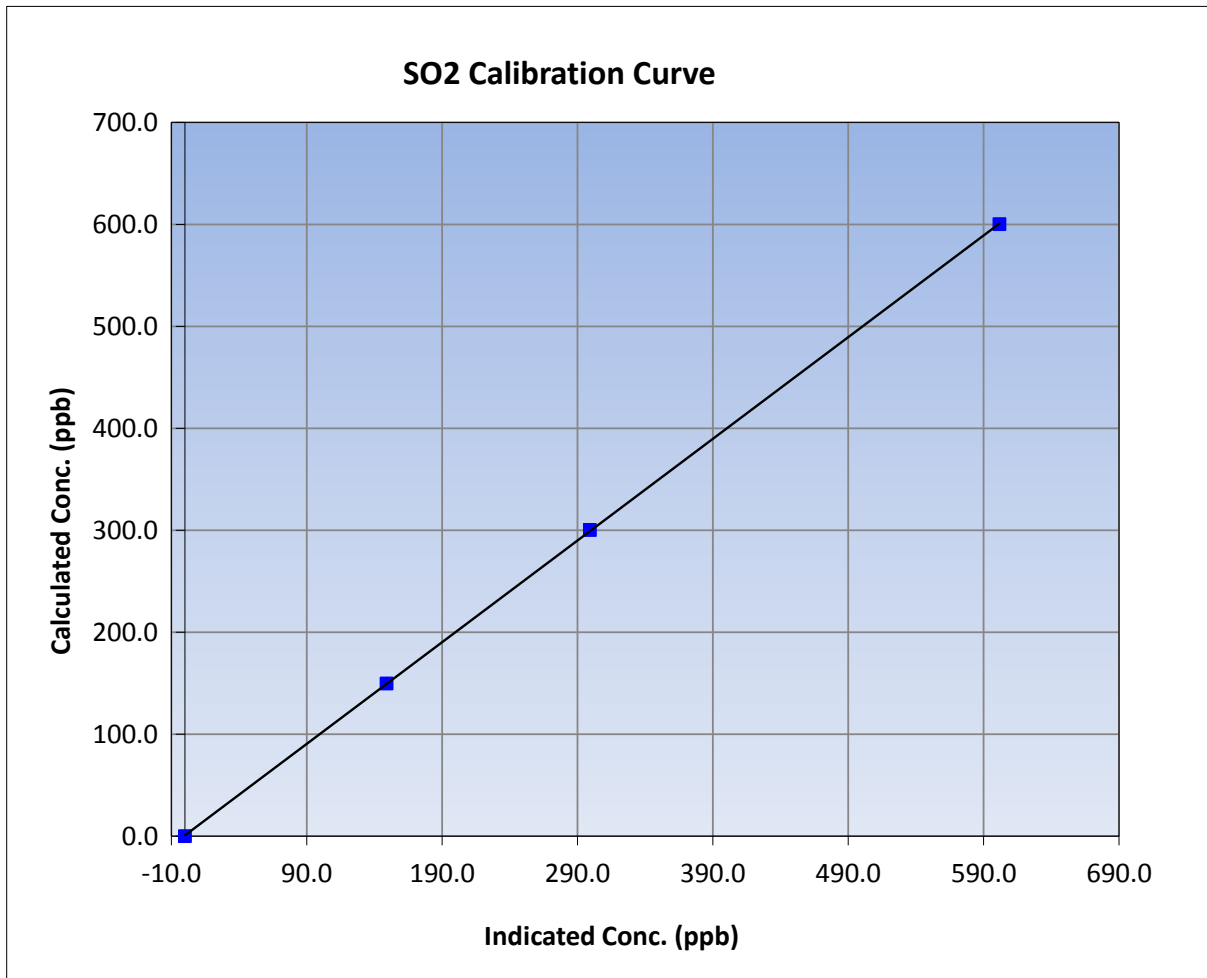
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 15, 2017	Previous Calibration	February 3, 2017
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	8:20	End Time (MST)	11:07
Analyzer make	TEI 43i	Analyzer serial #	1008841399

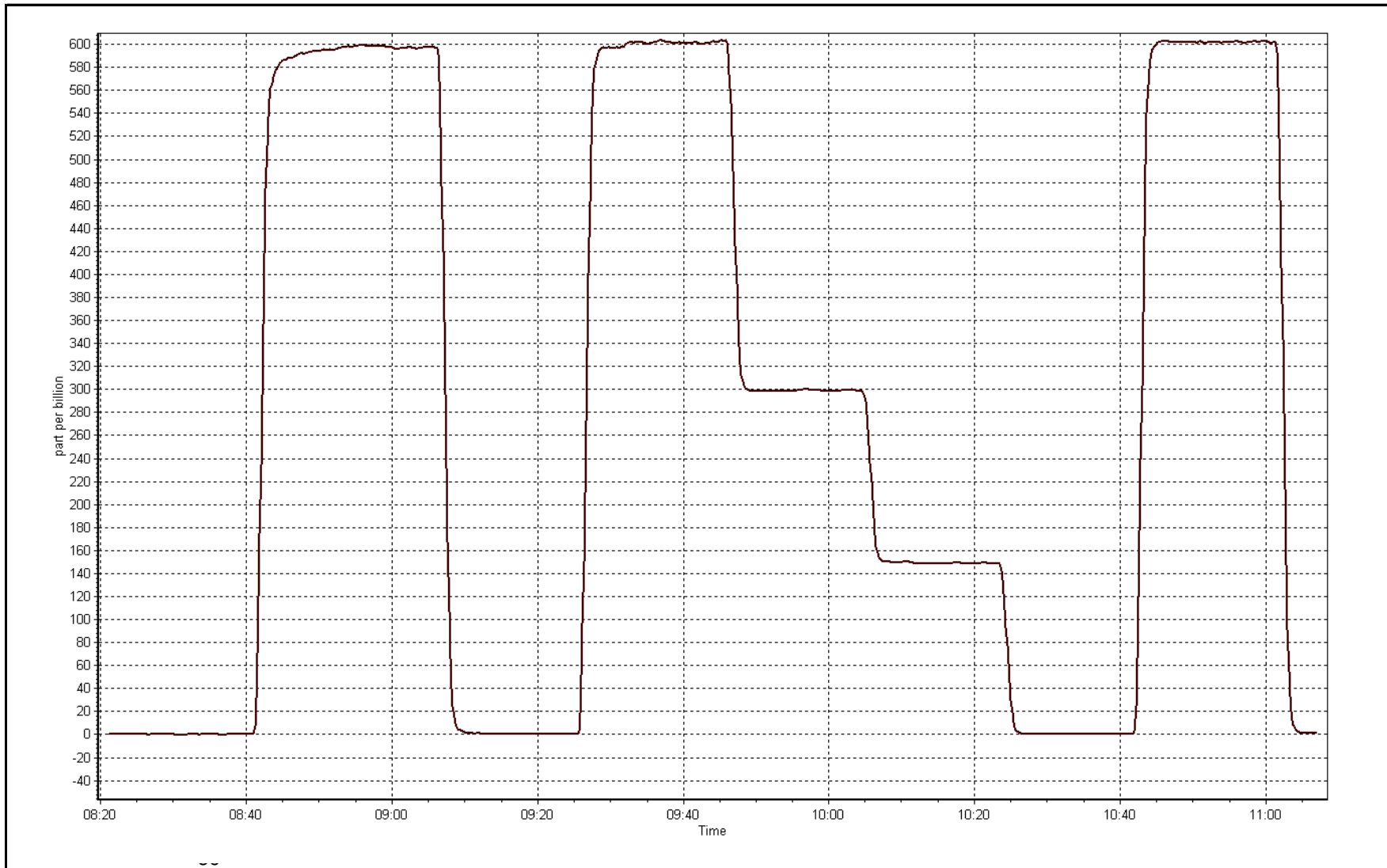
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999990
600.2	601.7	0.9975		
300.1	299.2	1.0031	Slope	0.997209
149.6	148.9	1.0048		
			Intercept	0.769451



SO2 Calibration Plot

Date: March 15, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	March 2, 2017	Last Calibration	February 3, 2017
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:17	End Time (MST)	15:58
Gas Cert Reference	ET0005008	Station temp.	21 Deg C
Cal Gas Concentration	5.03 ppm	Cal Gas Exp Date	02/12/2019
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
ZAG air Make/Model	API 701	Serial Number	138
DACS make/model	Campbell Scientific CR3000	Serial Number	2633
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S960161A 09-Sep-17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-643	-644
Analyzer IP address	192.168.1.42		Lamp voltage	800	798
Calculated slope	1.007258	1.012680	Chamber temp	45	45
Calculated intercept	-0.292668	-0.426332	Pressure	527.1	542.2
Analyzer Background	15.1	15.6	Flow	1.042	1.037
Analyzer Coefficient	0.938	0.957	Intensity	96	96
			Converter temp.	327	323

Analyzer make/model	Thermo 450i	Analyzer serial #	815129108
Converter make/model	NA	Converter serial #	NA

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.5	----
as found span	6000	85.2	71.4	70.4	1.015
SO2 scrubber check	5000	15.2	152.0	2.5	----
calibrator zero	6000	0.0	0.0	0.6	----
high point	6000	85.2	71.4	71.0	1.006
second point	6000	45.4	38.1	38.2	0.998
third point	6000	28.4	23.8	23.6	1.010
as left zero	5000	0.0	0.0	0.5	----
as left span	6000	85.2	71.4	70.7	1.010
Average Correction Factor					1.004

Corrected As found	69.9	Previous response	71.2	% change	1.9%
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Notes:

Changed inlet filter after as founds. Adjusted the zero and the span. Scrubber check completed after third point, Steadily drifted to 5 ppb over 15 minutes.
 Changed out SOx scrubber. Completed second multipoint calibration to ensure the linearity. No adjustments made.

Calibration Performed By: Jayme Marcoux



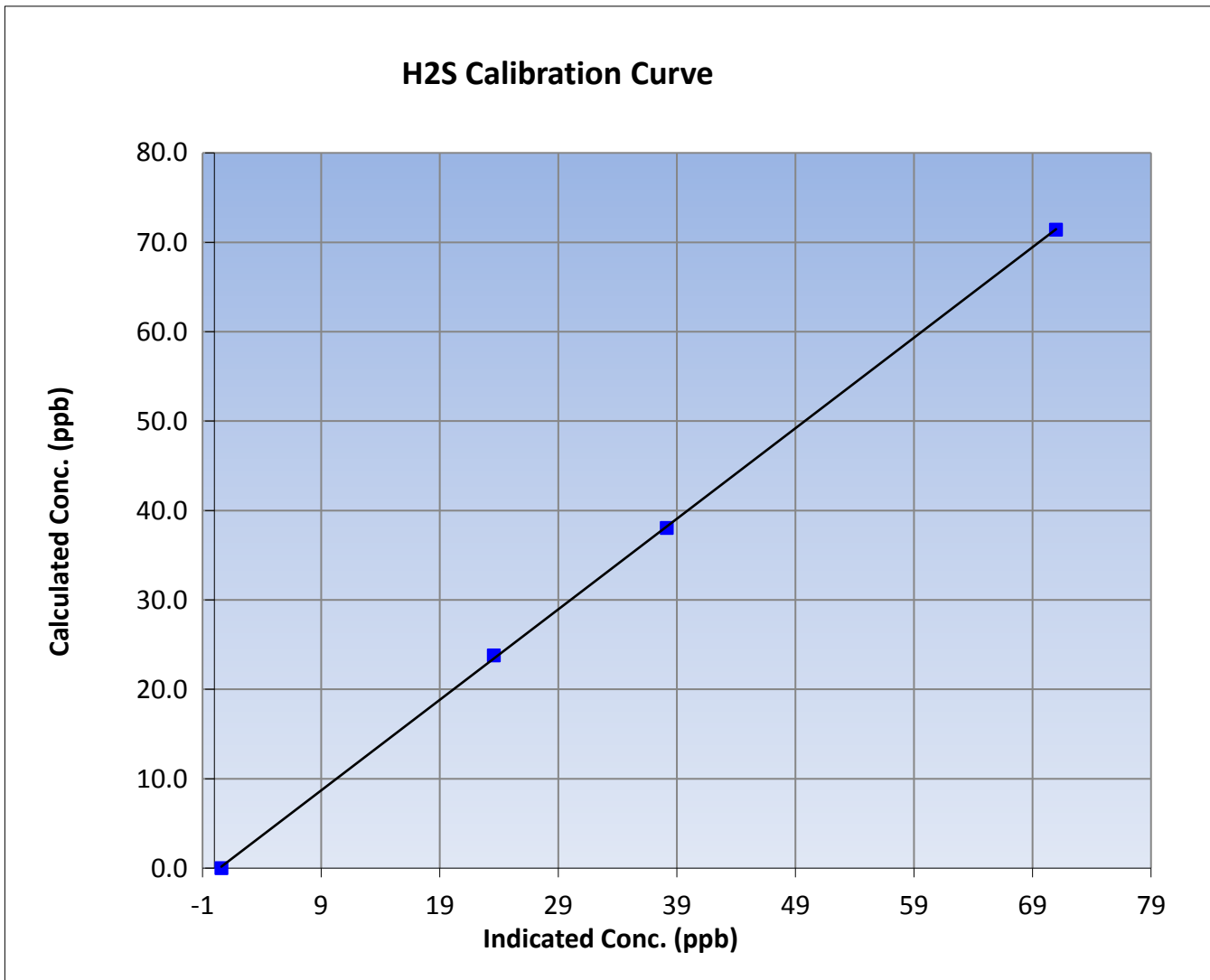
Wood Buffalo Environmental Association H2S Calibration Report

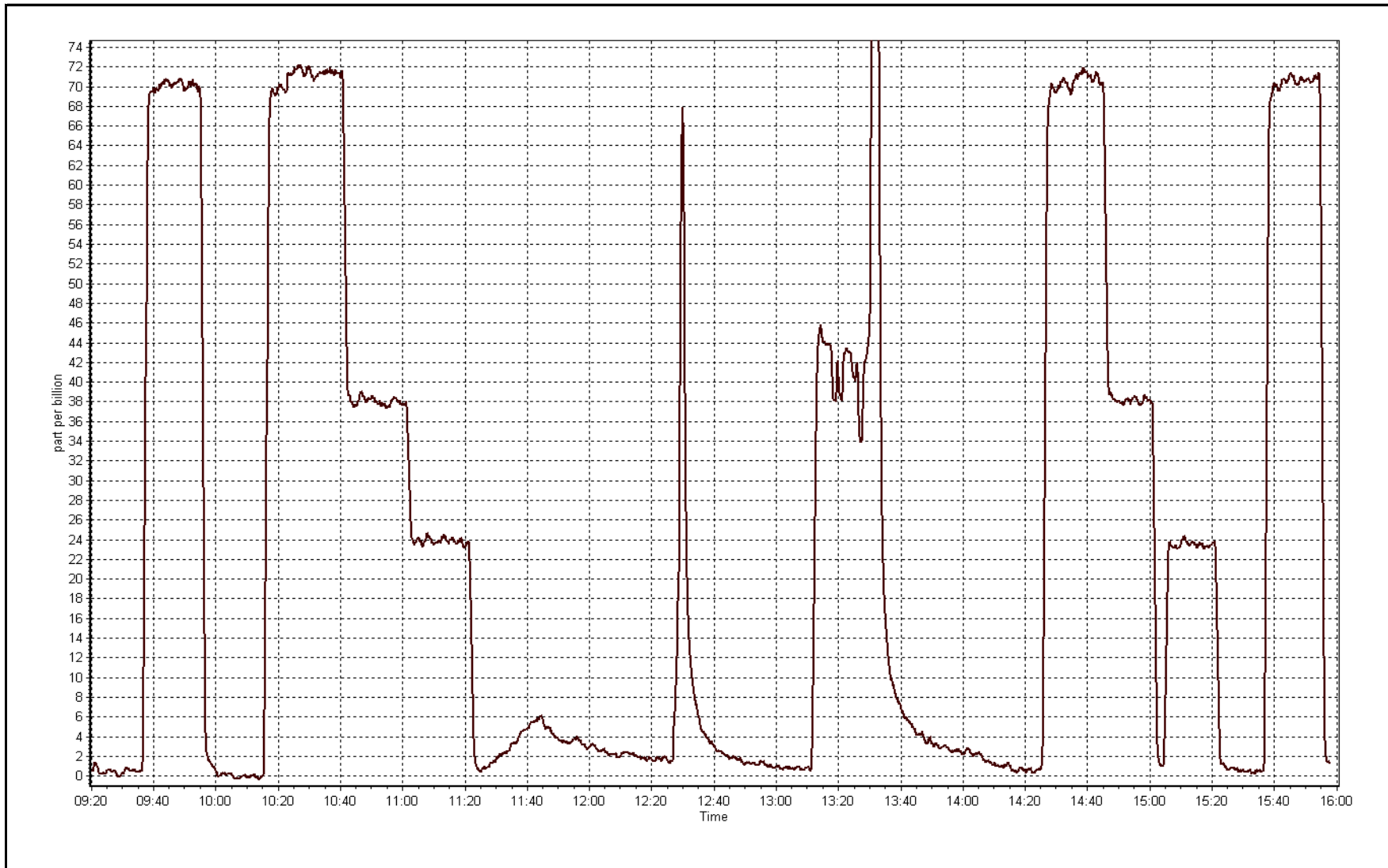
Station Information

Calibration Date	March 2, 2017	Previous Calibration	February 3, 2017
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:17	End Time (MST)	15:58
Analyzer make	Thermo 450i	Analyzer serial #	815129108

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	----	Correlation Coefficient	0.999933
71.4	71.0	1.0061		
38.1	38.2	0.9976	Slope	1.012680
23.8	23.6	1.0097		
			Intercept	-0.426332







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	March 15, 2017	Last Calibration	February 3, 2017
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	8:20	End Time (MST)	11:04
Gas Cert Reference	EY0000646	Cal Gas Expiry Date	Nov-04-2019
CH4 Cal Gas Conc.	514 ppm	CH4 Equiv Conc.	1064.0 ppm
C3H8 Cal Gas Conc.	200 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	746
ZAG make/model	Teledyne API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	9.4	9.4
Analyzer IP address	192.168.1.51		Air or Bypass Press	42.3	42.3
Calculated slope	0.999228	1.002488	Fuel Pressure	20.2	20.2
Calculated intercept	0.015813	-0.020196	Analyzer Coeff	3.584	3.621
			Analyzer BKG	3.33	3.33

Analyzer make Thermo 51i-LT Analyzer serial # 1317958295

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.08	----
as found span	5000	61.0	12.98	12.82	1.013
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	61.0	12.98	12.98	1.000
second point	5000	30.5	6.49	6.46	1.005
third point	5000	15.2	3.23	3.27	0.989
as left zero	5000	0.0	0.00	0.01	----
as left span	5000	61.0	12.98	13.08	0.992
Average Correction Factor					0.998

Corrected As found 12.90 Previous response 12.98 % change 0.6%

Notes:

Replaced inlet filter after asfinds. Adjusted the zero and span.

Calibration Performed By:

Jayne Marcoux



Wood Buffalo Environmental Association THC Calibration Report

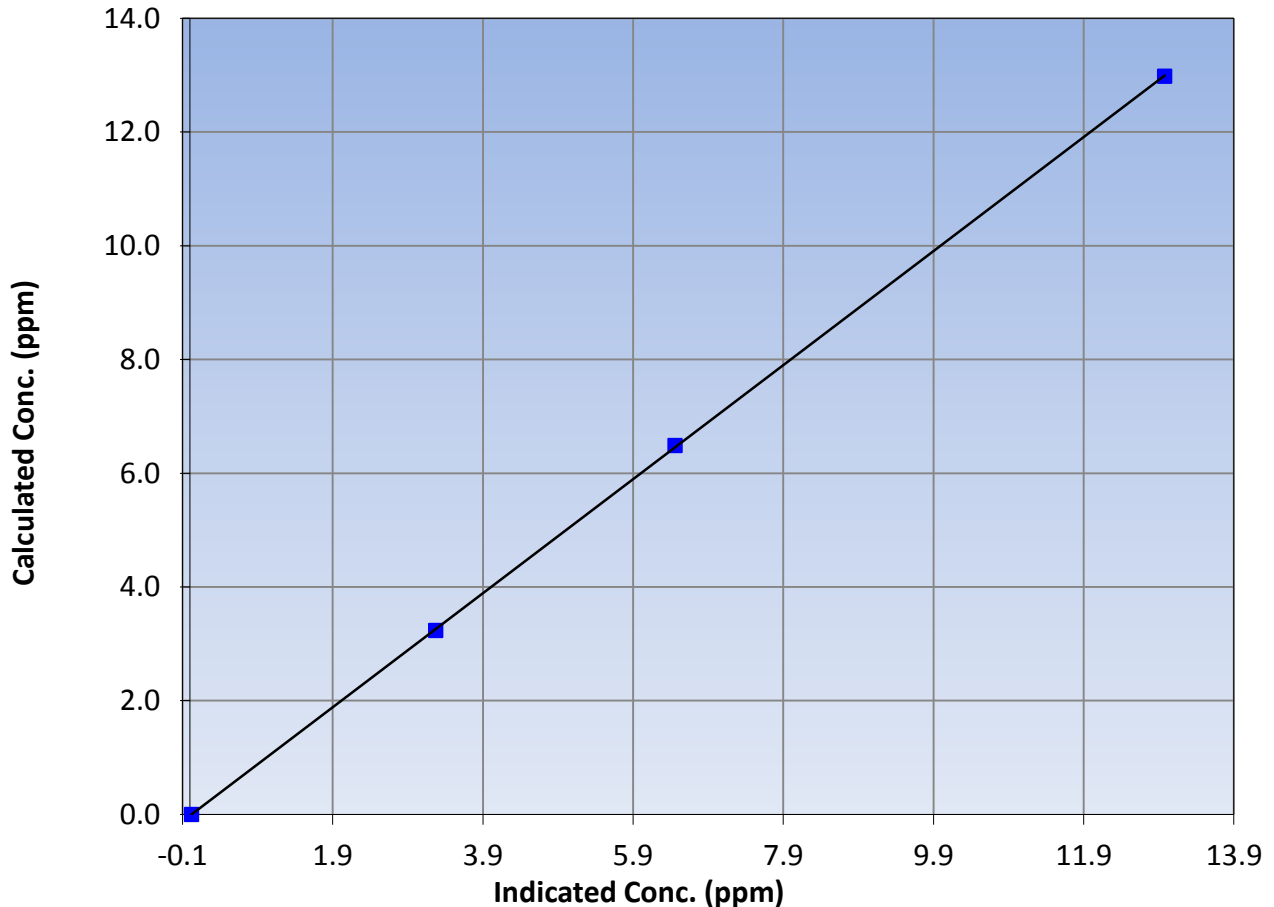
Station Information

Calibration Date	March 15, 2017	Previous Calibration	February 3, 2017
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	8:20	End Time (MST)	11:04
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295

Calibration Data

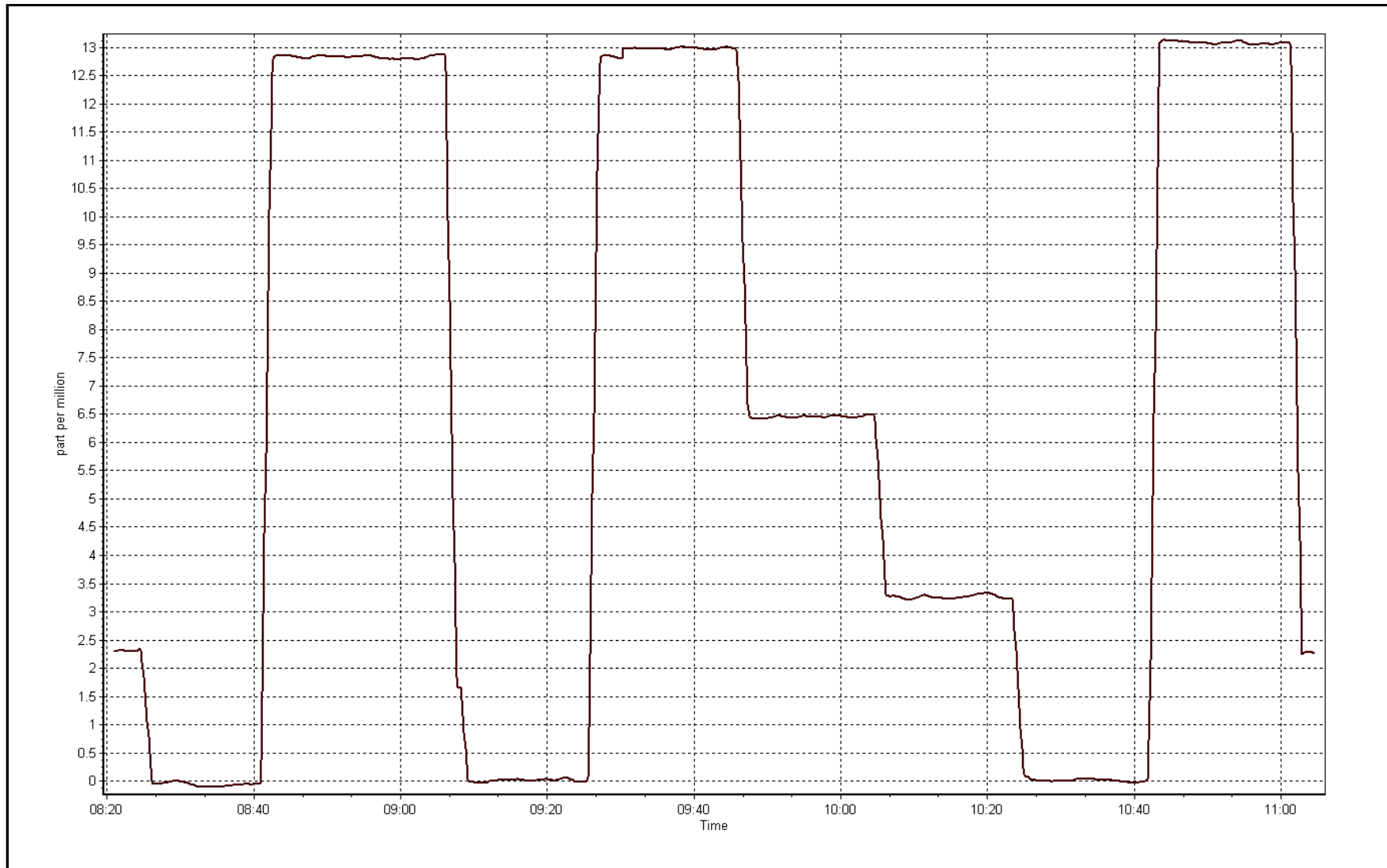
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999980
12.98	12.98	1.0001		
6.49	6.46	1.0047	Slope	1.002488
3.23	3.27	0.9892		
			Intercept	-0.020196

THC Calibration Curve



THC Calibration Plot

Date: March 15, 2017





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 6
PATRICIA MCINNES
MARCH 2017

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
MARCH 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	48	0	9	0
TRS (ppb) Average	706	38	38	100	1	0	1	0
THC (ppm) Average	698	35	46	98.52	2.3	-	2	-
NMHC(ppm) Average	698	35	46	98.52	0.057	-	0.003	-
CH4(ppm) Average	698	35	46	98.52	2.3	-	2	-
O3 (ppb) Average	708	35	36	99.87	52	0	41	-
NO2 (ppb) Average	705	38	39	99.87	29	0	11	-
NO (ppb) Average	705	38	39	99.87	26	-	7	-
NOX (ppb) Average	705	38	39	99.87	45	-	18	-
NH3 (ppb) Average	636	43	108	91.26	11	0	0	-
PM2.5 (ug/m3) Average	742	2	2	100	30	-	7.9	0
Temperature 2 m (C) Average	744	0	0	100	13.4	-	6.3	-
Relative Humidity (%) Average	744	0	0	100	97	-	85	-
Wind Speed 10 m (km/h) Average	744	0	0	100	30	-	23	-
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)
MARCH 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	1.1	3	-	0	0	0	0	1	3	48
TRS (ppb) Average	706	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	698	1.96	0.1	-	1.9	1.9	1.9	1.9	2	2	2.3
NMHC(ppm) Average	698	0	0.003	-	0	0	0	0	0	0	0.057
CH4(ppm) Average	698	1.96	0.1	-	1.9	1.9	1.9	1.9	2	2	2.3
O3 (ppb) Average	708	31.4	10	-	3	17	27	33	38	42	52
NO2 (ppb) Average	705	6.6	5	-	0	2	3	5	8	14	29
NO (ppb) Average	705	1.9	3	-	0	0	0	1	2	4	26
NOX (ppb) Average	705	8.5	7	-	0	3	4	7	10	17	45
NH3 (ppb) Average	636	0	0	-	0	0	0	0	0	0	11
PM2.5 (ug/m3) Average	742	5.08	3.2	-	0.3	2.2	3.2	4.5	6	8.4	30
Temperature 2 m (C) Average	744	-7.71	10.5	-	-31.7	-22	-17.3	-6	0.8	4.7	13.4
Relative Humidity (%) Average	744	65.2	16	-	24	43	54	65	76	88	97
Wind Speed 10 m (km/h) Average	744	10.6	6	-	1	4	7	9	14	19	30
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	09 Mar 2017 12:00	09 Mar 2017 12:00	1	Maintenance - sample manifold cleaned
NMHC, CH4, THC	17 Mar 2017 16:00	17 Mar 2017 16:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	17 Mar 2017 22:00	17 Mar 2017 22:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	23 Mar 2017 18:00	23 Mar 2017 18:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	23 Mar 2017 21:00	23 Mar 2017 21:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	24 Mar 2017 09:00	24 Mar 2017 14:00	6	Maintenance - replaced actuator
NH3	01 Mar 2017 02:00	31 Mar 2017 02:00	30	Stabilization after daily span
NH3	01 Mar 2017 03:00	02 Mar 2017 08:00	30	Analyzer Failure - power supply
NH3	02 Mar 2017 09:00	02 Mar 2017 12:00	4	Maintenance - replaced power supply connections



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

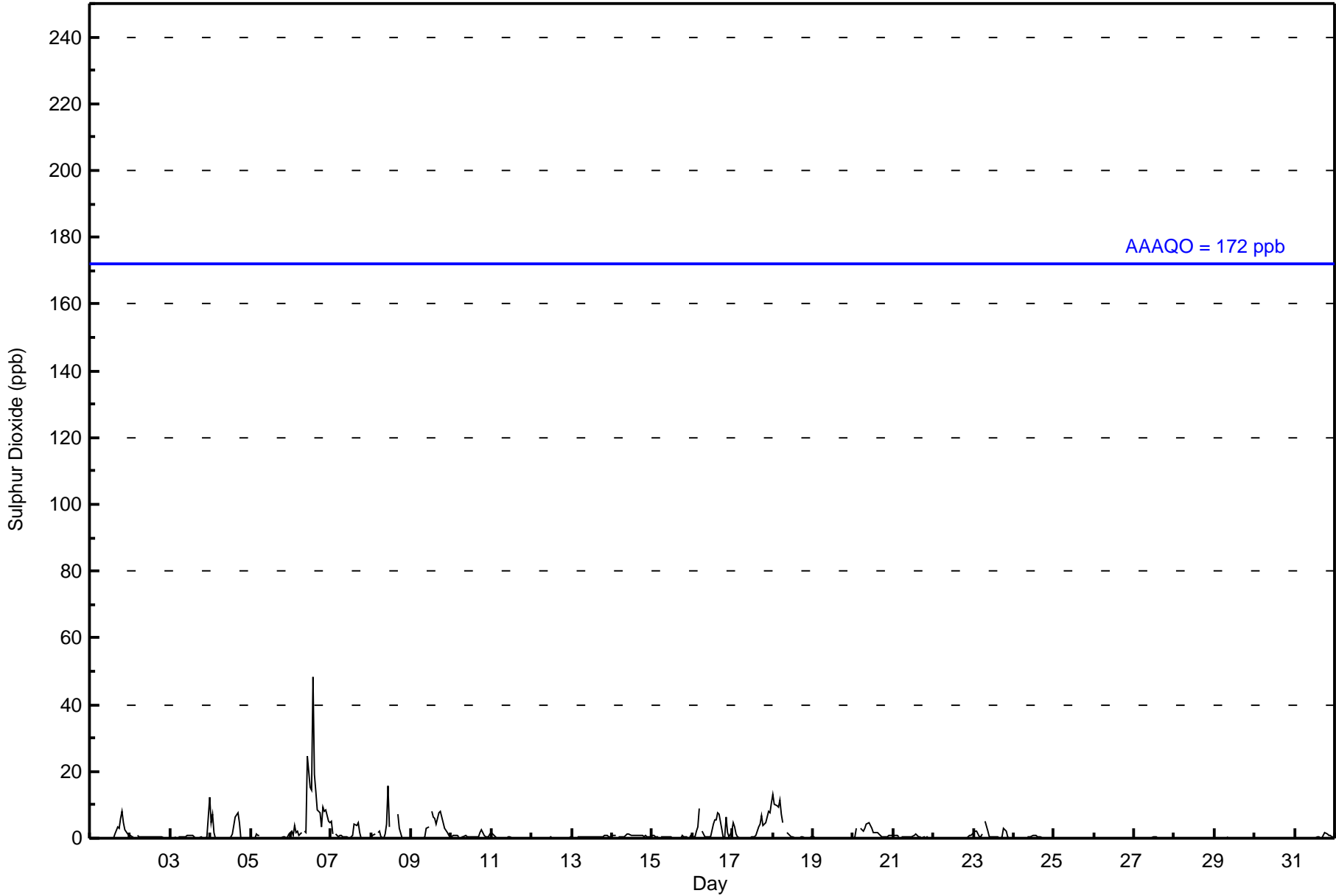
Patricia McInnes - March 2017

Number of Exceedences (AAAQO):		1-hr: 0 24-hr: 0		Hours in Service:		744																					
Maximum Value: 48 ppb on Mar 6 14:00		Maximum Daily Average: 9.1 ppb on Mar 6		Hours of Data:		708																					
Minimum Value: 0 ppb on Mar 1 01:00		Minimum Daily Average: 0.0 ppb on Mar 25		Hours of Missing Data:		36																					
Maximum Diurnal Average: 2.4 ppb at hour 14		Minimum Diurnal Average: 0.5 ppb at hour 8		Hours of Calibration:		35																					
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 = 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-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	3	3	6	8	5	2	1	1	1.3	8		
2-Mar	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1		
3-Mar	0	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	12	0.9	12		
4-Mar	5	7	2	0	0	Z	0	0	0	0	0	0	1	4	6	8	4	0	0	0	0	0	0	1.7	8		
5-Mar	0	0	0	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1		
6-Mar	2	1	4	2	2	1	2	Z	2	2	24	15	14	48	19	14	8	8	3	10	8	9	5	5	9.1	48	
7-Mar	5	1	Z	1	1	1	1	0	1	0	0	0	0	1	4	4	4	2	0	0	0	0	0	1.2	5		
8-Mar	0	1	1	Z	2	2	1	0	1	4	16	3	C	C	C	C	7	3	0	0	0	0	0	2.2	16		
9-Mar	0	0	0	0	Z	0	0	0	0	3	3	M	8	6	6	4	8	8	6	5	3	2	1	0	2.9	8	
10-Mar	1	1	1	1	0	Z	1	1	1	0	0	0	0	0	0	0	0	2	2	1	0	0	0	1	0.7	2	
11-Mar	2	1	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2	
12-Mar	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	
13-Mar	0	0	Z	0	0	0	0	0	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0.5	1	
14-Mar	1	1	1	Z	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1	
15-Mar	1	1	1	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0.4	1	
16-Mar	0	1	2	3	9	Z	2	0	0	0	0	4	6	6	7	7	3	0	0	6	2	0	2	2.7	9		
17-Mar	5	3	1	0	0	0	Z	0	0	0	0	0	0	0	1	3	4	7	4	4	5	8	8	10	2.8	10	
18-Mar	13	10	10	9	12	7	4	Z	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3.1	13	
19-Mar	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
20-Mar	0	1	3	Z	3	3	2	3	4	4	4	3	2	2	2	1	1	1	0	0	0	1	1	1	1.8	4	
21-Mar	1	1	1	1	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1	
22-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.2	1	
23-Mar	2	2	2	0	0	1	Z	5	2	0	0	0	0	0	0	0	0	1	3	2	0	0	0	1.0	5		
24-Mar	0	0	0	0	0	0	0	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1	
25-Mar	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-Mar	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-Mar	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-Mar	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-Mar	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	
30-Mar	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	
31-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1	0	0	0.3	2	
		1.3	1.1	1.2	0.8	1.3	0.7	0.6	0.5	0.6	0.7	1.8	1.0	1.2	2.4	1.6	1.5	1.8	1.4	1.0	1.1	1.0	0.9	0.7	1.3	Diurnal Average	
		13	10	10	9	12	7	4	5	4	4	24	15	14	48	19	14	8	8	6	10	8	9	8	12	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
Patricia McInnes - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	698	98.59	98.59
11 - 20	8	1.13	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: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - March 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	109	35	27	20	40	126	120	43	26	15	8	5	10	19	41	54	698
11 - 20	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8
21 - 60	2	0	0	0	0	0	0	0	0	0	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	118	35	27	20	40	126	120	43	26	15	8	5	10	19	41	55	708

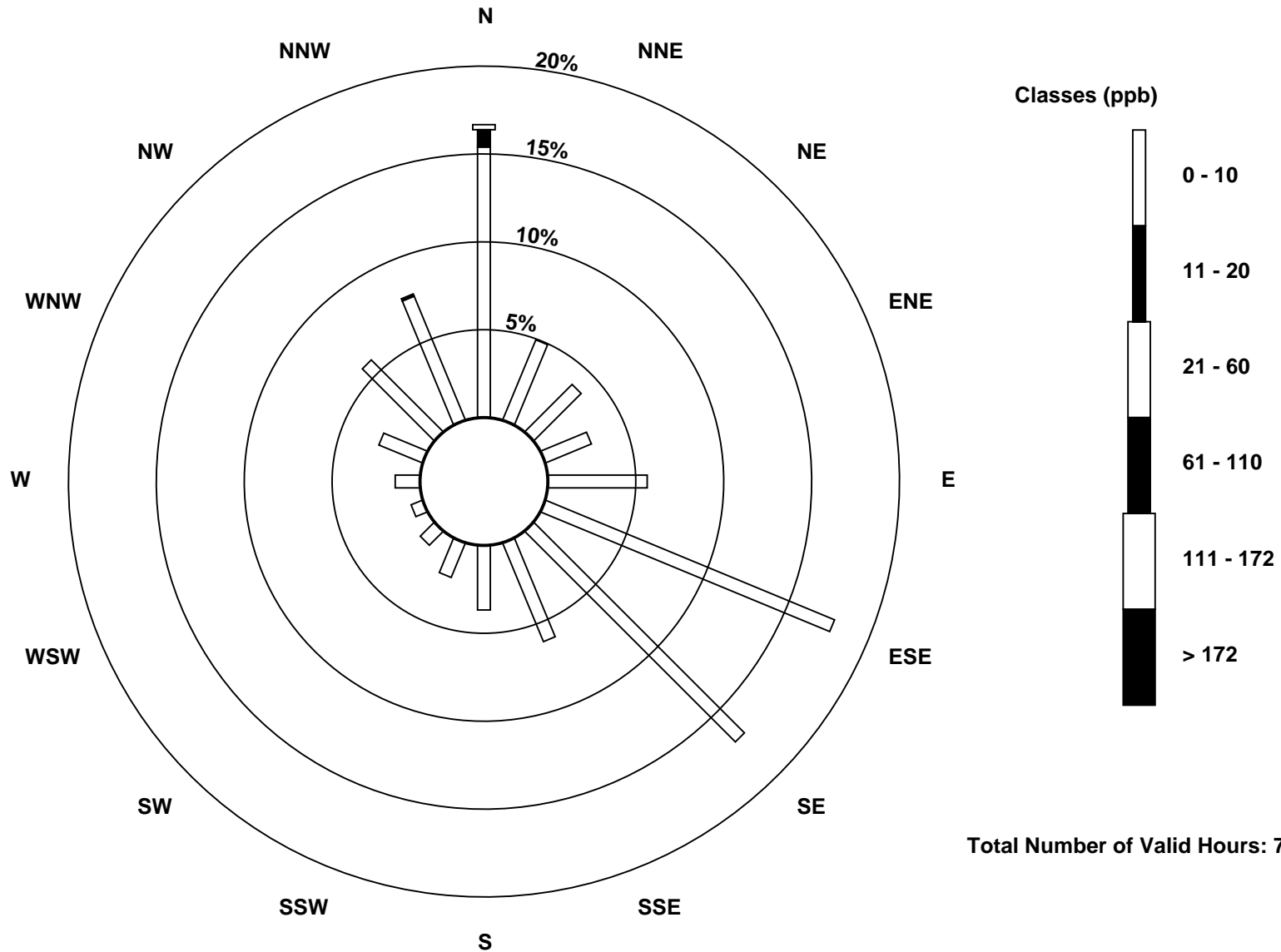
Total Number of Valid Hours: 708

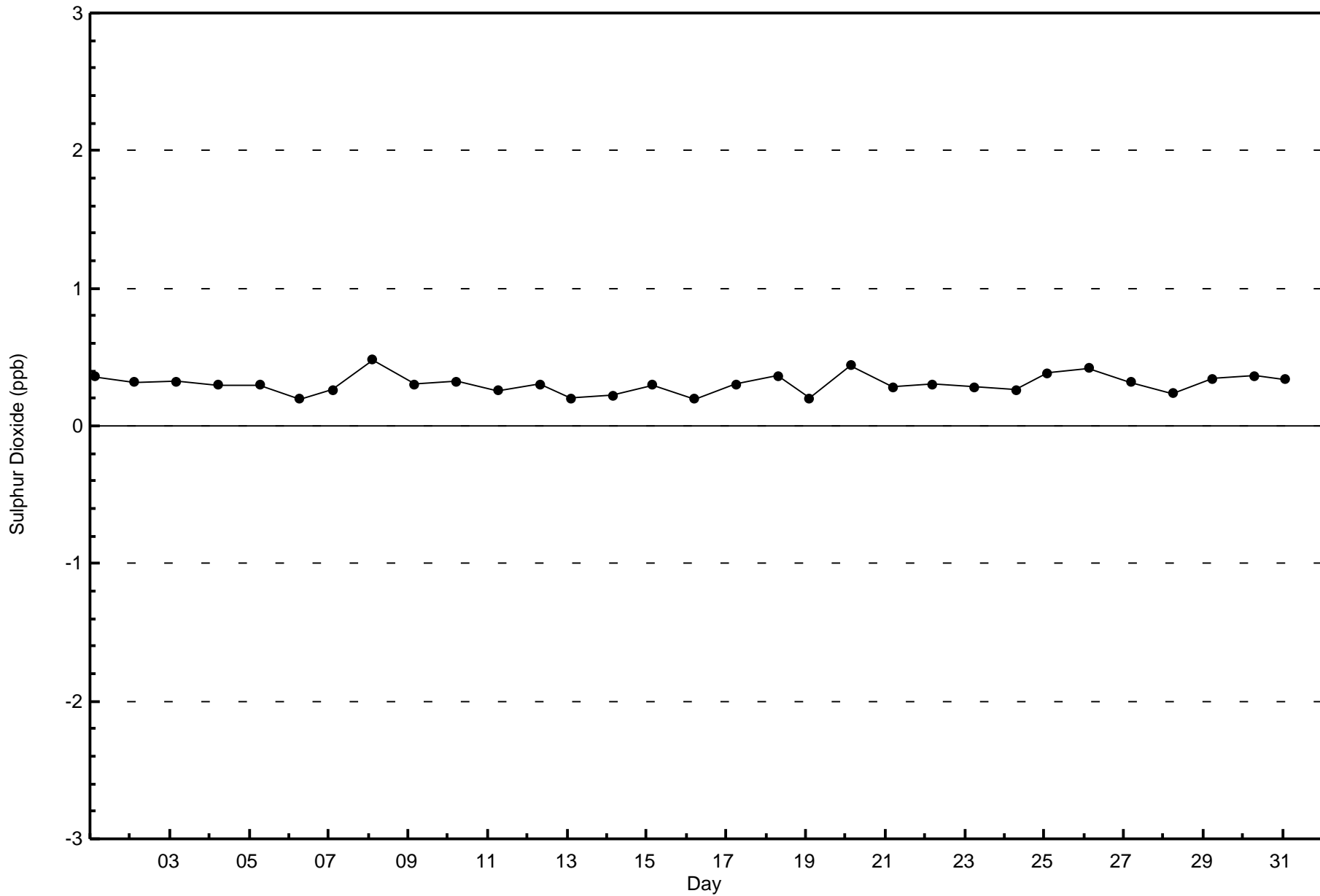
Total Number of Hours: 744

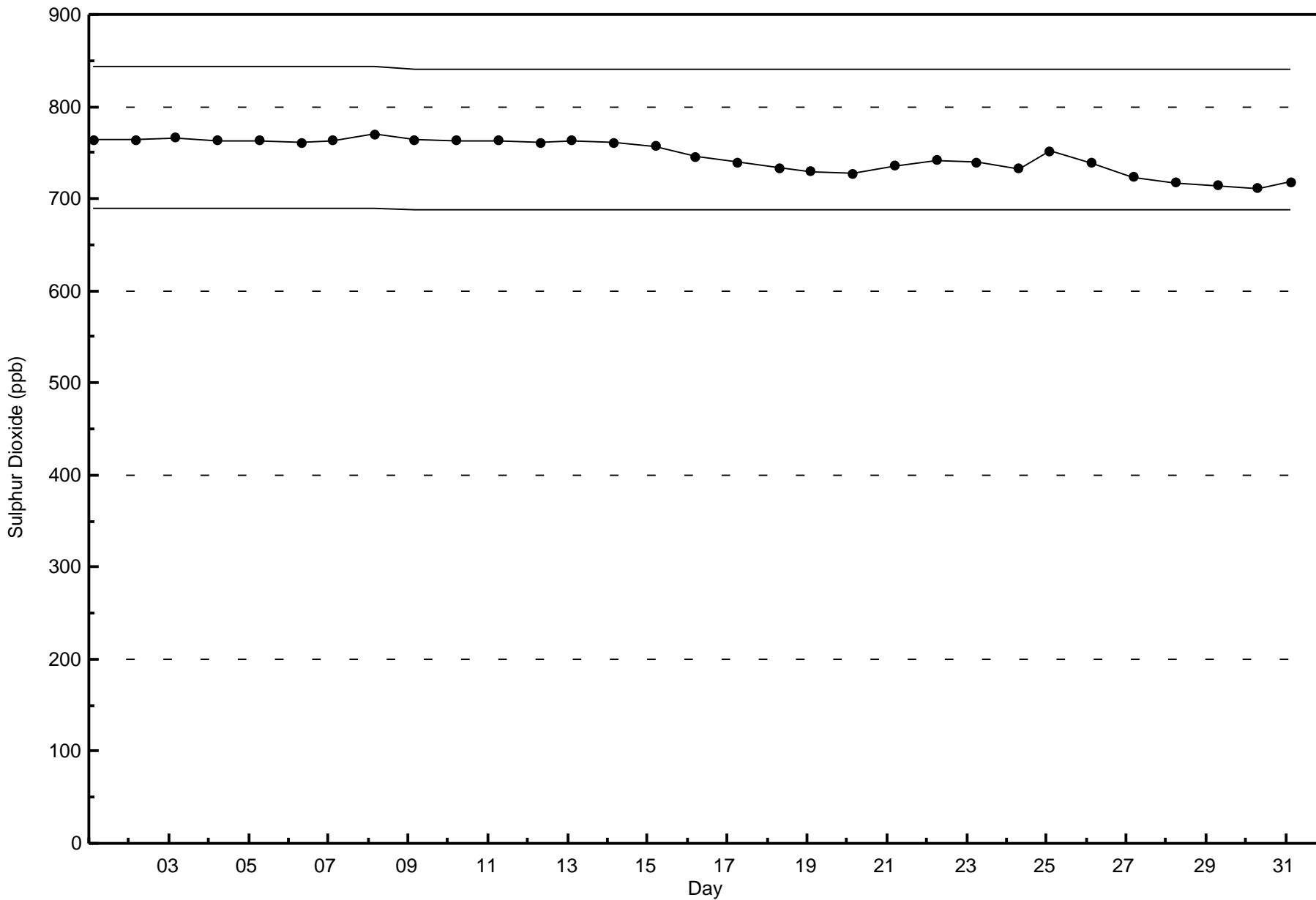


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes (AMS 6)









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

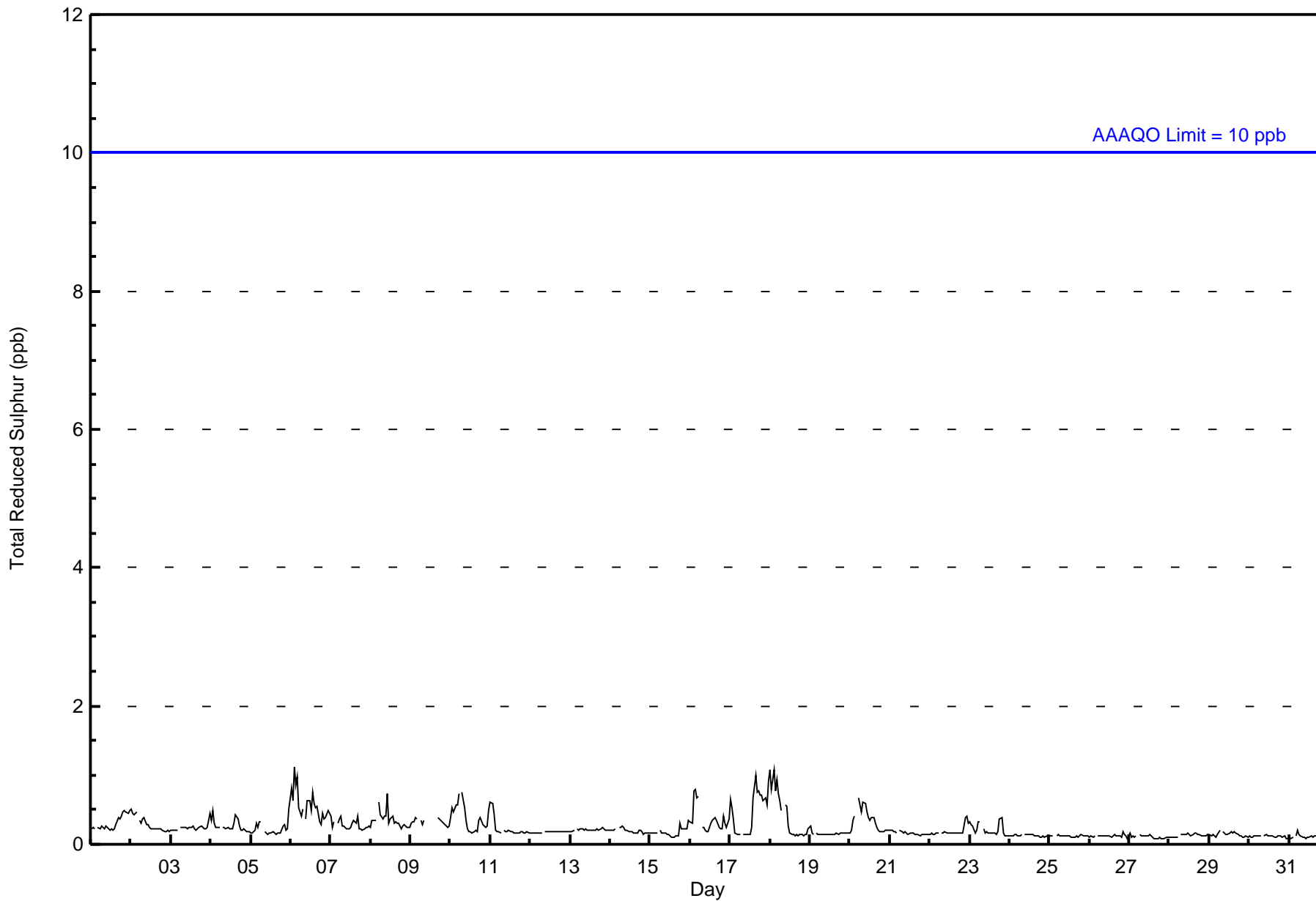
Patricia McInnes - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744														Daily Average		Daily Maximum																								
Maximum Value: 1 ppb on Mar 6 03:00										Maximum Daily Average: 0.6 ppb on Mar 6														Hours of Data: 706		Hours of Missing Data: 38																								
Minimum Value: 0 ppb on Mar 27 21:00										Minimum Daily Average: 0.1 ppb on Mar 27														Hours of Calibration: 38		Percent Operational Time: 100.0																								
Maximum Diurnal Average: 0.3 ppb at hour 6										Minimum Diurnal Average: 0.2 ppb at hour 13																																								
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																																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Mar	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																							
2-Mar	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	0.3	1																							
3-Mar	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																							
4-Mar	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																							
5-Mar	0	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																							
6-Mar	1	1	1	1	1	1	0	1	Z	0	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0.6	1																							
7-Mar	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																							
8-Mar	0	0	0	0	Z	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
9-Mar	0	0	0	0	0	Z	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0																								
10-Mar	0	1	0	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																							
11-Mar	1	1	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	1																							
12-Mar	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	0.2	0																							
13-Mar	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																							
14-Mar	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																							
15-Mar	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																							
16-Mar	0	0	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
17-Mar	1	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0.5	1																							
18-Mar	1	1	1	1	1	1	1	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
19-Mar	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																							
20-Mar	0	0	0	0	Z	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
21-Mar	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																							
22-Mar	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-Mar	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	0.2	0																							
24-Mar	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	0.1	0																							
25-Mar	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																							
26-Mar	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																							
27-Mar	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-Mar	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-Mar	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	0.1	0																							
30-Mar	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	0.1	0																							
31-Mar	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																							
																								0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	Diurnal Average	
																								1	1	1	1	1	1	1	1	1	1	1	1	0	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 10 ppb 24-hr 3 ppb																																																		



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	706	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: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - March 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	120	33	26	19	37	128	116	48	25	15	7	5	10	19	41	57	706
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	120	33	26	19	37	128	116	48	25	15	7	5	10	19	41	57	706

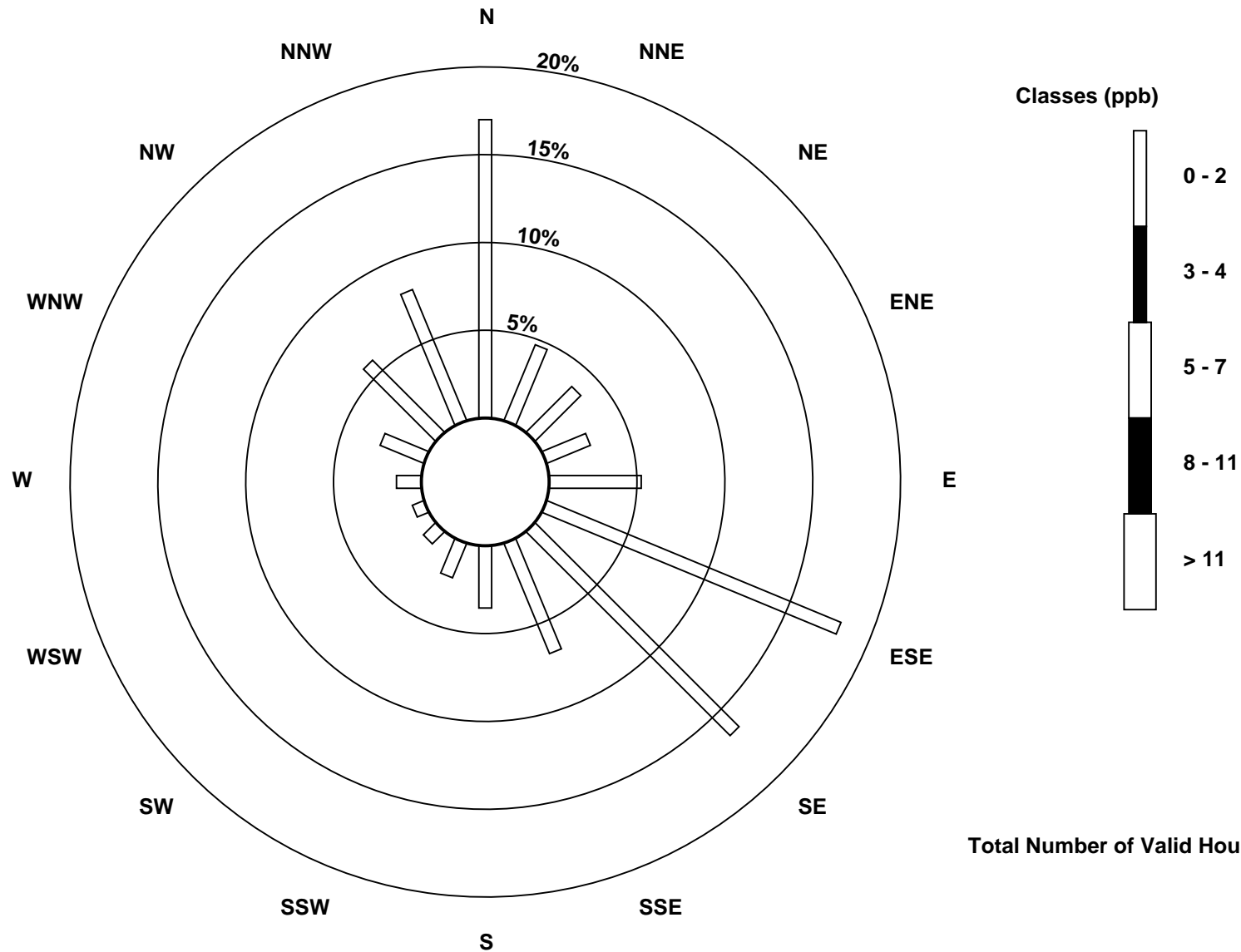
Total Number of Valid Hours: 706

Total Number of Hours: 744

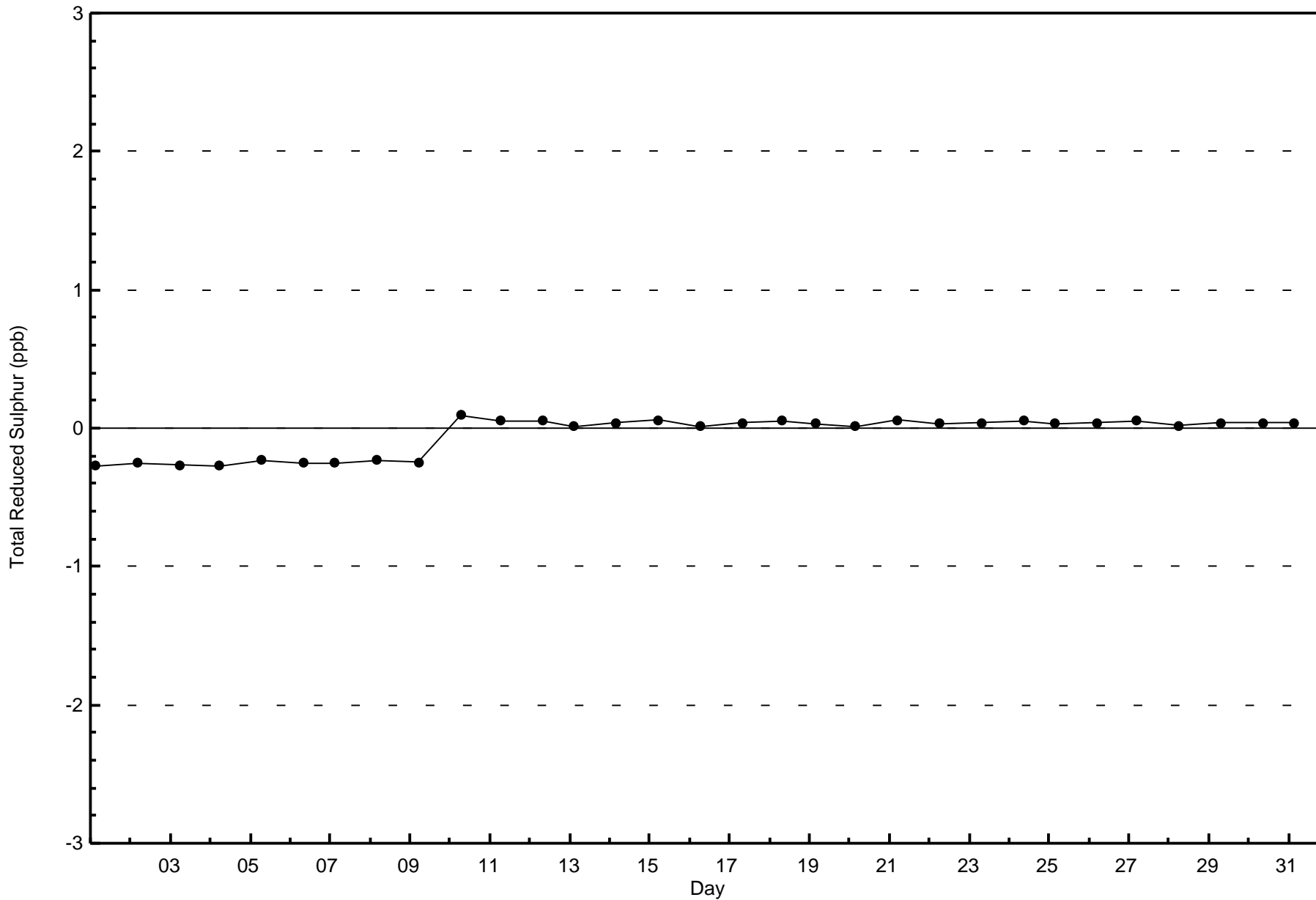


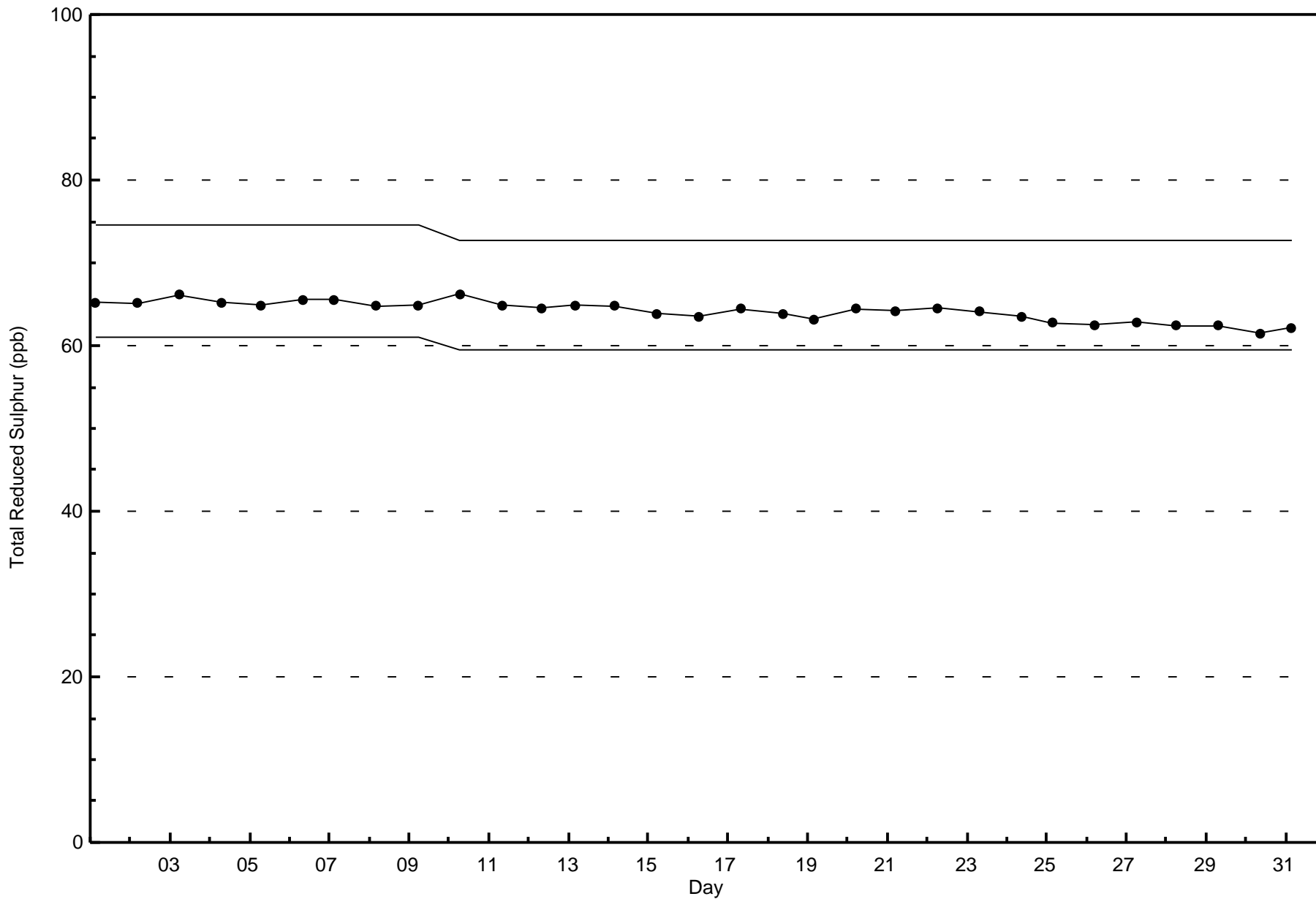
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes (AMS 6)



Total Number of Valid Hours: 706







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

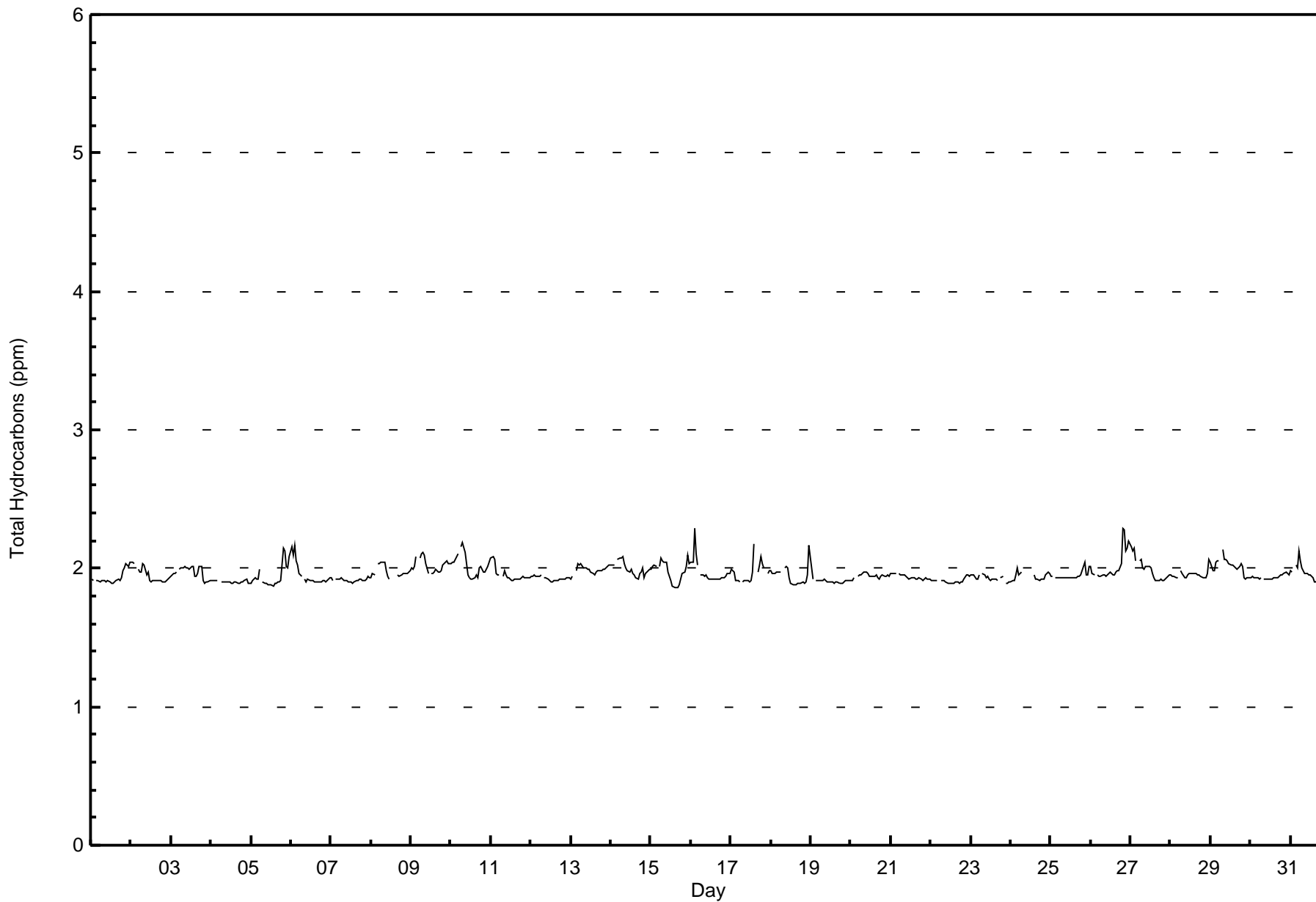
Patricia McInnes - March 2017

Maximum Value: 2.3 ppm on Mar 26 20:00																				Maximum Daily Average: 2.0 ppm on Mar 9					Hours in Service: 744				
Minimum Value: 1.9 ppm on Mar 15 15:00																				Minimum Daily Average: 1.9 ppm on Mar 4					Hours of Data: 698				
Maximum Diurnal Average: 2.0 ppm at hour 3																				Minimum Diurnal Average: 1.9 ppm at hour 16					Hours of Missing Data: 46				
Monthly Average: 1.96 ppm																				Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.0 P ₉₉ = 2.2					Hours of Calibration: 35				
																									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-Mar	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	2.0	2.0	2.0	2.0	1.9	2.0			
2-Mar	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	1.9	1.9	1.9	1.9	1.9	2.0	2.0		
3-Mar	1.9	2.0	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	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0		
4-Mar	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	1.9	1.9		
5-Mar	1.9	1.9	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	2.1	2.1	2.0	2.0	2.1	1.9	2.1		
6-Mar	2.2	2.1	2.2	2.0	2.0	2.0	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	2.2		
7-Mar	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		
8-Mar	1.9	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	C	C	C	C	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
9-Mar	2.0	2.0	2.0	2.1	Z	2.1	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	2.0	2.0	2.0	2.0	2.0	2.1		
10-Mar	2.0	2.0	2.0	2.1	2.1	Z	2.2	2.2	2.1	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	2.0	2.0	2.0	2.2		
11-Mar	2.1	2.1	2.1	2.0	2.0	2.0	Z	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	2.1		
12-Mar	1.9	1.9	2.0	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	1.9	1.9	1.9	2.0		
13-Mar	1.9	1.9	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		
14-Mar	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	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1		
15-Mar	2.0	2.0	2.0	2.0	Z	2.0	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	2.1	2.0	2.0	2.0	2.1		
16-Mar	2.0	2.0	2.3	2.1	2.0	Z	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	2.0	2.0	2.0	2.3		
17-Mar	2.0	2.0	2.0	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	UO	2.0	2.0	2.1	2.0	2.0	UO	2.0	2.0	2.0	2.0	2.2		
18-Mar	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	2.2		
19-Mar	2.0	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	2.0		
20-Mar	1.9	1.9	1.9	Z	1.9	1.9	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	2.0	1.9	1.9	2.0		
21-Mar	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	1.9	1.9	2.0		
22-Mar	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	2.0	1.9	1.9	2.0		
23-Mar	2.0	1.9	2.0	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	UO	1.9	1.9	UO	1.9	1.9	1.9	2.0		
24-Mar	1.9	1.9	1.9	2.0	2.0	2.0	Z	M	M	M	M	M	M	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	--		
25-Mar	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	1.9	2.0	2.0	1.9	2.0		
26-Mar	2.0	2.0	2.0	Z	1.9	1.9	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	2.3	2.3	2.1	2.1	2.2	2.0	2.3		
27-Mar	2.2	2.1	2.1	2.1	Z	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	1.9	1.9	2.0	2.0	2.2		
28-Mar	2.0	1.9	1.9	1.9	1.9	Z	2.0	2.0	1.9	1.9	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	2.1	2.0	2.1		
29-Mar	2.0	2.0	2.0	2.0	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	1.9	1.9	1.9	1.9	2.0	2.1		
30-Mar	1.9	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	2.0	2.0	2.0	2.0	2.0	1.9	2.0		
31-Mar	2.0	2.0	Z	2.0	2.0	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	1.9	2.0	2.0	2.0	2.0	2.1		
																								Diurnal Average					
																								Diurnal Maximum					
Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation																													



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Patricia McInnes - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Patricia McInnes - March 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	647	92.69	92.69
2.1 - 3.0	51	7.31	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Patricia McInnes - March 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	109	30	27	20	40	121	110	36	22	12	7	4	9	17	35	48	647
2.1 - 3.0	8	4	0	0	0	1	7	7	4	3	1	1	1	2	6	6	51
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	117	34	27	20	40	122	117	43	26	15	8	5	10	19	41	54	698

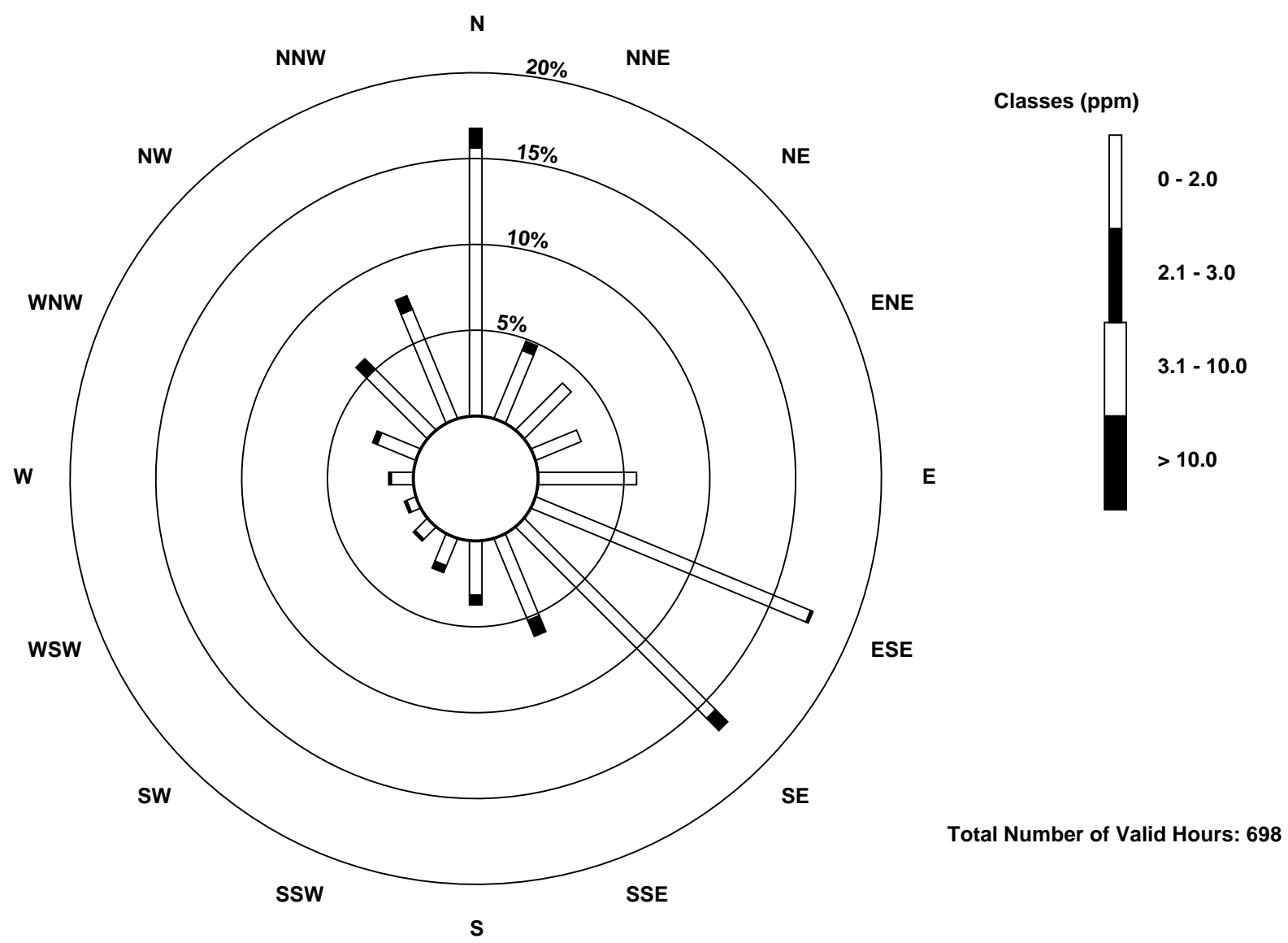
Total Number of Valid Hours: 698

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

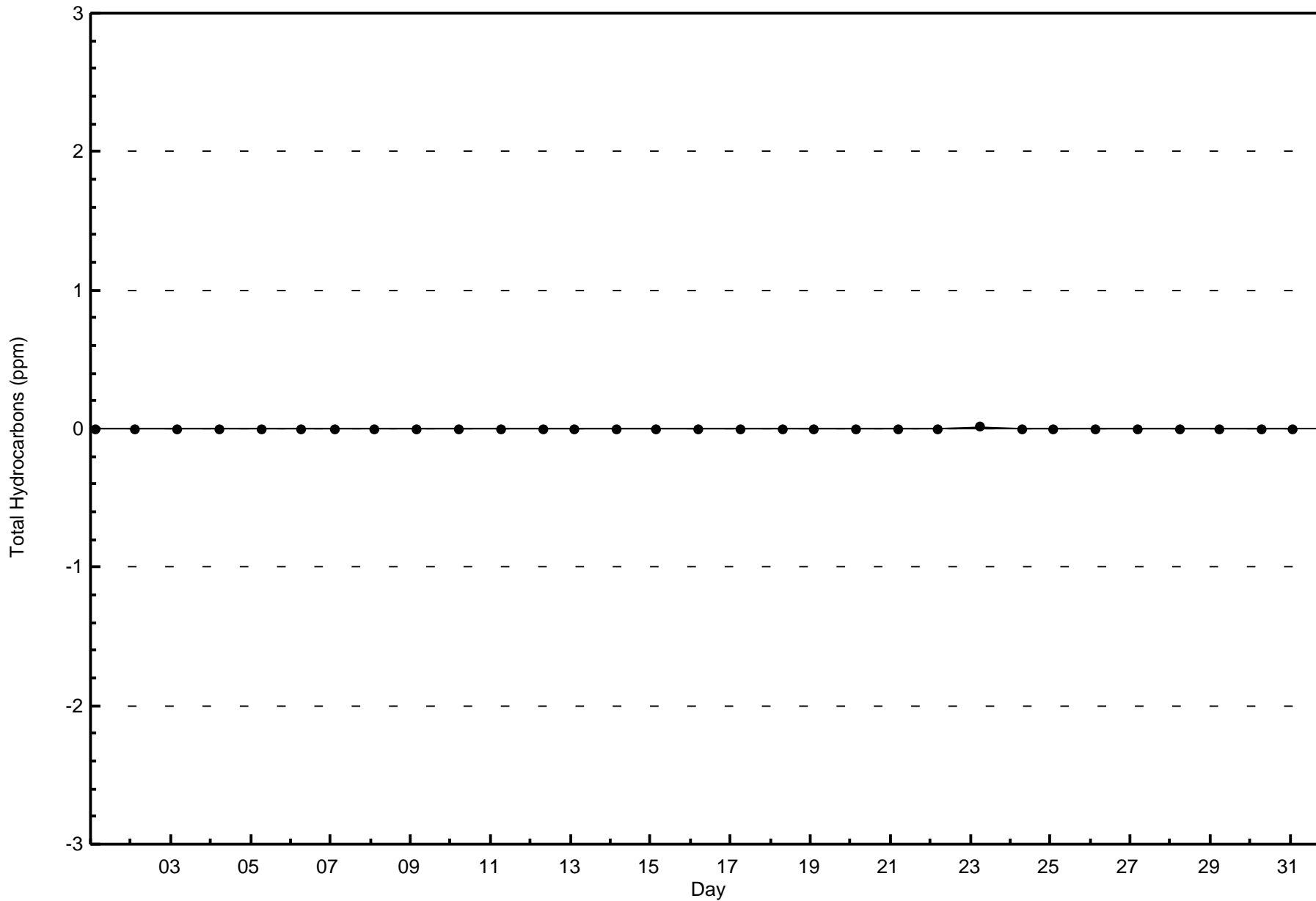
Total Hydrocarbons (THC) - ppm
Patricia McInnes (AMS 6)

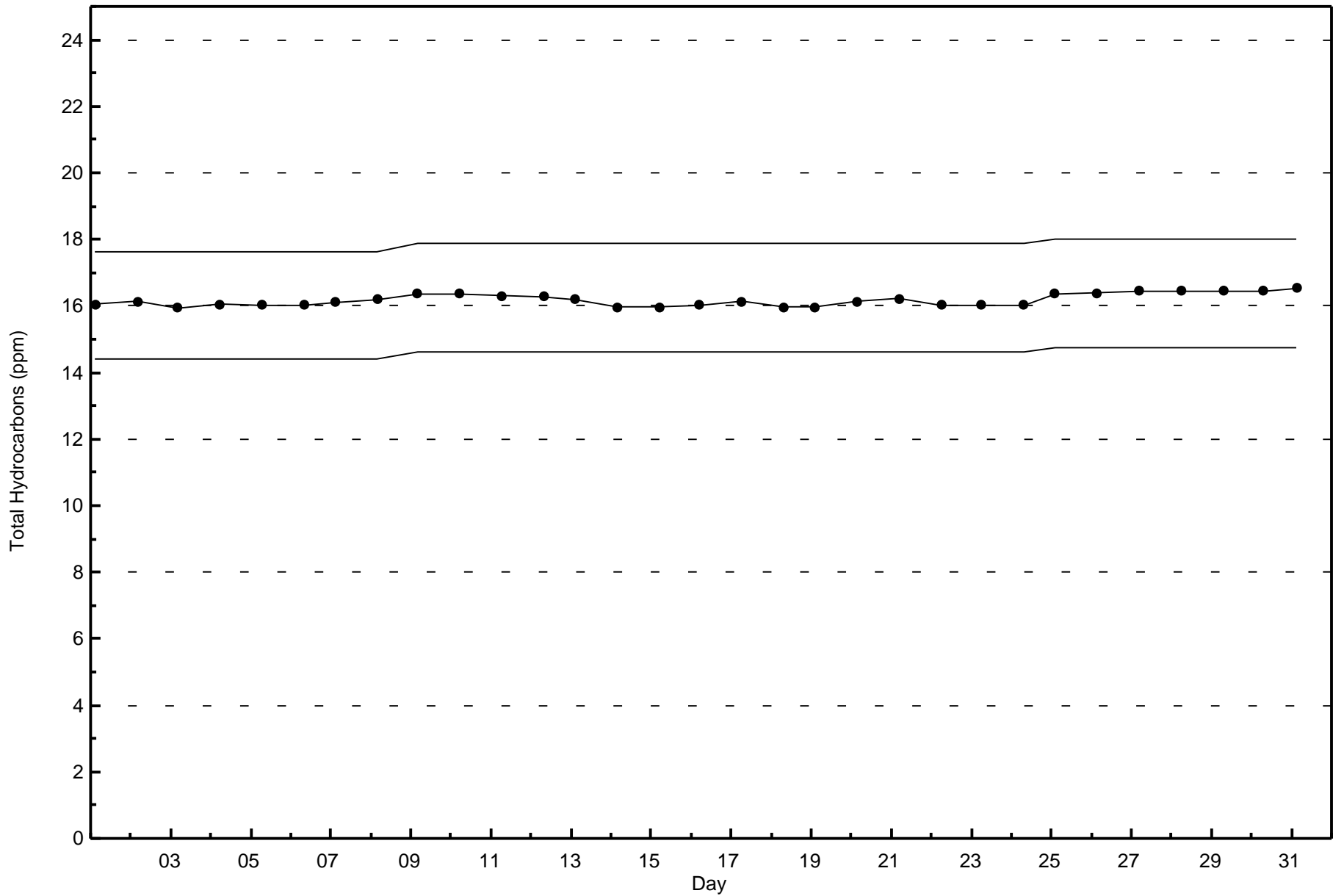




Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Patricia McInnes - March 2017







Summary of Hour Averages

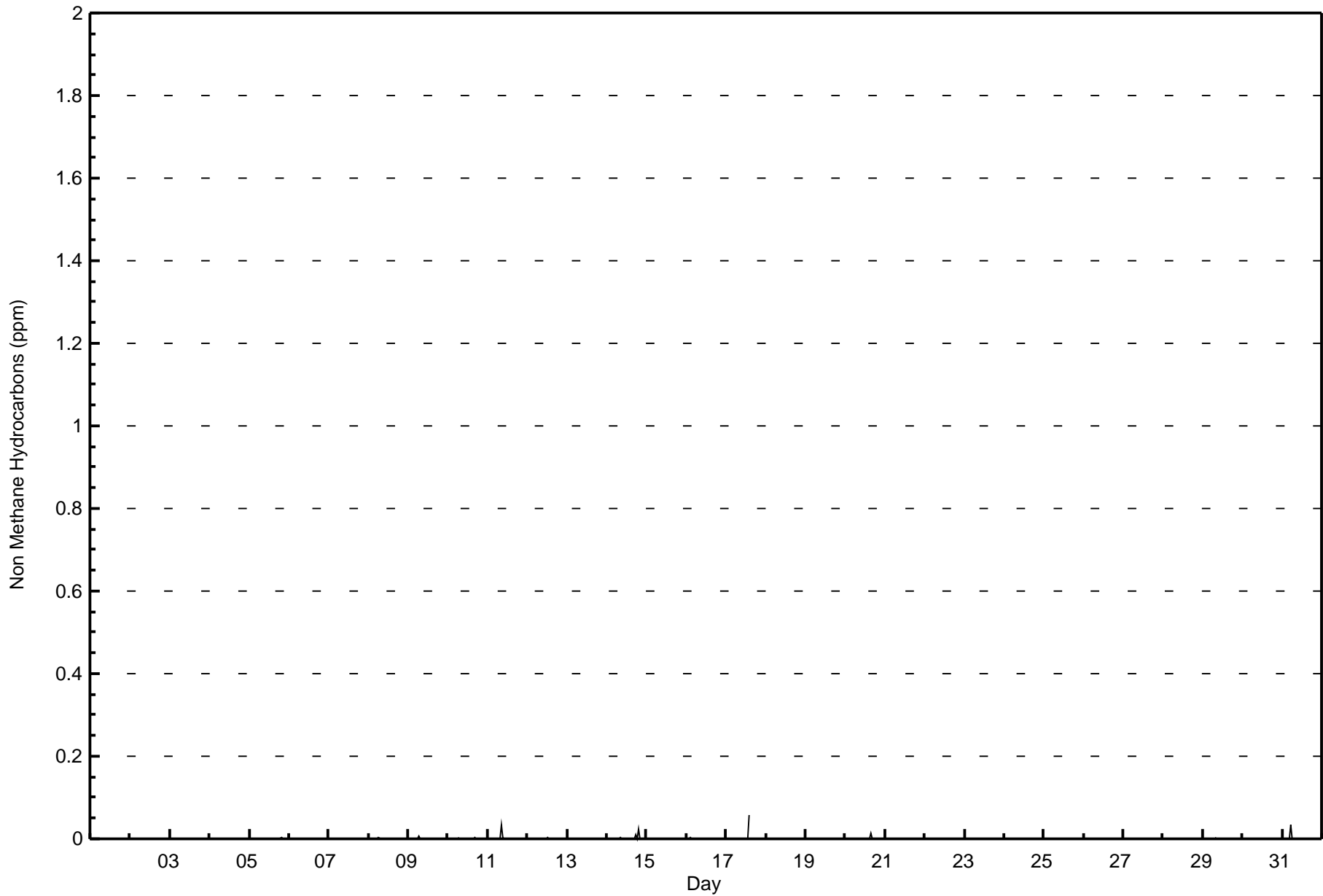
Patricia McInnes - March 2017

Maximum Value: 0.057 ppm on Mar 17 15:00	Maximum Daily Average: 0.003 ppm on Mar 17	Hours in Service: 744
Minimum Value: 0.000 ppm on Mar 1 01:00	Minimum Daily Average: 0.000 ppm on Mar 1	Hours of Data: 698
Maximum Diurnal Average: 0.002 ppm at hour 15	Minimum Diurnal Average: 0.000 ppm at hour 1	Hours of Missing Data: 46
Monthly Average: 0.000 ppm	Percentiles: P₁ = 0.0 P₁₀ = 0.0 Q₁ = 0.0 Median = 0.0 Q₃ = 0.0 P₉₀ = 0.0 P₉₉ = 0.0	Hours of Calibration: 35
		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-Mar	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	0.000	0.000
2-Mar	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	0.000	
3-Mar	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	0.000	
4-Mar	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	0.000	
5-Mar	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	0.003	0.000	0.000	0.000	0.000	
6-Mar	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	0.000	
7-Mar	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	0.000	
8-Mar	0.000	0.000	0.000	Z	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	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	0.000	0.000	
9-Mar	0.000	0.000	0.000	0.000	Z	0.000	0.007	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	0.000	0.000	
10-Mar	0.000	0.000	0.000	0.000	0.000	Z	0.002	0.000	0.000	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	
11-Mar	0.000	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.034	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	
12-Mar	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Z	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	0.000	0.000	
13-Mar	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	0.000	
14-Mar	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.009	0.000	0.024	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	
15-Mar	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	0.000	
16-Mar	0.000	0.000	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
17-Mar	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	0.057	UO	0.000	0.000	0.000	0.000	0.000	0.000	UO	0.000	0.000	0.000	0.000	0.000	0.000	
18-Mar	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	0.000	
19-Mar	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	0.000	
20-Mar	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	0.013	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	
21-Mar	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	0.000	
22-Mar	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	0.000	
23-Mar	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	UO	0.000	0.000	UO	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
24-Mar	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Z	M	M	M	M	M	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	
25-Mar	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	0.000	
26-Mar	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	0.000	
27-Mar	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	0.000	
28-Mar	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	0.000	
29-Mar	0.000	0.000	0.000	0.000	0.000	0.000	Z	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	
30-Mar	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	0.000	
31-Mar	0.000	0.000	Z	0.000	0.000	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

0.000	0.001	Diurnal Average
0.000	0.032	Diurnal Maximum

Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - March 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	691	99.00	99.00
0.006 - 0.05	6	0.86	99.86
0.06 - 0.1	1	0.14	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - March 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	116	34	27	19	40	120	116	43	26	14	8	5	9	19	41	54	691
0.006 - 0.05	0	0	0	1	0	2	1	0	0	1	0	0	1	0	0	0	6
0.06 - 0.1	1	0	0	0	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	117	34	27	20	40	122	117	43	26	15	8	5	10	19	41	54	698

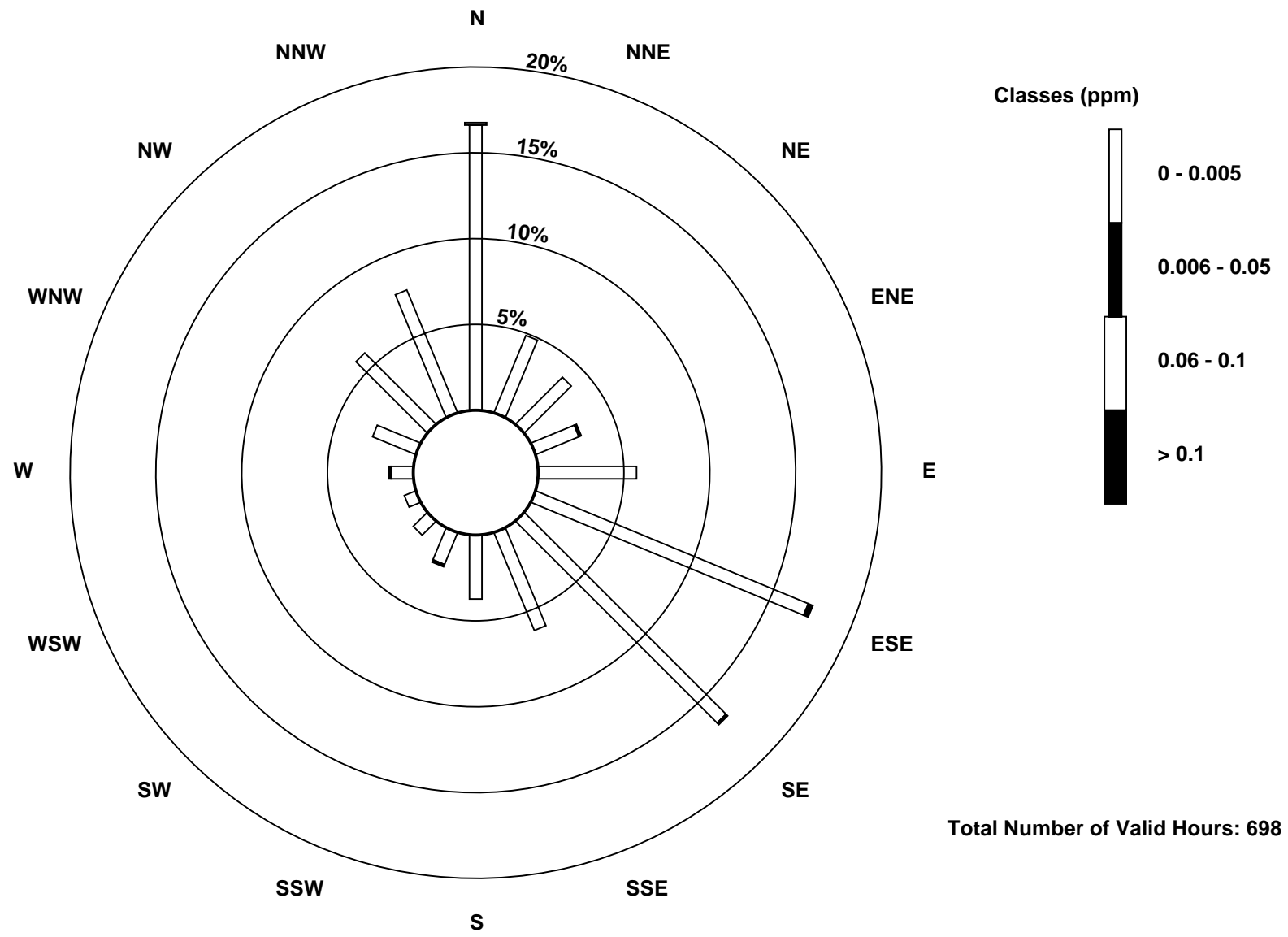
Total Number of Valid Hours: 698

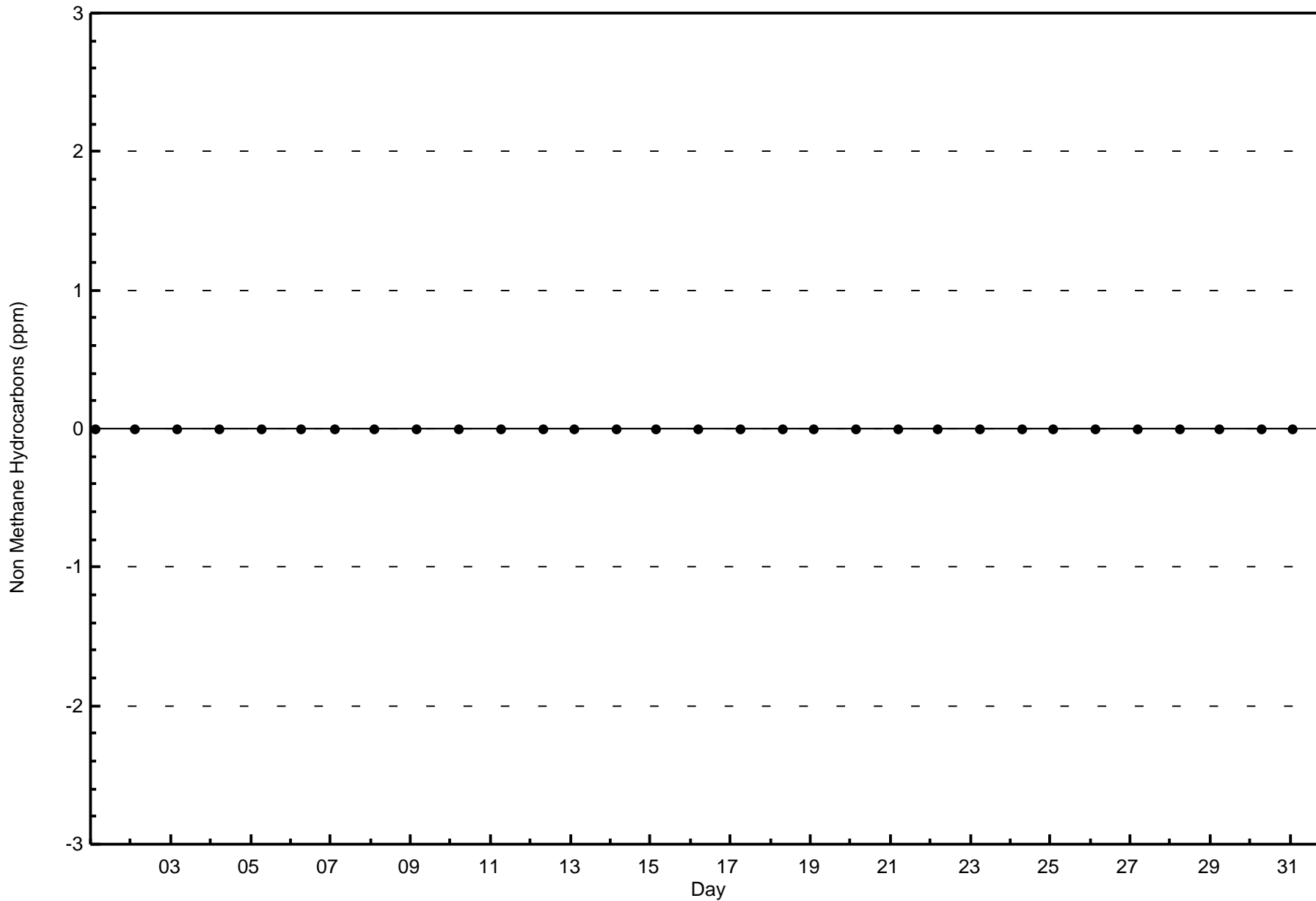
Total Number of Hours: 744

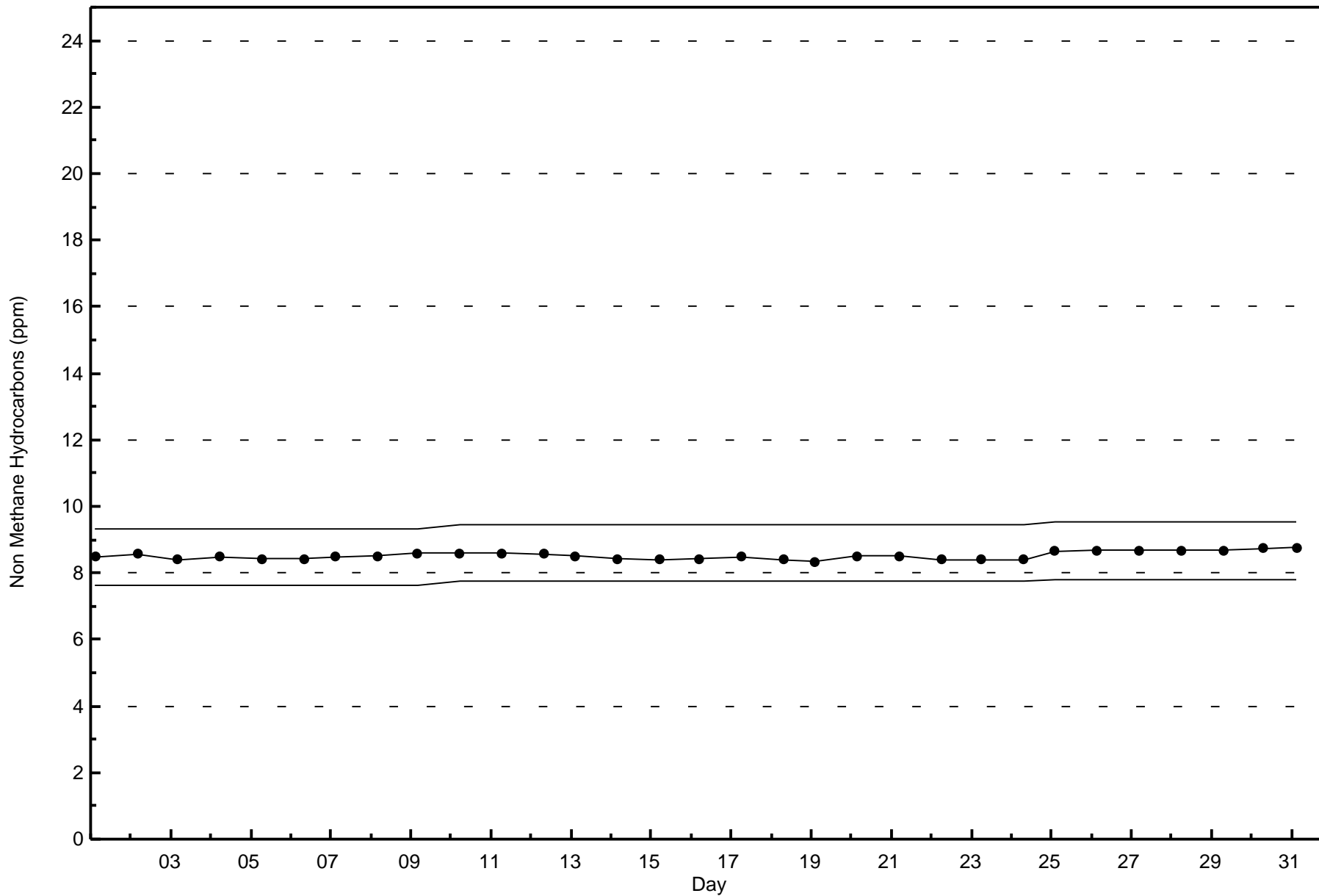


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes (AMS 6)









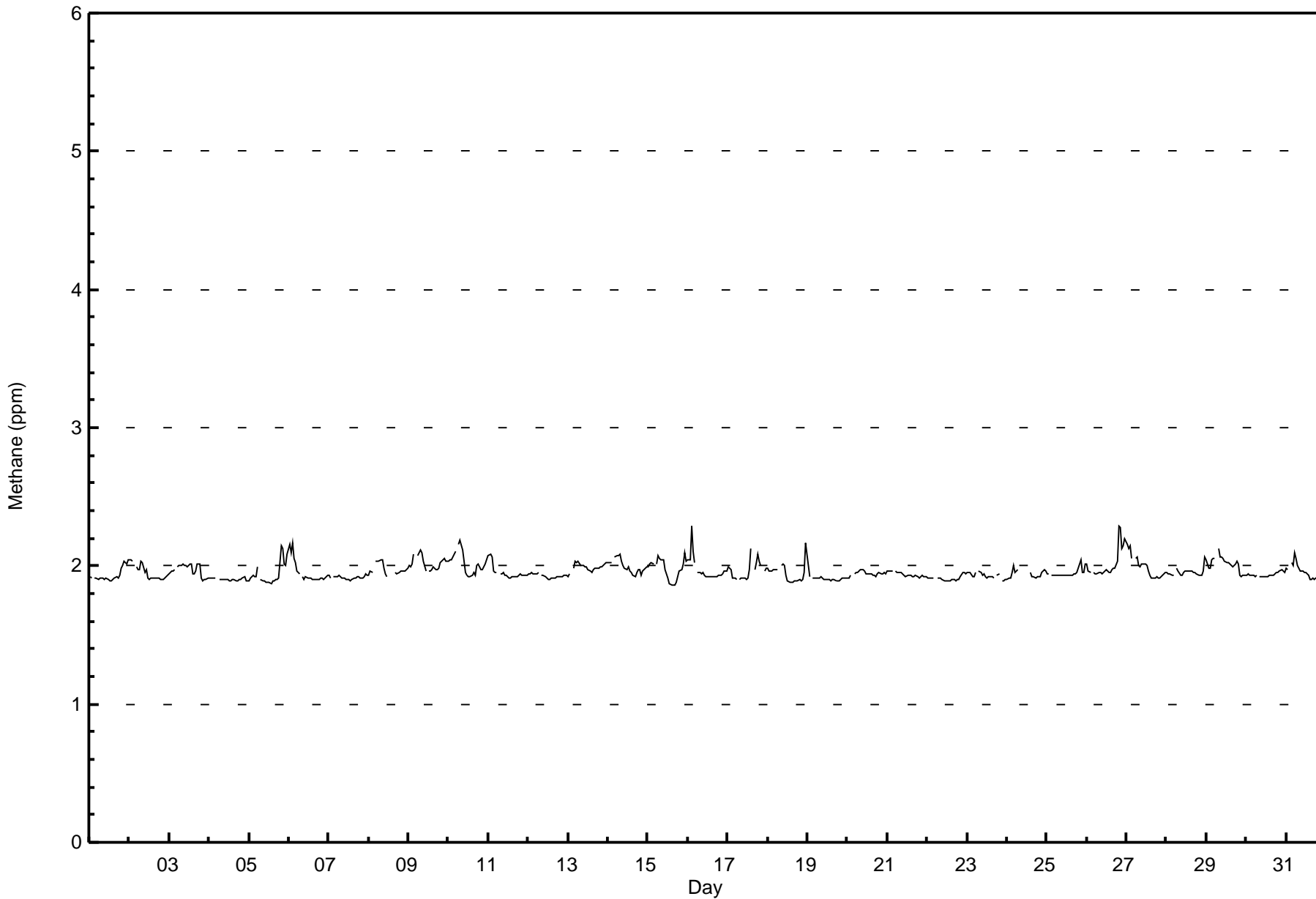
Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

Patricia McInnes - March 2017

Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0	Hours in Service: 744																				Daily Average	Daily Maximum																										
Maximum Value: 2.3 ppm on Mar 26 20:00		Maximum Daily Average: 2.0 ppm on Mar 9		Hours of Data: 698																																															
Minimum Value: 1.9 ppm on Mar 15 15:00		Minimum Daily Average: 1.9 ppm on Mar 4		Hours of Missing Data: 46																																															
Maximum Diurnal Average: 2.0 ppm at hour 3		Minimum Diurnal Average: 1.9 ppm at hour 16		Hours of Calibration: 35																																															
Monthly Average: 1.96 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.0 P ₉₉ = 2.2		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-Mar	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	2.0	2.0	2.0	2.0	1.9	2.0																									
2-Mar	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	1.9	1.9	1.9	1.9	1.9	2.0	2.0																								
3-Mar	1.9	2.0	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	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0																								
4-Mar	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	1.9	1.9																								
5-Mar	1.9	1.9	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	2.1	2.1	2.0	2.0	2.1	1.9	2.1																								
6-Mar	2.2	2.1	2.2	2.0	2.0	2.0	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	2.2																								
7-Mar	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																								
8-Mar	1.9	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	C	C	C	C	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																								
9-Mar	2.0	2.0	2.0	2.1	Z	2.1	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	2.0	2.0	2.0	2.0	2.0	2.1																								
10-Mar	2.0	2.0	2.0	2.1	2.1	Z	2.2	2.2	2.1	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	2.0	2.0	2.0	2.2																								
11-Mar	2.1	2.1	2.1	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	1.9	1.9	1.9	1.9	1.9	2.0	2.1																								
12-Mar	1.9	1.9	2.0	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	1.9	1.9	1.9	2.0																								
13-Mar	1.9	1.9	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																								
14-Mar	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	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																								
15-Mar	2.0	2.0	2.0	2.0	Z	2.0	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	2.1	2.0	2.0	2.0	2.1																								
16-Mar	2.0	2.0	2.3	2.1	2.0	Z	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	2.0	2.0	2.0	2.3																								
17-Mar	2.0	2.0	2.0	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	UO	2.0	2.0	2.1	2.0	2.0	UO	2.0	2.0	2.0	2.1																									
18-Mar	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	2.0	2.2	1.9																								
19-Mar	2.0	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	2.0																								
20-Mar	1.9	1.9	1.9	Z	1.9	1.9	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	2.0	1.9	1.9	2.0																								
21-Mar	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	1.9	1.9	2.0																								
22-Mar	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	2.0	1.9	1.9	2.0																								
23-Mar	2.0	1.9	2.0	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	UO	1.9	1.9	UO	1.9	1.9	1.9	2.0																								
24-Mar	1.9	1.9	1.9	2.0	2.0	2.0	Z	M	M	M	M	M	M	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	--																								
25-Mar	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	1.9	2.0	2.0	1.9	2.0																								
26-Mar	2.0	2.0	2.0	Z	1.9	1.9	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	2.3	2.3	2.1	2.1	2.2	2.0	2.3																								
27-Mar	2.2	2.1	2.1	2.1	Z	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	1.9	2.0	2.0	2.0	2.2																								
28-Mar	2.0	1.9	1.9	1.9	1.9	Z	2.0	2.0	1.9	1.9	2.0	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	2.0	2.0	2.1																								
29-Mar	2.0	2.0	2.0	2.0	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	1.9	1.9	1.9	1.9	2.0	2.1																								
30-Mar	1.9	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	2.0	2.0	2.0	2.0	2.0	1.9	2.0																								
31-Mar	2.0	2.0	Z	2.0	2.0	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	1.9	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	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	Diurnal Average	
																								2.2	2.1	2.3	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.3	2.3	2.1	2.1	2.2	2.0	2.0	2.2	Diurnal Maximum
Z - zerospan																								C - Calibration				M - Maintenance				UO - Unstable Operation																			





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - March 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	647	92.69	92.69
2.1 - 3.0	51	7.31	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - March 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	109	30	27	20	40	121	110	36	22	12	7	4	9	17	35	48	647
2.1 - 3.0	8	4	0	0	0	1	7	7	4	3	1	1	1	2	6	6	51
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	117	34	27	20	40	122	117	43	26	15	8	5	10	19	41	54	698

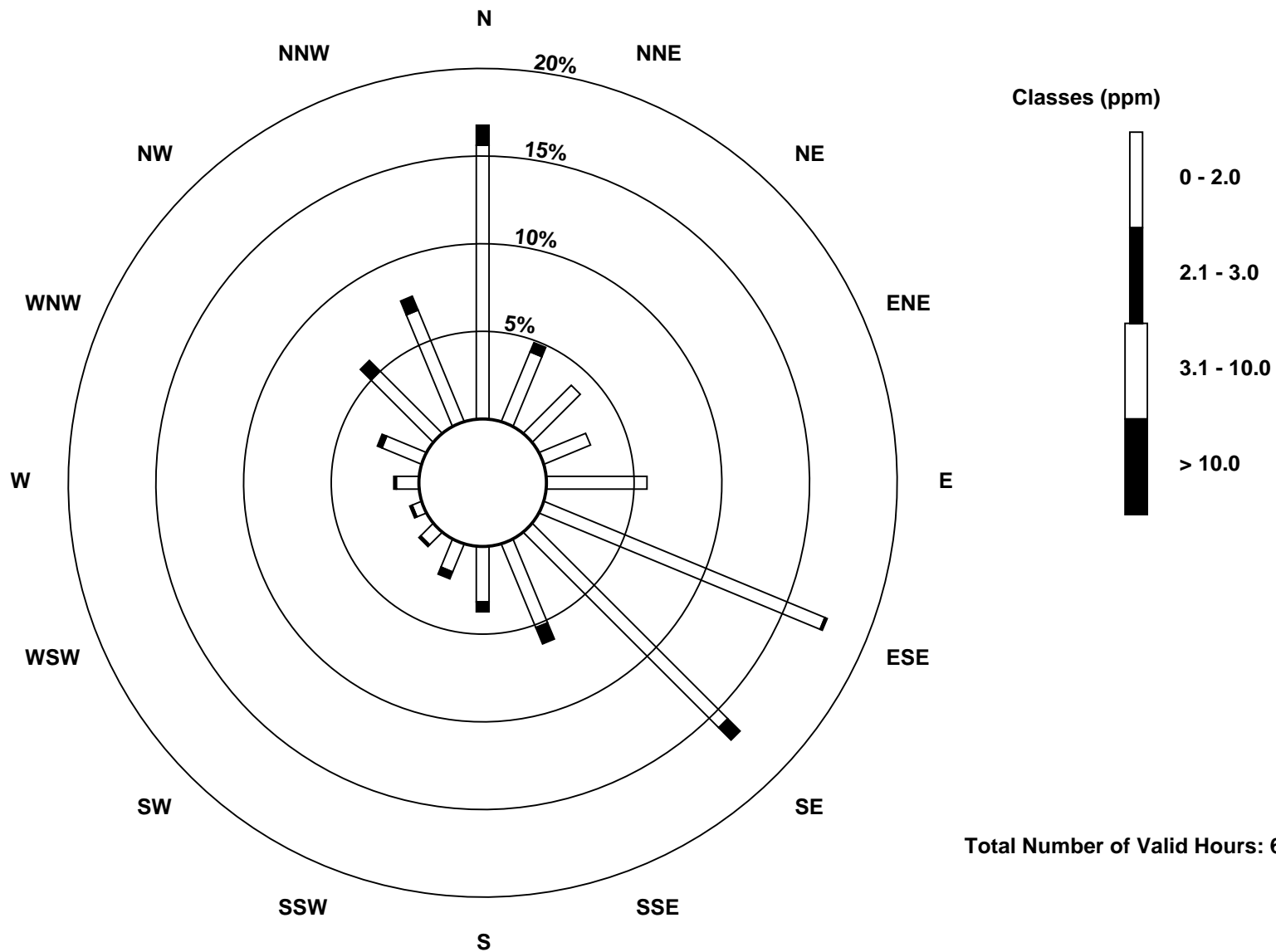
Total Number of Valid Hours: 698

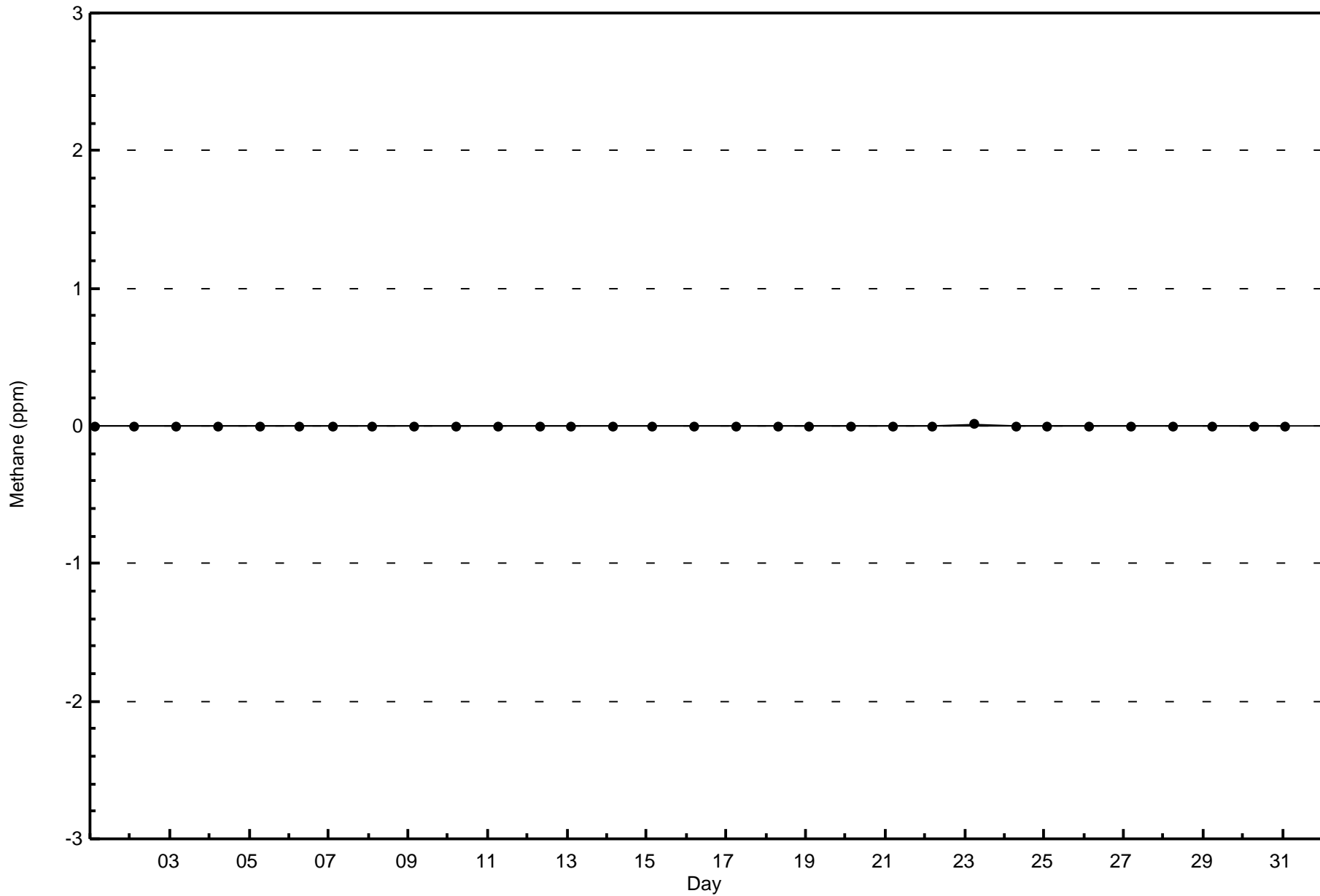
Total Number of Hours: 744

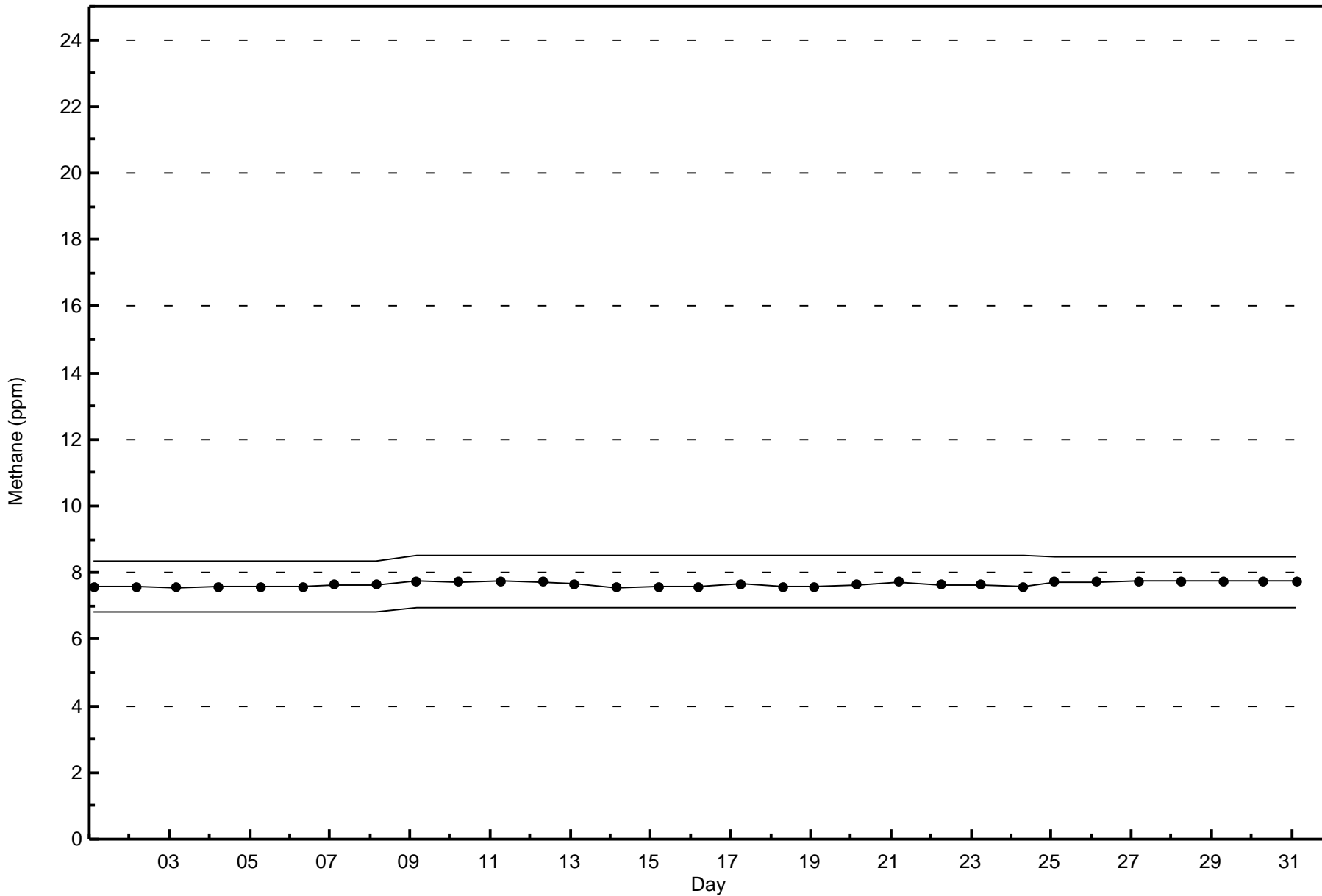


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Methane (CH₄) - ppm
Patricia McInnes (AMS 6)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

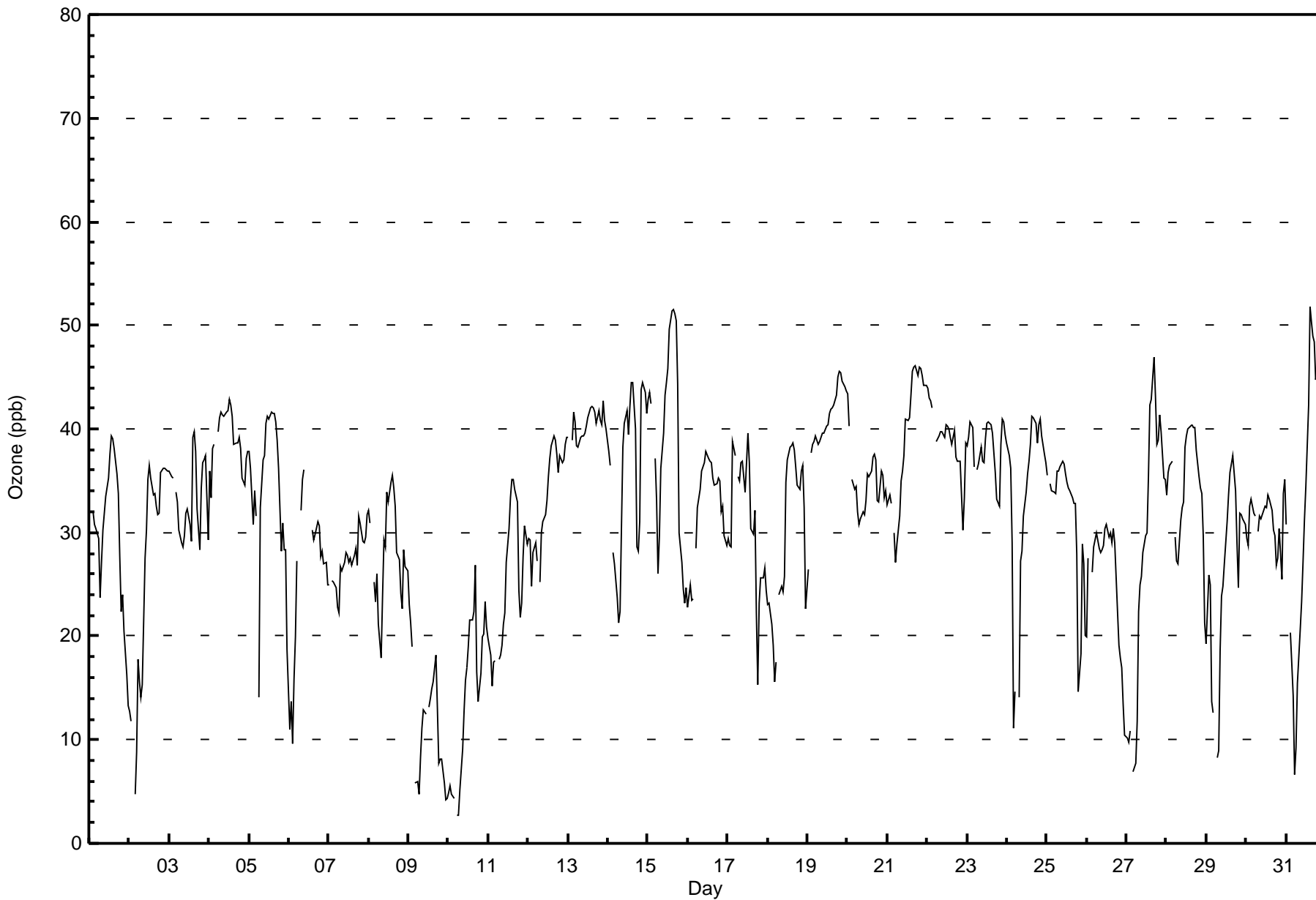
Patricia McInnes - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 52 ppb on Mar 31 15:00	Maximum Daily Average: 40.7 ppb on Mar 19		Hours of Data:	708
Minimum Value: 3 ppb on Mar 10 06:00	Minimum Daily Average: 11.4 ppb on Mar 9		Hours of Missing Data:	36
Maximum Diurnal Average: 37.0 ppb at hour 15	Minimum Diurnal Average: 24.7 ppb at hour 7		Hours of Calibration:	35
Monthly Average: 31.4 ppb	Percentiles: P ₁ = 5 P ₁₀ = 17 Q ₁ = 27 Median = 33 Q ₃ = 38 P ₉₀ = 42 P ₉₉ = 49		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-Mar	29	Z	32	31	30	29	24	27	30	32	33	35	38	39	39	38	36	34	28	22	24	20	16	13	29.6	39
2-Mar	13	12	Z	5	9	18	16	14	15	27	30	35	36	35	34	34	32	32	32	36	36	36	36	36	26.5	36
3-Mar	36	35	35	Z	34	33	30	29	29	30	32	32	31	29	39	40	38	32	28	34	37	37	37	29	33.4	40
4-Mar	36	33	38	38	Z	40	41	42	41	41	42	42	43	42	41	38	39	39	39	38	35	35	37	38	39.1	43
5-Mar	38	36	31	34	32	Z	14	32	37	37	41	41	41	42	41	42	41	39	36	28	31	28	28	19	34.3	42
6-Mar	11	14	10	16	20	27	Z	32	35	36	C	C	C	C	30	29	30	31	31	28	28	27	27	25	25.6	36
7-Mar	25	Z	25	25	25	23	22	27	26	27	28	28	27	28	27	28	28	27	32	31	29	29	30	32	27.3	32
8-Mar	32	31	Z	25	23	26	21	18	24	29	29	34	33	35	36	34	33	28	27	24	23	28	27	26	28.1	36
9-Mar	23	21	19	Z	6	6	5	8	11	13	12	M	13	14	15	16	18	13	8	8	8	6	4	4	11.4	23
10-Mar	5	6	5	4	Z	3	3	5	9	13	16	17	19	22	22	22	27	17	14	16	20	20	23	21	14.2	27
11-Mar	20	18	15	17	18	Z	18	18	19	21	22	27	30	33	35	35	34	33	24	22	23	28	31	29	24.9	35
12-Mar	29	29	25	28	29	27	Z	25	30	31	32	33	35	37	38	39	39	38	36	37	37	37	38	39	33.5	39
13-Mar	39	Z	39	42	41	38	38	39	39	39	40	40	41	42	42	42	42	41	42	41	40	43	41	40	40.5	43
14-Mar	38	37	Z	28	27	24	21	22	31	38	40	42	39	42	45	45	40	29	28	31	44	45	44	41	35.6	45
15-Mar	43	44	43	Z	37	33	26	30	36	40	43	44	46	50	51	51	51	50	44	30	27	25	23	25	38.8	51
16-Mar	23	25	23	24	Z	28	32	34	36	36	37	38	37	37	37	35	35	35	35	35	32	33	30	29	32.4	38
17-Mar	29	29	29	39	37	Z	35	35	37	37	34	37	40	37	30	30	32	22	15	23	26	26	27	24	30.8	40
18-Mar	23	23	21	19	16	18	Z	24	25	24	26	35	37	38	38	39	38	36	35	34	36	36	32	23	29.4	39
19-Mar	26	Z	38	39	39	39	38	39	39	40	40	40	40	41	42	42	42	43	45	46	45	45	44	44	40.7	46
20-Mar	43	40	Z	35	34	34	32	31	31	32	32	33	36	35	36	37	38	37	33	33	36	36	33	34	34.9	43
21-Mar	33	34	33	Z	30	27	29	32	35	36	37	41	41	41	43	46	46	46	45	46	46	45	44	44	39.1	46
22-Mar	44	43	43	42	Z	39	39	39	40	40	39	40	40	40	39	38	40	37	37	37	37	30	33	39	39.0	44
23-Mar	38	39	41	40	36	Z	36	37	38	37	37	39	41	41	40	40	38	36	33	33	39	41	41	39	38.2	41
24-Mar	39	37	36	29	11	15	Z	14	27	28	32	34	36	37	38	41	41	41	39	40	41	39	37	37	33.5	41
25-Mar	35	Z	35	34	34	34	36	36	36	37	37	36	35	34	34	33	33	33	28	15	18	29	27	20	31.7	37
26-Mar	20	27	Z	26	29	29	30	29	28	28	29	30	31	30	30	29	30	29	22	19	18	17	13	10	25.4	31
27-Mar	10	10	11	Z	7	8	12	22	25	26	28	30	30	35	42	43	47	43	39	39	41	40	35	35	28.6	47
28-Mar	34	36	37	37	Z	30	27	27	31	32	33	38	39	40	40	40	40	40	38	35	34	34	30	21	34.5	40
29-Mar	19	26	25	14	13	Z	8	9	19	24	25	27	31	34	36	37	37	34	29	25	32	32	31	31	25.9	37
30-Mar	29	29	33	33	32	32	Z	30	32	31	32	33	32	34	33	32	30	30	27	28	30	25	34	35	31.1	35
31-Mar	31	Z	20	17	14	7	9	15	21	23	27	31	34	42	52	50	49	48	45	47	46	45	43	39	32.9	52

28.8	28.6	28.5	27.7	25.5	25.6	24.7	26.5	29.4	31.2	32.1	34.9	35.1	36.2	37.0	37.0	36.9	34.6	32.0	31.0	32.2	32.1	31.6	29.7	Diurnal Average	
44	44	43	42	41	40	41	42	41	41	43	44	46	50	52	51	51	50	45	47	46	45	44	44	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 - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	98	13.84	13.84
21 - 50	606	85.59	99.44
51 - 82	4	0.56	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 - March 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	16	6	6	8	2	2	8	8	8	5	4	2	2	2	9	10	98
21 - 50	103	29	21	13	36	127	109	37	18	10	3	2	7	16	30	45	606
51 - 82	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	4
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	119	35	27	21	38	129	117	45	26	15	8	4	10	20	39	55	708

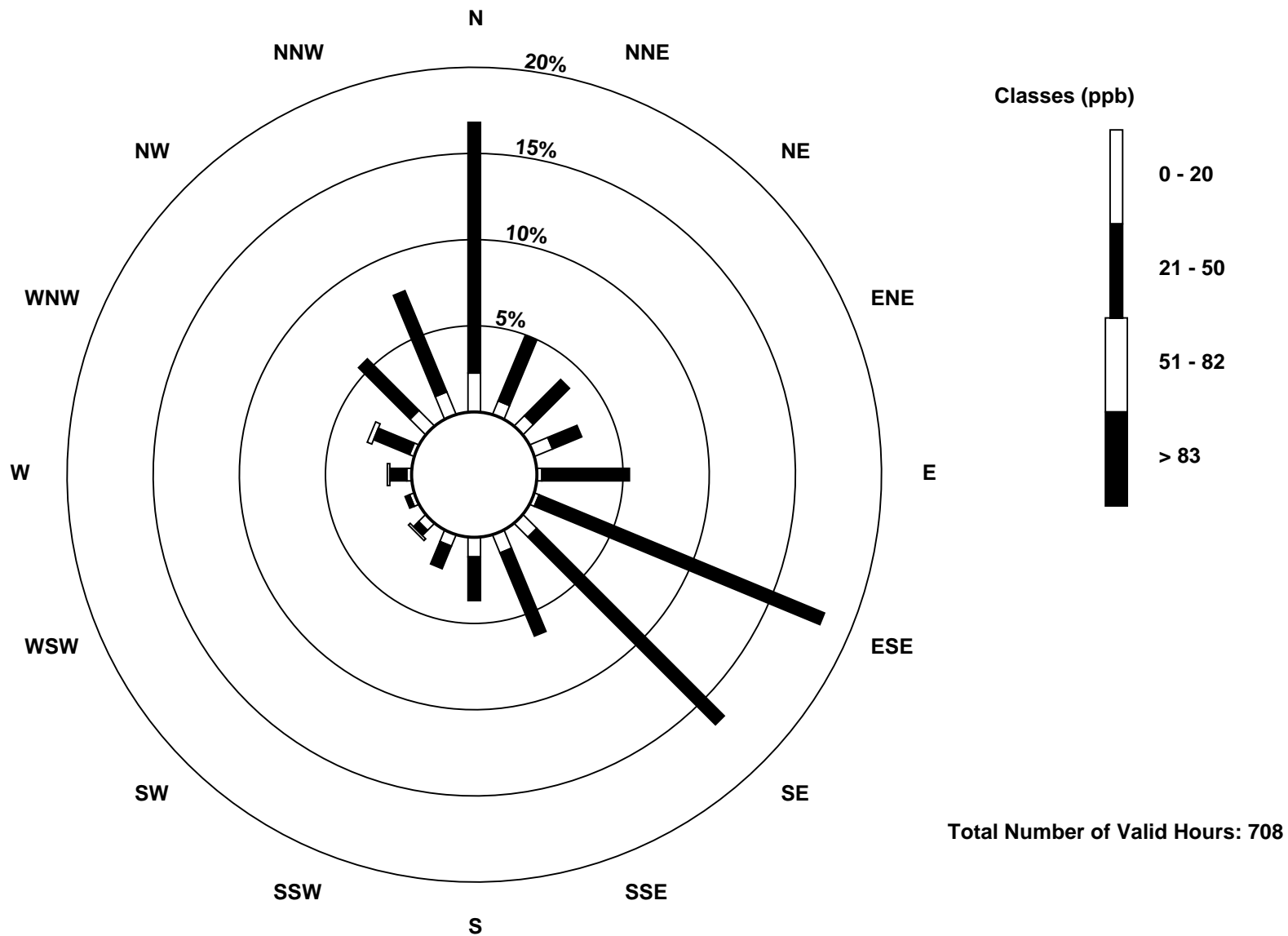
Total Number of Valid Hours: 708

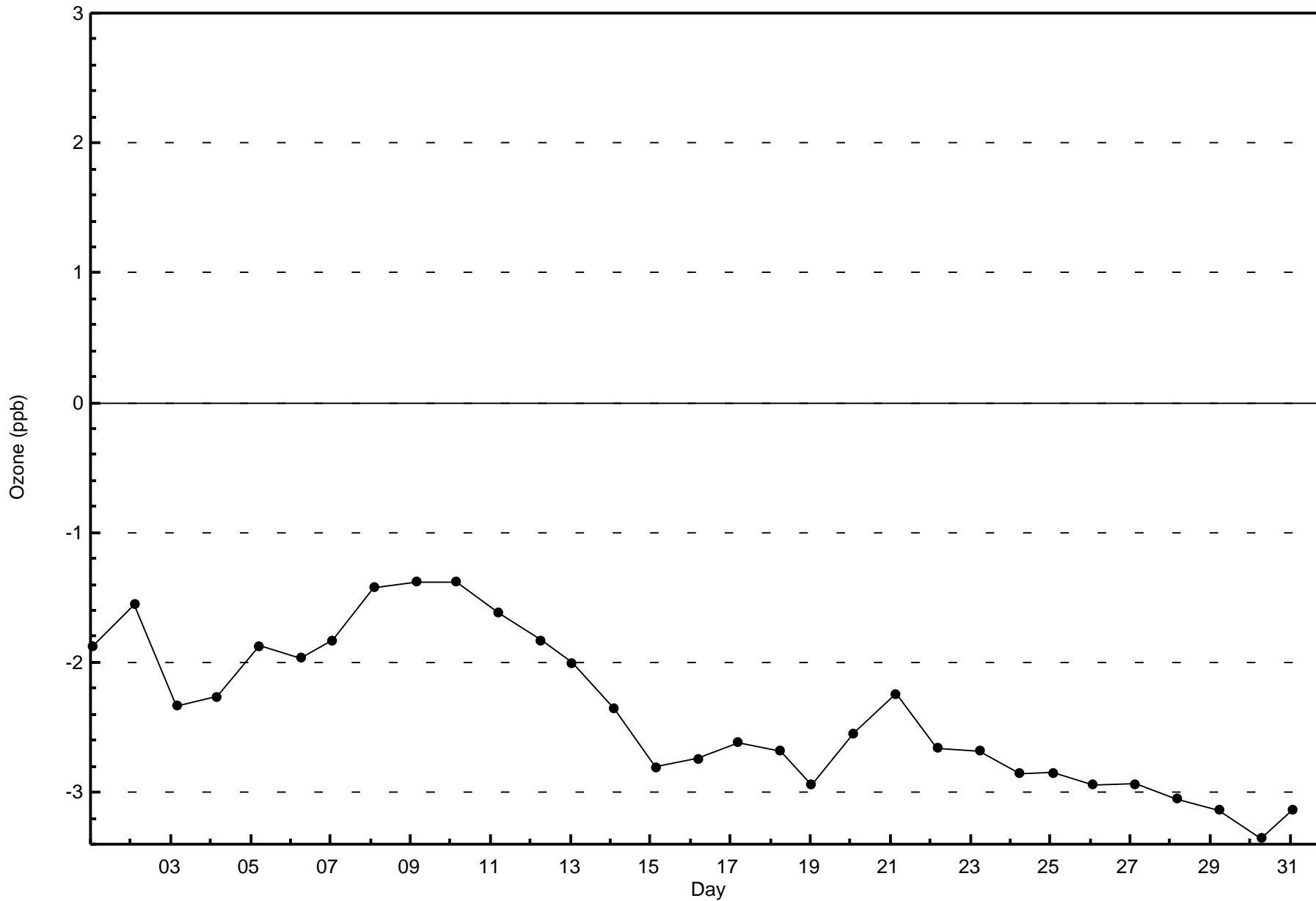
Total Number of Hours: 744

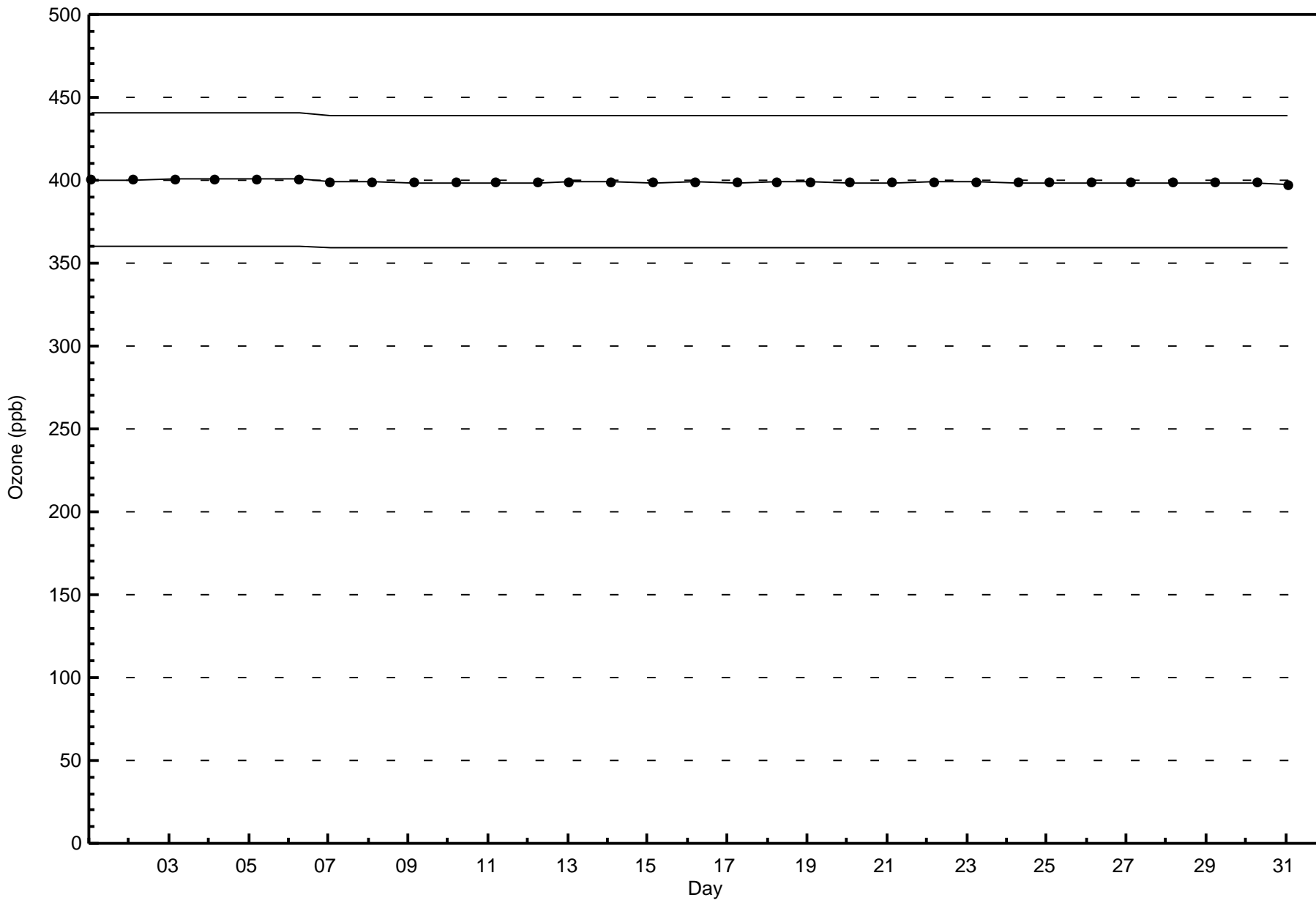


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Ozone (O₃) - ppb
Patricia McInnes (AMS 6)







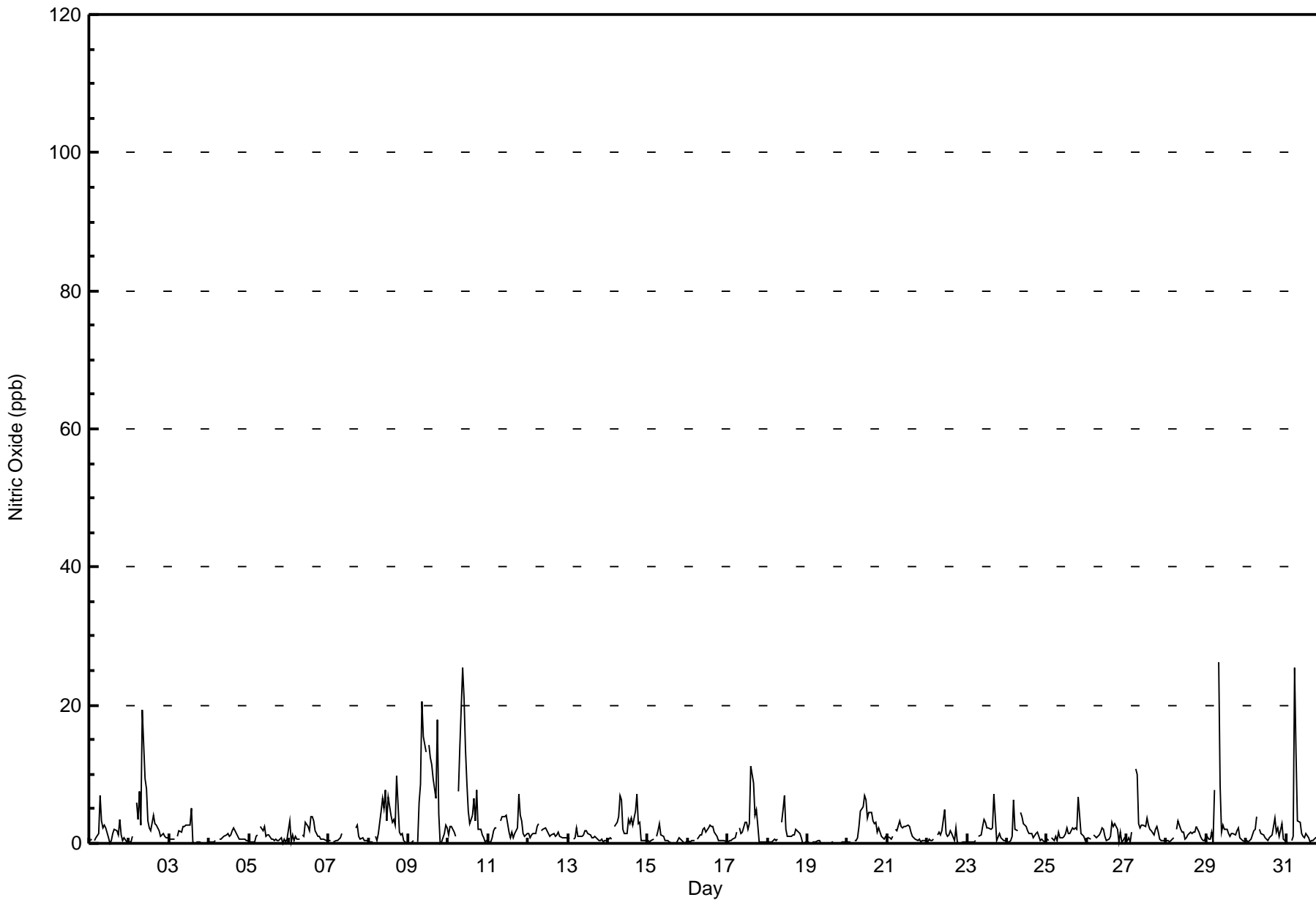


Maximum Value: 26 ppb on Mar 29 08:00		Maximum Daily Average: 6.7 ppb on Mar 9		Hours in Service: 744																						
Minimum Value: 0 ppb on Mar 3 16:00		Minimum Daily Average: 0.1 ppb on Mar 19		Hours of Data: 705																						
Maximum Diurnal Average: 4.4 ppb at hour 9		Minimum Diurnal Average: 0.5 ppb at hour 2		Hours of Missing Data: 39																						
Monthly Average: 1.9 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 4 P ₉₉ = 17		Hours of Calibration: 38																						
				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-Mar	0	1	Z	0	1	1	7	3	2	3	2	1	0	0	2	2	2	1	3	1	0	1	0	0	1.5	7
2-Mar	0	0	1	Z	6	3	8	3	19	9	8	3	2	2	4	3	3	2	2	1	1	1	1	1	3.6	19
3-Mar	1	1	1	1	Z	1	2	2	2	3	3	3	3	5	0	0	0	0	0	0	0	0	0	0	1.1	5
4-Mar	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	0	0	0.8	2
5-Mar	0	0	0	0	1	1	Z	2	2	2	1	1	1	1	1	0	1	0	0	1	0	1	0	1	0.8	2
6-Mar	3	0	1	0	1	1	1	Z	1	1	3	2	2	4	4	3	2	1	1	1	1	1	0	0	1.5	4
7-Mar	0	0	Z	0	0	0	1	1	1	C	C	C	C	C	C	C	2	3	1	1	1	0	0	0	--	3
8-Mar	0	0	0	Z	1	0	1	5	7	5	8	3	7	4	3	3	3	10	2	1	1	0	0	0	2.8	10
9-Mar	0	0	0	0	Z	0	6	8	21	15	13	M	14	12	11	9	7	18	4	0	0	1	3	2	6.7	21
10-Mar	1	2	2	2	1	Z	8	14	25	21	14	9	5	3	4	7	3	8	2	2	1	1	0	0	5.9	25
11-Mar	0	0	1	2	2	2	Z	3	4	4	4	4	2	1	2	1	1	2	7	4	3	2	1	2	2.3	7
12-Mar	1	1	1	1	1	2	3	Z	2	2	2	2	1	1	1	1	1	1	2	1	1	1	1	1	1.4	3
13-Mar	1	1	Z	1	1	2	1	1	1	2	2	1	1	1	1	1	1	1	0	0	1	0	0	0	0.9	2
14-Mar	1	1	1	Z	2	3	4	7	6	2	1	1	4	3	4	3	5	7	3	3	0	0	0	0	2.7	7
15-Mar	0	0	0	1	Z	1	2	3	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.6	3
16-Mar	0	0	0	0	0	Z	1	1	1	2	2	2	2	3	2	2	2	1	0	0	0	0	0	0	1.1	3
17-Mar	0	0	0	1	1	2	Z	2	1	2	3	3	2	3	11	9	4	5	3	0	0	0	0	0	2.3	11
18-Mar	0	0	0	0	1	0	1	Z	3	5	7	2	1	1	1	1	1	2	2	1	1	0	0	0	1.4	7
19-Mar	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-Mar	0	0	0	Z	0	0	1	2	5	5	7	6	4	4	4	3	3	3	2	2	1	1	1	1	2.5	7
21-Mar	1	1	1	1	Z	2	2	3	3	2	2	2	3	2	2	1	1	1	0	1	0	0	0	0	1.4	3
22-Mar	0	1	0	0	1	Z	1	2	1	2	5	1	1	1	2	1	0	2	0	0	0	0	0	0	1.0	5
23-Mar	0	0	0	0	0	0	Z	1	1	2	4	3	2	2	2	2	7	4	0	1	1	1	0	0	1.6	7
24-Mar	0	0	0	1	6	2	2	Z	4	4	3	3	2	2	1	1	1	1	2	1	0	1	0	0	1.7	6
25-Mar	1	0	Z	1	0	1	0	2	1	1	1	1	2	1	1	2	2	2	2	7	1	1	1	0	1.5	7
26-Mar	1	1	1	Z	1	1	1	1	2	2	2	1	0	1	1	3	2	3	2	0	2	0	0	1	1.2	3
27-Mar	0	1	0	2	Z	11	10	3	2	3	3	3	4	3	2	2	1	2	3	2	1	0	0	0	2.4	11
28-Mar	0	0	0	1	1	Z	2	3	2	2	2	1	1	1	2	2	2	2	2	2	1	1	0	0	1.3	3
29-Mar	1	1	1	2	0	8	Z	26	8	2	3	2	2	1	1	1	1	1	2	2	1	1	0	0	2.9	26
30-Mar	0	0	0	1	2	2	4	Z	2	1	1	1	1	0	1	1	2	4	2	2	1	3	1	0	1.4	4
31-Mar	0	0	Z	0	1	25	13	3	3	1	1	1	1	1	0	0	0	1	1	1	0	0	0	0	2.5	25
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan		C - Calibration				M - Maintenance																				



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Patricia McInnes - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Patricia McInnes - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	700	99.29	99.29
21 - 40	5	0.71	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

Nitric Oxide (NO) - ppb
Patricia McInnes - March 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	120	34	26	20	40	126	120	43	24	14	8	5	10	19	41	50	700
21 - 40	0	1	1	0	0	0	0	0	2	1	0	0	0	0	0	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	120	35	27	20	40	126	120	43	26	15	8	5	10	19	41	50	705

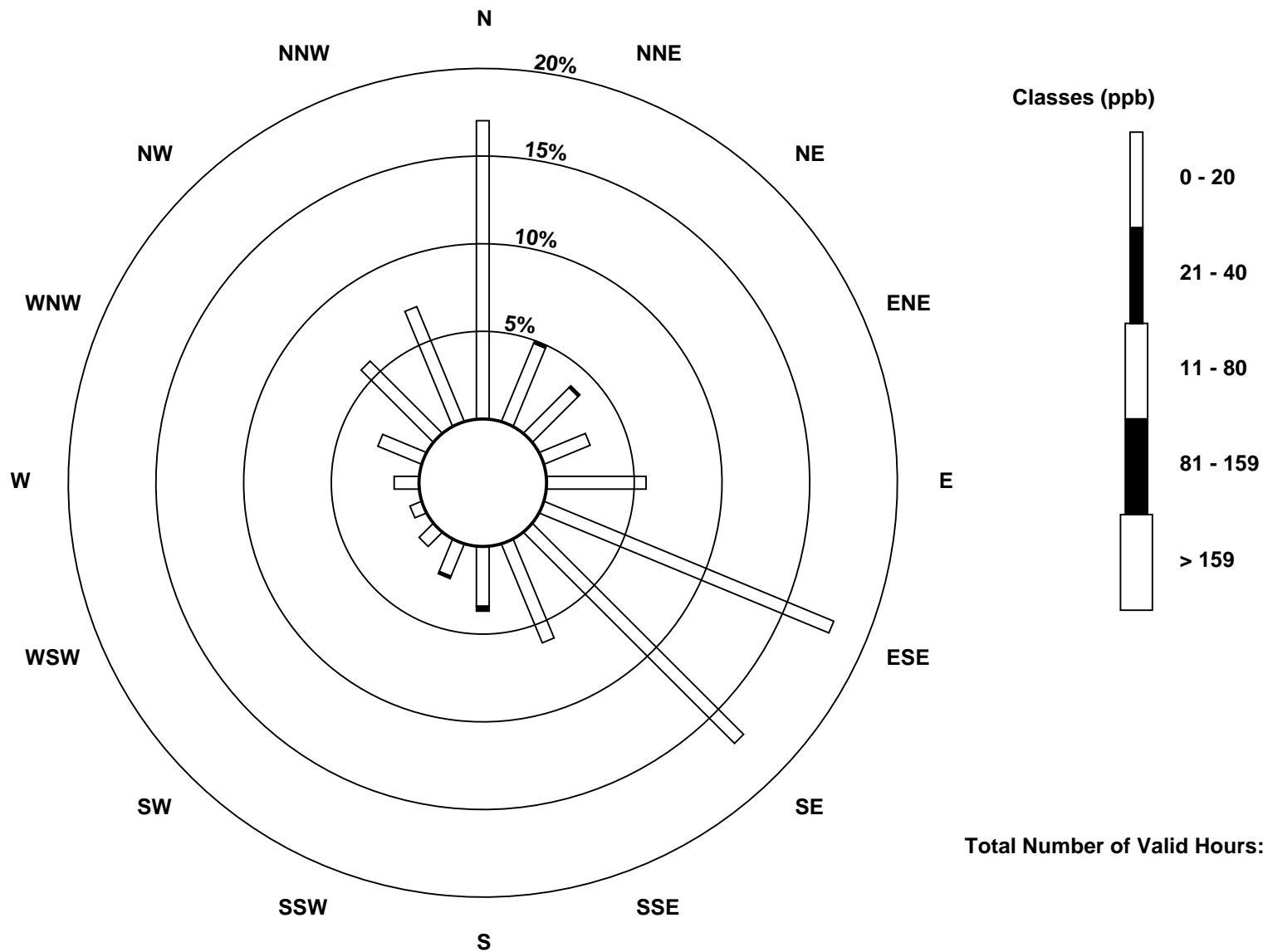
Total Number of Valid Hours: 705

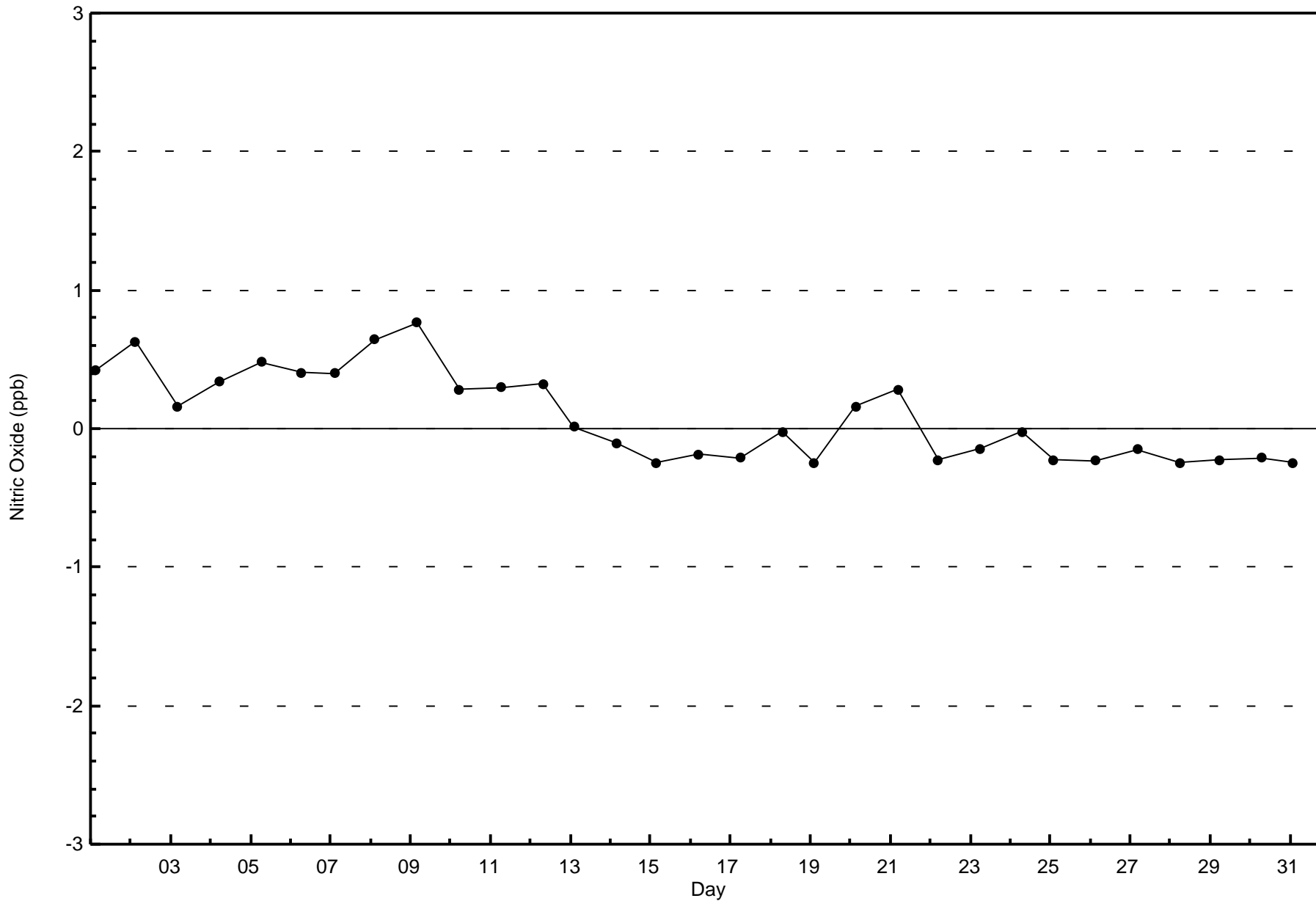
Total Number of Hours: 744

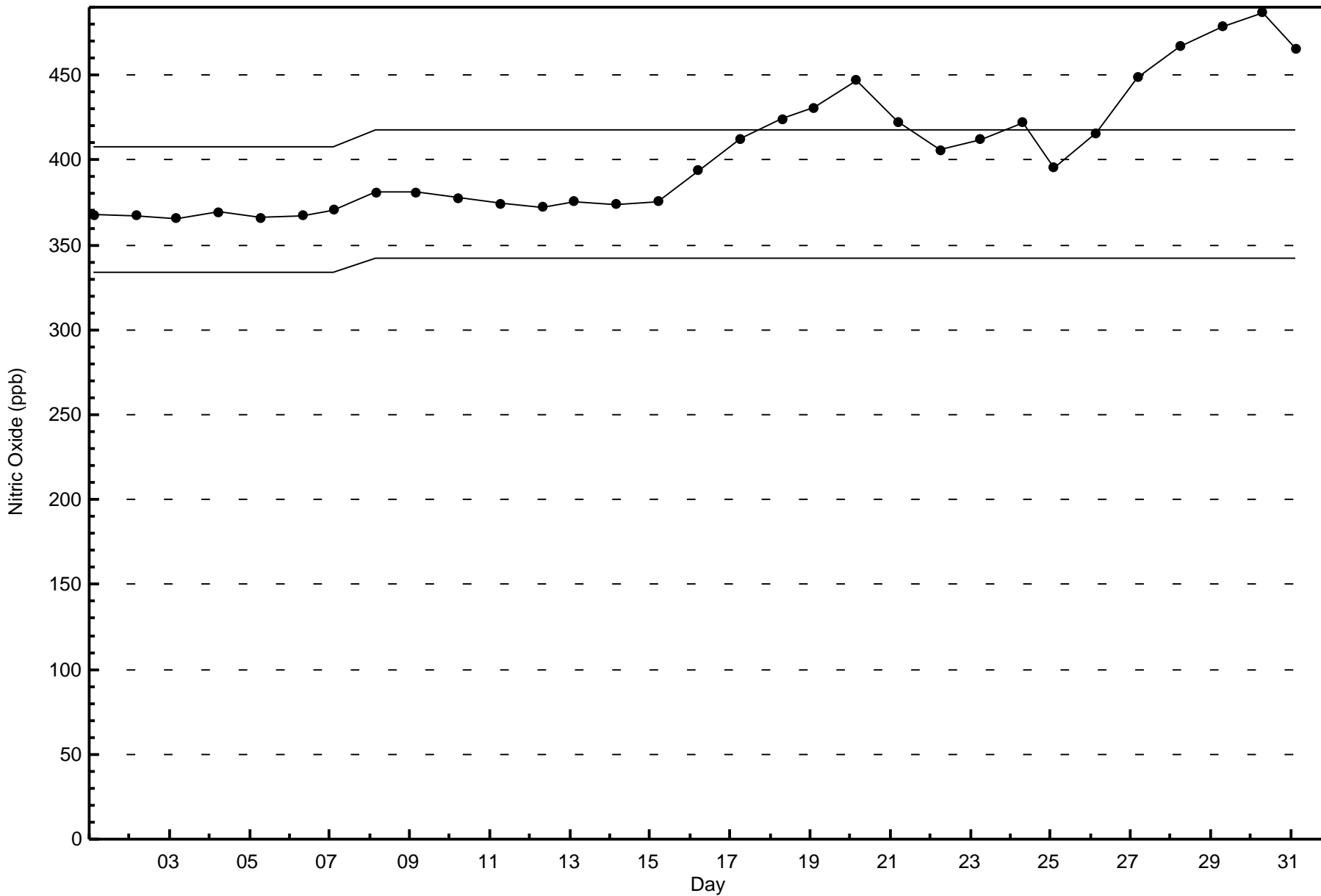


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitric Oxide (NO) - ppb
Patricia McInnes (AMS 6)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

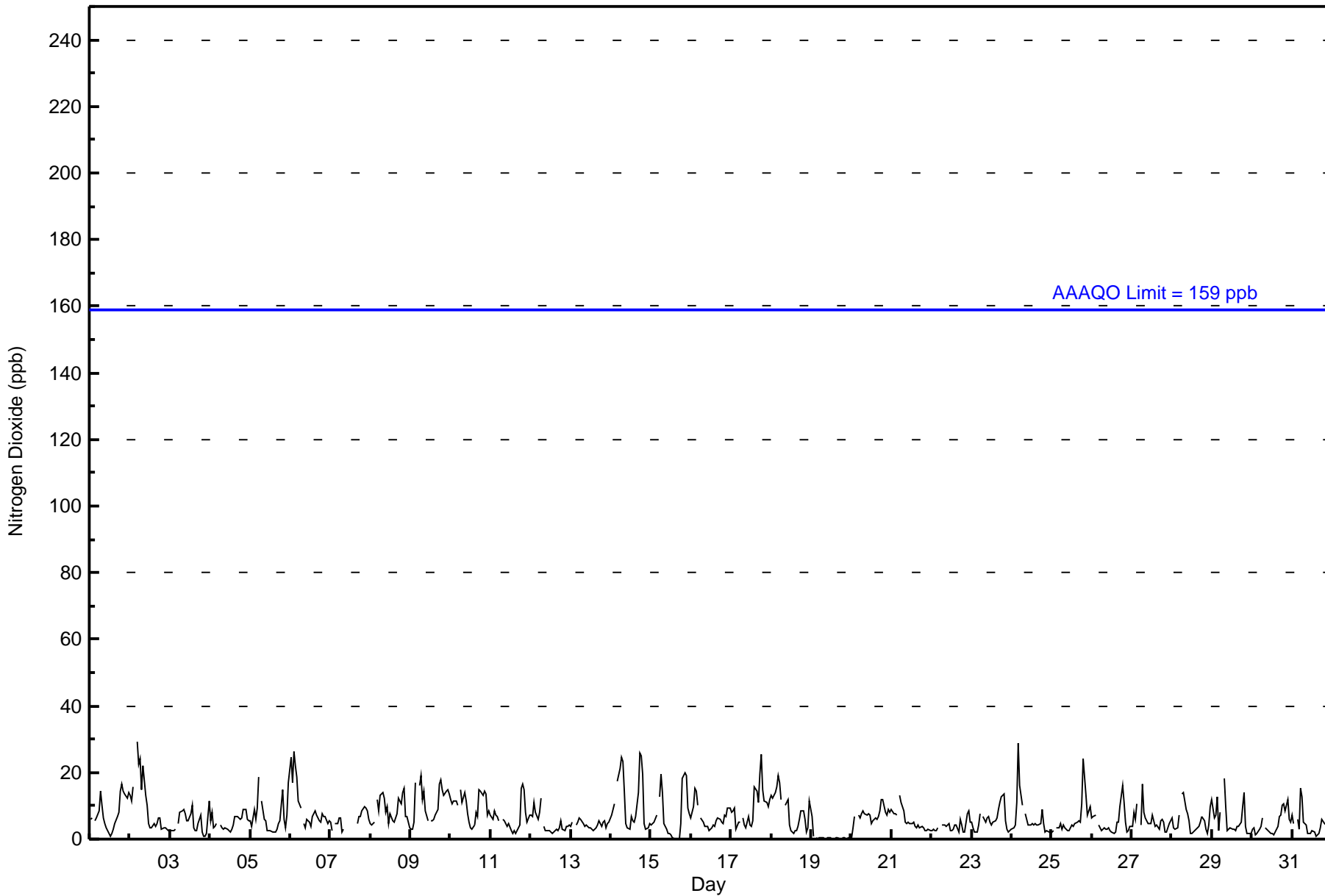
Patricia McInnes - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																	
Maximum Value: 29 ppb on Mar 2 05:00										Maximum Daily Average: 11.4 ppb on Mar 14																	
Minimum Value: 0 ppb on Mar 15 16:00										Minimum Daily Average: 0.6 ppb on Mar 19																	
Maximum Diurnal Average: 10.8 ppb at hour 7										Minimum Diurnal Average: 3.5 ppb at hour 12																	
Monthly Average: 6.6 ppb										Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 8 P ₉₀ = 14 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-Mar	6	6	Z	6	6	8	14	10	6	5	4	2	1	2	3	5	7	8	14	17	14	13	12	14	7.9	17	
2-Mar	13	11	16	Z	29	22	24	15	22	13	10	5	3	3	5	4	5	6	7	3	3	4	3	3	10.0	29	
3-Mar	2	3	3	3	Z	5	8	9	9	8	5	6	8	10	3	3	3	5	7	2	1	1	2	12	5.0	12	
4-Mar	6	8	4	4	5	Z	4	3	3	3	3	2	3	2	4	7	7	6	6	9	9	6	6	6	5.0	9	
5-Mar	5	4	9	6	10	19	Z	11	6	6	2	3	3	2	2	2	3	5	6	15	6	4	7	17	6.6	19	
6-Mar	25	17	26	22	19	12	9	Z	5	3	6	5	4	7	8	9	7	6	5	8	7	7	5	5	9.7	26	
7-Mar	5	3	Z	5	5	6	6	2	3	C	C	C	C	C	C	C	5	7	7	9	10	10	9	6	--	10	
8-Mar	5	4	5	Z	12	9	13	14	12	8	10	5	8	6	5	7	8	12	11	14	15	7	7	4	8.6	15	
9-Mar	3	3	5	17	Z	16	19	12	14	8	6	M	6	5	6	7	9	17	18	15	13	14	15	14	11.0	19	
10-Mar	12	11	12	12	10	Z	15	11	14	11	8	5	3	3	4	8	7	15	14	13	15	14	7	8	10.0	15	
11-Mar	7	6	9	7	7	6	Z	6	5	5	4	5	3	2	3	2	2	4	15	17	15	8	5	7	6.4	17	
12-Mar	7	7	11	8	6	8	12	Z	4	3	3	3	2	2	2	3	3	3	6	3	3	4	4	4	4.7	12	
13-Mar	4	5	Z	4	5	7	6	5	4	4	4	4	3	3	3	4	4	5	4	5	6	3	5	5	4.4	7	
14-Mar	7	9	11	Z	18	21	25	24	14	5	3	3	7	5	5	7	14	26	25	19	5	3	3	5	11.4	26	
15-Mar	4	5	5	7	Z	13	19	14	5	3	2	2	1	1	0	0	0	5	18	20	19	9	8	6.9	20		
16-Mar	7	10	15	14	10	Z	6	5	4	4	4	3	4	4	4	6	6	6	5	5	7	7	9	10	6.7	15	
17-Mar	8	8	9	3	5	5	Z	6	4	3	7	4	4	5	16	14	11	19	25	15	11	11	10	12	9.4	25	
18-Mar	13	12	14	16	19	17	12	Z	10	11	12	4	2	2	3	3	4	6	8	9	6	2	4	12	8.7	19	
19-Mar	7	1	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	7	
20-Mar	0	3	7	Z	7	6	8	8	8	7	8	7	5	6	6	6	7	9	12	12	8	7	9	8	7.1	12	
21-Mar	9	8	8	7	Z	13	11	8	5	5	5	5	5	5	4	3	4	3	4	3	3	2	3	3	5.4	13	
22-Mar	3	3	3	3	4	Z	4	4	4	4	4	5	3	3	3	4	4	2	6	4	2	2	8	9	5	4.0	9
23-Mar	5	4	2	2	4	8	Z	7	5	7	7	5	4	5	5	6	9	11	13	14	6	3	2	3	5.9	14	
24-Mar	3	4	4	11	29	16	10	Z	8	6	4	4	4	5	4	4	5	4	5	9	5	2	2	2	2	6.4	29
25-Mar	2	3	Z	4	4	5	3	4	3	2	2	3	4	4	4	5	5	5	5	11	24	13	7	9	10	5.9	24
26-Mar	6	7	7	Z	4	4	2	3	3	3	3	3	2	2	2	5	5	10	16	11	5	2	3	4	4.9	16	
27-Mar	4	8	6	10	Z	4	16	8	6	6	5	5	7	6	4	4	3	5	6	5	2	2	5	6	5.7	16	
28-Mar	6	4	3	4	7	Z	14	14	9	8	6	2	2	2	3	3	4	5	7	6	3	2	4	10	5.4	14	
29-Mar	12	6	7	13	3	8	Z	18	10	2	3	3	3	3	3	4	4	5	10	14	4	2	2	2	6.0	18	
30-Mar	3	3	1	2	3	4	6	Z	3	3	2	2	2	1	2	4	7	7	10	11	8	12	6	5	4.7	12	
31-Mar	7	5	Z	6	3	15	13	5	4	2	2	2	2	2	1	1	2	4	6	5	4	3	3	3	4.3	15	
6.7 6.1 8.0 7.4 8.9 9.8 10.8 8.7 6.9 5.2 4.7 3.5 3.5 3.5 4.0 4.7 5.1 7.5 9.5 9.7 7.3 6.2 5.7 6.7																								Diurnal Average			
25 17 26 22 29 22 25 24 22 13 12 7 8 10 16 14 14 26 25 24 20 19 15 17																								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 - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	690	97.87	97.87
21 - 40	15	2.13	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
Patricia McInnes - March 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	120	35	27	20	38	125	115	41	25	15	8	5	10	19	40	47	690
21 - 40	0	0	0	0	2	1	5	2	1	0	0	0	0	0	1	3	15
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	120	35	27	20	40	126	120	43	26	15	8	5	10	19	41	50	705

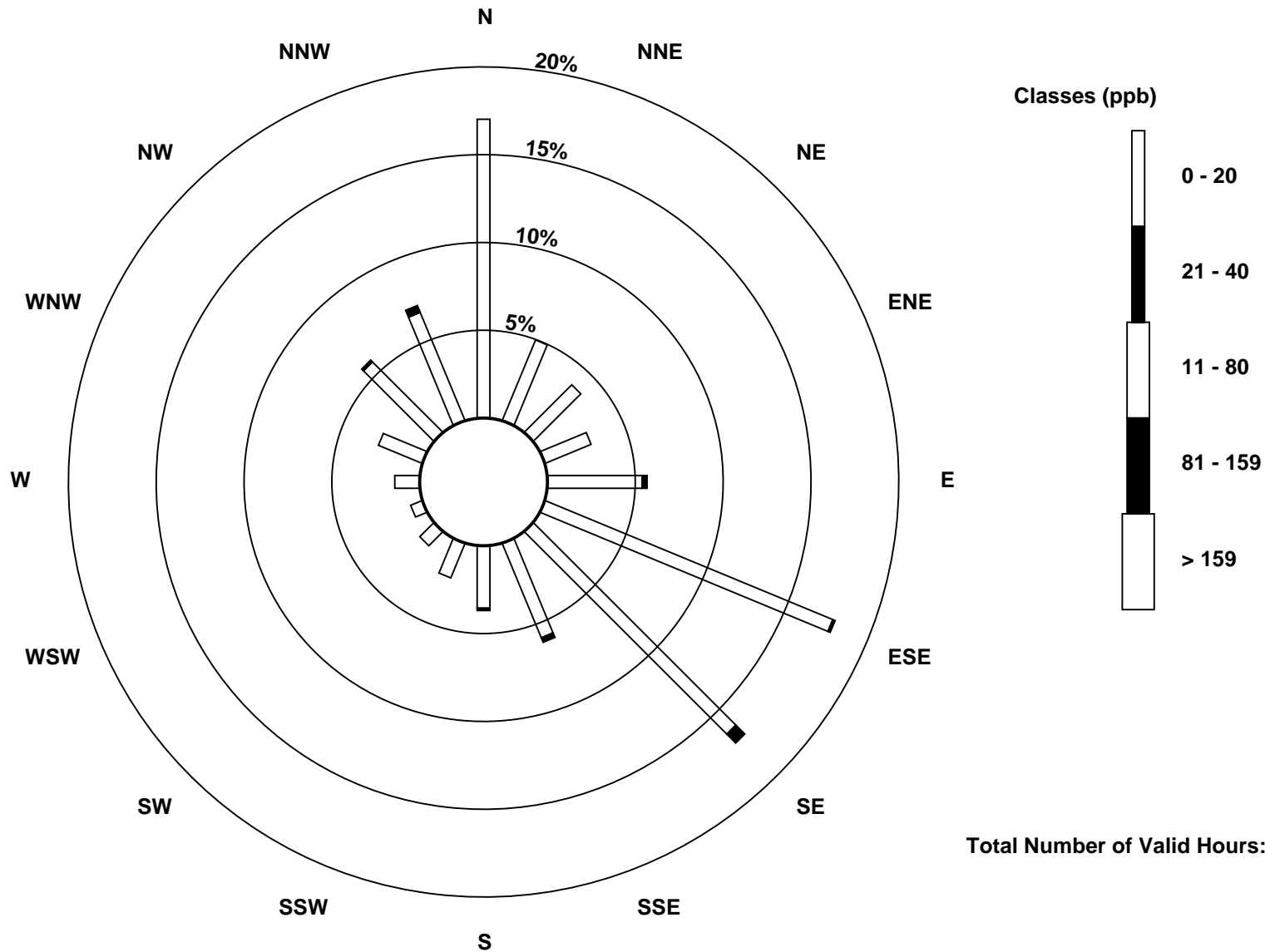
Total Number of Valid Hours: 705

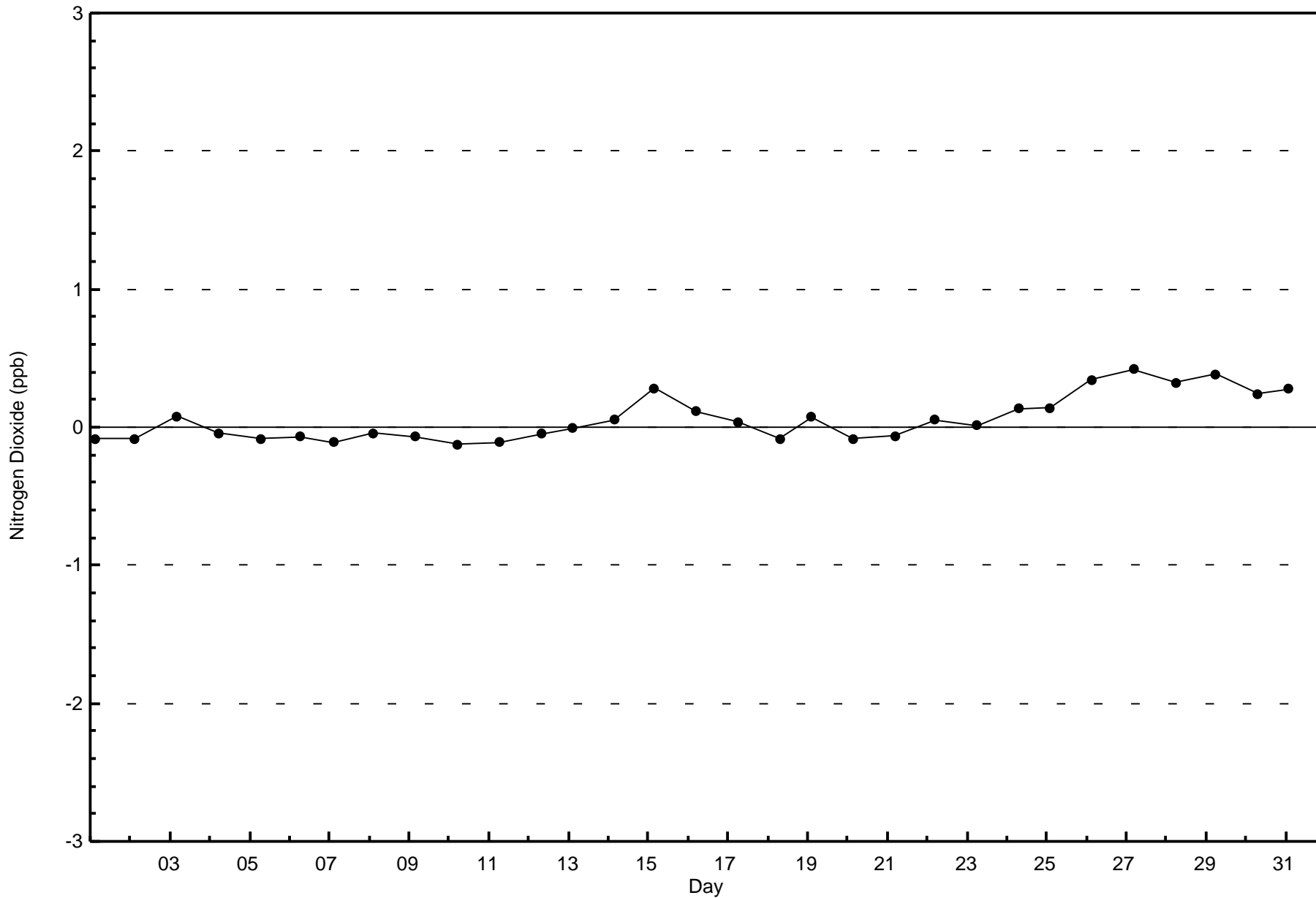
Total Number of Hours: 744

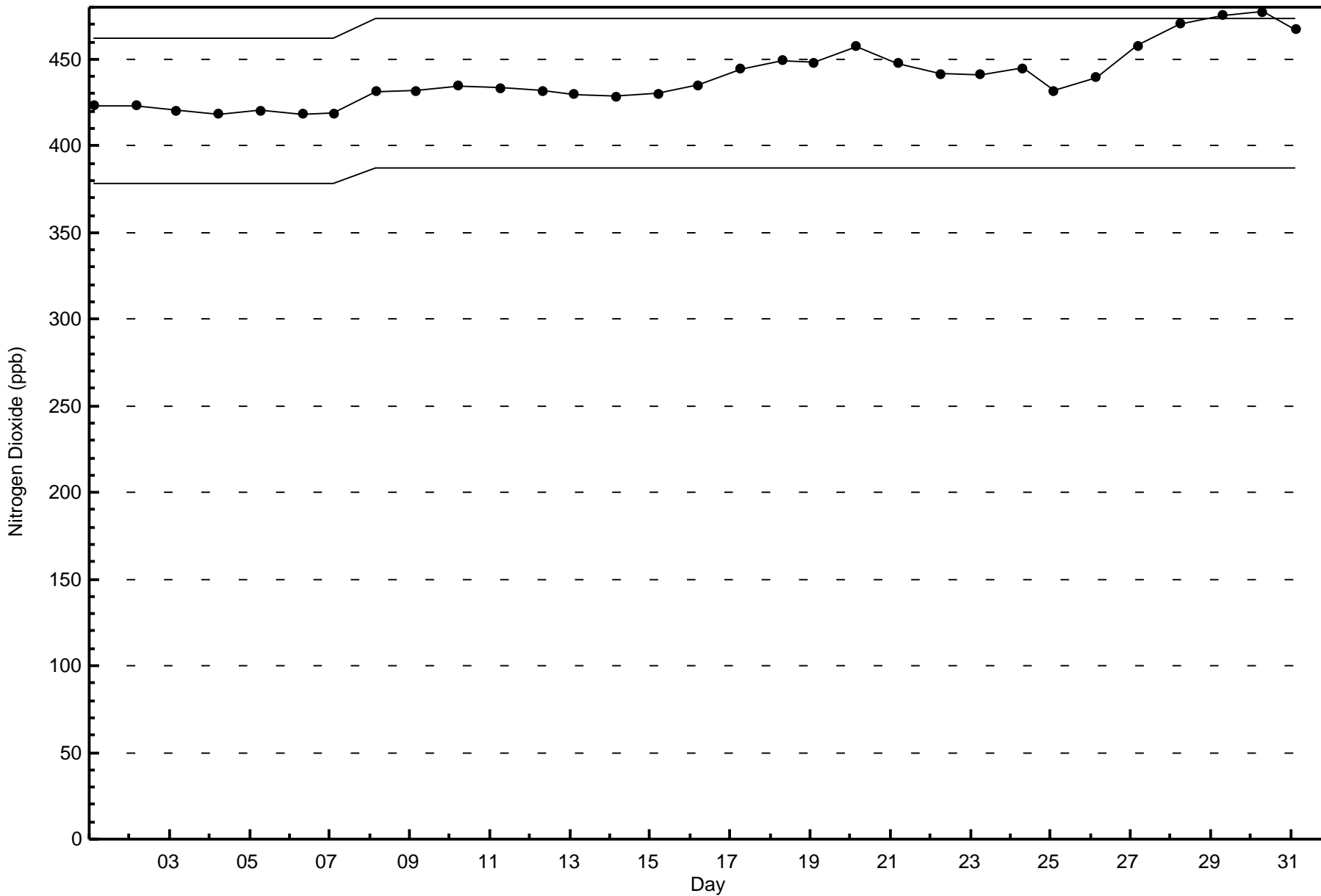


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes (AMS 6)









Wood Buffalo Environmental Association
Summary of Hour Averages

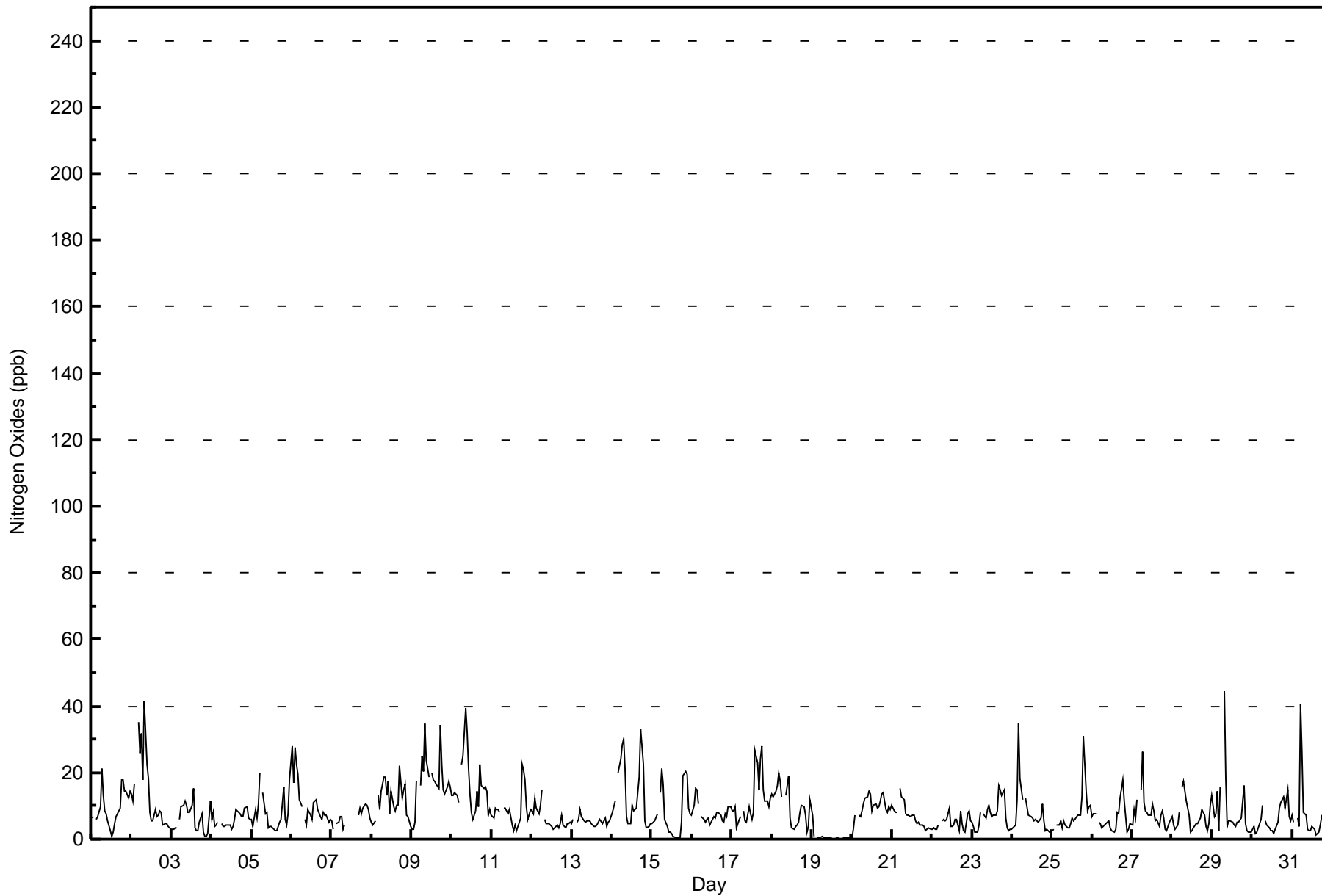
Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - March 2017

Maximum Value: 45 ppb on Mar 29 08:00		Maximum Daily Average: 17.7 ppb on Mar 9		Hours in Service: 744																																													
Minimum Value: 0 ppb on Mar 19 18:00		Minimum Daily Average: 0.7 ppb on Mar 19		Hours of Data: 705																																													
Maximum Diurnal Average: 13.9 ppb at hour 7		Minimum Diurnal Average: 5.7 ppb at hour 12		Hours of Missing Data: 39																																													
Monthly Average: 8.5 ppb		Percentiles: P ₁ = 0 P ₁₀ = 3 Q ₁ = 4 Median = 7 Q ₃ = 10 P ₉₀ = 17 P ₉₉ = 35		Hours of Calibration: 38																																													
				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-Mar	6	7	Z	6	7	10	21	13	8	7	6	2	1	2	5	7	9	9	18	18	15	14	12	14	9.5	21																							
2-Mar	13	12	16	Z	35	26	32	18	42	22	18	8	5	5	9	7	7	8	8	4	5	5	4	3	13.6	42																							
3-Mar	3	3	3	4	Z	6	10	10	11	10	8	8	10	15	4	3	3	5	7	2	1	1	2	12	6.1	15																							
4-Mar	6	8	4	4	5	Z	5	4	4	4	4	3	4	3	4	6	9	8	7	7	7	10	6	6	5.9	10																							
5-Mar	6	4	9	6	11	20	Z	14	8	8	3	4	4	3	3	2	4	5	6	16	6	4	8	18	7.4	20																							
6-Mar	28	17	28	22	20	12	10	Z	6	4	9	7	6	11	12	12	9	7	6	8	7	7	5	6	11.2	28																							
7-Mar	5	3	Z	5	5	7	7	3	4	C	C	C	C	C	C	C	7	9	8	9	11	10	9	6	--	11																							
8-Mar	5	4	5	Z	13	9	15	19	19	13	17	8	14	10	8	10	10	22	12	15	17	7	7	4	11.5	22																							
9-Mar	3	3	5	18	Z	16	25	20	35	24	19	M	20	18	18	16	15	35	22	15	14	16	18	16	17.7	35																							
10-Mar	13	13	14	13	11	Z	22	25	39	32	21	14	8	6	8	15	10	23	16	15	16	15	7	9	15.9	39																							
11-Mar	7	6	9	9	9	8	Z	9	9	8	8	9	4	3	4	3	4	7	22	21	18	10	6	9	8.8	22																							
12-Mar	9	8	12	9	7	10	15	Z	6	5	5	4	4	3	3	4	4	5	7	4	4	5	5	5	6.2	15																							
13-Mar	5	6	Z	5	6	9	7	5	5	5	6	5	5	4	4	4	5	6	4	5	6	4	5	6	5.3	9																							
14-Mar	8	10	11	Z	20	24	28	30	21	7	5	4	10	8	9	9	19	33	28	22	5	3	4	5	14.1	33																							
15-Mar	5	5	5	8	Z	14	21	17	6	4	2	2	2	1	0	0	0	0	5	19	20	19	9	8	7.5	21																							
16-Mar	7	10	15	15	10	Z	7	6	5	6	6	4	6	7	6	8	8	7	5	5	8	7	10	10	7.8	15																							
17-Mar	8	9	10	3	6	7	Z	8	6	5	10	7	6	8	27	23	15	24	28	15	11	11	10	12	11.7	28																							
18-Mar	13	13	14	16	20	17	13	Z	13	16	19	6	4	3	4	4	5	8	10	10	7	2	4	12	10.1	20																							
19-Mar	7	1	Z	0	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0.7	7																							
20-Mar	0	4	7	Z	7	7	9	11	12	13	15	13	8	10	11	9	10	12	14	14	9	8	10	9	9.5	15																							
21-Mar	10	8	8	8	Z	15	13	12	8	7	7	7	7	7	5	4	5	4	4	4	3	3	3	3	6.8	15																							
22-Mar	3	3	3	3	4	Z	5	6	6	6	9	4	4	4	6	6	2	8	5	2	2	8	9	5	5.0	9																							
23-Mar	5	4	2	2	4	8	Z	8	6	9	10	8	7	7	7	8	16	15	13	15	6	3	3	3	7.4	16																							
24-Mar	3	4	4	12	35	18	Z	12	10	7	7	6	6	6	6	5	6	11	6	2	3	2	2	2	8.1	35																							
25-Mar	3	3	Z	4	4	5	3	6	4	3	3	5	7	5	6	7	7	13	31	14	8	10	10	7.4	31																								
26-Mar	7	8	8	Z	5	5	3	4	5	5	5	3	3	2	3	8	8	12	18	11	7	2	3	5	6.1	18																							
27-Mar	4	9	6	12	Z	15	26	11	8	8	7	7	11	8	6	6	4	7	8	7	3	2	5	6	8.2	26																							
28-Mar	7	4	3	4	8	Z	16	17	11	9	7	2	2	3	5	5	6	6	9	7	4	2	5	10	6.7	17																							
29-Mar	13	7	8	14	3	16	Z	45	18	4	6	5	5	4	4	5	5	6	11	16	4	3	2	2	9.0	45																							
30-Mar	3	4	2	2	5	6	10	Z	5	4	3	2	2	2	3	5	9	11	12	13	9	15	7	5	6.1	15																							
31-Mar	7	5	Z	6	4	41	26	8	7	3	3	3	4	3	1	2	2	4	7	5	4	3	3	3	6.7	41																							
																								7.2	6.5	8.5	8.1	10.2	12.7	13.9	12.7	11.3	8.8	8.3	5.7	5.9	5.7	6.4	7.0	7.1	10.3	11.2	11.0	8.0	6.8	6.2	7.2	Diurnal Average	
																								28	17	28	22	35	41	32	45	42	32	21	14	20	18	27	23	19	35	28	31	20	19	18	18	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance																																											



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	664	94.18	94.18
21 - 40	38	5.39	99.57
41 - 80	3	0.43	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 Oxides (NO_x) - ppb
Patricia McInnes - March 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	117	30	26	17	36	124	114	38	23	13	8	5	9	19	39	46	664
21 - 40	3	5	1	3	4	2	6	4	2	1	0	0	1	0	2	4	38
11 - 80	0	0	0	0	0	0	0	1	1	1	0	0	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	120	35	27	20	40	126	120	43	26	15	8	5	10	19	41	50	705

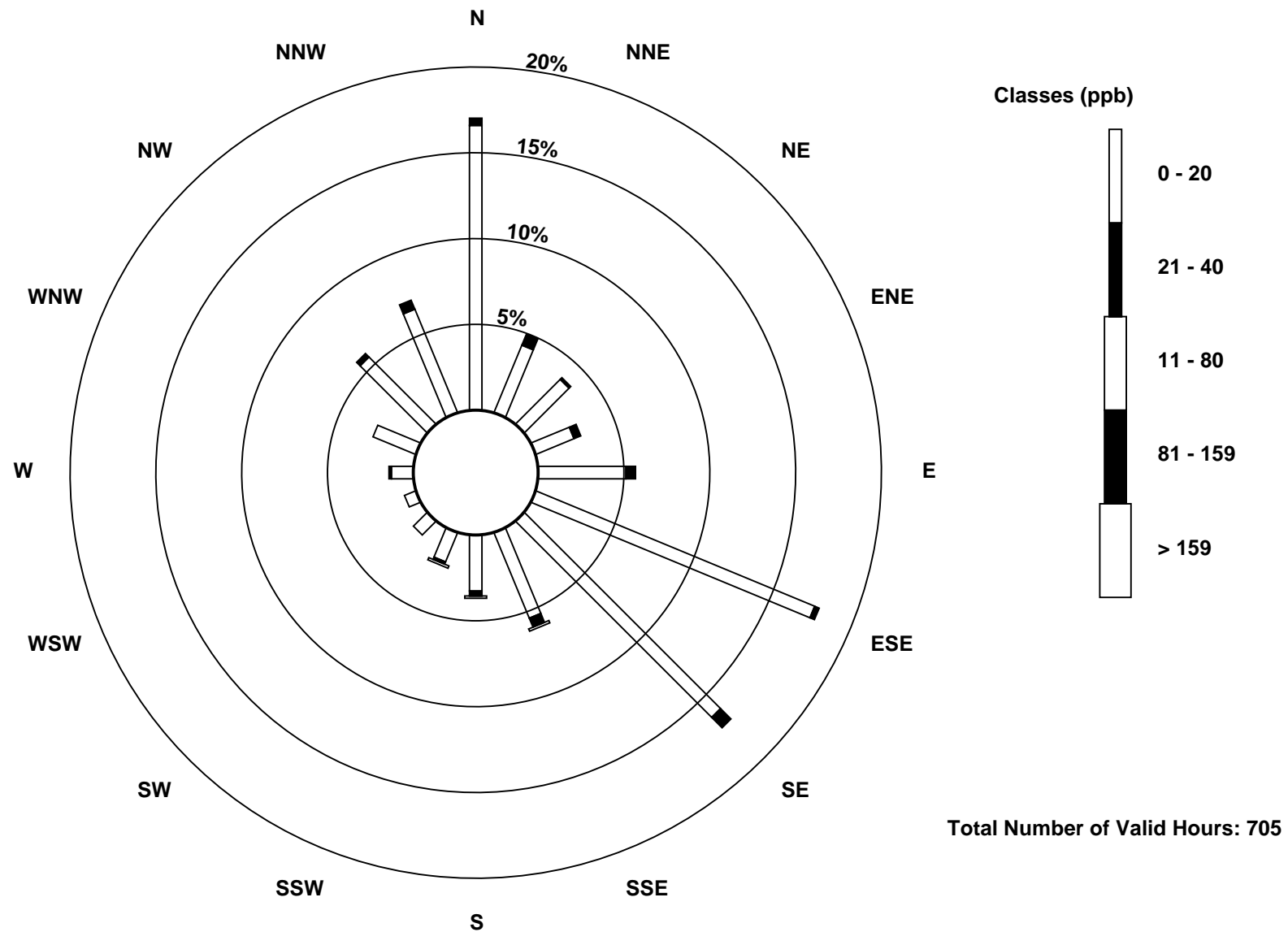
Total Number of Valid Hours: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

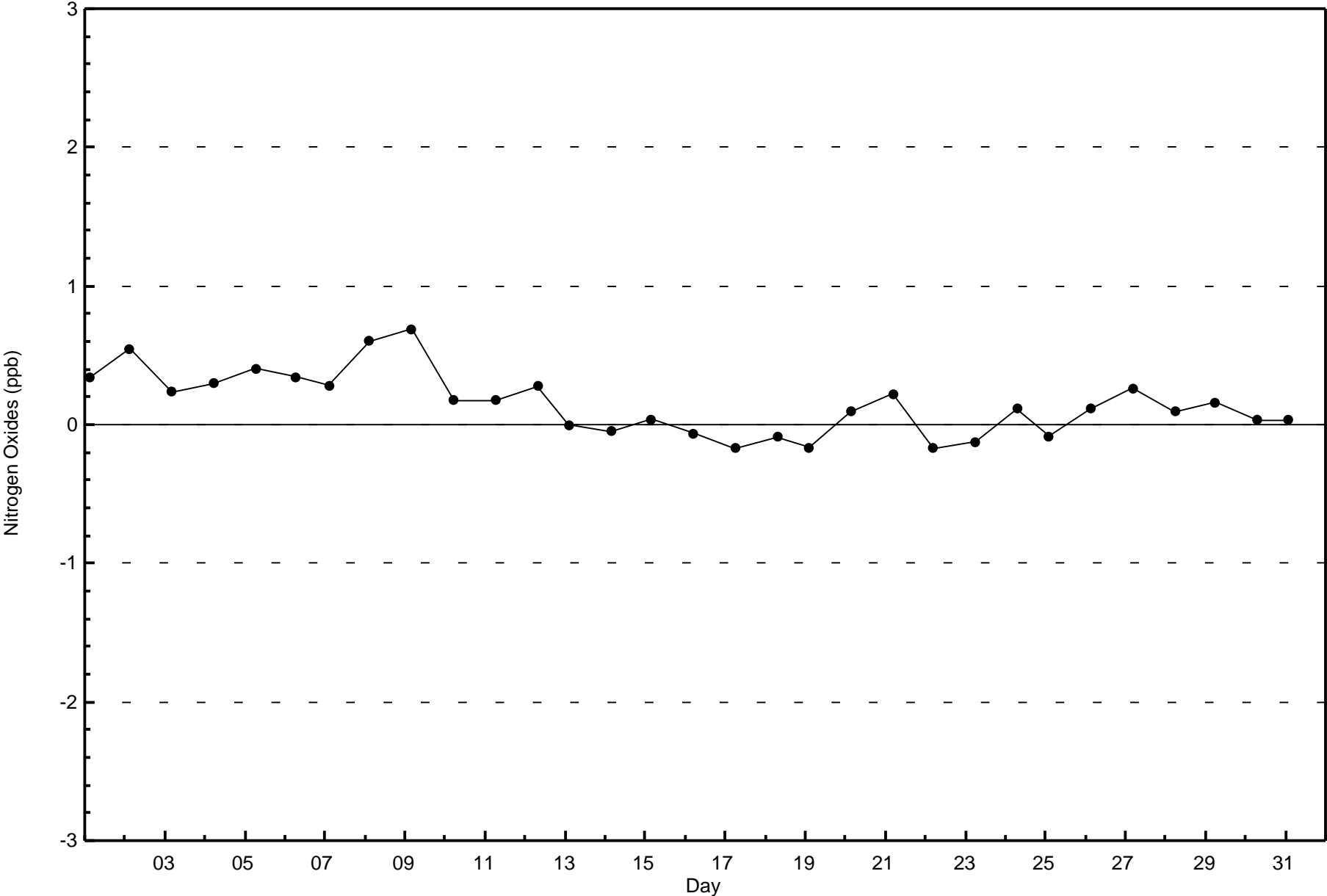
Nitrogen Oxides (NO_x) - ppb
Patricia McInnes (AMS 6)

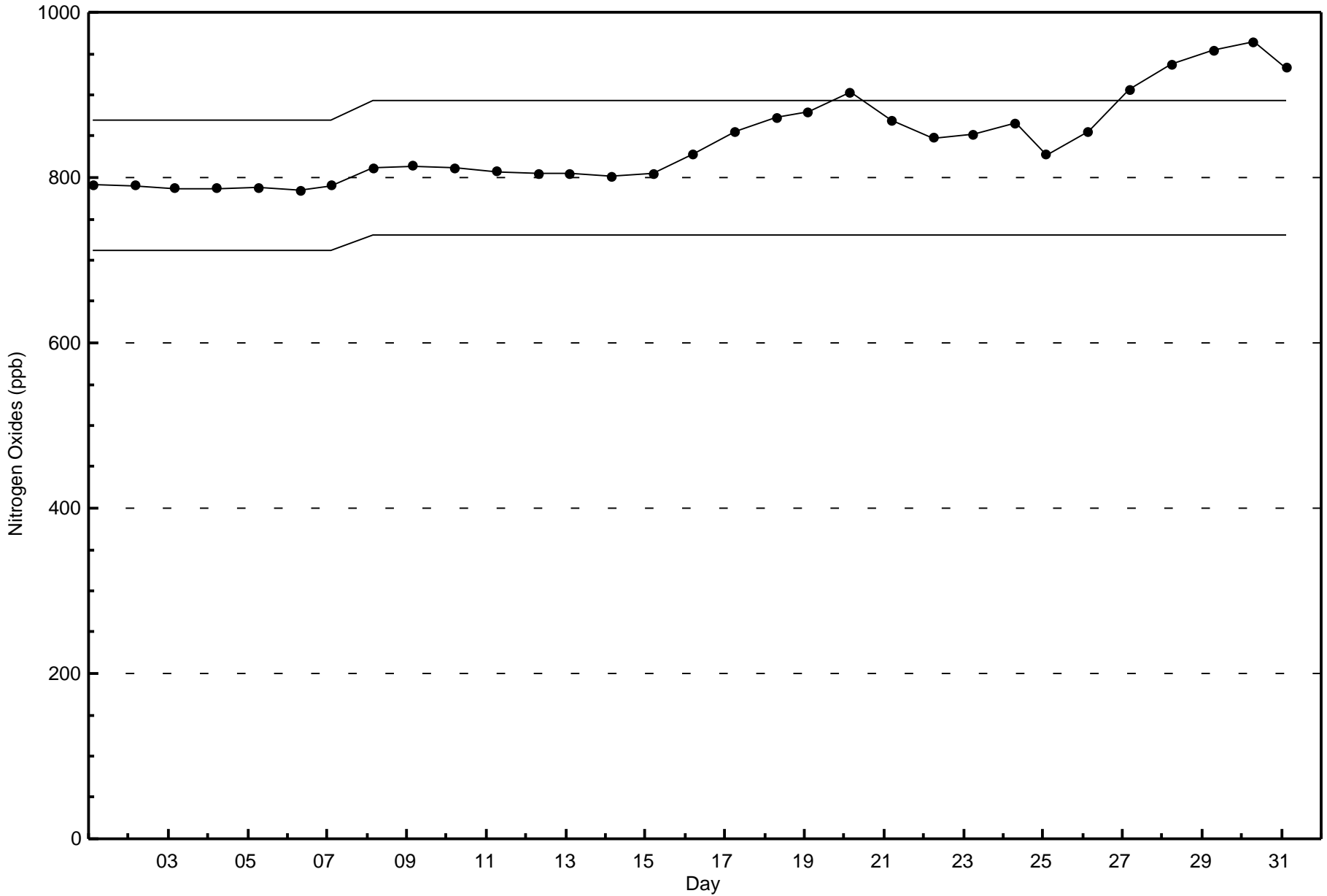




**Wood Buffalo Environmental Association
Zero Responses**

**Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - March 2017**







Number of Exceedences (AAAQO): 1-hr: 0	Hours in Service: 744
Maximum Value: 11 ppb on Mar 7 02:00	Maximum Daily Average: 0.0 ppb on Mar 3
Minimum Value: 0 ppb on Mar 2 13:00	Hours of Data: 636
Maximum Diurnal Average: 0.5 ppb at hour 2	Hours of Missing Data: 108
Monthly Average: 0.0 ppb	Hours of Calibration: 43
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 0	Percent Operational Time: 91.3

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-Mar	Z	RE	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
2-Mar	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	0	0	0	0	0	0	0	0	0	0	0	0	--	0
3-Mar	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
4-Mar	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
5-Mar	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
6-Mar	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
7-Mar	Z	11	0	0	0	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	11
8-Mar	0	Z	RE	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
9-Mar	0	0	Z	RE	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
10-Mar	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
11-Mar	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
12-Mar	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
13-Mar	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
14-Mar	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
15-Mar	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
16-Mar	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
17-Mar	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
18-Mar	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
19-Mar	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
20-Mar	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
21-Mar	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
22-Mar	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
23-Mar	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
24-Mar	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
25-Mar	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
26-Mar	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
27-Mar	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
28-Mar	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
29-Mar	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
30-Mar	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
31-Mar	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

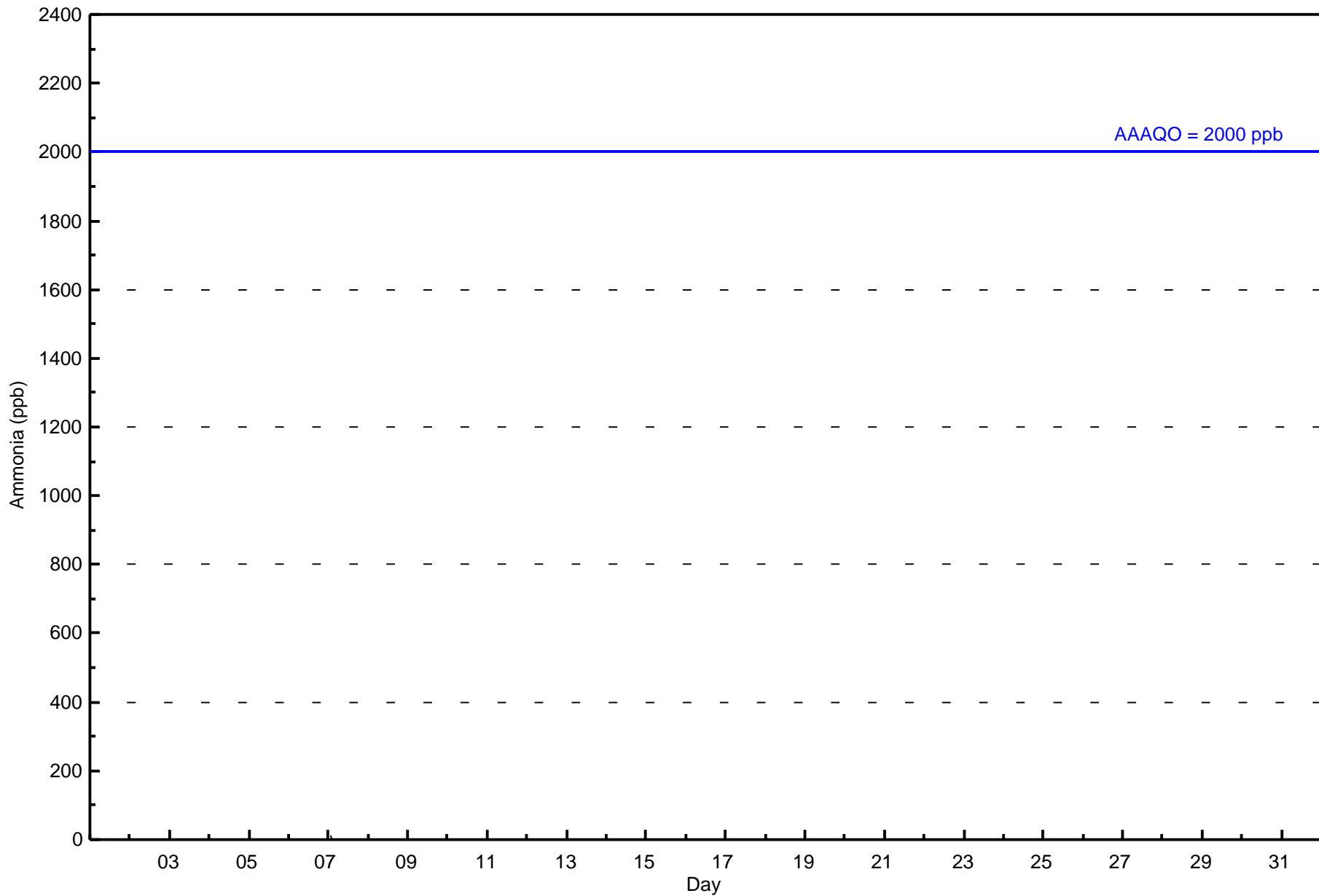
0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average
0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum

Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure RE - Recovery
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb



Wood Buffalo Environmental Association
Hourly Averages

Ammonia (NH₃) - ppb
Patricia McInnes - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	635	99.84	99.84
6 - 10	0	0.00	99.84
11 - 15	1	0.16	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: 636

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - March 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	107	30	21	20	37	125	106	40	23	12	6	3	9	19	32	45	635
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
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	108	30	21	20	37	125	106	40	23	12	6	3	9	19	32	45	636

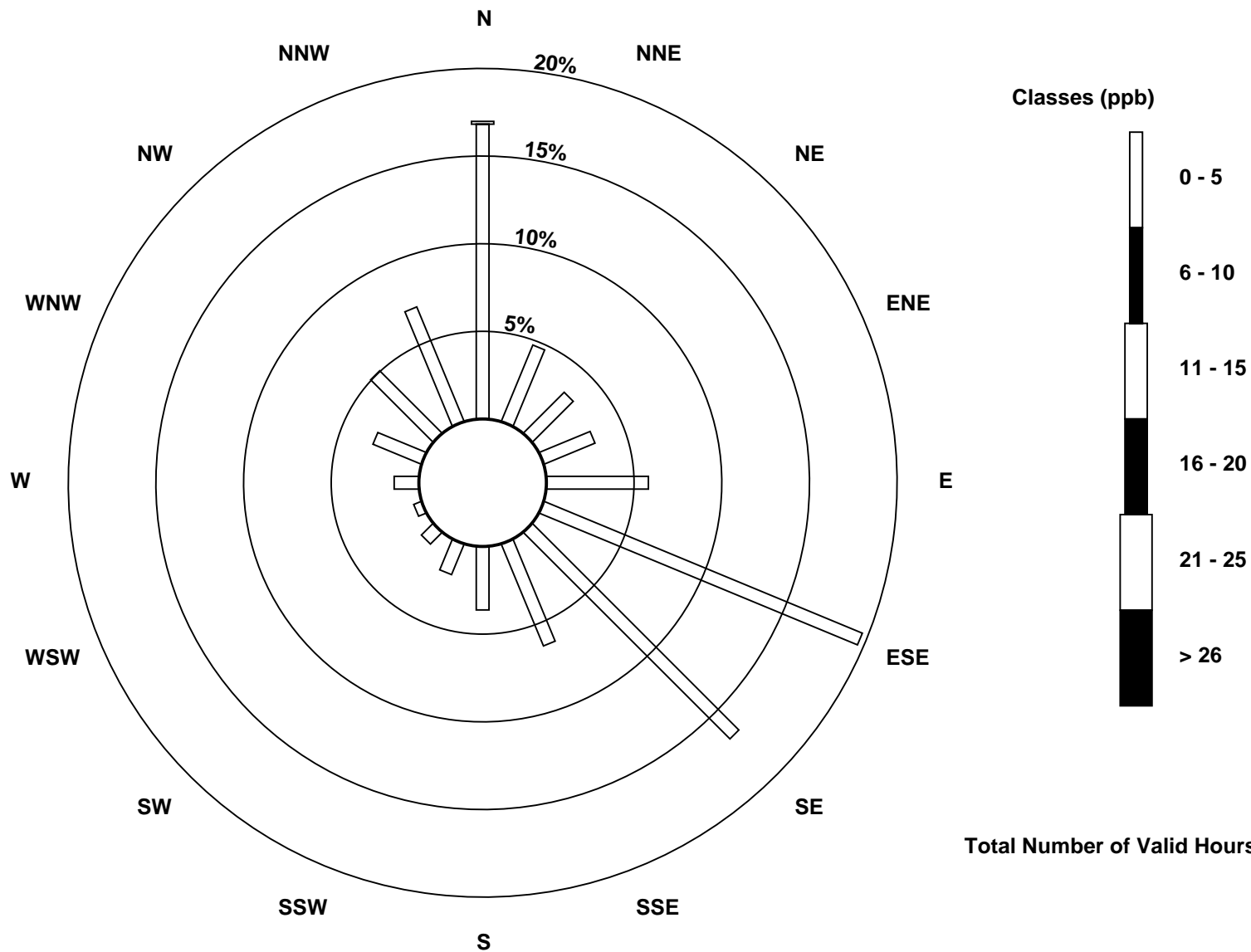
Total Number of Valid Hours: 636

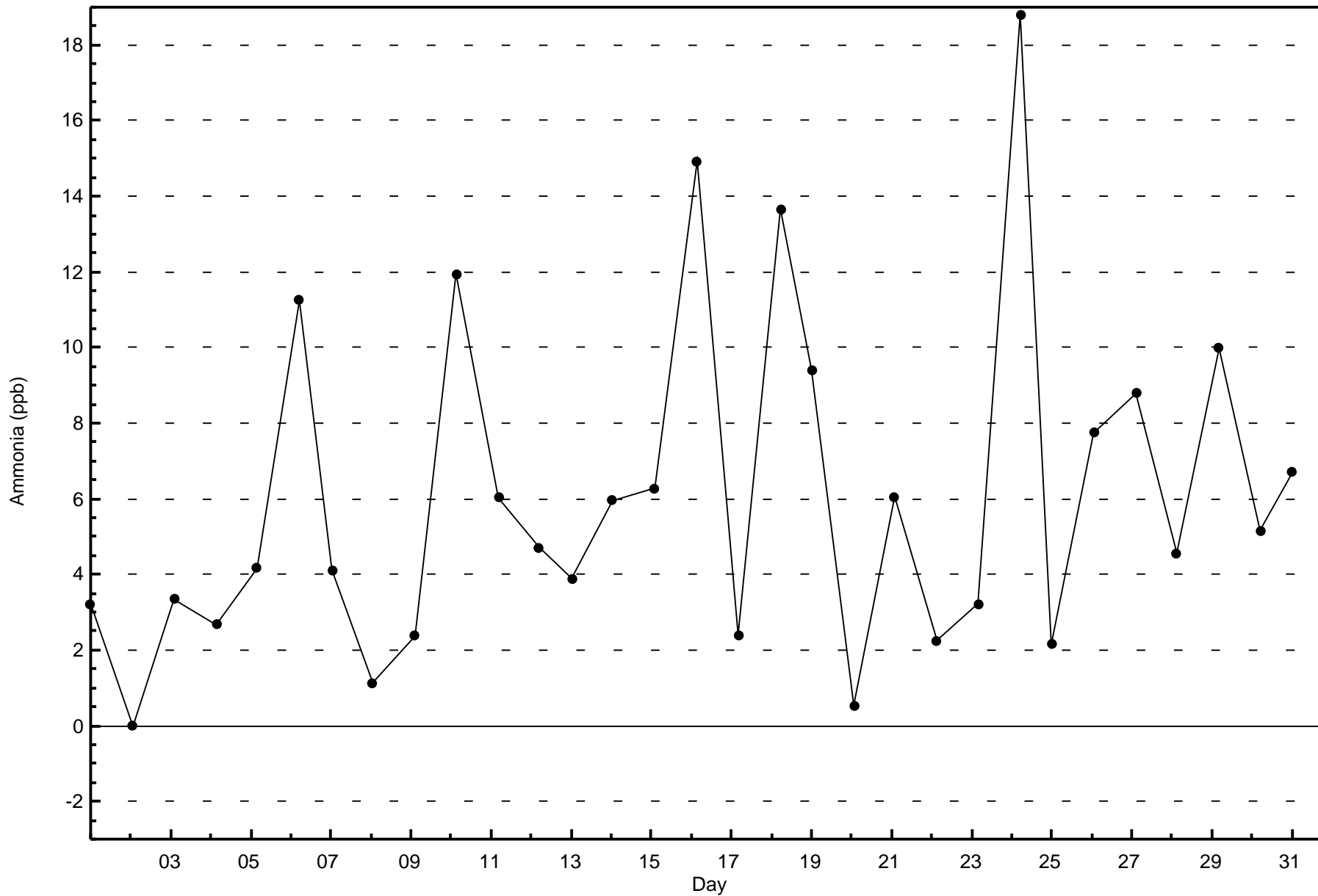
Total Number of Hours: 744

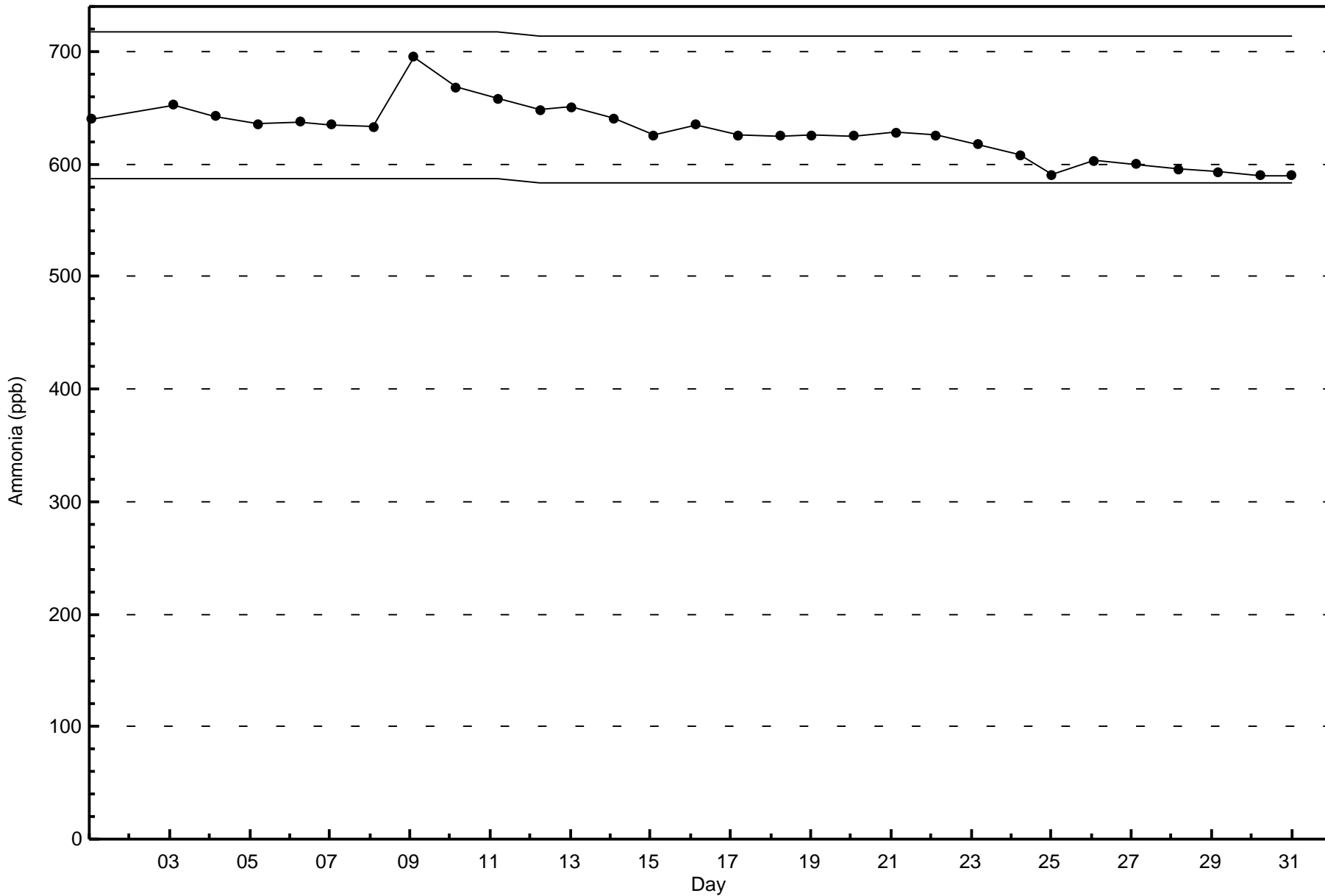


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Ammonia (NH₃) - ppb
Patricia McInnes (AMS 6)









Summary of Hour Averages

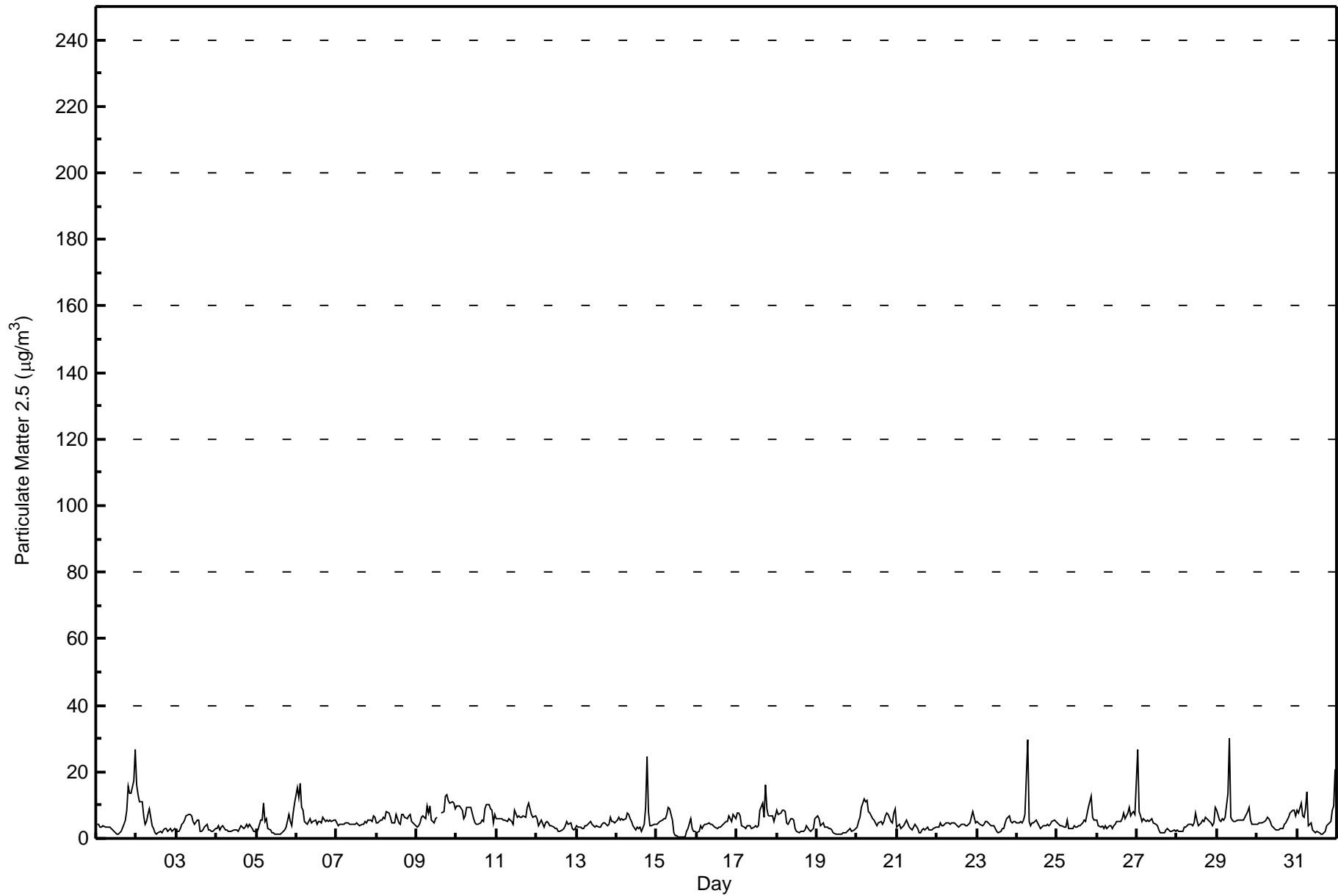
Patricia McInnes - March 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 30.0 µg/m ³ on Mar 29 08:00 Minimum Value: 0.3 µg/m ³ on Mar 15 16:00 Maximum Diurnal Average: 6.9 µg/m ³ at hour 7 Monthly Average: 5.08 µg/m ³		Maximum Daily Average: 7.9 µg/m ³ on Mar 9 Minimum Daily Average: 2.8 µg/m ³ on Mar 19 Minimum Diurnal Average: 3.2 µg/m ³ at hour 14 Percentiles: P ₁ = 1.1 P ₁₀ = 2.2 Q ₁ = 3.2 Median = 4.5 Q ₃ = 6.0 P ₉₀ = 8.4 P ₉₉ = 14.6		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-Mar	4.1	4.2	3.3	3.6	3.8	3.3	3.6	3.4	3.5	2.8	2.4	1.6	1.2	1.2	1.7	2.3	4.2	5.6	8.4	15.7	13.5	13.7	17.6	26.7	6.3	26.7
2-Mar	16.3	13.3	10.9	11.1	6.7	4.1	4.9	7.3	8.7	3.9	3.1	1.9	1.4	1.8	2.0	1.8	2.3	2.8	2.9	2.0	2.9	1.9	2.6	3.1	5.0	16.3
3-Mar	1.9	2.2	2.8	4.1	4.7	5.7	6.8	7.1	7.3	6.8	5.3	4.4	5.4	5.4	2.2	2.2	2.6	3.3	4.1	2.5	2.4	1.9	2.0	2.9	4.0	7.3
4-Mar	2.8	4.0	2.7	3.2	3.7	2.7	2.4	2.2	2.1	2.2	2.3	2.4	2.6	2.1	2.9	3.8	3.2	3.4	4.4	3.6	4.2	2.8	2.1	1.9	2.9	4.4
5-Mar	1.9	2.4	5.6	5.4	10.4	4.9	6.0	2.9	2.6	1.9	1.8	1.4	1.4	1.5	1.3	1.6	2.0	2.7	3.5	7.3	5.2	3.8	7.5	10.7	4.0	10.7
6-Mar	15.2	12.5	16.4	9.5	8.4	5.3	4.4	5.1	6.1	4.6	4.9	5.4	4.3	5.0	5.1	4.8	6.5	5.1	5.3	5.3	5.3	4.9	5.5	5.6	6.7	16.4
7-Mar	4.8	4.0	4.0	4.3	4.4	4.7	4.7	4.5	4.2	4.3	4.4	4.4	4.7	4.3	3.9	4.1	4.2	5.1	4.7	5.5	5.4	5.2	7.0	6.5	4.7	7.0
8-Mar	4.8	4.8	5.3	5.5	6.4	6.0	7.9	7.7	6.3	4.5	4.7	4.5	7.3	4.6	4.2	7.0	7.0	6.3	6.1	6.9	7.4	4.9	4.8	3.8	5.8	7.9
9-Mar	3.4	3.6	4.5	6.5	6.9	5.9	9.8	7.7	9.5	5.5	4.7	5.7	6.2	C	C	7.5	8.1	12.7	13.2	11.5	10.5	11.0	10.6	8.8	7.9	13.2
10-Mar	9.9	9.8	9.7	8.4	6.0	6.7	9.5	9.2	9.4	7.4	6.1	4.8	4.4	4.3	4.5	5.7	5.2	8.8	10.1	10.1	8.9	8.4	4.8	7.2	7.5	10.1
11-Mar	5.7	6.0	6.0	5.9	5.6	5.3	5.3	5.9	5.5	5.1	4.2	8.4	6.3	6.8	6.4	6.5	6.7	6.5	9.2	10.5	8.7	7.2	6.2	6.8	6.5	10.5
12-Mar	6.0	4.0	4.5	5.6	3.4	4.5	5.1	4.7	3.8	3.8	3.3	2.9	2.8	2.0	1.9	2.7	3.1	3.8	5.0	4.4	4.5	2.8	2.7	2.8	3.8	6.0
13-Mar	3.7	3.3	3.4	3.2	3.1	3.9	4.0	4.6	4.9	4.4	3.9	3.4	3.7	3.5	3.5	4.2	4.8	4.8	4.0	4.3	6.3	5.3	4.9	4.5	4.1	6.3
14-Mar	5.4	6.2	5.4	5.8	5.7	5.9	7.5	7.2	6.0	4.9	3.7	2.5	3.3	3.0	3.3	2.3	4.3	9.1	24.5	8.0	3.7	3.7	4.3	4.0	5.8	24.5
15-Mar	4.1	4.5	5.0	5.5	5.8	5.9	7.0	9.2	8.9	5.5	1.8	1.0	0.7	0.4	0.3	0.3	0.3	0.3	2.0	3.1	5.8	3.1	1.9	2.3	3.5	9.2
16-Mar	1.8	2.0	3.9	3.1	3.7	4.4	4.3	4.5	4.2	4.2	4.0	3.2	3.0	3.2	3.5	3.8	4.2	5.0	5.0	6.9	5.9	5.2	7.1	6.0	4.3	7.1
17-Mar	7.6	7.8	6.8	3.6	3.2	3.0	3.7	3.9	4.0	3.0	3.4	3.7	3.5	4.0	8.6	10.6	6.2	16.1	8.8	6.7	6.8	6.9	5.2	6.6	6.0	16.1
18-Mar	8.4	7.4	7.7	8.4	8.5	7.9	4.6	4.4	6.0	6.0	5.5	3.0	2.2	1.9	2.1	2.2	2.2	2.4	3.8	2.6	2.3	2.6	2.9	5.9	4.6	8.5
19-Mar	6.7	6.1	3.6	4.2	4.5	3.4	3.4	2.9	2.8	2.4	1.8	1.3	1.2	1.1	1.5	1.5	1.5	1.6	1.9	2.7	3.1	2.3	2.7	2.8	2.8	6.7
20-Mar	3.3	4.9	6.5	9.5	12.1	10.9	11.3	8.0	7.6	6.0	5.3	4.6	4.0	4.8	5.3	4.2	4.9	6.7	7.8	7.2	5.2	4.7	7.4	9.1	6.7	12.1
21-Mar	3.3	4.3	3.1	3.3	4.0	4.5	5.3	3.4	2.8	2.4	3.2	4.2	3.0	1.8	1.8	2.4	2.9	2.5	3.2	2.3	2.6	2.6	3.1	3.4	3.1	5.3
22-Mar	3.2	3.6	4.7	4.0	3.7	4.7	4.6	4.5	4.1	4.6	4.5	4.3	3.9	3.4	3.8	4.2	4.3	3.8	3.9	4.2	4.7	8.0	6.3	4.7	4.4	8.0
23-Mar	5.3	4.6	4.4	3.8	4.1	5.2	5.1	4.8	3.8	3.9	3.7	3.0	1.9	1.9	2.2	2.8	3.0	4.8	5.9	6.7	4.9	4.8	5.1	5.1	4.2	6.7
24-Mar	4.7	4.8	5.2	4.6	5.6	7.0	29.7	5.0	3.9	4.6	4.8	5.4	4.6	3.7	3.0	3.5	3.9	3.8	4.3	3.8	4.1	5.0	5.6	5.0	5.7	29.7
25-Mar	4.5	4.3	4.0	3.8	3.4	3.3	5.3	2.9	2.9	3.1	3.7	3.4	3.4	3.8	3.9	4.6	5.5	5.1	7.1	9.2	12.5	6.4	5.5	5.7	4.9	12.5
26-Mar	5.3	3.8	3.3	3.8	2.9	3.6	3.1	3.7	3.9	3.2	3.7	4.2	5.2	5.2	5.1	6.0	7.5	6.1	7.6	9.2	6.7	7.6	8.1	7.3	5.3	9.2
27-Mar	26.6	8.1	6.6	5.2	5.8	5.2	5.4	5.1	5.6	5.8	4.8	4.3	3.8	2.6	1.5	1.7	1.8	2.7	3.1	2.8	2.3	2.2	2.3	2.2	4.9	26.6
28-Mar	2.6	2.3	2.3	2.3	3.2	3.2	3.8	4.4	4.4	3.8	4.8	7.6	5.4	3.6	4.7	5.5	5.1	6.5	5.8	5.0	4.5	4.0	4.6	9.5	4.5	9.5
29-Mar	8.7	5.6	5.1	5.9	5.5	6.3	13.6	30.0	6.4	5.3	5.0	5.1	5.4	5.5	5.4	5.4	5.4	7.4	8.0	9.2	5.3	4.4	4.3	4.1	7.2	30.0
30-Mar	4.3	4.6	4.5	4.5	4.9	5.3	6.3	5.9	4.9	3.7	2.8	2.7	2.4	2.4	2.8	3.1	4.1	4.6	5.6	6.5	7.8	8.6	8.5	6.9	4.9	8.6
31-Mar	8.7	7.6	10.7	6.6	6.2	8.9	14.0	3.9	4.5	2.4	2.0	1.7	2.2	1.9	1.2	1.4	1.7	2.2	3.8	4.7	5.2	8.6	9.6	20.8	5.8	20.8
																								Diurnal Average		
																								Diurnal Maximum		
6.3 5.4 5.5 5.3 5.4 5.2 6.9 6.0 5.2 4.3 3.9 3.8 3.6 3.2 3.3 3.9 4.1 5.2 6.2 6.1 5.8 5.3 5.6 6.5																										
26.6 13.3 16.4 11.1 12.1 10.9 29.7 30.0 9.5 7.4 6.1 8.4 7.3 6.8 8.6 10.6 8.1 16.1 24.5 15.7 13.5 13.7 17.6 26.7																										
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}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - March 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	507	68.33	68.33
6 - 15	217	29.25	97.57
16 - 25	7	0.94	98.52
26 - 80	4	0.54	99.06
> 81.0	0	0.00	99.06

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 - March 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	81	22	22	10	27	110	97	32	17	6	2	1	7	15	25	33	507
6 - 15	46	13	6	10	13	20	28	17	9	8	3	2	1	3	15	23	217
16 - 25	0	0	0	0	1	0	0	0	0	1	1	1	0	0	1	2	7
26 - 80	0	1	0	0	0	0	1	0	1	0	0	0	1	0	0	0	4
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	127	36	28	20	41	130	126	49	27	15	6	4	9	18	41	58	735

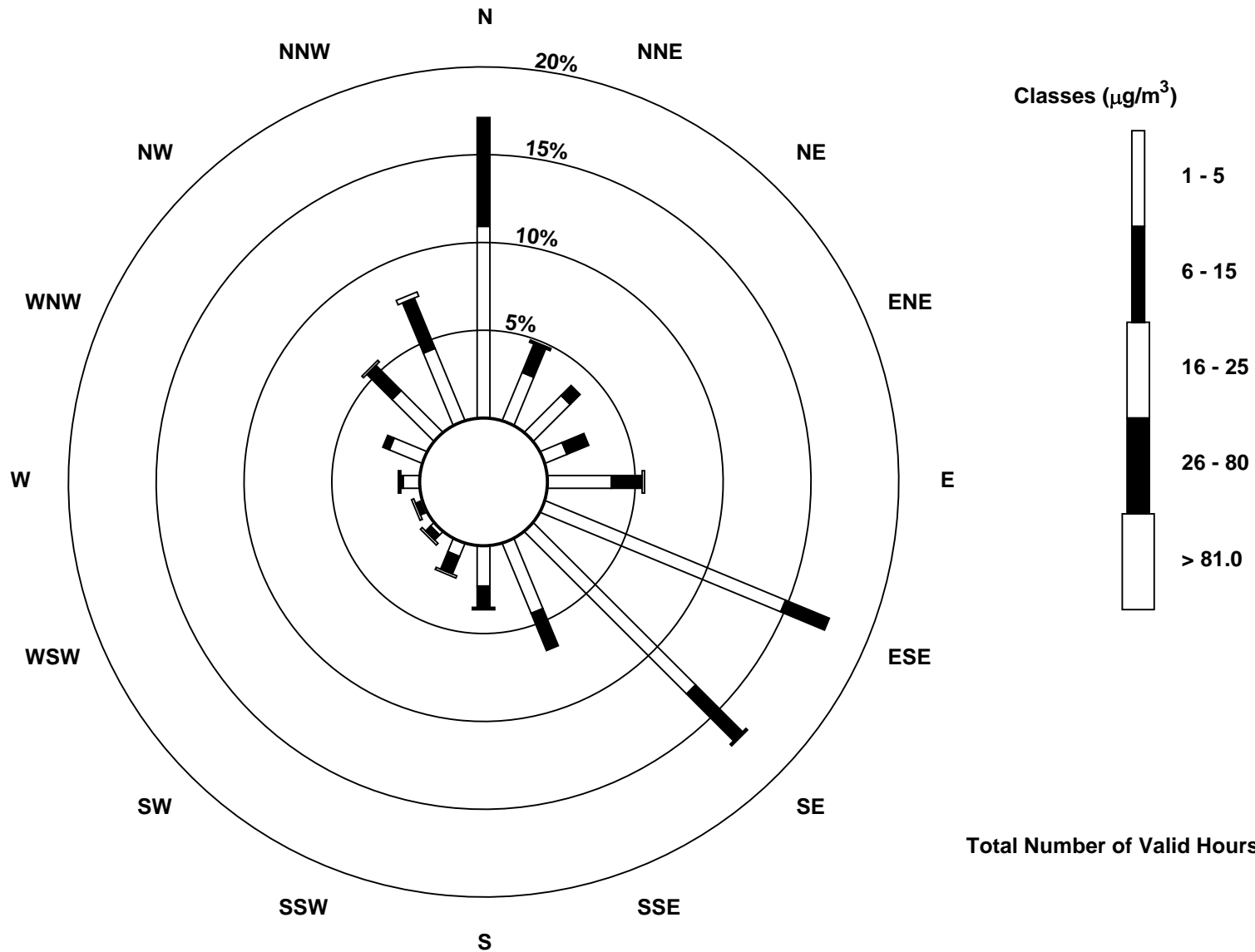
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes (AMS 6)





Wood Buffalo Environmental Association
Summary of Hour Averages

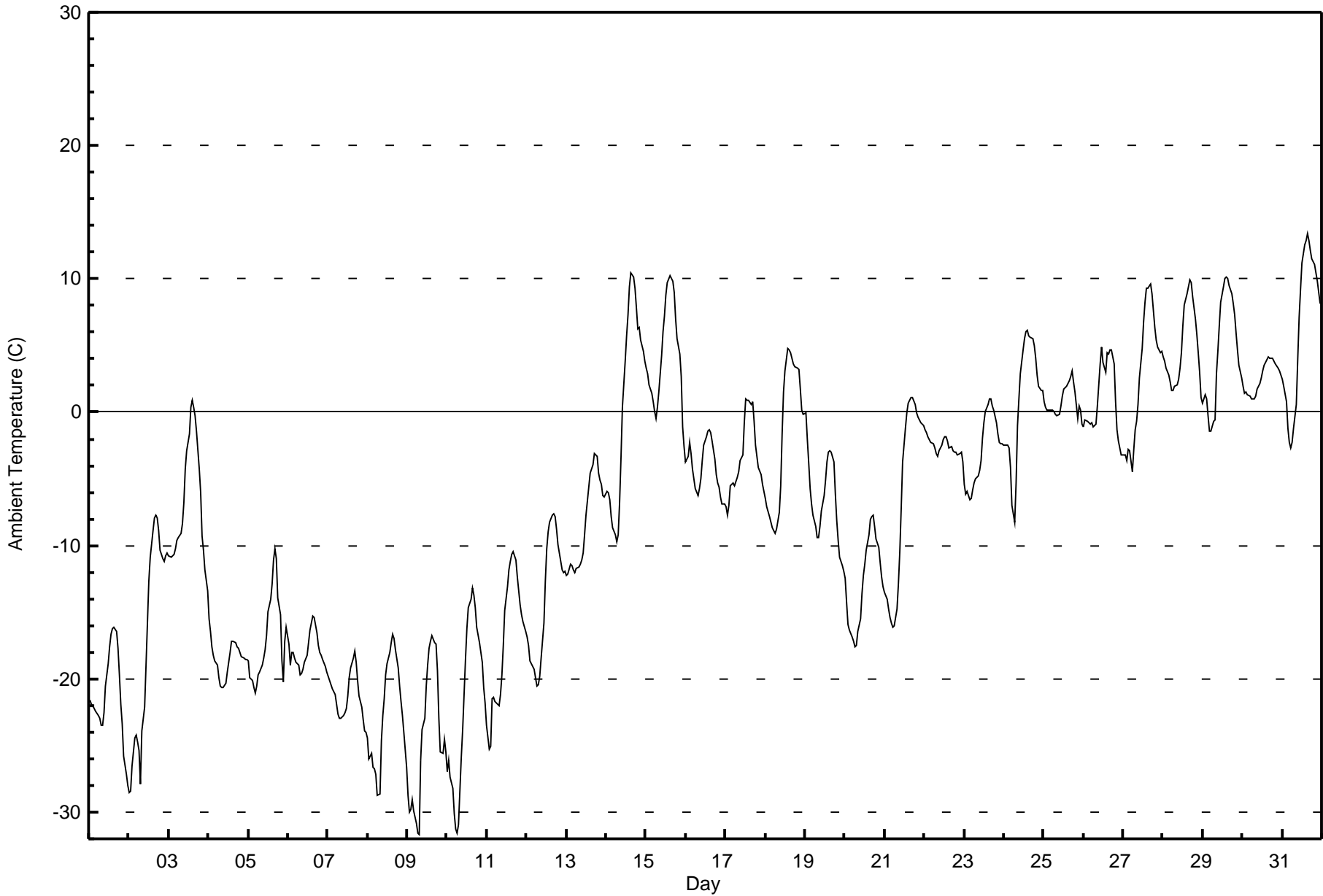
Ambient Temperature (AT) - C
Patricia McInnes - March 2017

Maximum Value: 13.4 C on Mar 31 16:00 Maximum Daily Average: 6.3 C on Mar 31																								Hours in Service:	744	
Minimum Value: -31.7 C on Mar 9 08:00 Minimum Daily Average: -24.3 C on Mar 9																								Hours of Data:	744	
Maximum Diurnal Average: -2.7 C at hour 16 Minimum Diurnal Average: -12.2 C at hour 7																								Hours of Missing Data:	0	
Monthly Average: -7.71 C Percentiles: P ₁ = -30.0 P ₁₀ = -22.0 Q ₁ = -17.3 Median = -6.0 Q ₃ = 0.8 P ₉₀ = 4.7 P ₉₉ = 10.8																								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-Mar	-21.6	-21.9	-22.0	-22.2	-22.5	-22.7	-22.9	-23.4	-23.5	-22.5	-20.6	-18.9	-17.6	-16.6	-16.2	-16.1	-16.5	-17.7	-19.7	-21.9	-23.4	-25.8	-27.1	-28.0	-21.3	-16.1
2-Mar	-28.5	-28.5	-26.5	-24.4	-24.3	-24.7	-25.4	-27.9	-23.9	-22.1	-19.0	-15.8	-12.6	-10.9	-8.9	-7.9	-7.7	-8.0	-8.9	-10.3	-11.0	-11.2	-10.8	-10.5	-17.1	-7.7
3-Mar	-10.8	-10.9	-10.8	-10.6	-10.2	-9.6	-9.4	-9.1	-8.4	-6.8	-4.3	-2.9	-1.6	0.3	0.9	0.3	-0.3	-1.4	-4.3	-6.0	-9.3	-10.4	-11.8	-13.4	-6.7	0.9
4-Mar	-15.5	-16.4	-17.6	-18.3	-18.6	-19.0	-19.9	-20.5	-20.6	-20.3	-19.5	-18.7	-18.0	-17.2	-17.2	-17.3	-17.6	-17.8	-18.1	-18.3	-18.5	-18.5	-18.5	-18.6	-18.4	-15.5
5-Mar	-18.7	-19.9	-20.1	-20.7	-21.1	-20.5	-19.7	-19.5	-19.0	-18.5	-17.9	-16.8	-15.0	-14.0	-12.8	-11.1	-10.3	-11.0	-11.0	-15.2	-18.7	-20.2	-17.2	-16.1	-17.0	-10.3
6-Mar	-17.3	-19.0	-18.1	-18.0	-18.5	-18.7	-19.0	-19.7	-19.6	-19.3	-18.8	-18.2	-17.3	-16.3	-15.8	-15.3	-15.4	-16.5	-17.5	-18.0	-18.2	-18.5	-19.1	-19.5	-18.0	-15.3
7-Mar	-19.8	-20.1	-20.4	-20.7	-21.1	-21.9	-22.6	-23.0	-22.9	-22.8	-22.6	-22.3	-21.2	-19.9	-19.2	-18.4	-17.9	-18.8	-20.1	-21.3	-22.1	-23.1	-23.9	-24.0	-21.3	-17.9
8-Mar	-24.5	-26.0	-25.6	-26.7	-26.7	-27.1	-28.7	-28.6	-24.7	-22.7	-21.5	-19.8	-18.8	-18.0	-17.3	-16.7	-17.0	-17.8	-19.2	-20.5	-21.7	-22.8	-24.0	-26.6	-22.6	-16.7
9-Mar	-28.7	-30.0	-29.8	-29.1	-29.9	-30.9	-31.6	-31.7	-26.1	-23.8	-23.0	-20.6	-19.0	-17.8	-17.1	-16.7	-17.3	-17.4	-19.3	-22.9	-25.5	-25.6	-24.5	-25.5	-24.3	-16.7
10-Mar	-27.0	-26.1	-27.4	-28.3	-30.1	-31.2	-31.6	-30.9	-25.9	-23.8	-21.2	-18.6	-16.3	-14.6	-14.0	-13.2	-13.7	-14.6	-16.1	-17.2	-18.0	-18.8	-20.7	-21.8	-21.7	-13.2
11-Mar	-23.5	-25.2	-25.0	-21.5	-21.4	-21.7	-21.9	-22.0	-21.2	-19.7	-17.5	-14.8	-13.1	-11.9	-11.1	-10.6	-10.5	-11.1	-12.4	-13.4	-14.4	-15.1	-15.8	-16.5	-17.1	-10.5
12-Mar	-16.9	-17.6	-18.7	-18.9	-19.3	-19.9	-20.5	-20.5	-19.8	-18.4	-15.8	-12.7	-10.2	-9.0	-8.2	-7.8	-7.6	-7.9	-8.8	-10.0	-11.2	-11.8	-12.0	-11.9	-14.0	-7.6
13-Mar	-12.3	-12.1	-11.4	-11.5	-11.8	-12.0	-11.7	-11.6	-11.4	-11.1	-10.5	-9.2	-7.7	-5.6	-4.6	-4.2	-4.0	-3.1	-3.3	-4.5	-5.1	-5.4	-6.3	-6.4	-8.2	-3.1
14-Mar	-5.9	-6.1	-6.6	-7.8	-8.7	-9.2	-9.8	-9.2	-6.8	-3.4	0.4	3.8	5.8	7.3	9.4	10.5	10.2	9.3	7.8	6.2	6.4	5.4	4.6	3.8	0.7	10.5
15-Mar	3.3	2.9	2.1	1.4	0.8	0.1	-0.5	0.4	1.6	4.3	6.0	7.2	8.8	9.8	10.3	10.0	9.8	8.9	7.0	5.5	4.4	2.6	-1.1	-2.6	4.3	10.3
16-Mar	-3.7	-3.4	-2.3	-3.1	-4.2	-5.0	-5.7	-6.2	-5.8	-5.0	-3.6	-2.4	-1.8	-1.4	-1.3	-1.5	-2.2	-3.5	-4.6	-5.3	-5.6	-6.3	-6.9	-6.9	-4.1	-1.3
17-Mar	-7.1	-7.7	-6.9	-5.5	-5.3	-5.5	-5.3	-4.9	-4.5	-3.6	-3.2	-0.7	1.0	0.9	0.9	0.5	0.8	-0.6	-2.4	-3.4	-4.2	-4.7	-5.4	-6.0	-3.5	1.0
18-Mar	-6.5	-7.1	-7.8	-8.3	-8.6	-8.9	-9.1	-8.7	-7.6	-5.5	-1.6	1.5	3.1	4.7	4.6	4.4	4.0	3.7	3.5	3.4	3.2	1.7	0.2	-0.2	-1.7	4.7
19-Mar	-0.1	-2.0	-3.8	-5.7	-6.9	-7.7	-8.5	-9.4	-9.4	-8.6	-7.4	-6.3	-5.1	-3.8	-3.0	-2.8	-3.0	-3.7	-6.1	-8.1	-9.7	-10.9	-11.5	-11.9	-6.5	-0.1
20-Mar	-12.4	-14.2	-15.9	-16.3	-16.9	-17.2	-17.6	-17.5	-16.5	-15.5	-13.6	-12.2	-11.4	-10.4	-9.2	-8.0	-7.9	-7.7	-8.6	-9.5	-10.1	-11.3	-12.4	-13.0	-12.7	-7.7
21-Mar	-13.5	-14.1	-14.8	-15.4	-15.8	-16.2	-16.0	-14.7	-12.9	-10.5	-7.2	-3.8	-1.2	0.0	0.6	0.9	1.1	1.1	0.5	0.0	-0.3	-0.6	-0.8	-1.0	-6.4	1.1
22-Mar	-1.3	-1.6	-1.8	-2.0	-2.3	-2.4	-2.7	-3.1	-3.3	-2.9	-2.5	-2.1	-1.9	-1.9	-2.1	-2.7	-2.5	-2.8	-3.0	-3.0	-3.2	-3.1	-3.0	-3.7	-2.5	-1.3
23-Mar	-5.4	-6.2	-6.0	-6.6	-6.4	-5.9	-5.3	-5.0	-4.8	-4.4	-3.6	-1.9	-0.8	0.1	0.6	1.0	1.0	0.5	0.2	-0.8	-1.6	-2.2	-2.4	-2.4	-2.8	1.0
24-Mar	-2.5	-2.4	-2.5	-2.7	-4.2	-7.0	-8.3	-5.3	-1.1	1.0	2.8	4.7	5.6	6.0	6.2	5.8	5.6	5.5	5.0	4.1	2.8	1.9	1.6	1.6	1.0	6.2
25-Mar	0.8	0.3	0.2	0.2	0.2	0.2	0.1	-0.2	-0.3	-0.1	0.4	1.2	1.7	1.8	2.0	2.4	2.7	3.1	2.2	1.5	-0.5	0.4	0.1	-0.9	0.8	3.1
26-Mar	-1.1	-0.6	-0.7	-0.8	-0.9	-0.8	-1.1	-0.9	0.5	2.0	3.6	4.9	3.7	3.0	4.4	4.4	4.7	4.7	3.6	0.8	-1.3	-2.1	-2.7	-3.2	1.0	4.9
27-Mar	-3.2	-3.2	-3.6	-2.8	-2.9	-4.5	-2.8	-1.4	-0.7	0.6	2.5	4.7	6.8	8.2	9.3	9.3	9.6	8.9	7.6	6.4	5.4	4.9	4.5	4.6	2.8	9.6
28-Mar	4.1	3.8	3.3	2.7	2.3	1.7	1.6	2.0	2.0	2.4	3.3	4.5	6.5	8.1	8.9	9.4	10.0	9.7	8.7	6.9	5.8	4.5	3.0	1.1	4.8	10.0
29-Mar	0.7	1.3	1.0	-0.2	-1.4	-1.4	-0.7	-0.6	2.9	4.6	6.5	8.2	9.4	10.1	10.2	10.0	9.6	8.8	8.2	7.3	6.0	4.7	3.5	2.6	4.6	10.2
30-Mar	1.9	1.4	1.5	1.3	1.2	1.0	1.0	1.0	1.2	1.7	2.1	2.6	3.0	3.5	3.7	4.1	4.0	4.0	4.0	3.9	3.6	3.3	3.1	2.8	2.5	4.1
31-Mar	2.4	1.9	0.8	-1.2	-2.2	-2.7	-2.3	-1.2	0.6	3.9	7.1	9.2	11.2	12.6	12.9	13.4	12.9	12.1	11.6	11.1	10.4	9.8	9.0	8.1	6.3	13.4
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Patricia McInnes - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Patricia McInnes - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	110	14.78	14.78
-20 - 0	421	56.59	71.37
0 - 10	198	26.61	97.98
10 - 20	15	2.02	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

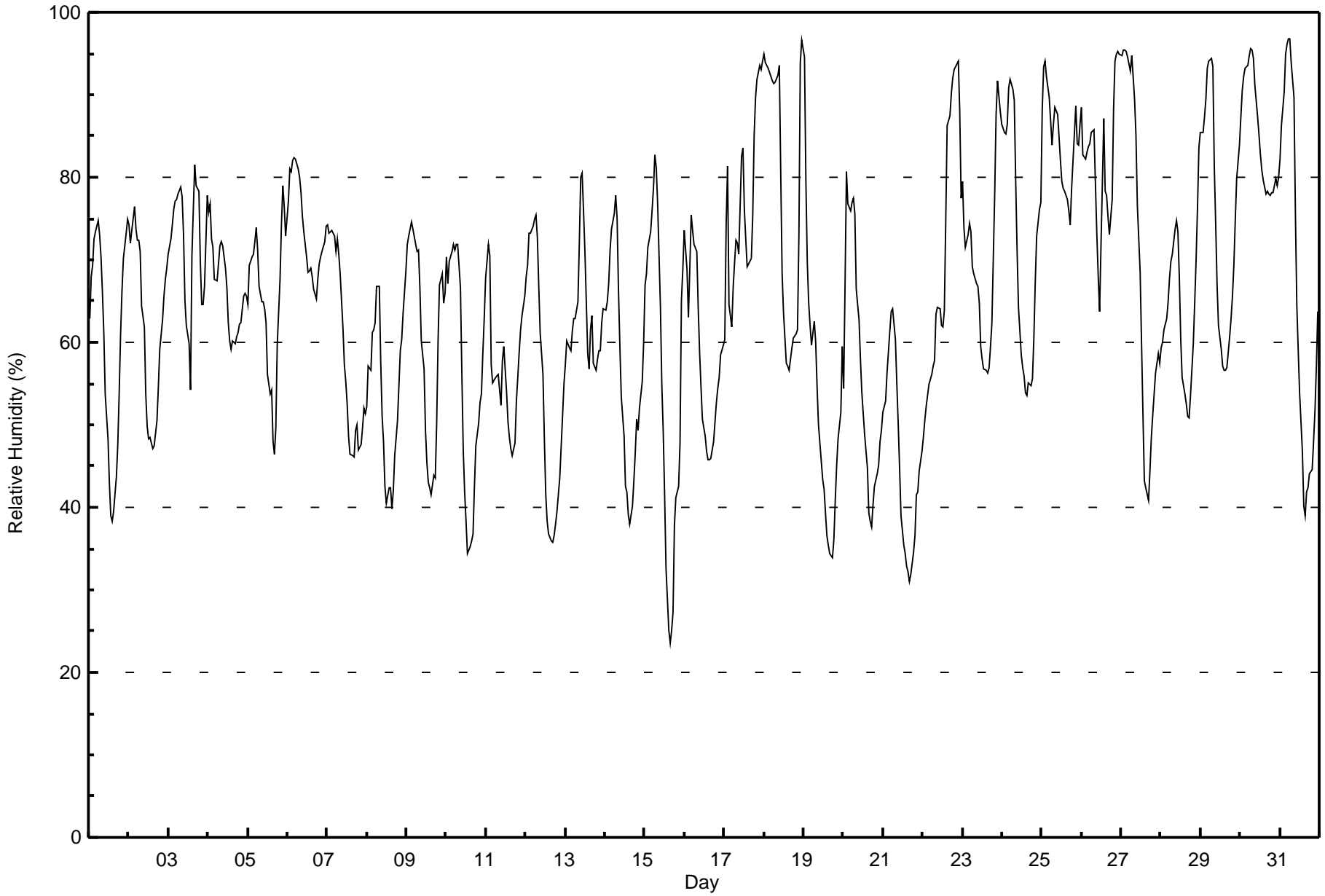
Patricia McInnes - March 2017

Maximum Value: 97 % on Mar 31 07:00																			Maximum Daily Average: 85.4 % on Mar 30						Hours in Service: 744																			
Minimum Value: 24 % on Mar 15 16:00																			Minimum Daily Average: 45.9 % on Mar 21						Hours of Data: 744																			
Maximum Diurnal Average: 76.0 % at hour 7																			Minimum Diurnal Average: 51.9 % at hour 16						Hours of Missing Data: 0																			
Monthly Average: 65.2 %																			Percentiles: P ₁ = 32 P ₁₀ = 43 Q ₁ = 54 Median = 65 Q ₃ = 76 P ₉₀ = 88 P ₉₉ = 95						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-Mar	63	68	69	73	73	75	73	70	66	61	54	48	43	39	38	40	44	48	54	61	66	70	73	75	60.2	75																		
2-Mar	74	72	73	76	74	72	72	71	64	62	54	50	48	48	47	48	49	51	55	59	63	66	68	69	61.9	76																		
3-Mar	71	72	74	76	77	77	78	79	78	73	65	62	60	54	71	76	82	79	78	70	65	65	67	78	71.9	82																		
4-Mar	76	77	73	72	68	67	69	72	72	72	69	67	62	60	59	60	60	61	61	62	62	66	66	66	66.6	77																		
5-Mar	65	69	70	71	72	74	71	67	65	65	64	62	56	54	54	48	46	50	60	68	74	79	76	73	64.7	79																		
6-Mar	77	81	81	82	82	82	81	80	78	75	73	70	69	69	69	68	66	65	68	70	70	71	72	74	73.9	82																		
7-Mar	74	73	73	74	73	71	73	71	68	62	57	55	52	49	46	46	46	49	50	47	48	50	52	51	58.8	74																		
8-Mar	52	57	57	61	62	62	67	67	58	51	48	42	40	42	40	42	46	51	55	59	60	64	69	53.9	69																			
9-Mar	72	73	74	75	74	72	71	71	67	60	57	49	45	43	42	42	44	44	50	60	67	68	65	66	60.4	75																		
10-Mar	70	67	70	71	72	71	72	72	67	56	47	42	38	34	35	36	37	43	48	50	53	54	59	63	55.2	72																		
11-Mar	68	72	70	57	55	55	56	56	54	52	58	60	54	50	48	47	46	48	53	56	59	62	63	66	56.9	72																		
12-Mar	68	69	73	73	74	75	75	73	67	61	56	48	42	38	37	36	36	37	38	40	44	47	51	55	54.7	75																		
13-Mar	57	60	59	59	61	63	63	65	72	80	81	76	71	59	57	62	63	57	57	58	59	59	62	64	63.5	81																		
14-Mar	64	65	67	71	74	76	78	75	66	60	53	49	43	42	39	38	40	43	47	51	49	52	55	60	56.5	78																		
15-Mar	67	68	72	73	76	79	83	81	77	64	55	49	41	33	25	24	25	27	38	41	42	48	65	69	55.1	83																		
16-Mar	74	69	63	69	75	74	72	71	64	59	55	51	49	47	46	46	46	48	50	53	54	56	58	60	58.6	75																		
17-Mar	60	74	81	65	62	67	70	72	72	71	83	84	76	73	69	70	70	75	85	90	92	94	93	94	76.7	94																		
18-Mar	95	94	93	93	92	92	91	92	92	94	81	68	64	57	57	57	58	59	60	61	62	73	94	97	78.1	97																		
19-Mar	95	79	70	65	62	60	63	60	55	50	48	43	42	39	37	35	34	34	36	41	45	48	51	59	52.1	95																		
20-Mar	54	67	81	77	76	77	77	76	66	63	58	54	51	49	45	39	38	38	40	43	44	45	48	49	56.5	81																		
21-Mar	52	53	56	59	61	64	64	60	55	50	45	39	35	34	33	32	31	32	35	37	41	42	44	47	45.9	64																		
22-Mar	49	51	52	54	55	56	57	58	63	64	64	62	62	64	75	86	87	90	92	93	93	94	88	78	70.3	94																		
23-Mar	80	74	72	73	74	73	69	68	67	67	65	60	58	57	57	56	57	60	62	78	88	92	90	88	70.1	92																		
24-Mar	87	86	85	86	91	92	91	89	80	71	64	59	57	56	54	54	55	55	56	61	67	73	76	77	71.6	92																		
25-Mar	88	93	94	92	90	87	84	86	89	88	85	82	80	79	78	77	76	74	79	82	89	84	84	86	84.4	94																		
26-Mar	89	83	82	83	84	84	85	86	79	73	68	64	72	87	78	78	75	73	77	88	94	95	95	95	82.0	95																		
27-Mar	95	95	95	95	95	93	95	92	90	85	77	69	60	51	43	42	41	44	48	51	54	56	59	57	70.1	95																		
28-Mar	59	60	61	63	65	68	70	71	74	75	73	68	61	56	54	52	51	51	54	60	65	70	76	83	64.1	83																		
29-Mar	85	85	87	90	93	94	94	93	81	74	67	62	59	57	57	57	57	61	63	66	69	75	80	84	74.6	94																		
30-Mar	87	90	92	93	94	95	96	95	94	91	87	85	83	81	80	78	78	78	78	78	78	80	79	80	85.4	96																		
31-Mar	82	86	90	95	96	97	97	94	90	76	65	59	54	47	40	39	42	42	44	45	48	52	57	64	66.7	97																		
																			72.5	73.7	74.6	74.7	75.2	75.6	76.0	75.3	71.9	67.9	63.7	59.3	55.7	53.2	52.0	51.9	52.4	53.6	56.9	60.4	63.3	65.9	68.7	70.8	Diurnal Average	
																			95	95	95	95	96	97	97	95	94	94	87	85	83	87	80	86	87	90	92	93	94	95	95	97	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Patricia McInnes - March 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Patricia McInnes - March 2017

Maximum Speed: 30 km/h on Mar 19 02:00	Maximum Daily Speed Average: 21.8 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 1 km/h on Mar 27 00:00	Minimum Daily Speed Average: 1.1 km/h on Mar 3	Hours of Data: 744
Maximum Diurnal Speed Average: 4.3 km/h at hour 19	Minimum Diurnal Speed Average: 2.1 km/h at hour 6	Hours of Missing Data: 0
Monthly Average Velocity: 3.0 km/h 66.3 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 7 Median = 9 Q ₃ = 14 P ₉₀ = 19 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-Mar	NNE10	NE11	NE9	NNE9	NE11	NE9	ENE8	NE9	NE8	NE6	NE6	NNE6	NNE6	N7	N9	N9	N10	NNW9	NW7	NW7	NW7	NW6	WSW2	W3	NNE6.3	NE11
2-Mar	SW2	SW1	SSE2	SSE4	SE4	S5	SSE4	SSW2	SSE3	SSE8	SE5	ESE5	ESE8	ESE9	ESE12	ESE13	ESE15	ESE16	ESE15	SE21	ESE19	SE16	SE15	SE15	SE8.7	SE21
3-Mar	SE16	SE16	SE16	SE15	SE15	SE15	SE12	SE9	SSE8	SE7	SSE11	SSE9	SSE8	ENE3	NNW15	W10	NW14	NW17	N17	NW22	NW22	NNW20	NNW17	N16	NE1.1	NW22
4-Mar	N18	N14	N18	N14	N14	N16	NNE20	N19	N19	N20	NNE20	N16	N18	NNE17	N16	N17	N18	N15	N14	N15	NNE12	NE13	NE10	NE9	N15.6	NNE20
5-Mar	NE6	NW5	NNW7	NNW8	N9	NNE7	ENE5	E6	E7	E9	SE9	SE6	SW2	SSE7	SSW4	W2	NNW1	S1	NW4	N8	NNW4	NW6	NNW4	N5	NNE2.0	E9
6-Mar	NW2	NW3	NNW10	NNW10	N10	NNW15	NNW15	N19	N17	N22	N20	N17	NNW17	N19	N20	N21	N21	N26	N22	N22	N22	N20	N19	N18	N16.8	N26
7-Mar	NNW19	N22	N20	N17	NNW18	NNW19	NNW15	NNW18	N20	N23	NNW21	NNW24	NNW23	NNW18	N18	NNW18	N18	NNE16	N15	NNE14	NNE13	N8	N8	N9	N17.1	NNW24
8-Mar	NNW10	NW8	NNW7	NNW8	NNW9	NW7	NW6	NW3	N7	N9	N6	NNW9	N12	N12	N11	N10	NNE13	NNE13	NNE13	N10	N8	N9	NNW6	NNW5	N8.4	NNE13
9-Mar	NW6	WNW3	NW7	NW8	NW6	NW6	W1	SW2	S2	NNE6	NE8	NE4	E3	NE3	ENE5	ENE7	NE9	ENE6	NW1	NW3	NNW5	NNW6	N6	N5	N3.1	NE9
10-Mar	N6	N8	N6	N5	WSW1	NNW3	N2	NNE4	NNE5	NE4	ENE5	NE5	NE5	E3	E2	NNE5	ENE8	NNE8	N7	N9	N8	N5	NNW4	N5	NNE4.4	N9
11-Mar	NNW4	WNW3	ESE4	ESE8	SE9	SE9	SE9	SE9	SE9	SE9	E7	E11	ESE14	ESE14	ESE13	ESE12	ESE10	E10	E9	E8	E8	ESE9	ESE10	ESE8	ESE8.2	ESE14
12-Mar	SE9	ESE9	ESE6	ESE6	SE8	SE8	SE6	SE7	SE12	SE11	SE11	ESE15	ESE17	ESE18	ESE19	ESE20	ESE19	SE16	SE14	SE18	SE18	SE16	SE16	SE15	SE12.9	ESE20
13-Mar	SE14	SE11	SSE11	SSE15	SSE15	SSE14	SSE15	SE20	SSE19	SSE16	SE17	SSE17	SSE20	SSE20	S20	SSE16	S13	SSW15	S13	S15	S16	SSE12	SSE11	SSE14.9	SSE20	
14-Mar	SSE9	SSE8	SSE9	SE9	SE9	SE9	SE8	SE7	SSE8	S11	S10	S10	ESE9	ESE9	ESE7	ESE6	ESE5	ESE7	E8	ESE9	ESE15	ESE16	SE14	SE9	SE8.3	ESE16
15-Mar	ESE14	SE15	SE12	SE11	SE10	SE10	SSE7	SSE9	S10	SSW11	WSW13	SW13	SW7	WSW13	W18	NNW19	NNW14	NW10	N11	NNE9	N8	N4	NW6	NW6	SW2.9	WNW19
16-Mar	NW6	N8	N11	N14	N17	N19	N19	N19	N19	N18	N20	N20	N21	N22	N24	N22	N20	N19	N17	N16	N15	N15	N13	NNW9	N16.7	N24
17-Mar	N10	NNE9	ENE5	ESE12	E10	E11	E8	E8	ESE11	ESE9	ESE8	E8	N9	N14	N16	N16	N16	NNW15	NNW14	NNW14	NNW12	NNW13	NNW11	NNW12	NNE6.8	N16
18-Mar	N11	N9	N9	N10	N9	N8	N9	N7	N7	NNE6	ENE7	ESE13	ESE17	ESE17	ESE16	ESE16	E12	E10	E7	ESE5	E6	NNW9	NW6	NW10	NE5.1	ESE17
19-Mar	WNW16	NW30	WNW29	WNW28	WNW26	WNW21	WNW14	WNW20	WNW20	WNW20	W21	W22	W24	W25	WNW23	WNW23	W22	WNW23	NW26	NNW23	NW23	NW23	WNW22	NW22	WNW21.8	NW30
20-Mar	NW24	NNW20	N13	N14	N13	NNW11	NNW9	N7	NNE7	NE6	E7	ENE6	NE7	ENE8	E7	ENE4	E8	ESE9	SE7	SE9	SE12	SE11	SE7	SE9	NE4.4	NW24
21-Mar	SE7	SE8	SE8	SE8	SSE7	SE7	SSE9	SE9	SE10	SE10	SE10	ESE14	ESE17	ESE19	SE20	SE19	SE18	SE19	SE17	SE20	SSE20	SE15	SE12	SE12	SE12.8	SE20
22-Mar	SE14	SE14	SE15	SE14	SE13	ESE13	SE14	ESE14	ESE13	ESE12	E11	E11	E9	ESE9	E7	NNE5	N6	NNE6	N5	NNW5	NW4	NNW8	NNW13	N13	E6.2	SE15
23-Mar	N7	NNW8	NNW8	NW7	NW6	NW5	NNW7	N7	NNE9	NNE10	N9	N5	N4	N3	NW1	S3	ENE4	NNE7	NNE5	E5	ESE11	ESE11	ESE10	SE10	NNE3.5	ESE11
24-Mar	ESE9	SE7	SE6	SSE5	SE4	SSW3	SE3	SSE5	SE8	SE8	SE10	ESE11	ESE12	ESE16	ESE17	SE17	SE15	ESE14	ESE11	ESE16	ESE19	ESE15	ESE14	SE13	SE10.4	ESE19
25-Mar	ESE10	ESE9	ESE7	ESE8	ESE9	ESE8	ESE11	SE11	ESE11	ESE12	ESE10	ESE8	ESE7	ESE7	ESE6	E6	ESE6	ESE6	ESE5	E4	ENE5	E7	ENE5	ENE4	ESE7.3	ESE12
26-Mar	ENE4	E5	E5	ESE4	ESE8	ESE10	SE12	SE9	ESE8	ESE6	ESE4	NW3	WNW6	NNW8	NE6	ENE7	E6	NE5	NE5	N3	NNW5	NNW5	NNE2	WNW1	E3.2	SE12
27-Mar	N2	SSE3	S2	SSE7	S4	S1	SE7	SE7	SE8	SE7	ESE6	ESE6	ENE5	E8	ESE11	ESE13	ESE16	ESE13	ESE12	ESE11	SE15	SE12	SE8	SE8	ESE7.4	ESE16
28-Mar	SE9	SE9	SE8	SE10	SE8	SE8	SE7	SE8	ESE10	SE10	SE9	S11	SE9	ESE7	ESE11	ESE11	ESE13	ESE11	E11	ESE11	ESE13	SE13	SE7	SE5	SE9.1	SE13
29-Mar	SE7	SSE9	SSE7	S4	SSW2	SSE4	SSE5	S3	SSE7	SSE8	SE8	ESE9	ESE10	SE9	ESE9	ESE11	SE10	SSE10	SE5	E8	ESE10	ESE13	ESE11	ESE9	SE7.2	ESE13
30-Mar	ESE7	ESE8	ESE13	ESE12	ESE10	ESE9	E8	ESE8	E9	ESE7	E6	NE7	NE7	NNE5	NE6	NE6	NE5	NE5	ENE3	ESE4	SE4	SE4	SSE7	SSE5	E5.7	ESE13
31-Mar	S5	S6	SSE4	SW3	WSW3	SSW4	SSW5	S5	SSE6	S8	SSE8	S6	SE9	S11	SW17	SSW20	SSW19	SSW16	S13	S14	SSW13	SSW10	S9	SSW10	S8.8	SSW20

NE2.6	NE2.3	NE2.5	ENE2.3	ENE2.2	ENE2.1	E2.7	E2.8	E3.4	E3.5	E3.4	E3.4	ENE3.7	ENE3.9	ENE3.2	ENE3.0	ENE3.9	NE4.2	NE4.3	NE3.9	ENE3.5	ENE2.7	ENE2.2	NE2.4	Diurnal Average	
NNW24	NW30	WNW29	WNW28	WNW26	WNW21	NNE20	WNW20	N20	N23	NNW21	NNW24	W24	W25	N24	WNW23	W22	N26	NW26	NNW23	NW23	NW23	WNW22	NW22	Diurnal Maximum	

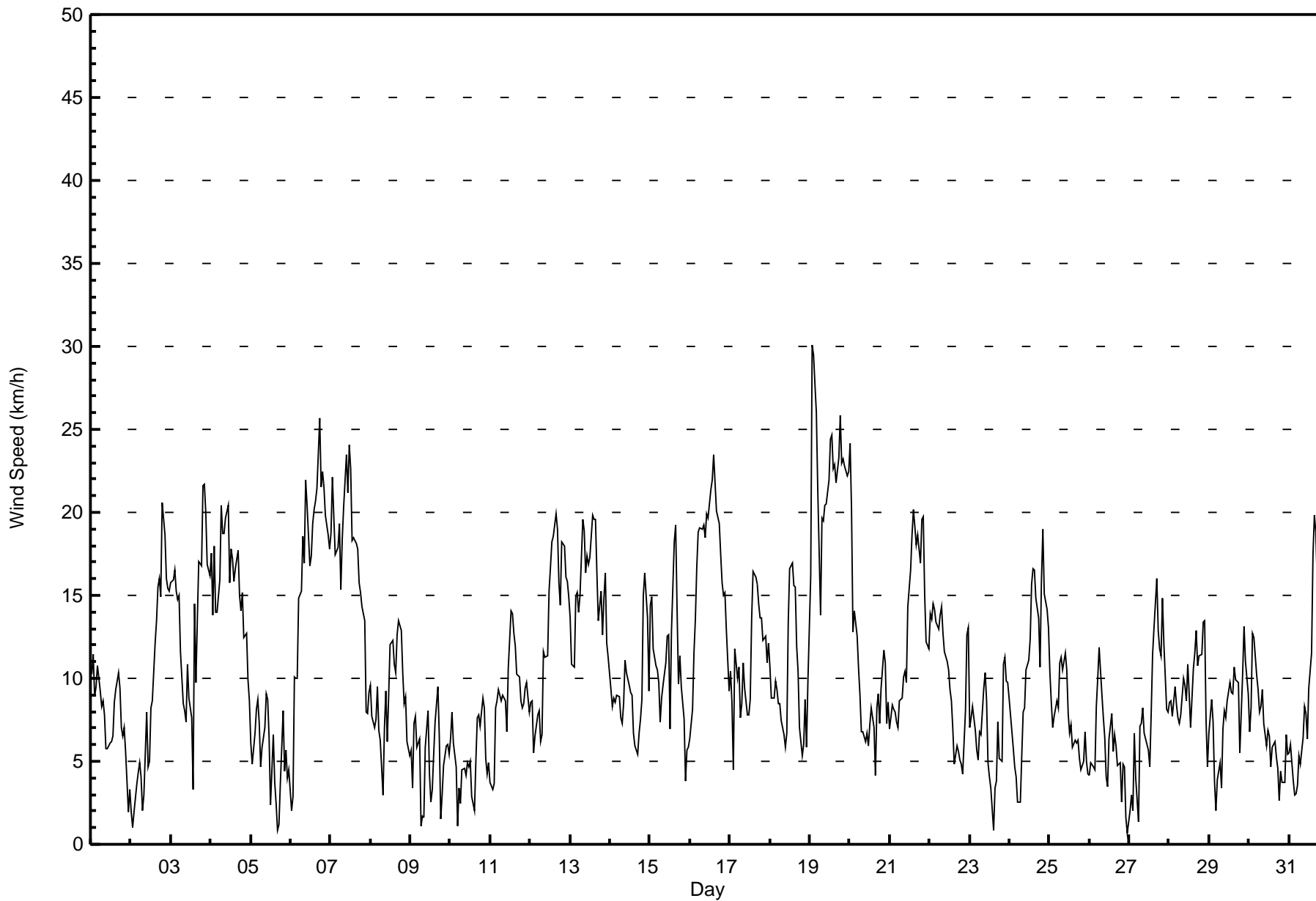
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Patricia McInnes - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Mar 19 01:00																		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 Mar 1 21:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 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-Mar	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	1	1	0	1	1	0	2
2-Mar	1	1	1	1	1	1	2	1	1	1	1	2	2	2	3	3	3	3	4	5	4	4	4	3	5
3-Mar	3	3	3	3	4	4	3	2	2	3	2	2	3	1	4	2	3	6	3	6	5	4	3	3	6
4-Mar	4	3	4	3	3	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3	2	2	2	1	4
5-Mar	2	1	1	1	1	2	2	1	2	2	2	2	2	2	2	1	2	1	2	1	2	1	1	1	2
6-Mar	1	1	3	2	2	3	2	3	3	5	4	3	3	3	3	4	4	5	4	5	5	5	4	3	5
7-Mar	4	5	4	3	3	4	3	4	4	6	4	4	4	4	3	3	3	3	3	4	3	2	1	2	6
8-Mar	1	1	1	1	1	2	1	2	2	2	2	3	3	3	4	3	3	3	3	2	2	1	1	1	4
9-Mar	1	0	1	1	1	1	1	1	1	3	2	3	2	3	2	2	2	2	1	1	1	1	1	1	3
10-Mar	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1	2	2	1	1	1	2
11-Mar	0	1	1	2	2	2	2	2	2	2	1	3	3	3	3	3	3	2	2	1	1	2	2	1	3
12-Mar	2	3	2	2	2	2	1	2	2	3	3	4	4	4	4	5	5	3	3	4	4	4	3	3	5
13-Mar	3	3	3	3	3	3	4	4	4	4	4	4	4	5	4	4	4	3	3	2	4	4	2	2	5
14-Mar	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	4	3	4	5	2	5
15-Mar	3	4	2	2	2	2	2	1	2	3	3	3	4	3	5	5	3	2	3	2	1	1	1	1	5
16-Mar	1	2	2	3	3	3	3	3	4	3	3	4	3	4	4	4	4	4	3	3	3	3	3	2	4
17-Mar	2	2	2	3	3	3	2	2	2	3	2	3	2	2	2	3	2	2	2	2	2	3	2	2	3
18-Mar	2	1	1	2	2	1	2	2	1	2	3	4	4	4	3	3	3	2	2	2	2	2	2	2	4
19-Mar	7	7	7	6	7	6	6	5	4	4	4	5	5	5	6	5	6	6	6	5	6	6	5	5	7
20-Mar	7	7	3	3	3	2	2	1	2	2	2	2	3	2	2	2	2	2	1	2	3	3	2	1	7
21-Mar	1	2	1	2	1	2	2	2	3	3	3	3	4	4	4	5	4	4	4	5	4	3	3	3	5
22-Mar	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	1	1	1	1	1	1	3	2	3	3
23-Mar	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	3	2	3
24-Mar	2	2	1	1	1	1	1	1	2	2	2	2	3	4	4	4	3	3	2	4	4	4	3	3	4
25-Mar	2	2	3	2	2	2	3	3	2	2	2	2	2	1	1	1	2	2	1	1	2	1	1	2	3
26-Mar	2	1	1	2	2	3	2	2	2	2	2	1	2	2	2	1	2	1	1	1	1	1	1	1	3
27-Mar	1	2	1	1	1	1	2	2	2	1	2	2	2	3	3	4	4	3	2	3	3	3	1	1	4
28-Mar	2	2	2	2	2	1	1	2	2	2	2	3	3	3	3	2	3	2	2	2	3	3	3	2	3
29-Mar	2	1	1	1	1	2	2	1	2	2	2	3	3	3	3	2	2	3	2	3	3	3	3	2	3
30-Mar	2	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	1	2	3
31-Mar	1	1	2	1	1	1	1	1	1	2	2	2	3	6	4	5	6	4	3	3	3	2	3	2	6
Diurnal Maximum																									
7 7 7 6 7 6 6 5 4 6 4 5 5 6 6 5 6 6 6 6 6 6 6 5 5																									





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Patricia McInnes - March 2017

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	129	17.34	17.34
6 - 11	347	46.64	63.98
12 - 19	204	27.42	91.40
20 - 28	62	8.33	99.73
29 - 38	2	0.27	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 - March 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	8	9	13	7	8	8	11	11	6	5	3	3	3	11	11	129
6 - 11	43	17	19	8	33	71	71	25	9	4	1	0	1	1	21	23	347
12 - 19	50	9	1	0	1	50	44	9	6	4	2	2	1	5	2	18	204
20 - 28	22	2	0	0	0	1	3	4	1	1	0	0	5	10	7	6	62
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	127	36	29	21	41	130	126	49	27	15	8	5	10	20	42	58	744

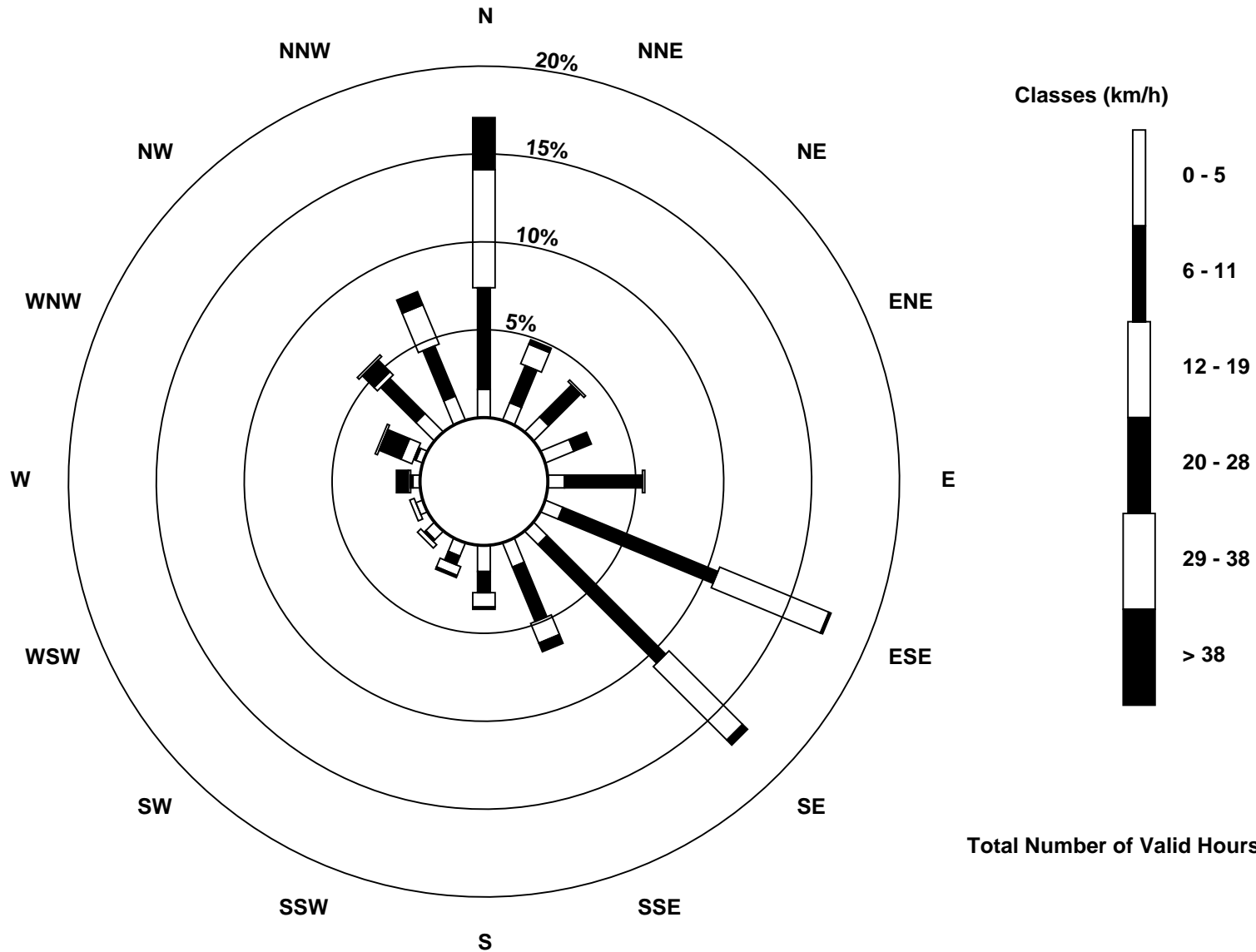
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Wind Speed (WS) - km/h
Patricia McInnes (AMS 6)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Patricia McInnes - March 2017

Direction of Maximum Speed: 309 deg on Mar 19 02:00		Hours in Service: 744
Direction of Maximum Daily Speed Average: 295.5 deg on Mar 19		Hours of Data: 744
Direction of Minimum Speed: 294 deg on Mar 27 00:00	Direction of Minimum Daily Speed Average: 1.1 deg on Mar 3	Hours of Missing Data: 0
Monthly Average Direction: 11.9 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-Mar	12	35	38	32	37	48	74	50	43	53	34	14	14	354	359	9	354	344	318	313	322	324	249	271	14.7
2-Mar	226	224	156	148	132	169	161	204	149	149	133	103	113	109	114	113	115	118	123	124	122	129	127	125	125.8
3-Mar	129	132	130	130	130	134	139	138	149	135	148	152	150	62	300	271	309	317	358	322	315	331	337	5	52.0
4-Mar	7	2	4	8	4	11	13	10	7	11	12	11	5	14	358	352	359	3	5	7	19	36	39	35	9.2
5-Mar	36	317	345	348	352	12	64	96	98	99	128	136	235	164	199	281	343	175	308	10	332	312	347	349	26.1
6-Mar	326	306	345	342	350	346	347	349	350	356	355	354	347	352	354	356	354	2	4	1	4	4	1	356	354.8
7-Mar	347	352	351	350	343	347	343	348	350	351	346	347	347	346	349	346	1	20	10	17	20	359	350	352	352.7
8-Mar	344	325	345	341	338	318	314	314	352	2	354	348	349	350	7	7	16	29	24	8	2	350	342	345	354.7
9-Mar	318	291	310	315	315	308	279	223	170	25	38	41	97	42	76	73	55	59	317	321	342	344	356	351	3.2
10-Mar	359	358	0	351	248	340	6	13	22	51	78	54	43	82	82	31	62	26	352	351	3	350	346	358	15.5
11-Mar	335	303	107	119	131	135	134	128	133	136	97	100	110	106	108	104	104	101	96	94	90	118	123	109	111.7
12-Mar	124	115	118	119	135	132	127	130	132	131	130	120	109	112	114	115	119	126	126	124	125	141	137	134	124.1
13-Mar	126	136	147	150	149	151	147	146	150	147	145	146	151	158	161	179	160	172	193	191	183	180	163	159	158.0
14-Mar	168	161	155	143	132	135	138	145	160	181	189	183	109	110	105	108	120	104	96	120	123	122	130	131	137.1
15-Mar	120	140	143	138	138	143	164	164	187	204	250	235	234	245	272	290	296	316	1	14	358	1	309	325	228.0
16-Mar	310	353	352	354	353	356	0	2	3	4	7	2	352	354	354	356	358	360	357	356	358	7	354	336	356.9
17-Mar	2	12	66	112	101	100	96	101	116	115	110	97	5	357	353	355	349	348	347	341	340	343	338	346	19.8
18-Mar	356	351	352	1	356	349	357	351	5	16	69	107	115	107	108	115	100	89	95	111	95	336	326	308	53.9
19-Mar	301	309	303	299	293	293	295	282	282	284	274	270	265	280	283	286	279	299	320	328	323	311	303	317	295.5
20-Mar	314	348	9	353	349	340	343	359	23	50	82	73	45	70	83	77	94	114	133	141	141	134	129	128	40.6
21-Mar	138	140	144	142	147	146	147	142	138	133	144	117	109	112	127	128	135	140	131	135	154	142	131	128	133.7
22-Mar	127	130	125	126	126	120	124	122	111	112	97	90	99	103	94	23	352	26	1	328	325	332	341	357	96.8
23-Mar	352	341	337	320	310	312	341	6	12	14	11	11	0	8	316	187	70	29	30	94	113	119	122	126	25.8
24-Mar	123	126	130	151	135	197	141	152	143	143	133	113	118	117	119	131	131	121	110	122	120	123	116	125	125.4
25-Mar	109	104	112	107	110	116	121	124	119	119	117	115	105	106	110	101	108	119	108	79	71	84	76	60	108.0
26-Mar	74	88	92	109	107	122	125	128	121	102	106	312	282	338	43	74	80	56	43	2	333	332	28	294	82.4
27-Mar	11	165	186	155	184	185	145	139	133	126	110	103	77	86	106	123	120	107	103	121	124	132	140	146	123.2
28-Mar	129	133	136	132	131	137	132	130	120	128	137	169	138	120	102	112	109	109	88	104	121	130	136	127	124.1
29-Mar	136	147	153	172	209	157	162	182	154	166	143	119	105	127	113	117	134	152	134	93	105	120	111	108	130.6
30-Mar	102	118	118	116	106	111	99	105	92	102	100	55	55	32	34	51	41	36	60	114	142	144	160	160	97.9
31-Mar	181	179	166	235	237	202	192	173	151	169	156	176	140	171	214	204	197	199	185	175	192	211	191	193	188.2

44.4	45.0	50.1	64.1	62.0	66.0	83.2	85.7	88.7	84.8	84.7	82.3	70.0	68.6	61.9	66.3	62.9	54.7	43.2	53.8	70.7	69.8	68.5	55.0
Diurnal Average																							

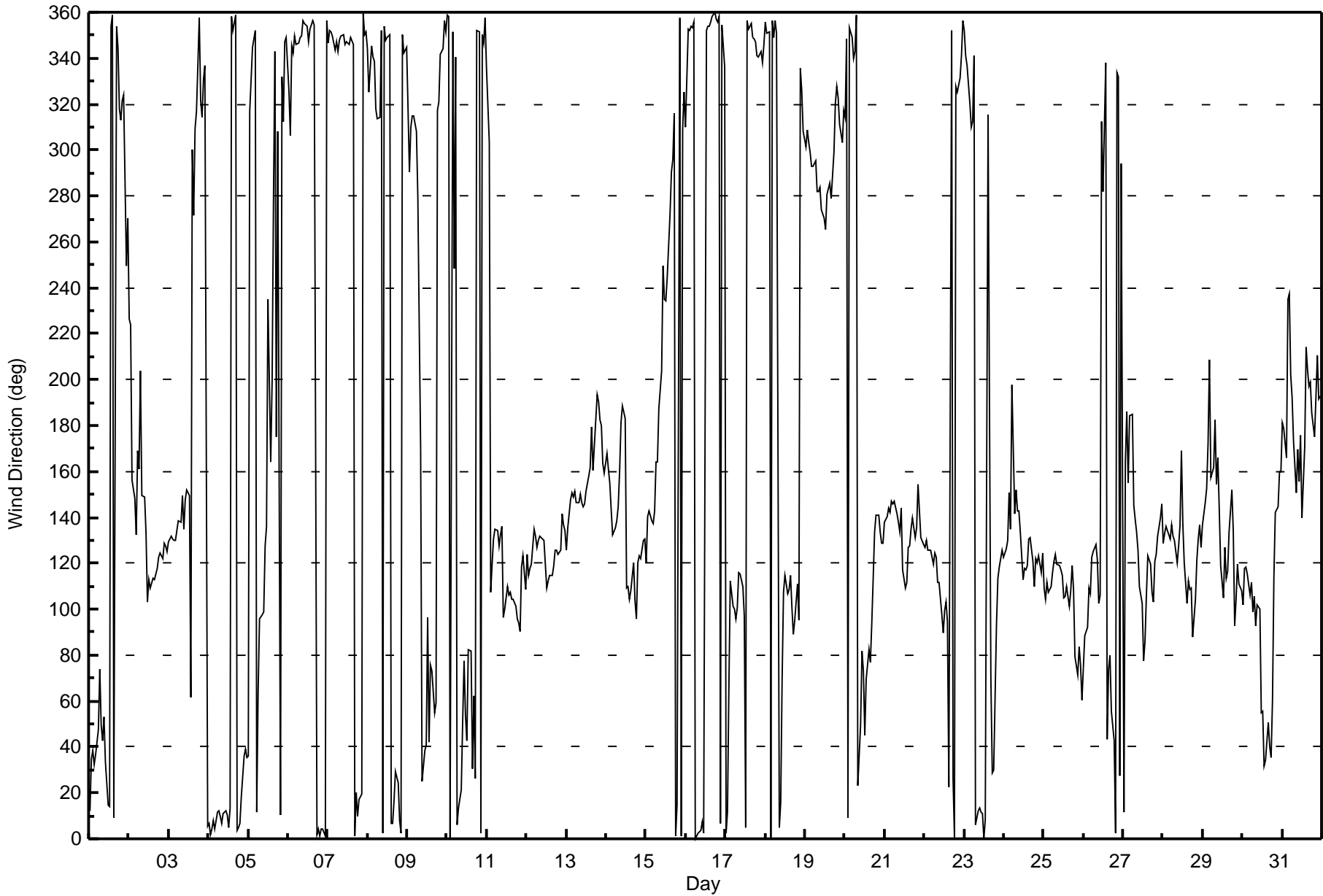
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Patricia McInnes - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 93 deg on Mar 27 00:00 Minimum Value: 6 deg on Mar 5 22:00 Percentiles: P ₁ = 8 P ₁₀ = 11 Q ₁ = 12 Median = 15 Q ₃ = 20 P ₉₀ = 32 P ₉₉ = 82																			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-Mar	10	13	11	11	9	13	15	16	15	28	33	29	35	29	24	20	16	12	9	11	9	8	41	17	41
2-Mar	29	49	24	23	20	16	34	41	18	14	32	32	17	17	18	16	12	11	12	12	12	12	12	13	49
3-Mar	11	12	11	12	13	13	15	15	17	31	13	15	24	43	23	18	11	19	14	16	12	11	13	14	43
4-Mar	12	14	14	13	13	14	13	13	14	13	13	16	15	13	16	14	16	14	12	12	16	12	11	11	16
5-Mar	23	20	9	9	11	12	32	16	15	18	23	33	86	42	75	60	85	83	43	12	22	6	19	13	86
6-Mar	65	48	17	11	12	8	12	13	13	14	15	15	13	15	16	16	15	16	15	15	15	15	14	14	65
7-Mar	12	15	14	13	11	13	11	13	14	15	15	14	15	18	14	13	19	12	12	13	11	21	12	12	21
8-Mar	12	15	10	10	8	20	6	44	14	20	35	29	20	21	24	24	19	12	11	14	14	13	14	9	44
9-Mar	14	23	7	8	12	7	64	32	71	41	19	68	75	88	49	33	20	25	68	45	15	16	15	18	88
10-Mar	11	10	10	19	65	17	32	15	21	36	37	44	44	84	88	32	26	37	11	10	14	10	11	15	88
11-Mar	14	25	46	13	13	12	13	14	15	18	19	19	17	19	22	21	19	15	11	10	9	15	13	10	46
12-Mar	11	13	15	15	14	12	13	14	14	15	16	16	15	15	15	14	15	13	12	11	11	13	12	12	16
13-Mar	11	13	15	11	12	12	13	12	12	12	13	13	17	17	14	14	13	13	11	12	10	11	10	11	17
14-Mar	11	11	10	8	9	13	15	15	15	10	13	15	24	21	28	31	15	10	14	14	12	12	14	12	31
15-Mar	11	19	13	11	10	15	25	16	16	20	14	14	37	20	15	14	12	12	16	14	13	23	10	9	37
16-Mar	7	21	12	14	15	15	13	14	14	15	15	16	14	15	15	15	15	13	15	14	12	16	25	25	
17-Mar	16	20	47	16	15	12	18	16	14	17	18	31	20	17	15	17	13	14	12	10	9	10	10	11	47
18-Mar	13	16	15	14	13	12	14	12	18	14	24	15	16	16	14	16	14	11	14	31	37	9	11	10	37
19-Mar	10	11	11	13	13	14	13	13	15	15	16	20	14	17	17	15	16	16	12	10	12	12	11	15	20
20-Mar	12	25	14	15	12	10	14	21	28	28	26	38	36	27	29	69	21	18	13	11	12	11	13	11	69
21-Mar	12	13	12	14	13	12	14	15	15	16	18	15	13	16	15	15	14	14	14	16	14	14	14	14	18
22-Mar	13	13	12	12	12	12	12	14	14	15	15	15	18	16	15	37	15	21	23	11	9	13	10	15	37
23-Mar	14	12	11	12	11	18	13	17	15	14	18	38	58	66	89	61	49	12	19	29	18	13	13	12	89
24-Mar	13	13	14	14	30	46	37	11	18	20	20	21	18	14	16	14	13	13	11	14	13	15	14	14	46
25-Mar	13	13	16	12	12	13	13	13	14	12	12	19	23	15	18	16	26	21	20	14	22	11	16	24	26
26-Mar	24	14	22	20	13	15	15	15	16	31	53	28	17	26	39	20	23	22	17	35	10	10	57	93	93
27-Mar	56	51	46	15	18	70	12	15	15	23	25	26	36	28	24	18	14	12	11	13	11	12	9	9	70
28-Mar	9	11	12	12	11	10	10	14	12	14	16	25	31	51	21	16	15	13	11	11	12	12	14	19	51
29-Mar	18	8	9	18	27	18	18	17	17	25	32	30	25	32	30	21	15	13	17	17	17	13	14	13	32
30-Mar	13	22	13	14	14	14	12	16	13	17	26	27	29	48	31	35	39	35	63	23	33	34	16	21	63
31-Mar	16	11	19	26	31	25	14	20	14	20	24	28	25	37	13	16	15	14	12	11	15	14	14	12	37
	65	51	47	26	65	70	64	44	71	41	53	68	86	88	89	69	85	83	68	45	37	34	57	93	
Diurnal Maximum																									





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 8, 2017	Last Calibration	February 3, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	12:25	End Time (MST)	15:45
Gas Cert Reference	LL107926	Station temp.	21 Deg C
Cal Gas Concentration	50.8 ppm	Cal Gas Exp Date	February-16-19
Calibrator Make/Model	Teledyne API T700	Serial Number	2449
ZAG Make/Model	Teledyne API 701	Serial Number	260
DACS make/model	Campbell Scientific CR3000	DACS serial No.	10957

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-678	-678
Analyzer IP address	192.168.1.43		Lamp voltage	764	763
Calculated slope	0.997174	0.998302	Chamber temp	44.9	45.0
Calculated intercept	2.411377	1.487864	Pressure	706.1	709.4
Analyzer Background	6.0	5.9	Flow	0.449	0.451
Analyzer Coefficient	1.141	1.129	Intensity	90	90
Analyzer make			Thermo 43i		
Analyzer serial #			1008841397		

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5542	0.0	0.0	0.1	----
as found span	5542	84.1	770.9	776.1	0.993
calibrator zero	5542	0.0	0.0	0.6	----
high point	5542	84.1	770.9	771.8	0.999
second point	5542	42.1	385.9	383.8	1.005
third point	5542	21.1	193.4	190.3	1.016
as left zero	5542	0.0	0.0	0.6	----
as left span	5542	84.1	770.9	767.0	1.005
Average Correction Factor					1.007

Corrected As found 775.9 Previous response 770.7 % change -0.7%

Notes:

Inlet filter changed after as founds.Span adjusted.

Calibration Performed By:

Devin Russell



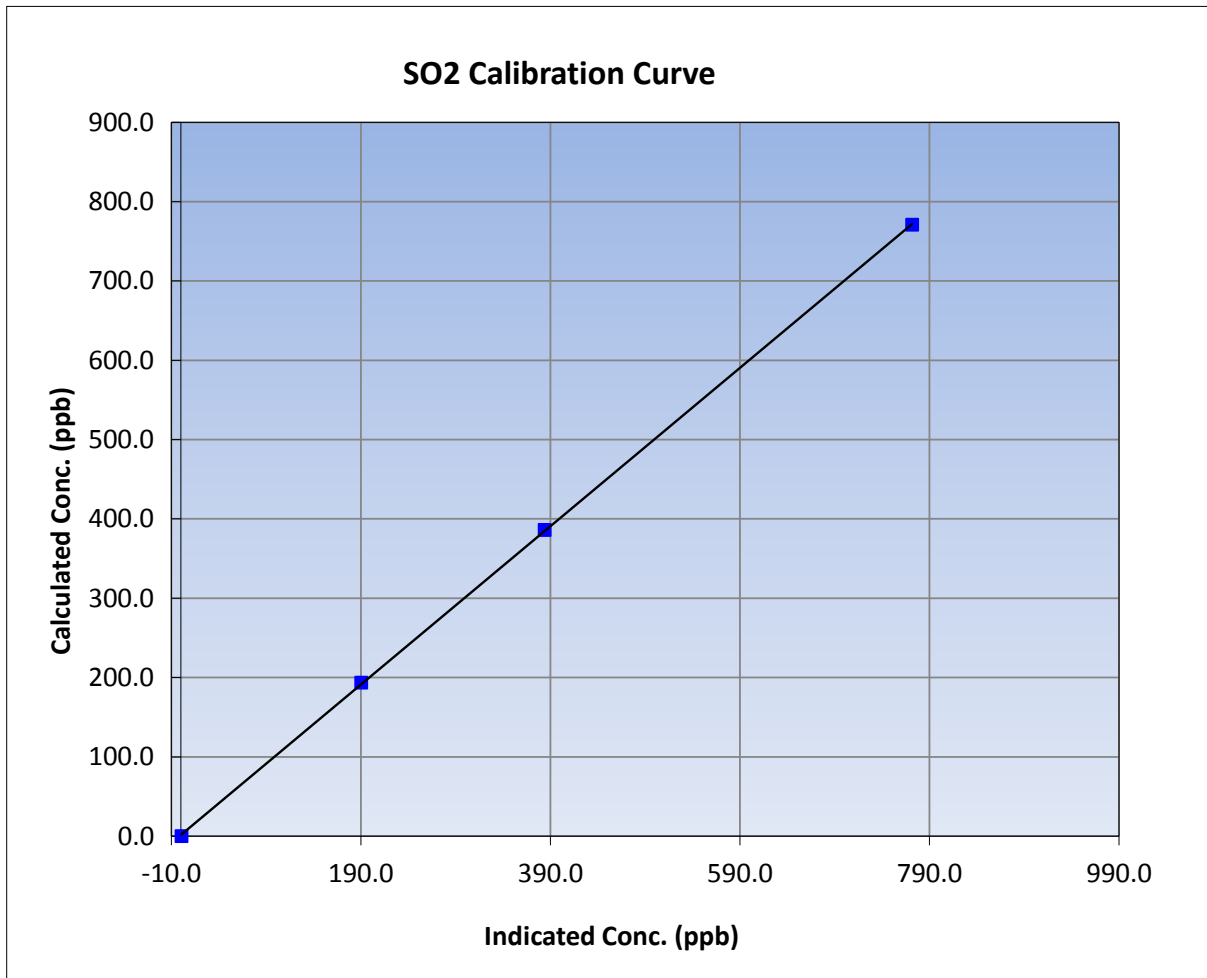
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 8, 2017	Previous Calibration	February 3, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	12:25	End Time (MST)	15:45
Analyzer make	Thermo 43i	Analyzer serial #	1008841397

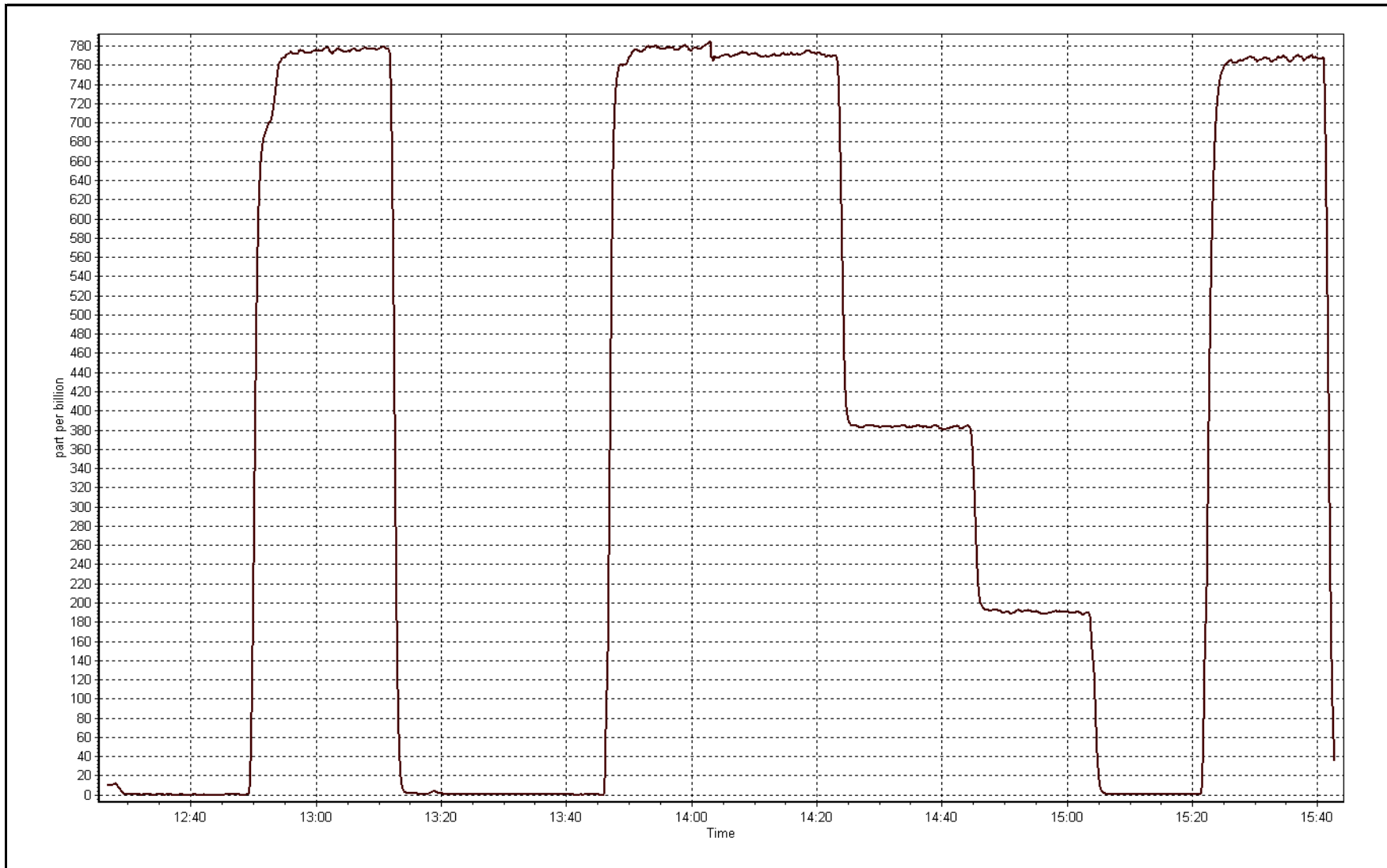
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	----	Correlation Coefficient	0.999967
770.9	771.8	0.9988		
385.9	383.8	1.0054	Slope	0.998302
193.4	190.3	1.0162		
			Intercept	1.487864



SO2 Calibration Plot

Date: March 8, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	March 9, 2017	Last Calibration	NA
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Install		
Start Time (MST)	9:10	End Time (MST)	15:25
Gas Cert Reference	SA5551	Station temp.	22 Deg C
Cal Gas Concentration	5.28 ppm	Cal Gas Exp Date	2/13/18
Calibrator Make/Model	Teledyne API T700	Serial Number	2449
Dil air Make/Model	Teledyne API 701H	Serial Number	201
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036
SO2 gas concentration	49.8 ppm	SO2 gas cert/exp	LL107926 6/Feb/19

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	NA	-601
Analyzer IP address	192.168.1.44		Lamp voltage	NA	1010
Calculated slope	0.986419	0.995261	Chamber temp	NA	45
Calculated intercept	0.306123	-0.005962	Pressure	NA	713.3
Analyzer Background	NA	1.12	Flow	NA	0.444
Analyzer Coefficient	NA	1.116	Intensity	NA	90
			Converter temp.	NA	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1410661331
Converter make/model	CDN-101	Converter serial #	520

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
SO2 scrubber check	5542	21.1	189.6	0.5	----
calibrator zero	5542	0.0	0.0	0.1	----
high point	5542	73.1	69.6	70.0	0.995
second point	5542	41.8	39.8	40.1	0.994
third point	5542	20.9	19.9	19.8	1.005
as left zero	5542	0.0	0.0	0.3	----
as left span	5542	73.1	69.6	69.6	1.001
Average Correction Factor					0.998

Corrected As found NA Previous response NA % change NA

Notes:

Installation calibration. Span required a large adjustment. Scrubber check completed after third point.

Calibration Performed By:

Devin Russell



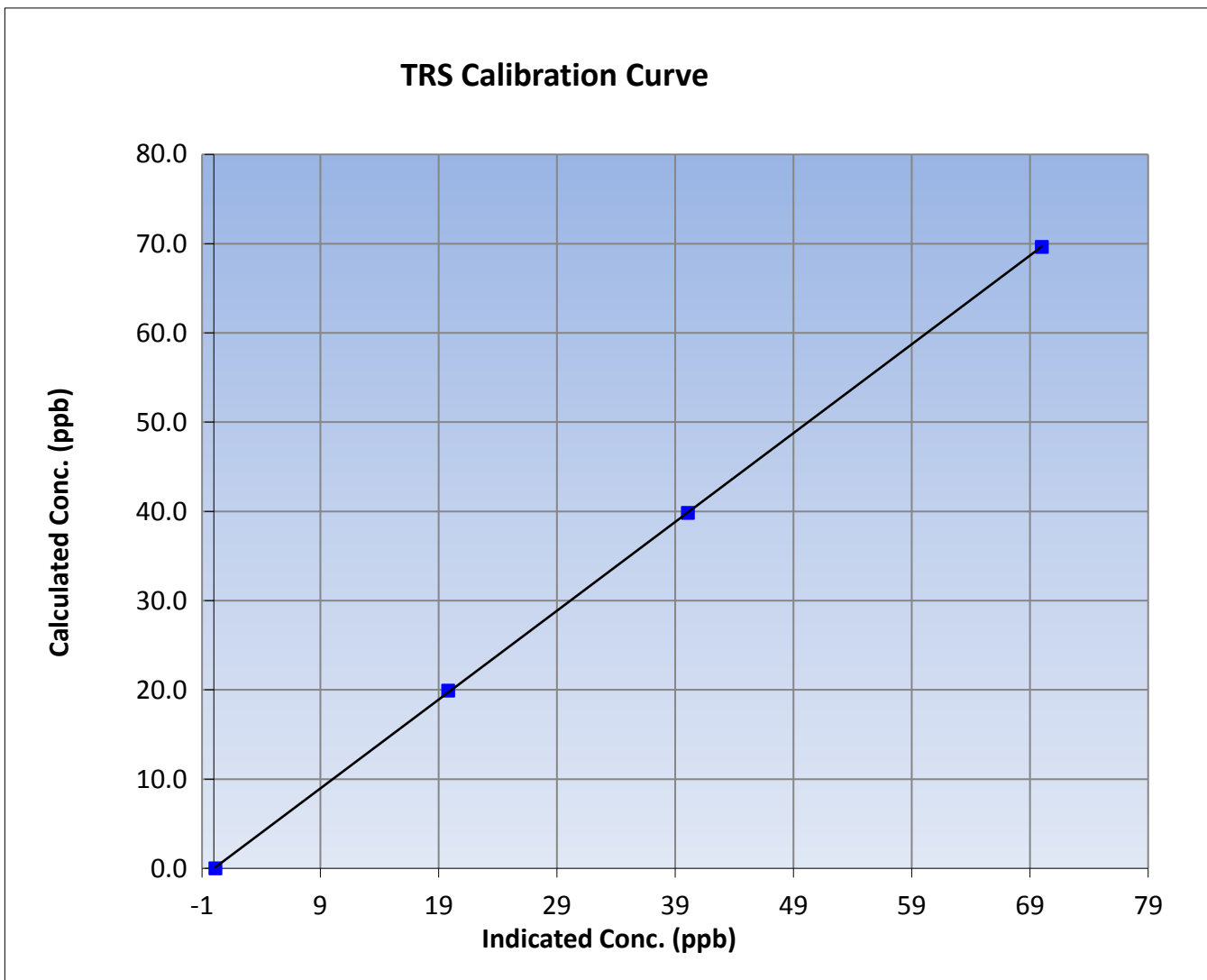
Wood Buffalo Environmental Association TRS Calibration Report

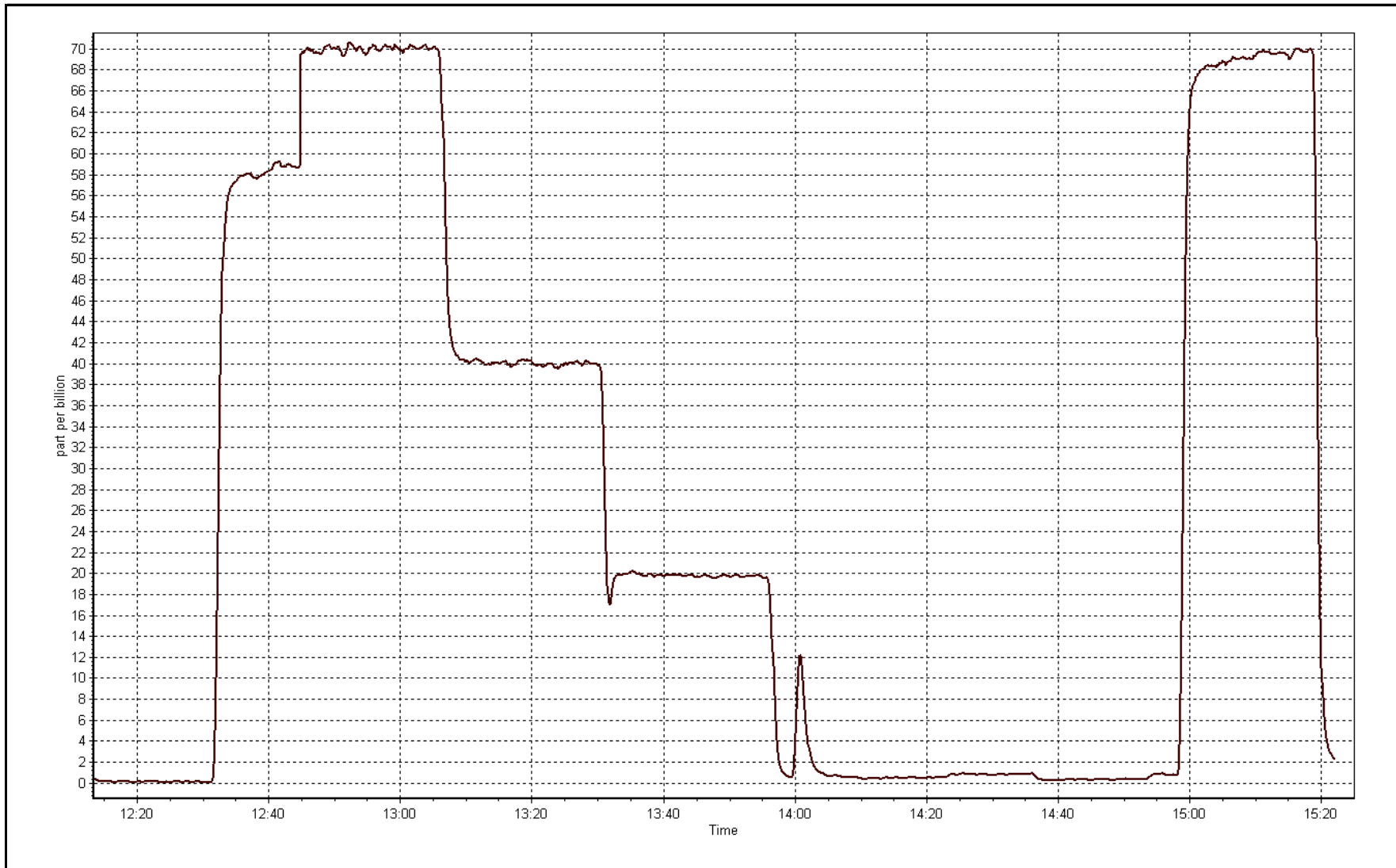
Station Information

Calibration Date	March 9, 2017	Previous Calibration	NA
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:10	End Time (MST)	15:25
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1410661331

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999978
69.6	70.0	0.9948		
39.8	40.1	0.9939	Slope	0.995261
19.9	19.8	1.0051		
			Intercept	-0.005962







Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	March 9, 2017	Last Calibration	February 7, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Removal		
Start Time (MST)	9:10	End Time (MST)	11:20
Gas Cert Reference	SA5551	Station temp.	22 Deg C
Cal Gas Concentration	5.28 ppm	Cal Gas Exp Date	2/13/18
Calibrator Make/Model	Teledyne API T700	Serial Number	2449
Dil air Make/Model	Teledyne API 701H	Serial Number	201
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036
SO2 gas concentration	49.8 ppm	SO2 gas cert/exp	LL107926 6/Feb/19

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-720	NA
Analyzer IP address	192.168.1.44		Lamp voltage	1005	NA
Calculated slope	0.986419	0.988990	Chamber temp	45	NA
Calculated intercept	0.306123	0.230038	Pressure	686.0	NA
Analyzer Background	2.48	NA	Flow	0.429	NA
Analyzer Coefficient	1.124	NA	Intensity	90	NA
			Converter temp.	800	NA
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153358	
Converter make/model	CDN-101		Converter serial #	520	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5542	0.0	0.0	-0.3	----
as found span	5542	73.1	69.6	70.1	0.994
SO2 scrubber check	5542	21.1	189.6	0.2	----
calibrator zero	5542	0.0	0.0	-0.3	----
high point	5542	73.1	69.6	70.1	0.994
second point	5542	41.8	39.8	40.3	0.989
third point	5542	20.9	19.9	19.8	1.007
as left zero					
as left span					
Average Correction Factor					0.996

Corrected As found	70.3	Previous response	70.3	% change	0.0%
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Notes:

Removal calibration. Removed to undergo maintenance at the FOC. Scrubber check completed after third point.

Calibration Performed By:

Devin Russell



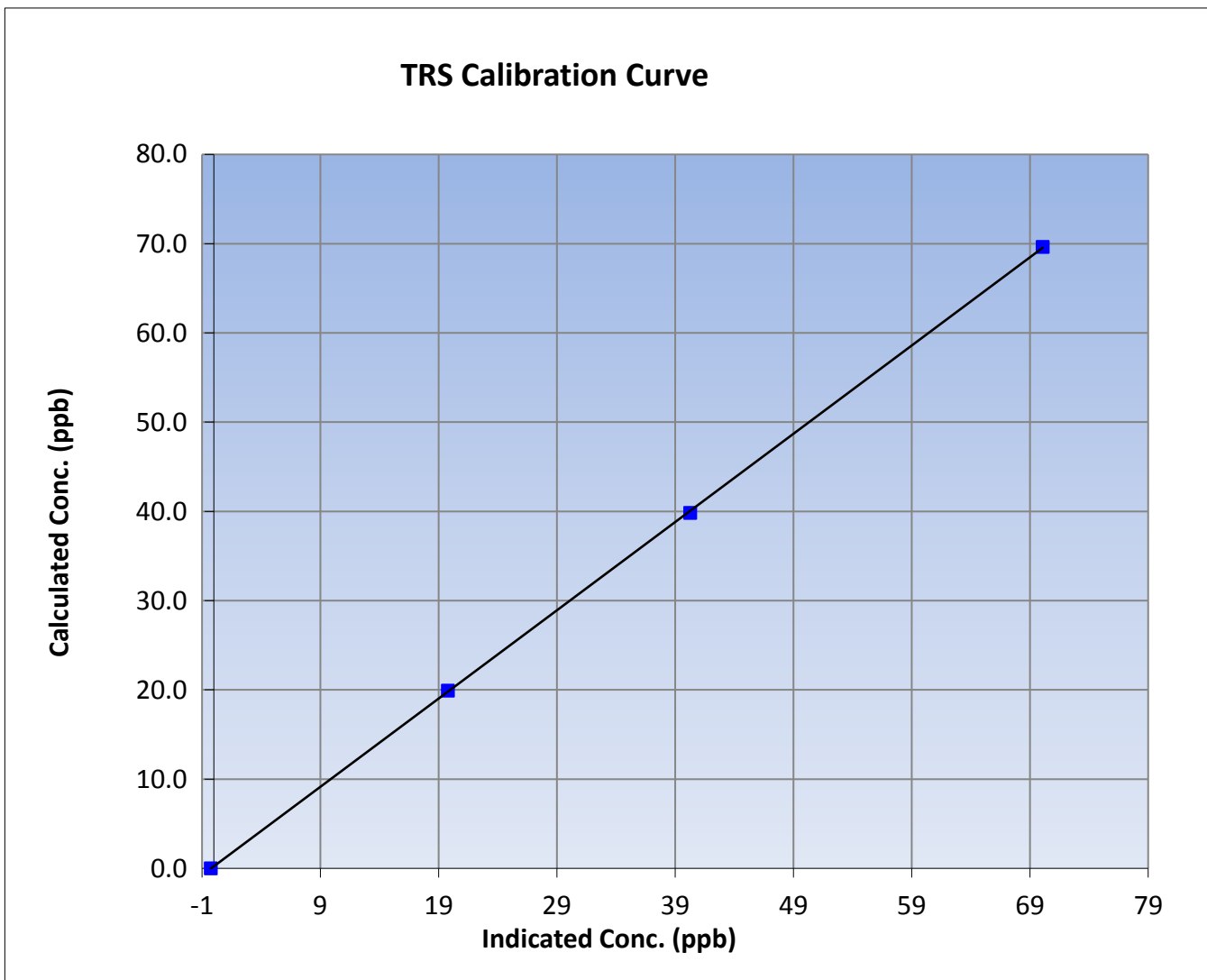
Wood Buffalo Environmental Association TRS Calibration Report

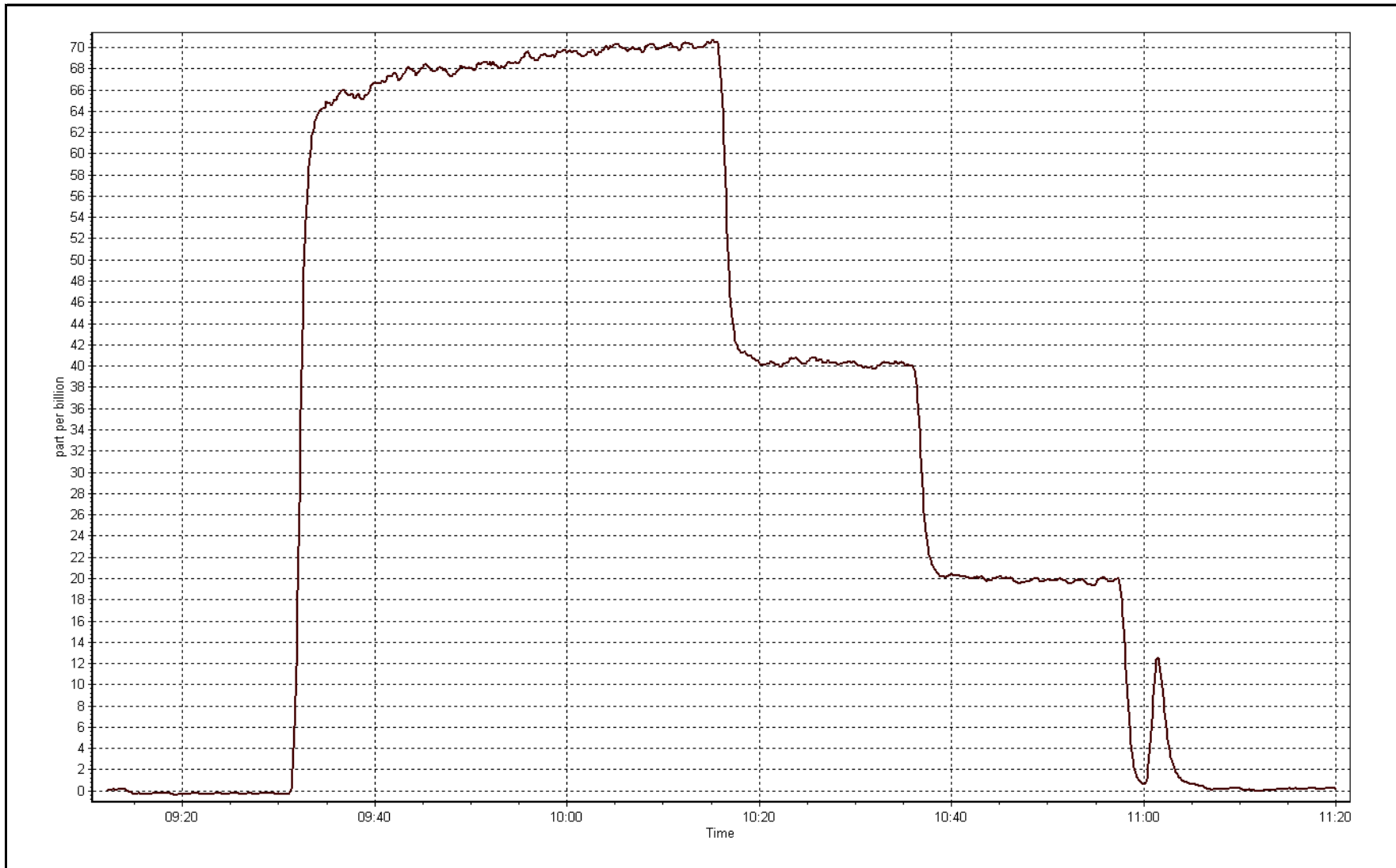
Station Information

Calibration Date	March 9, 2017	Previous Calibration	February 7, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:10	End Time (MST)	11:20
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153358

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999968
69.6	70.1	0.9938		
39.8	40.3	0.9887	Slope	0.988990
19.9	19.8	1.0067		
			Intercept	0.230038







Wood Buffalo Environmental Association THC / NMHC Calibration Report

version 02-2017

Station Information

Calibration Date	March 8, 2017	Last Calibration	February 3, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	12:25	End Time (MST)	15:45
Gas Cert Reference	LL107926	Cal Gas Expiry Date	February-16-19
CH4 Cal Gas Conc.	505.0 ppm	CH4 Equiv Conc.	1068.8 ppm
C3H8 Cal Gas Conc.	205.0 ppm	Station temp.	21 Deg C
Calibrator Model	Teledyne API T700	Serial Number	2449
ZAG make/model	Teledyne API 701	Serial Number	260
DACS make/model	Campbell Scientific CR3000	Serial Number	10957

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.3
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.1
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	1.004734	0.996683	Carrier Pressure	35.8	35.8
THC Calc intercept	0.058353	0.059972	Fuel Pressure	42.3	42.3
NMHC Calc slope	1.003957	0.995815	Air Pressure	32.4	32.4
NMHC Calc intercept	0.026297	0.024100			

Analyzer make Thermo 55i Analyzer serial # 1331259521

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5542	0.0	0.00	0.00	----
as found span	5542	84.1	16.22	16.12	1.006
calibrator zero	5542	0.0	0.00	0.00	----
high point	5542	84.1	16.22	16.25	0.998
second point	5542	42.1	8.12	8.03	1.011
third point	5542	21.1	4.07	3.98	1.022
as left zero	5542	0.0	0.00	0.00	----
as left span	5542	84.1	16.22	16.21	1.001
Average Correction Factor					1.010

Corrected As found 16.12 Previous response 16.08 % change -0.2%

Notes:

Inlet filter changed after as founds. N2 cylinder changed after as founds. Span adjusted slightly.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5542	0	0.00	0.00	----
as found span	5542	84.1	8.55	8.54	1.002
calibrator zero	5542	0.0	0.00	0.00	----
high point	5542	84.1	8.55	8.58	0.997
second point	5542	42.1	4.28	4.26	1.005
third point	5542	21.1	2.15	2.11	1.017
as left zero	5542	0.0	0.00	0.00	----
as left span	5542	84.1	8.55	8.58	0.997
Average Correction Factor					1.007

Corrected As found 8.54 Previous response 8.49 % change -0.5%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5542	0	0.00	0.00	----
as found span	5542	84.1	7.66	7.59	1.010
calibrator zero	5542	0.0	0.00	0.00	----
high point	5542	84.1	7.66	7.66	1.000
second point	5542	42.1	3.84	3.76	1.020
third point	5542	21.1	1.92	1.87	1.028
as left zero	5542	0.0	0.00	0.00	----
as left span	5542	84.1	7.66	7.63	1.004
Average Correction Factor					1.016

Corrected As found 7.59 Previous response 7.59 % change 0.0%



Wood Buffalo Environmental Association

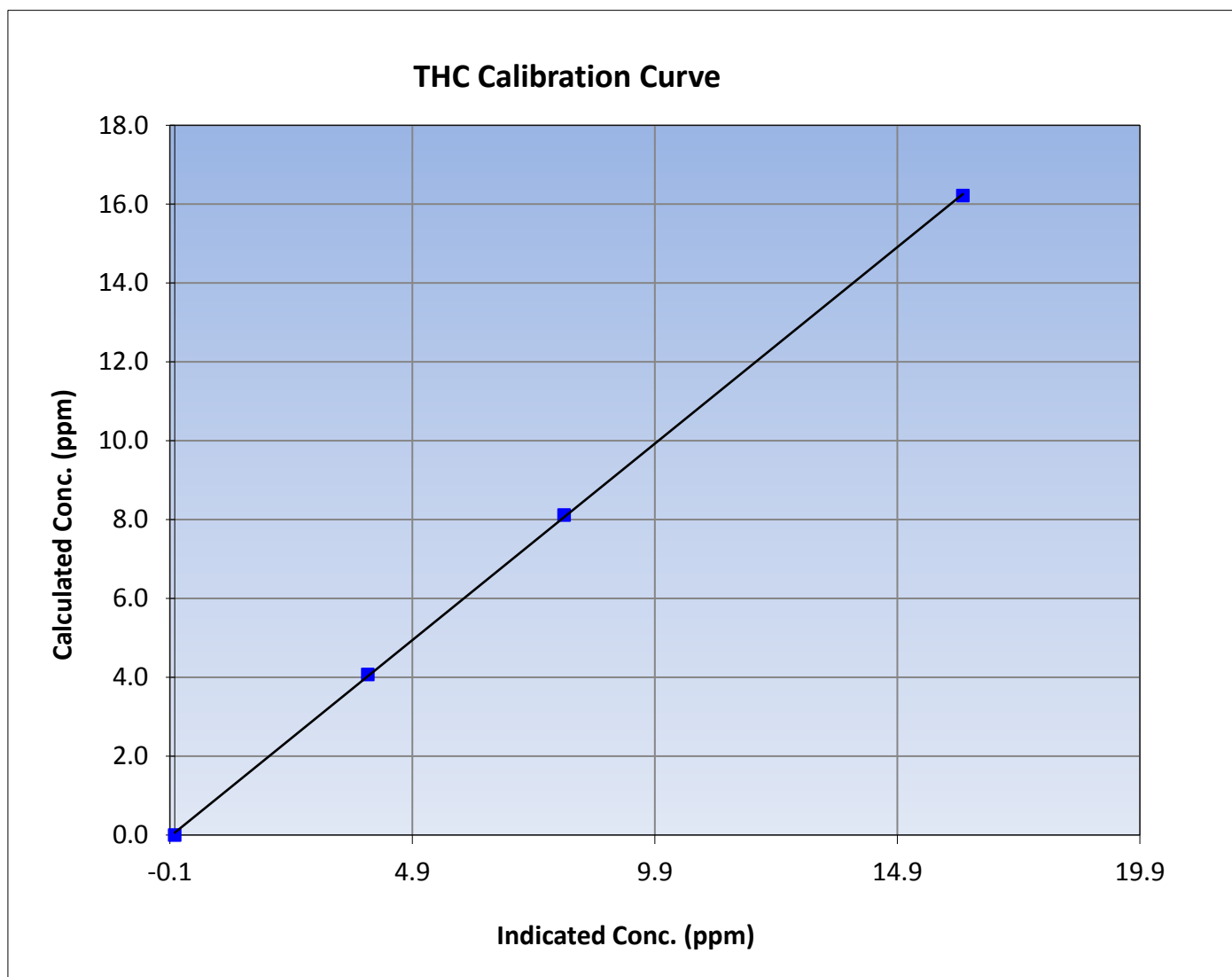
THC Calibration Summary

Station Information

Calibration Date	March 8, 2017	Previous Calibration	February 3, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	12:25	End Time (MST)	15:45
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999931
16.22	16.25	0.9980		
8.12	8.03	1.0111	Slope	0.996683
4.07	3.98	1.0224		
			Intercept	0.059972





Wood Buffalo Environmental Association

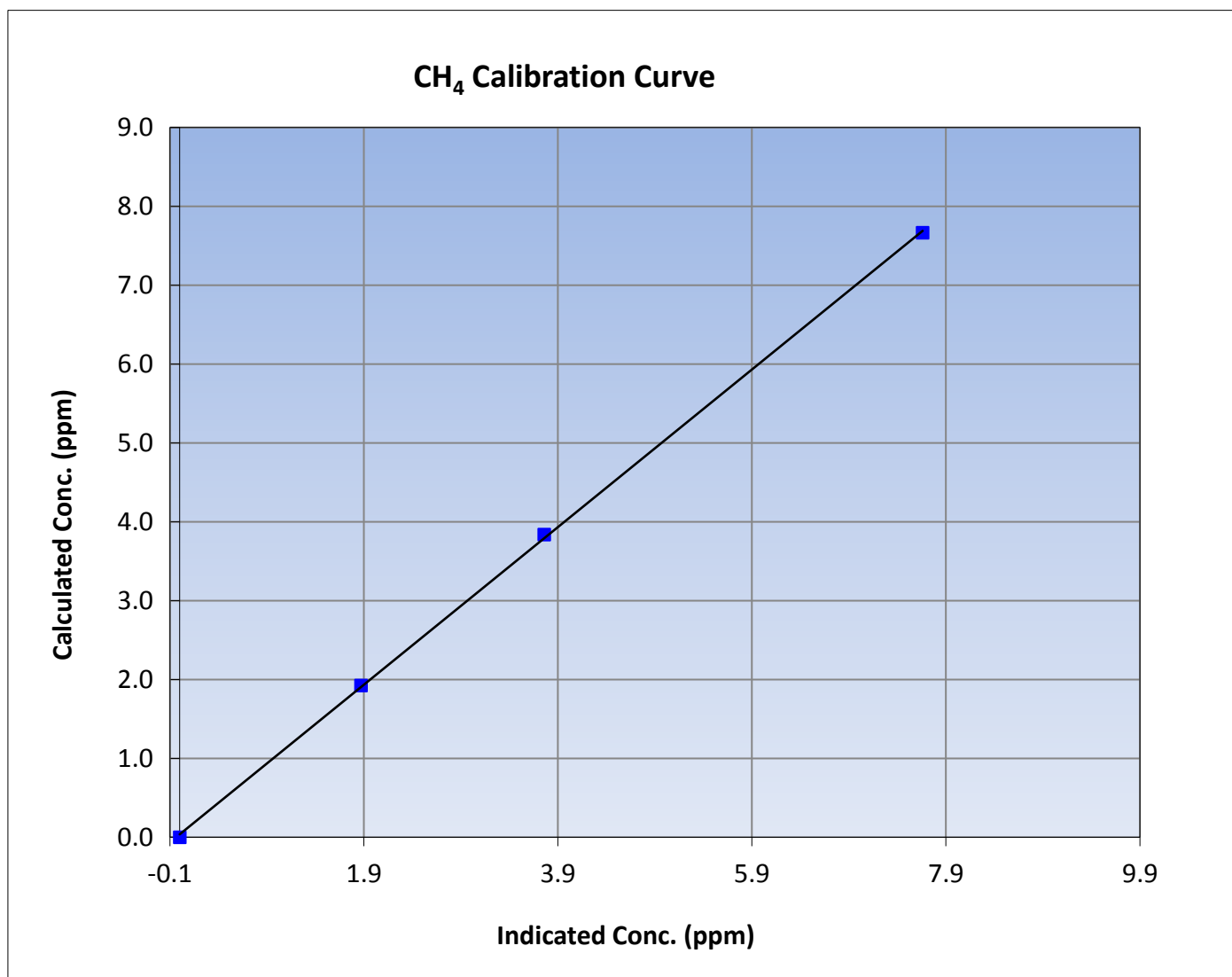
CH₄ Calibration Summary

Station Information

Calibration Date	March 8, 2017	Previous Calibration	February 3, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	12:25	End Time (MST)	15:45
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999869
7.66	7.66	1.0004		
3.84	3.76	1.0203	Slope	0.999115
1.92	1.87	1.0282		
			Intercept	0.036021





Wood Buffalo Environmental Association

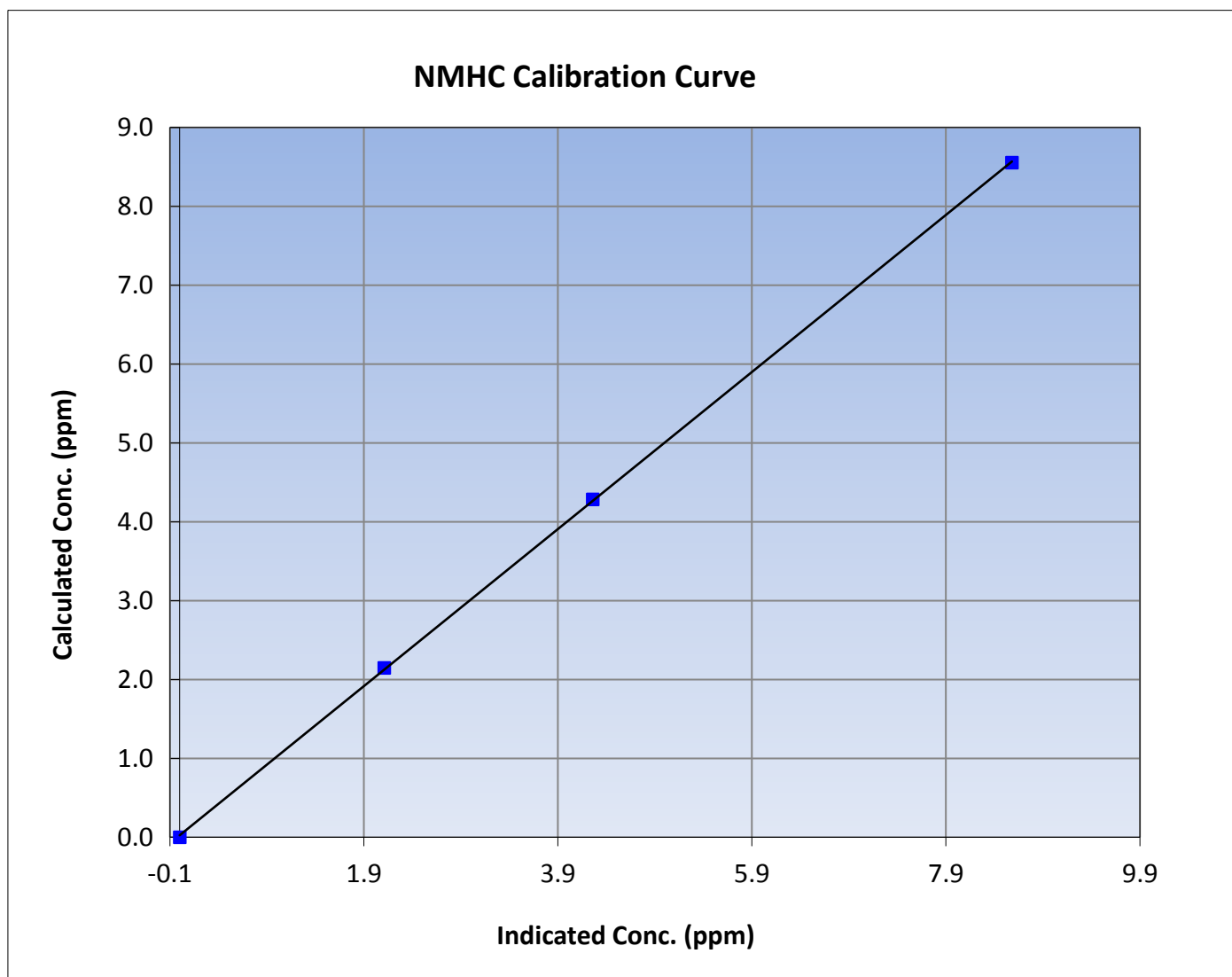
NMHC Calibration Summary

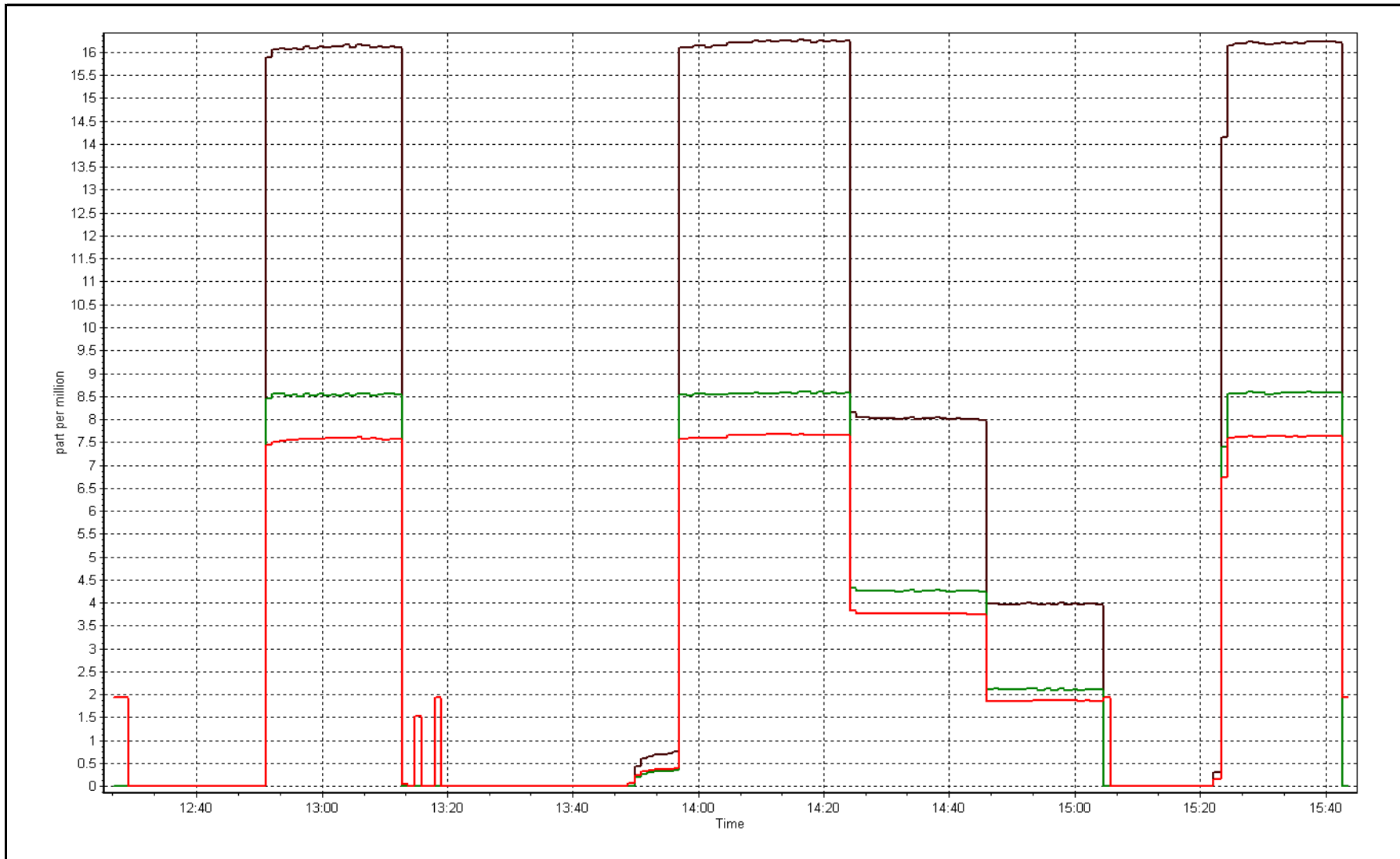
Station Information

Calibration Date	March 8, 2017	Previous Calibration	February 3, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	12:25	End Time (MST)	15:45
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999963
8.55	8.58	0.9971		
4.28	4.26	1.0053	Slope	0.995815
2.15	2.11	1.0172		
			Intercept	0.024100







Wood Buffalo Environmental Association THC / NMHC Calibration Report

version 02-2017

Station Information

Calibration Date	March 24, 2017	Last Calibration	March 8, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	<input type="checkbox"/> Other: <input type="checkbox"/> Repair		
Start Time (MST)	8:37	End Time (MST)	13:34
Gas Cert Reference	LL107926	Cal Gas Expiry Date	February-16-19
CH4 Cal Gas Conc.	505.0 ppm	CH4 Equiv Conc.	1068.8 ppm
C3H8 Cal Gas Conc.	205.0 ppm	Station temp.	21 Deg C
Calibrator Model	Teledyne API T700	Serial Number	2449
ZAG make/model	Teledyne API 701	Serial Number	260
DACS make/model	Campbell Scientific CR3000	Serial Number	10957

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	347.3	405.0
THC Calc slope	0.996683	0.994086	Carrier Pressure	35.8	35.8
THC Calc intercept	0.059972	0.065895	Fuel Pressure	42.3	42.3
NMHC Calc slope	0.995815	0.998343	Air Pressure	32.4	32.4
NMHC Calc intercept	0.024100	0.022138			

Analyzer make Thermo 55i Analyzer serial # 1331259521

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5542	0.0	0.00	0.00	----
as found span	5542	84.1	16.22	15.97	1.016
calibrator zero	5542	0.0	0.00	0.00	----
high point	5542	84.1	16.22	16.29	0.996
second point	5542	42.1	8.12	8.04	1.010
third point	5542	21.1	4.07	3.98	1.022
as left zero	5542	0.0	0.00	0.00	----
as left span	5542	84.1	16.22	16.36	0.991
Average Correction Factor					1.009

Corrected As found 15.97 Previous response 16.21 % change 1.5%

Notes:

Baseline is dipping; Actuator replaced, flame sensor not reading properly and was replaced, Lines coming from the pump were black inside and rubbing on the pump cable- they were also replaced; zero and span adjusted. RT before repairs around 12.5 after repairs around 12.1

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5542	0	0.00	0.00	----
as found span	5542	84.1	8.55	8.39	1.020
calibrator zero	5542	0.0	0.00	0.00	----
high point	5542	84.1	8.55	8.56	0.999
second point	5542	42.1	4.28	4.25	1.008
third point	5542	21.1	2.15	2.11	1.017
as left zero	5542	0.0	0.00	0.00	----
as left span	5542	84.1	8.55	8.61	0.994
Average Correction Factor					1.008

Corrected As found 8.39 Previous response 8.57 % change 2.1%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5542	0	0.00	0.00	----
as found span	5542	84.1	7.66	7.58	1.011
calibrator zero	5542	0.0	0.00	0.00	----
high point	5542	84.1	7.66	7.73	0.991
second point	5542	42.1	3.84	3.79	1.012
third point	5542	21.1	1.92	1.87	1.028
as left zero	5542	0.0	0.00	0.00	----
as left span	5542	84.1	7.66	7.76	0.988
Average Correction Factor					1.011

Corrected As found 7.58 Previous response 7.65 % change 0.9%



Wood Buffalo Environmental Association

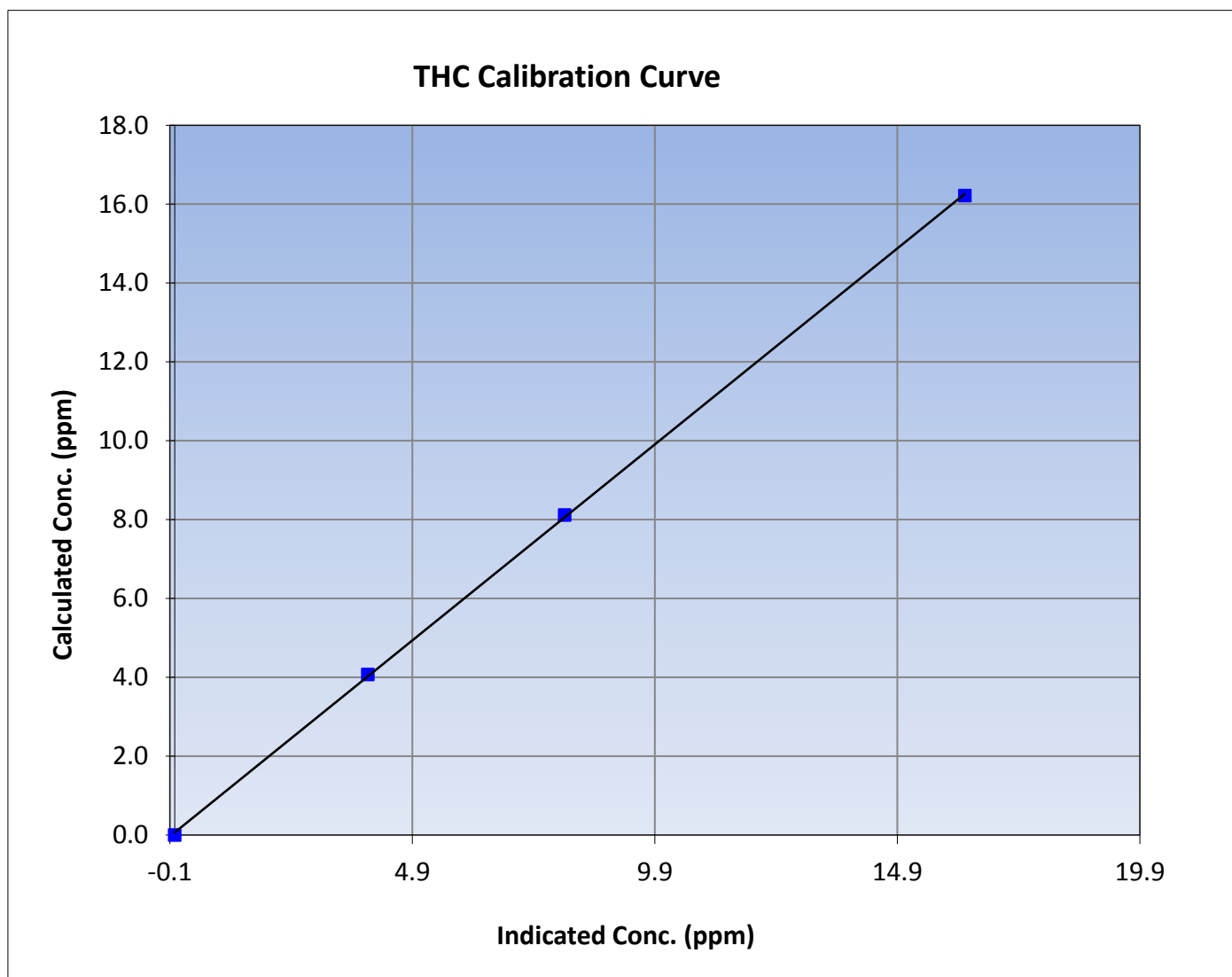
THC Calibration Summary

Station Information

Calibration Date	March 24, 2017	Previous Calibration	March 8, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:37	End Time (MST)	13:34
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999917
16.22	16.29	0.9956		
8.12	8.04	1.0098	Slope	0.994086
4.07	3.98	1.0224		
			Intercept	0.065895





Wood Buffalo Environmental Association

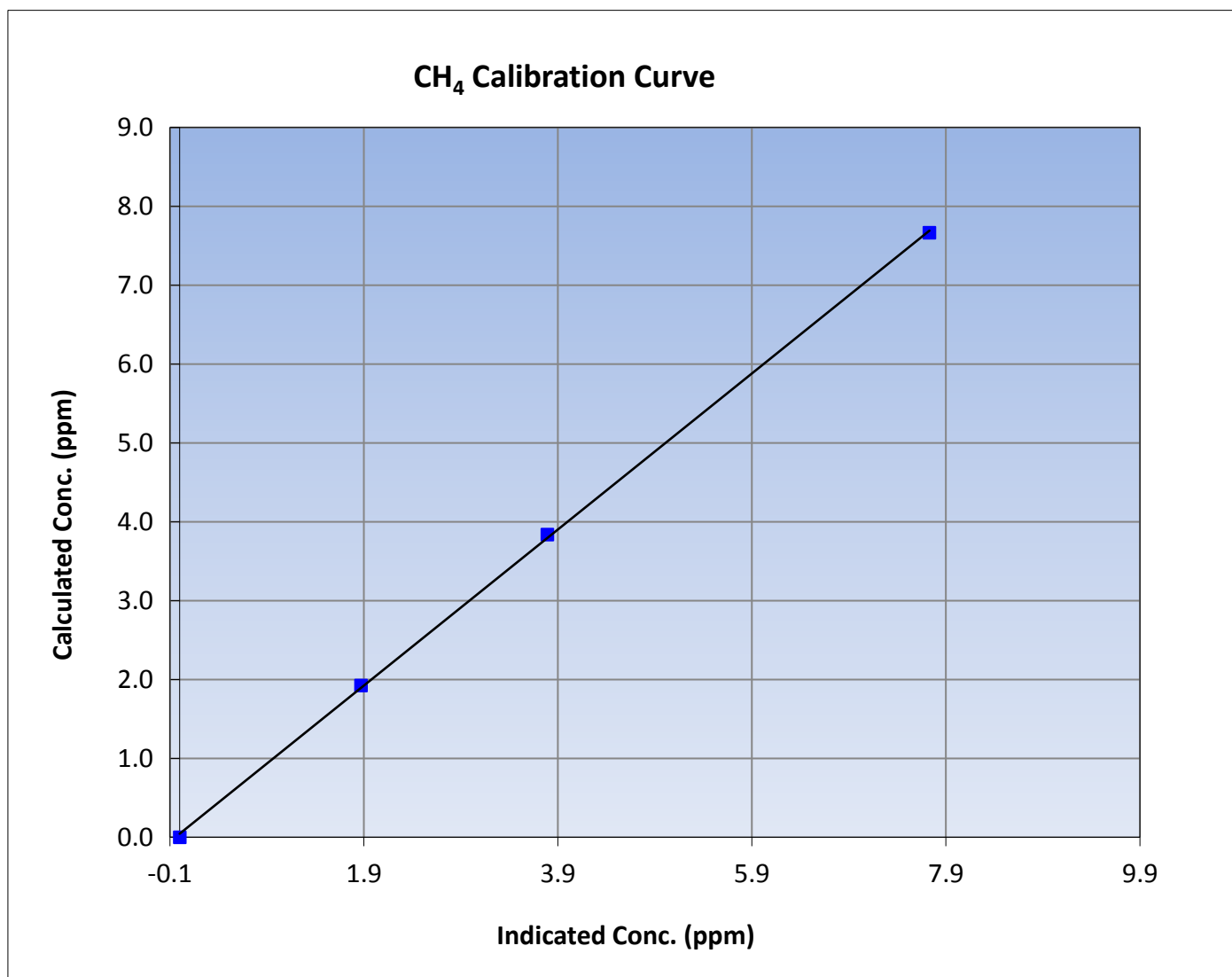
CH₄ Calibration Summary

Station Information

Calibration Date	March 24, 2017	Previous Calibration	March 8, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:37	End Time (MST)	13:34
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999833
7.66	7.73	0.9914		
3.84	3.79	1.0122	Slope	0.989348
1.92	1.87	1.0282		
			Intercept	0.043738





Wood Buffalo Environmental Association

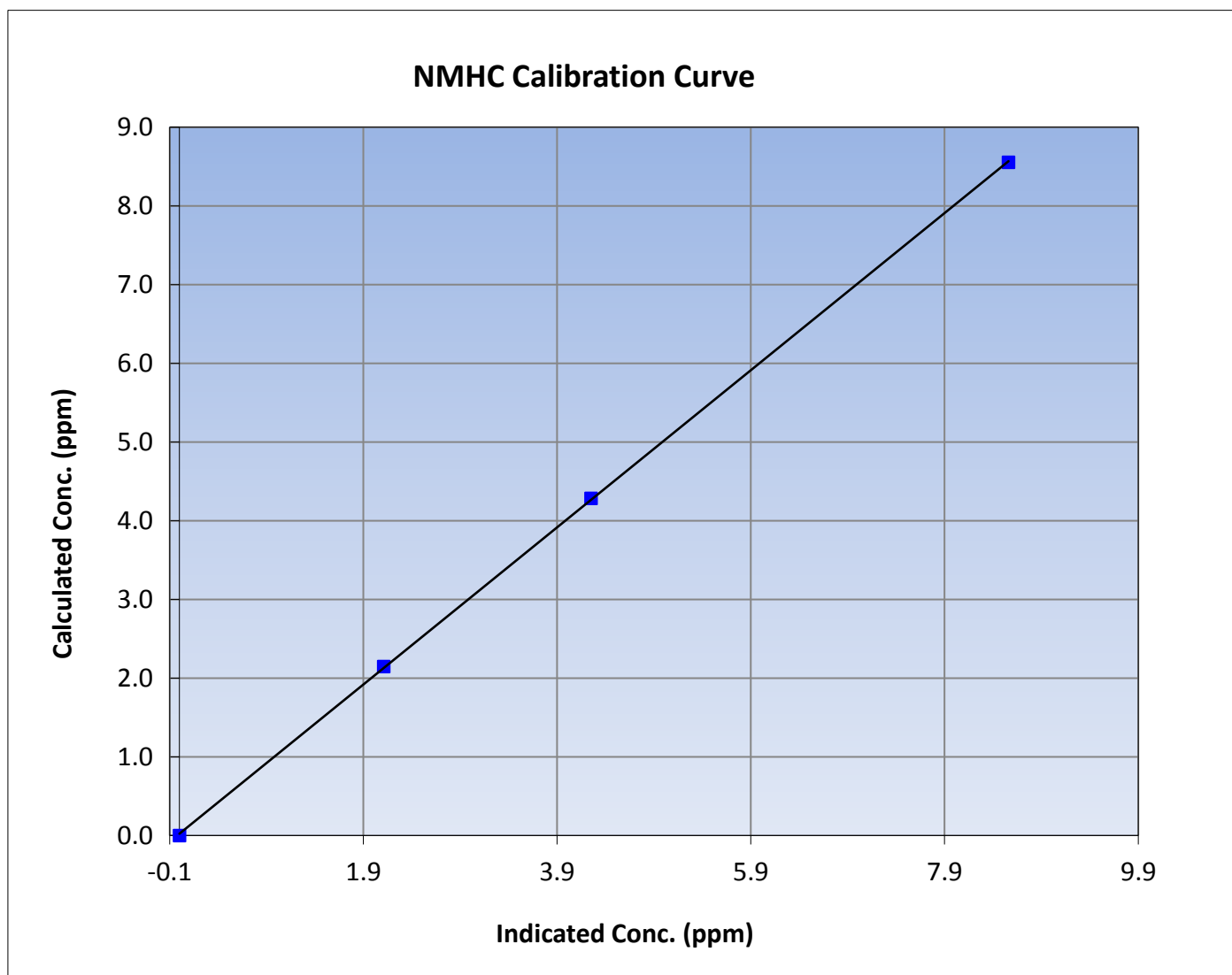
NMHC Calibration Summary

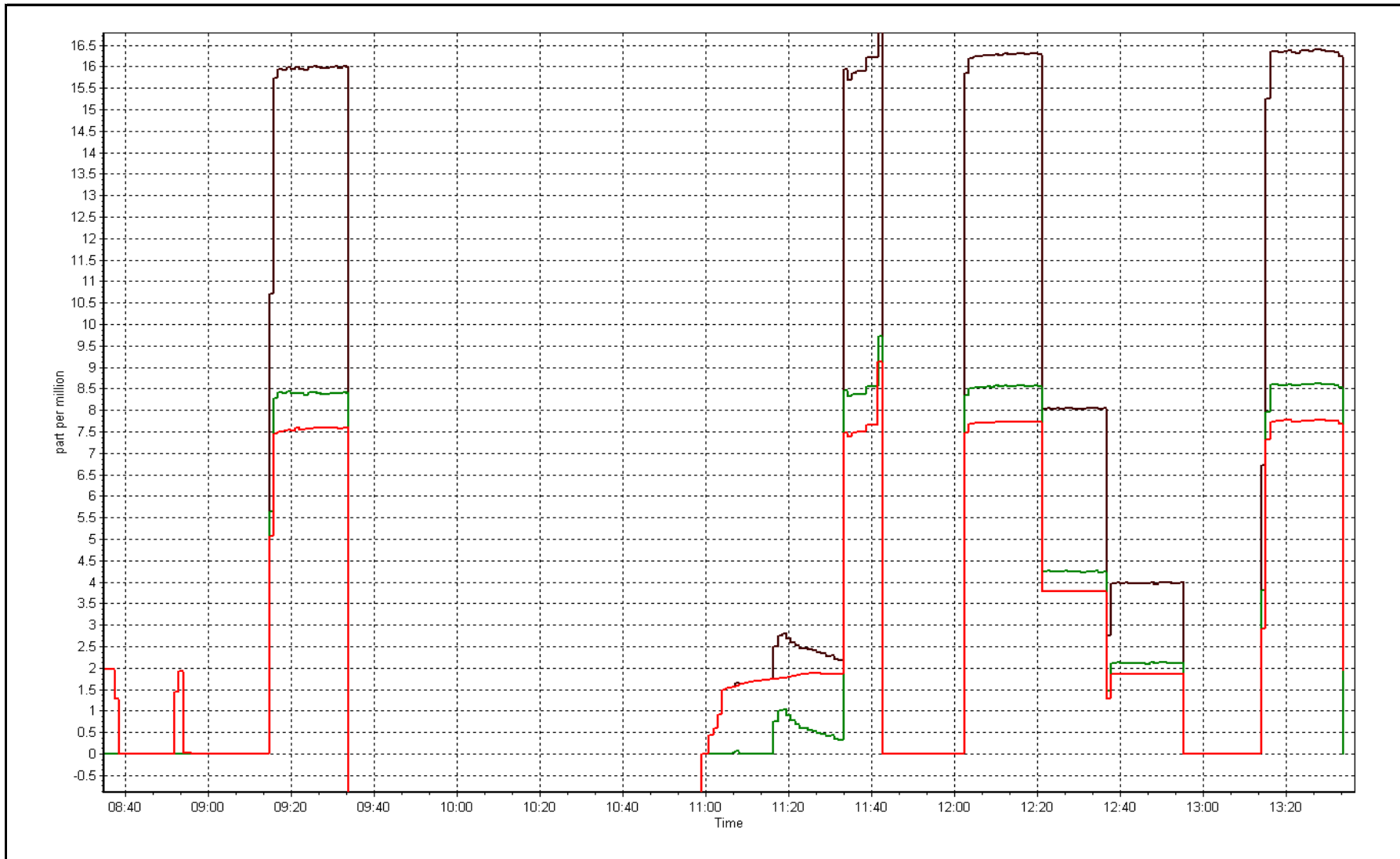
Station Information

Calibration Date	March 24, 2017	Previous Calibration	March 8, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:37	End Time (MST)	13:34
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999968
8.55	8.56	0.9994		
4.28	4.25	1.0077	Slope	0.998343
2.15	2.11	1.0172		
			Intercept	0.022138







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 6, 2017	Previous Calibration	February 3, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	13:50
NO2 GPT Ref date	NA	Transfer Standard	API T700
Calibrator Make/Model	Teledyne API T700	Station temp.	23 Deg C
ZAG make/model	Teledyne API T701	Serial Number	2449
DACS make/model	Campbell Scientific CR3000	Serial Number	260
		Serial Number	10957

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	29.9	30.7
Analyzer IP address	192.168.1.49		Lamp temp.	53.6	53.6
Calculated slope	1.000288	1.002039	Pressure	673.3	664.7
Calculated intercept	-1.468309	-2.062790	Flow cell A	0.706	0.700
Analyzer Background	-0.7	-0.7	Flow cell B	0.733	0.727
Analyzer Coefficient	0.996	0.992	Cell A Intensity	79011	78174
			Cell B Intensity	79333	78475

Analyzer make	Thermo 49i	Analyzer serial #	1300156234
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator O3 Generator Drive Voltage (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	800.0	0.0	-0.2	----
as found span	5500	1108.1	400.0	401.0	0.997
calibrator zero	5500	800.0	0.0	0.1	----
high point	5500	1108.1	400.0	400.2	0.999
second point	5500	927.7	200.0	202.6	0.987
third point	5500	823.4	100.0	103.8	0.963
as left zero	5500	800.0	0.0	0.2	----
as left span	5500	1108.1	400.0	400.0	1.000
Average Correction Factor					0.983

Corrected As found	401.2	Previous response	401.4	% change	0.0%
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Notes:

Inlet filter changed after as founds. Span adjusted slightly.

Calibration Performed By: Devin Russell



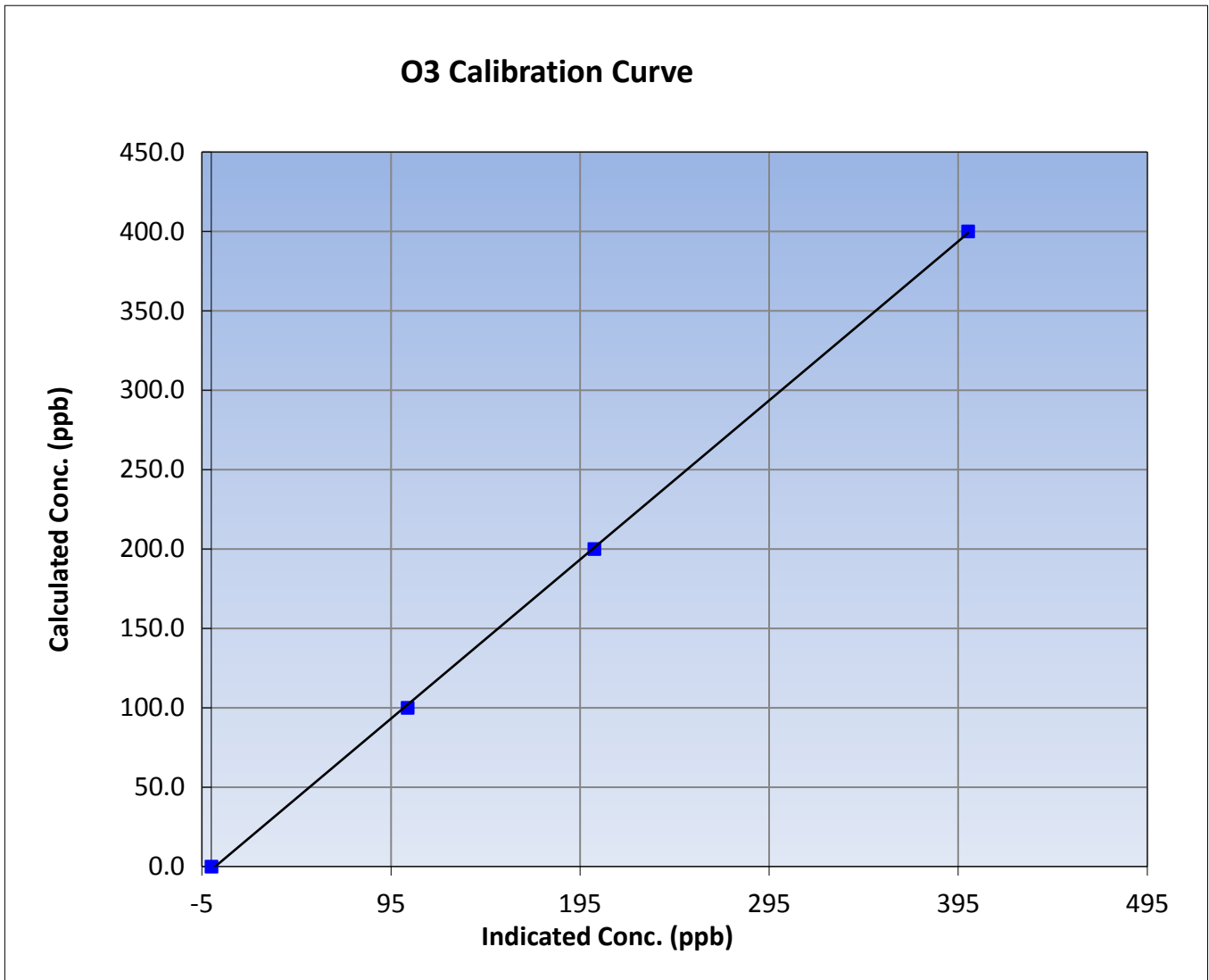
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	March 6, 2017	Previous Calibration	February 3, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	10:15	End Time (MST)	13:50
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

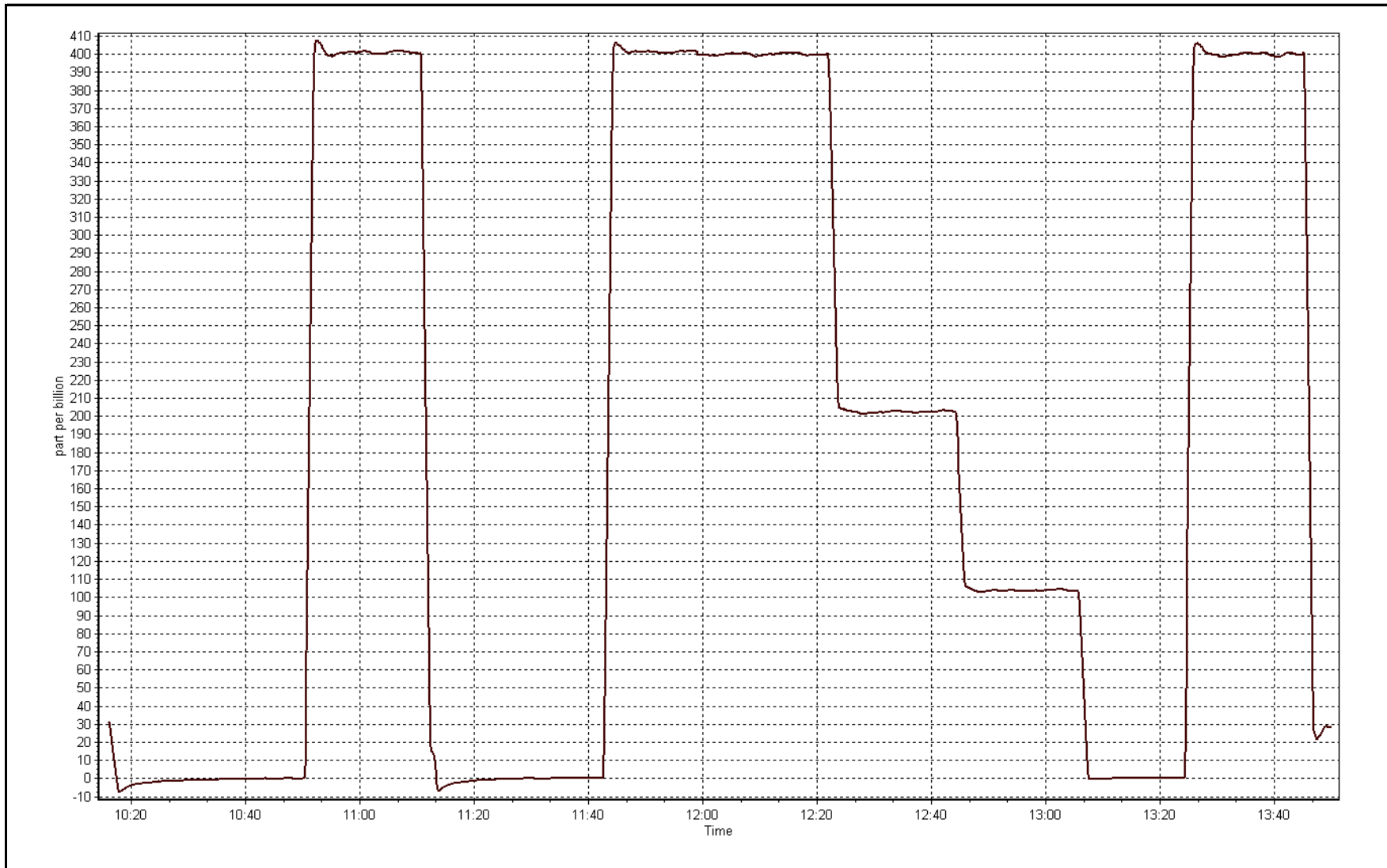
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999889
400.0	400.2	0.9994		
200.0	202.6	0.9871	Slope	1.002039
100.0	103.8	0.9630		
			Intercept	-2.062790



O3 Calibration Plot

Date: March 6, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 6, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	3:25
NO Cal Gas Conc	52.4 ppm	Gas Cert Reference	LL107926
NOX Cal Gas Conc	52.4 ppm	Cal Gas Expiry Date	2/16/19
Calibrator	Teledyne API T700	Serial Number	2449
Zero air Generator	Teledyne API 701	Serial Number	260

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	10957
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997518	0.996584	0.999458
	Data Offset	1.842373	1.900004	-0.697427
Current Calibration	Data Slope	0.995004	0.994821	0.996966
	Data Offset	0.157938	0.000761	-1.913860

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153460
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.033		1.043	
NOX coefficient	1.000		1.001	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.0		3.1	
NOX bkgrnd	3.3		3.3	
Chamber Temp	50.3	Deg C	50.7	Deg C
Moly Temp	323.9	Deg C	326.8	Deg C
PMT voltage	-772.6	V	-772.6	V
PMT Temp	-3.0	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	187.1	mmHg	186.5	mmHg
R Cell Press Nox	187.1	mmHg	186.5	mmHg
NO sample flow	0.770	lpm	0.787	lpm
Nox sample Flow	0.770	lpm	0.787	lpm

Notes:

Inlet filter changed after as founds. Pump and charcoal scrubber changed after as founds for preventative maintenance.
Span adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

March 7, 2017

Station Number:

AMS 6

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.3	0.4	-0.2	----	----
as found span	5542	84.1	795.2	795.2	0.0	796.8	795.9	1.0	0.9979	0.9991
calibrator zero	5542	0.0	0.0	0.0	0.0	-0.1	0.1	-0.2	----	----
high point	5542	84.1	795.2	795.2	0.0	798.8	799.1	-0.3	0.9954	0.9950
second point	5542	42.1	398.1	398.1	0.0	400.5	400.7	-0.2	0.9938	0.9933
third point	5542	21.1	199.5	199.5	0.0	199.9	200.0	-0.2	0.9982	0.9973
as left zero	5542	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as left span	5542	84.1	795.2	379.2	416.0	821.1	384.2	436.9	0.9684	0.9870
Average Correction Factor									0.9958	0.9952

Corrected As found

NO_x= 796.6

NO= 795.4

Percent Change

NO_x= -0.2%

NO= 0.1%

Previous Response

NO_x= 795.3

NO= 796.0

GPT Calibration Data

Dilution Flow (total) 5542 ccm

Source Gas Flow 84.10 ccm

NOx ref calc conc = 795.2 ppb

NO ref calc conc = 795.2 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	815.9	814.4	-0.2	0.9746	0.9764	----	----
1st NO2 (400)	379.2	435.2	816.5	379.2	437.3	0.9739	----	0.9952	100.5%
2nd NO2 (200)	598.9	215.5	818.2	598.9	219.3	0.9719	----	0.9827	101.8%
3rd NO2 (100)	705.6	108.8	818.6	705.6	113.0	0.9714	----	0.9623	103.9%
2nd NO ref point	----	0.0	818.2	816.7	1.4	0.9719	0.9736	----	----
Average Correction Factor						0.9723		0.9801	102.1%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

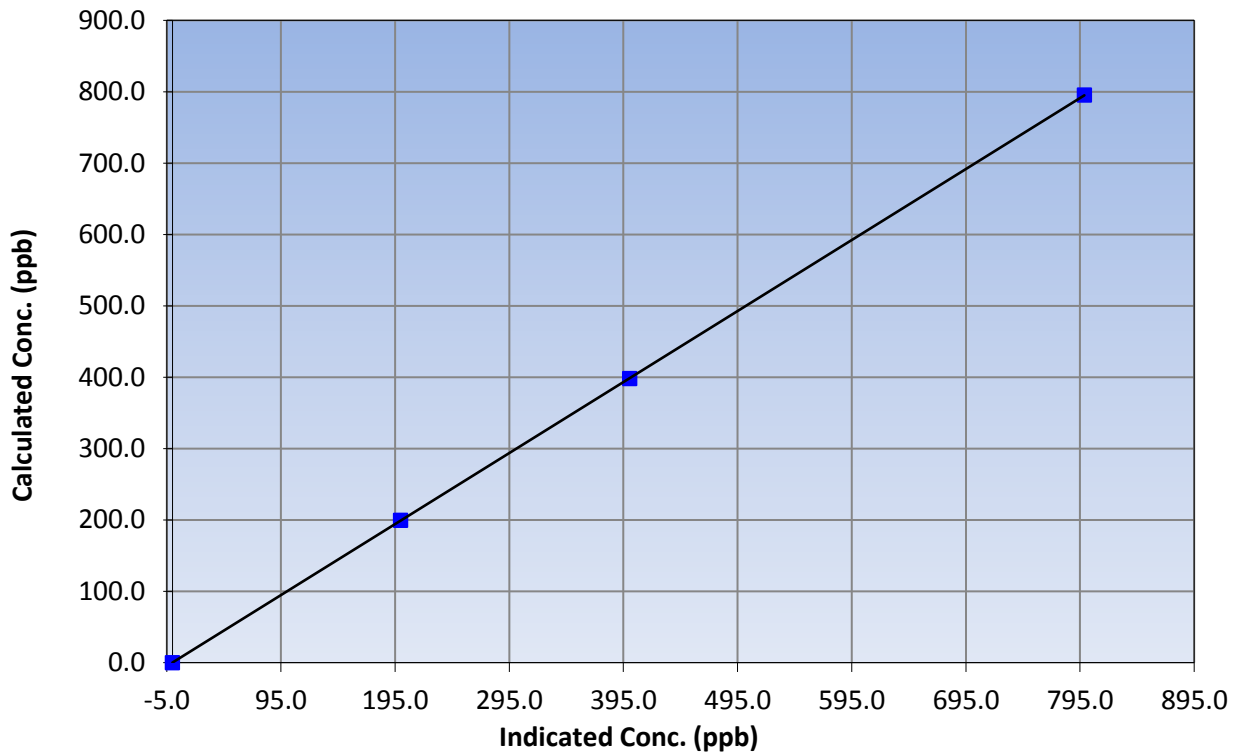
Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 6, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:30	End Time (MST)	3:25
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999998
795.2	798.8	0.9954		
398.1	400.5	0.9938	Slope	0.995004
199.5	199.9	0.9982		
			Intercept	0.157938

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

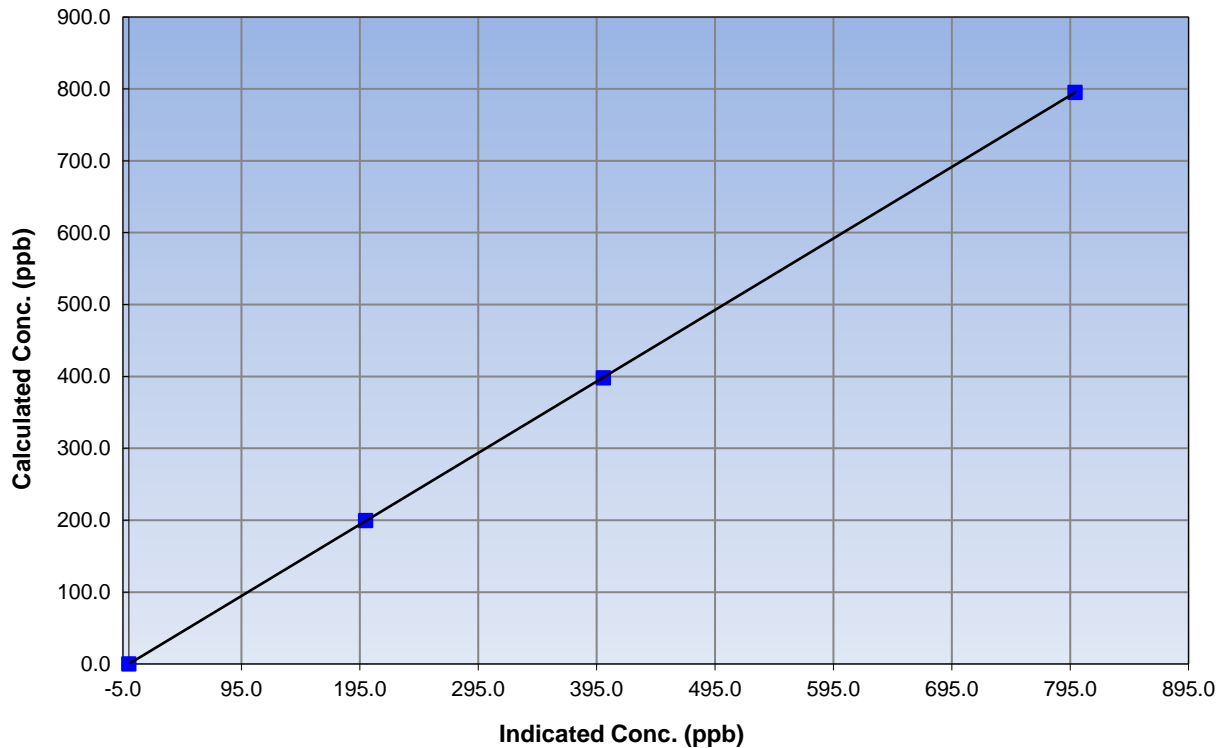
Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 6, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:30	End Time (MST)	3:25
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999998
795.2	799.1	0.9950		
398.1	400.7	0.9933	Slope	0.994821
199.5	200.0	0.9973		
			Intercept	0.000761

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

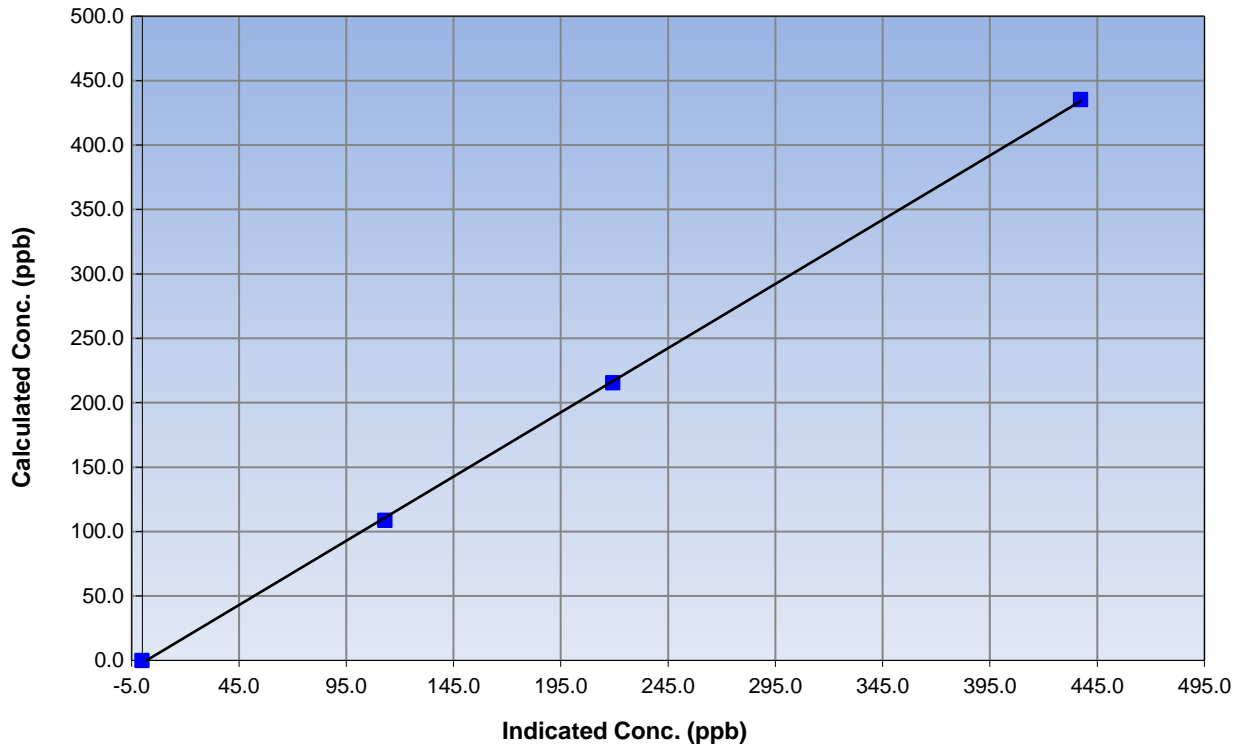
Station Information

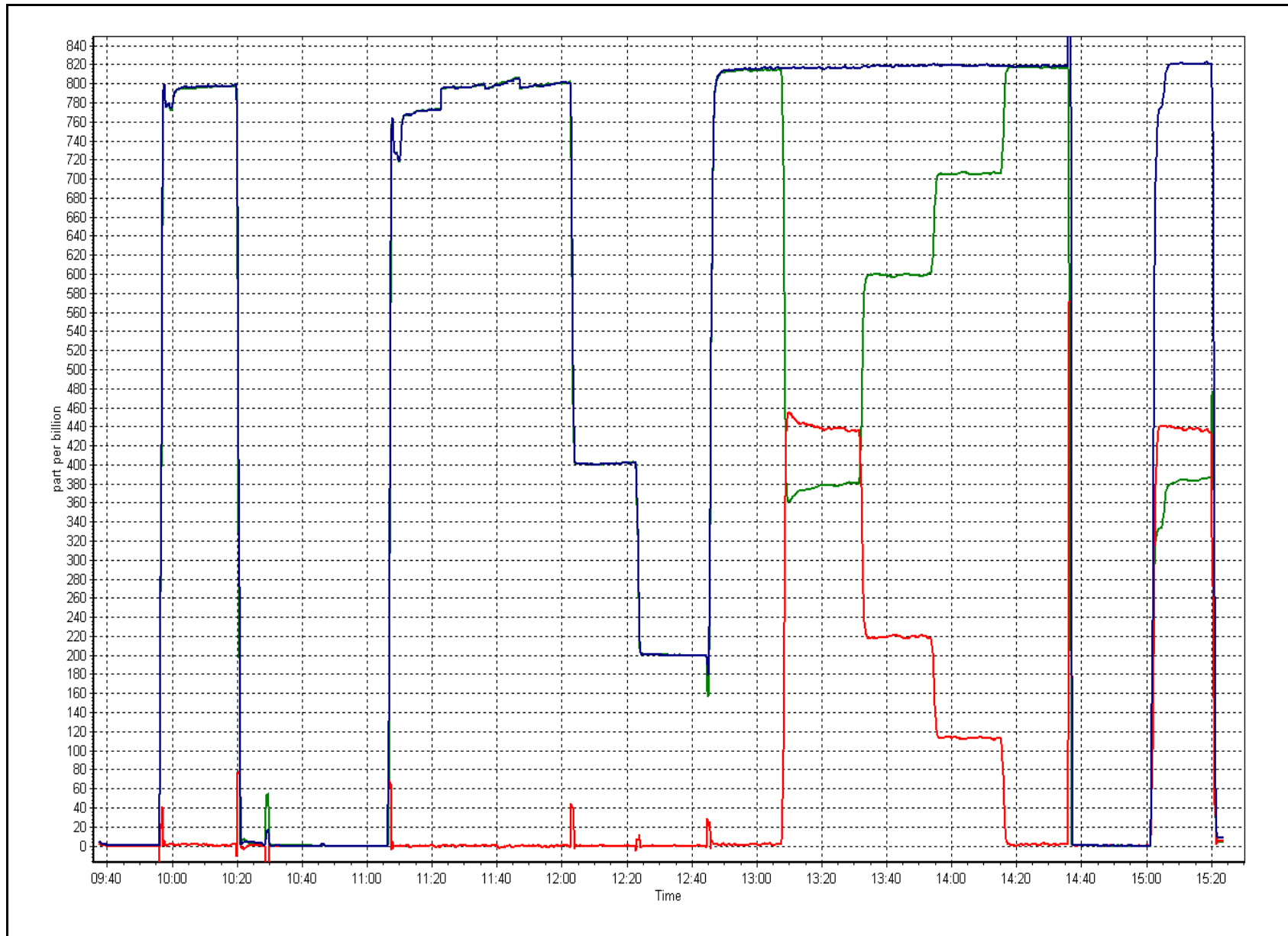
Calibration Date	March 7, 2017	Previous Calibration	February 6, 2017
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:30	End Time (MST)	3:25
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999892
435.2	437.3	0.9952		
215.5	219.3	0.9827	Slope	0.996966
108.8	113.0	0.9623		
			Intercept	-1.913860

NO₂ Calibration Curve







Wood Buffalo Environmental Association

N_t-NO_x-NH₃ Calibration Report

Station Information

Station Name	Patricia McInnis	Station Number	AMS 6
NOX Calibration Date	March 7, 2017	NOX Previous Cal Date	February 6, 2017
NH3 Calibration Date	March 8, 2017	NH3 Previous Cal Date	February 7, 2017
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	14:50
Calibrator	Teledyne API T700	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	95.4 ppm	Serial Number	2449
NOx Cal Gas Conc	52.4 ppm	NH3 Expiry Date / SN	24/May/2017 SA25992
NO Cal Gas Conc	52.4 ppm	NO Expiry Date / SN	16/Feb/2019 LL107926

DACs Information

DACs make & model	Campbell Scientific CR3000	DACs serial No.	10957
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Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.995377	0.970104	0.999390	0.997832	1.012816
	Data Offset	0.385289	-0.2005262	2.139227	2.516484	0.234648
Cal Stats After	Data Slope	0.999699	0.975215	1.002011	1.001672	0.989887
	Data Offset	1.956284	0.563386483	2.739653	3.059509	-0.192051
IP address		192.168.1.77				

Analyzer Information

Analyzer make/model	Teledyne T201	Analyzer serial #	215
Converter	Teledyne 501	Converter serial #	217

Test Point	before		after	
NH3 Conc range	2500	ppb	2500	ppb
NOx Conc range	1000	ppb	1000	ppb
NO BKG	-2.6		-2.9	ppb
NOx BKG	-2.5		-2.5	ppb
Nt BKG	-1.9		-1.9	
NO coefficient	1.062		1.230	
NO2 coefficient	1.000		1.000	ppb
NOx coefficient	1.080		1.255	
NH3 coefficient	0.965		0.955	
Nt coefficient	1.085		1.260	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	316.0	Deg C	314.6	Deg C
PMT Temp	7.1	Deg C	7.1	Deg C
O3 flow	86.0	ccm	87.0	ccm
R Cell Press	6.1	"Hg	4.6	mmHg
PMT Voltage	693.0	v	693.0	v
Sample Flow 1 NO	557.0	ccm	566.0	ccm
Sample Flow 2 Nox	546.0	ccm	556.0	ccm
Sample Flow 3 Nt	560.0	ccm	561.0	ccm

Notes:

Inlet filter changed after as founds. Pump and charcoal scrubber changed after as founds for preventative maintenance. Nox/NO response was low after maintenance. Nox/NO span adjusted. Second high NO point used as GPT reference. NH3 span adjusted slightly.



Wood Buffalo Environmental Association

NH₃ Calibration Report

Station Information

Calibration Date:

March 8, 2017

Station Number:

AMS 6

NH₃ Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NOx conc (ppb)	Calculated NH ₃ conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH ₃ conc (ppb)	Nt Correction factor	NH ₃ Correction factor
as found zero	5542	0.0	0.0	0.0	0.0	-1.6	-2.0	0.4	----	----
as found NO	5542	84.1	795.2	795.2	----	792.1	791.8	0.3	1.004	----
calibrator zero	5542	0.0	0.0	0.0	0.0	0.6	0.5	0.1	----	----
high NO point	5542	84.1	795.2	795.2	----	793.9	792.8	1.1	1.002	----
NO/O ₃ point	5542	84.1	795.2	795.2	----	783.6	782.4	1.3	1.015	----
as found NH ₃	5542	46.3	797.0	NA	797.0	803.7	20.2	783.4	0.992	1.017
first NH ₃	5542	46.3	797.0	NA	797.0	817.4	20.7	796.7	0.975	1.000
second NH ₃	5542	23.2	399.4	NA	399.4	408.0	12.6	395.4	0.979	1.010
third NH ₃	5542	11.7	201.4	NA	201.4	205.0	6.8	198.2	0.982	1.016
Average Correction Factor									1.0082	1.0089

Nt Corrected As Found Nt = 793.7 ppb
 NOx Corrected As Found NOx = 793.8 ppb
 NH₃ Previous Converter Efficiency = 96.5 %

Previous Response Nt = 819.9 ppb
 Previous Response NOx = 793.5 ppb
 NH₃ Current Converter Efficiency = 95.5 %

Nt percent change 3.3%
 NOx percent change 0.0%
 NH₃ percent change -1.0%



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date: March 7, 2017 Station Number: AMS 6

NO_x / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5542	0.0	0.0	0.0	0.0	0.1	0.1	0.1	----	----
as found span	5542	84.1	795.2	795.2	795.2	789.2	790.0	787.9	1.0076	1.0065
calibrator zero	5542	0.0	0.0	0.0	0.0	0.5	0.7	0.6	----	----
high point	5542	84.1	795.2	795.2	795.2	792.8	793.0	793.9	1.0030	1.0028
second point	5542	42.1	398.1	398.1	398.1	391.8	391.4	393.1	1.0161	1.0171
third point	5542	21.1	199.5	199.5	199.5	194.0	193.2	194.6	1.0286	1.0327
Average Correction Factor									1.0159	1.0175

	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	787.8	789.1	789.9	----
Previous Response	819.9	793.5	794.4	----
Percent Change	4.1%	0.6%	0.6%	0.0%

GPT Calibration Data

Dilution Flow (total) 5542 ccm Source Gas Flow 84.1 ccm NO_x ref calc conc = 795.2 ppb NO ref calc conc = 795.2 ppb

O ₃ Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
1st NO ref point	----	0.0	782.4	782.4	-0.1	1.0164	1.0163	----	----
1st NO ₂ (400)	364.4	418.0	786.5	364.4	422.1	1.0110	----	0.9902	101.0%
2nd NO ₂ (200)	575.9	206.5	785.4	575.9	209.5	1.0124	----	0.9859	101.4%
3rd NO ₂ (100)	676.3	106.1	783.7	676.3	107.5	1.0146	----	0.9874	101.3%
2nd NO ref point	----	0.0	793.6	789.3	4.3	1.0020	1.0075	----	----
Average Correction Factor						1.0100	1.0119	0.9878	101.2%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NH3 Calibration Summary

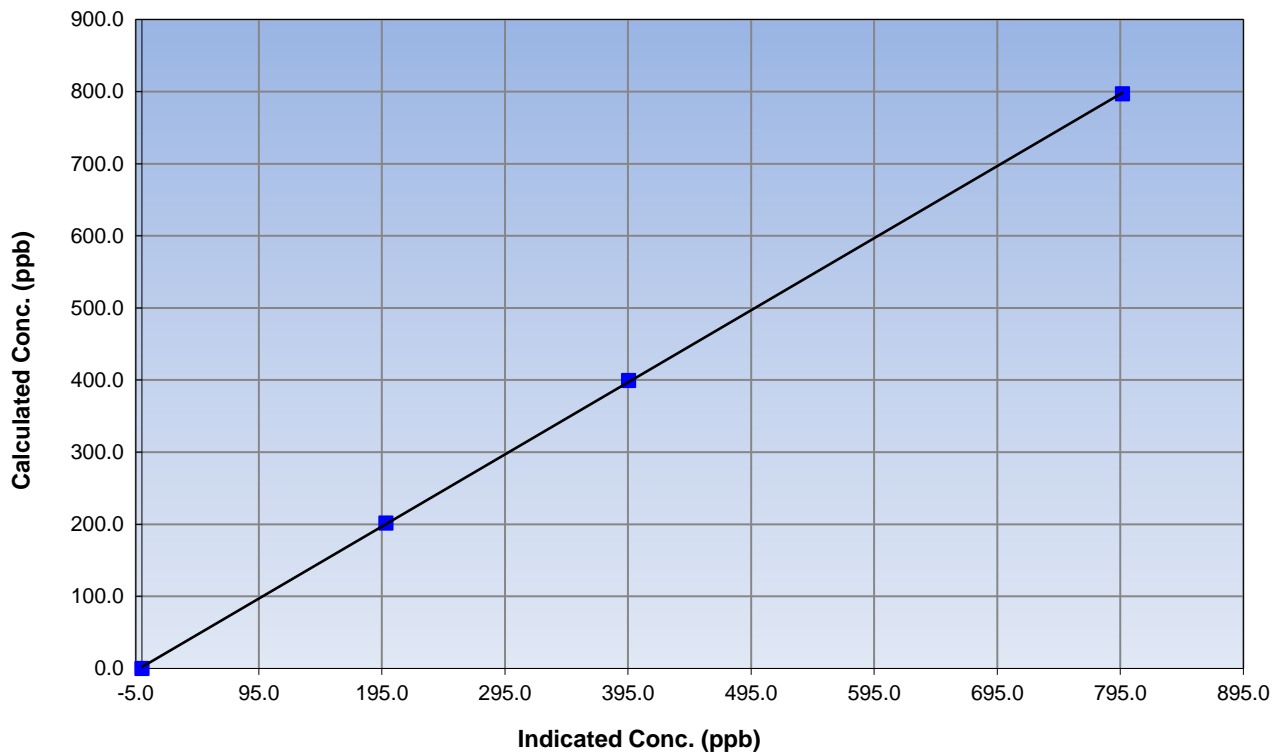
Station Information

Calibration Date	March 8, 2017	Previous Calibration	February 6, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	14:50
Analyzer make	Teledyne T201	Analyzer serial #	215

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999964
797.0	796.7	1.0004		
399.4	395.4	1.0100	Slope	0.999699
201.4	198.2	1.0162		
			Intercept	1.956284

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

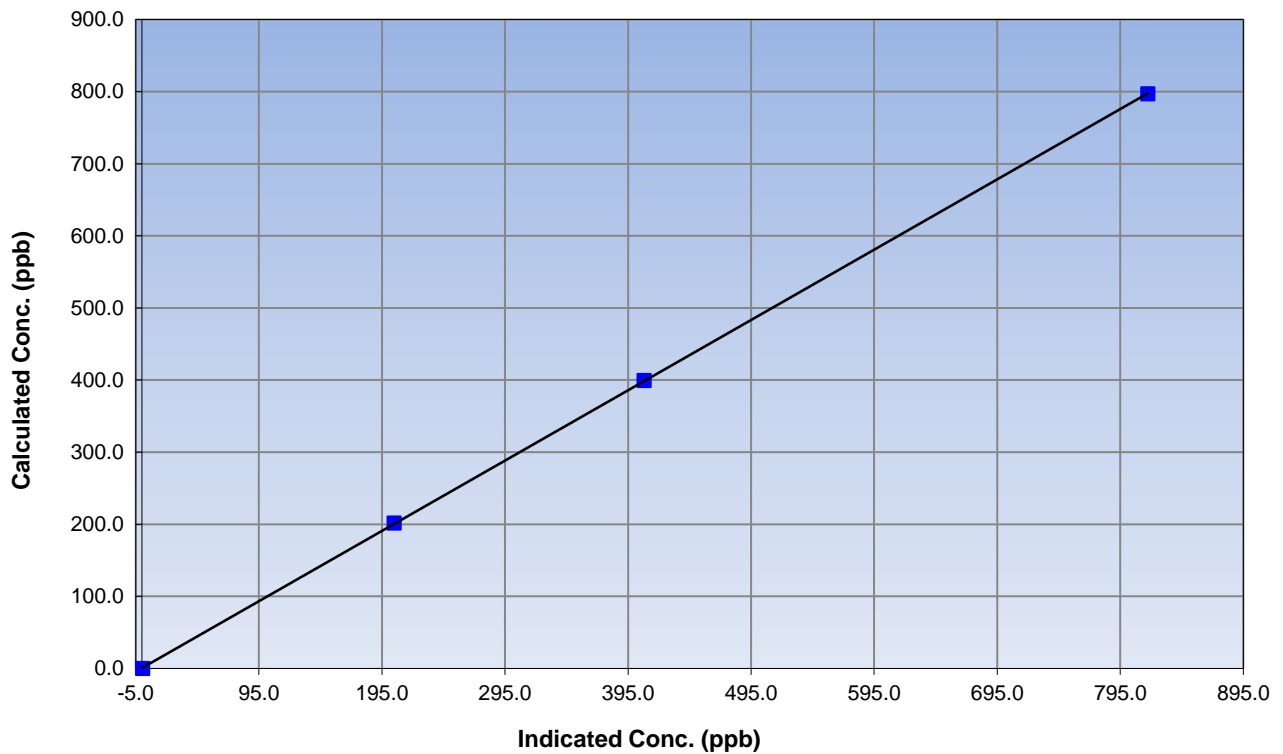
Station Information

Calibration Date	March 8, 2017	Previous Calibration	February 6, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	14:50
Analyzer make	Teledyne T201	Analyzer serial #	215

Nt (NH₃) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	----	Correlation Coefficient	0.999990
797.0	817.4	0.9751		
399.4	408.0	0.9787	Slope	0.975215
201.4	205.0	0.9825		
			Intercept	0.563386

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

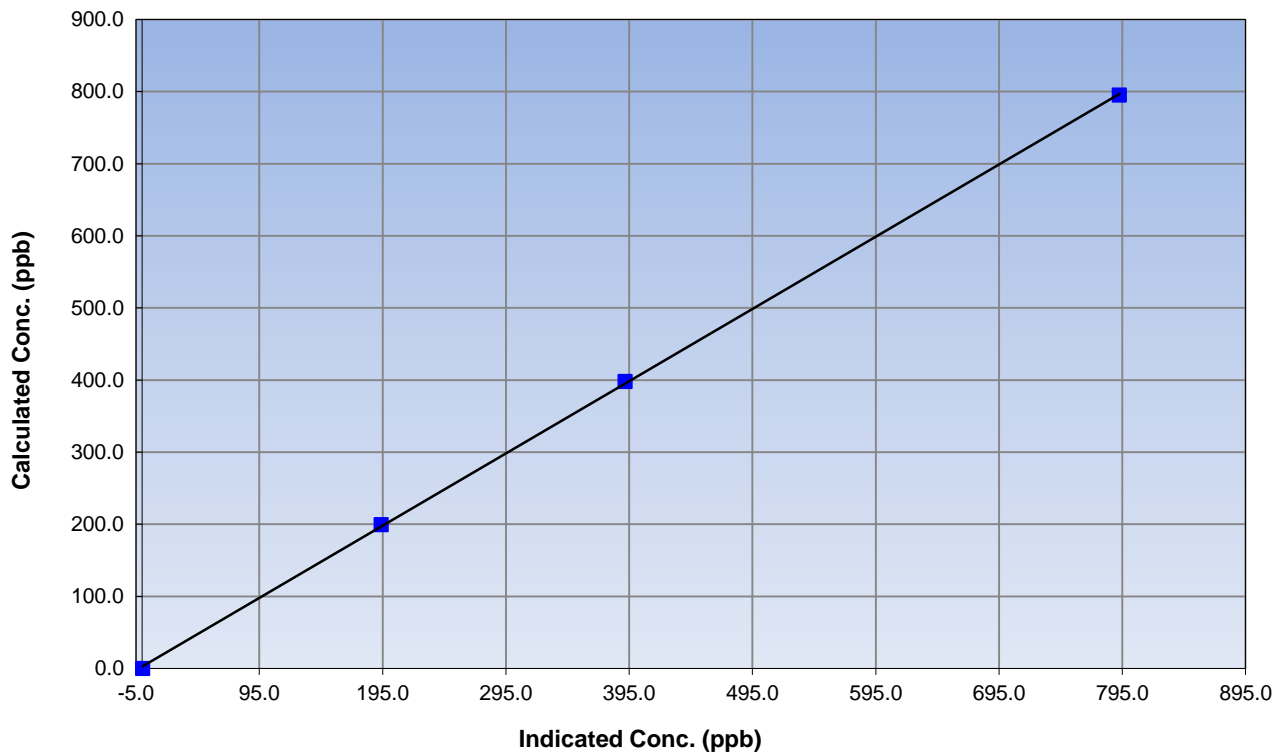
Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 6, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	14:50
Analyzer make	Teledyne T201	Analyzer serial #	215

NO_x Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999920
795.2	792.8	1.0030		
398.1	391.8	1.0161	Slope	1.002011
199.5	194.0	1.0286		
			Intercept	2.739653

NOx Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

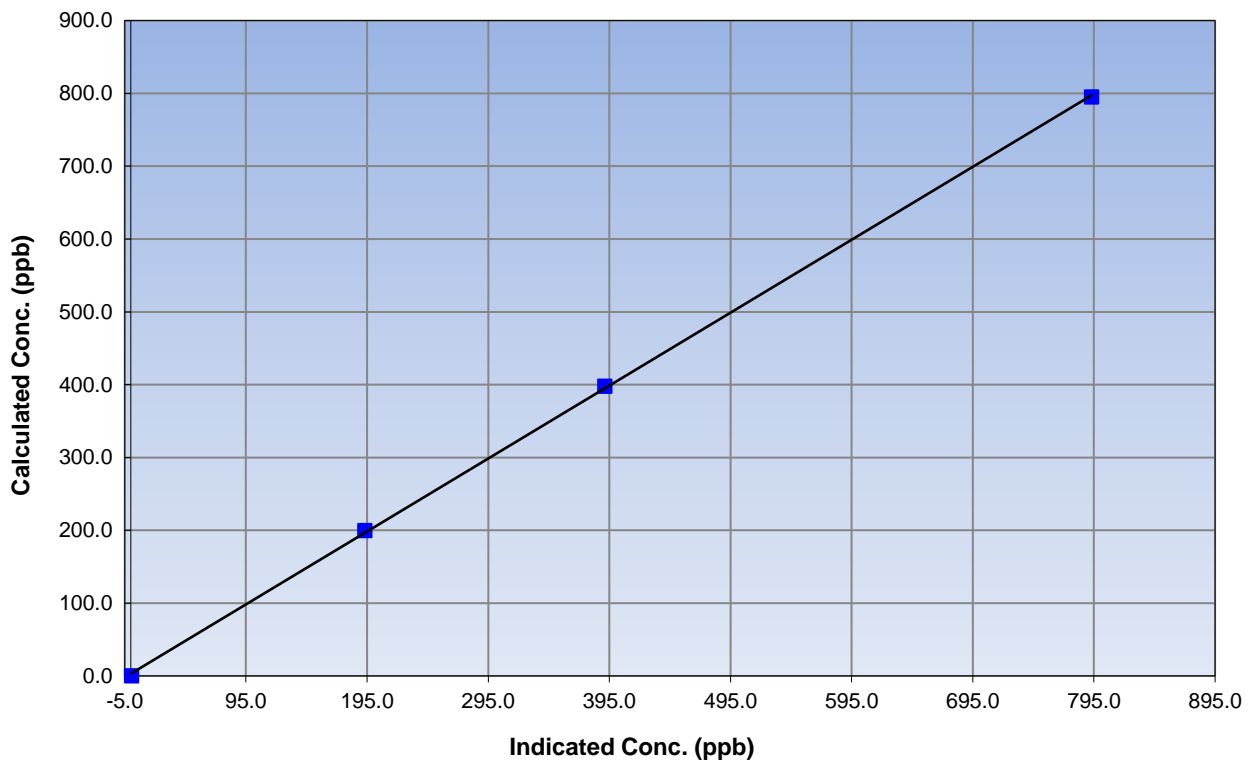
Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 6, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	14:50
Analyzer make	Teledyne T201	Analyzer serial #	215

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.7	----	Correlation Coefficient	0.999895
795.2	793.0	1.0028		
398.1	391.4	1.0171	Slope	1.001672
199.5	193.2	1.0327		
			Intercept	3.059509

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

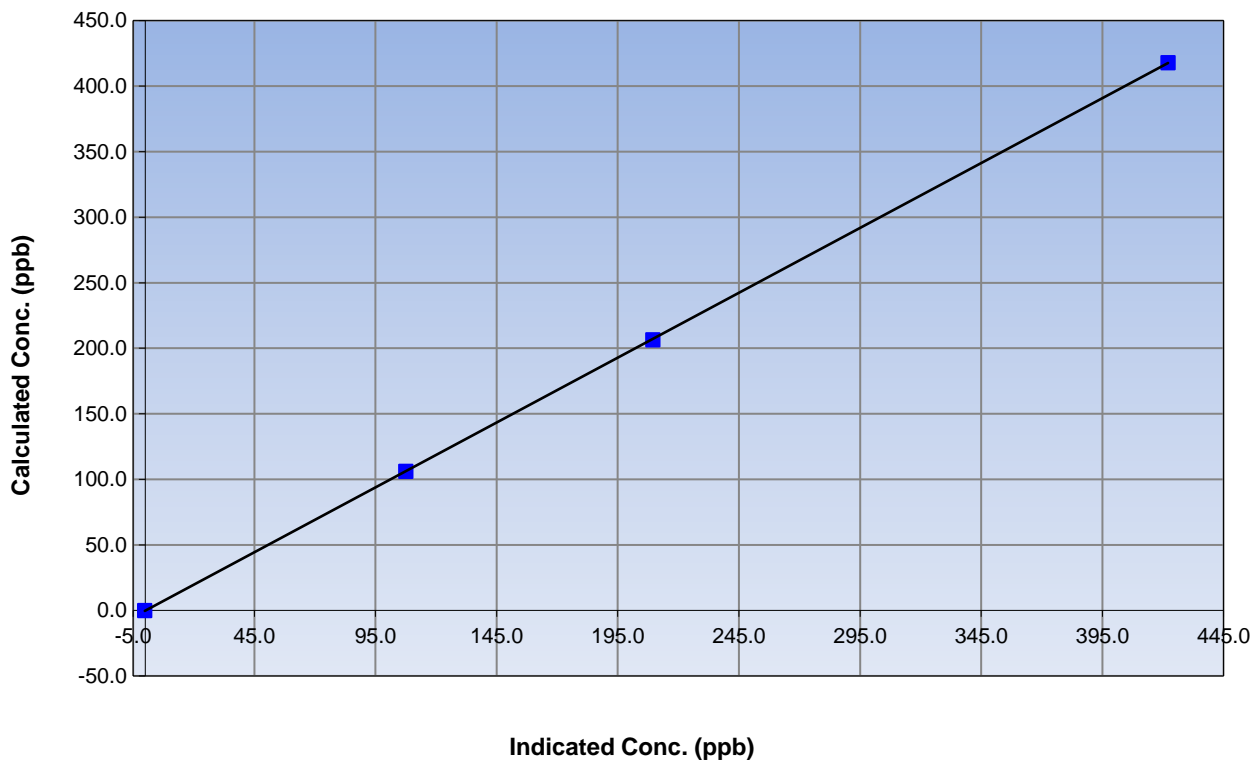
Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 6, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:25	End Time (MST)	14:50
Analyzer make	Teledyne T201	Analyzer serial #	215

Calibration Information

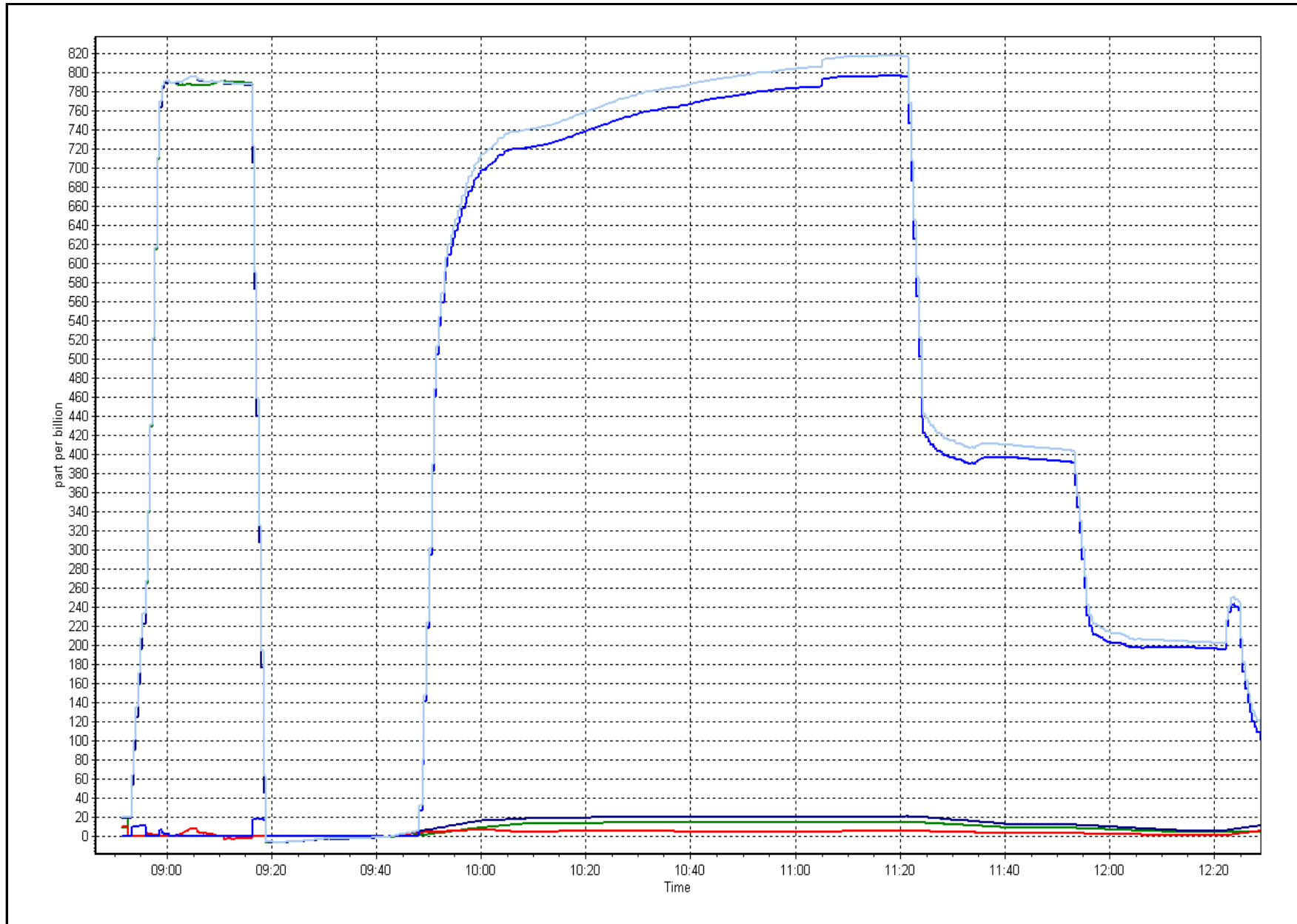
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999993
418.0	422.1	0.9902		
206.5	209.5	0.9859	Slope	0.989887
106.1	107.5	0.9874		
			Intercept	-0.192051

NO₂ Calibration Curve



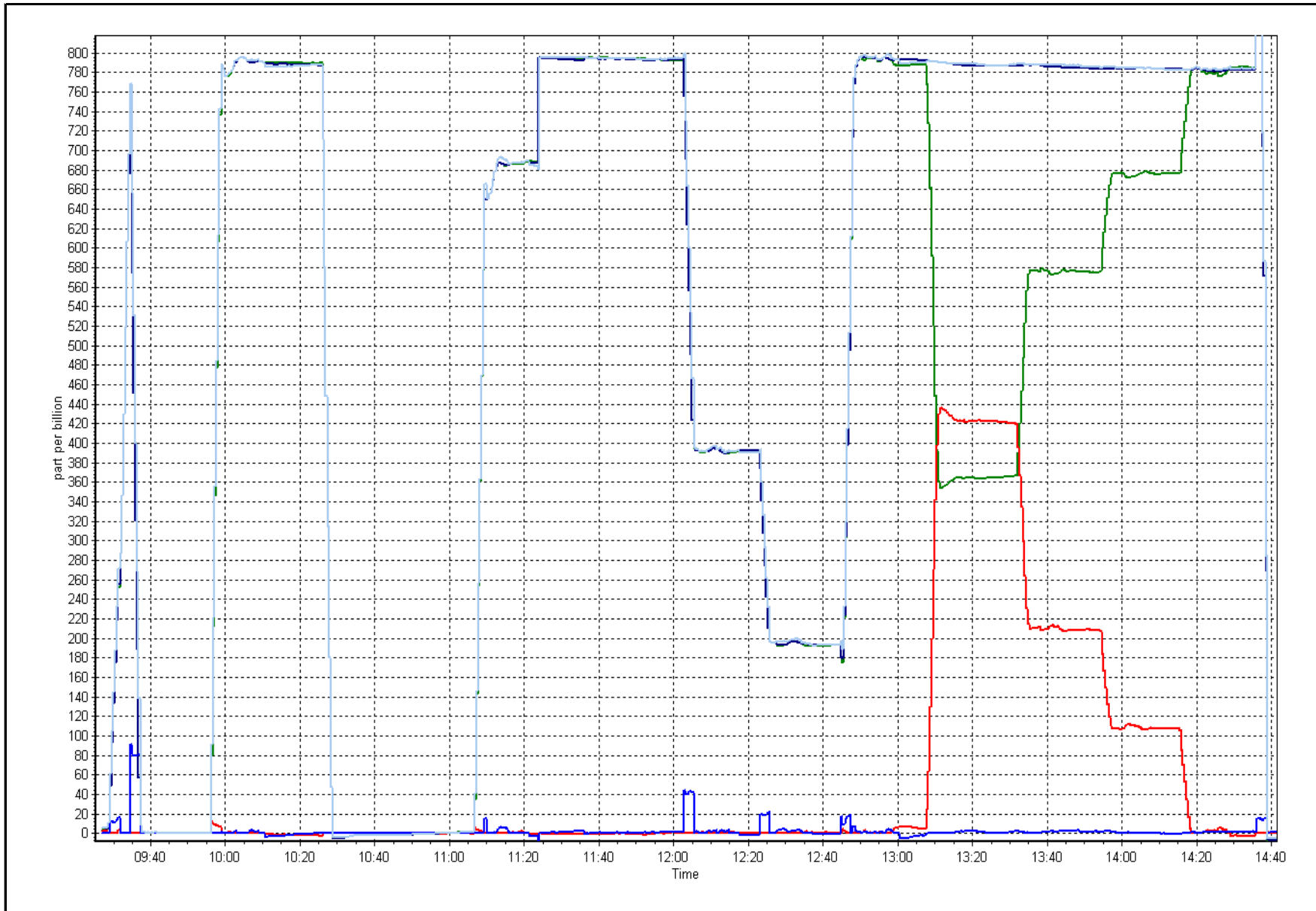
NH₃ Calibration Plot

Date: March 8, 2017



NOX Calibration Plot

Date: March 7, 2017





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Patricia McInnis	Station number:	AMS 6
Calibration Date:	March 9, 2017	Last Cal Date:	February 7, 2017
Start time (MST):	12:52	End time (MST):	14:15
Sharp Model:	Thermo SHARP 5030	S/N:	E-1475
Particulate Fraction:	PM2.5	C14 Source S/N:	5680
Flow Standard 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>	<u>Tolerance</u>
T1 (°C)	-19	-19.4	-19	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	998	990.9	998	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1005.69	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 type="checkbox"/>	PM2.5 Cyclone	<input type="checkbox"/>	
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

			<u>Tolerance</u>
Leak Test:	Date of check: <u>January 17, 2017</u>	Last Cal Date: _____	
	Flow w/o adaptor: <u>16.65</u>	Flow w/ adaptor: <u>16.47</u>	0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass: _____	S/N: _____
	Date of check: _____	Last Cal Date: <u>June 9, 2016</u>
	New Correction Factor: _____	Previous Correction Factor: _____

<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: Cyclone head did not require cleaning. No adjustments made to temperature, pressure, or flow. Nephelometer did not require an adjustment.

Calibration by: Devin Russell



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 7
ATHABASCA VALLEY
MARCH 2017

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
MARCH 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	40	0	5	0
TRS (ppb) Average	707	35	37	99.73	4	0	1	0
THC (ppm) Average	706	36	38	99.73	2.7	-	2.1	-
NMHC (ppm) Average	706	36	38	99.73	0.468	-	0.05	-
CH4(ppm) Average	706	36	38	99.73	2.3	-	2.1	-
O3 (ppb) Average	708	34	36	99.73	49	0	39	-
NO2 (ppb) Average	707	36	37	99.87	45	0	17	-
NO (ppb) Average	707	36	37	99.87	27	-	8	-
NOX (ppb) Average	707	36	37	99.87	61	-	22	-
PM2.5 (ug/m3) Average	735	2	9	99.06	61.8	-	12.8	0
CO(ppm) Average	708	34	36	99.73	0.5	0	0.2	-
Temperature 2 m (C) Average	743	0	1	99.87	14.2	-	6.7	-
Barometric Pressure (inHg) Average	743	0	1	99.87	29.9	-	29.8	-
Relative Humidity (%) Average	743	0	1	99.87	97	-	83	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	36	-	26	-
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 - ATHABASCA VALLEY (AMS 7)
MARCH 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	3	-	0	0	0	0	1	2	40
TRS (ppb) Average	707	0.4	0	-	0	0	0	0	0	0	4
THC (ppm) Average	706	2.01	0.1	-	1.9	2	2	2	2	2.1	2.7
NMHC (ppm) Average	706	0.006	0.031	-	0	0	0	0	0	0	0.468
CH4(ppm) Average	706	2	0	-	1.9	2	2	2	2	2.1	2.3
O3 (ppb) Average	708	29.1	10	-	3	15	23	31	36	40	49
NO2 (ppb) Average	707	7.9	6	-	1	2	4	7	10	15	45
NO (ppb) Average	707	2.1	3	-	0	0	0	1	3	5	27
NOX (ppb) Average	707	10	7	-	1	3	5	8	13	19	61
PM2.5 (ug/m3) Average	735	7.29	4.1	-	0.8	3.7	5.2	6.6	8.6	10.9	61.8
CO(ppm) Average	708	0.13	0	-	0.1	0.1	0.1	0.1	0.1	0.2	0.5
Temperature 2 m (C) Average	743	-7.47	10.8	-	-31.9	-22.2	-17	-5.3	1.2	5.3	14.2
Barometric Pressure (inHg) Average	743	29.09	0.3	-	28.4	28.8	28.9	29	29.4	29.6	29.9
Relative Humidity (%) Average	743	64.8	15	-	27	44	54	65	75	86	97
Wind Speed 10 m (km/h) Average	743	9.4	6	-	0	2	4	9	13	18	36
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS, O3, CO	03 Mar 2017 09:00	03 Mar 2017 09:00	1	Maintenance - sample manifold cleaned
ALL PARAMETERS	21 Mar 2017 09:00	21 Mar 2017 09:00	1	Maintenance - replaced router
THC	21 Mar 2017 09:00	21 Mar 2017 10:00	2	Maintenance - replaced carrier gas
PM2.5	14 Mar 2017 23:00	15 Mar 2017 00:00	2	Unstable operation - excessive baseline drift
PM2.5	15 Mar 2017 12:00	15 Mar 2017 15:00	4	Unstable operation - excessive baseline drift



Wood Buffalo Environmental Association
Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 40 ppb on Mar 17 18:00	Maximum Daily Average: 5.3 ppb on Mar 17
Minimum Value: 0 ppb on Mar 1 02:00	Hours of Data: 707
Maximum Diurnal Average: 2.2 ppb at hour 18	Hours of Missing Data: 37
Monthly Average: 1.0 ppb	Hours of Calibration: 36
Minimum Daily Average: 0.2 ppb on Mar 16	Percent Operational Time: 99.9
Minimum Diurnal Average: 0.5 ppb at hour 1	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q 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-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	2	3	3	3	2	1	1	1	1	0.8	3	
2-Mar	Z	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0.7	1	
3-Mar	0	Z	1	0	0	0	0	0	0	C	C	C	C	C	1	1	1	0	0	7	2	0	1	2	1	1.0	7
4-Mar	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.3	1	
5-Mar	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.4	1	
6-Mar	0	1	1	1	Z	0	0	0	0	0	0	5	8	2	0	0	0	0	0	0	0	0	0	2	1.0	8	
7-Mar	1	4	3	2	1	Z	0	2	4	6	12	12	6	8	6	6	2	0	0	0	0	0	0	0	3.3	12	
8-Mar	Z	0	0	0	0	0	1	0	1	1	2	14	6	8	5	7	4	2	0	0	0	0	0	0	2.3	14	
9-Mar	0	Z	0	0	0	0	0	0	0	1	1	6	9	7	6	5	9	10	8	6	4	3	2	2	3.5	10	
10-Mar	2	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	1	1	1	1.0	3	
11-Mar	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1	
12-Mar	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	
13-Mar	0	0	0	0	1	Z	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0.6	1	
14-Mar	Z	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1	
15-Mar	1	Z	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0.4	1	
16-Mar	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	
17-Mar	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	2	15	33	40	9	3	4	4	5	3	5.3	40	
18-Mar	2	3	8	9	Z	3	2	2	2	2	2	2	1	1	1	1	1	1	1	0	1	1	0	0	1.9	9	
19-Mar	1	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	1	
20-Mar	Z	1	3	8	7	4	4	4	7	6	4	3	2	2	2	1	1	1	1	1	1	1	1	1	2.9	8	
21-Mar	1	Z	1	1	1	1	1	1	M	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.7	1	
22-Mar	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	
23-Mar	0	0	2	Z	1	3	4	3	2	1	1	1	1	1	1	1	1	1	3	1	0	0	0	0	1.2	4	
24-Mar	0	0	0	0	Z	0	0	0	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0	0	0.7	2	
25-Mar	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	
26-Mar	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	0	1	0	0	0	0	0	0	0.3	1	
27-Mar	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	
28-Mar	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	
29-Mar	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	
30-Mar	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	
31-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1	0	0	0.4	2	

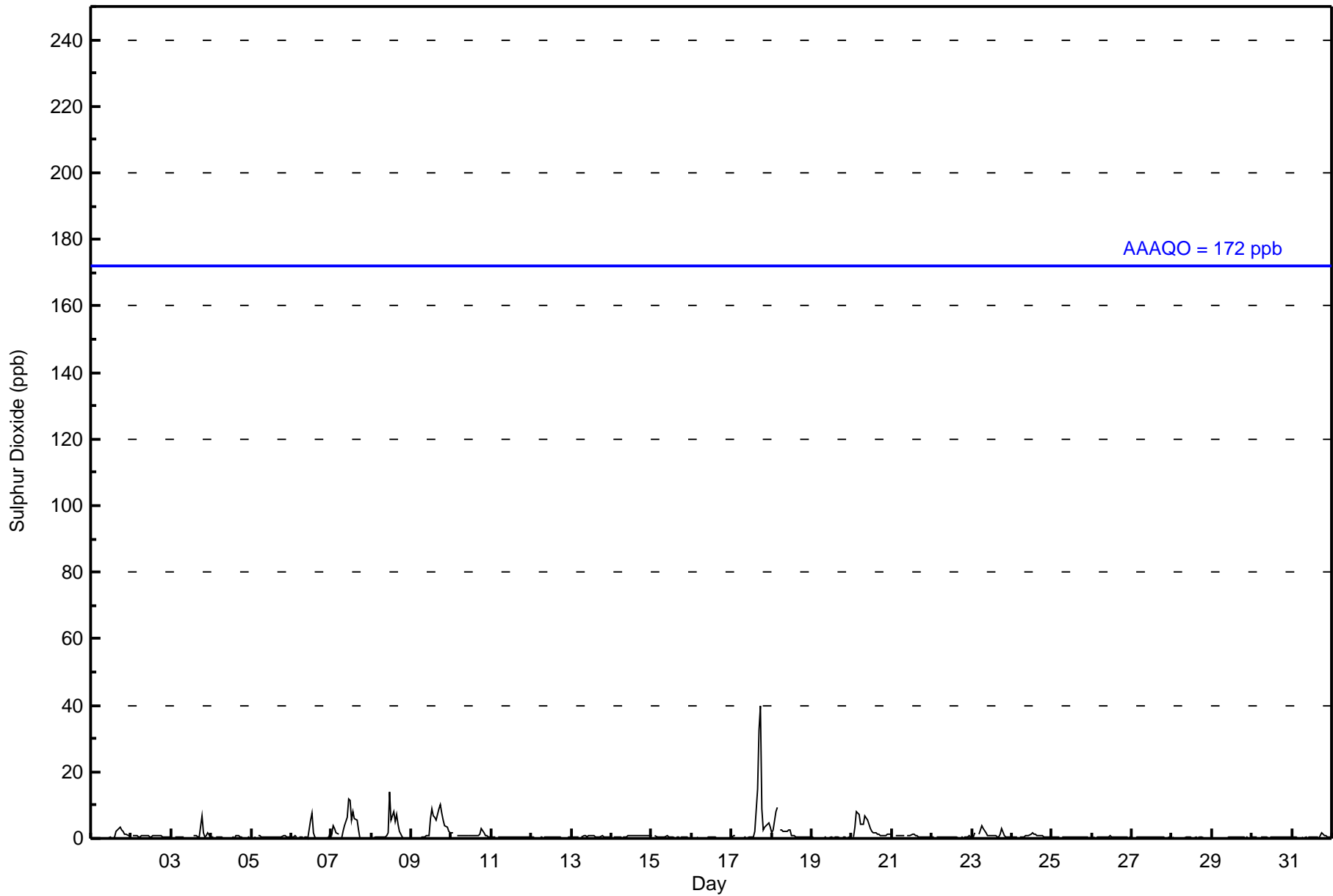
0.5	0.6	0.9	1.1	0.7	0.7	0.6	0.7	0.8	0.8	1.1	1.8	1.4	1.3	1.1	1.5	2.0	2.2	1.4	0.8	0.6	0.6	0.6	0.6	0.6	Diurnal Average
2	4	8	9	7	4	4	4	7	6	12	14	9	8	6	15	33	40	9	6	4	4	5	3	Diurnal Maximum	

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
Athabasca Valley - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	701	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: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - March 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	80	20	15	9	28	62	176	35	12	9	21	17	28	21	34	134	701
11 - 20	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	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	83	20	15	9	28	62	176	35	12	9	21	17	28	21	34	137	707

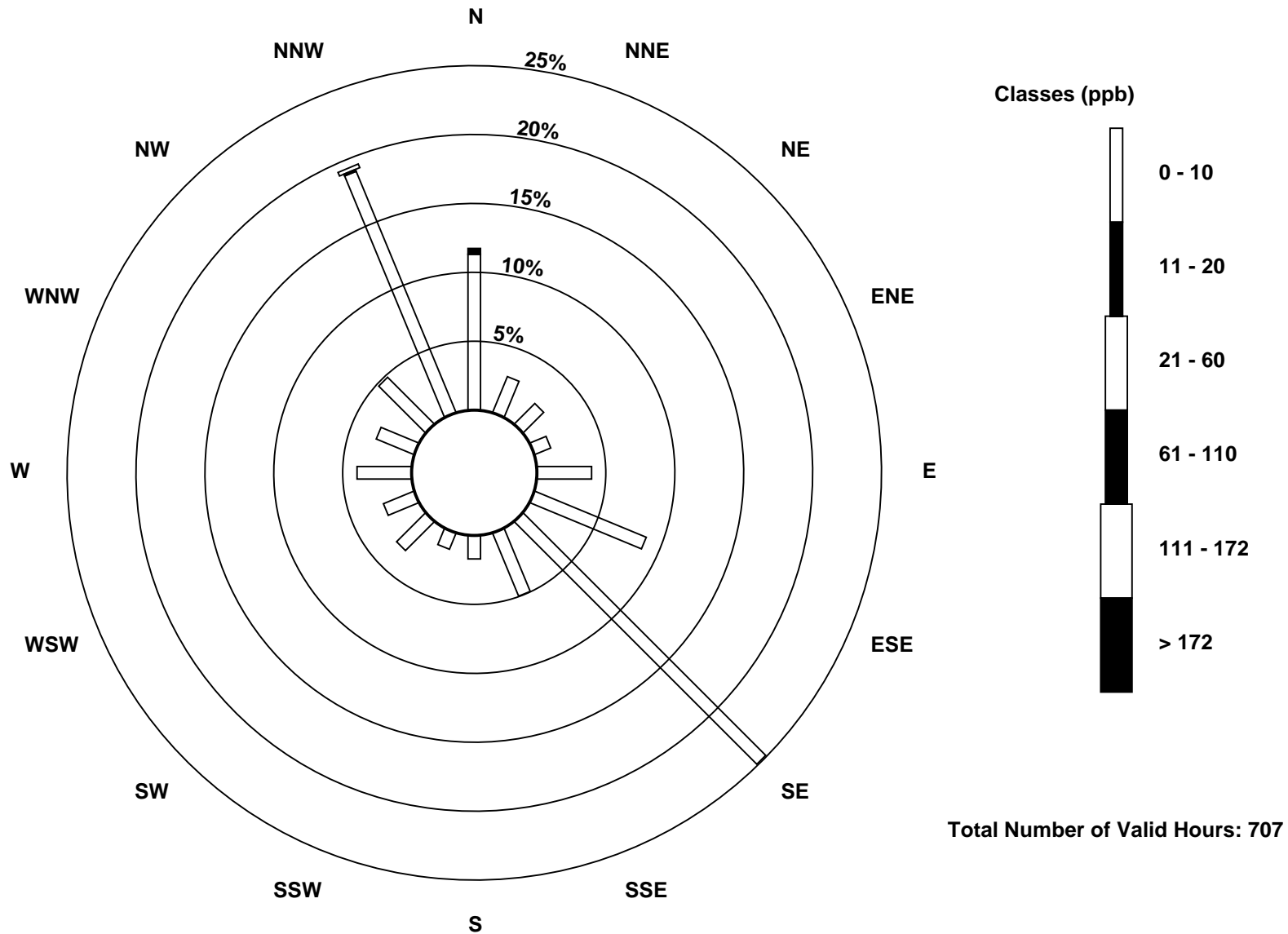
Total Number of Valid Hours: 707

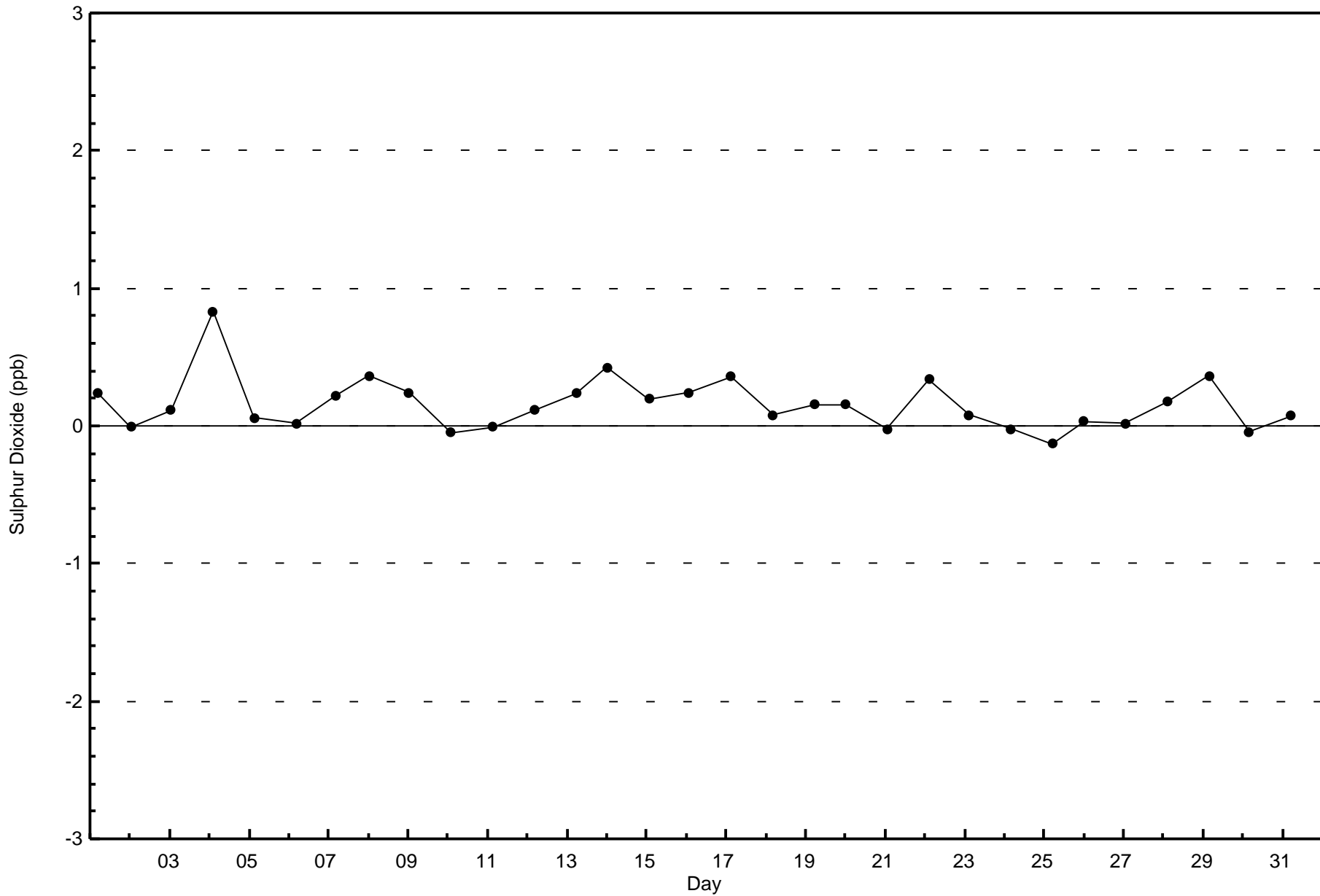
Total Number of Hours: 744

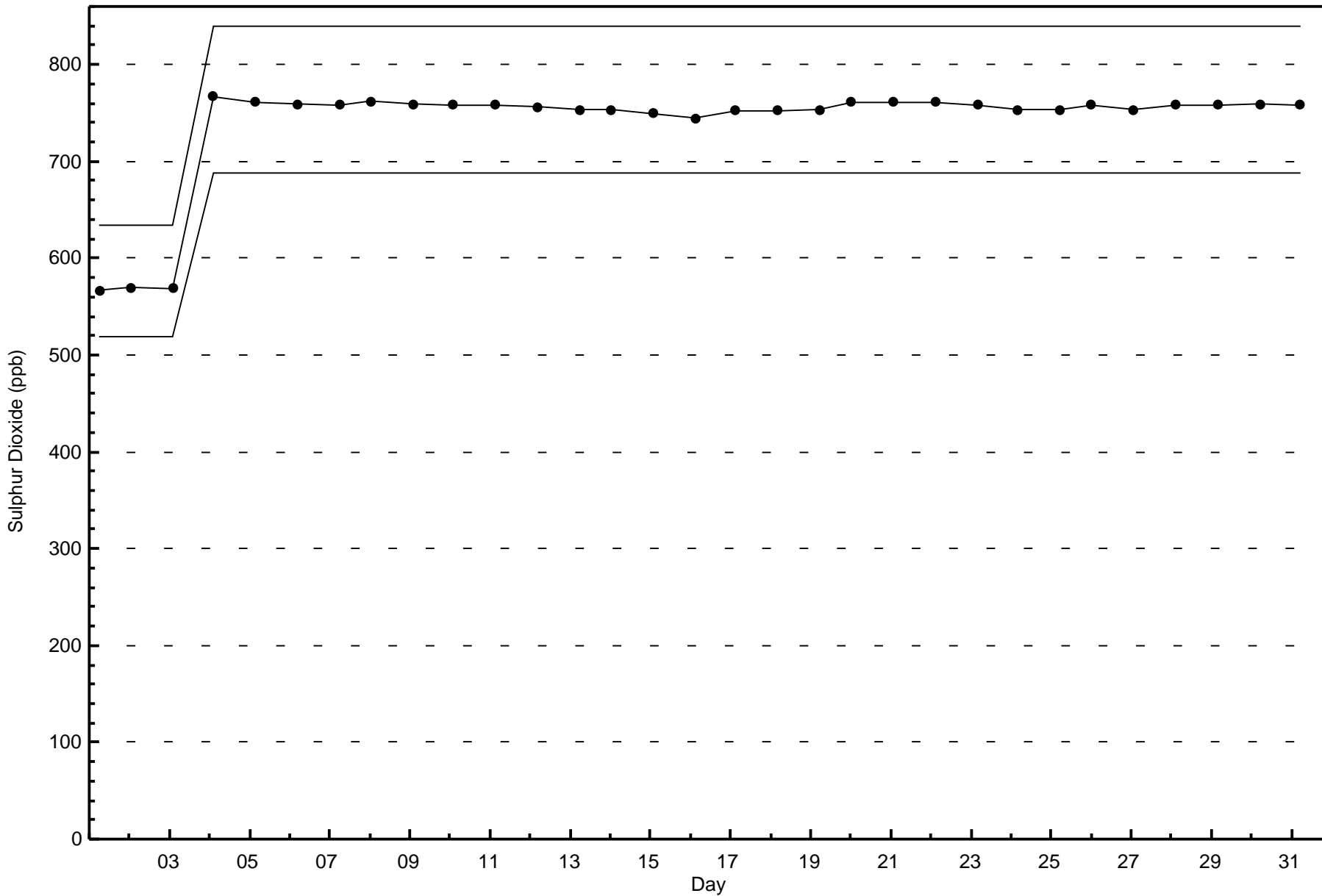


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley (AMS 7)









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

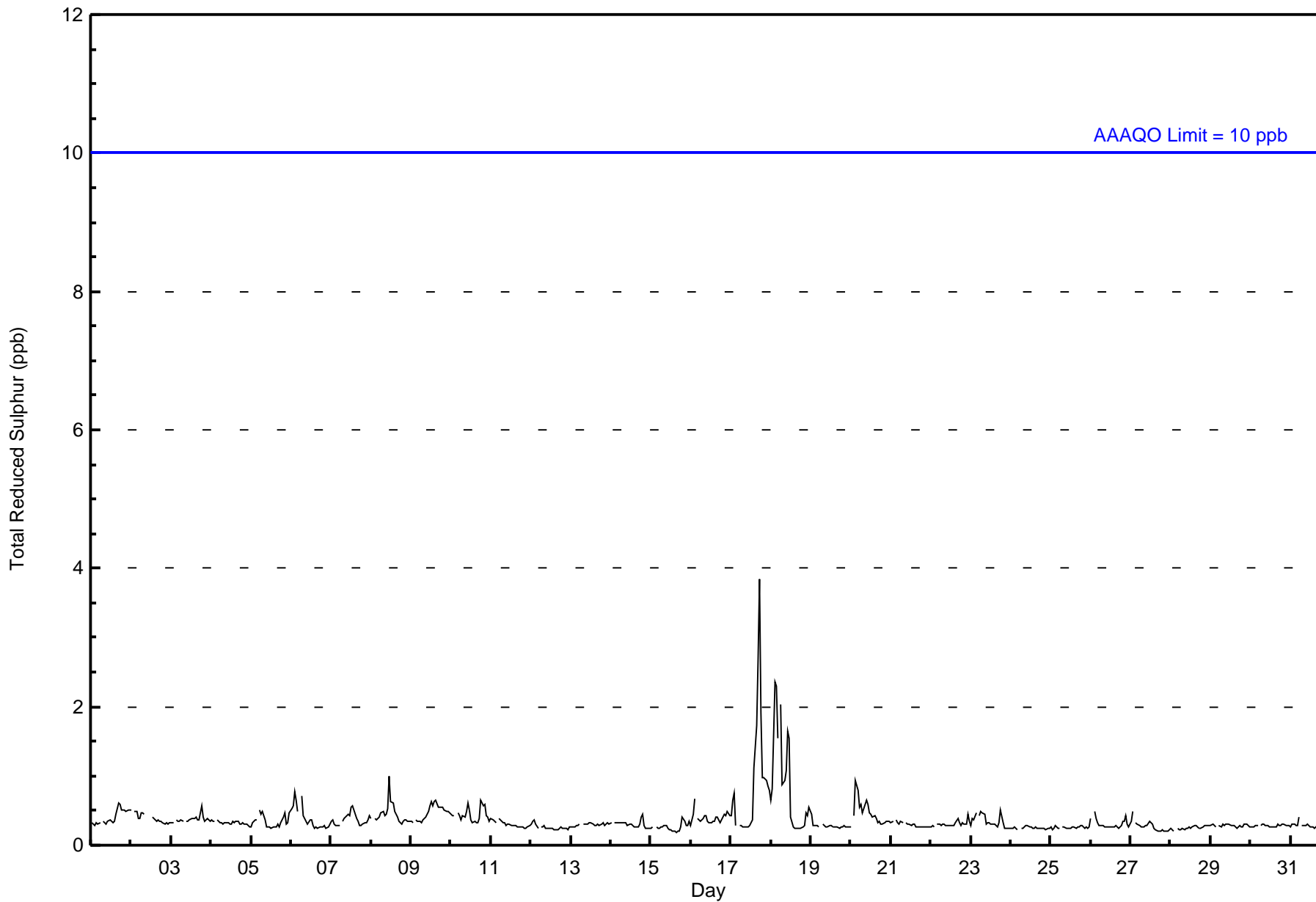
Athabasca Valley - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4 ppb on Mar 17 18:00 Maximum Daily Average: 0.9 ppb on Mar 17																	Hours in Service: 744 Hours of Data: 707										
Minimum Value: 0 ppb on Mar 15 16:00 Minimum Daily Average: 0.2 ppb on Mar 24 Maximum Diurnal Average: 0.5 ppb at hour 3 Minimum Diurnal Average: 0.3 ppb at hour 14 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 = 2																	Hours of Missing Data: 37 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-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	0.4	1
2-Mar	1	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
3-Mar	0	0	Z	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.4	1
4-Mar	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
5-Mar	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	0.3	1
6-Mar	1	1	1	1	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
7-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
8-Mar	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
9-Mar	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.5	1
10-Mar	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0.4	1
11-Mar	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	0.3	0
12-Mar	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
13-Mar	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
14-Mar	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
15-Mar	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	0
16-Mar	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
17-Mar	0	1	1	0	Z	0	0	0	0	0	0	0	0	0	1	2	3	4	2	1	1	1	1	1	1	0.9	4
18-Mar	1	1	2	2	2	Z	2	1	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	2
19-Mar	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
20-Mar	0	Z	0	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
21-Mar	0	0	Z	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
22-Mar	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
23-Mar	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	0.3	0
24-Mar	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
25-Mar	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
26-Mar	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
27-Mar	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	0
28-Mar	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
29-Mar	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	0.3	0
30-Mar	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
31-Mar	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
0.3 0.4 0.5 0.4 0.4 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.3																								Diurnal Average			
1 1 2 2 2 1 2 1 1 1 2 2 1 1 1 2 3 4 2 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 - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - March 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**

**Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - March 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	82	21	13	11	28	60	180	35	12	9	21	17	29	19	33	135	705
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	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	82	21	13	11	28	60	180	35	12	9	21	17	29	19	33	137	707

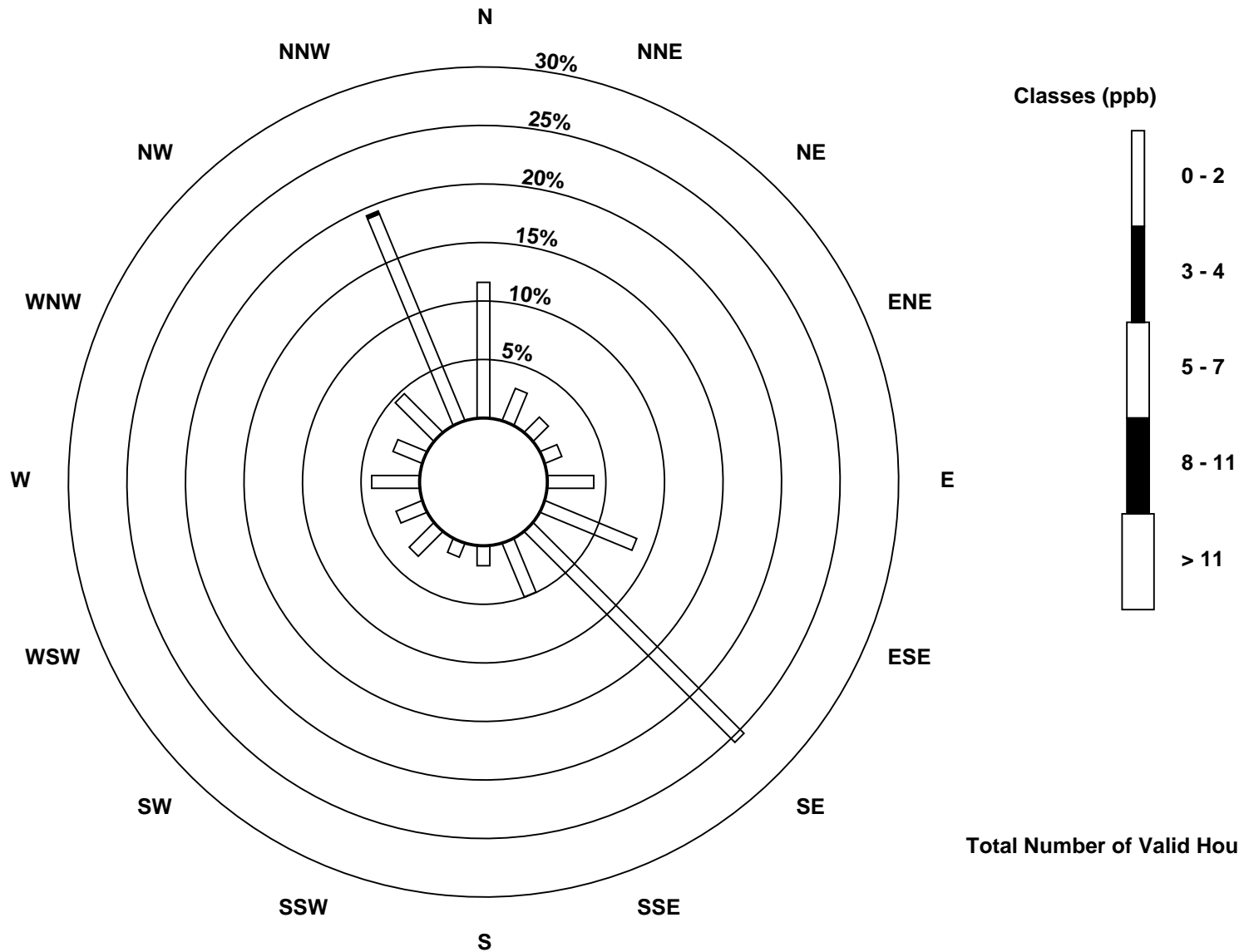
Total Number of Valid Hours: 707

Total Number of Hours: 744

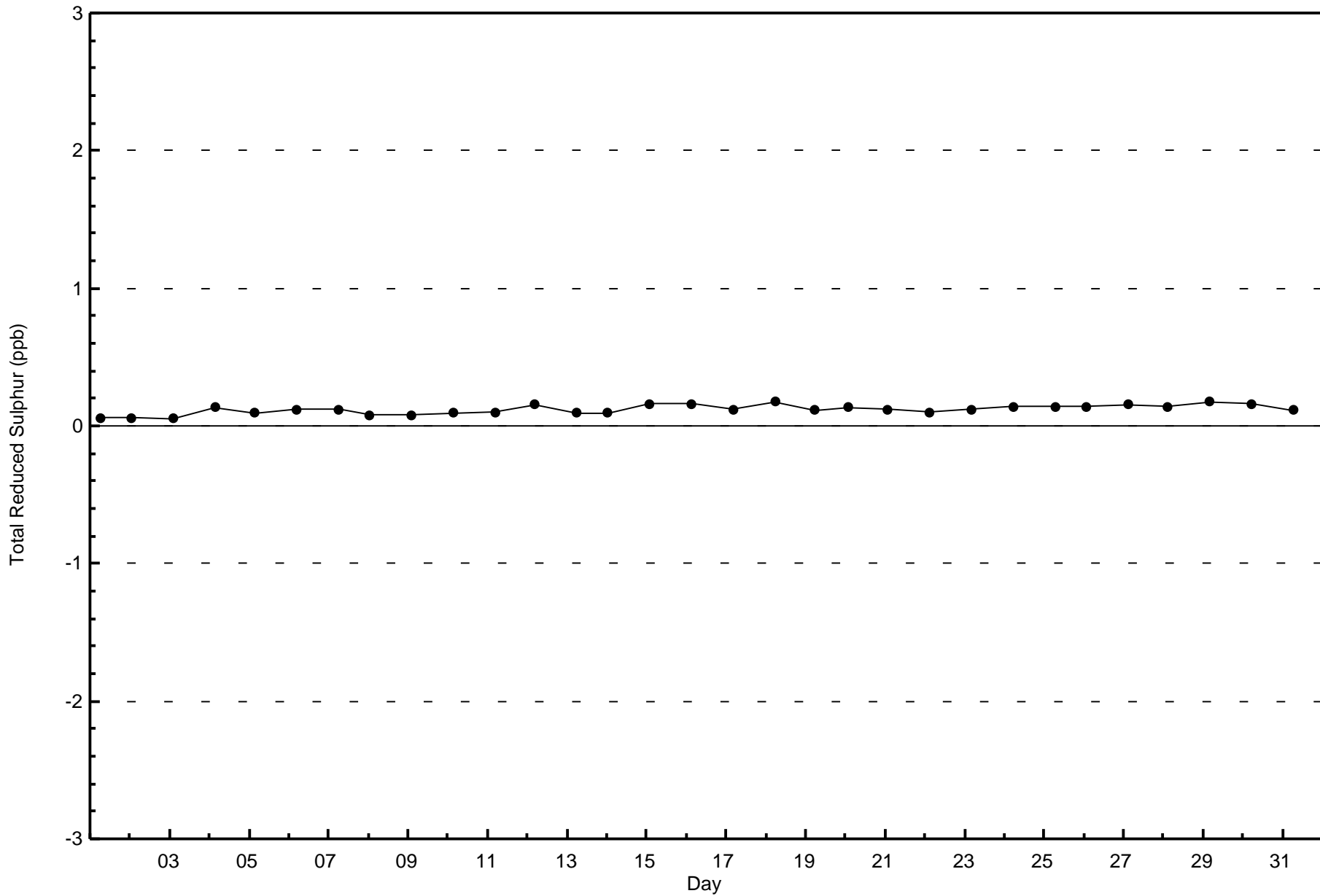


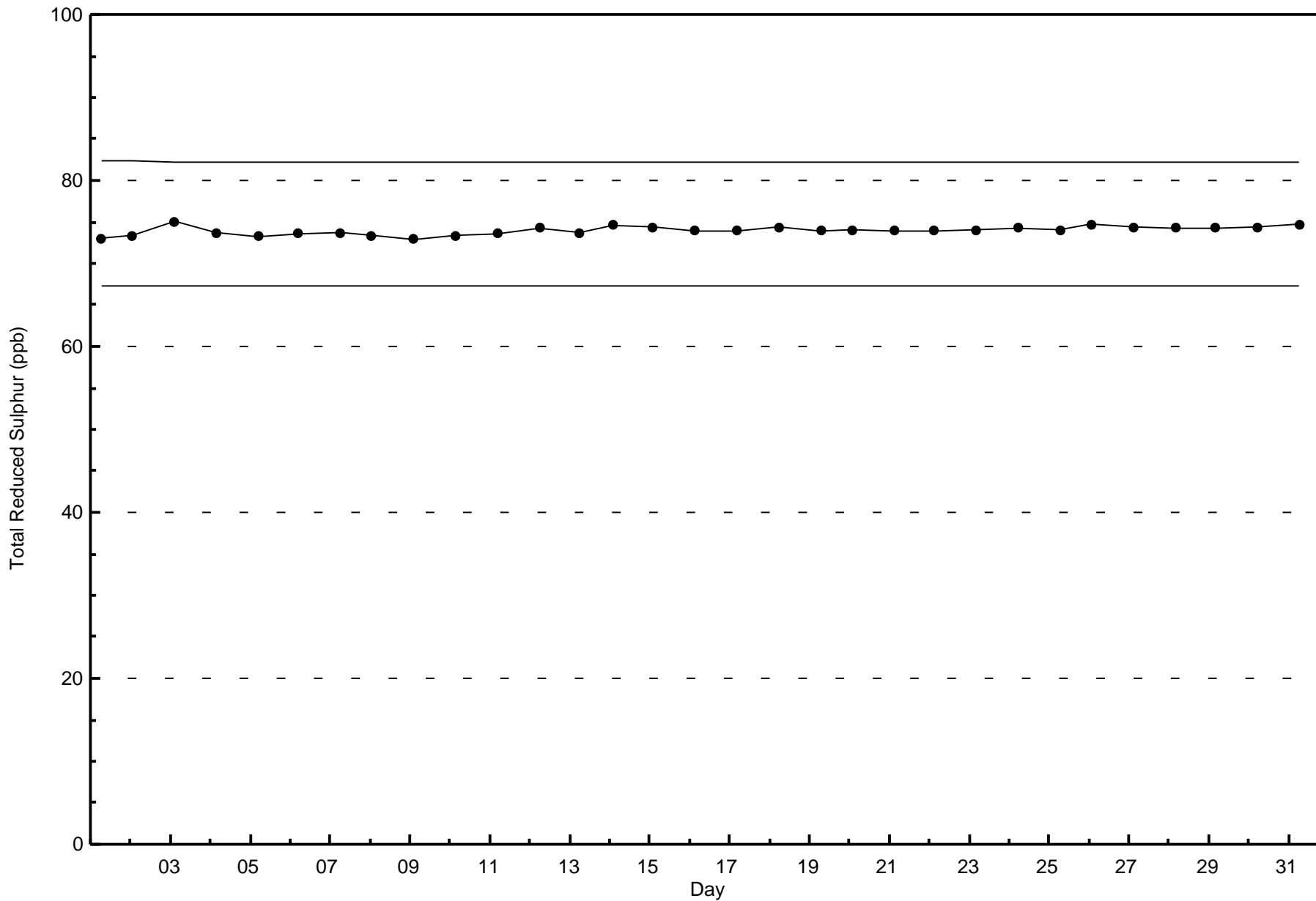
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 707







Wood Buffalo Environmental Association
Summary of Hour Averages

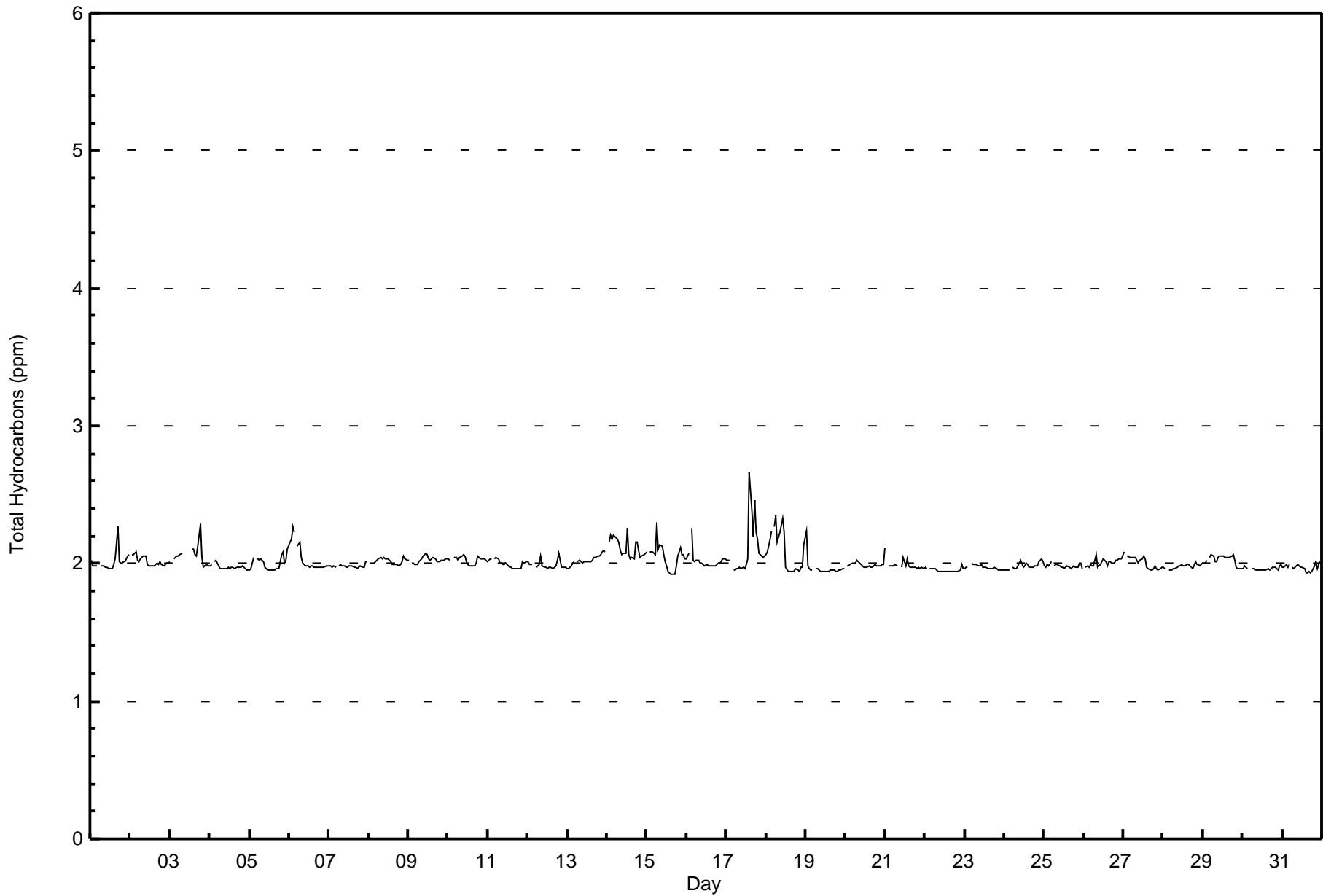
Total Hydrocarbons (THC) - ppm
Athabasca Valley - March 2017

Maximum Value: 2.7 ppm on Mar 17 15:00		Maximum Daily Average: 2.1 ppm on Mar 14		Hours in Service: 744																							
Minimum Value: 1.9 ppm on Mar 15 16:00		Minimum Daily Average: 2.0 ppm on Mar 22		Hours of Data: 706																							
Maximum Diurnal Average: 2.0 ppm at hour 4		Minimum Diurnal Average: 2.0 ppm at hour 14		Hours of Missing Data: 38																							
Monthly Average: 2.01 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.3		Hours of Calibration: 36																							
				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-Mar	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	2.0	2.0	2.0	2.3	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.3	
2-Mar	Z	2.1	2.1	2.1	2.0	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	2.0	2.0	2.0	2.1
3-Mar	2.0	Z	2.0	2.0	2.1	2.1	2.1	2.1	C	C	C	C	C	2.1	2.1	2.1	2.1	2.1	2.3	2.0	2.0	2.0	2.0	2.0	2.0	2.3	
4-Mar	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	2.0	2.0
5-Mar	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	2.1	2.1	2.0	2.0	2.1	2.1	2.1
6-Mar	2.2	2.2	2.3	2.2	Z	2.1	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3
7-Mar	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	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
8-Mar	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	2.0	2.0	2.1
9-Mar	2.0	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
10-Mar	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1
11-Mar	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	2.0
12-Mar	2.0	2.0	2.0	2.0	Z	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	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1
13-Mar	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	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
14-Mar	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.3	2.1	2.0	2.0	2.0	2.2	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.3
15-Mar	2.1	Z	2.1	2.1	2.1	2.1	2.3	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.3
16-Mar	2.0	2.1	Z	2.3	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	2.3
17-Mar	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	2.7	2.4	2.2	2.5	2.2	2.2	2.1	2.1	2.0	2.1	2.1	2.7	
18-Mar	2.1	2.1	2.2	2.2	Z	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.0	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.0	2.1	2.1	2.3	
19-Mar	2.2	2.0	2.0	2.0	2.0	Z	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	1.9	2.0	2.0	2.0	2.0	2.2	
20-Mar	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	2.0
21-Mar	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	M	M	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	
22-Mar	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	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	
23-Mar	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	2.0
24-Mar	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	2.0	2.0
25-Mar	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	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-Mar	Z	2.0	2.0	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	2.0	2.0	2.0	2.0	2.0	2.1
27-Mar	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
28-Mar	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	2.0	2.0
29-Mar	2.0	2.0	2.0	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
30-Mar	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	2.0	2.0
31-Mar	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	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
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Athabasca Valley - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Athabasca Valley - March 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	597	84.56	84.56
2.1 - 3.0	109	15.44	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
Athabasca Valley - March 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	74	19	13	8	28	60	145	22	10	6	19	14	28	17	29	105	597
2.1 - 3.0	9	1	2	1	0	2	30	13	2	3	2	3	0	4	5	32	109
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	83	20	15	9	28	62	175	35	12	9	21	17	28	21	34	137	706

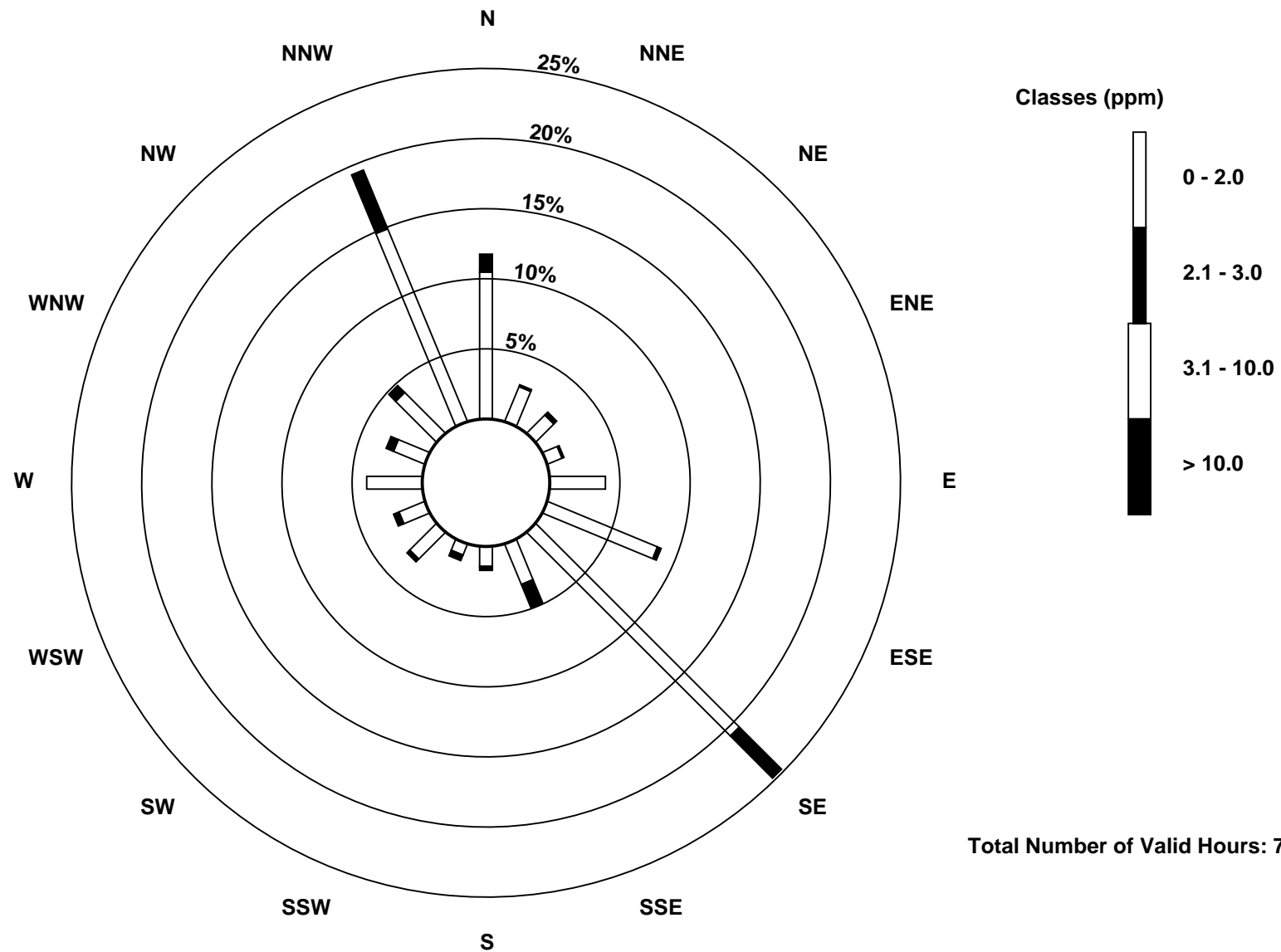
Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Hydrocarbons (THC) - ppm
Athabasca Valley (AMS 7)

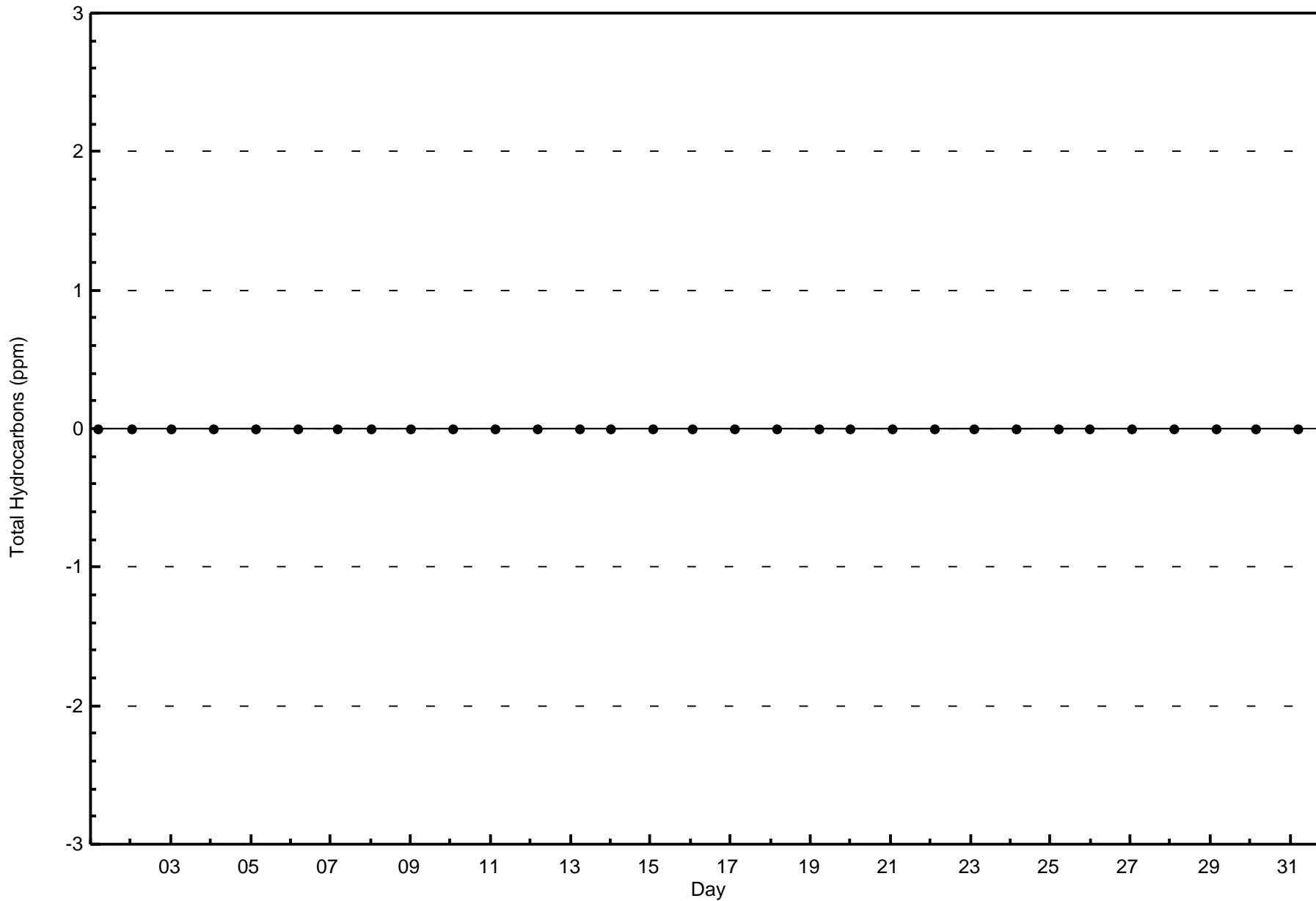


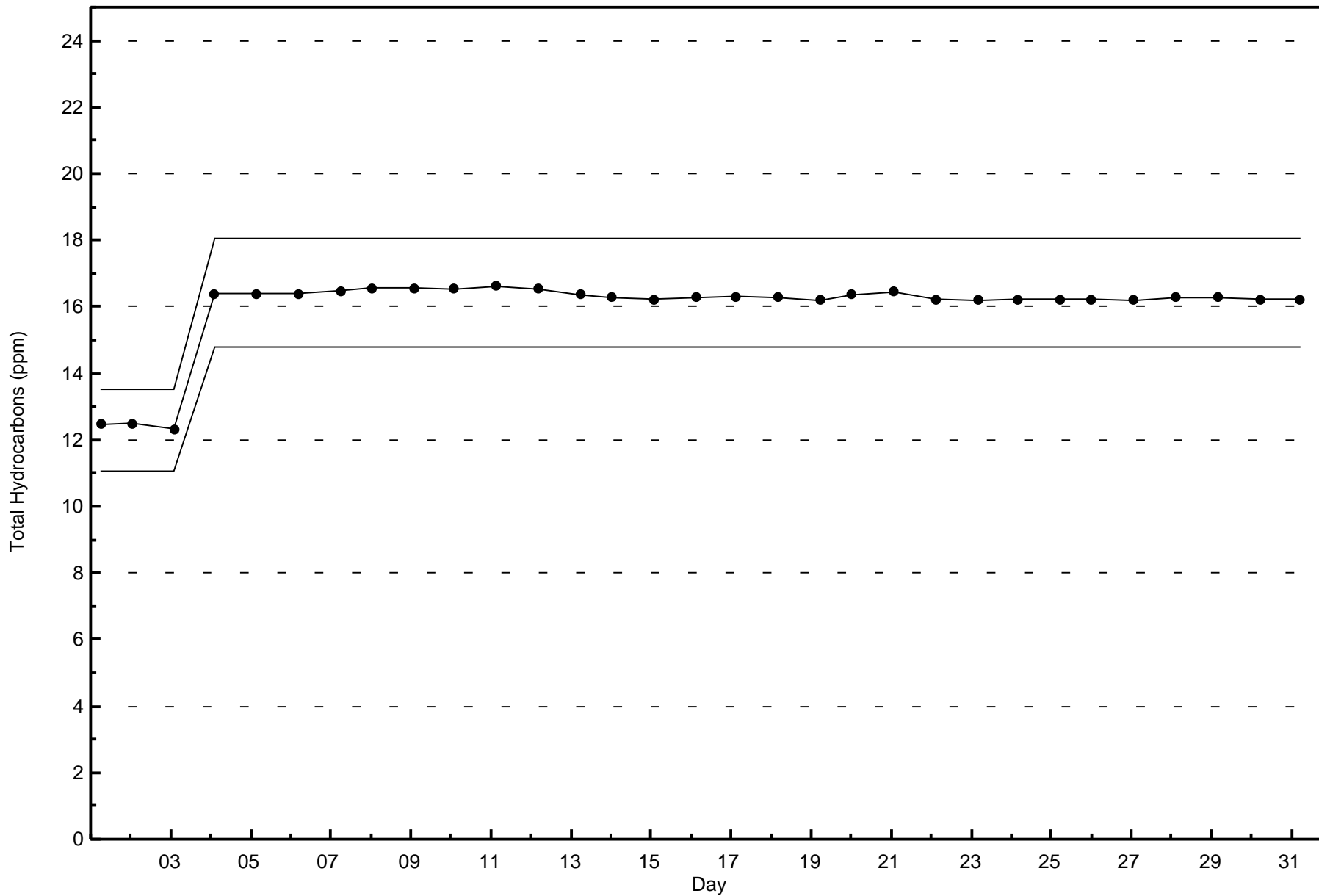
Total Number of Valid Hours: 706



Wood Buffalo Environmental Association
Zero Responses

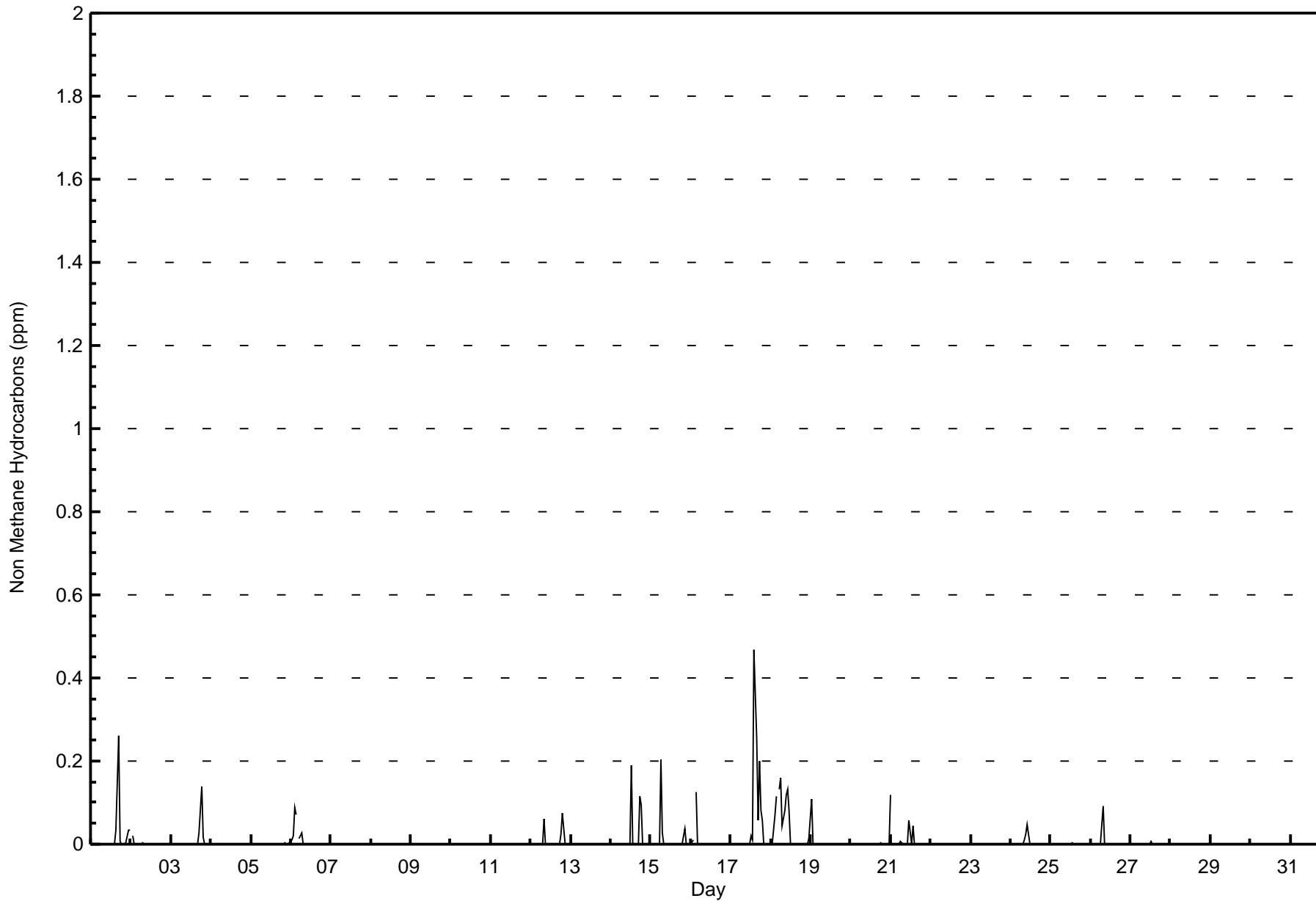
Total Hydrocarbons (THC) - ppm
Athabasca Valley - March 2017







Maximum Value: 0.468 ppm on Mar 17 15:00		Maximum Daily Average: 0.050 ppm on Mar 17		Hours in Service:	744																					
Minimum Value: 0.000 ppm on Mar 1 01:00		Minimum Daily Average: 0.000 ppm on Mar 4		Hours of Data:	706																					
Maximum Diurnal Average: 0.015 ppm at hour 15		Minimum Diurnal Average: 0.000 ppm at hour 5		Hours of Missing Data:	38																					
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 = 0.1		Hours of Calibration:	36																					
				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-Mar	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	0.033	0.260	0.008	0.000	0.000	0.000	0.002	0.034	0.035	0.016	0.260
2-Mar	Z	0.021	0.001	0.000	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.021
3-Mar	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	C	0.000	0.000	0.000	0.000	0.026	0.137	0.016	0.000	0.000	0.000	0.000	0.010	0.137
4-Mar	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
5-Mar	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	0.004	0.000	0.000	0.000	0.004
6-Mar	0.012	0.019	0.089	0.073	Z	0.014	0.029	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.089
7-Mar	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
8-Mar	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
9-Mar	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
10-Mar	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
11-Mar	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
12-Mar	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.062	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.074	0.000	0.000	0.000	0.000	0.007	0.074
13-Mar	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
14-Mar	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.189	0.000	0.000	0.000	0.000	0.116	0.094	0.000	0.000	0.000	0.000	0.000	0.017	0.189
15-Mar	0.000	Z	0.000	0.000	0.000	0.000	0.204	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.037	0.001	0.001	0.000	0.012	0.204
16-Mar	0.000	0.012	Z	0.126	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.126
17-Mar	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.010	0.468	0.254	0.059	0.202	0.083	0.059	0.000	0.000	0.000	0.000	0.000	0.050	0.468
18-Mar	0.000	0.001	0.070	0.115	Z	0.133	0.160	0.043	0.081	0.118	0.132	0.079	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.041	0.160
19-Mar	0.108	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	0.005	0.108
20-Mar	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	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.003
21-Mar	0.119	Z	0.000	0.000	0.000	0.000	0.005	0.000	M	M	0.000	0.057	0.000	0.044	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.119
22-Mar	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
23-Mar	0.000	0.000	0.000	Z	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	0.000	0.000	0.001
24-Mar	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.010	0.024	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.046
25-Mar	0.000	0.000	0.000	0.000	0.000	Z	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	0.002
26-Mar	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.090	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.090
27-Mar	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008
28-Mar	0.000	0.000	Z	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	0.000	0.000	0.000	0.002
29-Mar	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
30-Mar	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
31-Mar	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
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - March 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	653	92.49	92.49
0.006 - 0.05	24	3.40	95.89
0.06 - 0.1	22	3.12	99.01
> 0.1	7	0.99	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - March 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	76	20	14	9	27	62	167	31	11	9	19	17	28	19	32	112	653
0.006 - 0.05	2	0	1	0	0	0	5	1	0	0	2	0	0	1	1	11	24
0.06 - 0.1	5	0	0	0	1	0	2	2	1	0	0	0	0	1	1	9	22
> 0.1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	5	7
Totals	83	20	15	9	28	62	175	35	12	9	21	17	28	21	34	137	706

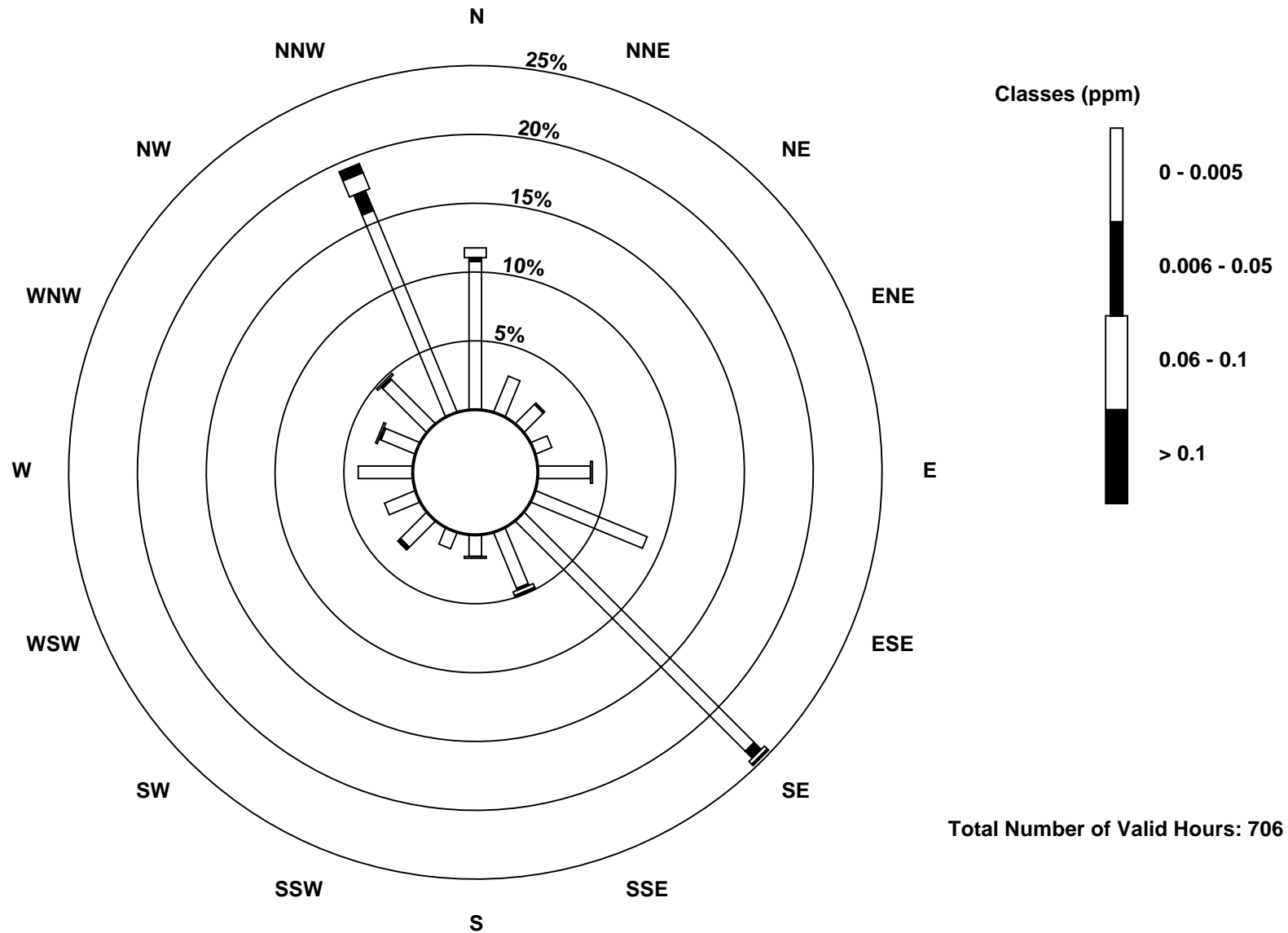
Total Number of Valid Hours: 706

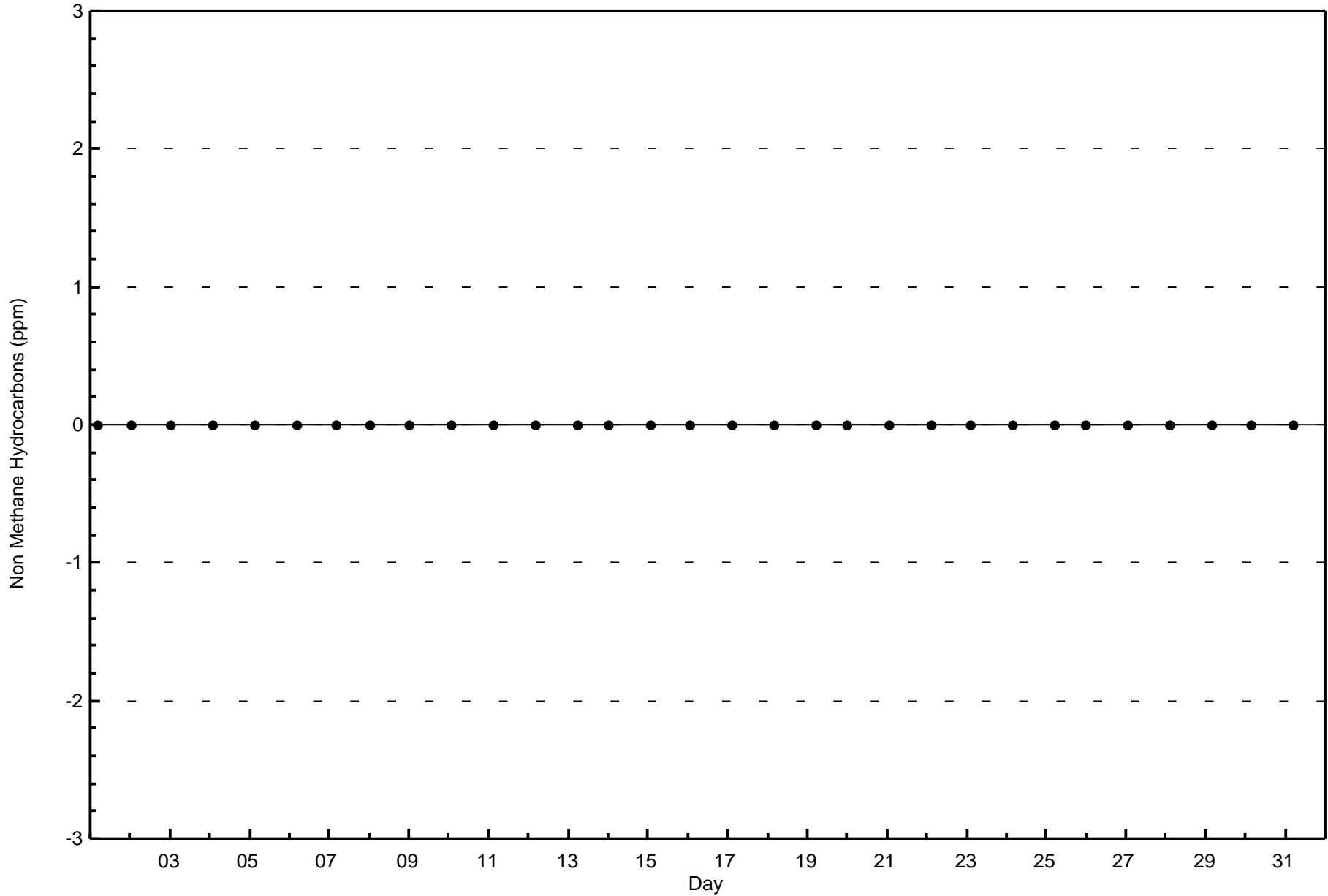
Total Number of Hours: 744

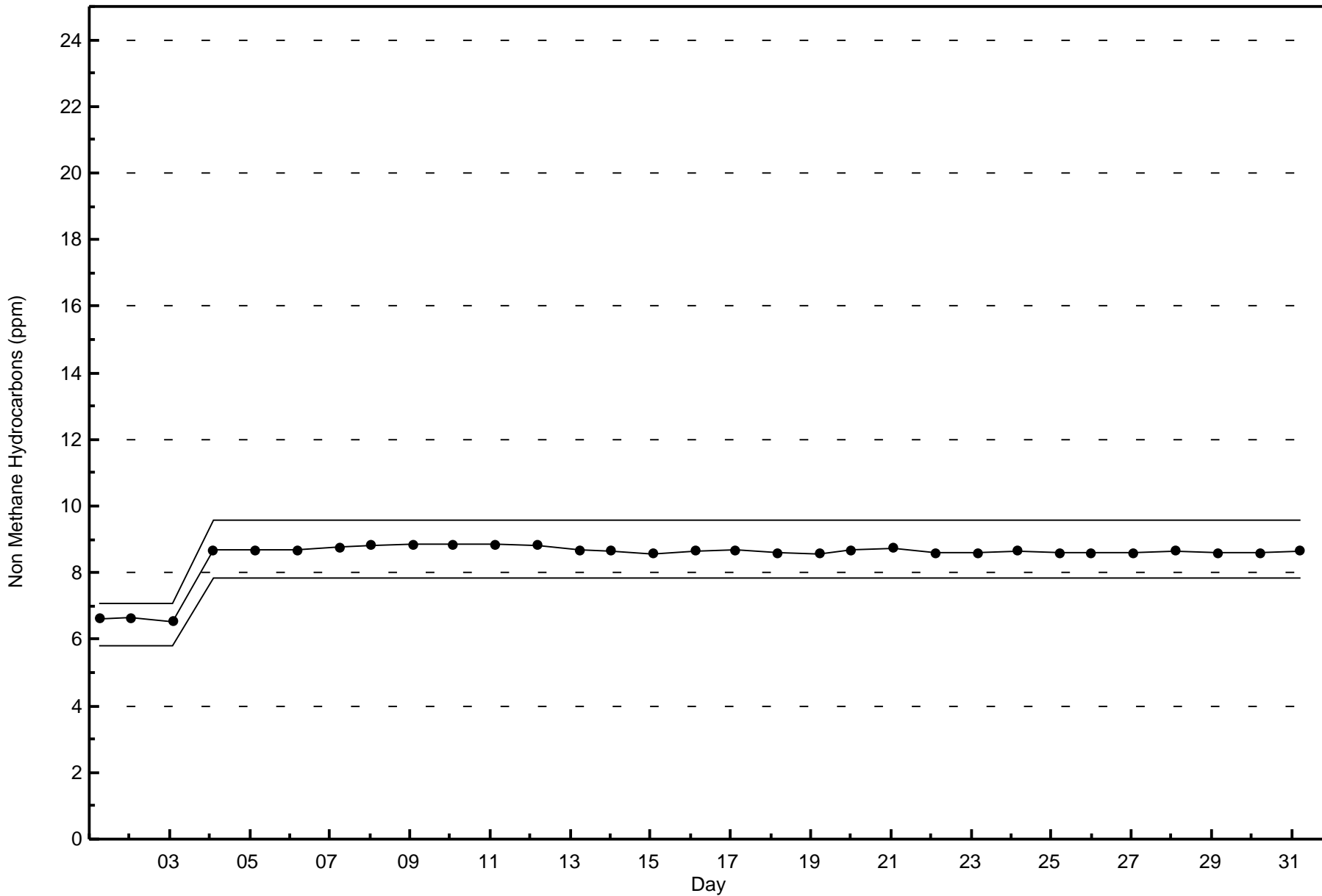


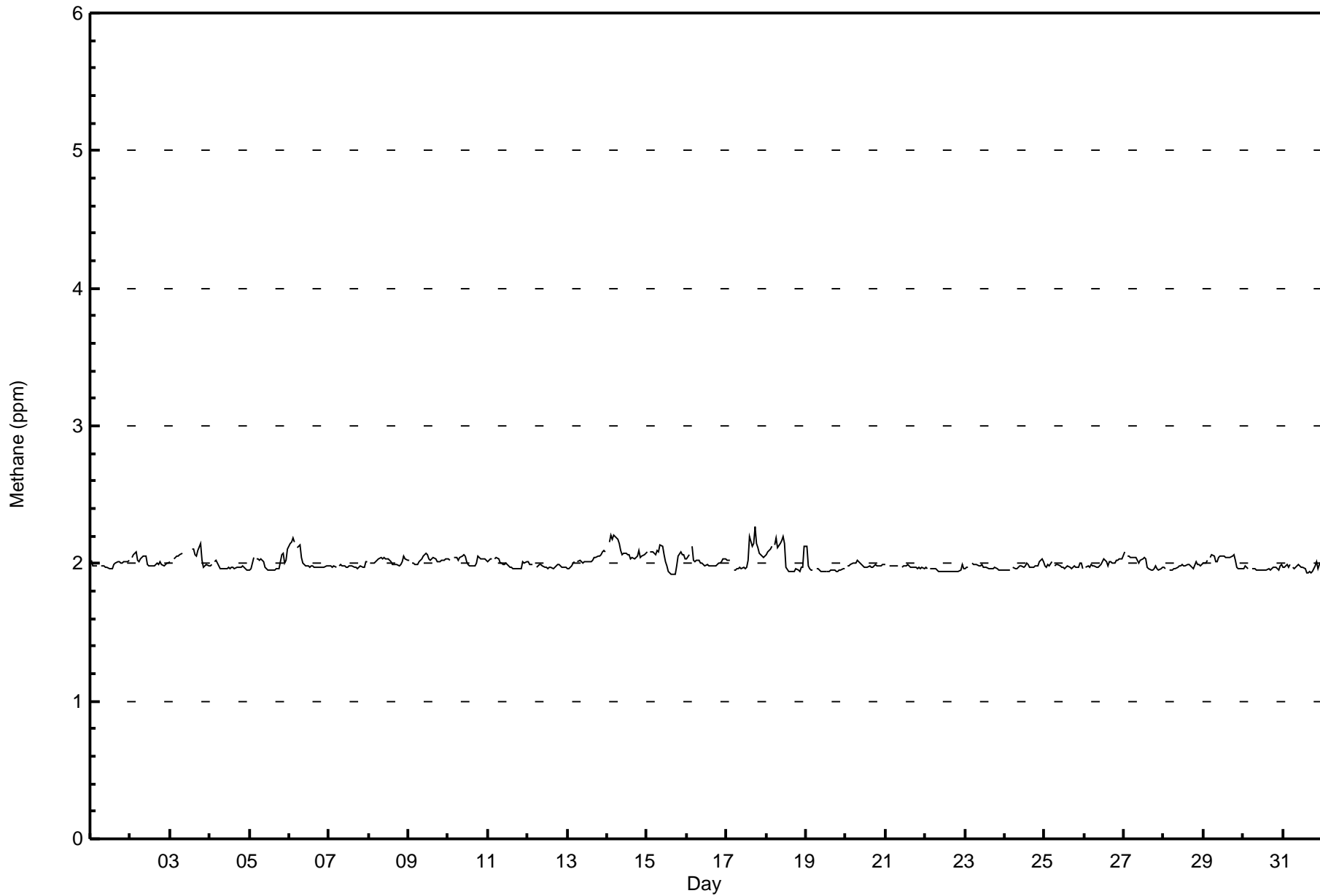
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley (AMS 7)











**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Athabasca Valley - March 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	606	85.84	85.84
2.1 - 3.0	100	14.16	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**

**Methane (CH₄) - ppm
Athabasca Valley - March 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	75	19	14	8	28	60	147	24	10	6	21	14	28	17	29	106	606
2.1 - 3.0	8	1	1	1	0	2	28	11	2	3	0	3	0	4	5	31	100
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	83	20	15	9	28	62	175	35	12	9	21	17	28	21	34	137	706

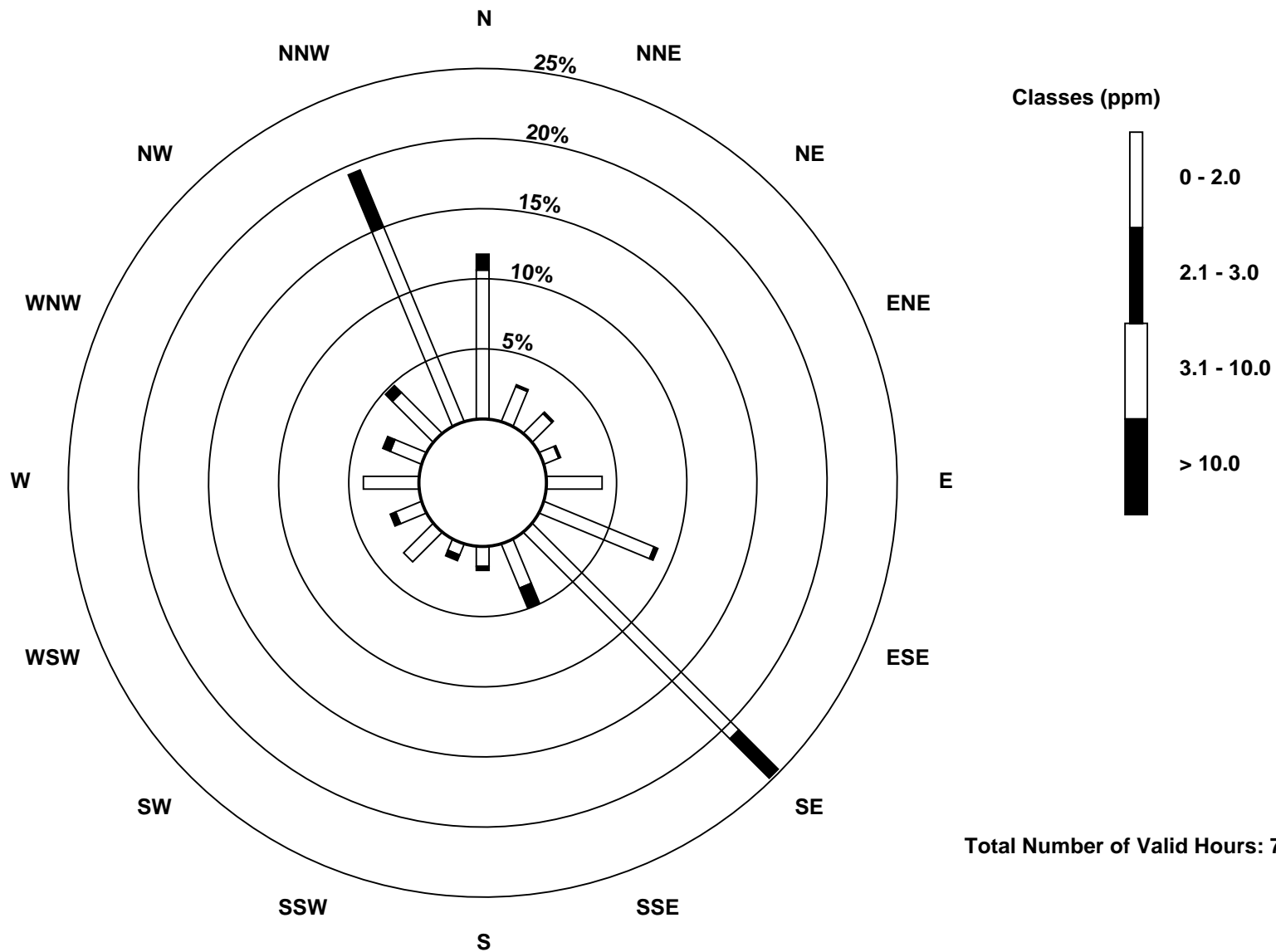
Total Number of Valid Hours: 706

Total Number of Hours: 744

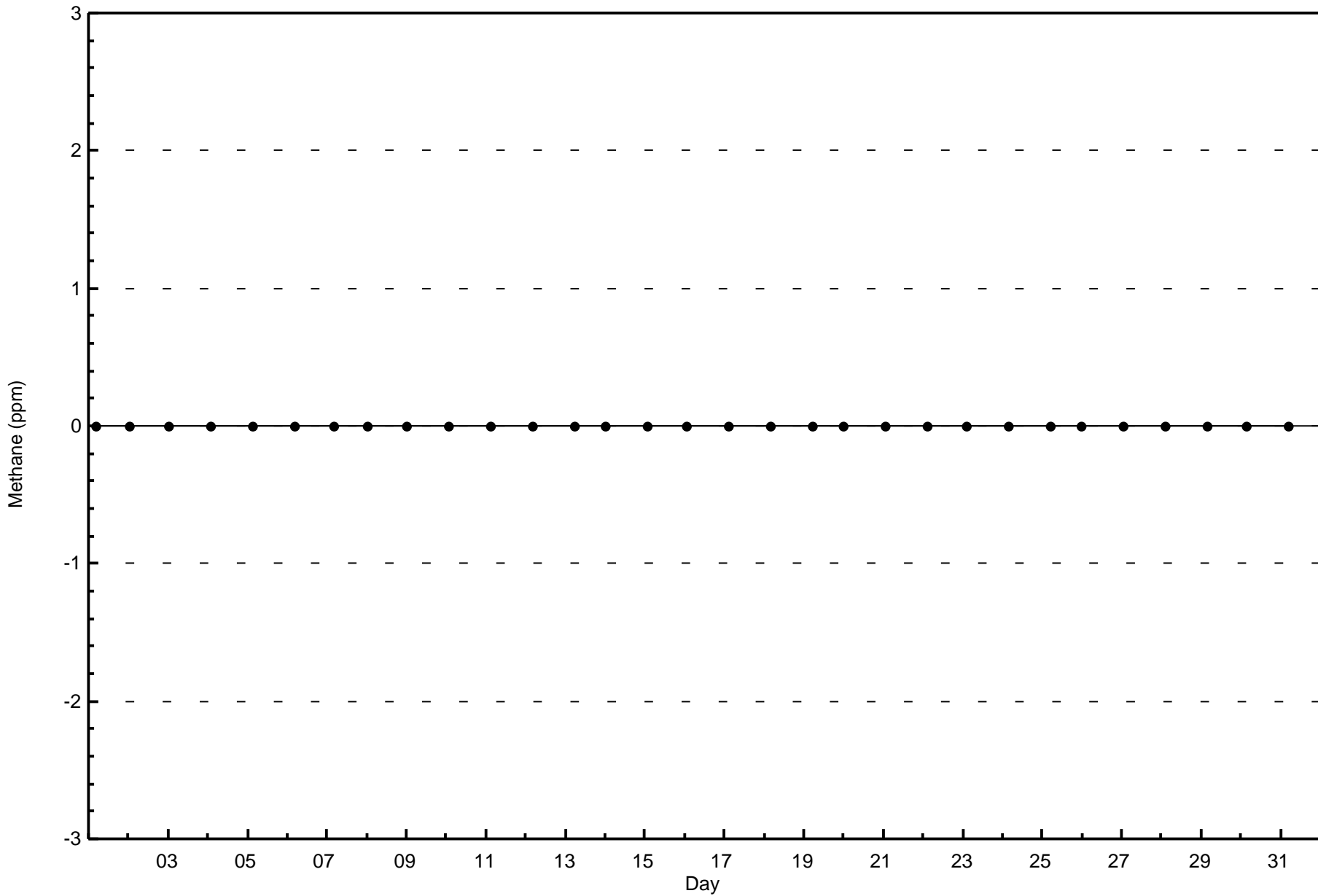


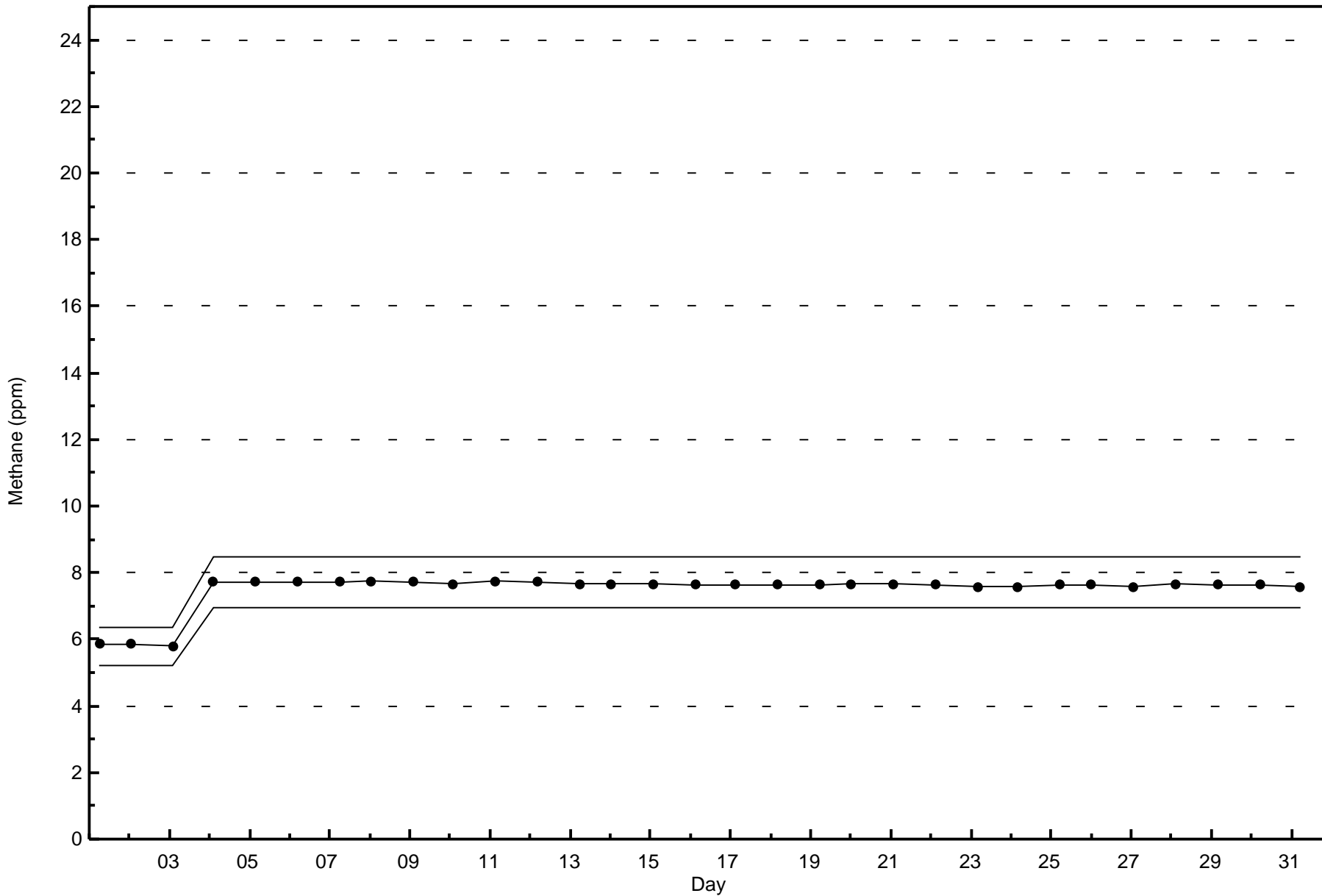
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Methane (CH₄) - ppm
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 706







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

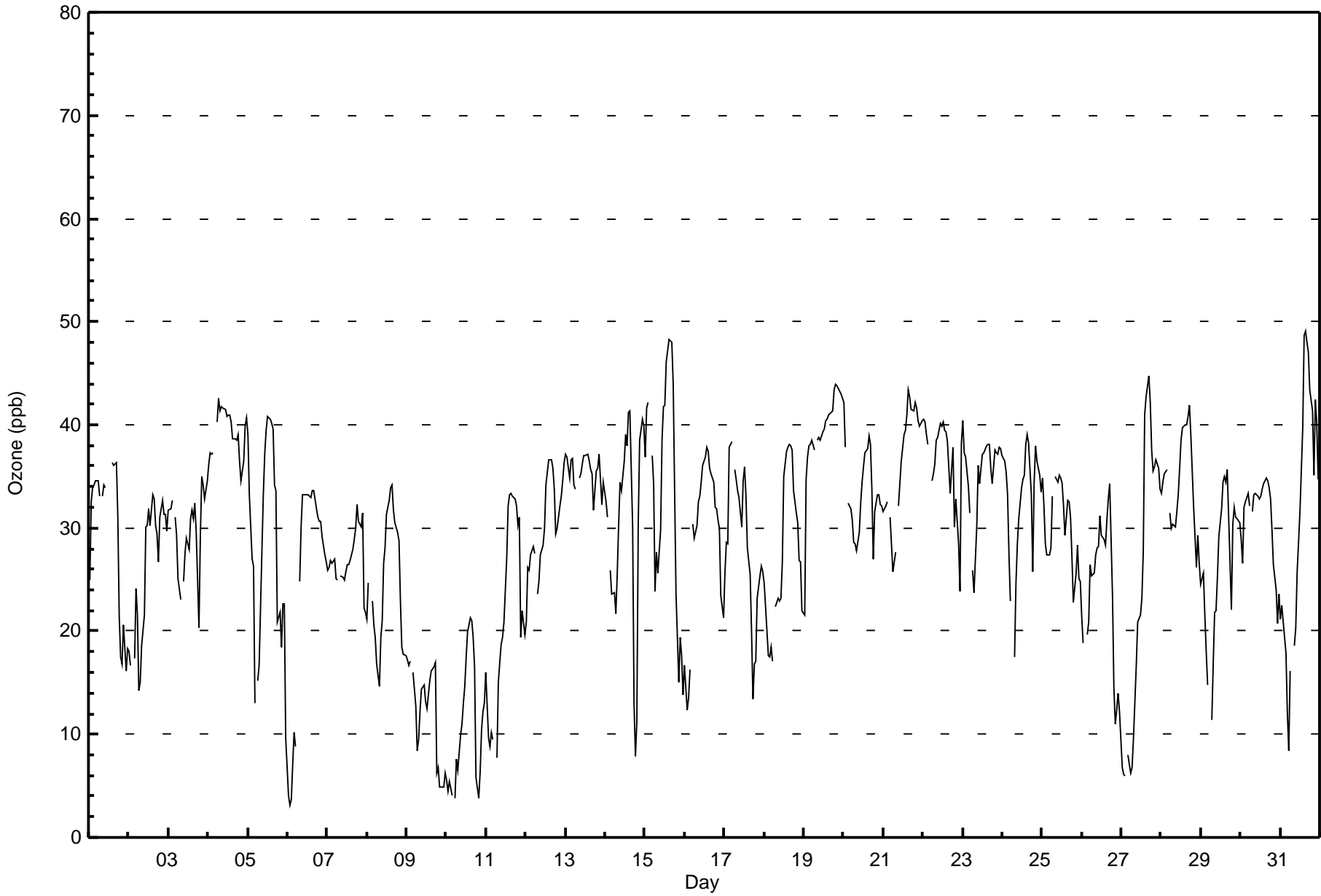
Athabasca Valley - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 49 ppb on Mar 31 16:00										Maximum Daily Average: 39.3 ppb on Mar 19										Hours of Data: 708						
Minimum Value: 3 ppb on Mar 6 02:00										Minimum Daily Average: 11.0 ppb on Mar 10										Hours of Missing Data: 36						
Maximum Diurnal Average: 35.8 ppb at hour 16										Minimum Diurnal Average: 23.1 ppb at hour 8										Hours of Calibration: 34						
Monthly Average: 29.1 ppb										Percentiles: P ₁ = 5 P ₁₀ = 15 Q ₁ = 23 Median = 31 Q ₃ = 36 P ₉₀ = 40 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-Mar	25	33	34	34	35	35	33	Z	33	34	34	C	C	C	36	36	36	31	21	17	17	21	16	18	29.0	36
2-Mar	18	17	Z	17	24	22	14	15	19	22	30	30	32	30	33	33	30	29	27	31	33	31	31	30	26.0	33
3-Mar	32	32	33	Z	31	29	25	23	M	25	27	29	28	31	32	31	32	30	20	29	35	34	33	35	29.8	35
4-Mar	36	37	37	Z	40	43	41	42	42	42	41	41	41	41	40	39	39	38	39	36	35	36	40	41	39.3	43
5-Mar	39	33	27	26	13	Z	15	17	28	33	37	39	41	40	40	40	34	34	21	22	18	23	23	10	28.4	41
6-Mar	4	3	4	7	10	9	Z	25	30	33	33	33	33	33	33	34	34	32	31	31	31	29	27	27	24.6	34
7-Mar	26	26	27	27	27	25	25	Z	25	25	25	26	26	26	27	28	29	30	32	31	30	32	22	22	26.9	32
8-Mar	21	25	Z	23	21	19	17	15	19	21	27	28	31	33	34	34	32	31	30	29	23	18	18	18	24.6	34
9-Mar	17	17	17	Z	16	13	8	10	12	14	15	13	12	14	15	16	17	17	6	7	5	5	5	6	12.0	17
10-Mar	6	5	5	4	Z	4	8	7	10	11	13	15	17	20	21	21	19	17	6	4	6	10	12	13	11.0	21
11-Mar	16	10	9	10	9	Z	8	15	17	19	19	21	27	32	33	33	33	33	32	30	31	19	22	20	21.7	33
12-Mar	21	26	26	27	28	28	Z	24	25	27	28	30	34	35	37	37	36	34	29	30	32	33	35	36	30.4	37
13-Mar	37	37	35	37	37	34	34	Z	35	35	36	37	37	37	36	36	35	32	35	36	37	35	32	34	35.5	37
14-Mar	33	31	Z	26	24	24	22	26	30	34	34	36	39	38	41	41	30	13	8	11	30	39	41	40	30.0	41
15-Mar	37	42	42	Z	37	34	24	28	26	30	39	42	42	46	48	48	48	44	34	24	15	19	18	14	33.9	48
16-Mar	17	12	14	16	Z	30	29	30	33	33	34	36	37	38	37	36	35	34	32	32	31	30	23	21	29.2	38
17-Mar	26	29	29	38	38	Z	36	35	34	33	30	35	36	33	28	26	20	13	17	17	23	25	26	26	28.3	38
18-Mar	25	22	18	17	18	17	Z	22	23	23	23	27	35	37	38	38	38	38	34	32	31	27	27	22	27.4	38
19-Mar	22	35	37	38	38	38	38	Z	39	39	39	39	40	40	41	41	41	41	43	44	44	44	43	43	39.3	44
20-Mar	42	38	Z	32	32	31	29	28	28	30	32	34	36	37	38	39	38	34	27	32	33	33	32	32	33.4	42
21-Mar	32	32	32	Z	31	28	26	28	M	32	34	36	39	39	41	43	43	41	41	42	42	40	40	40	36.6	43
22-Mar	41	40	39	38	Z	35	35	36	38	39	40	40	40	40	39	38	33	36	38	30	33	29	24	38	36.5	41
23-Mar	40	37	37	34	31	Z	26	24	30	36	34	36	37	37	38	38	38	36	34	38	37	37	38	38	35.3	40
24-Mar	37	37	35	33	27	23	Z	17	25	28	31	34	35	35	38	39	38	33	26	34	38	36	35	34	32.6	39
25-Mar	35	32	28	27	27	28	33	Z	35	34	35	35	34	32	29	33	32	31	27	23	26	28	25	25	30.3	35
26-Mar	21	19	Z	20	21	26	25	26	27	28	28	31	29	29	28	31	33	34	24	14	11	12	14	12	23.7	34
27-Mar	7	6	6	Z	8	6	7	10	13	17	21	22	23	28	41	43	45	42	38	36	36	37	36	34	24.3	45
28-Mar	33	34	35	36	Z	31	30	30	30	32	33	36	38	40	40	40	41	42	39	32	29	26	29	27	34.1	42
29-Mar	25	26	22	18	15	Z	11	17	22	22	25	29	32	34	35	34	36	27	22	30	32	31	31	30	26.3	36
30-Mar	29	27	32	33	33	32	Z	32	33	33	33	33	33	34	34	35	35	34	33	30	26	24	21	24	30.9	35
31-Mar	21	22	19	18	12	8	16	Z	19	20	26	29	32	40	49	49	48	47	43	41	35	43	40	35	31.0	49
26.4 26.5 26.1 25.9 24.8 25.0 23.7 23.1 26.9 28.5 30.3 31.7 33.3 34.4 35.6 35.8 34.8 32.5 28.7 28.2 28.5 28.6 27.7 27.2																								Diurnal Average		
42 42 42 38 38 40 43 41 42 42 42 42 42 46 49 49 48 47 43 44 44 44 44 43 43																								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 - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Athabasca Valley - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	132	18.64	18.64
21 - 50	576	81.36	100.00
51 - 82	0	0.00	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
Athabasca Valley - March 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	7	11	3	0	4	7	0	2	4	15	9	10	7	8	25	132
21 - 50	62	13	4	8	26	56	173	36	10	4	7	4	21	15	26	111	576
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	82	20	15	11	26	60	180	36	12	8	22	13	31	22	34	136	708

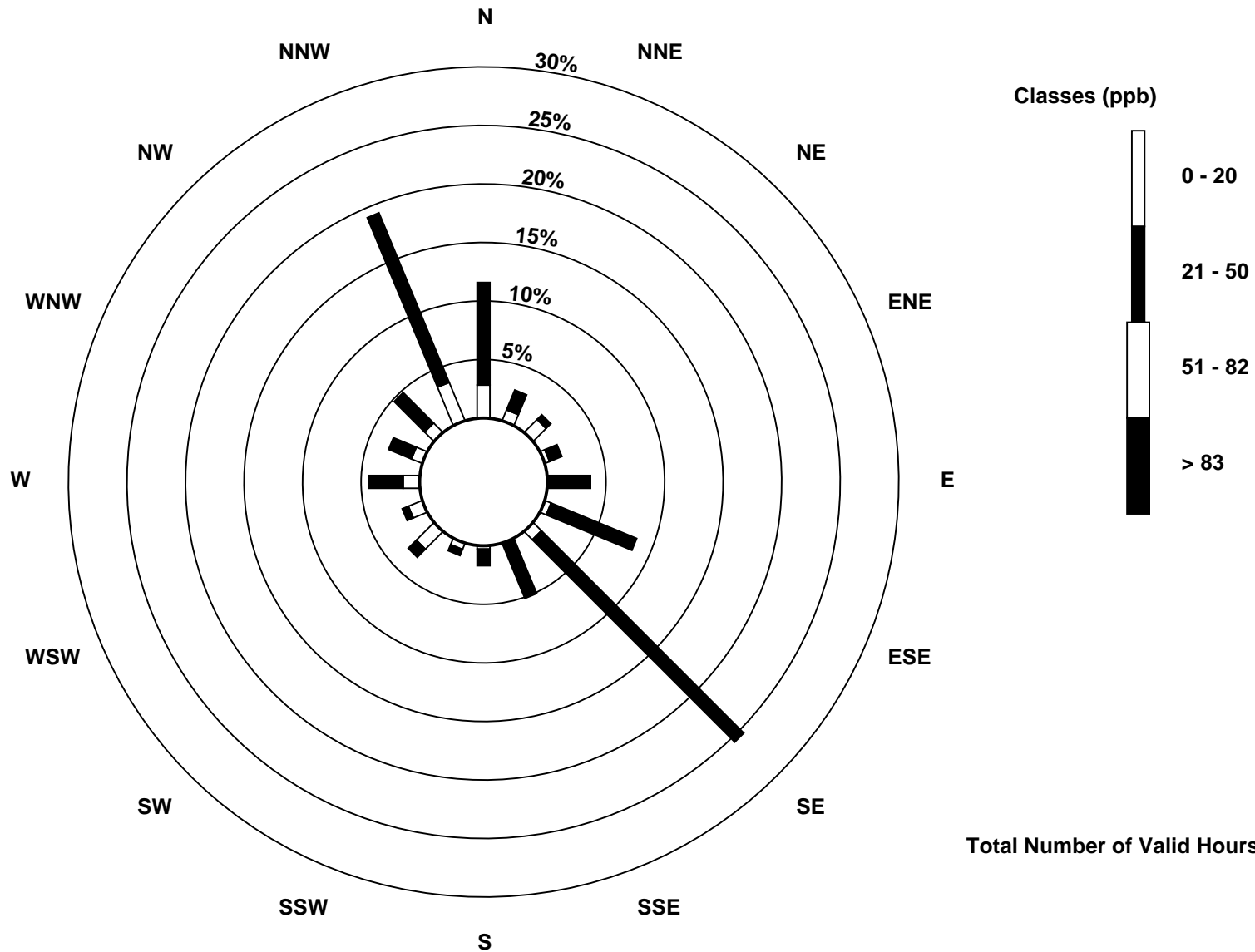
Total Number of Valid Hours: 708

Total Number of Hours: 744

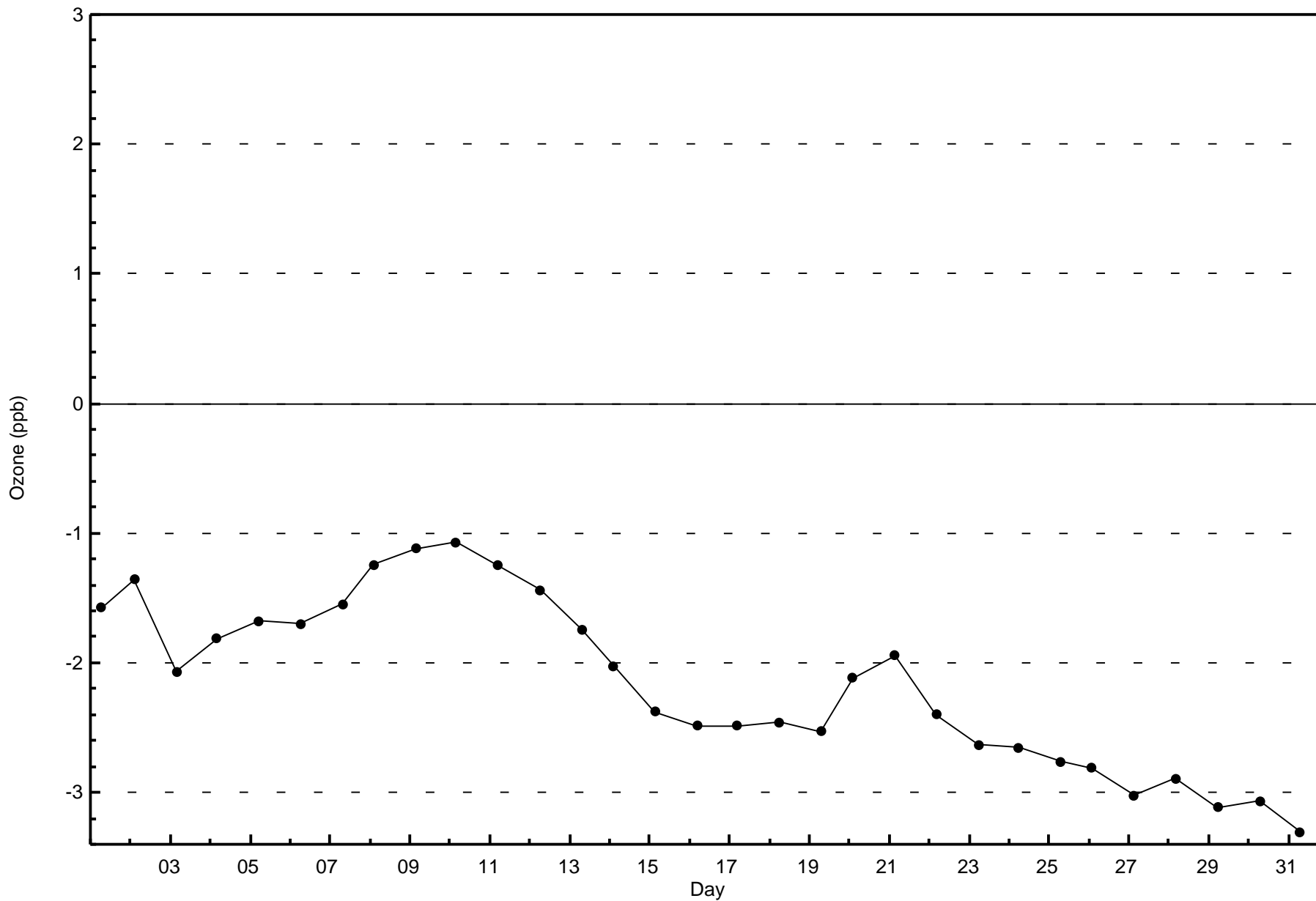


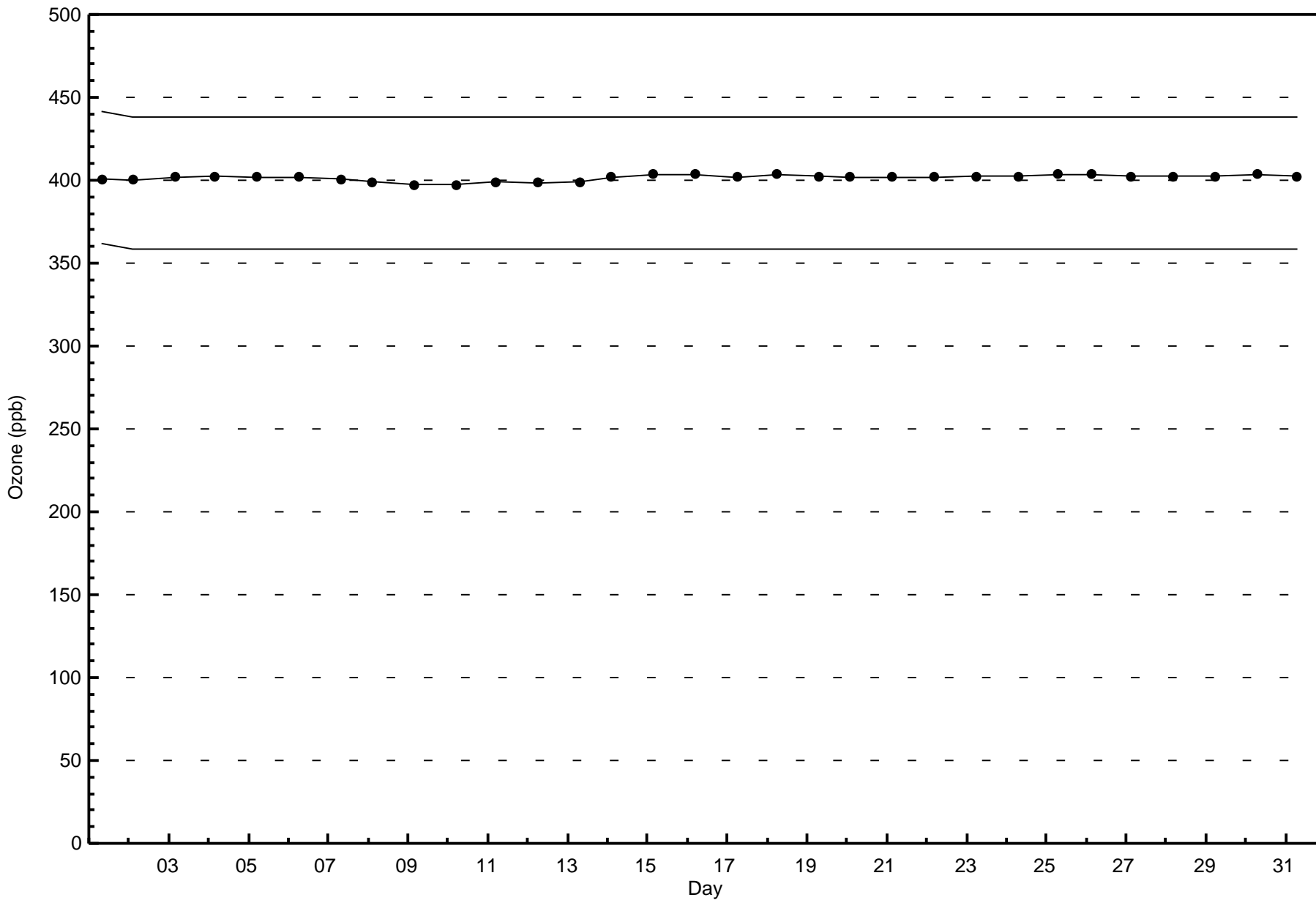
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Ozone (O₃) - ppb
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 708





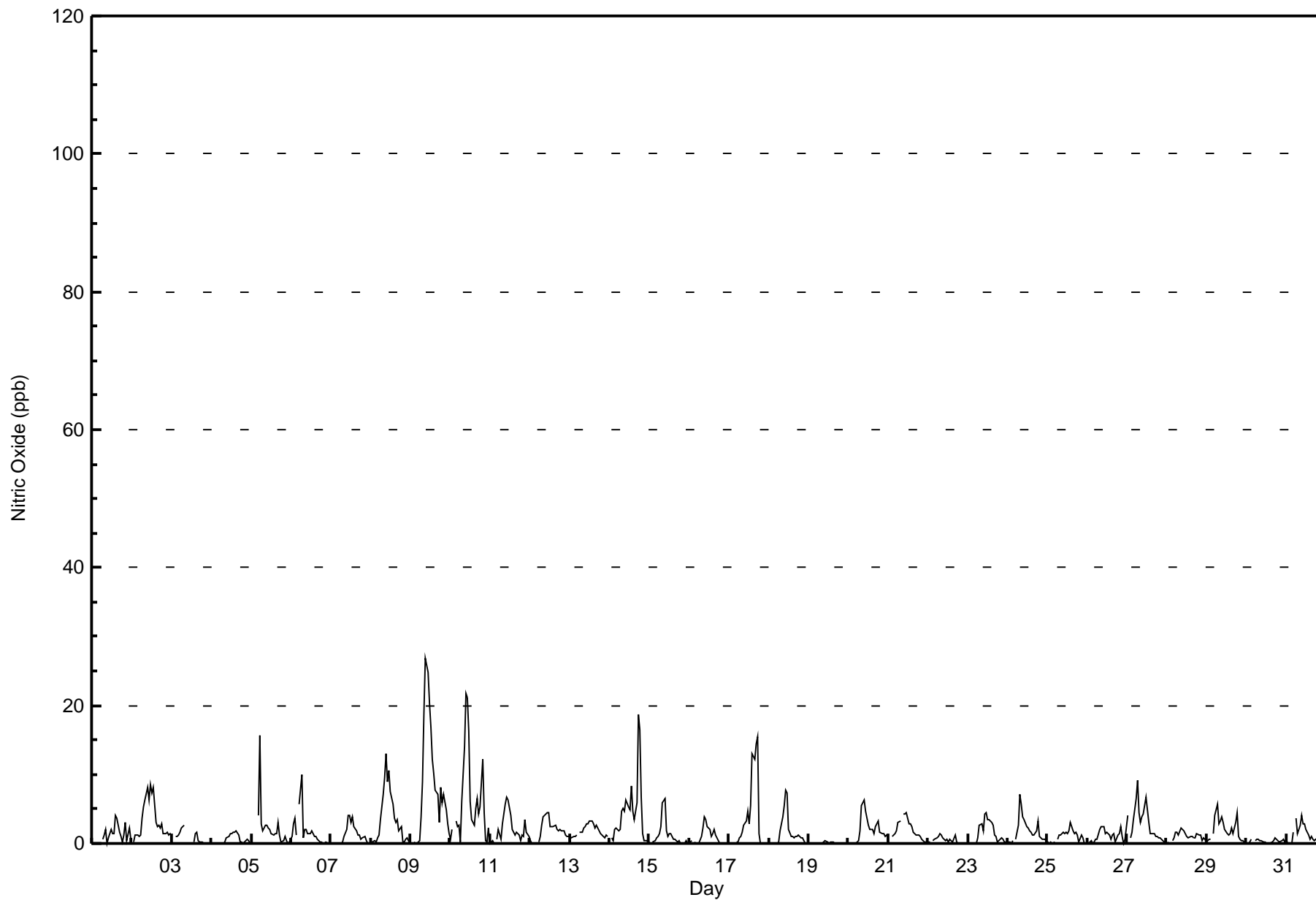


Maximum Value: 27 ppb on Mar 9 10:00		Maximum Daily Average: 8.3 ppb on Mar 9		Hours in Service: 744																							
Minimum Value: 0 ppb on Mar 3 20:00		Minimum Daily Average: 0.1 ppb on Mar 19		Hours of Data: 707																							
Maximum Diurnal Average: 5.0 ppb at hour 10		Minimum Diurnal Average: 0.3 ppb at hour 2		Hours of Missing Data: 37																							
Monthly Average: 2.1 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 19		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-Mar	0	0	0	0	0	Z	1	1	2	0	1	2	1	2	4	4	2	1	0	1	3	0	2	1	1.2	4	
2-Mar	Z	0	1	1	1	1	4	5	6	8	6	9	7	8	3	2	3	2	3	1	2	2	1	1	3.4	9	
3-Mar	1	Z	1	1	1	2	2	3	C	C	C	C	C	0	1	2	0	0	0	0	0	0	0	0.8	3		
4-Mar	0	0	Z	0	0	0	0	0	0	1	1	1	1	2	2	1	0	0	0	0	1	0	0	0.6	2		
5-Mar	0	0	0	Z	4	16	3	2	3	3	2	2	1	1	1	1	3	1	0	0	1	0	0	2.0	16		
6-Mar	1	3	4	1	Z	6	10	1	2	2	1	1	2	1	1	1	1	0	0	0	0	0	0	1.7	10		
7-Mar	0	0	0	0	0	Z	0	0	1	2	4	4	3	4	2	2	1	1	1	1	1	0	0	1.2	4		
8-Mar	Z	0	0	0	1	1	4	7	9	13	9	11	8	6	4	3	3	2	2	0	0	1	1	3.7	13		
9-Mar	0	Z	0	0	0	0	4	9	19	27	25	20	17	12	10	8	7	3	8	6	7	5	3	8.3	27		
10-Mar	1	2	Z	3	2	3	0	6	14	22	21	16	6	3	3	5	7	4	5	12	5	0	0	6.2	22		
11-Mar	0	0	0	Z	1	2	1	3	4	6	7	6	4	2	2	1	2	1	0	1	1	3	2	2.2	7		
12-Mar	0	0	0	0	Z	0	1	3	4	4	4	4	2	2	2	3	2	2	2	2	2	1	1	1.9	4		
13-Mar	1	1	1	1	1	Z	2	2	2	2	3	3	3	3	2	3	2	1	1	1	1	1	1	1.8	3		
14-Mar	Z	1	0	2	2	2	2	5	5	5	6	5	5	8	5	3	6	19	16	7	1	0	0	4.6	19		
15-Mar	0	Z	0	0	1	1	1	2	6	7	2	1	1	1	1	1	0	0	0	0	0	0	0	1.2	7		
16-Mar	0	0	Z	0	0	0	0	1	2	4	3	3	2	1	1	2	1	0	0	0	0	0	0	0.9	4		
17-Mar	0	0	0	Z	0	0	1	1	2	3	3	5	3	6	13	12	14	15	1	0	0	0	0	3.5	15		
18-Mar	0	0	0	0	Z	0	0	2	4	5	8	7	2	1	1	1	1	1	1	1	1	0	0	1.6	8		
19-Mar	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		
20-Mar	Z	0	0	0	0	0	0	2	5	6	5	4	3	2	2	1	2	3	3	2	1	1	1	2.0	6		
21-Mar	1	Z	1	1	1	2	3	3	M	4	4	4	3	3	2	2	1	1	1	1	1	0	0	1.9	4		
22-Mar	0	0	Z	0	1	1	1	1	1	1	0	1	0	1	1	0	1	0	0	0	0	0	0	0.5	1		
23-Mar	0	0	0	Z	0	0	1	3	3	2	4	5	3	3	3	3	1	1	0	1	1	1	0	1.5	5		
24-Mar	0	0	0	0	Z	1	3	7	6	4	3	3	2	2	1	1	2	3	1	1	1	1	0	1.9	7		
25-Mar	0	0	0	0	0	Z	1	1	1	2	1	2	1	2	3	2	2	2	1	0	1	1	0	1.0	3		
26-Mar	Z	0	0	0	0	1	1	2	2	2	2	1	2	1	1	1	1	0	1	1	2	1	0	1.1	2		
27-Mar	4	Z	1	2	4	7	9	4	3	4	4	7	5	3	1	1	1	1	1	1	1	1	0	2.8	9		
28-Mar	0	0	Z	0	1	2	2	1	2	2	2	1	1	1	1	1	1	1	1	1	1	0	1	1.1	2		
29-Mar	0	1	1	Z	1	4	6	3	3	4	3	2	1	1	1	2	1	3	4	1	1	0	0	2.0	6		
30-Mar	0	0	0	1	Z	0	1	1	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	0.3	1		
31-Mar	1	0	0	0	2	Z	4	1	3	4	3	3	2	1	1	1	1	0	1	0	1	0	0	1.2	4		
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan																								C - Calibration		M - Maintenance	



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Athabasca Valley - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Athabasca Valley - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	99.43	99.43
21 - 40	4	0.57	100.00
11 - 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
Athabasca Valley - March 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	83	19	14	9	28	62	176	35	12	9	21	17	28	20	33	137	703
21 - 40	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	4
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	83	20	15	9	28	62	176	35	12	9	21	17	28	21	34	137	707

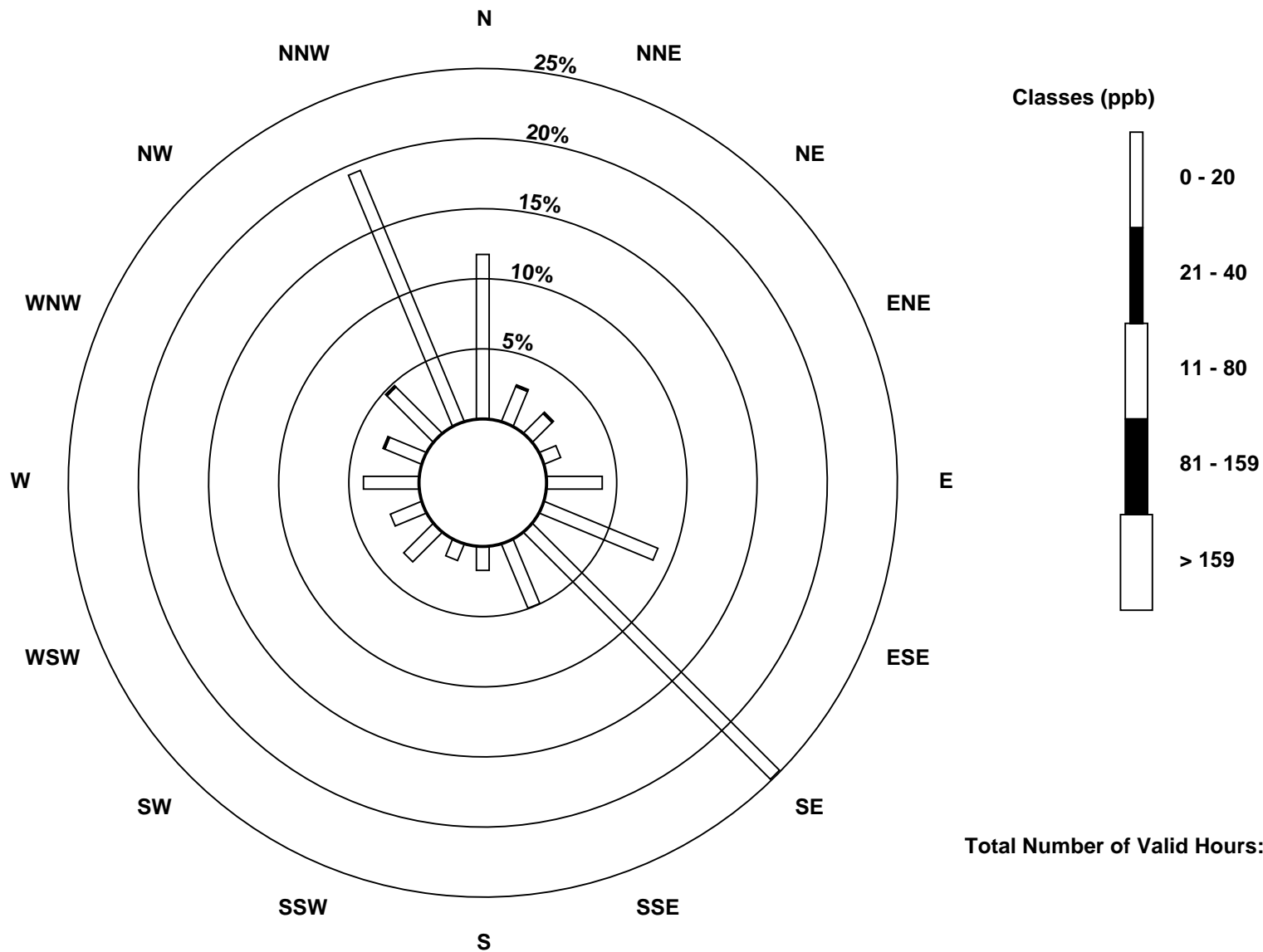
Total Number of Valid Hours: 707

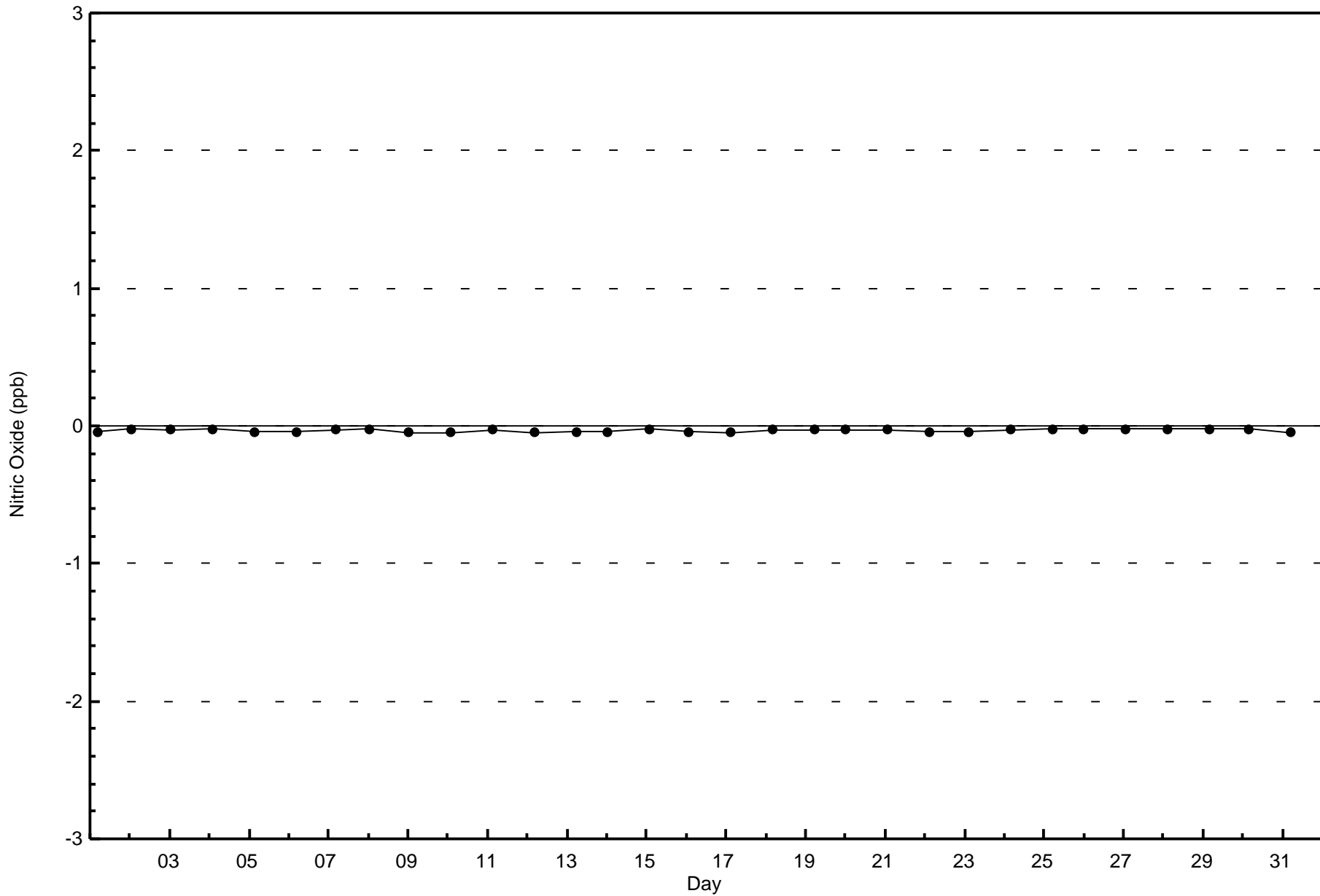
Total Number of Hours: 744

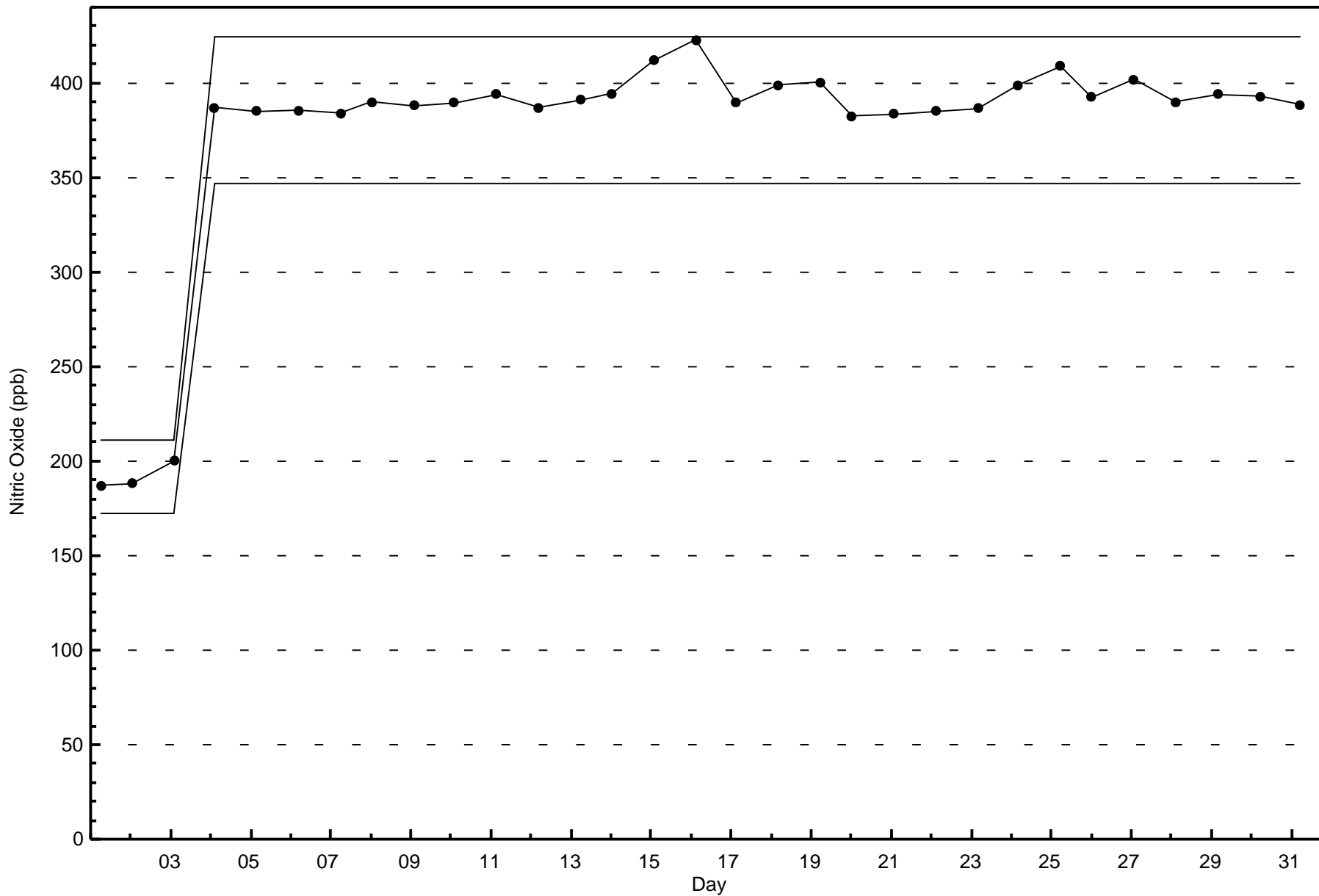


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitric Oxide (NO) - ppb
Athabasca Valley (AMS 7)









Wood Buffalo Environmental Association
Summary of Hour Averages

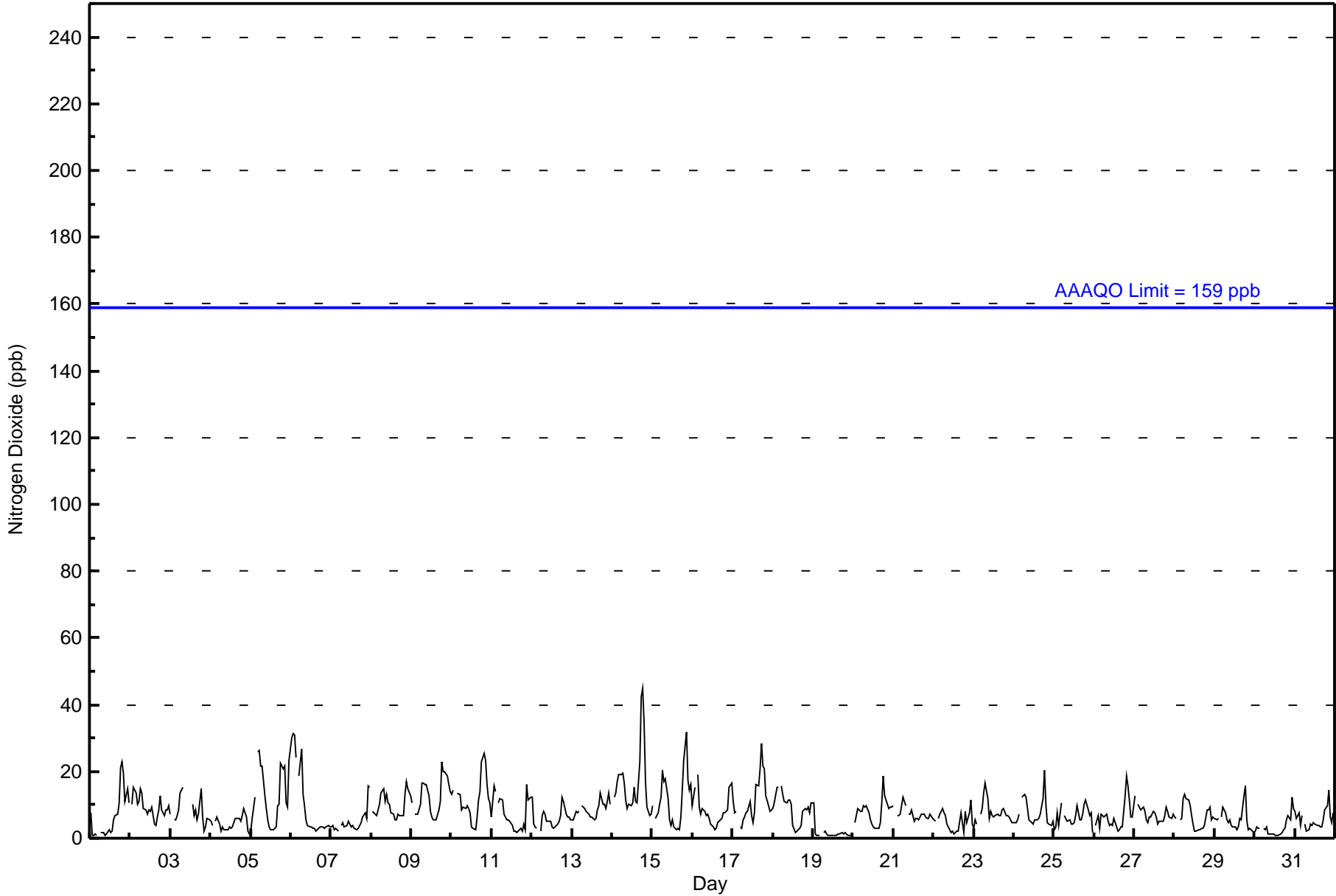
Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 45 ppb on Mar 14 19:00 Maximum Daily Average: 17.0 ppb on Mar 14		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 ppb on Mar 1 02:00 Maximum Diurnal Average: 12.2 ppb at hour 19 Monthly Average: 7.9 ppb		Minimum Daily Average: 1.6 ppb on Mar 19 Minimum Diurnal Average: 4.4 ppb at hour 13 Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 10 P ₉₀ = 15 P ₉₉ = 30																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	8	1	1	1	1	Z	2	2	2	1	1	2	2	2	6	7	7	11	21	23	19	11	15	11	6.7	23
2-Mar	Z	10	15	14	10	11	15	14	9	8	7	9	8	9	4	4	7	9	13	8	7	9	8	10	9.5	15
3-Mar	7	Z	5	6	7	8	13	15	C	C	C	C	C	10	7	8	6	7	15	6	2	3	6	6	7.7	15
4-Mar	5	4	Z	5	6	4	2	3	3	3	2	3	3	3	5	6	6	6	5	7	9	6	2	1	4.4	9
5-Mar	2	6	12	Z	26	26	21	22	13	9	6	4	2	3	3	3	10	10	23	21	22	10	9	23	12.4	26
6-Mar	30	31	31	24	Z	19	27	13	10	6	4	3	3	3	3	2	3	3	3	4	3	3	4	3	10.3	31
7-Mar	4	4	3	3	2	Z	4	5	3	4	5	4	3	4	3	3	3	4	5	6	8	6	16	15	5.0	16
8-Mar	Z	8	7	7	8	10	13	15	11	13	10	10	8	7	6	5	7	7	7	7	13	17	15	13	9.8	17
9-Mar	11	Z	7	7	7	10	17	17	16	16	13	8	6	6	6	6	8	11	23	20	20	19	16	14	12.3	23
10-Mar	13	15	Z	13	13	13	8	9	9	10	9	8	4	3	2	6	12	14	23	25	23	16	12	11	11.8	25
11-Mar	6	16	14	Z	11	12	12	7	6	6	6	5	4	2	2	2	2	3	2	4	2	16	12	12	7.1	16
12-Mar	12	4	3	3	Z	2	7	8	7	5	5	5	3	3	3	4	5	7	12	11	7	6	7	6	5.9	12
13-Mar	5	6	8	8	8	Z	10	9	8	8	7	7	6	6	6	8	10	14	10	10	9	11	14	10	8.5	14
14-Mar	Z	12	14	17	19	19	20	17	11	9	10	10	11	15	11	11	23	43	45	35	17	9	7	7	17.0	45
15-Mar	10	Z	6	8	10	12	20	17	18	12	6	4	5	4	3	3	6	14	23	32	17	15	16	16	11.4	32
16-Mar	10	15	Z	19	10	7	9	8	7	7	6	4	3	3	3	5	5	6	8	8	8	9	15	16	8.2	19
17-Mar	11	8	8	Z	3	3	6	6	8	8	11	7	5	8	16	16	21	28	22	21	13	10	8	9	11.0	28
18-Mar	9	11	15	15	Z	16	13	11	11	11	12	10	4	2	2	3	3	4	8	9	8	9	8	11	8.9	16
19-Mar	11	1	1	1	1	Z	2	2	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1.6	11
20-Mar	Z	5	7	9	8	8	10	9	10	8	6	4	4	3	3	3	5	11	19	13	10	9	10	10	7.9	19
21-Mar	10	Z	7	7	7	10	12	10	M	7	7	8	5	6	6	6	7	7	7	6	6	6	7	6	7.2	12
22-Mar	6	5	Z	6	7	9	8	7	4	3	2	2	1	2	2	2	8	5	2	8	5	8	12	4	5.0	12
23-Mar	3	5	4	Z	7	9	14	16	12	6	8	7	6	7	7	7	8	9	7	7	6	5	5	5	7.5	16
24-Mar	5	5	5	7	Z	12	13	12	9	5	5	4	5	6	5	6	7	12	20	10	5	4	4	5	7.5	20
25-Mar	3	3	8	4	10	Z	7	6	5	6	4	4	5	7	10	5	5	7	10	11	9	7	8	2	6.3	11
26-Mar	Z	4	7	3	7	7	7	7	5	4	4	4	6	4	2	3	4	4	13	19	16	12	6	6	6.6	19
27-Mar	13	Z	10	9	9	9	8	5	5	6	6	8	8	6	4	5	5	5	7	9	8	6	6	7	7.2	13
28-Mar	7	6	Z	6	6	12	13	12	12	10	7	4	2	2	3	3	3	3	4	9	8	9	6	6	6.5	13
29-Mar	6	6	6	Z	7	9	8	6	5	5	4	3	3	3	4	6	5	13	16	6	3	3	3	2	5.6	16
30-Mar	2	3	3	3	Z	3	3	3	1	1	1	1	1	1	1	1	2	3	3	5	7	6	12	9	3.2	12
31-Mar	8	6	8	4	7	Z	4	2	3	4	4	5	4	4	4	3	4	6	8	10	14	6	5	8	5.6	14
8.3 7.7 8.3 8.0 8.4 10.4 10.5 9.5 7.6 6.7 5.9 5.3 4.4 4.5 4.6 4.9 6.5 8.9 12.2 11.7 10.3 8.8 8.7 8.5																								Diurnal Average		
30 31 31 24 26 26 27 22 18 16 13 10 11 15 16 16 23 43 45 35 32 19 16 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
Athabasca Valley - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	678	95.90	95.90
21 - 40	27	3.82	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 Dioxide (NO₂) - ppb
Athabasca Valley - March 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	77	18	15	9	28	62	175	35	11	9	21	16	27	20	32	123	678
21 - 40	5	2	0	0	0	0	1	0	0	0	0	1	1	1	2	14	27
11 - 80	1	0	0	0	0	0	0	0	1	0	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	83	20	15	9	28	62	176	35	12	9	21	17	28	21	34	137	707

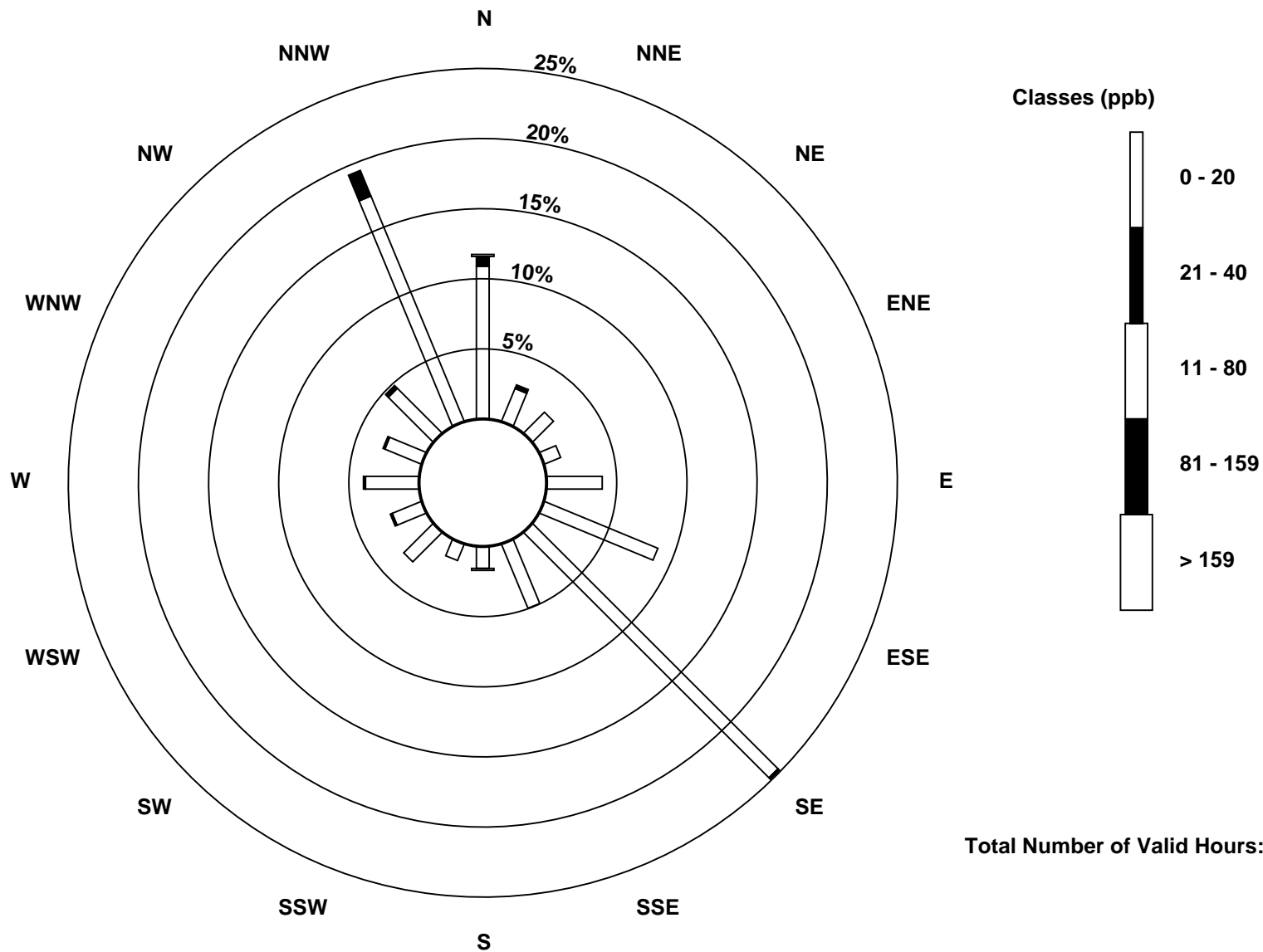
Total Number of Valid Hours: 707

Total Number of Hours: 744

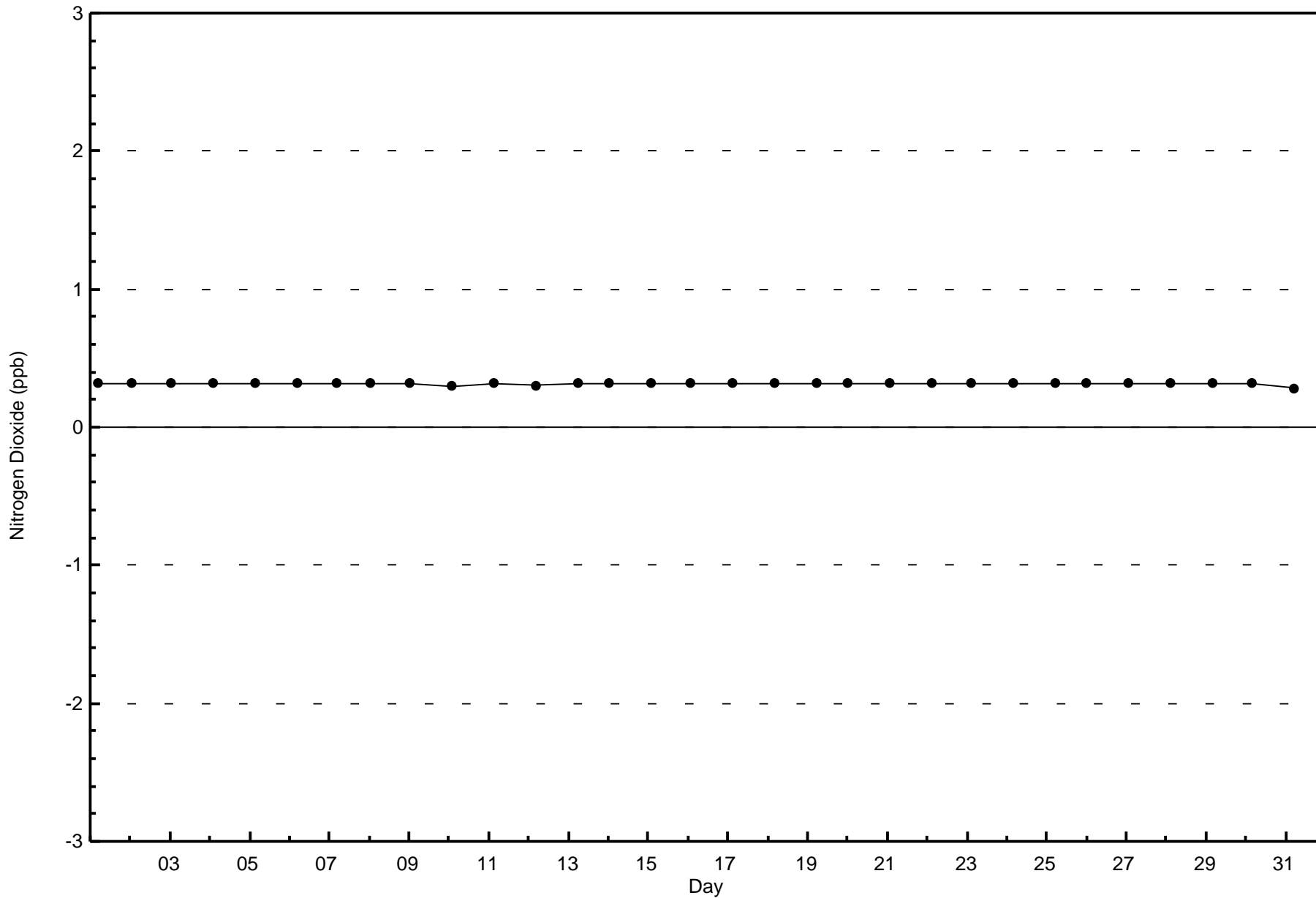


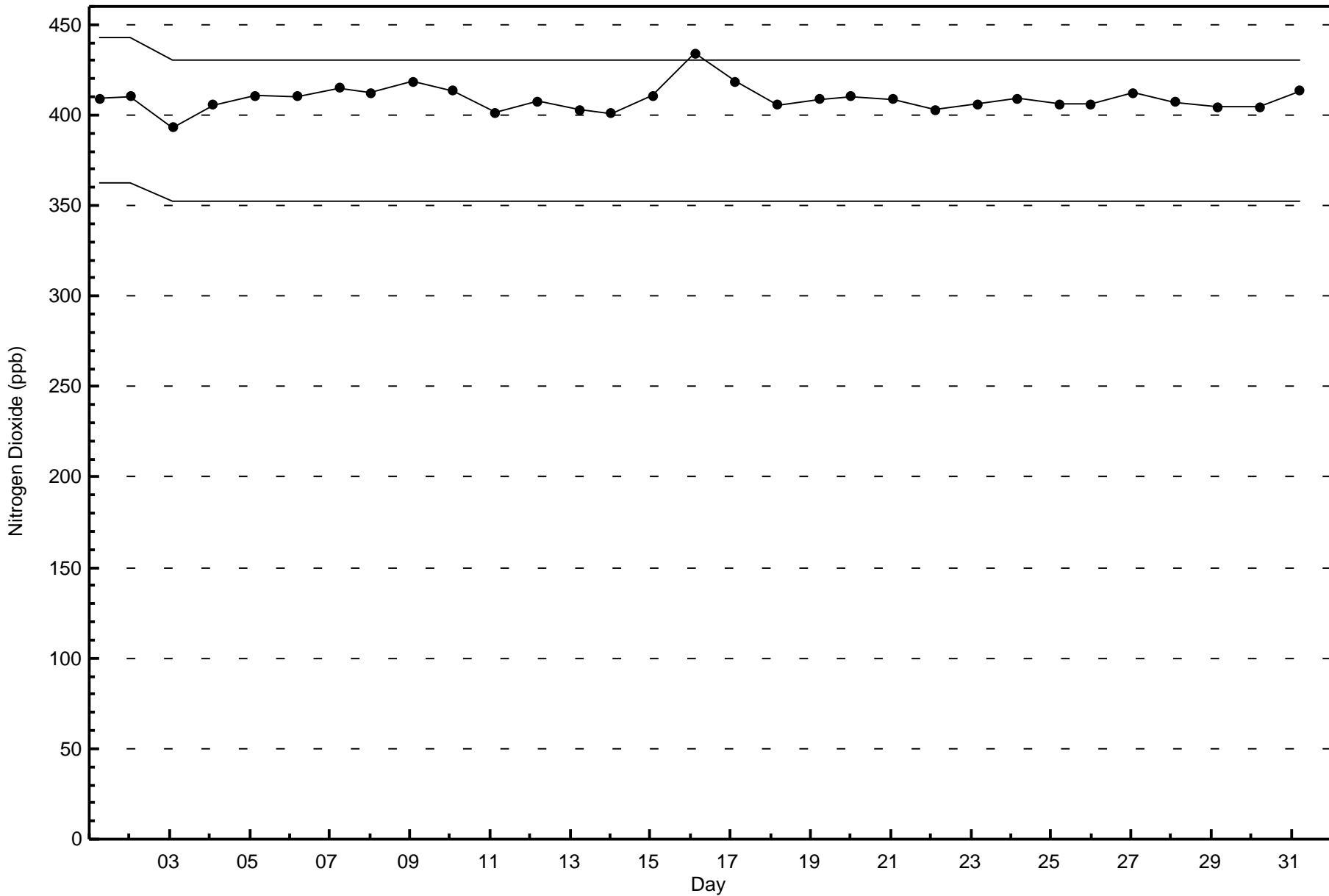
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 707







Wood Buffalo Environmental Association
Summary of Hour Averages

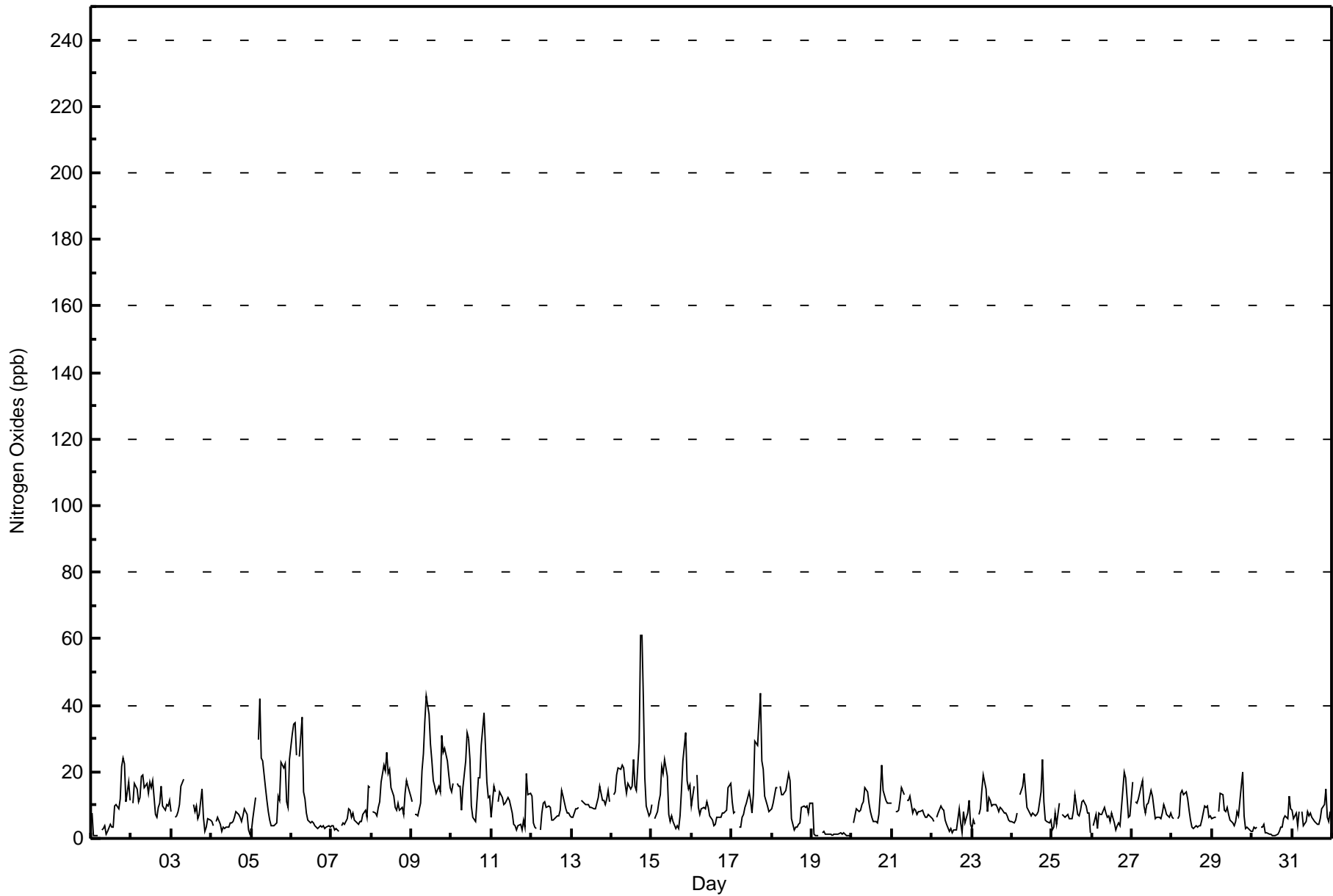
Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - March 2017

Maximum Value: 61 ppb on Mar 14 19:00		Maximum Daily Average: 21.6 ppb on Mar 14		Hours in Service: 744																																													
Minimum Value: 1 ppb on Mar 1 03:00		Minimum Daily Average: 1.7 ppb on Mar 19		Hours of Data: 707																																													
Maximum Diurnal Average: 14.1 ppb at hour 19		Minimum Diurnal Average: 7.1 ppb at hour 15		Hours of Missing Data: 37																																													
Monthly Average: 10.0 ppb		Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 13 P ₉₀ = 19 P ₉₉ = 35		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-Mar	8	1	1	1	1	Z	2	3	4	1	2	4	3	3	10	10	9	12	22	24	22	11	17	11	7.9	24																							
2-Mar	Z	10	17	15	11	12	19	19	15	16	14	17	15	17	7	6	9	11	16	10	8	10	10	11	12.9	19																							
3-Mar	8	Z	6	7	8	10	16	18	C	C	C	C	C	10	8	10	6	7	15	6	2	3	6	6	8.5	18																							
4-Mar	5	4	Z	5	6	4	2	3	3	3	3	5	5	5	6	8	7	6	5	7	9	7	3	1	4.9	9																							
5-Mar	2	6	12	Z	30	42	24	23	15	11	8	6	4	4	4	5	13	11	23	21	23	11	9	24	14.4	42																							
6-Mar	31	34	35	25	Z	24	37	14	12	8	6	5	5	5	4	3	3	4	3	4	3	3	4	3	11.9	37																							
7-Mar	4	4	3	3	2	Z	4	5	4	6	9	9	6	8	5	4	4	5	5	7	8	7	16	15	6.2	16																							
8-Mar	Z	8	8	7	9	11	17	22	21	26	19	21	15	13	9	8	11	9	9	7	13	18	16	13	13.4	26																							
9-Mar	11	Z	7	7	7	11	20	25	35	43	37	28	23	18	16	13	16	14	31	26	27	23	19	15	20.6	43																							
10-Mar	14	17	Z	17	15	16	8	15	23	32	30	24	10	6	5	11	18	18	28	38	28	17	12	13	18.0	38																							
11-Mar	6	16	14	Z	11	14	12	10	11	11	12	11	8	4	4	3	4	4	2	5	3	20	13	13	9.3	20																							
12-Mar	13	4	3	3	Z	3	8	11	11	9	10	9	6	5	6	7	7	9	14	13	9	8	8	7	7.8	14																							
13-Mar	6	6	9	9	9	Z	11	11	10	10	10	9	9	9	9	11	12	16	11	11	10	12	15	11	10.3	16																							
14-Mar	Z	13	14	19	21	21	22	21	17	13	16	15	16	24	16	14	29	61	61	42	18	10	7	7	21.6	61																							
15-Mar	10	Z	6	8	11	13	22	19	24	18	7	5	7	5	3	4	3	7	15	23	32	17	15	16	12.6	32																							
16-Mar	10	16	Z	19	9	7	9	9	9	11	9	7	5	4	4	6	6	6	8	8	8	8	15	16	9.2	19																							
17-Mar	11	8	8	Z	3	3	6	7	9	11	14	11	8	13	29	28	35	44	23	21	13	10	8	9	14.5	44																							
18-Mar	9	11	15	15	Z	16	13	13	14	17	19	17	6	3	3	3	4	5	9	10	9	10	8	11	10.5	19																							
19-Mar	11	1	1	1	1	Z	2	2	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1.7	11																							
20-Mar	Z	5	7	9	8	8	10	11	15	14	10	8	6	5	5	5	7	14	22	14	12	10	11	11	9.9	22																							
21-Mar	10	Z	8	8	9	12	15	13	M	11	11	13	8	9	8	7	8	8	8	7	6	6	7	6	9.2	15																							
22-Mar	6	5	Z	6	8	10	9	8	5	4	2	3	2	2	2	3	9	5	2	8	4	8	12	4	5.5	12																							
23-Mar	3	5	4	Z	7	9	14	19	15	8	12	11	10	10	10	9	8	9	9	7	7	7	6	5	9.0	19																							
24-Mar	5	5	6	8	Z	13	16	19	14	9	9	7	8	7	7	8	14	24	11	5	5	4	5	5	9.4	24																							
25-Mar	3	3	8	4	11	Z	7	7	6	7	6	6	6	9	13	7	7	9	11	12	10	7	8	2	7.3	13																							
26-Mar	Z	4	7	3	7	7	7	9	8	7	7	5	8	5	3	4	5	4	14	20	18	12	6	7	7.7	20																							
27-Mar	17	Z	11	11	12	16	17	10	8	10	10	14	13	9	6	6	6	6	8	10	9	7	6	8	10.0	17																							
28-Mar	7	6	Z	6	7	14	14	13	14	12	9	5	3	3	4	3	4	4	5	10	9	10	6	7	7.6	14																							
29-Mar	6	6	6	Z	8	13	13	8	8	9	7	5	5	4	5	8	7	16	20	7	3	3	3	2	7.5	20																							
30-Mar	2	3	3	3	Z	4	3	4	2	2	1	1	1	1	1	1	2	4	4	6	7	6	13	9	3.6	13																							
31-Mar	9	6	8	4	8	Z	8	4	5	8	7	8	6	5	4	4	4	6	9	10	15	6	5	8	6.8	15																							
																								8.7	8.0	8.7	8.6	9.3	12.5	12.6	12.2	11.7	11.7	10.7	9.7	7.6	7.3	7.1	7.2	8.8	11.2	14.1	13.1	11.4	9.5	9.2	9.0	Diurnal Average	
																								31	34	35	25	30	42	37	25	35	43	37	28	23	24	29	28	35	61	61	42	32	23	19	24	Diurnal Maximum	
Z - zerospan																								C - Calibration				M - Maintenance																					



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	648	91.65	91.65
21 - 40	53	7.50	99.15
41 - 80	6	0.85	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
Athabasca Valley - March 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	76	17	12	7	28	61	169	34	9	9	21	15	24	17	30	119	648
21 - 40	5	3	2	2	0	1	6	1	2	0	0	2	4	4	4	17	53
11 - 80	2	0	1	0	0	0	1	0	1	0	0	0	0	0	0	1	6
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	83	20	15	9	28	62	176	35	12	9	21	17	28	21	34	137	707

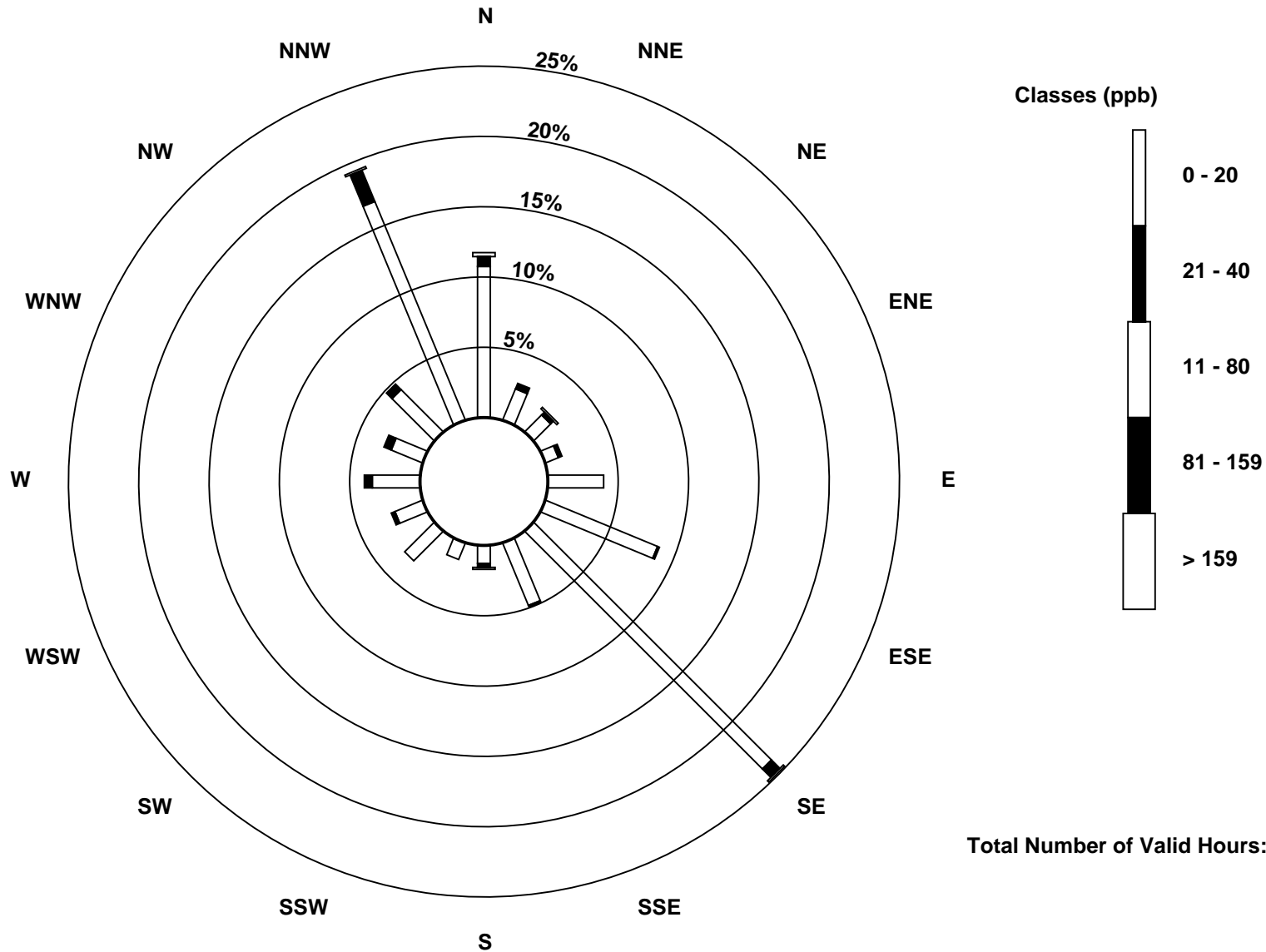
Total Number of Valid Hours: 707

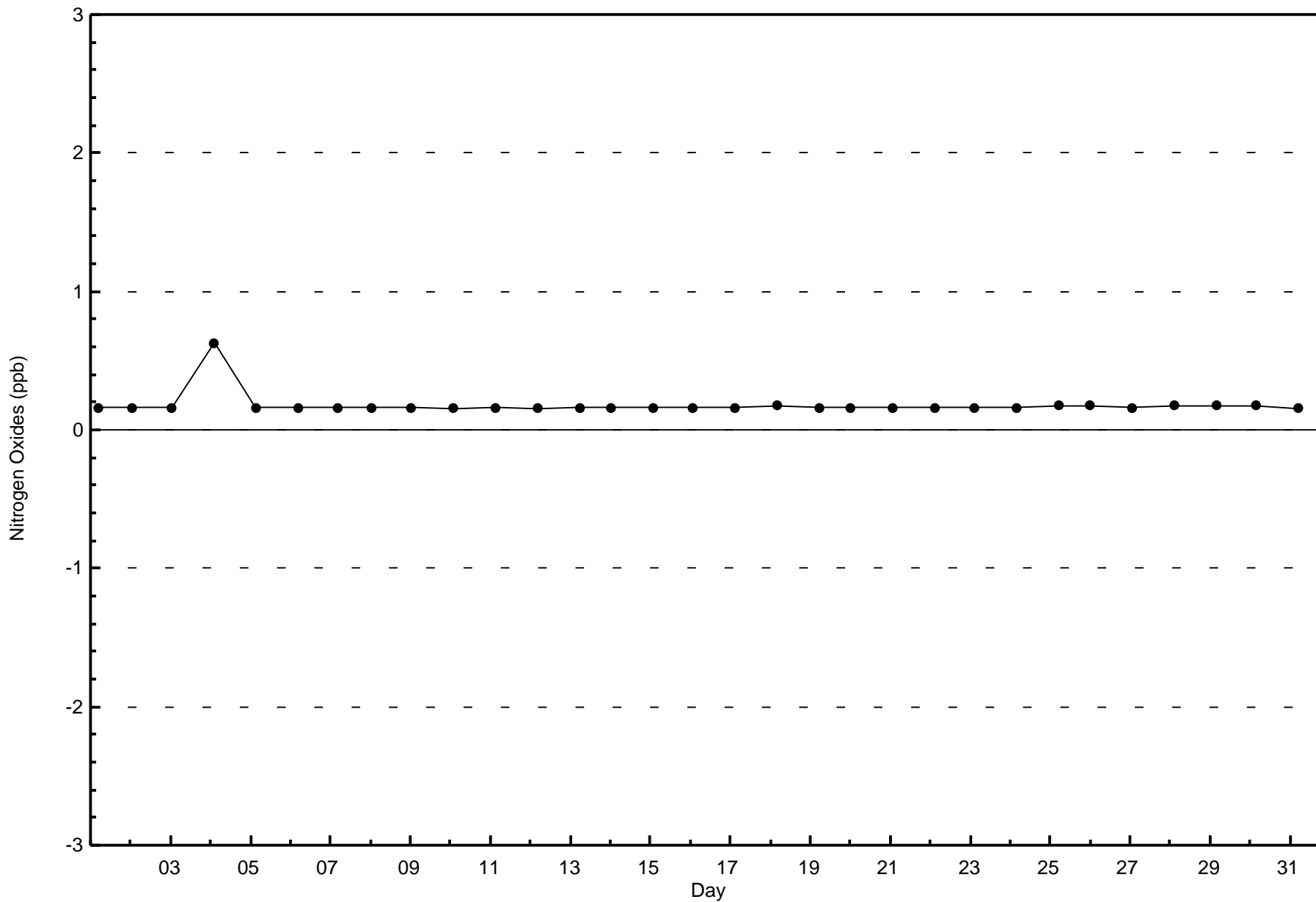
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley (AMS 7)

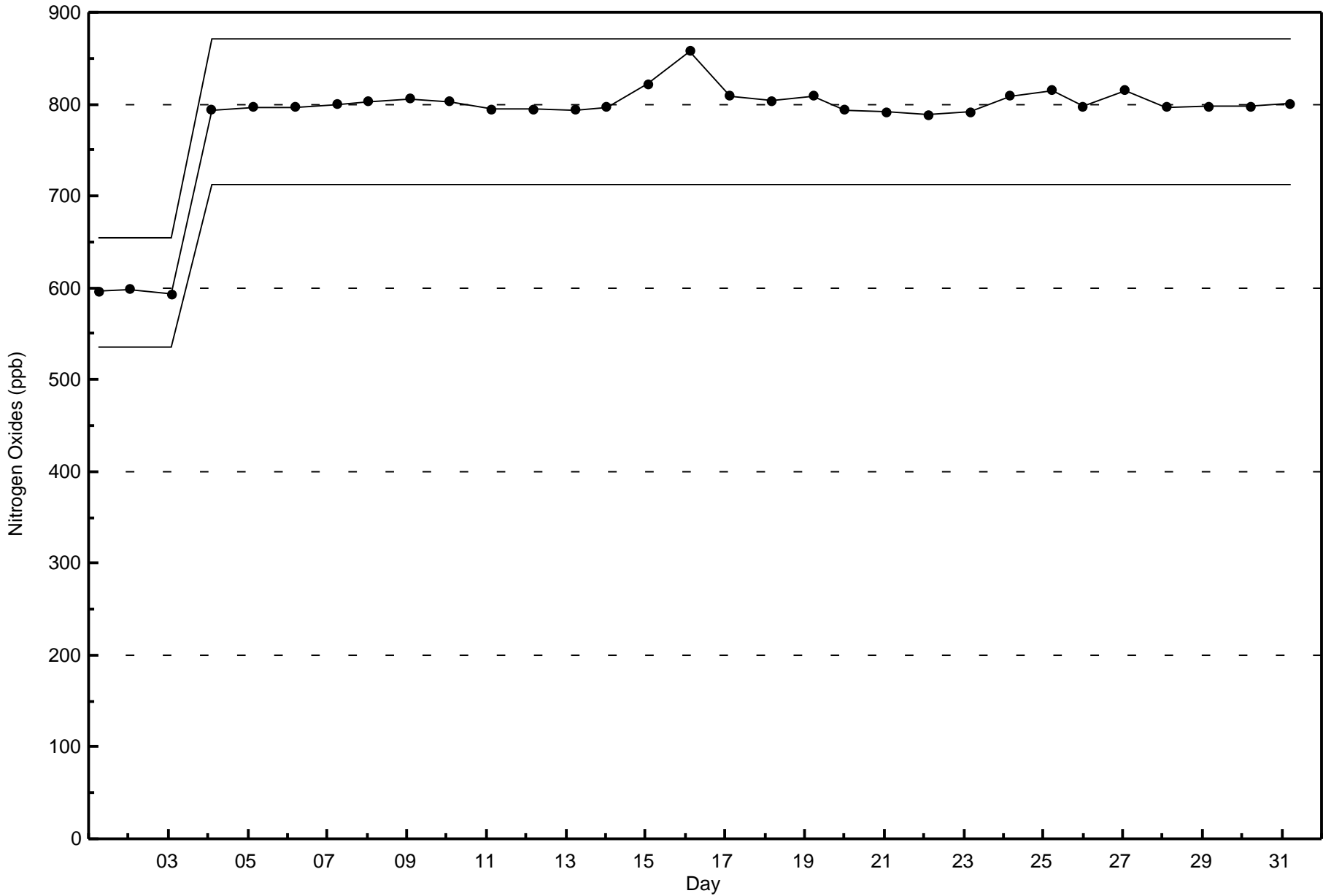






Wood Buffalo Environmental Association
Span Responses

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - March 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

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

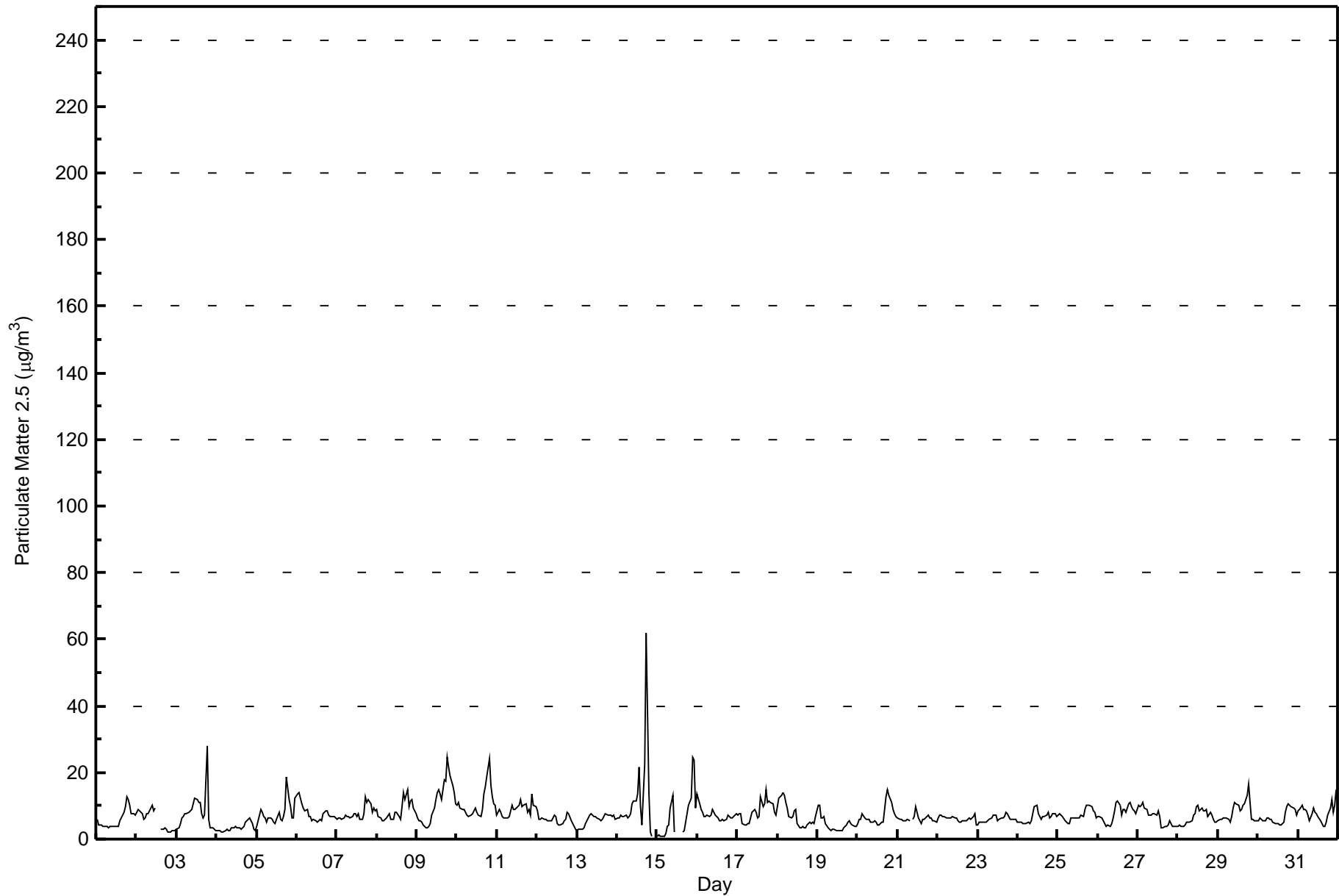
Athabasca Valley - March 2017

Number of Exceedences (AAAQO):		24-hr: 0		Hours in Service:		744																																										
Maximum Value: 61.8 µg/m ³ on Mar 14 18:00		Maximum Daily Average: 12.8 µg/m ³ on Mar 14		Hours of Data:		735																																										
Minimum Value: 0.8 µg/m ³ on Mar 14 22:00		Minimum Daily Average: 3.5 µg/m ³ on Mar 4		Hours of Missing Data:		9																																										
Maximum Diurnal Average: 11.4 µg/m ³ at hour 19		Minimum Diurnal Average: 5.7 µg/m ³ at hour 8		Hours of Calibration:		2																																										
Monthly Average: 7.29 µg/m ³		Percentiles: P ₁ = 2.0 P ₁₀ = 3.7 Q ₁ = 5.2 Median = 6.6 Q ₃ = 8.6 P ₉₀ = 10.9 P ₉₉ = 23.5		Percent Operational Time:		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-Mar	5.8	4.3	4.0	4.0	3.9	3.8	3.6	3.5	3.6	3.9	4.0	3.9	3.9	4.0	5.3	6.3	8.0	9.7	12.6	11.7	10.3	7.5	7.6	7.0	5.9	12.6																						
2-Mar	8.0	8.7	8.6	7.7	5.8	6.5	7.8	7.8	8.4	10.2	8.7	9.5	C	C	3.1	2.8	2.9	3.4	3.1	2.1	2.1	2.5	2.5	2.4	5.7	10.2																						
3-Mar	2.9	3.5	4.8	6.2	6.9	7.4	7.8	8.1	8.6	8.9	10.7	12.5	12.0	10.9	11.0	7.7	6.2	7.0	28.1	6.0	3.2	3.5	3.3	2.5	7.9	28.1																						
4-Mar	2.6	2.6	2.5	2.2	2.1	2.7	2.8	2.7	2.7	3.6	3.6	3.7	3.4	3.6	3.4	3.2	3.9	5.1	5.4	6.0	6.4	4.8	2.9	2.5	3.5	6.4																						
5-Mar	3.9	5.7	8.8	8.1	6.7	6.3	5.0	6.5	6.3	5.9	4.9	4.6	5.8	7.9	6.0	5.7	7.0	9.0	18.8	11.7	9.9	6.3	6.4	12.2	7.5	18.8																						
6-Mar	13.6	13.8	12.5	10.6	9.5	8.5	9.0	6.7	6.6	5.7	6.1	5.7	5.1	5.5	5.7	5.6	7.6	8.5	8.5	7.2	6.8	6.9	6.8	6.2	7.9	13.8																						
7-Mar	6.1	6.4	6.3	6.1	6.4	7.1	6.8	6.6	6.3	6.7	7.4	7.8	6.9	7.7	6.1	6.0	7.6	12.7	11.2	11.9	10.8	8.2	9.1	8.3	7.8	12.7																						
8-Mar	8.8	6.8	6.2	5.5	5.4	6.1	6.4	7.7	6.0	5.8	6.1	8.1	8.2	6.9	6.1	9.5	13.9	11.7	14.7	9.5	11.4	12.1	9.4	7.6	8.3	14.7																						
9-Mar	6.4	5.4	5.4	5.2	4.3	3.4	3.6	3.7	4.9	7.2	9.5	11.8	14.0	14.7	13.5	12.0	17.8	17.2	24.7	21.5	19.2	15.9	13.8	10.6	11.1	24.7																						
10-Mar	10.0	11.2	9.2	9.1	8.7	8.2	7.0	6.9	7.0	7.7	8.5	9.5	8.0	7.3	6.6	8.8	13.7	15.6	18.8	24.3	15.9	12.7	10.7	10.3	10.7	24.3																						
11-Mar	7.1	9.1	8.2	6.7	6.4	6.5	6.2	7.0	8.4	10.3	8.9	8.9	9.9	10.2	11.9	9.7	10.3	10.6	8.3	8.8	7.1	13.8	10.4	9.6	8.9	13.8																						
12-Mar	8.6	6.1	6.0	6.2	5.9	5.9	5.6	5.6	5.6	5.7	7.2	6.8	4.5	4.4	4.1	4.5	5.6	6.1	8.0	7.8	5.5	4.5	3.8	3.0	5.7	8.6																						
13-Mar	2.5	2.8	2.9	3.2	3.3	4.5	5.3	7.1	7.6	7.0	6.6	7.0	6.4	5.7	5.5	6.1	6.8	7.7	7.2	7.2	7.1	6.6	7.1	6.0	5.8	7.7																						
14-Mar	6.2	6.2	7.1	6.8	6.6	7.0	6.5	6.7	7.7	10.6	11.3	11.4	13.4	21.6	9.9	4.1	22.3	61.8	37.6	13.4	2.0	0.8	UO	UO	12.8	61.8																						
15-Mar	0.9	1.3	0.9	1.0	1.0	1.6	3.9	4.3	9.3	13.1	2.0	UO	UO	UO	UO	2.1	2.6	5.1	7.6	10.0	12.2	24.8	23.9	9.3	6.8	24.8																						
16-Mar	13.7	10.6	9.0	8.2	6.7	7.0	7.1	6.7	7.4	9.0	8.1	7.0	6.5	5.3	5.4	6.1	5.5	5.9	7.2	6.9	6.4	6.4	7.0	7.6	7.4	13.7																						
17-Mar	7.2	7.5	7.5	4.7	4.4	4.4	4.6	4.8	6.2	7.9	8.8	8.1	6.5	6.7	12.8	9.8	10.7	15.0	11.2	11.4	10.9	10.4	8.1	7.3	8.2	15.0																						
18-Mar	9.6	12.2	13.2	14.0	13.3	11.1	9.2	6.6	6.4	6.9	8.3	8.7	4.5	3.3	3.4	3.9	3.5	3.5	4.2	4.9	4.5	5.0	4.7	6.8	7.2	14.0																						
19-Mar	10.0	10.2	6.5	6.4	6.6	4.7	3.6	3.1	2.7	2.8	2.8	2.7	2.6	2.4	2.4	2.7	3.5	4.4	5.1	5.3	4.6	4.3	3.7	3.6	4.4	10.2																						
20-Mar	4.7	5.7	5.9	7.5	6.5	6.0	6.0	5.8	5.0	5.3	5.4	4.9	4.4	4.3	5.1	5.2	9.1	12.5	14.9	12.9	11.0	8.8	7.6	6.9	7.1	14.9																						
21-Mar	6.4	6.1	5.8	5.5	5.4	5.5	5.9	5.4	M	6.1	6.6	9.7	6.3	5.3	4.8	5.8	6.1	6.2	7.2	6.2	6.2	5.5	5.5	5.2	6.0	9.7																						
22-Mar	6.4	7.2	7.1	6.8	6.6	6.5	6.2	6.2	6.3	6.8	6.4	6.3	5.6	4.9	5.2	5.3	5.6	5.7	5.9	6.5	6.1	6.8	7.5	4.2	6.2	7.5																						
23-Mar	4.3	5.0	5.0	5.1	5.1	5.1	5.5	5.7	6.6	7.0	7.2	7.1	5.7	5.8	6.2	6.2	6.9	8.0	7.8	6.1	6.0	5.9	6.0	5.7	6.0	8.0																						
24-Mar	5.0	5.1	5.2	4.8	4.7	4.6	5.2	4.6	5.5	7.7	9.6	10.3	7.7	6.6	6.1	6.8	6.7	7.3	7.9	6.5	6.7	7.5	7.8	6.6	6.5	10.3																						
25-Mar	7.2	7.7	7.4	6.8	5.7	5.3	4.7	4.5	6.3	6.5	6.3	6.3	6.4	6.4	7.4	7.0	8.8	10.3	10.3	10.3	9.8	8.6	8.1	6.5	7.3	10.3																						
26-Mar	6.7	6.7	6.2	5.6	4.6	3.8	4.1	3.9	4.8	6.2	8.6	11.2	11.5	10.1	7.2	9.0	8.7	8.2	10.8	10.9	9.6	9.1	8.3	7.8	7.7	11.5																						
27-Mar	10.3	9.9	10.3	10.9	9.4	8.9	7.2	7.2	7.3	7.6	7.5	7.3	8.3	6.9	3.4	3.4	3.7	3.7	4.4	5.3	4.8	3.9	3.7	3.9	6.6	10.9																						
28-Mar	4.0	4.2	3.9	3.9	4.1	5.0	5.2	5.1	5.5	7.1	7.7	9.6	10.0	8.4	9.2	8.3	8.5	8.8	7.0	7.9	7.0	6.1	5.1	5.1	6.5	10.0																						
29-Mar	5.7	5.8	6.1	6.3	6.2	6.2	5.9	5.2	6.9	9.5	10.9	10.8	10.2	8.6	9.1	10.2	10.5	13.3	16.4	10.8	5.9	5.7	5.5	5.5	8.2	16.4																						
30-Mar	5.6	6.1	5.8	5.5	5.6	6.2	6.2	5.8	5.8	5.2	4.8	4.5	4.5	4.2	4.2	4.9	8.0	9.8	10.4	10.2	9.9	9.2	8.7	7.3	6.6	10.4																						
31-Mar	8.3	9.1	10.1	8.8	8.8	8.5	7.0	5.3	7.6	9.5	8.0	7.6	7.0	5.7	4.8	4.0	3.9	5.0	7.1	9.5	11.9	8.1	10.2	14.9	8.0	14.9																						
																								6.7	6.9	6.7	6.4	6.0	5.9	5.8	5.7	6.3	7.2	7.2	7.8	7.2	7.1	6.5	6.2	7.9	10.3	11.4	9.4	8.1	7.8	7.5	6.7	Diurnal Average
																								13.7	13.8	13.2	14.0	13.3	11.1	9.2	8.1	9.3	13.1	11.3	12.5	14.0	21.6	13.5	12.0	22.3	61.8	37.6	24.3	19.2	24.8	23.9	14.9	Diurnal Maximum
C - Calibration																								M - Maintenance						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 - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - March 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	209	28.44	28.44
6 - 15	504	68.57	97.01
16 - 25	16	2.18	99.18
26 - 80	3	0.41	99.59
> 81.0	0	0.00	99.59

Total Number of Valid Hours: 735

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 - March 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	21	7	5	6	7	20	62	7	3	2	3	5	12	8	13	28	209
6 - 15	60	14	11	5	22	43	120	30	7	7	17	10	18	13	18	109	504
16 - 25	3	0	0	0	0	0	1	0	1	0	0	3	1	1	3	3	16
26 - 80	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	3
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	85	21	16	11	29	63	183	37	12	9	20	18	31	22	34	141	732

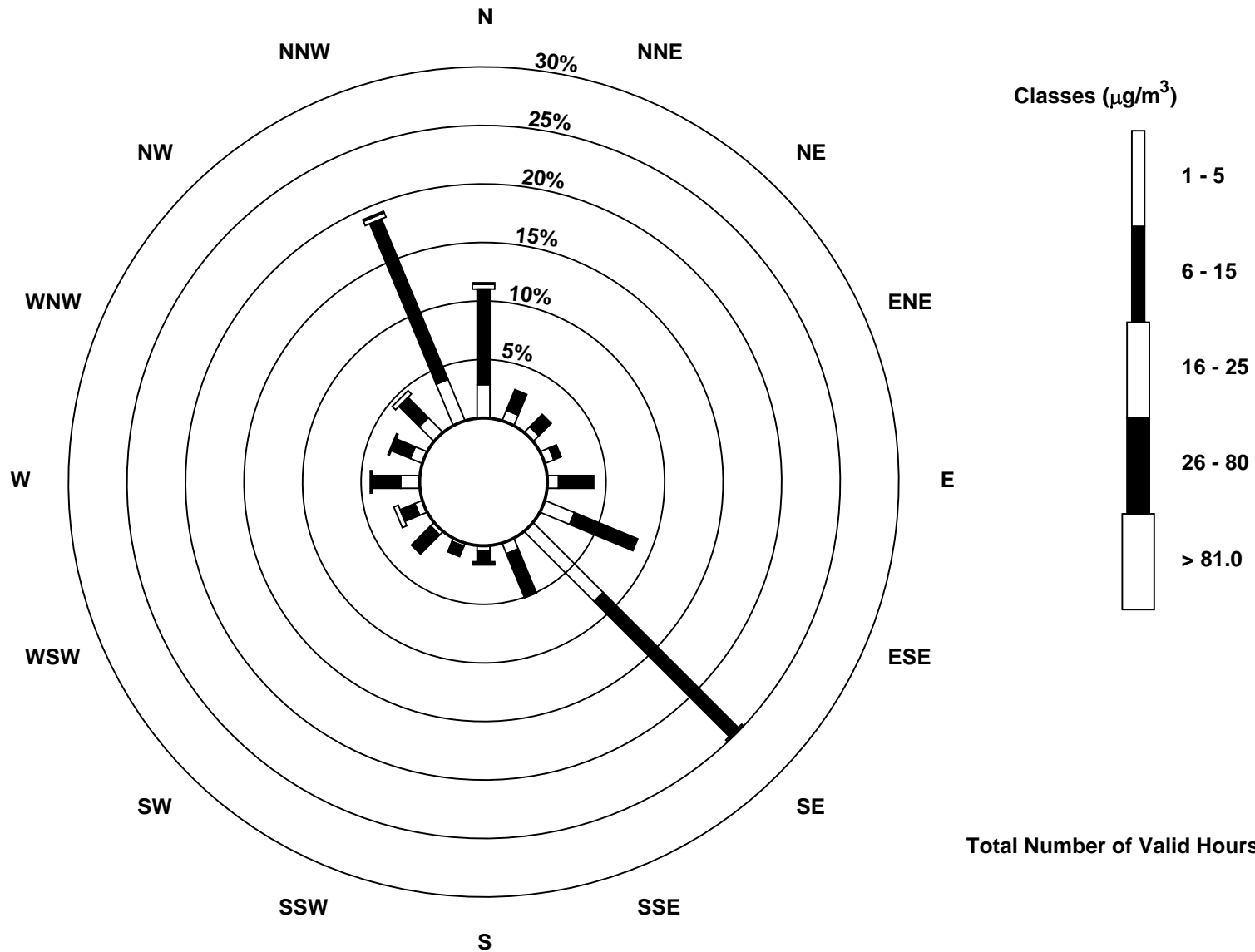
Total Number of Valid Hours: 735

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley (AMS 7)

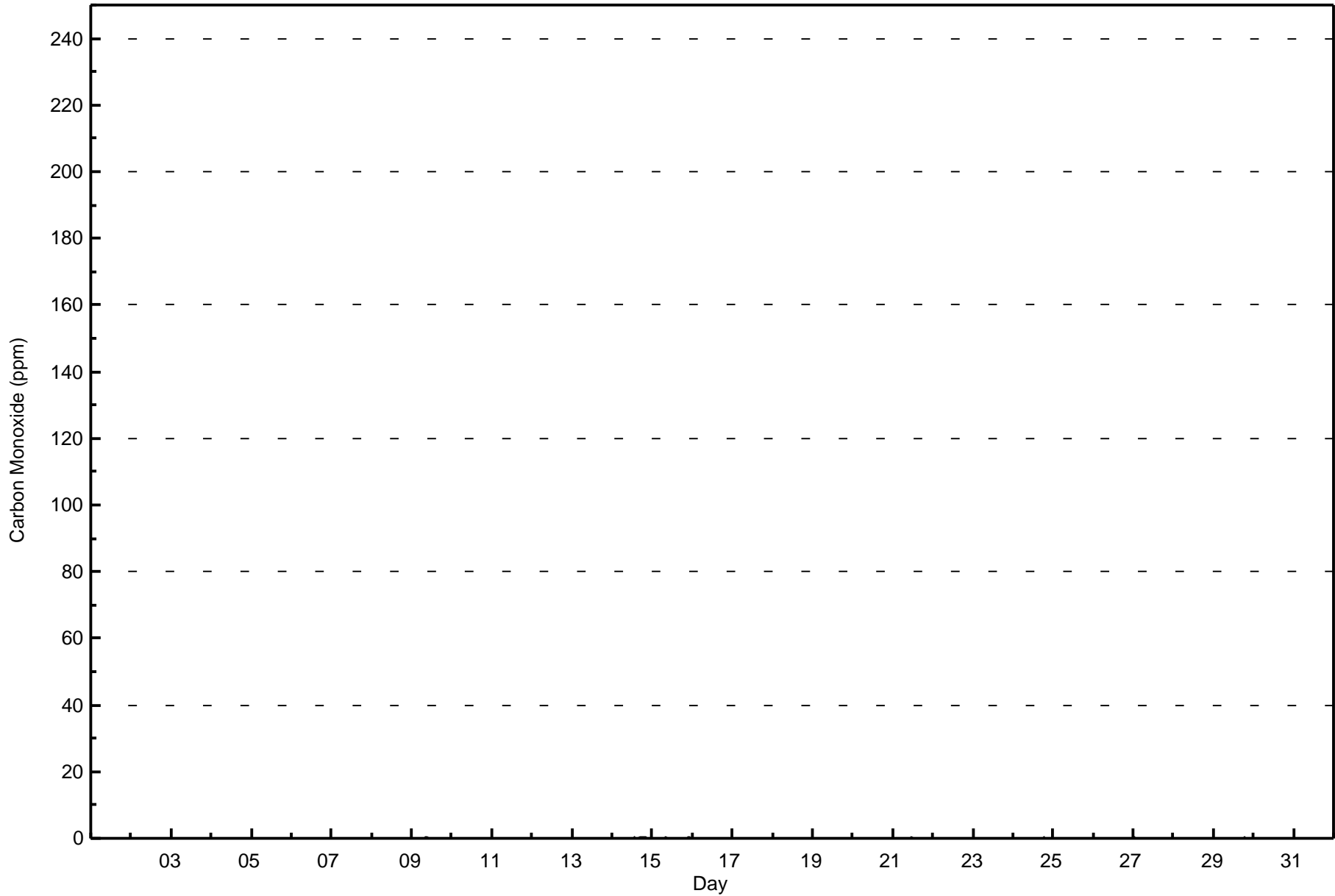


Total Number of Valid Hours: 735



Wood Buffalo Environmental Association
Hourly Averages

Carbon Monoxide (CO) - ppm
Athabasca Valley - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Carbon Monoxide (CO) - ppm
Athabasca Valley - March 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	705	99.58	99.58
0.4 - 0.5	3	0.42	100.00
0.6 - 0.7	0	0.00	100.00
0.8 - 1.4	0	0.00	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Carbon Monoxide (CO) - ppm
Athabasca Valley - March 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	80	19	15	10	28	61	173	37	11	7	23	18	30	21	35	137	705
0.4 - 0.5	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	3
0.6 - 0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.8 - 1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	81	19	15	10	28	61	174	37	12	7	23	18	30	21	35	137	708

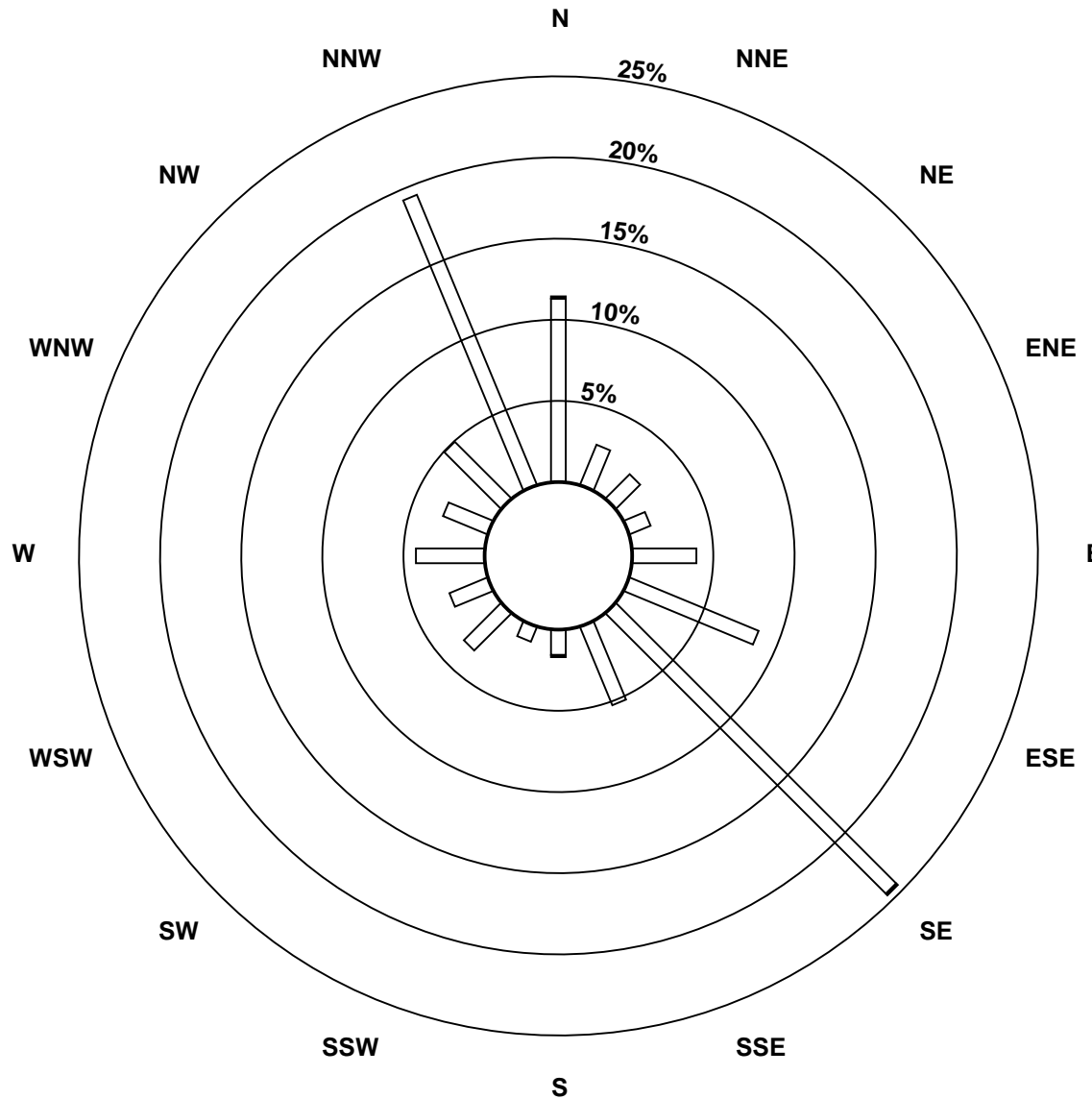
Total Number of Valid Hours: 708

Total Number of Hours: 744

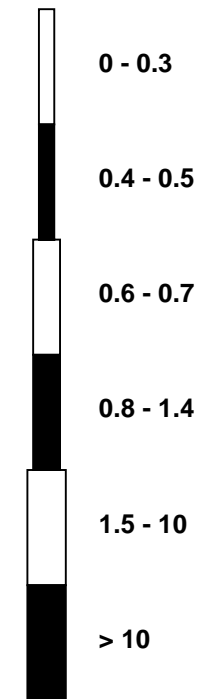


Wood Buffalo Environmental Association
Wind Rose Mar 2017

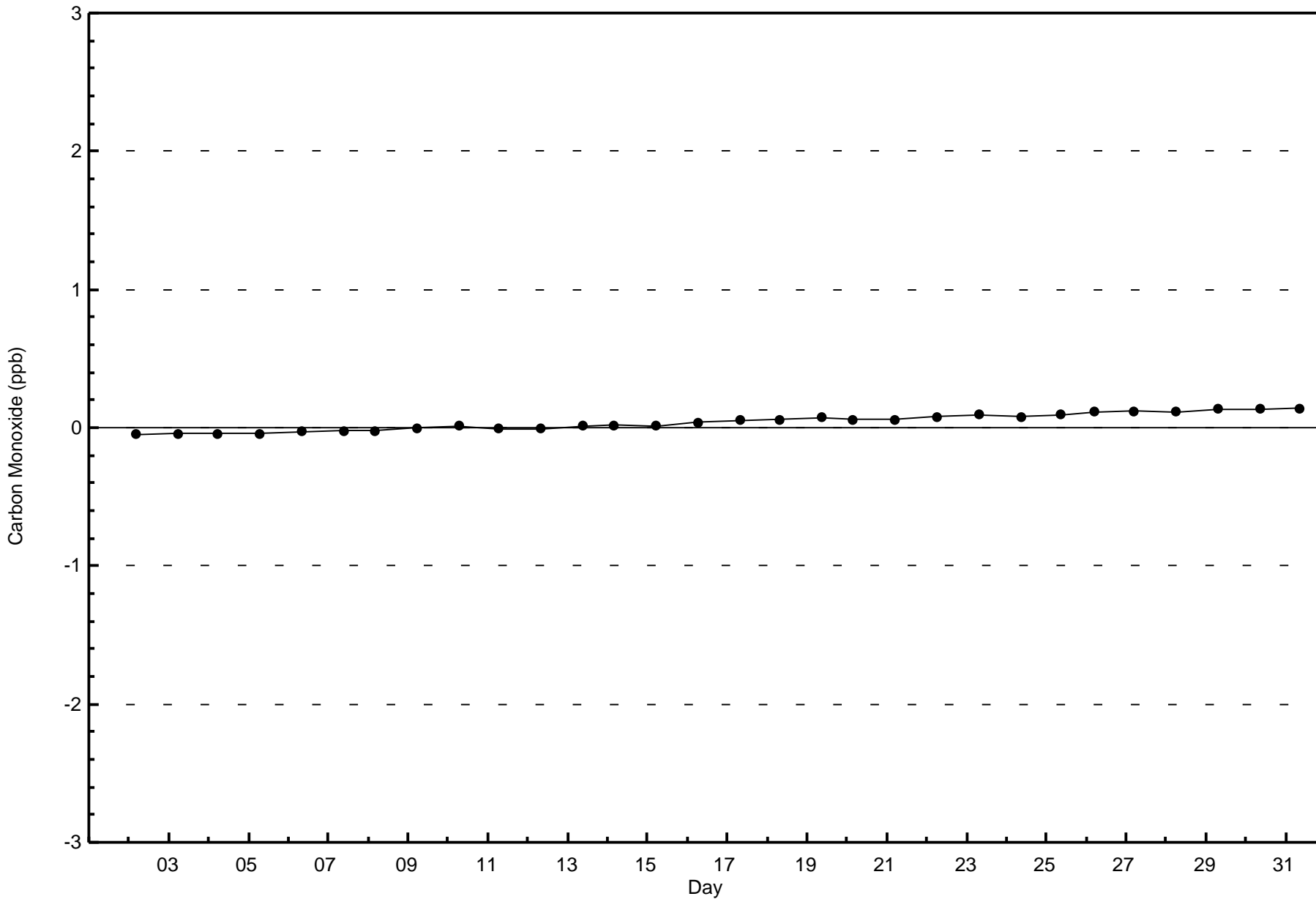
Carbon Monoxide (CO) - ppm
Athabasca Valley (AMS 7)



Classes (ppm)



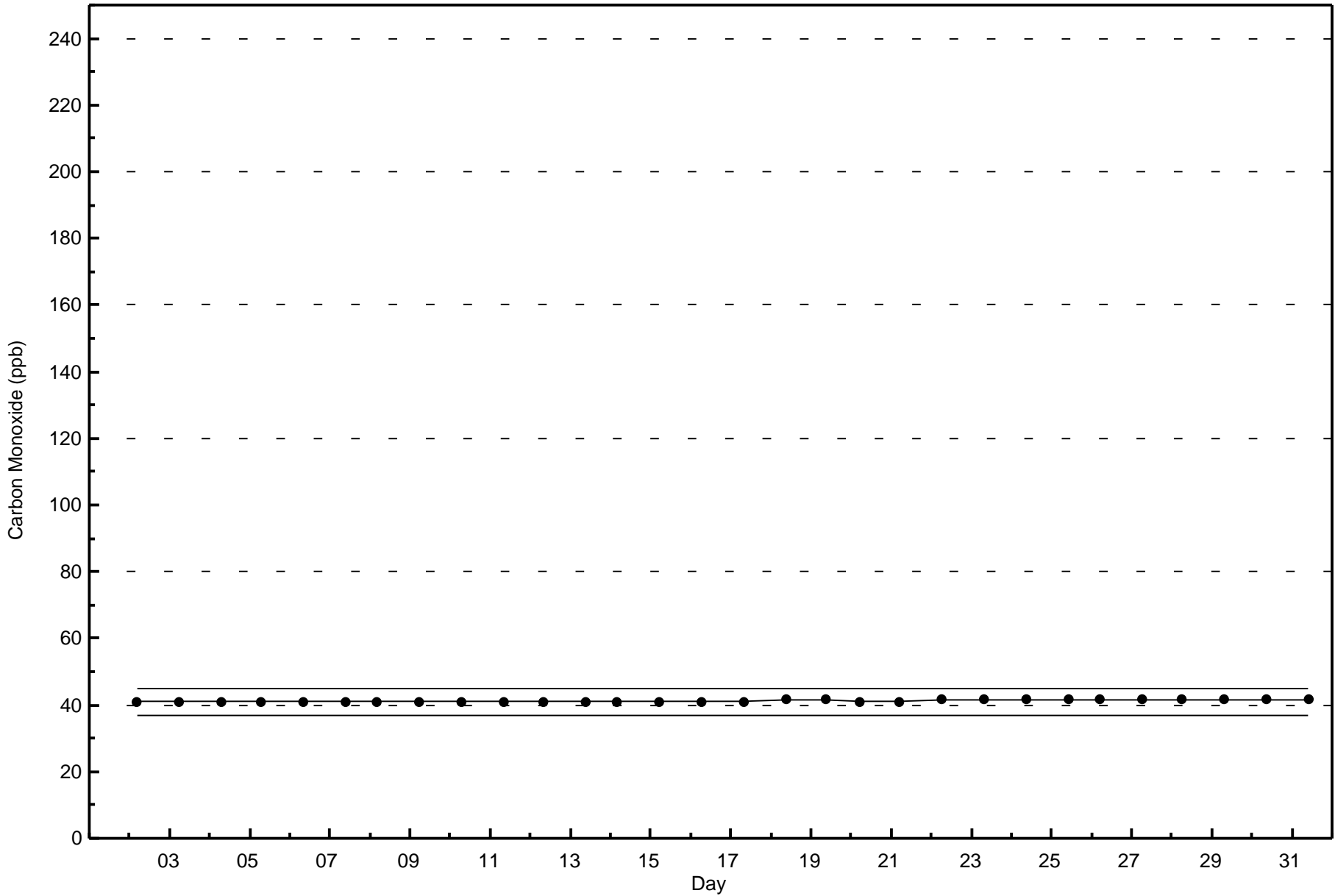
Total Number of Valid Hours: 708





Wood Buffalo Environmental Association
Span Responses

Carbon Monoxide (CO) - ppb
Athabasca Valley - March 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

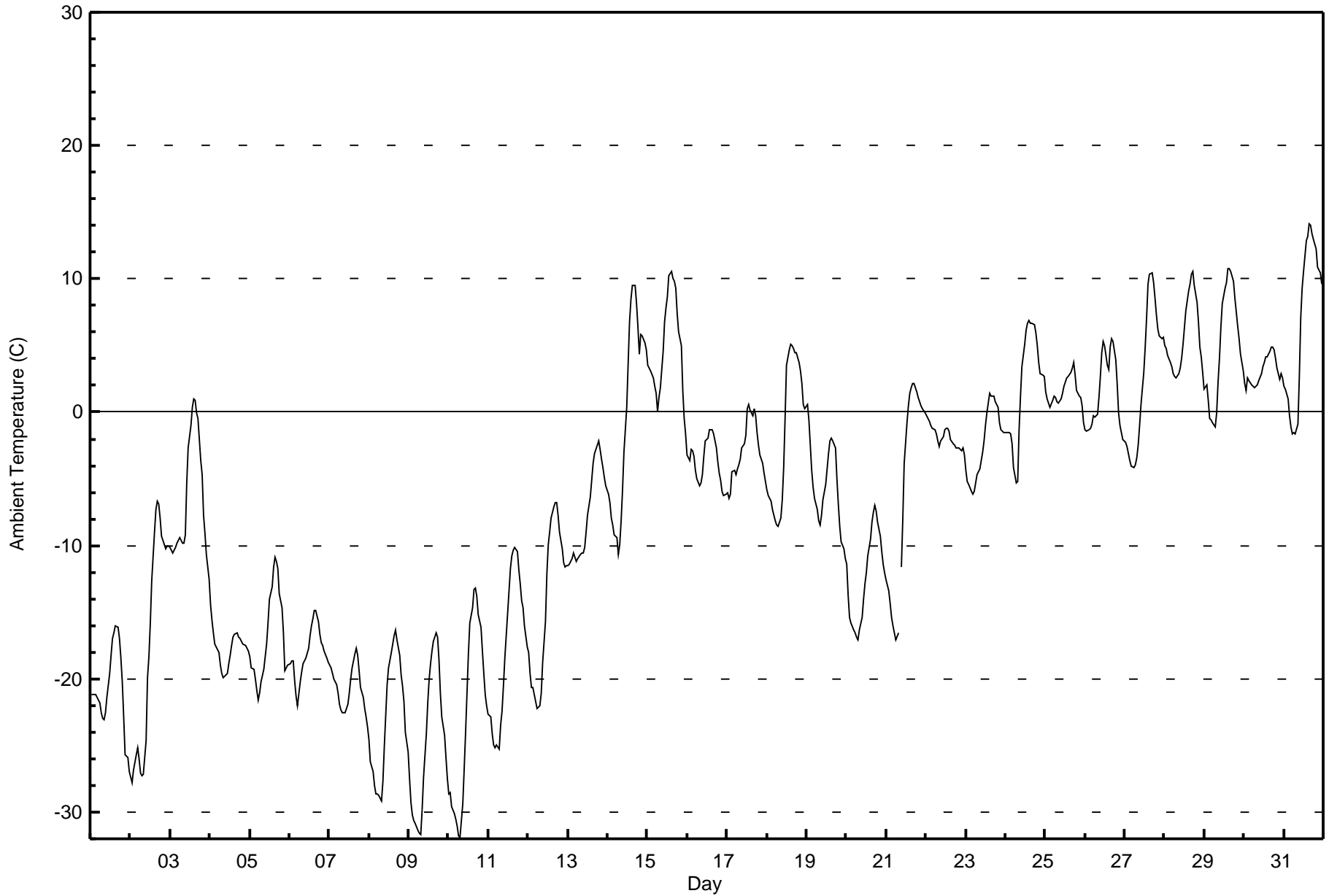
Ambient Temperature (AT) - C
Athabasca Valley - March 2017

Maximum Value: 14.2 C on Mar 31 16:00 Minimum Value: -31.9 C on Mar 10 08:00 Maximum Diurnal Average: -2.2 C at hour 17 Monthly Average: -7.47 C		Maximum Daily Average: 6.7 C on Mar 31 Minimum Daily Average: -24.7 C on Mar 9 Minimum Diurnal Average: -12.1 C at hour 7 Percentiles: P ₁ = -30.6 P ₁₀ = -22.2 Q ₁ = -17.0 Median = -5.3 Q ₃ = 1.2 P ₉₀ = 5.3 P ₉₉ = 11.6		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 Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-21.2	-21.2	-21.2	-21.2	-21.4	-21.8	-22.5	-23.0	-23.1	-22.5	-21.4	-19.6	-18.2	-17.0	-16.5	-16.0	-16.2	-16.9	-18.4	-20.3	-22.9	-25.7	-25.9	-27.0	-20.9	-16.0
2-Mar	-27.4	-27.8	-26.8	-25.7	-25.1	-26.0	-27.1	-27.3	-27.2	-24.6	-20.0	-18.3	-15.8	-12.7	-9.0	-7.4	-6.6	-6.9	-8.0	-9.3	-10.0	-10.2	-10.0	-10.0	-17.5	-6.6
3-Mar	-10.1	-10.5	-10.4	-10.2	-9.8	-9.6	-9.5	-9.9	-9.8	-9.2	-5.3	-2.7	-1.0	0.3	1.0	0.9	-0.1	-0.5	-3.6	-4.6	-7.8	-9.1	-10.7	-12.6	-6.4	1.0
4-Mar	-14.5	-15.6	-16.6	-17.3	-17.6	-18.0	-18.9	-19.6	-19.9	-19.8	-19.6	-18.8	-18.2	-17.5	-16.8	-16.7	-16.6	-16.8	-17.0	-17.2	-17.4	-17.5	-17.7	-18.0	-17.7	-14.5
5-Mar	-18.3	-19.2	-19.3	-20.0	-20.8	-21.6	-21.1	-20.2	-19.3	-18.4	-17.4	-15.8	-14.0	-13.0	-11.7	-10.8	-11.2	-11.7	-13.6	-14.7	-16.5	-19.3	-19.1	-19.0	-16.9	-10.8
6-Mar	-18.8	-18.6	-18.6	-20.1	-21.3	-22.0	-20.2	-19.5	-18.9	-18.6	-18.4	-17.7	-16.7	-16.0	-15.5	-14.9	-14.9	-15.7	-16.7	-17.3	-17.5	-17.9	-18.4	-18.8	-18.0	-14.9
7-Mar	-19.0	-19.2	-19.6	-20.0	-20.4	-21.1	-21.9	-22.4	-22.5	-22.5	-22.2	-21.9	-21.1	-20.0	-19.2	-18.1	-17.7	-18.2	-19.4	-20.6	-21.4	-22.2	-22.9	-23.6	-20.7	-17.7
8-Mar	-24.5	-26.2	-26.9	-28.0	-28.7	-28.7	-28.8	-29.1	-27.7	-25.1	-22.8	-20.5	-19.2	-18.1	-17.4	-16.7	-16.4	-17.0	-18.2	-19.7	-20.6	-21.7	-24.0	-25.5	-23.0	-16.4
9-Mar	-27.5	-29.2	-30.2	-30.6	-30.9	-31.3	-31.6	-31.7	-29.8	-27.4	-24.1	-21.8	-20.0	-18.9	-17.9	-17.1	-16.5	-16.9	-18.5	-21.0	-22.9	-24.2	-26.0	-27.5	-24.7	-16.5
10-Mar	-28.6	-28.5	-29.6	-30.1	-30.6	-31.1	-31.8	-31.9	-29.4	-26.7	-24.0	-21.1	-18.1	-15.8	-14.7	-13.3	-13.2	-13.8	-15.1	-16.2	-17.9	-19.6	-21.2	-22.0	-22.7	-13.2
11-Mar	-22.7	-22.9	-24.1	-25.0	-25.2	-24.9	-25.3	-23.4	-22.5	-20.6	-18.4	-16.7	-13.4	-11.7	-10.8	-10.4	-10.2	-10.5	-11.8	-12.9	-14.1	-14.7	-16.1	-17.7	-17.7	-10.2
12-Mar	-18.0	-19.6	-20.7	-20.7	-21.7	-22.2	-22.2	-22.0	-21.0	-18.8	-15.7	-12.1	-10.0	-9.0	-7.9	-7.1	-6.8	-6.8	-7.7	-9.0	-10.2	-11.3	-11.6	-11.5	-14.3	-6.8
13-Mar	-11.5	-11.4	-11.0	-10.6	-10.9	-11.1	-10.9	-10.7	-10.6	-10.6	-10.2	-8.9	-7.7	-6.3	-5.1	-3.9	-3.1	-2.8	-2.1	-2.8	-3.6	-4.2	-4.9	-5.5	-7.5	-2.1
14-Mar	-6.1	-6.8	-8.0	-8.4	-9.2	-9.4	-10.7	-9.9	-8.2	-5.8	-3.0	0.3	3.6	6.8	8.5	9.5	9.5	8.1	6.4	4.3	5.8	5.7	5.2	4.7	-0.3	9.5
15-Mar	3.6	3.3	3.1	2.5	2.0	1.4	0.0	1.1	1.8	4.6	6.7	7.9	8.7	10.2	10.5	10.1	9.8	9.3	7.4	6.1	5.0	1.7	-0.5	-1.6	4.8	10.5
16-Mar	-3.2	-3.6	-2.8	-2.9	-3.3	-4.3	-5.0	-5.6	-5.3	-4.7	-3.4	-2.2	-1.9	-1.3	-1.3	-1.3	-1.7	-2.7	-3.7	-4.6	-5.1	-5.9	-6.3	-6.2	-3.7	-1.3
17-Mar	-6.1	-6.5	-6.1	-4.4	-4.4	-4.6	-4.3	-3.9	-3.5	-2.7	-2.3	-1.7	0.2	0.6	0.2	-0.2	0.2	-0.2	-1.5	-2.4	-3.3	-3.8	-4.5	-5.2	-2.9	0.6
18-Mar	-5.8	-6.2	-6.7	-7.3	-7.7	-8.2	-8.5	-8.6	-7.9	-6.6	-4.2	-0.5	3.5	4.7	5.1	5.0	4.8	4.5	4.5	3.7	3.1	2.1	0.5	0.3	-1.5	5.1
19-Mar	0.6	-0.6	-2.5	-4.4	-5.7	-6.4	-7.3	-8.1	-8.4	-7.7	-6.6	-5.5	-4.2	-3.1	-2.1	-2.0	-2.2	-2.6	-5.0	-6.9	-8.6	-9.7	-10.3	-11.0	-5.4	0.6
20-Mar	-11.4	-13.7	-15.4	-15.8	-16.3	-16.5	-16.8	-17.0	-16.3	-15.4	-14.1	-12.9	-12.0	-10.7	-9.6	-8.2	-7.5	-6.9	-7.4	-8.2	-9.3	-10.5	-11.4	-12.0	-12.3	-6.9
21-Mar	-12.5	-13.4	-14.3	-15.4	-16.0	-16.6	-17.0	-16.6	M	-11.6	-8.1	-3.8	-0.8	0.5	1.4	1.8	2.1	2.1	1.5	1.1	0.8	0.5	0.2	0.0	-5.8	2.1
22-Mar	-0.3	-0.5	-0.7	-1.0	-1.2	-1.3	-1.7	-2.1	-2.6	-2.2	-1.9	-1.3	-1.2	-1.2	-1.4	-2.1	-2.3	-2.4	-2.7	-2.7	-2.7	-2.9	-2.7	-3.2	-1.8	-0.3
23-Mar	-4.4	-5.2	-5.4	-6.0	-6.1	-5.9	-5.3	-4.6	-4.2	-3.6	-3.0	-2.2	-1.0	0.0	1.5	1.2	1.2	1.2	0.8	0.3	-0.8	-1.3	-1.4	-1.5	-2.3	1.5
24-Mar	-1.5	-1.5	-1.5	-1.7	-2.4	-4.2	-5.3	-5.2	-1.3	1.2	3.4	5.0	6.1	6.7	6.9	6.7	6.7	6.6	6.0	5.0	3.7	2.9	2.7	2.7	2.0	6.9
25-Mar	1.5	1.0	0.7	0.4	0.9	1.2	1.1	0.7	0.7	0.9	1.4	2.0	2.3	2.5	2.7	3.0	3.3	3.7	2.8	1.7	1.2	1.1	0.5	-0.8	1.5	3.7
26-Mar	-1.3	-1.4	-1.3	-1.3	-0.9	-0.3	-0.4	-0.1	1.1	2.7	4.5	5.3	4.9	3.5	3.2	4.9	5.5	5.3	4.0	2.2	0.0	-1.1	-1.5	-2.1	1.5	5.5
27-Mar	-2.2	-2.6	-3.1	-3.7	-4.0	-4.1	-4.0	-3.4	-2.4	-1.0	0.6	3.0	4.8	7.1	9.6	10.3	10.5	9.8	8.5	7.3	6.3	5.7	5.6	5.6	2.7	10.5
28-Mar	4.9	4.8	4.3	3.8	3.4	2.9	2.7	2.6	2.9	3.3	4.1	5.1	6.4	7.6	9.1	9.6	10.3	10.6	9.5	8.2	6.8	4.8	4.2	3.0	5.6	10.6
29-Mar	1.7	2.1	0.9	-0.5	-0.6	-0.8	-1.1	0.0	2.3	4.0	6.4	8.2	9.3	9.7	10.8	10.8	10.6	9.9	8.6	7.5	6.4	5.6	4.4	3.1	5.0	10.8
30-Mar	2.1	1.6	2.6	2.3	2.1	2.0	1.8	2.0	2.1	2.4	2.9	3.4	3.7	4.1	4.2	4.6	4.9	4.9	4.6	4.0	3.4	2.5	2.9	2.6	3.1	4.9
31-Mar	2.0	1.7	1.0	-0.3	-1.1	-1.6	-1.5	-1.6	-0.9	2.7	7.1	9.3	10.6	12.9	13.2	14.2	14.1	13.4	13.0	12.2	10.9	10.7	10.4	9.7	6.7	14.2
																								Diurnal Average		
																								Diurnal Maximum		
M - Maintenance																										



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Athabasca Valley - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Athabasca Valley - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	114	15.34	15.34
-20 - 0	409	55.05	70.39
0 - 10	199	26.78	97.17
10 - 20	21	2.83	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744

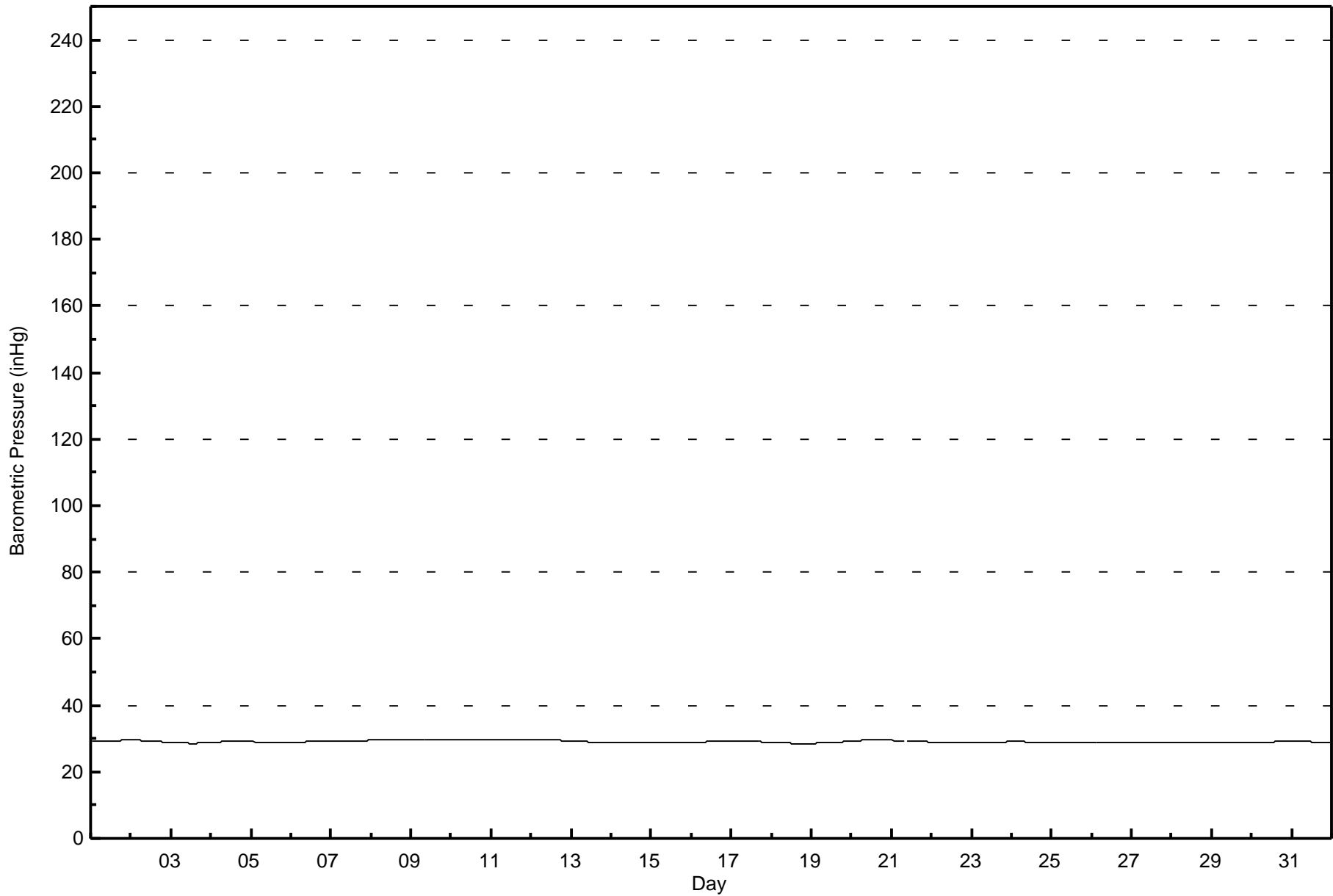


Maximum Value: 29.9 inHg on Mar 9 10:00 Maximum Daily Average: 29.8 inHg on Mar 9																						Hours in Service:	744				
Minimum Value: 28.4 inHg on Mar 18 20:00 Minimum Daily Average: 28.6 inHg on Mar 18																						Hours of Data:	743				
Maximum Diurnal Average: 29.1 inHg at hour 10 Minimum Diurnal Average: 29.1 inHg at hour 18																						Hours of Missing Data:	1				
Monthly Average: 29.09 inHg Percentiles: P ₁ = 28.4 P ₁₀ = 28.8 Q ₁ = 28.9 Median = 29.0 Q ₃ = 29.4 P ₉₀ = 29.6 P ₉₉ = 29.8																						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-Mar	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.4	29.5
2-Mar	29.5	29.5	29.5	29.5	29.5	29.5	29.4	29.4	29.4	29.4	29.4	29.3	29.3	29.2	29.2	29.1	29.1	29.1	29.0	29.0	28.9	28.9	28.9	28.9	28.9	29.2	29.5
3-Mar	28.8	28.8	28.8	28.7	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	28.7	28.7	28.7	28.8	28.8	28.8	28.9	28.7	28.9	
4-Mar	28.9	28.9	28.9	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	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.1	
5-Mar	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0
6-Mar	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.1	
7-Mar	29.1	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.5	
8-Mar	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.6	29.6	29.6	29.5	29.5	29.5	29.5	29.6	29.6	29.6	29.6	29.6	29.6	29.7	29.7	29.5
9-Mar	29.7	29.7	29.7	29.8	29.8	29.8	29.8	29.8	29.8	29.9	29.9	29.9	29.9	29.9	29.9	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.9	29.9
10-Mar	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.8	29.8
11-Mar	29.7	29.8	29.8	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.6	29.6	29.6	29.6	29.6	29.5	29.5	29.5	29.5	29.5	29.5	29.6	29.8	29.8
12-Mar	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.5	29.5	29.5	29.5	29.5	29.4	29.4	29.4	29.4	29.4	29.3	29.5	29.6
13-Mar	29.3	29.3	29.3	29.2	29.2	29.2	29.1	29.1	29.1	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	29.0	29.3	29.3
14-Mar	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.8	28.9	28.9
15-Mar	28.7	28.6	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	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.8	28.8
16-Mar	28.8	28.8	28.9	28.9	28.9	28.9	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	29.2	29.2	29.2	29.2	29.0	29.2
17-Mar	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	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.2	29.2
18-Mar	29.0	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.7	28.7	28.7	28.6	28.6	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.6	29.0	29.0
19-Mar	28.4	28.5	28.6	28.6	28.7	28.7	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.1	29.1	29.2	29.2	28.9	29.2
20-Mar	29.2	29.3	29.3	29.4	29.4	29.4	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.4	29.5	29.5
21-Mar	29.5	29.4	29.4	29.4	29.4	29.4	29.4	29.4	M	29.3	29.3	29.3	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.2	29.5	29.5
22-Mar	29.0	28.9	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	29.0
23-Mar	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	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	28.9	29.0	29.0
24-Mar	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	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.9	28.9	28.8	28.8	28.9	29.0
25-Mar	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	28.9	28.9	28.9	28.9	28.8	28.9	28.9
26-Mar	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
27-Mar	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	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
28-Mar	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	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
29-Mar	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	28.8	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
30-Mar	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	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	29.0	29.1	29.1
31-Mar	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	29.0	29.1	29.1
																						Diurnal Average					
																						Diurnal Maximum					
M - Maintenance																											



Wood Buffalo Environmental Association
Hourly Averages

Barometric Pressure (BP) - inHg
Athabasca Valley - March 2017



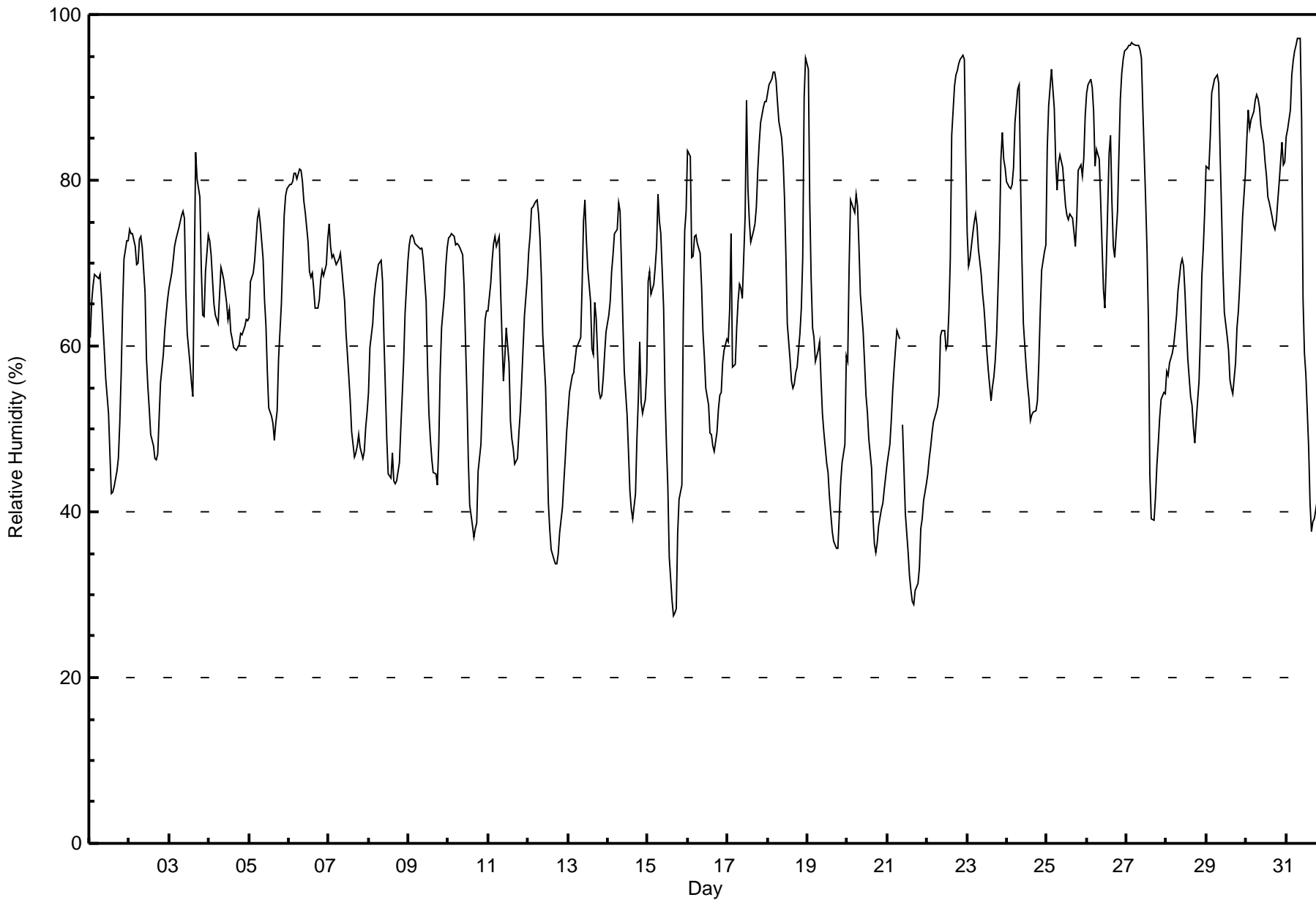


Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %
Athabasca Valley - March 2017

Maximum Value: 97 % on Mar 31 09:00																			Maximum Daily Average: 82.8 % on Mar 30						Hours in Service: 744																			
Minimum Value: 27 % on Mar 15 16:00																			Minimum Daily Average: 42.9 % on Mar 21						Hours of Data: 743																			
Maximum Diurnal Average: 75.3 % at hour 7																			Minimum Diurnal Average: 51.6 % at hour 16						Hours of Missing Data: 1																			
Monthly Average: 64.8 %																			Percentiles: P ₁ = 30 P ₁₀ = 44 Q ₁ = 54 Median = 65 Q ₃ = 75 P ₉₀ = 86 P ₉₉ = 96						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-Mar	61	65	67	69	68	68	69	66	63	59	56	52	47	42	42	43	45	46	51	57	65	71	73	73	59.1	73																		
2-Mar	74	73	74	72	70	70	73	73	72	66	59	55	52	49	48	46	46	47	51	56	59	62	64	66	61.6	74																		
3-Mar	67	69	70	72	73	73	74	76	76	75	67	62	58	56	54	69	83	80	78	70	64	64	69	73	69.6	83																		
4-Mar	73	71	68	65	64	63	66	70	69	68	65	63	64	62	61	60	59	60	60	61	61	62	63	63	64.3	73																		
5-Mar	63	68	69	70	73	75	76	75	71	66	62	57	53	52	51	49	51	52	58	65	70	76	78	79	65.0	79																		
6-Mar	79	79	80	81	81	80	81	81	80	78	76	73	69	68	69	67	64	65	66	68	69	68	70	73	73.6	81																		
7-Mar	75	72	71	71	70	70	70	71	69	65	61	59	56	53	50	47	47	48	49	48	46	47	50	52	59.1	75																		
8-Mar	54	60	63	66	67	69	70	70	68	61	55	49	45	44	47	44	43	44	46	50	54	58	64	70	56.7	70																		
9-Mar	72	73	73	73	72	72	72	72	72	70	66	58	52	49	47	45	45	43	48	57	62	66	70	72	62.5	73																		
10-Mar	73	73	73	73	72	72	72	72	71	67	61	54	46	41	38	37	38	39	45	48	54	59	63	64	58.6	73																		
11-Mar	64	68	70	72	73	72	73	67	61	56	59	62	58	51	49	48	46	46	49	52	56	60	64	68	60.2	73																		
12-Mar	71	73	77	77	77	78	76	73	68	61	55	48	41	38	35	34	34	34	35	37	41	44	46	50	54.3	78																		
13-Mar	52	54	56	57	58	60	60	61	67	75	78	73	69	65	60	59	65	63	55	54	54	56	59	62	61.4	78																		
14-Mar	64	65	69	71	74	74	77	76	70	63	57	52	47	43	40	39	42	49	54	61	53	52	54	57	58.4	77																		
15-Mar	68	69	66	67	69	72	78	75	74	65	54	48	43	34	29	27	28	28	38	42	43	64	74	76	55.5	78																		
16-Mar	84	83	71	71	73	73	72	71	67	62	59	55	53	50	49	48	47	50	52	54	54	58	59	61	61.5	84																		
17-Mar	61	64	74	57	58	62	65	67	67	66	76	90	79	75	73	74	75	77	81	84	87	89	89	90	74.1	90																		
18-Mar	90	92	92	93	93	92	89	87	85	83	78	71	63	58	56	55	55	57	57	61	65	71	90	95	76.2	95																		
19-Mar	93	77	68	62	61	58	59	60	56	52	50	46	45	42	40	38	37	36	36	40	43	46	48	59	52.1	93																		
20-Mar	58	69	78	77	76	78	77	72	66	62	58	54	52	49	45	39	36	35	36	38	40	41	43	44	55.2	78																		
21-Mar	46	48	51	55	57	60	62	61	M	51	45	40	35	32	30	29	29	31	31	33	38	39	41	43	42.9	62																		
22-Mar	45	46	48	49	51	52	53	54	61	62	62	60	60	64	70	85	91	93	93	94	95	95	95	83	69.2	95																		
23-Mar	74	70	71	74	75	76	75	72	69	66	65	62	59	57	53	55	56	58	62	73	83	86	83	82	68.8	86																		
24-Mar	80	79	79	80	81	87	91	92	80	70	63	57	55	54	51	52	52	52	53	58	64	69	71	72	68.5	92																		
25-Mar	84	89	91	93	89	82	79	82	83	82	79	77	76	75	72	76	74	72	76	81	82	80	83	88	81.2	93																		
26-Mar	90	92	92	91	88	82	84	83	78	72	67	65	70	83	85	77	72	71	76	83	90	93	95	96	82.2	96																		
27-Mar	96	96	96	97	96	96	96	96	96	95	89	78	72	63	44	39	39	42	46	48	51	54	54	54	72.2	97																		
28-Mar	57	56	58	59	60	62	64	67	70	70	70	66	62	58	54	53	50	48	51	56	61	68	72	76	61.2	76																		
29-Mar	82	81	85	90	91	92	93	92	83	76	69	64	61	59	56	55	54	58	62	64	67	71	76	81	73.5	93																		
30-Mar	85	88	86	87	88	90	90	90	89	87	84	82	81	78	77	76	75	74	75	77	80	85	82	82	82.8	90																		
31-Mar	85	86	89	93	94	96	96	97	97	87	66	59	57	48	41	38	39	39	40	42	47	50	54	58	66.6	97																		
																			71.6	72.7	73.4	73.7	74.1	74.4	75.3	74.8	73.2	69.0	64.8	61.0	57.4	54.6	52.3	51.6	52.2	52.8	55.2	58.5	61.3	64.6	67.6	69.7	Diurnal Average	
																			96	96	96	97	96	96	96	97	97	95	89	90	81	83	85	85	91	93	93	94	95	95	95	96	Diurnal Maximum	
M - Maintenance																																												





Maximum Speed: 36 km/h on Mar 19 02:00	Maximum Daily Speed Average: 24.6 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 10 23:00	Minimum Daily Speed Average: 0.9 km/h on Mar 3	Hours of Data: 743
Maximum Diurnal Speed Average: 2.9 km/h at hour 19	Minimum Diurnal Speed Average: 0.8 km/h at hour 4	Hours of Missing Data: 1
Monthly Average Velocity: 1.4 km/h 51.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 9 Q ₃ = 13 P ₉₀ = 18 P ₉₉ = 29	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-Mar	N9	N7	NNE5	ENE6	ENE8	ENE9	NE6	NE6	ENE7	NNW5	NW4	NNW6	NW5	NW6	NNW12	NNW13	NNW12	NNW8	NNW5	W3	W4	WSW4	SW1	SW1	N4.4	NNW13	
2-Mar	SW1	NE1	SE2	SSW3	SE7	SSE3	WSW2	SW3	WSW3	WSW4	SSE4	WNW3	NW4	NW4	ESE9	ESE12	SE14	ESE11	SE12	SE14	SE15	SE11	SE12	SE11	SE5.1	SE15	
3-Mar	SE13	SE14	SE17	SE17	SE16	SE17	SSE12	SE7	SSE5	W3	SE9	SSE11	SE8	NW3	NNW3	NNW5	NNW9	NW17	NNW21	NNW23	NW26	NNW23	NNW16	NNW17	NNE0.9	NW26	
4-Mar	NNW21	NNW17	N18	NNW14	N12	N14	NNE17	N15	N17	N16	N16	N14	NNW16	NNW16	NNW17	NNW19	NNW18	NNW15	N11	N11	N8	NNE7	N6	N7	N13.9	NNW21	
5-Mar	N7	NNW5	NNW10	NNW9	N5	N3	NNE2	NNE2	E2	SSE6	SSE9	S9	S7	S6	SSW4	NW2	NNW8	N7	NW4	N7	WNW3	W5	WNW4	NNW3	NNW1.5	NNW10	
6-Mar	NNW2	NNW2	NNW8	NW5	NW3	WNW4	NNW7	NNW14	NNW19	NNW18	NNW22	NNW17	NNW16	NNW18	NNW20	NNW22	N22	NNW22	NNW18	NNW21	N16	N17	NNW15	NNW18	NNW14.2	NNW22	
7-Mar	NNW20	NNW21	NNW20	NNW21	NNW20	NNW19	NNW17	NNW15	NNW19	N19	N19	N19	N15	N14	NNW16	N14	NNW20	NNE15	N12	N10	NNE9	N3	WNW4	NW4	NNW14.8	NNW21	
8-Mar	W3	W5	WSW5	WSW5	W5	SW4	SW3	S1	SW5	W4	NNW5	N6	NNW7	NNW10	N12	NNW13	NNE9	NNE12	NNE9	N7	N7	N5	NNW5	N3	NNW4.3	NNW13	
9-Mar	W3	WSW5	W5	WSW2	NNE0	NE2	N1	NE4	ENE5	NE2	NW2	NNW3	NE5	NNE7	NNW7	NNW7	N7	NNW6	WSW3	W4	NW3	WNW2	WNW2	WSW3	NNW2.2	N7	
10-Mar	W4	N1	NE1	WNW1	NNE1	NE2	N1	NE2	ENE4	NNE3	WNW2	NNW4	NW4	W4	NW4	W4	WSW5	NW4	NNW8	N6	N4	N1	NO	NE1	NNW2.0	NNW8	
11-Mar	NE1	N1	NNE2	NNE3	NE2	E4	ESE3	ESE6	SE6	SE7	ESE4	N2	ESE6	ESE12	ESE10	E12	ESE9	ESE9	E7	E5	E6	SE5	SE5	ESE4	ESE4.9	ESE12	
12-Mar	ESE4	E3	E5	E5	ENE6	E6	ESE8	ESE8	SE7	SE11	SSE9	SE9	SE17	SE17	ESE17	SE17	SE17	SE14	SE11	SE13	SE16	SE16	SE16	SE17	SE10.8	ESE17	
13-Mar	SE18	SE17	SE12	SE14	SE15	SE15	SE17	SE18	SE20	SE19	SE20	SE19	SE19	SE19	SE20	SE15	SE14	SE10	SSE11	SSE11	SSE12	SSE9	SE13	SE14	SE15.3	SE20	
14-Mar	SE12	SE12	ESE9	SE8	SE7	SE7	ESE5	SE11	SE11	SE13	SE11	SE12	SE10	S3	W2	N3	NNW2	N2	S1	SE5	SE8	SE9	SE14	SE12	SE7.1	SE14	
15-Mar	SE9	SE14	SE13	SSE11	SE12	SE13	SSE5	SSE11	SE8	SSE4	SSW7	SW9	SW7	SW11	W13	WNW14	WNW12	NW10	N9	NNW6	NNW5	WSW4	WSW3	WNW4	SSW3.1	WNW14	
16-Mar	W5	NNW5	NNW12	NNW16	NNW15	NNW14	NNW14	NNW15	NNW16	NNW19	NNW19	NNW21	NNW21	NNW19	NNW24	NNW25	NNW21	NNW16	NNW15	NNW17	NNW16	N15	NNW17	NNW10	NNW16.0	NNW25	
17-Mar	N9	NNW10	NE4	ESE11	ESE8	E9	ESE9	ESE8	SE9	SE8	SE8	NW2	N12	NNW17	NNW19	NNW17	NNW16	NNW16	NNW11	NNW11	NNW10	NNW12	NNW8	NNW10	N5.8	NNW19	
18-Mar	NNW10	N8	N9	NNW12	NNW13	NNW12	NNW11	NNW12	N9	N8	N6	NNW4	ESE12	E15	ESE15	ESE13	ESE9	E6	ESE6	ESE1	NNE4	N10	NNW7	NNW8	NNE5.0	ESE15	
19-Mar	WNW14	NW36	NW29	NW33	WNW28	WNW22	NW17	W20	WNW22	WNW24	W22	W26	W30	W31	W26	W28	W29	WNW24	NW29	NNW27	NW27	NW27	WNW25	NW26	WNW24.6	NW36	
20-Mar	NW25	N18	N12	N13	N12	N8	N9	NNW8	N7	NNE6	N5	NW5	NW6	NNW7	NNW7	NNW4	E5	SE8	SE10	SE11	SE13	SE12	SSE10	SSE10	N3.3	NW25	
21-Mar	SSE8	SE11	SE14	SE14	SE14	SE13	SE10	SE13	M	SE9	SE9	E4	ESE13	SE18	SE19	SE20	SE16	SE16	SE15	SE15	SSE16	SE12	SE10	SE11	SE13.0	SE20	
22-Mar	SE11	SE12	SE11	SE12	SE11	SE10	SE13	ESE12	ESE10	ESE10	E10	E9	E11	E9	E6	NNW5	NNW6	NNW6	NNW5	NNW5	N5	W4	WNW4	N11	E4.9	SE13	
23-Mar	NNW11	NNW7	WNW6	W6	W4	WSW4	WSW4	W3	NNW6	NNW9	NNW10	NNW9	NNW6	WNW3	SW2	NW4	N6	N6	N2	ESE7	SE9	ESE8	SE9	SE10	NNW2.0	NNW11	
24-Mar	SE10	SE10	SE10	SE8	SE8	SE2	WSW1	SW4	SE8	SE10	SE11	SE12	SE12	SE12	SE16	SE17	SE16	SE13	SE8	SE5	SE13	SE15	SE13	SE12	SE8	SE9.7	SE17
25-Mar	ESE5	E4	SSE3	NNE1	SE4	SE6	ESE8	SE10	SE11	SE11	SE12	SE10	SE8	SE6	SSE6	ESE5	SE5	SSE6	ESE3	NE1	ESE4	E5	SE1	N2	SE5.3	SE12	
26-Mar	N2	N2	E1	N1	SE3	SE6	SE6	SSE9	SSE8	SSE9	S5	SW2	SE8	NW4	N8	NNE2	NE4	NNW3	NNW4	NNW3	N3	N3	ENE2	NNW2	ESE1.2	SSE9	
27-Mar	N2	W1	NW1	WSW2	SSW3	SSW2	SW2	W3	NW3	N2	NNW5	NNW5	N8	N8	ESE13	SE14	SE14	ESE10	ESE7	ESE8	SE9	SE12	SE10	SE9	ESE3.1	SE14	
28-Mar	SE9	SE11	SE11	SE12	SE14	SE12	SE10	SE11	SE10	SE10	SE10	SE9	ESE8	ESE10	ESE10	E11	ESE12	ESE10	ESE8	ESE9	SE9	SE5	SE11	SE8	SE9.6	SE14	
29-Mar	SE5	SSE8	SSE5	SW2	SW1	SSW2	SW2	SE4	SE11	SE9	SE9	SE10	SE8	SE10	SE9	SSE10	SE10	SSE9	SE4	E4	ESE9	ESE10	ESE8	E6	SE6.3	SE11	
30-Mar	NW0	SE4	ESE10	ESE10	E10	ESE8	E8	ESE7	E9	E8	ENE4	NE3	N4	NNW4	NNW5	N5	ENE3	E3	ENE2	ESE2	ESE2	W1	SSE3	SE2	E3.5	ESE10	
31-Mar	S2	ESE2	SE2	SW2	SW1	SE2	SW7	SW9	SW11	SSW6	SSE6	SSW4	SW3	SE9	SW10	SSW15	S15	S12	SSE12	SSE11	SSE7	S5	S8	SSE7	S5.9	SSW15	

N1.4 NNE1.3 NE1.4 NE0.8 E1.7 E2.0 E1.6 ESE1.8 E1.8 E1.6 E1.3 NNE1.0 NE1.7 NE1.7 NNE2.0 N2.1 NNE2.6 NNE2.8 NNE2.9 NNE2.2 ENE1.9 ENE1.0 ESE1.3 ENE1.1	Diurnal Average
NNW25 NW36 NW29 NW33 WNW28 WNW22 SE17 W20 WNW22 WNW24 W22 W26 W30 W31 W26 W28 W29 WNW24 NW29 NNW27 NW27 NW27 WNW25 NW26	Diurnal Maximum

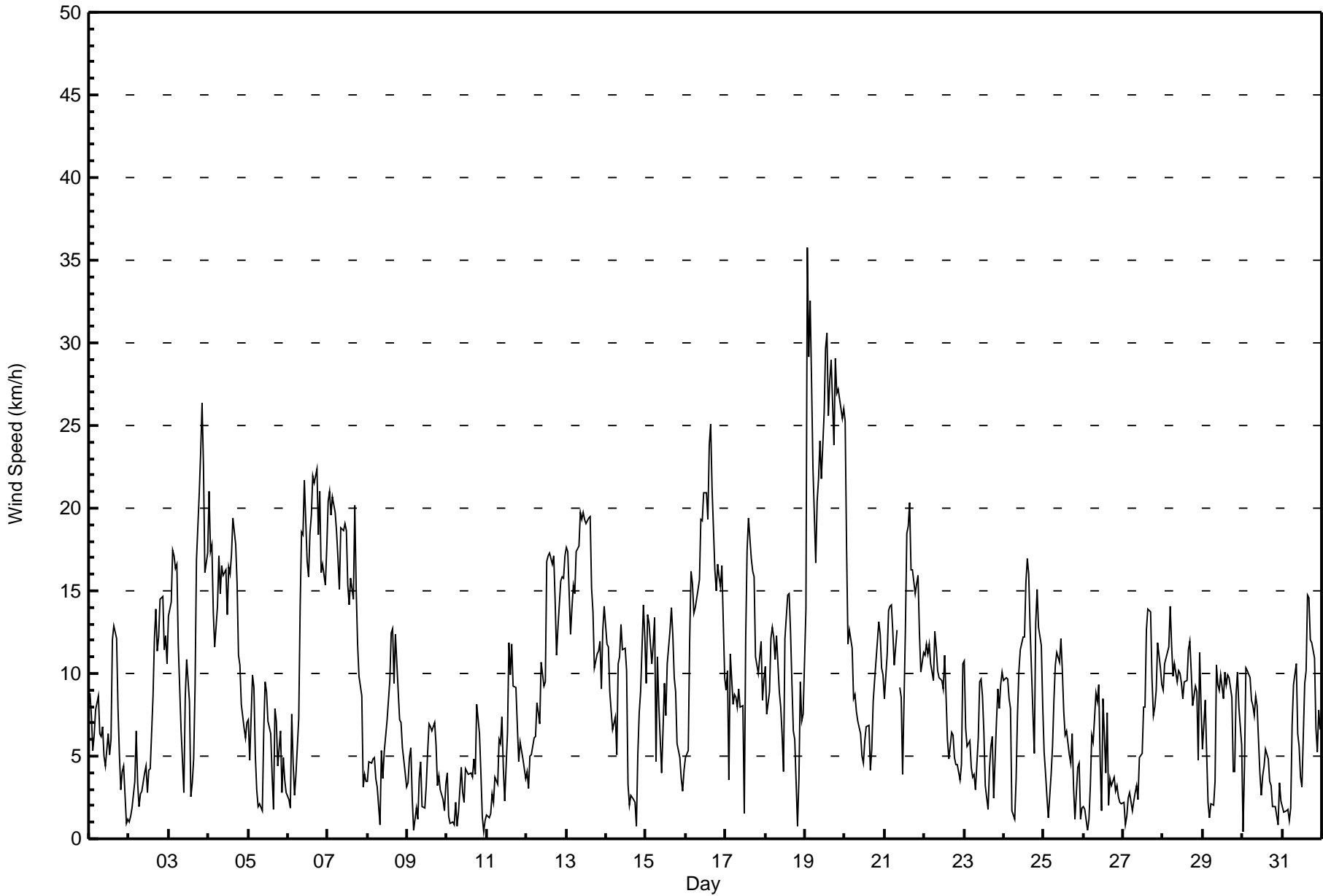
M - Maintenance
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Athabasca Valley - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Mar 19 04:00 Minimum Value: 1 km/h on Mar 27 09:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6																		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-Mar	3	1	2	2	2	2	1	2	2	1	1	1	2	3	3	2	2	3	2	1	1	2	1	2	3		
2-Mar	1	1	2	1	2	2	1	2	2	2	2	1	1	1	5	3	4	3	5	4	4	3	3	2	5		
3-Mar	3	3	3	3	4	3	3	2	2	2	3	3	2	2	2	2	7	5	5	5	4	6	4	7			
4-Mar	4	3	5	3	3	4	4	4	4	5	3	3	3	4	3	3	3	3	2	2	2	1	1	5			
5-Mar	1	2	2	2	1	1	1	1	2	2	2	2	2	2	3	2	2	2	2	2	1	1	1	3			
6-Mar	2	2	2	2	1	2	4	3	3	3	4	4	3	4	4	4	5	5	5	4	4	4	4	5			
7-Mar	3	5	5	4	5	4	4	4	5	4	5	6	3	3	3	4	4	4	3	3	2	2	1	6			
8-Mar	1	1	1	1	1	3	2	1	1	2	2	2	2	3	3	3	3	3	2	1	2	1	1	3			
9-Mar	2	1	1	2	1	1	1	2	2	1	1	1	2	2	2	2	2	2	2	1	1	1	1	2			
10-Mar	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	2			
11-Mar	1	1	1	1	1	1	2	2	2	2	1	1	5	4	4	3	3	3	2	1	1	2	3	5			
12-Mar	2	2	1	1	1	1	2	2	2	2	2	3	4	4	4	4	4	4	3	3	3	3	3	4			
13-Mar	3	3	2	3	3	3	3	4	4	4	4	4	4	4	4	4	3	2	3	3	3	2	2	4			
14-Mar	2	2	2	2	3	3	2	3	4	2	2	3	2	1	1	1	1	2	2	2	2	3	2	4			
15-Mar	2	4	3	2	2	2	3	3	2	3	3	3	3	4	5	4	4	3	3	1	2	1	2	5			
16-Mar	1	1	3	3	4	3	3	3	3	3	3	4	5	4	5	3	5	4	3	3	3	3	3	5			
17-Mar	3	3	4	4	2	3	2	2	3	2	2	2	4	3	4	3	3	3	3	2	2	2	2	4			
18-Mar	3	2	2	2	2	2	2	2	2	2	2	1	4	5	4	3	2	2	2	1	2	2	1	5			
19-Mar	5	6	7	9	6	5	6	4	5	4	4	6	5	5	6	5	5	5	5	5	5	7	5	9			
20-Mar	7	7	3	4	3	2	3	1	1	2	2	2	1	2	2	2	2	2	3	2	3	3	2	7			
21-Mar	2	2	3	2	3	3	3	2	M	3	2	2	5	5	4	5	4	4	4	5	5	3	2	5			
22-Mar	3	3	3	3	3	2	3	3	3	3	2	2	2	2	2	2	2	1	1	1	1	1	3	3			
23-Mar	3	3	2	1	1	2	2	1	2	2	2	2	1	1	1	1	1	2	3	2	2	3	2	3			
24-Mar	3	2	2	2	2	2	1	2	4	2	3	3	3	4	5	4	4	3	2	4	4	4	3	5			
25-Mar	2	2	1	1	2	2	2	3	3	3	3	2	2	2	2	1	2	2	2	1	2	2	1	3			
26-Mar	1	1	2	2	2	3	2	2	2	2	2	2	3	3	3	1	1	1	1	1	1	1	1	3			
27-Mar	1	1	1	1	2	1	1	1	1	1	1	2	2	2	6	4	4	3	2	3	3	2	2	6			
28-Mar	2	2	2	2	3	2	2	2	2	2	2	3	3	3	3	4	3	3	2	2	4	2	3	4			
29-Mar	2	3	2	1	1	1	1	2	3	2	2	3	3	3	3	3	3	2	1	2	3	3	2	3			
30-Mar	1	4	3	3	2	2	2	2	2	2	1	1	2	2	1	1	2	1	1	2	2	2	1	4			
31-Mar	2	2	1	2	2	1	2	2	2	2	2	2	2	3	3	5	4	3	2	3	2	2	2	5			
																		Diurnal Maximum									
M - Maintenance																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Athabasca Valley - March 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	242	32.57	32.57
6 - 11	266	35.80	68.37
12 - 19	186	25.03	93.41
20 - 28	42	5.65	99.06
29 - 38	7	0.94	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
Athabasca Valley - March 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	28	12	14	6	12	14	18	8	6	6	16	18	22	12	22	28	242
6 - 11	33	6	2	5	15	38	87	24	4	2	7	0	1	1	3	38	266
12 - 19	23	3	0	0	2	11	78	6	2	1	0	0	1	3	2	54	186
20 - 28	1	0	0	0	0	0	4	0	0	0	0	0	5	6	5	21	42
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	3	0	4	0	7
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	85	21	16	11	29	63	187	38	12	9	23	18	32	22	36	141	743

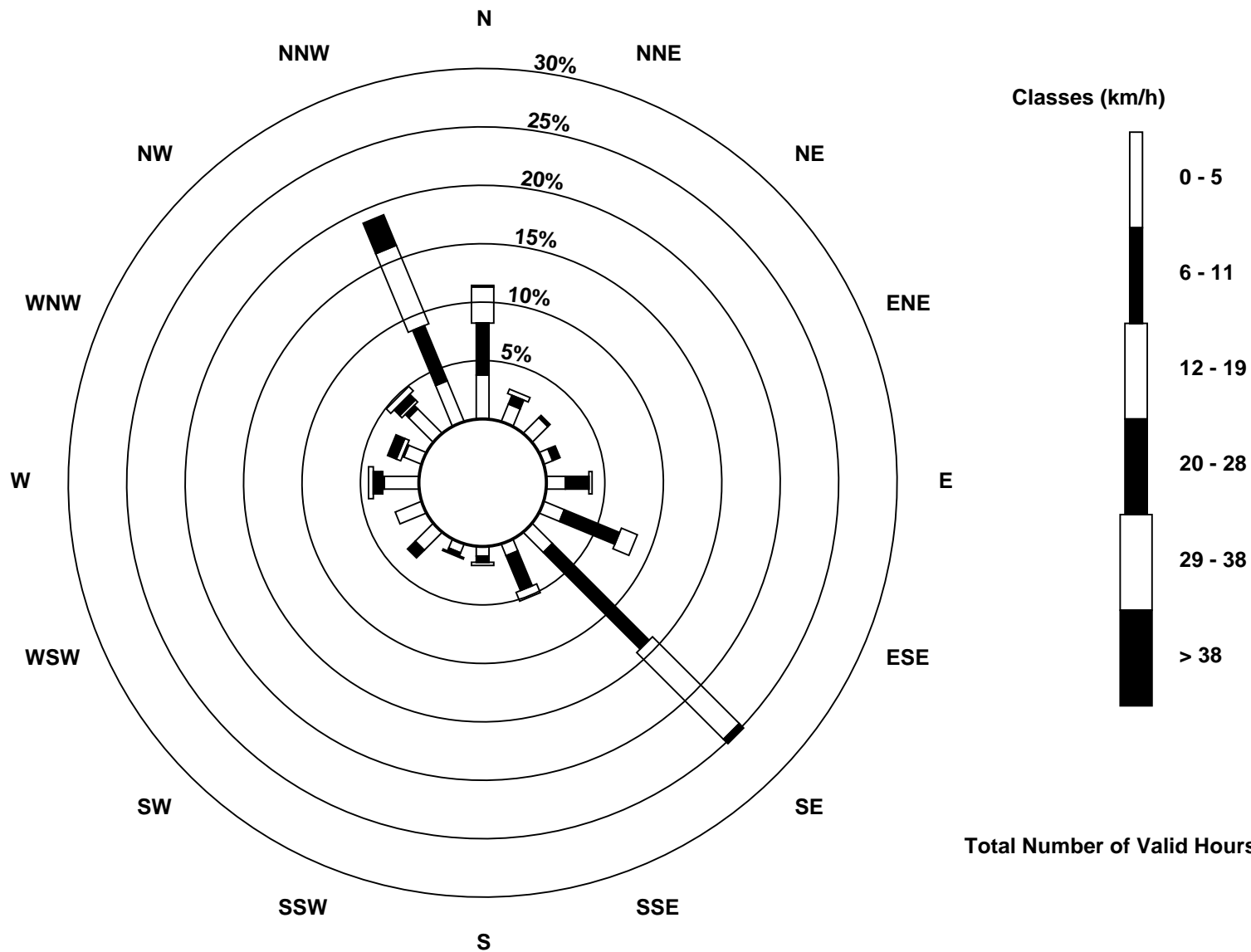
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Wind Speed (WS) - km/h
Athabasca Valley (AMS 7)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Athabasca Valley - March 2017

Direction of Maximum Speed: 307 deg on Mar 19 02:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 296.1 deg on Mar 19	Hours of Data: 743
Direction of Minimum Speed: 355 deg on Mar 10 23:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 0.9 deg on Mar 3	Percent Operational Time: 99.9
Monthly Average Direction: 335.0 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-Mar	3	2	18	62	63	75	53	53	64	336	313	336	321	312	328	338	344	341	327	278	268	251	231	218	355.2	
2-Mar	218	37	145	202	128	168	239	225	246	248	149	292	311	308	105	119	126	120	128	130	131	139	138	144	137.3	
3-Mar	140	145	145	144	142	143	147	137	156	268	142	150	146	313	344	337	348	317	343	327	309	331	341	348	13.9	
4-Mar	340	342	355	346	355	4	16	7	5	7	358	356	341	340	338	337	342	343	352	350	1	26	6	1	352.5	
5-Mar	356	340	348	348	1	10	28	28	79	162	165	178	185	171	195	308	342	350	325	353	300	259	293	334	330.0	
6-Mar	329	330	347	308	310	290	329	347	340	341	341	342	347	345	344	344	350	345	348	341	351	352	348	342	343.3	
7-Mar	337	343	346	341	345	346	345	345	345	349	351	352	351	351	346	350	344	13	6	8	33	1	288	306	348.7	
8-Mar	275	262	247	255	267	229	222	186	236	263	329	356	347	345	349	346	14	20	19	0	354	355	338	350	336.4	
9-Mar	276	254	259	247	20	50	2	56	75	48	311	338	35	15	346	328	351	339	254	267	316	294	297	252	329.4	
10-Mar	271	1	39	298	15	51	8	35	70	32	299	334	306	275	305	274	242	306	337	356	5	7	355	36	330.2	
11-Mar	42	7	15	22	36	85	122	119	127	135	119	352	113	104	112	95	107	107	93	91	91	130	128	103	103.9	
12-Mar	107	83	96	83	78	93	120	123	127	142	149	128	128	132	123	130	130	129	130	131	138	145	145	143	129.0	
13-Mar	142	143	140	142	144	145	142	140	139	137	136	131	132	129	131	144	146	136	160	168	161	158	139	142	141.4	
14-Mar	136	132	123	135	132	133	123	136	141	136	134	141	142	177	259	350	333	2	171	130	128	127	141	140	135.0	
15-Mar	130	147	146	152	145	141	150	147	138	166	211	225	226	223	270	289	300	324	349	337	327	245	253	291	199.4	
16-Mar	271	343	348	340	347	348	347	347	344	340	337	340	343	346	340	337	341	348	340	342	346	349	343	329	341.9	
17-Mar	356	345	45	119	106	100	116	113	139	146	137	311	354	342	346	344	345	345	342	331	330	335	336	344	2.6	
18-Mar	345	359	349	340	339	339	345	342	352	354	0	346	116	100	109	113	106	99	113	113	28	352	342	328	19.5	
19-Mar	302	307	309	305	300	295	305	272	282	282	268	274	281	274	279	280	279	299	323	328	325	312	302	313	296.1	
20-Mar	316	353	353	349	350	353	349	347	354	30	11	314	322	328	338	339	91	146	143	133	137	143	147	147	7.2	
21-Mar	148	141	140	141	138	140	142	140	M	137	134	94	115	126	128	131	136	133	129	137	152	138	133	133	135.0	
22-Mar	129	130	131	131	130	125	125	122	113	111	92	95	87	89	96	340	347	343	345	333	351	261	295	357	100.5	
23-Mar	343	334	301	265	260	250	256	260	337	344	334	327	342	291	215	311	357	4	7	118	125	122	131	131	336.4	
24-Mar	132	131	141	145	142	129	254	230	141	140	143	127	131	129	131	130	134	129	129	131	125	129	124	139	133.8	
25-Mar	102	101	159	21	125	135	122	127	129	132	130	129	129	130	155	112	133	165	119	34	102	100	131	10	126.1	
26-Mar	360	0	87	5	131	134	145	150	147	153	171	228	143	308	353	29	48	327	347	343	358	355	72	346	111.1	
27-Mar	353	261	305	240	210	201	221	271	306	358	327	346	355	352	122	130	125	121	114	123	130	141	136	145	123.1	
28-Mar	130	136	133	135	137	144	138	133	133	134	133	134	111	106	113	96	102	109	106	121	126	145	143	138	126.5	
29-Mar	139	149	165	232	221	197	221	132	131	131	131	131	131	128	125	142	151	137	168	128	88	107	110	103	98	133.5
30-Mar	319	128	122	115	99	116	101	107	90	84	69	36	5	332	337	354	60	90	63	111	121	273	162	134	92.2	
31-Mar	186	119	128	228	233	144	221	226	229	197	149	211	226	139	221	208	186	181	157	147	148	190	172	165	185.6	

7.8	30.3	52.5	42.1	82.5	97.4	87.7	102.6	85.5	89.8	91.0	17.3	51.5	35.8	24.7	10.5	25.3	20.2	22.4	31.5	62.3	67.4	111.1	71.3
Diurnal Average																							

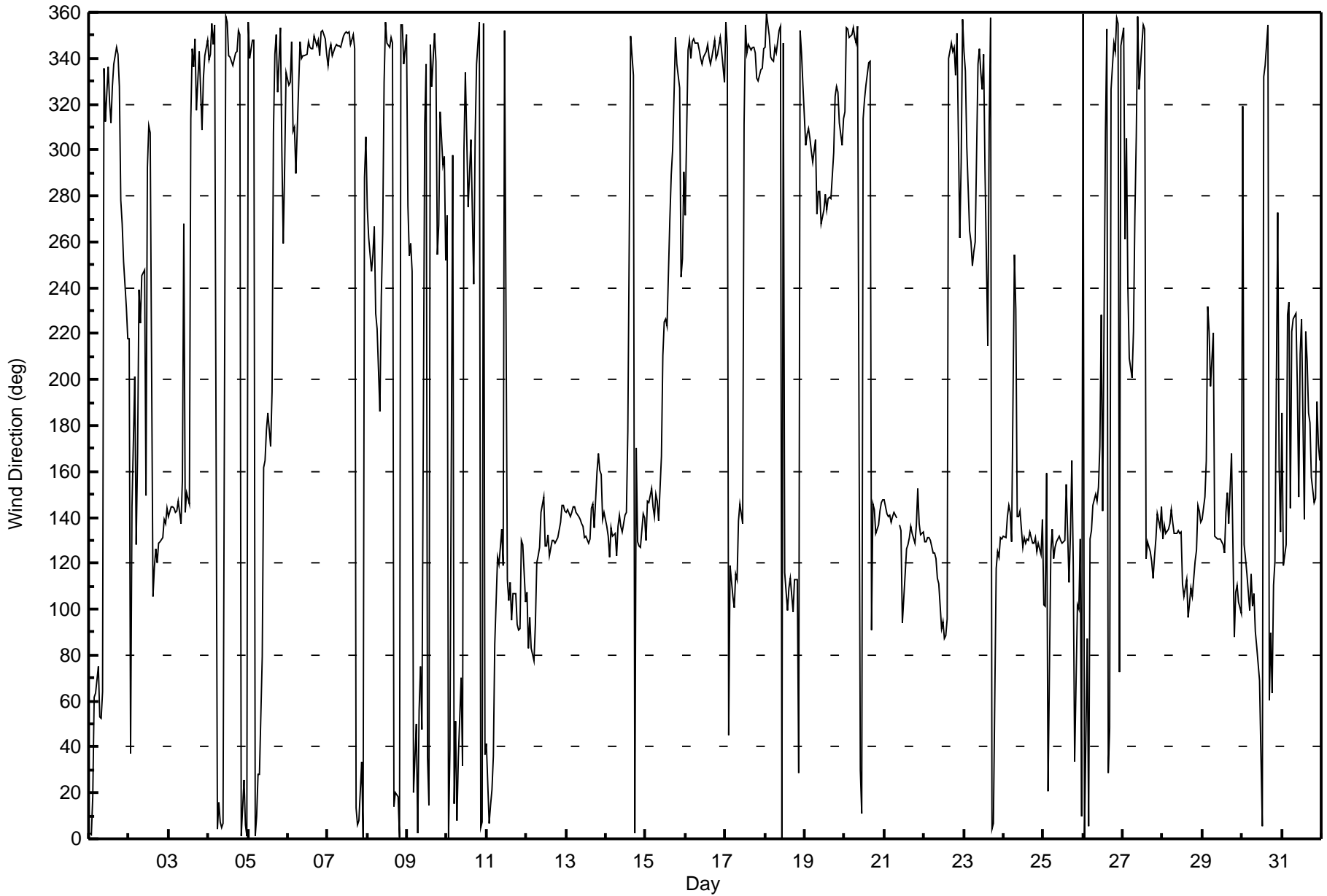
M - Maintenance
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Athabasca Valley - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 94 deg on Mar 14 19:00 Minimum Value: 8 deg on Mar 12 05:00 Percentiles: P ₁ = 9 P ₁₀ = 12 Q ₁ = 15 Median = 19 Q ₃ = 33 P ₉₀ = 58 P ₉₉ = 90		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-Mar	25	15	29	22	15	12	20	29	24	28	16	14	28	35	13	14	11	16	18	30	22	23	86	80	86
2-Mar	86	73	94	49	31	62	59	88	75	45	75	45	15	16	74	21	18	18	17	15	16	18	15	12	94
3-Mar	12	11	10	11	11	11	18	29	61	55	31	15	21	61	48	41	14	20	13	19	9	12	20	16	61
4-Mar	9	12	19	16	19	19	16	19	18	17	19	20	13	13	12	11	12	11	17	17	19	18	15	12	20
5-Mar	11	25	11	13	24	36	53	45	73	25	17	16	28	35	70	91	13	16	18	25	24	14	30	24	91
6-Mar	17	88	18	38	44	53	33	17	9	10	12	15	15	14	14	16	15	17	11	18	18	16	11	88	
7-Mar	9	14	15	11	14	14	15	14	14	16	17	18	17	18	15	16	15	16	18	18	20	46	20	29	46
8-Mar	19	12	13	21	24	88	70	91	16	32	32	27	32	27	19	16	26	15	12	15	15	14	14	33	91
9-Mar	43	18	13	78	67	53	71	35	31	71	58	51	41	28	28	16	24	15	38	38	44	56	60	58	78
10-Mar	18	35	35	53	78	29	47	28	15	55	58	41	35	24	29	39	35	51	13	20	60	49	88	37	88
11-Mar	45	40	50	22	62	36	52	30	48	15	43	60	89	23	34	23	26	20	11	19	12	26	40	33	89
12-Mar	39	50	22	16	8	19	18	21	22	15	16	23	18	19	18	18	16	16	16	14	14	12	12	11	50
13-Mar	12	11	12	12	12	12	12	14	14	14	13	14	14	15	14	18	15	12	17	13	13	17	12	11	18
14-Mar	15	13	17	20	25	23	43	14	26	12	12	14	13	69	63	48	35	39	94	41	26	16	13	13	94
15-Mar	12	20	15	16	13	12	48	16	20	51	40	19	22	23	27	18	14	10	19	17	21	44	78	23	78
16-Mar	15	31	16	10	16	16	14	14	12	10	11	13	15	16	12	8	12	17	12	12	12	13	9	38	38
17-Mar	24	21	57	22	23	19	21	22	24	24	23	89	17	11	15	13	13	13	15	13	11	10	12	12	89
18-Mar	14	17	17	9	9	10	14	10	18	19	26	35	33	20	20	21	20	19	24	92	33	16	12	15	92
19-Mar	15	14	14	16	16	15	14	12	15	13	16	14	12	13	13	13	13	21	11	10	12	13	11	13	21
20-Mar	11	26	18	16	16	16	17	14	18	31	55	43	17	26	24	56	37	24	14	15	15	15	13	15	56
21-Mar	17	13	12	11	11	13	16	12	M	20	16	45	27	16	16	16	15	15	16	17	18	15	15	16	45
22-Mar	15	15	15	15	14	16	15	19	22	23	18	19	12	15	20	31	14	11	15	12	12	29	24	19	31
23-Mar	14	18	16	13	17	66	39	28	31	13	15	17	16	45	72	52	19	16	72	27	17	19	17	16	72
24-Mar	16	13	15	15	21	80	80	39	39	18	19	24	20	16	16	15	17	23	26	15	17	18	19	24	80
25-Mar	25	41	83	73	32	22	18	15	14	15	15	16	20	20	26	26	48	25	42	79	25	31	80	65	83
26-Mar	35	50	93	48	63	41	38	25	19	20	60	79	50	71	21	75	32	14	16	34	29	39	39	54	93
27-Mar	48	90	85	26	45	62	42	39	14	46	13	25	15	18	57	16	18	18	22	27	18	13	15	13	90
28-Mar	15	12	14	13	12	12	13	12	15	13	15	23	38	34	29	22	20	18	19	16	40	42	14	17	42
29-Mar	30	19	36	52	77	67	72	53	18	14	19	28	35	29	29	27	21	13	39	25	21	21	19	22	77
30-Mar	72	78	20	19	18	21	20	23	15	13	31	60	54	35	24	47	48	58	74	75	71	91	41	57	91
31-Mar	82	68	80	83	82	59	11	9	9	44	45	56	60	35	30	21	26	23	16	16	27	46	23	24	83
86 90 94 83 82 88 80 91 75 71 75 89 89 71 74 91 48 58 94 92 71 91 88 80																									
Diurnal Maximum																									
M - Maintenance																									





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 3, 2017	Last Calibration	February 3, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	7:55	End Time (MST)	13:11
Gas Cert Reference	LL110103	Station temp.	22 Deg C
Cal Gas Concentration	49.2 ppm	Cal Gas Exp Date	February 16, 2019
Calibrator Make/Model	API T700	Serial Number	2445
ZAG Make/Model	API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-619	-619
Analyzer IP address	192.168.1.103		Lamp voltage	802	802
Calculated slope	0.991807	1.002512	Chamber temp	43.8	43.9
Calculated intercept	1.045429	-0.011583	Pressure	687.0	701.6
Analyzer Background	18.5	18.5	Flow	0.474	0.477
Analyzer Coefficient	1.040	1.040	Intensity	43815	43815

Analyzer make Thermo 45C Analyzer serial # 630718530

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	59.1	581.5	577.7	1.007
calibrator zero	5000	0.0	0.0	0.5	----
high point	5000	78.6	773.4	772.0	1.002
second point	5000	39.5	388.7	386.7	1.005
third point	5000	19.7	193.8	193.4	1.002
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	78.6	773.4	773.0	1.001
Average Correction Factor					1.003

Corrected As found 577.4 Previous response 585.3 % change 1.4%

Notes:

Power blip during calibrator zero and high point, calibrator restarted, Zero and high point redone; No maintenance or adjustments done, filter changed out. Calibration points changed to 773, 388, 194ppb from 581,290,145ppb, this done after as found

Calibration Performed By:

Melissa Lemay



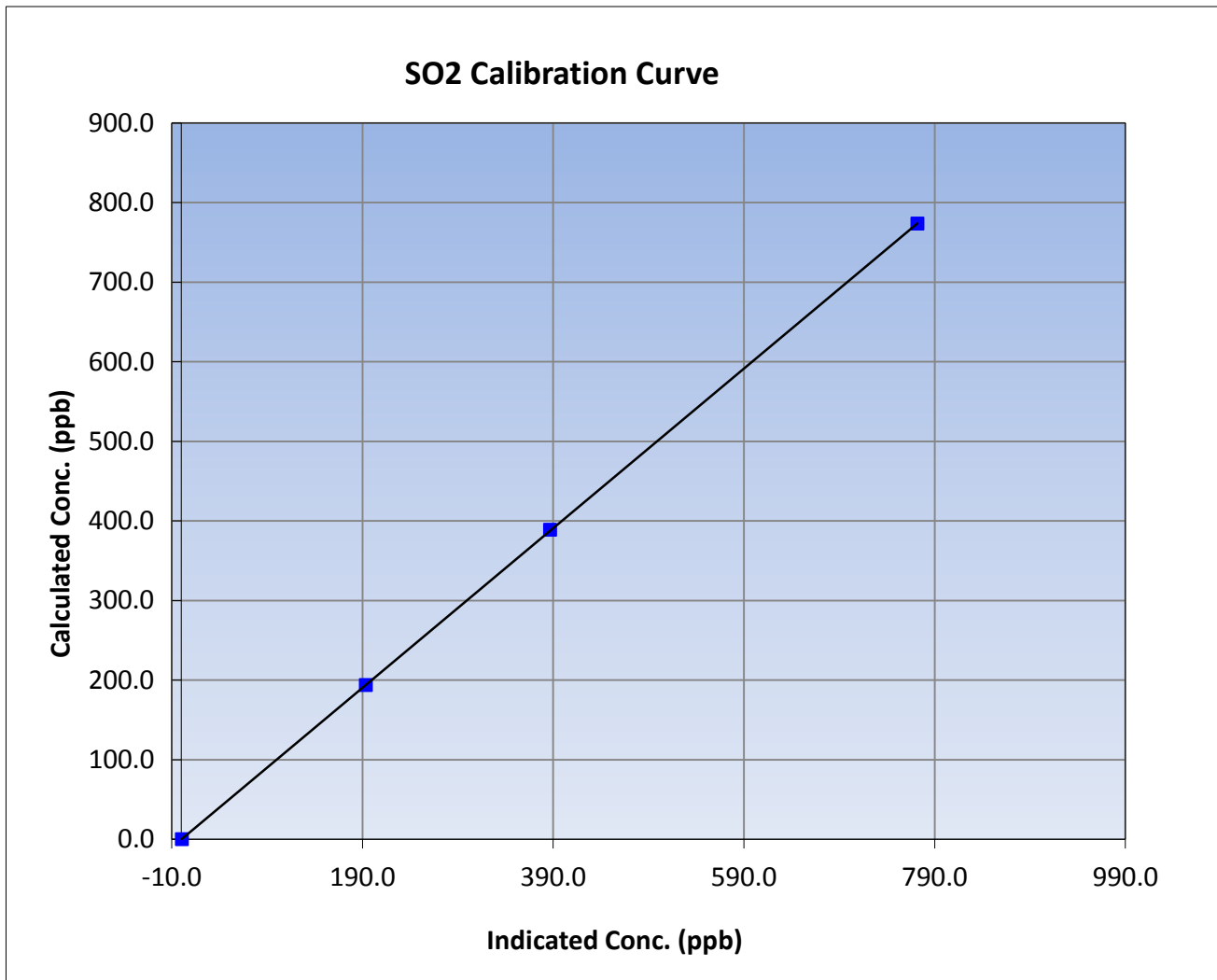
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 3, 2017	Previous Calibration	February 3, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:55	End Time (MST)	13:11
Analyzer make	Thermo 45C	Analyzer serial #	630718530

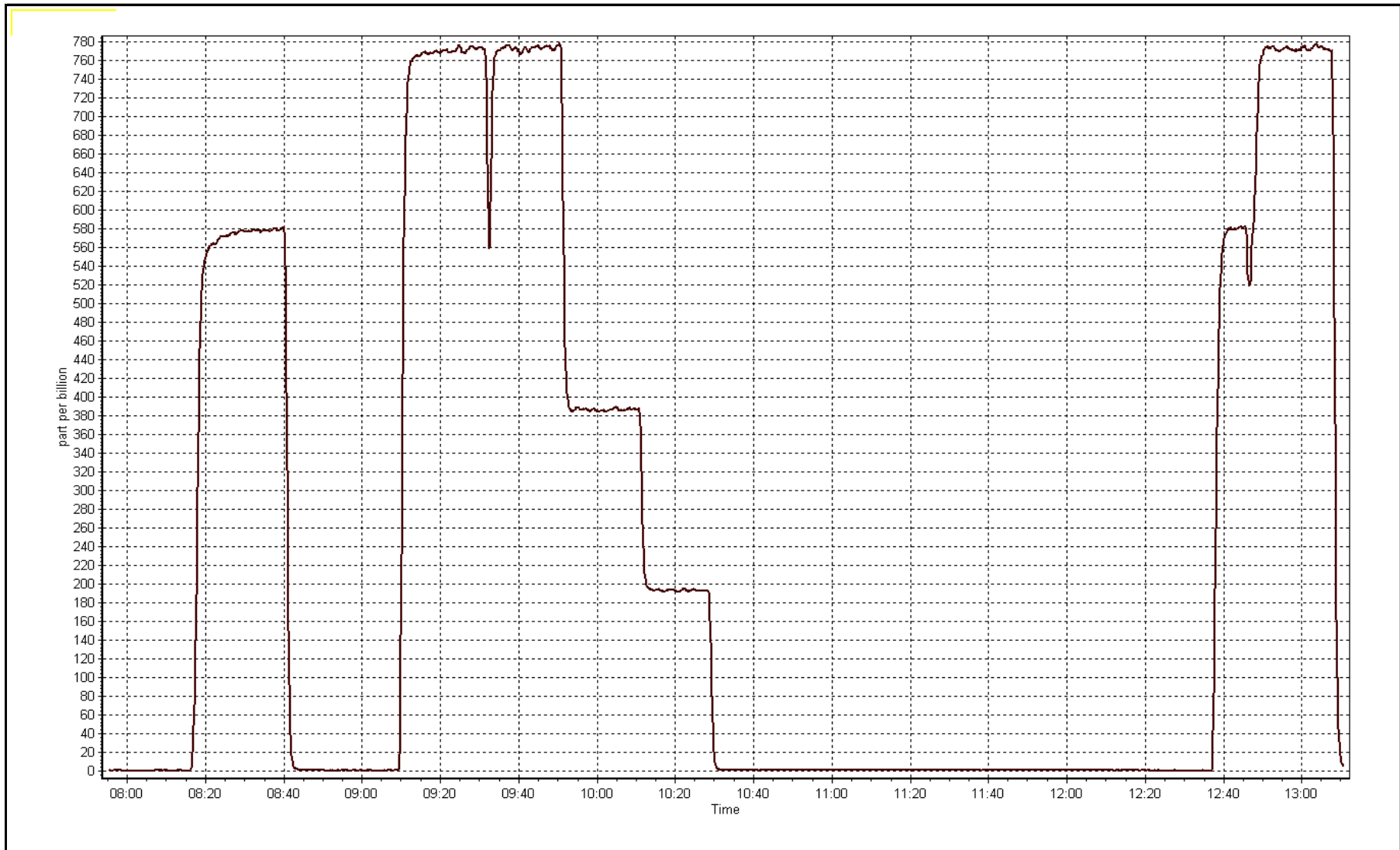
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999995
773.4	772.0	1.0018		
388.7	386.7	1.0051	Slope	1.002512
193.8	193.4	1.0023		
			Intercept	-0.011583



SO2 Calibration Plot

Date: March 3, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	March 2, 2017	Last Calibration	February 2, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	12:08
Gas Cert Reference	ALM052589	Station temp.	3 Deg C
Cal Gas Concentration	5.02 ppm	Cal Gas Exp Date	September 9, 2017
Calibrator Make/Model	API T700	Serial Number	2445
Dil air Make/Model	API 701-H	Serial Number	198
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S970259A 26/Sep/17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-698.9	-698.9
Analyzer IP address	192.168.1.44		Lamp voltage	1149	1149
Calculated slope	0.992305	0.994095	Chamber temp	45	45
Calculated intercept	-0.126260	-0.162758	Pressure	713.5	713.5
Analyzer Background	2.5	2.5	Flow	0.454	0.454
Analyzer Coefficient	1.028	1.028	Intensity	72	72
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-LTE		Analyzer serial #	1507864683	
Converter make/model	CDN-101		Converter serial #	460	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	75.0	75.3	75.3	1.000
SO2 scrubber check	5000	14.8	148.0	0.5	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	75.0	75.3	75.8	0.993
second point	5000	40.0	40.2	40.8	0.984
third point	5000	20.0	20.1	20.3	0.989
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	75.0	75.3	75.9	0.992
Average Correction Factor					0.989

Corrected As found	75.2	Previous response	76.0	% change	1.1%
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Notes:

No adjustments or maintenance done, SO2 scrubber checked after as founds, filter changed out

Calibration Performed By:

Melissa Lemay



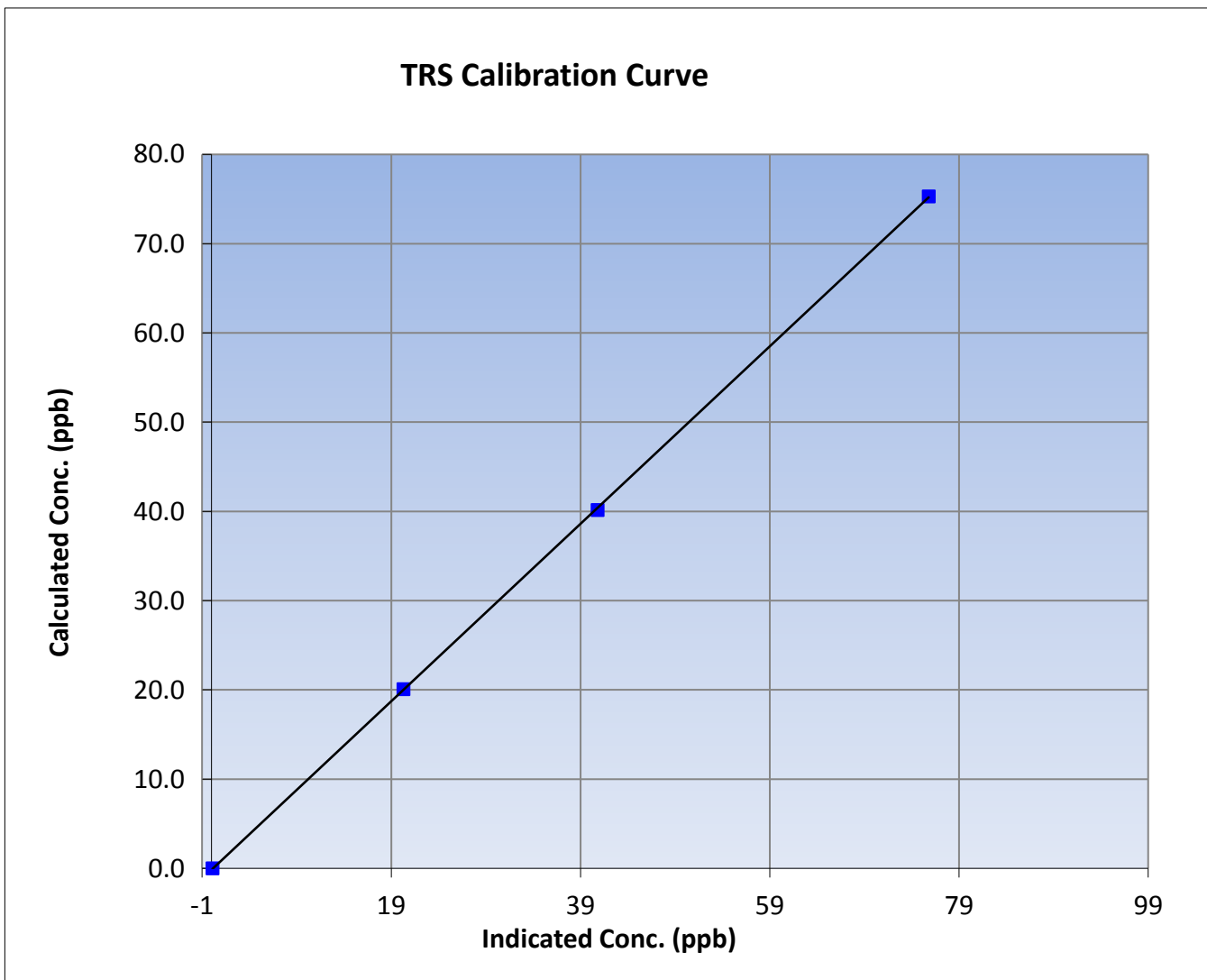
Wood Buffalo Environmental Association TRS Calibration Report

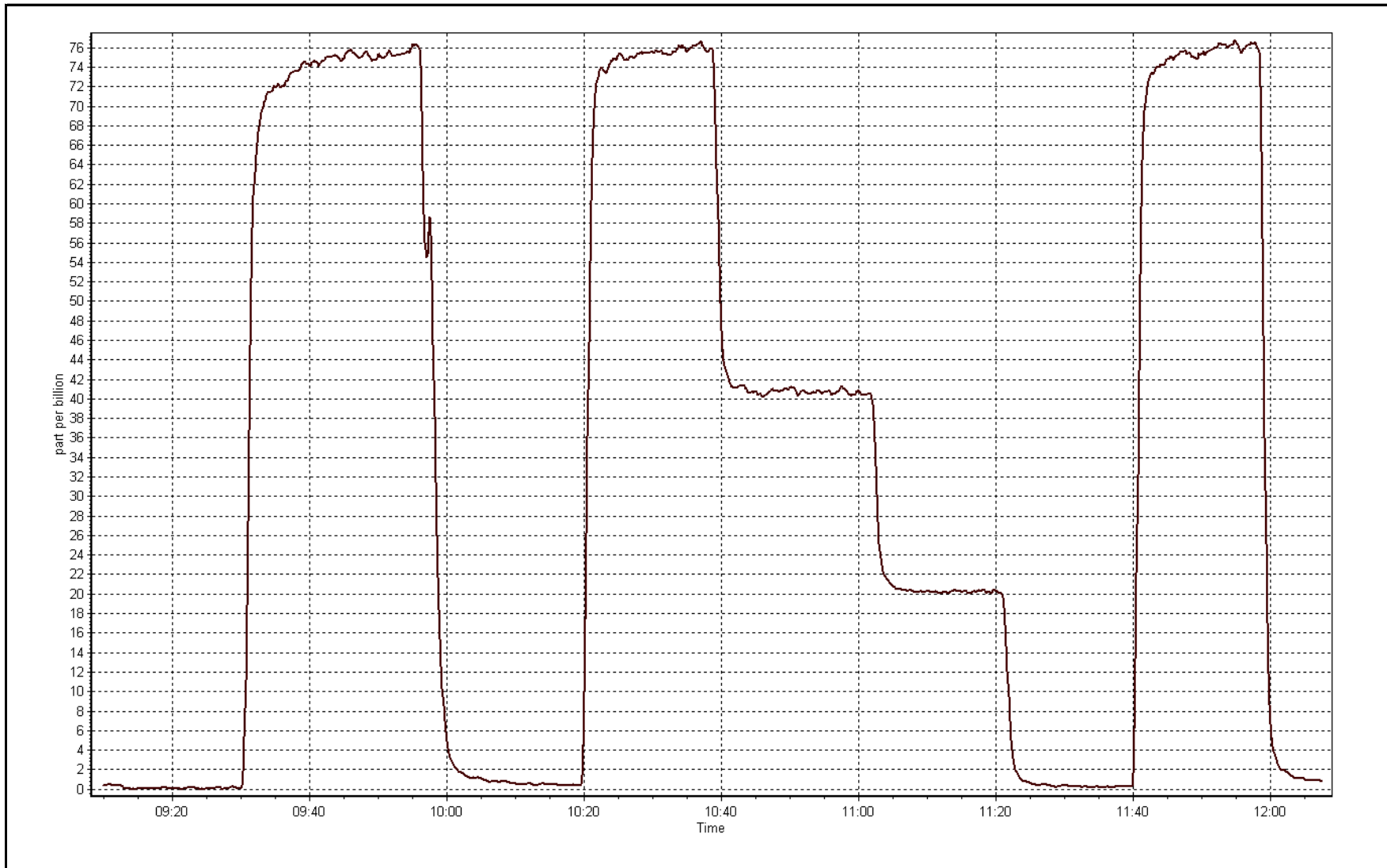
Station Information

Calibration Date	March 2, 2017	Previous Calibration	February 2, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:10	End Time (MST)	12:08
Analyzer make	Thermo 43i-LTE	Analyzer serial #	1507864683

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999975
75.3	75.8	0.9934		
40.2	40.8	0.9843	Slope	0.994095
20.1	20.3	0.9892		
			Intercept	-0.162758







Wood Buffalo Environmental Association THC / NMHC Calibration Report

version 02-2017

Station Information

Calibration Date	March-03-17	Last Calibration	February-16-17
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	7:55	End Time (MST)	13:10
Gas Cert Reference	LL110103	Cal Gas Expiry Date	February 16, 2019
CH4 Cal Gas Conc.	488.0 ppm	CH4 Equiv Conc.	1035.3 ppm
C3H8 Cal Gas Conc.	199.0 ppm	Station temp.	22 Deg C
Calibrator Model	Teledyne API 700	Serial Number	2445
ZAG make/model	Teledyne API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	Serial Number	5564

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	1.007856	1.001607	Carrier Pressure	35.9	35.9
THC Calc intercept	0.008088	0.016458	Fuel Pressure	44.7	44.7
NMHC Calc slope	1.012266	1.000662	Air Pressure	26.0	26.0
NMHC Calc intercept	0.000000	0.000559			

Analyzer make Thermo 55i Analyzer serial # 1426262594

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	59.1	12.24	12.26	0.998
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	16.27	16.25	1.001
second point	5000	39.5	8.18	8.11	1.008
third point	5000	19.7	4.08	4.06	1.005
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	78.6	16.27	16.30	0.998
Average Correction Factor					1.005

Corrected As found 12.26 Previous response 12.13 % change -1.0%

Notes:

Power blip during calibrator zero and high point, calibrator restarted, Zero and high point redone; No maintenance or adjustments done, filter changed out. Calibration points changed to 16.27, 8.18, 4.08ppm from 12.24, 6.11, 3.06ppm, this done after as found

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	59.1	6.47	6.50	0.995
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	8.60	8.60	1.000
second point	5000	39.5	4.32	4.31	1.003
third point	5000	19.7	2.16	2.16	0.998
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	78.6	8.60	8.60	1.000
Average Correction Factor					1.001

Corrected As found 6.50 Previous response 6.39 % change -1.7%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	59.1	5.77	5.76	1.001
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	7.67	7.65	1.003
second point	5000	39.5	3.86	3.81	1.012
third point	5000	19.7	1.92	1.90	1.012
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	78.6	7.67	7.70	0.996
Average Correction Factor					1.009

Corrected As found 5.76 Previous response 5.74 % change -0.3%



Wood Buffalo Environmental Association

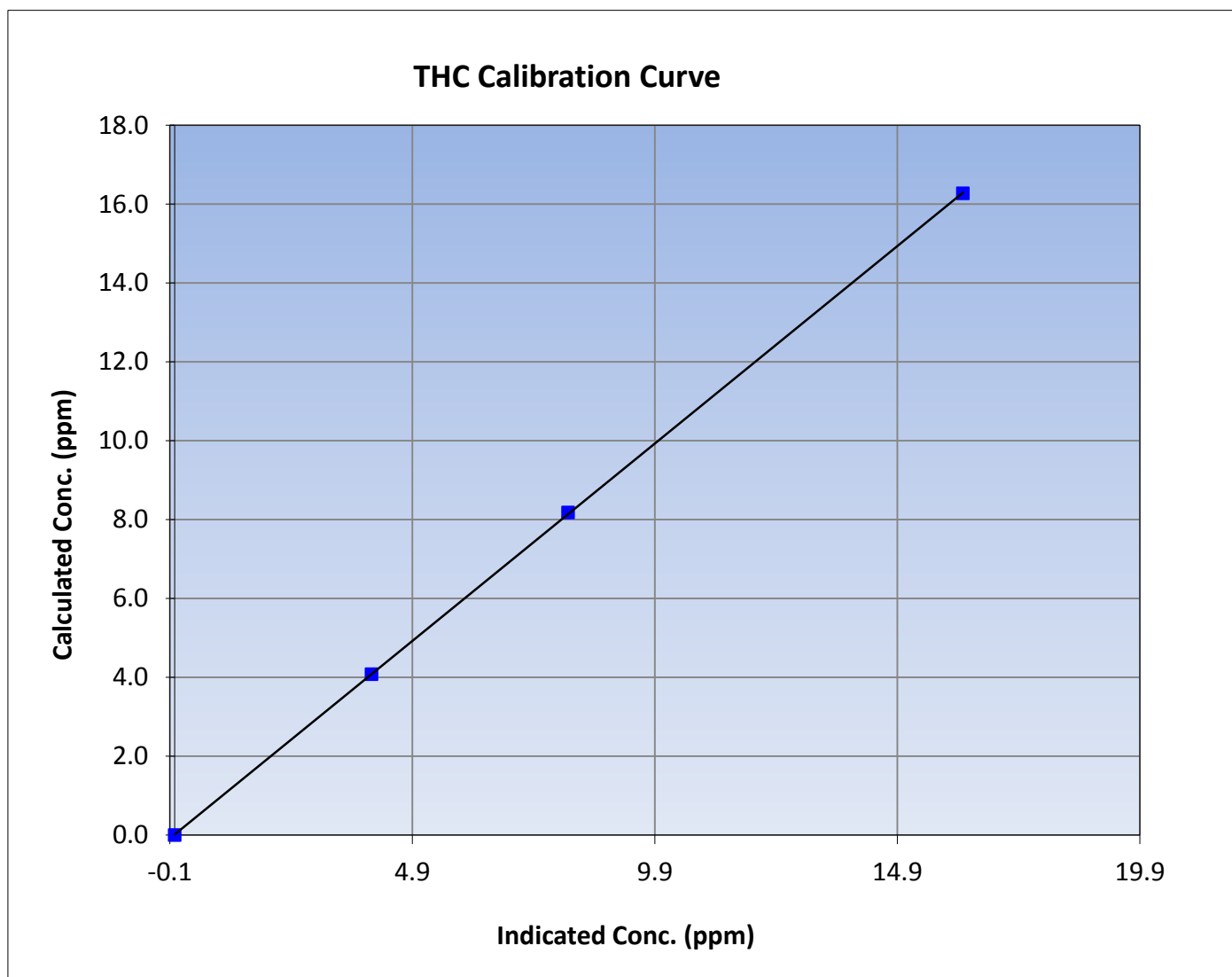
THC Calibration Summary

Station Information

Calibration Date	March 3, 2017	Previous Calibration	February 16, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:55	End Time (MST)	13:10
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999985
16.27	16.25	1.0015		
8.18	8.11	1.0084	Slope	1.001607
4.08	4.06	1.0047		
			Intercept	0.016458





Wood Buffalo Environmental Association

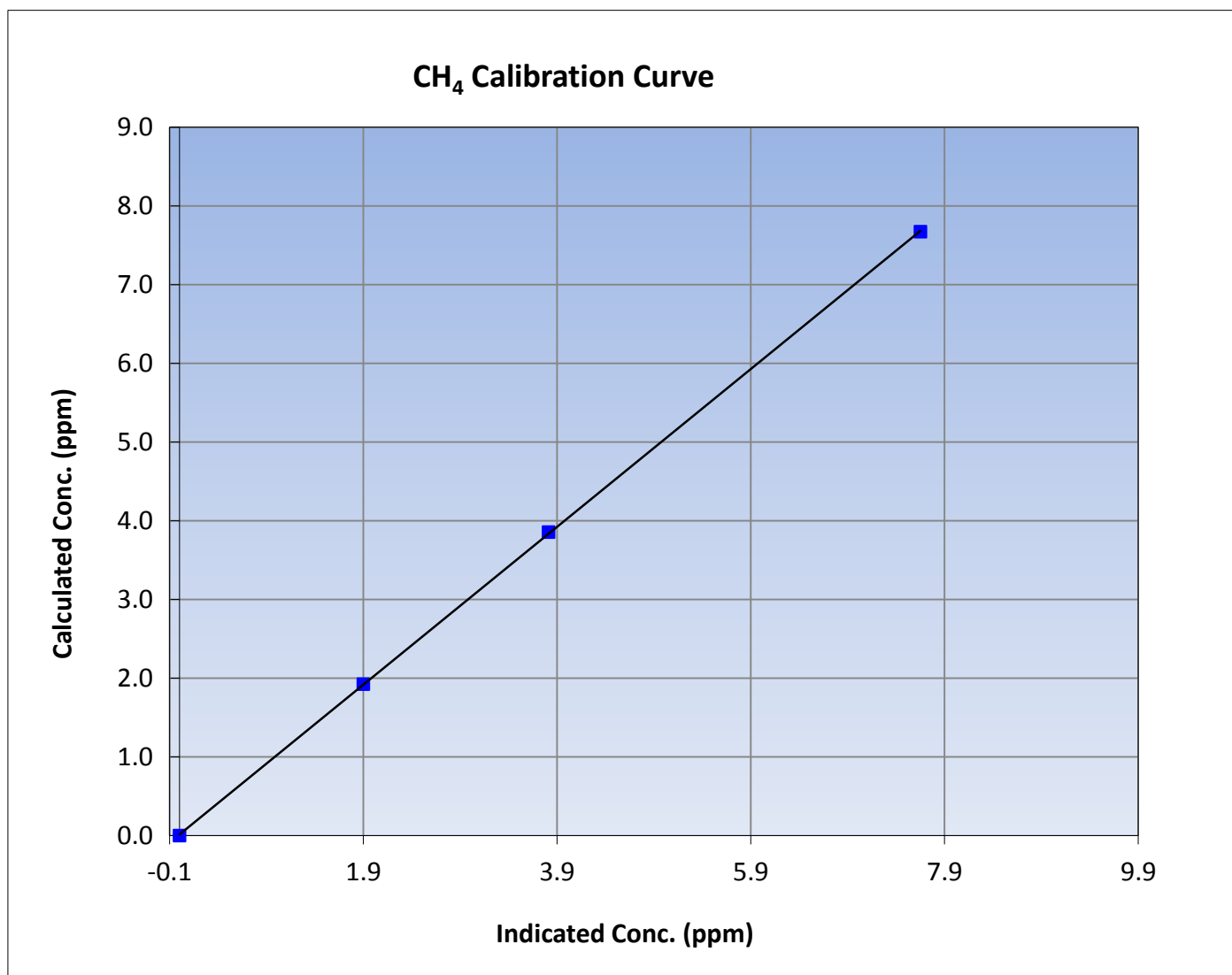
CH₄ Calibration Summary

Station Information

Calibration Date	March 3, 2017	Previous Calibration	February 16, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:55	End Time (MST)	13:10
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999975
7.67	7.65	1.0028		
3.86	3.81	1.0119	Slope	1.002516
1.92	1.90	1.0120		
			Intercept	0.013915





Wood Buffalo Environmental Association

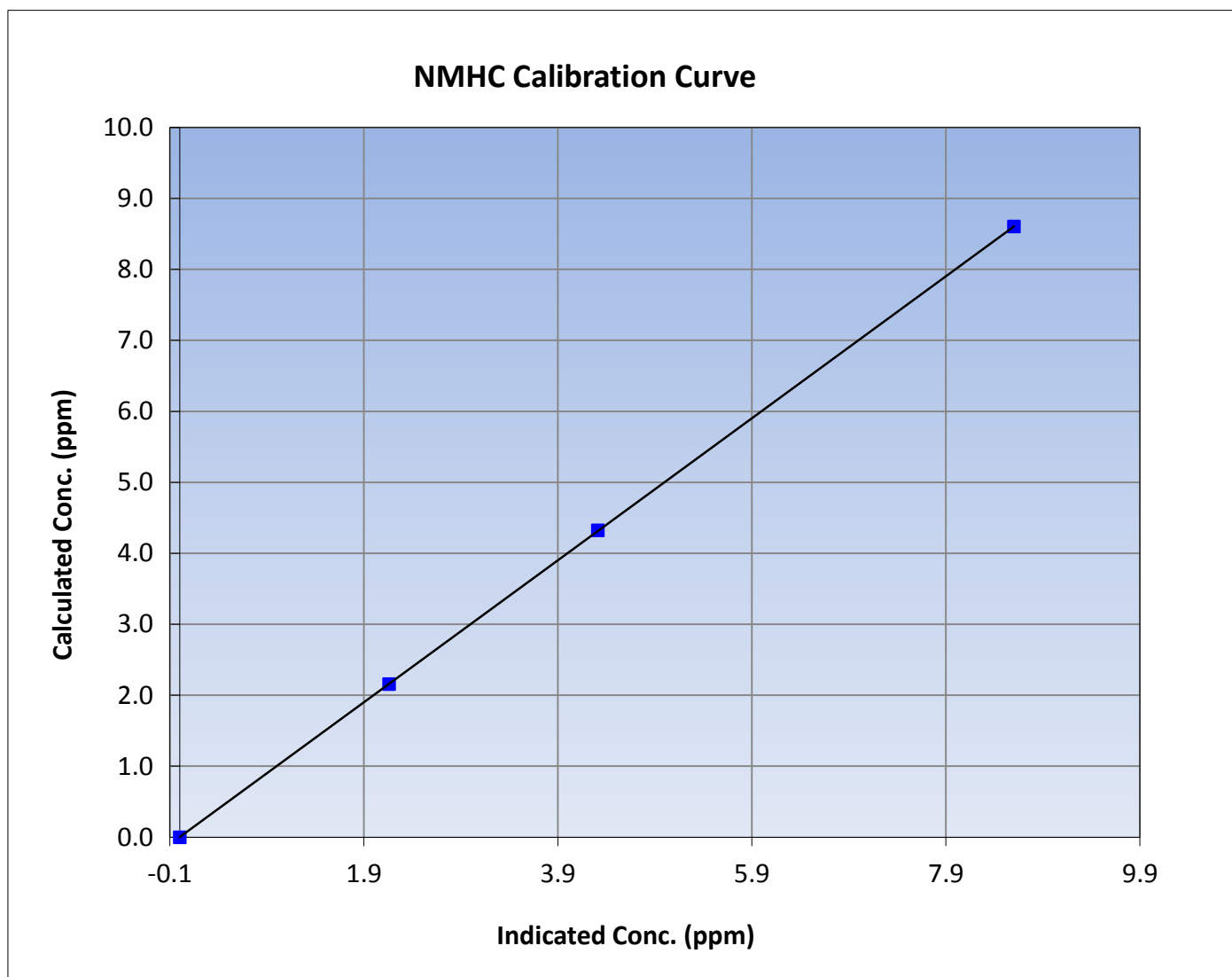
NMHC Calibration Summary

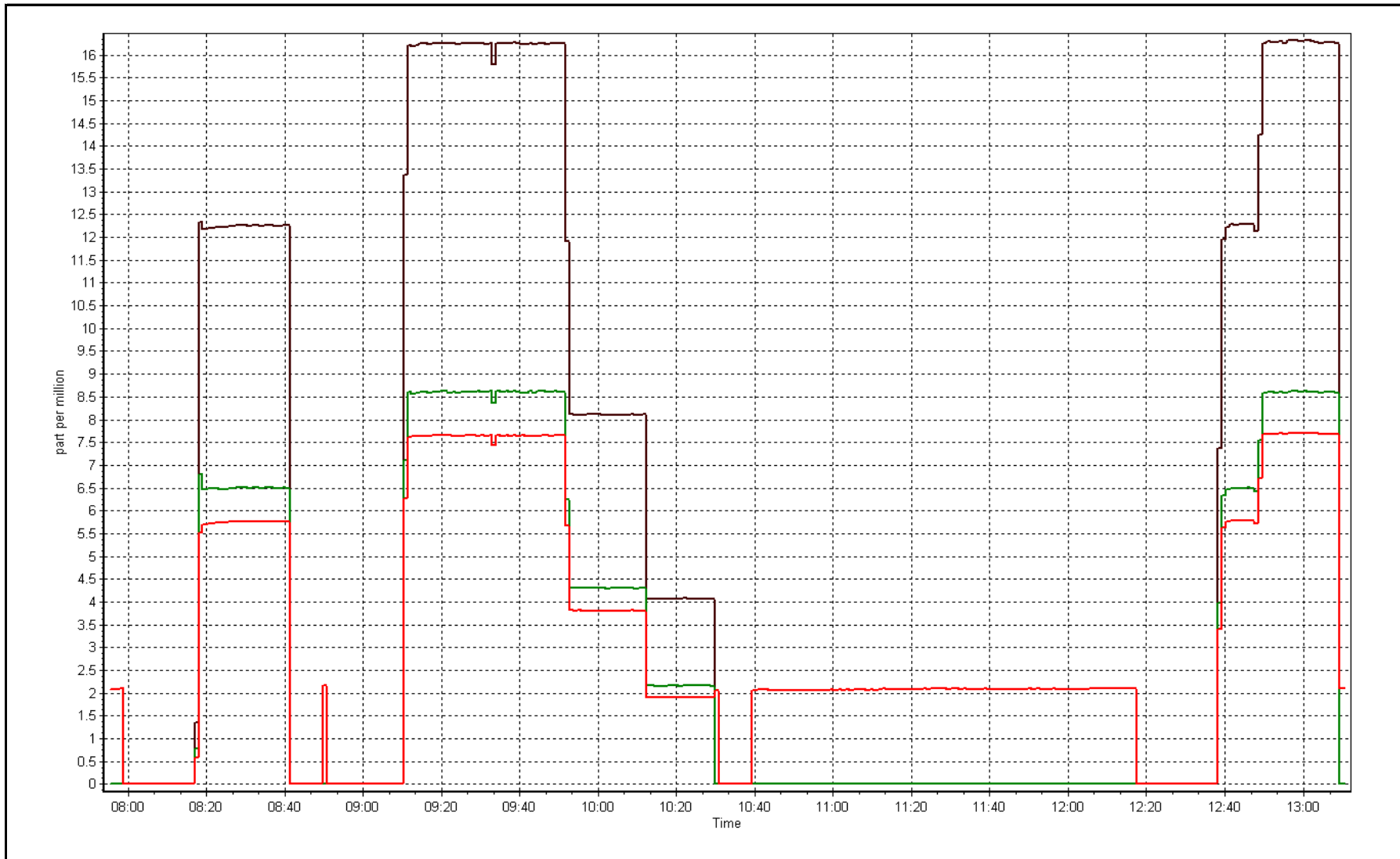
Station Information

Calibration Date	March 3, 2017	Previous Calibration	February 16, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:55	End Time (MST)	13:10
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999996
8.60	8.60	1.0003		
4.32	4.31	1.0031	Slope	1.000662
2.16	2.16	0.9982		
			Intercept	0.000559







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 1, 2017	Previous Calibration	February 2, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	11:15	End Time (MST)	14:04
NO2 GPT Ref date	NA	Transfer Standard	GPTPS
Calibrator Make/Model	API T700	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	2445
DACS make/model	Campbell Scientific CR3000	Serial Number	1864
		Serial Number	5564

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	28.0	28.0
Analyzer IP address	192.168.1.48		Lamp temp.	67.9	67.9
Calculated slope	0.996349	1.009848	Pressure	725.2	737.9
Calculated intercept	-0.058491	-0.738876	Flow cell A	0.762	0.772
Analyzer Background	-0.8	-0.8	Flow cell B	0.781	0.787
Analyzer Coefficient	1.027	1.027	Cell A Intensity	107848	107848
			Cell B Intensity	94645	94645

Analyzer make	TEI 49i	Analyzer serial #	1507964700
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-0.4	----
as found span	5000	995.40	400.0	400.1	1.000
calibrator zero	5000	0.00	0.0	-0.4	----
high point	5000	994.20	400.0	396.0	1.010
second point	5000	848.50	200.0	200.1	1.000
third point	5000	750.90	100.0	100.4	0.996
as left zero	5000	0.00	0.0	0.3	----
as left span	5000	994.10	400.0	399.5	1.001
Average Correction Factor					1.002

Corrected As found	400.5	Previous response	401.5	% change	0.3%
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Notes:

no adjustments or maintenance done, filter changed out

Calibration Performed By: Melissa Lemay



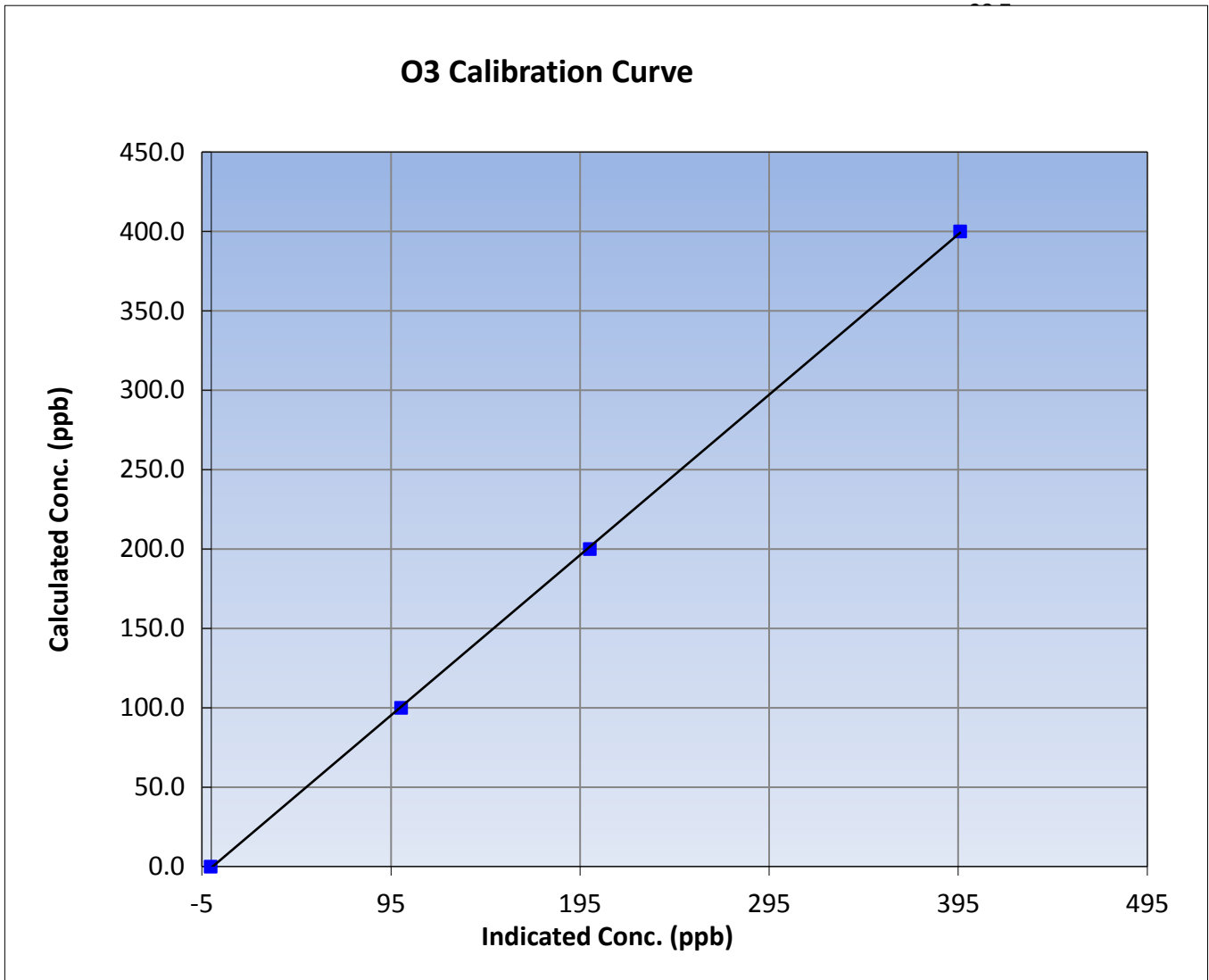
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	March 1, 2017	Previous Calibration	February 2, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	11:15	End Time (MST)	14:04
Analyzer make	TEI 49i	Analyzer serial #	1507964700

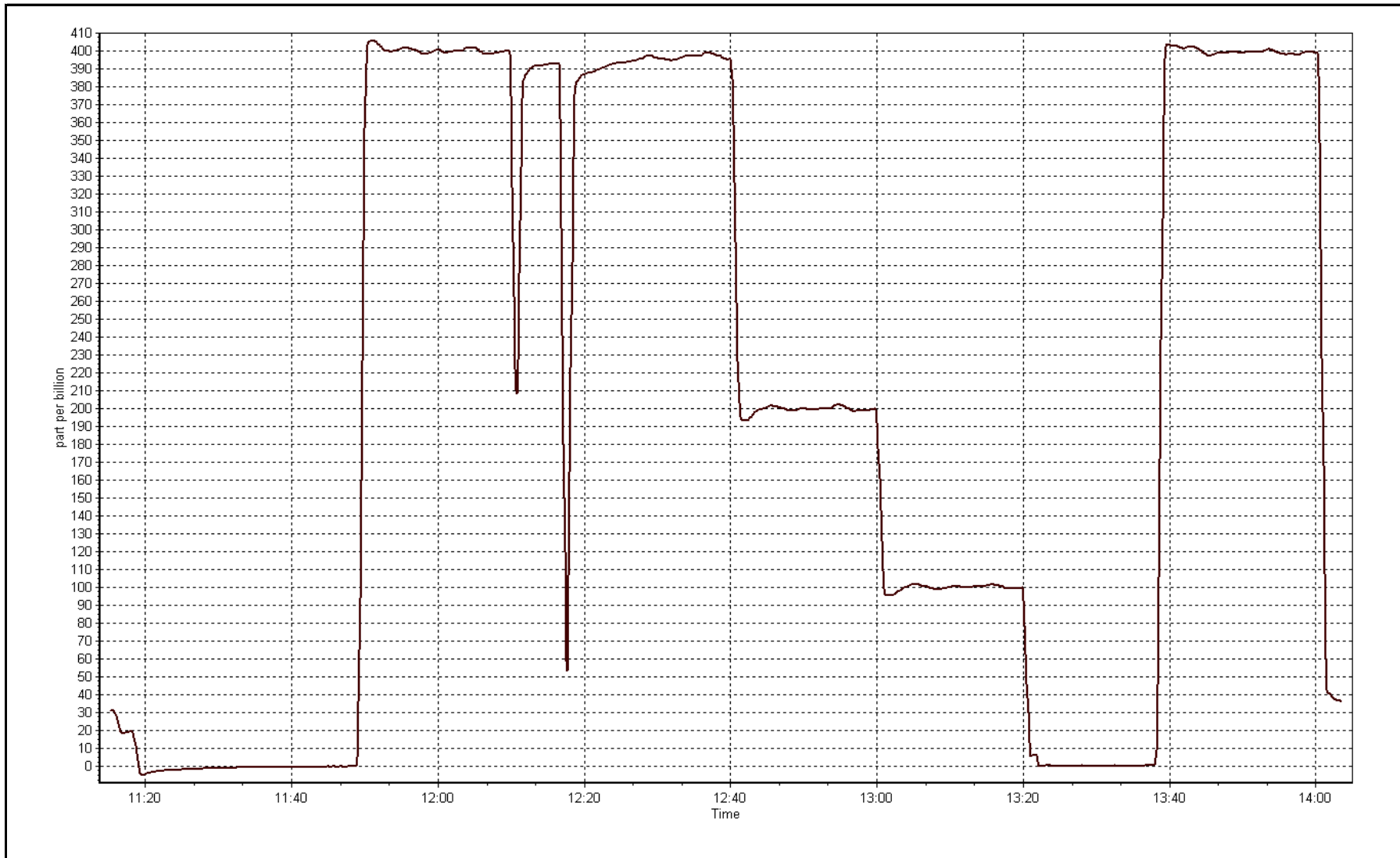
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999952
400.0	396.0	1.0101		
200.0	200.1	0.9995	Slope	1.009848
100.0	100.4	0.9960		
			Intercept	-0.738876



O3 Calibration Plot

Date: March 1, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 3, 2017	Previous Calibration	February 3, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	7:55	End Time (MST)	13:10
NO Cal Gas Conc	50.8 ppm	Gas Cert Reference	LL110103
NOx Cal Gas Conc	50.8 ppm	Cal Gas Expiry Date	February 16, 2019
Calibrator	API T700	Serial Number	2445
Zero air Generator	Teledyne PAI T701	Serial Number	1864

DACs Information

DACs make & model	Campbell Scientific CR3000	DACs serial No.	8205
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999223	0.997356	1.006252
	Data Offset	1.064515	1.204186	1.168518
Current Calibration	Data Slope	1.000221	0.998591	0.999798
	Data Offset	0.709921	1.029383	-0.139279

Analyzer Information

Analyzer make/model	Thermo 42C	Analyzer serial #	601114773
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.103		192.168.1.103	
NO coefficient	1.159		1.177	
NOX coefficient	0.998		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.3		3.3	
NOX bkgrnd	3.4		3.5	
Chamber Temp	49.4	Deg C	49.4	Deg C
Moly Temp	323	Deg C	323	Deg C
PMT voltage	-784	V	-784	V
PMT Temp	-3.6	Deg C	-3.6	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	136.8	mmHg	135.3	mmHg
R Cell Press Nox	136.8	mmHg	135.3	mmHg
NO sample flow	0.875	lpm	0.863	lpm
Nox sample Flow	0.875	lpm	0.863	lpm

Notes: No maintenance done, filter changed out, span adjusted; Power blip during calibrator zero and high point.

Calibrator restarted, zero and high point redone; Calibration points changed to 800,400,200ppb from 600,300,150ppb, this done after as found; GPT second NO ref point used due to NO drift



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 3, 2017 Station Number: AMS 7

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.2	-0.1	0.3	----	----
as found span	5000	59.1	600.5	600.5	0.0	597.6	597.0	0.8	1.0048	1.0058
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	-0.1	0.3	----	----
high point	5000	78.6	798.6	798.6	0.0	798.4	799.4	-1.0	1.0002	0.9990
second point	5000	39.5	401.3	401.3	0.0	399.3	399.6	-0.1	1.0051	1.0043
third point	5000	19.7	200.2	200.2	0.0	199.0	199.0	0.0	1.0058	1.0058
as left zero	5000	0.0	0.0	0.0	0.0	0.2	-0.1	0.3	----	----
as left span	5000	78.6	798.6	394.2	404.4	784.0	393.6	390.5	1.0186	1.0015
Average Correction Factor									1.0037	1.0030

Corrected As found NO_x= 597.4 NO= 597.1 Percent Change NO_x= 0.4% NO= 0.6%
 Previous Response NO_x= 599.9 NO= 600.8

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 78.60 ccm NOx ref calc conc = 798.6 ppb NO ref calc conc = 798.6 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	794.8	796.8	0.3	1.0048	1.0022	----	----
1st NO2 (300)	394.2	402.6	797.0	394.2	402.8	1.0020	----	0.9995	100.0%
2nd NO2 (200)	593.9	202.9	797.2	593.9	203.3	1.0017	----	0.9980	100.2%
3rd NO2 (100)	695.4	101.4	796.4	695.4	101.2	1.0027	----	1.0020	99.8%
2nd NO ref point		0.0	798.8	800.5	-1.8	0.9997	0.9976	----	----
Average Correction Factor						1.0015		0.9998	100.0%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

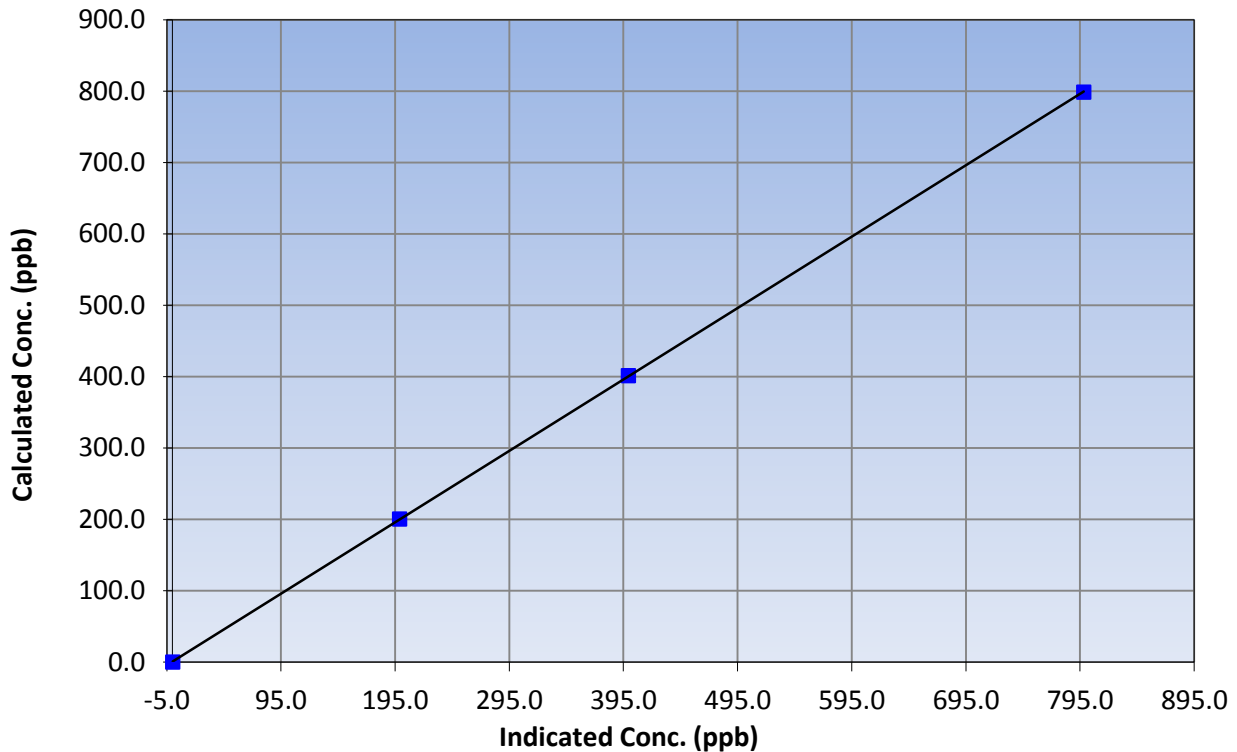
Station Information

Calibration Date	March 3, 2017	Previous Calibration	February 3, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:55	End Time (MST)	13:10
Analyzer make	Thermo 42C	Analyzer serial #	601114773

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999991
798.6	798.4	1.0002		
401.3	399.3	1.0051		
200.2	199.0	1.0058		
			Slope	1.000221
			Intercept	0.709921

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

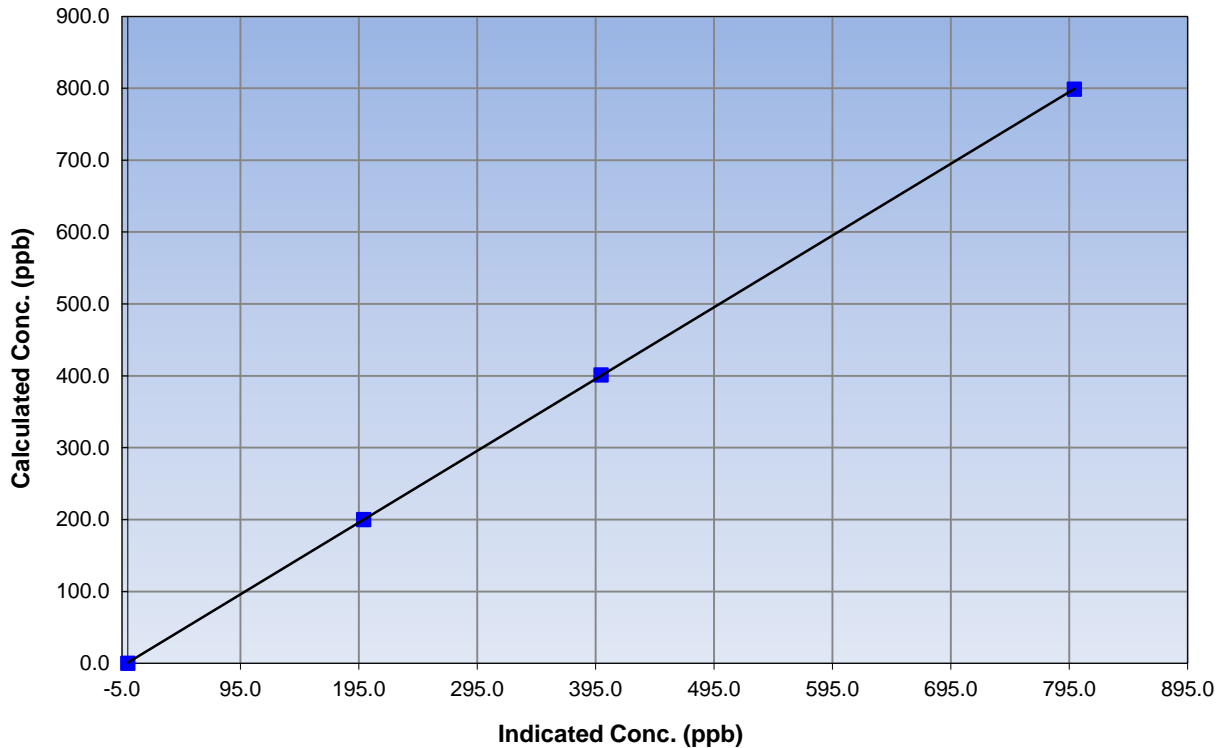
Station Information

Calibration Date	March 3, 2017	Previous Calibration	February 3, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:55	End Time (MST)	13:10
Analyzer make	Thermo 42C	Analyzer serial #	601114773

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999991
798.6	799.4	0.9990		
401.3	399.6	1.0043		
200.2	199.0	1.0058		
			Slope	0.998591
			Intercept	1.029383

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

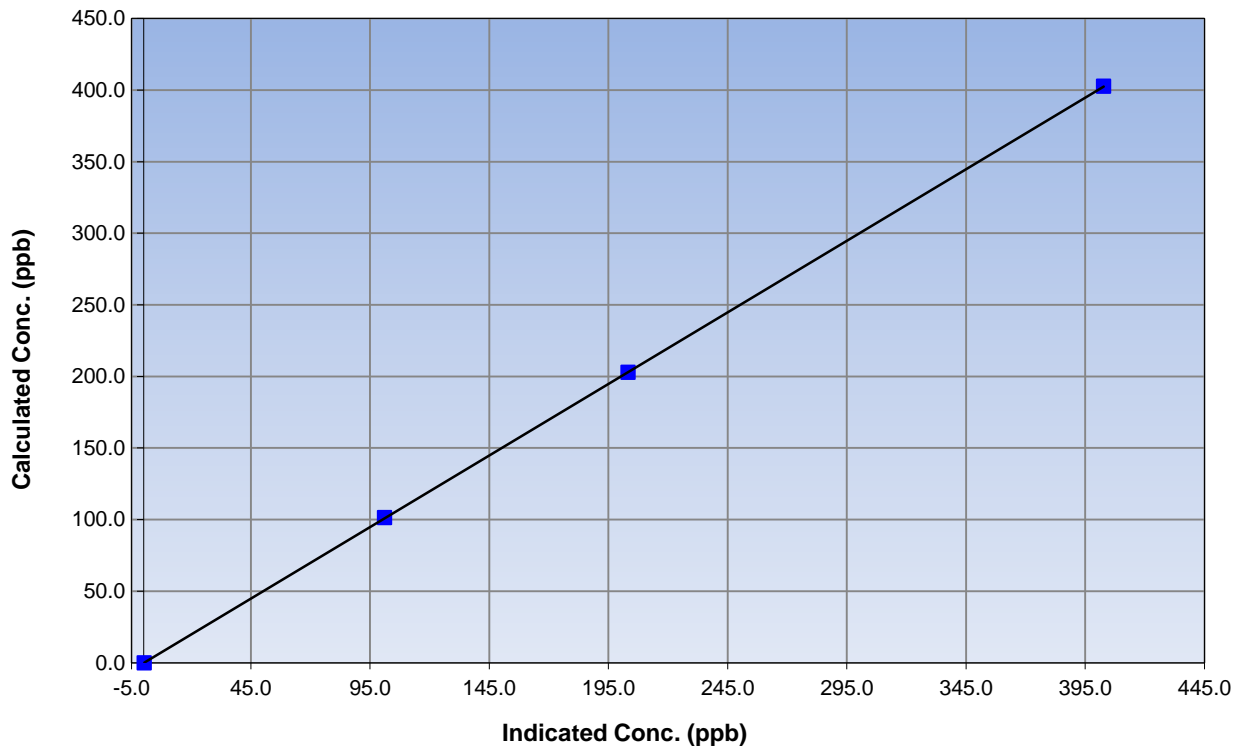
Station Information

Calibration Date	March 3, 2017	Previous Calibration	February 3, 2017
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:55	End Time (MST)	13:10
Analyzer make	Thermo 42C	Analyzer serial #	601114773

Calibration Information

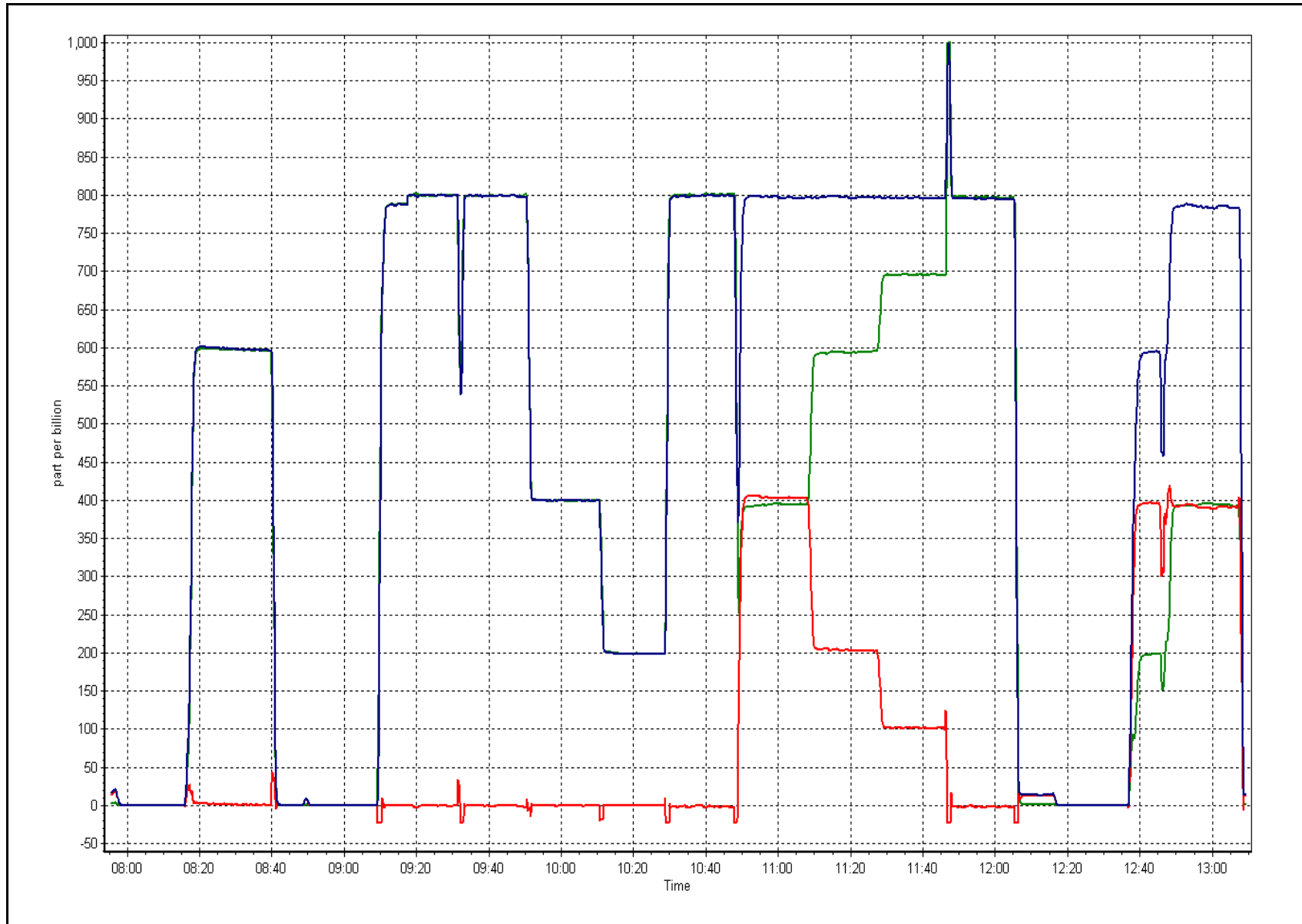
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999998
402.6	402.8	0.9995		
202.9	203.3	0.9980	Slope	0.999798
101.4	101.2	1.0020		
			Intercept	-0.139279

NO₂ Calibration Curve



NOX Calibration Plot

Date: March 3, 2017





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Athabasca Valley	Station number:	AMS 7
Calibration Date:	March 2, 2017	Last Cal Date:	February 1, 2017
Start time (MST):	12:10	End time (MST):	13:41
Sharp Model:	Thermo 5030	S/N:	E515
Particulate Fraction:	PM2.5	C14 Source S/N:	3256
Flow Standard Model:	Delta Cal	S/N:	1045
Temp/RH standard:	Delta Cal	S/N:	1045

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)	-17	-17.1	-17	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	995	988	995	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1017	1017	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	3	-----	-0.5	<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"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

Leak Test:	Date of check: _____	Last Cal Date: <u>February 1, 2017</u>	<u>Tolerance</u>
	Flow w/o adaptor: _____	Flow w/ adaptor: _____	0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass: _____	S/N: <u>2518</u>
	Date of check: _____	Last Cal Date: <u>July 22, 2016</u>
	New Correction Factor: _____	Previous Correction Factor: <u>6895</u>

<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: cyclone head cleaned, Nephelometer adjusted,

Calibration by: Melissa Lemay



Wood Buffalo Environmental Association CO Calibration Report

Station Information

Calibration Date	March 1, 2017	Last Calibration	February 1, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:22	End Time (MST)	11:19
Gas Cert Reference	CC101396	Station temp.	22 Deg C
Cal Gas Concentration	2970 ppm	Cal Gas Exp Date	February 2, 2023
Calibrator Make/Model	API T700	Serial Number	2445
ZAG Make/Model	API 701	Serial Number	5564
DACS make/model	Campbell Scientific CR3000	Serial Number	1864

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Chamber temp.	48.6	48.6
Analyzer IP address	192.168.1.48		Pressure	739.4	740.9
Calculated slope	1.005747	1.007669	Flow	0.497	0.498
Calculated intercept	-0.054877	-0.038682	Intensity	199464	199464
Analyzer Background	7.032	7.262	S/R ratio	1.169162	1.169162
Analyzer Coefficient	1.088	1.088			

Analyzer make Thermo 48i-TLE Analyzer serial # 1408761381

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	69.7	41.4	41.5	0.997
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	69.7	41.4	41.1	1.008
second point	5000	35.2	20.9	20.9	1.003
third point	5000	15.2	9.0	9.1	0.997
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	69.7	41.4	41.0	1.009
Average Correction Factor					1.002

Corrected As found 41.4 Previous response 41.2 % change -0.5%

Notes:

During high point valve switched to zero mode around 9:36MST, High point restarted, filter changed out, zero adjusted, no maintenance done

Calibration Performed By:

Melissa Lemay



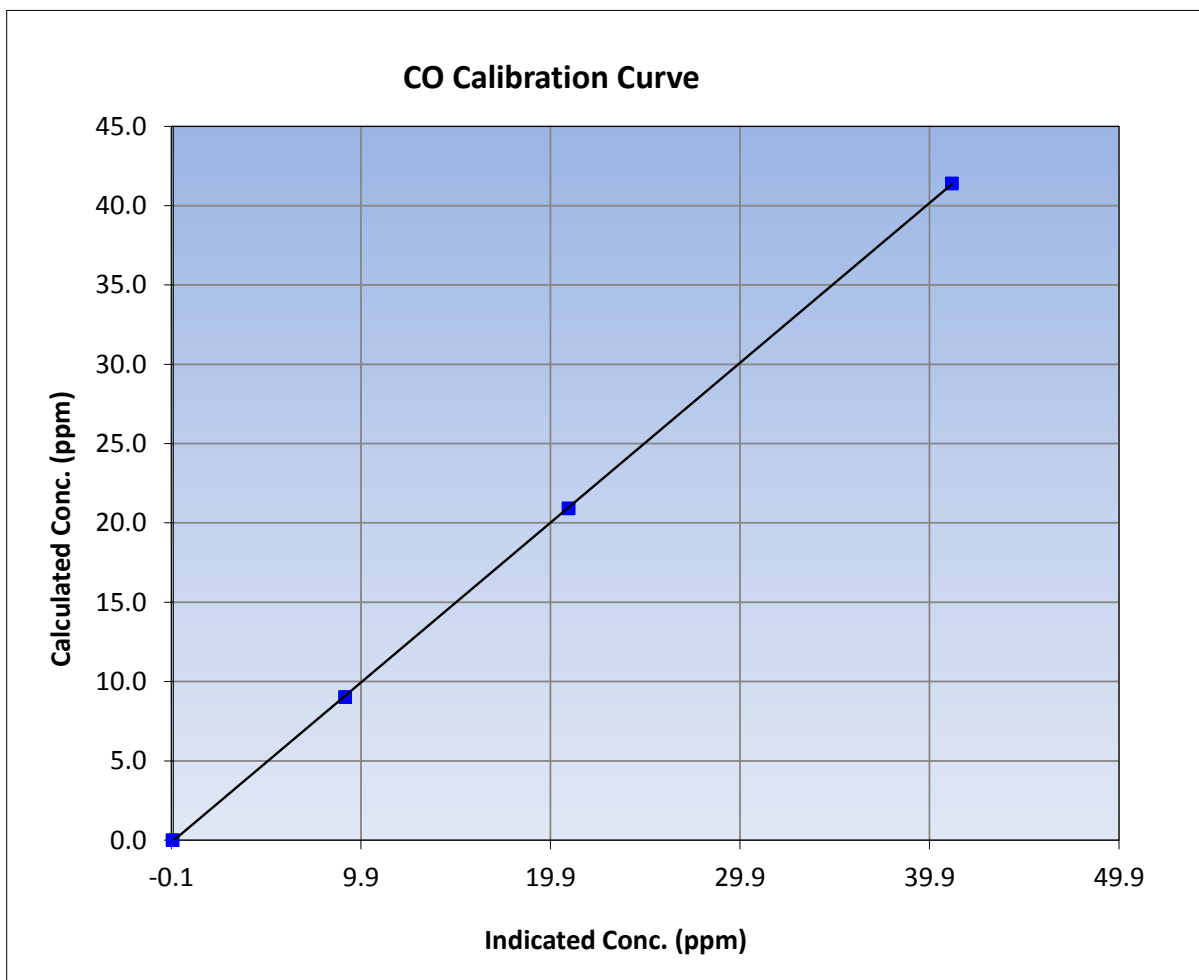
Wood Buffalo Environmental Association CO Calibration Report

Station Information

Calibration Date	March 1, 2017	Previous Calibration	February 1, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:22	End Time (MST)	13:06
Analyzer make	Thermo 48i-TLE	Analyzer serial #	1408761381

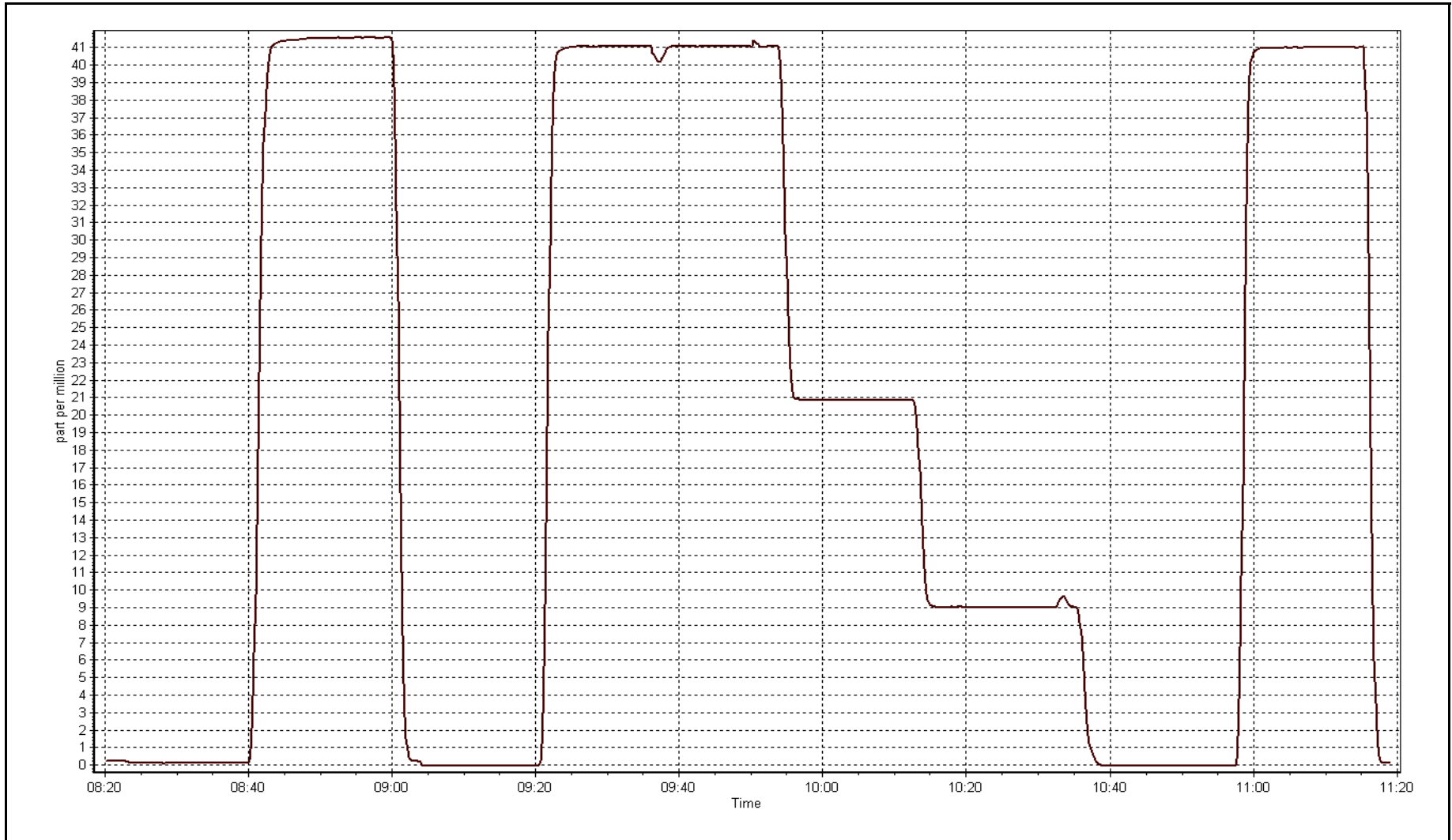
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999983
41.4	41.1	1.0078		
20.9	20.9	1.0028	Slope	1.007669
9.0	9.1	0.9966		
			Intercept	-0.038682



CO Calibration Plot

Date: March 1, 2017





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 8
FORT CHIPEWYAN
MARCH 2017**

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
FEBRUARY 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	37	38	99.87	7	0	3	0
O3(ppb) Average	703	40	41	99.87	54	0	43	-
NO2(ppb) Average	705	38	39	99.87	13	0	3	-
NO(ppb) Average	705	38	39	99.87	4	-	1	-
NOX(ppb) Average	705	38	39	99.87	15	-	3	-
PM2.5(ug/m3) Average	740	4	4	100	36.7	-	7.2	0
Wind Speed 10 m (km/h) Average	739	0	5	99.33	37	-	27	-
Wind Direction 10 m (deg) Average	739	0	5	99.33	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100	8.1	-	3.4	-
Relative Humidity (%) Average	744	0	0	100	100	-	94	-
Precipitation (mm) Total	744	0	0	100	0.3	-	0.3	-
Leaf Wetness (% of range) Average	744	0	0	100	8	-	1	-
Global Solar Radiation (W/m2) Average	744	0	0	100	670	-	196	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
MARCH 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	0.3	1	-	0	0	0	0	0	1	7
O3(ppb) Average	703	34.9	10	-	4	20	31	39	41	43	54
NO2(ppb) Average	705	1	1	-	0	0	0	1	1	3	13
NO(ppb) Average	705	0.2	0	-	0	0	0	0	0	0	4
NOX(ppb) Average	705	1.2	2	-	0	0	0	1	1	3	15
PM2.5(ug/m3) Average	740	3.61	2.6	-	0.6	1.8	2.2	3.1	4.1	5.6	36.7
Wind Speed 10 m (km/h) Average	739	15.9	8	-	1	7	10	16	21	26	37
Wind Direction 10 m (deg) Average	739	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-11.98	10.2	-	-32.3	-25.9	-21.1	-10.3	-2.8	0.9	8.1
Relative Humidity (%) Average	744	70.8	13	-	39	54	62	70	80	90	100
Precipitation (mm) Total	744	-	-	0.25	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	744	0.2	1	-	-1	0	0	0	0	0	8
Global Solar Radiation (W/m2) Average	744	137.6	190	-	0	0	0	5	256	474	670

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	23 Mar 2017 10:00	23 Mar 2017 10:00	1	Maintenance - station router replaced
Wind Speed, Wind Direction	01 Mar 2017 02:00	01 Mar 2017 02:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	02 Mar 2017 01:00	02 Mar 2017 01:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	02 Mar 2017 03:00	02 Mar 2017 03:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	09 Mar 2017 08:00	09 Mar 2017 09:00	2	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Fort Chipewyan - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 7 ppb on Mar 31 10:00	Maximum Daily Average: 2.5 ppb on Mar 14		Hours of Data:	706
Minimum Value: 0 ppb on Mar 5 15:00	Minimum Daily Average: 0.0 ppb on Mar 6		Hours of Missing Data:	38
Maximum Diurnal Average: 0.6 ppb at hour 10	Minimum Diurnal Average: 0.1 ppb at hour 1		Hours of Calibration:	37
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 = 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-Mar	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
2-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	2	4	4	3	3	1	0	0	0	0	0	0	0.8	4
3-Mar	0	Z	0	0	0	0	1	1	2	2	2	2	3	4	1	0	0	0	0	0	0	0	0	0	0	0.9	4
4-Mar	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
5-Mar	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
6-Mar	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
7-Mar	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	0
8-Mar	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
9-Mar	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
10-Mar	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
11-Mar	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
12-Mar	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
13-Mar	0	0	0	0	0	Z	0	0	1	1	1	1	0	0	1	1	1	2	2	2	2	2	1	1	1	0.9	2
14-Mar	Z	2	3	3	3	3	4	3	3	3	3	3	3	3	3	3	3	2	2	1	1	1	1	1	1	2.5	4
15-Mar	1	Z	1	1	1	1	0	1	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
16-Mar	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
17-Mar	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
18-Mar	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
19-Mar	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
20-Mar	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
21-Mar	0	Z	0	0	0	1	1	1	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.7	2
22-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	--	0
23-Mar	0	0	0	Z	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
24-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.2	1
25-Mar	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	0
26-Mar	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
27-Mar	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
28-Mar	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
29-Mar	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
30-Mar	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
31-Mar	0	0	0	0	0	Z	4	6	7	7	6	4	3	4	4	4	4	1	1	2	2	0	0	0	0	2.5	7

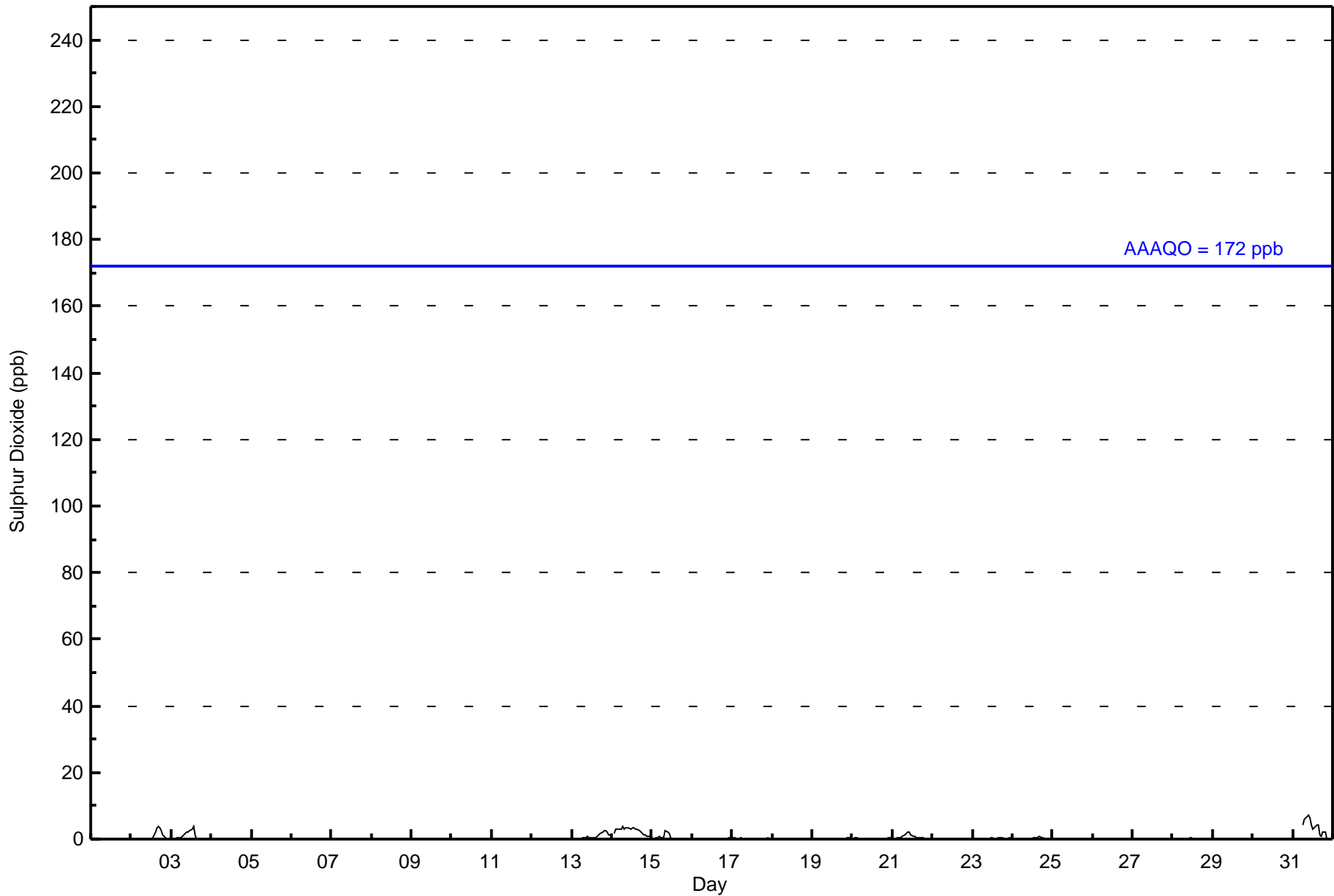
0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.5	0.6	0.6	0.6	0.5	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2	Diurnal Average		
1	2	3	3	3	3	3	4	6	7	7	6	4	3	4	4	4	4	4	4	3	3	2	2	2	1	1	Diurnal Maximum	

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
Fort Chipewyan - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	706	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: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - March 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	6	15	148	219	32	17	18	16	10	10	18	32	15	46	80	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	20	6	15	148	219	32	17	18	16	10	10	18	32	15	46	80	702

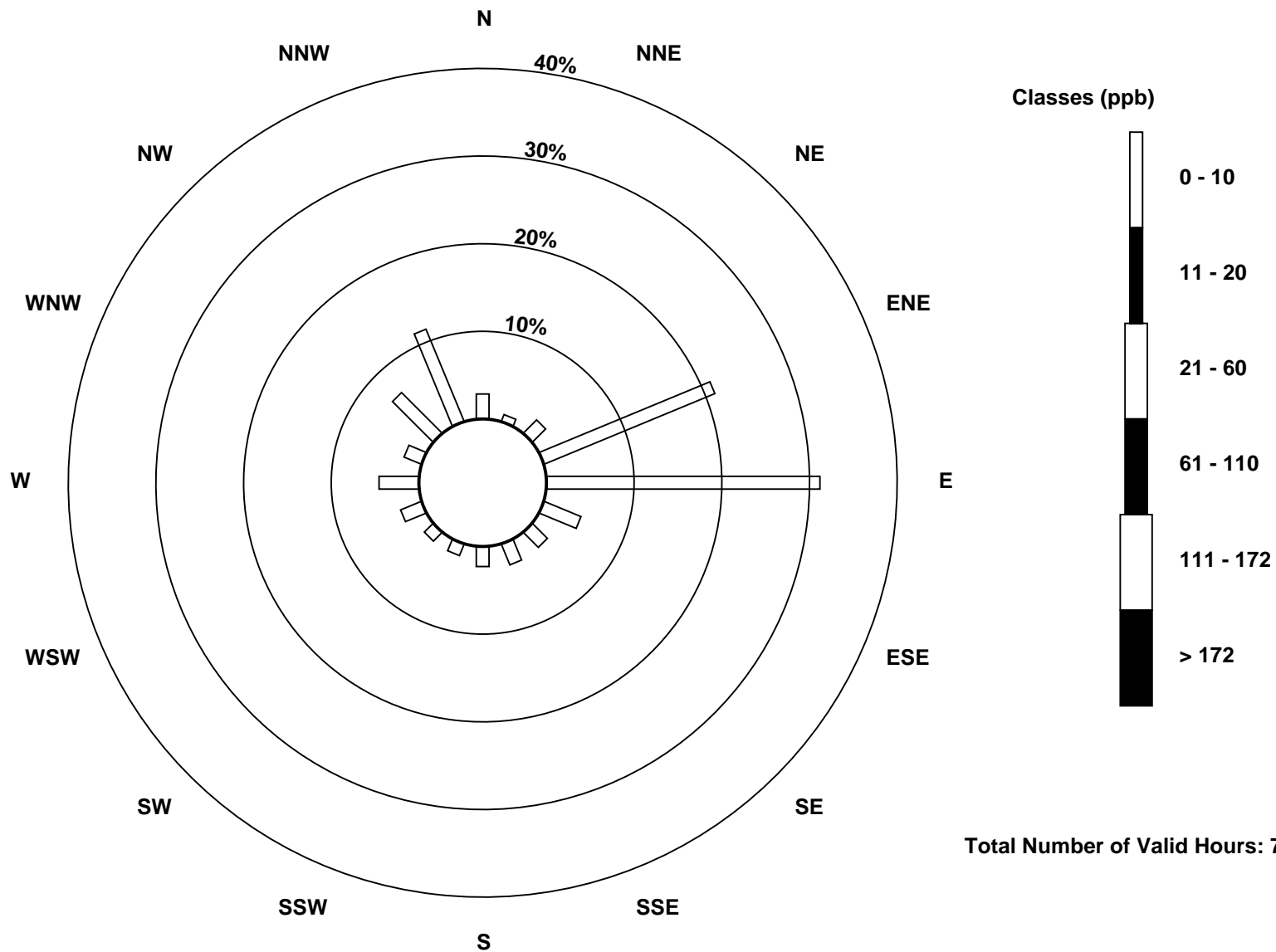
Total Number of Valid Hours: 702

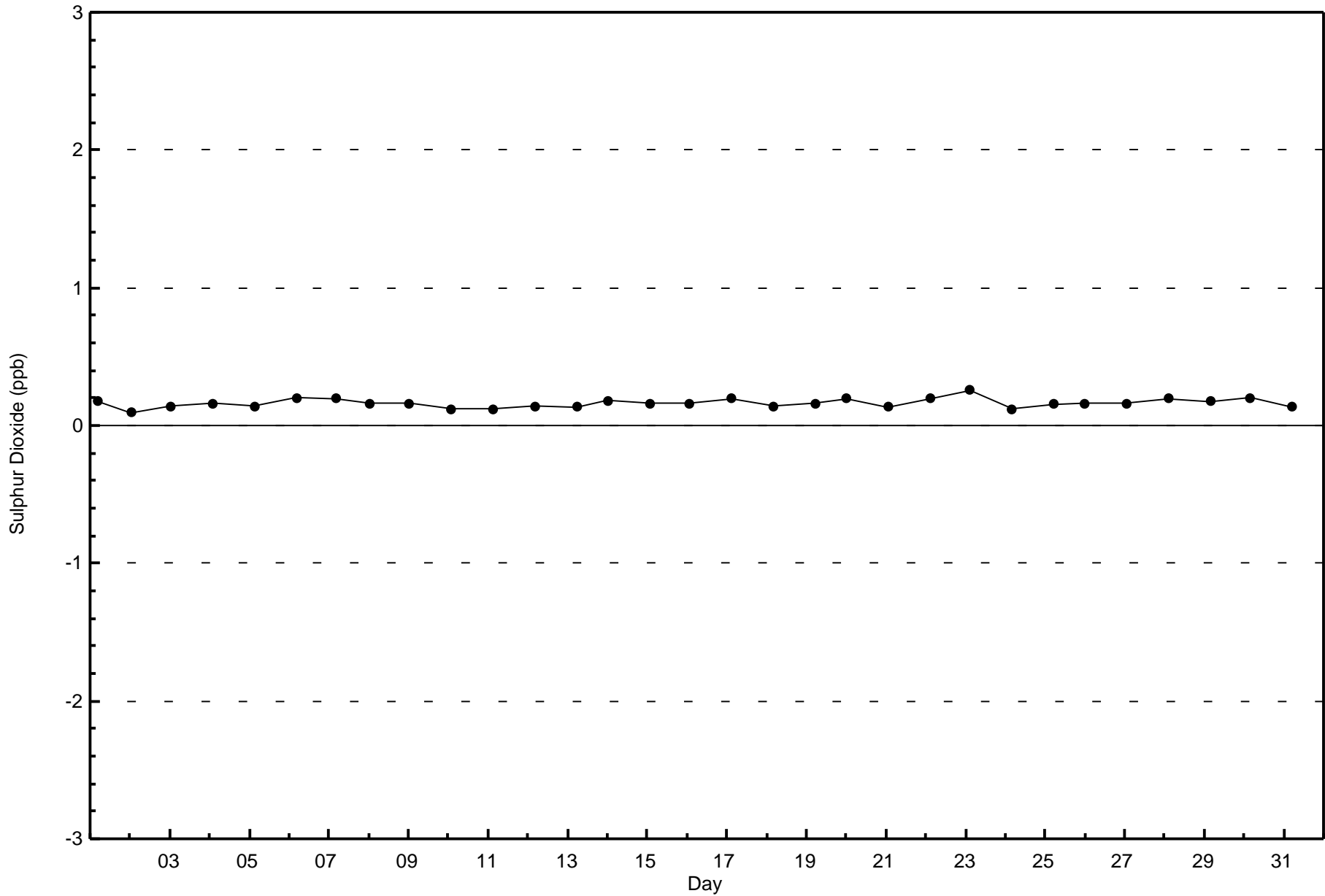
Total Number of Hours: 744

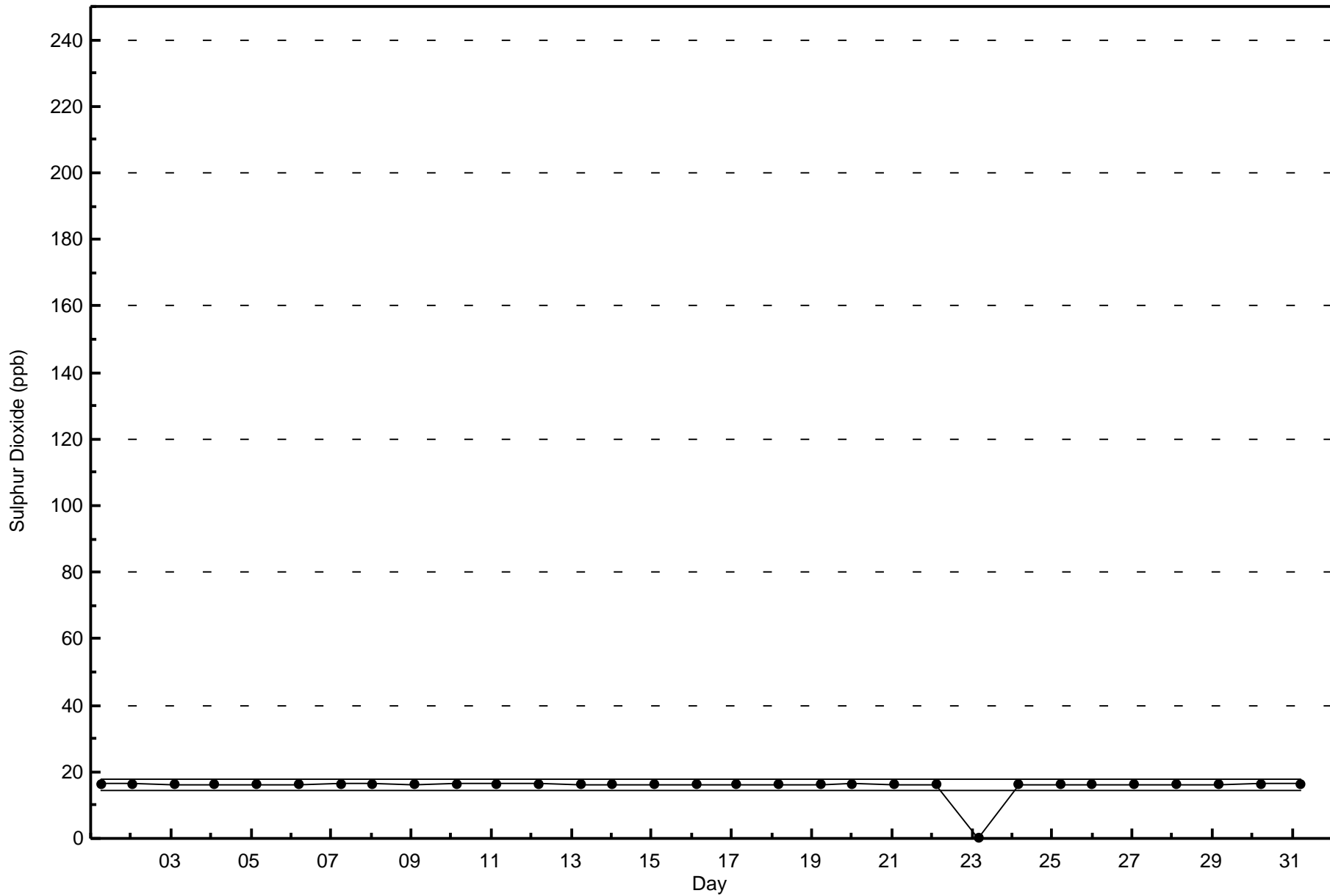


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan (AMS 8)









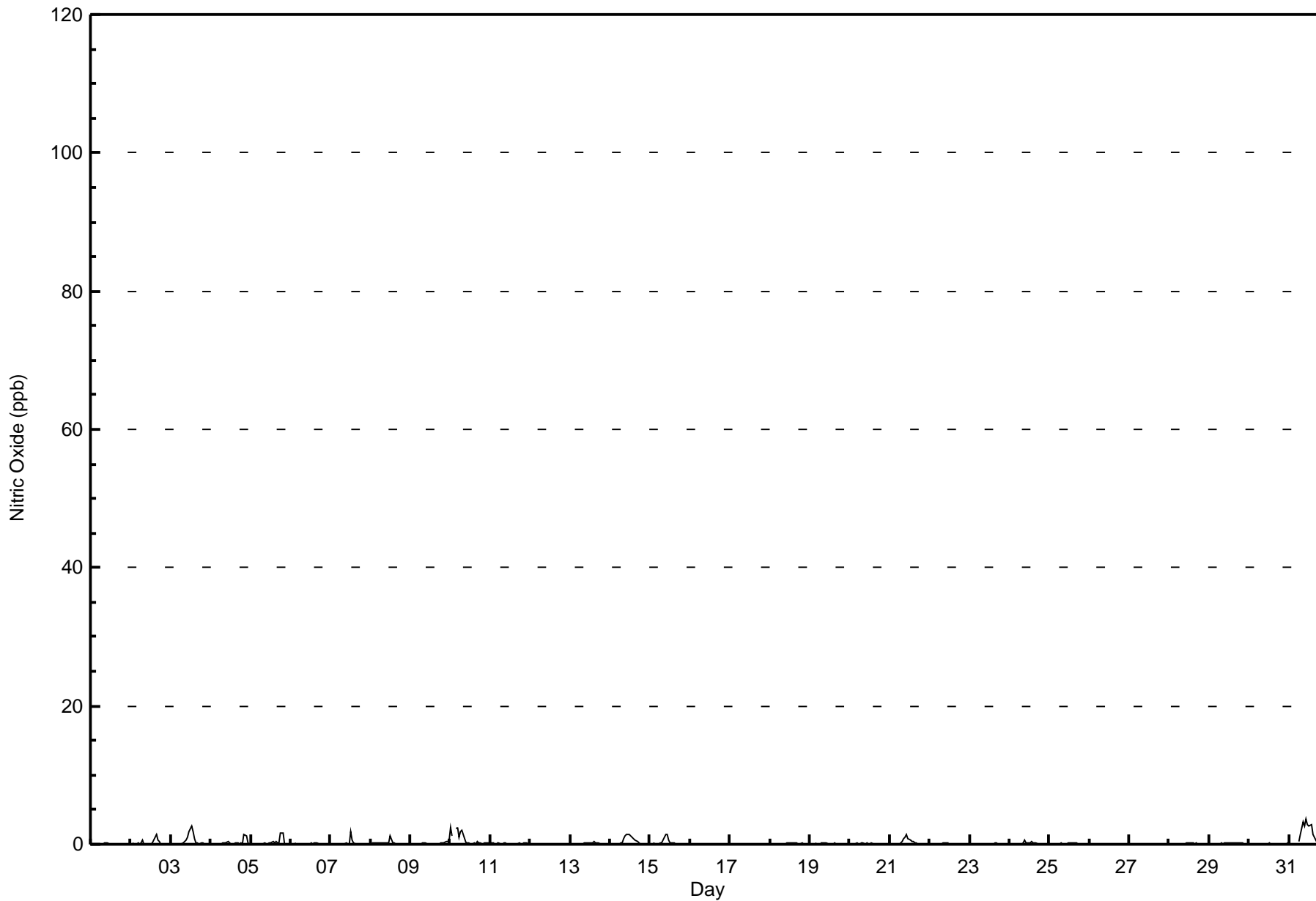
Maximum Value: 4 ppb on Mar 31 11:00														Maximum Daily Average: 1.0 ppb on Mar 31														Hours in Service: 744	
Minimum Value: 0 ppb on Mar 1 02:00														Minimum Daily Average: 0.0 ppb on Mar 12														Hours of Data: 705	
Maximum Diurnal Average: 0.4 ppb at hour 13														Minimum Diurnal Average: 0.0 ppb at hour 3														Hours of Missing Data: 39	
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 = 2														Hours of Calibration: 38	
																												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-Mar	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	0		
2-Mar	Z	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1		
3-Mar	0	Z	0	0	0	0	0	0	0	1	1	2	3	2	1	0	0	0	0	0	0	0	0	0	0	0.5	3		
4-Mar	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	0.2	1		
5-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0.2	2		
6-Mar	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		
7-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0.2	2		
8-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1		
9-Mar	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	1		
10-Mar	2	1	Z	2	2	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2		
11-Mar	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		
12-Mar	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		
13-Mar	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		
14-Mar	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1		
15-Mar	0	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1		
16-Mar	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		
17-Mar	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		
18-Mar	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		
19-Mar	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		
20-Mar	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		
21-Mar	0	Z	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1		
22-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	--	0		
23-Mar	0	0	0	Z	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0		
24-Mar	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	0.1	1		
25-Mar	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		
26-Mar	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		
27-Mar	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		
28-Mar	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		
29-Mar	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		
30-Mar	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		
31-Mar	0	0	0	0	0	Z	0	1	3	3	4	3	3	3	1	1	1	0	0	0	0	0	0	0	0	1.0	4		
																								Diurnal Average					
																								Diurnal Maximum					
Z - zerospan C - Calibration M - Maintenance																													



Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb
Fort Chipewyan - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort Chipewyan - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	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: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort Chipewyan - March 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	6	15	147	219	32	17	18	16	10	10	18	32	15	46	80	701
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	6	15	147	219	32	17	18	16	10	10	18	32	15	46	80	701

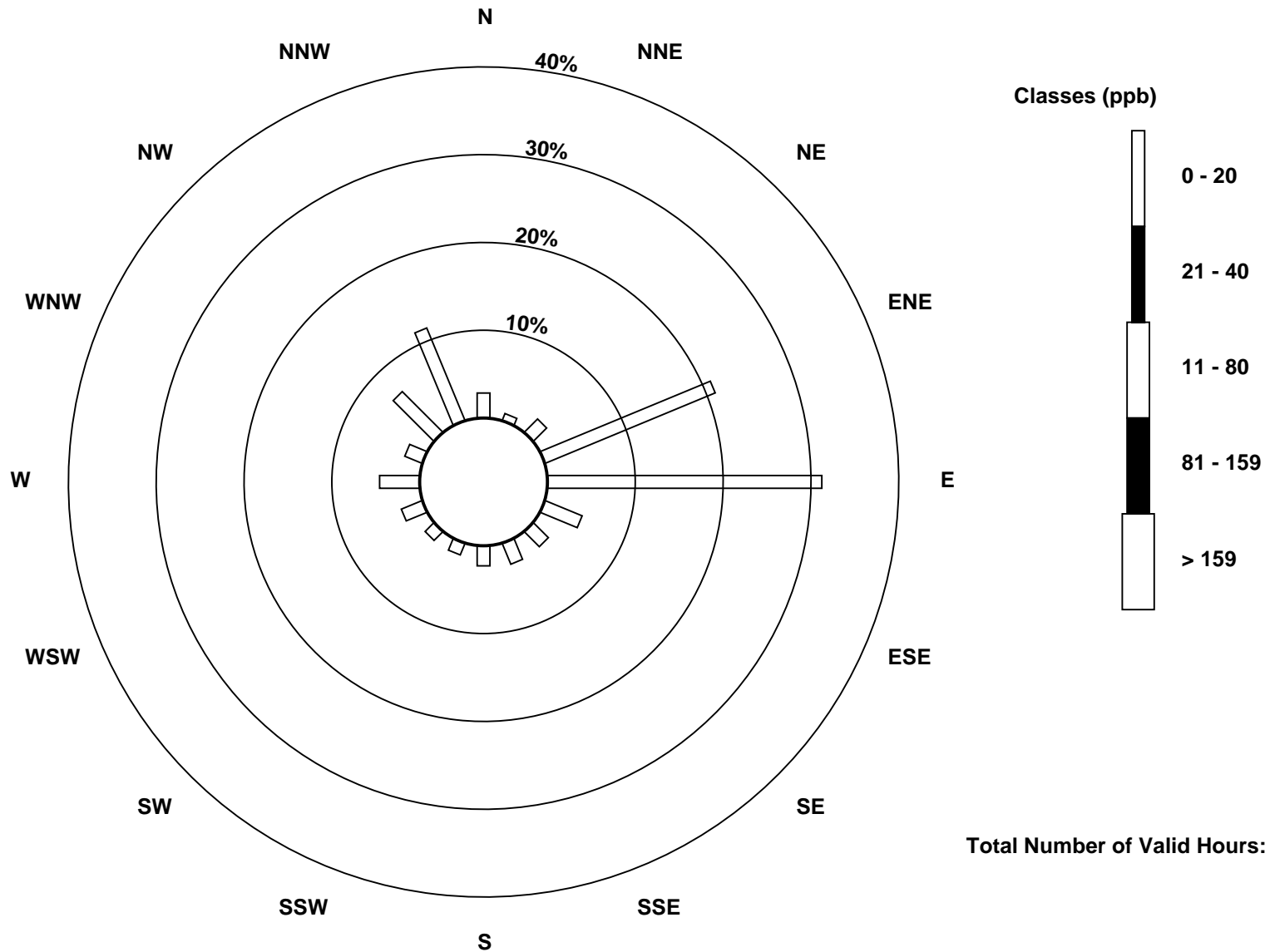
Total Number of Valid Hours: 701

Total Number of Hours: 744

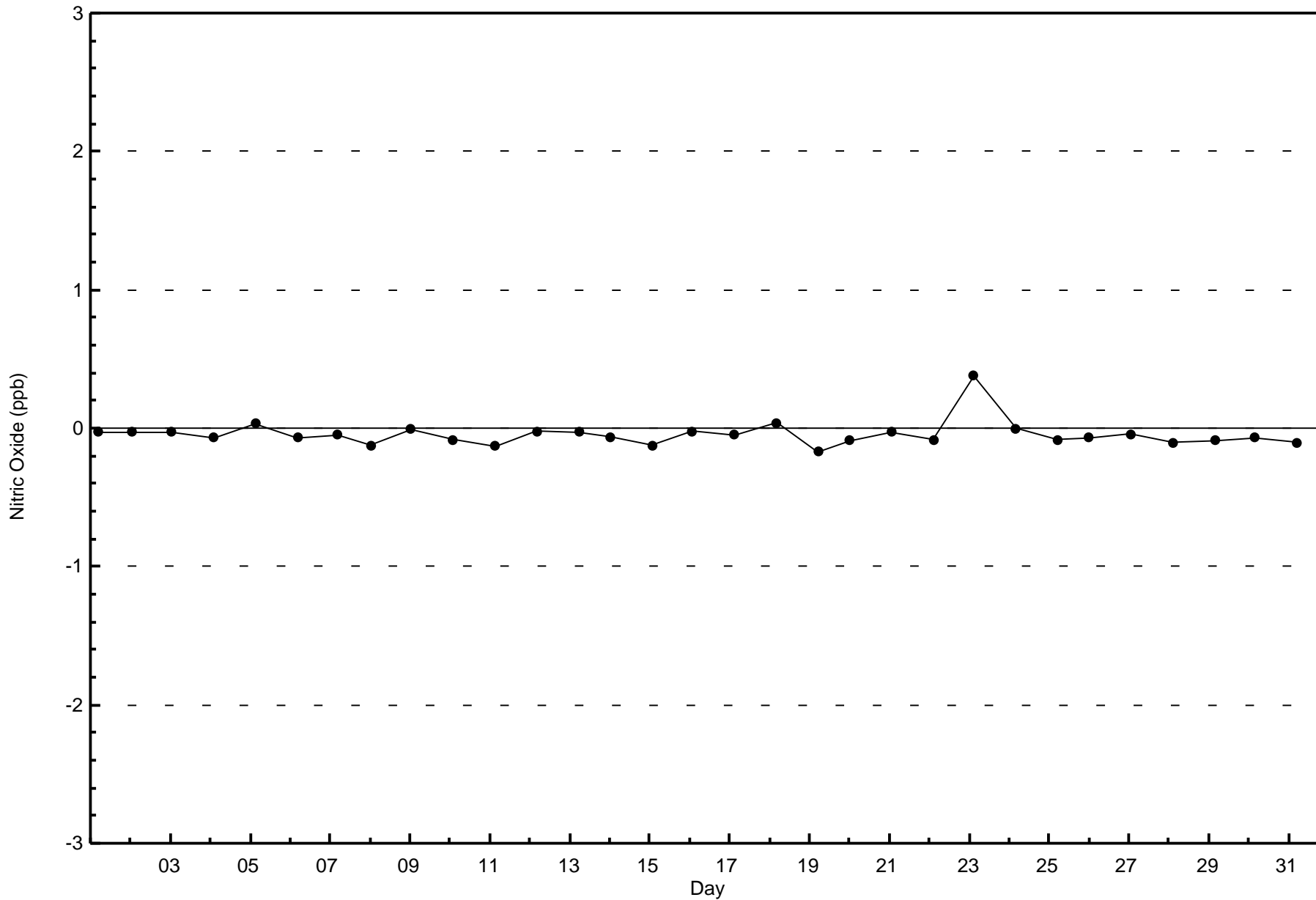


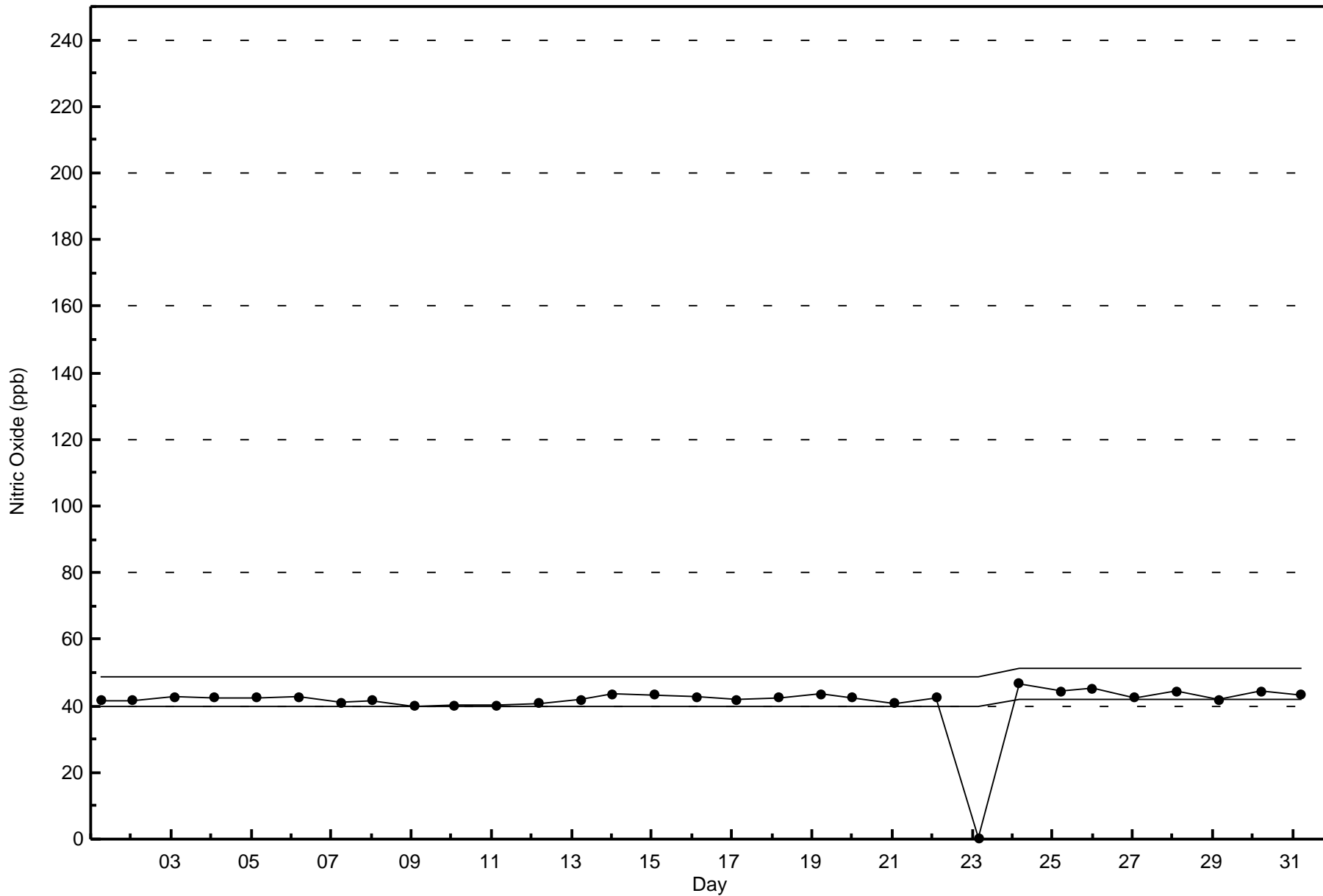
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitric Oxide (NO) - ppb
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 701







Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 13 ppb on Mar 4 22:00	Maximum Daily Average: 2.8 ppb on Mar 14
Minimum Value: 0 ppb on Mar 6 09:00	Hours of Data: 705
Maximum Diurnal Average: 1.4 ppb at hour 2	Hours of Missing Data: 39
Monthly Average: 1.0 ppb	Hours of Calibration: 38
Minimum Daily Average: 0.3 ppb on Mar 12	Percent Operational Time: 99.9
Minimum Diurnal Average: 0.8 ppb at hour 24	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 6

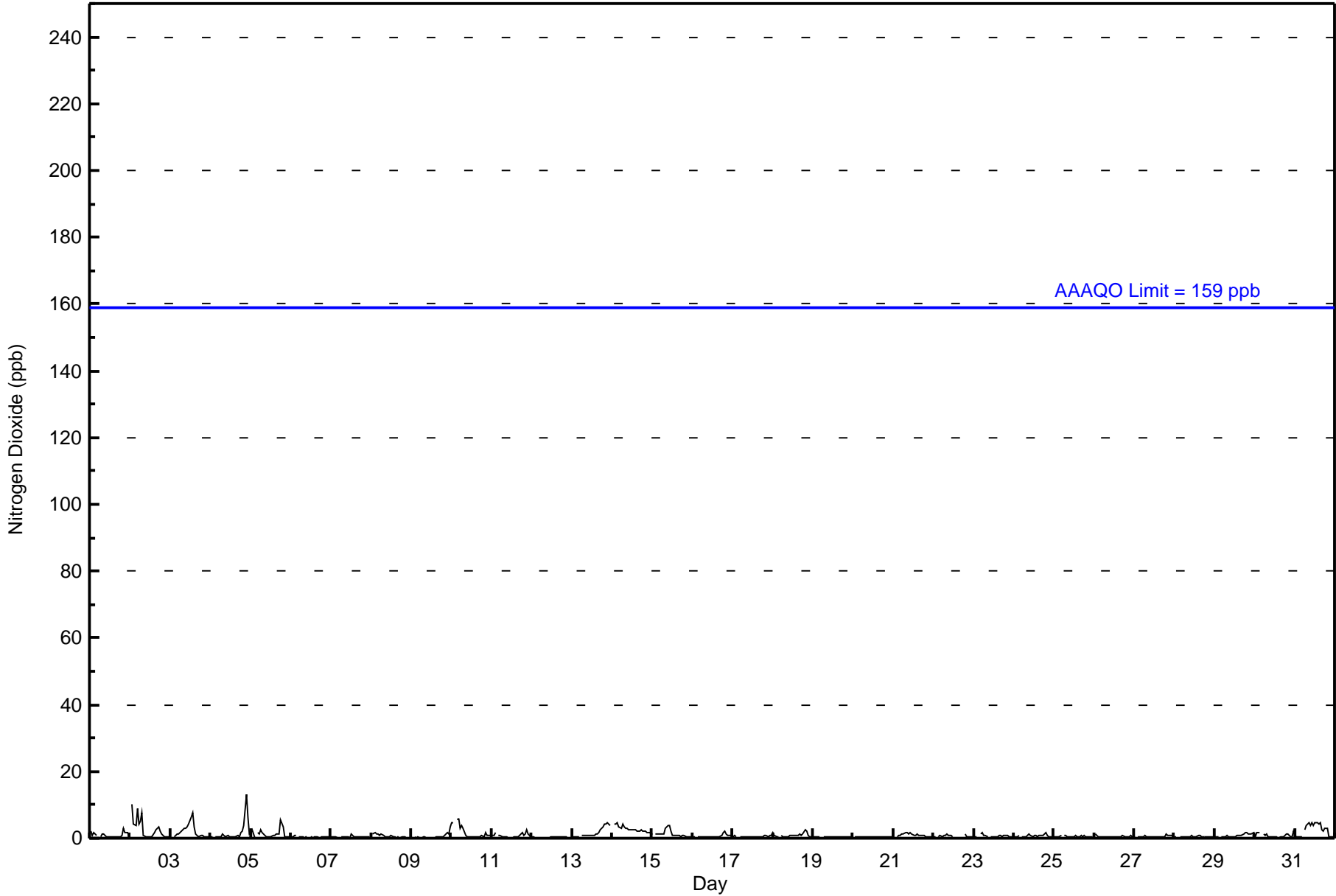
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	2	1	2	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	1	1	1	3	2	2	1	0.9	3
2-Mar	Z	10	4	4	9	4	5	8	1	0	0	0	1	2	3	3	3	3	2	1	1	0	0	0	2.7	10
3-Mar	0	Z	1	1	1	1	2	3	3	3	3	4	6	8	3	1	1	1	1	1	0	1	0	0	1.9	8
4-Mar	0	0	Z	0	1	0	0	1	1	1	1	1	0	0	1	1	1	1	2	2	4	13	6	1	1.6	13
5-Mar	2	3	0	Z	2	1	3	2	1	1	1	0	1	1	1	1	1	1	6	3	0	0	0	0	1.3	6
6-Mar	0	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
7-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
8-Mar	Z	1	2	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.6	2
9-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	1	3	0.6	3
10-Mar	5	5	Z	6	6	3	4	3	1	0	0	0	0	0	0	0	1	1	1	0	2	1	1	1	1.8	6
11-Mar	1	1	2	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	1	2	1	1	2	1	1	0.8	2
12-Mar	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0.3	1
13-Mar	0	0	0	0	1	Z	1	1	1	1	1	1	1	1	1	2	3	3	4	4	5	4	4	4	1.7	5
14-Mar	Z	4	4	5	3	3	4	3	3	3	3	3	3	2	2	2	3	2	2	2	2	2	1	1	2.8	5
15-Mar	1	Z	1	1	1	1	1	1	3	4	4	3	2	1	1	1	1	1	1	1	1	0	0	0	1.3	4
16-Mar	0	0	Z	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2	2	1	1	1	1	0.6	2
17-Mar	1	1	1	Z	1	0	0	0	0	1	1	1	0	0	0	1	1	0	1	1	1	0	1	1	0.6	1
18-Mar	2	1	0	0	Z	1	1	1	0	0	1	1	1	1	1	1	1	1	1	3	2	1	1	1	0.9	3
19-Mar	1	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	1
20-Mar	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
21-Mar	0	Z	1	1	1	1	1	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2
22-Mar	1	1	Z	1	1	1	1	1	1	1	1	1	C	C	C	C	C	C	C	1	1	0	0	1	--	1
23-Mar	1	0	0	Z	1	2	1	1	1	M	1	0	1	0	0	1	1	1	1	1	1	1	0	0	0.6	2
24-Mar	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	0.7	2
25-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.6	1
26-Mar	Z	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0.5	1
27-Mar	0	Z	1	1	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.6	1
28-Mar	1	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.5	1
29-Mar	1	1	0	Z	1	0	0	1	0	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	0.8	2
30-Mar	1	2	2	2	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0	1	2	0.8	2
31-Mar	1	0	0	0	0	Z	3	4	5	4	5	4	5	5	4	5	2	2	3	3	1	0	0	0	2.4	5
	0.8	1.4	0.9	1.1	1.3	1.0	1.1	1.3	1.0	0.9	0.9	0.8	0.9	0.9	0.8	0.8	0.8	0.9	1.2	1.2	1.1	1.2	0.9	0.8		Diurnal Average
	5	10	4	6	9	4	5	8	5	4	5	4	6	8	4	5	3	3	6	4	4	13	6	4		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 Chipewyan - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	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: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - March 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	6	15	147	219	32	17	18	16	10	10	18	32	15	46	80	701
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	6	15	147	219	32	17	18	16	10	10	18	32	15	46	80	701

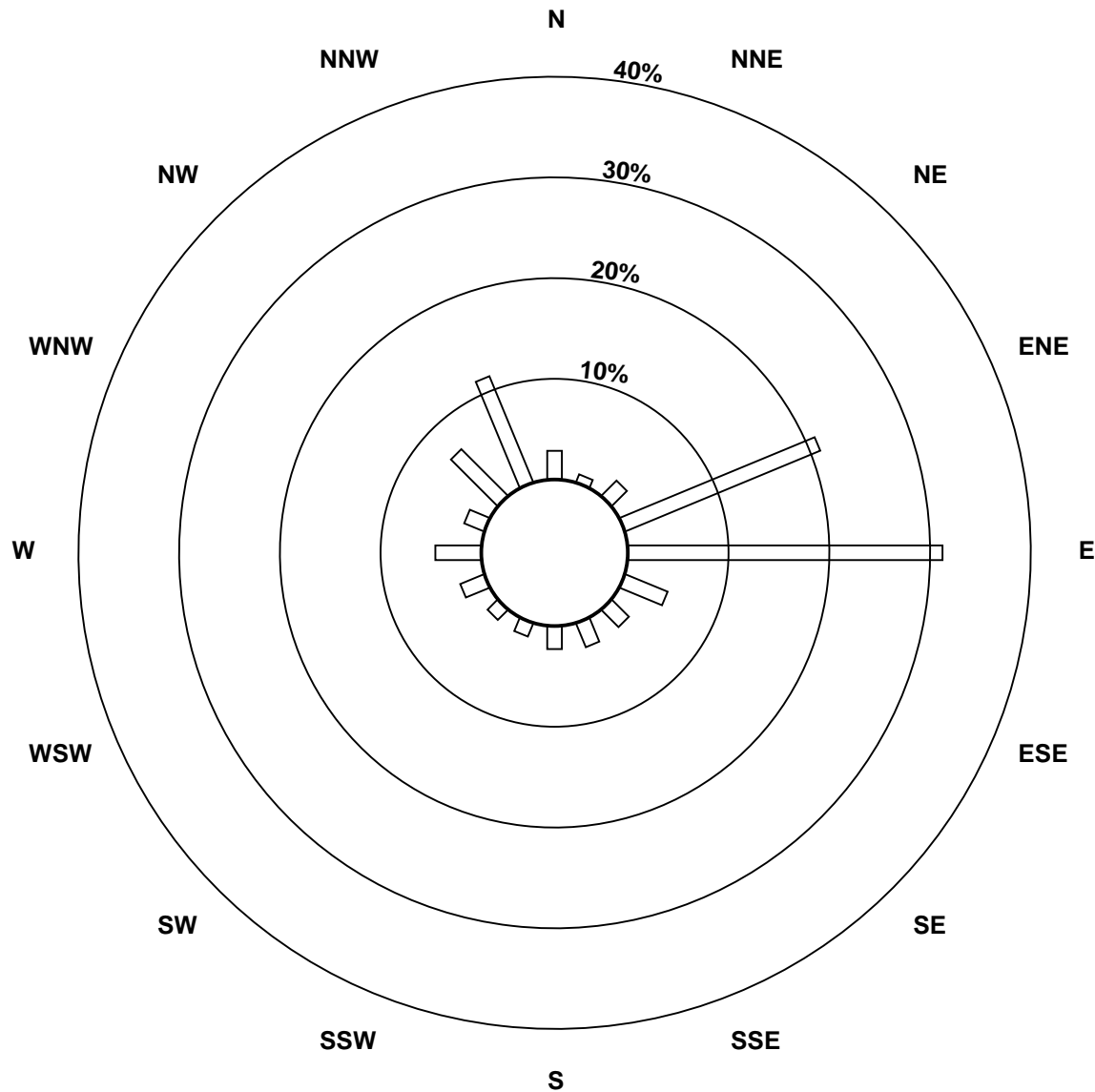
Total Number of Valid Hours: 701

Total Number of Hours: 744

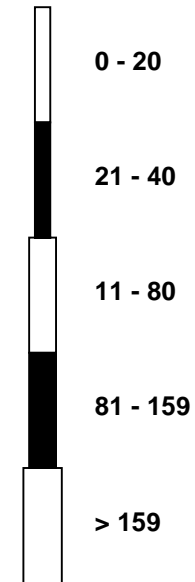


Wood Buffalo Environmental Association
Wind Rose Mar 2017

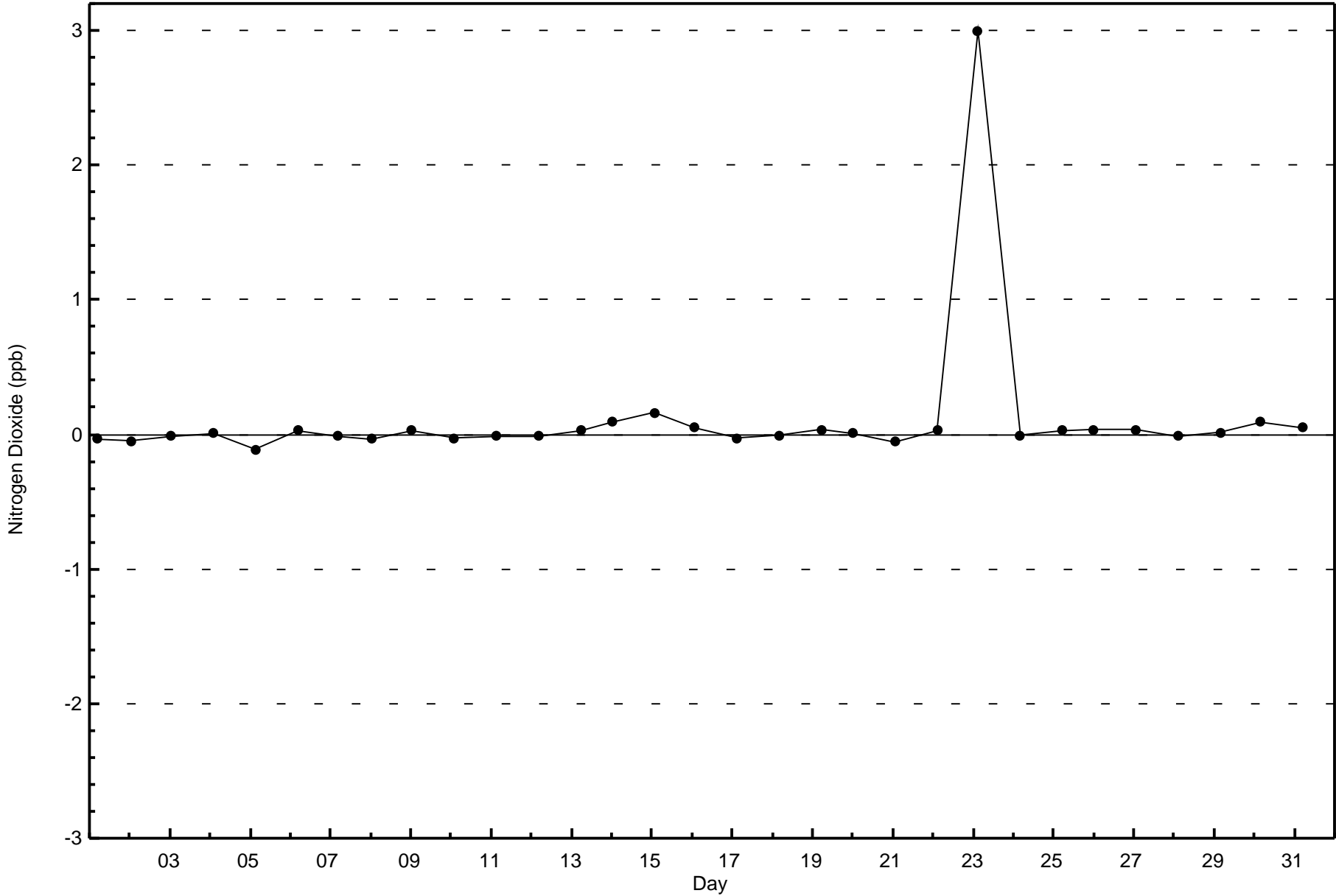
Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan (AMS 8)

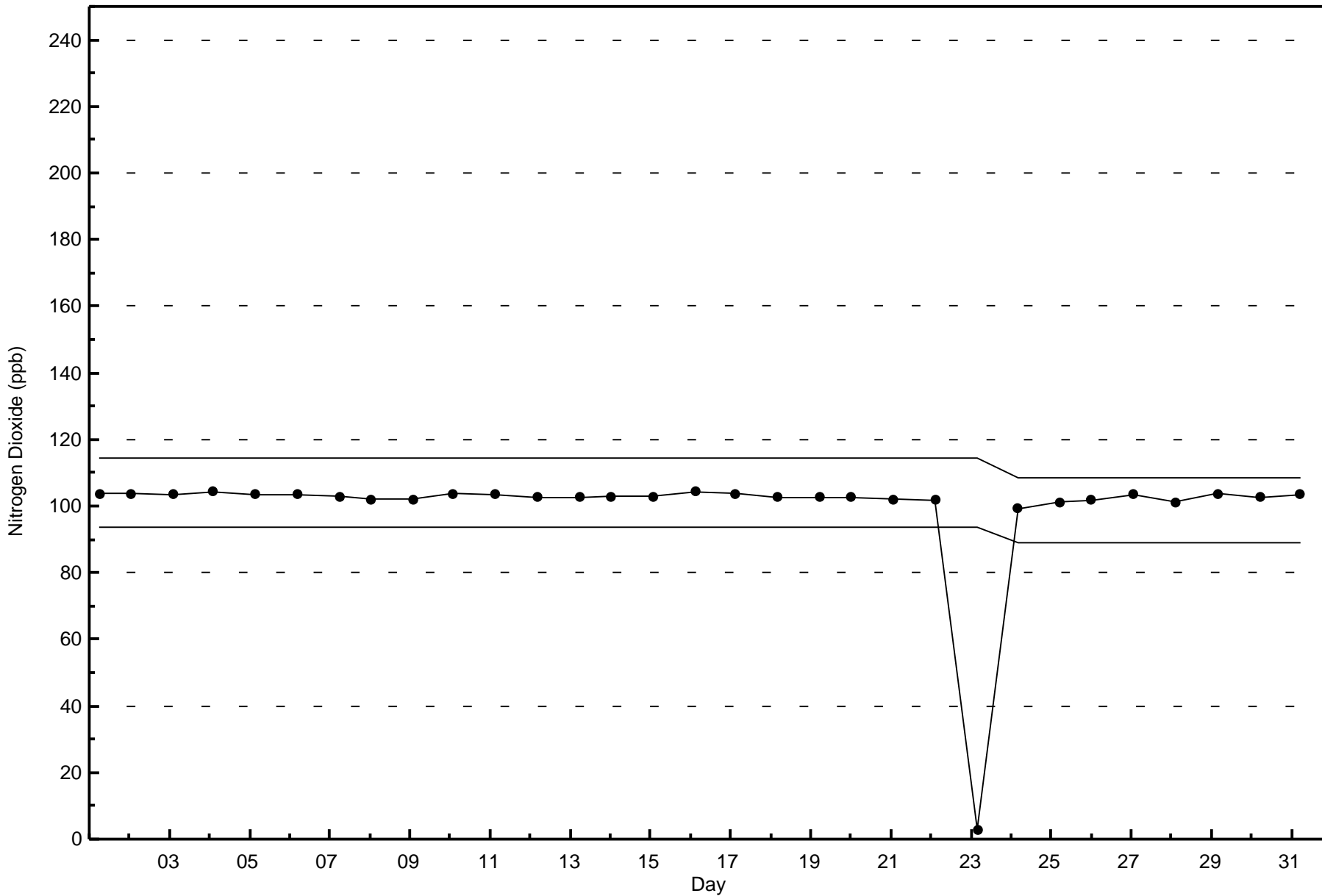


Classes (ppb)



Total Number of Valid Hours: 701







Wood Buffalo Environmental Association
Summary of Hour Averages

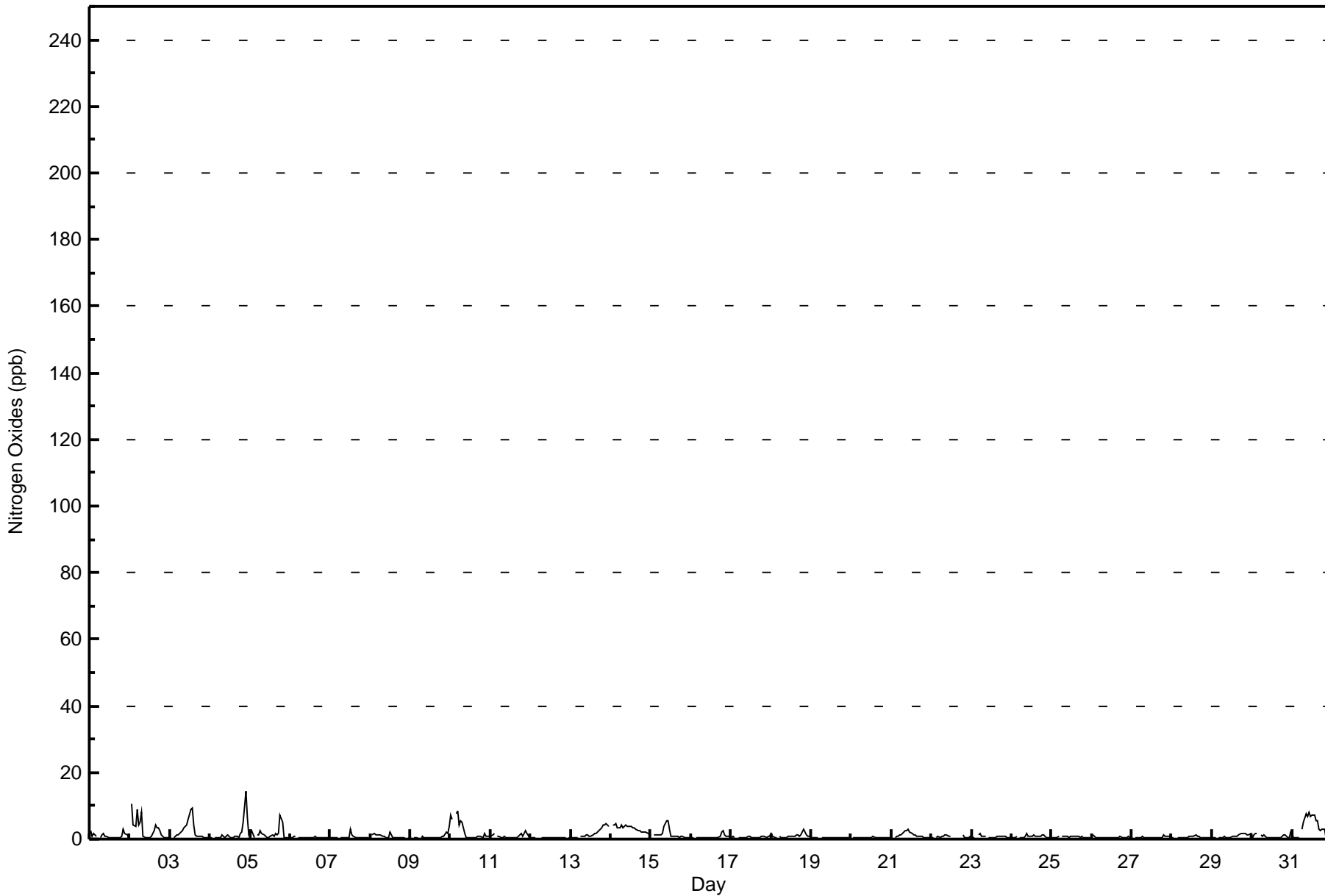
Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - March 2017

Maximum Value: 15 ppb on Mar 4 22:00																	Maximum Daily Average: 3.4 ppb on Mar 31																	Hours in Service: 744	
Minimum Value: 0 ppb on Mar 8 22:00																	Minimum Daily Average: 0.3 ppb on Mar 12																	Hours of Data: 705	
Maximum Diurnal Average: 1.5 ppb at hour 8																	Minimum Diurnal Average: 0.9 ppb at hour 24																	Hours of Missing Data: 39	
Monthly Average: 1.2 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 8																	Hours of Calibration: 38	
																																		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-Mar	2	1	2	1	1	Z	1	1	2	1	1	0	0	0	0	0	0	0	1	1	3	2	1	1	1.0	3									
2-Mar	Z	10	4	4	9	4	5	8	1	0	0	0	1	3	4	4	4	4	2	1	1	0	0	0	3.0	10									
3-Mar	0	Z	0	1	1	1	2	3	3	4	4	6	9	10	4	1	1	1	1	1	1	0	0	0	2.4	10									
4-Mar	0	0	Z	0	1	0	0	1	1	1	1	1	0	0	0	1	1	1	2	2	5	15	6	1	1.8	15									
5-Mar	2	3	0	Z	1	1	2	2	1	1	0	1	1	1	2	1	2	7	5	0	0	0	0	1.5	7										
6-Mar	0	0	1	1	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.4	1									
7-Mar	0	0	0	0	0	Z	0	0	0	1	0	0	3	1	1	0	0	0	0	1	0	0	0	0	0.5	3									
8-Mar	Z	1	2	1	1	1	1	1	1	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0.7	2									
9-Mar	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	4	0.7	4									
10-Mar	7	6	Z	8	8	4	6	5	2	1	0	0	0	0	0	1	1	1	1	0	2	1	1	1	2.5	8									
11-Mar	1	1	2	Z	1	1	1	0	1	0	0	0	0	0	0	0	0	1	2	1	1	3	1	1	0.9	3									
12-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0.3	1									
13-Mar	0	0	0	0	1	Z	1	1	1	1	1	1	1	2	2	2	3	3	4	4	5	4	4	4	1.8	5									
14-Mar	Z	4	4	5	3	3	4	4	4	4	4	4	4	3	3	2	3	2	2	2	2	2	1	1	3.2	5									
15-Mar	1	Z	1	1	1	1	1	2	4	5	5	3	1	1	1	1	1	1	1	1	0	0	0	0	1.5	5									
16-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	1	1	1	0.7	2									
17-Mar	1	1	1	Z	1	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1	0	1	1	0.6	1									
18-Mar	2	1	0	0	Z	1	0	1	0	1	1	1	1	1	1	1	1	1	1	3	2	1	1	1	1.0	3									
19-Mar	1	1	0	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1									
20-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1									
21-Mar	0	Z	1	1	1	1	1	2	2	2	3	2	2	1	1	1	1	1	1	1	0	1	0	0	1.2	3									
22-Mar	0	0	Z	0	1	1	1	1	1	1	1	1	C	C	C	C	C	C	C	1	0	0	0	1	--	1									
23-Mar	0	0	0	Z	1	2	1	1	1	M	1	0	1	0	1	1	1	1	1	1	1	1	0	0	0.7	2									
24-Mar	0	0	0	1	Z	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	0	0.8	2									
25-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0.7	1									
26-Mar	Z	1	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	0	0.5	1									
27-Mar	0	Z	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	0.6	1									
28-Mar	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1	0.6	1									
29-Mar	0	1	0	Z	0	0	0	1	0	1	1	1	1	1	1	1	1	2	2	2	2	1	1	2	0.9	2									
30-Mar	0	1	2	2	Z	1	1	1	1	0	0	0	1	0	0	0	0	0	1	1	1	0	1	2	0.9	2									
31-Mar	1	0	0	0	0	Z	3	5	8	7	8	7	7	7	6	6	3	2	3	3	0	0	0	0	3.4	8									
																	0.9 1.4 1.0 1.2 1.4 1.1 1.2 1.5 1.3 1.2 1.3 1.1 1.3 1.3 1.1 1.0 0.9 1.0 1.3 1.3 1.1 1.3 1.0 0.9																	Diurnal Average	
																	7 10 4 8 9 4 6 8 8 7 8 7 9 10 6 6 4 4 7 5 5 15 6 4																	Diurnal Maximum	
Z - zerspan		C - Calibration					M - Maintenance																												



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	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: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - March 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	6	15	147	219	32	17	18	16	10	10	18	32	15	46	80	701
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	6	15	147	219	32	17	18	16	10	10	18	32	15	46	80	701

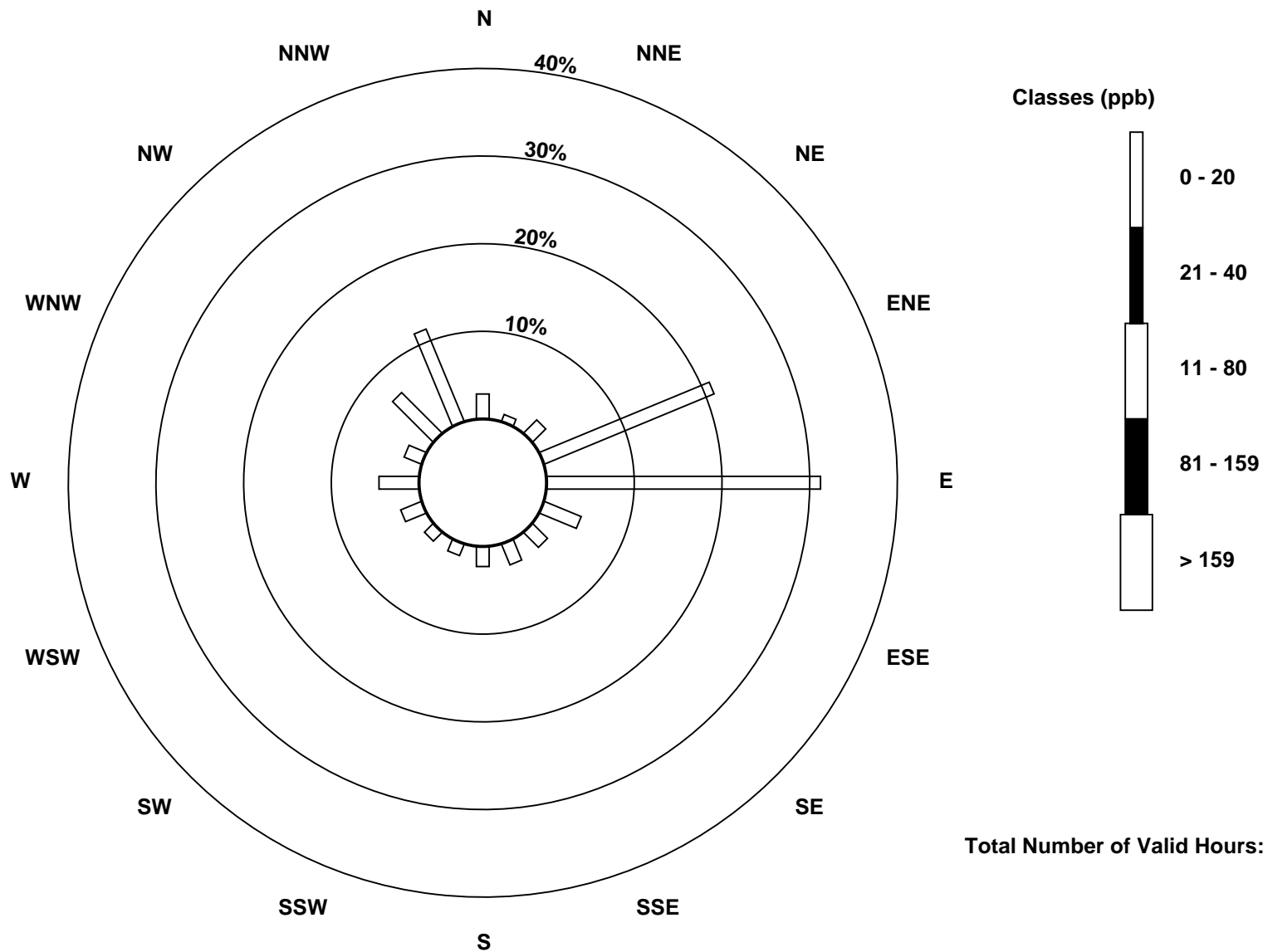
Total Number of Valid Hours: 701

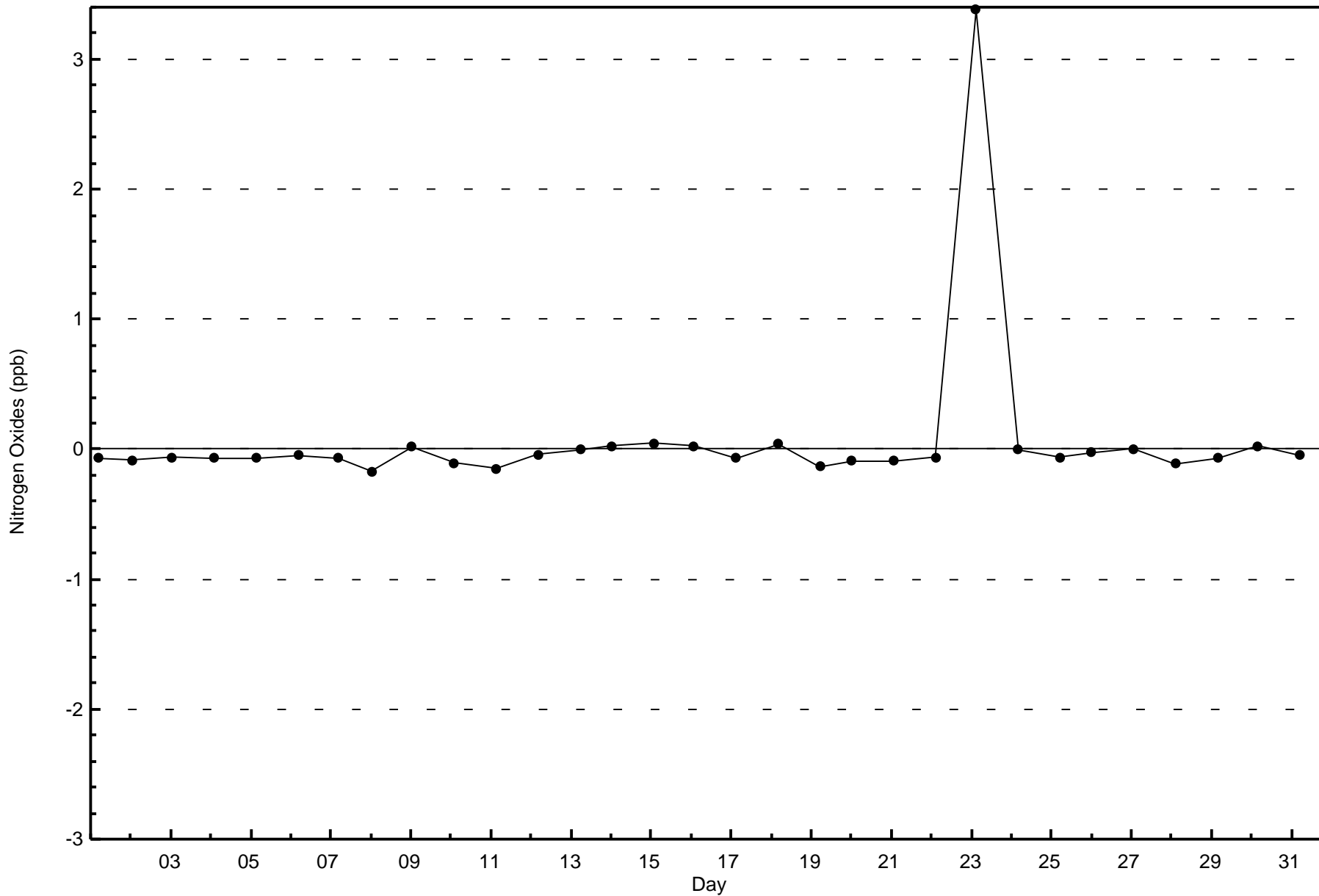
Total Number of Hours: 744

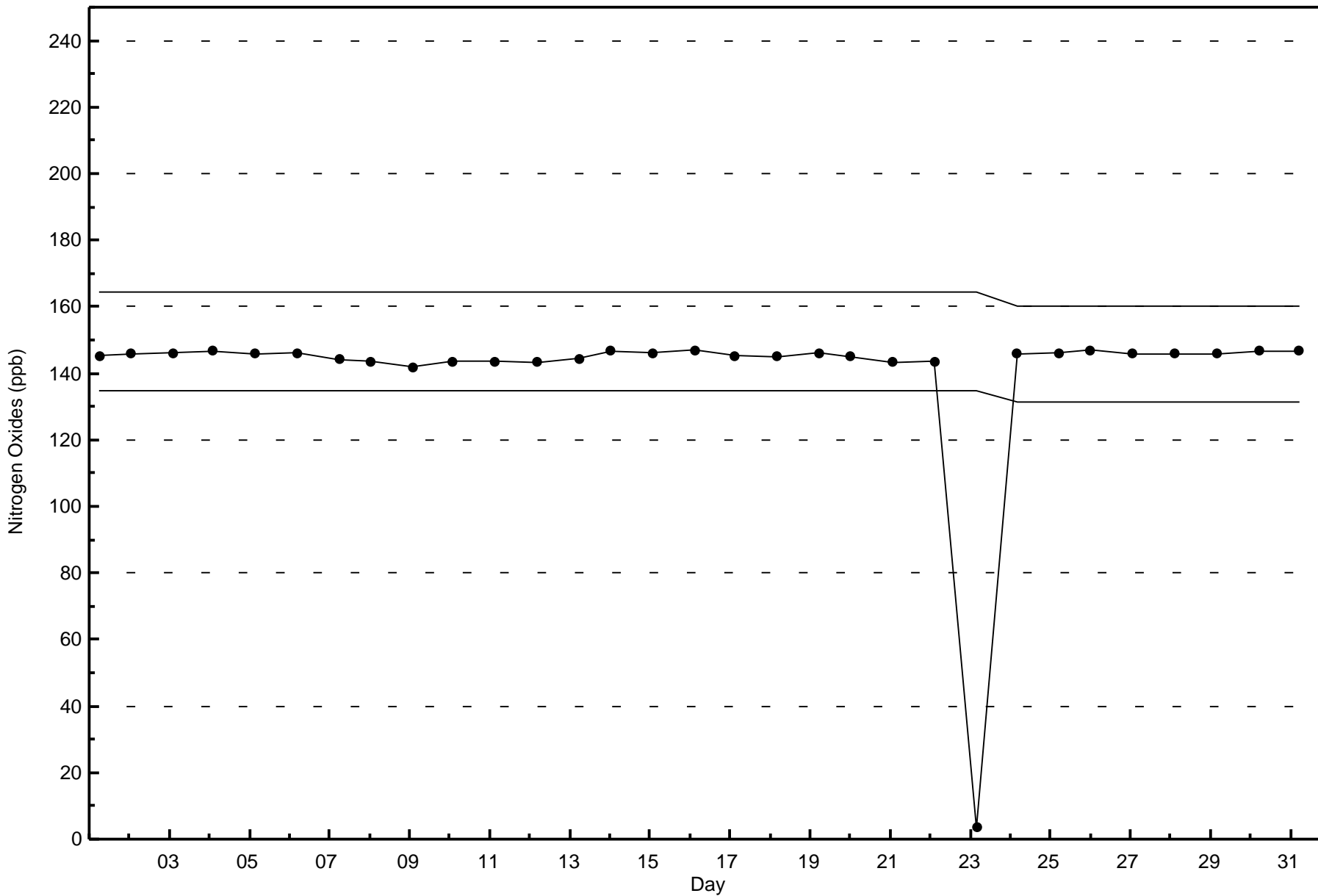


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan (AMS 8)









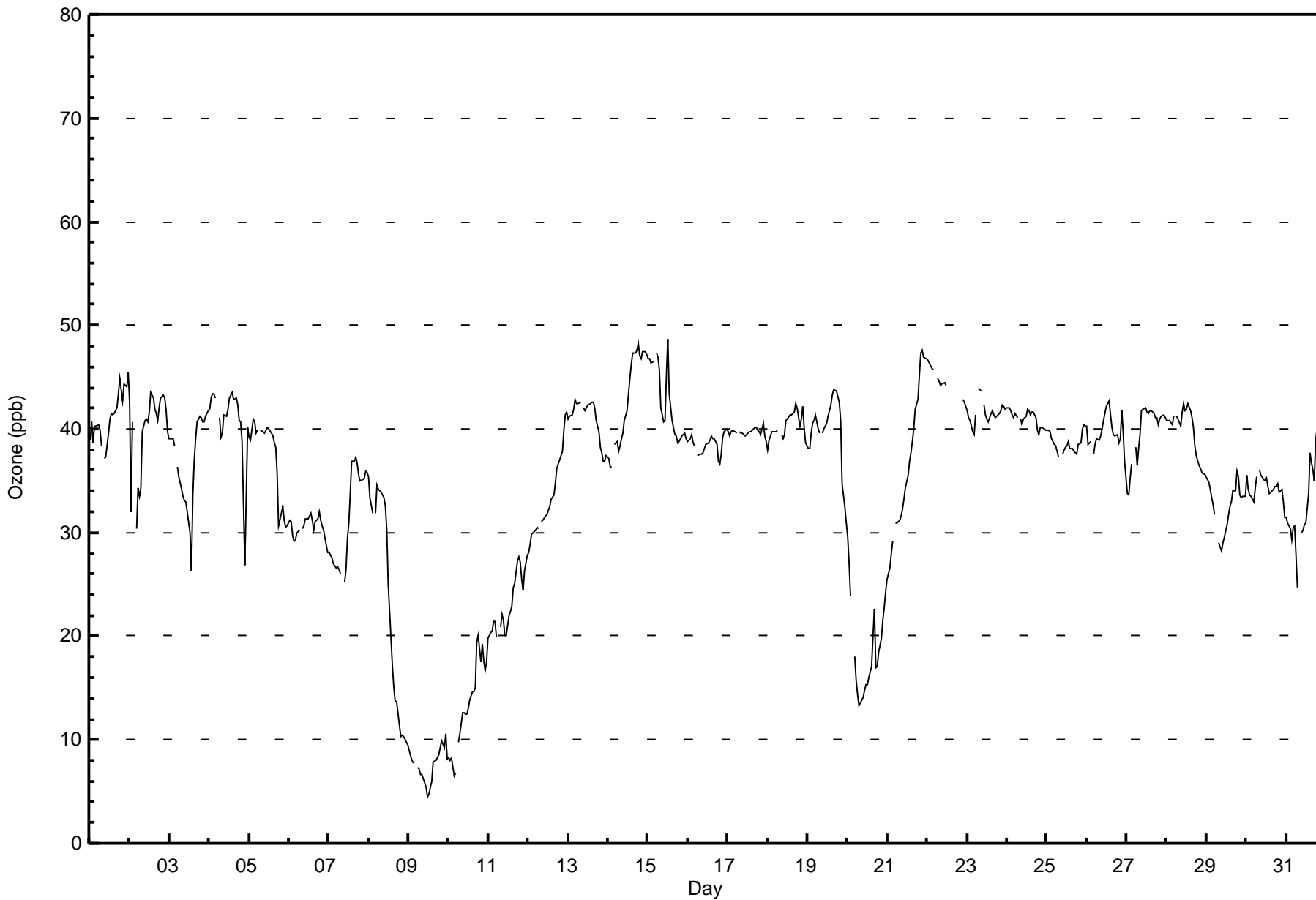
Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Fort Chipewyan - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 54 ppb on Mar 31 21:00										Maximum Daily Average: 42.8 ppb on Mar 14										Hours of Data: 703						
Minimum Value: 4 ppb on Mar 9 12:00										Minimum Daily Average: 7.5 ppb on Mar 9										Hours of Missing Data: 41						
Maximum Diurnal Average: 35.8 ppb at hour 21										Minimum Diurnal Average: 33.4 ppb at hour 8										Hours of Calibration: 40						
Monthly Average: 34.9 ppb										Percentiles: P ₁ = 7 P ₁₀ = 20 Q ₁ = 31 Median = 39 Q ₃ = 41 P ₉₀ = 43 P ₉₉ = 48										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-Mar	39	41	39	40	40	40	40	38	Z	37	37	40	41	41	41	41	42	43	45	44	43	44	44	45	41.2	45
2-Mar	43	32	41	Z	30	34	34	34	40	41	41	41	42	43	43	42	41	41	42	43	43	43	42	40	39.8	43
3-Mar	39	39	39	38	Z	36	35	34	34	33	32	30	26	34	37	39	41	41	41	41	41	41	41	42	36.8	42
4-Mar	42	43	43	43	43	Z	41	39	40	41	41	42	43	43	43	43	42	41	41	39	27	33	40	40.8	43	
5-Mar	39	39	41	41	40	40	Z	40	40	40	40	40	40	40	39	39	38	36	31	32	32	31	31	31	37.3	41
6-Mar	31	31	30	29	29	30	30	Z	30	31	31	31	32	32	31	30	31	31	32	31	31	30	29	28	30.5	32
7-Mar	28	28	28	27	27	27	26	26	Z	25	26	29	31	34	37	37	37	37	35	35	35	35	36	36	31.4	37
8-Mar	35	33	32	Z	32	35	34	34	34	33	33	30	25	20	17	15	14	14	11	10	10	10	10	10	23.1	35
9-Mar	9	8	8	8	Z	7	7	7	7	6	5	4	5	5	6	8	8	8	8	9	10	9	11	8	7.5	11
10-Mar	8	8	8	7	7	Z	10	11	13	13	12	12	13	14	15	15	15	19	20	18	19	18	17	18	13.4	20
11-Mar	20	20	20	21	21	20	Z	21	22	22	20	20	22	22	23	25	25	27	28	27	26	24	26	28	23.1	28
12-Mar	28	29	30	30	30	30	30	Z	31	31	32	32	32	33	33	34	35	36	37	37	38	40	41	42	33.5	42
13-Mar	41	41	41	42	43	43	42	43	Z	42	42	42	42	42	43	43	42	41	40	38	38	37	37	37	40.9	43
14-Mar	37	36	36	Z	39	39	38	38	39	40	41	42	43	45	46	47	47	48	48	47	47	48	47	47	42.8	48
15-Mar	47	47	46	46	Z	47	47	46	42	41	41	45	49	43	41	40	39	39	39	39	39	39	40	39	42.7	49
16-Mar	39	39	39	39	38	Z	37	37	38	38	38	39	39	39	39	39	39	38	37	37	38	39	40	40	38.4	40
17-Mar	40	39	40	40	40	40	Z	40	40	40	39	39	40	40	40	40	40	40	40	40	39	40	39	39	39.7	40
18-Mar	38	39	40	40	40	40	40	Z	39	39	40	41	41	41	41	41	42	42	42	40	41	42	40	39	40.4	42
19-Mar	38	38	40	40	41	41	40	40	Z	40	40	41	41	42	42	43	44	44	43	43	41	35	32	31	39.9	44
20-Mar	30	27	24	Z	18	16	14	13	14	14	15	15	15	16	17	20	23	17	17	18	20	22	23	24	18.8	30
21-Mar	25	27	28	29	Z	31	31	31	32	32	33	34	35	37	38	39	40	42	43	45	47	48	47	47	36.5	48
22-Mar	47	46	46	46	46	Z	45	45	44	44	45	44	C	C	C	C	C	C	C	C	C	43	43	42	--	47
23-Mar	42	41	41	40	39	41	Z	44	44	M	42	41	41	41	41	42	41	41	41	42	42	42	42	42	41.5	44
24-Mar	42	42	42	41	41	41	41	Z	41	40	41	41	42	42	41	42	42	41	40	39	40	40	40	40	41.0	42
25-Mar	40	40	40	39	39	38	38	Z	37	38	38	38	38	39	38	38	38	38	37	38	39	40	40	40	38.6	40
26-Mar	40	39	39	Z	38	38	39	39	39	40	41	42	42	43	41	40	39	39	40	39	39	42	40	37	39.7	43
27-Mar	34	34	35	37	Z	38	36	38	39	42	42	42	42	41	42	42	41	41	41	40	41	41	41	41	39.7	42
28-Mar	41	41	41	40	41	Z	41	41	40	42	42	42	42	42	41	40	38	37	36	36	36	36	36	36	39.8	42
29-Mar	35	35	34	33	33	32	Z	29	29	28	29	30	31	32	33	33	34	34	36	35	34	33	33	34	32.5	36
30-Mar	36	34	34	33	33	34	35	Z	36	35	35	35	35	34	34	34	34	34	34	35	34	34	33	31	34.3	36
31-Mar	32	31	30	29	31	31	28	25	Z	30	30	31	31	34	38	37	36	35	39	41	54	52	50	48	35.7	54
34.9 34.4 34.6 34.6 34.5 34.2 33.9 33.4 33.8 33.9 34.4 34.8 34.8 34.9 35.3 35.5 35.7 35.6 35.5 35.4 35.8 35.7 35.6 35.5																								Diurnal Average		
47 47 46 46 46 47 47 46 44 44 45 45 49 45 46 47 47 48 48 47 54 52 50 48																								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 - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	79	11.24	11.24
21 - 50	622	88.48	99.72
51 - 82	2	0.28	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Fort Chipewyan - March 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	0	0	14	16	2	1	0	1	1	5	11	2	0	5	14	77
21 - 50	15	6	15	133	202	27	17	18	14	10	4	7	31	15	41	64	619
51 - 82	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	6	15	147	218	29	18	18	16	11	10	18	33	15	46	78	698

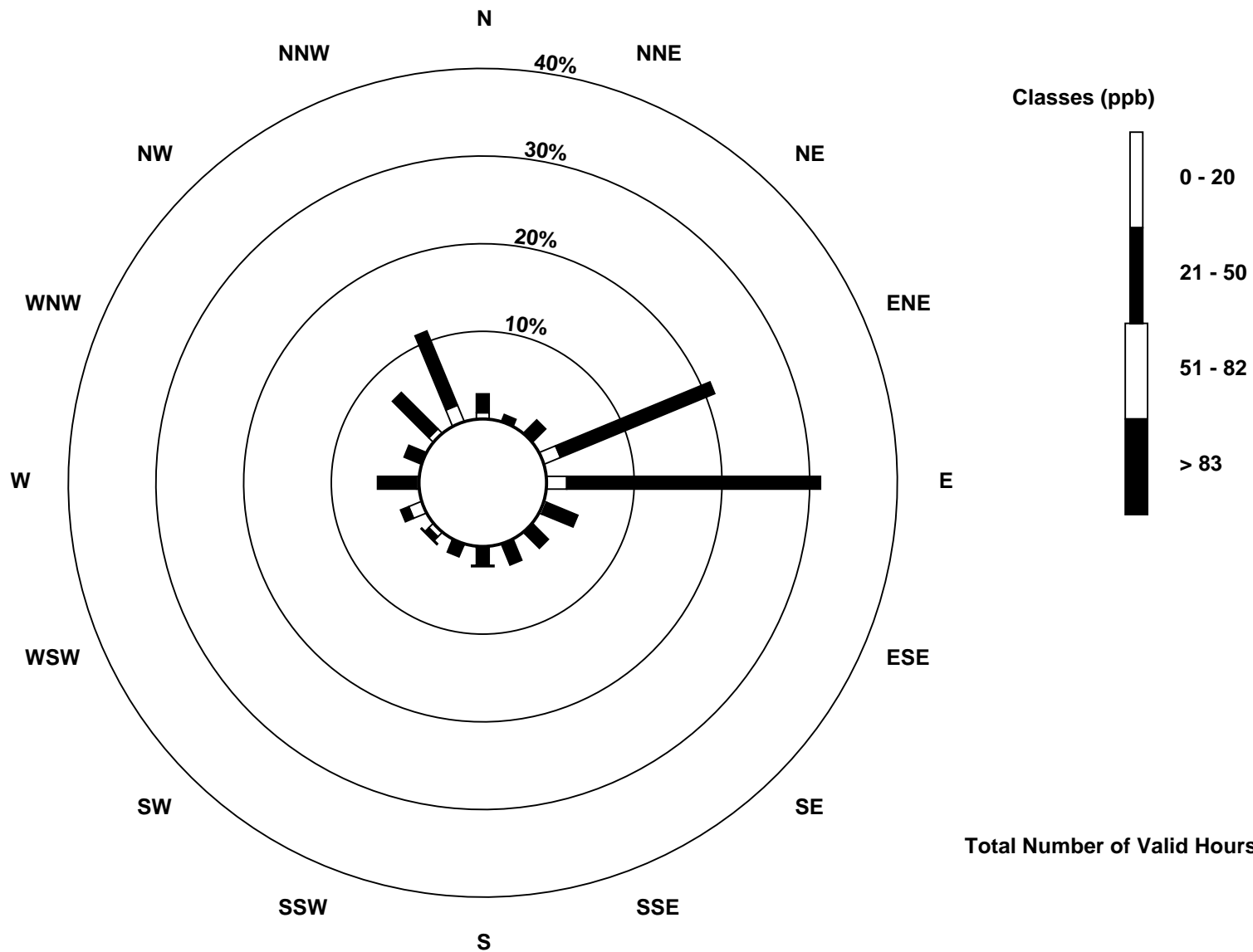
Total Number of Valid Hours: 698

Total Number of Hours: 744

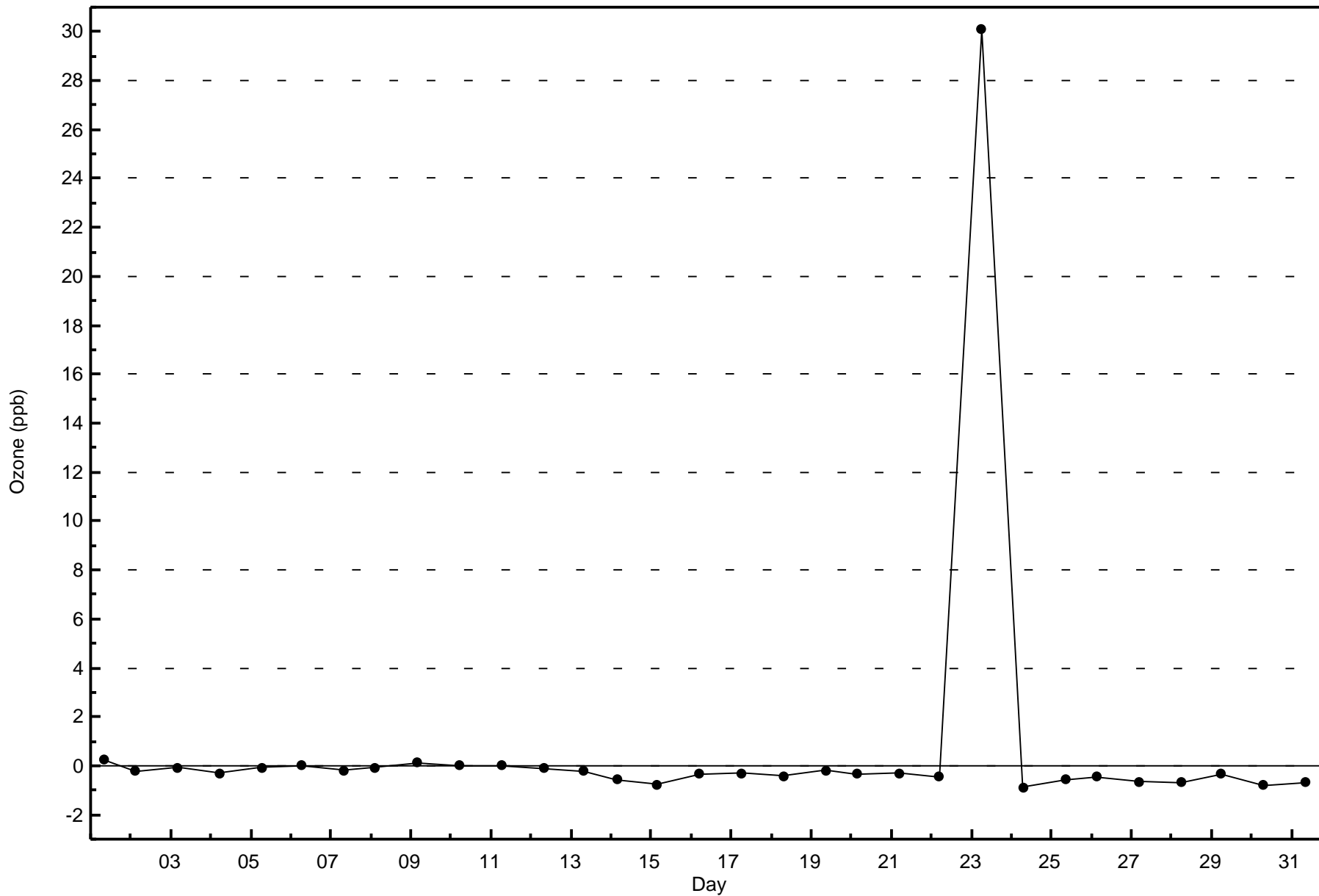


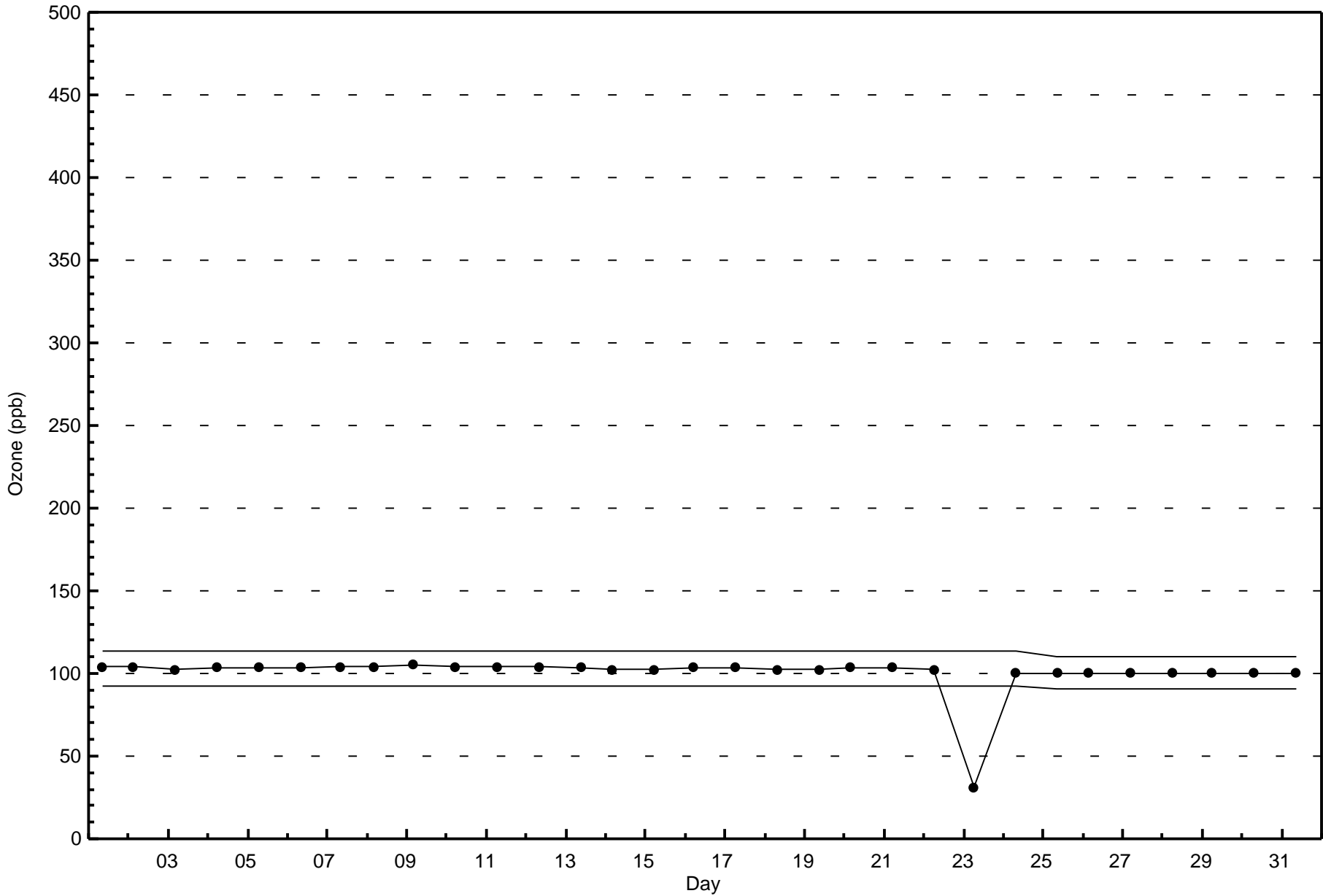
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Ozone (O₃) - ppb
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 698







Wood Buffalo Environmental Association

Summary of Hour Averages

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

Fort Chipewyan - March 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 36.7 µg/m ³ on Mar 10 04:00 Maximum Daily Average: 7.2 µg/m ³ on Mar 10		Hours in Service: 744 Hours of Data: 740 Hours of Missing Data: 4 Hours of Calibration: 4 Percent Operational Time: 100.0																								
Minimum Value: 0.6 µg/m ³ on Mar 2 12:00 Maximum Diurnal Average: 4.6 µg/m ³ at hour 2 Monthly Average: 3.61 µg/m ³		Minimum Daily Average: 2.2 µg/m ³ on Mar 22 Minimum Diurnal Average: 2.7 µg/m ³ at hour 13 Percentiles: P ₁ = 0.9 P ₁₀ = 1.8 Q ₁ = 2.2 Median = 3.1 Q ₃ = 4.1 P ₉₀ = 5.6 P ₉₉ = 12.8																								
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-Mar	8.3	4.0	4.9	4.4	4.5	3.8	4.1	8.0	4.1	1.9	1.3	1.5	1.8	1.8	1.7	1.9	2.1	2.3	2.5	3.6	6.6	10.4	7.1	2.4	4.0	10.4
2-Mar	5.8	22.5	3.6	4.0	2.4	2.3	2.8	3.9	1.4	0.9	0.7	0.6	0.8	0.8	2.2	2.4	1.8	1.7	2.2	1.8	0.9	0.8	0.8	1.1	2.8	22.5
3-Mar	1.1	1.3	1.7	2.4	3.4	4.5	5.6	6.9	7.1	7.2	7.1	6.9	6.4	6.6	4.5	4.4	2.1	2.2	3.0	2.3	2.1	2.3	2.5	1.9	4.0	7.2
4-Mar	1.9	1.8	1.3	1.4	1.4	1.3	1.2	5.3	1.4	1.7	2.3	2.0	1.9	2.0	1.8	2.0	2.5	2.7	3.2	4.0	6.1	15.1	7.2	3.5	3.1	15.1
5-Mar	2.5	3.1	1.6	2.5	2.1	2.0	2.4	2.4	3.0	2.2	1.9	1.7	2.0	1.6	1.9	2.1	2.5	3.1	3.3	3.4	3.4	3.1	3.7	3.7	2.6	3.7
6-Mar	6.9	9.3	5.6	3.5	3.4	3.1	3.4	3.5	2.8	3.0	2.9	2.3	2.5	2.9	2.8	2.9	3.1	3.1	3.4	3.5	3.3	3.6	3.5	3.9	3.7	9.3
7-Mar	4.0	4.1	4.0	4.0	4.2	4.2	4.4	4.4	4.8	4.4	3.9	3.2	3.0	2.8	2.4	2.6	2.9	3.2	6.0	4.4	3.8	4.0	3.8	3.8	3.9	6.0
8-Mar	3.9	6.6	4.0	3.2	2.8	2.5	3.6	3.0	2.2	1.5	1.7	1.7	1.6	2.0	2.5	3.3	3.9	3.7	4.0	4.2	4.3	4.5	4.6	4.6	3.3	6.6
9-Mar	4.9	4.6	4.9	5.3	5.1	4.8	4.9	5.5	5.1	3.5	3.2	2.9	2.7	3.3	4.2	4.9	5.6	5.7	5.4	8.7	7.8	9.0	11.3	11.5	5.6	11.5
10-Mar	10.3	9.4	15.4	36.7	22.2	11.7	9.6	14.4	4.4	2.7	2.2	1.9	1.8	1.8	2.1	2.3	2.5	2.2	2.3	2.6	3.7	3.0	3.1	3.5	7.2	36.7
11-Mar	3.3	3.6	3.5	3.4	4.0	4.5	3.8	3.5	3.2	2.5	2.4	2.3	2.3	1.9	1.6	1.7	2.0	2.3	3.0	3.6	4.1	3.2	3.2	3.7	3.0	4.5
12-Mar	3.7	3.2	3.3	2.9	2.7	2.6	2.9	2.9	2.5	2.1	1.7	1.6	1.7	1.7	1.9	2.1	2.4	2.5	2.4	2.1	1.6	1.3	1.4	2.1	2.3	3.7
13-Mar	2.6	2.6	2.6	2.4	2.2	2.4	2.4	2.7	2.9	3.4	3.5	3.8	3.7	3.5	3.8	4.0	4.2	4.3	4.5	4.9	4.9	4.9	4.5	4.8	3.6	4.9
14-Mar	4.6	5.3	5.6	5.6	5.5	6.0	6.5	5.6	5.7	5.4	4.7	5.1	5.8	6.2	6.4	6.1	5.6	5.4	6.6	6.2	5.1	4.8	4.7	5.0	5.6	6.6
15-Mar	5.0	4.8	4.9	5.0	4.5	4.3	4.2	3.8	4.5	4.4	3.8	1.9	0.8	1.9	2.9	3.0	2.8	2.8	3.3	4.1	4.6	4.5	4.3	4.5	3.8	5.0
16-Mar	3.7	3.6	3.3	3.5	3.2	3.1	3.3	3.7	2.5	3.0	2.1	1.8	1.8	1.9	1.9	1.9	1.9	2.6	4.7	9.2	5.5	2.9	2.6	2.6	3.2	9.2
17-Mar	2.8	3.0	2.8	2.7	2.6	2.6	2.5	2.4	2.2	2.0	2.0	2.0	1.8	2.0	1.9	1.9	2.1	2.2	2.5	2.7	3.2	2.5	2.3	2.0	2.4	3.2
18-Mar	2.4	2.6	2.3	2.4	2.3	2.2	2.0	1.9	1.8	1.9	3.0	3.3	2.3	2.2	1.8	1.7	1.6	1.4	2.0	2.9	2.9	2.0	1.8	2.9	2.2	3.3
19-Mar	4.1	4.7	3.8	3.7	3.7	3.1	3.9	3.9	3.5	2.8	2.6	2.6	2.2	2.1	2.2	1.9	1.8	3.6	3.5	3.2	4.1	4.7	5.1	4.6	3.4	5.1
20-Mar	4.4	5.1	5.5	5.1	4.9	5.4	5.5	5.9	5.0	4.4	3.8	3.2	3.6	6.0	10.5	3.8	3.1	4.0	4.2	4.1	3.7	3.7	3.4	3.0	4.6	10.5
21-Mar	3.3	3.5	3.2	3.0	3.0	2.8	3.0	3.1	3.1	2.9	2.5	2.2	2.1	2.2	2.2	2.3	2.1	2.2	2.2	1.8	1.4	1.5	1.6	1.5	2.4	3.5
22-Mar	1.6	1.6	1.6	1.7	1.8	1.8	2.3	2.0	1.9	2.0	2.0	2.1	2.1	2.1	2.1	2.3	2.5	2.3	2.7	3.2	2.9	2.6	3.2	3.2	2.2	3.2
23-Mar	3.2	3.2	3.6	4.2	5.5	4.3	3.6	C	C	C	C	6.6	7.1	6.6	9.9	8.3	7.9	5.6	5.8	5.2	3.6	4.0	3.7	3.7	5.3	9.9
24-Mar	4.4	5.0	4.5	4.1	4.0	4.2	3.9	3.4	3.2	2.9	2.7	2.6	2.3	2.5	2.7	3.2	3.6	3.7	4.2	3.8	4.0	4.3	4.1	3.6	3.6	5.0
25-Mar	3.9	3.9	4.2	4.3	4.2	4.0	4.1	4.3	4.0	3.5	3.1	3.2	2.8	2.7	2.9	3.3	2.8	2.3	2.8	2.8	3.0	2.6	2.7	2.6	3.3	4.3
26-Mar	3.0	3.9	2.5	2.6	2.8	2.3	2.1	2.2	1.8	1.7	1.8	1.6	1.6	1.6	1.9	2.7	3.0	3.4	2.8	3.2	3.3	2.5	2.7	2.9	2.5	3.9
27-Mar	4.2	5.2	4.8	4.1	3.6	3.7	4.2	2.9	2.5	2.0	1.9	2.1	3.4	2.5	1.8	1.9	1.9	2.0	2.2	3.0	3.3	2.5	2.1	2.1	2.9	5.2
28-Mar	2.9	3.2	3.0	2.9	2.6	2.5	2.5	2.2	1.9	1.6	1.6	1.7	2.0	2.6	3.8	2.2	2.3	2.5	4.1	4.7	4.9	5.2	4.8	4.1	3.0	5.2
29-Mar	3.3	3.4	3.4	3.4	3.2	2.9	2.9	3.0	1.9	1.9	2.2	1.9	1.9	2.4	2.5	3.5	4.0	3.9	22.2	21.6	6.3	5.0	4.8	5.2	4.9	22.2
30-Mar	2.8	3.3	4.6	6.2	9.3	7.0	3.7	3.1	2.0	1.8	2.3	1.9	2.8	1.7	1.7	1.8	2.1	2.1	2.9	3.6	3.9	2.5	3.3	18.2	3.9	18.2
31-Mar	10.1	2.6	3.1	3.2	3.4	3.9	6.0	7.4	7.8	8.1	7.8	5.1	3.9	3.0	2.9	3.2	2.5	2.3	2.5	2.2	1.3	1.2	1.2	1.2	4.0	10.1
4.1 4.6 4.0 4.6 4.2 3.7 3.8 4.2 3.3 3.0 2.8 2.7 2.7 2.7 3.1 3.0 2.9 3.0 4.1 4.4 3.9 4.0 3.7 4.0																								Diurnal Average		
10.3 22.5 15.4 36.7 22.2 11.7 9.6 14.4 7.8 8.1 7.8 6.9 7.1 6.6 10.5 8.3 7.9 5.7 22.2 21.6 7.8 15.1 11.3 18.2																								Diurnal Maximum		
C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										

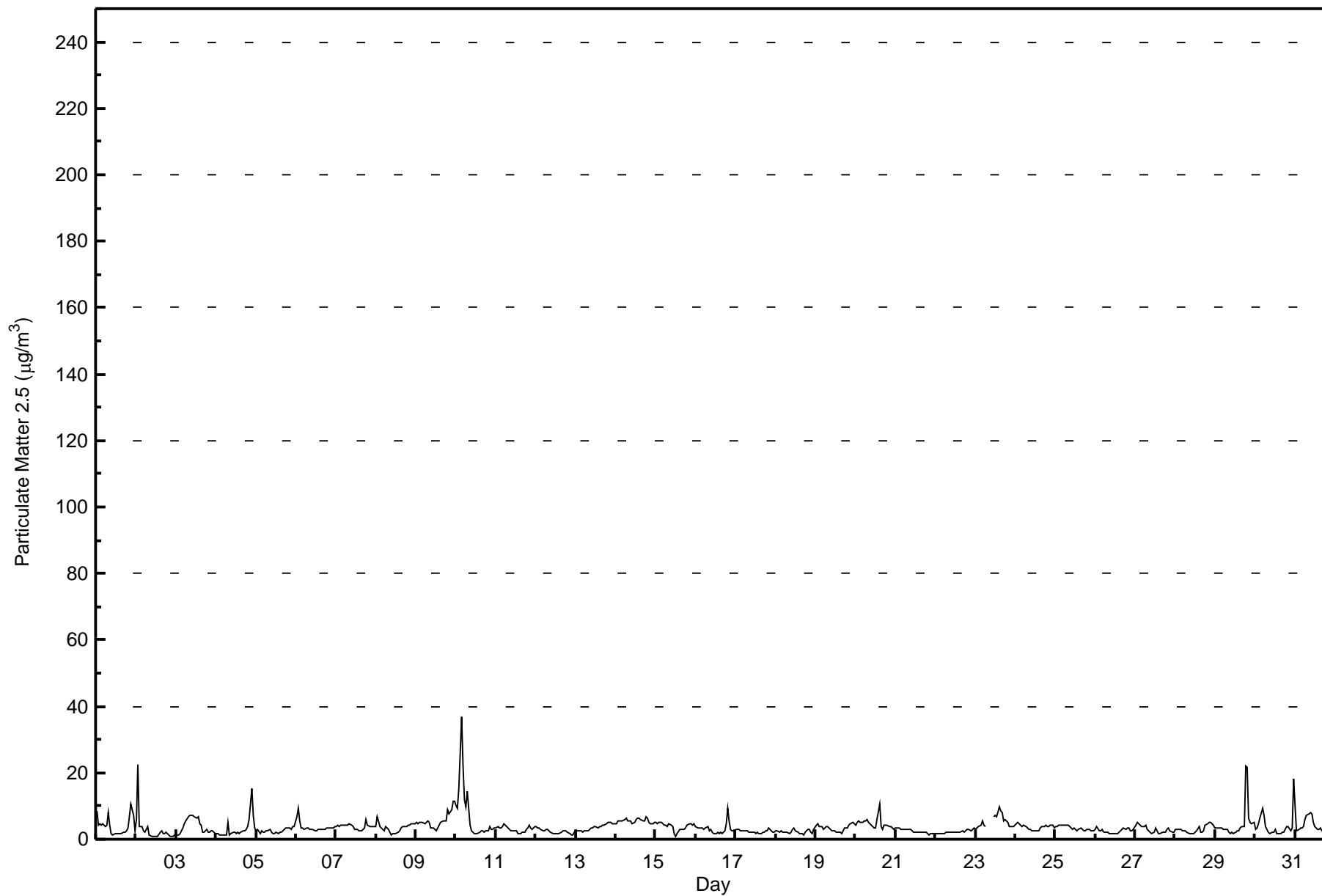


Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$

Fort Chipewyan - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - March 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	654	88.38	88.38
6 - 15	71	9.59	97.97
16 - 25	5	0.68	98.65
26 - 80	1	0.14	98.78
> 81.0	0	0.00	98.78

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 Chipewyan - March 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	20	7	12	141	206	24	14	19	14	5	7	11	29	15	45	81	650
6 - 15	1	0	4	11	15	8	4	0	2	5	3	6	5	1	3	2	70
16 - 25	0	0	2	2	0	0	0	0	0	1	0	0	0	0	0	0	5
26 - 80	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	21	7	18	154	222	32	18	19	16	11	10	17	34	16	48	83	726

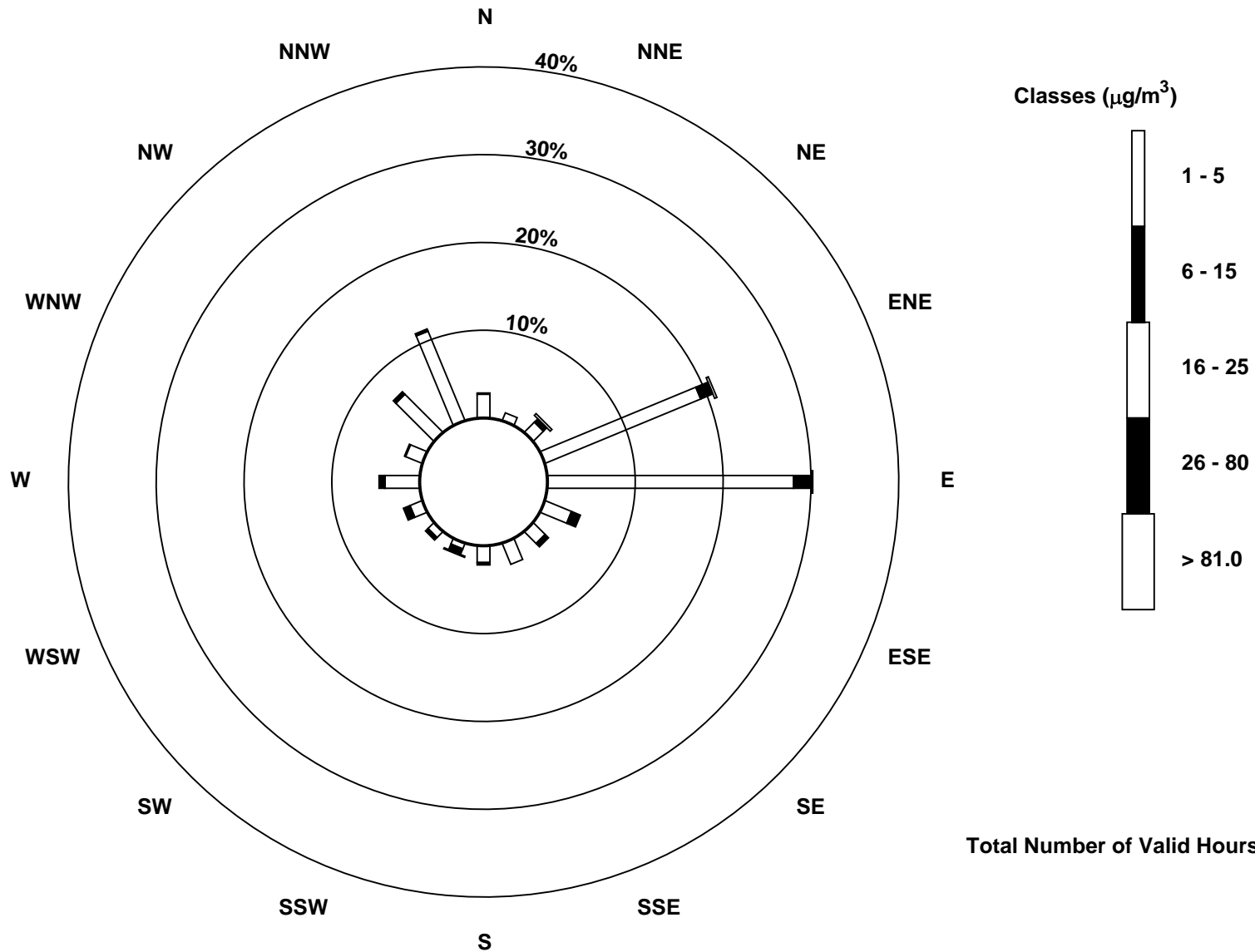
Total Number of Valid Hours: 735

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan (AMS 8)



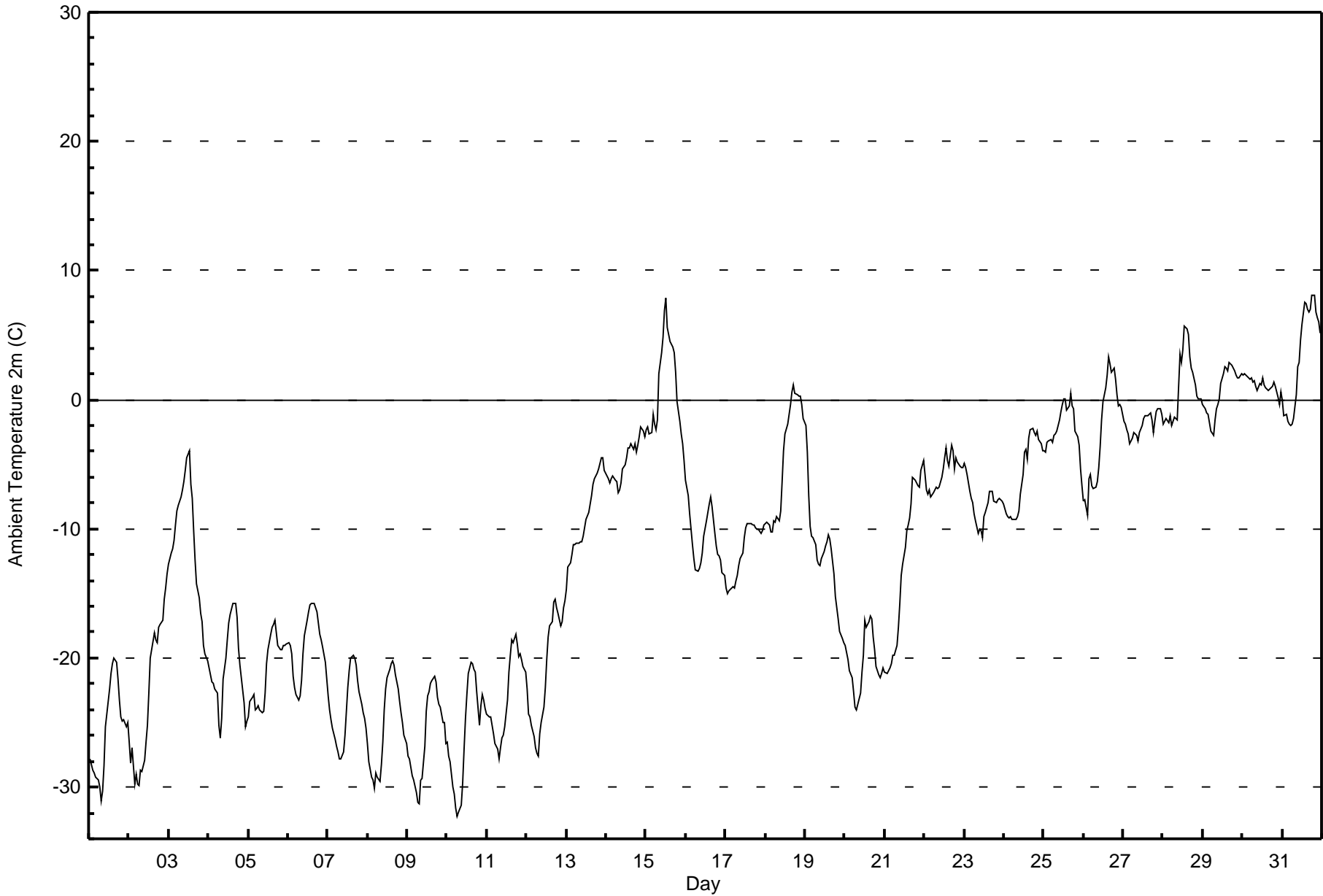


Maximum Value: 8.1 C on Mar 31 19:00 Maximum Daily Average: 3.4 C on Mar 31																						Hours in Service:	744			
Minimum Value: -32.3 C on Mar 10 07:00 Minimum Daily Average: -26.0 C on Mar 9																						Hours of Data:	744			
Maximum Diurnal Average: -8.9 C at hour 17 Minimum Diurnal Average: -15.1 C at hour 7																						Hours of Missing Data:	0			
Monthly Average: -11.98 C Percentiles: P ₁ = -30.5 P ₁₀ = -25.9 Q ₁ = -21.1 Median = -10.3 Q ₃ = -2.8 P ₉₀ = 0.9 P ₉₉ = 6.9																						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-Mar	-27.8	-28.3	-28.7	-28.9	-29.2	-29.5	-30.0	-31.1	-30.3	-28.4	-25.4	-23.4	-22.4	-21.2	-20.4	-20.0	-20.4	-21.7	-23.3	-24.5	-24.9	-24.8	-25.3	-25.0	-25.6	-20.0
2-Mar	-26.5	-28.1	-26.9	-29.8	-29.0	-29.7	-29.9	-28.7	-28.8	-27.9	-26.5	-25.3	-22.7	-20.0	-18.7	-18.0	-18.6	-18.8	-17.7	-17.4	-17.1	-15.5	-14.6	-13.5	-22.9	-13.5
3-Mar	-12.7	-11.9	-11.5	-10.9	-9.7	-8.6	-8.1	-7.5	-7.0	-6.3	-5.4	-4.5	-4.0	-6.5	-7.6	-10.1	-12.4	-14.2	-15.4	-16.6	-17.2	-19.1	-19.7	-20.2	-11.1	-4.0
4-Mar	-20.7	-21.3	-21.8	-22.0	-22.4	-22.7	-25.2	-26.2	-24.7	-21.7	-20.0	-18.6	-17.3	-16.6	-16.2	-15.8	-15.7	-16.8	-19.3	-20.5	-21.5	-23.5	-25.3	-24.9	-20.9	-15.7
5-Mar	-24.6	-23.3	-23.0	-22.8	-24.0	-23.9	-23.7	-24.0	-24.2	-24.1	-22.7	-20.5	-19.4	-18.2	-17.7	-17.4	-17.1	-18.0	-19.1	-19.3	-19.3	-19.1	-19.0	-18.9	-21.0	-17.1
6-Mar	-18.9	-19.0	-19.7	-21.4	-22.3	-22.9	-23.2	-23.0	-21.7	-19.7	-18.3	-17.1	-16.4	-15.9	-15.8	-15.8	-15.8	-16.4	-17.3	-18.2	-18.6	-19.1	-20.3	-21.6	-19.1	-15.8
7-Mar	-22.9	-24.1	-24.8	-25.5	-26.3	-26.8	-27.3	-27.8	-27.9	-27.3	-25.9	-24.1	-22.3	-20.9	-20.0	-19.8	-20.0	-20.5	-21.7	-22.6	-23.6	-24.2	-24.7	-25.4	-24.0	-19.8
8-Mar	-26.6	-28.0	-29.2	-29.4	-30.1	-28.9	-29.3	-29.5	-28.3	-26.5	-24.0	-22.4	-21.5	-20.9	-20.5	-20.2	-20.5	-21.3	-22.4	-23.3	-24.2	-25.0	-26.0	-26.6	-25.2	-20.2
9-Mar	-27.6	-27.8	-28.5	-29.1	-29.5	-30.4	-31.2	-31.3	-29.5	-29.3	-26.9	-24.1	-23.0	-22.6	-22.0	-21.7	-21.4	-21.8	-23.1	-23.6	-23.8	-25.0	-25.0	-26.6	-26.0	-21.4
10-Mar	-26.5	-27.6	-28.1	-30.0	-30.5	-31.6	-32.3	-31.9	-31.4	-29.7	-27.1	-24.7	-22.8	-21.2	-20.4	-20.5	-20.9	-21.1	-22.6	-25.2	-23.7	-22.8	-23.2	-23.9	-25.8	-20.4
11-Mar	-24.3	-24.6	-24.6	-25.2	-25.9	-26.6	-27.1	-27.8	-26.9	-26.2	-26.0	-25.4	-23.2	-21.0	-19.8	-18.6	-18.8	-18.2	-18.9	-19.9	-19.7	-20.1	-20.7	-21.1	-22.9	-18.2
12-Mar	-22.4	-24.3	-24.6	-25.2	-26.1	-27.0	-27.3	-27.6	-25.9	-25.0	-23.8	-22.3	-20.1	-18.4	-17.6	-17.2	-15.7	-15.4	-16.1	-16.6	-17.5	-17.1	-16.1	-15.6	-21.0	-15.4
13-Mar	-14.7	-12.9	-12.6	-12.0	-11.2	-11.2	-11.2	-11.1	-11.0	-11.1	-10.6	-10.0	-9.3	-8.7	-8.1	-7.5	-6.6	-6.2	-5.7	-5.3	-5.0	-4.5	-4.5	-5.5	-9.0	-4.5
14-Mar	-5.9	-6.2	-6.5	-6.1	-5.9	-6.2	-6.4	-7.2	-7.0	-6.4	-5.3	-5.1	-4.5	-3.7	-3.7	-3.4	-3.8	-3.4	-4.1	-3.5	-2.9	-2.1	-2.5	-2.9	-4.8	-2.1
15-Mar	-2.4	-2.1	-2.7	-2.5	-1.1	-1.9	-2.4	-1.6	2.0	3.7	4.8	6.8	7.8	5.6	4.5	4.2	4.1	3.7	2.1	-0.1	-1.7	-2.7	-3.4	-4.7	0.8	7.8
16-Mar	-6.2	-7.5	-8.8	-10.0	-11.2	-12.3	-13.2	-13.3	-13.1	-12.7	-11.9	-10.6	-9.4	-8.7	-8.1	-7.6	-8.3	-10.3	-11.3	-12.0	-12.0	-12.4	-13.4	-13.6	-10.7	-6.2
17-Mar	-14.6	-15.0	-14.8	-14.6	-14.5	-14.5	-14.1	-13.6	-12.9	-12.3	-11.9	-10.7	-9.9	-9.6	-9.6	-9.5	-9.7	-9.7	-9.9	-10.0	-10.1	-10.3	-10.1	-9.7	-11.7	-9.5
18-Mar	-9.6	-9.5	-9.7	-10.3	-10.3	-9.4	-9.5	-9.0	-9.4	-8.6	-6.3	-3.9	-2.6	-1.9	-1.2	-0.4	0.6	1.2	0.5	0.4	0.2	0.3	-0.4	-1.4	-4.6	1.2
19-Mar	-2.1	-4.1	-7.4	-9.8	-10.6	-10.7	-11.2	-12.4	-12.8	-12.9	-12.3	-11.8	-11.3	-11.0	-10.5	-10.8	-11.5	-13.5	-15.2	-16.1	-17.0	-18.0	-18.5	-18.8	-12.1	-2.1
20-Mar	-19.0	-19.6	-20.1	-21.0	-21.6	-22.6	-23.8	-24.0	-23.6	-22.7	-21.1	-19.8	-17.1	-17.7	-17.2	-16.8	-17.0	-18.3	-19.3	-20.6	-21.3	-21.6	-21.2	-20.7	-20.3	-16.8
21-Mar	-21.1	-21.2	-21.0	-20.8	-20.5	-19.8	-19.8	-19.0	-17.6	-15.7	-13.6	-12.8	-11.4	-10.1	-9.6	-9.2	-8.1	-6.0	-6.2	-6.4	-6.7	-6.7	-5.4	-4.8	-13.1	-4.8
22-Mar	-5.8	-7.0	-7.3	-7.0	-7.6	-7.2	-7.0	-6.8	-6.9	-6.8	-6.1	-5.3	-4.5	-3.8	-4.7	-5.1	-3.6	-4.0	-5.4	-4.5	-4.8	-5.1	-5.3	-5.2	-5.7	-3.6
23-Mar	-4.9	-5.2	-5.8	-7.1	-7.6	-8.0	-8.8	-9.4	-10.3	-10.1	-10.1	-10.7	-9.0	-8.7	-8.0	-7.1	-7.1	-7.1	-7.8	-8.0	-7.7	-7.6	-7.7	-7.9	-8.0	-4.9
24-Mar	-8.1	-8.8	-9.0	-9.1	-9.0	-9.3	-9.3	-9.3	-9.0	-8.6	-7.3	-5.8	-4.1	-3.8	-4.6	-2.9	-2.4	-2.2	-2.6	-2.7	-2.4	-3.1	-3.4	-4.0	-5.9	-2.2
25-Mar	-4.0	-4.1	-3.4	-3.2	-3.1	-3.3	-2.8	-2.7	-2.4	-1.6	-0.9	-0.4	0.1	0.0	-0.8	-0.5	0.5	-0.5	-0.7	-2.4	-2.8	-3.5	-5.4	-6.7	-2.3	0.5
26-Mar	-7.9	-7.8	-9.0	-6.1	-5.8	-6.7	-6.9	-6.8	-6.3	-5.2	-3.7	-1.6	-0.2	0.9	1.9	3.3	2.8	2.1	2.5	1.6	0.4	-0.5	-0.4	-0.6	-2.5	3.3
27-Mar	-1.6	-1.9	-2.3	-2.6	-3.4	-3.0	-2.6	-2.7	-2.8	-3.2	-2.5	-2.0	-1.5	-1.3	-1.2	-1.2	-1.1	-1.6	-2.6	-1.7	-1.0	-0.7	-0.7	-1.1	-1.9	-0.7
28-Mar	-1.9	-1.6	-1.4	-1.8	-1.3	-2.0	-1.7	-1.4	-1.5	1.1	3.6	2.9	3.8	5.7	5.5	5.1	3.4	2.4	2.1	1.1	0.3	0.0	0.1	0.0	0.9	5.7
29-Mar	-0.3	-0.7	-1.0	-1.2	-1.8	-2.5	-2.8	-1.6	-0.7	-0.3	0.1	1.3	2.0	2.5	2.4	2.2	2.9	2.6	2.4	2.2	1.9	1.6	1.7	2.0	0.6	2.9
30-Mar	1.9	2.1	1.9	1.8	1.6	1.7	1.3	1.4	1.1	0.7	1.2	1.2	1.6	1.2	0.9	0.7	0.8	0.9	1.0	1.4	1.1	0.2	-0.3	0.6	1.2	2.1
31-Mar	-0.1	-1.2	-1.1	-1.7	-1.9	-2.0	-1.9	-1.4	0.4	2.5	2.8	4.6	5.8	7.6	7.5	7.0	6.8	7.0	8.1	8.1	6.8	6.4	6.0	5.1	3.4	8.1
																						Diurnal Average				
																						Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	219	29.44	29.44
-20 - 0	429	57.66	87.10
0 - 10	96	12.90	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

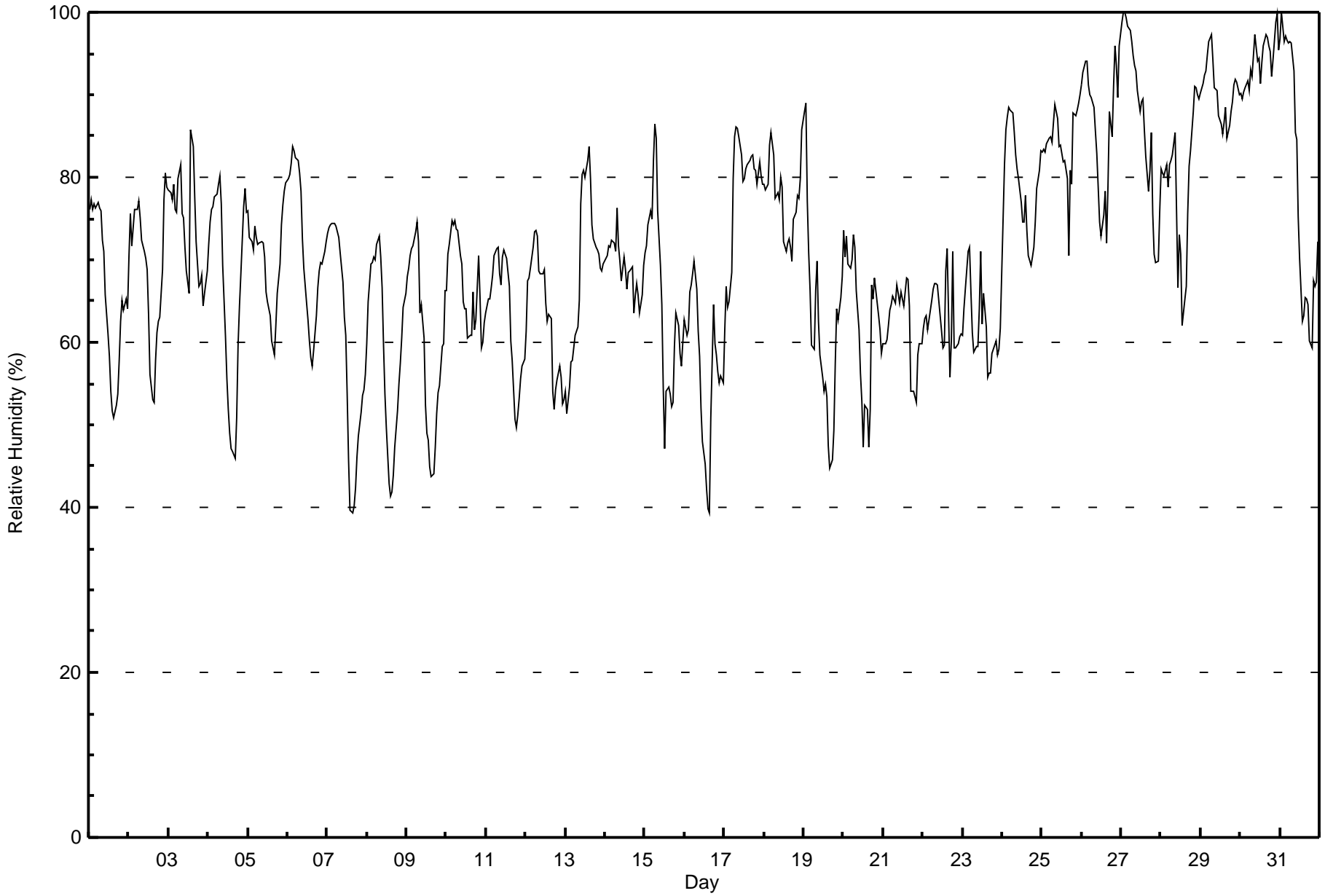
**Relative Humidity (RH) - %
Fort Chipewyan - March 2017**

Maximum Value: 100 % on Mar 27 02:00																		Maximum Daily Average: 94.0 % on Mar 30						Hours in Service: 744																									
Minimum Value: 39 % on Mar 16 16:00																		Minimum Daily Average: 56.9 % on Mar 16						Hours of Data: 744																									
Maximum Diurnal Average: 77.8 % at hour 7																		Minimum Diurnal Average: 63.0 % at hour 17						Hours of Missing Data: 0																									
Monthly Average: 70.8 %																		Percentiles: P ₁ = 42 P ₁₀ = 54 Q ₁ = 62 Median = 70 Q ₃ = 80 P ₉₀ = 90 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-Mar	76	77	76	77	76	77	76	76	72	71	66	61	58	54	52	51	52	54	58	63	65	64	65	64	65.9	77																							
2-Mar	71	76	72	76	76	76	77	75	72	71	70	69	63	56	53	53	58	61	63	63	69	77	81	79	69.0	81																							
3-Mar	79	78	77	79	76	76	80	82	76	75	72	69	66	86	85	84	78	72	67	67	68	64	66	69	74.5	86																							
4-Mar	72	75	76	76	78	78	79	80	77	69	61	56	52	49	47	47	46	51	60	64	68	76	79	76	66.3	80																							
5-Mar	76	73	72	71	74	73	72	72	72	72	70	66	65	63	60	59	58	62	66	70	74	77	78	79	69.8	79																							
6-Mar	80	80	82	84	83	82	82	80	78	73	69	65	63	60	58	57	59	63	67	69	70	69	71	72	71.5	84																							
7-Mar	73	74	74	74	74	74	73	73	71	67	63	61	54	46	40	39	40	42	46	49	52	54	54	56	59.3	74																							
8-Mar	60	65	70	70	70	70	72	73	70	67	60	54	50	43	41	42	44	47	52	55	57	60	64	66	59.2	73																							
9-Mar	68	69	70	71	72	73	75	72	64	65	60	52	49	48	45	44	44	47	51	54	55	60	60	66	59.8	75																							
10-Mar	66	71	72	75	74	75	74	74	71	69	65	64	64	61	61	61	66	62	63	70	65	59	60	62	66.8	75																							
11-Mar	64	65	65	67	68	71	71	71	68	67	70	71	70	69	67	60	58	51	50	51	53	56	57	58	63.2	71																							
12-Mar	61	68	68	69	71	73	73	73	69	68	68	69	65	63	63	63	54	52	54	55	57	56	53	53	63.3	73																							
13-Mar	54	51	55	58	58	59	61	62	65	77	80	81	80	82	84	80	74	73	72	71	71	69	69	70	68.9	84																							
14-Mar	70	71	72	71	72	72	71	76	72	70	67	70	69	66	69	69	64	66	67	66	64	66	66	69	69.1	76																							
15-Mar	71	72	74	76	75	82	86	85	76	69	65	54	47	54	54	54	52	53	60	64	62	59	57	60	65.0	86																							
16-Mar	63	61	62	66	67	68	70	66	61	58	52	48	45	42	40	39	51	65	60	59	56	55	56	55	56.9	70																							
17-Mar	62	67	64	65	68	80	85	86	86	85	83	79	80	81	81	82	83	83	81	81	79	82	80	79	78.4	86																							
18-Mar	79	78	79	84	85	84	83	78	78	77	80	79	72	71	72	73	72	70	75	76	78	77	80	86	77.7	86																							
19-Mar	88	89	77	71	66	60	59	66	70	63	59	56	54	55	53	47	45	46	49	58	64	63	65	68	62.1	89																							
20-Mar	74	70	73	70	69	70	73	72	66	62	56	53	47	52	52	47	52	67	65	68	65	63	62	59	62.7	74																							
21-Mar	60	60	60	62	64	64	66	65	67	66	65	66	64	66	68	68	64	54	54	53	53	58	60	60	62.0	68																							
22-Mar	62	63	63	62	63	65	66	67	67	67	63	61	59	60	69	71	56	60	71	59	59	60	61	61	63.1	71																							
23-Mar	61	64	66	71	71	66	61	59	59	60	64	71	62	66	62	56	56	56	59	60	60	58	59	62	62.1	71																							
24-Mar	68	81	86	87	88	88	88	85	83	81	80	77	75	78	74	71	69	70	72	75	79	81	83	83	78.9	88																							
25-Mar	83	83	83	84	85	85	84	87	89	87	84	84	83	82	82	80	70	81	79	88	87	88	89	90	84.0	90																							
26-Mar	91	93	94	94	91	90	90	89	86	83	79	75	73	75	78	72	79	88	85	91	96	94	90	96	86.2	96																							
27-Mar	99	100	100	99	98	98	96	95	94	93	91	88	89	90	86	83	78	81	85	76	71	70	70	76	87.7	100																							
28-Mar	81	81	80	81	79	81	82	83	85	76	67	73	71	62	65	67	76	81	83	88	91	91	90	89	79.3	91																							
29-Mar	90	91	92	93	95	96	97	94	91	91	91	88	86	85	87	88	85	86	88	89	91	92	92	90	90.4	97																							
30-Mar	90	89	90	91	92	91	93	92	95	97	94	94	91	94	96	97	97	96	95	92	94	99	100	95	94.0	100																							
31-Mar	97	100	96	97	97	96	96	96	93	85	85	75	70	63	63	65	65	65	60	59	67	67	67	72	79.1	100																							
																								73.8	75.3	75.5	76.5	76.7	77.2	77.8	77.5	75.6	73.6	70.9	68.7	65.7	65.1	64.8	63.6	63.0	64.5	66.2	67.7	69.0	69.6	70.3	71.6	Diurnal Average	
																								99	100	100	99	98	98	97	96	95	97	94	94	91	94	96	97	97	96	95	92	96	99	100	96	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Fort Chipewyan - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Fort Chipewyan - March 2017**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	4	0.54	0.54
40 - 60	150	20.16	20.70
60 - 80	408	54.84	75.54
80 - 100	179	24.06	99.60

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

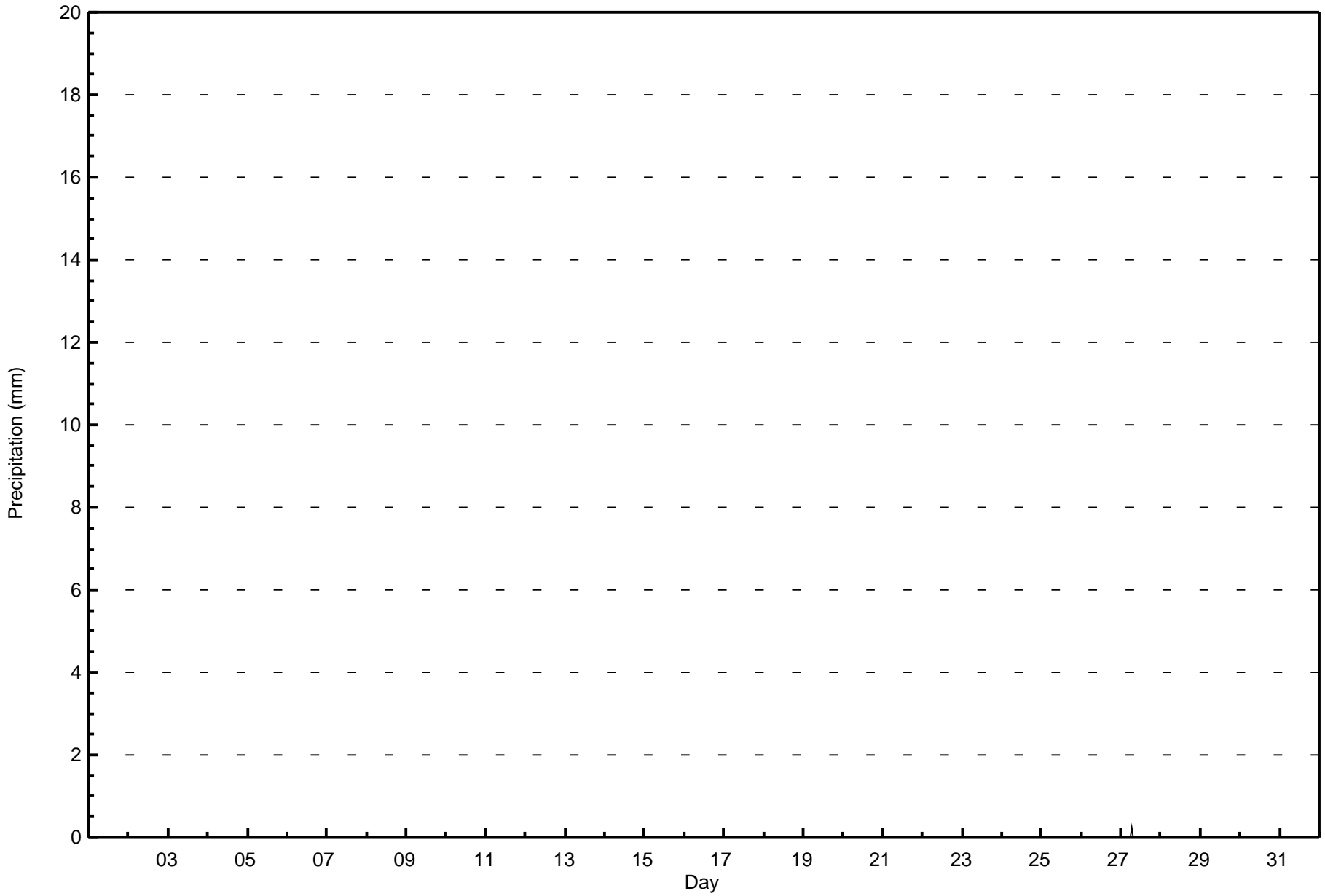
Fort Chipewyan - March 2017

Maximum Value: 0.3 mm on Mar 27 07:00 Maximum Daily Total: 0.3 mm on Mar 27		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 Mar 1 01:00 Maximum Diurnal Total: 0.3 mm at hour 7 Monthly Total: 0.25 mm		Minimum Daily Total: 0.0 mm on Mar 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 = 0.0																										
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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort Chipewyan - March 2017

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	744	100.00	100.00
0.4 - 0.5	0	0.00	100.00
0.6 - 0.7	0	0.00	100.00
0.8 - 1.4	0	0.00	100.00
1.5 - 10	0	0.00	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) - %

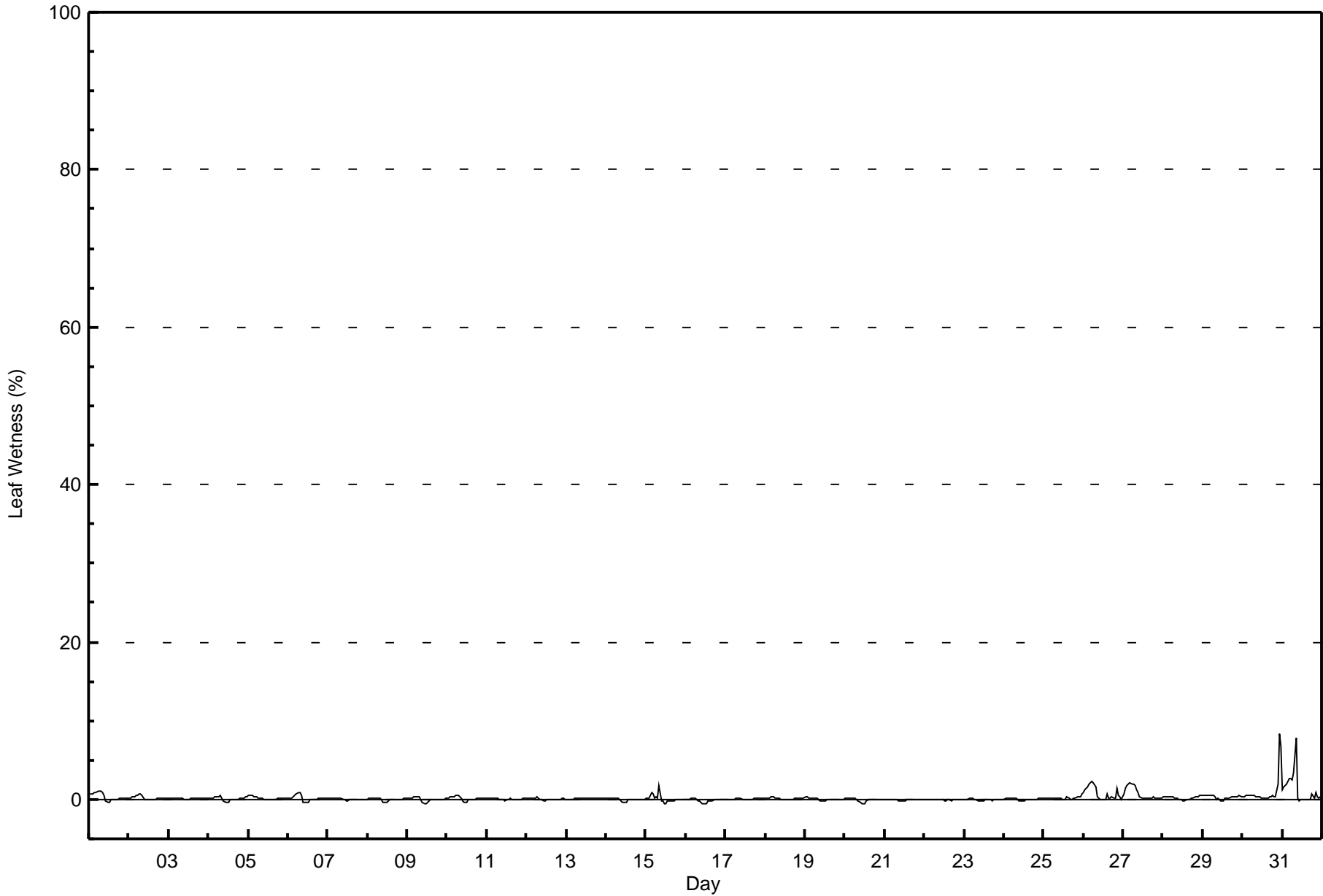
Fort Chipewyan - March 2017

Maximum Value: 8 % on Mar 30 23:00																	Maximum Daily Average: 1.2 % on Mar 31																	Hours in Service: 744			
Minimum Value: -1 % on Mar 20 12:00																	Minimum Daily Average: -0.1 % on Mar 16																	Hours of Data: 744			
Maximum Diurnal Average: 0.5 % at hour 6																	Minimum Diurnal Average: -0.2 % at hour 12																	Hours of Missing Data: 0			
Monthly Average: 0.2 %																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 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-Mar	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1											
2-Mar	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1											
3-Mar	0	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-Mar	0	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-Mar	0	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-Mar	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1											
7-Mar	0	0	0	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-Mar	0	0	0	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-Mar	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											
10-Mar	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1											
11-Mar	0	0	0	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-Mar	0	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											
13-Mar	0	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											
14-Mar	0	0	0	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-Mar	0	0	0	1	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	2											
16-Mar	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	0	-0.1	0											
17-Mar	0	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-Mar	0	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-Mar	0	0	0	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-Mar	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	0	-0.1	0											
21-Mar	0	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											
22-Mar	0	0	0	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-Mar	0	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-Mar	0	0	0	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-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1											
26-Mar	1	1	2	2	2	2	2	2	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0.8	2											
27-Mar	1	1	2	2	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	2											
28-Mar	0	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-Mar	0	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											
30-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	8	7	1.0	8											
31-Mar	1	1	2	2	3	3	2	3	8	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1.2	8											
																	Diurnal Average				Diurnal Maximum																
																	1				1																



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (SW) - %
Fort Chipewyan - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (SW) - %
Fort Chipewyan - March 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	428	80.45	80.45
0.4 - 0.5	51	9.59	90.04
0.6 - 0.7	10	1.88	91.92
0.8 - 1.4	18	3.38	95.30
1.5 - 10	23	4.32	99.62
> 10	0	0.00	99.62

Total Number of Valid Hours: 532

Total Number of Hours: 744



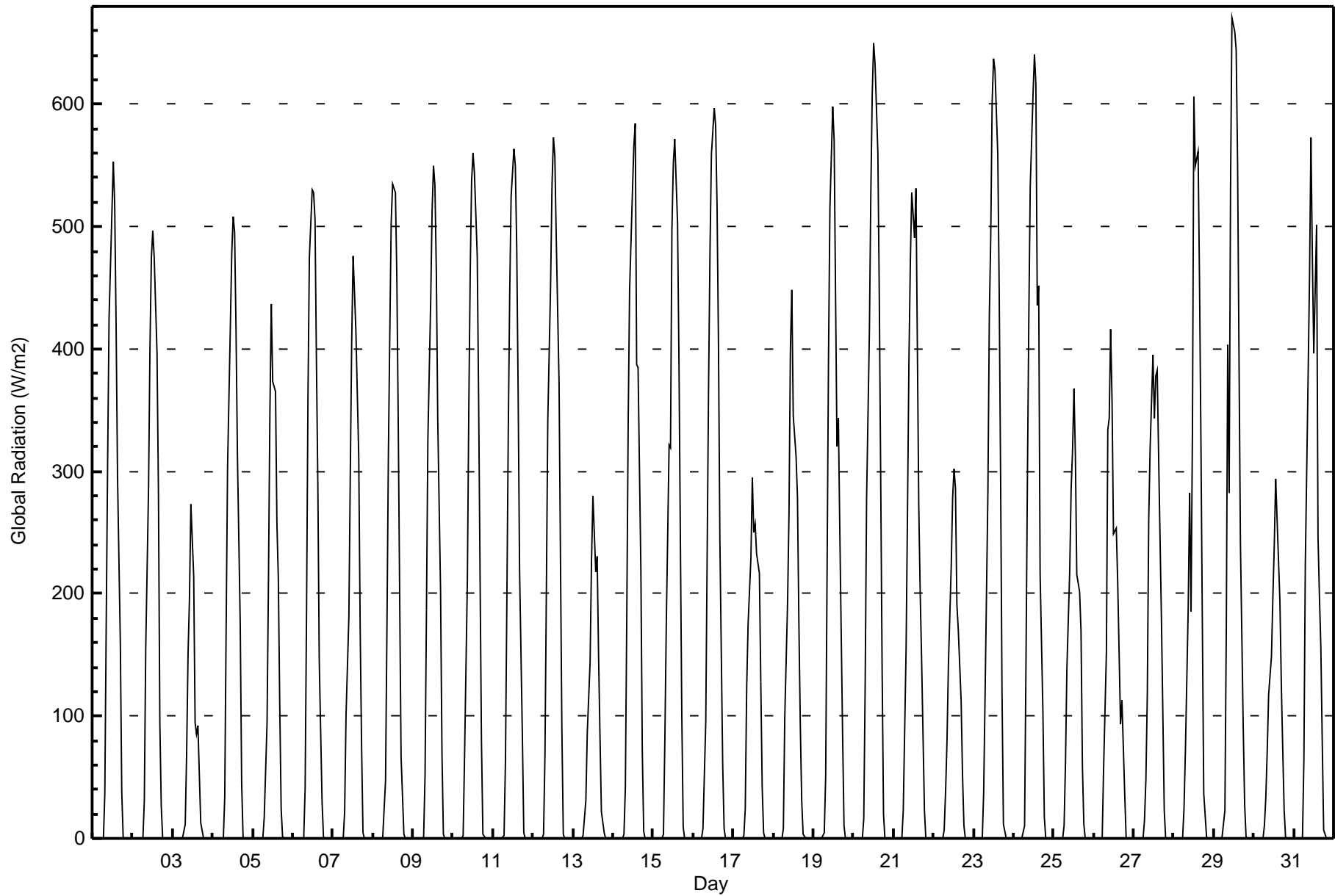
Wood Buffalo Environmental Association

Summary of Hour Averages

Global Radiation (GR) - W/m2

Fort Chipewyan - March 2017

Maximum Value: 670 W/m2 on Mar 29 12:00		Maximum Daily Average: 196.3 W/m2 on Mar 20		Hours in Service: 744																						
Minimum Value: 0 W/m2 on Mar 3 20:00		Minimum Daily Average: 52.2 W/m2 on Mar 3		Hours of Data: 744																						
Maximum Diurnal Average: 473.3 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 23		Hours of Missing Data: 0																						
Monthly Average: 137.6 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 5 Q ₃ = 256 P ₉₀ = 474 P ₉₉ = 628		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-Mar	0	0	0	0	0	0	0	37	177	309	425	510	554	518	418	296	159	38	1	0	0	0	0	0	143.4	554
2-Mar	0	0	0	0	0	0	0	32	156	287	401	475	496	475	397	284	95	26	1	0	0	0	0	0	130.2	496
3-Mar	0	0	0	0	0	0	0	11	70	151	195	273	214	95	85	92	52	13	0	0	0	0	0	0	52.2	273
4-Mar	0	0	0	0	0	0	0	33	173	303	420	479	509	495	416	313	174	45	1	0	0	0	0	0	140.1	509
5-Mar	0	0	0	0	0	0	0	18	94	211	346	437	373	365	257	212	109	24	1	0	0	0	0	0	102.0	437
6-Mar	0	0	0	0	0	0	1	41	187	360	475	530	528	505	390	289	145	29	1	0	0	0	0	0	145.1	530
7-Mar	0	0	0	0	0	0	0	22	102	181	298	406	476	447	414	311	172	77	4	0	0	0	0	0	121.2	476
8-Mar	0	0	0	0	0	0	1	47	174	313	411	503	535	528	459	340	200	66	3	0	0	0	0	0	149.2	535
9-Mar	0	0	0	0	0	0	1	52	187	327	439	513	550	534	463	342	202	69	3	0	0	0	0	0	153.5	550
10-Mar	0	0	0	0	0	0	2	67	211	350	461	537	560	544	476	356	215	79	4	0	0	0	0	0	161.0	560
11-Mar	0	0	0	0	0	0	3	63	195	333	444	524	563	550	482	363	220	83	5	0	0	0	0	0	159.6	563
12-Mar	0	0	0	0	0	0	3	67	202	341	453	533	572	558	490	372	228	89	4	0	0	0	0	0	163.1	572
13-Mar	0	0	0	0	0	0	3	31	86	116	144	227	280	218	231	149	85	22	4	0	0	0	0	0	66.4	280
14-Mar	0	0	0	0	0	0	3	41	181	340	449	527	566	584	388	385	219	71	5	0	0	0	0	0	156.7	584
15-Mar	0	0	0	0	0	0	3	81	174	322	319	497	552	571	503	389	244	101	10	0	0	0	0	0	156.9	571
16-Mar	0	0	0	0	0	0	8	95	235	372	481	559	597	583	516	404	244	60	8	0	0	0	0	0	173.4	597
17-Mar	0	0	0	0	0	0	2	24	123	175	230	295	250	257	232	217	128	41	5	0	0	0	0	0	82.4	295
18-Mar	0	0	0	0	0	0	8	99	194	266	400	449	346	313	279	176	94	31	3	0	0	0	0	0	110.8	449
19-Mar	0	0	0	0	0	0	4	51	220	392	515	598	571	443	321	344	253	84	10	0	0	0	0	0	158.6	598
20-Mar	0	0	0	0	0	0	16	126	278	415	526	609	650	633	560	444	295	139	20	0	0	0	0	0	196.3	650
21-Mar	0	0	0	0	0	0	23	154	268	389	470	528	491	532	401	271	201	146	23	0	0	0	0	0	162.3	532
22-Mar	0	0	0	0	0	0	7	38	80	141	223	279	302	286	192	170	113	51	10	0	0	0	0	0	78.8	302
23-Mar	0	0	0	0	0	0	38	117	283	427	491	602	638	628	559	447	295	120	12	0	0	0	0	0	194.1	638
24-Mar	0	0	0	0	0	0	11	146	294	425	532	608	641	617	436	451	216	102	17	0	0	0	0	0	187.4	641
25-Mar	0	0	0	0	0	0	11	62	140	219	286	317	367	313	215	202	169	59	12	0	0	0	0	0	98.9	367
26-Mar	0	0	0	0	0	1	57	152	335	344	416	357	249	253	210	152	94	113	36	0	0	0	0	0	115.4	416
27-Mar	0	0	0	0	0	0	15	49	117	260	319	395	344	378	383	313	180	102	23	0	0	0	0	0	119.9	395
28-Mar	0	0	0	0	0	0	24	71	189	283	185	336	606	550	561	456	325	178	37	1	0	0	0	0	158.3	606
29-Mar	0	0	0	0	0	1	24	172	404	283	531	670	659	645	551	393	242	90	27	1	0	0	0	0	195.5	670
30-Mar	0	0	0	0	0	0	10	34	71	117	149	197	240	294	261	193	125	72	23	1	0	0	0	0	74.5	294
31-Mar	0	0	0	0	0	2	65	224	379	460	573	474	396	501	246	198	157	80	7	0	0	0	0	0	156.8	573
		0.0	0.0	0.0	0.0	0.0	0.2	11.1	72.8	192.8	297.1	387.4	459.6	473.3	458.4	380.4	300.9	182.2	74.2	10.4	0.2	0.0	0.0	0.0	0.0	Diurnal Average
		0	0	0	0	0	2	65	224	404	460	573	670	659	645	561	456	325	178	37	1	0	0	0	0	Diurnal Maximum





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Global Radiation (GR) - W/m2
Fort Chipewyan - March 2017**

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	394	52.96	52.96
21 - 100	69	9.27	62.23
101 - 300	121	16.26	78.49
301 - 600	147	19.76	98.25
601 - 900	13	1.75	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 - March 2017

Maximum Speed: 37 km/h on Mar 18 09:00	Maximum Daily Speed Average: 25.5 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 1 km/h on Mar 10 03:00	Minimum Daily Speed Average: 1.1 km/h on Mar 3	Hours of Data: 739
Maximum Diurnal Speed Average: 10.2 km/h at hour 6	Minimum Diurnal Speed Average: 6.6 km/h at hour 19	Hours of Missing Data: 5
Monthly Average Velocity: 8.1 km/h 74.3 deg	Percentiles: P ₁ = 2 P ₁₀ = 7 Q ₁ = 10 Median = 16 Q ₃ = 21 P ₉₀ = 26 P ₉₉ = 34	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-Mar	ENE1	AF	NNE4	N4	N8	N11	N9	N4	NNW3	NW3	W2	NW5	NW7	W7	SW10	SW10WSW11	WSW10	W8	W4	W5	W6	W6	W5	WNW4.1	N11	
2-Mar	AF	SSW1	AF	E8	E8	E7	ENE10	E9	E11	E16	E18	E20	E21	E26	ENE25	ENE26	ENE22	ENE20	ENE29	E36	E36	E30	E29	E30	E19.7	E36
3-Mar	E30	E29	E29	E24	ESE21	SE21	SE18	S18	S18	SSW8	SSW14	SSW14WSW18	W17	NW18	NW18	NW18	NW20	NW21	NW19	NW19	NW20WNW17	WNW16	NW1.1	E30		
4-Mar	WNW15	W13	W12WNW12	NW10	NW11	WSW7WNW10	W9	NW10	NNW10	NNW8	NNW11	NNW10	NW9	NW9	NW7	W6	W5	W3	SSW1	E6	E9	E8	NW6.3	WNW15		
5-Mar	E7	E10	E9	E10	ENE14	E14	E12	ENE18	ENE25	E22	ENE22	ENE24	ENE24	ENE21	ENE25	ENE24	ENE18	NE13	N9	N8	N6	NNW4	NNW4	ENE13.1	ENE25	
6-Mar	NW6	NW8	NW7	NW8	NW8	NNW9	N6	N9	N8	SW4	NW9	NNW9	NNW13	NNW14	NNW14	NNW13	NNW13	NNW13	NNW12	NNW14	NNW15	NNW19	NNW18	NNW21	NNW10.8	NNW21
7-Mar	NNW19	NNW21	NNW21	NNW19	NNW18	NNW19	NNW15	NNW20	NNW19	NNW16	NNW16	NNW18	NNW15	NW13	NNW13	NNW12	NNW12	NNW12	NNW10	NNW11	NNW13	NNW13	NNW8	NNW15.1	NNW21	
8-Mar	W4	WNW6	WNW9WNW10	WNW10	NW9	NW8	NNW9	NNW11	NNW8	NNW8	NNW10	NNW11	NNW13	NNW11	NNW11	NNW12	NNW10	NNW8	NNW8	N9	N10	N11	NNW11	NNW8.9	NNW13	
9-Mar	NNW5	NNW7	NNW7	NNW8	N8	N8	N4	AF	AF	SW8	SW9	WSW8WSW11	WSW13WSW11	W11	WSW10WSW10	WSW9	WSW7	WSW6	WSW4	W5	SW1	W5.6	WSW13			
10-Mar	SW3	SW1	SSW1	E5	ENE4	ENE8	E7	ENE8	ENE7	ENE7	ENE6	ENE7	ENE7	E10	E12	E14	E9	E13	E7	ESE11	ENE10	E18	ENE17	ENE14	E8.1	E18
11-Mar	ENE15	ENE10	ENE11	ENE12	ENE17	ENE16	ENE21	E17	E16	E17	E21	E21	E21	ESE18	E18	E17	E15	ENE10	ENE10	ENE18	ENE22	ENE16	ENE15	ENE17	ENE15.9	ENE22
12-Mar	E13	E12	E16	E17	E16	E15	E14	E13	E16	E18	E18	E20	E22	E22	E22	E21	E21	E20	E26	E29	E25	ESE19	ESE20	ESE19	E18.6	E29
13-Mar	ESE22	SE24	SE23	SE24	SSE27	SSE27	SSE29	SSE31	SSE34	SSE30	SSE31	SSE34	S33	SSE26	S31	S26	S25	S22	S27	S26	SSW24	SSW15	S12	SSE8	SSE24.2	SSE34
14-Mar	SE7	SE6	ESE8	ESE7	ESE9	SE11	E10	ESE18	ESE14	E11	E9	E14	E16	E16	E15	E18	E19	ENE18	NE19	ENE23	ENE24	ENE27	ENE27	ENE30	E14.8	ENE30
15-Mar	ENE33	E33	E32	E31	E28	E31	E22	ESE10	S23	SSW23	SSW21	WSW21	WSW9	W32	W26	W23	W19	W17	NW8	N10	N9	N10	N9	NNE9	ESE1.4	E33
16-Mar	NNE8	N7	NNW7	NNW8	NNW8	NNW6	NNW8	NNW7	NNW11	NW10	NW9	NNW10	NW10	NNW10	NNW10	NNW10	ENE6	ENE11	ENE11	ENE9	NE12	ENE19	ENE20	ENE23	NNE7.3	ENE23
17-Mar	ENE27	ENE21	ENE28	ENE30	ENE30	E31	E30	E27	E24	ENE21	ENE18	ENE11	ESE8	ESE9	E9	E12	E15	E14	E12	ENE11	ENE10	E12	NE6	NNE6	ENE17.2	E31
18-Mar	ENE8	NE9	NE12	NE14	NE15	ENE26	ENE36	ENE34	ENE37	ENE34	ENE27	ENE28	ENE31	ENE30	ENE32	ENE27	ENE23	ENE25	ENE14	ENE7	ENE5	SSW2	W14	W19	ENE18.4	ENE37
19-Mar	W23WNW25	WNW28	WNW30	WNW30	NW33	WNW27	W22	W26	W30	W32	W32	W31	W32	W27	WNW27	NW26	NW24	NW23	NW23	NW22	NW25	NW25	NW20	WNW25.5	WNW33	
20-Mar	NW17	NW18	NW16	NW14	NW15	NW13	NW9	NNW9	NW9	NW8	NNW2	WSW4	S8	SE7	ESE9	E8	ESE14	E16	E16	E15	E18	E17	E19	E22	NE4.4	E22
21-Mar	E22	E22	E21	E18	E17	E16	E15	E15	E14	E14	E16	E17	E18	E21	E22	E20	E21	E23	E25	E24	E23	E21	ESE20	ESE18	E19.0	E25
22-Mar	ESE17	E18	E17	E20	E20	E21	ENE20	ENE21	ENE19	ENE22	ENE23	ENE20	ENE17	ENE16	E17	E15	NE11	NE9	ENE11	NNE6	N6	NNW6	NNW7	NW10	ENE13.7	ENE23
23-Mar	NNW11	NNW12	NNW11	NNE3	NNE7	NE11	NE13	ENE17	ENE27	ENE23	E20	E26	ENE20	E22	E22	ENE22	NE23	NE21	NE20	NE26	ENE29	ENE32	ENE34	ENE29	ENE18.2	ENE34
24-Mar	ENE26	ENE24	ENE24	ENE24	ENE23	ENE26	ENE25	ENE26	ENE24	E23	ENE24	E25	E24	E22	E22	E19	ENE18	ENE18	ENE16	ENE19	E25	E23	E22	E21	ENE22.6	ENE26
25-Mar	E20	E20	E19	E21	ENE22	ENE23	ENE20	ENE17	ENE19	ENE20	ENE20	ENE18	E16	ENE17	ENE11	E8	ESE7	E8	E6	ESE8	E7	E8	ENE15.4	ENE23		
26-Mar	E10	ENE8	E11	E18	E20	E20	E23	ENE22	E24	E26	E26	E26	E24	E23	ESE16	SE20	SE21	SE24	SSE14	ESE10	E16	E17	E13	E17	E17.5	E26
27-Mar	E14	E18	E14	E13	E12	E12	ENE8	E6	E7	E12	E15	E16	E16	E15	E19	E20	E19	E14	E12	ENE10	ENE9	ENE15	ENE20	ENE18	E13.6	E20
28-Mar	E17	E17	E17	E18	E17	E13	E9	E10	E12	ESE11	SSE14	ESE13	ESE14	SSE19	SSE21	SSE19	SE21	SE22	ESE19	E17	E18	E21	E22	ENE23	ESE15.2	ENE23
29-Mar	E21	ENE20	E21	ENE22	E23	E22	E20	ENE13	E16	E14	E19	E17	E20	E22	E19	E21	ENE20	ENE23	NE21	NE19	ENE19	ENE15	ENE13	ENE11	ENE18.5	E23
30-Mar	E13	ENE10	ENE8	ENE5	ENE5	ENE9	ENE11	ENE8	E9	E10	E6	E6	E4	E8	E7	E9	E8	E8	E9	E7	E6	E8	E6	ENE7	E7.5	E13
31-Mar	E8	E9	SE11	ESE13	E15	E17	E15	E14	ESE15	SE15	ESE15	SE19	SSE19	SSE27	SSE30	S26	S20	S18	SW14	WSW14	SW23	S17	SSE16	SE8	SSE12.6	SSE30

ENE8.7	ENE8.3	ENE8.4	ENE9.0	ENE9.3	ENE10.2	ENE10.0	ENE9.2	E9.1	E8.2	E8.1	E7.1	E6.9	E7.4	E7.3	ENE7.1	ENE7.2	ENE6.6	ENE7.6	ENE8.1	ENE8.7	ENE8.2	ENE8.5	Diurnal Average	
ENE33	E33	E32	E31	ENE30	WNW33	ENE36	ENE34	ENE37	ENE34	W32	SSE34	S33	W32	ENE32	ENE27	NW26	ENE25	ENE29	E36	E36	ENE32	ENE34	ENE30	Diurnal Maximum

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



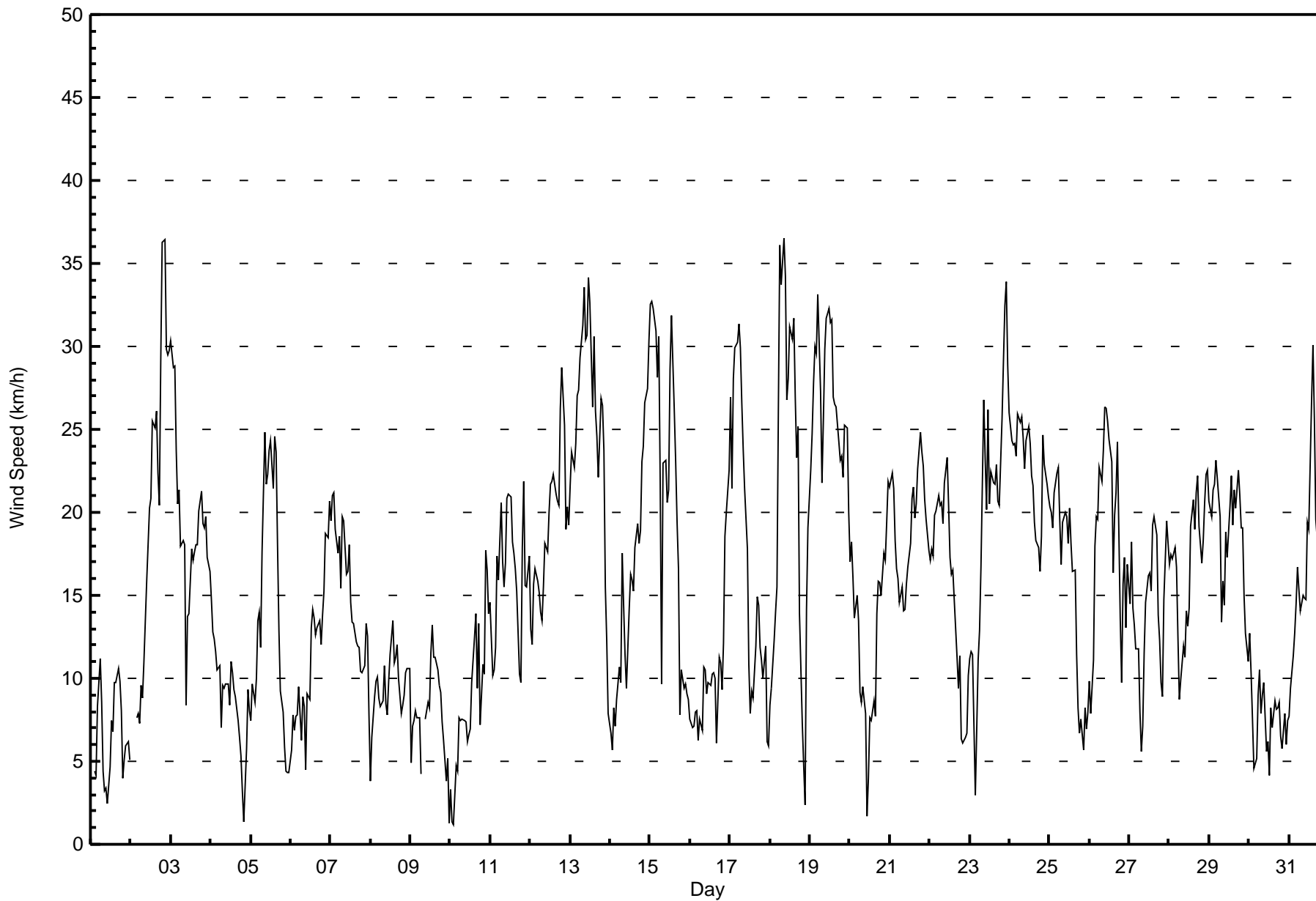
Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Fort Chipewyan - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Mar 19 06:00	Hours in Service: 744 Hours of Data: 739 Hours of Missing Data: 5 Hours of Calibration: 0 Percent Operational Time: 99.3
Minimum Value: 1 km/h on Mar 2 04:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 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-Mar	1	AF	3	1	2	2	4	2	2	1	1	3	2	3	2	2	2	2	2	1	1	1	1	1	4
2-Mar	AF	1	AF	1	1	1	1	1	2	3	2	1	2	2	3	4	4	2	4	3	3	3	2	2	4
3-Mar	2	2	2	3	3	4	3	3	4	2	2	2	4	5	5	6	5	6	7	6	8	6	4	4	8
4-Mar	3	3	3	3	3	3	2	2	3	3	4	3	3	3	4	3	3	3	2	1	1	1	2	2	4
5-Mar	2	1	1	2	3	2	2	3	2	2	2	2	3	3	4	3	3	5	3	2	2	1	1	2	5
6-Mar	2	2	2	1	2	4	2	4	3	3	3	3	4	5	4	5	4	4	4	4	5	5	6	6	6
7-Mar	6	6	6	5	5	5	5	6	6	5	5	6	5	5	5	5	4	4	3	3	3	3	3	2	6
8-Mar	1	1	2	1	1	2	1	2	3	3	3	4	5	4	4	4	4	4	2	2	2	2	2	2	5
9-Mar	2	2	2	2	2	2	2	AF	AF	1	1	2	3	3	2	2	2	2	1	1	2	2	1	1	3
10-Mar	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	2	3	2	2	3
11-Mar	2	2	1	2	2	2	2	3	2	2	2	1	1	1	1	2	2	3	2	6	2	2	2	2	6
12-Mar	3	2	3	2	2	1	1	1	1	1	1	1	2	1	1	2	2	2	4	2	3	2	1	1	4
13-Mar	2	3	2	2	4	3	4	4	5	5	5	5	5	5	5	5	4	5	4	3	4	4	2	2	5
14-Mar	2	2	1	1	1	4	3	3	3	2	2	3	1	2	1	2	2	3	3	3	3	3	3	4	4
15-Mar	3	3	3	3	3	2	5	3	4	3	3	6	7	8	8	7	5	4	2	3	3	3	3	3	8
16-Mar	3	2	2	3	2	2	2	2	4	4	3	3	4	4	4	3	3	2	2	2	2	3	3	4	4
17-Mar	4	3	3	3	3	3	3	2	2	3	3	2	1	1	1	1	2	2	2	2	2	2	2	2	4
18-Mar	1	2	2	3	2	6	4	4	3	4	4	3	4	5	4	3	3	4	5	1	2	3	6	5	6
19-Mar	6	7	7	7	8	9	8	5	7	8	8	7	8	8	9	8	8	8	7	7	7	8	7	6	9
20-Mar	5	6	5	5	4	3	3	3	3	3	2	2	3	2	3	4	1	1	3	1	2	2	2	2	6
21-Mar	2	2	2	1	1	1	1	1	1	1	2	1	1	2	2	2	2	3	3	2	2	1	2	1	3
22-Mar	1	1	1	2	2	2	2	2	2	2	3	2	2	2	1	3	3	2	4	2	2	2	2	3	4
23-Mar	2	2	3	1	2	2	3	5	4	5	3	2	2	3	3	3	4	4	3	4	4	3	3	3	5
24-Mar	3	3	3	3	3	3	3	2	3	3	3	2	3	2	2	2	3	3	3	3	3	2	2	2	3
25-Mar	2	2	2	2	2	2	2	2	2	2	3	3	3	3	5	5	3	2	6	2	2	2	2	2	6
26-Mar	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	3	6	6	4	2	4	4	2	2	6
27-Mar	2	2	1	1	1	1	4	4	5	2	1	1	2	1	2	2	1	1	2	2	2	4	3	3	5
28-Mar	2	1	1	2	2	2	1	1	1	3	3	1	3	3	3	3	2	2	2	2	2	2	2	2	3
29-Mar	2	2	2	2	2	2	2	3	2	3	2	1	1	2	2	3	3	3	3	3	2	2	1	2	3
30-Mar	1	1	2	1	2	2	2	3	2	2	2	2	1	3	1	1	1	1	1	1	1	2	1	1	3
31-Mar	2	1	1	1	1	1	1	1	3	3	2	3	4	4	4	4	2	2	4	8	5	3	2	3	8
	6	7	7	7	8	9	8	6	7	8	8	7	8	8	9	8	8	8	7	8	8	8	7	6	
	Diurnal Maximum																								

AF - Analyzer Failure





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Chipewyan - March 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	38	5.14	5.14
6 - 11	225	30.45	35.59
12 - 19	231	31.26	66.85
20 - 28	195	26.39	93.23
29 - 38	50	6.77	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 739

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Chipewyan - March 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	2	0	5	2	0	0	0	0	4	4	2	8	0	2	6	38
6 - 11	18	5	5	36	46	13	6	1	1	1	4	11	7	5	23	43	225
12 - 19	0	0	8	36	98	15	3	6	5	3	1	3	7	4	12	30	231
20 - 28	0	0	5	64	70	4	9	5	8	3	1	1	6	4	11	4	195
29 - 38	0	0	0	16	15	0	0	7	2	0	0	1	6	3	0	0	50
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	21	7	18	157	231	32	18	19	16	11	10	18	34	16	48	83	739

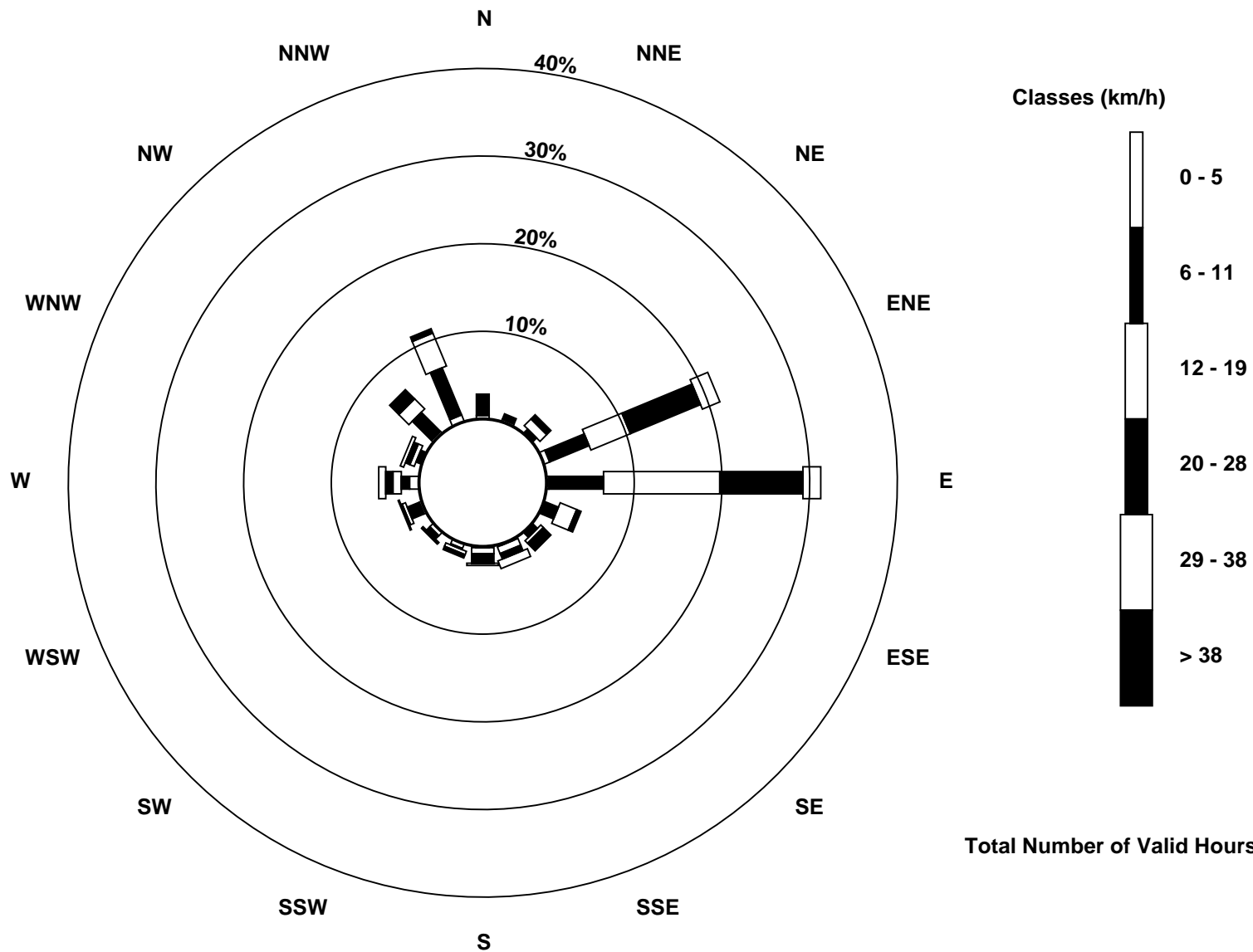
Total Number of Valid Hours: 739

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Wind Speed (WS) - km/h
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 739



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort Chipewyan - March 2017

Direction of Maximum Speed: 75 deg on Mar 18 09:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 289.3 deg on Mar 19	Hours of Data: 739
Direction of Minimum Speed: 197 deg on Mar 10 03:00	Hours of Missing Data: 5
Direction of Minimum Daily Speed Average: 1.1 deg on Mar 3	Percent Operational Time: 99.3
Monthly Average Direction: 353.3 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-Mar	64	AF	13	5	350	358	355	349	341	323	268	317	315	280	234	229	242	246	261	266	267	262	275	276	290.9
2-Mar	AF	193	AF	83	81	81	78	79	92	89	93	83	85	80	76	73	61	64	75	80	82	87	89	88	80.9
3-Mar	89	89	89	94	112	127	143	173	185	193	194	200	250	278	316	321	316	312	315	319	310	318	301	293	307.1
4-Mar	290	279	280	291	307	309	250	284	273	314	343	342	335	330	321	306	315	261	263	261	199	86	86	92	304.4
5-Mar	86	86	89	84	78	81	81	78	78	82	78	77	77	63	59	59	57	41	8	357	7	347	338	337	66.2
6-Mar	326	315	304	304	314	327	350	349	352	229	325	334	328	333	334	332	330	339	332	334	338	342	339	339	332.0
7-Mar	340	339	340	335	331	332	334	333	333	328	332	338	340	324	333	327	337	334	327	334	342	346	342	348	335.3
8-Mar	276	292	295	293	299	325	326	329	333	337	334	334	335	347	342	344	339	342	337	348	359	355	349	347	332.9
9-Mar	335	337	335	345	349	350	356	AF	AF	226	233	252	237	237	242	263	246	242	237	251	247	249	273	231	266.0
10-Mar	232	225	197	79	70	74	80	78	78	78	76	75	75	88	92	97	97	83	83	104	71	79	76	76	83.4
11-Mar	77	71	69	68	72	74	75	83	81	87	93	88	90	102	97	83	80	66	64	60	64	68	73	78	78.7
12-Mar	82	90	94	89	93	93	90	94	89	92	92	91	93	94	95	93	83	79	81	89	100	119	121	119	93.9
13-Mar	123	139	140	136	147	148	152	157	156	164	168	169	167	170	171	181	189	185	185	193	202	190	168	163.7	
14-Mar	126	125	113	116	105	125	92	108	119	90	83	94	87	89	88	89	82	66	55	61	61	71	75	77	84.5
15-Mar	78	82	82	81	82	84	93	110	191	198	210	237	244	275	274	270	261	264	315	353	5	5	10	13	108.5
16-Mar	14	7	347	337	348	336	329	329	341	318	325	334	321	334	345	328	58	76	71	71	56	67	65	67	16.3
17-Mar	72	69	74	71	75	79	85	86	84	77	71	74	104	108	98	98	89	88	79	76	58	85	35	18	78.3
18-Mar	59	56	50	48	49	65	72	72	75	74	68	68	62	60	64	65	64	75	75	69	67	194	269	275	64.8
19-Mar	272	282	284	289	296	304	293	278	271	273	269	269	265	265	277	303	308	310	308	305	310	313	312	316	289.3
20-Mar	319	324	319	322	315	315	324	328	322	321	340	246	175	138	118	101	106	87	88	93	84	91	92	87	41.7
21-Mar	93	92	99	96	92	93	94	92	96	90	88	89	92	93	92	90	88	82	83	89	92	92	107	117	92.6
22-Mar	112	92	89	84	80	80	75	77	73	76	74	72	67	75	85	86	34	43	73	22	7	344	339	325	72.0
23-Mar	334	340	343	25	13	44	54	59	61	62	84	88	78	85	79	62	51	48	49	56	61	73	74	77	61.6
24-Mar	78	78	73	71	75	78	76	76	77	79	78	79	79	84	86	83	70	66	63	62	80	85	85	84	77.2
25-Mar	83	83	82	82	78	78	76	70	74	75	78	68	64	73	83	76	61	86	108	87	91	103	88	92	78.5
26-Mar	94	78	91	83	80	84	81	78	79	80	79	79	79	83	104	139	130	125	147	108	86	82	81	85	91.5
27-Mar	89	86	82	83	84	80	60	87	95	93	91	90	93	100	87	84	82	84	86	64	58	60	69	78	82.6
28-Mar	81	81	85	89	94	94	84	88	99	123	150	113	113	152	155	149	128	124	112	90	85	84	80	78	105.5
29-Mar	79	78	80	77	80	83	82	76	82	85	82	85	85	81	86	79	67	64	50	50	61	64	61	71	74.7
30-Mar	82	68	65	61	57	59	73	72	84	90	92	93	93	94	101	96	94	82	79	79	80	92	85	77	81.1
31-Mar	91	99	126	108	101	96	97	97	119	139	118	137	151	166	168	170	181	174	225	241	225	180	168	126	150.9
72.1 68.6 69.3 68.9 68.3 70.2 75.1 78.5 84.6 86.9 88.4 85.9 84.8 86.2 87.8 81.2 72.1 70.7 64.7 60.4 62.7 67.6 66.3 66.8																									
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
Fort Chipewyan - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 99 deg on Mar 20 11:00	Hours of Data: 739
Minimum Value: 3 deg on Mar 27 18:00	Hours of Missing Data: 5
Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 6 Median = 10 Q ₃ = 17 P ₉₀ = 26 P ₉₉ = 75	Hours of Calibration: 0
	Percent Operational Time: 99.3

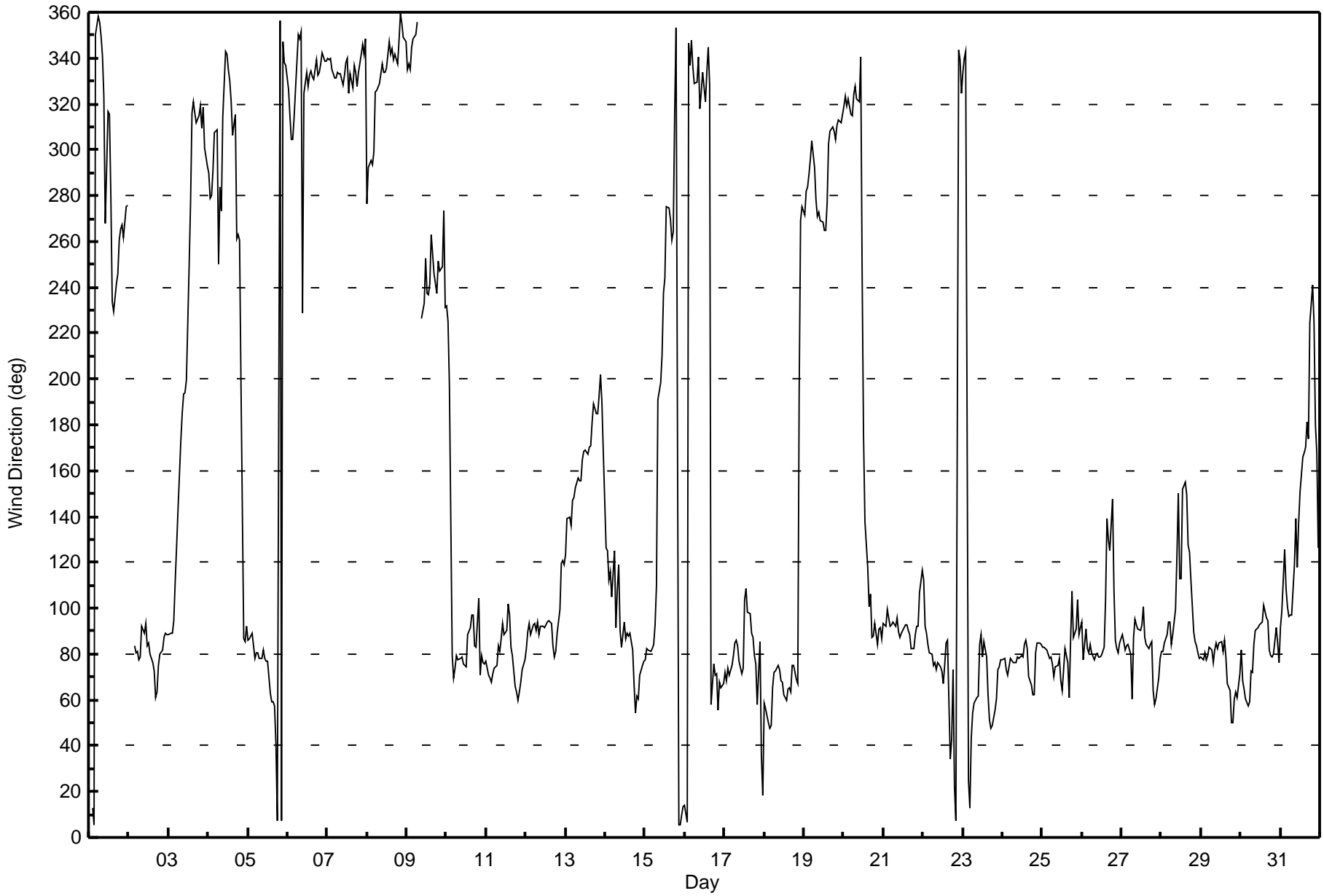
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	75	AF	57	45	17	13	22	39	74	60	81	79	28	39	19	13	12	10	15	17	11	10	11	8	81
2-Mar	AF	87	AF	9	9	10	6	6	5	4	6	4	6	5	6	7	6	7	7	5	5	5	4	4	87
3-Mar	4	4	4	5	15	9	17	14	10	12	9	14	18	15	20	20	18	17	17	18	17	18	16	14	20
4-Mar	14	15	17	17	20	17	35	17	25	24	34	29	26	32	32	26	23	52	26	30	62	12	11	16	62
5-Mar	7	6	7	5	6	7	8	5	6	7	7	6	6	10	8	8	11	22	21	19	22	26	27	27	27
6-Mar	22	14	16	14	11	34	24	20	19	73	27	32	26	26	25	25	22	21	21	21	19	18	18	17	73
7-Mar	18	17	16	18	18	17	21	17	16	18	18	20	22	24	28	27	24	22	18	17	14	14	14	17	28
8-Mar	34	15	14	5	12	11	11	13	15	21	29	29	29	23	27	27	22	20	15	14	13	13	11	13	34
9-Mar	56	29	26	27	20	18	65	AF	AF	11	16	33	23	16	19	17	17	12	13	11	14	19	8	62	65
10-Mar	36	76	67	18	20	11	12	6	7	6	9	10	9	7	3	7	6	9	15	8	11	6	6	5	76
11-Mar	4	11	10	9	5	6	6	7	6	5	4	4	4	7	8	7	6	12	13	9	6	6	9	5	13
12-Mar	8	12	9	6	6	5	4	6	5	4	4	3	4	3	4	5	5	5	5	6	7	6	4	6	12
13-Mar	6	7	7	6	7	7	8	9	9	9	10	9	10	10	9	10	9	8	8	7	8	9	8	36	36
14-Mar	30	25	13	15	14	41	33	7	8	10	5	4	4	3	5	5	6	8	9	8	6	8	7	6	41
15-Mar	6	5	4	5	5	5	7	34	11	7	8	16	14	16	16	16	14	15	31	16	19	20	20	18	34
16-Mar	17	22	19	19	22	24	21	24	31	26	34	31	36	34	30	30	63	12	7	10	6	9	8	8	63
17-Mar	8	8	6	7	7	6	4	4	4	6	7	13	12	8	9	7	5	5	6	10	11	6	25	23	25
18-Mar	11	15	9	9	9	9	7	7	6	6	8	8	7	8	7	7	7	10	13	12	28	68	18	15	68
19-Mar	15	16	14	14	15	16	15	15	14	14	14	15	15	15	25	18	17	17	16	16	17	16	15	18	25
20-Mar	19	21	18	21	16	16	19	24	24	31	99	82	26	16	17	21	13	4	4	3	5	6	5	5	99
21-Mar	6	5	5	5	5	5	5	4	5	5	7	4	4	4	4	4	4	6	5	6	5	5	10	6	10
22-Mar	8	5	7	6	6	5	6	5	6	5	6	7	10	9	7	7	16	24	22	15	20	19	20	14	24
23-Mar	13	14	14	49	35	14	12	13	9	9	9	3	10	8	11	8	10	10	9	8	8	7	6	6	49
24-Mar	6	6	6	6	6	6	5	5	6	6	5	6	6	6	5	7	10	7	8	6	7	6	6	5	10
25-Mar	6	5	6	6	5	5	6	6	6	7	7	9	11	15	14	16	14	17	60	17	17	18	11	12	60
26-Mar	9	14	10	4	5	5	6	6	5	5	5	4	4	5	27	12	10	14	18	20	6	12	7	4	27
27-Mar	4	4	6	6	6	6	42	41	53	6	4	4	5	9	4	4	4	3	7	14	11	10	9	7	53
28-Mar	5	5	5	5	8	10	11	7	6	29	18	20	28	13	15	16	5	4	8	9	5	4	5	5	29
29-Mar	5	6	5	6	5	5	6	10	5	7	6	5	3	5	4	12	8	8	8	10	7	8	7	10	12
30-Mar	6	8	7	10	20	14	13	18	14	7	18	25	27	14	11	8	14	6	10	15	14	10	16	9	27
31-Mar	13	15	10	7	9	4	5	4	20	17	15	9	14	9	7	6	6	4	30	18	12	10	8	38	38
	75	87	67	49	35	41	65	41	74	73	99	82	36	39	32	30	63	52	60	30	62	68	27	62	
	Diurnal Maximum																								

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Fort Chipewyan - March 2017





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 22, 2017	Last Calibration	February 9, 2017
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	12:10	End Time (MST)	16:15
Gas Cert Reference	LL79696	Station temp.	22 Deg C
Cal Gas Concentration	2.35 ppm	Cal Gas Exp Date	2/13/18
Calibrator Make/Model	Teledyne API T700	Serial Number	2656
ZAG Make/Model	Teledyne API T701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	DACS serial No.	11039

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-826	-826
Analyzer IP address	192.168.1.43		Lamp voltage	1023	1028
Calculated slope	1.000140	1.001791	Chamber temp	44.9	44.8
Calculated intercept	-0.088118	-0.100259	Pressure	707.0	704.9
Analyzer Background	1.25	1.25	Flow	0.426	0.426
Analyzer Coefficient	1.119	1.117	Intensity	90	90

Analyzer make Thermo 43i-TLE Analyzer serial # 1136451241

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.2	----
as found span	6000	44.8	17.5	17.3	1.016
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	44.8	17.5	17.6	0.995
second point	6000	29.9	11.7	11.8	0.994
third point	6000	15.0	5.9	5.9	0.994
as left zero					
as left span					
Average Correction Factor					0.994

Corrected As found 17.1 Previous response 17.6 % change 3.1%

Notes:

As founds completed with T700 calibrator SN: 747. After as founds, the calibrator was replaced with a new T700 calibrator SN: 2656. Inlet filter changed after as founds. Span adjusted. As lefts not completed.

Calibration Performed By: Devin Russell



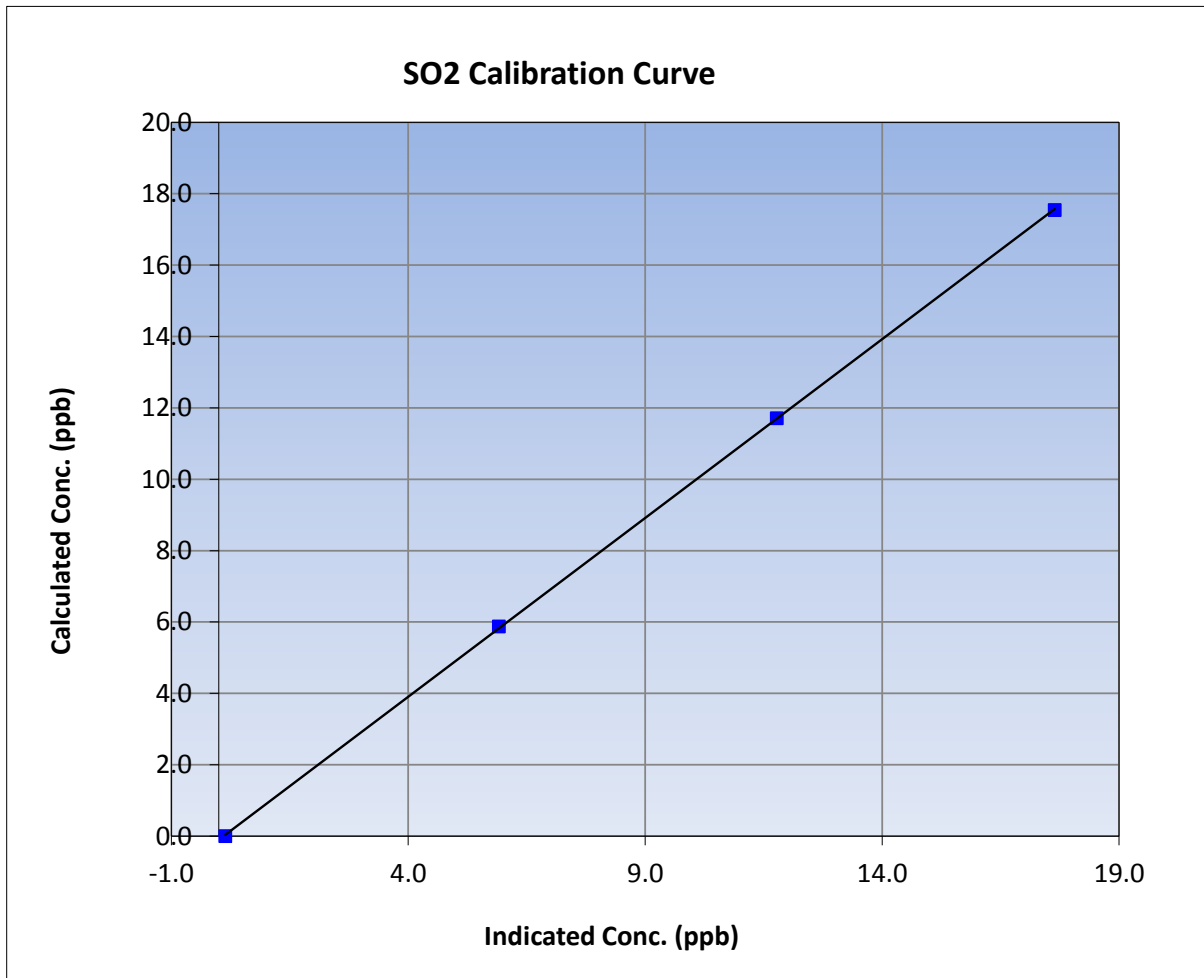
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 22, 2017	Previous Calibration	February 9, 2017
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	12:10	End Time (MST)	16:15
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241

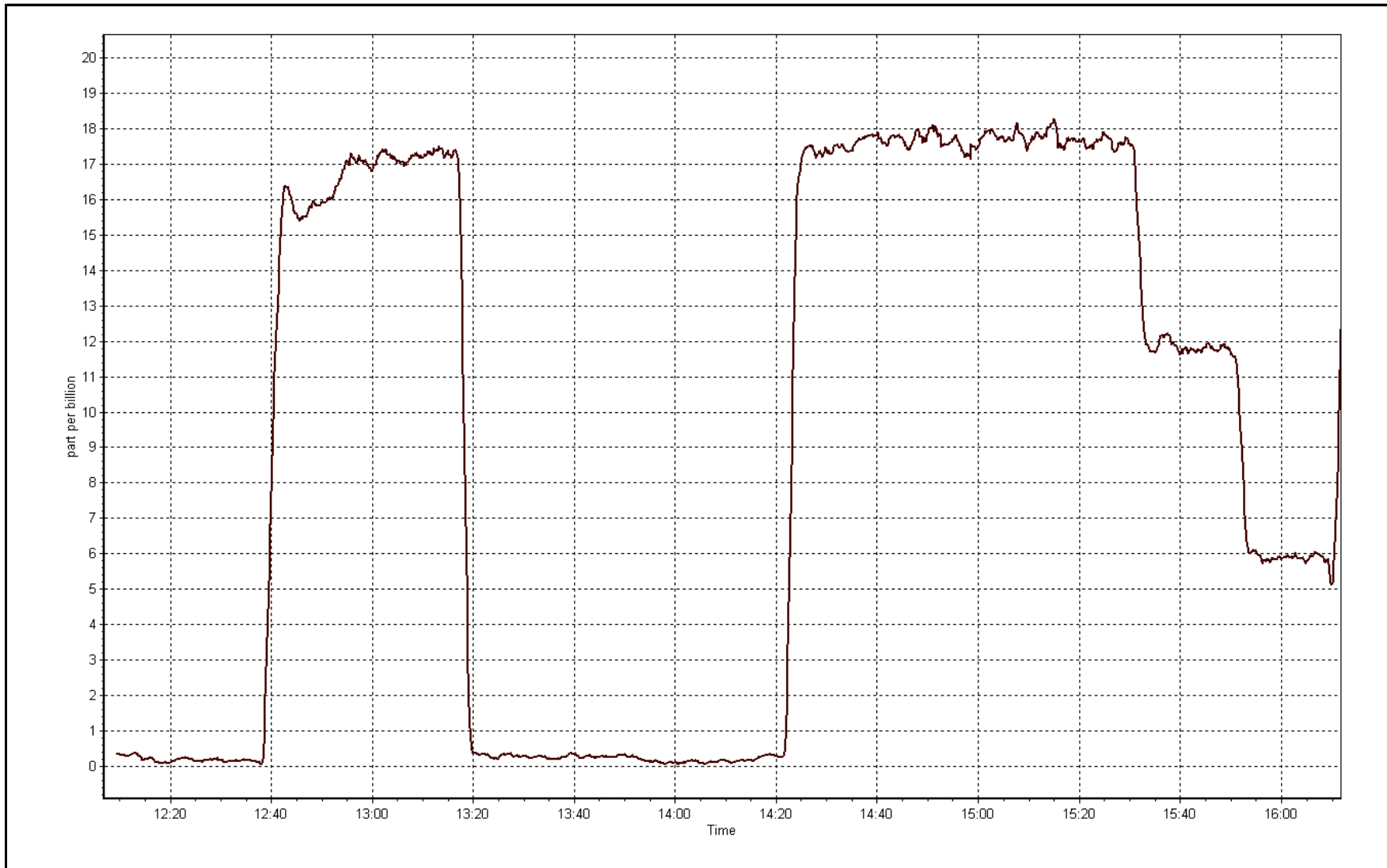
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999969
17.5	17.6	0.9947		
11.7	11.8	0.9941	Slope	1.001791
5.9	5.9	0.9941		
			Intercept	-0.100259



SO2 Calibration Plot

Date: March 22, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 22, 2017	Previous Calibration	February 10, 2017	
Station Name	Fort Chipewyan	Station Number	AMS 8	
Reason:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Routine</td> </tr> </table>			Routine
Routine				
Start Time (MST)	12:10	End Time (MST)	20:20	
NO2 GPT Ref date	NA	Transfer Standard	API T700	
Calibrator Make/Model	Teledyne API T700	Station temp.	23 Deg C	
ZAG make/model	Teledyne API 701	Serial Number	2656	
DACS make/model	Campbell Scientific CR3000	Serial Number	4698	
		Serial Number	11039	

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	35.7	37.6
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	0.997350	1.001088	Pressure	26.7	27.1
Calculated intercept	-0.209248	0.097618	Flow cell A	739.000	754.000
Analyzer Background	-0.4	-0.4	Flow cell B	742.000	754.000
Analyzer Coefficient	1.019	0.997	O3 Measure	3870.9	3713.9
			O3 Reference	3872.4	3715.7

Analyzer make	API T400	Analyzer serial #	1020
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator O3 generator reference voltage - generator drive voltage (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
As found zero	6000	800.00	0.0	0.1	----
As found span	6000	830.10	102.5	102.1	1.004
calibrator zero	6000	800.00	0.0	-0.2	----
high point	6000	830.10	100.0	99.7	1.003
second point	6000	799.10	80.0	79.8	1.003
third point	6000	733.20	50.0	50.0	1.000
as left zero					
as left span					
Average Correction Factor					1.002

Corrected As found	102.1	Previous response	103.0	% change	0.9%
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Notes:

As founds completed with T700 calibrator SN: 747. After as founds, the calibrator was replaced with a new T700 calibrator SN: 2656. Span adjusted slightly. As left spans not completed.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association O3 Calibration Report

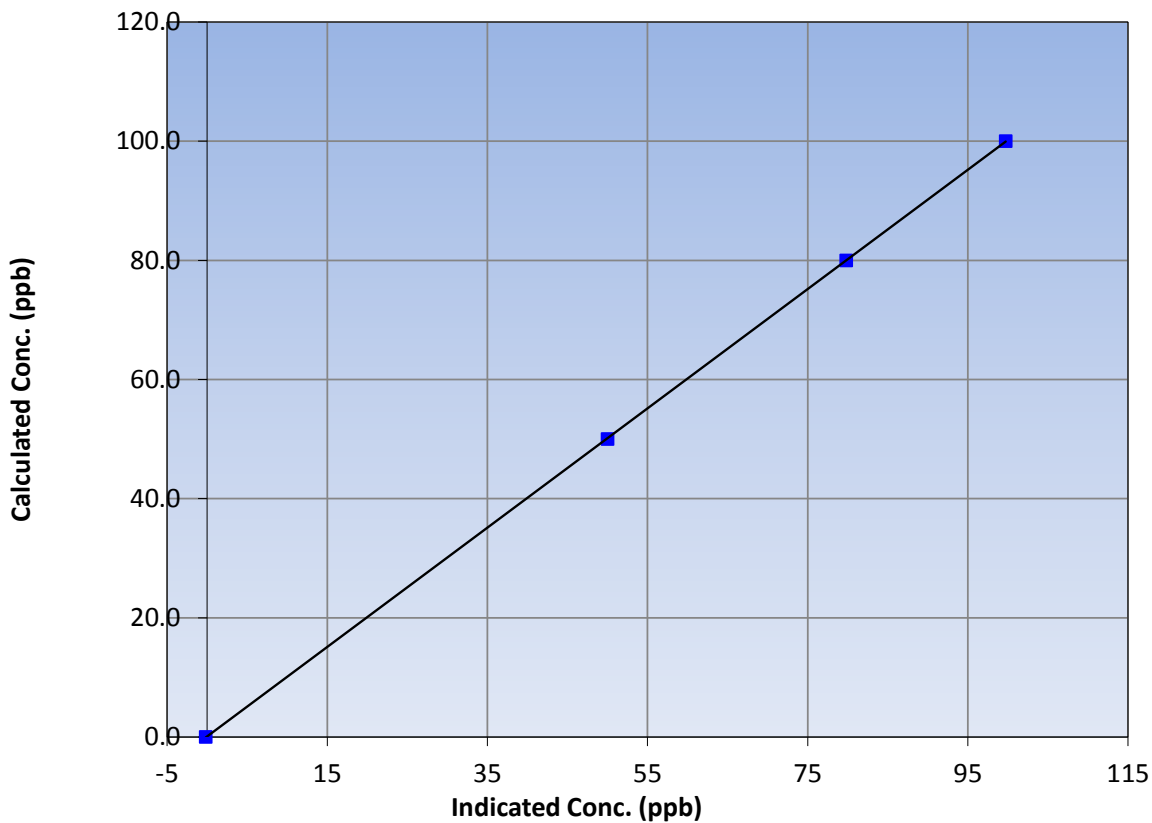
Station Information

Calibration Date	March-22-17	Previous Calibration	February-10-17
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	12:10	End Time (MST)	20:20
Analyzer make	API T400	Analyzer serial #	1020

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999994
100.0	99.7	1.0027		
80.0	79.8	1.0025	Slope	1.001088
50.0	50.0	1.0000		
			Intercept	0.097618

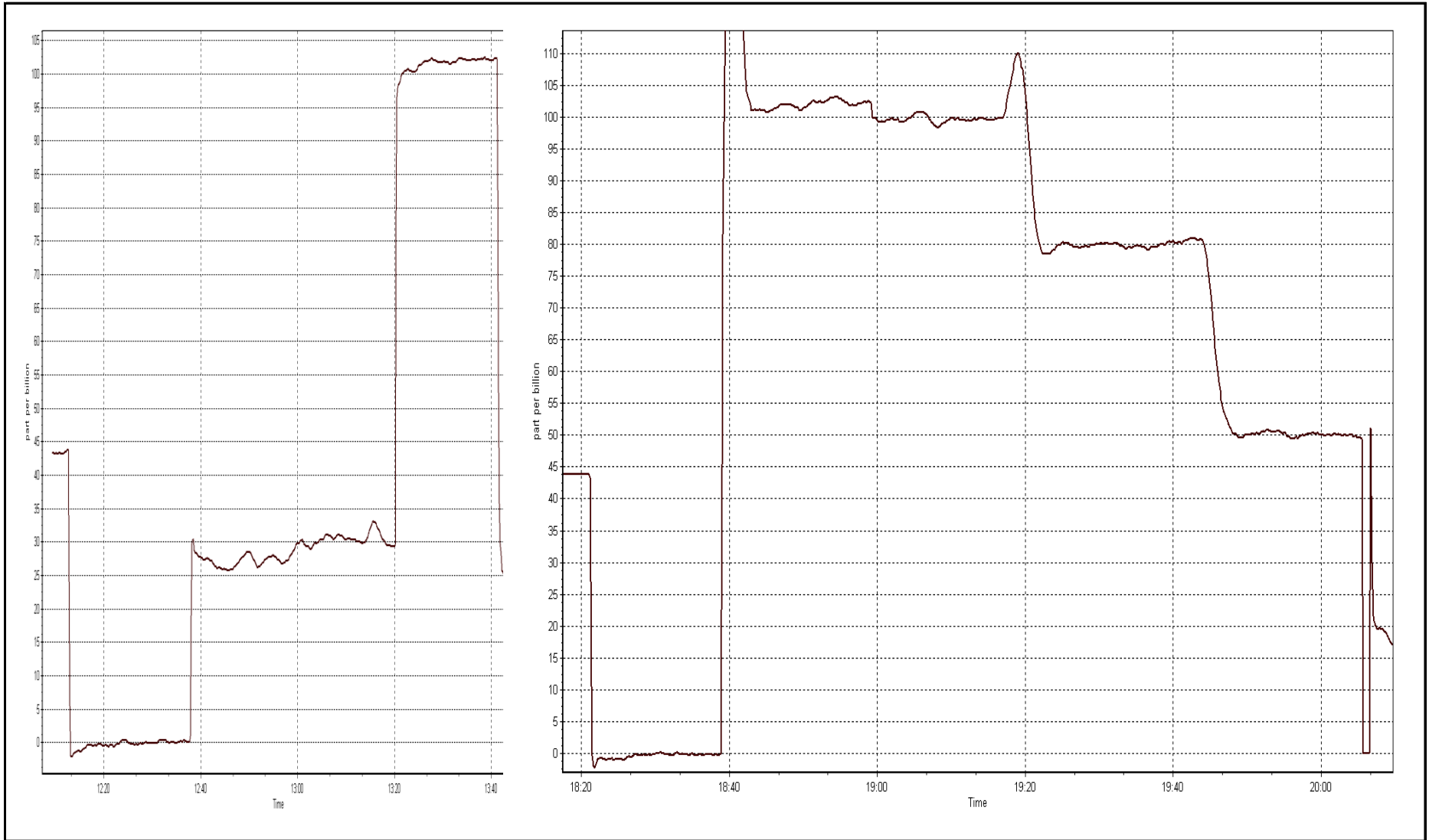
O3 Calibration Curve



O3 Calibration Plot

Date:

March 22, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 22, 2017	Previous Calibration	February 9, 2017
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	12:10	End Time (MST)	18:25
NO Cal Gas Conc	20.1 ppm	Gas Cert Reference	LL79696
NOx Cal Gas Conc	20.1 ppm	Cal Gas Expiry Date	2/13/18
Calibrator	Teledyne API T700	Serial Number	2656
Zero air Generator	Teledyne API 701	Serial Number	4698

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	11039
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.002721	1.002774	1.000122
	Data Offset	0.451139	0.467943	0.037735
Current Calibration	Data Slope	1.001897	1.004030	1.001577
	Data Offset	0.352197	0.353600	-0.230589

Analyzer Information

Analyzer make/model	Teledyne API T200u	Analyzer serial #	172
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Test Point	before		after	
		ppb		ppb
Concentration range	0-200		0-200	
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	1.299		1.299	
NOx coefficient	1.313		1.317	
NO2 coefficient	1.000		1.000	
NO bkgrnd	0.1		0.1	
NOx bkgrnd	0.2		0.2	
Chamber Temp	40	Deg C	40	Deg C
Moly Temp	314.1	Deg C	316.5	Deg C
PMT voltage	502	V	502	V
PMT Temp	5.1	Deg C	5.1	Deg C
O3 flow	87	ccm	88	ccm
R Cell press NO	4	"Hg	4.1	"Hg
R Cell Press Nox	4	"Hg	4.1	"Hg
NO sample flow	1098	cc/min	1126	cc/min
Nox sample Flow	1074	cc/min	1101	cc/min

Notes:

As founds completed with T700 calibrator SN: 747. After as founds, the calibrator was replaced with a new T700 calibrator SN: 2656. Inlet filter changed after as founds. Span adjusted. As lefts not completed.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

March 22, 2017

Station Number:

AMS 8

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as found span	6000	44.8	150.1	150.1	0.0	146.2	145.6	0.6	1.0268	1.0310
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	6000	44.8	150.1	150.1	0.0	149.6	149.3	0.3	1.0033	1.0054
second point	6000	29.9	100.2	100.2	0.0	99.6	99.4	0.2	1.0053	1.0077
third point	6000	15.0	50.3	50.3	0.0	49.4	49.3	0.1	1.0180	1.0197
as left zero										
as left span										
Average Correction Factor									1.0089	1.0109

Corrced As found NO_x= 146.2 NO= 145.6 Percent Change NO_x= 2.1% NO= 2.4%
 Previous Response NO_x= 149.2 NO= 149.2

GPT Calibration Data

Dilution Flow (total) 6000 ccm Source Gas Flow 44.80 ccm NOx ref calc conc = 150.1 ppb NO ref calc conc = 150.1 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	149.6	149.3	0.0	1.0029	1.0056	----	----
1st NO2 (100)	13.8	135.5	148.5	13.8	134.8	1.0106	----	1.0054	99.5%
2nd NO2 (80)	33.9	115.4	149.9	33.9	116.0	1.0014	----	0.9947	100.5%
3rd NO2 (50)	62.8	86.4	149.8	62.8	86.9	1.0022	----	0.9944	100.6%
2nd NO ref point	----	0.0	150.1	150.0	0.1	0.9999	1.0004	----	----
Average Correction Factor						1.0035		0.9981	100.2%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

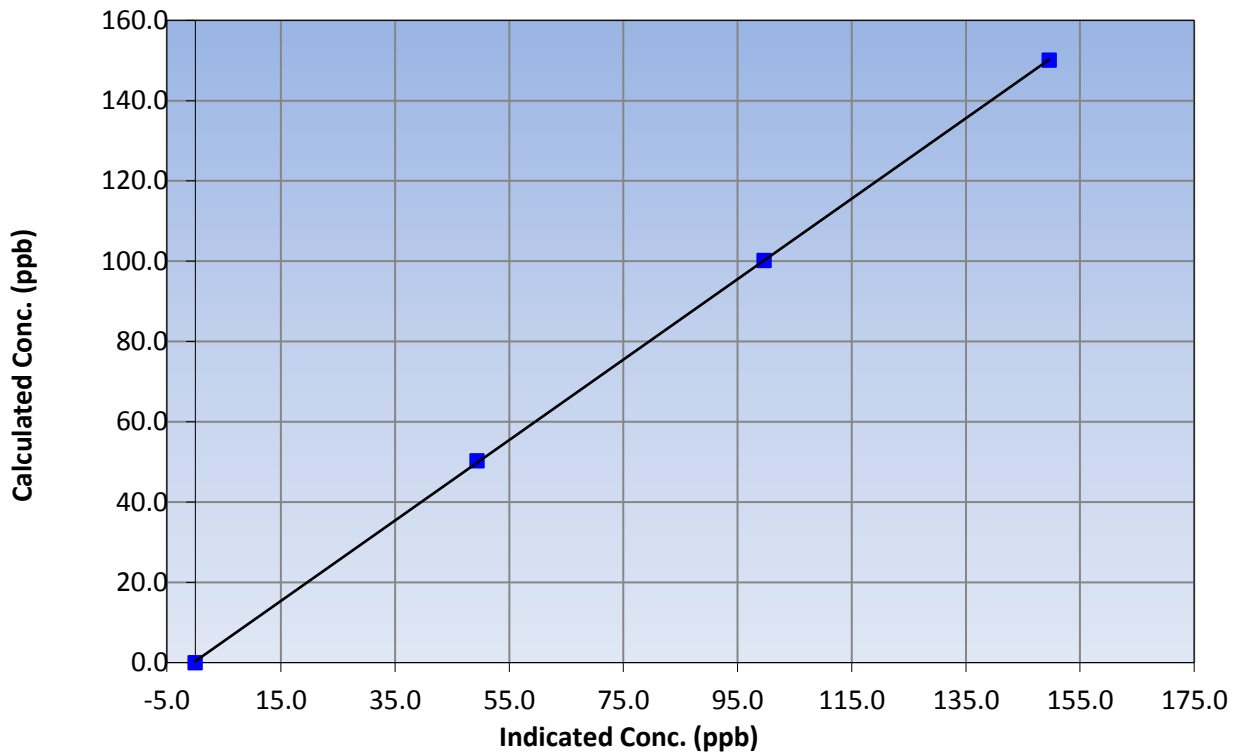
Station Information

Calibration Date	March 22, 2017	Previous Calibration	February 9, 2017
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	12:10	End Time (MST)	18:25
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999976
150.1	149.6	1.0033		
100.2	99.6	1.0053	Slope	1.001897
50.3	49.4	1.0180		
			Intercept	0.352197

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

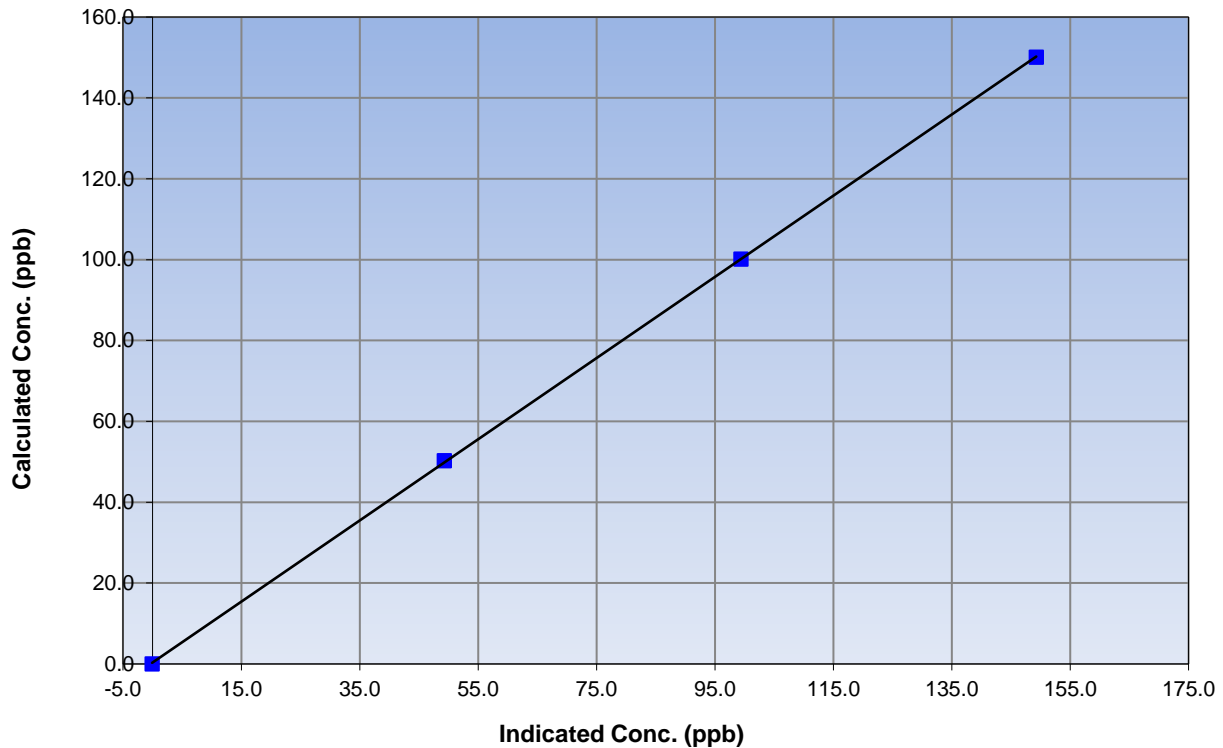
Station Information

Calibration Date	March 22, 2017	Previous Calibration	February 9, 2017
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	12:10	End Time (MST)	18:25
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999978
150.1	149.3	1.0054		
100.2	99.4	1.0077	Slope	1.004030
50.3	49.3	1.0197		
			Intercept	0.353600

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

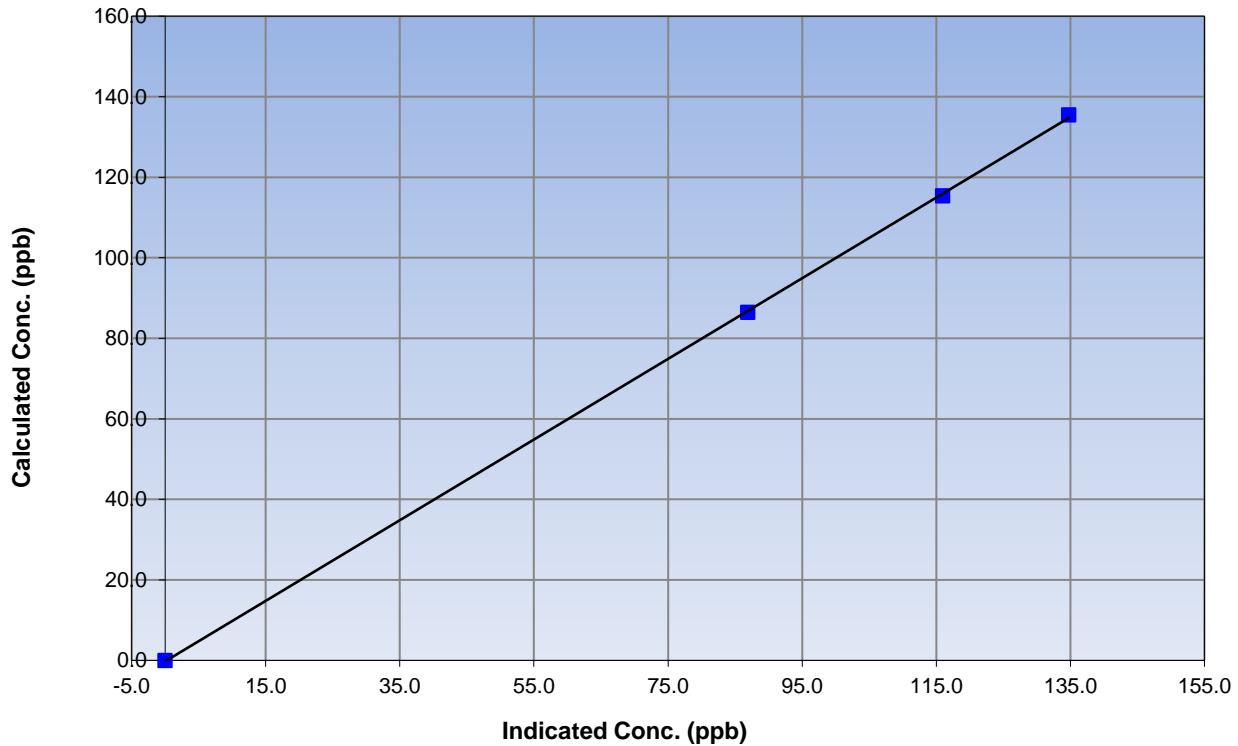
Station Information

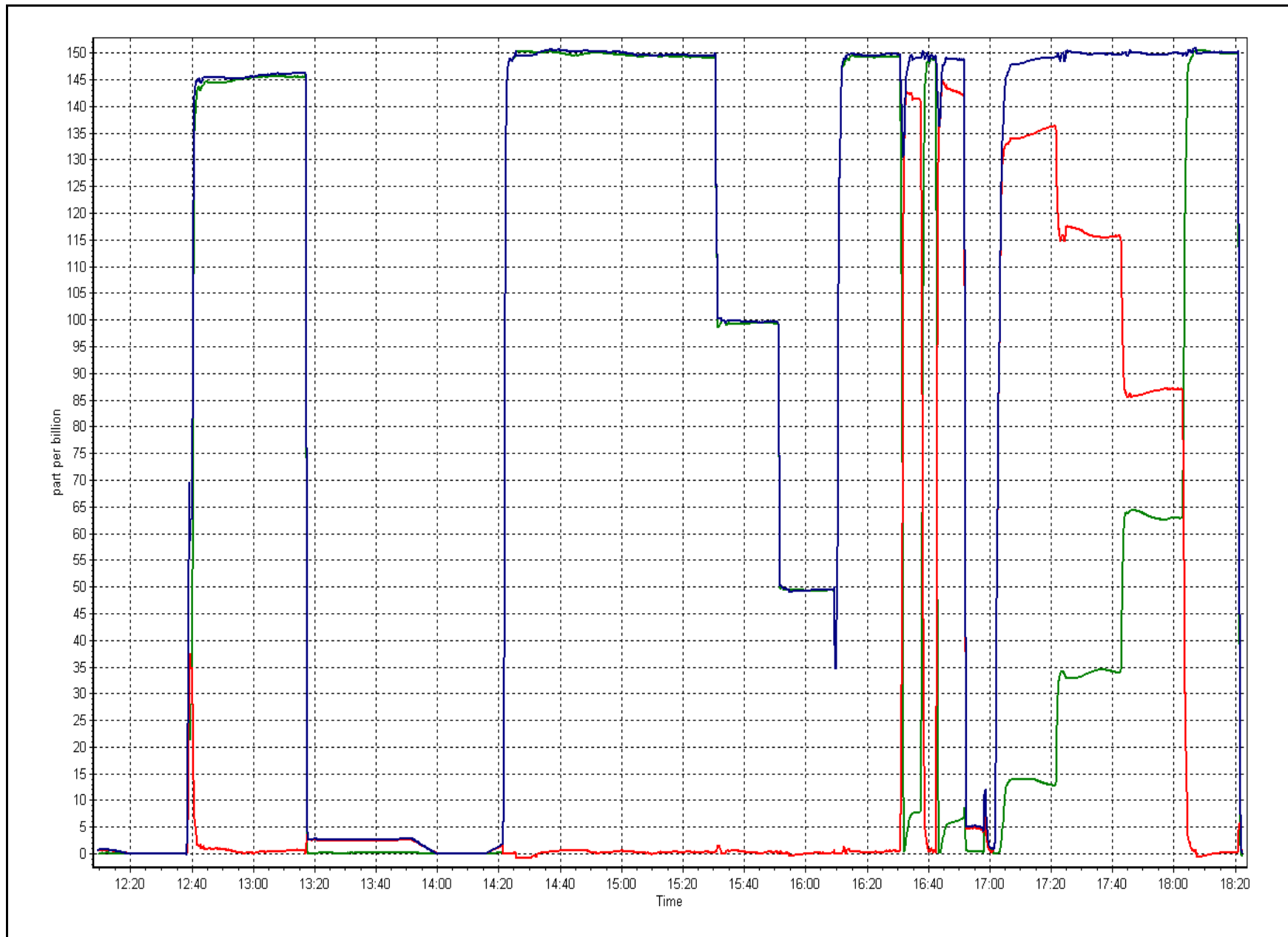
Calibration Date	March 22, 2017	Previous Calibration	February 9, 2017
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	12:10	End Time (MST)	18:25
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999898
135.5	134.8	1.0054		
115.4	116.0	0.9947	Slope	1.001577
86.4	86.9	0.9944		
			Intercept	-0.230589

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS 8
Calibration Date:	March 23, 2017	Last Cal Date:	February 9, 2017
Start time (MST):	7:25	End time (MST):	10:22
Sharp Model:	Thermo 5030	S/N:	E-2025
Particulate Fraction:	PM2.5	C14 Source S/N:	7414
Flow Standard 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>	<u>Tolerance</u>
T1 (°C)	-9	-7.7	-9	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	981	981.24	981	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1006.8	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.4	----	0.3	<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>March 23, 2017</u>	Last Cal Date: <u>September 1, 2016</u>		
	Flow w/o adaptor: <u>16.78</u>	Flow w/ adaptor: <u>16.16</u>		0.8 LPM

Annual Calibration Test

Foil Calibration	Foil Mass: _____	S/N: _____
	Date of check: _____	Last Cal Date: _____
	New Correction Factor: _____	Previous Correction Factor: _____

<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: Cyclone head cleaned. No adjustments needed to temperature, pressure or flow. Leak check passed. Nephelometer was adjusted. Tape was changed.

Calibration by: Devin Russell



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 9
BARGE LANDING
MARCH 2017**

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
MARCH 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	709	35	35	100	3	0	1	0
THC(ppm) Average	710	34	34	100	6	-	2.9	-
Temperature (C) Average	744	0	0	100	14.4	-	7.3	-
Relative Humidity (%) Average	744	0	0	100	98	-	90	-
Wind Speed 10 m (km/h) Average	731	0	13	98.25	19	-	14	-
Wind Direction 10 m (deg) Average	731	0	13	98.25	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
MARCH 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	709	0.4	0	-	0	0	0	0	1	1	3
THC(ppm) Average	710	2.37	0.3	-	2	2.1	2.2	2.3	2.4	2.7	6
Temperature (C) Average	744	-8.39	10.8	-	-33.3	-23.5	-17.9	-7	0.5	4	14.4
Relative Humidity (%) Average	744	67.1	16	-	24	48	56	68	77	89	98
Wind Speed 10 m (km/h) Average	731	6.1	4	-	0	2	3	5	8	11	19
Wind Direction 10 m (deg) Average	731	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	08 Mar 2017 06:00	08 Mar 2017 06:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	27 Mar 2017 00:00	27 Mar 2017 09:00	10	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	28 Mar 2017 04:00	28 Mar 2017 04:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	30 Mar 2017 08:00	30 Mar 2017 08:00	1	Flat line in sensor output signal -sensor frozen



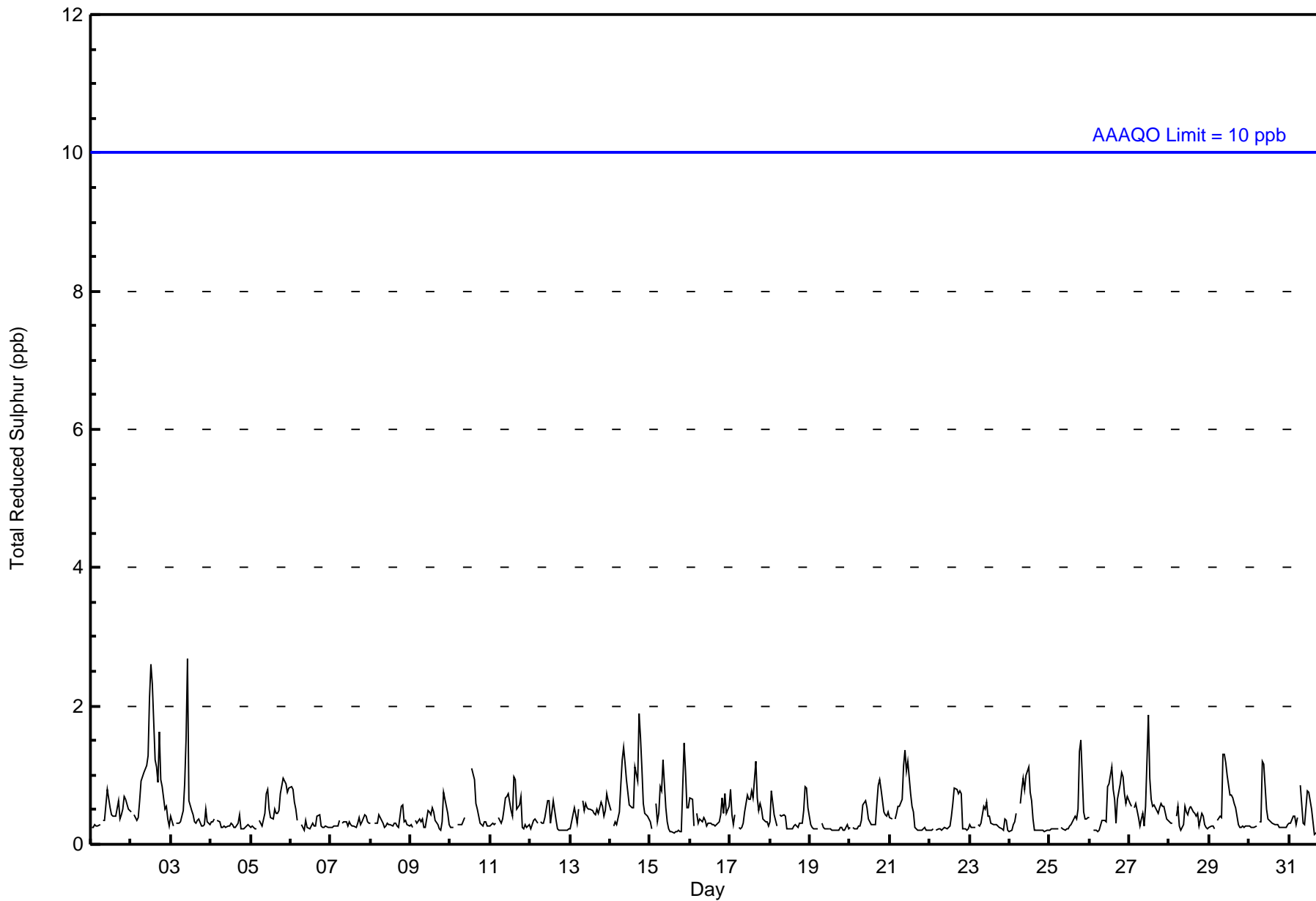
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Barge Landing - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3 ppb on Mar 3 11:00 Maximum Daily Average: 1.0 ppb on Mar 2																	Hours in Service: 744 Hours of Data: 709									
Minimum Value: 0 ppb on Mar 31 16:00 Minimum Daily Average: 0.2 ppb on Mar 19 Maximum Diurnal Average: 0.6 ppb at hour 11 Minimum Diurnal Average: 0.3 ppb at hour 3 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 = 1																	Hours of Missing Data: 35 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-Mar	0	0	0	0	0	0	Z	0	0	1	1	1	0	0	0	0	1	0	0	1	1	1	1	0	0.4	1
2-Mar	0	Z	0	0	0	1	1	1	1	1	1	2	3	2	1	1	1	2	1	1	1	1	0	0	1.0	3
3-Mar	0	0	Z	0	0	0	0	0	1	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
4-Mar	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
5-Mar	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	1	0	0	0	1	1	1	1	1	1	0.5	1
6-Mar	1	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
7-Mar	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
8-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.3	1
9-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0.4	1
10-Mar	0	0	0	Z	0	0	0	0	0	C	C	C	C	1	1	1	1	0	0	0	0	0	0	0	0.4	1
11-Mar	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0.5	1
12-Mar	0	0	0	0	0	Z	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
13-Mar	0	0	1	0	0	1	Z	1	0	1	1	1	1	0	0	1	0	1	0	1	0	0	1	1	0.5	1
14-Mar	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	0	0	0	0.8	2
15-Mar	0	0	Z	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1
16-Mar	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0.4	1
17-Mar	1	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0.5	1
18-Mar	0	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
19-Mar	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-Mar	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0.4	1
21-Mar	0	0	Z	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1
22-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0.4	1
23-Mar	0	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
24-Mar	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
25-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.4	1
26-Mar	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0.6	1
27-Mar	1	1	Z	1	1	0	0	0	0	0	1	2	1	1	1	1	0	0	1	1	1	1	0	0	0.6	2
28-Mar	0	0	0	Z	0	1	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
29-Mar	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1
30-Mar	0	0	0	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
31-Mar	0	0	0	0	0	0	Z	1	0	0	1	1	1	1	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
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Barge Landing - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	707	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: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Barge Landing - March 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	92	127	46	41	19	23	43	65	62	24	22	13	14	21	23	61	696
3 - 4	0	0	0	0	0	0	0	0	0	1	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	92	127	46	41	19	23	43	65	62	25	22	13	14	22	23	61	698

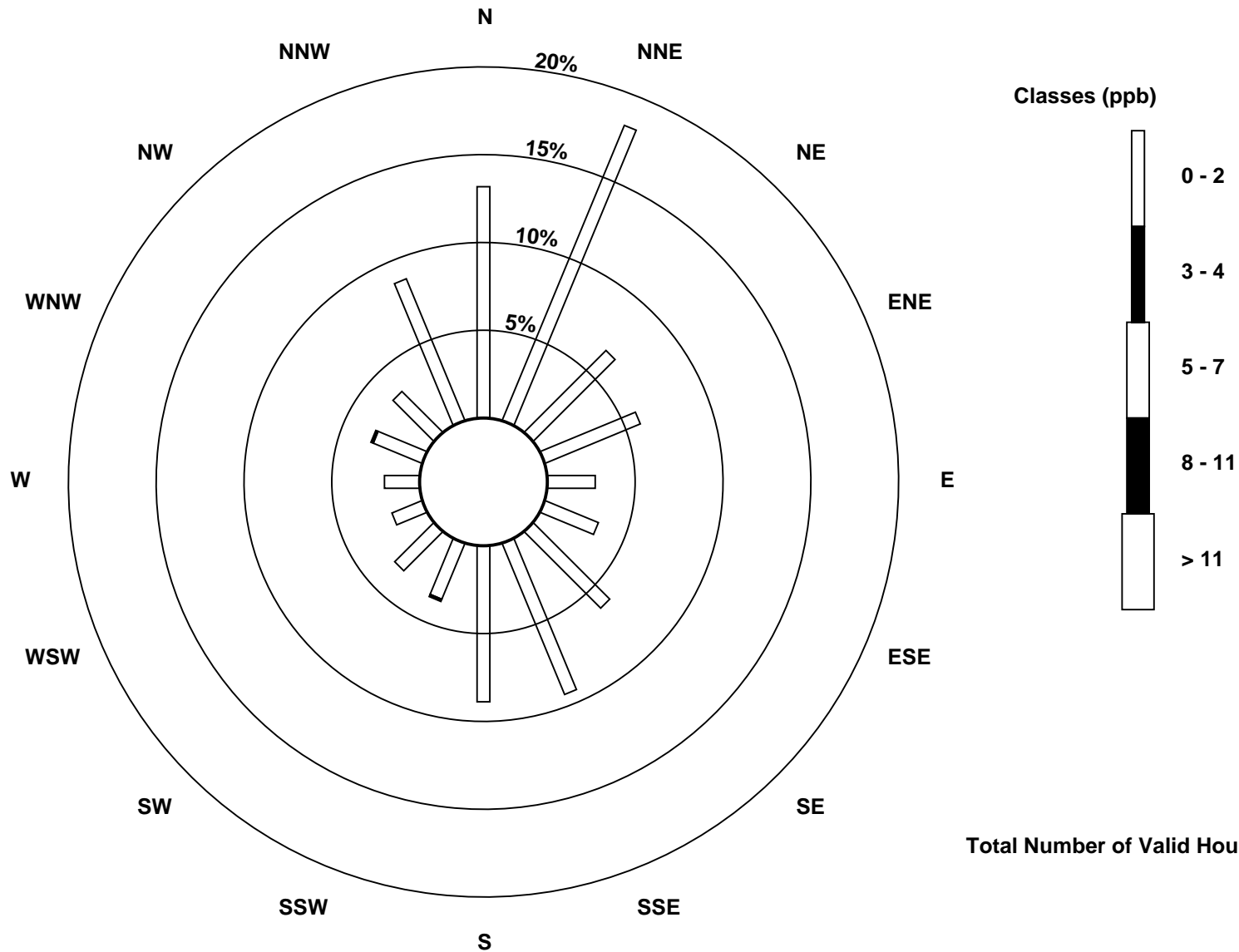
Total Number of Valid Hours: 698

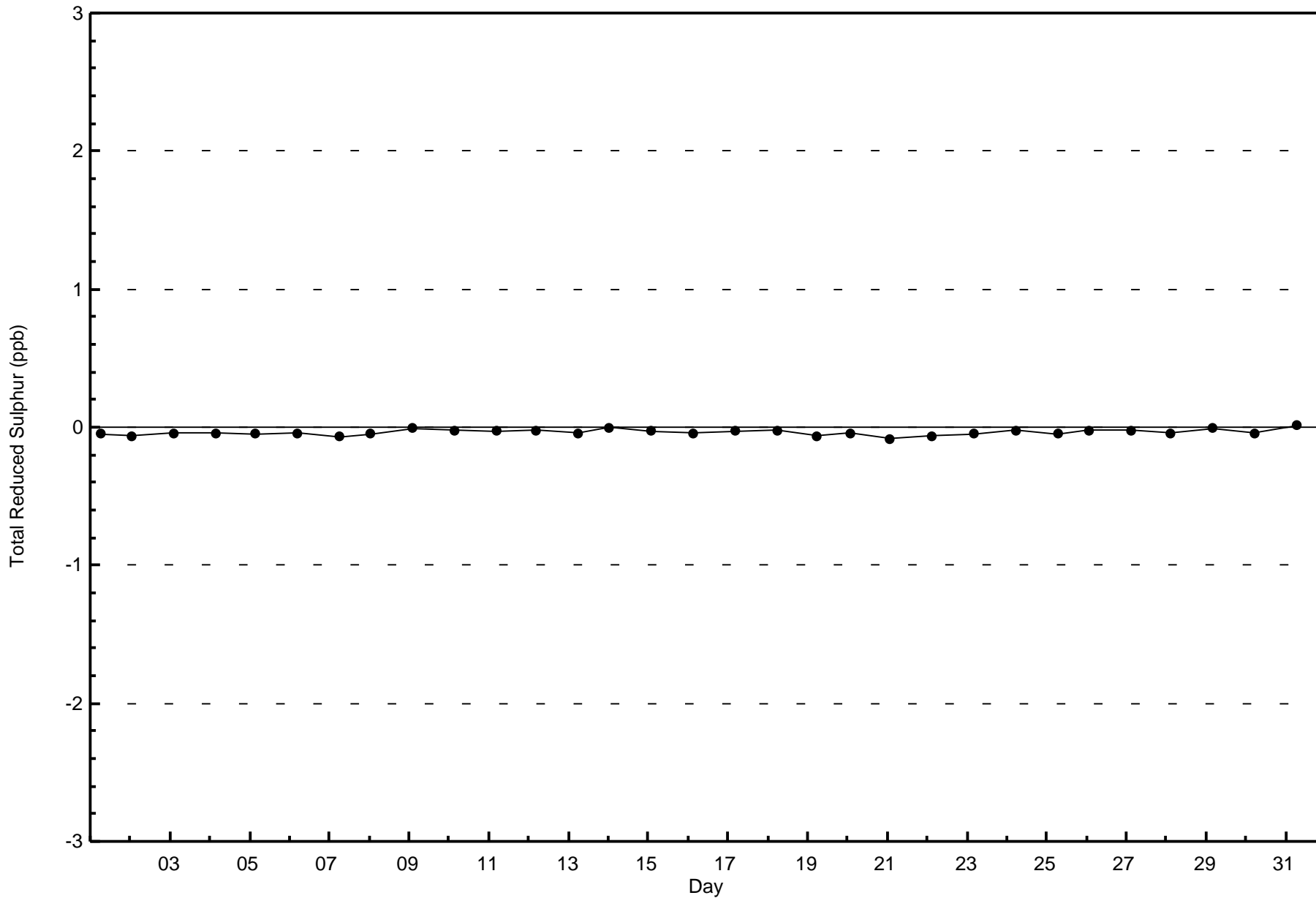
Total Number of Hours: 744

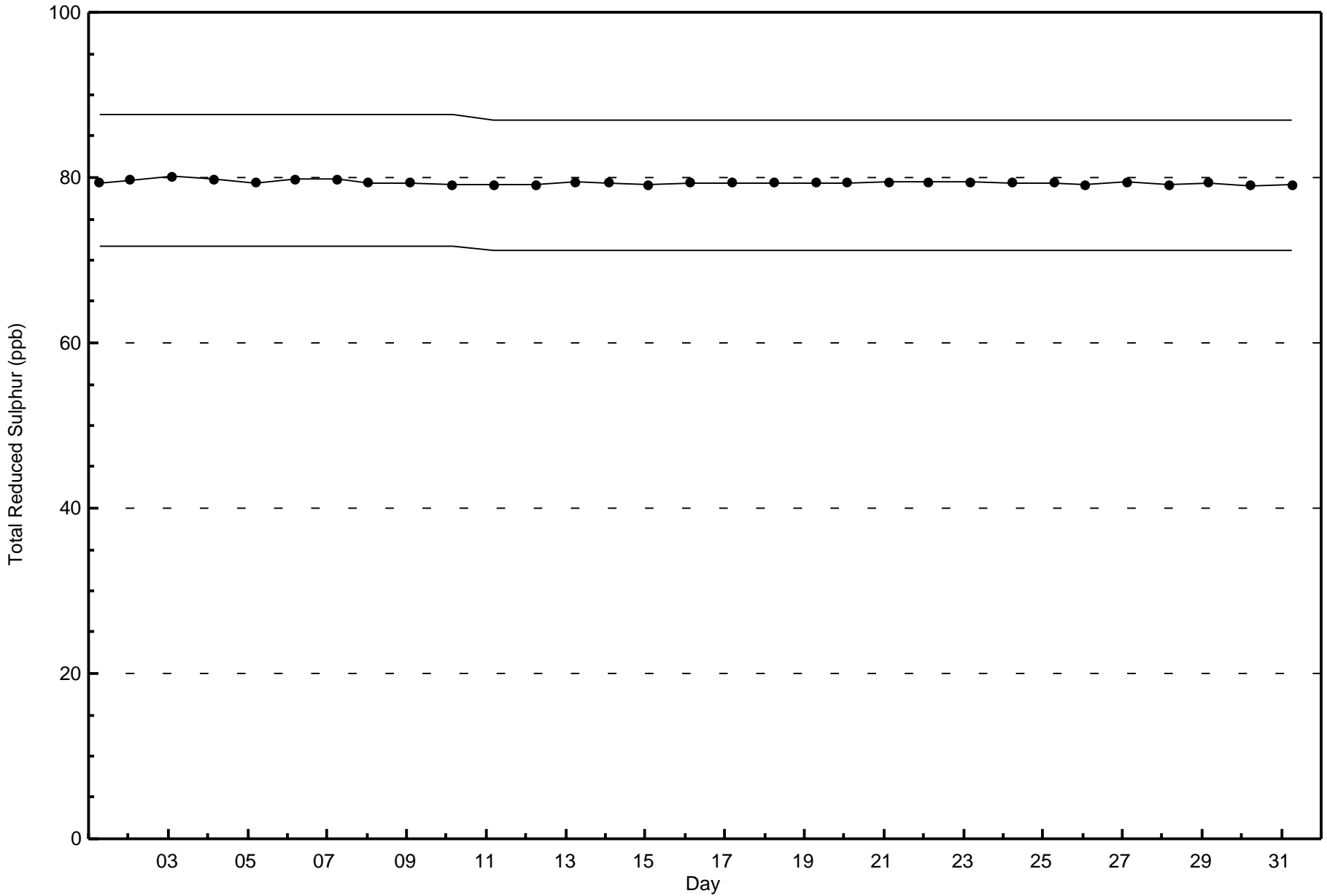


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Reduced Sulphur (TRS) - ppb
Barge Landing (AMS 9)









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

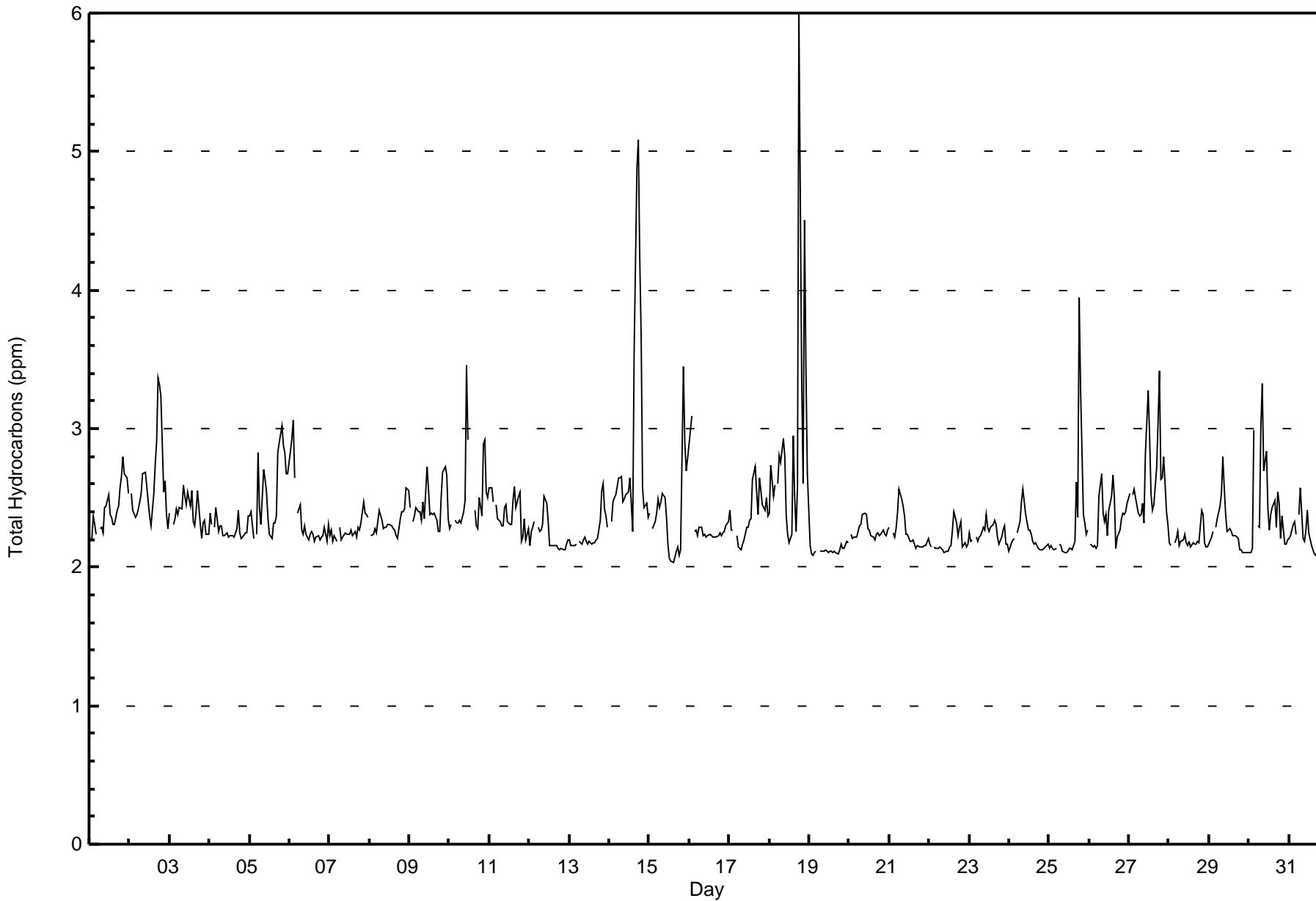
Barge Landing - March 2017

Maximum Value: 6.0 ppm on Mar 18 19:00																				Maximum Daily Average: 2.9 ppm on Mar 14					Hours in Service: 744	
Minimum Value: 2.0 ppm on Mar 15 15:00																				Minimum Daily Average: 2.1 ppm on Mar 19					Hours of Data: 710	
Maximum Diurnal Average: 2.6 ppm at hour 19																				Minimum Diurnal Average: 2.3 ppm at hour 14					Hours of Missing Data: 34	
Monthly Average: 2.37 ppm																				Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.4 P ₉₀ = 2.7 P ₉₉ = 3.5					Hours of Calibration: 34	
																									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-Mar	2.2	2.2	2.4	2.3	2.2	Z	2.3	2.3	2.2	2.4	2.4	2.5	2.4	2.4	2.3	2.3	2.4	2.4	2.6	2.7	2.8	2.7	2.6	2.5	2.4	2.8
2-Mar	Z	2.5	2.4	2.4	2.4	2.4	2.5	2.5	2.7	2.7	2.6	2.5	2.4	2.3	2.5	2.7	2.9	3.4	3.3	3.2	2.5	2.6	2.4	2.3	2.6	3.4
3-Mar	2.4	Z	2.3	2.4	2.4	2.4	2.4	2.4	2.6	2.5	2.5	2.4	2.5	2.3	2.3	2.4	2.6	2.3	2.2	2.3	2.3	2.2	2.2	2.4	2.4	2.6
4-Mar	2.4	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	2.4	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.4
5-Mar	2.4	2.4	2.2	Z	2.2	2.8	2.4	2.3	2.7	2.6	2.5	2.4	2.2	2.2	2.3	2.3	2.4	2.8	2.9	3.0	2.9	2.8	2.7	2.7	2.5	3.0
6-Mar	2.8	2.9	3.1	2.6	Z	2.4	2.4	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.4	3.1
7-Mar	2.2	2.3	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.3	2.3	2.3	2.5	2.4	2.4	2.4	2.3	2.5
8-Mar	Z	2.2	2.2	2.3	2.2	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.4	2.4	2.4	2.4	2.6	2.5	2.3	2.6
9-Mar	2.4	Z	2.3	2.4	2.4	2.4	2.4	2.3	2.5	2.4	2.7	2.6	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.5	2.7	2.7	2.7	2.3	2.4	2.7
10-Mar	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.5	3.5	2.9	C	C	C	2.4	2.3	2.3	2.5	2.4	2.9	2.9	2.5	2.5	2.5	3.5
11-Mar	2.6	2.6	2.5	Z	2.4	2.4	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.5	2.6	2.4	2.5	2.5	2.2	2.2	2.4	2.2	2.3	2.4	2.6
12-Mar	2.2	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.5	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.5
13-Mar	2.2	2.2	2.2	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	2.3	2.6	2.6	2.4	2.4	2.3	2.6
14-Mar	Z	2.3	2.5	2.5	2.5	2.6	2.6	2.7	2.5	2.5	2.5	2.5	2.6	2.5	2.3	3.5	4.9	5.1	4.2	3.7	2.6	2.4	2.5	2.4	2.9	5.1
15-Mar	2.4	Z	2.3	2.3	2.4	2.5	2.4	2.5	2.5	2.5	2.4	2.2	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	3.5	2.9	2.7	2.8	2.4	3.5
16-Mar	2.9	3.1	Z	2.3	2.3	2.2	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	2.3	2.3	3.1
17-Mar	2.4	2.3	2.3	Z	2.2	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.4	2.6	2.7	2.5	2.4	2.6	2.6	2.4	2.4	2.5	2.4	2.4	2.7
18-Mar	2.4	2.7	2.5	2.6	Z	2.6	2.8	2.8	2.9	2.8	2.4	2.2	2.2	2.2	3.0	2.5	2.3	2.6	6.0	3.3	2.6	4.5	3.4	2.7	2.9	6.0
19-Mar	2.2	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	2.2	2.1	2.1	2.2	2.2	2.1	2.2
20-Mar	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.4
21-Mar	2.3	Z	2.3	2.2	2.3	2.4	2.6	2.5	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.6
22-Mar	2.2	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.4	2.3	2.2	2.3	2.3	2.1	2.2	2.1	2.2	2.2	2.4
23-Mar	2.2	2.2	2.2	Z	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	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.4
24-Mar	2.1	2.2	2.2	2.2	Z	2.2	2.3	2.5	2.6	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.6
25-Mar	2.1	2.2	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	2.2	2.6	2.4	3.9	3.3	2.4	2.3	2.2	2.3	2.3	3.9
26-Mar	Z	2.2	2.1	2.2	2.1	2.2	2.5	2.7	2.4	2.3	2.4	2.2	2.4	2.5	2.7	2.5	2.1	2.2	2.3	2.3	2.4	2.4	2.4	2.5	2.3	2.7
27-Mar	2.5	Z	2.5	2.6	2.5	2.4	2.4	2.4	2.5	2.3	2.8	3.3	3.0	2.5	2.4	2.5	2.7	3.0	3.4	2.6	2.6	2.8	2.4	2.3	2.6	3.4
28-Mar	2.2	2.2	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.2	2.1	2.1	2.2	2.4
29-Mar	2.2	2.2	2.3	Z	2.3	2.3	2.4	2.5	2.8	2.6	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.8
30-Mar	2.1	2.1	2.1	3.0	Z	2.3	2.3	3.0	3.3	2.7	2.8	2.4	2.3	2.4	2.4	2.5	2.3	2.5	2.5	2.2	2.4	2.2	2.2	2.2	2.4	3.3
31-Mar	2.2	2.2	2.3	2.3	2.2	Z	2.4	2.6	2.2	2.2	2.3	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.3	2.1	2.2	2.3	2.4	2.1	2.2	2.6
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Barge Landing - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Barge Landing - March 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	2	0.28	0.28
2.1 - 3.0	687	96.76	97.04
3.1 - 10.0	21	2.96	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
Barge Landing - March 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	1	0	1	0	0	2
2.1 - 3.0	81	125	40	39	18	24	43	63	63	26	22	11	15	20	22	63	675
3.1 - 10.0	9	3	5	2	0	0	0	0	0	0	1	0	0	0	0	1	21
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	90	128	45	41	18	24	43	63	63	26	23	12	15	21	22	64	698

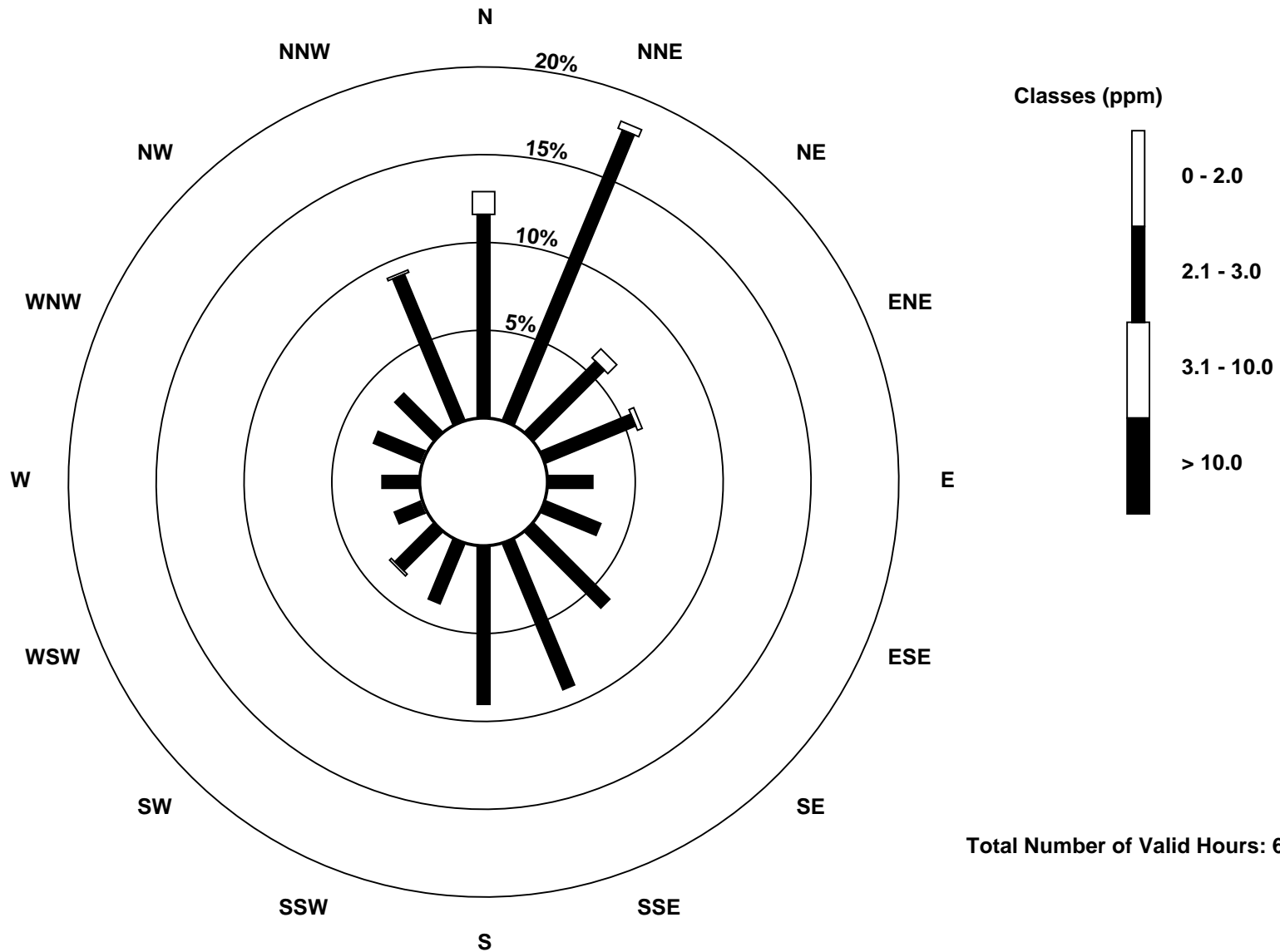
Total Number of Valid Hours: 698

Total Number of Hours: 744

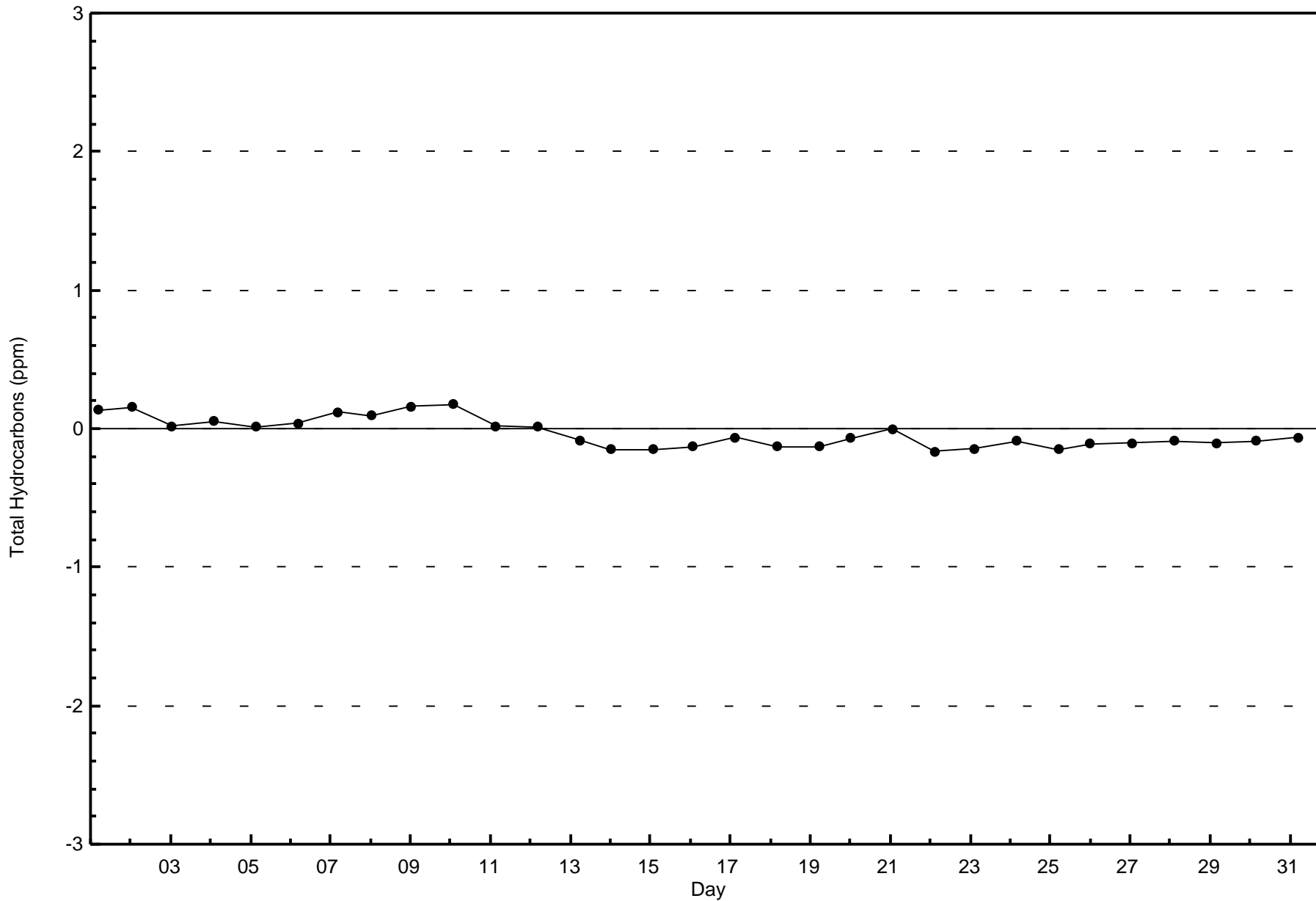


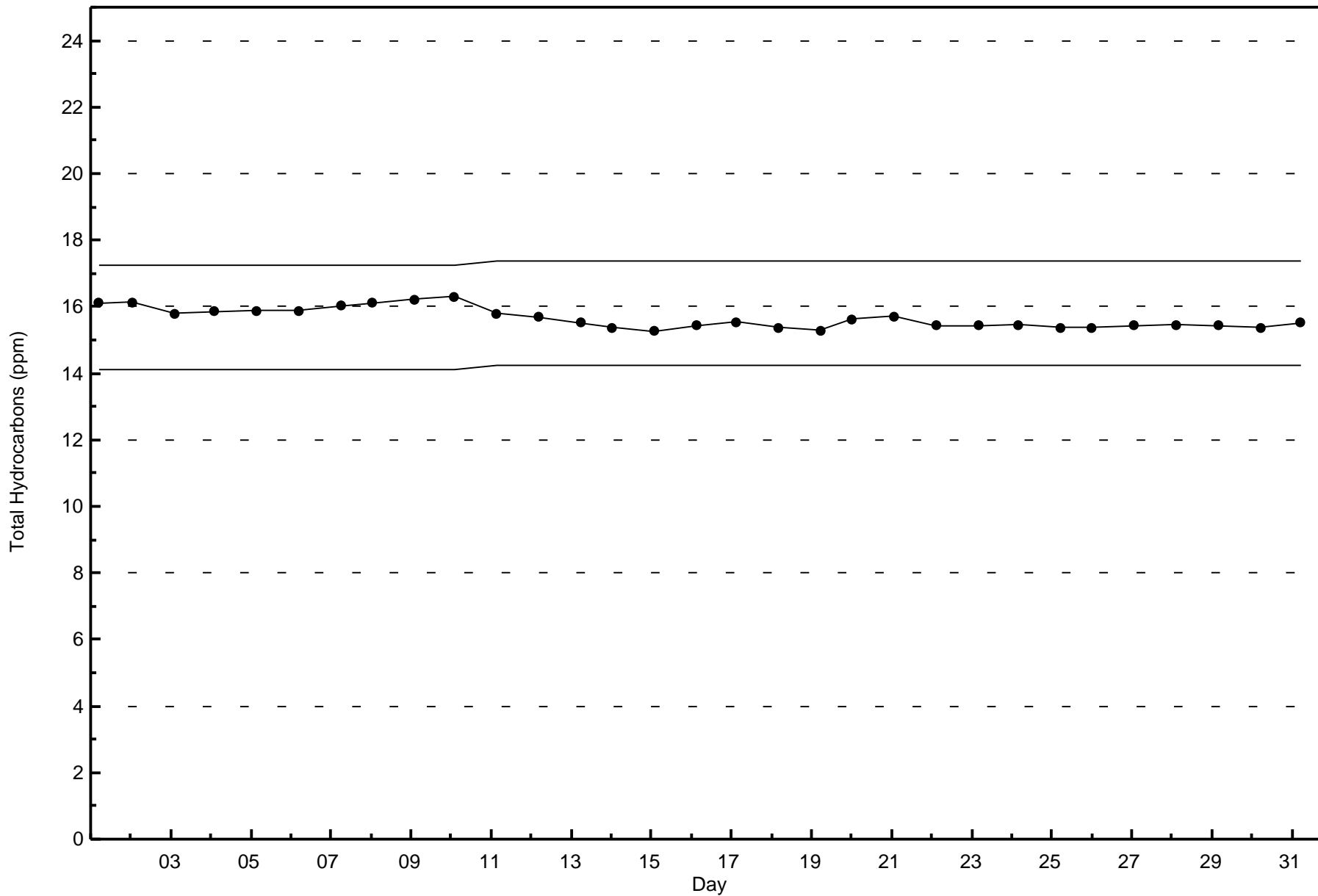
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Hydrocarbons (THC) - ppm
Barge Landing (AMS 9)



Total Number of Valid Hours: 698







Wood Buffalo Environmental Association
Summary of Hour Averages

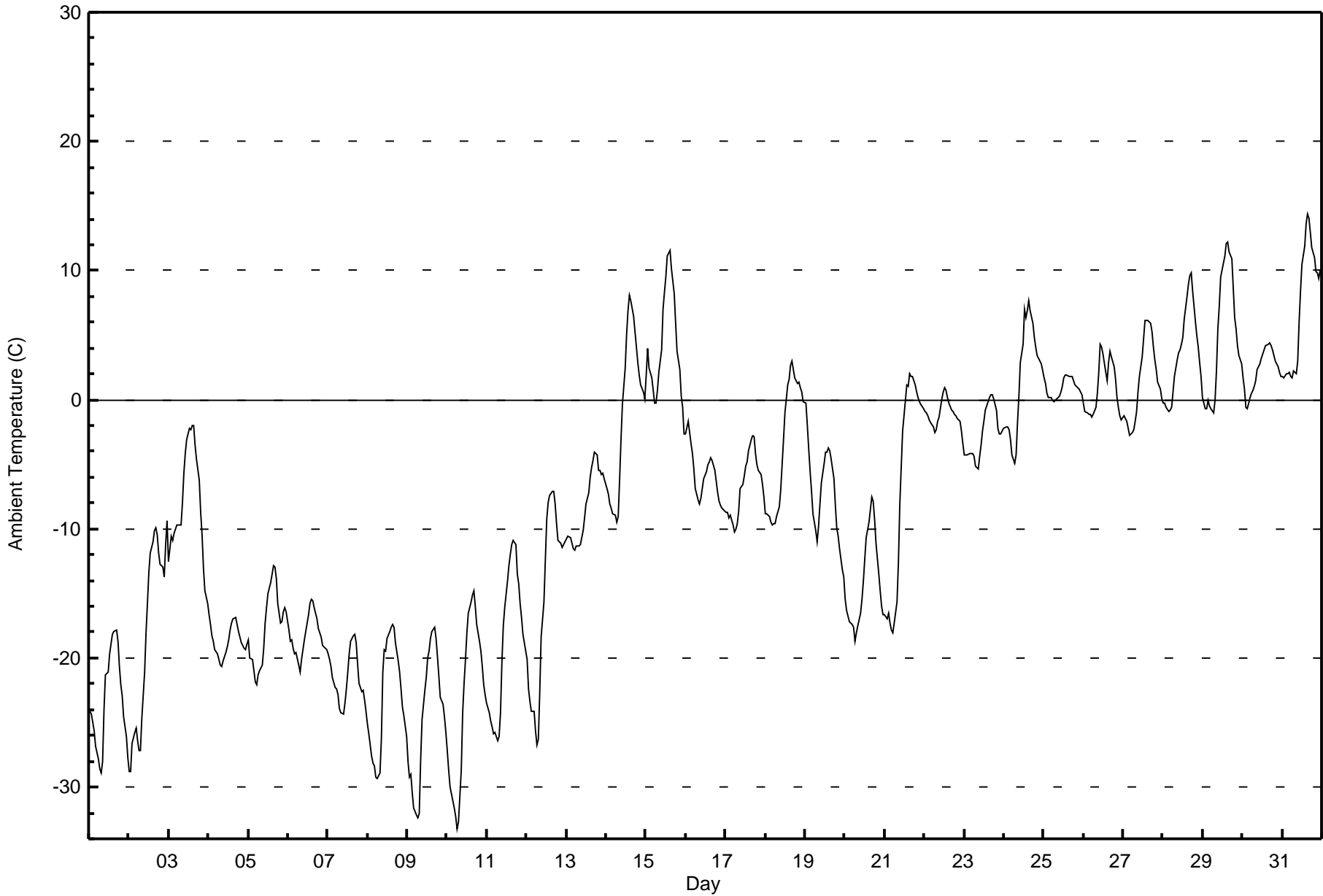
Ambient Temperature (AT) - C
Barge Landing - March 2017

Maximum Value: 14.4 C on Mar 31 16:00 Maximum Daily Average: 7.3 C on Mar 31																							Hours in Service:	744		
Minimum Value: -33.3 C on Mar 10 07:00 Minimum Daily Average: -24.7 C on Mar 9																							Hours of Data:	744		
Maximum Diurnal Average: -3.5 C at hour 16 Minimum Diurnal Average: -13.1 C at hour 7																							Hours of Missing Data:	0		
Monthly Average: -8.39 C Percentiles: P ₁ = -31.7 P ₁₀ = -23.5 Q ₁ = -17.9 Median = -7.0 Q ₃ = 0.5 P ₉₀ = 4.0 P ₉₉ = 11.7																							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-Mar	-24.1	-24.4	-25.0	-25.7	-26.9	-27.8	-28.6	-28.9	-28.0	-24.0	-21.3	-21.1	-19.6	-18.9	-18.2	-18.0	-17.8	-18.7	-20.7	-22.1	-23.0	-24.6	-26.1	-27.7	-23.4	-17.8
2-Mar	-28.8	-28.7	-26.6	-25.7	-25.4	-26.4	-27.1	-27.2	-24.7	-21.1	-18.1	-15.8	-13.4	-11.8	-11.0	-10.1	-9.9	-10.4	-11.9	-12.8	-13.0	-13.8	-11.2	-9.3	-18.1	-9.3
3-Mar	-12.5	-10.6	-10.9	-10.4	-10.0	-9.7	-9.7	-9.7	-8.0	-5.7	-4.2	-3.1	-2.2	-2.3	-2.0	-2.0	-3.5	-4.6	-6.2	-8.7	-10.5	-13.0	-14.8	-15.8	-7.9	-2.0
4-Mar	-16.7	-17.4	-18.3	-18.7	-19.3	-19.7	-20.1	-20.5	-20.6	-20.2	-19.6	-19.2	-18.6	-17.9	-17.2	-16.9	-16.9	-17.4	-17.9	-18.4	-18.8	-19.2	-19.4	-18.9	-18.7	-16.7
5-Mar	-18.6	-20.0	-20.1	-20.9	-21.9	-22.1	-21.4	-21.0	-20.5	-19.3	-17.3	-16.1	-15.0	-14.2	-13.5	-12.8	-13.0	-13.9	-15.8	-17.3	-17.2	-16.4	-16.1	-16.4	-17.5	-12.8
6-Mar	-17.8	-18.7	-18.6	-19.2	-19.7	-19.6	-20.6	-21.1	-20.1	-19.3	-18.6	-17.3	-16.6	-15.8	-15.4	-15.6	-16.1	-17.0	-17.7	-18.0	-18.4	-19.0	-19.3	-19.3	-18.3	-15.4
7-Mar	-19.7	-20.1	-20.7	-21.5	-22.2	-22.3	-22.9	-23.9	-24.3	-24.3	-23.5	-22.4	-21.1	-19.6	-18.7	-18.3	-18.1	-18.9	-20.5	-21.9	-22.7	-22.5	-23.2	-24.1	-21.6	-18.1
8-Mar	-25.1	-25.9	-27.6	-28.1	-28.3	-29.2	-29.4	-28.9	-26.2	-21.1	-19.4	-19.4	-18.5	-17.9	-17.6	-17.4	-17.6	-18.8	-20.3	-21.1	-22.4	-23.8	-24.5	-26.1	-23.1	-17.4
9-Mar	-28.1	-29.2	-29.0	-30.5	-31.7	-32.1	-32.4	-32.0	-27.9	-24.8	-22.5	-21.5	-20.0	-19.4	-18.5	-17.9	-17.7	-18.5	-19.9	-21.4	-23.1	-23.6	-24.5	-25.7	-24.7	-17.7
10-Mar	-27.1	-28.7	-30.0	-31.1	-31.6	-32.3	-33.3	-32.7	-28.6	-24.3	-22.0	-20.1	-18.0	-16.6	-15.7	-15.2	-14.8	-16.0	-17.4	-18.7	-19.5	-20.7	-22.0	-22.8	-23.3	-14.8
11-Mar	-23.4	-24.3	-24.8	-25.3	-25.9	-25.8	-26.4	-26.1	-24.2	-20.3	-17.5	-16.1	-14.0	-12.8	-12.0	-11.2	-10.9	-11.3	-13.5	-14.2	-15.8	-16.9	-18.1	-19.5	-18.8	-10.9
12-Mar	-20.1	-22.4	-23.4	-24.1	-24.2	-25.6	-26.7	-26.3	-22.7	-18.4	-15.7	-12.4	-9.2	-7.9	-7.4	-7.1	-7.1	-8.1	-9.5	-10.9	-11.1	-11.4	-11.3	-11.1	-15.6	-7.1
13-Mar	-10.8	-10.5	-10.7	-11.1	-11.6	-11.6	-11.3	-11.3	-11.2	-10.7	-10.1	-9.2	-8.1	-7.2	-6.1	-5.2	-4.7	-4.1	-4.2	-5.4	-5.4	-5.8	-5.7	-6.2	-8.3	-4.1
14-Mar	-6.9	-7.3	-8.0	-8.4	-8.8	-8.9	-9.4	-9.1	-6.2	-3.0	-0.4	2.5	5.0	6.9	8.1	7.6	6.4	5.3	4.1	2.9	1.9	1.2	0.6	0.0	-1.0	8.1
15-Mar	1.9	3.9	2.4	1.7	0.7	-0.3	-0.2	0.7	2.1	3.9	7.0	8.3	9.6	11.2	11.5	10.2	9.2	8.2	6.0	3.7	2.3	0.3	-0.6	-2.6	4.2	11.5
16-Mar	-2.6	-1.7	-2.5	-3.4	-4.2	-5.4	-6.9	-7.8	-8.1	-7.6	-6.8	-6.1	-5.5	-5.0	-4.8	-4.5	-4.8	-5.5	-6.4	-7.2	-7.8	-8.2	-8.4	-8.6	-5.8	-1.7
17-Mar	-8.7	-8.7	-9.2	-8.9	-9.7	-10.2	-10.1	-9.6	-8.6	-6.9	-6.6	-5.9	-5.1	-4.8	-4.0	-3.1	-2.7	-2.9	-4.1	-5.0	-5.4	-5.8	-6.6	-7.5	-6.7	-2.7
18-Mar	-8.8	-8.9	-9.0	-9.5	-9.7	-9.5	-9.6	-9.1	-8.3	-6.9	-5.1	-3.1	-1.0	1.2	1.6	2.6	3.0	2.3	1.7	1.2	1.4	0.9	0.6	-0.1	-3.4	3.0
19-Mar	-0.2	-2.0	-3.8	-5.6	-7.1	-8.8	-10.1	-11.0	-9.8	-8.1	-6.5	-4.9	-4.0	-4.1	-3.7	-3.9	-4.6	-6.1	-8.2	-9.9	-10.6	-11.5	-13.2	-13.8	-7.2	-0.2
20-Mar	-15.4	-16.3	-16.7	-17.1	-17.4	-17.7	-18.7	-18.1	-17.5	-16.5	-15.4	-14.0	-12.3	-10.7	-9.4	-8.5	-7.6	-7.9	-9.3	-11.1	-13.5	-14.8	-15.9	-16.7	-14.1	-7.6
21-Mar	-16.6	-16.9	-16.5	-17.3	-17.9	-18.1	-17.3	-15.7	-12.6	-8.1	-5.2	-2.4	0.0	1.1	1.1	2.0	1.8	1.8	1.1	0.6	0.2	-0.2	-0.4	-0.7	-6.5	2.0
22-Mar	-0.9	-1.0	-1.2	-1.5	-1.8	-2.1	-2.6	-2.4	-1.6	-1.4	0.0	0.6	1.0	0.7	0.2	-0.2	-0.8	-1.0	-1.1	-1.2	-1.5	-1.6	-2.5	-3.5	-1.1	1.0
23-Mar	-4.2	-4.3	-4.2	-4.2	-4.2	-4.4	-4.4	-5.1	-5.4	-4.4	-3.5	-2.4	-1.7	-0.8	-0.2	0.2	0.3	0.3	0.0	-0.8	-2.2	-2.6	-2.6	-2.5	-2.6	0.3
24-Mar	-2.2	-2.1	-2.1	-2.3	-3.1	-4.2	-4.9	-4.3	-1.8	0.3	2.9	4.3	7.0	6.4	6.9	7.6	6.9	5.9	4.9	4.0	3.4	3.2	2.8	2.3	1.7	7.6
25-Mar	1.7	1.3	0.5	0.2	0.1	0.0	-0.1	-0.1	0.0	0.2	0.6	1.0	1.7	1.9	2.0	1.8	1.8	1.8	1.5	1.2	0.9	0.8	0.6	0.4	0.9	2.0
26-Mar	-0.2	-0.9	-1.1	-1.2	-1.1	-1.3	-1.1	-0.6	0.5	2.1	4.3	4.1	3.6	2.1	1.5	2.8	3.8	3.3	2.5	1.6	0.2	-0.5	-1.3	-1.6	0.9	4.3
27-Mar	-1.3	-1.5	-1.7	-2.2	-2.7	-2.5	-2.3	-1.6	-0.9	0.6	1.7	3.3	4.7	6.1	6.2	6.1	6.0	5.3	4.0	3.1	2.3	1.3	0.8	0.1	1.5	6.2
28-Mar	-0.3	-0.3	-0.5	-0.9	-0.8	-0.6	0.6	1.8	3.1	3.6	3.8	4.3	4.8	6.2	8.0	8.9	9.6	9.8	8.5	6.0	4.9	4.1	2.9	1.8	3.7	9.8
29-Mar	0.1	-0.7	-0.7	-0.1	-0.4	-0.7	-1.0	-0.1	2.3	5.5	7.3	9.5	10.6	11.1	12.1	12.3	11.4	10.9	8.6	6.3	5.5	4.2	3.4	2.7	5.0	12.3
30-Mar	1.7	0.8	-0.6	-0.6	0.2	0.5	0.7	1.1	1.5	2.3	2.8	3.2	3.6	3.8	4.2	4.3	4.4	4.2	3.9	3.4	3.0	2.6	2.1	1.8	2.3	4.4
31-Mar	1.7	1.7	2.0	2.0	2.1	1.8	1.7	2.2	2.0	3.0	6.0	8.4	10.5	11.9	13.6	14.4	14.1	12.9	11.7	11.0	9.9	9.8	9.4	10.1	7.3	14.4
																							Diurnal Average			
																							Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Barge Landing - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Barge Landing - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	127	17.07	17.07
-20 - 0	412	55.38	72.45
0 - 10	187	25.13	97.58
10 - 20	18	2.42	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

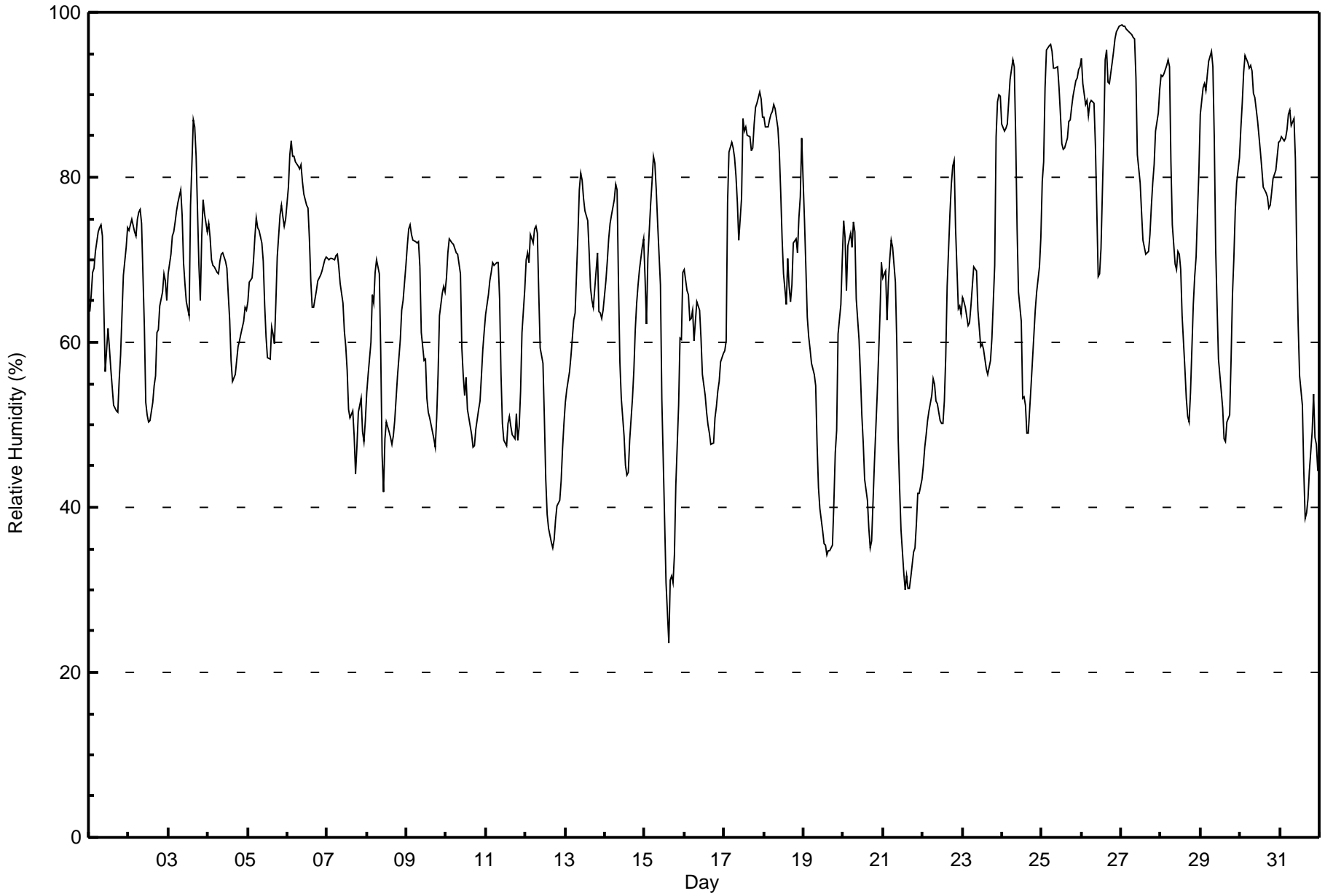
Barge Landing - March 2017

Maximum Value: 98 % on Mar 27 01:00 Maximum Daily Average: 89.6 % on Mar 25																			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 Mar 15 15:00 Minimum Daily Average: 48.2 % on Mar 21 Maximum Diurnal Average: 77.3 % at hour 6 Minimum Diurnal Average: 56.3 % at hour 17 Monthly Average: 67.1 % Percentiles: P₁ = 31 P₁₀ = 48 Q₁ = 56 Median = 68 Q₃ = 77 P₉₀ = 89 P₉₉ = 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-Mar	64	66	68	69	71	73	74	74	73	64	57	62	59	57	55	52	52	52	55	58	63	68	71	74	63.8	74																																																																																												
2-Mar	74	74	75	73	73	75	76	76	74	62	53	51	50	51	53	55	56	61	61	64	66	68	67	65	64.8	76																																																																																												
3-Mar	68	71	73	73	75	76	77	78	75	70	67	65	63	77	82	87	86	82	69	65	73	77	76	73	74.1	87																																																																																												
4-Mar	74	73	70	69	69	69	68	70	71	71	70	69	66	63	58	55	56	58	60	60	61	63	64	64	65.4	74																																																																																												
5-Mar	65	67	68	70	73	75	74	74	72	70	65	61	58	58	62	61	60	65	70	75	77	75	74	75	68.4	77																																																																																												
6-Mar	79	83	84	83	83	82	81	81	81	79	78	77	76	73	68	64	64	66	68	68	68	69	70	70	74.8	84																																																																																												
7-Mar	70	70	70	70	70	71	71	69	67	65	61	60	57	52	51	52	49	44	48	52	53	49	48	51	59.0	71																																																																																												
8-Mar	54	56	60	66	65	68	70	68	59	46	42	48	50	49	48	48	49	51	56	58	60	64	65	69	57.1	70																																																																																												
9-Mar	72	74	74	73	72	72	72	72	69	61	58	58	53	52	51	50	48	47	51	56	63	66	67	66	62.4	74																																																																																												
10-Mar	68	71	72	72	72	71	71	71	68	59	56	54	56	52	50	49	47	48	50	52	53	56	59	61	59.9	72																																																																																												
11-Mar	63	66	67	68	70	69	70	70	65	56	50	48	48	50	51	50	49	48	51	48	50	54	61	66	57.9	70																																																																																												
12-Mar	70	71	70	73	72	74	74	73	66	59	57	51	43	39	38	36	35	36	38	40	41	43	47	50	54.1	74																																																																																												
13-Mar	53	54	56	58	61	63	64	73	78	80	80	77	76	75	71	67	65	64	69	71	64	64	63	64	67.0	80																																																																																												
14-Mar	67	70	73	74	75	77	79	78	67	58	53	49	45	44	44	48	53	57	61	65	67	69	72	73	63.3	79																																																																																												
15-Mar	68	62	70	77	80	83	82	79	74	67	53	46	38	31	24	31	32	31	34	43	52	61	60	68	56.0	83																																																																																												
16-Mar	69	66	66	63	63	64	60	65	64	64	61	56	54	52	50	49	48	48	51	52	54	55	58	59	57.9	69																																																																																												
17-Mar	59	60	77	83	84	84	82	80	77	72	77	87	86	86	85	85	83	84	86	89	89	90	90	87	81.8	90																																																																																												
18-Mar	87	86	86	87	88	88	89	88	86	83	78	73	68	65	70	67	65	67	72	73	71	75	78	85	78.1	89																																																																																												
19-Mar	75	69	63	61	59	57	56	55	48	42	40	37	36	35	34	35	35	35	40	47	49	61	65	70	50.2	75																																																																																												
20-Mar	75	73	66	72	73	71	75	73	65	60	56	51	48	43	41	37	35	36	41	45	54	58	64	70	57.6	75																																																																																												
21-Mar	68	69	63	67	70	72	72	67	60	48	42	37	32	30	32	30	30	31	35	35	38	42	42	43	48.2	72																																																																																												
22-Mar	45	47	49	51	52	53	56	55	53	53	50	50	50	53	58	67	76	79	81	82	74	64	64	63	59.4	82																																																																																												
23-Mar	65	65	64	62	62	64	67	69	69	64	62	59	60	59	57	56	57	58	60	69	85	89	90	90	66.8	90																																																																																												
24-Mar	86	86	86	86	89	92	94	93	85	74	66	63	53	53	52	49	49	55	58	61	64	66	69	73	70.9	94																																																																																												
25-Mar	79	82	91	95	96	96	95	93	93	93	91	88	84	83	83	85	87	87	88	90	92	92	93	93	89.6	96																																																																																												
26-Mar	94	91	89	89	88	89	89	89	84	76	68	68	71	85	94	95	91	91	94	95	97	98	98	98	88.5	98																																																																																												
27-Mar	98	98	98	98	98	97	97	97	97	92	83	79	76	72	72	71	71	73	77	79	82	86	88	91	86.2	98																																																																																												
28-Mar	92	92	93	93	94	93	82	74	69	69	71	71	69	63	57	53	51	50	54	65	68	70	76	81	73.0	94																																																																																												
29-Mar	88	91	91	90	92	94	95	93	85	71	64	58	54	52	48	48	50	51	58	66	70	76	79	82	72.9	95																																																																																												
30-Mar	86	89	93	95	94	93	94	93	90	90	87	85	83	81	79	78	78	76	77	78	80	81	83	84	85.2	95																																																																																												
31-Mar	84	85	84	85	86	88	88	86	87	82	70	62	56	52	44	39	39	41	44	49	54	49	48	44	64.5	88																																																																																												
																			72.9				73.4				74.5				75.7				76.3				77.3				77.2				76.7				73.3				67.8				63.4				61.2				58.6				57.6				56.8				56.4				56.3				57.2				59.9				62.9				65.5				67.7				69.3				71.1				Diurnal Average			
																			98				98				98				98				97				97				97				97				93				91				88				86				86				94				95				91				91				94				95				97				98				98				98				Diurnal Maximum							



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Barge Landing - March 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Barge Landing - March 2017

Maximum Speed: 19 km/h on Mar 19 18:00	Maximum Daily Speed Average: 12.9 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 10 09:00	Minimum Daily Speed Average: 0.2 km/h on Mar 2	Hours of Data: 731
Maximum Diurnal Speed Average: 2.4 km/h at hour 20	Minimum Diurnal Speed Average: 0.1 km/h at hour 10	Hours of Missing Data: 13
Monthly Average Velocity: 1.2 km/h 41.6 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 8 P ₉₀ = 11 P ₉₉ = 15	Percent Operational Time: 98.3

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-Mar	NNW4	NNW5	N5	NNW3	N3	N3	NNW4	N3	NNW4	NNW3	N5	NNE7	NNE7	NNE7	NE6	NE6	NE5	NNE3	N3	NNE2	E1	WNW1	NNW1	NW1	N3.5	NNE7	
2-Mar	WSW1	SW2	SSE2	S2	S1	S3	SSE3	SSE4	S4	WSW3	W4	W5	WNW3	NNE4	NNE5	NNE5	NNE4	NNE3	N4	NE2	SE3	NNW3	SSE7	SSE5	SE0.2	SSE7	
3-Mar	NE1	SSE5	SE2	S2	SSE4	S4	SSE3	SSE4	SSW5	S9	SSW8	S8	SSW8	WSW7	SSW6	WNW3	N11	NNW7	NNW10	NNW11	N8	NNE9	N8	N7	W0.9	N11	
4-Mar	NNE7	NNE10	NNE7	N6	NNE7	NNE12	NNE11	NNE11	NNE11	NNE12	NNE11	NNE10	NNE10	NNE10	NNE11	NNE10	NNE7	NE6	ENE5	NE5	ENE6	NE4	NE4	NE6	NNE8.0	NNE12	
5-Mar	NE6	NNW4	NNW5	NNW4	N4	N2	E3	ENE3	NNW5	NNW4	NNW4	WNW4	WNW4	NW4	W6	WSW6	W2	ENE3	NNE2	ESE4	ESE4	S2	SW1	N4	NNW1.8	W6	
6-Mar	N4	N2	N2	NNW5	N3	NNE4	N4	E4	ENE5	NNE8	NNE11	NNE10	NNE9	NE8	NE10	NNE11	NNE10	NNE11	NNE11	N11	N11	N11	N12	NNE12	NNE7.5	NNE12	
7-Mar	N13	N10	NNE11	N11	NNE11	NE11	NNE10	NNE11	NNE11	NNE12	NNE12	NNE11	NNE10	NNE10	NNE10	NNE9	NNE11	NE9	ENE6	NE4	NE5	N6	N6	N5	NNE9.2	N13	
8-Mar	NNW5	NNW4	NNW2	WNW2	NNW1	AF	SW3	SW3	WSW2	W2	NW4	NE7	NE7	NE8	NE8	NE8	ENE8	ENE9	NE9	NE7	N4	N3	NNW4	N4	NNE3.5	ENE9	
9-Mar	NNW3	NW1	NNW1	N1	WSW3	WSW2	WSW2	WSW3	WSW2	NNW1	ENE3	NNE5	NE4	NE6	ENE6	ENE6	ENE6	ENE7	NE6	NNE3	NNW3	NNE3	N3	NNW4	NNE2.1	ENE7	
10-Mar	NNW3	NNW2	N3	NNW3	NNW3	NW2	WNW1	NNW2	SE0	W3	N3	NNE5	NNE6	NNE6	NNE6	NNE6	NNE7	N6	N5	N6	N7	N4	N3	N2	N3.5	NNE7	
11-Mar	N2	N2	N2	N2	N3	N3	N3	N3	NNW2	WNW2	NW4	N4	NNW4	NNE5	NNE6	NNE6	NNE6	N3	NE2	ENE7	NE1	SE1	ESE2	ESE1	NNE2.6	ENE7	
12-Mar	SE1	NNW3	NNW4	N3	N4	N2	NNW3	NNW3	NNW3	W2	WNW4	WNW4	SSE8	S11	SSW12	SSE11	SE13	SE12	SE10	SE9	SE13	SSE12	SSE12	SSE12	SSE4.1	SE13	
13-Mar	SSE12	SSE12	SSE13	SSE12	SSE10	S11	S11	S11	S12	S13	S13	S15	S14	S13	S12	SSE13	S12	S9	S8	S8	S8	S10	S9	SSE7	S11.1	S15	
14-Mar	SSE7	SSE7	SSE8	SSE8	SSE6	S7	S6	SSE6	S9	S10	SSW10	SW9	S3	SSE5	SE2	NE3	NE5	N4	N5	NNW3	NNW7	N5	NNW4	NW1	S2.7	SSW10	
15-Mar	SE7	SE8	SSW6	S8	SSE7	S7	S8	S7	S10	SSW9	SW12	SW9	SW13	WSW13	WNW13	NNW13	NNW11	NNW9	N5	NNE4	NE3	NNE2	WNW1	NNW2	SW3.3	WSW13	
16-Mar	N5	N8	N10	NNE10	NNE10	NNE12	NNE13	NNE12	NE13	NNE12	NNE12	NNE11	NNE11	NNE11	NNE12	NNE10	NNE10	NNE10	NNE9	NNE9	NNE8	NNE8	NNE9	NNE7	NNE10.0	NE13	
17-Mar	NNE7	NE6	NE5	N3	NNW5	NNW6	NNW5	NNW3	NW2	W3	N2	NNW3	NNW5	N5	NNE4	NNE6	NNE6	NNE7	NNE6	NNE6	N7	N6	N6	N6	N4.6	NNE7	
18-Mar	NNE5	NNE6	NNE6	NNE6	NNE6	NNE5	N4	NNE5	NNE5	N5	NNE5	N5	NNW6	NNE5	NNE6	N6	NW4	NNE4	N3	N3	N4	ENE2	SW1	W2	N4.0	NNW6	
19-Mar	NW15	NW13	NW17	WNW15	WNW14	WNW14	W13	W12	W13	WNW15	W14	WNW13	WNW14	NW15	NW15	NW16	NW17	NW19	NW15	NW13	NW12	NNW12	N9	N7	NW12.9	NW19	
20-Mar	NNE10	N9	N9	N6	N6	N5	NNE3	ENE4	ENE6	NE5	E6	E6	ENE6	ENE7	ENE7	E4	SSW4	S4	SE4	NE1	N2	NNW3	E1	ESE4	NE3.5	NNE10	
21-Mar	ESE2	SE5	SSE5	SE4	S1	S3	S4	S4	SSW6	SSW8	S7	S9	S12	S11	SSE12	SSE13	SSE14	SSE12	SE11	SE13	SSE10	SSE9	SSE10	SSE11	SSE7.7	SSE14	
22-Mar	SSE11	SSE10	SSE9	SE9	SE9	SE7	ESE5	ESE7	SE9	SE7	SE7	SE3	W2	SW5	SW6	SW6	SW7	SW5	SSE2	N2	N7	NNE9	N11	NNE8	SE2.8	SSE11	
23-Mar	NNE9	NNE8	N7	N6	NNE7	NNE7	NNE7	NNE8	NE8	NE8	NNE8	NNE8	NNE7	NNE7	NNE6	NNE5	NNE5	N4	NNW4	NNW5	N4	ENE3	ENE3	ESE4	NNE5.7	NNE9	
24-Mar	SSE5	SSE3	SSE4	SSE5	SSW4	SSW2	S4	SW1	WNW1	NNW4	WNW5	NNW3	SSW8	S9	SSE8	SSE10	SSE11	SE12	SE8	ESE7	SE7	SE10	SSE10	SE8	SSE4.8	SE12	
25-Mar	ESE6	ESE2	E3	E5	ENE5	ENE3	E3	E3	ESE4	SE3	SE5	SE6	S2	NW3	NW3	NNE2	ENE3	ENE2	NE3	ENE4	ENE3	ENE2	ENE1	ENE1	E2.3	SE6	
26-Mar	E3	ESE4	ESE4	SE3	E4	NNE1	NNE3	N2	ENE3	ENE5	WNW3	WSW7	SW5	W5	ENE3	SE7	ESE4	SSW5	SW3	N1	E3	NE1	E1	AF	ESE1.0	WSW7	
27-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NE2	NE4	NNE5	NNE6	NNE8	NNE6	NNE6	NNE6	NNE5	NNE5	N5	N5	N3	NNW4	NNW4	----	NNE8
28-Mar	NNW5	NNW3	W0	AF	SSW1	SE3	SSE5	SSE5	SSE6	S6	S8	S8	SSW8	S8	S6	S6	SSE2	SE1	SE5	E4	ESE5	ESE5	SSE4	E2	SSE3.4	S8	
29-Mar	ESE3	ESE4	SSE6	S4	SSE4	SSE5	S4	SSE5	S6	S8	SSW8	S9	SSW7	SW7	SSE3	SSE7	SSE5	SE4	SE7	SE5	ESE1	SE6	SE6	ESE5	SSE4.7	S9	
30-Mar	ESE5	ESE6	NE1	ENE3	E3	ENE2	E2	AF	N2	NNE4	NE5	NNW5	NNW4	ENE3	NE2	ENE3	ENE3	NE3	ENE3	ENE3	E2	SSE2	WNW1	SE2	ENE2.1	ESE6	
31-Mar	SE3	SSE4	S4	SW3	SSW4	SSE4	S4	S5	SW8	SW8	WSW8	S8	S8	SSE11	S12	SSW15	SSW13	SSW12	S9	SW9	SSW5	SSW9	SSW9	SW10	SSW7.2	SSW15	

NE2.1	NE1.5	NNE1.3	NNE0.9	NNE1.2	NE1.0	NE0.5	ENE0.6	ESE0.5	NNW0.1	NW0.7	N0.7	N0.4	NNE0.6	NE1.5	NE1.7	NE2.1	NE2.1	NE2.2	NE2.4	NE2.1	NE1.6	ENE1.3	ENE1.5	Diurnal Average	
NNW15	NW13	NW17	WNW15	WNW14	WNW14	W13	W12	W13	WNW15	W14	S15	S14	NW15	NW15	NW16	NW17	NW19	NW15	NW13	SE13	NNW12	N12	NNE12	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

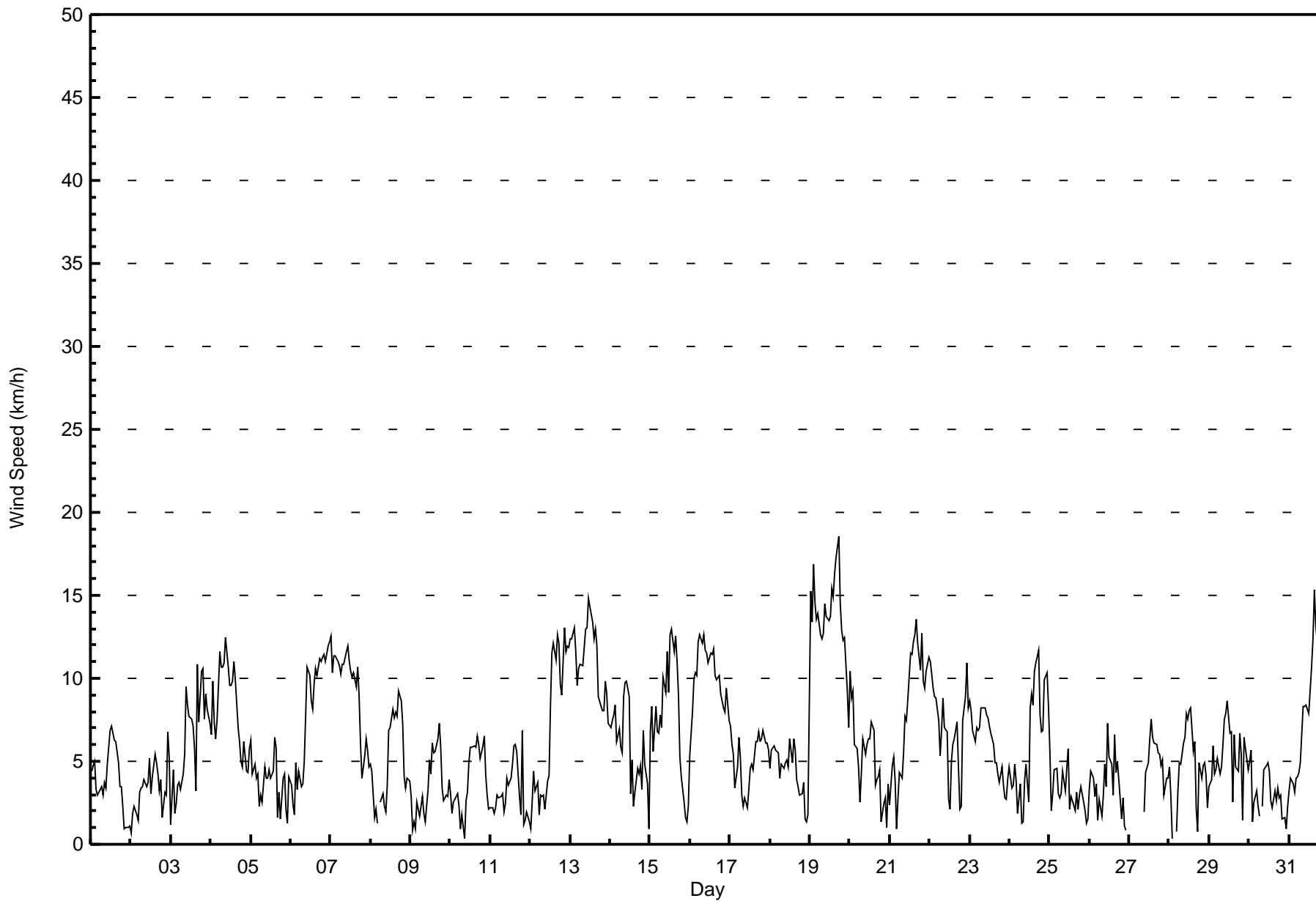
Wind Speed (WS) - km/h
Barge Landing - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Mar 19 18:00											Hours in Service: 744 Hours of Data: 731 Hours of Missing Data: 13 Hours of Calibration: 0 Percent Operational Time: 98.3														
Minimum Value: 0 km/h on Mar 12 07:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 5																									
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-Mar	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2
2-Mar	1	1	2	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	2	1	3	2	3
3-Mar	1	3	2	1	1	2	1	1	3	3	3	3	2	2	2	3	2	4	4	3	2	3	3	4	
4-Mar	2	3	2	2	2	3	3	4	4	4	3	3	3	3	3	3	2	2	2	2	1	1	2	4	
5-Mar	2	1	1	1	1	1	2	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	2	
6-Mar	1	1	1	1	2	2	2	1	2	2	3	3	3	2	3	3	3	4	4	3	3	3	4	4	
7-Mar	4	4	3	4	3	3	3	3	3	4	3	3	3	3	3	3	3	2	2	2	2	2	1	4	
8-Mar	1	1	1	1	1	AF	1	1	1	1	2	2	2	2	2	3	3	3	3	2	2	1	1	3	
9-Mar	1	1	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2	3	2	2	1	1	1	3	
10-Mar	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	2	
11-Mar	1	1	1	1	1	1	1	1	0	1	1	1	1	2	2	2	2	2	2	2	1	1	1	2	
12-Mar	1	2	1	1	1	1	0	0	1	1	1	1	4	4	4	4	4	3	3	2	3	3	4	4	
13-Mar	4	4	5	4	3	4	4	4	4	5	5	5	5	6	5	5	4	3	3	2	3	3	2	6	
14-Mar	1	1	2	2	1	2	2	3	3	3	3	3	2	2	2	1	2	1	2	2	1	1	1	3	
15-Mar	3	3	2	2	2	2	3	2	3	3	3	3	4	4	5	4	4	3	2	1	1	1	1	5	
16-Mar	1	3	4	3	3	4	4	4	3	3	3	3	3	3	3	3	3	3	3	2	3	2	3	4	
17-Mar	2	2	2	1	2	2	2	1	1	2	1	1	1	2	1	2	1	2	1	1	2	1	1	2	
18-Mar	1	1	1	1	1	2	1	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	
19-Mar	5	5	5	5	6	5	5	4	5	5	5	5	5	6	6	6	6	7	5	4	4	5	4	7	
20-Mar	3	3	3	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	3	
21-Mar	1	2	1	1	1	1	1	1	2	3	3	3	4	4	4	4	4	4	3	4	3	3	3	4	
22-Mar	4	3	3	3	3	2	2	2	3	2	2	2	1	1	1	2	2	1	2	3	2	2	4	4	
23-Mar	2	3	2	2	2	2	2	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	3	
24-Mar	2	1	1	1	1	2	1	1	1	1	1	2	3	3	3	4	4	3	3	2	2	3	4	4	
25-Mar	2	2	1	2	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	
26-Mar	1	1	1	1	1	1	1	1	1	2	2	3	2	2	2	2	2	2	1	1	1	1	2	3	
27-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	1	1	1	2	2	2	1	2	1	1	1	1	1	1	2	
28-Mar	1	1	1	AF	1	1	1	1	1	2	2	3	3	3	3	3	2	2	1	1	2	1	2	3	
29-Mar	1	1	1	1	1	1	1	1	1	2	3	2	3	3	2	2	3	2	2	2	2	2	2	3	
30-Mar	1	2	1	1	1	1	2	AF	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	
31-Mar	1	1	1	1	1	1	2	2	3	3	3	3	3	4	5	6	5	5	3	5	2	3	3	6	
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Barge Landing - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Barge Landing - March 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	377	51.57	51.57
6 - 11	282	38.58	90.15
12 - 19	72	9.85	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: 731

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Barge Landing - March 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	65	34	24	29	18	20	20	27	19	9	11	8	11	15	12	55	377
6 - 11	31	89	21	13	2	4	20	29	35	14	10	4	1	0	0	9	282
12 - 19	2	11	1	0	0	0	5	12	10	4	2	1	4	7	11	2	72
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	98	134	46	42	20	24	45	68	64	27	23	13	16	22	23	66	731

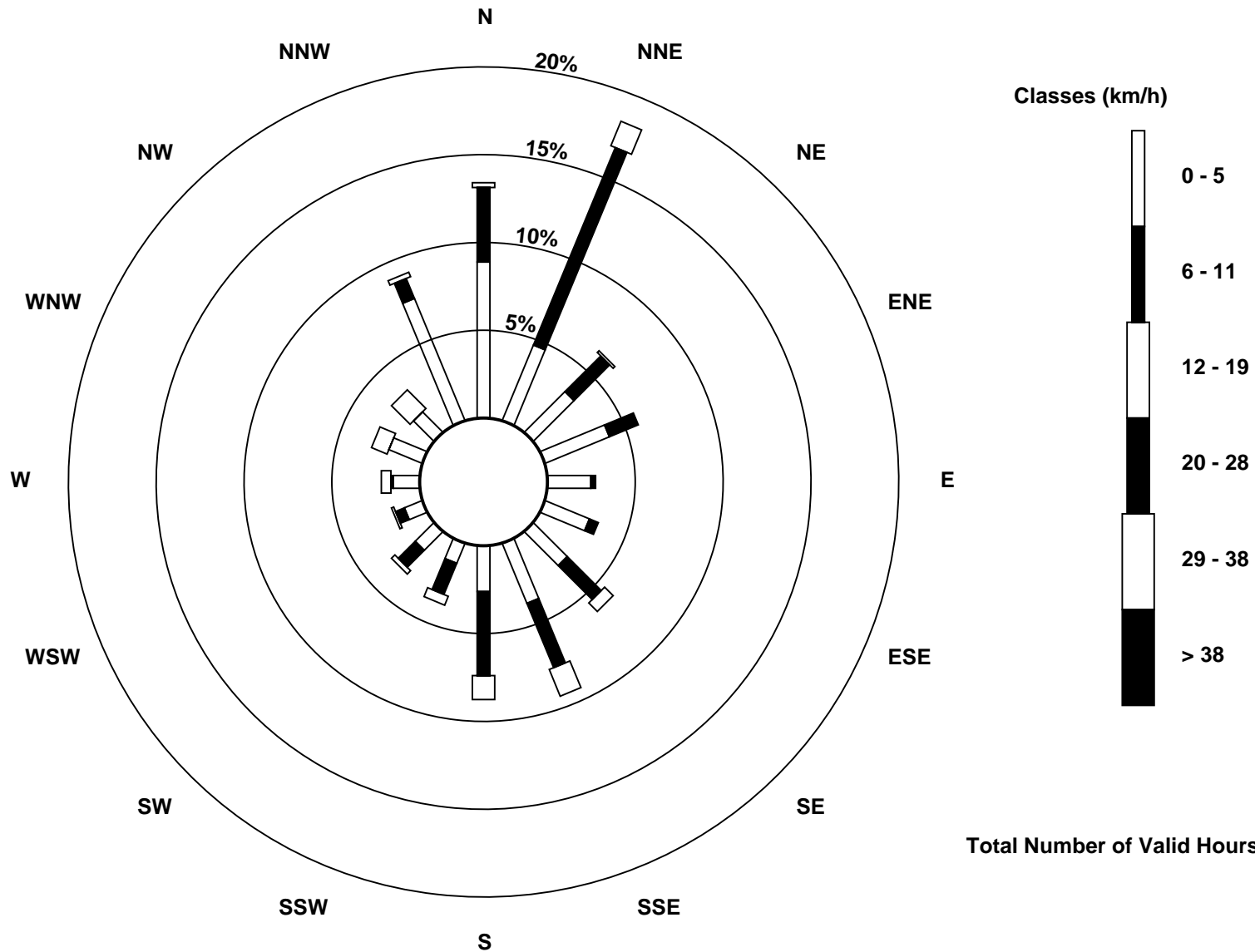
Total Number of Valid Hours: 731

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Wind Speed (WS) - km/h
Barge Landing (AMS 9)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Barge Landing - March 2017

Direction of Maximum Speed: 314 deg on Mar 19 18:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 306.8 deg on Mar 19	Hours of Data: 731
Direction of Minimum Speed: 128 deg on Mar 10 09:00	Hours of Missing Data: 13
Direction of Minimum Daily Speed Average: 0.2 deg on Mar 2	Percent Operational Time: 98.3
Monthly Average Direction: 311.9 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-Mar	342	344	349	341	354	349	337	359	345	329	351	21	17	25	35	35	47	30	352	23	96	291	345	310	5.8	
2-Mar	240	226	148	171	175	181	149	160	171	245	269	280	299	16	25	13	31	12	353	38	132	348	150	160	136.8	
3-Mar	51	156	141	173	168	185	155	160	199	178	206	189	207	237	206	300	352	328	331	332	7	23	8	9	273.4	
4-Mar	26	29	25	10	26	20	15	12	13	19	27	21	17	20	17	18	31	49	57	48	77	51	46	38	25.7	
5-Mar	42	331	340	336	1	354	85	77	341	345	330	293	287	309	273	242	281	57	14	114	114	176	232	351	338.3	
6-Mar	350	357	356	342	1	12	10	85	60	25	20	23	32	35	35	26	32	23	14	6	3	3	7	12	18.2	
7-Mar	7	10	16	9	15	37	26	12	18	16	20	25	26	27	24	24	29	34	57	56	49	11	0	353	21.4	
8-Mar	342	333	330	282	328	AF	225	231	249	259	325	36	38	40	36	41	60	60	45	38	4	350	346	354	21.6	
9-Mar	329	306	335	358	252	255	253	241	248	335	59	30	48	45	59	63	63	78	53	25	344	30	359	343	31.8	
10-Mar	344	347	350	336	348	315	300	327	128	275	1	22	33	33	32	27	22	6	354	355	356	358	357	2	4.3	
11-Mar	10	353	8	356	352	353	355	350	332	297	312	1	348	18	26	23	21	7	38	63	36	138	111	105	11.9	
12-Mar	126	341	343	356	354	349	348	341	333	279	303	282	152	191	195	165	142	138	132	140	142	147	157	153	155.7	
13-Mar	156	163	168	165	165	169	173	172	169	171	172	170	174	175	170	167	169	178	177	187	185	176	169	154	170.2	
14-Mar	147	153	155	166	163	173	189	166	182	185	202	216	181	167	146	38	50	4	1	335	348	356	338	324	172.3	
15-Mar	146	142	202	173	167	179	187	188	187	209	230	231	233	241	288	327	333	342	356	21	54	24	297	328	229.3	
16-Mar	354	358	9	13	13	14	15	30	35	32	30	26	29	33	27	32	29	28	25	17	16	19	31	23	22.8	
17-Mar	25	52	36	4	337	328	331	326	305	281	4	346	339	349	26	25	27	23	22	12	11	3	1	1	5.1	
18-Mar	18	22	27	29	24	25	358	12	32	3	17	0	340	18	33	349	321	23	1	357	5	57	233	271	10.7	
19-Mar	321	311	315	295	301	284	277	271	273	284	278	291	303	314	313	317	320	314	320	325	313	330	3	359	306.8	
20-Mar	15	11	2	7	10	6	24	69	63	52	86	88	77	75	63	93	196	170	140	40	356	347	81	119	49.5	
21-Mar	106	140	152	141	172	174	190	189	204	195	189	172	171	180	157	152	153	149	139	143	161	155	155	151	160.6	
22-Mar	155	155	149	138	140	133	110	117	138	146	132	124	274	236	235	227	233	222	162	356	3	21	7	19	141.2	
23-Mar	20	16	8	10	13	15	22	21	34	38	26	18	26	23	24	22	27	10	336	346	357	57	59	112	21.3	
24-Mar	150	160	159	156	199	195	184	221	291	347	297	346	192	183	165	149	164	138	131	117	132	139	152	143	156.5	
25-Mar	123	123	101	80	78	77	83	89	117	129	132	137	178	306	323	33	66	60	54	68	72	71	63	65	91.8	
26-Mar	89	112	119	127	93	17	29	6	70	62	289	247	235	261	68	130	110	194	216	353	92	45	96	AF	120.5	
27-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	49	36	33	29	18	29	24	23	24	18	6	2	358	344	341	--
28-Mar	339	330	280	AF	202	134	154	158	167	175	170	171	195	179	187	180	155	138	135	80	104	122	149	100	160.3	
29-Mar	106	123	163	175	150	148	171	166	180	191	193	190	195	216	160	161	159	144	139	127	103	145	136	105	162.2	
30-Mar	105	113	38	61	93	71	80	AF	359	32	36	343	340	72	41	78	58	41	59	62	90	148	286	135	58.5	
31-Mar	146	159	184	219	207	165	180	191	214	222	245	186	170	160	189	205	208	208	183	221	194	207	199	216	198.3	
41.7 51.7 33.0 30.2 29.9 35.2 42.1 72.9 123.2 299.2 322.4 358.0 7.3 25.4 38.0 49.0 47.9 47.7 45.8 35.8 39.9 47.0 58.6 57.6																										
Diurnal Average																										

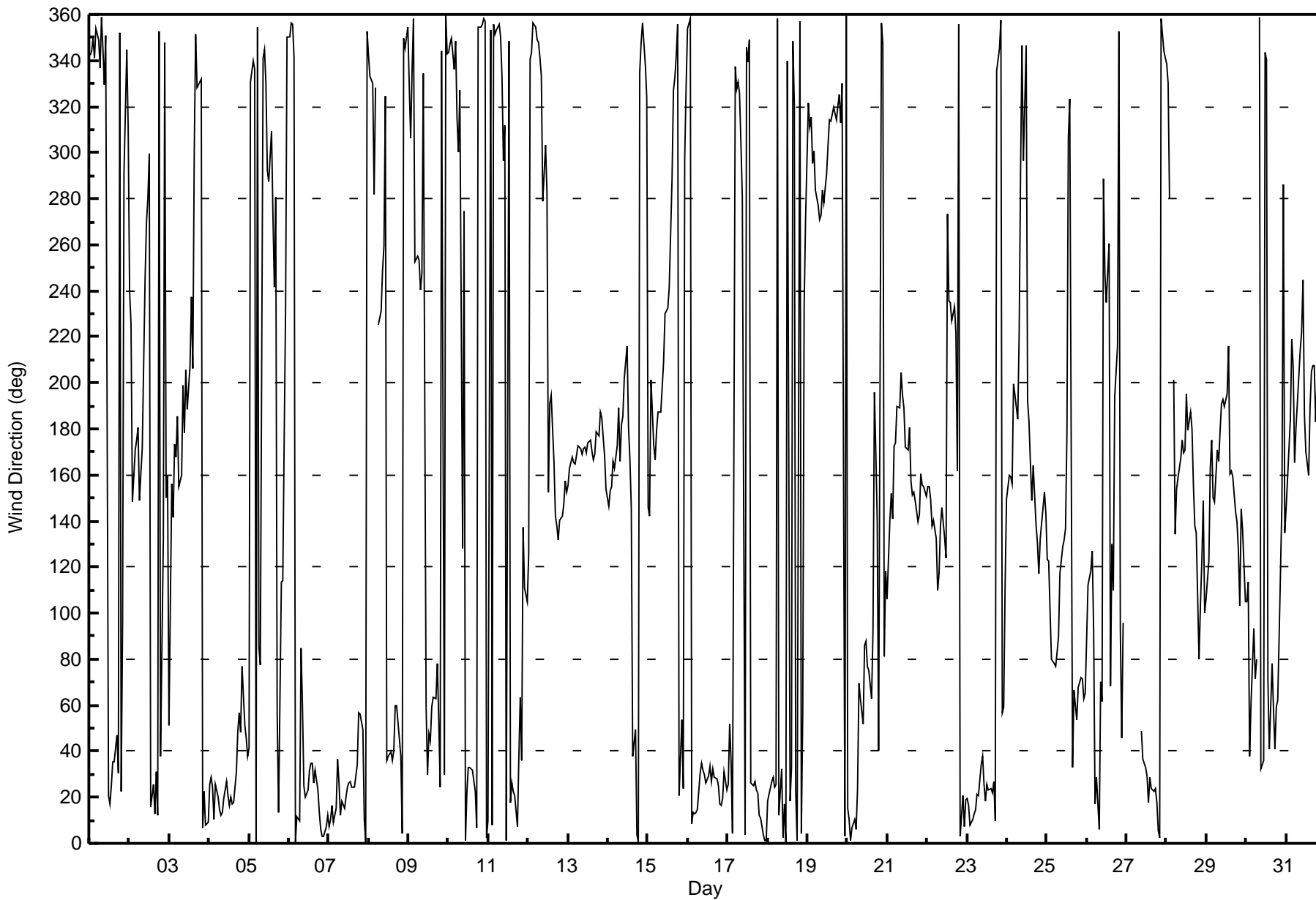
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Barge Landing - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Mar 28 18:00		Hours in Service: 744 Hours of Data: 731 Hours of Missing Data: 13 Hours of Calibration: 0 Percent Operational Time: 98.3																							
Minimum Value: 8 deg on Mar 12 03:00																									
Percentiles: P ₁ = 10 P ₁₀ = 15 Q ₁ = 19 Median = 23 Q ₃ = 32 P ₉₀ = 51 P ₉₉ = 87																									
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-Mar	13	11	11	18	18	15	11	15	16	17	28	19	26	24	24	22	24	25	12	34	70	24	14	31	70
2-Mar	60	41	59	29	68	24	19	19	31	42	34	33	63	53	23	25	20	31	12	55	28	24	53	60	68
3-Mar	67	44	75	34	26	46	43	27	36	27	33	31	34	26	28	54	22	25	22	20	28	18	21	24	75
4-Mar	18	18	19	19	18	18	20	19	21	19	18	19	20	22	19	20	21	19	29	23	18	17	18	16	29
5-Mar	20	19	18	13	13	20	38	36	17	28	33	37	48	48	32	32	86	20	41	10	10	37	58	11	86
6-Mar	18	14	18	13	28	32	40	34	28	19	17	18	19	20	20	18	18	21	21	21	20	20	20	19	40
7-Mar	21	21	19	20	19	17	20	20	19	21	19	20	19	19	21	21	19	18	23	42	29	22	18	18	42
8-Mar	13	13	58	35	30	AF	32	16	18	62	58	27	27	27	21	22	23	18	18	18	22	13	11	9	62
9-Mar	32	56	35	60	13	21	10	11	35	71	59	36	51	27	32	33	25	19	17	43	23	32	26	13	71
10-Mar	11	16	34	20	13	23	72	39	96	39	38	28	29	30	27	26	22	19	15	15	16	13	17	30	96
11-Mar	21	25	20	15	15	16	14	14	24	22	36	49	51	36	23	25	20	76	76	17	101	69	56	74	101
12-Mar	82	32	8	10	14	26	9	11	19	45	30	46	64	30	29	32	22	15	12	13	14	16	20	18	82
13-Mar	19	23	23	22	23	24	25	27	25	24	26	25	28	27	26	25	25	27	23	19	26	21	22	17	28
14-Mar	11	12	14	19	16	21	20	20	23	23	30	28	72	43	90	52	20	21	32	52	15	14	20	91	91
15-Mar	20	21	30	21	17	22	25	23	26	28	24	29	20	22	33	22	20	20	20	16	48	34	55	27	55
16-Mar	14	18	23	21	21	19	19	19	18	19	19	21	20	19	19	18	19	17	19	18	19	17	18	19	23
17-Mar	18	24	23	34	20	22	21	26	50	62	60	30	23	23	22	18	17	15	12	13	15	16	17	18	62
18-Mar	15	13	14	15	15	18	22	20	22	26	29	28	24	39	18	26	30	24	21	30	14	57	69	44	69
19-Mar	22	25	22	26	29	29	26	24	26	27	30	33	31	25	26	24	22	24	22	20	24	26	27	27	33
20-Mar	20	20	21	22	21	21	45	30	26	37	32	32	33	32	36	77	62	34	21	66	21	16	49	10	77
21-Mar	18	15	9	15	85	49	20	33	36	31	30	32	30	30	26	24	22	19	16	19	24	20	21	19	85
22-Mar	22	21	20	15	16	15	19	18	18	25	34	77	71	28	19	23	22	34	36	84	22	18	22	18	84
23-Mar	19	20	21	21	19	19	17	17	18	22	23	22	24	25	22	24	19	19	21	22	23	32	29	21	32
24-Mar	20	22	20	22	16	83	19	51	74	36	33	71	38	27	31	23	25	16	15	16	16	17	26	17	83
25-Mar	19	61	35	22	21	31	23	22	16	25	24	19	70	31	30	37	24	30	18	26	41	48	55	58	70
26-Mar	14	13	16	28	22	64	34	48	38	32	59	29	27	29	55	16	36	25	18	38	25	26	69	AF	69
27-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	43	25	22	19	24	18	20	16	16	17	18	15	41	36	24	43
28-Mar	19	20	46	AF	80	15	10	17	24	26	26	28	34	37	54	42	92	103	23	14	30	12	24	35	103
29-Mar	11	11	17	18	16	15	16	22	24	30	33	37	48	40	89	39	41	35	15	18	77	15	14	14	89
30-Mar	14	14	62	28	29	14	34	AF	31	18	20	24	27	58	55	29	34	29	26	20	57	58	57	48	62
31-Mar	17	19	24	25	24	18	29	35	25	30	24	38	36	25	30	27	27	26	26	31	37	24	24	24	38
Diurnal Maximum																									
AF - Analyzer Failure																									





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	March 10, 2017	Last Calibration	February 8, 2017
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	9:28	End Time (MST)	12:38
Gas Cert Reference	LL29997	Station temp.	22 Deg C
Cal Gas Concentration	5.18 ppm	Cal Gas Exp Date	2/12/2019
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
Dil air Make/Model	API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564
SO2 gas concentration	49 ppm	SO2 gas cert/exp	EY0000675 4/Nov/19

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-690	-690
Analyzer IP address	192.168.1.42		Lamp voltage	1046	10447
Calculated slope	0.996760	0.998247	Chamber temp	45	45
Calculated intercept	-0.189736	-0.189819	Pressure	708.9	727.5
Analyzer Background	2.1	2.04	Flow	0.446	0.455
Analyzer Coefficient	1.067	1.06	Intensity	91	91
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1331259320
Converter make/model	CDN-101	Converter serial #	519

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	77.2	80.0	79.9	1.001
SO2 scrubber check	5000	15.0	147.0	1.3	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	77.2	80.0	80.1	0.998
second point	5000	38.6	40.0	40.6	0.986
third point	5000	19.3	20.0	20.3	0.984
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	77.2	80.0	79.7	1.003
Average Correction Factor					0.990

Corrected As found	79.9	Previous response	80.4	% change	0.6%
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Notes:

Inlet filter changed, changed the pump and scrubber check done after as founds. Adjusted the span.

Calibration Performed By:

Jayme Marcoux



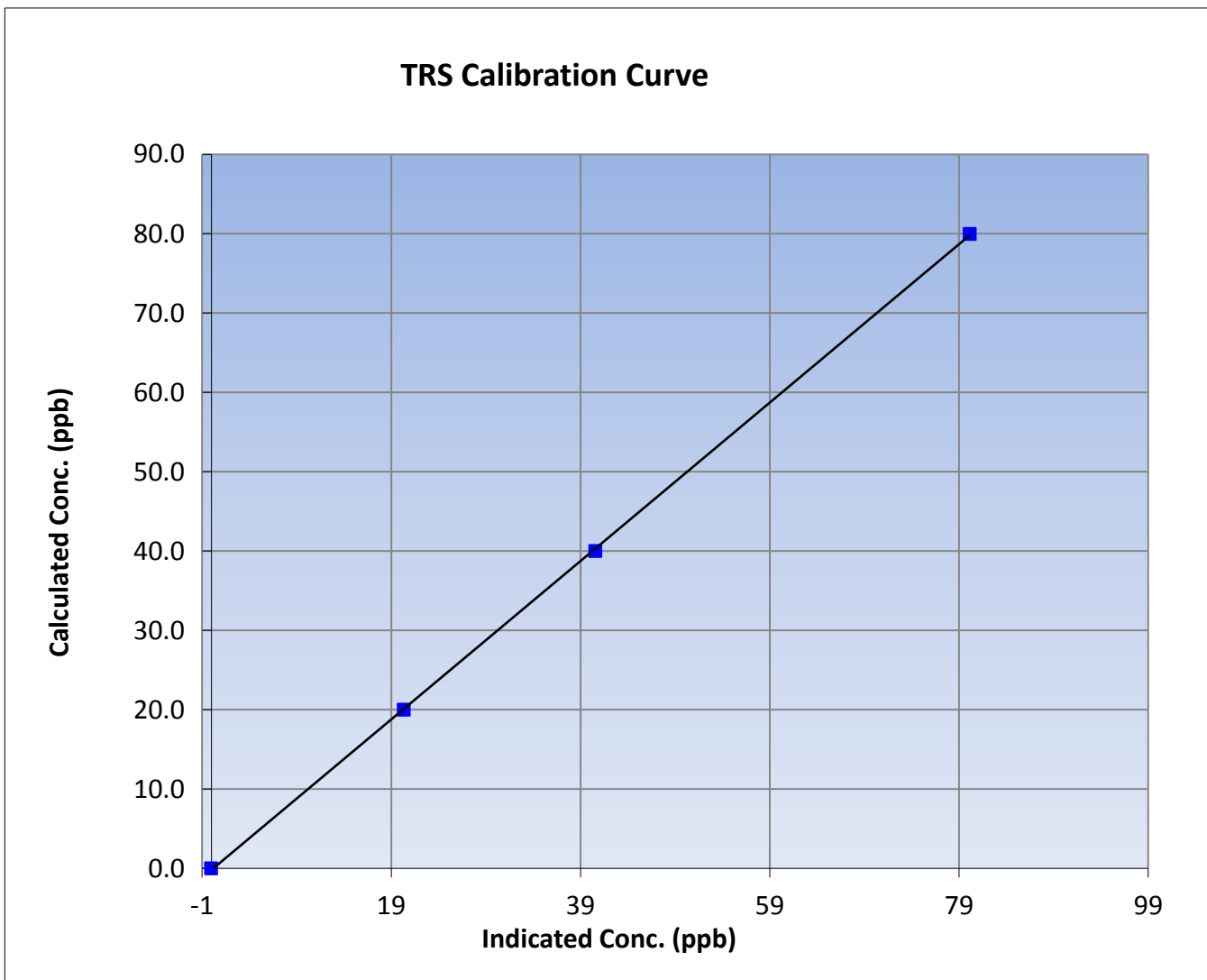
Wood Buffalo Environmental Association TRS Calibration Report

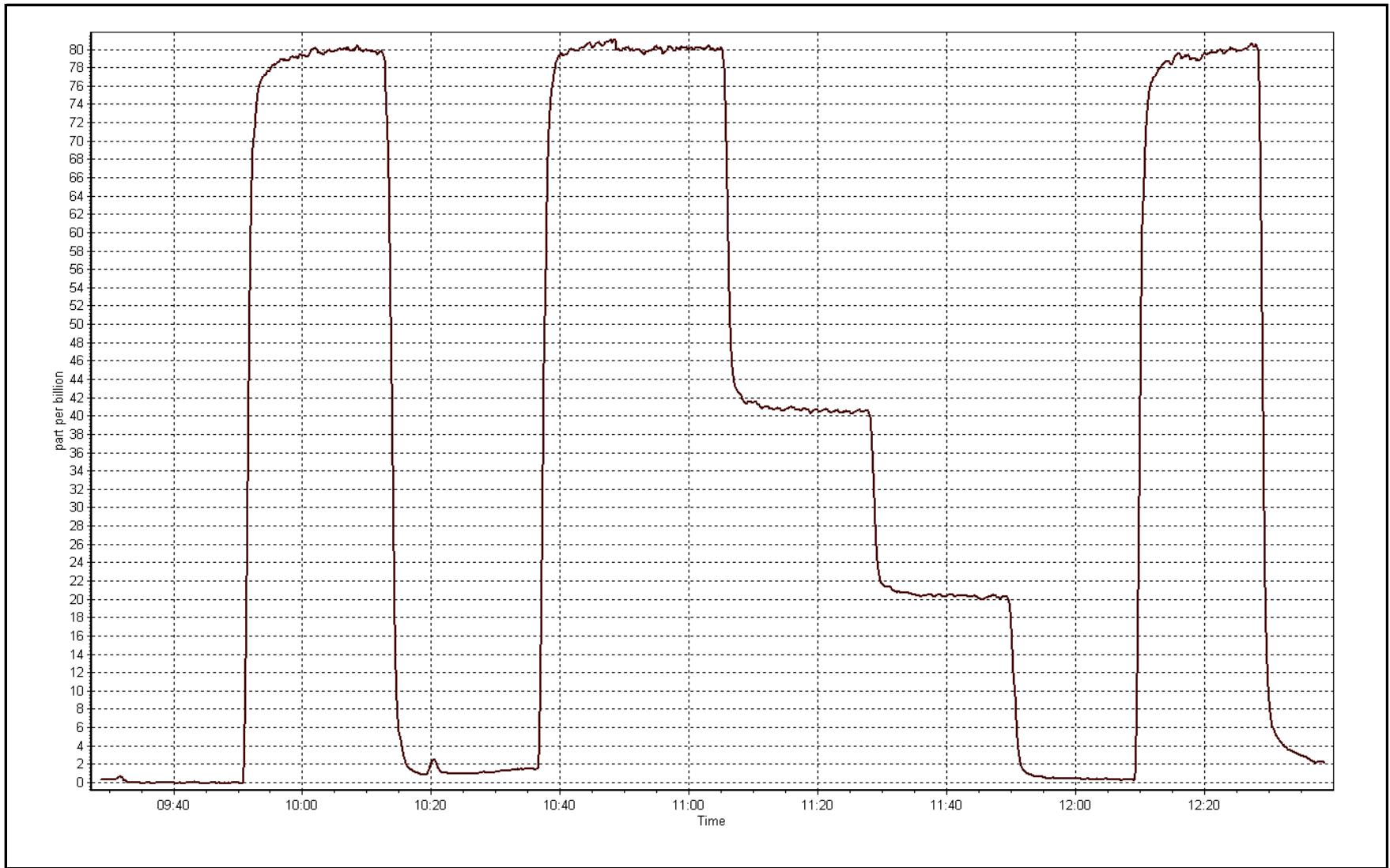
Station Information

Calibration Date	March 10, 2017	Previous Calibration	February 8, 2017
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	9:28	End Time (MST)	12:38
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1331259320

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999947
80.0	80.1	0.9981		
40.0	40.6	0.9859	Slope	0.998247
20.0	20.3	0.9845		
			Intercept	-0.189819







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	March 10, 2017	Last Calibration	February 8, 2017
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	12:23	End Time (MST)	14:50
Gas Cert Reference	EY0000675	Cal Gas Expiry Date	November 4, 2019
CH4 Cal Gas Conc.	511 ppm	CH4 Equiv Conc.	1055.5 ppm
C3H8 Cal Gas Conc.	198 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
ZAG make/model	Teledyne API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	Serial Number	5564

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	9.1	9.1
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.7	34.7
Calculated slope	0.998524	1.001054	Fuel Pressure	24.1	24.1
Calculated intercept	0.011092	-0.048703	Analyzer Coeff	4.344	4.276
			Analyzer BKG	5.50	5.58

Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.18	----
as found span	5000	74.4	15.71	16.16	0.972
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	74.4	15.71	15.74	0.998
second point	5000	39.9	8.42	8.44	0.998
third point	5000	14.9	3.15	3.24	0.971
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.4	15.71	15.71	1.000
Average Correction Factor					0.989

Corrected As found	15.98	Previous response	15.72	% change	-1.6%
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Notes:

Inlet filter changed after as founds. Adjusted the zero and span.

Calibration Performed By:

Jayme Marcoux



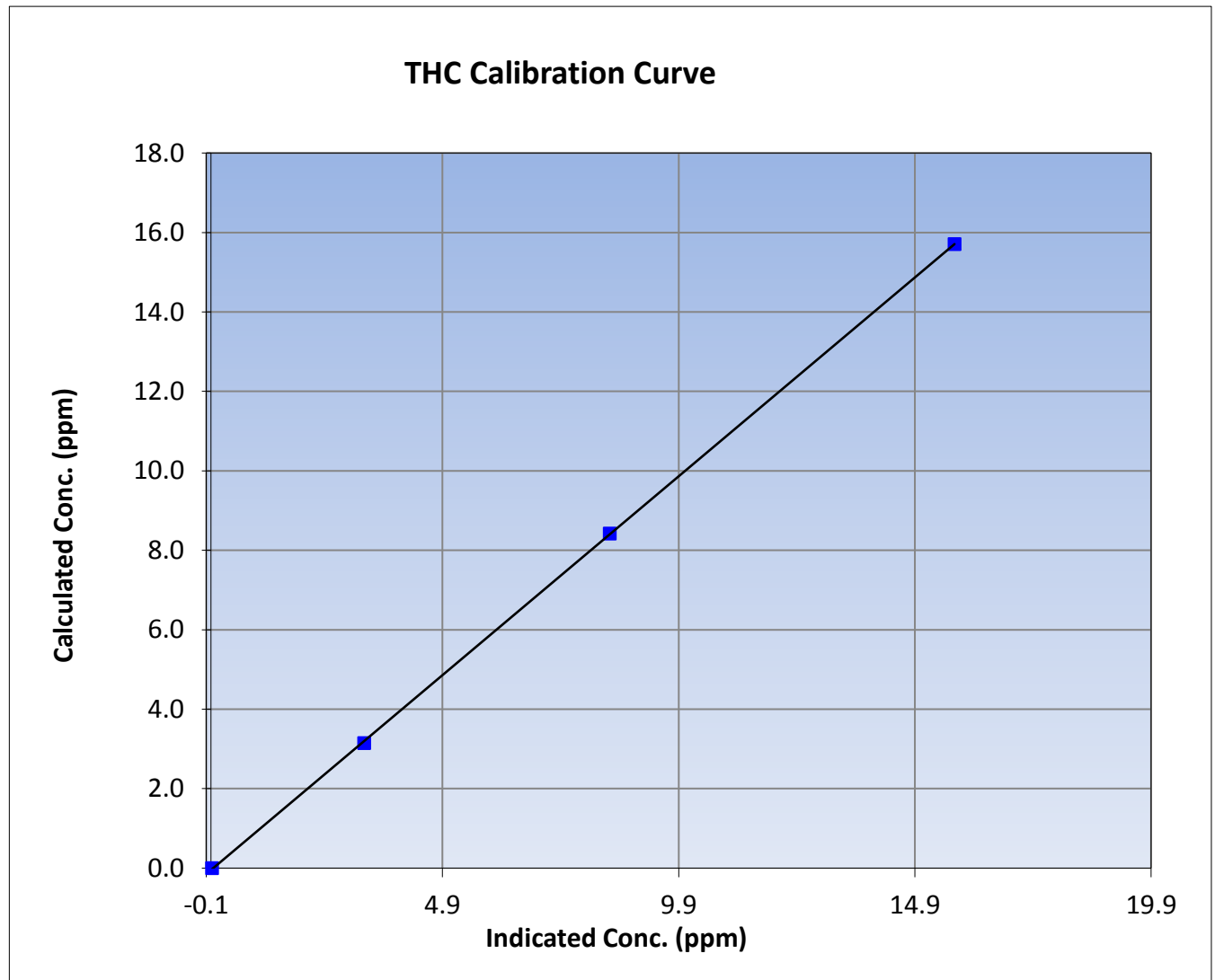
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	March 10, 2017	Previous Calibration	February 8, 2017
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	12:23	End Time (MST)	14:50
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

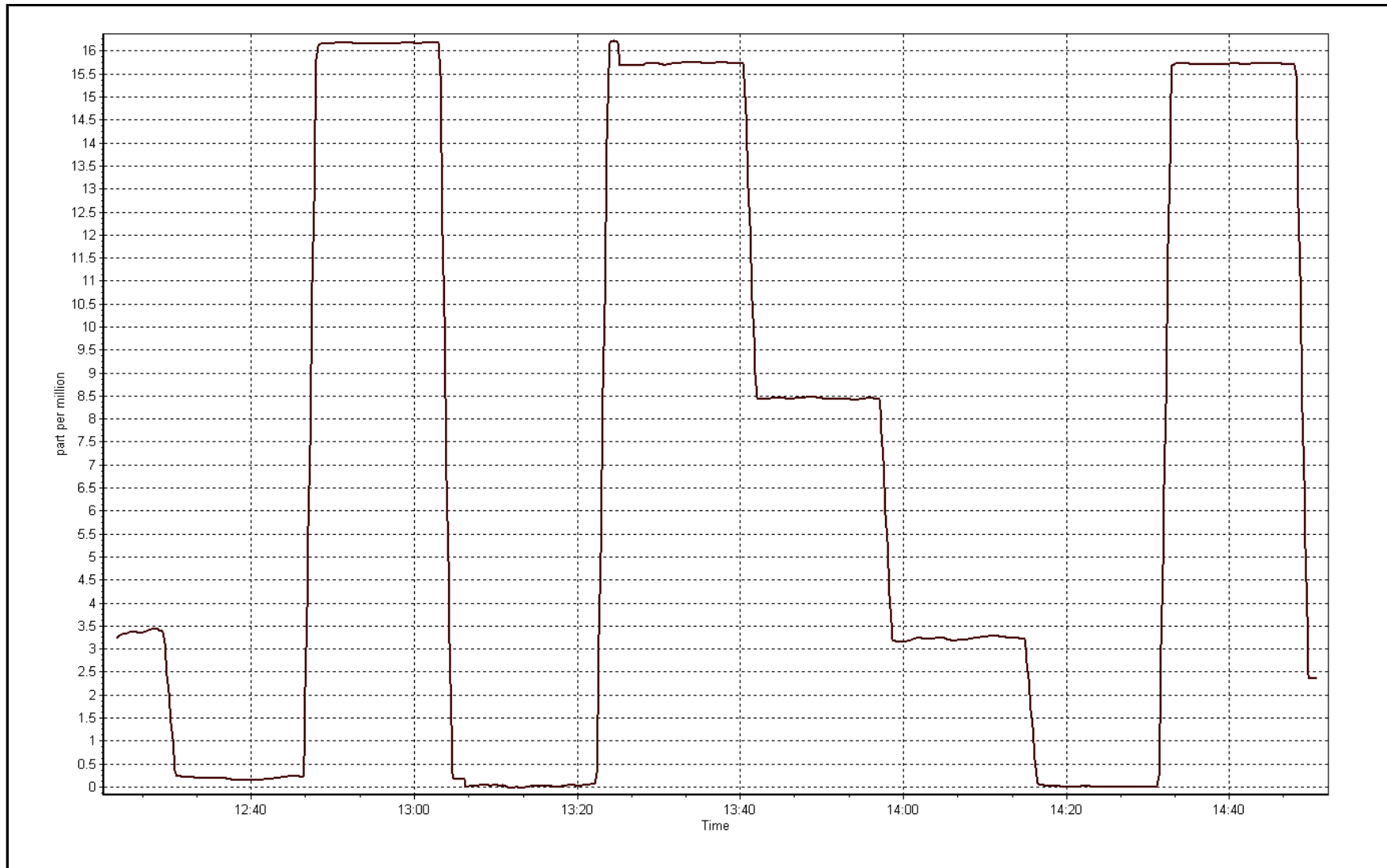
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999973
15.71	15.74	0.9978		
8.42	8.44	0.9980		
3.15	3.24	0.9708		
			Slope	1.001054
			Intercept	-0.048703



THC Calibration Plot

Date: March 10, 2017





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 11 LOWER CAMP MARCH 2017

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
MARCH 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	83	0	22	0
H2S (ppb) Average	710	34	34	100	7	0	1	0
THC (ppm) Average	705	37	39	99.73	3.9	-	3	-
Temperature (C) Average	744	0	0	100	14.4	-	7.2	-
Relative Humidity (%) Average	744	0	0	100	98	-	88	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	31	-	23	-
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 - LOWER CAMP (AMS 11)
MARCH 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	2.2	7	-	0	0	0	0	1	4	83
H2S (ppb) Average	710	0.4	0	-	0	0	0	0	0	1	7
THC (ppm) Average	705	2.34	0.2	-	1.9	2.1	2.2	2.3	2.4	2.6	3.9
Temperature 2 m (C) Average	744	-8.24	11	-	-34.2	-24	-17.6	-6.5	0.7	3.8	14.4
Relative Humidity (%) Average	744	67.3	15	-	27	46	57	68	78	88	98
Wind Speed 10 m (km/h) Average	743	9.7	6	-	0	3	4	9	14	19	31
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	31 Mar 2017 10:00	31 Mar 2017 11:00	2	Maintenance - Station operator on site
Wind Speed, Wind Direction	02 Mar 2017 08:00	02 Mar 2017 08:00	1	Flat line in sensor output signal -sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

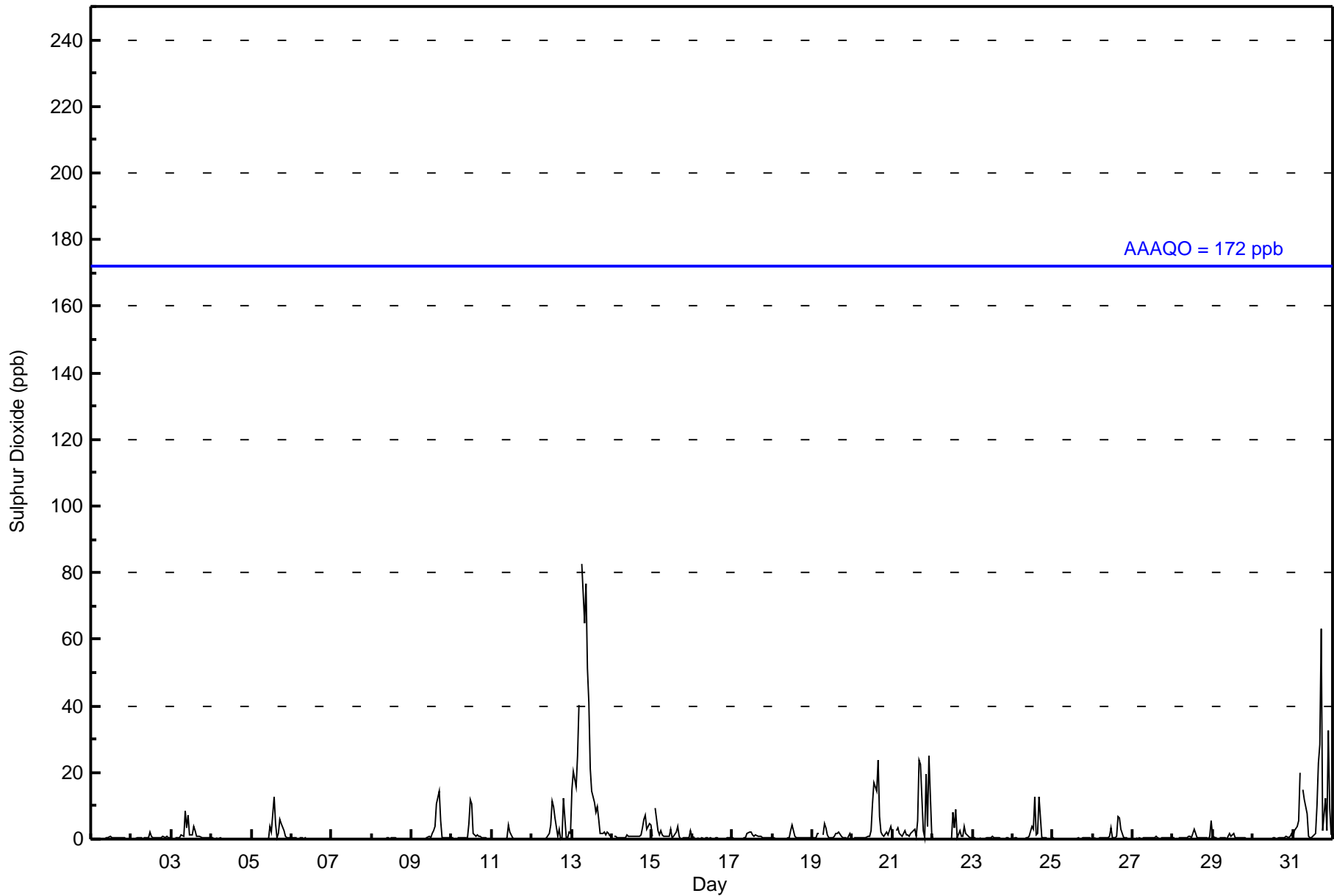
Lower Camp - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 83 ppb on Mar 13 07:00										Maximum Daily Average: 22.3 ppb on Mar 13										Hours of Data: 710						
Minimum Value: 0 ppb on Mar 6 20:00										Minimum Daily Average: 0.1 ppb on Mar 7										Hours of Missing Data: 34						
Maximum Diurnal Average: 3.7 ppb at hour 17										Minimum Diurnal Average: 0.4 ppb at hour 6										Hours of Calibration: 34						
Monthly Average: 2.2 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 4 P ₉₉ = 39										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-Mar	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1
2-Mar	Z	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	1	0	1	1	0	0.5	2
3-Mar	0	Z	0	0	0	0	1	1	8	3	7	1	1	4	3	1	1	1	0	0	0	0	0	1.6	8	
4-Mar	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
5-Mar	0	0	0	Z	0	0	0	0	0	0	0	4	2	13	5	0	2	6	5	3	1	1	0	1	1.8	13
6-Mar	1	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	1
7-Mar	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
8-Mar	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
9-Mar	0	Z	0	0	0	0	0	0	0	0	1	0	2	3	4	11	15	5	1	0	0	0	0	0	1.9	15
10-Mar	0	0	Z	0	0	0	0	0	0	1	5	12	11	2	1	1	1	1	0	0	0	0	0	0	1.6	12
11-Mar	0	0	0	Z	0	0	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4
12-Mar	0	0	0	0	Z	0	0	0	0	0	2	4	12	10	6	1	3	0	0	12	0	0	2	2	2.4	12
13-Mar	15	20	16	25	40	Z	83	65	77	51	41	21	14	11	8	10	6	2	2	2	1	2	1	22.3	83	
14-Mar	Z	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	3	6	7	3	5	4	1.8	7
15-Mar	1	Z	9	2	1	2	1	1	1	1	1	3	0	1	2	4	1	0	0	0	0	0	0	2	1.6	9
16-Mar	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
17-Mar	0	0	0	Z	0	0	0	0	1	2	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0.7	2
18-Mar	0	0	0	0	Z	0	0	0	0	0	0	3	4	1	0	0	0	0	0	0	0	0	0	1	0.6	4
19-Mar	1	0	0	2	2	Z	1	4	3	1	0	0	1	2	2	2	2	1	0	0	0	0	2	0	1.1	4
20-Mar	Z	0	0	0	1	1	0	0	0	1	1	3	11	17	14	24	7	2	1	1	2	1	3	4	4.1	24
21-Mar	1	Z	2	3	2	1	1	3	1	1	1	2	3	3	1	6	24	22	3	0	19	4	25	1	5.6	25
22-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	8	4	9	1	2	1	1	4	2	1	0	0	1.5	9
23-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
24-Mar	0	0	0	0	Z	0	0	0	0	1	1	4	3	13	1	2	13	0	0	0	0	0	0	0	1.8	13
25-Mar	1	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	1
26-Mar	Z	0	0	0	0	0	0	0	0	0	1	3	0	0	1	7	7	3	1	0	0	0	0	0	1.1	7
27-Mar	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
28-Mar	0	0	Z	0	0	0	0	0	0	1	1	0	2	3	1	0	0	0	0	0	0	0	1	5	0.8	5
29-Mar	1	0	0	Z	0	0	0	0	0	1	2	1	2	0	0	1	0	0	0	0	0	0	0	0	0.5	2
30-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	0.4	2
31-Mar	1	2	4	6	20	Z	15	12	8	1	0	0	1	2	10	23	29	63	3	12	2	33	9	1	11.1	63
0.9 1.1 1.4 1.6 2.7 0.4 3.4 2.9 3.4 2.3 2.4 2.4 2.7 3.0 2.4 3.1 3.7 3.6 0.7 1.5 1.3 1.6 1.7 0.9																								Diurnal Average		
15 20 16 25 40 2 83 65 77 51 41 21 14 17 14 24 29 63 5 12 19 33 25 5																								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
Lower Camp - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Lower Camp - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	672	94.65	94.65
11 - 20	22	3.10	97.75
21 - 60	12	1.69	99.44
61 - 110	4	0.56	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
Lower Camp - March 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	90	21	4	13	7	47	163	18	5	4	1	7	25	83	91	92	671
11 - 20	0	0	2	1	0	0	8	7	1	1	0	0	2	0	0	0	22
21 - 60	0	0	0	0	0	0	7	2	2	1	0	0	0	0	0	0	12
61 - 110	0	0	0	0	0	0	2	1	0	1	0	0	0	0	0	0	4
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	90	21	6	14	7	47	180	28	8	7	1	7	27	83	91	92	709

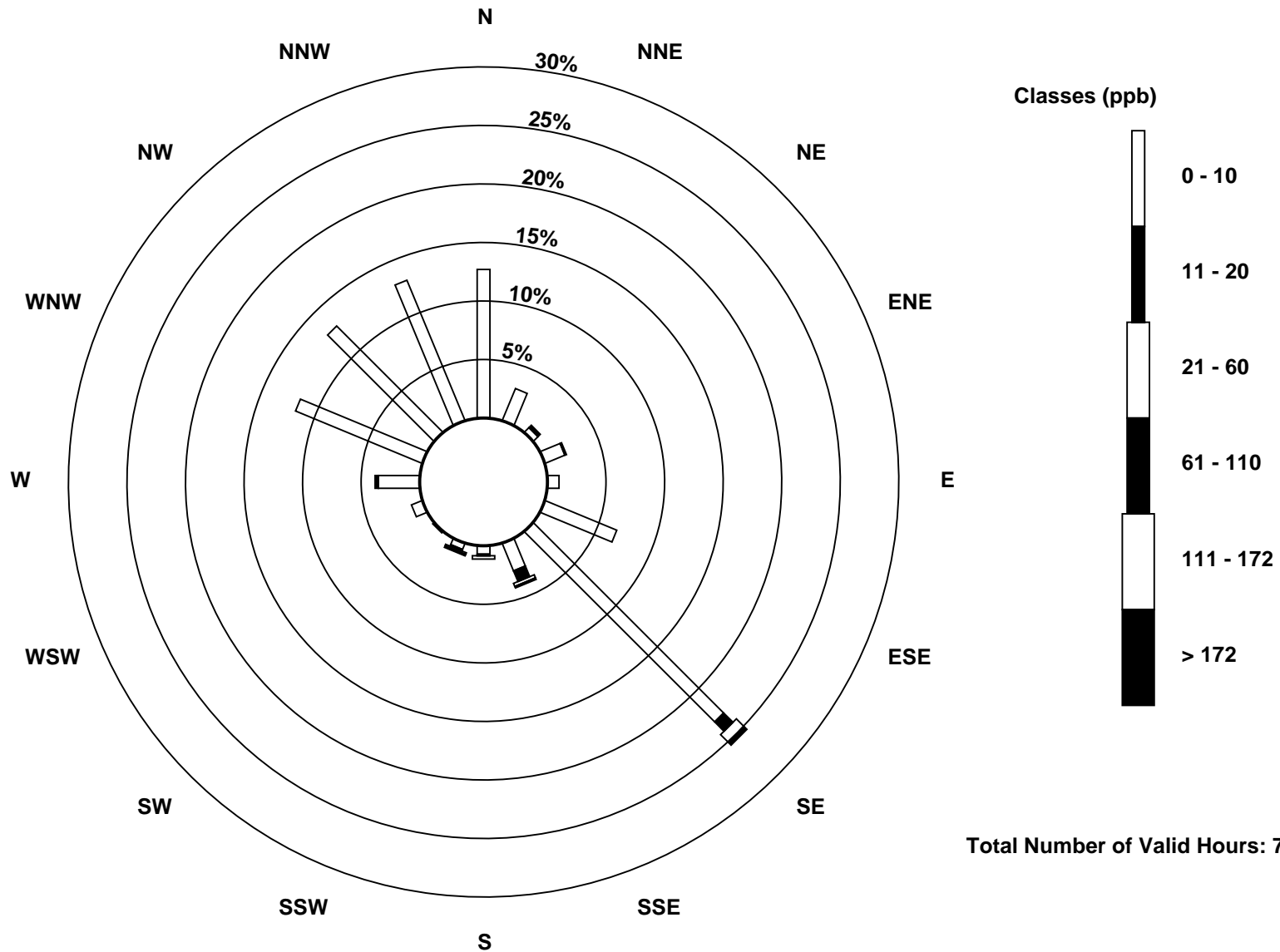
Total Number of Valid Hours: 709

Total Number of Hours: 744

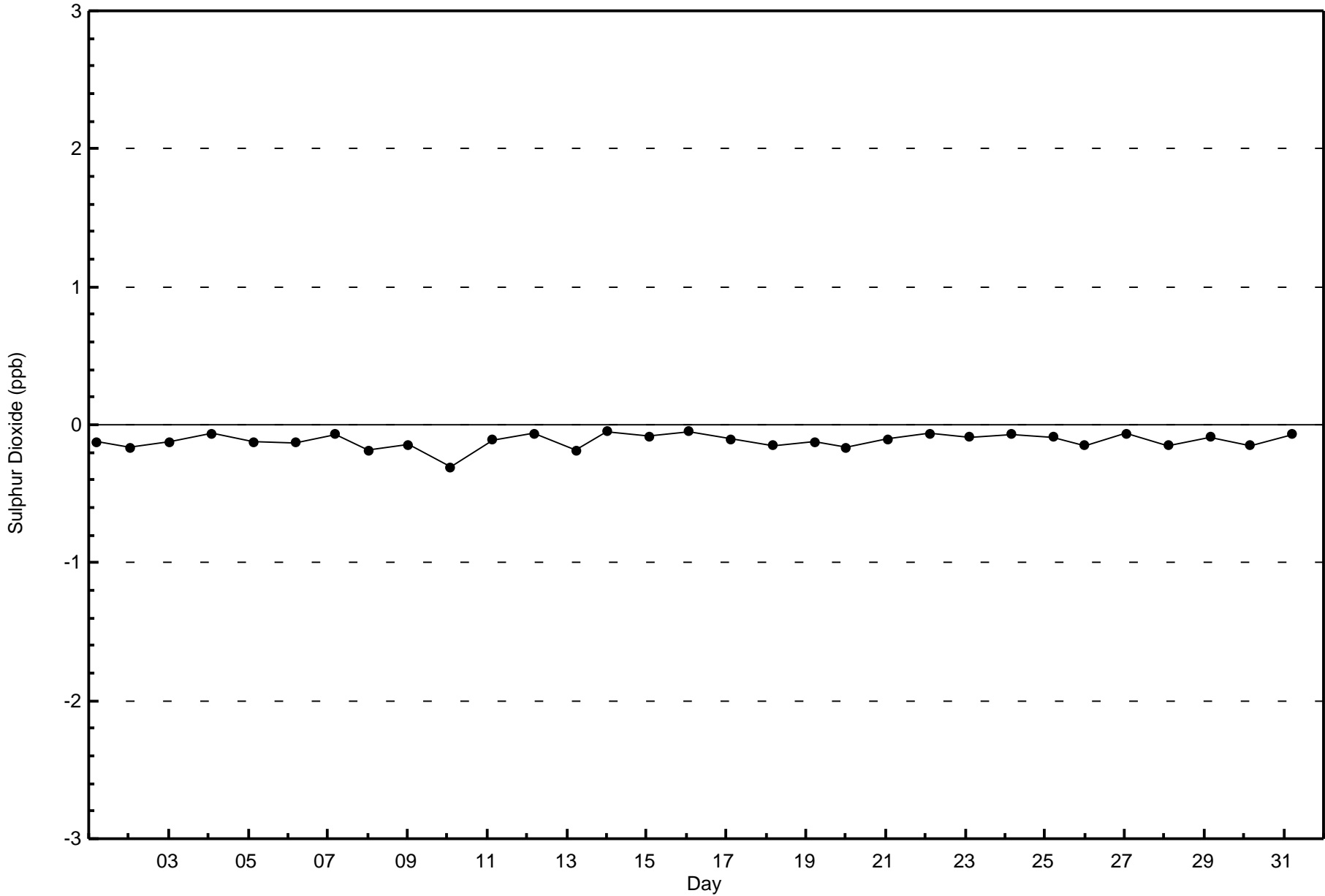


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Sulphur Dioxide (SO₂) - ppb
Lower Camp (AMS 11)



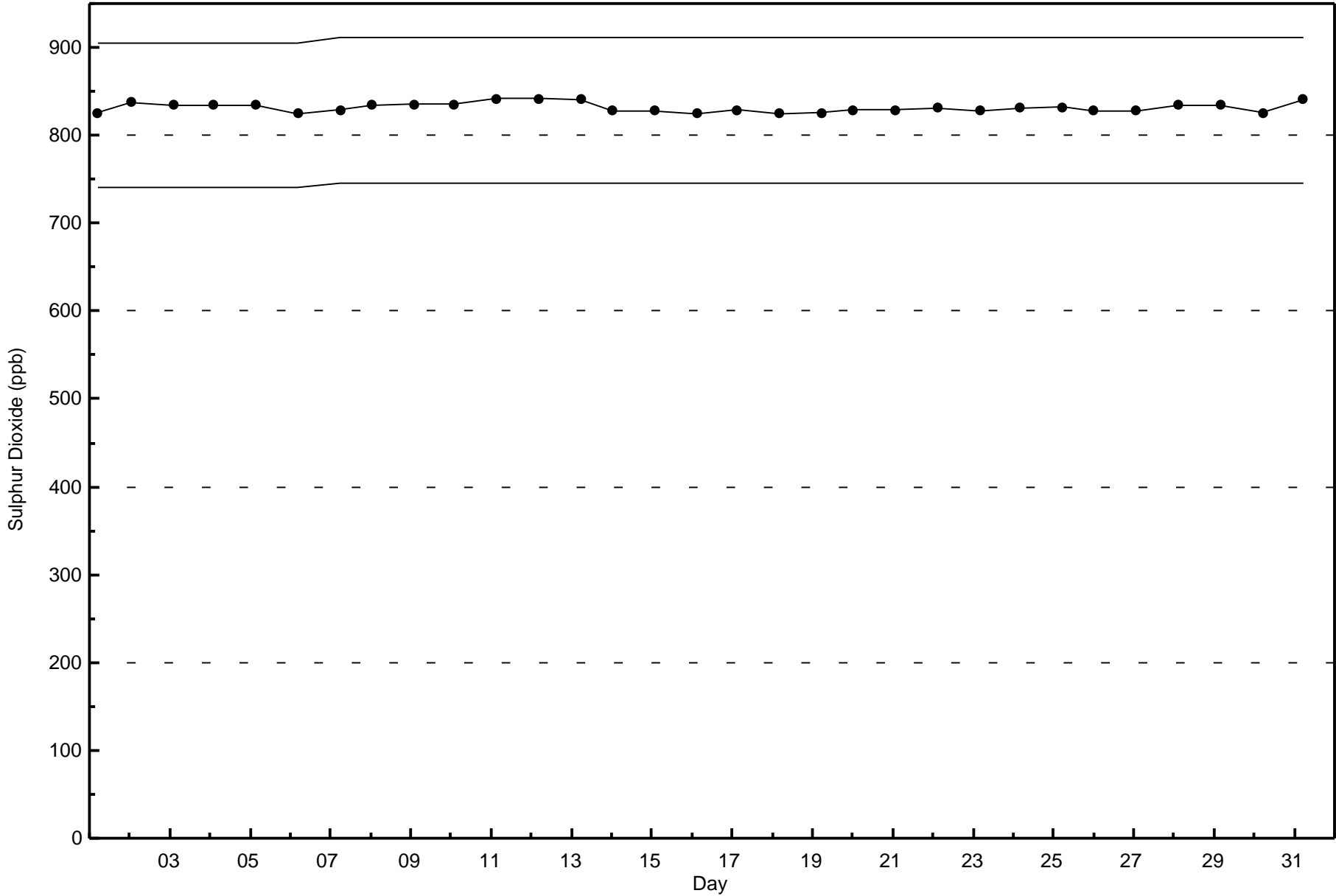
Total Number of Valid Hours: 709





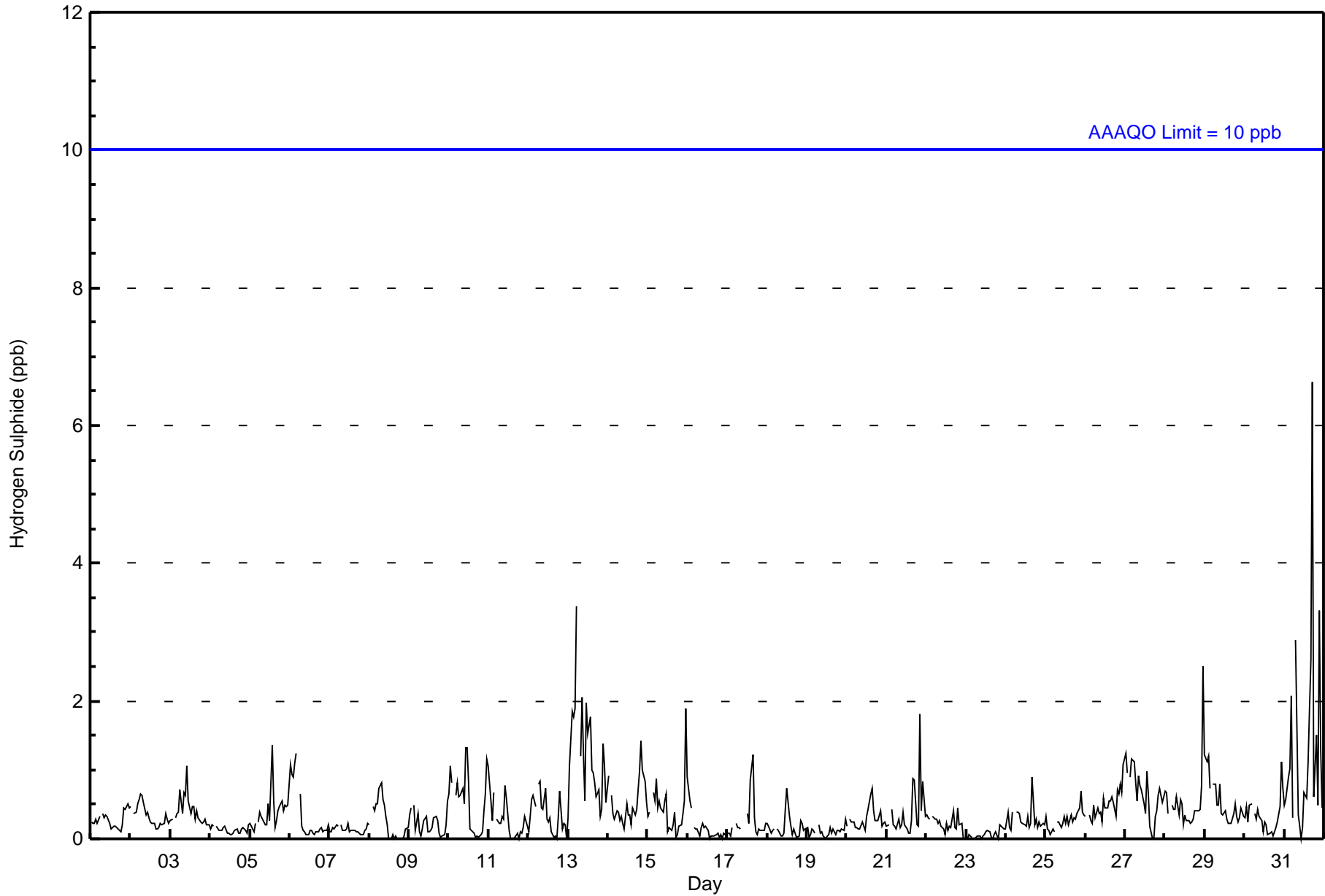
Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Lower Camp - March 2017





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 ppb on Mar 31 18:00 Maximum Daily Average: 1.3 ppb on Mar 31																	Hours in Service: 744 Hours of Data: 710									
Minimum Value: 0 ppb on Mar 8 14:00 Minimum Daily Average: 0.1 ppb on Mar 23 Maximum Diurnal Average: 0.5 ppb at hour 5 Minimum Diurnal Average: 0.2 ppb at hour 19 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 = 2																	Hours of Missing Data: 34 Hours of Calibration: 34 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-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1
2-Mar	0	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
3-Mar	0	0	Z	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
4-Mar	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
5-Mar	0	0	0	0	Z	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0	0.4	1
6-Mar	1	1	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Mar	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
8-Mar	0	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
9-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
10-Mar	1	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0.6	1
11-Mar	1	1	0	1	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Mar	0	0	1	1	0	Z	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1
13-Mar	0	1	2	2	2	3	Z	1	2	1	1	2	2	2	1	1	1	1	1	0	0	1	1	1	1.2	3
14-Mar	1	Z	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	0.5	1
15-Mar	0	0	Z	1	1	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	2	0	0.4	2
16-Mar	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
17-Mar	0	0	0	0	Z	0	0	0	0	C	C	C	0	0	1	1	0	0	0	0	0	0	0	0	0.2	1
18-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
19-Mar	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
20-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.3	1
21-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	1	0	0.4	2
22-Mar	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
23-Mar	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
24-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1
25-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1
26-Mar	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0	1	1	1	1	1	0.5	1
27-Mar	1	1	Z	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	1	1	1	1	0.7	1
28-Mar	1	1	0	Z	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	2	0.5	2
29-Mar	1	1	1	1	Z	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.5	1
30-Mar	0	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
31-Mar	0	1	1	1	2	0	Z	3	0	0	0	0	1	1	1	2	3	7	1	2	0	3	1	0	1.3	7
0.4 0.4 0.4 0.5 0.5 0.5 0.4 0.4 0.4 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.2 0.3 0.3 0.4 0.4 0.5																								Diurnal Average		
1 1 2 2 2 3 1 3 2 1 1 2 2 2 2 1 2 3 7 1 2 2 3 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
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Lower Camp - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	705	99.30	99.30
3 - 4	4	0.56	99.86
5 - 7	1	0.14	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
Lower Camp - March 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	93	22	6	14	6	47	180	26	7	5	1	7	27	89	86	88	704
3 - 4	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	4
5 - 7	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
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	93	22	6	14	6	47	181	27	8	7	1	7	27	89	86	88	709

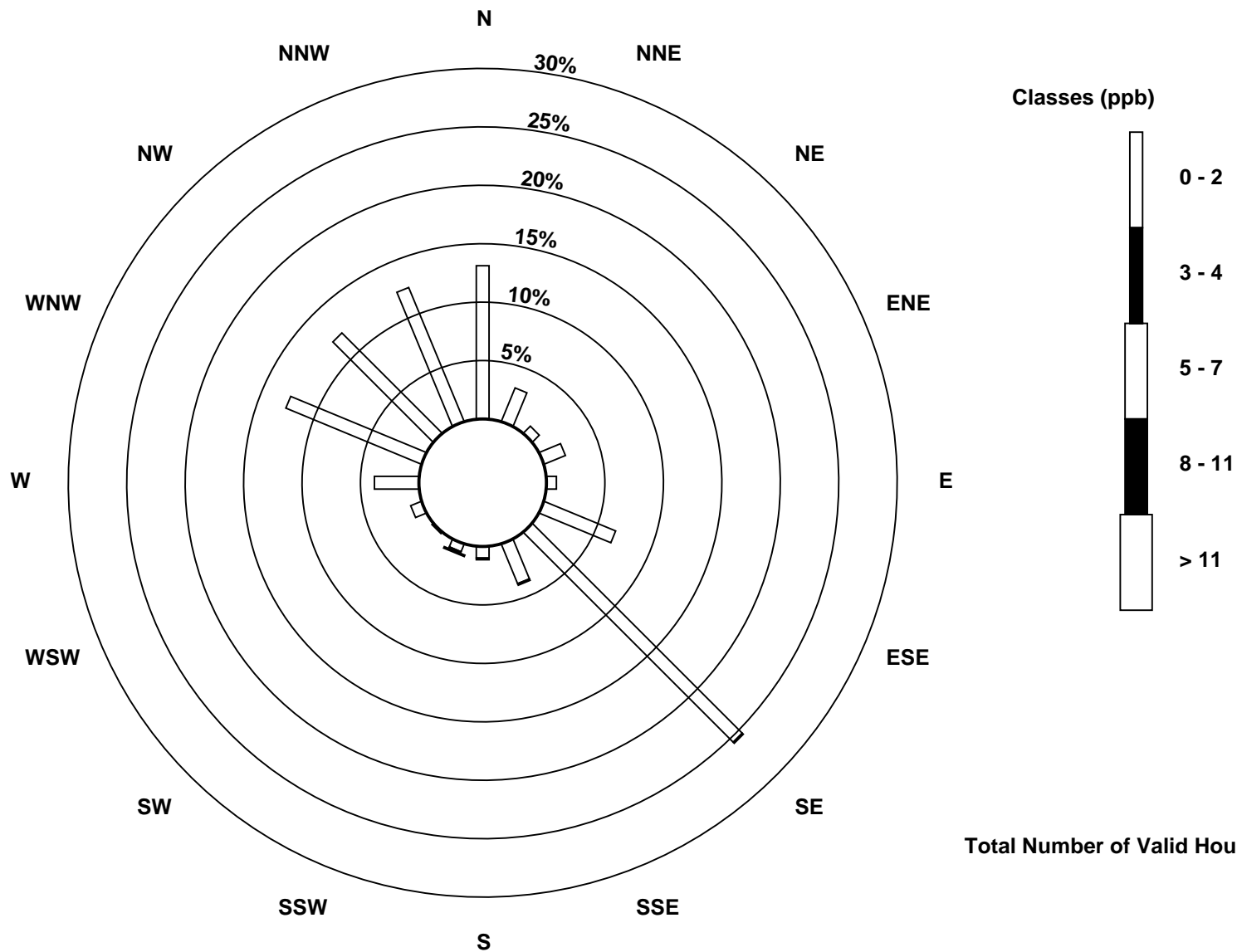
Total Number of Valid Hours: 709

Total Number of Hours: 744

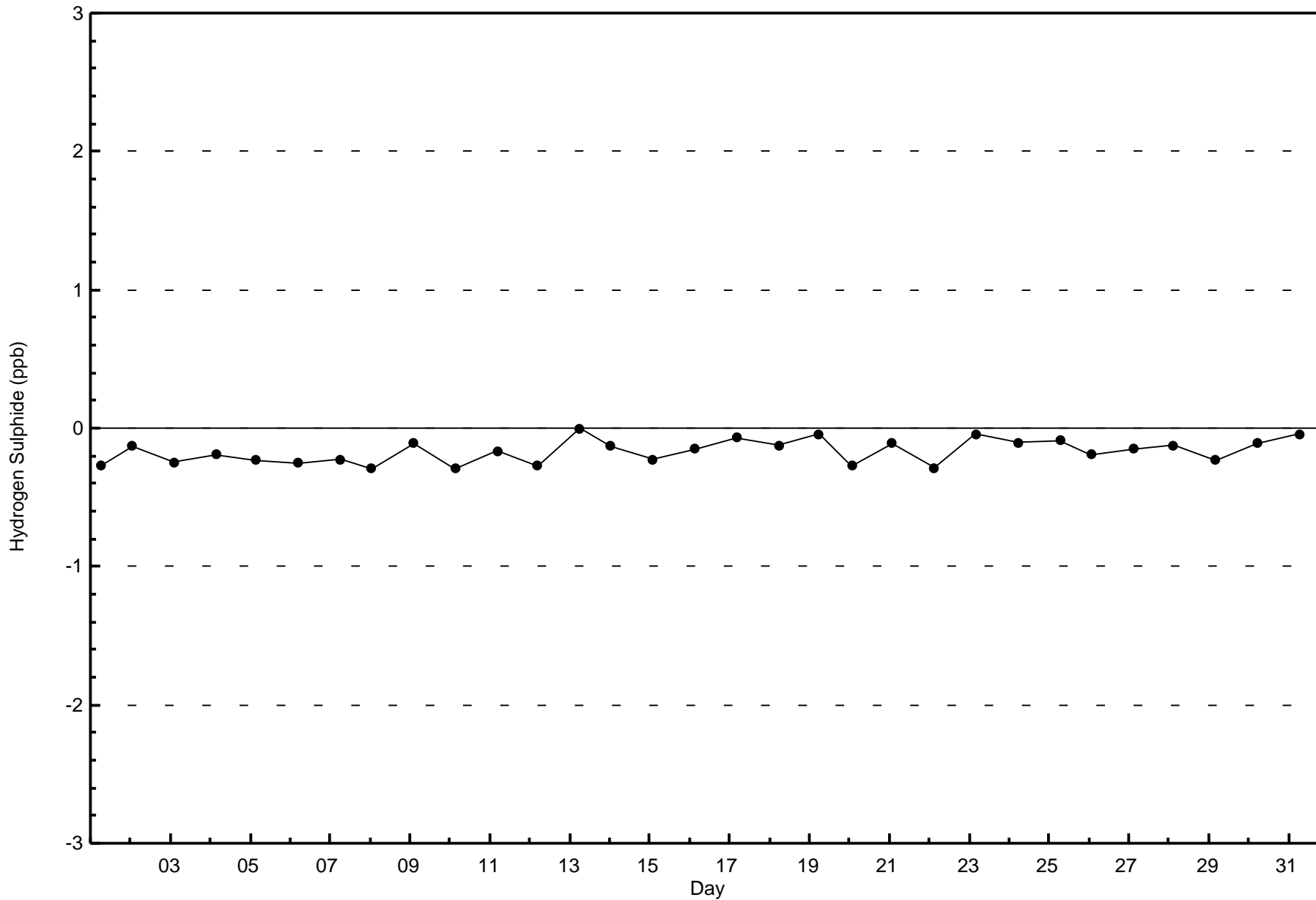


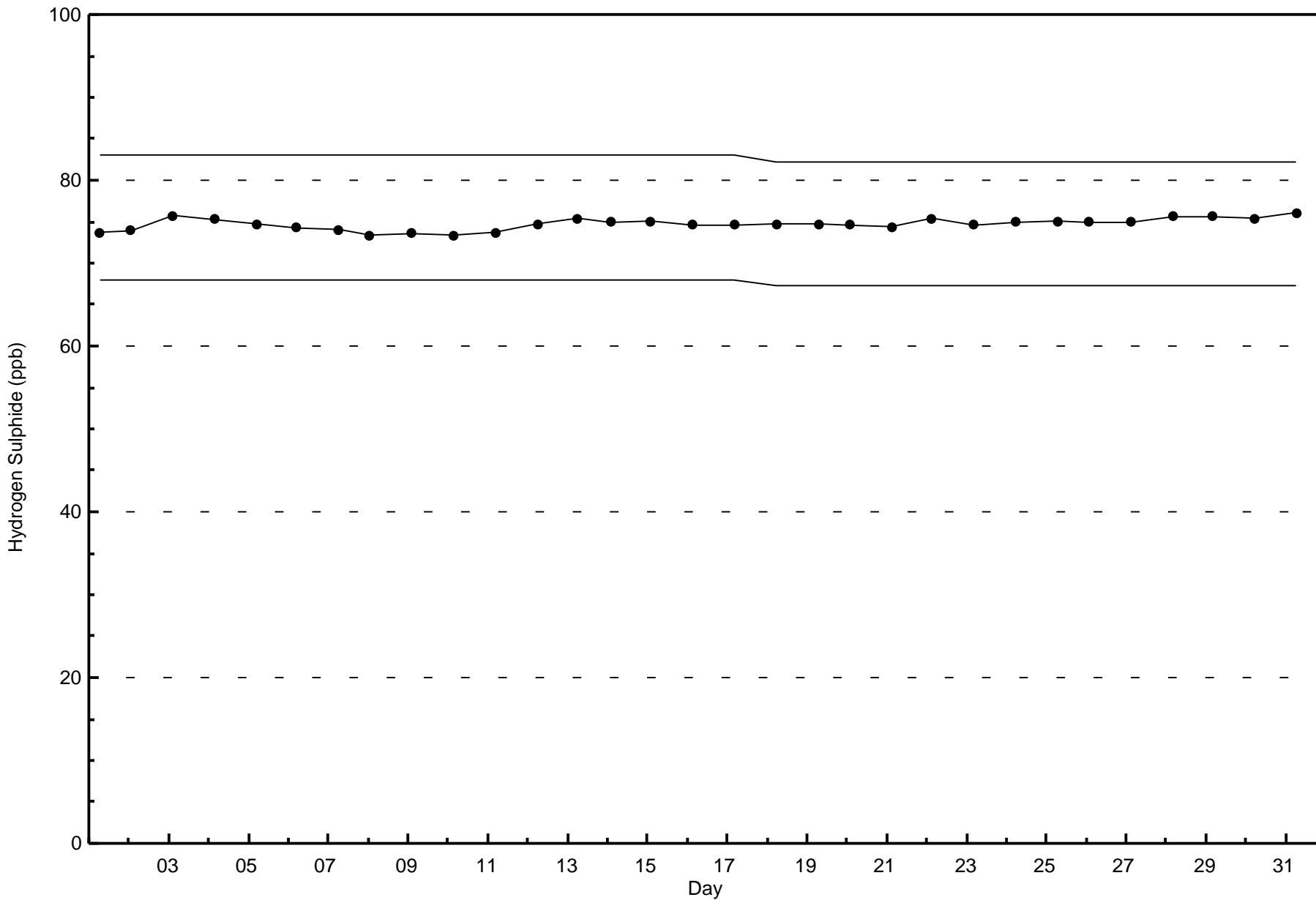
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Hydrogen Sulphide (H₂S) - ppb
Lower Camp (AMS 11)



Total Number of Valid Hours: 709







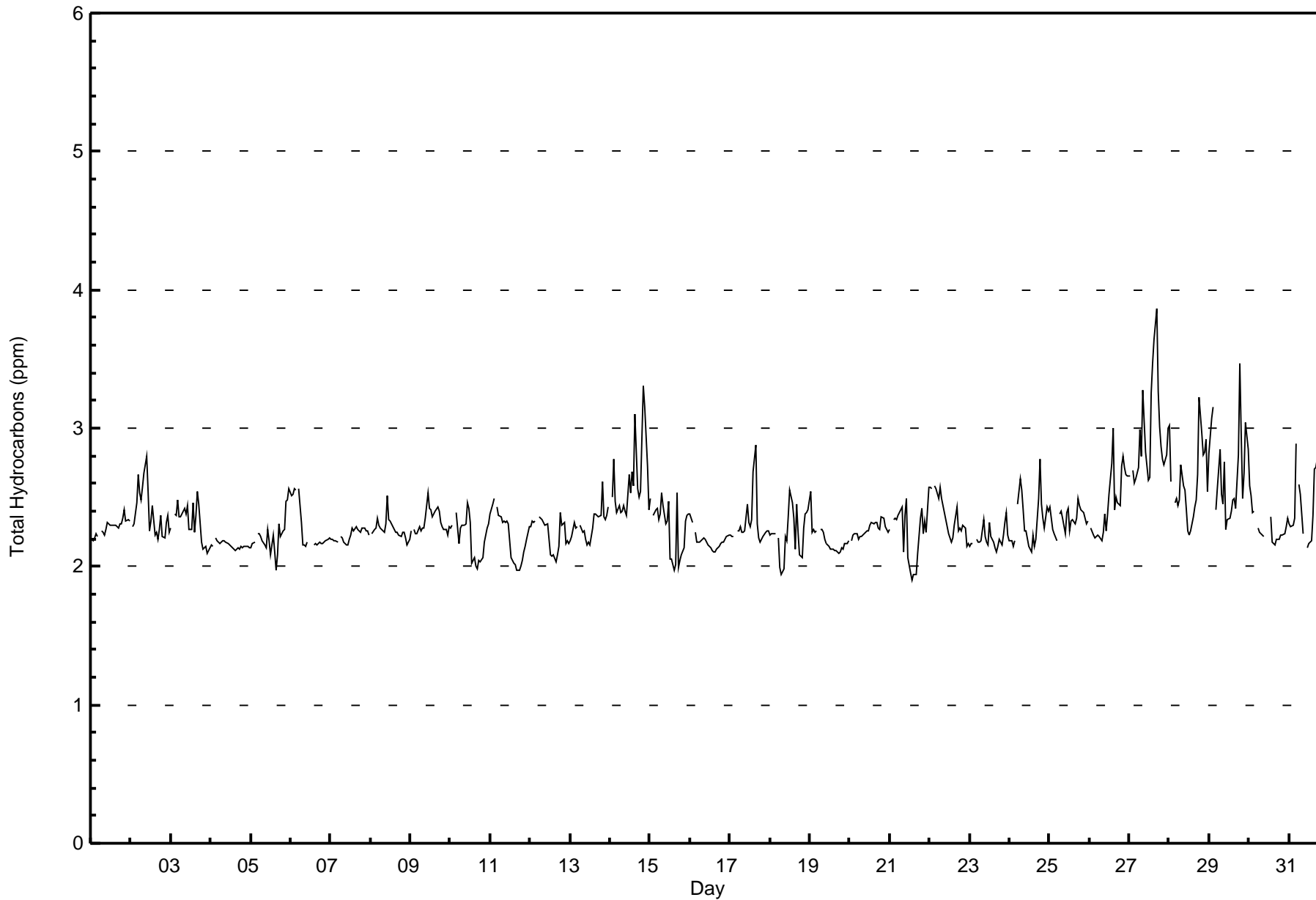
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Lower Camp - March 2017

Maximum Value: 3.9 ppm on Mar 27 17:00																				Maximum Daily Average: 3.0 ppm on Mar 27					Hours in Service: 744	
Minimum Value: 1.9 ppm on Mar 21 14:00																				Minimum Daily Average: 2.2 ppm on Mar 4					Hours of Data: 705	
Maximum Diurnal Average: 2.4 ppm at hour 23																				Minimum Diurnal Average: 2.3 ppm at hour 13					Hours of Missing Data: 39	
Monthly Average: 2.34 ppm																				Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.4 P ₉₀ = 2.6 P ₉₉ = 3.3					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-Mar	2.2	2.2	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.4
2-Mar	Z	2.3	2.3	2.5	2.7	2.5	2.5	2.6	2.7	2.8	2.5	2.3	2.3	2.4	2.2	2.2	2.2	2.3	2.4	2.2	2.2	2.3	2.4	2.3	2.4	2.8
3-Mar	2.3	Z	2.4	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.5	2.3	2.4	2.5	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.3	2.5
4-Mar	2.2	2.1	Z	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	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2
5-Mar	2.1	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.3	2.2	2.1	2.2	2.1	2.0	2.1	2.3	2.2	2.3	2.3	2.5	2.5	2.6	2.2	2.6
6-Mar	2.5	2.5	2.6	2.6	Z	2.6	2.3	2.2	2.2	2.1	2.2	C	C	C	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.6
7-Mar	2.2	2.2	2.2	2.2	2.2	Z	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	2.2	2.2	2.3
8-Mar	Z	2.2	2.3	2.3	2.4	2.3	2.3	2.3	2.2	2.3	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	2.3	2.5
9-Mar	2.3	Z	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.5
10-Mar	2.3	2.3	Z	2.4	2.3	2.2	2.3	2.3	2.3	2.3	2.5	2.4	2.3	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.3	2.3	2.2	2.5
11-Mar	2.4	2.5	2.5	Z	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.3	2.2	2.5
12-Mar	2.3	2.3	2.3	2.3	Z	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.4
13-Mar	2.2	2.2	2.3	2.3	2.3	Z	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.4	2.6	2.4	2.3	2.4	2.4	2.3	2.6
14-Mar	Z	2.5	2.8	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.7	2.5	2.7	2.6	3.1	2.6	2.5	2.5	2.9	3.3	3.2	2.7	2.4	2.6	3.3
15-Mar	2.5	Z	2.4	2.4	2.4	2.3	2.4	2.5	2.4	2.3	2.3	2.5	2.1	2.1	2.0	2.0	2.5	2.0	2.0	2.1	2.1	2.3	2.4	2.4	2.3	2.5
16-Mar	2.4	2.3	Z	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4
17-Mar	2.2	2.2	2.2	Z	2.3	2.3	2.3	2.2	2.3	2.3	2.5	2.3	2.3	2.3	2.7	2.9	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.9
18-Mar	2.2	2.2	2.2	2.2	Z	2.2	2.0	1.9	2.0	2.2	2.2	2.4	2.6	2.5	2.3	2.1	2.5	2.2	2.1	2.1	2.3	2.4	2.4	2.4	2.2	2.6
19-Mar	2.5	2.2	2.3	2.2	2.3	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	2.5
20-Mar	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	2.4	2.3	2.3	2.3	2.3	2.3	2.4
21-Mar	2.3	Z	2.3	2.4	2.3	2.4	2.4	2.4	2.1	2.4	2.5	2.1	1.9	1.9	1.9	1.9	1.9	2.1	2.3	2.4	2.2	2.3	2.2	2.6	2.2	2.6
22-Mar	2.6	2.6	Z	2.6	2.6	2.5	2.6	2.5	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.1	2.2	2.4	2.6
23-Mar	2.1	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.4	2.2	2.2	2.4
24-Mar	2.2	2.2	2.1	2.2	Z	2.5	2.6	2.6	2.4	2.3	2.3	2.1	2.1	2.1	2.2	2.2	2.2	2.5	2.8	2.5	2.4	2.3	2.4	2.4	2.3	2.8
25-Mar	2.4	2.4	2.3	2.2	2.2	Z	2.4	2.4	2.4	2.2	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.5
26-Mar	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.4	2.5	2.7	3.0	2.4	2.5	2.5	2.4	2.7	2.8	2.7	2.7	2.7	2.5	3.0
27-Mar	2.7	Z	2.7	2.6	2.6	2.7	3.0	2.8	3.3	3.1	2.8	2.6	2.6	3.3	3.5	3.6	3.9	3.3	3.0	2.9	2.8	2.7	2.8	3.0	3.0	3.9
28-Mar	3.0	2.6	Z	2.5	2.5	2.4	2.5	2.7	2.6	2.6	2.4	2.3	2.2	2.3	2.4	2.4	2.5	2.7	3.2	3.0	2.8	2.8	2.9	2.5	2.6	3.2
29-Mar	2.8	3.1	3.2	Z	2.4	2.6	2.9	2.5	2.5	2.8	2.3	2.3	2.3	2.4	2.5	2.5	2.4	2.8	3.5	2.9	2.5	2.7	3.0	2.9	2.7	3.5
30-Mar	2.6	2.5	2.4	2.4	Z	2.3	2.2	2.2	2.2	2.2	C	C	C	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.6
31-Mar	2.3	2.3	2.3	2.3	2.9	Z	2.6	2.5	2.2	M	M	2.1	2.2	2.2	2.4	2.7	2.7	2.8	2.6	2.6	2.5	2.8	3.1	2.4	2.5	3.1
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - March 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	26	3.69	3.69
2.1 - 3.0	664	94.18	97.87
3.1 - 10.0	15	2.13	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
Lower Camp - March 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	3	0	0	3	0	1	8	0	0	1	0	2	0	2	3	3	26
2.1 - 3.0	87	20	5	11	7	45	165	28	7	6	1	5	27	79	84	86	663
3.1 - 10.0	0	1	1	0	0	1	5	0	1	0	0	0	0	1	2	3	15
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	90	21	6	14	7	47	178	28	8	7	1	7	27	82	89	92	704

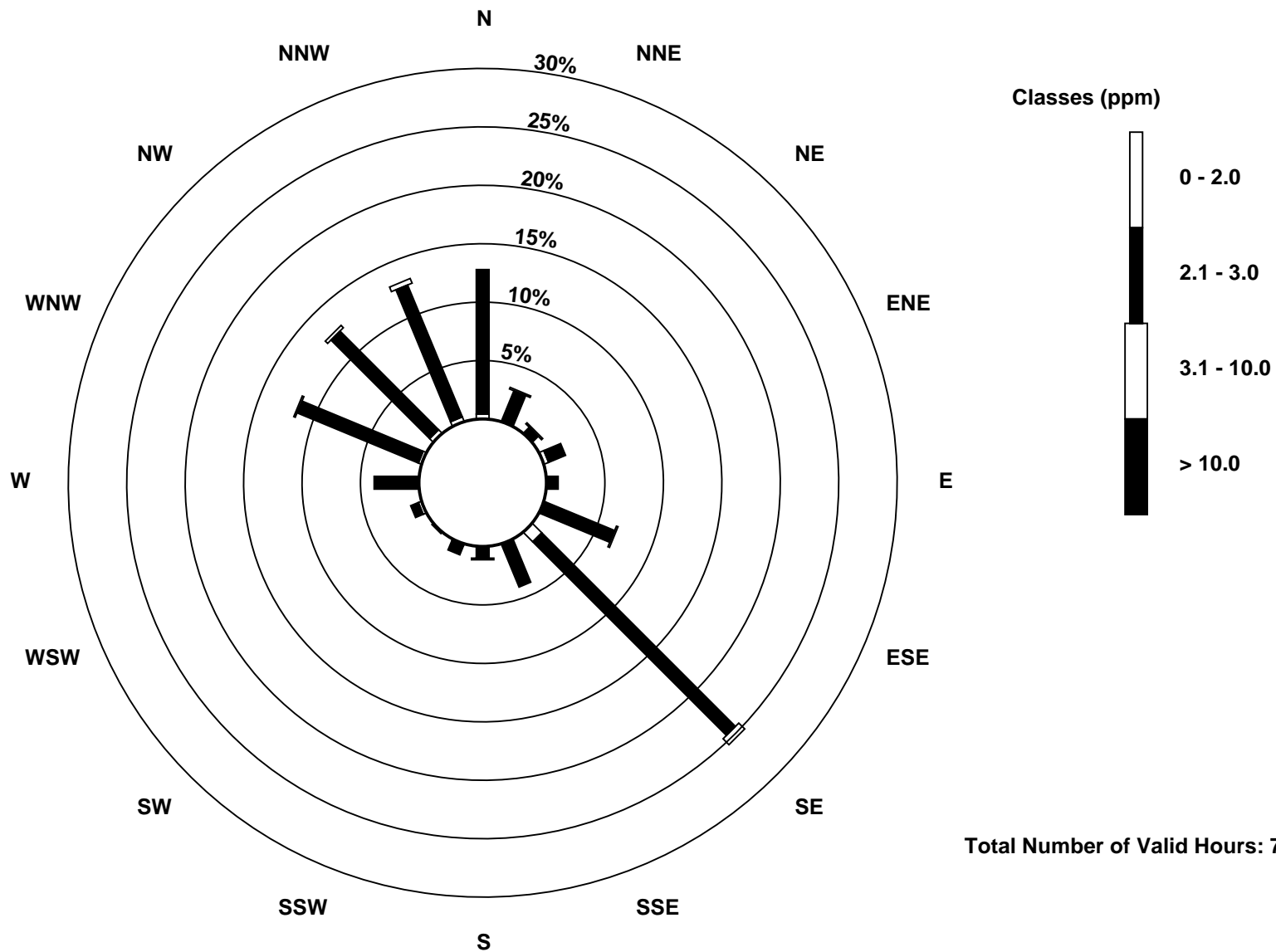
Total Number of Valid Hours: 704

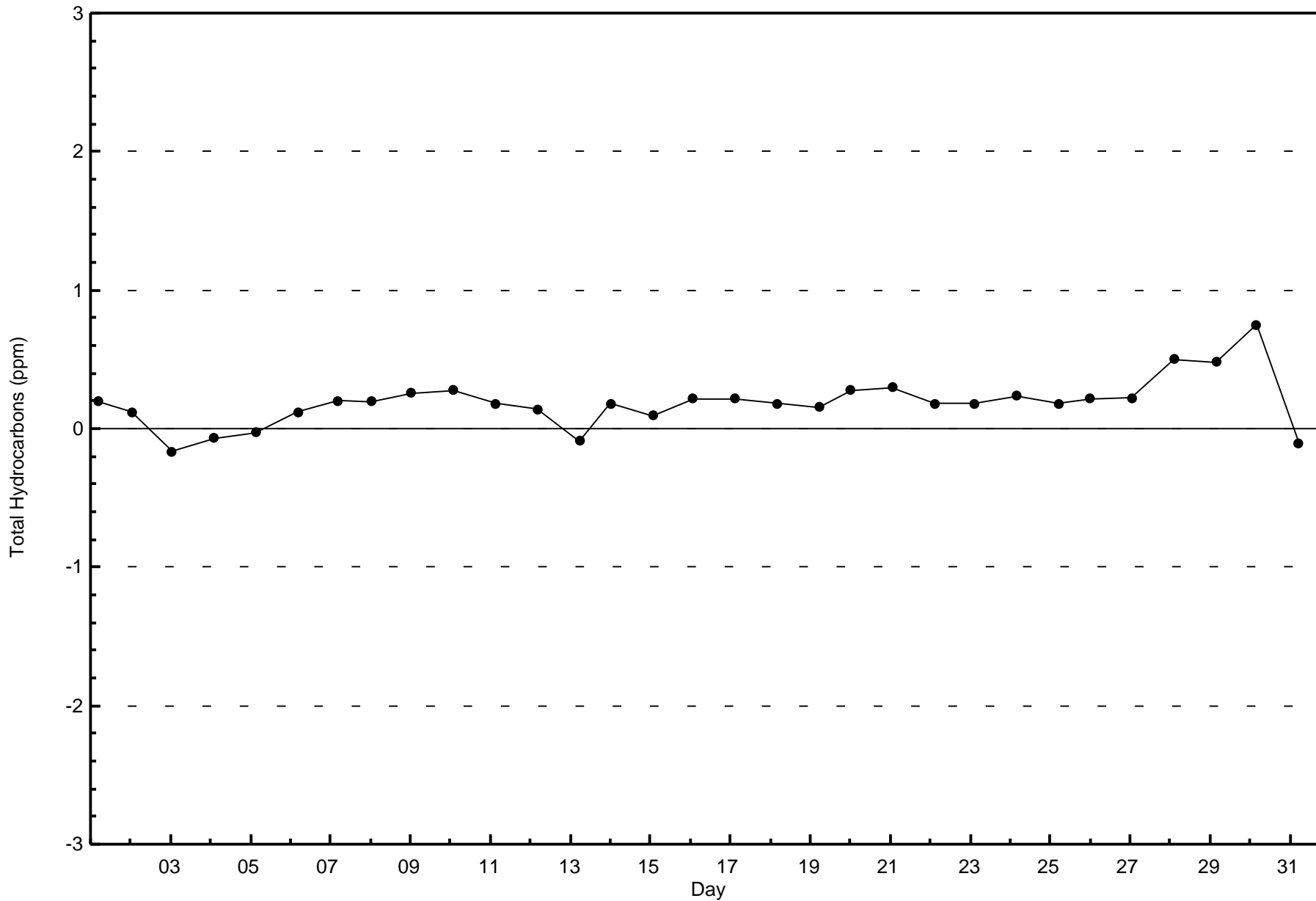
Total Number of Hours: 744

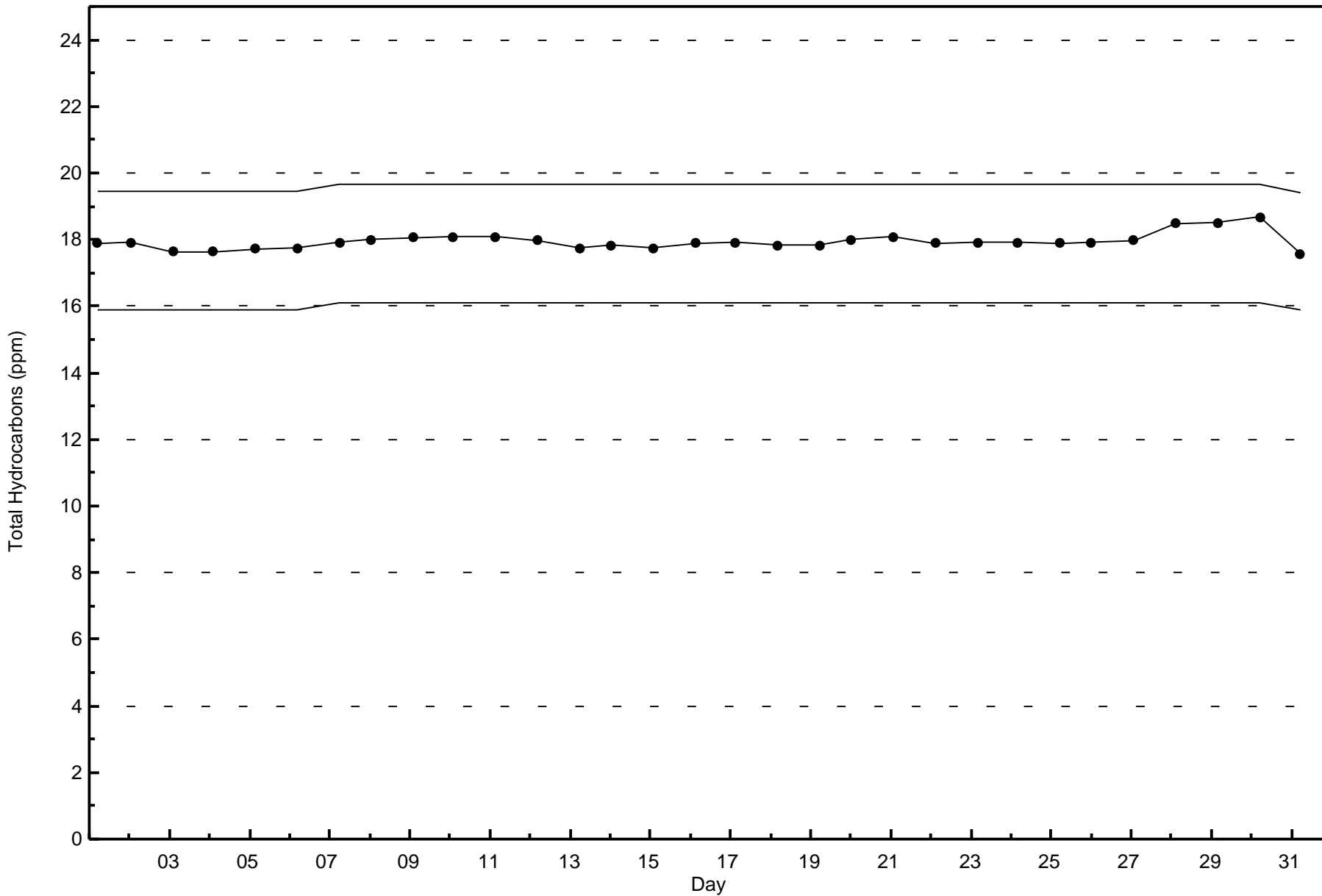


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Hydrocarbons (THC) - ppm
Lower Camp (AMS 11)









Wood Buffalo Environmental Association
Summary of Hour Averages

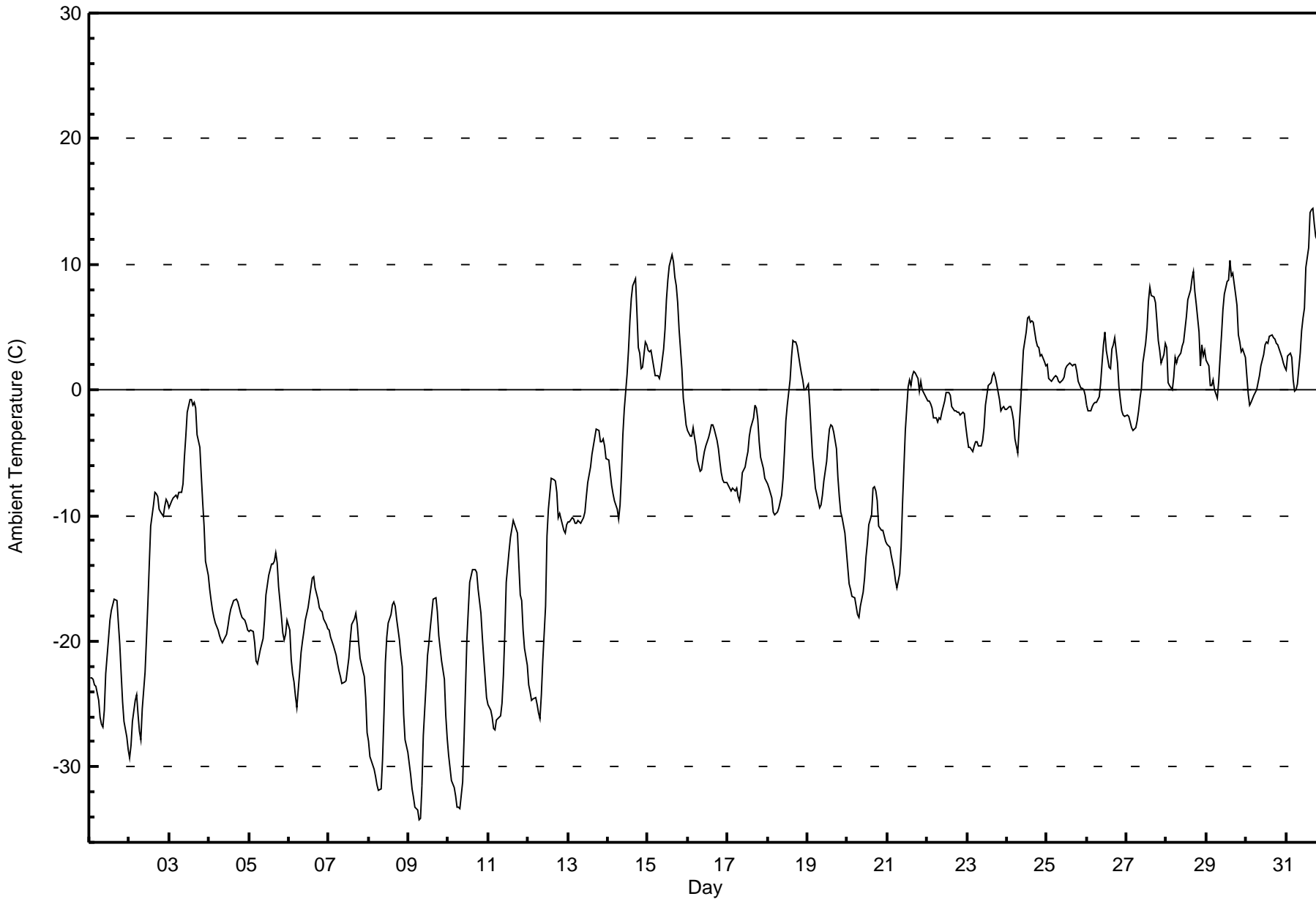
Ambient Temperature (AT) - C
Lower Camp - March 2017

Maximum Value: 14.4 C on Mar 31 17:00 Maximum Daily Average: 7.2 C on Mar 31																						Hours in Service:	744			
Minimum Value: -34.2 C on Mar 9 07:00 Minimum Daily Average: -25.4 C on Mar 9																						Hours of Data:	744			
Maximum Diurnal Average: -3.1 C at hour 17 Minimum Diurnal Average: -12.8 C at hour 7																						Hours of Missing Data:	0			
Monthly Average: -8.24 C Percentiles: P ₁ = -32.4 P ₁₀ = -24.0 Q ₁ = -17.6 Median = -6.5 Q ₃ = 0.7 P ₉₀ = 3.8 P ₉₉ = 11.1																						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-Mar	-22.9	-22.9	-23.0	-23.4	-23.6	-24.6	-26.0	-26.6	-26.8	-25.5	-22.6	-19.7	-18.3	-17.6	-17.1	-16.7	-16.7	-18.5	-20.2	-22.6	-24.9	-26.4	-27.6	-28.6	-22.6	-16.7
2-Mar	-29.3	-28.3	-26.4	-24.7	-24.2	-25.9	-27.2	-27.8	-25.4	-22.5	-19.8	-17.0	-13.9	-10.9	-9.2	-8.1	-8.2	-8.5	-9.4	-9.7	-10.0	-9.3	-8.7	-8.9	-17.2	-8.1
3-Mar	-9.4	-8.9	-8.6	-8.5	-8.3	-8.6	-8.1	-8.1	-7.4	-5.3	-3.6	-1.8	-0.7	-0.7	-1.2	-1.0	-1.4	-3.5	-4.5	-6.8	-9.0	-10.9	-13.6	-14.8	-6.4	-0.7
4-Mar	-15.8	-16.7	-17.5	-18.2	-18.5	-19.1	-19.6	-19.9	-20.1	-19.8	-19.5	-18.8	-18.0	-17.4	-17.1	-16.7	-16.7	-16.9	-17.3	-17.8	-18.1	-18.4	-18.6	-19.1	-18.1	-15.8
5-Mar	-19.3	-19.1	-19.3	-20.1	-21.6	-21.7	-21.3	-20.6	-19.7	-18.3	-16.3	-15.5	-14.8	-13.8	-13.8	-13.7	-13.0	-13.8	-15.7	-18.0	-19.3	-19.9	-19.5	-18.3	-17.8	-13.0
6-Mar	-19.1	-21.4	-22.6	-23.3	-24.3	-25.3	-22.5	-21.0	-20.0	-19.2	-18.4	-17.3	-16.5	-15.8	-15.0	-14.9	-15.8	-16.7	-17.3	-17.6	-17.6	-18.2	-18.7	-19.0	-19.1	-14.9
7-Mar	-19.1	-19.6	-20.0	-20.4	-21.1	-21.8	-22.3	-22.8	-23.3	-23.2	-23.2	-22.2	-21.3	-19.9	-18.7	-18.2	-17.8	-18.7	-20.2	-21.4	-22.3	-22.8	-24.5	-27.3	-21.3	-17.8
8-Mar	-28.0	-29.1	-29.8	-30.2	-30.8	-31.4	-31.9	-31.8	-29.4	-25.8	-21.7	-19.6	-18.5	-17.9	-17.1	-16.9	-17.2	-18.2	-19.9	-21.2	-22.0	-25.8	-27.8	-28.8	-24.6	-16.9
9-Mar	-29.8	-30.7	-31.8	-32.4	-33.2	-33.5	-34.2	-34.1	-31.5	-27.5	-23.3	-21.1	-20.1	-18.9	-17.8	-16.7	-16.6	-17.7	-19.5	-20.5	-21.6	-23.0	-25.9	-27.7	-25.4	-16.6
10-Mar	-29.1	-30.0	-31.1	-31.6	-32.3	-33.2	-33.2	-33.3	-31.2	-27.7	-23.8	-19.9	-17.6	-15.3	-14.3	-14.2	-14.3	-14.5	-15.9	-17.8	-19.7	-21.4	-23.0	-24.4	-23.7	-14.2
11-Mar	-25.1	-25.4	-26.0	-26.9	-27.0	-26.2	-26.1	-25.9	-25.0	-22.6	-19.3	-15.3	-12.8	-11.7	-11.1	-10.4	-10.8	-11.4	-14.0	-16.4	-16.8	-19.1	-20.6	-21.9	-19.5	-10.4
12-Mar	-23.5	-24.0	-24.7	-24.6	-24.5	-25.0	-25.7	-26.1	-24.3	-21.6	-17.2	-11.6	-9.5	-8.2	-7.1	-7.2	-7.2	-8.1	-10.1	-9.8	-10.7	-11.2	-11.3	-10.7	-16.0	-7.1
13-Mar	-10.5	-10.5	-10.2	-10.3	-10.6	-10.7	-10.4	-10.6	-10.4	-10.1	-9.7	-8.4	-7.4	-6.2	-5.1	-4.5	-3.8	-3.1	-3.2	-4.1	-4.1	-3.9	-4.5	-5.5	-7.4	-3.1
14-Mar	-5.6	-6.5	-7.5	-8.2	-8.8	-9.4	-10.3	-9.2	-6.6	-3.6	-1.5	1.3	3.1	5.5	7.3	8.3	8.9	6.1	3.4	2.9	1.7	1.8	3.9	3.6	-0.8	8.9
15-Mar	3.2	3.0	3.1	1.8	1.2	1.1	1.1	0.9	1.5	3.3	4.8	7.2	8.7	9.9	10.7	10.2	9.0	8.2	7.0	4.9	1.7	-0.6	-1.7	-2.8	4.1	10.7
16-Mar	-3.2	-3.7	-3.6	-3.1	-3.7	-4.5	-5.6	-6.5	-6.3	-5.6	-4.9	-4.5	-3.8	-3.3	-2.8	-2.8	-3.2	-4.0	-4.7	-5.7	-6.6	-7.2	-7.3	-7.4	-4.7	-2.8
17-Mar	-7.6	-7.8	-8.0	-7.8	-8.0	-7.9	-8.5	-8.8	-7.9	-6.6	-6.2	-5.5	-4.9	-3.7	-3.0	-2.3	-1.2	-1.5	-2.3	-4.2	-5.4	-6.3	-7.0	-7.2	-5.8	-1.2
18-Mar	-7.4	-7.8	-8.6	-9.8	-10.0	-9.8	-9.7	-9.3	-8.4	-7.0	-4.9	-2.5	-1.2	0.8	2.6	3.9	3.8	3.8	3.5	2.0	1.4	0.8	0.0	0.0	-3.1	3.9
19-Mar	0.5	-1.2	-3.3	-5.3	-6.5	-7.8	-8.9	-9.4	-9.1	-8.4	-7.3	-5.7	-4.2	-3.1	-2.8	-2.9	-3.3	-4.7	-6.9	-8.5	-9.7	-10.1	-11.3	-12.7	-6.4	0.5
20-Mar	-14.1	-15.4	-15.8	-16.4	-16.6	-17.2	-17.8	-18.1	-17.2	-16.1	-15.0	-13.3	-12.2	-10.7	-9.9	-7.9	-7.7	-8.1	-8.9	-10.8	-11.2	-11.1	-11.6	-12.0	-13.1	-7.7
21-Mar	-12.2	-12.5	-13.1	-13.7	-14.3	-15.1	-15.7	-14.6	-12.5	-9.1	-6.2	-3.2	0.2	0.8	0.4	1.1	1.5	1.4	0.9	-0.1	0.7	0.0	-0.2	-0.6	-5.7	1.5
22-Mar	-0.9	-0.8	-1.1	-1.5	-2.2	-2.3	-2.5	-2.2	-2.3	-1.7	-0.8	-0.2	-0.2	-0.2	-0.4	-1.4	-1.7	-1.7	-1.8	-1.7	-1.9	-1.8	-1.9	-2.9	-1.5	-0.2
23-Mar	-3.7	-4.6	-4.6	-4.9	-4.5	-4.1	-4.2	-4.4	-4.5	-4.0	-3.1	-1.2	-0.5	0.3	0.6	1.2	1.3	1.0	0.5	-0.8	-1.6	-1.4	-1.3	-1.5	-2.1	1.3
24-Mar	-1.6	-1.3	-1.3	-1.8	-2.4	-3.9	-5.0	-3.0	-1.1	1.1	3.2	4.6	5.7	5.8	5.4	5.5	5.4	3.9	3.5	3.4	2.7	2.8	2.2	1.9	1.5	5.8
25-Mar	2.1	0.9	0.8	0.7	1.1	1.1	1.0	0.7	0.6	0.8	1.0	1.7	1.9	2.1	2.2	1.9	2.0	2.1	1.5	0.7	0.1	0.2	0.1	-0.4	1.1	2.2
26-Mar	-1.2	-1.7	-1.7	-1.3	-1.1	-1.0	-1.0	-0.5	0.5	2.1	3.6	4.6	3.2	1.8	1.6	3.2	3.7	4.2	2.2	0.2	-0.7	-1.7	-2.0	-2.1	0.6	4.6
27-Mar	-2.0	-2.1	-2.6	-3.0	-3.2	-3.0	-2.4	-1.7	-0.7	0.2	2.2	3.7	5.0	7.0	8.2	7.5	7.5	6.9	5.5	3.9	3.2	2.1	2.8	3.7	2.0	8.2
28-Mar	3.4	0.6	0.4	0.0	1.1	2.6	2.2	2.6	2.9	3.5	3.8	4.9	5.8	7.1	7.9	8.8	9.4	7.9	6.8	4.6	2.0	3.6	2.7	3.2	4.1	9.4
29-Mar	2.4	1.9	0.4	0.3	0.8	0.0	-0.6	0.7	2.6	4.4	6.5	7.6	8.7	8.8	10.3	9.1	9.3	7.7	6.7	4.4	3.8	3.1	3.3	2.6	4.4	10.3
30-Mar	1.1	-0.3	-1.2	-0.9	-0.4	-0.2	0.1	0.6	1.2	1.9	2.8	3.6	3.8	3.8	4.2	4.4	4.2	4.1	3.7	3.6	3.3	2.6	2.1	1.9	2.1	4.4
31-Mar	1.5	2.8	3.0	2.6	0.8	-0.1	0.0	0.5	2.9	4.7	5.7	6.5	9.8	11.4	14.1	14.3	14.4	13.3	12.2	11.6	11.1	10.5	10.5	9.4	7.2	14.4
																						Diurnal Average				
																						Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Lower Camp - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Lower Camp - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	128	17.20	17.20
-20 - 0	405	54.44	71.64
0 - 10	198	26.61	98.25
10 - 20	13	1.75	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

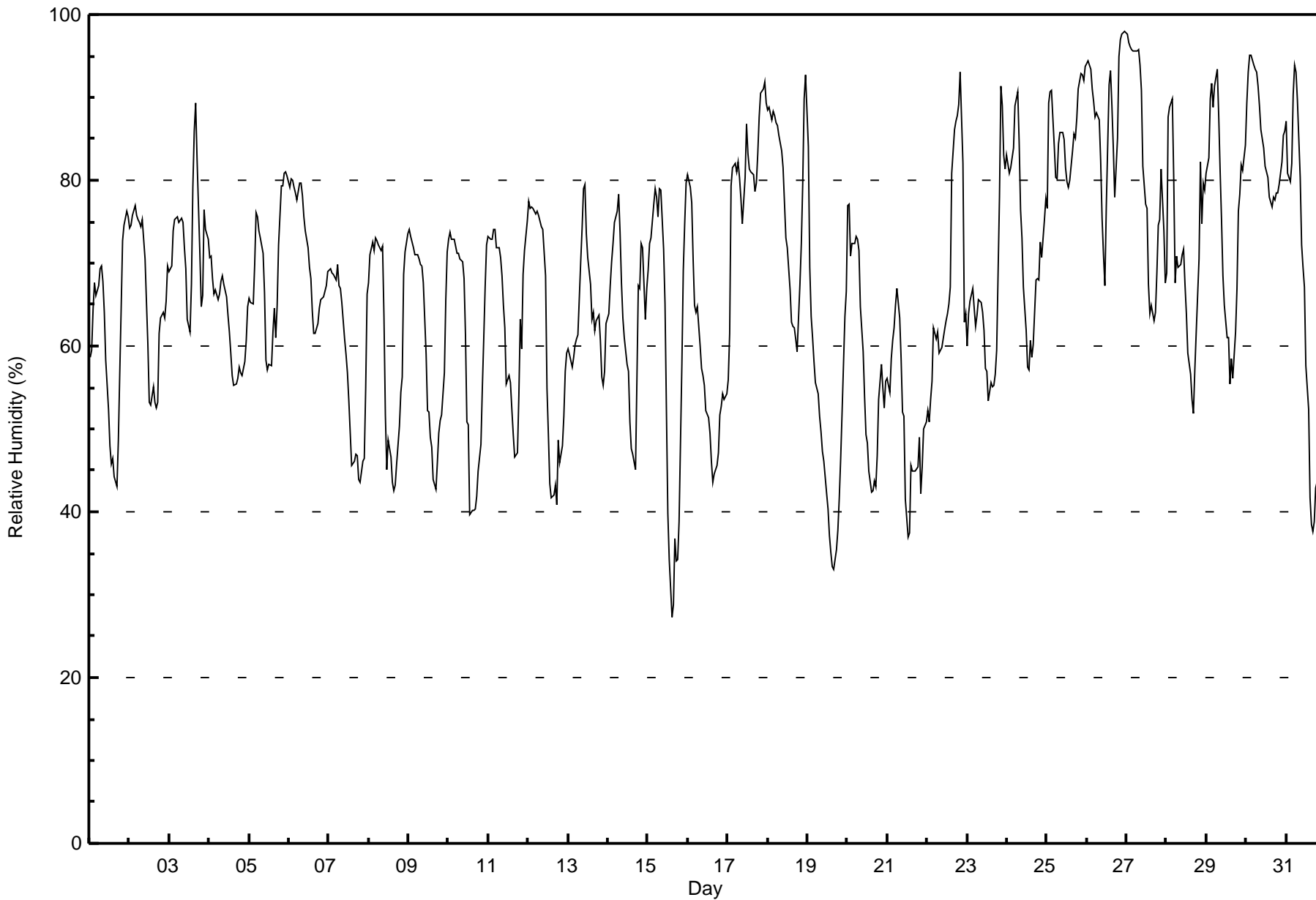
Lower Camp - March 2017

Maximum Value: 98 % on Mar 27 00:00																		Maximum Daily Average: 87.7 % on Mar 26																		Hours in Service: 744	
Minimum Value: 27 % on Mar 15 15:00																		Minimum Daily Average: 50.2 % on Mar 19																		Hours of Data: 744	
Maximum Diurnal Average: 76.0 % at hour 4																		Minimum Diurnal Average: 55.9 % at hour 17																		Hours of Missing Data: 0	
Monthly Average: 67.3 %																		Percentiles: P ₁ = 35 P ₁₀ = 46 Q ₁ = 57 Median = 68 Q ₃ = 78 P ₉₀ = 88 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-Mar	59	60	64	68	66	67	69	70	68	64	58	52	48	46	46	44	43	49	57	65	73	75	76	76	60.9	76											
2-Mar	74	75	76	77	76	75	75	74	75	70	65	60	53	53	55	53	52	53	61	63	64	63	65	70	65.9	77											
3-Mar	69	70	74	75	75	76	75	75	75	72	69	63	62	67	79	86	89	82	71	65	66	77	74	73	73.3	89											
4-Mar	71	71	68	66	67	66	66	68	68	67	66	64	62	59	56	55	55	56	57	57	56	58	61	65	62.8	71											
5-Mar	66	65	65	70	76	76	74	73	71	66	58	57	58	58	62	65	61	65	72	79	79	81	81	81	69.1	81											
6-Mar	79	80	80	79	78	78	80	80	78	76	74	72	69	68	64	62	61	63	65	66	66	66	67	69	71.6	80											
7-Mar	69	69	69	69	68	70	67	67	65	61	59	57	53	49	46	46	47	47	44	44	46	46	55	66	57.5	70											
8-Mar	68	71	73	71	73	73	72	72	72	64	52	45	49	47	43	43	43	46	50	54	56	69	71	73	60.4	73											
9-Mar	74	73	73	72	71	71	70	70	70	68	59	52	52	49	48	44	43	46	49	51	52	57	66	71	60.4	74											
10-Mar	73	74	73	73	72	71	71	70	70	68	61	51	51	40	40	40	40	42	45	48	55	61	67	72	59.5	74											
11-Mar	73	73	73	74	74	72	72	71	68	65	62	55	56	56	52	49	47	47	54	63	60	69	72	75	63.8	75											
12-Mar	77	77	77	77	76	76	76	75	74	74	69	55	49	43	42	42	43	41	49	46	48	52	57	59	60.5	77											
13-Mar	60	59	57	59	60	61	61	70	74	79	80	74	71	68	63	64	62	63	64	61	56	55	57	63	64.2	80											
14-Mar	64	67	70	72	75	76	78	74	68	63	61	58	57	51	48	47	45	56	67	67	72	72	63	67	64.1	78											
15-Mar	69	72	73	77	79	78	76	79	79	72	65	52	40	34	27	29	37	34	34	39	58	69	75	80	59.4	80											
16-Mar	81	79	77	70	65	64	65	60	57	56	55	52	51	49	46	44	45	46	47	52	53	54	54	54	57.4	81											
17-Mar	56	62	79	82	82	81	82	80	78	75	80	87	83	81	81	81	79	80	83	88	90	91	92	89	80.9	92											
18-Mar	88	89	87	88	88	87	87	85	83	81	77	73	72	67	63	62	62	61	59	68	72	80	90	93	77.6	93											
19-Mar	84	69	63	61	58	56	54	52	50	47	46	42	40	37	35	33	33	35	38	42	46	52	64	67	50.2	84											
20-Mar	77	77	71	72	72	73	73	71	65	59	54	49	48	45	42	42	44	43	47	54	58	55	53	56	58.4	77											
21-Mar	56	54	58	61	62	65	67	63	59	52	52	41	37	38	46	45	45	45	45	49	42	45	50	51	51.2	67											
22-Mar	52	51	53	56	62	61	62	59	59	60	62	63	64	65	67	81	86	87	88	89	93	82	63	64	67.9	93											
23-Mar	60	64	65	67	65	62	64	66	65	64	62	57	57	53	56	55	55	57	60	78	91	89	83	81	65.7	91											
24-Mar	83	81	82	83	84	89	91	85	76	73	67	62	58	57	61	59	60	68	68	68	72	71	75	78	72.9	91											
25-Mar	77	89	91	91	84	80	80	84	86	86	85	82	80	79	80	84	86	85	88	91	93	93	92	94	85.7	94											
26-Mar	94	94	93	91	90	88	88	87	82	75	71	67	77	92	93	89	84	78	85	95	97	98	98	98	87.7	98											
27-Mar	98	97	96	96	96	96	96	96	94	91	82	77	77	67	64	65	63	64	69	75	75	81	74	68	81.4	98											
28-Mar	69	88	89	90	80	68	71	69	70	71	72	68	64	59	57	54	52	57	62	71	82	75	80	79	70.5	90											
29-Mar	81	83	90	92	89	91	93	88	81	75	68	65	61	61	55	59	56	62	67	76	78	82	81	84	75.8	93											
30-Mar	89	93	95	95	94	93	93	91	89	86	84	82	81	80	78	77	78	78	79	78	79	82	85	86	85.3	95											
31-Mar	87	81	80	82	90	94	93	90	80	72	70	67	58	52	42	39	38	39	43	44	46	46	45	55	63.8	94											
	73.4	74.4	75.3	76.0	75.7	75.3	75.5	74.7	72.6	69.5	66.0	61.4	59.3	57.1	56.1	56.0	55.9	57.2	60.2	64.0	67.0	69.2	70.5	72.8	Diurnal Average												
	98	97	96	96	96	96	96	96	94	91	85	87	83	92	93	89	89	87	88	95	97	98	98	98	Diurnal Maximum												



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Lower Camp - March 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Lower Camp - March 2017

Maximum Speed: 31 km/h on Mar 19 04:00	Maximum Daily Speed Average: 21.8 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 28 20:00	Minimum Daily Speed Average: 1.1 km/h on Mar 27	Hours of Data: 743
Maximum Diurnal Speed Average: 3.6 km/h at hour 18	Minimum Diurnal Speed Average: 0.6 km/h at hour 4	Hours of Missing Data: 1
Monthly Average Velocity: 1.6 km/h 75.5 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 9 Q ₃ = 14 P ₉₀ = 19 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-Mar	NW4	N4	NNW4	NNW4	N8	NNW9	NNW10	NW8	NW7	NNW8	NNW6	W8	NW10	NW11	NW14	NNW11	NNW9	NW6	WNW4	NW3	NW3	NNW2	WNW4	NNW2	NW6.2	NW14
2-Mar	WNW1	E1	NNE2	ENE1	SE4	NW2	N1	AF	SE6	SSE6	SE6	SE7	SE8	SE9	SE16	SE17	ESE19	ESE18	SE19	SE25	ESE24	ESE19	ESE22	SE25	SE10.6	SE25
3-Mar	ESE23	ESE22	SE24	SE21	SE18	ESE16	SE6	SE9	SE9	SE19	SE12	SE11	SE11	SSW3	NW3	WNW6	NW11	NW16	NW13	NNW19	NNW18	NNE13	NNE15	N15	E4.8	SE24
4-Mar	N17	N13	N12	NNW7	N8	N16	N16	N16	N16	N19	N20	N15	N14	N15	N16	N14	N14	N12	N8	NNE6	ENE8	NNE4	NNW5	NNW6	N12.1	N20
5-Mar	NNW5	NW5	NNW4	NNW2	NW3	NW3	NW4	NW4	NNW5	NNW4	ESE7	SSE3	ESE5	SSW5	W8	WNW8	NW7	NW5	W2	W3	NW1	ENE0	NW1	WNW4	NW2.3	W8
6-Mar	WNW3	NNE1	WNW4	WNW5	WNW4	NW2	WNW7	NW8	NNW10	N12	N16	N15	NNE13	N16	N17	N19	N24	N20	N20	N15	N15	N14	NNW12	NNW12	N11.2	N24
7-Mar	N14	N16	NNW14	N15	N15	N12	N16	N14	N17	N18	N18	N17	NNW15	NNW17	NNW16	N14	NNE13	NNE15	NNE10	NE2	NW3	WNW6	W6	W4	N12.1	N18
8-Mar	WNW3	NW3	NW3	NW3	NW3	NW3	NW3	NNW3	NNW3	N3	NW6	NNW9	N15	NNW11	NNW8	N10	NNE13	NE14	NNE10	N10	NW6	NW3	NNW1	NNW1	N5.3	N15
9-Mar	NW3	WNW3	NW2	NNW2	NNW3	NW3	NNW2	NNW2	NNW2	NNW3	WNW4	WNW5	W8	WSW8	W7	SSE2	SE6	WNW2	NW5	WNW5	NW4	WNW5	NNW2	WNW3	WNW2.8	W8
10-Mar	NW3	WNW3	WNW3	WNW4	NW3	NNW2	WNW4	NW3	N3	NNW3	NW4	W6	W8	WNW8	NNW13	NW12	N10	N10	NNW7	NNW6	NNW4	NW2	WNW3	NW3	NW4.7	WNW13
11-Mar	WNW3	WNW4	WNW4	WNW3	NW3	WNW4	WNW4	NW4	NW4	NW3	NNW3	ESE2	ESE11	ESE15	SE15	SE13	ENE12	ENE8	ENE4	SSW2	E3	WNW3	ENE3	WNW4	E1.6	SE15
12-Mar	WNW3	WNW3	WNW3	WNW4	WNW4	NW3	NW3	NNW3	NNW3	WNW3	NW1	ESE15	SE24	SE20	SE19	SE23	SE23	ESE21	ESE16	SE24	SE23	SE23	SE16	SE21	SE9.8	SE24
13-Mar	SE23	SE21	SE16	SSE14	SSE16	SSE15	SSE16	SE20	SE19	SE21	SE22	SE19	SSE18	SSE17	SSE15	SE17	SSE14	SSE11	SSE10	SSE6	SSE11	SSE13	SSE13	SE12	SSE15.7	SE23
14-Mar	SE12	SE11	SE12	SE12	SE13	SE14	SE14	SE16	SE16	SE18	SE16	SE13	SE13	SE12	SE11	SE12	SE7	WNW2	WNW3	WNW6	WNW5	NE5	ESE16	SE23	SE10.1	SE23
15-Mar	SE20	SE18	SE11	SE12	SE13	SE10	SSE10	SE11	SE14	SE16	SE13	S6WSW17	WSW13	WSW18	WSW17	W9	NNW7	N8	WNW5	N1	NNW1	WNW3	NW1	NW1	S4.9	SE20
16-Mar	WNW5	WNW5	NW6	NNW9	NNW10	NNW13	N16	N15	NNE17	N18	N18	N18	N19	N19	N18	N19	N21	N20	N13	N16	N14	N11	N8	NNW9	N13.4	NNE21
17-Mar	NNW8	N5	NW5	NW8	NNW6	NNW7	NNW9	N7	NW6	NW5	NNW4	NNW8	NW11	NNW9	NNW8	NNW9	NNW10	N12	NNW10	NW6	WNW6	NW4	NW4	NNW6	NNW7.0	N12
18-Mar	NNW7	NW8	NW8	NW4	NW6	NW6	NW7	NW7	NNW6	NNW8	NNW7	W9	W6	NNW7	NNW7	ESE12	ESE16	E9	ENE6	N3	WNW4	WNW3	WNW5	WNW3	NNW3.3	ESE16
19-Mar	NW15	WNW29	WNW30	WNW31	WNW30	WNW25	NW21	WNW21	WNW18	W21	W20	W19	W20	W22	WNW24	WNW28	WNW28	NW24	NW27	NW25	NW23	WNW22	NNW18	N14	WNW21.8	WNW31
20-Mar	N15	N16	N14	N14	NNW11	NNE9	N7	NNE4	N5	N6	NNE6	ENE3	NE3	ENE4	NE3	SE10	SE13	SE12	SE6	NNE1	SE8	SE14	SE15	SE18	ENE4.3	SE18
21-Mar	SE14	SE10	SE8	SE11	ESE11	ESE8	SE10	SE11	ESE10	SE11	SE10	SE11	SE13	SE18	SE24	SE25	SE20	SE24	ESE23	SE24	SE15	SE13	SE18	ESE17	SE14.8	SE25
22-Mar	ESE21	ESE16	ESE20	ESE21	SE20	ESE19	SE17	SE16	ESE16	ESE14	SE16	SE14	SE11	SE10	SE8	SE7	WSW1	W5	WNW4	W4	WNW5	NNW7	N17	N14	ESE8.3	ESE21
23-Mar	N10	NW7	NNW7	NW5	NW5	NNW7	N10	N13	N10	NNW9	NW8	NW8	WSW14	NW11	NNW9	NNW8	NNW7	WN9	WN9	N7	NNE3	ESE11	ESE13	ESE15	NNW5.0	ESE15
24-Mar	SE14	SE6	SE9	SE12	SE8	ESE4	E3	SE6	ESE3	SE12	SE12	SE12	SE11	SE12	SE18	SE21	SE18	SE16	SE9	SE13	SE21	SE21	ESE19	SE18	SE12.3	SE21
25-Mar	SE14	SE6	ENE6	ENE5	E10	ESE12	ESE18	ESE15	SE15	SE13	SE12	SE12	SE9	SE6	SE4	NNE3	ENE2	NE2	NNW2	W3	W2	NW3	WNW1	WNW2	ESE6.2	ESE18
26-Mar	WNW2	WNW3	WNW1	WNW3	WNW2	W4	WNW2	NW3	E3	ESE16	SE7	W4	W11	W8	NNW2	SW2	SE7	SE4	SE4	WNW4	WNW3	WNW3	WNW4	WNW4	WSW1.3	ESE16
27-Mar	WNW1	WNW3	WNW1	WNW1	ENE0	SE6	SE8	SE4	ESE3	NNE2	E2	N5	N9	NNW7	NW5	NNW6	NNW3	NW3	NNW3	WNW6	NNW5	WNW6	ESE4	SE10	NNW1.1	SE10
28-Mar	SE7	WNW5	WNW4	WNW3	SE4	SE10	SE10	SE10	SE11	SSE10	SE9	SSE8	SSE9	SE10	SE12	SE12	SE11	SE12	SE10	SE0	ESE6	ESE14	SE7	SE11	SE7.3	ESE14
29-Mar	SE10	SE11	SE10	SE7	SE9	SE11	SE9	SE11	SE12	SE12	SE11	SE13	SE12	SE14	SE15	SE15	SE15	SE10	SE5	SE7	SE11	ESE16	ESE15	ESE5	SE10.9	ESE16
30-Mar	NNW1	WNW3	NW2	NW4	WNW4	WNW4	WNW3	NW3	NNW3	NW2	NW2	WNW3	NW4	N7	NNW7	NNW7	N7	N9	N7	NW3	W4	SSW0	SSW0	N1	NNW3.4	N9
31-Mar	N1	S4	S5	SSE4	SSE4	SE8	SSE6	SE6	SE7	SE12	SE14	SE17	SE15	SE14	S11	S12	SSW12	SSW9	SSE8	S8	SSE9	S8	S10	SSE9	SSE8.2	SE17

E2.3 NE1.0 NE0.7 NNE0.6 ENE0.8 ENE1.2 NE1.3 ENE1.6 ENE2.3 E3.1 E2.5 ESE1.7 SSE1.1 ENE0.9 NE0.8 E1.8 ENE3.3 NE3.6 NNE2.5 N1.4 ENE1.1 E2.0 E2.8 ESE3.2	Diurnal Average
ESE23WNW29WNW30WNW31WNW30WNW25WNW21WNW21 SE19 SE21 SE22 W19 SE24 W22WNW24WNW28WNW28 NW24 NW27 SE25 ESE24 SE23 ESE22 SE25	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
Lower Camp - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 12 km/h on Mar 19 01:00	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9
Minimum Value: 1 km/h on Mar 1 21:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6	

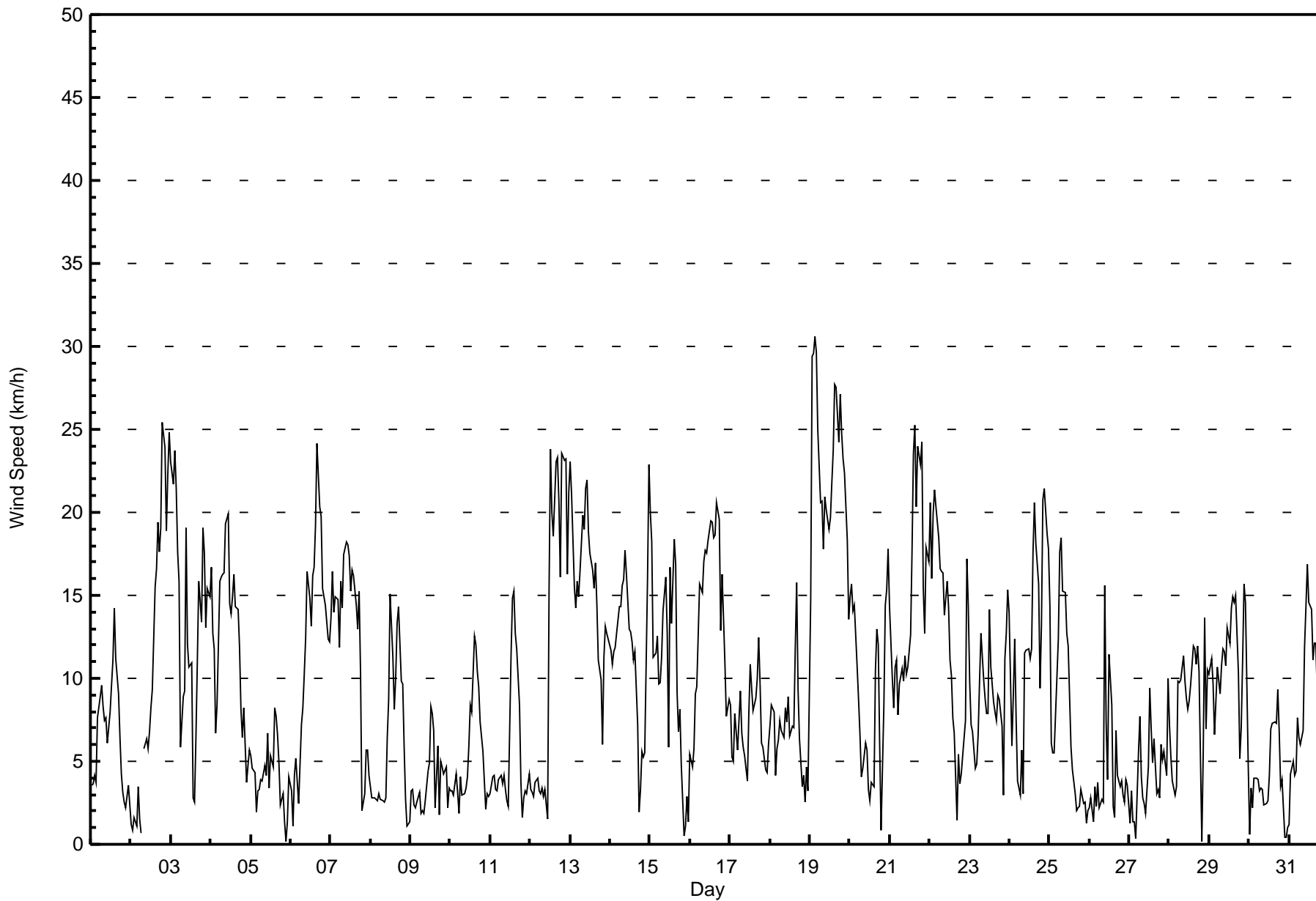
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Mar	1	1	1	1	2	2	3	2	2	2	2	3	3	3	3	2	2	2	1	1	1	1	1	1	3
2-Mar	1	1	1	1	1	1	1	AF	3	2	1	2	2	3	2	3	3	3	4	4	4	3	5	3	5
3-Mar	3	2	3	4	6	6	3	4	5	5	3	4	4	2	1	3	4	3	3	4	4	3	3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

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Lower Camp - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Lower Camp - March 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	244	32.84	32.84
6 - 11	227	30.55	63.39
12 - 19	210	28.26	91.66
20 - 28	58	7.81	99.46
29 - 38	4	0.54	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
Lower Camp - March 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	8	5	9	5	7	8	4	2	5	1	1	10	73	59	36	244
6 - 11	21	6	0	4	2	7	72	13	5	1	0	1	12	9	27	47	227
12 - 19	58	7	1	1	0	27	78	12	1	1	0	5	1	2	5	11	210
20 - 28	5	1	0	0	0	9	28	0	0	0	0	0	4	7	4	0	58
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	95	22	6	14	7	50	186	29	8	7	1	7	27	95	95	94	743

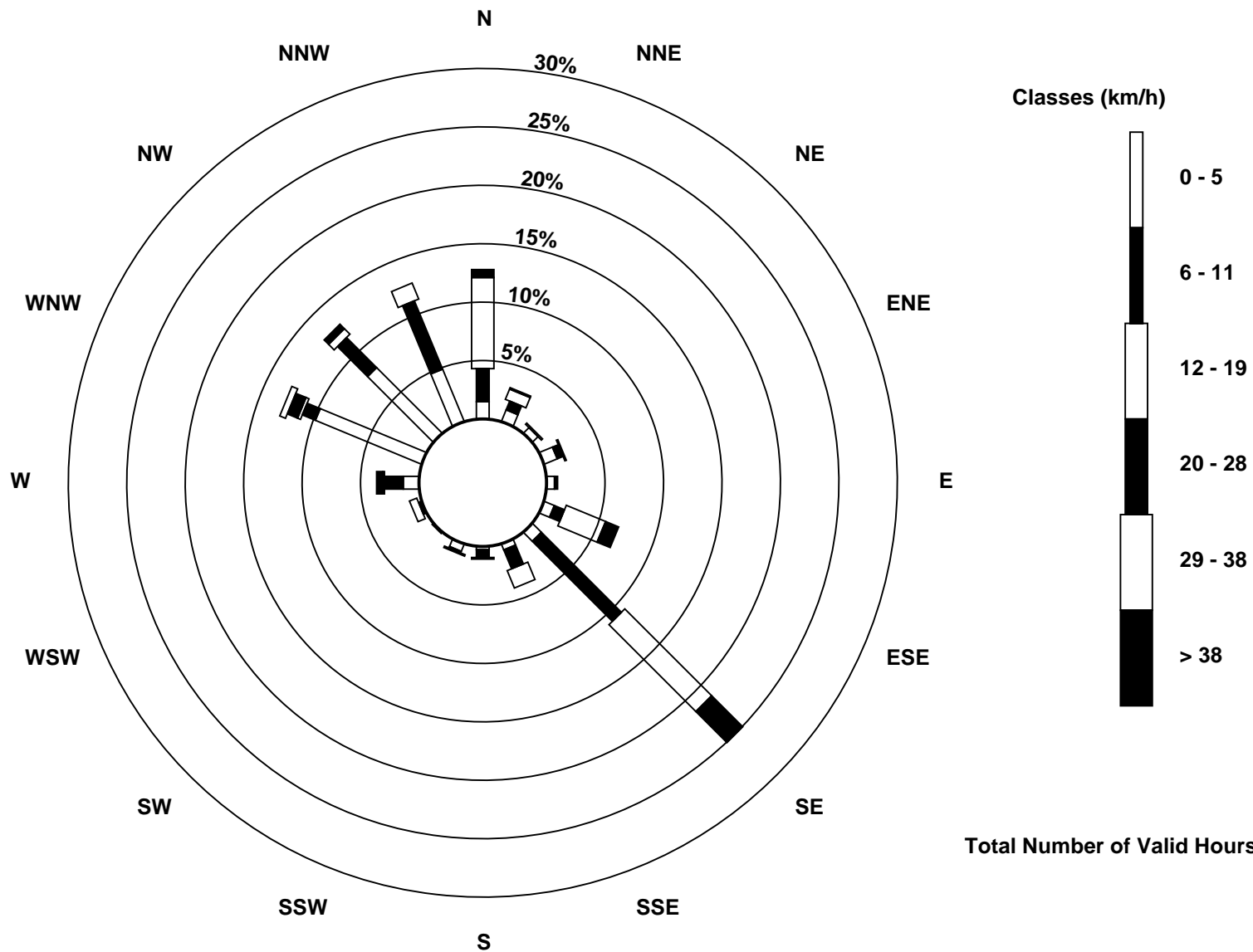
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Wind Speed (WS) - km/h
Lower Camp (AMS 11)



Total Number of Valid Hours: 743



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Lower Camp - March 2017

Direction of Maximum Speed: 296 deg on Mar 19 04:00																						Hours in Service: 744			
Direction of Maximum Daily Speed Average: 296.8 deg on Mar 19																						Hours of Data: 743			
Direction of Minimum Speed: 140 deg on Mar 28 20:00											Direction of Minimum Daily Speed Average: 1.1 deg on Mar 27											Hours of Missing Data: 1			
Monthly Average Direction: 321.6 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-Mar	314	355	336	333	2	347	334	325	325	344	342	266	315	317	311	329	331	318	287	309	315	329	298	327	324.3
2-Mar	300	81	20	60	140	323	349	AF	133	149	137	127	138	135	126	129	123	118	127	131	119	114	118	126	124.8
3-Mar	122	118	127	127	127	123	142	142	141	133	132	133	139	212	321	283	325	320	317	331	345	12	19	358	98.3
4-Mar	359	359	9	341	349	3	3	1	1	4	8	8	357	356	357	4	7	8	360	21	67	12	347	345	3.1
5-Mar	341	319	335	345	313	317	323	325	340	330	119	158	122	196	269	289	318	313	265	279	308	76	310	300	308.1
6-Mar	295	18	288	287	290	307	299	304	343	3	352	360	19	8	4	357	6	4	359	352	354	349	343	348	352.0
7-Mar	349	351	344	349	352	354	357	351	357	353	359	353	344	348	344	352	13	26	18	52	315	293	278	278	352.0
8-Mar	299	309	317	308	304	311	309	329	329	9	307	336	1	347	338	357	24	34	23	10	320	321	332	347	351.0
9-Mar	315	296	321	339	335	313	335	341	338	342	296	301	264	258	272	152	144	296	313	300	315	297	329	301	296.7
10-Mar	316	302	300	299	304	330	303	322	359	345	315	280	259	297	301	326	359	0	344	330	328	312	290	320	317.9
11-Mar	303	301	295	303	308	293	301	317	312	320	327	117	118	111	127	129	71	70	57	204	97	302	69	296	81.4
12-Mar	284	297	297	299	294	317	311	327	334	284	317	120	128	130	130	125	129	118	123	134	135	128	131	131	128.5
13-Mar	134	138	146	149	151	152	150	143	144	141	141	146	151	151	151	144	148	156	156	168	158	157	153	141	147.0
14-Mar	141	143	139	141	138	139	137	140	135	130	128	132	136	134	134	131	135	290	289	291	297	38	120	131	134.5
15-Mar	126	127	145	132	138	145	152	136	133	134	136	183	238	250	247	252	267	329	352	290	2	327	291	324	170.0
16-Mar	283	285	304	338	331	345	354	2	12	6	0	357	355	360	0	359	11	9	358	356	352	357	355	344	355.6
17-Mar	345	353	310	326	334	328	345	350	322	306	332	340	325	330	341	335	337	352	340	307	295	304	305	327	331.6
18-Mar	334	314	311	318	319	310	309	321	333	341	329	265	279	342	344	122	119	99	74	4	303	295	288	292	330.1
19-Mar	305	300	292	296	295	295	304	294	284	270	264	269	263	278	284	297	295	317	317	317	310	302	335	355	296.8
20-Mar	6	6	2	357	346	18	11	15	7	9	15	63	44	76	54	133	130	124	133	17	131	131	138	134	63.4
21-Mar	137	129	128	127	116	108	126	125	123	136	134	143	136	131	127	128	130	130	123	126	146	143	136	121	129.8
22-Mar	119	112	117	120	126	121	128	130	123	121	127	132	128	128	126	126	256	274	289	262	300	332	350	353	117.9
23-Mar	354	326	331	310	316	337	350	4	355	346	326	314	256	305	332	327	338	308	310	10	19	115	118	121	339.3
24-Mar	131	136	131	136	136	120	93	131	102	125	131	132	134	135	125	127	128	125	126	130	127	127	123	126	128.0
25-Mar	124	129	77	72	99	109	117	123	123	128	133	133	133	126	131	25	72	45	347	274	278	309	295	285	117.9
26-Mar	290	291	303	293	294	268	287	322	92	120	137	260	268	269	327	214	137	138	132	284	288	288	288	288	247.8
27-Mar	292	282	286	290	75	139	139	139	123	23	80	7	355	345	304	335	334	314	329	294	329	284	122	140	342.8
28-Mar	135	290	285	302	134	142	135	135	136	147	144	163	164	138	133	134	135	124	132	140	123	117	137	143	138.6
29-Mar	137	133	127	141	136	137	135	137	132	129	136	134	131	130	133	131	133	133	146	128	128	118	111	121	130.9
30-Mar	329	303	315	308	295	291	283	305	328	316	326	292	308	349	341	344	355	4	11	317	263	213	201	4	328.3
31-Mar	359	175	176	166	151	141	154	146	138	131	131	128	139	140	173	189	193	196	157	171	156	180	172	160	156.6
89.6 46.6 37.8 31.9 71.0 65.6 45.6 70.4 72.6 90.3 92.3 113.4 149.1 68.8 54.2 83.9 70.2 44.9 29.1 7.5 73.6 98.3 101.1 107.2																									
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

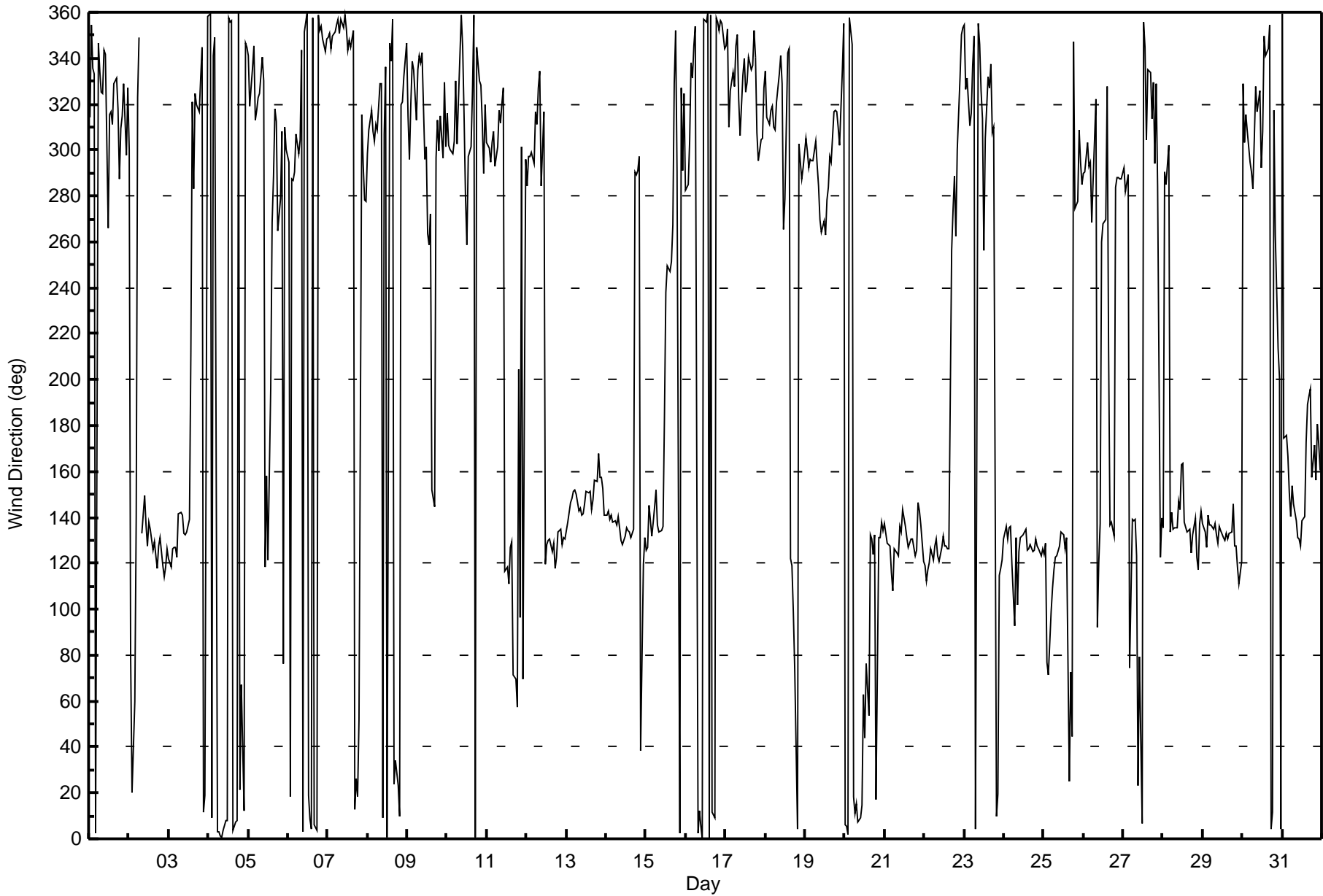
Wind Direction (WD) - deg
Lower Camp - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 107 deg on Mar 15 21:00																	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9								
Minimum Value: 4 deg on Mar 29 17:00																									
Percentiles: P ₁ = 6 P ₁₀ = 9 Q ₁ = 13 Median = 19 Q ₃ = 28 P ₉₀ = 49 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-Mar	18	20	27	30	14	18	17	11	10	18	25	34	35	21	13	17	17	19	19	28	32	36	20	42	42
2-Mar	79	43	28	60	20	62	48	AF	32	17	18	10	17	20	10	8	8	8	9	8	9	11	10	6	79
3-Mar	8	7	6	8	13	26	36	26	31	10	14	20	25	63	62	23	30	19	16	16	21	26	16	15	63
4-Mar	16	23	20	25	21	16	17	15	16	16	18	19	16	20	18	17	16	15	14	24	15	41	19	19	41
5-Mar	20	25	20	29	14	22	25	24	26	36	38	65	30	47	31	21	32	25	49	48	44	86	28	20	86
6-Mar	45	85	24	24	50	82	12	12	22	16	17	18	20	19	17	17	16	15	17	18	18	19	19	18	85
7-Mar	19	18	20	18	18	18	17	18	17	19	18	19	19	19	19	21	25	14	20	86	59	20	15	23	86
8-Mar	31	29	29	29	16	28	23	29	25	27	27	30	22	26	36	26	25	14	15	10	23	45	77	68	77
9-Mar	20	16	23	35	28	25	51	40	35	40	32	48	23	22	24	80	24	59	31	34	37	27	46	41	80
10-Mar	29	28	25	14	29	43	19	24	24	30	26	27	16	22	13	21	18	18	18	18	27	39	29	25	43
11-Mar	28	20	18	22	28	18	19	30	25	25	40	95	26	18	15	15	16	13	59	67	49	40	69	18	95
12-Mar	22	20	23	19	31	27	26	19	28	17	75	16	11	12	13	9	8	9	9	8	9	9	14	10	75
13-Mar	12	11	19	21	20	22	21	16	17	15	14	19	23	24	22	20	20	24	21	23	21	24	20	11	24
14-Mar	11	11	10	9	9	8	8	7	6	8	8	7	4	7	10	7	21	37	37	26	38	42	14	8	42
15-Mar	7	23	23	20	10	15	24	10	9	10	12	56	12	15	12	12	26	23	18	28	107	94	57	69	107
16-Mar	19	26	25	18	20	19	17	19	16	17	19	18	18	17	18	18	16	14	20	16	20	19	27	20	27
17-Mar	28	32	32	25	25	23	18	18	26	35	61	61	23	18	20	19	17	17	17	21	12	19	22	14	61
18-Mar	16	15	10	14	13	15	13	15	22	22	27	20	38	34	28	66	10	18	18	59	26	53	18	44	66
19-Mar	41	11	11	12	11	11	12	13	16	12	12	13	13	20	14	12	12	14	11	14	13	11	22	17	41
20-Mar	24	13	17	16	19	16	16	29	30	28	27	56	83	47	54	8	9	13	24	94	74	14	15	12	94
21-Mar	13	21	19	11	12	24	13	11	13	9	9	13	14	13	7	9	12	10	9	8	22	17	15	14	24
22-Mar	8	11	8	7	6	6	8	8	9	10	8	7	11	13	17	10	85	15	18	33	19	24	20	19	85
23-Mar	20	13	15	17	22	18	18	17	18	19	20	32	12	19	22	16	23	12	11	15	54	36	10	11	54
24-Mar	11	27	17	11	37	50	46	48	46	8	10	14	15	13	9	9	12	7	8	10	7	10	9	9	50
25-Mar	10	30	17	14	11	8	8	7	8	10	10	7	8	11	9	30	42	58	53	38	62	48	83	49	83
26-Mar	64	33	43	22	53	45	67	76	82	10	22	81	13	15	52	71	17	34	45	28	36	28	22	75	82
27-Mar	82	20	73	62	90	16	18	19	42	23	54	62	14	29	37	21	83	77	79	32	45	23	56	9	90
28-Mar	59	14	21	71	29	16	12	15	10	18	18	31	33	19	9	10	10	10	8	95	57	11	36	16	95
29-Mar	14	15	10	16	10	7	8	8	6	8	14	9	13	6	6	6	4	8	36	17	9	7	7	68	68
30-Mar	100	55	70	41	29	25	31	30	22	31	34	48	46	17	18	20	17	15	19	48	33	99	94	90	100
31-Mar	75	27	25	25	21	8	33	21	23	10	5	7	14	15	33	28	27	26	19	24	18	25	24	18	75
																	Diurnal Maximum								
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Lower Camp - March 2017





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 6, 2017	Last Calibration	February 13, 2017
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	10:53	End Time (MST)	13:58
Gas Cert Reference	LL101792	Station temp.	20 Deg C
Cal Gas Concentration	49.5 ppm	Cal Gas Exp Date	2/16/2019
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2403

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-675	-675
Analyzer IP address	192.168.1.43		Lamp voltage	804	802
Calculated slope	0.999602	1.000433	Chamber temp	45.1	44.9
Calculated intercept	1.034929	0.897601	Pressure	724.7	712.0
Analyzer Background	11.8	12.1	Flow	0.386	0.634
Analyzer Coefficient	1.038	1.058	Intensity	90	91
Analyzer make	TEI 43i		Analyzer serial #	100841398	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	83.8	829.6	824.6	1.006
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	83.8	829.6	828.7	1.001
second point	5000	42.4	419.8	418.4	1.003
third point	5000	21.2	209.9	208.0	1.009
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	83.8	829.6	830.1	0.999
Average Correction Factor					1.004

Corrected As found 824.7 Previous response 828.9 % change 0.5%

Notes:

Sample Inlet filter changed after as founds. Changed out pump as well after as founds for preventative maintenance.
Adjusted span.

Calibration Performed By:

Aswin Sasi Kumar



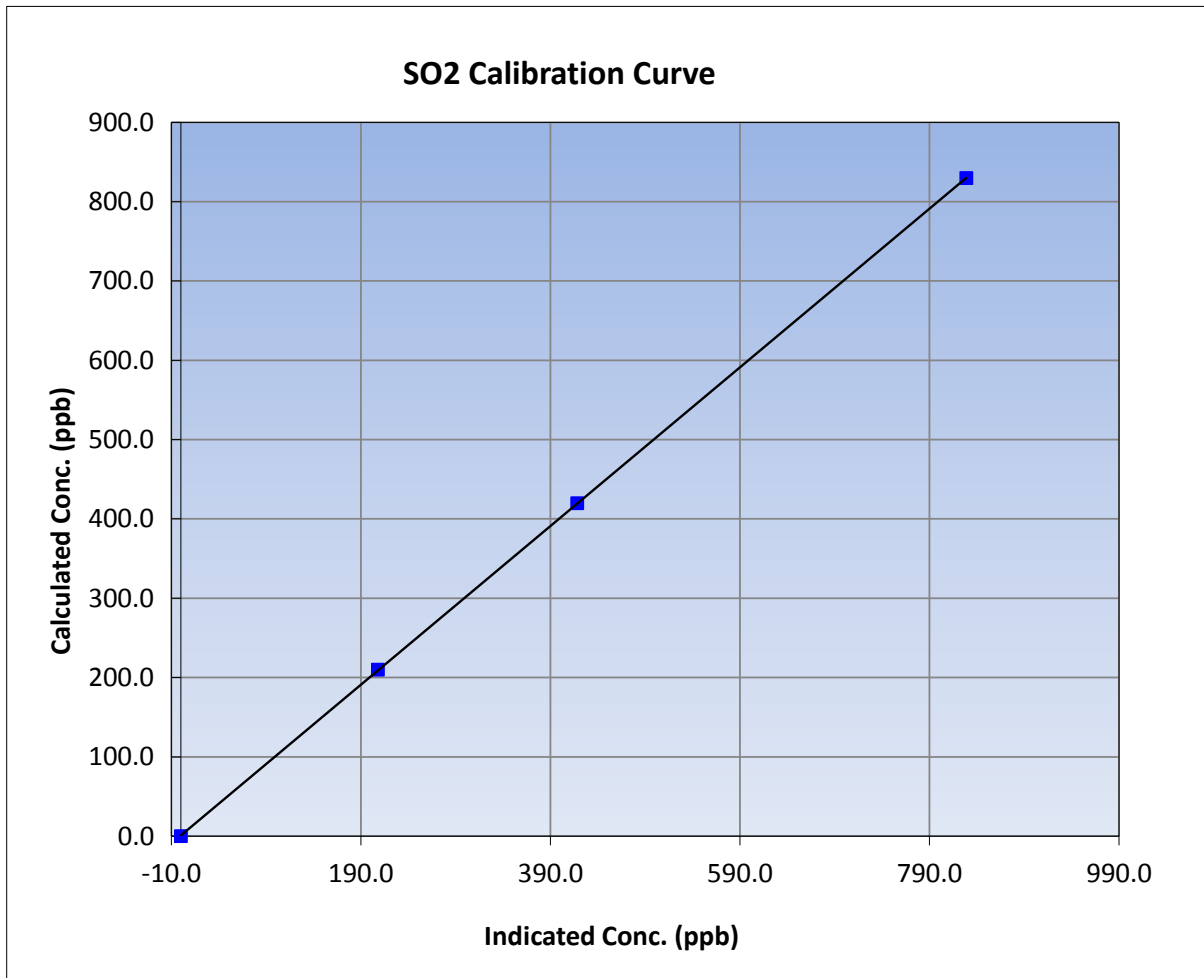
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 6, 2017	Previous Calibration	February 13, 2017
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	10:53	End Time (MST)	13:58
Analyzer make	TEI 43i	Analyzer serial #	100841398

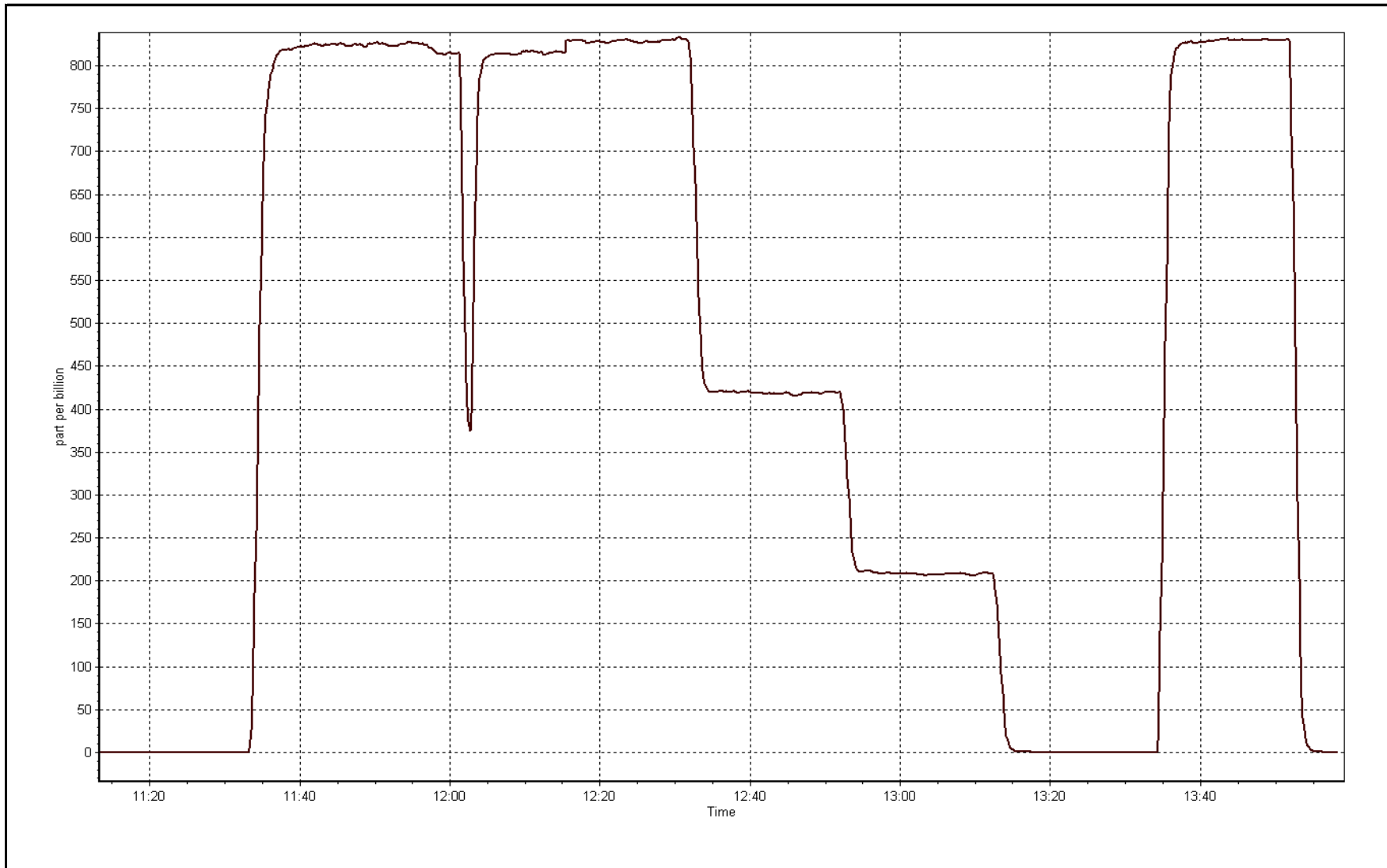
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999995
829.6	828.7	1.0011		
419.8	418.4	1.0033	Slope	1.000433
209.9	208.0	1.0090		
			Intercept	0.897601



SO2 Calibration Plot

Date: March 6, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	March 17, 2017	Last Calibration	February 14, 2017
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	11:30
Gas Cert Reference	ALM061435	Station temp.	22 Deg C
Cal Gas Concentration	5.15 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG air Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	Serial Number	2403
SO2 gas concentration	49.5 ppm	SO2 gas cert/exp	LL101792 16/02/2019

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-671	-671
Analyzer IP address	192.168.1.42		Lamp voltage	799	799
Calculated slope	0.997129	0.997799	Chamber temp	45	45
Calculated intercept	0.022055	0.126635	Pressure	438.9	441.0
Analyzer Background	13.7	13.3	Flow	0.822	0.820
Analyzer Coefficient	1.271	1.271	Intensity	91	91
			Converter temp.	323	325

Analyzer make/model	Thermo 450i	Analyzer serial #	1410661328
Converter make/model	NA	Converter serial #	NA

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	72.8	75.0	74.9	1.001
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	72.8	75.0	74.9	1.001
second point	5000	38.8	40.0	40.2	0.993
third point	5000	19.4	20.0	19.8	1.011
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	72.8	75.0	75.1	0.998
Average Correction Factor					1.002

Corrected As found	75.1	Previous response	75.2	% change	0.2%
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Notes:

Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By: Aswin Sasi Kumar



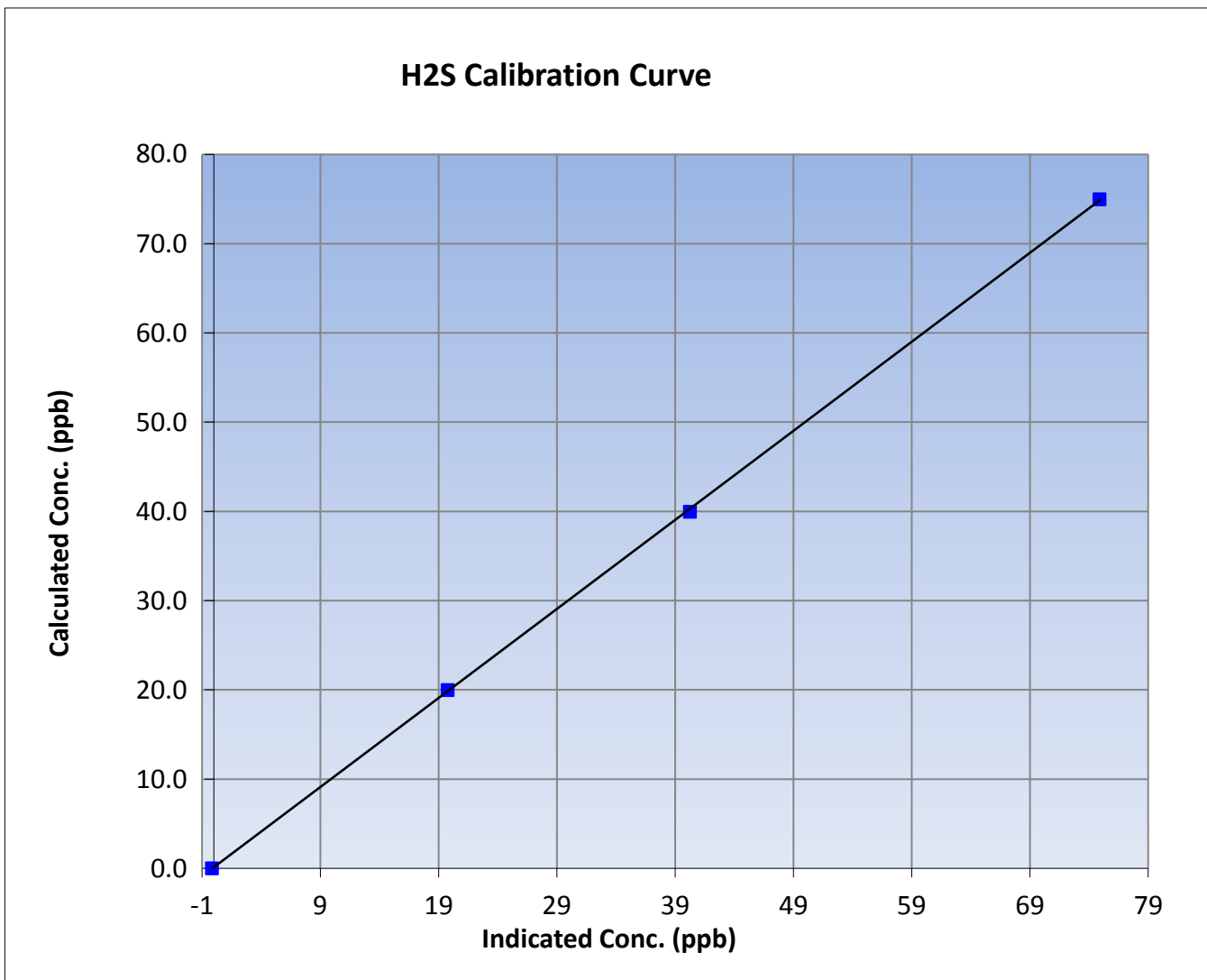
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	March 17, 2017	Previous Calibration	February 14, 2017
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:05	End Time (MST)	11:30
Analyzer make	Thermo 450i	Analyzer serial #	1410661328

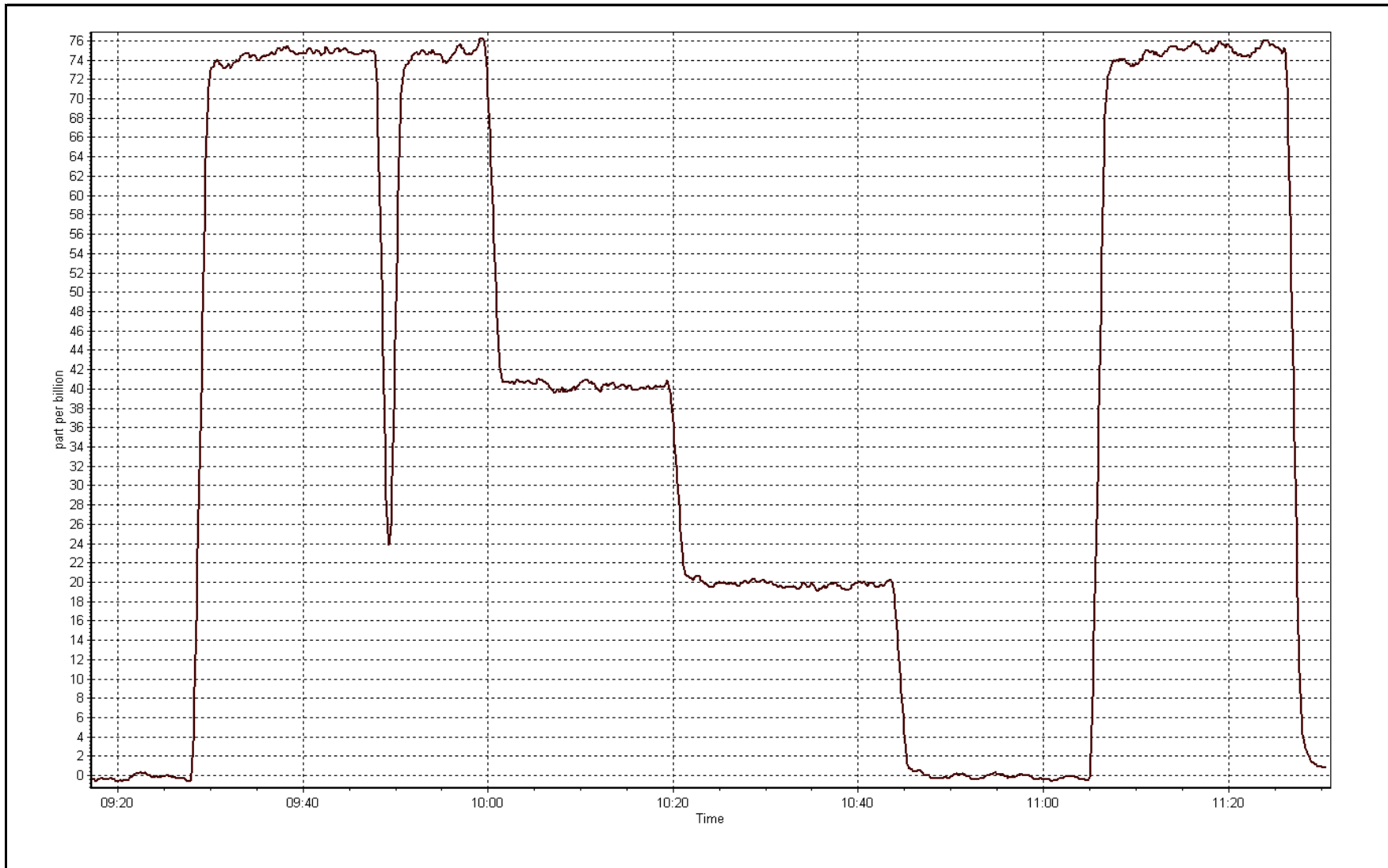
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999955
75.0	74.9	1.0013		
40.0	40.2	0.9931	Slope	0.997799
20.0	19.8	1.0112		
			Intercept	0.126635



H2S Calibration Plot

Date: March 17, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	March 6, 2017	Last Calibration	February 11, 2017
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	10:53	End Time (MST)	13:58
Gas Cert Reference	LL101792	Cal Gas Expiry Date	16/02/2019
CH4 Cal Gas Conc.	493 ppm	CH4 Equiv Conc.	1043.0 ppm
C3H8 Cal Gas Conc.	200 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG make/model	Teledyne API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	Serial Number	2403

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	7.8	7.8
Analyzer IP address	192.168.1.51		Air or Bypass Press	40.2	40.2
Calculated slope	1.004288	0.998575	Fuel Pressure	25.1	25.1
Calculated intercept	-0.098830	-0.181861	Analyzer Coeff	4.565	4.565
			Analyzer BKG	3.18	3.18

Analyzer make	51i-LT	Analyzer serial #	1218153353
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.18	----
as found span	5000	83.8	17.48	17.72	0.986
calibrator zero	5000	0.0	0.00	0.18	----
high point	5000	83.8	17.48	17.68	0.989
second point	5000	42.4	8.84	9.06	0.976
third point	5000	21.2	4.42	4.60	0.961
as left zero	5000	0.0	0.00	0.20	----
as left span	5000	83.8	17.48	17.74	0.985
Average Correction Factor					0.975

Corrected As found	17.54	Previous response	17.50	% change	-0.2%
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Notes:

Sample inlet filter changed after as founds.

Calibration Performed By:

Aswin Sasi Kumar



Wood Buffalo Environmental Association THC Calibration Report

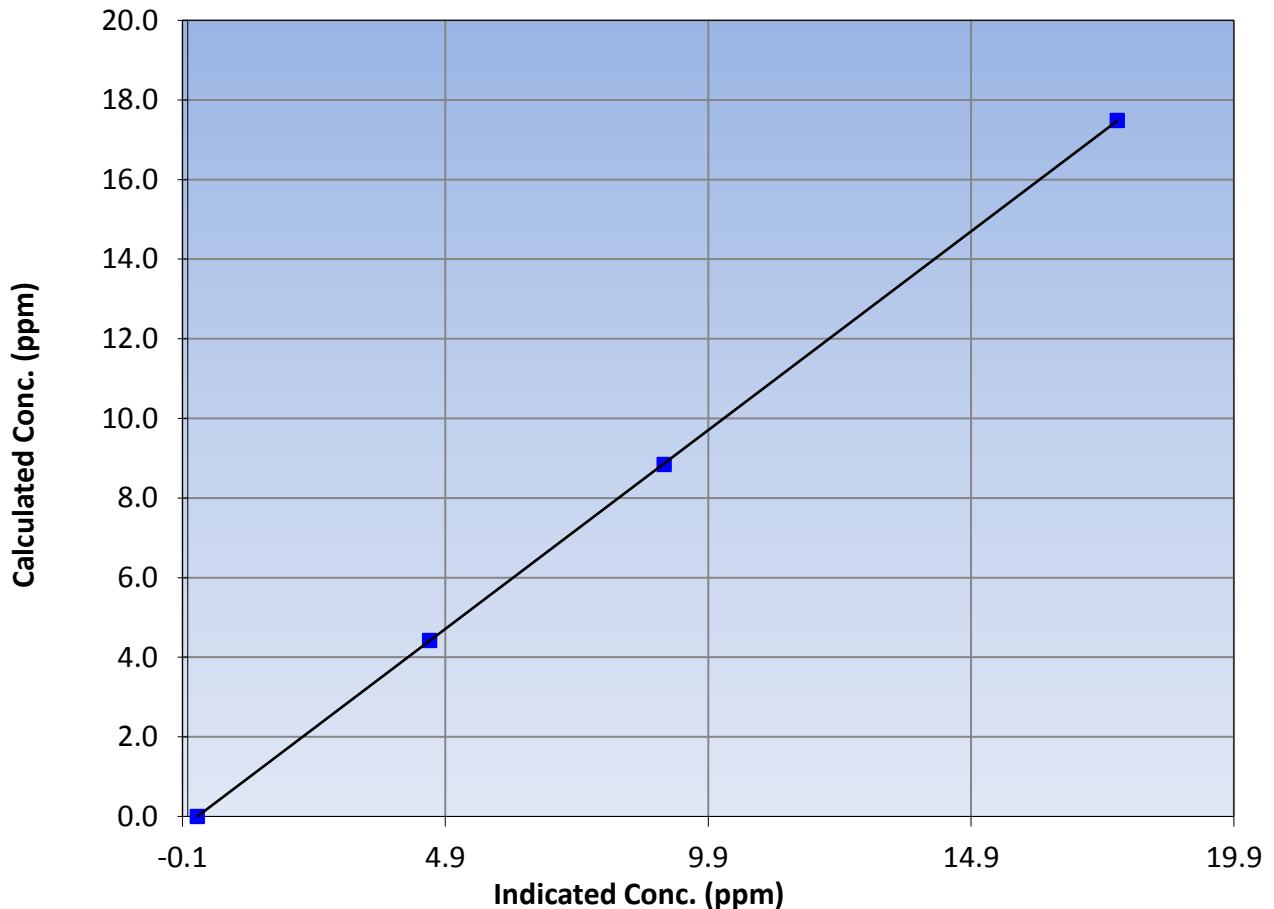
Station Information

Calibration Date	March 6, 2017	Previous Calibration	February 11, 2017
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	10:53	End Time (MST)	13:58
Analyzer make	51i-LT	Analyzer serial #	1218153353

Calibration Data

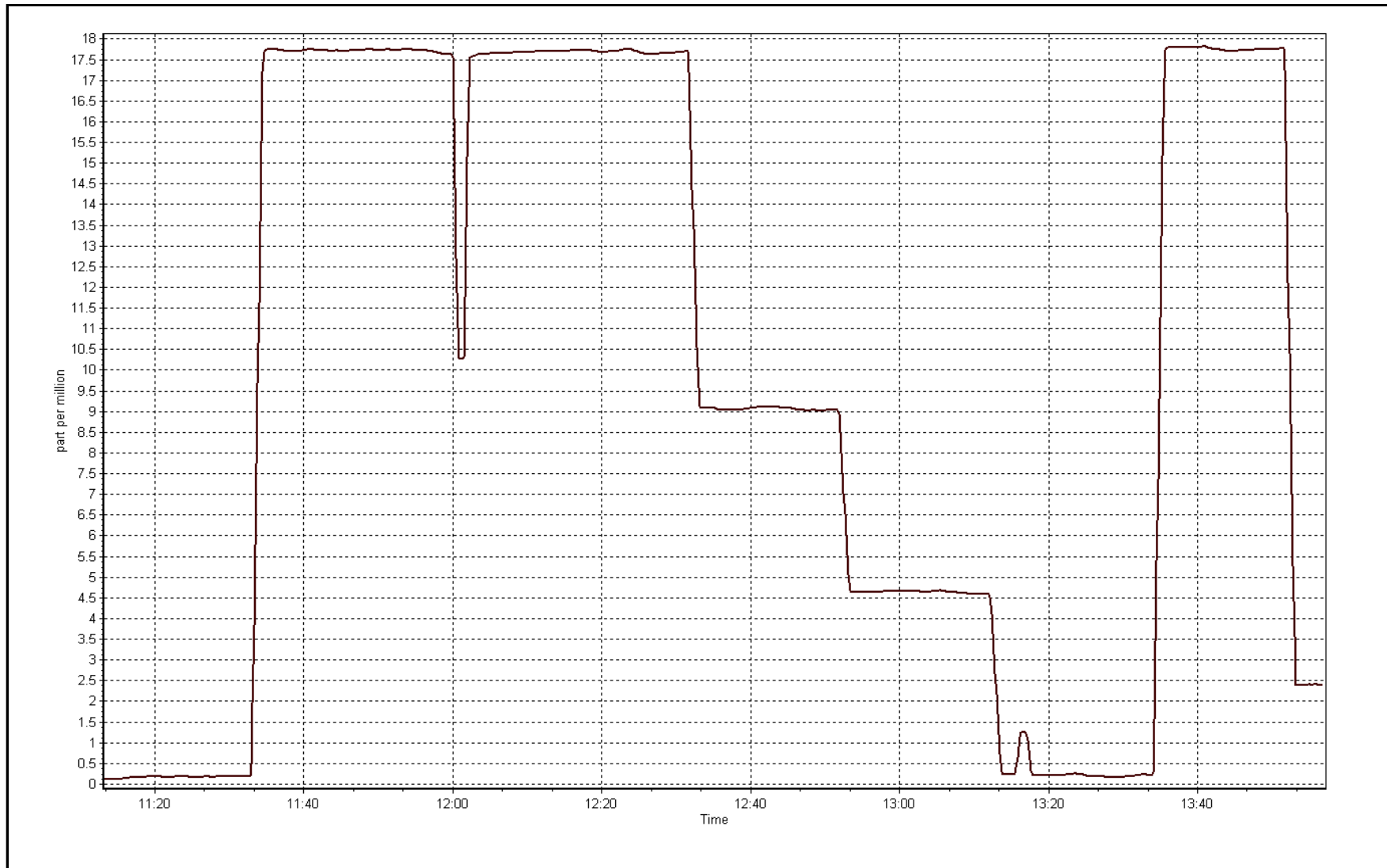
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.18	----	Correlation Coefficient	0.999996
17.48	17.68	0.9887		
8.84	9.06	0.9762		
4.42	4.60	0.9614		
			Slope	0.998575
			Intercept	-0.181861

THC Calibration Curve



THC Calibration Plot

Date: March 6, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	March 30, 2017	Last Calibration	March 6, 2017
Station Name	Lower Camp	Station Number	AMS 11
Reason:	<input type="checkbox"/> Other: <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Adjusting baseline drift		
Start Time (MST)	10:08	End Time (MST)	12:49
Gas Cert Reference	LL101792	Cal Gas Expiry Date	16/02/2019
CH4 Cal Gas Conc.	493 ppm	CH4 Equiv Conc.	1043.0 ppm
C3H8 Cal Gas Conc.	200 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG make/model	Teledyne API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	Serial Number	2403

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	7.8	7.8
Analyzer IP address	192.168.1.51		Air or Bypass Press	40.2	40.2
Calculated slope	0.994440	1.003639	Fuel Pressure	25.1	25.1
Calculated intercept	-0.126903	-0.018531	Analyzer Coeff	4.565	4.475
			Analyzer BKG	3.18	3.72

Analyzer make	51i-LT	Analyzer serial #	1218153353
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.64	----
as found span	5000	83.8	17.48	18.42	0.949
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	83.8	17.48	17.44	1.002
second point	5000	42.4	8.84	8.82	1.003
third point	5000	21.2	4.42	4.43	0.998
as left zero	5000	0.0	0.00	0.02	----
as left span	5000	83.8	17.48	17.53	0.997
Average Correction Factor					1.001

Corrected As found	17.78	Previous response	17.71	% change	-0.4%
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Notes:

Baseline had been drifted up. Checked diagnostics and all parameters were within acceptable limits. Decided to adjust baseline back to specification limits. Adjusted zero and span after as founds.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association THC Calibration Report

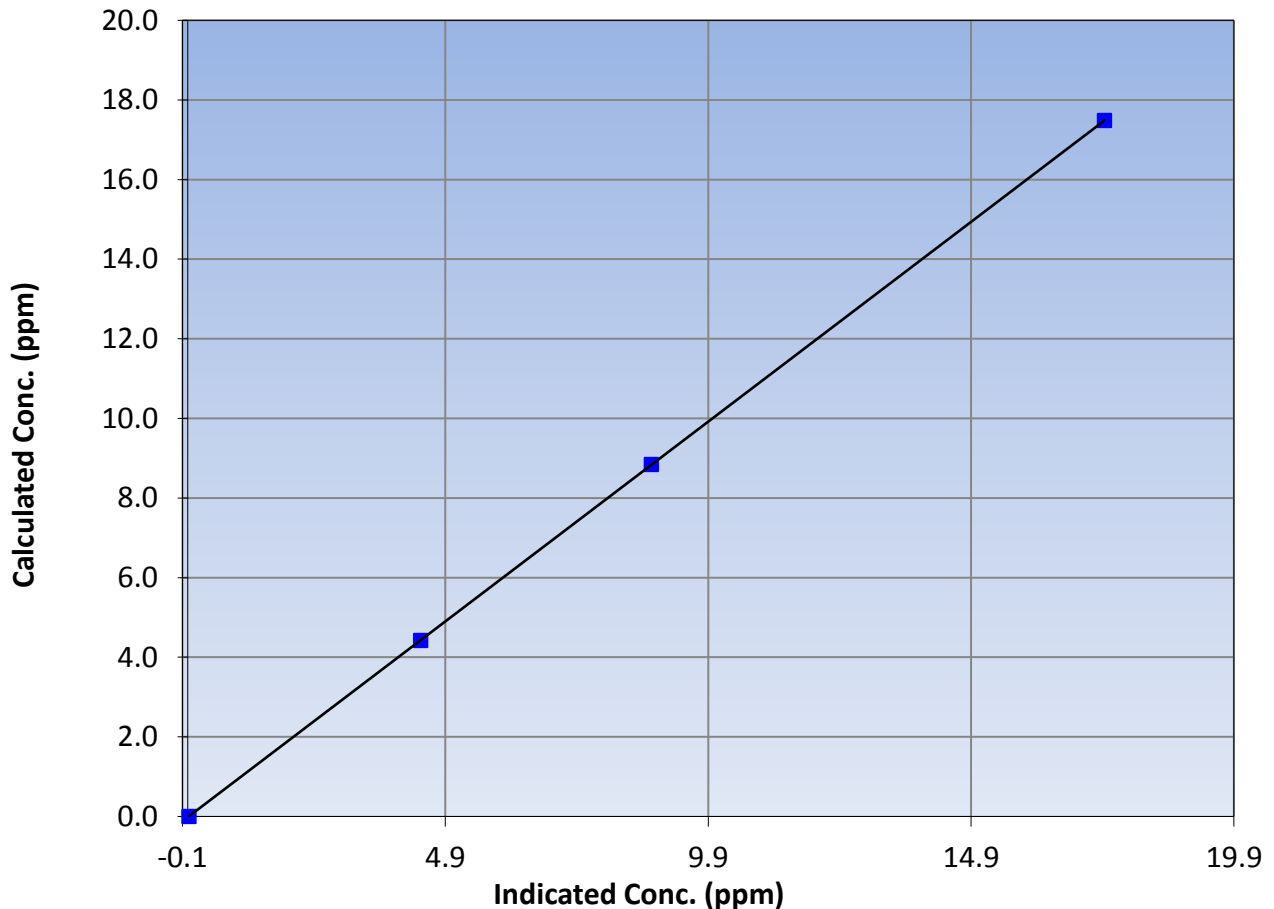
Station Information

Calibration Date	March 30, 2017	Previous Calibration	March 6, 2017
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	10:08	End Time (MST)	12:49
Analyzer make	51i-LT	Analyzer serial #	1218153353

Calibration Data

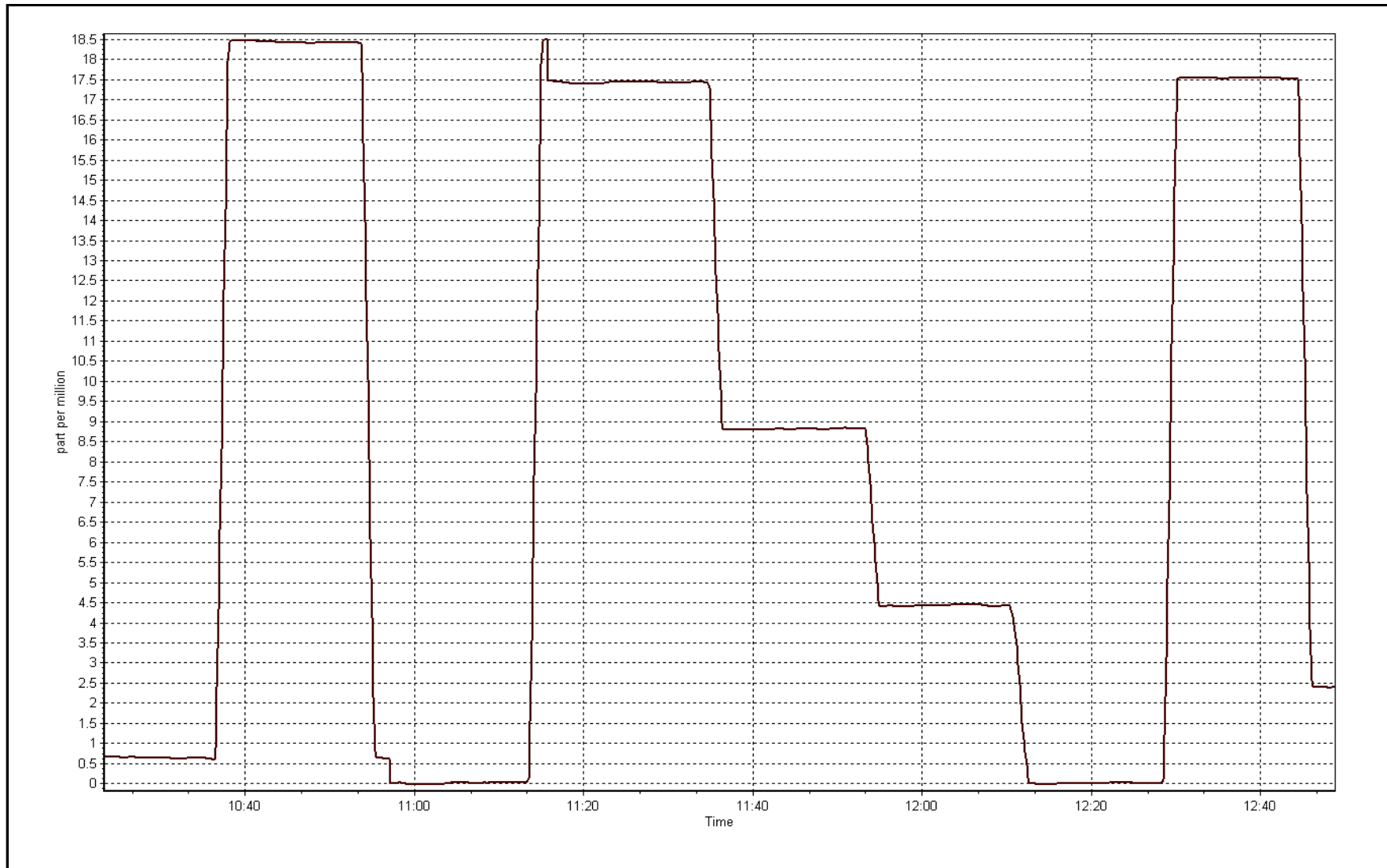
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999999
17.48	17.44	1.0023		
8.84	8.82	1.0028	Slope	1.003639
4.42	4.43	0.9983		
			Intercept	-0.018531

THC Calibration Curve



THC Calibration Plot

Date: March 30, 2017





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 13
FORT MCKAY SOUTH
MARCH 2017**

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
MARCH 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	47	0	9	0
TRS(ppb) Average	709	35	35	100	4	0	1	0
THC(ppm) Average	708	36	36	100	4.2	-	3.1	-
O3(ppb) Average	708	34	36	99.73	49	0	40	-
NO2(ppb) Average	708	36	36	100	39	0	19	-
NO(ppb) Average	708	36	36	100	46	-	10	-
NOX(ppb) Average	708	36	36	100	71	-	28	-
PM2.5(ug/m3) Average	740	2	4	99.73	68.9	-	12.4	0
ET(C) Average	744	0	0	100	14.3	-	7.2	-
RH(%) Average	744	0	0	100	97	-	89	-
WS(km/h) Average	744	0	0	100	24	-	17	-
WD(deg) Average	744	0	0	100	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
MARCH 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	2.1	5	-	0	0	0	0	1	5	47
TRS(ppb) Average	709	0.4	0	-	0	0	0	0	0	1	4
THC(ppm) Average	708	2.39	0.2	-	2.1	2.2	2.3	2.3	2.4	2.6	4.2
O3(ppb) Average	708	23.7	11	-	1	7	15	25	33	38	49
NO2(ppb) Average	708	8.6	6	-	0	2	4	7	12	17	39
NO(ppb) Average	708	2.5	5	-	0	0	0	0	3	7	46
NOX(ppb) Average	708	11.1	9	-	0	2	5	8	16	23	71
PM2.5(ug/m3) Average	740	6.86	4.5	-	0.2	3.2	4.4	6	8.4	10.9	68.9
Temperature 2 m (C) Average	744	-8.95	11.2	-	-35.2	-24.9	-18.5	-7.2	0	3.5	14.3
Relative Humidity (%) Average	744	67.5	16	-	23	46	57	69	79	89	97
Wind Speed 10 m (km/h) Average	744	8.1	6	-	0	2	3	7	12	17	24
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
O3	31 Mar 2017 03:00	31 Mar 2017 03:00	1	Intermittent unstable operation
O3	31 Mar 2017 05:00	31 Mar 2017 05:00	1	Intermittent unstable operation
PM2.5	15 Mar 2017 15:00	15 Mar 2017 16:00	2	Unstable operation - baseline drift



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 47 ppb on Mar 14 16:00	Maximum Daily Average: 9.2 ppb on Mar 14		Hours of Data:	708
Minimum Value: 0 ppb on Mar 1 19:00	Minimum Daily Average: 0.1 ppb on Mar 1		Hours of Missing Data:	36
Maximum Diurnal Average: 5.9 ppb at hour 13	Minimum Diurnal Average: 0.4 ppb at hour 7		Hours of Calibration:	36
Monthly Average: 2.1 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 5 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-Mar	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
2-Mar	0	Z	0	0	0	0	0	0	1	1	2	4	25	45	29	5	4	3	1	1	1	2	4	8	5.9	45	
3-Mar	14	16	Z	14	5	4	1	1	2	2	5	5	3	1	1	1	1	1	1	0	0	0	0	0	3.4	16	
4-Mar	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	
5-Mar	0	0	0	0	Z	0	0	0	0	0	0	2	8	6	8	10	13	11	2	1	1	1	1	1	2.8	13	
6-Mar	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
7-Mar	Z	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
8-Mar	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
9-Mar	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0.3	1	
10-Mar	0	0	0	Z	0	0	0	0	1	1	1	12	8	4	4	2	1	1	0	0	0	0	0	0	1.5	12	
11-Mar	0	0	0	0	Z	0	0	0	0	0	11	11	6	3	2	1	1	0	0	0	0	0	0	0	1.6	11	
12-Mar	0	0	0	0	0	Z	0	0	0	0	12	16	13	4	1	6	4	1	0	0	0	4	4	6	3.2	16	
13-Mar	Z	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	8	3	1	4	3	1	1	1.7	8	
14-Mar	2	Z	2	1	1	1	1	1	2	4	3	4	6	23	45	47	29	15	8	6	5	3	2	3	9.2	47	
15-Mar	6	1	Z	1	1	2	3	3	2	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	1.1	6	
16-Mar	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	
17-Mar	0	0	0	0	Z	0	1	3	3	3	3	3	3	3	3	2	1	1	0	0	0	1	0	0	1.3	3	
18-Mar	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-Mar	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	
20-Mar	0	Z	1	1	0	0	0	0	0	0	1	1	1	1	0	4	12	10	6	1	1	0	0	0	1.8	12	
21-Mar	0	0	Z	0	0	0	0	0	2	5	4	1	1	1	5	6	3	3	4	1	2	0	3	3	2.0	6	
22-Mar	3	4	2	Z	1	1	0	0	2	15	14	12	11	4	4	4	4	4	3	3	1	1	0	0	4.1	15	
23-Mar	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-Mar	1	1	0	0	0	Z	0	0	1	2	11	20	6	2	7	2	4	2	0	0	0	0	0	0	2.6	20	
25-Mar	Z	0	0	0	0	0	0	0	0	0	1	2	6	5	4	3	3	3	2	2	1	1	1	0	1.5	6	
26-Mar	0	Z	0	0	0	0	0	0	0	0	26	13	12	3	3	6	3	13	2	0	0	0	0	0	3.7	26	
27-Mar	0	0	Z	0	0	0	0	0	1	3	3	2	4	3	1	1	1	1	1	1	1	1	1	0	1.1	4	
28-Mar	0	0	0	Z	0	0	0	1	1	1	1	1	16	23	20	9	9	11	2	1	1	1	1	0	4.3	23	
29-Mar	0	0	0	0	Z	0	0	0	1	2	4	25	36	30	22	8	16	13	3	2	1	1	1	1	7.2	36	
30-Mar	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	
31-Mar	Z	0	0	0	0	0	2	1	0	1	6	13	7	11	1	1	1	0	1	1	1	1	0	1	2.2	13	

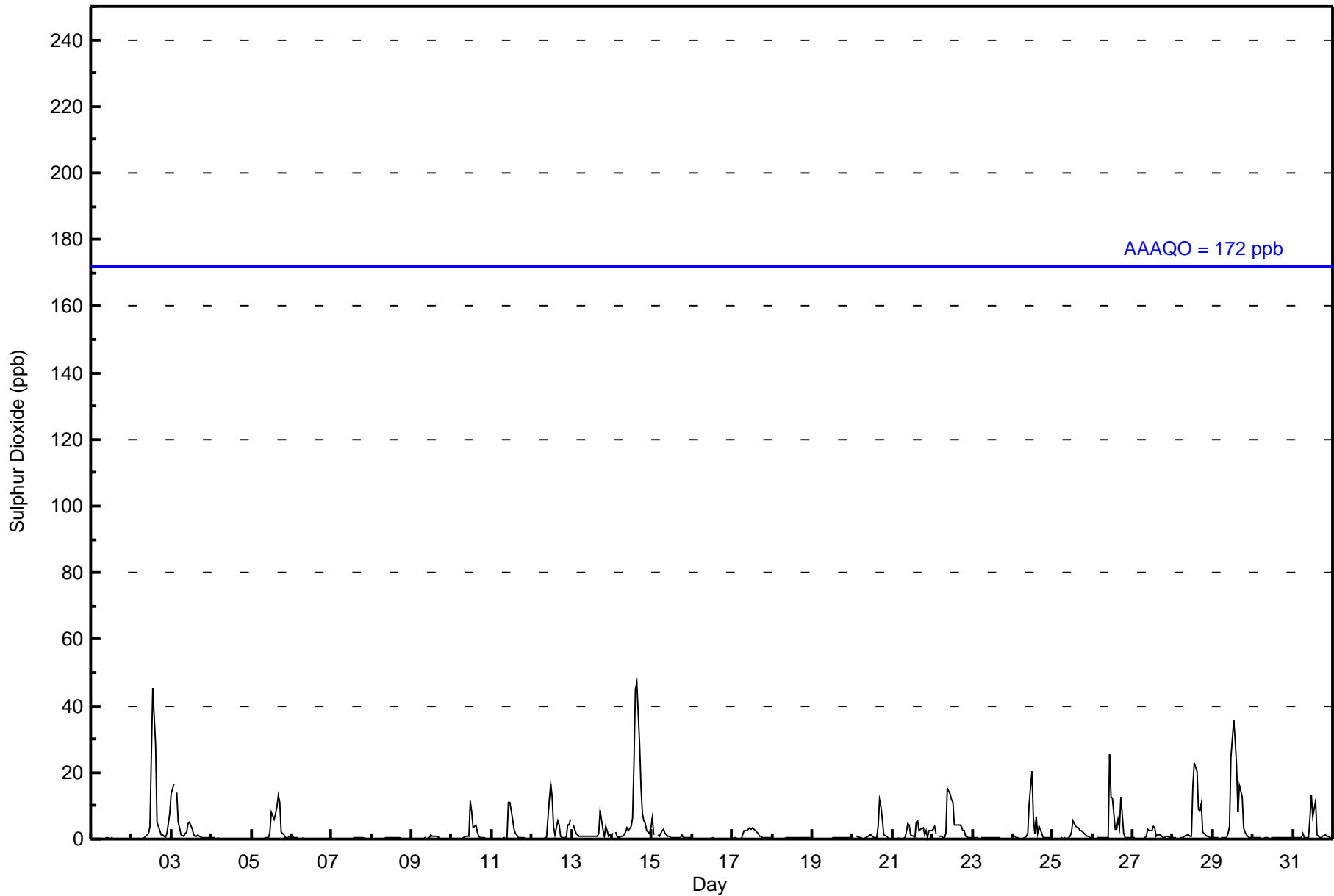
1.2	1.2	0.4	0.9	0.5	0.4	0.4	0.5	0.7	1.5	3.7	5.1	5.9	5.7	5.3	3.9	3.6	3.2	1.4	0.8	0.7	0.7	0.7	0.9	Diurnal Average
14	16	2	14	5	4	3	3	3	15	26	25	36	45	45	47	29	15	8	6	5	4	4	8	Diurnal Maximum

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 - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort McKay South - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	666	94.07	94.07
11 - 20	29	4.10	98.16
21 - 60	13	1.84	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 - March 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	164	90	22	9	3	10	24	86	57	22	21	24	20	19	31	64	666
11 - 20	2	1	0	0	1	0	3	15	4	2	1	0	0	0	0	0	29
21 - 60	0	0	0	0	1	0	0	12	0	0	0	0	0	0	0	0	13
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	166	91	22	9	5	10	27	113	61	24	22	24	20	19	31	64	708

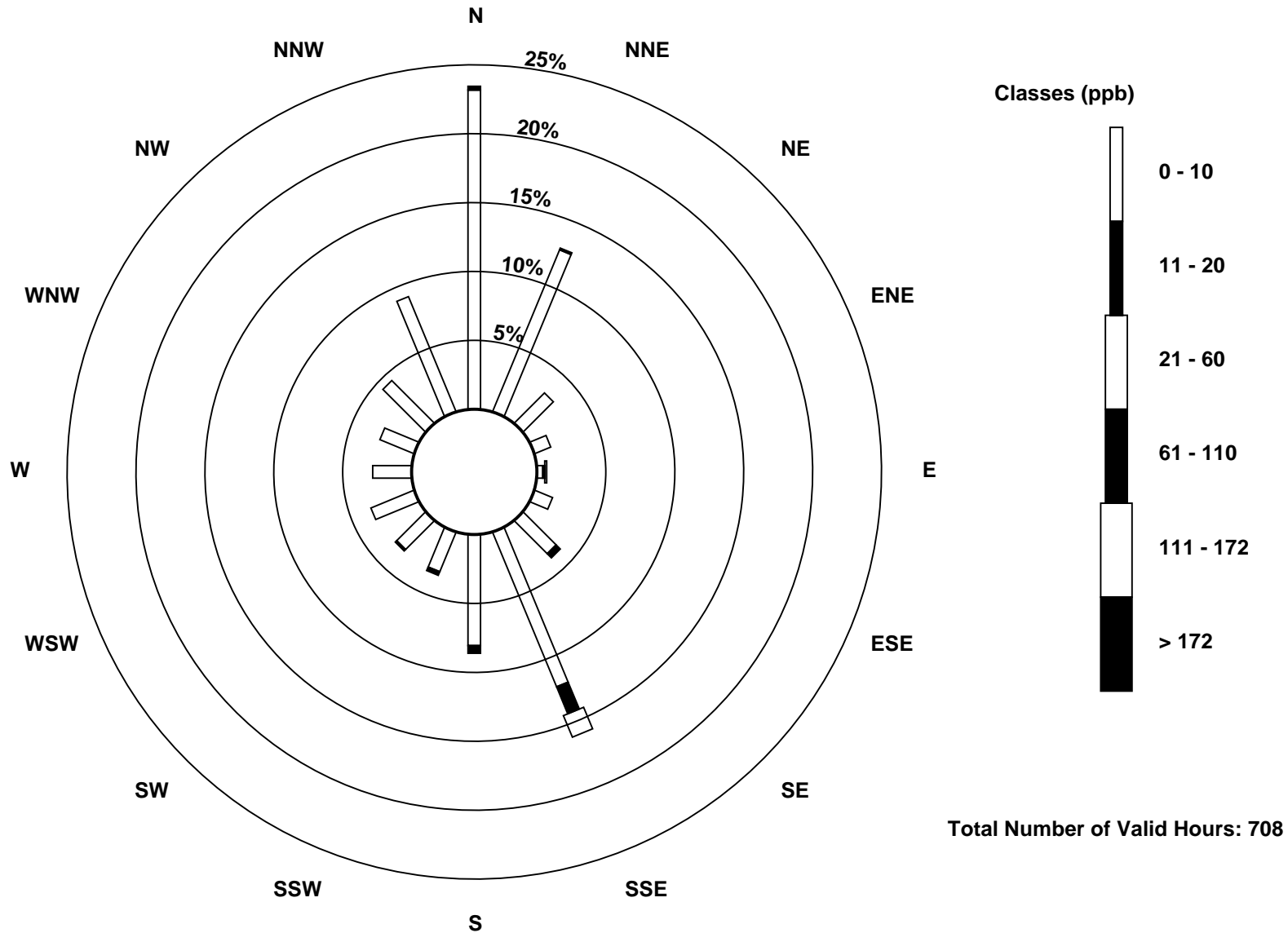
Total Number of Valid Hours: 708

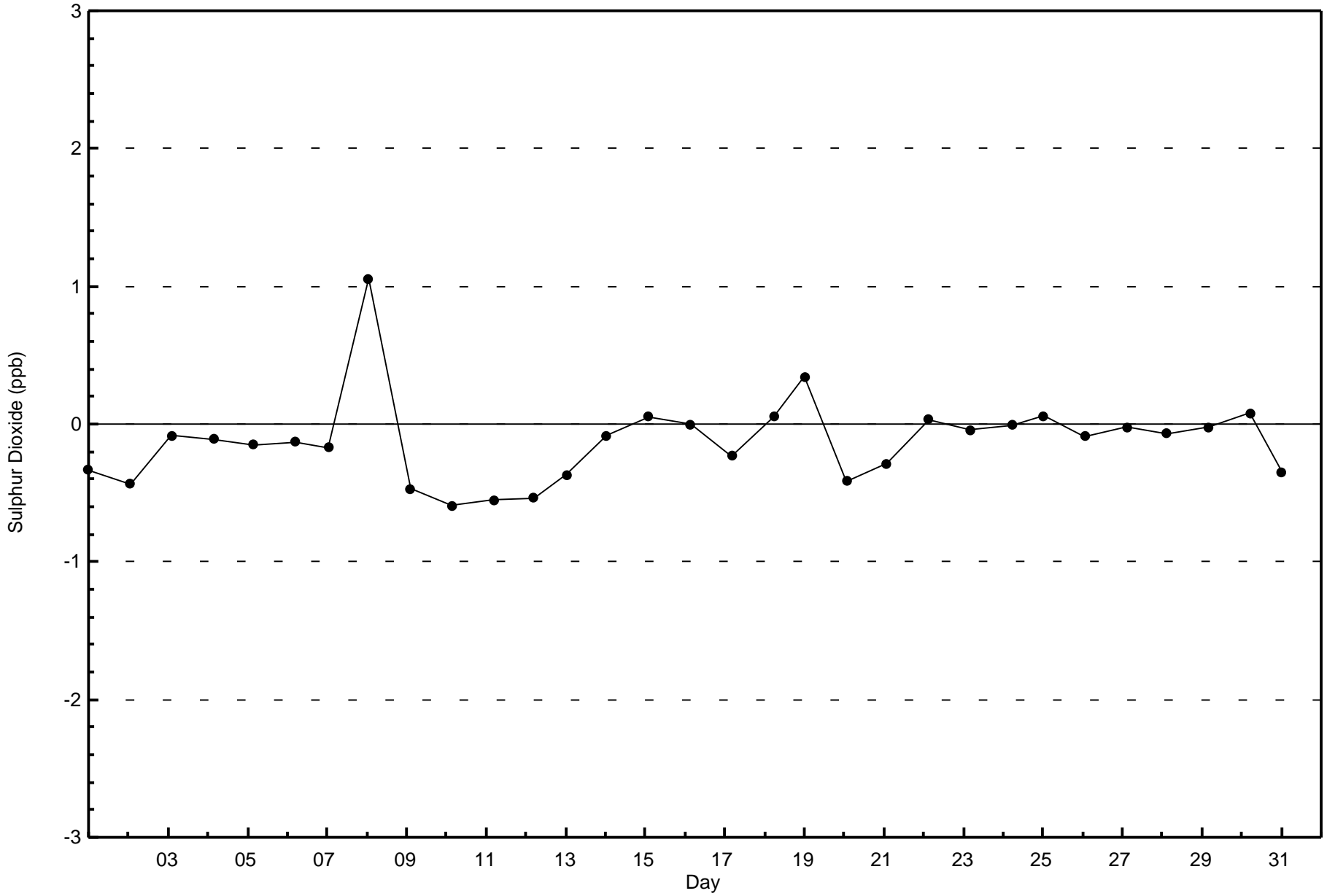
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Sulphur Dioxide (SO₂) - ppb
Fort McKay South (AMS 13)

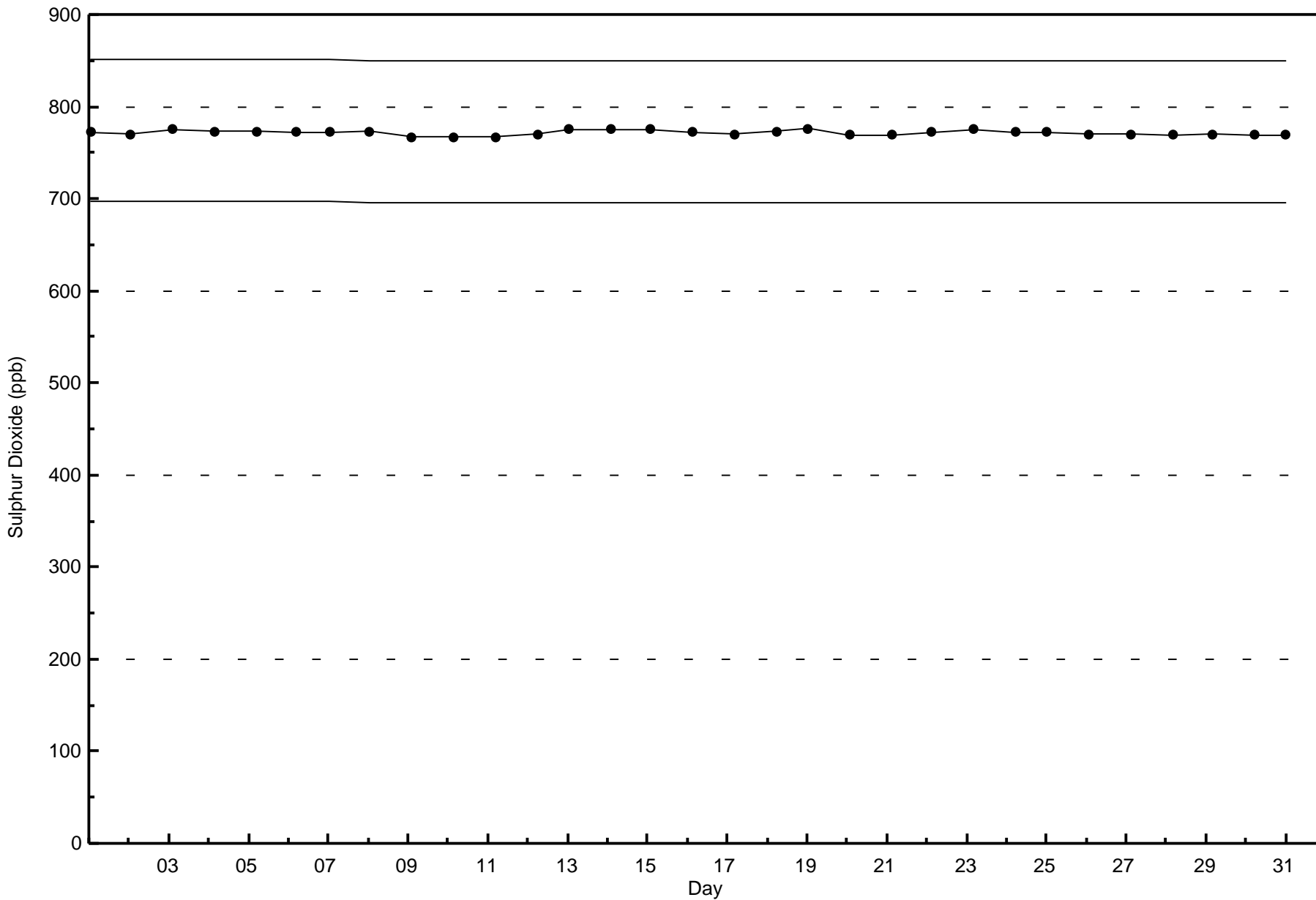






Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - March 2017





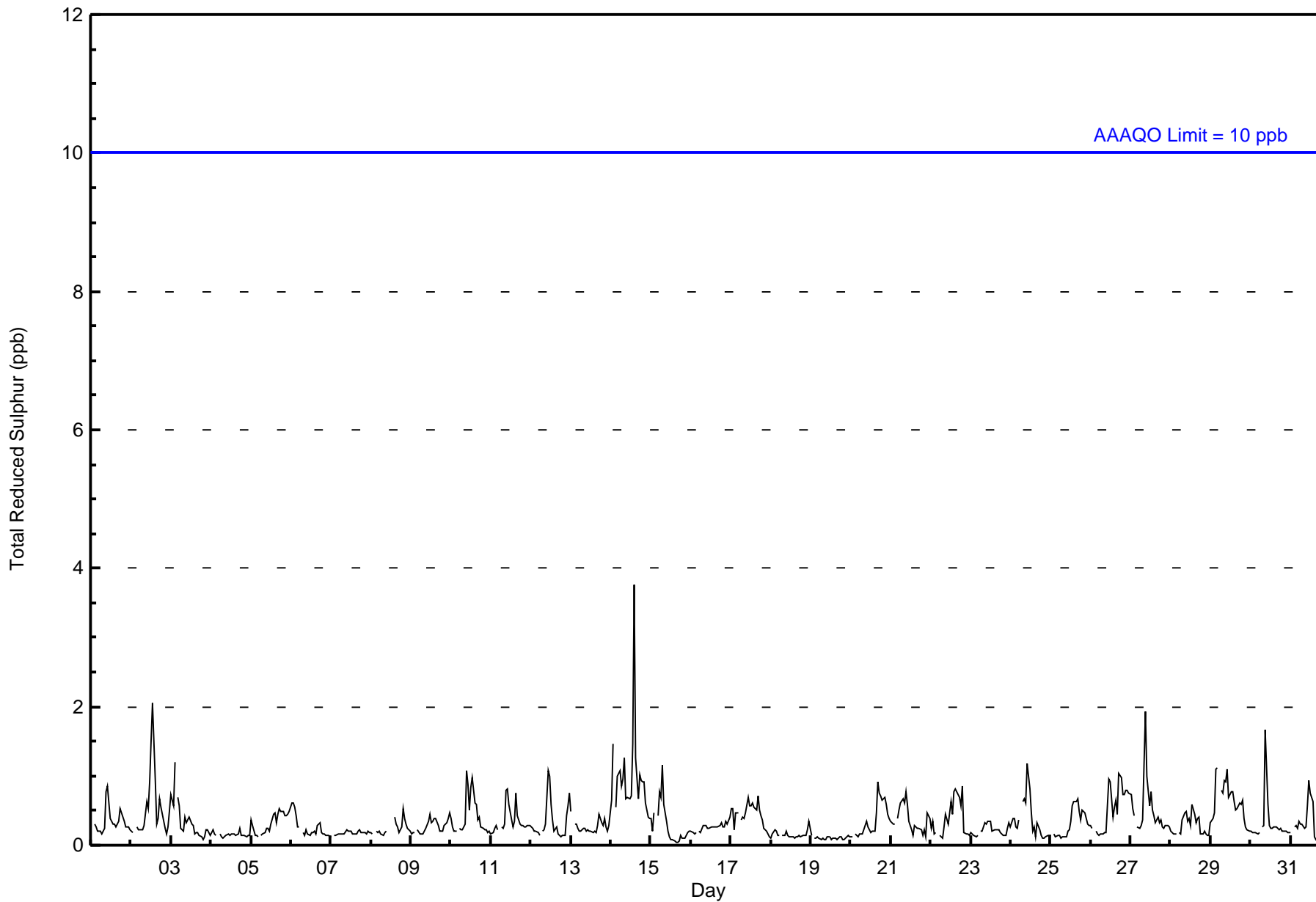
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Fort McKay South - March 2017

Number of Exceedences (AAAQO):		1-hr: 0 24-hr: 0		Hours in Service:		744																				
Maximum Value: 4 ppb on Mar 14 15:00		Maximum Daily Average: 1.0 ppb on Mar 14		Hours of Data:		709																				
Minimum Value: 0 ppb on Mar 15 16:00		Minimum Daily Average: 0.1 ppb on Mar 19		Hours of Missing Data:		35																				
Maximum Diurnal Average: 0.5 ppb at hour 10		Minimum Diurnal Average: 0.3 ppb at hour 4		Hours of Calibration:		35																				
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 = 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-Mar	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
2-Mar	0	0	Z	0	0	0	0	0	0	1	1	1	2	2	1	0	0	1	1	0	0	0	0	0	0.5	2
3-Mar	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
4-Mar	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
5-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
6-Mar	1	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Mar	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
8-Mar	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	1	0	0	0	0	0.2	1
9-Mar	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
10-Mar	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1
11-Mar	0	0	0	0	0	Z	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0.4	1
12-Mar	0	0	0	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0.3	1
13-Mar	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
14-Mar	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	0	1.0	4
15-Mar	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
16-Mar	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
17-Mar	1	1	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1
18-Mar	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
19-Mar	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-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0.4	1
21-Mar	0	0	0	Z	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
22-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0.4	1
23-Mar	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
24-Mar	0	0	0	0	0	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
25-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1	0	0	0	0	0.3	1
26-Mar	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	1	1	0	1	1	1	1	1	1	1	0.5	1
27-Mar	1	1	0	Z	0	0	0	0	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	2
28-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1
29-Mar	0	0	0	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6	1
30-Mar	0	0	0	0	0	0	Z	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
31-Mar	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	Diurnal Average
		1	1	1	1	1	1	1	1	1	2	1	1	2	2	4	1	1	1	1	1	1	1	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
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay South - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	708	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: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay South - March 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	164	91	20	9	6	10	26	112	62	22	25	23	23	17	31	67	708
3 - 4	0	0	0	0	0	0	0	1	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	164	91	20	9	6	10	26	113	62	22	25	23	23	17	31	67	709

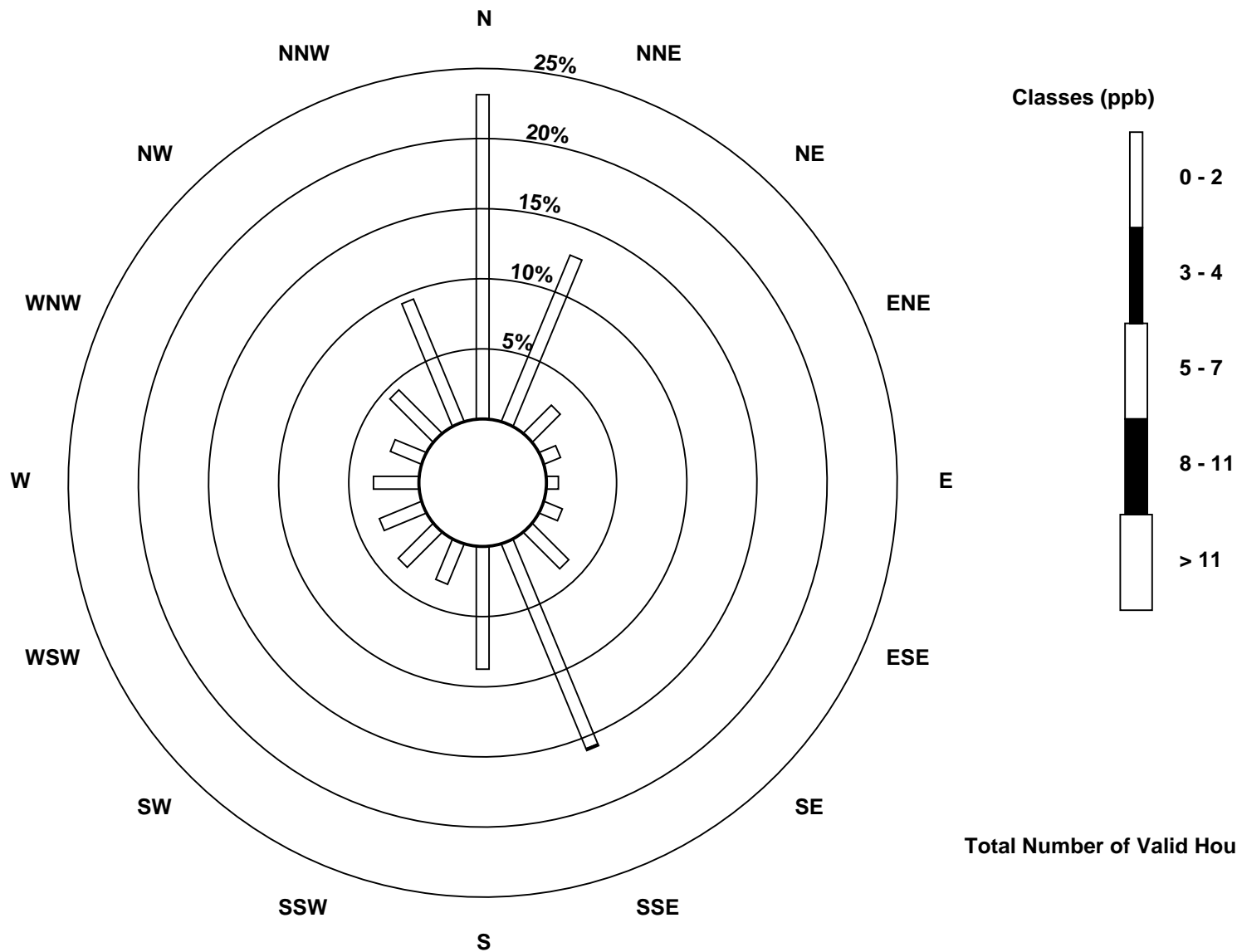
Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Reduced Sulphur (TRS) - ppb
Fort McKay South (AMS 13)

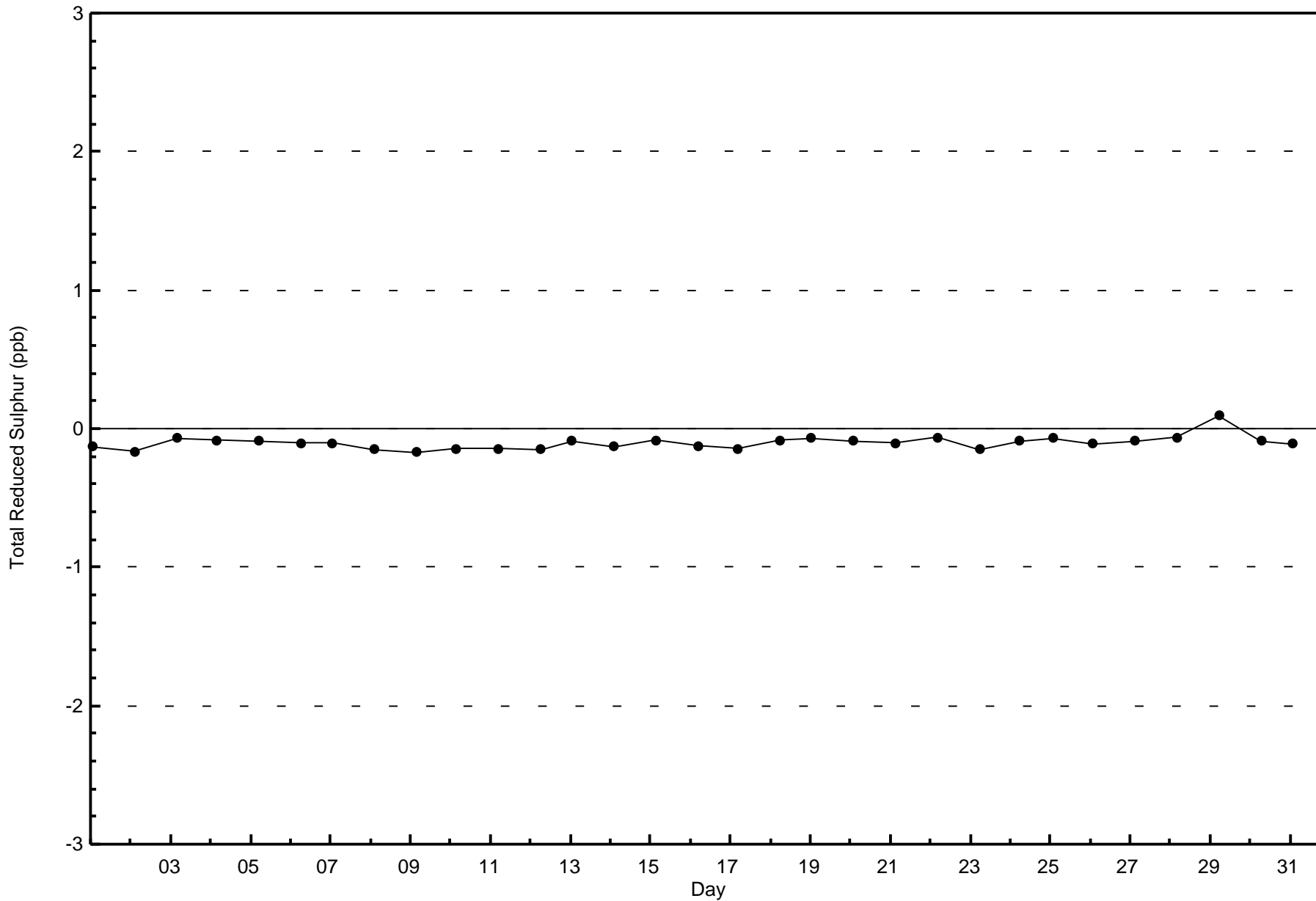


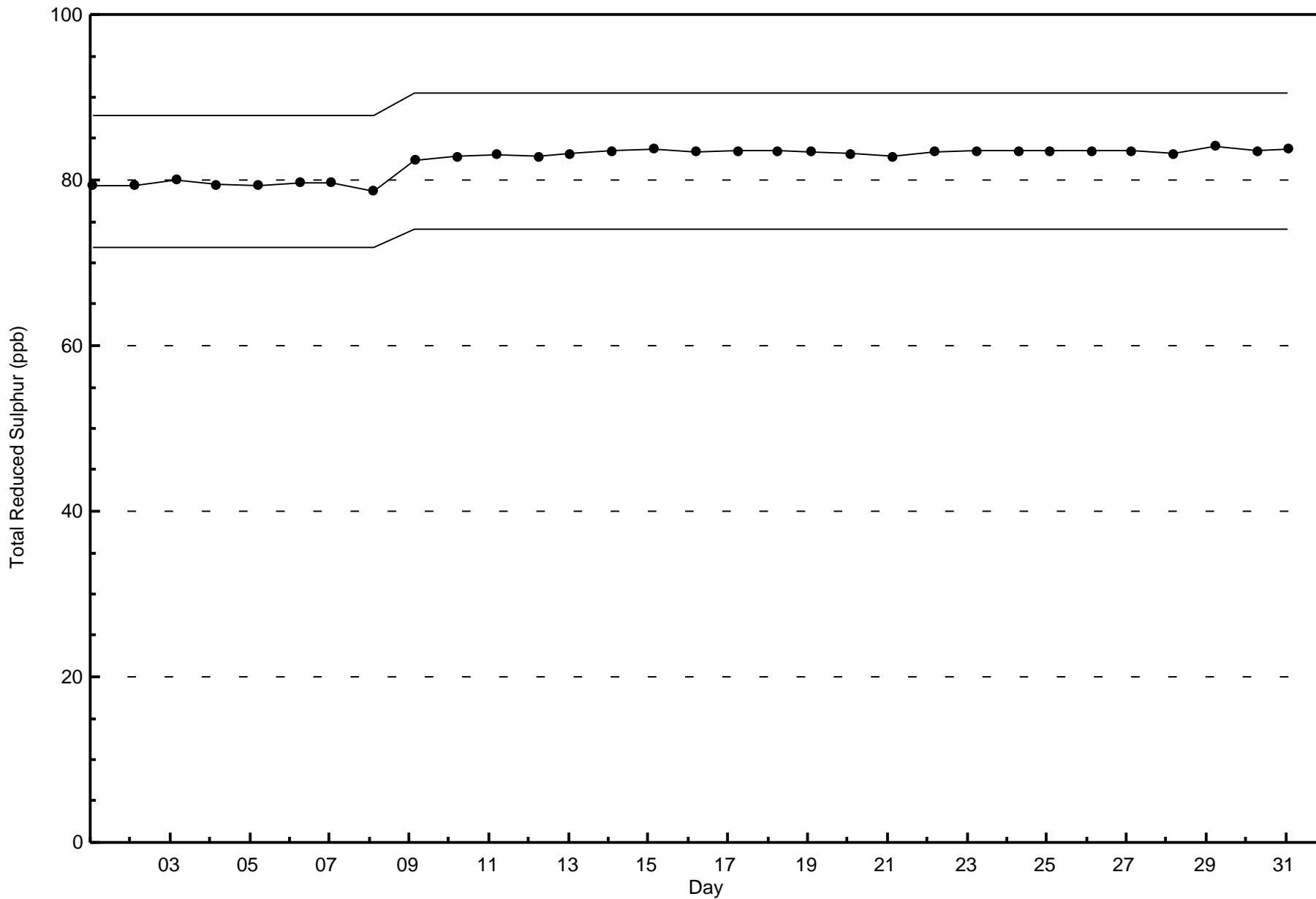
Total Number of Valid Hours: 709



Wood Buffalo Environmental Association
Zero Responses

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - March 2017







Wood Buffalo Environmental Association
Summary of Hour Averages

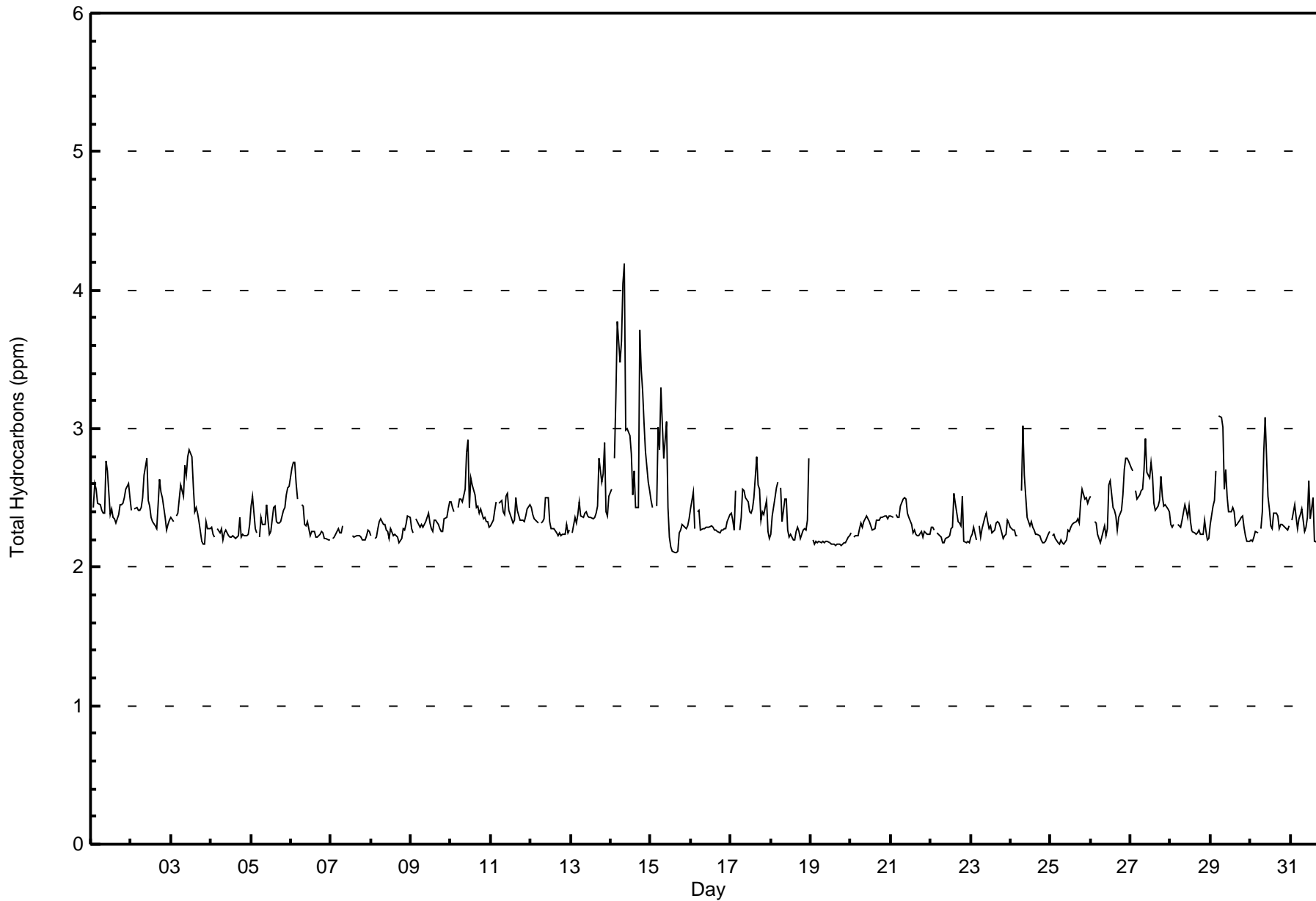
Total Hydrocarbons (THC) - ppm
Fort McKay South - March 2017

Maximum Value: 4.2 ppm on Mar 14 09:00		Maximum Daily Average: 3.1 ppm on Mar 14		Hours in Service: 744																							
Minimum Value: 2.1 ppm on Mar 15 15:00		Minimum Daily Average: 2.2 ppm on Mar 19		Hours of Data: 708																							
Maximum Diurnal Average: 2.5 ppm at hour 10		Minimum Diurnal Average: 2.3 ppm at hour 17		Hours of Missing Data: 36																							
Monthly Average: 2.39 ppm		Percentiles: P ₁ = 2.2 P ₁₀ = 2.2 Q ₁ = 2.3 Median = 2.3 Q ₃ = 2.4 P ₉₀ = 2.6 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-Mar	Z	2.4	2.6	2.6	2.5	2.5	2.4	2.4	2.4	2.8	2.7	2.4	2.4	2.4	2.3	2.3	2.4	2.5	2.4	2.5	2.5	2.6	2.6	2.5	2.5	2.8	
2-Mar	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.5	2.7	2.8	2.5	2.4	2.4	2.3	2.3	2.3	2.4	2.6	2.5	2.5	2.4	2.3	2.3	2.3	2.4	2.8	
3-Mar	2.4	2.3	Z	2.4	2.4	2.5	2.6	2.5	2.7	2.7	2.8	2.9	2.8	2.6	2.4	2.4	2.4	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.5	2.9	
4-Mar	2.3	2.2	2.2	Z	2.3	2.2	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.4	
5-Mar	2.4	2.5	2.3	2.2	Z	2.2	2.4	2.3	2.3	2.4	2.3	2.2	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.6	2.6	2.4	2.6	
6-Mar	2.7	2.8	2.8	2.6	2.5	Z	2.5	2.4	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.4	2.8	
7-Mar	Z	2.2	2.2	2.2	2.3	2.2	2.3	2.3	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	2.2	2.3	
8-Mar	2.2	Z	2.2	2.2	2.3	2.3	2.3	2.3	2.3	C	C	C	C	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.3	2.4
9-Mar	2.3	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.3	2.5	
10-Mar	2.5	2.4	2.4	Z	2.4	2.5	2.5	2.5	2.6	2.8	2.9	2.4	2.6	2.6	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.5	2.9	
11-Mar	2.3	2.3	2.4	2.5	Z	2.5	2.5	2.4	2.4	2.5	2.5	2.4	2.4	2.3	2.3	2.5	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.4	2.5	
12-Mar	2.4	2.4	2.3	2.3	2.3	Z	2.3	2.3	2.4	2.5	2.5	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.5	
13-Mar	Z	2.2	2.4	2.3	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.8	2.6	2.7	2.9	2.4	2.4	2.5	2.4	2.9	
14-Mar	2.6	Z	2.8	3.2	3.8	3.5	3.6	4.1	4.2	3.0	3.0	2.9	2.8	2.5	2.7	2.4	2.4	3.7	3.4	3.3	3.0	2.8	2.6	2.5	3.1	4.2	
15-Mar	2.5	2.4	Z	2.4	3.0	2.8	3.3	3.0	2.8	3.0	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.3	2.4	2.5	2.5	3.3	
16-Mar	2.4	2.5	2.3	Z	2.4	2.4	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	2.3	2.3	2.3	2.3	2.4	2.3	2.5	
17-Mar	2.4	2.3	2.3	2.6	Z	2.3	2.4	2.6	2.6	2.5	2.5	2.4	2.4	2.4	2.5	2.8	2.6	2.6	2.3	2.4	2.4	2.5	2.3	2.2	2.4	2.8	
18-Mar	2.2	2.4	2.5	2.6	2.6	Z	2.6	2.3	2.5	2.5	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.8	2.4	2.8	
19-Mar	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	2.2	2.2	2.2	2.2	2.2	2.2
20-Mar	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.3	2.4	2.3	2.4	
21-Mar	2.4	2.4	Z	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.4	2.4	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.5
22-Mar	2.3	2.3	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.5	2.5	2.3	2.3	2.3	2.5	2.2	2.2	2.2	2.2	2.3	2.5	
23-Mar	2.2	2.2	2.3	2.2	Z	2.3	2.2	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	
24-Mar	2.3	2.3	2.3	2.2	2.2	Z	2.6	3.0	2.7	2.5	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	3.0	
25-Mar	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	2.5	2.6	2.5	2.5	2.5	2.5	2.3	2.6	
26-Mar	2.5	Z	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.6	2.6	2.4	2.4	2.4	2.3	2.4	2.4	2.5	2.7	2.8	2.8	2.8	2.4	2.8	
27-Mar	2.7	2.7	Z	2.6	2.5	2.5	2.5	2.6	2.7	2.9	2.7	2.6	2.8	2.7	2.5	2.4	2.4	2.5	2.7	2.5	2.4	2.4	2.4	2.4	2.6	2.9	
28-Mar	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.5	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.2	2.3	2.5	
29-Mar	2.3	2.4	2.5	2.7	Z	3.1	3.1	3.0	2.6	2.7	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.4	2.4	2.3	2.2	2.2	2.2	2.5	3.1	
30-Mar	2.2	2.2	2.2	2.3	2.2	Z	2.3	2.4	2.8	3.1	2.5	2.4	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	3.1	
31-Mar	Z	2.3	2.4	2.4	2.3	2.3	2.4	2.4	2.3	2.3	2.4	2.6	2.3	2.5	2.2	2.2	2.2	2.3	2.8	2.8	2.3	2.4	2.4	2.3	2.4	2.8	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Fort McKay South - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - March 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	695	98.16	98.16
3.1 - 10.0	13	1.84	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 - March 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	164	91	22	9	5	10	27	113	54	22	22	24	20	19	31	62	695
3.1 - 10.0	2	0	0	0	0	0	0	0	7	2	0	0	0	0	0	2	13
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	166	91	22	9	5	10	27	113	61	24	22	24	20	19	31	64	708

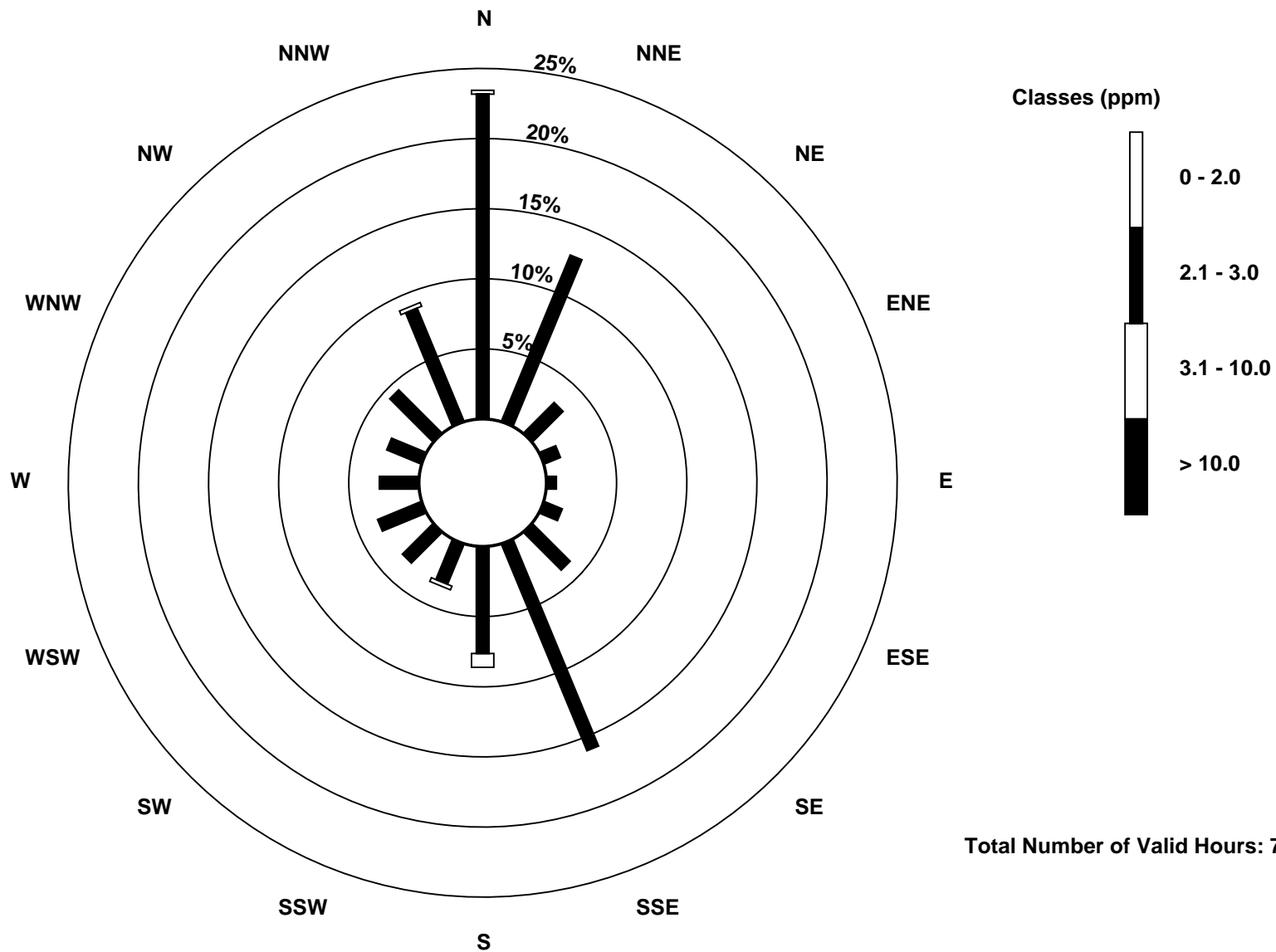
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Hydrocarbons (THC) - ppm
Fort McKay South (AMS 13)

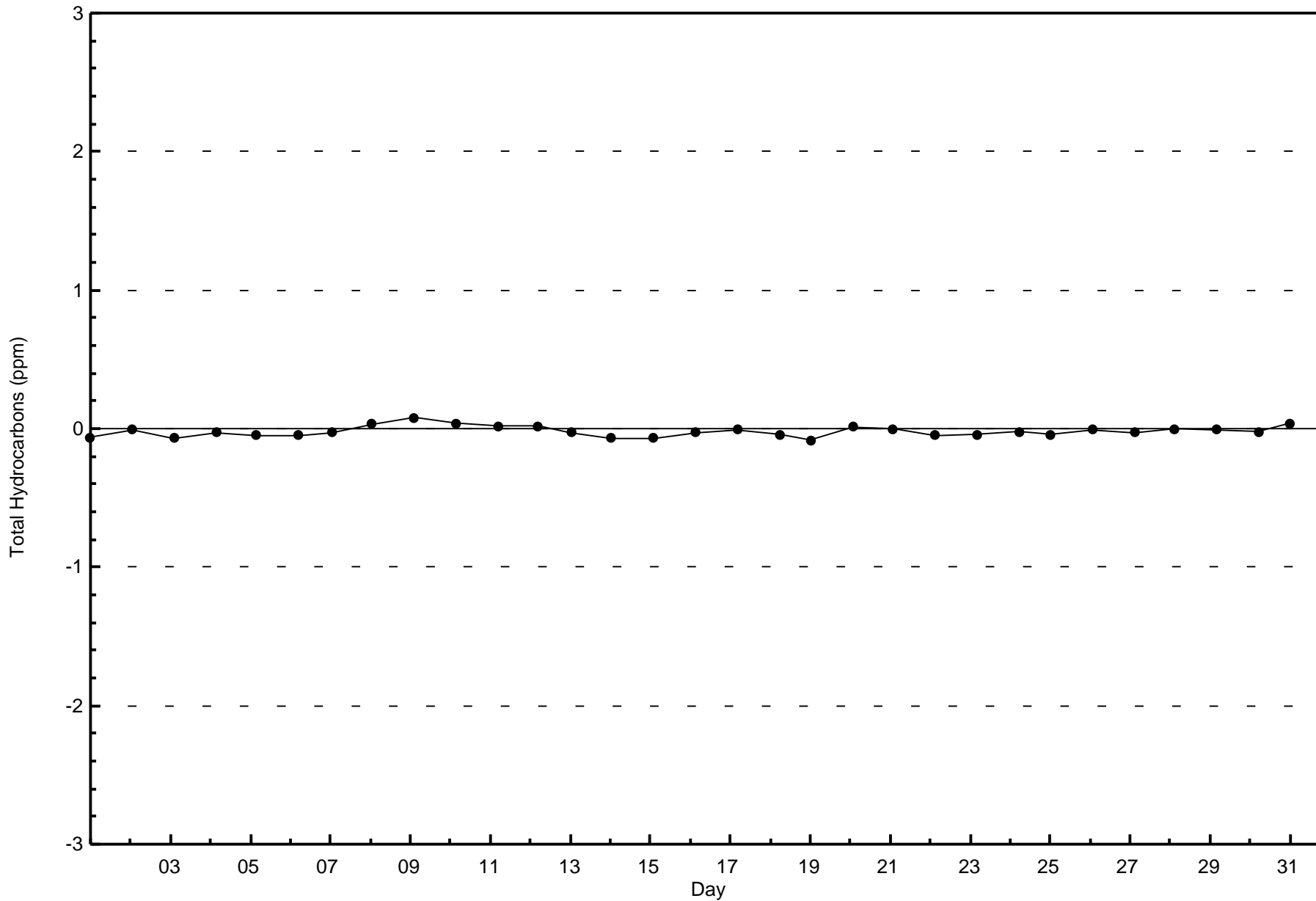


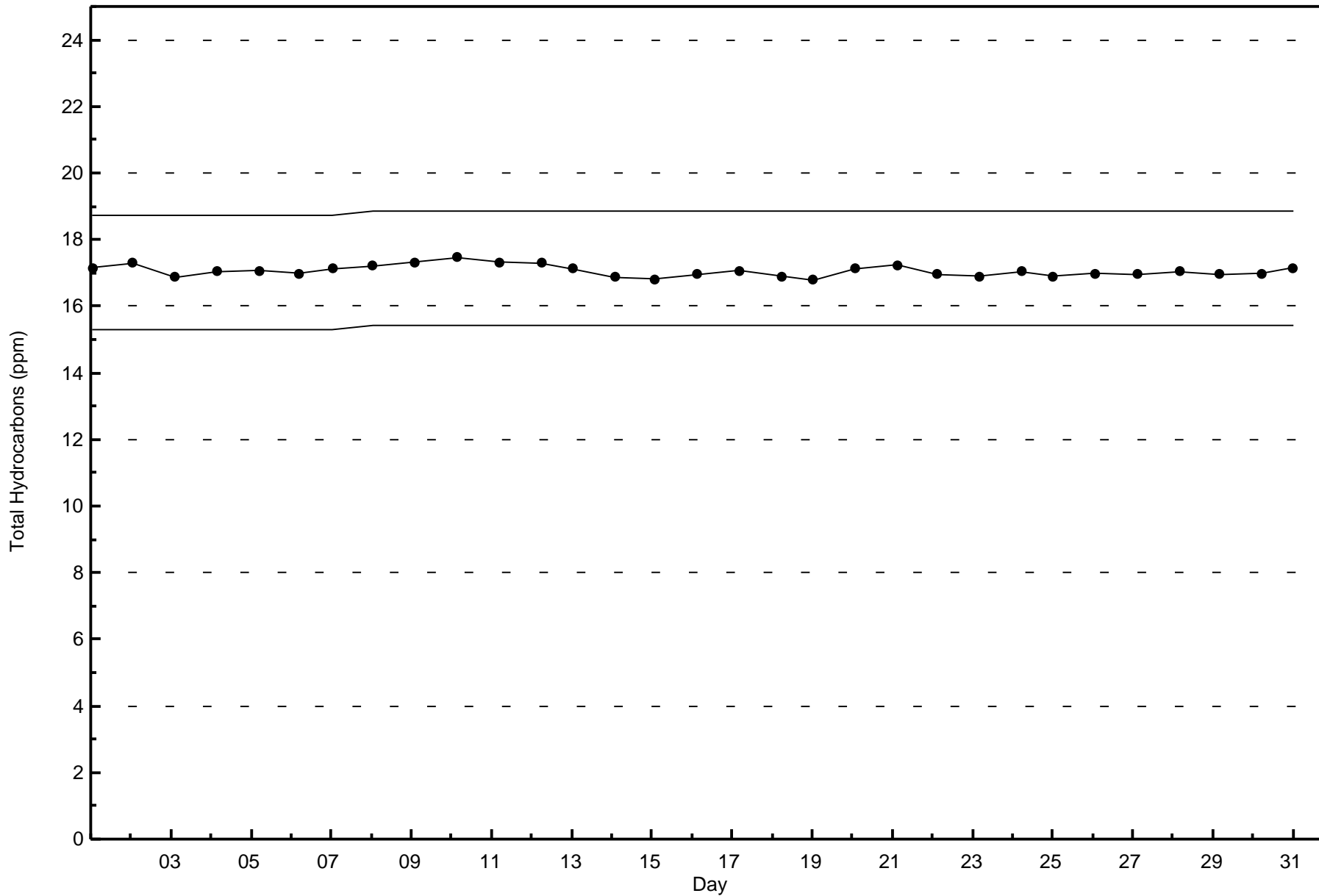
Total Number of Valid Hours: 708



Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Fort McKay South - March 2017







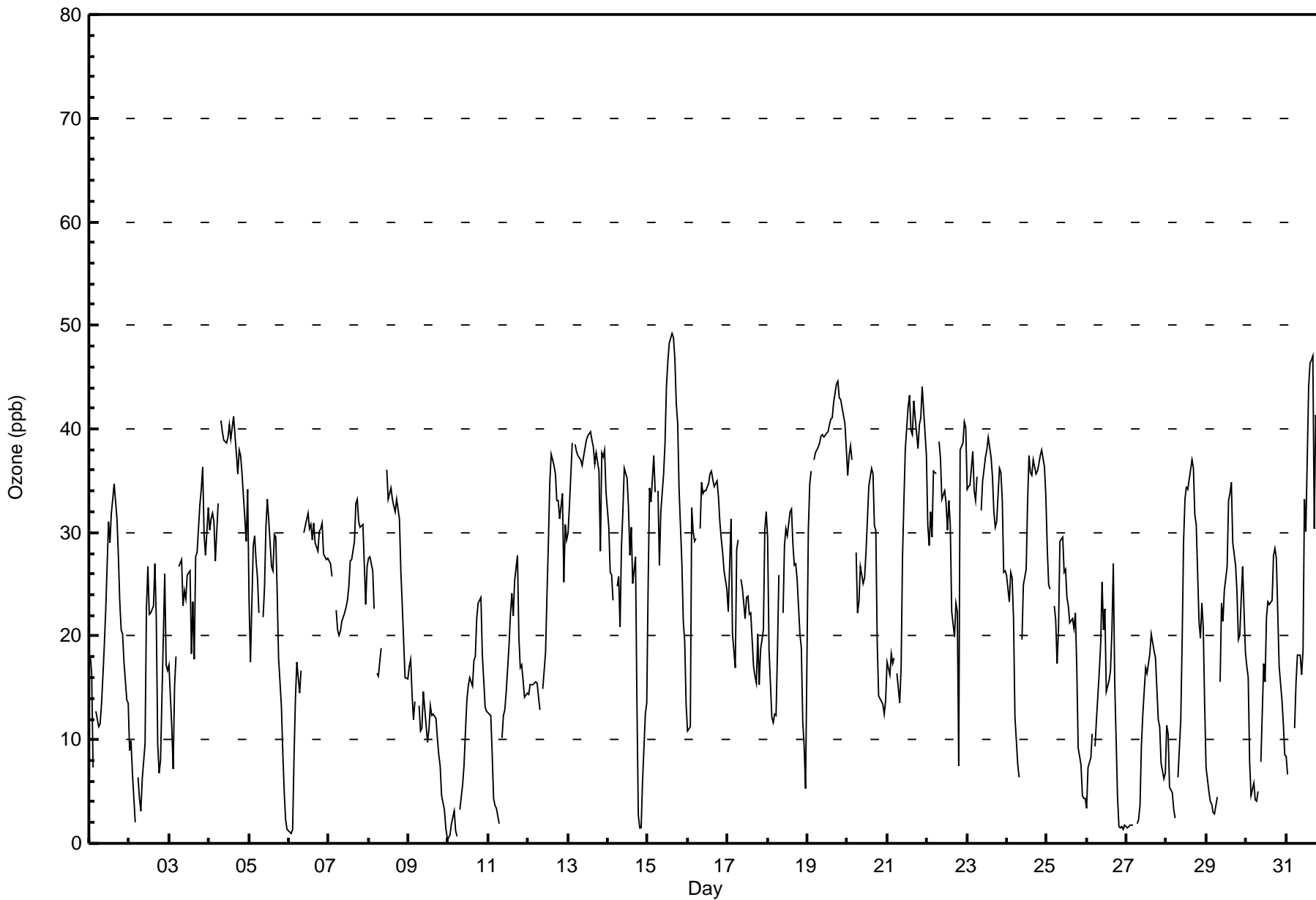
Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Fort McKay South - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 49 ppb on Mar 15 15:00										Maximum Daily Average: 39.6 ppb on Mar 19										Hours of Data: 708																													
Minimum Value: 1 ppb on Mar 10 00:00										Minimum Daily Average: 9.7 ppb on Mar 27										Hours of Missing Data: 36																													
Maximum Diurnal Average: 30.7 ppb at hour 15										Minimum Diurnal Average: 17.6 ppb at hour 4										Hours of Calibration: 34																													
Monthly Average: 23.7 ppb										Percentiles: P ₁ = 1 P ₁₀ = 7 Q ₁ = 15 Median = 25 O ₃ = 33 P ₉₀ = 38 P ₉₉ = 46										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-Mar	18	16	7	Z	13	11	12	13	16	19	22	31	29	32	33	35	31	28	23	21	20	18	14	14	20.7	35																							
2-Mar	9	10	7	2	Z	6	4	3	6	10	23	27	22	22	23	27	22	10	7	8	20	26	17	17	14.2	27																							
3-Mar	17	11	7	15	18	Z	27	27	23	24	24	26	26	18	23	18	28	28	33	34	36	30	28	32	24.1	36																							
4-Mar	30	31	32	31	27	33	Z	41	40	39	39	40	39	40	41	38	36	38	38	37	36	31	29	34	35.7	41																							
5-Mar	24	17	29	30	27	26	22	Z	22	25	31	33	31	27	26	30	30	24	18	13	9	5	2	1	21.8	33																							
6-Mar	1	1	1	8	14	17	14	17	Z	30	31	32	30	31	29	31	29	28	30	30	31	28	27	28	22.6	32																							
7-Mar	27	27	26	Z	23	21	20	20	21	22	23	24	25	27	27	29	33	33	31	30	31	27	23	27	26.0	33																							
8-Mar	28	28	26	23	Z	16	16	19	C	C	C	36	33	34	33	33	32	33	31	26	23	19	16	16	26.1	36																							
9-Mar	17	18	14	12	14	Z	13	11	11	15	11	10	11	13	12	12	12	10	8	7	5	3	1	1	10.6	18																							
10-Mar	1	1	2	3	1	1	Z	3	6	8	11	14	15	16	15	18	18	22	23	24	18	16	13	13	11.3	24																							
11-Mar	13	12	9	4	4	3	2	Z	10	12	13	15	19	22	24	22	25	28	20	17	17	16	14	14	14.6	28																							
12-Mar	14	15	15	15	16	15	14	13	Z	15	18	24	29	35	38	36	36	33	33	31	34	25	31	29	24.6	38																							
13-Mar	30	33	39	Z	39	38	37	37	36	37	38	39	39	40	39	38	37	38	36	28	38	37	38	34	36.7	40																							
14-Mar	30	26	26	23	Z	25	26	21	29	32	36	35	32	28	30	25	28	14	3	1	2	6	12	14	21.9	36																							
15-Mar	25	34	33	37	34	Z	34	27	32	36	39	44	47	48	49	49	47	42	41	34	27	21	19	13	35.3	49																							
16-Mar	11	11	32	30	29	29	Z	30	35	34	34	34	35	36	36	35	34	35	33	31	29	28	26	25	30.2	36																							
17-Mar	22	27	31	20	17	28	29	Z	26	25	22	24	24	22	22	17	16	15	20	15	19	21	30	32	22.8	32																							
18-Mar	30	19	12	12	12	12	18	26	Z	22	29	30	30	32	32	29	27	27	26	20	19	12	9	5	21.3	32																							
19-Mar	30	35	36	Z	37	38	38	39	39	39	39	39	40	40	40	41	41	43	44	45	43	43	42	41	38	39.6	45																						
20-Mar	36	37	38	37	Z	28	22	23	27	25	26	28	31	34	36	36	31	30	19	14	14	13	12	14	26.7	38																							
21-Mar	17	16	18	17	18	Z	16	14	17	28	33	38	42	43	40	39	43	41	38	40	41	44	42	37	31.5	44																							
22-Mar	31	29	32	30	36	36	Z	39	37	33	34	33	30	33	31	22	20	23	22	7	38	39	41	40	31.1	41																							
23-Mar	34	34	35	38	34	33	35	Z	32	35	36	37	38	39	37	35	32	30	31	36	36	33	26	26	34.1	39																							
24-Mar	26	23	26	26	22	12	8	6	Z	20	25	26	33	37	36	36	37	36	36	37	37	38	36	33	28.4	38																							
25-Mar	29	25	25	Z	23	22	17	21	29	30	26	26	24	23	21	22	21	22	17	9	8	5	4	4	19.6	30																							
26-Mar	3	7	8	11	Z	9	12	17	19	25	21	23	15	16	17	20	27	16	4	2	2	2	1	2	12.1	27																							
27-Mar	1	2	2	2	2	Z	2	2	4	9	12	17	16	17	18	20	19	18	15	12	11	8	6	7	9.7	20																							
28-Mar	11	11	5	5	3	2	Z	6	12	20	29	33	34	34	36	37	36	32	31	21	20	23	21	13	20.8	37																							
29-Mar	7	5	4	4	3	3	4	Z	16	23	21	24	27	33	34	35	29	27	24	20	20	24	27	18	18.8	35																							
30-Mar	17	16	8	5	6	4	4	5	Z	8	17	16	22	23	23	23	28	28	27	22	17	14	12	9	15.4	28																							
31-Mar	8	7	UO	Z	UO	11	15	18	18	16	19	33	30	44	46	47	47	30	41	36	24	16	28	17	26.4	47																							
																								19.3	18.9	19.5	17.6	18.8	18.5	17.9	19.2	22.5	23.8	26.0	28.7	29.0	30.4	30.7	30.3	30.1	27.8	26.0	22.9	23.3	21.6	20.9	19.6	Diurnal Average	
																								36	37	39	38	39	38	38	41	40	39	39	44	47	48	49	49	47	44	45	43	43	44	42	40	Diurnal Maximum	
Z - zerospan C - Calibration UO - Unstable Operation																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																																																	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	275	38.84	38.84
21 - 50	433	61.16	100.00
51 - 82	0	0.00	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 - March 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	64	18	8	4	3	4	4	15	16	12	17	20	21	8	16	45	275
21 - 50	103	71	11	4	3	5	23	99	45	10	5	2	2	10	17	23	433
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	167	89	19	8	6	9	27	114	61	22	22	22	23	18	33	68	708

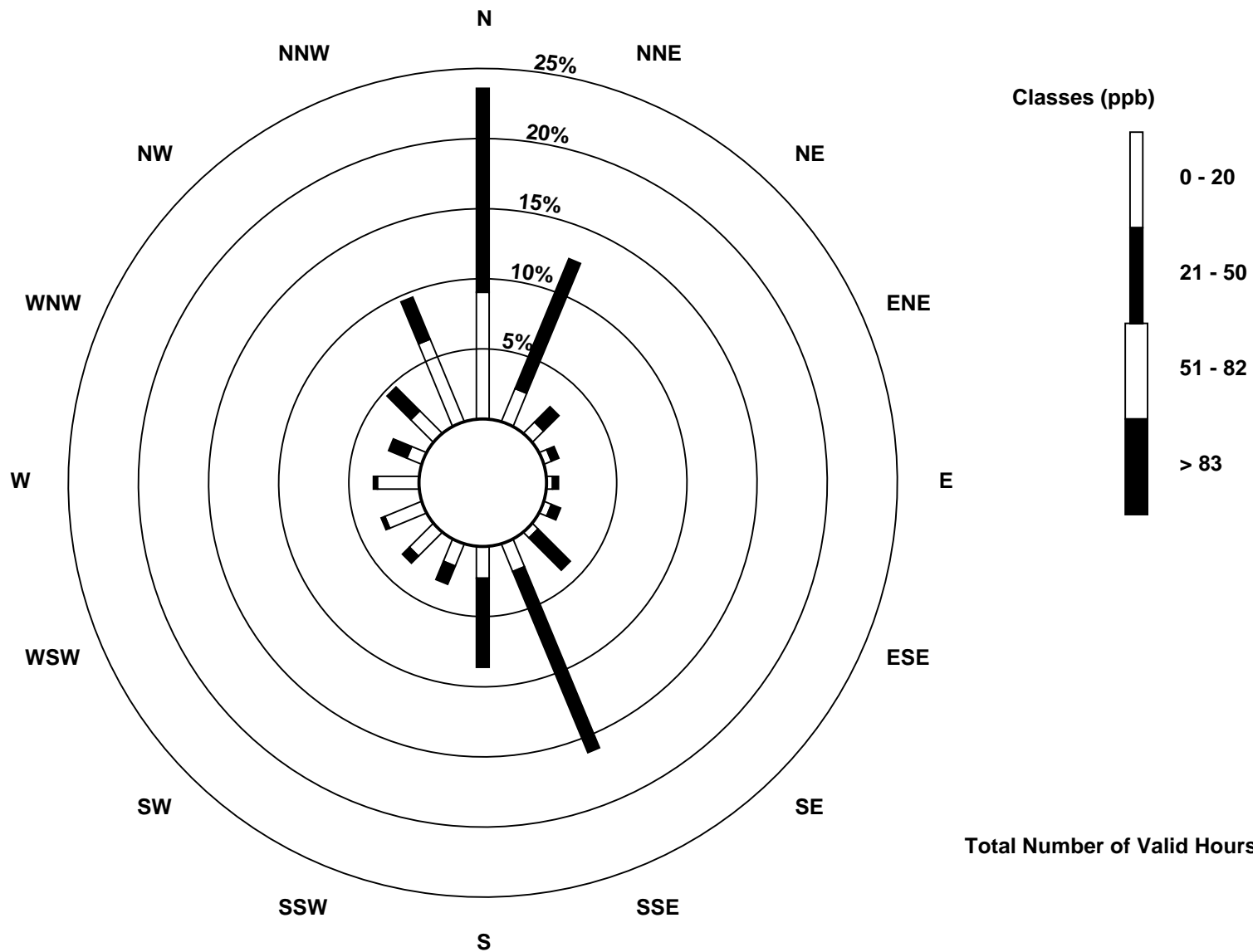
Total Number of Valid Hours: 708

Total Number of Hours: 744

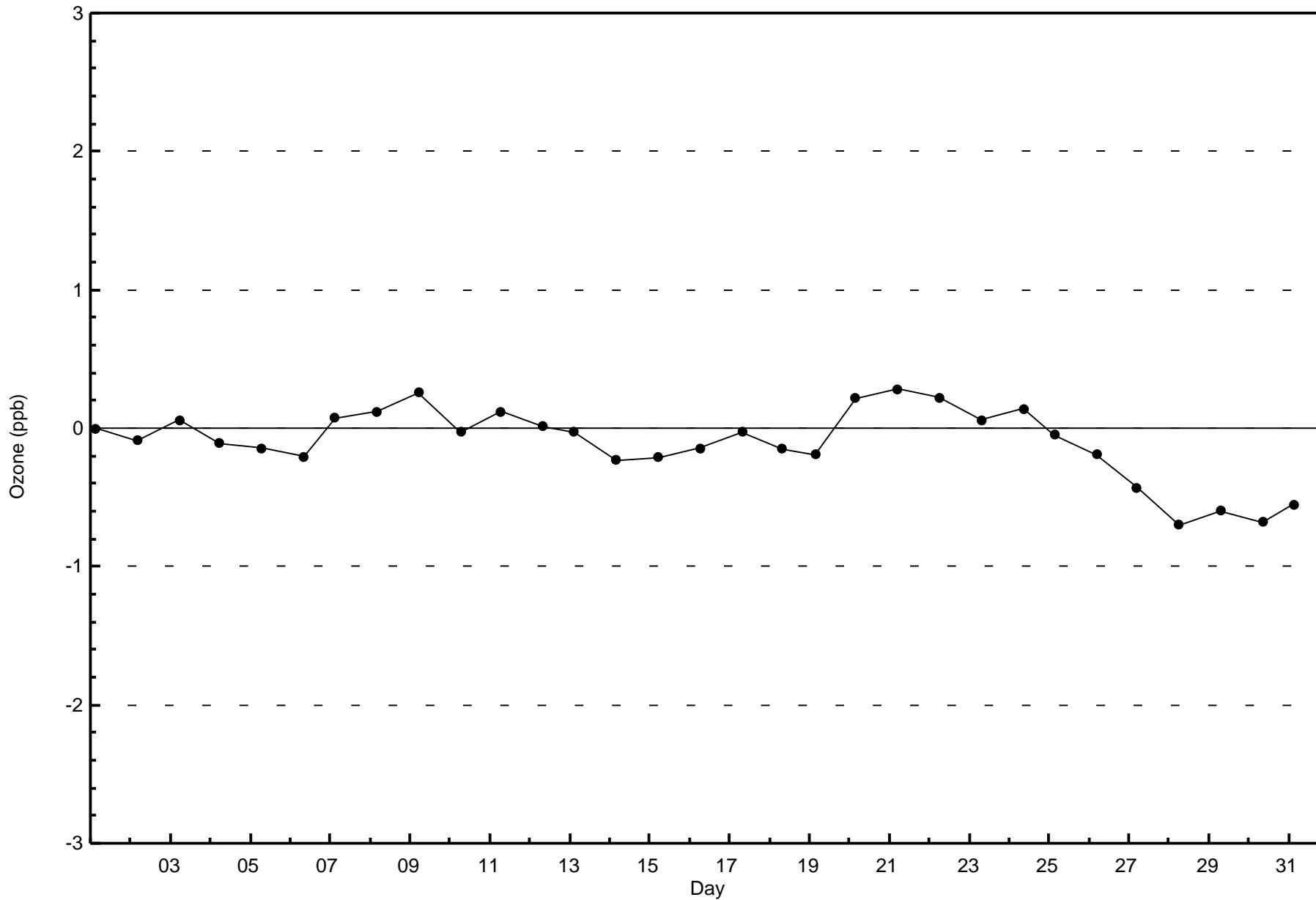


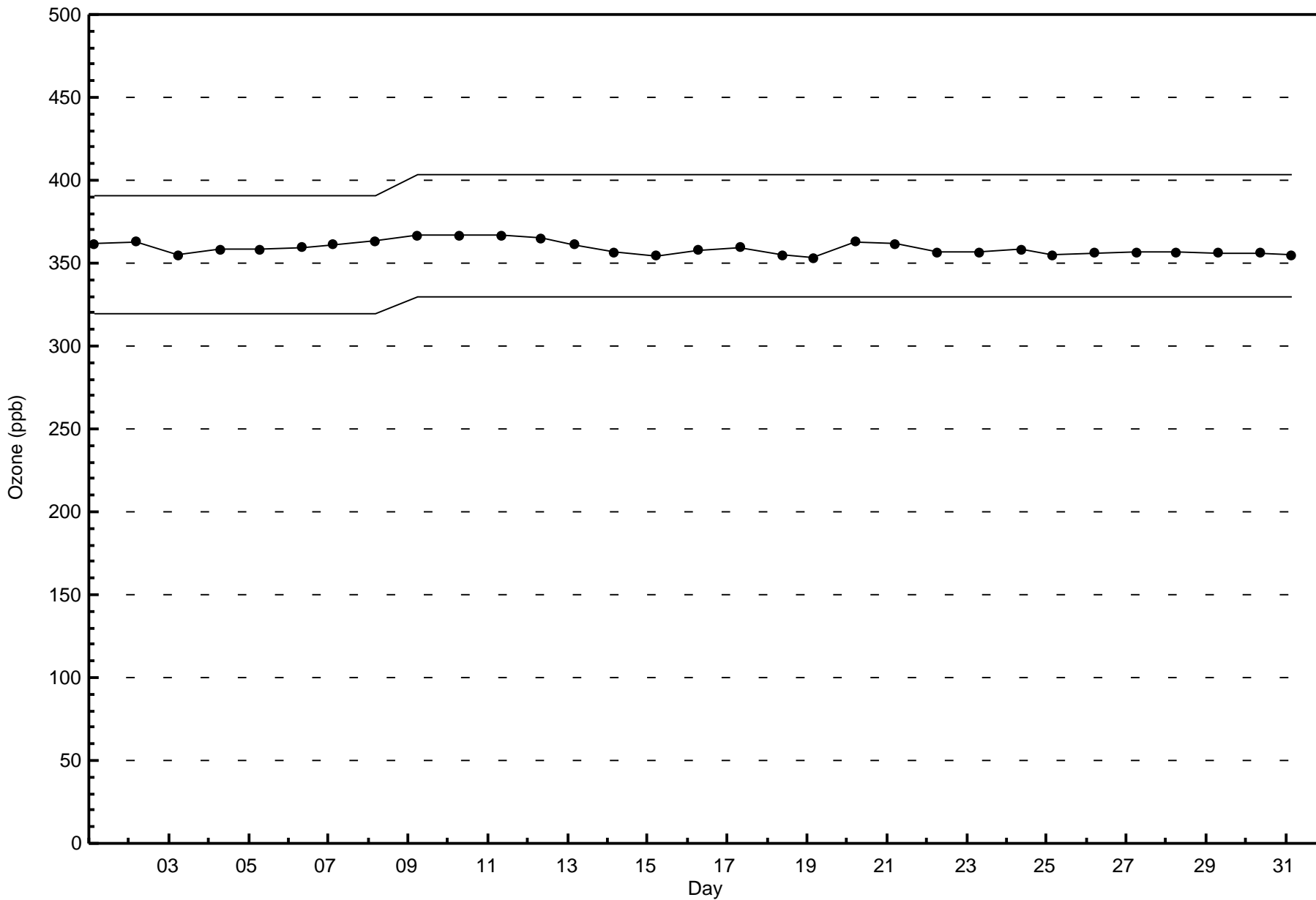
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Ozone (O₃) - ppb
Fort McKay South (AMS 13)



Total Number of Valid Hours: 708





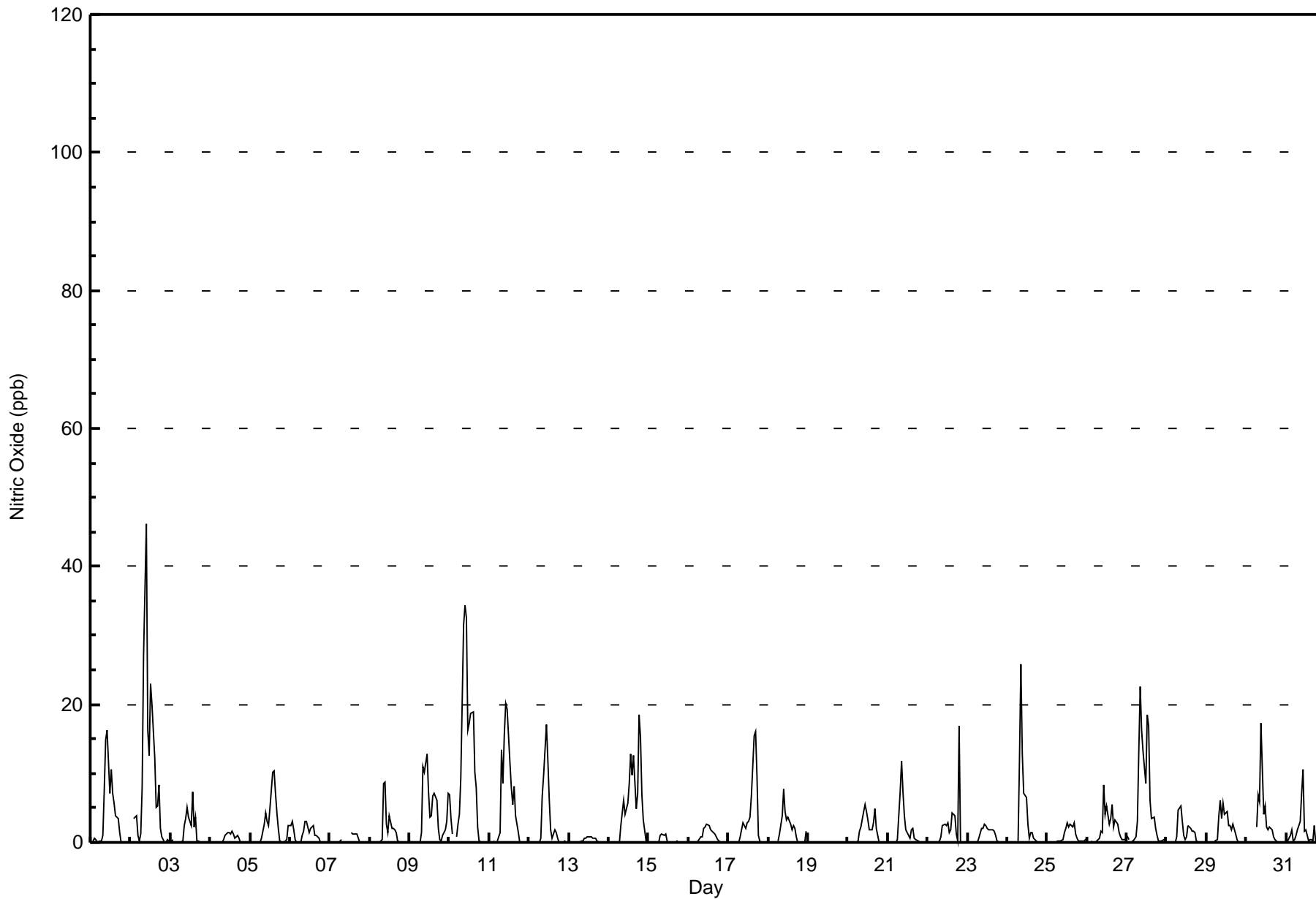


Maximum Value: 46 ppb on Mar 2 10:00																		Maximum Daily Average: 9.5 ppb on Mar 10						Hours in Service: 744		
Minimum Value: 0 ppb on Mar 3 19:00																		Minimum Daily Average: 0.0 ppb on Mar 19						Hours of Data: 708		
Maximum Diurnal Average: 8.3 ppb at hour 10																		Minimum Diurnal Average: 0.1 ppb at hour 5						Hours of Missing Data: 36		
Monthly Average: 2.5 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 3 P ₉₀ = 7 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-Mar	Z	0	1	0	0	0	0	1	8	15	16	7	11	7	6	4	3	1	0	0	0	0	0	0	3.5	16
2-Mar	0	Z	4	4	1	0	1	8	27	46	16	13	23	20	12	5	5	8	2	1	0	0	0	0	8.6	46
3-Mar	0	0	Z	0	0	0	0	0	3	4	5	4	3	7	2	4	0	0	0	0	0	0	0	0	1.4	7
4-Mar	0	0	0	Z	0	0	0	0	1	1	1	1	1	2	1	1	1	1	0	0	0	0	0	0	0.5	2
5-Mar	0	0	0	0	Z	0	0	1	3	4	3	2	5	10	10	7	4	2	0	0	0	0	0	2	2.4	10
6-Mar	2	3	2	0	0	Z	0	1	2	3	3	1	2	2	2	1	1	1	0	0	0	0	0	0	1.2	3
7-Mar	Z	0	0	0	0	0	0	0	C	C	C	C	C	1	1	1	1	1	0	0	0	0	0	0	0.4	1
8-Mar	0	Z	0	0	0	0	0	0	9	9	3	1	4	2	2	2	1	0	0	0	0	0	0	0	1.5	9
9-Mar	0	0	Z	0	0	0	0	1	11	10	13	7	4	4	7	7	6	2	0	0	1	2	3	7	3.7	13
10-Mar	7	3	1	Z	1	3	4	9	32	34	33	16	17	19	19	10	8	2	0	0	0	0	0	0	9.5	34
11-Mar	0	0	0	0	Z	0	1	13	8	16	20	19	12	8	6	8	4	1	0	0	0	0	0	0	5.1	20
12-Mar	0	0	0	0	0	Z	0	1	7	10	17	12	6	2	1	2	1	1	0	0	0	0	0	0	2.6	17
13-Mar	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.3	1
14-Mar	0	Z	0	0	0	0	0	3	4	6	4	6	9	13	10	13	5	7	18	15	7	3	0	0	5.3	18
15-Mar	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
16-Mar	0	0	0	Z	0	0	0	1	1	2	2	3	2	2	2	2	1	0	0	0	0	0	0	0	0.8	3
17-Mar	0	0	0	0	Z	0	0	1	2	3	2	3	3	4	7	16	16	10	1	0	0	0	0	0	2.9	16
18-Mar	0	0	0	0	0	Z	0	1	4	8	5	3	4	3	2	2	2	1	0	0	0	0	0	2	1.6	8
19-Mar	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
20-Mar	0	Z	0	0	0	0	0	2	2	4	6	4	3	2	2	3	5	2	1	0	0	0	0	0	1.6	6
21-Mar	0	0	Z	0	0	0	0	7	12	7	4	2	1	1	2	2	1	0	0	0	0	0	0	0	1.7	12
22-Mar	0	0	0	Z	0	0	0	0	1	2	3	2	3	1	2	4	4	1	0	17	0	0	0	0	1.8	17
23-Mar	0	0	0	0	Z	0	0	1	2	2	3	2	2	2	2	2	2	1	0	0	0	0	0	0	0.9	3
24-Mar	0	0	0	0	0	Z	0	12	26	13	7	7	3	1	1	1	1	0	0	0	0	0	0	0	3.1	26
25-Mar	Z	0	0	0	0	0	0	0	0	0	1	2	3	2	3	2	3	1	1	0	0	0	0	0	0.9	3
26-Mar	0	Z	0	0	0	0	0	1	2	1	8	4	5	3	3	6	2	3	3	1	1	0	0	0	2.0	8
27-Mar	1	0	Z	0	0	1	3	13	23	16	13	8	19	17	6	4	4	2	1	0	0	0	0	0	5.7	23
28-Mar	0	0	0	Z	0	0	1	5	5	3	1	0	1	2	2	2	2	1	0	0	0	0	0	0	1.1	5
29-Mar	0	0	0	0	Z	0	0	4	6	4	6	4	4	2	3	2	3	1	0	0	0	0	0	0	1.7	6
30-Mar	0	0	0	0	0	Z	2	7	6	17	4	5	2	2	2	2	1	0	0	0	0	0	0	0	2.2	17
31-Mar	Z	0	1	2	0	0	1	2	3	7	11	2	2	0	0	0	0	2	0	0	0	1	0	4	1.7	11
																								Diurnal Average		
																								Diurnal Maximum		
0.5 0.3 0.3 0.3 0.1 0.2 0.5 3.1 6.9 8.3 7.0 4.8 5.1 4.5 3.8 3.7 2.8 1.8 1.0 1.1 0.3 0.2 0.2 0.6																										
7 3 4 4 1 3 4 13 32 46 33 19 23 20 19 16 16 10 18 17 7 3 3 7																										
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Fort McKay South - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	700	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: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort McKay South - March 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	165	89	21	8	4	10	27	112	61	24	22	24	19	19	31	64	700
21 - 40	1	2	1	0	1	0	0	1	0	0	0	0	1	0	0	0	7
11 - 80	0	0	0	1	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	166	91	22	9	5	10	27	113	61	24	22	24	20	19	31	64	708

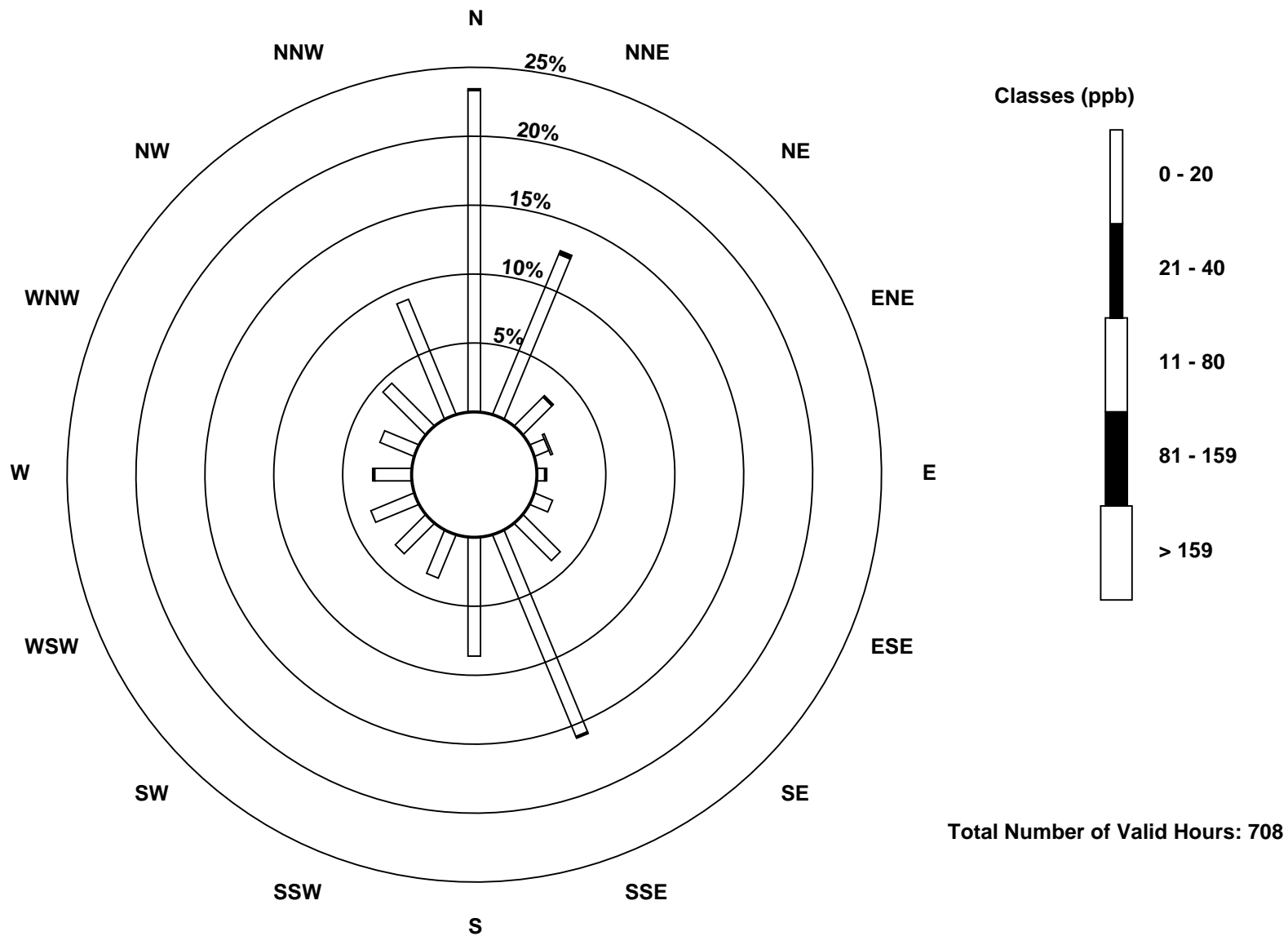
Total Number of Valid Hours: 708

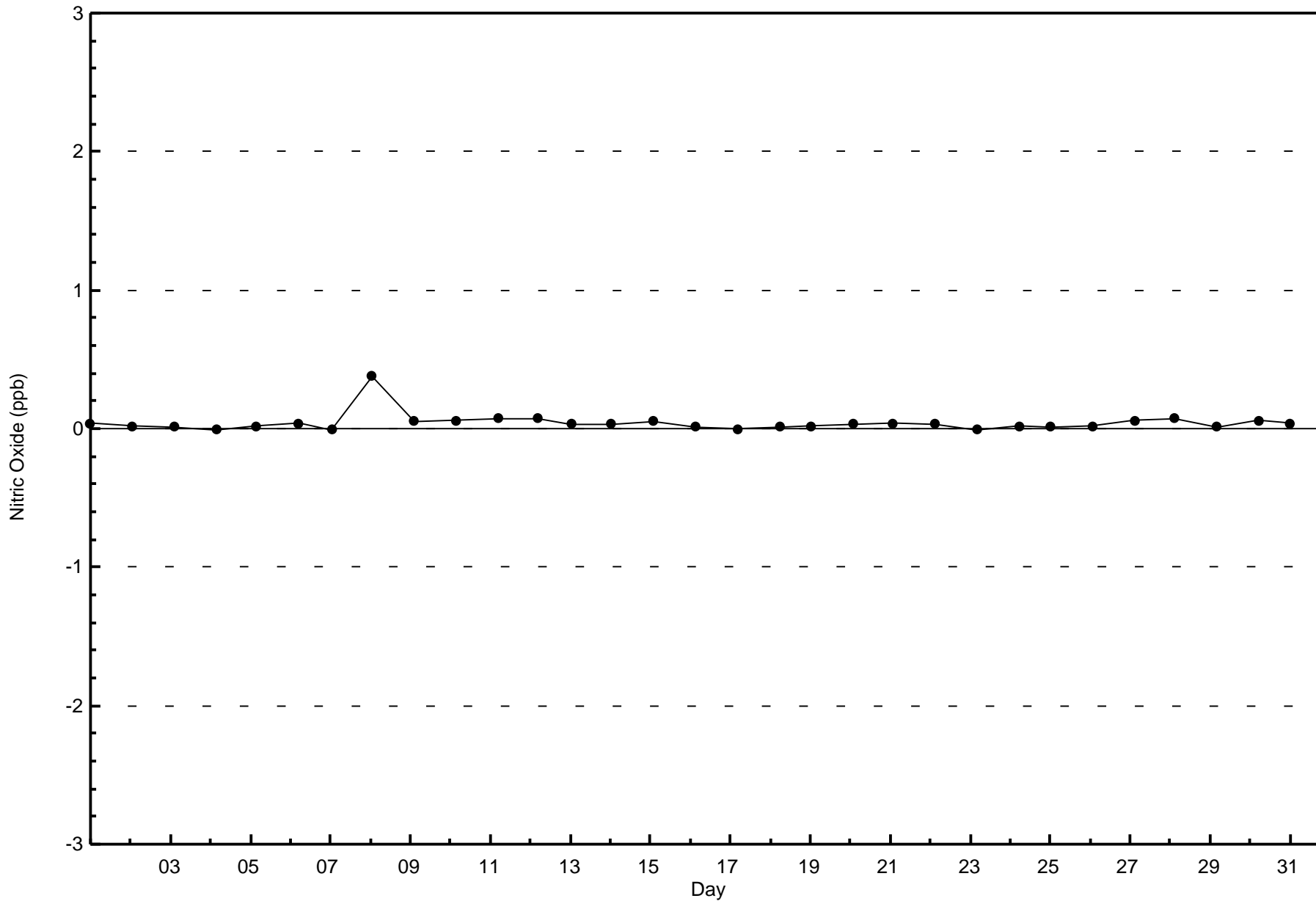
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitric Oxide (NO) - ppb
Fort McKay South (AMS 13)

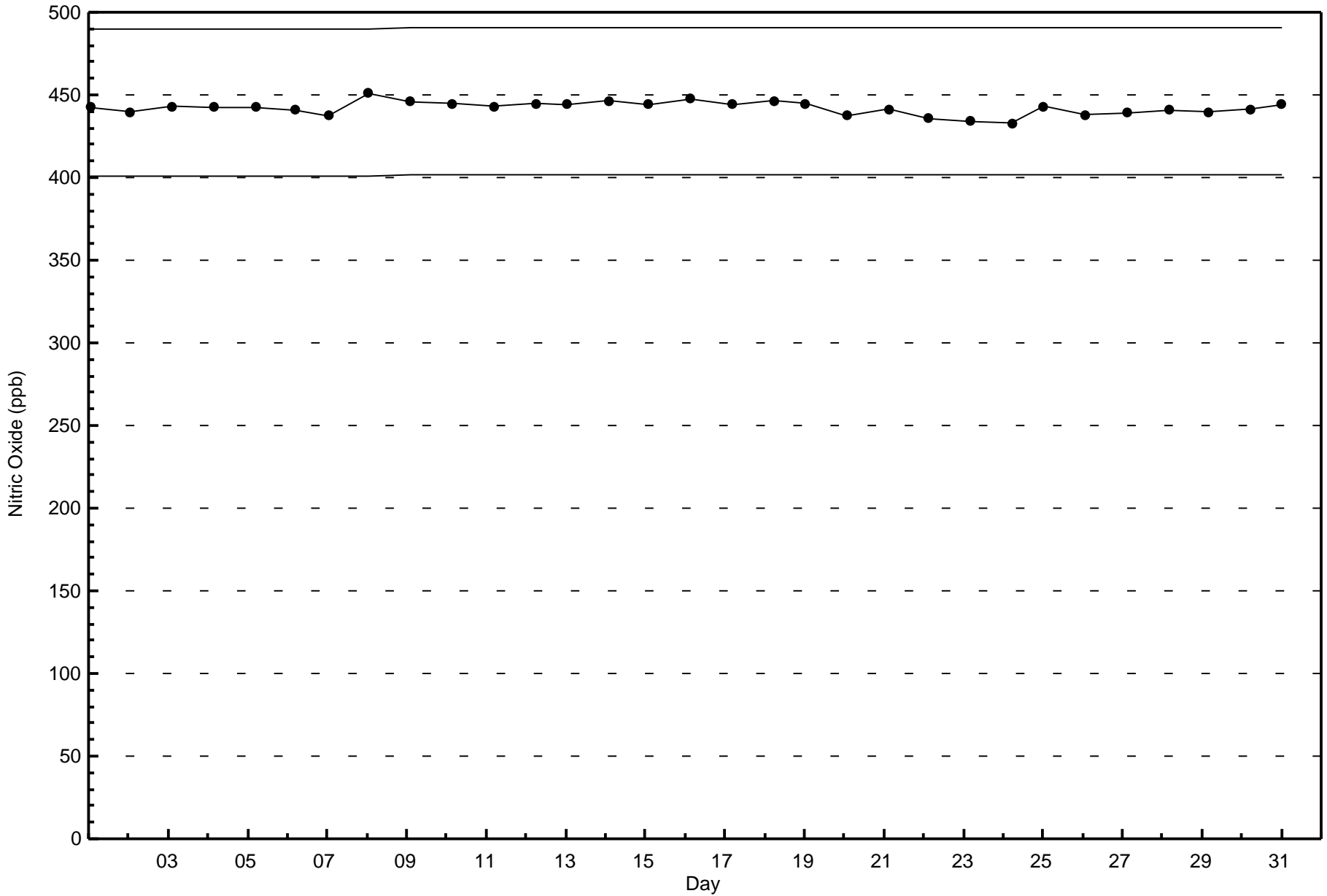






Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Fort McKay South - March 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

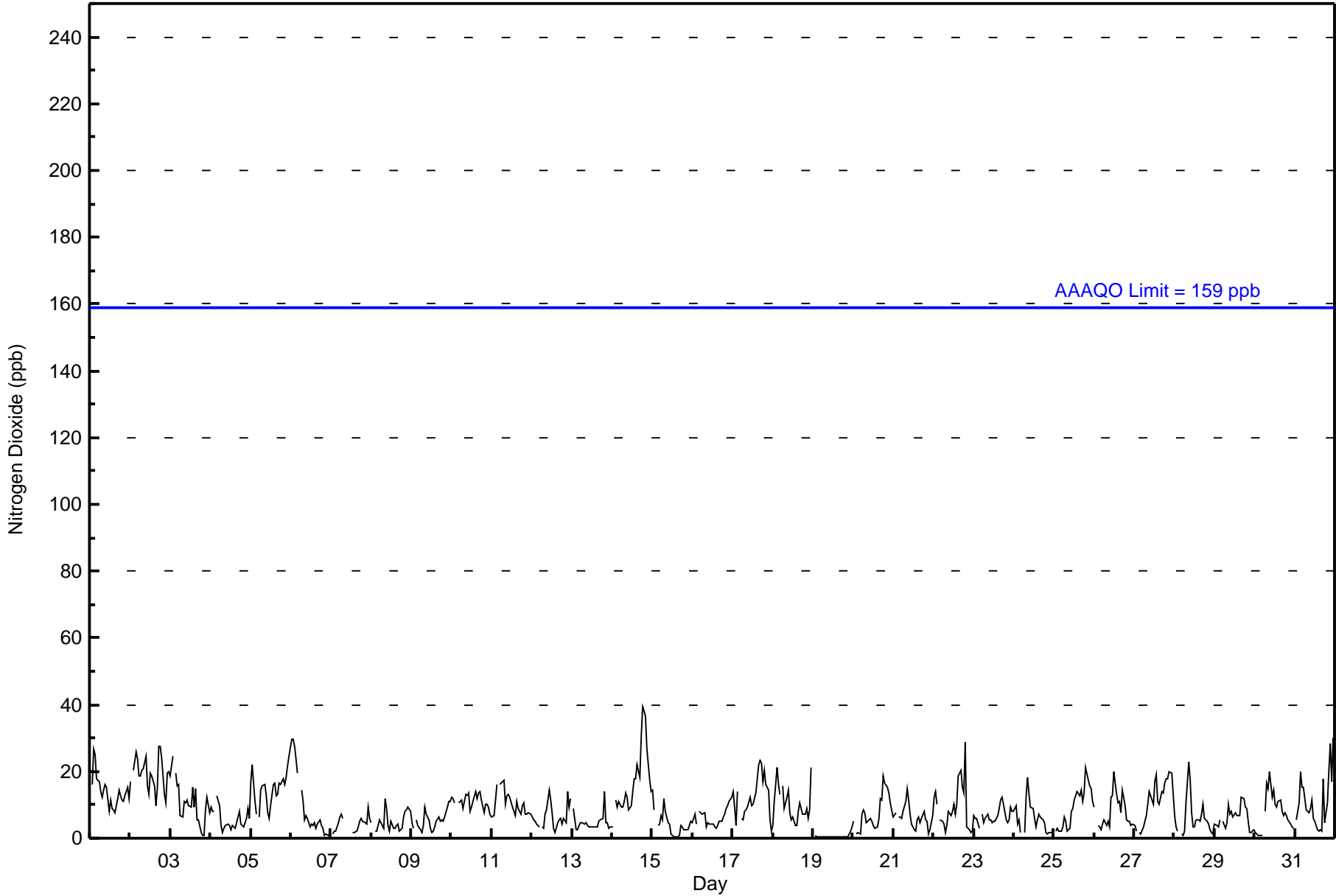
Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 39 ppb on Mar 14 19:00 Maximum Daily Average: 19.1 ppb on Mar 2		Hours in Service: 744 Hours of Data: 708 Hours of Missing Data: 36 Hours of Calibration: 36 Percent Operational Time: 100.0																									
Minimum Value: 0 ppb on Mar 15 16:00 Maximum Diurnal Average: 10.7 ppb at hour 18 Monthly Average: 8.6 ppb		Minimum Daily Average: 0.6 ppb on Mar 19 Minimum Diurnal Average: 7.0 ppb at hour 12 Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 12 P ₉₀ = 17 P ₉₉ = 30																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	Z	16	27	25	18	17	14	12	15	16	15	8	11	9	8	8	12	14	13	12	11	13	15	12	13.9	27	
2-Mar	17	Z	20	26	24	19	19	21	21	25	16	13	19	19	16	10	15	28	28	24	13	10	19	20	19.1	28	
3-Mar	19	25	Z	19	16	16	7	6	11	10	12	10	9	15	9	15	6	6	2	1	1	8	12	8	10.5	25	
4-Mar	9	8	8	Z	13	10	4	2	3	4	4	3	4	3	3	6	8	4	4	4	4	6	9	6	5.5	13	
5-Mar	16	22	11	7	Z	6	14	16	16	13	8	6	10	16	17	13	13	17	16	18	16	18	22	25	14.6	25	
6-Mar	30	30	28	24	19	Z	14	11	6	7	6	3	4	4	5	3	4	6	4	3	1	1	1	1	9.3	30	
7-Mar	Z	1	2	2	5	6	7	6	C	C	C	C	C	2	2	2	3	5	6	5	5	4	9	6	4.4	9	
8-Mar	5	Z	2	2	4	6	5	3	12	9	4	2	5	3	3	4	4	2	3	7	8	9	9	8	5.1	12	
9-Mar	5	3	Z	5	4	2	2	4	9	7	6	3	2	2	4	5	6	5	6	5	6	9	11	11	5.2	11	
10-Mar	12	12	11	Z	11	11	11	9	13	13	14	8	10	11	14	12	14	14	12	8	10	10	9	7	11.0	14	
11-Mar	6	7	11	16	Z	16	17	17	10	13	13	12	10	8	7	11	9	7	10	11	7	7	8	7	10.5	17	
12-Mar	6	6	5	4	4	Z	3	3	7	8	14	12	8	3	2	5	6	6	4	6	5	14	10	12	6.6	14	
13-Mar	Z	9	3	3	4	5	5	4	5	4	4	3	3	3	4	5	6	6	14	5	5	3	3	4.6	14		
14-Mar	4	Z	11	10	11	9	9	11	14	12	8	10	14	18	18	22	18	31	39	38	37	27	17	14	17.5	39	
15-Mar	14	9	Z	4	4	7	6	12	8	5	4	1	1	1	0	0	1	4	3	3	3	2	4	5	4.3	14	
16-Mar	5	7	4	Z	8	8	7	8	3	5	4	4	4	4	3	4	5	5	6	7	9	10	11	12	6.2	12	
17-Mar	14	9	4	14	Z	6	5	8	8	9	12	10	10	12	14	22	23	23	17	20	16	14	5	2	12.1	23	
18-Mar	4	11	21	16	13	Z	16	9	12	14	8	6	6	4	4	8	11	9	7	7	9	6	9	21	10.1	21	
19-Mar	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	0.6	3	
20-Mar	5	Z	1	2	1	7	8	8	5	6	6	5	4	3	3	6	12	11	19	16	15	14	11	8	7.6	19	
21-Mar	6	8	Z	6	6	6	8	11	15	12	7	4	3	2	5	6	5	6	8	5	5	1	3	7	6.3	15	
22-Mar	12	14	10	Z	6	5	4	2	4	8	7	8	10	7	10	19	20	15	14	29	3	3	2	2	9.3	29	
23-Mar	7	6	6	3	Z	7	5	6	7	6	5	5	5	5	7	9	11	12	10	6	5	5	9	8	6.7	12	
24-Mar	8	10	4	6	2	Z	2	12	18	13	9	9	6	4	6	7	6	6	5	2	1	2	2	2	6.1	18	
25-Mar	Z	2	3	2	2	4	7	5	2	3	8	9	9	12	13	14	13	14	11	13	21	17	16	15	11	9.4	21
26-Mar	10	Z	4	3	3	4	5	4	5	3	12	13	20	13	11	11	8	15	10	5	5	5	4	4	7.6	20	
27-Mar	4	2	Z	2	1	3	5	7	10	14	13	10	17	19	11	10	14	14	17	18	18	20	20	13	11.3	20	
28-Mar	7	3	2	Z	1	1	2	11	23	17	8	4	3	5	5	5	7	10	6	5	4	3	2	1	5.9	23	
29-Mar	4	4	4	5	Z	5	3	5	10	7	8	6	8	7	7	7	12	12	9	9	5	2	2	3	6.2	12	
30-Mar	2	1	1	1	1	Z	8	17	15	20	12	15	10	9	11	11	8	7	8	7	5	4	3	3	7.7	20	
31-Mar	Z	6	10	20	15	15	12	9	8	9	12	6	5	3	2	3	2	18	5	11	20	29	17	30	11.5	30	
																								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
Fort McKay South - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	674	95.20	95.20
21 - 40	34	4.80	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
Fort McKay South - March 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	159	88	20	8	5	10	27	110	60	23	20	24	17	18	29	56	674
21 - 40	7	3	2	1	0	0	0	3	1	1	2	0	3	1	2	8	34
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	166	91	22	9	5	10	27	113	61	24	22	24	20	19	31	64	708

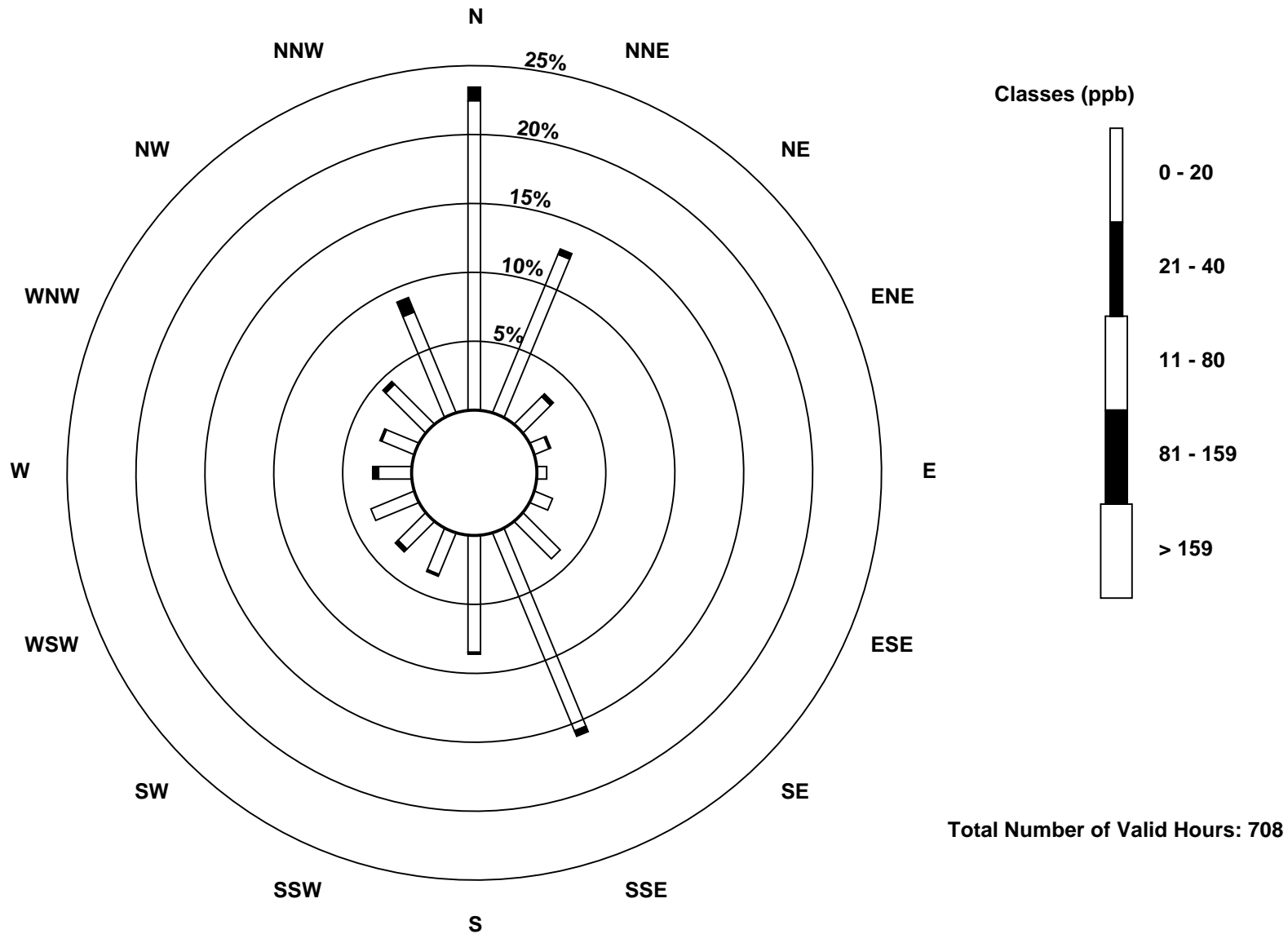
Total Number of Valid Hours: 708

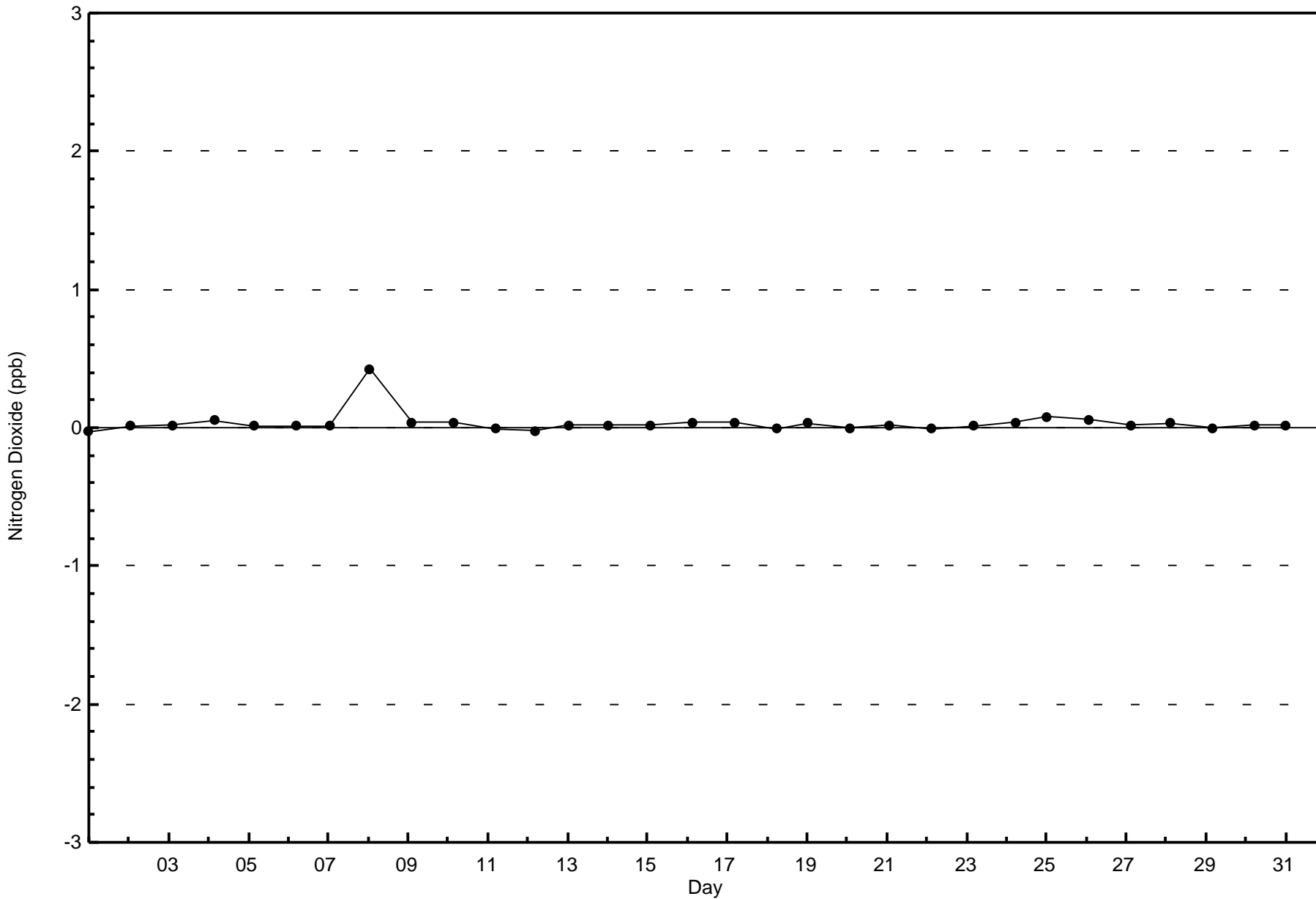
Total Number of Hours: 744

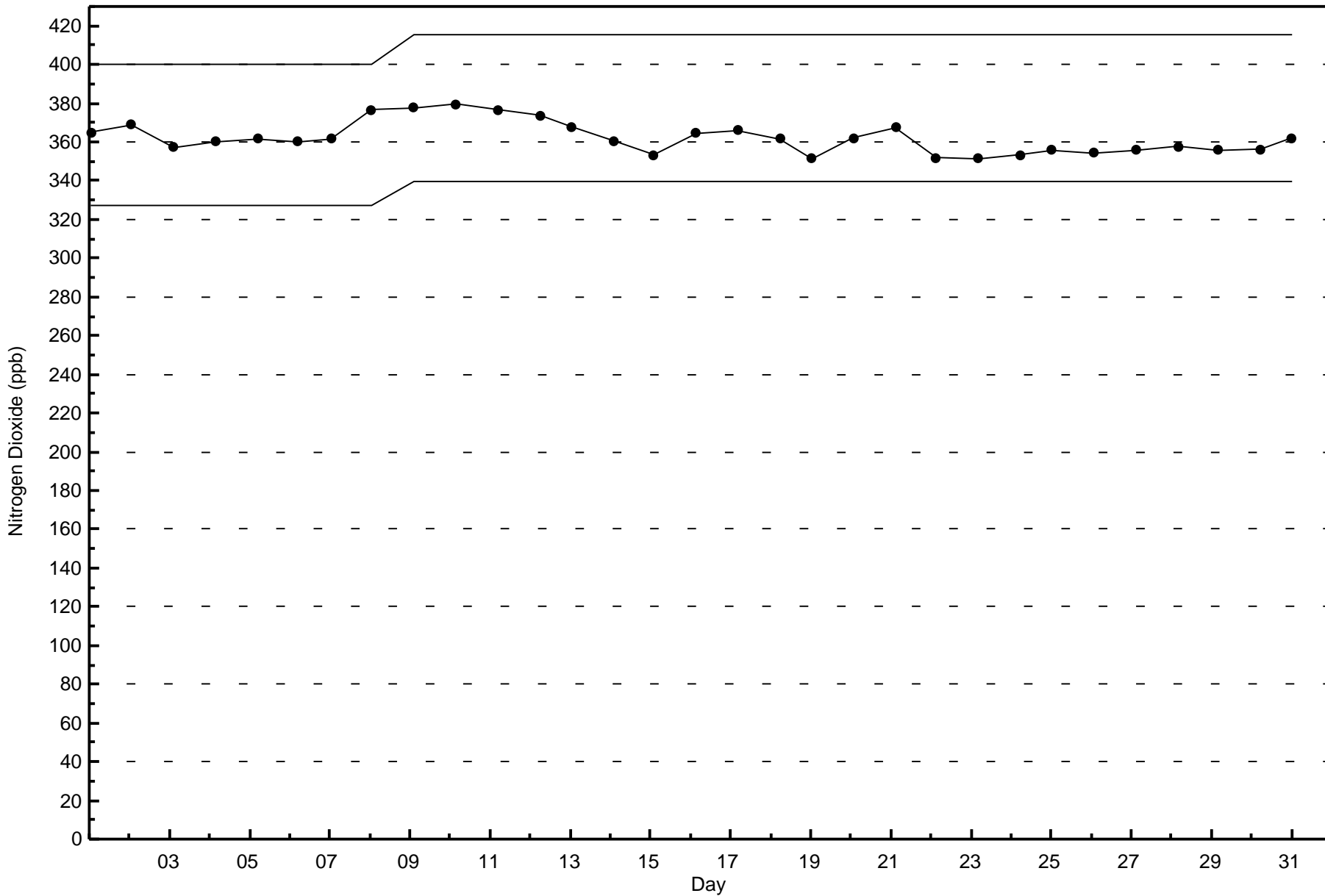


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South (AMS 13)









Wood Buffalo Environmental Association
Summary of Hour Averages

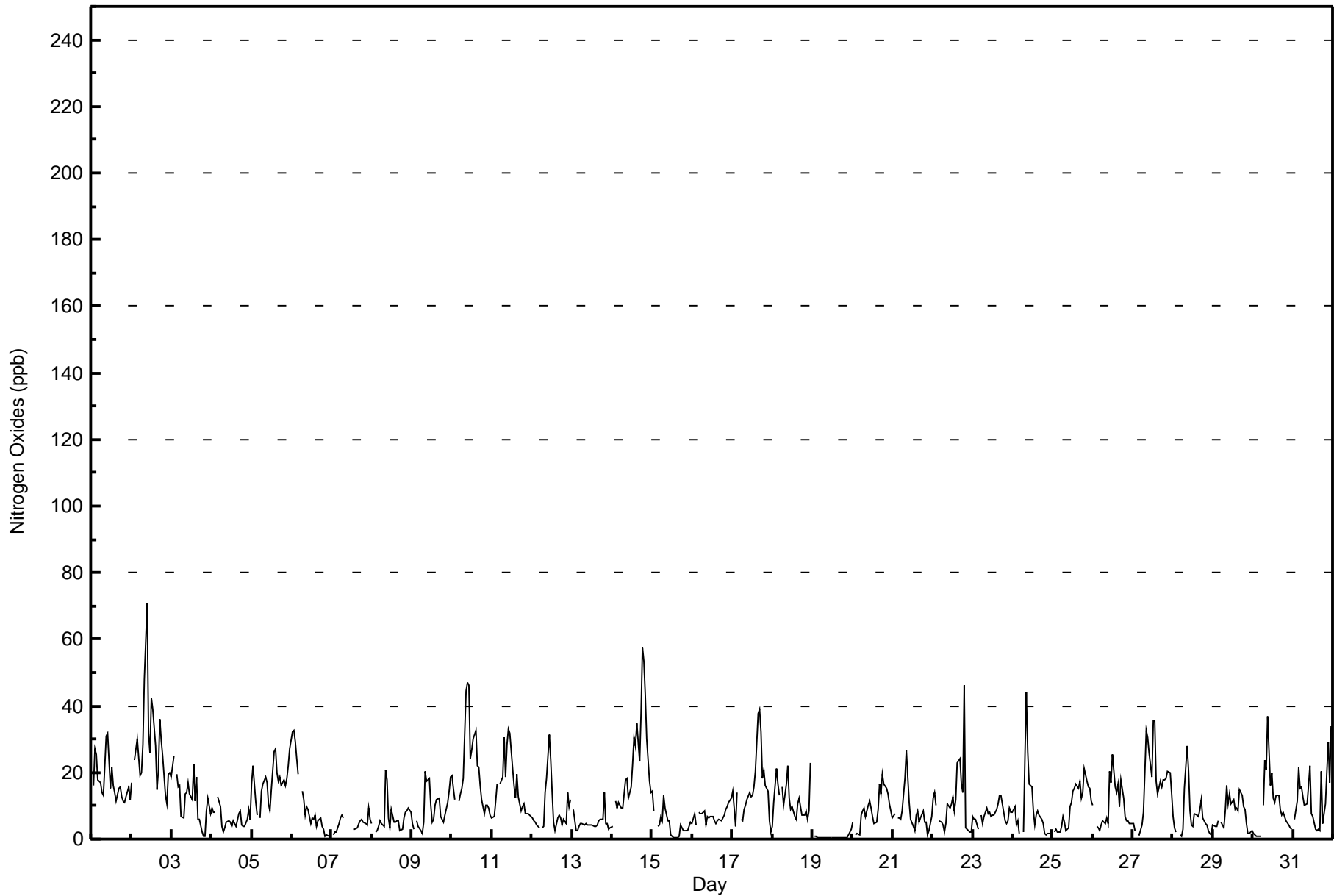
Nitrogen Oxides (NO_x) - ppb
Fort McKay South - March 2017

Maximum Value: 71 ppb on Mar 2 10:00		Maximum Daily Average: 27.7 ppb on Mar 2		Hours in Service: 744																																													
Minimum Value: 0 ppb on Mar 19 18:00		Minimum Daily Average: 0.6 ppb on Mar 19		Hours of Data: 708																																													
Maximum Diurnal Average: 18.0 ppb at hour 10		Minimum Diurnal Average: 7.6 ppb at hour 5		Hours of Missing Data: 36																																													
Monthly Average: 11.1 ppb		Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 5 Median = 8 Q ₃ = 16 P ₉₀ = 23 P ₉₉ = 46		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-Mar	Z	16	27	25	18	17	14	13	22	31	32	15	22	16	14	12	15	16	13	12	11	13	16	12	17.4	32																							
2-Mar	17	Z	24	30	25	19	20	28	48	71	32	26	42	39	28	15	21	36	30	25	13	11	20	20	27.7	71																							
3-Mar	19	25	Z	19	16	16	7	7	14	14	17	13	12	23	11	19	6	6	2	1	1	8	12	7	11.9	25																							
4-Mar	9	8	8	Z	13	10	4	2	3	5	6	5	4	5	5	4	7	8	4	4	4	6	9	6	6.0	13																							
5-Mar	16	22	11	7	Z	6	15	17	19	17	11	9	15	26	27	20	17	19	16	18	16	18	22	27	17.0	27																							
6-Mar	32	33	29	24	20	Z	14	12	7	10	9	5	6	6	7	4	6	6	4	3	1	1	1	1	10.5	33																							
7-Mar	Z	1	2	2	5	6	7	6	C	C	C	C	C	3	3	3	5	6	6	5	5	4	9	6	4.8	9																							
8-Mar	5	Z	2	2	4	6	5	4	21	18	6	3	9	5	5	6	6	3	3	6	8	9	9	8	6.6	21																							
9-Mar	5	3	Z	5	4	2	1	5	20	17	18	10	5	6	10	12	12	7	6	5	7	11	14	18	9.0	20																							
10-Mar	19	15	12	Z	11	14	15	18	45	47	46	24	27	30	33	22	22	16	12	8	10	10	9	7	20.5	47																							
11-Mar	6	7	11	16	Z	17	19	31	19	28	33	32	21	16	12	19	13	9	10	11	7	7	8	7	15.6	33																							
12-Mar	6	6	5	4	4	Z	3	4	14	18	31	24	14	5	2	6	7	6	4	6	5	14	10	12	9.1	31																							
13-Mar	Z	9	3	3	4	5	5	4	5	4	4	4	4	4	4	4	6	6	6	14	5	5	3	3	4.9	14																							
14-Mar	4	Z	11	10	11	9	9	13	18	18	12	15	23	30	28	35	23	38	58	53	43	30	17	14	22.8	58																							
15-Mar	14	8	Z	4	4	7	6	13	9	6	5	1	1	1	0	0	1	4	3	3	3	2	4	5	4.6	14																							
16-Mar	4	7	4	Z	8	8	8	9	4	7	7	7	7	5	5	5	6	5	6	7	9	10	11	12	7.0	12																							
17-Mar	14	9	4	14	Z	6	5	9	10	12	14	13	13	16	20	38	39	32	18	21	16	14	5	2	15.1	39																							
18-Mar	4	11	21	16	13	Z	16	10	16	22	12	9	10	7	6	11	13	10	7	7	9	6	9	23	11.7	23																							
19-Mar	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	0.6	3																							
20-Mar	5	Z	1	2	1	7	8	9	7	10	12	9	7	5	5	9	17	13	20	16	15	13	11	8	9.2	20																							
21-Mar	6	8	Z	6	6	6	8	18	27	19	11	6	4	3	7	8	5	6	8	5	5	1	3	7	8.0	27																							
22-Mar	12	14	10	Z	6	5	4	2	4	10	9	10	13	9	12	23	24	17	14	46	3	3	2	2	11.1	46																							
23-Mar	7	6	6	3	Z	7	5	7	9	8	8	7	7	7	9	11	13	13	10	6	5	5	9	8	7.6	13																							
24-Mar	8	10	4	5	2	Z	2	24	44	26	17	16	8	4	7	9	7	6	5	2	1	2	2	2	9.2	44																							
25-Mar	Z	2	3	2	2	4	7	5	2	3	10	11	15	15	17	15	17	12	14	21	17	16	15	11	10.3	21																							
26-Mar	10	Z	4	3	3	4	6	5	6	5	20	17	25	16	14	17	10	18	12	7	6	5	5	4	9.6	25																							
27-Mar	5	3	Z	2	1	4	8	20	32	30	26	19	36	36	17	14	17	16	18	18	18	20	20	14	17.1	36																							
28-Mar	7	3	2	Z	1	1	3	15	28	20	8	4	4	8	7	7	9	12	6	5	4	3	2	1	7.0	28																							
29-Mar	4	4	4	5	Z	5	3	8	16	10	14	10	12	9	9	8	15	13	10	9	5	2	2	2	7.9	16																							
30-Mar	2	1	1	1	1	Z	10	24	21	37	16	20	12	11	13	13	9	7	8	7	5	4	3	3	9.9	37																							
31-Mar	Z	6	11	22	15	16	13	10	11	16	22	8	7	3	2	3	2	20	5	11	20	29	17	34	13.2	34																							
																								9.6	9.2	8.5	9.0	7.6	8.0	8.1	11.4	16.7	18.0	15.6	11.8	12.8	11.8	11.0	11.9	11.9	12.5	10.9	11.6	8.9	9.2	9.0	9.4	Diurnal Average	
																								32	33	29	30	25	19	20	31	48	71	46	32	42	39	33	38	39	38	58	53	43	30	22	34	Diurnal Maximum	
Z - zerospan		C - Calibration																																															



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay South - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	620	87.57	87.57
21 - 40	77	10.88	98.45
41 - 80	11	1.55	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
Fort McKay South - March 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	143	80	18	8	2	9	23	100	60	17	16	24	17	18	29	56	620
21 - 40	21	10	3	0	2	1	4	12	1	7	6	0	2	1	1	6	77
11 - 80	2	1	1	1	1	0	0	1	0	0	0	0	1	0	1	2	11
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	166	91	22	9	5	10	27	113	61	24	22	24	20	19	31	64	708

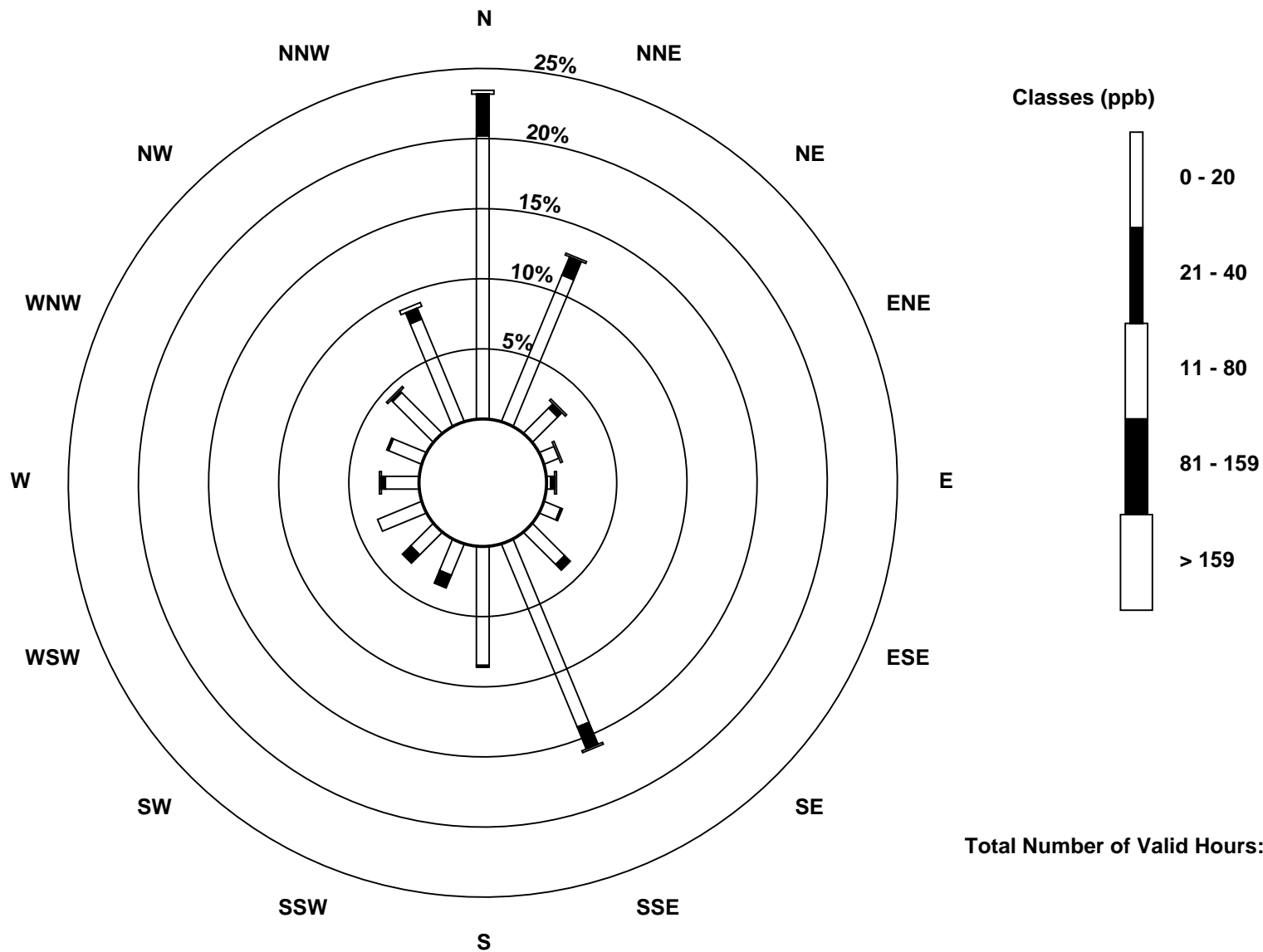
Total Number of Valid Hours: 708

Total Number of Hours: 744

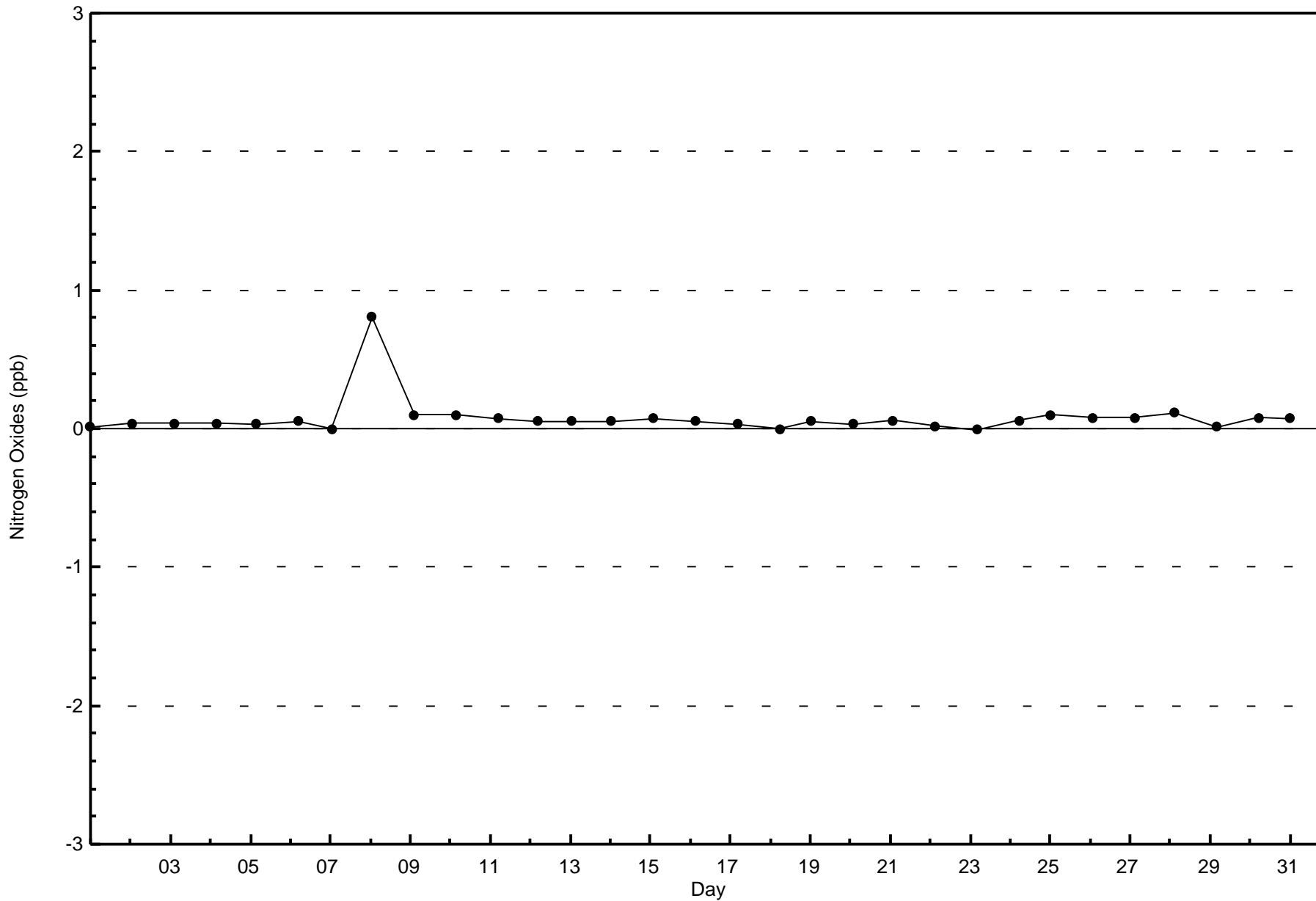


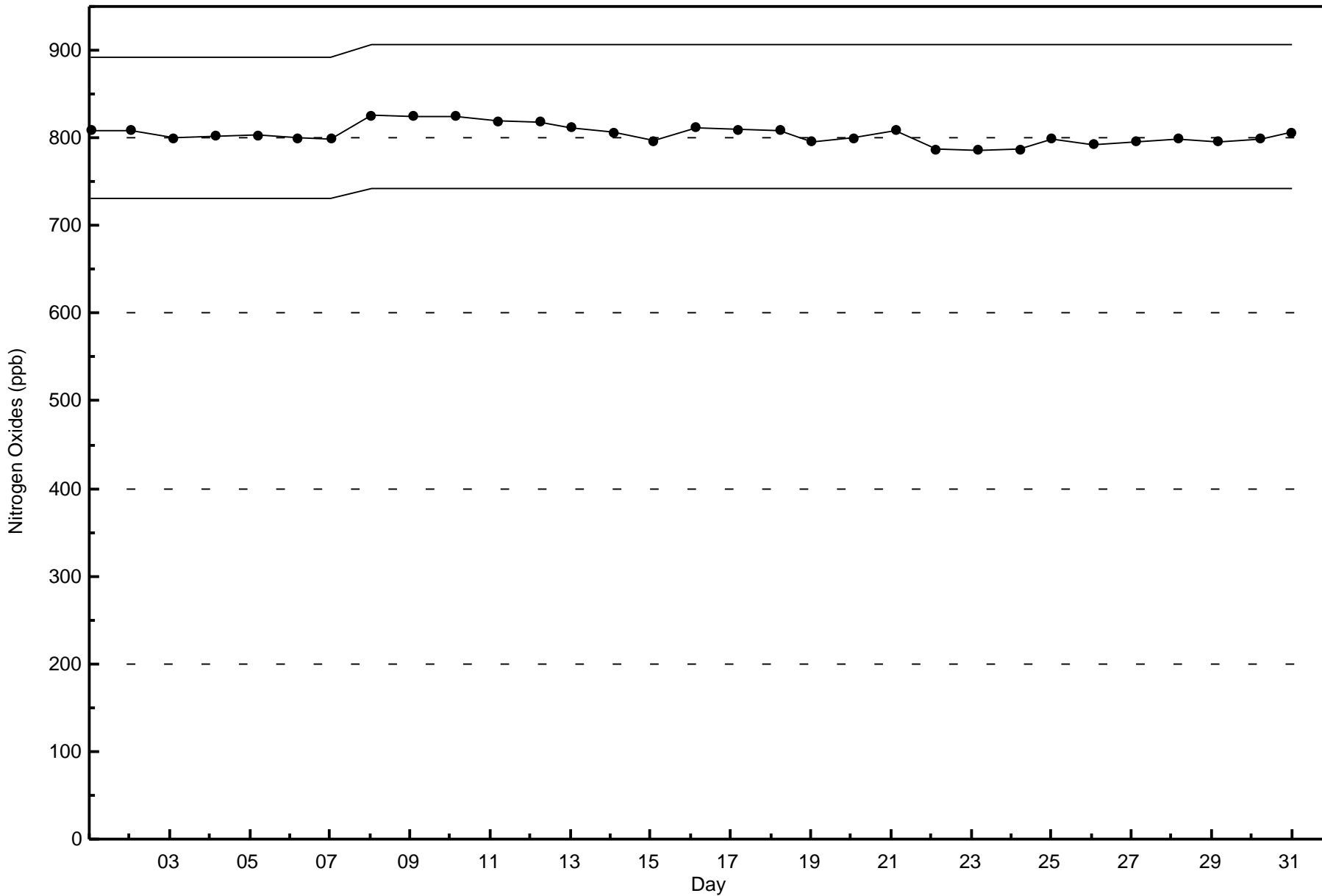
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Oxides (NO_x) - ppb
Fort McKay South (AMS 13)



Total Number of Valid Hours: 708







Wood Buffalo Environmental Association

Summary of Hour Averages

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

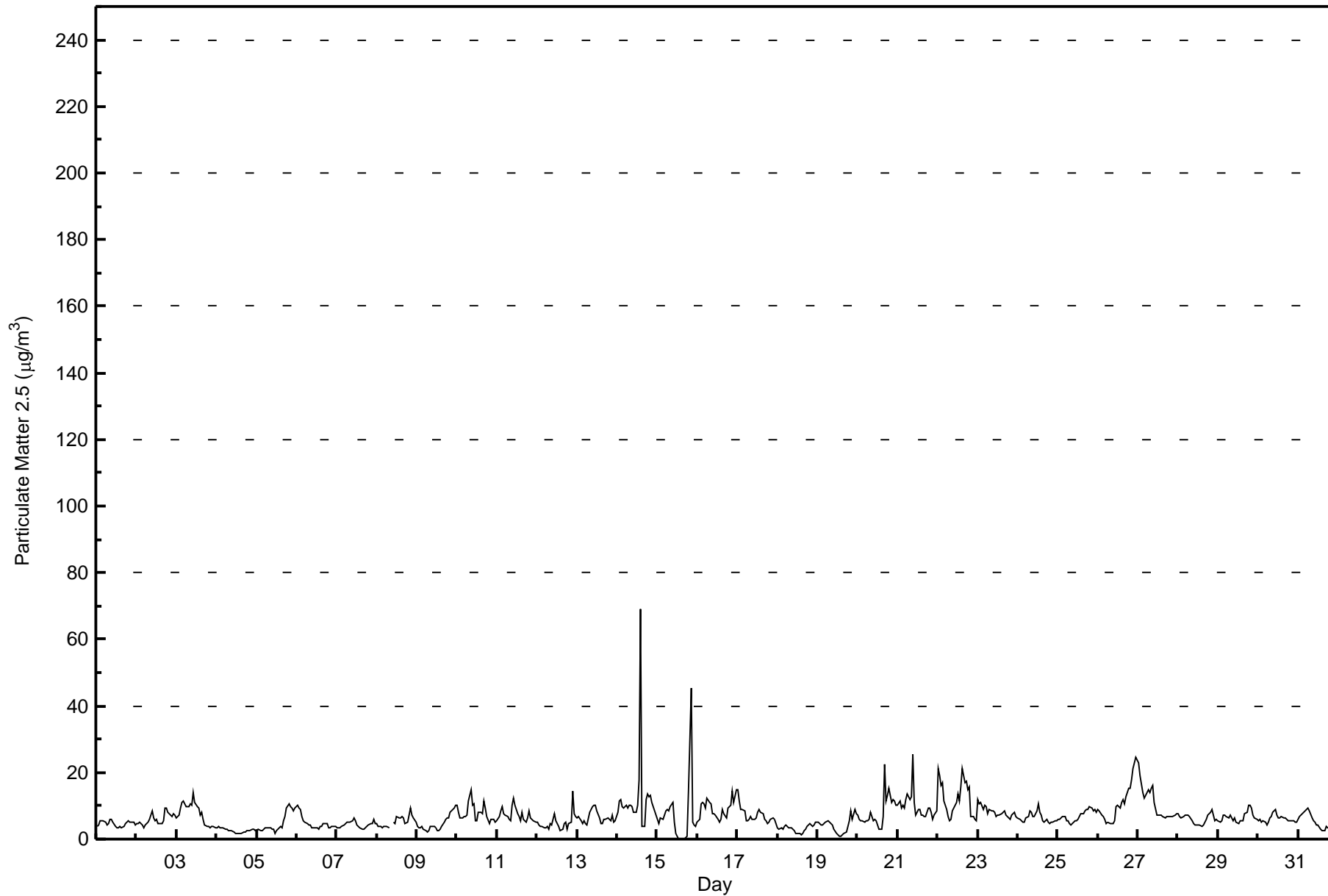
Fort McKay South - March 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 68.9 µg/m ³ on Mar 14 15:00 Minimum Value: 0.2 µg/m ³ on Mar 15 14:00 Maximum Diurnal Average: 8.5 µg/m ³ at hour 21 Monthly Average: 6.86 µg/m ³		Maximum Daily Average: 12.4 µg/m ³ on Mar 14 Minimum Daily Average: 2.6 µg/m ³ on Mar 4 Minimum Diurnal Average: 5.8 µg/m ³ at hour 14 Percentiles: P ₁ = 1.2 P ₁₀ = 3.2 Q ₁ = 4.4 Median = 6.0 Q ₃ = 8.4 P ₉₀ = 10.9 P ₉₉ = 22.0		Hours in Service: 744 Hours of Data: 740 Hours of Missing Data: 4 Hours of Calibration: 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-Mar	4.0	4.3	5.3	5.6	5.6	5.2	4.3	4.8	5.9	5.8	4.9	3.6	3.5	3.2	3.9	3.6	3.8	4.5	5.0	5.4	5.0	5.1	5.2	4.4	4.7	5.9
2-Mar	4.8	4.6	5.0	4.1	3.6	4.2	4.9	5.1	6.1	8.7	6.2	5.3	5.8	4.8	4.5	4.5	5.5	9.2	9.4	8.2	7.2	6.9	7.6	7.3	6.0	9.4
3-Mar	6.4	7.1	9.2	11.1	11.5	10.8	9.9	9.9	10.7	10.4	14.1	11.0	9.7	9.4	7.2	8.0	5.8	4.4	4.0	3.6	3.3	3.6	3.7	3.6	7.9	14.1
4-Mar	3.6	3.9	3.5	3.5	3.4	3.1	2.9	2.6	2.6	2.3	2.3	1.9	1.8	1.7	1.7	1.7	2.1	2.3	2.6	2.7	3.0	3.0	2.6	2.6	3.9	
5-Mar	2.7	2.8	2.7	2.7	3.0	3.5	3.5	3.2	3.2	3.1	3.1	1.9	2.6	3.6	3.8	3.5	5.5	6.7	9.3	10.4	9.7	9.1	8.6	9.4	4.9	10.4
6-Mar	10.0	9.5	9.0	7.0	5.5	5.2	4.5	4.1	4.2	3.6	3.3	3.2	3.3	2.9	4.0	3.7	4.5	4.8	4.5	3.5	3.3	3.6	3.6	3.6	4.8	10.0
7-Mar	3.4	3.2	3.6	3.7	4.3	4.7	5.0	5.2	5.3	5.6	6.4	5.4	4.4	3.6	3.3	2.9	3.1	3.6	4.0	4.4	4.8	4.6	5.8	4.7	4.4	6.4
8-Mar	4.6	3.9	3.9	3.5	3.6	3.8	3.8	3.5	C	C	5.0	4.5	6.8	6.2	6.5	6.8	6.4	4.8	5.0	7.2	9.3	7.1	6.2	5.2	5.3	9.3
9-Mar	3.9	3.4	3.5	3.7	3.1	2.5	2.2	2.7	3.7	3.7	4.0	3.5	2.6	2.3	3.1	3.9	5.1	6.0	6.3	6.3	8.2	8.7	9.2	10.1	4.7	10.1
10-Mar	10.2	8.0	6.4	6.3	6.9	7.0	7.2	11.6	14.8	10.0	10.7	5.3	5.4	7.9	8.1	7.5	11.6	9.1	6.9	4.8	5.8	5.9	5.9	5.0	7.8	14.8
11-Mar	5.5	6.8	8.6	9.8	7.5	7.2	6.6	6.1	5.7	10.2	12.4	10.0	7.6	6.8	5.6	7.9	6.0	5.0	6.3	8.5	6.4	5.8	5.5	5.1	7.2	12.4
12-Mar	4.9	4.4	3.9	3.7	3.5	3.5	3.9	3.1	4.6	4.4	7.6	5.7	4.8	3.9	2.6	3.1	4.6	4.9	3.1	4.5	5.1	14.6	7.5	6.8	5.0	14.6
13-Mar	6.5	6.7	5.7	4.8	5.5	4.6	4.3	7.9	9.1	9.7	10.1	10.1	8.6	6.4	4.8	4.7	5.8	5.9	6.4	6.0	5.4	7.0	4.9	5.5	6.5	10.1
14-Mar	7.8	11.3	12.0	9.9	9.4	10.0	9.4	10.2	10.1	9.9	8.2	8.1	10.2	17.7	68.9	3.8	3.6	11.7	13.7	12.8	13.1	11.1	8.3	7.3	12.4	68.9
15-Mar	6.0	4.8	6.2	5.9	7.0	8.4	9.0	8.6	9.8	10.9	4.9	1.9	0.6	0.2	UO	UO	0.2	0.6	0.8	14.4	45.4	5.1	4.2	3.8	7.2	45.4
16-Mar	4.9	6.1	10.7	10.9	10.5	9.2	12.2	10.9	10.4	7.6	7.5	7.0	6.1	5.1	6.0	8.8	7.5	6.2	9.3	9.7	10.4	14.6	11.2	14.7	9.1	14.7
17-Mar	14.7	11.6	8.8	8.8	8.4	5.6	5.4	6.1	6.6	5.8	6.1	6.5	8.2	8.9	8.1	7.5	6.1	5.4	4.5	5.3	6.0	6.5	5.7	4.7	7.1	14.7
18-Mar	3.5	2.8	3.2	3.0	4.0	4.2	3.8	3.4	3.4	2.8	2.6	1.9	1.7	1.8	1.4	1.7	2.4	3.0	4.0	4.5	4.2	3.9	4.1	5.2	3.2	5.2
19-Mar	4.9	4.8	4.3	4.2	4.7	5.0	5.4	5.3	4.5	4.1	2.8	1.6	1.2	0.9	1.0	1.2	1.8	2.2	3.6	5.7	8.3	5.8	8.7	7.8	4.2	8.7
20-Mar	7.1	5.9	5.4	5.5	5.0	5.7	5.3	6.1	7.9	5.5	6.0	5.4	4.3	2.8	3.0	6.9	22.3	11.4	13.3	15.2	10.9	11.9	11.6	10.1	8.1	22.3
21-Mar	10.4	11.3	9.4	10.1	9.2	11.9	13.4	12.0	12.5	25.5	11.2	7.3	8.8	8.9	7.1	7.0	6.9	6.8	9.3	9.3	8.2	5.8	7.3	8.7	9.9	25.5
22-Mar	21.1	18.9	15.9	16.9	11.5	9.0	6.9	5.3	6.1	8.4	10.1	11.1	13.5	11.4	15.7	21.3	16.8	17.2	14.9	15.7	6.9	6.8	6.1	5.6	12.2	21.3
23-Mar	12.1	10.6	11.2	8.9	10.1	9.9	7.5	8.7	8.3	8.6	8.1	6.9	7.1	7.4	7.6	8.0	8.4	7.4	6.8	6.1	7.1	7.6	8.1	7.0	8.3	12.1
24-Mar	6.1	5.9	5.5	5.1	5.0	6.2	6.6	8.5	8.1	6.6	6.6	8.6	10.5	8.2	7.2	5.4	5.1	5.8	5.1	4.7	4.9	5.0	5.5	5.7	6.3	10.5
25-Mar	5.8	5.9	6.4	6.7	6.6	5.6	5.5	4.8	4.4	4.9	5.5	5.6	6.1	6.6	7.5	7.6	8.5	9.0	8.8	9.6	9.2	8.6	8.7	8.1	6.9	9.6
26-Mar	8.8	8.6	7.4	6.6	5.8	4.9	5.0	4.8	4.6	4.6	5.6	9.7	10.0	9.4	10.9	11.9	10.7	12.8	15.2	15.2	17.9	21.2	22.9	24.7	10.8	24.7
27-Mar	22.7	19.1	16.6	14.1	12.4	14.1	14.7	14.0	15.3	16.1	11.0	7.0	7.4	7.4	7.2	6.9	6.5	6.7	7.0	6.8	7.0	7.0	7.3	7.6	10.9	22.7
28-Mar	7.5	6.9	6.5	6.9	7.1	7.0	7.1	7.0	5.6	4.9	4.1	4.2	4.1	4.4	3.7	4.0	5.0	6.0	7.0	7.9	9.1	7.3	5.6	5.8	6.0	9.1
29-Mar	5.6	5.1	5.5	7.3	7.3	6.7	6.4	7.2	6.4	5.7	6.5	5.2	4.9	5.5	5.5	5.7	7.5	8.3	10.0	10.1	9.1	7.1	6.5	5.8	6.7	10.1
30-Mar	5.6	5.7	5.1	5.3	5.0	4.4	5.2	6.2	6.7	8.1	9.1	7.4	6.5	6.4	6.8	6.6	6.3	6.0	5.7	5.5	5.5	5.4	5.1	5.2	6.0	9.1
31-Mar	6.0	6.9	7.7	8.2	8.6	9.1	9.3	8.3	6.4	5.4	4.9	4.3	4.4	3.1	2.5	2.4	2.4	4.0	3.3	3.8	4.4	4.1	3.7	3.8	5.3	9.3
																								Diurnal Average		
																								Diurnal Maximum		
7.5 7.1 7.0 6.9 6.6 6.5 6.5 6.7 7.1 7.4 6.8 5.8 5.9 5.8 7.6 6.0 6.4 6.5 6.9 7.7 8.5 7.4 7.0 6.9 22.7 19.1 16.6 16.9 12.4 14.1 14.7 14.0 15.3 25.5 14.1 11.1 13.5 17.7 68.9 21.3 22.3 17.2 15.2 15.7 45.4 21.2 22.9 24.7																										
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 - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	302	40.81	40.81
6 - 15	410	55.41	96.22
16 - 25	19	2.57	98.78
26 - 80	3	0.41	99.19
> 81.0	0	0.00	99.19

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 - March 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	70	47	10	2	2	5	9	36	13	10	8	13	11	16	19	31	302
6 - 15	105	46	12	6	4	5	17	72	52	13	13	8	9	3	11	34	410
16 - 25	0	1	0	0	0	0	1	5	1	1	3	3	2	0	1	1	19
26 - 80	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	3
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	175	94	22	8	6	10	27	115	66	24	24	25	22	19	31	66	734

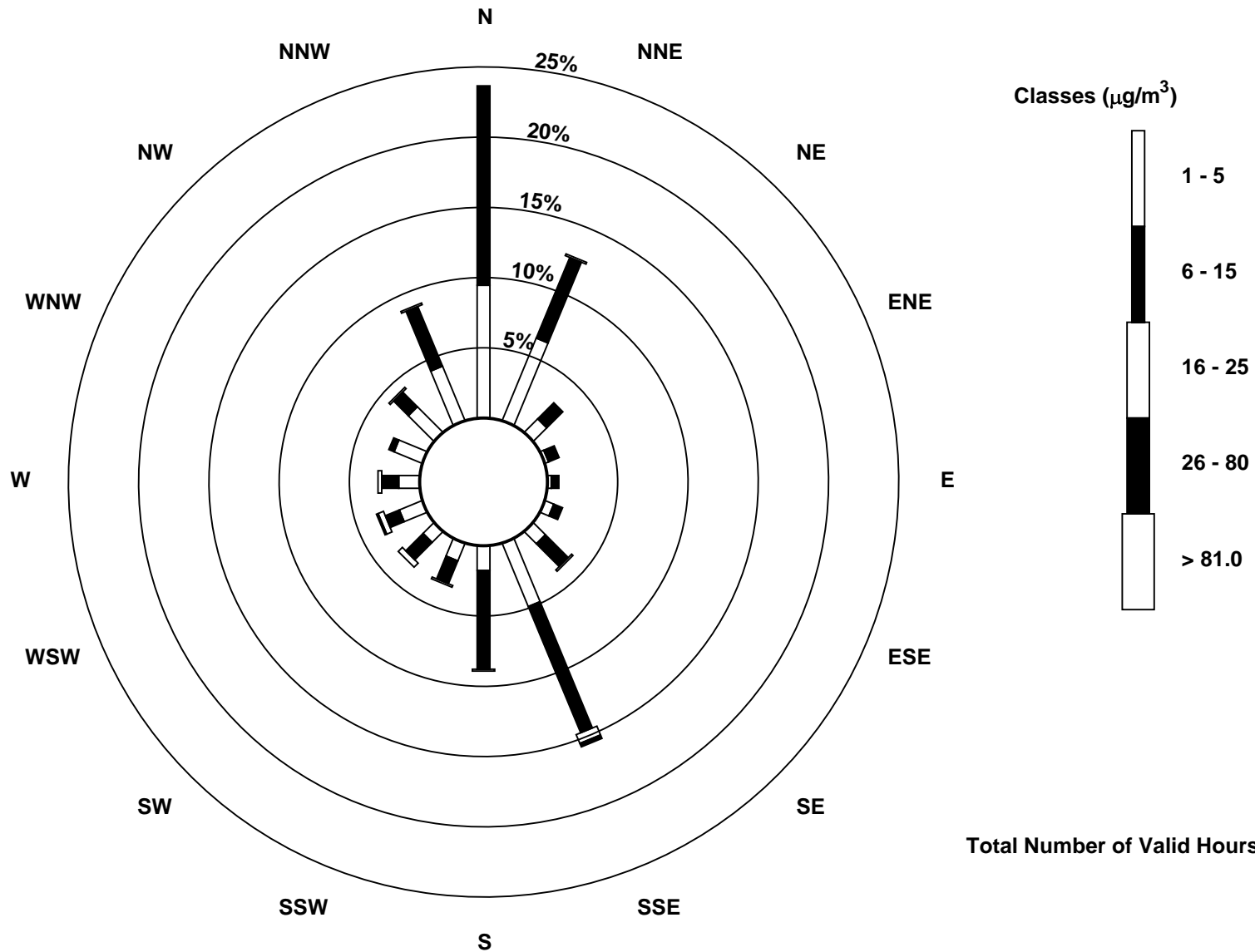
Total Number of Valid Hours: 740

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 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

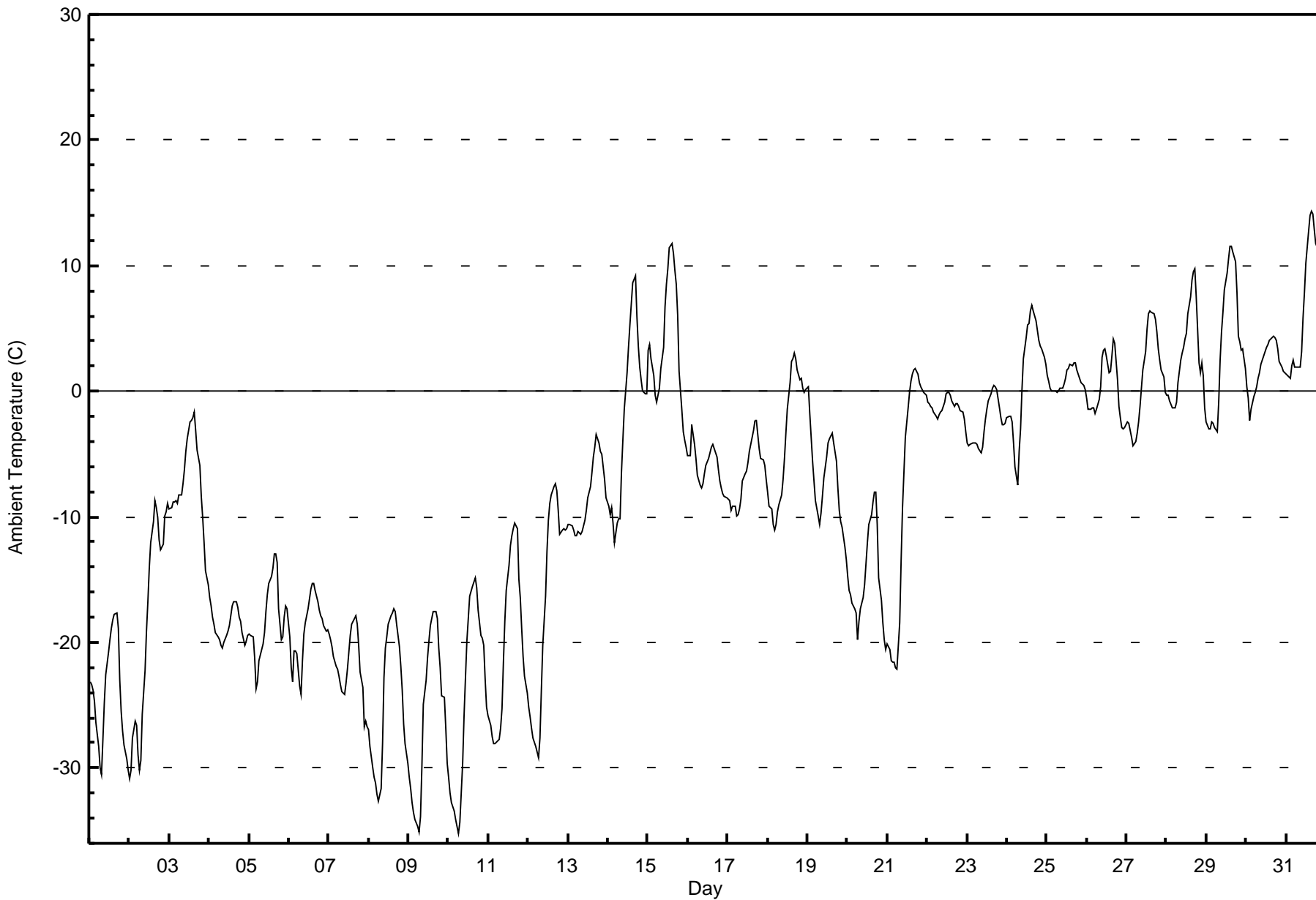
Ambient Temperature (AT) - C
Fort McKay South - March 2017

Maximum Value: 14.3 C on Mar 31 16:00 Minimum Value: -35.2 C on Mar 10 07:00 Maximum Diurnal Average: -3.4 C at hour 17 Monthly Average: -8.95 C		Maximum Daily Average: 7.2 C on Mar 31 Minimum Daily Average: -26.0 C on Mar 9 Minimum Diurnal Average: -14.1 C at hour 7 Percentiles: P ₁ = -33.9 P ₁₀ = -24.9 Q ₁ = -18.5 Median = -7.2 Q ₃ = 0.0 P ₉₀ = 3.5 P ₉₉ = 11.7		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 Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	-23.1	-23.4	-23.8	-24.6	-26.4	-28.3	-30.0	-30.5	-27.7	-24.8	-22.6	-20.7	-19.8	-18.9	-18.3	-17.7	-17.6	-18.9	-23.0	-25.4	-27.1	-28.2	-29.2	-30.1	-24.2	-17.6
2-Mar	-30.9	-30.2	-27.7	-26.3	-26.6	-28.9	-30.2	-29.4	-25.7	-22.3	-19.1	-16.7	-14.1	-12.1	-10.3	-8.7	-9.2	-10.0	-11.9	-12.6	-12.2	-10.0	-9.6	-9.0	-18.5	-8.7
3-Mar	-9.4	-9.3	-8.8	-8.8	-8.8	-8.9	-8.3	-8.2	-7.4	-6.2	-4.7	-3.8	-2.4	-2.3	-2.1	-1.6	-3.1	-4.7	-5.9	-8.4	-10.1	-12.1	-14.3	-15.4	-7.3	-1.6
4-Mar	-16.4	-17.1	-18.0	-18.6	-19.2	-19.6	-19.8	-20.3	-20.4	-20.1	-19.5	-19.1	-18.6	-17.9	-17.1	-16.8	-16.8	-17.2	-17.9	-18.3	-19.3	-20.2	-19.9	-19.4	-18.6	-16.4
5-Mar	-19.4	-19.4	-19.5	-21.3	-23.6	-23.1	-21.5	-21.0	-20.2	-19.3	-17.6	-16.2	-15.3	-14.7	-14.1	-13.0	-12.9	-13.6	-17.3	-19.8	-19.6	-17.9	-17.1	-17.4	-18.1	-12.9
6-Mar	-19.6	-22.1	-23.1	-20.7	-20.7	-20.9	-23.4	-24.1	-21.4	-19.3	-18.4	-17.3	-16.6	-15.8	-15.3	-15.4	-15.9	-16.7	-17.4	-17.8	-18.1	-18.7	-19.1	-19.0	-19.0	-15.3
7-Mar	-19.3	-19.7	-20.3	-21.1	-21.9	-22.1	-22.6	-23.4	-23.9	-24.1	-23.3	-22.1	-20.8	-19.4	-18.5	-18.1	-17.8	-18.5	-20.2	-22.4	-23.5	-26.7	-26.2	-26.7	-21.8	-17.8
8-Mar	-26.9	-28.3	-30.0	-30.8	-31.1	-32.1	-32.6	-31.7	-28.1	-22.8	-20.5	-19.6	-18.5	-17.8	-17.6	-17.4	-17.5	-18.5	-20.4	-21.9	-23.8	-26.5	-28.0	-29.6	-24.7	-17.4
9-Mar	-30.8	-31.7	-32.8	-33.5	-34.1	-34.7	-35.1	-33.9	-29.9	-25.0	-23.1	-21.3	-19.9	-18.7	-18.1	-17.5	-17.5	-18.1	-20.4	-22.0	-24.3	-24.3	-26.9	-29.7	-26.0	-17.5
10-Mar	-30.8	-31.9	-32.7	-33.5	-34.1	-34.6	-35.2	-34.3	-29.7	-25.8	-22.8	-19.9	-18.1	-16.3	-15.6	-15.2	-14.8	-15.7	-17.4	-19.4	-19.6	-20.2	-22.9	-25.1	-24.4	-14.8
11-Mar	-25.8	-26.7	-27.5	-28.1	-28.0	-28.0	-27.7	-26.8	-25.2	-21.5	-18.3	-15.9	-13.8	-12.3	-11.4	-11.0	-10.5	-10.9	-15.0	-16.4	-18.8	-21.2	-22.7	-24.0	-20.3	-10.5
12-Mar	-25.2	-25.9	-26.8	-27.6	-28.2	-28.7	-29.1	-27.6	-23.8	-20.2	-16.3	-12.7	-10.3	-8.9	-8.2	-7.6	-7.4	-7.9	-9.5	-11.4	-11.1	-11.0	-11.0	-11.0	-17.0	-7.4
13-Mar	-10.6	-10.6	-10.7	-11.1	-11.5	-11.5	-11.2	-11.4	-11.2	-10.8	-10.2	-9.5	-8.5	-7.6	-6.4	-5.3	-4.4	-3.4	-4.1	-4.8	-5.0	-6.0	-7.0	-8.5	-8.4	-3.4
14-Mar	-9.1	-9.9	-9.3	-10.4	-12.1	-10.5	-10.2	-10.1	-6.5	-3.9	-1.4	1.4	3.5	5.2	7.0	8.6	9.2	6.0	3.6	1.9	1.0	0.0	-0.2	-0.2	-1.9	9.2
15-Mar	3.2	3.7	2.6	1.3	-0.3	-0.9	-0.3	0.2	1.8	3.5	6.8	8.5	9.8	11.4	11.8	11.0	9.7	8.5	6.1	1.6	-1.5	-3.2	-3.8	-4.4	3.6	11.8
16-Mar	-5.2	-5.1	-2.6	-3.5	-4.2	-5.3	-6.7	-7.5	-7.6	-7.3	-6.5	-5.9	-5.4	-4.9	-4.5	-4.3	-4.6	-5.2	-6.3	-7.1	-7.7	-8.1	-8.4	-8.5	-5.9	-2.6
17-Mar	-8.6	-8.7	-9.5	-9.1	-9.2	-9.9	-9.9	-9.4	-8.6	-7.1	-6.6	-6.4	-5.6	-4.8	-4.2	-3.1	-2.4	-2.3	-3.4	-4.5	-5.3	-5.5	-5.9	-7.0	-6.5	-2.3
18-Mar	-8.0	-9.1	-9.3	-10.6	-11.0	-10.6	-9.6	-9.1	-8.3	-7.0	-5.4	-3.3	-1.4	0.7	2.4	2.6	3.0	2.6	1.7	0.9	1.0	0.2	-0.1	0.1	-3.6	3.0
19-Mar	0.4	-1.7	-3.7	-5.6	-7.1	-8.7	-10.0	-10.6	-9.7	-8.4	-6.9	-5.2	-4.1	-3.8	-3.6	-3.3	-4.1	-5.6	-7.7	-9.4	-10.4	-10.9	-12.4	-13.5	-6.9	0.4
20-Mar	-14.7	-15.8	-16.3	-16.8	-17.3	-17.7	-19.8	-18.4	-17.3	-16.4	-15.4	-13.8	-12.0	-10.7	-9.8	-8.8	-8.1	-8.0	-10.6	-14.8	-16.6	-18.4	-19.7	-20.6	-14.9	-8.0
21-Mar	-20.2	-20.6	-21.4	-21.5	-21.5	-22.0	-22.1	-18.5	-13.6	-9.2	-6.5	-3.7	-1.3	-0.1	0.8	1.4	1.7	1.8	1.4	0.7	0.4	0.1	-0.1	-0.3	-8.1	1.8
22-Mar	-0.8	-1.0	-1.2	-1.4	-1.7	-2.0	-2.2	-1.9	-1.7	-1.5	-0.9	-0.2	-0.1	-0.1	-0.3	-0.7	-1.2	-1.0	-1.0	-1.3	-1.5	-1.6	-2.2	-3.2	-1.3	-0.1
23-Mar	-4.1	-4.4	-4.2	-4.1	-4.1	-4.1	-4.2	-4.6	-4.9	-4.4	-3.2	-2.2	-1.4	-0.8	-0.2	0.2	0.4	0.4	0.2	-1.3	-2.1	-2.7	-2.7	-2.6	-2.5	0.4
24-Mar	-2.1	-2.0	-2.0	-2.4	-4.1	-6.0	-7.5	-4.8	-3.0	0.1	2.6	4.3	5.3	5.4	6.4	6.9	6.4	5.7	4.8	4.1	3.6	3.4	2.7	2.2	1.2	6.9
25-Mar	1.3	0.8	0.2	0.0	0.0	0.0	-0.1	0.0	0.2	0.3	0.6	1.0	1.6	1.9	2.2	2.0	2.2	2.2	1.8	1.3	0.7	0.6	0.5	0.2	0.9	2.2
26-Mar	-0.6	-1.4	-1.4	-1.3	-1.3	-1.8	-1.4	-0.6	0.4	2.7	3.3	3.4	2.8	1.5	1.6	2.8	4.1	3.8	0.9	-1.2	-2.0	-2.9	-3.0	-2.8	0.2	4.1
27-Mar	-2.4	-2.5	-3.1	-3.7	-4.4	-4.0	-3.4	-2.4	-1.2	0.3	1.7	3.1	4.9	6.1	6.4	6.3	6.2	5.8	4.7	3.4	2.5	1.7	1.1	-0.1	1.1	6.4
28-Mar	-0.3	-0.3	-0.8	-1.3	-1.3	-1.3	-0.9	0.7	2.4	3.1	3.5	4.1	4.6	6.1	7.5	8.8	9.5	9.7	7.5	2.2	1.5	2.2	1.2	-1.3	2.8	9.7
29-Mar	-2.4	-3.0	-3.0	-2.4	-2.5	-2.9	-3.2	-0.9	2.4	4.8	6.3	8.0	9.4	10.6	11.6	11.5	11.1	10.3	7.9	4.4	3.9	3.3	3.4	1.8	3.8	11.6
30-Mar	0.4	-0.6	-2.3	-1.4	-0.4	-0.1	0.3	1.0	1.4	2.1	2.8	3.2	3.5	3.7	4.0	4.3	4.3	4.3	4.0	3.3	2.3	1.9	1.6	1.5	1.9	4.3
31-Mar	1.4	1.3	1.0	2.1	2.5	1.9	1.9	1.9	1.9	3.2	5.9	7.9	10.2	12.8	14.0	14.3	14.1	12.9	11.7	11.2	9.9	9.5	9.0	9.8	7.2	14.3
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Fort McKay South - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Fort McKay South - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	143	19.22	19.22
-20 - 0	413	55.51	74.73
0 - 10	172	23.12	97.85
10 - 20	16	2.15	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

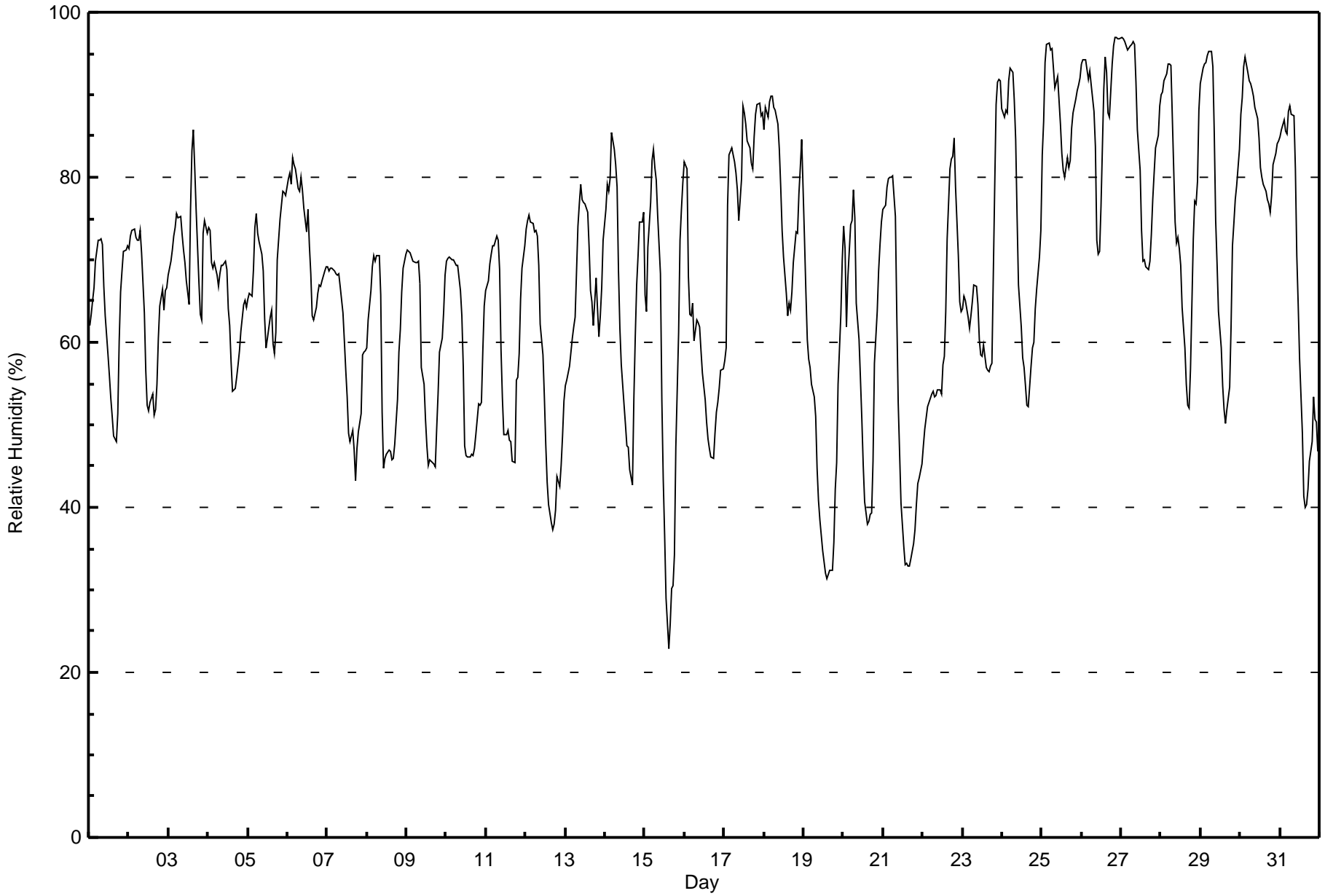


Wood Buffalo Environmental Association

Summary of Hour Averages

**Relative Humidity (RH) - %
Fort McKay South - March 2017**

Maximum Value: 97 % on Mar 27 01:00																			Maximum Daily Average: 89.3 % on Mar 26						Hours in Service: 744																				
Minimum Value: 23 % on Mar 15 15:00																			Minimum Daily Average: 47.4 % on Mar 19						Hours of Data: 744																				
Maximum Diurnal Average: 77.6 % at hour 6																			Minimum Diurnal Average: 55.1 % at hour 17						Hours of Missing Data: 0																				
Monthly Average: 67.5 %																			Percentiles: P ₁ = 32 P ₁₀ = 46 Q ₁ = 57 Median = 69 Q ₃ = 79 P ₉₀ = 89 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-Mar	62	63	65	67	70	72	72	73	72	67	63	58	56	53	51	49	48	51	60	66	69	71	71	72	63.4	73																			
2-Mar	71	73	74	74	73	72	72	74	71	64	57	52	52	53	54	51	52	55	60	64	66	64	66	67	63.8	74																			
3-Mar	68	70	71	73	74	76	75	75	73	71	70	67	65	76	83	86	81	76	67	63	63	73	75	73	72.7	86																			
4-Mar	74	74	70	69	70	68	67	68	69	69	70	69	64	62	58	54	54	56	57	59	61	65	65	64	64.8	74																			
5-Mar	65	66	66	69	74	76	73	72	71	69	63	59	61	63	64	60	59	61	70	75	77	78	78	78	68.5	78																			
6-Mar	80	80	79	82	81	81	79	78	80	78	76	73	76	72	68	63	63	64	66	67	67	67	69	69	73.4	82																			
7-Mar	69	69	69	69	69	68	68	68	67	64	60	57	53	49	48	49	47	43	47	49	51	58	59	59	58.7	69																			
8-Mar	59	63	66	69	71	70	70	71	66	52	45	46	46	47	47	46	46	48	53	59	62	66	69	71	58.6	71																			
9-Mar	71	71	71	70	70	70	70	70	67	57	55	51	48	45	46	46	45	45	49	54	59	61	64	68	59.2	71																			
10-Mar	70	70	70	70	70	70	69	69	66	63	57	47	46	46	46	46	46	47	49	53	52	53	59	64	58.4	70																			
11-Mar	66	68	69	71	72	72	73	72	69	59	53	49	49	49	48	48	46	45	55	56	59	65	69	72	60.6	73																			
12-Mar	74	75	75	75	74	73	74	73	69	62	59	53	48	43	40	38	37	38	40	44	43	45	49	53	56.4	75																			
13-Mar	55	55	57	59	60	62	63	74	77	79	77	77	77	76	72	66	65	62	68	64	61	63	67	72	67.0	79																			
14-Mar	76	79	78	80	85	83	82	79	69	62	57	52	50	47	47	45	43	53	61	67	71	75	75	76	66.3	85																			
15-Mar	66	64	71	77	82	83	81	80	75	68	53	43	37	29	23	26	30	31	34	47	61	72	76	79	57.9	83																			
16-Mar	82	81	68	63	63	65	60	63	62	62	59	56	53	50	48	47	46	46	49	52	53	54	57	57	58.2	82																			
17-Mar	58	59	77	83	84	83	82	80	78	75	80	89	88	86	84	84	82	81	85	88	89	89	88	88	81.6	89																			
18-Mar	86	89	87	89	90	90	89	88	86	83	79	74	70	66	63	65	64	66	70	73	73	78	81	85	78.5	90																			
19-Mar	73	66	60	58	57	55	53	51	45	41	38	35	33	32	31	32	32	32	36	42	45	55	63	70	47.4	73																			
20-Mar	74	71	62	68	74	75	78	75	65	60	56	51	45	41	38	38	39	39	46	57	64	69	72	75	59.6	78																			
21-Mar	76	77	79	80	80	80	80	75	63	53	47	40	35	33	33	33	33	34	36	37	40	43	44	45	53.1	80																			
22-Mar	47	50	51	52	53	54	54	53	54	54	54	54	54	57	58	64	73	81	82	83	85	79	70	65	64	62.1	85																		
23-Mar	64	66	65	63	62	63	65	67	67	65	60	58	58	60	57	57	56	57	57	57	79	89	92	92	92	67.1	92																		
24-Mar	88	87	88	88	92	93	93	89	85	75	67	62	58	57	55	52	52	57	59	60	64	66	70	74	72.2	93																			
25-Mar	83	87	94	96	96	95	96	93	91	92	89	86	83	81	80	82	81	82	86	88	90	91	91	92	88.5	96																			
26-Mar	94	94	94	93	92	93	91	88	84	72	71	71	76	91	95	93	88	87	94	96	97	97	97	97	89.3	97																			
27-Mar	97	97	96	96	95	96	96	96	96	92	86	81	74	70	70	69	69	70	73	77	80	84	85	89	84.7	97																			
28-Mar	90	90	92	93	94	94	94	87	75	72	73	71	69	64	59	55	52	52	57	72	77	77	80	88	76.1	94																			
29-Mar	91	93	94	94	95	95	95	93	85	75	70	64	59	55	52	50	52	55	62	72	74	77	79	83	75.6	95																			
30-Mar	88	90	93	95	93	92	91	91	90	88	87	85	81	80	79	78	77	77	76	78	81	83	84	84	85.0	95																			
31-Mar	85	86	87	86	85	88	89	88	87	81	71	65	58	49	41	40	40	42	46	48	53	51	50	47	65.1	89																			
																			74.3	74.9	75.5	76.4	77.4	77.6	77.2	76.6	73.3	68.5	64.5	61.2	58.9	57.5	56.3	55.5	55.1	56.0	59.7	64.2	66.7	69.4	71.2	73.1	Diurnal Average		
																			97	97	96	96	96	96	96	96	96	92	89	89	88	91	95	93	88	87	94	96	97	97	97	97	97	Diurnal Maximum	





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Fort McKay South - March 2017

Maximum Speed: 24 km/h on Mar 13 12:00	Maximum Daily Speed Average: 17.1 km/h on Mar 13	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 8 08:00	Minimum Daily Speed Average: 0.9 km/h on Mar 26	Hours of Data: 744
Maximum Diurnal Speed Average: 3.2 km/h at hour 17	Minimum Diurnal Speed Average: 1.2 km/h at hour 2	Hours of Missing Data: 0
Monthly Average Velocity: 1.6 km/h 26.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 7 Q ₃ = 12 P ₉₀ = 17 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-Mar	NNW7	N8	NNW7	NNE4	N5	N5	NNW3	NNW2	NNE4	NNE9	NNE11	N12	N13	N10	NNE9	N10	NNE8	N6	NNW4	NW3	WSW3	W1	WSW2	WSW2	N5.6	N13
2-Mar	WSW2	SW1	SSW1	NNW1	SW1	SW3	WSW2	SW2	W0	ENE2	SE6	SSE7	SSE7	SSE10	SSE9	SSE8	NNE5	NE3	NNE4	NE2	SSE8	SSE11	SSE10	SSE14	SSE3.5	SSE14
3-Mar	SSE11	SSE11	S10	S8	S9	S8	S10	S11	SSW9	S15	S12	SSE10	S9	SSW6	S6	W4	NNW15	NW10	NNW14	NNW15	NNW15	N14	N14	N12	SSW1.8	S15
4-Mar	N11	NNE14	N11	N8	N8	N14	NNE18	N18	N16	NNE19	N18	NNE16	N17	N16	N16	NNE16	N14	NNE9	NNE6	NNE6	NNE3	N4	N6	N7	N12.1	NNE19
5-Mar	N8	NW5	NNW6	NNW4	NNW4	N4	N3	NNW3	N5	N5	NNW2	SSE4	SSE3	SSW4	SW5	SW3	SSE2	NNE3	NNW2	SW3	SW3	SW2	W1	N4	NW1.5	N8
6-Mar	NNW5	NNW1	WNW2	NNW8	N7	NNW6	N3	NNW3	N7	N12	N16	NNE16	NNE14	NNE15	NNE16	NNE18	NNE18	NNE18	N20	N17	N22	N20	N17	N18	N12.2	N22
7-Mar	N21	N20	N15	N18	NNE19	N18	N19	N18	N15	N18	NNE16	NNE18	NNE18	NNE19	N17	NNE17	NNE17	NNE13	NE7	N5	NNE5	NW3	NNW6	NNW5	N14.2	N21
8-Mar	NW6	NW3	NW2	WNW3	WSW1	SW2	WSW1	W0	SE1	ENE3	NE6	NNE11	NNE12	NNE11	NNE12	NNE12	NE12	NNE12	NNE8	N7	NNW6	NNW4	NW5	NNW1	NNE4.9	NNE12
9-Mar	W1	WSW1	W1	SW2	W2	WSW1	S1	NNW1	NE2	ESE2	NNE5	NE5	ENE4	NE4	NE6	NNE7	NNE9	NNE8	N6	N7	N5	N6	N4	W2	NNE2.8	NNE9
10-Mar	SW1	NNW1	NNW1	SW1	NW1	SW1	SW1	SSW1	E2	NNE4	N5	N5	N7	N7	N10	N10	N12	N10	N7	NNW7	NNW9	N8	N4	NNW3	N4.4	N12
11-Mar	N4	NNW2	NNW1	NW1	NNW2	NNW1	NNW2	N1	NNE2	NE2	E3	SSE6	SSE4	NNE5	NE8	N8	NNE5	ENE3	NNW4	NNW6	NNW5	NNW3	NNW3	NW2	N2.3	N8
12-Mar	W2	NNW2	NW1	W1	WNW2	W2	NNW1	NNW1	NE1	NNE3	SSE4	SSE11	SE15	SSE16	SSE16	SSE16	SSE17	SSE14	SE9	SSE8	SSE12	SSE17	S15	SSE12	SSE7.1	SSE17
13-Mar	SSE15	SSE19	SSE18	SSE16	SSE17	SSE17	SSE19	SSE18	SSE19	SSE20	SSE24	SSE24	SSE24	SSE23	SSE21	SSE21	SSE16	S17	S11	S13	S12	S12	S9	S6	SSE17.1	SSE24
14-Mar	S6	S7	S9	S7	S5	S8	SSW8	S6	S11	SSE11	S14	SSE11	SE8	SSE10	SSE10	SSE8	E1	N9	NNW8	NNW7	N5	NNW4	NW2	S4	S4.4	S14
15-Mar	SSE10	SSE9	S12	S10	S9	S9	S10	SSE8	S13	S12	SSW12	SSW10	SW12	SW14	W11	NW13	NNW15	NNW11	NNW8	NNW4	WSW1	WSW4	WSW3	WNW1	SSW4.8	NNW15
16-Mar	NNW2	N6	N18	N15	N16	N18	N20	NNE17	NNE19	NNE21	NNE19	N20	NNE20	NNE20	NNE19	NNE19	NNE17	NNE16	N14	N12	N14	N13	N14	N12	N15.8	NNE21
17-Mar	N11	NNE10	NNE10	N7	N7	NNW8	NNW6	N3	NE3	NE2	NNE3	NNE5	NNE7	NNE7	N9	N11	N12	N12	N11	N9	N9	N11	N12	N9	N7.9	N12
18-Mar	N8	N6	N7	N5	N5	N6	N8	N11	NNE9	NNE10	NNE9	NNE7	NNE10	NNE9	N10	NNE9	N5	NNE6	N6	NW4	NNW4	NW2	W2	W5	N6.3	N11
19-Mar	NW19	NNW15	NW18	NNW16	NNW14	NNW12	NNW11	NNW11	NNW13	NNW14	NNW14	W14	NNW13	NW16	NW15	NNW16	NW19	NW20	NW18	NNW17	NW13	NW14	N16	N10	NW14.1	NW20
20-Mar	N15	N12	N14	N11	N8	N5	NNW3	ENE2	NE7	NE7	NE8	NE5	SE8	ESE7	ESE8	ESE10	SE9	SSE9	SSE5	NW3	NW2	WSW3	WSW2	NNW1	NE3.4	N15
21-Mar	N3	N2	WSW0	N2	NNW2	WSW2	WSW1	ENE1	ESE4	SSE12	SSE13	SSE17	SSE17	SSE16	SSE17	SE19	SSE19	SE15	SE14	SSE17	SSE18	SSE16	SSE15	SSE14	SSE9.6	SE19
22-Mar	SSE12	SSE12	SSE11	SSE11	SE9	SE7	ESE5	SE6	SSE10	SSE9	SSE10	S7	S7	SSE5	S7	SSW6	SW7	SW5	SSE2	NW2	N13	N10	N18	N15	SE3.5	N18
23-Mar	NNE11	N10	N10	N9	N10	N11	N12	NNE13	N13	NNE11	N12	N12	N11	N12	N9	N8	N8	N7	NW5	NNW5	N6	N6	N5	NNE3	N9.0	N13
24-Mar	SSE4	S5	S5	S5	SSW5	SW3	WSW4	SW3	NE3	SE1	SSE8	SSE9	SSE12	SSE13	SSE13	SSE13	SSE12	SSE12	SE7	E4	SSE8	SSE14	SSE12	SSE6	SSE6.9	SSE16
25-Mar	E3	SE2	NE2	N4	N5	NNE4	NNE3	NE3	ESE4	ESE3	SE6	SSE7	SE6	SSE4	N1	ENE3	SE3	ENE2	NNE5	NNE4	NNW3	N4	NNW2	NNW2	ENE1.7	SSE7
26-Mar	NNE3	SE2	NE2	N1	NNE3	NNW4	NNW3	N4	NNE4	SSE4	SSE9	SSW7	SW6	W5	ENE3	SSE7	SSE7	SSW5	W2	W2	WSW3	W2	W1	WSW1	SSW0.9	SSE9
27-Mar	NNW1	WSW1	SW1	SW2	S2	S3	S1	N1	NNE3	N3	N5	NNE8	N11	N13	N12	N12	N11	N10	N10	N8	N8	N8	NNW6	NW4	N5.0	N13
28-Mar	NNW3	NW1	S1	W2	WSW2	W1	SW1	S4	SSE7	SSE8	SSE11	S11	S11	SSE11	SE9	SE8	SE8	SSE9	SE5	N2	N2	SSE5	S2	NNW2	SSE3.9	S11
29-Mar	WSW2	WSW2	S3	SSW3	S2	S3	SSW3	S4	SE6	SE10	SSE10	SSE12	SSE12	SSE9	SSE10	SE10	SSE10	S8	S6	SSE1	S1	SSE6	SE5	ESE3	SSE5.5	SSE12
30-Mar	E3	ESE2	NNW2	NW1	NNW2	NNW2	N3	N3	N5	N7	N7	N5	N5	NNE2	N6	N5	NNE6	N5	NNE3	NE3	SW1	NW2	WSW3	SE1	N2.7	N7
31-Mar	S3	S3	SSW2	SSW5	SW6	SSE5	SSW5	S8	SSW11	SSW11	SSW8	SSE10	SSE10	SSE17	S19	S19	S16	SSW14	S13	SSW10	S9	S10	S10	SSW11	S9.6	S19

N2.2	N1.2	N1.4	NNW1.4	NNW1.5	NNW1.5	NNW1.5	NNE1.3	NE1.7	ENE2.0	E1.9	E1.9	E2.3	E1.8	ENE2.1	NE2.9	NE3.2	NNE2.8	N3.0	N3.1	N2.3	N1.3	N1.7	N1.4	Diurnal Average
N21	N20	SSE18	N18	NNE19	N18	N20	SSE18	SSE19	NNE21	SSE24	SSE24	SSE24	SSE23	SSE21	SSE21	NW19	NW20	N20	N17	N22	N20	N18	N18	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

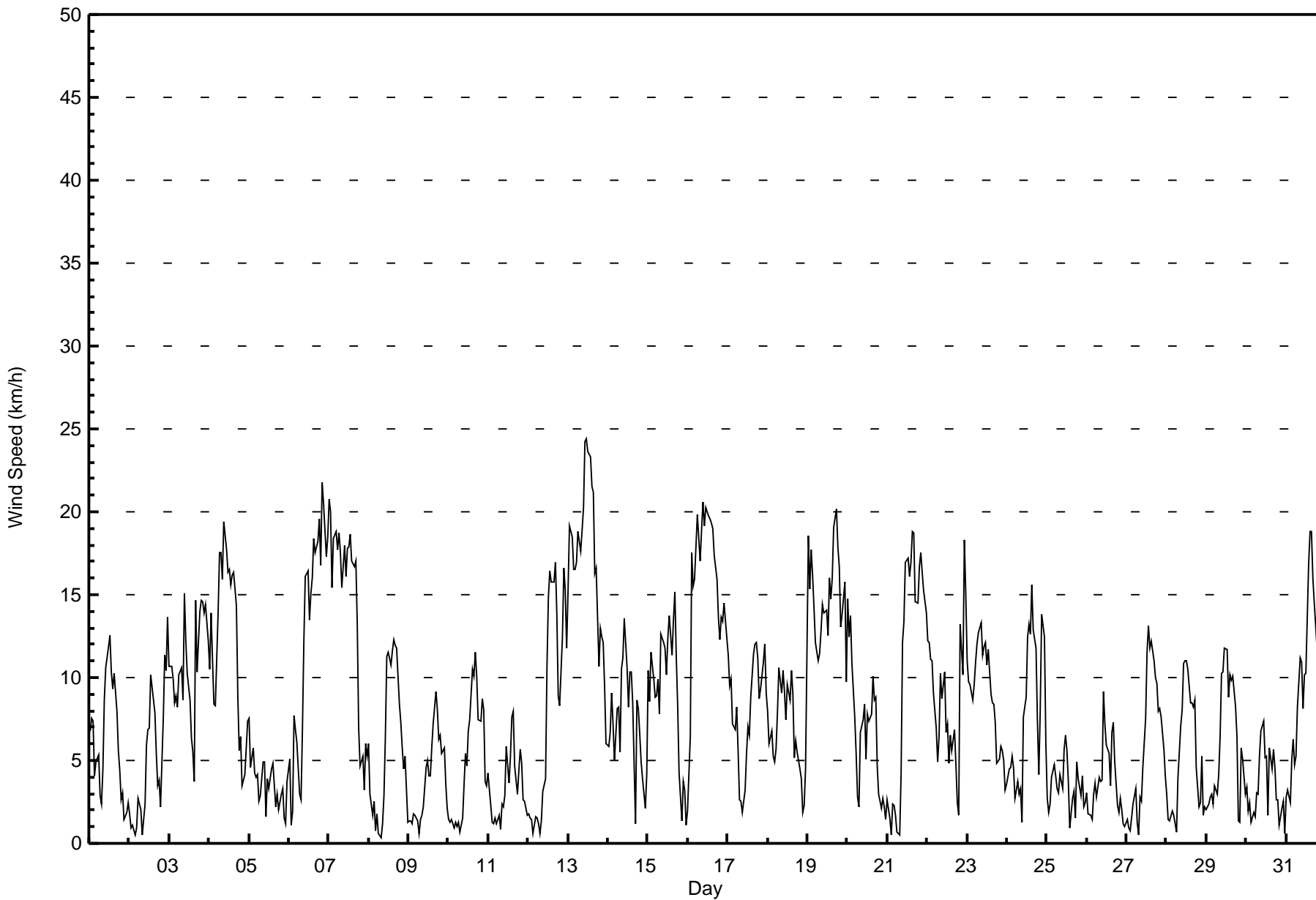
Wind Speed (WS) - km/h
Fort McKay South - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Mar 19 01:00														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 Mar 12 09:00																									
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-Mar	1	2	1	1	1	1	1	1	1	2	2	2	2	3	3	2	2	2	1	1	1	2	1	1	3
2-Mar	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	3	2	2	1	2	5	3	2	3	5
3-Mar	2	2	2	2	2	2	3	2	3	3	3	2	2	1	2	6	3	4	4	4	3	3	2	6	
4-Mar	3	3	3	2	2	3	4	4	4	4	4	3	3	3	3	3	3	2	1	1	1	1	1	4	
5-Mar	2	1	1	1	1	1	1	1	1	1	1	1	2	2	3	2	2	1	1	0	0	1	1	2	3
6-Mar	1	1	1	2	1	3	1	1	4	3	3	4	3	3	4	4	4	4	5	4	5	4	3	4	5
7-Mar	4	5	3	4	4	4	4	4	4	3	3	4	4	4	4	4	3	4	2	1	1	1	1	1	5
8-Mar	2	2	1	1	1	1	1	1	1	1	4	3	3	3	3	3	3	3	2	1	2	1	2	1	4
9-Mar	1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	2	2	2	1	1	1	2	2	1	3
10-Mar	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	3	1	1	1	1	1	1	3
11-Mar	1	1	1	1	1	1	1	1	1	1	2	1	2	3	3	3	2	2	2	1	1	1	1	1	3
12-Mar	1	1	1	1	1	1	1	1	0	1	3	3	4	3	3	4	4	3	3	2	3	4	3	3	4
13-Mar	3	4	3	3	3	3	3	3	4	4	5	5	5	5	4	4	5	3	2	3	4	2	3	1	5
14-Mar	1	1	1	2	2	1	2	1	3	2	2	3	2	2	2	2	2	1	1	1	2	1	2	3	3
15-Mar	3	2	3	3	2	2	2	1	3	3	4	4	4	5	5	4	4	3	2	2	1	1	1	1	5
16-Mar	2	6	4	3	3	4	4	5	5	4	5	4	4	4	4	4	3	3	3	2	2	3	3	2	6
17-Mar	2	2	2	1	1	2	2	1	1	1	2	1	1	1	2	2	2	2	2	1	2	2	2	2	2
18-Mar	2	1	1	1	1	2	2	2	1	2	2	2	2	2	2	2	1	1	2	2	1	1	2	1	2
19-Mar	7	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5	6	6	6	5	4	4	4	3	7
20-Mar	3	3	3	3	2	2	1	1	2	2	2	3	2	3	3	3	3	2	3	1	1	1	1	1	3
21-Mar	1	1	1	1	1	1	1	1	3	3	3	3	3	3	4	4	4	3	3	5	4	3	3	3	5
22-Mar	2	3	2	2	3	3	2	2	2	2	2	2	3	2	2	1	2	2	1	3	3	3	5	4	5
23-Mar	2	2	2	2	3	2	3	3	3	2	3	2	2	3	2	2	2	1	1	1	1	1	1	1	3
24-Mar	2	1	1	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	2	1	2	3	4	2	4
25-Mar	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	2
26-Mar	1	1	1	1	1	1	1	1	1	3	2	2	2	2	1	1	2	2	1	1	1	1	1	1	3
27-Mar	1	1	1	1	1	2	1	1	1	1	1	2	2	2	2	2	2	2	1	2	3	1	1	1	3
28-Mar	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	2	2	1	1	1	2	2	1	3
29-Mar	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	3	2	2	2	1	2	3	2	1	3
30-Mar	2	1	1	1	1	1	1	1	1	1	1	2	2	1	2	2	1	2	2	1	1	1	1	1	2
31-Mar	1	1	1	1	2	1	1	3	3	3	3	3	2	4	5	4	4	3	2	4	4	2	3	4	5
														Diurnal Maximum											



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Fort McKay South - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay South - March 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	302	40.59	40.59
6 - 11	244	32.80	73.39
12 - 19	180	24.19	97.58
20 - 28	18	2.42	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 South - March 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	43	29	14	9	6	7	8	14	19	11	21	25	21	9	21	45	302
6 - 11	71	29	7	0	0	3	17	49	32	11	3	0	1	2	2	17	244
12 - 19	54	33	1	0	0	0	3	45	15	2	2	0	1	8	9	7	180
20 - 28	7	3	0	0	0	0	0	7	0	0	0	0	0	0	1	0	18
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	175	94	22	9	6	10	28	115	66	24	26	25	23	19	33	69	744

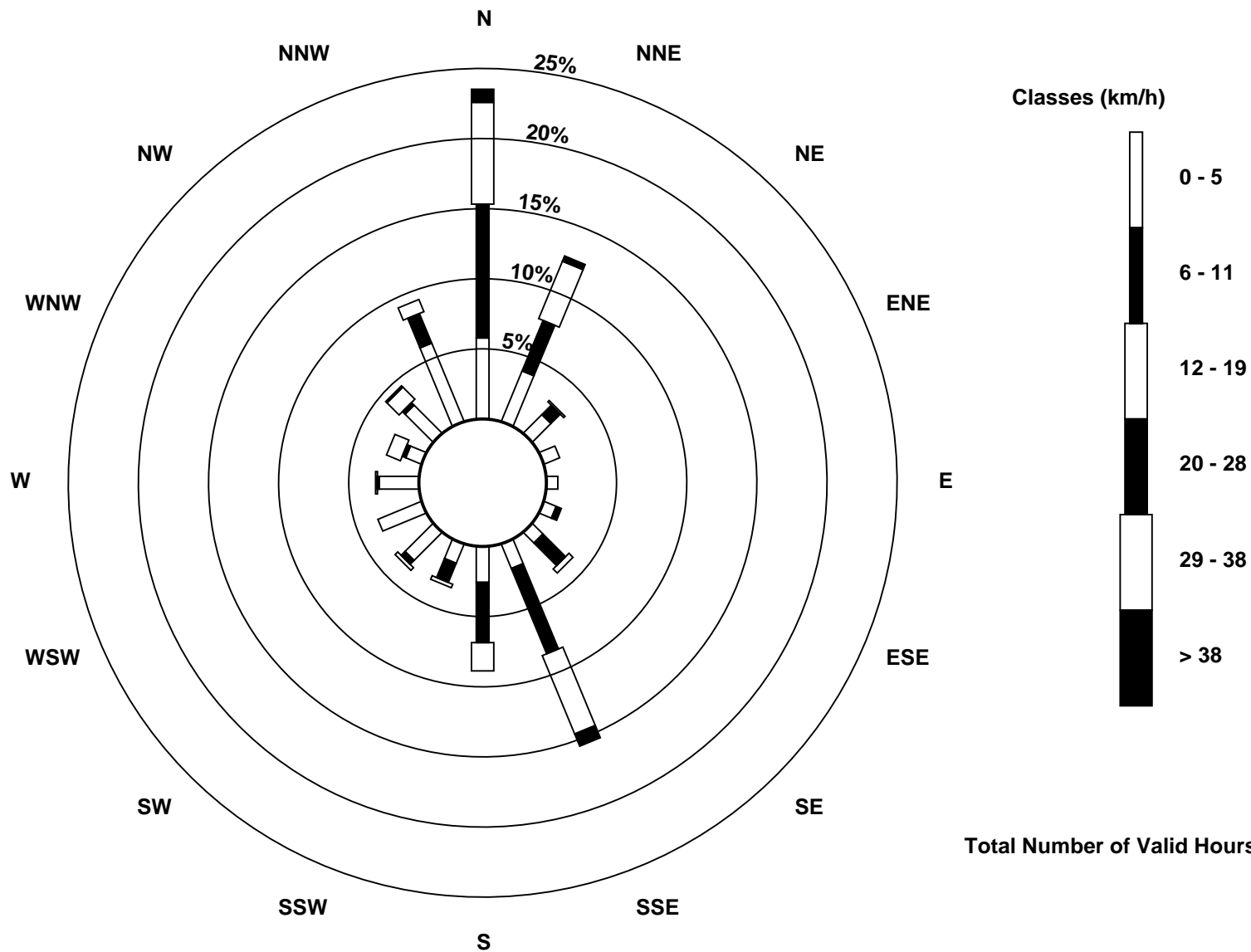
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 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 - March 2017

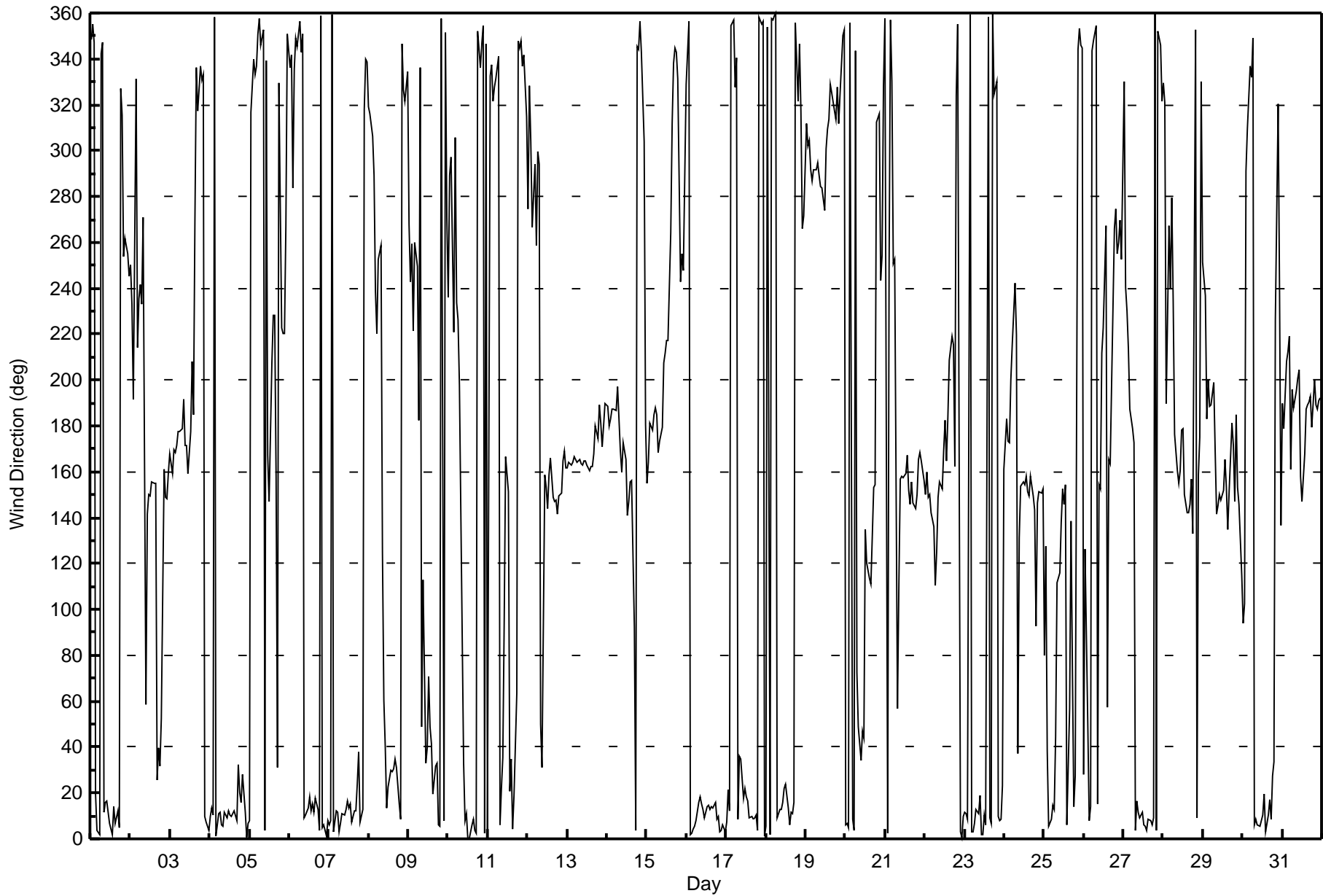
Direction of Maximum Speed: 165 deg on Mar 13 12:00																								Hours in Service:	744
Direction of Maximum Daily Speed Average: 167.0 deg on Mar 13																								Hours of Data:	744
Direction of Minimum Speed: 259 deg on Mar 8 08:00												Direction of Minimum Daily Speed Average: 0.9 deg on Mar 26												Hours of Missing Data:	0
Monthly Average Direction: 283.5 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-Mar	348	355	347	20	4	2	343	347	12	16	17	7	4	2	14	7	12	5	327	315	254	262	255	246	359.5
2-Mar	250	233	192	331	214	236	242	233	271	58	141	150	150	155	155	155	26	40	32	52	161	149	148	159	150.4
3-Mar	168	159	169	169	172	178	177	179	192	171	172	159	177	208	185	269	336	317	337	331	333	10	7	3	201.4
4-Mar	10	14	10	358	1	11	12	6	6	12	9	12	11	10	11	12	8	32	20	16	28	11	0	7	10.5
5-Mar	8	317	340	333	337	351	358	346	353	4	339	167	147	207	228	228	158	31	329	223	220	220	267	351	323.1
6-Mar	336	342	284	336	349	346	356	343	351	9	10	13	18	12	15	12	18	13	4	359	5	6	1	8	5.6
7-Mar	6	8	360	3	12	11	3	7	11	10	13	16	13	15	7	12	12	24	38	7	13	318	340	339	9.2
8-Mar	319	316	306	289	239	220	253	259	125	61	41	14	23	30	29	31	35	31	15	9	346	327	321	334	13.9
9-Mar	268	243	260	222	260	249	183	336	49	113	33	40	71	49	42	20	32	33	6	5	358	8	351	271	19.4
10-Mar	236	289	297	221	306	234	226	198	88	33	8	11	0	0	6	8	4	2	352	336	346	354	2	347	356.8
11-Mar	3	333	337	322	327	331	341	6	22	35	95	167	152	21	35	4	19	63	348	345	348	337	342	315	9.2
12-Mar	274	328	304	266	294	259	300	294	50	31	158	153	144	159	166	149	147	147	142	150	151	165	169	162	155.7
13-Mar	161	164	163	164	167	165	164	165	164	163	165	165	163	160	163	162	168	180	175	189	181	171	180	190	167.0
14-Mar	188	180	183	187	187	187	197	183	169	160	173	165	141	147	156	156	92	4	346	344	356	343	304	181	170.7
15-Mar	155	164	181	178	185	188	185	168	173	180	208	211	217	217	264	312	338	345	343	331	243	255	248	289	212.8
16-Mar	329	356	2	3	4	6	8	16	18	15	13	9	14	15	13	14	14	16	9	10	3	3	6	3	9.6
17-Mar	7	21	12	355	357	327	341	9	36	35	18	22	18	17	9	10	9	10	4	358	355	356	1		5.3
18-Mar	6	354	2	357	357	359	360	9	13	13	16	22	24	13	6	12	11	16	356	322	347	318	266	272	3.8
19-Mar	312	302	304	292	287	292	292	294	289	284	284	274	301	309	314	329	325	317	314	328	312	325	350	353	308.2
20-Mar	6	7	5	356	9	4	343	72	49	34	47	44	135	120	114	111	132	153	154	313	316	244	255	328	45.1
21-Mar	358	2	249	357	330	251	253	57	111	157	158	158	159	167	152	146	156	146	144	150	165	168	165	156	155.8
22-Mar	150	160	149	150	142	136	110	125	149	156	153	169	183	165	184	209	219	215	162	324	355	3	1	9	144.1
23-Mar	12	11	8	360	3	3	7	13	11	19	2	2	10	6	358	9	6	360	325	330	10	8	8	23	5.7
24-Mar	161	183	174	173	200	216	242	220	37	131	154	156	154	158	151	149	158	149	143	93	147	151	151	153	156.2
25-Mar	80	127	38	5	8	15	13	44	112	116	138	152	146	154	6	57	139	73	14	28	344	353	346	345	62.8
26-Mar	28	126	50	8	14	343	348	354	15	154	153	212	222	267	57	166	163	199	266	274	255	260	270	252	205.9
27-Mar	330	240	230	214	187	179	173	4	16	11	9	12	6	6	4	9	8	6	9	360	3	352	346	322	2.5
28-Mar	329	321	190	267	240	280	234	177	160	155	161	178	179	150	142	142	146	157	133	353	9	159	175	330	161.1
29-Mar	252	237	183	200	189	189	199	169	142	145	150	148	152	166	153	135	152	181	172	147	185	153	146	115	158.5
30-Mar	94	102	291	309	337	332	349	6	9	6	6	8	11	19	3	11	17	9	28	34	226	320	238	136	6.2
31-Mar	190	179	208	212	219	161	196	188	195	201	204	158	147	168	187	189	190	193	179	200	189	187	191	192	187.1
3.1 6.6 349.5 332.5 341.0 342.7 346.4 17.7 53.0 67.1 87.3 97.9 93.7 86.7 60.5 51.3 35.0 28.0 8.3 350.6 350.0 3.9 356.2 4.2																								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 South - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 99 deg on Mar 24 10:00		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 7 deg on Mar 14 03:00																									
Percentiles: P ₁ = 9 P ₁₀ = 12 Q ₁ = 14 Median = 18 Q ₃ = 32 P ₉₀ = 54 P ₉₉ = 86																									
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-Mar	10	13	13	26	18	13	21	15	9	9	13	14	17	23	20	15	21	17	11	43	20	54	21	20	54
2-Mar	19	75	70	52	42	11	26	21	88	42	18	12	23	15	16	16	53	41	34	63	51	11	11	13	88
3-Mar	12	11	12	12	10	21	12	12	25	13	16	16	31	38	27	52	18	20	19	18	18	19	13	16	52
4-Mar	16	16	17	15	14	14	15	14	15	16	16	13	16	16	15	16	15	19	22	13	32	20	15	13	32
5-Mar	15	24	15	12	12	12	37	21	18	22	82	41	58	63	68	65	63	37	65	24	14	53	31	64	82
6-Mar	15	63	46	12	12	24	27	31	23	16	14	15	17	16	20	16	16	15	16	16	16	15	17	15	63
7-Mar	16	15	17	17	15	16	17	14	15	16	16	15	16	17	18	16	17	18	22	18	21	26	12	14	26
8-Mar	15	40	79	26	64	32	67	83	76	30	32	23	23	23	22	21	20	17	16	13	16	12	15	64	83
9-Mar	54	42	48	33	40	37	90	46	21	42	30	46	72	60	41	31	17	17	16	14	16	15	29	45	90
10-Mar	40	43	29	28	44	59	40	86	53	12	19	33	22	29	18	17	14	15	12	10	12	13	13	13	86
11-Mar	10	26	22	21	23	29	20	79	12	29	62	19	75	50	42	26	46	63	41	25	16	44	24	41	79
12-Mar	39	43	38	58	33	46	44	66	43	21	86	17	17	14	17	16	12	13	14	9	12	11	9	12	86
13-Mar	10	10	10	10	10	10	11	11	11	11	11	11	11	10	11	11	11	12	11	12	13	7	10	11	13
14-Mar	10	8	7	10	10	10	10	13	10	16	15	18	13	12	11	22	74	12	11	14	24	54	72	21	74
15-Mar	13	17	15	12	9	12	12	9	14	15	29	30	23	25	41	31	21	16	18	50	73	24	35	68	73
16-Mar	59	32	15	14	13	16	15	16	16	16	18	17	19	17	18	17	15	14	14	12	14	15	13	14	59
17-Mar	14	15	13	16	18	18	19	27	41	78	72	18	13	14	15	13	14	13	12	12	13	13	12	13	78
18-Mar	11	11	10	10	12	12	13	12	10	14	14	21	16	21	18	13	19	13	31	31	20	45	65	17	65
19-Mar	20	26	24	28	29	32	31	28	34	29	35	32	38	27	30	25	21	21	24	21	22	27	18	19	38
20-Mar	16	15	15	15	14	19	44	50	27	31	29	61	33	38	30	23	23	15	25	11	50	38	25	54	61
21-Mar	41	58	79	31	34	31	44	70	56	19	15	13	15	18	18	12	12	13	12	14	12	11	10	14	79
22-Mar	14	11	13	12	16	30	24	22	14	15	15	33	23	42	23	32	24	33	48	97	15	16	18	15	97
23-Mar	15	13	14	15	13	15	14	14	15	19	19	18	18	18	21	20	16	12	17	19	18	12	11	38	38
24-Mar	45	12	12	27	13	29	34	36	37	99	19	19	20	13	13	12	11	11	20	23	14	15	15	17	99
25-Mar	43	60	45	13	10	13	25	27	19	28	23	13	27	12	65	40	37	68	15	18	33	20	44	26	68
26-Mar	53	32	49	53	36	28	32	31	27	59	17	28	29	32	54	14	20	19	35	44	36	33	62	75	75
27-Mar	42	44	81	68	20	22	56	87	14	28	30	14	16	14	12	15	13	11	10	15	32	14	16	27	87
28-Mar	22	65	55	33	32	47	83	14	10	11	12	15	19	20	31	27	22	9	22	40	65	23	72	44	83
29-Mar	29	40	15	13	23	14	18	11	15	17	18	18	18	34	23	27	10	11	10	73	82	37	18	34	82
30-Mar	35	61	40	63	41	22	19	18	14	15	14	50	35	85	28	35	21	26	43	33	62	56	36	86	86
31-Mar	27	17	24	17	22	17	25	22	17	24	37	28	15	18	14	15	16	13	10	21	18	15	12	14	37
	59	75	81	68	64	59	90	87	88	99	86	61	75	85	68	65	74	68	65	97	82	56	72	86	
	Diurnal Maximum																								





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	March 7, 2017	Last Calibration	February 7, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	12:38
Gas Cert Reference	LL110515	Station temp.	22 Deg C
Cal Gas Concentration	49.8 ppm	Cal Gas Exp Date	9/08/18
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG Make/Model	API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	DACS serial No.	11038

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		HVPS voltage	524	524
Analyzer IP address	192.168.1.73		Lamp voltage	2624	2624
Calculated slope	1.000837	0.998769	Box temp	31.2	31.2
Calculated intercept	0.683170	1.866363	Pressure	26.5	26.5
Analyzer Background	32.9	32.9	Flow	697	697
Analyzer Coefficient	1.052	1.052	Lamp Ratio	89	89

Analyzer make API T100 Analyzer serial # 599

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	----
as found span	5000	78.9	785.8	781.8	1.005
calibrator zero	5000	0.0	0.0	-0.4	----
high point	5000	78.9	785.8	786.0	1.000
second point	5000	39.4	392.4	389.3	1.008
third point	5000	19.7	196.2	193.8	1.012
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	78.9	785.8	776.9	1.012
Average Correction Factor					1.007

Corrected As found 782.2 Previous response 784.5 % change 0.3%

Notes:

No maintenance or adjustments done, filter changed out

Calibration Performed By: Melissa Lemay



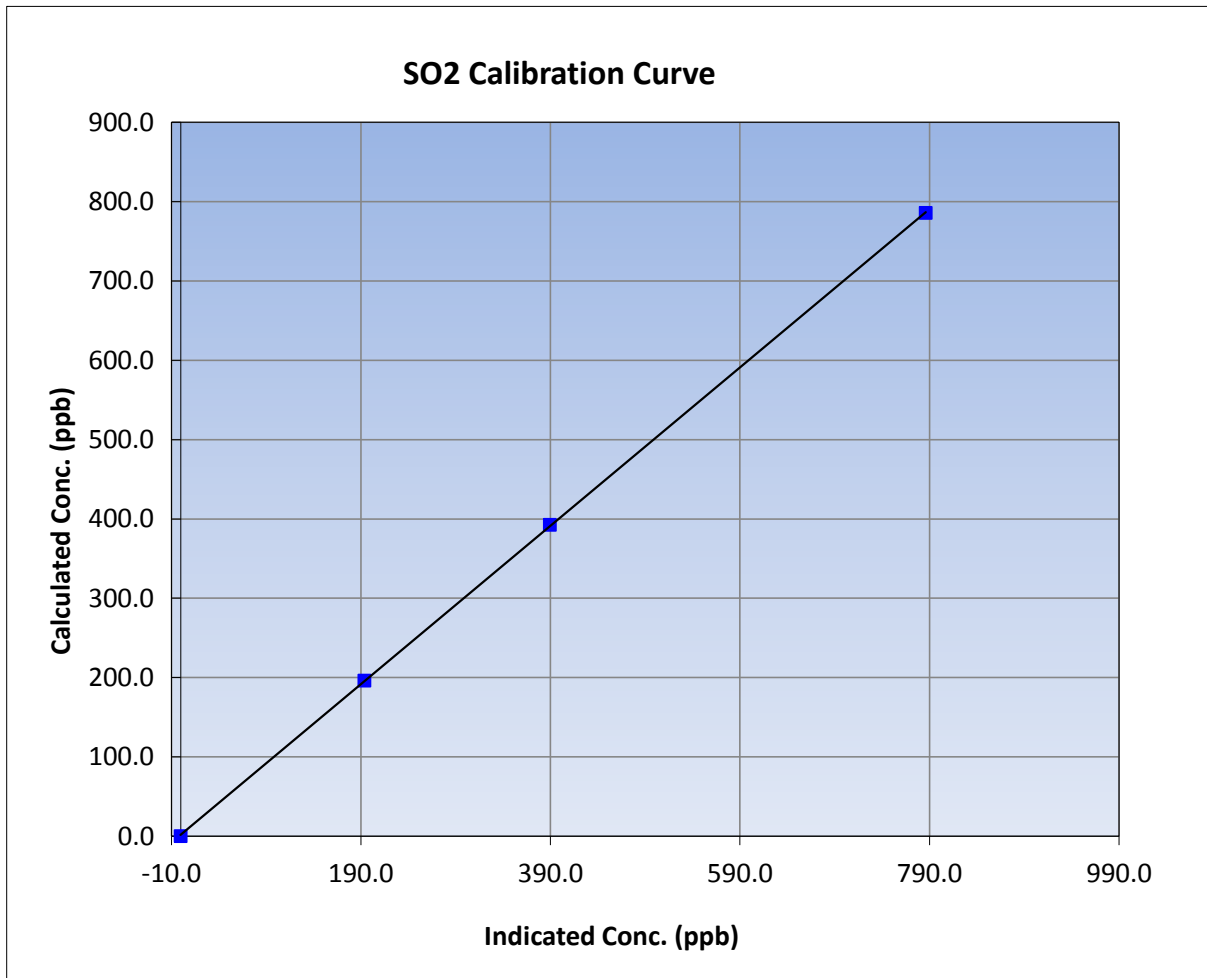
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 7, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:25	End Time (MST)	11:28
Analyzer make	API T100	Analyzer serial #	599

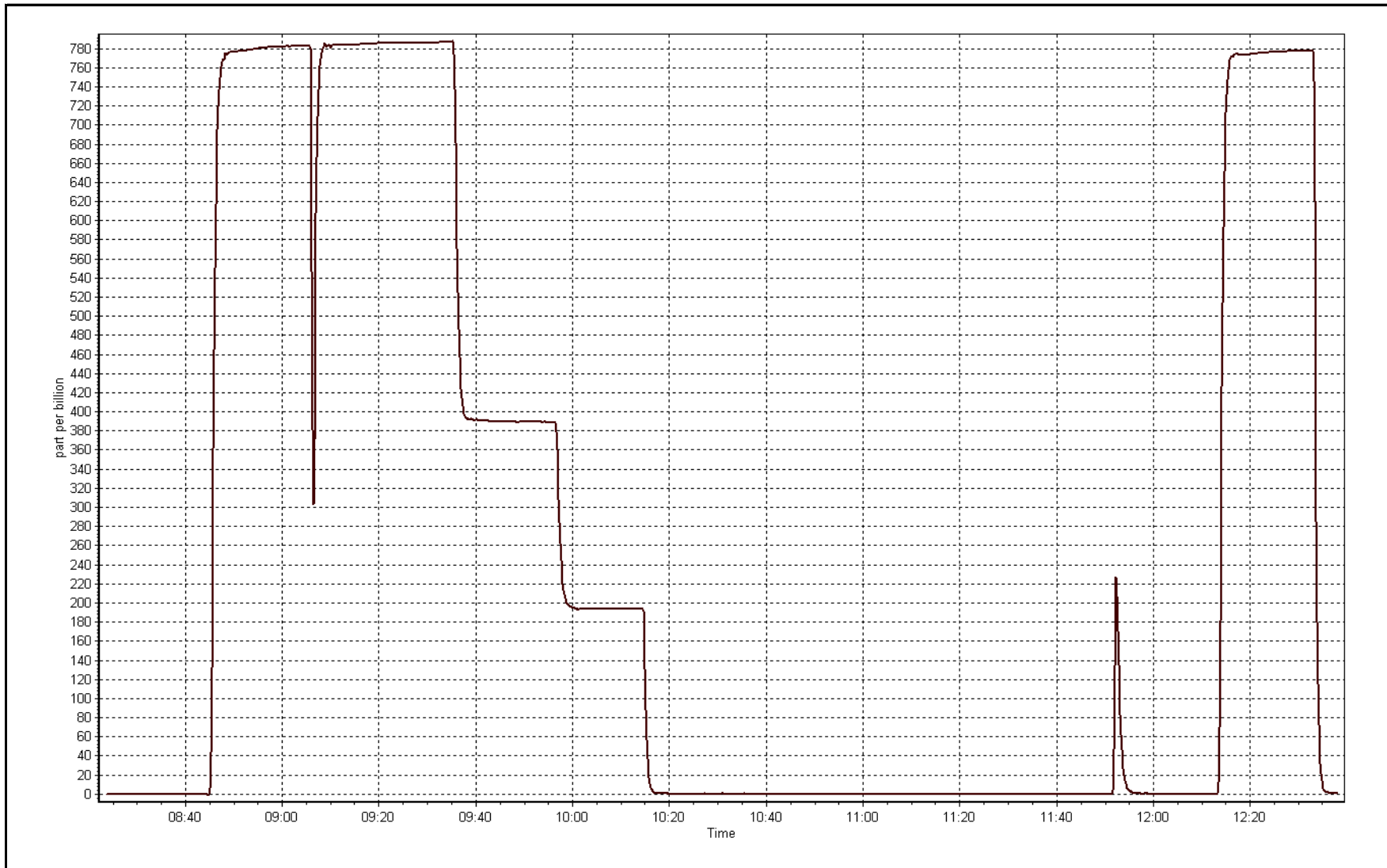
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999980
785.8	786.0	0.9998		
392.4	389.3	1.0080	Slope	0.998769
196.2	193.8	1.0124		
			Intercept	1.866363



SO2 Calibration Plot

Date: March 7, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	March 8, 2017	Last Calibration	February 8, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:35	End Time (MST)	13:28
Gas Cert Reference	CC178364	Station temp.	22 Deg C
Cal Gas Concentration	5.07 ppm	Cal Gas Exp Date	September 9, 2017
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
Dil air Make/Model	API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	DACS serial No.	11038
SO2 gas concentration	49.8 ppm	SO2 gas cert/exp	LL110515 8/Sep/18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-727	-727
Analyzer IP address	192.168.1.44		Lamp voltage	1015	1015
Calculated slope	1.000860	0.987314	Chamber temp	45	45
Calculated intercept	0.403271	0.376967	Pressure	703.4	703.4
Analyzer Background	2.07	2.18	Flow	0.451	0.451
Analyzer Coefficient	1.016	1.063	Intensity	89	89
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153359	
Converter make/model	CDN-101		Converter serial #	456	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	78.9	80.0	78.6	1.018
SO2 scrubber check	5000	17.6	175.3	0.4	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	78.9	80.0	80.7	0.991
second point	5000	39.4	40.0	40.2	0.994
third point	5000	19.6	19.9	19.3	1.030
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	78.9	80.0	83.6	0.957
Average Correction Factor					1.005

Corrected As found	78.7	Previous response	79.5	% change	1.1%
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Notes:

Scrubber check done after as founds. Inlet filter changed. No maintenance or adjustments done

Calibration Performed By:

Melissa Lemay



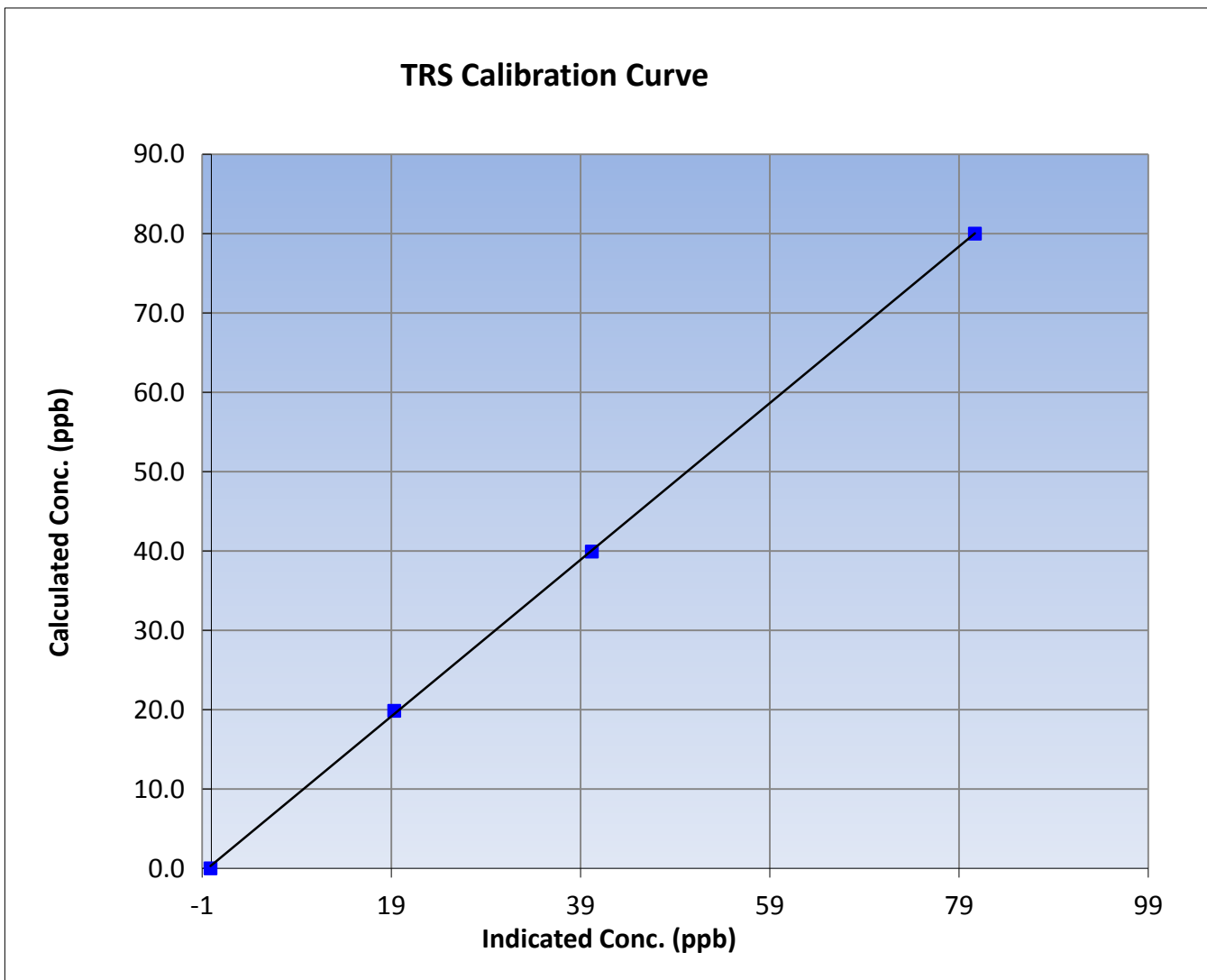
Wood Buffalo Environmental Association TRS Calibration Report

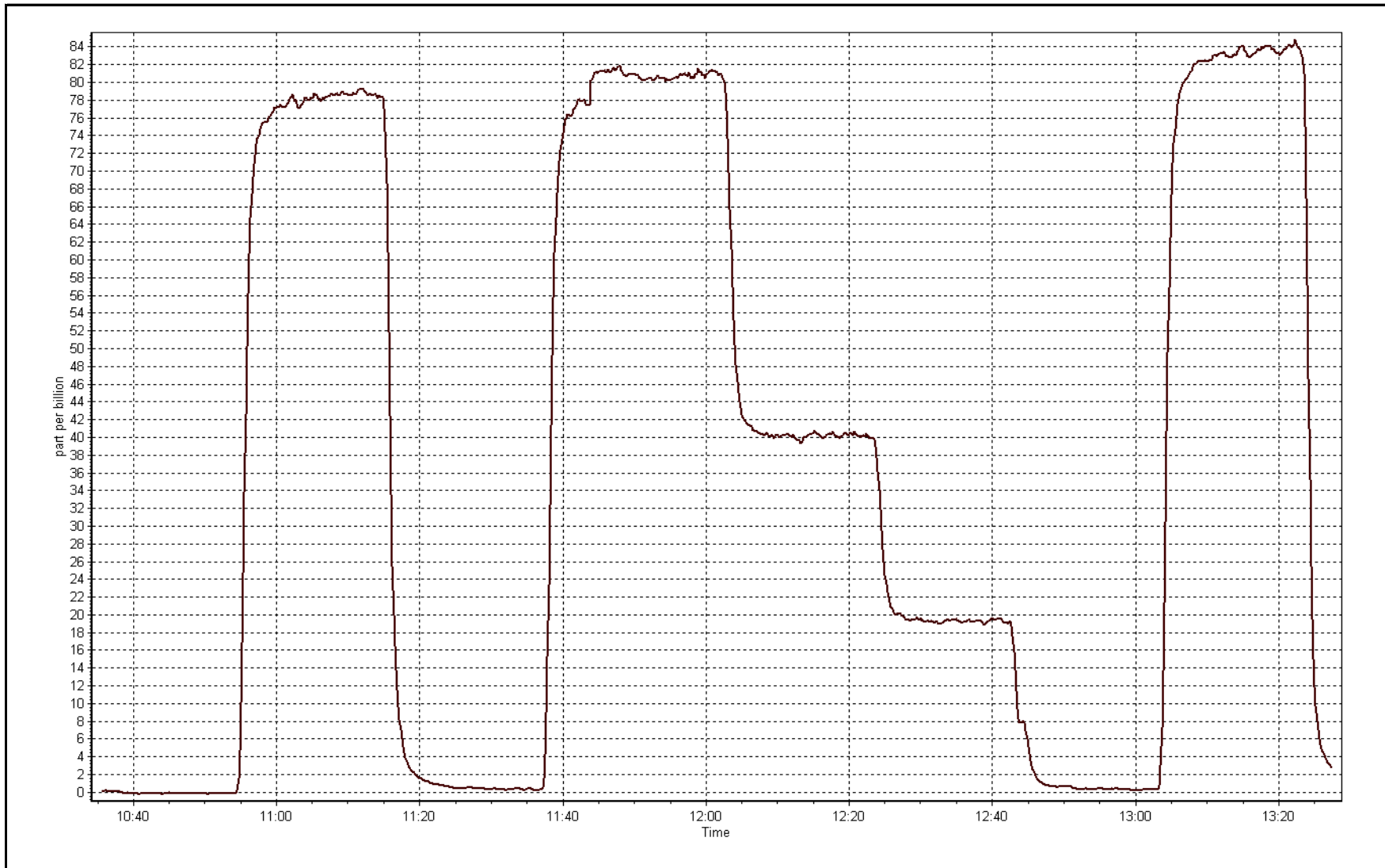
Station Information

Calibration Date	March 8, 2017	Previous Calibration	February 8, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:35	End Time (MST)	13:28
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153359

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999918
80.0	80.7	0.9914		
40.0	40.2	0.9938	Slope	0.987314
19.9	19.3	1.0298		
			Intercept	0.376967







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	March 7, 2017	Last Calibration	February 7, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	12:38
Gas Cert Reference	LL110515	Cal Gas Expiry Date	September 8, 2018
CH4 Cal Gas Conc.	517 ppm	CH4 Equiv Conc.	1067.0 ppm
C3H8 Cal Gas Conc.	200 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG make/model	Teledyne API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	Serial Number	11038

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	9.2	9.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.3	34.3
Calculated slope	1.000129	0.991547	Fuel Pressure	23.1	23.1
Calculated intercept	0.033517	0.017036	Analyzer Coeff	3.074	3.074
			Analyzer BKG	1.320	1.320

Analyzer make	51i-LT	Analyzer serial #	1505164380
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	78.9	16.84	16.94	0.994
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.9	16.84	16.98	0.992
second point	5000	39.4	8.41	8.43	0.997
third point	5000	19.6	4.18	4.20	0.996
as left zero	5000	0.0	0.00	0.04	----
as left span	5000	78.9	16.84	17.10	0.985
Average Correction Factor					0.995

Corrected As found	16.94	Previous response	16.80	% change	-0.8%
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Notes:

no maintenance done, filter changed out, No adjustments done

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association THC Calibration Report

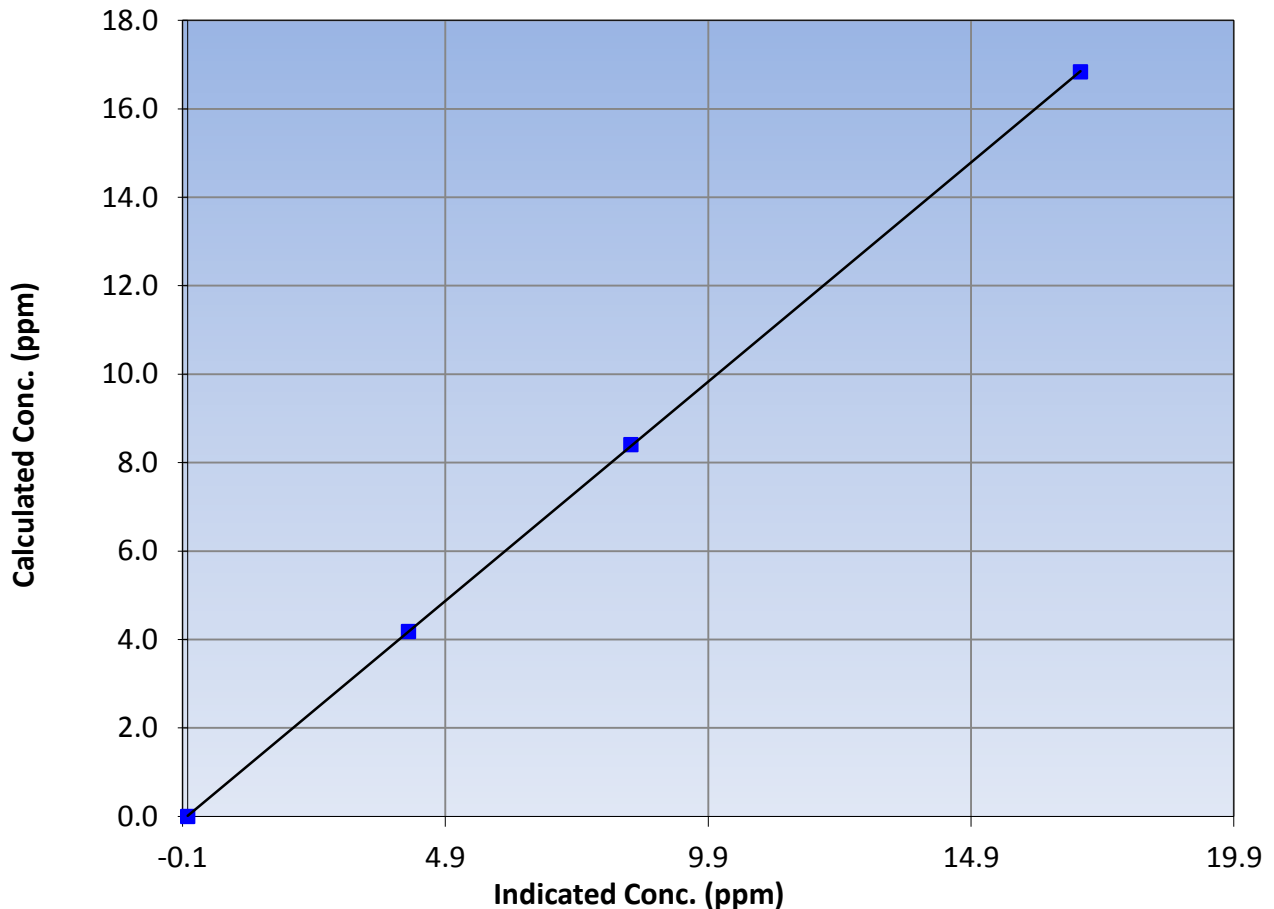
Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 7, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:25	End Time (MST)	11:28
Analyzer make	51i-LT	Analyzer serial #	1505164380

Calibration Data

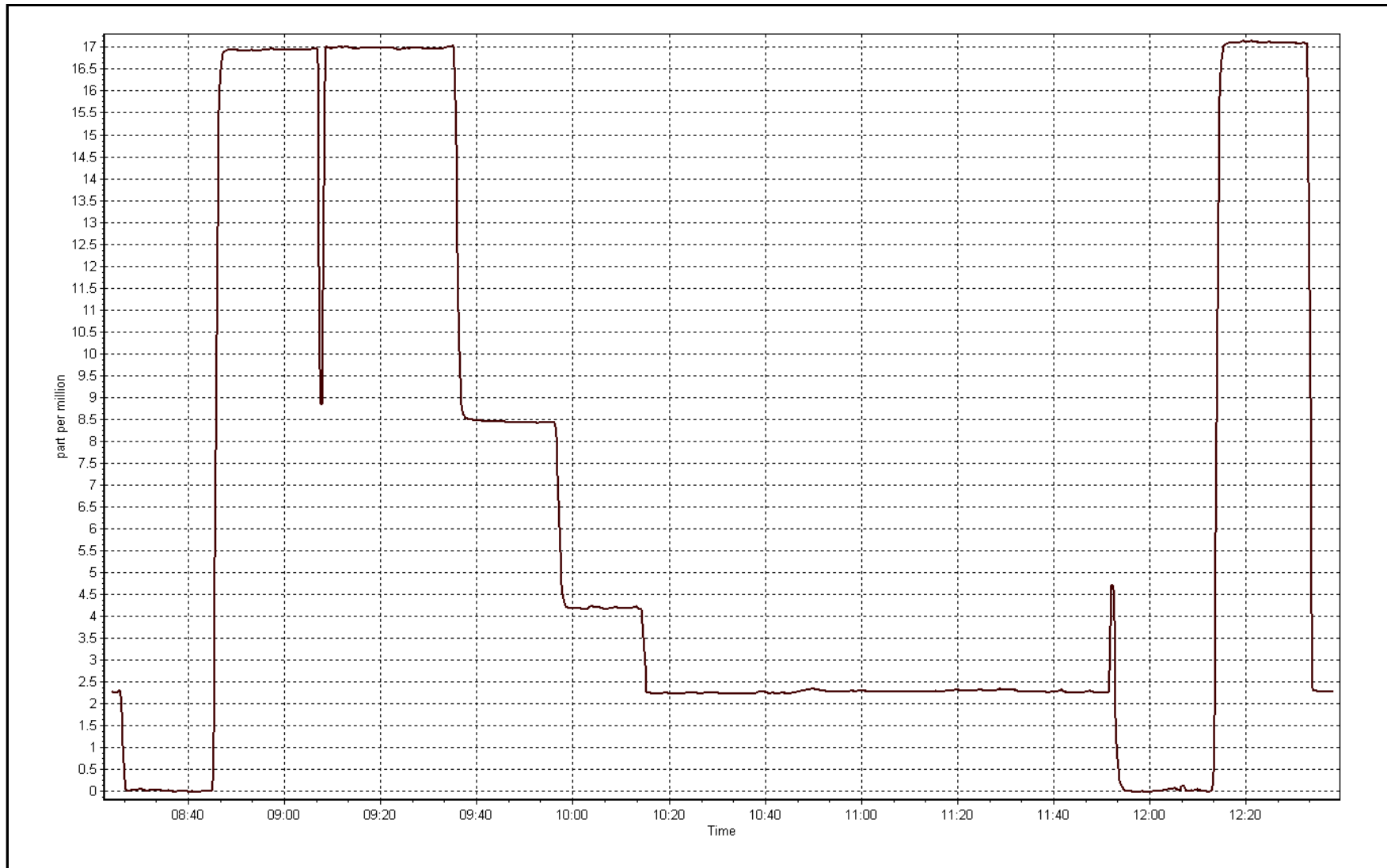
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999990
16.84	16.98	0.9916		
8.41	8.43	0.9974	Slope	0.991547
4.18	4.20	0.9959		
			Intercept	0.017036

THC Calibration Curve



THC Calibration Plot

Date: March 7, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 8, 2017	Previous Calibration	February 8, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:10	End Time (MST)	10:38
NO2 GPT Ref date	March 7, 2017	Transfer Standard	Nox GPT
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	11041107
DACS make/model	Campbell Scientific CR3000	Serial Number	5613
		Serial Number	11038

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Box temp.	25.9	25.9
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	1.011937	1.005247	Pressure	27.0	27.0
Calculated intercept	0.408936	0.134770	Flow	779.0	779.0
Analyzer Background	2.0	2.0	Intensity	4250.5	4250.5
Analyzer Coefficient	1.004	1.004			

Analyzer make	API T400	Analyzer serial #	825
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.3	----
as found span	5000	0.89	357.0	356.7	1.001
calibrator zero	5000	0.00	0.0	0.3	----
high point	5000	0.89	357.0	355.1	1.005
second point	5000	0.47	212.7	211.7	1.005
third point	5000	0.36	113.0	111.5	1.013
as left zero	5000	0.00	0.0	0.3	----
as left span	5000	0.89	357.0	364.1	0.980
Average Correction Factor					1.008

Corrected As found	356.4	Previous response	352.4	% change	-1.1%
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Notes:

Filter changed out, no adjustments or maintenance done

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

O3 Calibration Report

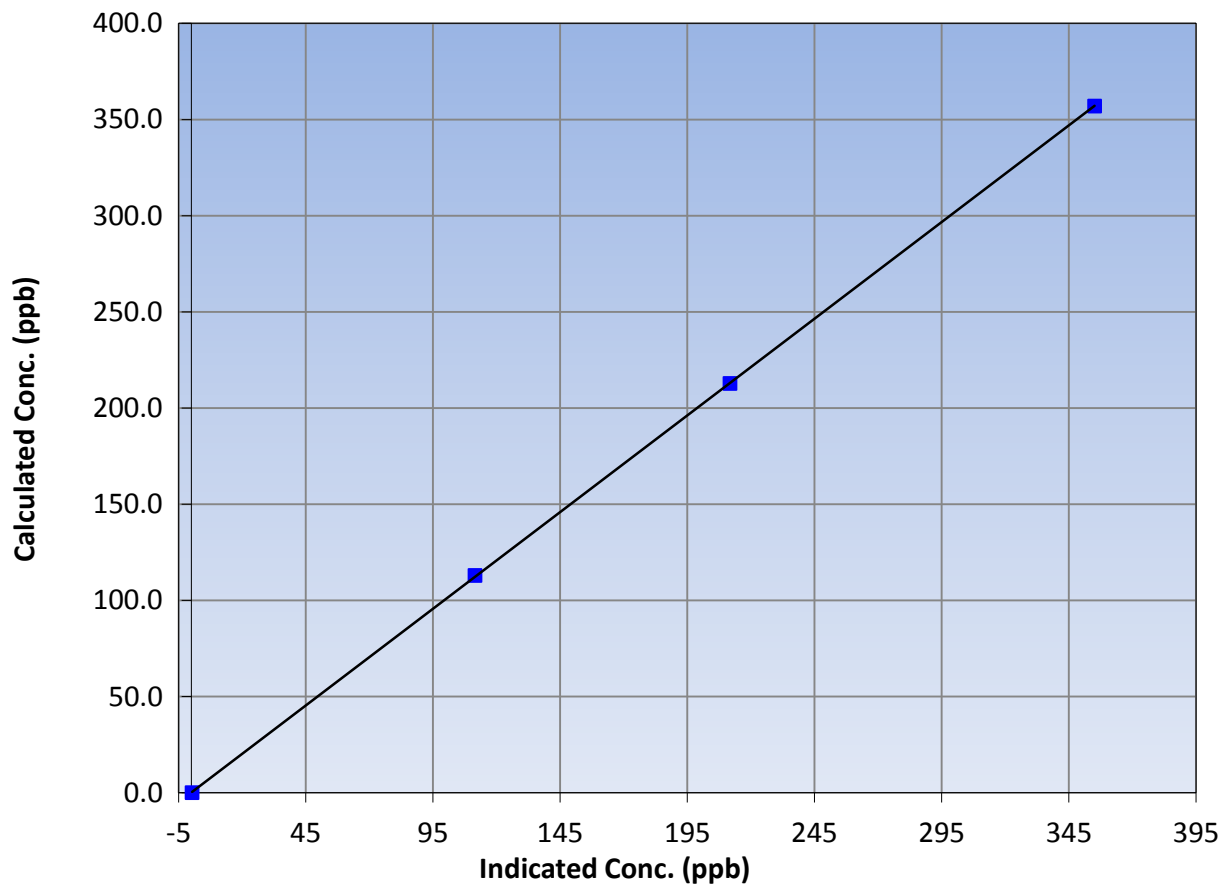
Station Information

Calibration Date	March 8, 2017	Previous Calibration	February 8, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:10	End Time (MST)	10:58
Analyzer make	API T400	Analyzer serial #	825

Calibration Data

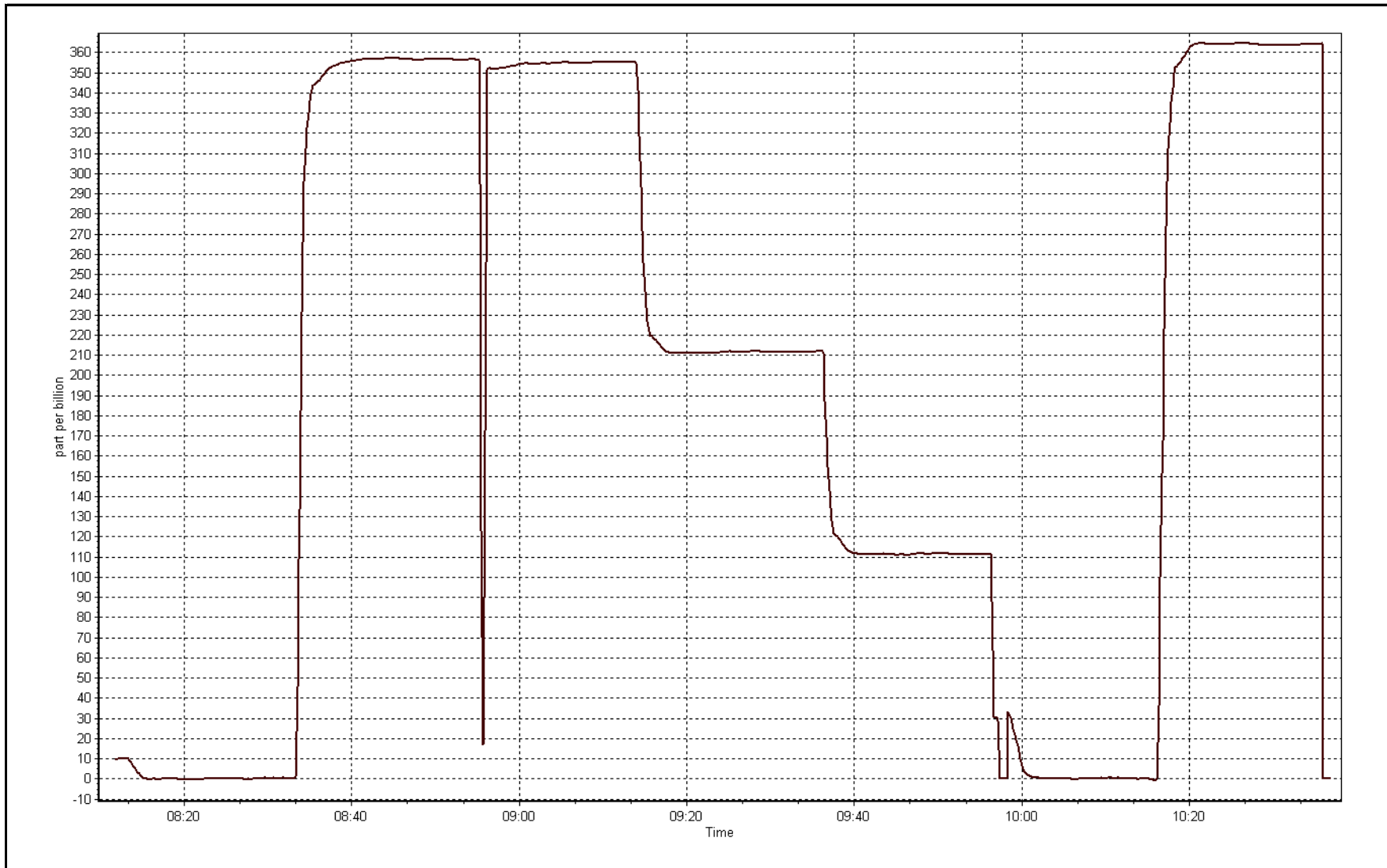
Calculated concentration (ppb) (Cc)	2/07/17	Correction factor (Cc/lc)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999987
357.0	355.1	1.0054		
212.7	211.7	1.0047	Slope	1.005247
113.0	111.5	1.0135		
			Intercept	0.134770

O3 Calibration Curve



O3 Calibration Plot

Date: March 8, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 7, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	12:38
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	LL110515
NOx Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	September 8, 2018
Calibrator	Sabio 4010	Serial Number	11041107
Zero air Generator	Teledyne API T701	Serial Number	5613

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	11038
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999980	1.000279	1.002246
	Data Offset	1.142033	1.082643	0.508636
Current Calibration	Data Slope	1.000526	1.000512	0.994056
	Data Offset	0.600649	0.501166	1.070378

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661329
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.024		1.069	
NOx coefficient	1.003		1.002	
NO2 coefficient	1.000		1.000	
NO bkgrnd	7.6		7.9	
NOx bkgrnd	7.7		8.0	
Chamber Temp	50.7	Deg C	50.5	Deg C
Moly Temp	326.3	Deg C	323.9	Deg C
PMT voltage	-828.1	V	-828.1	V
PMT Temp	-3	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	183.9	mmHg	186.6	mmHg
R Cell Press Nox	183.9	mmHg	186.6	mmHg
NO sample flow	0.831	lpm	0.854	lpm
Nox sample Flow	0.831	lpm	0.854	lpm

Notes:

no maintenance done, filter changed out, span adjusted



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

March 7, 2017

Station Number:

AMS 13

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as found span	5000	78.9	803.2	800.0	3.2	770.8	766.7	4.1	1.0420	1.0435
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
high point	5000	78.9	803.2	800.0	3.2	802.0	798.9	3.1	1.0015	1.0014
second point	5000	39.4	401.1	399.5	1.6	401.4	400.0	1.4	0.9992	0.9988
third point	5000	19.7	200.5	199.8	0.8	198.3	197.7	0.6	1.0113	1.0104
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.1	----	----
as left span	5000	78.9	803.2	439.3	363.9	807.4	441.7	365.7	0.9948	0.9946
Average Correction Factor									1.0040	1.0035

Corrected As found
Previous Response

NO_x= 770.8
NO_x= 802.1

NO= 766.7
NO= 798.7

Percent Change

NO_x= 4.1%

NO= 4.2%

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 78.90 ccm NOx ref calc conc = 803.2 ppb NO ref calc conc = 800.0 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		3.2	799.1	796.3	0.0	1.0051	1.0047	----	----
1st NO2 (300)	439.3	360.2	800.1	439.3	361.8	1.0039	----	0.9955	100.5%
2nd NO2 (200)	583.6	215.9	799.5	583.6	215.9	1.0046	----	0.9998	100.0%
3rd NO2 (100)	683.3	116.2	797.7	683.3	114.3	1.0069	----	1.0162	98.4%
2nd NO ref point		3.2	796.4	793.6	2.8	1.0085	1.0081	----	----
Average Correction Factor						1.0060		1.0038	99.6%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

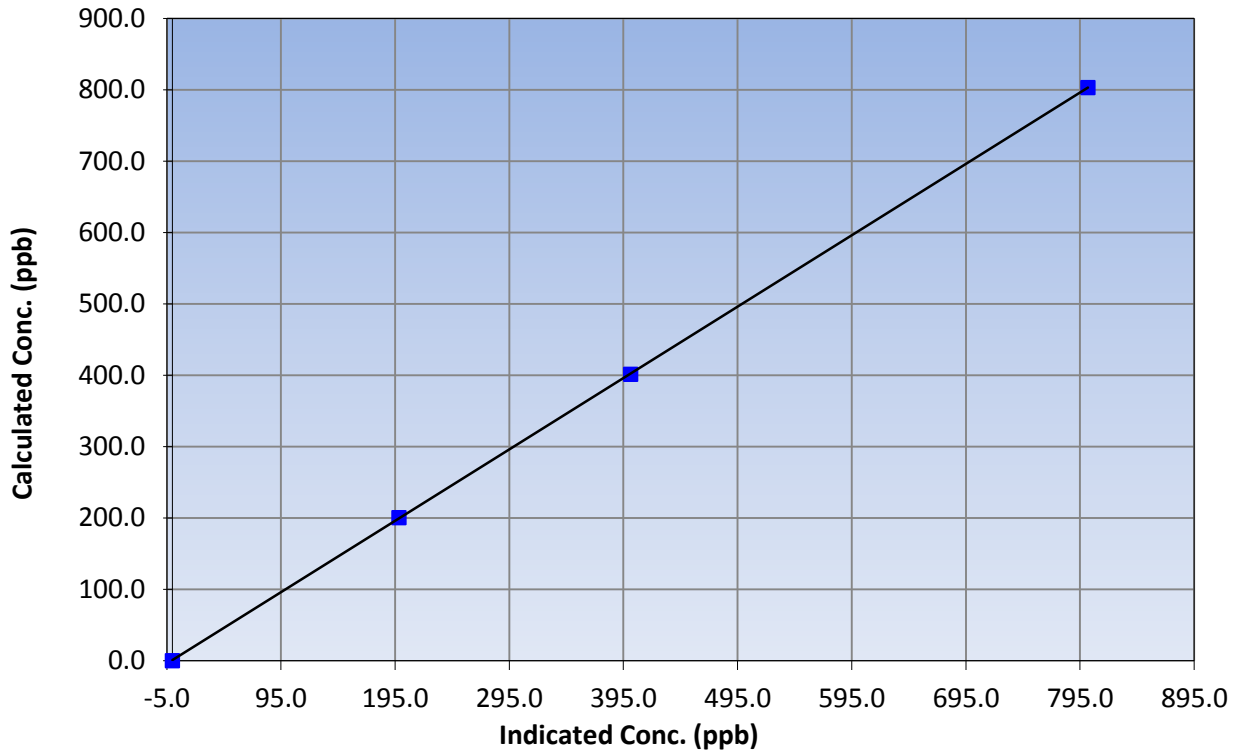
Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 7, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:25	End Time (MST)	13:44
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999989
803.2	802.0	1.0015		
401.1	401.4	0.9992	Slope	1.000526
200.5	198.3	1.0113		
			Intercept	0.600649

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

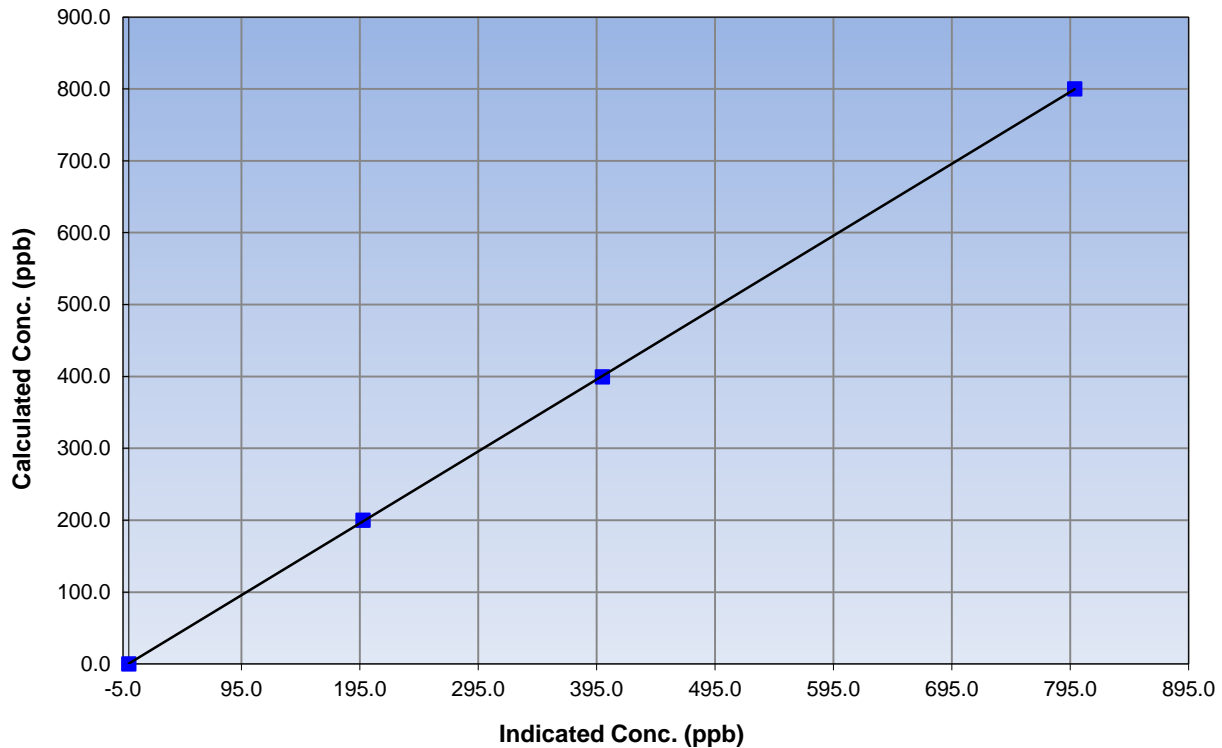
Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 7, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:25	End Time (MST)	13:44
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999989
800.0	798.9	1.0014		
399.5	400.0	0.9988	Slope	1.000512
199.8	197.7	1.0104		
			Intercept	0.501166

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

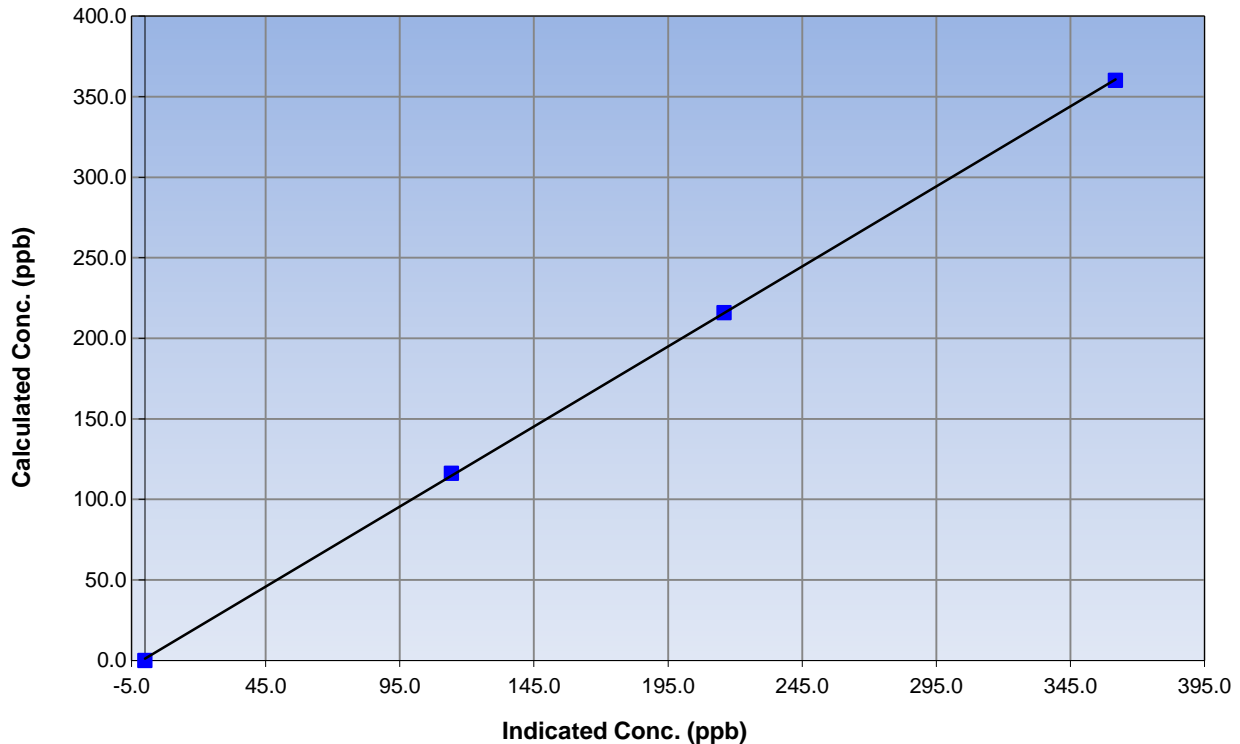
Station Information

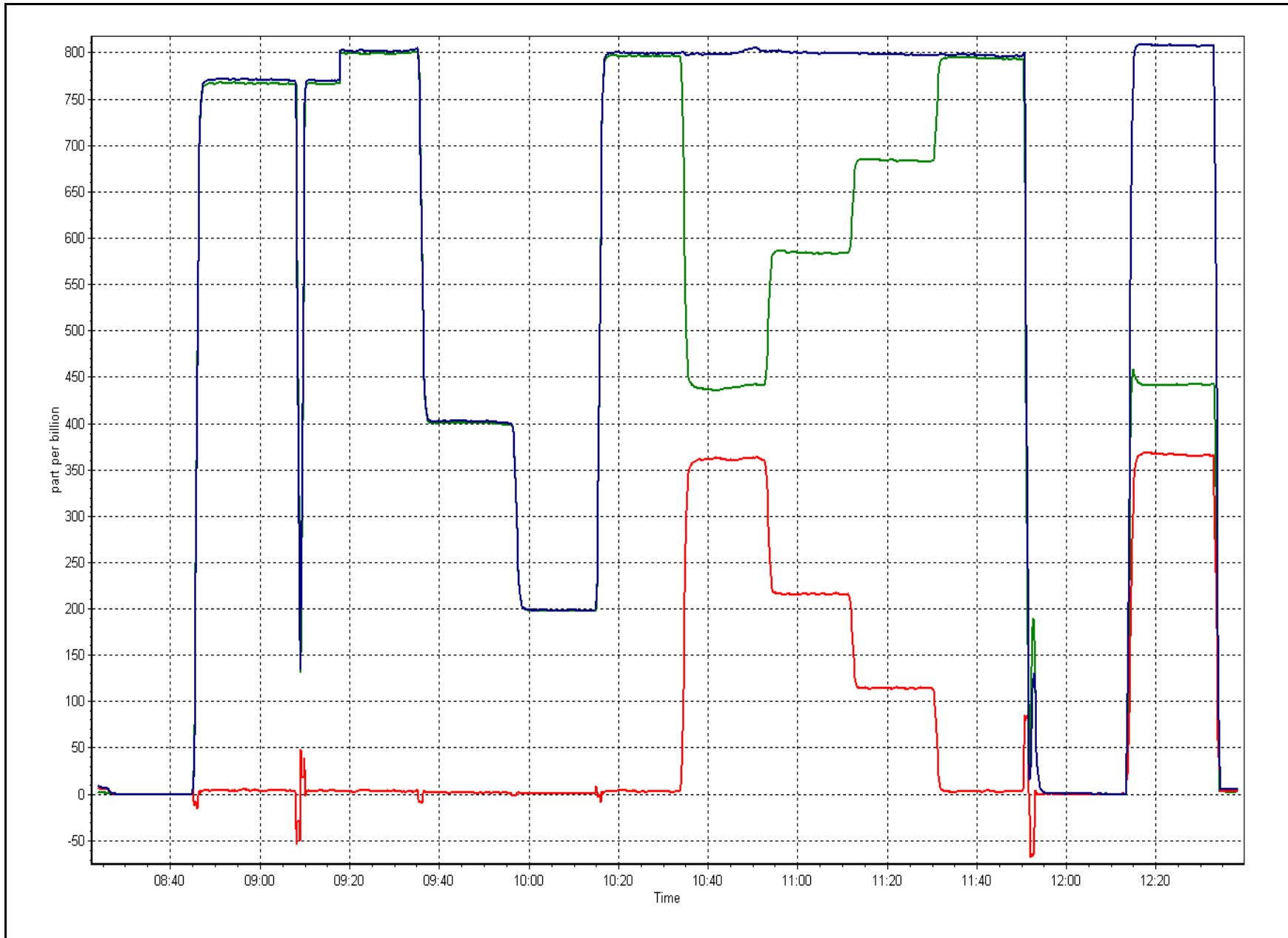
Calibration Date	March 7, 2017	Previous Calibration	February 7, 2017
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:25	End Time (MST)	13:44
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999948
360.2	361.8	0.9955		
215.9	215.9	0.9998	Slope	0.994056
116.2	114.3	1.0162		
			Intercept	1.070378

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	March 8, 2017	Last Cal Date:	February 8, 2017
Start time (MST):	8:16	End time (MST):	9:28
Sharp Model:	5030	S/N:	E-803
Particulate Fraction:	PM2.5	C14 Source S/N:	4066
Flow Standard Model:	Delta Cal	S/N:	1450
Temp/RH standard:	Delta Cal	S/N:	1450

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	-27	-28.6	-28	<input checked="" type="checkbox"/>	+/- 2 °C
P3 (hPa)	996	988	988	<input checked="" type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	988	1000	<input checked="" type="checkbox"/>	+/- 50 LPH
Nephelometer zero	3.9	-----	-0.3	<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"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

				Tolerance
Leak Test:	Date of check:	<u>February 8, 2017</u>	Last Cal Date:	<u>November 18, 2016</u>
	Flow w/o adaptor:	<u>16.7</u>	Flow w/ adaptor:	<u>16.4</u> 0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass:	<u>1337</u>	S/N:	<u>NA</u>
	Date of check:	_____	Last Cal Date:	<u>June 9, 2016</u>
	New Correction Factor:	_____	Previous Correction Factor:	<u>7150</u>

Parameter	As found	Measured	As left	Adjusted	Tolerance
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: Cyclone head cleaned, T1, P1, Nephelometer and Flow adjusted

Calibration by: Melissa Lemay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

**AMS 14
ANZAC
MARCH 2017**

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
MARCH 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	10	0	3	0
TRS(ppb) Average	710	34	34	100	2	0	1	0
THC(ppm) Average	707	36	37	99.87	2.2	-	2	-
NMHC(ppm) Average	707	36	37	99.87	0.146	-	0.024	-
CH4(ppm) Average	707	36	37	99.87	2.1	-	2	-
NO2(ppb) Average	708	36	36	100	22	0	7	-
NO(ppb) Average	708	36	36	100	9	-	2	-
NOX(ppb) Average	708	36	36	100	23	-	9	-
O3(ppb) Average	710	34	34	100	51	0	42	-
PM2.5(ug/m3) Average	743	1	1	100	59.5	-	9.5	0
AT 2m(C) Average	744	0	0	100	12.3	-	6.2	-
RH(%) Average	744	0	0	100	99	-	91	-
Leaf Wetness (% of range) Average	744	0	0	100	47	-	4	-
WS(km/h) Average	741	0	3	99.6	23	-	19	-
WD(deg) Average	741	0	3	99.6	-	-	-	-
PC(mm) Total	744	0	0	100	1	-	1.5	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
MARCH 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
TRS(ppb) Average	710	0.3	0	-	0	0	0	0	0	0	2
THC(ppm) Average	707	1.95	0	-	1.9	1.9	1.9	1.9	2	2	2.2
NMHC (ppm) Average	707	0.002	0.011	-	0	0	0	0	0	0	0.146
CH4(ppm) Average	707	1.95	0	-	1.9	1.9	1.9	1.9	2	2	2.1
NO2(ppb) Average	708	2.7	3	-	0	1	1	2	3	6	22
NO(ppb) Average	708	0.5	1	-	0	0	0	0	1	2	9
NOX(ppb) Average	708	3.3	3	-	0	1	1	2	4	7	23
O3(ppb) Average	710	34.3	8	-	5	23	29	35	40	44	51
PM2.5(ug/m3) Average	743	4.06	3.7	-	0.3	1.2	2	3.4	4.9	7.1	59.5
Temperature 2 m (C) Average	744	-7.98	10.9	-	-33	-22.8	-17.9	-5.1	0.6	5	12.3
Relative Humidity (%) Average	744	66.9	16	-	30	44	54	68	79	89	99
Leaf Wetness (% of range) Average	744	0.6	2	-	0	0	0	0	1	1	47
Wind Speed 20 m (km/h) Average	741	9.4	4	-	0	4	6	9	12	16	23
Wind Direction 20 m (deg) Average	741	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	3.81	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
CH4, NMHC, THC	17 Mar 2017 15:00	17 Mar 2017 15:00	1	Maintenance - replaced carrier gas
Wind Speed, Wind Direction	09 Mar 2017 22:00	10 Mar 2017 00:00	3	Flat line in sensor output signal -sensor frozen



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 10 ppb on Mar 9 11:00	Maximum Daily Average: 2.6 ppb on Mar 9		Hours of Data:	708
Minimum Value: 0 ppb on Mar 7 01:00	Minimum Daily Average: 0.0 ppb on Mar 30		Hours of Missing Data:	36
Maximum Diurnal Average: 1.1 ppb at hour 11	Minimum Diurnal Average: 0.3 ppb at hour 2		Hours of Calibration:	36
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 = 7		Percent Operational Time:	100.0

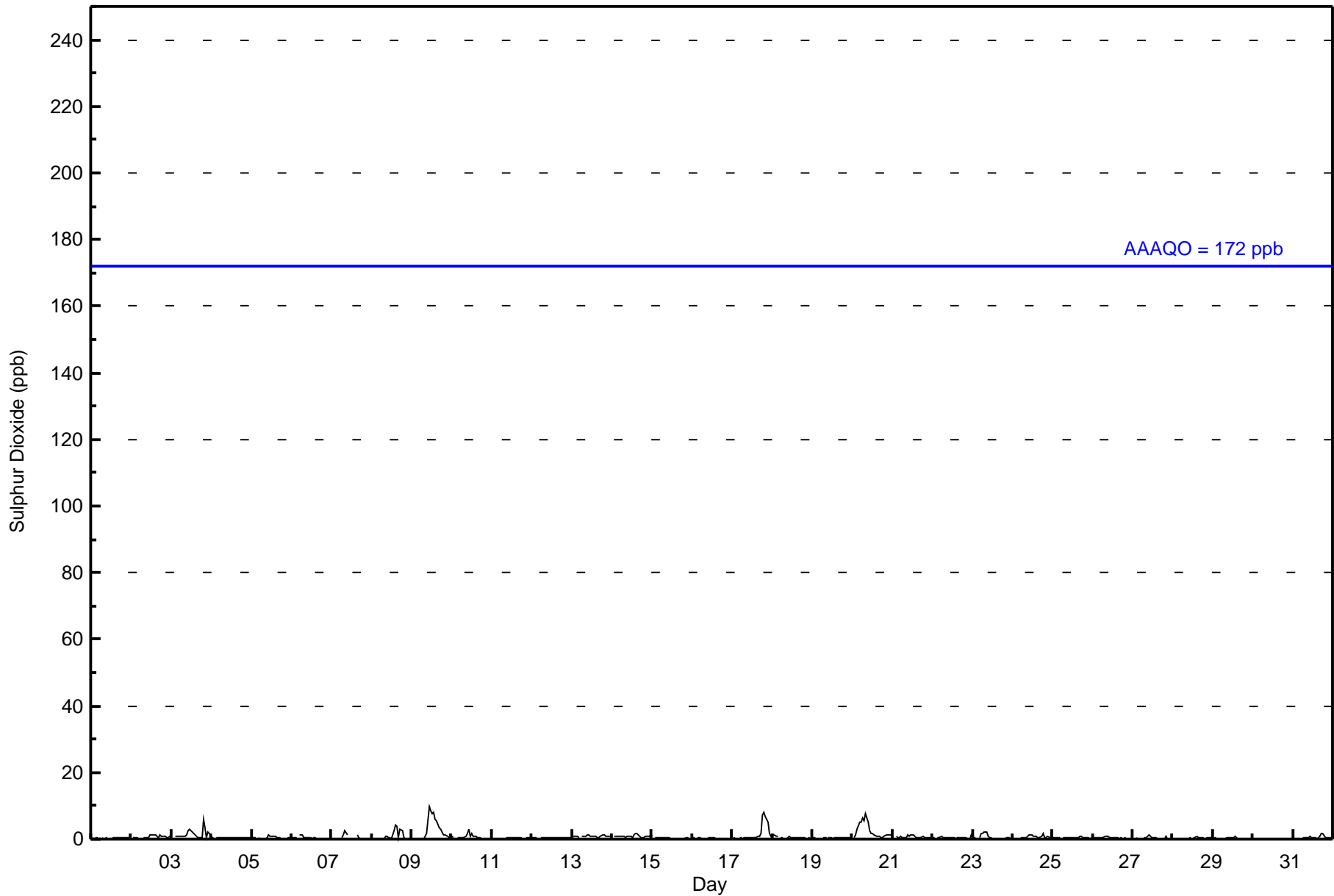
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Mar	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0.6	1
3-Mar	1	Z	1	1	1	1	1	1	1	1	2	3	2	2	1	1	0	0	0	6	3	0	2	1	1.5	6
4-Mar	1	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
5-Mar	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0.4	1
6-Mar	1	1	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Mar	0	0	0	0	0	Z	1	1	3	1	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0.4	3
8-Mar	Z	0	0	0	0	0	0	0	1	1	0	0	0	3	4	4	0	3	3	0	0	0	0	0	0.9	4
9-Mar	0	Z	0	0	0	0	0	0	1	2	10	9	7	8	6	6	3	3	2	1	1	1	1	1	2.6	10
10-Mar	1	1	Z	0	0	1	1	1	1	2	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0.6	3
11-Mar	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-Mar	0	0	0	0	Z	0	0	1	0	0	0	1	0	0	0	1	1	0	0	0	1	0	1	0	0.4	1
13-Mar	0	1	1	1	1	Z	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0.8	1
14-Mar	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	0	0	1	1	1	1	1	0.9	2
15-Mar	1	Z	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
16-Mar	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
17-Mar	0	0	0	Z	0	1	0	0	1	0	0	1	0	1	0	1	1	2	7	8	7	5	2	1	1.7	8
18-Mar	1	1	1	1	Z	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0.4	1
19-Mar	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
20-Mar	Z	0	1	3	5	5	7	5	7	5	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2.4	7
21-Mar	1	Z	1	0	1	1	0	0	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0.6	1
22-Mar	0	0	Z	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
23-Mar	1	0	0	Z	0	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
24-Mar	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	0	1	2	0	0	1	0	0	0	0.6	2
25-Mar	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0.4	1
26-Mar	Z	0	1	0	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
27-Mar	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1
28-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.2	1
29-Mar	0	0	0	Z	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1
30-Mar	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
31-Mar	0	0	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	1	2	1	0	0	0	0	0	0.4	2
	0.4	0.3	0.4	0.4	0.5	0.6	0.6	0.6	0.8	0.8	1.1	0.9	0.8	0.9	0.8	0.7	0.5	0.6	0.7	0.8	0.7	0.5	0.4	0.4	Diurnal Average	
	1	1	1	3	5	5	7	5	7	5	10	9	7	8	6	6	3	3	7	8	7	5	2	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 - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - March 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 - March 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	39	17	18	22	27	85	162	131	35	12	9	1	9	32	38	68	705
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	39	17	18	22	27	85	162	131	35	12	9	1	9	32	38	68	705

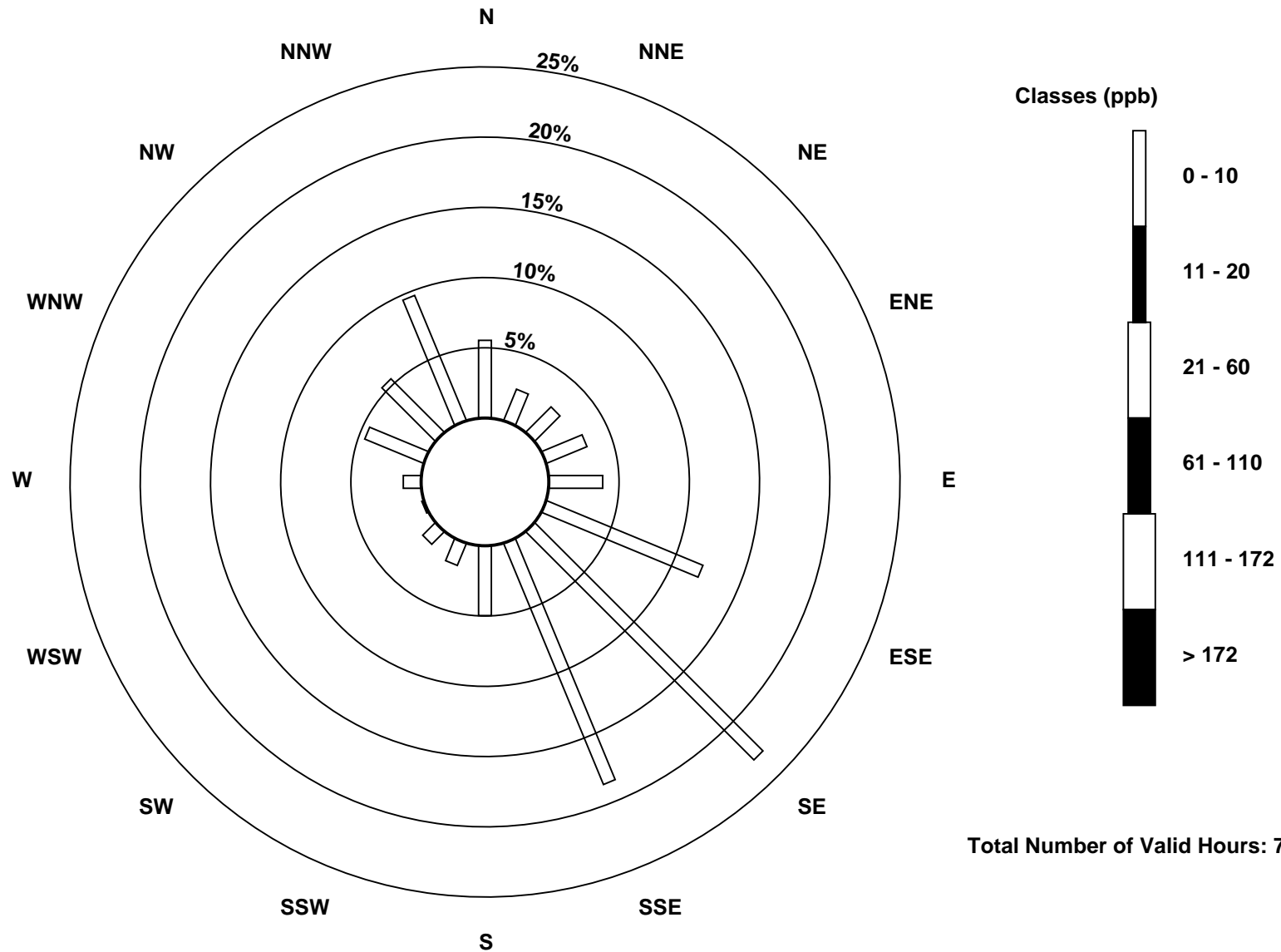
Total Number of Valid Hours: 705

Total Number of Hours: 744

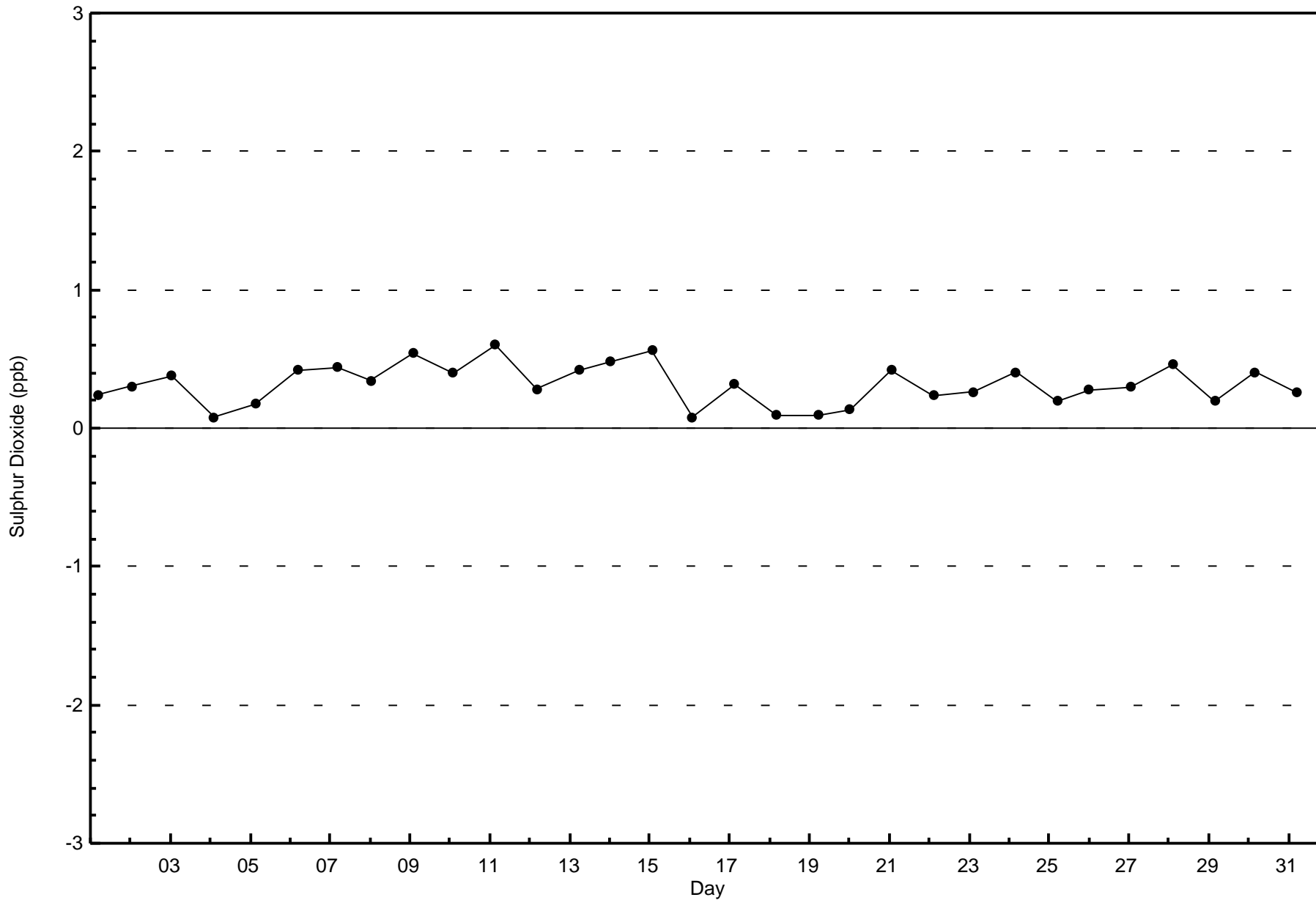


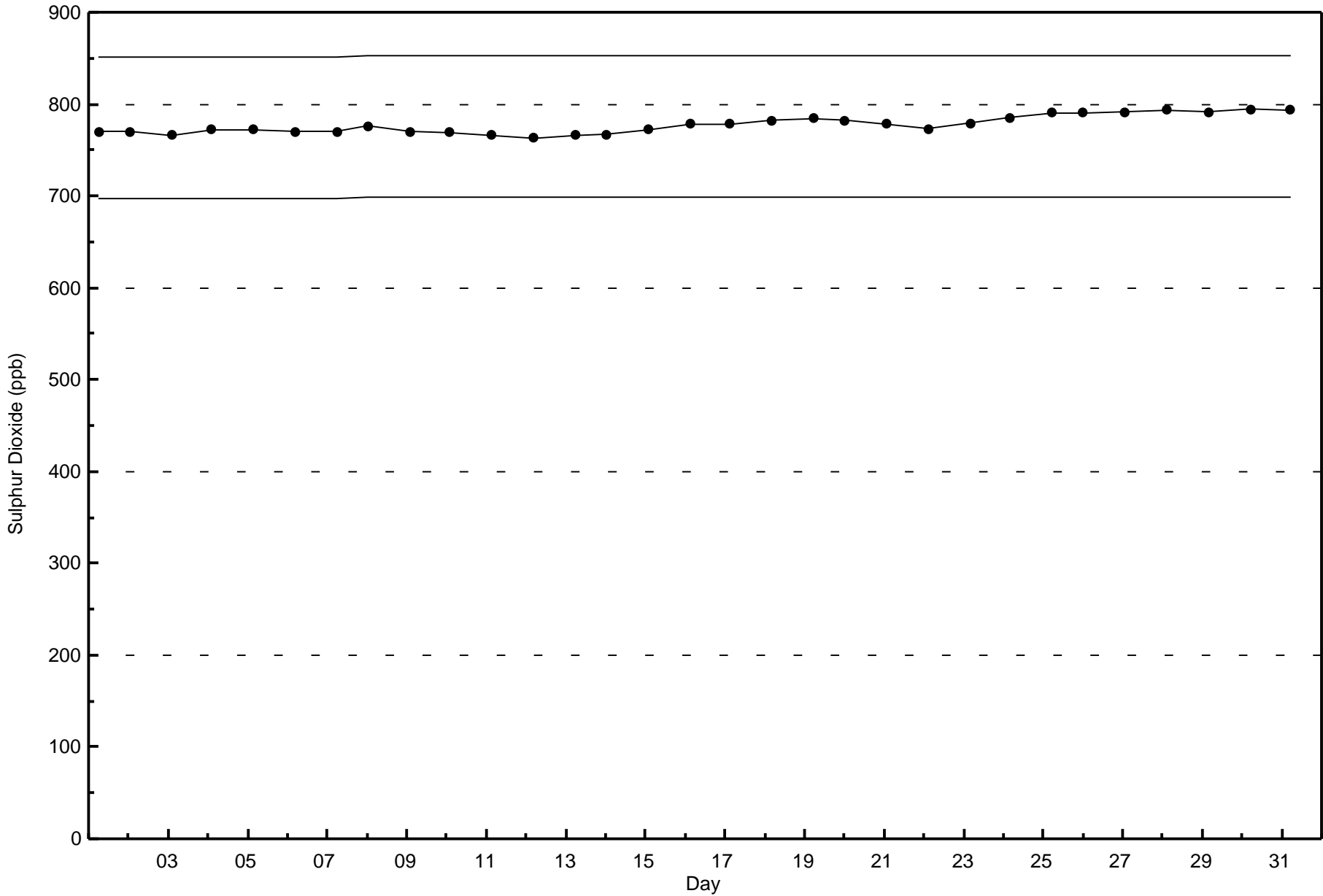
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Sulphur Dioxide (SO₂) - ppb
Anzac (AMS 14)



Total Number of Valid Hours: 705





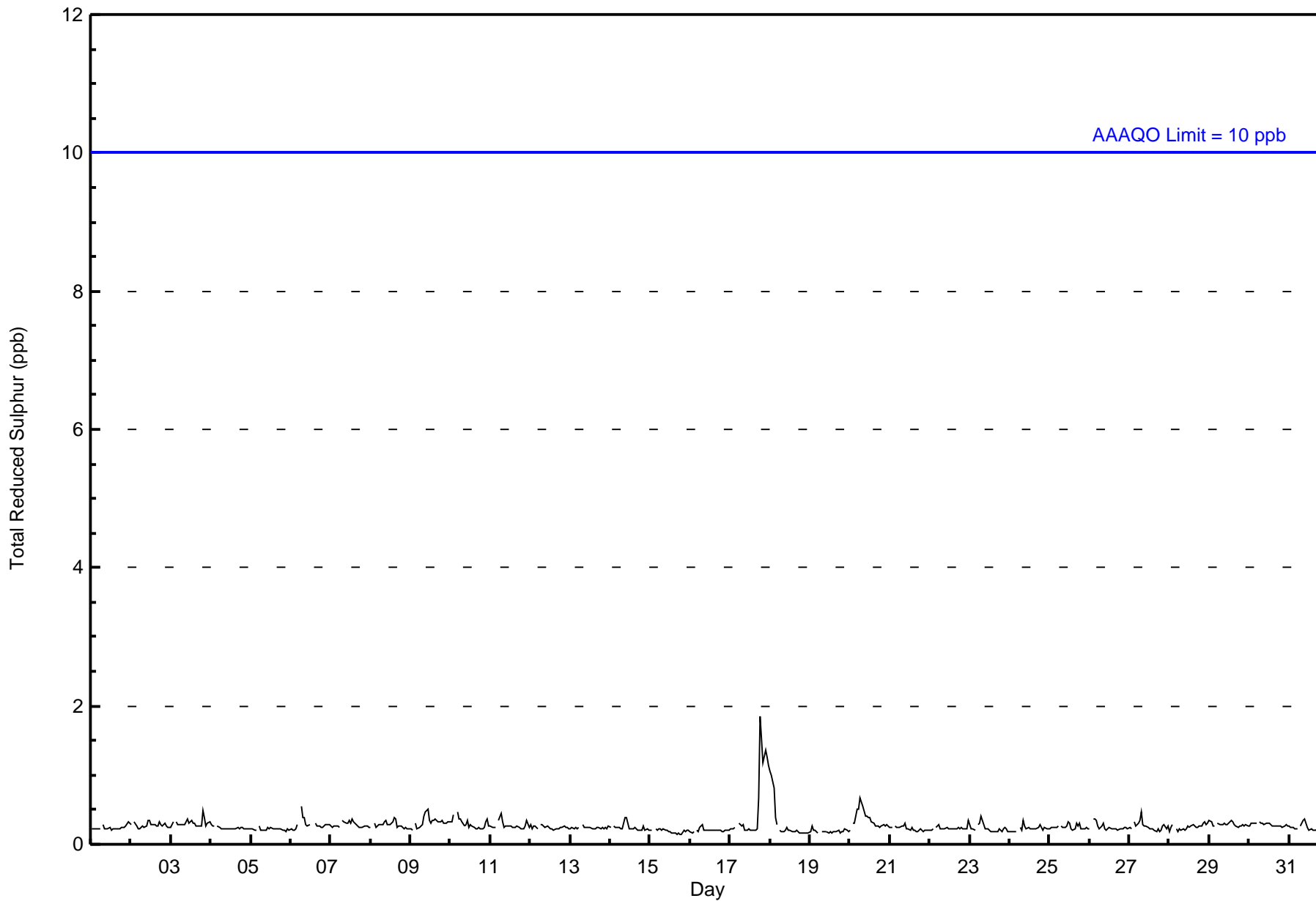


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2 ppb on Mar 17 19:00 Maximum Daily Average: 0.6 ppb on Mar 17																	Hours in Service: 744 Hours of Data: 710																																	
Minimum Value: 0 ppb on Mar 15 20:00 Minimum Daily Average: 0.2 ppb on Mar 19 Maximum Diurnal Average: 0.3 ppb at hour 7 Minimum Diurnal Average: 0.2 ppb at hour 17 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 = 1																	Hours of Missing Data: 34 Hours of Calibration: 34 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-Mar	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																							
2-Mar	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																							
3-Mar	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	0																							
4-Mar	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																							
5-Mar	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																							
6-Mar	0	0	0	0	0	Z	1	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0.3	1																							
7-Mar	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																							
8-Mar	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																							
9-Mar	0	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																							
10-Mar	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																							
11-Mar	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	0.3	0																							
12-Mar	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																							
13-Mar	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																							
14-Mar	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																							
15-Mar	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																							
16-Mar	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																							
17-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	1	1	1	0.6	2																							
18-Mar	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	0.3	1																							
19-Mar	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																							
20-Mar	0	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
21-Mar	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																							
22-Mar	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																							
23-Mar	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																							
24-Mar	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																							
25-Mar	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																							
26-Mar	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																							
27-Mar	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	0																							
28-Mar	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																							
29-Mar	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	0.3	0																							
30-Mar	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																							
31-Mar	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																							
																								0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	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	0	1	0	0	0	0	0	0	0	0	1	2	2	1	1	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

Total Reduced Sulphur (TRS) - ppb
Anzac - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - March 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
Anzac - March 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	38	17	18	23	25	85	163	132	34	12	9	1	9	31	43	67	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	38	17	18	23	25	85	163	132	34	12	9	1	9	31	43	67	707

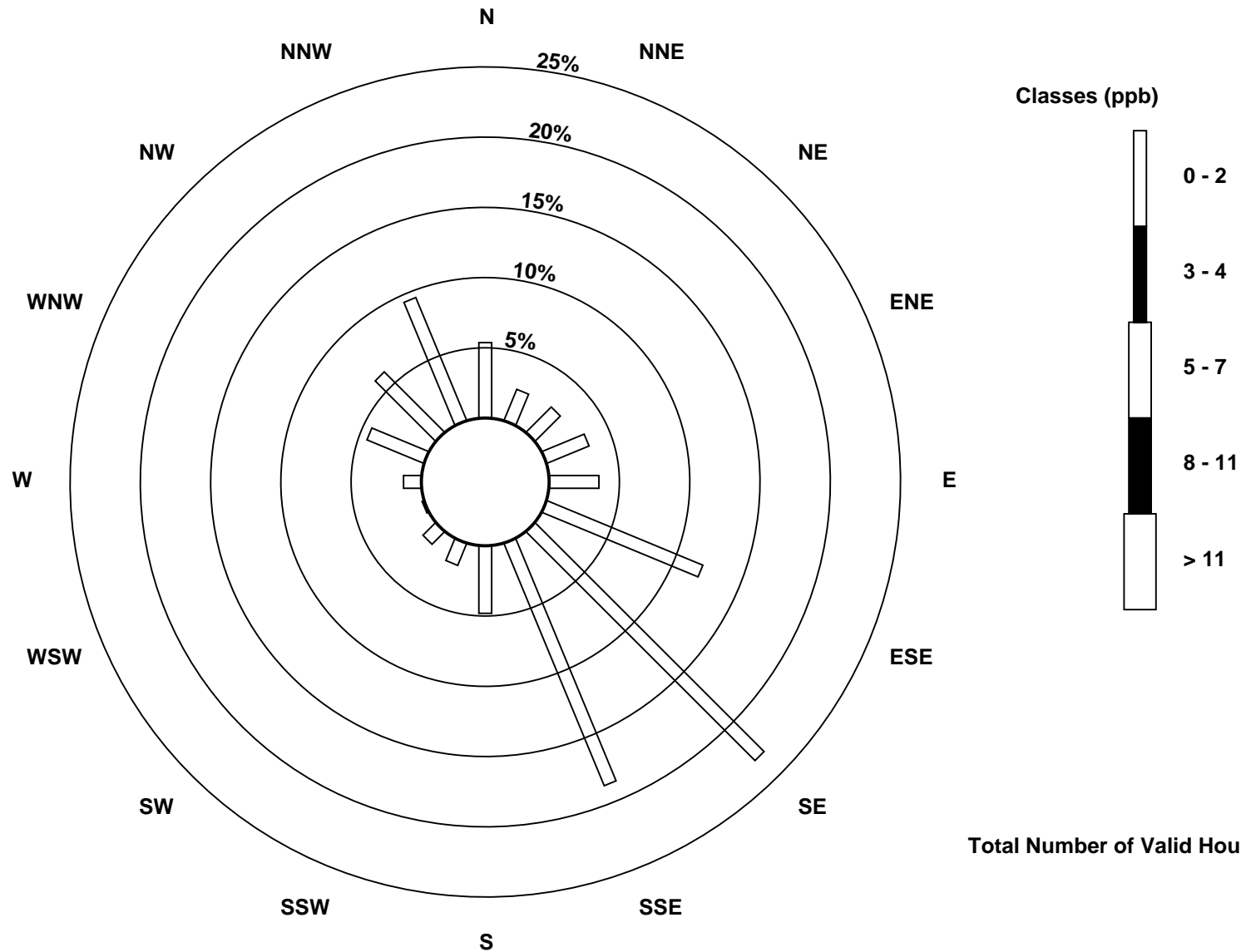
Total Number of Valid Hours: 707

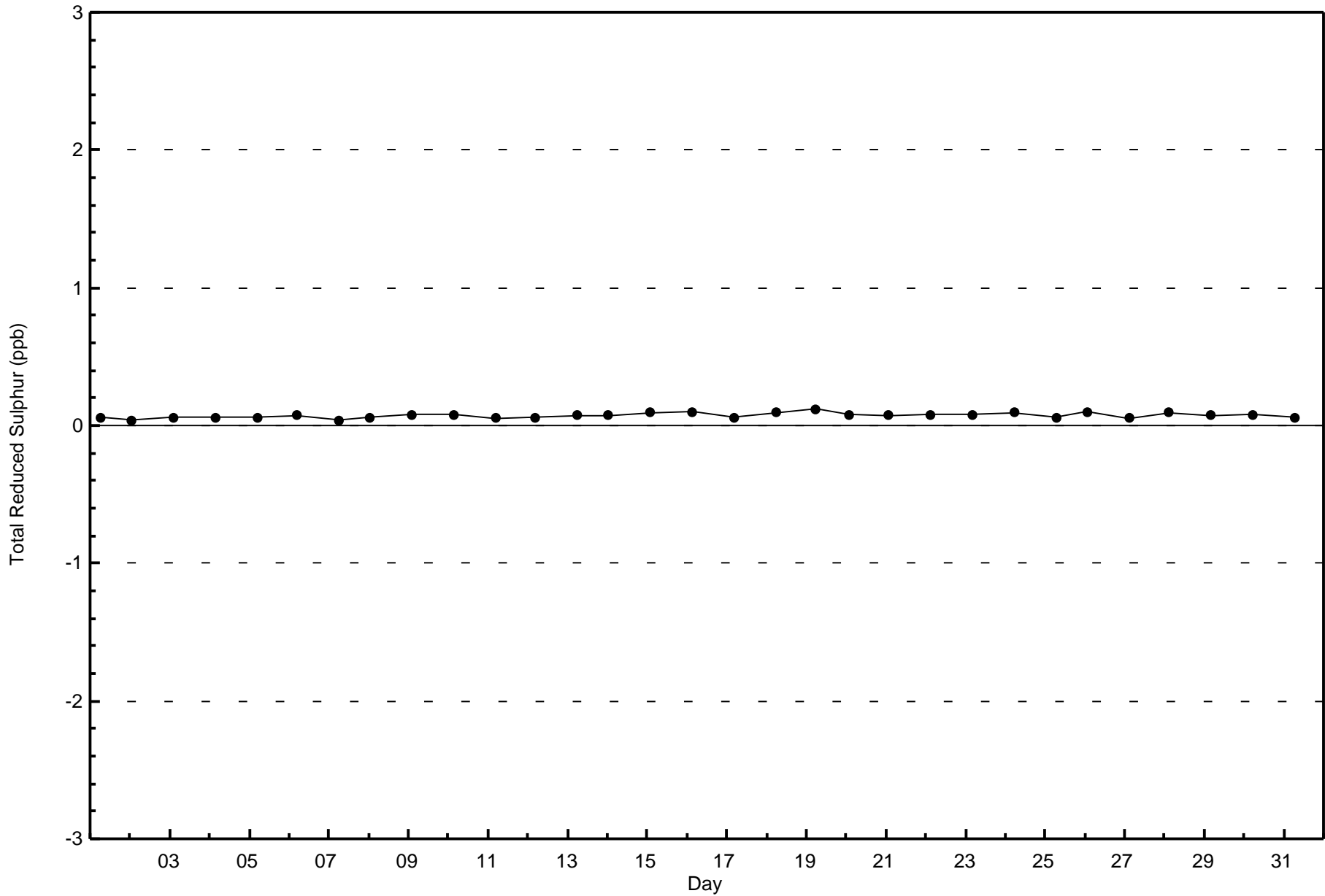
Total Number of Hours: 744

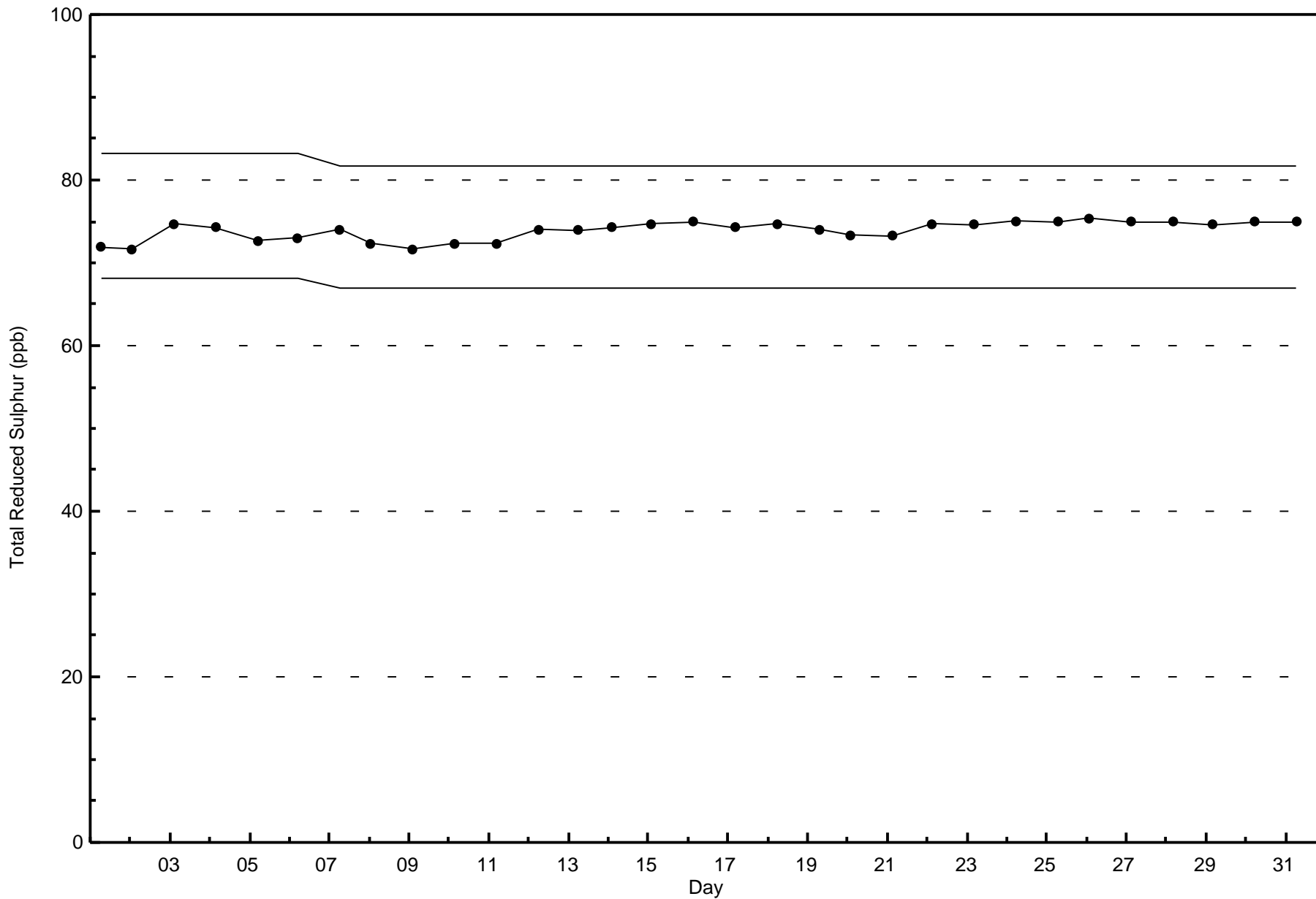


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Reduced Sulphur (TRS) - ppb
Anzac (AMS 14)

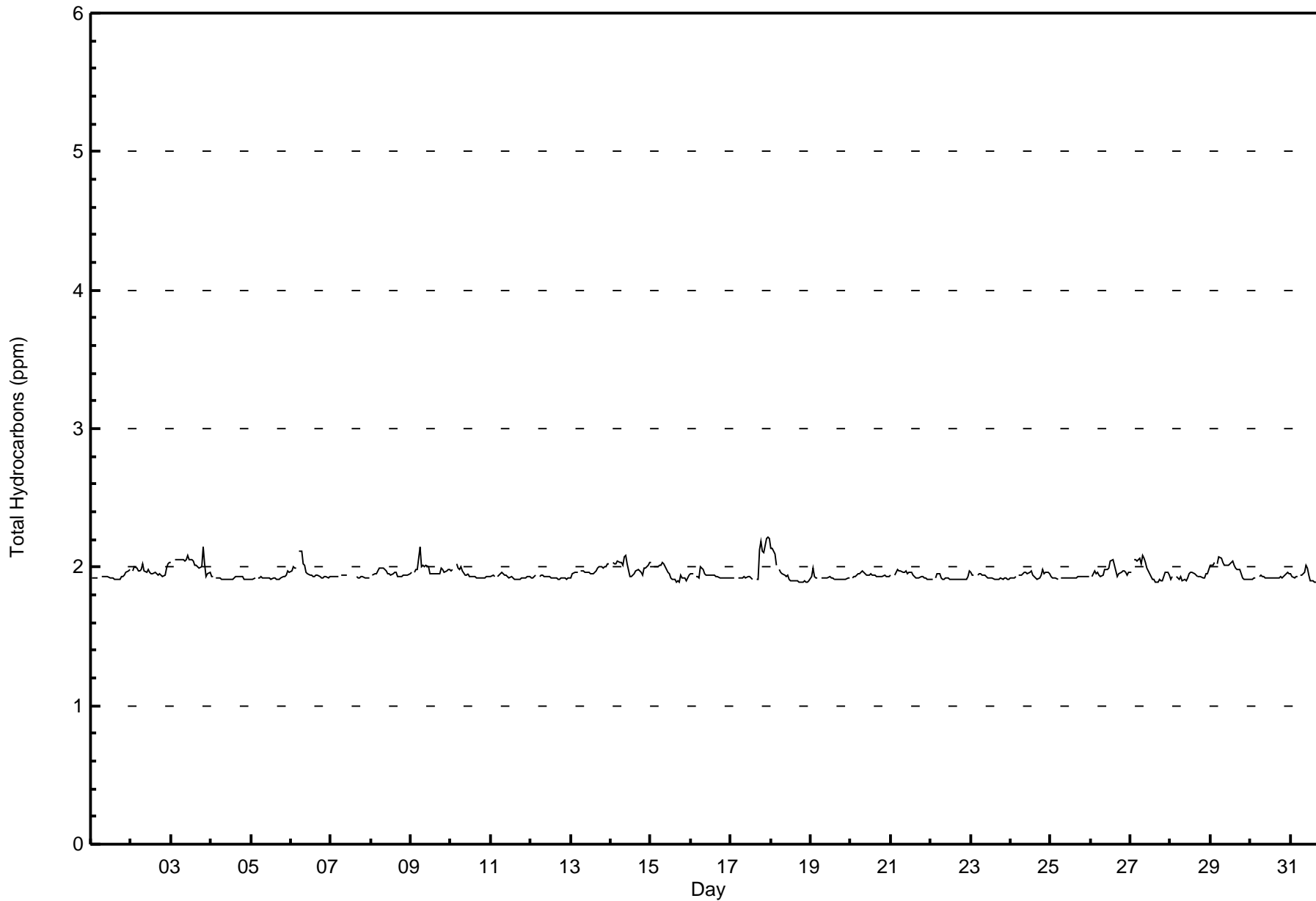








Maximum Value: 2.2 ppm on Mar 17 23:00		Maximum Daily Average: 2.0 ppm on Mar 3		Hours in Service: 744																						
Minimum Value: 1.9 ppm on Mar 31 15:00		Minimum Daily Average: 1.9 ppm on Mar 4		Hours of Data: 707																						
Maximum Diurnal Average: 2.0 ppm at hour 6		Minimum Diurnal Average: 1.9 ppm at hour 17		Hours of Missing Data: 37																						
Monthly Average: 1.95 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.0 P ₉₉ = 2.1		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-Mar	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	2.0	2.0	2.0	1.9	2.0
2-Mar	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	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0
3-Mar	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	1.9	2.0	2.0	2.0	2.1
4-Mar	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
5-Mar	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	2.0	2.0	1.9	2.0
6-Mar	2.0	2.0	2.0	2.0	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	1.9	1.9	1.9	2.0
7-Mar	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
8-Mar	Z	1.9	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	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0
9-Mar	2.0	Z	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
10-Mar	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	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	1.9	2.0
11-Mar	1.9	1.9	1.9	Z	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	1.9	1.9	2.0
12-Mar	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
13-Mar	1.9	1.9	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
14-Mar	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.1
15-Mar	2.0	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	1.9	1.9	1.9	1.9	2.0
16-Mar	2.0	1.9	Z	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	1.9	1.9	2.0
17-Mar	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	M	1.9	1.9	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2
18-Mar	2.1	2.1	2.1	2.0	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	1.9	1.9	2.1
19-Mar	1.9	2.0	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	2.0
20-Mar	Z	1.9	1.9	1.9	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
21-Mar	1.9	Z	1.9	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	1.9	1.9	1.9	2.0
22-Mar	1.9	1.9	Z	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	1.9	1.9	1.9	1.9	2.0	1.9	2.0
23-Mar	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	1.9	1.9	1.9	2.0
24-Mar	1.9	1.9	1.9	1.9	Z	1.9	1.9	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	2.0
25-Mar	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	1.9
26-Mar	Z	1.9	2.0	1.9	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.1
27-Mar	2.0	Z	2.1	2.1	2.0	2.1	2.0	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	2.0	2.0	1.9	2.0	2.1
28-Mar	1.9	1.9	Z	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	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0
29-Mar	2.0	2.0	2.0	Z	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	1.9	1.9	1.9	1.9	1.9	1.9	2.1
30-Mar	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	2.0	2.0	1.9	2.0
31-Mar	1.9	1.9	1.9	1.9	1.9	Z	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	1.9	2.0	2.0	1.9	2.0
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - March 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	673	95.19	95.19
2.1 - 3.0	34	4.81	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
Anzac - March 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	37	17	18	22	23	83	155	122	32	11	9	1	8	31	36	65	670
2.1 - 3.0	2	0	0	0	4	2	7	9	2	1	0	0	1	1	2	3	34
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	39	17	18	22	27	85	162	131	34	12	9	1	9	32	38	68	704

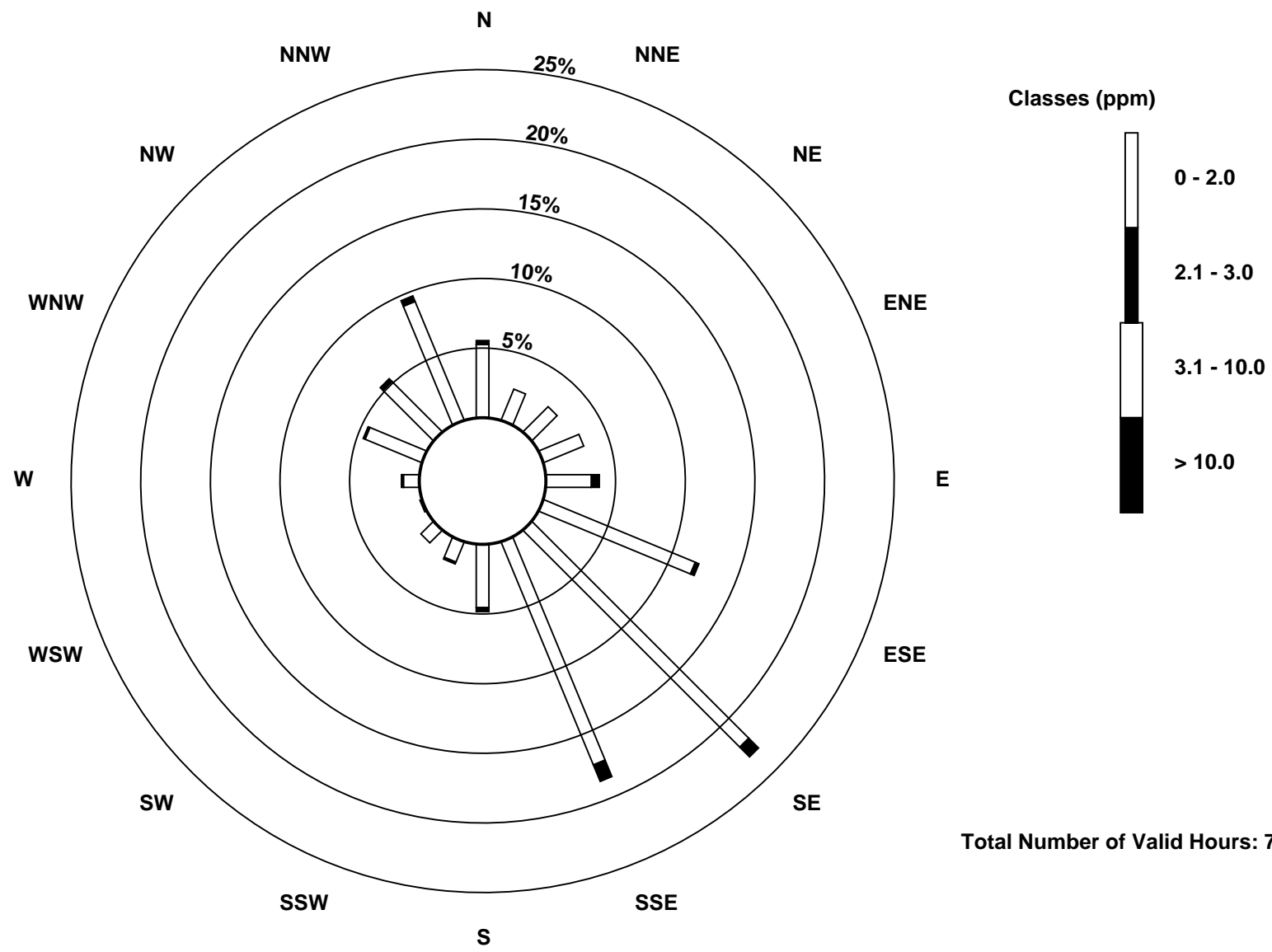
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Hydrocarbons (THC) - ppm
Anzac (AMS 14)



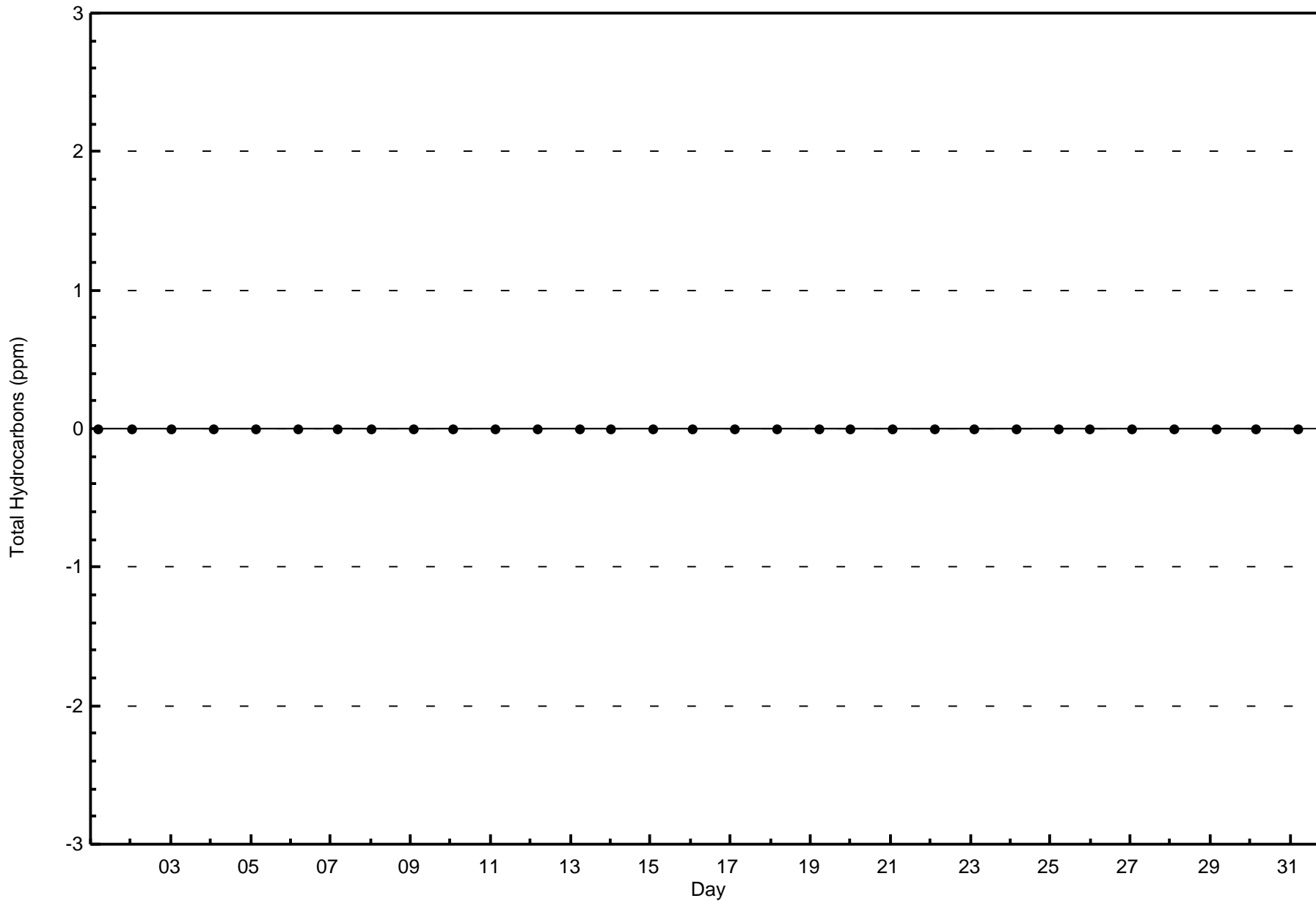


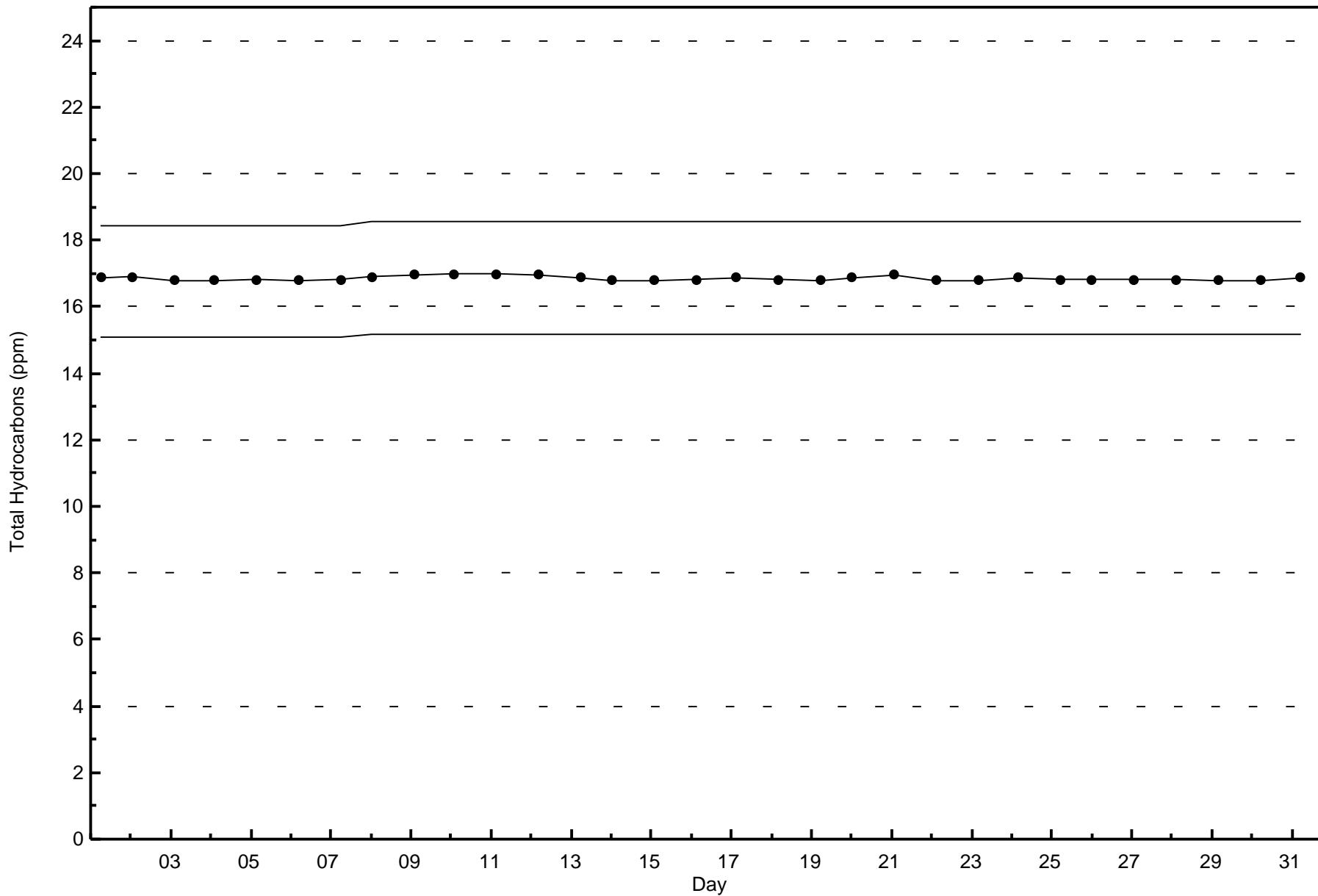
Wood Buffalo Environmental Association

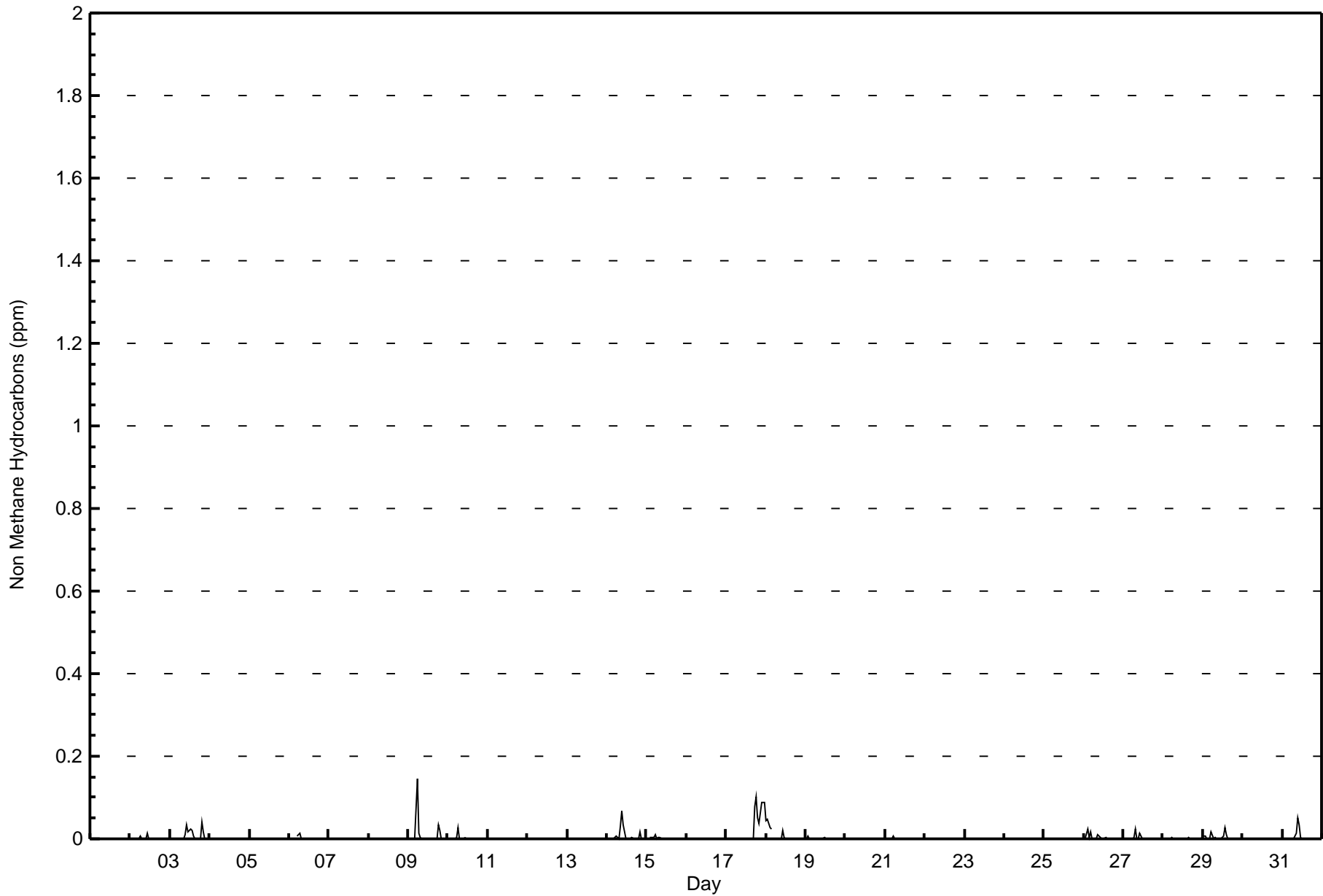
Zero Responses

Total Hydrocarbons (THC) - ppm

Anzac - March 2017









**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Anzac - March 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	657	92.93	92.93
0.006 - 0.05	43	6.08	99.01
0.06 - 0.1	7	0.99	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
Anzac - March 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	36	17	18	22	24	80	143	124	34	10	9	1	8	30	34	64	654
0.006 - 0.05	1	0	0	0	2	5	18	6	0	2	0	0	0	2	3	4	43
0.06 - 0.1	2	0	0	0	1	0	1	1	0	0	0	0	1	0	1	0	7
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	17	18	22	27	85	162	131	34	12	9	1	9	32	38	68	704

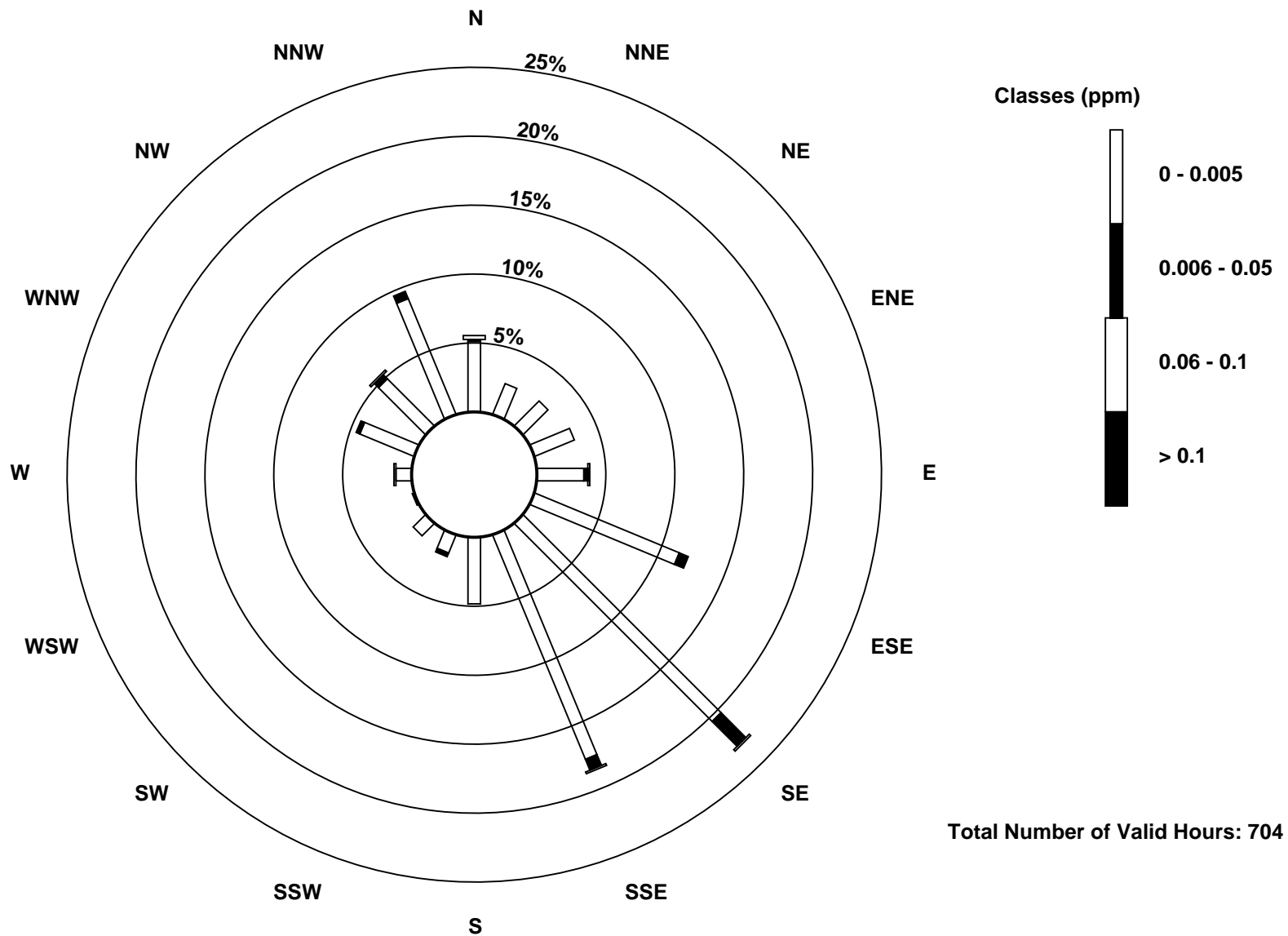
Total Number of Valid Hours: 704

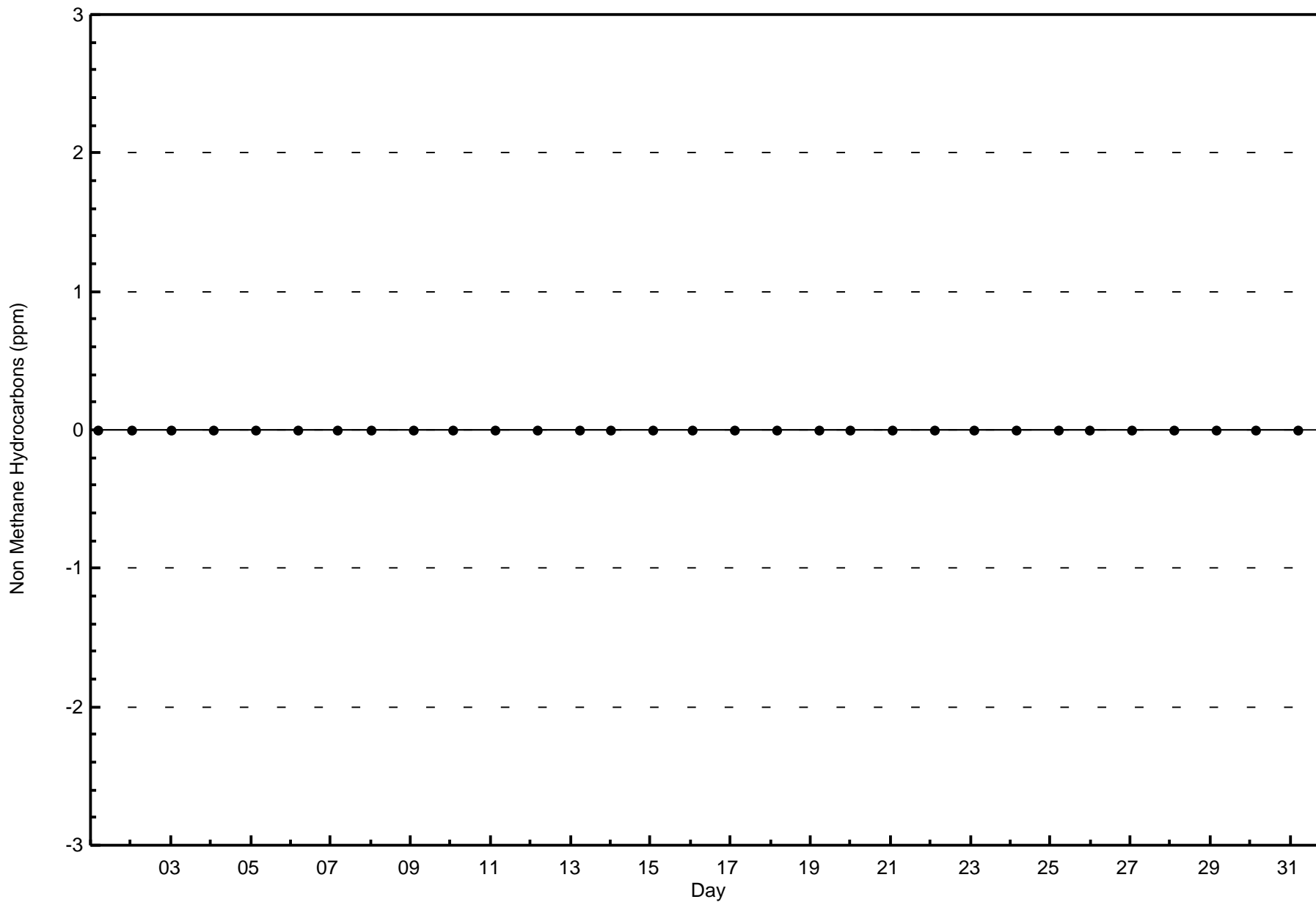
Total Number of Hours: 744

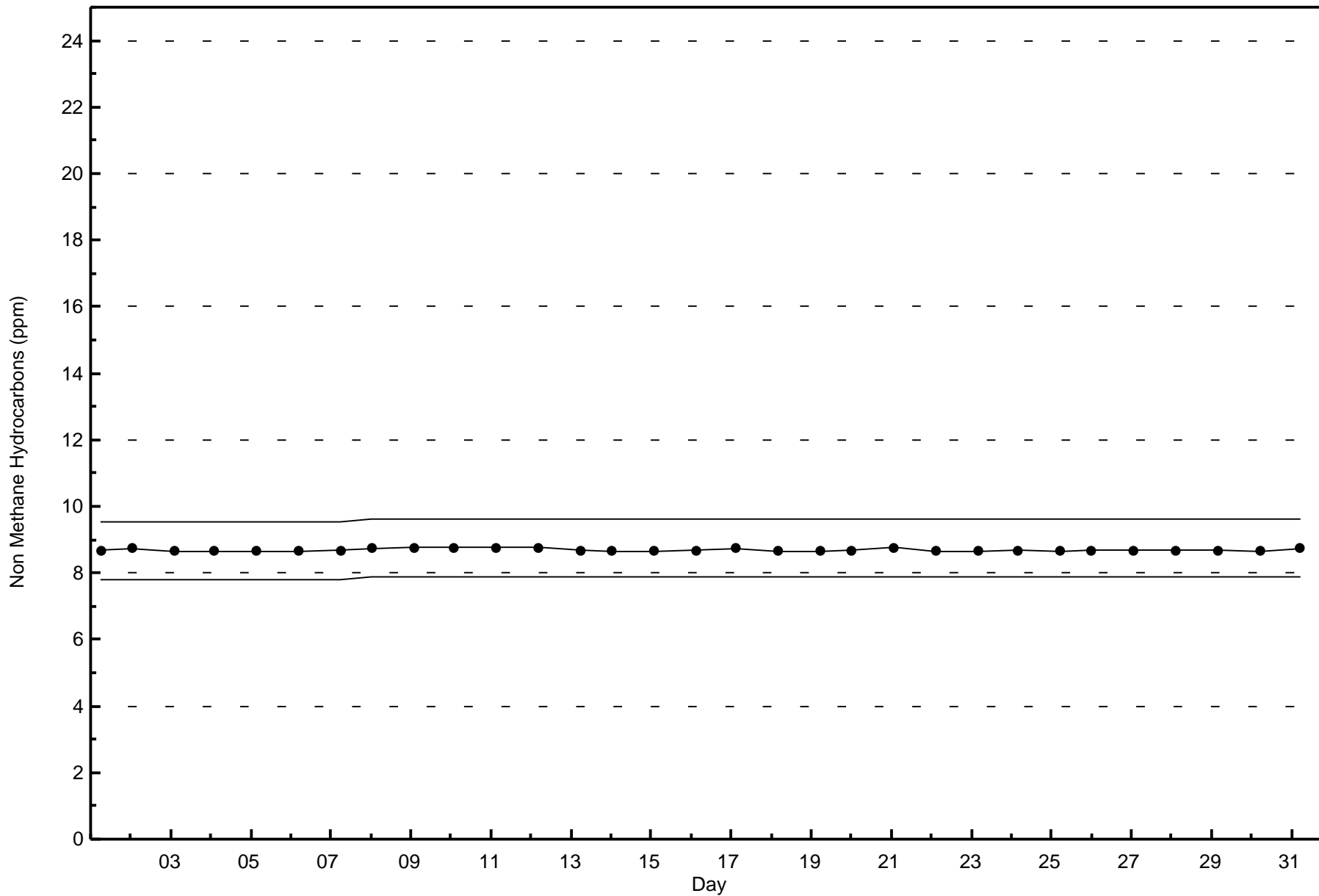


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Non Methane Hydrocarbons (NMHC) - ppm
Anzac (AMS 14)









Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

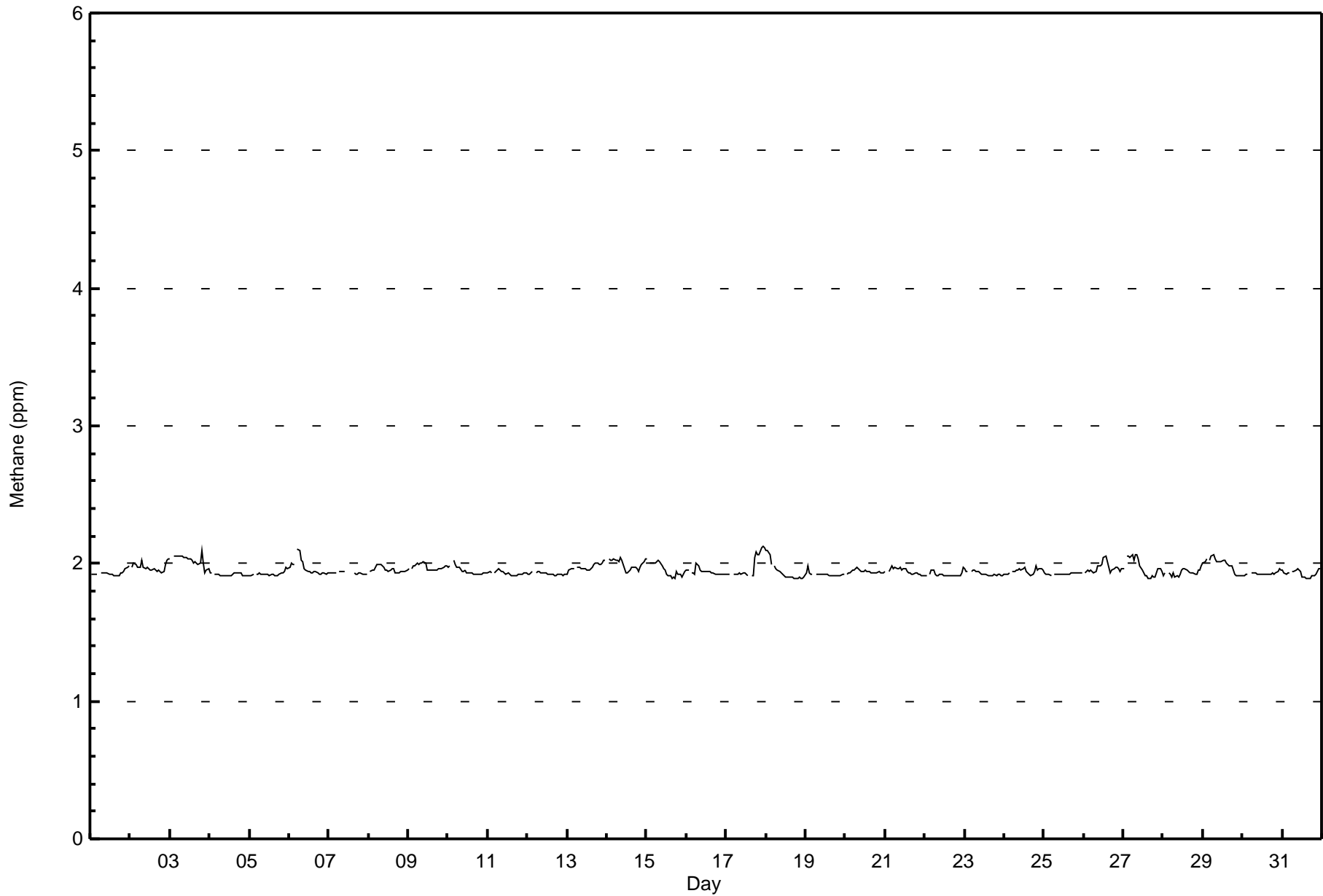
Anzac - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2.1 ppm on Mar 17 23:00 Maximum Daily Average: 2.0 ppm on Mar 3																	Hours in Service: 744 Hours of Data: 707									
Minimum Value: 1.9 ppm on Mar 31 15:00 Minimum Daily Average: 1.9 ppm on Mar 4 Maximum Diurnal Average: 2.0 ppm at hour 6 Minimum Diurnal Average: 1.9 ppm at hour 17 Monthly Average: 1.95 ppm Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.0 P ₉₉ = 2.1																	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-Mar	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	2.0	2.0	2.0	1.9	2.0
2-Mar	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	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0
3-Mar	2.0	Z	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	2.0	2.0	2.0	2.1	2.0	1.9	2.0	2.0	2.0	2.1
4-Mar	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
5-Mar	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	2.0	2.0	1.9	2.0
6-Mar	2.0	2.0	2.0	2.0	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	1.9	1.9	1.9	2.0
7-Mar	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
8-Mar	Z	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0
9-Mar	2.0	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
10-Mar	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	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
11-Mar	1.9	1.9	1.9	Z	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	1.9	1.9	2.0
12-Mar	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
13-Mar	1.9	1.9	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
14-Mar	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	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0
15-Mar	2.0	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	1.9	1.9	1.9	1.9	2.0
16-Mar	2.0	1.9	Z	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	1.9	1.9	2.0
17-Mar	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	M	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0
18-Mar	2.1	2.1	2.1	2.0	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	1.9	1.9	1.9
19-Mar	1.9	2.0	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	2.0
20-Mar	Z	1.9	1.9	1.9	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
21-Mar	1.9	Z	1.9	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	1.9	1.9	1.9	2.0
22-Mar	1.9	1.9	Z	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	1.9	1.9	1.9	1.9	2.0	1.9	2.0
23-Mar	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	1.9	1.9	1.9	2.0
24-Mar	1.9	1.9	1.9	1.9	Z	1.9	1.9	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	1.9	1.9	2.0
25-Mar	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	1.9
26-Mar	Z	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.1
27-Mar	2.0	Z	2.0	2.1	2.0	2.1	2.0	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	2.0	2.0	1.9	2.0	2.1
28-Mar	1.9	1.9	Z	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	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0
29-Mar	2.0	2.0	2.0	Z	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	1.9	1.9	1.9	1.9	1.9	1.9	2.1
30-Mar	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	2.0	2.0	1.9	2.0
31-Mar	1.9	1.9	1.9	1.9	1.9	Z	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	2.0	2.0	1.9	2.0
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										



Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Anzac - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Anzac - March 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	682	96.46	96.46
2.1 - 3.0	25	3.54	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
Anzac - March 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	38	17	18	22	23	84	160	123	32	11	9	1	9	31	36	65	679
2.1 - 3.0	1	0	0	0	4	1	2	8	2	1	0	0	0	1	2	3	25
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	39	17	18	22	27	85	162	131	34	12	9	1	9	32	38	68	704

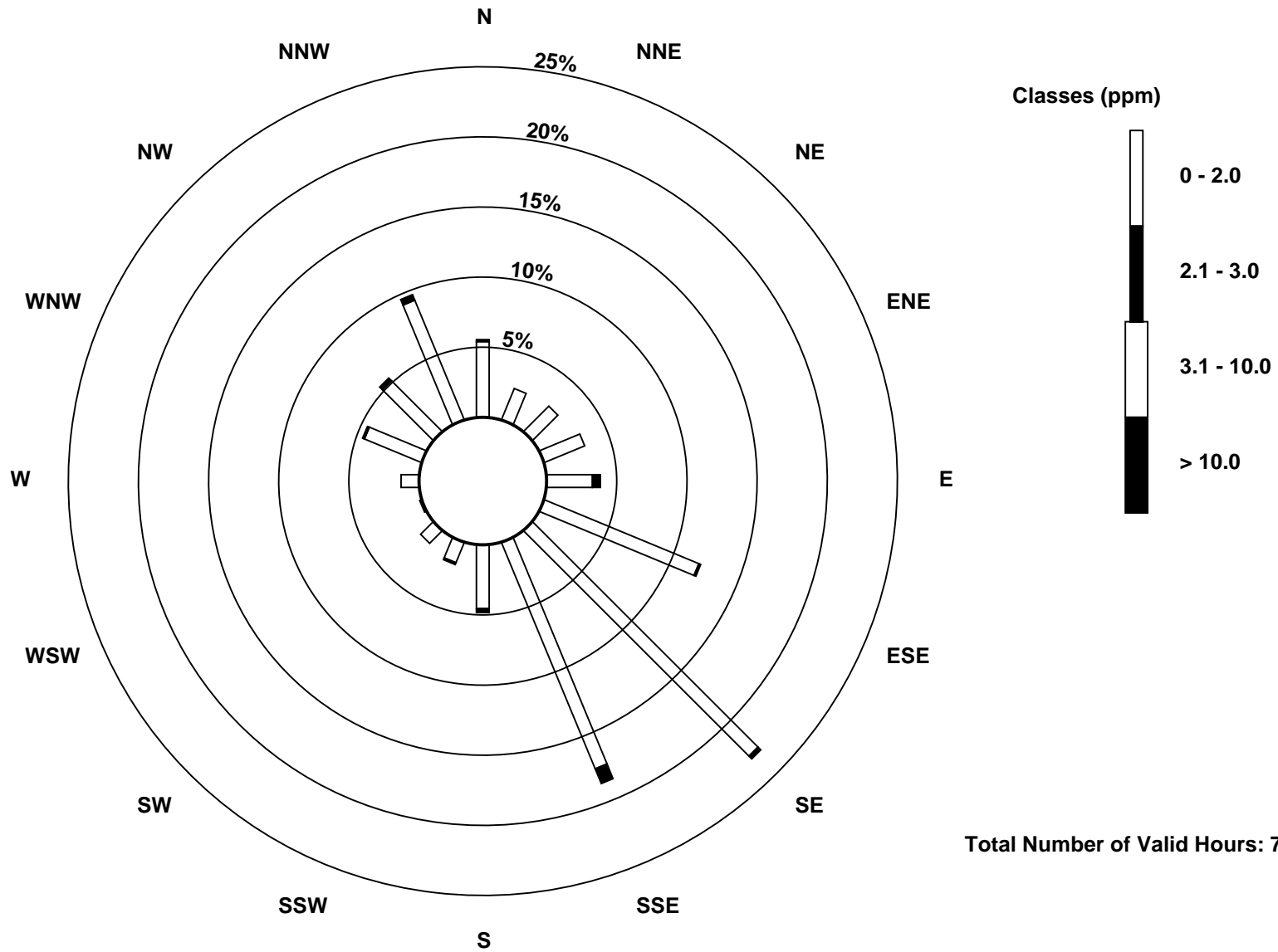
Total Number of Valid Hours: 704

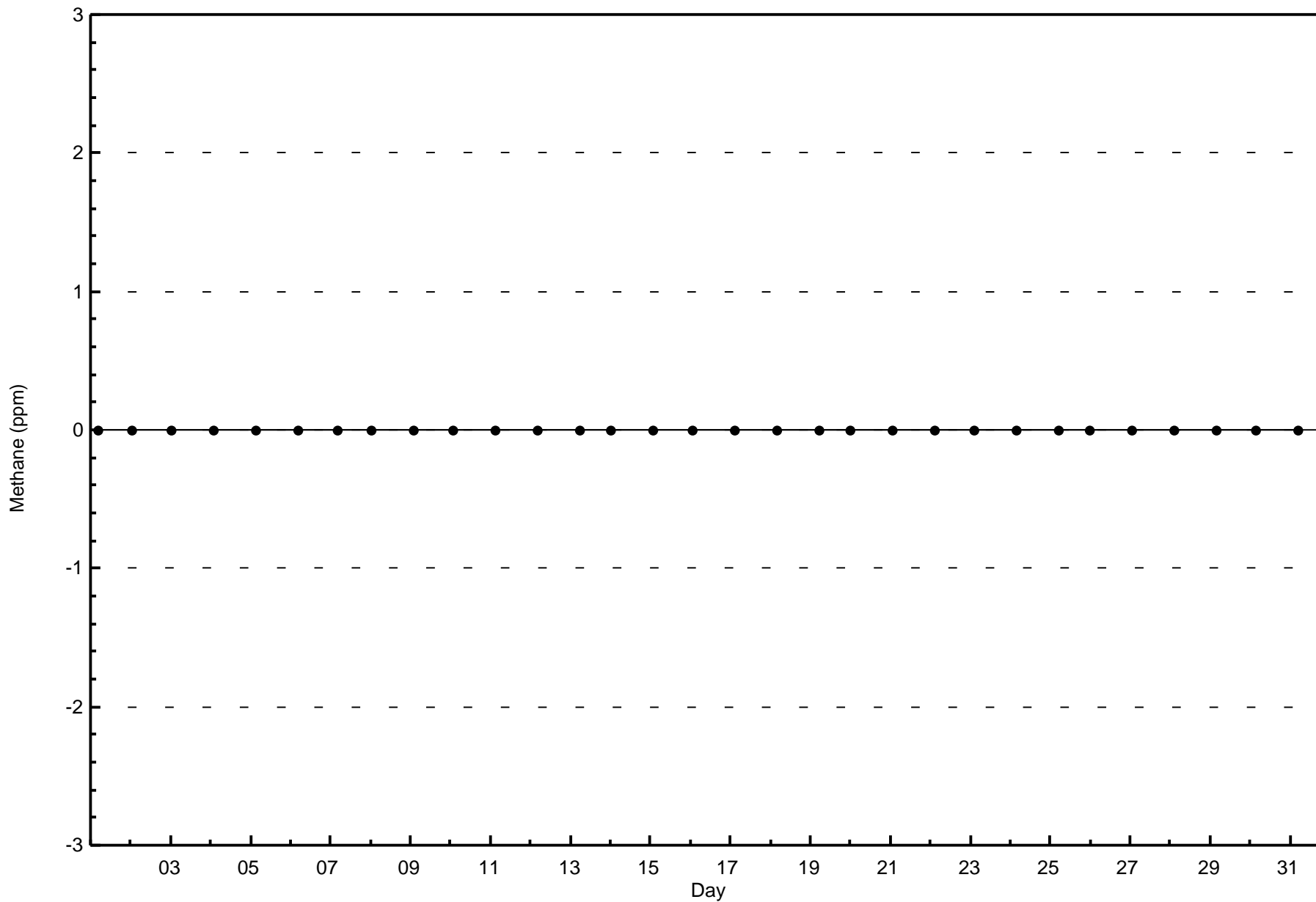
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Methane (CH₄) - ppm
Anzac (AMS 14)

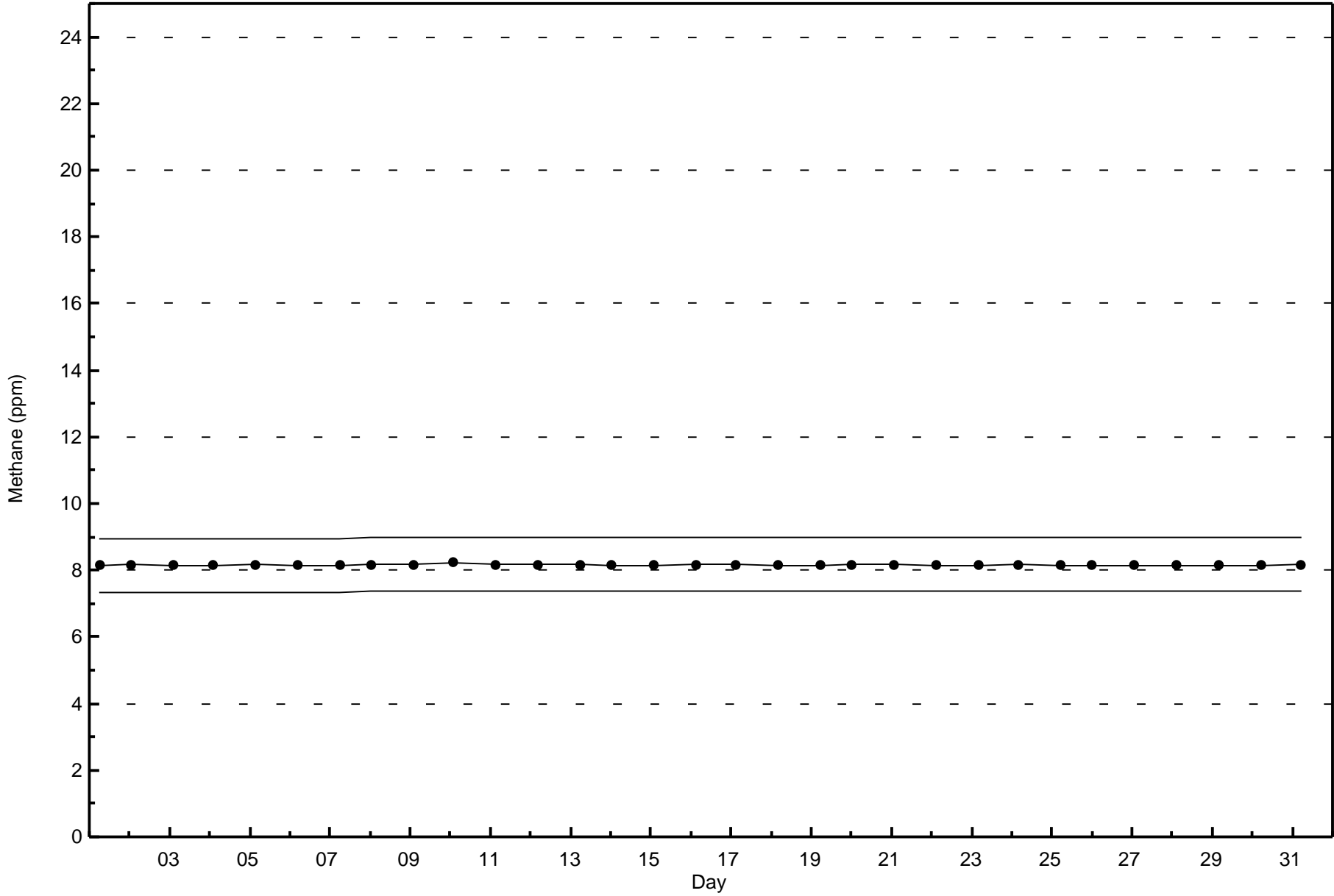






Wood Buffalo Environmental Association
Span Responses

Methane (CH₄) - ppm
Anzac - March 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

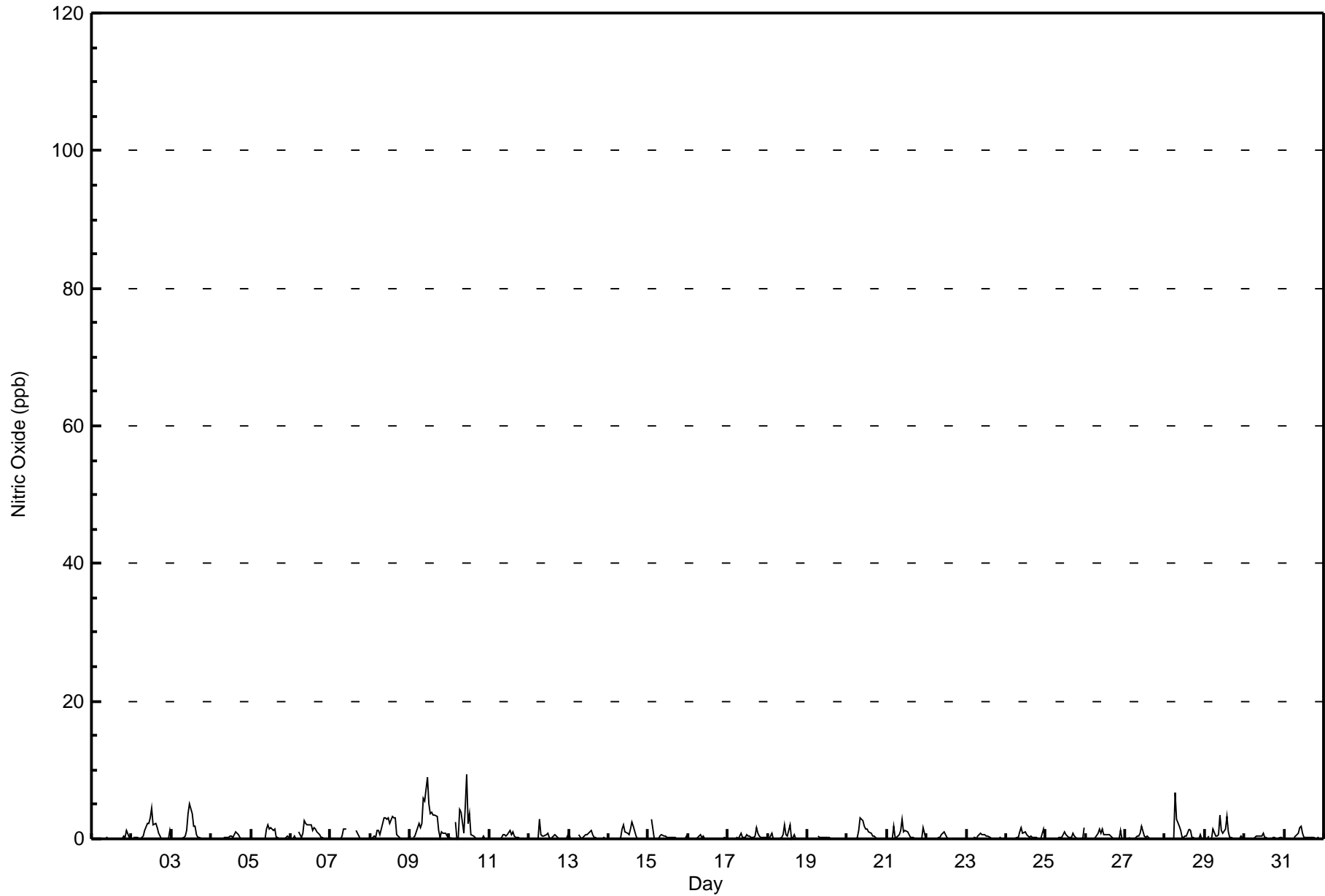
Anzac - March 2017

Maximum Value: 9 ppb on Mar 10 11:00																		Maximum Daily Average: 2.4 ppb on Mar 9						Hours in Service: 744		
Minimum Value: 0 ppb on Mar 5 02:00																		Minimum Daily Average: 0.1 ppb on Mar 19						Hours of Data: 708		
Maximum Diurnal Average: 1.6 ppb at hour 11																		Minimum Diurnal Average: 0.1 ppb at hour 2						Hours of Missing Data: 36		
Monthly Average: 0.5 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 5						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-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1
2-Mar	Z	0	0	0	0	0	0	0	1	2	2	3	5	2	2	2	1	0	0	0	0	0	0	1	1.0	5
3-Mar	0	Z	0	0	0	0	0	0	0	1	4	5	4	2	2	1	0	0	0	0	0	0	0	0	0.9	5
4-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.2	1
5-Mar	0	0	0	Z	0	0	0	0	0	1	2	1	2	1	1	0	0	0	0	0	0	0	0	0	0.5	2
6-Mar	0	0	0	0	Z	1	0	1	3	2	2	2	2	1	2	1	1	1	0	0	0	0	0	0	0.9	3
7-Mar	0	0	0	0	0	Z	0	0	1	1	C	C	C	C	C	1	1	0	0	0	0	0	0	0	0.3	1
8-Mar	Z	0	0	0	1	1	1	2	3	3	3	3	2	3	3	3	1	0	0	0	0	0	0	0	1.3	3
9-Mar	0	Z	0	0	1	2	2	2	6	6	9	5	4	4	3	4	3	1	0	1	1	1	0	0	2.4	9
10-Mar	0	0	Z	2	0	0	4	4	1	5	9	2	4	1	0	0	0	0	0	0	0	0	0	0	1.5	9
11-Mar	0	0	0	Z	0	0	0	0	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
12-Mar	0	0	0	0	Z	0	3	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0.3	3
13-Mar	1	0	0	0	0	Z	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
14-Mar	Z	0	0	0	0	0	0	0	1	2	1	1	1	1	2	2	0	0	0	0	0	0	0	0	0.6	2
15-Mar	0	Z	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3
16-Mar	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
17-Mar	0	0	0	Z	0	0	0	0	1	0	0	1	0	0	0	0	0	2	1	0	0	0	0	0	0.4	2
18-Mar	0	0	1	0	Z	0	0	0	0	1	2	1	0	2	0	0	1	0	0	0	0	0	0	0	0.3	2
19-Mar	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-Mar	Z	0	0	0	0	0	0	1	3	3	2	1	2	1	1	1	0	0	0	0	0	0	0	0	0.7	3
21-Mar	0	Z	0	0	2	0	0	1	1	3	1	1	1	1	0	0	0	0	0	0	0	0	2	0	0.6	3
22-Mar	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
23-Mar	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
24-Mar	0	0	0	0	Z	0	0	0	1	2	1	1	1	0	0	0	0	0	0	0	0	2	0	0	0.4	2
25-Mar	0	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	2	0.3	2
26-Mar	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0.4	1
27-Mar	0	Z	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
28-Mar	0	0	Z	0	0	0	7	3	2	1	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0.8	7
29-Mar	0	0	0	Z	0	1	0	0	1	4	1	1	2	3	1	0	0	0	0	0	0	0	0	0	0.7	4
30-Mar	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
31-Mar	0	0	0	0	0	Z	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
																		Diurnal Average		Diurnal Maximum						
																		0.1		1						
																		0.1		0						
																		0.2		3						
																		0.2		2						
																		0.2		2						
																		0.3		2						
																		0.6		7						
																		0.7		4						
																		1.0		6						
																		1.4		6						
																		1.6		9						
																		1.2		5						
																		1.1		5						
																		1.0		4						
																		0.8		3						
																		0.6		4						
																		0.4		3						
																		0.2		2						
																		0.1		1						
																		0.1		1						
																		0.1		1						
																		0.2		1						
																		0.2		2						
																		0.2		2						
Z - zerospan																		C - Calibration								



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Anzac - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Anzac - March 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
Anzac - March 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	39	17	18	22	27	85	162	131	35	12	9	1	9	32	38	68	705
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	39	17	18	22	27	85	162	131	35	12	9	1	9	32	38	68	705

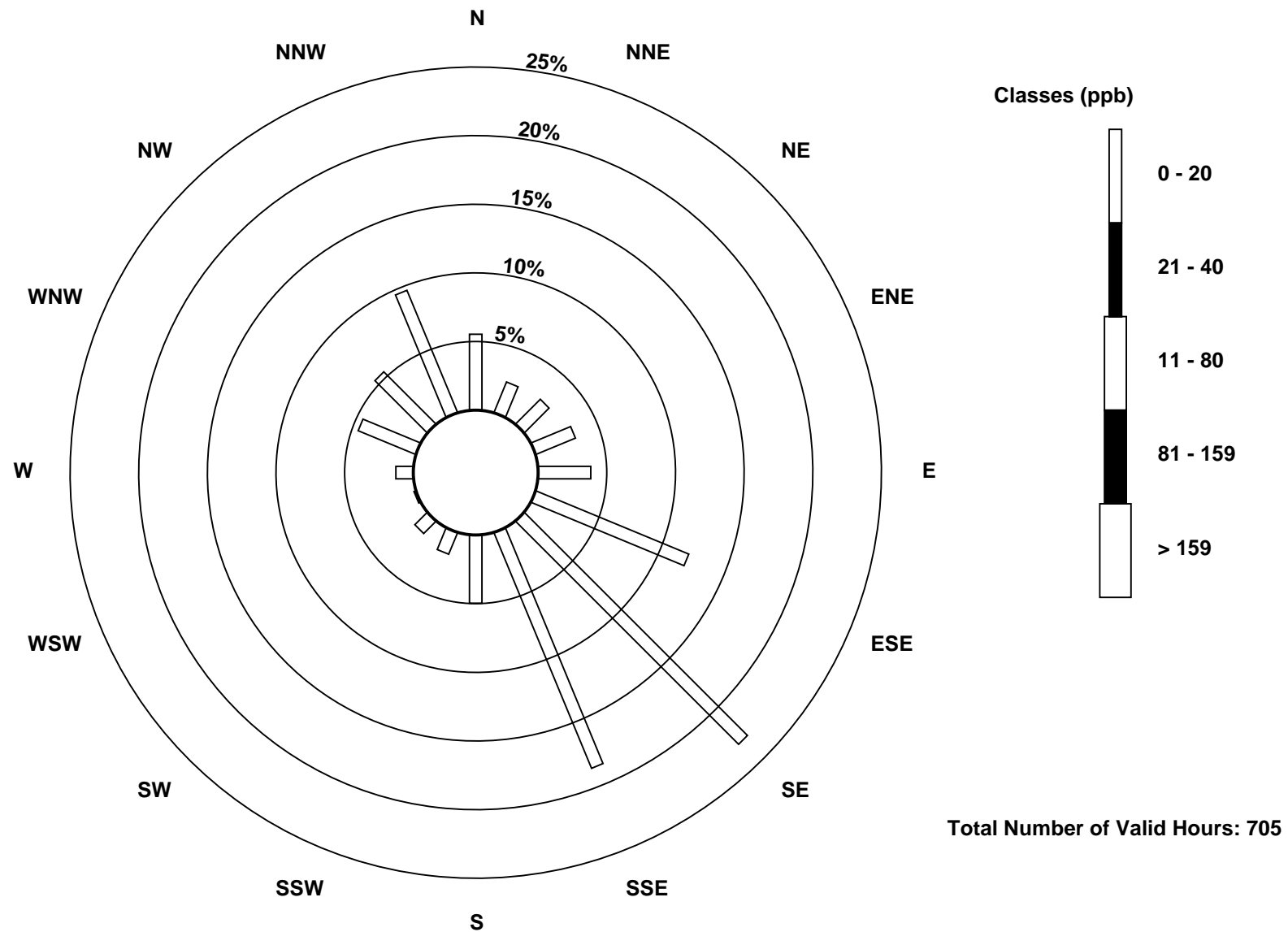
Total Number of Valid Hours: 705

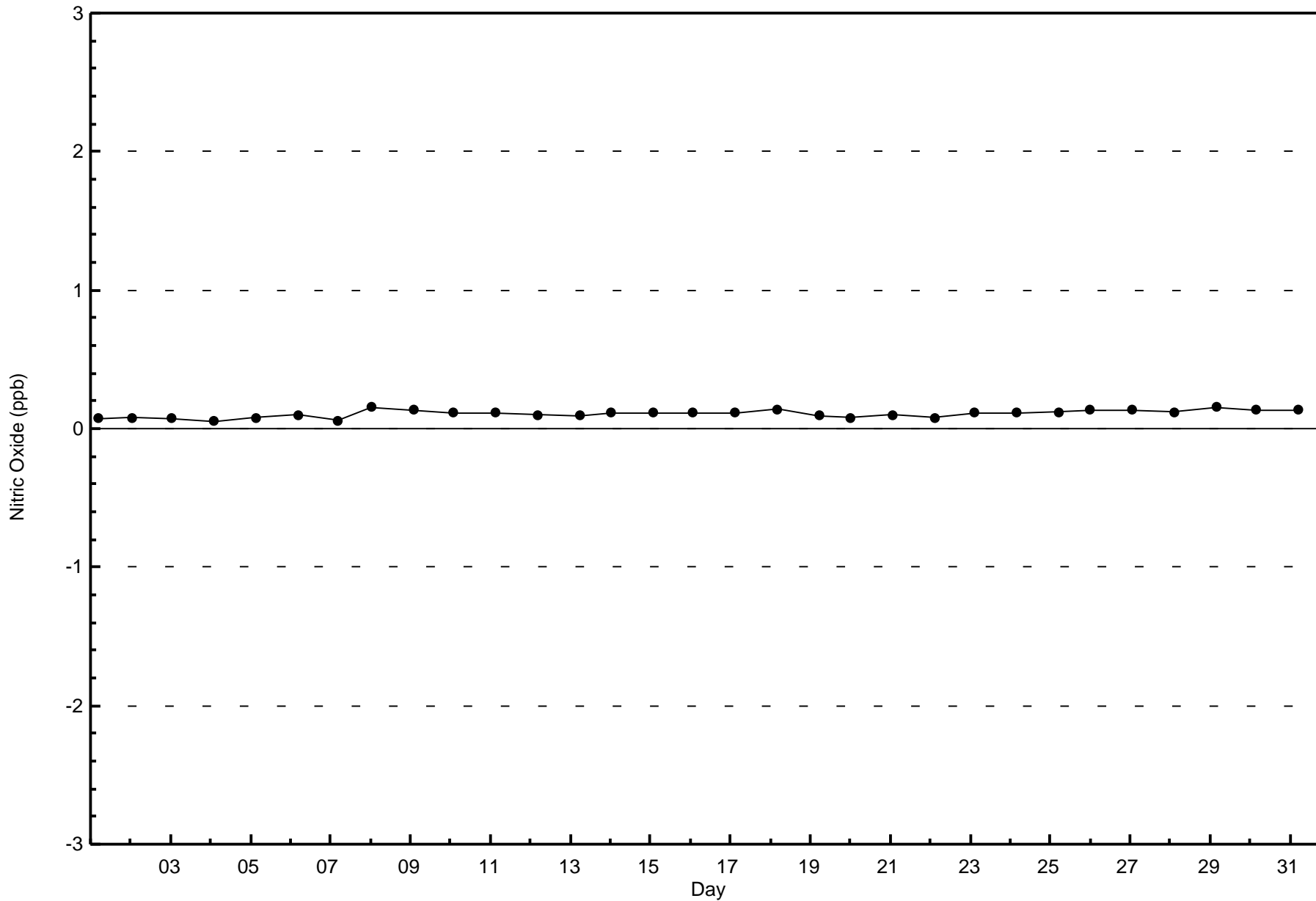
Total Number of Hours: 744

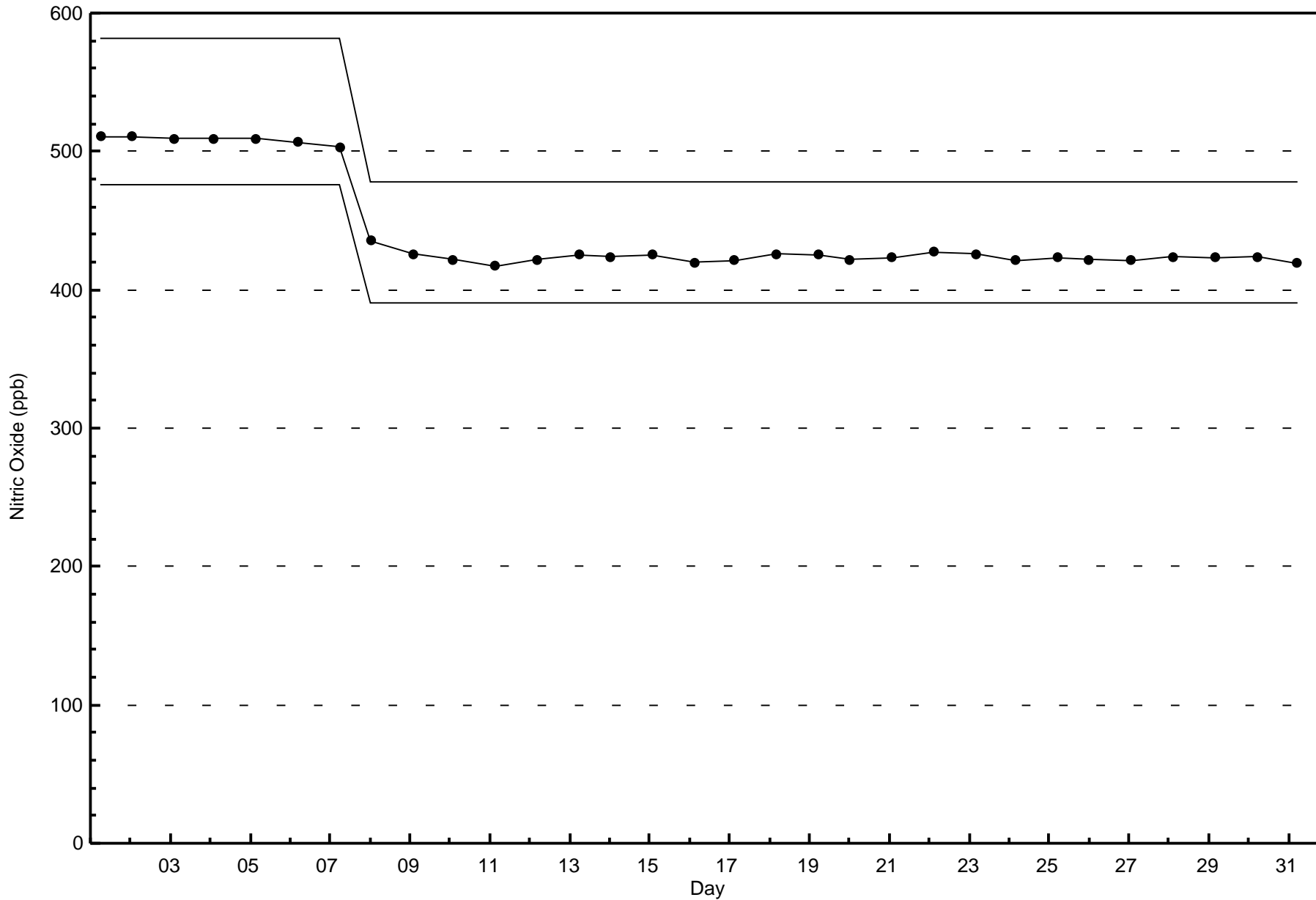


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitric Oxide (NO) - ppb
Anzac (AMS 14)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Anzac - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 22 ppb on Mar 6 06:00	Maximum Daily Average: 6.8 ppb on Mar 17		Hours of Data:	708
Minimum Value: 0 ppb on Mar 1 02:00	Minimum Daily Average: 0.7 ppb on Mar 19		Hours of Missing Data:	36
Maximum Diurnal Average: 4.1 ppb at hour 7	Minimum Diurnal Average: 1.8 ppb at hour 17		Hours of Calibration:	36
Monthly Average: 2.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 6 P ₉₉ = 17		Percent Operational Time:	100.0

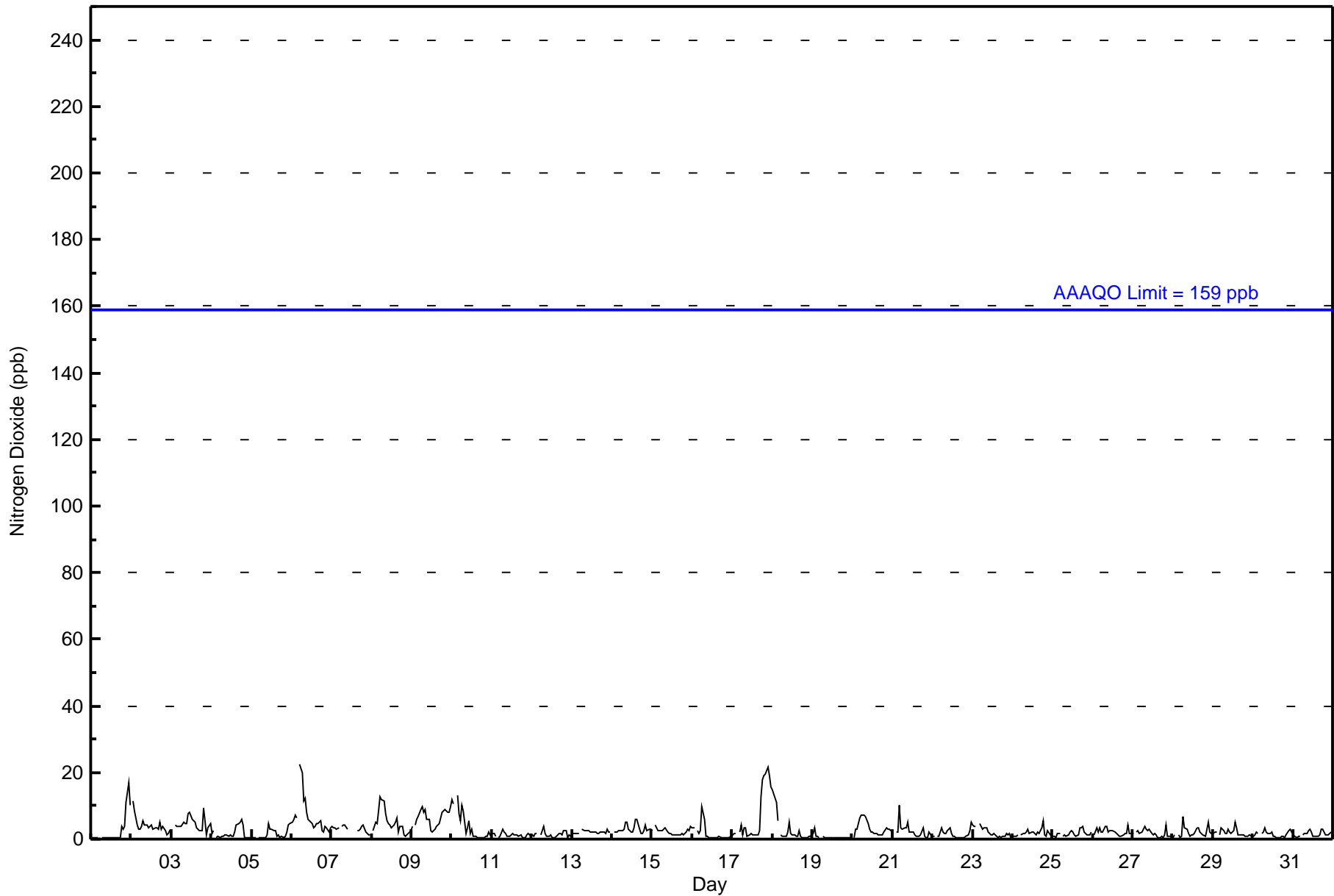
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	1	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	4	3	4	11	17	10	2.4	17
2-Mar	Z	12	9	4	3	3	4	6	4	4	3	4	4	3	3	3	3	5	3	4	3	1	2	2	4.0	12
3-Mar	2	Z	4	4	4	4	4	5	5	5	8	8	6	5	5	3	3	3	2	9	6	1	3	5	4.5	9
4-Mar	2	2	Z	1	1	0	1	1	1	1	1	1	1	2	4	5	5	6	4	1	0	0	0	0	1.8	6
5-Mar	1	0	0	Z	0	0	0	0	0	1	5	3	3	2	3	1	1	1	1	1	1	2	4	5	1.6	5
6-Mar	5	6	7	6	Z	22	20	12	12	8	6	5	5	3	4	5	5	5	3	2	4	3	2	3	6.7	22
7-Mar	4	4	3	3	3	Z	4	4	4	3	C	C	C	C	C	3	3	3	4	4	2	2	1	1	3.1	4
8-Mar	Z	3	5	5	8	13	12	11	8	6	5	4	3	4	5	6	2	4	4	1	1	1	2	3	5.0	13
9-Mar	4	Z	4	6	7	9	10	8	9	6	6	3	2	3	3	4	5	6	8	8	9	8	8	10	6.3	10
10-Mar	12	11	Z	13	8	6	10	8	2	4	6	2	3	1	1	1	1	1	1	1	1	1	2	1	4.0	13
11-Mar	2	2	1	Z	1	1	3	2	2	1	1	1	2	1	1	1	1	1	0	0	0	1	2	1	1.2	3
12-Mar	1	1	2	2	Z	1	2	4	2	1	1	1	1	0	1	1	2	2	1	3	3	1	1	1	1.4	4
13-Mar	2	2	2	2	2	Z	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2.1	3
14-Mar	Z	2	2	2	2	3	3	3	5	5	3	2	4	6	6	3	2	2	3	4	3	3	3	3	3.1	6
15-Mar	3	Z	4	2	2	2	2	3	3	2	2	2	1	1	1	1	1	1	2	1	2	3	2	4	2.2	4
16-Mar	3	3	Z	3	2	2	10	6	1	1	1	1	1	1	0	1	1	1	0	0	0	0	1	1	1.6	10
17-Mar	1	2	2	Z	2	4	1	3	3	1	1	2	1	1	1	1	3	13	18	19	19	22	19	16	6.8	22
18-Mar	15	14	11	6	Z	1	1	1	1	2	5	2	1	1	1	1	3	1	1	1	1	1	1	1	3.0	15
19-Mar	2	3	1	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	0	0	0.7	3
20-Mar	Z	0	3	3	6	7	7	7	7	5	3	2	2	2	2	1	1	1	1	2	3	3	3	3	3.3	7
21-Mar	2	Z	2	2	10	3	3	3	4	5	2	2	2	1	1	1	1	1	3	1	1	1	2	1	2.4	10
22-Mar	1	1	Z	1	1	3	2	2	2	3	3	2	1	1	1	1	1	1	1	1	1	1	3	5	1.5	5
23-Mar	4	4	4	Z	5	4	3	4	4	2	2	1	1	2	1	1	1	1	1	1	2	1	2	1	2.1	5
24-Mar	1	1	1	1	Z	1	2	2	2	3	2	2	2	2	1	2	2	3	5	1	1	3	1	1	1.8	5
25-Mar	1	1	1	2	2	Z	1	1	1	1	2	3	2	1	1	1	3	3	4	2	1	1	1	2	1.7	4
26-Mar	Z	1	4	2	3	2	2	4	4	2	3	3	2	2	2	1	1	1	1	2	2	4	2	2	2.2	4
27-Mar	2	Z	2	2	2	2	3	4	3	3	3	2	1	2	1	1	1	1	0	1	4	1	1	1	1.8	4
28-Mar	1	1	Z	1	1	1	7	4	3	2	1	1	1	2	3	3	2	2	1	1	3	5	2	2	2.1	7
29-Mar	2	2	2	Z	1	4	3	2	2	3	2	2	3	5	4	1	1	1	1	1	1	1	1	1	2.0	5
30-Mar	1	1	2	2	Z	2	2	3	2	2	2	2	1	1	1	1	1	1	1	1	1	3	3	2	1.5	3
31-Mar	2	1	1	1	1	Z	1	2	2	3	3	2	1	1	1	1	1	3	3	1	1	1	2	2	1.5	3
	2.8	3.0	3.0	2.9	3.0	4.0	4.1	3.8	3.2	2.7	2.7	2.2	1.9	1.8	1.9	1.9	1.8	2.3	2.7	2.6	2.7	2.9	3.1	2.9	Diurnal Average	
	15	14	11	13	10	22	20	12	12	8	8	8	6	5	6	6	5	13	18	19	19	22	19	16	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 - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - March 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**

**Nitrogen Dioxide (NO₂) - ppb
Anzac - March 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	39	17	18	22	27	85	162	131	35	12	9	1	9	32	37	67	703
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	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	39	17	18	22	27	85	162	131	35	12	9	1	9	32	38	68	705

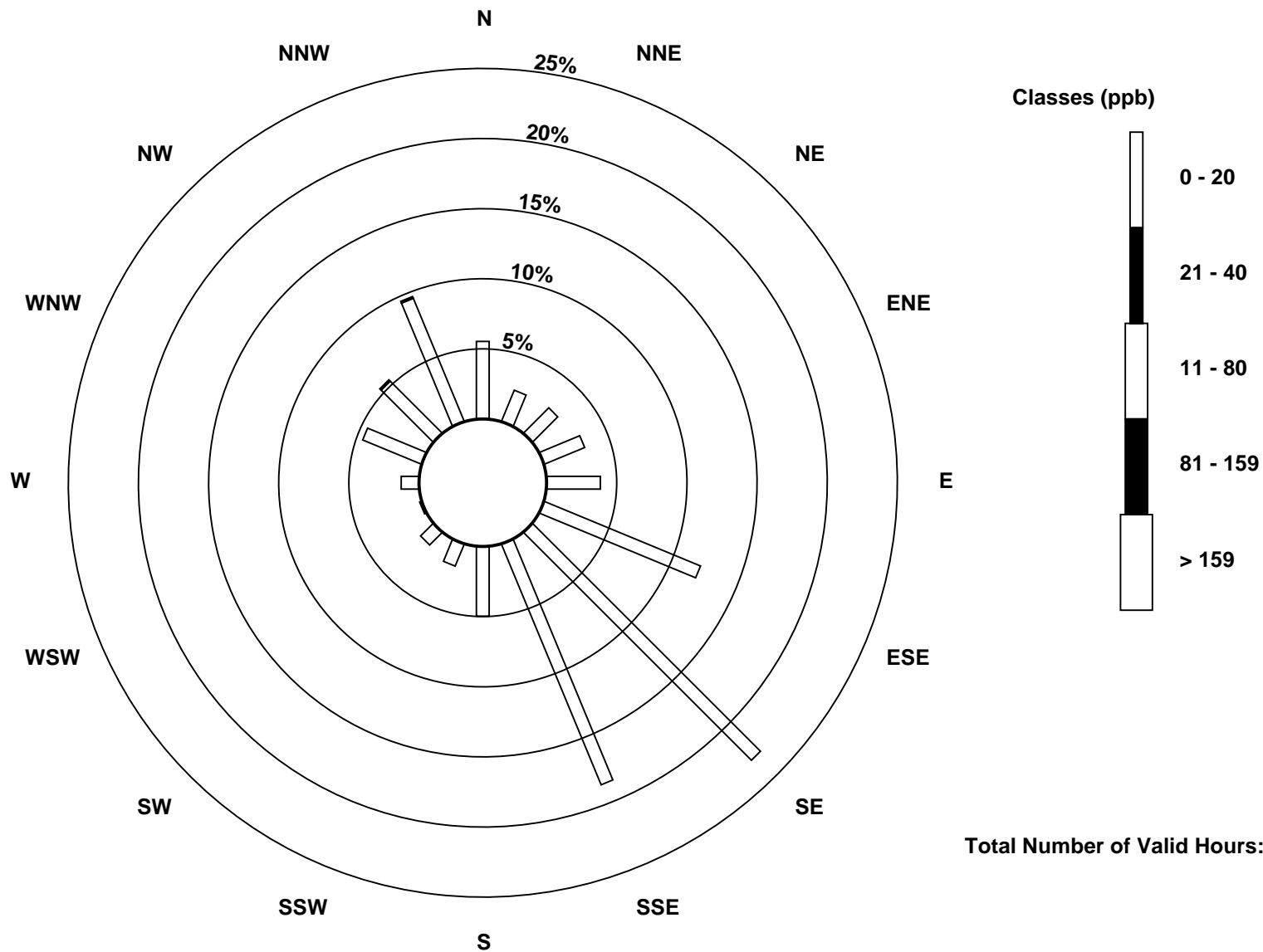
Total Number of Valid Hours: 705

Total Number of Hours: 744

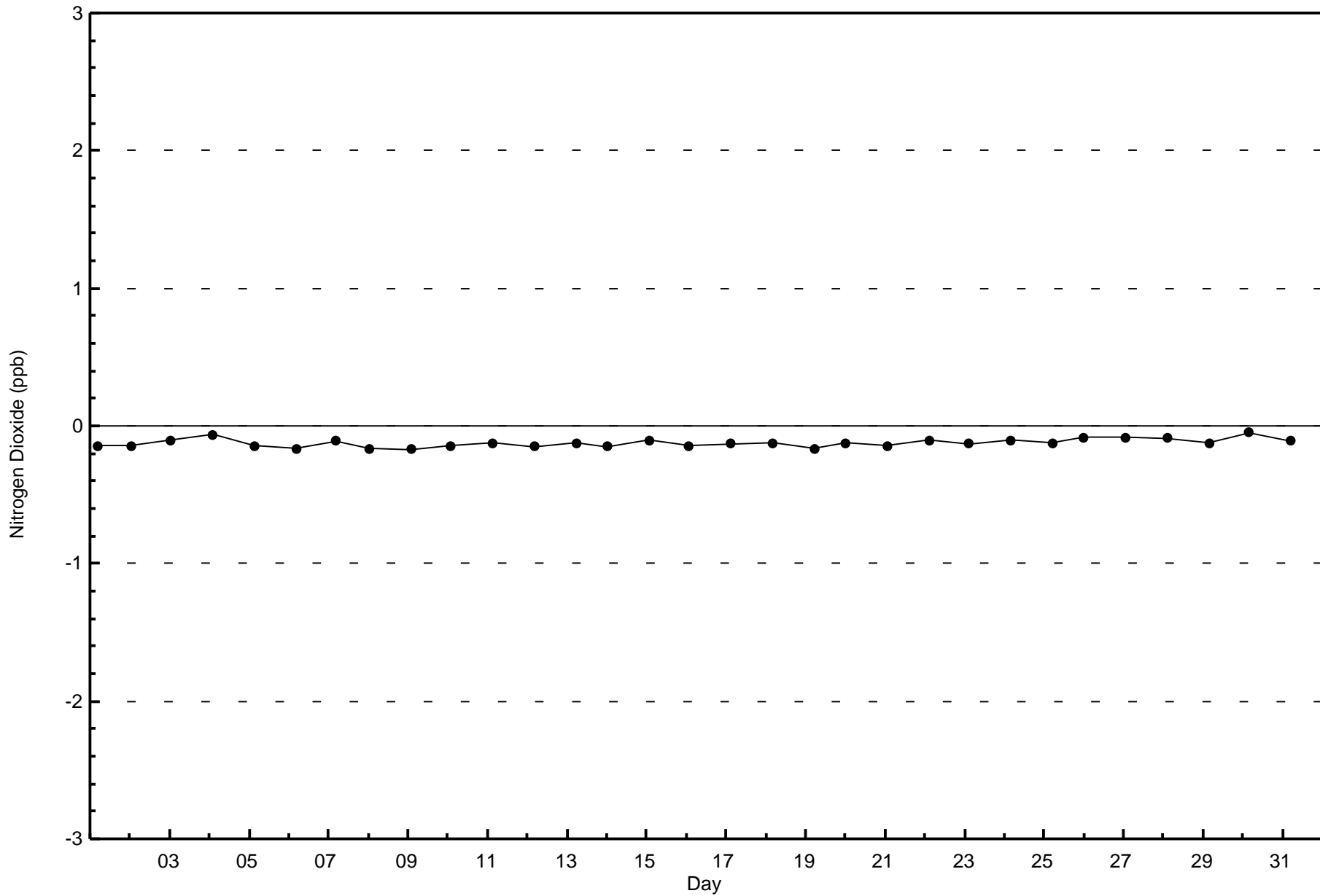


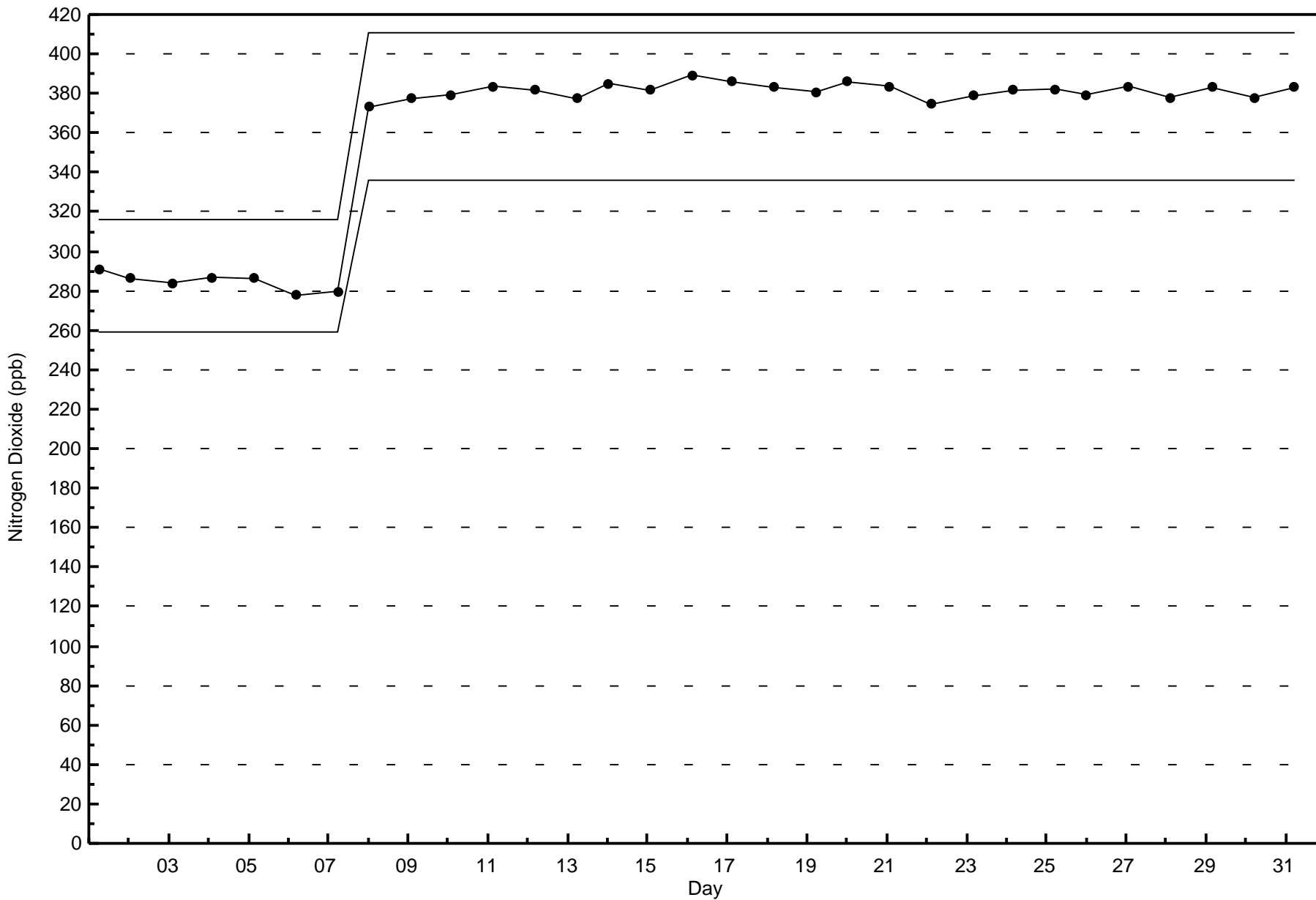
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Dioxide (NO₂) - ppb
Anzac (AMS 14)



Total Number of Valid Hours: 705







Wood Buffalo Environmental Association
Summary of Hour Averages

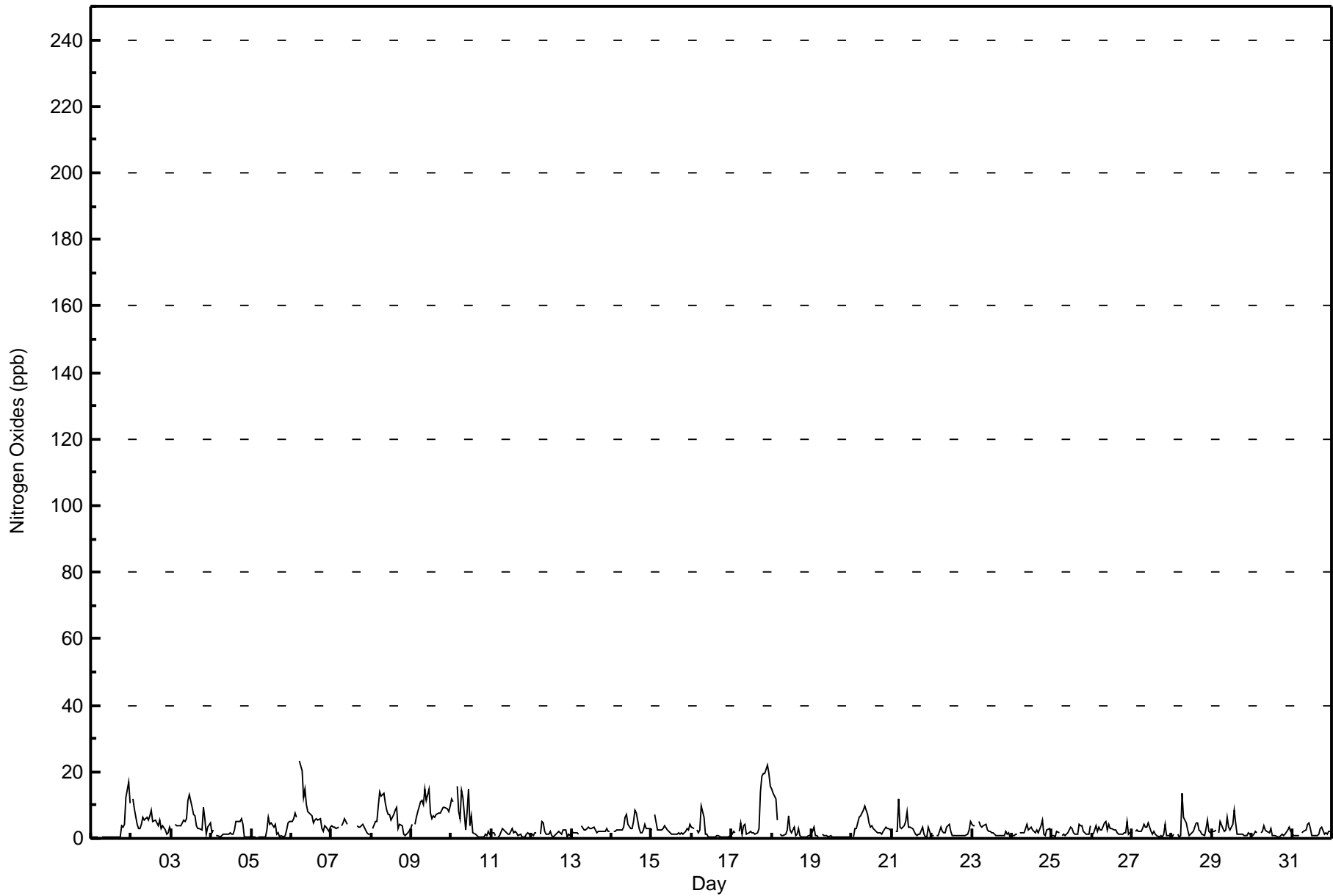
Nitrogen Oxides (NO_x) - ppb
Anzac - March 2017

Maximum Value: 23 ppb on Mar 6 06:00		Maximum Daily Average: 8.7 ppb on Mar 9		Hours in Service: 744																																												
Minimum Value: 0 ppb on Mar 1 16:00		Minimum Daily Average: 0.8 ppb on Mar 19		Hours of Data: 708																																												
Maximum Diurnal Average: 4.7 ppb at hour 7		Minimum Diurnal Average: 2.2 ppb at hour 17		Hours of Missing Data: 36																																												
Monthly Average: 3.3 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 7 P ₉₉ = 18		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-Mar	1	0	1	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	4	3	4	12	17	10	2.5	17																						
2-Mar	Z	12	9	4	3	3	4	6	6	6	6	7	9	5	6	5	4	5	3	4	3	1	2	3	5.0	12																						
3-Mar	2	Z	4	4	4	4	4	5	5	6	11	13	10	7	7	4	3	3	2	9	6	1	3	5	5.3	13																						
4-Mar	2	2	Z	1	1	0	1	1	1	1	1	2	1	1	3	5	5	5	6	4	1	0	0	0	2.0	6																						
5-Mar	1	0	0	Z	0	0	0	0	0	3	7	4	5	4	4	1	2	1	1	1	1	3	5	5	2.0	7																						
6-Mar	5	6	8	6	Z	23	20	12	15	10	8	7	7	5	5	6	6	6	3	2	4	3	2	3	7.5	23																						
7-Mar	4	4	3	3	3	Z	4	4	6	4	C	C	C	C	C	4	3	4	4	4	2	2	1	1	3.4	6																						
8-Mar	Z	3	5	5	10	14	13	14	11	9	7	7	6	7	8	9	3	4	4	1	1	1	2	3	6.3	14																						
9-Mar	4	Z	4	6	8	11	11	10	15	11	15	8	6	7	7	7	8	7	8	9	10	9	8	10	8.7	15																						
10-Mar	12	11	Z	16	8	6	14	12	3	8	15	4	7	2	1	1	1	1	1	0	1	1	2	1	5.5	16																						
11-Mar	2	2	1	Z	1	1	3	2	2	2	1	1	3	2	2	2	1	1	0	0	0	1	2	1	1.4	3																						
12-Mar	1	1	2	2	Z	1	5	4	2	1	1	2	1	0	1	2	2	2	1	3	3	1	1	1	1.8	5																						
13-Mar	2	2	2	1	1	Z	4	3	3	3	3	3	3	3	3	2	2	2	2	2	2	3	2	2	2.4	4																						
14-Mar	Z	2	2	2	2	3	3	3	6	7	4	3	3	5	8	8	3	2	2	3	4	3	3	3	3.7	8																						
15-Mar	3	Z	7	2	2	3	3	3	4	2	2	2	1	1	1	1	2	1	2	1	2	3	2	4	2.4	7																						
16-Mar	3	3	Z	3	2	2	10	6	1	1	1	0	0	1	1	1	1	0	0	0	0	0	1	1	1.7	10																						
17-Mar	1	2	2	Z	2	5	1	4	4	1	2	2	2	2	1	2	3	14	19	20	20	22	19	16	7.1	22																						
18-Mar	15	14	12	6	Z	1	1	1	1	2	7	2	2	3	1	1	3	1	1	1	1	1	1	1	3.3	15																						
19-Mar	2	3	1	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	0	0	0	0.8	3																						
20-Mar	Z	0	3	3	6	7	7	8	10	7	5	4	4	3	2	2	2	1	1	2	3	3	3	2	3.9	10																						
21-Mar	2	Z	2	2	12	3	3	4	5	8	3	3	3	2	1	1	1	1	3	1	1	1	3	1	2.9	12																						
22-Mar	1	1	Z	1	1	3	2	2	2	3	4	2	1	1	1	1	1	1	1	1	1	1	3	5	1.6	5																						
23-Mar	4	4	4	Z	5	4	3	4	4	3	2	2	2	2	1	1	1	1	1	1	2	1	2	1	2.3	5																						
24-Mar	1	1	1	1	Z	1	2	2	3	4	3	3	2	2	3	2	4	6	1	1	3	3	1	1	2.2	6																						
25-Mar	1	1	1	2	2	Z	1	1	1	2	3	3	3	2	1	1	4	4	4	2	1	1	1	4	2.0	4																						
26-Mar	Z	1	4	2	3	2	2	5	5	3	4	3	3	3	2	2	1	1	1	2	2	5	1	2	2.6	5																						
27-Mar	2	Z	2	3	2	2	3	4	3	4	5	2	1	2	1	1	1	1	0	1	4	1	1	1	2.1	5																						
28-Mar	0	1	Z	1	1	1	13	7	5	3	1	1	2	2	5	5	3	2	1	1	3	6	2	2	2.9	13																						
29-Mar	2	2	3	Z	2	5	3	2	2	6	3	2	4	8	5	1	1	1	1	1	1	1	2	1	2.6	8																						
30-Mar	1	1	2	2	Z	2	2	4	2	2	2	3	1	1	1	1	1	1	1	1	1	3	3	2	1.7	4																						
31-Mar	2	1	1	1	1	Z	2	2	3	4	5	3	1	1	1	1	1	3	3	1	2	1	2	2	1.9	5																						
																								2.9	3.1	3.2	3.1	3.2	4.3	4.7	4.4	4.2	4.2	4.4	3.4	3.0	2.8	2.7	2.5	2.2	2.6	2.8	2.7	2.8	3.0	3.2	3.1	Diurnal Average
																								15	14	12	16	12	23	20	14	15	11	15	13	10	8	8	9	8	14	19	20	20	22	19	16	Diurnal Maximum
Z - zerospan																								C - Calibration																								



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Anzac - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - March 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**

**Nitrogen Oxides (NO_x) - ppb
Anzac - March 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	39	17	18	22	27	85	162	131	35	12	9	1	9	32	37	67	703
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	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	39	17	18	22	27	85	162	131	35	12	9	1	9	32	38	68	705

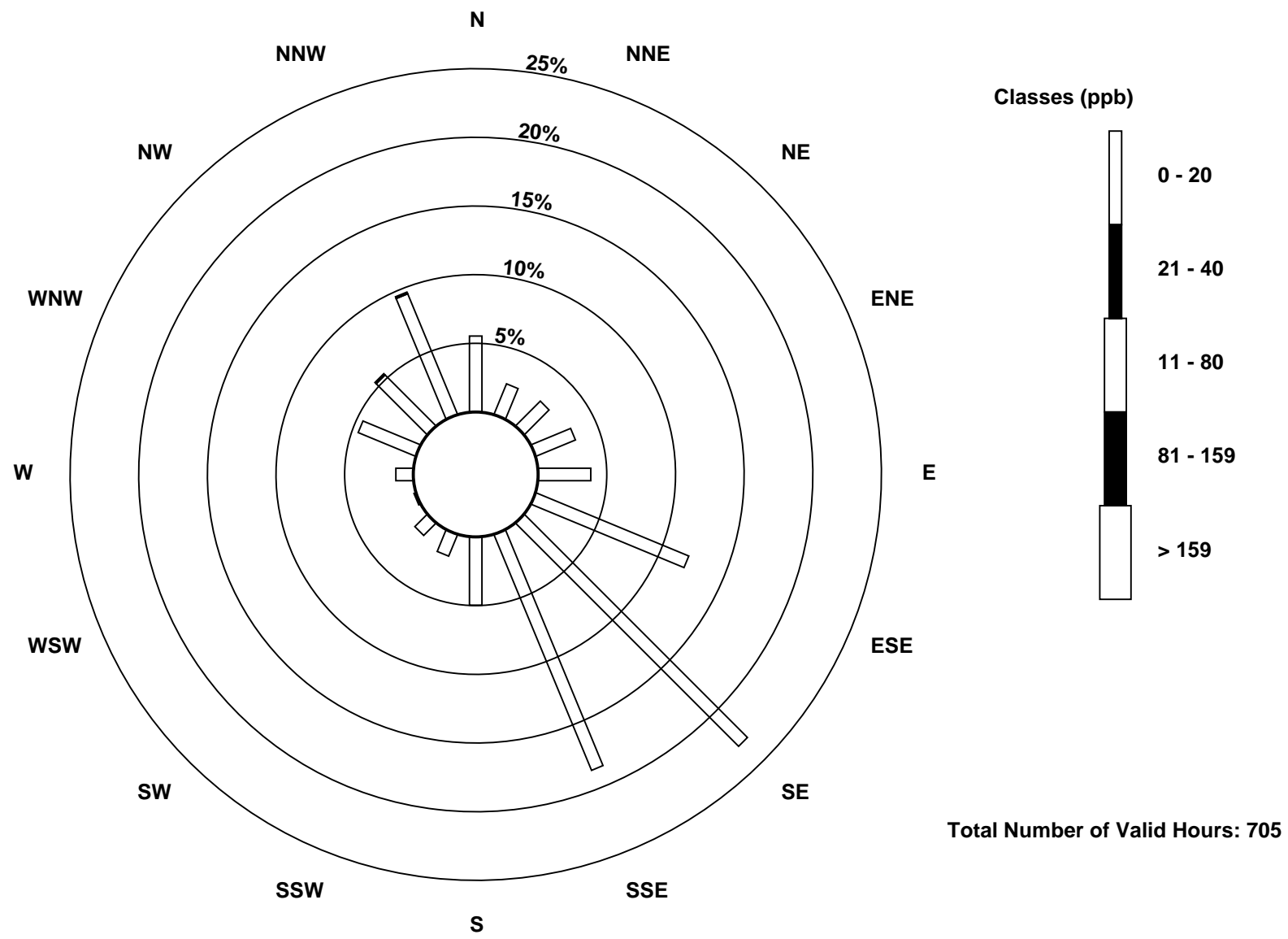
Total Number of Valid Hours: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

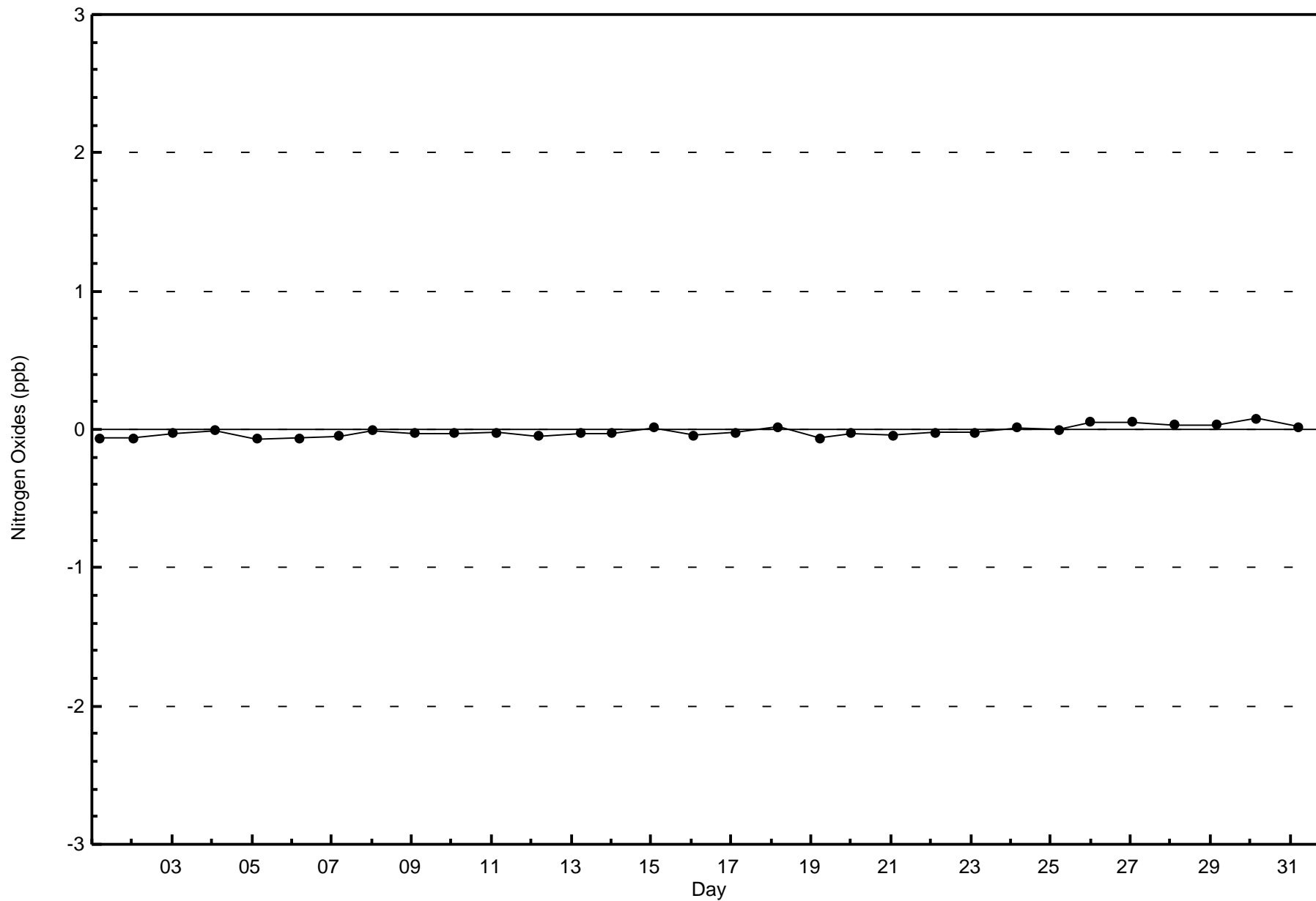
Nitrogen Oxides (NO_x) - ppb
Anzac (AMS 14)

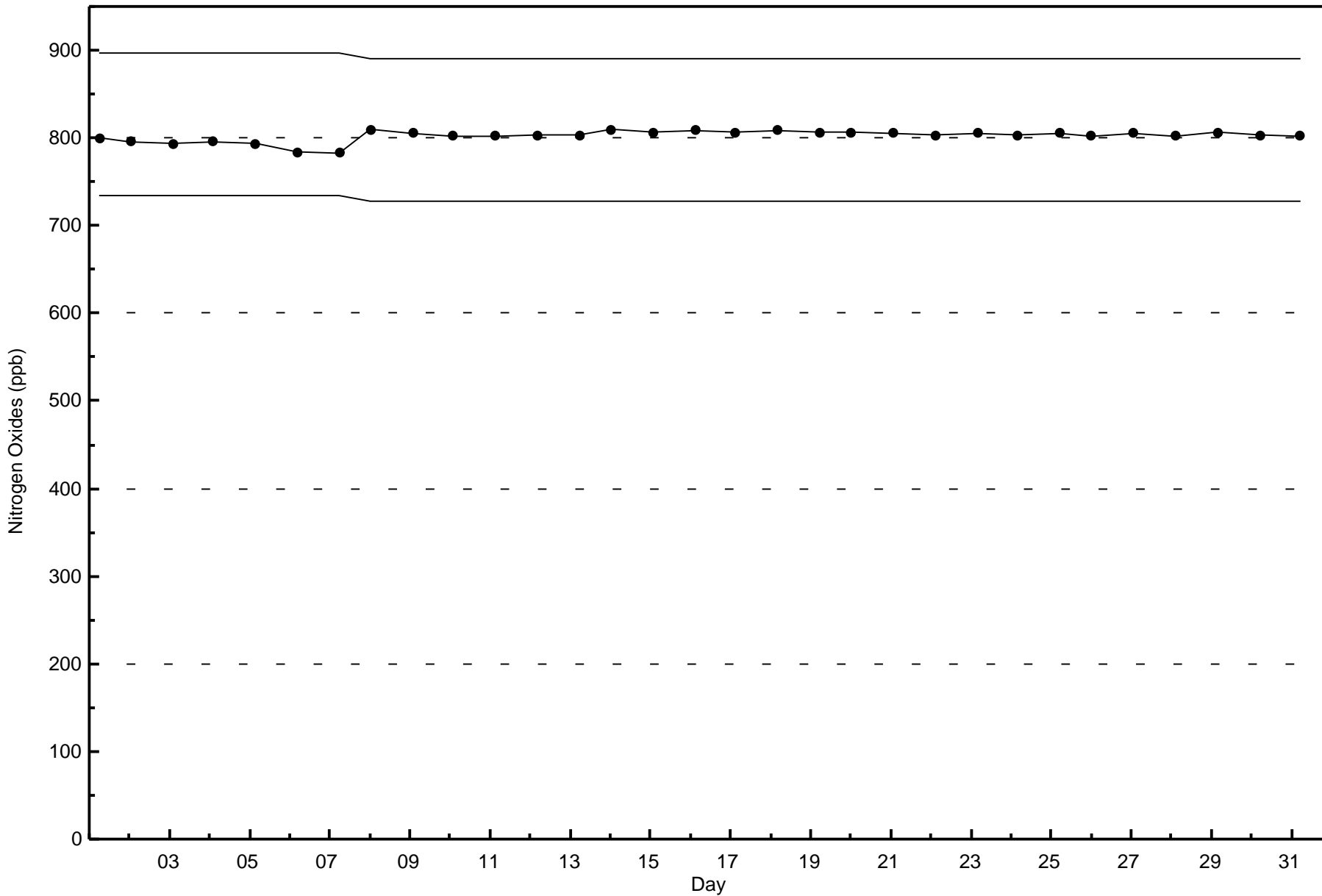




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Anzac - March 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

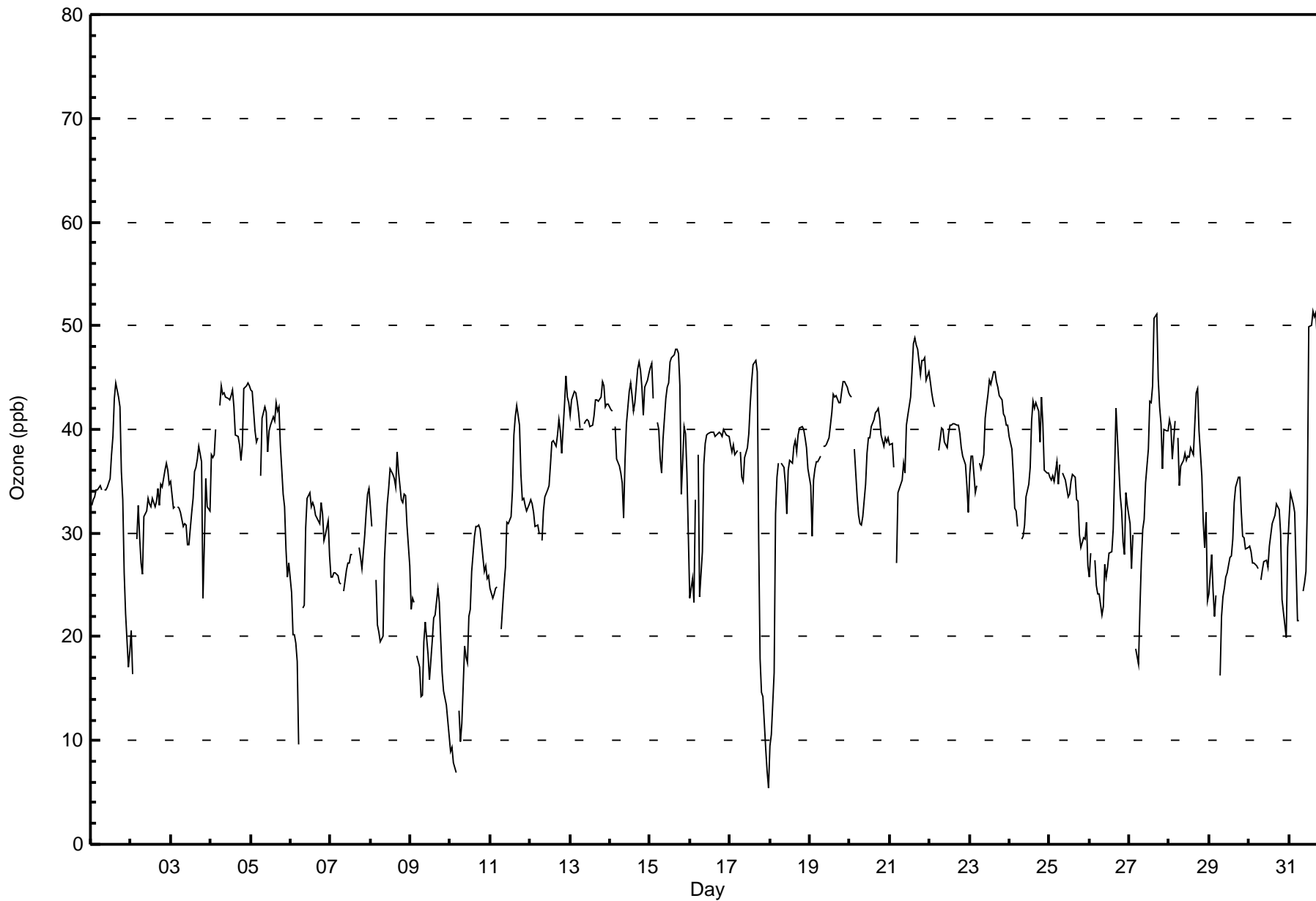
Anzac - March 2017

Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0	Hours in Service: 744																		Daily Average		Daily Maximum																										
Maximum Value: 51 ppb on Mar 31 15:00		Maximum Daily Average: 42.1 ppb on Mar 13		Hours of Data: 710																		33.8		44																										
Minimum Value: 5 ppb on Mar 18 00:00		Minimum Daily Average: 18.5 ppb on Mar 9		Hours of Missing Data: 34																		31.4		37																										
Maximum Diurnal Average: 40.4 ppb at hour 17		Minimum Diurnal Average: 29.5 ppb at hour 8		Hours of Calibration: 34																		32.6		38																										
Monthly Average: 34.3 ppb		Percentiles: P ₁ = 9 P ₁₀ = 23 Q ₁ = 29 Median = 35 Q ₃ = 40 P ₉₀ = 44 P ₉₉ = 50		Percent Operational Time: 100.0																		41.5		44																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Mar	33	33	33	34	34	35	34	Z	34	34	34	35	38	39	43	44	43	42	36	33	26	22	17	19	33.8	44																								
2-Mar	21	16	Z	29	33	30	27	26	32	32	33	33	33	33	33	34	33	35	34	36	37	36	35	31.4	37																									
3-Mar	35	32	33	Z	33	32	32	31	31	31	29	29	32	33	36	36	37	38	37	24	29	35	33	32	32.6	38																								
4-Mar	38	37	38	40	Z	42	44	43	43	43	43	43	44	42	39	39	39	37	39	44	44	44	44	44	41.5	44																								
5-Mar	44	44	40	39	39	Z	36	41	42	42	38	40	40	41	41	43	42	42	39	34	33	28	26	27	38.2	44																								
6-Mar	24	20	20	19	18	10	Z	23	23	31	33	34	33	33	33	32	31	31	33	32	29	30	31	28	27.4	34																								
7-Mar	26	26	26	26	26	25	25	Z	24	26	27	27	28	28	C	C	C	29	28	27	30	32	34	34	27.7	34																								
8-Mar	33	31	Z	25	21	20	20	20	27	30	33	34	36	36	35	34	38	36	33	33	34	34	31	27	30.5	38																								
9-Mar	23	24	23	Z	18	17	14	14	20	21	18	16	18	20	22	22	25	23	20	17	15	13	12	10	18.5	25																								
10-Mar	9	9	8	7	Z	13	10	12	19	18	18	22	23	26	30	31	31	31	30	28	26	27	26	26	20.8	31																								
11-Mar	25	24	24	25	25	Z	21	23	25	27	31	31	32	34	39	41	42	40	36	33	33	33	32	33	30.8	42																								
12-Mar	33	33	32	31	31	30	Z	29	32	34	34	35	37	39	39	38	39	41	40	38	42	45	43	43	36.4	45																								
13-Mar	41	43	44	44	43	42	40	Z	41	41	41	41	40	40	41	43	43	43	43	45	44	42	43	42	42.1	45																								
14-Mar	42	42	Z	40	37	36	36	35	32	37	41	44	44	43	42	43	46	46	46	44	41	44	45	45	41.3	46																								
15-Mar	46	46	43	Z	41	40	37	36	39	43	44	44	46	47	47	48	48	47	44	34	40	40	36	30	42.0	48																								
16-Mar	24	26	23	33	Z	38	24	28	37	39	39	40	40	40	39	39	40	40	39	40	40	39	39	39	35.9	40																								
17-Mar	39	38	38	38	38	Z	38	35	35	37	38	40	42	45	46	47	46	29	18	15	14	9	7	5	32.0	47																								
18-Mar	9	11	17	32	35	37	Z	37	36	35	32	36	37	37	38	39	38	39	40	40	40	39	38	36	33.9	40																								
19-Mar	35	30	35	36	37	37	37	Z	38	38	39	39	40	42	43	43	43	43	43	44	45	45	44	44	39.9	45																								
20-Mar	43	43	Z	38	34	32	31	31	32	35	38	39	39	40	41	42	42	42	41	39	38	39	39	39	38.1	43																								
21-Mar	39	39	36	Z	27	34	34	35	37	36	40	41	43	46	48	49	48	48	45	47	47	47	45	46	41.5	49																								
22-Mar	45	44	43	42	Z	38	39	40	40	39	38	40	40	40	41	41	40	40	40	38	37	37	35	32	39.5	45																								
23-Mar	36	37	37	34	35	Z	37	36	38	41	42	43	45	44	46	46	45	44	43	43	42	41	40	40	40.6	46																								
24-Mar	39	38	36	32	32	31	Z	29	30	31	33	35	36	41	43	42	43	42	39	43	41	36	36	36	36.6	43																								
25-Mar	35	35	35	35	37	35	37	Z	36	35	34	33	34	35	36	35	33	33	30	29	30	29	31	27	33.4	37																								
26-Mar	26	28	Z	27	25	24	24	22	23	27	26	27	28	28	30	36	42	39	34	32	29	28	34	33	29.2	42																								
27-Mar	31	27	30	Z	19	17	23	27	30	31	35	38	43	43	44	51	51	45	42	41	36	40	40	40	35.8	51																								
28-Mar	41	40	37	41	Z	39	35	36	37	38	37	37	37	38	38	41	44	44	40	35	31	29	32	23	37.0	44																								
29-Mar	24	28	24	22	24	Z	16	22	24	25	26	26	28	28	29	33	34	35	35	32	30	30	29	29	27.5	35																								
30-Mar	29	28	27	27	27	Z	25	26	27	27	27	27	29	30	31	32	33	33	32	30	24	21	20	29	27.8	33																								
31-Mar	31	34	33	32	27	22	21	Z	24	25	26	33	50	50	51	51	51	49	47	49	46	41	37	36	37.7	51																								
																								32.1	31.8	31.4	31.9	30.5	30.1	29.7	29.5	31.8	33.2	33.8	34.9	36.6	37.5	38.9	39.7	40.4	38.9	36.9	35.1	34.6	34.1	33.3	32.5	Diurnal Average		
																								46	46	44	44	43	42	44	43	43	43	44	44	44	50	50	51	51	51	49	47	49	47	47	45	46	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
Anzac - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Anzac - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	49	6.90	6.90
21 - 50	656	92.39	99.30
51 - 82	5	0.70	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
Anzac - March 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	0	0	1	4	4	5	5	3	2	0	0	3	6	8	1	46
21 - 50	35	15	19	21	22	82	155	126	33	9	6	1	5	25	34	68	656
51 - 82	0	0	0	0	0	0	1	1	0	0	3	0	0	0	0	0	5
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	15	19	22	26	86	161	132	36	11	9	1	8	31	42	69	707

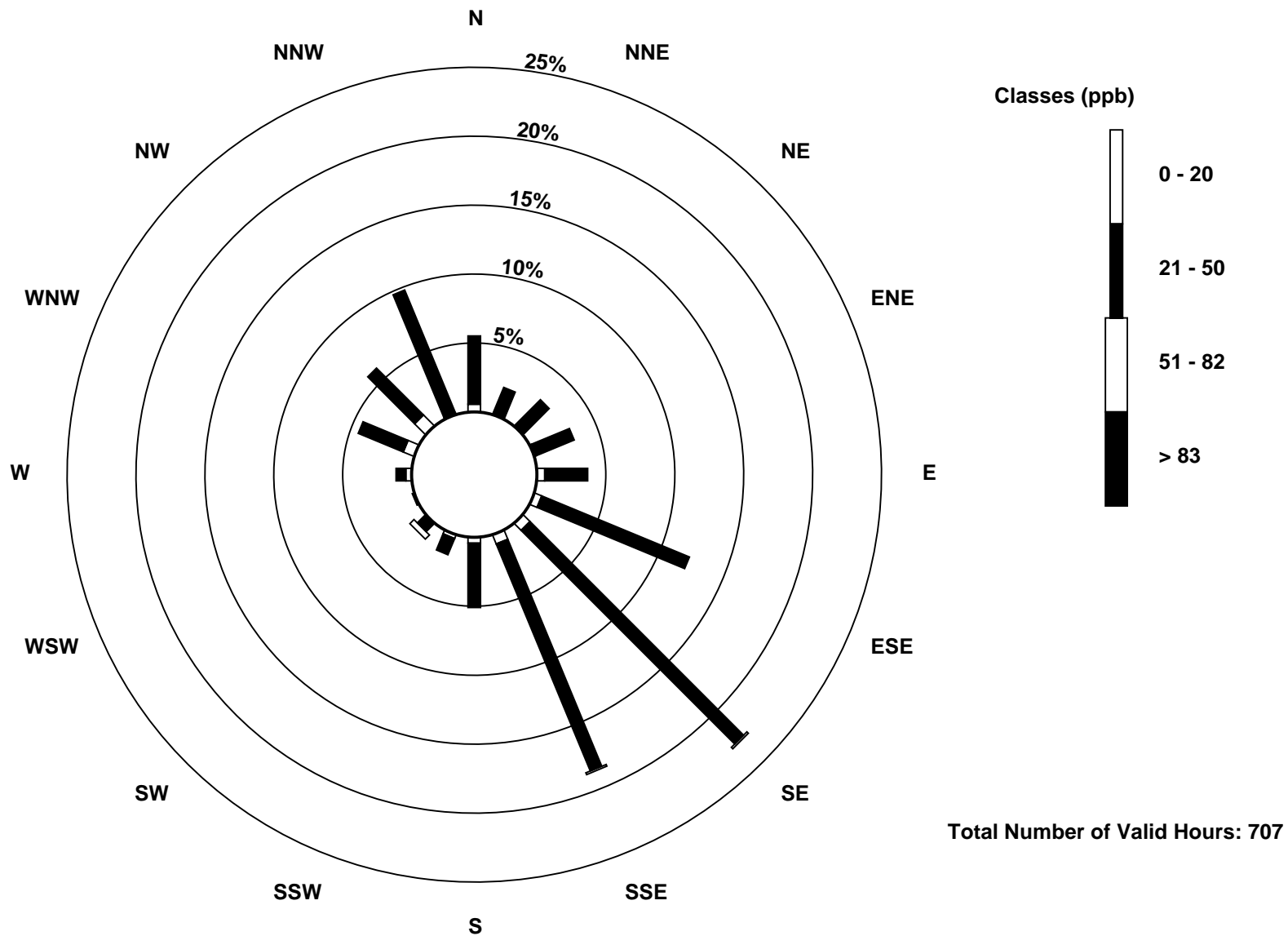
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

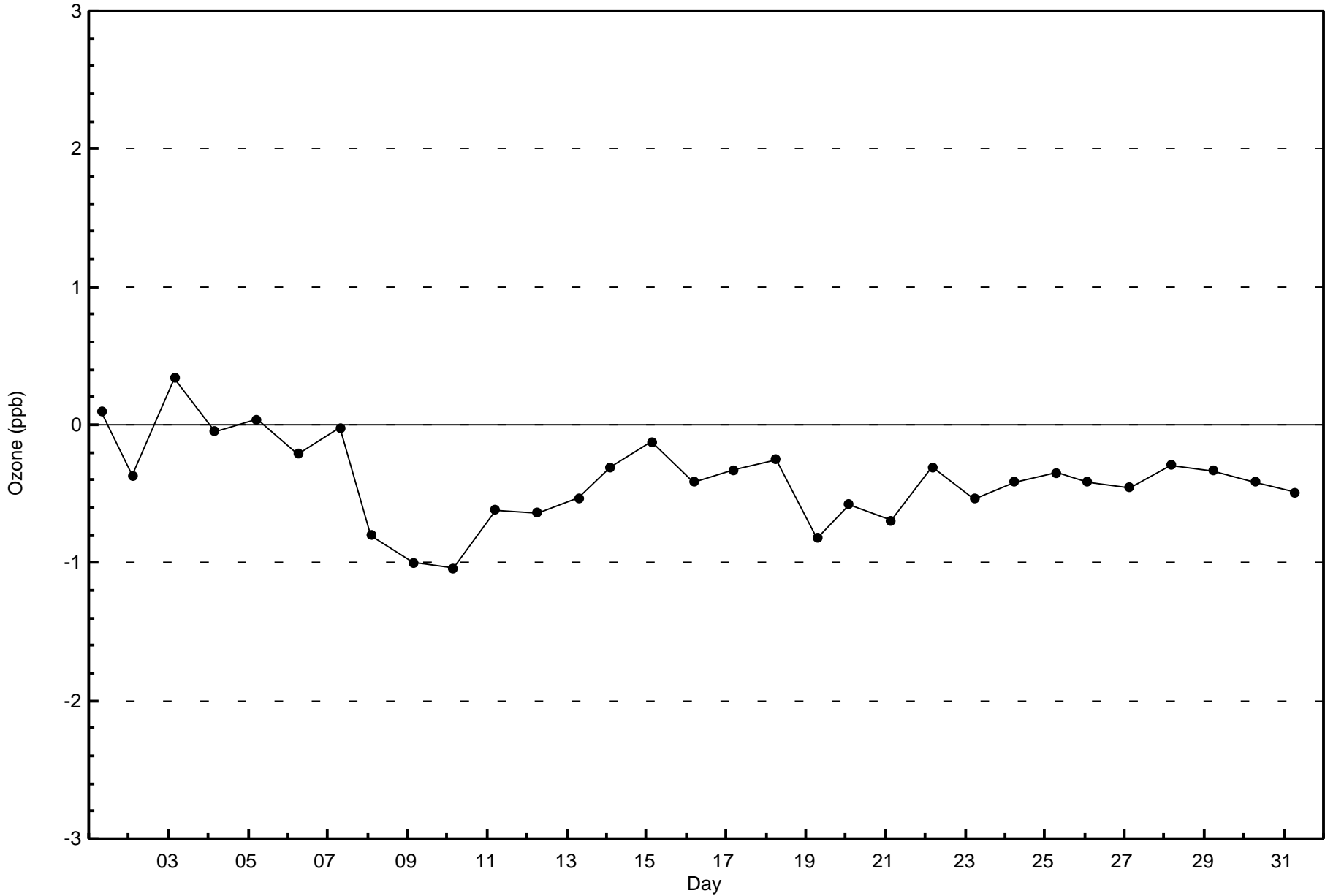
Ozone (O₃) - ppb
Anzac (AMS 14)

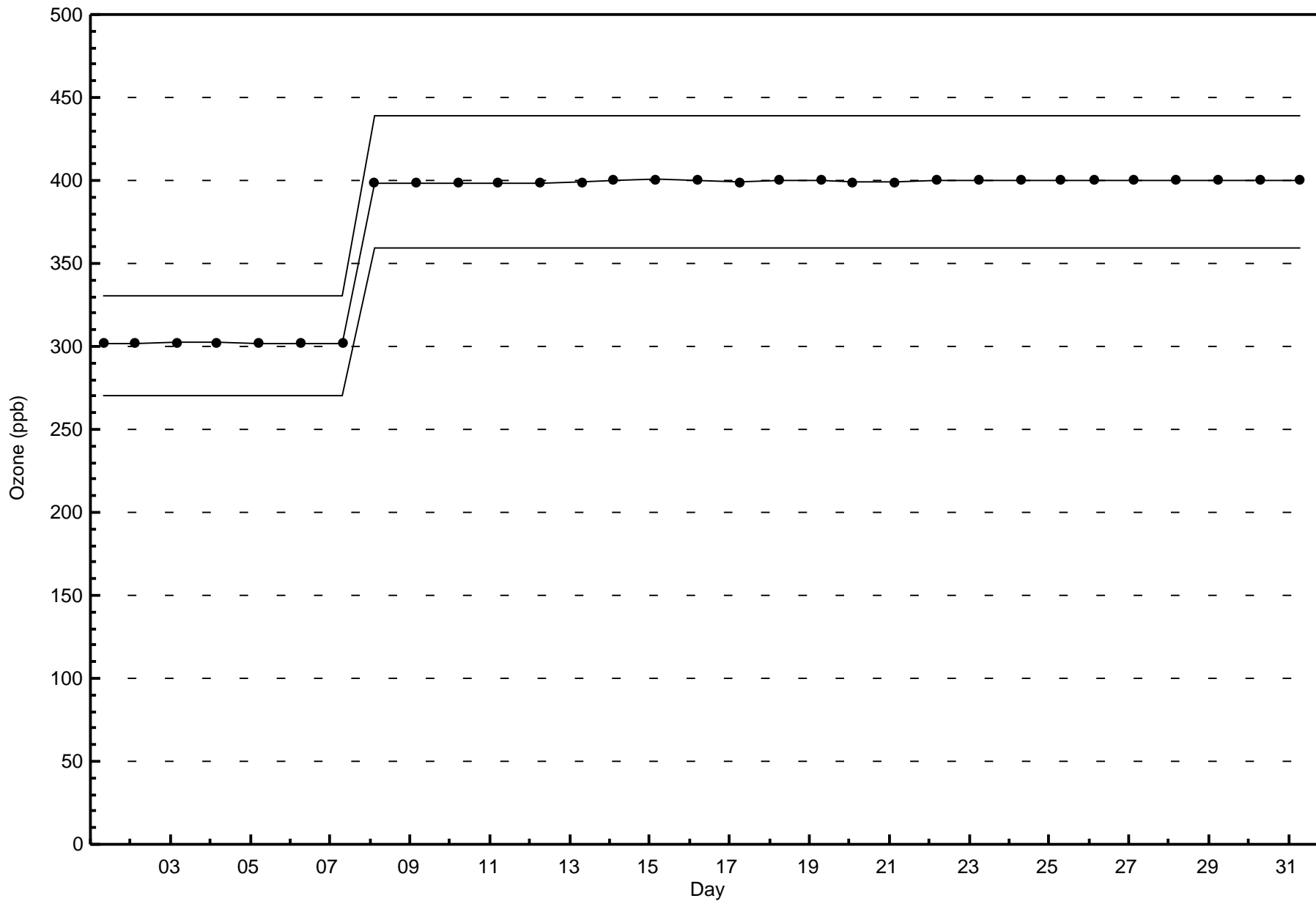




Wood Buffalo Environmental Association
Zero Responses

Ozone (O₃) - ppb
Anzac - March 2017





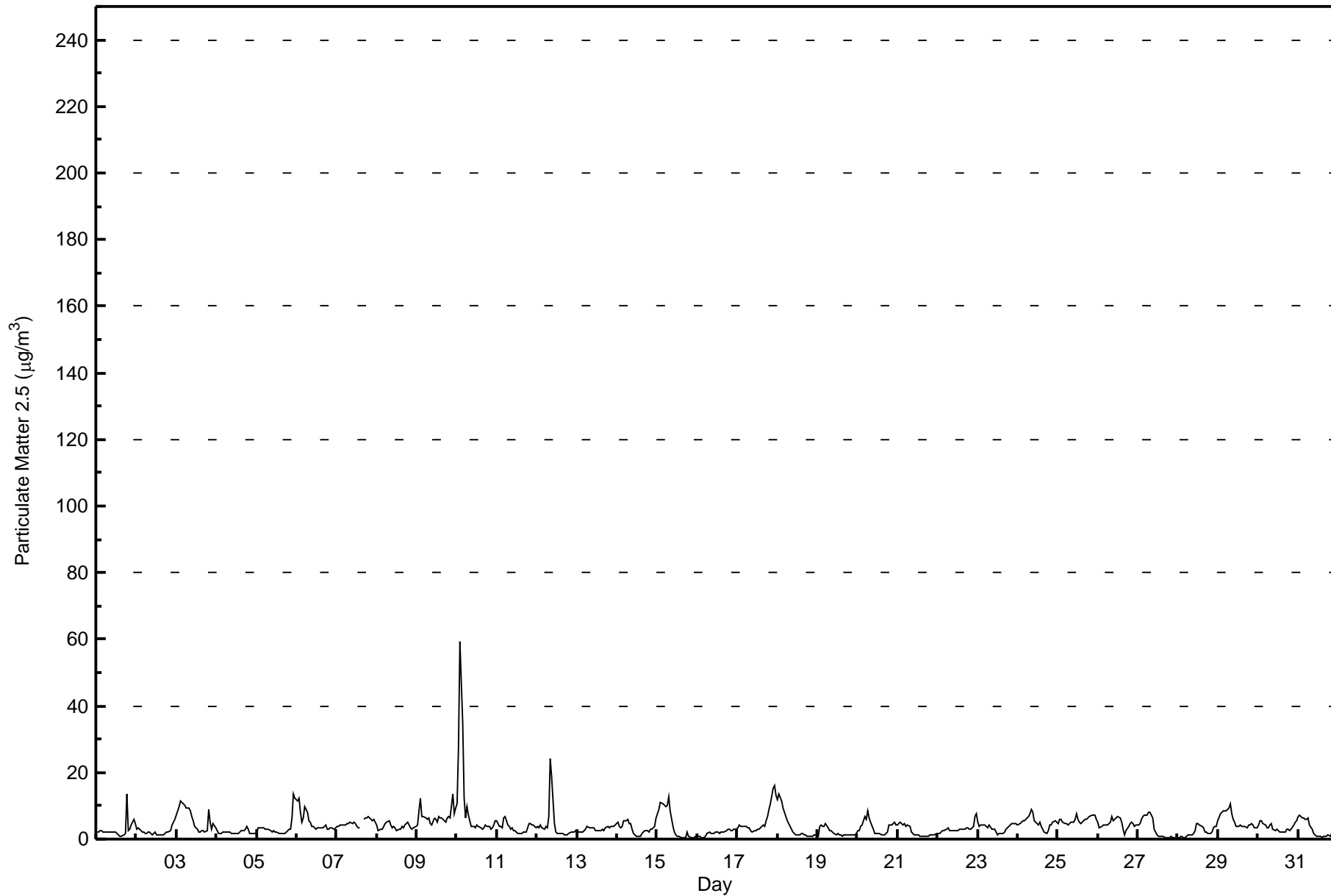


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 59.5 µg/m ³ on Mar 10 03:00 Maximum Daily Average: 9.5 µg/m ³ on Mar 10		Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 1 Percent Operational Time: 100.0																									
Minimum Value: 0.3 µg/m ³ on Mar 15 16:00 Maximum Diurnal Average: 6.8 µg/m ³ at hour 3 Monthly Average: 4.06 µg/m ³		Minimum Daily Average: 1.9 µg/m ³ on Mar 16 Minimum Diurnal Average: 2.4 µg/m ³ at hour 16 Percentiles: P ₁ = 0.6 P ₁₀ = 1.2 Q ₁ = 2.0 Median = 3.4 Q ₃ = 4.9 P ₉₀ = 7.1 P ₉₉ = 16.9																									
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-Mar	2.0	2.1	2.4	2.6	2.3	2.1	2.1	2.1	2.1	2.1	2.2	2.0	1.8	1.5	1.0	1.1	1.2	1.6	13.4	2.4	3.1	4.1	5.9	4.5	2.8	13.4	
2-Mar	3.1	3.5	2.8	2.3	1.9	1.7	1.8	2.2	2.0	1.4	1.6	1.9	1.4	1.4	1.3	1.2	1.4	1.7	2.0	2.1	2.4	4.1	4.9	6.0	2.3	6.0	
3-Mar	7.3	9.8	11.2	11.0	10.5	10.0	9.3	9.3	8.4	6.9	5.4	3.9	3.0	2.0	2.1	2.7	2.6	2.3	2.7	8.8	5.0	2.8	4.7	3.4	6.0	11.2	
4-Mar	2.4	1.7	1.8	1.7	2.2	2.2	2.2	2.1	1.9	1.8	1.6	1.6	1.7	1.9	1.9	2.5	2.6	2.9	4.0	3.0	1.7	1.6	1.6	1.7	2.1	4.0	
5-Mar	2.3	3.6	3.5	3.3	3.3	3.0	3.1	2.8	2.5	2.3	2.4	2.3	2.3	1.8	1.6	1.6	1.5	2.0	2.9	3.2	6.2	13.7	12.1	3.5	13.7		
6-Mar	11.3	12.3	8.1	4.9	6.2	9.7	8.1	5.6	5.1	4.0	3.9	2.9	3.5	3.3	3.4	3.5	3.6	4.1	3.1	3.1	3.6	3.5	2.9	3.6	5.1	12.3	
7-Mar	3.7	3.8	4.3	4.2	4.3	4.3	4.6	4.8	4.9	4.7	4.9	4.5	3.8	3.5	3.3	C	6.0	6.1	6.4	6.7	6.0	5.6	5.8	5.0	4.8	6.7	
8-Mar	4.4	2.7	2.8	3.2	3.8	4.6	5.2	5.6	4.3	3.4	3.7	3.4	2.7	3.1	3.1	3.7	3.3	4.3	5.2	4.1	3.4	3.2	3.3	3.7	3.8	5.6	
9-Mar	4.3	8.3	12.4	6.7	6.6	6.2	5.9	6.3	4.6	4.3	6.2	6.1	5.1	6.7	6.2	6.3	5.6	5.1	6.3	6.8	6.4	13.4	7.6	9.3	6.8	13.4	
10-Mar	10.7	27.4	59.5	34.7	12.4	6.3	9.7	7.1	3.8	3.8	3.8	3.2	4.2	3.8	3.4	3.1	3.3	4.1	3.8	3.7	3.0	3.5	4.4	5.6	9.5	59.5	
11-Mar	5.3	3.9	3.8	3.5	6.5	6.8	4.2	3.6	3.1	3.2	2.5	2.5	1.6	1.7	1.7	1.8	1.9	2.3	3.4	4.6	4.7	4.4	4.2	3.6	3.5	6.8	
12-Mar	3.7	3.5	4.1	3.5	3.0	3.7	3.4	6.6	24.1	18.5	4.6	2.0	1.7	1.7	1.7	1.6	1.5	1.4	1.4	1.9	2.0	1.9	2.2	2.4	4.3	24.1	
13-Mar	2.5	2.2	2.1	2.2	2.5	3.1	3.7	3.5	3.5	3.2	3.3	2.7	2.6	2.4	2.5	2.8	2.5	3.3	3.6	3.6	3.8	4.0	4.0	4.4	3.1	4.4	
14-Mar	5.0	3.6	3.5	4.0	5.6	5.6	5.8	4.7	4.7	2.9	1.8	0.8	0.7	0.8	1.0	1.6	2.4	2.7	2.4	2.0	2.9	3.1	4.0	6.3	3.3	6.3	
15-Mar	7.5	8.9	11.1	10.7	10.0	9.7	10.1	12.8	8.5	3.8	2.1	1.5	0.8	0.7	0.6	0.3	0.4	0.5	2.0	0.8	0.6	0.5	0.6	0.8	4.4	12.8	
16-Mar	0.9	0.7	0.6	0.5	0.6	0.9	1.9	2.0	1.8	1.5	1.6	1.9	2.0	1.8	2.1	2.1	2.3	2.6	2.9	3.0	2.6	2.7	2.9	2.9	1.9	3.0	
17-Mar	3.4	4.2	3.8	3.7	3.6	3.7	3.4	3.2	2.6	2.1	2.4	2.4	2.9	3.1	3.3	4.0	3.8	5.6	6.7	9.0	10.4	15.1	16.1	13.3	5.5	16.1	
18-Mar	11.8	13.4	11.6	9.2	8.1	6.9	5.6	4.5	3.1	2.1	1.8	1.4	1.3	1.4	1.7	1.7	1.4	1.2	1.0	0.9	0.9	1.0	1.1	1.2	3.9	13.4	
19-Mar	1.0	3.9	4.1	3.7	3.9	4.5	3.2	2.6	2.3	1.9	1.7	1.5	1.5	1.3	1.1	1.0	1.1	1.1	1.3	1.1	1.1	1.2	1.4	1.9	2.1	4.5	
20-Mar	2.4	2.7	3.9	4.3	6.9	6.1	8.4	6.3	5.2	3.2	1.9	1.9	1.8	1.5	1.4	1.3	1.4	1.6	2.3	4.0	4.3	4.8	5.1	4.4	3.6	8.4	
21-Mar	4.4	5.0	4.5	4.2	4.6	4.0	4.2	3.9	2.3	1.8	1.3	1.1	1.1	1.0	1.0	0.9	0.8	0.8	0.8	1.1	1.2	1.3	1.4	1.5	2.3	5.0	
22-Mar	1.6	1.7	2.0	2.4	2.7	3.0	3.2	2.7	2.6	2.7	2.7	2.7	2.7	2.9	2.8	3.0	2.8	3.5	3.5	3.0	3.1	3.6	7.0	7.8	3.1	7.8	
23-Mar	5.2	3.9	4.2	4.1	4.0	3.9	3.5	4.4	3.0	2.9	2.8	1.9	1.4	1.5	1.8	1.5	2.2	2.8	3.5	4.3	4.6	4.5	4.9	4.9	3.4	5.2	
24-Mar	4.2	4.5	5.0	5.6	5.6	5.8	6.9	7.8	8.7	7.9	5.5	4.5	4.3	5.3	4.0	2.9	2.2	1.8	2.6	4.2	4.4	5.3	5.7	5.1	5.0	8.7	
25-Mar	4.8	5.7	5.8	5.0	4.7	4.5	4.3	4.8	5.0	5.3	6.1	7.6	6.0	5.2	4.8	5.4	5.8	6.0	6.4	6.8	7.1	7.0	7.1	6.1	5.7	7.6	
26-Mar	4.9	3.6	3.9	4.0	4.3	4.2	4.4	5.1	6.8	5.5	5.9	6.4	6.8	6.3	5.3	3.0	1.5	2.4	4.0	4.7	5.1	4.6	3.7	4.4	4.6	6.8	
27-Mar	4.2	4.6	6.0	6.7	7.2	7.3	8.0	8.1	7.4	6.4	3.2	1.4	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	3.3	8.1	
28-Mar	0.6	0.6	0.6	0.6	0.6	0.8	1.2	1.2	1.3	1.6	2.7	4.5	4.8	4.2	3.8	3.2	2.3	2.0	1.8	1.8	2.1	3.2	4.0	4.0	2.2	4.8	
29-Mar	5.6	7.8	8.3	8.4	8.4	8.3	9.2	10.7	7.7	5.9	5.2	3.8	3.8	4.2	3.6	3.8	3.6	3.6	4.3	4.2	4.6	4.1	3.5	3.2	5.7	10.7	
30-Mar	4.1	5.4	5.4	4.8	4.1	3.5	3.6	4.1	4.7	2.8	2.6	2.8	2.6	2.3	2.0	2.2	2.1	2.8	2.8	2.6	3.0	4.2	5.3	5.7	3.6	5.7	
31-Mar	6.7	7.3	6.4	6.2	6.0	6.1	6.4	4.3	2.8	1.9	1.5	1.0	0.7	0.7	0.6	0.7	0.7	0.9	1.4	1.0	2.1	8.6	20.8	17.6	4.7	20.8	
4.6 5.6 6.8 5.5 5.1 4.9 5.0 5.0 4.9 3.9 3.2 2.8 2.6 2.6 2.4 2.4 2.4 2.7 3.5 3.5 3.5 4.3 5.2 5.1																								Diurnal Average			
11.8 27.4 59.5 34.7 12.4 10.0 10.1 12.8 24.1 18.5 6.2 7.6 6.8 6.7 6.2 6.3 6.0 6.1 13.4 9.0 10.4 15.1 20.8 17.6																								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}) - $\mu\text{g}/\text{m}^3$
Anzac - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - March 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	534	71.87	71.87
6 - 15	145	19.52	91.39
16 - 25	5	0.67	92.06
26 - 80	3	0.40	92.46
> 81.0	0	0.00	92.46

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
Anzac - March 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	30	12	16	20	20	68	128	96	23	7	0	0	3	22	34	55	534
6 - 15	10	0	0	1	4	14	24	33	13	5	3	0	4	6	9	16	142
16 - 25	0	0	0	0	0	0	2	1	0	1	1	0	0	0	0	0	5
26 - 80	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	3
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	40	12	16	21	24	84	155	130	36	13	4	0	7	28	43	71	684

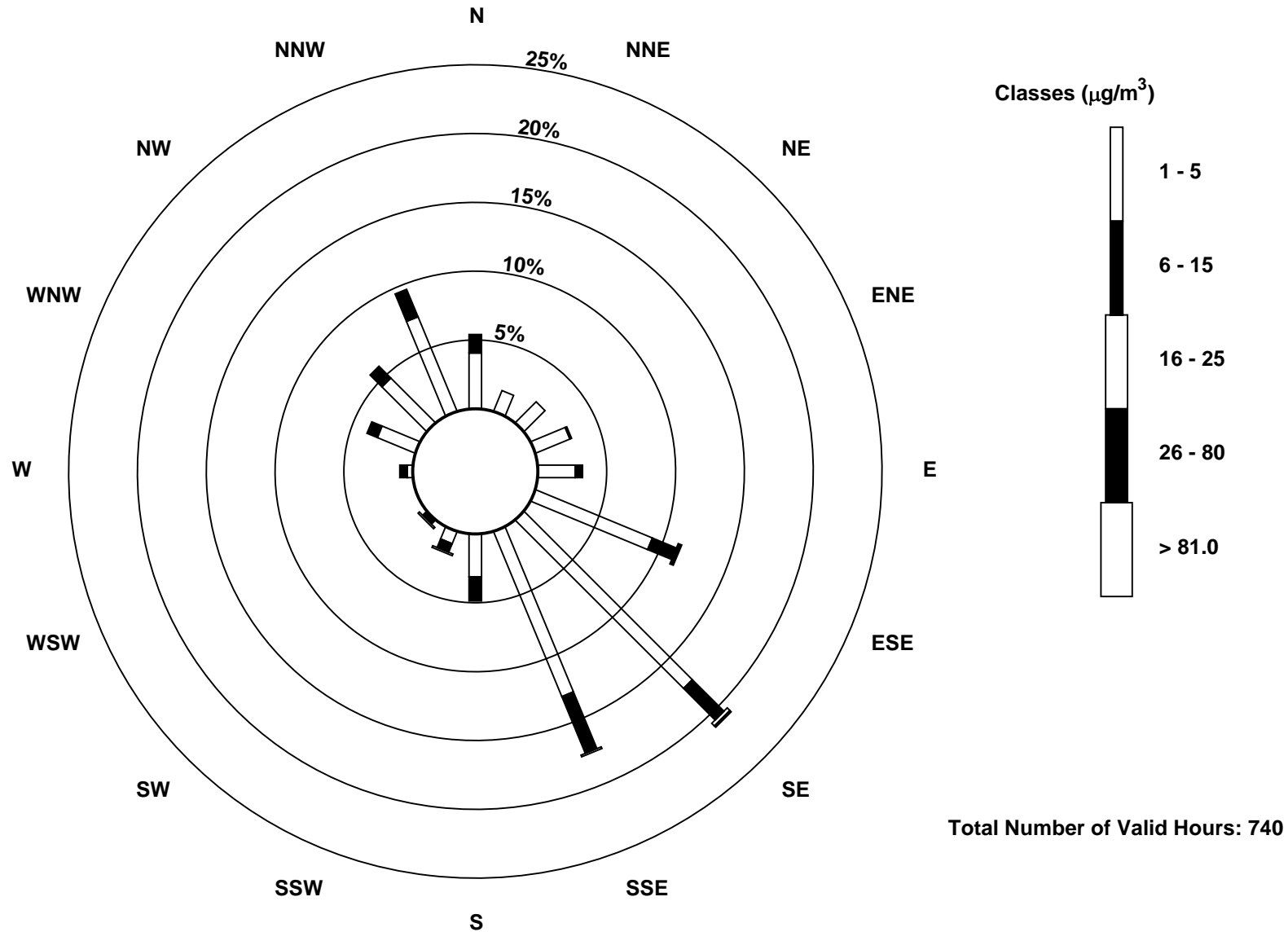
Total Number of Valid Hours: 740

Total Number of Hours: 744



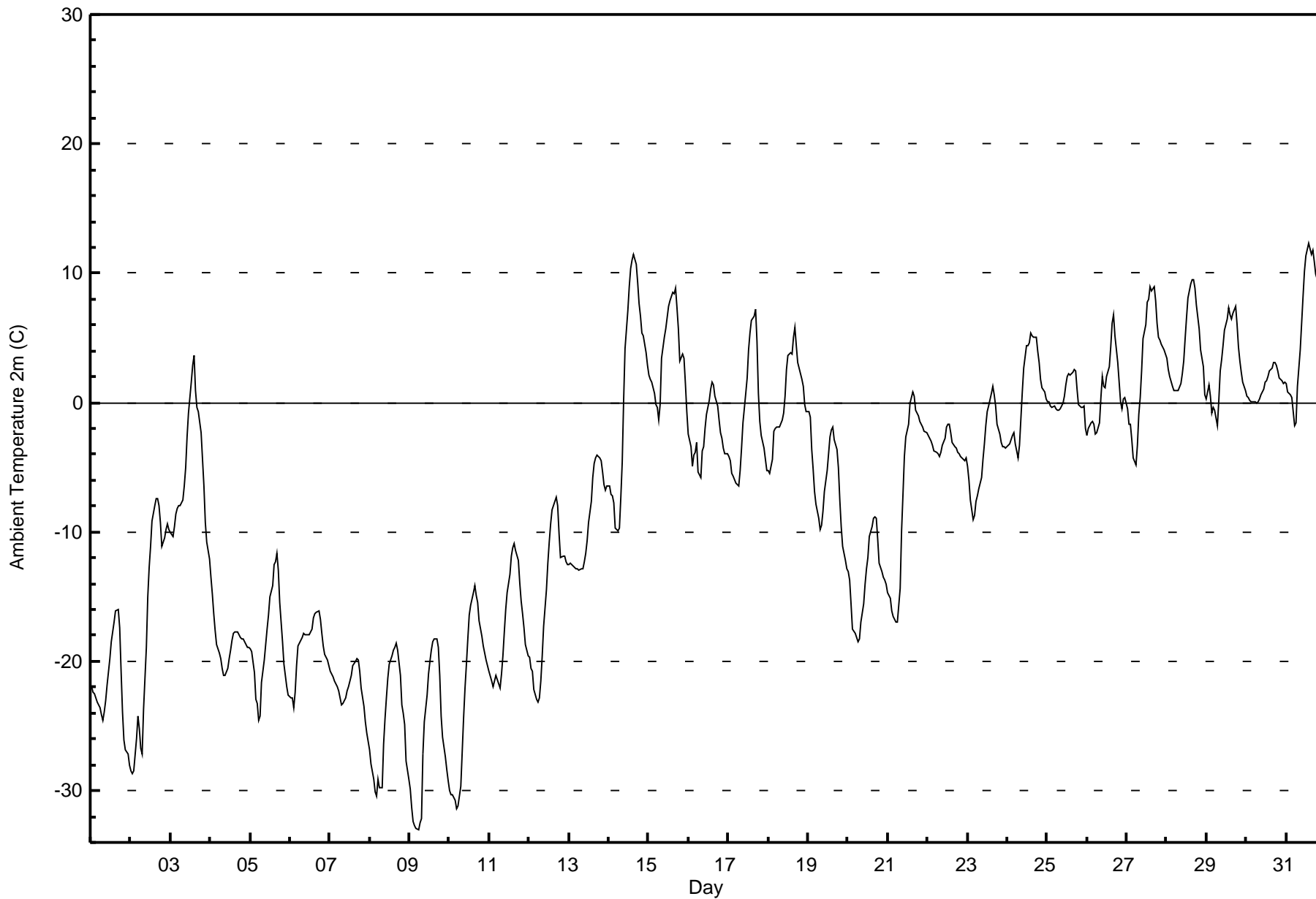
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac (AMS 14)





Maximum Value: 12.3 C on Mar 31 14:00 Maximum Daily Average: 6.2 C on Mar 31																						Hours in Service:	744			
Minimum Value: -33.0 C on Mar 9 06:00 Minimum Daily Average: -25.9 C on Mar 9																						Hours of Data:	744			
Maximum Diurnal Average: -2.9 C at hour 17 Minimum Diurnal Average: -12.5 C at hour 7																						Hours of Missing Data:	0			
Monthly Average: -7.98 C Percentiles: P ₁ = -31.3 P ₁₀ = -22.8 Q ₁ = -17.9 Median = -5.1 Q ₃ = 0.6 P ₉₀ = 5.0 P ₉₉ = 10.7																						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-Mar	-22.0	-22.3	-22.6	-22.8	-23.1	-23.6	-24.1	-24.6	-23.9	-23.0	-21.8	-19.8	-18.5	-17.8	-17.0	-16.1	-16.0	-17.4	-20.8	-24.0	-26.0	-26.9	-27.1	-28.0	-22.1	-16.0
2-Mar	-28.5	-28.7	-28.5	-26.0	-24.2	-25.2	-26.8	-27.2	-23.7	-19.0	-15.1	-12.8	-11.1	-9.2	-8.0	-7.4	-7.4	-8.0	-9.2	-11.2	-10.5	-9.8	-9.4	-9.8	-16.5	-7.4
3-Mar	-10.0	-10.4	-9.6	-8.7	-8.2	-7.9	-7.9	-7.5	-6.5	-5.0	-2.7	-0.8	1.5	2.9	3.6	1.0	-0.3	-0.7	-2.3	-4.4	-6.5	-9.2	-10.8	-12.1	-5.1	3.6
4-Mar	-13.5	-14.8	-16.3	-17.7	-18.7	-19.3	-19.8	-20.6	-21.1	-21.1	-20.6	-19.8	-19.1	-18.4	-17.8	-17.7	-17.8	-18.0	-18.2	-18.3	-18.2	-18.7	-19.0	-19.0	-18.5	-13.5
5-Mar	-19.0	-19.3	-20.9	-22.9	-23.2	-24.6	-24.3	-21.7	-19.9	-18.8	-17.5	-16.5	-15.0	-14.1	-12.5	-12.3	-11.7	-12.9	-15.4	-18.5	-20.2	-21.1	-22.0	-22.6	-18.6	-11.7
6-Mar	-22.8	-22.9	-23.6	-22.4	-20.3	-18.8	-18.4	-18.2	-17.9	-17.9	-17.9	-17.9	-17.7	-17.5	-16.7	-16.3	-16.2	-16.1	-16.8	-17.9	-18.8	-19.5	-19.9	-20.3	-18.9	-16.1
7-Mar	-20.7	-21.0	-21.2	-21.6	-21.9	-22.3	-22.8	-23.3	-23.3	-22.8	-22.3	-22.0	-21.6	-21.0	-20.3	-20.1	-19.8	-19.9	-20.8	-22.1	-23.5	-24.6	-25.5	-26.2	-22.1	-19.8
8-Mar	-26.8	-27.9	-29.1	-30.1	-30.4	-29.2	-29.8	-29.7	-26.4	-24.5	-22.8	-21.3	-20.2	-19.5	-19.1	-18.9	-18.6	-19.1	-21.1	-23.4	-24.0	-24.9	-27.7	-29.1	-24.7	-18.6
9-Mar	-29.8	-31.3	-32.3	-32.7	-33.0	-33.0	-32.5	-32.2	-27.1	-24.7	-22.6	-21.0	-20.0	-19.2	-18.5	-18.3	-18.3	-18.9	-21.1	-24.2	-25.9	-27.4	-28.4	-29.2	-25.9	-18.3
10-Mar	-30.0	-30.3	-30.3	-30.7	-31.4	-31.2	-30.4	-29.7	-24.3	-22.1	-20.2	-18.3	-16.4	-15.7	-14.7	-14.1	-14.9	-15.5	-16.9	-18.1	-18.9	-19.4	-19.9	-20.3	-22.2	-14.1
11-Mar	-20.8	-21.5	-22.0	-21.5	-21.1	-21.4	-22.1	-21.0	-19.6	-17.7	-16.0	-14.7	-13.3	-11.9	-11.2	-10.9	-11.4	-12.2	-13.9	-15.4	-16.3	-17.4	-18.7	-19.6	-17.1	-10.9
12-Mar	-19.7	-20.6	-20.8	-22.2	-22.9	-23.1	-22.8	-21.6	-19.6	-17.3	-14.5	-12.4	-10.8	-9.4	-8.3	-7.6	-7.3	-8.0	-10.1	-12.0	-11.9	-11.9	-12.3	-12.5	-15.0	-7.3
13-Mar	-12.5	-12.4	-12.6	-12.8	-12.9	-12.9	-13.0	-12.9	-12.8	-12.3	-11.6	-10.6	-9.2	-7.6	-5.8	-4.7	-4.2	-4.1	-4.3	-4.5	-5.3	-6.3	-6.7	-6.5	-9.1	-4.1
14-Mar	-6.4	-7.1	-7.2	-7.7	-9.7	-9.9	-9.7	-7.3	-4.6	0.2	4.2	7.2	9.0	10.4	11.1	11.5	10.7	9.3	7.7	6.7	5.4	5.1	3.9	2.9	1.5	11.5
15-Mar	2.1	1.8	1.6	0.8	-0.2	-0.3	-1.3	-0.2	3.4	5.0	5.7	6.6	7.4	7.9	8.5	8.4	8.9	7.4	5.7	3.2	3.7	3.4	1.5	-0.7	3.8	8.9
16-Mar	-2.5	-3.5	-4.9	-4.1	-3.9	-3.1	-5.3	-5.8	-3.7	-3.4	-2.0	-0.9	0.2	1.0	1.6	1.3	0.5	-0.3	-1.3	-2.3	-2.8	-3.6	-4.0	-4.0	-2.4	1.6
17-Mar	-4.2	-4.5	-5.4	-5.7	-6.2	-6.3	-6.5	-5.3	-3.5	-1.6	0.8	1.9	4.0	5.4	6.4	6.6	7.2	4.8	0.7	-1.5	-2.5	-3.5	-4.4	-5.3	-1.2	7.2
18-Mar	-5.3	-5.5	-4.4	-2.2	-2.0	-1.9	-1.9	-1.9	-1.3	-0.8	0.5	2.5	3.6	3.8	3.7	5.0	5.8	4.4	3.1	2.3	1.8	1.3	-0.2	-0.7	0.4	5.8
19-Mar	-0.7	-1.2	-3.7	-5.1	-6.9	-7.9	-8.9	-9.8	-9.5	-8.4	-6.9	-5.3	-3.9	-2.7	-2.1	-1.9	-2.8	-3.6	-5.1	-7.5	-9.6	-11.1	-12.2	-12.8	-6.2	-0.7
20-Mar	-13.1	-13.7	-15.5	-17.5	-17.9	-18.2	-18.5	-18.2	-17.0	-15.5	-14.0	-12.8	-12.0	-10.4	-9.6	-8.9	-8.8	-9.0	-10.6	-12.4	-13.0	-13.5	-13.7	-14.0	-13.7	-8.8
21-Mar	-14.7	-15.2	-16.1	-16.6	-16.7	-16.9	-17.0	-14.3	-9.9	-7.1	-4.2	-2.7	-1.7	0.0	0.4	0.8	0.5	-0.6	-1.0	-1.5	-1.7	-1.9	-2.2	-2.4	-6.8	0.8
22-Mar	-2.6	-2.8	-3.0	-3.3	-3.8	-3.9	-4.0	-4.2	-3.8	-3.3	-2.8	-1.9	-1.7	-1.7	-2.3	-3.1	-3.4	-3.6	-3.8	-4.0	-4.2	-4.4	-4.5	-4.3	-3.3	-1.7
23-Mar	-4.9	-6.0	-7.6	-9.0	-8.7	-7.6	-7.2	-6.7	-5.8	-4.4	-3.2	-1.7	-0.7	-0.2	0.8	1.3	0.7	-0.2	-1.7	-2.4	-3.1	-3.4	-3.4	-3.5	-3.7	1.3
24-Mar	-3.4	-3.2	-2.9	-2.5	-2.3	-3.2	-4.2	-3.3	-1.3	0.8	2.7	4.4	4.4	4.6	5.4	5.1	5.0	5.1	4.0	3.1	1.7	1.1	0.8	0.3	0.9	5.4
25-Mar	0.1	0.0	-0.3	-0.3	-0.3	-0.4	-0.6	-0.6	-0.4	0.0	0.5	1.4	2.0	2.2	2.1	2.3	2.6	2.4	1.0	-0.1	-0.3	-0.4	-0.2	-2.0	0.4	2.6
26-Mar	-2.5	-2.0	-1.6	-1.5	-1.7	-2.4	-2.4	-1.5	0.4	2.0	1.2	1.1	2.0	2.8	4.3	6.1	6.8	5.1	3.1	1.6	0.1	-0.5	0.3	0.4	0.9	6.8
27-Mar	-0.5	-1.7	-1.6	-2.9	-4.3	-4.9	-3.3	-1.0	0.4	2.5	4.9	6.1	7.8	8.0	9.0	8.6	8.9	7.8	6.1	5.0	4.9	4.5	4.1	3.8	3.0	9.0
28-Mar	3.4	2.6	2.0	1.3	0.9	0.9	0.9	0.9	1.5	2.2	3.3	5.0	6.5	8.1	9.1	9.5	9.5	8.8	7.6	5.7	4.1	3.4	2.8	0.6	4.2	9.5
29-Mar	0.3	1.4	0.5	-0.8	-0.4	-0.6	-1.7	0.2	2.4	3.3	4.4	5.6	6.5	7.3	6.7	6.4	6.9	7.4	6.0	4.3	3.2	2.3	1.6	0.9	3.1	7.4
30-Mar	0.4	0.4	0.2	0.1	0.1	0.0	0.0	0.1	0.2	0.6	1.0	1.5	1.7	2.0	2.4	2.7	3.1	3.1	2.9	2.4	1.9	1.7	1.4	1.6	1.3	3.1
31-Mar	1.5	0.8	0.6	0.4	-0.7	-1.8	-1.6	1.2	4.0	6.2	8.2	10.1	11.4	12.3	11.9	11.5	11.8	10.9	10.0	9.2	8.5	8.1	7.6	6.8	6.2	12.3
																						Diurnal Average				
																						Diurnal Maximum				





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Anzac - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	133	17.88	17.88
-20 - 0	395	53.09	70.97
0 - 10	205	27.55	98.52
10 - 20	11	1.48	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

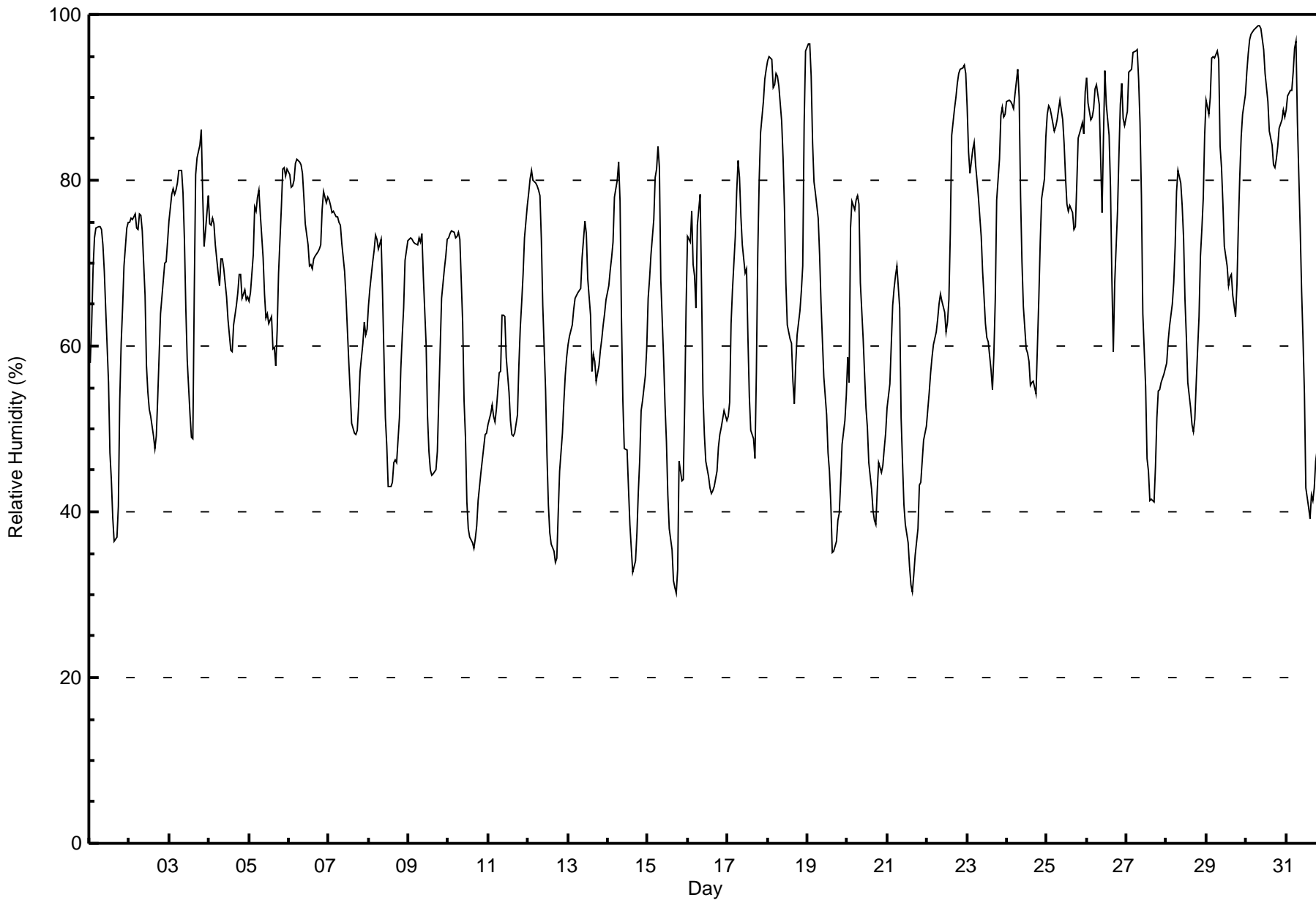


Maximum Value: 99 % on Mar 30 08:00																		Maximum Daily Average: 91.4 % on Mar 30																		Hours in Service: 744													
Minimum Value: 30 % on Mar 15 18:00																		Minimum Daily Average: 47.8 % on Mar 21																		Hours of Data: 744													
Maximum Diurnal Average: 79.8 % at hour 7																		Minimum Diurnal Average: 51.8 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 66.9 %																		Percentiles: P ₁ = 33 P ₁₀ = 44 Q ₁ = 54 Median = 68 Q ₃ = 79 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-Mar	58	63	69	73	74	74	74	74	72	69	64	56	47	44	39	36	37	41	54	60	65	70	74	75	60.9	75																							
2-Mar	75	75	75	76	74	74	76	76	74	66	58	54	52	51	49	48	49	54	59	64	68	70	70	73	65.0	76																							
3-Mar	75	78	79	78	79	80	81	81	78	73	65	58	52	49	49	66	81	83	84	86	78	72	74	78	73.2	86																							
4-Mar	75	75	76	75	72	69	67	71	70	69	66	63	61	60	59	63	65	66	69	69	66	67	66	66	67.6	76																							
5-Mar	65	66	71	77	76	78	79	76	71	66	63	64	63	64	60	60	58	62	69	77	81	81	80	81	70.4	81																							
6-Mar	81	79	79	80	82	83	82	82	81	78	75	72	70	70	69	70	71	71	72	72	76	79	77	78	76.2	83																							
7-Mar	78	77	76	76	76	76	75	75	72	69	66	62	58	54	51	49	49	50	53	57	60	63	61	62	64.4	78																							
8-Mar	65	67	70	72	73	73	72	73	66	59	51	48	43	43	44	46	46	46	51	57	61	65	70	73	59.8	73																							
9-Mar	73	73	73	73	72	72	73	73	74	68	60	52	47	45	44	45	45	47	54	60	66	69	71	73	62.5	74																							
10-Mar	73	73	74	74	73	73	74	73	63	53	49	41	38	37	36	36	37	38	41	45	46	48	49	49	53.9	74																							
11-Mar	50	52	53	52	51	52	57	57	64	64	64	59	54	51	49	49	49	52	58	62	65	69	73	77	57.6	77																							
12-Mar	78	80	81	80	80	79	79	78	73	65	55	47	41	38	36	35	34	34	40	45	49	53	56	59	58.2	81																							
13-Mar	60	61	63	64	66	66	66	67	71	73	75	73	68	64	57	59	58	56	58	60	61	63	64	66	64.1	75																							
14-Mar	67	69	71	72	78	80	82	78	63	53	48	47	43	39	36	33	34	38	42	46	52	53	56	60	55.9	82																							
15-Mar	66	68	71	75	80	81	84	82	68	58	53	48	42	38	35	32	31	30	33	46	44	44	53	65	55.3	84																							
16-Mar	73	73	76	70	69	65	75	78	67	54	49	46	44	43	42	43	43	45	48	49	50	51	52	51	56.5	78																							
17-Mar	52	53	63	67	73	79	82	80	76	72	69	69	61	54	50	49	47	57	71	80	86	89	92	93	69.3	93																							
18-Mar	94	95	95	91	91	93	93	91	87	83	77	68	63	61	60	56	53	58	61	64	67	70	87	96	77.2	96																							
19-Mar	97	96	93	84	80	78	75	71	65	61	56	52	47	45	41	35	35	36	39	40	44	48	51	54	59.3	97																							
20-Mar	59	56	74	77	77	78	78	77	68	61	57	53	50	46	43	40	39	38	43	46	45	46	48	49	56.1	78																							
21-Mar	53	55	60	65	67	68	70	65	51	46	41	38	36	33	31	30	32	35	38	43	44	46	49	50	47.8	70																							
22-Mar	52	54	57	59	60	62	63	65	66	65	64	62	63	66	74	85	89	90	92	93	93	94	94	93	73.1	94																							
23-Mar	89	83	81	84	85	82	80	78	73	69	66	63	61	61	57	55	59	66	78	83	88	89	88	88	75.1	89																							
24-Mar	89	90	90	89	89	90	93	90	78	70	65	60	59	58	55	56	56	54	60	66	73	78	80	85	73.8	93																							
25-Mar	88	89	89	88	86	86	87	89	90	87	84	80	77	76	77	76	74	74	80	85	86	87	86	91	83.9	91																							
26-Mar	92	89	87	88	89	91	91	89	83	76	85	93	89	85	79	68	59	68	76	83	89	92	88	87	84.0	93																							
27-Mar	88	93	93	93	95	96	96	92	87	78	64	55	46	45	41	42	41	45	51	54	55	56	57	57	67.6	96																							
28-Mar	58	60	62	65	68	72	79	81	80	77	73	66	61	56	53	51	50	51	56	64	71	74	78	85	66.2	85																							
29-Mar	90	88	90	95	95	95	96	95	84	82	77	72	70	67	68	69	66	64	67	75	81	85	88	90	81.1	96																							
30-Mar	93	95	97	98	98	98	99	99	99	98	96	93	91	89	86	84	82	81	82	84	86	87	89	88	91.4	99																							
31-Mar	88	90	91	91	93	96	97	87	74	67	61	54	43	40	39	42	41	43	46	49	53	61	66	70	66.0	97																							
																								74.0	74.8	76.7	77.4	78.1	78.7	79.8	78.7	73.8	68.7	64.3	60.3	56.2	53.9	52.0	51.8	51.9	54.0	58.8	63.3	66.1	68.3	70.6	73.0	Diurnal Average	
																								97	96	97	98	98	98	99	99	99	98	96	93	91	89	86	85	89	90	92	93	93	94	94	96	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Anzac - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Anzac - March 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	42	5.65	5.65
40 - 60	212	28.49	34.14
60 - 80	319	42.88	77.02
80 - 100	171	22.98	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Leaf Wetness (SW) - %

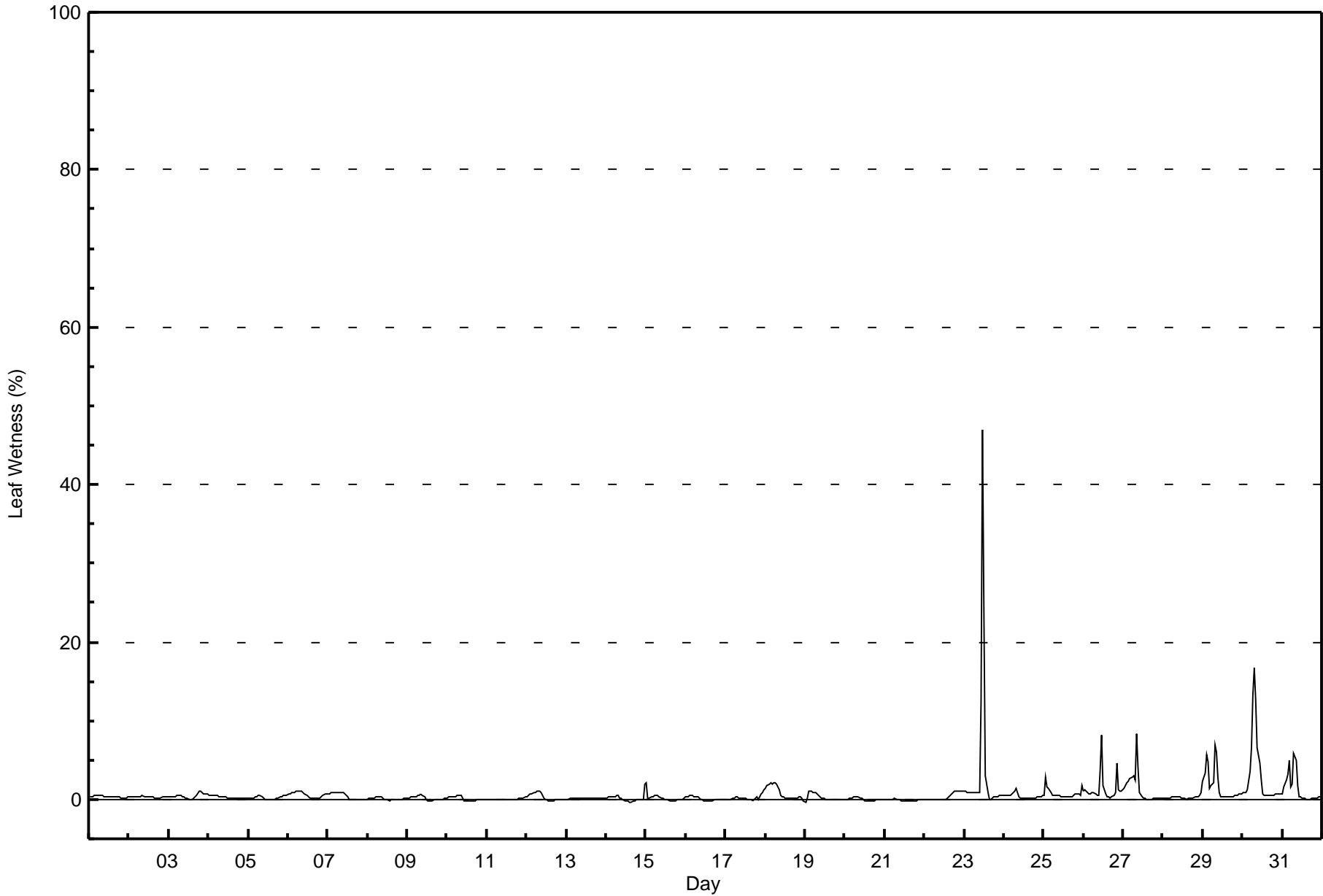
Anzac - March 2017

Maximum Value: 47 % on Mar 23 12:00														Maximum Daily Average: 4.1 % on Mar 23														Hours in Service: 744			
Minimum Value: 0 % on Mar 14 16:00														Minimum Daily Average: -0.1 % on Mar 21														Hours of Data: 744			
Maximum Diurnal Average: 2.0 % at hour 12														Minimum Diurnal Average: 0.0 % at hour 16														Hours of Missing Data: 0			
Monthly Average: 0.6 %														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 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-Mar	0	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-Mar	0	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-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.4	1					
4-Mar	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1					
5-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1					
6-Mar	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0.6	1					
7-Mar	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1					
8-Mar	0	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					
9-Mar	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1					
10-Mar	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1					
11-Mar	0	0	0	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-Mar	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1					
13-Mar	0	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					
14-Mar	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	2					
15-Mar	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2					
16-Mar	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1					
17-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.2	1					
18-Mar	1	2	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	2					
19-Mar	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1					
20-Mar	0	0	0	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-Mar	0	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					
22-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.4	1					
23-Mar	1	1	1	1	1	1	1	1	1	1	12	47	24	3	1	0	0	0	0	0	0	0	0	0	4.1	47					
24-Mar	1	1	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					
25-Mar	1	3	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.7	3					
26-Mar	1	1	1	1	1	1	1	1	1	0	4	8	2	1	0	0	0	0	1	1	5	1	1	1	1.4	8					
27-Mar	1	2	2	2	3	3	3	2	8	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	8					
28-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1					
29-Mar	2	3	6	5	1	2	2	7	6	3	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1.8	7					
30-Mar	1	1	1	1	3	7	13	17	13	7	5	2	1	1	1	1	1	1	1	1	1	1	1	1	3.2	17					
31-Mar	1	2	3	3	5	2	2	6	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	6					
														0.5 0.7 0.8 0.8 0.8 0.9 1.2 1.5 1.5 0.8 0.9 2.0 0.9 0.2 0.1 0.0 0.1 0.1 0.2 0.2 0.4 0.3 0.3 0.5														Diurnal Average			
														2 3 6 5 5 7 13 17 13 7 12 47 24 3 1 1 1 1 1 1 1 5 1 1 2														Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (SW) - %
Anzac - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (SW) - %
Anzac - March 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	310	52.10	52.10
0.4 - 0.5	104	17.48	69.58
0.6 - 0.7	48	8.07	77.65
0.8 - 1.4	78	13.11	90.76
1.5 - 10	49	8.24	98.99
> 10	6	1.01	100.00

Total Number of Valid Hours: 595

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Anzac - March 2017

Maximum Speed: 23 km/h on Mar 20 02:00	Maximum Daily Speed Average: 18.3 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 9 20:00	Minimum Daily Speed Average: 0.9 km/h on Mar 3	Hours of Data: 741
Maximum Diurnal Speed Average: 3.9 km/h at hour 11	Minimum Diurnal Speed Average: 2.7 km/h at hour 18	Hours of Missing Data: 3
Monthly Average Velocity: 3.1 km/h 134.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 20	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-Mar	ESE7	ESE8	ESE8	ESE9	ESE9	ESE8	E6	E6	ESE7	E7	ENE6	ESE7	ESE7	ENE6	ENE6	ENE5	ENE3	NE4	SW1	N2	NW2	W3	S1	S2	E4.4	ESE9	
2-Mar	S3	S4	S5	SSE6	SE5	ESE2	S3	S8	S7	SSE5	SE6	ESE9	ESE10	ESE14	SE14	SE16	SE15	SE13	SE14	SE14	SSE18	SSE18	SSE17	SSE13	SE9.6	SSE18	
3-Mar	SE15	SE12	SSE12	SSE11	SSE11	SSE12	SSE12	SE9	SE10	ESE6	SE9	SE9	SE5	ESE5	NW7	NW13	WNW7	NW11	NNW11	NNW15	NNW17	NNW16	NNW14	NNW15	E0.9	NNW17	
4-Mar	N14	N11	N10	N10	NNE10	N12	N13	N12	N13	N12	N11	N9	N11	N11	NNW10	NNW11	NNW10	NNW9	N6	N6	NNE7	NE10	ENE11	E8	N9.3	N14	
5-Mar	ESE9	ESE4	E2	ENE6	E7	ENE5	ENE3	ENE6	ESE4	ESE7	SSE6	SSE7	SSE8	SSE6	SE6	ESE7	SE8	SE5	SE4	E2	E1	NNW2	NNW2	NNW2	ESE4.1	ESE9	
6-Mar	WNW3	WNW2	NW2	NW3	NW5	NNW4	NNW5	NW6	NW5	NNW10	NNW9	NW11	NNW12	NNW14	NNW14	NNW15	NNW13	NNW11	NNW14	NNW15	NNW12	NNW11	NNW14	NNW13	NNW9.1	NNW15	
7-Mar	NNW13	NNW14	NNW15	NNW16	NNW15	NNW14	NNW15	NW14	NNW16	NNW16	NNW14	NNW16	NW16	NNW16	NNW15	NNW15	NNW15	NNW13	NNW10	NNW8	N8	NNW7	NNW7	NNW6	NNW13.0	NNW16	
8-Mar	NW6	NW6	WNW6	NW5	WNW6	WNW7	WNW5	WNW6	NW5	NW5	NW7	WNW9	NNW10	N11	NNW12	NNW12	NNW12	N9	N5	N6	NNE7	N6	N4	N5	NNW6.5	NNW12	
9-Mar	NNW1	NW1	N2	W2	W1	W6	WNW5	NW4	NW5	WNW5	W5	NW6	N6	N7	N8	N9	N7	N5	N1	SE0	S1	AF	AF	AF	NNW3.2	N9	
10-Mar	ENE2	ESE2	ESE4	SE4	ESE4	SE7	SSE6	SSE6	SSE7	SE7	ESE7	ESE9	SE8	ESE8	ESE8	ESE8	E8	E6	E6	ESE6	SE7	SE6	SE6	SE7	ESE6.0	ESE9	
11-Mar	SSE8	SSE8	SSE9	SSE10	SSE9	SE8	SE8	SE7	SSE7	SSE8	SE11	SSE13	SE13	SE12	SE11	SE12	SE11	SE9	ESE9	ESE8	ESE10	SE8	ESE5	SE6	SE9.0	SSE13	
12-Mar	ESE7	SE6	SSE6	ESE5	SE5	ESE4	SE6	SE8	SE9	SE10	SE13	SE14	SE15	SSE14	SE13	SE13	SE14	SSE12	SE9	SE8	SSE11	SSE14	SSE14	SSE13	SE9.8	SE15	
13-Mar	SSE13	SSE15	SSE15	SSE16	SSE17	SSE16	SSE16	SSE17	SSE17	SSE19	SSE17	SSE18	SSE17	SSE17	SSE17	S17	S16	S14	S13	S13	S13	S13	S10	S8	SSE15.0	SSE19	
14-Mar	SSW7	SSW8	SSW9	S8	S8	SSW8	SSW9	S7	SE5	SE6	SSE4	WNW5	ESE2	SE6	ESE7	ESE8	ESE8	ESE8	ESE9	SE12	SE13	SSE15	SSE16	SSE15	SSE6.8	SSE16	
15-Mar	SSE14	SSE15	SSE12	SSE9	SE8	SSE9	S5	SW7	WNW11	W13	WNW13	WNW9	WNW9	WNW9	W8	WNW6	WNW4	NW6	WNW4	NNW3	NNE7	NNE6	NE4	NNE2	WSW2.4	SSE15	
16-Mar	W2	ENE3	NE3	NE6	NNE6	NNE7	N6	NNE8	NE12	NE13	ENE12	NE12	NE10	NE10	NE10	NNE10	NNE9	NE9	ENE8	ENE10	E10	ESE9	ESE10	SE10	NE7.2	NE13	
17-Mar	SE11	SE10	SE13	SSE15	SE13	SE14	SE11	SE12	SSE12	SSE12	SSE10	SSE14	SSE14	SSE15	S9	E4	NNE5	N8	N5	NW5	WNW6	NW2	SSE1	E4	SE6.8	SSE15	
18-Mar	E8	E7	ESE8	SE10	ESE11	ESE10	ESE12	ESE13	SE16	SE15	SE16	SE15	SSE15	SE14	SE16	SE16	SE15	ESE10	E10	E8	E7	ENE7	N4	NNW6	ESE9.9	SE16	
19-Mar	NW12	NW19	NW21	NW20	NW21	NW19	NNW18	NNW20	NNW21	NNW19	NNW18	NNW18	NNW18	NNW18	NNW20	NNW22	NW18	NW19	NW17	NW18	NNW19	NNW17	NNW19	NNW18	NW17	NW18.3	WNW22
20-Mar	NNW20	NNW23	N16	N12	N10	NNW10	NNW11	NNW10	NNW10	NNW9	NW8	NW8	NNE6	N5	NNE7	NNE7	ENE8	E7	ESE6	SE8	SSE9	SSE11	S13	SSE13	N4.5	NNW23	
21-Mar	SSE10	SSE9	SSE8	SSE8	SSE8	SSE6	SE6	SE7	SE10	ESE10	SE12	SE15	SSE17	SSE15	SSE17	SSE18	SSE16	SE17	SE18	SE17	SSE17	SSE17	SSE15	SSE17	SSE12.8	SSE18	
22-Mar	SSE16	SSE17	SSE14	SE12	SE12	SE11	SE11	SE12	SE11	SE11	ESE11	SE10	SE10	ESE7	ENE7	NE7	NE7	ENE7	NE3	N4	N4	NNW6	NW7	NNW10	ESE5.9	SSE17	
23-Mar	NNW8	NW8	NW9	NW7	WNW7	NW6	NW5	NW5	N5	NE5	NE5	NE6	NE6	ENE6	E9	ESE8	SE9	SE10	SSE10	SSE8	SSE9	SE10	SE10	SSE9	E1.8	SE10	
24-Mar	SSE10	SSE8	S6	S5	S7	S9	SSE11	SSE9	SSE11	SE10	SE12	SE14	SSE16	SSE15	SE14	SE14	SE13	SE14	SE15	SSE15	ESE13	SE14	ESE12	ESE10	SSE11.1	SSE16	
25-Mar	SE12	SE10	ESE9	SE10	SSE11	SE10	SE8	SE8	SE8	SE8	ESE8	ESE7	ESE5	ESE6	ESE6	SE7	ESE7	SE6	SE5	ESE6	SE5	ESE6	SE6	SE6	SE7.3	SE12	
26-Mar	SE6	SE7	SE6	SE8	SE10	ESE9	ESE10	SE8	SE9	SSE10	SSE9	SSE6	SSE7	S3	SSW3	W2	WNW3	ENE6	E6	E6	SE6	SSE7	SSE9	SSE10	SE5.8	SE10	
27-Mar	SSE8	SSE7	SSE10	SSE4	SE4	E4	SE8	SSE7	SE9	SE11	SE12	SE13	SE14	SE11	SE10	SE14	SSE13	ESE10	ESE11	SE11	SE11	SE10	SSE8	SE10	SE9.3	SE14	
28-Mar	SSE10	SE10	SE10	SSE8	SSE7	SSE7	SSE9	SSE7	SSE7	SSE9	SSE10	SSE9	SE12	SE13	SE13	SE14	SE11	SE9	ESE9	ESE10	SE9	S8	S8	SE3	SE9.0	SE14	
29-Mar	SE6	SSE7	S6	SSE5	S7	SSW6	S5	SSE7	SSE8	SSE9	SE11	SE12	SE11	ESE12	ESE9	ESE8	ESE5	ESE7	E8	ESE8	ESE9	SE10	SE9	SE9	SE7.3	ESE12	
30-Mar	ESE9	SE8	SE8	SE7	SE7	SE6	SE7	SE7	ESE7	ESE6	ESE5	ESE3	NE4	ENE2	ENE4	E3	ESE3	S3	SSE2	E3	ESE1	SSE2	SSE3	S6	SE4.4	ESE9	
31-Mar	SSW7	S8	S10	SSE8	SSE5	SSE6	SSE6	SSE7	SE8	SE9	SE10	SE8	WSW17	SW15	SW17	SW18	SW20	SW16	SSW11	S12	SSW13	SW18	SW17	SSW14	SSW10.0	SW20	

SE3.4 SSE3.0 SSE3.1 SE3.4 SE3.3 SE2.7 SE2.7 SE3.0 SE3.3 SE3.5 SE3.9 SE3.9 SE3.8 SE3.5 ESE2.8 ESE2.8 ESE2.7 ESE2.7 ESE3.0 ESE3.4 SE3.4 SE3.5 SSE3.5 SSE3.3	Diurnal Average
NNW20 NNW23 NW21 NW20 NNW21 WNW19 NNW18 NNW20 NNW21 NNW19 NNW18 NNW18 NNW18 NNW20 NNW22 SW18 SW20 NW17 NW18 NNW19 SSE18 NNW19 NNW18 NW17	Diurnal Maximum

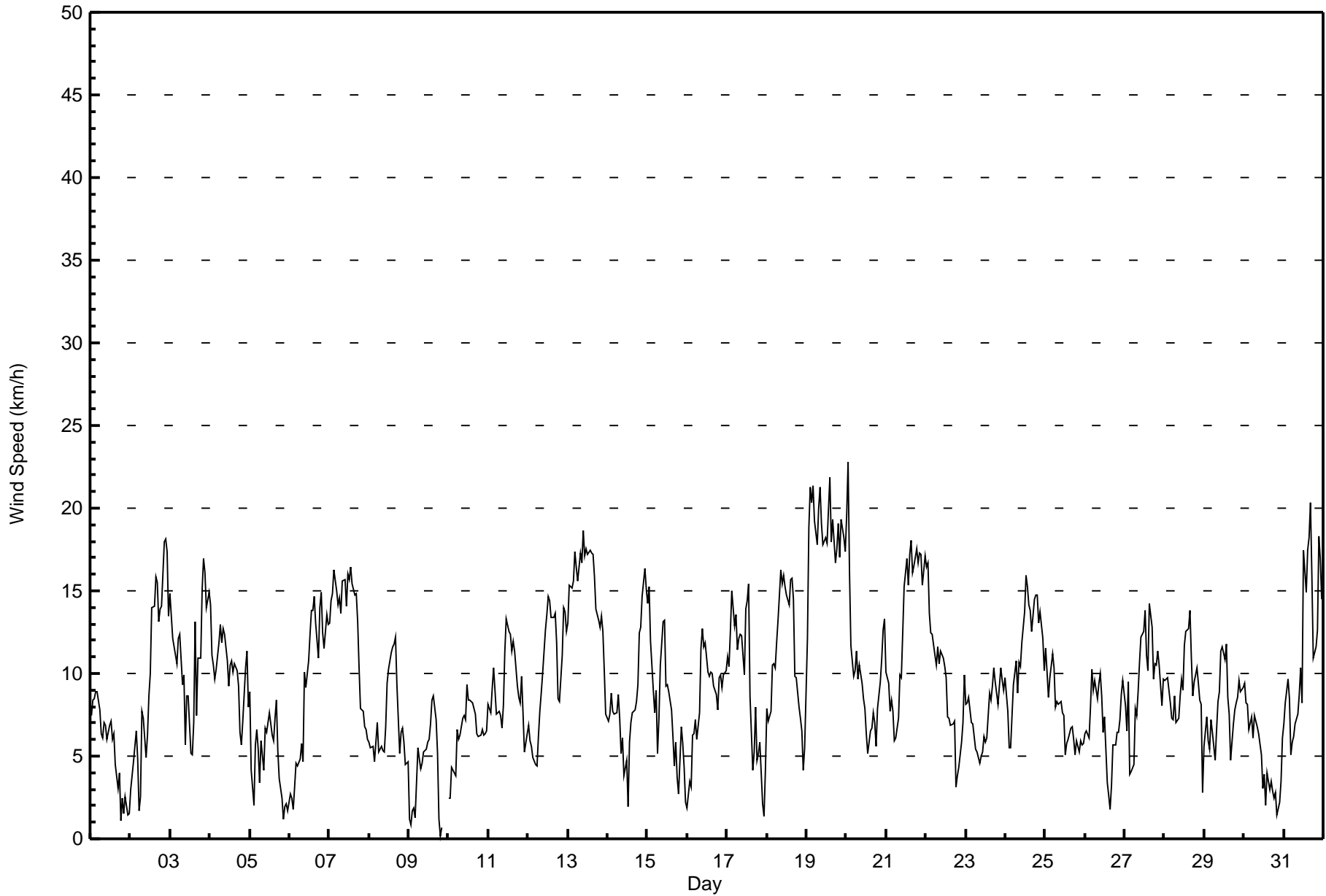
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Anzac - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Mar 20 02:00 Minimum Value: 1 km/h on Mar 5 21:00 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: 741 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 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-Mar	3	3	3	3	3	2	2	2	2	2	2	2	3	2	2	2	2	2	1	2	1	2	1	1	3																						
2-Mar	1	1	1	1	1	1	3	2	2	2	2	3	4	4	4	4	4	4	4	4	5	4	5	4	5																						
3-Mar	4	3	3	4	3	3	3	3	3	2	2	3	2	2	6	5	4	5	4	4	5	5	4	4	6																						
4-Mar	4	4	3	3	3	3	4	4	4	3	3	3	3	3	3	3	3	2	2	2	3	4	4	3	4																						
5-Mar	3	3	1	2	1	1	1	2	2	3	2	2	3	2	3	2	2	2	1	1	1	1	2	2	3																						
6-Mar	1	1	1	2	1	1	2	2	2	3	3	3	4	4	4	4	4	3	4	4	3	3	4	4	4																						
7-Mar	4	4	4	5	5	4	4	4	4	5	5	5	5	5	5	4	4	4	3	2	2	2	2	2	5																						
8-Mar	2	1	1	1	2	2	1	2	2	2	2	3	3	3	4	3	4	3	2	2	2	1	1	1	4																						
9-Mar	1	1	1	1	1	1	1	1	1	2	2	2	2	3	2	2	2	2	1	1	1	AF	AF	AF	3																						
10-Mar	1	1	1	1	1	1	1	2	2	2	2	3	2	3	2	3	2	3	2	1	2	2	2	2	3																						
11-Mar	2	2	2	2	3	2	2	2	2	2	3	4	4	4	4	4	3	3	3	2	3	2	2	2	4																						
12-Mar	2	2	2	1	2	1	2	2	3	3	4	4	4	4	3	5	4	4	2	2	3	4	4	4	5																						
13-Mar	4	5	5	5	5	6	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	3	4	2	6																						
14-Mar	3	3	3	2	2	2	3	2	2	1	1	2	2	2	2	2	2	2	2	3	3	4	4	4	4																						
15-Mar	4	4	4	3	2	2	2	2	4	4	4	4	3	3	2	3	2	2	1	2	2	1	1	1	4																						
16-Mar	1	1	1	1	2	1	2	2	3	3	3	3	3	3	3	2	3	2	2	2	3	3	3	3	3																						
17-Mar	3	3	3	4	4	4	3	3	3	3	4	4	4	5	3	2	2	2	1	1	2	1	1	1	5																						
18-Mar	1	1	2	2	2	3	3	4	5	4	5	4	5	4	4	5	4	3	3	3	2	2	1	2	5																						
19-Mar	4	7	7	7	6	6	6	6	7	6	6	6	6	7	7	7	7	6	5	6	5	6	6	6	7																						
20-Mar	6	8	5	3	3	3	3	3	3	3	3	3	2	3	2	2	2	2	2	3	2	3	3	3	8																						
21-Mar	4	3	2	2	2	1	1	2	3	2	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5																						
22-Mar	4	4	4	3	3	3	3	3	4	3	3	3	3	2	2	1	1	1	1	1	1	2	2	3	4																						
23-Mar	2	2	2	2	2	2	1	2	1	2	2	2	2	2	3	3	3	3	3	2	3	3	3	2	3																						
24-Mar	2	2	1	1	2	2	2	2	2	3	3	4	4	4	4	4	4	4	4	4	3	4	3	3	4																						
25-Mar	3	2	2	4	3	3	2	2	2	2	2	2	1	1	1	2	2	1	1	1	1	1	1	1	4																						
26-Mar	1	1	2	2	2	2	2	2	2	3	3	2	2	1	1	2	2	1	1	1	1	2	2	2	3																						
27-Mar	2	1	2	1	1	1	1	2	2	3	4	3	4	3	3	5	5	3	3	3	3	3	3	2	5																						
28-Mar	2	2	2	2	1	2	2	2	2	2	3	3	3	4	4	3	4	2	2	3	2	2	2	2	4																						
29-Mar	1	2	2	2	2	1	1	2	2	2	2	3	3	3	3	2	2	2	2	2	3	3	2	2	3																						
30-Mar	3	2	2	2	2	2	2	2	2	2	3	2	1	2	2	2	1	1	1	1	1	1	1	2	3																						
31-Mar	2	2	2	2	2	1	1	2	2	2	2	3	5	4	6	6	7	5	3	3	4	5	5	4	7																						
Diurnal Maximum																								6	8	7	7	6	6	6	6	7	6	6	6	6	7	7	7	7	6	5	6	5	6	6	6
AF - Analyzer Failure																																															





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Anzac - March 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	127	17.14	17.14
6 - 11	397	53.58	70.72
12 - 19	207	27.94	98.65
20 - 28	10	1.35	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 741

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Anzac - March 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	3	6	8	8	17	12	9	10	3	1	0	6	9	15	8	127
6 - 11	20	14	10	14	19	65	101	71	18	8	1	0	2	13	15	26	397
12 - 19	8	0	3	1	0	6	55	60	9	2	6	1	1	7	10	38	207
20 - 28	0	0	0	0	0	0	0	0	0	0	1	0	0	4	4	1	10
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	40	17	19	23	27	88	168	140	37	13	9	1	9	33	44	73	741

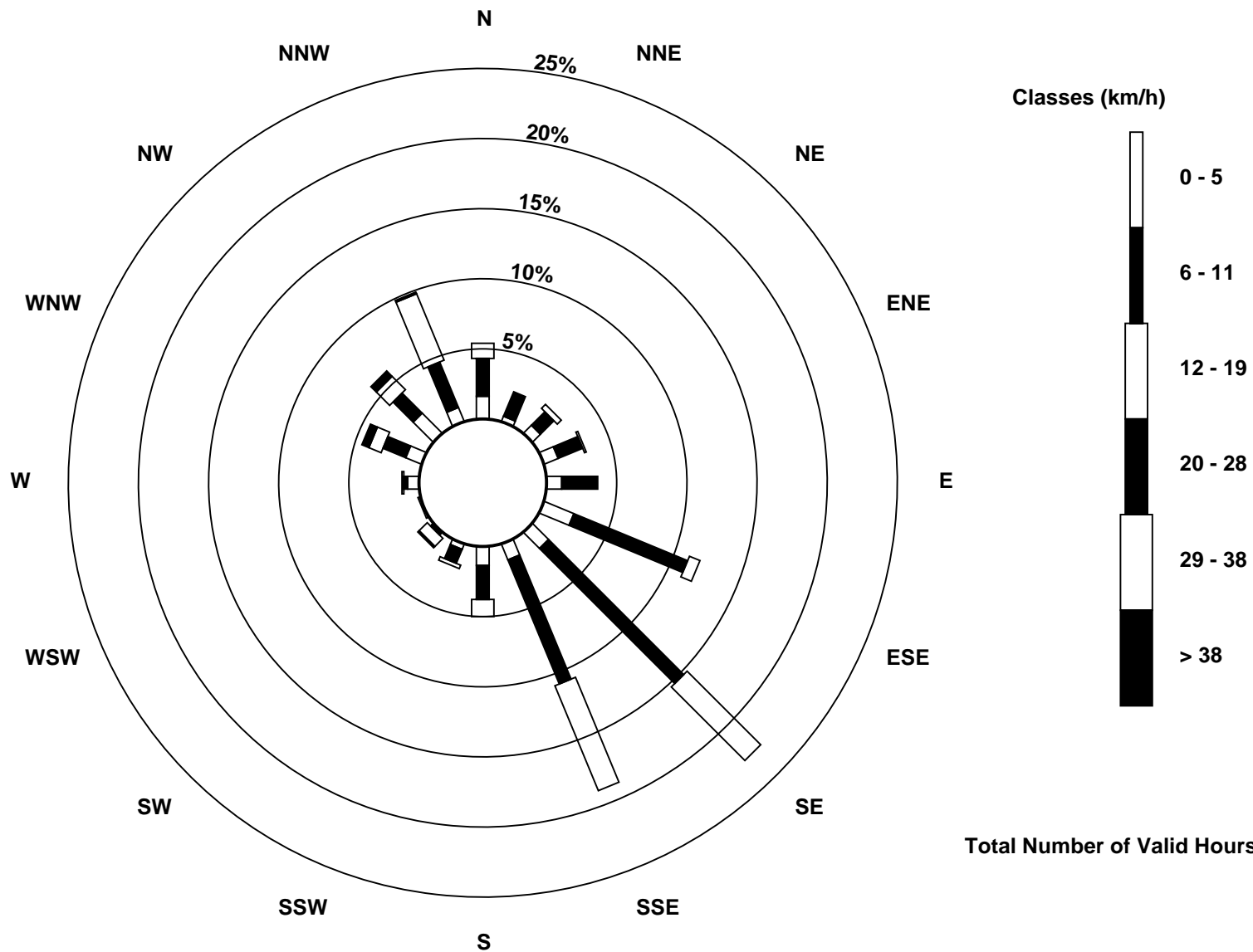
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Wind Speed (WS) - km/h
Anzac (AMS 14)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Anzac - March 2017

Direction of Maximum Speed: 327 deg on Mar 20 02:00																				Hours in Service: 744							
Direction of Maximum Daily Speed Average: 312.4 deg on Mar 19																				Hours of Data: 741							
Direction of Minimum Speed: 143 deg on Mar 9 20:00										Direction of Minimum Daily Speed Average: 0.9 deg on Mar 3										Hours of Missing Data: 3							
Monthly Average Direction: 141.5 deg																								Percent Operational Time: 99.6			
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-Mar	121	105	120	115	105	102	96	89	103	99	76	121	106	64	59	72	60	34	227	4	310	269	191	191	97.0		
2-Mar	176	184	170	165	146	114	175	172	173	151	130	121	119	122	132	140	143	141	129	134	149	158	160	154	145.1		
3-Mar	145	142	147	149	151	157	152	145	143	117	125	134	142	121	318	314	300	321	328	346	339	332	341	345	89.5		
4-Mar	355	354	357	4	19	5	352	5	8	1	1	358	0	355	340	340	338	340	349	354	12	49	77	99	3.7		
5-Mar	118	122	93	71	82	71	63	74	112	114	149	148	148	157	133	102	128	131	133	98	84	343	347	342	113.3		
6-Mar	285	292	324	325	326	339	332	318	316	337	329	316	327	334	335	338	336	340	342	338	339	338	335	331	332.5		
7-Mar	331	331	331	333	328	328	327	326	327	330	328	328	325	328	335	334	336	339	338	343	349	348	346	337	332.1		
8-Mar	320	306	296	323	294	293	298	303	306	317	313	297	345	350	343	337	348	354	2	11	14	360	349	3	332.3		
9-Mar	333	312	352	281	277	277	300	304	305	290	271	308	354	4	10	10	10	357	351	143	176	AF	AF	AF	331.3		
10-Mar	75	110	118	133	121	124	152	152	152	145	107	114	126	109	109	114	94	96	79	119	128	136	145	144	121.9		
11-Mar	147	150	155	151	153	140	145	146	153	150	145	150	141	145	140	136	129	136	109	104	122	131	123	126	139.3		
12-Mar	120	139	153	123	135	122	127	128	143	145	139	138	142	152	143	137	146	147	132	127	147	163	161	153	142.8		
13-Mar	156	166	164	159	162	166	161	161	160	163	163	162	162	162	165	177	174	177	181	187	188	180	188	191	168.4		
14-Mar	199	201	205	189	184	193	202	185	137	136	148	283	111	125	118	110	105	108	115	128	138	155	165	165	156.3		
15-Mar	150	160	161	151	135	154	185	219	285	281	282	288	295	284	275	284	283	323	288	341	23	32	51	30	243.9		
16-Mar	260	66	36	45	24	21	350	13	42	55	64	50	52	52	44	32	30	42	57	75	89	103	118	132	55.0		
17-Mar	131	129	137	148	142	142	136	138	149	158	166	149	148	164	169	86	21	355	355	305	289	319	161	86	142.9		
18-Mar	81	99	118	127	122	116	117	118	125	131	145	144	148	135	124	130	134	110	91	94	100	70	7	329	120.8		
19-Mar	325	320	319	314	318	304	300	300	301	300	300	300	297	299	301	310	312	313	322	340	333	334	328	316	312.4		
20-Mar	322	327	352	359	353	346	340	340	344	337	321	326	15	4	22	24	62	96	118	135	164	168	170	165	353.6		
21-Mar	163	159	163	160	159	150	146	146	137	123	143	143	156	153	167	157	150	146	143	145	159	161	160	161	152.6		
22-Mar	160	160	153	145	146	138	127	128	126	135	121	128	131	123	62	54	56	59	39	2	350	334	309	336	123.6		
23-Mar	332	324	315	306	302	305	311	309	352	48	55	52	47	64	91	123	128	134	153	148	149	144	144	156	97.7		
24-Mar	158	166	177	180	173	175	168	154	156	142	141	141	157	158	146	144	143	142	142	152	121	130	120	123	147.9		
25-Mar	127	130	121	139	149	144	142	144	143	125	121	119	115	112	114	142	120	128	129	118	134	118	129	134	130.5		
26-Mar	124	124	134	128	143	116	118	131	146	156	166	155	155	182	212	279	302	63	83	96	125	156	163	165	138.8		
27-Mar	155	156	162	150	135	90	142	148	145	145	142	146	144	143	143	145	149	116	111	124	142	144	147	145	141.4		
28-Mar	151	145	145	153	159	156	152	151	148	151	150	157	141	141	137	127	130	146	123	122	143	174	169	136	144.8		
29-Mar	137	164	173	159	181	194	177	164	153	147	140	140	140	122	123	105	112	103	98	105	123	135	130	132	137.7		
30-Mar	123	137	132	143	130	141	140	134	123	113	117	110	47	67	59	97	114	177	160	93	121	156	162	186	128.2		
31-Mar	195	184	170	164	147	153	155	152	140	143	136	142	240	228	219	219	223	221	202	185	196	214	215	210	197.7		
140.9	149.5	148.9	141.1	140.1	140.5	146.2	143.6	136.7	131.7	136.3	138.1	138.1	132.9	122.2	116.9	117.2	104.6	106.8	106.1	126.4	144.1	151.0	152.5				
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

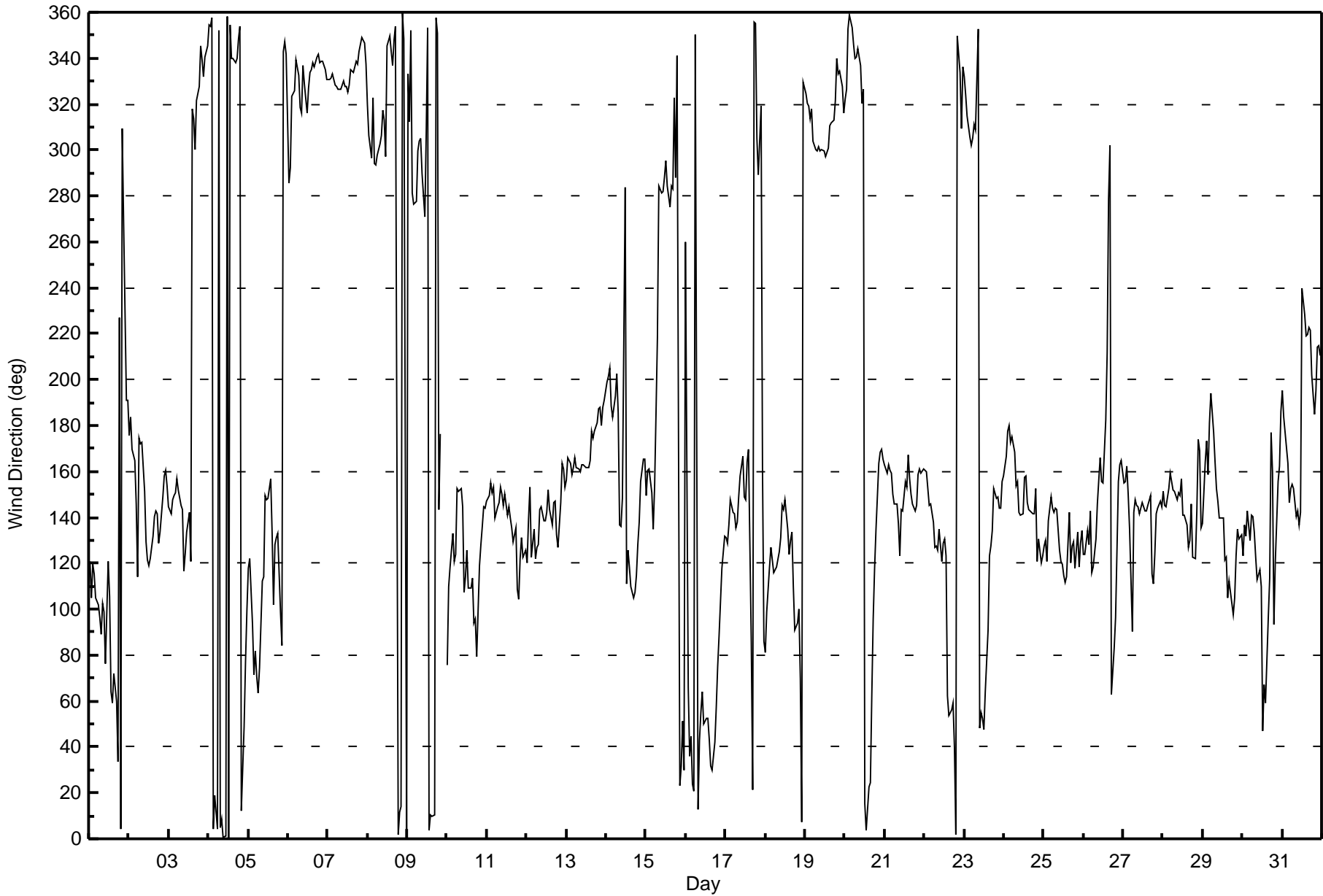
Wind Direction (WD) - deg
Anzac - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 104 deg on Mar 14 13:00 Minimum Value: 8 deg on Mar 5 04:00 Percentiles: P ₁ = 11 P ₁₀ = 14 Q ₁ = 16 Median = 19 Q ₃ = 22 P ₉₀ = 32 P ₉₉ = 65																			Hours in Service: 744 Hours of Data: 741 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 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-Mar	16	21	21	18	18	20	19	17	21	21	28	32	34	33	29	48	50	17	64	11	36	11	53	63	64
2-Mar	11	11	9	10	16	40	52	12	14	24	19	22	23	17	23	20	19	18	16	19	18	15	17	17	52
3-Mar	18	19	19	20	18	15	15	20	18	32	19	20	29	29	65	23	22	19	17	17	18	15	15	17	65
4-Mar	17	17	17	16	19	16	16	17	15	17	18	20	18	19	18	16	15	15	14	15	19	19	16	20	20
5-Mar	20	23	31	8	12	9	11	15	24	22	26	29	26	36	37	29	22	27	17	38	33	25	21	60	60
6-Mar	23	20	18	15	12	15	14	22	21	15	20	19	17	14	16	15	15	15	16	16	14	14	14	13	23
7-Mar	14	14	15	13	15	14	15	15	16	16	18	17	18	18	17	16	15	15	14	14	13	14	12	14	18
8-Mar	15	14	15	14	15	17	16	17	18	34	41	33	21	20	21	17	19	16	15	14	13	13	11	10	41
9-Mar	17	27	16	12	33	16	14	13	18	22	40	48	43	30	19	20	23	17	40	83	83	AF	AF	AF	83
10-Mar	18	26	15	24	11	12	14	16	16	20	22	23	27	30	31	28	20	22	13	19	17	14	17	15	31
11-Mar	15	13	12	13	17	17	14	12	17	19	19	23	25	26	32	24	24	24	21	20	18	14	16	14	32
12-Mar	15	21	17	16	12	13	16	16	18	19	20	21	21	25	22	23	22	19	17	14	18	19	18	18	25
13-Mar	18	18	19	19	19	18	20	19	20	19	19	19	19	19	20	21	20	19	21	20	18	17	21	29	29
14-Mar	26	22	24	21	19	17	20	19	25	17	50	47	104	41	32	24	18	18	16	14	15	18	17	17	104
15-Mar	17	17	20	26	23	17	40	23	25	22	23	26	23	25	26	35	28	19	44	46	13	15	21	60	60
16-Mar	57	19	34	14	16	19	17	17	16	16	21	17	23	26	21	18	17	16	13	15	20	22	27	21	57
17-Mar	16	17	19	18	19	18	18	17	18	18	26	19	22	19	33	47	43	15	15	23	22	52	60	26	60
18-Mar	10	15	15	13	15	17	18	18	17	18	20	21	26	23	19	21	22	21	19	22	22	17	43	17	43
19-Mar	17	18	18	18	17	20	20	19	20	21	19	20	22	22	20	19	21	18	19	16	17	17	17	19	22
20-Mar	18	17	17	15	15	16	15	15	17	21	31	40	46	65	39	36	25	25	16	15	15	15	13	13	65
21-Mar	15	16	14	13	11	11	13	15	16	17	22	21	21	23	20	22	20	19	18	19	19	18	18	18	23
22-Mar	17	17	19	18	18	19	15	16	19	20	19	24	25	29	19	14	15	15	34	16	13	14	16	18	34
23-Mar	17	14	14	17	14	18	16	22	26	38	39	39	36	39	32	32	25	21	19	19	18	18	19	19	39
24-Mar	16	18	21	19	16	14	12	20	16	25	19	19	21	20	20	20	18	19	17	18	21	18	18	21	25
25-Mar	17	18	18	22	18	20	21	18	18	17	19	19	28	20	19	24	22	24	19	18	15	14	17	18	28
26-Mar	14	14	22	17	15	18	16	18	18	17	21	26	22	40	61	99	61	19	12	14	14	16	13	12	99
27-Mar	15	11	13	22	39	28	12	15	17	17	20	19	20	22	25	23	19	24	18	17	17	17	16	16	39
28-Mar	17	19	19	18	16	16	19	21	20	21	21	30	21	20	23	20	19	17	17	18	18	23	15	66	66
29-Mar	21	15	19	16	16	14	28	15	22	22	18	20	24	17	23	19	43	22	18	22	18	16	17	15	43
30-Mar	17	18	17	20	19	20	17	21	22	24	45	45	38	94	44	70	39	45	48	27	54	39	26	22	94
31-Mar	24	21	14	16	19	12	15	16	16	20	19	68	22	25	21	22	19	19	20	18	22	19	19	18	68
57 27 34 26 39 40 52 23 26 38 50 68 104 94 65 99 61 45 64 83 83 52 60 66																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Anzac - March 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

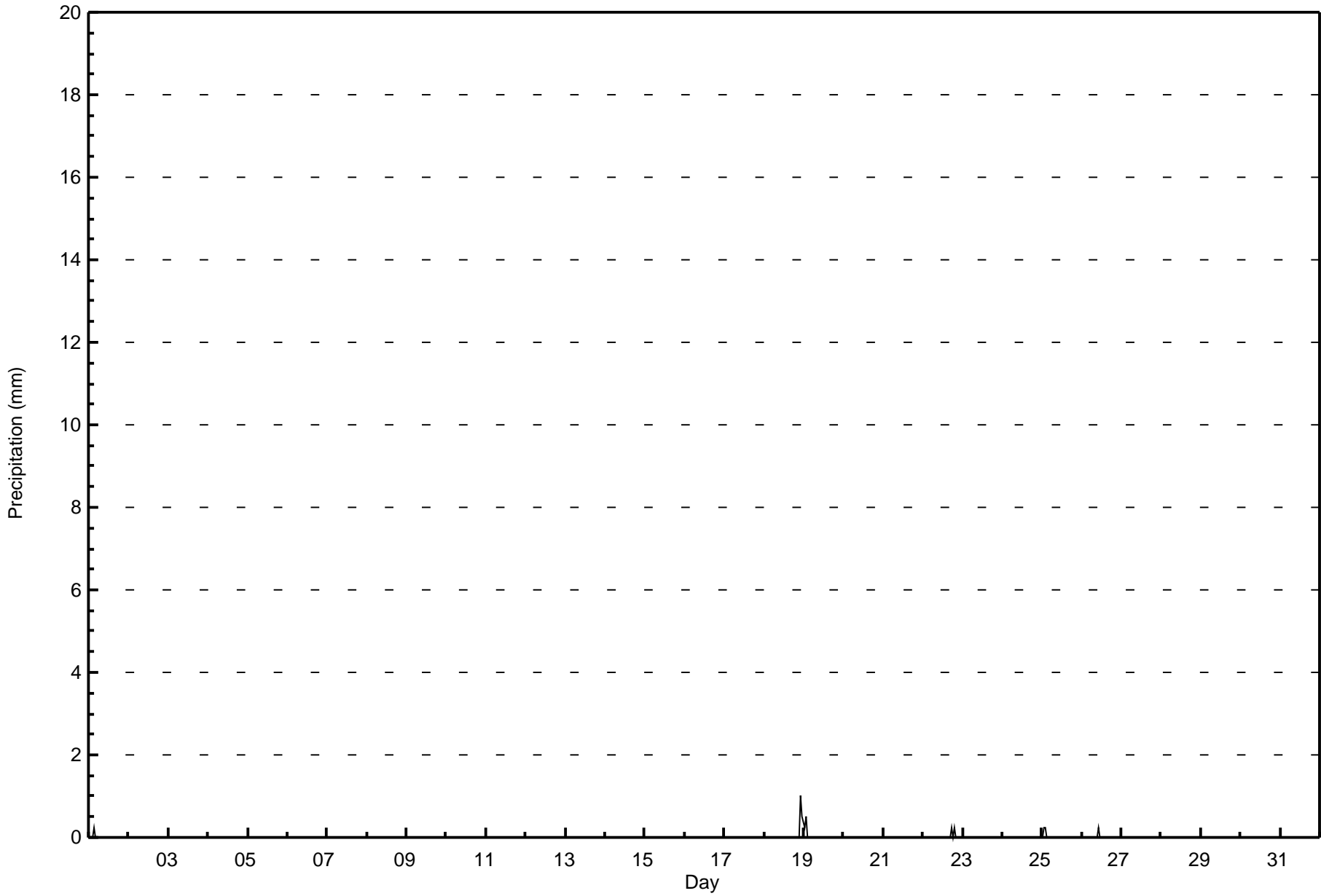
Anzac - March 2017

Maximum Value: 1.0 mm on Mar 18 23:00 Maximum Daily Total: 1.5 mm on Mar 18		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 Mar 1 01:00 Maximum Diurnal Total: 1.0 mm at hour 23 Monthly Total: 3.81 mm		Minimum Daily Total: 0.0 mm on Mar 2 Minimum Diurnal Total: 0.0 mm at hour 5 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-Mar	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	0.0	0.3	0.3	
2-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.5	1.5
19-Mar	0.3	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
20-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.5
23-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	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	0.0	0.0	0.0	0.5
26-Mar	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	0.0	0.0	0.0	0.0	0.3
27-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 - March 2017





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	March 7, 2017	Last Calibration	February 2, 2017
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	14:10
Gas Cert Reference	EY0000647	Station temp.	22 Deg C
Cal Gas Concentration	49.1 ppm	Cal Gas Exp Date	November 4, 2019
Calibrator Make/Model	API T700	Serial Number	2659
ZAG Make/Model	API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-638	-638
Analyzer IP address	192.168.1.43		Lamp voltage	792	792
Calculated slope	0.993583	0.996627	Chamber temp	45.3	45.3
Calculated intercept	2.037531	-0.027738	Pressure	703.3	696.9
Analyzer Background	13.6	13.7	Flow	0.433	0.413
Analyzer Coefficient	0.948	0.948	Intensity	84	84

Analyzer make Thermo 43i Analyzer serial # 1152430005

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	79.2	777.7	780.6	0.996
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	79.2	777.7	780.6	0.996
second point	5000	39.6	388.9	390.0	0.997
third point	5000	19.8	194.4	195.0	0.997
as left zero	5000	0.0	0.0	0.8	----
as left span	5000	79.2	777.7	778.8	0.999
Average Correction Factor					0.997

Corrected As found 780.3 Previous response 780.7 % change 0.1%

Notes:

Sample inlet filter replaced after as founds. No adjustments.

Calibration Performed By: Asad Hidayat



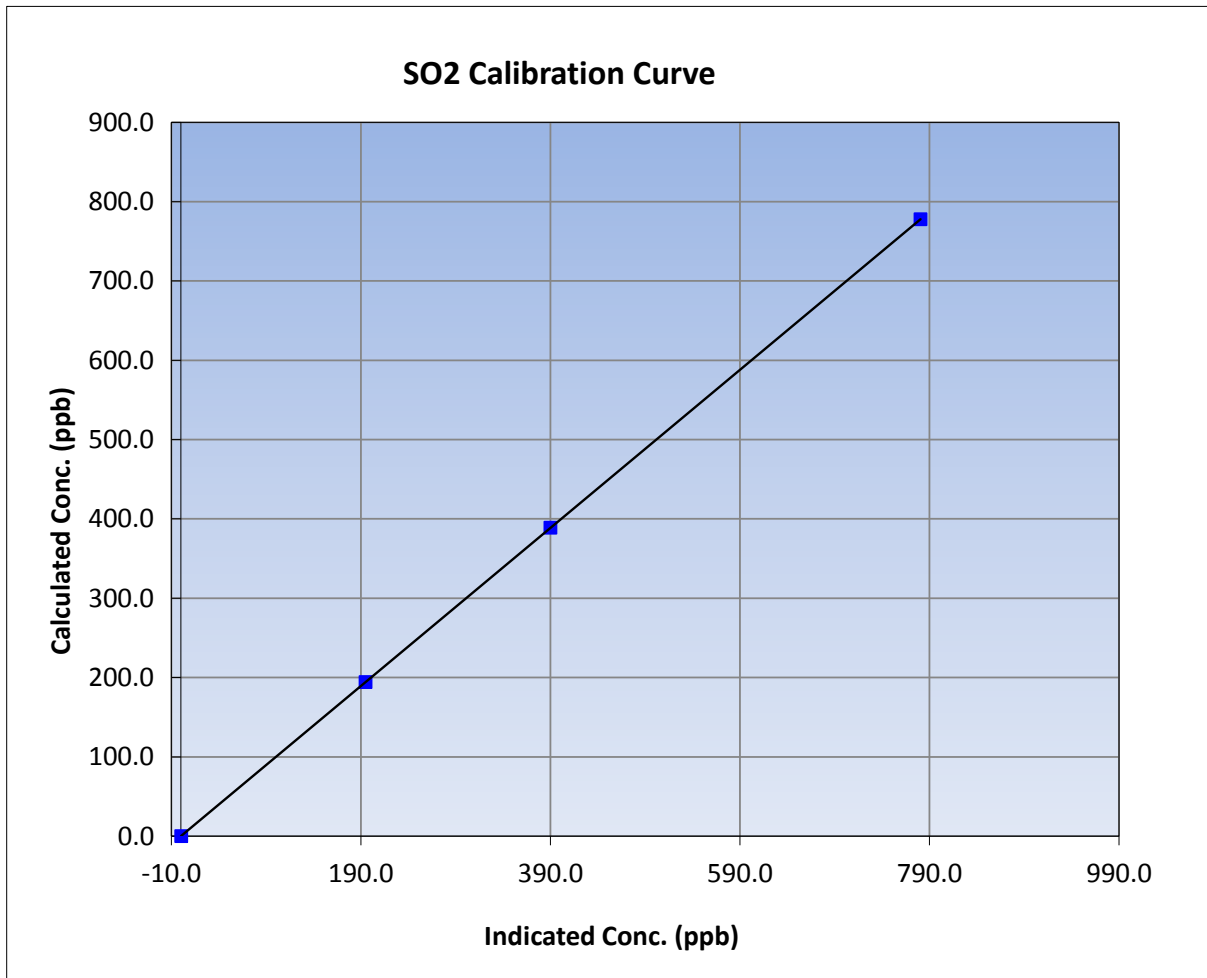
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 2, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:00	End Time (MST)	14:10
Analyzer make	Thermo 43i	Analyzer serial #	1152430005

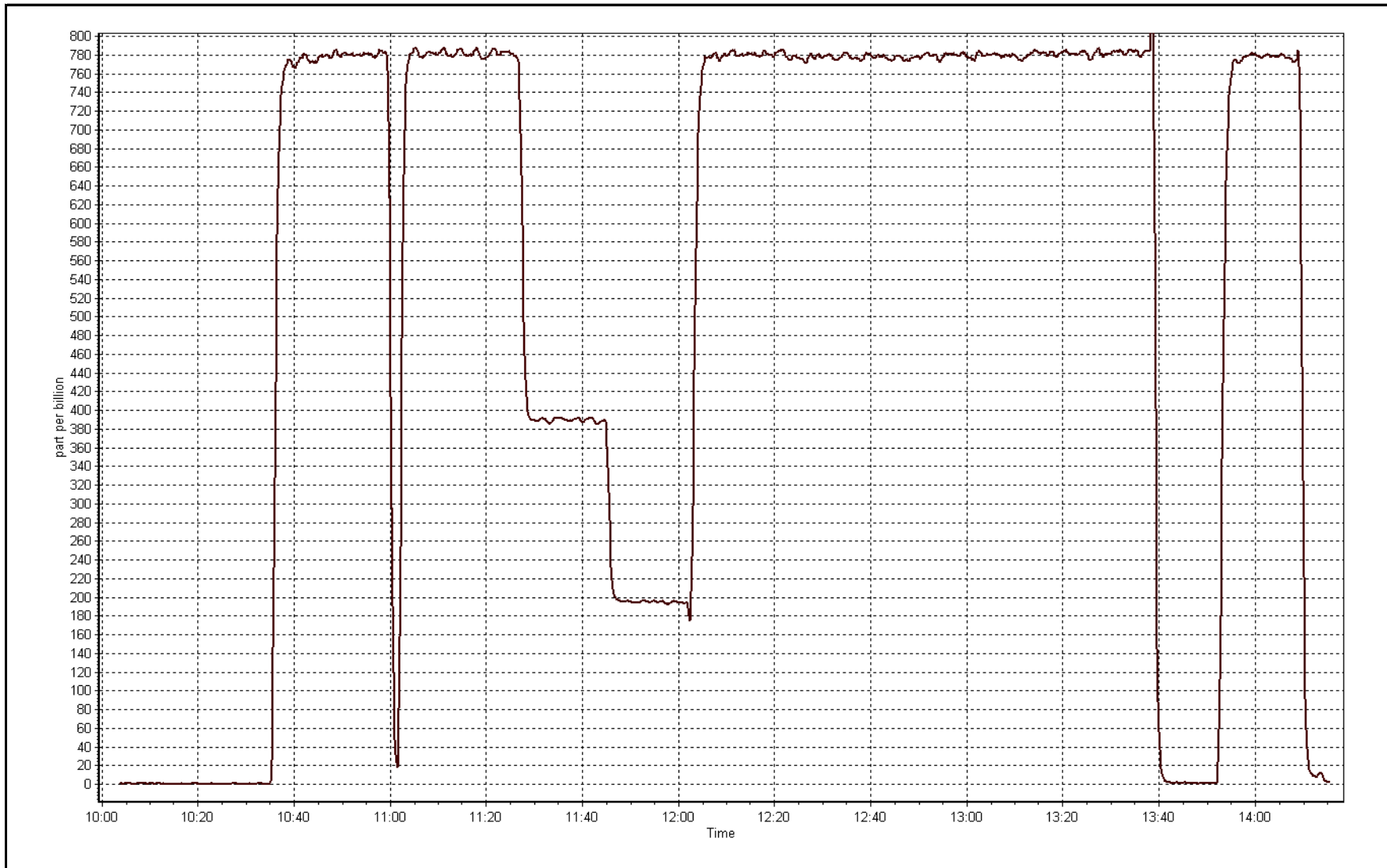
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	1.000000
777.7	780.6	0.9964		
388.9	390.0	0.9971	Slope	0.996627
194.4	195.0	0.9974		
			Intercept	-0.027738



SO2 Calibration Plot

Date: March 7, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	March 6, 2017	Last Calibration	February 1, 2017
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	11:45	End Time (MST)	14:28
Gas Cert Reference	ALM033528	Station temp.	22 Deg C
Cal Gas Concentration	5.05 ppm	Cal Gas Exp Date	September 9, 2017
Calibrator Make/Model	API T700	Serial Number	2659
Dil air Make/Model	API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
SO2 gas concentration	49.1 ppm	SO2 gas cert/exp	EY0000647 November 4, 2019

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-731	-731
Analyzer IP address	192.168.1.44		Lamp voltage	1005	1009
Calculated slope	1.001172	1.000146	Chamber temp	45	45
Calculated intercept	-0.115404	-0.333240	Pressure	688.6	675.6
Analyzer Background	1.7	1.71	Flow	0.423	0.415
Analyzer Coefficient	1.198	1.198	Intensity	97	98
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1300156232	
Converter make/model	CDN-101		Converter serial #	510	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	74.3	75.0	75.1	0.999
SO2 scrubber check	5000	20.4	200.3	0.7	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	74.3	75.0	75.1	0.999
second point	5000	39.6	40.0	40.7	0.982
third point	5000	19.8	20.0	20.5	0.977
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	74.3	75.0	75.7	0.992
Average Correction Factor					0.986

Corrected As found	75.1	Previous response	75.1	% change	0.0%
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Notes:

Sample inlet filter replaced after as founds. No adjustments. Sox scrubber test completed after 3rd point.

Calibration Performed By:

Asad Hidayat



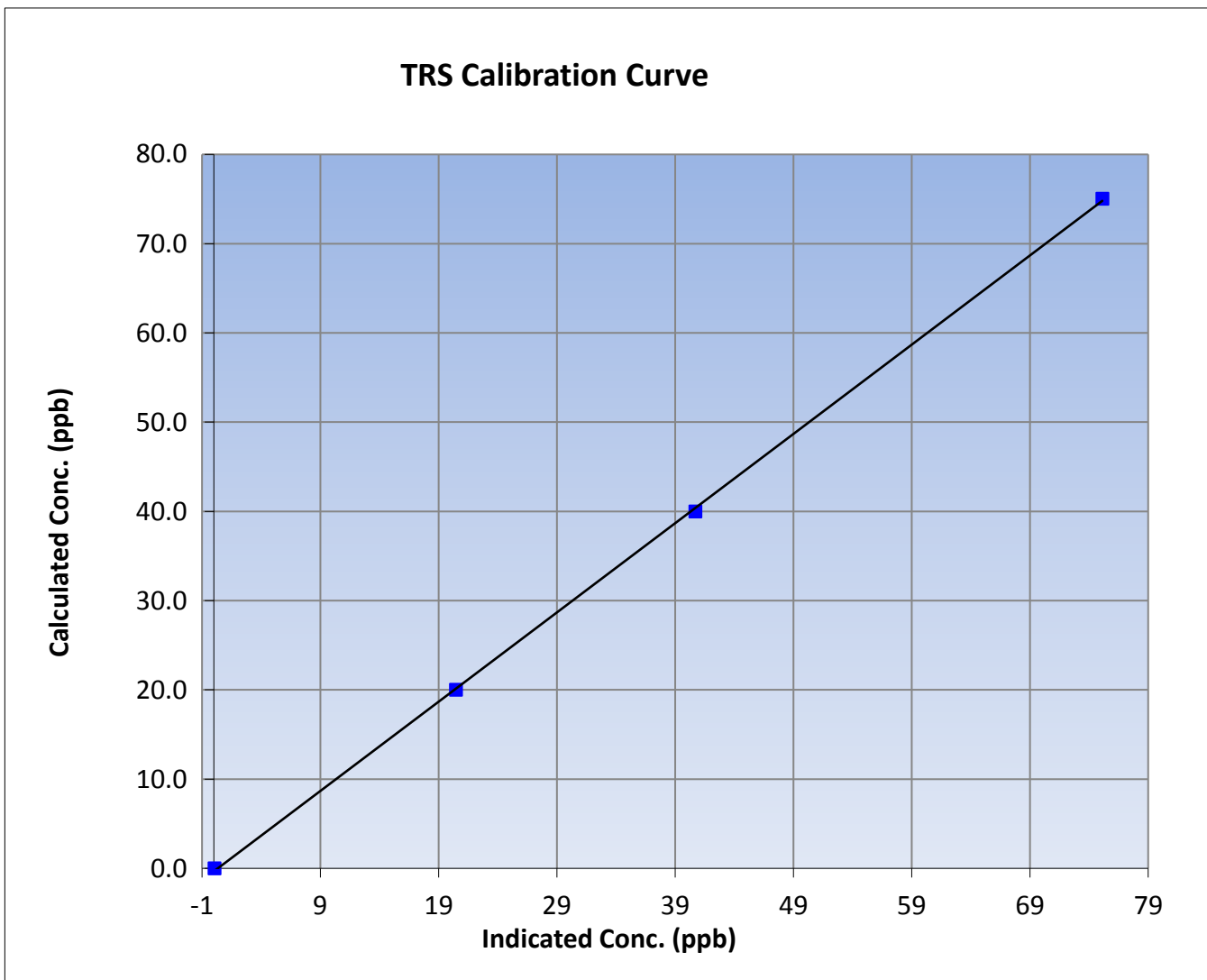
Wood Buffalo Environmental Association TRS Calibration Report

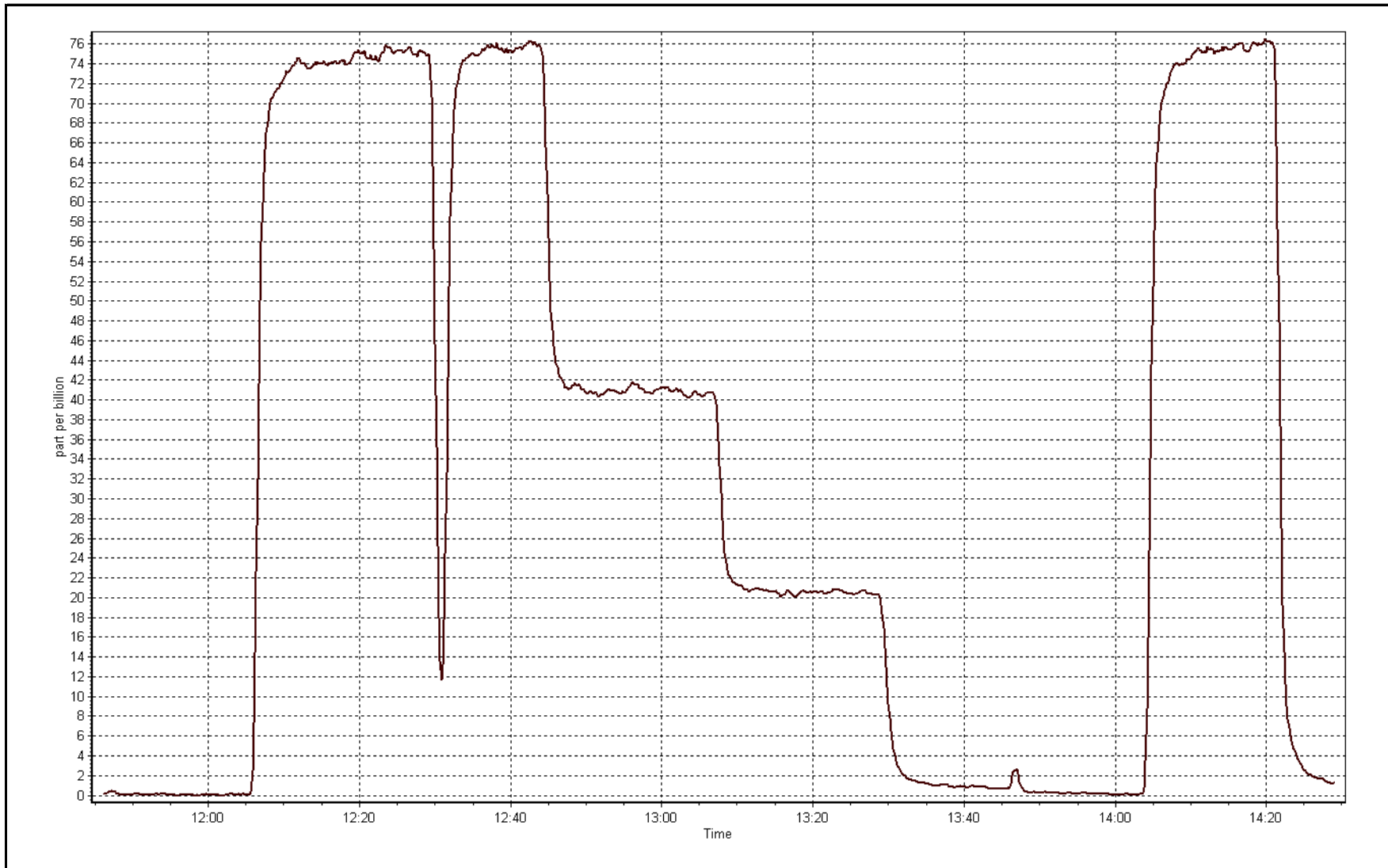
Station Information

Calibration Date	March 6, 2017	Previous Calibration	February 1, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	11:45	End Time (MST)	14:28
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1300156232

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999902
75.0	75.1	0.9990		
40.0	40.7	0.9825	Slope	1.000146
20.0	20.5	0.9774		
			Intercept	-0.333240







Wood Buffalo Environmental Association THC / NMHC Calibration Report

version 02-2017

Station Information

Calibration Date	March 7, 2017	Last Calibration	February 2, 2017
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	14:10
Gas Cert Reference	EY0000647	Cal Gas Expiry Date	November 4, 2019
CH4 Cal Gas Conc.	513.0 ppm	CH4 Equiv Conc.	1060.3 ppm
C3H8 Cal Gas Conc.	199.0 ppm	Station temp.	Deg C
Calibrator Model	Teledyne API 700	Serial Number	2659
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	75.1
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.995854	0.996439	Carrier Pressure	33.3	33.3
THC Calc intercept	0.060371	0.036160	Fuel Pressure	47.9	47.9
NMHC Calc slope	0.993800	0.994580	Air Pressure	36.6	36.6
NMHC Calc intercept	0.016001	0.008065			

Analyzer make Thermo 55i Analyzer serial # 1218153355

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	79.2	16.79	16.89	0.994
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	79.2	16.79	16.85	0.997
second point	5000	39.6	8.40	8.33	1.008
third point	5000	19.8	4.20	4.17	1.007
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	79.2	16.79	16.84	0.997
Average Correction Factor					1.004

Corrected As found 16.89 Previous response 16.80 % change -0.5%

Notes:

Blank chromatogram taken after the "as found zero". Sample inlet filter replaced after as founds. No adjustments.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	79.2	8.67	8.72	0.994
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	79.2	8.67	8.72	0.994
second point	5000	39.6	4.33	4.32	1.003
third point	5000	19.8	2.17	2.18	0.994
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	79.2	8.67	8.70	0.996
Average Correction Factor					0.997

Corrected As found 8.72 Previous response 8.71 % change -0.2%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	79.2	8.13	8.17	0.995
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	79.2	8.13	8.13	0.999
second point	5000	39.6	4.06	4.01	1.013
third point	5000	19.8	2.03	1.99	1.021
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	79.2	8.13	8.15	0.997
Average Correction Factor					1.011

Corrected As found 8.17 Previous response 8.10 % change -0.9%



Wood Buffalo Environmental Association

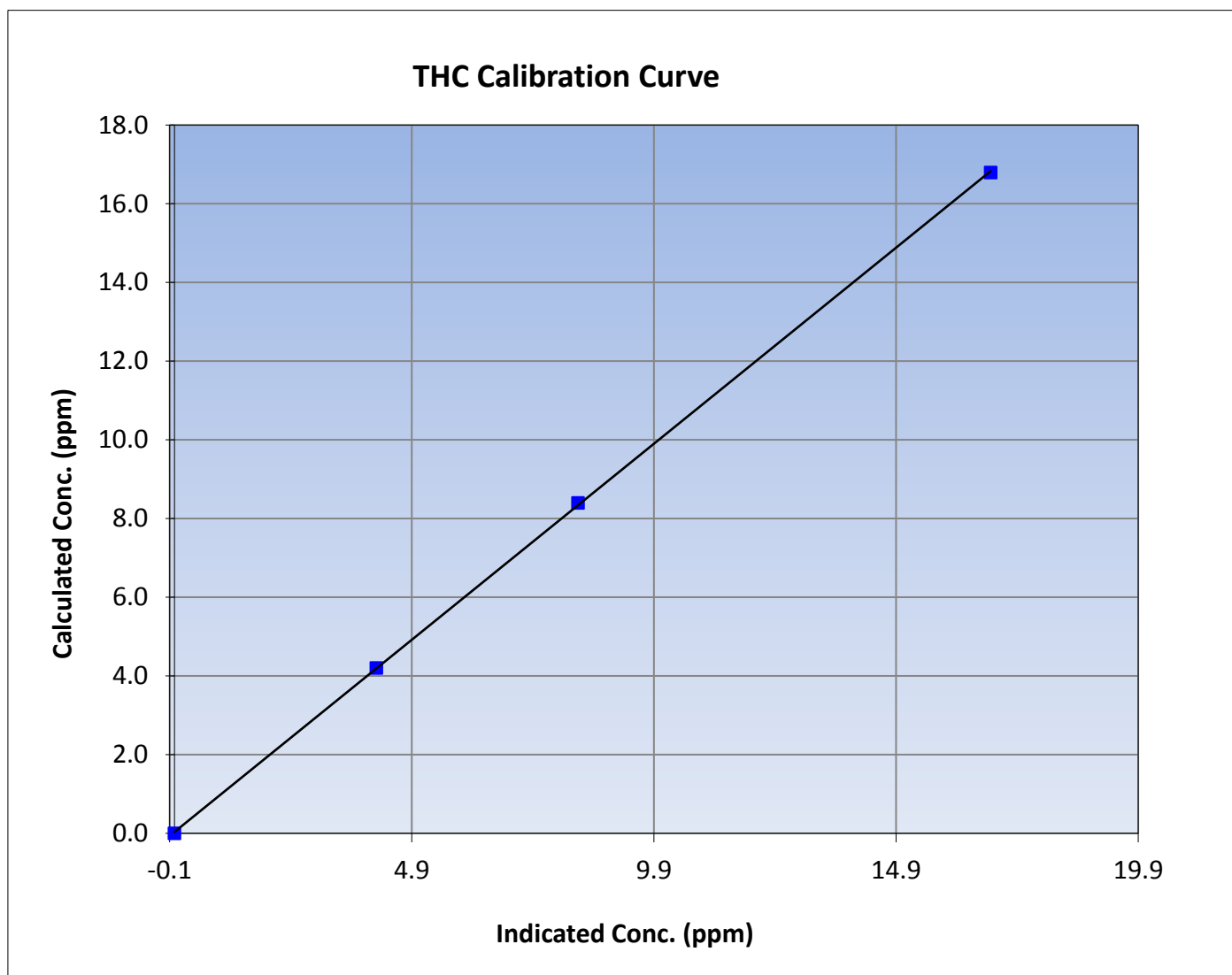
THC Calibration Summary

Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 2, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:00	End Time (MST)	14:10
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999961
16.79	16.85	0.9967		
8.40	8.33	1.0081	Slope	0.996439
4.20	4.17	1.0069		
			Intercept	0.036160





Wood Buffalo Environmental Association

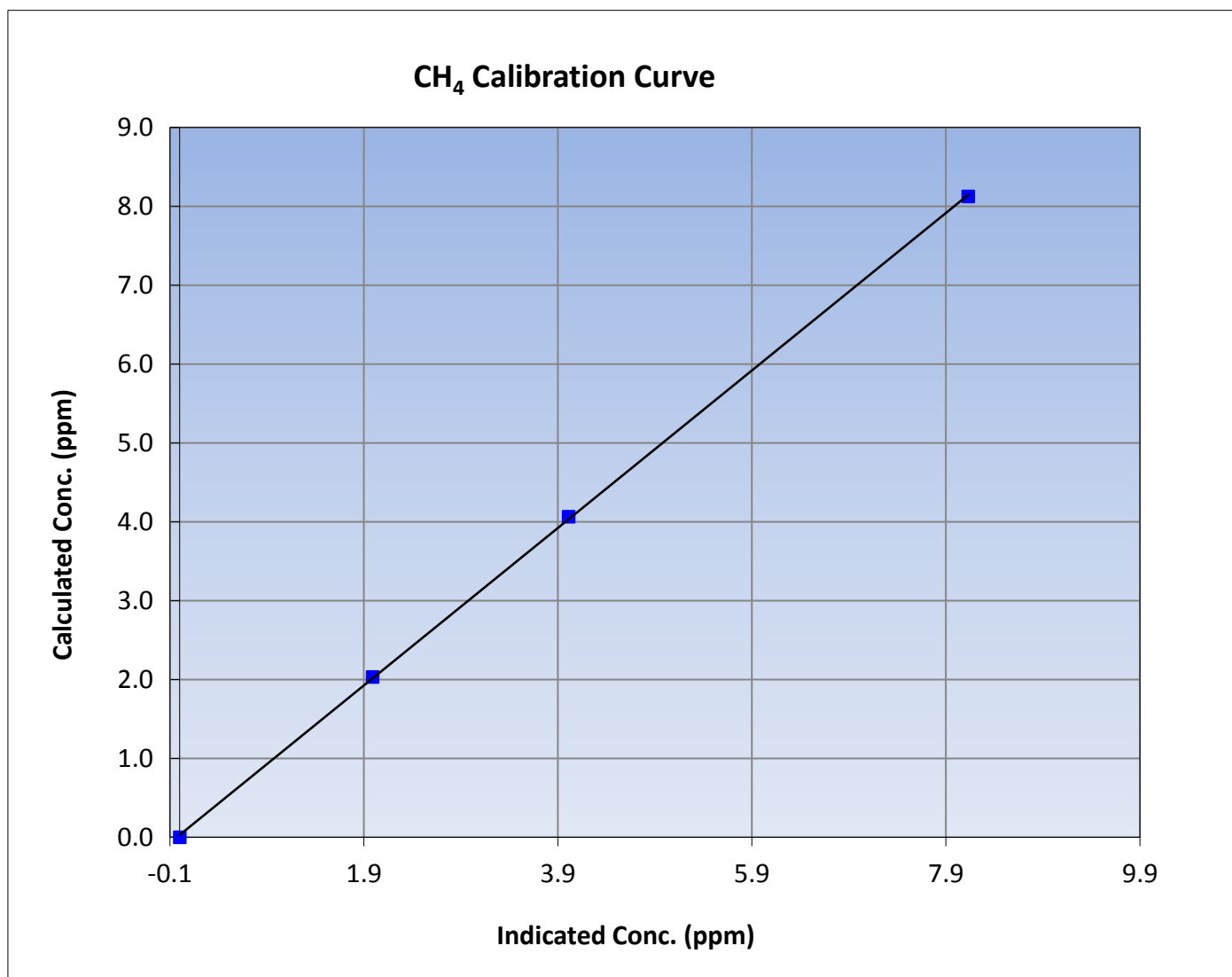
CH₄ Calibration Summary

Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 2, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:00	End Time (MST)	14:10
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999933
8.13	8.13	0.9995		
4.06	4.01	1.0132	Slope	0.998414
2.03	1.99	1.0208		
			Intercept	0.028193





Wood Buffalo Environmental Association

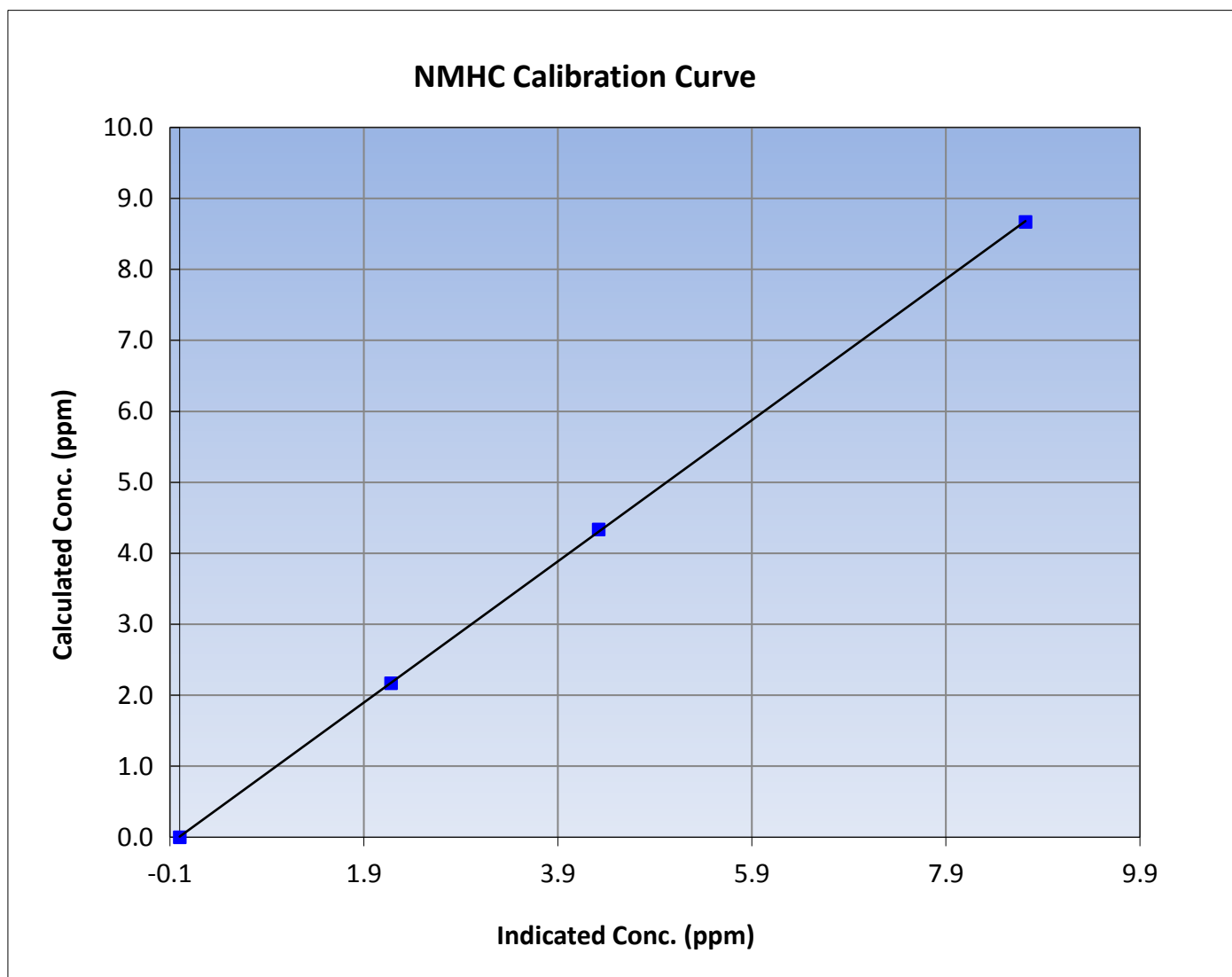
NMHC Calibration Summary

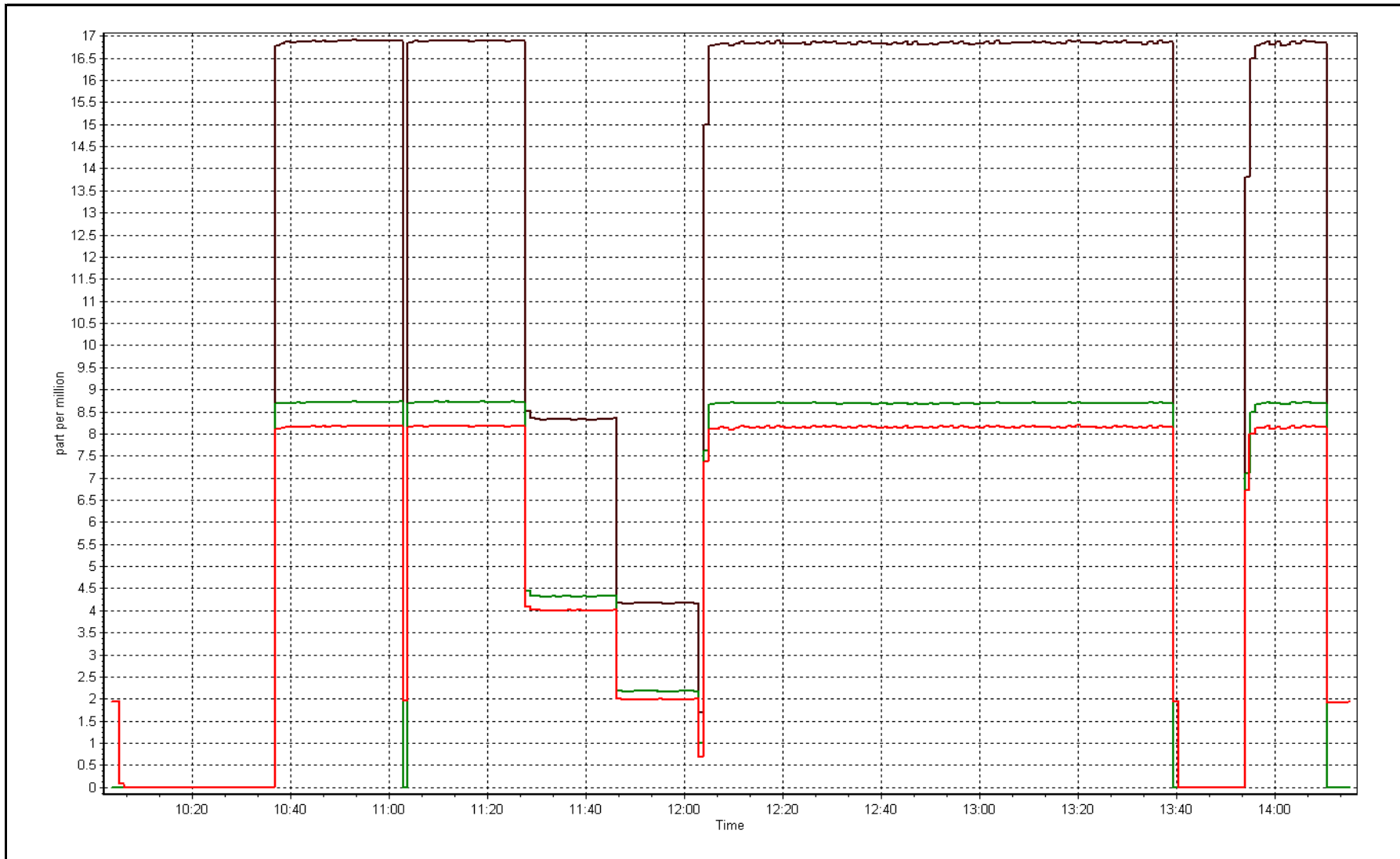
Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 2, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:00	End Time (MST)	14:10
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999971
8.67	8.72	0.9941		
4.33	4.32	1.0033	Slope	0.994580
2.17	2.18	0.9941		
			Intercept	0.008065







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 3, 2017
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	14:15	End Time (MST)	17:12
NO2 GPT Ref date	NA	Transfer Standard	Calibrator photometer
		Station temp.	23 Deg C
Calibrator Make/Model	API T700	Serial Number	2659
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	26.7	26.0
Analyzer IP address	192.168.1.49		Lamp temp.	53.8	53.7
Calculated slope	1.000891	1.001614	Pressure	665.9	668.3
Calculated intercept	-1.992790	-2.077831	Flow cell A	0.713	0.713
Analyzer Background	-1.8	-1.0	Flow cell B	0.722	0.723
Analyzer Coefficient	1.017	1.017	Cell A Intensity	94302	92713
			Cell B Intensity	107505	106713

Analyzer make	Thermo 49i	Analyzer serial #	1426262595
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	800.00	0.0	0.8	----
as found span	5000	975.60	400.0	400.9	0.998
calibrator zero	5000	800.00	0.0	0.3	----
high point	5000	973.60	400.0	400.5	0.999
second point	5000	808.20	200.0	202.6	0.987
third point	5000	698.00	100.0	103.7	0.964
as left zero	5000	800.00	0.0	0.9	----
as left span	5000	974.90	400.0	398.1	1.005
Average Correction Factor					0.983

Corrected As found	400.2	Previous response	401.6	% change	0.4%
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Notes:

Sample inlet filter replaced after as founds. Slightly adjusted both zero and span.

Calibration Performed By:

Asad Hidayat



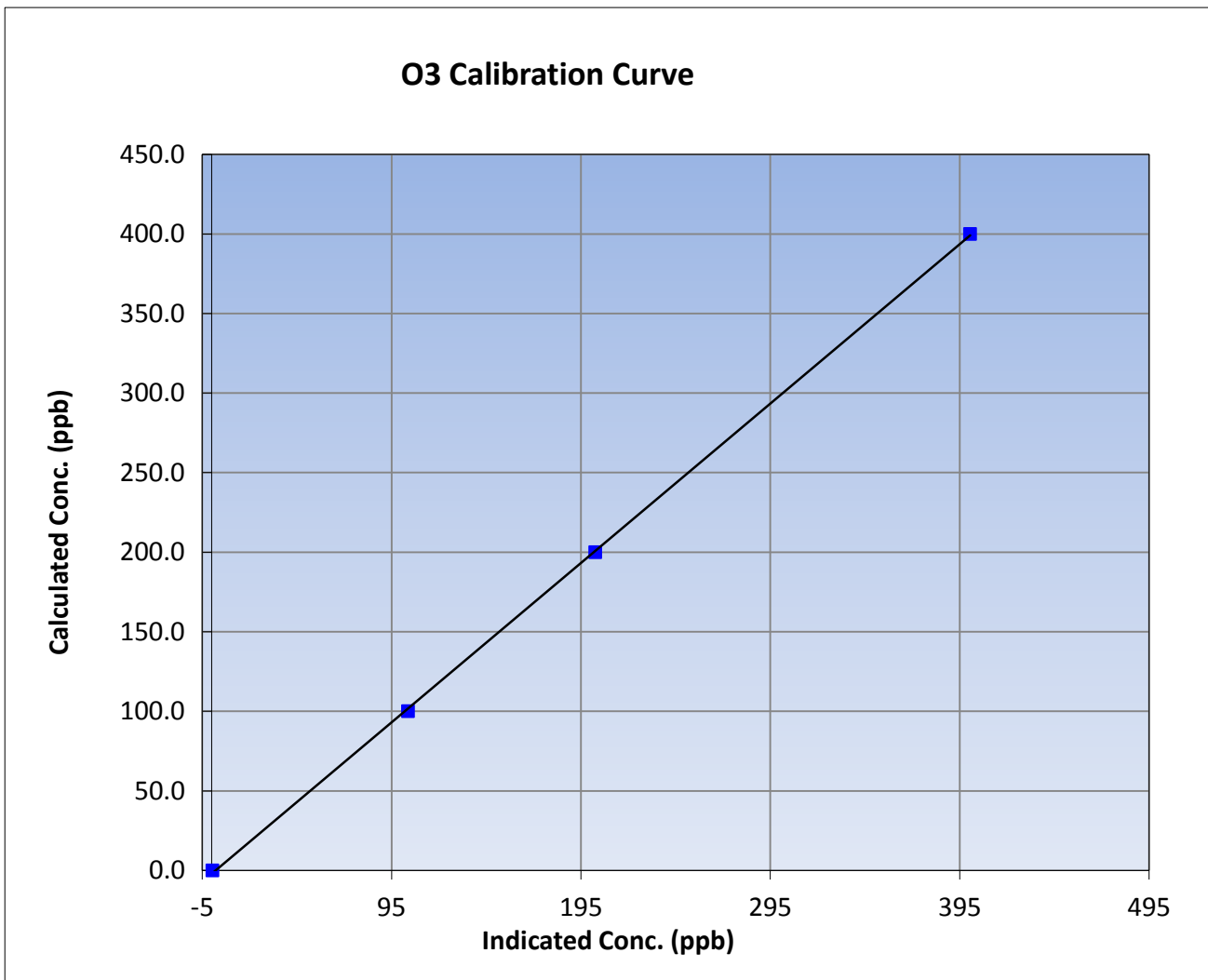
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 3, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	14:15	End Time (MST)	17:12
Analyzer make	Thermo 49i	Analyzer serial #	1426262595

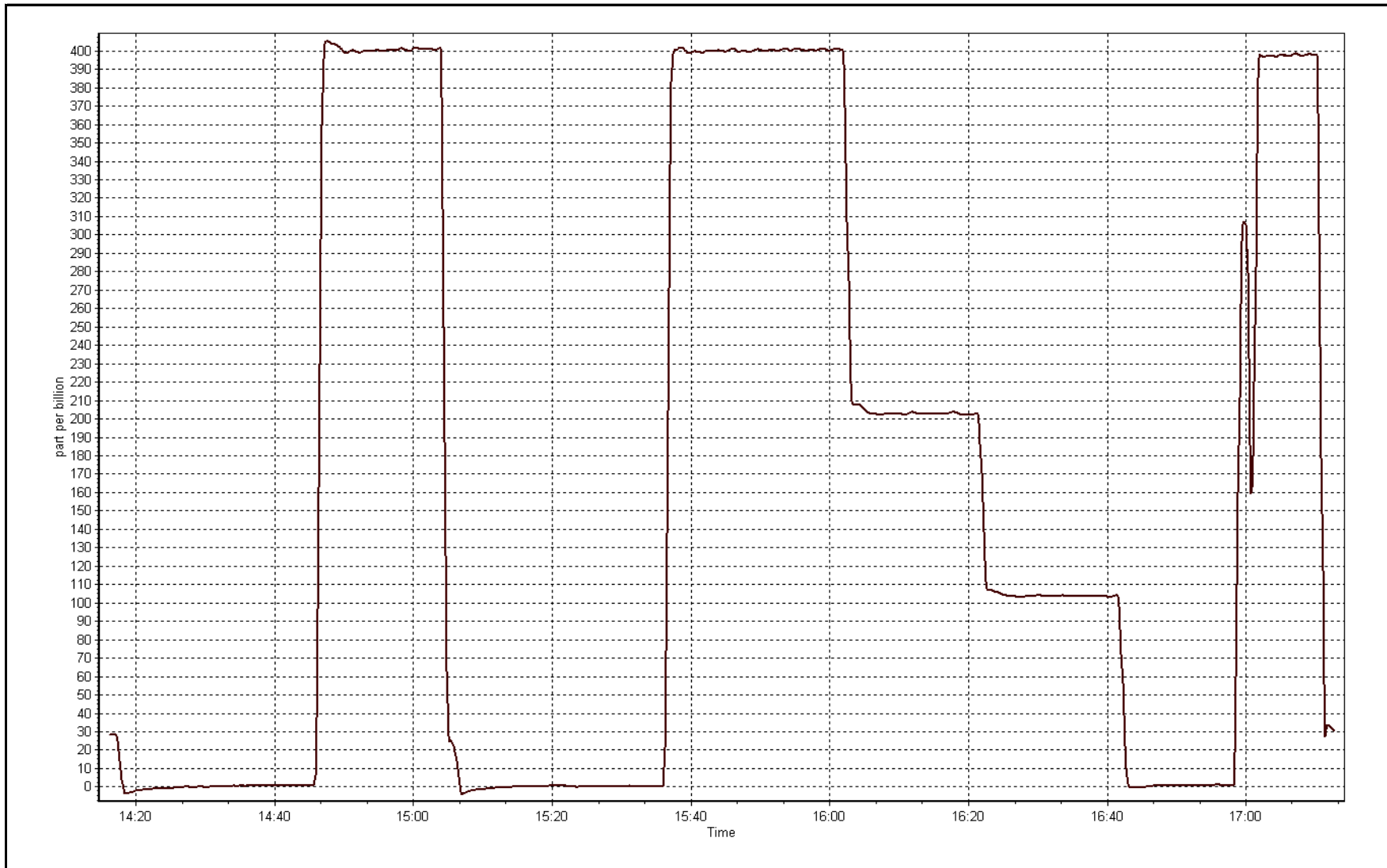
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999911
400.0	400.5	0.9987		
200.0	202.6	0.9872	Slope	1.001614
100.0	103.7	0.9643		
			Intercept	-2.077831



O3 Calibration Plot

Date: March 7, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 2, 2017
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	14:10
NO Cal Gas Conc	50.5 ppm	Gas Cert Reference	EY0000647
NOX Cal Gas Conc	50.5 ppm	Cal Gas Expiry Date	November 4, 2019
Calibrator	Teledyne API T700	Serial Number	2659
Zero air Generator	Teledyne API T701	Serial Number	4764

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2582
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998842	0.998085	1.022480
	Data Offset	1.738554	1.725532	-1.071201
Current Calibration	Data Slope	0.999845	1.000721	0.999431
	Data Offset	0.981628	0.838626	-0.803522

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262592
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.067		1.105	
NOX coefficient	1.001		1.002	
NO2 coefficient	1.000		1.000	
NO bkgrnd	4.0		4.1	
NOX bkgrnd	4.2		4.3	
Chamber Temp	49.9	Deg C	50.1	Deg C
Moly Temp	326.6	Deg C	324.2	Deg C
PMT voltage	-808.1	V	-808.1	V
PMT Temp	-2.7	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	176.5	mmHg	180.4	mmHg
R Cell Press Nox	176.4	mmHg	180.7	mmHg
NO sample flow	0.761	lpm	0.694	lpm
Nox sample Flow	0.762	lpm	0.696	lpm

Notes:

Sample inlet filter replaced after as founds. Adjusted span only.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

March 7, 2017

Station Number:

AMS 14

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-0.2	----	----
as found span	5000	79.2	799.9	799.9	0.0	770.2	770.2	-0.1	1.0387	1.0386
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-0.2	----	----
high point	5000	79.2	799.9	799.9	0.0	799.9	799.3	0.6	1.0001	1.0007
second point	5000	39.6	400.0	400.0	0.0	397.6	397.4	0.3	1.0059	1.0066
third point	5000	19.8	200.0	200.0	0.0	198.6	198.7	0.0	1.0067	1.0067
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.2	-0.1	----	----
as left span	5000	79.2	799.9	415.0	384.9	815.0	422.1	393.0	0.9815	0.9833
									1.0042	1.0047

Corrced As found NO_x= 770.1 NO= 770.1 Percent Change NO_x= 3.8% NO= 3.9%
 Previous Response NO_x= 799.1 NO= 799.7

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 79.20 ccm NOx ref calc conc = 799.9 ppb NO ref calc conc = 799.9 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	798.5	796.5	-0.2	1.0018	1.0044	----	----
1st NO2 (300)	415.0	381.4	797.0	415.0	382.0	1.0036	----	0.9984	100.2%
2nd NO2 (200)	602.5	194.0	797.6	602.5	195.1	1.0029	----	0.9941	100.6%
3rd NO2 (100)	697.7	98.8	798.5	697.7	100.8	1.0018	----	0.9802	102.0%
2nd NO ref point		0.0	798.9	797.6	1.3	1.0013	1.0029	----	----
Average Correction Factor						1.0024		0.9909	100.9%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

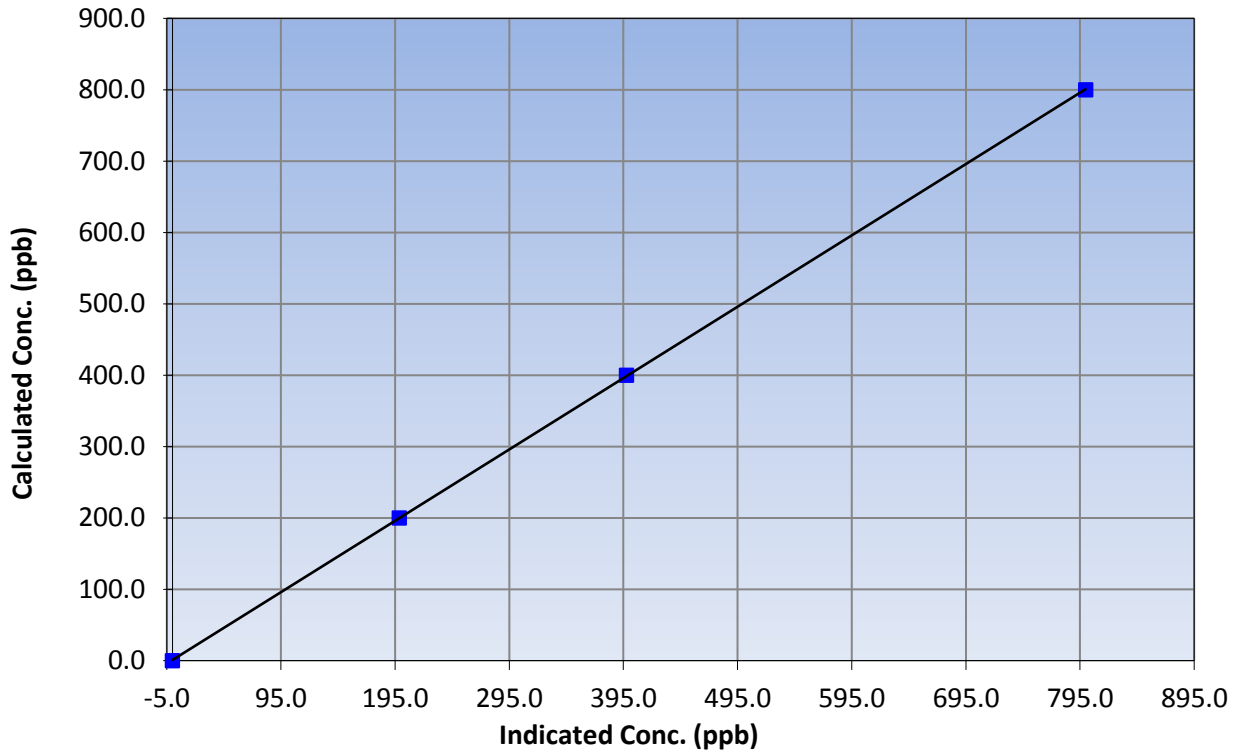
Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 2, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:00	End Time (MST)	14:10
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999989
799.9	799.9	1.0001		
400.0	397.6	1.0059	Slope	0.999845
200.0	198.6	1.0067		
			Intercept	0.981628

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

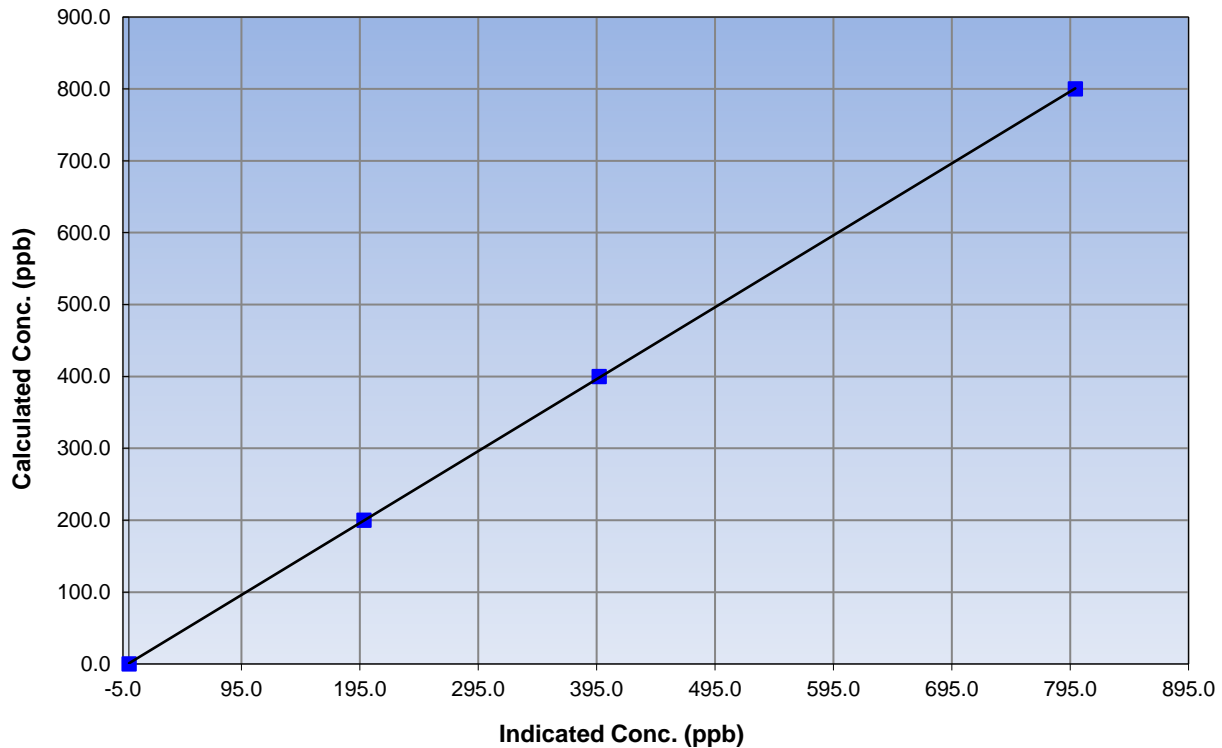
Station Information

Calibration Date	March 7, 2017	Previous Calibration	February 2, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:00	End Time (MST)	14:10
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999989
799.9	799.3	1.0007		
400.0	397.4	1.0066	Slope	1.000721
200.0	198.7	1.0067		
			Intercept	0.838626

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

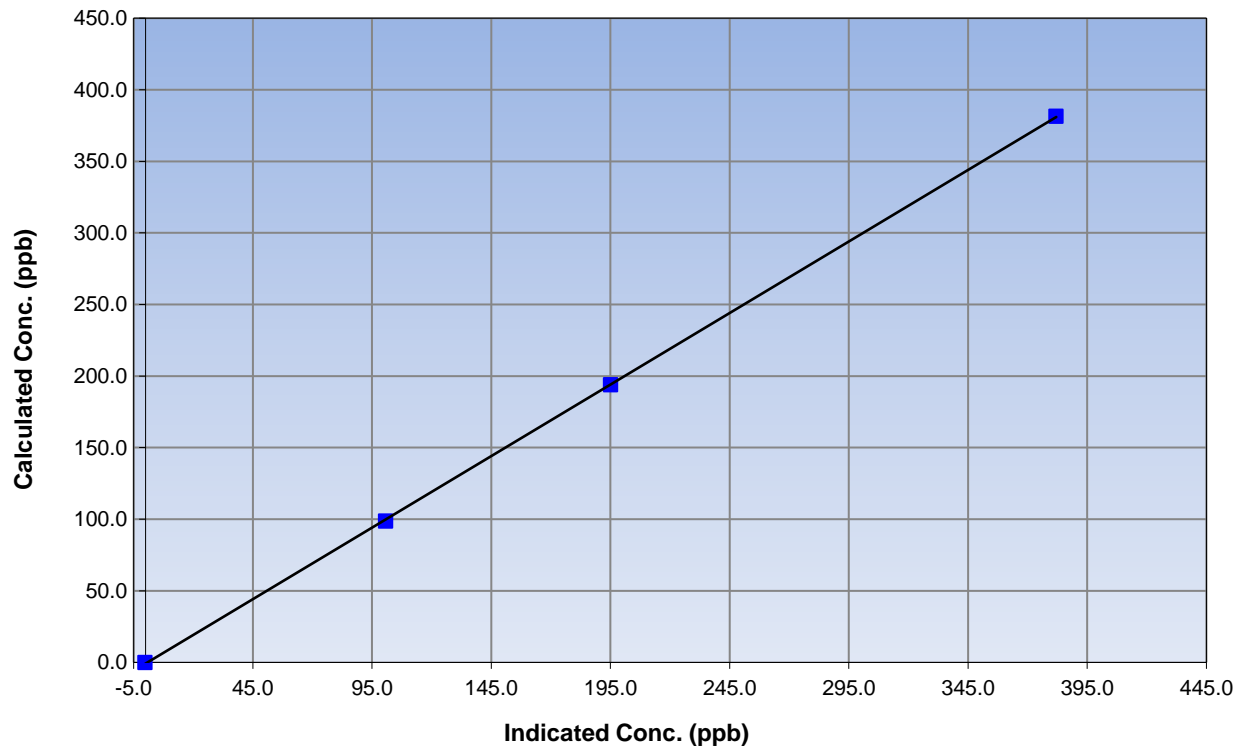
Station Information

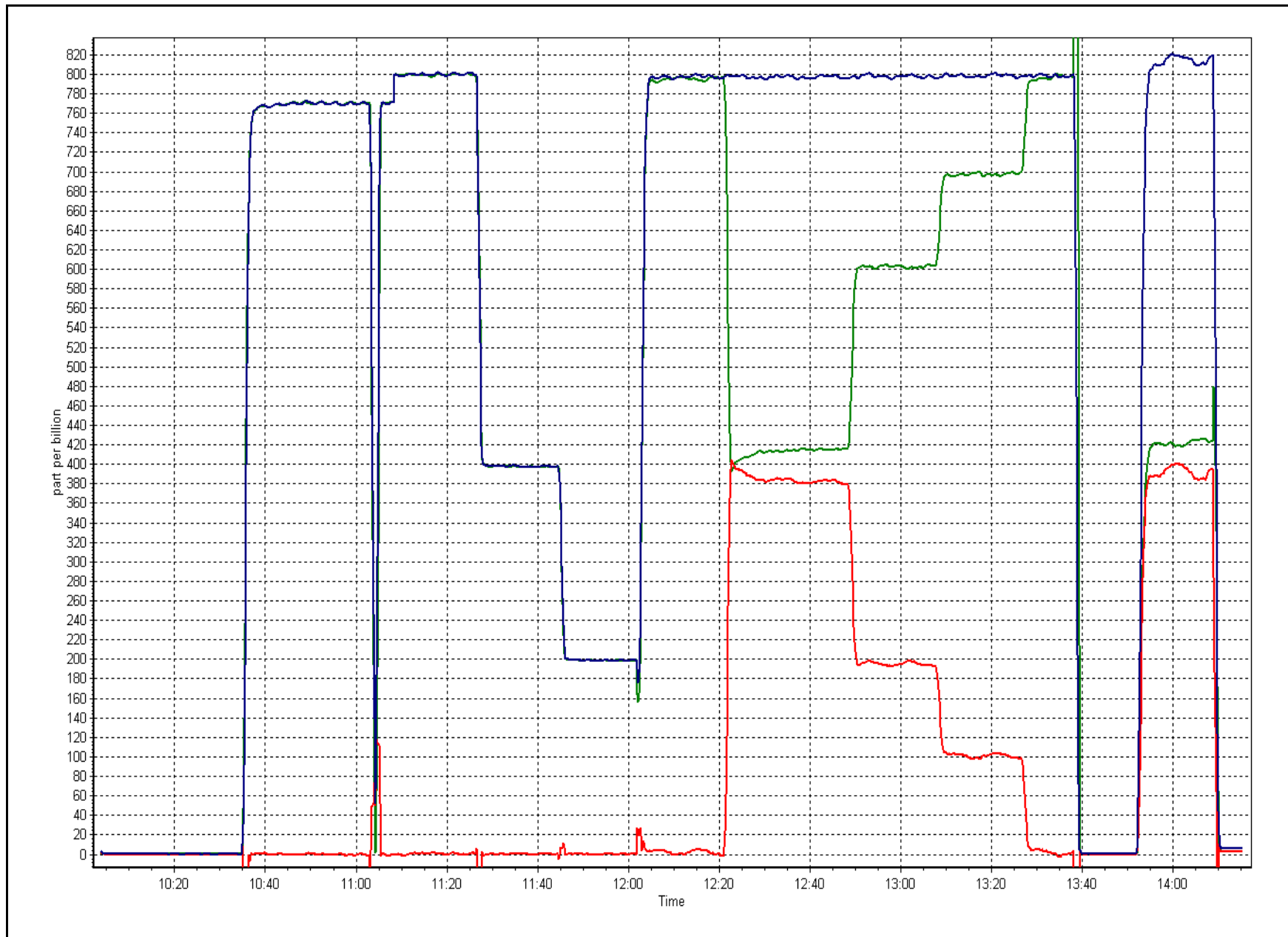
Calibration Date	March 7, 2017	Previous Calibration	February 2, 2017
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	10:00	End Time (MST)	14:10
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999969
381.4	382.0	0.9984		
194.0	195.1	0.9941	Slope	0.999431
98.8	100.8	0.9802		
			Intercept	-0.803522

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	March 7, 2017	Last Cal Date:	February 3, 2017
Start time (MST):	14:45	End time (MST):	15:50
Sharp Model:	5030	S/N:	E1093
Particulate Fraction:	PM2.5	C14 Source S/N:	4933
Flow Standard Model:	Delta Cal	S/N:	1019
Temp/RH standard:	Delta Cal	S/N:	1019

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	-17	-19.6	-19	<input checked="" type="checkbox"/>	+/- 2 °C
P3 (hPa)	964	959.05	964	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	992	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.4	-----	0.4	<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"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

Leak Test:	Date of check:	January 13, 2017	Last Cal Date:	September 22, 2016	Tolerance
	Flow w/o adaptor:	<u>16.63</u>	Flow w/ adaptor:	<u>16.51</u>	0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass: <u>1337</u>	S/N: <u>5872</u>
	Date of check: <u>June 15, 2016</u>	Last Cal Date: <u>March 16, 2016</u>
	New Correction Factor: <u>7212</u>	Previous Correction Factor: <u>7124</u>

Parameter	As found	Measured	As left	Adjusted	Tolerance
T2 (°C)	17		17	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	21		21	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	17		17	<input type="checkbox"/>	+/- 2 °C
RH (%)	4		4	<input type="checkbox"/>	+/- 10%

Notes: Cyclone head cleaned. Adjusted T1 sensor only.

Calibration by: Asad Hidayat



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 15
CNRL HORIZON
MARCH 2017**

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
MARCH 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	38	38	100	30	0	6	0
TRS (ppb) Average	710	34	34	100	6	0	1	0
THC (ppm) Average	708	36	36	100	4	-	2.6	-
NO2 (ppb) Average	708	36	36	100	39	0	18	-
NO (ppb) Average	708	36	36	100	40	-	8	-
NOX (ppb) Average	708	36	36	100	64	-	24	-
PM2.5 (ug/m3) Average	742	2	2	100	33.8	-	10.1	0
Temperature 2 m (C) Average	744	0	0	100	13.9	-	6.8	-
Wind Speed 10 m (km/h) Average	742	0	2	99.73	34	-	24	-
Wind Direction 10 m (deg) Average	742	0	2	99.73	-	-	-	-
Precipitation (mm) Total	744	0	0	100	3.3	-	4.8	-
Relative Humidity (%) Average	744	0	0	100	99	-	93	-
Global Solar Radiation (W/m2) Average	744	0	0	100	626	-	183	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
MARCH 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	2.3	4	-	0	0	0	1	2	6	30
TRS (ppb) Average	710	0.4	0	-	0	0	0	0	0	1	6
THC (ppm) Average	708	2.33	0.2	-	2.1	2.1	2.2	2.2	2.4	2.6	4
NO2 (ppb) Average	708	7.7	8	-	0	1	2	5	11	19	39
NO (ppb) Average	708	2.6	5	-	0	0	0	0	2	8	40
NOX (ppb) Average	708	10.3	11	-	0	1	2	6	14	28	64
PM2.5 (ug/m3) Average	742	7.23	3.6	-	1.5	3.4	4.5	6.6	9.3	11.5	33.8
Temperature 2 m (C) Average	744	-8.86	10.8	-	-33.4	-23.7	-18.3	-7.7	0.2	3.6	13.9
Wind Speed 10 m (km/h) Average	742	8.1	5	-	0	3	5	7	11	15	34
Wind Direction 10 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	7.11	-	-	-	-	-	-	-
Relative Humidity (%) Average	744	67.1	16	-	27	45	54	67	79	91	99
Global Solar Radiation (W/m2) Average	744	118.4	172	-	0	0	0	5	205	427	626

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	18 Mar 2017 18:00	18 Mar 2017 18:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	22 Mar 2017 19:00	22 Mar 2017 19:00	1	Flat line in sensor output signal -sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

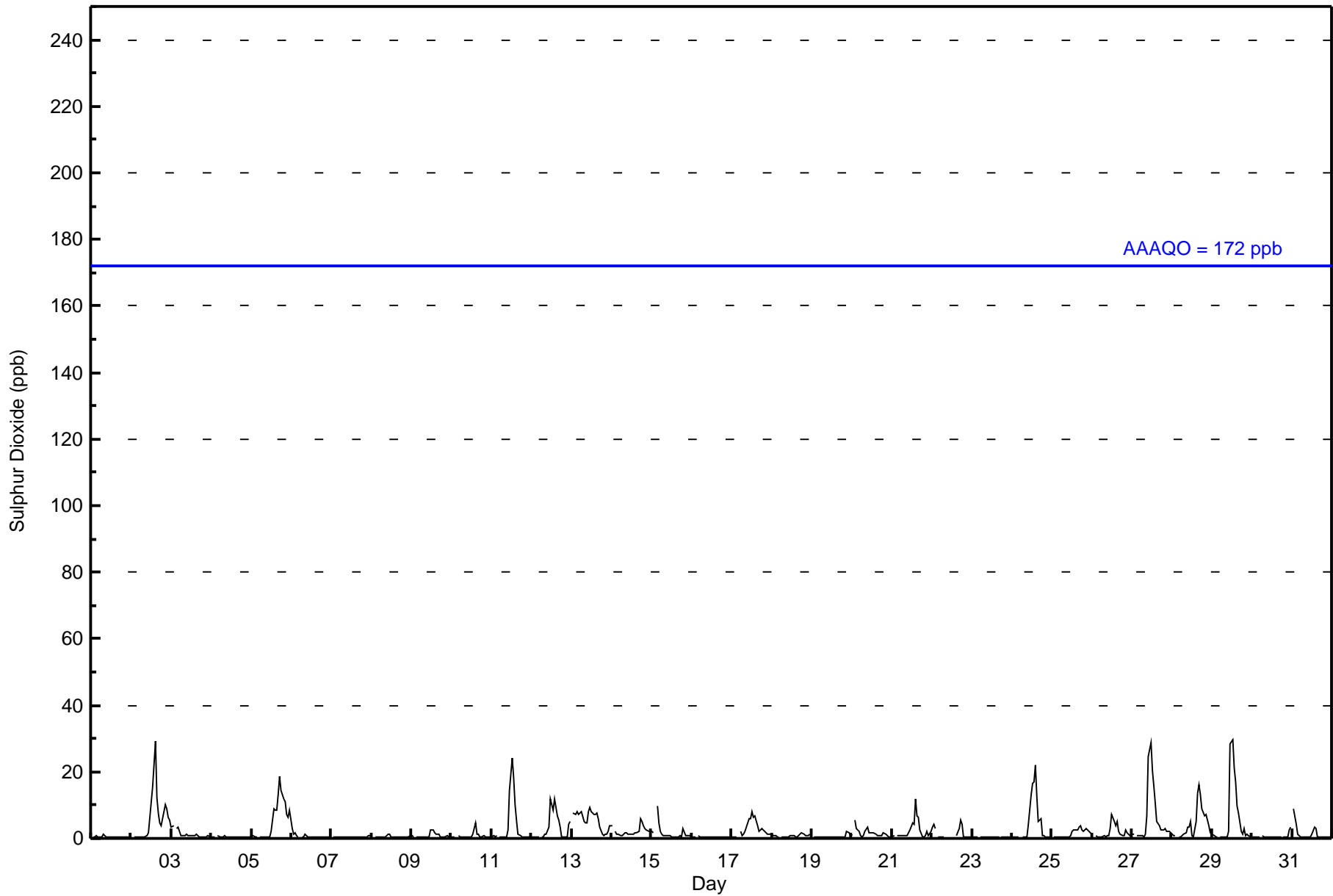
CNRL Horizon - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744												
Maximum Value: 30 ppb on Mar 29 13:00														Maximum Daily Average: 6.1 ppb on Mar 27												
Minimum Value: 0 ppb on Mar 23 18:00														Minimum Daily Average: 0.3 ppb on Mar 23												
Maximum Diurnal Average: 5.5 ppb at hour 15														Minimum Diurnal Average: 0.8 ppb at hour 7												
Monthly Average: 2.3 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 6 P ₉₉ = 21												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0.5	1
2-Mar	0	Z	0	0	0	0	0	0	1	1	2	6	11	16	29	12	7	5	4	6	10	9	6	6	5.8	29
3-Mar	3	4	Z	3	3	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1.3	4	
4-Mar	1	1	1	Z	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.5	1
5-Mar	1	1	1	0	Z	1	1	0	1	0	0	0	2	9	8	9	13	19	14	12	11	7	6	8	5.4	19
6-Mar	3	1	2	1	1	Z	0	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	0	0.7	3
7-Mar	Z	0	0	0	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.5	1
8-Mar	1	Z	1	1	1	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	1	1	0	1	0.6	1
9-Mar	1	0	Z	0	0	0	0	0	0	0	1	3	2	2	2	1	1	0	0	0	0	1	0	0	0.9	3
10-Mar	0	0	0	Z	1	1	0	0	0	0	0	0	0	1	5	1	1	0	1	1	1	0	0	0	0.7	5
11-Mar	0	1	1	1	Z	0	0	1	0	0	3	14	24	18	10	5	1	1	1	1	0	0	1	0	3.7	24
12-Mar	0	0	0	1	0	Z	0	1	1	1	3	12	10	8	12	7	6	3	0	0	0	0	4	5	3.4	12
13-Mar	Z	8	7	8	7	7	8	5	5	4	8	9	8	7	7	8	6	4	1	1	1	1	2	4	5.6	9
14-Mar	4	Z	2	1	1	1	1	1	2	2	1	1	1	1	2	2	2	6	5	4	3	2	2	2	2.2	6
15-Mar	2	2	Z	10	5	2	1	1	1	1	1	1	0	0	0	0	1	0	3	1	1	1	1	1	1.6	10
16-Mar	1	0	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
17-Mar	0	0	0	1	Z	2	1	1	2	3	6	6	8	6	7	4	2	3	3	3	2	1	1	1	2.8	8
18-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	0.8	2
19-Mar	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0.5	2
20-Mar	1	Z	6	3	2	1	1	1	2	3	2	2	2	2	1	1	1	1	1	2	1	1	0	1	1.5	6
21-Mar	0	1	Z	1	1	1	1	1	1	1	2	3	4	4	12	7	6	3	1	1	1	2	1	2	2.3	12
22-Mar	3	4	3	Z	1	0	1	0	C	C	C	C	C	C	C	1	3	6	4	1	0	0	0	0	--	6
23-Mar	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-Mar	0	0	0	0	0	Z	0	0	0	1	4	13	17	17	22	13	5	6	1	1	1	1	0	0	4.5	22
25-Mar	Z	0	0	0	0	0	0	0	0	0	0	1	2	2	3	3	3	4	2	2	3	3	2	2	1.5	4
26-Mar	1	Z	1	1	1	1	1	1	1	1	1	3	7	5	4	5	2	1	1	1	3	2	1	1	1.9	7
27-Mar	1	1	Z	1	1	1	1	1	1	7	25	29	20	16	10	5	4	3	2	3	3	2	2	2	6.1	29
28-Mar	1	1	1	Z	1	1	1	1	2	3	3	5	1	1	5	14	16	13	9	7	7	6	4	2	4.5	16
29-Mar	1	1	0	0	Z	0	0	0	1	1	2	28	30	21	17	10	8	2	1	3	1	1	1	1	5.6	30
30-Mar	1	1	0	0	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	3	3	0.7	3
31-Mar	Z	9	4	1	1	0	0	0	1	0	0	0	1	3	3	0	0	0	0	0	0	0	0	0	1.2	9
																								Diurnal Average		
																								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
CNRL Horizon - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	675	95.61	95.61
11 - 20	23	3.26	98.87
21 - 60	8	1.13	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
CNRL Horizon - March 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	178	101	39	19	20	22	32	45	75	30	7	11	19	24	19	673
11 - 20	1	3	0	0	0	2	1	4	4	1	0	0	0	0	2	5	23
21 - 60	0	2	0	0	0	0	0	1	3	0	0	0	0	0	1	1	8
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	183	101	39	19	22	23	37	52	76	30	7	11	19	27	25	704

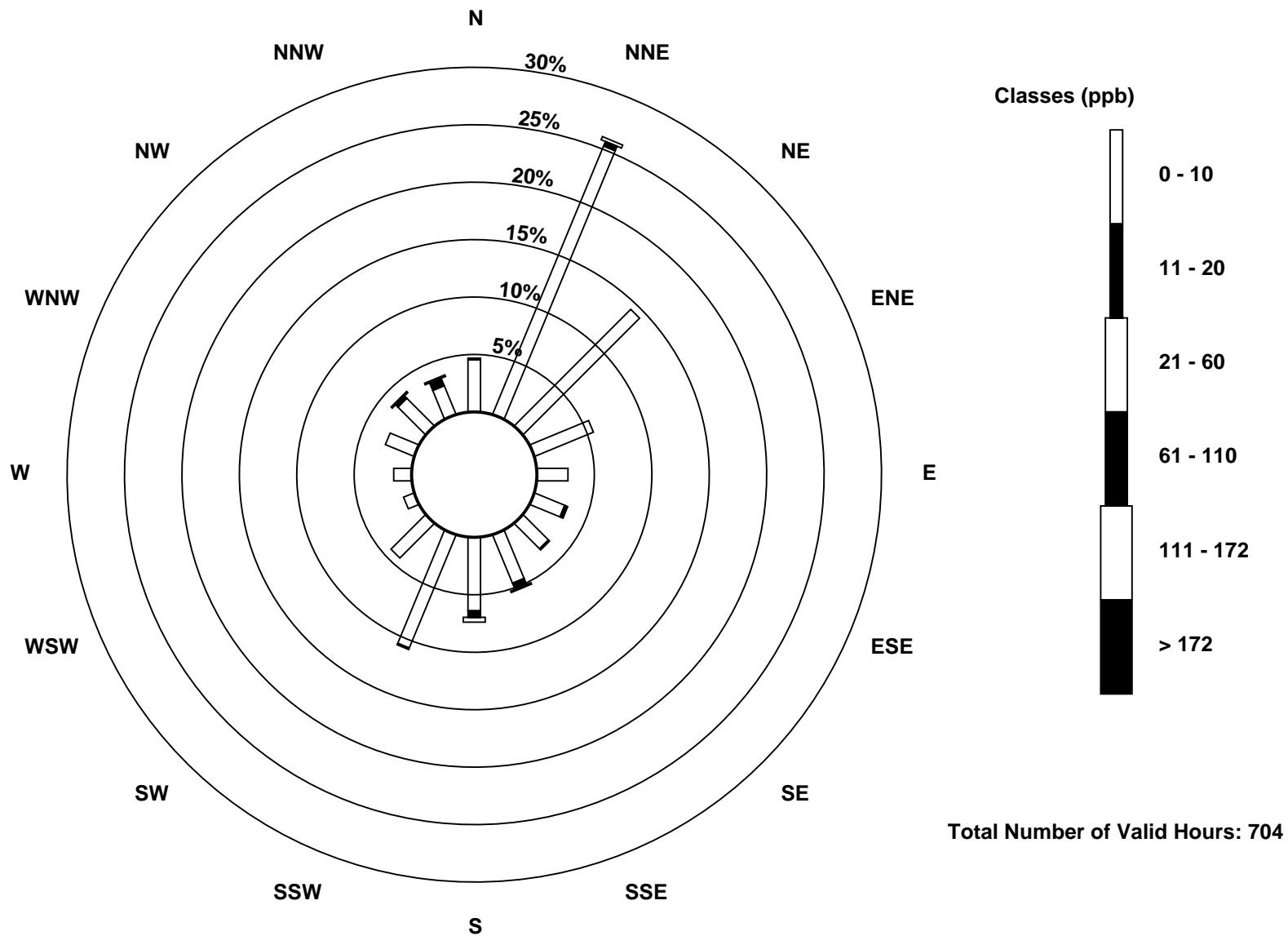
Total Number of Valid Hours: 704

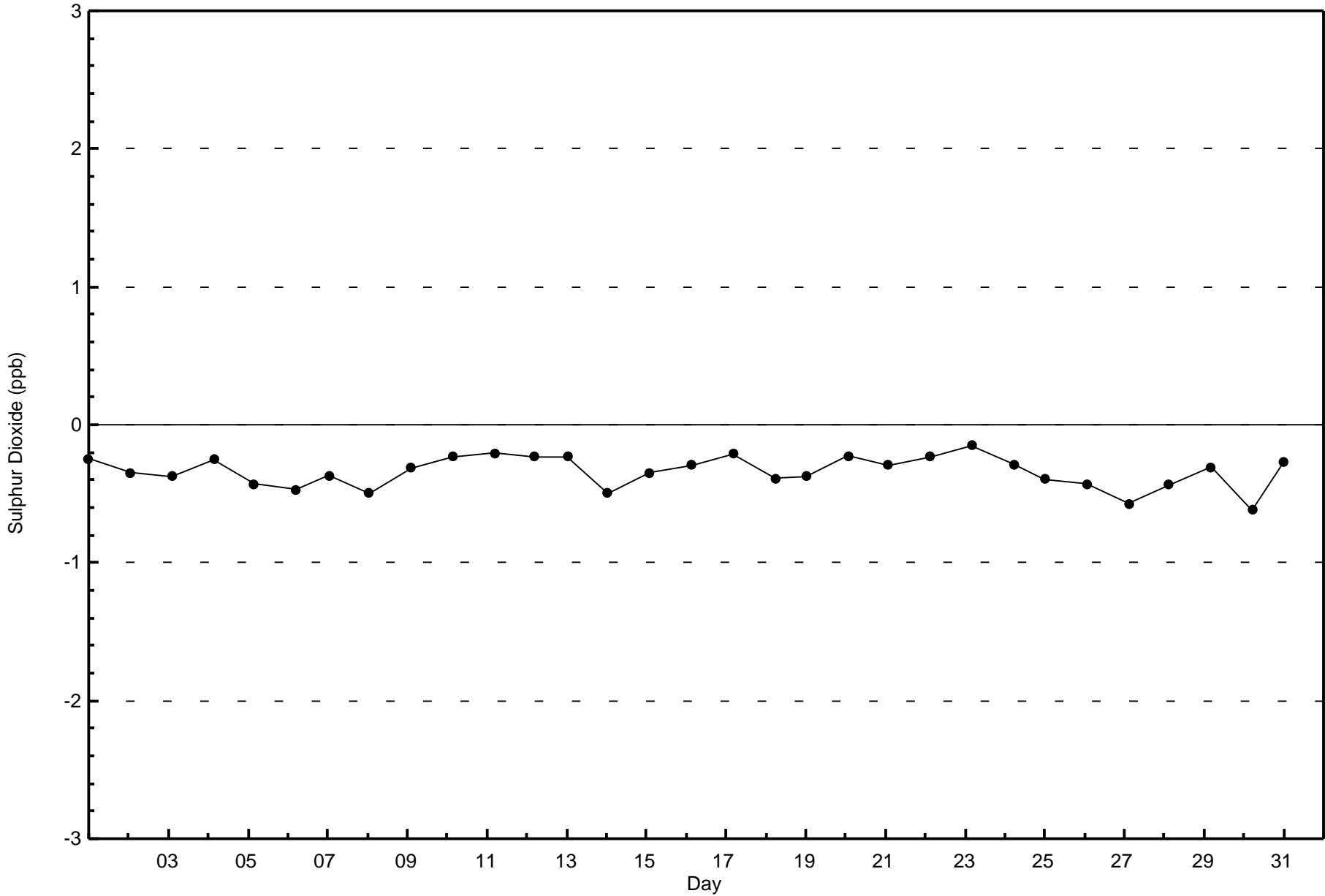
Total Number of Hours: 744

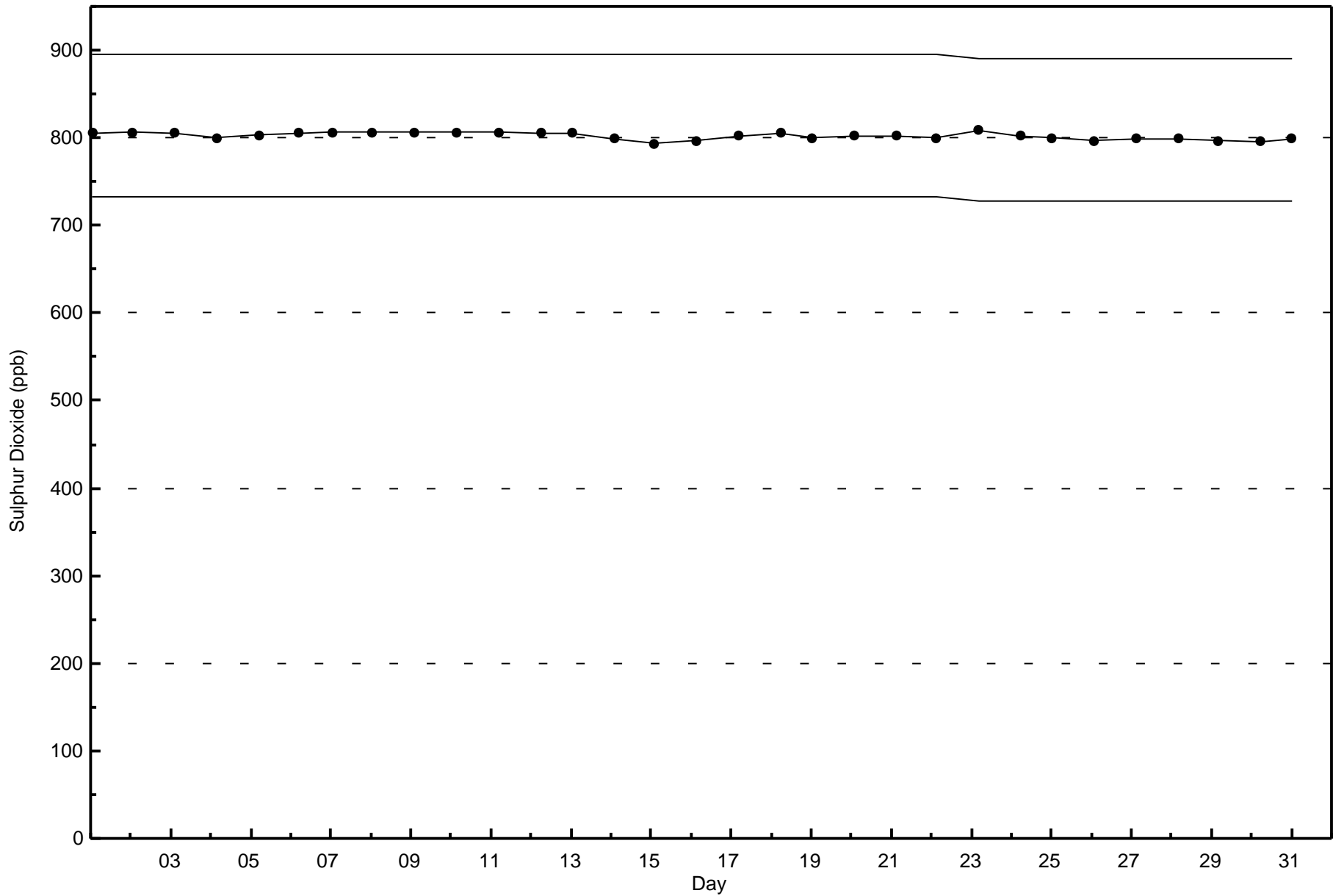


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon (AMS 15)





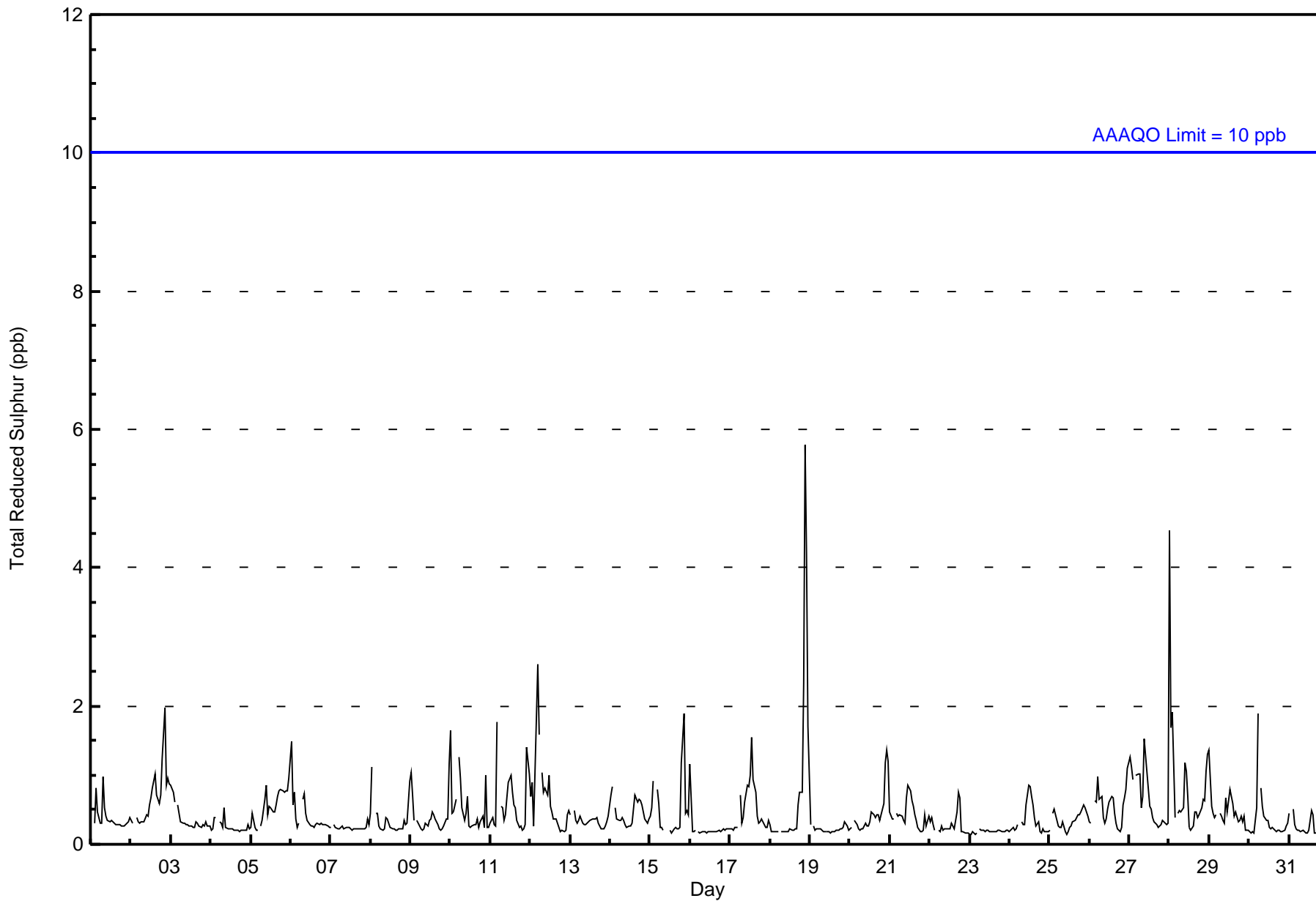




Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 6 ppb on Mar 18 22:00	Maximum Daily Average: 0.9 ppb on Mar 28
Minimum Value: 0 ppb on Mar 23 02:00	Minimum Daily Average: 0.2 ppb on Mar 23
Maximum Diurnal Average: 0.7 ppb at hour 1	Minimum Diurnal Average: 0.3 ppb at hour 18
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 = 2
	Hours of Data: 710
	Hours of Missing Data: 34
	Hours of Calibration: 34
	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-Mar	0	Z	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
2-Mar	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	1	1	1	0.7	2	
3-Mar	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
4-Mar	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	
5-Mar	0	0	0	0	0	Z	0	0	1	1	0	1	1	0	0	1	1	1	1	1	1	1	1	1	0.6	1	
6-Mar	1	1	1	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
7-Mar	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	
8-Mar	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
9-Mar	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
10-Mar	2	0	0	1	Z	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0.5	2	
11-Mar	0	0	0	0	2	Z	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0.6	2	
12-Mar	1	1	0	1	3	2	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.7	3	
13-Mar	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	
14-Mar	1	1	Z	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0.5	1	
15-Mar	0	1	1	Z	1	1	0	0	0	C	C	C	0	0	0	0	0	0	0	1	2	0	0	0	0.5	2	
16-Mar	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
17-Mar	0	0	0	0	0	Z	1	0	0	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0.5	2	
18-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	6	4	2	0.8	6
19-Mar	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	
20-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1	
21-Mar	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1	
22-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.3	1	
23-Mar	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	
24-Mar	0	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1	
25-Mar	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1	
26-Mar	0	0	Z	1	1	1	1	1	0	0	0	1	1	1	1	0	0	0	0	0	1	1	1	1	0.5	1	
27-Mar	1	1	1	Z	1	1	1	1	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.7	2	
28-Mar	5	2	2	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	0.9	5	
29-Mar	1	1	0	0	0	Z	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1	
30-Mar	0	0	0	0	1	2	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
31-Mar	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
	0.7	0.5	0.5	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.4	0.5	0.6	0.6	0.5	Diurnal Average		
	5	2	2	1	3	2	1	1	1	2	1	1	1	2	1	1	1	1	1	1	2	6	4	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
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	706	99.44	99.44
3 - 4	2	0.28	99.72
5 - 7	2	0.28	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
CNRL Horizon - March 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	184	102	38	17	24	26	38	51	71	29	10	11	19	28	25	704
3 - 4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
5 - 7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
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	185	102	38	17	24	26	38	51	71	29	10	11	19	28	26	708

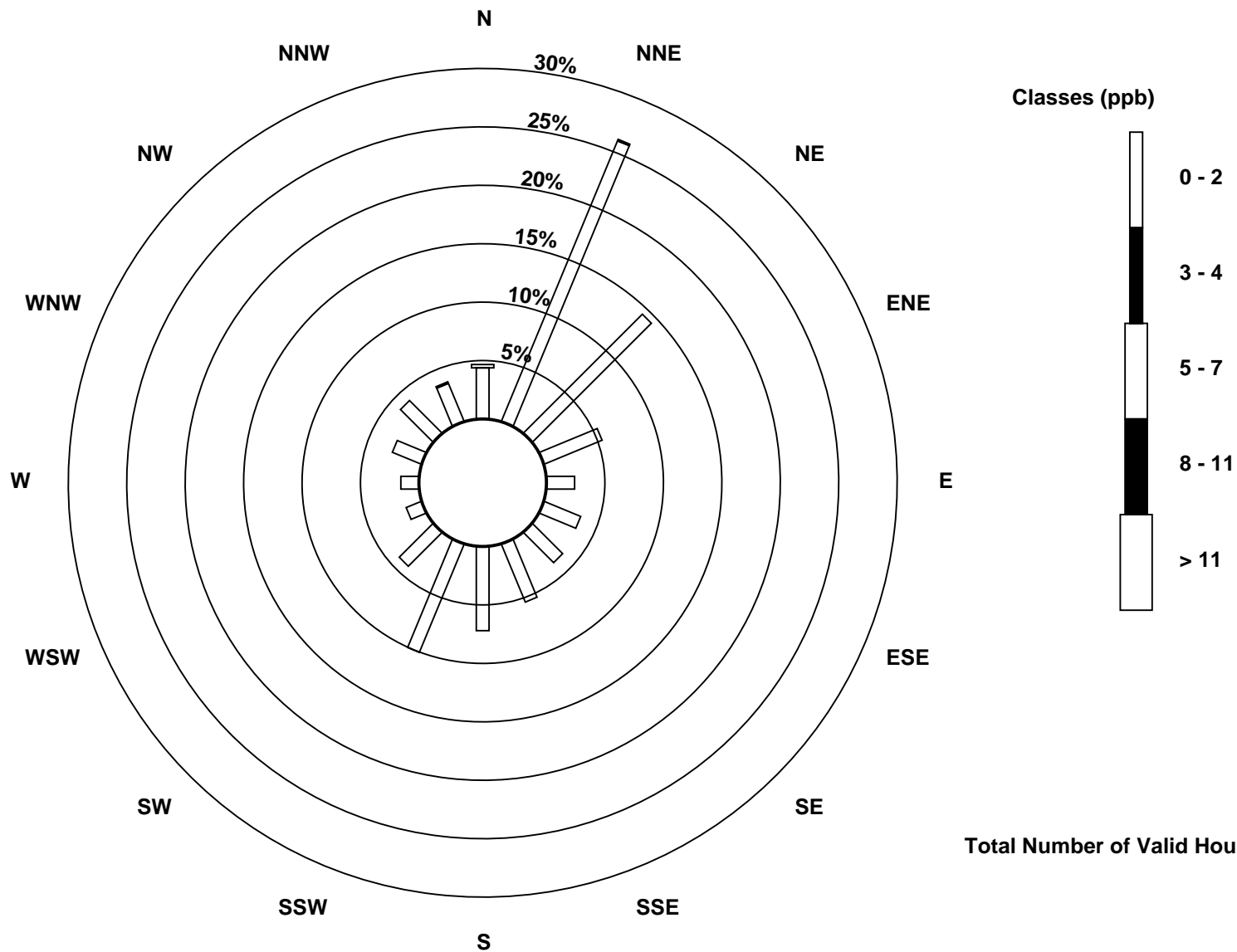
Total Number of Valid Hours: 708

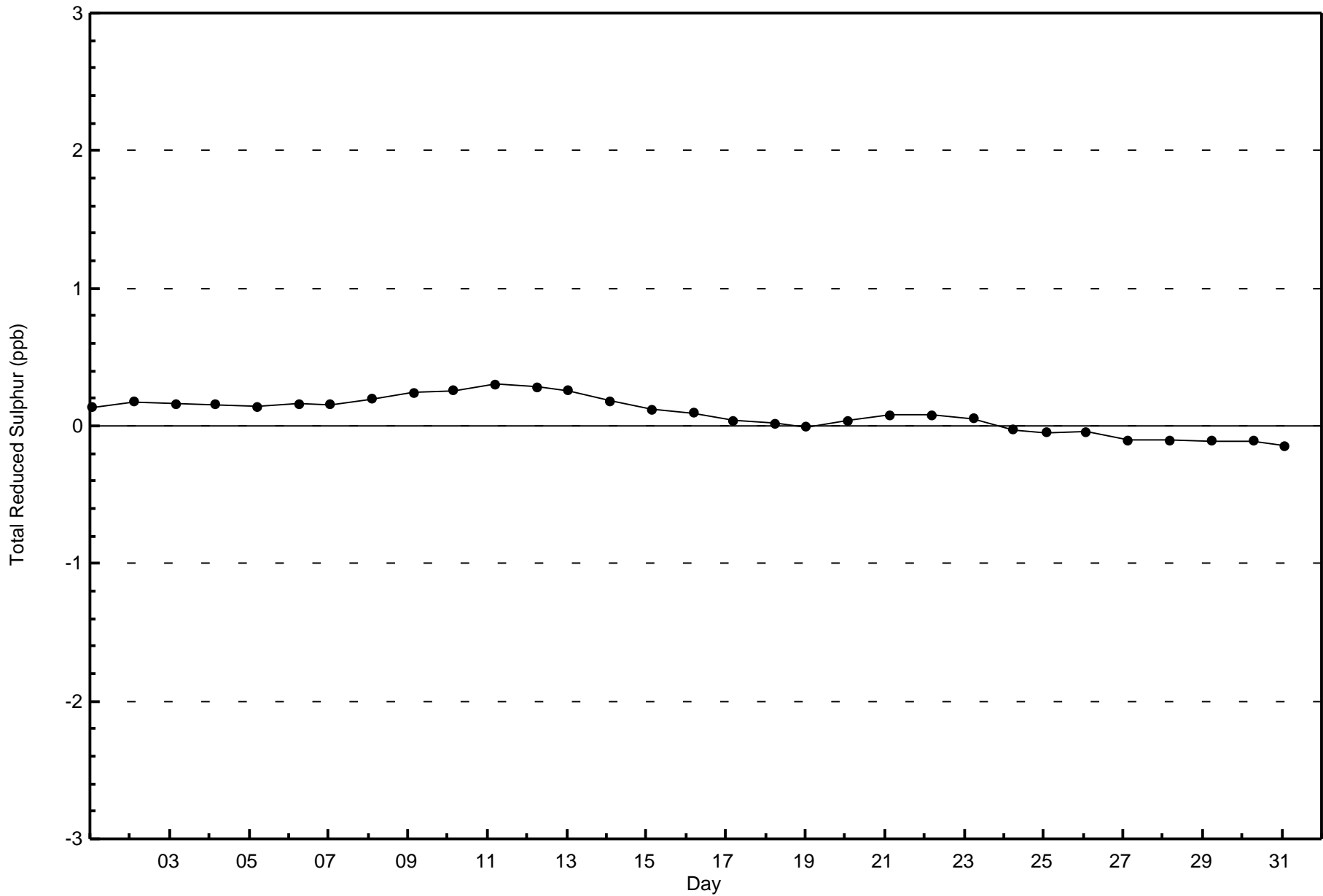
Total Number of Hours: 744

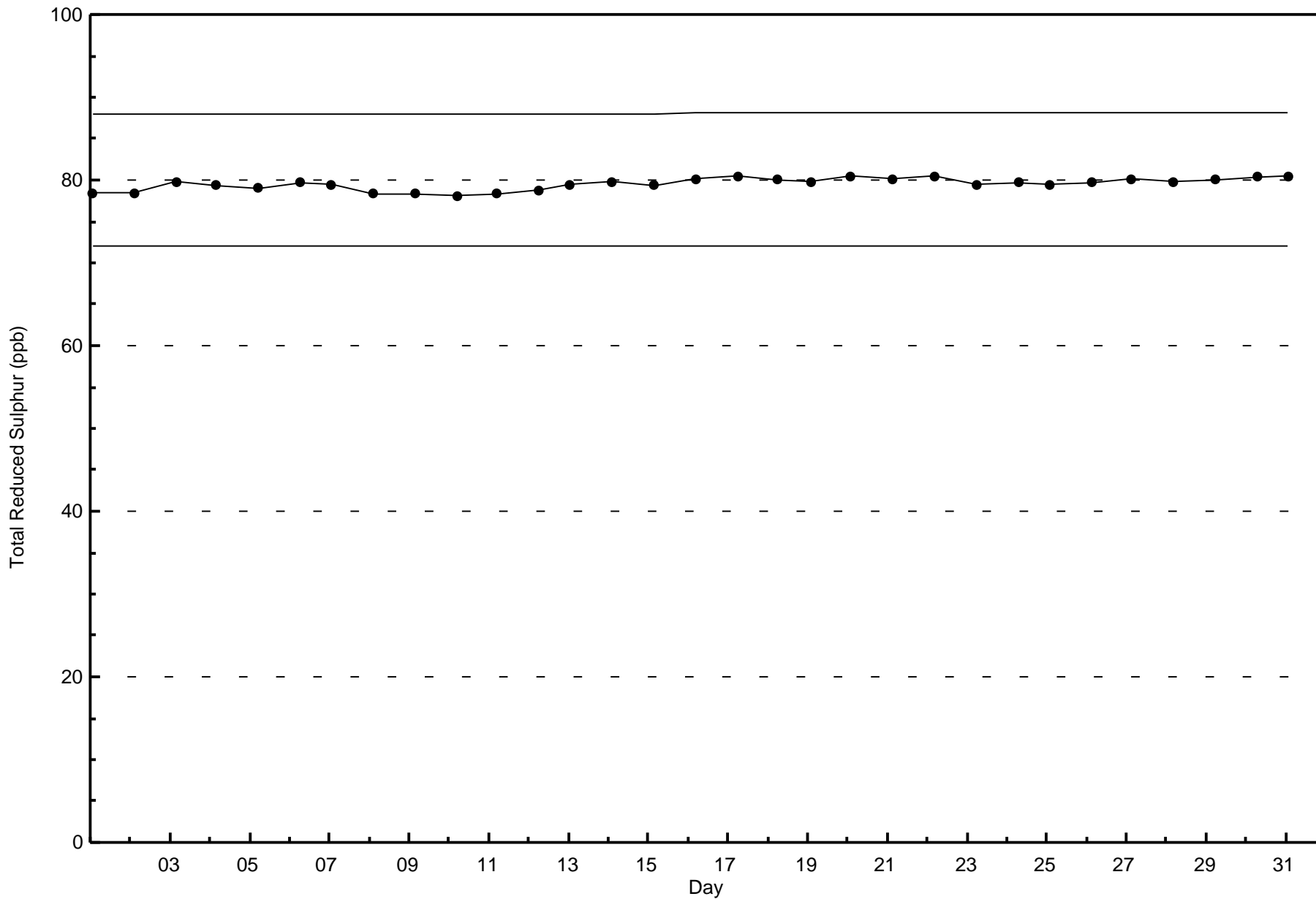


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon (AMS 15)









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

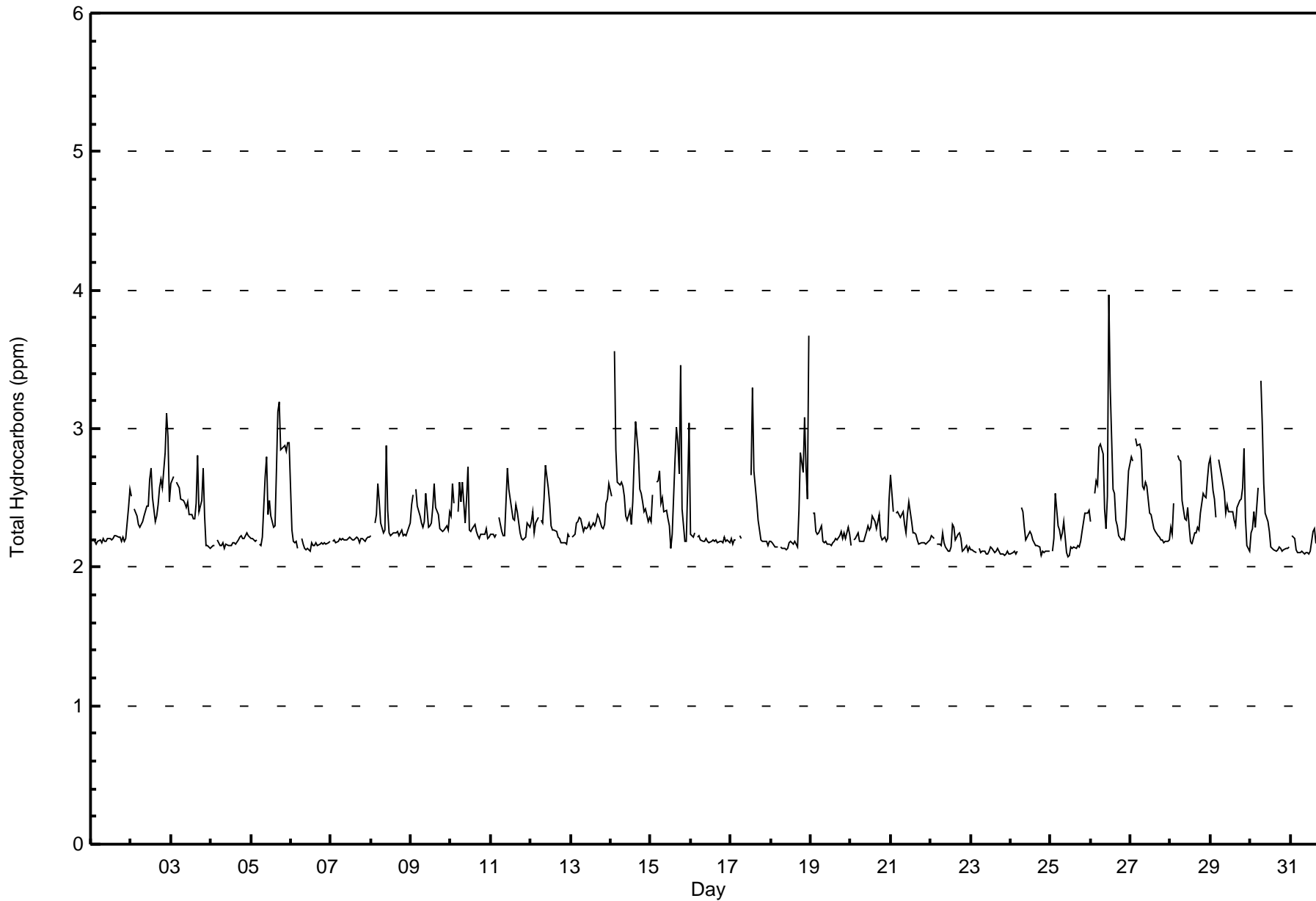
CNRL Horizon - March 2017

Maximum Value: 4.0 ppm on Mar 26 12:00																				Maximum Daily Average: 2.6 ppm on Mar 14					Hours in Service: 744			
Minimum Value: 2.1 ppm on Mar 25 11:00																				Minimum Daily Average: 2.1 ppm on Mar 23					Hours of Data: 708			
Maximum Diurnal Average: 2.4 ppm at hour 6																				Minimum Diurnal Average: 2.3 ppm at hour 22					Hours of Missing Data: 36			
Monthly Average: 2.33 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 = 3.3					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-Mar	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	2.2	2.4	2.6	2.2	2.6		
2-Mar	2.5	Z	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.6	2.7	2.5	2.3	2.4	2.4	2.6	2.6	2.6	2.8	3.1	2.9	2.5	2.5	3.1		
3-Mar	2.6	2.7	Z	2.6	2.6	2.6	2.5	2.5	2.5	2.4	2.5	2.4	2.4	2.3	2.3	2.5	2.8	2.4	2.5	2.7	2.4	2.2	2.2	2.1	2.5	2.8		
4-Mar	2.1	2.2	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	2.2	2.2	2.2	2.2	2.2	2.2		
5-Mar	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.7	2.8	2.4	2.5	2.4	2.3	2.3	2.7	3.1	3.2	2.8	2.9	2.9	2.8	2.9	2.9	2.6	3.2	
6-Mar	2.3	2.2	2.2	2.2	2.1	Z	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
7-Mar	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	2.2	2.2	2.2	2.2	2.2	2.2	
8-Mar	2.2	Z	2.3	2.4	2.6	2.5	2.3	2.3	2.3	2.9	2.4	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.9	2.9	
9-Mar	2.5	2.5	Z	2.6	2.4	2.4	2.3	2.3	2.3	2.5	2.3	2.3	2.3	2.4	2.6	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.6	2.6	
10-Mar	2.4	2.6	2.5	Z	2.4	2.6	2.5	2.6	2.3	2.5	2.7	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.4	2.7		
11-Mar	2.2	2.2	2.2	2.2	Z	2.4	2.3	2.2	2.2	2.5	2.7	2.6	2.4	2.4	2.3	2.5	2.4	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.7	2.7	
12-Mar	2.3	2.4	2.2	2.3	2.4	Z	2.3	2.3	2.5	2.7	2.6	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	2.3	2.7	
13-Mar	Z	2.2	2.2	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.5	2.5	2.6	2.3	2.6		
14-Mar	2.5	Z	3.6	2.8	2.6	2.6	2.6	2.6	2.5	2.4	2.3	2.4	2.3	2.5	2.8	3.1	2.8	2.6	2.5	2.5	2.4	2.4	2.3	2.4	2.6	3.6		
15-Mar	2.3	2.5	Z	2.6	2.6	2.7	2.5	2.5	2.4	2.4	2.3	2.3	2.1	2.2	2.8	3.0	2.9	2.7	3.5	2.4	2.2	2.2	2.6	3.0	2.6	3.5		
16-Mar	2.2	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	2.2	2.2	2.2	
17-Mar	2.2	2.2	2.2	2.2	Z	2.2	2.2	C	C	C	C	C	2.7	3.3	2.7	2.5	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	3.3		
18-Mar	2.2	2.2	2.1	2.2	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.4	2.8	2.7	3.1	2.7	2.5	3.7	2.4	3.7		
19-Mar	Z	2.4	2.4	2.3	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	2.2	2.2	2.2	2.3	2.2	2.2	2.4		
20-Mar	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.5	2.3	2.5		
21-Mar	2.7	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.3	2.2	2.4	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	2.3	2.7		
22-Mar	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	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.2	2.3		
23-Mar	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		
24-Mar	2.1	2.1	2.1	2.1	2.1	Z	2.4	2.4	2.3	2.2	2.2	2.3	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	2.4		
25-Mar	Z	2.1	2.2	2.5	2.3	2.3	2.2	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.3	2.4	2.4	2.4	2.2	2.5		
26-Mar	2.3	Z	2.5	2.6	2.6	2.9	2.9	2.8	2.4	2.3	2.5	4.0	3.3	2.6	2.5	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.5	2.7	2.6	4.0		
27-Mar	2.8	2.8	Z	2.9	2.9	2.9	2.9	2.6	2.6	2.6	2.6	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.9		
28-Mar	2.3	2.2	2.5	Z	2.8	2.8	2.8	2.5	2.4	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.5	2.5	2.5	2.6	2.7	2.4	2.8		
29-Mar	2.8	2.6	2.5	2.4	Z	2.8	2.7	2.6	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.4	2.5	2.5	2.6	2.9	2.4	2.2	2.1	2.5	2.9		
30-Mar	2.2	2.3	2.4	2.3	2.6	Z	3.3	3.0	2.6	2.4	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.3	3.3		
31-Mar	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	2.3	2.3	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.3		
																								Diurnal Average				
																								Diurnal Maximum				
Z - zerospan C - Calibration																												



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
CNRL Horizon - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - March 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	696	98.31	98.31
3.1 - 10.0	12	1.69	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
CNRL Horizon - March 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	32	182	101	40	18	22	26	37	52	74	30	6	10	19	22	23	694
3.1 - 10.0	1	2	0	0	1	0	0	0	0	1	0	0	0	1	4	2	12
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	33	184	101	40	19	22	26	37	52	75	30	6	10	20	26	25	706

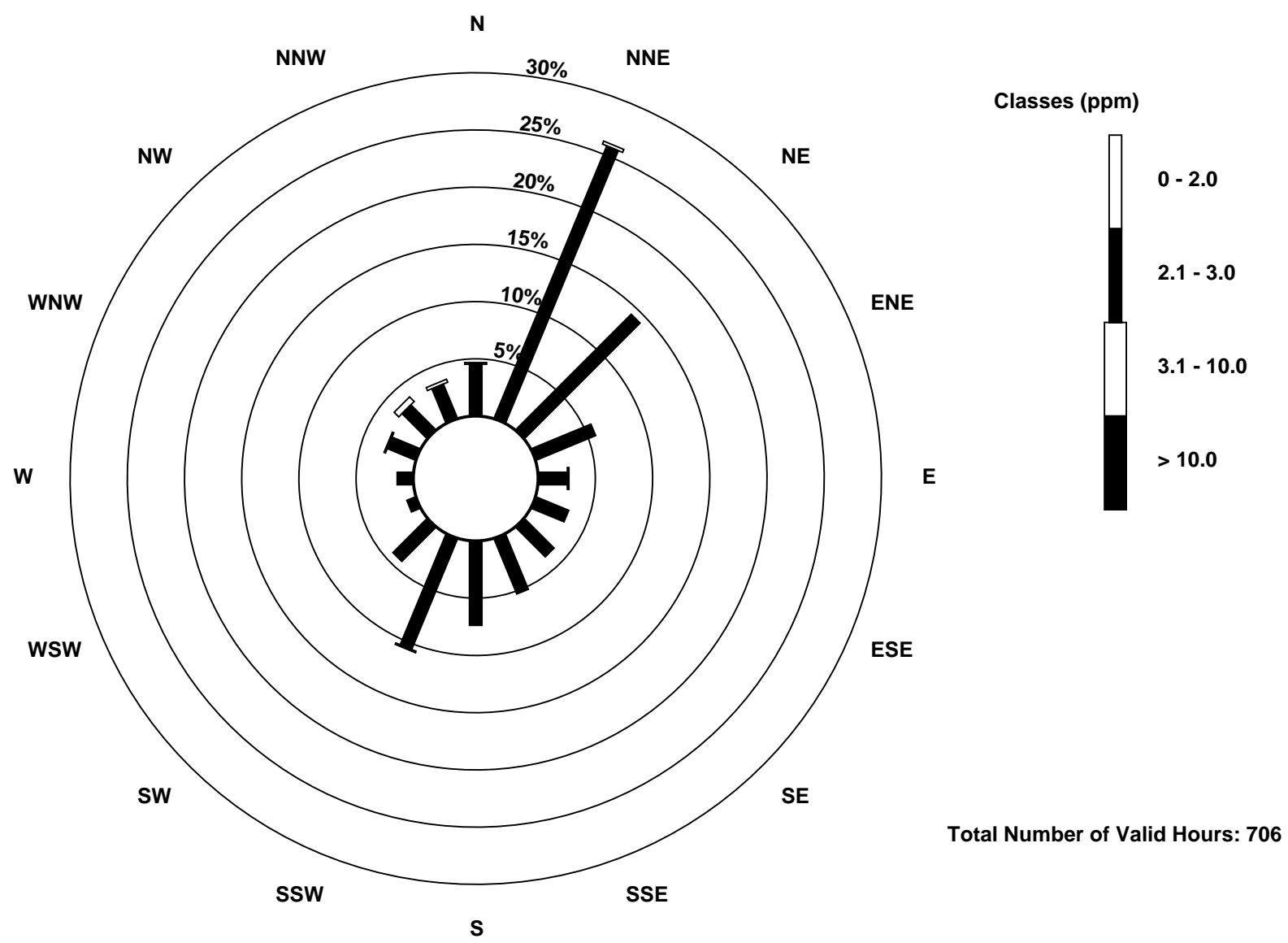
Total Number of Valid Hours: 706

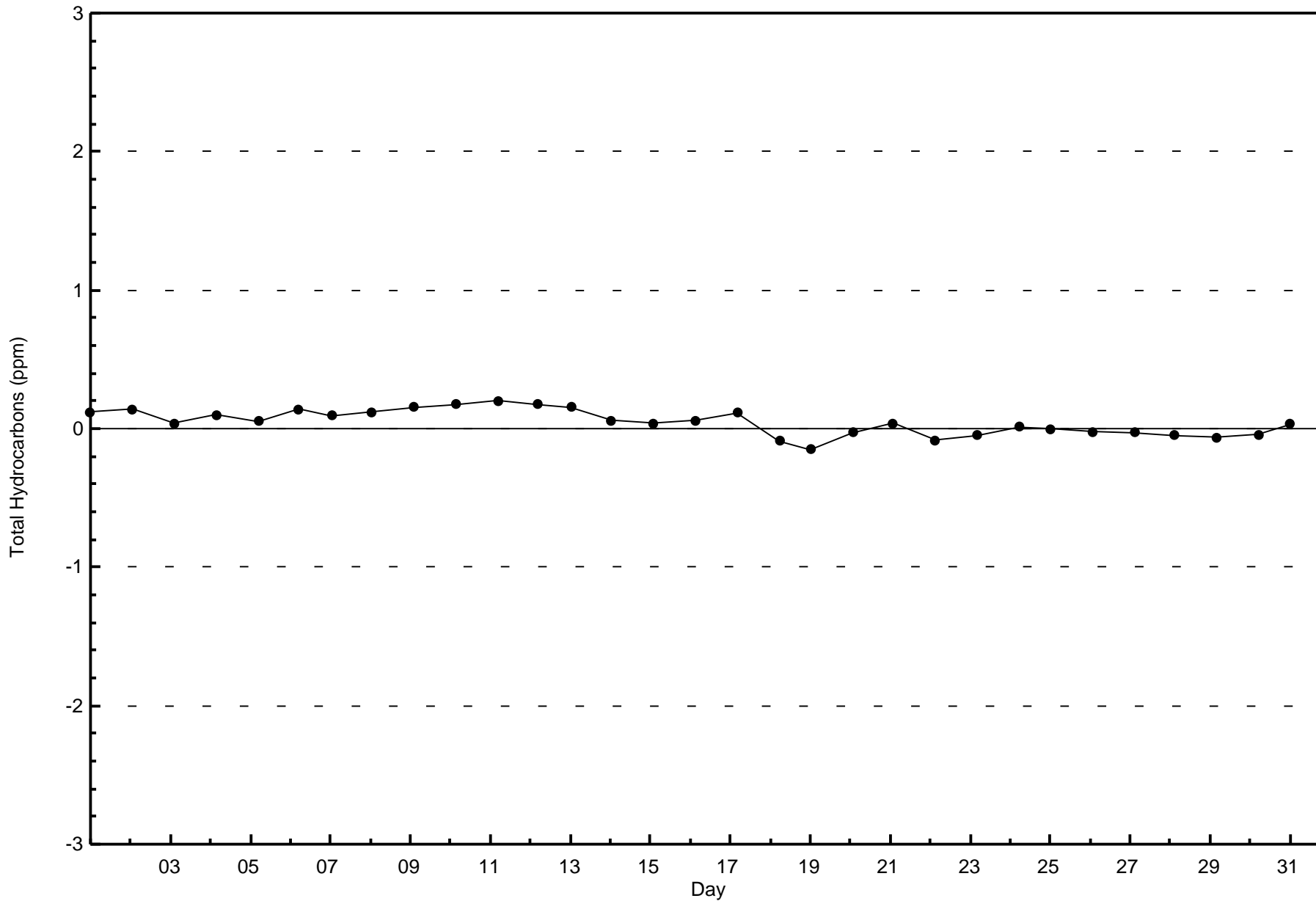
Total Number of Hours: 744

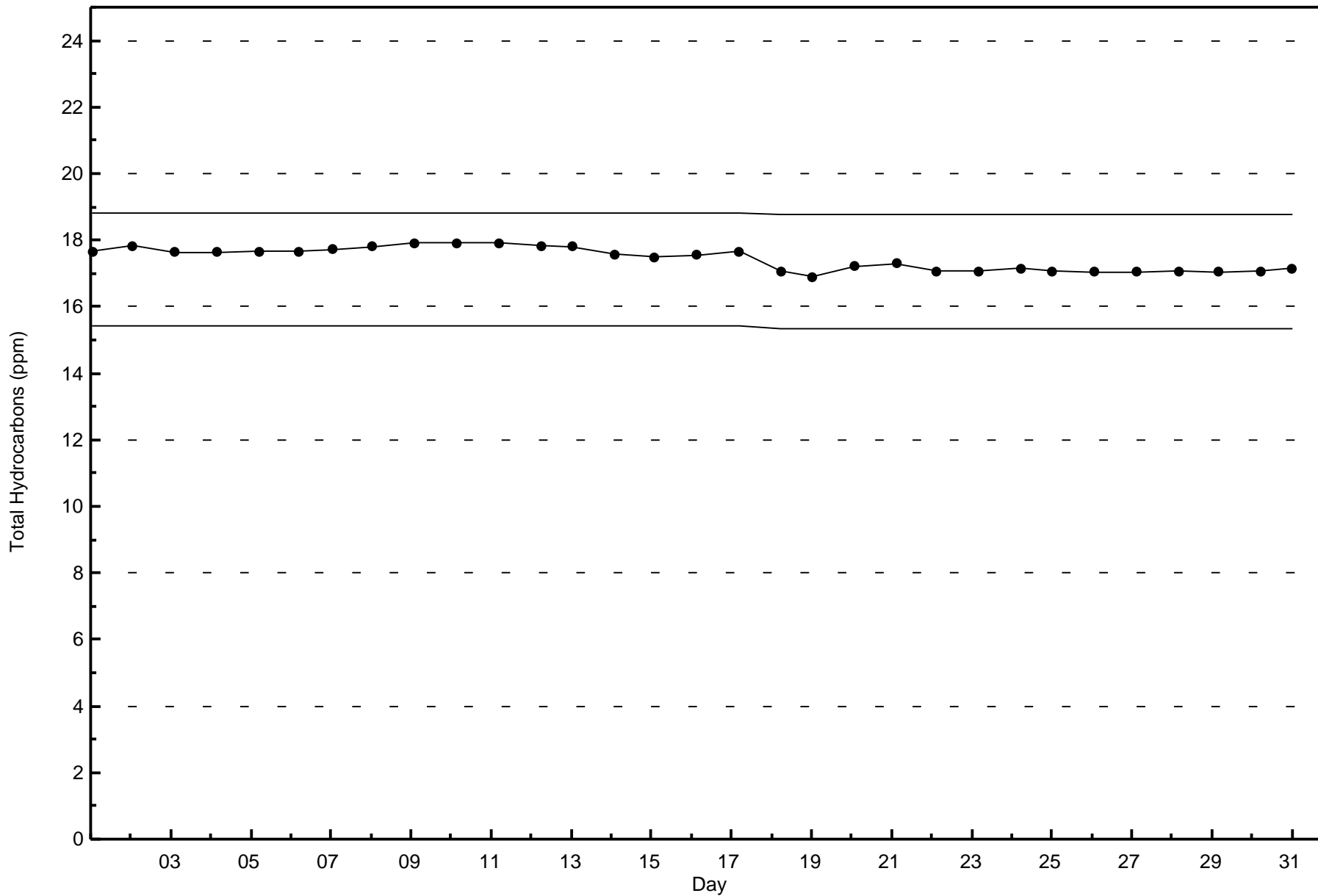


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Hydrocarbons (THC) - ppm
CNRL Horizon (AMS 15)









Wood Buffalo Environmental Association

Summary of Hour Averages

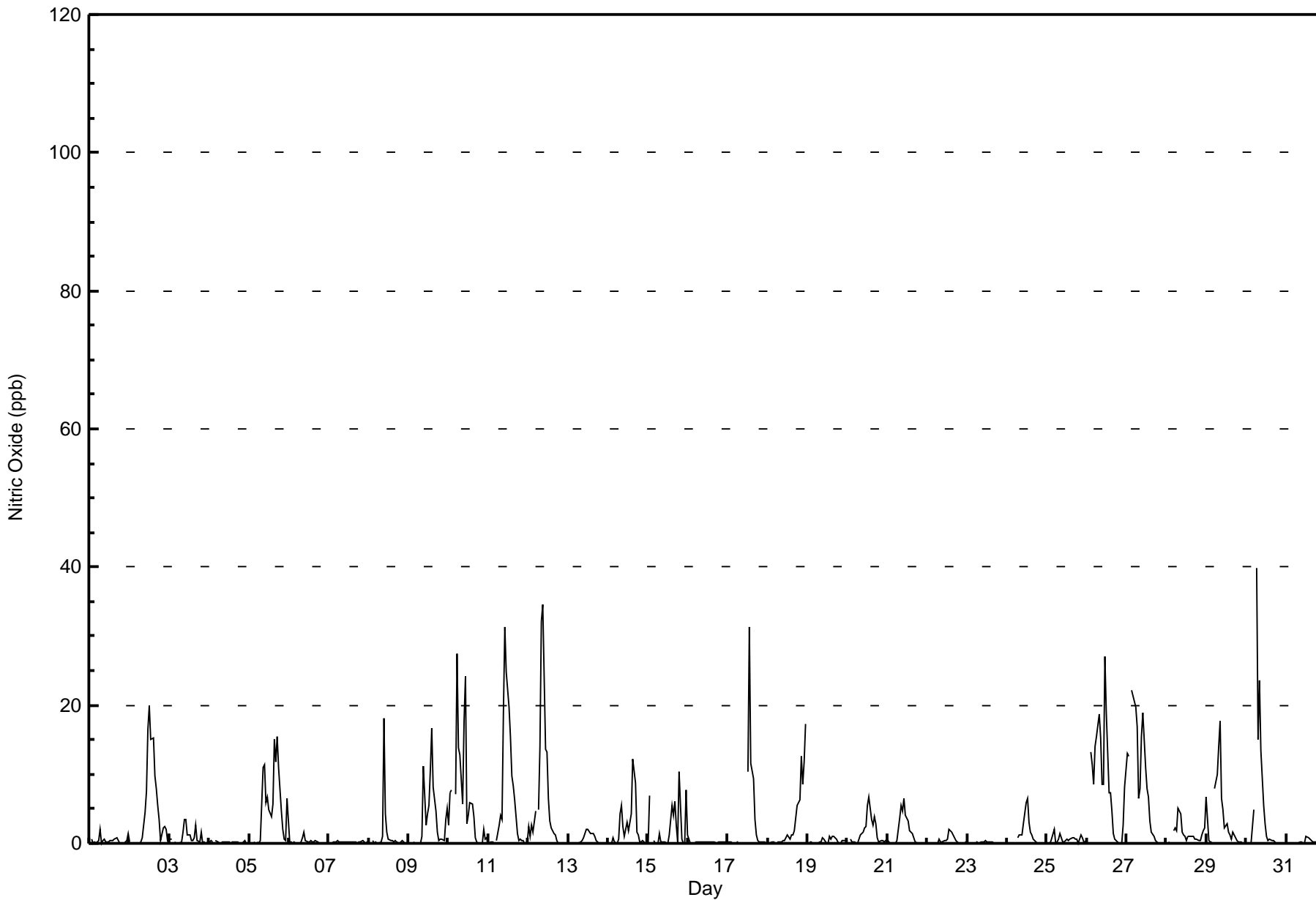
Nitric Oxide (NO) - ppb
CNRL Horizon - March 2017

Maximum Value: 40 ppb on Mar 30 07:00																		Maximum Daily Average: 8.4 ppb on Mar 26																		Hours in Service: 744	
Minimum Value: 0 ppb on Mar 5 02:00																		Minimum Daily Average: 0.1 ppb on Mar 23																		Hours of Data: 708	
Maximum Diurnal Average: 6.0 ppb at hour 10																		Minimum Diurnal Average: 0.6 ppb at hour 22																		Hours of Missing Data: 36	
Monthly Average: 2.6 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 2 P ₉₀ = 8 P ₉₉ = 27																		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-Mar	Z	1	0	0	0	0	2	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0.4	2											
2-Mar	0	Z	0	0	0	0	0	0	1	4	8	17	20	15	15	10	8	6	3	0	2	2	2	0	5.0	20											
3-Mar	1	1	Z	0	0	0	0	0	2	3	3	1	1	0	0	1	3	0	0	2	0	0	0	0	0.9	3											
4-Mar	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											
5-Mar	0	0	0	0	Z	0	0	0	11	11	6	7	5	4	6	15	12	16	11	5	2	1	1	6	5.1	16											
6-Mar	0	0	0	0	0	Z	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2											
7-Mar	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											
8-Mar	0	Z	0	0	0	0	0	0	1	18	4	2	1	0	0	0	0	0	0	0	0	0	0	0	1.3	18											
9-Mar	0	0	Z	0	0	0	0	0	1	11	3	4	6	11	17	8	5	2	0	1	1	0	4	5	3.4	17											
10-Mar	3	7	8	Z	7	27	14	13	6	18	24	3	4	6	6	4	1	0	0	0	0	2	1	1	6.7	27											
11-Mar	0	0	0	0	Z	0	3	4	3	19	31	25	20	15	10	8	6	1	0	1	0	0	0	0	6.5	31											
12-Mar	2	1	3	2	5	Z	5	14	32	34	14	13	6	3	2	1	1	1	0	0	0	0	0	0	6.1	34											
13-Mar	Z	0	0	0	0	0	0	0	0	1	1	2	2	2	1	1	1	0	0	0	0	0	0	0	0.6	2											
14-Mar	0	Z	0	1	0	0	1	4	5	2	1	3	2	3	4	12	9	2	1	0	0	0	0	0	2.3	12											
15-Mar	0	7	Z	0	0	0	0	1	0	0	0	0	0	1	6	4	6	3	0	10	1	0	0	8	2.1	10											
16-Mar	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											
17-Mar	0	0	0	0	Z	0	0	C	C	C	C	C	10	31	12	9	3	1	0	0	0	0	0	0	3.8	31											
18-Mar	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	2	4	6	6	13	9	12	17	3.3	17											
19-Mar	Z	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0.4	1											
20-Mar	0	Z	1	0	0	0	0	1	1	2	2	2	5	7	3	3	4	3	1	0	0	0	0	0	1.6	7											
21-Mar	1	0	Z	0	0	0	0	4	6	5	6	4	3	2	2	1	1	0	0	0	0	0	0	0	1.5	6											
22-Mar	0	0	0	Z	0	0	0	1	0	0	0	0	1	2	2	2	1	0	0	0	0	0	0	0	0.4	2											
23-Mar	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											
24-Mar	0	0	0	0	0	Z	1	1	1	1	3	6	7	3	2	1	1	0	0	0	0	0	0	0	1.2	7											
25-Mar	Z	0	0	1	2	0	0	1	1	0	0	0	1	0	1	1	1	1	1	0	1	1	0	0	0.6	2											
26-Mar	1	Z	13	11	9	14	15	19	15	9	9	27	19	7	7	5	1	1	0	0	0	0	3	8	8.4	27											
27-Mar	13	13	Z	22	21	20	17	6	8	15	19	11	8	7	3	2	1	0	0	0	0	0	0	0	8.1	22											
28-Mar	0	0	0	Z	2	2	2	5	4	2	1	1	0	1	1	1	1	1	1	0	0	1	2	2	1.4	5											
29-Mar	7	0	0	0	Z	8	10	14	18	6	5	2	3	2	1	1	2	1	0	0	0	0	0	0	3.5	18											
30-Mar	0	0	0	0	5	Z	40	15	24	13	5	3	1	0	1	0	0	0	0	0	0	0	0	0	4.7	40											
31-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1											
																								Diurnal Average													
																								Diurnal Maximum													
1.2 1.2 1.0 1.5 2.0 2.8 3.6 3.5 4.8 6.0 5.0 4.5 4.1 4.1 3.4 3.1 2.3 1.4 0.9 0.9 0.7 0.6 0.8 1.7 13 13 13 22 21 27 40 19 32 34 31 27 20 31 17 15 12 16 11 10 13 9 12 17																																					
Z - zerospan C - Calibration																																					



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
CNRL Horizon - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
CNRL Horizon - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	696	98.31	98.31
21 - 40	12	1.69	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
CNRL Horizon - March 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	32	181	100	40	18	22	26	37	50	75	30	6	9	20	24	24	694
21 - 40	1	3	1	0	1	0	0	0	2	0	0	0	1	0	2	1	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	33	184	101	40	19	22	26	37	52	75	30	6	10	20	26	25	706

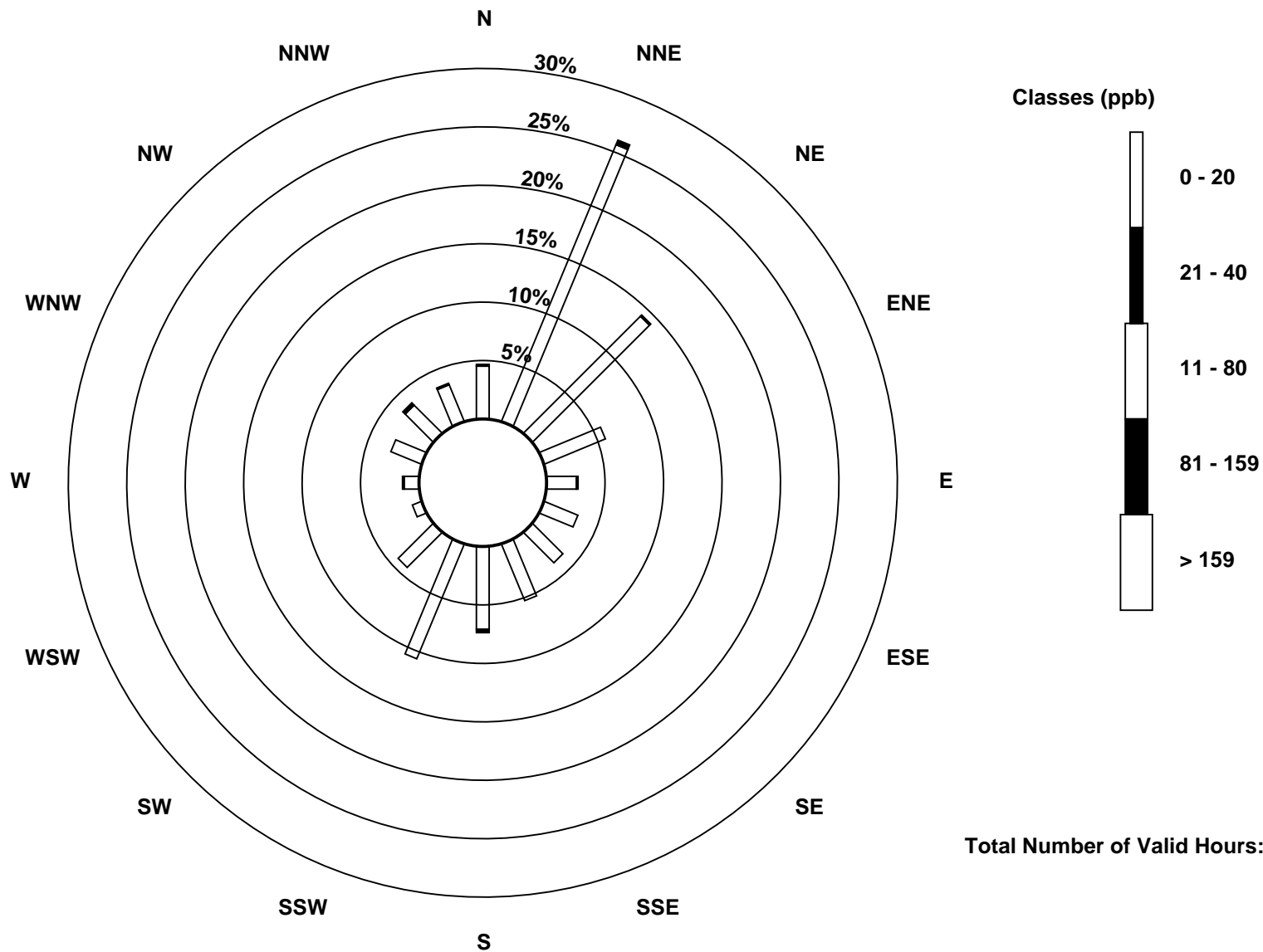
Total Number of Valid Hours: 706

Total Number of Hours: 744

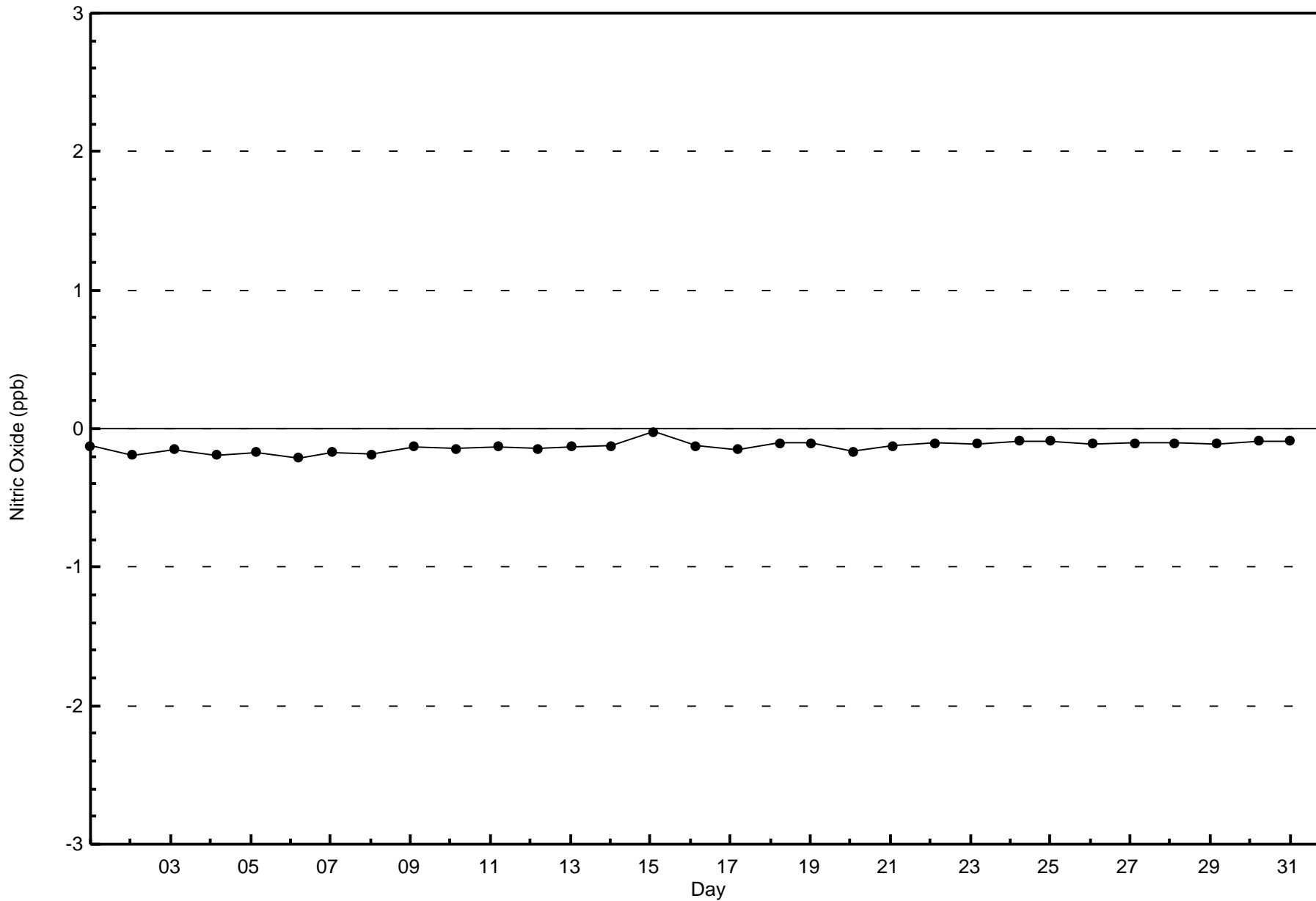


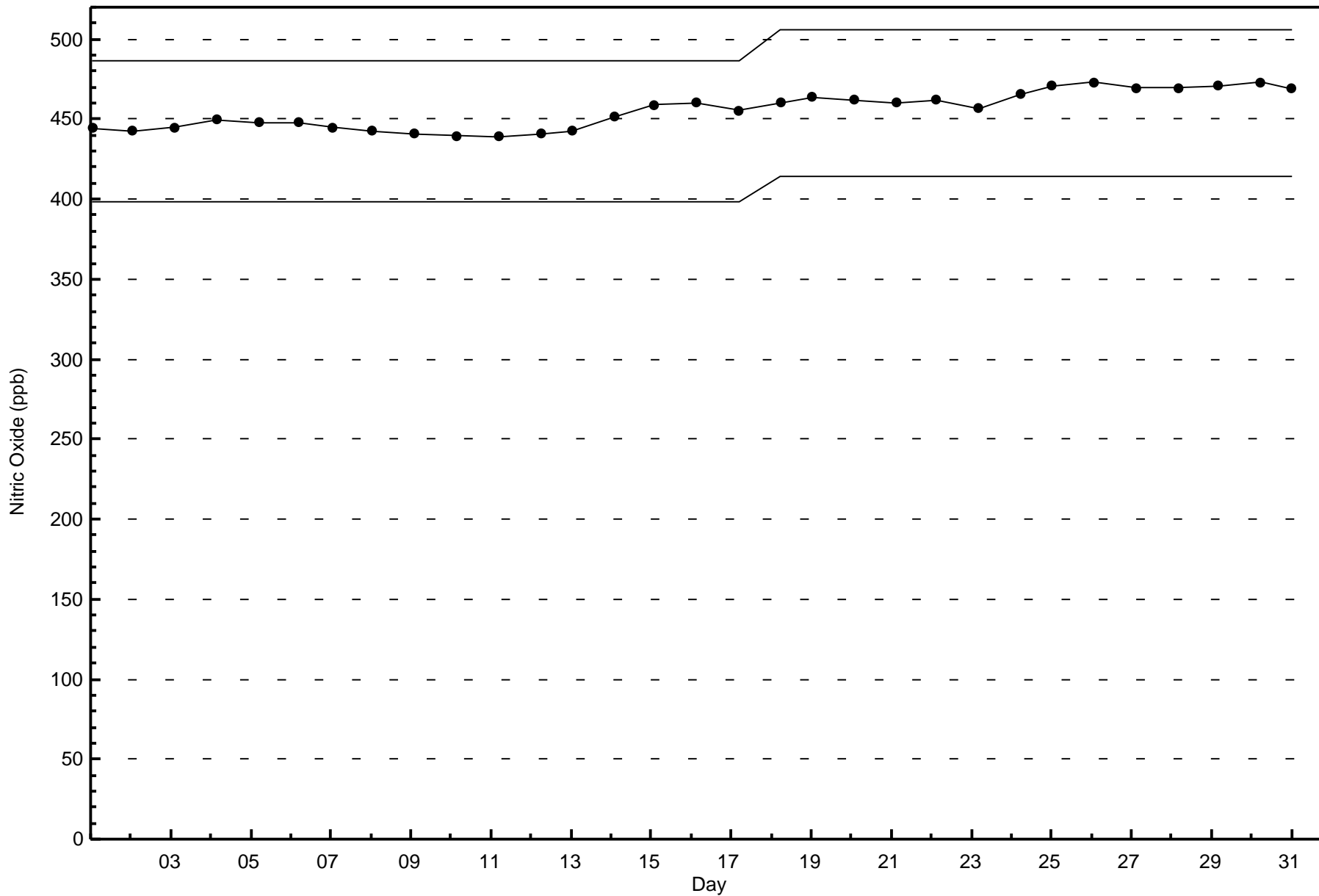
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitric Oxide (NO) - ppb
CNRL Horizon (AMS 15)



Total Number of Valid Hours: 706







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

CNRL Horizon - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 39 ppb on Mar 5 19:00	Maximum Daily Average: 17.7 ppb on Mar 5
Minimum Value: 0 ppb on Mar 7 14:00	Hours of Data: 708
Maximum Diurnal Average: 10.0 ppb at hour 24	Hours of Missing Data: 36
Monthly Average: 7.7 ppb	Hours of Calibration: 36
Minimum Daily Average: 1.3 ppb on Mar 7	Percent Operational Time: 100.0
Minimum Diurnal Average: 5.3 ppb at hour 12	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 5 Q ₃ = 11 P ₉₀ = 19 P ₉₉ = 34	

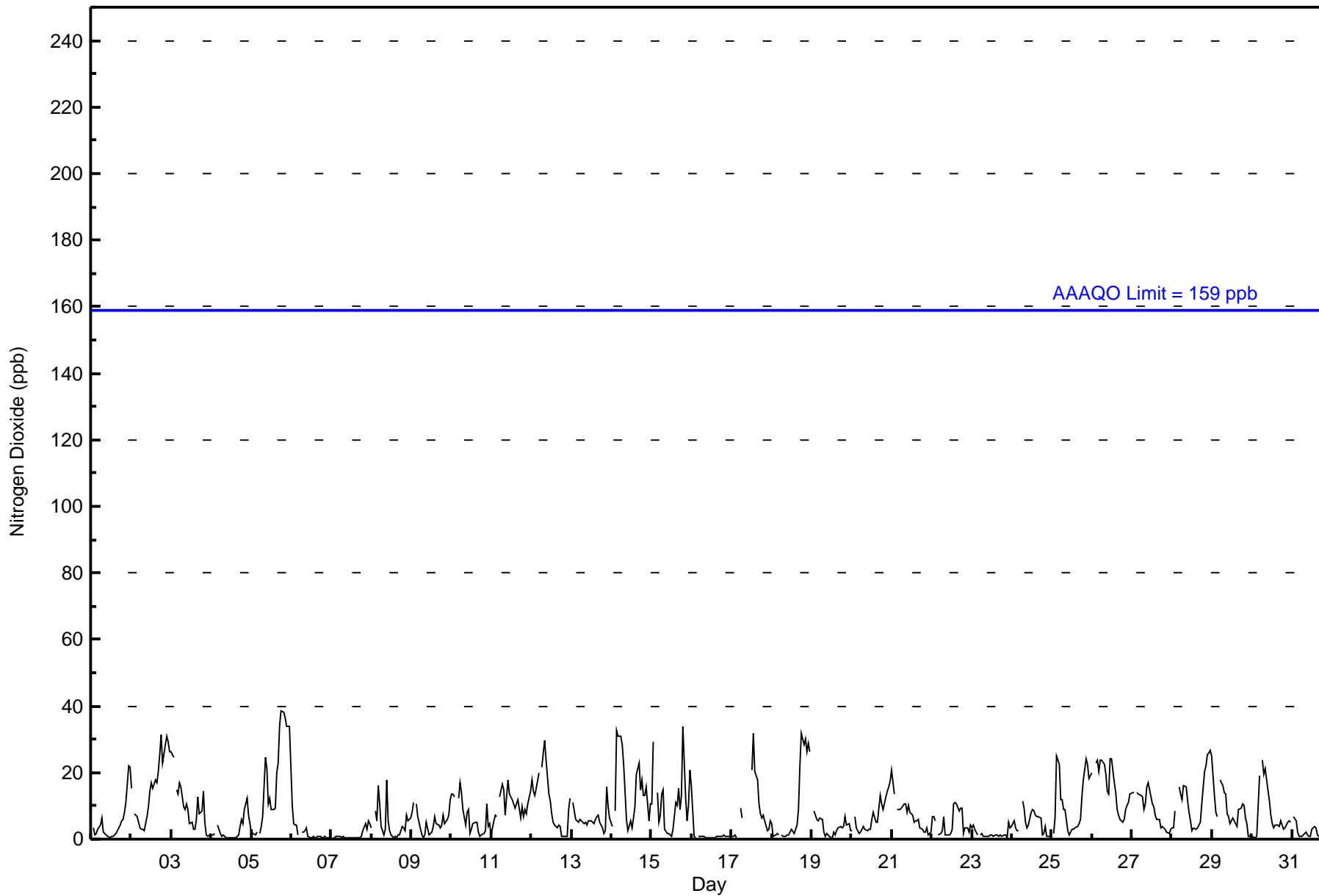
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	Z	3	1	2	3	4	6	2	2	1	1	1	1	1	2	4	4	6	6	8	11	22	22	4.9	22																								
2-Mar	15	Z	8	7	5	3	3	3	3	7	10	15	17	15	18	17	20	26	31	23	29	31	29	26	15.6	31																							
3-Mar	26	25	Z	15	13	17	16	10	9	10	9	5	5	3	3	6	13	8	8	14	5	1	1	1	9.7	26																							
4-Mar	1	1	2	Z	4	2	1	1	1	1	1	1	0	1	1	1	4	6	5	9	12	7	5	2.9	12																								
5-Mar	2	2	1	2	Z	2	4	7	25	21	11	12	9	9	9	20	23	34	39	38	37	34	34	34	17.7	39																							
6-Mar	10	5	4	4	1	Z	2	2	3	3	1	0	1	1	1	1	1	1	1	1	1	1	0	1.9	10																								
7-Mar	Z	0	0	1	1	1	1	1	1	1	1	0	0	0	1	1	1	0	1	3	5	3	6	5	1.3	6																							
8-Mar	3	Z	9	6	16	10	4	1	3	18	6	3	1	1	1	1	1	1	4	4	3	7	6	6	4.9	18																							
9-Mar	8	11	Z	10	7	3	1	1	1	5	1	2	2	4	7	5	4	4	4	7	5	6	7	12	5.1	12																							
10-Mar	14	14	13	Z	12	17	14	9	4	8	9	2	3	5	5	5	2	1	1	2	3	11	4	5	6.9	17																							
11-Mar	1	6	7	7	Z	13	17	15	7	13	18	14	12	11	9	11	12	6	10	7	9	8	11	14	10.2	18																							
12-Mar	18	14	13	15	20	Z	22	26	30	24	13	12	8	5	4	4	4	4	1	1	1	1	9	12	11.3	30																							
13-Mar	Z	11	6	6	5	6	6	5	5	4	6	6	6	5	6	7	7	5	3	2	3	16	10	6	6.0	16																							
14-Mar	4	Z	8	33	31	31	28	23	14	6	3	6	3	6	10	19	23	15	18	13	13	16	6	11	14.7	33																							
15-Mar	11	29	Z	14	5	7	14	15	3	2	2	1	1	3	11	10	15	9	13	34	12	5	10	21	10.7	34																							
16-Mar	16	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	16																							
17-Mar	1	1	1	1	Z	9	6	C	C	C	C	C	21	32	20	18	11	8	6	7	6	3	3	6	8.8	32																							
18-Mar	5	1	1	2	1	Z	1	1	1	1	1	2	3	2	3	4	9	22	32	28	30	26	29	26	10.1	32																							
19-Mar	Z	8	7	6	6	6	6	2	1	2	1	0	0	2	1	3	4	4	4	4	7	4	5	3	3.7	8																							
20-Mar	3	Z	7	3	2	2	3	4	3	Z	3	3	3	6	8	5	5	10	13	11	9	13	15	16	18	7.0	18																						
21-Mar	21	14	Z	9	9	9	9	11	11	8	10	8	7	5	5	6	6	4	3	2	2	3	1	2	7.1	21																							
22-Mar	7	7	6	Z	1	2	3	7	1	1	1	2	3	11	11	10	8	9	9	2	4	3	2	4	5.0	11																							
23-Mar	4	4	3	1	Z	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	3	1.6	5																							
24-Mar	4	5	3	3	Z	12	9	5	3	4	8	9	8	7	7	7	6	1	2	4	1	1	1	1	4.9	12																							
25-Mar	Z	2	7	25	22	12	12	9	9	2	1	2	3	3	3	4	5	6	13	18	24	22	18	19	10.5	25																							
26-Mar	20	Z	23	24	20	24	24	23	19	15	14	24	24	17	14	9	7	6	5	6	9	10	11	14	15.7	24																							
27-Mar	14	14	Z	14	13	13	13	9	11	16	17	13	11	10	7	6	6	4	4	3	3	2	2	3	9.0	17																							
28-Mar	3	4	9	Z	16	14	12	16	16	12	8	6	2	3	3	4	4	5	11	21	22	25	26	27	11.6	27																							
29-Mar	25	13	8	7	Z	18	16	14	14	8	7	5	7	5	5	4	9	9	11	10	6	5	1	1	8.9	25																							
30-Mar	1	1	1	1	19	Z	24	19	21	18	11	7	5	3	4	4	4	5	4	3	3	5	6	5	7.6	24																							
31-Mar	Z	7	6	2	1	1	1	1	2	1	1	1	3	4	4	1	1	1	1	1	1	1	1	1	1.7	7																							
																								9.4	7.7	5.9	8.4	9.2	8.7	9.1	8.2	7.5	7.1	5.7	5.3	5.6	5.9	5.8	6.2	7.1	7.3	8.4	8.9	8.9	9.3	9.3	10.0	Diurnal Average	
																								26	29	23	33	31	31	28	26	30	24	18	24	24	32	20	20	23	34	39	38	37	34	34	34	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
CNRL Horizon - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	645	91.10	91.10
21 - 40	63	8.90	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
CNRL Horizon - March 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	171	93	39	16	20	24	35	50	70	26	6	9	18	21	20	644
21 - 40	7	13	8	1	3	2	2	2	2	5	4	0	1	2	5	5	62
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	184	101	40	19	22	26	37	52	75	30	6	10	20	26	25	706

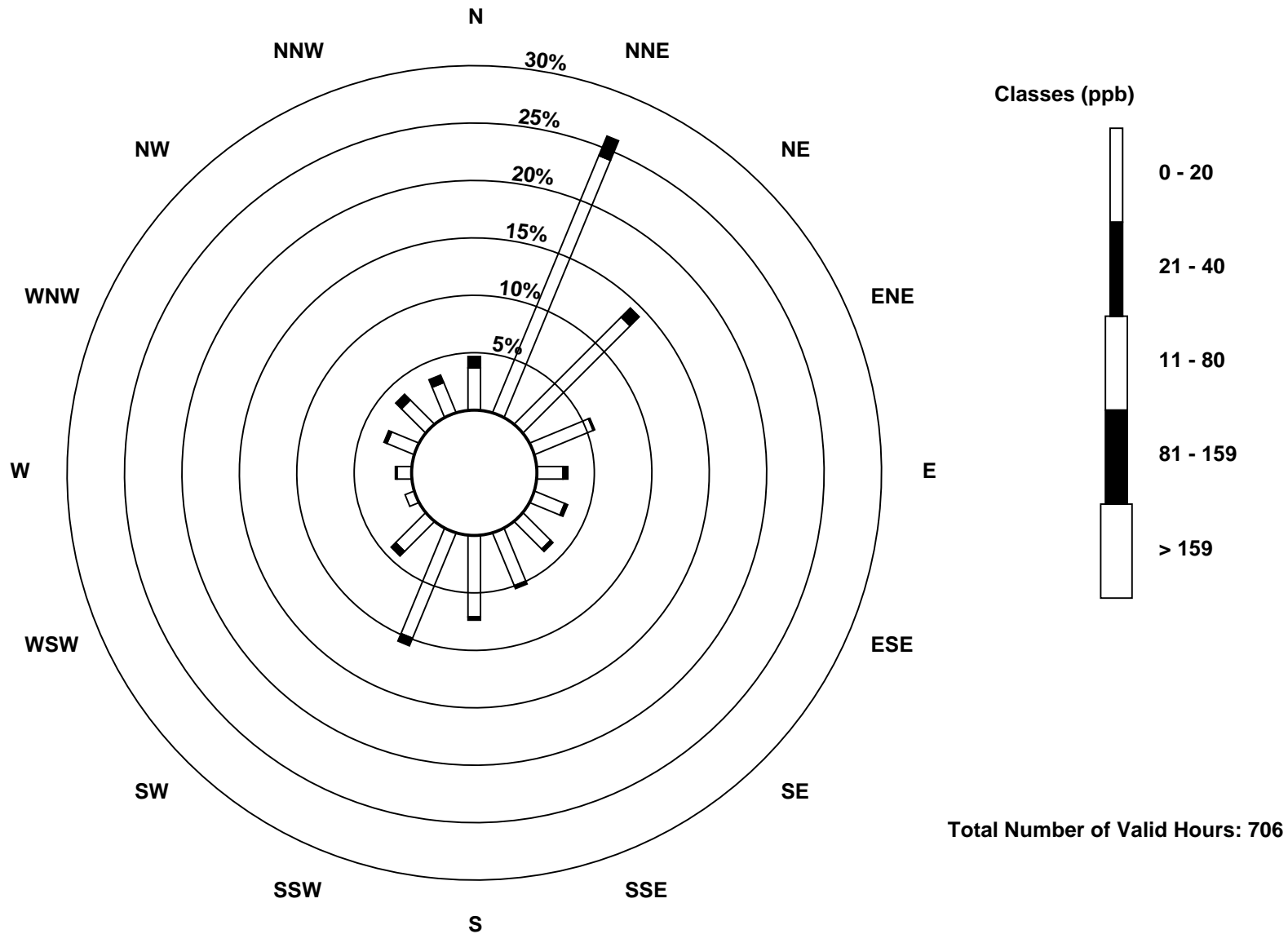
Total Number of Valid Hours: 706

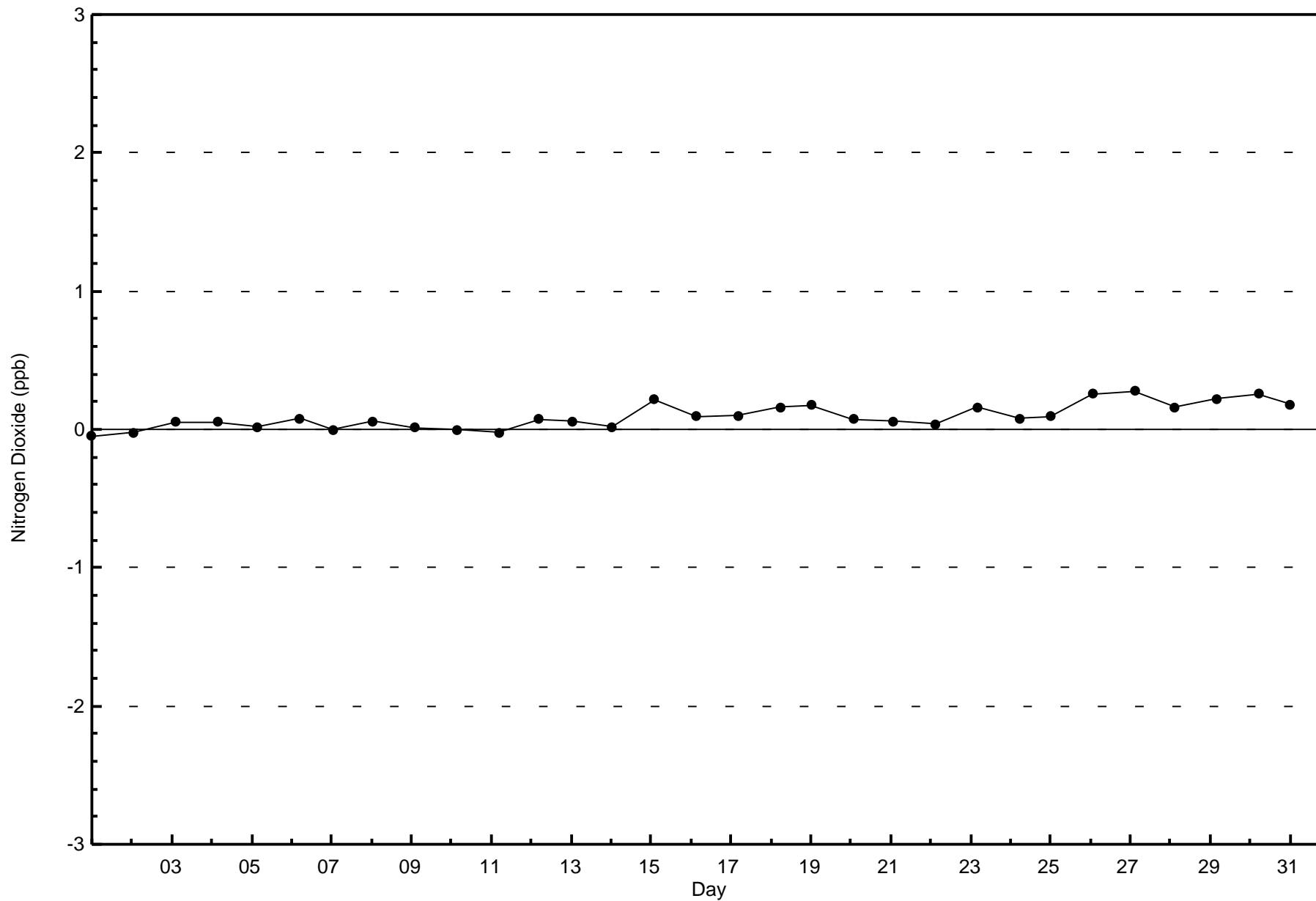
Total Number of Hours: 744

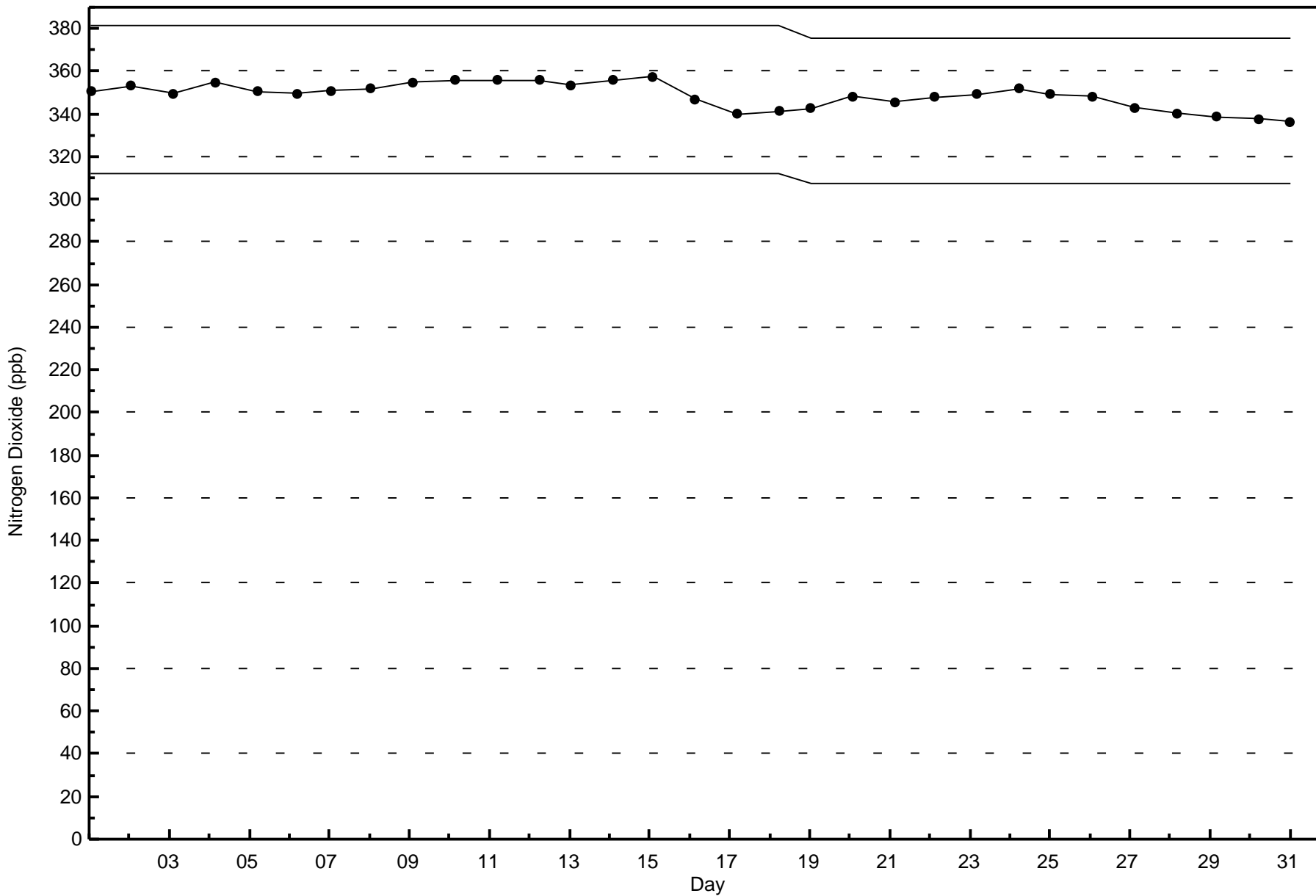


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon (AMS 15)









Wood Buffalo Environmental Association
Summary of Hour Averages

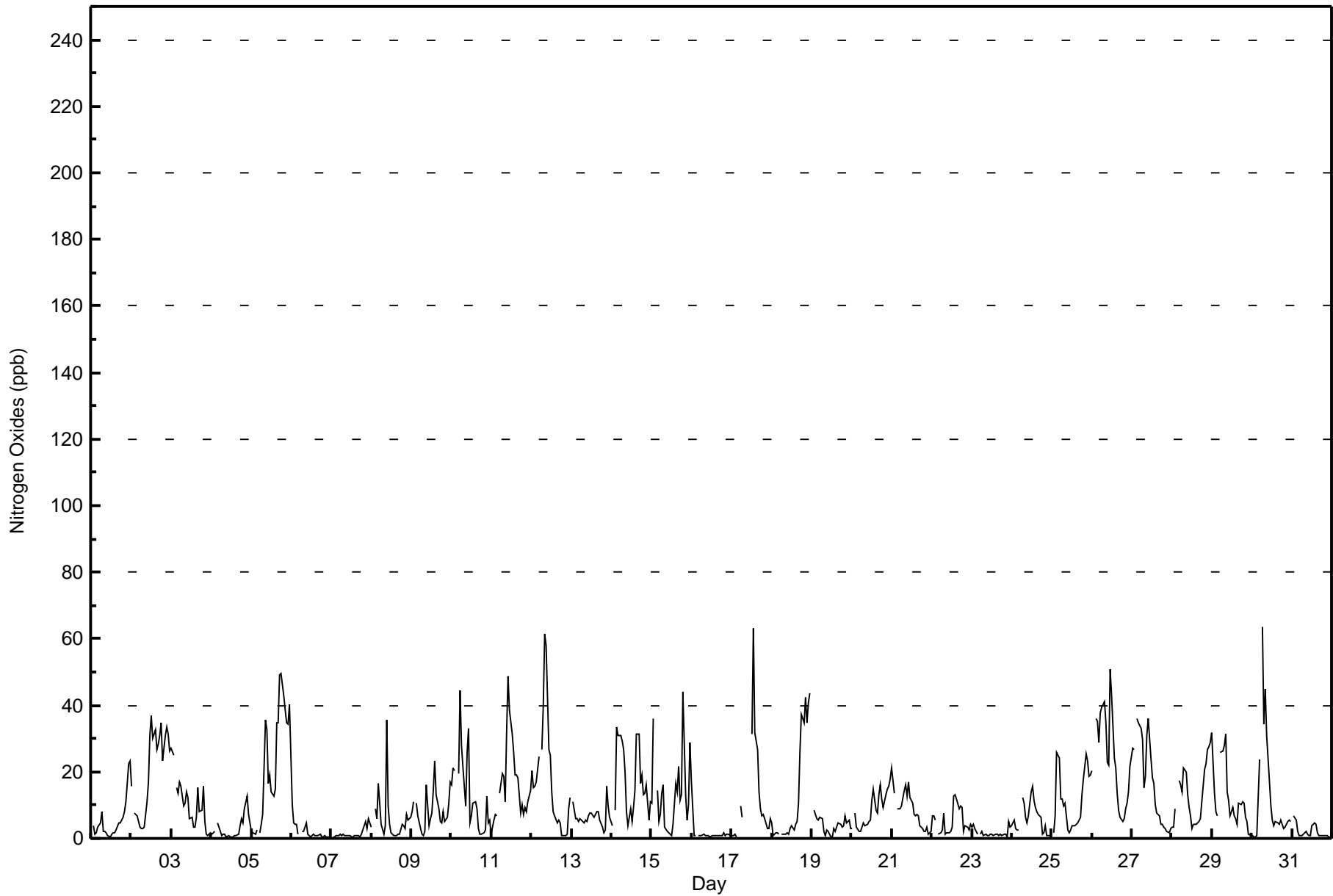
Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - March 2017

Maximum Value: 64 ppb on Mar 30 07:00 Maximum Daily Average: 24.1 ppb on Mar 26																		Hours in Service: 744 Hours of Data: 708																															
Minimum Value: 0 ppb on Mar 19 12:00 Minimum Daily Average: 1.5 ppb on Mar 7 Maximum Diurnal Average: 13.1 ppb at hour 10 Minimum Diurnal Average: 6.9 ppb at hour 3 Monthly Average: 10.3 ppb Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 6 Q ₃ = 14 P ₉₀ = 28 P ₉₉ = 49																		Hours of Missing Data: 36 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-Mar	Z	4	1	2	3	5	8	2	2	2	1	1	1	1	2	2	4	5	6	6	8	11	22	23	5.4	23																							
2-Mar	16	Z	8	7	5	3	3	3	3	11	17	31	37	30	33	26	28	31	35	23	31	33	31	26	20.6	37																							
3-Mar	27	25	Z	15	13	17	16	10	10	14	12	6	6	3	3	7	15	8	9	16	5	1	1	2	10.5	27																							
4-Mar	1	2	2	Z	5	2	1	1	1	1	1	1	1	0	1	1	1	4	6	5	9	13	7	5	3.0	13																							
5-Mar	2	2	1	2	Z	2	4	7	36	33	17	19	14	13	15	35	35	49	50	43	39	35	34	40	22.8	50																							
6-Mar	10	5	4	4	1	Z	2	2	3	5	1	1	1	1	1	1	1	1	1	1	1	0	1	1	2.1	10																							
7-Mar	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	5	3	6	5	1.5	6																							
8-Mar	3	Z	9	6	16	10	4	1	4	36	10	4	2	1	1	1	1	1	4	4	3	7	6	6	6.2	36																							
9-Mar	8	11	Z	11	7	3	1	1	2	16	4	6	8	14	23	13	9	5	5	8	5	6	11	17	8.4	23																							
10-Mar	16	21	20	Z	19	44	28	22	10	26	33	5	7	11	11	9	3	1	1	2	3	13	5	6	13.6	44																							
11-Mar	1	6	7	7	Z	13	19	19	11	32	49	38	32	26	19	19	18	8	10	7	9	8	11	14	16.7	49																							
12-Mar	20	15	16	17	25	Z	27	40	62	58	27	25	14	8	7	5	6	5	1	1	1	1	9	12	17.4	62																							
13-Mar	Z	11	6	6	5	6	6	5	5	5	7	8	8	6	7	8	8	5	3	2	3	16	10	6	6.6	16																							
14-Mar	4	Z	8	34	31	31	29	27	20	8	4	9	5	9	14	31	31	17	19	13	13	16	6	11	17.0	34																							
15-Mar	11	36	Z	14	5	7	14	16	3	2	2	1	1	4	17	14	21	11	13	44	13	5	10	29	12.8	44																							
16-Mar	17	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1.6	17																							
17-Mar	1	1	1	1	Z	10	6	C	C	C	C	C	31	63	32	27	14	9	7	7	6	3	3	6	12.6	63																							
18-Mar	5	1	2	2	1	Z	1	1	1	2	1	3	4	2	4	5	11	26	37	35	43	35	41	43	13.3	43																							
19-Mar	Z	9	7	6	6	6	6	2	1	3	2	0	0	3	2	4	5	4	4	4	7	5	5	3	4.0	9																							
20-Mar	3	Z	8	3	2	2	3	4	4	4	5	5	11	15	9	8	13	16	12	9	13	15	16	18	8.6	18																							
21-Mar	21	14	Z	9	9	9	10	14	16	13	17	12	11	7	7	7	7	4	3	2	2	3	1	2	8.7	21																							
22-Mar	7	7	5	Z	1	2	3	7	1	2	2	2	4	13	13	12	9	10	9	2	4	3	2	4	5.4	13																							
23-Mar	3	4	3	1	Z	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	3	1.7	5																							
24-Mar	4	5	3	3	3	Z	12	11	7	5	7	14	16	12	9	8	7	7	1	2	4	1	1	1	6.1	16																							
25-Mar	Z	2	7	26	24	12	12	10	11	3	2	2	4	4	4	5	5	7	13	18	25	23	18	19	11.0	26																							
26-Mar	20	Z	36	35	29	38	39	41	35	23	22	51	43	24	21	14	9	7	5	6	9	10	14	22	24.1	51																							
27-Mar	27	27	Z	36	35	33	30	15	19	31	36	24	18	17	10	8	7	4	4	3	3	2	2	3	17.1	36																							
28-Mar	3	4	9	Z	17	16	14	21	20	13	9	7	3	4	4	5	5	6	11	21	22	27	28	29	12.9	29																							
29-Mar	32	13	8	7	Z	26	26	28	31	14	11	7	9	7	6	4	11	10	11	10	6	5	1	1	12.4	32																							
30-Mar	1	1	1	1	24	Z	64	34	45	31	17	10	5	4	5	4	4	5	4	3	3	5	6	5	12.3	64																							
31-Mar	Z	7	5	2	1	1	1	1	2	1	1	1	4	4	4	1	1	1	1	1	1	1	1	0	1.9	7																							
																								10.6	8.9	6.9	9.9	11.1	11.6	12.7	11.7	12.3	13.1	10.6	9.8	9.7	10.0	9.2	9.2	9.4	8.7	9.3	9.8	9.6	9.9	10.1	11.7	Diurnal Average	
																								32	36	36	36	35	44	64	41	62	58	49	51	43	63	33	35	35	49	50	44	43	35	41	43	Diurnal Maximum	
Z - zerospan C - Calibration																																																	



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	594	83.90	83.90
21 - 40	97	13.70	97.60
41 - 80	17	2.40	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
CNRL Horizon - March 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	161	85	37	14	18	23	35	47	63	25	5	8	18	16	16	593
21 - 40	9	20	15	3	4	4	3	1	4	12	5	1	1	1	6	7	96
11 - 80	2	3	1	0	1	0	0	1	1	0	0	0	1	1	4	2	17
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	184	101	40	19	22	26	37	52	75	30	6	10	20	26	25	706

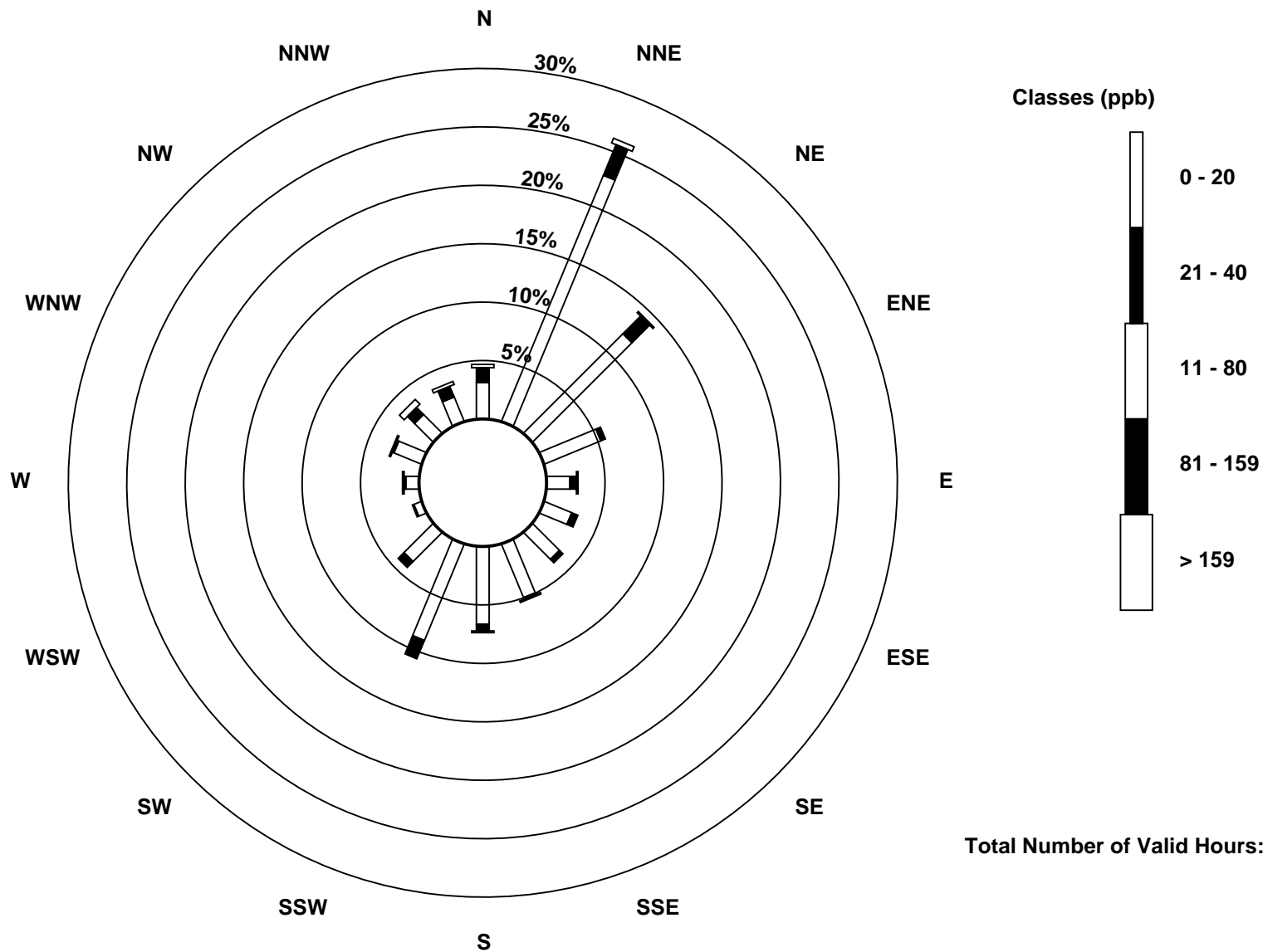
Total Number of Valid Hours: 706

Total Number of Hours: 744

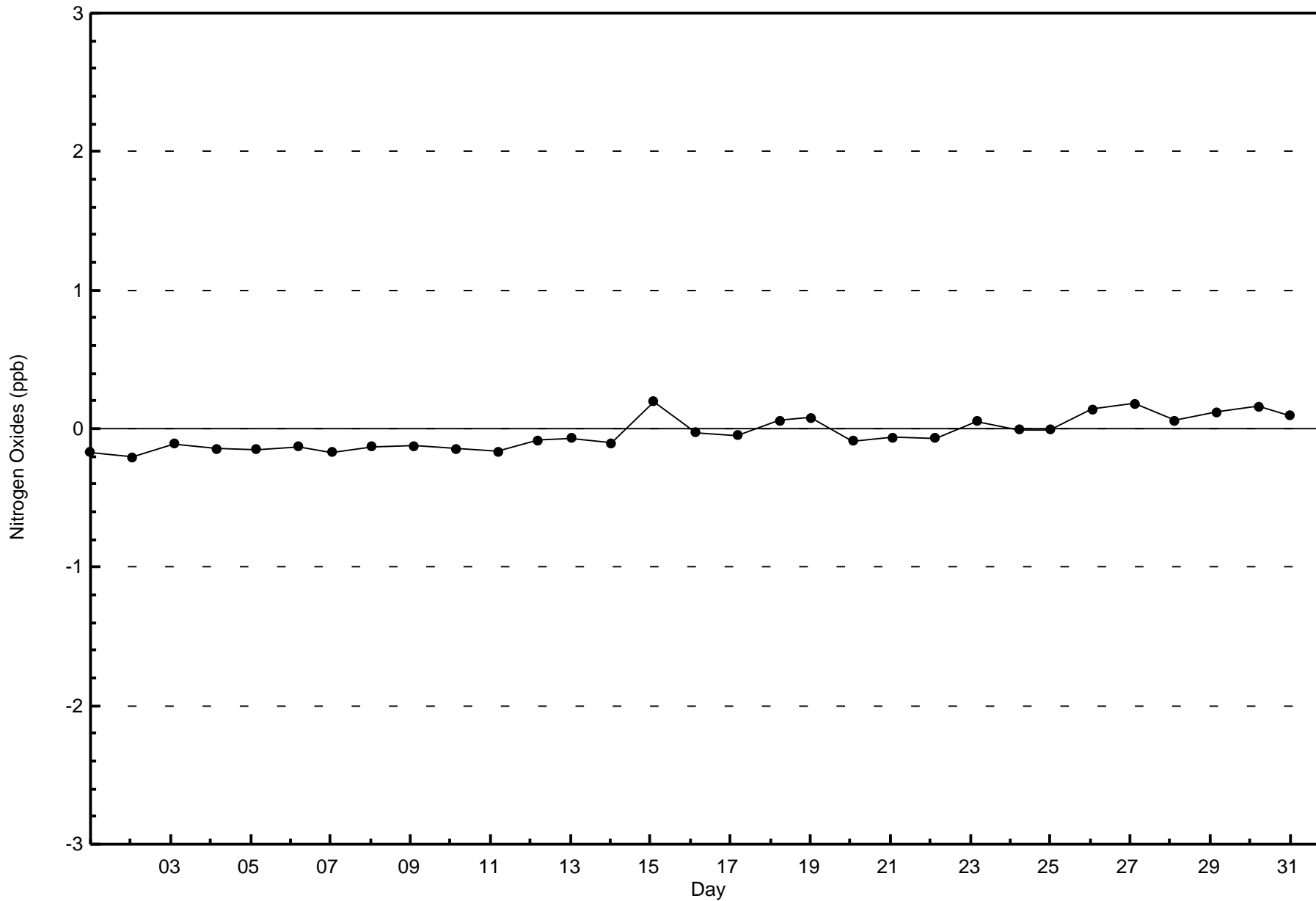


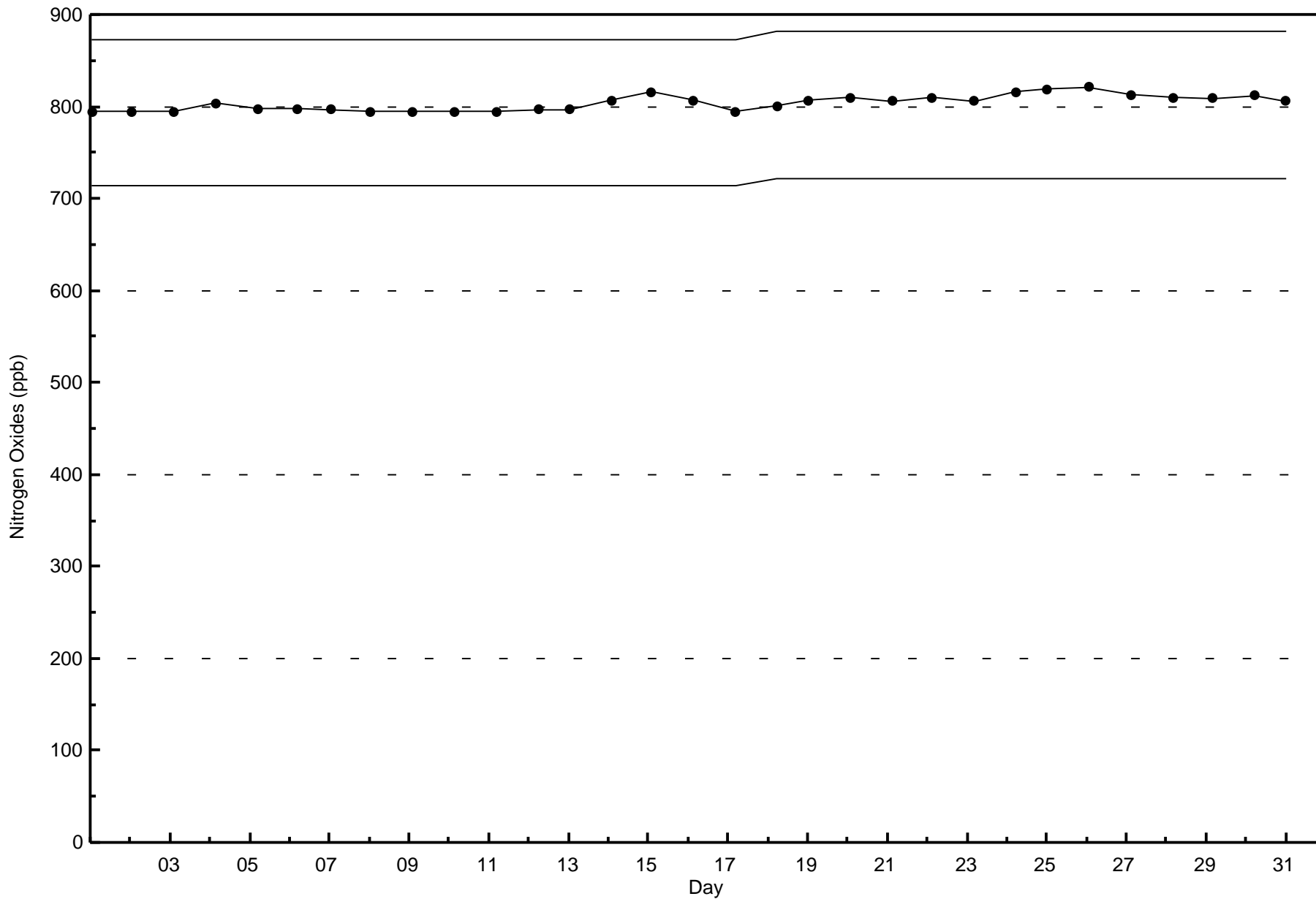
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon (AMS 15)



Total Number of Valid Hours: 706







Summary of Hour Averages

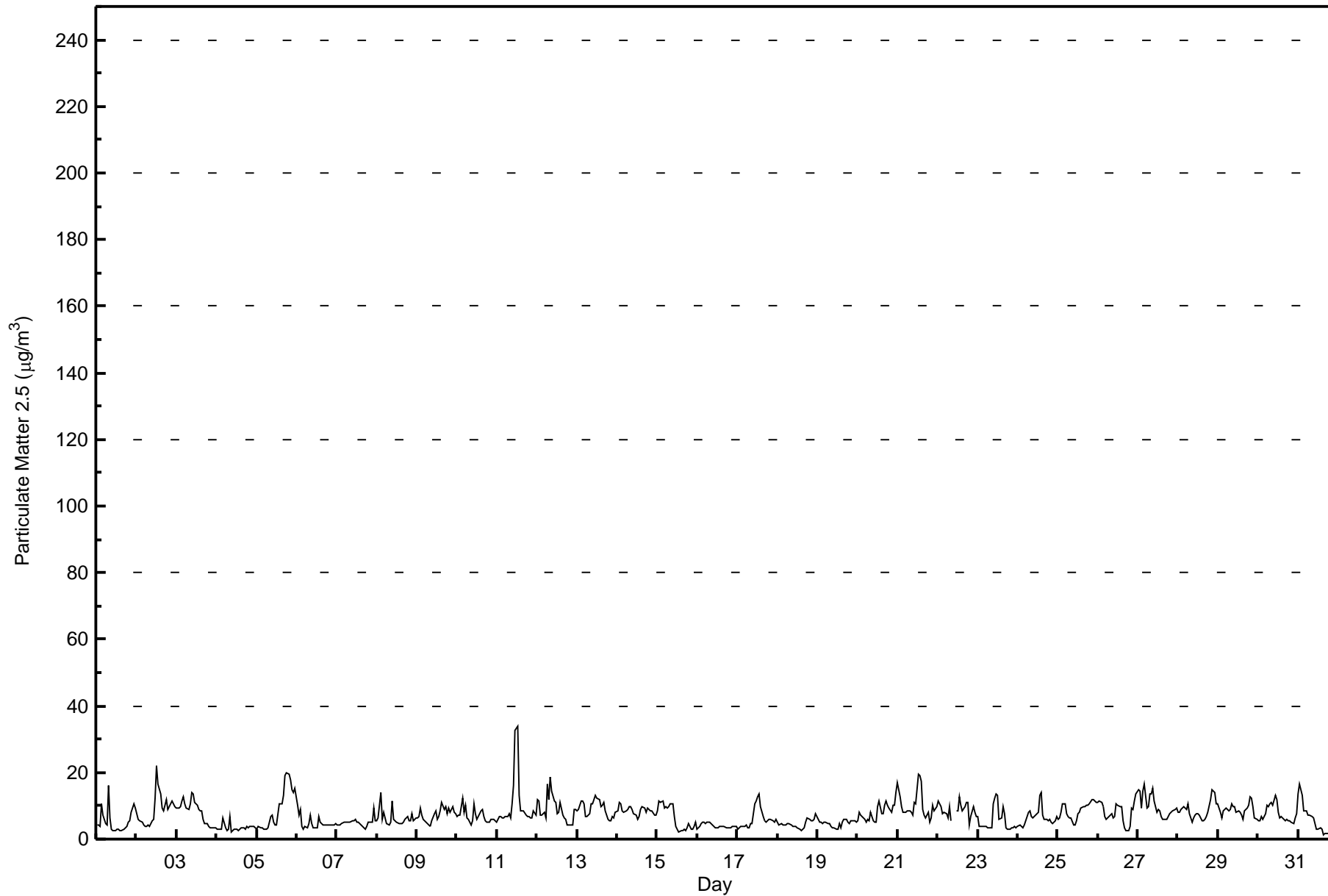
CNRL Horizon - March 2017

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 744																																															
Maximum Value: 33.8 µg/m ³ on Mar 11 13:00		Maximum Daily Average: 10.1 µg/m ³ on Mar 21																																															
Minimum Value: 1.5 µg/m ³ on Mar 31 16:00		Hours of Data: 742																																															
Maximum Diurnal Average: 8.6 µg/m ³ at hour 13		Hours of Missing Data: 2																																															
Monthly Average: 7.23 µg/m ³		Hours of Calibration: 2																																															
Minimum Daily Average: 3.4 µg/m ³ on Mar 4		Percent Operational Time: 100.0																																															
Minimum Diurnal Average: 6.5 µg/m ³ at hour 18		Percentiles: P ₁ = 1.8 P ₁₀ = 3.4 Q ₁ = 4.5 Median = 6.6 Q ₃ = 9.3 P ₉₀ = 11.5 P ₉₉ = 18.7																																															
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-Mar	4.4	4.1	3.9	10.5	7.2	4.8	4.3	16.1	6.1	3.0	2.6	2.5	2.9	3.0	2.5	2.4	3.0	3.4	3.9	5.1	5.6	7.9	10.4	9.4	5.4	16.1																							
2-Mar	7.6	6.0	5.4	4.9	4.1	3.7	3.8	4.2	3.7	5.3	5.8	12.5	22.0	16.6	13.5	9.3	8.6	10.0	11.7	8.7	10.6	11.7	10.4	9.8	8.7	22.0																							
3-Mar	9.5	9.3	9.7	11.4	12.9	10.4	9.4	9.0	10.7	13.9	13.4	11.1	10.2	9.0	8.4	8.5	6.1	4.8	4.7	4.0	3.5	3.4	3.6	3.2	8.3	13.9																							
4-Mar	3.0	3.1	3.1	3.1	6.2	3.4	2.5	2.8	6.7	2.3	2.9	2.9	2.8	2.6	2.8	3.2	3.5	3.0	3.9	3.6	3.7	3.9	3.7	3.3	3.4	6.7																							
5-Mar	2.8	3.9	3.5	3.2	3.1	3.0	3.0	3.2	6.6	7.3	5.0	4.3	4.2	10.6	10.6	10.6	13.3	19.0	19.9	19.3	17.8	14.8	14.1	15.2	9.1	19.9																							
6-Mar	10.0	7.1	9.1	3.9	3.2	4.0	3.5	4.6	7.4	4.6	3.6	3.5	3.5	6.8	5.1	4.8	4.4	4.1	4.2	4.1	4.1	4.4	4.3	4.5	4.9	10.0																							
7-Mar	4.3	4.0	4.2	4.8	4.9	5.0	5.1	5.2	5.3	5.3	5.4	5.9	5.1	4.9	4.5	4.0	3.5	3.0	3.7	4.9	5.2	5.2	9.2	5.5	4.9	9.2																							
8-Mar	5.4	6.2	14.1	6.0	7.9	6.5	4.6	4.2	5.2	11.5	6.1	5.5	5.2	4.6	4.6	4.6	5.1	5.7	6.9	5.5	5.5	7.4	5.6	6.3	6.3	14.1																							
9-Mar	6.3	6.8	9.5	7.1	6.1	5.0	4.7	4.4	3.8	5.5	7.8	8.3	5.9	6.9	8.4	10.9	8.8	9.6	7.7	9.1	8.2	9.7	8.1	7.6	7.4	10.9																							
10-Mar	6.8	7.0	7.1	12.1	8.0	10.3	6.2	6.0	4.1	5.7	10.7	7.7	6.0	6.9	8.5	8.9	6.9	5.4	5.0	5.0	5.9	6.0	5.9	5.5	7.0	12.1																							
11-Mar	5.3	6.9	6.8	6.3	6.5	6.7	6.8	7.6	6.1	10.4	16.1	32.7	33.8	13.0	8.6	8.4	8.7	7.4	6.6	6.7	6.4	6.3	8.5	7.3	10.0	33.8																							
12-Mar	12.0	11.5	7.3	7.4	8.2	6.5	16.6	11.8	18.7	14.6	11.4	10.8	7.5	8.1	10.9	7.0	6.1	6.1	4.3	4.1	4.1	4.1	8.9	8.8	9.0	18.7																							
13-Mar	8.3	8.9	11.4	11.6	10.6	6.6	6.9	7.8	10.6	10.4	11.9	12.9	12.5	11.7	9.9	10.0	10.9	8.3	6.0	5.4	5.6	6.7	6.5	8.1	9.1	12.9																							
14-Mar	8.6	11.2	10.6	8.3	8.1	8.4	9.1	9.6	9.8	9.1	7.8	7.4	6.1	6.7	8.9	9.6	9.1	7.9	9.5	8.9	8.4	8.5	7.2	7.4	8.6	11.2																							
15-Mar	8.5	11.5	11.2	11.5	9.5	9.8	9.1	9.7	10.8	10.4	6.6	3.7	2.8	2.3	2.5	2.5	2.9	2.6	3.5	4.5	3.1	2.9	3.6	5.1	6.3	11.5																							
16-Mar	2.8	3.7	4.5	4.9	4.9	4.9	5.3	5.2	4.8	4.3	3.7	3.5	3.4	3.8	3.8	3.7	3.7	3.2	3.6	3.5	3.6	4.0	3.9	3.6	4.0	5.3																							
17-Mar	3.1	3.2	3.9	3.8	3.8	4.0	3.6	3.5	4.7	4.7	10.5	11.6	12.9	13.4	9.8	7.0	5.4	5.0	5.5	5.9	5.9	5.3	5.3	5.8	6.1	13.4																							
18-Mar	5.2	4.3	4.5	4.2	4.1	4.2	4.5	4.5	4.2	3.9	3.8	3.6	3.4	3.2	2.6	2.8	3.4	5.0	6.4	5.8	5.6	5.6	5.8	7.8	4.5	7.8																							
19-Mar	6.1	4.9	5.0	4.9	5.1	5.1	4.8	4.5	3.8	3.4	3.6	3.1	3.1	4.5	3.5	5.0	5.7	5.8	5.1	4.7	5.4	5.3	5.7	4.9	4.7	6.1																							
20-Mar	5.5	8.0	7.1	6.9	5.9	5.1	6.1	5.4	8.2	5.4	5.0	5.2	9.5	11.5	7.6	7.7	10.3	11.4	10.3	9.3	8.1	10.4	10.2	14.0	8.1	14.0																							
21-Mar	17.1	12.5	9.9	8.1	8.1	8.0	8.6	8.4	8.0	7.3	11.0	10.6	19.5	19.0	17.3	9.0	7.1	6.2	8.1	5.1	6.3	10.0	8.5	9.9	10.1	19.5																							
22-Mar	11.6	10.5	9.7	7.5	8.2	7.7	6.5	9.8	5.5	C	C	8.4	8.6	12.7	10.1	8.4	9.7	10.9	11.1	4.4	6.7	9.8	7.8	6.7	8.7	12.7																							
23-Mar	6.7	3.7	3.9	3.7	3.7	3.6	3.4	3.3	3.3	10.7	12.1	13.6	13.1	5.7	6.6	9.9	7.7	3.5	2.8	3.1	3.4	3.3	4.0	3.6	5.8	13.6																							
24-Mar	3.6	4.3	3.9	3.6	4.1	5.3	8.3	8.3	7.0	6.5	6.9	7.5	8.0	12.9	13.9	7.2	5.8	5.7	5.6	5.8	4.9	4.8	5.6	6.7	6.5	13.9																							
25-Mar	6.1	6.4	8.0	10.6	10.8	7.7	6.7	6.2	6.2	4.0	4.1	5.6	7.7	8.0	9.2	9.7	9.9	10.2	10.0	10.8	11.9	11.8	11.3	11.0	8.5	11.9																							
26-Mar	10.8	11.3	10.9	9.6	6.8	5.7	6.2	7.2	7.8	6.4	6.8	10.4	10.2	9.9	9.6	5.7	3.4	2.7	2.4	3.8	9.2	9.0	11.6	13.6	8.0	13.6																							
27-Mar	14.9	14.5	9.2	14.3	16.4	9.3	9.9	13.7	13.4	15.4	11.5	7.9	8.8	8.5	7.0	5.7	5.9	6.1	7.0	7.7	7.9	8.4	8.8	9.5	10.1	16.4																							
28-Mar	7.9	8.1	8.8	9.8	9.3	9.0	10.4	7.8	5.2	6.2	7.1	7.6	7.8	7.4	5.7	5.4	6.1	6.8	8.1	12.0	14.9	14.4	14.0	10.7	8.8	14.9																							
29-Mar	10.4	7.9	6.6	8.4	9.1	9.2	8.4	8.7	10.7	9.8	9.9	8.2	8.4	7.9	7.4	6.0	8.4	9.5	10.2	12.7	12.1	9.9	6.3	6.0	8.8	12.7																							
30-Mar	5.5	5.4	6.8	5.8	7.4	10.1	9.9	10.5	11.0	10.1	13.1	11.8	8.0	6.4	6.8	6.1	5.6	5.9	5.4	5.3	5.1	4.9	6.5	7.6	7.5	13.1																							
31-Mar	13.4	16.7	13.1	8.3	8.3	8.4	7.3	7.3	6.9	6.3	4.6	3.0	3.0	3.5	2.8	1.5	1.8	1.8	1.8	1.8	1.8	1.8	1.6	1.6	5.3	16.7																							
																								7.5	7.5	7.5	7.3	7.2	6.5	6.6	7.1	7.3	7.5	7.7	8.2	8.6	8.1	7.5	6.6	6.5	6.5	6.6	6.5	6.8	7.1	7.3	7.4	Diurnal Average	
																								17.1	16.7	14.1	14.3	16.4	10.4	16.6	16.1	18.7	15.4	16.1	32.7	33.8	19.0	17.3	10.9	13.3	19.0	19.9	19.3	17.8	14.8	14.1	15.2	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}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - March 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	276	37.20	37.20
6 - 15	448	60.38	97.57
16 - 25	16	2.16	99.73
26 - 80	2	0.27	100.00
> 81.0	0	0.00	100.00

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
CNRL Horizon - March 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	11	96	63	7	5	6	7	8	6	23	7	3	6	12	8	7	275
6 - 15	24	95	40	33	14	19	18	27	44	54	24	7	5	8	18	17	447
16 - 25	1	1	1	0	0	0	0	3	3	2	1	0	0	0	2	2	16
26 - 80	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	37	192	104	40	19	25	25	38	53	79	32	10	11	20	29	26	740

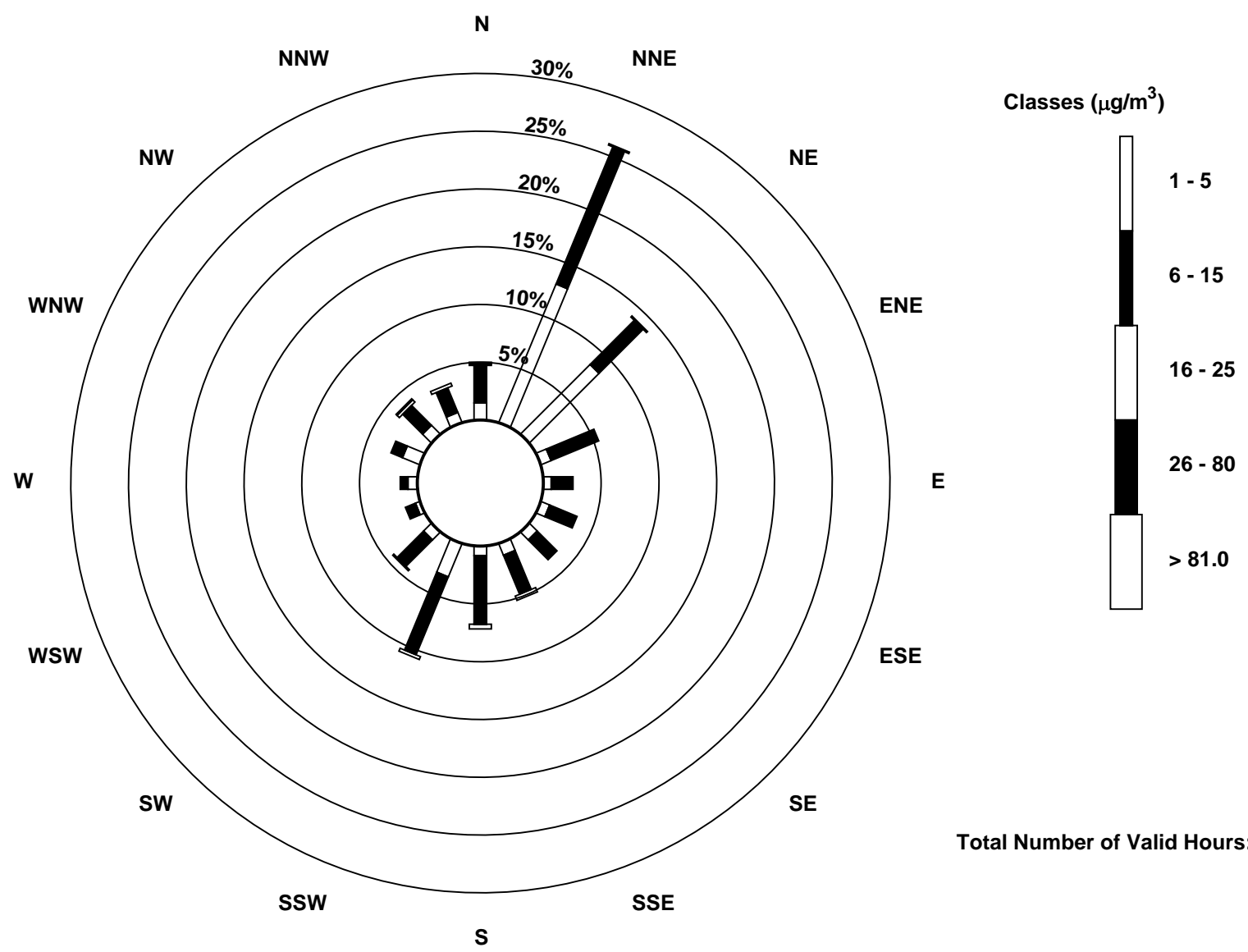
Total Number of Valid Hours: 740

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon (AMS 15)





Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

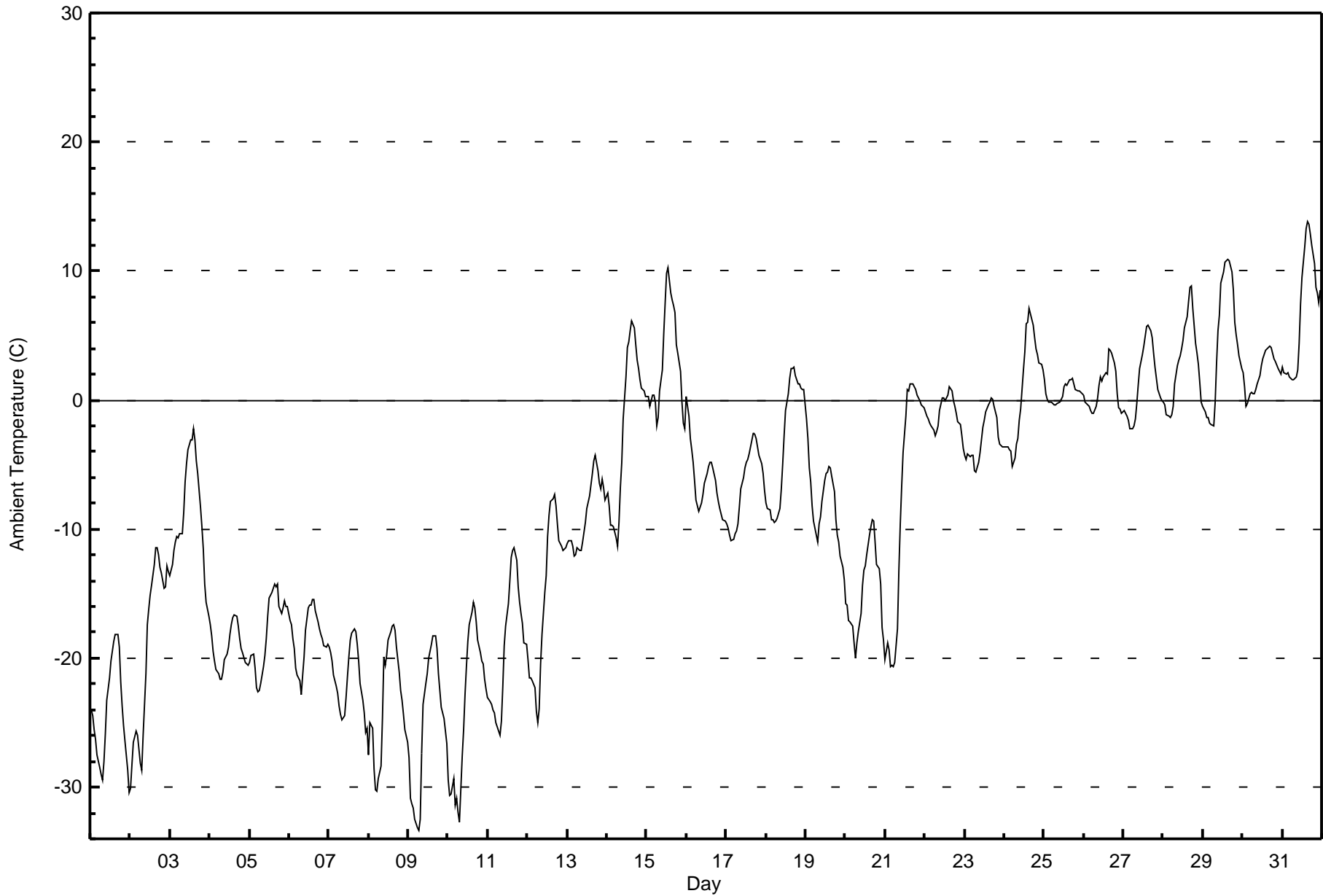
CNRL Horizon - March 2017

Maximum Value: 13.9 C on Mar 31 16:00 Maximum Daily Average: 6.8 C on Mar 31																								Hours in Service:	744	
Minimum Value: -33.4 C on Mar 9 07:00 Minimum Daily Average: -25.2 C on Mar 9																								Hours of Data:	744	
Maximum Diurnal Average: -4.0 C at hour 16 Minimum Diurnal Average: -13.6 C at hour 7																								Hours of Missing Data:	0	
Monthly Average: -8.86 C Percentiles: $P_1 = -31.4$ $P_{10} = -23.7$ $Q_1 = -18.3$ Median = -7.7 $Q_3 = 0.2$ $P_{90} = 3.6$ $P_{99} = 10.0$																								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-Mar	-24.0	-24.5	-25.6	-26.3	-27.5	-28.4	-29.0	-29.4	-28.0	-25.9	-23.3	-21.5	-20.3	-19.4	-18.7	-18.2	-18.2	-19.1	-21.9	-23.7	-25.3	-26.4	-28.6	-30.4	-24.3	-18.2
2-Mar	-30.1	-28.3	-26.5	-25.7	-26.0	-27.0	-28.1	-28.7	-26.0	-21.2	-17.4	-16.3	-15.1	-14.3	-12.7	-11.5	-11.5	-12.0	-12.9	-13.4	-14.6	-14.4	-12.9	-13.3	-19.2	-11.5
3-Mar	-13.6	-12.7	-11.7	-11.0	-10.5	-10.6	-10.4	-10.3	-8.7	-6.3	-4.9	-3.8	-3.1	-3.0	-2.2	-3.1	-4.7	-5.7	-8.3	-9.8	-11.6	-14.2	-15.6	-16.8	-8.9	-2.2
4-Mar	-17.4	-18.2	-19.4	-20.2	-20.9	-21.2	-21.7	-21.6	-21.1	-20.1	-19.7	-19.2	-18.2	-17.4	-16.9	-16.7	-16.8	-17.5	-18.5	-19.3	-19.6	-20.3	-20.5	-20.6	-19.3	-16.7
5-Mar	-20.3	-19.8	-19.7	-20.7	-22.3	-22.6	-22.5	-21.9	-20.6	-19.8	-18.5	-16.7	-15.3	-14.9	-14.5	-14.3	-14.5	-14.3	-16.0	-16.6	-16.1	-15.6	-16.0	-16.0	-17.9	-14.3
6-Mar	-17.1	-17.4	-18.5	-19.3	-20.8	-21.3	-21.8	-22.9	-21.3	-19.9	-17.8	-16.1	-15.9	-15.8	-15.5	-15.5	-16.4	-17.2	-17.8	-18.2	-18.5	-19.0	-19.1	-19.0	-18.4	-15.5
7-Mar	-19.2	-19.5	-20.3	-21.3	-22.2	-22.7	-23.7	-24.4	-24.7	-24.5	-23.0	-21.5	-19.9	-18.6	-18.1	-17.8	-18.0	-18.9	-20.3	-22.0	-23.3	-24.2	-25.7	-25.4	-21.6	-17.8
8-Mar	-27.5	-25.0	-25.4	-28.5	-30.2	-30.3	-29.3	-28.4	-24.7	-19.9	-20.5	-19.8	-18.6	-18.0	-17.6	-17.4	-17.8	-19.1	-21.1	-22.5	-23.3	-24.4	-25.5	-26.5	-23.4	-17.4
9-Mar	-27.7	-30.9	-31.3	-31.6	-32.5	-33.2	-33.4	-32.5	-27.4	-23.6	-22.0	-21.2	-20.0	-19.4	-18.9	-18.3	-18.3	-19.2	-21.2	-22.5	-23.8	-24.7	-25.6	-26.6	-25.2	-18.3
10-Mar	-29.4	-30.7	-30.5	-29.3	-31.4	-30.9	-32.0	-32.7	-27.6	-25.6	-22.8	-20.6	-18.7	-17.4	-16.4	-15.7	-16.1	-17.2	-18.6	-19.6	-20.3	-20.5	-21.7	-22.4	-23.7	-15.7
11-Mar	-23.1	-23.4	-23.6	-24.0	-24.2	-25.0	-25.7	-25.9	-24.9	-22.2	-19.0	-17.5	-15.8	-14.0	-12.2	-11.6	-11.5	-12.4	-14.4	-15.7	-16.5	-17.3	-18.8	-19.0	-19.1	-11.5
12-Mar	-20.1	-21.5	-21.6	-21.8	-22.3	-24.2	-25.0	-23.9	-20.5	-18.2	-15.0	-13.6	-10.6	-8.9	-7.9	-7.7	-7.3	-8.2	-9.6	-10.9	-11.3	-11.6	-11.6	-11.4	-15.2	-7.3
13-Mar	-11.1	-10.9	-10.9	-11.3	-12.0	-12.0	-11.4	-11.6	-11.7	-11.0	-10.2	-9.4	-8.4	-7.5	-6.6	-5.7	-4.7	-4.3	-5.4	-6.5	-6.9	-6.1	-6.8	-7.8	-8.8	-4.3
14-Mar	-7.2	-8.2	-9.7	-9.7	-9.8	-10.7	-11.3	-9.4	-6.8	-4.8	-1.5	1.8	4.1	4.5	5.4	6.2	5.6	4.3	3.1	2.4	1.5	0.9	0.7	0.3	-2.0	6.2
15-Mar	0.2	0.3	-0.4	0.4	0.4	-0.1	-2.0	-1.3	0.7	2.4	5.1	7.6	9.9	10.3	8.3	7.7	7.3	6.7	4.2	3.6	2.2	-0.1	-1.8	-2.2	2.9	10.3
16-Mar	0.3	-1.2	-3.0	-3.8	-4.8	-6.2	-7.7	-8.6	-8.3	-8.0	-7.3	-6.5	-5.7	-5.2	-4.8	-4.9	-5.2	-6.2	-7.2	-7.9	-8.4	-8.9	-9.2	-9.4	-6.2	0.3
17-Mar	-9.6	-9.9	-10.5	-10.9	-10.8	-10.4	-10.2	-9.5	-8.3	-6.8	-6.0	-5.3	-4.8	-4.6	-4.2	-3.1	-2.5	-2.7	-3.0	-3.6	-4.2	-4.9	-5.6	-7.0	-6.6	-2.5
18-Mar	-8.0	-8.4	-8.5	-9.2	-9.3	-9.5	-9.3	-9.2	-8.4	-6.9	-4.9	-2.7	-0.8	0.5	1.7	2.5	2.4	2.6	1.9	1.3	1.2	0.9	0.9	0.9	-3.3	2.6
19-Mar	-1.4	-3.0	-5.3	-6.4	-8.2	-9.4	-10.5	-11.1	-9.6	-9.0	-7.9	-6.2	-5.6	-5.6	-5.2	-5.2	-5.9	-7.0	-9.3	-10.5	-11.0	-12.1	-13.0	-13.9	-8.0	-1.4
20-Mar	-15.8	-15.9	-17.0	-17.2	-17.6	-18.8	-20.0	-18.8	-18.0	-16.5	-14.3	-13.2	-12.8	-11.9	-10.5	-9.8	-9.3	-9.4	-11.0	-12.7	-13.0	-14.2	-17.6	-18.6	-14.8	-9.3
21-Mar	-20.1	-18.9	-19.4	-20.7	-20.5	-20.7	-20.3	-17.7	-13.2	-9.6	-6.7	-4.1	-1.2	0.8	0.7	1.3	1.3	1.2	0.8	0.4	0.2	-0.1	-0.4	-0.6	-7.8	1.3
22-Mar	-0.9	-1.3	-1.5	-1.8	-2.0	-2.3	-2.8	-2.4	-2.0	-0.8	0.2	0.2	0.0	0.1	0.4	1.0	0.7	0.0	-0.4	-1.0	-1.7	-1.9	-2.7	-3.7	-1.1	1.0
23-Mar	-4.3	-4.6	-4.2	-4.4	-4.3	-4.3	-5.5	-5.6	-4.8	-4.1	-3.0	-2.2	-1.5	-0.9	-0.4	-0.1	0.1	0.1	-0.5	-1.3	-2.9	-3.4	-3.5	-3.6	-2.9	0.1
24-Mar	-3.6	-3.6	-3.7	-3.8	-3.9	-5.2	-4.5	-3.4	-2.9	-1.6	-0.7	2.3	3.8	6.0	6.0	7.1	6.7	5.8	4.8	4.0	3.5	2.9	2.7	2.3	0.9	7.1
25-Mar	1.6	0.5	0.1	-0.1	-0.1	-0.2	-0.4	-0.4	-0.2	-0.2	0.0	0.3	1.1	1.2	1.1	1.5	1.6	1.7	1.2	0.8	0.7	0.7	0.6	0.4	0.6	1.7
26-Mar	0.3	-0.2	-0.3	-0.5	-0.8	-1.1	-1.0	-0.5	0.2	1.2	1.8	1.4	1.8	2.1	2.0	4.0	3.9	3.6	2.9	2.2	0.5	-0.6	-0.7	-1.1	0.9	4.0
27-Mar	-0.8	-1.0	-1.3	-1.6	-2.2	-2.2	-2.0	-1.4	-0.3	1.2	2.5	3.5	4.2	5.0	5.7	5.8	5.4	4.8	3.7	2.6	1.7	0.8	0.2	-0.1	1.4	5.8
28-Mar	-0.2	-0.4	-1.2	-1.2	-1.3	-1.1	-0.5	1.2	2.7	3.0	3.5	4.0	4.6	5.6	6.5	7.6	8.8	8.8	7.2	4.4	3.6	2.8	1.4	-0.2	2.9	8.8
29-Mar	-0.5	-0.9	-1.4	-1.4	-1.8	-1.9	-2.0	-0.1	2.9	5.4	6.6	9.0	10.0	10.7	10.8	10.9	10.8	10.0	8.5	6.1	5.1	4.3	3.4	2.5	4.4	10.9
30-Mar	2.1	1.0	-0.5	-0.2	0.5	0.6	0.5	0.5	0.8	1.3	1.9	2.7	3.2	3.6	3.8	4.0	4.2	4.0	3.7	3.2	3.0	2.5	2.3	2.0	2.1	4.2
31-Mar	2.5	2.1	2.0	2.1	1.8	1.6	1.5	1.6	1.8	2.4	4.4	7.4	9.5	11.9	13.3	13.9	13.6	12.8	11.9	10.6	8.7	8.3	7.6	8.5	6.8	13.9
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
CNRL Horizon - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
CNRL Horizon - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	143	19.22	19.22
-20 - 0	407	54.70	73.92
0 - 10	182	24.46	98.39
10 - 20	12	1.61	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

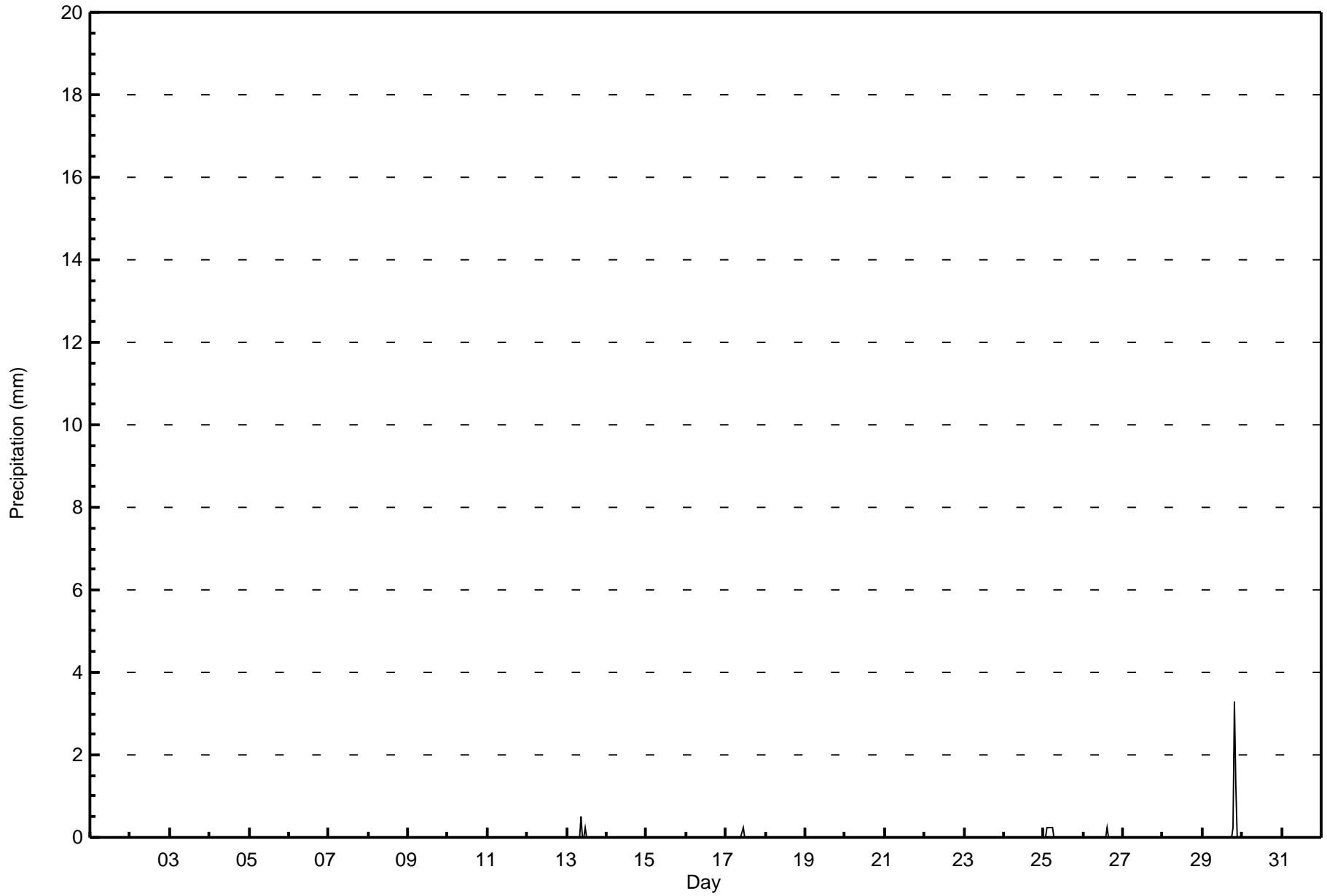
CNRL Horizon - March 2017

Maximum Value: 3.3 mm on Mar 29 20:00 Maximum Daily Total: 4.8 mm on Mar 29		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 Mar 1 01:00 Minimum Daily Total: 0.0 mm on Mar 1 Maximum Diurnal Total: 3.3 mm at hour 20 Minimum Diurnal Total: 0.0 mm at hour 1 Monthly Total: 7.11 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 = 0.3																													
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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.3	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
14-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	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	0.0	0.0	0.0	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-Mar	0.0	0.0	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	0.0	0.0	0.0	0.0
27-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	3.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.0	0.0	0.5	0.0	0.3	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.3	3.3	1.3	0.0	0.0	0.0			Diurnal Average	
		0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.5	0.0	0.3	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.3	3.3	1.3	0.0	0.0	0.0			Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
CNRL Horizon - March 2017





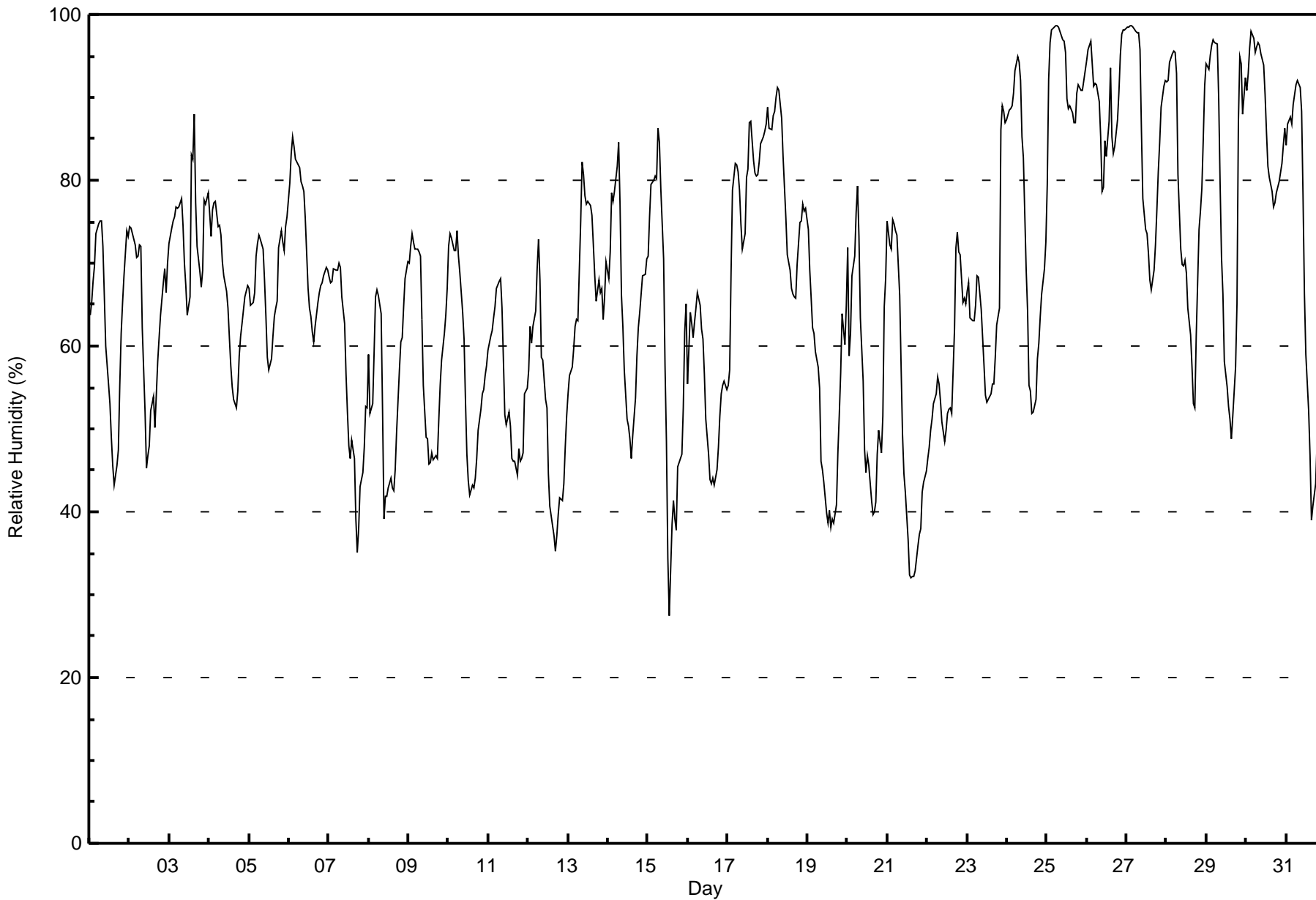
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

CNRL Horizon - March 2017

Maximum Value: 99 % on Mar 27 04:00																			Maximum Daily Average: 92.7 % on Mar 25						Hours in Service: 744																			
Minimum Value: 27 % on Mar 15 14:00																			Minimum Daily Average: 50.7 % on Mar 21						Hours of Data: 744																			
Maximum Diurnal Average: 78.7 % at hour 7																			Minimum Diurnal Average: 55.0 % at hour 17						Hours of Missing Data: 0																			
Monthly Average: 67.1 %																			Percentiles: P ₁ = 35 P ₁₀ = 45 Q ₁ = 54 Median = 67 Q ₃ = 79 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-Mar	64	65	68	70	74	75	75	75	72	66	60	55	53	49	46	43	46	47	55	62	65	68	74	73	62.5	75																		
2-Mar	74	74	74	72	71	71	72	72	62	52	45	47	48	52	54	50	54	58	61	64	68	69	67	70	62.5	74																		
3-Mar	72	74	75	76	77	77	77	78	75	70	67	64	66	83	83	88	77	72	69	67	69	78	77	78	74.5	88																		
4-Mar	76	73	76	77	77	74	75	73	70	68	67	65	61	58	55	54	53	55	59	61	63	66	67	67	66.2	77																		
5-Mar	67	65	65	66	71	72	73	73	72	68	63	59	57	59	61	64	65	65	72	74	72	72	74	76	67.7	76																		
6-Mar	80	83	85	84	83	82	82	80	79	79	75	67	65	64	62	61	62	65	66	67	68	68	70	69	72.7	85																		
7-Mar	68	68	68	69	69	69	70	69	66	63	57	52	48	46	49	46	39	35	38	43	45	48	53	53	55.4	70																		
8-Mar	59	52	53	59	66	67	66	64	52	39	42	42	43	44	43	43	45	50	57	61	61	65	68	70	54.6	70																		
9-Mar	70	72	73	73	72	72	71	71	63	55	49	49	46	46	47	46	47	47	51	55	58	61	64	67	59.4	73																		
10-Mar	72	74	73	72	71	74	71	69	64	61	53	47	44	42	43	43	44	46	50	52	54	55	56	58	57.8	74																		
11-Mar	60	61	62	63	65	67	68	68	65	58	52	51	52	50	46	46	46	44	48	46	46	47	54	55	55.0	68																		
12-Mar	57	62	60	62	64	69	73	68	59	58	54	52	45	41	39	37	35	37	40	42	41	43	48	52	51.6	73																		
13-Mar	54	56	57	60	62	63	63	75	82	81	78	77	77	76	72	69	65	68	66	67	63	66	70	70	68.6	82																		
14-Mar	68	71	78	77	79	82	85	77	66	62	57	51	50	49	46	49	54	59	62	64	66	68	69	70	65.1	85																		
15-Mar	71	76	79	80	80	80	86	85	79	70	58	48	34	27	38	41	39	38	45	46	47	53	62	65	59.5	86																		
16-Mar	55	64	63	61	63	65	66	65	62	61	57	51	47	44	43	44	43	45	48	52	54	55	56	55	55.0	66																		
17-Mar	55	57	69	79	82	82	81	79	75	72	74	80	81	87	87	82	81	81	81	82	84	85	86	87	78.7	87																		
18-Mar	89	86	86	88	88	90	91	91	87	83	79	75	71	69	67	66	66	66	70	75	75	77	76	77	78.7	91																		
19-Mar	74	69	66	62	61	59	57	55	46	45	44	40	39	40	38	39	39	41	47	52	57	64	60	65	52.5	74																		
20-Mar	72	59	62	68	71	76	79	73	63	56	47	45	47	46	41	40	40	41	47	50	47	52	65	68	56.4	79																		
21-Mar	75	72	72	75	75	74	73	66	57	49	45	42	37	32	32	32	32	33	36	37	38	42	44	45	50.7	75																		
22-Mar	46	48	50	51	53	54	56	56	53	51	48	50	52	52	52	52	62	72	74	71	71	65	66	65	57.1	74																		
23-Mar	67	68	63	63	63	65	68	68	64	61	58	54	53	54	54	55	55	59	63	65	86	89	88	87	65.4	89																		
24-Mar	87	89	89	89	91	93	95	94	92	85	83	69	64	55	55	52	52	54	58	60	63	66	69	73	74.1	95																		
25-Mar	79	92	97	98	99	99	99	98	98	97	97	95	90	89	89	88	87	87	90	92	91	91	92	93	92.7	99																		
26-Mar	94	96	97	94	91	92	92	89	85	79	79	85	83	87	94	85	83	84	87	91	95	98	98	98	89.8	98																		
27-Mar	98	99	99	99	98	98	98	98	96	86	78	74	74	71	68	67	69	72	76	81	85	89	91	92	85.6	99																		
28-Mar	92	92	94	95	96	95	93	81	72	70	70	70	69	65	61	57	53	53	61	74	76	79	85	91	76.8	96																		
29-Mar	94	93	95	96	97	97	96	90	79	71	66	58	55	53	51	49	52	57	65	87	95	94	88	92	78.0	97																		
30-Mar	91	93	96	98	97	95	96	97	96	95	94	90	86	82	80	79	77	77	78	79	80	82	84	86	87.9	98																		
31-Mar	84	87	88	87	89	90	91	92	91	88	78	66	59	52	47	39	41	42	43	53	67	62	58	49	68.5	92																		
																			73.1	73.9	75.2	76.3	77.2	78.0	78.7	77.0	72.4	67.7	63.6	60.4	57.9	56.9	56.4	55.2	55.0	56.4	60.2	63.6	66.3	68.2	70.1	71.5	Diurnal Average	
																			98	99	99	99	99	99	99	98	98	97	97	95	90	89	94	88	87	87	90	92	95	98	98	98	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
CNRL Horizon - March 2017**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	30	4.03	4.03
40 - 60	222	29.84	33.87
60 - 80	323	43.41	77.29
80 - 100	169	22.72	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



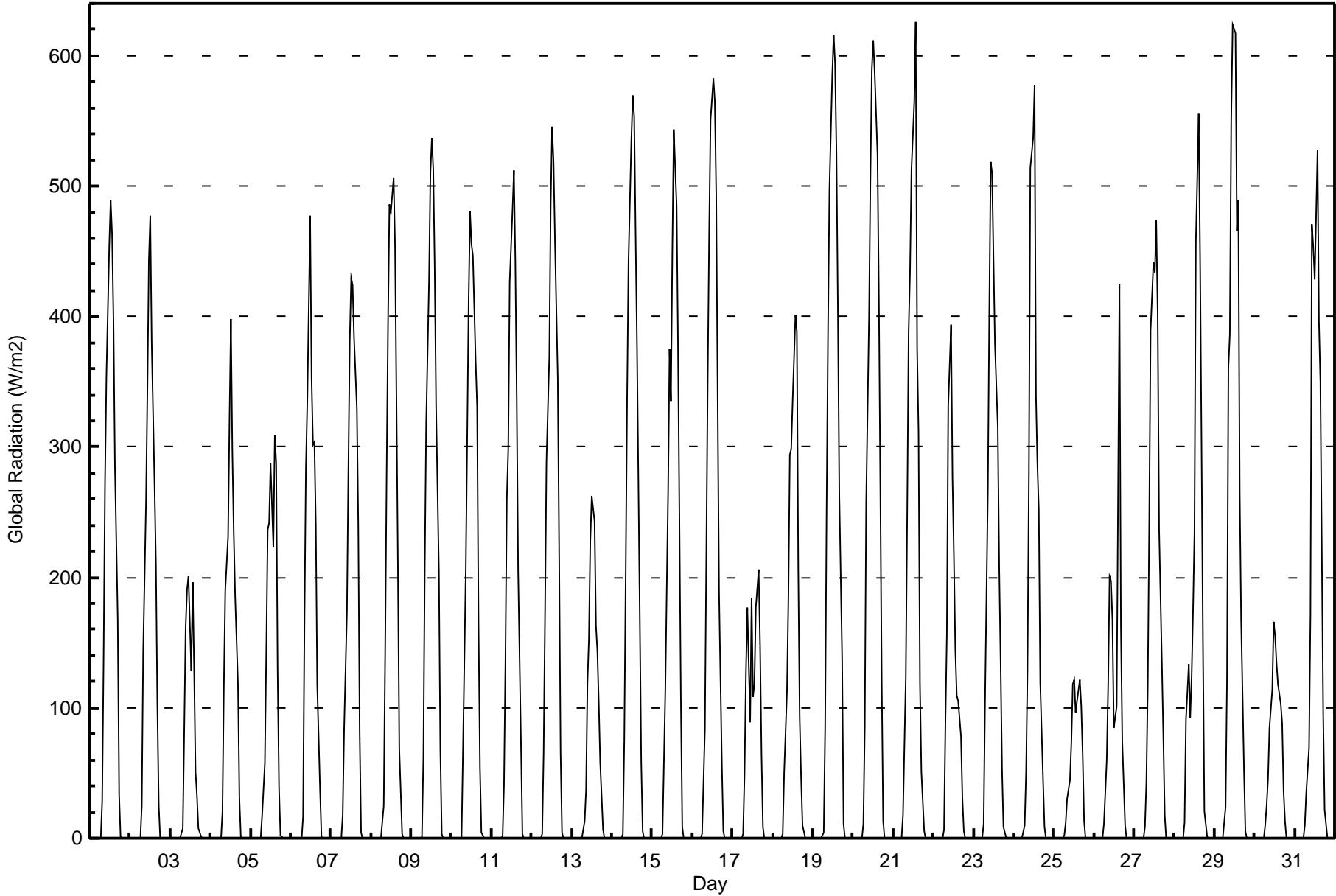
Wood Buffalo Environmental Association

Summary of Hour Averages

Global Radiation (GR) - W/m2

CNRL Horizon - March 2017

Maximum Value: 626 W/m2 on Mar 21 14:00		Maximum Daily Average: 182.5 W/m2 on Mar 20		Hours in Service: 744																						
Minimum Value: 0 W/m2 on Mar 1 01:00		Minimum Daily Average: 37.6 W/m2 on Mar 25		Hours of Data: 744																						
Maximum Diurnal Average: 402.4 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 2		Hours of Missing Data: 0																						
Monthly Average: 118.4 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 5 Q ₃ = 205 P ₉₀ = 427 P ₉₉ = 587		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-Mar	0	0	0	0	0	0	0	28	138	272	354	455	489	463	395	286	168	34	1	0	0	0	0	0	128.5	489
2-Mar	0	0	0	0	0	0	0	25	144	258	347	444	477	380	271	210	102	25	0	0	0	0	0	0	111.8	477
3-Mar	0	0	0	0	0	0	0	8	82	162	191	201	128	196	130	51	32	8	1	0	0	0	0	0	49.5	201
4-Mar	0	0	0	0	0	0	0	19	116	190	231	322	398	298	234	185	118	31	1	0	0	0	0	0	89.3	398
5-Mar	0	0	0	0	0	0	0	17	57	144	237	242	288	224	309	287	130	39	2	0	0	0	0	0	82.4	309
6-Mar	0	0	0	0	0	0	0	16	168	284	335	477	353	301	304	241	117	37	1	0	0	0	0	0	109.8	477
7-Mar	0	0	0	0	0	0	0	17	83	173	282	382	430	424	384	329	240	82	4	0	0	0	0	0	118.0	430
8-Mar	0	0	0	0	0	0	0	25	142	276	392	486	479	507	453	333	209	69	3	0	0	0	0	0	140.6	507
9-Mar	0	0	0	0	0	0	1	61	208	319	428	511	537	513	439	332	204	67	4	0	0	0	0	0	150.9	537
10-Mar	0	0	0	0	0	0	1	67	208	309	412	481	455	447	365	331	165	54	4	0	0	0	0	0	137.4	481
11-Mar	0	0	0	0	0	0	1	42	136	261	299	427	481	512	443	337	205	73	4	0	0	0	0	0	134.2	512
12-Mar	0	0	0	0	0	0	4	65	171	288	369	486	546	518	459	353	216	65	4	0	0	0	0	0	147.7	546
13-Mar	0	0	0	0	0	0	0	13	36	119	153	227	263	243	162	144	103	58	7	0	0	0	0	0	63.7	263
14-Mar	0	0	0	0	0	0	3	75	201	338	442	536	569	553	463	377	167	58	5	0	0	0	0	0	157.8	569
15-Mar	0	0	0	0	0	0	3	58	113	267	375	335	453	543	485	375	242	107	9	0	0	0	0	0	140.1	543
16-Mar	0	0	0	0	0	0	3	84	217	354	464	551	582	565	493	338	188	55	6	0	0	0	0	0	162.5	582
17-Mar	0	0	0	0	0	0	4	49	127	177	89	185	108	119	176	206	148	63	8	0	0	0	0	0	60.7	206
18-Mar	0	0	0	0	0	0	3	50	112	183	294	298	335	402	388	206	92	47	10	0	0	0	0	0	100.9	402
19-Mar	0	0	0	0	0	0	5	85	249	387	497	585	616	594	524	404	265	138	11	0	0	0	0	0	181.7	616
20-Mar	0	0	0	0	0	0	11	84	258	399	507	590	611	587	524	411	267	118	13	0	0	0	0	0	182.5	611
21-Mar	0	0	0	0	0	0	17	123	251	388	435	513	565	626	376	312	118	51	5	0	0	0	0	0	157.5	626
22-Mar	0	0	0	0	0	0	7	89	156	332	394	277	216	145	109	105	78	30	6	0	0	0	0	0	81.0	394
23-Mar	0	0	0	0	0	0	11	105	266	404	519	510	443	378	316	209	135	53	8	0	0	0	0	0	139.9	519
24-Mar	0	0	0	0	0	0	9	50	128	279	514	537	577	338	287	252	120	45	9	0	0	0	0	0	131.1	577
25-Mar	0	0	0	0	0	0	2	12	31	44	73	118	121	97	105	122	101	64	13	0	0	0	0	0	37.6	122
26-Mar	0	0	0	0	0	0	11	59	117	201	198	168	84	101	262	425	164	74	10	0	0	0	0	0	78.1	425
27-Mar	0	0	0	0	0	0	9	43	117	239	390	442	434	474	402	238	133	78	18	0	0	0	0	0	125.7	474
28-Mar	0	0	0	0	0	0	11	91	133	93	124	175	234	458	555	443	301	150	20	1	0	0	0	0	116.2	555
29-Mar	0	0	0	0	0	0	23	122	361	386	551	624	617	465	490	265	167	54	5	0	0	0	0	0	172.0	624
30-Mar	0	0	0	0	0	0	9	25	46	85	114	166	155	135	119	103	88	35	13	0	0	0	0	0	45.5	166
31-Mar	0	0	0	0	0	0	10	34	69	172	471	454	429	527	396	351	224	94	21	0	0	0	0	0	135.5	527
		0.0	0.0	0.0	0.0	0.0	0.0	5.1	52.9	149.7	251.1	338.1	393.7	402.4	391.3	349.0	276.1	161.5	63.1	7.3	0.1	0.0	0.0	0.0	0.0	Diurnal Average
		0	0	0	0	0	0	23	123	361	404	551	624	617	626	555	443	301	150	21	1	0	0	0	0	Diurnal Maximum





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

CNRL Horizon - March 2017

Maximum Speed: 34 km/h on Mar 19 03:00	Maximum Daily Speed Average: 22.8 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 10 01:00	Minimum Daily Speed Average: 1.3 km/h on Mar 26	Hours of Data: 742
Maximum Diurnal Speed Average: 4.1 km/h at hour 20	Minimum Diurnal Speed Average: 0.3 km/h at hour 7	Hours of Missing Data: 2
Monthly Average Velocity: 2.0 km/h 32.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 11 P ₉₀ = 15 P ₉₉ = 28	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-Mar	NNE8	NNE7	NNE8	NNE8	NNE7	NNE7	NE8	NNE6	NNE7	N5	NNE6	NNE6	NNE6	NE8	NE7	NE8	NE6	ENE5	E4	ENE3	NW3	WNW4	SE2	SW5	NNE5.0	NNE8	
2-Mar	SW6	SW6	SSW6	S8	SSW9	SSW10	SSW9	SSW9	SSW7	SSW6	SSW5	SW1	NNW3	NNW6	NNW6	NNE6	NNE5	NNE5	NNE7	N6	N6	NW5	NE3	NNE2	SW1.4	SSW10	
3-Mar	SW4	SW4	WSW4	SW5	SSW7	SW7	SW7	SSW7	SW8	SSW10	SSW9	S8	SSW11	SSW11	SSW6	N11	NW11	NW18	NW22	NW20	NNW16	NNE12	NNE12	NE8	W4.0	NW22	
4-Mar	NE13	NE13	NNE8	NNE5	NNE8	NNE7	NNE7	NNE9	NNE10	NNE15	NNE15	NNE12	NNE10	NNE13	NNE11	NNE10	NE9	ENE7	E6	ENE7	ENE6	NE6	NNE6	NNE7	NE8.8	NNE15	
5-Mar	NNE8	N8	NNE6	NE7	NE7	NE7	NE4	N3	NNW5	NNE5	N4	SW4	SW4	SSW4	WNW2	N6	NNW7	NW5	S2	SSE5	SSE4	SSW4	NNW3	NNE5	N2.5	N8	
6-Mar	NNE7	NNE5	N6	NNE7	NNE5	N7	N7	NE3	NNW3	N5	NNE9	NNE15	NE14	ENE15	NE15	NE16	NE16	NE16	NNE14	NNE17	NNE16	NNE14	NNE16	NNE10.5	NNE17		
7-Mar	NNE17	NNE16	NNE15	NE13	NE14	NE13	NNE13	NNE11	NNE13	NE10	NNE10	NE12	NE14	NNE15	NNE14	NE13	NE14	NE14	NNE14	NE8	NE6	NNE8	NNE4	NNE6	NNE11.8	NNE17	
8-Mar	N2	N8	NNE7	NW3	NW2	SW4	SW5	SSW6	SSW4	WSW2	NNE4	ENE7	NNE4	NE8	NE8	NE9	ENE10	E11	E8	NE8	NNE9	NNE7	N5	NNW5	NE3.7	E11	
9-Mar	N3	NNW2	NW1	ENE2	SSW4	SW5	SW6	SW6	S3	S4	SE3	ENE3	SE2	E7	ENE8	E8	ENE9	ENE9	ENE8	NE6	NNE8	NNE8	N5	N5	ENE2.3	ENE9	
10-Mar	W0	NE1	NNE5	NNE5	NW3	NNW4	NNE3	SE2	NE3	NE4	NNE4	NNE6	NNE5	NE5	NNE7	NNE8	NNE9	NNE8	NNE7	NNE7	NNE8	N8	NNE7	NNE6	NNE5.0	NNE9	
11-Mar	NNE7	NNE7	NNE7	NNE7	N6	NNE5	NNE5	NNE4	NE4	N3	NW2	N5	NW5	NW7	NNE0	ENE6	NE7	NNE8	NNE5	NE7	NNE6	NNE7	N5	N5	NNE4.9	NNE8	
12-Mar	NNE6	NNE6	NNE7	N7	NNE7	N4	N3	NNE2	NE1	W1	SW2	SSW2	SSE10	SSE12	S11	SSE12	SSE11	SSE10	SE10	SSE9	SSE11	SSE11	SSE13	SSE12	SE4.3	SSE13	
13-Mar	SSE13	SSE14	S15	S14	S11	S12	S15	S16	S12	S14	S16	S17	S16	S13	S13	S12	SSW12	SSW10	SSW13	S13	S13	SSE8	S8	S13.0	S17		
14-Mar	S11	S10	SSW10	SSW10	SSW11	SSW10	SSW10	S9	S13	SSW17	SSW13	S8	S3	ENE8	ENE9	NNE6	NE7	NNE7	NNE8	NNE9	NNE9	NE7	NNE8	NNE4	S2.8	SSW17	
15-Mar	NE4	N4	WSW2	S10	S9	S11	SSW10	SSW12	SSW17	SSW15	SSW15	SSW12	WSW12	W17	WNW2	NW22	NW18	NNW14	NNW8	N11	NNE5	SE3	SSW2	NNW5	WSW5.1	WNW22	
16-Mar	NNE8	NNE15	NNE17	NNE19	NNE16	NNE17	NNE18	NE18	NE17	NE18	NE17	NE15	NE15	NE16	NE16	NE17	NE16	NE16	NE15	NE12	NNE12	NNE11	NNE13	NNE12	NE15.0	NNE19	
17-Mar	NNE12	NNE11	NNE12	NNE11	NNE10	N8	NE4	SSE1	SSW3	WSW2	NW5	W1	WNW1	NNE4	NE6	NE6	NNE8	NNE10	NE11	NNE13	NNE13	NNE13	NNE11	NNE10	NNE6.9	NNE13	
18-Mar	NE8	NE9	NE11	NE10	NE10	NNE11	NNE12	NNE12	NNE9	NNE10	NNE10	NE7	NNE8	NNE8	NNE10	N6	NNW2	AF	NNE4	NW5	N4	N5	NNW4	WNW15	NNE7.4	WNW15	
19-Mar	NW33	WNW27	WNW34	WNW22	WNW21	WNW20	W17	WSW11	W13	WNW21	WNW21	W21	W23	WNW29	WNW27	WNW32	WNW33	WNW31	NW33	NW28	WNW24	NNW25	NNW17	NNW20	WNW22.8	WNW34	
20-Mar	NNE14	NNW20	N13	N9	NNE7	E3	ESE4	NE6	NE6	NE4	S4	ESE4	ESE11	ESE10	ESE7	E8	ENE9	NE8	NNE8	NNE7	NNE7	NNE6	NNW2	SW3	NE5.2	NNW20	
21-Mar	SW6	SW9	SSW9	SSW8	SSW9	SSW10	SSW11	SSW9	SSW11	SSW9	SSW7	SSW7	SSW9	S12	SSE13	SSE11	SSE9	SSE9	SE8	SSE12	SSE13	SSE15	SSE11	SSE11	S8.9	SSE15	
22-Mar	SSE8	SSE8	SE6	ESE4	ESE6	ESE6	E6	E6	SE7	SSE5	SE7	SE3	ENE5	NNE4	WNW3	SW3	SSW6	SW6	AF	NNE13	NNE10	NNE10	NNE13	NNE9	E3.1	NNE13	
23-Mar	NNE10	NNE7	NNE9	NE6	NNE6	NE7	NE10	NE12	NE13	NE12	NE11	NE9	NE7	NE10	NE9	NE8	NNE6	NNE6	NNE8	NE7	NE6	ENE4	NE5	NE6	NE7.8	NE13	
24-Mar	NNE5	NNE5	NE5	NNE3	W1	SSW2	SW5	SW8	W3	NW1	NW4	NNW2	NNW3	S10	S9	S6	S8	SSE9	SE7	ESE6	ESE8	ESE6	SSE9	SE7	SSE2.6	S10	
25-Mar	ESE5	ENE4	ENE4	NE5	NE6	ENE5	NE4	ENE4	E5	ESE5	E4	ESE5	S2	NNW1	NNW2	ENE1	ENE2	NNW3	ENE4	ENE4	E4	ENE4	SE2	E0	E2	ENE2.7	NE6
26-Mar	ENE2	NE2	E4	ESE3	E4	NNE2	NNE4	NNE4	NE6	ENE3	NW5	NW7	NW4	W5	ESE5	SE7	SE6	SE4	NW1	SE2	ESE1	SE3	WSW1	E1	ENE1.3	NW7	
27-Mar	NNE2	NE2	NE2	S2	S4	SSW1	NE2	ENE2	SE3	NE3	NNE4	NNE6	NNE8	NNE9	NNE8	NE9	NNE9	NNE9	NNE9	NNE9	NNE9	NNE10	NNE11	NNE9	NNE7	NNE5.0	NNE11
28-Mar	N5	NW1	SW3	SSW3	SW3	SSW3	SSW4	S6	S8	S8	S7	S9	S9	S6	SE5	ESE3	SSE7	SE5	NE5	NE6	NE5	NE5	NNE4	E3	SSE2.5	S9	
29-Mar	ESE3	SSE3	SSW1	SSW2	SW5	SSW6	SSW6	SSW6	SSW7	SSW5	SE6	S8	SSE6	S7	ESE8	ENE8	ENE9	ENE6	NNW3	NW13	WSW4	SSE6	SSE5	ESE3	SSE2.7	NW13	
30-Mar	ESE6	SE3	SSE0	SE1	ESE4	ESE4	E1	N3	NNE3	NE3	NNE5	NNE5	NE5	NE5	ENE5	ENE6	ENE6	ENE3	E4	ESE5	SE4	SSE4	SW5	WSW5	E2.2	ENE6	
31-Mar	WSW5	SSW5	SSW7	SSW9	SW8	SSW7	SW10	SW9	SW9	SSW11	SSW11	SSW12	SSE6	S9	SSW10	SW21	SSW21	SSW16	S14	SW13	SSE4	SSW9	SSW10	SSW11	SSW10.1	SSW21	

NNE3.3 NNE3.0 NNE3.0 NNE1.7 NE0.9 NE0.5 ENE0.3 SE0.8 SSE0.8 SSE0.5 NNE0.3 E0.9 ENE1.0 NE1.5 NE2.3 NE3.3 NE3.2 NE3.3 NNE3.8 NNE4.1 NNE3.7 NNE3.4 NNE2.9 NNE2.7	Diurnal Average
NW33WNW27WNW34WNW22WNW21WNW20 NNE18 NNE18 SSW17WNW21WNW21 W21 W23WNW29WNW27WNW32WNW33WNW31 NW33 NW28WNW24NNW25 NNW17 NNW20	Diurnal Maximum

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



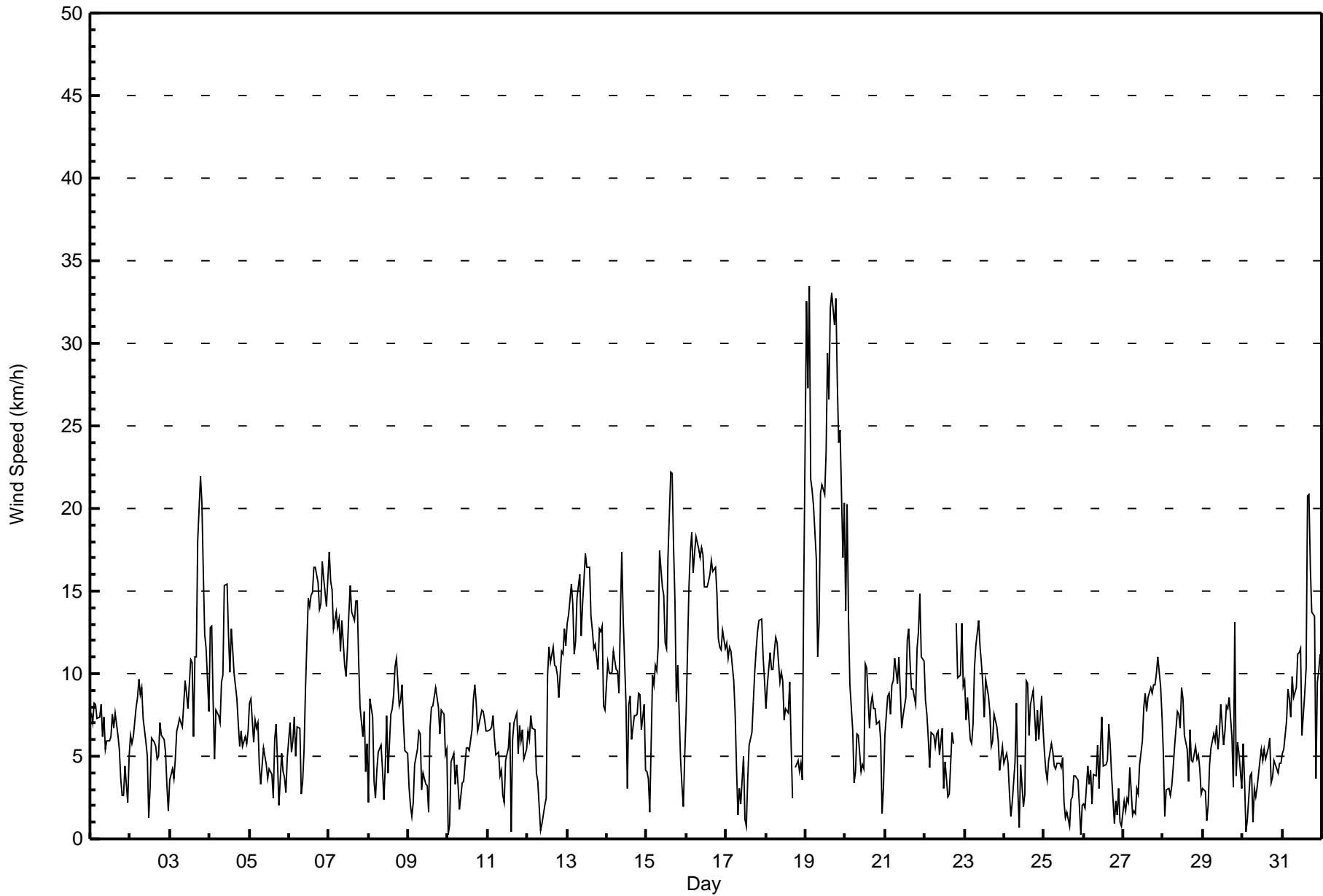
Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
CNRL Horizon - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 14 km/h on Mar 19 00:00	Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7
Minimum Value: 0 km/h on Mar 9 05:00	
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-Mar	2	2	2	2	1	1	2	1	1	1	2	1	2	2	2	2	1	1	1	1	1	1	1	2	2
2-Mar	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	2	2	1	1	1	1	1	1	2	2
3-Mar	1	1	1	2	1	1	1	1	2	3	2	2	3	3	3	5	6	6	3	3	6	3	3	2	6
4-Mar	4	3	2	1	2	1	1	2	3	4	4	3	3	3	3	2	2	1	1	1	1	1	1	1	4
5-Mar	2	2	2	2	1	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	2	2
6-Mar	1	1	1	1	2	1	1	1	1	2	4	4	4	3	4	4	4	4	4	4	4	4	3	4	4
7-Mar	4	4	4	3	3	3	3	3	3	3	2	3	4	4	4	3	4	3	3	1	1	1	3	1	4
8-Mar	2	1	2	1	2	1	1	1	1	1	2	2	2	3	2	3	3	3	2	2	2	1	1	1	3
9-Mar	1	1	1	1	0	1	0	1	1	1	2	2	2	3	2	2	2	2	1	1	1	1	1	1	3
10-Mar	1	1	2	2	1	1	2	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	2
11-Mar	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	2
12-Mar	1	2	1	1	1	1	1	1	1	2	1	4	3	4	4	3	4	3	3	2	3	3	3	3	4
13-Mar	3	4	4	3	3	3	5	5	3	4	4	4	4	4	3	3	3	3	2	2	2	3	2	2	5
14-Mar	2	2	1	2	2	2	1	2	3	4	3	3	2	2	2	2	2	1	1	2	2	2	2	2	4
15-Mar	1	2	2	2	2	2	2	2	4	4	3	2	6	4	4	3	2	3	2	2	3	2	1	3	6
16-Mar	2	4	4	5	4	4	5	5	4	4	5	4	4	4	4	3	3	4	4	3	3	3	3	3	5
17-Mar	3	3	3	3	2	2	1	1	1	2	2	1	1	1	1	2	2	2	3	3	3	3	3	2	3
18-Mar	2	2	3	2	2	2	3	3	2	2	2	2	2	2	3	1	2	AF	1	2	1	1	2	14	14
19-Mar	5	7	6	6	5	4	4	3	4	5	5	5	6	5	6	7	6	6	6	5	6	6	4	7	7
20-Mar	5	4	4	4	3	1	1	2	2	2	2	3	3	3	3	3	2	2	2	1	1	1	2	2	5
21-Mar	2	1	1	1	1	1	2	2	2	2	2	2	3	4	4	4	3	3	2	3	3	4	3	3	4
22-Mar	2	2	2	1	2	2	1	2	2	2	2	2	2	2	1	1	3	2	AF	3	4	3	4	2	4
23-Mar	2	2	3	1	2	3	2	2	3	3	3	3	3	3	2	2	2	1	2	2	2	1	1	1	3
24-Mar	1	1	1	1	1	2	2	2	2	2	1	1	1	4	3	2	4	3	2	1	2	2	3	3	4
25-Mar	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	2	2	2
26-Mar	2	2	1	1	2	2	1	1	1	2	4	2	2	3	2	2	2	2	1	1	1	1	2	2	4
27-Mar	1	2	2	1	1	1	2	1	1	2	1	2	2	2	2	2	2	2	2	2	2	2	3	2	3
28-Mar	2	1	1	1	1	1	1	1	2	2	2	3	2	2	2	2	2	2	1	1	1	1	1	1	3
29-Mar	1	2	1	2	1	1	1	1	2	2	2	3	2	3	2	2	2	1	4	4	2	1	2	1	4
30-Mar	1	2	1	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2	1	1	1	1	1	1	2
31-Mar	1	1	2	2	2	2	2	2	2	3	3	3	2	3	5	5	5	4	3	6	2	2	2	3	6
	5	7	6	6	5	4	5	5	4	5	5	5	6	5	6	7	6	6	6	6	6	6	4	14	
Diurnal Maximum																									

AF - Analyzer Failure





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
CNRL Horizon - March 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	253	34.10	34.10
6 - 11	338	45.55	79.65
12 - 19	124	16.71	96.36
20 - 28	20	2.70	99.06
29 - 38	7	0.94	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
CNRL Horizon - March 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	40	26	20	12	15	16	9	8	19	16	8	6	5	17	16	253
6 - 11	16	110	50	19	7	10	10	20	26	48	14	1	0	0	3	4	338
12 - 19	1	42	28	1	0	0	0	10	19	11	1	1	3	1	3	3	124
20 - 28	0	0	0	0	0	0	0	0	0	1	1	0	2	9	4	3	20
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2	0	7
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	37	192	104	40	19	25	26	39	53	79	32	10	11	20	29	26	742

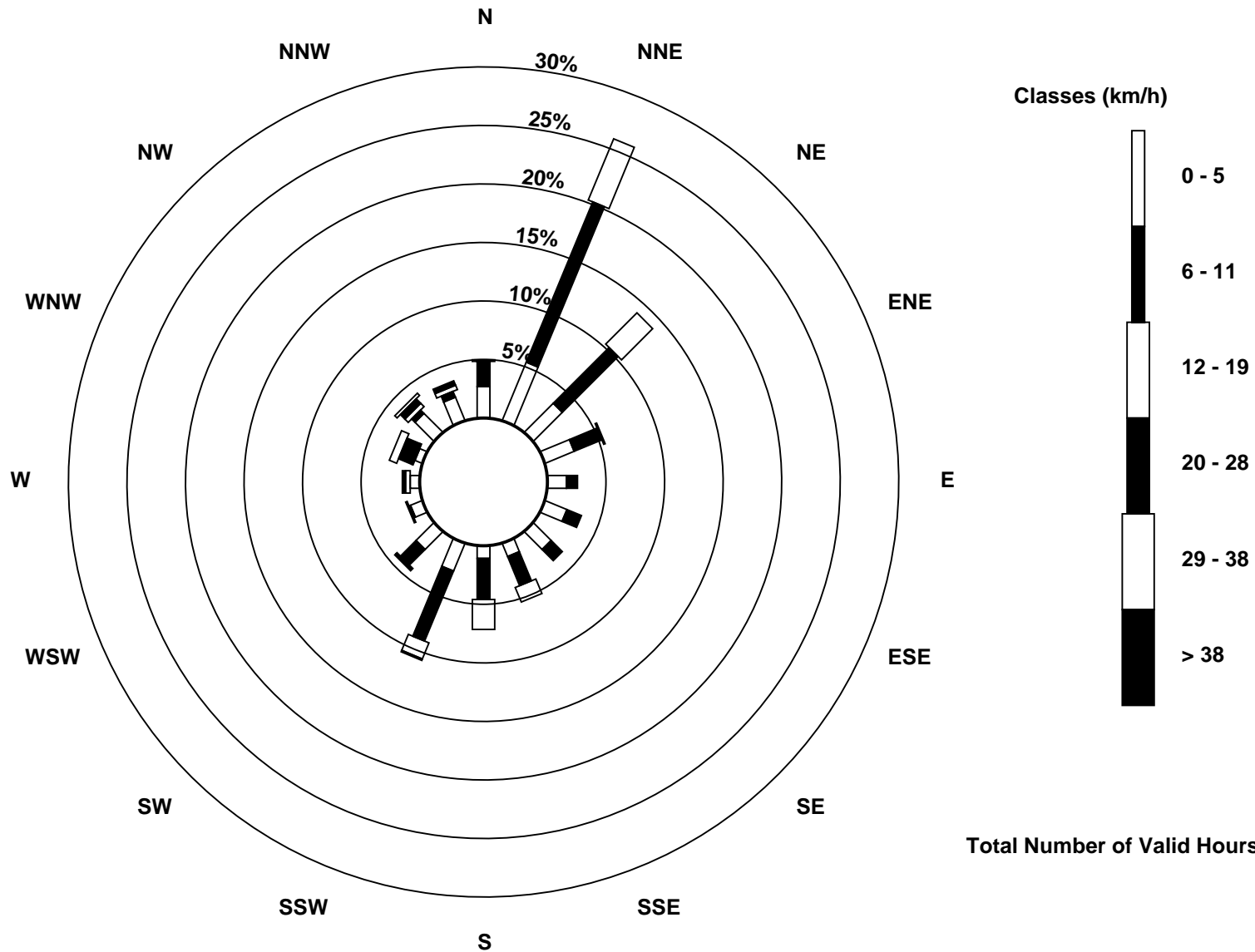
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Wind Speed (WS) - km/h
CNRL Horizon (AMS 15)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
CNRL Horizon - March 2017

Direction of Maximum Speed: 303 deg on Mar 19 03:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 296.0 deg on Mar 19	Hours of Data: 742
Direction of Minimum Speed: 270 deg on Mar 10 01:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 1.3 deg on Mar 26	Percent Operational Time: 99.7
Monthly Average Direction: 235.7 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-Mar	20	33	25	29	23	27	36	20	17	7	12	15	24	49	45	47	54	68	81	62	318	295	146	218	29.8
2-Mar	232	215	192	187	193	200	199	206	196	193	199	214	343	336	333	31	20	22	20	8	352	313	49	24	230.8
3-Mar	227	217	248	218	213	230	223	213	220	195	205	191	207	200	192	1	325	319	306	308	328	30	27	41	276.3
4-Mar	34	36	29	27	32	30	22	16	21	27	31	31	28	25	30	30	53	77	86	62	66	37	21	21	33.8
5-Mar	26	10	25	39	34	43	41	355	335	27	354	231	218	212	302	358	338	314	175	168	166	213	334	13	6.7
6-Mar	18	22	3	15	12	2	2	38	342	355	17	28	51	59	39	37	38	34	24	20	20	18	21	26	26.2
7-Mar	23	25	25	40	42	37	26	27	32	34	32	41	41	31	32	34	37	46	34	43	35	28	26	29	33.3
8-Mar	5	7	14	324	314	221	219	213	213	254	21	68	19	38	40	44	72	83	79	44	29	23	4	341	35.6
9-Mar	352	289	324	77	204	214	218	219	186	172	129	78	127	85	75	82	59	59	58	49	25	21	11	8	65.3
10-Mar	270	39	17	13	316	346	22	139	50	40	22	25	14	49	28	24	20	27	17	21	13	7	22	32	21.1
11-Mar	21	14	12	15	7	18	33	27	39	359	305	357	319	317	25	64	53	24	15	35	20	16	7	8	15.4
12-Mar	27	24	28	5	22	6	4	30	41	272	219	193	149	163	169	156	158	155	140	148	148	157	160	159	141.4
13-Mar	161	168	169	171	175	177	177	183	174	171	174	174	172	178	176	171	171	193	194	196	190	180	167	169	176.1
14-Mar	174	187	192	197	198	201	194	179	190	196	201	190	181	66	66	22	35	21	28	25	12	19	27	14	169.5
15-Mar	48	358	244	176	177	186	200	201	207	212	210	197	246	274	301	307	315	340	329	352	27	144	201	331	257.0
16-Mar	19	25	24	21	27	31	30	34	43	35	38	38	38	52	46	53	51	48	42	35	32	31	33	29	36.1
17-Mar	30	32	33	19	14	358	37	157	201	238	308	262	291	24	44	43	26	31	39	26	23	27	20	15	24.1
18-Mar	35	46	37	35	37	30	30	31	30	30	30	34	23	26	18	3	341	AF	22	319	3	357	342	302	20.6
19-Mar	307	299	303	288	286	284	278	244	261	282	285	271	271	290	286	294	292	297	312	311	297	339	339	344	296.0
20-Mar	17	346	5	5	32	82	102	53	52	52	178	121	102	102	113	90	78	55	30	20	14	22	348	223	44.2
21-Mar	226	215	212	201	204	204	206	203	200	199	211	206	200	185	168	155	151	147	139	147	167	167	163	166	182.7
22-Mar	153	159	138	121	118	108	91	96	130	148	132	133	74	25	295	228	202	214	AF	25	27	23	25	26	89.4
23-Mar	27	29	24	43	33	43	38	47	40	40	48	45	56	54	50	38	24	31	30	36	38	62	42	38	40.1
24-Mar	16	22	40	18	279	199	216	216	260	312	317	344	333	177	179	184	172	158	137	108	120	119	163	131	157.5
25-Mar	119	60	60	48	50	67	54	57	92	115	92	111	169	341	345	65	60	327	69	100	60	131	60	101	75.6
26-Mar	70	43	101	114	100	32	33	25	45	70	322	324	306	264	103	145	146	136	306	128	122	130	258	84	76.2
27-Mar	26	52	55	181	184	207	36	76	131	34	14	31	31	23	21	42	32	27	28	23	21	23	22	12	29.8
28-Mar	358	309	221	204	219	196	202	177	180	186	178	175	187	175	133	114	152	128	46	39	51	41	26	86	156.2
29-Mar	106	151	205	201	217	195	196	199	199	193	146	186	160	176	120	77	77	77	348	316	258	150	152	122	161.9
30-Mar	116	138	151	145	123	106	82	11	12	37	14	24	34	45	58	66	61	70	99	109	136	167	225	239	79.1
31-Mar	241	201	209	211	216	207	218	217	216	202	206	203	149	188	204	215	203	205	188	226	166	200	199	210	205.8

20.1 12.9 13.4 25.9 35.1 40.0 61.8 144.4 147.4 151.7 17.9 83.9 66.5 54.6 46.1 37.3 41.5 35.1 26.3 16.2 22.8 33.3 32.3 17.9
 Diurnal Average

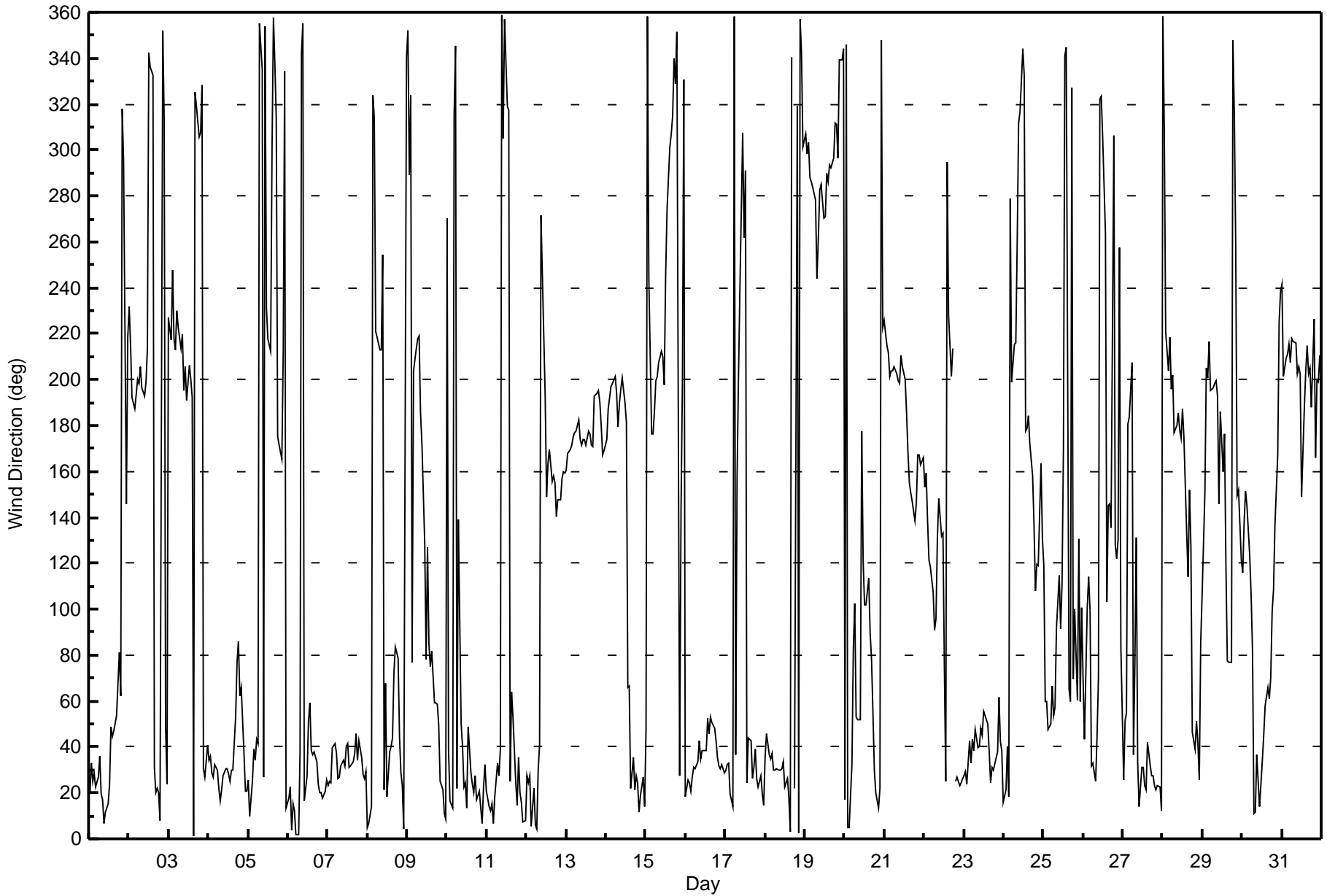
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
CNRL Horizon - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Mar 25 23:00		Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7																							
Minimum Value: 5 deg on Mar 2 01:00																									
Percentiles: P ₁ = 7 P ₁₀ = 12 Q ₁ = 15 Median = 18 Q ₃ = 27 P ₉₀ = 48 P ₉₉ = 86																									
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-Mar	15	17	15	16	11	13	13	9	15	22	25	25	33	24	24	20	22	12	41	15	47	9	50	13	50
2-Mar	5	18	11	12	10	10	9	10	15	20	27	99	79	15	20	39	23	17	7	15	19	14	39	80	99
3-Mar	41	30	36	36	17	18	16	17	30	22	18	21	23	19	38	28	40	14	8	10	33	18	18	17	41
4-Mar	18	17	15	18	15	14	14	16	17	19	18	20	23	19	19	21	22	15	16	11	11	9	11	16	23
5-Mar	16	18	20	14	12	9	18	26	22	24	32	49	48	48	71	27	17	20	51	10	12	15	42	15	71
6-Mar	12	15	21	16	23	13	13	34	15	30	24	18	20	17	20	18	18	17	19	19	17	17	16	18	34
7-Mar	18	18	18	16	16	16	18	20	18	19	20	19	18	19	20	19	19	14	17	12	10	10	68	10	68
8-Mar	82	12	10	25	36	16	6	10	20	44	52	27	63	36	24	24	25	16	12	19	16	11	13	15	82
9-Mar	23	43	60	38	17	11	6	6	21	30	63	85	94	42	29	29	19	13	10	10	9	10	13	14	94
10-Mar	84	82	30	24	44	25	61	42	24	34	35	28	32	40	26	21	17	16	10	12	12	15	12	8	84
11-Mar	6	10	7	6	9	10	8	10	21	32	51	34	22	22	93	45	29	16	13	13	9	8	10	9	93
12-Mar	7	14	9	14	6	18	21	18	75	68	89	93	35	33	29	24	24	22	17	14	16	16	17	17	93
13-Mar	17	17	16	16	15	16	18	16	18	17	18	17	18	17	17	17	18	17	11	11	12	14	15	14	18
14-Mar	15	13	11	12	11	11	12	14	15	15	17	24	81	28	20	25	18	14	13	13	15	17	12	42	81
15-Mar	27	24	65	13	13	15	12	12	13	16	16	17	41	24	9	8	12	11	12	16	41	53	69	32	69
16-Mar	23	17	17	20	19	18	18	18	17	19	19	20	21	20	17	15	15	15	15	16	17	18	18	18	23
17-Mar	18	17	17	17	19	19	33	49	30	74	41	73	81	29	18	22	21	17	15	17	18	17	18	16	81
18-Mar	18	13	16	16	15	16	18	16	17	18	20	21	20	21	20	22	53	AF	12	30	35	25	23	17	53
19-Mar	9	11	10	14	14	14	16	21	20	17	16	18	18	12	16	12	12	14	9	12	11	18	16	31	31
20-Mar	28	15	22	24	26	48	21	14	28	66	54	67	26	26	49	31	26	17	17	14	15	10	65	31	67
21-Mar	10	9	12	10	11	11	10	13	14	18	19	20	26	24	24	24	24	19	18	21	18	18	18	18	26
22-Mar	20	19	21	28	17	22	16	22	24	49	36	80	39	45	29	39	16	19	AF	19	21	18	19	17	80
23-Mar	20	18	19	17	17	18	14	15	18	20	27	25	29	21	25	23	25	20	16	18	18	16	19	17	29
24-Mar	21	17	15	27	58	43	17	16	63	85	30	73	68	38	24	23	20	21	19	12	16	23	19	32	85
25-Mar	23	21	18	14	16	13	13	14	20	21	24	25	43	89	21	83	46	31	22	25	27	57	101	65	101
26-Mar	27	51	14	25	16	60	24	25	17	68	51	13	26	34	38	30	27	23	84	64	53	15	69	78	84
27-Mar	36	60	39	46	28	53	56	46	26	50	40	32	23	23	24	23	18	16	16	15	16	14	18	18	60
28-Mar	15	59	22	10	14	16	22	15	17	17	22	21	23	37	47	65	37	35	42	19	33	16	24	43	65
29-Mar	35	72	43	85	16	10	13	15	17	33	41	36	44	37	34	25	17	16	64	19	56	17	32	26	85
30-Mar	10	34	100	49	14	12	52	18	24	26	21	24	28	26	30	24	22	34	21	13	15	19	24	20	100
31-Mar	19	16	16	14	16	16	16	18	16	18	20	19	41	38	32	20	16	15	15	21	61	15	12	17	61
	84	82	100	85	58	60	61	49	75	85	89	99	94	89	93	83	53	35	84	64	61	57	101	80	
	Diurnal Maximum																								
AF - Analyzer Failure																									





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	March 22, 2017	Last Calibration	February 9, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	8:43	End Time (MST)	14:15
Gas Cert Reference	S0002488	Station temp.	21 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	September 26, 2017
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG Make/Model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	DACS serial No.	11040

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-622	-622
Analyzer IP address	192.168.1.43		Lamp voltage	870	872
Calculated slope	1.002689	0.999660	Chamber temp	45.2	45.1
Calculated intercept	-0.669533	-0.298715	Pressure	705.1	706.9
Analyzer Background	19.9	20.5	Flow	0.352	0.554
Analyzer Coefficient	1.017	1.020	Intensity	91	91

Analyzer make Thermo 43i Analyzer serial # 710321322

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	----
as found span	5000	81.6	816.0	807.3	1.011
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	81.6	816.0	816.4	1.000
second point	5000	40.6	406.0	406.8	0.998
third point	5000	20.3	203.0	203.6	0.997
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	81.6	816.0	818.8	0.997
Average Correction Factor					0.998

Corrected As found 807.7 Previous response 814.5 % change 0.8%

Notes:

Replaced the flow sensor, allowing the correct flow reading. Changed inlet filter after as founds. Adjusted the zero and the span.

Calibration Performed By: Jayne Marcoux



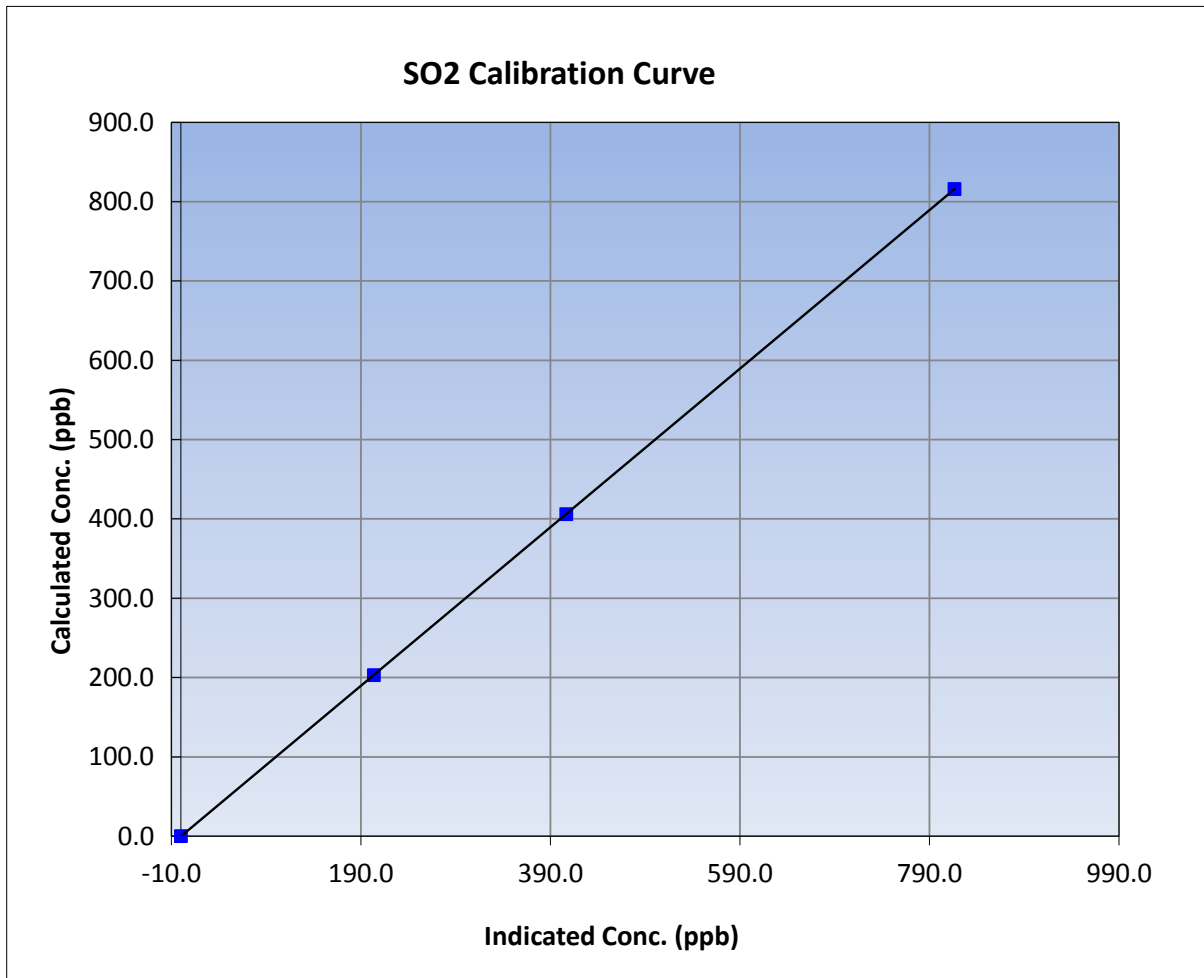
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 22, 2017	Previous Calibration	February 9, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	8:43	End Time (MST)	14:15
Analyzer make	Thermo 43i	Analyzer serial #	710321322

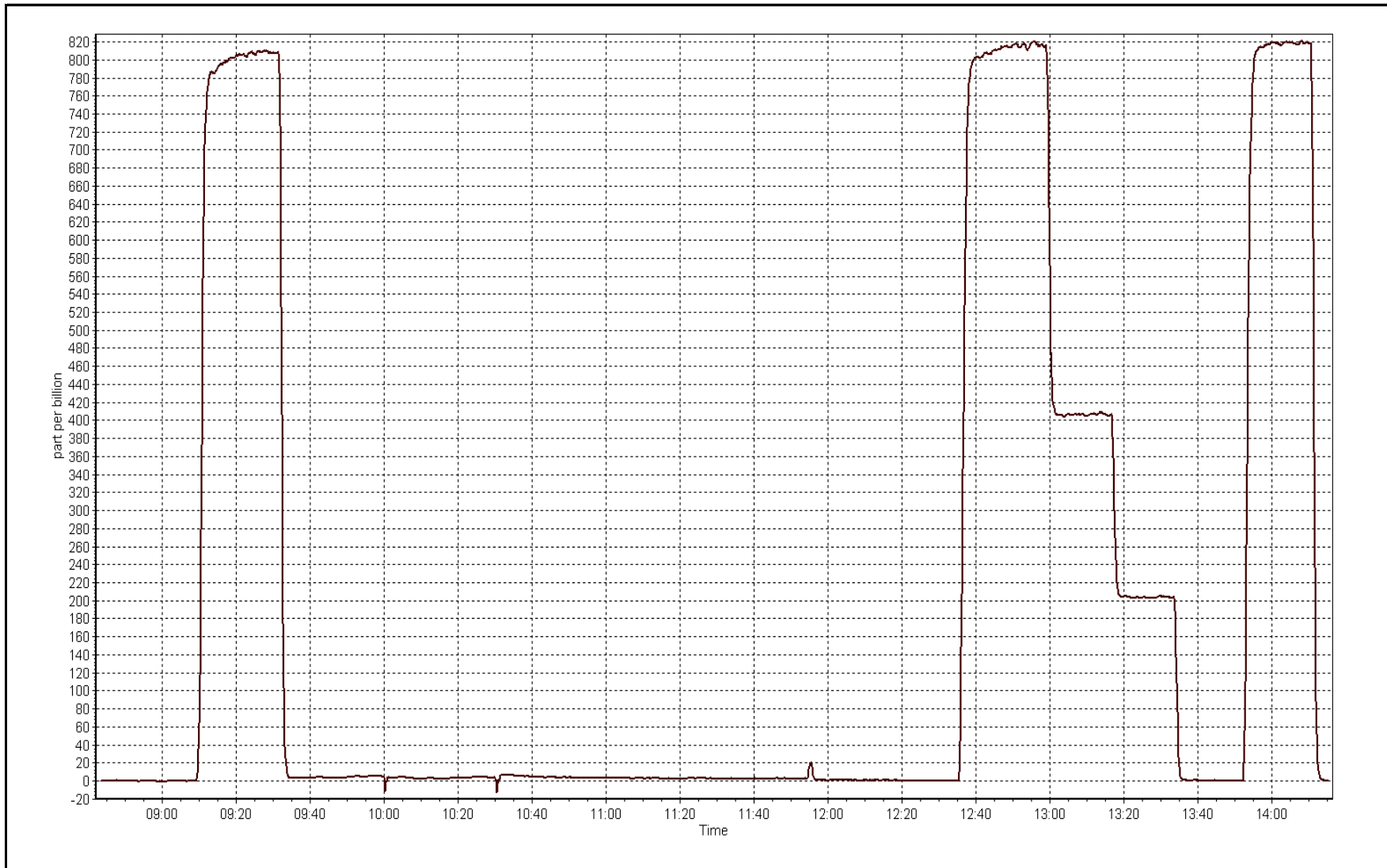
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999999
816.0	816.4	0.9996		
406.0	406.8	0.9981	Slope	0.999660
203.0	203.6	0.9969		
			Intercept	-0.298715



SO2 Calibration Plot

Date: March 22, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	March 15, 2017	Last Calibration	February 10, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	11:55
Gas Cert Reference	LL119538	Station temp.	22 Deg C
Cal Gas Concentration	4.95 ppm	Cal Gas Exp Date	February 12, 2019
Calibrator Make/Model	API T700	Serial Number	1223
Dil air Make/Model	API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	DACS serial No.	11040
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S0002486 September 26, 2017

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-685	-685
Analyzer IP address	192.168.1.44		Lamp voltage	995	995
Calculated slope	1.005438	0.994749	Chamber temp	45	45
Calculated intercept	-0.331875	-0.301701	Pressure	632.8	632.8
Analyzer Background	2.5	2.5	Flow	0.401	0.401
Analyzer Coefficient	1.167	1.167	Intensity	90	90
			Converter temp.	800	800
Analyzer make/model	Thermo 43i TLE		Analyzer serial #	1151680032	
Converter make/model	CDN-101		Converter serial #	531	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	80.6	79.8	80.4	0.992
SO2 scrubber check	5000	20.2	202.0	0.9	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	80.6	79.8	80.4	0.992
second point	5000	40.2	39.8	40.5	0.983
third point	5000	20.2	20.0	20.5	0.976
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	80.6	79.8	80.4	0.992
Average Correction Factor					0.984

Corrected As found	80.3	Previous response	79.7	% change	-0.7%
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Notes:

Scrubber checked after as found, filter changed out, no maintenance or adjustments done

Calibration Performed By:

Melissa Lemay



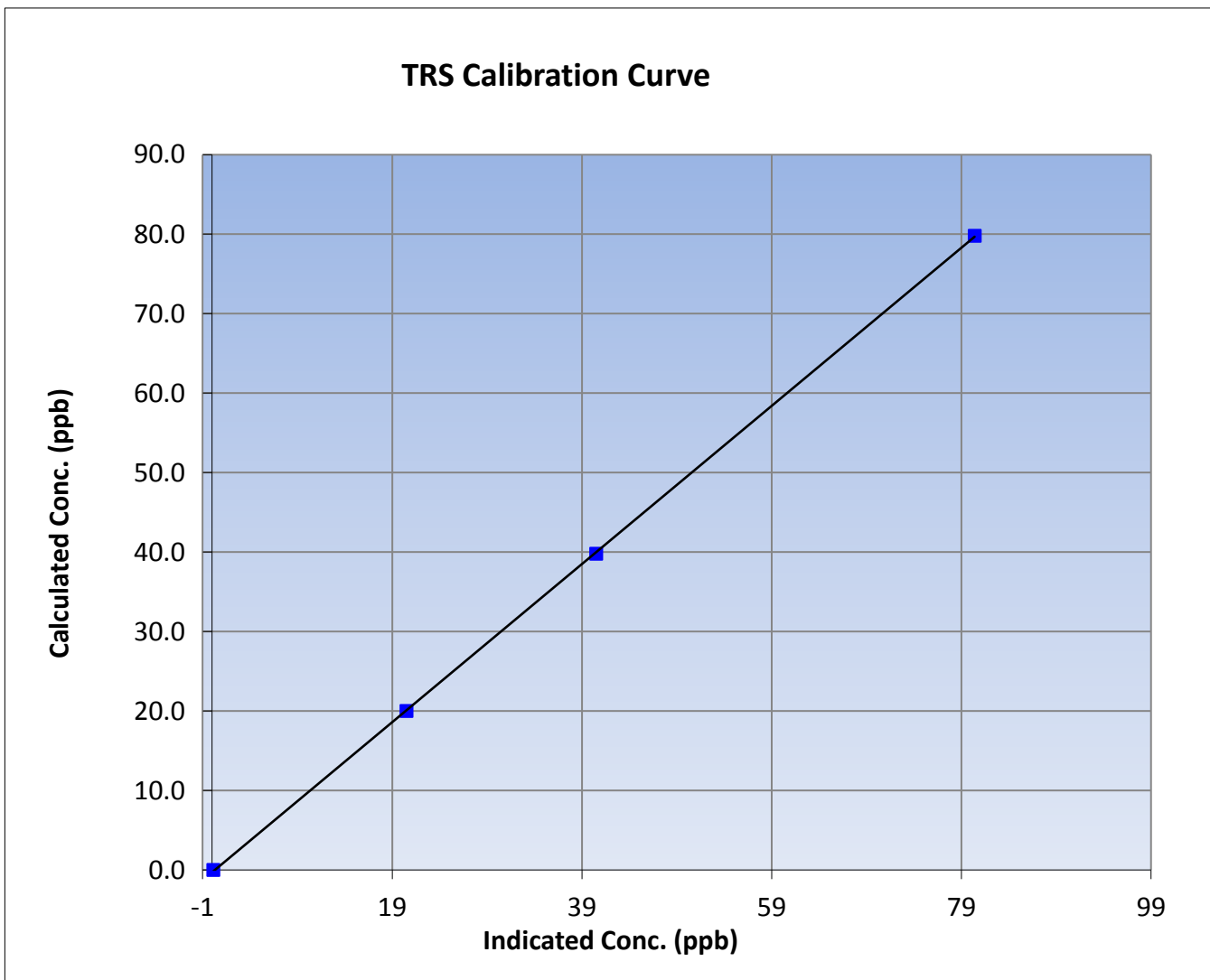
Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	March 15, 2017	Previous Calibration	February 10, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:15	End Time (MST)	13:26
Analyzer make	Thermo 43i TLE	Analyzer serial #	1151680032

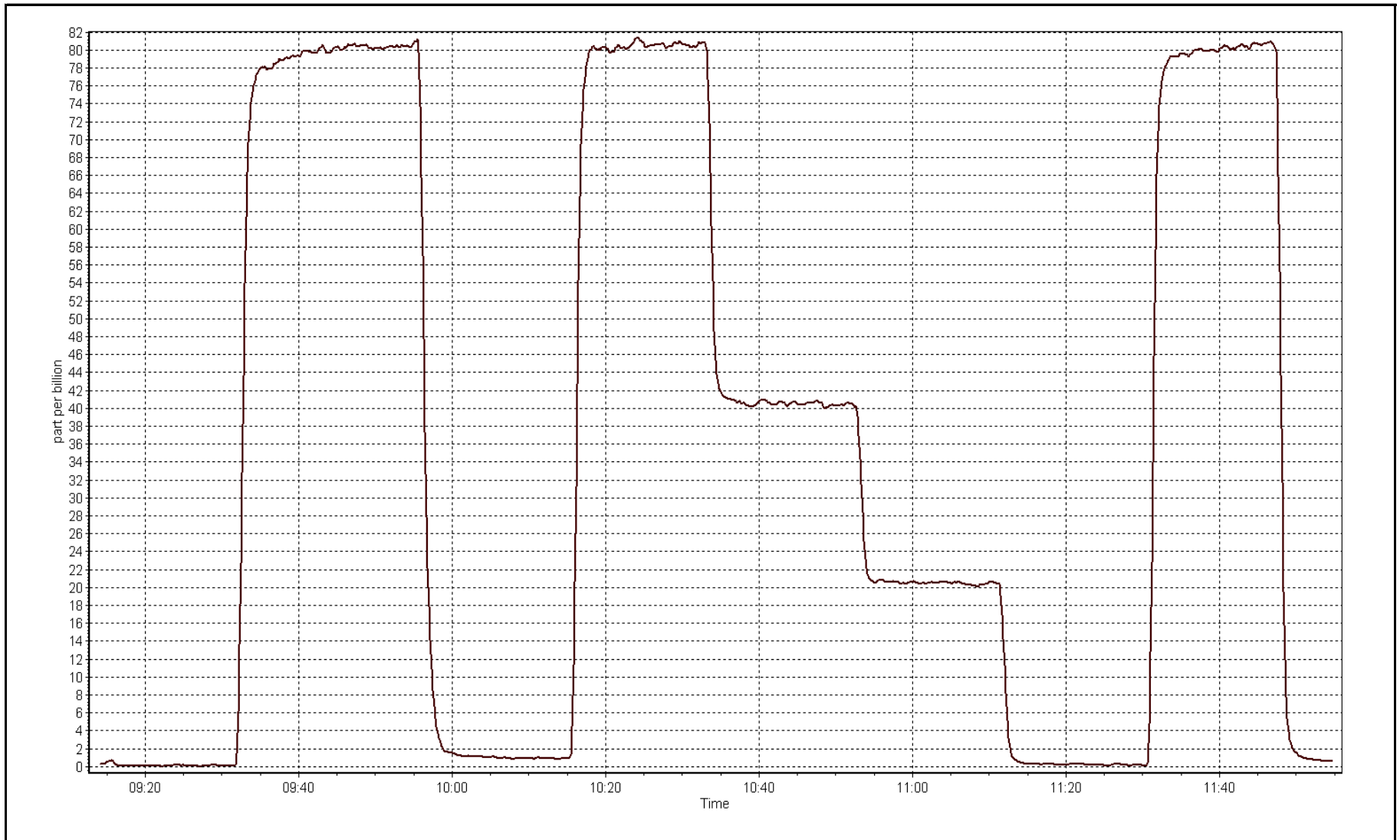
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999976
79.8	80.4	0.9925		
39.8	40.5	0.9827	Slope	0.994749
20.0	20.5	0.9755		
			Intercept	-0.301701



TRS Calibration Plot

Date: March 15, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	March 17, 2017	Last Calibration	February 9, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	7:37	End Time (MST)	11:40
Gas Cert Reference	S0002488	Cal Gas Expiry Date	September 26, 2017
CH4 Cal Gas Conc.	505 ppm	CH4 Equiv Conc.	1046.8 ppm
C3H8 Cal Gas Conc.	197 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG make/model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	Serial Number	11040

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.8	8.7
Analyzer IP address	192.168.1.51		Air or Bypass Press	38.0	38.0
Calculated slope	0.999507	1.001129	Fuel Pressure	26.3	26.3
Calculated intercept	-0.010486	-0.040587	Analyzer Coeff	3.258	3.196
			Analyzer BKG	2.31	2.39

Analyzer make: Thermo 51i-LT Analyzer serial #: 1327059295

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.06	----
as found span	5000	81.5	17.06	17.53	0.973
calibrator zero	5000	0.0	0.00	0.03	----
high point	5000	81.5	17.06	17.08	0.999
second point	5000	40.6	8.50	8.53	0.996
third point	5000	20.3	4.25	4.30	0.988
as left zero	5000	0.0	0.00	-0.05	----
as left span	5000	81.5	17.06	17.07	1.000
Average Correction Factor					0.995

Corrected As found: 17.47 Previous response: 17.08 % change: -2.2%

Notes:

Changed out inlet filter after as founds. Adjusted the zero and span. No Maintenance done

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association THC Calibration Report

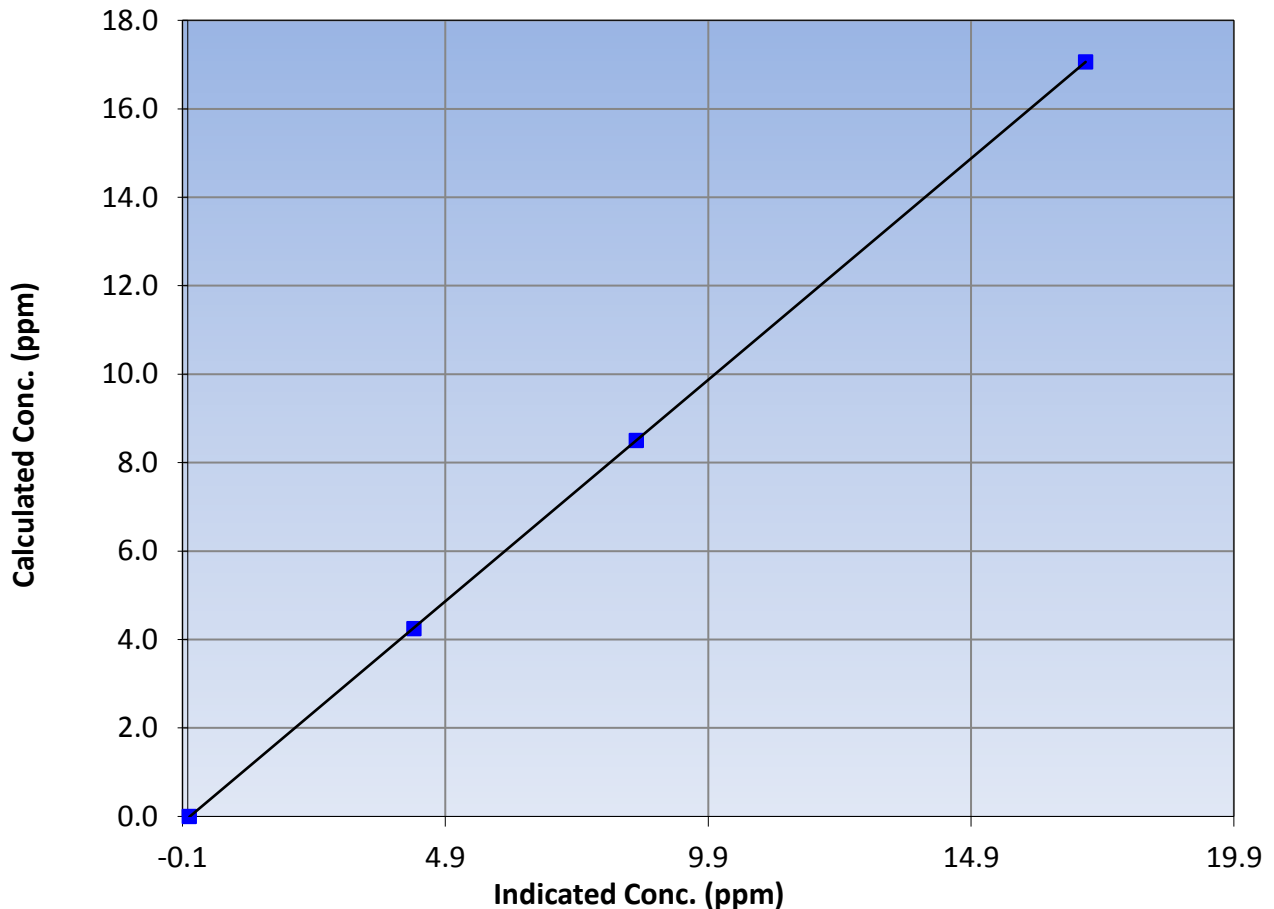
Station Information

Calibration Date	March 17, 2017	Previous Calibration	February 9, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	7:37	End Time (MST)	11:40
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295

Calibration Data

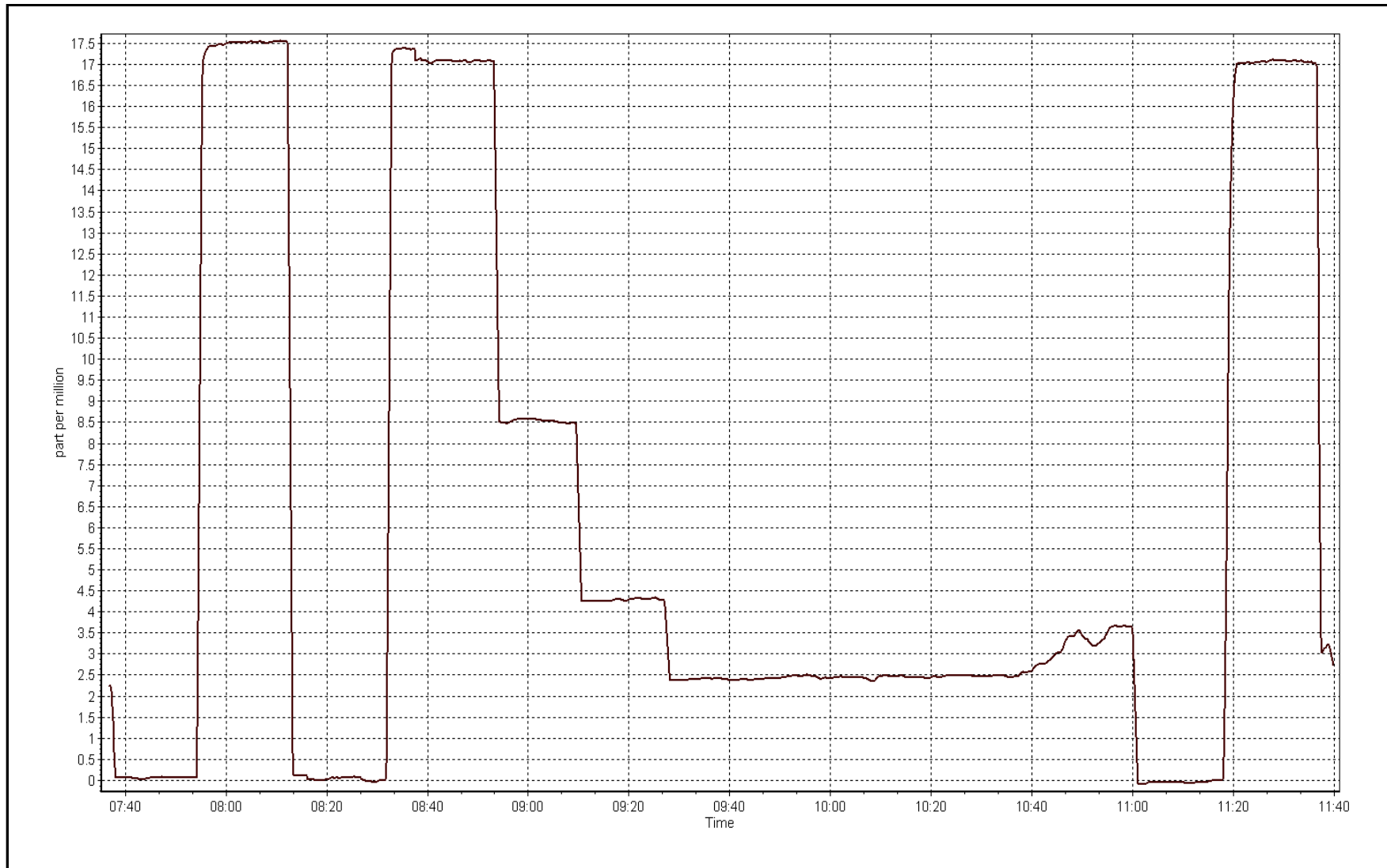
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	0.999998
17.06	17.08	0.9989		
8.50	8.53	0.9964	Slope	1.001129
4.25	4.30	0.9883		
			Intercept	-0.040587

THC Calibration Curve



THC Calibration Plot

Date: March 17, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 17, 2017	Previous Calibration	February 9, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	7:37	End Time (MST)	11:40
NO Cal Gas Conc	48.9 ppm	Gas Cert Reference	S0002488
NOx Cal Gas Conc	48.9 ppm	Cal Gas Expiry Date	September 26, 2017
Calibrator	Teledyne API T700	Serial Number	1223
Zero air Generator	Teledyne API T701	Serial Number	1004

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	11040
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999174	0.999575	0.993084
	Data Offset	0.045023	-0.004608	-0.317545
Current Calibration	Data Slope	0.997369	0.998125	0.994507
	Data Offset	-0.188115	-0.027995	-0.575945

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	710321429
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.725		0.739	
NOx coefficient	1.000		1.000	
NO2 coefficient	1.000		1.001	
NO bkgrnd	9.1		9.3	
NOx bkgrnd	9.2		9.3	
Chamber Temp	49.9	Deg C	49.9	Deg C
Moly Temp	323.9	Deg C	323.9	Deg C
PMT voltage	-778.1	V	-778.1	V
PMT Temp	-2.8	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	150.3	mmHg	150.3	mmHg
R Cell Press Nox	150.3	mmHg	150.3	mmHg
NO sample flow	0.769	lpm	0.769	lpm
Nox sample Flow	0.769	lpm	0.769	lpm

Notes:

Changed out inlet filter after as founds. Adjusted the span. No Maintenance done



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

March 17, 2017

Station Number:

AMS 15

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1	----	----
as found span	5000	81.5	797.1	797.1	0.0	789.3	788.8	0.5	1.0098	1.0105
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1	----	----
high point	5000	81.5	797.1	797.1	0.0	799.2	798.5	0.8	0.9973	0.9982
second point	5000	40.6	397.1	397.1	0.0	398.5	397.9	0.6	0.9964	0.9979
third point	5000	20.3	198.5	198.5	0.0	199.5	199.2	0.3	0.9952	0.9967
as left zero	5000	0.0	0.0	0.0	0.0	0.3	0.2	0.1	----	----
as left span	5000	81.5	797.1	461.8	335.3	799.2	460.0	339.2	0.9973	1.0039
Average Correction Factor									0.9963	0.9976

Corrected As found

NO_x= 789.4

NO= 789.0

Percent Change

NO_x= 1.0%

NO= 1.1%

Previous Response

NO_x= 797.7

NO= 797.4

GPT Calibration Data

Dilution Flow (total) 5000 ccm

0.999911

81.50 ccm

NOx ref calc conc = 797.1 ppb

NO ref calc conc = 797.1 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	799.0	798.8	0.1	0.9976	0.9978	----	----
1st NO2 (300)	461.8	337.0	801.2	461.8	339.5	0.9948	----	0.9926	100.7%
2nd NO2 (200)	569.4	229.4	800.0	569.4	230.6	0.9963	----	0.9948	100.5%
3rd NO2 (100)	680.2	118.6	801.1	680.2	120.9	0.9950	----	0.9810	101.9%
2nd NO ref point		0.0	797.1	796.9	0.2	1.0000	1.0002	----	----
Average Correction Factor						0.9965		0.9895	101.1%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

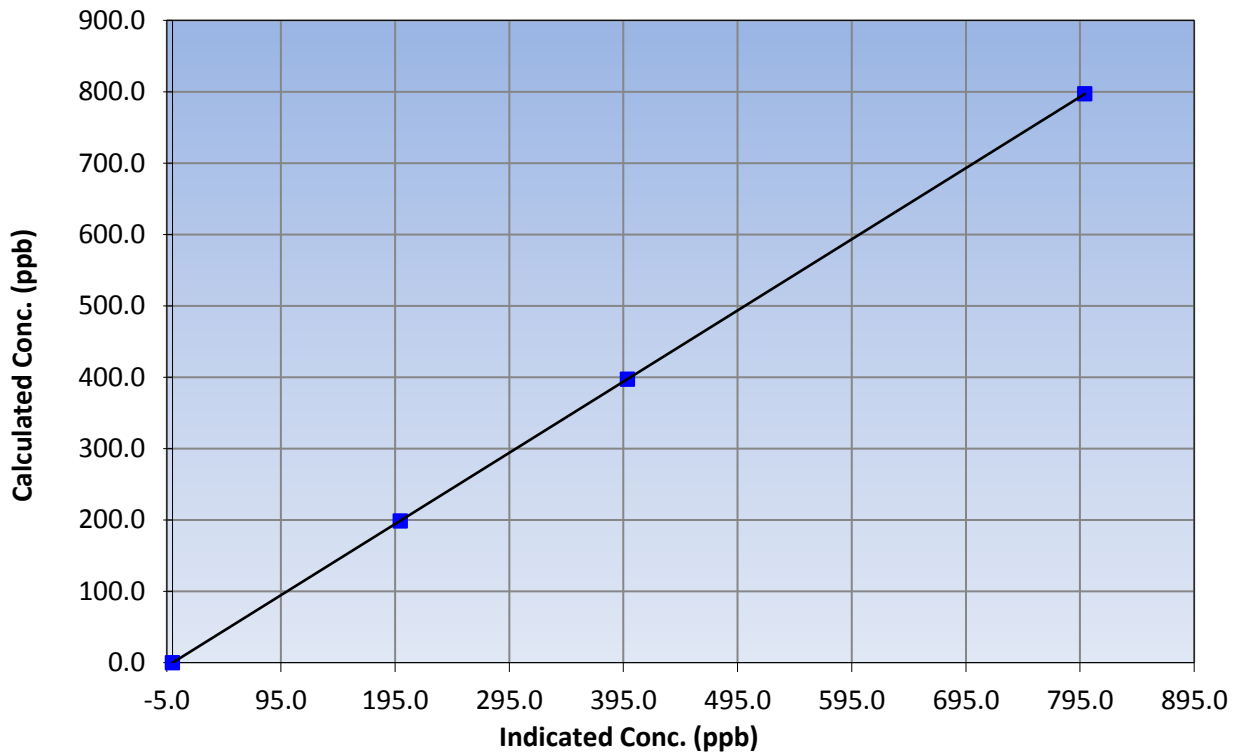
Station Information

Calibration Date	March 17, 2017	Previous Calibration	February 9, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	7:37	End Time (MST)	11:40
Analyzer make	Thermo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999999
797.1	799.2	0.9973		
397.1	398.5	0.9964	Slope	0.997369
198.5	199.5	0.9952		
			Intercept	-0.188115

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

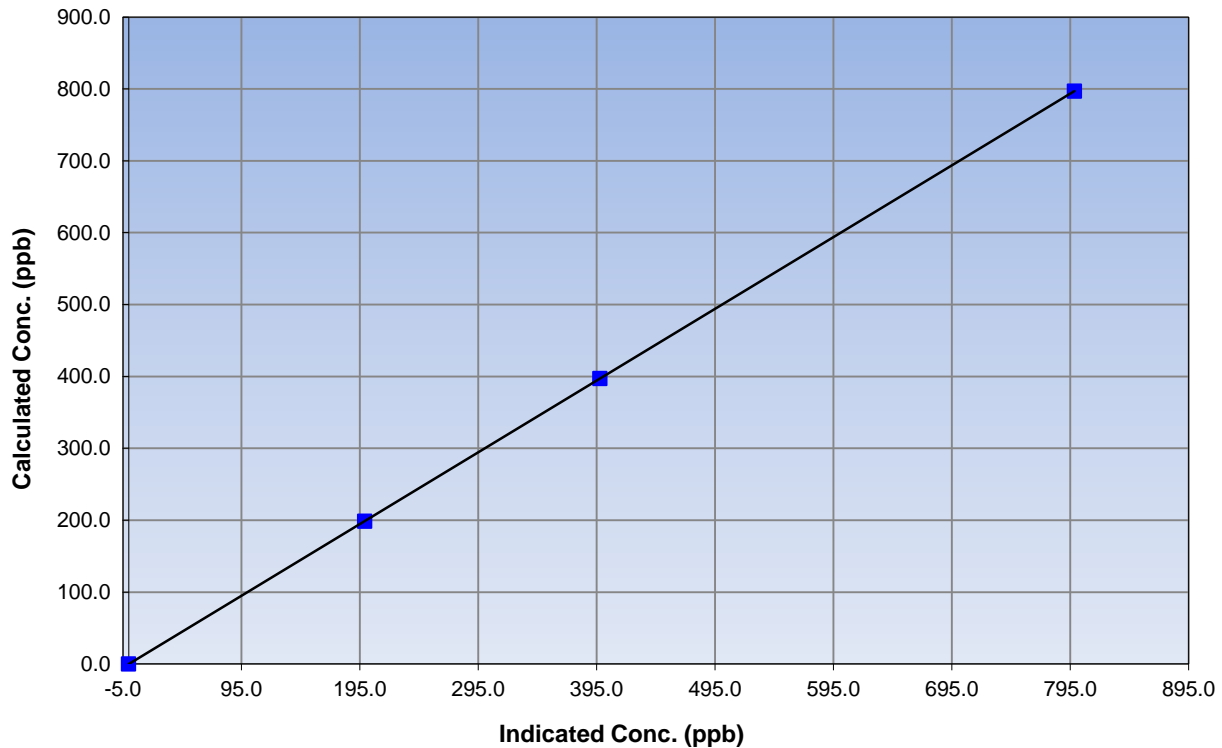
Station Information

Calibration Date	March 17, 2017	Previous Calibration	February 9, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	7:37	End Time (MST)	11:40
Analyzer make	Thermo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	1.000000
797.1	798.5	0.9982		
397.1	397.9	0.9979	Slope	0.998125
198.5	199.2	0.9967		
			Intercept	-0.027995

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

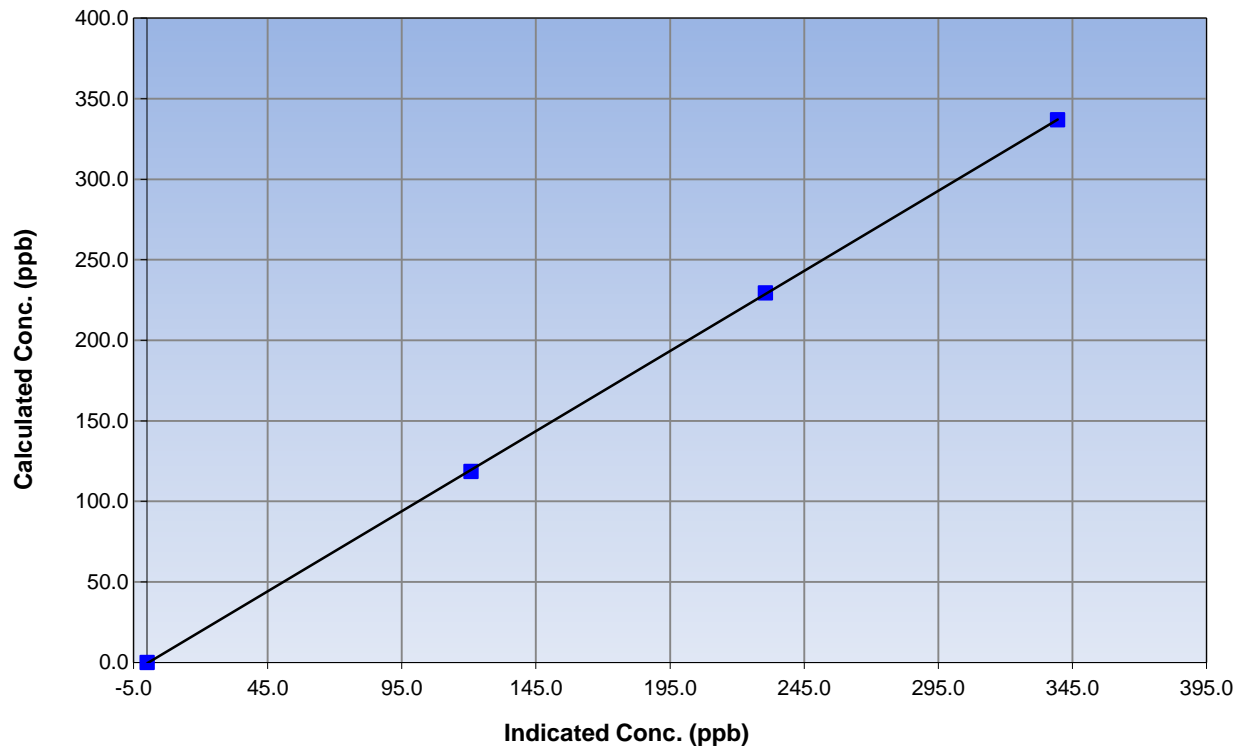
Station Information

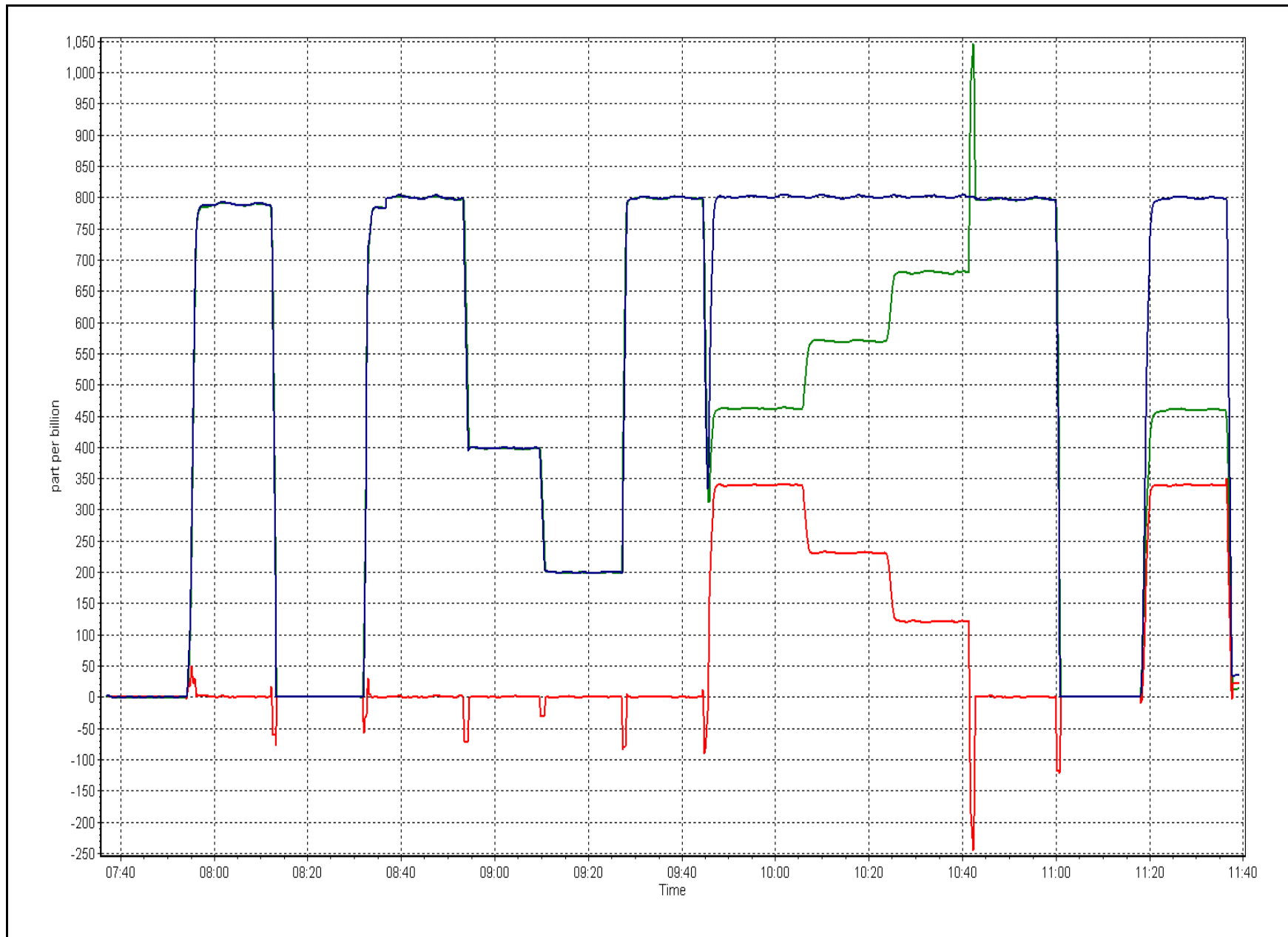
Calibration Date	March 17, 2017	Previous Calibration	February 9, 2017
Station Number	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	7:37	End Time (MST)	11:40
Analyzer make	Thermo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999972
337.0	339.5	0.9926		
229.4	230.6	0.9948	Slope	0.994507
118.6	120.9	0.9810		
			Intercept	-0.575945

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	CNRL Horizon	Station number:	AMS 15
Calibration Date:	March 22, 2017	Last Cal Date:	February 6, 2017
Start time (MST):	8:52	End time (MST):	10:29
Sharp Model:	5030	S/N:	E-2020
Particulate Fraction:	PM2.5	C14 Source S/N:	7409
Flow Standard Model:	DeltaCal	S/N:	1450
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>	<u>Tolerance</u>
T1 (°C)	-1	-0.07	-1	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	960	959	960	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	919	1000	<input checked="" type="checkbox"/>	+/- 50 LPH
Nephelometer zero	1.3	-----	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>March 22, 2017</u>	Last Cal Date: <u>February 6, 2017</u>	
	Flow w/o adaptor: <u>15.32</u>	Flow w/ adaptor: <u>15.18</u>	0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass: <u>2395</u>	S/N: <u>2022</u>
	Date of check: _____	Last Cal Date: <u>February 6, 2017</u>
	New Correction Factor: _____	Previous Correction Factor: <u>7127</u>

Notes: Adjusted the flow since it was low. Completed leak check. No leaks.

Calibration by: Jayme Marcoux



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 16
SHELL MUSKEG RIVER
MARCH 2017

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MUSKEG RIVER (AMS 16)
MARCH 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	36	0	6	0
THC (ppm) Average	707	37	37	100	6.4	-	3.3	-
NO2 (ppb) Average	702	36	42	99.19	52	0	22	-
NO (ppb) Average	702	36	42	99.19	103	-	24	-
NOX (ppb) Average	702	36	42	99.19	139	-	46	-
PM2.5 (ug/m3) Average	742	2	2	100	77.9	-	17.6	0
Temperature 2 m (C) Average	744	0	0	100	13.5	-	6.4	-
Relative Humidity (%) Average	744	0	0	100	98	-	91	-
Barometric Pressure (inHg) Average	744	0	0	100	29.8	-	29.7	-
Wind Speed 10 m (km/h) Average	744	0	0	100	31	-	23	-
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 - SHELL MUSKEG RIVER (AMS 16)
MARCH 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	3	-	0	0	0	0	1	2	36
THC (ppm) Average	707	2.51	0.5	-	2	2.2	2.2	2.4	2.6	3	6.4
NO2 (ppb) Average	702	10.7	9	-	0	1	4	9	14	23	52
NO (ppb) Average	702	7.8	14	-	0	0	0	3	9	21	103
NOX (ppb) Average	702	18.4	21	-	0	1	4	13	23	41	139
PM2.5 (ug/m3) Average	742	6.89	5.6	-	0.2	2.9	3.9	5.6	8	11.6	77.9
Temperature 2 m (C) Average	744	-8.84	10.6	-	-32.2	-23.5	-18.3	-7.5	-0.1	3.5	13.5
Relative Humidity (%) Average	744	69.1	15	-	30	50	58	70	79	90	98
Barometric Pressure (inHg) Average	744	29.01	0.3	-	28.3	28.7	28.8	28.9	29.3	29.5	29.8
Wind Speed 10 m (km/h) Average	744	10.8	7	-	0	3	5	9	16	21	31
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NO2, NO, NOX	01 Mar 2017 10:00	01 Mar 2017 15:00	6	Unstable Operation - shelter temp fluctuation



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Shell Muskeg River - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 36 ppb on Mar 31 12:00	Maximum Daily Average: 5.6 ppb on Mar 31		Hours of Data:	707
Minimum Value: 0 ppb on Mar 1 04:00	Minimum Daily Average: 0.0 ppb on Mar 12		Hours of Missing Data:	37
Maximum Diurnal Average: 3.9 ppb at hour 12	Minimum Diurnal Average: 0.2 ppb at hour 3		Hours of Calibration:	37
Monthly Average: 1.1 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 17		Percent Operational Time:	100.0

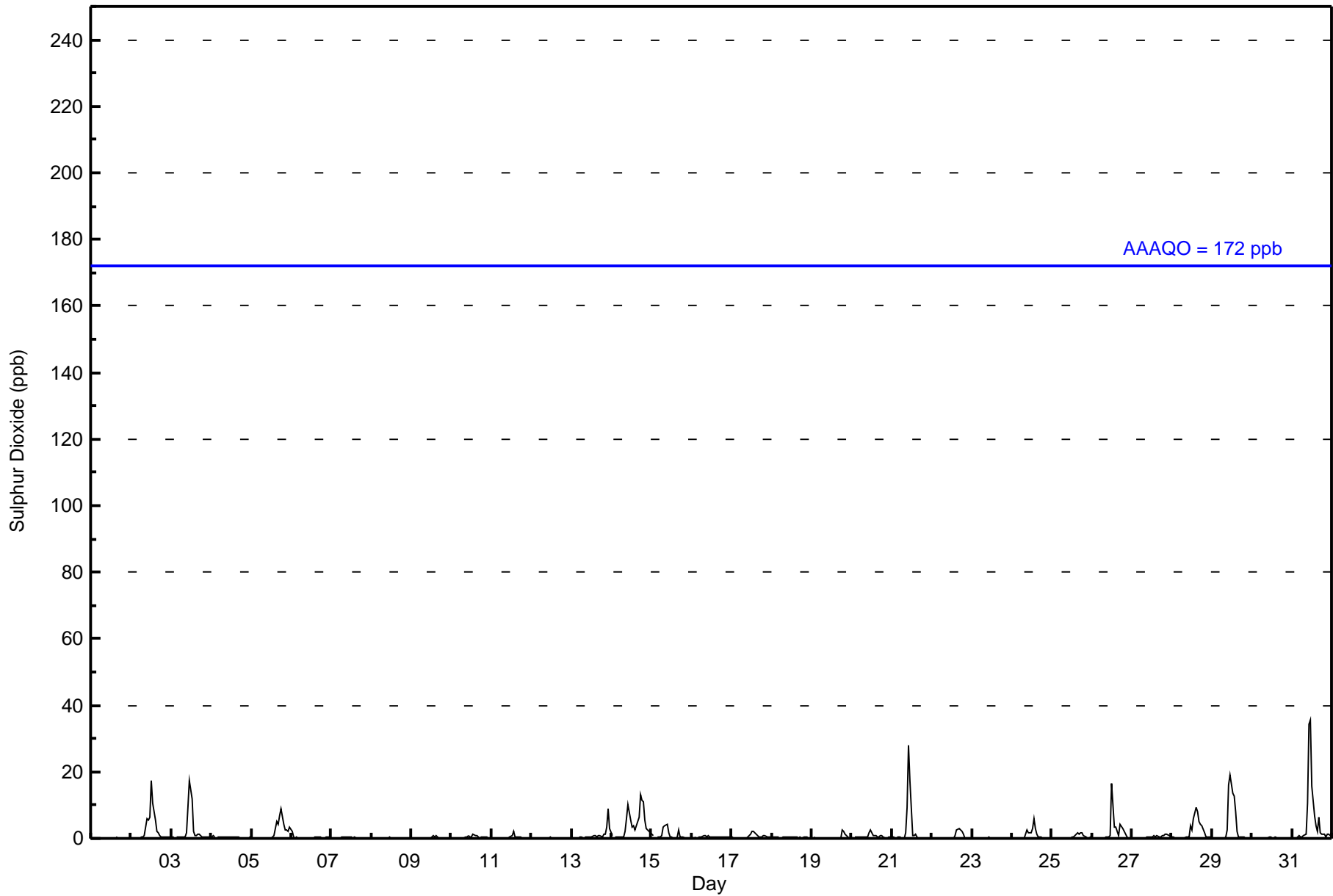
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Mar	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0																						
2-Mar	0	Z	0	0	0	0	0	0	1	6	6	6	17	11	6	2	2	1	0	0	0	0	0	0	2.7	17																						
3-Mar	0	0	Z	1	0	0	0	0	0	2	9	17	12	2	1	1	1	1	1	0	0	1	1	1	2.3	17																						
4-Mar	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
5-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	3	5	4	7	9	4	2	3	2	3	1.9	9																						
6-Mar	2	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	2																						
7-Mar	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																						
8-Mar	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																						
9-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.1	1																						
10-Mar	0	0	0	Z	0	0	0	0	0	0	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0.3	1																						
11-Mar	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																						
12-Mar	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																						
13-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	4	9	3	1.1	9																					
14-Mar	1	Z	0	0	0	0	0	0	2	6	10	5	3	4	3	4	7	13	12	11	6	3	2	2	4.1	13																						
15-Mar	1	1	Z	1	0	0	1	4	4	4	2	1	0	0	0	1	3	0	0	0	0	0	0	0	1.0	4																						
16-Mar	0	0	0	Z	0	1	1	1	1	0	1	1	1	1	0	1	0	1	0	0	1	0	0	1	0.5	1																						
17-Mar	0	0	0	0	Z	0	0	0	0	0	1	1	2	2	2	1	0	0	0	1	1	1	1	0	0.6	2																						
18-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1																						
19-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	0	0	0.4	2																						
20-Mar	0	Z	0	0	0	0	1	0	0	1	2	2	2	1	1	1	0	1	1	0	0	0	0	0	0.6	2																						
21-Mar	0	1	Z	0	0	0	0	0	2	9	28	18	1	1	1	0	0	0	0	0	0	0	0	0	2.8	28																						
22-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	3	3	2	2	1	0	0	0	0	0.6	3																						
23-Mar	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																						
24-Mar	0	0	0	0	0	Z	0	0	1	2	2	2	3	6	3	1	0	0	0	0	0	0	0	0	0.9	6																						
25-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	2	2	1	0	0	0	0	0.4	2																						
26-Mar	0	Z	0	0	0	0	0	0	0	0	0	1	16	4	3	2	1	4	3	2	1	0	0	0	1.7	16																						
27-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	0.5	1																						
28-Mar	1	0	0	Z	0	0	0	0	0	1	0	4	3	6	9	8	5	4	4	2	1	0	0	0	2.1	9																						
29-Mar	0	0	0	0	Z	0	0	0	1	2	16	19	14	13	8	2	1	0	0	0	0	0	0	0	3.3	19																						
30-Mar	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																						
31-Mar	Z	0	0	1	1	1	1	1	1	10	34	36	16	7	4	2	6	2	1	1	0	1	1	1	5.6	36																						
																								0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.5	1.6	3.8	3.9	3.2	2.1	1.7	1.3	1.2	1.4	1.3	1.0	0.6	0.5	0.6	0.4	Diurnal Average
																								2	1	1	1	1	1	1	4	4	10	34	36	17	13	9	8	7	13	12	11	6	4	9	3	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
Shell Muskeg River - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	690	97.60	97.60
11 - 20	14	1.98	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: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - March 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	45	110	84	59	37	22	46	49	83	42	19	16	15	17	22	24	690
11 - 20	1	1	2	0	0	0	0	0	2	6	0	0	2	0	0	0	14
21 - 60	0	0	0	0	0	0	0	0	0	1	1	1	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	46	111	86	59	37	22	46	49	85	49	20	17	17	17	22	24	707

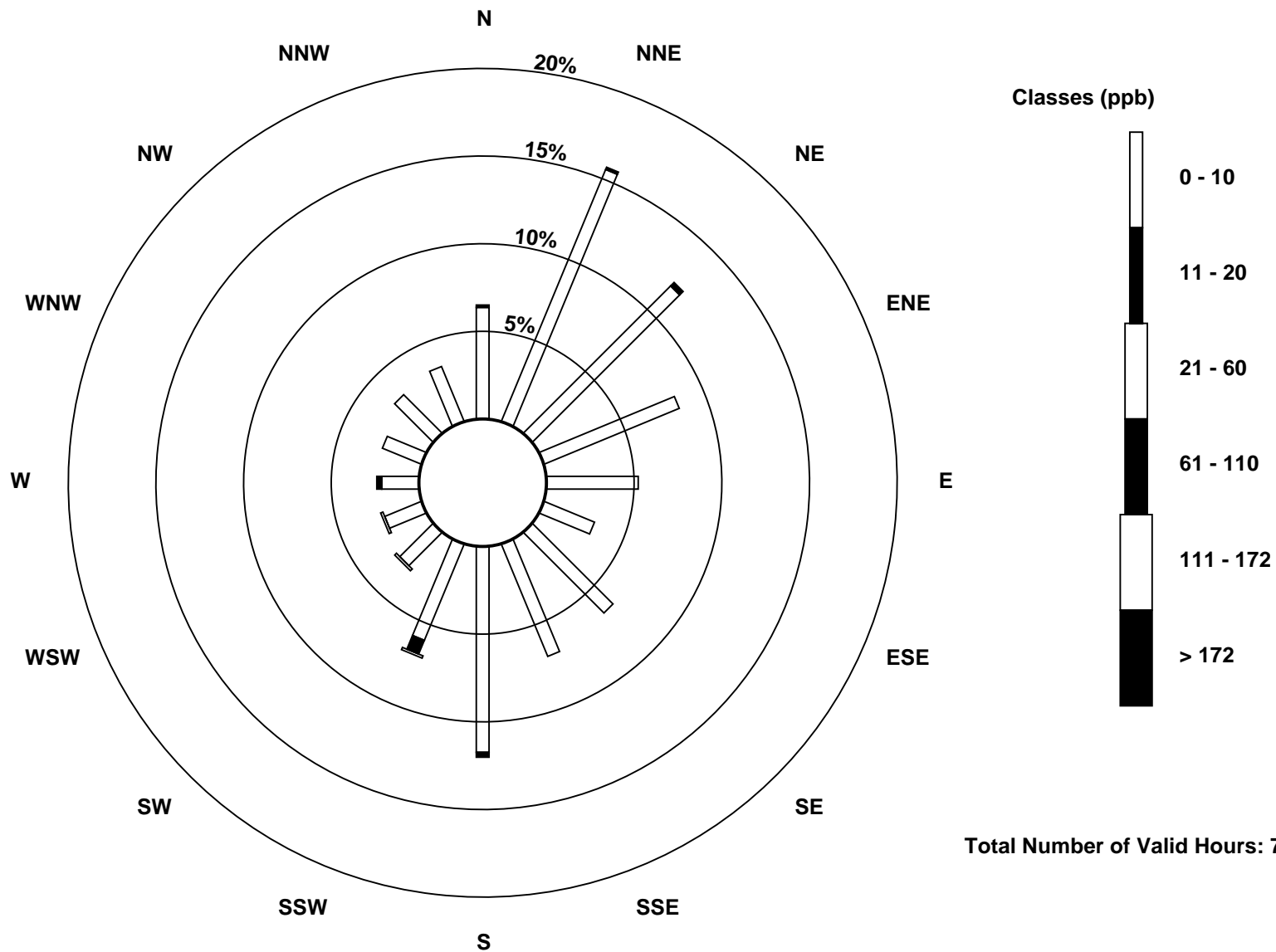
Total Number of Valid Hours: 707

Total Number of Hours: 744

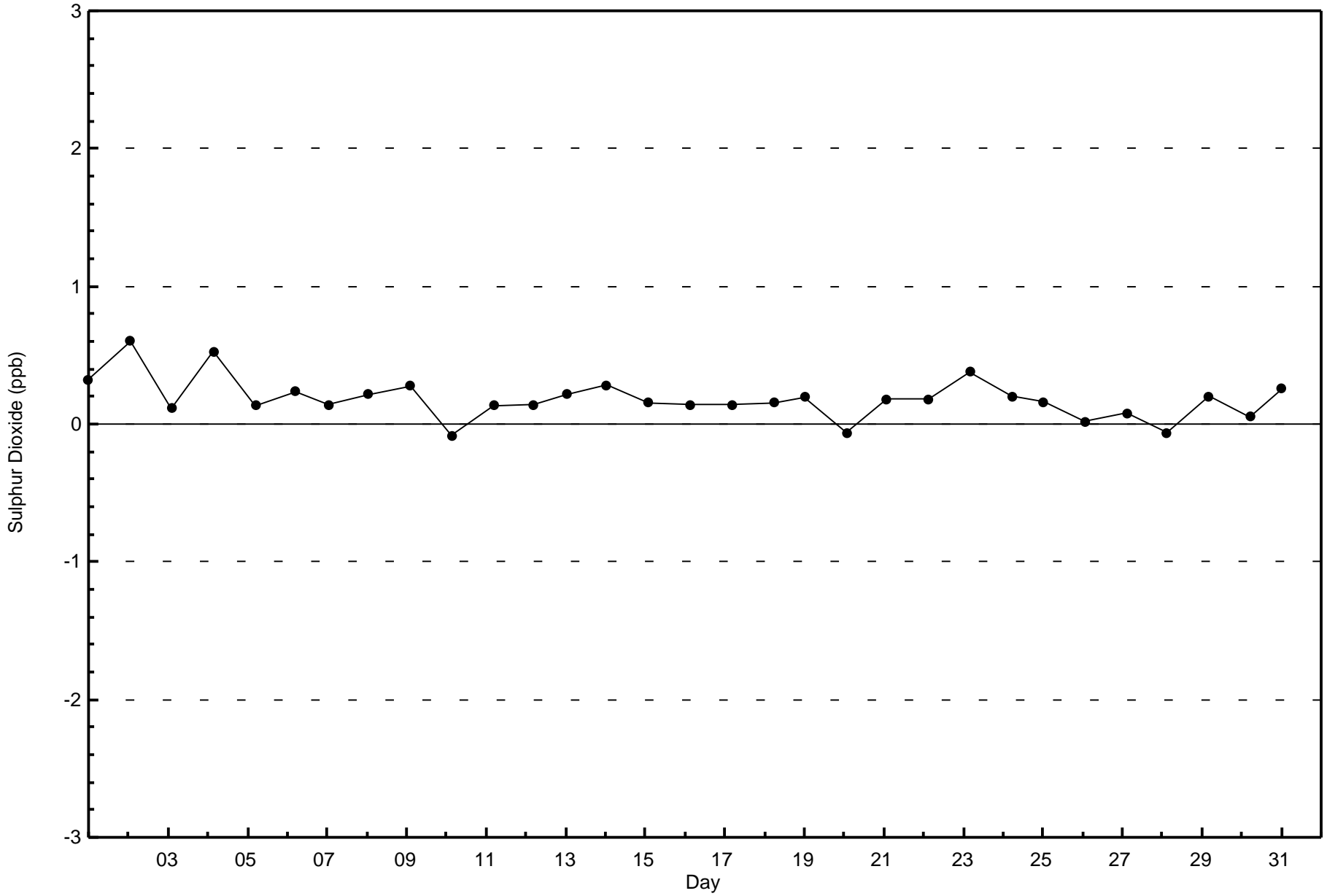


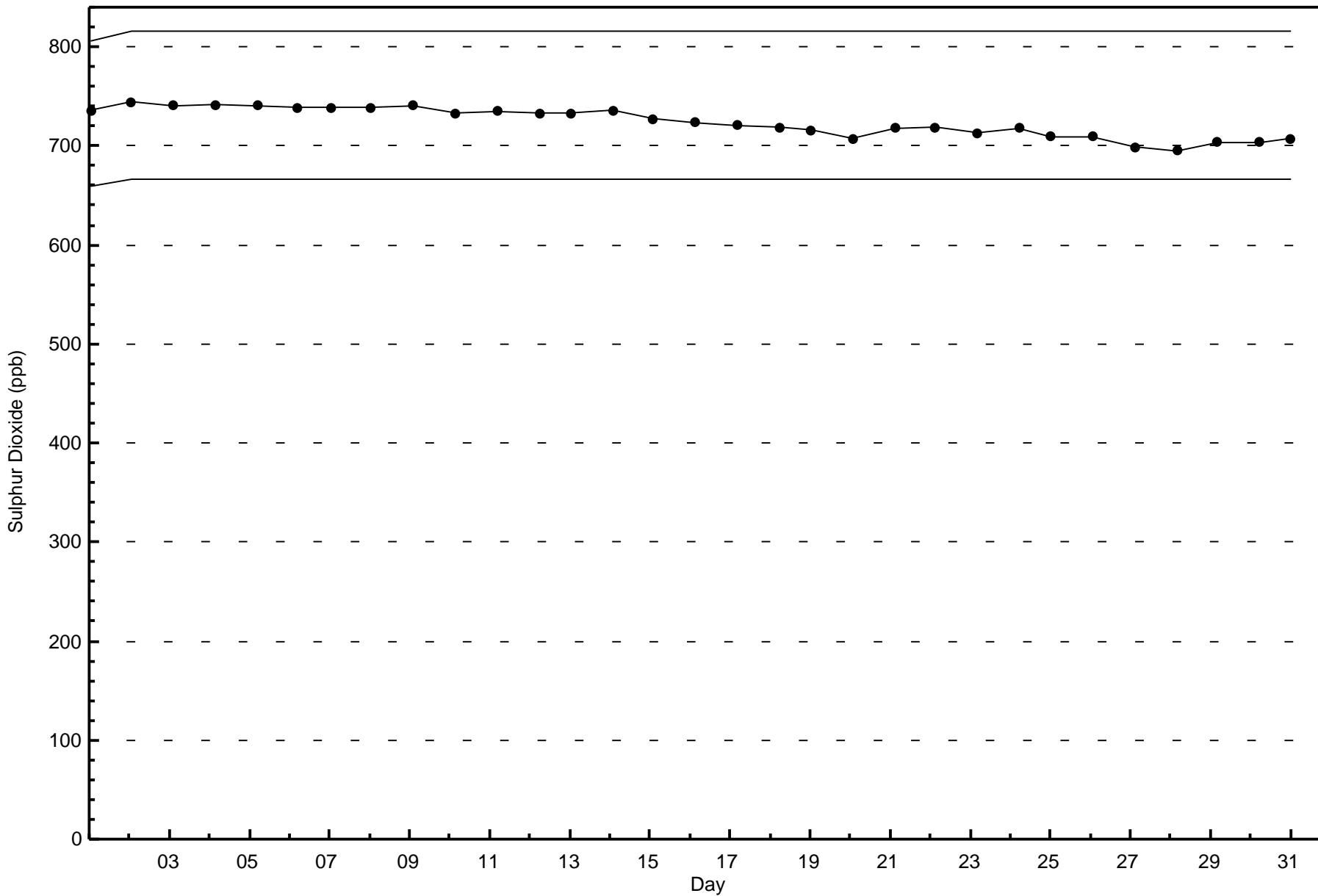
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River (AMS 16)



Total Number of Valid Hours: 707







Wood Buffalo Environmental Association
Summary of Hour Averages

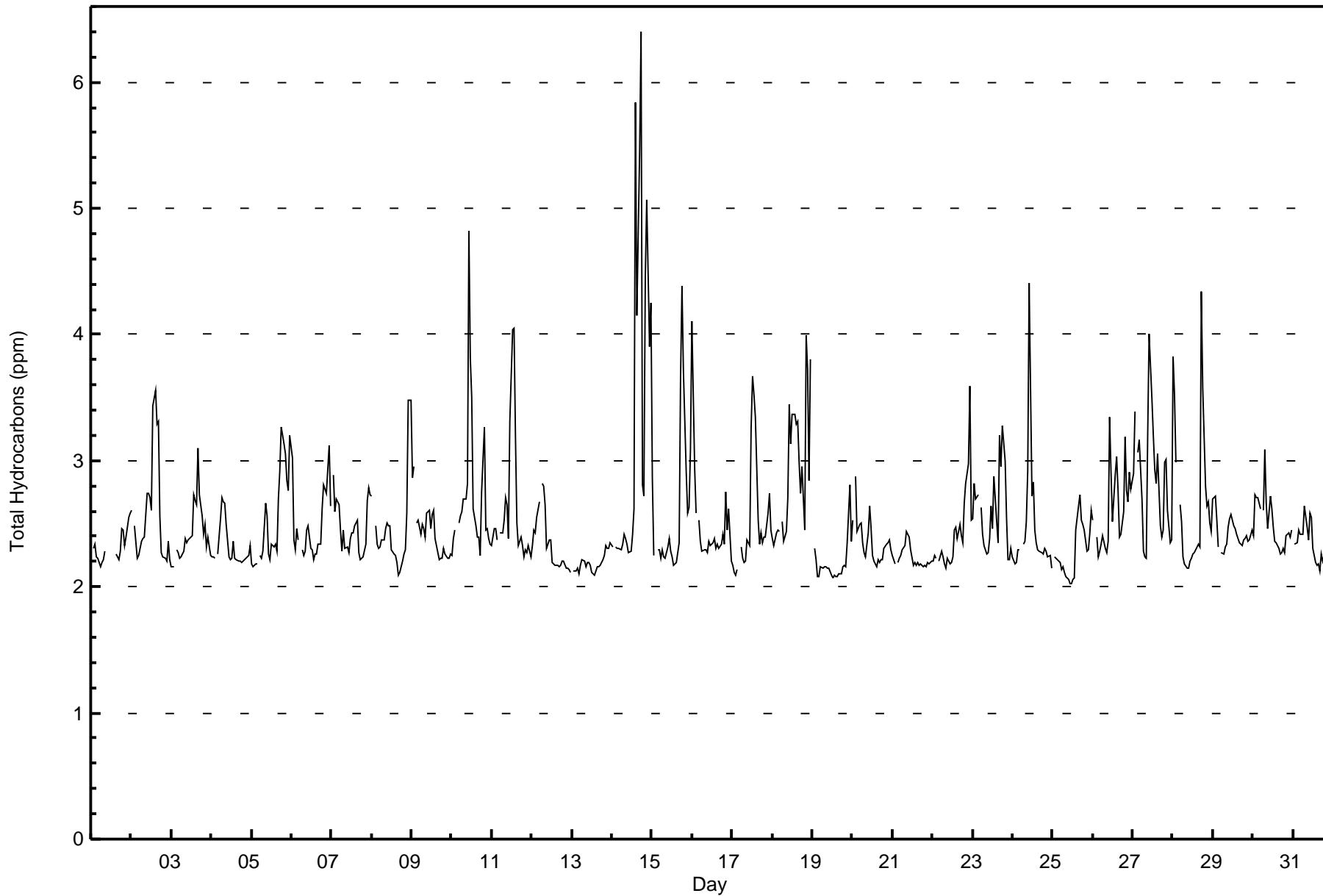
Total Hydrocarbons (THC) - ppm
Shell Muskeg River - March 2017

Maximum Value: 6.4 ppm on Mar 14 18:00		Maximum Daily Average: 3.3 ppm on Mar 14		Hours in Service: 744																							
Minimum Value: 2.0 ppm on Mar 25 11:00		Minimum Daily Average: 2.2 ppm on Mar 19		Hours of Data: 707																							
Maximum Diurnal Average: 2.7 ppm at hour 11		Minimum Diurnal Average: 2.4 ppm at hour 6		Hours of Missing Data: 37																							
Monthly Average: 2.51 ppm		Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.2 Median = 2.4 Q ₃ = 2.6 P ₉₀ = 3.0 P ₉₉ = 4.4		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-Mar	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	C	C	C	C	C	C	2.3	2.2	2.3	2.5	2.5	2.3	2.4	2.6	2.6	--	2.6	
2-Mar	2.6	Z	2.5	2.2	2.2	2.3	2.4	2.4	2.4	2.7	2.7	2.7	2.6	3.4	3.6	3.3	3.3	2.6	2.3	2.2	2.2	2.2	2.4	2.2	2.6	3.6	
3-Mar	2.2	2.2	Z	2.3	2.3	2.2	2.2	2.3	2.4	2.3	2.4	2.4	2.4	2.7	2.7	2.6	3.1	2.7	2.6	2.4	2.5	2.3	2.4	2.2	2.4	3.1	
4-Mar	2.2	2.2	2.2	Z	2.3	2.5	2.7	2.7	2.7	2.5	2.2	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.7	
5-Mar	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.3	2.7	2.6	2.3	2.2	2.3	2.3	2.3	2.3	2.7	2.9	3.3	3.1	3.1	2.8	2.8	3.2	2.5	3.3	
6-Mar	3.0	2.4	2.3	2.5	2.4	Z	2.3	2.2	2.3	2.4	2.5	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.6	2.8	2.8	2.7	3.1	2.6	2.5	3.1	
7-Mar	Z	2.9	2.6	2.7	2.7	2.5	2.3	2.4	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.5	2.3	2.2	2.2	2.2	2.3	2.7	2.8	2.7	2.5	2.9	
8-Mar	2.7	Z	2.5	2.3	2.3	2.3	2.4	2.4	2.5	2.5	2.5	2.5	2.3	2.3	2.3	2.2	2.1	2.1	2.2	2.3	2.3	2.6	3.5	3.5	2.5	3.5	
9-Mar	2.9	3.0	Z	2.5	2.5	2.4	2.5	2.5	2.4	2.6	2.6	2.5	2.6	2.6	2.4	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3	2.4	3.0	
10-Mar	2.2	2.4	2.5	Z	2.5	2.6	2.6	2.7	2.7	2.8	4.8	3.8	3.5	2.6	2.5	2.4	2.4	2.2	2.8	3.3	2.5	2.5	2.4	2.3	2.7	4.8	
11-Mar	2.3	2.5	2.5	2.4	Z	2.4	2.4	2.5	2.7	2.7	2.4	3.3	4.0	4.0	3.2	2.5	2.3	2.4	2.3	2.2	2.3	2.3	2.3	2.2	2.6	4.0	
12-Mar	2.3	2.5	2.4	2.6	2.7	Z	2.8	2.8	2.7	2.3	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.3	2.8	
13-Mar	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.3	
14-Mar	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.4	2.6	5.8	4.1	5.5	6.4	2.8	2.7	4.4	5.1	3.9	4.2	3.3	6.4	
15-Mar	2.9	2.2	Z	2.3	2.3	2.2	2.3	2.2	2.2	2.3	2.4	2.3	2.2	2.2	2.2	2.3	2.3	3.7	4.4	3.7	2.9	2.6	2.6	3.1	2.6	4.4	
16-Mar	4.1	2.9	2.6	Z	2.5	2.4	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.4	2.3	2.8	2.4	2.6	2.2	2.5	4.1	
17-Mar	2.2	2.1	2.1	2.1	Z	2.3	2.2	2.2	2.2	2.4	2.3	3.3	3.7	3.5	3.3	2.5	2.3	2.4	2.4	2.4	2.4	2.6	2.7	2.4	2.5	3.7	
18-Mar	2.4	2.3	2.4	2.5	2.4	Z	2.5	2.4	2.4	2.7	3.5	3.1	3.4	3.4	3.3	3.3	3.0	2.7	3.0	2.4	4.0	3.7	2.8	3.8	2.9	4.0	
19-Mar	Z	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.8	2.4	2.2	2.8	
20-Mar	2.5	Z	2.9	2.4	2.5	2.5	2.4	2.3	2.2	2.4	2.6	2.5	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.3	2.4	2.9	
21-Mar	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4	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	2.4	
22-Mar	2.2	2.2	2.2	Z	2.2	2.3	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.5	2.5	2.4	2.5	2.4	2.4	2.7	2.8	3.0	3.6	2.5	2.4	3.6	
23-Mar	2.5	2.8	2.7	2.7	Z	2.6	2.4	2.3	2.3	2.4	2.6	2.5	2.9	2.5	2.4	3.2	2.9	3.3	3.0	2.5	2.2	2.2	2.3	2.6	2.6	3.3	
24-Mar	2.2	2.2	2.2	2.3	2.3	Z	2.3	2.4	2.5	2.9	4.4	2.7	2.8	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.5	2.5	4.4	
25-Mar	Z	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.4	2.6	2.7	2.5	2.5	2.5	2.3	2.3	2.4	2.6	2.3	2.7	
26-Mar	2.5	Z	2.4	2.2	2.3	2.3	2.4	2.3	2.3	2.4	3.3	2.9	2.5	2.9	3.0	2.8	2.4	2.4	2.6	3.2	2.8	2.7	2.9	2.8	2.6	3.3	
27-Mar	2.9	3.4	Z	3.1	3.2	2.7	2.3	2.2	2.2	3.2	4.0	3.5	3.2	2.9	2.8	3.1	2.5	2.4	2.5	3.0	3.0	2.6	2.4	2.4	2.8	4.0	
28-Mar	3.8	3.5	3.0	Z	2.7	2.5	2.2	2.2	2.2	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	4.3	3.6	2.8	2.6	2.7	2.5	2.4	2.7	4.3
29-Mar	2.7	2.7	2.5	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.5	2.5	2.6	2.5	2.5	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.7
30-Mar	2.4	2.7	2.7	2.7	2.6	Z	2.6	3.1	2.7	2.5	2.7	2.6	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.5	3.1	
31-Mar	Z	2.3	2.4	2.4	2.4	2.4	2.4	2.6	2.5	2.4	2.6	2.5	2.3	2.2	2.2	2.2	2.1	2.3	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.6	
																								Diurnal Average			
																								Diurnal Maximum			
2.6 2.5 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.7 2.6 2.5 2.6 2.6 2.5 2.5 2.6 2.5 2.5 2.6 2.6 2.6 2.6 2.6 2.6																											
4.1 3.5 3.0 3.1 3.2 2.7 2.8 3.1 2.7 3.2 4.8 3.8 4.0 4.0 5.8 4.1 5.5 6.4 4.4 3.7 4.4 5.1 3.9 4.2 4.2 4.2																											
Z - zerospan C - Calibration																											



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - March 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	2	0.28	0.28
2.1 - 3.0	640	90.52	90.81
3.1 - 10.0	65	9.19	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
Shell Muskeg River - March 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	0	0	0	0	0	0	0	0	2
2.1 - 3.0	30	101	83	59	34	22	42	47	84	49	19	15	17	17	13	8	640
3.1 - 10.0	16	10	3	0	3	0	3	1	1	0	1	2	0	0	9	16	65
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	46	111	86	59	37	22	46	49	85	49	20	17	17	17	22	24	707

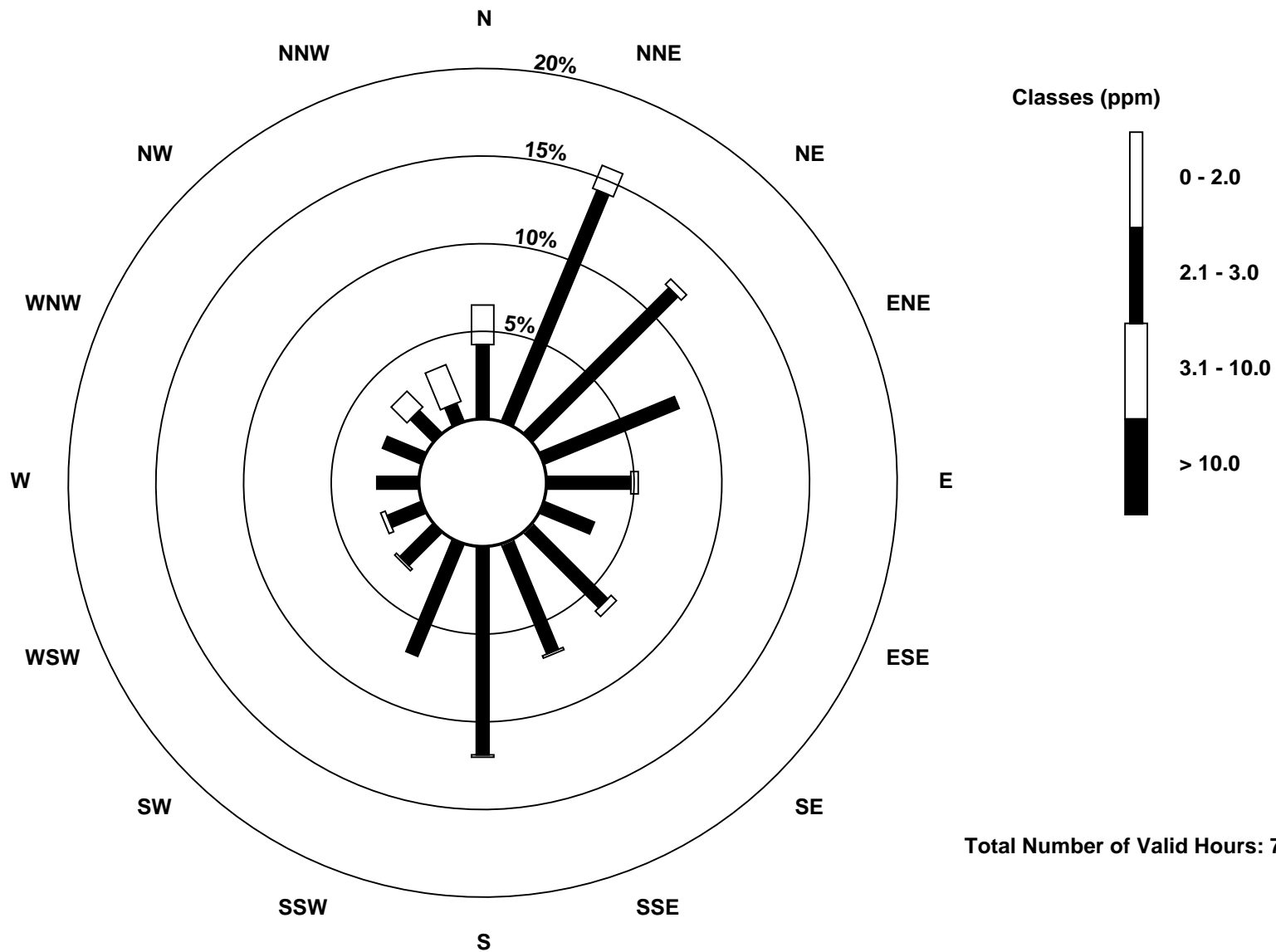
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

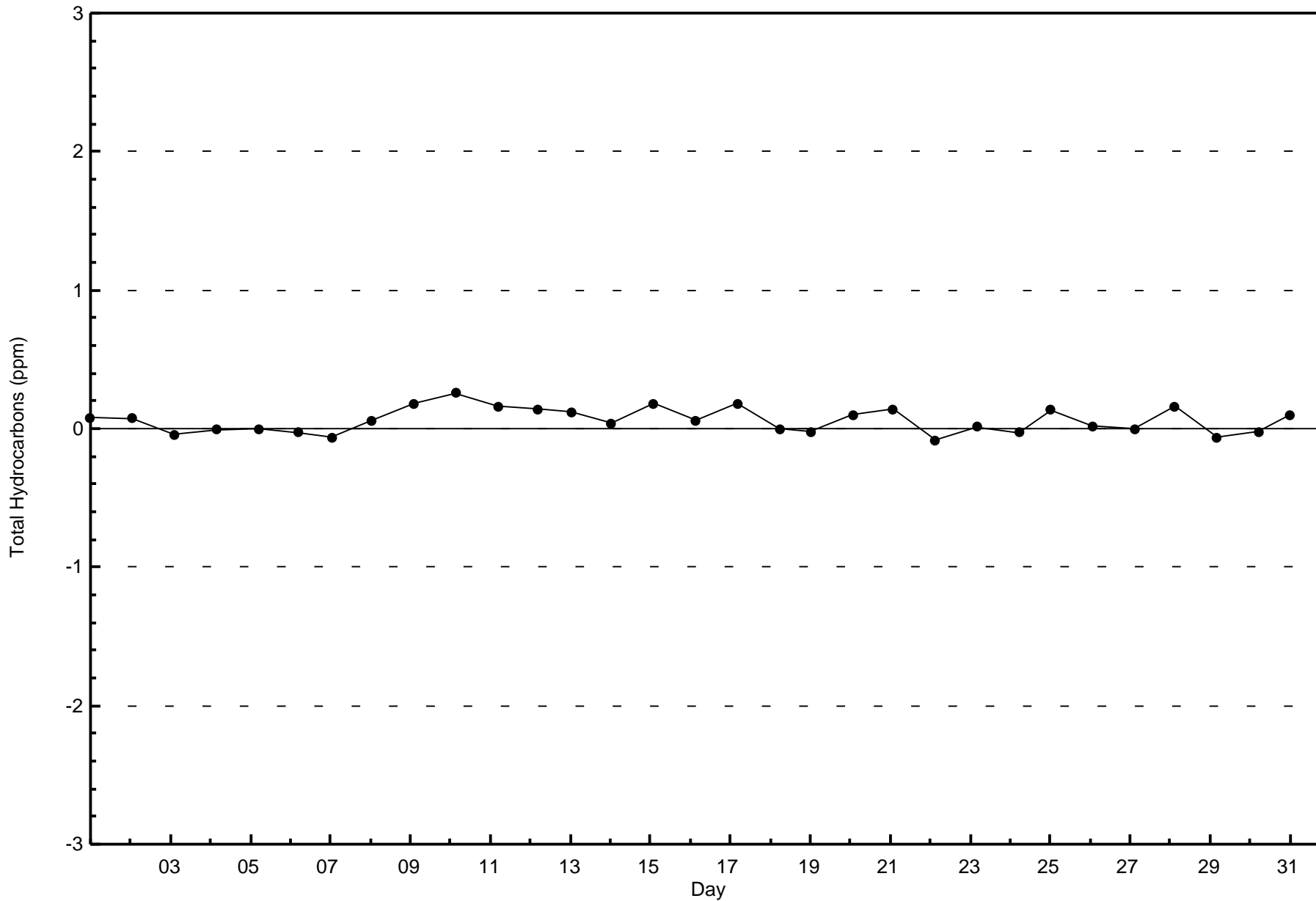
Total Hydrocarbons (THC) - ppm
Shell Muskeg River (AMS 16)

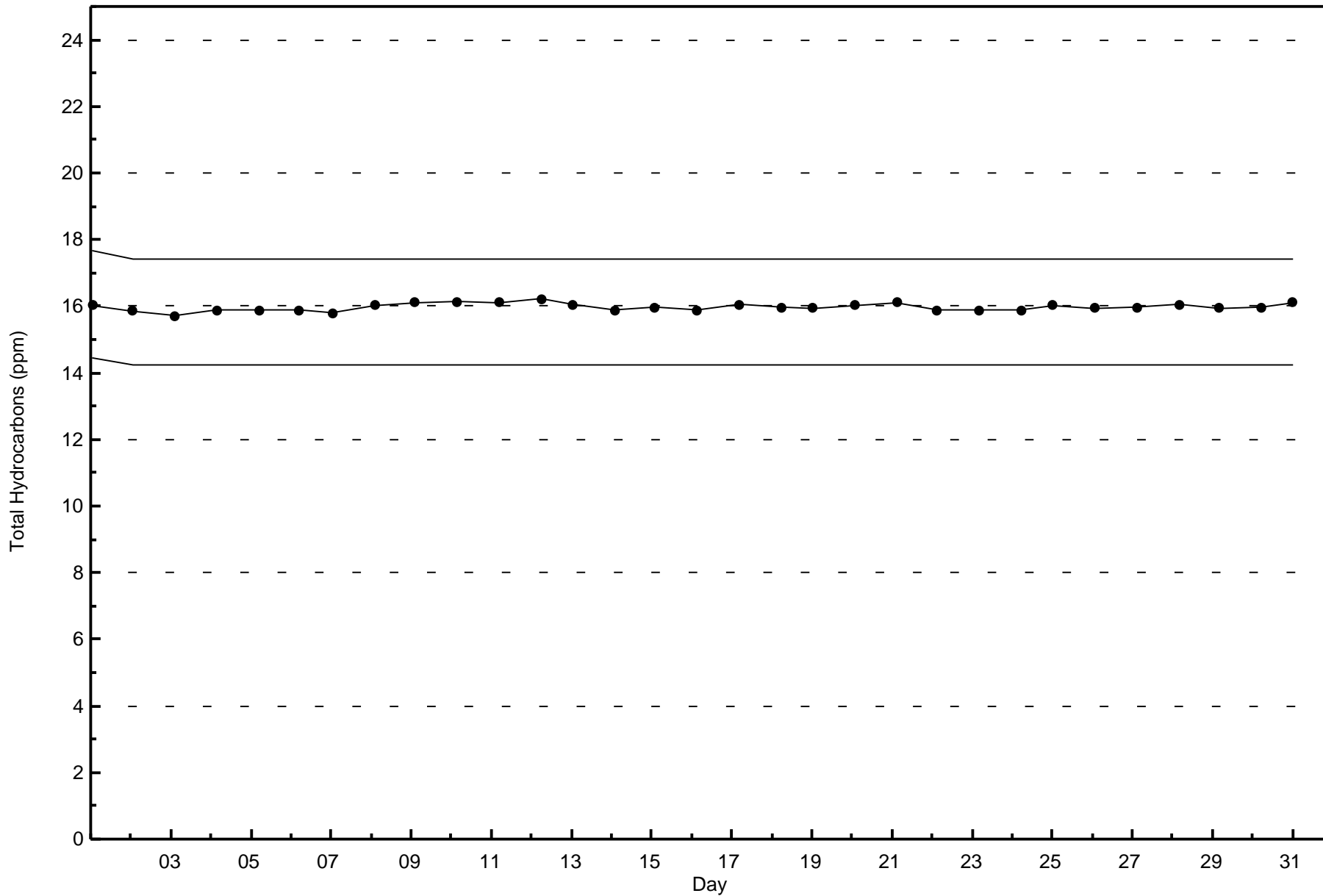




Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - March 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

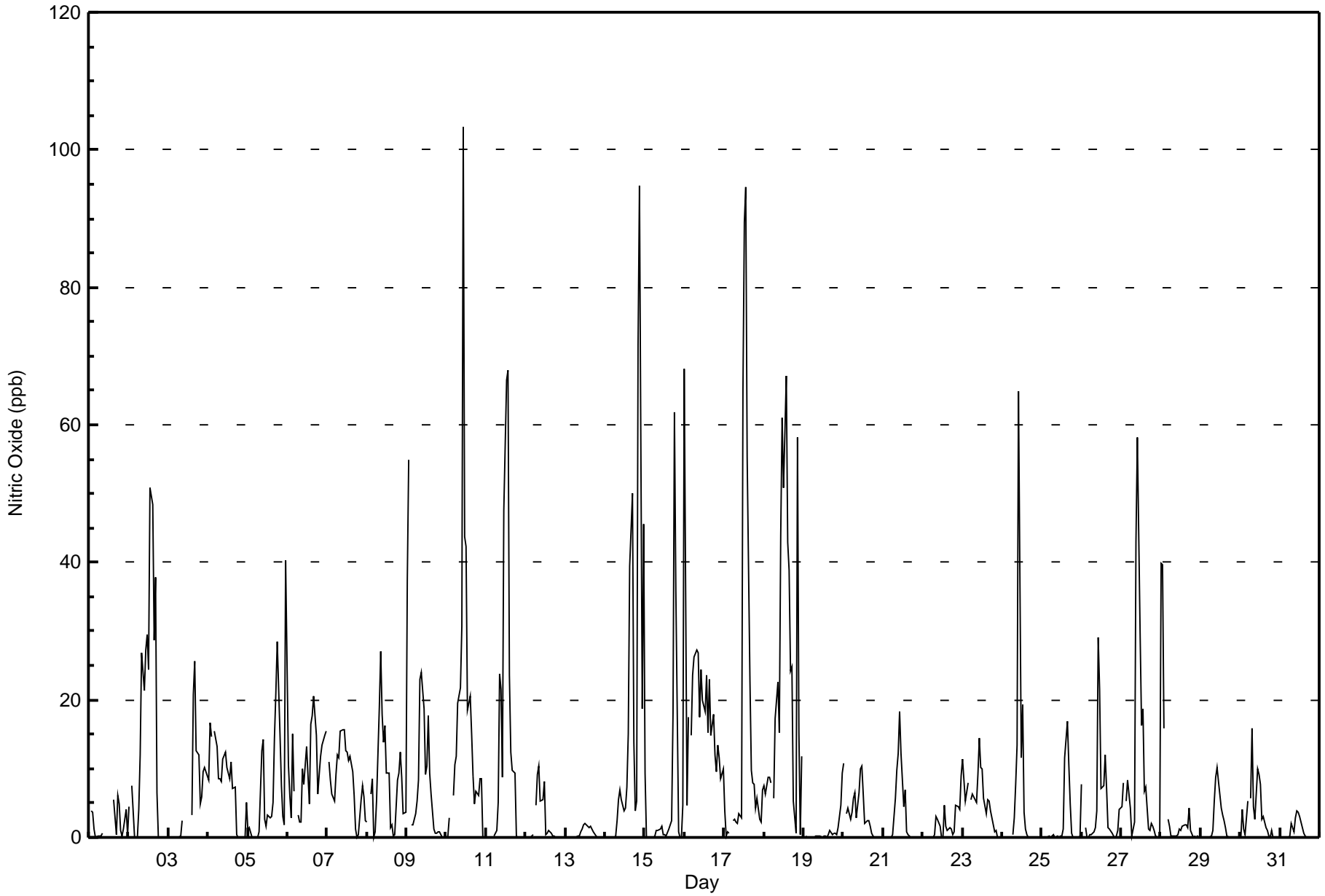
Shell Muskeg River - March 2017

Maximum Value: 103 ppb on Mar 10 11:00		Maximum Daily Average: 23.7 ppb on Mar 18		Hours in Service: 744																						
Minimum Value: 0 ppb on Mar 2 21:00		Minimum Daily Average: 0.6 ppb on Mar 13		Hours of Data: 702																						
Maximum Diurnal Average: 17.8 ppb at hour 11		Minimum Diurnal Average: 2.3 ppb at hour 4		Hours of Missing Data: 42																						
Monthly Average: 7.8 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 3 Q ₃ = 9 P ₉₀ = 21 P ₉₉ = 68		Hours of Calibration: 36																						
				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-Mar	Z	4	4	1	0	0	0	0	1	M	M	M	M	M	M	5	0	6	5	1	0	1	4	0	--	6
2-Mar	4	Z	7	0	0	0	4	12	27	21	27	29	24	51	48	29	38	6	0	0	0	0	0	0	14.3	51
3-Mar	0	0	Z	0	0	0	0	0	3	C	C	C	C	C	3	21	26	13	12	5	6	10	10	9	6.5	26
4-Mar	8	17	15	Z	15	13	9	9	8	11	12	10	9	9	11	7	7	0	0	0	0	0	0	5	7.7	17
5-Mar	1	1	0	0	Z	0	0	1	13	14	3	2	3	3	3	5	14	21	28	15	8	3	2	40	7.8	40
6-Mar	11	6	3	15	7	Z	3	2	2	10	8	13	9	5	16	18	21	15	6	9	12	13	15	15	10.2	21
7-Mar	Z	11	8	6	5	9	12	12	15	16	16	13	12	11	12	10	6	1	0	0	5	7	6	2	8.6	16
8-Mar	2	Z	6	9	0	1	5	19	27	18	14	16	9	9	1	2	0	0	8	9	12	9	4	4	8.1	27
9-Mar	37	55	Z	2	2	4	5	8	23	24	19	9	10	18	9	6	1	1	1	1	1	0	0	0	10.2	55
10-Mar	0	0	3	Z	6	11	12	20	22	31	103	44	42	18	21	15	9	5	7	6	8	9	0	0	17.0	103
11-Mar	0	0	0	0	Z	0	1	5	24	22	9	48	66	68	24	12	10	9	0	0	0	0	0	0	12.9	68
12-Mar	0	0	0	0	0	Z	5	9	10	5	6	8	0	1	1	1	0	0	0	0	0	0	0	0	2.0	10
13-Mar	Z	0	0	0	0	0	0	0	0	1	1	2	2	2	1	2	1	1	0	0	0	0	0	0	0.6	2
14-Mar	0	Z	0	0	0	0	0	2	6	7	5	4	4	7	15	40	50	14	4	5	72	95	19	46	17.2	95
15-Mar	9	0	Z	0	0	0	0	1	1	1	2	0	0	0	1	2	3	18	62	36	1	0	0	5	6.2	62
16-Mar	68	5	18	Z	15	24	26	27	27	17	24	20	18	24	15	23	15	18	12	10	13	12	9	10	19.5	68
17-Mar	4	0	1	1	Z	2	3	2	2	4	3	65	89	95	55	23	10	8	8	4	6	3	2	7	17.2	95
18-Mar	8	6	9	9	8	Z	6	17	23	15	44	61	51	67	43	39	24	25	5	1	58	15	0	12	23.7	67
19-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	5	9	0.9	9
20-Mar	11	Z	3	4	3	4	6	7	3	6	10	10	6	2	2	2	2	1	0	0	0	0	0	0	3.6	11
21-Mar	0	0	Z	0	0	0	0	6	10	12	18	12	4	7	1	0	0	0	0	0	0	0	0	0	3.1	18
22-Mar	0	0	0	Z	0	0	0	0	3	3	2	0	0	5	2	1	1	1	0	1	5	4	4	9	1.8	9
23-Mar	11	8	5	8	Z	6	6	6	5	9	14	10	10	6	4	5	5	4	3	1	1	0	0	0	5.6	14
24-Mar	0	0	0	0	0	Z	0	3	8	14	65	12	19	4	1	0	0	0	0	0	0	0	0	0	5.5	65
25-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	12	17	10	5	1	0	0	0	0	0	2.1	17
26-Mar	8	Z	2	0	0	0	0	1	1	4	29	22	7	8	12	7	1	1	1	0	0	0	1	4	4.7	29
27-Mar	4	8	Z	5	8	4	0	1	2	43	58	29	16	19	7	7	1	1	2	2	1	0	0	1	9.6	58
28-Mar	40	40	16	Z	3	2	0	0	0	0	0	1	1	2	2	2	1	4	1	0	0	0	0	0	5.0	40
29-Mar	0	0	0	0	Z	0	0	1	5	9	10	8	4	3	2	1	0	0	0	0	0	0	0	0	2.0	10
30-Mar	0	4	1	0	5	Z	6	16	4	3	10	9	8	3	3	2	1	0	0	1	0	0	0	0	3.3	16
31-Mar	Z	0	0	0	0	0	0	2	1	3	4	4	3	1	1	0	0	0	0	0	0	0	0	0	0.8	4
																								Diurnal Average		
																								Diurnal Maximum		
9.1 6.4 3.9 2.3 3.0 3.1 3.6 6.1 8.9 11.1 17.8 15.9 14.9 15.4 11.0 9.8 8.4 5.8 5.4 3.5 6.8 5.9 2.6 5.8																										
68 55 18 15 15 24 26 27 27 43 103 65 89 95 55 40 50 25 62 36 72 95 19 46																										
Z - zerospan C - Calibration M - Maintenance																										



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Shell Muskeg River - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Shell Muskeg River - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	632	90.03	90.03
21 - 40	42	5.98	96.01
41 - 80	24	3.42	99.43
81 - 159	4	0.57	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**

**Nitric Oxide (NO) - ppb
Shell Muskeg River - March 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	34	97	85	59	37	21	46	48	80	45	17	14	15	14	12	8	632
21 - 40	5	12	0	0	0	1	0	1	3	1	2	3	2	2	3	7	42
11 - 80	7	2	0	0	0	0	0	0	1	0	0	0	0	1	6	7	24
81 - 159	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2	4
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	46	111	86	59	37	22	46	49	84	46	19	17	17	17	22	24	702

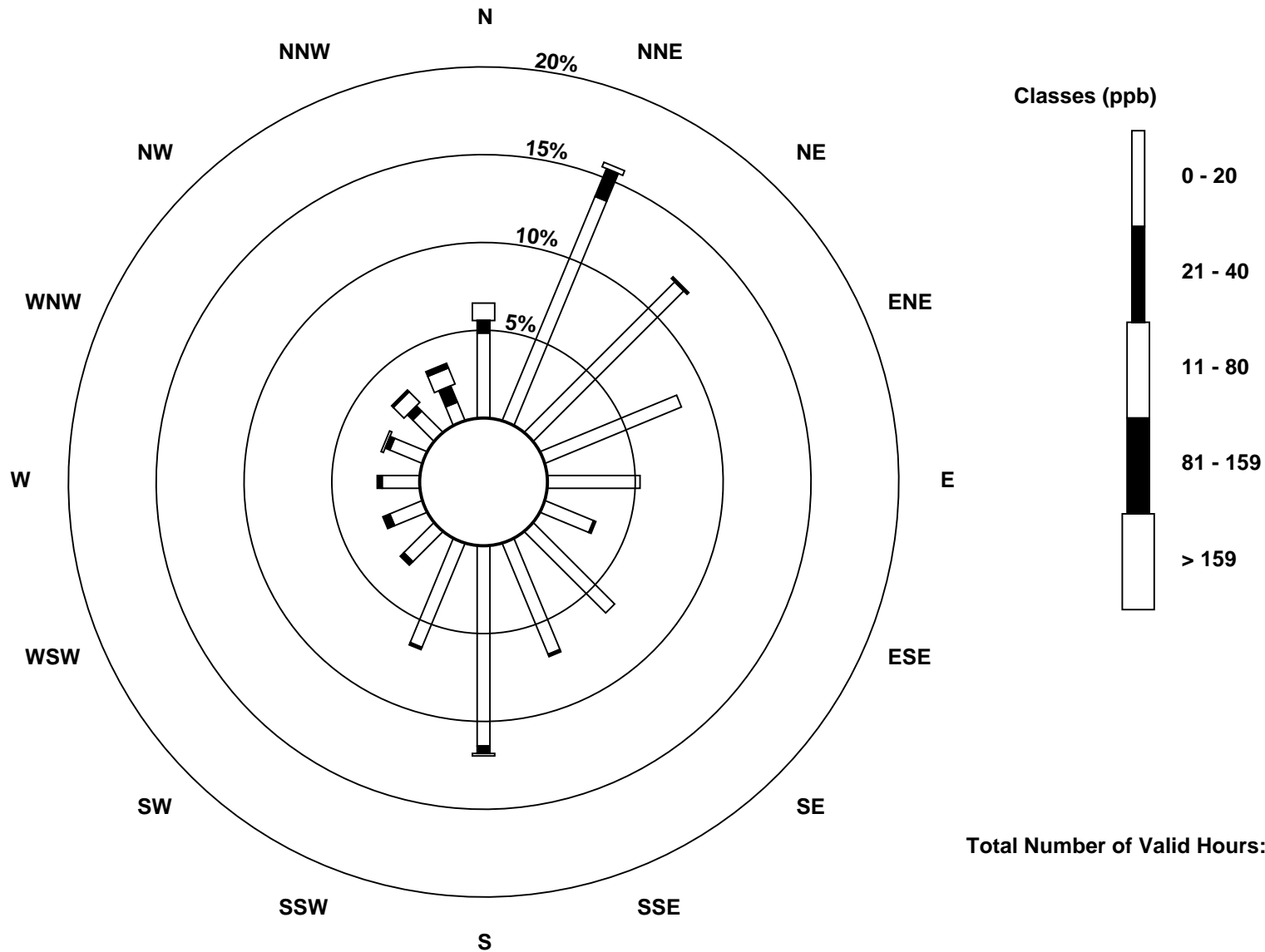
Total Number of Valid Hours: 702

Total Number of Hours: 744

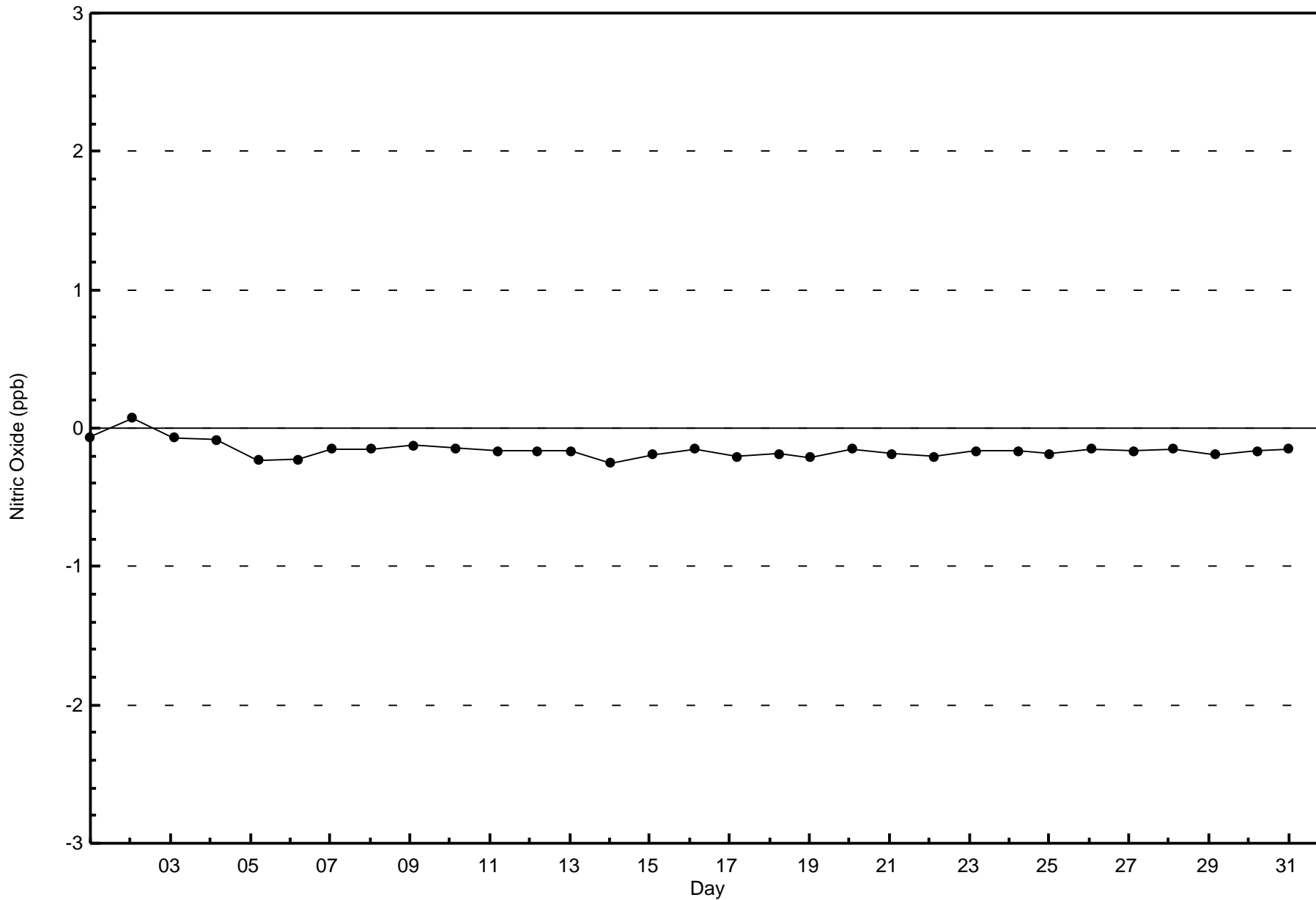


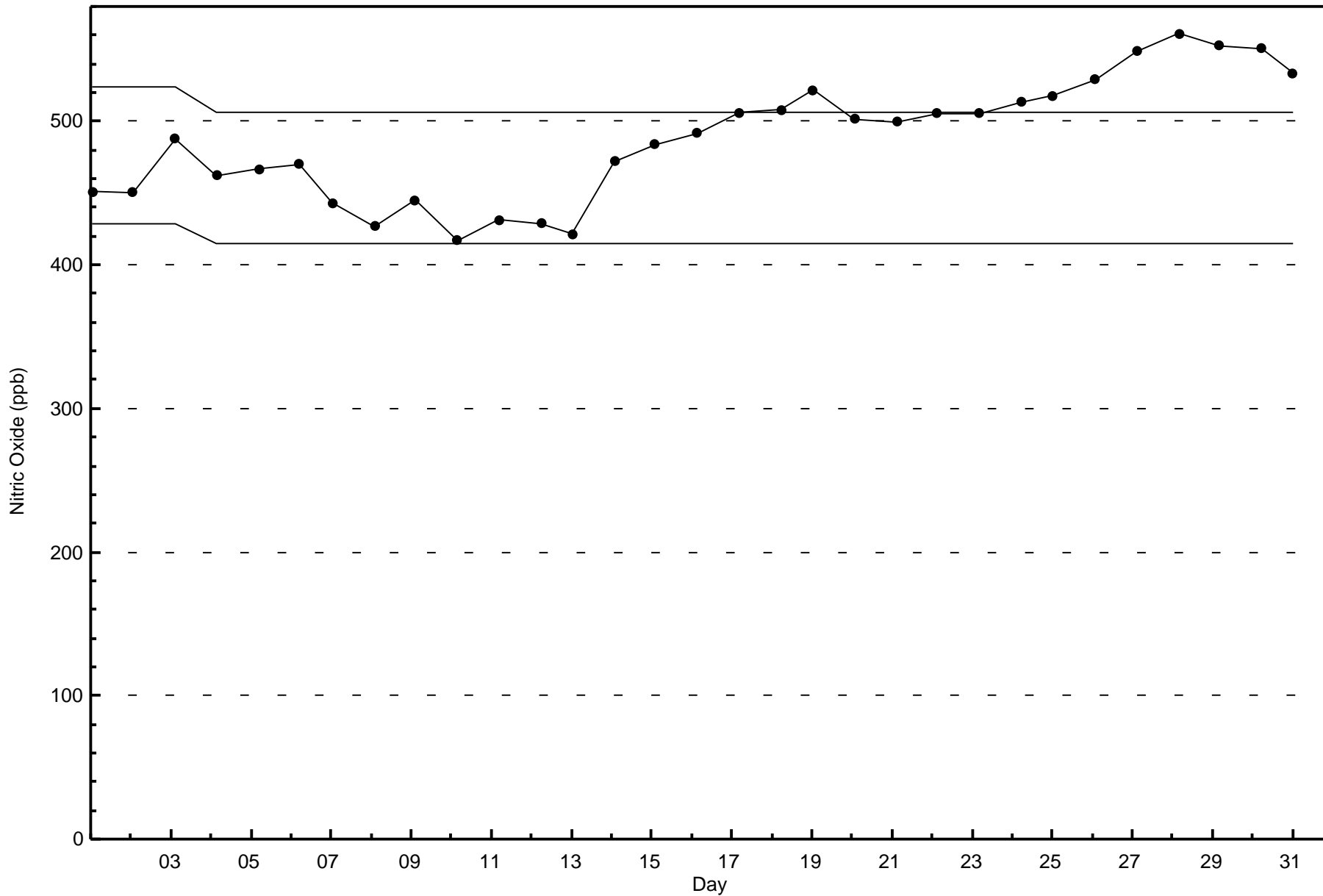
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitric Oxide (NO) - ppb
Shell Muskeg River (AMS 16)



Total Number of Valid Hours: 702







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Shell Muskeg River - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 52 ppb on Mar 15 19:00	Maximum Daily Average: 22.5 ppb on Mar 18		Hours of Data:	702
Minimum Value: 0 ppb on Mar 19 05:00	Minimum Daily Average: 3.1 ppb on Mar 19		Hours of Missing Data:	42
Maximum Diurnal Average: 12.5 ppb at hour 11	Minimum Diurnal Average: 7.7 ppb at hour 4		Hours of Calibration:	36
Monthly Average: 10.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 4 Median = 9 Q ₃ = 14 P ₉₀ = 23 P ₉₉ = 42		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-Mar	Z	11	13	4	1	2	3	2	3	M	M	M	M	M	M	6	2	10	21	22	12	32	31	22	--	32
2-Mar	28	Z	27	12	18	22	29	30	26	21	21	22	20	30	33	30	37	19	6	5	5	3	4	3	19.6	37
3-Mar	2	2	Z	2	3	2	4	6	10	C	C	C	C	C	14	23	29	23	10	11	14	15	12	11.3	29	
4-Mar	12	18	16	Z	19	16	18	13	11	11	10	8	9	11	8	9	4	3	1	1	5	6	14	10.2	19	
5-Mar	9	8	5	4	Z	3	2	12	29	22	7	5	7	7	7	10	26	40	46	42	38	37	34	38	19.0	46
6-Mar	23	12	6	18	11	Z	7	5	4	12	7	10	8	4	11	13	15	13	9	12	15	14	17	13	11.2	23
7-Mar	Z	12	9	9	7	8	10	10	9	10	9	8	8	7	8	8	7	3	3	3	9	15	14	9	8.4	15
8-Mar	10	Z	12	17	10	13	23	28	27	19	16	13	9	8	3	3	1	3	8	10	14	12	12	12	12.3	28
9-Mar	22	26	Z	16	16	17	16	14	15	12	9	4	5	7	6	5	2	2	3	4	2	1	2	1	9.0	26
10-Mar	2	7	11	Z	11	12	12	13	11	14	31	19	17	10	13	12	10	9	15	11	10	15	6	4	12.0	31
11-Mar	4	4	4	2	Z	10	9	14	19	16	8	23	28	30	18	13	12	12	6	3	2	8	16	5	11.5	30
12-Mar	4	5	4	5	11	Z	19	17	13	8	8	10	2	2	3	3	2	3	4	4	2	2	2	2	5.7	19
13-Mar	Z	2	3	4	3	5	9	8	4	6	6	6	6	6	7	8	9	10	10	17	8	9	12	13	7.4	17
14-Mar	15	Z	5	6	11	8	7	14	14	13	11	8	9	12	26	38	42	35	22	25	46	44	24	40	20.7	46
15-Mar	18	5	Z	9	10	12	15	14	10	7	6	3	3	2	5	7	11	39	52	43	14	4	10	20	13.8	52
16-Mar	37	13	19	Z	17	19	19	20	19	13	15	14	15	14	12	16	14	18	14	12	16	13	11	11	16.2	37
17-Mar	6	2	4	4	Z	18	20	14	8	10	12	37	42	44	36	21	12	11	13	10	10	10	9	10	15.8	44
18-Mar	12	10	12	13	11	Z	14	19	22	16	29	34	32	34	29	33	30	32	23	7	41	25	12	30	22.5	41
19-Mar	Z	3	3	1	0	0	0	0	0	0	0	0	0	0	0	1	2	2	4	5	4	12	17	17	3.1	17
20-Mar	13	Z	19	15	12	13	10	5	2	5	8	8	5	2	3	4	4	3	4	10	6	5	5	3	7.2	19
21-Mar	2	1	Z	1	2	6	12	17	16	15	21	14	5	8	2	1	1	1	2	1	0	0	0	0	5.5	21
22-Mar	0	0	1	Z	1	1	0	1	3	2	2	0	0	13	13	8	12	17	19	18	14	14	17	14	7.3	19
23-Mar	16	14	10	13	Z	9	10	9	5	8	13	10	10	9	6	9	19	23	22	13	8	2	2	3	10.5	23
24-Mar	2	0	2	4	10	Z	11	11	13	15	35	14	18	9	7	2	1	1	1	1	0	1	0	1	6.8	35
25-Mar	Z	1	1	7	11	6	9	6	0	1	0	1	1	5	25	29	26	21	11	6	5	7	7	8	8.4	29
26-Mar	17	Z	9	4	4	11	7	5	4	6	19	16	16	19	23	12	6	8	10	15	8	5	9	18	10.9	23
27-Mar	11	12	Z	12	8	7	5	6	6	22	28	23	15	13	9	12	3	4	6	12	9	5	2	4	10.1	28
28-Mar	24	17	16	Z	13	12	3	1	1	2	2	6	4	3	4	5	5	18	17	9	15	9	7	6	8.6	24
29-Mar	4	3	4	4	Z	1	2	3	6	9	10	8	6	6	6	4	1	0	1	1	2	0	1	2	3.6	10
30-Mar	0	10	15	11	12	Z	17	16	11	11	15	15	11	6	5	4	2	1	1	3	1	5	2	2	7.7	17
31-Mar	Z	3	3	4	4	4	3	7	4	4	6	7	6	4	2	0	1	1	1	1	2	3	4	6	3.4	7

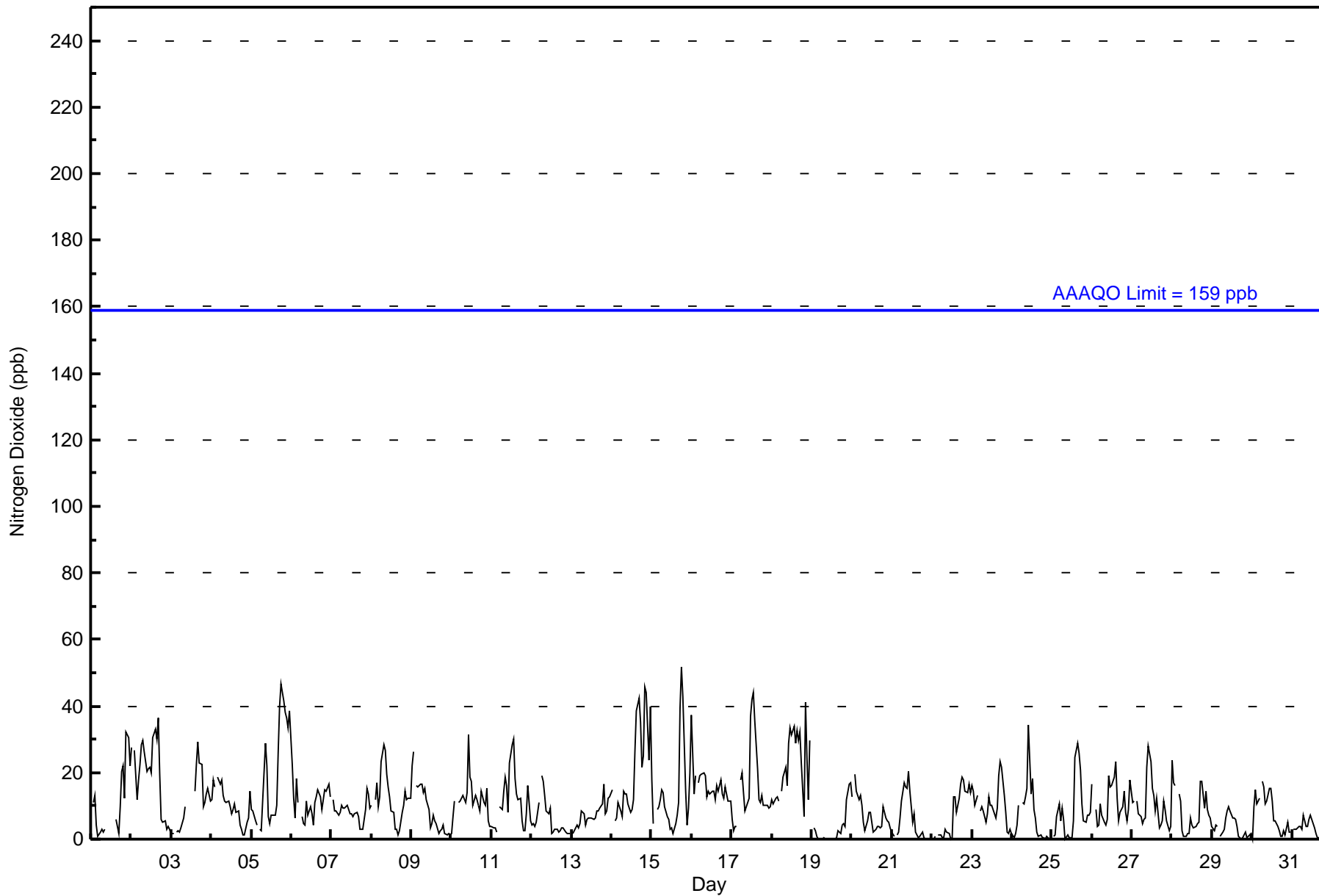
11.6	7.7	9.0	7.7	9.1	9.1	10.5	10.9	10.5	10.7	12.5	11.9	10.9	11.1	11.5	11.2	11.3	12.4	12.1	10.7	10.7	10.7	9.9	11.1	Diurnal Average
37	26	27	18	19	22	29	30	29	22	35	37	42	44	36	38	42	40	52	43	46	44	34	40	Diurnal Maximum

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
Shell Muskeg River - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	616	87.75	87.75
21 - 40	76	10.83	98.58
41 - 80	10	1.42	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
Shell Muskeg River - March 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	32	103	82	57	31	21	43	47	78	42	18	15	16	15	10	6	616
21 - 40	11	8	3	2	6	1	2	2	6	4	1	2	1	2	11	14	76
41 - 80	3	0	1	0	0	0	1	0	0	0	0	0	0	0	1	4	10
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	46	111	86	59	37	22	46	49	84	46	19	17	17	17	22	24	702

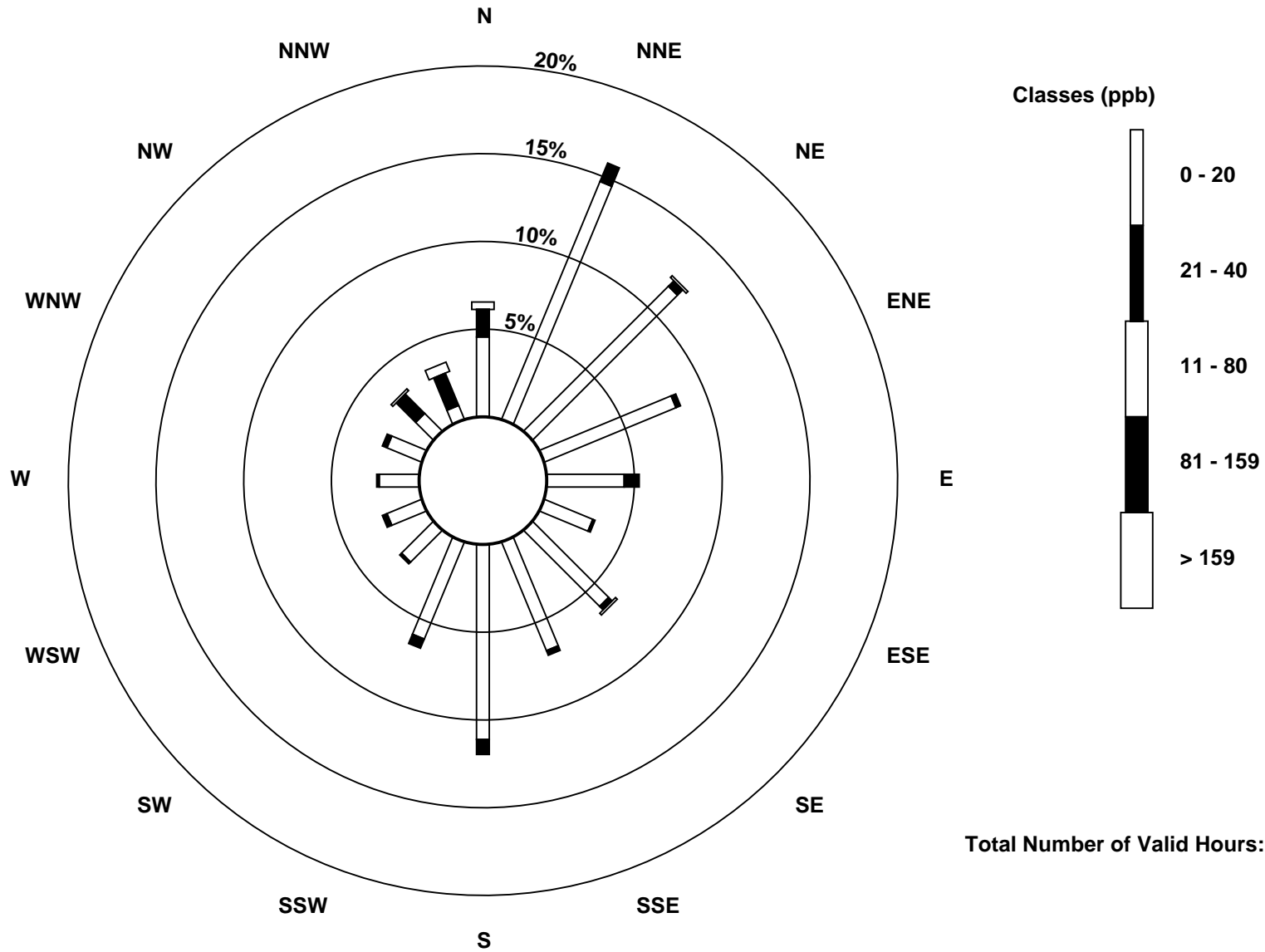
Total Number of Valid Hours: 702

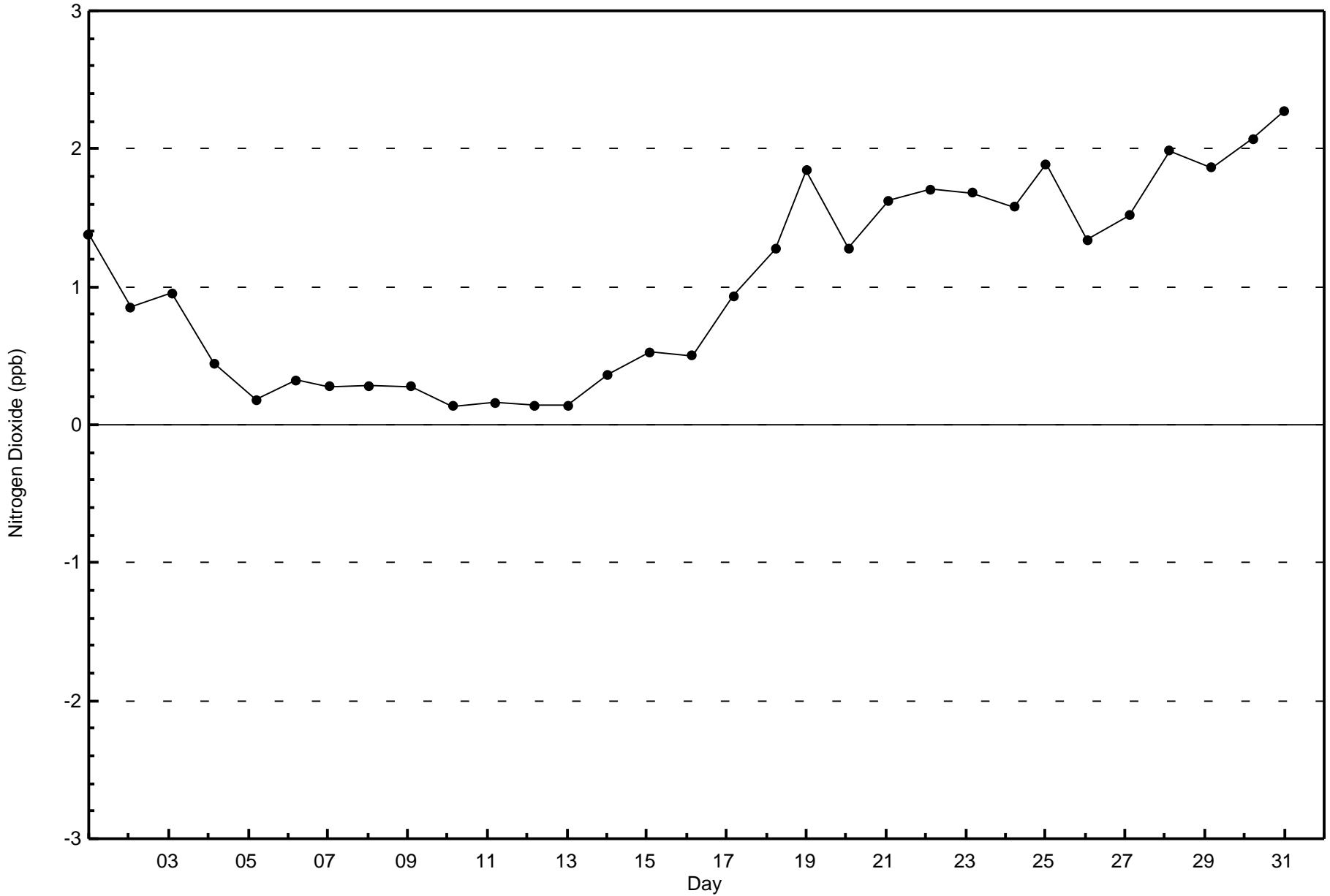
Total Number of Hours: 744

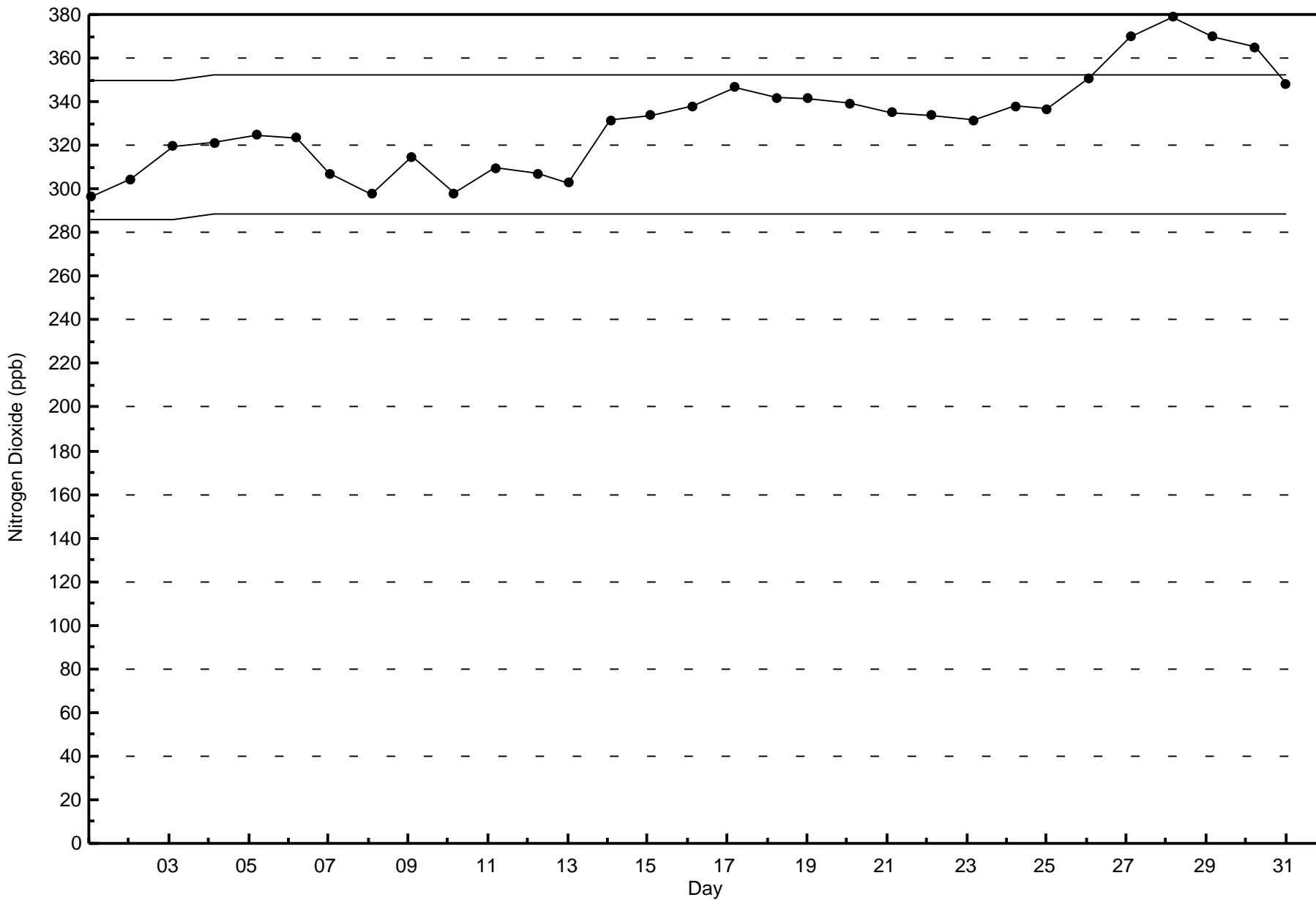


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River (AMS 16)





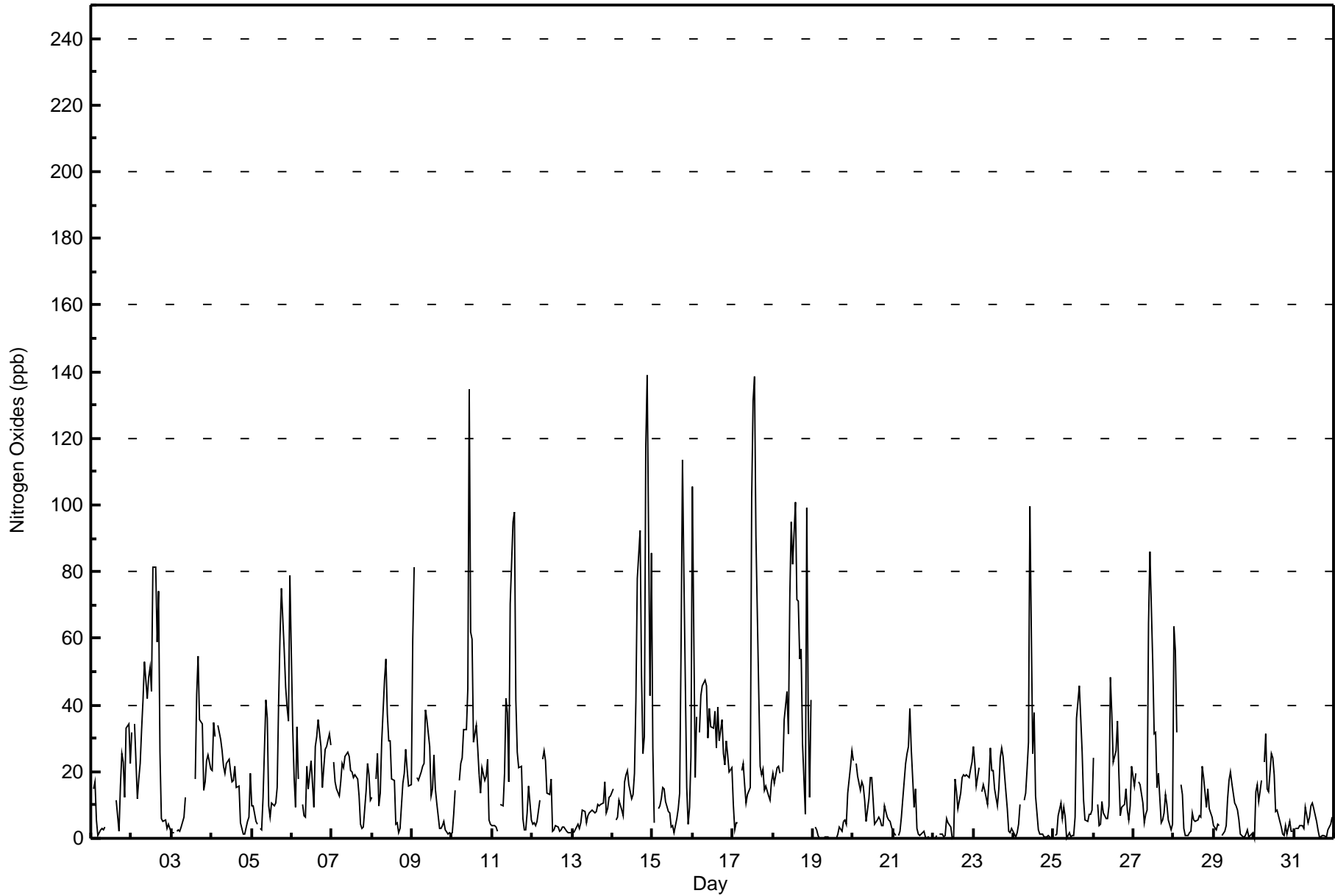




Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - March 2017

Maximum Value: 139 ppb on Mar 14 22:00																			Maximum Daily Average: 46.2 ppb on Mar 18						Hours in Service: 744		
Minimum Value: 0 ppb on Mar 21 21:00																			Minimum Daily Average: 4.0 ppb on Mar 19						Hours of Data: 702		
Maximum Diurnal Average: 30.3 ppb at hour 11																			Minimum Diurnal Average: 10.0 ppb at hour 4						Hours of Missing Data: 42		
Monthly Average: 18.4 ppb																			Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 4 Median = 13 Q ₃ = 23 P ₉₀ = 41 P ₉₉ = 101						Hours of Calibration: 36		
																									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-Mar	Z	15	17	5	1	3	3	3	3	M	M	M	M	M	M	12	2	16	25	23	12	33	34	22	--	34	
2-Mar	32	Z	34	12	18	23	33	42	53	42	48	51	44	81	81	59	74	26	6	5	5	3	4	3	33.9	81	
3-Mar	2	2	Z	2	3	2	4	6	12	C	C	C	C	C	18	43	55	36	35	15	17	23	25	21	17.7	55	
4-Mar	20	35	30	Z	34	30	26	22	19	23	24	20	17	17	22	15	16	5	3	1	1	5	6	20	17.9	35	
5-Mar	10	10	5	4	Z	3	2	12	41	36	10	6	11	10	10	15	40	60	75	56	46	40	35	79	26.8	79	
6-Mar	33	18	9	33	18	Z	10	7	6	22	15	23	16	9	27	31	35	27	15	21	27	28	32	28	21.4	35	
7-Mar	Z	23	17	15	13	17	22	21	25	26	25	20	20	18	19	18	13	4	3	3	14	23	19	12	16.9	26	
8-Mar	12	Z	18	26	10	13	29	47	54	37	29	29	18	17	4	5	2	3	16	19	27	21	16	16	20.4	54	
9-Mar	60	81	Z	18	17	20	22	22	38	36	28	13	15	25	15	11	3	3	4	5	3	1	2	1	19.2	81	
10-Mar	2	7	14	Z	17	22	24	33	33	45	135	62	60	29	34	27	19	13	21	17	19	24	6	4	29.0	135	
11-Mar	4	4	4	2	Z	10	10	19	42	38	17	70	95	98	42	26	21	21	6	3	2	8	16	5	24.4	98	
12-Mar	4	5	4	5	11	Z	24	26	24	14	13	18	2	3	4	3	2	3	3	4	2	2	1	2	7.7	26	
13-Mar	Z	2	3	4	3	4	9	8	5	7	8	8	8	8	8	10	10	10	11	17	8	9	12	13	8.0	17	
14-Mar	15	Z	5	6	11	9	7	17	19	20	16	12	13	19	41	78	92	49	25	30	117	139	43	85	37.8	139	
15-Mar	27	5	Z	9	10	12	15	15	11	8	8	4	4	2	6	9	13	57	114	79	15	4	10	25	20.0	114	
16-Mar	105	18	36	Z	32	43	46	47	46	30	39	34	33	38	27	39	29	36	26	22	29	25	20	21	35.7	105	
17-Mar	10	3	5	5	Z	20	23	16	10	13	15	102	131	139	91	44	22	19	21	14	16	13	11	17	33.0	139	
18-Mar	20	17	21	22	19	Z	20	36	44	32	73	95	82	101	72	71	54	57	28	7	99	40	12	41	46.2	101	
19-Mar	Z	3	3	1	0	0	0	1	0	0	0	0	0	0	0	1	3	2	5	5	4	14	21	26	4.0	26	
20-Mar	23	Z	23	19	14	17	16	12	5	12	18	18	11	4	5	6	5	4	4	10	6	5	5	3	10.7	23	
21-Mar	2	1	Z	1	2	6	12	22	26	27	39	27	10	15	3	1	1	1	2	0	0	0	0	0	8.6	39	
22-Mar	0	0	1	Z	1	1	0	1	6	5	3	0	0	18	14	9	14	18	19	19	19	18	21	23	9.1	23	
23-Mar	28	22	15	21	Z	14	16	14	10	17	27	20	20	15	10	15	24	27	24	14	9	2	2	3	16.1	28	
24-Mar	2	0	2	4	10	Z	12	13	21	29	99	25	38	13	8	2	1	1	1	0	0	1	0	1	12.3	99	
25-Mar	Z	1	1	7	11	6	9	6	0	2	0	1	1	6	36	46	36	26	11	6	5	7	7	8	10.4	46	
26-Mar	24	Z	10	4	4	11	7	6	6	10	48	37	23	26	35	20	7	9	10	15	8	6	10	22	15.6	48	
27-Mar	16	19	Z	17	16	11	5	7	9	64	86	53	31	32	15	19	5	5	8	13	10	6	2	4	19.7	86	
28-Mar	64	56	32	Z	16	13	3	1	1	2	2	8	5	5	6	7	6	22	18	9	15	9	7	6	13.6	64	
29-Mar	4	3	4	4	Z	1	2	4	12	17	20	17	10	10	8	5	1	0	1	1	2	0	1	2	5.6	20	
30-Mar	0	14	16	11	17	Z	23	31	15	14	25	24	19	8	8	5	3	1	1	4	1	5	2	2	10.9	31	
31-Mar	Z	3	3	4	4	4	3	9	5	7	10	11	9	5	2	0	1	1	1	1	2	3	4	6	4.2	11	
																			20.7 14.1 12.8 10.0 12.0 12.1 14.0 17.0 19.4 21.8 30.3 27.8 25.8 26.5 22.4 21.0 19.7 18.2 17.5 14.2 17.5 16.6 12.5 16.8						Diurnal Average		
																			105 81 36 33 34 43 46 47 54 64 135 102 131 139 91 78 92 60 114 79 117 139 43 85						Diurnal Maximum		
Z - zerospan			C - Calibration			M - Maintenance																					





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	486	69.23	69.23
21 - 40	145	20.66	89.89
41 - 80	49	6.98	96.87
81 - 159	19	2.71	99.57
> 159	0	0.00	99.57

Total Number of Valid Hours: 702

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - March 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	18	40	70	55	29	18	40	45	74	36	15	11	14	13	7	1	486
21 - 40	16	60	15	4	7	3	4	4	6	9	2	3	1	2	5	4	145
11 - 80	7	9	0	0	1	1	2	0	3	1	2	3	2	1	5	12	49
81 - 159	4	1	1	0	0	0	0	0	1	0	0	0	0	0	5	7	19
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	45	110	86	59	37	22	46	49	84	46	19	17	17	16	22	24	699

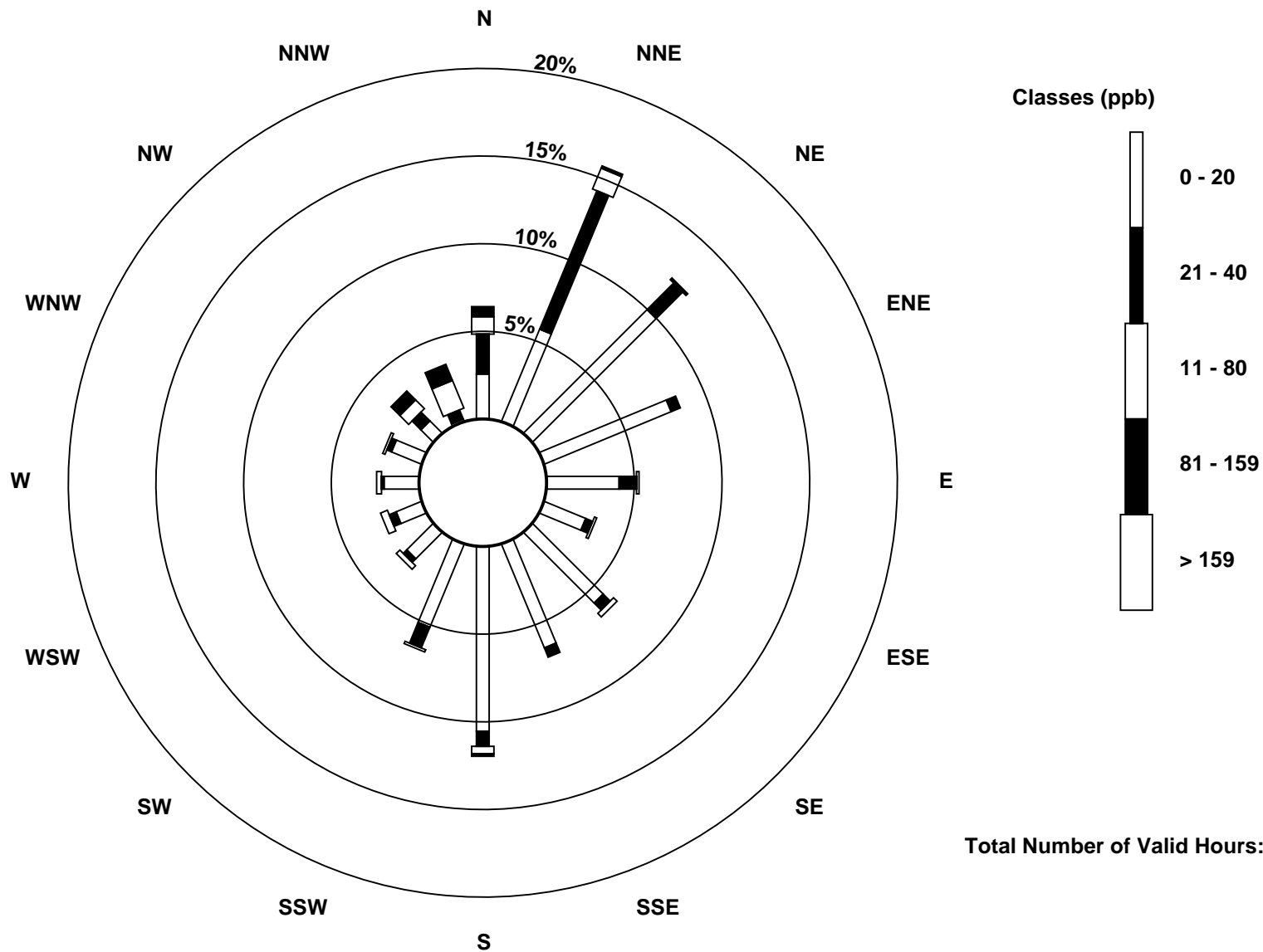
Total Number of Valid Hours: 702

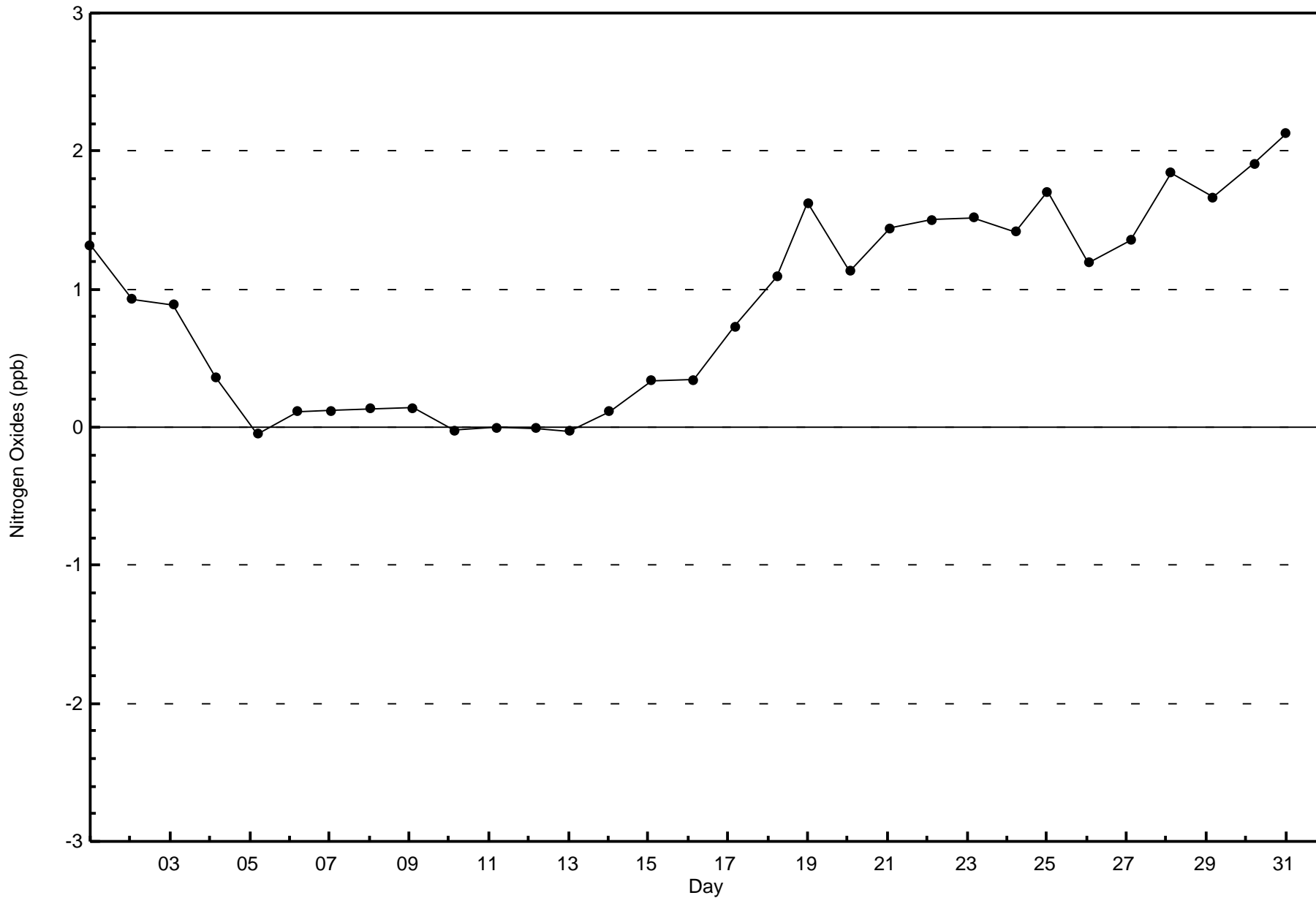
Total Number of Hours: 744

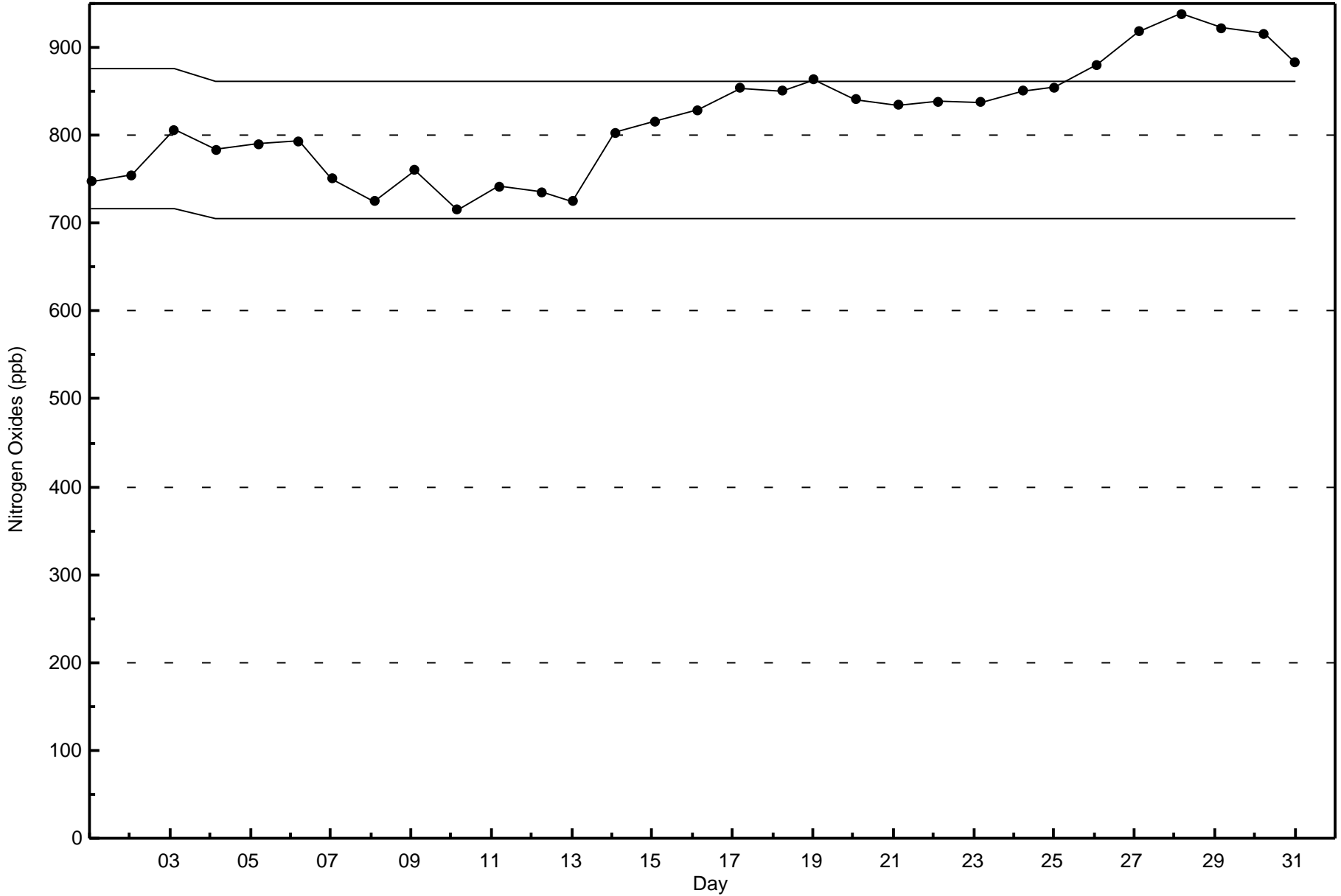


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River (AMS 16)







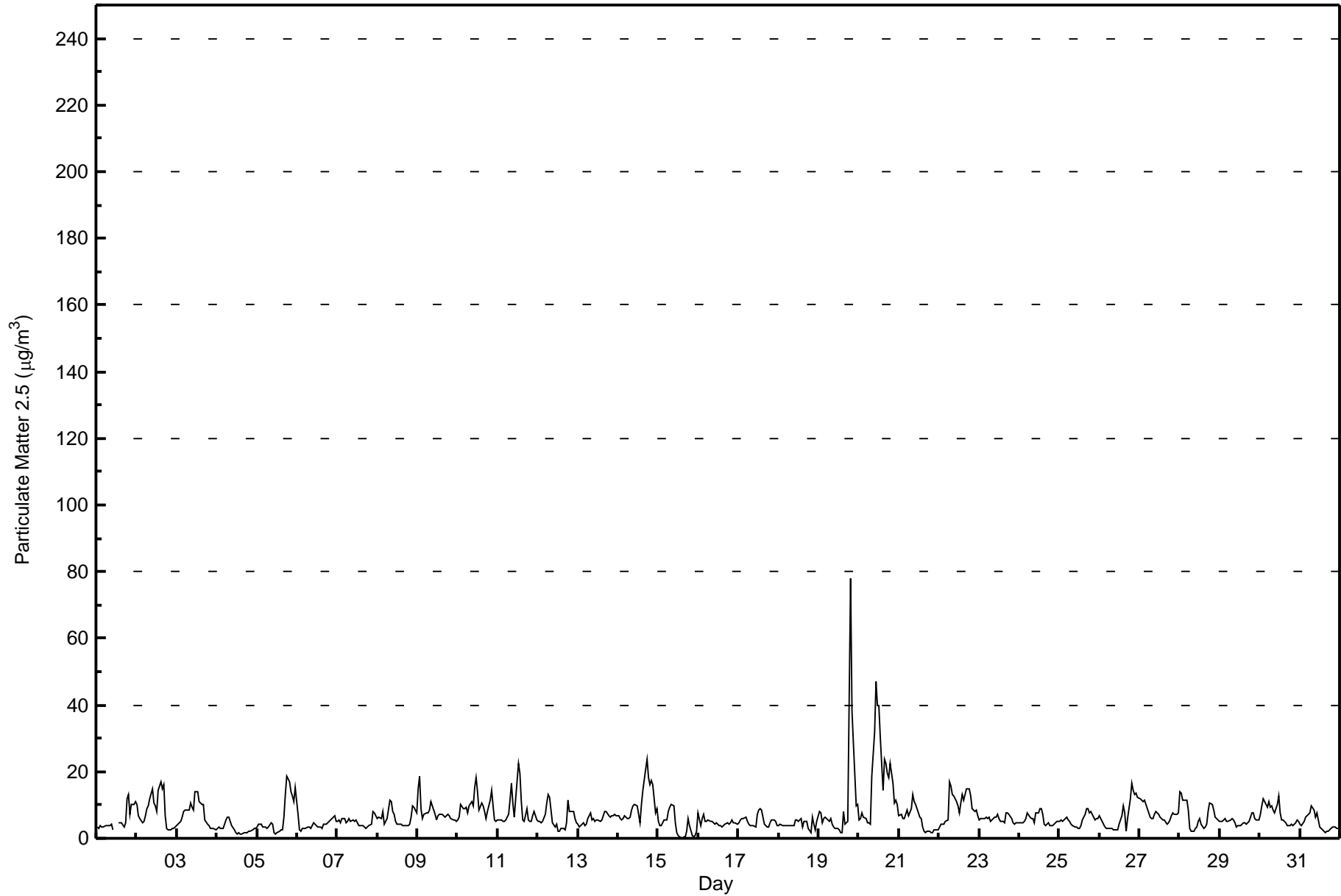


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 77.9 µg/m ³ on Mar 19 20:00 Maximum Daily Average: 17.6 µg/m ³ on Mar 20		Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 2 Percent Operational Time: 100.0																								
Minimum Value: 0.2 µg/m ³ on Mar 15 15:00 Maximum Diurnal Average: 9.7 µg/m ³ at hour 20 Monthly Average: 6.89 µg/m ³		Minimum Daily Average: 2.9 µg/m ³ on Mar 4 Minimum Diurnal Average: 5.8 µg/m ³ at hour 3 Percentiles: P ₁ = 0.8 P ₁₀ = 2.9 Q ₁ = 3.9 Median = 5.6 Q ₃ = 8.0 P ₉₀ = 11.6 P ₉₉ = 26.4																								
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-Mar	3.5	3.2	3.7	3.2	3.2	3.9	4.0	3.7	3.7	4.3	2.4	C	C	4.5	4.8	4.7	3.5	4.6	11.7	13.3	7.1	10.1	10.3	11.2	5.7	13.3
2-Mar	10.1	7.0	6.1	4.6	5.0	6.6	8.9	9.7	11.7	14.7	10.6	9.9	8.0	14.4	16.8	15.0	15.9	7.0	3.1	2.7	2.7	2.8	2.8	3.5	8.3	16.8
3-Mar	3.9	4.7	5.1	6.3	8.0	8.6	8.5	8.6	10.4	9.2	8.5	14.0	13.8	10.9	10.5	10.1	10.2	5.4	4.3	3.8	3.2	2.9	3.1	2.6	7.4	14.0
4-Mar	2.9	3.4	3.2	2.9	2.9	5.6	6.5	6.5	5.0	3.9	2.4	1.7	1.4	1.5	1.3	1.4	1.6	1.7	1.9	2.1	2.2	2.6	2.9	3.1	2.9	6.5
5-Mar	3.4	4.0	4.0	3.5	3.3	3.5	3.1	3.6	4.8	4.2	1.8	1.4	1.8	2.0	2.4	2.7	6.5	13.0	18.8	16.9	13.9	12.9	11.1	15.3	6.6	18.8
6-Mar	7.2	2.4	2.2	2.9	2.9	3.1	3.2	3.3	3.0	3.9	4.8	3.9	3.6	3.4	3.2	3.1	4.1	4.2	4.5	5.1	5.5	5.9	6.9	5.1	4.1	7.2
7-Mar	5.1	5.6	4.8	5.8	5.8	4.8	4.9	5.9	5.0	5.5	5.3	5.6	4.6	3.8	3.7	3.7	3.2	3.1	3.4	3.6	4.3	7.9	7.5	6.9	5.0	7.9
8-Mar	6.1	6.2	5.9	8.0	4.1	5.1	6.1	11.6	10.9	7.9	7.4	5.1	4.2	4.2	4.1	3.7	3.8	3.8	4.0	4.4	6.3	9.6	9.4	7.5	6.2	11.6
9-Mar	14.8	18.5	8.7	6.0	7.4	7.6	7.5	8.5	11.2	9.6	7.2	5.5	6.6	7.3	7.3	7.0	6.4	6.6	7.3	6.7	6.1	5.6	5.5	5.1	7.9	18.5
10-Mar	5.6	6.5	10.4	8.7	8.7	9.4	7.8	9.8	11.1	9.9	15.2	18.1	14.0	8.6	10.5	9.9	8.0	5.9	8.1	11.2	14.5	9.7	5.5	5.3	9.7	18.1
11-Mar	5.4	5.5	5.5	5.1	5.1	5.5	7.1	11.3	16.6	10.6	6.3	11.8	22.2	19.5	10.8	5.6	5.2	9.1	5.4	5.2	5.2	6.8	8.2	5.3	8.5	22.2
12-Mar	5.1	5.0	4.7	5.1	7.3	10.5	13.1	12.3	8.5	4.5	3.5	4.4	2.1	2.2	2.9	2.9	2.4	4.7	11.6	8.1	7.9	8.0	5.7	4.7	6.1	13.1
13-Mar	4.2	3.4	4.2	4.5	3.7	4.1	6.1	7.6	5.6	5.7	5.1	5.4	5.5	5.2	5.4	7.0	8.1	7.9	6.7	6.5	6.8	6.6	7.1	7.0	5.8	8.1
14-Mar	6.6	5.8	5.5	5.8	6.6	5.8	6.0	6.6	8.4	9.6	10.2	9.6	7.2	4.7	10.2	14.3	20.6	23.7	18.1	16.3	17.2	16.3	7.7	8.8	10.5	23.7
15-Mar	5.1	3.7	3.8	5.5	5.5	5.5	8.1	9.1	10.3	9.9	4.8	1.6	0.8	0.3	0.2	0.3	0.4	2.2	6.1	3.8	0.8	0.5	0.8	2.2	3.8	10.3
16-Mar	7.4	3.8	5.9	7.4	4.9	4.9	5.6	5.2	5.0	4.7	4.3	4.7	4.0	3.7	3.6	3.8	4.4	4.5	4.4	4.5	5.4	4.9	4.5	4.0	4.8	7.4
17-Mar	4.8	5.7	5.8	6.1	6.4	5.1	4.3	3.8	3.7	3.6	3.5	7.2	8.3	9.1	8.6	4.4	3.7	3.3	3.5	4.7	5.3	5.7	5.0	3.7	5.2	9.1
18-Mar	3.8	4.0	4.0	3.9	3.9	3.7	3.9	3.8	3.7	3.8	5.6	5.6	4.9	5.8	3.5	5.1	5.0	5.2	3.0	1.9	6.5	4.2	2.7	4.9	4.3	6.5
19-Mar	8.0	7.7	4.8	6.0	6.4	5.8	5.2	5.9	4.4	3.2	3.0	2.9	2.6	1.8	1.6	8.0	4.4	5.0	41.5	77.9	38.0	28.4	9.9	10.0	12.2	77.9
20-Mar	5.6	5.9	7.7	6.5	5.9	4.8	4.7	4.0	18.8	32.0	47.0	40.0	39.8	30.7	14.4	23.9	22.4	19.5	18.0	22.4	16.6	10.6	11.6	10.1	17.6	47.0
21-Mar	6.9	7.2	5.9	5.8	7.3	8.7	6.7	8.7	13.2	11.0	10.0	9.0	6.2	6.1	3.5	2.2	1.8	1.9	1.9	1.8	1.9	2.4	2.6	2.6	5.6	13.2
22-Mar	3.3	4.2	4.2	4.4	5.2	5.7	17.0	15.7	12.9	12.6	11.0	9.8	7.5	10.7	13.1	11.6	14.6	14.7	15.0	12.6	8.8	8.2	8.7	6.6	9.9	17.0
23-Mar	5.7	6.1	6.1	5.9	6.4	5.8	6.2	5.1	6.0	6.4	6.2	7.3	5.7	5.0	5.1	4.8	7.7	7.6	7.3	6.1	4.7	4.1	4.5	4.5	5.8	7.7
24-Mar	4.7	4.6	4.7	4.9	6.0	7.7	6.2	6.0	6.0	4.5	7.6	7.7	8.9	9.0	7.2	4.2	3.7	4.5	3.9	3.8	4.0	4.2	5.2	5.1	5.6	9.0
25-Mar	5.1	5.4	4.9	5.6	6.2	5.6	5.1	4.3	3.6	3.5	3.3	3.1	2.9	3.6	5.4	7.4	8.7	8.9	7.7	8.1	6.4	5.6	6.0	6.1	5.5	8.9
26-Mar	6.6	6.0	4.2	3.5	3.1	3.1	2.8	2.8	2.7	2.5	2.7	2.6	4.1	6.8	9.6	7.7	2.1	5.8	12.0	16.4	14.2	12.9	13.5	12.5	6.7	16.4
27-Mar	11.7	11.6	11.2	11.3	10.3	7.5	6.2	5.9	6.0	7.4	8.2	7.0	6.3	5.8	5.5	5.6	4.4	4.5	5.3	6.9	7.5	7.3	7.1	7.5	7.4	11.7
28-Mar	14.2	13.4	11.4	11.3	11.4	8.5	3.1	2.2	2.1	2.8	3.3	5.2	5.8	4.3	2.9	3.2	4.4	8.1	10.7	10.0	8.7	6.4	6.0	5.6	6.9	14.2
29-Mar	5.2	5.3	5.6	5.9	5.3	5.1	5.7	6.0	5.4	4.6	3.3	3.8	4.0	4.2	4.6	4.8	4.4	5.1	6.4	7.8	7.6	5.9	5.7	5.5	5.3	7.8
30-Mar	7.2	9.9	11.7	10.8	9.4	10.9	9.5	9.7	8.3	7.5	10.2	12.8	7.8	5.4	5.3	4.5	3.9	3.9	3.9	4.0	3.9	4.6	5.5	4.9	7.3	12.8
31-Mar	4.3	3.8	5.1	6.3	7.0	7.0	7.7	9.7	8.5	6.3	7.5	5.4	3.5	2.4	2.1	1.7	2.0	2.2	2.4	3.5	3.3	3.3	2.9	2.9	4.6	9.7
																								Diurnal Average		
6.2 6.1 5.8 5.9 6.0 6.1 6.5 7.0 7.6 7.4 7.5 7.7 7.3 6.7 6.1 6.3 6.4 6.7 8.4 9.7 8.0 7.3 6.3 6.1																								Diurnal Maximum		
14.8 18.5 11.7 11.3 11.4 10.9 17.0 15.7 18.8 32.0 47.0 40.0 39.8 30.7 16.8 23.9 22.4 23.7 41.5 77.9 38.0 28.4 13.5 15.3																										
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}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - March 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	350	47.17	47.17
6 - 15	350	47.17	94.34
16 - 25	25	3.37	97.71
26 - 80	9	1.21	98.92
> 81.0	0	0.00	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}) - μg/m³
Shell Muskeg River - March 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	11	70	58	34	12	10	27	33	32	17	6	9	9	8	6	8	350
6 - 15	34	42	28	24	23	11	20	17	58	35	13	7	8	7	11	12	350
16 - 25	3	2	4	3	3	2	2	0	0	0	0	1	0	1	1	3	25
26 - 80	1	1	1	0	2	0	0	0	0	0	0	0	0	1	2	1	9
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	49	115	91	61	40	23	49	50	90	52	19	17	17	17	20	24	734

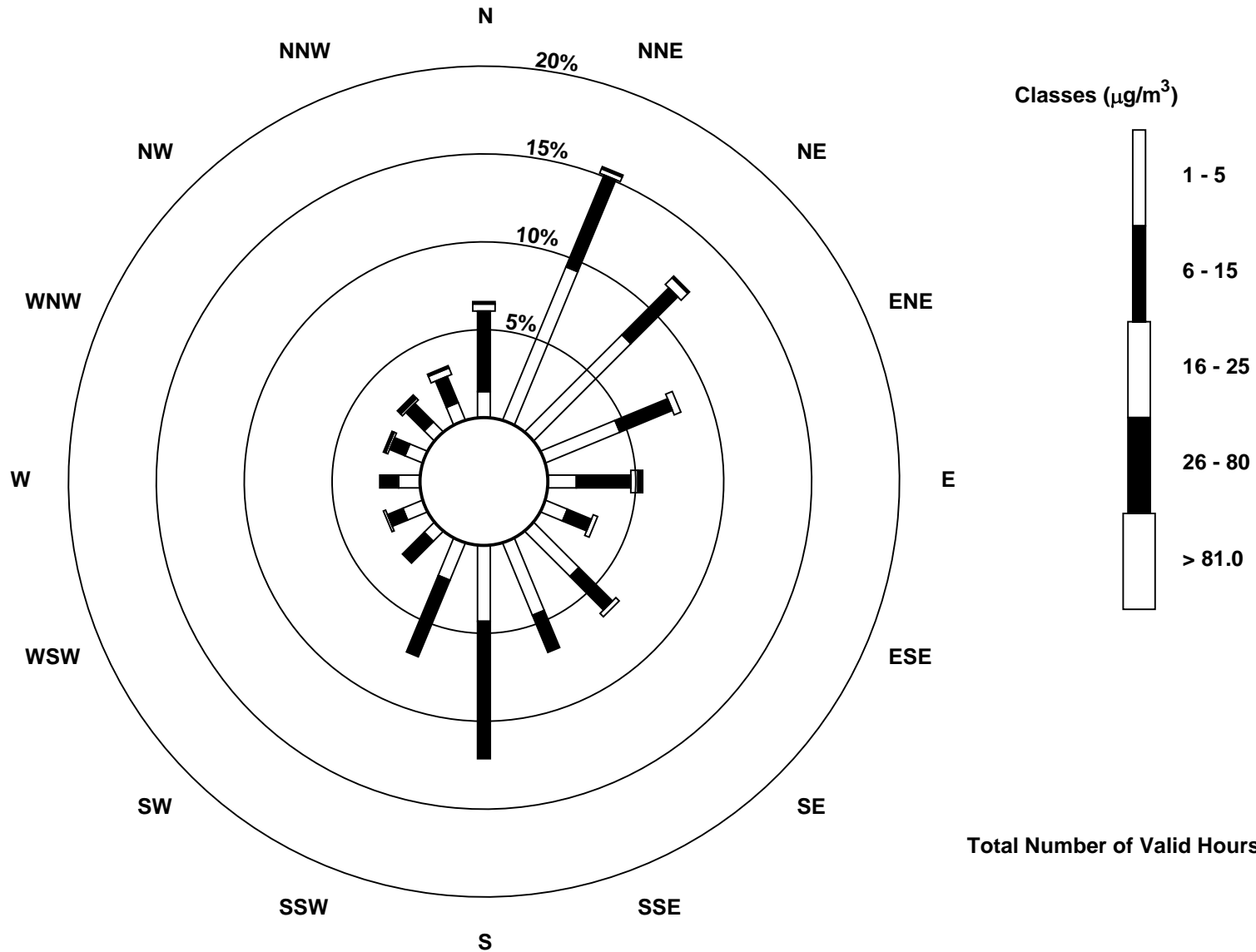
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River (AMS 16)





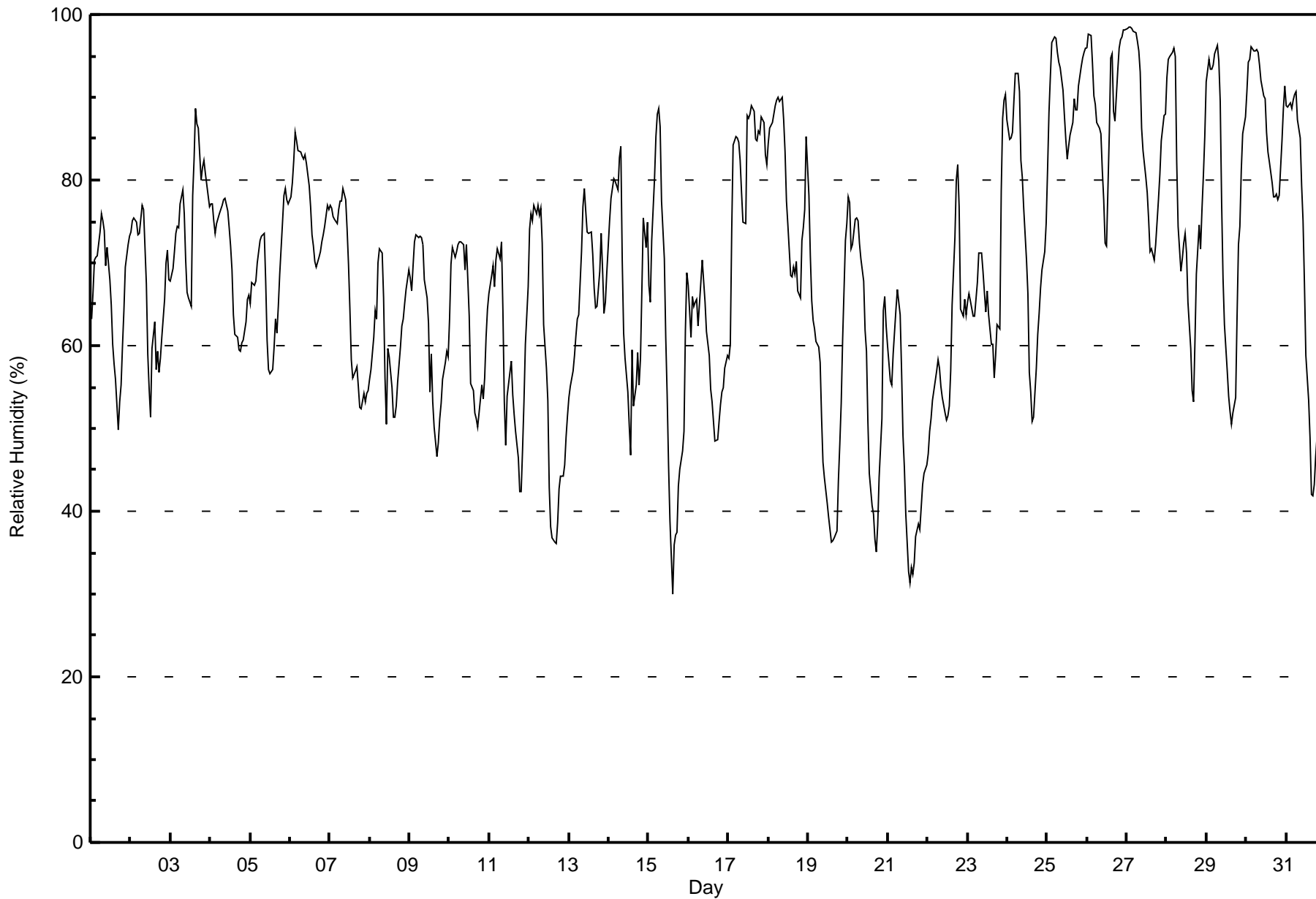
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Shell Muskeg River - March 2017

Maximum Value: 98 % on Mar 27 02:00																			Maximum Daily Average: 90.7 % on Mar 25						Hours in Service: 744																								
Minimum Value: 30 % on Mar 15 15:00																			Minimum Daily Average: 47.0 % on Mar 21						Hours of Data: 744																								
Maximum Diurnal Average: 78.7 % at hour 6																			Minimum Diurnal Average: 58.1 % at hour 17						Hours of Missing Data: 0																								
Monthly Average: 69.1 %																			Percentiles: P ₁ = 36 P ₁₀ = 50 Q ₁ = 58 Median = 70 Q ₃ = 79 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-Mar	63	66	70	71	71	74	76	75	74	70	72	68	65	60	58	56	50	53	55	60	64	69	72	73	66.1	76																							
2-Mar	74	75	75	75	73	74	75	77	76	67	59	55	51	60	63	57	59	57	59	61	66	70	72	68	66.6	77																							
3-Mar	68	69	71	74	74	74	77	79	76	70	66	66	65	78	83	89	87	86	80	82	82	81	79	77	76.4	89																							
4-Mar	77	77	75	74	75	76	76	77	78	78	76	74	72	69	64	61	61	59	59	60	61	63	66	66	69.8	78																							
5-Mar	65	68	67	68	70	71	73	73	74	68	61	57	57	57	60	63	62	65	69	75	78	79	78	77	68.0	79																							
6-Mar	78	80	82	86	85	84	83	83	83	83	82	79	77	73	72	70	69	71	71	73	73	74	77	76	77.7	86																							
7-Mar	77	77	76	75	75	76	78	77	79	78	74	70	64	58	56	57	58	55	52	52	54	53	54	55	65.8	79																							
8-Mar	56	57	61	64	63	70	72	71	66	56	51	60	59	55	51	51	53	56	60	62	63	65	67	69	60.7	72																							
9-Mar	68	67	70	73	73	73	73	73	72	68	66	63	54	59	53	50	47	48	51	53	56	58	59	59	61.9	73																							
10-Mar	63	70	72	71	71	72	72	73	72	69	72	68	64	55	55	52	51	50	52	55	54	56	61	64	63.1	73																							
11-Mar	66	68	70	67	70	72	70	73	64	53	48	54	57	58	54	52	50	46	42	42	47	53	60	67	58.6	73																							
12-Mar	74	76	75	77	76	77	76	77	72	63	57	53	43	38	37	36	36	39	43	44	44	46	49	51	56.6	77																							
13-Mar	54	55	57	59	61	63	64	71	77	79	76	74	74	71	67	65	65	69	74	69	64	65	69	69	67.2	79																							
14-Mar	75	78	79	80	80	79	83	84	70	62	58	54	50	47	60	53	55	59	55	58	67	75	72	75	67.0	84																							
15-Mar	67	65	73	80	85	88	89	86	78	71	61	54	46	39	30	36	37	38	43	45	47	50	62	69	59.9	89																							
16-Mar	67	61	66	65	65	66	62	68	70	68	65	62	59	55	53	51	49	49	51	53	54	55	57	59	59.5	70																							
17-Mar	58	60	74	84	85	85	85	82	78	75	75	88	88	88	89	88	85	85	86	86	88	87	83	82	81.8	89																							
18-Mar	84	86	87	88	89	90	90	89	90	87	83	78	75	68	68	69	69	70	67	66	73	74	77	85	79.3	90																							
19-Mar	78	71	65	63	62	61	60	58	51	46	44	41	39	38	36	36	37	38	44	48	53	61	73	75	53.2	78																							
20-Mar	78	77	72	72	75	75	75	72	71	68	62	59	51	45	41	40	37	35	38	44	51	64	66	62	59.6	78																							
21-Mar	60	56	55	59	62	64	67	64	57	49	45	40	33	31	33	32	34	37	38	38	41	43	45	46	47.0	67																							
22-Mar	47	50	51	53	55	57	58	57	55	54	52	51	52	53	57	65	73	80	82	77	64	64	66	64	59.8	82																							
23-Mar	65	66	65	64	64	66	68	71	71	69	66	64	67	64	60	60	56	59	62	62	79	88	90	90	68.2	90																							
24-Mar	87	85	85	86	89	93	93	91	82	80	77	70	66	57	54	51	51	57	61	64	67	69	71	75	73.5	93																							
25-Mar	81	88	92	97	97	97	95	94	94	91	88	85	83	84	85	87	90	89	89	91	94	95	95	96	90.7	97																							
26-Mar	96	98	97	94	90	89	87	86	86	81	78	72	72	86	95	95	88	87	93	96	97	97	98	98	89.9	98																							
27-Mar	98	98	98	98	98	98	97	96	93	86	84	80	79	75	71	72	70	72	75	78	81	85	88	88	85.7	98																							
28-Mar	92	95	95	95	96	95	82	74	69	71	72	74	71	65	60	55	53	61	69	75	72	76	80	85	76.3	96																							
29-Mar	92	95	93	93	94	95	96	94	89	77	68	63	57	54	52	51	52	54	64	72	74	81	86	88	76.4	96																							
30-Mar	91	94	95	96	96	96	96	95	94	92	90	90	86	83	82	80	78	78	78	78	78	85	89	91	87.9	96																							
31-Mar	89	89	89	89	90	90	91	87	85	79	75	67	59	53	49	42	42	43	47	52	63	57	55	52	68.1	91																							
																								73.9	74.7	76.0	77.1	77.8	78.7	78.7	78.4	75.7	71.2	67.9	65.6	62.3	60.6	59.7	58.8	58.1	59.3	61.4	63.7	66.3	68.9	71.3	72.6	Diurnal Average	
																								98	98	98	98	98	98	97	96	94	92	90	90	88	88	95	95	90	89	93	96	97	97	98	98	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Shell Muskeg River - March 2017**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	29	3.90	3.90
40 - 60	186	25.00	28.90
60 - 80	352	47.31	76.21
80 - 100	177	23.79	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

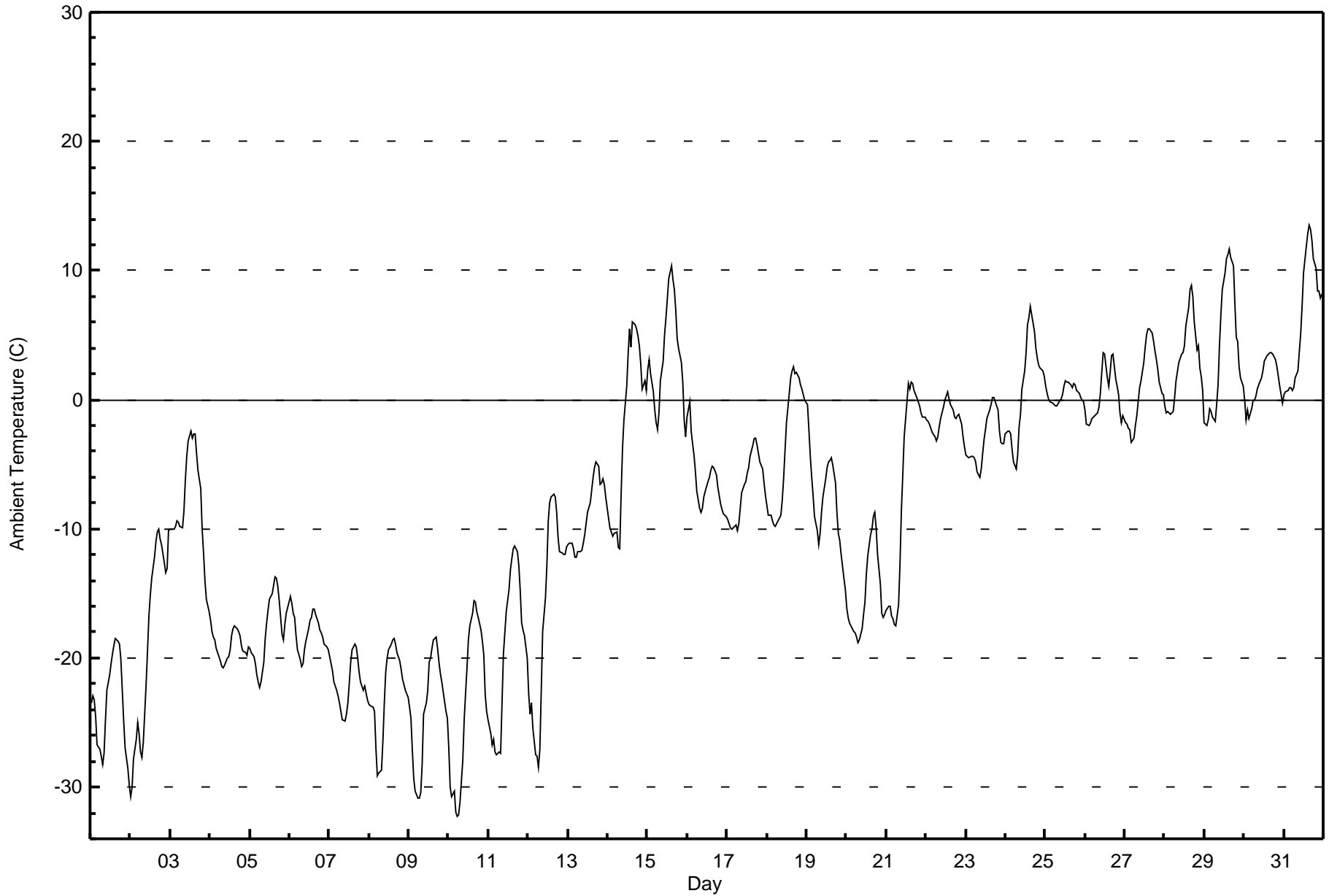
Ambient Temperature (AT) - C
Shell Muskeg River - March 2017

Maximum Value: 13.5 C on Mar 31 16:00 Maximum Daily Average: 6.4 C on Mar 31																								Hours in Service: 744		
Minimum Value: -32.2 C on Mar 10 06:00 Minimum Daily Average: -24.1 C on Mar 9																								Hours of Data: 744		
Maximum Diurnal Average: -4.1 C at hour 16 Minimum Diurnal Average: -13.4 C at hour 7																								Hours of Missing Data: 0		
Monthly Average: -8.84 C Percentiles: P₁ = -30.7 P₁₀ = -23.5 Q₁ = -18.3 Median = -7.5 Q₃ = -0.1 P₉₀ = 3.5 P₉₉ = 10.9																								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-Mar	-23.5	-22.9	-23.3	-24.6	-26.7	-27.0	-27.6	-28.3	-27.4	-24.8	-22.5	-21.3	-20.4	-19.7	-19.0	-18.5	-18.7	-18.9	-20.1	-22.6	-24.9	-27.0	-28.5	-29.8	-23.7	-18.5
2-Mar	-30.7	-30.0	-27.8	-26.3	-25.0	-25.9	-27.3	-27.7	-26.5	-22.1	-19.4	-16.8	-15.1	-13.8	-12.2	-11.0	-10.3	-10.0	-10.8	-11.3	-12.6	-13.3	-13.0	-10.1	-18.7	-10.0
3-Mar	-10.1	-10.0	-10.0	-9.8	-9.4	-9.4	-9.8	-9.9	-8.6	-6.2	-4.4	-3.2	-2.4	-3.0	-2.7	-2.7	-4.1	-5.5	-6.9	-10.0	-11.9	-14.0	-15.4	-16.4	-8.2	-2.4
4-Mar	-17.1	-17.9	-18.4	-18.6	-19.3	-19.9	-20.2	-20.7	-20.8	-20.5	-20.0	-19.8	-19.4	-18.3	-17.7	-17.5	-17.7	-17.9	-18.3	-19.1	-19.5	-19.6	-19.8	-19.1	-19.0	-17.1
5-Mar	-19.2	-19.5	-19.9	-20.5	-21.4	-21.8	-22.3	-21.8	-20.3	-18.5	-17.3	-16.3	-15.5	-15.0	-14.4	-13.7	-13.8	-14.4	-15.5	-18.1	-18.7	-17.4	-16.6	-16.1	-17.8	-13.7
6-Mar	-15.2	-15.8	-16.6	-16.8	-18.3	-19.4	-20.1	-20.7	-20.4	-19.4	-18.7	-17.7	-17.0	-16.8	-16.3	-16.2	-16.7	-17.3	-17.9	-18.1	-18.4	-18.9	-19.2	-19.4	-18.0	-15.2
7-Mar	-19.9	-20.5	-21.0	-21.8	-22.5	-23.0	-23.5	-24.1	-24.8	-24.8	-24.4	-23.5	-21.9	-20.4	-19.4	-19.0	-19.1	-20.0	-21.1	-21.8	-22.5	-22.2	-22.7	-23.3	-22.0	-19.0
8-Mar	-23.6	-23.7	-23.8	-24.1	-26.9	-29.1	-28.9	-28.7	-26.4	-23.4	-21.1	-20.0	-19.4	-18.9	-18.6	-18.5	-18.9	-19.6	-20.3	-20.9	-21.6	-22.1	-22.5	-23.0	-22.7	-18.5
9-Mar	-23.8	-24.7	-27.2	-29.3	-30.3	-30.9	-30.9	-30.5	-28.3	-24.3	-23.5	-22.5	-20.3	-20.0	-19.3	-18.6	-18.4	-19.3	-20.3	-21.2	-21.9	-23.3	-24.1	-24.6	-24.1	-18.4
10-Mar	-26.9	-30.0	-30.7	-30.3	-31.9	-32.2	-32.1	-31.1	-27.9	-24.8	-22.7	-20.7	-18.6	-17.5	-16.5	-15.6	-15.7	-16.5	-16.9	-17.8	-18.7	-19.8	-22.8	-24.1	-23.4	-15.6
11-Mar	-24.8	-25.9	-26.7	-26.3	-27.3	-27.4	-27.3	-27.4	-23.5	-19.7	-18.0	-16.4	-14.7	-13.2	-12.4	-11.6	-11.3	-11.8	-12.9	-14.9	-17.3	-17.8	-18.3	-20.0	-19.4	-11.3
12-Mar	-22.7	-24.3	-23.5	-25.4	-27.5	-27.7	-28.4	-27.0	-22.5	-17.9	-15.4	-12.8	-9.3	-8.0	-7.6	-7.3	-7.5	-8.7	-10.6	-11.8	-11.9	-12.0	-11.9	-11.5	-16.4	-7.3
13-Mar	-11.2	-11.1	-11.1	-11.6	-12.2	-12.2	-11.8	-11.7	-11.6	-11.1	-10.5	-9.6	-8.7	-7.9	-6.9	-6.0	-5.3	-4.8	-5.1	-6.6	-6.4	-6.1	-6.6	-7.5	-8.9	-4.8
14-Mar	-9.2	-9.9	-10.2	-10.5	-10.4	-10.2	-11.5	-11.5	-7.3	-3.8	-1.6	1.0	3.5	5.5	4.1	6.0	5.8	5.4	4.9	4.2	2.8	0.8	1.5	0.7	-2.1	6.0
15-Mar	2.3	3.1	2.0	0.6	-0.9	-1.8	-2.3	-1.1	1.5	3.0	5.0	6.3	7.9	9.3	10.3	9.3	8.5	6.9	4.7	4.0	2.9	1.4	-1.5	-2.9	3.3	10.3
16-Mar	-1.4	-0.2	-2.5	-3.4	-4.3	-5.5	-7.1	-8.4	-8.7	-8.4	-7.5	-7.1	-6.4	-6.0	-5.4	-5.2	-5.3	-5.8	-6.7	-7.5	-8.1	-8.5	-8.8	-9.0	-6.1	-0.2
17-Mar	-9.3	-9.6	-9.9	-10.0	-9.8	-9.6	-10.1	-9.6	-8.4	-7.2	-6.6	-6.4	-5.7	-5.2	-4.4	-3.5	-3.0	-3.0	-3.5	-4.2	-4.8	-5.3	-6.4	-7.4	-6.8	-3.0
18-Mar	-8.2	-8.9	-9.0	-9.3	-9.7	-9.8	-9.6	-9.4	-8.9	-7.8	-6.0	-3.9	-1.8	0.5	1.7	2.2	2.5	2.0	2.1	1.7	1.2	0.8	0.4	0.0	-3.6	2.5
19-Mar	-0.4	-2.3	-4.4	-6.0	-7.5	-9.0	-10.1	-11.2	-10.3	-8.7	-7.5	-6.1	-5.2	-4.9	-4.7	-4.5	-5.1	-6.4	-8.7	-10.4	-10.9	-11.9	-13.9	-14.7	-7.7	-0.4
20-Mar	-16.1	-16.8	-17.3	-17.6	-18.0	-18.0	-18.4	-18.8	-18.6	-17.7	-16.6	-15.7	-13.5	-12.1	-10.4	-10.0	-9.1	-8.7	-9.9	-12.0	-14.3	-16.5	-16.9	-16.6	-15.0	-8.7
21-Mar	-16.4	-15.9	-16.0	-16.7	-16.9	-17.4	-17.5	-15.9	-12.7	-8.6	-5.8	-2.8	-0.1	1.2	0.8	1.4	1.2	0.7	0.1	-0.1	-0.5	-1.1	-1.3	-1.4	-6.7	1.4
22-Mar	-1.5	-1.6	-1.9	-2.2	-2.5	-2.9	-3.2	-2.9	-2.1	-1.4	-0.6	0.0	0.3	0.6	0.1	-0.4	-0.8	-1.3	-1.4	-1.2	-1.2	-1.9	-2.8	-3.6	-1.5	0.6
23-Mar	-4.3	-4.4	-4.5	-4.3	-4.4	-4.5	-4.9	-5.6	-6.0	-5.4	-4.2	-3.1	-2.4	-1.5	-0.8	-0.4	0.2	0.2	-0.2	-0.8	-2.4	-3.3	-3.4	-3.4	-3.1	0.2
24-Mar	-2.6	-2.4	-2.4	-2.6	-3.8	-4.8	-5.3	-4.3	-2.1	-1.2	0.8	2.2	3.6	5.8	6.3	7.2	6.5	5.2	4.0	3.2	2.7	2.5	2.2	1.8	0.9	7.2
25-Mar	1.1	0.5	0.1	-0.2	-0.2	-0.4	-0.5	-0.5	-0.3	0.1	0.4	1.1	1.5	1.3	1.4	1.2	0.9	1.2	1.1	0.7	0.5	0.2	0.0	-0.2	0.5	1.5
26-Mar	-0.8	-1.9	-2.0	-1.7	-1.5	-1.4	-1.2	-1.0	-0.6	0.5	2.2	3.7	3.5	1.7	1.1	2.2	3.4	3.5	1.6	1.0	0.4	-1.0	-1.8	-1.3	0.4	3.7
27-Mar	-1.8	-1.9	-2.2	-2.4	-3.3	-3.0	-2.0	-1.3	-0.2	0.9	1.5	2.9	4.1	5.1	5.5	5.5	5.2	4.5	3.7	3.1	2.3	1.3	0.5	0.4	1.2	5.5
28-Mar	-0.5	-1.0	-0.9	-1.1	-1.0	-0.9	0.1	1.5	2.9	3.2	3.5	3.6	4.2	5.7	7.2	8.5	8.8	8.0	6.0	3.9	4.1	2.4	1.8	0.7	2.9	8.8
29-Mar	-1.8	-2.0	-1.6	-0.7	-0.9	-1.3	-1.7	-0.4	1.1	4.2	6.6	8.5	9.9	10.9	11.3	11.6	11.0	10.4	7.4	4.8	4.5	2.5	1.7	1.1	4.0	11.6
30-Mar	-0.1	-1.6	-0.8	-1.5	-0.7	-0.1	-0.1	0.3	0.8	1.1	1.7	2.2	2.9	3.2	3.4	3.6	3.6	3.5	3.3	3.1	2.5	1.0	0.4	-0.2	1.3	3.6
31-Mar	0.4	0.6	0.7	1.0	0.9	0.8	0.9	1.6	2.2	3.7	5.2	7.3	9.9	11.9	12.9	13.5	13.2	12.3	11.0	10.1	8.4	8.4	7.9	8.2	6.4	13.5
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Shell Muskeg River - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Shell Muskeg River - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	131	17.61	17.61
-20 - 0	430	57.80	75.40
0 - 10	170	22.85	98.25
10 - 20	13	1.75	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

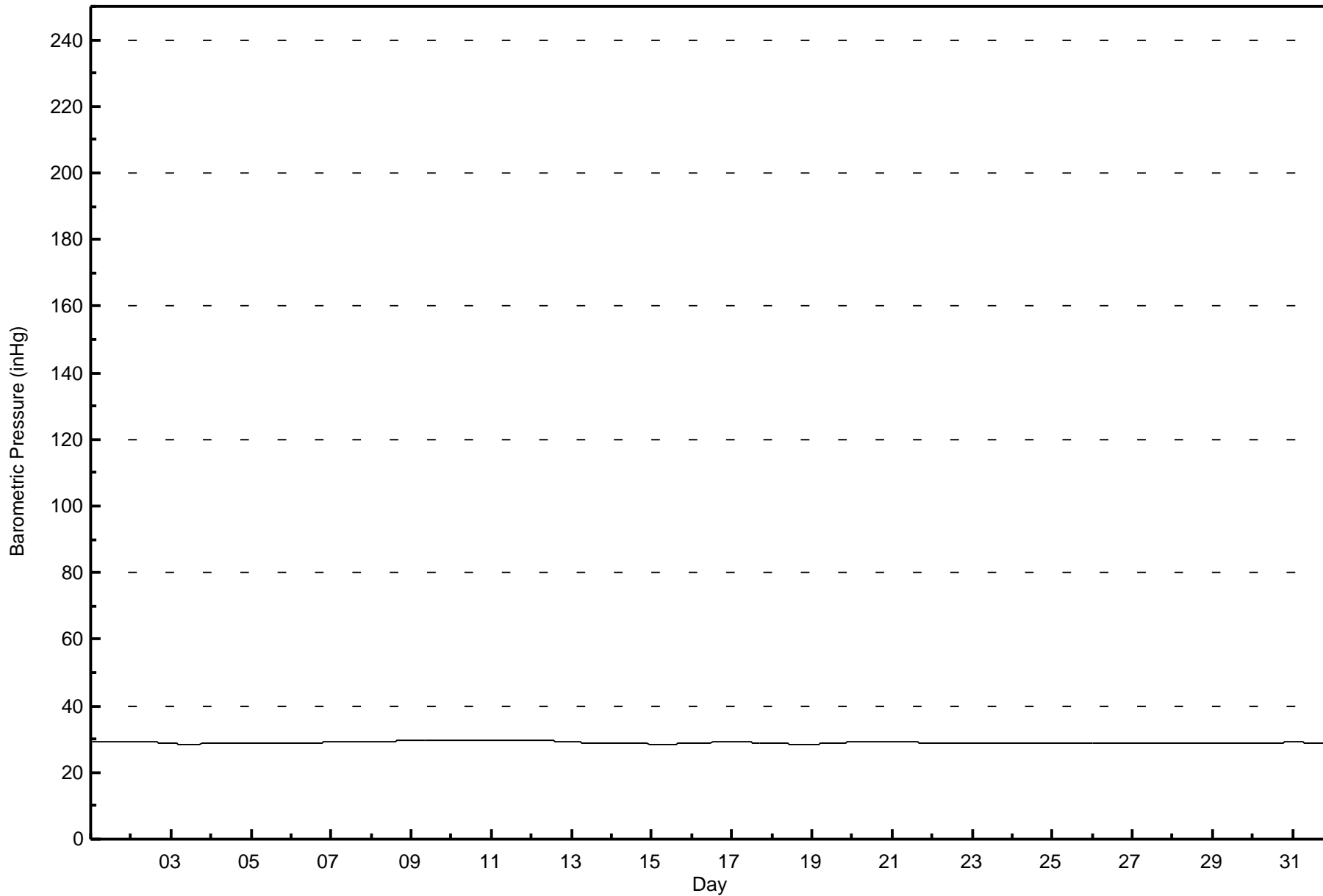
Barometric Pressure (BP) - inHg
Shell Muskeg River - March 2017

Maximum Value: 29.8 inHg on Mar 9 11:00 Maximum Daily Average: 29.7 inHg on Mar 9																						Hours in Service: 744					
Minimum Value: 28.3 inHg on Mar 18 23:00 Minimum Daily Average: 28.6 inHg on Mar 18																						Hours of Data: 744					
Maximum Diurnal Average: 29.0 inHg at hour 9 Minimum Diurnal Average: 29.0 inHg at hour 18																						Hours of Missing Data: 0					
Monthly Average: 29.01 inHg Percentiles: P₁ = 28.4 P₁₀ = 28.7 Q₁ = 28.8 Median = 28.9 O₃ = 29.3 P₉₀ = 29.5 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-Mar	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	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	29.4	29.4	29.4	29.4	29.3	29.4
2-Mar	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	29.1	29.1	29.1	29.0	29.0	28.9	28.9	28.9	28.8	28.8	28.8	28.8	29.1	29.4
3-Mar	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.7	28.7	28.7	28.8	28.8	28.6	28.8	
4-Mar	28.8	28.8	28.9	28.9	28.9	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
5-Mar	28.9	28.9	28.9	28.9	28.9	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9
6-Mar	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	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
7-Mar	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.4	29.4	29.3	29.4
8-Mar	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.4	29.6
9-Mar	29.6	29.6	29.6	29.6	29.7	29.7	29.7	29.7	29.7	29.7	29.8	29.8	29.8	29.8	29.8	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.8
10-Mar	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.7	29.7	29.7	29.7
11-Mar	29.7	29.7	29.7	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.6	29.7
12-Mar	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.2	29.2	29.4	29.5	
13-Mar	29.2	29.2	29.1	29.1	29.1	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.9	29.2	
14-Mar	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	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.7	28.8	
15-Mar	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	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	28.6	28.7	
16-Mar	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	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	29.1	29.1	29.1	29.0	29.1	
17-Mar	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	28.9	28.9	28.9	28.9	29.0	29.1	
18-Mar	28.9	28.9	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.6	28.6	28.6	28.5	28.5	28.4	28.4	28.4	28.4	28.3	28.3	28.4	28.3	28.3	28.3	28.6	28.9	
19-Mar	28.4	28.4	28.5	28.5	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	29.0	29.0	29.0	29.1	28.8	29.1	
20-Mar	29.2	29.2	29.2	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.4	29.4	
21-Mar	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	29.1	29.3	
22-Mar	28.9	28.9	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	28.7	28.7	28.7	28.7	28.9	
23-Mar	28.7	28.7	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	28.9	28.9	28.9	28.9	28.9	28.9	29.0	28.9	28.9	29.0	
24-Mar	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	
25-Mar	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	28.8	28.8	28.8	28.8	28.7	28.8	
26-Mar	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	
27-Mar	28.8	28.8	28.8	28.8	28.8	28.8	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-Mar	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	
29-Mar	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	
30-Mar	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	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	28.9	29.1	
31-Mar	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.9	29.1	
																								Diurnal Average			
																								Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

Barometric Pressure (BP) - inHg
Shell Muskeg River - March 2017





Maximum Speed: 31 km/h on Mar 19 18:00	Maximum Daily Speed Average: 21.8 km/h on Mar 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 26 15:00	Minimum Daily Speed Average: 0.6 km/h on Mar 3	Hours of Data: 744
Maximum Diurnal Speed Average: 7.0 km/h at hour 21	Minimum Diurnal Speed Average: 0.5 km/h at hour 10	Hours of Missing Data: 0
Monthly Average Velocity: 3.3 km/h 46.7 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 9 Q ₃ = 16 P ₉₀ = 21 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-Mar	NE9	NE11	NE13	ENE9	ENE9	NE13	NE12	NE9	ENE7	NE7	NE9	NE9	NNE12	NE13	NE10	NE12	ENE12	NE10	NE7	E3	ENE3	E1	ENE3	SE1	NE8.3	NE13	
2-Mar	S4	S4	SSE4	S5	S5	SSW5	S6	SSW3	S3	SW4	WSW3	W4	W4	N5	NNE5	NNW4	N5	SE6	SE9	SE9	SE4	SE4	SSE7	SSE10	S2.6	SSE10	
3-Mar	SSE11	SSE10	S6	SSE6	SSE10	S10	S6	S7	SSW8	S10	SSW10	SSW11	SSW11	SW11	SSW7	NW6	N18	N14	NNW13	NNE17	NNE18	NNE19	NNE18	NNE20	ENE0.6	NNE20	
4-Mar	NE21	NNE23	NNE21	NNE20	NNE24	NNE22	N19	N22	N21	NNE22	NNE22	NNE21	NE17	NNE15	NE20	NE20	NE19	NE18	NE14	ENE14	ENE12	ENE15	ENE15	NE17	NNE18.0	NNE24	
5-Mar	NE19	NE12	E5	ENE5	ENE6	ENE8	ENE5	E2	NNW0	ESE2	SW1	W4	SW7	SW6	W6	WNW6	NW6	NNW5	NW6	SE4	SE4	SE4	SSE3	SSW2	NNW5	NNE1.5	NE19
6-Mar	NNE16	NE16	NE13	NNE18	NE13	NNE5	NE12	ENE10	ENE10	NNE17	N20	NNE22	NNE17	NE23	NE23	NNE23	NNE25	NNE26	N22	N25	N25	N26	N26	NNE24	NNE18.3	N26	
7-Mar	N25	N24	N22	N24	N21	NNE23	NNE24	NNE21	NE24	NNE22	NNE24	NNE19	NNE20	NNE21	NNE21	NNE22	NE21	NE19	NE16	NE17	NE14	N15	NNE15	N18	NNE19.7	N25	
8-Mar	N19	N21	NNE17	NNE11	SSE2	SSW4	SSW3	S3	S3	WSW4	NW6	NNE15	NNE16	NNE14	NE11	NE14	NE18	NE20	NE19	NE18	NNE20	NNE17	N17	N13	NNE10.6	N21	
9-Mar	N5	WNW1	SE1	SE2	SSW2	S3	S2	SSW1	SSW2	SSE4	WSW4	NE7	WNW4	NE7	ENE8	NE7	ENE10	NE15	NE17	NE16	NE19	NE15	NE11	ENE11	NE5.4	NE19	
10-Mar	ENE2	E3	ENE5	ENE6	ESE3	SE2	S2	ESE1	S1	WSW1	NW4	NNW5	N5	NNE8	NNE11	NNE11	NNE14	NE14	NNE13	NNE15	NNE20	NE10	ENE5	ENE5	NNE5.9	NNE20	
11-Mar	ENE3	ENE3	ENE4	ENE6	ENE3	ENE5	NE6	ENE2	ESE1	WSW3	WNW3	NW6	NNW7	NNW7	NNE4	NE7	NE10	NE15	NE18	NE11	ENE10	ENE7	E4	ESE5	NE4.9	NE18	
12-Mar	ESE3	ESE4	E5	E1	ENE5	E4	ENE5	E4	SE1	WSW5	WSW4	W4	SSE14	S14	S15	SSE15	SSE16	SE15	SE12	SE13	SE19	SSE20	SSE19	SSE19	SSE8.3	SSE20	
13-Mar	SSE21	SSE21	SSE20	SSE21	SSE18	SSE19	S19	S20	S20	S20	S23	S25	S26	S24	S24	S22	S21	S16	S13	S11	SSW13	S13	S9	S8	S18.5	S26	
14-Mar	SSE9	S10	S10	S10	S11	S11	S7	SSE7	S8	SSW11	SSW13	SW11	WSW7	WNW3	NNE6	NNW5	N7	NNE10	NE15	NE13	N7	NE4	E6	S7	SSE2.8	NE15	
15-Mar	SSE11	SE9	SSW9	S9	S8	S8	S10	S10	S12	SSW11	SW18	SW15	SSW12	SW18	WNW18	NW20	NW13	NNW12	NNW8	N11	NE11	ENE9	ENE7	NNE3	SW3.9	NW20	
16-Mar	N11	N20	N21	NNE19	NNE21	NNE28	NNE30	NNE28	NNE26	NNE23	NNE21	NNE20	NNE23	NNE20	NNE22	NNE21	NNE23	NNE25	NNE21	NNE21	NNE20	NNE20	NE18	NNE21.8	NNE30		
17-Mar	NE18	NE13	NE16	NE11	ENE6	NW9	NW8	WNW3	WSW3	WSW3	W4	NNW5	NNW6	NNW6	N7	NNE12	NNE14	NNE16	NNE17	NNE23	NNE25	NNE16	N15	NNE19	NNE9.6	NNE25	
18-Mar	NNE16	NE14	NNE15	NNE14	NNE14	NE11	NNE10	NNE16	NNE10	N9	N7	NW6	NW7	NW7	NNW10	NNW7	WNW7	NNW4	E5	ENE3	NNW3	E6	S3	WSW8	NNE6.8	NNE16	
19-Mar	WNW23	WNW24	WNW28	WNW23	W25	W21	W18	W18	WSW18	WSW20	WSW22	W22	W28	W28	WNW27	WNW27	NW29	WNW31	NW25	NW22	WNW21	NNW20	N16	NNE20	WNW20.9	WNW31	
20-Mar	NNE21	N17	N15	N13	N11	NNE10	NNE11	NE15	NE13	NNE7	N4	NE6	E6	E6	ESE7	ENE8	E6	E2	ENE5	ENE8	E6	SE9	SSE9	SSE9	NE6.4	NNE21	
21-Mar	SSE10	S10	S8	SSW6	SSW5	SSW6	SSW6	SSW6	SSW8	SW8	SW10	SSW10	S15	S16	S18	SSE16	SE16	SE13	SE15	SSE16	SSE16	SSE15	SSE14	SSE16	S10.6	S18	
22-Mar	SSE17	SSE14	SE12	SE9	SE9	SE7	ESE7	SE9	SE10	SE8	SE7	SE4	E3	W4	W9	SW11	SW11	SW8	SSW4	N7	N18	N18	N18	NNE19	ESE2.3	NNE19	
23-Mar	NNE18	N18	NNE16	NNE15	NNE14	NNE16	NNE18	NE18	NE20	NE14	NNE12	NNE11	NNE13	N12	NNE10	NE8	NNW4	N6	N11	NNE9	ENE7	ENE6	ENE8	E5	NNE11.4	NE20	
24-Mar	SSE7	S5	SSE6	SSE6	S5	SSW5	SSW7	SSW6	SSW3	NNW4	NW7	NW6	NNW5	S10	S10	SE12	SSE14	SE14	SE9	ESE10	SE9	SE10	S11	SE11	SSE5.6	SE14	
25-Mar	SE6	SE3	ESE5	ENE8	ENE7	E5	ESE5	SE5	SE5	SE5	SE7	SE5	SE4	NW3	NW4	NNW2	ENE4	E3	ENE4	E6	ENE9	ESE3	ENE3	E3	E3.6	ENE9	
26-Mar	ESE4	ESE4	E4	E2	E4	NE4	NE7	ENE3	ENE4	NE4	NNW5	WNW7	W8	WNW7	NNE0	ESE6	ESE7	S6	SW4	WSW2	ESE6	E5	E3	E1	ENE1.5	W8	
27-Mar	E2	E4	E5	SE2	SSE5	S8	S5	W3	SW2	NW3	NNE4	N6	NNE10	NNE13	NE10	NNE11	NE15	NE15	NE15	NNE10	NE11	NE9	NE6	NE6	NE5.4	NE15	
28-Mar	NW3	SW3	S3	S3	SSW5	S7	S8	SSE9	SSE12	S11	S11	S12	S10	SSW9	S6	S7	SE3	NNE3	NE5	ESE5	E7	SSE4	S3	SW1	S4.8	S12	
29-Mar	SE6	SSE8	S7	SSW5	S8	S7	S7	SSW6	SW4	SSW6	SSW10	S11	SSW9	SSW7	S6	SE8	ESE8	ESE8	SE10	SE8	SSW2	SSE8	SSE9	ESE5	SSE6.2	S11	
30-Mar	SE6	ESE6	ENE5	ENE5	E6	E5	NE1	NE0	E2	E2	NE8	ENE6	E4	ENE6	ENE7	ENE8	NE9	ENE7	E6	ENE6	ENE4	SSW4	SW4	SSE5	E3.9	NE9	
31-Mar	SSW5	S5	S6	SSW6	SSW5	S5	S7	S8	S11	SW13	SW14	SSW10	S12	S17	S17	SSW19	SSW17	SSW14	S13	SSW16	SSW6	SSW11	S10	SSW11	SSW10.3	SSW19	

NE4.4	NE3.7	NE3.7	NE3.4	ENE2.5	ENE2.2	ENE2.5	ENE2.5	E1.9	NE0.5	NW1.1	NNW1.5	N0.9	N1.4	NNE2.5	NE3.6	NE5.1	NE6.0	NE6.4	NE6.6	NE7.0	NE5.3	ENE4.4	NE4.3	Diurnal Average	
N25	WNW24	WNW28	N24	W25	NNE28	NNE30	NNE28	NNE26	NNE26	NNE24	S25	W28	W28	WNW27	WNW27	NW29	WNW31	NW25	N25	NNE25	N26	N26	NNE24	Diurnal Maximum	

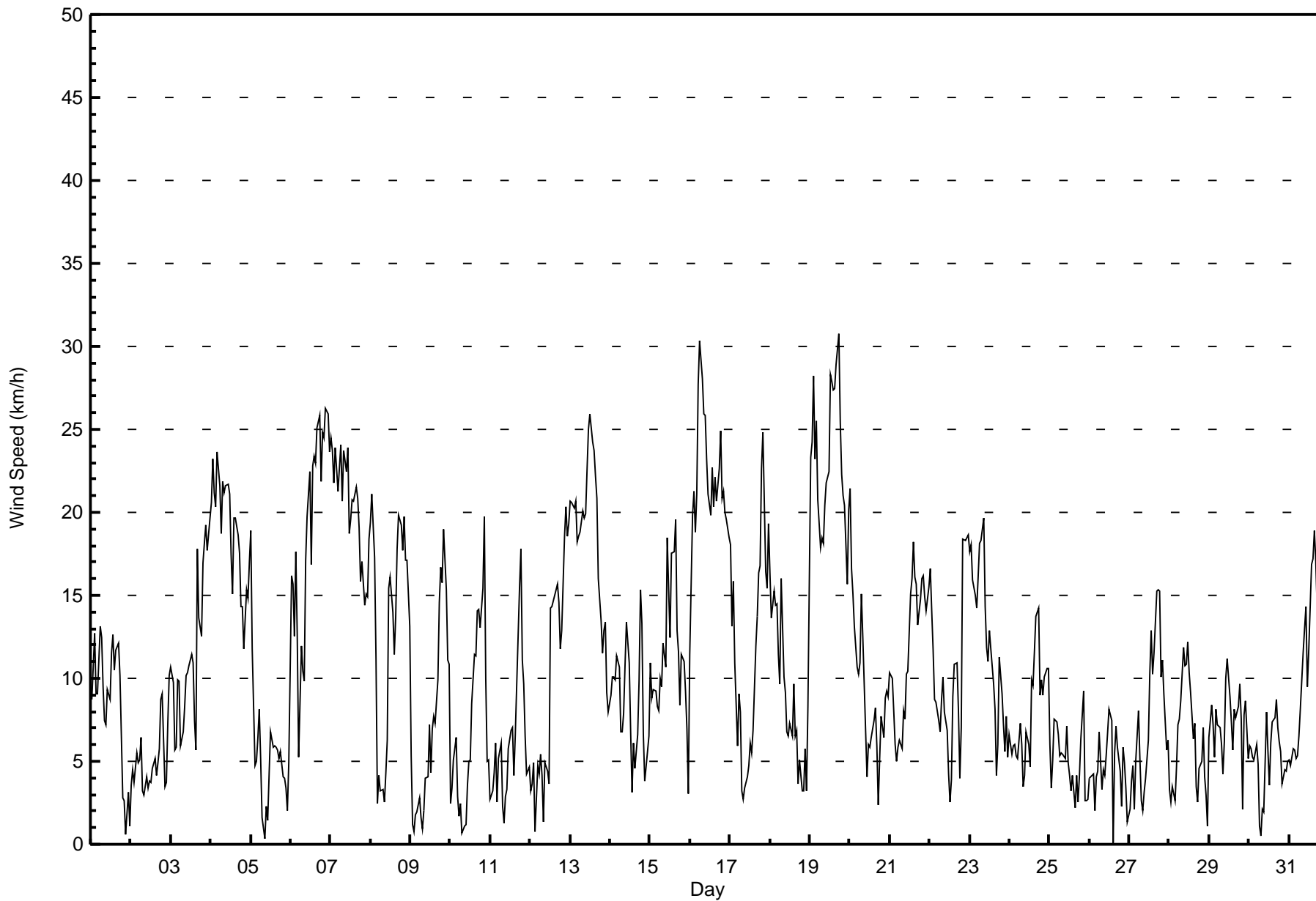
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Shell Muskeg River - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Mar 19 19:00 Minimum Value: 1 km/h on Mar 26 02:00 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-Mar	3	2	2	4	2	3	4	2	2	1	2	2	3	3	3	2	2	1	4	3	1	1	2	1	4
2-Mar	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	2	1	3	2	3	2	1	3	3	3
3-Mar	2	3	1	2	2	3	1	2	3	3	3	4	4	4	2	3	5	4	4	4	4	5	4	4	5
4-Mar	4	4	4	4	5	5	4	5	5	5	4	3	3	4	3	3	3	3	3	2	3	2	3	2	5
5-Mar	2	6	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1	1	4	6
6-Mar	4	2	4	4	3	4	4	3	4	4	4	5	3	3	3	4	5	5	6	5	6	5	6	5	6
7-Mar	6	6	5	6	5	4	4	5	4	4	5	5	4	5	5	5	4	3	3	2	3	4	4	5	6
8-Mar	4	4	4	4	1	1	1	1	2	2	2	5	4	3	3	4	3	4	3	3	4	4	4	4	5
9-Mar	4	2	2	1	1	1	1	1	1	1	1	3	2	3	3	3	4	2	3	2	2	3	2	2	4
10-Mar	2	2	2	2	1	1	1	1	1	1	1	2	2	3	3	3	3	2	3	3	3	3	2	2	3
11-Mar	1	1	1	1	1	1	1	1	1	2	1	2	2	2	2	3	2	2	2	3	2	1	1	1	3
12-Mar	1	2	2	1	1	1	1	1	1	1	1	2	4	4	4	4	4	3	3	3	4	4	4	4	4
13-Mar	4	4	5	4	4	4	4	5	5	5	5	7	7	6	5	5	5	4	3	3	3	3	2	1	7
14-Mar	2	2	2	2	2	2	2	1	2	4	4	2	2	2	2	2	2	7	2	3	3	2	2	2	7
15-Mar	3	3	3	2	1	1	2	2	5	4	4	4	4	3	4	4	4	3	2	3	4	2	2	2	5
16-Mar	5	5	5	4	4	6	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	6
17-Mar	2	2	2	2	2	5	3	1	2	2	3	2	2	2	3	2	3	2	2	4	3	4	3	3	5
18-Mar	3	2	3	2	3	2	4	2	2	2	3	2	2	2	3	3	3	2	1	2	2	2	1	1	4
19-Mar	8	7	7	6	6	6	4	4	4	5	5	6	6	6	5	6	7	7	8	7	6	7	5	5	8
20-Mar	5	5	4	3	3	4	3	2	3	3	2	2	3	2	3	2	2	2	3	1	1	2	1	2	5
21-Mar	2	2	2	1	1	1	1	2	2	2	2	5	4	4	4	4	4	3	4	4	4	3	3	3	5
22-Mar	3	3	3	3	2	2	2	3	3	2	2	2	2	4	1	2	2	2	2	8	4	4	5	4	8
23-Mar	4	4	3	3	3	4	4	2	2	3	3	4	3	3	3	3	2	3	3	2	2	1	1	1	4
24-Mar	2	2	1	1	1	2	2	2	1	2	2	2	1	5	3	3	3	4	2	3	3	3	3	3	5
25-Mar	2	2	1	1	2	1	1	1	2	2	1	1	1	2	1	1	1	1	3	1	2	2	1	2	3
26-Mar	1	1	1	2	2	2	1	2	1	1	2	2	3	2	3	3	2	1	1	2	1	1	2	1	3
27-Mar	2	2	1	1	2	1	3	1	1	2	1	2	2	2	2	3	2	2	2	3	2	2	2	2	3
28-Mar	2	1	1	1	1	2	1	2	2	3	3	3	3	3	2	2	2	2	1	1	2	2	2	2	3
29-Mar	2	1	1	1	1	1	1	1	1	2	3	3	3	2	3	3	3	3	2	2	3	3	2	1	3
30-Mar	1	1	2	2	1	2	1	1	1	1	2	2	2	2	2	2	3	2	2	2	3	1	1	1	3
31-Mar	1	1	1	2	1	1	2	3	3	3	3	3	3	5	5	6	6	4	3	6	3	3	2	3	6
Diurnal Maximum																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Shell Muskeg River - March 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	199	26.75	26.75
6 - 11	265	35.62	62.37
12 - 19	172	23.12	85.48
20 - 28	105	14.11	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
Shell Muskeg River - March 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	7	6	26	30	14	17	7	19	19	8	10	7	5	5	14	199
6 - 11	11	18	32	32	10	9	22	20	47	27	8	3	3	4	12	7	265
12 - 19	18	42	46	5	0	0	10	17	15	7	4	2	2	1	1	2	172
20 - 28	15	48	9	0	0	0	0	6	9	0	0	2	5	7	3	1	105
29 - 38	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	3
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	49	116	93	63	40	23	49	50	90	53	20	17	17	18	22	24	744

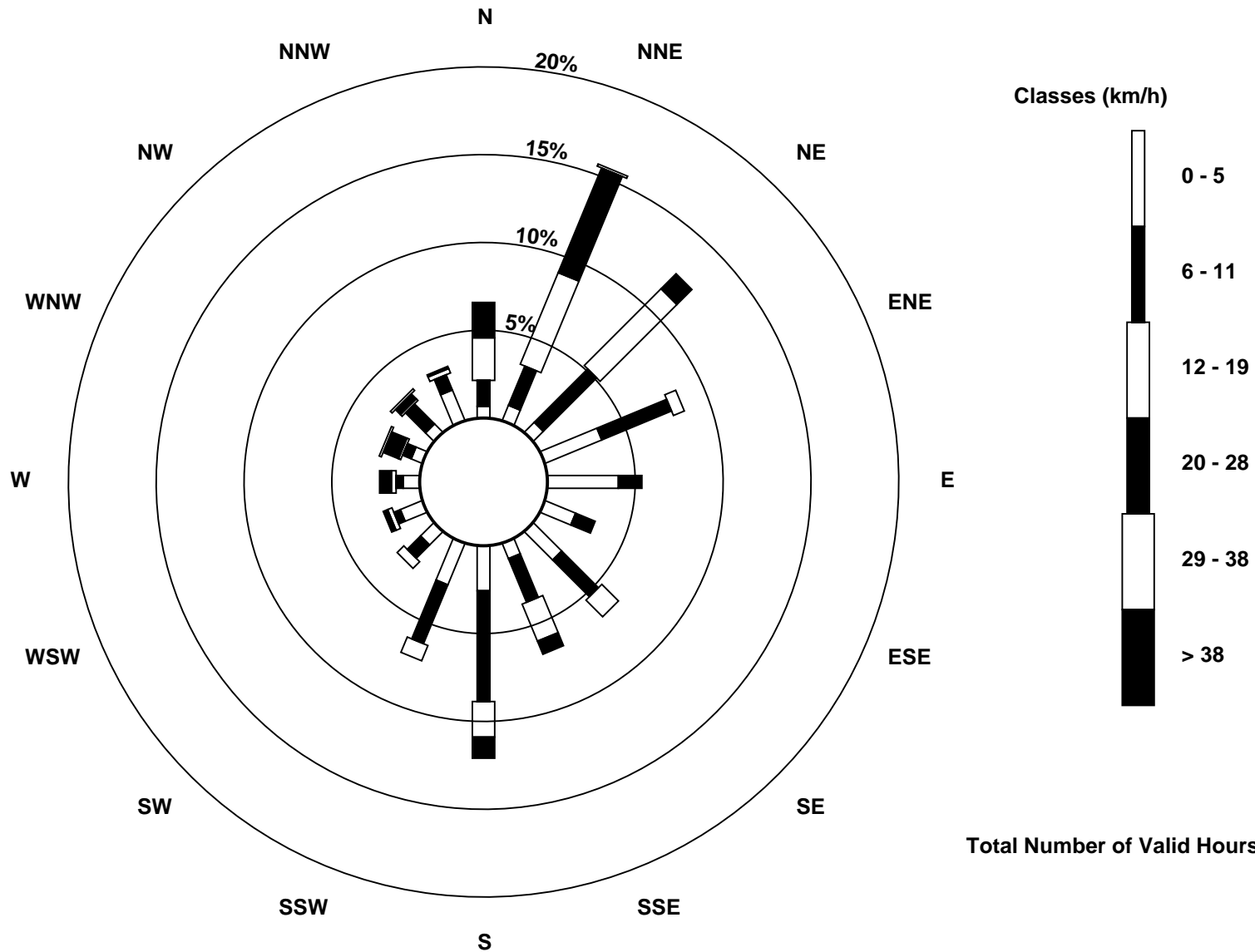
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Wind Speed (WS) - km/h
Shell Muskeg River (AMS 16)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Shell Muskeg River - March 2017

Direction of Maximum Speed: 301 deg on Mar 19 18:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 24.2 deg on Mar 16		Hours of Data:	744
Direction of Minimum Speed: 32 deg on Mar 26 15:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 0.6 deg on Mar 3		Percent Operational Time:	100.0
Monthly Average Direction: 203.6 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-Mar	51	52	51	60	59	49	50	56	63	51	51	43	33	47	41	44	57	49	39	84	72	88	64	135	51.0
2-Mar	169	191	164	183	180	203	185	193	190	231	252	266	279	1	20	342	356	137	141	137	139	133	150	156	169.5
3-Mar	164	168	185	165	159	182	185	172	209	176	213	199	211	224	205	304	355	2	344	25	21	28	31	30	69.1
4-Mar	34	28	28	28	28	17	7	5	8	19	29	32	36	23	36	38	42	48	54	68	70	63	60	41	32.7
5-Mar	42	43	86	68	63	67	66	98	335	113	230	268	236	235	268	290	323	331	319	142	128	168	193	329	29.2
6-Mar	23	44	45	23	42	33	50	58	59	18	11	22	29	41	35	32	22	19	4	4	7	8	8	12	23.2
7-Mar	9	5	9	5	7	25	25	20	34	26	26	21	18	16	12	16	38	49	53	53	45	11	12	0	21.4
8-Mar	360	1	25	33	149	195	200	185	186	246	321	16	22	23	43	47	49	48	41	37	24	17	2	2	24.0
9-Mar	351	298	130	125	193	184	186	193	204	161	256	42	298	36	74	52	61	50	42	43	41	48	53	57	48.8
10-Mar	67	97	59	60	116	134	181	122	190	245	324	330	354	21	30	32	32	44	22	13	28	37	63	59	33.3
11-Mar	62	63	64	61	62	76	54	60	109	245	286	326	335	341	26	51	53	38	45	52	65	69	79	112	45.8
12-Mar	123	116	85	81	59	91	78	85	140	237	252	259	164	174	172	163	152	143	137	137	140	150	159	157	150.0
13-Mar	159	163	166	164	165	166	169	171	169	169	170	172	173	171	170	170	170	169	173	186	192	180	170	174	170.1
14-Mar	162	169	179	176	182	179	169	155	185	199	196	218	247	286	27	335	6	33	38	39	9	52	81	177	162.5
15-Mar	156	145	206	181	177	185	187	186	191	195	219	220	205	226	298	311	315	333	334	360	51	63	63	13	225.4
16-Mar	4	5	10	13	19	24	24	30	29	26	30	27	29	29	18	28	22	26	25	25	25	26	33	41	24.2
17-Mar	38	56	46	53	71	307	317	289	243	258	272	332	334	329	9	28	29	25	33	26	27	16	7	23	20.1
18-Mar	33	40	31	30	30	34	28	26	33	11	349	313	326	319	347	341	298	343	98	66	343	81	170	257	15.9
19-Mar	296	291	297	283	278	274	267	264	258	256	258	270	271	276	285	292	306	301	314	315	302	330	2	15	290.6
20-Mar	13	0	353	9	1	18	27	40	44	22	351	46	88	92	113	78	79	81	72	58	79	139	156	161	42.2
21-Mar	167	177	190	197	210	199	207	203	208	216	227	199	174	179	169	155	141	136	142	148	159	149	158	156	169.8
22-Mar	158	155	146	140	134	130	112	126	131	136	139	140	98	280	269	221	222	214	201	357	2	7	360	16	122.8
23-Mar	19	11	12	20	20	17	25	43	44	42	29	13	20	10	29	47	340	356	353	12	57	68	66	79	25.7
24-Mar	153	169	163	162	189	192	199	194	209	335	318	319	342	182	170	139	161	145	128	112	126	138	169	143	158.8
25-Mar	125	132	116	66	65	65	81	105	125	144	159	136	126	307	314	346	70	79	76	86	70	105	70	87	93.7
26-Mar	102	107	98	91	86	44	55	59	59	43	342	296	276	288	32	119	107	173	234	254	105	94	95	84	78.3
27-Mar	93	88	97	145	157	173	176	269	228	305	33	352	28	23	36	32	46	47	44	33	35	54	53	41	44.9
28-Mar	314	216	185	190	210	174	172	158	154	170	177	175	186	205	185	187	140	15	49	106	84	150	182	225	170.1
29-Mar	140	161	183	192	187	189	187	198	222	205	195	182	205	207	176	130	115	111	131	137	202	153	149	120	168.3
30-Mar	130	110	68	73	89	81	52	34	84	95	53	60	92	63	65	65	53	70	79	65	65	213	232	168	79.2
31-Mar	193	185	180	207	194	183	184	174	189	222	239	205	188	173	176	201	204	200	185	212	201	196	188	204	196.3
49.1 50.5 47.1 48.2 64.1 63.8 58.8 68.2 91.1 54.8 305.1 345.0 350.0 0.3 32.5 39.5 41.6 44.7 43.6 45.1 44.3 54.4 56.4 53.2																									
Diurnal Average																									

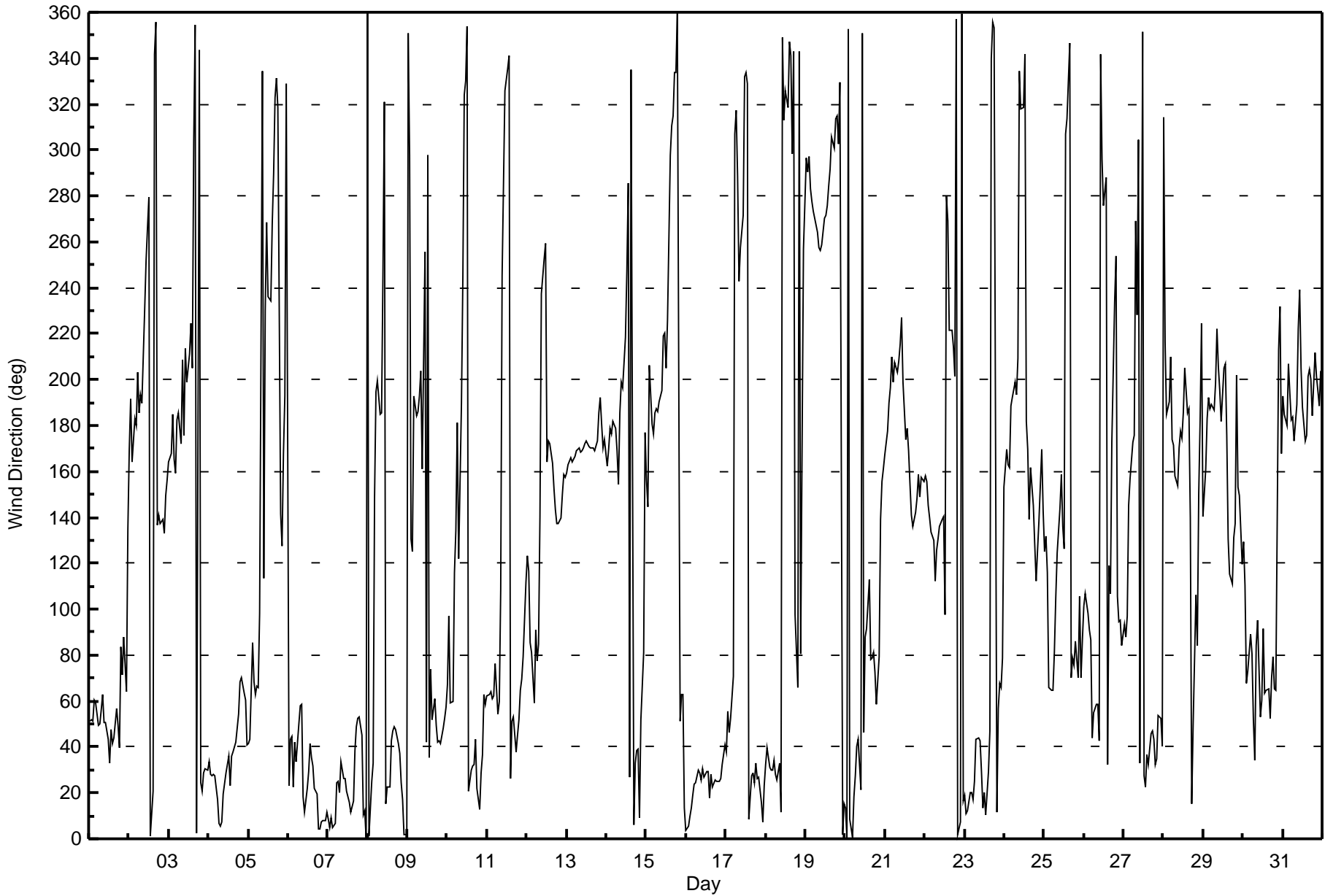
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Shell Muskeg River - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 102 deg on Mar 9 03:00 Minimum Value: 5 deg on Mar 11 19:00 Percentiles: P ₁ = 6 P ₁₀ = 10 Q ₁ = 13 Median = 17 Q ₃ = 26 P ₉₀ = 42 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-Mar	18	10	7	22	15	9	13	12	12	12	14	26	26	16	21	19	13	9	27	54	22	34	56	43	56
2-Mar	16	9	17	7	11	11	10	12	21	33	34	57	70	36	31	34	24	40	11	12	26	10	14	14	70
3-Mar	13	17	19	16	12	21	18	17	22	18	20	23	22	24	24	46	22	22	25	26	18	14	15	13	46
4-Mar	13	11	11	12	11	16	17	16	16	16	14	13	15	21	12	12	10	7	14	8	11	6	11	8	21
5-Mar	6	29	26	20	17	11	18	37	87	53	83	53	25	19	28	35	25	24	22	64	22	14	39	38	87
6-Mar	18	12	12	12	17	75	21	19	23	17	17	14	19	10	12	12	14	15	16	14	14	15	13	16	75
7-Mar	16	15	18	16	16	14	10	18	12	14	13	19	17	18	19	17	15	9	9	8	15	19	17	16	19
8-Mar	15	12	20	27	30	12	21	17	24	26	45	26	24	23	31	20	11	9	10	13	10	15	14	16	45
9-Mar	41	94	102	59	26	11	17	29	26	34	43	30	46	38	27	27	26	14	6	6	6	10	12	10	102
10-Mar	26	32	21	15	37	38	17	61	66	74	42	36	47	29	21	20	22	11	15	15	7	19	19	18	74
11-Mar	13	16	12	9	13	13	11	12	38	51	53	29	26	30	55	26	17	12	5	11	9	10	20	18	55
12-Mar	14	24	28	80	11	10	13	7	40	15	29	60	23	21	20	19	15	14	12	13	14	12	11	11	80
13-Mar	11	11	12	11	12	12	13	13	13	14	13	14	14	14	14	14	14	13	12	15	18	15	13	11	18
14-Mar	8	12	14	12	14	12	14	11	22	23	22	26	23	51	15	33	29	26	7	10	20	40	26	16	51
15-Mar	13	16	17	15	10	13	17	15	19	23	13	12	20	17	22	13	15	18	14	16	18	14	20	62	62
16-Mar	23	15	16	15	14	10	8	11	10	8	11	14	16	11	18	13	13	11	7	10	8	8	11	8	23
17-Mar	7	15	13	13	25	28	21	34	46	47	60	40	23	30	31	13	12	8	10	8	6	15	17	12	60
18-Mar	11	10	11	10	11	11	20	8	12	19	26	26	25	28	25	49	50	59	19	50	61	23	50	10	61
19-Mar	18	13	13	14	13	12	12	11	12	15	13	16	14	14	14	15	15	13	18	20	15	22	20	22	22
20-Mar	17	19	16	21	22	25	19	10	16	41	55	33	56	45	36	24	32	66	51	12	18	19	7	9	66
21-Mar	8	12	15	16	13	13	12	21	18	18	10	30	19	19	16	20	16	15	13	13	14	13	12	12	30
22-Mar	12	12	14	14	15	15	18	15	15	22	30	65	66	81	25	11	12	17	20	88	18	18	16	16	88
23-Mar	14	17	17	17	16	16	13	8	9	14	21	27	24	25	26	19	38	34	15	22	22	13	7	25	38
24-Mar	13	13	10	18	16	16	17	23	55	43	30	24	36	66	25	17	18	13	13	16	17	20	28	14	66
25-Mar	17	30	26	10	15	9	13	23	16	21	13	25	26	64	22	38	15	28	30	10	10	56	15	23	64
26-Mar	22	9	13	40	18	49	16	74	20	41	33	34	28	29	88	38	22	25	15	67	10	11	46	74	88
27-Mar	59	12	14	32	23	24	23	42	57	55	45	35	19	17	26	19	8	9	6	15	12	10	21	37	59
28-Mar	56	40	25	18	19	13	13	13	12	16	17	16	21	32	44	36	71	80	29	20	17	43	57	87	87
29-Mar	13	18	13	16	13	12	14	21	24	34	27	25	32	34	54	29	27	21	13	14	75	15	16	25	75
30-Mar	13	12	17	17	14	21	75	75	29	27	14	24	54	23	22	20	19	20	22	33	69	35	27	28	75
31-Mar	23	25	19	17	17	15	18	17	21	20	14	36	23	18	23	23	22	19	19	24	35	17	14	16	36
	59	94	102	80	37	75	75	75	87	74	83	65	70	81	88	49	71	80	51	88	75	56	57	87	
Diurnal Maximum																									





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	March 1, 2017	Last Calibration	February 13, 2017
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:24	End Time (MST)	15:02
Gas Cert Reference	EY0000638	Station temp.	22 Deg C
Cal Gas Concentration	48.2 ppm	Cal Gas Exp Date	04-Nov-18
Calibrator Make/Model	API T700	Serial Number	493
ZAG Make/Model	API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-710	-710
Analyzer IP address	192.168.1.43		Lamp voltage	832	831
Calculated slope	1.002078	1.004404	Chamber temp	45.3	45.1
Calculated intercept	2.708587	1.306963	Pressure	718.3	724.0
Analyzer Background	8.4	8.4	Flow	0.446	0.449
Analyzer Coefficient	1.021	1.021	Intensity	90	90
Analyzer make	Thermo 43i		Analyzer serial #	1118148498	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	76.6	738.4	734.5	1.005
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	76.6	738.4	734.5	1.005
second point	5000	38.5	371.1	367.6	1.010
third point	5000	19.4	187.0	183.7	1.018
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	76.6	738.4	729.1	1.013
Average Correction Factor					1.011

Corrected As found 734.6 Previous response 734.2 % change -0.1%

Notes:

Replaced inlet filter after asfound. No adjustments made.

Calibration Performed By:

Jayme Marcoux



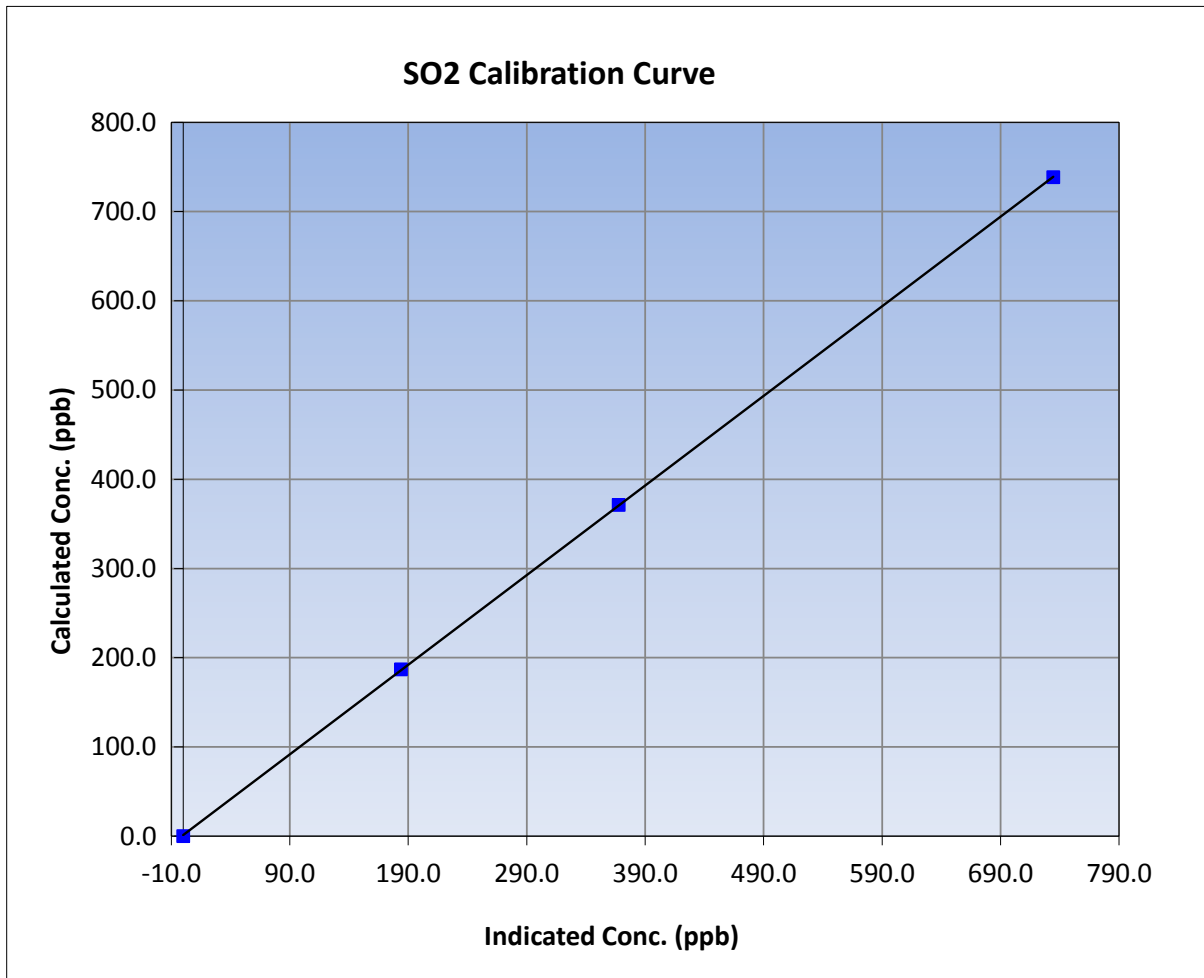
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 1, 2017	Previous Calibration	February 13, 2017
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:24	End Time (MST)	15:02
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

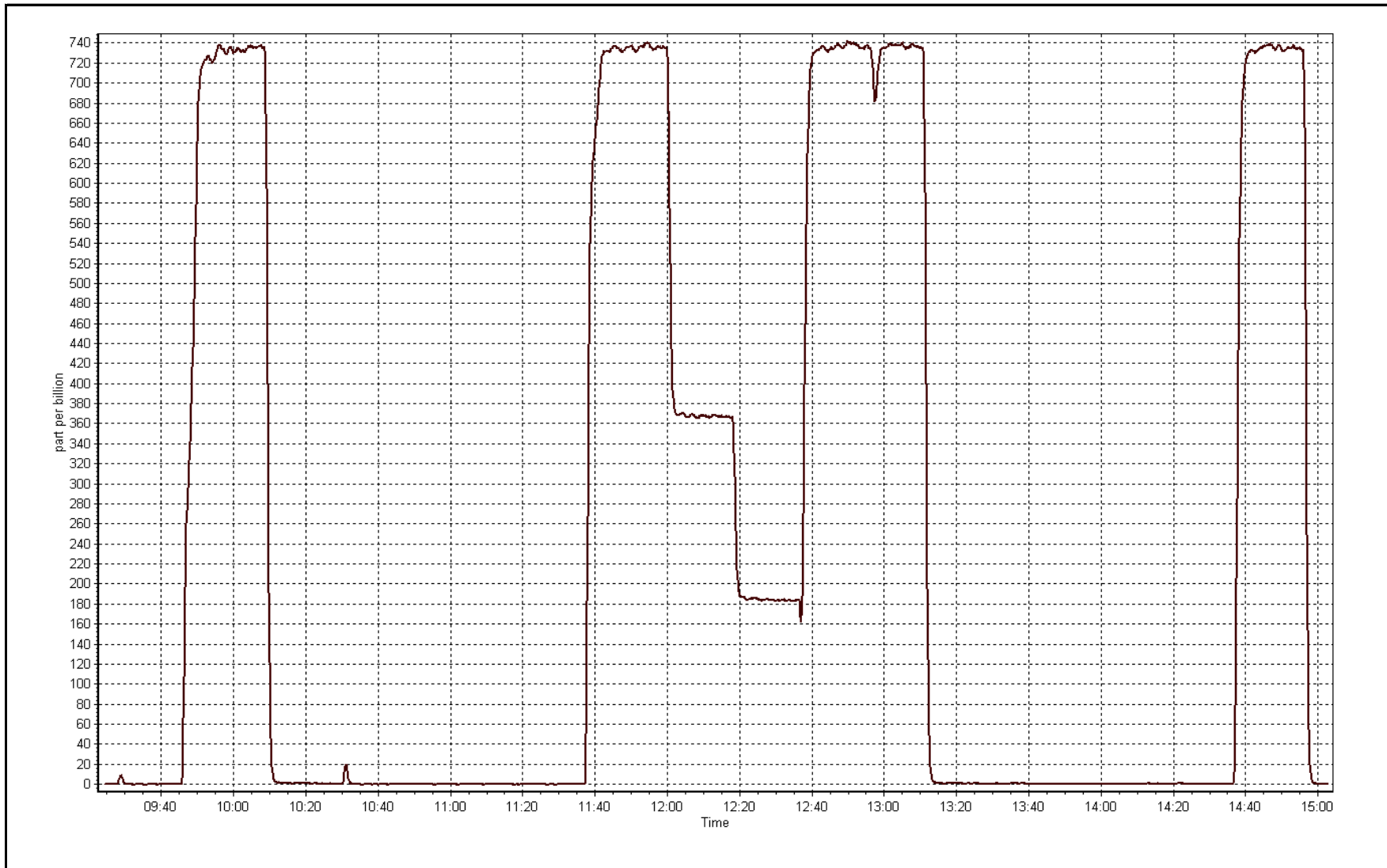
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999988
738.4	734.5	1.0053		
371.1	367.6	1.0098	Slope	1.004404
187.0	183.7	1.0179		
			Intercept	1.306963



SO2 Calibration Plot

Date: March 1, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	March-01-17	Last Calibration	February-02-17
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:24	End Time (MST)	14:58
Gas Cert Reference	EY0000638	Cal Gas Expiry Date	04-Nov-18
CH4 Cal Gas Conc.	502 ppm	CH4 Equiv Conc.	1035.5 ppm
C3H8 Cal Gas Conc.	194 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	493
ZAG make/model	Teledyne API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	Serial Number	3492

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.9	34.9
Calculated slope	1.010232	0.998886	Fuel Pressure	24.2	24.2
Calculated intercept	-0.070003	0.048952	Analyzer Coeff	4.550	4.753
			Analyzer BKG	2.32	2.37

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.05	----
as found span	5000	76.6	15.86	15.85	1.001
calibrator zero	5000	0.0	0.00	-0.04	----
high point	5000	76.6	15.86	15.84	1.002
second point	5000	38.5	7.97	7.92	1.007
third point	5000	19.4	4.02	3.97	1.012
as left zero	5000	0.0	0.00	0.01	----
as left span	5000	76.6	15.86	15.71	1.010
Average Correction Factor					1.007

Corrected As found	15.80	Previous response	15.77	% change	-0.2%
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Notes:

Replaced THC Pump. Installed new hydrogen cylinder. Changed the inlet filter after as founds. Adjusted the zero and the span. Adjusted the Fuel pressure on the regulator after multipoint calibration. Adjusted it too low. Readjusted it to the original value.

Calibration Performed By:

Jayme Marcoux



Wood Buffalo Environmental Association THC Calibration Report

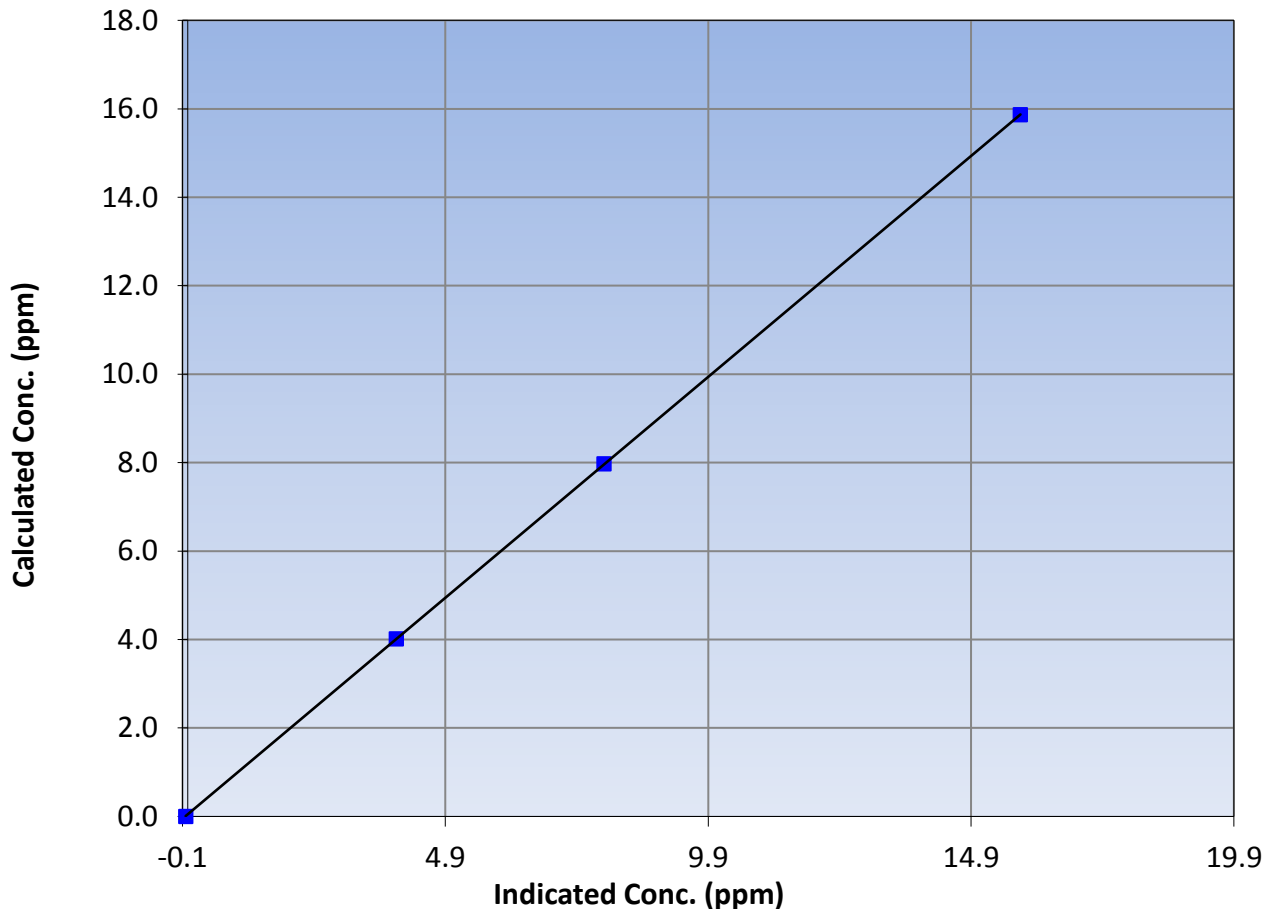
Station Information

Calibration Date	March 1, 2017	Previous Calibration	February 2, 2017
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:24	End Time (MST)	14:58
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

Calibration Data

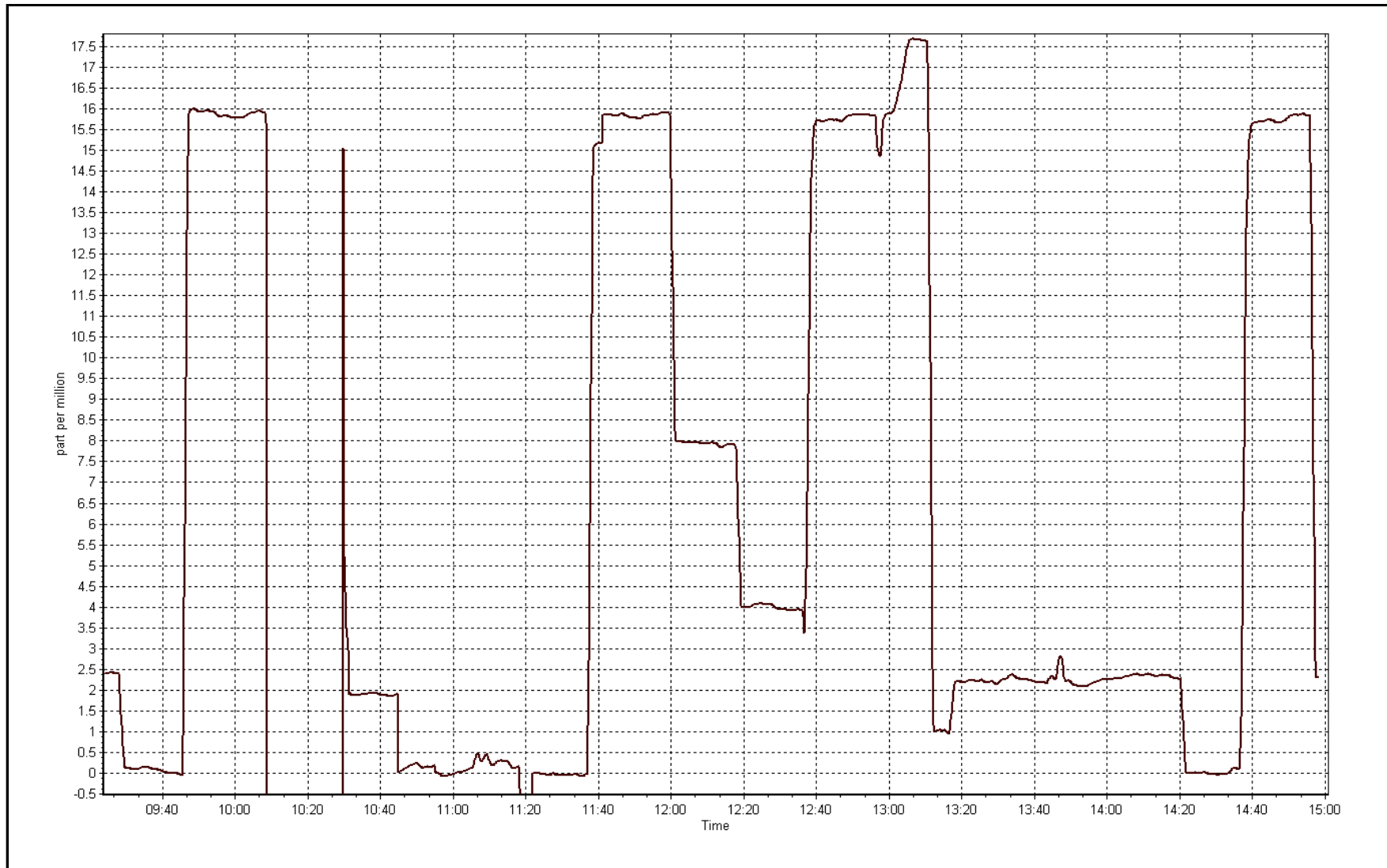
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.04	----	Correlation Coefficient	0.999998
15.86	15.84	1.0015		
7.97	7.92	1.0067	Slope	0.998886
4.02	3.97	1.0120		
			Intercept	0.048952

THC Calibration Curve



THC Calibration Plot

Date: March 1, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 1, 2017	Previous Calibration	February 2, 2017
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:24	End Time (MST)	14:59
NO Cal Gas Conc	52.4 ppm	Gas Cert Reference	EY0000638
NOx Cal Gas Conc	52.4 ppm	Cal Gas Expiry Date	November 4, 2019
Calibrator	API T700	Serial Number	493
Zero air Generator	Teledyne API T701	Serial Number	2155

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	3492
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000381	0.998925	0.992910
	Data Offset	0.040964	0.421368	-0.185212
Current Calibration	Data Slope	0.996956	0.994315	0.961109
	Data Offset	0.997986	1.230259	3.799833

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661309
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.071		1.145	
NOx coefficient	0.996		0.996	
NO2 coefficient	1.000		1.000	
NO bkgnd	8.9		9.5	
NOx bkgnd	9.3		9.9	
Chamber Temp	50.1	Deg C	50.2	Deg C
Moly Temp	324.5	Deg C	326	Deg C
PMT voltage	-744.4	V	-744.8	V
PMT Temp	-2.7	Deg C	-2.9	Deg C
O3 flow	-3.1	ccm	-3.1	ccm
R Cell press NO	177.4	mmHg	171	mmHg
R Cell Press Nox	177.7	mmHg	170.7	mmHg
NO sample flow	0.888	lpm	0.927	lpm
Nox sample Flow	0.890	lpm	0.929	lpm

Notes:

Changed the inlet filter after as founds. Adjusted the span. The drift of the GPT point most likely the result in the temperature change in the pump cabinet, affecting the reaction cell pressure.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

March 1, 2017

Station Number:

AMS 16

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.1	----	----
as found span	5000	76.6	802.8	802.8	0.0	742.8	744.8	-2.1	1.0807	1.0778
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	5000	76.6	802.8	802.8	0.0	804.9	807.0	-2.0	0.9973	0.9948
second point	5000	38.5	403.5	403.5	0.0	402.5	403.2	-0.7	1.0024	1.0007
third point	5000	19.4	203.3	203.3	0.0	202.6	202.6	0.0	1.0038	1.0035
as left zero	5000	0.0	0.0	0.0	0.0	1.1	0.1	1.0	----	----
as left span	5000	76.6	802.8	501.5	301.3	805.8	583.8	325.5	0.9962	0.8591
Average Correction Factor									1.0012	0.9997

Corrected As found
Previous Response

NO_x= 742.8
NO_x= 802.4

NO= 744.9
NO= 803.2

Percent Change

NO_x= 8.0%

NO= 7.8%

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 76.60 ccm NOx ref calc conc = 802.8 ppb NO ref calc conc = 802.8 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	810.7	810.6	0.0	0.9903	0.9904	----	----
1st NO2 (300)	501.5	309.1	819.8	501.5	318.3	0.9792	----	0.9708	103.0%
2nd NO2 (200)	601.7	208.9	817.7	601.7	216.0	0.9817	----	0.9669	103.4%
3rd NO2 (100)	694.0	116.6	804.0	694.0	110.0	0.9985	----	1.0595	94.4%
2nd NO ref point	----	0.0	799.7	800.1	-0.4	1.0038	1.0033	----	----
Average Correction Factor						0.9908		0.9991	100.3%

Calibration Performed By: Jayne Marcoux



Wood Buffalo Environmental Association

NO_x Calibration Summary

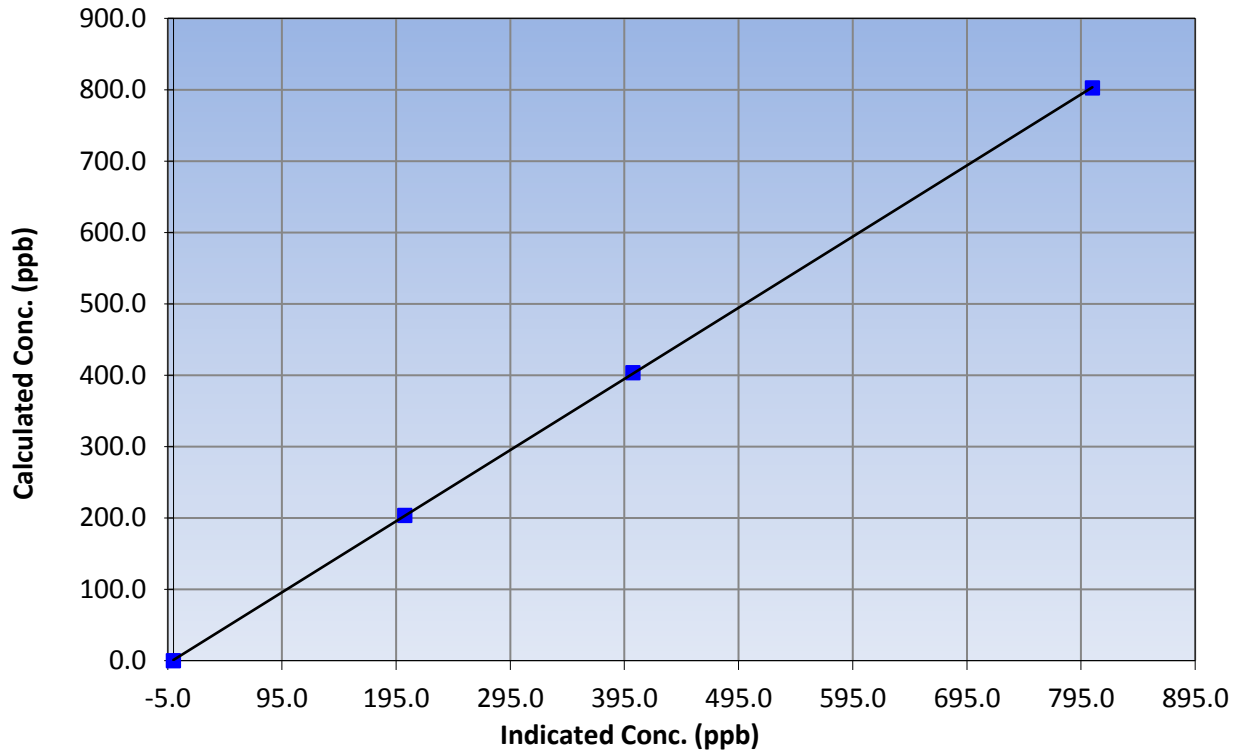
Station Information

Calibration Date	March 1, 2017	Previous Calibration	February 2, 2017
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:24	End Time (MST)	14:59
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999992
802.8	804.9	0.9973		
403.5	402.5	1.0024	Slope	0.996956
203.3	202.6	1.0038		
			Intercept	0.997986

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

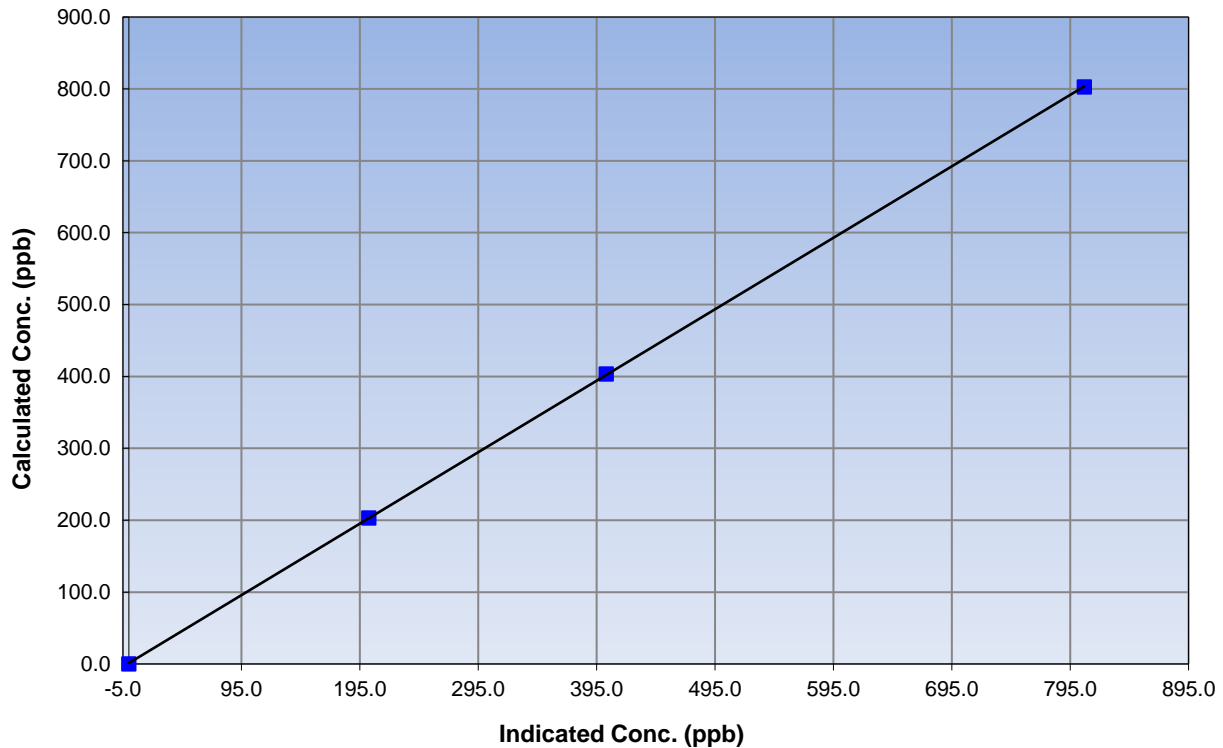
Station Information

Calibration Date	March 1, 2017	Previous Calibration	February 2, 2017
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:24	End Time (MST)	14:59
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999988
802.8	807.0	0.9948		
403.5	403.2	1.0007	Slope	0.994315
203.3	202.6	1.0035		
			Intercept	1.230259

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

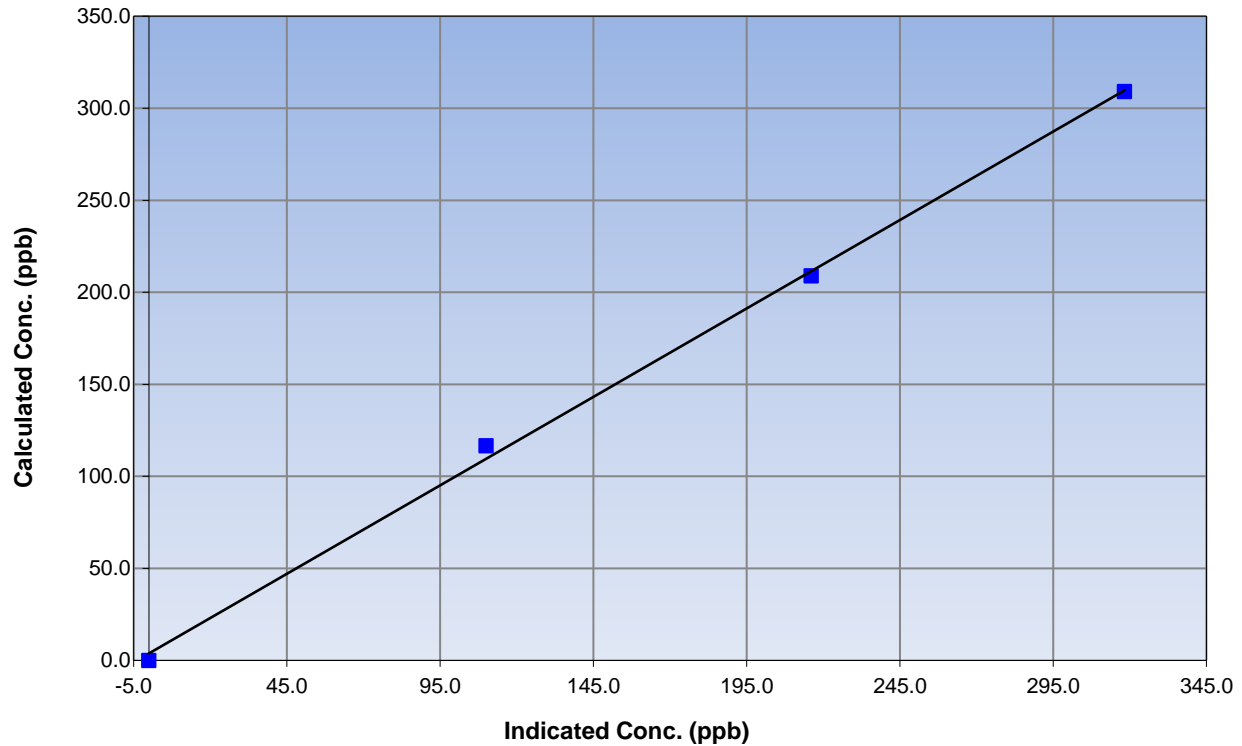
Station Information

Calibration Date	March 1, 2017	Previous Calibration	February 2, 2017
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:24	End Time (MST)	14:59
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.998643
309.1	318.3	0.9708		
208.9	216.0	0.9669	Slope	0.961109
116.6	110.0	1.0595		
			Intercept	3.799833

NO₂ Calibration Curve







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 3, 2017	Previous Calibration	March 1, 2017
Station Name	Muskeg River	Station Number	AMS 16
Reason:	Other: Maintenance		
Start Time (MST)	9:29	End Time (MST)	14:10
NO Cal Gas Conc	52.4 ppm	Gas Cert Reference	EY0000638
NOX Cal Gas Conc	52.4 ppm	Cal Gas Expiry Date	November 4, 2019
Calibrator	API T700	Serial Number	493
Zero air Generator	Teledyne API T701	Serial Number	2155

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2632
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.996956	0.994315	0.961109
	Data Offset	0.997986	1.230259	3.799833
Current Calibration	Data Slope	0.998615	0.998492	1.025379
	Data Offset	1.976078	2.353819	0.681852

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262593
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.145		1.129	
NOX coefficient	0.996		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	9.5		9.5	
NOX bkgrnd	9.9		10.1	
Chamber Temp	50.1	Deg C	50.4	Deg C
Moly Temp	327.1	Deg C	323.4	Deg C
PMT voltage	-744.8	V	-744.8	V
PMT Temp	-2.8	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	169.5	mmHg	166.8	mmHg
R Cell Press Nox	169.2	mmHg	166.5	mmHg
NO sample flow	0.874	lpm	0.900	lpm
Nox sample Flow	0.877	lpm	0.899	lpm

Notes:

Changed the inlet filter after as founds. Adjusted the zero and span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

March 3, 2017

Station Number:

AMS 16

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.4	-0.1	0.5	----	----
as found span	5000	76.6	802.8	802.8	0.0	800.7	802.7	-2.0	1.0025	1.0001
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	5000	76.6	802.8	802.8	0.0	803.2	803.1	0.1	0.9994	0.9996
second point	5000	38.5	403.5	403.5	0.0	400.0	399.5	0.5	1.0087	1.0101
third point	5000	19.4	203.3	203.3	0.0	200.5	199.8	0.7	1.0143	1.0176
as left zero	5000	0.0	0.0	0.0	0.0	0.2	-0.1	0.3	----	----
as left span	5000	76.6	802.8	487.7	315.1	807.6	482.2	325.4	0.9941	1.0114
Average Correction Factor									1.0075	1.0091

Corrected As found NO_x= 800.4 NO= 802.9 Percent Change NO_x= 0.5% NO= 0.4%
 Previous Response NO_x= 804.2 NO= 806.1

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 76.60 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	487.7	317.4	797.7	487.7	310.0	0.9912	1.0000	1.0237	97.7%
2nd NO2 (200)	----	585.8	219.3	797.4	585.8	211.7	0.9915	1.0000	1.0360	96.5%
3rd NO2 (100)	----	690.4	114.7	801.2	690.4	110.8	0.9868	1.0000	1.0346	96.7%
4th NO2 (0)	805.1	----	-8.4	796.6	794.1	2.6	0.9925	1.0138	N/A	----
Average Correction Factor							0.9905	1.0035	1.0314	97.0%

Calibration Performed By: Jayne Marcoux



Wood Buffalo Environmental Association

NO_x Calibration Summary

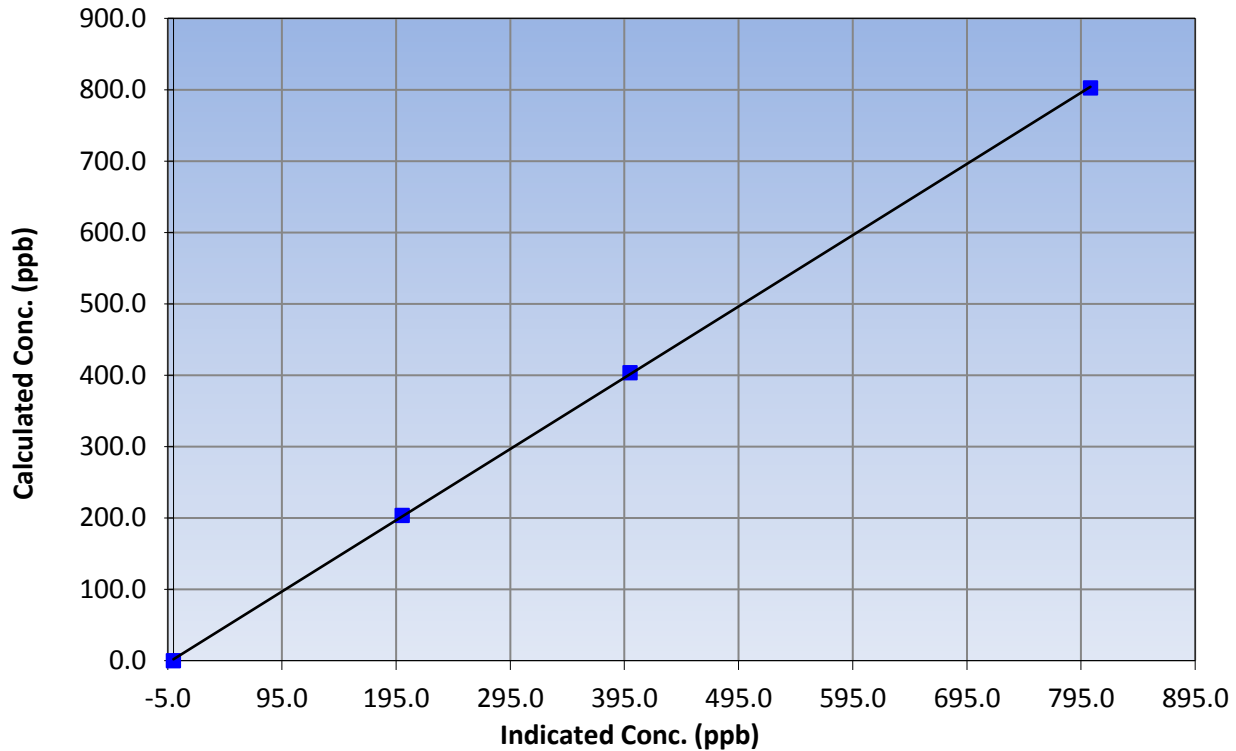
Station Information

Calibration Date	March 3, 2017	Previous Calibration	March 1, 2017
Station Name	Muskeg River	Station Number	AMS 16
Start Time (MST)	9:29	End Time (MST)	14:10
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999969
802.8	803.2	0.9994		
403.5	400.0	1.0087	Slope	0.998615
203.3	200.5	1.0143		
			Intercept	1.976078

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

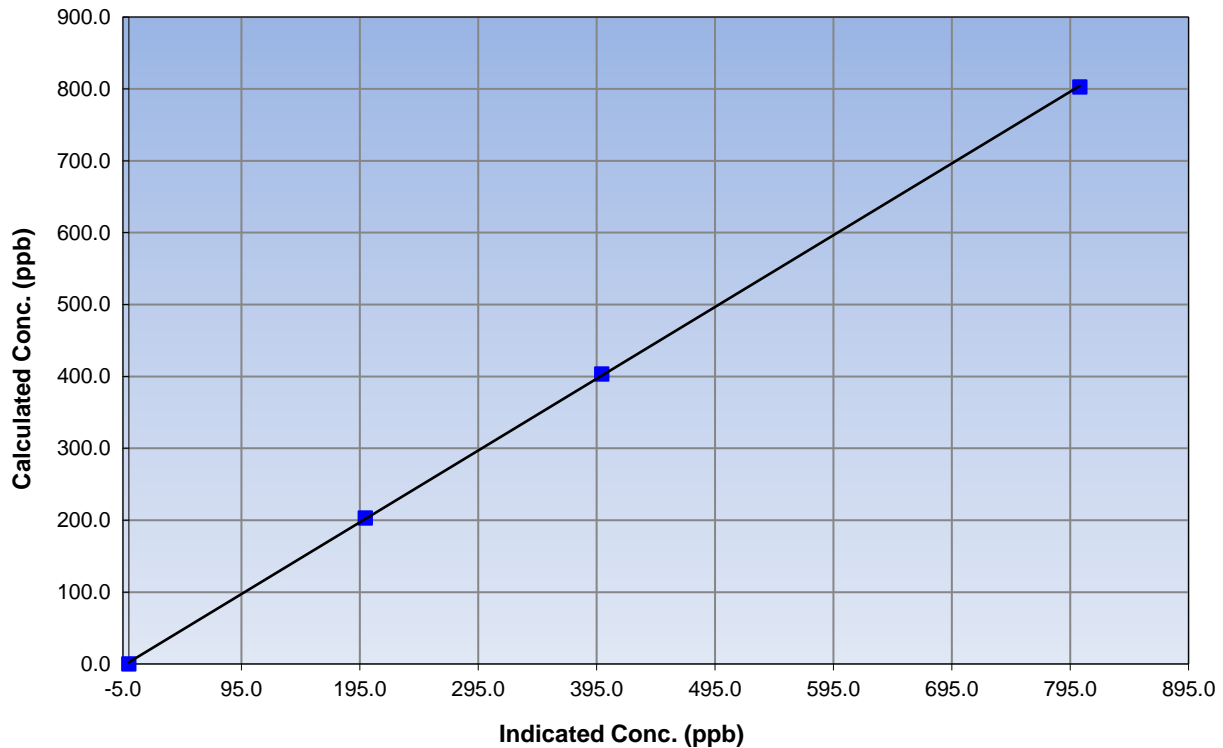
Station Information

Calibration Date	March 3, 2017	Previous Calibration	March 1, 2017
Station Name	Muskeg River	Station Number	AMS 16
Start Time (MST)	9:29	End Time (MST)	14:10
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999959
802.8	803.1	0.9996		
403.5	399.5	1.0101	Slope	0.998492
203.3	199.8	1.0176		
			Intercept	2.353819

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

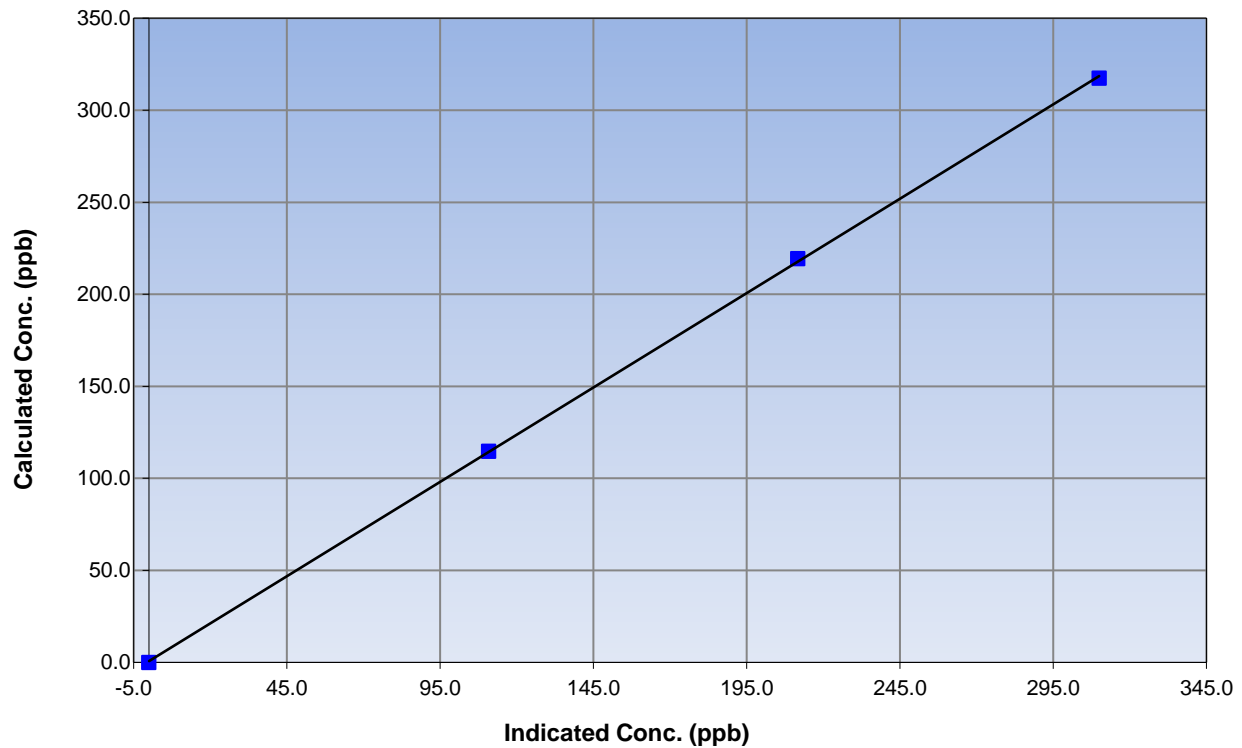
Station Information

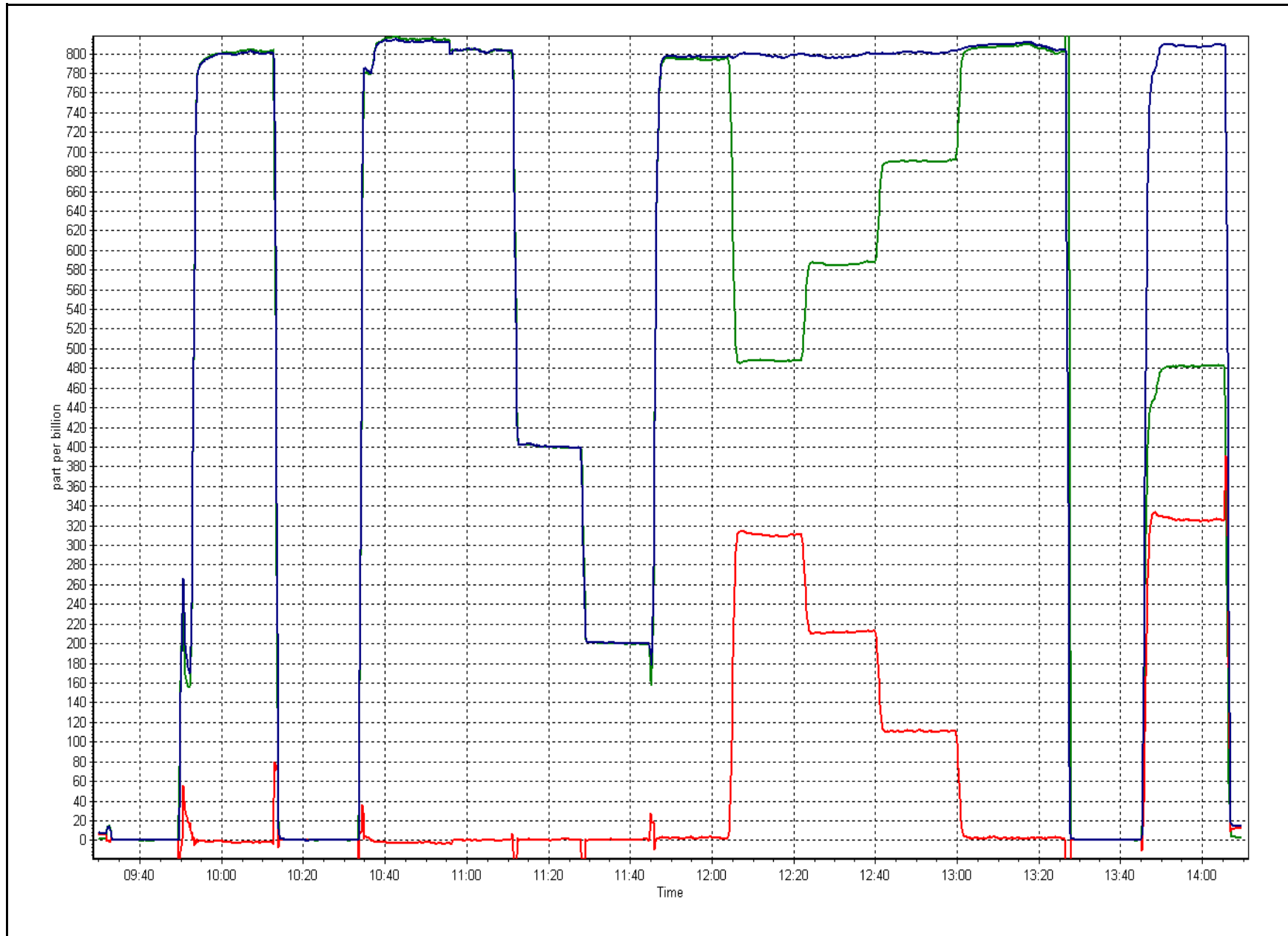
Calibration Date	March 3, 2017	Previous Calibration	March 1, 2017
Station Number	Muskeg River	Station Number	AMS 16
Start Time (MST)	9:29	End Time (MST)	14:10
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999920
317.4	310.0	1.0237		
219.3	211.7	1.0360	Slope	1.025379
114.7	110.8	1.0346		
			Intercept	0.681852

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Shell Muskeg River	Station number:	AMS 16
Calibration Date:	March 1, 2017	Last Cal Date:	February 2, 2017
Start time (MST):	11:00	End time (MST):	12:17
Sharp Model:	Thermo / SHARP 5030	S/N:	E-798
Particulate Fraction:	PM2.5	C14 Source S/N:	4142
Flow Standard Model:	DeltaCal	S/N:	628
Temp/RH standard:	NA	S/N:	NA

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	-20	-20.7	-20	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	979	979	978	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1015	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"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

Leak Test:	Date of check: _____	Last Cal Date: <u>December 12, 2016</u>	<u>Tolerance</u>
	Flow w/o adaptor: _____	Flow w/ adaptor: _____	0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass: <u>NA</u>	S/N: <u>NA</u>
	Date of check: <u>NA</u>	Last Cal Date: <u>June 24, 2016</u>
	New Correction Factor: <u>NA</u>	Previous Correction Factor: <u>NA</u>

Parameter	As found	Measured	As left	Adjusted	Tolerance
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: Cleaned cyclone head. Adjusted the flow.

Calibration by: Jayme Marcoux



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

**AMS 17
WAPASU
MARCH 2017**

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
MARCH 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	12	0	4	0
H2S (ppb) Average	709	35	35	100	1	0	0	0
THC (ppm) Average	708	35	36	99.87	2.5	-	2.3	-
O3 (ppb) Average	710	34	34	100	48	0	44	-
NO2 (ppb) Average	709	35	35	100	20	0	6	-
NO (ppb) Average	709	35	35	100	7	-	1	-
NOX (ppb) Average	709	35	35	100	24	-	6	-
PM2.5 (ug/m3) Average	739	2	5	99.6	17.1	-	7.3	0
Temperature 2 m (C) Average	744	0	0	100	11.2	-	6	-
Relative Humidity (%) Average	744	0	0	100	99	-	90	-
Precipitation (mm) Total	744	0	0	100	1.1	-	1.7	-
Wind Speed 10 m (km/h) Average	742	0	2	99.73	23	-	18	-
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 - WAPASU (AMS 17)
MARCH 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	0.5	1	-	0	0	0	0	0	1	12
H2S (ppb) Average	709	0.1	0	-	0	0	0	0	0	0	1
THC (ppm) Average	708	2.21	0.1	-	2.1	2.2	2.2	2.2	2.2	2.3	2.5
O3 (ppb) Average	710	34.6	8	-	8	24	31	36	40	42	48
NO2 (ppb) Average	709	1.4	3	-	0	0	0	1	1	3	20
NO (ppb) Average	709	0.3	1	-	0	0	0	0	0	1	7
NOX (ppb) Average	709	1.7	3	-	0	0	0	1	2	4	24
PM2.5 (ug/m3) Average	739	4.34	1.8	-	1.2	2.4	3.2	4.1	5.2	6.3	17.1
Temperature 2 m (C) Average	744	-9.11	11.2	-	-38.1	-23.5	-19	-7.5	0.2	3.8	11.2
Relative Humidity (%) Average	744	66.4	17	-	25	43	54	69	79	89	99
Precipitation (mm) Total	744	-	-	4.75	-	-	-	-	-	-	-
Wind Speed 10 m (km/h) Average	742	9.9	4	-	1	4	7	10	13	16	23
Wind Direction 10 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	23 Mar 2017 20:00	23 Mar 2017 20:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	25 Mar 2017 19:00	25 Mar 2017 19:00	1	Flat line in sensor output signal -sensor frozen
THC	21 Mar 2017 22:00	21 Mar 2017 22:00	1	DAS collection error - data not recorded
PM2.5	10 Mar 2017 11:00	10 Mar 2017 11:00	1	Stabilization following calibration
PM2.5	14 Mar 2017 14:00	14 Mar 2017 15:00	2	Flat line in sensor output signal



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Wapasu - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 12 ppb on Mar 14 10:00	Maximum Daily Average: 4.1 ppb on Mar 14		Hours of Data:	709
Minimum Value: 0 ppb on Mar 10 02:00	Minimum Daily Average: 0.1 ppb on Mar 27		Hours of Missing Data:	35
Maximum Diurnal Average: 1.2 ppb at hour 16	Minimum Diurnal Average: 0.2 ppb at hour 20		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 = 8		Percent Operational Time:	100.0

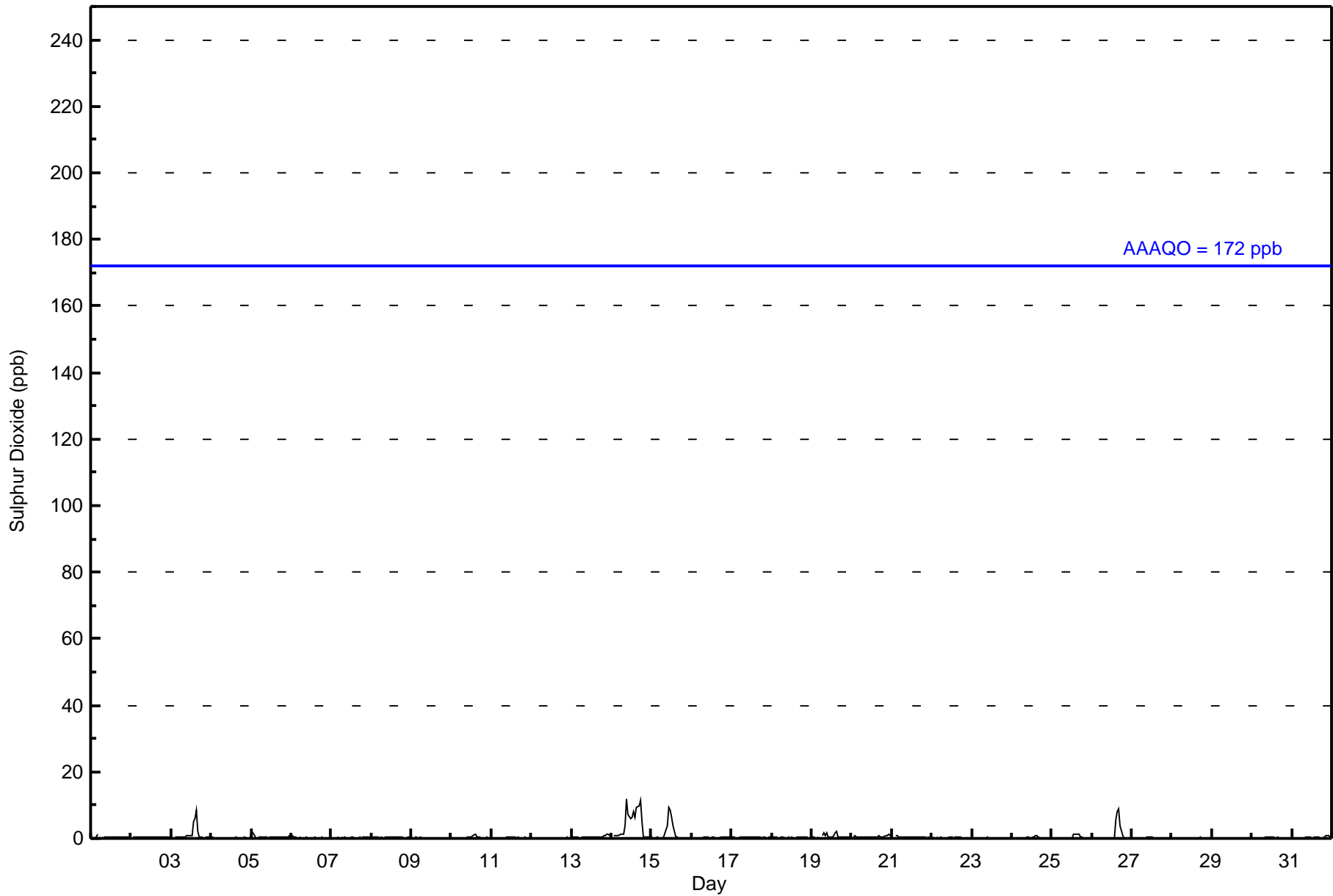
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0	0	0	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
2-Mar	Z	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
3-Mar	1	Z	1	1	0	0	0	0	1	1	1	1	1	5	6	8	2	0	0	0	0	0	0	1.4	8	
4-Mar	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	
5-Mar	2	2	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	2	
6-Mar	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
7-Mar	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	
8-Mar	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	
9-Mar	0	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
10-Mar	0	0	Z	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0.3	1	
11-Mar	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-Mar	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	
13-Mar	0	0	0	0	0	Z	0	0	1	0	0	1	0	0	0	0	1	1	1	1	1	1	1	0.5	1	
14-Mar	Z	1	1	1	1	1	1	1	4	12	7	6	6	8	7	9	10	11	5	0	0	0	1	4.1	12	
15-Mar	1	Z	0	0	0	0	0	0	1	4	9	8	6	4	0	0	0	0	0	0	0	0	0	1.5	9	
16-Mar	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	
17-Mar	1	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	
18-Mar	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	
19-Mar	0	0	0	0	0	Z	1	2	1	2	1	0	0	1	2	2	0	0	0	0	0	0	0	0.6	2	
20-Mar	Z	0	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0	1	1	1	0.6	1	
21-Mar	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
22-Mar	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0.2	1	
23-Mar	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	
24-Mar	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	
25-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0.3	1	
26-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	5	8	9	4	1	0	0	0	0	0	1.2	9	
27-Mar	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	
28-Mar	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	
29-Mar	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	
30-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1	
31-Mar	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	
																								Diurnal Average		
																								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
Wapasu - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	99.72	99.72
11 - 20	2	0.28	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: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - March 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	96	51	29	14	14	28	133	157	73	22	11	7	9	13	21	27	705
11 - 20	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	2
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	96	51	29	15	14	28	133	157	73	23	11	7	9	13	21	27	707

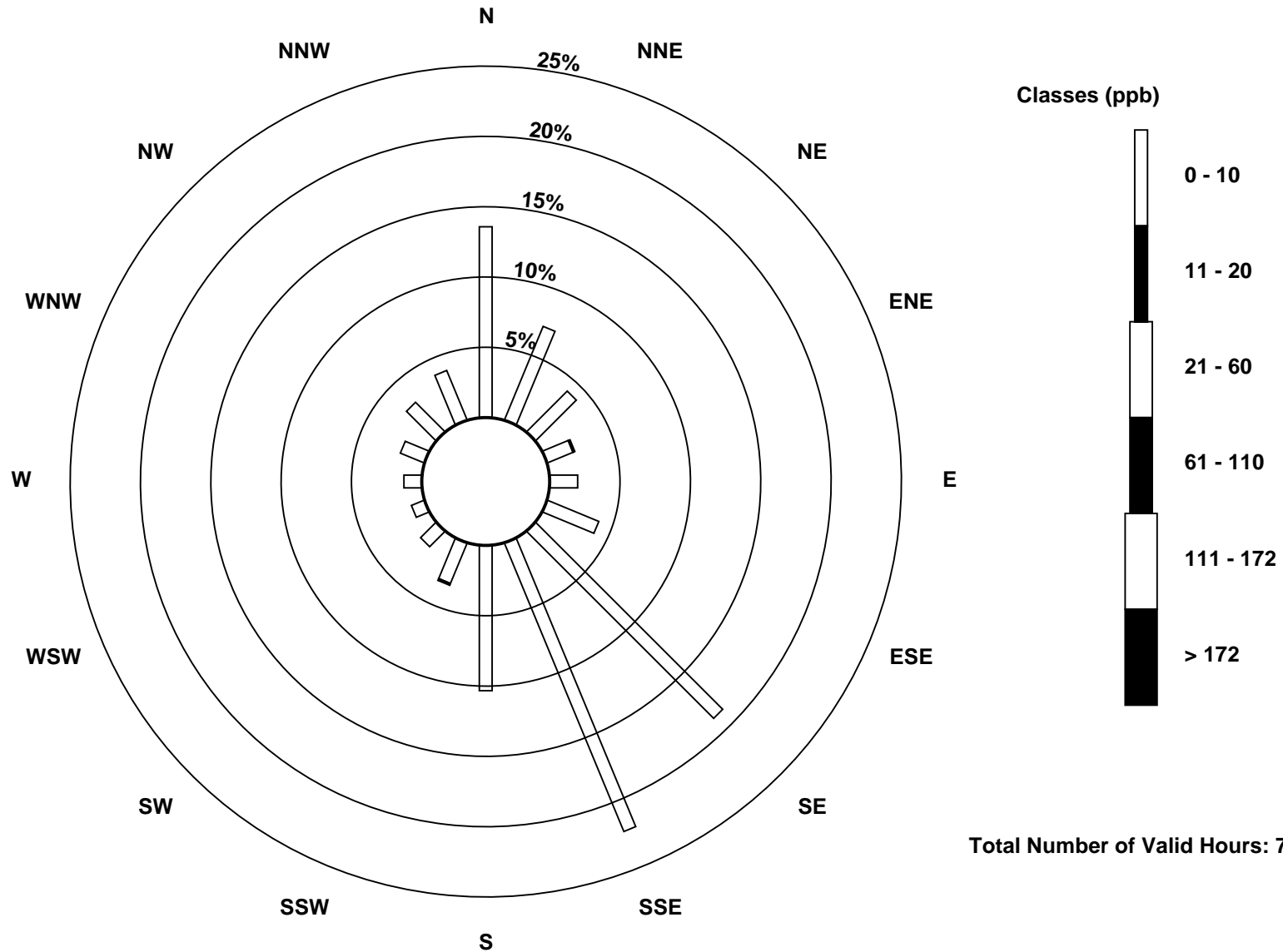
Total Number of Valid Hours: 707

Total Number of Hours: 744

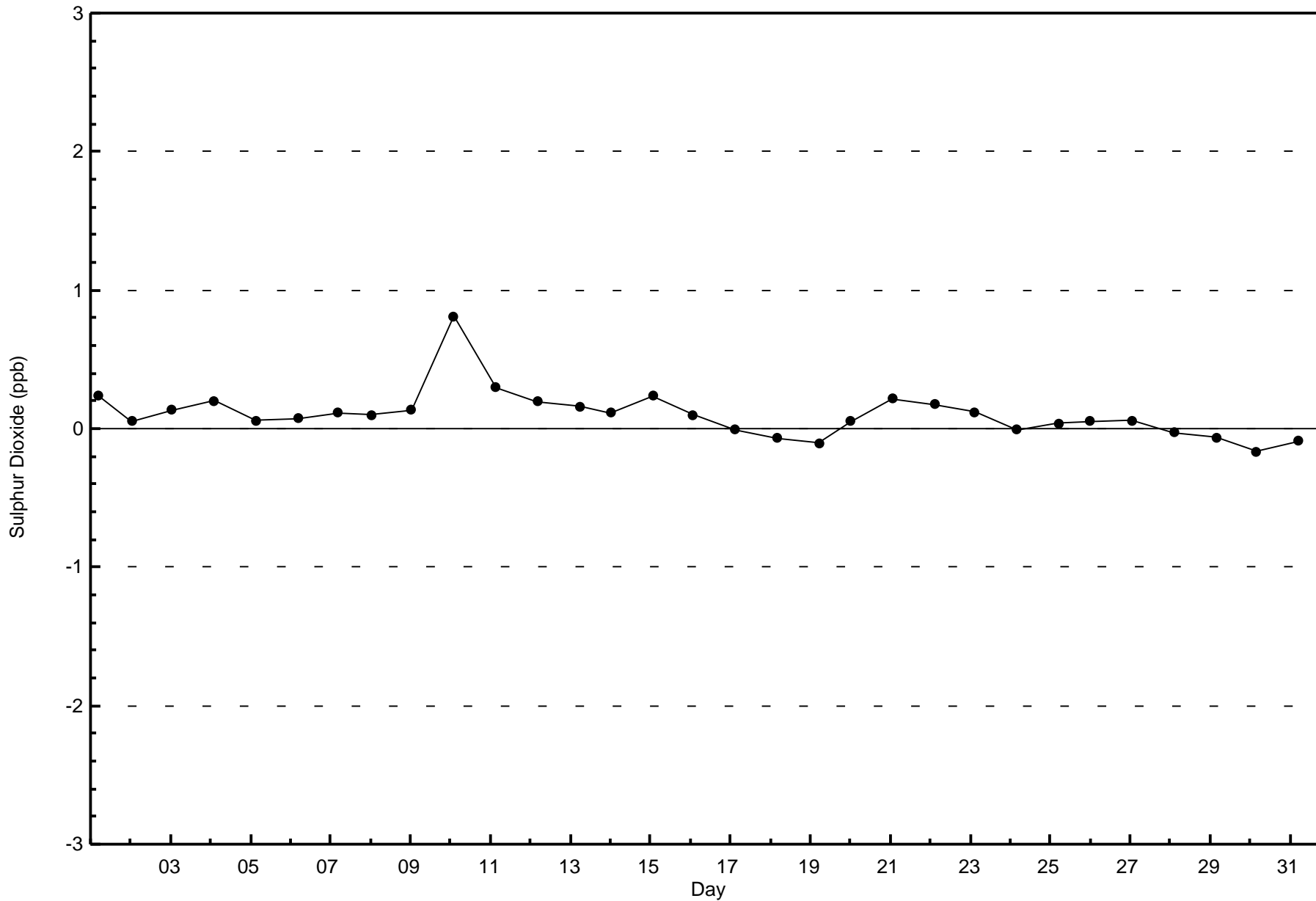


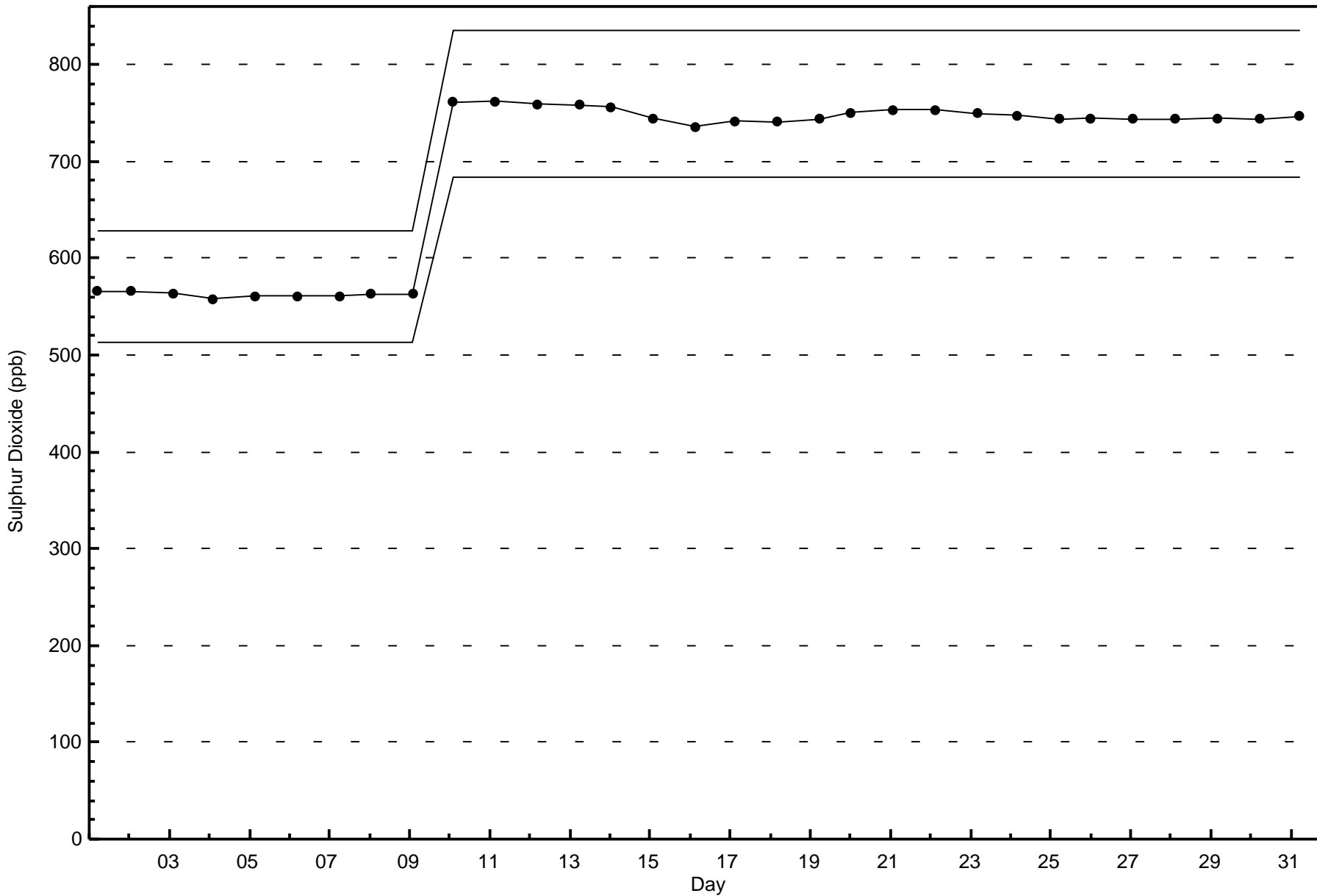
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Sulphur Dioxide (SO₂) - ppb
Wapasu (AMS 17)



Total Number of Valid Hours: 707





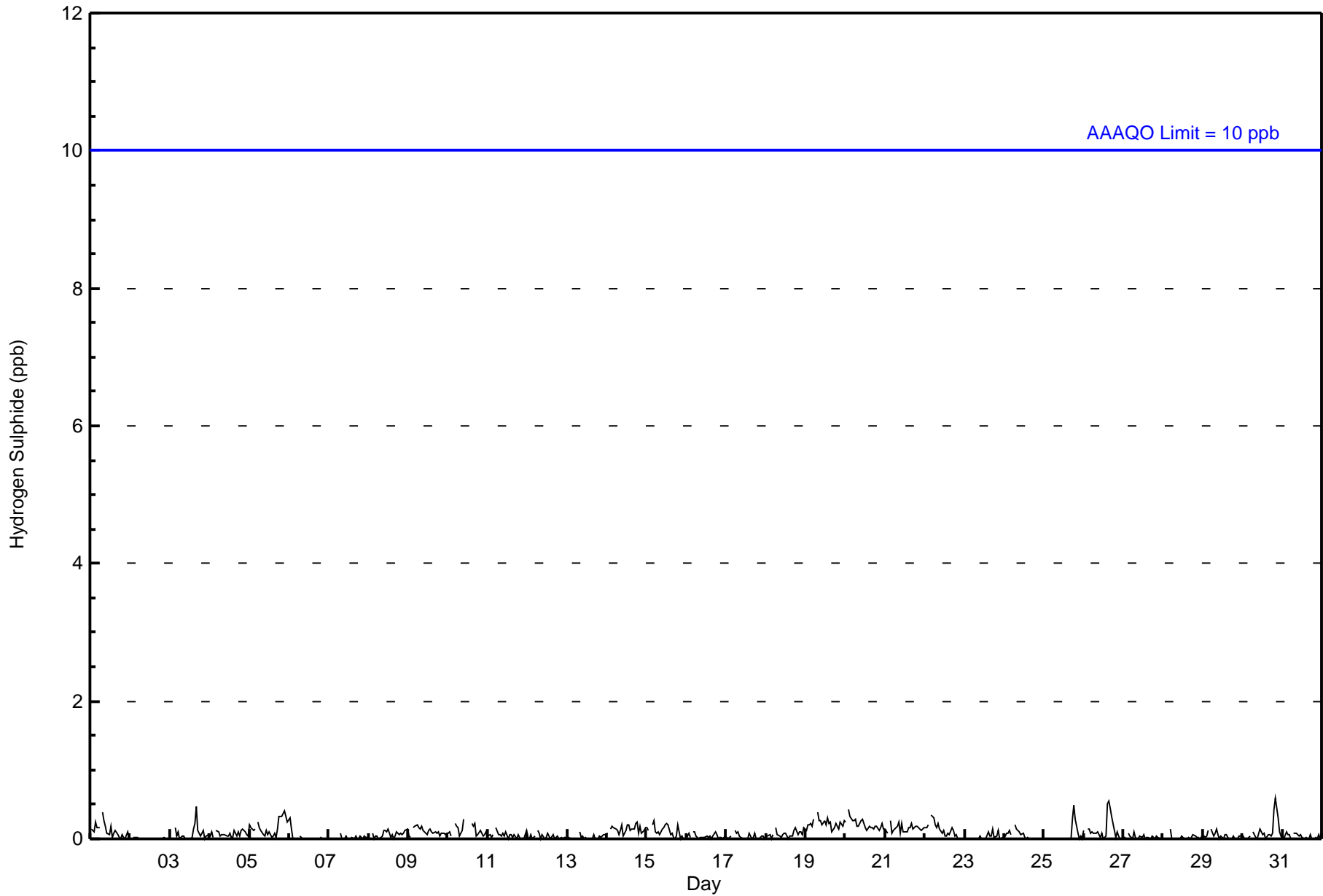


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 1 ppb on Mar 30 21:00	Maximum Daily Average: 0.2 ppb on Mar 19		Hours of Data:	709
Minimum Value: 0 ppb on Mar 1 19:00	Minimum Daily Average: 0.0 ppb on Mar 2		Hours of Missing Data:	35
Maximum Diurnal Average: 0.1 ppb at hour 6	Minimum Diurnal Average: 0.1 ppb at hour 14		Hours of Calibration:	35
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 = 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-Mar	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
2-Mar	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
3-Mar	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
4-Mar	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
5-Mar	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
6-Mar	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	0
7-Mar	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	0
8-Mar	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
9-Mar	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
10-Mar	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.1	0
11-Mar	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
12-Mar	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	0
13-Mar	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	0
14-Mar	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
15-Mar	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
16-Mar	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
17-Mar	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
18-Mar	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
19-Mar	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
20-Mar	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
21-Mar	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
22-Mar	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
23-Mar	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
24-Mar	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	0
25-Mar	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
26-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.1	1
27-Mar	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
28-Mar	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
29-Mar	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
30-Mar	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	0.1	1
31-Mar	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	0

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	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	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	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
Wapasu - March 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
Wapasu - March 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	98	50	29	15	13	30	133	156	73	23	11	7	8	13	21	27	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	98	50	29	15	13	30	133	156	73	23	11	7	8	13	21	27	707

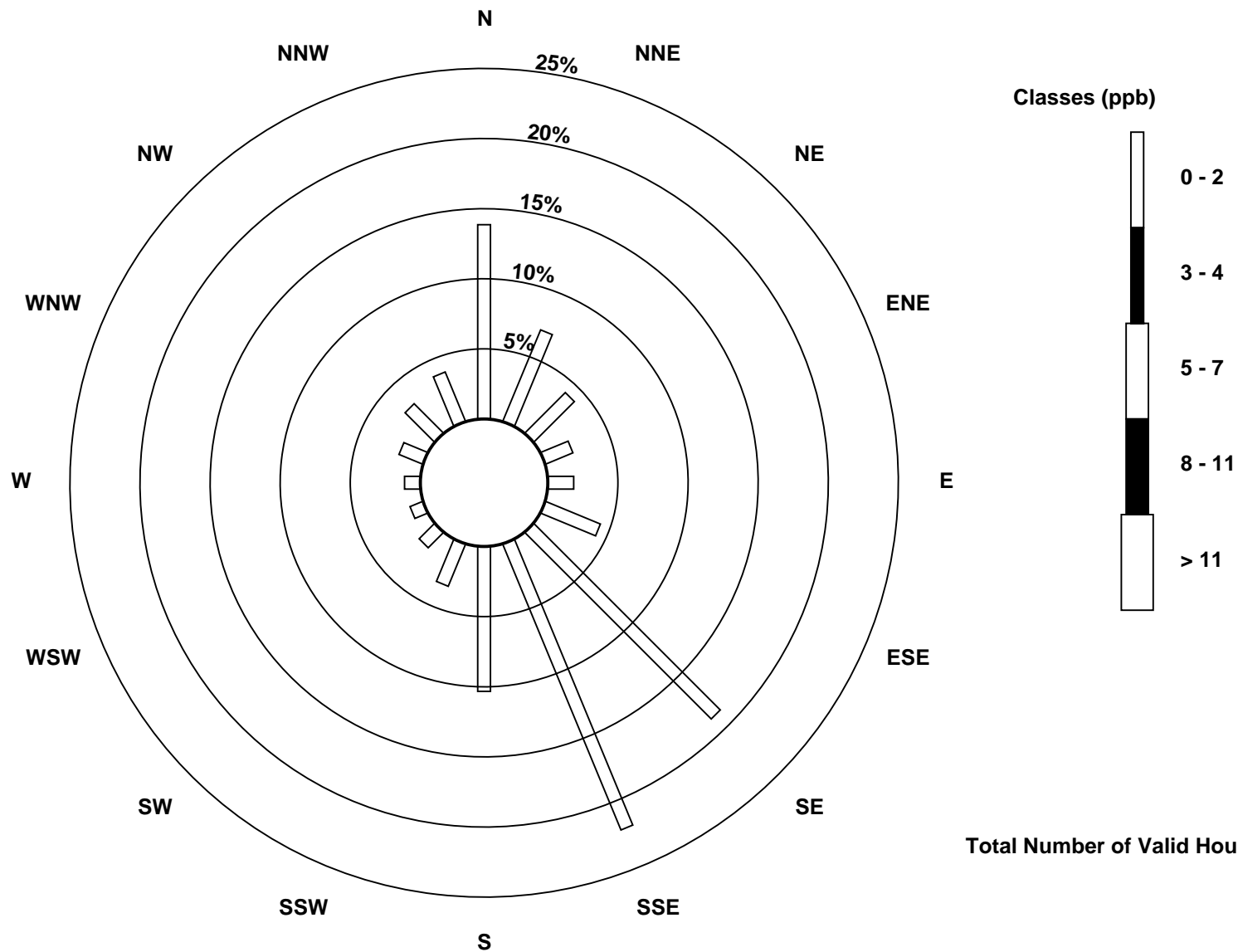
Total Number of Valid Hours: 707

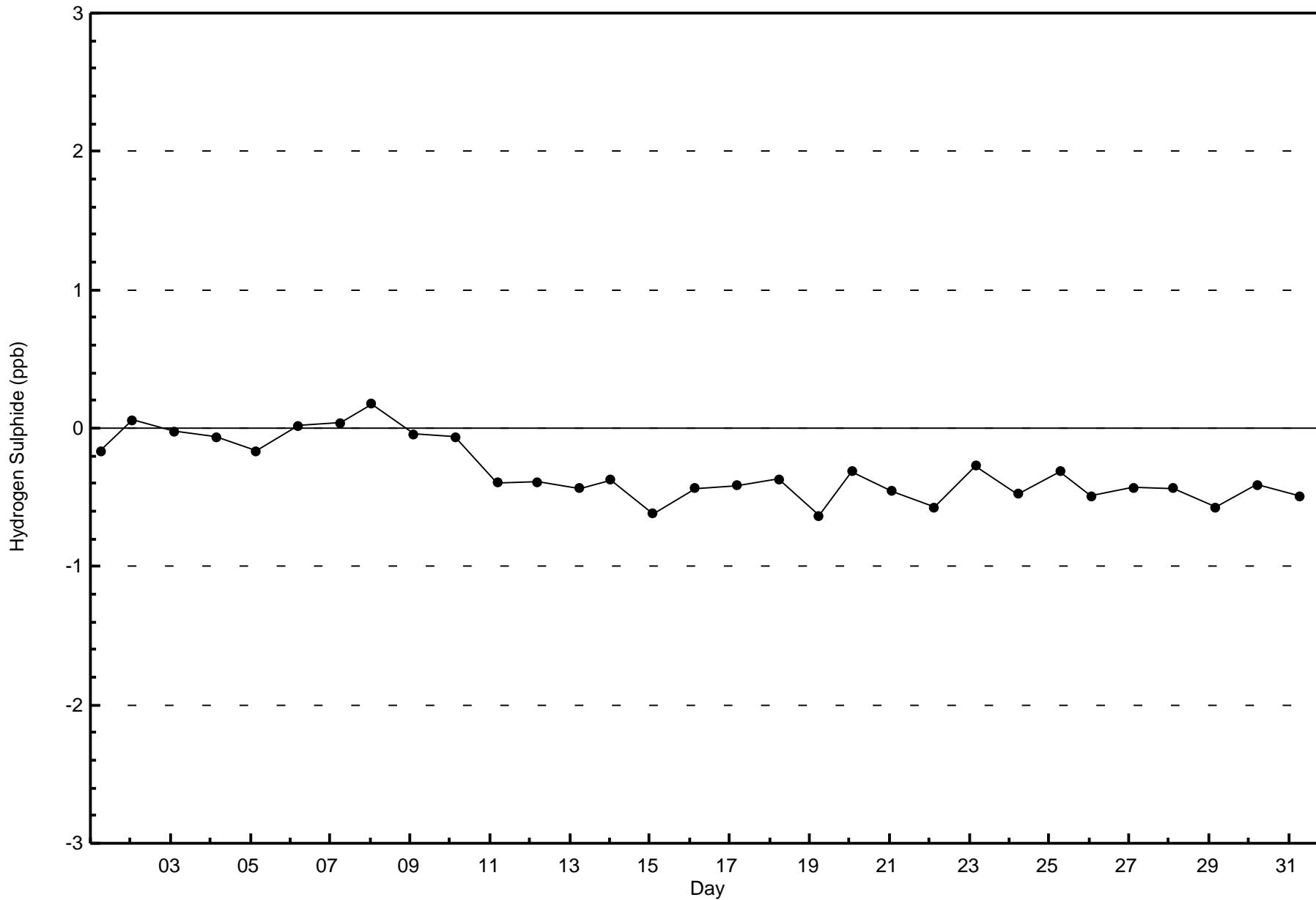
Total Number of Hours: 744

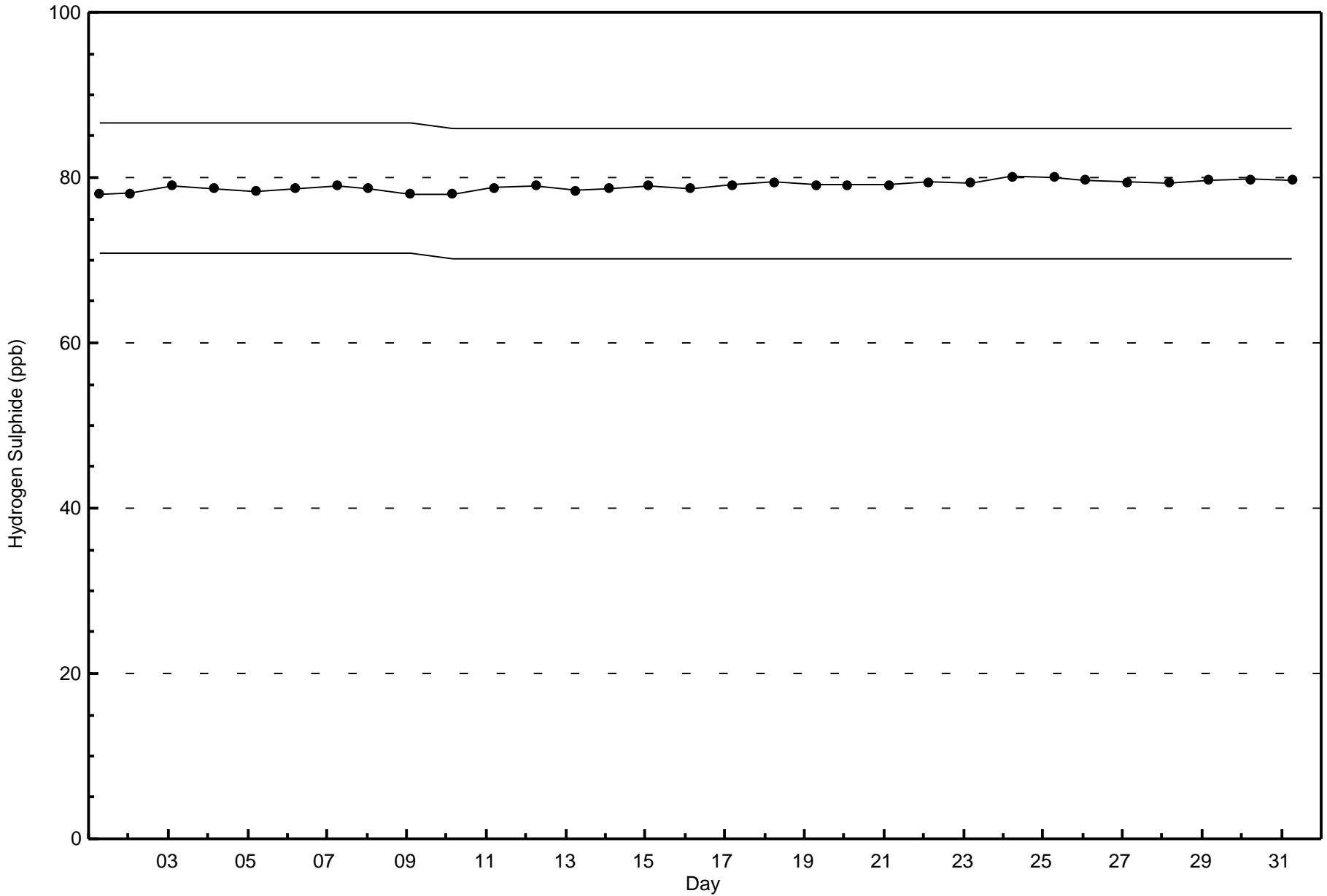


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Hydrogen Sulphide (H₂S) - ppb
Wapasu (AMS 17)









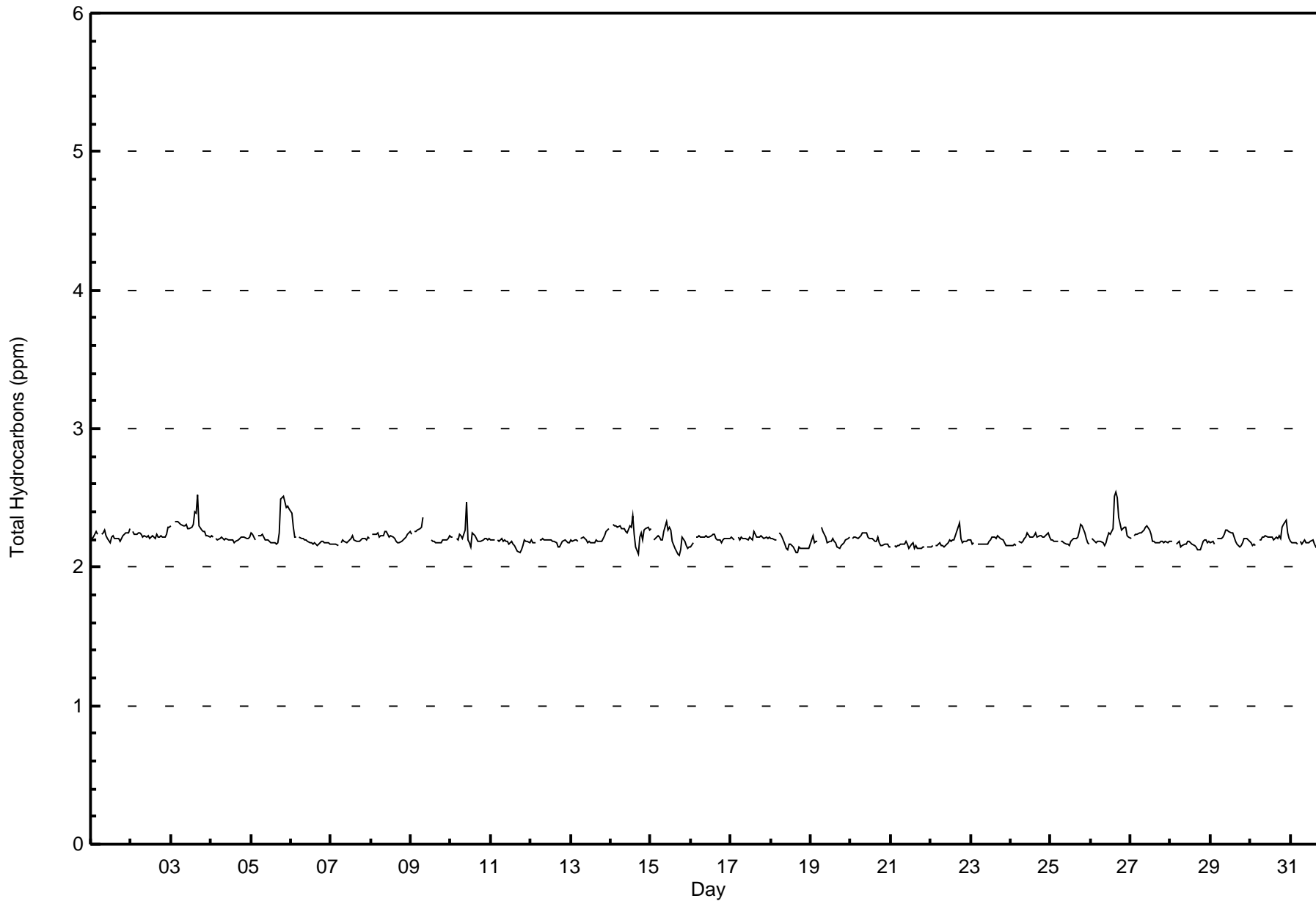
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Wapasu - March 2017

Maximum Value: 2.5 ppm on Mar 26 16:00																				Maximum Daily Average: 2.3 ppm on Mar 3					Hours in Service: 744			
Minimum Value: 2.1 ppm on Mar 15 18:00																				Minimum Daily Average: 2.2 ppm on Mar 21					Hours of Data: 708			
Maximum Diurnal Average: 2.2 ppm at hour 10																				Minimum Diurnal Average: 2.2 ppm at hour 18					Hours of Missing Data: 36			
Monthly Average: 2.21 ppm																				Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 O ₁ = 2.2 Median = 2.2 Q ₃ = 2.2 P ₉₀ = 2.3 P ₉₉ = 2.5					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-Mar	2.2	2.2	2.2	2.3	2.2	Z	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	2.2	2.2	2.3	2.3	2.2	2.3		
2-Mar	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3		
3-Mar	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	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	2.3		
4-Mar	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	2.2	2.2	2.2		
5-Mar	2.2	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	2.5	2.5	2.5	2.4	2.4	2.4	2.3		
6-Mar	2.4	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
7-Mar	2.2	2.2	2.2	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		
8-Mar	Z	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2		
9-Mar	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.4	C	C	C	C	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-Mar	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.5	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		
11-Mar	2.2	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	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
12-Mar	2.2	2.2	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	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
13-Mar	2.2	2.2	2.2	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	2.3	2.3	2.3	2.3	2.2		
14-Mar	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.2	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3		
15-Mar	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.2		
16-Mar	2.1	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	2.2	2.2	2.2		
17-Mar	2.2	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
18-Mar	2.2	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.2	2.1	2.1	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	2.2		
19-Mar	2.2	2.2	2.2	2.2	2.2	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
20-Mar	Z	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	2.2	2.2	2.2	2.2	2.2	2.1	2.2		
21-Mar	2.1	Z	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	DF	2.1	2.1	2.2	2.2		
22-Mar	2.1	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	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
23-Mar	2.2	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	2.2	2.2		
24-Mar	2.2	2.2	2.2	2.2	Z	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	2.2	2.2	2.2		
25-Mar	2.2	2.2	2.2	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	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2		
26-Mar	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.5	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3		
27-Mar	2.2	Z	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
28-Mar	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
29-Mar	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	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		
30-Mar	2.2	2.2	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	2.3	2.3	2.3	2.3	2.2	2.2	2.3		
31-Mar	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2		
																								Diurnal Average				
																								Diurnal Maximum				
Z - zerospan C - Calibration DF - DAS Failure																												





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - March 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	708	100.00	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
Wapasu - March 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	96	51	29	15	14	28	133	156	73	23	11	7	9	13	21	27	706
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	96	51	29	15	14	28	133	156	73	23	11	7	9	13	21	27	706

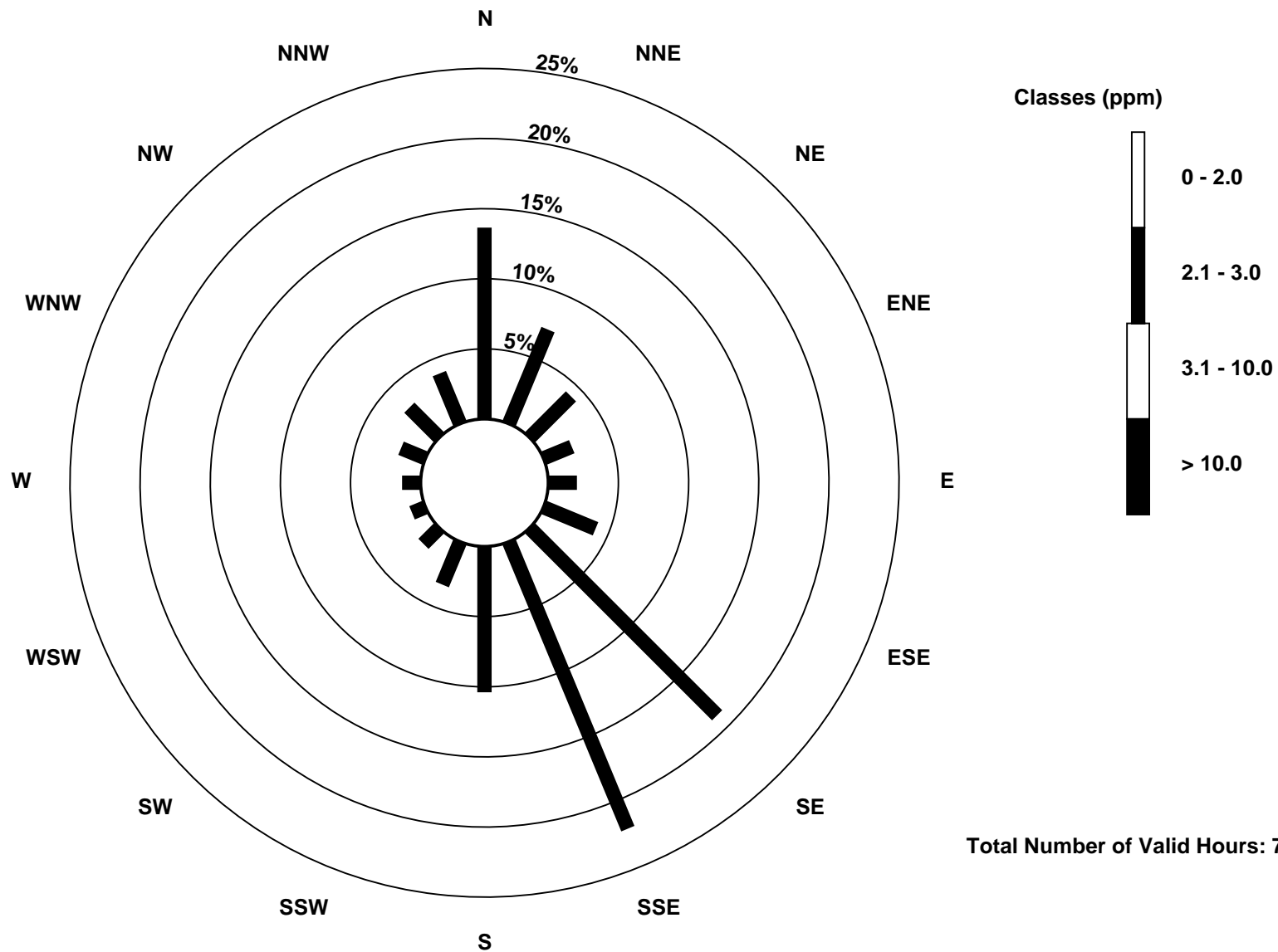
Total Number of Valid Hours: 706

Total Number of Hours: 744

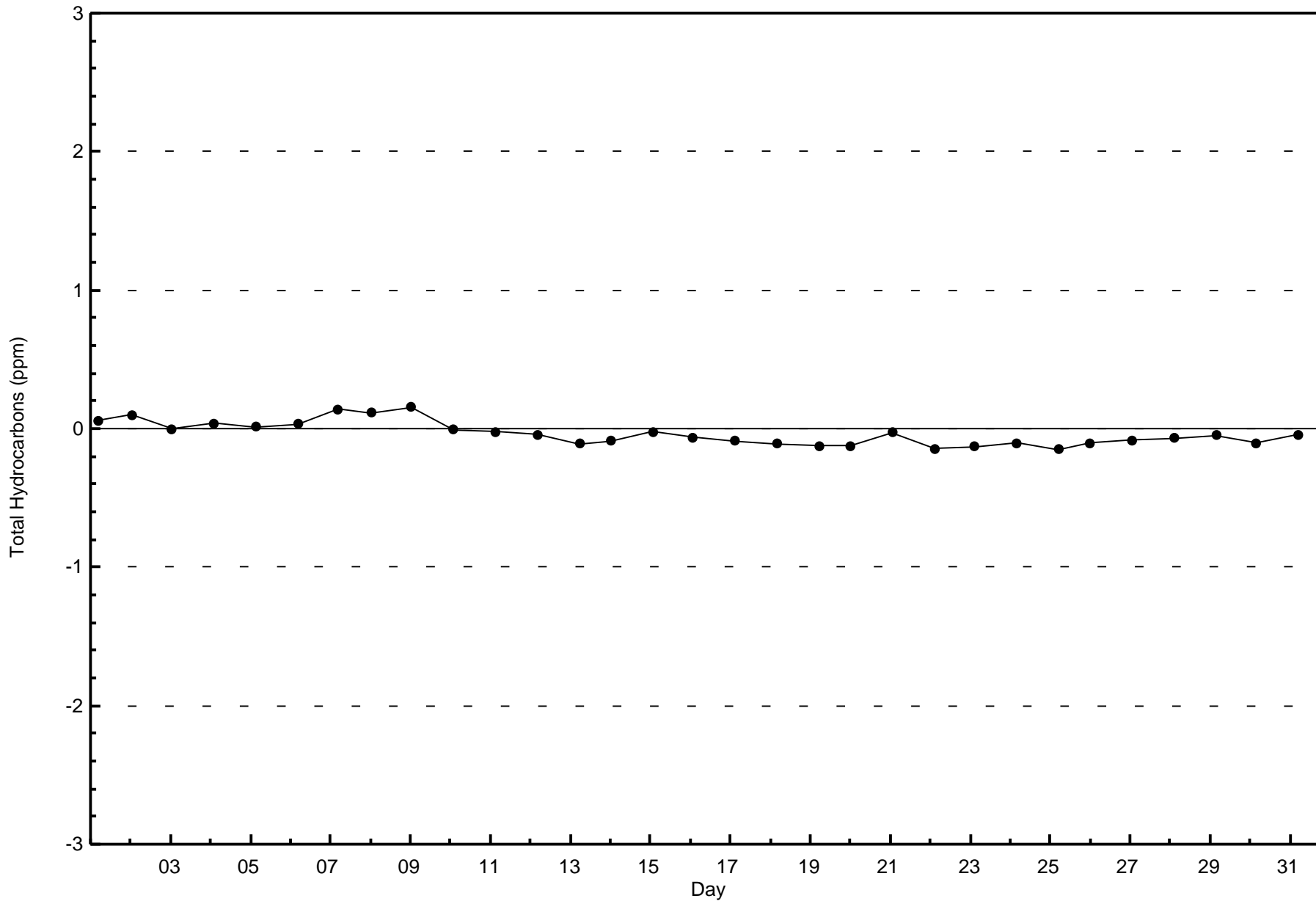


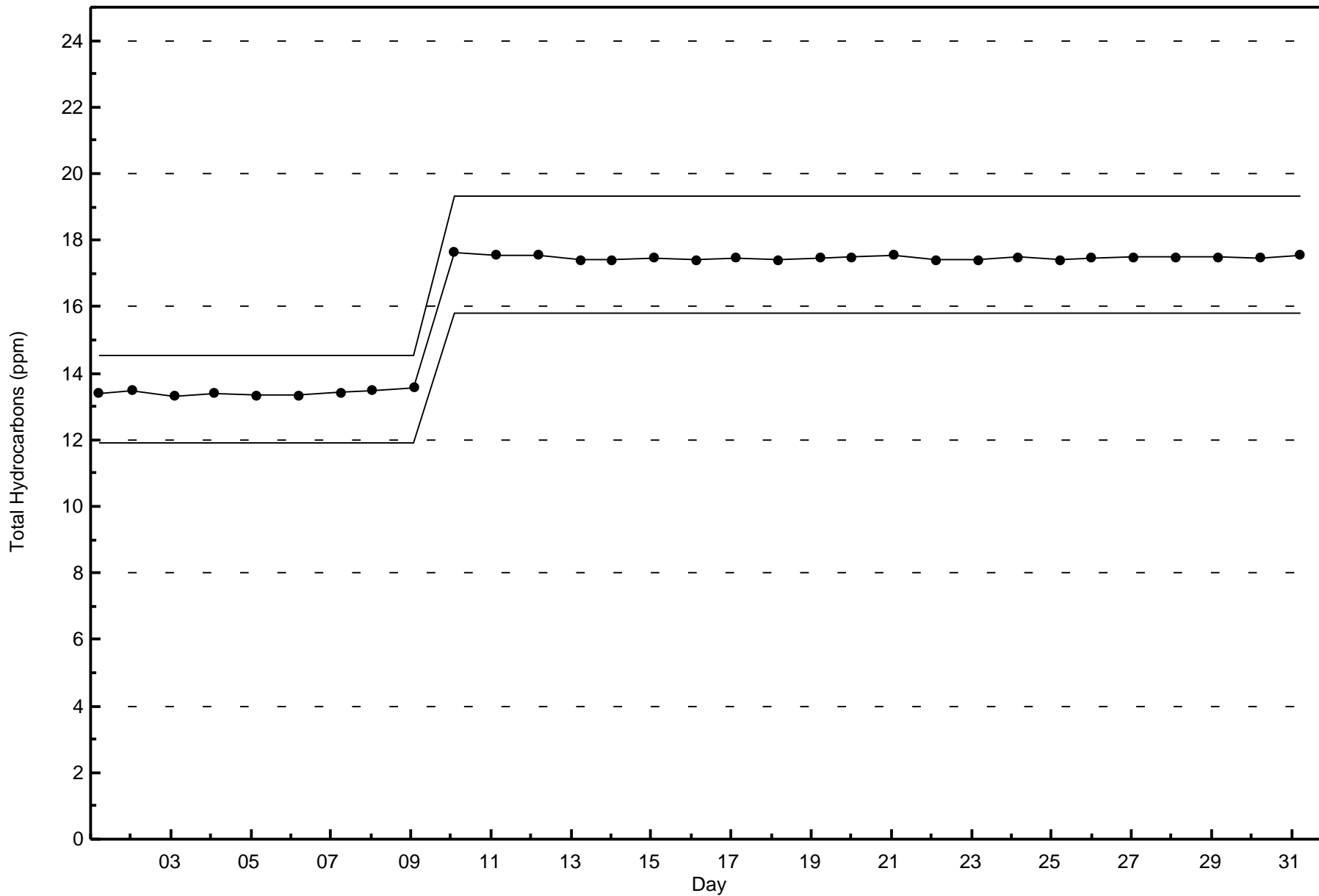
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Hydrocarbons (THC) - ppm
Wapasu (AMS 17)



Total Number of Valid Hours: 706







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

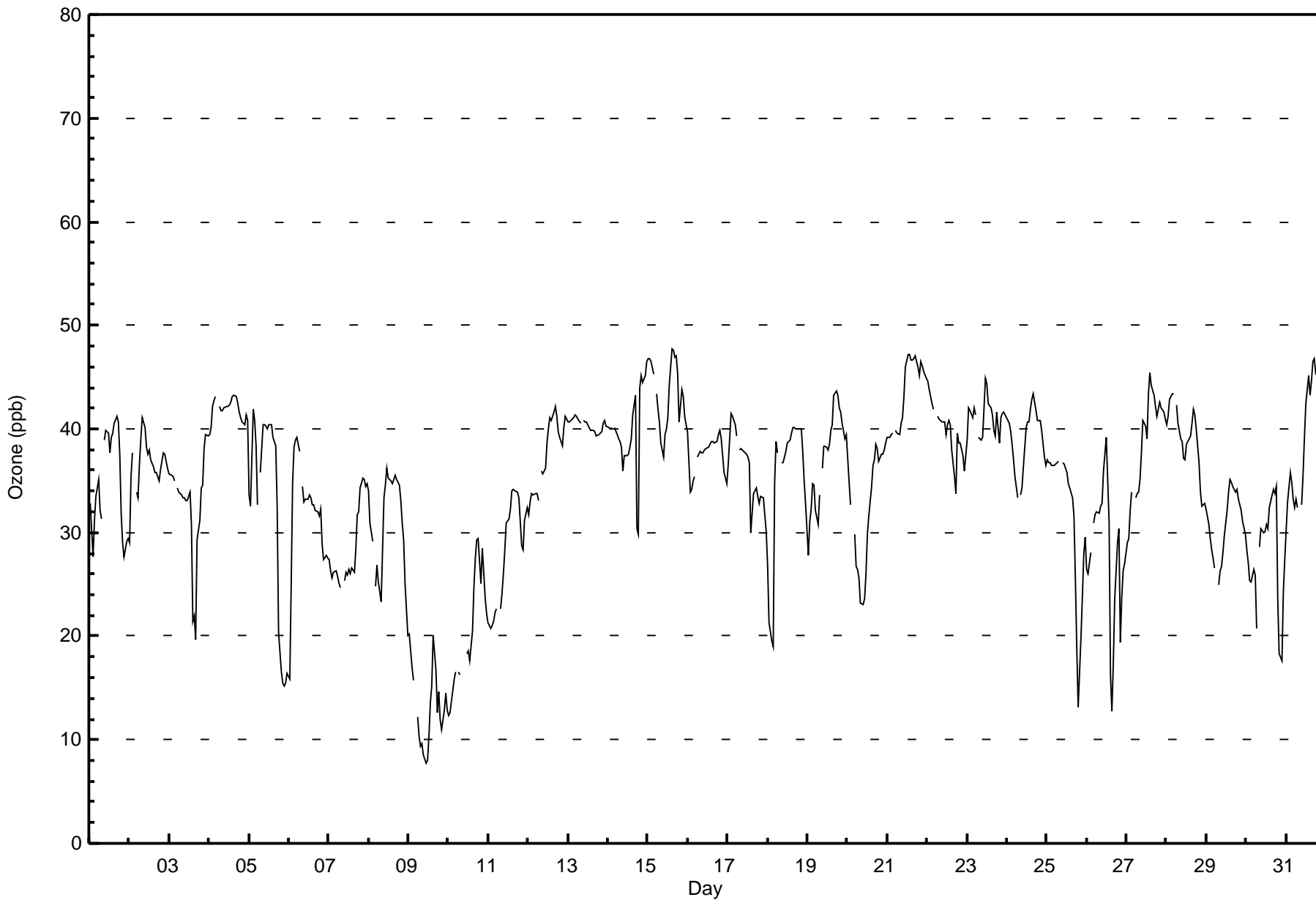
Wapasu - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744																																			
Maximum Value: 48 ppb on Mar 15 15:00														Maximum Daily Average: 43.6 ppb on Mar 21																																			
Minimum Value: 8 ppb on Mar 9 11:00														Minimum Daily Average: 13.2 ppb on Mar 9																																			
Maximum Diurnal Average: 36.5 ppb at hour 17														Minimum Diurnal Average: 32.8 ppb at hour 1																																			
Monthly Average: 34.6 ppb														Percentiles: P ₁ = 11 P ₁₀ = 24 Q ₁ = 31 Median = 36 Q ₃ = 40 P ₉₀ = 42 P ₉₉ = 47																																			
														Hours of Data: 710																																			
														Hours of Missing Data: 34																																			
														Hours of Calibration: 34																																			
														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-Mar	33	30	28	31	34	35	32	31	Z	39	40	40	38	39	40	41	41	41	38	32	29	28	29	29	34.6	41																							
2-Mar	29	35	38	Z	34	33	37	39	41	40	38	38	38	37	36	36	36	35	35	36	38	38	37	36	36.5	41																							
3-Mar	36	36	35	35	Z	34	34	34	33	33	33	33	34	31	21	22	20	29	31	34	35	38	39	39	32.6	39																							
4-Mar	39	40	42	43	43	Z	42	42	42	42	42	42	42	43	43	43	43	42	42	41	41	40	41	41	41.9	43																							
5-Mar	34	33	42	41	38	33	Z	36	40	40	40	40	40	40	39	39	38	33	20	17	15	15	16	32.4	42																								
6-Mar	16	25	35	38	39	39	38	Z	34	33	33	33	34	33	33	33	32	32	32	32	29	27	28	28	32.0	39																							
7-Mar	27	26	26	26	26	26	25	25	Z	25	26	26	26	26	27	26	28	32	32	34	35	35	34	35	28.5	35																							
8-Mar	34	31	29	Z	25	27	25	23	28	33	35	36	35	35	35	35	36	35	35	33	31	29	25	20	30.9	36																							
9-Mar	20	19	17	16	Z	12	10	9	10	9	8	8	10	14	15	20	17	13	15	12	11	13	15	13	13.2	20																							
10-Mar	12	13	14	16	17	Z	17	16	C	C	C	18	19	18	20	25	27	29	29	25	29	26	24	22	20.8	29																							
11-Mar	21	21	21	21	22	23	Z	23	24	26	28	31	31	32	34	34	34	34	33	31	29	28	31	32	28.1	34																							
12-Mar	32	33	34	34	34	34	33	Z	36	36	36	39	40	41	41	42	42	41	40	39	38	40	41	41	37.6	42																							
13-Mar	41	41	41	41	41	41	41	41	Z	41	41	41	40	40	40	40	39	39	40	40	41	41	40	40	40.4	41																							
14-Mar	40	40	40	Z	40	39	39	39	38	36	37	37	38	38	39	41	43	30	30	44	45	44	45	47	39.6	47																							
15-Mar	47	47	46	45	Z	43	42	41	39	37	39	40	41	44	48	48	47	47	45	41	44	43	41	40	43.3	48																							
16-Mar	40	34	34	35	35	Z	37	38	38	38	38	38	38	39	39	39	39	39	39	40	39	37	36	35	37.5	40																							
17-Mar	37	39	42	41	40	39	Z	38	38	38	38	38	37	37	30	34	34	34	33	33	34	33	32	30	36.0	42																							
18-Mar	27	21	19	19	35	39	38	Z	37	37	37	38	39	39	40	40	40	40	40	40	40	38	35	33	35.2	40																							
19-Mar	28	31	32	35	35	32	31	34	Z	36	38	38	38	38	40	40	43	44	43	42	42	41	39	39	37.4	44																							
20-Mar	37	35	33	Z	30	27	26	26	23	23	24	26	30	32	34	36	37	39	38	37	38	38	38	39	32.3	39																							
21-Mar	39	39	39	40	Z	40	40	40	40	41	43	46	47	47	47	47	47	47	46	45	46	46	46	45	43.6	47																							
22-Mar	45	44	43	42	42	Z	41	41	41	41	41	39	40	41	40	38	35	34	40	39	39	37	36	37	39.8	45																							
23-Mar	39	42	42	41	42	41	Z	39	39	39	42	45	44	42	42	41	40	39	42	39	41	42	42	41	41.1	45																							
24-Mar	41	41	40	39	37	35	33	Z	34	34	36	40	41	41	42	43	43	42	41	41	41	40	37	37	39.0	43																							
25-Mar	37	37	37	36	36	37	37	37	Z	37	37	36	36	35	34	33	32	26	19	13	20	24	28	30	31.8	37																							
26-Mar	26	26	28	Z	31	32	32	32	33	33	36	38	39	31	16	13	17	24	29	30	19	24	26	27	27.9	39																							
27-Mar	29	29	32	34	Z	33	34	34	35	38	41	40	39	43	45	44	43	42	41	42	43	42	42	41	38.6	45																							
28-Mar	40	41	43	43	43	Z	42	41	39	39	37	37	38	39	39	41	42	41	40	37	34	32	33	33	38.9	43																							
29-Mar	32	31	29	28	28	27	Z	25	26	27	28	30	32	34	35	35	34	34	34	33	33	32	31	30	30.8	35																							
30-Mar	28	27	25	25	26	26	21	Z	29	30	30	30	31	30	32	34	34	34	34	24	18	18	24	27	27.8	34																							
31-Mar	30	33	36	35	33	32	33	32	Z	33	35	39	42	45	43	45	46	47	45	46	45	46	43	43	39.6	47																							
																								32.8	32.9	33.6	33.9	34.1	33.1	33.1	32.8	34.0	34.5	35.3	35.5	36.1	36.3	35.8	36.3	36.5	36.1	35.5	34.6	34.2	34.0	34.0	33.8	Diurnal Average	
																								47	47	46	45	43	43	42	42	42	42	43	46	47	47	48	48	47	47	46	46	46	46	46	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 - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Wapasu - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	54	7.61	7.61
21 - 50	656	92.39	100.00
51 - 82	0	0.00	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 - March 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	11	1	1	4	8	9	7	4	0	0	1	0	0	1	3	3	53
21 - 50	88	50	27	11	7	19	128	153	70	23	10	6	9	11	18	25	655
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	99	51	28	15	15	28	135	157	70	23	11	6	9	12	21	28	708

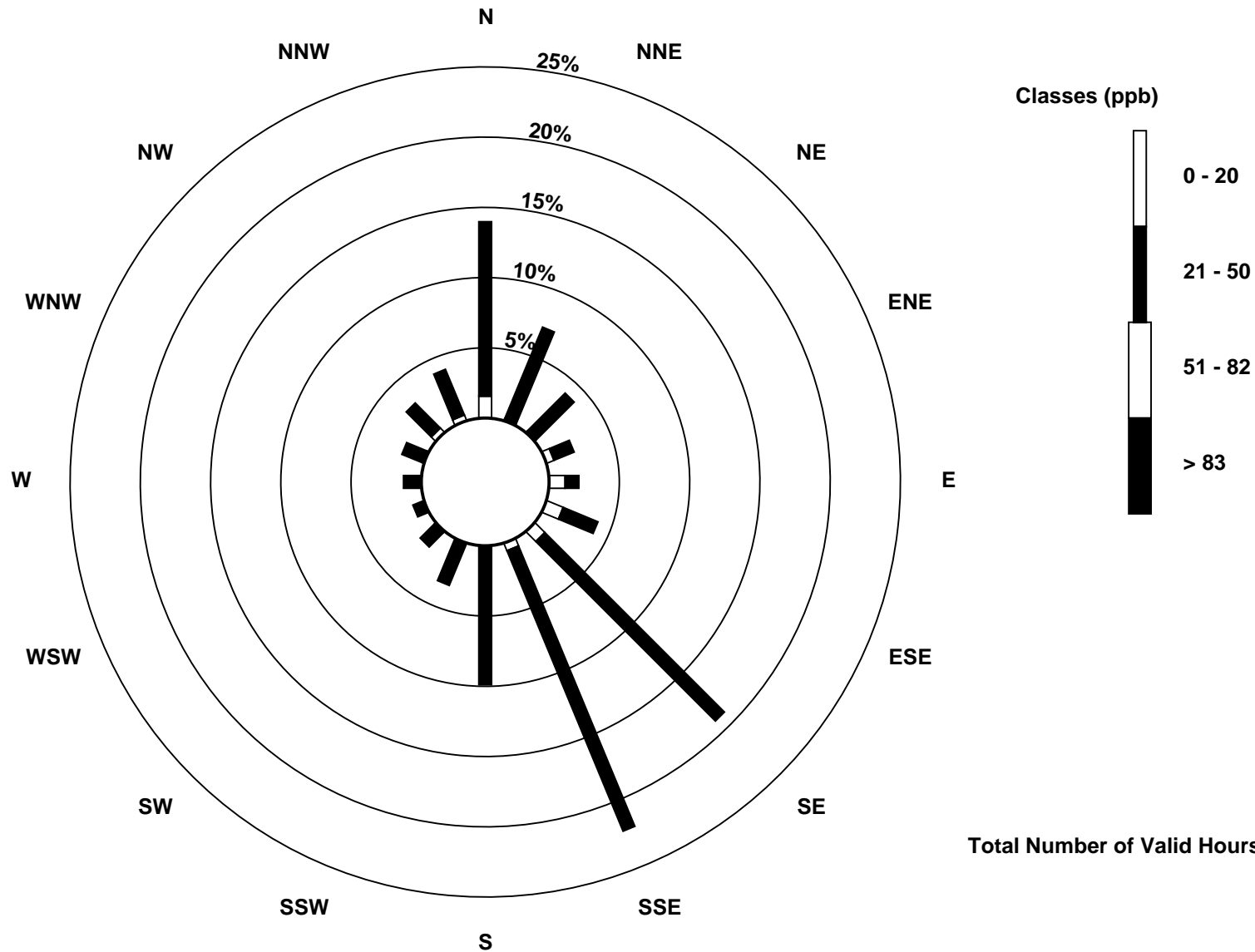
Total Number of Valid Hours: 708

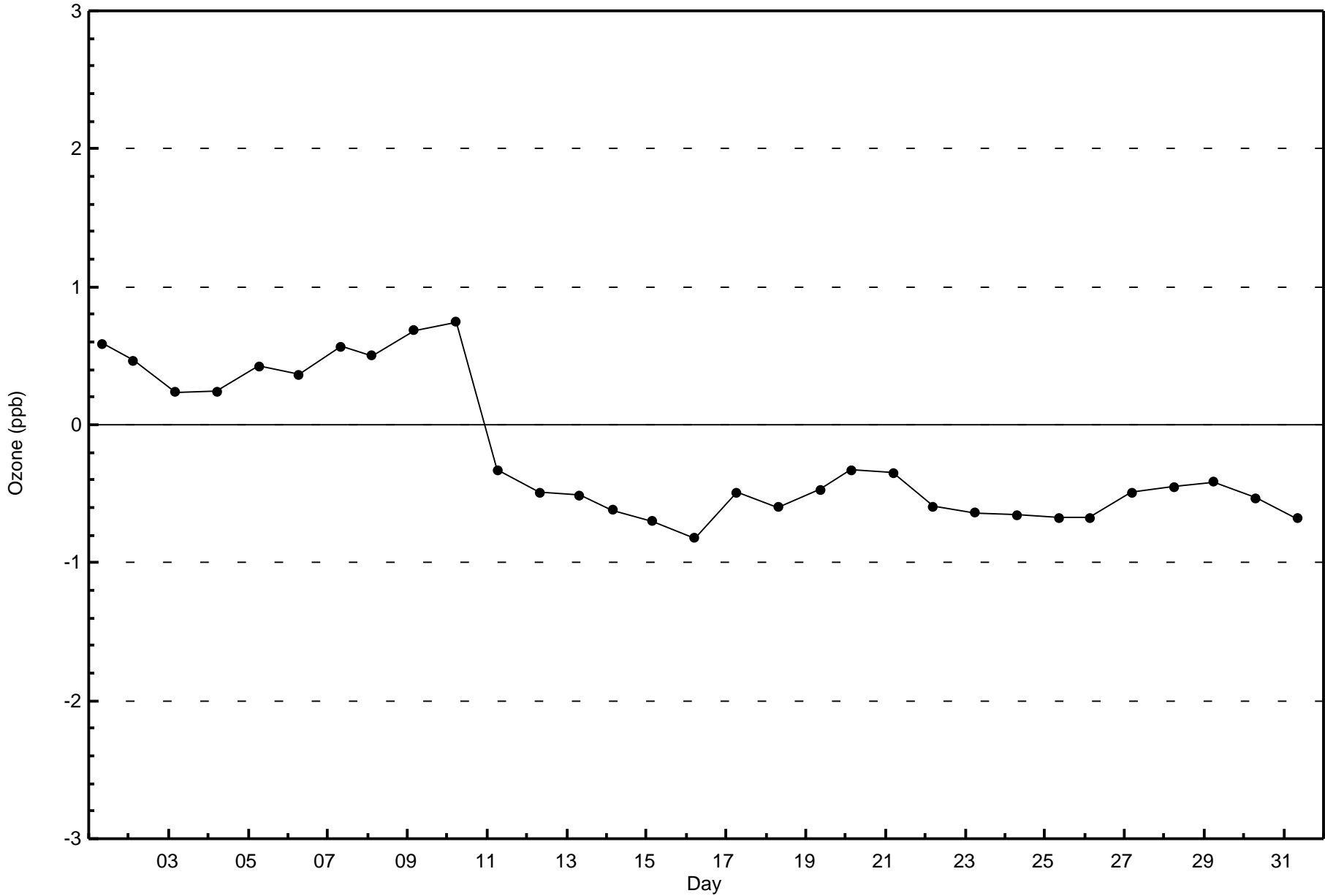
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Ozone (O₃) - ppb
Wapasu (AMS 17)

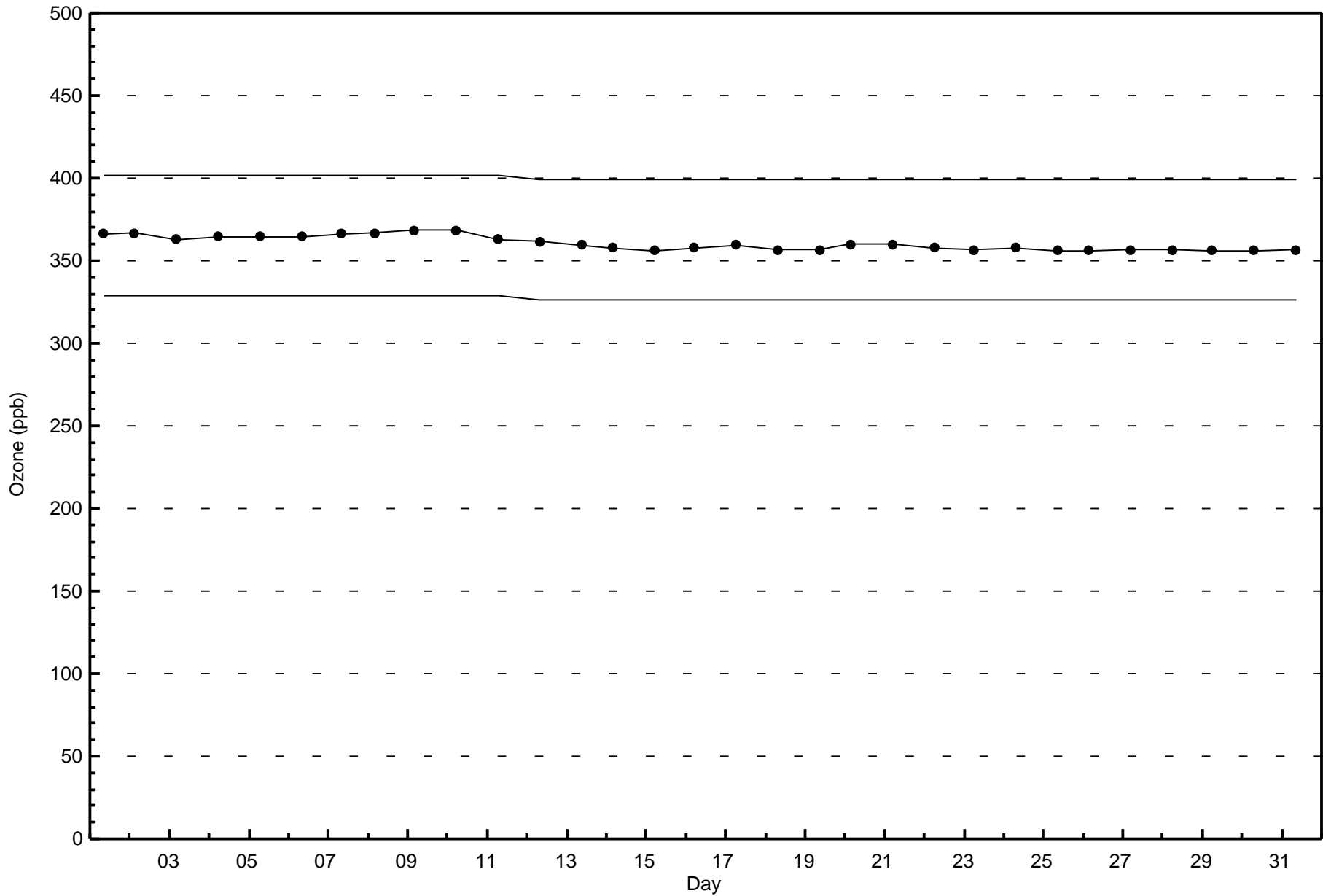






Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Wapasu - March 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

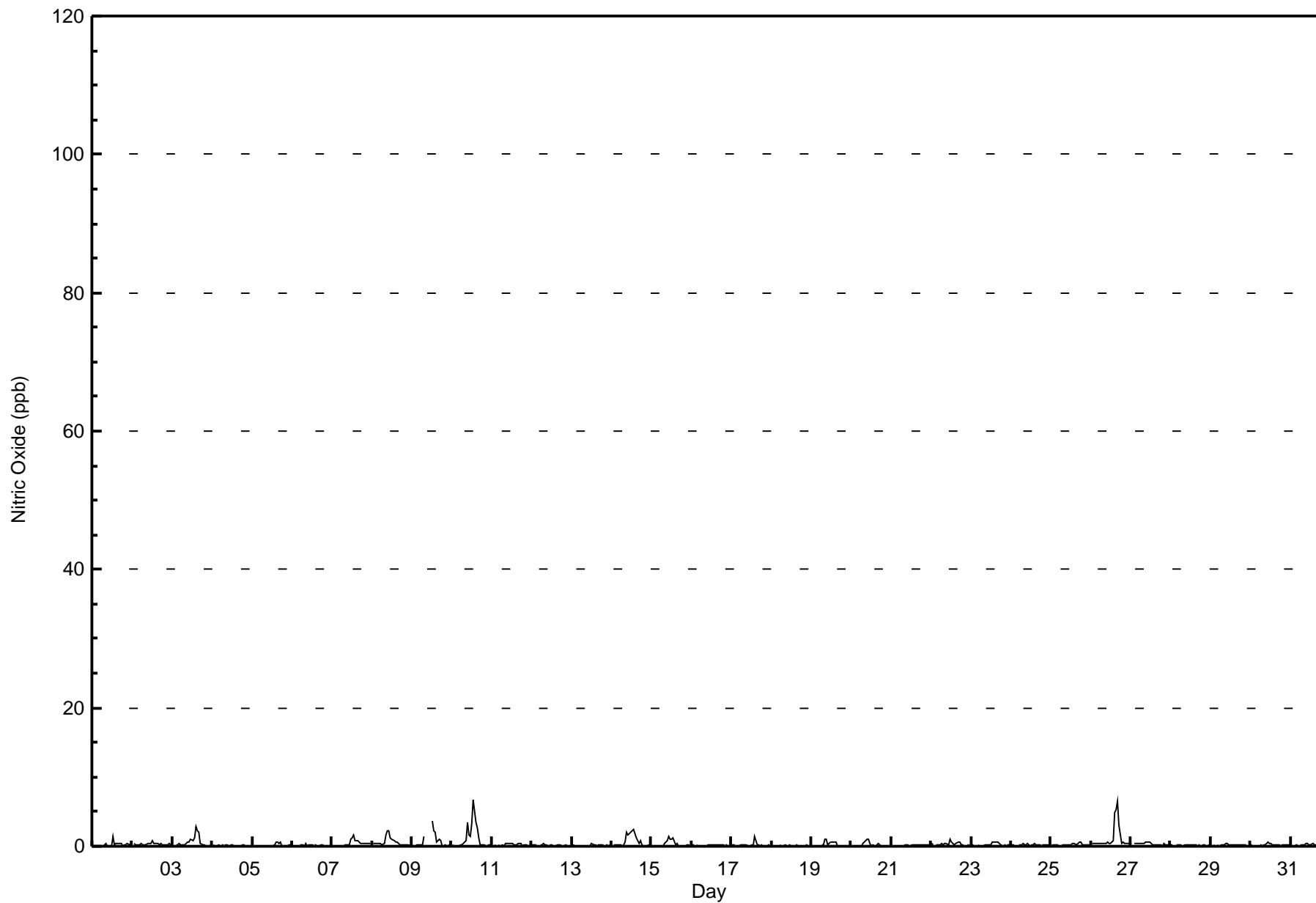
Wapasu - March 2017

Maximum Value: 7 ppb on Mar 10 14:00														Maximum Daily Average: 1.2 ppb on Mar 26														Hours in Service: 744																				
Minimum Value: 0 ppb on Mar 1 01:00														Minimum Daily Average: 0.1 ppb on Mar 18														Hours of Data: 709																				
Maximum Diurnal Average: 0.8 ppb at hour 15														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 = 1 P ₉₉ = 3														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-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0.2	1																						
2-Mar	Z	0	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																						
3-Mar	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	3	2	2	0	0	0	0	0	0	0.6	3																							
4-Mar	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																							
5-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0.1	1																							
6-Mar	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																							
7-Mar	0	0	0	0	0	Z	0	0	0	0	0	1	1	2	1	1	1	0	0	0	0	0	0	0.4	2																							
8-Mar	Z	0	0	0	0	0	0	0	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0.6	2																							
9-Mar	0	Z	0	0	0	0	0	1	C	C	C	C	4	2	2	1	1	1	0	0	0	0	0	0.7	4																							
10-Mar	0	0	Z	0	0	0	0	0	1	4	2	1	3	7	3	3	1	0	0	0	0	0	0	1.2	7																							
11-Mar	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
12-Mar	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																							
13-Mar	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																							
14-Mar	Z	0	0	0	0	0	0	0	1	2	2	2	2	2	2	1	0	1	0	0	0	0	0	0.7	2																							
15-Mar	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1																							
16-Mar	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																							
17-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1																							
18-Mar	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																							
19-Mar	0	0	0	0	0	Z	0	0	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0.3	1																							
20-Mar	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1																							
21-Mar	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																							
22-Mar	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0.3	1																							
23-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.2	1																							
24-Mar	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																							
25-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.3	1																							
26-Mar	Z	0	0	0	0	0	0	0	0	0	1	0	0	1	5	5	6	3	0	1	0	0	0	1.2	6																							
27-Mar	0	Z	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
28-Mar	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																							
29-Mar	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																							
30-Mar	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																							
31-Mar	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																							
																								0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.5	0.5	0.5	0.7	0.7	0.8	0.7	0.6	0.4	0.1	0.1	0.1	0.1	0.1	0.1	Diurnal Average
																								0	0	0	0	0	0	0	1	2	4	2	2	4	7	5	5	6	3	1	1	0	0	0	0	Diurnal Maximum
Z - zerospan C - Calibration																																																



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Wapasu - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Wapasu - March 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 - March 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	96	51	29	15	14	28	133	157	73	23	11	7	9	13	21	27	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	96	51	29	15	14	28	133	157	73	23	11	7	9	13	21	27	707

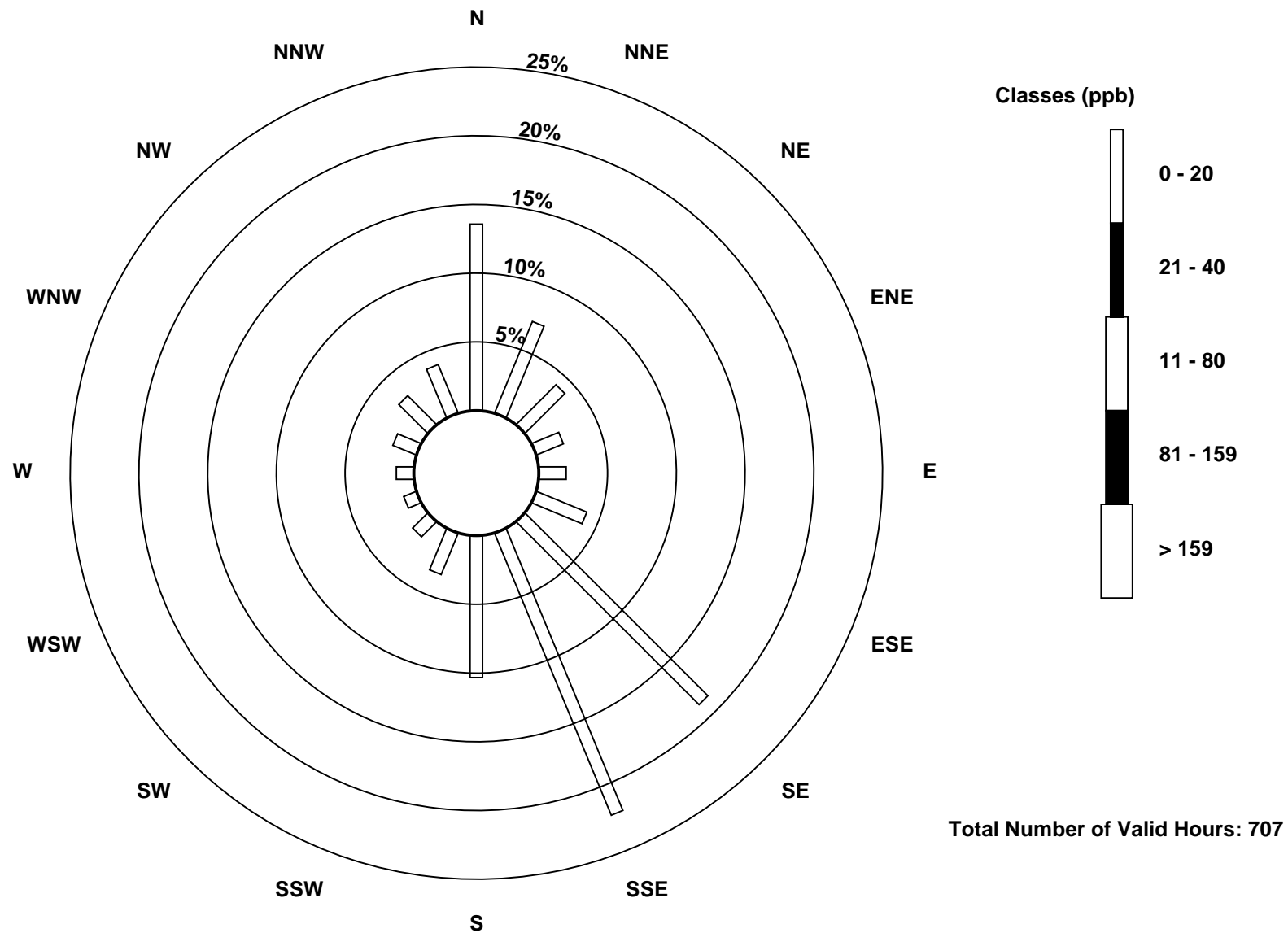
Total Number of Valid Hours: 707

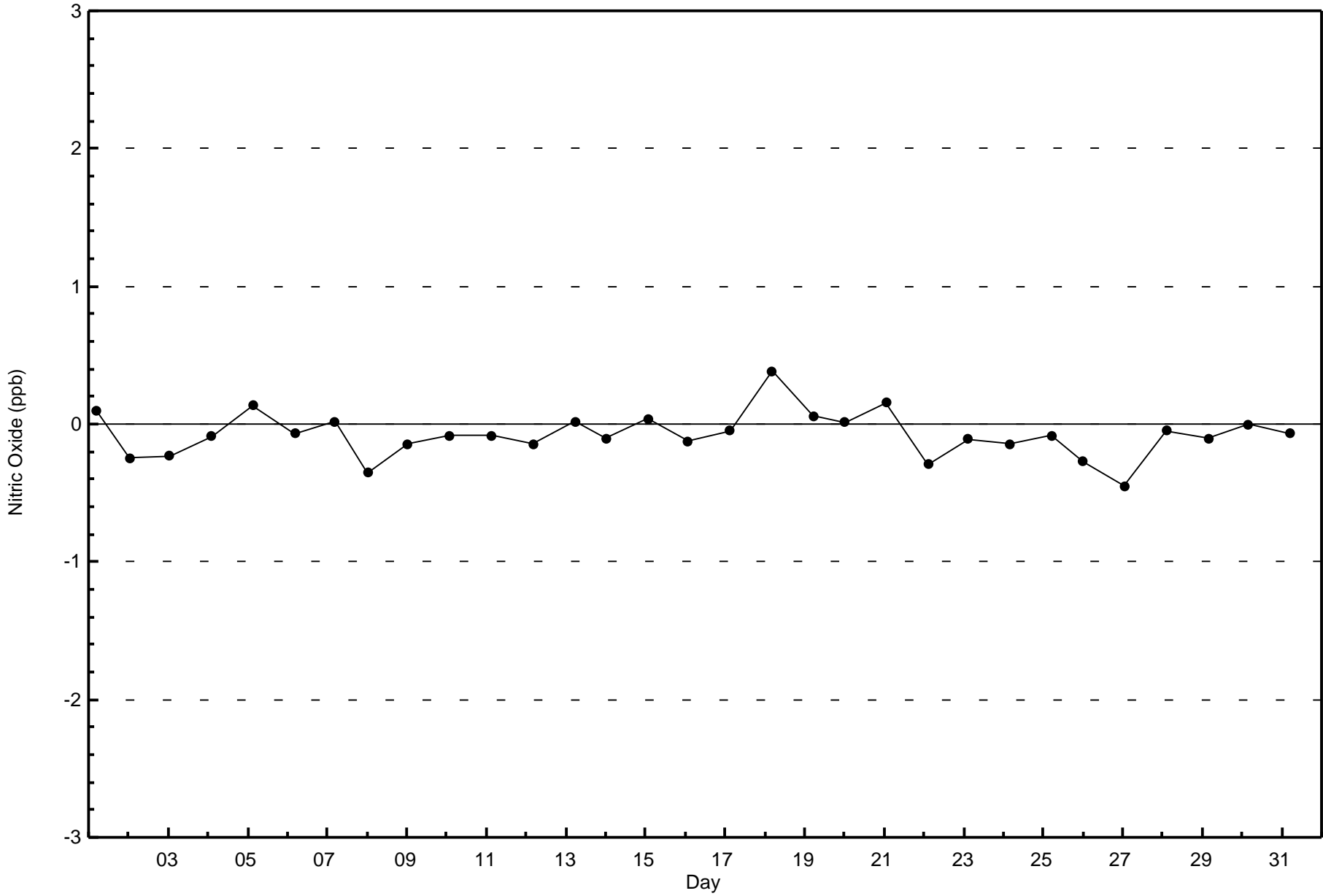
Total Number of Hours: 744

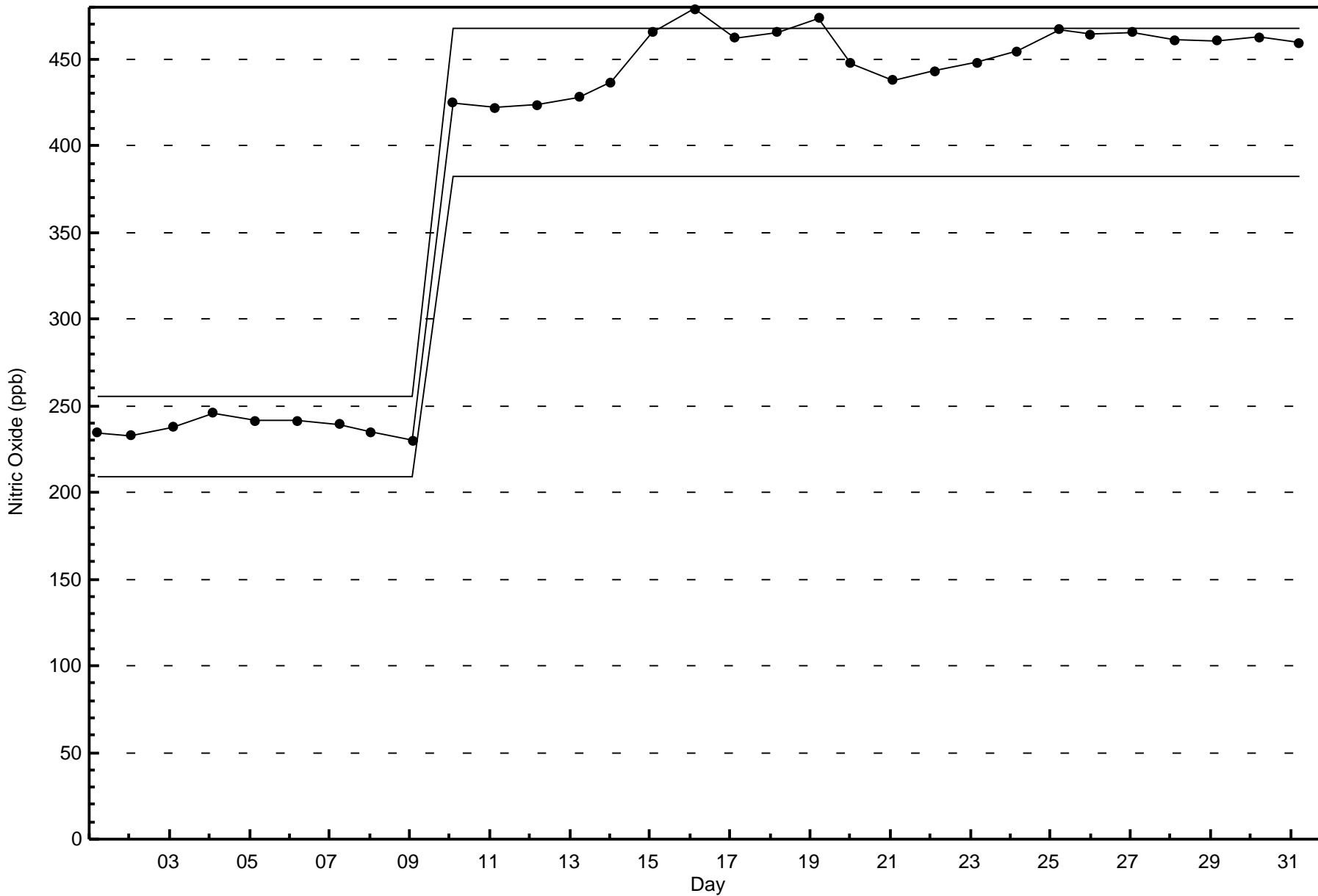


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitric Oxide (NO) - ppb
Wapasu (AMS 17)









Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 20 ppb on Mar 5 22:00	Maximum Daily Average: 6.2 ppb on Mar 5		Hours of Data:	709
Minimum Value: 0 ppb on Mar 4 10:00	Minimum Daily Average: 0.1 ppb on Mar 12		Hours of Missing Data:	35
Maximum Diurnal Average: 2.1 ppb at hour 15	Minimum Diurnal Average: 0.6 ppb at hour 4		Hours of Calibration:	35
Monthly Average: 1.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 16		Percent Operational Time:	100.0

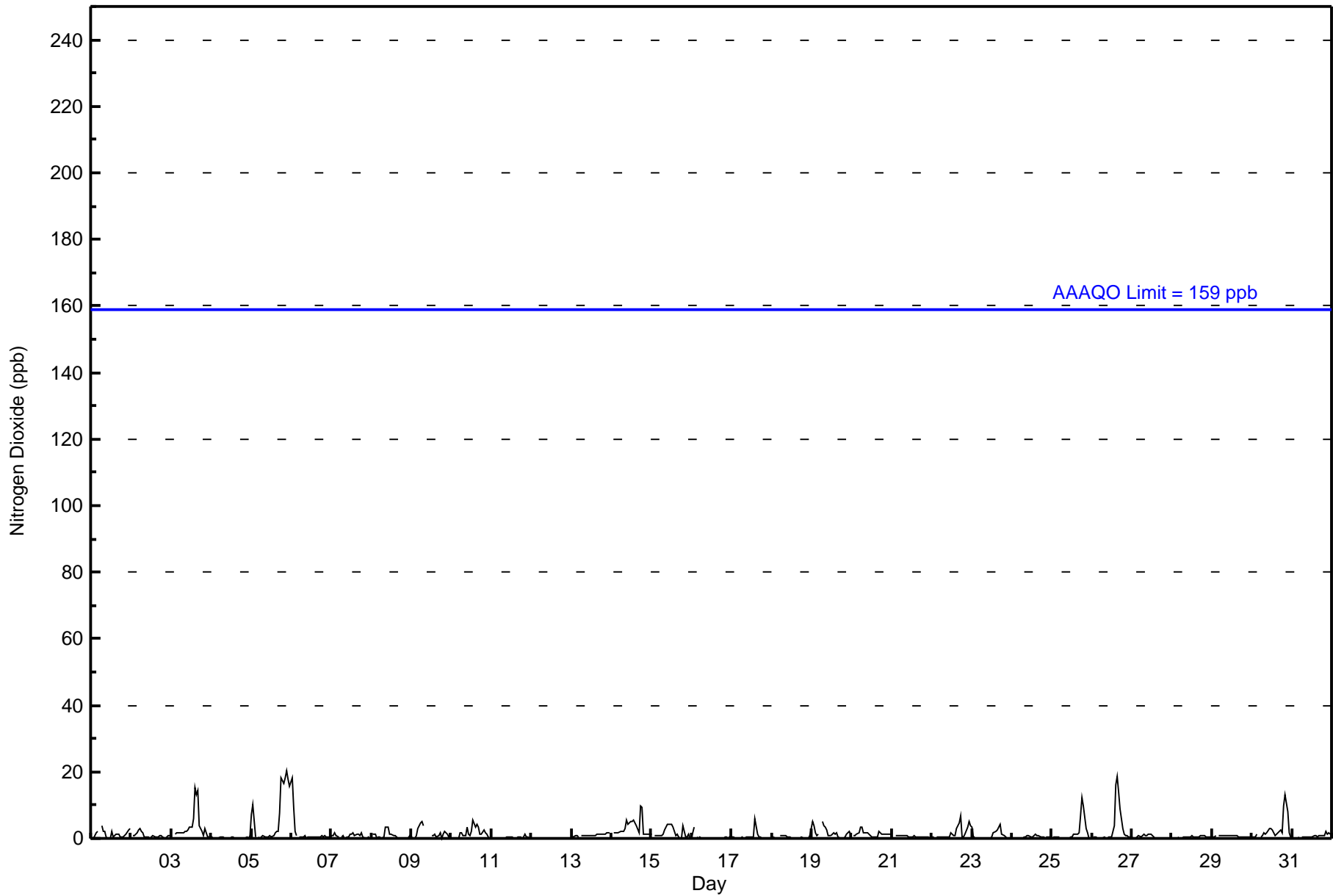
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	0	0	1	2	2	Z	4	2	2	1	0	0	2	0	1	1	1	1	0	0	1	1	2	3	1.2	4	
2-Mar	Z	1	1	2	2	3	2	2	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1	1	0.9	3	
3-Mar	1	Z	1	2	2	2	2	2	2	2	3	3	3	6	15	13	14	4	2	1	3	2	1	1	3.7	15	
4-Mar	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.2	1	
5-Mar	7	10	1	Z	0	0	0	1	0	0	0	1	1	1	2	2	2	8	18	17	18	20	18	16	6.2	20	
6-Mar	18	9	2	1	Z	1	0	0	1	0	1	1	0	0	1	1	0	0	1	1	1	1	1	1	1.7	18	
7-Mar	1	1	2	1	0	Z	1	1	0	0	0	1	1	2	1	1	1	1	2	1	0	0	0	0	0.8	2	
8-Mar	Z	1	1	0	1	0	0	0	4	4	3	1	1	1	0	0	0	0	0	0	0	0	0	1	0.9	4	
9-Mar	0	Z	0	1	3	5	5	4	C	C	C	C	1	1	1	1	1	2	0	1	2	1	1	0	1.5	5	
10-Mar	0	0	Z	0	0	2	2	1	1	3	1	1	2	5	3	4	4	1	1	3	2	1	1	0	1.6	5	
11-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0.2	1	
12-Mar	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	
13-Mar	0	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1.0	2	
14-Mar	Z	2	2	2	2	2	2	2	3	6	4	5	5	5	5	4	2	10	9	1	1	1	1	1	3.4	10	
15-Mar	1	Z	1	1	1	1	1	1	3	4	4	4	4	4	1	0	0	0	4	1	0	1	0	0	1.7	4	
16-Mar	0	3	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	3	
17-Mar	1	0	0	Z	0	0	1	0	0	0	0	1	1	0	6	1	1	0	0	0	0	0	0	0	0.6	6	
18-Mar	0	0	0	0	Z	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1	
19-Mar	5	4	2	1	1	Z	5	4	3	3	1	1	1	2	1	2	0	0	0	0	0	1	2	1	1.8	5	
20-Mar	Z	1	1	1	2	3	3	2	2	2	1	1	0	0	1	1	2	2	1	1	1	1	1	1	1.4	3	
21-Mar	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.6	1	
22-Mar	0	0	Z	0	0	0	0	0	0	0	0	2	1	1	1	3	5	7	1	1	1	3	5	4	1.6	7	
23-Mar	3	0	1	Z	0	0	0	0	0	0	0	0	1	2	2	3	4	4	1	1	1	0	0	0	1.0	4	
24-Mar	0	0	0	0	Z	0	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1	
25-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	2	7	12	10	3	2	0	0	1.8	12	
26-Mar	Z	1	0	0	0	0	0	1	0	0	0	1	1	4	16	19	14	9	3	1	1	1	1	0	3.1	19	
27-Mar	0	Z	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
28-Mar	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.4	1	
29-Mar	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.7	1	
30-Mar	0	0	1	1	Z	0	1	2	1	2	3	3	2	2	1	2	2	3	2	10	13	8	2	0	2.6	13	
31-Mar	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	0.7	2
	1.6	1.4	0.7	0.6	0.8	0.9	1.1	1.0	1.0	1.1	1.0	1.1	1.1	1.1	1.4	2.1	2.1	2.0	2.1	1.9	1.8	1.8	1.7	1.4	1.2	Diurnal Average	
	18	10	2	2	3	5	5	4	4	6	4	5	5	6	16	19	14	10	18	17	18	20	18	16	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 - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Wapasu - March 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 - March 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	96	51	29	15	14	28	133	157	73	23	11	7	9	13	21	27	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	96	51	29	15	14	28	133	157	73	23	11	7	9	13	21	27	707

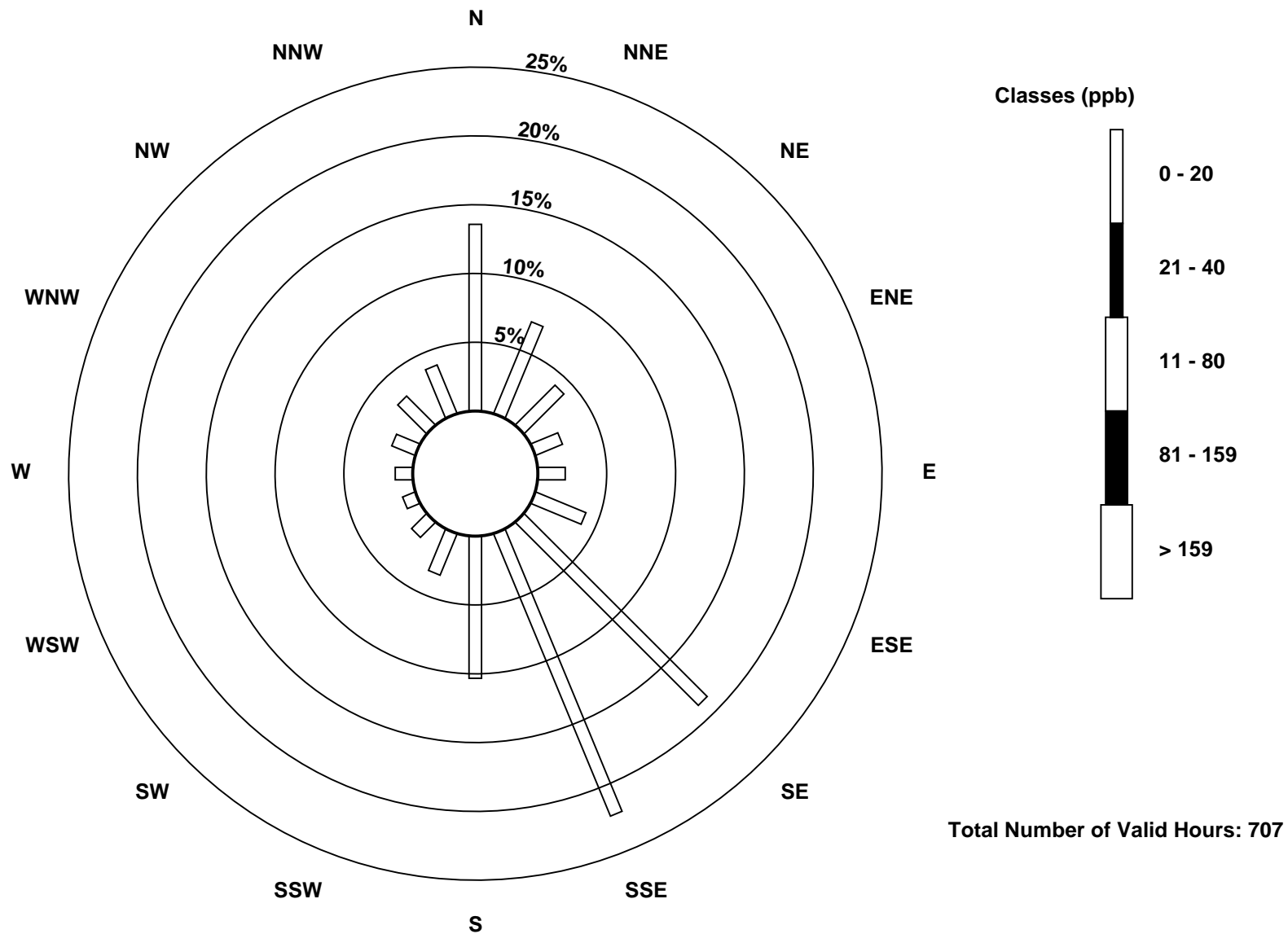
Total Number of Valid Hours: 707

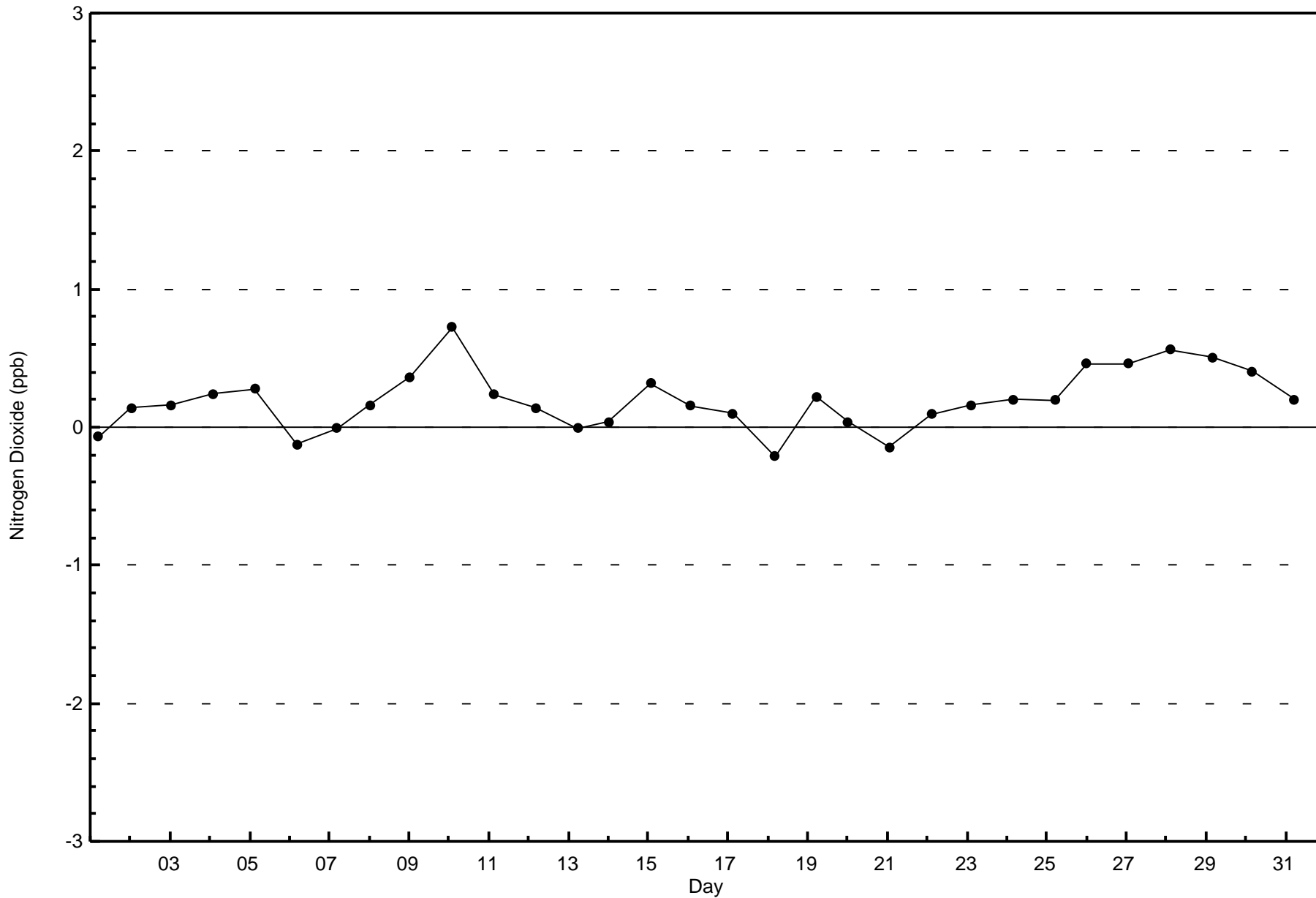
Total Number of Hours: 744

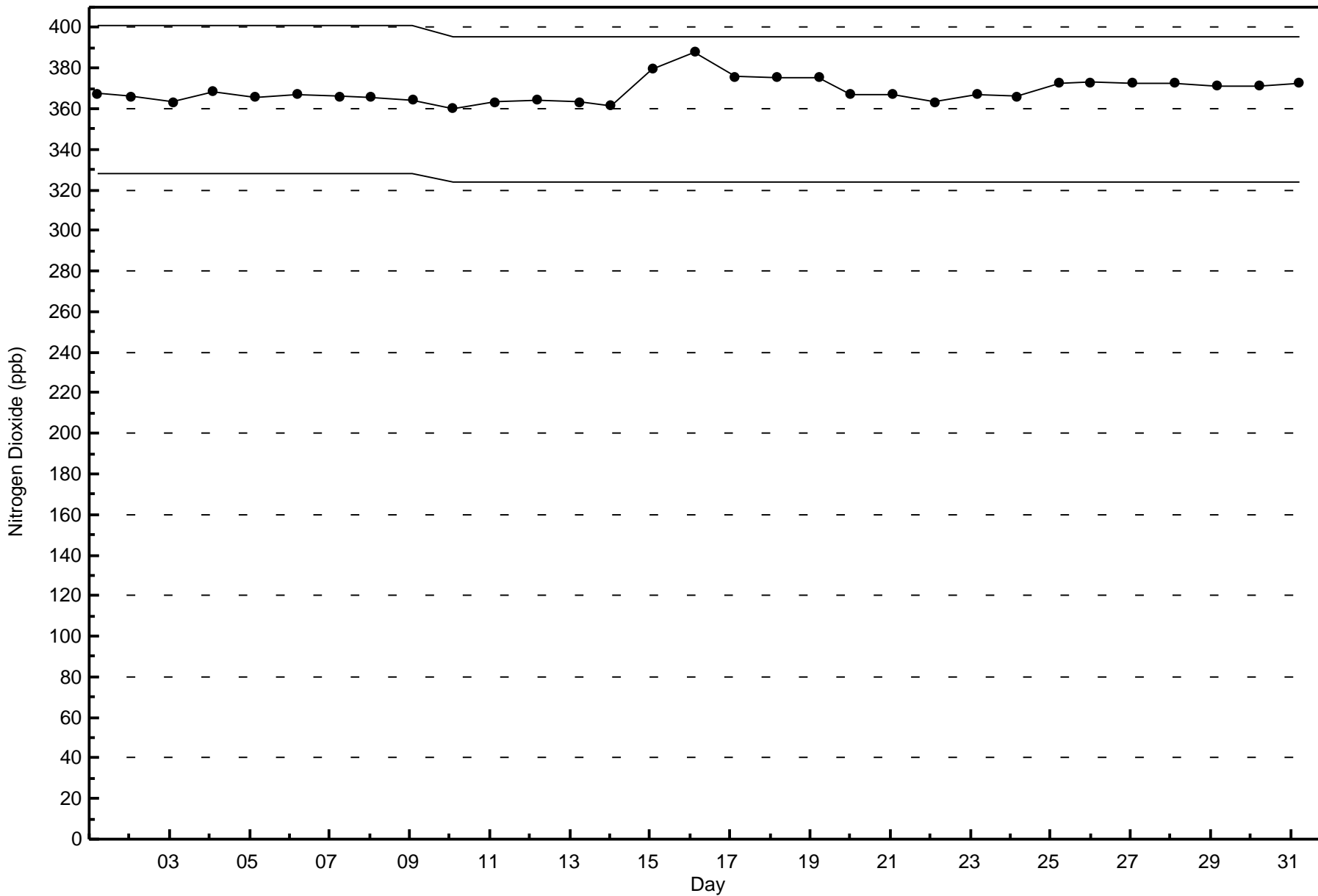


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Dioxide (NO₂) - ppb
Wapasu (AMS 17)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

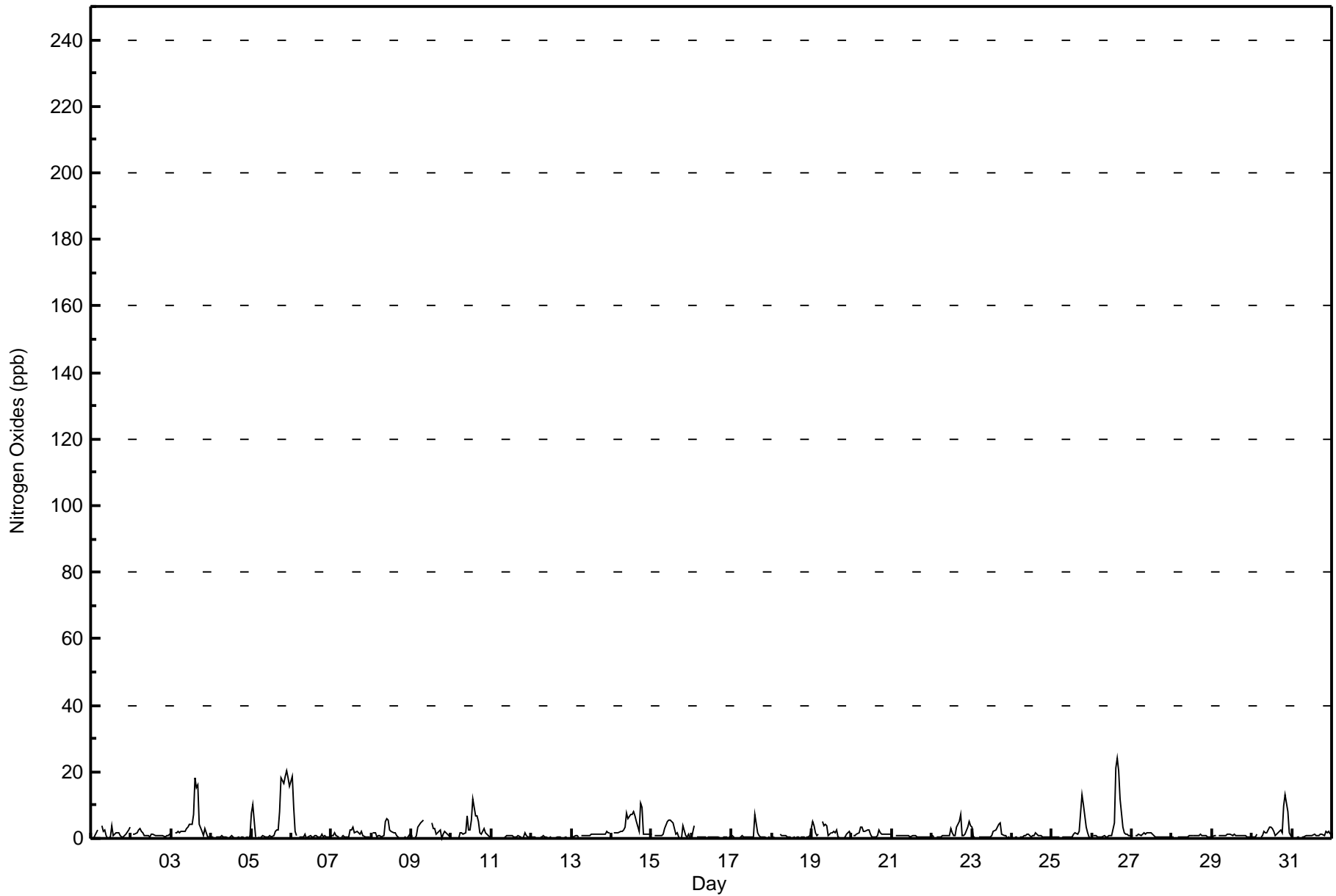
Wapasu - March 2017

Maximum Value: 24 ppb on Mar 26 16:00																	Maximum Daily Average: 6.4 ppb on Mar 5																	Hours in Service: 744	
Minimum Value: 0 ppb on Mar 9 19:00																	Minimum Daily Average: 0.2 ppb on Mar 12																	Hours of Data: 709	
Maximum Diurnal Average: 2.9 ppb at hour 15																	Minimum Diurnal Average: 0.7 ppb at hour 4																	Hours of Missing Data: 35	
Monthly Average: 1.7 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 4 P ₉₉ = 18																	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-Mar	0	0	1	2	2	Z	4	2	3	1	0	0	4	1	1	2	1	1	0	1	1	1	3	3	1.5	4									
2-Mar	Z	1	1	2	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	3									
3-Mar	1	Z	2	2	2	2	2	2	2	3	3	4	4	7	18	15	16	4	2	1	3	2	1	1	4.3	18									
4-Mar	0	0	Z	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0.3	1									
5-Mar	7	10	0	Z	0	0	0	1	0	0	0	1	1	1	2	3	3	8	18	17	18	20	18	16	6.4	20									
6-Mar	18	9	2	1	Z	1	0	0	1	0	1	1	0	0	1	1	1	0	1	1	1	1	0	1	1.8	18									
7-Mar	1	1	2	1	0	Z	0	1	0	0	1	2	3	4	2	2	2	1	2	1	1	1	1	0	1.2	4									
8-Mar	Z	2	2	0	1	1	0	1	5	6	6	2	2	2	1	1	0	0	0	0	0	0	0	2	1.5	6									
9-Mar	0	Z	0	1	3	5	5	5	C	C	C	C	5	3	3	1	2	3	0	1	2	1	1	0	2.2	5									
10-Mar	0	0	Z	0	0	2	2	1	2	7	3	2	6	12	7	7	5	2	1	3	2	1	1	0	2.8	12									
11-Mar	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	1	1	0	1	2	1	0	0	0.4	2									
12-Mar	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									
13-Mar	0	1	1	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1.1	2									
14-Mar	Z	2	2	2	2	2	2	3	3	8	6	7	7	8	7	5	2	11	10	1	1	1	1	1	4.1	11									
15-Mar	1	Z	1	1	1	1	1	1	3	5	6	5	5	5	1	2	0	0	0	4	1	0	1	0	2.0	6									
16-Mar	0	4	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	4									
17-Mar	1	0	0	Z	0	0	1	0	0	0	1	0	1	0	7	2	1	0	0	0	0	0	0	0	0.7	7									
18-Mar	0	0	0	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1									
19-Mar	5	4	2	1	1	Z	5	4	4	4	1	2	2	2	2	2	0	0	0	0	0	1	2	1	2.0	5									
20-Mar	Z	1	1	1	2	3	3	2	2	3	2	1	0	0	1	1	3	2	1	1	1	1	1	1	1.6	3									
21-Mar	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0.8	1									
22-Mar	1	1	Z	1	1	1	1	1	1	1	1	3	2	1	1	3	5	7	1	1	1	3	5	4	1.9	7									
23-Mar	4	0	1	Z	0	0	0	0	0	0	1	0	1	2	3	3	4	5	1	1	1	0	0	0	1.2	5									
24-Mar	0	0	0	0	Z	0	0	1	1	1	0	1	0	1	1	2	1	1	0	0	1	1	1	1	0.6	2									
25-Mar	0	1	0	0	0	Z	0	0	0	0	0	1	1	2	1	2	7	13	10	3	2	0	0	0	2.1	13									
26-Mar	Z	1	1	0	0	0	0	1	1	0	1	1	1	5	21	24	20	12	4	2	1	1	1	1	4.3	24									
27-Mar	1	Z	1	1	1	1	1	2	1	2	2	2	1	1	0	1	0	0	0	0	0	0	0	0	0.8	2									
28-Mar	0	0	Z	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.6	1									
29-Mar	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.8	1									
30-Mar	1	0	1	1	Z	0	1	2	2	2	4	3	3	2	1	2	2	3	2	10	13	8	2	1	2.8	13									
31-Mar	0	0	0	0	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	0.9	2									
1.7																	1.5																	Diurnal Average	
18																	10																	Diurnal Maximum	
0.8																	0.7																		
0.9																	1.1																		
1.2																	1.2																		
1.3																	1.7																		
1.5																	1.5																		
1.8																	2.1																		
2.9																	2.7																		
2.5																	2.4																		
2.1																	2.0																		
2.0																	1.8																		
1.5																	1.4																		
Z - zerospan																	C - Calibration																		



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Wapasu - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Wapasu - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	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: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Wapasu - March 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	96	51	29	15	14	28	133	157	73	23	10	7	9	12	21	27	705
21 - 40	0	0	0	0	0	0	0	0	0	0	1	0	0	1	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	96	51	29	15	14	28	133	157	73	23	11	7	9	13	21	27	707

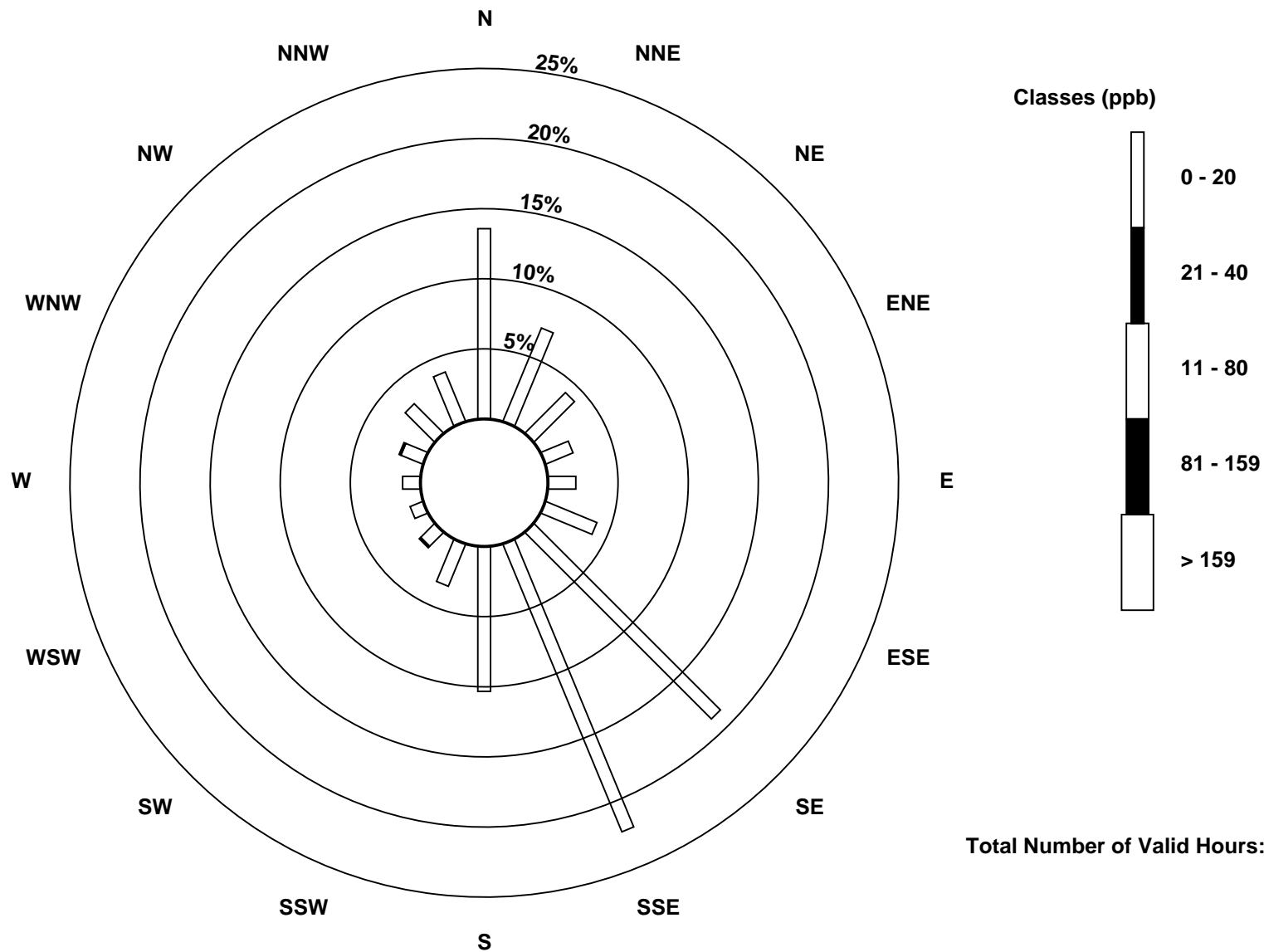
Total Number of Valid Hours: 707

Total Number of Hours: 744

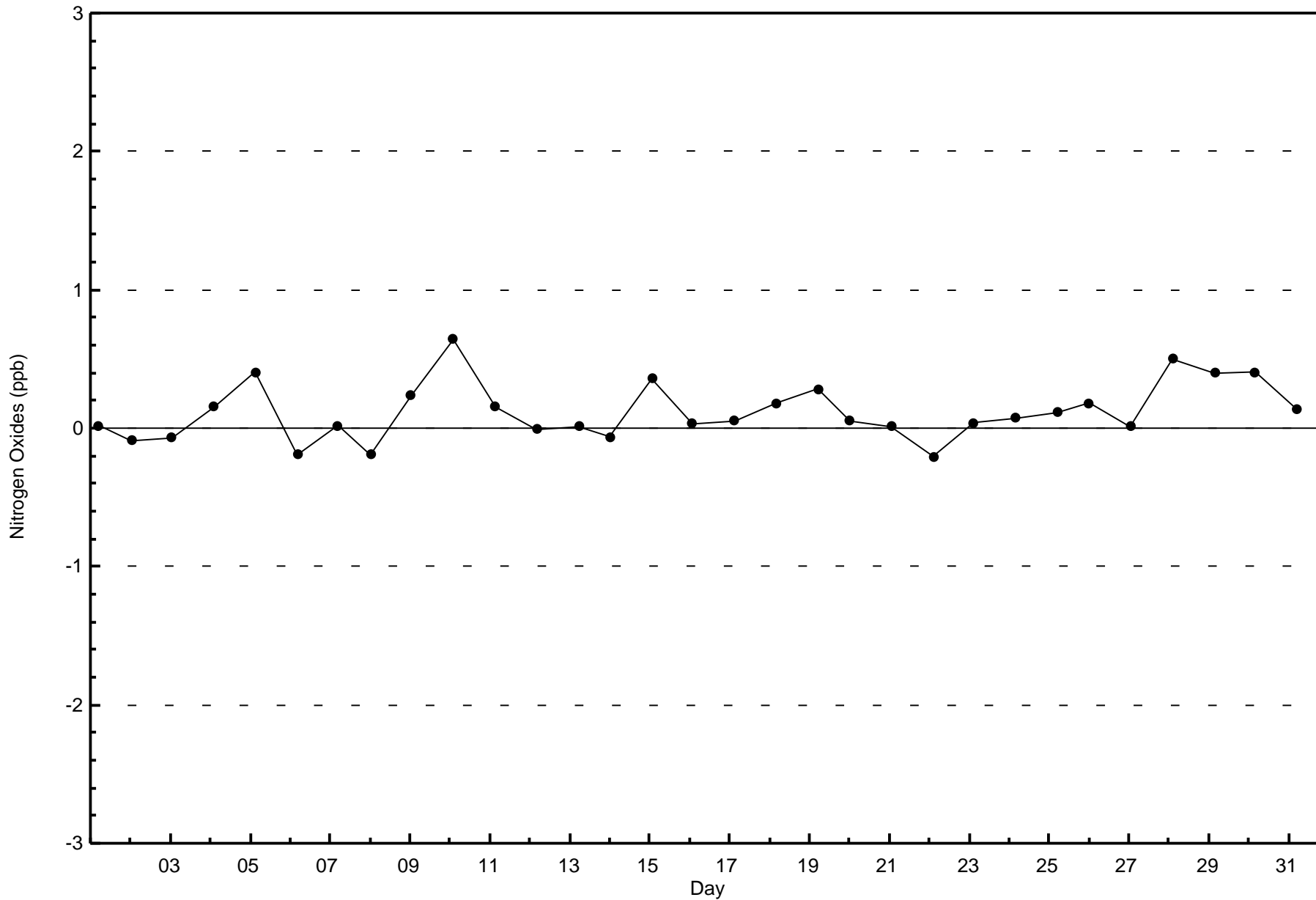


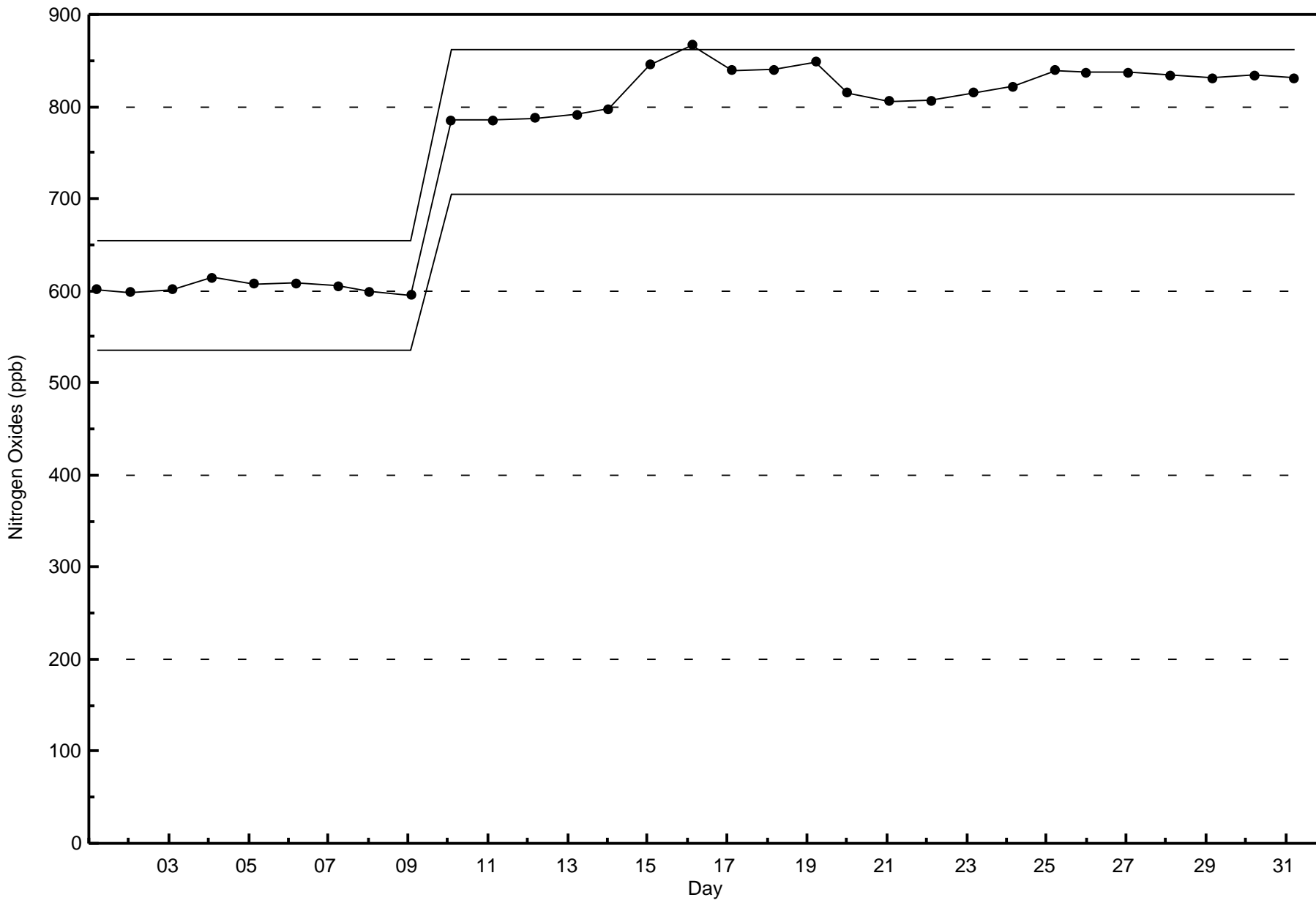
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Oxides (NO_x) - ppb
Wapasu (AMS 17)



Total Number of Valid Hours: 707







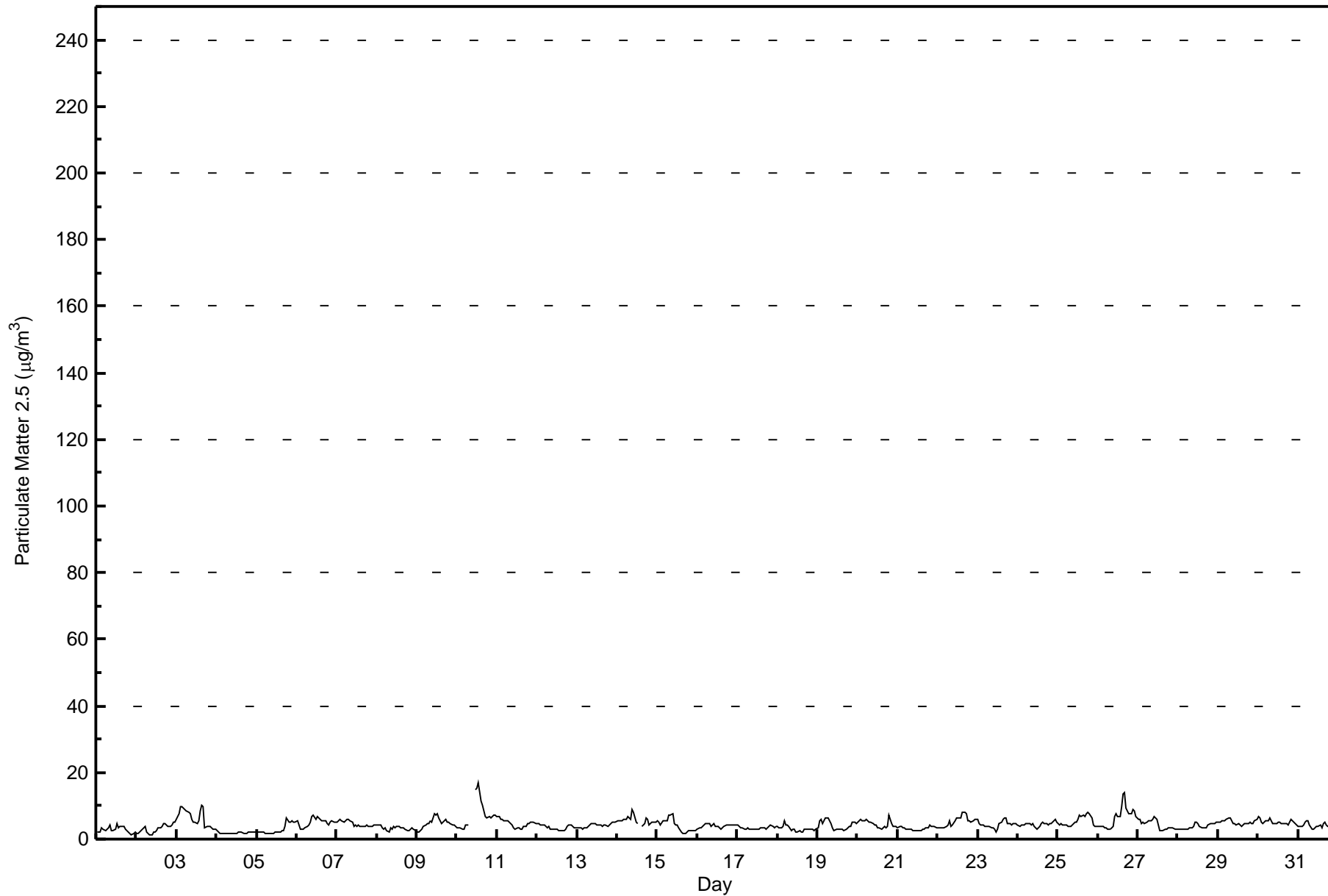
Wood Buffalo Environmental Association

Summary of Hour Averages

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

Wapasu - March 2017

Number of Exceedences (AAAQO):		24-hr: 0		Hours in Service:		744																																										
Maximum Value: 17.1 µg/m ³ on Mar 10 14:00		Maximum Daily Average: 7.3 µg/m ³ on Mar 10		Hours of Data:		739																																										
Minimum Value: 1.2 µg/m ³ on Mar 2 10:00		Minimum Daily Average: 1.9 µg/m ³ on Mar 4		Hours of Missing Data:		5																																										
Maximum Diurnal Average: 4.7 µg/m ³ at hour 17		Minimum Diurnal Average: 4.1 µg/m ³ at hour 3		Hours of Calibration:		2																																										
Monthly Average: 4.34 µg/m ³		Percentiles: P ₁ = 1.6 P ₁₀ = 2.4 Q ₁ = 3.2 Median = 4.1 Q ₃ = 5.2 P ₉₀ = 6.3 P ₉₉ = 8.7		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-Mar	2.3	2.2	2.3	3.4	2.8	2.6	3.1	3.4	4.2	2.5	2.4	3.0	4.5	3.5	3.6	3.7	3.8	2.9	2.5	1.9	1.5	1.3	1.7	2.0	2.8	4.5																						
2-Mar	1.6	1.7	2.1	3.1	3.6	3.9	2.3	1.7	1.4	1.2	2.0	2.2	2.6	3.4	3.4	3.8	4.7	4.8	4.2	4.0	3.9	4.1	4.9	5.1	3.2	5.1																						
3-Mar	6.0	7.5	9.6	9.8	9.3	8.9	8.3	8.0	7.8	5.9	5.2	5.2	4.6	5.4	8.6	10.0	9.8	3.5	3.7	4.0	3.7	3.3	3.0	2.8	6.4	10.0																						
4-Mar	2.4	2.0	1.8	1.7	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.7	2.1	2.3	1.9	1.6	1.7	1.8	2.0	2.0	2.1	2.2	2.2	1.9	2.4																						
5-Mar	2.3	2.3	2.1	2.0	2.0	1.8	1.6	1.8	1.9	1.9	1.9	2.2	2.3	2.1	2.3	2.6	2.7	3.8	6.2	5.2	5.1	5.5	5.0	5.2	3.0	6.2																						
6-Mar	5.5	4.2	3.0	2.8	3.0	3.4	4.0	4.4	5.0	6.8	7.1	6.0	6.6	6.5	5.7	5.7	5.6	5.3	4.7	4.3	5.1	5.4	5.1	4.9	5.0	7.1																						
7-Mar	5.1	5.4	5.8	5.4	5.3	5.5	5.8	5.8	5.7	5.0	3.9	4.1	4.0	4.2	3.7	3.8	3.8	3.7	4.3	3.8	4.0	3.9	4.2	4.1	4.6	5.8																						
8-Mar	4.2	4.3	4.1	3.4	3.0	3.2	2.7	2.2	3.2	3.1	3.6	3.5	3.9	3.6	3.6	3.5	3.3	2.8	2.6	2.7	2.9	3.5	3.1	2.3	3.3	4.3																						
9-Mar	2.1	2.3	2.4	2.8	3.8	4.4	4.5	4.9	5.3	5.1	7.8	7.3	7.6	6.3	5.7	4.9	5.7	5.9	4.9	5.0	4.8	4.3	4.2	3.8	4.8	7.8																						
10-Mar	3.4	3.4	3.2	3.1	2.8	4.2	4.2	4.2	C	C	UO	15.0	15.3	17.1	11.5	10.0	8.3	6.9	6.3	6.6	6.2	6.9	7.0	7.1	7.3	17.1																						
11-Mar	6.9	6.7	5.9	5.8	5.6	5.4	5.4	5.1	4.7	4.1	3.3	3.0	3.2	3.3	3.1	3.2	3.6	4.0	4.5	4.8	5.3	5.3	5.0	4.8	4.7	6.9																						
12-Mar	4.8	4.5	4.3	4.2	4.1	3.8	3.6	3.7	3.1	2.8	2.9	3.0	3.0	2.6	2.5	2.6	2.6	3.1	3.8	4.3	4.2	3.9	3.6	3.4	3.5	4.8																						
13-Mar	3.5	3.4	3.3	3.1	3.2	3.3	3.6	4.1	4.6	4.8	4.7	4.7	4.4	4.1	4.5	AF	AF	4.0	4.7	6.5	6.0	4.3	4.8	5.2	5.1	5.7	9.1																					
14-Mar	5.5	5.5	5.6	5.7	5.9	6.0	6.8	6.2	6.0	9.1	8.0	5.1	4.5	AF	AF	4.0	4.7	6.5	6.0	4.3	4.8	5.2	5.0	5.1	5.7	9.1																						
15-Mar	5.5	5.0	4.4	5.4	5.5	5.4	5.6	7.2	7.2	7.4	4.8	4.1	4.2	3.4	2.1	1.9	1.8	1.8	1.9	2.4	2.4	2.5	2.6	2.7	4.1	7.4																						
16-Mar	2.8	3.2	3.4	3.8	4.4	4.7	4.7	4.9	4.0	4.3	4.5	3.9	3.7	3.4	3.2	3.4	3.7	4.2	4.3	4.3	4.3	4.3	4.0	4.1	4.0	4.9																						
17-Mar	4.1	3.9	3.3	3.2	3.1	3.0	3.2	3.0	2.9	2.8	2.8	2.9	3.0	2.9	3.4	3.3	3.2	3.0	3.2	3.8	4.1	3.9	3.6	4.0	3.3	4.1																						
18-Mar	3.8	3.6	3.3	3.8	5.6	4.2	4.2	3.7	2.7	2.9	2.9	2.3	2.3	2.5	2.3	2.3	2.8	3.1	3.0	2.9	2.9	3.0	2.7	2.9	3.2	5.6																						
19-Mar	3.5	5.5	5.9	4.8	5.3	6.2	6.1	5.6	4.7	3.2	2.7	2.8	2.9	3.1	2.9	3.1	2.6	3.1	3.3	3.8	3.7	5.1	5.1	4.5	4.1	6.2																						
20-Mar	5.0	5.6	5.8	5.3	5.5	6.0	5.7	5.0	4.9	4.8	4.4	4.3	3.4	3.6	2.8	3.2	3.7	3.3	3.6	7.2	4.8	4.0	3.7	3.6	4.6	7.2																						
21-Mar	3.5	3.7	3.6	3.4	3.3	3.2	3.1	3.0	2.8	2.5	2.6	2.6	2.5	2.5	2.5	2.9	2.9	3.2	3.6	4.3	3.9	3.7	3.7	3.5	3.2	4.3																						
22-Mar	3.3	3.3	3.4	3.6	3.5	3.7	4.1	5.6	3.9	4.4	5.5	6.3	6.3	6.2	6.4	8.2	8.0	7.6	5.4	5.5	5.2	5.4	5.9	5.9	5.3	8.2																						
23-Mar	6.0	4.6	4.3	4.3	3.9	3.9	3.9	3.7	3.5	3.2	2.8	2.3	2.9	4.5	5.0	6.0	6.4	6.6	4.9	4.6	4.4	4.6	4.7	4.6	4.4	6.6																						
24-Mar	4.4	3.8	4.0	4.3	4.3	4.6	4.8	4.8	4.4	4.6	3.8	2.8	3.2	4.0	4.9	5.2	4.9	4.6	4.3	4.5	4.5	5.2	6.1	5.2	4.5	6.1																						
25-Mar	4.7	4.4	4.6	4.4	4.1	4.0	3.8	3.9	4.0	4.5	5.2	5.2	5.9	7.2	7.0	7.0	6.9	7.8	8.0	7.8	6.3	4.4	3.8	3.9	5.4	8.0																						
26-Mar	3.8	3.9	3.9	3.9	3.3	3.2	3.0	3.1	3.4	4.0	6.7	7.5	6.8	6.6	9.6	13.6	13.9	9.4	7.8	7.8	7.6	9.1	8.6	6.6	6.6	13.9																						
27-Mar	6.0	5.8	4.9	5.0	4.6	4.9	5.3	5.4	5.6	6.1	6.7	5.8	4.1	2.7	2.5	2.8	2.9	3.0	3.3	3.5	3.3	3.2	3.1	3.1	4.3	6.7																						
28-Mar	3.0	3.1	2.9	2.8	3.0	2.9	3.0	3.2	3.3	3.6	5.2	5.1	4.8	3.9	3.3	3.4	3.4	3.6	4.1	4.6	4.8	4.7	4.7	4.9	3.8	5.2																						
29-Mar	5.0	5.1	5.4	5.4	5.4	5.8	6.4	6.3	5.4	4.8	4.5	4.3	4.5	4.4	3.9	4.1	4.7	4.7	4.9	5.0	4.9	4.7	5.4	6.1	5.0	6.4																						
30-Mar	7.0	6.3	5.3	4.8	5.5	5.6	5.4	6.2	5.7	4.8	4.5	4.8	4.9	4.9	4.7	4.6	4.7	4.6	4.2	5.3	6.0	5.2	4.5	4.3	5.1	7.0																						
31-Mar	3.9	3.8	3.9	4.2	5.0	5.7	5.7	4.3	3.0	3.1	3.4	3.7	3.8	4.1	3.5	4.6	5.2	4.4	3.7	3.7	4.2	4.2	4.6	5.3	4.2	5.7																						
																								4.2	4.2	4.1	4.2	4.2	4.4	4.4	4.4	4.2	4.2	4.2	4.4	4.4	4.5	4.3	4.6	4.7	4.4	4.3	4.5	4.4	4.4	4.4	4.3	Diurnal Average
																								7.0	7.5	9.6	9.8	9.3	8.9	8.3	8.0	7.8	9.1	8.0	15.0	15.3	17.1	11.5	13.6	13.9	9.4	8.0	7.8	7.6	9.1	8.6	7.1	Diurnal Maximum
C - Calibration																								AF - Analyzer Failure						UO - Unstable Operation																		
Alberta Ambient Air Quality Objectives (AAAQO):																								24-hr						30 µg/m ³																		





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - March 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	603	81.60	81.60
6 - 15	135	18.27	99.86
16 - 25	1	0.14	100.00
26 - 80	0	0.00	100.00
> 81.0	0	0.00	100.00

Total Number of Valid Hours: 739

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Wapasu - March 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	76	53	27	13	14	24	115	148	60	16	7	5	6	7	14	17	602
6 - 15	25	1	2	2	1	6	26	21	12	5	4	1	3	6	7	12	134
16 - 25	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	102	54	29	15	15	30	141	169	72	21	11	6	9	13	21	29	737

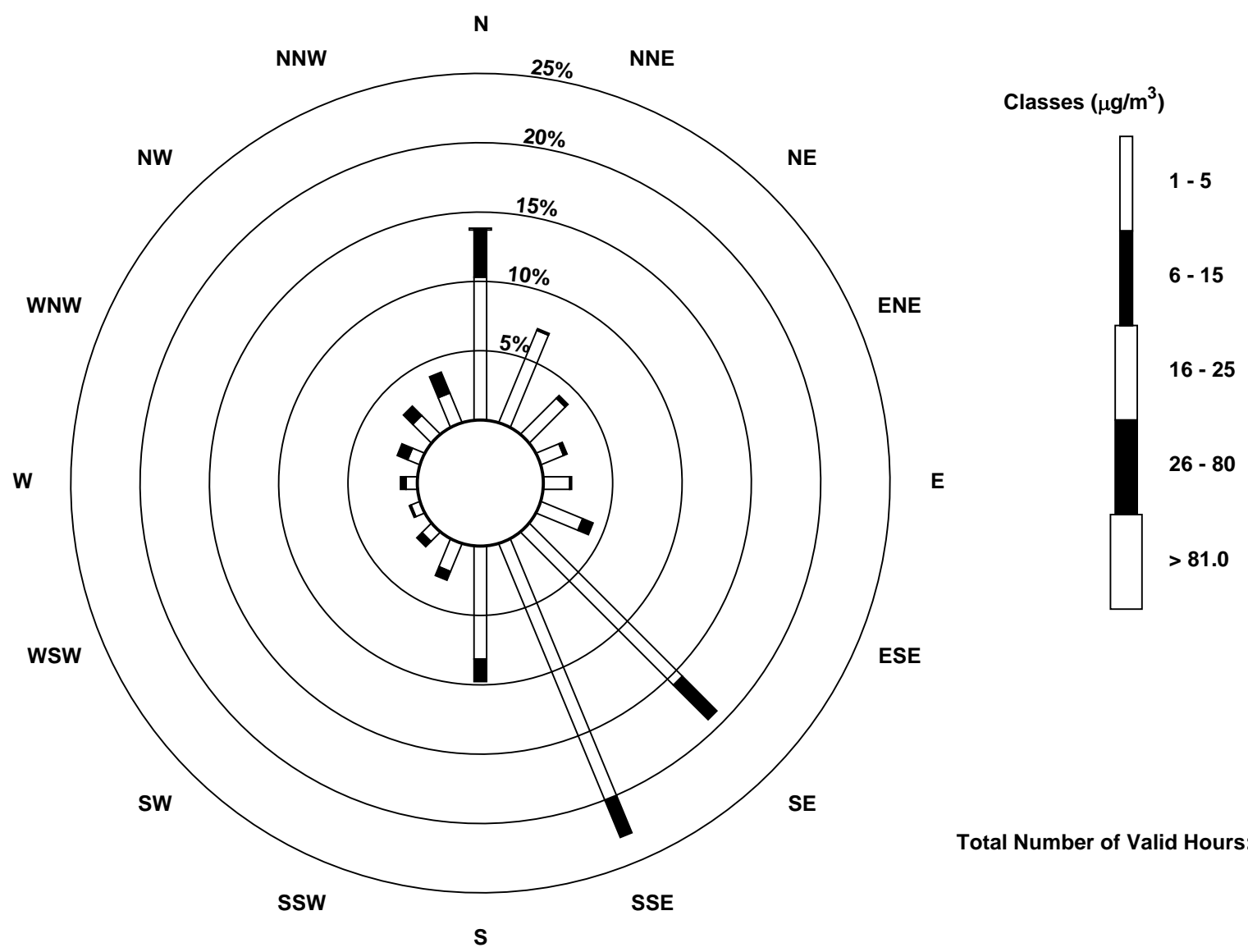
Total Number of Valid Hours: 737

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu (AMS 17)



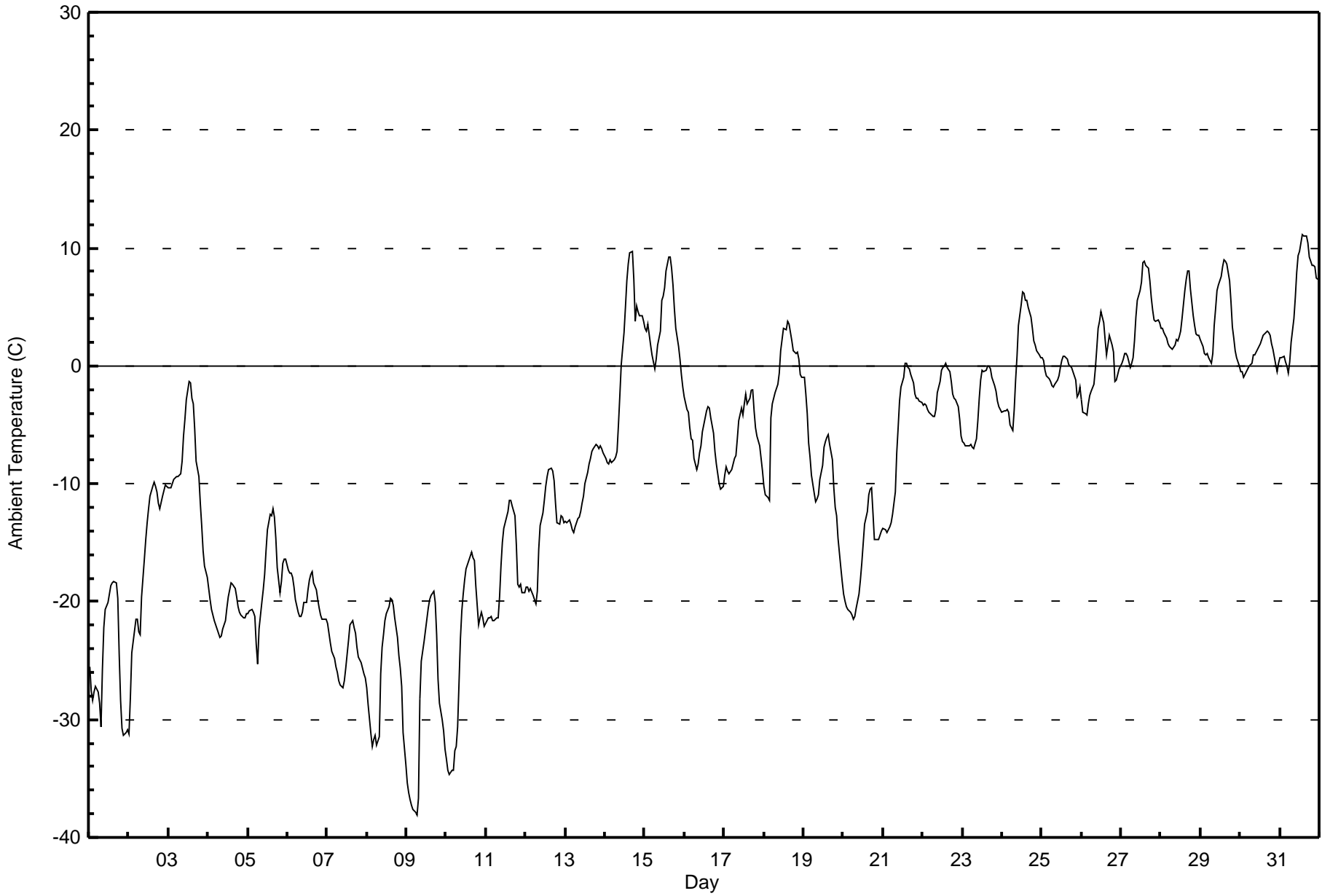
Total Number of Valid Hours: 737



Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Wapasu - March 2017

Maximum Value: 11.2 C on Mar 31 14:00		Maximum Daily Average: 6.0 C on Mar 31		Hours in Service: 744																						
Minimum Value: -38.1 C on Mar 9 07:00		Minimum Daily Average: -28.6 C on Mar 9		Hours of Data: 744																						
Maximum Diurnal Average: -4.5 C at hour 16		Minimum Diurnal Average: -13.0 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -9.11 C		Percentiles: P ₁ = -35.4 P ₁₀ = -23.5 Q ₁ = -19.0 Median = -7.5 Q ₃ = 0.2 P ₉₀ = 3.8 P ₉₉ = 9.7		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-Mar	-25.5	-27.6	-28.4	-27.7	-27.2	-27.7	-28.7	-30.6	-25.8	-22.2	-20.7	-20.0	-19.4	-18.7	-18.4	-18.3	-18.4	-19.7	-24.5	-28.4	-30.7	-31.3	-31.1	-30.9	-25.1	-18.3
2-Mar	-31.3	-28.2	-24.4	-22.4	-21.5	-21.5	-22.6	-22.8	-19.6	-16.3	-14.8	-13.3	-12.1	-11.1	-10.2	-9.8	-10.2	-10.7	-11.6	-12.2	-11.0	-10.6	-10.1	-10.3	-16.2	-9.8
3-Mar	-10.3	-10.4	-10.0	-9.6	-9.5	-9.4	-9.3	-9.2	-8.1	-5.9	-4.5	-2.9	-1.3	-1.4	-2.7	-3.2	-5.3	-8.1	-9.4	-11.6	-13.6	-15.6	-17.0	-18.0	-8.6	-1.3
4-Mar	-18.8	-19.9	-20.7	-21.1	-21.7	-22.3	-22.7	-23.0	-22.9	-22.3	-21.7	-20.6	-19.6	-19.0	-18.4	-18.6	-18.8	-19.6	-20.4	-20.9	-21.1	-21.4	-21.3	-21.0	-20.7	-18.4
5-Mar	-21.1	-20.8	-20.7	-20.9	-21.2	-22.3	-25.3	-22.3	-20.1	-19.0	-17.7	-15.7	-13.9	-12.7	-12.7	-12.2	-12.8	-14.6	-17.1	-19.2	-18.3	-16.7	-16.4	-16.4	-18.0	-12.2
6-Mar	-17.3	-17.6	-17.5	-17.9	-18.7	-19.9	-20.9	-21.2	-21.3	-20.9	-20.1	-20.0	-19.0	-18.2	-17.7	-17.4	-18.4	-19.0	-19.9	-20.6	-21.2	-21.5	-21.5	-21.5	-19.5	-17.3
7-Mar	-21.8	-22.7	-23.5	-24.2	-24.8	-25.5	-26.0	-26.7	-27.1	-27.2	-26.8	-25.6	-24.5	-23.3	-22.0	-21.6	-22.3	-22.7	-23.9	-24.7	-25.2	-25.6	-26.1	-26.5	-24.6	-21.6
8-Mar	-27.4	-28.7	-31.2	-32.3	-31.7	-31.4	-32.2	-31.5	-26.1	-23.9	-22.7	-21.6	-21.0	-20.4	-19.7	-19.9	-20.4	-21.4	-23.0	-24.6	-25.7	-27.1	-31.2	-33.9	-26.2	-19.7
9-Mar	-35.4	-36.3	-36.8	-37.3	-37.6	-37.9	-38.1	-36.7	-28.2	-25.0	-23.4	-22.5	-21.5	-20.6	-19.9	-19.4	-19.1	-20.1	-22.8	-26.6	-28.6	-30.0	-30.9	-32.5	-28.6	-19.1
10-Mar	-33.3	-34.3	-34.7	-34.3	-34.3	-32.6	-32.3	-30.6	-23.2	-20.8	-19.3	-18.1	-17.2	-16.8	-16.1	-15.8	-16.3	-16.4	-18.6	-22.0	-21.3	-20.9	-21.4	-22.1	-23.9	-15.8
11-Mar	-21.9	-21.3	-21.4	-21.2	-21.6	-21.6	-21.4	-21.3	-19.6	-16.9	-15.0	-13.8	-12.8	-12.4	-11.4	-11.4	-11.9	-12.7	-15.3	-18.5	-18.7	-18.5	-19.2	-19.3	-17.5	-11.4
12-Mar	-18.8	-18.8	-19.2	-18.8	-19.4	-19.8	-20.2	-19.2	-15.6	-13.6	-12.5	-11.4	-10.2	-9.4	-8.8	-8.7	-8.9	-9.8	-11.7	-13.3	-13.4	-12.7	-12.8	-13.3	-14.2	-8.7
13-Mar	-13.2	-13.3	-13.1	-13.4	-13.9	-14.1	-13.7	-13.0	-12.8	-12.4	-11.7	-11.0	-10.0	-9.1	-8.3	-7.8	-7.3	-7.0	-6.7	-6.8	-7.0	-6.8	-7.1	-7.4	-10.3	-6.7
14-Mar	-7.8	-8.2	-8.3	-8.0	-8.2	-8.0	-7.8	-7.3	-5.0	0.1	2.8	5.0	7.2	8.7	9.6	9.7	7.3	3.8	5.1	4.6	4.2	4.3	3.7	0.2	9.7	
15-Mar	3.2	3.0	3.5	1.8	0.9	0.4	-0.2	0.5	1.8	2.9	5.6	5.9	6.7	8.0	9.2	9.2	8.3	6.9	4.9	3.2	1.6	0.5	-0.7	-1.8	3.6	9.2
16-Mar	-2.6	-3.7	-4.0	-5.2	-6.2	-6.4	-7.9	-8.8	-8.4	-7.4	-6.8	-5.6	-4.4	-3.8	-3.4	-3.5	-4.4	-5.7	-7.3	-8.3	-9.1	-9.9	-10.4	-10.2	-6.4	-2.6
17-Mar	-9.3	-8.6	-8.9	-9.1	-8.8	-8.3	-7.8	-7.6	-6.2	-4.7	-3.6	-4.1	-3.3	-2.4	-3.2	-2.7	-2.1	-2.1	-3.8	-5.2	-5.9	-6.8	-7.9	-9.0	-5.9	-2.1
18-Mar	-10.3	-11.0	-11.2	-11.4	-4.4	-3.2	-2.8	-2.3	-1.6	-0.6	1.3	2.2	3.1	3.0	3.8	3.5	2.9	2.1	1.3	1.0	1.2	0.6	-0.7	-1.0	-1.4	3.8
19-Mar	-1.0	-2.4	-4.1	-6.5	-7.7	-9.2	-10.8	-11.5	-11.2	-10.9	-9.6	-8.4	-6.9	-6.4	-6.1	-5.8	-6.6	-8.0	-10.3	-12.0	-12.7	-14.6	-17.1	-18.3	-9.1	-1.0
20-Mar	-19.4	-19.9	-20.5	-20.6	-20.8	-21.1	-21.5	-21.2	-20.5	-19.4	-18.2	-16.7	-15.1	-13.4	-12.3	-10.9	-10.5	-10.3	-12.4	-14.7	-14.8	-14.7	-14.3	-14.1	-16.6	-10.3
21-Mar	-13.8	-13.9	-14.1	-14.0	-13.6	-13.3	-12.6	-10.7	-7.4	-5.2	-3.0	-1.8	-1.0	0.2	0.2	-0.1	-0.3	-0.7	-1.4	-2.4	-2.7	-2.7	-3.0	-3.1	-5.9	0.2
22-Mar	-3.3	-3.3	-3.4	-3.7	-3.9	-4.2	-4.3	-4.2	-3.7	-2.3	-1.3	-0.4	-0.1	0.0	0.2	-0.1	-0.4	-1.3	-2.4	-2.7	-2.8	-3.4	-4.5	-5.9	-2.6	0.2
23-Mar	-6.4	-6.5	-6.8	-6.8	-6.8	-6.7	-6.9	-7.1	-6.2	-4.6	-2.8	-1.2	-0.3	-0.5	-0.3	0.0	0.0	-0.3	-1.0	-1.7	-2.1	-3.0	-3.4	-3.7	-3.5	0.0
24-Mar	-3.9	-3.9	-3.8	-3.7	-3.9	-4.9	-5.5	-3.7	-1.2	0.8	3.5	5.2	6.3	6.1	5.5	5.6	5.0	4.1	3.2	2.1	1.8	1.3	0.9	0.7	0.7	6.3
25-Mar	0.7	0.5	-0.4	-0.8	-1.1	-1.4	-1.6	-1.8	-1.5	-1.2	-0.8	-0.2	0.5	0.8	0.8	0.6	0.1	0.0	-0.1	-0.5	-1.2	-2.6	-2.4	-1.8	-0.6	0.8
26-Mar	-2.9	-4.0	-4.1	-4.2	-3.2	-2.5	-2.2	-1.5	-0.2	1.4	3.2	3.8	4.7	3.7	2.2	1.0	1.8	2.5	1.7	1.2	-1.4	-1.2	-0.7	-0.2	0.0	4.7
27-Mar	0.2	0.6	1.1	1.0	0.8	-0.2	0.2	0.7	2.1	4.1	5.6	6.4	7.1	8.7	8.9	8.5	8.3	7.2	5.8	4.7	4.0	3.8	3.9	3.6	4.0	8.9
28-Mar	3.2	3.1	2.9	2.3	1.8	1.7	1.5	1.4	1.8	2.2	2.2	2.4	2.9	4.1	6.4	7.4	8.0	8.0	6.4	4.2	3.4	2.7	2.6	2.6	3.6	8.0
29-Mar	2.2	1.7	1.1	0.9	1.1	0.7	0.2	1.1	3.4	4.8	6.4	6.8	7.6	8.4	9.0	8.9	8.6	7.2	5.5	3.3	2.4	1.3	0.7	0.0	3.9	9.0
30-Mar	-0.5	-0.5	-0.9	-0.7	-0.3	0.0	0.2	0.2	0.9	0.9	1.4	1.7	1.9	2.3	2.6	2.8	2.9	2.9	2.6	1.9	1.4	0.1	-0.5	0.2	1.0	2.9
31-Mar	0.7	0.7	0.8	0.3	0.0	-0.6	0.3	1.9	4.1	5.8	7.9	9.3	9.7	11.2	11.0	11.1	11.1	10.4	9.3	8.5	8.5	8.4	7.5	7.3	6.0	11.2
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Wapasu - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	160	21.51	21.51
-20 - 0	389	52.28	73.79
0 - 10	190	25.54	99.33
10 - 20	5	0.67	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

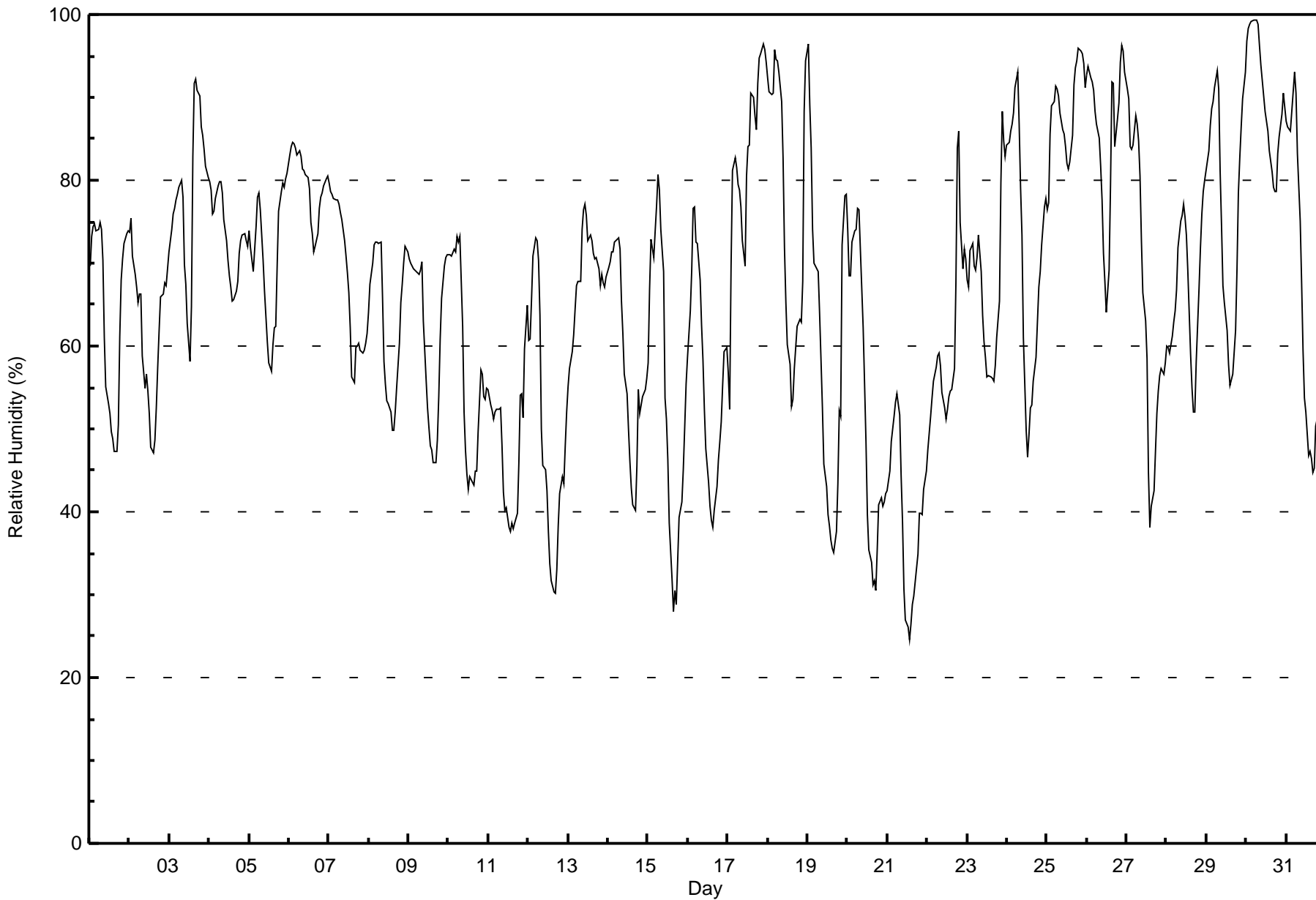
Wapasu - March 2017

Maximum Value: 99 % on Mar 30 06:00 Maximum Daily Average: 90.4 % on Mar 30																		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 Mar 21 14:00 Minimum Daily Average: 39.5 % on Mar 21 Maximum Diurnal Average: 76.8 % at hour 7 Minimum Diurnal Average: 54.2 % at hour 15 Monthly Average: 66.4 % Percentiles: P ₁ = 30 P ₁₀ = 43 Q ₁ = 54 Median = 69 Q ₃ = 79 P ₉₀ = 89 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-Mar	70	73	74	75	74	74	75	74	70	61	55	53	52	50	49	47	47	51	61	68	71	72	74	74	64.3	75
2-Mar	74	75	71	69	67	65	66	66	59	55	57	55	52	48	47	49	53	57	62	66	66	68	67	69	61.7	75
3-Mar	71	74	76	77	78	78	79	80	78	70	68	63	58	65	83	92	92	91	90	86	85	84	82	80	78.3	92
4-Mar	80	79	76	76	78	79	80	80	79	75	73	70	69	67	65	66	67	68	71	73	73	74	73	72	73.4	80
5-Mar	74	72	69	72	74	78	79	76	70	67	64	60	58	57	60	62	62	70	76	79	80	79	80	81	70.8	81
6-Mar	83	84	85	84	84	83	84	83	81	81	81	80	79	75	74	71	72	74	77	78	78	79	80	80	79.6	85
7-Mar	80	79	78	78	78	78	77	76	75	73	71	69	66	62	56	56	60	60	60	60	59	60	60	61	68.0	80
8-Mar	64	68	70	72	73	73	72	73	66	58	55	53	53	52	50	50	52	55	60	65	67	70	72	71	63.1	73
9-Mar	71	70	70	69	69	69	69	69	70	63	56	53	50	48	47	46	46	49	54	61	66	70	71	71	61.5	71
10-Mar	71	71	71	72	71	73	73	73	62	52	47	45	43	44	44	43	45	45	50	57	57	54	54	55	57.1	73
11-Mar	55	53	52	51	52	52	52	52	48	42	40	40	38	38	39	38	39	40	46	54	54	51	60	65	48.0	65
12-Mar	61	61	66	71	73	73	70	64	50	46	45	43	38	34	32	30	30	33	38	42	44	43	48	52	49.4	73
13-Mar	55	57	59	61	64	67	68	68	74	76	77	76	73	73	71	71	71	69	67	69	68	67	68	68	68.5	77
14-Mar	70	70	71	71	73	73	73	72	65	62	57	54	50	46	43	41	40	46	55	52	53	54	55	56	58.3	73
15-Mar	58	67	73	71	74	77	81	79	74	69	54	51	46	39	32	28	30	29	34	39	41	45	50	55	54.0	81
16-Mar	59	64	69	77	77	73	72	68	63	58	52	48	44	41	39	38	40	43	46	49	51	55	59	60	56.0	77
17-Mar	57	52	70	81	83	82	80	79	77	73	70	81	84	84	91	90	88	86	92	95	95	96	96	94	82.2	96
18-Mar	92	91	90	91	96	95	94	93	90	83	72	65	60	58	53	54	57	60	62	63	63	68	88	94	76.3	96
19-Mar	96	89	84	74	70	70	69	64	58	53	46	43	40	38	37	36	35	38	43	52	52	72	78	78	59.0	96
20-Mar	74	68	68	72	74	74	77	77	72	62	55	48	40	35	34	31	32	30	35	41	42	41	41	42	52.8	77
21-Mar	43	45	48	50	51	53	54	52	44	39	31	27	26	25	26	29	30	32	35	40	40	40	43	45	39.5	54
22-Mar	47	49	52	54	56	57	59	59	58	54	52	51	52	54	55	55	57	68	84	86	75	69	72	70	60.2	86
23-Mar	68	67	72	72	70	69	71	73	69	64	61	59	56	56	56	56	58	61	65	80	88	85	83	83	67.3	88
24-Mar	84	85	86	87	88	91	93	87	79	73	61	50	47	49	53	53	56	59	63	67	69	72	77	78	71.1	93
25-Mar	76	77	86	89	89	91	91	90	88	86	86	84	82	81	82	85	92	94	94	96	96	95	94	91	88.2	96
26-Mar	93	94	92	92	91	88	87	85	82	78	71	68	64	69	79	92	92	84	87	89	94	96	96	93	85.7	96
27-Mar	91	90	84	84	84	88	87	85	81	73	66	63	58	45	38	41	43	47	52	55	56	57	57	58	65.9	91
28-Mar	60	60	59	61	63	64	67	72	75	76	77	76	73	69	59	55	52	52	58	67	72	76	79	80	66.7	80
29-Mar	81	84	87	89	89	91	93	91	81	75	67	65	62	58	55	56	57	62	69	78	83	86	90	93	76.8	93
30-Mar	97	98	99	99	99	99	99	99	96	94	90	88	87	86	84	81	79	79	79	83	85	88	90	89	90.4	99
31-Mar	87	86	86	88	91	93	91	83	75	68	59	54	52	47	47	46	45	45	50	52	53	53	56	59	65.3	93
	72.3	72.7	74.0	75.1	75.9	76.5	76.8	75.5	71.3	66.3	61.8	59.2	56.5	54.6	54.2	54.4	55.3	57.1	61.8	65.3	66.7	68.5	70.7	71.6	Diurnal Average	
	97	98	99	99	99	99	99	99	96	94	90	88	87	86	91	92	92	94	94	96	96	96	96	94	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Wapasu - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Wapasu - March 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	49	6.59	6.59
40 - 60	225	30.24	36.83
60 - 80	308	41.40	78.23
80 - 100	162	21.77	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

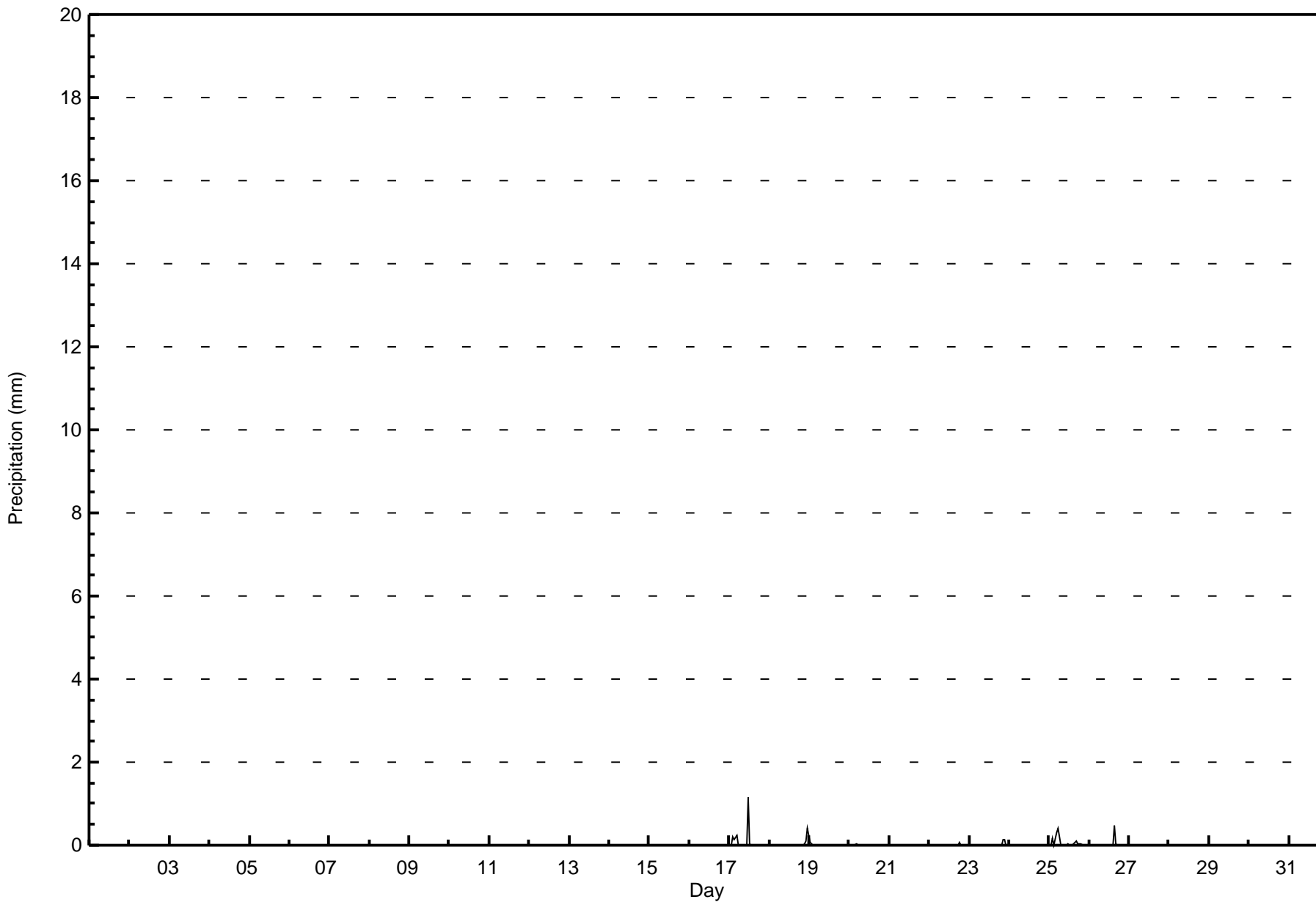
Wapasu - March 2017

Maximum Value: 1.1 mm on Mar 17 12:00 Maximum Daily Total: 1.7 mm on Mar 17		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 Mar 1 01:00 Maximum Diurnal Total: 1.2 mm at hour 12 Monthly Total: 4.75 mm		Minimum Daily Total: 0.0 mm on Mar 1 Minimum Diurnal Total: 0.0 mm at hour 8 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																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.1	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
18-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.4	0.6	0.4	0.6	0.4
19-Mar	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	0.1	0.1
20-Mar	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	0.0	0.0	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
21-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	0.1
23-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.3	0.1
24-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.2	0.0	0.3	0.4	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	1.5	0.4
26-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5
27-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
Wapasu - March 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Wapasu - March 2017

Maximum Speed: 23 km/h on Mar 2 21:00	Maximum Daily Speed Average: 17.8 km/h on Mar 13	Hours in Service: 744
Minimum Speed Value: 1 km/h on Mar 20 16:00	Minimum Daily Speed Average: 1.6 km/h on Mar 5	Hours of Data: 742
Maximum Diurnal Speed Average: 5.7 km/h at hour 23	Minimum Diurnal Speed Average: 0.3 km/h at hour 16	Hours of Missing Data: 2
Monthly Average Velocity: 3.4 km/h 139.8 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 7 Median = 10 Q ₃ = 13 P ₉₀ = 16 P ₉₉ = 21	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-Mar	E3	ESE4	ESE5	ESE6	ESE7	ESE8	E6	E6	ESE5	ENE7	NNE7	NNE8	N9	NNE8	N10	N10	N8	NNE5	ENE3	ESE2	ESE4	SE6	SSE5	SSE4	ENE3.8	N10
2-Mar	SSE6	SSE7	SSE6	SSE6	SSE5	SSE5	SSE6	SE6	SSE7	S8	S8	S8	SSW8	SSW8	S8	SE10	SSE11	SSE14	SE15	SE18	SSE23	SSE23	SSE18	SSE19	SSE10.2	SSE23
3-Mar	SSE17	SSE19	SSE19	SSE17	SSE17	SSE17	SSE13	SSE15	S13	S13	S13	SSW10	SSW10	WSW11	WSW9	NW7	NNW14	N9	N11	N13	N13	N13	N11	N10	SSE4.1	SSE19
4-Mar	N12	N13	N13	N11	N14	N14	N14	N13	N12	NNE13	N12	N11	N11	N12	N11	NNE10	N9	N8	NNE7	NE6	ENE6	ENE7	E9	E12	NNE9.8	N14
5-Mar	ESE8	SE4	S5	SSE3	SE1	ESE3	ESE4	SE6	SE8	SE9	SE7	ESE4	NNE1	NNE2	NW7	NW7	NW8	NW5	NW3	ESE2	E4	SE4	SE2	N3	ESE1.6	SE9
6-Mar	NNE5	NE5	NNE7	NNE8	NNE7	NNE7	NNE9	NNE11	NNE11	N11	N13	N14	N11	N13	N14	N14	N14	N14	N14	N14	N13	N14	N14	N13	N11.0	N14
7-Mar	N14	N16	N15	N14	N14	N12	N10	N14	N13	N14	N15	N15	N15	NNW16	N15	N14	N13	N13	N9	N8	NNE7	NNE7	NNE7	NNE6	N12.2	NNW16
8-Mar	N5	NNE5	NE4	NE3	NNE2	NE4	NE3	ENE3	N5	N11	NNW12	NNW13	N13	N13	N12	NNE13	N13	N10	N7	NNE6	NE6	NE6	ENE3	SSE3	N6.6	N13
9-Mar	SE4	ESE4	SE4	SE4	SE4	ESE4	ESE4	SE4	NNW3	N7	N8	N7	NW6	NW7	N7	N8	N7	N6	NE5	E4	ENE6	ENE5	E5	E5	NE2.8	N8
10-Mar	E5	E5	E5	E5	ESE4	SE6	SSE5	SSE5	S3	WSW5	WNW5	NNW6	N8	N10	N10	N10	N9	NE7	NE6	E5	ESE8	SE8	SE9	SE9	ENE2.7	N10
11-Mar	SE9	SE8	SE9	SE9	SE9	SE10	SE10	SE10	SE8	S7	S7	S7	SSE7	SE7	ESE6	SE9	SE9	SE9	SE6	ESE7	ESE9	SE9	SE9	SE8	SE7.9	SE10
12-Mar	SSE9	SE10	SE8	SSE8	SSE9	SSE10	SSE10	SSE9	SSE10	S12	S12	SSE13	SSE13	SSE13	S14	SSE14	SSE15	SSE12	SE12	SE14	SE16	SSE21	SSE20	SSE18	SSE12.3	SSE21
13-Mar	SSE18	SSE17	SSE18	SSE18	SSE19	SSE19	SSE21	SSE19	SSE21	SSE23	SSE21	SSE23	S21	S20	S21	S20	S17	S16	S16	S16	S13	S13	S11	SSE12	SSE17.8	SSE23
14-Mar	SSE14	SSE14	SSE13	SSE13	S11	S9	S12	S12	S10	SSW12	SSW12	SW11	SW9	SSW7	SSW6	SW7	SW7	ENE3	ESE6	SE12	SE15	SE15	SE17	SSE19	S9.2	SSE19
15-Mar	SSE18	SSE16	SSE18	SSE14	SSE13	SSE14	S14	SSW13	SSW13	SW14	WSW18	SW16	SW16	SW18	WSW15	WNW13	NW15	NNW13	NNW7	NNE6	NE7	ENE7	ENE6	E6	SSW5.9	WSW18
16-Mar	ENE4	NNE5	NNE7	NNE7	NNE7	NNE9	NNE11	NE12	NE10	NE12	NNE13	NNE11	NNE11	NNE12	NNE12	NNE10	NE10	NE10	NE10	NE8	NE4	NE3	NE4	NNE8.8	NNE13	
17-Mar	ESE6	SE8	SE12	SE13	SSE11	SSE14	S9	SSE8	SSE10	SSE10	S7	SE8	SSE2	ENE2	N8	NNE6	NNE7	NNE7	NE6	NE7	NE8	NE7	NNE5	NE4	ESE4.1	SSE14
18-Mar	NE5	NNE3	ENE2	ESE3	SE8	SE10	SE11	SE10	SE13	SE14	SE13	SE13	SE14	SE15	SE14	SE15	SE15	SE12	SE11	SE11	SE8	SSE1	NNE1	NW5	SE8.6	SE15
19-Mar	W7	NW17	WNW16	WNW17	WNW14	WNW13	W12	WNW14	WNW15	WSW16	W16	W18	W17	W18	W18	WNW15	NW16	NW16	NW18	NW18	NW17	NNW17	N14	N16	WNW13.9	W18
20-Mar	NNW19	NNW19	NNW17	NNW15	NNW15	NNW13	NNW11	N9	N10	N10	NW7	NW7	NNW6	NW6	NNW8	N1	S5	SSE6	SSE5	SE8	SSE10	SSE13	SSE15	SSE15	NNW4.0	NNW19
21-Mar	SSE16	SSE15	SSE11	SSE11	SSE11	SSE11	S12	S11	S12	S12	S14	S15	S16	S14	S15	SSE16	SSE17	SSE16	SSE16	SE19	SE21	SSE21	SSE19	SSE18	SSE14.6	SE21
22-Mar	SSE18	SSE18	SE17	SE16	SE15	SSE12	SE13	SE11	SE12	SSE9	SE7	SE8	SE8	ESE4	NNW3	WNW7	WNW6	NW4	NNE5	NNW4	N9	N12	NNW13	NNW12	SE4.2	SSE18
23-Mar	N12	N11	N9	N10	N9	N8	NNE7	NNE8	NE8	NE6	NNE7	NNE7	NNW9	NNW12	N12	N11	NNW9	NNW7	WNW3	AF	SSW7	SSE8	SSE11	SSE11	N5.2	NNW12
24-Mar	SSE12	SSE11	SSE10	SSE9	SSE7	SSE8	SSE8	SSE9	SSE10	SSE9	SSE8	S8	S10	SSE12	SSE13	SSE12	SSE14	SSE13	SE14	SE16	SE17	SE18	SE17	SE16	SSE11.4	SE18
25-Mar	SE15	SE14	SE12	SE8	SE9	SE11	SE12	SE12	SE12	SE12	SSE11	SSE8	SSE6	SSW4	SW4	W3	NW4	NNE4	AF	ESE2	ESE5	SE5	SE6	SE5	SE6.8	SE15
26-Mar	SE5	SE5	SE6	SE7	SE9	SE10	SE12	SE12	SSE8	SE9	SSE13	S10	S8	W4	WNW6	SW2	SSE4	SE7	S6	SSE5	ESE4	SE7	SE9	SE8	SSE6.3	SSE13
27-Mar	SE9	SE7	SSE8	SSE8	SSE7	SSE7	SSE7	SE8	SSE6	S5	SW8	S6	S6	S9	S11	S9	SSE10	SE10	SE11	SE13	SE13	SE16	SSE16	SSE15	SSE8.8	SSE16
28-Mar	SSE14	SSE12	SSE12	SSE12	SSE11	SSE12	SSE12	SSE12	SSE11	SSE12	S12	SSW10	S11	S10	S9	S9	S9	SSE8	SE8	SE9	SE13	SE14	SE13	SSE13	SSE10.7	SE14
29-Mar	SSE11	SSE9	SSE10	SSE9	SSE9	SSE9	SSE9	SSE10	S11	S10	SSE11	SSE10	SSE9	S7	SSE5	SSE7	SE11	SE9	SE10	SE9	SE12	SE12	SE11	SE10	SSE9.2	SE12
30-Mar	SE10	SE9	SE7	SE8	SE8	SE7	NNW2	N2	SE5	SE6	SE4	ESE2	S1	N2	W2	NNW5	NNW6	WNW4	N2	N4	ENE2	SE4	SE5	SSE5	SE2.4	SE10
31-Mar	SSE6	S6	S6	S5	S6	SSE9	SSE10	S9	S10	S12	SSW12	SSW14	SSW12	SSW15	SSW14	S13	SSW12	SSW10	S9	S10	SSW10	SSW11	S10	SSW11	S9.8	SSW15

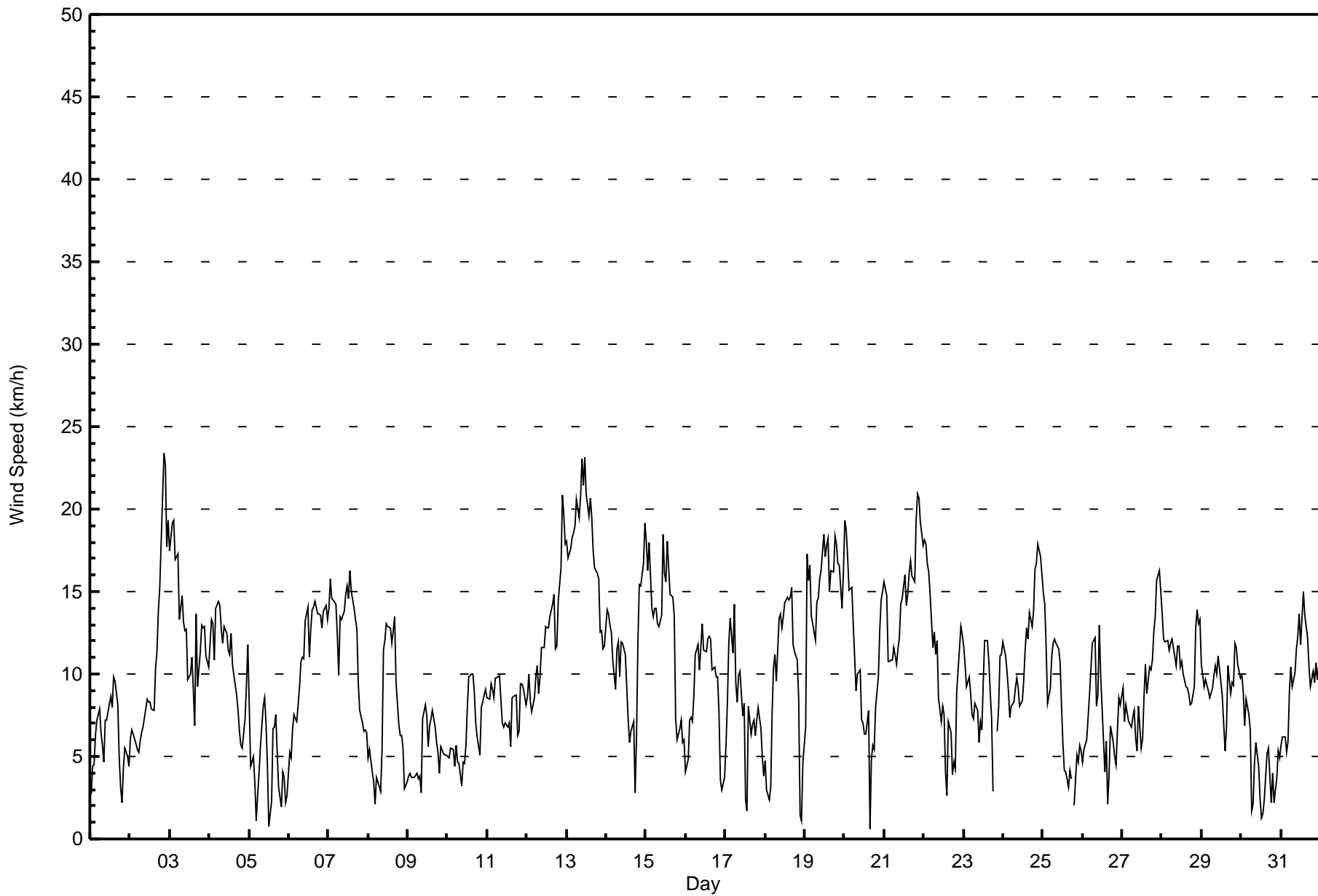
SE5.3 SE4.7 SE4.7 SE4.5 SE4.5 SE5.1 SE4.9 SE4.6 SSE4.5 SSE4.1 S3.4 S2.9 SSW2.4 SW1.7 WSW1.2 NNE0.3 NE0.4 E1.6 E3.0 ESE4.4 ESE5.2 SE5.6 SE5.7 SE5.6	Diurnal Average
NNW19 SSE19 SSE19 SSE18 SSE19 SSE19 SSE21 SSE19 SSE21 SSE23 SSE21 SSE23 S21 S20 S21 S20 S17 S16 NW18 SE19 SSE23 SSE23 SSE20 SSE19	Diurnal 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
Wapasu - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Wapasu - March 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	127	17.12	17.12
6 - 11	341	45.96	63.07
12 - 19	259	34.91	97.98
20 - 28	15	2.02	100.00
29 - 38	0	0.00	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
Wapasu - March 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	7	14	10	9	10	19	17	15	6	1	2	1	3	3	5	5	127
6 - 11	44	34	17	6	4	11	75	71	38	12	5	2	1	3	9	9	341
12 - 19	51	6	2	0	1	0	48	73	25	10	4	4	5	8	7	15	259
20 - 28	0	0	0	0	0	0	1	10	4	0	0	0	0	0	0	0	15
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	102	54	29	15	15	30	141	169	73	23	11	7	9	14	21	29	742

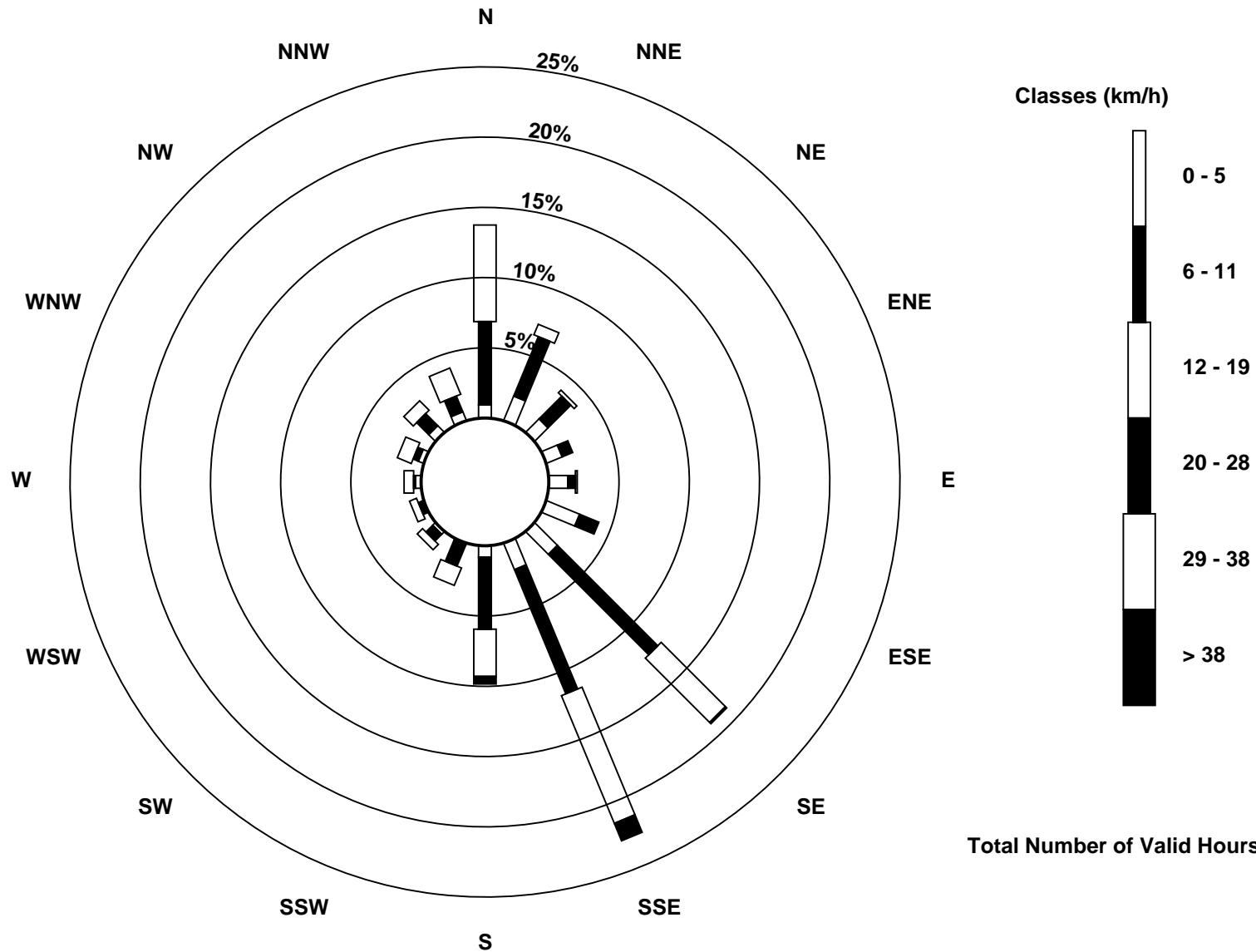
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Wind Speed (WS) - km/h
Wapasu (AMS 17)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Wapasu - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Mar 13 12:00																	Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7								
Minimum Value: 0 km/h on Mar 8 08:00																									
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-Mar	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	2	2	1	2	1	1	1	1	3
2-Mar	1	1	1	1	1	1	1	1	2	3	3	3	3	3	3	3	3	4	4	5	6	7	7	5	7
3-Mar	5	5	5	5	5	5	5	4	4	4	4	3	3	4	3	2	4	4	3	4	4	4	3	3	5
4-Mar	3	4	4	3	4	4	4	4	4	4	4	4	3	4	4	3	3	3	2	2	2	2	2	3	4
5-Mar	4	2	2	1	1	1	1	2	2	2	3	2	1	2	2	2	2	2	1	1	1	1	1	2	4
6-Mar	1	1	2	3	3	2	3	4	4	3	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4
7-Mar	4	5	4	4	4	4	4	4	4	4	5	4	4	4	4	4	4	4	3	2	2	2	2	2	5
8-Mar	1	1	1	1	2	1	1	0	3	3	3	3	4	4	4	4	4	4	2	2	1	1	1	1	4
9-Mar	0	1	1	0	0	1	0	1	2	2	3	3	3	3	3	3	3	2	1	1	1	1	1	1	3
10-Mar	1	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	2	2	1	2	2	2	2	3
11-Mar	2	1	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	2	1	1	2	2	2	1	3
12-Mar	2	2	2	2	3	2	2	2	3	4	4	4	4	4	4	5	5	4	3	4	5	6	6	6	6
13-Mar	5	5	5	6	5	6	6	6	7	7	7	8	7	7	7	7	6	5	5	5	4	4	4	4	8
14-Mar	3	4	4	4	4	3	3	4	3	4	4	3	3	2	2	3	4	1	2	3	4	4	4	5	5
15-Mar	5	5	6	4	4	4	4	4	4	5	5	4	4	4	5	4	4	4	2	2	1	2	1	1	6
16-Mar	1	2	2	2	2	3	4	4	4	4	5	4	4	4	4	4	4	4	3	3	2	2	1	2	5
17-Mar	3	3	3	4	4	4	5	3	4	3	3	3	2	2	2	2	2	2	2	2	2	2	1	1	5
18-Mar	1	2	1	2	2	3	3	3	4	5	4	4	5	4	4	4	5	4	3	3	5	2	1	1	5
19-Mar	3	5	5	6	5	5	4	5	4	4	5	5	6	6	6	5	5	5	6	6	6	5	4	5	6
20-Mar	5	5	4	4	4	3	2	3	3	3	3	3	3	3	3	3	2	2	1	2	2	3	3	4	5
21-Mar	4	4	3	3	3	3	3	3	3	4	5	5	5	4	5	5	5	5	4	6	6	6	5	5	6
22-Mar	5	5	5	4	5	3	3	3	3	3	2	3	2	2	2	2	2	2	2	1	4	3	3	3	5
23-Mar	3	3	3	3	3	3	2	2	3	2	3	3	3	3	3	3	2	2	2	AF	2	3	3	3	3
24-Mar	3	3	3	3	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4	4	4	5	5	4	5
25-Mar	4	4	3	3	3	3	3	3	3	4	3	3	2	2	1	1	1	1	AF	1	1	1	1	1	4
26-Mar	1	1	1	1	2	2	3	3	3	3	4	3	3	3	2	2	1	2	2	2	1	1	2	2	4
27-Mar	2	2	2	2	2	1	2	2	2	2	2	2	2	3	4	3	3	3	3	3	3	4	4	4	4
28-Mar	4	3	4	3	3	3	3	4	3	4	4	4	3	3	4	3	3	3	2	2	3	3	3	3	4
29-Mar	3	2	2	2	2	2	2	3	3	4	3	4	3	3	3	3	3	3	3	2	3	3	3	2	4
30-Mar	3	2	2	2	2	2	1	1	2	2	2	1	2	2	2	1	2	2	2	1	1	1	1	1	3
31-Mar	1	2	2	2	2	3	3	3	3	3	4	4	4	5	6	4	4	3	3	3	4	4	3	3	6
																	Diurnal Maximum								
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Summary of Hour Averages

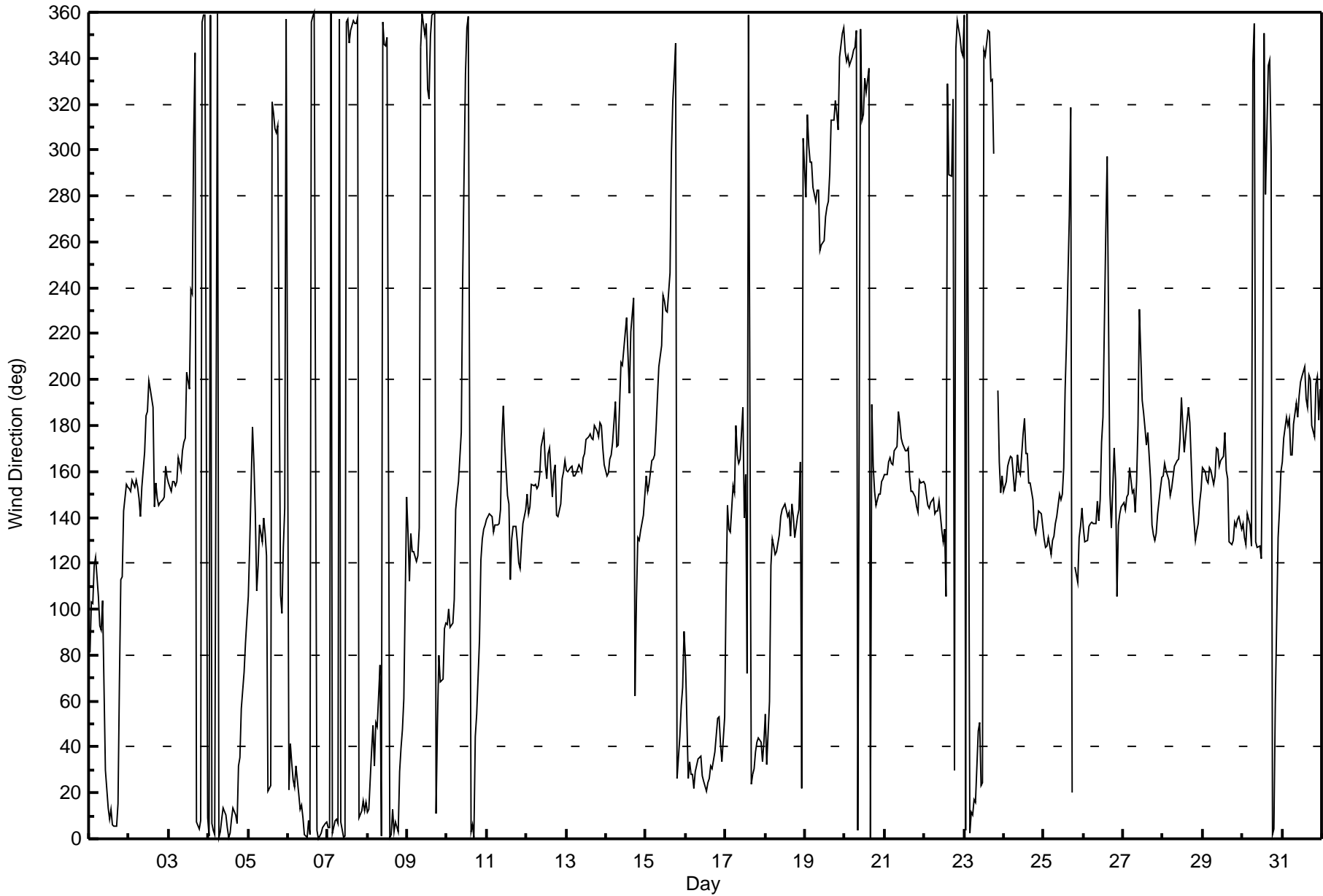
Wind Direction (WD) - deg
Wapasu - March 2017

Direction of Maximum Speed: 148 deg on Mar 2 21:00 Direction of Maximum Daily Speed Average: 167.7 deg on Mar 13	Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2
Direction of Minimum Speed: 1 deg on Mar 20 16:00 Direction of Minimum Daily Speed Average: 1.6 deg on Mar 5	Percent Operational Time: 99.7
Monthly Average Direction: 159.3 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-Mar	81	103	103	119	123	106	93	91	104	66	30	14	8	13	6	5	6	15	68	113	114	143	154	153	64.7
2-Mar	153	151	156	153	156	153	148	140	153	169	184	186	200	196	188	145	155	148	146	146	148	149	162	157	157.6
3-Mar	155	152	156	155	154	156	166	161	169	172	174	203	196	239	238	306	342	8	4	8	355	359	359	9	162.0
4-Mar	1	359	7	4	2	360	1	3	9	13	11	5	0	2	9	14	10	7	32	35	57	73	85	96	14.3
5-Mar	105	128	179	163	142	108	119	137	129	140	133	123	21	23	321	316	309	307	311	106	98	127	144	357	119.8
6-Mar	21	41	33	26	23	32	20	13	14	9	2	1	8	2	356	358	360	3	0	1	2	5	7	7	7.7
7-Mar	5	5	360	3	8	8	7	357	7	1	1	356	357	347	352	356	355	355	357	9	12	17	12	16	1.2
8-Mar	11	13	38	49	32	51	49	76	1	356	346	345	349	1	2	13	3	8	3	29	40	48	61	149	10.5
9-Mar	133	112	133	125	125	121	123	135	344	359	350	355	326	322	350	359	360	11	51	80	68	70	92	94	38.8
10-Mar	94	100	92	94	104	144	150	156	177	244	290	333	353	358	3	6	1	45	54	86	122	130	135	137	73.1
11-Mar	139	141	141	141	134	136	137	137	143	174	189	171	150	146	113	131	136	136	129	120	118	129	138	144	139.7
12-Mar	150	142	145	154	154	155	152	154	158	171	177	163	157	168	170	149	159	163	141	141	146	157	160	165	156.7
13-Mar	160	160	161	162	158	158	159	163	162	160	166	168	174	175	176	174	174	180	178	175	181	180	170	163	167.7
14-Mar	158	160	165	167	173	190	171	172	189	208	206	220	227	210	194	221	236	62	104	131	130	134	141	150	170.1
15-Mar	158	152	154	165	165	167	178	192	206	215	237	234	230	229	246	299	322	333	347	26	44	58	66	90	203.2
16-Mar	78	26	33	28	28	22	29	35	36	36	27	25	21	24	27	32	30	38	45	52	53	41	34	53	33.5
17-Mar	108	145	135	134	154	151	180	167	164	165	188	139	159	72	359	24	28	30	38	42	44	42	33	42	118.1
18-Mar	54	32	60	119	130	128	124	125	133	140	144	145	146	141	142	132	146	140	131	141	143	164	22	305	134.8
19-Mar	279	316	302	295	295	284	278	283	283	256	259	261	271	275	278	290	313	313	321	316	309	341	351	353	296.7
20-Mar	343	339	341	337	341	344	344	352	4	353	313	315	331	325	335	1	189	162	151	145	150	150	156	157	344.1
21-Mar	159	159	164	166	164	163	169	171	186	181	175	172	169	169	171	158	151	151	149	145	142	156	155	155	160.9
22-Mar	155	150	145	144	146	148	142	143	143	147	134	129	135	105	329	289	289	322	30	344	357	349	343	341	134.7
23-Mar	359	4	360	2	11	11	17	16	47	51	23	25	344	341	352	351	330	331	298	AF	195	164	151	158	6.7
24-Mar	151	155	162	165	167	166	151	158	167	161	159	176	183	168	168	155	155	148	135	133	137	143	142	136	153.1
25-Mar	131	127	127	131	124	130	132	137	140	150	147	150	162	196	217	272	319	20	AF	119	112	131	136	144	137.7
26-Mar	136	129	130	136	137	138	137	137	147	139	148	173	184	263	297	225	150	136	170	156	105	137	141	145	147.2
27-Mar	146	144	149	150	162	151	152	142	155	180	231	191	185	179	172	177	156	137	133	130	133	141	152	157	154.7
28-Mar	158	164	161	156	150	153	157	162	164	166	174	192	180	169	182	188	181	164	146	130	134	137	146	152	160.1
29-Mar	161	160	156	155	162	160	155	158	170	170	163	165	167	177	161	157	130	128	130	138	136	139	140	135	152.3
30-Mar	137	131	128	141	137	128	338	355	129	127	127	122	189	351	281	337	339	300	2	4	59	131	143	160	123.8
31-Mar	164	175	183	180	183	167	167	180	190	183	193	199	202	206	192	188	202	200	180	175	198	202	183	196	188.9

134.5 132.3 136.2 139.2 138.4 139.1 140.9 142.6 149.4 158.8 178.1 184.8 196.7 221.2 252.5 12.6 34.7 84.7 100.3 112.3 118.7 127.7 133.3 137.1
 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
Wapasu - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																			Hours in Service: 744						
Maximum Value: 105 deg on Mar 20 16:00																			Hours of Data: 742						
Minimum Value: 5 deg on Mar 10 03:00																			Hours of Missing Data: 2						
Percentiles: P ₁ = 8 P ₁₀ = 16 Q ₁ = 19 Median = 25 Q ₃ = 29 P ₉₀ = 37 P ₉₉ = 73																			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-Mar	22	14	14	14	13	14	22	11	16	32	38	35	31	34	27	26	25	24	14	47	25	13	5	8	47
2-Mar	8	6	11	13	14	15	10	10	19	31	33	38	41	40	32	30	23	19	20	19	19	20	27	20	41
3-Mar	21	18	20	23	20	19	29	23	26	29	27	27	29	30	21	35	22	29	27	29	23	23	24	24	35
4-Mar	24	25	27	26	26	24	25	25	30	31	29	26	26	26	30	29	30	27	25	23	25	21	22	22	31
5-Mar	19	47	30	29	58	19	16	21	20	22	23	44	101	90	34	34	25	25	26	69	18	17	15	65	101
6-Mar	27	23	26	28	31	28	27	28	30	27	27	24	26	25	23	24	25	28	25	25	26	27	27	26	31
7-Mar	27	27	26	27	27	27	30	21	28	26	27	23	25	20	22	25	23	23	25	30	31	29	27	25	31
8-Mar	20	18	18	26	58	14	23	10	40	24	28	24	30	28	33	29	27	30	27	22	21	13	24	11	58
9-Mar	13	22	19	11	6	12	15	15	65	25	34	49	61	46	41	36	35	28	15	30	14	8	13	8	65
10-Mar	7	16	5	11	22	6	17	18	40	38	68	50	32	30	25	26	24	25	19	14	14	14	14	13	68
11-Mar	13	13	15	15	15	14	14	16	22	34	40	38	44	44	69	34	27	19	13	10	15	15	13	13	69
12-Mar	14	16	16	20	16	15	14	17	23	30	31	30	27	29	32	26	24	25	17	18	19	20	23	25	32
13-Mar	21	22	23	23	21	21	22	24	22	22	25	26	28	29	27	27	30	30	27	28	27	28	26	23	30
14-Mar	20	20	23	23	31	35	23	26	29	26	28	26	33	33	45	36	32	67	21	16	17	18	18	19	67
15-Mar	21	19	20	26	24	24	27	30	27	27	18	17	18	17	33	27	23	17	24	24	15	19	23	19	33
16-Mar	29	37	29	28	27	30	29	29	29	30	32	32	35	35	35	31	32	27	22	24	24	29	47	52	52
17-Mar	39	31	19	19	28	19	41	27	27	26	31	26	70	65	24	31	27	27	25	23	24	25	26	23	70
18-Mar	16	43	25	47	14	19	18	20	20	23	24	23	22	23	24	22	21	20	20	27	38	62	69	29	69
19-Mar	30	23	27	27	27	28	25	26	29	26	27	25	31	30	29	32	24	24	22	23	25	24	21	22	32
20-Mar	17	17	18	17	18	17	16	22	27	30	49	46	56	55	38	105	48	32	14	11	17	17	18	19	105
21-Mar	22	20	23	21	21	21	22	23	27	30	30	29	28	31	30	26	22	21	21	20	19	20	20	20	31
22-Mar	19	19	19	18	21	21	18	19	20	24	29	32	31	47	74	28	34	55	34	23	26	18	17	16	74
23-Mar	25	27	23	25	29	29	29	29	33	53	41	52	36	24	22	20	26	20	63	AF	31	25	20	21	63
24-Mar	20	21	22	23	24	21	18	22	27	32	40	34	32	29	28	24	22	20	20	19	18	18	18	18	40
25-Mar	20	20	20	22	20	19	18	20	21	21	20	26	34	36	29	54	30	29	AF	15	13	17	16	18	54
26-Mar	24	13	16	14	17	18	17	17	48	23	22	29	34	63	33	59	24	31	25	41	10	13	12	14	63
27-Mar	16	14	16	16	19	16	17	17	21	33	29	37	39	35	31	30	25	23	18	18	18	19	20	21	39
28-Mar	20	23	22	19	18	19	21	23	27	24	30	30	31	31	36	34	32	26	16	16	17	18	17	18	36
29-Mar	22	20	19	20	22	20	17	19	27	30	26	30	37	41	48	49	26	20	18	17	18	18	17	17	49
30-Mar	19	17	18	19	19	21	65	47	27	22	33	75	55	82	74	32	27	62	56	32	25	23	15	18	82
31-Mar	18	23	27	26	26	25	25	29	32	30	32	29	31	29	33	32	29	29	28	28	29	30	30	29	33
39 47 30 47 58 35 65 47 65 53 68 75 101 90 74 105 48 67 63 69 38 62 69 65																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	March 9, 2017	Last Calibration	February 21, 2017
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	8:00	End Time (MST)	12:05
Gas Cert Reference	SA130010A	Station temp.	22 Deg C
Cal Gas Concentration	47.8 ppm	Cal Gas Exp Date	December 12, 2016
Calibrator Make/Model	API T700	Serial Number	997
ZAG Make/Model	API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-653	-653
Analyzer IP address	192.168.1.43		Lamp voltage	1003	1003
Calculated slope	0.997701	0.996053	Chamber temp	45.0	45.0
Calculated intercept	1.655314	-0.048322	Pressure	707.8	707.8
Analyzer Background	9.2	8.9	Flow	0.463	0.463
Analyzer Coefficient	1.047	1.035	Intensity	92	92

Analyzer make Thermo 43i Analyzer serial # 1218153459

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	60.5	578.4	572.5	1.010
calibrator zero	5000	0.0	0.0	0.1	----
high point	5019	80.4	765.7	768.9	0.996
second point	5058	40.2	379.9	381.2	0.997
third point	5077	20.0	188.3	189.2	0.995
as left zero	5000	0.0	0.0	0.4	----
as left span	5019	80.4	765.7	770.9	0.993
Average Correction Factor					0.996

Corrected As found 572.4 Previous response 578.1 % change 1.0%

Notes:

span adjusted, no maintenance done, filter changed out, calibration points changed to 765.7,379.9,188.3ppb

Calibration Performed By: Melissa Lemay



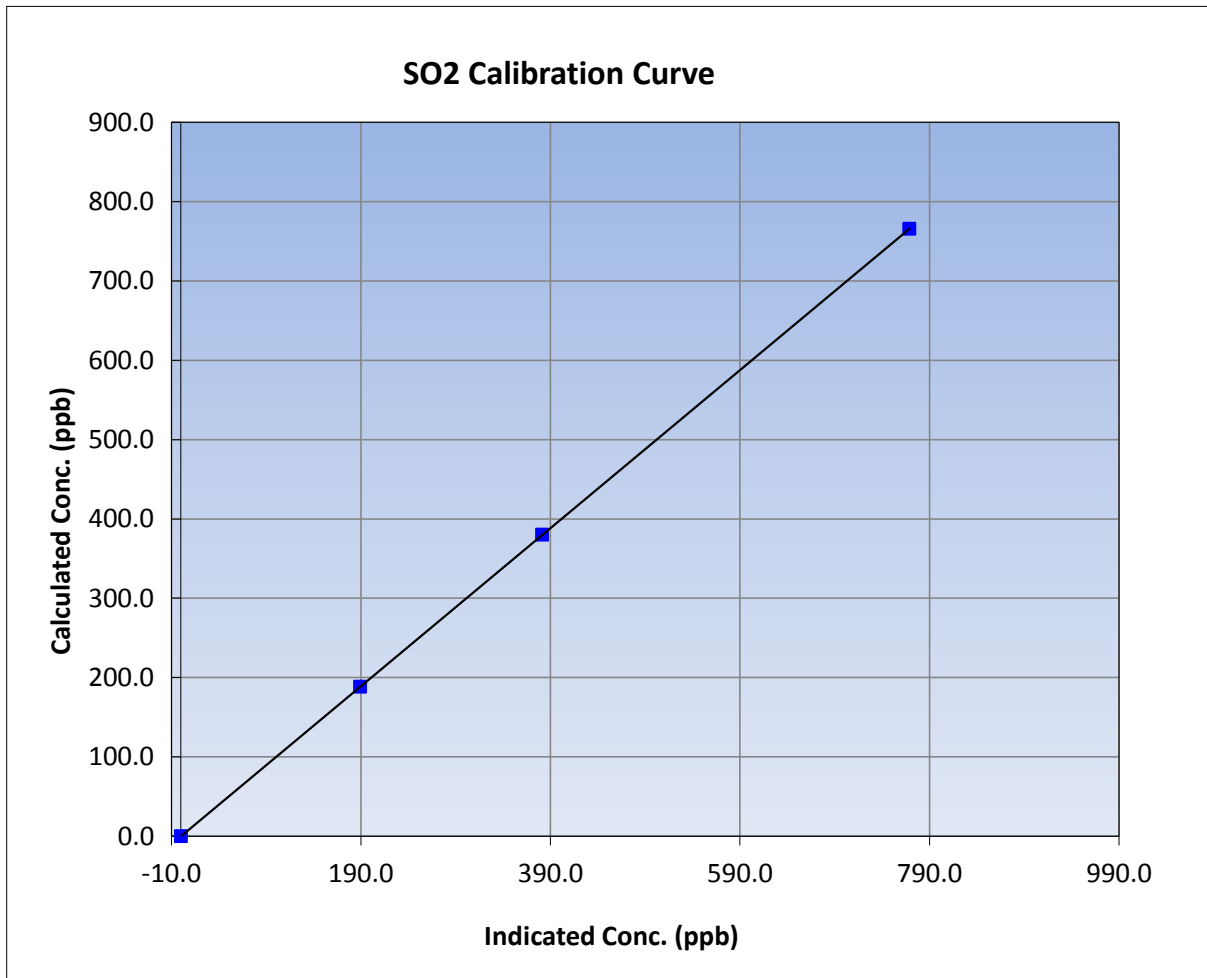
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 9, 2017	Previous Calibration	February 21, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	8:00	End Time (MST)	12:05
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

Calibration Data

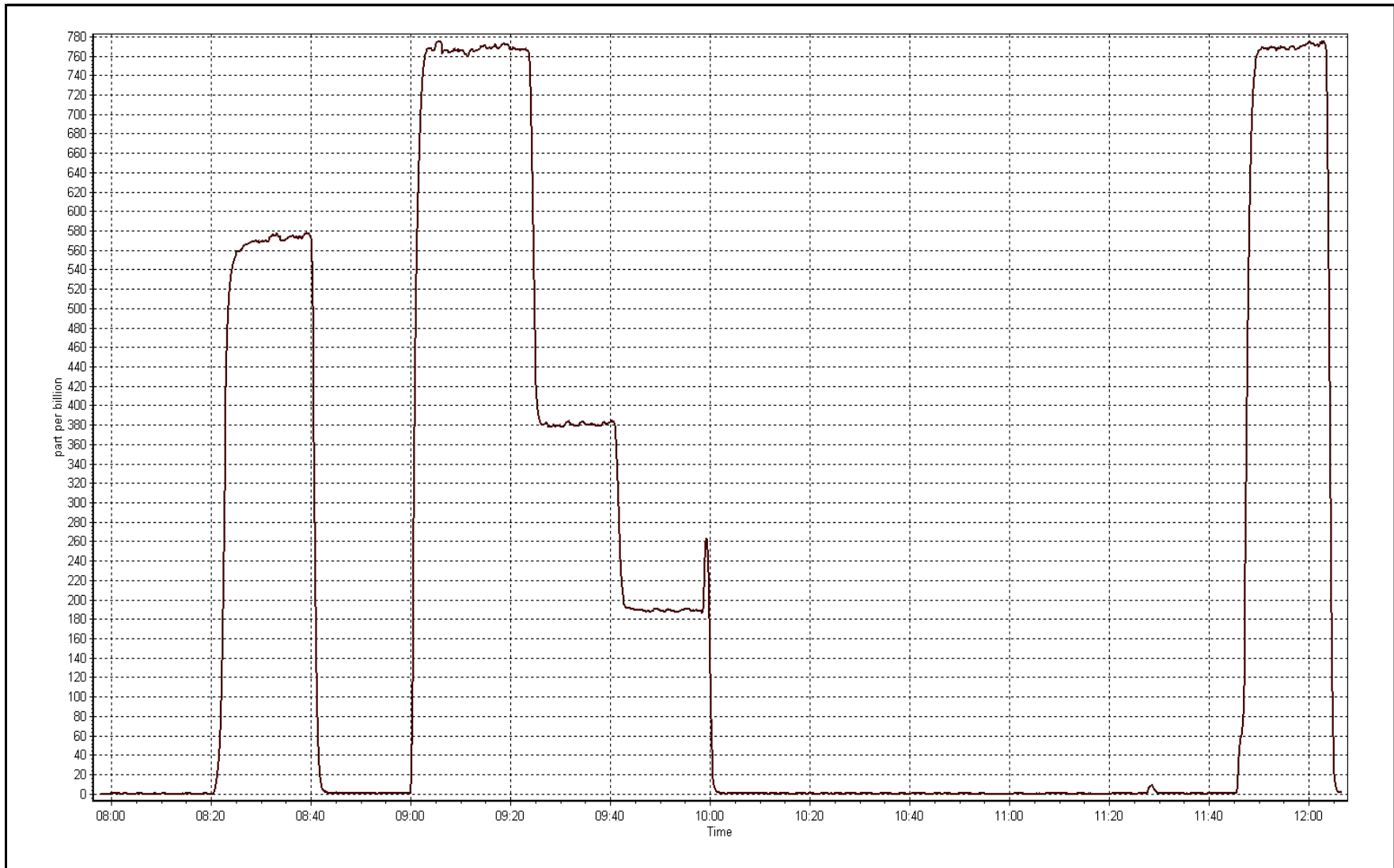
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	1.000000
765.7	768.9	0.9959		
379.9	381.2	0.9966	Slope	0.996053
188.3	189.2	0.9952		
			Intercept	-0.048322



SO2 Calibration Plot

Date:

March 9, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	March 10, 2017	Last Calibration	February 22, 2017
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	12:51
Gas Cert Reference	CC107167	Station temp.	21 Deg C
Cal Gas Concentration	5.1 ppm	Cal Gas Exp Date	September-09-17
Calibrator Make/Model	API T700	Serial Number	997
ZAG air Make/Model	API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	2633
SO2 gas concentration	47.8 ppm	SO2 gas cert/exp	SA130010A December-12-16

Analyzer Information

	Before	After		Before	Before
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-675	-675
Analyzer IP address	192.168.1.45		Lamp voltage	763	760
Calculated slope	1.000203	1.005163	Chamber temp	45	45
Calculated intercept	-0.208027	-0.496820	Pressure	564.2	536.9
Analyzer Background	15	15	Flow	0.985	0.970
Analyzer Coefficient	1.055	1.055	Intensity	100	100
			Converter temp.	339	339

Analyzer make/model	Thermo 450i	Analyzer serial #	1218153583
Converter make/model	na	Converter serial #	na

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5018	78.2	79.5	79.4	1.001
SO2 scrubber check	5081	14.8	139.2	2.2	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5019	78.3	79.6	79.4	1.002
second point	5000	39.2	40.0	40.6	0.985
third point	5000	19.6	20.0	20.7	0.966
as left zero	5019	0.0	0.0	0.2	----
as left span	5000	78.3	79.9	80.7	0.990
Average Correction Factor					0.984

Corrected As found	79.3	Previous response	79.7	% change	0.5%
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Notes:

filter changed out, no maintenance or adjustments done

Calibration Performed By: Melissa Lemay



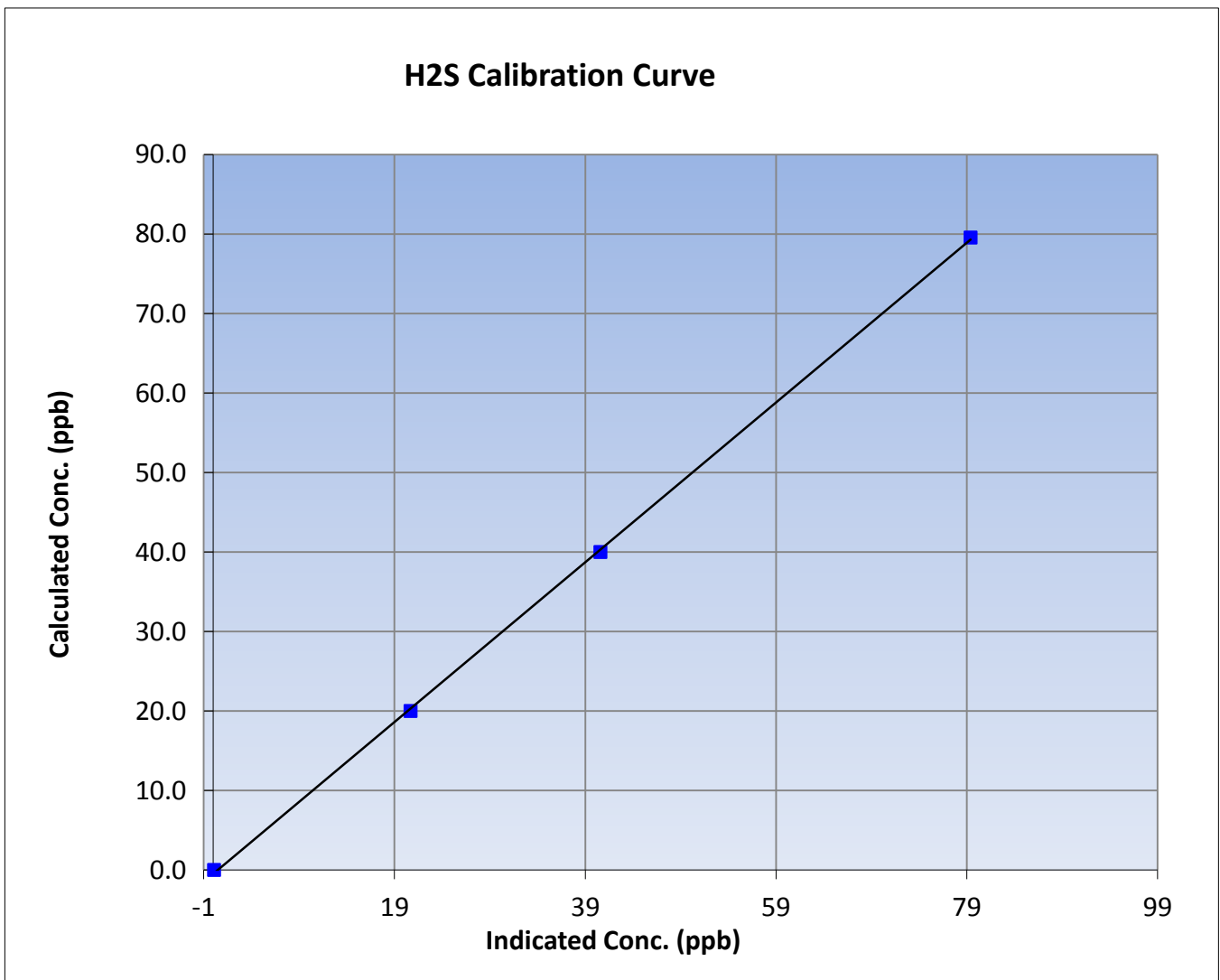
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	March 10, 2017	Previous Calibration	February 22, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:15	End Time (MST)	12:51
Analyzer make	Thermo 450i	Analyzer serial #	1218153583

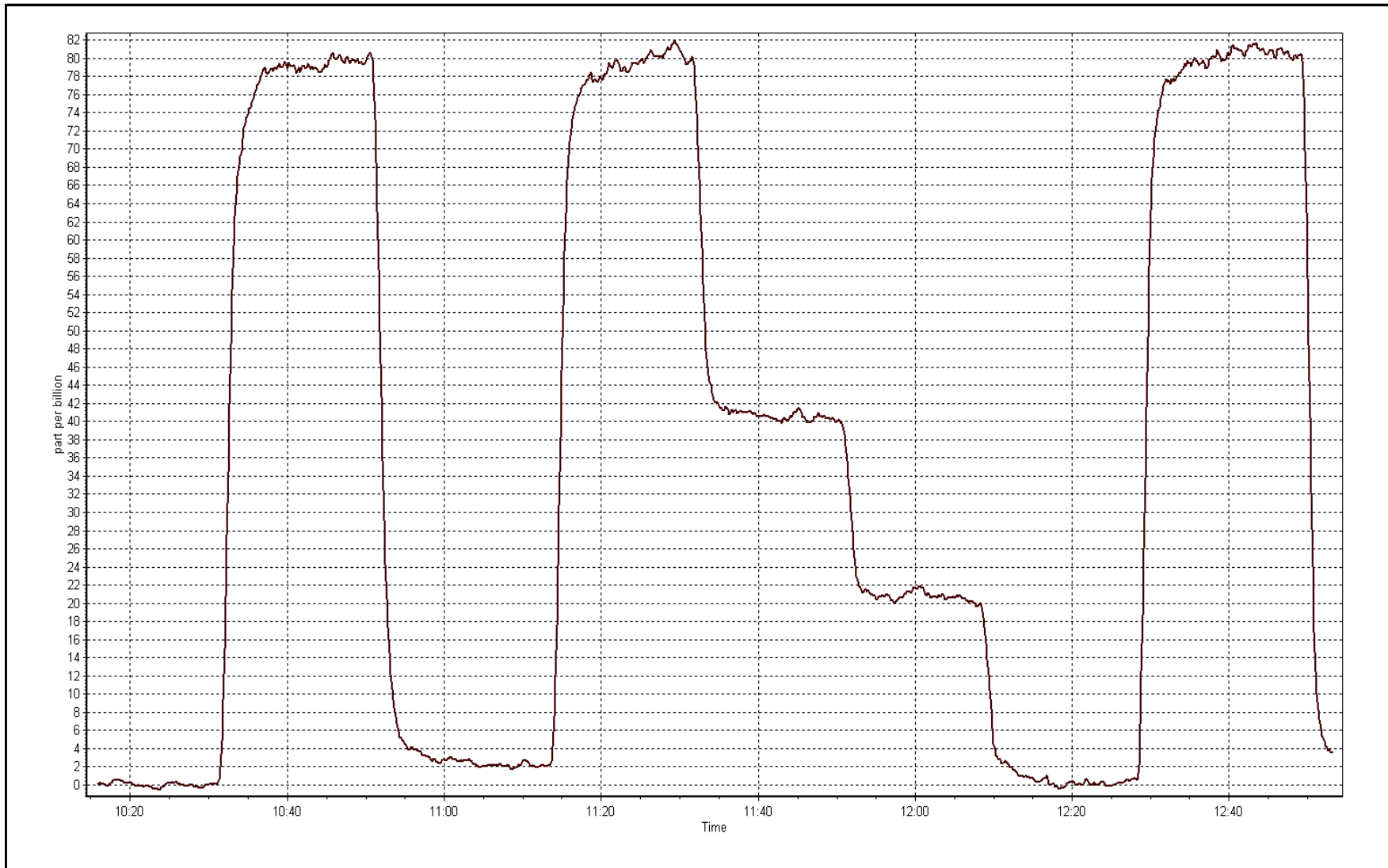
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999876
79.6	79.4	1.0021		
40.0	40.6	0.9848	Slope	1.005163
20.0	20.7	0.9658		
			Intercept	-0.496820



H2S Calibration Plot

Date: March 10, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	March 9, 2017	Last Calibration	February 21, 2017
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	8:00	End Time (MST)	12:05
Gas Cert Reference	SA130010A	Cal Gas Expiry Date	December 12, 2016
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	997
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	40.8	40.8
Calculated slope	1.004004	0.999712	Fuel Pressure	24.8	24.8
Calculated intercept	-0.019681	-0.030142	Analyzer Coeff	4.500	4.414
			Analyzer BKG	3.010	3.150

Analyzer make Thermo 51i-LT Analyzer serial # 1218153352

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.11	----
as found span	5000	60.5	13.22	13.54	0.976
calibrator zero	5000	0.0	0.00	0.01	----
high point	5019	80.4	17.50	17.52	0.999
second point	5058	40.2	8.68	8.73	0.994
third point	5077	20.0	4.30	4.35	0.989
as left zero	5000	0.0	0.00	-0.06	----
as left span	5019	80.4	17.50	17.46	1.002
Average Correction Factor					0.994

Corrected As found 13.43 Previous response 13.18 % change -1.8%

Notes:

Inlet filter changed after as founds. Adjusted zero and span adjusted, no maintenance done, Calibration points changed to 17.5,8.68,4.3ppm

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association THC Calibration Report

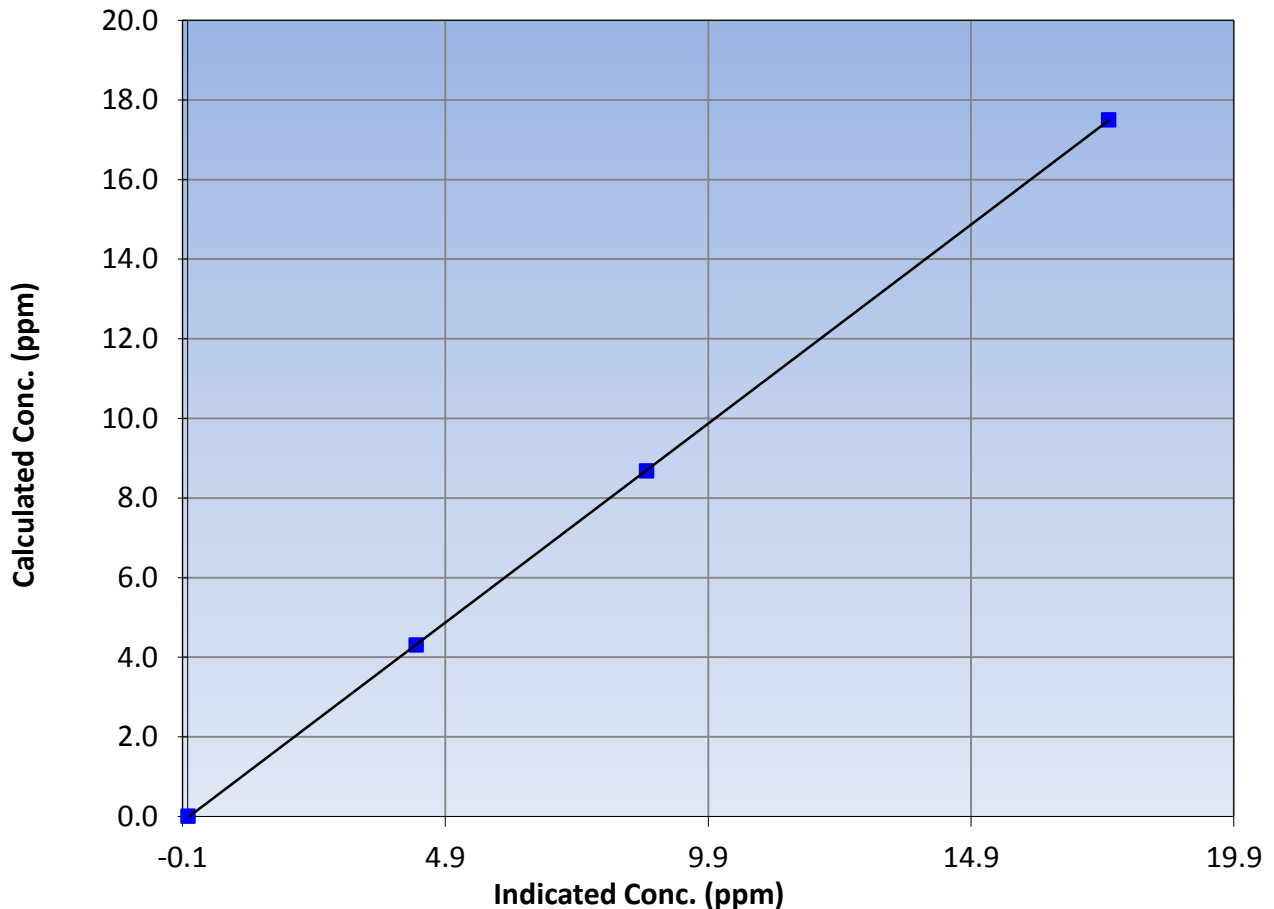
Station Information

Calibration Date	March 9, 2017	Previous Calibration	February 21, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	8:00	End Time (MST)	14:10
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

Calibration Data

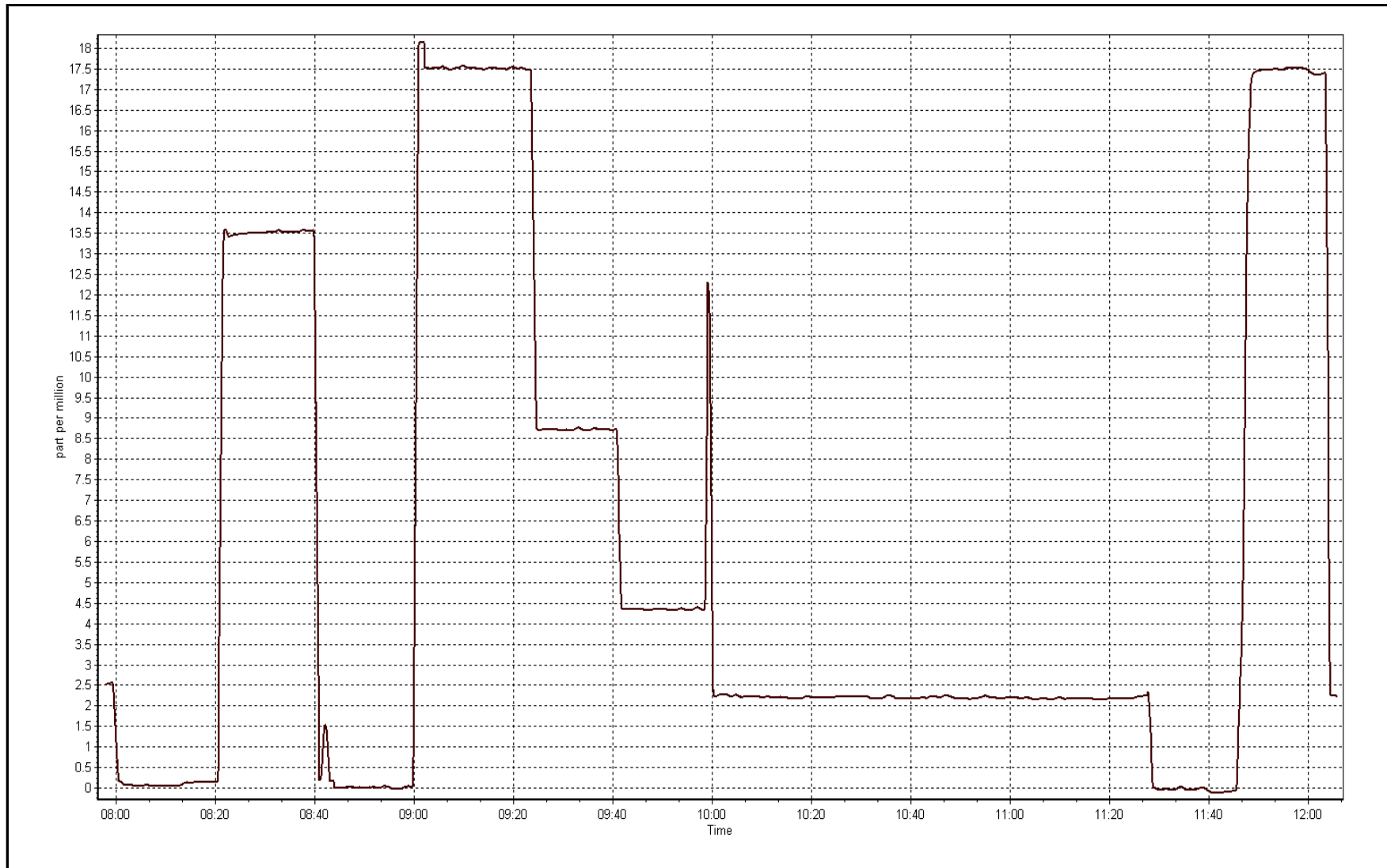
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999994
17.50	17.52	0.9987		
8.68	8.73	0.9944	Slope	0.999712
4.30	4.35	0.9891		
			Intercept	-0.030142

THC Calibration Curve



THC Calibration Plot

Date: March 9, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 10, 2017	Previous Calibration	February 22, 2017
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:55	End Time (MST)	10:17
NO2 GPT Ref date	March 9, 2017	Transfer Standard	GPT
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	997
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	26.1	26.1
Analyzer IP address	192.168.1.72		Lamp temp.	58.0	58.0
Calculated slope	0.994368	0.998934	Pressure	26.9	26.9
Calculated intercept	-0.134295	0.960094	Flow cell A	733	733
Analyzer Background	6.327	7.132	Flow cell B	746	746
Analyzer Coefficient	0.992	0.979	O3 measure	4520.2	4520.2
			O3 reference	4520.2	4520.2

Analyzer make	Teledyne T400	Analyzer serial #	824
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	197.7/800	0.0	0.7	----
as found span	5000	713.2/1079.8	362.8	368.3	0.985
calibrator zero	5000	197.7/800	0.0	-0.1	----
high point	5000	713.2/1079.8	362.8	362.4	1.001
second point	5000	494.7/971.3	244.4	244.3	1.000
third point	5000	260.9/844.3	127.6	125.1	1.020
as left zero	5000	197.7/800	0.0	-1.0	----
as left span	5000	713.2/1079.8	362.8	362.3	1.001
Average Correction Factor					1.007

Corrected As found	367.6	Previous response	365.0	% change	-0.7%
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Notes:

Inlet filter changed after as founds. Zero and span adjusted no maintenance done

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association O3 Calibration Report

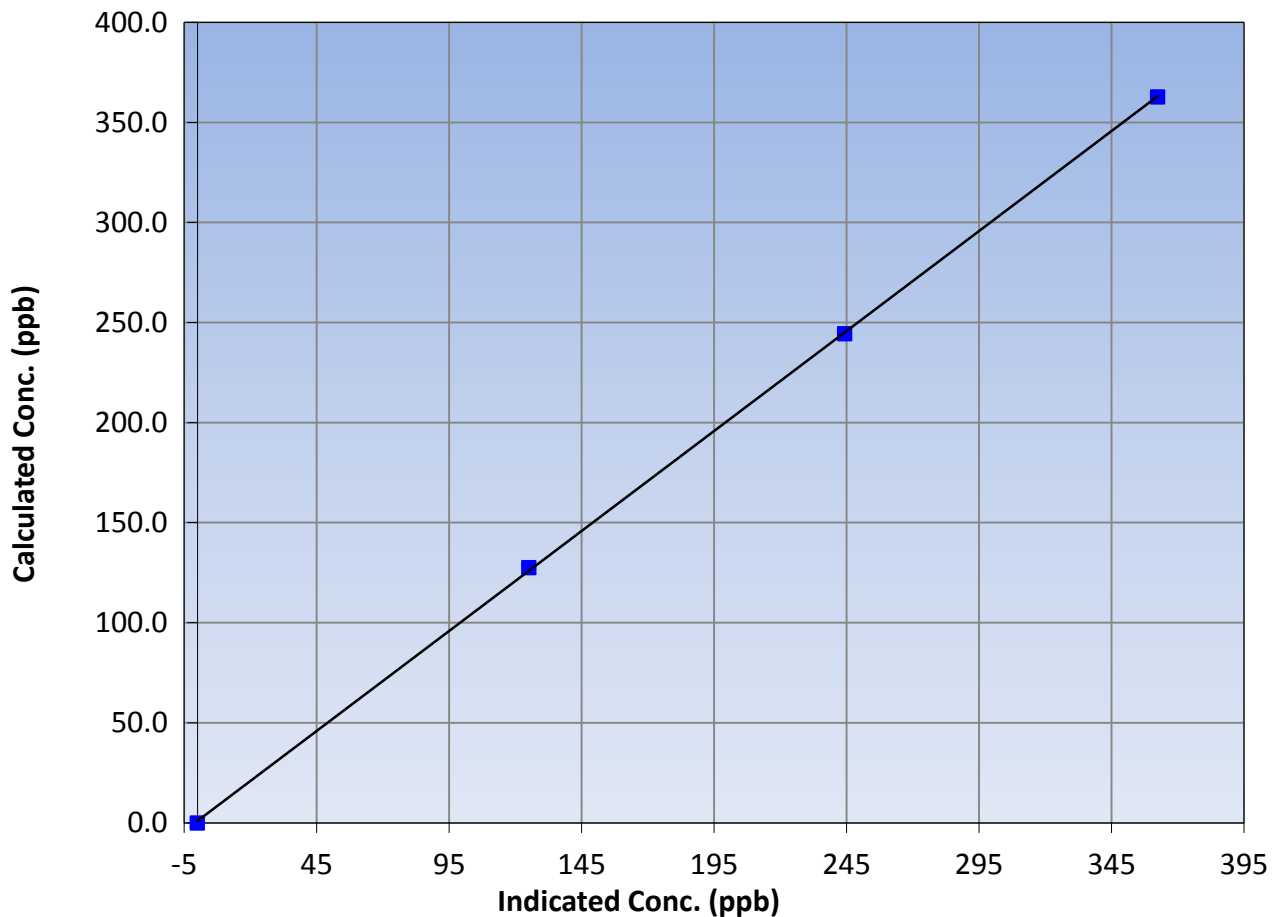
Station Information

Calibration Date	March 10, 2017	Previous Calibration	February 22, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:55	End Time (MST)	10:17
Analyzer make	Teledyne T400	Analyzer serial #	824

Calibration Data

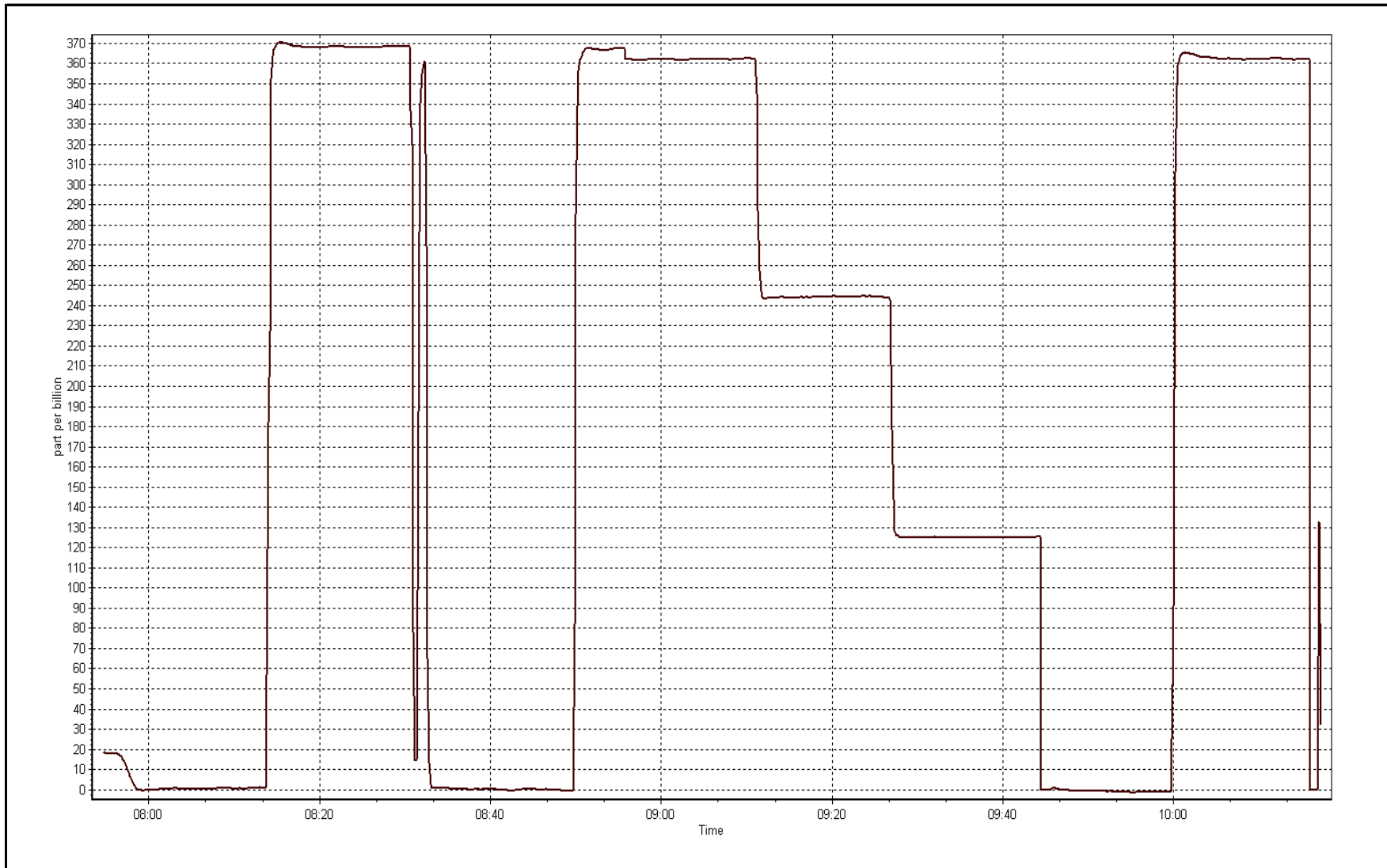
Calculated concentration (ppb) (Cc)	3/9/2017	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999945
362.8	362.4	1.0011		
244.4	244.3	1.0004	Slope	0.998934
127.6	125.1	1.0200		
			Intercept	0.960094

O3 Calibration Curve



O3 Calibration Plot

Date: March 10, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 9, 2017	Previous Calibration	February 21, 2017
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	8:00	End Time (MST)	12:05
NO Cal Gas Conc	49.7 ppm	Gas Cert Reference	SA130010A
NOx Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	December 12, 2016
Calibrator	API T700	Serial Number	997
Zero air Generator	Teledyne API T701	Serial Number	4427

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2633
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.988925	0.989094	1.013574
	Data Offset	-0.251953	-0.370690	-0.160893
Current Calibration	Data Slope	0.999334	0.999453	1.022044
	Data Offset	0.366037	0.224935	-0.651129

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	722
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	0.933		0.933	
NOx coefficient	0.933		0.933	
NO2 coefficient	1.000		1.000	
NO bkgrnd	0.0		0.0	
NOx bkgrnd	0.1		0.1	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	316.3	Deg C	316.3	Deg C
PMT voltage	781	V	781	V
PMT Temp	7	Deg C	7	Deg C
O3 flow	73	ccm	73	ccm
R Cell press NO	3.1	mmHg	3.2	mmHg
R Cell Press Nox	3.1	mmHg	3.2	mmHg
NO sample flow	456	lpm	456	lpm
Nox sample Flow	456	lpm	456	lpm

Notes:

filter changed out, no maintenance or adjustments done, due to drift in the GPT the 2nd high GPT point was used, Calibration points have been changed from 600,300, 150 ppb to 800,400,200ppb



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

March 9, 2017

Station Number:

AMS 17

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.1	----	----
as found span	5036	60.3	595.1	595.1	0.0	595.5	598.3	-2.6	0.9993	0.995
calibrator zero	5091	0.0	0.0	0.0	0.0	0.0	0.0	0.1	----	----
high point	5019	80.4	796.2	796.2	0.0	796.6	796.4	0.2	0.9994	1.000
second point	5058	40.2	395.0	395.0	0.0	394.4	395.1	-0.6	1.0015	1.000
third point	5077	20.0	195.8	195.8	0.0	195.4	195.3	0.1	1.0020	1.002
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	0.0	----	----
as left span	5019	80.4	796.2	427.1	369.1	780.1	424.3	355.6	1.0206	1.007
Average Correction Factor									1.0010	1.0006

Corrced As found NO_x= 595.5 NO= 598.3 Percent Change NO_x= 1.1% NO= 0.6%
 Previous Response NO_x= 602.0 NO= 602.0

GPT Calibration Data

Dilution Flow (total) 5019 ccm Source Gas Flow 80.40 ccm NOx ref calc conc = 796.2 ppb NO ref calc conc = 796.2 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	789.2	789.9	0.1	1.0088	1.0079	----	----
1st NO2 (300)	427.1	362.8	782.3	427.1	355.2	1.0177	----	1.0214	97.9%
2nd NO2 (200)	545.5	244.4	785.5	545.5	240.0	1.0136	----	1.0183	98.2%
3rd NO2 (100)	662.3	127.6	788.5	662.3	126.2	1.0097	----	1.0111	98.9%
2nd NO ref point	----	0.0	792.3	793.6	-1.3	1.0049	1.0032	----	----
Average Correction Factor						1.0115		1.0169	98.3%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

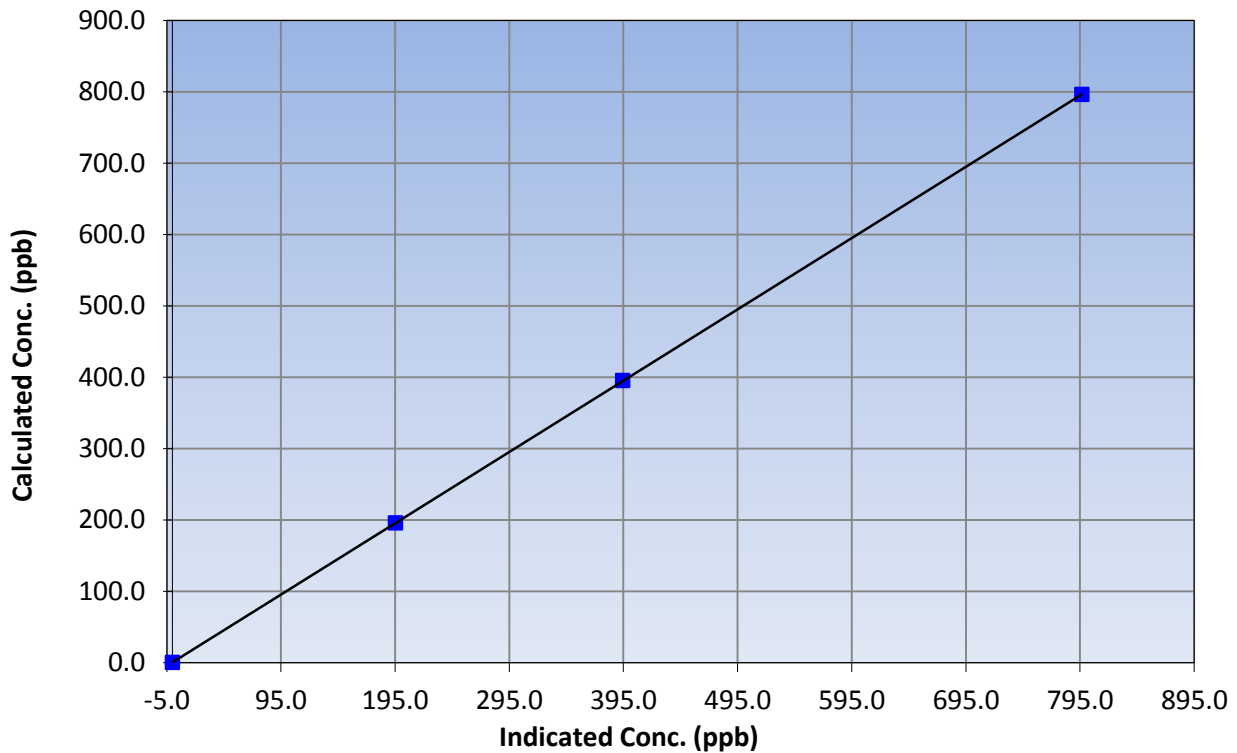
Station Information

Calibration Date	March 9, 2017	Previous Calibration	February 21, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	8:00	End Time (MST)	14:10
Analyzer make	API T200	Analyzer serial #	722

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999999
796.2	796.6	0.9994		
395.0	394.4	1.0015	Slope	0.999334
195.8	195.4	1.0020		
			Intercept	0.366037

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

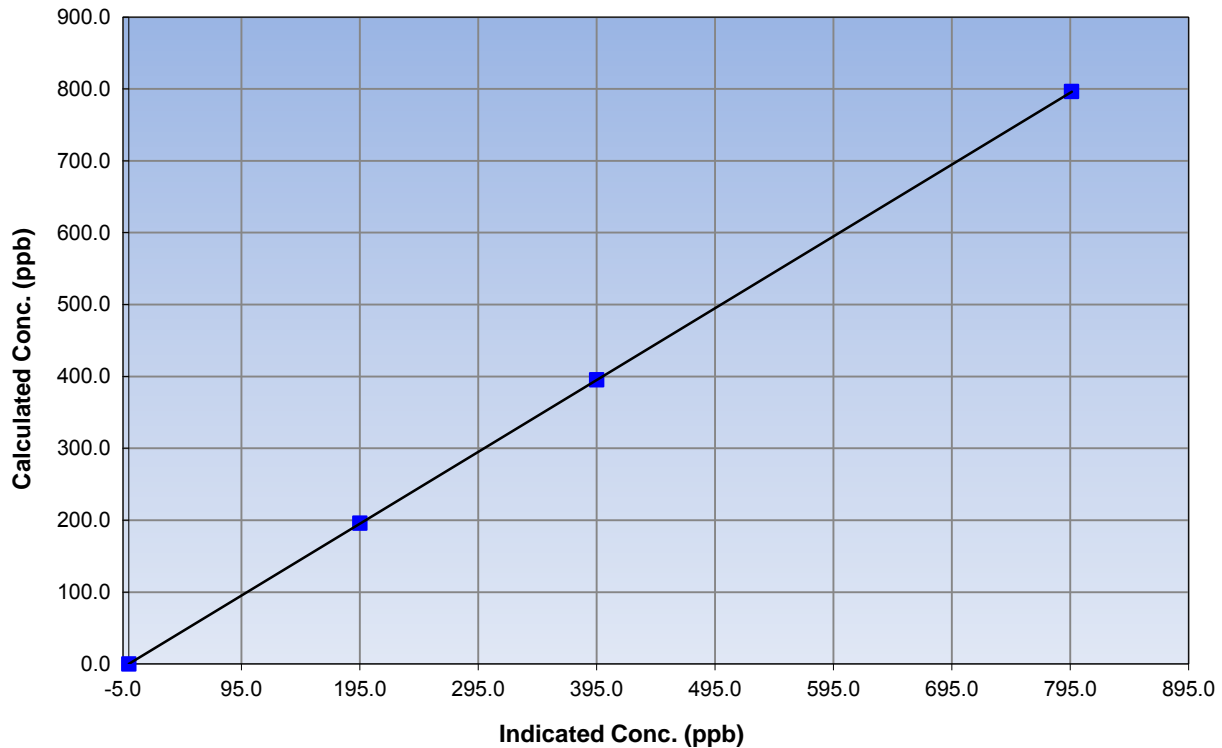
Station Information

Calibration Date	March 9, 2017	Previous Calibration	February 21, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	8:00	End Time (MST)	14:10
Analyzer make	API T200	Analyzer serial #	722

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999999
796.2	796.4	0.9997		
395.0	395.1	0.9998	Slope	0.999453
195.8	195.3	1.0025		
			Intercept	0.224935

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

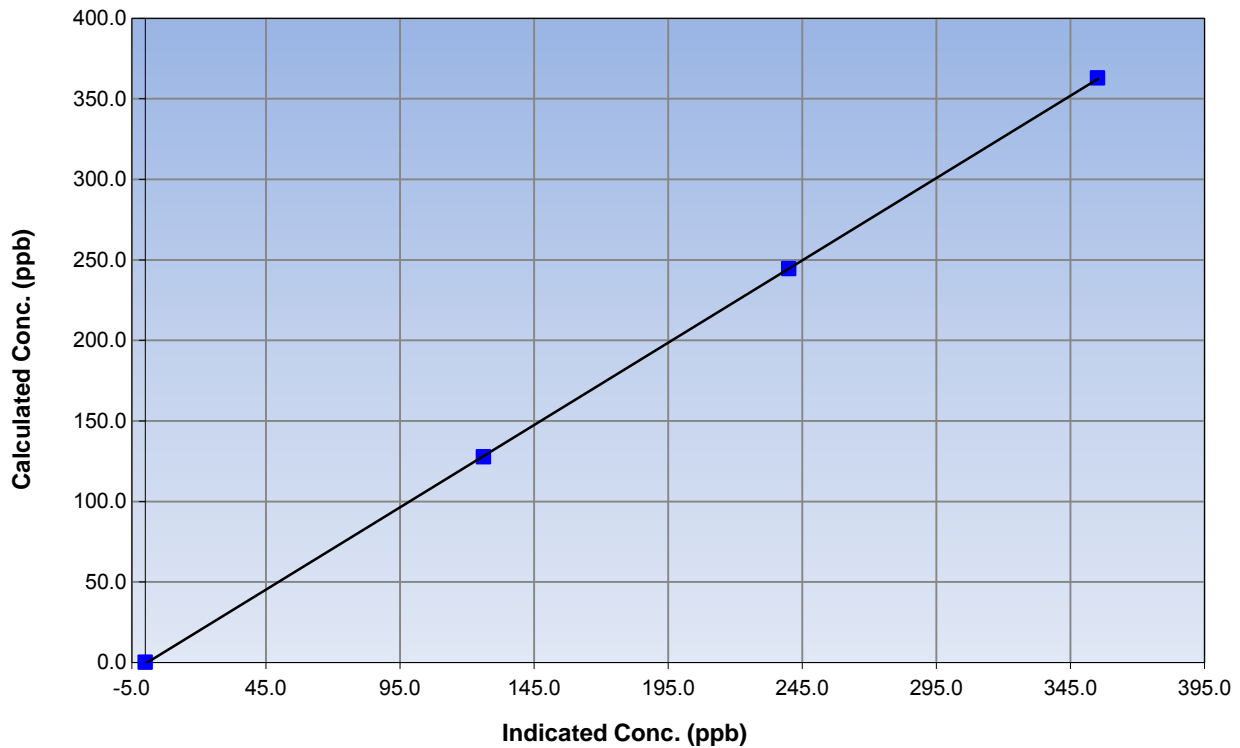
Station Information

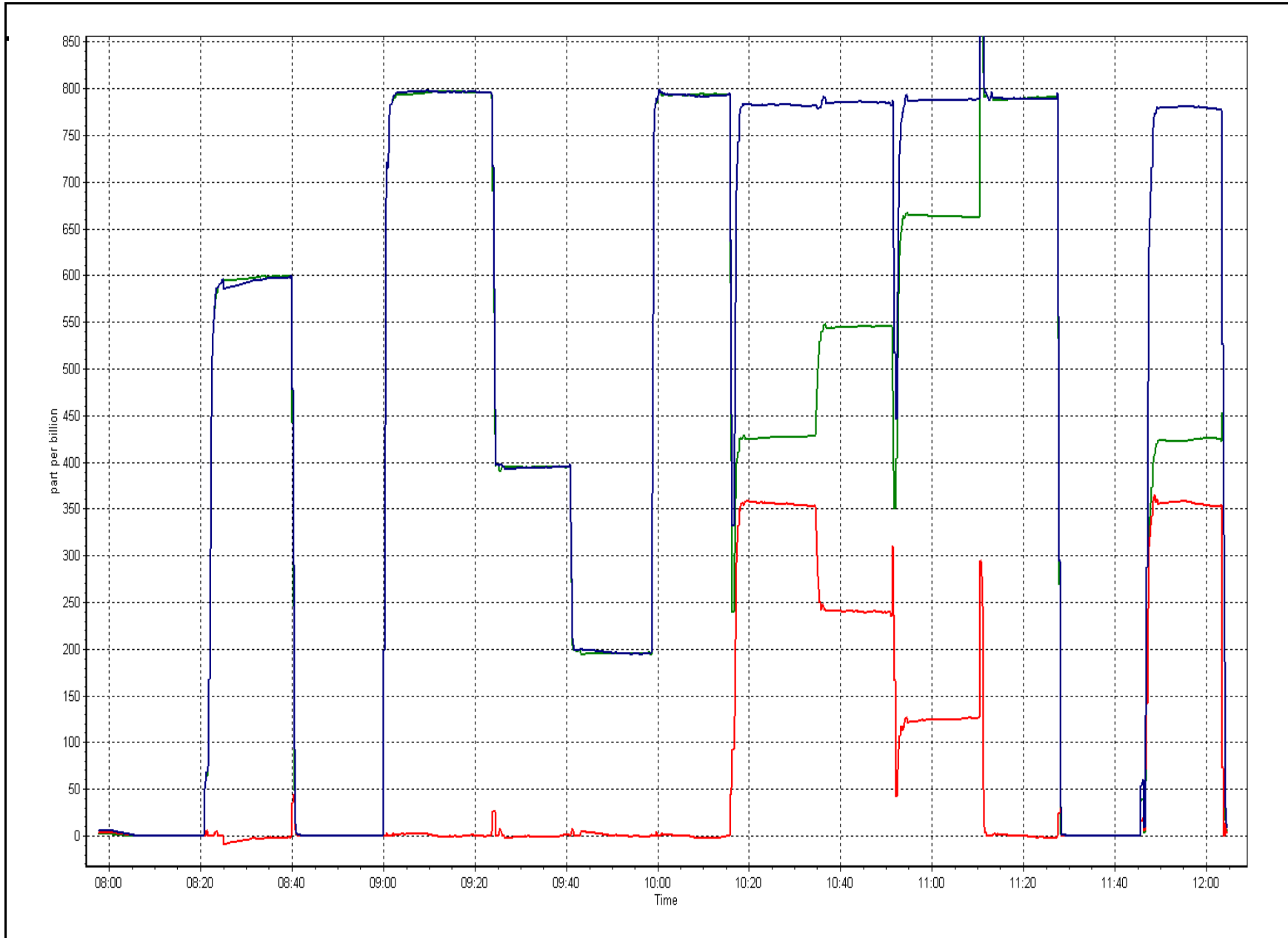
Calibration Date	March 9, 2017	Previous Calibration	February 21, 2017
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	8:00	End Time (MST)	14:10
Analyzer make	API T200	Analyzer serial #	722

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999985
362.8	355.2	1.0214		
244.4	240.0	1.0183	Slope	1.022044
127.6	126.2	1.0111		
			Intercept	-0.651129

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Wapasu	Station number:	AMS 17
Calibration Date:	March 10, 2017	Last Cal Date:	February 22, 2017
Start time (MST):	8:01	End time (MST):	9:04
Sharp Model:	5030	S/N:	CM-2390
Particulate Fraction:	PM2.5	C14 Source S/N:	10391
Flow Standard Model:	DeltaCal	S/N:	1450
Temp/RH standard:	NA	S/N:	NA

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	-22	-25	-25	<input checked="" type="checkbox"/>	+/- 2 °C
P3 (hPa)	973	970	970	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	982	1000	<input checked="" type="checkbox"/>	+/- 50 LPH
Nephelometer zero	-1.1	-----	-0.1	<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"/>	
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

				Tolerance
Leak Test:	Date of check:	<u>March 10, 2017</u>	Last Cal Date:	<u>December 8, 2016</u>
	Flow w/o adaptor:	<u>16.6</u>	Flow w/ adaptor:	<u>16.51</u> 0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass:	_____	S/N:	<u>2519</u>
	Date of check:	_____	Last Cal Date:	<u>December 8, 2016</u>
	New Correction Factor:	_____	Previous Correction Factor:	<u>7072</u>

Parameter	As found	Measured	As left	Adjusted	Tolerance
T2 (°C)	NA	NA	NA	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	NA	NA	NA	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	NA	NA	NA	<input type="checkbox"/>	+/- 2 °C
RH (%)	NA	NA	NA	<input type="checkbox"/>	+/- 10%

Notes: nephelometer, T1 and flow adjusted; During the checking of the nephelometer the concentration started at -1.1ug/m3 for 10minutes then went up to -0.1 ug/m3 for 5minutes then back down to -1.1ug/m3. cyclone head cleaned

Calibration by: Melissa Lemay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 18
STONY MOUNTAIN
MARCH 2017

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS 18)
MARCH 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	8	0	3	0
TRS(ppb) Average	709	35	35	100	0	0	0	0
THC(ppm) Average	705	36	39	99.6	2.2	-	2.1	-
NMHC(ppm) Average	705	36	39	99.6	0.072	-	0.021	-
CH4(ppm) Average	705	36	39	99.6	2.2	-	2.1	-
O3 (ppb) Average	646	37	98	91.8	62	0	54	-
NO2 (ppb) Average	708	36	36	100	10	0	3	-
NO (ppb) Average	708	36	36	100	4	-	1	-
NOX (ppb) Average	708	36	36	100	10	-	4	-
PM2.5 (ug/m3) Average	738	4	6	99.73	13.3	-	7.1	0
Wind Speed 10 m (km/h) Average	734	0	10	98.66	22	-	15	-
Wind Direction 10 m (deg) Average	734	0	10	98.66	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100	10.8	-	4.8	-
Relative Humidity (%) Average	744	0	0	100	99	-	96.0	-
Precipitation (mm) Total	744	0	0	100	2.8	-	8.8	-
Leaf Wetness (% of range) Average	744	0	0	100	22	-	5.0	-
Global Solar Radiation (W/m2) Average	744	0	0	100	775	-	228.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS 18)
MARCH 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	8
TRS (ppb) Average	709	0.3	0	-	0	0	0	0	0	0	0
THC (ppm) Average	705	1.99	0	-	1.9	1.9	2	2	2	2.1	2.2
NMHC(ppm) Average	705	0.002	0.007	-	0	0	0	0	0	0	0.072
CH4(ppm) Average	705	1.99	0	-	1.9	1.9	2	2	2	2	2.2
O3 (ppb) Average	646	43.8	8	-	22	32	38	46	50	53	62
NO2 (ppb) Average	708	1.9	1	-	0	1	1	2	2	3	10
NO (ppb) Average	708	0.2	0	-	0	0	0	0	0	1	4
NOX (ppb) Average	708	2	1	-	0	1	1	2	3	4	10
PM2.5 (ug/m3) Average	738	4.06	2.2	-	0.7	1.8	2.5	3.6	5	7.2	13.3
Wind Speed 10 m (km/h) Average	734	8.5	4	-	1	4	5	8	11	14	22
Wind Direction 10 m (deg) Average	734	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-7.22	9.9	-	-28.6	-20.7	-16.1	-5	0.5	5.2	10.8
Relative Humidity (%) Average	744	69.1	17	-	26	44	56	71	83	92	99
Precipitation (mm) Total	744	-	-	17.43	-	-	-	-	-	-	-
Surface Wetness (% of range) Average	744	2.2	2	-	1	1	1	2	2	3	22
Global Solar Radiation (W/m2) Average	744	130.5	194	-	0	0	0	3	214	460	775

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS 18)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NMHC, CH4, THC	10 Mar 2017 12:00	10 Mar 2017 14:00	3	Maintenance - replaced fuel cylinder
O3	01 Mar 2017 04:00	02 Mar 2017 12:00	33	Analyzer Failure- daily span outside of criteria
O3	04 Mar 2017 09:00	04 Mar 2017 11:00	3	Maintenance - span adjustment and calibration
O3	23 Mar 2017 11:00	24 Mar 2017 11:00	25	Maintenance - ozone scrubber and solenoids replaced
PM2.5	14 Mar 2017 14:00	14 Mar 2017 15:00	2	Data logger program uploaded - data not recorded
Wind Speed, Wind Direction	14 Mar 2017 03:00	14 Mar 2017 11:00	9	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	20 Mar 2017 20:00	20 Mar 2017 20:00	1	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Stony Mountain - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 8 ppb on Mar 7 10:00	Maximum Daily Average: 3.0 ppb on Mar 7		Hours of Data:	708
Minimum Value: 0 ppb on Mar 6 05:00	Minimum Daily Average: 0.1 ppb on Mar 19		Hours of Missing Data:	36
Maximum Diurnal Average: 0.7 ppb at hour 20	Minimum Diurnal Average: 0.4 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 = 1 P ₉₀ = 1 P ₉₉ = 4		Percent Operational Time:	100.0

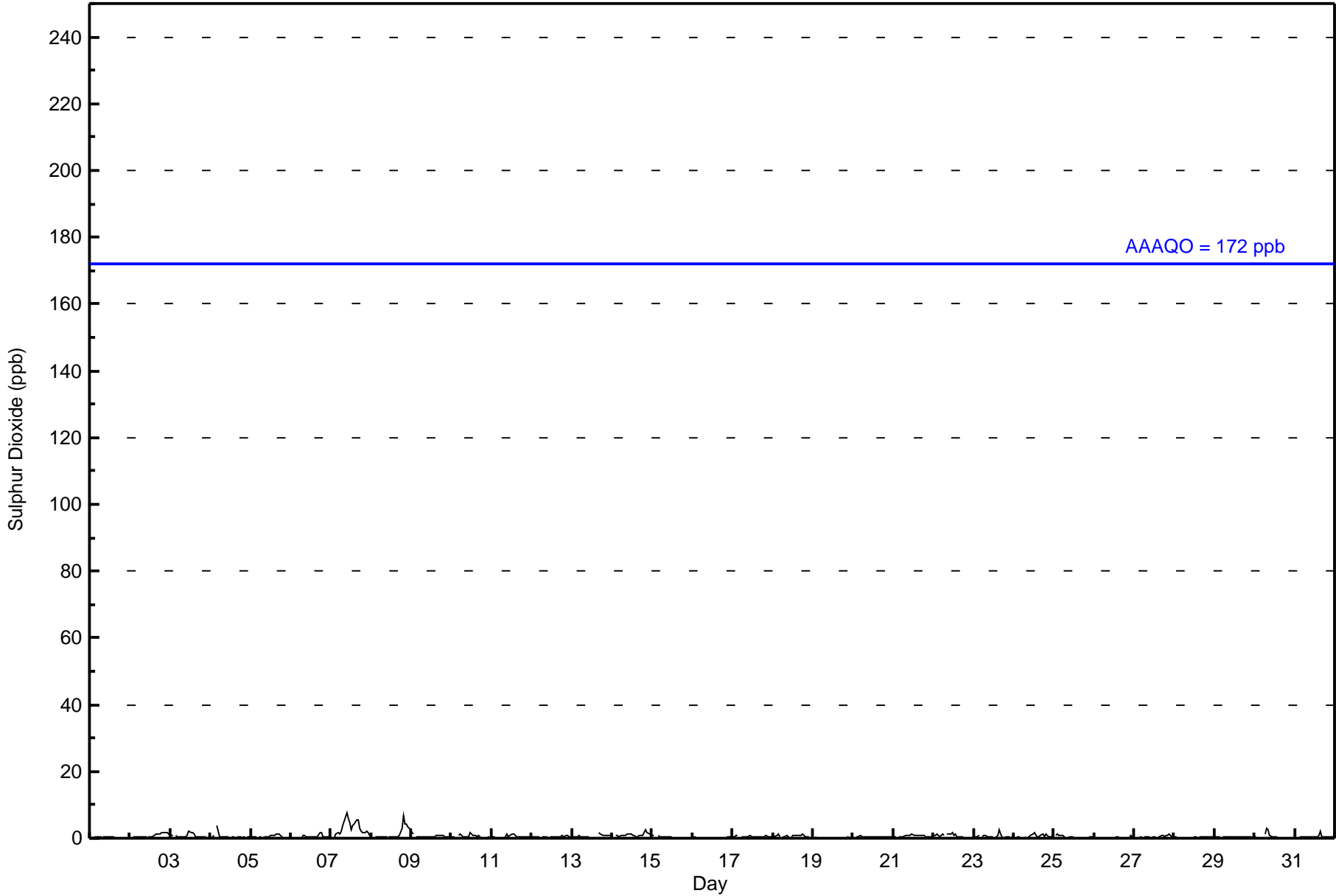
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	2	2	2	2	1	0.8	2
3-Mar	1	1	Z	1	1	1	1	0	0	0	1	2	2	2	1	1	0	0	0	0	0	0	0	0	0.7	2
4-Mar	0	0	1	Z	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4
5-Mar	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1
6-Mar	0	0	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0.4	2
7-Mar	Z	0	0	1	2	1	2	4	5	8	6	5	3	4	4	5	6	3	2	2	2	2	2	1	3.0	8
8-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	7	4	4	3	3	1.3	7	
9-Mar	2	1	Z	1	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0.6	2
10-Mar	0	0	0	Z	1	1	1	1	1	1	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0.6	2
11-Mar	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0.5	1
12-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0	0	0.4	1
13-Mar	Z	0	0	0	1	1	0	1	1	0	0	C	C	C	C	C	2	1	1	1	1	1	1	1	0.7	2
14-Mar	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	2	2	2	1	1	1.0	2
15-Mar	1	1	Z	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
16-Mar	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
17-Mar	0	0	1	1	Z	0	0	0	0	0	1	1	0	1	0	0	0	0	0	1	1	0	0	1	0.5	1
18-Mar	1	0	1	1	0	Z	0	0	1	0	0	0	1	1	1	1	1	1	1	0	1	0	0	0	0.6	1
19-Mar	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
20-Mar	0	Z	0	0	1	1	1	0	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	0	0.5	1
21-Mar	0	1	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6	1
22-Mar	1	1	1	1	1	1	1	Z	1	1	1	2	1	1	0	0	1	0	0	0	0	0	0	0	0.7	2
23-Mar	0	0	1	1	Z	0	1	1	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0.5	2
24-Mar	0	0	0	0	0	Z	0	0	0	0	1	1	2	1	0	0	1	1	1	1	1	1	0	1	0.6	2
25-Mar	Z	1	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
26-Mar	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
27-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0.4	1
28-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1
29-Mar	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-Mar	0	0	0	0	0	Z	1	3	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
31-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0.4	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
Stony Mountain - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Stony Mountain - March 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 - March 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	46	48	35	50	38	57	67	73	80	73	8	7	13	30	32	41	698
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	46	48	35	50	38	57	67	73	80	73	8	7	13	30	32	41	698

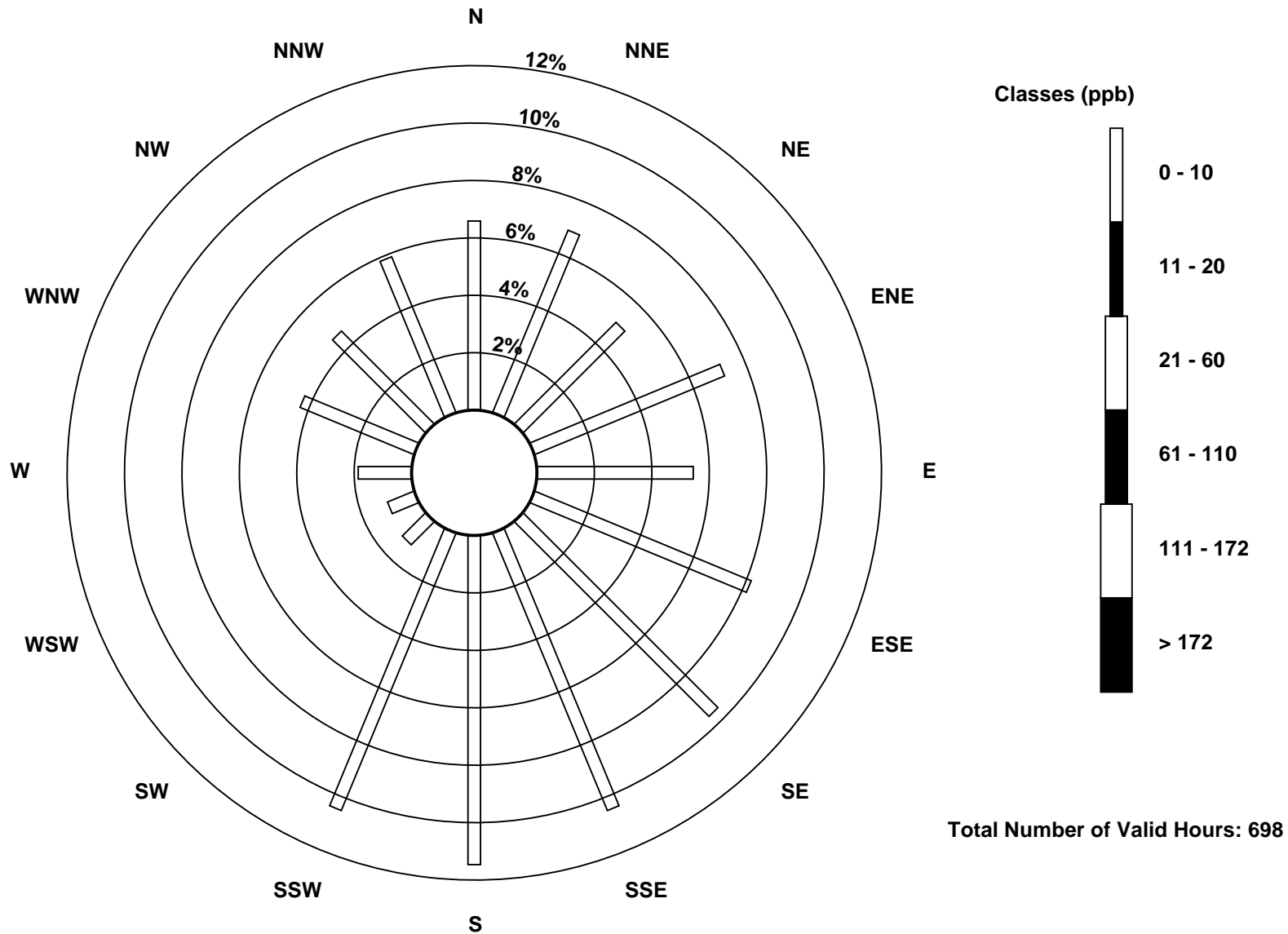
Total Number of Valid Hours: 698

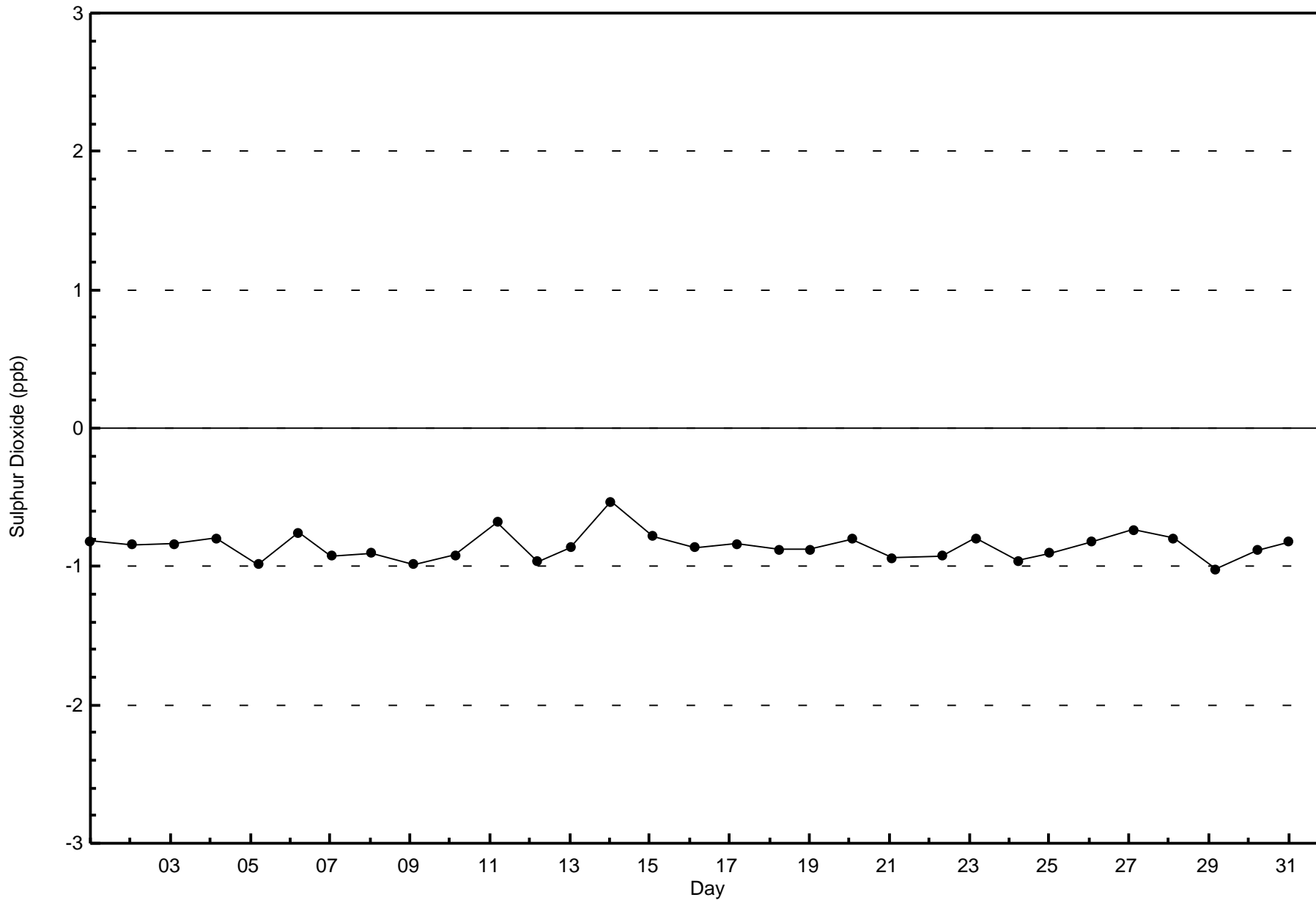
Total Number of Hours: 744

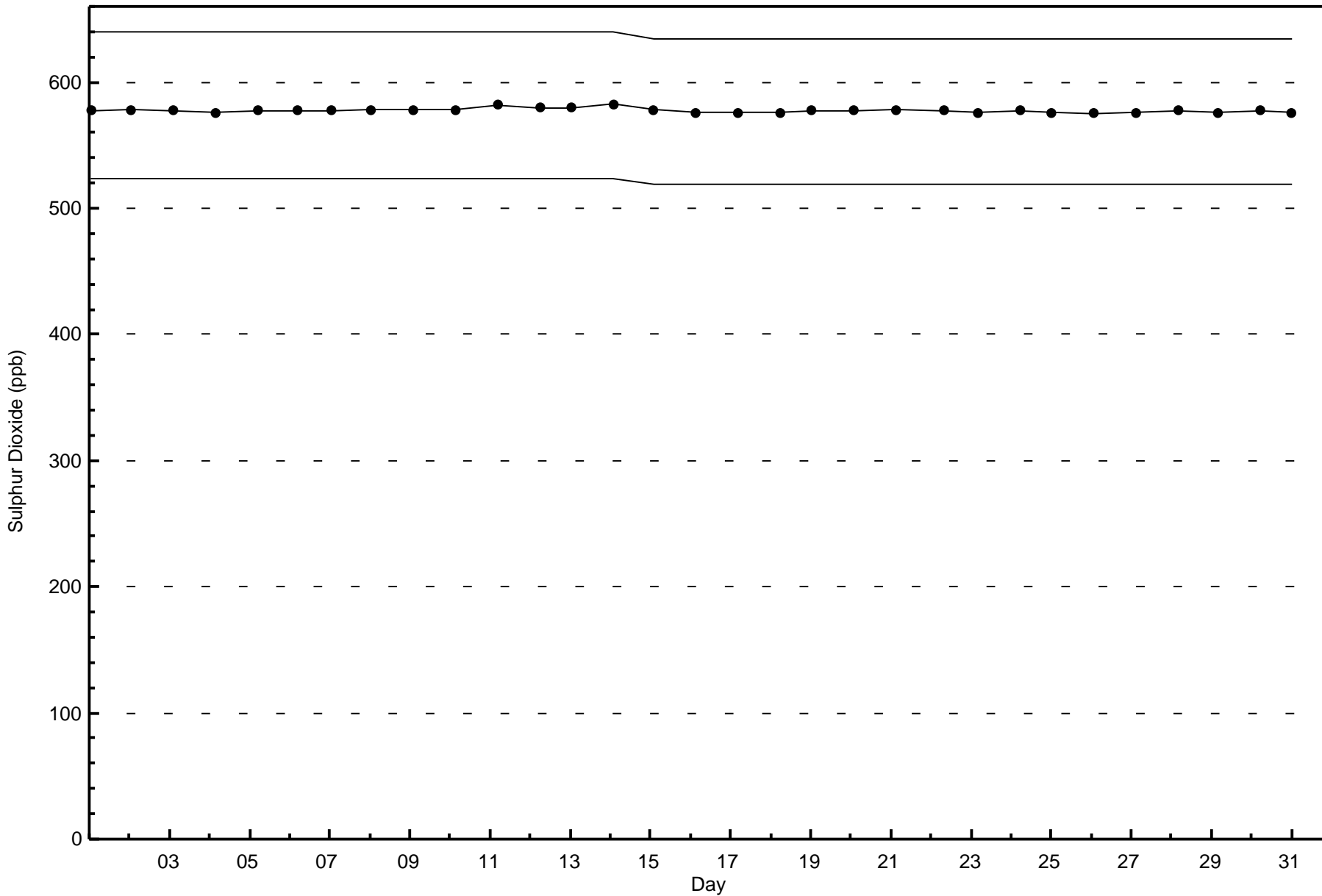


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Sulphur Dioxide (SO₂) - ppb
Stony Mountain (AMS 18)







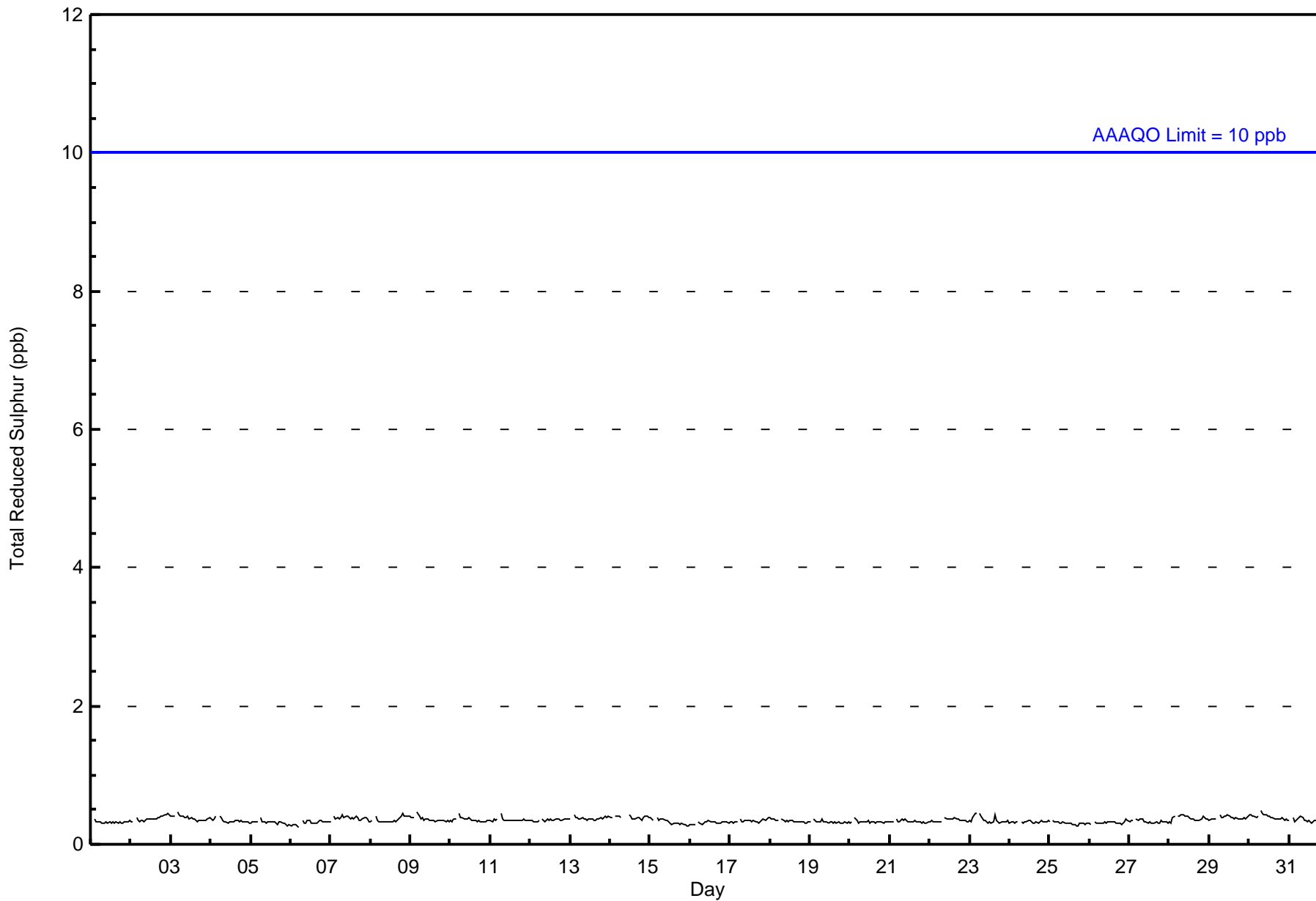


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744										Daily Average		Daily Maximum																													
Maximum Value: 0 ppb on Mar 30 08:00										Maximum Daily Average: 0.4 ppb on Mar 30										Hours of Data: 709																															
Minimum Value: 0 ppb on Mar 6 06:00										Minimum Daily Average: 0.3 ppb on Mar 25										Hours of Missing Data: 35																															
Maximum Diurnal Average: 0.4 ppb at hour 7										Minimum Diurnal Average: 0.3 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 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 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-Mar	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																								
2-Mar	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	0.4	0																								
3-Mar	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	0																								
4-Mar	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	0.3	0																								
5-Mar	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																								
6-Mar	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																								
7-Mar	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	0.4	0																								
8-Mar	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	0.4	0																								
9-Mar	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	0																								
10-Mar	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	0.4	0																								
11-Mar	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	0.4	0																								
12-Mar	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	0.4	0																								
13-Mar	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	0.4	0																								
14-Mar	0	0	Z	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0																								
15-Mar	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																								
16-Mar	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	0.3	0																								
17-Mar	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																								
18-Mar	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																								
19-Mar	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																								
20-Mar	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	0																								
21-Mar	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																								
22-Mar	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	0.3	0																								
23-Mar	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	0.4	0																								
24-Mar	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																								
25-Mar	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																								
26-Mar	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	0																								
27-Mar	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																								
28-Mar	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	0.4	0																								
29-Mar	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	0.4	0																								
30-Mar	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	0.4	0																								
31-Mar	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	0.4	0																								
																								0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	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		
																								0	0	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																																																			
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 - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Stony Mountain - March 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
Stony Mountain - March 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	48	47	35	50	39	56	68	73	83	75	8	7	13	30	32	40	704
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	48	47	35	50	39	56	68	73	83	75	8	7	13	30	32	40	704

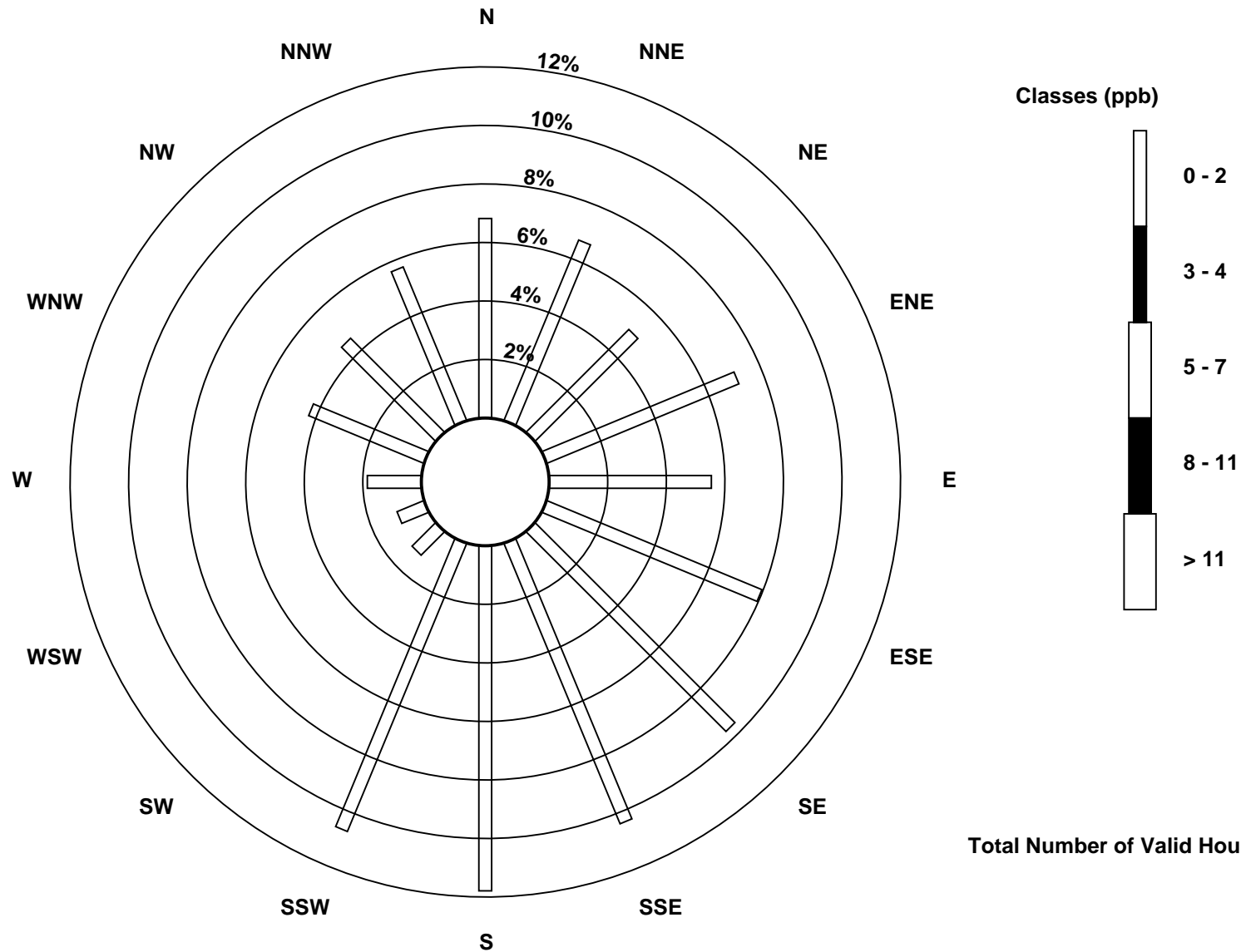
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

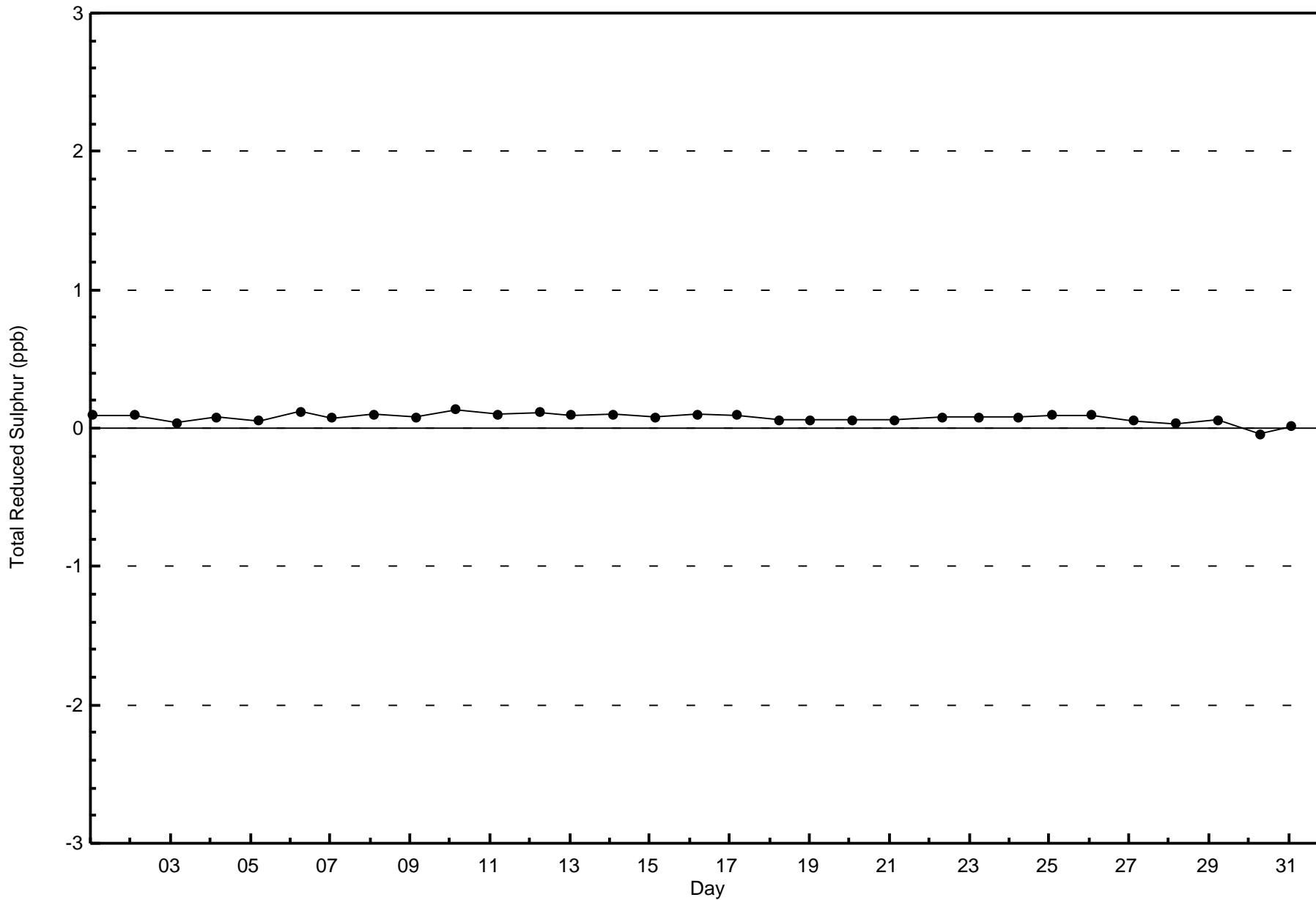
Total Reduced Sulphur (TRS) - ppb
Stony Mountain (AMS 18)

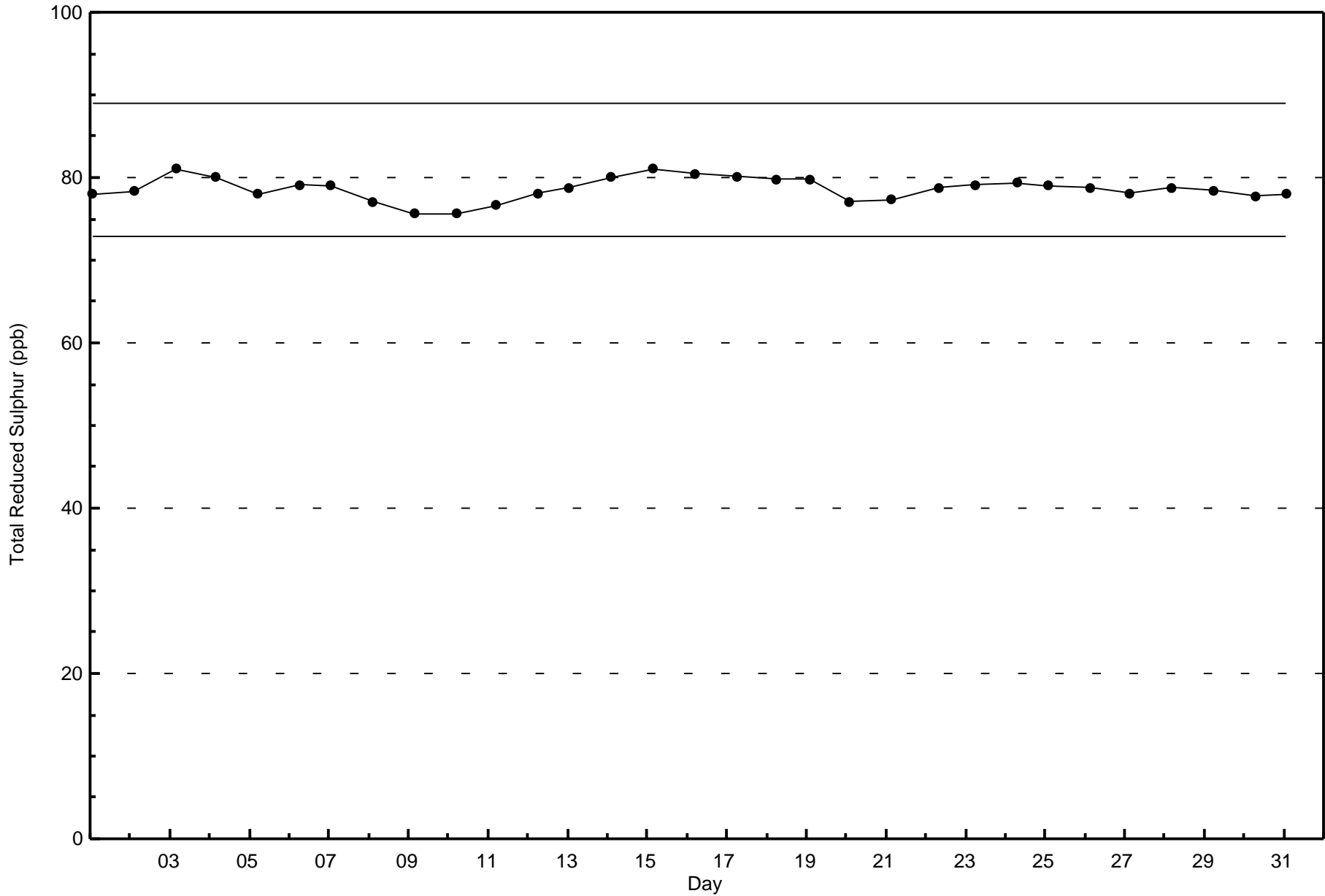




Wood Buffalo Environmental Association
Zero Responses

Total Reduced Sulphur (TRS) - ppb
Stony Mountain - March 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

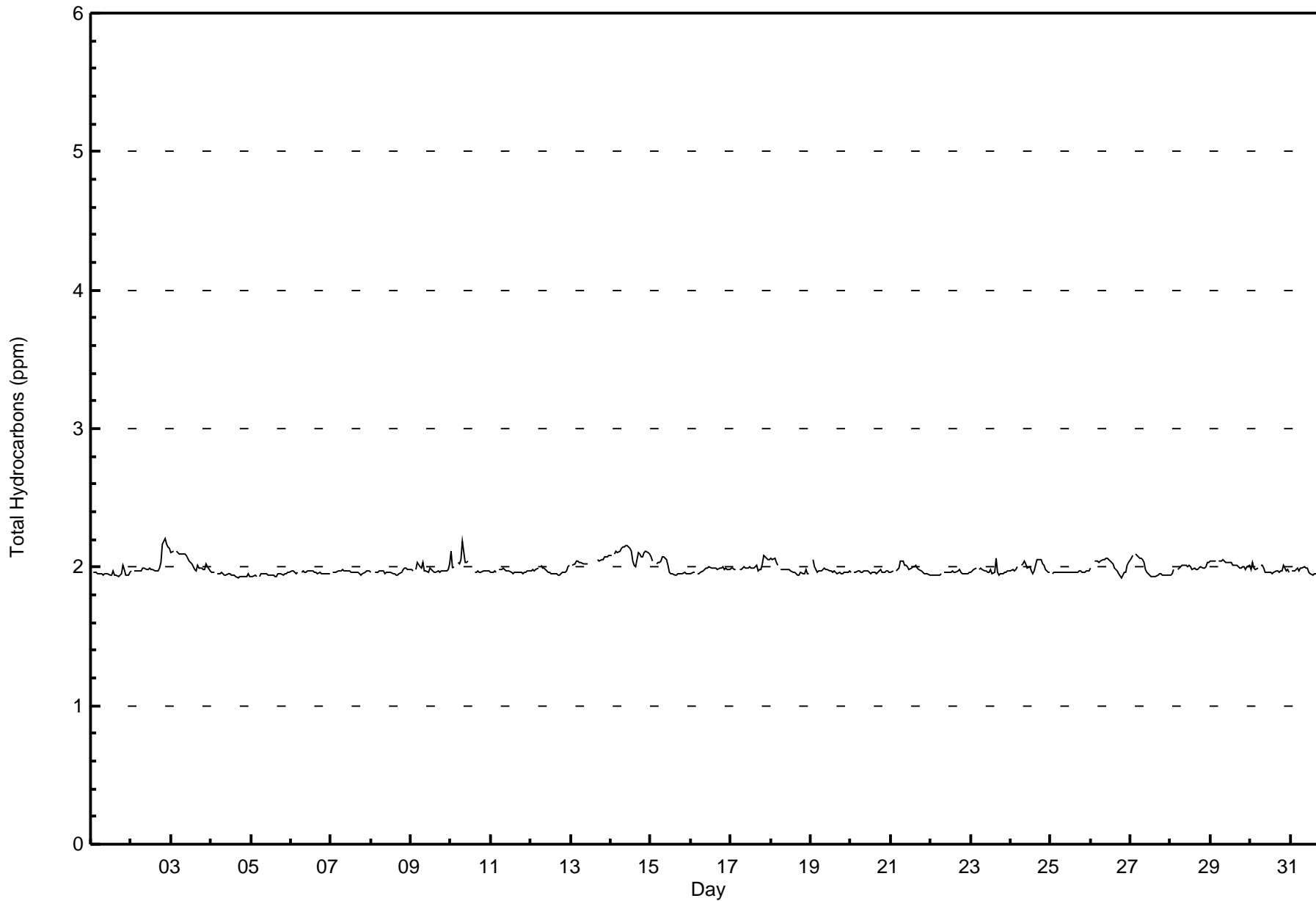
Stony Mountain - March 2017

Maximum Value: 2.2 ppm on Mar 2 21:00		Maximum Daily Average: 2.1 ppm on Mar 14		Hours in Service: 744																							
Minimum Value: 1.9 ppm on Mar 4 17:00		Minimum Daily Average: 1.9 ppm on Mar 4		Hours of Data: 705																							
Maximum Diurnal Average: 2.0 ppm at hour 8		Minimum Diurnal Average: 2.0 ppm at hour 15		Hours of Missing Data: 39																							
Monthly Average: 1.99 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.1		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-Mar	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	
2-Mar	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	2.2	2.2	2.2	2.1	2.1	2.0	2.2	
3-Mar	2.1	2.1	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
4-Mar	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
5-Mar	1.9	1.9	1.9	1.9	Z	1.9	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	2.0	2.0	2.0	1.9	2.0	2.0
6-Mar	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	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
7-Mar	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	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
8-Mar	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
9-Mar	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	2.0	2.0
10-Mar	2.1	2.0	2.0	Z	2.0	2.0	2.1	2.2	2.0	2.0	2.0	M	M	M	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
11-Mar	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	2.0	2.0
12-Mar	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	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
13-Mar	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	C	C	C	C	C	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1
14-Mar	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
15-Mar	2.1	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.1
16-Mar	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	2.0
17-Mar	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	2.1	2.1	2.1	2.1	2.0	2.1
18-Mar	2.1	2.1	2.1	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	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
19-Mar	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	2.0
20-Mar	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	2.0	2.0	2.0
21-Mar	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	1.9	2.0	2.0	1.9	2.0	2.0	2.0
22-Mar	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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
23-Mar	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	2.1	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1
24-Mar	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	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1
25-Mar	Z	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	2.0	2.0	2.0	2.0	2.0
26-Mar	2.0	Z	2.0	2.0	2.0	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	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1
27-Mar	2.1	2.1	Z	2.1	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	1.9	1.9	1.9	1.9	1.9	1.9	2.1
28-Mar	1.9	1.9	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	2.0
29-Mar	2.0	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	2.0	2.0	2.0	2.0	2.0	2.0	2.1
30-Mar	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	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
31-Mar	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	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
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Stony Mountain - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Stony Mountain - March 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	633	89.79	89.79
2.1 - 3.0	72	10.21	100.00
3.1 - 10.0	0	0.00	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
Stony Mountain - March 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	46	48	35	47	35	53	63	57	66	55	6	6	13	29	32	41	632
2.1 - 3.0	0	0	0	3	0	4	4	16	14	18	2	1	0	1	0	0	63
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	46	48	35	50	35	57	67	73	80	73	8	7	13	30	32	41	695

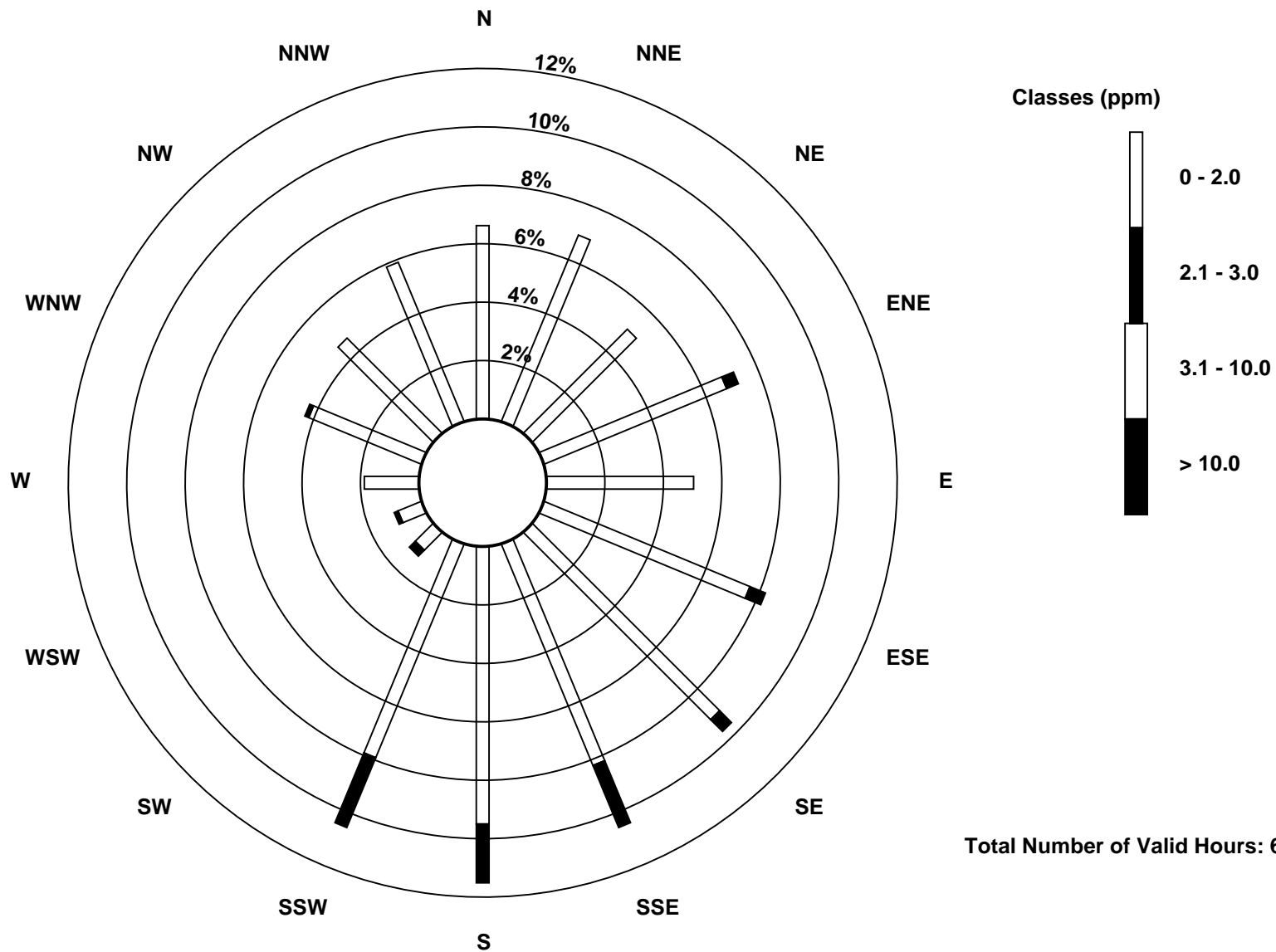
Total Number of Valid Hours: 695

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Hydrocarbons (THC) - ppm
Stony Mountain (AMS 18)

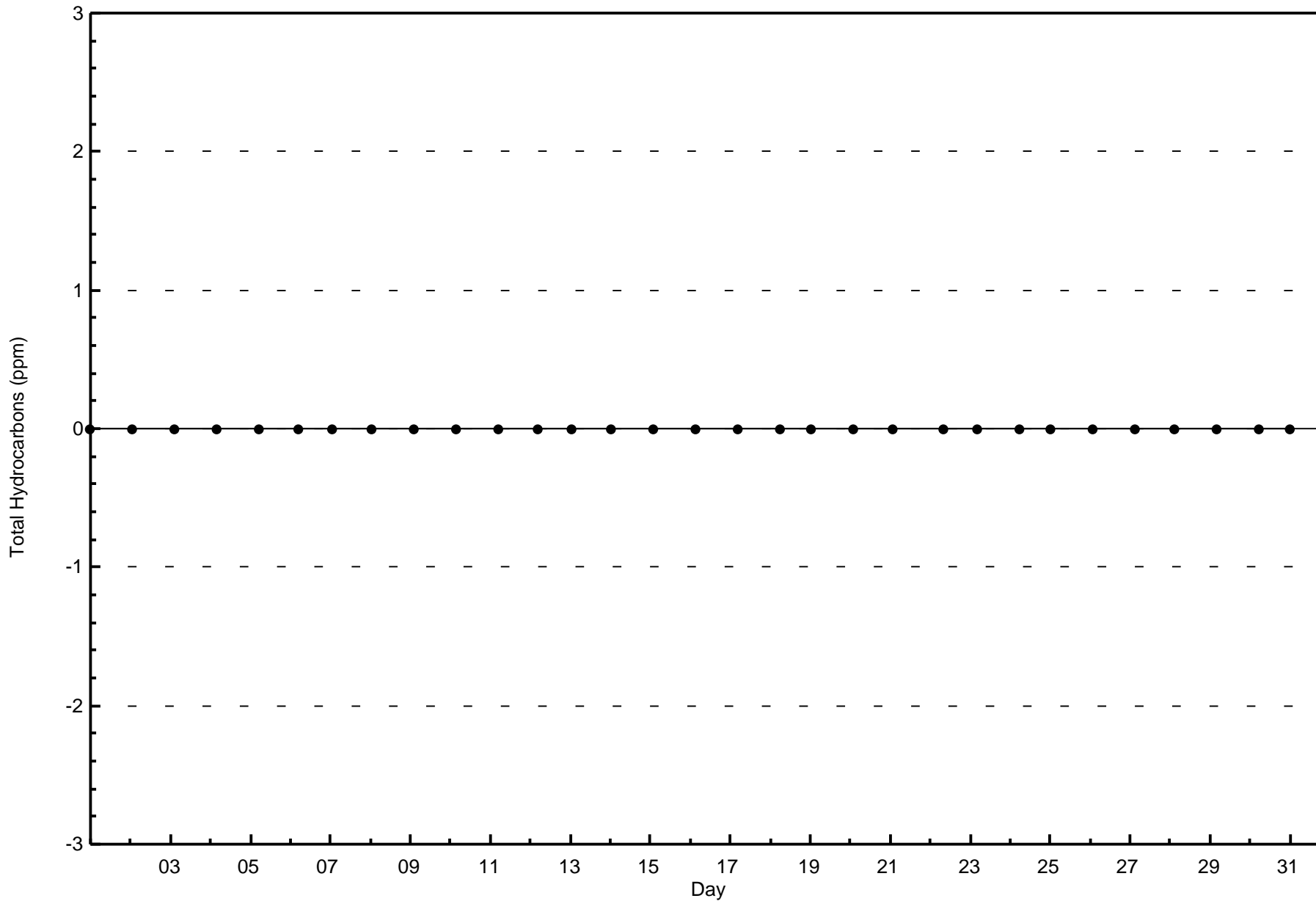


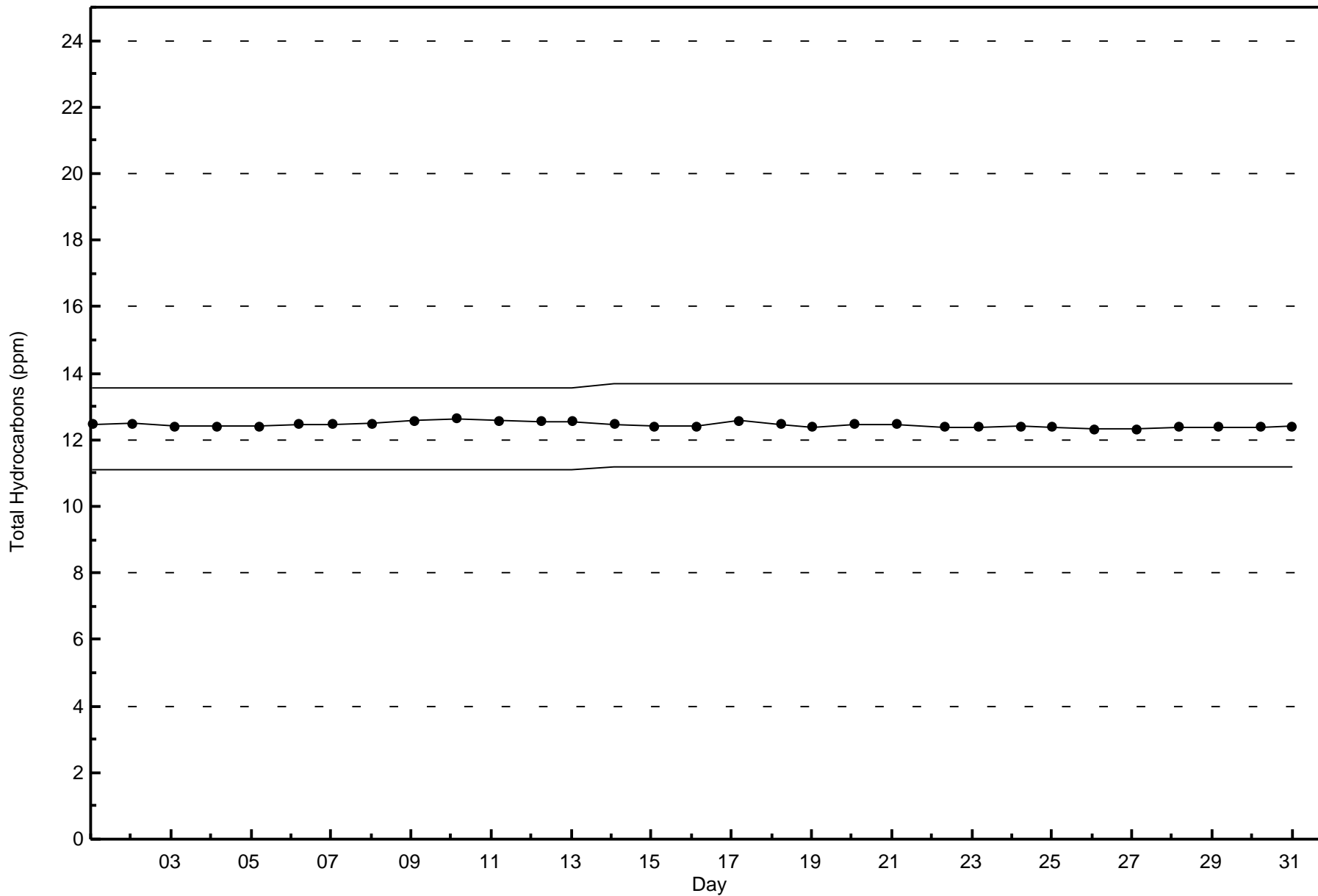
Total Number of Valid Hours: 695



Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Stony Mountain - March 2017







Wood Buffalo Environmental Association
Summary of Hour Averages

Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain - March 2017

Maximum Value: 0.072 ppm on Mar 23 16:00	Maximum Daily Average: 0.021 ppm on Mar 14	Hours in Service: 744
Minimum Value: 0.000 ppm on Mar 1 02:00	Minimum Daily Average: 0.000 ppm on Mar 1	Hours of Data: 705
Maximum Diurnal Average: 0.005 ppm at hour 8	Minimum Diurnal Average: 0.000 ppm at hour 15	Hours of Missing Data: 39
Monthly Average: 0.002 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: 99.6

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-Mar	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	0.000	0.000	0.000	0.000	0.000
2-Mar	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	0.002	0.002	0.009	0.014	0.001	0.014	0.000	0.000		
3-Mar	0.007	0.008	Z	0.012	0.008	0.008	0.009	0.007	0.006	0.008	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.006	0.000	0.003	0.000	0.000	0.000	0.004	0.012	0.000	0.000	0.000	
4-Mar	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	0.000	0.000	
5-Mar	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	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.002	0.002	
6-Mar	0.001	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	0.000	
7-Mar	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	0.000	0.000	0.000	0.000	
8-Mar	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	0.000	0.000	0.000	
9-Mar	0.000	0.000	Z	0.009	0.071	0.030	0.023	0.059	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	0.002	0.008	
10-Mar	0.003	0.000	0.000	Z	0.000	0.000	0.011	0.030	0.002	0.000	0.001	M	M	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	0.002	
11-Mar	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	0.000	0.000	
12-Mar	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	0.000	0.000	
13-Mar	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	C	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	
14-Mar	0.002	Z	0.020	0.024	0.022	0.022	0.030	0.033	0.032	0.039	0.046	0.044	0.036	0.009	0.000	0.000	0.020	0.020	0.012	0.007	0.011	0.011	0.021	0.019	0.021	0.021	0.046	0.000	0.000	0.000	
15-Mar	0.015	0.004	Z	0.001	0.000	0.001	0.000	0.002	0.005	0.005	0.000	0.000	0.001	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	0.002	
16-Mar	0.000	0.001	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	0.000	
17-Mar	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	0.001	0.000	0.000	
18-Mar	0.000	0.001	0.002	0.003	0.001	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	0.001	0.000	0.000	
19-Mar	Z	0.030	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	0.000	0.000	0.000	0.000	0.000	0.000	
20-Mar	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	0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	
21-Mar	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	0.000	0.000	
22-Mar	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Z	0.001	0.000	0.000	0.004	0.001	0.001	0.000	0.001	0.006	0.011	0.002	0.002	0.001	0.002	0.001	0.002	0.001	0.002	0.001	0.002	0.002	0.002	
23-Mar	0.004	0.005	0.011	0.010	Z	0.004	0.013	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.072	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.072	
24-Mar	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.014	0.004	0.000	0.000	0.000	0.000	0.002	0.001	0.004	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	
25-Mar	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	0.000	0.000	0.000	0.000	
26-Mar	0.000	Z	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	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025	0.006	0.002	
27-Mar	0.001	0.000	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	0.000	0.000	0.000	0.000	
28-Mar	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.001	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	0.000	
29-Mar	0.001	0.001	0.001	0.002	Z	0.006	0.006	0.005	0.004	0.004	0.004	0.007	0.004	0.001	0.004	0.005	0.004	0.000	0.001	0.008	0.003	0.000	0.004	0.011	0.004	0.004	0.011	0.004	0.011	0.004	
30-Mar	0.001	0.011	0.000	0.000	0.000	Z	0.008	0.010	0.003	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.042	0.006	0.006	0.000	0.004	0.004	0.042	0.004		
31-Mar	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	0.000	0.000	0.000	0.000	0.001	0.000	

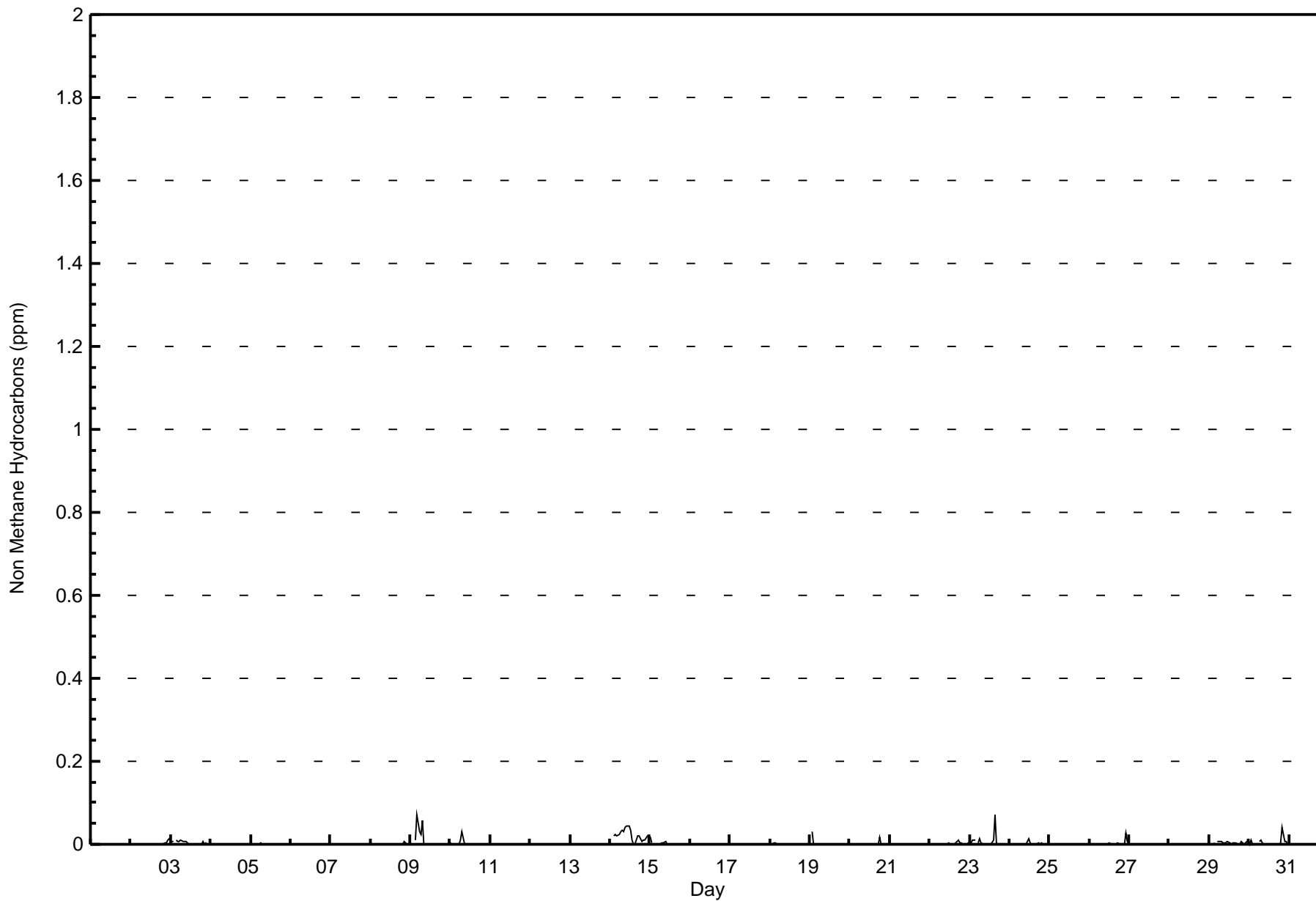
0.001	0.002	0.001	0.002	0.004	0.003	0.003	0.005	0.002	0.002	0.002	0.002	0.002	0.000	0.003	0.001	0.001	0.001	0.001	0.002	0.001	0.002	0.002	0.002	0.002	0.001	0.002	0.002	0.002	0.002	0.002	Diurnal Average
0.015	0.030	0.020	0.024	0.071	0.030	0.030	0.059	0.032	0.039	0.046	0.044	0.036	0.009	0.009	0.072	0.020	0.020	0.018	0.008	0.042	0.011	0.025	0.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Diurnal Maximum

Z - zerospan C - Calibration M - Maintenance



Wood Buffalo Environmental Association
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain - March 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	642	91.06	91.06
0.006 - 0.05	60	8.51	99.57
0.06 - 0.1	3	0.43	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain - March 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	41	48	33	46	34	55	66	61	76	63	7	7	13	29	24	38	641
0.006 - 0.05	5	0	2	4	1	1	1	12	4	10	1	0	0	1	7	2	51
0.06 - 0.1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	46	48	35	50	35	57	67	73	80	73	8	7	13	30	32	41	695

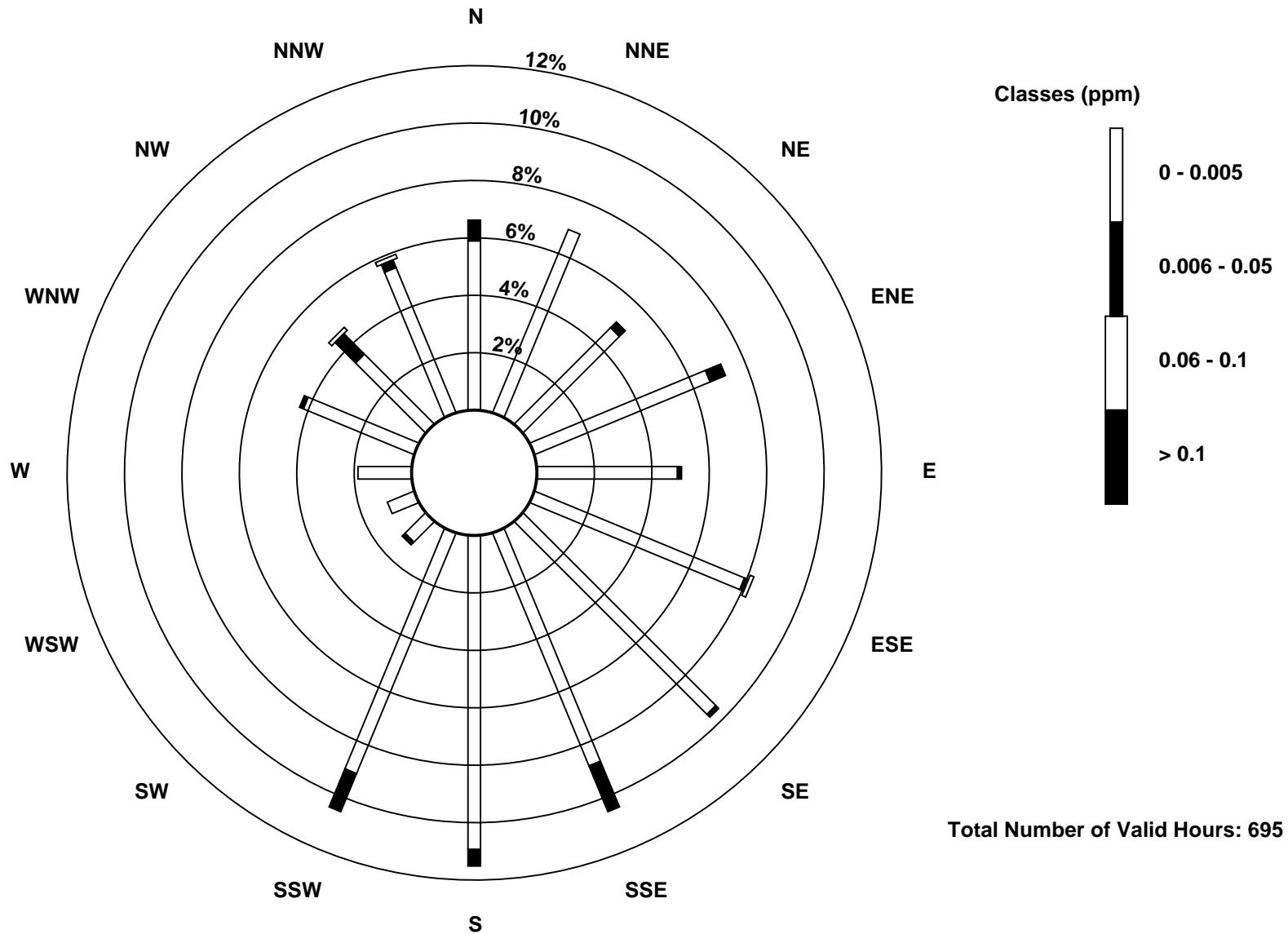
Total Number of Valid Hours: 695

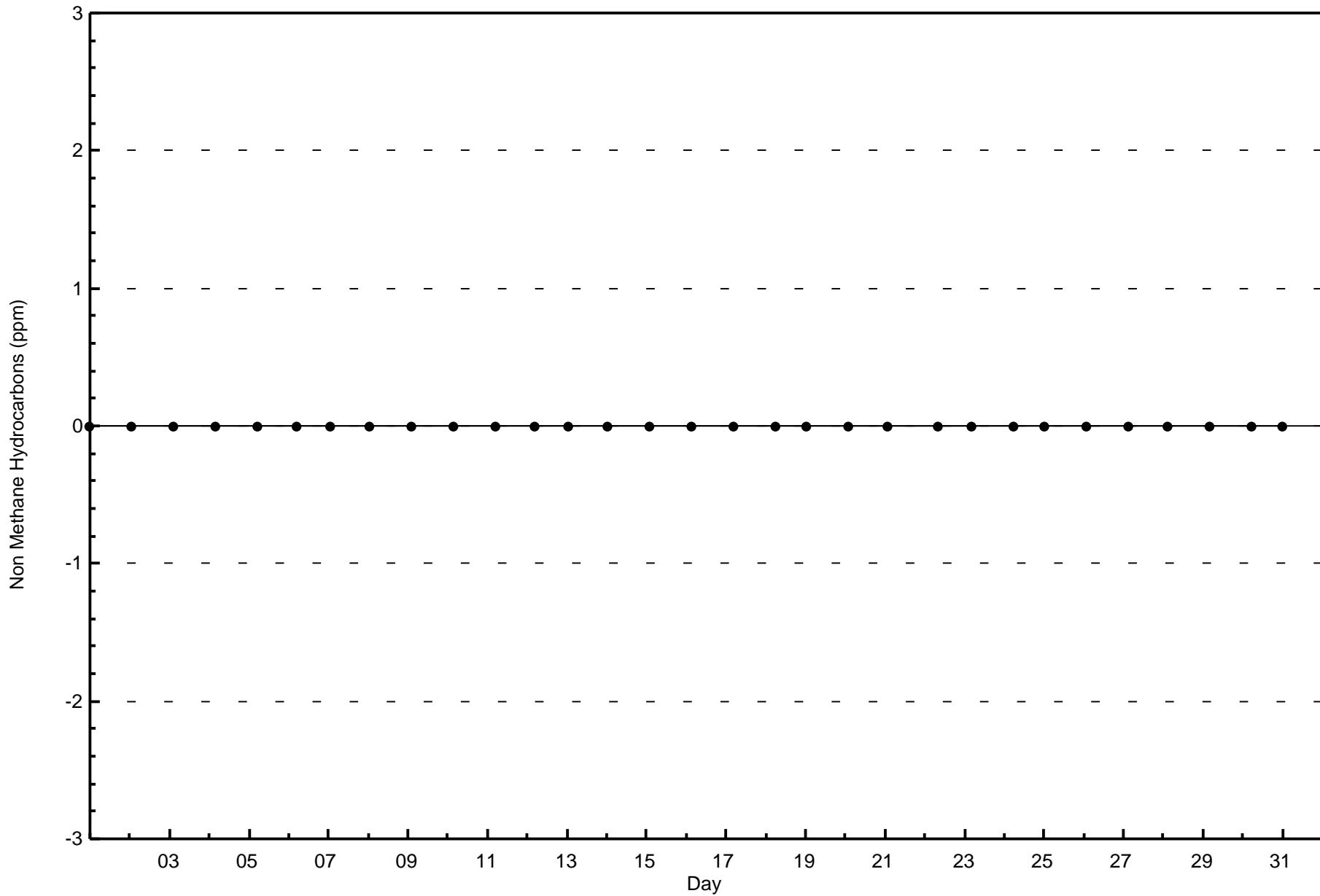
Total Number of Hours: 744

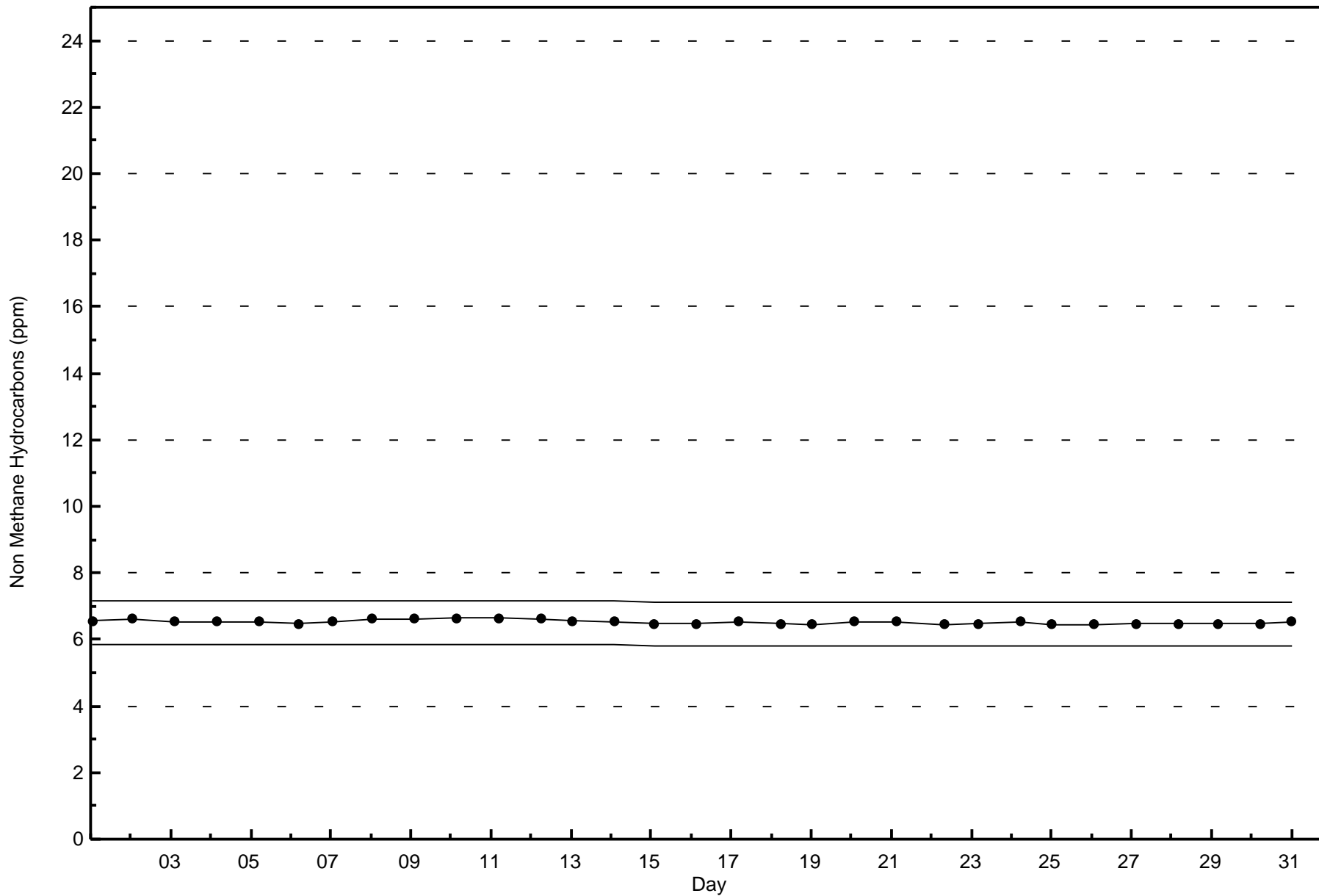


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain (AMS 18)









Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

Stony Mountain - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2.2 ppm on Mar 2 21:00	Maximum Daily Average: 2.1 ppm on Mar 14		Hours of Data:	705
Minimum Value: 1.9 ppm on Mar 4 17:00	Minimum Daily Average: 1.9 ppm on Mar 4		Hours of Missing Data:	39
Maximum Diurnal Average: 2.0 ppm at hour 8	Minimum Diurnal Average: 2.0 ppm at hour 15		Hours of Calibration:	36
Monthly Average: 1.99 ppm	Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.0 P ₉₀ = 2.0 P ₉₉ = 2.1		Percent Operational Time:	99.6

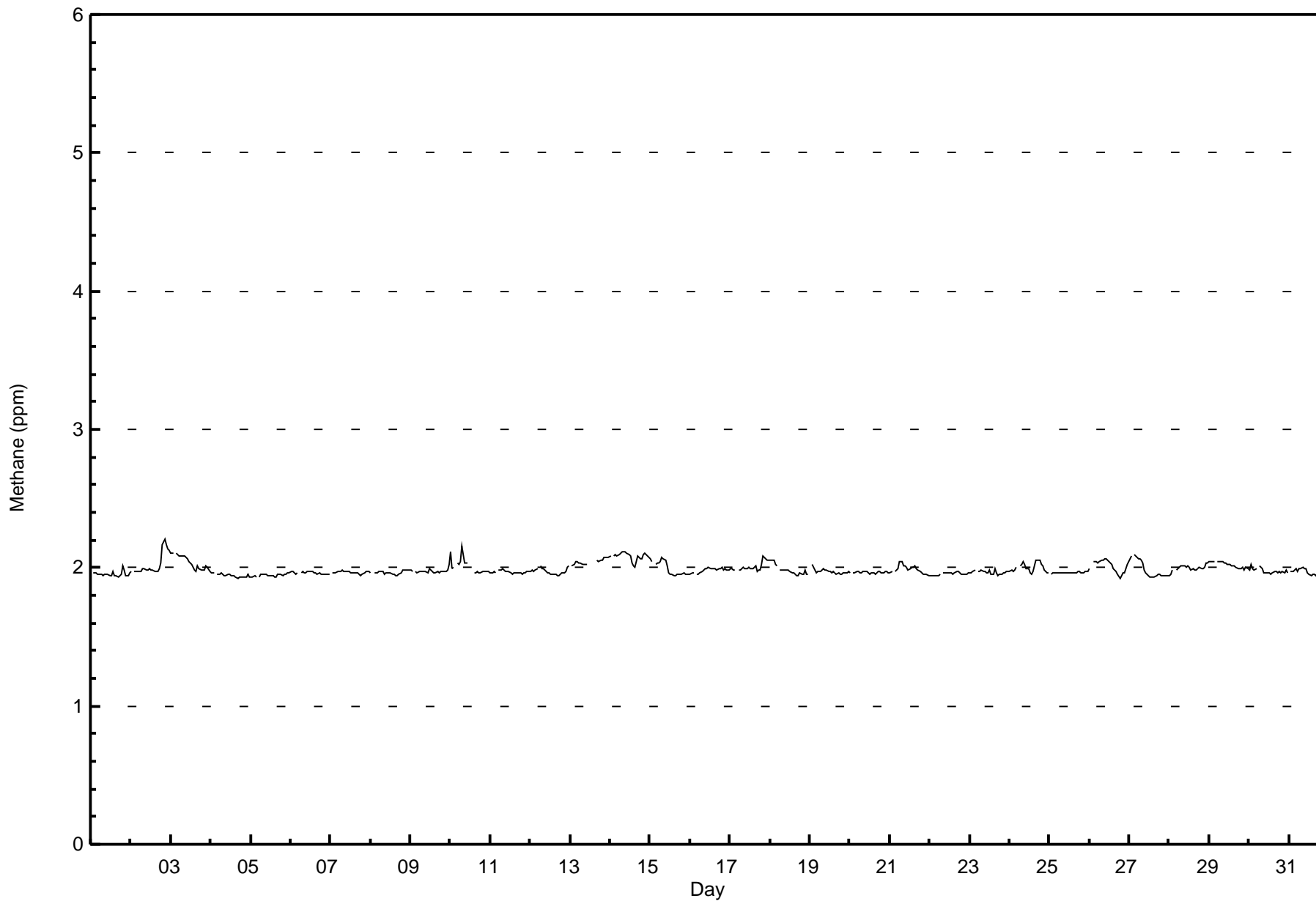
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Mar	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0																								
2-Mar	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	2.2	2.2	2.2	2.1	2.1	2.0	2.2																								
3-Mar	2.1	2.1	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																							
4-Mar	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0																							
5-Mar	1.9	1.9	1.9	1.9	Z	1.9	2.0	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0																							
6-Mar	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	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																							
7-Mar	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	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																							
8-Mar	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																							
9-Mar	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	2.0	2.0																							
10-Mar	2.1	2.0	2.0	Z	2.0	2.0	2.0	2.2	2.0	2.0	2.0	M	M	M	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																							
11-Mar	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	2.0	2.0																							
12-Mar	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	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																							
13-Mar	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	C	C	C	C	C	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1																							
14-Mar	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	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1																							
15-Mar	2.1	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.1																							
16-Mar	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	2.0																							
17-Mar	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	2.1	2.1	2.1	2.1	2.0	2.1																							
18-Mar	2.1	2.1	2.1	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	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																							
19-Mar	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	2.0																							
20-Mar	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	2.0	2.0	2.0																							
21-Mar	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	1.9	2.0	2.0	1.9	2.0	2.0	2.0																							
22-Mar	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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																							
23-Mar	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	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0																							
24-Mar	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	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																							
25-Mar	Z	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	2.0	2.0	2.0	2.0	2.0																							
26-Mar	2.0	Z	2.0	2.0	2.0	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	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1																							
27-Mar	2.1	2.1	Z	2.1	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	1.9	1.9	1.9	1.9	1.9	1.9	2.1																							
28-Mar	1.9	1.9	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	2.0																							
29-Mar	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	2.0	2.0																							
30-Mar	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	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																							
31-Mar	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	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	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	Diurnal Average
																								2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	Diurnal Maximum

Z - zerospan C - Calibration M - Maintenance



Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Stony Mountain - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Stony Mountain - March 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	638	90.50	90.50
2.1 - 3.0	67	9.50	100.00
3.1 - 10.0	0	0.00	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**

**Methane (CH₄) - ppm
Stony Mountain - March 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	46	48	35	48	35	55	63	57	66	56	6	6	13	30	32	41	637
2.1 - 3.0	0	0	0	2	0	2	4	16	14	17	2	1	0	0	0	0	58
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	46	48	35	50	35	57	67	73	80	73	8	7	13	30	32	41	695

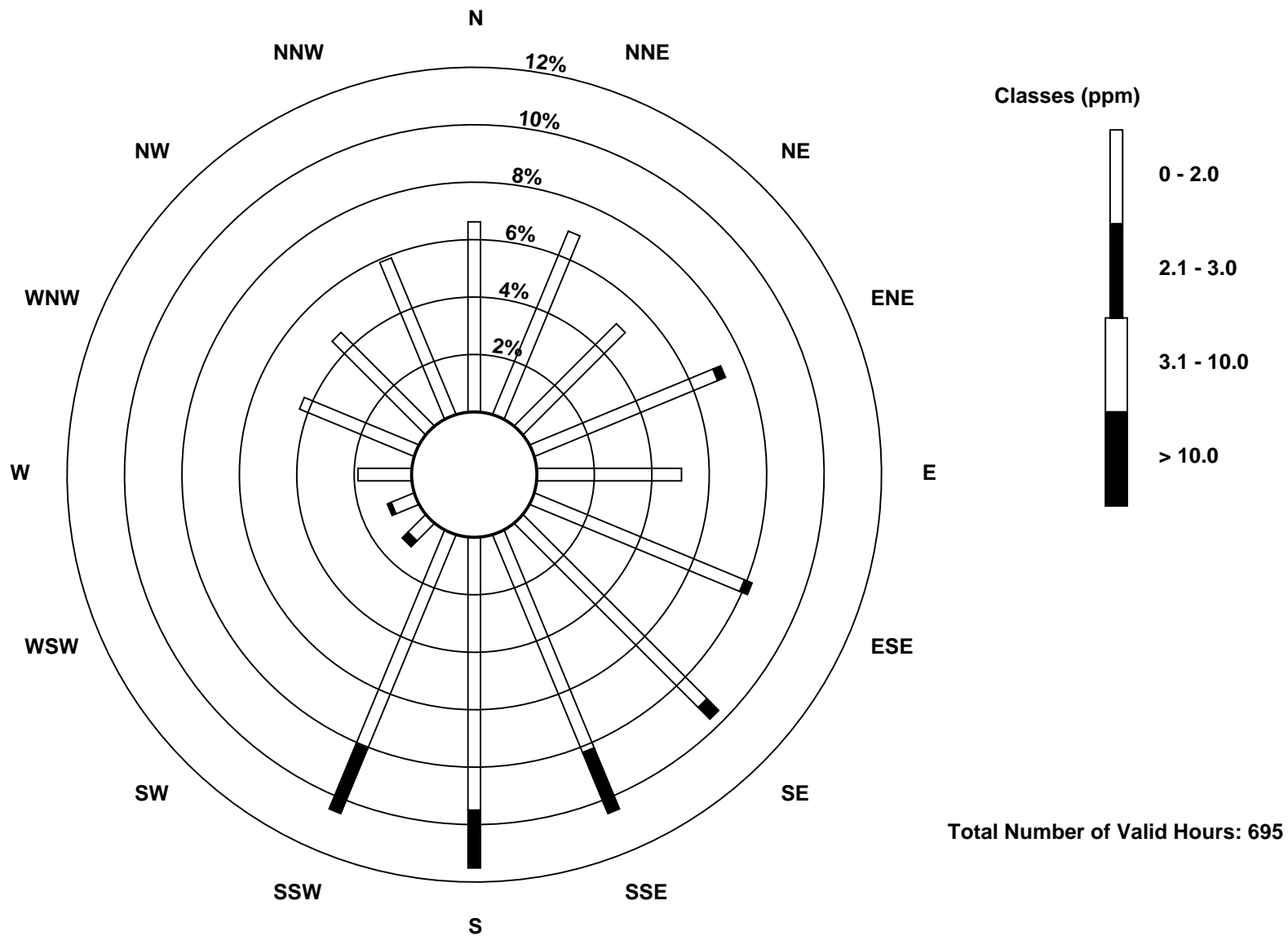
Total Number of Valid Hours: 695

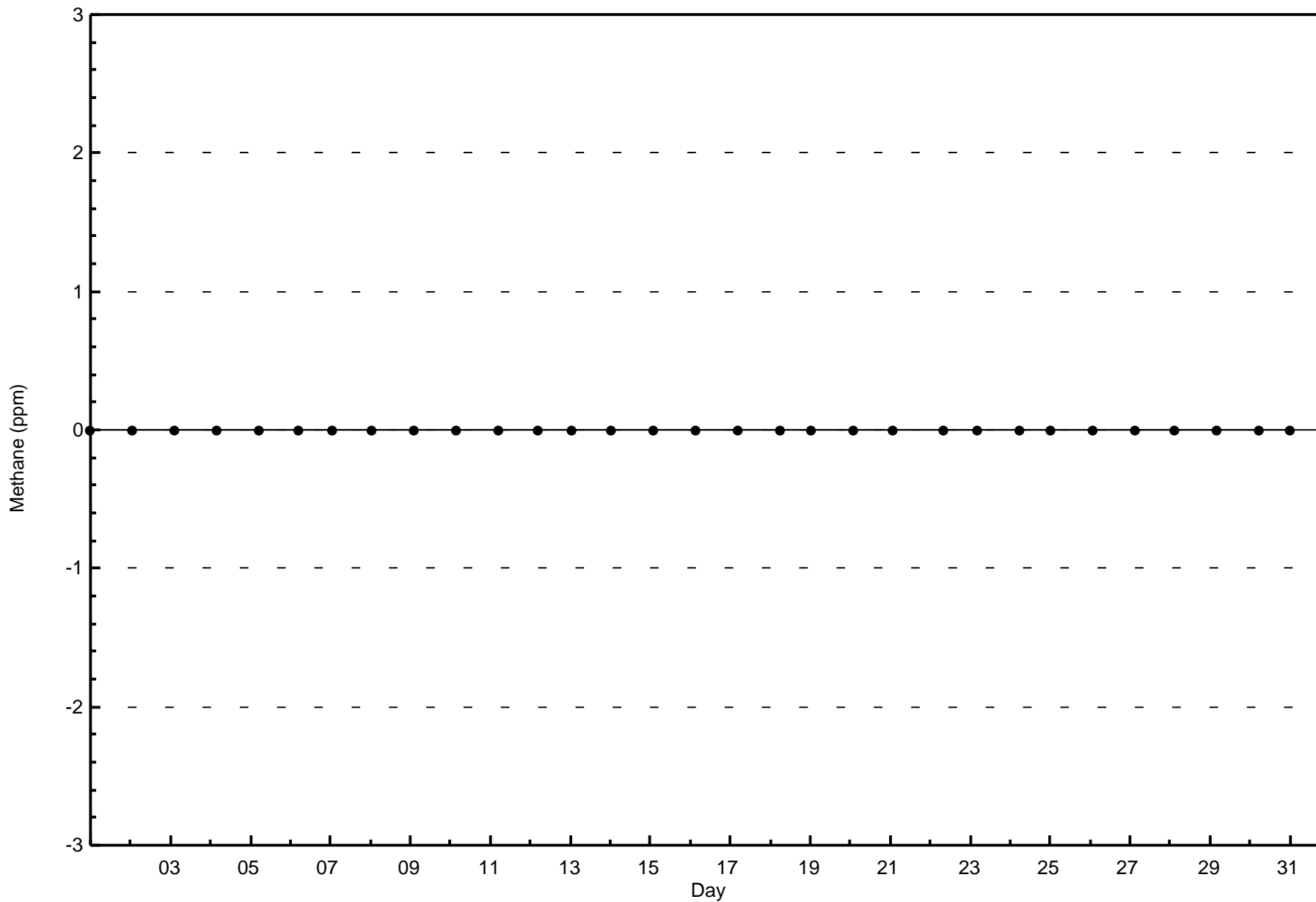
Total Number of Hours: 744

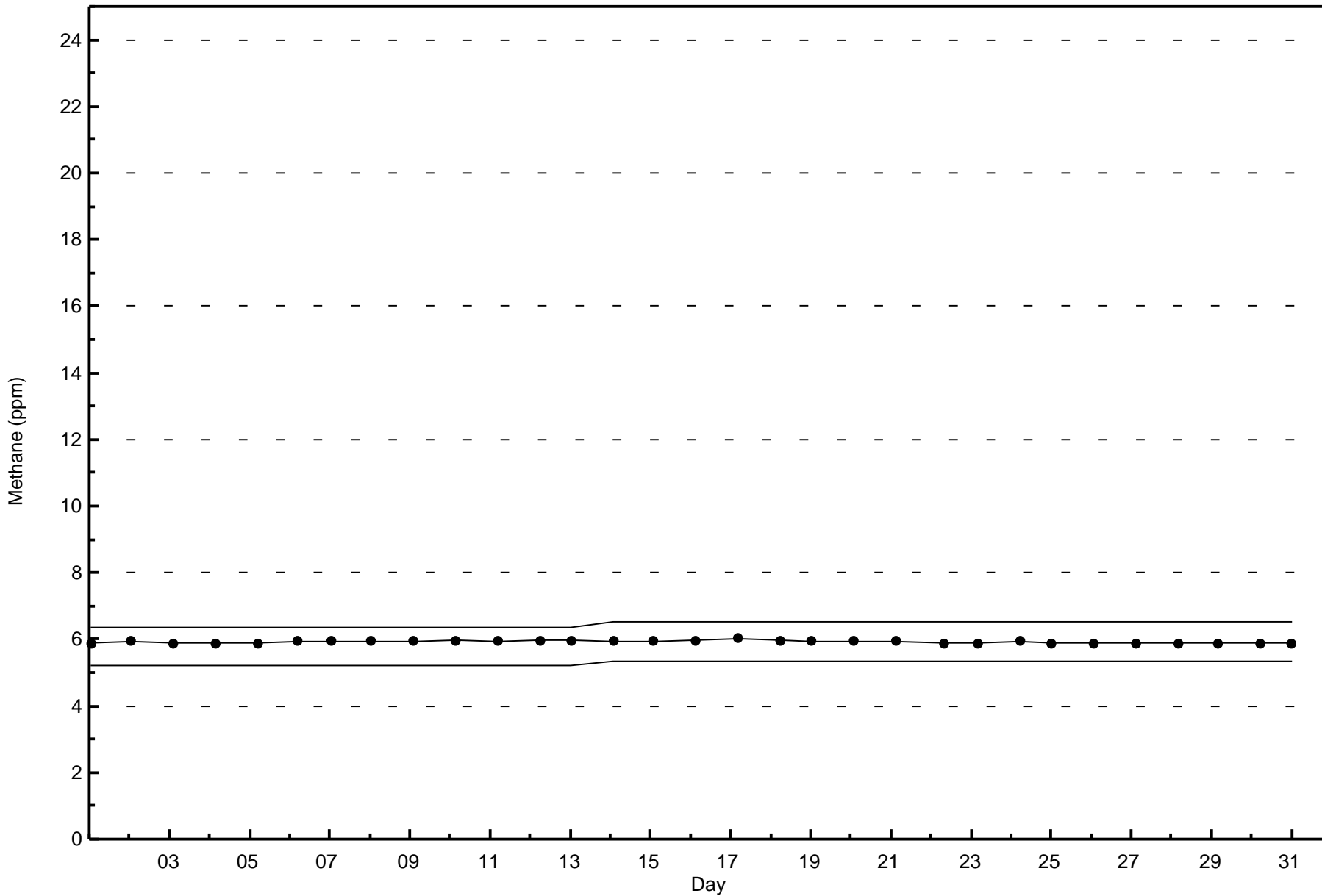


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Methane (CH₄) - ppm
Stony Mountain (AMS 18)







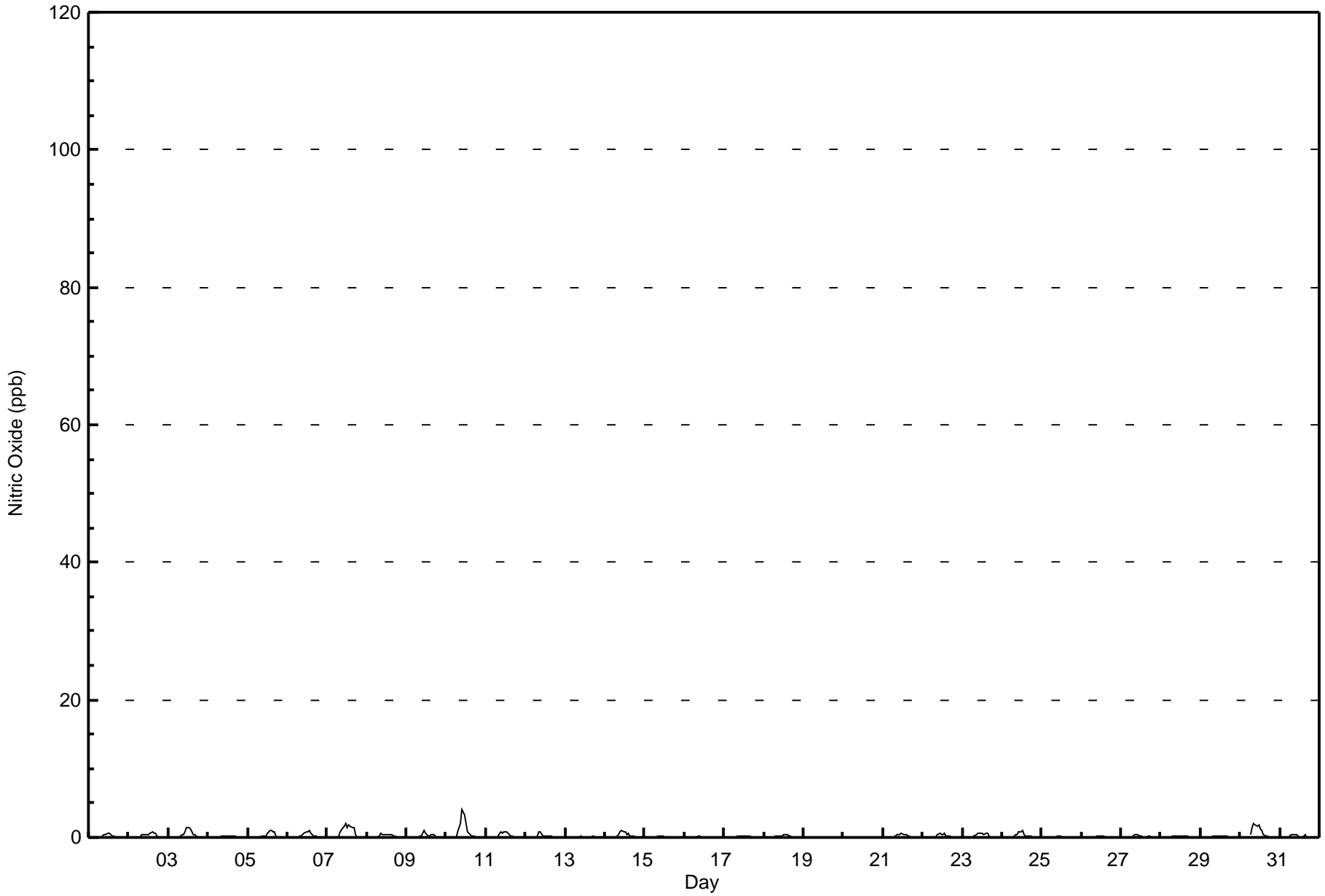


Maximum Value: 4 ppb on Mar 10 10:00																	Maximum Daily Average: 0.8 ppb on Mar 10										Hours in Service: 744																
Minimum Value: 0 ppb on Mar 10 20:00																	Minimum Daily Average: 0.0 ppb on Mar 20										Hours of Data: 708																
Maximum Diurnal Average: 0.6 ppb at hour 12																	Minimum Diurnal Average: 0.0 ppb at hour 1										Hours of Missing Data: 36																
Monthly Average: 0.2 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 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-Mar	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1																	
2-Mar	0	Z	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0.2	1																	
3-Mar	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1																	
4-Mar	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																	
5-Mar	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0.3	1																	
6-Mar	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1																	
7-Mar	Z	0	0	0	0	0	0	0	1	2	2	2	1	2	2	2	1	0	0	0	0	0	0	0	0.6	2																	
8-Mar	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																	
9-Mar	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																	
10-Mar	0	0	0	Z	0	0	0	1	2	4	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0.8	4																	
11-Mar	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1																	
12-Mar	0	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																	
13-Mar	Z	0	0	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0.0	0																	
14-Mar	0	Z	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1																	
15-Mar	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																	
16-Mar	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																	
17-Mar	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																	
18-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1																	
19-Mar	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																	
20-Mar	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																	
21-Mar	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																	
22-Mar	0	0	0	0	0	0	0	Z	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1																	
23-Mar	0	0	0	0	Z	0	0	0	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0.2	1																	
24-Mar	0	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1																	
25-Mar	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																	
26-Mar	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																	
27-Mar	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																	
28-Mar	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																	
29-Mar	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																	
30-Mar	0	0	0	0	0	Z	0	2	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0.6	2																	
31-Mar	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																	
																	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.5	0.6	0.6	0.5	0.4	0.4	0.3	0.2	0.1	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	2	2	4	4	3	2	2	2	2	1	0	0	0	0	0	0	0	0	0	Diurnal Maximum
Z - zerospan		C - Calibration																																									



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Stony Mountain - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Stony Mountain - March 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 - March 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	46	48	35	50	38	57	67	73	80	73	8	7	13	30	32	41	698
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	46	48	35	50	38	57	67	73	80	73	8	7	13	30	32	41	698

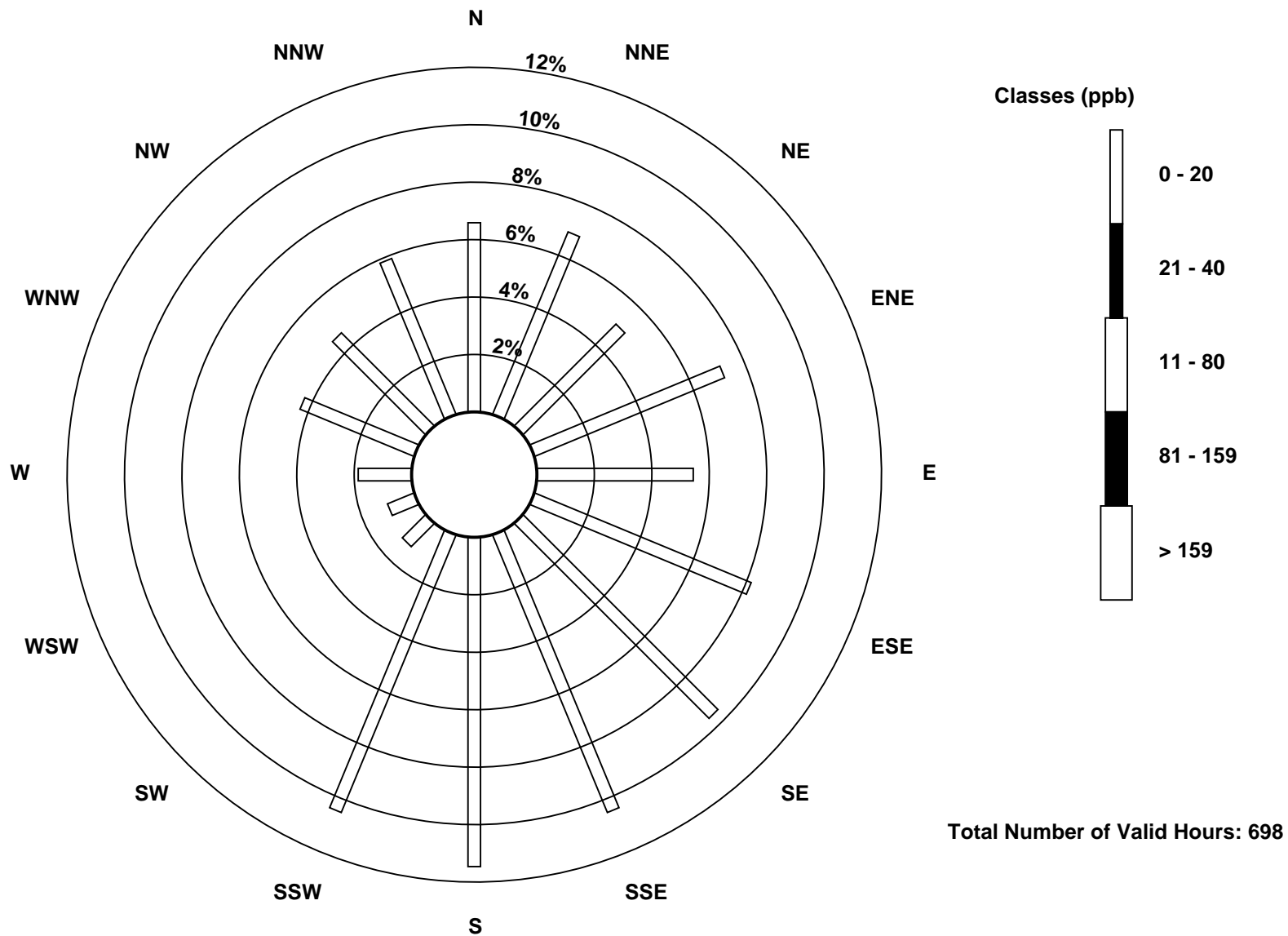
Total Number of Valid Hours: 698

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

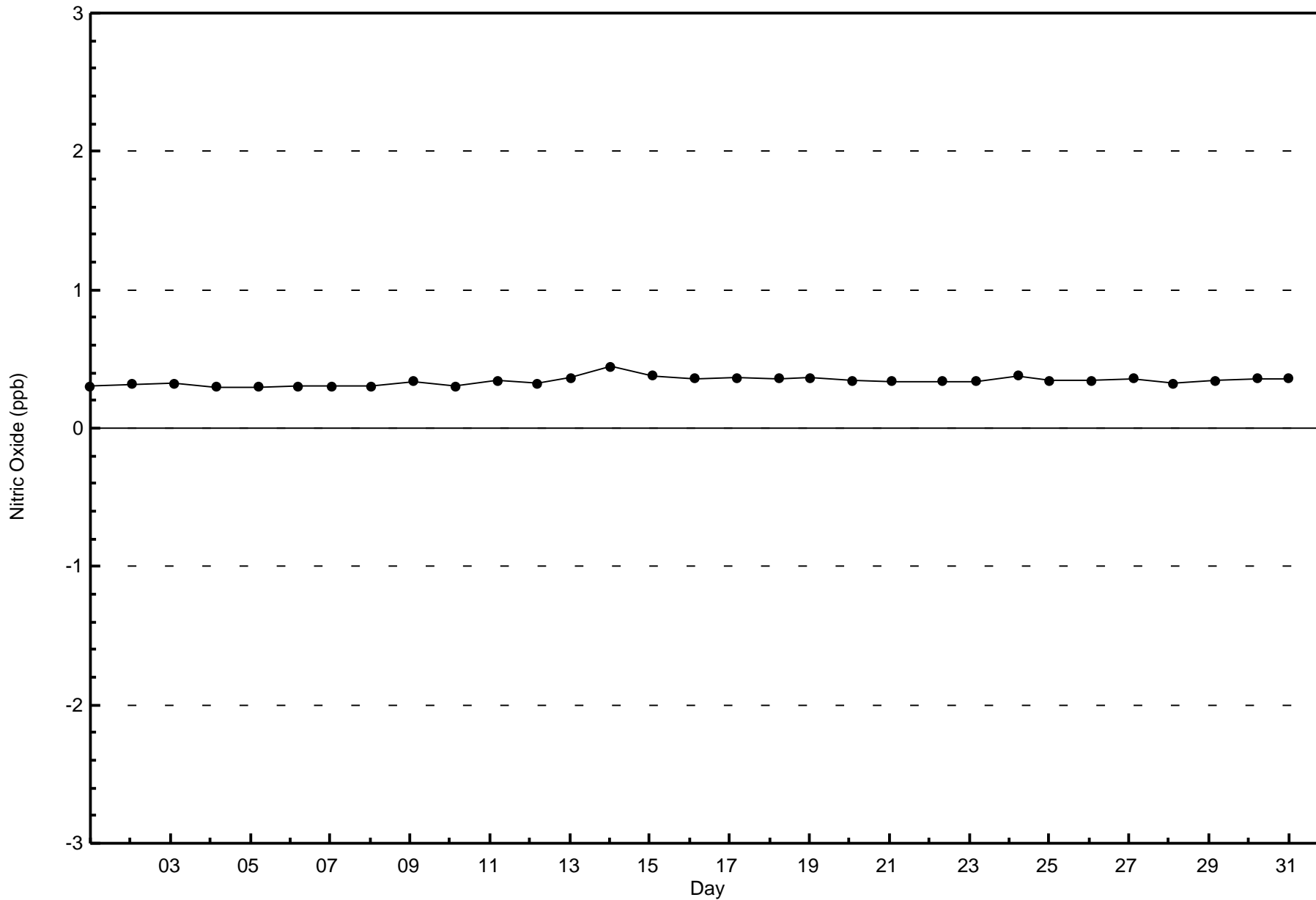
Nitric Oxide (NO) - ppb
Stony Mountain (AMS 18)





Wood Buffalo Environmental Association
Zero Responses

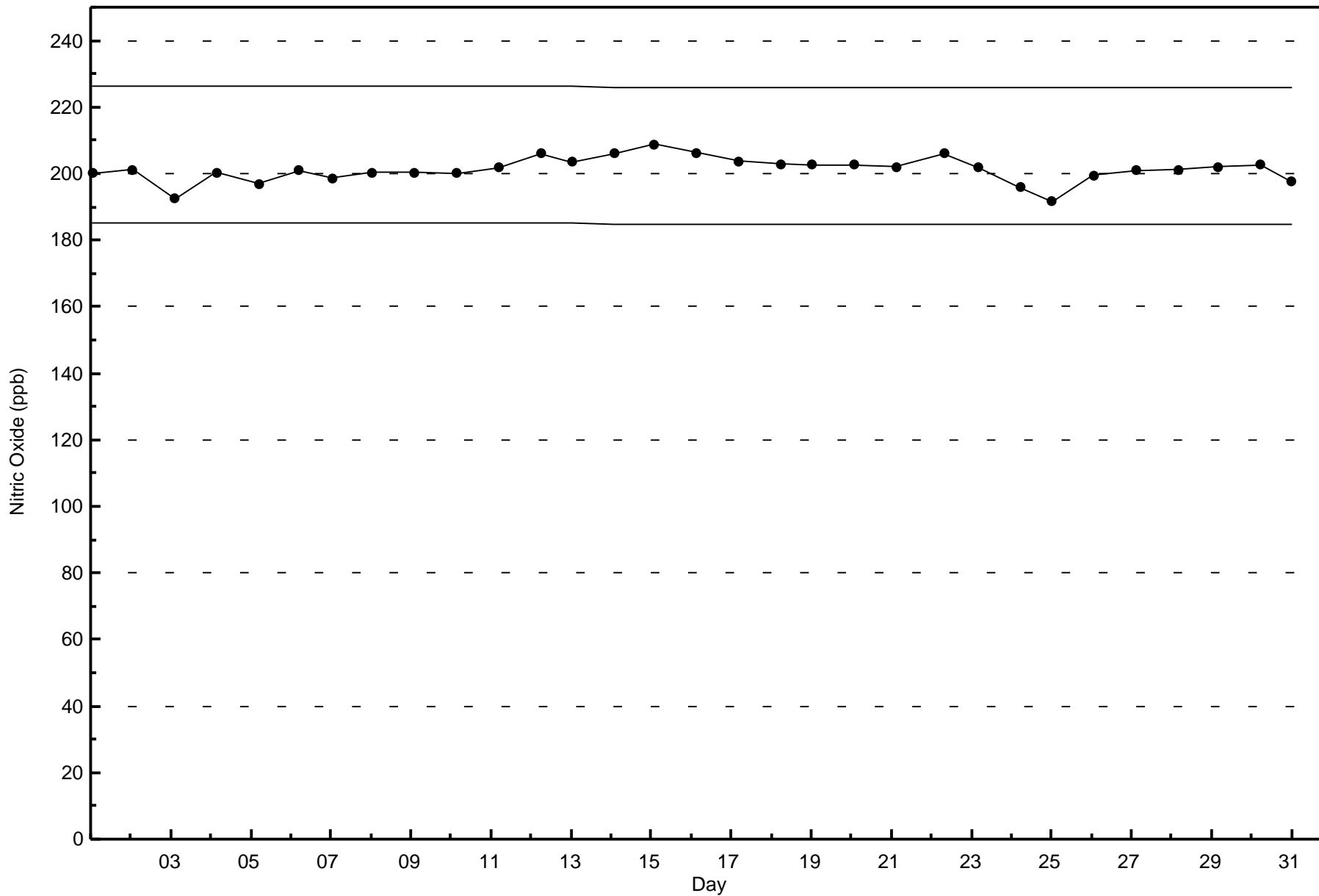
Nitric Oxide (NO) - ppb
Stony Mountain - March 2017





Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Stony Mountain - March 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 10 ppb on Mar 8 20:00	Maximum Daily Average: 3.4 ppb on Mar 7
Minimum Value: 0 ppb on Mar 5 01:00	Hours of Data: 708
Maximum Diurnal Average: 2.2 ppb at hour 8	Hours of Missing Data: 36
Monthly Average: 1.9 ppb	Hours of Calibration: 36
Minimum Daily Average: 0.4 ppb on Mar 20	Percent Operational Time: 100.0
Minimum Diurnal Average: 1.5 ppb at hour 15	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 6	

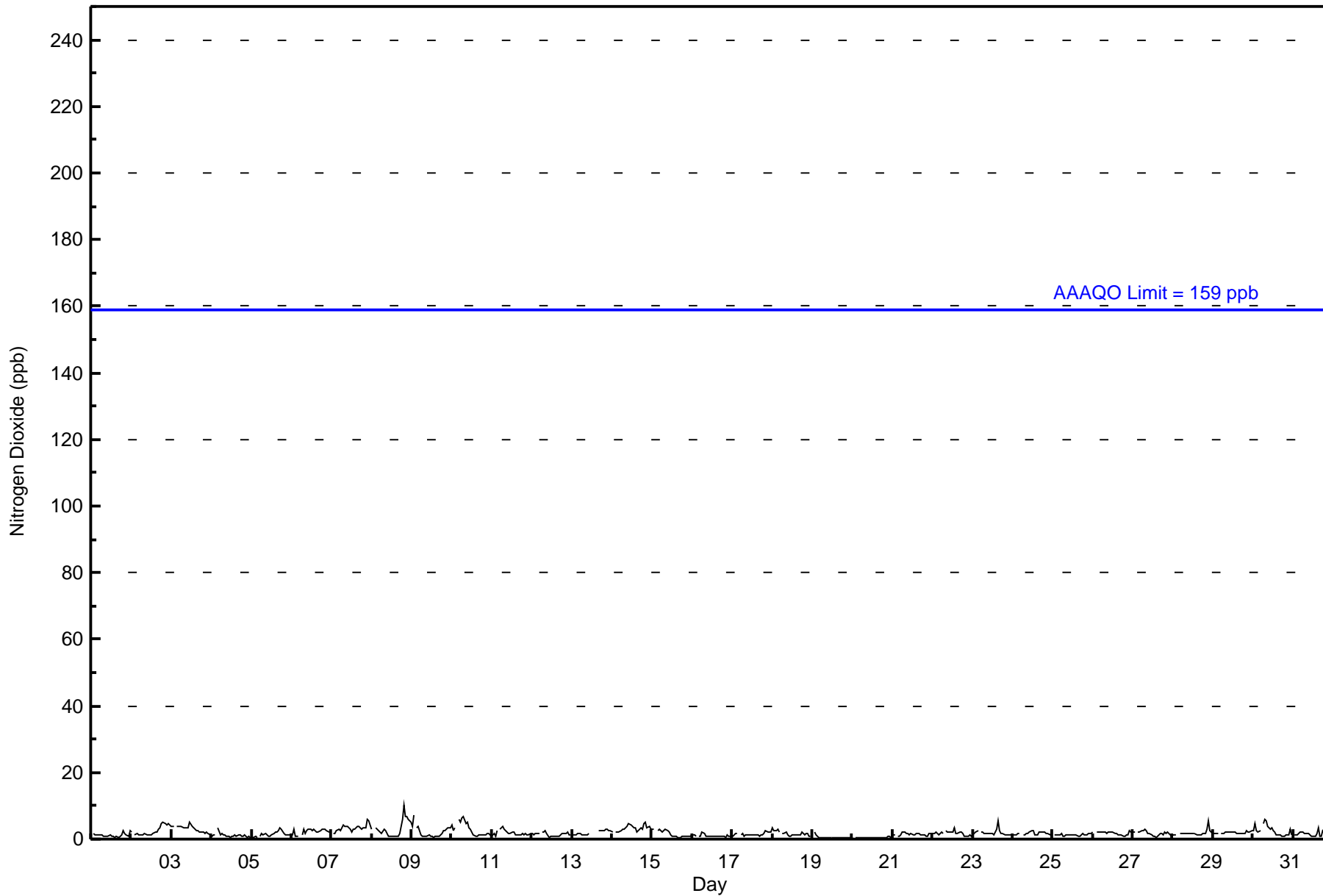
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Mar	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	1	1	2	1.2	3																							
2-Mar	2	Z	1	2	1	1	1	1	2	1	1	1	2	2	2	3	4	5	5	5	4	5	4	4	2.5	5																							
3-Mar	4	4	Z	4	4	4	4	4	3	3	4	5	4	4	3	2	3	2	2	2	2	2	1	1	3.1	5																							
4-Mar	1	1	1	Z	4	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	4																							
5-Mar	0	1	1	1	Z	1	2	1	2	1	1	1	2	2	2	3	4	3	2	1	1	1	1	1	1.5	4																							
6-Mar	1	3	1	1	1	Z	1	3	2	3	3	3	3	3	3	2	2	3	3	3	3	3	2	2	2.3	3																							
7-Mar	Z	2	2	2	3	3	3	4	4	4	3	3	2	3	3	4	4	3	3	3	4	6	6	4	3.4	6																							
8-Mar	3	Z	4	3	3	2	2	3	3	2	1	1	1	1	1	1	2	6	10	7	7	6	5	3.1	10																								
9-Mar	4	7	Z	3	4	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	4	4	4	2.1	7																								
10-Mar	4	3	4	Z	6	5	6	7	5	5	4	3	2	1	1	1	1	1	1	1	1	2	2	1	2.9	7																							
11-Mar	1	2	1	3	Z	3	4	3	2	2	2	2	2	1	1	1	1	1	2	1	2	1	1	2	1.8	4																							
12-Mar	2	1	2	2	2	Z	2	2	3	2	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1.4	3																							
13-Mar	Z	1	1	2	2	2	1	1	1	1	2	C	C	C	C	C	2	3	3	3	3	3	2	2	2.0	3																							
14-Mar	2	Z	2	2	2	2	3	3	4	4	5	4	4	3	3	2	3	3	3	5	5	4	4	3	3.3	5																							
15-Mar	3	3	Z	3	3	3	2	3	3	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.6	3																							
16-Mar	1	1	1	Z	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2																							
17-Mar	1	1	2	2	Z	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	3	2	2	2	1.5	3																							
18-Mar	3	2	3	3	2	Z	2	2	2	1	1	1	1	1	1	1	1	1	2	1	2	2	1	1	1.6	3																							
19-Mar	Z	2	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	1	1	0	0.6	2																							
20-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	0.4	1																							
21-Mar	1	1	Z	1	1	1	2	2	2	2	1	2	1	1	2	2	2	1	1	1	1	1	2	2	1.4	2																							
22-Mar	2	2	2	2	1	2	2	Z	2	2	2	2	2	3	2	2	2	2	2	1	1	1	1	1	1.8	3																							
23-Mar	1	2	2	3	Z	2	2	2	2	2	2	2	2	1	3	5	3	2	2	1	1	1	1	1	1.9	5																							
24-Mar	1	1	1	2	2	Z	1	1	2	2	2	2	3	1	1	1	2	2	2	2	2	1	2	1	1.7	3																							
25-Mar	Z	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	2	2	1.2	2																							
26-Mar	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	3	2	1.8	3																							
27-Mar	2	2	Z	2	2	2	3	3	2	2	2	1	1	1	1	1	2	2	1	2	2	2	1	1	1.7	3																							
28-Mar	1	1	1	Z	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	3	6	2	2	1.8	6																							
29-Mar	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2.0	3																							
30-Mar	3	5	3	2	3	Z	5	6	6	4	3	3	2	2	1	1	1	1	1	1	1	1	3	1	2.6	6																							
31-Mar	Z	1	1	2	2	2	2	2	2	2	1	1	1	1	2	3	1	1	3	2	2	2	2	2	1.7	3																							
																								2.0	2.1	1.7	1.9	2.1	1.9	2.1	2.2	2.1	1.9	1.7	1.8	1.6	1.5	1.5	1.6	1.6	1.6	1.9	2.0	2.0	2.2	2.0	1.9	Diurnal Average	
																								4	7	4	4	6	5	6	7	6	5	5	5	4	4	3	5	4	4	6	10	7	7	6	5	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 - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - March 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 - March 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	46	48	35	50	38	57	67	73	80	73	8	7	13	30	32	41	698
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	46	48	35	50	38	57	67	73	80	73	8	7	13	30	32	41	698

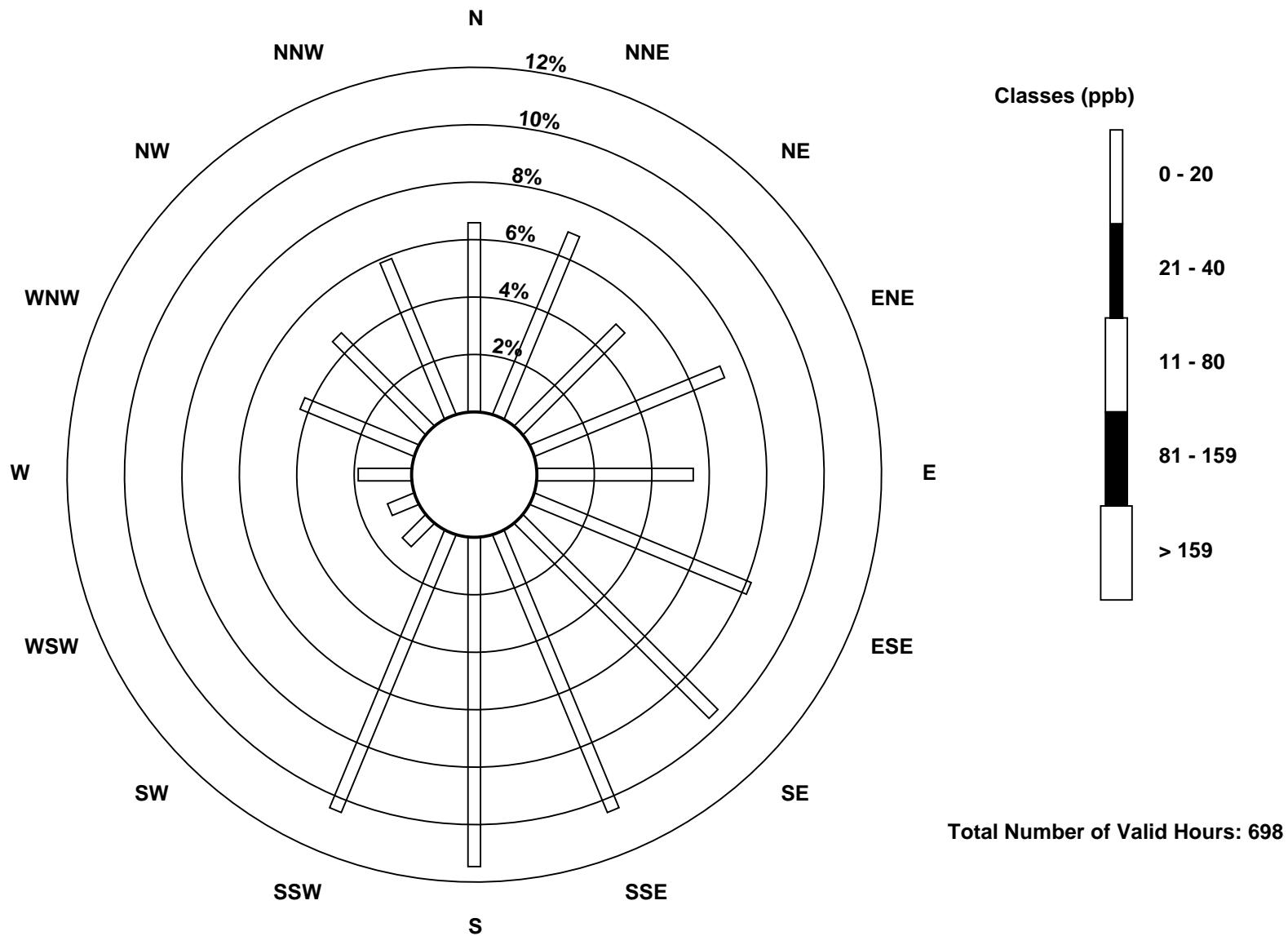
Total Number of Valid Hours: 698

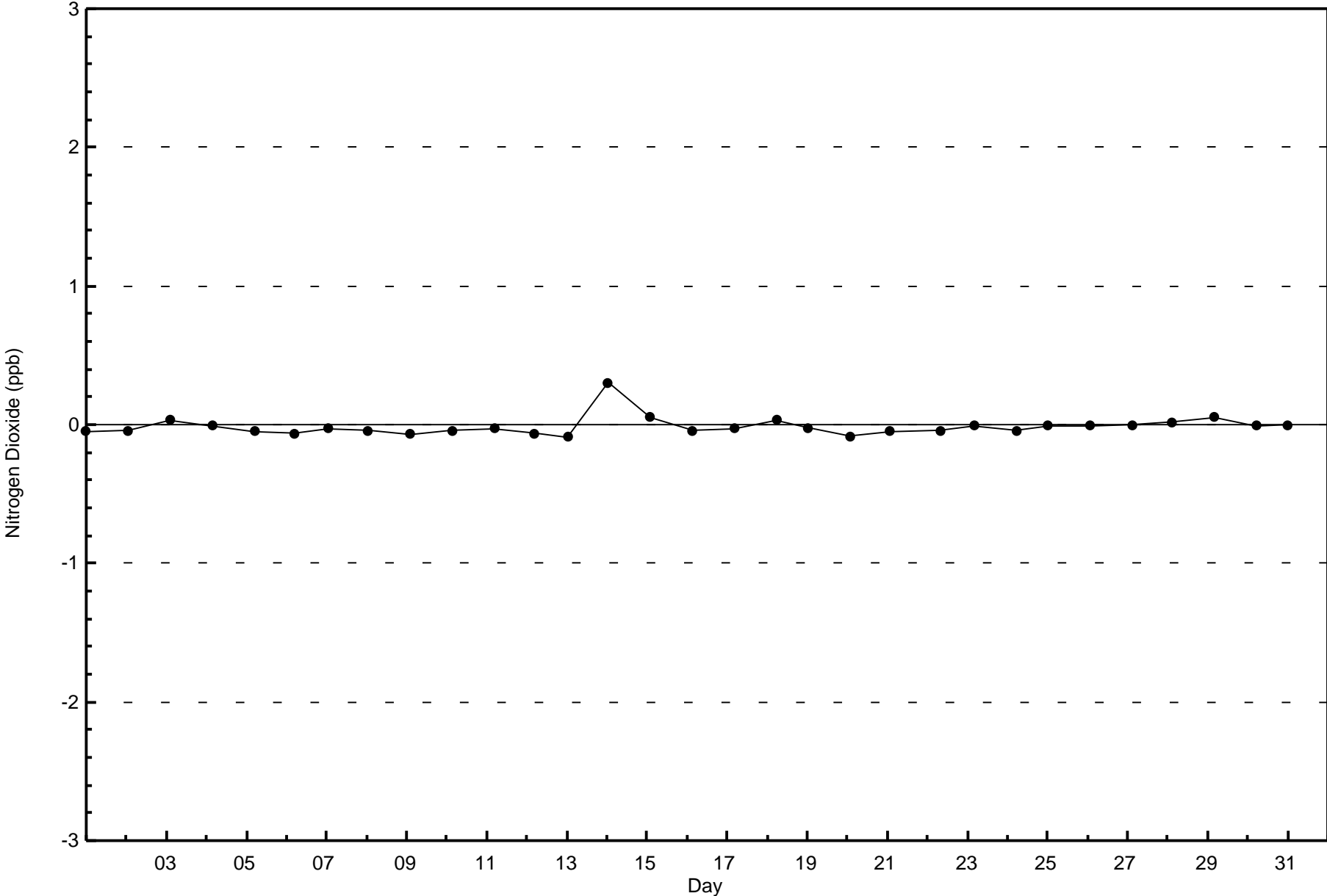
Total Number of Hours: 744

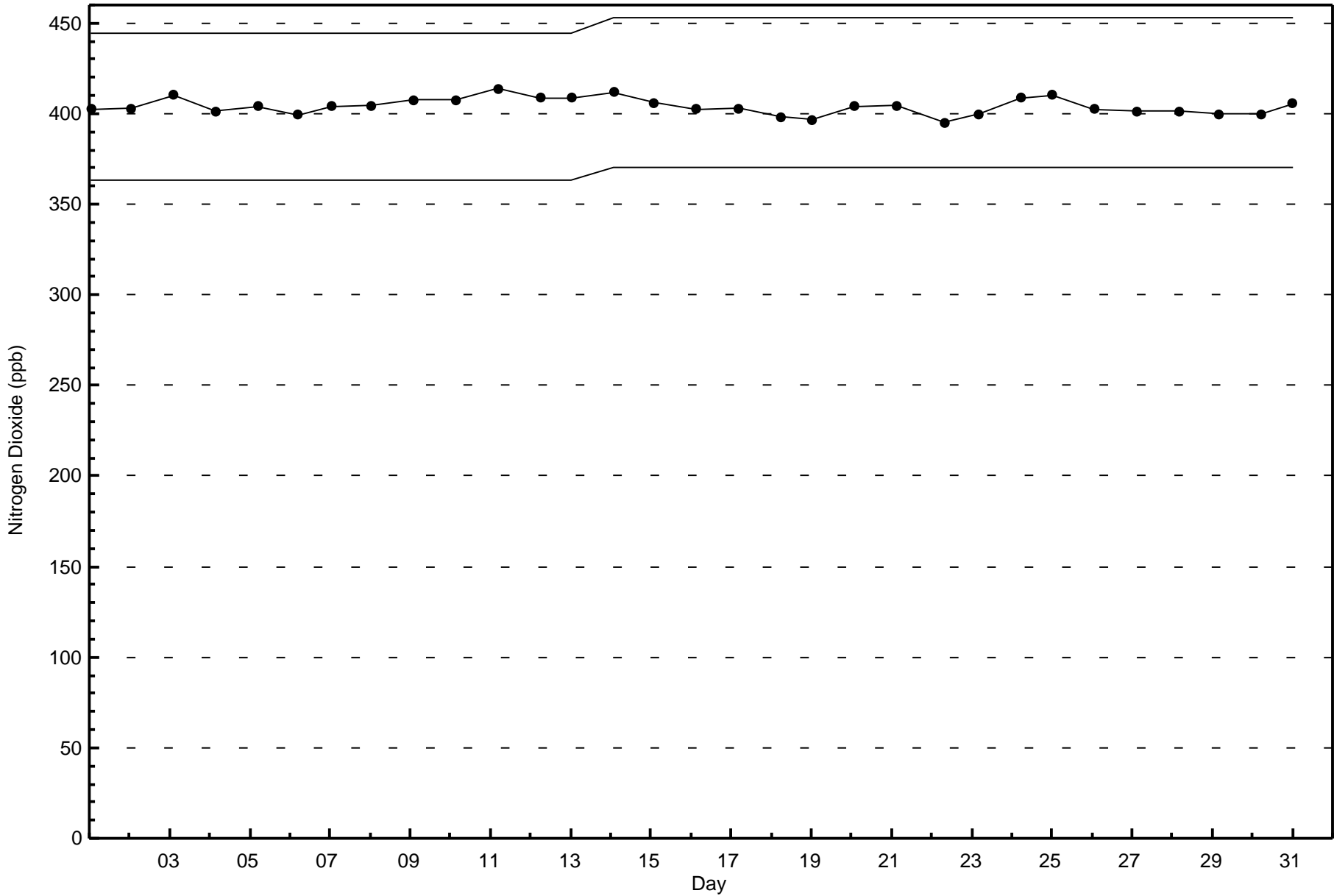


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Dioxide (NO₂) - ppb
Stony Mountain (AMS 18)









Wood Buffalo Environmental Association
Summary of Hour Averages

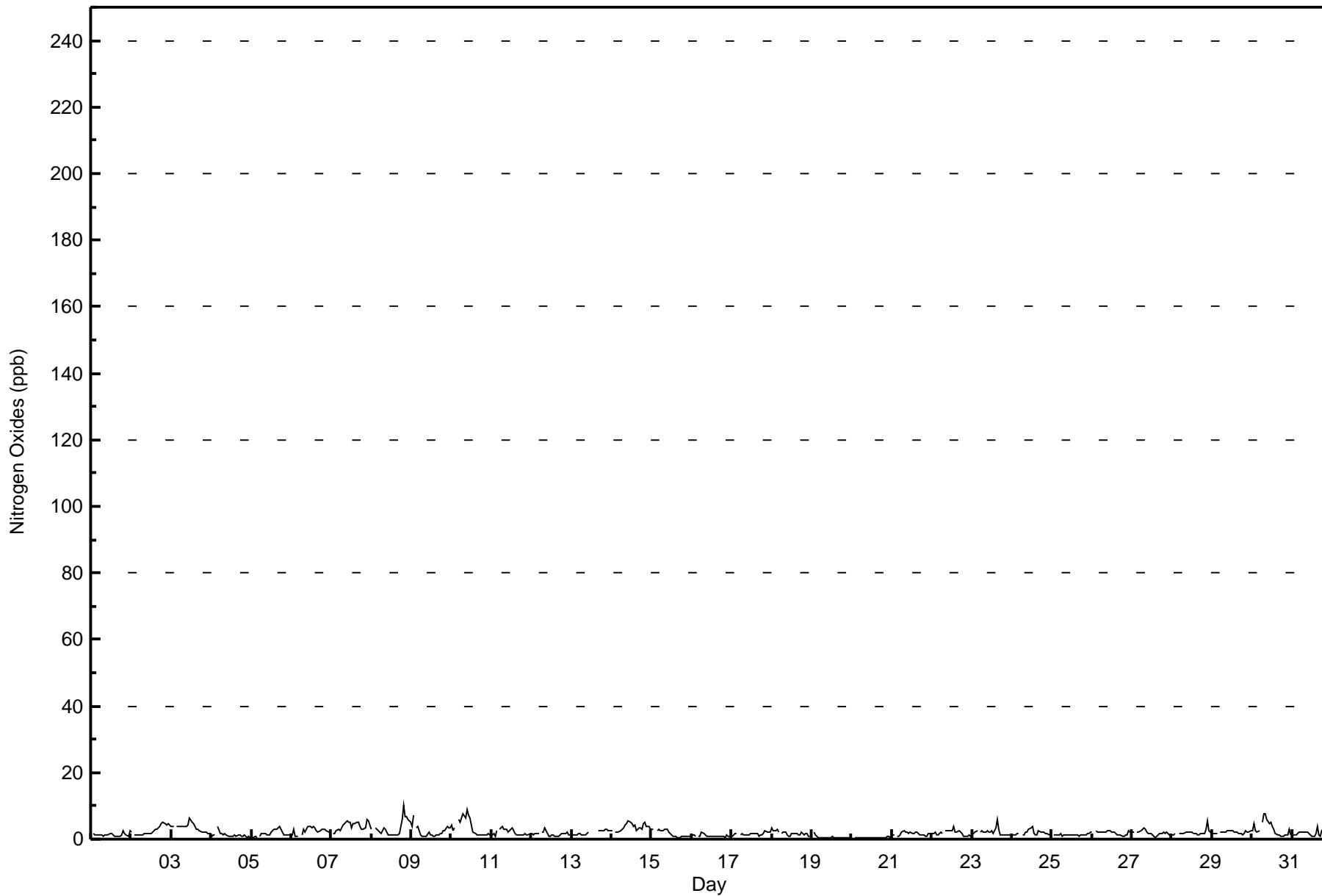
Nitrogen Oxides (NO_x) - ppb
Stony Mountain - March 2017

Maximum Value: 10 ppb on Mar 8 20:00																	Maximum Daily Average: 4.0 ppb on Mar 7																	Hours in Service: 744			
Minimum Value: 0 ppb on Mar 19 20:00																	Minimum Daily Average: 0.5 ppb on Mar 20																	Hours of Data: 708			
Maximum Diurnal Average: 2.5 ppb at hour 9																	Minimum Diurnal Average: 1.7 ppb at hour 3																	Hours of Missing Data: 36			
Monthly Average: 2.0 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 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-Mar	Z	2	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	2	2	1	1	2	1.3	2											
2-Mar	2	Z	1	1	1	1	1	1	2	2	2	2	2	3	3	3	4	5	5	4	4	5	4	2.7	5												
3-Mar	4	4	Z	4	4	4	4	4	4	4	6	5	5	4	3	3	2	2	2	2	2	2	1	3.4	6												
4-Mar	1	1	1	Z	4	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1.2	4												
5-Mar	0	0	1	1	Z	1	2	2	2	1	1	1	2	3	3	3	4	3	1	1	1	1	1	1.7	4												
6-Mar	1	3	1	1	1	Z	1	3	2	3	4	4	3	4	3	3	2	3	3	3	3	3	2	2.5	4												
7-Mar	Z	2	2	2	3	3	3	4	5	5	5	5	4	5	5	5	5	4	3	3	4	6	6	4.0	6												
8-Mar	3	Z	3	3	3	2	2	3	3	2	1	1	1	1	1	1	2	6	10	7	7	6	5	3.3	10												
9-Mar	4	7	Z	3	4	1	1	1	1	1	2	1	1	1	1	1	2	1	3	3	4	3	4	2.3	7												
10-Mar	4	3	4	Z	6	5	6	8	6	9	7	6	4	2	2	1	1	1	1	1	1	2	1	3.7	9												
11-Mar	1	2	1	3	Z	3	4	3	3	3	2	3	3	3	2	1	1	1	1	1	2	1	1	2.0	4												
12-Mar	2	1	1	2	2	Z	2	2	3	2	1	1	1	1	1	1	1	1	2	2	2	2	1	1.6	3												
13-Mar	Z	1	1	1	2	2	1	1	1	2	2	C	C	C	C	C	3	3	3	3	3	3	2	2.0	3												
14-Mar	2	Z	2	2	2	2	3	3	4	5	6	5	5	4	4	2	3	3	3	5	5	4	3	3.5	6												
15-Mar	3	3	Z	3	3	3	2	3	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1.6	3												
16-Mar	1	1	1	Z	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2												
17-Mar	1	1	2	2	Z	1	2	1	1	1	1	2	2	2	2	2	1	1	1	2	3	2	2	1.5	3												
18-Mar	3	2	3	3	2	Z	2	2	2	1	1	1	2	2	2	2	1	1	2	1	2	2	1	1.7	3												
19-Mar	Z	2	1	1	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0.6	2												
20-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.5	1												
21-Mar	1	1	Z	1	1	1	2	3	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	1.6	3												
22-Mar	2	2	2	1	1	2	2	Z	3	3	3	3	3	4	2	2	2	2	2	1	1	1	1	1.9	4												
23-Mar	1	2	2	3	Z	2	2	2	2	2	2	2	2	3	6	3	1	1	1	1	1	1	1	2.1	6												
24-Mar	1	1	1	2	2	Z	1	1	2	2	3	3	4	2	1	1	2	2	2	2	2	1	2	1.9	4												
25-Mar	Z	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1.3	2												
26-Mar	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	3	1.9	3												
27-Mar	2	2	Z	2	2	2	3	3	3	2	2	2	1	1	1	1	2	2	2	2	2	2	1	1.8	3												
28-Mar	1	1	2	Z	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	3	6	2	1.9	6												
29-Mar	2	2	2	2	Z	2	2	2	2	2	3	2	2	2	2	2	2	2	1	1	2	2	2	2.1	3												
30-Mar	3	5	3	2	3	Z	5	8	8	6	5	5	4	3	2	1	1	1	1	1	1	1	3	3.1	8												
31-Mar	Z	1	1	2	2	2	2	2	2	2	2	1	1	1	2	4	1	1	3	2	2	2	2	1.8	4												
																								Diurnal Average													
																								Diurnal Maximum													
2.0 2.1 1.7 1.9 2.1 1.9 2.1 2.4 2.5 2.4 2.3 2.4 2.1 2.0 1.8 1.9 1.8 1.7 1.9 2.0 2.0 2.2 2.0 1.9																																					
4 7 4 4 6 5 6 8 8 9 7 6 5 5 5 6 5 4 6 10 7 7 6 5																																					
Z - zerospan C - Calibration																																					



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Stony Mountain - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Stony Mountain - March 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 - March 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	46	48	35	50	38	57	67	73	80	73	8	7	13	30	32	41	698
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	46	48	35	50	38	57	67	73	80	73	8	7	13	30	32	41	698

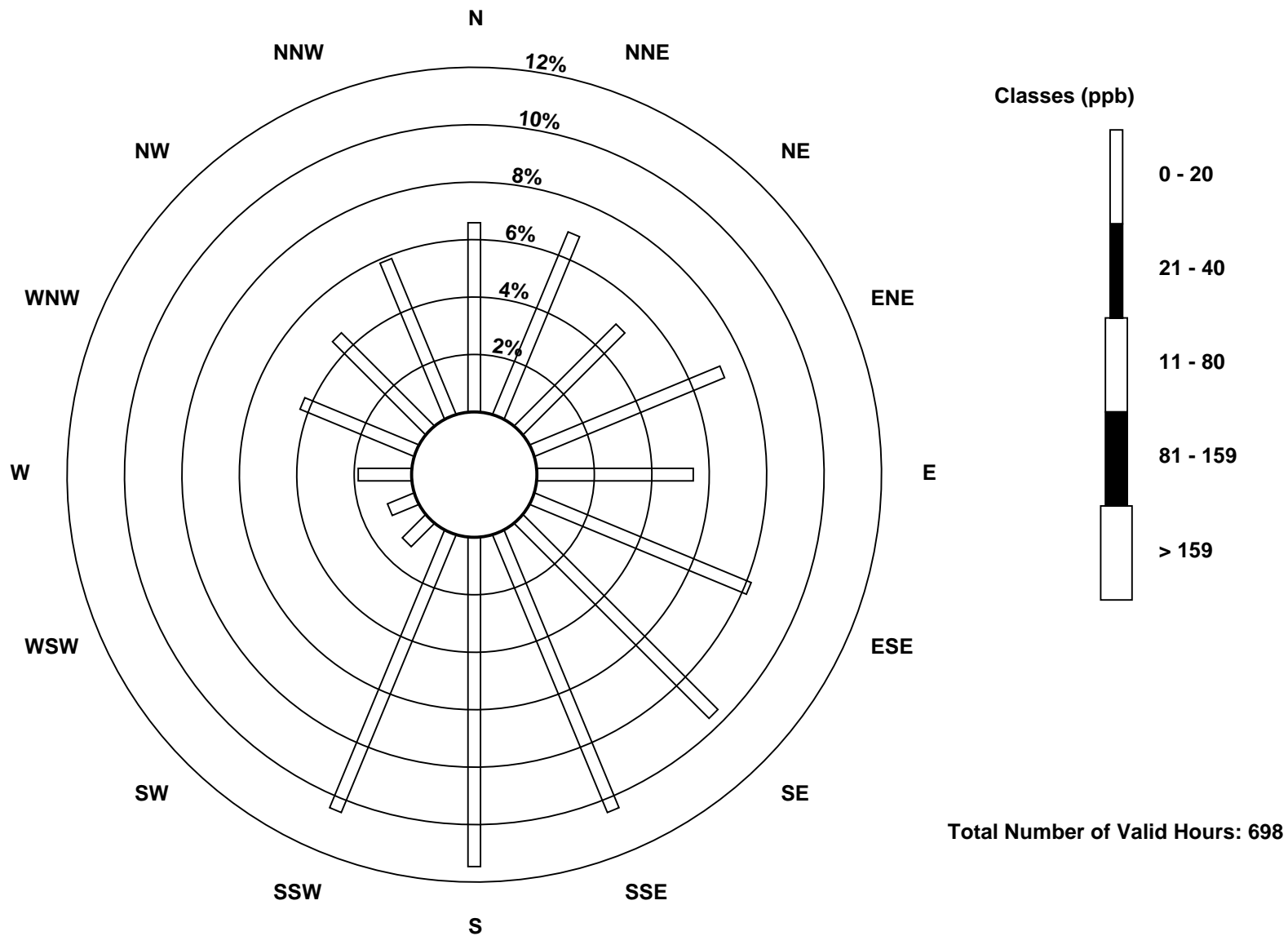
Total Number of Valid Hours: 698

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

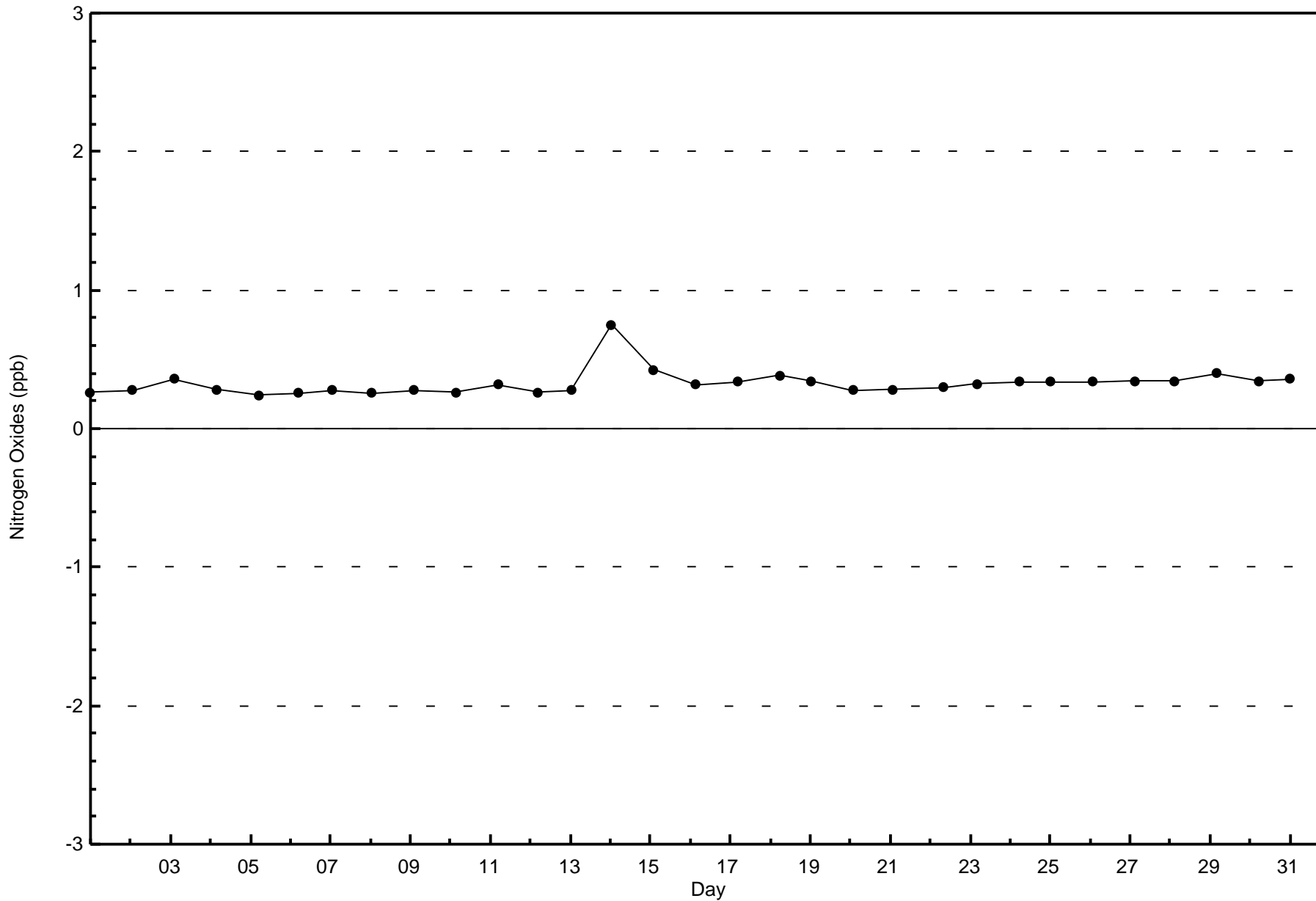
Nitrogen Oxides (NO_x) - ppb
Stony Mountain (AMS 18)

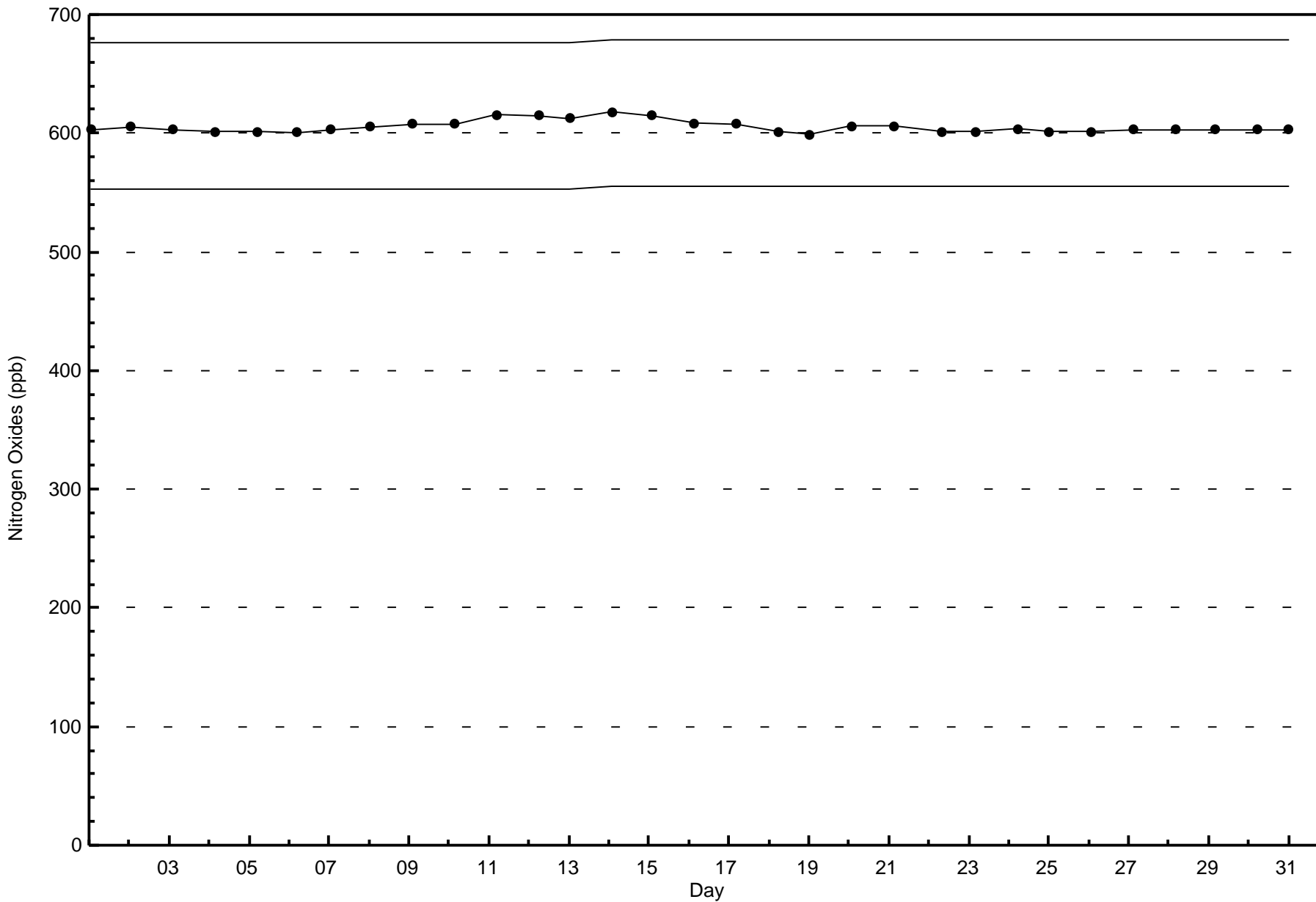




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Stony Mountain - March 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

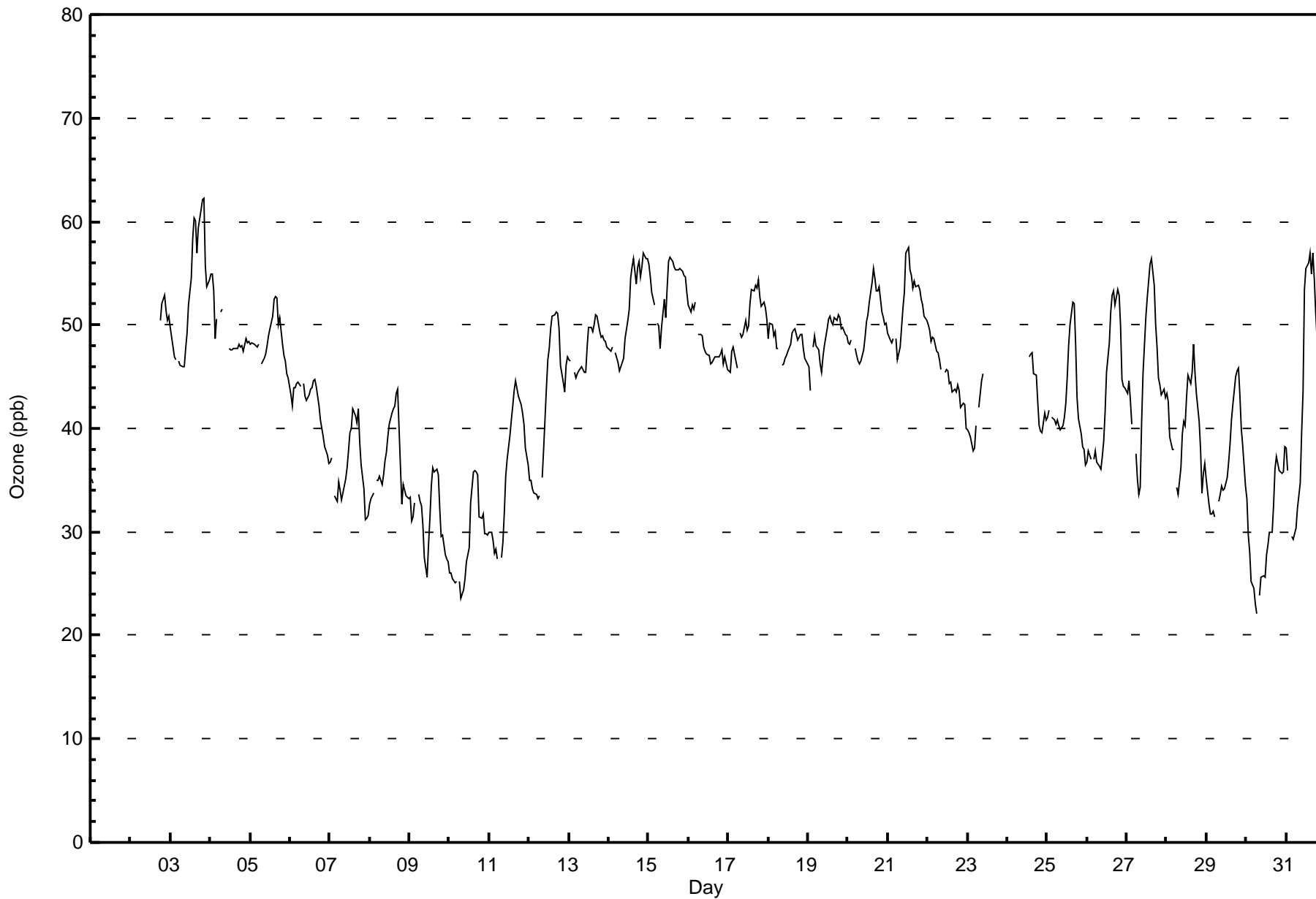
Stony Mountain - March 2017

Number of Exceedences (AAAQO):		1-hr: 0 24-hr: 0		Hours in Service:		744																																											
Maximum Value: 62 ppb on Mar 3 21:00		Maximum Daily Average: 53.6 ppb on Mar 15		Hours of Data:		646																																											
Minimum Value: 22 ppb on Mar 30 07:00		Minimum Daily Average: 29.1 ppb on Mar 10		Hours of Missing Data:		98																																											
Maximum Diurnal Average: 48.3 ppb at hour 17		Minimum Diurnal Average: 40.1 ppb at hour 9		Hours of Calibration:		37																																											
Monthly Average: 43.8 ppb		Percentiles: P ₁ = 25 P ₁₀ = 32 Q ₁ = 38 Median = 46 Q ₃ = 50 P ₉₀ = 53 P ₉₉ = 59		Percent Operational Time:		91.8																																											
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-Mar	35	35	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	35																							
2-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	C	C	51	52	53	51	50	51	--	53																							
3-Mar	50	48	47	47	Z	46	46	46	46	48	49	52	54	58	60	60	57	59	61	62	62	56	54	54	53.2	62																							
4-Mar	55	55	53	49	51	Z	51	51	M	M	M	48	48	48	48	48	48	48	48	48	48	49	48	48	49.4	55																							
5-Mar	48	48	48	48	48	48	Z	46	47	47	48	49	50	51	53	53	53	50	51	48	47	47	45	45	48.5	53																							
6-Mar	43	42	44	44	44	44	44	Z	44	43	43	43	44	44	45	45	44	42	41	40	39	38	37	37	42.4	45																							
7-Mar	37	37	Z	34	33	35	34	33	34	35	36	38	40	40	42	41	41	42	39	36	34	31	31	32	36.3	42																							
8-Mar	33	33	34	Z	35	35	35	35	36	37	38	39	40	41	42	42	43	44	36	33	35	34	34	33	36.8	44																							
9-Mar	33	31	31	33	Z	34	33	32	31	28	26	29	31	34	36	36	36	35	32	30	30	28	27	27	31.5	36																							
10-Mar	26	26	26	25	25	Z	25	24	24	26	27	28	28	33	36	36	36	35	31	31	32	30	30	30	29.1	36																							
11-Mar	30	30	29	28	28	27	Z	27	29	32	35	37	39	41	42	44	45	43	43	42	41	40	38	36	36.0	45																							
12-Mar	35	35	34	34	34	33	34	Z	35	38	44	47	48	50	51	51	51	51	50	46	44	44	46	47	42.6	51																							
13-Mar	47	46	Z	45	45	45	46	46	46	45	45	48	50	50	49	50	51	51	49	49	49	49	48	48	47.7	51																							
14-Mar	48	47	48	Z	47	46	46	46	46	47	49	50	52	55	56	56	54	56	56	55	56	57	56	56	51.5	57																							
15-Mar	56	55	53	52	Z	50	50	48	50	53	51	54	56	57	56	56	55	55	55	55	55	55	55	53	53.6	57																							
16-Mar	52	51	52	51	52	Z	49	49	49	48	47	47	47	46	46	47	47	47	47	47	48	46	47	46	48.2	52																							
17-Mar	46	45	47	48	47	46	Z	49	49	49	49	50	49	50	52	53	53	54	54	54	53	52	52	51	50.2	54																							
18-Mar	49	50	50	49	49	48	48	Z	46	46	47	47	47	48	49	50	50	49	48	49	49	48	47	47	48.2	50																							
19-Mar	46	44	Z	48	49	48	48	46	45	47	48	50	51	51	50	50	51	50	51	51	50	50	49	49	48.7	51																							
20-Mar	48	48	49	Z	48	47	47	46	47	48	49	50	51	52	54	55	55	53	53	54	51	51	50	50	50.2	55																							
21-Mar	49	48	48	49	Z	49	47	48	50	52	53	57	57	55	55	54	54	54	54	53	52	52	51	50	51.8	57																							
22-Mar	50	49	48	49	49	47	47	47	46	Z	45	46	45	44	45	44	44	43	44	44	42	42	42	40	45.4	50																							
23-Mar	40	40	39	38	38	40	Z	42	45	45	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--	45																							
24-Mar	M	M	M	M	M	M	M	M	M	M	M	C	C	47	47	47	45	45	43	40	40	40	41	41	--	47																							
25-Mar	41	42	Z	41	41	40	41	40	40	40	41	42	45	48	48	50	52	52	48	43	41	39	38	36	42.7	52																							
26-Mar	37	38	37	Z	37	38	37	36	36	37	39	42	45	48	51	53	53	52	53	53	50	45	44	44	43.7	53																							
27-Mar	43	45	43	40	Z	38	35	34	34	40	45	51	53	54	56	56	54	50	48	45	44	43	44	43	45.2	56																							
28-Mar	43	43	39	38	38	Z	34	34	36	40	41	40	43	45	44	45	48	45	43	41	38	34	36	37	40.2	48																							
29-Mar	35	33	32	32	32	31	Z	33	34	34	34	34	35	37	39	41	42	45	46	46	43	40	38	34	37.0	46																							
30-Mar	33	30	28	25	25	23	Z	24	26	26	26	26	28	29	30	30	33	36	37	37	36	36	36	38	30.1	38																							
31-Mar	38	36	Z	30	29	30	30	32	35	40	43	53	55	56	57	55	57	55	51	46	43	42	41	40	43.2	57																							
																								42.3	41.7	41.7	40.6	40.1	40.4	40.3	40.5	40.1	41.1	42.3	44.3	45.7	46.9	47.9	48.2	48.3	47.8	46.9	45.7	44.9	43.6	43.3	42.9	Diurnal Average	
																								56	55	53	52	52	50	51	51	50	53	53	57	57	58	60	60	60	57	59	61	62	62	57	56	56	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Stony Mountain - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Stony Mountain - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
21 - 50	513	79.41	79.41
51 - 82	133	20.59	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 646

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Stony Mountain - March 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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 50	43	40	25	33	35	49	51	33	63	50	5	2	3	14	28	31	505
51 - 82	5	6	2	2	3	1	10	28	15	16	1	5	10	16	4	8	132
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	48	46	27	35	38	50	61	61	78	66	6	7	13	30	32	39	637

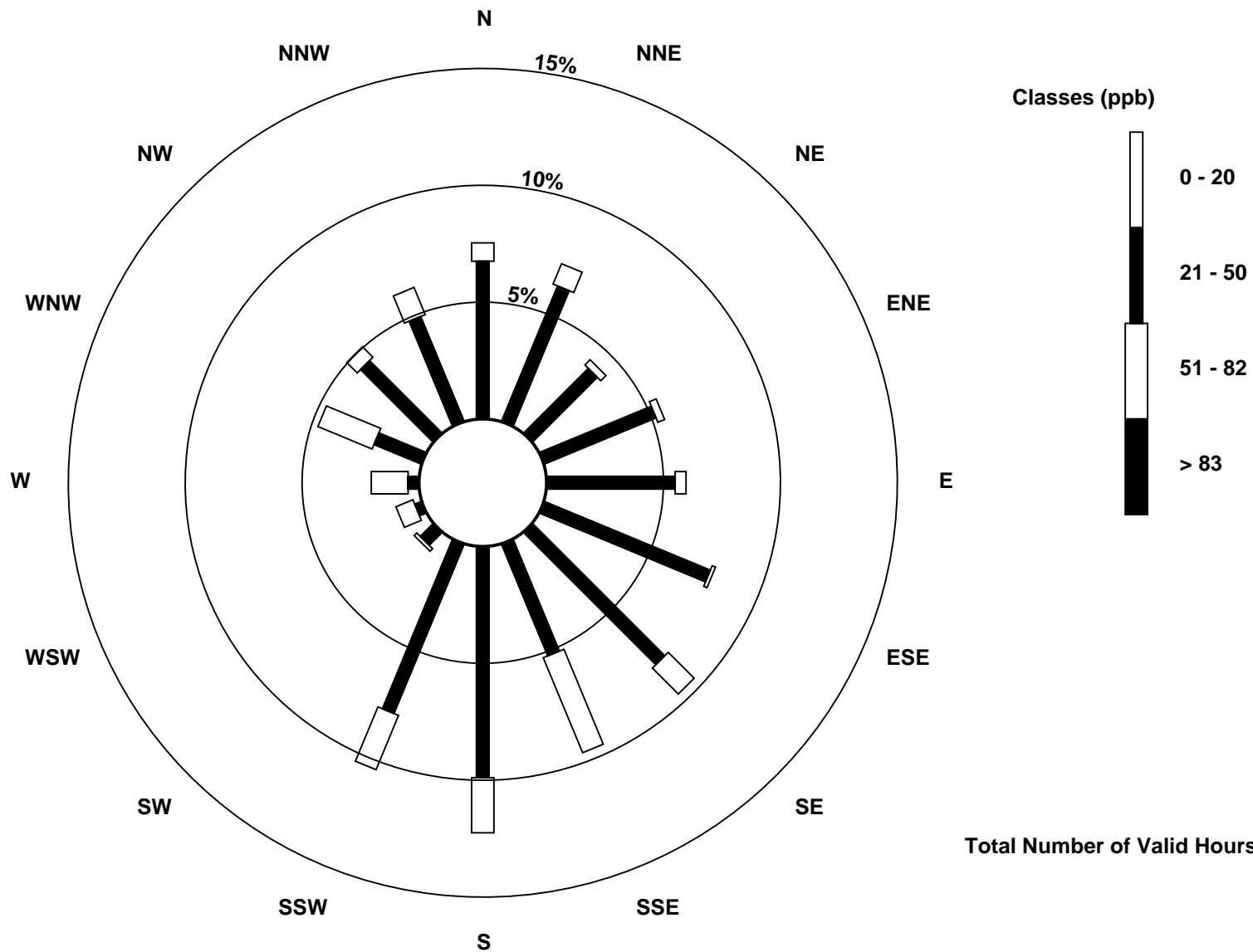
Total Number of Valid Hours: 637

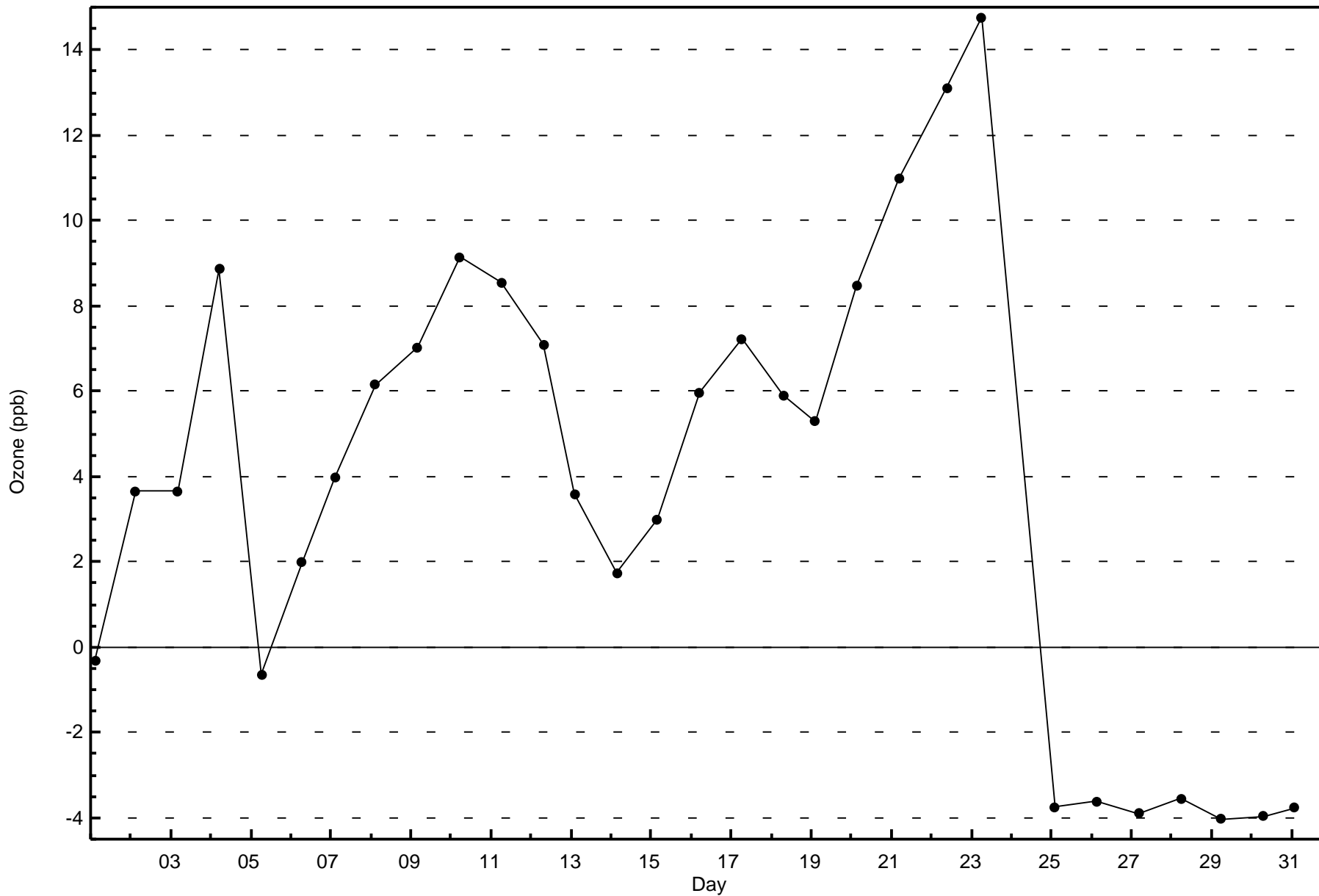
Total Number of Hours: 744

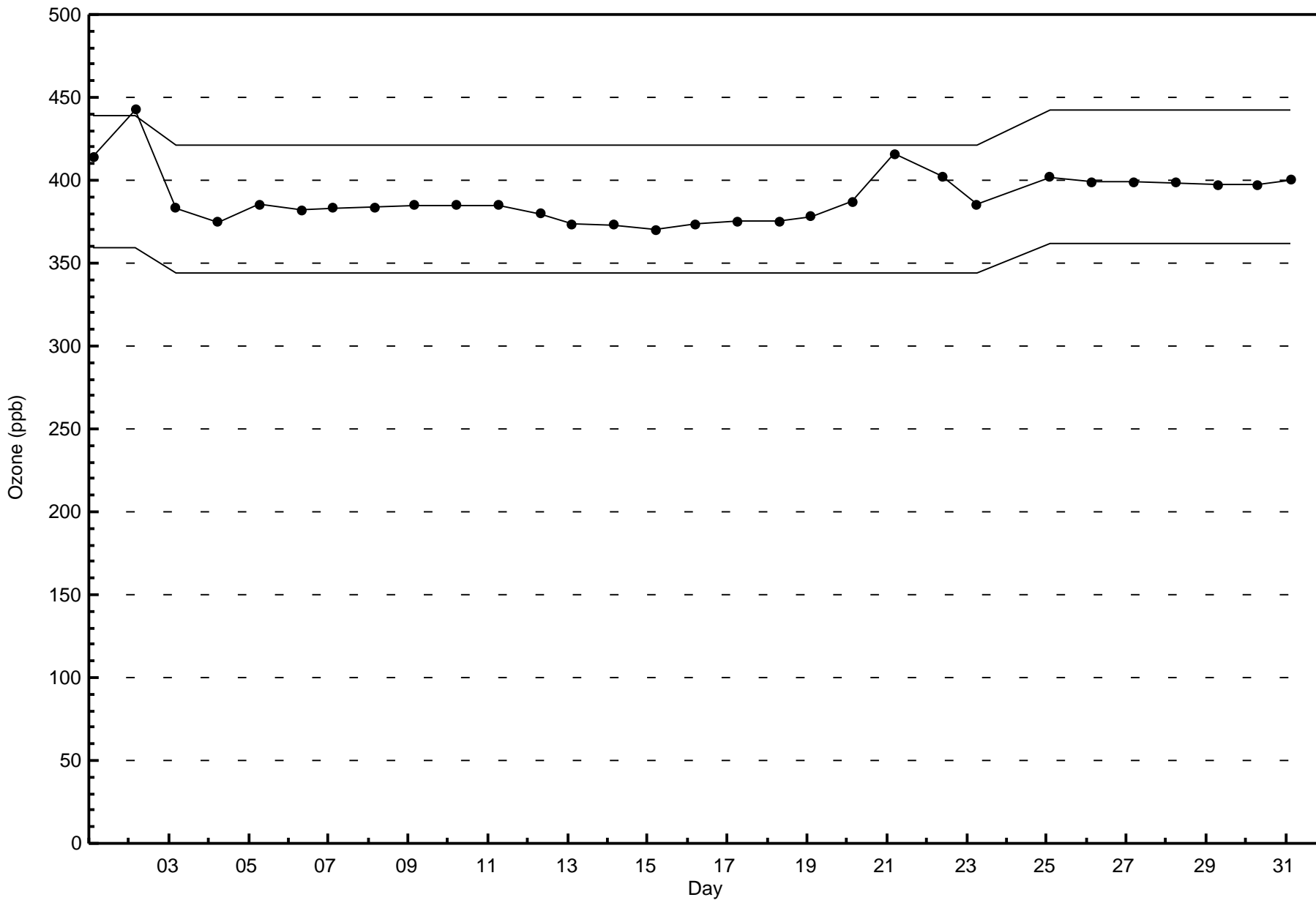


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Ozone (O₃) - ppb
Stony Mountain (AMS 18)









Summary of Hour Averages

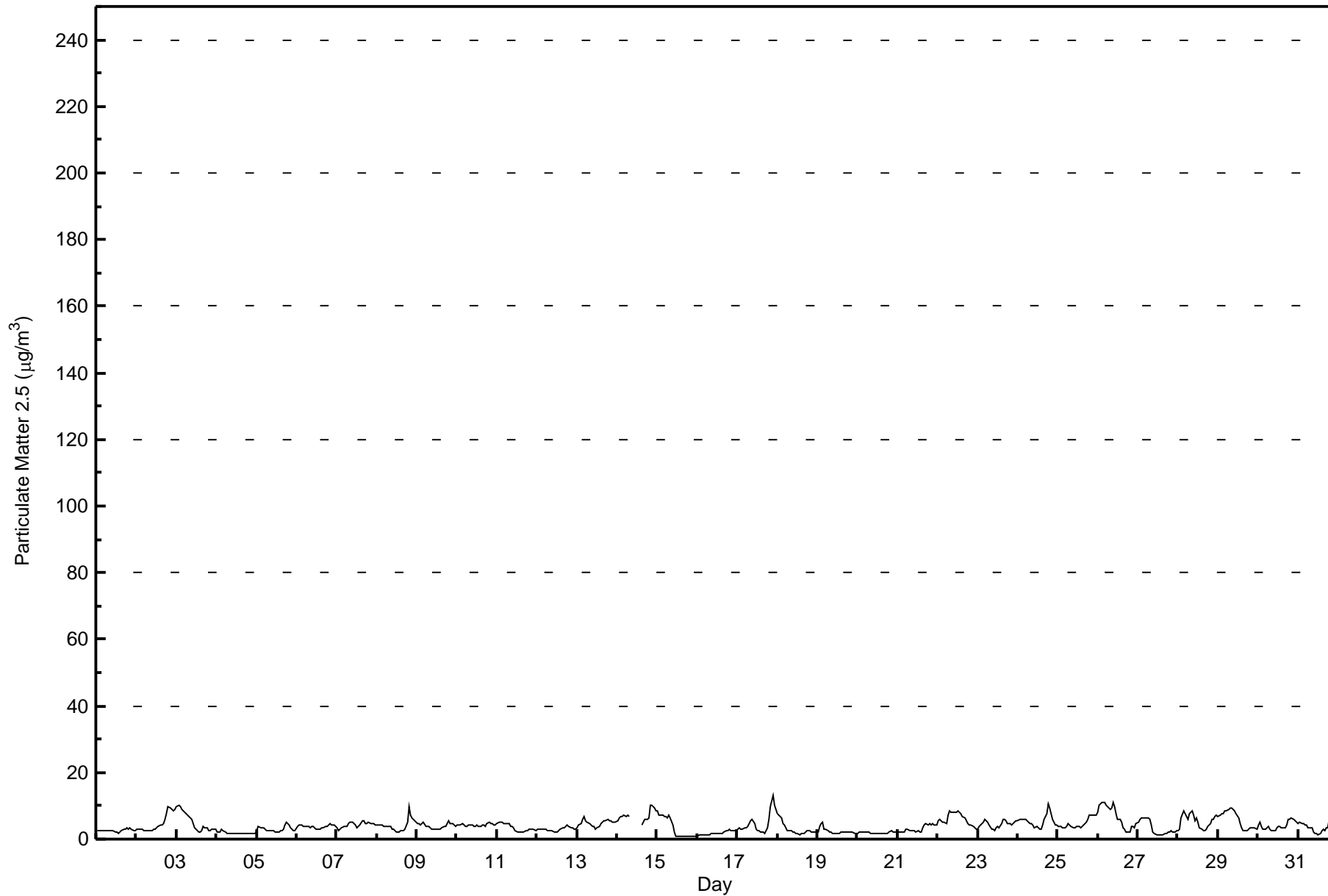
Stony Mountain - March 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 13.3 µg/m ³ on Mar 17 22:00 Maximum Daily Average: 7.1 µg/m ³ on Mar 14		Hours in Service: 744 Hours of Data: 738 Hours of Missing Data: 6 Hours of Calibration: 4 Percent Operational Time: 99.7																								
Minimum Value: 0.7 µg/m ³ on Mar 15 16:00 Maximum Diurnal Average: 4.8 µg/m ³ at hour 21 Monthly Average: 4.06 µg/m ³		Minimum Daily Average: 1.8 µg/m ³ on Mar 4 Minimum Diurnal Average: 2.9 µg/m ³ at hour 14 Percentiles: P ₁ = 0.8 P ₁₀ = 1.8 Q ₁ = 2.5 Median = 3.6 Q ₃ = 5.0 P ₉₀ = 7.2 P ₉₉ = 10.4																								
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-Mar	2.5	2.5	2.5	2.6	2.4	2.5	2.4	2.6	2.6	2.4	2.4	2.3	2.0	1.9	1.9	2.5	2.8	3.0	3.2	3.1	3.3	3.1	2.7	2.7	2.6	3.3
2-Mar	3.1	3.1	3.0	2.9	2.6	2.4	2.6	2.5	2.6	2.6	2.8	3.0	3.2	3.8	4.3	4.1	4.7	5.8	7.6	9.9	9.1	8.7	8.5	9.0	4.7	9.9
3-Mar	9.6	10.0	9.7	9.1	8.6	8.1	7.5	6.9	6.5	5.8	4.8	3.3	2.6	2.1	2.0	2.5	3.8	3.6	3.2	2.7	2.6	3.0	2.9	2.8	5.2	10.0
4-Mar	2.3	2.0	2.2	3.0	2.7	1.9	1.8	1.7	1.6	1.6	1.5	1.5	1.5	1.6	1.6	1.6	1.5	1.6	1.5	1.6	1.6	1.6	1.5	1.5	1.8	3.0
5-Mar	2.7	3.6	3.4	3.2	3.2	2.9	2.6	2.6	2.5	2.5	2.4	2.2	2.3	2.3	2.3	2.4	3.2	4.3	5.0	4.1	3.3	3.0	2.7	2.5	3.0	5.0
6-Mar	3.8	4.4	4.1	4.0	3.7	3.7	3.8	3.8	3.5	3.7	3.7	3.1	3.0	2.9	2.8	3.2	3.4	3.8	3.9	4.2	4.5	4.4	4.1	4.0	3.7	4.5
7-Mar	3.3	2.6	3.0	3.3	3.6	3.6	3.9	4.7	5.0	5.0	4.5	4.2	3.4	3.9	4.2	5.5	5.6	4.7	4.9	5.0	4.8	4.7	4.5	4.2	4.3	5.6
8-Mar	4.4	4.3	4.2	4.2	3.9	3.8	4.0	4.0	3.6	2.9	2.9	2.7	2.0	2.1	2.5	2.7	2.6	2.8	5.1	9.8	7.2	6.4	5.8	5.1	4.1	9.8
9-Mar	4.7	4.7	4.4	4.5	5.1	3.8	3.8	3.8	3.3	3.0	3.1	3.1	3.2	3.1	3.2	3.5	3.8	3.9	4.7	5.3	4.7	4.5	4.1	3.9	4.0	5.3
10-Mar	4.4	4.4	4.2	4.5	4.1	4.0	4.0	4.3	4.1	4.3	3.9	3.9	4.1	4.0	4.0	4.2	4.3	3.9	4.7	5.0	4.6	4.5	4.3	4.4	4.2	5.0
11-Mar	4.8	5.0	5.0	5.1	4.8	4.8	4.7	4.6	4.0	3.7	3.3	2.4	2.2	2.3	2.3	2.3	2.1	2.5	2.7	3.0	3.1	2.9	2.9	2.7	3.5	5.1
12-Mar	2.8	2.8	2.9	2.9	2.9	2.8	2.7	2.7	2.7	2.7	2.2	1.9	2.2	2.8	2.8	3.3	3.4	3.8	4.1	3.9	3.5	3.2	3.1	2.9	3.0	4.1
13-Mar	3.4	4.3	4.8	5.9	6.7	5.6	5.1	4.8	4.4	3.8	3.7	3.1	3.2	3.6	4.9	5.3	5.6	5.5	5.9	5.3	5.4	4.9	4.9	5.3	4.8	6.7
14-Mar	5.7	6.2	6.7	6.6	7.0	7.0	7.1	7.0	C	C	C	C	8.8	DF	DF	4.2	6.0	6.0	5.9	6.4	10.0	10.1	9.3	8.6	7.1	10.1
15-Mar	8.5	7.4	7.2	7.2	6.8	6.7	6.5	7.2	6.4	4.1	2.0	1.0	0.8	0.8	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	3.3	8.5
16-Mar	0.9	1.1	1.1	1.1	1.2	1.1	1.2	1.3	1.6	1.6	1.6	1.7	1.7	1.8	1.8	1.9	2.2	2.4	2.7	3.0	2.7	2.6	2.6	2.6	1.8	3.0
17-Mar	3.0	3.3	3.1	3.1	3.3	3.4	3.8	4.7	5.3	5.7	4.6	2.8	2.4	2.4	2.2	2.0	1.8	2.5	3.3	6.0	9.8	13.3	10.0	8.7	4.6	13.3
18-Mar	7.6	7.1	6.3	4.8	4.2	3.2	2.7	2.6	2.4	2.2	1.9	1.7	1.5	1.4	1.5	1.7	1.8	2.1	2.6	2.5	2.3	2.3	2.2	2.0	2.9	7.6
19-Mar	2.3	3.9	4.8	5.0	3.1	2.9	2.6	2.2	2.0	1.8	1.8	1.8	1.7	1.8	2.2	2.1	2.0	2.2	2.2	2.3	2.3	1.9	1.8	1.7	2.4	5.0
20-Mar	1.8	1.9	2.0	2.1	2.0	1.9	2.0	1.9	1.8	1.7	1.6	1.5	1.6	1.6	1.6	1.6	1.6	1.7	1.9	2.2	2.4	2.2	2.3	2.1	1.9	2.4
21-Mar	2.0	1.9	2.0	2.1	2.2	3.1	2.9	2.5	2.4	2.5	2.5	2.3	2.4	2.0	2.2	3.2	4.1	4.6	4.3	4.9	4.4	4.6	4.3	4.3	3.1	4.9
22-Mar	5.4	6.1	5.4	5.3	5.1	4.6	7.1	8.6	8.3	7.9	8.0	8.1	8.6	8.3	7.6	6.6	6.3	5.7	4.7	4.2	4.2	3.9	3.2	3.1	6.1	8.6
23-Mar	3.1	3.8	4.3	5.0	5.9	5.5	5.0	4.3	3.1	2.8	2.6	3.5	3.9	3.4	4.6	6.0	6.0	5.7	4.7	4.6	4.4	4.7	5.2	5.7	4.5	6.0
24-Mar	5.7	5.9	5.9	6.0	5.9	5.7	5.0	4.7	4.8	4.1	3.5	3.9	3.3	2.8	3.1	4.4	6.0	7.5	10.4	9.3	7.7	5.8	4.4	4.1	5.4	10.4
25-Mar	3.7	3.7	3.8	3.6	3.5	3.9	4.6	4.1	3.6	3.2	3.2	3.6	3.6	3.6	3.6	3.5	4.1	4.7	5.0	6.1	7.2	7.3	7.2	7.2	4.6	7.3
26-Mar	8.2	10.2	11.0	11.1	11.1	10.1	9.8	9.1	9.2	10.9	9.8	7.8	5.7	5.8	5.0	3.4	2.8	2.2	2.0	2.1	4.0	3.8	3.6	4.5	6.8	11.1
27-Mar	5.2	6.0	6.2	6.4	6.5	6.2	6.2	6.0	4.4	2.3	1.6	1.3	1.2	1.1	1.1	1.1	1.5	1.8	2.0	2.2	2.3	2.1	2.2	2.5	3.3	6.5
28-Mar	2.4	2.8	6.4	8.7	7.6	6.6	5.9	7.7	8.3	7.1	5.6	6.3	4.9	3.3	2.9	2.7	2.7	2.9	3.6	4.6	5.8	6.0	6.9	7.3	5.4	8.7
29-Mar	6.8	7.3	7.4	7.8	8.4	8.5	8.9	9.1	9.2	8.9	8.4	7.5	6.2	4.5	3.3	2.7	2.4	2.4	2.8	3.5	3.6	3.3	3.2	3.1	5.8	9.2
30-Mar	4.2	5.2	3.9	3.2	3.1	3.6	3.8	3.0	2.7	2.5	2.7	3.4	3.6	3.8	3.3	3.3	3.5	4.2	5.9	6.1	6.2	6.0	5.4	5.1	4.1	6.2
31-Mar	4.8	5.1	4.8	4.5	4.4	4.1	3.6	3.4	3.3	2.2	1.9	1.6	1.5	1.7	2.5	2.9	2.5	3.4	3.5	8.1	12.0	10.6	10.4	9.8	4.7	12.0
																								Diurnal Average		
																								Diurnal Maximum		
4.3 4.6 4.7 4.8 4.7 4.5 4.4 4.5 4.2 3.9 3.5 3.2 3.2 2.9 2.9 3.1 3.4 3.6 4.1 4.6 4.8 4.7 4.4 4.3 9.6 10.2 11.0 11.1 11.1 10.1 9.8 9.1 9.2 10.9 9.8 8.1 8.8 8.3 7.6 6.6 6.3 7.5 10.4 9.9 12.0 13.3 10.4 9.8																										
C - Calibration DF - DAS 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}) - $\mu\text{g}/\text{m}^3$
Stony Mountain - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Stony Mountain - March 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	566	76.69	76.69
6 - 15	158	21.41	98.10
16 - 25	0	0.00	98.10
26 - 80	0	0.00	98.10
> 81.0	0	0.00	98.10

Total Number of Valid Hours: 738

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Stony Mountain - March 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	45	47	33	48	35	46	63	50	48	40	3	3	10	24	33	37	565
6 - 15	5	2	2	3	6	14	6	26	38	40	3	1	0	0	2	4	152
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	50	49	35	51	41	60	69	76	86	80	6	4	10	24	35	41	717

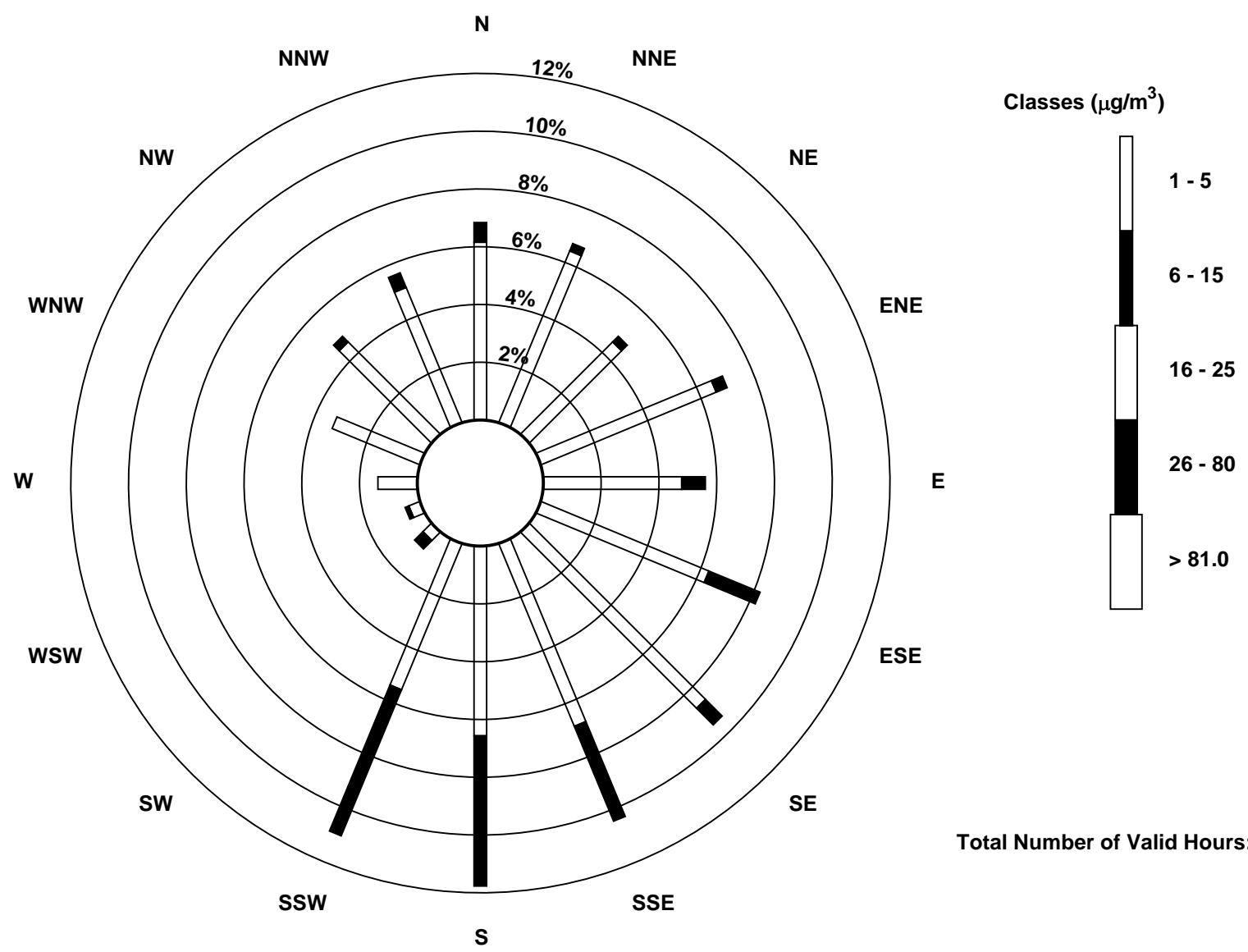
Total Number of Valid Hours: 731

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Stony Mountain (AMS 18)



Total Number of Valid Hours: 731

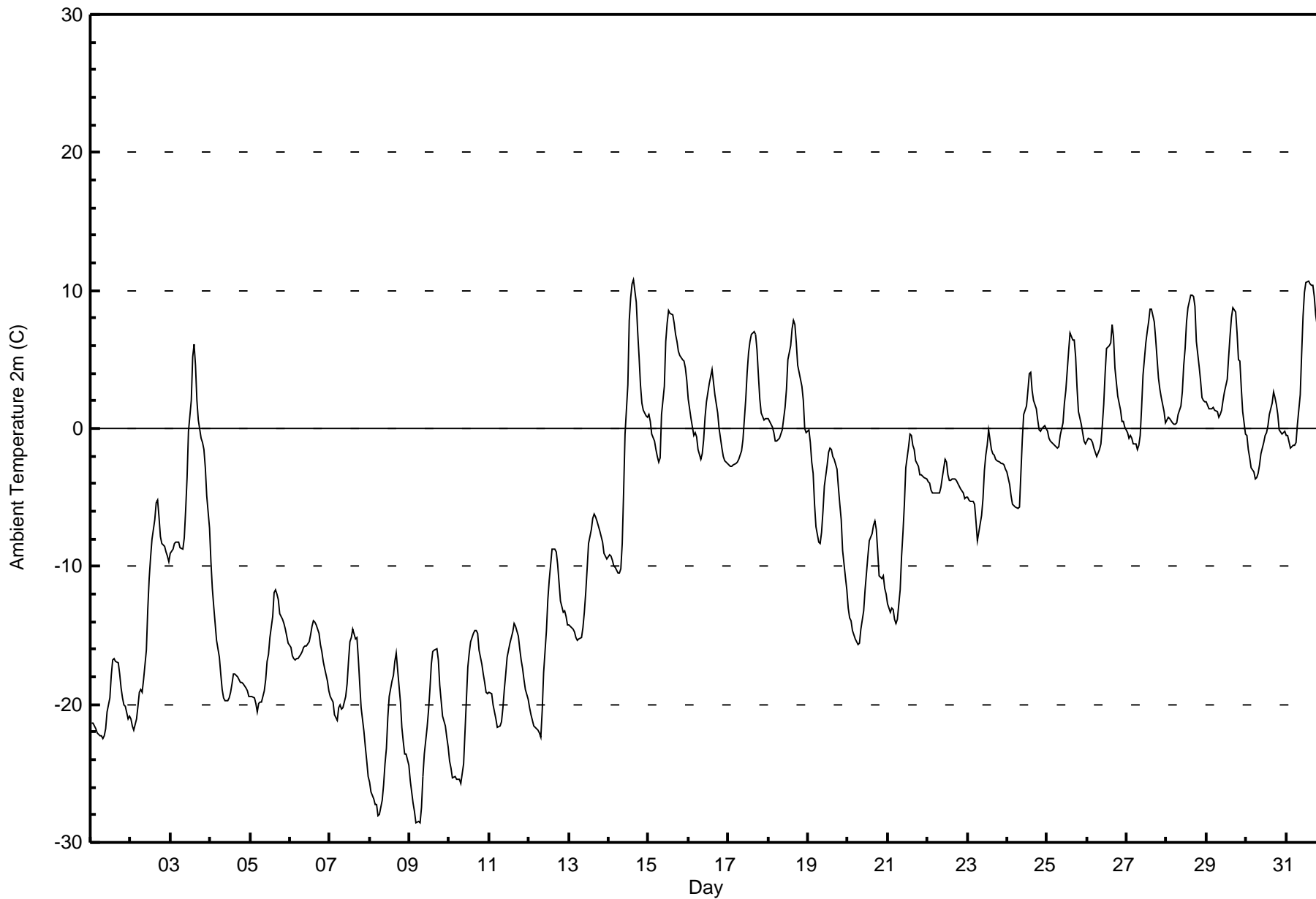


Maximum Value: 10.8 C on Mar 14 16:00 Maximum Daily Average: 4.8 C on Mar 31																						Hours in Service: 744 Hours of Data: 744				
Minimum Value: -28.6 C on Mar 9 05:00 Minimum Daily Average: -23.0 C on Mar 8 Maximum Diurnal Average: -2.5 C at hour 16 Minimum Diurnal Average: -11.2 C at hour 7 Monthly Average: -7.22 C Percentiles: P ₁ = -27.3 P ₁₀ = -20.7 Q ₁ = -16.1 Median = -5.0 Q ₃ = 0.5 P ₉₀ = 5.2 P ₉₉ = 10.3																						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-Mar	-21.3	-21.3	-21.5	-21.8	-22.0	-22.2	-22.3	-22.5	-22.3	-21.7	-20.6	-19.5	-17.9	-16.8	-16.6	-16.9	-17.0	-17.8	-18.8	-19.6	-20.1	-20.1	-21.0	-20.9	-20.1	-16.6
2-Mar	-21.1	-21.6	-21.8	-21.1	-20.1	-19.1	-18.9	-19.1	-18.2	-16.1	-13.1	-10.9	-9.4	-8.0	-6.6	-5.4	-5.2	-6.4	-7.8	-8.4	-8.5	-8.9	-9.3	-9.6	-13.1	-5.2
3-Mar	-9.0	-8.8	-8.3	-8.2	-8.3	-8.3	-8.6	-8.8	-8.0	-5.9	-3.5	-0.2	2.1	5.2	6.1	4.6	2.0	0.6	-0.7	-1.0	-1.5	-2.9	-4.9	-7.2	-3.5	6.1
4-Mar	-9.7	-11.6	-13.0	-14.1	-15.4	-16.6	-17.7	-18.9	-19.5	-19.7	-19.7	-19.5	-19.1	-18.5	-17.8	-17.8	-18.0	-18.2	-18.4	-18.4	-18.5	-18.8	-19.0	-19.4	-17.4	-9.7
5-Mar	-19.4	-19.4	-19.5	-19.9	-20.5	-19.9	-19.8	-19.8	-19.1	-18.2	-16.9	-16.3	-15.2	-13.7	-11.9	-11.7	-12.0	-12.4	-13.4	-13.8	-14.1	-14.5	-15.1	-15.5	-16.3	-11.7
6-Mar	-15.9	-16.4	-16.6	-16.8	-16.7	-16.7	-16.3	-16.1	-15.9	-15.8	-15.8	-15.5	-14.9	-14.3	-13.9	-14.1	-14.3	-14.8	-15.6	-16.2	-16.9	-17.4	-18.3	-19.0	-16.0	-13.9
7-Mar	-19.4	-19.6	-19.9	-20.7	-21.1	-20.3	-20.0	-20.3	-20.2	-19.4	-18.5	-16.9	-15.5	-15.1	-14.5	-15.3	-15.2	-16.6	-18.5	-20.2	-22.0	-23.1	-24.1	-25.2	-19.2	-14.5
8-Mar	-25.6	-26.3	-26.8	-27.2	-27.3	-28.0	-28.0	-26.9	-25.8	-24.3	-23.2	-21.0	-19.5	-18.3	-17.9	-16.8	-16.3	-17.5	-19.9	-21.7	-22.6	-23.6	-23.6	-24.4	-23.0	-16.3
9-Mar	-25.6	-26.4	-27.1	-27.7	-28.6	-28.5	-28.5	-27.4	-25.2	-23.6	-21.6	-20.5	-19.0	-17.1	-16.2	-16.0	-15.9	-16.8	-18.6	-19.7	-20.9	-21.6	-22.4	-23.1	-22.4	-15.9
10-Mar	-24.1	-24.6	-25.4	-25.2	-25.4	-25.4	-25.4	-25.8	-24.3	-22.0	-19.6	-17.3	-16.2	-15.4	-14.9	-14.7	-14.6	-14.9	-16.1	-17.1	-17.8	-18.5	-19.1	-19.2	-20.1	-14.6
11-Mar	-19.1	-19.3	-20.0	-20.5	-21.0	-21.6	-21.6	-21.3	-20.3	-18.9	-17.8	-16.6	-15.6	-15.2	-14.7	-14.2	-14.3	-15.0	-16.0	-16.8	-17.3	-18.2	-19.0	-19.6	-18.1	-14.2
12-Mar	-20.2	-20.8	-21.2	-21.5	-21.8	-21.9	-22.1	-22.4	-20.4	-17.7	-14.7	-12.4	-11.0	-9.8	-8.8	-8.7	-8.9	-9.9	-11.2	-12.5	-13.4	-13.3	-13.6	-14.2	-15.5	-8.7
13-Mar	-14.2	-14.4	-14.5	-14.7	-15.1	-15.4	-15.3	-15.2	-14.4	-13.4	-11.9	-10.2	-8.4	-7.3	-6.5	-6.2	-6.4	-6.7	-7.4	-7.9	-8.2	-9.0	-9.3	-9.5	-10.9	-6.2
14-Mar	-9.2	-9.2	-9.6	-9.9	-10.0	-10.5	-10.5	-10.2	-8.3	-4.6	-0.4	3.2	7.9	9.4	10.5	10.8	9.1	7.1	5.2	3.1	1.9	1.4	0.9	0.8	-0.9	10.8
15-Mar	1.0	0.5	-0.4	-0.9	-1.6	-2.1	-2.4	-2.1	1.0	3.1	6.3	7.6	8.5	8.4	8.2	7.6	6.8	6.3	5.6	5.3	5.0	4.9	4.4	3.4	3.5	8.5
16-Mar	2.1	0.7	0.1	-0.5	-0.3	-0.6	-1.6	-2.2	-1.9	-0.8	0.8	1.9	3.3	3.8	4.2	3.4	2.4	1.1	0.0	-0.7	-1.4	-2.0	-2.4	-2.5	0.3	4.2
17-Mar	-2.7	-2.7	-2.7	-2.6	-2.6	-2.5	-2.3	-2.0	-1.6	-0.8	2.1	4.0	5.5	6.3	6.9	7.0	6.8	5.7	3.9	2.2	1.1	0.6	0.7	0.7	1.3	7.0
18-Mar	0.7	0.5	0.1	-0.3	-0.9	-1.0	-0.8	-0.7	-0.1	0.7	1.6	2.9	5.0	6.0	7.2	7.8	7.6	6.2	4.5	3.6	3.0	2.0	0.0	-0.3	2.3	7.8
19-Mar	-0.1	-1.0	-2.5	-3.2	-5.5	-7.1	-8.2	-8.3	-7.6	-6.0	-4.2	-2.6	-1.7	-1.4	-1.5	-2.0	-2.3	-3.0	-4.3	-5.5	-6.6	-8.9	-10.8	-11.6	-4.8	-0.1
20-Mar	-13.0	-13.7	-14.0	-14.7	-15.3	-15.4	-15.6	-15.5	-14.5	-13.2	-11.7	-10.5	-9.2	-8.1	-7.6	-7.0	-6.7	-7.3	-9.0	-10.7	-10.9	-10.7	-11.6	-12.0	-11.6	-6.7
21-Mar	-12.7	-13.3	-13.0	-13.1	-13.8	-14.1	-13.8	-11.7	-9.3	-7.5	-5.5	-2.8	-1.3	-0.4	-0.5	-1.2	-1.6	-2.3	-2.7	-3.3	-3.4	-3.5	-3.5	-3.7	-6.6	-0.4
22-Mar	-3.8	-4.0	-4.4	-4.7	-4.7	-4.7	-4.7	-4.6	-4.3	-3.5	-2.2	-2.4	-3.4	-3.8	-3.8	-3.7	-3.7	-3.7	-4.0	-4.2	-4.3	-4.7	-5.1	-5.0	-4.1	-2.2
23-Mar	-5.0	-5.2	-5.3	-5.3	-5.5	-6.7	-8.1	-7.5	-6.3	-5.1	-3.1	-1.9	-1.2	-0.1	-1.5	-1.8	-2.0	-2.2	-2.4	-2.5	-2.5	-2.5	-2.6	-2.9	-3.7	-0.1
24-Mar	-3.2	-4.0	-4.9	-5.5	-5.6	-5.7	-5.7	-5.7	-3.3	-0.8	1.0	1.6	2.7	4.0	4.1	2.8	2.0	1.4	0.6	-0.1	-0.2	0.0	0.2	0.0	-1.0	4.1
25-Mar	-0.2	-0.7	-0.9	-1.0	-1.2	-1.4	-1.4	-1.4	-0.5	0.4	1.8	2.8	4.2	5.6	6.9	6.4	6.4	5.2	2.9	1.2	0.3	-0.3	-0.9	-1.2	1.4	6.9
26-Mar	-0.9	-0.7	-0.8	-1.0	-1.5	-1.8	-2.0	-1.5	-1.1	0.2	1.8	3.9	5.8	6.0	6.2	7.5	6.6	4.4	2.3	1.8	1.3	0.5	0.5	0.1	1.6	7.5
27-Mar	-0.4	-0.7	-0.5	-0.7	-1.1	-1.1	-1.5	-1.2	-0.5	1.5	3.9	6.2	7.0	7.7	8.6	8.7	7.7	6.5	5.1	3.7	2.9	2.3	1.3	0.4	2.7	8.7
28-Mar	0.6	0.8	0.8	0.4	0.3	0.3	0.4	1.0	1.6	2.7	4.6	5.8	7.7	8.7	9.7	9.7	9.6	8.8	6.3	4.5	3.4	2.3	2.0	2.0	3.9	9.7
29-Mar	1.9	1.5	1.4	1.5	1.5	1.3	1.2	0.8	1.0	1.4	2.0	2.7	3.6	5.2	6.8	8.0	8.8	8.4	6.9	5.0	4.9	2.9	1.3	-0.4	3.3	8.8
30-Mar	-0.5	-1.5	-2.1	-2.8	-3.1	-3.6	-3.6	-3.3	-2.7	-1.8	-1.0	-0.5	-0.3	0.2	1.0	1.9	2.6	2.3	1.8	1.0	-0.1	-0.5	-0.3	-0.2	-0.7	2.6
31-Mar	-0.5	-0.5	-1.4	-1.3	-1.2	-1.2	-1.1	0.3	2.5	5.3	8.1	9.9	10.6	10.7	10.4	10.4	10.4	9.6	8.2	6.7	5.9	5.3	4.9	4.0	4.8	10.7
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Stony Mountain - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Stony Mountain - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	91	12.23	12.23
-20 - 0	451	60.62	72.85
0 - 10	195	26.21	99.06
10 - 20	7	0.94	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

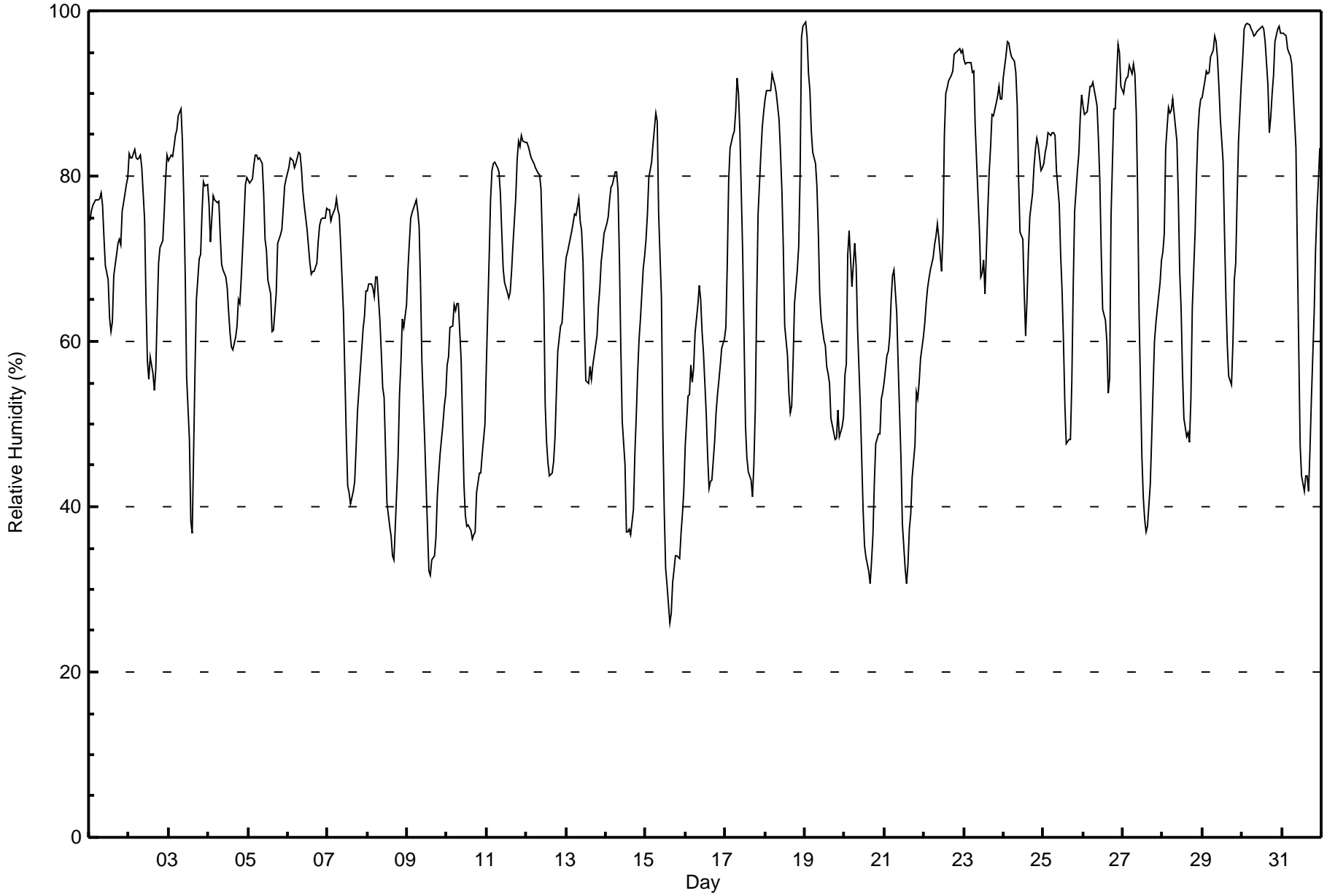
Stony Mountain - March 2017

Maximum Value: 99 % on Mar 19 01:00														Maximum Daily Average: 95.7 % on Mar 30														Hours in Service: 744	
Minimum Value: 26 % on Mar 15 15:00														Minimum Daily Average: 49.2 % on Mar 10														Hours of Data: 744	
Maximum Diurnal Average: 82.1 % at hour 7														Minimum Diurnal Average: 52.0 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 69.1 %														Percentiles: P ₁ = 32 P ₁₀ = 44 Q ₁ = 56 Median = 71 Q ₃ = 83 P ₉₀ = 92 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-Mar	75	76	76	77	77	77	77	78	76	73	69	67	63	61	62	68	70	72	72	72	76	77	79	80	72.9	80			
2-Mar	83	82	82	83	82	82	82	83	81	75	65	58	55	58	56	54	57	63	69	71	72	76	80	83	72.2	83			
3-Mar	82	83	82	84	85	86	87	88	84	77	68	56	48	38	37	47	57	65	70	70	76	79	79	79	71.1	88			
4-Mar	77	72	75	78	77	77	77	73	69	69	68	67	64	61	59	59	60	62	65	65	68	75	79	80	69.7	80			
5-Mar	79	79	80	81	83	82	82	82	81	78	72	71	67	66	61	61	64	66	72	73	74	76	79	80	74.6	83			
6-Mar	81	82	82	82	81	81	83	83	81	78	76	74	72	69	68	68	68	69	72	74	75	75	75	76	76.1	83			
7-Mar	76	76	75	75	76	77	76	75	72	63	56	48	43	42	40	42	43	47	51	54	59	61	63	66	60.7	77			
8-Mar	66	67	67	67	65	68	68	63	59	54	53	47	40	38	36	34	34	38	46	54	57	63	62	64	54.5	68			
9-Mar	69	72	75	76	76	77	76	74	67	57	48	43	37	32	32	34	34	36	41	44	46	50	52	54	54.2	77			
10-Mar	57	58	62	62	64	64	65	65	58	50	43	39	38	38	37	36	37	37	42	44	44	46	48	50	49.2	65			
11-Mar	57	70	77	81	82	82	81	80	78	73	69	67	66	65	66	69	72	77	82	84	84	85	84	84	75.6	85			
12-Mar	84	84	83	82	82	81	81	80	80	79	66	52	48	45	44	44	45	48	54	59	62	62	65	68	65.7	84			
13-Mar	70	71	73	73	74	75	75	77	75	73	70	62	55	55	57	55	57	58	61	64	67	70	71	73	67.1	77			
14-Mar	74	75	77	79	79	81	81	78	70	59	50	45	37	37	37	37	40	46	51	56	60	63	69	70	60.5	81			
15-Mar	72	75	80	82	84	86	88	87	75	65	49	39	33	31	26	27	31	32	34	34	34	37	39	42	53.4	88			
16-Mar	47	53	54	57	55	57	61	64	67	65	61	59	51	46	42	43	43	48	51	54	55	57	59	60	54.6	67			
17-Mar	62	69	79	83	85	85	88	92	90	85	71	60	50	46	44	43	41	45	52	65	75	83	86	88	69.5	92			
18-Mar	89	90	90	90	92	92	91	90	87	83	78	71	62	58	54	51	52	58	65	69	72	80	97	98	77.5	98			
19-Mar	99	97	92	90	85	83	82	79	73	66	63	60	60	57	56	55	51	49	48	48	52	48	50	51	66.4	99			
20-Mar	56	57	70	73	67	69	72	69	62	52	46	40	35	34	32	31	33	37	43	48	49	49	53	54	51.2	73			
21-Mar	55	58	59	61	65	68	69	63	57	52	46	38	33	31	33	37	39	44	47	54	53	55	58	60	51.5	69			
22-Mar	62	64	66	68	69	70	72	73	74	73	69	73	85	90	91	92	92	93	95	95	95	95	95	95	81.0	95			
23-Mar	94	94	94	94	94	93	93	86	78	73	68	68	70	66	76	81	84	87	87	89	90	91	89	89	84.4	94			
24-Mar	92	95	96	96	95	94	94	93	89	80	73	72	66	61	65	71	75	78	81	83	85	84	81	81	82.5	96			
25-Mar	81	83	84	85	85	85	85	85	81	77	70	66	60	53	48	48	48	55	67	76	81	83	87	90	73.5	90			
26-Mar	89	87	88	89	91	91	91	90	88	84	79	71	64	62	60	54	56	75	88	88	92	96	95	91	81.7	96			
27-Mar	90	91	92	92	93	92	94	92	88	78	63	46	41	38	37	38	43	48	54	60	62	64	67	70	68.1	94			
28-Mar	71	73	83	88	88	88	89	88	84	78	69	64	56	51	48	49	48	53	64	73	80	85	88	89	72.8	89			
29-Mar	90	92	93	92	93	94	95	97	96	94	91	87	82	73	65	60	56	55	60	67	69	77	84	91	81.4	97			
30-Mar	94	98	98	99	98	98	98	97	97	97	98	98	98	98	96	91	85	87	90	92	96	98	98	97	95.7	99			
31-Mar	97	97	97	96	95	95	94	90	83	71	59	47	44	42	44	44	42	47	53	63	71	76	79	83	71.2	97			
																												Diurnal Average	
76.5														78.1														99	
80.1														81.1														98	
81.1														81.2														98	
81.6														82.1														98	
81.1														81.1														97	
77.4														77.4														97	
72.0														72.0														97	
65.4														65.4														98	
59.9														59.9														98	
55.5														55.5														98	
52.9														52.9														98	
52.0														52.0														96	
52.3														52.3														92	
53.4														53.4														92	
57.3														57.3														93	
62.2														62.2														95	
65.9														65.9														95	
68.7														68.7														96	
71.5														71.5														98	
73.9														73.9														98	
75.4														75.4														98	
																												Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Stony Mountain - March 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

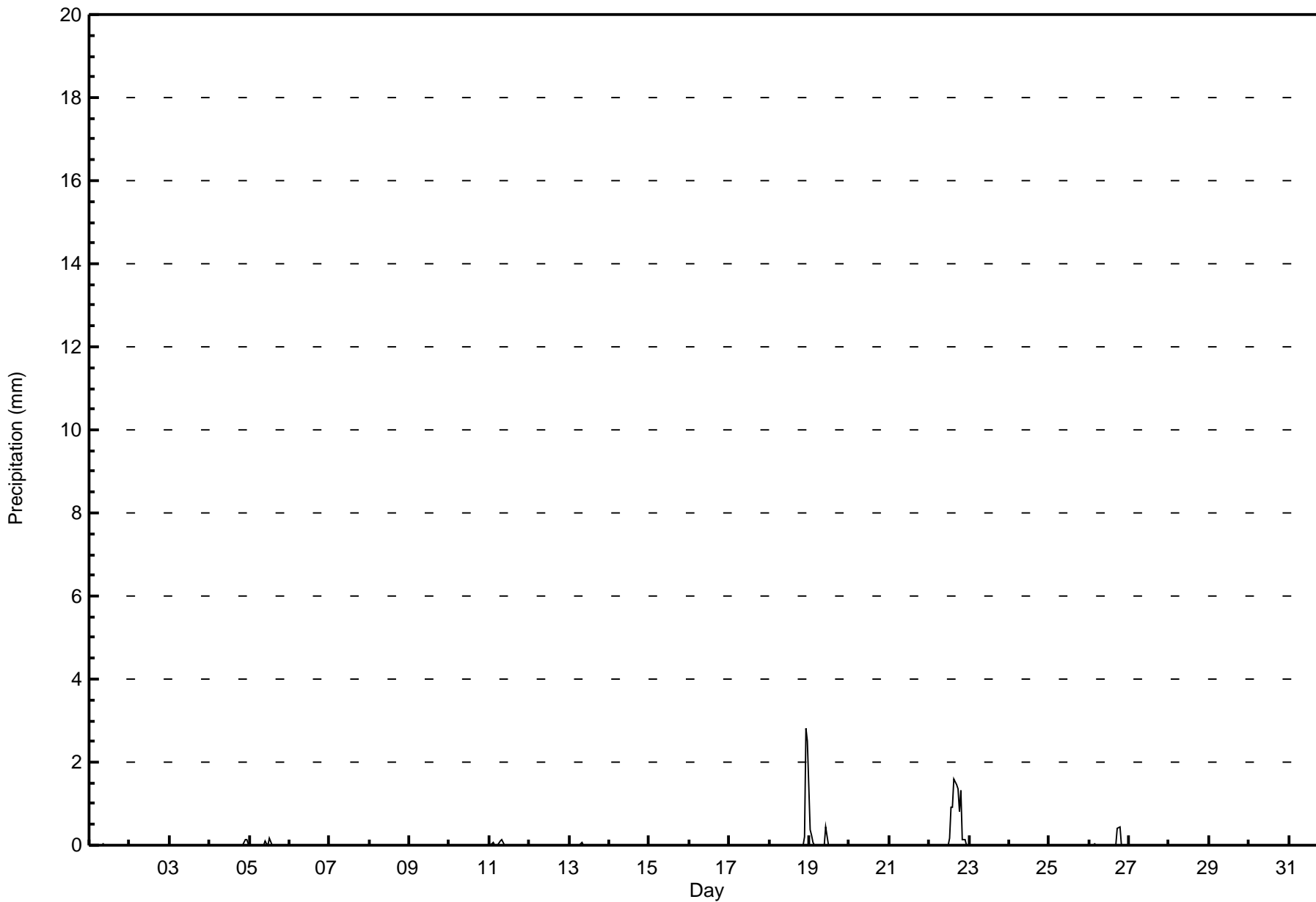
Stony Mountain - March 2017

Maximum Value: 2.8 mm on Mar 18 23:00 Maximum Daily Total: 8.8 mm on Mar 22																								Hours in Service: 744			
Minimum Value: 0.0 mm on Mar 1 01:00 Minimum Daily Total: 0.0 mm on Mar 2																								Hours of Data: 744			
Maximum Diurnal Total: 2.9 mm at hour 23 Minimum Diurnal Total: 0.0 mm at hour 5																								Hours of Missing Data: 0			
Monthly Total: 17.43 mm Percentiles: P₁ = 0.0 P₁₀ = 0.0 Q₁ = 0.0 Median = 0.0 Q₃ = 0.0 P₉₀ = 0.0 P₉₉ = 0.6																								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-Mar	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	
2-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.1	
5-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	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	
6-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.1	0.1	0.0	0.0	0.0	0.1	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	0.4	0.1	
12-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	
14-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.8	2.5	5.5	2.8	
19-Mar	0.4	0.2	0.1	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	1.1	0.5	0.5	
20-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.9	0.9	1.6	1.5	1.4	0.8	1.3	0.1	0.1	0.0	0.0	8.8	1.6	1.6	
23-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	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	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.9	0.4	0.4	
27-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
Stony Mountain - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Stony Mountain - March 2017

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	731	98.25	98.25
0.4 - 0.5	4	0.54	98.79
0.6 - 0.7	0	0.00	98.79
0.8 - 1.4	5	0.67	99.46
1.5 - 10	3	0.40	99.87
> 10	0	0.00	99.87

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Leaf Wetness (LW) - %

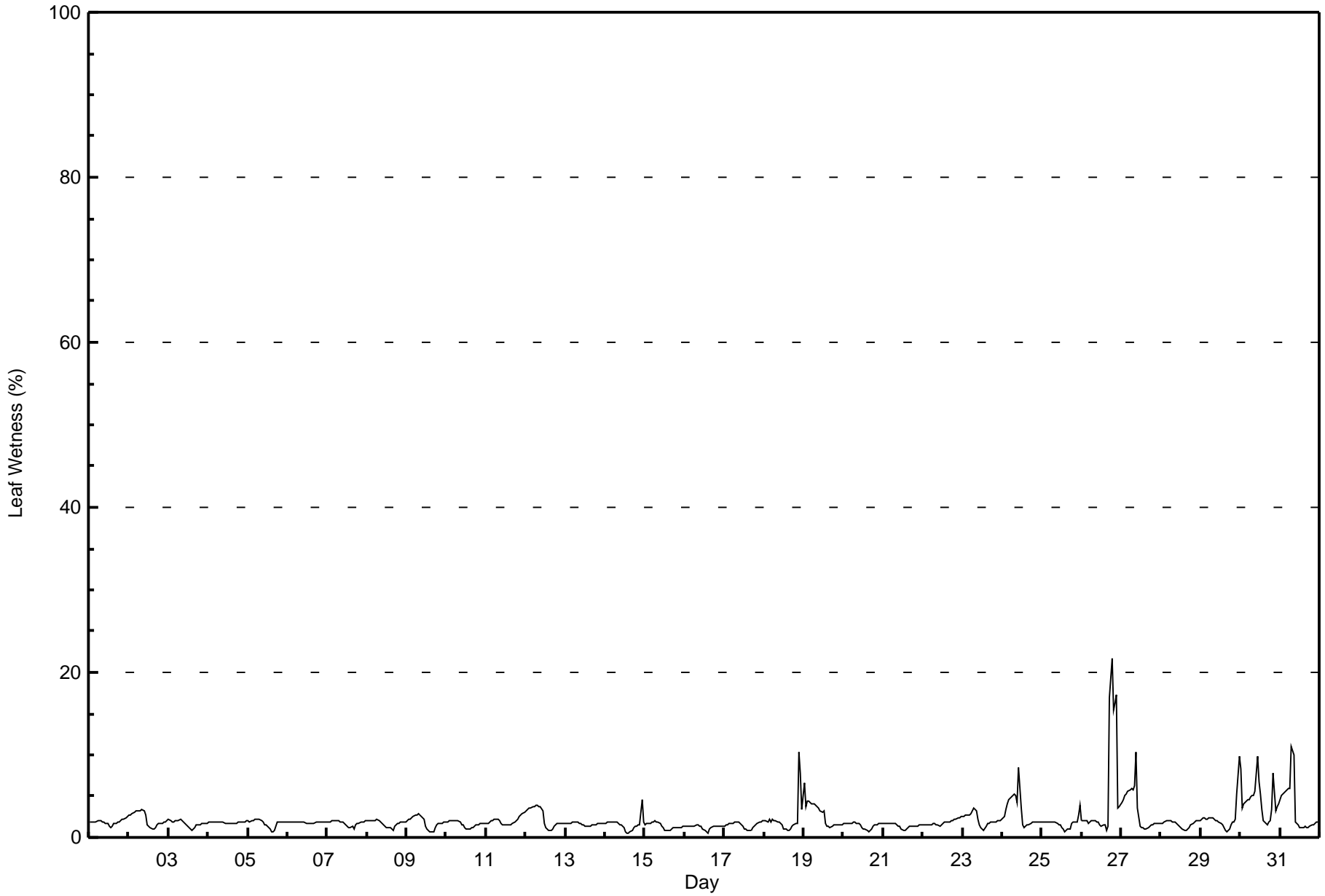
Stony Mountain - March 2017

Maximum Value: 22 % on Mar 26 19:00														Maximum Daily Average: 5.2 % on Mar 26														Hours in Service: 744			
Minimum Value: 1 % on Mar 14 14:00														Minimum Daily Average: 1.3 % on Mar 16														Hours of Data: 744			
Maximum Diurnal Average: 2.8 % at hour 8														Minimum Diurnal Average: 1.1 % at hour 15														Hours of Missing Data: 0			
Monthly Average: 2.2 %														Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 10														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-Mar	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	3	1.9	3					
2-Mar	3	3	3	3	3	3	3	3	3	3	3	2	1	1	1	1	1	2	2	2	2	2	2	2	2.2	3					
3-Mar	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2	2	2	1.7	2					
4-Mar	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.8	2					
5-Mar	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	2	2	2	1.7	2					
6-Mar	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.8	2					
7-Mar	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	2	2	2	1.7	2					
8-Mar	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	2	2	2	2	2	1.7	2					
9-Mar	2	2	2	2	3	3	3	3	3	3	2	1	1	1	1	1	1	1	2	2	2	2	2	2	1.8	3					
10-Mar	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1.6	2					
11-Mar	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	2.0	3					
12-Mar	3	3	4	4	4	4	4	4	4	4	3	2	1	1	1	1	1	1	2	2	2	2	2	2	2.4	4					
13-Mar	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2	2	2	1.6	2					
14-Mar	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	2	5	2	1.6	5					
15-Mar	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	2					
16-Mar	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	1					
17-Mar	1	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2	2	2	2	1.5	2					
18-Mar	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	10	8	3	2.3	10					
19-Mar	7	4	4	4	4	4	4	4	4	3	3	3	3	2	1	1	1	1	1	1	2	2	2	2	2.8	7					
20-Mar	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1.5	2					
21-Mar	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	2					
22-Mar	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	3	1.8	3					
23-Mar	3	3	3	3	3	3	3	3	3	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2.1	3					
24-Mar	2	3	3	4	5	5	5	5	5	4	8	3	1	1	1	2	2	2	2	2	2	2	2	2	3.0	8					
25-Mar	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	2	2	2	3	4	1.7	4					
26-Mar	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	17	22	15	16	17	4	4	5.2	22					
27-Mar	4	5	5	5	6	6	6	6	6	10	4	1	1	1	1	1	1	1	1	2	2	2	2	2	3.3	10					
28-Mar	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	2	2	2	2	2	1.6	2					
29-Mar	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	2	5	10	2.3	10					
30-Mar	8	4	4	4	4	5	5	5	5	6	10	7	5	3	2	2	2	2	2	3	8	3	4	4	4.5	10					
31-Mar	5	5	5	6	6	6	6	11	10	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	3.4	11					
2.4 2.3 2.4 2.5 2.5 2.6 2.6 2.8 2.7 2.4 2.3 1.7 1.4 1.2 1.1 1.2 1.2 1.9 2.3 2.2 2.4 2.6 2.4 2.4																								Diurnal Average							
8 5 5 6 6 6 6 11 10 10 10 7 5 3 2 2 2 2 17 22 15 16 17 8 10																								Diurnal Maximum							



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (LW) - %
Stony Mountain - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (LW) - %
Stony Mountain - March 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	0	0.00	0.00
0.4 - 0.5	1	0.13	0.13
0.6 - 0.7	11	1.48	1.61
0.8 - 1.4	176	23.66	25.27
1.5 - 10	531	71.37	96.64
> 10	9	1.21	97.85

Total Number of Valid Hours: 744

Total Number of Hours: 744



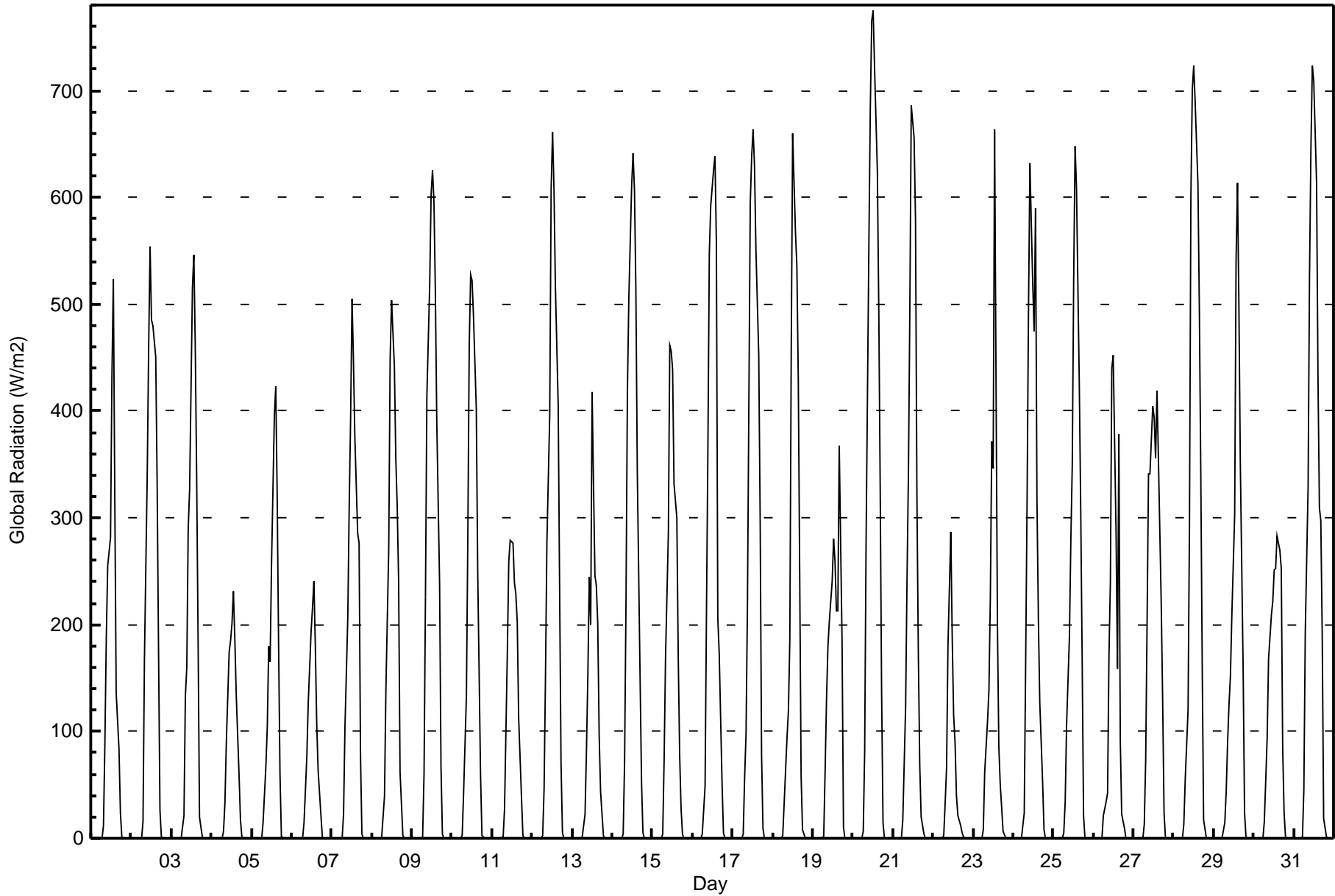
Wood Buffalo Environmental Association

Summary of Hour Averages

Global Radiation (GR) - W/m2

Stony Mountain - March 2017

Maximum Value: 775 W/m2 on Mar 20 13:00		Maximum Daily Average: 227.7 W/m2 on Mar 20		Hours in Service: 744																						
Minimum Value: 0 W/m2 on Mar 1 01:00		Minimum Daily Average: 43.5 W/m2 on Mar 22		Hours of Data: 744																						
Maximum Diurnal Average: 472.4 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 1		Hours of Missing Data: 0																						
Monthly Average: 130.5 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 3 Q ₃ = 214 P ₉₀ = 460 P ₉₉ = 693		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-Mar	0	0	0	0	0	0	0	11	88	187	255	282	433	524	323	136	84	23	1	0	0	0	0	0	97.8	524
2-Mar	0	0	0	0	0	0	0	16	166	341	460	555	485	481	451	333	176	26	1	0	0	0	0	0	145.5	555
3-Mar	0	0	0	0	0	0	1	21	134	160	289	327	516	546	461	337	187	20	1	0	0	0	0	0	125.0	546
4-Mar	0	0	0	0	0	0	0	7	33	90	174	186	201	232	188	135	59	18	1	0	0	0	0	0	55.2	232
5-Mar	0	0	0	0	0	0	0	14	68	104	179	166	256	395	423	321	181	59	2	0	0	0	0	0	90.3	423
6-Mar	0	0	0	0	0	0	0	14	45	77	127	193	216	240	181	107	64	21	1	0	0	0	0	0	53.6	240
7-Mar	0	0	0	0	0	0	0	23	104	206	310	392	504	448	376	286	277	78	3	0	0	0	0	0	125.4	504
8-Mar	0	1	0	0	0	0	1	39	141	206	271	449	503	441	356	311	240	63	3	1	1	0	0	1	126.2	503
9-Mar	0	0	0	0	0	0	2	61	226	414	518	603	625	596	513	391	239	67	3	0	0	0	0	0	177.5	625
10-Mar	0	0	0	0	0	0	2	43	134	283	461	527	522	489	402	250	154	60	3	0	0	0	0	0	138.7	527
11-Mar	0	0	0	0	0	0	1	28	101	175	260	279	277	239	229	202	112	39	3	0	0	0	0	0	81.1	279
12-Mar	0	0	0	0	0	0	2	46	153	278	397	608	661	608	517	405	232	70	5	0	0	0	0	0	166.0	661
13-Mar	0	0	0	0	0	0	1	22	81	153	245	199	417	245	236	201	97	44	3	0	0	0	0	0	81.1	417
14-Mar	0	0	0	0	0	0	3	72	221	417	505	611	641	607	513	344	148	53	6	0	0	0	0	0	172.5	641
15-Mar	0	0	0	0	0	0	5	75	170	285	462	456	439	332	299	170	78	28	3	0	0	0	0	0	116.8	462
16-Mar	0	0	0	0	0	0	4	49	214	364	547	592	625	639	557	206	173	53	5	0	0	0	0	0	167.9	639
17-Mar	0	0	0	0	0	0	4	57	97	219	594	638	663	630	552	453	299	78	9	0	0	0	0	0	179.0	663
18-Mar	0	0	0	0	0	0	3	34	94	119	185	455	660	567	535	429	247	59	7	0	0	0	0	0	141.4	660
19-Mar	0	0	0	0	0	0	2	63	131	180	204	241	281	259	212	213	367	184	10	0	0	0	0	0	97.8	367
20-Mar	0	0	0	0	0	0	6	81	276	558	684	765	775	722	624	494	328	136	14	0	0	0	0	0	227.7	775
21-Mar	0	0	0	0	0	0	17	123	243	342	497	686	656	579	321	173	69	20	4	0	0	0	0	0	155.4	686
22-Mar	0	0	0	0	0	0	3	33	66	181	286	188	115	90	40	21	12	6	1	0	0	0	0	0	43.5	286
23-Mar	0	0	0	0	0	0	8	62	109	139	226	371	346	663	203	85	50	29	7	0	0	0	0	0	95.8	663
24-Mar	0	0	0	0	0	0	24	164	315	491	632	520	474	589	317	207	127	53	8	0	0	0	0	0	163.5	632
25-Mar	0	0	0	0	0	0	5	35	107	189	279	349	523	648	608	423	307	169	22	0	0	0	0	0	152.7	648
26-Mar	0	0	0	0	0	0	21	34	42	171	241	440	452	287	158	378	92	23	9	0	0	0	0	0	97.9	452
27-Mar	0	0	0	0	0	0	13	74	206	342	341	405	394	355	419	355	220	130	23	0	0	0	0	0	136.5	419
28-Mar	0	0	0	0	0	0	14	56	121	295	600	700	723	690	612	495	344	166	17	0	0	0	0	0	201.4	723
29-Mar	0	0	0	0	0	0	15	44	90	126	152	209	302	541	614	498	351	159	24	1	0	0	0	0	130.3	614
30-Mar	0	0	0	0	0	1	16	55	94	167	209	222	251	253	283	269	252	84	24	1	0	0	0	0	90.9	283
31-Mar	0	0	0	0	0	1	47	194	330	526	647	723	708	613	431	309	298	190	18	1	0	0	0	0	209.8	723
		0.0	0.1	0.1	0.1	0.1	0.1	7.1	53.2	141.9	251.2	362.5	430.3	472.4	469.2	385.6	288.3	189.2	71.2	7.8	0.2	0.1	0.1	0.1	0.1	Diurnal Average
		0	1	0	0	0	1	47	194	330	558	684	765	775	722	624	498	367	190	24	1	1	0	0	1	Diurnal Maximum





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Stony Mountain - March 2017

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	406	54.57	54.57
21 - 100	75	10.08	64.65
101 - 300	127	17.07	81.72
301 - 600	102	13.71	95.43
601 - 900	34	4.57	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

Stony Mountain - March 2017

Maximum Speed: 22 km/h on Mar 14 02:00	Maximum Daily Speed Average: 14.7 km/h on Mar 13	Hours in Service: 744
Minimum Speed Value: 1 km/h on Mar 30 02:00	Minimum Daily Speed Average: 1.6 km/h on Mar 25	Hours of Data: 734
Maximum Diurnal Speed Average: 3.2 km/h at hour 21	Minimum Diurnal Speed Average: 1.9 km/h at hour 7	Hours of Missing Data: 10
Monthly Average Velocity: 2.4 km/h 149.2 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 5 Median = 8 Q ₃ = 11 P ₉₀ = 14 P ₉₉ = 18	Percent Operational Time: 98.7

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-Mar	E9	E9	ENE10	ENE10	ENE11	ENE11	ENE10	ENE10	ENE10	ENE11	ENE10	ENE10	ENE11	ENE11	ENE9	NE8	NE7	NE6	NNE5	ENE5	E5	E5	SE4	SE5	ENE8.0	ENE11	
2-Mar	SSE5	SSE5	SSE4	SSW5	SSW6	SW8	SW8	SSW7	S6	S9	SSE8	SSE8	SSE9	SSE9	SSE9	SSE10	SSE10	SSE9	SSE13	SSE15	SSE13	SSE11	SSE11	SSE9	SSE8.1	SSE15	
3-Mar	S14	S16	SSW18	SSW18	SSW18	SSW17	SSW17	SSW17	SSW17	SSW15	SSW15	SSW15	SSW15	WSW10	WSW6	NNW15	NNW12	NNW9	NNW5	NW4	NNW5	NNW8	NNW9	NNW9	SW7.9	SSW18	
4-Mar	N10	N9	N9	NNE12	NNE13	NNE14	NNE14	NNE14	NE13	NE12	NNE12	NNE11	NNE12	NNE13	NNE11	NNE13	NNE12	NNE13	NE15	NNE13	NE11	NE13	ENE9	ENE9	NNE11.4	NE15	
5-Mar	ENE7	ENE8	ENE7	E5	E4	ENE3	NNW3	NNE3	NE5	E5	ENE4	E5	E5	ENE6	E5	E5	ENE6	ESE5	NNE3	NE6	NNE5	N5	N5	ENE3	ENE4.2	ENE8	
6-Mar	NNW3	N4	N4	N5	NNE7	N6	N6	N8	NNE10	NNE10	NNE10	NNE11	NNE10	NNE11	NNE12	NNE10	NNE11	N8	N7	N8	N9	N9	N9	NNW8	N7.9	NNE12	
7-Mar	NNW8	NNW8	NNW8	NNW8	NNW7	NNW7	NNW9	NNW8	NNW9	NNW9	NNW10	NNW9	NNW11	NNW10	NNW8	NNW10	NNW9	N8	N6	N8	N5	N5	N5	NNW4	NNW7.7	NNW11	
8-Mar	N4	N4	NNW4	N4	N5	N3	N3	NNE5	NE7	NNE6	NNE6	NE4	N6	N6	NNE5	N5	N6	NNE8	NNE7	N4	N4	N3	NNE6	NNE6	NNE4.9	NNE8	
9-Mar	NNE5	N4	N3	N3	NNW2	NW2	NW2	NW3	N3	NNE5	N4	N4	NNE4	NNW4	N4	NNE1	E3	ESE3	SE3	ESE6	E5	E6	ENE5	ENE5	NNE2.5	E6	
10-Mar	ENE5	E4	SE4	SSE4	SSE4	S3	ENE2	ENE2	ENE3	E4	ESE6	E8	E9	E10	E11	E10	E8	E6	NE5	NE6	E6	ESE7	SE7	SSE7	E5.1	E11	
11-Mar	S8	SSE7	SE4	SE5	SE4	SE5	SE5	SE6	SSE7	SE6	SE7	SE6	SE8	SE9	ESE10	ESE9	E9	E9	ESE8	ESE7	SE7	ESE7	ESE9	SE8	SE6.7	ESE10	
12-Mar	SE7	ESE7	ESE7	ESE6	ESE5	ESE6	E5	ESE5	SE5	SE7	SE9	SE11	SE12	SSE11	SSE10	SSE13	SSE12	SSE11	SSE10	SSE8	SSE11	S12	S13	S12	SSE8.3	SSE13	
13-Mar	S12	S12	SSE14	S15	S15	SSE14	S13	S14	S15	S15	S16	S15	S17	S15	S16	S15	S14	S13	S14	S13	SSW15	SSW18	SSW20	SSW21	S14.7	SSW21	
14-Mar	SSW22	SSW22	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SW10	SSW5	S7	S9	S10	SSE9	SSE9	SSE10	SSE11	SSE11	SSE11	SSE10	---	SSW22	
15-Mar	SSE10	S13	S13	S16	S16	S14	SSW12	SW15	WSW11	NNW11	W13	W13	W13	W13	W13	W13	W13	W13	W13	W13	W13	W13	W13	W13	WSW6.9	S16	
16-Mar	NNW5	NNW4	NNW4	N5	NNE8	NE10	NNE9	NE10	NE12	NE13	NE14	ENE14	ENE13	NE13	NE12	ENE11	NE14	NE11	NE9	ENE8	E10	E9	E6	E4	NE8.7	NE14	
17-Mar	SE5	SSE8	SSE9	SSE9	SSE9	S7	S8	S10	S10	S11	SSW11	S11	S11	SSW13	SSW14	SSW14	SSW14	SSW14	SSW11	S7	S9	S10	S9	S10	S10	S9.6	SSW14
18-Mar	SSE9	SSE9	SE10	SE10	ESE11	SE11	ESE10	ESE10	ESE10	SE11	SE11	SE11	ESE10	ESE12	ESE12	SE11	SE11	ESE10	ESE9	ESE7	NE5	N6	NW5	NNW4	ESE7.8	ESE12	
19-Mar	NW9	NW14	NW15	WNW13	WNW16	WNW14	WNW10	WNW10	WNW11	W10	W10	W12	W18	W20	WNW17	WNW17	WNW15	WNW14	WNW12	WNW11	WNW11	NW10	NW11	NW14	WNW12.7	W20	
20-Mar	NW14	NW13	NW11	NW13	NW11	NW11	NW11	NW11	NW11	NW11	NW11	WNW9	WNW9	W9	W10	W10	WNW8	WNW9	WNW6	WNW3	AF	SSE3	SSW5	SSW6	S6	WNW7.8	NW14
21-Mar	S7	SSW8	SSW10	SSW10	SSW9	S9	S10	S11	S13	SSE16	SSE15	SSE14	SSE16	SSE15	SSE13	SE12	SE14	ESE15	SE14	SE13	SE14	SE13	SSE14	SE12	SSE11.4	SSE16	
22-Mar	SE11	SE12	SE11	SE11	SE9	ESE8	ESE6	E8	ESE8	ESE7	E7	E8	E8	ESE6	E4	NNE2	NNW2	NNW2	N3	NNW3	NNW2	N4	NNW3	NW3	ESE4.4	SE12	
23-Mar	NW5	NNW4	NW4	NW3	NW4	NW4	NNW4	NNE6	NE7	ENE3	NE6	NE5	ESE7	ESE8	ESE7	E6	ESE6	ESE6	ESE6	ESE6	SE4	SE4	SSW6	SSW5	E1.9	ESE8	
24-Mar	SSW7	SSW7	S7	SSW11	SSW12	SSW11	SSW10	S7	SSE9	SSE11	SE11	SE11	SE12	SE13	SE12	SE12	ESE12	ESE12	ESE12	ESE12	ESE9	ESE8	ESE10	ESE9	ESE10	SSE8.3	SE13
25-Mar	ESE8	ESE8	ESE6	ESE6	SE6	SE4	S4	SSW3	NW3	NW4	NW3	WNW4	NW3	NW3	WNW4	W8	NW6	NNE8	ENE6	ESE7	ESE9	SE6	SSE6	S6	ESE1.6	ESE9	
26-Mar	SSW8	SSW9	SSW8	S8	S8	S8	SSW8	SSW11	SSW11	SSW9	SSW6	SE5	NE2	NE2	E4	NE5	NNE5	NW6	N6	NE8	ESE7	SE8	SSE9	S7	S3.7	SSW11	
27-Mar	S7	S5	S6	S8	S7	S6	SE4	SE6	SE8	SE9	ESE8	SE9	SE12	SE12	SE12	SSE10	SSE11	S11	SSE8	SSE8	SSE8	SSE6	SE6	SSE6	SSE7.7	SE12	
28-Mar	SSE8	SSE5	S8	SSW9	S5	SSE4	SSE4	S5	S8	S8	SSE9	SSE9	S9	S11	SSE9	S11	S10	S9	S7	S9	S8	S7	SSW12	S9	S7.9	SSW12	
29-Mar	SSE5	S3	SSW4	SW4	SSW3	SSW5	SSW7	SSW7	SSW8	SSW6	SW7	SSW5	SSW6	WSW6	SW6	E3	SE1	SE3	ESE1	NE2	ENE5	ESE6	ESE3	N4	S2.9	SSW8	
30-Mar	ENE4	NE1	NNW4	NNE4	NE6	ENE5	E4	ENE5	ENE5	ENE5	ENE5	ENE6	ENE6	E5	ENE4	ENE7	NE6	ENE8	ENE6	ENE5	ENE4	N3	N2	ENE4	E5	ENE4.3	ENE8
31-Mar	ESE5	SSE6	S8	SSW10	SSW11	SSW12	SSW10	SSW11	SSW13	SSW11	SSW10	SSW16	SSW17	SSW17	SSW19	SSW15	SSW17	S15	SSW15	SSW15	S13	S12	SSW12	SSW13	SSW12.2	SSW19	

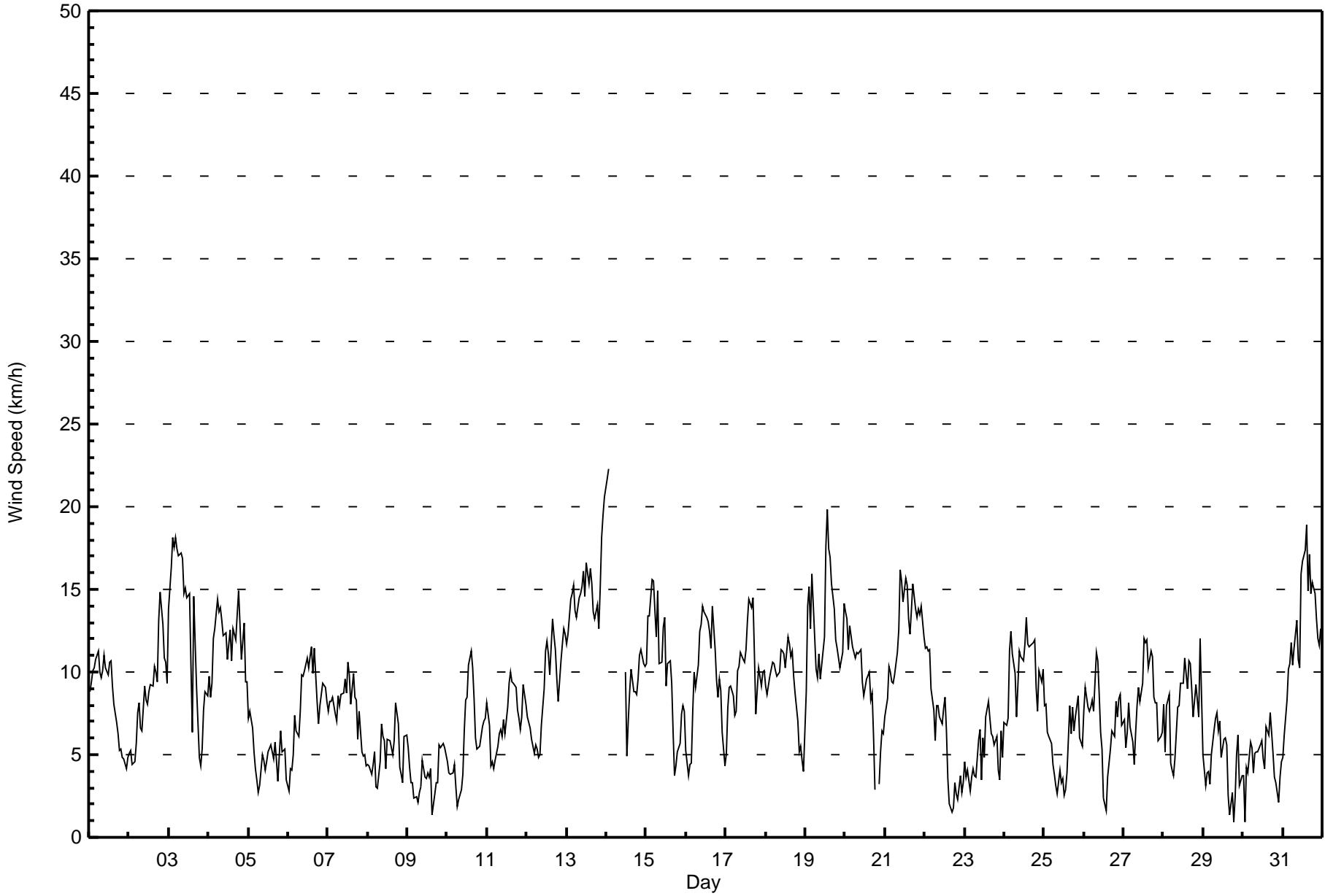
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SSW22	SSW22	SSW18	SSW18	SSW18	SSW17	SSW17	SSW17	SSW17	SSE16	S16	SSW16	W18	W20	SSW19	NNW17	SSW17	ESE15	SSW15	SSE15	SSW15	SSW18	SSW20	SSW21	Diurnal Maximum	

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
Stony Mountain - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Stony Mountain - March 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	190	25.89	25.89
6 - 11	393	53.54	79.43
12 - 19	146	19.89	99.32
20 - 28	5	0.68	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 734

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Stony Mountain - March 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	31	14	10	20	20	8	18	10	6	9	2	2	0	3	16	21	190
6 - 11	19	22	16	28	21	46	35	51	51	35	5	5	8	17	13	21	393
12 - 19	0	13	9	3	0	6	16	15	31	32	1	0	4	10	6	0	146
20 - 28	0	0	0	0	0	0	0	0	0	4	0	0	1	0	0	0	5
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	50	49	35	51	41	60	69	76	88	80	8	7	13	30	35	42	734

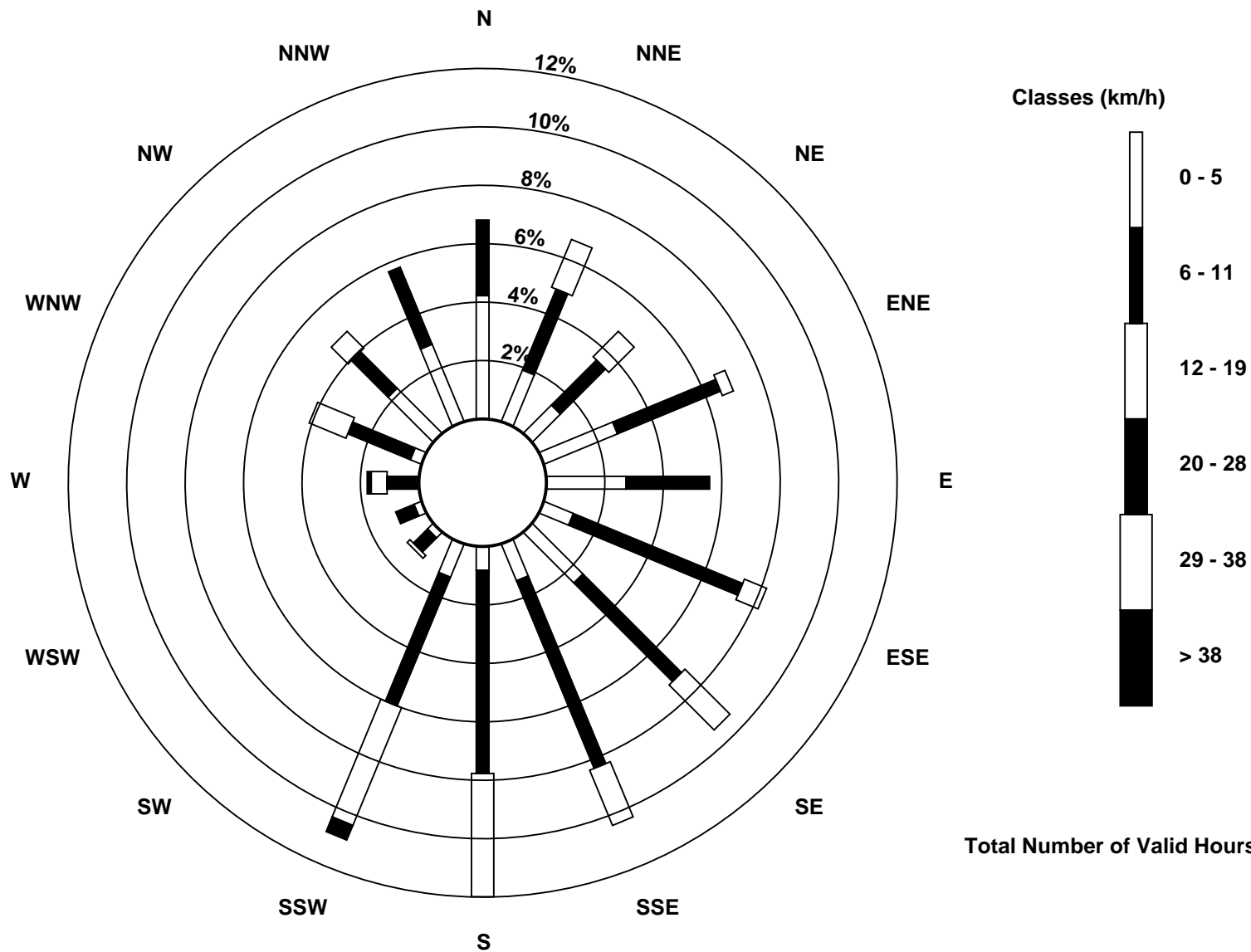
Total Number of Valid Hours: 734

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Wind Speed (WS) - km/h
Stony Mountain (AMS 18)



Total Number of Valid Hours: 734



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Stony Mountain - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Mar 19 14:00 Minimum Value: 0 km/h on Mar 20 21:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 4 P ₉₉ = 6																	Hours in Service: 744 Hours of Data: 734 Hours of Missing Data: 10 Hours of Calibration: 0 Percent Operational Time: 98.7								
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-Mar	3	3	3	3	3	3	3	3	3	3	3	3	4	4	3	3	2	2	1	1	1	1	1	1	4
2-Mar	1	2	1	1	1	2	2	2	2	3	3	3	3	3	3	3	3	3	4	4	4	3	3	3	4
3-Mar	4	5	5	5	5	5	5	4	4	4	4	5	4	3	3	5	4	3	2	2	2	3	3	3	5
4-Mar	4	3	4	5	4	5	5	4	4	4	4	4	5	4	4	4	4	4	5	4	4	4	3	3	5
5-Mar	2	2	2	2	1	1	1	1	2	2	1	1	2	2	2	2	2	2	1	2	2	2	2	2	2
6-Mar	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	3	3	3	3	3	3	3	3	2	4
7-Mar	2	2	3	3	3	3	3	3	3	3	4	3	4	4	3	3	3	3	2	3	2	1	1	1	4
8-Mar	1	1	1	1	2	1	1	2	2	2	2	2	3	3	3	2	3	3	3	2	2	1	2	2	3
9-Mar	2	1	1	1	1	1	0	0	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2
10-Mar	1	1	1	1	1	1	1	1	1	2	2	3	3	4	3	3	3	2	2	1	1	2	2	2	4
11-Mar	2	2	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	2	2	3
12-Mar	2	2	2	1	1	1	1	1	1	3	3	4	4	4	4	4	4	4	3	2	3	4	4	4	4
13-Mar	4	4	4	5	5	4	4	5	5	5	6	5	5	5	5	5	5	4	4	4	5	6	7	6	7
14-Mar	7	7	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	2	2	3	3	3	2	2	3	3	3	3	3	7
15-Mar	3	4	4	4	5	4	4	4	4	4	4	4	5	3	4	4	3	2	1	1	2	2	2	2	5
16-Mar	2	1	1	1	2	3	2	3	4	4	4	4	4	4	4	3	4	3	2	2	3	3	3	1	4
17-Mar	2	3	3	3	3	2	3	3	3	4	3	4	4	4	5	5	4	3	2	3	3	2	3	3	5
18-Mar	3	3	3	3	2	2	3	2	3	3	4	4	4	4	4	4	4	3	3	3	1	2	2	2	4
19-Mar	4	6	6	5	6	5	4	3	4	3	4	5	6	7	6	6	5	5	4	4	4	4	5	5	7
20-Mar	6	5	5	5	4	4	4	4	4	5	4	3	4	4	4	3	4	2	1	AF	0	1	1	1	6
21-Mar	1	2	2	2	2	2	3	3	4	5	5	5	5	5	4	4	4	5	5	4	4	4	5	4	5
22-Mar	3	4	3	3	3	2	2	2	2	2	2	3	2	2	2	1	1	1	2	1	1	2	1	1	4
23-Mar	1	1	1	1	1	1	1	1	2	2	2	2	3	3	2	2	2	2	2	1	1	1	3	2	3
24-Mar	2	2	2	3	3	3	3	2	3	3	4	4	4	4	4	3	4	4	4	3	2	3	3	3	4
25-Mar	2	2	2	2	2	2	2	1	2	1	2	2	2	2	3	4	3	3	2	2	2	1	1	1	4
26-Mar	2	2	2	2	2	2	2	3	3	2	2	2	2	1	2	3	2	3	3	2	2	2	2	1	3
27-Mar	2	1	2	2	1	2	1	2	2	3	2	4	4	4	4	4	3	4	3	2	3	2	1	2	4
28-Mar	2	2	4	3	2	1	1	2	3	2	3	3	3	4	3	4	3	3	2	3	3	2	4	4	4
29-Mar	1	1	1	1	1	2	2	2	2	2	2	2	2	3	2	2	2	2	2	1	1	1	2	1	3
30-Mar	1	1	1	1	2	2	1	2	2	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2
31-Mar	1	1	2	2	2	3	2	3	4	3	4	5	5	6	6	5	5	5	5	4	4	3	3	3	6
	7	7	6	5	6	5	5	5	5	5	6	5	6	7	6	6	5	5	5	4	5	6	7	6	
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Stony Mountain - March 2017

Direction of Maximum Speed: 213 deg on Mar 14 02:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 181.6 deg on Mar 13	Hours of Data: 734
Direction of Minimum Speed: 41 deg on Mar 30 02:00	Hours of Missing Data: 10
Direction of Minimum Daily Speed Average: 1.6 deg on Mar 25	Percent Operational Time: 98.7
Monthly Average Direction: 208.9 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-Mar	86	85	71	71	72	73	72	74	72	74	70	75	75	59	71	45	48	42	31	58	90	100	133	146	72.1	
2-Mar	158	154	168	203	209	218	215	210	189	182	168	160	162	162	149	147	147	153	151	158	162	159	165	167	167.7	
3-Mar	184	190	193	193	193	194	194	196	198	197	192	199	199	249	252	291	302	318	341	318	347	345	344	348	214.9	
4-Mar	359	351	358	17	20	19	20	23	40	41	24	14	17	20	22	25	23	33	37	32	39	56	61	70	26.9	
5-Mar	75	65	68	82	81	68	348	13	53	96	78	97	97	58	99	99	65	119	31	42	30	9	0	18	62.9	
6-Mar	332	356	354	3	25	10	358	7	25	30	20	18	18	21	27	21	28	10	355	352	354	356	355	347	10.8	
7-Mar	346	341	339	334	337	342	342	341	337	342	343	342	335	335	339	332	343	5	2	6	351	351	353	347	343.3	
8-Mar	351	349	348	355	1	350	354	15	38	32	32	37	11	10	30	357	11	18	27	10	9	1	15	22	13.4	
9-Mar	15	9	6	10	340	322	323	325	360	22	354	357	12	340	356	27	98	115	135	104	94	89	62	58	32.5	
10-Mar	70	95	129	167	168	176	66	68	69	94	119	92	94	87	86	94	81	90	45	55	83	112	127	153	98.1	
11-Mar	181	155	146	128	125	125	138	146	150	138	137	140	136	135	113	103	101	99	104	114	128	109	122	128	127.2	
12-Mar	124	121	112	108	115	110	101	113	136	138	138	138	145	148	162	147	167	168	158	160	161	169	176	175	147.6	
13-Mar	174	169	168	169	169	168	173	172	176	173	180	178	179	183	182	184	181	178	187	187	195	202	204	206	181.6	
14-Mar	213	213	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	218	194	188	191	175	168	151	150	162	168	166	154	147	--
15-Mar	161	173	180	185	188	189	212	216	257	284	280	281	283	289	290	301	280	250	216	238	246	278	286	298	238.8	
16-Mar	328	338	348	352	28	40	20	37	46	48	47	57	64	51	43	57	48	51	53	74	89	99	95	81	49.4	
17-Mar	126	147	156	164	162	173	174	181	180	184	196	185	171	201	202	201	206	201	188	170	177	175	179	174	181.7	
18-Mar	163	151	135	129	122	125	118	115	123	137	138	140	112	107	119	135	134	112	104	102	53	3	325	327	122.4	
19-Mar	314	309	304	298	295	297	294	288	286	279	275	279	271	275	282	285	285	286	296	289	295	323	321	306	291.7	
20-Mar	308	304	306	314	315	311	309	311	313	309	296	288	281	281	265	293	285	287	296	AF	157	203	202	188	294.1	
21-Mar	191	200	201	198	195	180	182	177	178	168	159	156	150	165	147	134	130	114	124	142	140	145	149	133	157.0	
22-Mar	130	133	133	133	130	120	102	100	114	110	88	94	93	109	88	15	331	331	357	343	341	358	342	326	105.9	
23-Mar	319	327	315	325	323	314	315	346	29	55	74	40	56	121	104	105	100	111	116	118	143	144	198	205	79.8	
24-Mar	206	203	188	199	207	204	198	175	166	162	133	131	132	126	145	131	116	114	115	119	103	113	111	112	147.0	
25-Mar	111	114	111	116	130	139	174	192	311	304	309	301	320	307	299	280	309	21	77	102	106	143	152	170	115.8	
26-Mar	193	207	196	188	176	183	192	202	206	204	195	143	56	44	82	49	20	317	356	53	106	144	149	172	173.6	
27-Mar	185	176	177	190	185	171	140	135	132	129	122	130	126	136	143	149	168	170	166	163	165	151	146	155	152.9	
28-Mar	157	162	187	194	181	158	161	169	182	177	151	161	173	185	160	179	189	177	180	176	169	188	192	188	176.2	
29-Mar	152	169	194	217	212	206	212	202	213	213	217	199	201	237	217	93	126	126	122	55	61	112	117	3	190.4	
30-Mar	61	41	340	19	41	61	94	75	65	67	69	77	84	57	57	52	62	75	68	68	7	7	57	82	59.6	
31-Mar	109	153	183	202	208	209	203	202	207	211	203	210	210	202	210	206	194	190	193	192	188	190	194	210	199.3	

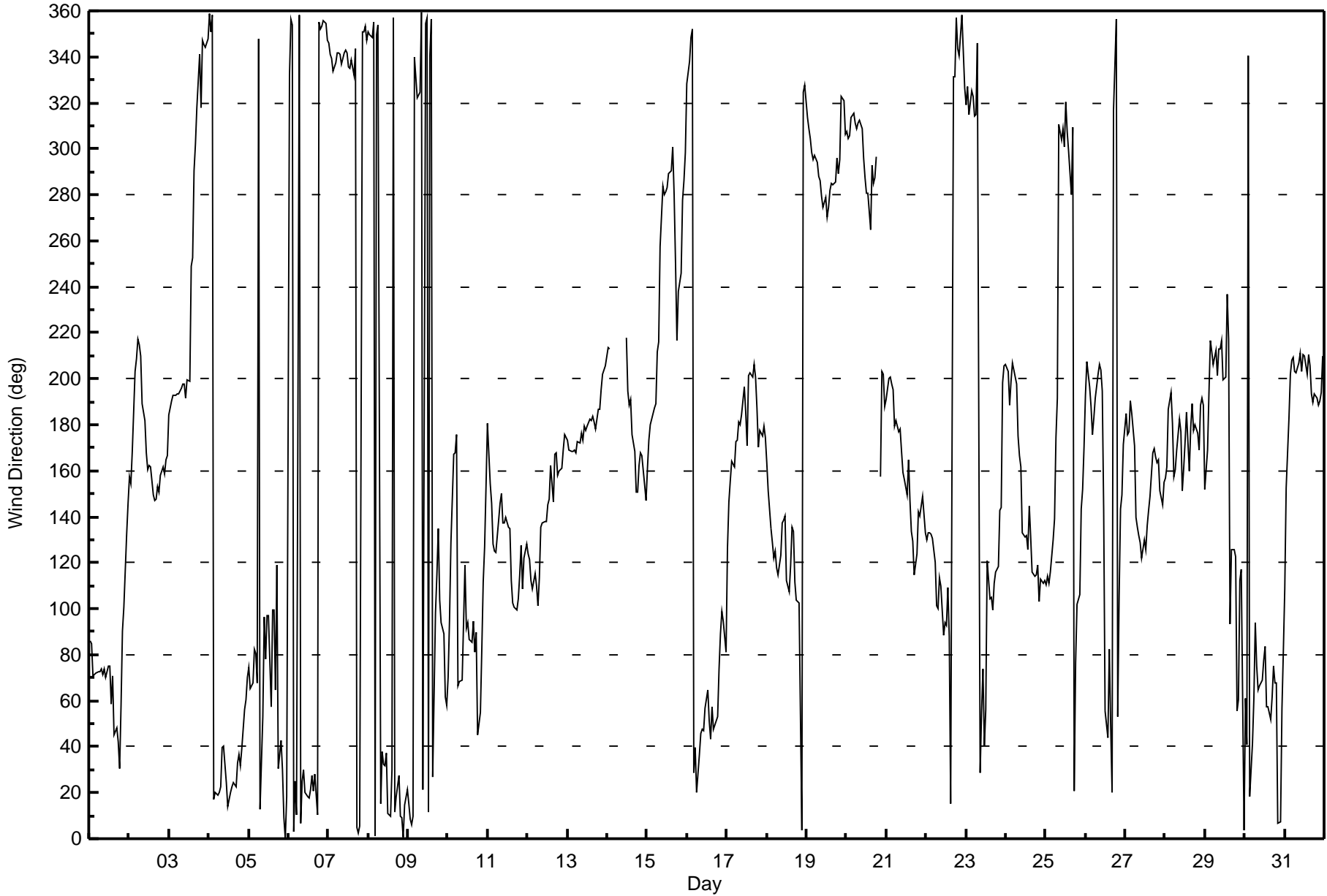
162.7 172.5 170.8 175.5 170.5 169.1 179.4 169.0 156.4 147.1 142.7 147.0 141.4 151.2 144.6 138.0 128.4 116.4 113.7 122.0 130.9 138.1 154.7 162.1
 Diurnal Average

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
Stony Mountain - March 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Stony Mountain - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 95 deg on Mar 9 16:00	Hours of Data: 734
Minimum Value: 7 deg on Mar 20 21:00	Hours of Missing Data: 10
	Hours of Calibration: 0
	Percent Operational Time: 98.7
Percentiles: P ₁ = 11 P ₁₀ = 16 Q ₁ = 18 Median = 22 O ₃ = 26 P ₉₀ = 33 P ₉₉ = 76	

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-Mar	16	17	17	16	16	16	16	17	16	17	20	23	25	25	25	25	22	20	16	13	14	20	16	11	25
2-Mar	13	14	16	14	17	16	18	17	21	23	31	34	33	32	36	27	24	20	18	18	19	17	18	18	36
3-Mar	20	18	18	18	18	18	18	18	18	19	19	22	23	30	50	24	22	22	27	23	27	29	30	29	50
4-Mar	27	26	29	24	21	22	20	21	20	20	25	25	24	24	26	20	21	20	20	21	21	17	17	16	29
5-Mar	19	18	18	19	14	28	20	25	22	30	37	28	30	34	41	49	35	25	30	17	20	18	20	33	49
6-Mar	30	19	23	20	21	23	21	21	21	22	23	24	26	24	22	22	19	27	22	24	20	21	20	19	30
7-Mar	19	19	20	21	24	23	23	25	24	25	27	29	30	31	34	26	29	25	23	21	19	14	13	10	34
8-Mar	14	11	12	13	18	11	12	19	20	27	31	52	48	49	55	48	46	24	27	17	17	15	18	18	55
9-Mar	16	15	14	16	20	13	11	15	29	37	70	77	67	65	64	95	69	38	27	21	15	17	14	19	95
10-Mar	17	21	18	16	15	11	43	24	17	26	24	27	31	26	22	23	22	24	25	19	15	15	15	20	43
11-Mar	20	20	17	13	16	14	18	17	21	27	32	36	30	25	26	22	19	17	16	15	17	16	15	15	36
12-Mar	15	14	14	14	15	13	15	18	19	25	29	29	30	32	37	28	29	24	21	18	21	24	24	24	37
13-Mar	25	24	24	23	23	24	24	24	25	26	25	27	28	25	26	26	26	26	23	24	26	23	23	21	28
14-Mar	21	20	AF	AF	AF	AF	AF	AF	AF	AF	AF	24	48	39	33	27	25	18	17	19	21	20	20	24	48
15-Mar	20	23	22	21	20	21	34	21	30	29	26	27	30	27	26	23	29	25	20	16	28	17	19	19	34
16-Mar	16	13	17	17	20	18	19	18	18	18	21	23	24	23	22	20	17	17	16	18	17	20	22	24	24
17-Mar	19	20	20	23	22	25	24	24	26	25	29	32	33	29	25	26	22	20	21	22	21	20	21	23	33
18-Mar	22	24	21	19	16	16	16	15	18	24	24	26	30	22	29	29	25	21	17	22	21	28	27	33	33
19-Mar	26	24	25	27	23	22	23	24	22	27	25	27	24	24	24	23	25	23	22	21	23	26	28	23	28
20-Mar	23	23	24	24	24	23	23	24	24	29	35	41	41	37	36	40	34	31	19	AF	7	14	12	13	41
21-Mar	13	15	16	16	15	16	18	21	23	24	24	29	28	27	28	25	22	18	22	22	21	21	21	20	29
22-Mar	19	20	19	19	20	18	17	17	20	26	27	23	19	21	29	28	26	28	25	27	23	25	23	24	29
23-Mar	21	20	18	27	25	22	19	21	27	23	61	44	51	44	19	21	21	24	19	16	21	22	25	24	61
24-Mar	19	18	15	17	18	18	21	20	23	24	27	26	26	23	26	24	21	19	19	18	18	19	18	17	27
25-Mar	17	17	18	19	21	27	25	27	42	40	54	61	87	87	84	36	39	38	25	14	14	16	13	13	87
26-Mar	15	17	22	17	19	19	19	18	19	20	26	35	72	77	29	53	22	22	40	18	23	16	15	17	77
27-Mar	16	13	15	14	15	19	14	16	18	19	25	28	26	25	28	29	25	24	21	20	21	19	15	16	29
28-Mar	19	24	24	23	30	24	25	26	28	33	30	34	35	34	36	33	27	27	24	21	21	18	19	26	36
29-Mar	25	21	22	23	24	24	28	23	24	30	25	39	44	56	61	75	94	39	59	8	31	12	60	26	94
30-Mar	37	68	13	30	22	23	23	27	27	24	29	24	30	43	27	29	26	25	21	21	13	31	17	17	68
31-Mar	17	16	17	17	17	16	16	18	19	23	28	26	26	25	22	24	24	24	22	20	20	19	17	18	28
	37	68	29	30	30	28	43	27	42	40	70	77	87	87	84	95	94	39	59	27	31	31	60	33	

Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	March 13, 2017	Last Calibration	February 21, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	11:03	End Time (MST)	16:04
Gas Cert Reference	LL110090	Station temp.	22 Deg C
Cal Gas Concentration	49.4 ppm	Cal Gas Exp Date	February 16, 2019
Calibrator Make/Model	API T700	Serial Number	1222
ZAG Make/Model	API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	DACS serial No.	11041

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-602	-601
Analyzer IP address	192.168.1.43		Lamp voltage	904	904
Calculated slope	0.996849	0.992926	Chamber temp	45.0	45.2
Calculated intercept	1.474791	1.778731	Pressure	666.0	655.5
Analyzer Background	21.6	21.5	Flow	0.379	0.375
Analyzer Coefficient	0.902	0.902	Intensity	86	86
Analyzer make	Thermo 43i		Analyzer serial #	JC1501301453	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.8	----
as found span	5000	58.9	581.9	584.9	0.995
calibrator zero	5000	0.0	0.0	-0.8	----
high point	5000	58.9	581.9	584.9	0.995
second point	5000	29.5	291.5	290.9	1.002
third point	5000	14.7	145.2	143.7	1.011
as left zero	5000	0.0	0.0	-0.5	----
as left span	5000	58.9	581.9	587.6	0.990
Average Correction Factor					1.003

Corrected As found 585.7 Previous response 582.3 % change -0.6%

Notes:

Changed inlet filter after as founds. No adjustments made.

Calibration Performed By:

Aswin Sasi Kumar



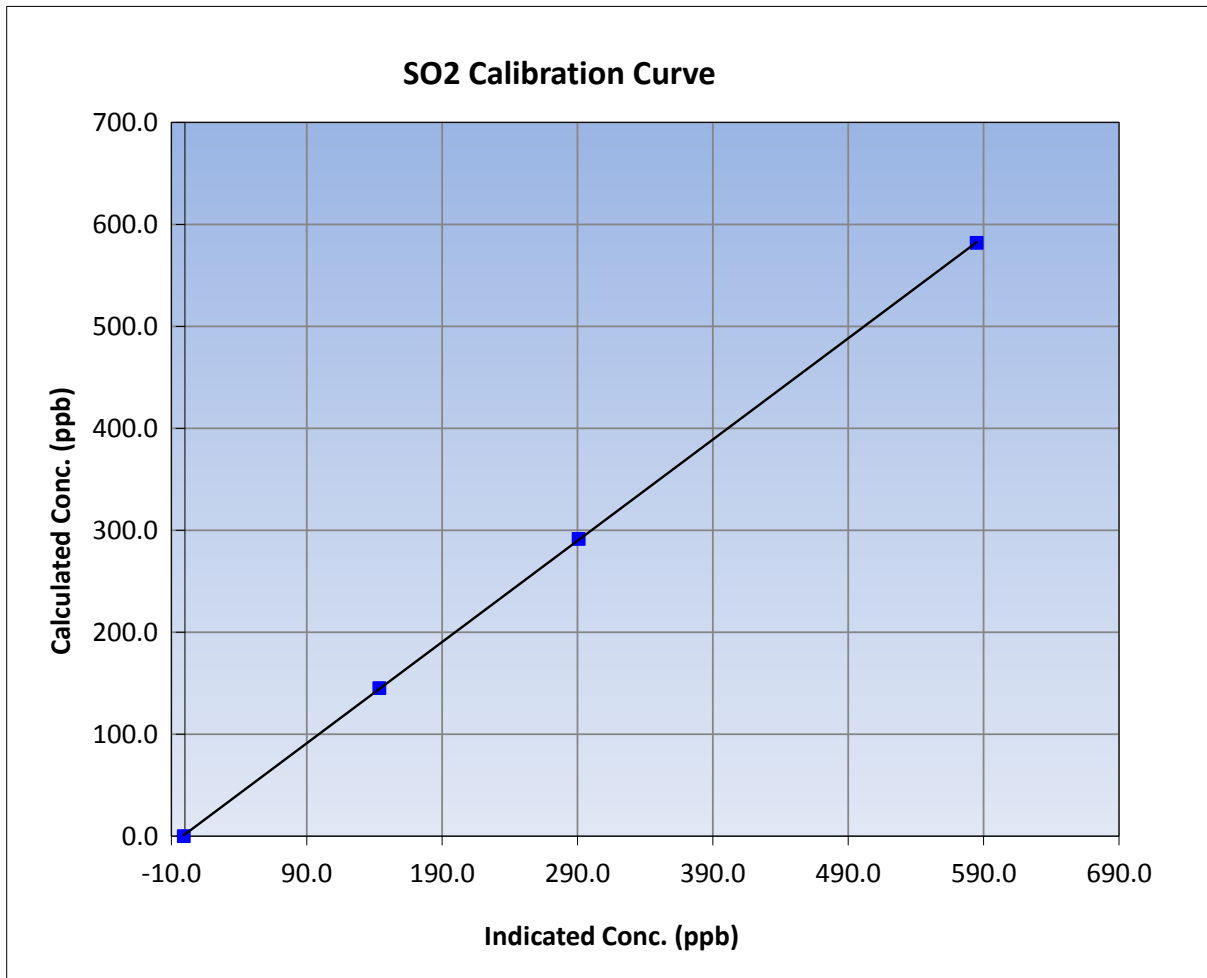
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 13, 2017	Previous Calibration	February 21, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	11:03	End Time (MST)	16:04
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301453

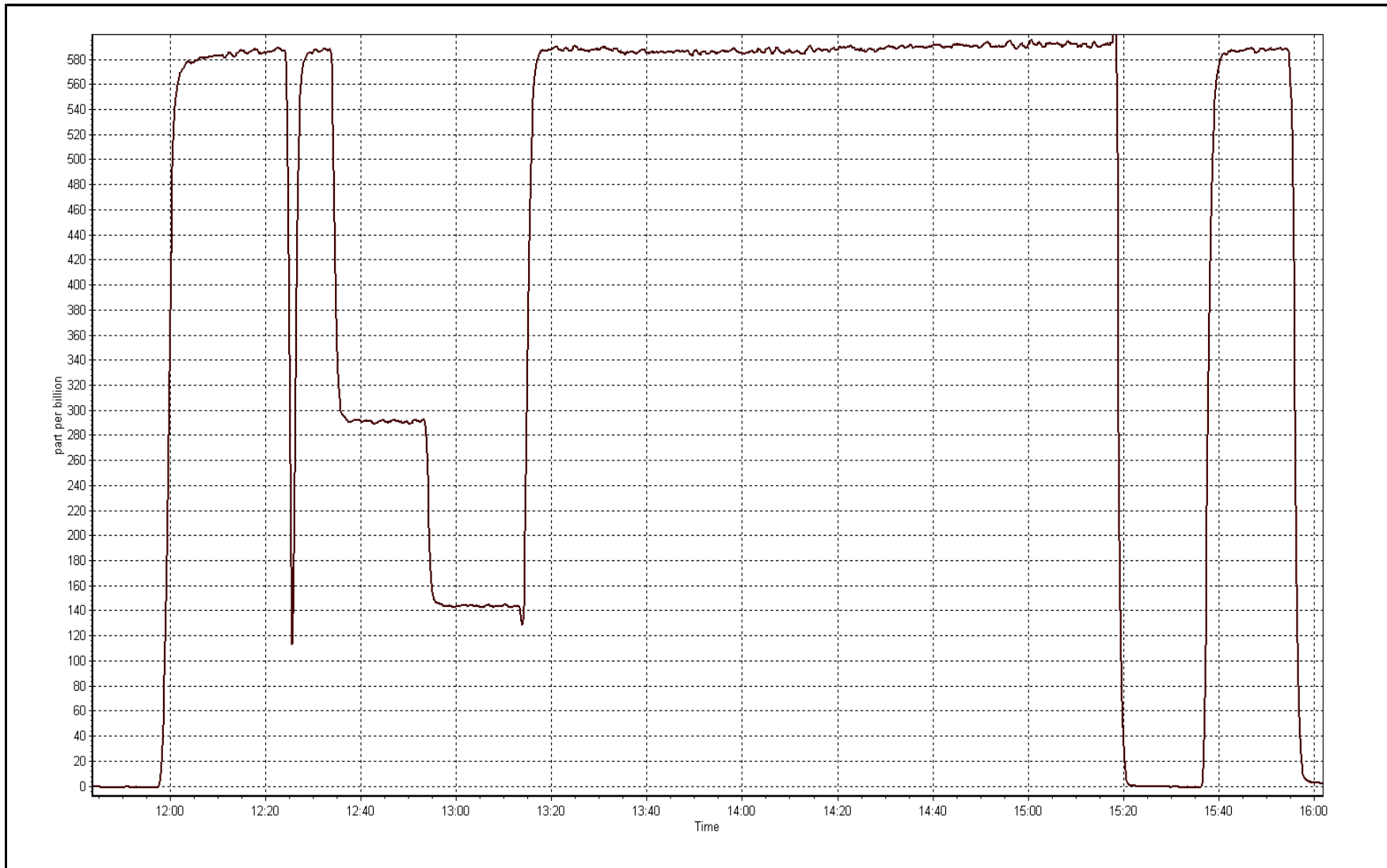
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.8	----	Correlation Coefficient	0.999986
581.9	584.9	0.9949		
291.5	290.9	1.0019	Slope	0.992926
145.2	143.7	1.0107		
			Intercept	1.778731



SO2 Calibration Plot

Date: March 13, 2017





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	March 14, 2017	Last Calibration	February 15, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	7:16	End Time (MST)	10:07
Gas Cert Reference	CC233389	Station temp.	22 Deg C
Cal Gas Concentration	4.88 ppm	Cal Gas Exp Date	10/6/2014
Calibrator Make/Model	API 700	Serial Number	1222
Dil air Make/Model	API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	DACS serial No.	11041
SO2 gas concentration	49.4 ppm	SO2 gas cert/exp	LL11090 16/Feb/19

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-699	-699
Analyzer IP address	192.168.1.44		Lamp voltage	1024	1023
Calculated slope	0.989967	0.994668	Chamber temp	45	45
Calculated intercept	-0.170136	-0.195681	Pressure	634.5	631.2
Analyzer Background	2.91	2.86	Flow	0.409	0.407
Analyzer Coefficient	1.103	1.085	Intensity	90	91
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1336160090	
Converter make/model	CDN-101		Converter serial #	522	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	82.0	80.0	81.0	0.988
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	82.0	80.0	80.6	0.993
second point	5000	41.1	40.1	40.6	0.988
third point	5000	20.6	20.1	20.5	0.981
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	82.0	80.0	80.8	0.990
Average Correction Factor					0.987

Corrected As found	80.9	Previous response	81.0	% change	0.1%
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Notes:

Sample Inlet filter changed after as founds. No adjustments made.

Calibration Performed By:

Aswin Sasi Kumar



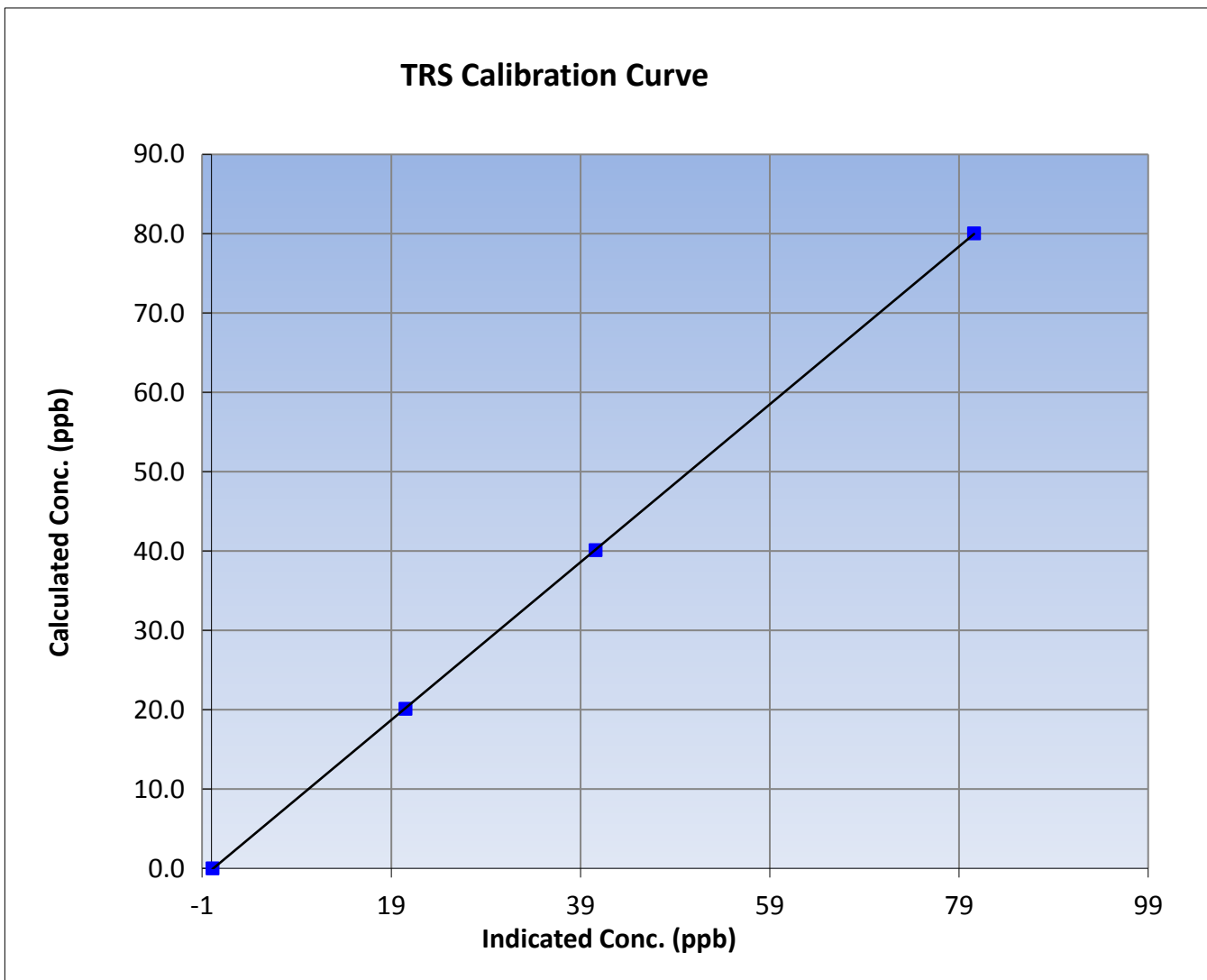
Wood Buffalo Environmental Association TRS Calibration Report

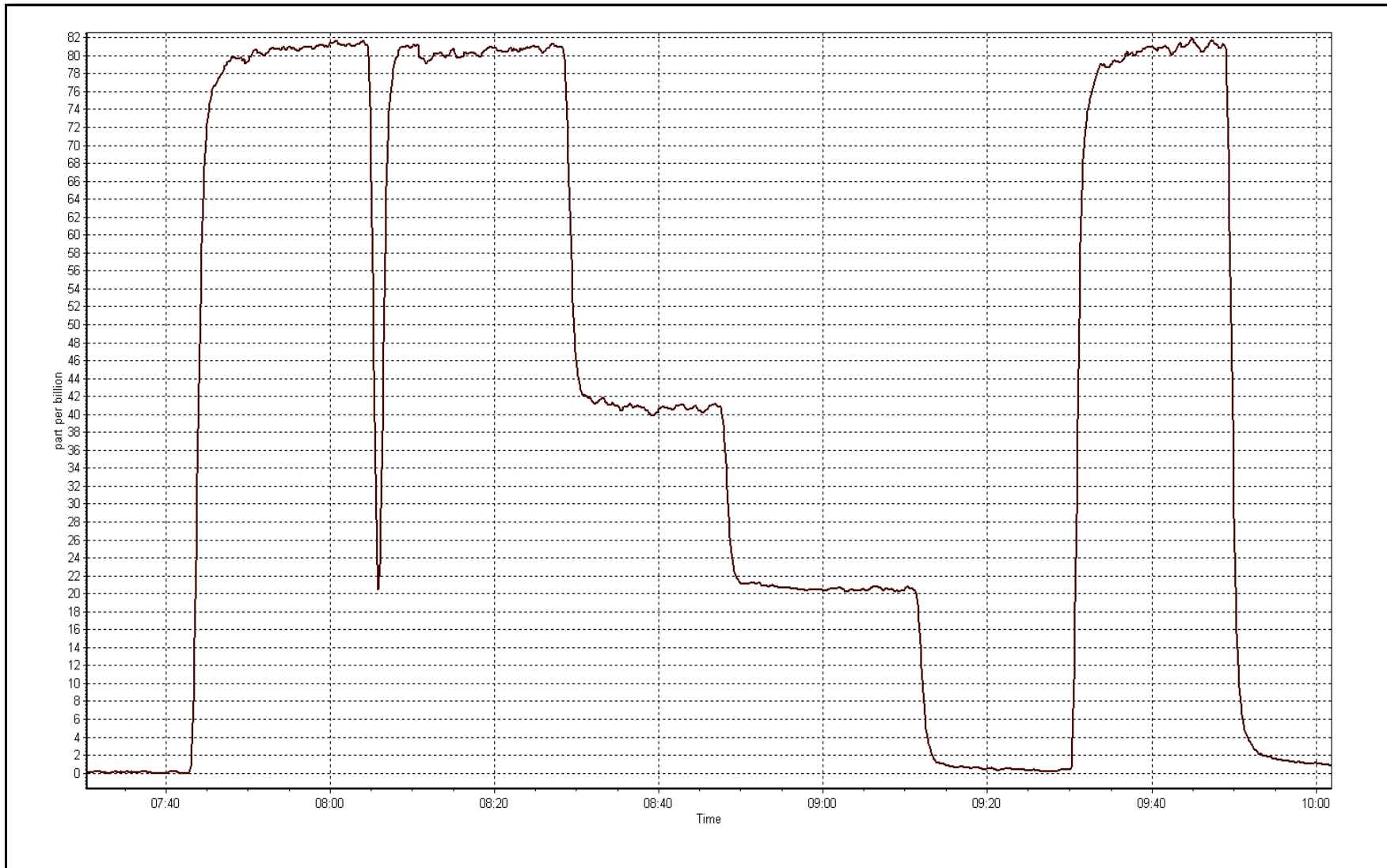
Station Information

Calibration Date	March 14, 2017	Previous Calibration	February 15, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	7:16	End Time (MST)	10:07
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1336160090

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999993
80.0	80.6	0.9930		
40.1	40.6	0.9880	Slope	0.994668
20.1	20.5	0.9812		
			Intercept	-0.195681







Wood Buffalo Environmental Association THC / NMHC Calibration Report

version 02-2017

Station Information

Calibration Date	March 13, 2017	Last Calibration	February 8, 2017
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	11:03	End Time (MST)	16:04
Gas Cert Reference	LL110090	Cal Gas Expiry Date	February 16, 2019
CH4 Cal Gas Conc.	491.0 ppm	CH4 Equiv Conc.	1041.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm	Station temp.	Deg C
Calibrator Model	API T700	Serial Number	1222
ZAG make/model	Teledyne API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	Serial Number	11041

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	75.3
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.997612	0.986603	Carrier Pressure	31.5	31.5
THC Calc intercept	0.034116	0.033764	Fuel Pressure	44.2	44.3
NMHC Calc slope	0.997238	0.994446	Air Pressure	34.4	34.4
NMHC Calc intercept	0.018053	0.015997			

Analyzer make Thermo 55i Analyzer serial # 1505164831

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	58.9	12.26	12.42	0.987
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.9	12.26	12.42	0.987
second point	5000	29.5	6.14	6.15	0.999
third point	5000	14.7	3.06	3.05	1.003
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.9	12.26	12.45	0.985
Average Correction Factor					0.996

Corrected As found 12.42 Previous response 12.26 % change -1.3%

Notes:

Changed sample inlet filter after as founds. No adjustments made.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	58.9	6.48	6.51	0.995
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.9	6.48	6.51	0.995
second point	5000	29.5	3.25	3.23	1.005
third point	5000	14.7	1.62	1.60	1.011
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.9	6.48	6.52	0.994
Average Correction Factor					1.004

Corrected As found 6.51 Previous response 6.48 % change -0.5%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	58.9	5.78	5.91	0.979
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.9	5.78	5.91	0.979
second point	5000	29.5	2.90	2.92	0.992
third point	5000	14.7	1.44	1.45	0.996
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.9	5.78	5.93	0.975
Average Correction Factor					0.989

Corrected As found 5.91 Previous response 5.78 % change -2.2%



Wood Buffalo Environmental Association

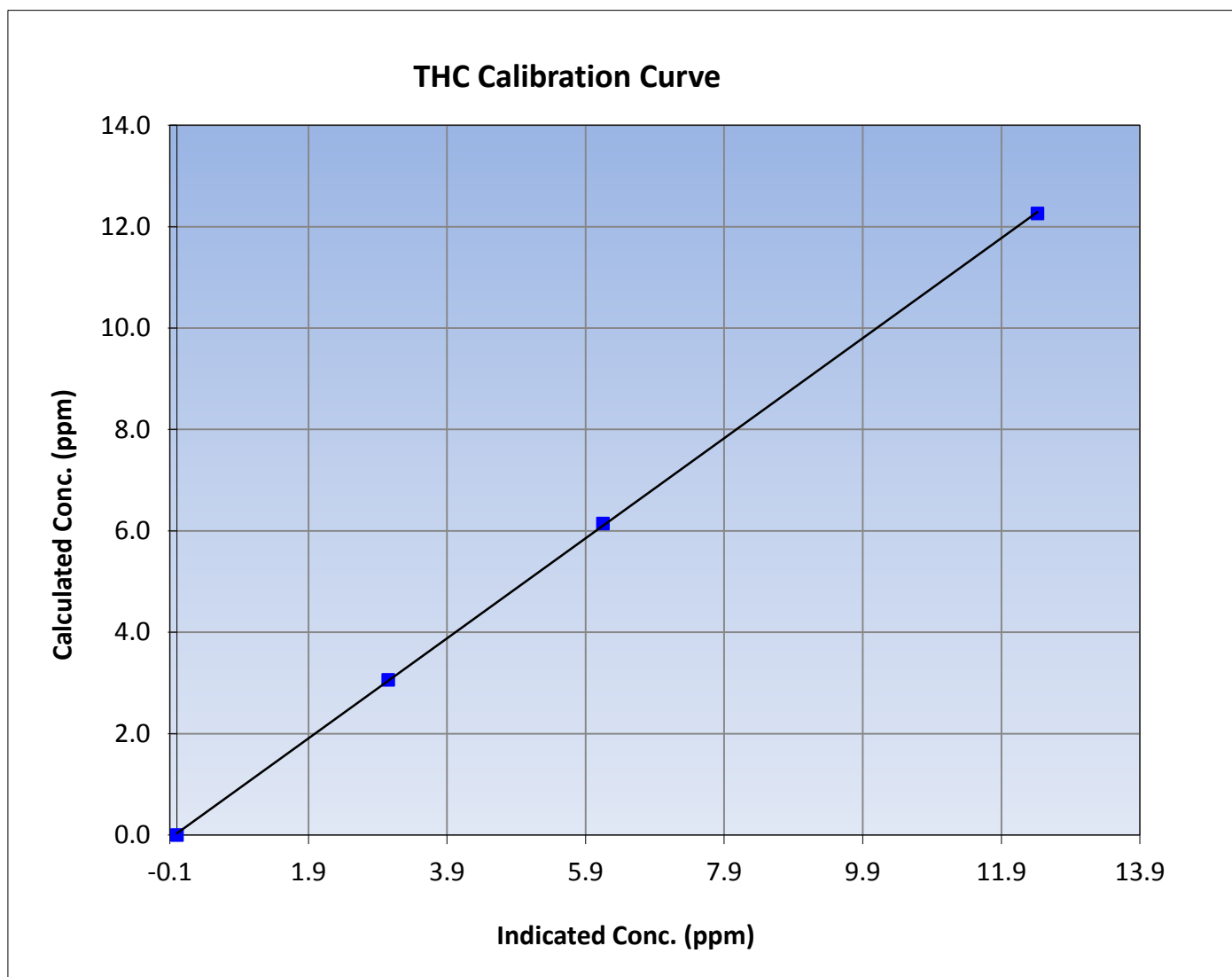
THC Calibration Summary

Station Information

Calibration Date	March 13, 2017	Previous Calibration	February 8, 2017
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	11:03	End Time (MST)	16:04
Analyzer make	Thermo 55i	Analyzer serial #	1505164831

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999955
12.26	12.42	0.9874		
6.14	6.15	0.9987	Slope	0.986603
3.06	3.05	1.0035		
			Intercept	0.033764





Wood Buffalo Environmental Association

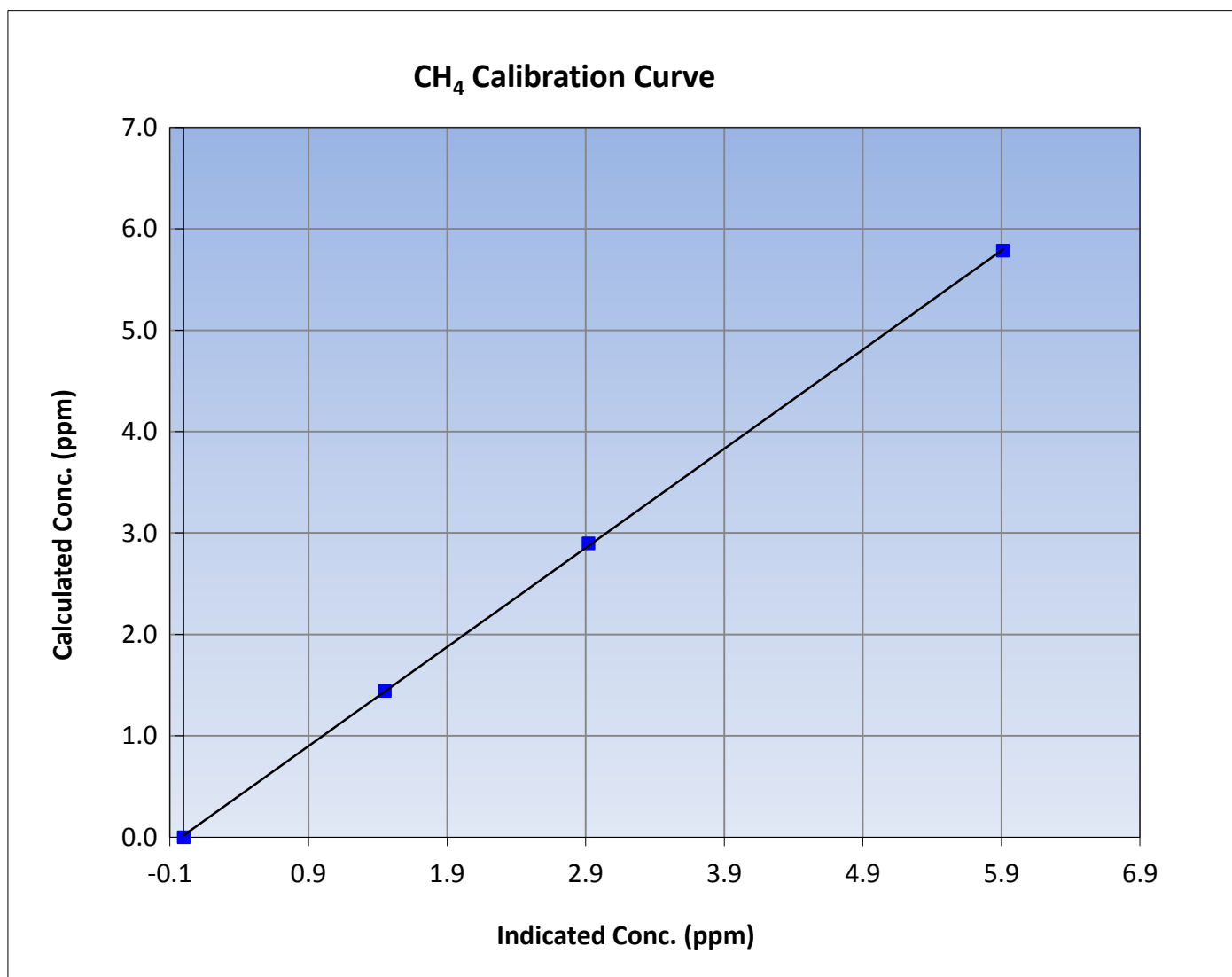
CH₄ Calibration Summary

Station Information

Calibration Date	March 13, 2017	Previous Calibration	February 8, 2017
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	11:03	End Time (MST)	16:04
Analyzer make	Thermo 55i	Analyzer serial #	1505164831

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999939
5.78	5.91	0.9787		
2.90	2.92	0.9921	Slope	0.977962
1.44	1.45	0.9955		
			Intercept	0.017744





Wood Buffalo Environmental Association

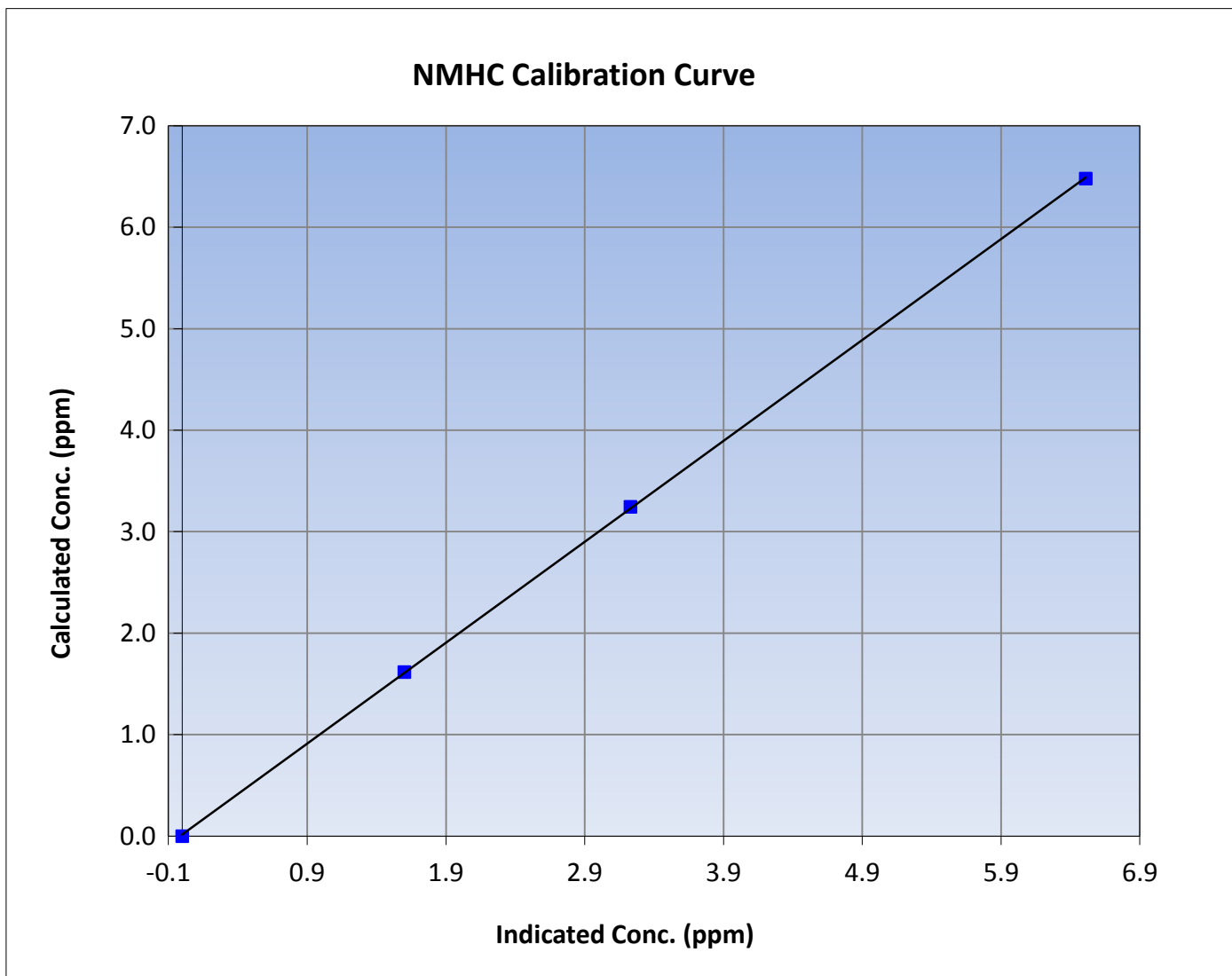
NMHC Calibration Summary

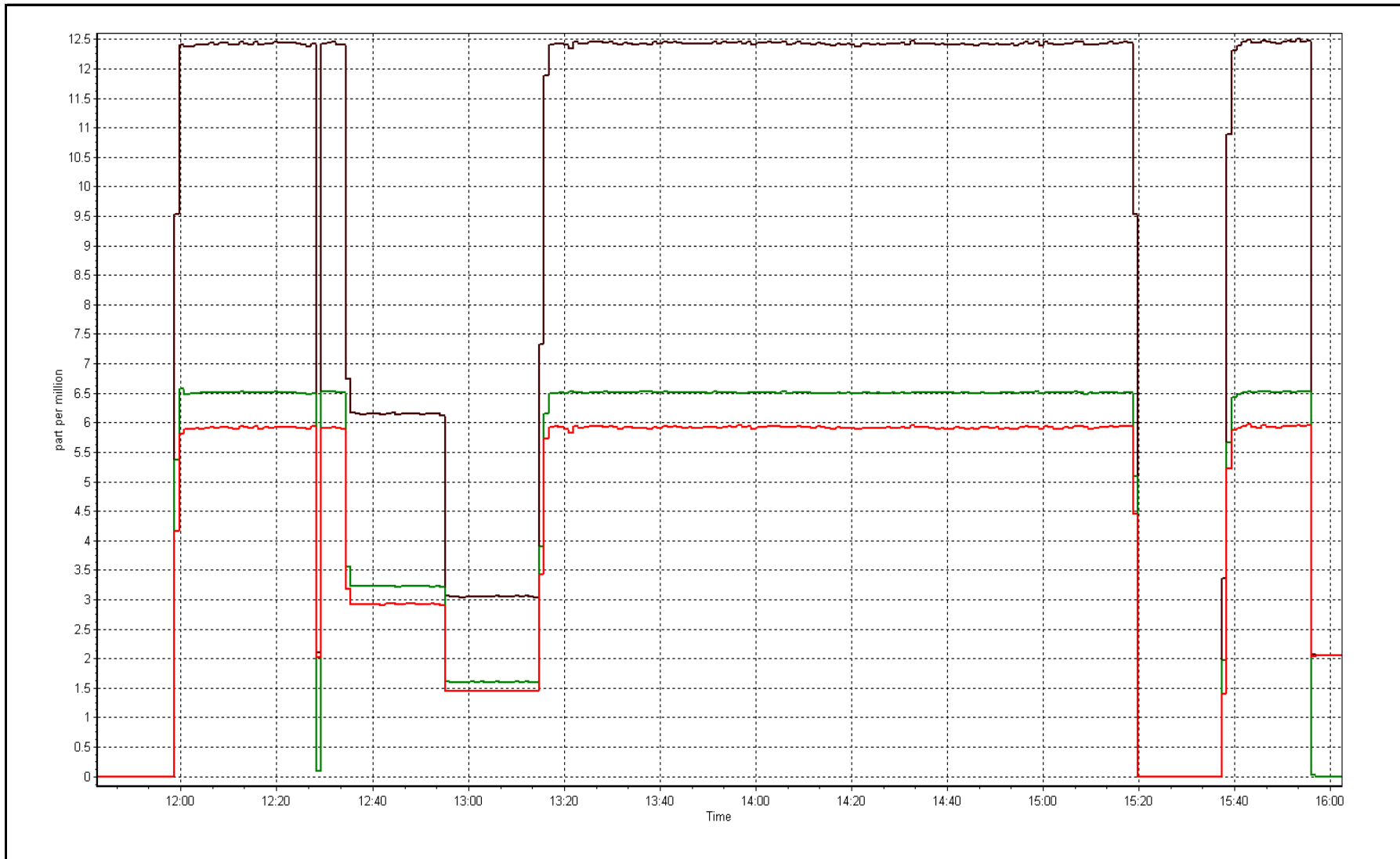
Station Information

Calibration Date	March 13, 2017	Previous Calibration	February 8, 2017
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	11:03	End Time (MST)	16:04
Analyzer make	Thermo 55i	Analyzer serial #	1505164831

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999967
6.48	6.51	0.9952		
3.25	3.23	1.0046	Slope	0.994446
1.62	1.60	1.0106		
			Intercept	0.015997







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 2, 2017	Previous Calibration	February 22, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	<input type="checkbox"/> Other: <input checked="" type="checkbox"/> Maintenance		
Start Time (MST)	11:20	End Time (MST)	17:35
NO2 GPT Ref date	February 21, 2017	Transfer Standard	GPT
Calibrator Make/Model	Teledyne API 700	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	1222
DACS make/model	Campbell Scientific CR3000	Serial Number	5610
		Serial Number	11041

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.3	27.7
Analyzer IP address	192.168.1.48		Lamp temp.	53.2	53.3
Calculated slope	0.998392	0.997786	Pressure	623.6	659.1
Calculated intercept	-1.909793	-2.697687	Flow cell A	0.696	0.717
Analyzer Background	-2.2	-29.7	Flow cell B	0.712	0.741
Analyzer Coefficient	1.368	1.080	Cell A Intensity	62789	62553
			Cell B Intensity	63991	64050

Analyzer make	Thermo 49i	Analyzer serial #	1501663733
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp O3 Gen Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	400	0.0	5.7	----
as found span	5000	1086	397.2	477.0	0.833
calibrator zero	5000	400.00	0.0	0.4	----
high point	5000	1086	397.2	399.0	0.996
second point	5000	975	268.4	272.7	0.984
third point	5000	847	134.4	140.4	0.957
as left zero	5000	400	0.0	3.2	----
as left span	5000	1086	397.2	401.8	0.989
Average Correction Factor					0.979

Corrected As found	471.3	Previous response	399.7	% change	-15.2%
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Notes:

Daily Zero/Span had a 11% difference. After checking diagnostics, determined that it is most likely the solenoid valve unit malfunctioning which is causing the flow to drop. During dis-assembly found that the three way valve that connects to the solenoid unit was severed. Installed new valve. Executed multipoint calibration. Adjusted zero and span. Did not change filter.

Calibration Performed By:

Aswin Sasi Kumar



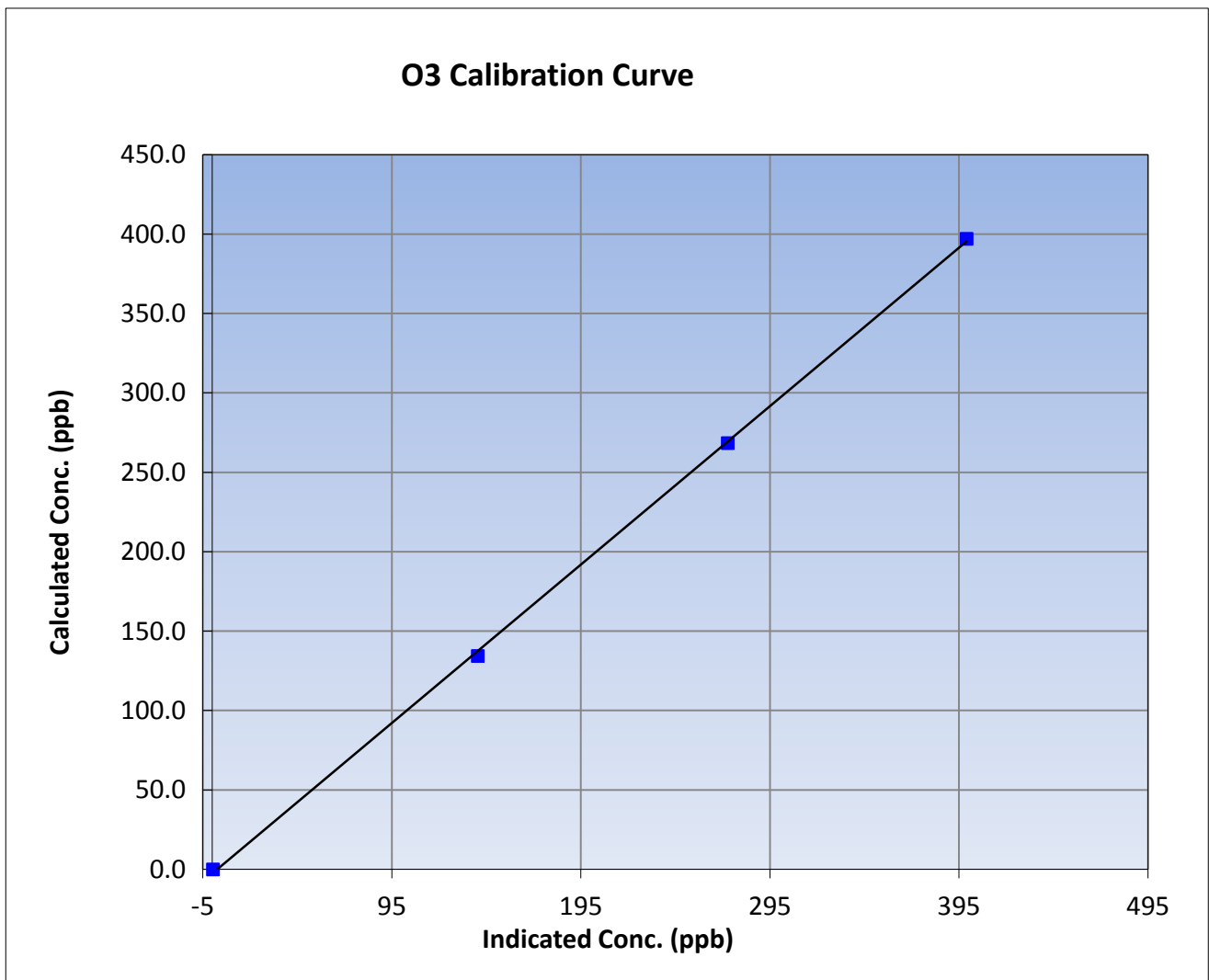
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	March 2, 2017	Previous Calibration	February 22, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	11:20	End Time (MST)	17:35
Analyzer make	Thermo 49i	Analyzer serial #	1501663733

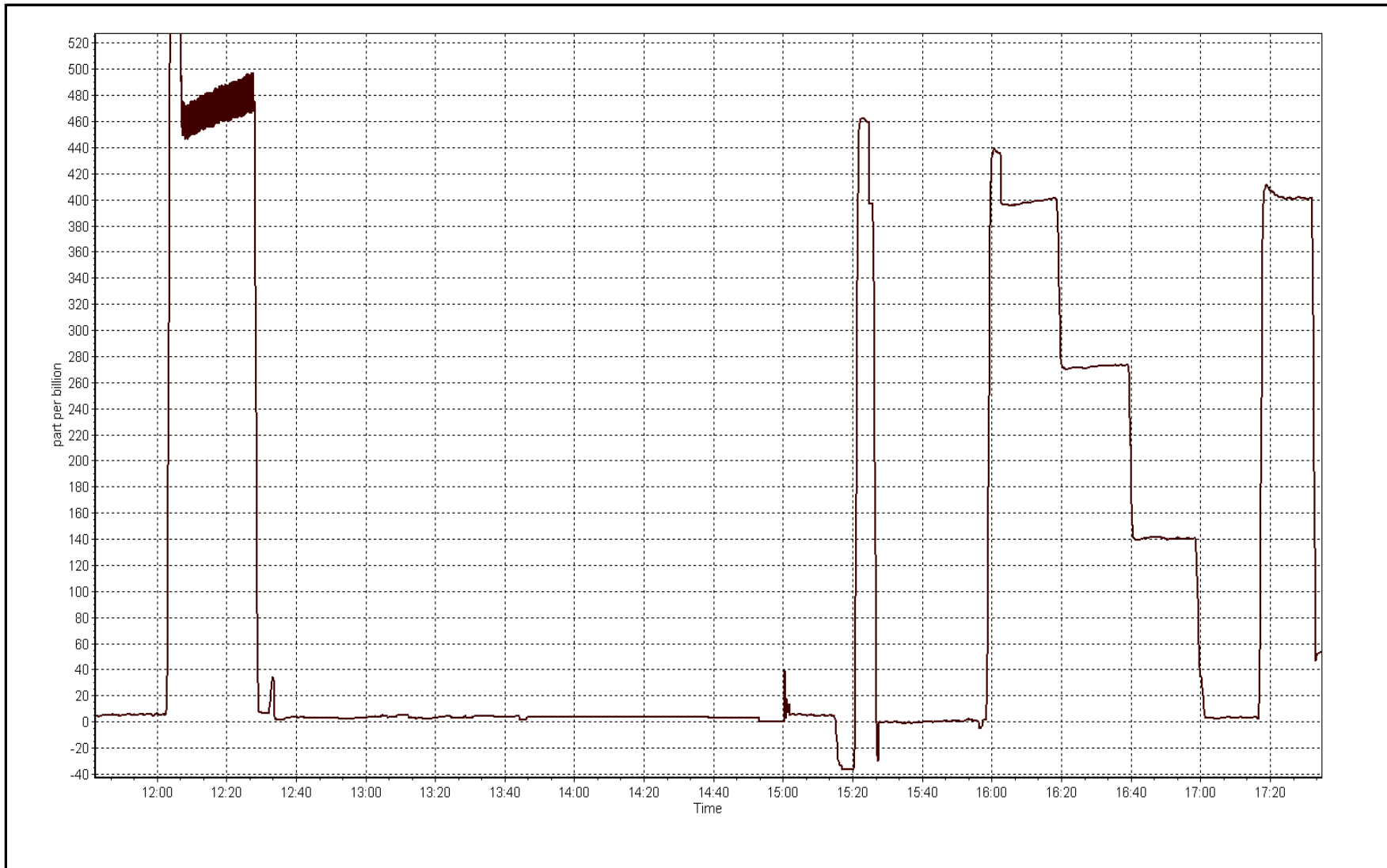
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999786
397.2	399.0	0.9955		
268.4	272.7	0.9840	Slope	0.997786
134.4	140.4	0.9571		
			Intercept	-2.697687



O3 Calibration Plot

Date: March 2, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 4, 2017	Previous Calibration	March 2, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	<input type="checkbox"/> Other: <input checked="" type="checkbox"/> Maintenance		
Start Time (MST)	11:20	End Time (MST)	10:33
NO2 GPT Ref date	February 21, 2017	Transfer Standard	GPT
		Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	1222
ZAG make/model	Teledyne API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	Serial Number	11041

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.5	27.5
Analyzer IP address	192.168.1.48		Lamp temp.	53.3	53.3
Calculated slope	0.997786	1.012439	Pressure	649.4	649.4
Calculated intercept	-2.697687	-1.211887	Flow cell A	0.711	0.711
Analyzer Background	-29.7	-22.5	Flow cell B	0.737	0.737
Analyzer Coefficient	1.080	1.152	Cell A Intensity	63112	63112
			Cell B Intensity	64594	64594

Analyzer make	Thermo 49i	Analyzer serial #	1501663733
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp O3 Gen Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	400	0.0	8.2	----
as found span	5000	1086	397.2	374.8	1.060
calibrator zero	5000	400.00	0.0	-0.4	----
high point	5000	1086	397.2	392.7	1.011
second point	5000	975	268.4	266.2	1.008
third point	5000	847	134.4	136.4	0.985
as left zero					----
as left span					
Average Correction Factor					1.002

Corrected As found	366.6	Previous response	400.8	% change	9.3%
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Notes:

Remote Calibration, Nightly zero was high, diagnostics similar to last calibration. Last calibration there was a major adjustment of the zero after repair work. Zero and span adjusted

Calibration Performed By: _____ Melissa Lemay



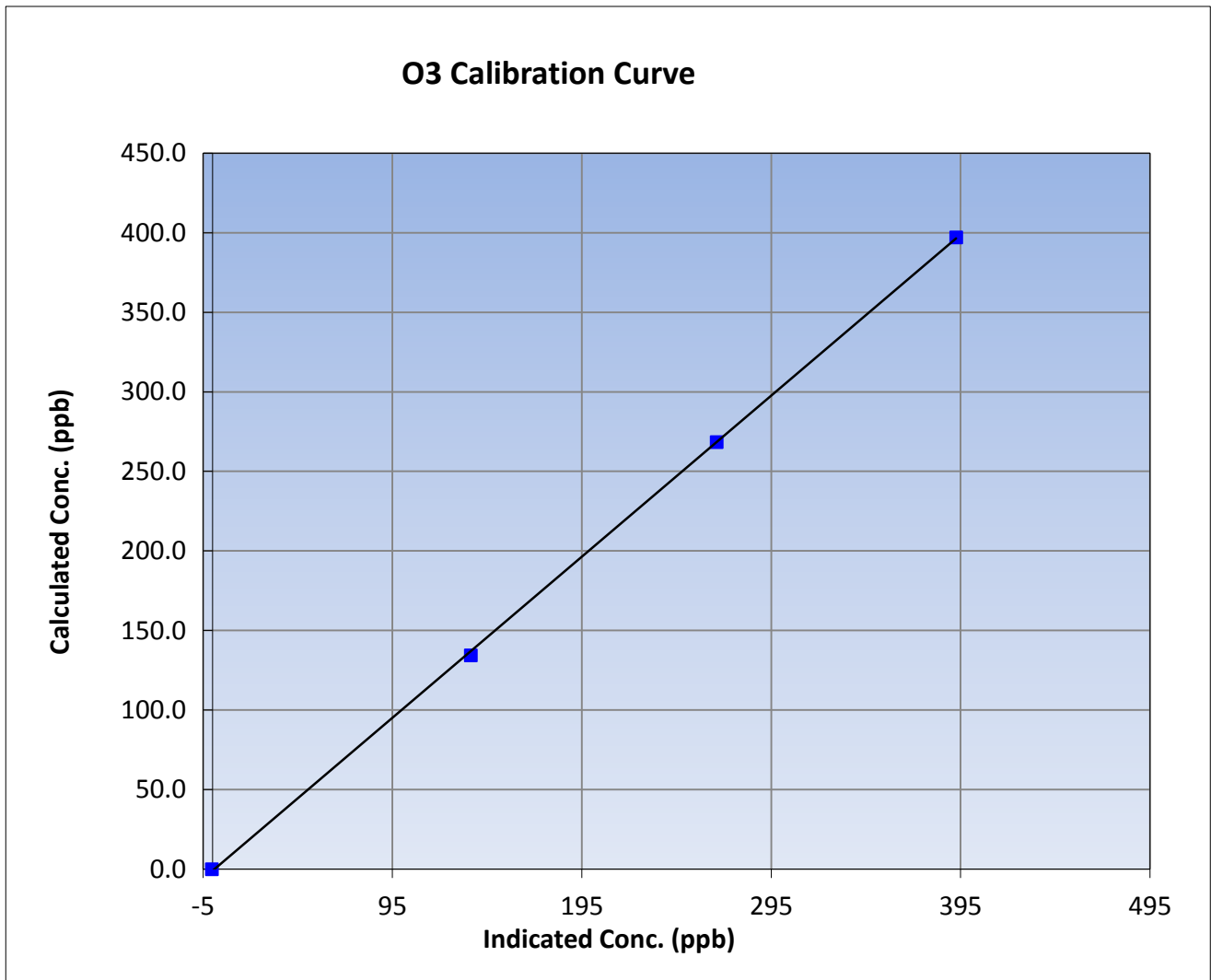
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	March 4, 2017	Previous Calibration	March 2, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	11:20	End Time (MST)	10:33
Analyzer make	Thermo 49i	Analyzer serial #	1501663733

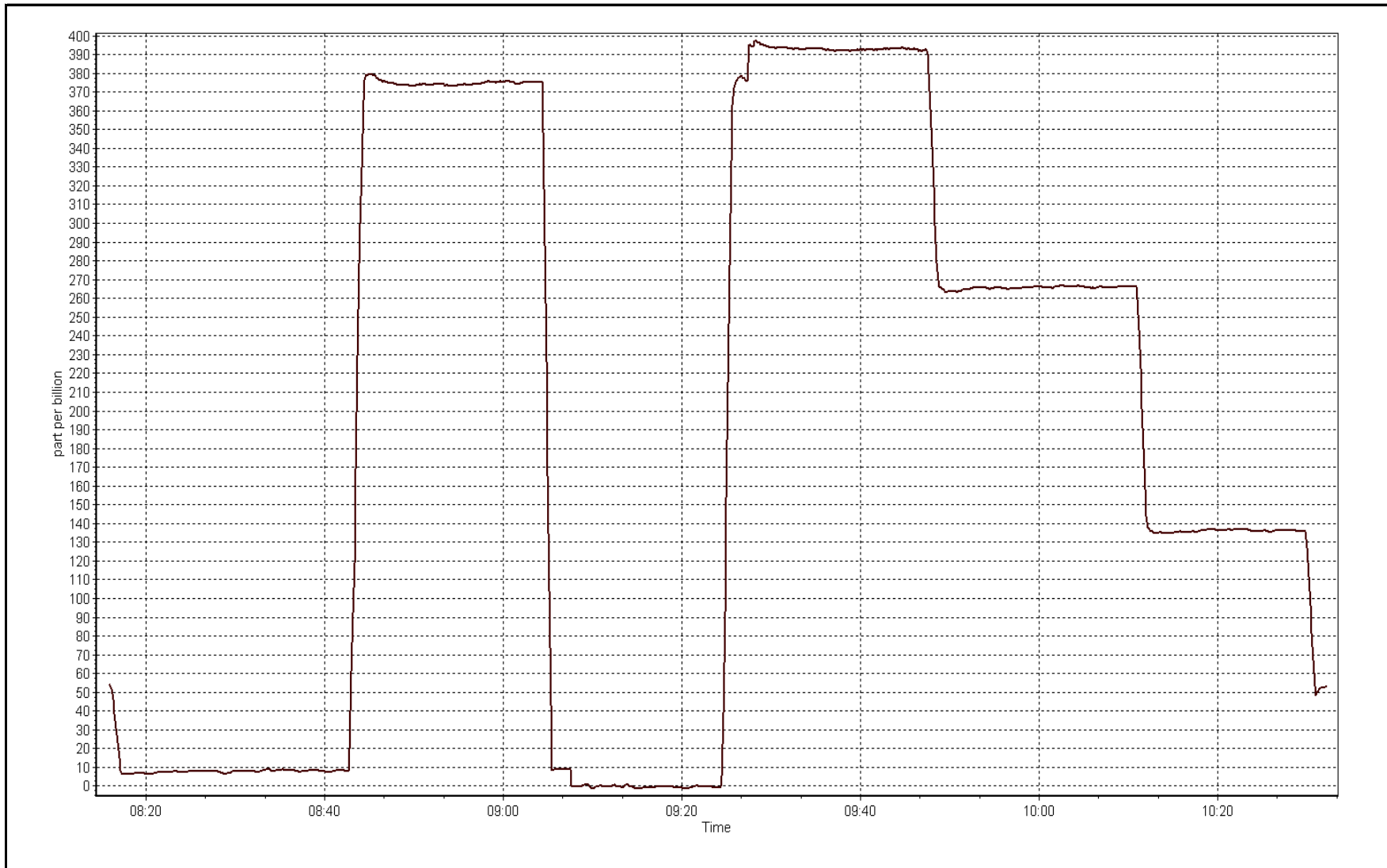
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999890
397.2	392.7	1.0115		
268.4	266.2	1.0082		
134.4	136.4	0.9851		
			Slope	1.012439
			Intercept	-1.211887



O3 Calibration Plot

Date: March 4, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 24, 2017	Previous Calibration	March 4, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	<input type="checkbox"/> Other: <input checked="" type="checkbox"/> Maintenance		
Start Time (MST)	10:00	End Time (MST)	13:04
NO2 GPT Ref date	February 21, 2017	Transfer Standard	GPT
Calibrator Make/Model	Teledyne API 700	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	1222
DACS make/model	Campbell Scientific CR3000	Serial Number	5610
		Serial Number	11041

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.5	27.8
Analyzer IP address	192.168.1.48		Lamp temp.	53.3	53.3
Calculated slope	1.012439	0.994977	Pressure	649.4	620.9
Calculated intercept	-1.211887	-2.087396	Flow cell A	0.711	0.727
Analyzer Background	-22.5	-1.6	Flow cell B	0.737	0.735
Analyzer Coefficient	1.152	1.030	Cell A Intensity	63112	82090
			Cell B Intensity	64594	83559

Analyzer make	Thermo 49i	Analyzer serial #	1501663733
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp O3 Gen Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	400.00	0.0	0.1	----
high point	5000	1086	397.2	400.1	0.993
second point	5000	975	268.4	272.2	0.986
third point	5000	847	134.4	140.1	0.959
as left zero	5000	400	0.0	-0.5	----
as left span	5000	1086	397.2	405.6	0.979
Average Correction Factor					0.979

Corrected As found	NA	Previous response	NA	% change	NA
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Notes:

Changed out sample/reference valve assembly. Noisy response seems to have resolved after valve assembly replacement. Adjusted zero and span.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

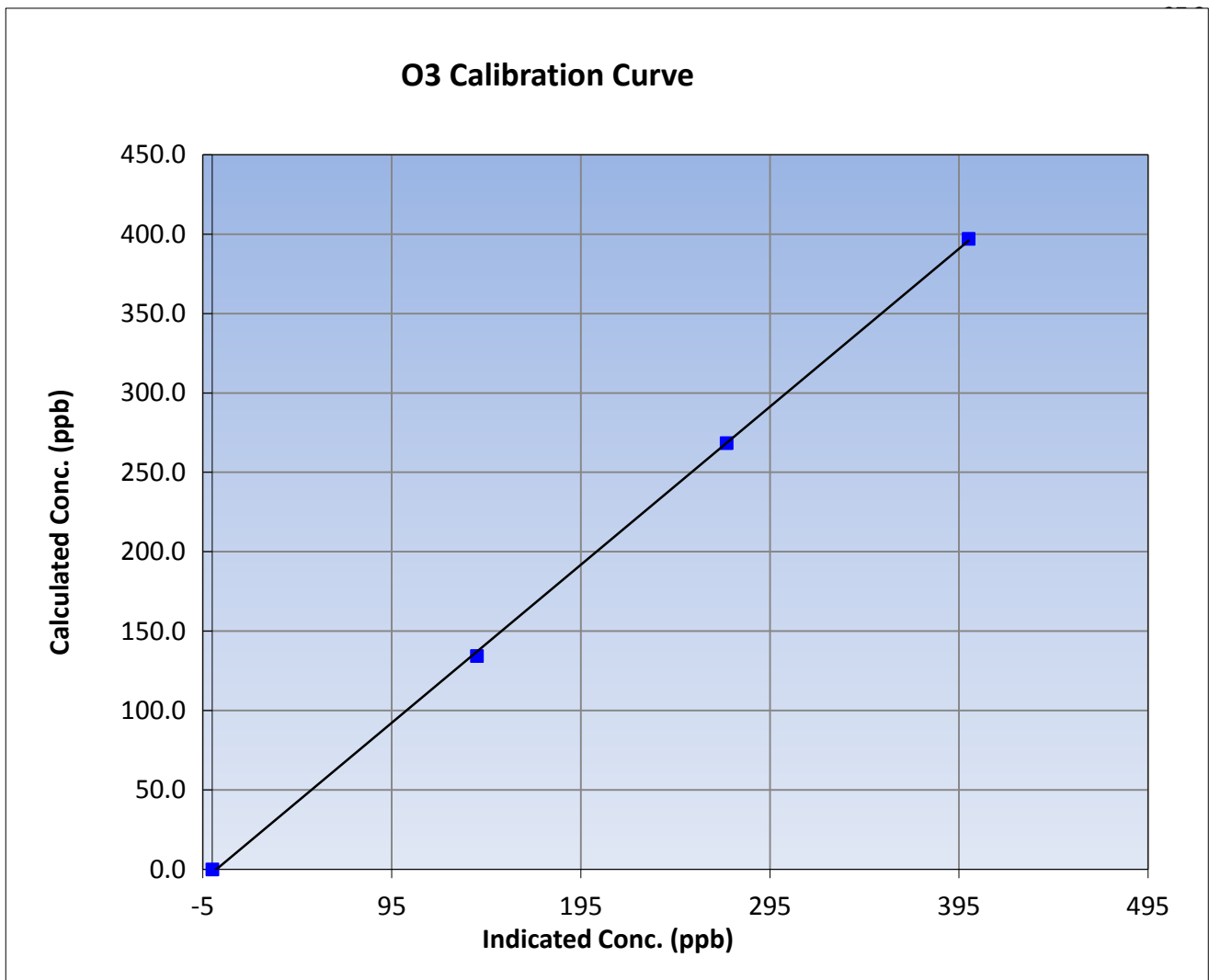
O3 Calibration Report

Station Information

Calibration Date	March 24, 2017	Previous Calibration	March 4, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:00	End Time (MST)	13:04
Analyzer make	Thermo 49i	Analyzer serial #	1501663733

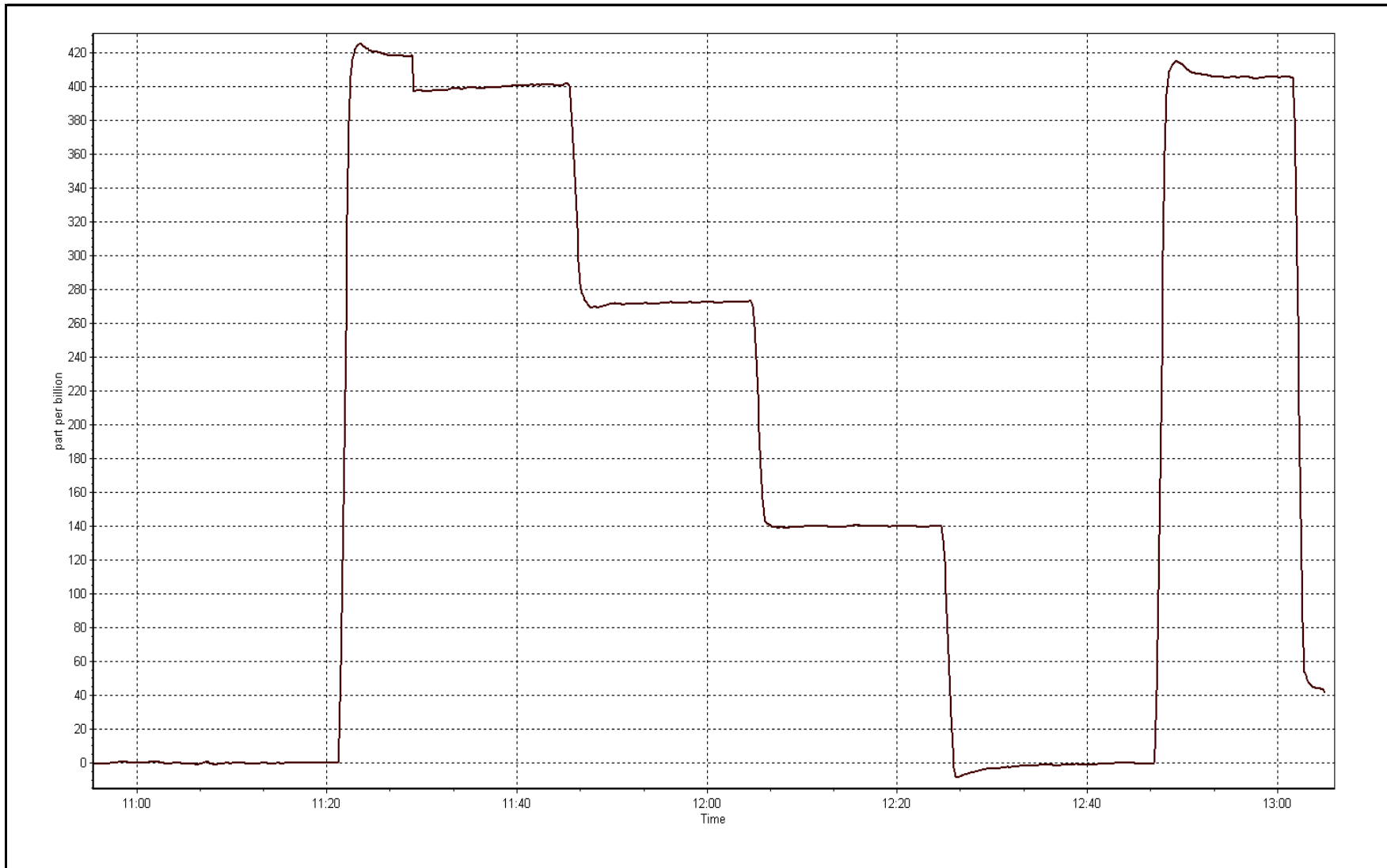
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999838
397.2	400.1	0.9929		
268.4	272.2	0.9861	Slope	0.994977
134.4	140.1	0.9592		
			Intercept	-2.087396



O3 Calibration Plot

Date: March 24, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 13, 2017	Previous Calibration	February 21, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	11:03	End Time (MST)	16:04
NO Cal Gas Conc	50.9 ppm	Gas Cert Reference	LL110090
NOx Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	February 16, 2019
Calibrator	API T700	Serial Number	1222
Zero air Generator	Teledyne API T701	Serial Number	5610

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	11041
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.996255	0.993841	0.993630
	Data Offset	0.638424	0.567009	-1.940570
Current Calibration	Data Slope	0.985909	0.982930	1.014316
	Data Offset	0.985560	0.954778	-0.838133

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1336160088
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.986		0.986	
NOx coefficient	0.996		0.996	
NO2 coefficient	0.999		0.999	
NO bkgnd	1.8		1.8	
NOx bkgnd	1.9		1.9	
Chamber Temp	50.5	Deg C	50.2	Deg C
Moly Temp	325	Deg C	323.4	Deg C
PMT voltage	-849.9	V	-849.9	V
PMT Temp	-2.8	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	197.8	mmHg	196	mmHg
R Cell Press Nox	198.1	mmHg	196.9	mmHg
NO sample flow	0.721	lpm	0.712	lpm
Nox sample Flow	0.722	lpm	0.713	lpm

Notes:

Changed inlet filter after as founds. Adjusted span. During the GPT cal, the NOX increased steadily at every point. Used 2nd GPT high point as reference.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

March 13, 2017

Station Number:

AMS 18

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.3	0.3	-0.1	----	----
as found span	5000	58.9	599.6	599.6	0.0	608.0	609.8	-1.4	0.986	0.983
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.3	0.0	----	----
high point	5000	58.9	599.6	599.6	0.0	608.0	609.8	-1.4	0.986	0.983
second point	5000	29.5	300.3	300.3	0.0	302.4	303.6	-1.2	0.993	0.989
third point	5000	14.7	149.6	149.6	0.0	149.9	150.2	-0.4	0.999	0.996
as left zero	5000	0.0	0.0	0.0	0.0	0.4	0.5	0.0	----	----
as left span	5000	58.9	599.6	208.7	390.9	613.6	206.2	407.4	0.977	1.012
Average Correction Factor									0.993	0.990

Corrcted As found
Previous Response

NO_x= 607.7
NO_x= 601.2

NO= 609.5
NO= 602.8

Percent Change

NO_x= -1.1%

NO= -1.1%

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 58.90 ccm NOx ref calc conc = 599.6 ppb NO ref calc conc = 599.6 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	618.8	619.5	0.0	0.9690	0.9678	----	----
1st NO2 (300)	208.7	410.8	613.2	208.7	404.5	0.9779	----	1.0157	98.5%
2nd NO2 (200)	339.8	279.7	618.2	339.8	278.3	0.9700	----	1.0049	99.5%
3rd NO2 (100)	476.5	143.1	618.8	476.5	142.4	0.9690	----	1.0051	99.5%
2nd NO ref point		0.0	618.8	619.5	-0.8	0.9690	0.9678	----	----
Average Correction Factor						0.9715		1.0086	99.2%

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

NO_x Calibration Summary

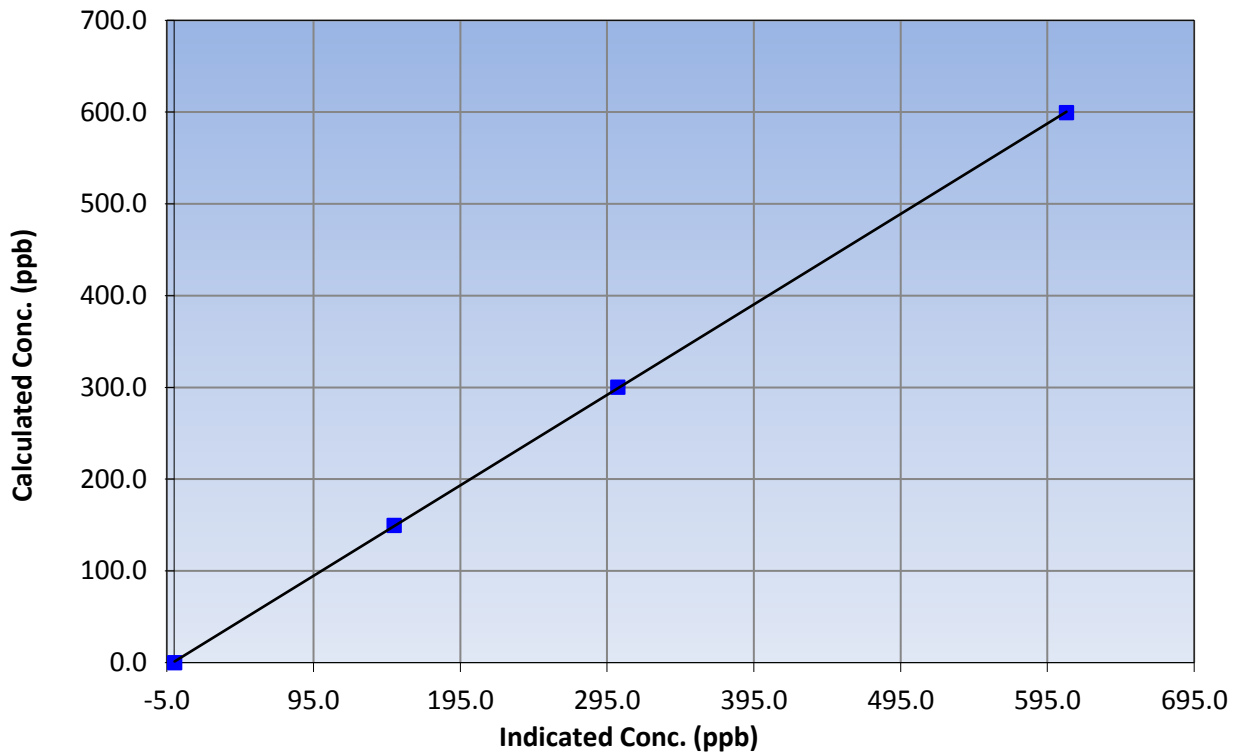
Station Information

Calibration Date	March 13, 2017	Previous Calibration	February 21, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	11:03	End Time (MST)	16:04
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999977
599.6	608.0	0.9862		
300.3	302.4	0.9931	Slope	0.985909
149.6	149.9	0.9985		
			Intercept	0.985560

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

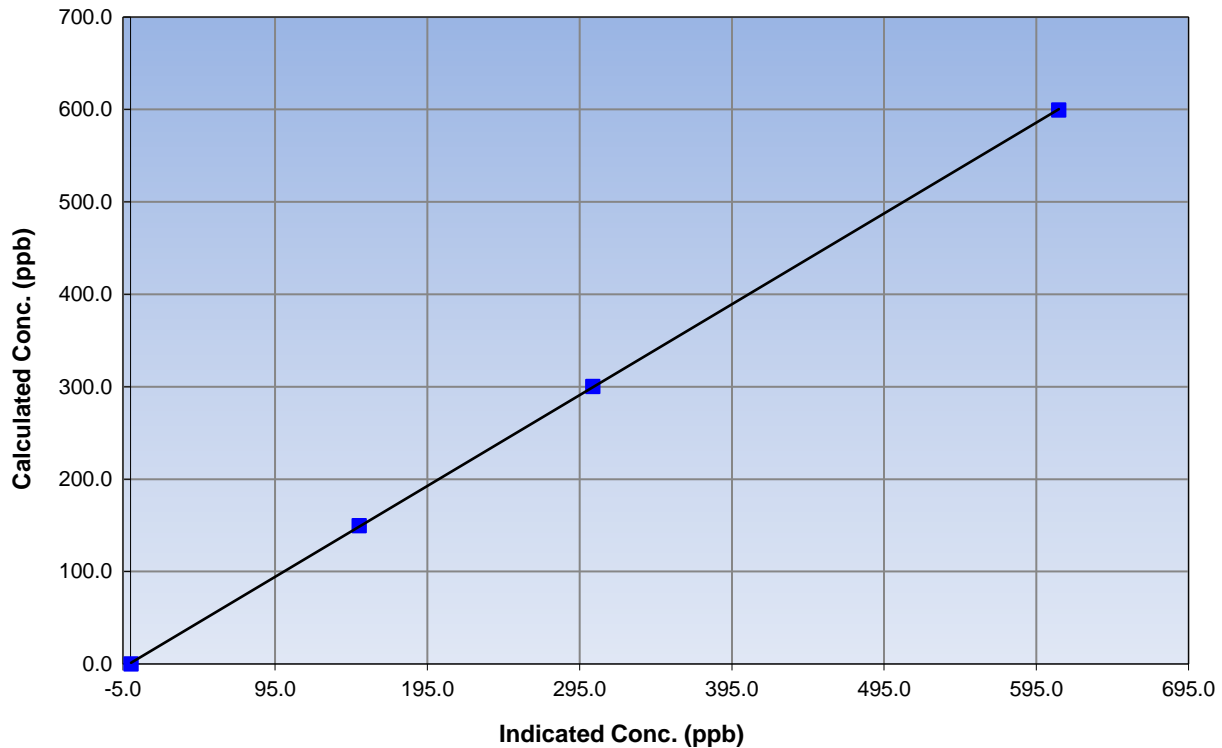
Station Information

Calibration Date	March 13, 2017	Previous Calibration	February 21, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	11:03	End Time (MST)	16:04
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999979
599.6	609.8	0.9833		
300.3	303.6	0.9893	Slope	0.982930
149.6	150.2	0.9961		
			Intercept	0.954778

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

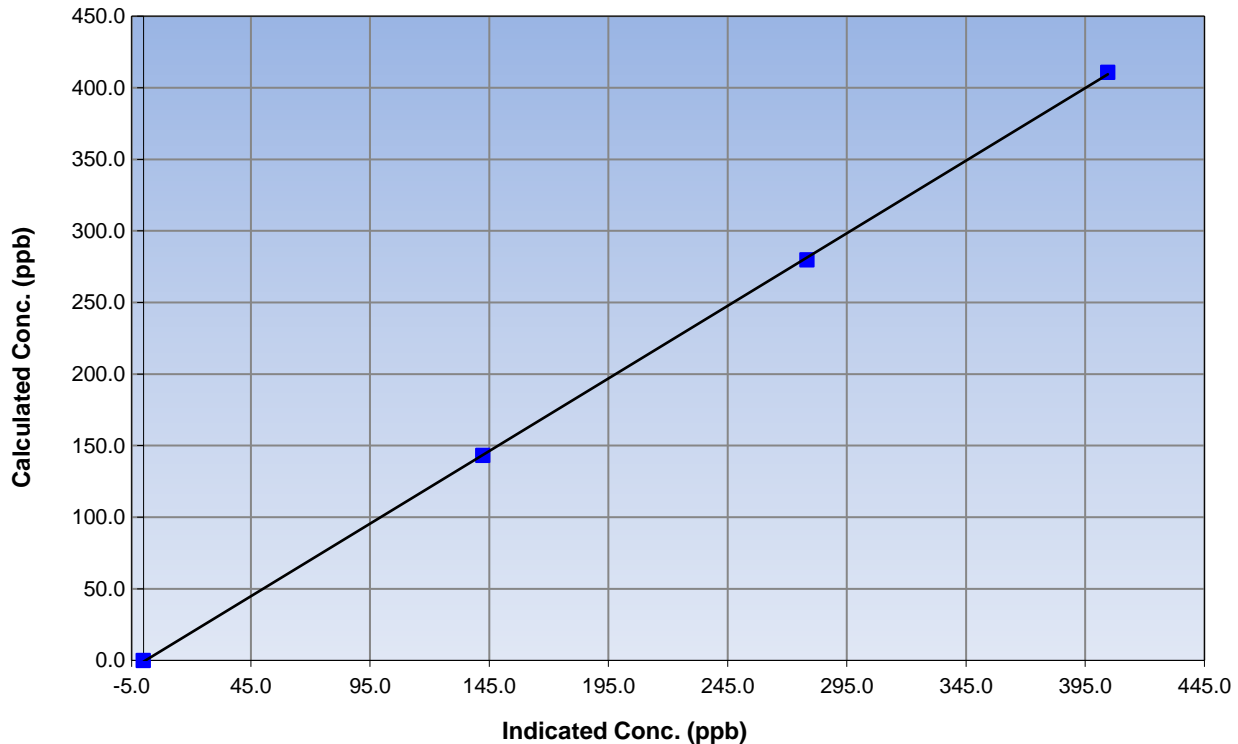
Station Information

Calibration Date	March 13, 2017	Previous Calibration	February 21, 2017
Station Number	Stony Mountain	Station Number	AMS 18
Start Time (MST)	11:03	End Time (MST)	16:04
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

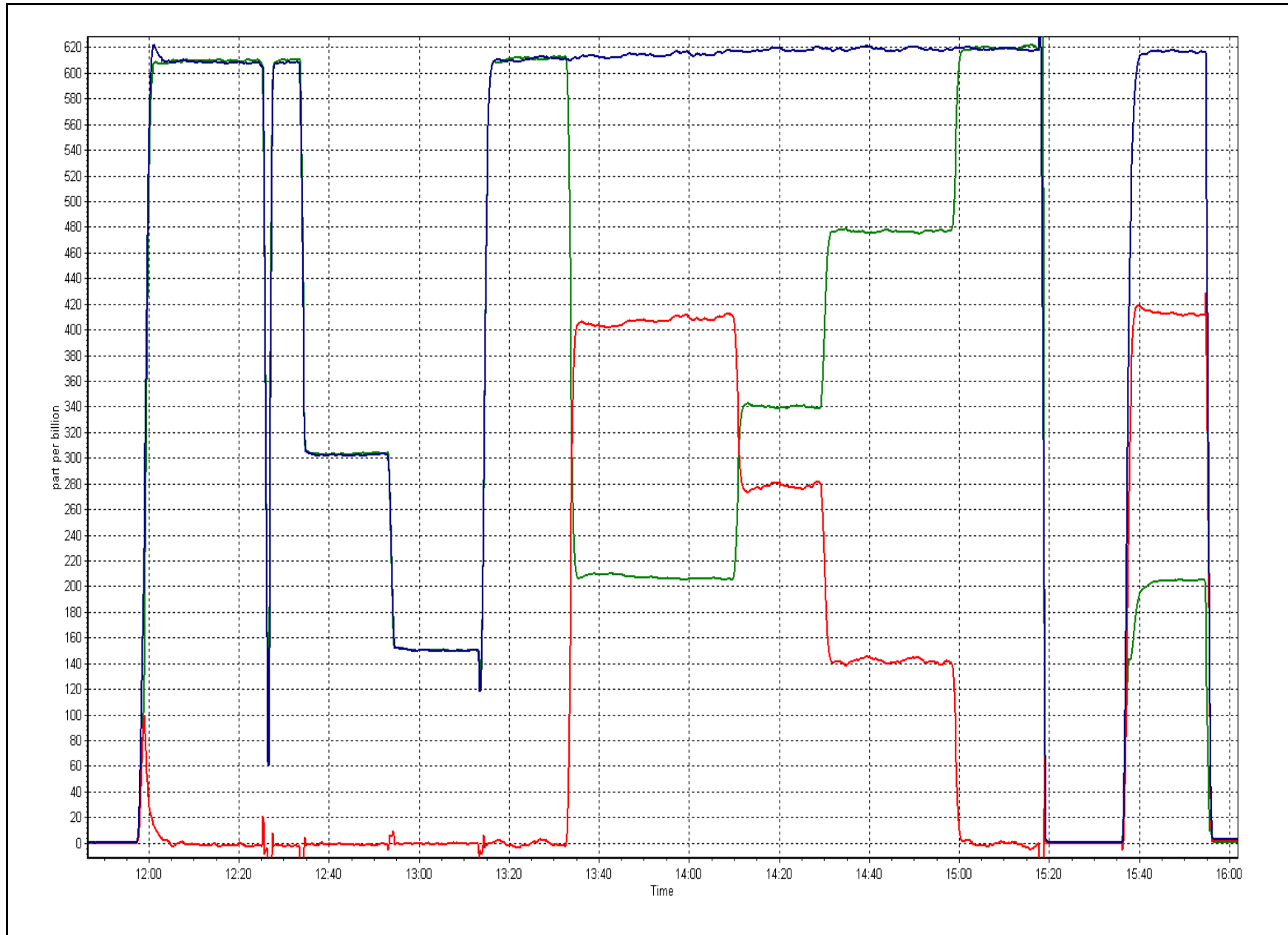
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999936
410.8	404.5	1.0157		
279.7	278.3	1.0049	Slope	1.014316
143.1	142.4	1.0051		
			Intercept	-0.838133

NO₂ Calibration Curve



NOX Calibration Plot

Date: March 13, 2017





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	March 14, 2017	Last Cal Date:	February 24, 2017
Start time (MST):	9:12	End time (MST):	11:45
Sharp Model:	Thermo 5030 SHARP	S/N:	E-781
Particulate Fraction:	PM2.5	C14 Source S/N:	4048
Flow Standard Model:	Delta-Cal	S/N:	954
Temp/RH standard:	Delta-Cal	S/N:	954

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	-2	-0.7	-2	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	928	930	928	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1018.2	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	1.5	-----	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"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

Leak Test:	Date of check:	<u>Jan 10 2016</u>	Last Cal Date:	<u>Oct 18 2016</u>	<u>Tolerance</u>
	Flow w/o adaptor:	<u>16.63</u>	Flow w/ adaptor:	<u>16.40</u>	0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass:	<u>1337</u>	S/N:	<u>5872</u>
	Date of check:	<u>June 22 2016</u>	Last Cal Date:	<u>March 23 2016</u>
	New Correction Factor:	<u>7027</u>	Previous Correction Factor:	<u>6985</u>

Parameter	As found	Measured	As left	Adjusted	Tolerance
T2 (°C)	17	NA	20	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	20	NA	23	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	14	NA	18	<input type="checkbox"/>	+/- 2 °C
RH (%)	5	NA	19	<input type="checkbox"/>	+/- 10%

Notes: Cleaned Cyclone head. Nephelometer zero adjusted.

Calibration by: Aswin Sasi Kumar



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 19 FIREBAG MARCH 2017

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
MARCH 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	10	0	2	0
H2S (ppb) Average	709	35	35	100	1	0	0	0
THC (ppm) Average	703	36	41	99.33	2.5	-	2.3	-
NO2 (ppb) Average	709	35	35	100	36	0	10	-
NO (ppb) Average	709	35	35	100	22	-	5	-
NOX (ppb) Average	709	35	35	100	52	-	14	-
Temperature 2 m (C) Average	744	0	0	100	9.6	-	5	-
Relative Humidity (%) Average	744	0	0	100	100	-	93	-
Wind Speed 10 m (km/h) Average	744	0	0	100	40	-	31	-
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)
MARCH 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	10
H2S (ppb) Average	709	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	703	2.19	0.1	-	1.9	2.1	2.2	2.2	2.2	2.3	2.5
NO2 (ppb) Average	709	3.6	5	-	0	0	1	2	5	8	36
NO (ppb) Average	709	1.2	2	-	0	0	0	1	1	3	22
NOX (ppb) Average	709	4.9	6	-	0	0	1	3	6	11	52
Temperature 2 m (C) Average	744	-9.81	10.6	-	-33.2	-24.2	-20	-8.3	-0.3	2.6	9.6
Relative Humidity (%) Average	744	69	16	-	29	46	57	72	81	90	100
Wind Speed 10 m (km/h) Average	744	15.1	7	-	1	6	10	14	20	24	40
	6 744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	06 Mar 2017 07:00	06 Mar 2017 11:00	5	Analyzer Failure - zero air generator failure



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Firebag - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 10 ppb on Mar 15 12:00	Maximum Daily Average: 1.8 ppb on Mar 15		Hours of Data:	708
Minimum Value: 0 ppb on Mar 25 10:00	Minimum Daily Average: 0.1 ppb on Mar 25		Hours of Missing Data:	36
Maximum Diurnal Average: 0.8 ppb at hour 16	Minimum Diurnal Average: 0.2 ppb at hour 19		Hours of Calibration:	36
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:	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-Mar	Z	3	4	5	1	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	5	
2-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
3-Mar	1	1	Z	1	1	1	1	1	1	1	1	1	1	3	8	5	1	1	0	0	1	1	1	1	1.4	8	
4-Mar	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	1	
5-Mar	3	7	2	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	7	
6-Mar	2	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	2	
7-Mar	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	
8-Mar	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	
9-Mar	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	
10-Mar	0	0	0	Z	0	0	0	0	0	0	1	1	3	4	2	0	0	0	0	0	1	0	0	0	0.6	4	
11-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0.3	2	
12-Mar	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	
13-Mar	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.6	1	
14-Mar	1	Z	1	1	1	1	1	1	2	6	3	2	1	1	1	6	4	1	0	1	1	1	1	1	1.6	6	
15-Mar	1	1	Z	0	0	0	0	0	1	1	9	10	9	7	2	1	0	0	0	0	0	0	0	0	1.8	10	
16-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7	0.4	7	
17-Mar	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	
18-Mar	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	
19-Mar	Z	0	0	0	0	1	1	2	1	2	1	0	0	1	1	2	1	0	0	0	0	0	0	0	0.6	2	
20-Mar	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0.5	1	
21-Mar	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
22-Mar	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	
23-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1	
24-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.3	1	
25-Mar	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	
26-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	4	1	0	0	0	0	0	0	0	0.4	4	
27-Mar	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
28-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1	
29-Mar	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-Mar	0	0	0	0	0	Z	0	1	0	0	1	2	2	1	1	0	0	0	0	0	0	0	1	0	0.5	2	
31-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.3	1

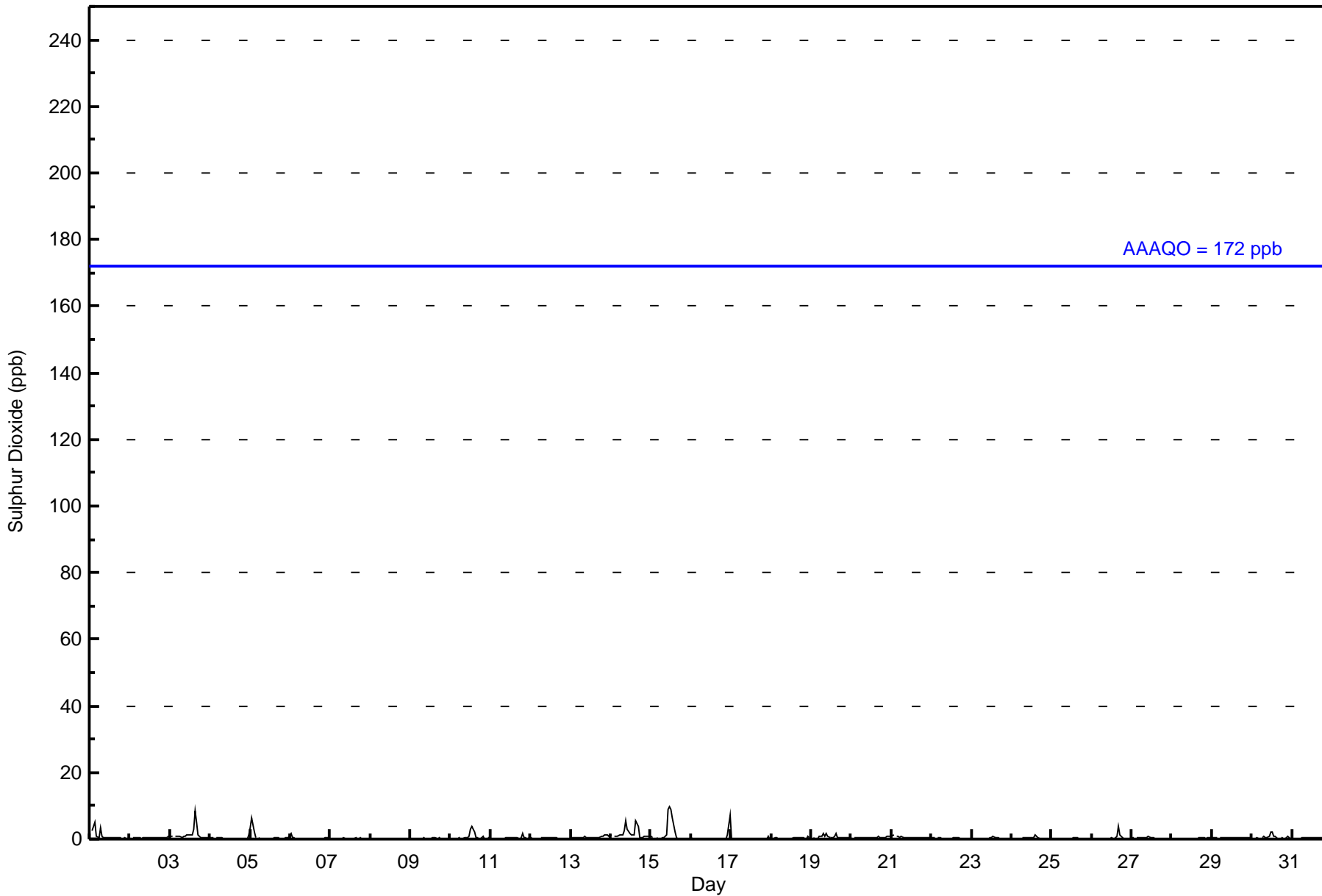
0.5	0.6	0.4	0.5	0.3	0.3	0.4	0.3	0.3	0.5	0.7	0.7	0.8	0.7	0.6	0.8	0.7	0.3	0.2	0.3	0.3	0.3	0.4	0.5	Diurnal Average	
3	7	4	5	1	1	3	2	2	6	9	10	9	7	3	8	5	1	1	2	1	1	1	7	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Firebag - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - March 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
Firebag - March 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	82	40	24	18	13	52	121	146	94	21	9	7	11	14	17	39	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	82	40	24	18	13	52	121	146	94	21	9	7	11	14	17	39	708

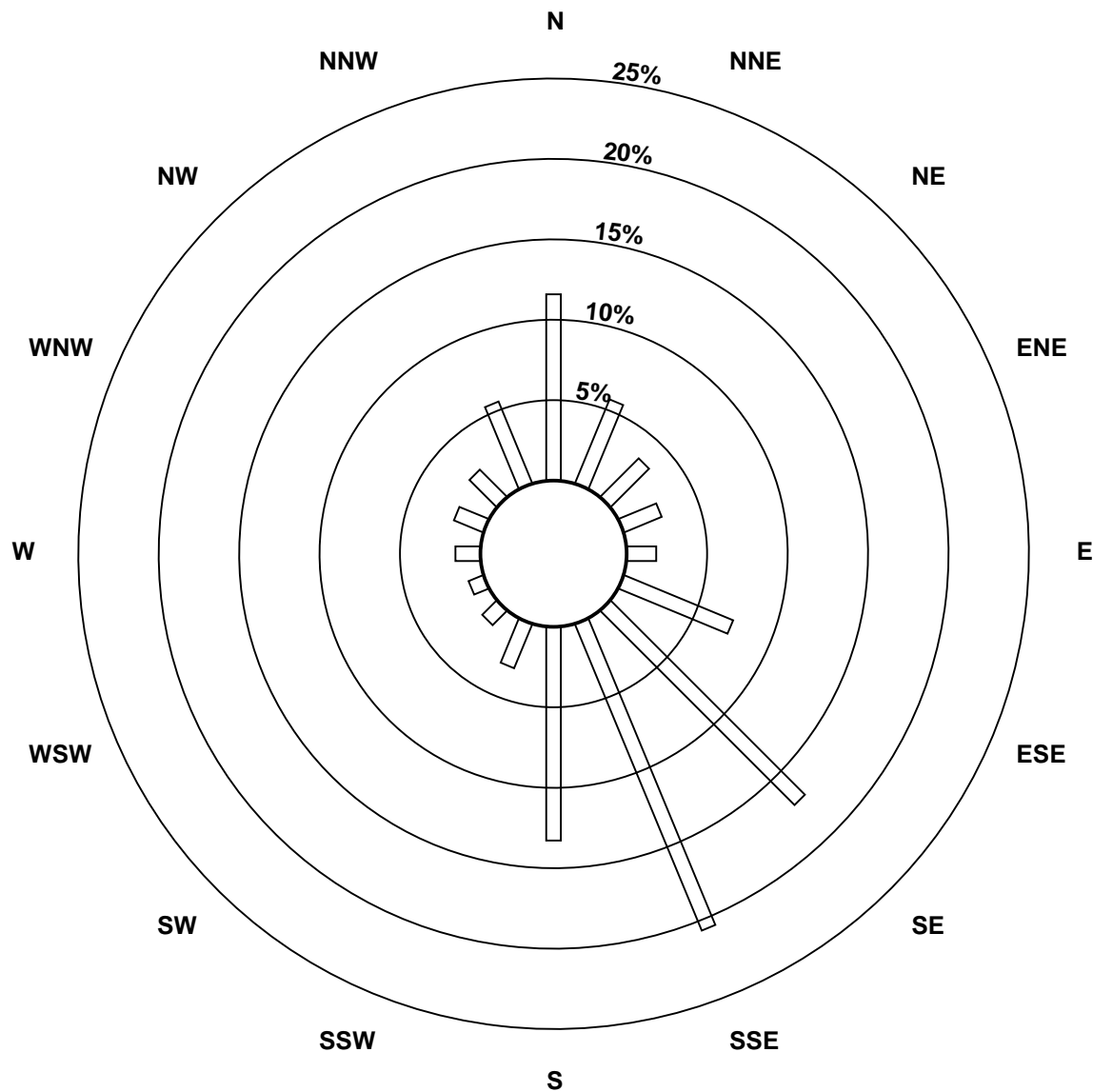
Total Number of Valid Hours: 708

Total Number of Hours: 744

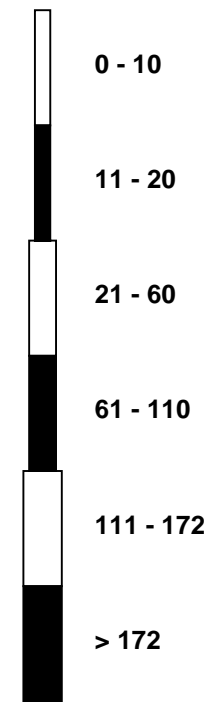


Wood Buffalo Environmental Association
Wind Rose Mar 2017

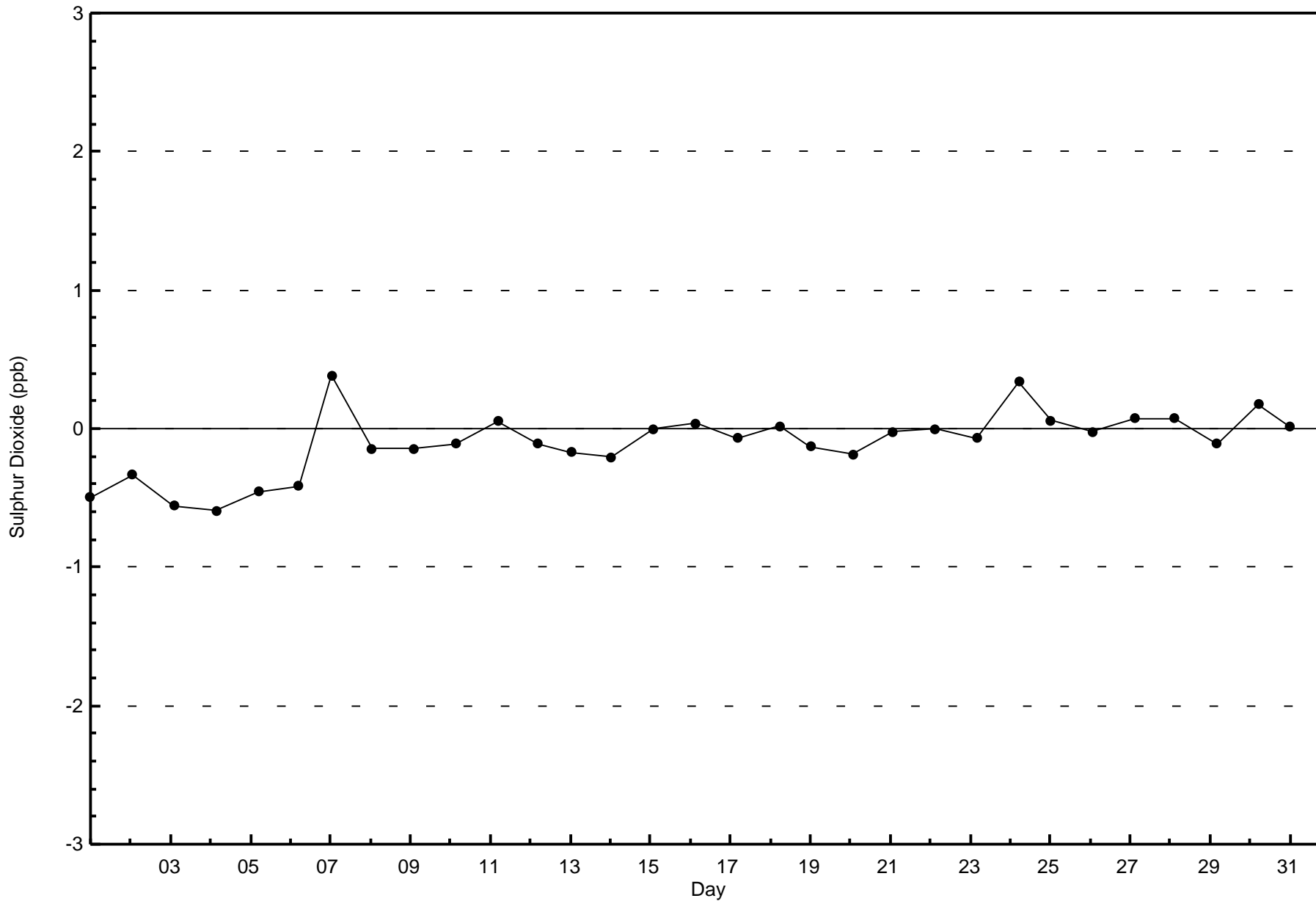
Sulphur Dioxide (SO₂) - ppb
Firebag (AMS 19)

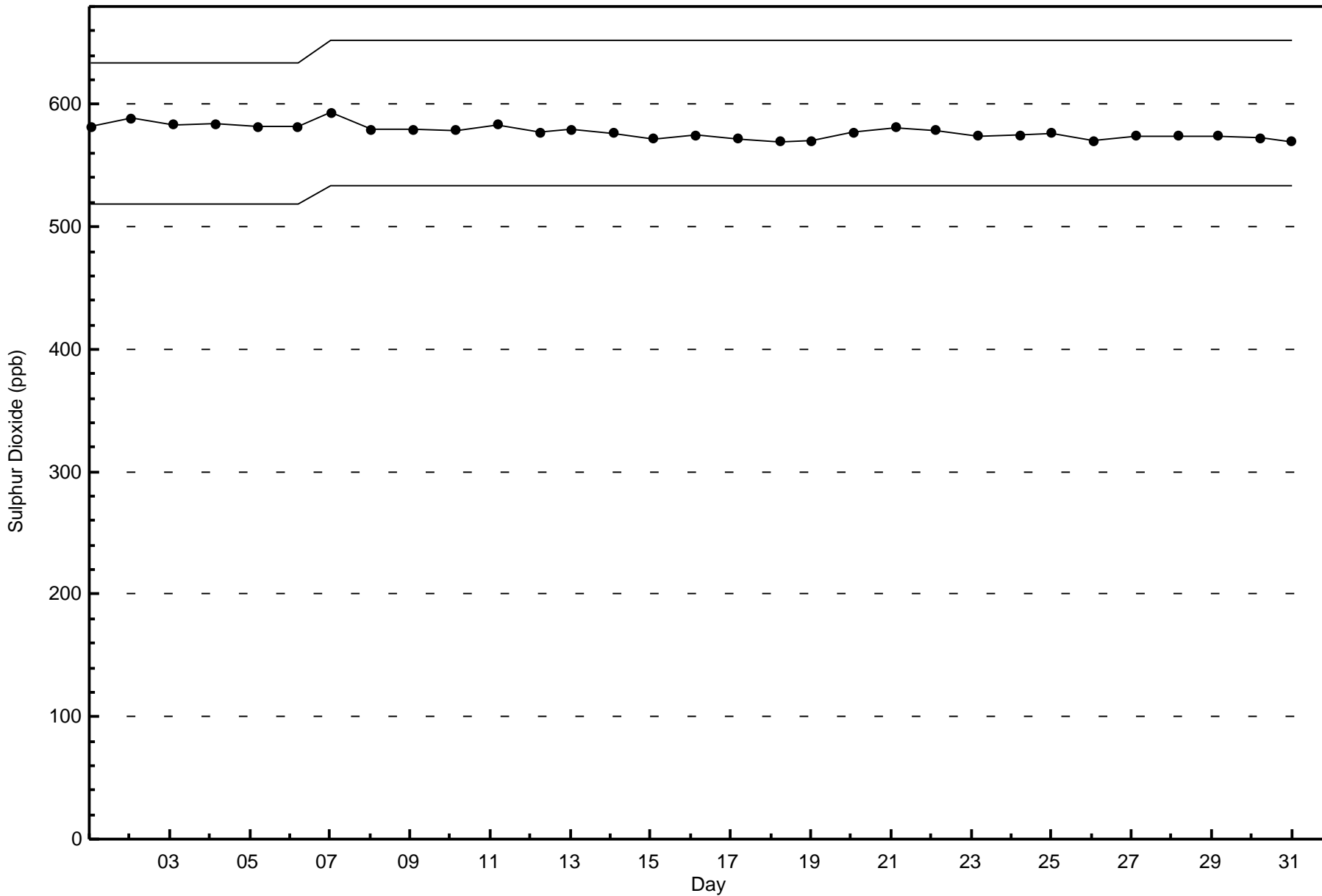


Classes (ppb)



Total Number of Valid Hours: 708







Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

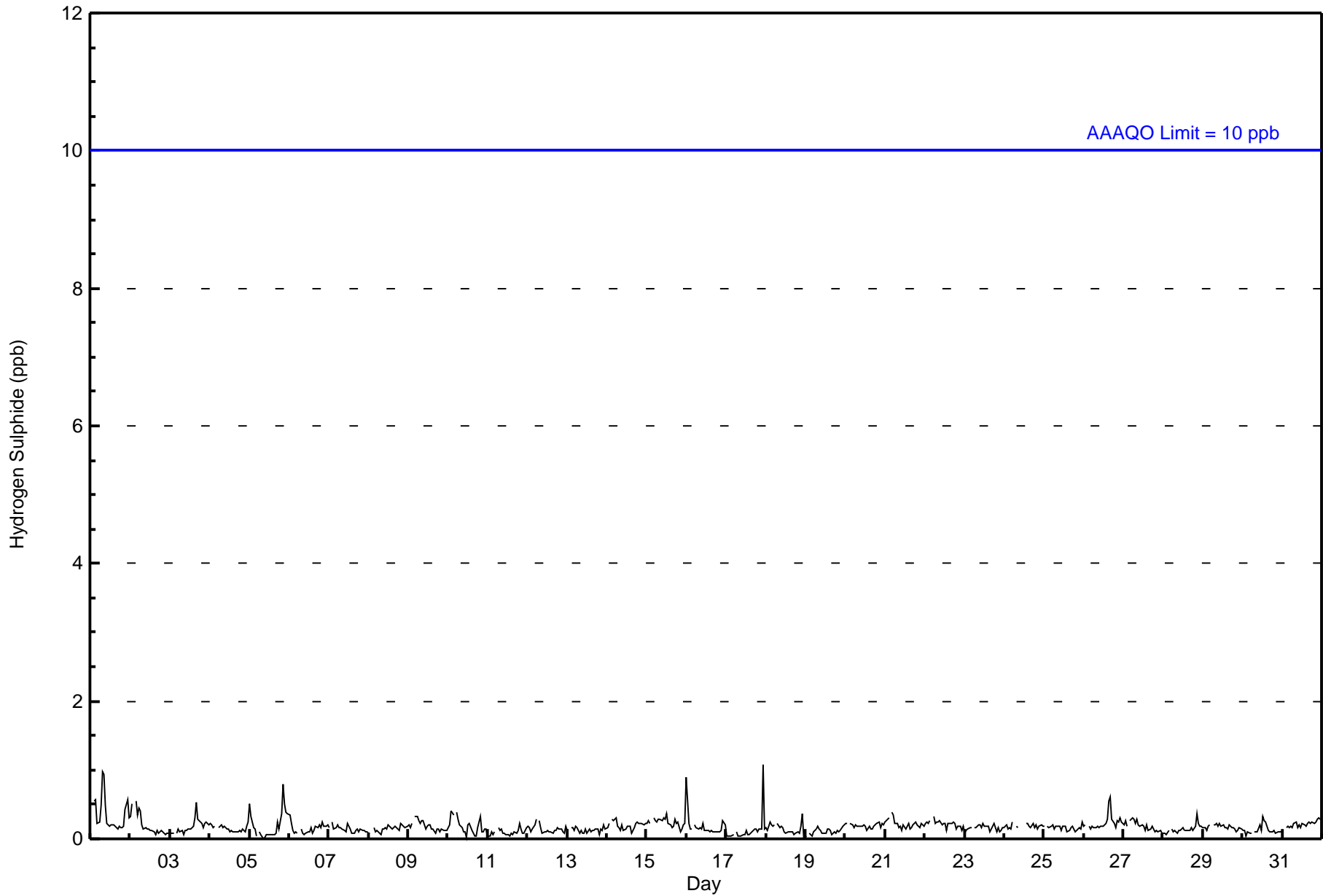
Firebag - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 1 ppb on Mar 17 23:00										Maximum Daily Average: 0.4 ppb on Mar 1										Hours of Data: 709																													
Minimum Value: 0 ppb on Mar 5 09:00										Minimum Daily Average: 0.1 ppb on Mar 11										Hours of Missing Data: 35																													
Maximum Diurnal Average: 0.2 ppb at hour 23										Minimum Diurnal Average: 0.1 ppb at hour 16										Hours of Calibration: 35																													
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: 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-Mar	0	Z	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1																							
2-Mar	0	1	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																							
3-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1																							
4-Mar	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																							
5-Mar	1	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																							
6-Mar	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																							
7-Mar	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-Mar	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-Mar	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-Mar	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-Mar	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																							
12-Mar	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																							
13-Mar	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-Mar	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																							
15-Mar	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																							
16-Mar	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
17-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.1	1																							
18-Mar	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																							
19-Mar	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-Mar	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																							
21-Mar	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																							
22-Mar	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																							
23-Mar	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																							
24-Mar	0	0	0	0	0	0	Z	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
25-Mar	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																							
26-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.2	1																							
27-Mar	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																							
28-Mar	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-Mar	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																							
30-Mar	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																							
31-Mar	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																							
																								0.2	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	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average	
																								1	1	1	1	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	1	1	1	0	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
Firebag - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Firebag - March 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 - March 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	87	40	23	18	14	50	121	142	95	22	9	7	11	16	16	38	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	87	40	23	18	14	50	121	142	95	22	9	7	11	16	16	38	709

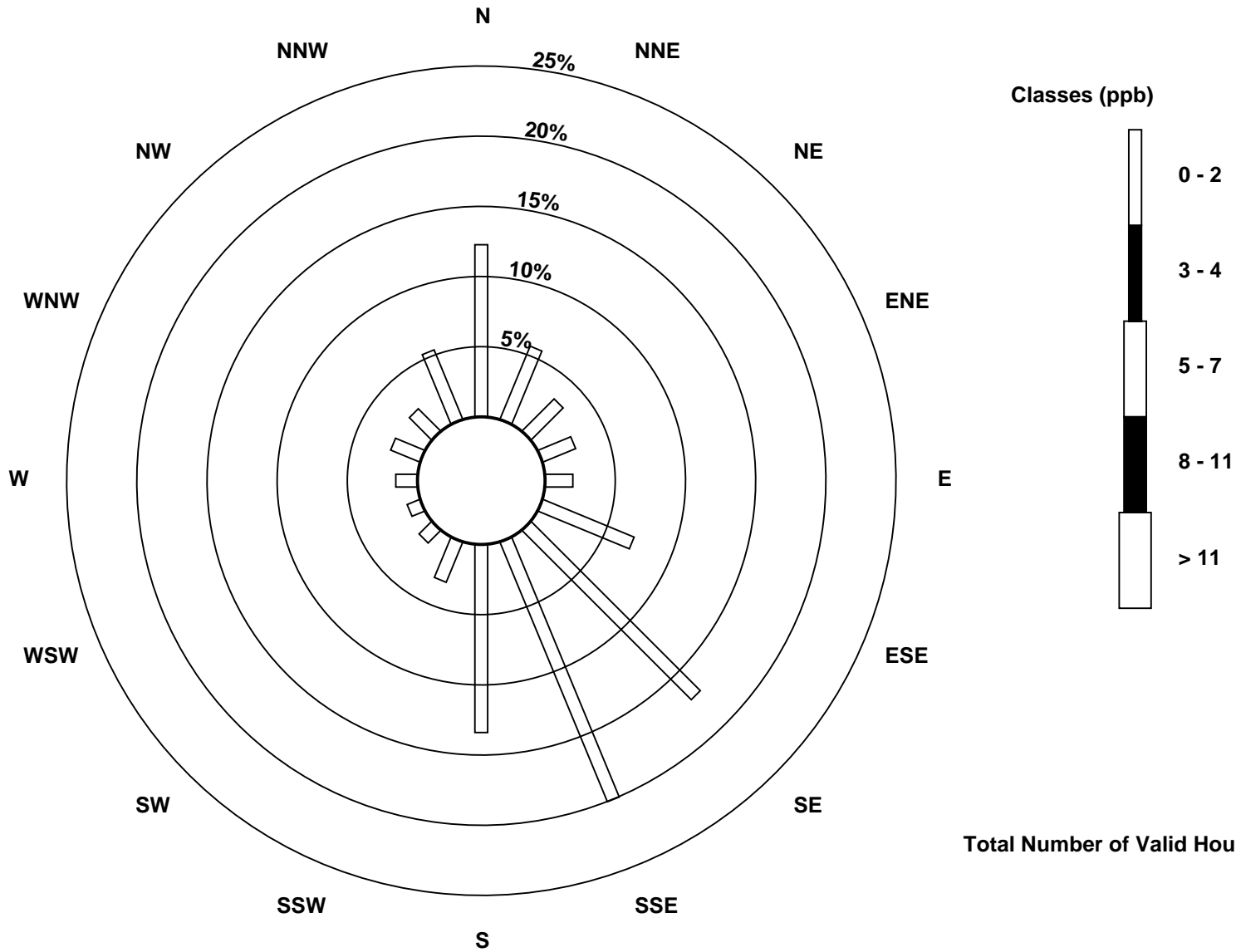
Total Number of Valid Hours: 709

Total Number of Hours: 744

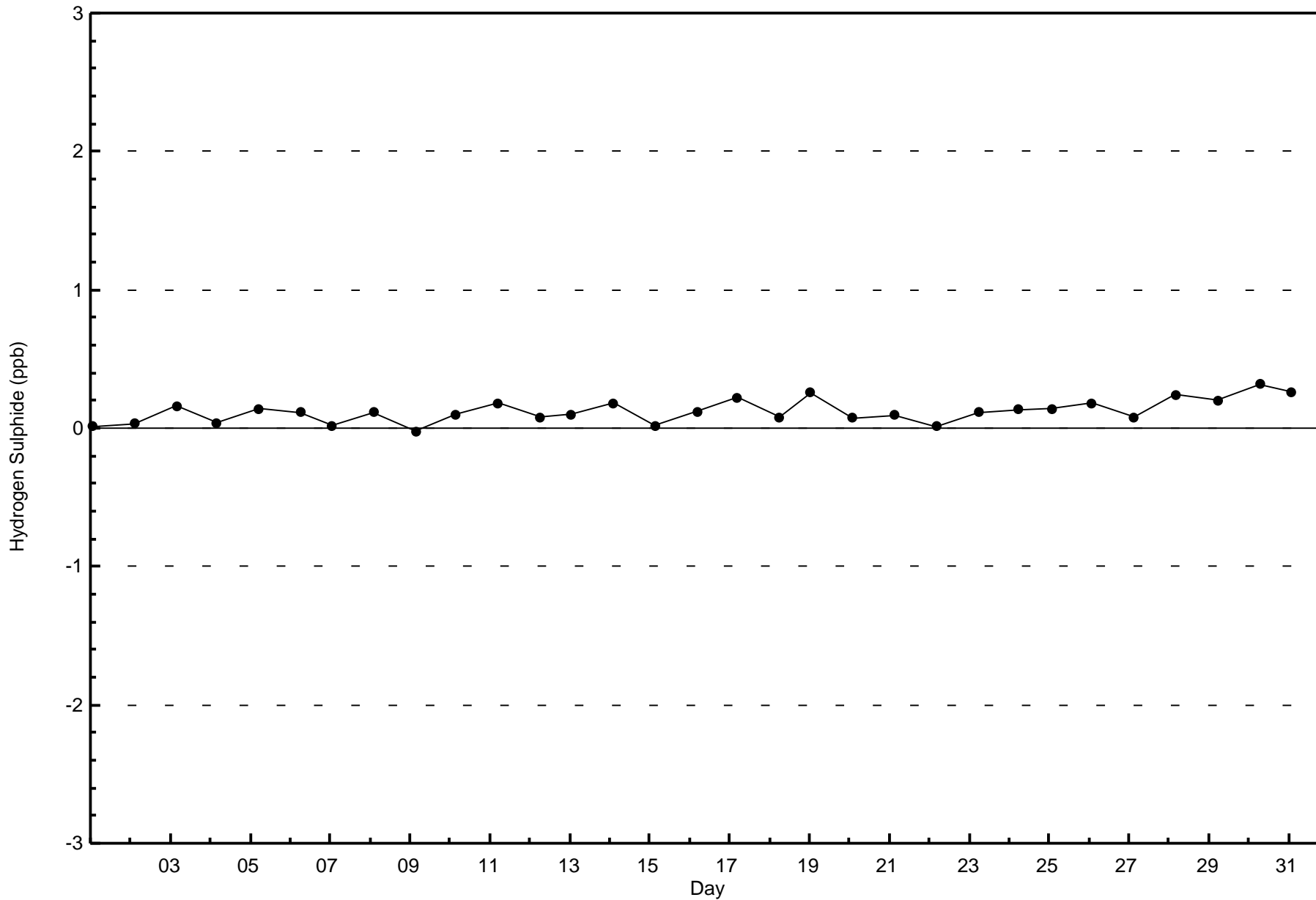


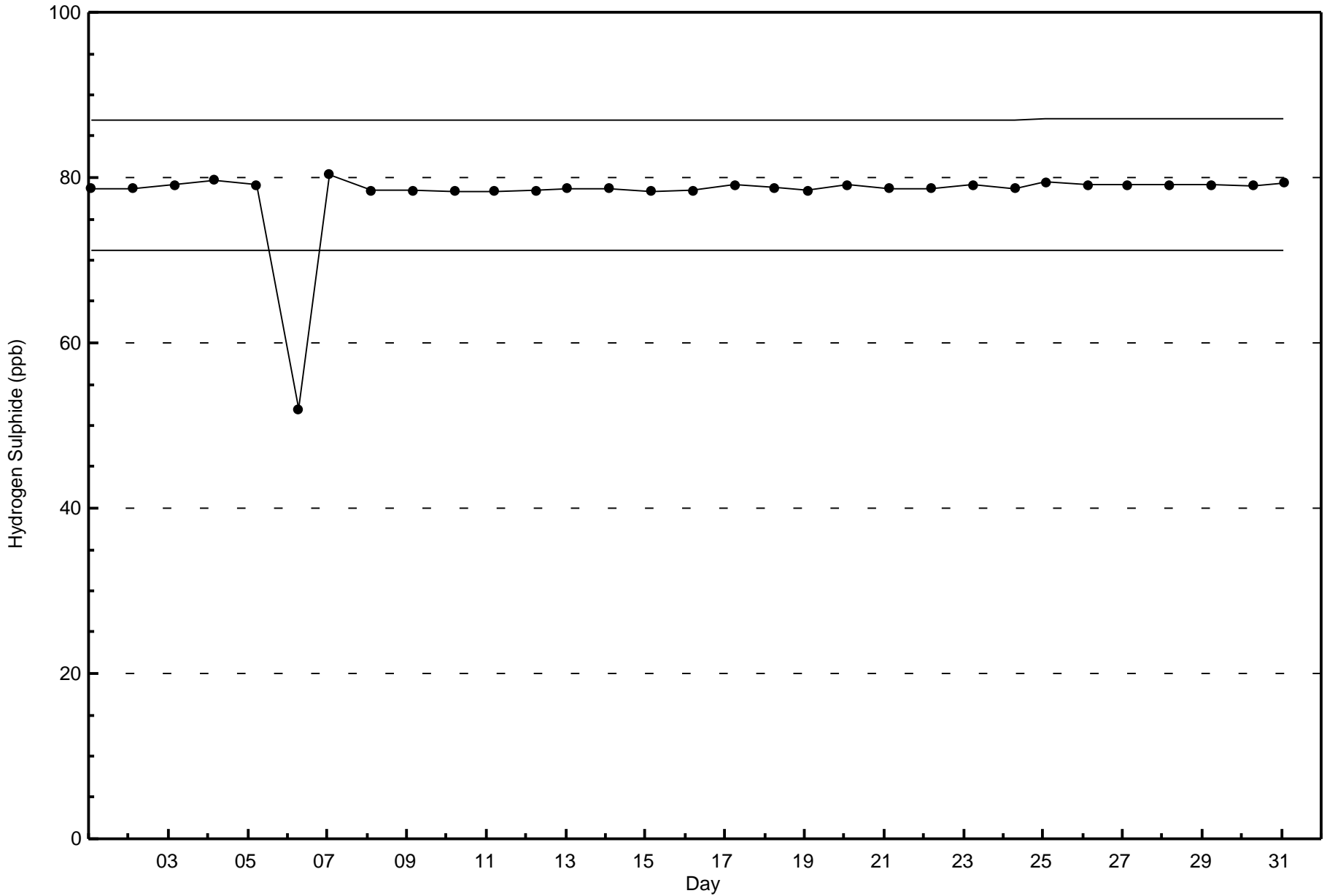
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Hydrogen Sulphide (H₂S) - ppb
Firebag (AMS 19)



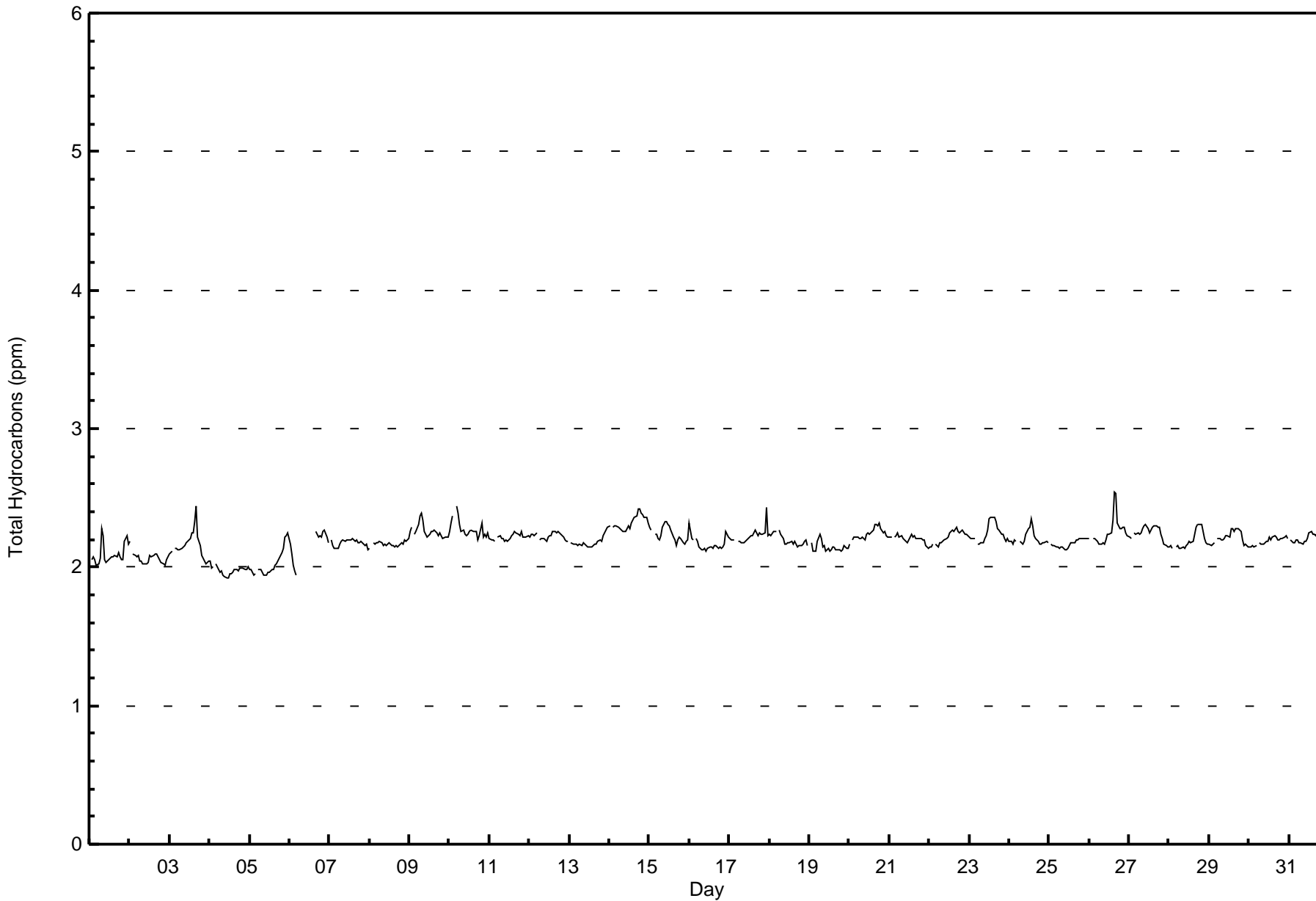
Total Number of Valid Hours: 709







Maximum Value: 2.5 ppm on Mar 26 16:00		Maximum Daily Average: 2.3 ppm on Mar 14		Hours in Service: 744																						
Minimum Value: 1.9 ppm on Mar 4 11:00		Minimum Daily Average: 2.0 ppm on Mar 4		Hours of Data: 703																						
Maximum Diurnal Average: 2.2 ppm at hour 17		Minimum Diurnal Average: 2.2 ppm at hour 3		Hours of Missing Data: 41																						
Monthly Average: 2.19 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.2 Q ₃ = 2.2 P ₉₀ = 2.3 P ₉₉ = 2.4		Hours of Calibration: 36																						
				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-Mar	Z	2.1	2.1	2.1	2.0	2.0	2.1	2.3	2.2	2.0	2.0	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	2.3
2-Mar	2.2	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.2
3-Mar	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	2.3	2.3	2.4	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.2	2.4
4-Mar	2.0	2.0	2.0	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
5-Mar	2.0	2.0	1.9	1.9	Z	2.0	2.0	2.0	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	2.2	2.2	2.2	2.0	2.2
6-Mar	2.2	2.1	2.0	2.0	1.9	Z	AF	AF	AF	AF	AF	C	C	C	C	C	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.2	--	2.3
7-Mar	Z	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	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2
8-Mar	2.1	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	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
9-Mar	2.3	2.3	Z	2.2	2.3	2.3	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4
10-Mar	2.3	2.3	2.4	Z	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.4
11-Mar	2.2	2.2	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	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3
12-Mar	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3
13-Mar	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3
14-Mar	2.3	Z	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	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.4
15-Mar	2.3	2.3	Z	2.2	2.2	2.2	2.2	2.2	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	2.3
16-Mar	2.3	2.2	2.2	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.3
17-Mar	2.2	2.2	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	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.2	2.2	2.4
18-Mar	2.2	2.2	2.3	2.3	2.3	Z	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	2.2	2.2	2.2	2.2	2.2	2.3
19-Mar	Z	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.1	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	2.1	2.1	2.2
20-Mar	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	2.3	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.3
21-Mar	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	2.1	2.2	2.2
22-Mar	2.1	2.1	2.2	Z	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	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.3
23-Mar	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4
24-Mar	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	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
25-Mar	Z	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
26-Mar	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	2.3	2.5	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.5
27-Mar	2.2	2.2	Z	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.3
28-Mar	2.1	2.2	2.1	Z	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3
29-Mar	2.2	2.2	2.2	2.2	Z	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	2.2	2.2	2.2	2.2	2.3
30-Mar	2.1	2.2	2.2	2.1	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
31-Mar	Z	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	2.2	2.2	2.2	2.2	2.2	2.2	2.3
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration AF - Analyzer Failure																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - March 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	60	8.53	8.53
2.1 - 3.0	643	91.47	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - March 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	18	7	3	2	4	5	8	9	3	0	0	0	0	1	0	0	60
2.1 - 3.0	59	33	21	16	9	47	113	137	91	21	9	7	11	13	17	39	643
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	77	40	24	18	13	52	121	146	94	21	9	7	11	14	17	39	703

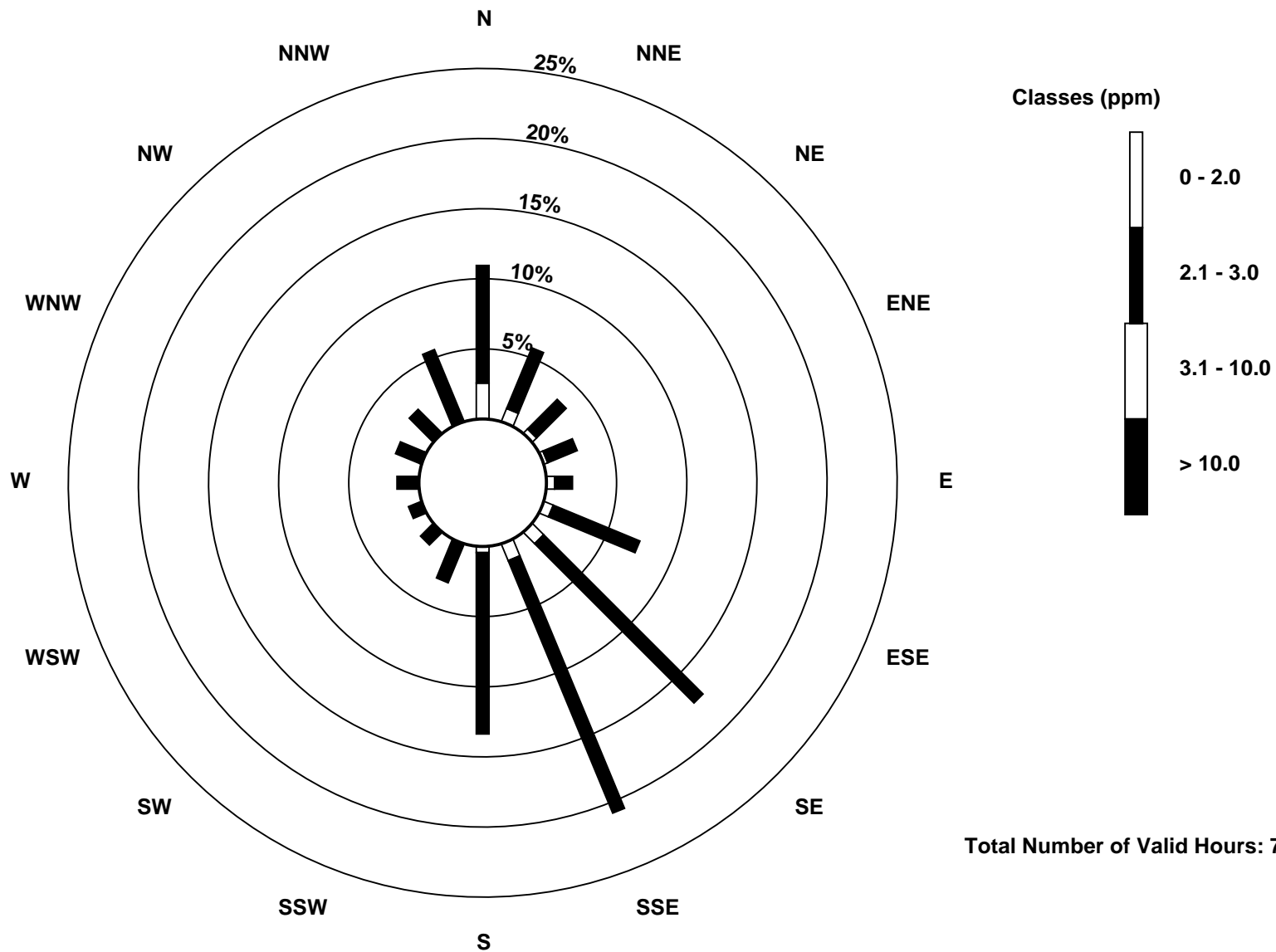
Total Number of Valid Hours: 703

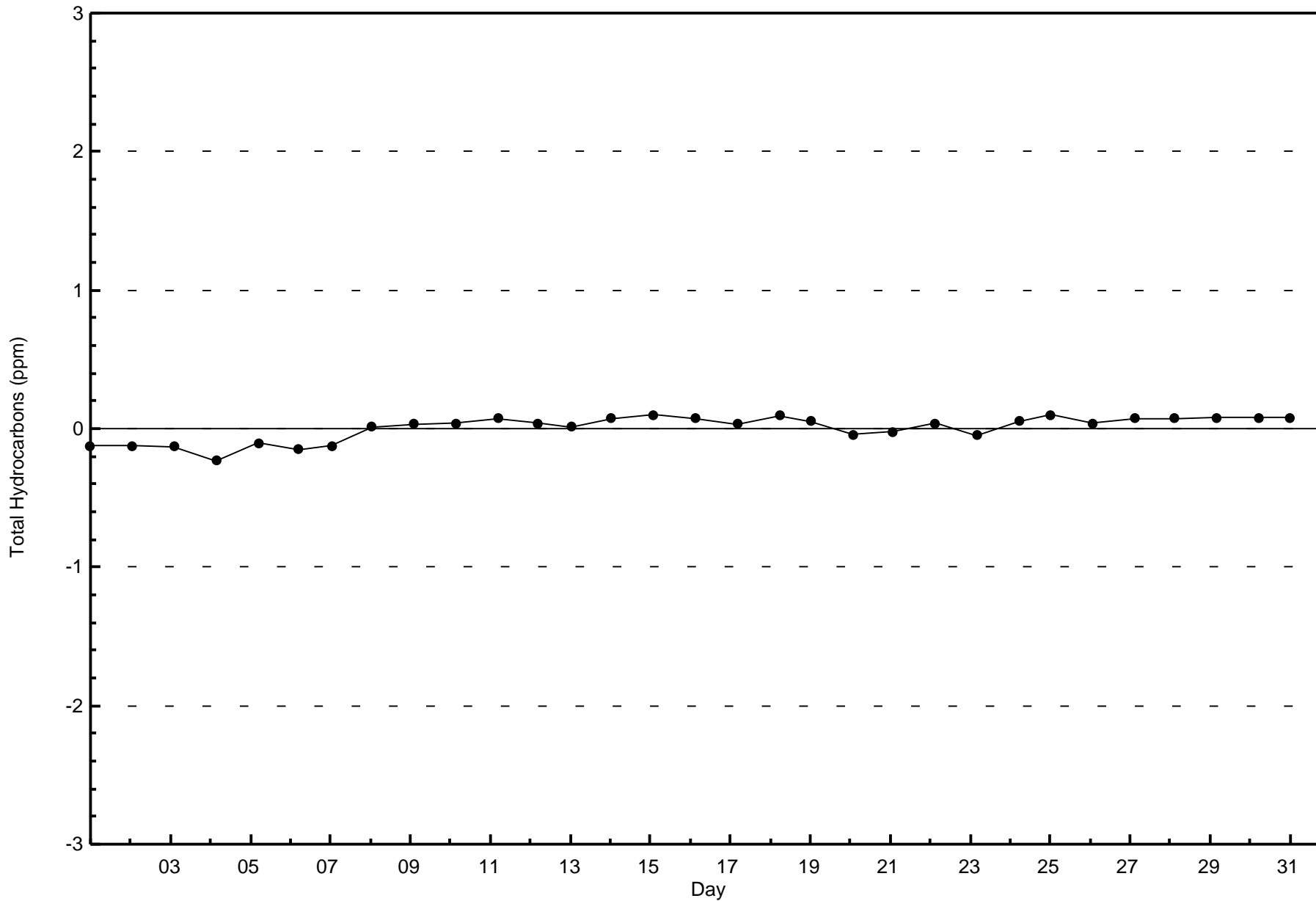
Total Number of Hours: 744

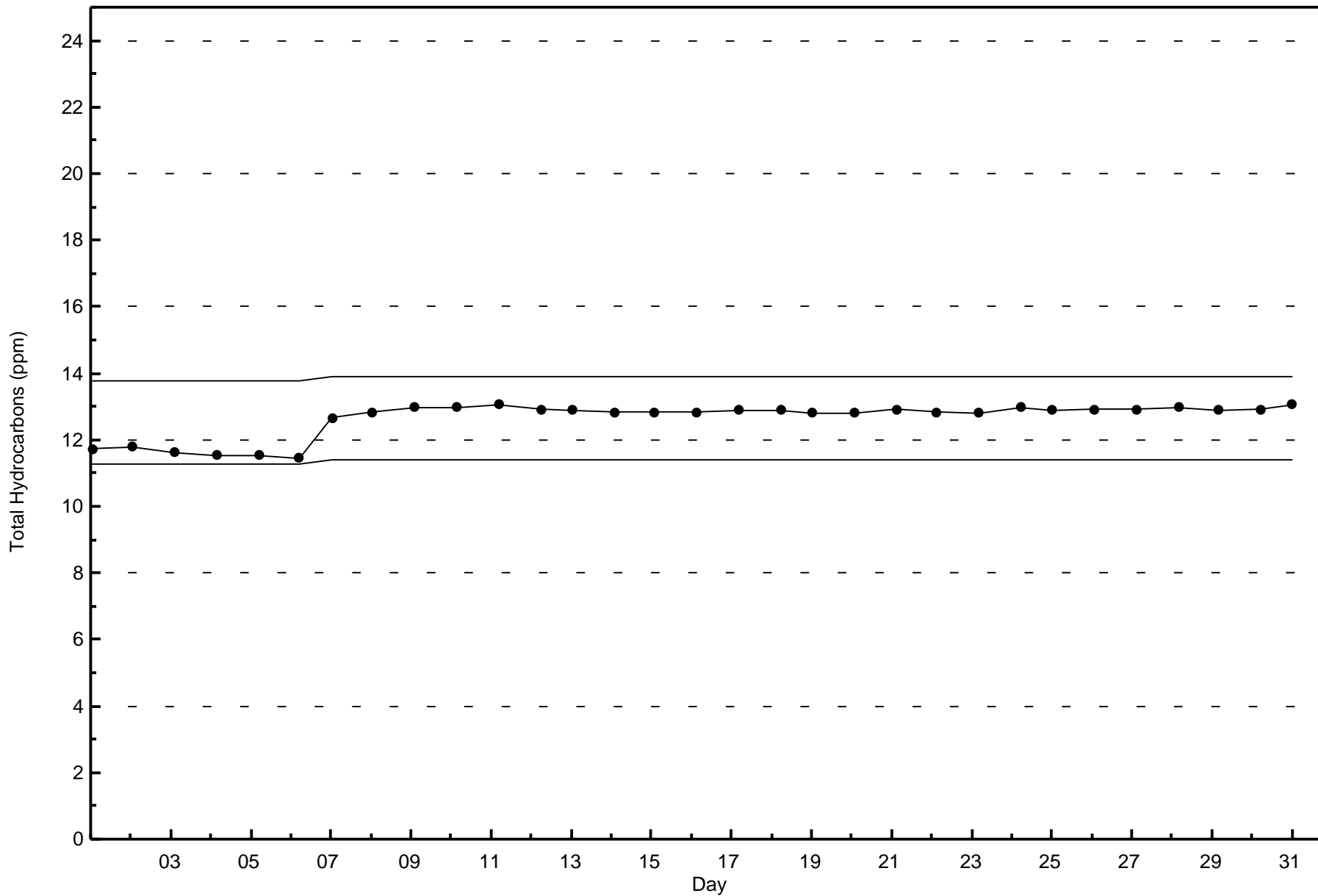


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Hydrocarbons (THC) - ppm
Firebag (AMS 19)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

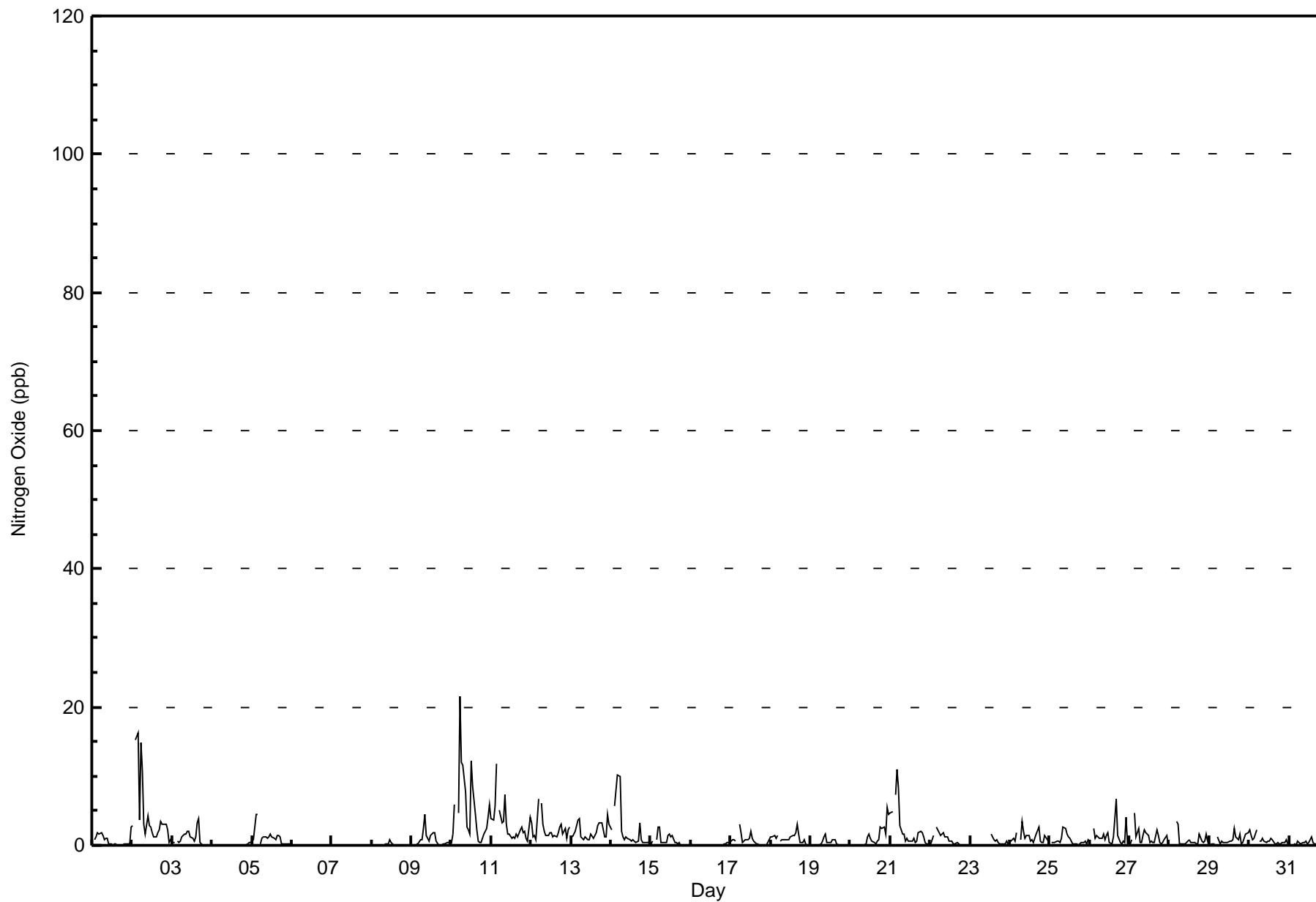
Firebag - March 2017

Maximum Value: 22 ppb on Mar 10 06:00		Maximum Daily Average: 5.1 ppb on Mar 10		Hours in Service: 744																						
Minimum Value: 0 ppb on Mar 6 19:00		Minimum Daily Average: 0.0 ppb on Mar 6		Hours of Data: 709																						
Maximum Diurnal Average: 3.2 ppb at hour 6		Minimum Diurnal Average: 0.6 ppb at hour 22		Hours of Missing Data: 35																						
Monthly Average: 1.2 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 12		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-Mar	Z	1	1	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.7	3
2-Mar	3	Z	15	16	4	15	11	3	2	4	3	3	2	1	1	2	2	3	3	3	3	2	0	1	4.4	16
3-Mar	0	0	Z	1	0	1	1	2	2	2	2	1	1	1	3	4	0	0	0	0	0	0	0	0	1.0	4
4-Mar	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
5-Mar	1	1	5	4	Z	0	1	1	1	1	1	2	1	1	1	1	1	1	0	0	0	0	0	0	1.1	5
6-Mar	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
7-Mar	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
8-Mar	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
9-Mar	0	0	Z	0	0	1	1	3	4	2	1	1	2	2	2	1	0	0	0	0	0	0	0	1	0.9	4
10-Mar	0	2	6	Z	5	22	12	12	8	3	2	2	12	9	5	2	1	0	0	2	2	2	4	6	5.1	22
11-Mar	4	4	6	12	Z	5	3	3	7	3	2	2	1	1	1	2	1	2	3	2	2	1	1	4	3.1	12
12-Mar	3	1	1	1	7	Z	6	3	2	1	1	2	2	1	1	1	2	3	3	2	3	1	2	3	2.3	7
13-Mar	Z	1	2	3	4	4	1	1	1	1	1	2	1	2	2	3	3	3	2	1	1	4	3	2.0	4	
14-Mar	2	Z	6	8	10	10	2	1	1	1	1	1	1	1	0	1	3	1	0	0	0	0	1	2.3	10	
15-Mar	0	1	Z	1	3	3	0	0	0	1	0	2	2	1	1	0	0	0	0	0	0	0	0	0	0.7	3
16-Mar	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
17-Mar	1	1	1	1	Z	3	2	0	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	1	0.7	3
18-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	2	3	2	0	0	1	0	0	0	0	1.0	3
19-Mar	Z	0	0	0	0	0	0	1	1	2	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.4	2
20-Mar	0	Z	0	0	0	0	0	0	0	0	1	2	1	1	0	0	1	1	3	2	3	2	6	4	1.2	6
21-Mar	5	5	Z	7	11	8	3	2	2	1	1	1	1	1	0	1	2	2	2	1	0	0	0	2.4	11	
22-Mar	0	1	1	Z	3	2	1	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.8	3
23-Mar	0	0	0	0	Z	0	0	0	0	C	C	C	C	2	1	1	1	0	0	0	0	1	0	0.3	2	
24-Mar	0	1	1	1	2	Z	1	3	2	1	1	1	1	1	0	1	2	3	1	0	0	1	1	0	1.1	3
25-Mar	Z	0	0	0	1	1	0	1	3	2	2	1	1	1	0	0	0	0	0	0	0	1	0	1	0.7	3
26-Mar	1	Z	3	1	1	1	1	1	2	1	1	2	0	0	1	4	7	1	0	0	1	0	4	0	1.5	7
27-Mar	0	1	Z	5	1	2	0	0	1	2	2	1	1	1	0	0	2	1	0	0	0	1	2	0	1.1	5
28-Mar	0	0	0	Z	4	3	0	0	0	0	0	1	1	0	0	0	0	0	2	1	0	1	2	1	0.7	4
29-Mar	0	0	0	0	Z	1	0	1	0	0	0	0	1	1	1	2	1	1	2	0	0	1	2	2	0.8	2
30-Mar	2	2	1	1	2	Z	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	1	0	0.7	2
31-Mar	Z	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Firebag - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
Firebag - March 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 Oxide (NO) - ppb
Firebag - March 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	87	40	22	17	12	52	120	146	94	21	9	7	11	14	17	39	708
21 - 40	0	0	0	0	0	0	1	0	0	0	0	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	87	40	22	17	12	52	121	146	94	21	9	7	11	14	17	39	709

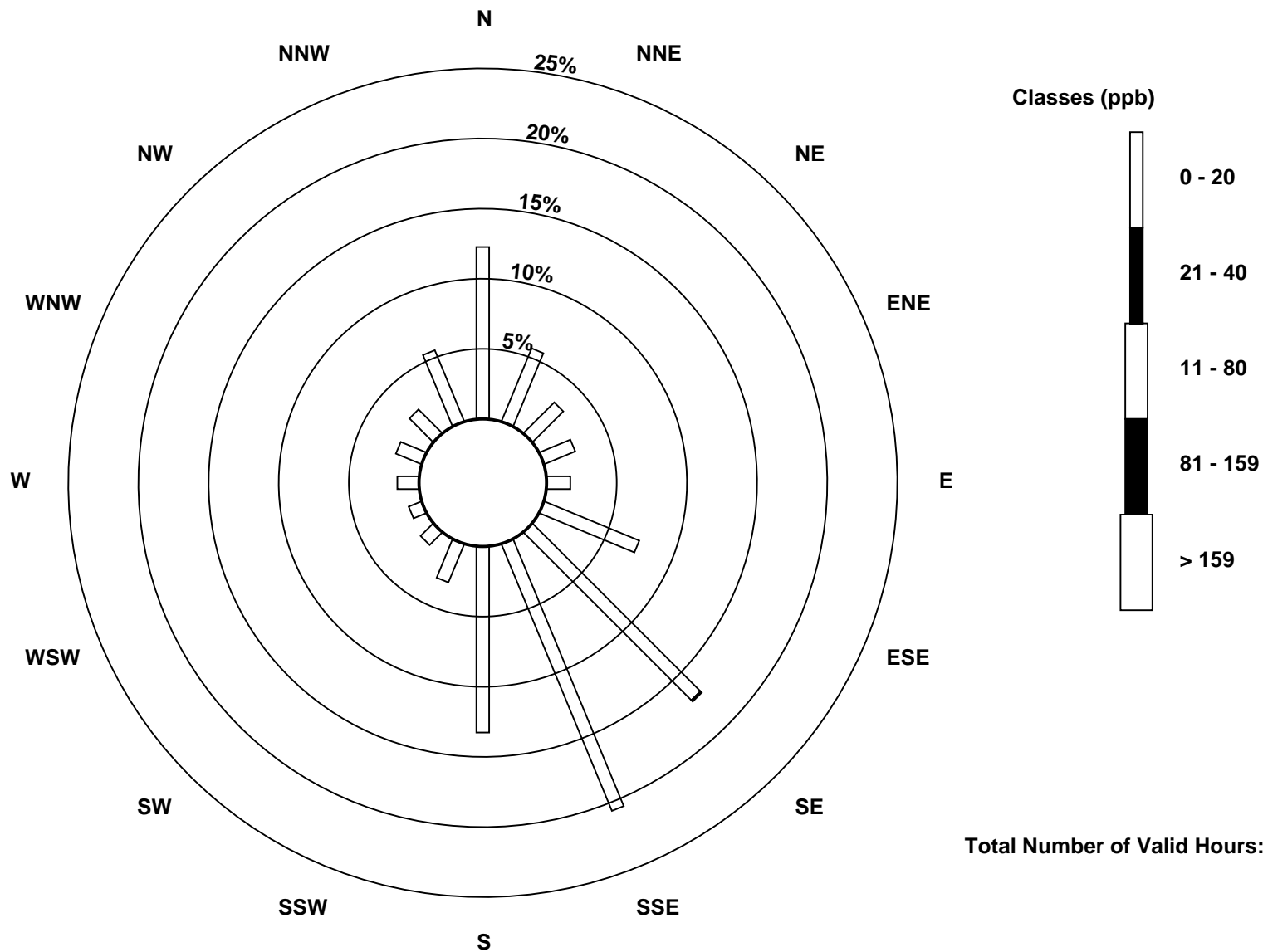
Total Number of Valid Hours: 709

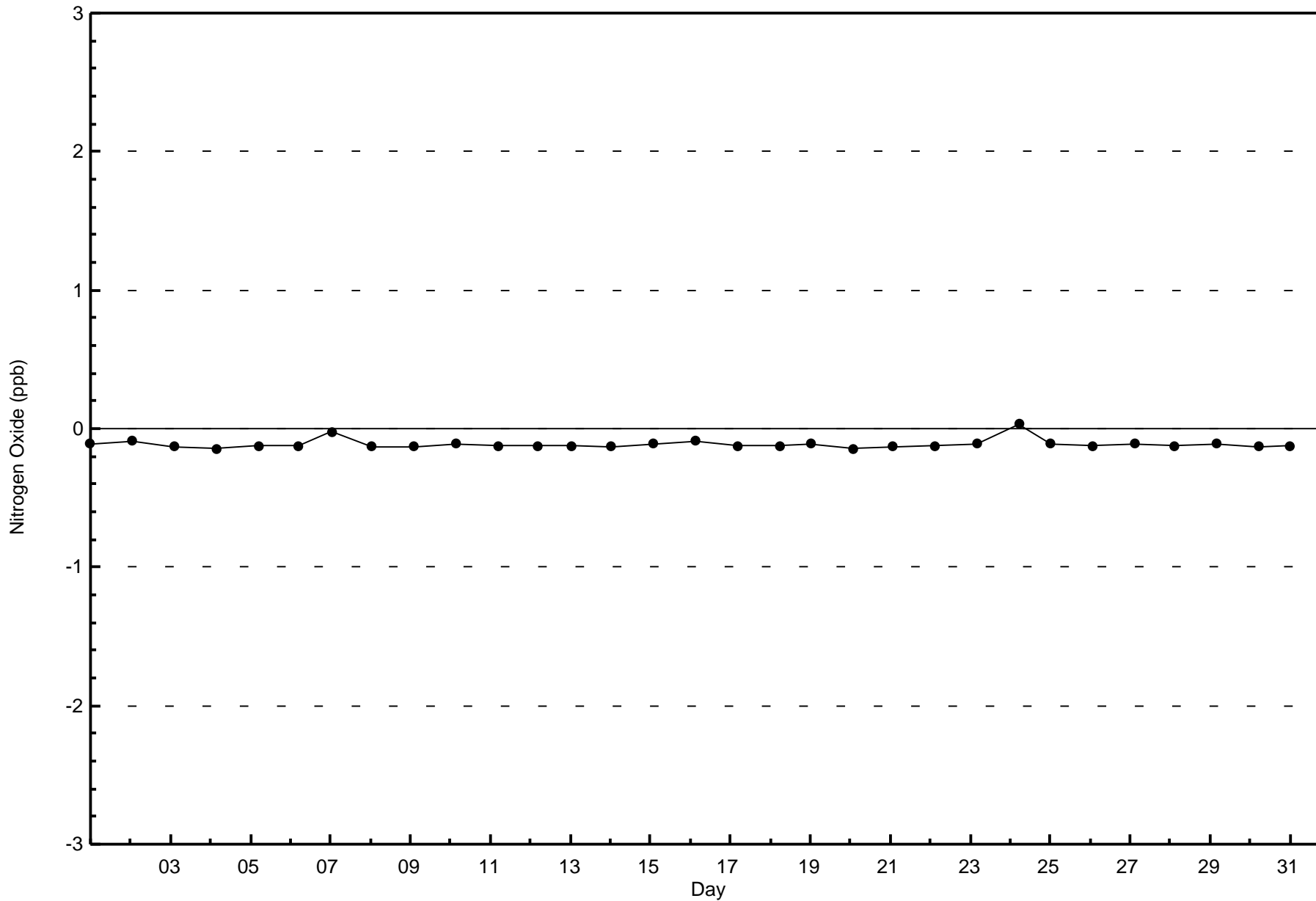
Total Number of Hours: 744

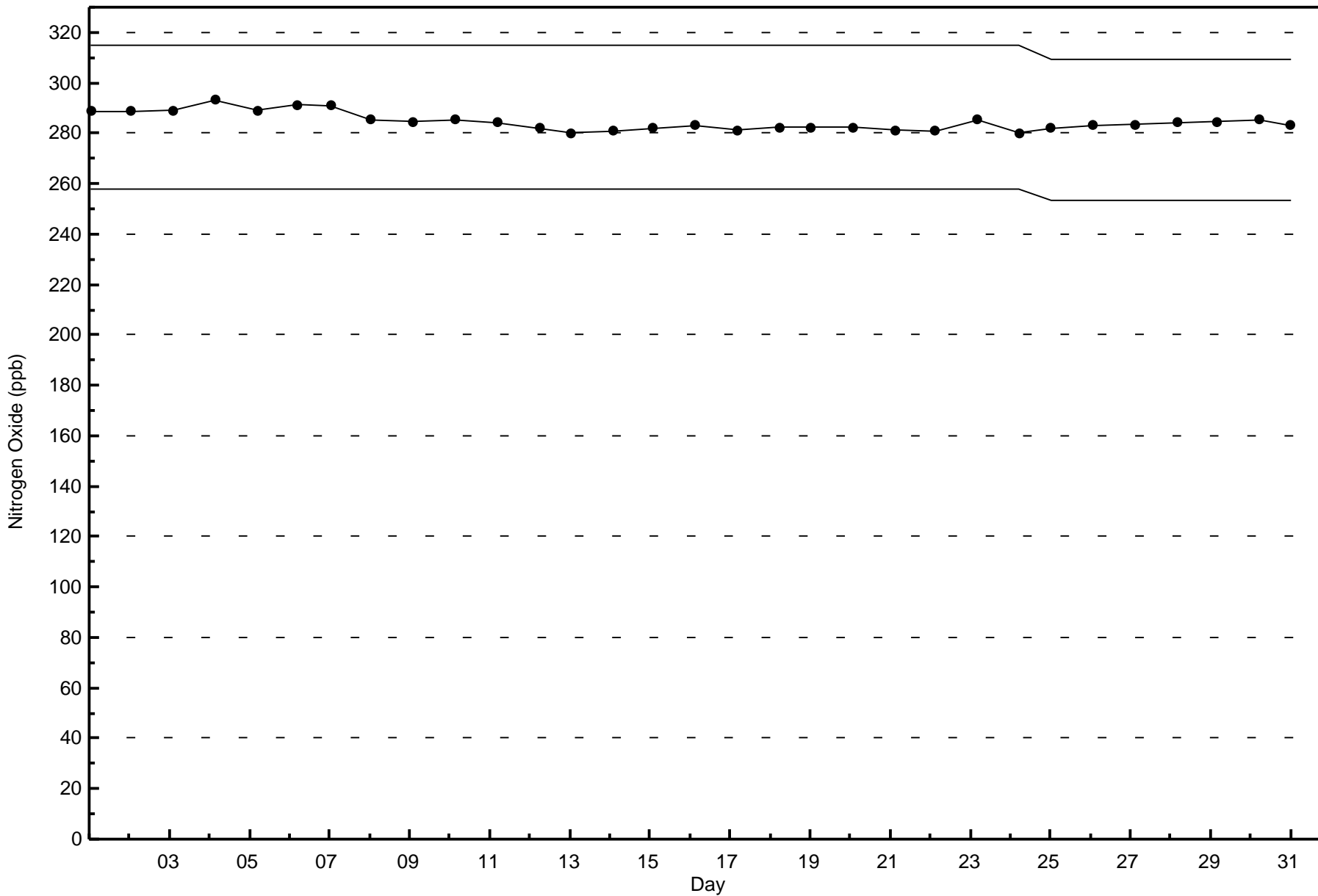


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Oxide (NO) - ppb
Firebag (AMS 19)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Firebag - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 36 ppb on Mar 2 04:00	Maximum Daily Average: 10.1 ppb on Mar 2		Hours of Data:	709
Minimum Value: 0 ppb on Mar 1 18:00	Minimum Daily Average: 0.3 ppb on Mar 7		Hours of Missing Data:	35
Maximum Diurnal Average: 7.4 ppb at hour 6	Minimum Diurnal Average: 1.8 ppb at hour 12		Hours of Calibration:	35
Monthly Average: 3.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 8 P ₉₉ = 23		Percent Operational Time:	100.0

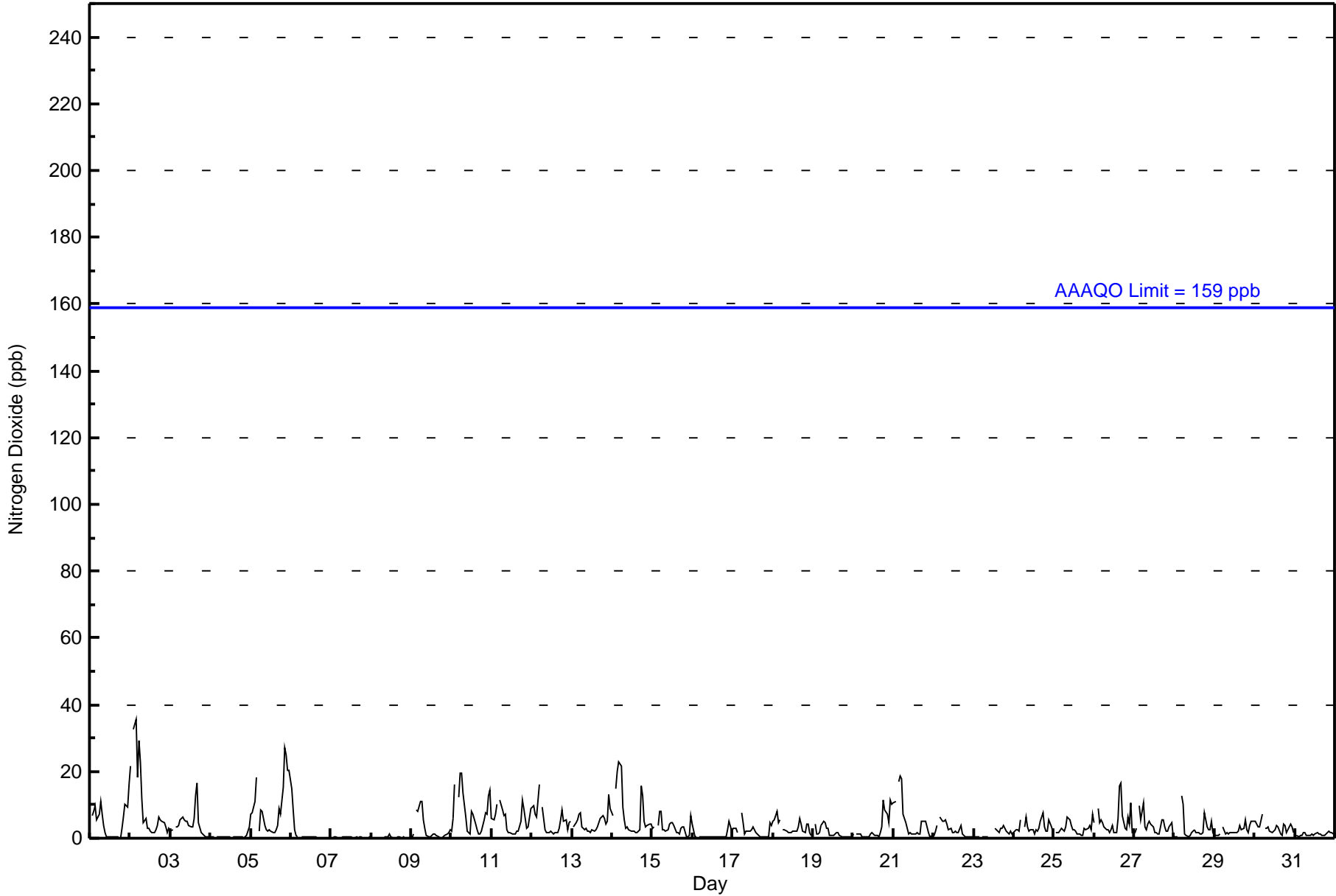
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Mar	Z	7	8	10	6	7	11	7	4	2	0	1	0	1	0	0	0	0	0	3	6	10	9	16	4.7	16																						
2-Mar	22	Z	33	36	18	29	23	12	5	6	3	3	2	2	2	3	4	6	6	5	5	3	2	3	10.1	36																						
3-Mar	2	3	Z	3	3	4	5	7	6	5	5	4	3	4	6	13	17	5	2	1	1	1	1	1	4.3	17																						
4-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	0.5	3																						
5-Mar	7	8	11	18	Z	2	8	8	4	2	2	3	2	2	2	3	4	9	7	15	27	25	21	20	9.1	27																						
6-Mar	15	9	3	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	15																						
7-Mar	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																						
8-Mar	0	Z	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
9-Mar	0	1	Z	8	8	11	11	6	3	1	1	1	1	1	1	1	0	0	0	1	1	1	2	2	2.7	11																						
10-Mar	2	6	16	Z	12	19	20	14	6	2	2	1	8	7	4	3	1	1	2	6	8	7	13	15	7.6	20																						
11-Mar	6	6	7	10	Z	11	9	7	7	3	2	2	1	1	1	2	2	5	11	9	6	3	4	9	5.4	11																						
12-Mar	9	10	7	6	16	Z	9	6	3	2	2	2	2	1	2	2	3	5	8	5	6	3	5	5	5.1	16																						
13-Mar	Z	3	5	6	7	8	3	2	3	2	2	2	2	2	3	3	5	6	7	6	4	5	13	9	4.6	13																						
14-Mar	7	Z	15	20	23	22	9	5	3	3	3	2	2	2	2	2	3	16	13	5	3	4	4	4	7.4	23																						
15-Mar	3	4	Z	4	8	8	3	3	2	3	4	5	5	4	2	2	1	3	3	3	0	0	1	7	3.3	8																						
16-Mar	4	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	5	2	0.9	5																						
17-Mar	3	3	3	2	Z	8	5	1	2	2	2	3	4	3	2	1	1	1	0	0	0	1	5	4	2.3	8																						
18-Mar	5	6	8	5	6	Z	3	3	2	2	2	2	2	2	2	3	6	4	2	2	4	4	2	1	3.4	8																						
19-Mar	Z	4	1	1	2	4	5	5	3	3	1	1	1	1	2	2	1	1	1	1	0	0	0	0	1.7	5																						
20-Mar	1	Z	1	1	1	1	0	0	0	0	1	2	1	1	1	1	2	3	11	8	7	5	11	10	3.1	11																						
21-Mar	10	11	Z	17	19	18	7	5	3	1	2	1	1	1	2	1	1	5	5	5	4	2	1	1	5.3	19																						
22-Mar	1	2	4	Z	6	5	5	6	4	3	3	2	2	2	2	2	4	1	1	1	1	1	1	1	2.4	6																						
23-Mar	1	1	1	1	Z	0	0	0	0	C	C	C	C	3	2	2	3	3	4	2	2	1	2	1	1.5	4																						
24-Mar	2	3	3	2	6	Z	3	6	3	2	2	3	1	2	2	3	5	8	3	2	2	6	4	2	3.3	8																						
25-Mar	Z	2	2	2	3	3	2	3	7	6	4	3	2	2	1	1	1	1	3	3	3	4	3	7	2.8	7																						
26-Mar	5	Z	9	5	5	5	4	2	3	2	3	4	2	2	6	16	17	7	3	3	6	4	10	2	5.3	17																						
27-Mar	2	3	Z	10	6	11	3	2	4	5	4	3	2	2	1	1	6	6	4	2	2	4	5	0	3.8	11																						
28-Mar	0	0	0	Z	13	10	1	1	1	1	2	2	3	2	2	1	1	2	8	3	3	3	5	2	2.8	13																						
29-Mar	1	1	1	1	Z	3	1	2	1	2	2	2	2	2	2	4	3	3	6	3	2	4	5	5	2.4	6																						
30-Mar	5	4	3	4	7	Z	3	3	3	2	2	2	3	4	3	1	1	4	4	2	3	4	3	2	3.1	7																						
31-Mar	Z	1	1	1	1	2	2	1	1	1	1	1	1	2	1	1	1	1	1	2	2	2	2	1	1.2	2																						
																								4.5	3.7	5.4	6.6	6.8	7.4	5.1	3.8	2.7	2.1	1.9	1.8	1.9	1.9	1.8	2.4	3.0	3.5	3.7	3.2	3.5	3.5	4.5	4.3	Diurnal Average
																								22	11	33	36	23	29	23	14	7	6	5	5	8	7	6	16	17	16	13	15	27	25	21	20	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
Firebag - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Firebag - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	699	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: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Firebag - March 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	86	40	21	16	12	52	121	145	88	21	9	7	11	14	17	39	699
21 - 40	1	0	1	1	0	0	0	1	6	0	0	0	0	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	87	40	22	17	12	52	121	146	94	21	9	7	11	14	17	39	709

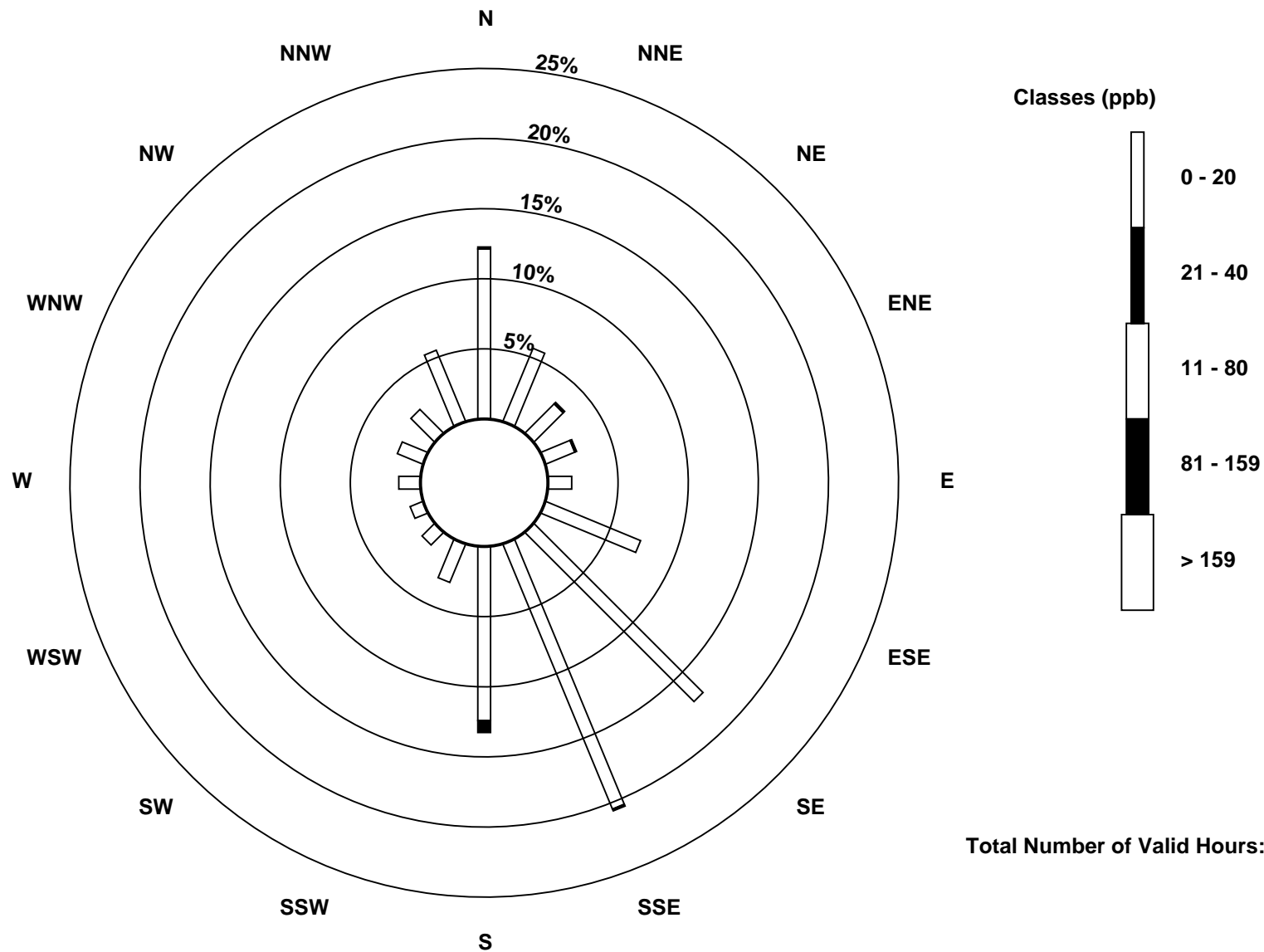
Total Number of Valid Hours: 709

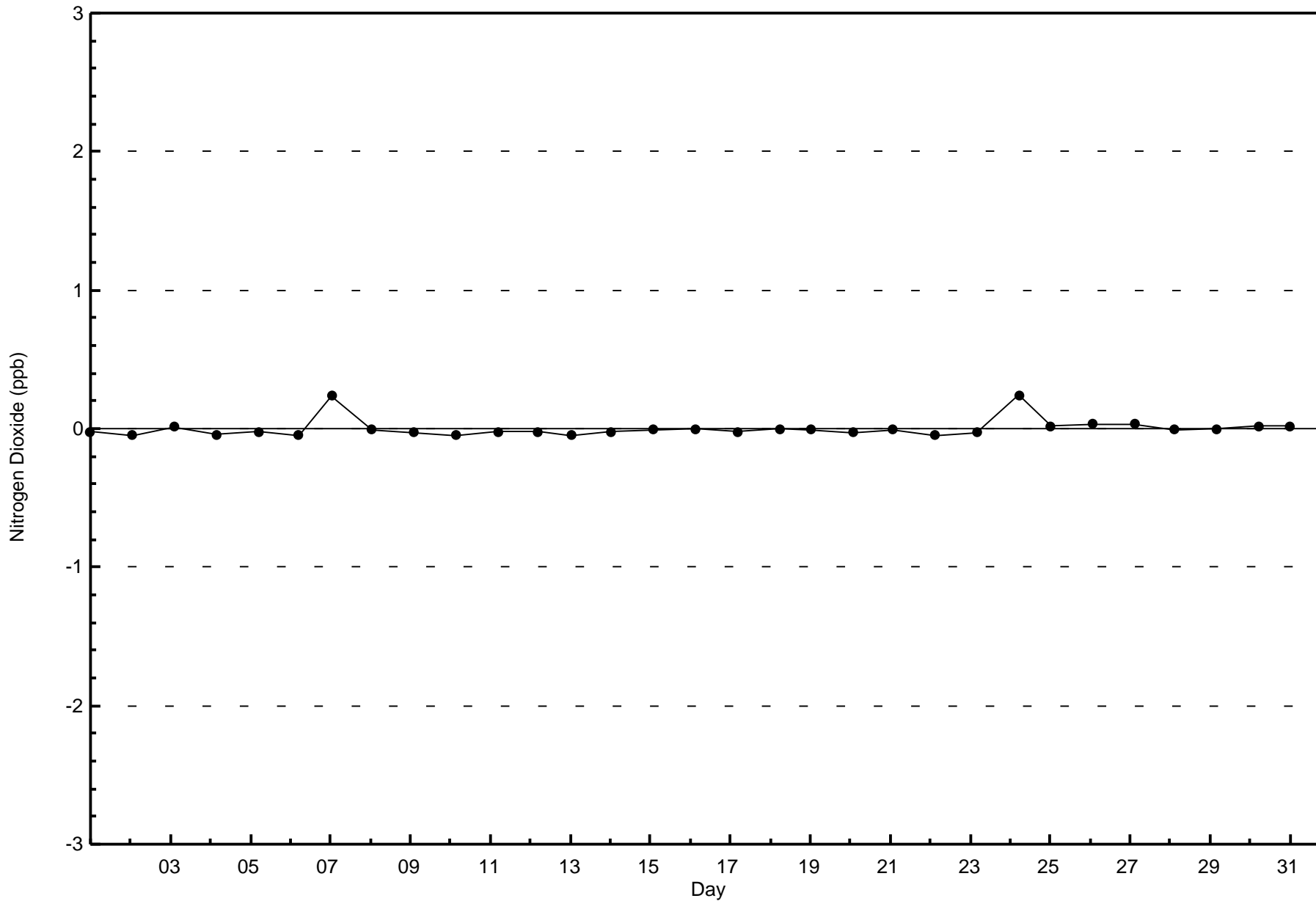
Total Number of Hours: 744

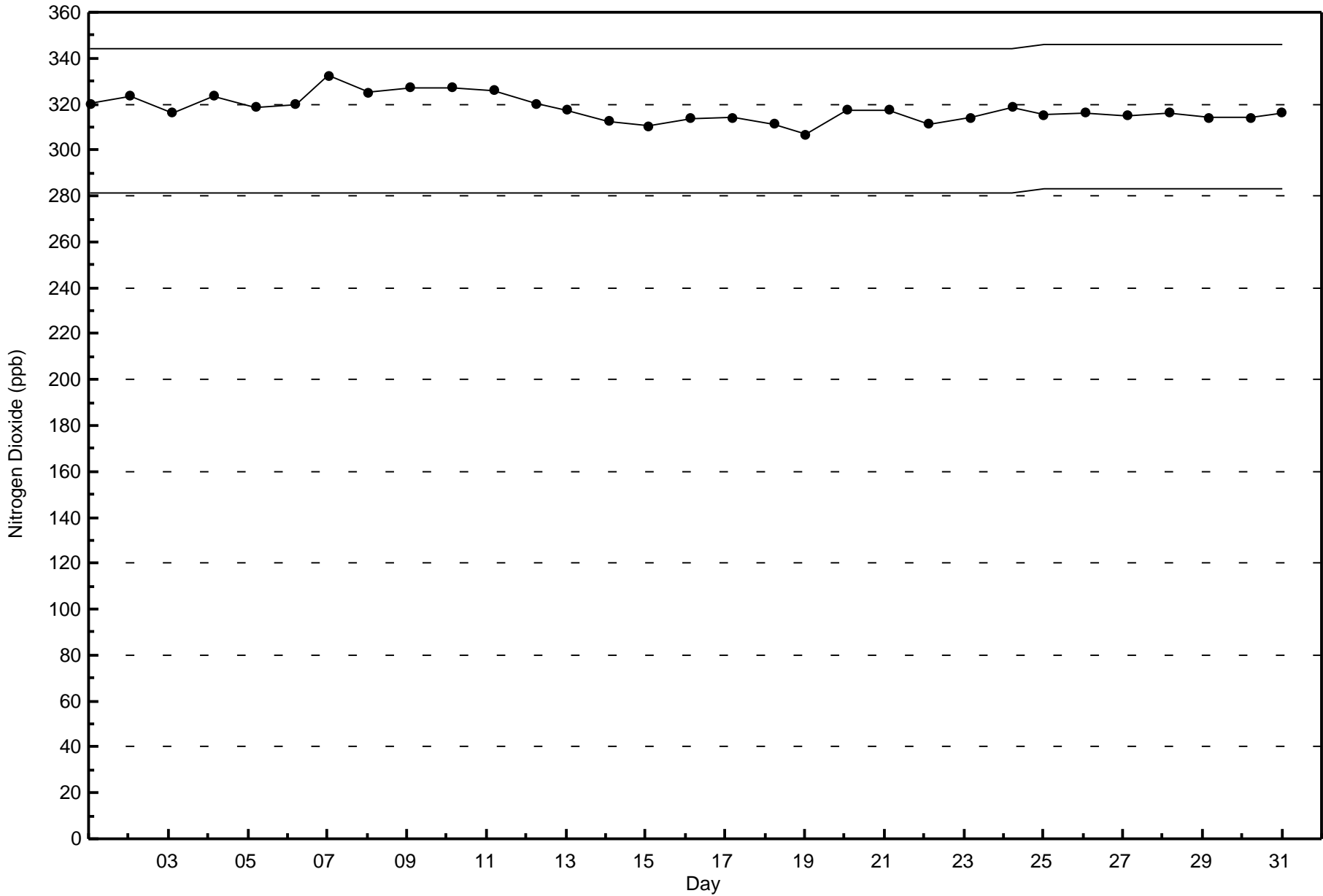


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Dioxide (NO₂) - ppb
Firebag (AMS 19)







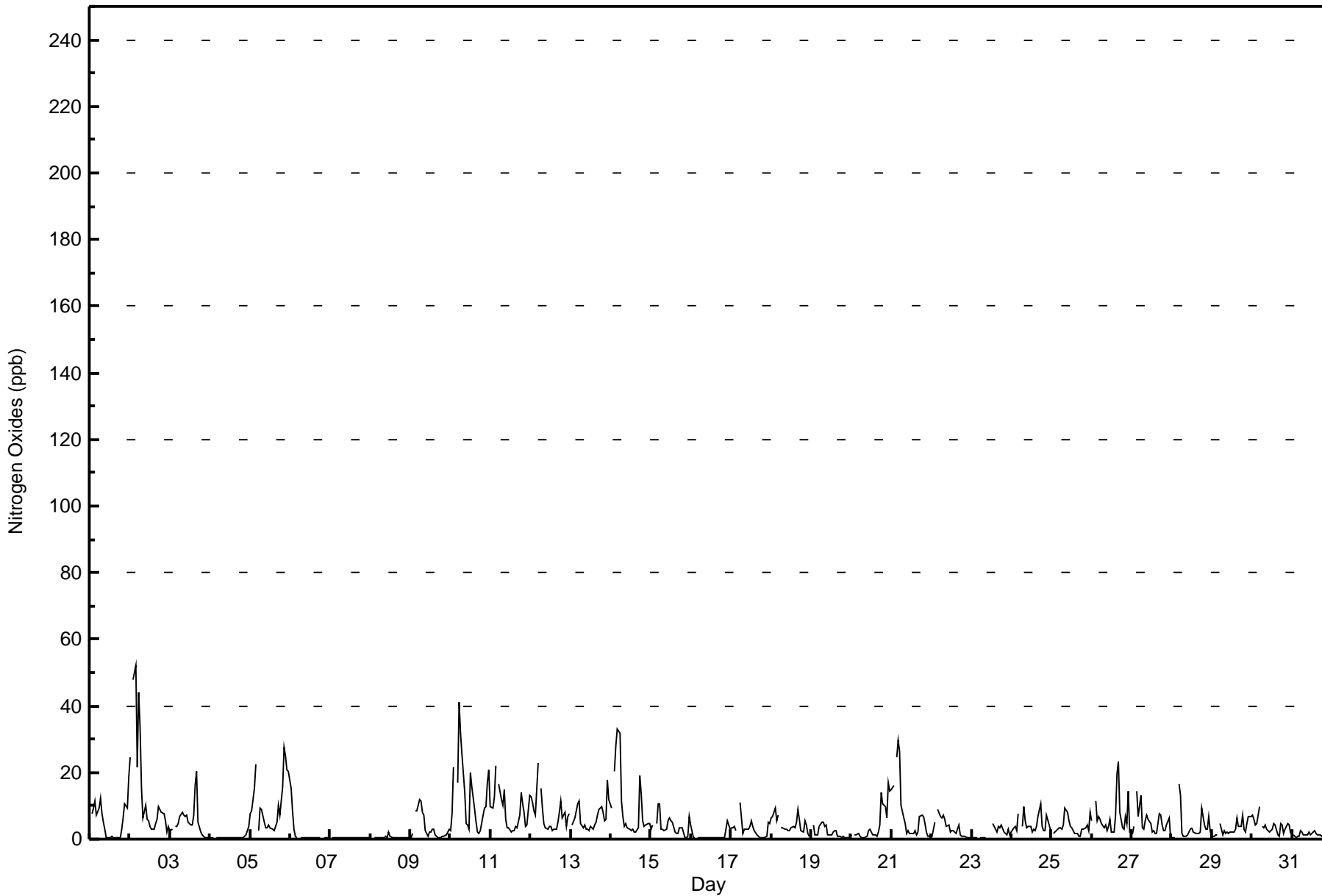


Maximum Value: 52 ppb on Mar 2 04:00																	Maximum Daily Average: 14.5 ppb on Mar 2																	Hours in Service: 744	
Minimum Value: 0 ppb on Mar 6 20:00																	Minimum Daily Average: 0.3 ppb on Mar 7																	Hours of Data: 709	
Maximum Diurnal Average: 10.6 ppb at hour 6																	Minimum Diurnal Average: 2.6 ppb at hour 15																	Hours of Missing Data: 35	
Monthly Average: 4.9 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 3 Q ₃ = 6 P ₉₀ = 11 P ₉₉ = 31																	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-Mar	Z	8	9	11	7	9	12	8	5	3	0	1	0	1	1	0	0	0	0	3	7	11	10	19	5.5	19									
2-Mar	24	Z	48	52	22	44	33	15	6	10	6	6	4	3	3	5	6	10	9	8	8	6	2	4	14.5	52									
3-Mar	3	3	Z	4	4	5	7	8	7	7	7	5	4	4	7	16	20	5	2	1	1	1	1	0	5.3	20									
4-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	0.6	4									
5-Mar	8	9	15	23	Z	2	9	9	5	4	3	4	3	2	4	5	10	7	16	27	25	21	20	10.2	27										
6-Mar	15	9	3	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	15									
7-Mar	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									
8-Mar	0	Z	0	0	0	0	0	0	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2									
9-Mar	0	2	Z	9	8	12	12	8	7	2	1	2	2	3	3	1	0	0	0	1	1	1	2	3	3.6	12									
10-Mar	3	8	22	Z	17	41	32	25	14	5	4	3	20	16	9	5	2	2	2	7	9	10	17	21	12.7	41									
11-Mar	10	9	13	22	Z	16	12	10	15	6	3	3	2	2	2	4	3	7	14	11	8	4	4	13	8.5	22									
12-Mar	13	11	9	7	23	Z	15	9	5	3	3	4	4	3	3	3	5	8	11	6	8	4	7	8	7.4	23									
13-Mar	Z	4	6	8	11	12	5	3	4	3	3	3	4	3	4	5	7	9	10	8	5	6	18	12	6.7	18									
14-Mar	9	Z	20	28	33	32	11	7	4	5	3	3	3	3	2	2	3	19	14	5	4	4	4	5	9.7	33									
15-Mar	3	4	Z	5	11	11	3	3	3	3	6	6	6	5	2	2	2	4	3	4	0	0	1	7	4.0	11									
16-Mar	4	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	5	3	1.0	5									
17-Mar	3	4	4	2	Z	11	6	2	3	3	3	4	6	4	2	1	1	1	1	1	0	1	5	5	3.1	11									
18-Mar	6	7	9	6	7	Z	3	3	3	3	2	3	4	4	4	5	9	6	3	2	5	4	2	1	4.4	9									
19-Mar	Z	4	1	1	1	4	5	5	4	4	1	1	1	2	2	3	1	1	1	1	0	0	0	0	2.0	5									
20-Mar	1	Z	1	1	2	1	0	0	0	1	2	3	2	1	1	1	2	4	14	11	10	6	17	14	4.2	17									
21-Mar	15	16	Z	24	30	26	10	6	4	2	3	2	2	2	2	1	2	7	7	7	5	2	1	1	7.7	30									
22-Mar	1	3	5	Z	9	7	7	7	6	4	4	2	2	3	2	2	4	1	1	1	1	1	1	1	3.2	9									
23-Mar	1	0	0	0	Z	0	0	0	0	C	C	C	C	5	3	2	4	3	4	2	2	1	3	1	1.8	5									
24-Mar	2	4	4	3	8	Z	4	10	5	3	4	4	2	3	3	4	7	10	4	2	3	7	4	2	4.4	10									
25-Mar	Z	2	2	2	4	3	3	4	9	8	5	4	3	3	2	2	1	1	3	3	3	4	3	8	3.6	9									
26-Mar	5	Z	11	6	7	6	5	3	4	3	4	6	2	2	7	19	23	8	3	3	7	5	14	2	6.8	23									
27-Mar	2	4	Z	14	7	13	4	3	6	7	6	5	2	2	2	2	8	7	4	2	2	4	6	0	4.9	14									
28-Mar	0	0	0	Z	16	13	2	1	1	1	2	3	3	2	2	2	2	2	9	4	3	3	7	2	3.6	16									
29-Mar	1	1	1	1	Z	5	1	3	2	2	2	2	2	2	3	7	4	4	7	3	2	5	7	7	3.2	7									
30-Mar	7	6	4	5	10	Z	4	3	4	3	2	3	3	5	4	1	1	5	4	2	3	5	4	2	3.9	10									
31-Mar	Z	1	1	1	1	2	2	1	1	1	2	1	2	3	2	1	1	1	1	2	2	2	2	1	1.5	3									
																								Diurnal Average											
																								Diurnal Maximum											
5.5 4.6 7.4 9.1 9.1 10.6 6.7 5.2 4.2 3.2 2.9 2.8 3.0 2.9 2.6 3.3 4.0 4.4 4.5 3.8 4.2 4.1 5.5 5.4																																			
24 16 48 52 33 44 33 25 15 10 7 6 20 16 9 19 23 19 14 16 27 25 21 21																																			
Z - zerospan C - Calibration																																			



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Firebag - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Firebag - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	685	96.61	96.62
21 - 40	20	2.82	99.44
41 - 80	4	0.56	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
Firebag - March 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	86	40	21	16	11	52	116	144	81	21	9	7	11	14	17	39	685
21 - 40	1	0	1	1	1	0	4	2	10	0	0	0	0	0	0	0	20
11 - 80	0	0	0	0	0	0	1	0	3	0	0	0	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	87	40	22	17	12	52	121	146	94	21	9	7	11	14	17	39	709

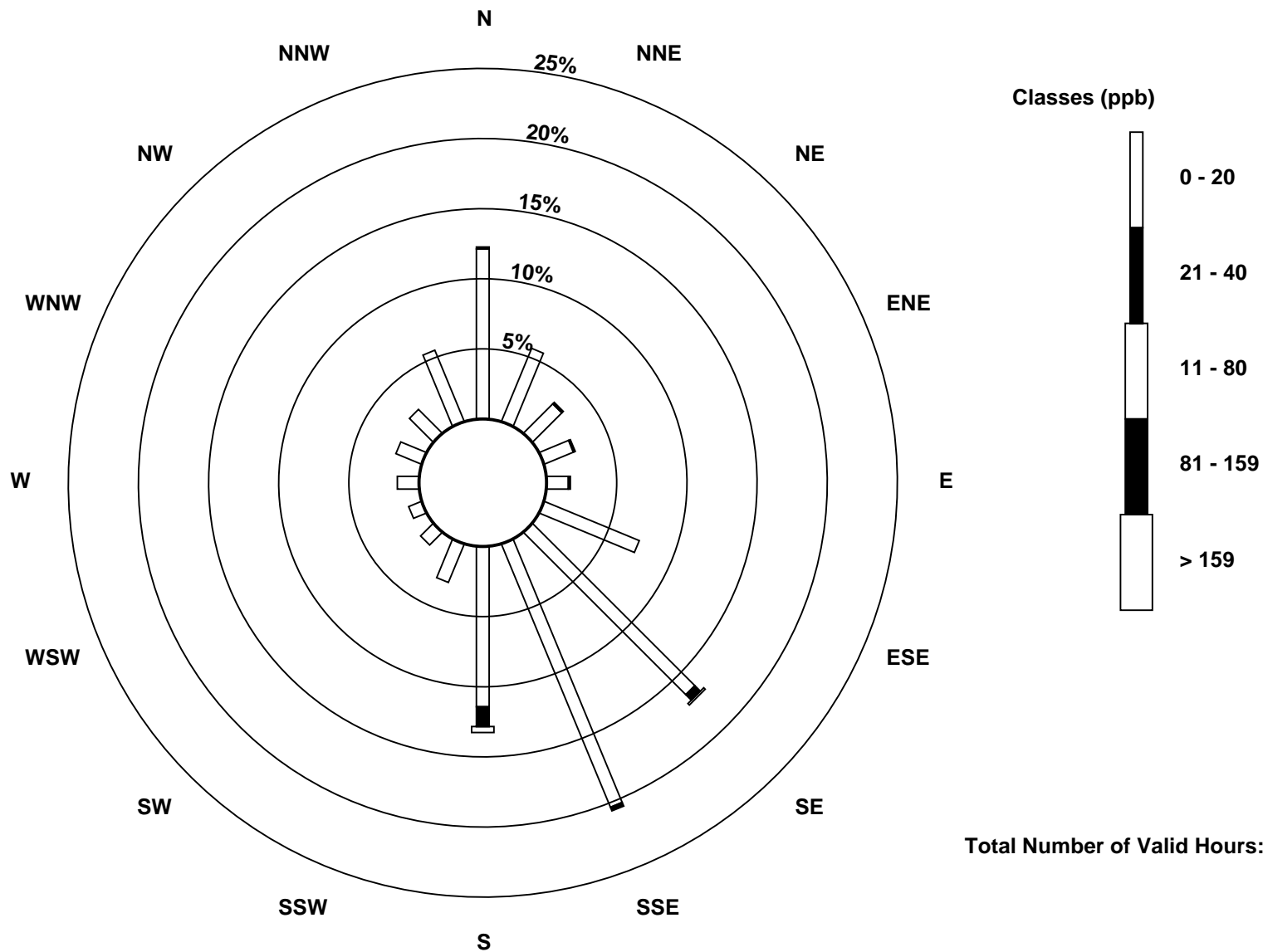
Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

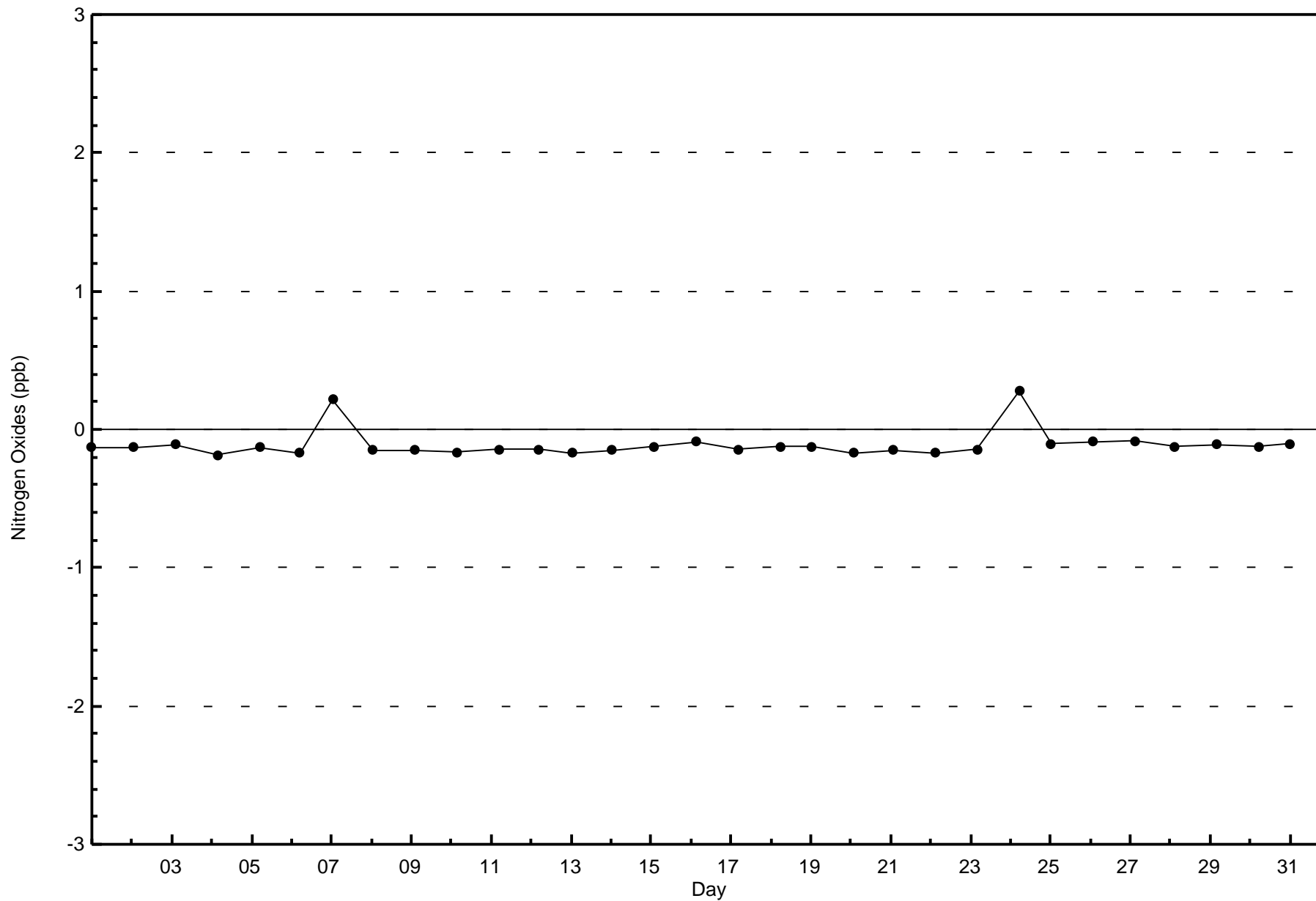
Nitrogen Oxides (NO_x) - ppb
Firebag (AMS 19)

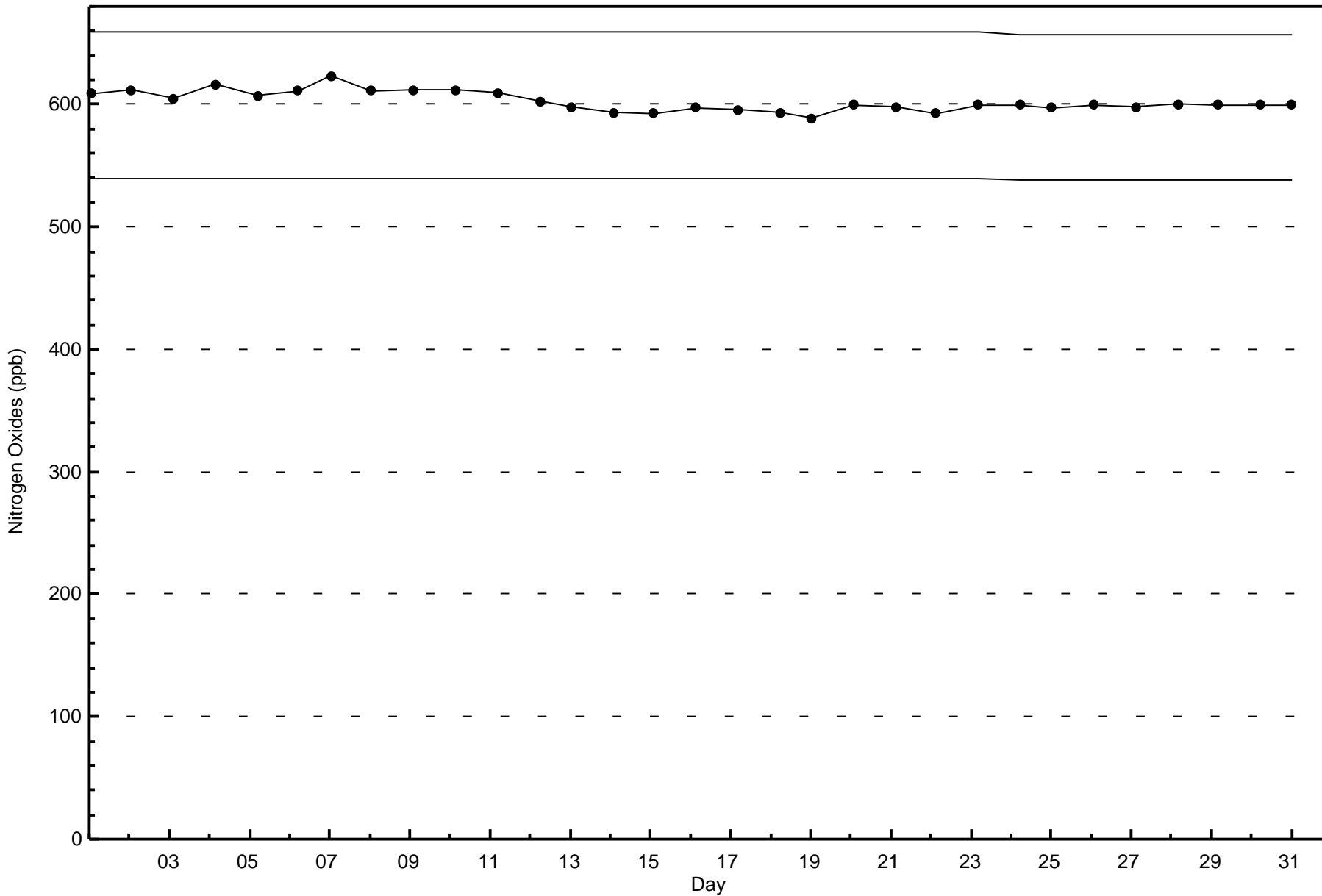




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Firebag - March 2017







Wood Buffalo Environmental Association
Summary of Hour Averages

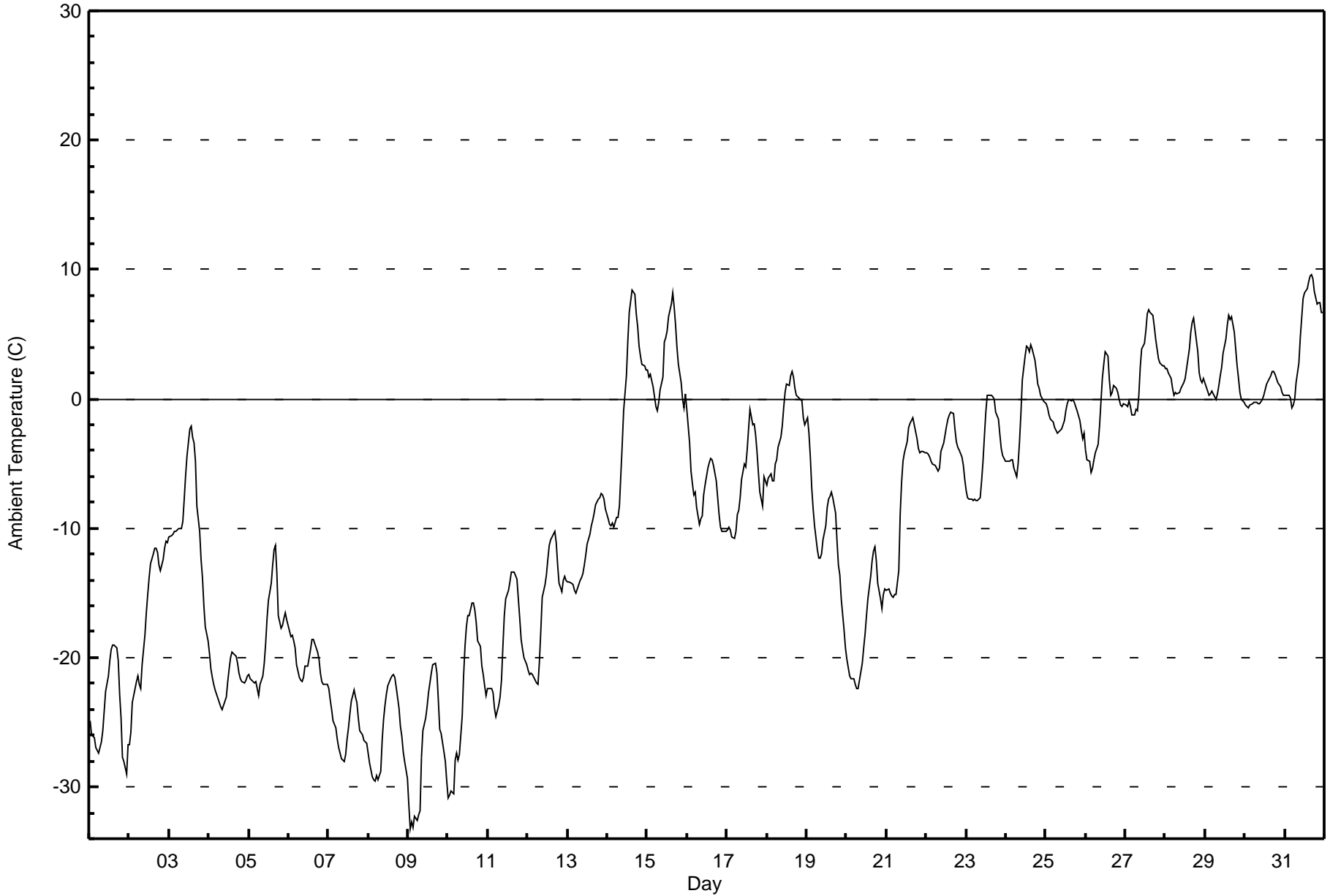
Ambient Temperature (AT) - C
Firebag - March 2017

Maximum Value: 9.6 C on Mar 31 17:00		Maximum Daily Average: 5.0 C on Mar 31		Hours in Service: 744																						
Minimum Value: -33.2 C on Mar 9 02:00		Minimum Daily Average: -27.0 C on Mar 9		Hours of Data: 744																						
Maximum Diurnal Average: -5.6 C at hour 16		Minimum Diurnal Average: -13.3 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -9.81 C		Percentiles: P ₁ = -31.4 P ₁₀ = -24.2 Q ₁ = -20.0 Median = -8.3 Q ₃ = -0.3 P ₉₀ = 2.6 P ₉₉ = 8.1		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-Mar	-24.9	-26.0	-26.1	-26.2	-27.0	-27.4	-27.0	-26.5	-25.7	-24.2	-22.6	-21.4	-20.3	-19.4	-19.0	-19.0	-19.3	-20.2	-22.8	-24.7	-27.7	-28.0	-29.0	-26.7	-24.2	-19.0
2-Mar	-26.7	-25.8	-23.5	-22.4	-21.8	-21.5	-22.1	-22.4	-20.6	-18.3	-16.6	-15.1	-13.8	-12.7	-12.0	-11.5	-11.6	-11.9	-12.8	-13.3	-12.4	-11.6	-11.0	-11.1	-16.8	-11.0
3-Mar	-10.7	-10.6	-10.4	-10.2	-10.3	-10.2	-10.0	-10.0	-9.5	-7.8	-5.9	-4.4	-2.3	-2.1	-3.0	-3.4	-4.8	-8.3	-10.3	-12.4	-13.8	-16.0	-17.6	-18.7	-9.3	-2.1
4-Mar	-19.7	-20.9	-21.5	-22.0	-22.5	-23.2	-23.5	-23.9	-24.0	-23.7	-23.1	-21.8	-20.9	-20.0	-19.6	-19.7	-19.9	-20.4	-21.2	-21.7	-21.8	-22.0	-21.7	-21.4	-21.7	-19.6
5-Mar	-21.3	-21.6	-21.8	-21.9	-21.8	-22.4	-22.9	-22.0	-21.4	-20.5	-19.0	-17.0	-15.5	-14.3	-12.9	-11.7	-11.3	-13.5	-16.8	-17.7	-17.5	-17.0	-16.6	-17.1	-18.1	-11.3
6-Mar	-17.9	-18.4	-18.2	-18.7	-19.3	-20.5	-21.5	-21.7	-21.8	-21.5	-20.6	-20.7	-20.0	-19.3	-18.6	-18.6	-19.0	-19.5	-20.1	-21.2	-21.9	-22.1	-22.1	-22.1	-20.2	-17.9
7-Mar	-22.4	-23.3	-24.0	-24.9	-25.5	-26.3	-26.9	-27.4	-27.9	-28.0	-27.5	-26.3	-25.4	-24.4	-23.4	-22.5	-23.0	-23.4	-24.6	-25.7	-26.0	-26.4	-26.5	-26.6	-25.3	-22.4
8-Mar	-27.4	-28.1	-29.3	-29.5	-29.5	-29.2	-29.4	-28.8	-26.4	-24.8	-23.7	-22.8	-22.2	-21.6	-21.4	-21.3	-21.5	-22.3	-23.9	-25.3	-26.1	-27.3	-28.0	-29.3	-25.8	-21.3
9-Mar	-31.4	-33.2	-32.7	-33.1	-32.3	-32.6	-32.1	-31.8	-27.7	-25.7	-24.6	-23.8	-22.8	-22.0	-21.2	-20.5	-20.4	-21.2	-23.2	-25.6	-25.9	-27.2	-28.1	-29.5	-27.0	-20.4
10-Mar	-30.9	-30.7	-30.3	-30.5	-27.9	-27.4	-27.9	-27.5	-24.6	-21.4	-19.1	-17.6	-16.7	-16.8	-15.8	-15.8	-16.3	-17.3	-18.7	-19.2	-20.6	-21.3	-22.2	-22.9	-22.5	-15.8
11-Mar	-22.4	-22.4	-22.4	-22.7	-23.9	-24.6	-23.7	-23.1	-21.8	-19.2	-16.8	-15.4	-14.8	-14.2	-13.4	-13.4	-13.4	-13.9	-15.5	-17.0	-18.6	-19.4	-20.0	-20.6	-18.8	-13.4
12-Mar	-21.0	-21.3	-21.2	-21.3	-21.7	-22.0	-22.1	-20.4	-18.0	-15.4	-14.3	-13.6	-12.4	-11.4	-10.9	-10.5	-10.3	-11.2	-12.9	-14.3	-14.9	-14.0	-13.7	-14.1	-15.9	-10.3
13-Mar	-14.1	-14.2	-14.2	-14.4	-14.8	-15.0	-14.7	-14.1	-13.8	-13.5	-12.9	-12.1	-11.2	-10.5	-9.8	-9.3	-8.8	-8.1	-7.8	-7.6	-7.3	-7.4	-7.8	-8.5	-11.3	-7.3
14-Mar	-9.3	-9.7	-9.8	-9.6	-9.9	-9.2	-9.1	-8.3	-5.9	-3.6	-0.9	1.8	4.5	6.7	7.5	8.5	8.1	6.6	5.6	4.1	3.3	2.7	2.6	2.2	-0.9	8.5
15-Mar	2.2	1.7	1.9	0.9	0.2	-0.5	-0.9	-0.2	0.7	1.7	4.4	4.7	5.2	6.4	7.3	8.2	7.1	5.7	3.9	2.6	1.2	-0.1	-0.7	0.4	2.7	8.2
16-Mar	-0.8	-3.4	-5.6	-6.6	-7.4	-7.2	-8.4	-9.6	-9.3	-9.0	-7.5	-6.6	-5.4	-4.9	-4.6	-4.7	-5.1	-6.3	-7.7	-9.0	-10.0	-10.2	-10.3	-10.3	-7.1	-0.8
17-Mar	-10.1	-9.9	-10.2	-10.7	-10.8	-10.3	-9.0	-8.6	-7.6	-6.2	-5.1	-5.2	-3.9	-2.4	-0.8	-2.0	-1.9	-2.8	-4.0	-5.7	-7.2	-8.3	-6.0	-6.3	-6.5	-0.8
18-Mar	-6.7	-6.2	-5.8	-6.3	-6.4	-5.0	-4.7	-3.7	-2.9	-2.1	-0.7	0.5	1.1	1.1	1.8	2.1	1.6	0.8	0.2	0.0	0.0	-0.2	-1.5	-2.0	-1.9	2.1
19-Mar	-1.5	-2.6	-4.5	-6.8	-8.5	-9.8	-11.7	-12.3	-12.3	-11.9	-10.9	-9.9	-8.4	-7.7	-7.5	-7.2	-7.6	-8.9	-11.0	-12.9	-13.6	-15.4	-17.9	-19.2	-10.0	-1.5
20-Mar	-20.1	-20.8	-21.4	-21.6	-21.7	-22.1	-22.4	-22.4	-21.8	-20.5	-19.3	-18.1	-16.8	-15.5	-13.8	-12.5	-11.8	-11.5	-12.5	-14.3	-15.5	-16.2	-15.1	-14.7	-17.6	-11.5
21-Mar	-14.8	-14.7	-15.1	-15.2	-15.3	-15.1	-15.1	-13.2	-8.9	-6.5	-4.8	-4.2	-3.3	-2.2	-1.9	-1.7	-1.4	-2.0	-3.0	-3.9	-4.2	-4.1	-4.1	-4.2	-7.4	-1.4
22-Mar	-4.2	-4.3	-4.5	-4.8	-5.1	-5.2	-5.4	-5.6	-5.4	-4.1	-3.4	-2.8	-2.1	-1.6	-1.3	-1.1	-1.1	-2.3	-3.3	-3.7	-3.9	-4.5	-5.1	-6.2	-3.8	-1.1
23-Mar	-7.1	-7.6	-7.8	-7.7	-7.9	-7.8	-7.8	-7.9	-7.6	-6.4	-4.8	-2.9	-1.1	0.3	0.2	0.3	0.2	0.0	-1.0	-1.5	-2.8	-3.9	-4.3	-4.6	-4.2	0.3
24-Mar	-4.8	-4.8	-4.8	-4.8	-4.7	-5.3	-6.0	-5.0	-3.3	-1.2	1.5	3.3	4.0	3.9	3.6	4.2	3.9	3.0	2.1	1.1	0.8	0.2	-0.1	-0.3	-0.6	4.2
25-Mar	-0.3	-0.7	-1.2	-1.6	-1.8	-2.2	-2.4	-2.6	-2.5	-2.3	-2.0	-1.6	-0.9	-0.4	0.0	-0.2	-0.1	-0.2	-0.5	-0.9	-1.6	-2.5	-3.0	-2.7	-1.4	0.0
26-Mar	-4.0	-4.7	-4.8	-5.7	-5.4	-4.8	-4.2	-3.5	-2.1	-0.3	1.5	2.7	3.6	3.3	1.4	0.3	0.5	1.1	0.8	0.5	-0.1	-0.5	-0.6	-0.3	-1.0	3.6
27-Mar	-0.4	-0.6	-0.2	-0.6	-1.3	-1.3	-0.8	-0.9	0.3	2.4	3.8	4.3	5.3	6.5	6.9	6.7	6.5	5.6	4.6	3.8	3.1	2.8	2.6	2.6	2.6	6.9
28-Mar	2.3	2.3	2.0	1.6	0.8	0.3	0.5	0.4	0.5	0.8	1.1	1.3	1.6	2.3	3.8	5.2	5.9	6.2	5.4	3.6	2.0	1.4	1.2	1.6	2.3	6.2
29-Mar	1.2	0.6	0.3	0.4	0.7	0.4	-0.1	0.4	1.0	1.8	2.5	3.5	4.6	5.7	6.4	6.1	6.4	5.1	3.9	2.6	1.6	0.5	-0.1	-0.3	2.3	6.4
30-Mar	-0.4	-0.6	-0.7	-0.5	-0.4	-0.3	-0.3	-0.3	-0.4	-0.3	-0.1	0.2	0.7	1.1	1.4	1.8	2.1	2.2	1.9	1.6	1.2	0.9	0.5	0.3	0.5	2.2
31-Mar	0.3	0.3	0.3	0.1	-0.7	-0.5	-0.1	1.3	2.8	4.7	6.3	7.7	8.2	8.5	9.1	9.5	9.6	9.3	8.3	7.4	7.5	7.4	6.7	6.7	5.0	9.6
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Firebag - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Firebag - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	185	24.87	24.87
-20 - 0	397	53.36	78.23
0 - 10	162	21.77	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

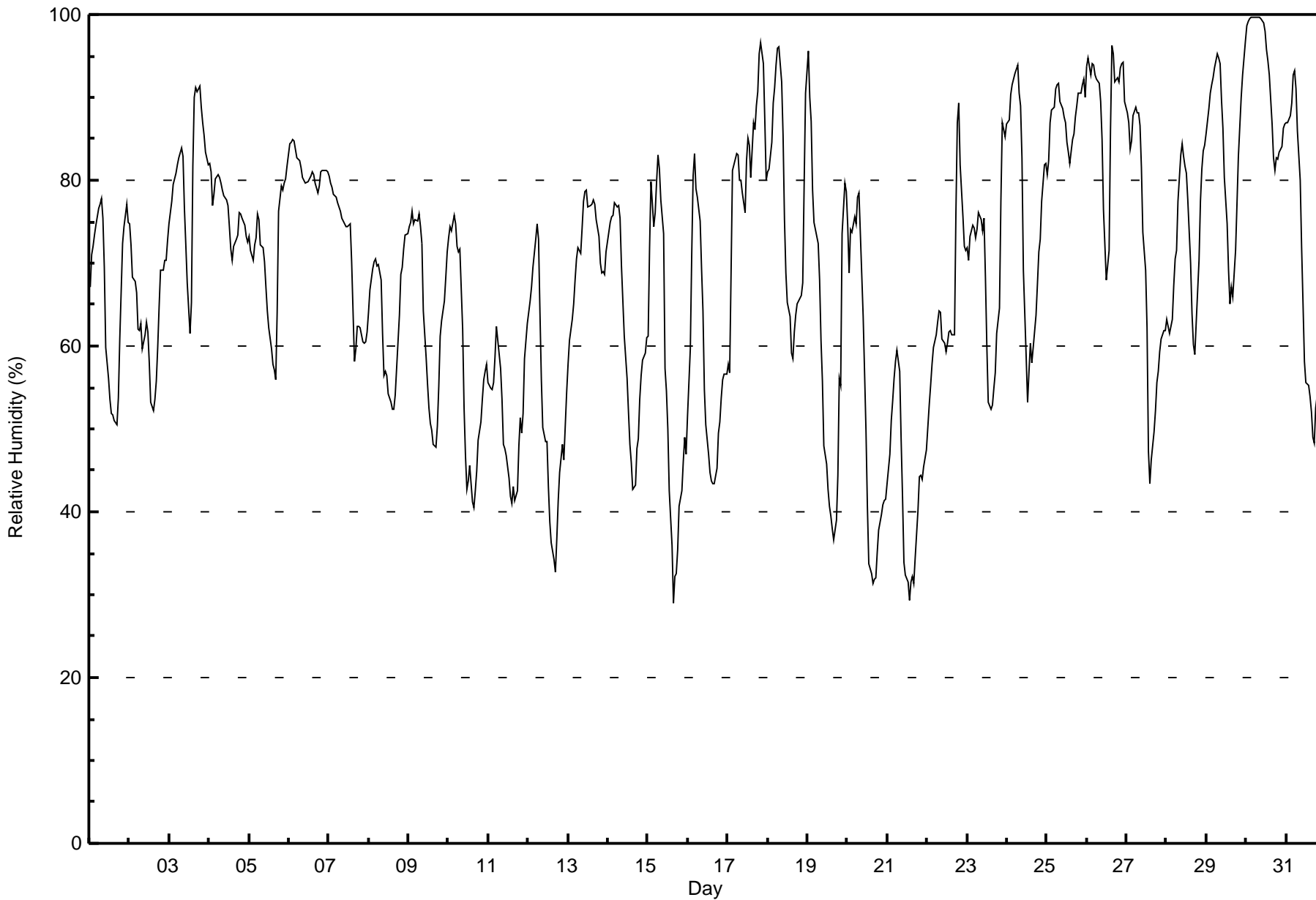
Firebag - March 2017

Maximum Value: 100 % on Mar 30 06:00																			Maximum Daily Average: 93.0 % on Mar 30						Hours in Service: 744																								
Minimum Value: 29 % on Mar 15 16:00																			Minimum Daily Average: 43.2 % on Mar 21						Hours of Data: 744																								
Maximum Diurnal Average: 78.8 % at hour 7																			Minimum Diurnal Average: 57.7 % at hour 16						Hours of Missing Data: 0																								
Monthly Average: 69.0 %																			Percentiles: P ₁ = 32 P ₁₀ = 46 Q ₁ = 57 Median = 72 Q ₃ = 81 P ₉₀ = 90 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-Mar	67	71	72	73	75	77	77	78	75	69	60	56	54	52	52	51	51	54	61	67	72	74	77	75	66.2	78																							
2-Mar	75	72	68	68	66	62	62	63	60	61	63	62	58	53	52	53	56	60	65	69	69	70	70	73	63.8	75																							
3-Mar	75	77	80	80	81	82	83	84	83	77	72	68	62	65	82	90	91	91	91	89	87	85	83	82	80.8	91																							
4-Mar	82	81	77	78	80	81	80	80	79	78	78	77	74	72	70	72	73	73	76	76	75	75	73	73	76.4	82																							
5-Mar	73	71	70	72	73	76	75	72	72	70	67	64	62	60	58	57	56	64	76	79	79	80	80	82	70.4	82																							
6-Mar	84	85	85	85	84	83	82	82	80	80	80	80	80	81	81	81	80	78	79	81	81	81	81	81	81.4	85																							
7-Mar	80	80	79	78	78	77	77	76	75	75	74	74	75	75	70	58	60	62	62	62	60	60	60	62	70.5	80																							
8-Mar	64	67	69	70	71	70	70	68	61	56	57	56	54	53	52	52	54	57	64	69	70	72	73	74	63.5	74																							
9-Mar	74	75	76	75	75	75	76	74	72	64	59	55	52	51	50	48	48	50	55	61	63	65	68	71	64.0	76																							
10-Mar	73	74	74	76	75	72	71	72	62	53	47	43	44	46	41	40	43	45	49	51	54	56	57	58	57.2	76																							
11-Mar	56	55	55	56	59	62	59	57	54	48	48	47	44	42	41	43	41	43	48	51	50	52	58	63	51.3	63																							
12-Mar	64	65	67	70	73	75	73	64	56	50	48	48	43	39	36	34	33	37	41	45	48	46	50	54	52.5	75																							
13-Mar	58	61	63	65	68	71	72	71	74	77	79	79	77	77	77	78	77	75	73	70	69	69	69	71	71.6	79																							
14-Mar	74	75	76	76	77	77	77	75	70	65	61	56	52	48	46	43	43	48	49	54	56	58	59	61	61.5	77																							
15-Mar	61	72	80	74	76	80	83	81	78	74	57	55	50	43	36	29	32	33	35	41	43	46	49	47	56.4	83																							
16-Mar	52	60	71	81	83	79	78	75	69	64	55	50	47	45	44	43	43	45	50	51	54	56	57	57	58.7	83																							
17-Mar	58	57	69	81	83	83	83	80	80	79	76	82	85	84	80	87	86	89	91	95	97	94	87	80	81.9	97																							
18-Mar	81	81	85	89	91	94	96	96	92	85	75	69	65	64	59	58	62	64	65	66	66	68	80	90	76.7	96																							
19-Mar	96	90	87	79	75	74	72	68	61	56	48	46	43	41	40	38	37	39	44	56	55	74	80	79	61.5	96																							
20-Mar	75	69	74	74	76	75	78	79	74	64	57	50	41	34	33	31	32	32	35	38	40	41	41	41	53.3	79																							
21-Mar	43	47	51	53	56	58	59	57	49	42	34	32	32	29	31	32	31	34	40	44	44	44	45	48	43.2	59																							
22-Mar	50	53	55	58	60	61	63	64	64	61	60	59	60	62	62	61	61	76	87	89	82	76	72	72	65.4	89																							
23-Mar	72	70	73	75	74	73	74	76	75	74	75	68	60	53	52	53	55	57	61	65	77	87	86	85	69.7	87																							
24-Mar	87	87	90	91	92	93	94	91	89	83	69	59	53	57	60	58	60	64	68	71	73	77	82	82	76.2	94																							
25-Mar	81	82	87	88	89	91	91	92	89	89	88	87	85	83	82	85	86	88	89	91	91	92	92	90	87.7	92																							
26-Mar	94	95	93	94	94	93	92	92	90	85	76	72	68	71	86	96	95	92	92	92	94	94	94	90	88.9	96																							
27-Mar	88	87	84	85	88	89	88	88	87	82	74	69	62	47	43	46	50	52	56	57	59	61	62	62	69.4	89																							
28-Mar	63	62	62	63	67	71	71	78	83	84	83	82	81	78	70	64	60	59	63	70	77	81	84	84	72.5	84																							
29-Mar	86	89	90	92	92	94	95	95	94	90	86	80	75	69	65	67	66	71	77	83	86	90	93	97	84.3	97																							
30-Mar	99	99	99	100	100	100	100	100	100	99	99	98	96	94	93	87	83	81	83	83	83	84	86	87	93.0	100																							
31-Mar	87	87	88	89	93	93	91	86	80	72	65	58	56	55	54	52	49	48	53	55	55	56	59	61	68.4	93																							
																								73.2	74.1	75.8	77.0	78.1	78.6	78.8	77.8	75.1	71.1	66.8	64.0	60.9	58.8	58.0	57.7	57.8	60.0	63.8	66.8	68.1	69.8	71.3	71.9	Diurnal Average	
																								99	99	99	100	100	100	100	100	100	99	99	98	96	94	93	96	95	92	92	95	97	94	94	97	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Firebag - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Firebag - March 2017**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	30	4.03	4.03
40 - 60	196	26.34	30.38
60 - 80	311	41.80	72.18
80 - 100	207	27.82	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 - March 2017

Maximum Speed: 40 km/h on Mar 13 15:00	Maximum Daily Speed Average: 31.0 km/h on Mar 13	Hours in Service: 744
Minimum Speed Value: 1 km/h on Mar 20 17:00	Minimum Daily Speed Average: 4.6 km/h on Mar 23	Hours of Data: 744
Maximum Diurnal Speed Average: 7.6 km/h at hour 24	Minimum Diurnal Speed Average: 2.3 km/h at hour 17	Hours of Missing Data: 0
Monthly Average Velocity: 5.2 km/h 143.9 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 10 Median = 14 Q ₃ = 20 P ₉₀ = 24 P ₉₉ = 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-Mar	E6	ESE8	ESE10	ESE10	ESE10	ESE11	ESE10	E9	E9	ENE8	NE10	NE7	NNE7	NNE6	N8	NNW11	N10	N9	NNE6	NE6	ENE5	ESE3	SE4	SSE6	ENE5.4	NNW11
2-Mar	SSE6	S8	S8	S8	S7	S9	S11	SSE11	SSE11	SSE14	SSE14	S14	S11	SSE11	SSE14	SSE16	SSE17	SE20	SE25	SE25	SE25	SSE30	SSE29	SSE25	SSE15.0	SSE30
3-Mar	SSE26	SSE27	SSE28	SSE25	SSE22	SSE23	SSE23	S21	S20	S16	S20	SSW14	SSW16	SW16	WSW14	W10	NW16	N18	N18	N20	N18	N20	N18	N16	S6.2	SSE28
4-Mar	N19	N20	N23	N20	N22	N21	N21	N21	N21	N23	NNE21	NNE19	N17	N18	NNE17	N16	N14	N12	N10	NNE10	NE9	ENE11	E15	E19	NNE15.8	N23
5-Mar	E18	E17	SSE11	S8	SSW4	NE2	ESE6	SE9	SE12	SE13	SE13	SE10	SE8	ESE6	SE7	SSE8	SSE9	WNNW5	NNW6	NW4	N3	NE2	E2	N3	SE5.5	E18
6-Mar	N8	NNE8	NNE10	NNE14	NNE11	NNE10	N15	N16	N16	N14	N19	N19	N17	N20	N20	N21	N22	N24	N24	N23	N21	N21	N24	N25	N17.5	N25
7-Mar	N27	N25	N26	N27	N24	N24	N23	N19	N19	N20	N20	N20	NNW21	NNW22	N20	NNW22	N18	N19	N16	N14	N15	N14	N17	N17	N20.3	N27
8-Mar	N12	N11	NNE8	NE6	NNE7	N10	NNW9	NNW6	NNW10	NNW16	NNW18	NNW18	NNW18	N18	N19	N19	N18	N17	N11	N11	NNE11	NNE8	NNE8	NE5	N11.8	N19
9-Mar	WNNW2	NW4	WNNW4	NW3	NNW3	NW4	NW6	NW6	NNW7	NNW10	NNW10	NNW9	WNNW10	NNW10	NW8	N9	NNE9	NNE10	NNE8	NE6	NE8	ENE6	ENE5	ENE5	NNW5.2	NNW10
10-Mar	ENE5	E4	E4	E6	ESE8	SE11	SE5	SSE5	SSE5	SE3	ENE3	ENE1	SW3	S5	W1	NE7	NE12	ENE11	ENE9	ESE12	ESE11	SE11	SE11	SE11	ESE5.5	ESE12
11-Mar	SSE14	SSE12	SSE12	SE14	SE11	SE9	SE12	SE10	SE10	SSE11	SSE11	S12	S10	SE8	ESE7	SSE12	SE12	SE12	SE8	ESE11	ESE13	SE12	SE11	SE10	SE10.5	SE14
12-Mar	SE11	SE12	SE13	SE13	SE13	SE14	SSE15	SSE14	SSE14	SSE19	S20	S19	SSE18	SSE20	S21	SSE21	SSE21	SE19	SE16	SE19	SE18	SSE26	SSE29	SSE29	SSE17.6	SSE29
13-Mar	SSE30	SSE31	SSE29	SSE30	SSE31	SSE31	SSE31	SSE33	SSE33	SSE36	SSE36	SSE36	S38	S38	S40	S37	S35	S30	S28	S28	S27	S25	S17	SSE17	S31.0	S40
14-Mar	SSE19	SSE18	S18	S18	S16	S14	S17	S18	SSW20	SSW20	SW17	SSW13	SW11	SW10	SW11	SSW7	SSW11	SSE7	SE9	SE15	ESE17	ESE16	SE20	SSE22	S12.8	SSE22
15-Mar	SSE26	SSE23	SSE24	SSE24	S23	S24	S25	SSW25	SSW24	SW22	WSW25	WSW24	WSW22	WSW23	WSW20	WNNW19	NW21	NNW17	NNW11	N12	NNE11	NE11	ENE9	E13	SSW9.2	SSE26
16-Mar	E10	NNE7	NE13	NNE12	NNE12	NNE15	NNE17	NNE19	NNE20	NE18	NE20	NNE16	NNE15	NNE18	NNE19	NNE18	NNE18	NE18	NE15	NE18	ENE17	E11	ESE8	ESE15	NE14.0	NE20
17-Mar	SE11	SE14	SE16	SE18	SE20	SE17	SSE19	SSE17	SSE17	S16	S14	SSE12	SE14	S6	S4	NNE11	NNE12	NNE13	NE12	NE11	NE10	ENE8	ESE11	ESE11	SE9.0	SE20
18-Mar	ESE12	SE13	SE12	ESE13	ESE14	ESE17	ESE16	ESE16	SE21	SE23	SE23	SE22	SE23	SE22	SE20	SE19	SSE20	SE19	SE16	SE15	SE12	SE3	ENE3	NW7	SE15.1	SE23
19-Mar	WNNW14	NW27	WNNW27	WNNW27	WNNW23	WNNW21	WNNW22	W26	W27	W27	W25	W29	W30	W29	W29	WNNW27	WNNW25	NW24	NW26	NW25	WNNW26	NNW23	NNW19	WNNW22	WNNW23.1	W30
20-Mar	NNW26	NW26	NNW22	NNW24	NNW20	NNW21	NNW17	NNW17	N14	NNW16	NW13	NNW12	NW12	NNW12	NW6	WNNW6	SSW1	SSW6	SSE9	SSE12	SSE14	SSE17	S20	S21	NW6.9	NW26
21-Mar	S22	S22	S17	S17	S16	S16	S17	S15	S18	S20	S26	S27	SSE25	SSE25	S26	SSE27	SSE26	SE22	SE23	SSE24	SE24	SSE26	SSE27	SSE26	SSE21.6	SSE27
22-Mar	SSE26	SSE21	SSE21	SSE20	SSE20	SSE19	SE15	SE16	SE14	SE11	SE11	ESE12	SE12	ESE8	E1	SSE2	WNNW8	NNE9	N7	NNW8	NNW13	N13	N16	NNW16	SE6.3	SSE26
23-Mar	NNW16	N15	N14	N16	N17	N16	NNE11	NNE12	NNE12	NE11	ENE10	NE6	E7	ESE7	ESE11	SE12	ESE11	SE10	S9	SSE12	S14	SSE16	SSE16	SSE18	ENE4.6	SSE18
24-Mar	SSE17	SSE15	SSE15	S14	S13	S12	SSE14	SSE14	S16	SSE14	SSE13	SSE14	SSE16	S19	SSE23	SSE19	SSE18	SE18	SE18	SE18	SE20	SE21	SE21	SE20	SSE16.1	SSE23
25-Mar	SE18	ESE19	ESE17	ESE15	SE14	ESE16	ESE17	SE16	SE16	SE15	SE12	SE11	SSE9	SSE8	S6	SSW7	SW7	SW4	S6	SE7	ESE9	SE8	SSE8	SE6	SE10.3	ESE19
26-Mar	SE8	SE9	SE10	SE11	SE10	ESE12	ESE13	ESE14	ESE13	SE12	SE15	SSE17	SSE15	S15	WSW9	W4	S3	SSE9	S10	S11	SE6	SE10	SE12	SSE13	SE9.4	SSE17
27-Mar	SSE13	SSE11	SSE11	SSE12	SSE12	SSE12	SSE15	SSE12	SSE9	SSE11	S12	SSE13	SSE17	S19	SSE17	SE14	SE14	SE13	SE14	SE15	SE17	SSE19	SSE22	SSE13.7	SSE22	
28-Mar	SSE20	SSE18	SSE20	SSE18	SE14	SSE15	SSE17	SSE18	SSE19	S19	S21	S21	S18	S17	SSE15	SSE16	SSE15	SSE14	SE11	SE13	ESE13	SE14	SE14	SSE15	SSE15.9	S21
29-Mar	SSE15	SSE16	SSE15	S16	S13	S12	SSE14	SSE15	SSE17	S18	S20	SSE17	SSE14	SSE11	SE9	SSE12	SE12	ESE13	SE12	SE11	SE13	SE12	SE12	SE13	SSE13.2	S20
30-Mar	SE13	SE11	ESE10	SE11	SE10	ESE9	ESE9	ESE8	SE8	ESE7	ESE5	SE5	SE2	S3	NE1	N4	NNW4	NNW5	N2	E6	ESE8	SE8	SSE9	S9	SE5.6	SE13
31-Mar	S9	S11	S15	S14	SSW11	S16	S15	S16	SSW17	S17	S19	SSW23	SSW23	S22	S22	S22	S20	SSW18	S18	S17	SSW18	SSW21	SSW21	SSW20	S17.6	SSW23

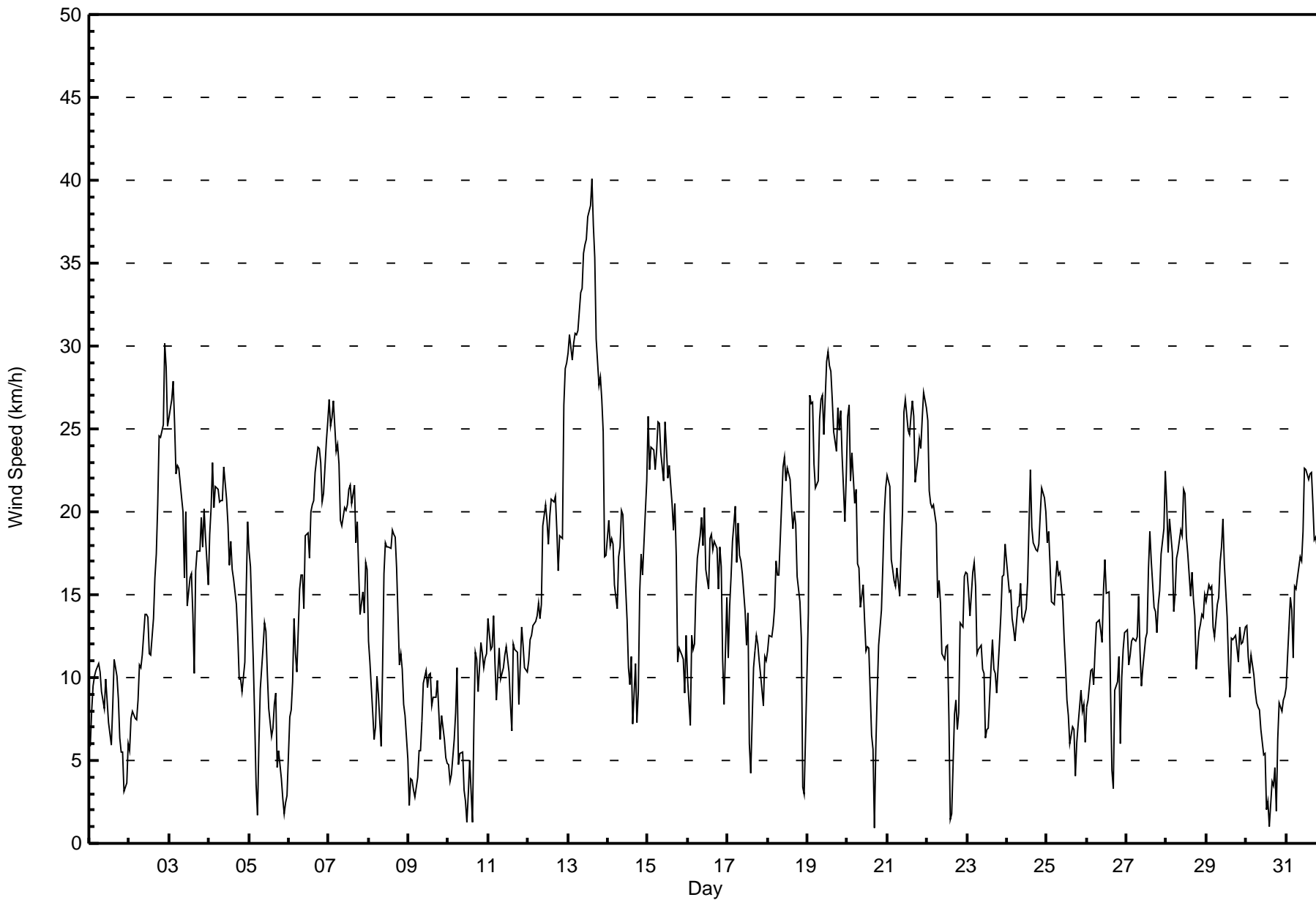
SE6.9	SE6.1	SE6.4	SE6.0	SE5.7	SE5.8	SE6.2	SSE6.2	SSE6.2	SSE5.9	SSE6.0	S5.7	S5.7	S5.0	S4.2	SSE2.8	SE2.3	E3.5	ESE4.1	ESE5.7	ESE6.0	SE6.7	SE7.4	SE7.6	Diurnal Average
SSE30	SSE31	SSE29	SSE30	SSE31	SSE31	SSE31	SSE33	SSE33	SSE36	SSE36	SSE36	S38	S38	S40	S37	S35	S30	S28	S28	S27	SSE30	SSE29	SSE29	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Firebag - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Firebag - March 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	50	6.72	6.72
6 - 11	199	26.75	33.47
12 - 19	308	41.40	74.87
20 - 28	161	21.64	96.51
29 - 38	25	3.36	99.87
> 38	1	0.13	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 - March 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	0	4	8	3	2	6	3	4	2	2	0	2	3	4	3	50
6 - 11	11	21	13	9	6	28	39	23	18	5	4	1	1	3	5	12	199
12 - 19	43	19	6	1	5	25	61	76	44	6	2	1	0	2	3	14	308
20 - 28	33	2	1	0	0	0	19	36	27	9	1	5	4	8	6	10	161
29 - 38	0	0	0	0	0	0	0	16	5	0	0	0	4	0	0	0	25
> 38	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Totals	91	42	24	18	14	55	125	154	99	22	9	7	11	16	18	39	744

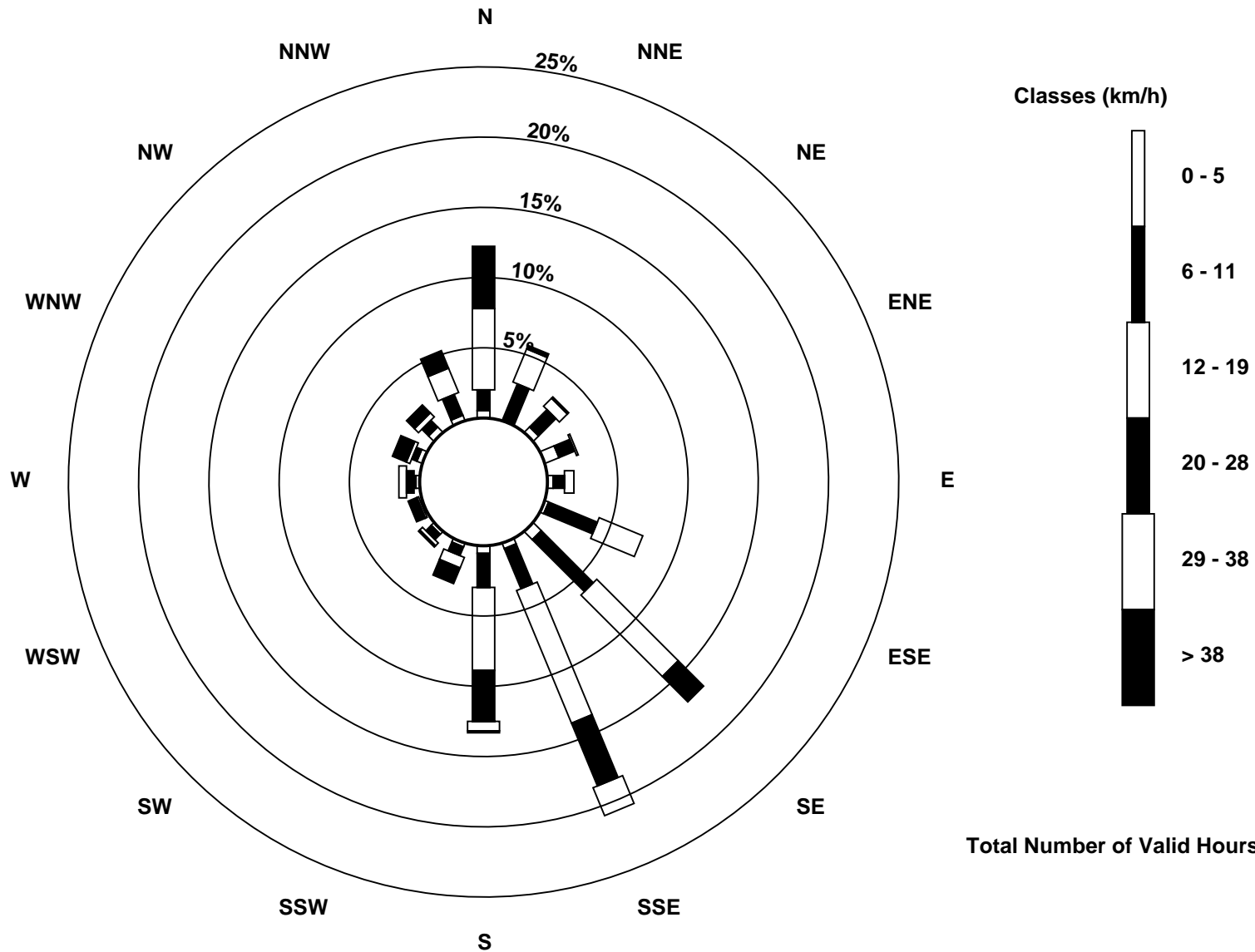
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Wind Speed (WS) - km/h
Firebag (AMS 19)



Total Number of Valid Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Firebag - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Mar 13 13:00 Minimum Value: 1 km/h on Mar 9 02:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 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-Mar	1	2	2	1	2	2	2	2	2	1	1	2	3	2	2	2	2	2	1	1	1	1	2	1	3
2-Mar	1	1	1	1	1	1	2	1	1	2	2	2	3	3	2	3	3	4	4	4	5	5	5	4	5
3-Mar	4	4	5	4	4	4	4	3	3	2	3	3	3	3	2	2	5	5	4	4	4	4	4	4	5
4-Mar	4	4	5	4	5	4	4	4	4	5	4	4	3	4	4	3	3	3	2	2	2	2	3	3	5
5-Mar	3	3	3	2	1	2	2	2	2	2	2	2	2	2	2	3	3	3	2	2	1	1	2	2	3
6-Mar	1	1	2	3	3	2	3	4	3	3	4	4	3	4	4	4	5	5	5	5	4	5	4	5	5
7-Mar	5	5	5	5	5	4	5	4	4	3	4	4	4	5	4	4	3	4	3	2	3	2	3	3	5
8-Mar	3	2	2	1	2	1	1	1	4	3	4	4	4	4	4	4	4	4	2	2	2	1	1	2	4
9-Mar	2	1	1	1	1	1	1	1	2	2	2	3	2	3	2	2	2	2	2	2	1	1	1	1	3
10-Mar	1	1	1	1	2	1	2	1	1	1	1	1	2	2	2	3	2	2	2	2	2	2	2	1	3
11-Mar	2	1	2	2	2	1	2	2	2	2	2	3	2	3	3	3	2	2	1	3	2	2	2	1	3
12-Mar	1	2	2	2	2	2	2	2	3	4	3	3	4	4	3	3	4	3	3	3	3	4	5	4	5
13-Mar	4	5	5	5	4	4	5	6	5	6	6	6	7	6	6	5	6	5	5	4	4	4	3	2	7
14-Mar	2	2	2	3	3	2	2	2	3	3	3	3	3	3	3	3	3	1	2	4	3	2	3	4	4
15-Mar	4	4	5	4	3	4	3	3	4	4	5	4	4	4	4	4	5	4	2	2	1	2	2	2	5
16-Mar	2	2	2	2	2	2	3	3	4	3	4	4	3	3	4	4	3	3	2	3	3	4	2	3	4
17-Mar	3	3	3	4	3	3	5	4	2	3	2	2	4	2	3	2	2	2	1	1	1	1	4	4	5
18-Mar	2	2	2	2	2	2	2	3	4	4	5	4	4	5	4	4	4	4	3	3	3	2	1	2	5
19-Mar	4	6	6	6	5	5	5	5	6	5	6	6	6	7	6	6	5	5	6	6	6	7	4	5	7
20-Mar	5	7	4	5	4	4	4	3	3	3	3	3	3	3	4	3	2	2	1	1	2	2	3	3	7
21-Mar	3	3	2	2	2	2	2	2	2	3	4	4	4	4	5	5	4	4	4	5	4	4	4	4	5
22-Mar	4	3	3	3	3	3	3	3	3	2	2	2	2	2	1	3	2	1	2	4	2	3	3	3	4
23-Mar	3	3	3	3	3	3	2	3	2	2	3	3	3	3	2	3	2	3	4	3	3	2	2	3	4
24-Mar	3	3	2	3	2	2	2	2	3	3	2	3	3	4	4	3	4	3	3	4	4	4	4	4	4
25-Mar	4	3	3	3	3	3	4	3	3	3	2	2	1	1	2	1	1	1	1	1	2	2	1	1	4
26-Mar	1	2	1	2	2	2	2	2	2	3	3	3	3	3	3	1	1	2	2	3	2	1	2	2	3
27-Mar	2	1	2	2	2	3	2	2	1	2	3	2	3	3	3	3	3	3	2	3	3	3	4	3	4
28-Mar	3	3	3	3	2	2	3	3	3	3	4	3	3	3	3	2	3	2	2	2	2	2	3	2	4
29-Mar	2	2	2	2	2	2	2	2	3	3	3	3	2	2	3	2	2	2	2	2	2	2	2	3	3
30-Mar	3	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	1	1	2	2	2	1	1	3
31-Mar	1	1	3	2	1	2	2	3	2	3	3	4	4	4	4	4	4	4	2	3	4	4	4	3	4
Diurnal Maximum																									



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Firebag - March 2017

Direction of Maximum Speed: 173 deg on Mar 13 15:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 169.5 deg on Mar 13	Hours of Data: 744
Direction of Minimum Speed: 202 deg on Mar 20 17:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 4.6 deg on Mar 23	Percent Operational Time: 100.0
Monthly Average Direction: 160.2 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-Mar	101	106	109	115	113	111	106	96	97	67	52	48	26	21	350	348	7	7	27	54	76	116	144	151	71.9
2-Mar	153	170	182	175	182	178	170	158	157	164	167	172	172	152	156	152	148	140	142	141	143	149	159	165	156.4
3-Mar	159	162	161	163	161	162	165	170	169	180	173	195	201	218	238	278	323	6	2	6	355	3	6	0	172.8
4-Mar	4	360	358	357	356	356	356	3	8	9	13	20	360	7	16	3	4	11	8	30	38	62	83	95	12.2
5-Mar	101	100	156	174	208	35	116	135	124	126	124	126	143	119	143	148	160	295	329	317	359	50	79	4	125.6
6-Mar	354	27	25	15	13	12	10	8	6	4	357	358	357	3	4	1	4	6	4	358	356	1	1	2	3.9
7-Mar	359	358	360	4	5	4	358	356	354	353	355	350	348	347	353	347	354	351	352	356	358	360	1	6	356.4
8-Mar	2	5	25	35	12	360	348	327	340	341	342	343	345	351	359	355	1	4	10	8	12	21	26	38	358.5
9-Mar	284	311	292	311	329	313	314	317	337	338	329	334	286	331	312	352	13	23	24	35	47	66	66	62	346.7
10-Mar	73	83	99	81	119	139	140	151	154	125	71	63	227	174	276	55	53	60	70	108	122	124	124	132	107.8
11-Mar	150	148	147	142	131	127	130	132	143	159	165	170	169	145	115	156	129	139	125	112	117	128	132	140	140.3
12-Mar	135	134	137	135	137	146	147	151	154	168	171	173	161	167	170	164	152	143	139	138	140	158	167	168	154.8
13-Mar	166	164	166	166	164	164	163	162	165	166	166	166	170	175	173	174	171	175	174	180	184	182	171	161	169.5
14-Mar	160	165	174	175	171	175	181	188	203	213	215	213	223	223	228	207	208	155	124	126	122	123	135	149	175.1
15-Mar	164	155	149	167	172	171	183	196	213	221	244	245	241	239	248	294	315	328	330	356	22	37	64	86	210.6
16-Mar	87	30	36	17	20	24	18	21	32	35	39	28	22	30	20	22	24	34	47	56	63	79	115	111	37.9
17-Mar	126	132	132	124	133	141	152	161	166	171	174	155	143	174	186	26	25	33	41	45	48	59	103	119	125.6
18-Mar	123	133	137	121	119	113	113	120	125	128	130	134	135	134	132	134	147	141	128	129	140	135	69	314	129.4
19-Mar	288	311	299	296	292	287	285	280	280	272	267	266	269	276	277	283	301	312	313	312	301	334	348	348	293.9
20-Mar	335	324	328	334	331	337	344	341	350	329	312	330	315	331	311	301	202	192	151	147	150	160	170	173	323.5
21-Mar	175	172	170	172	170	171	169	172	189	182	178	173	168	166	174	160	158	146	146	147	139	158	160	159	164.7
22-Mar	159	152	149	148	147	150	141	138	141	137	139	117	125	116	92	167	301	29	8	345	345	352	351	338	129.6
23-Mar	342	1	355	359	4	7	13	16	33	55	59	40	82	123	114	127	122	126	173	166	172	166	154	157	71.8
24-Mar	158	160	168	180	178	175	159	167	177	161	153	149	168	170	166	157	152	143	133	127	132	139	135	132	154.4
25-Mar	125	116	118	117	124	122	123	130	141	143	146	143	149	167	174	201	217	218	184	144	117	126	164	134	137.4
26-Mar	126	136	136	129	126	119	118	116	120	129	137	149	165	189	251	273	178	159	170	170	125	134	146	157	145.2
27-Mar	163	157	159	150	158	167	157	155	161	161	166	173	166	164	170	168	146	135	124	129	127	138	154	162	154.5
28-Mar	168	167	165	158	145	147	157	163	165	170	173	174	178	173	166	162	165	164	142	127	122	131	139	162	159.7
29-Mar	164	166	166	169	170	169	165	160	161	169	171	162	162	163	146	147	133	115	136	131	129	134	136	137	154.3
30-Mar	140	138	119	136	143	122	114	114	128	117	107	139	129	188	46	350	341	340	8	91	116	136	157	170	127.5
31-Mar	188	185	191	188	193	180	177	191	193	183	176	199	199	189	177	175	190	199	186	178	199	200	195	202	189.1

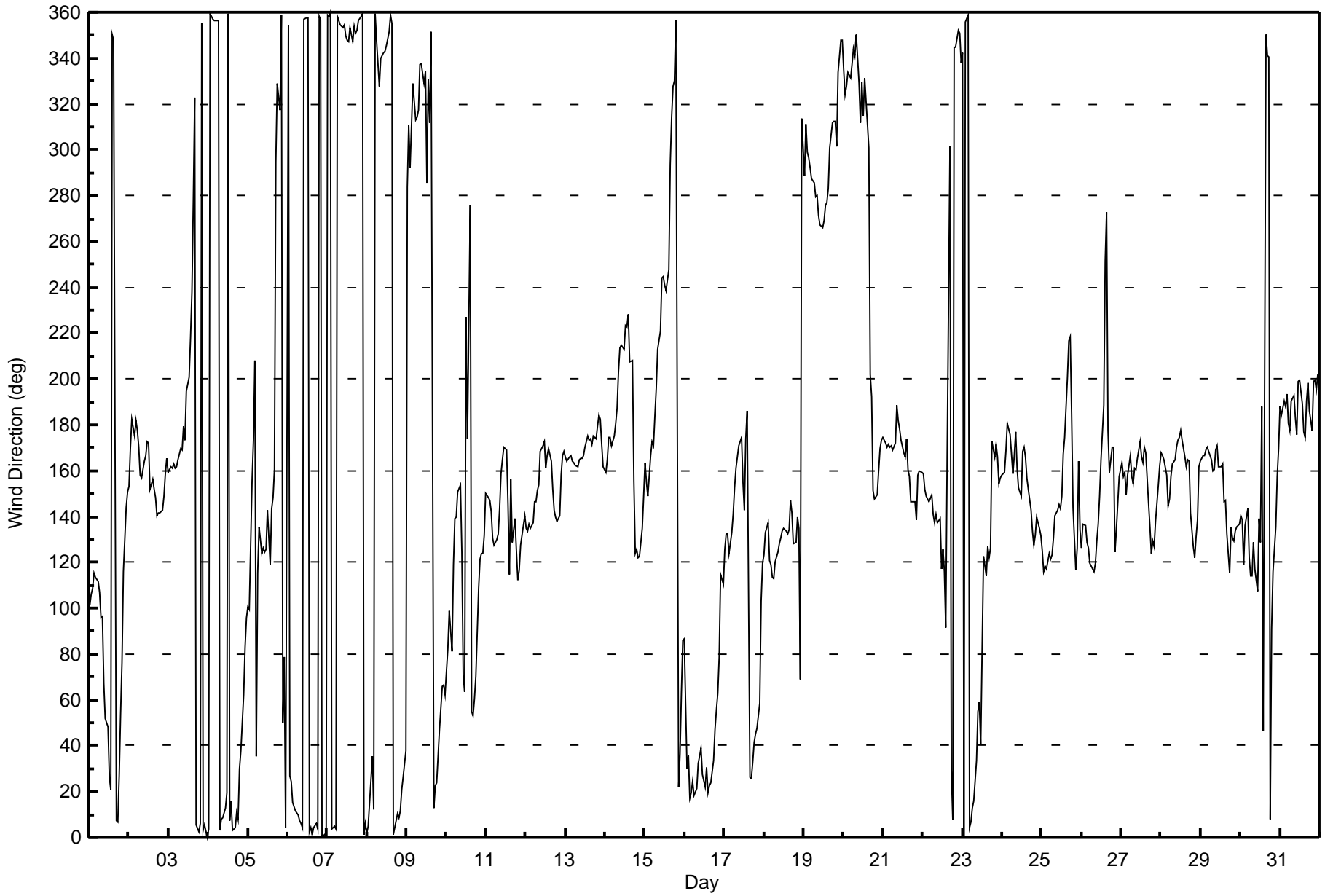
142.2 139.8 144.5 142.4 141.5 139.4 142.2 149.8 155.3 161.3 163.8 170.4 180.9 180.0 183.6 164.5 130.5 95.9 104.2 108.9 111.6 124.7 131.8 138.6
 Diurnal Average

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Firebag - March 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Firebag - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 91 deg on Mar 20 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: 5 deg on Mar 1 19:00																									
Percentiles: P ₁ = 6 P ₁₀ = 8 Q ₁ = 9 Median = 11 Q ₃ = 14 P ₉₀ = 20 P ₉₉ = 65																									
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-Mar	18	14	10	9	9	8	10	9	17	12	12	22	28	37	24	13	14	9	5	11	12	19	17	7	37
2-Mar	6	11	6	7	7	8	8	6	6	8	10	12	14	21	15	13	11	9	10	9	10	9	10	9	21
3-Mar	8	8	8	8	9	8	10	8	8	9	9	13	12	15	11	17	14	17	16	13	13	14	13	13	17
4-Mar	14	15	14	13	13	15	13	13	13	13	12	14	15	14	16	16	13	13	10	10	10	9	13	10	16
5-Mar	9	11	24	10	44	50	27	9	12	13	14	17	17	33	28	27	19	66	17	17	14	39	36	24	66
6-Mar	16	11	11	10	11	10	12	13	12	13	14	14	12	13	14	15	14	14	14	14	14	16	15	16	16
7-Mar	14	14	14	16	13	15	15	14	13	12	12	12	14	13	14	13	14	13	10	13	12	13	15	11	16
8-Mar	12	12	9	8	13	9	9	10	12	13	15	18	18	18	18	16	14	13	9	10	9	8	6	16	18
9-Mar	36	13	22	10	12	11	12	10	14	14	18	23	22	25	28	28	26	9	6	24	8	18	14	12	36
10-Mar	10	18	16	13	12	6	26	11	12	41	37	65	46	60	82	29	14	7	12	10	11	10	9	11	82
11-Mar	8	7	8	8	11	11	10	11	10	10	14	15	19	28	46	20	17	12	13	11	10	11	10	9	46
12-Mar	9	9	9	9	8	7	7	8	9	11	12	12	13	15	14	13	14	10	9	9	10	8	9	8	15
13-Mar	8	9	9	9	8	8	8	8	9	8	9	9	9	9	8	8	8	8	9	7	8	7	9	8	9
14-Mar	8	7	8	8	8	8	7	6	9	10	10	12	20	20	17	21	18	20	9	10	10	11	10	14	21
15-Mar	8	10	11	9	9	8	9	9	9	14	11	10	10	11	12	14	19	11	9	13	6	12	18	11	19
16-Mar	14	18	9	9	10	9	9	10	9	9	12	15	17	15	14	15	11	9	7	8	9	16	28	11	28
17-Mar	15	16	13	11	11	10	10	9	8	10	12	18	11	22	54	13	12	11	6	7	7	10	12	13	54
18-Mar	8	10	8	11	9	9	9	10	11	11	11	12	13	15	15	15	12	12	11	11	13	67	48	13	67
19-Mar	10	13	11	13	11	12	10	10	13	11	15	13	14	16	13	15	15	12	12	11	11	19	12	12	19
20-Mar	11	11	10	11	10	10	11	12	12	17	21	24	23	23	50	48	91	37	10	6	7	8	7	7	91
21-Mar	7	7	7	7	7	7	7	8	7	8	9	10	10	11	14	10	10	10	9	9	10	10	8	8	14
22-Mar	8	9	10	9	9	8	12	10	11	15	15	16	17	23	81	50	45	18	21	11	13	11	11	11	81
23-Mar	14	13	11	12	12	10	10	13	12	15	17	33	39	42	26	19	17	23	33	14	9	10	10	9	42
24-Mar	9	11	11	8	8	9	7	9	9	11	14	15	14	10	9	12	11	11	11	11	11	10	11	11	15
25-Mar	14	10	11	11	11	11	11	12	11	11	12	13	16	17	19	12	12	27	14	19	12	14	9	11	27
26-Mar	12	11	10	9	11	10	10	10	11	13	11	12	11	19	35	42	39	16	12	11	16	10	9	8	42
27-Mar	7	9	8	8	10	9	8	8	9	10	11	10	11	13	10	10	13	10	11	11	11	10	12	8	13
28-Mar	8	8	9	8	9	9	9	9	9	10	10	10	11	13	14	11	10	9	12	11	10	12	10	9	14
29-Mar	7	7	7	7	8	7	9	8	8	9	11	10	11	15	26	15	22	10	14	11	11	10	10	11	26
30-Mar	10	11	11	12	12	17	13	14	18	16	22	21	50	21	75	40	30	26	43	13	19	16	14	8	75
31-Mar	10	6	8	8	8	7	7	8	10	11	9	12	13	10	10	11	12	8	8	10	10	10	10	9	13
	36	18	24	16	44	50	27	14	18	41	37	65	50	60	82	50	91	66	43	24	19	67	48	24	
	Diurnal Maximum																								



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	March 6, 2017	Last Calibration	February 14, 2017
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:55	End Time (MST)	15:43
Gas Cert Reference	EY0000652	Station temp.	22 Deg C
Cal Gas Concentration	49 ppm	Cal Gas Exp Date	November 4, 2019
Calibrator Make/Model	API T700	Serial Number	996
ZAG Make/Model	API 701	Serial Number	201
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6466

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-606	-606
Analyzer IP address	192.168.1.43		Lamp voltage	810	811
Calculated slope	0.998546	0.999351	Chamber temp	42.5	44.9
Calculated intercept	-0.981910	-2.431625	Pressure	687.7	699.6
Analyzer Background	8.4	7.9	Flow	0.448	0.456
Analyzer Coefficient	0.973	0.963	Intensity	90	90

Analyzer make Thermo 43i Analyzer serial # 1410661308

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.5	----
as found span	5000	59.8	586.0	590.5	0.992
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	59.8	586.0	587.8	0.997
second point	5000	30.0	294.0	297.4	0.989
third point	5000	15.1	148.0	153.2	0.966
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	59.8	586.0	586.2	1.000
Average Correction Factor					0.984

Corrected As found 590.9 Previous response 587.9 % change -0.5%

Notes:

Switched off the analyzer briefly after the as founds. Inlet filter changed after as founds. Adjusted the zero and the span.

Calibration Performed By: Jayne Marcoux



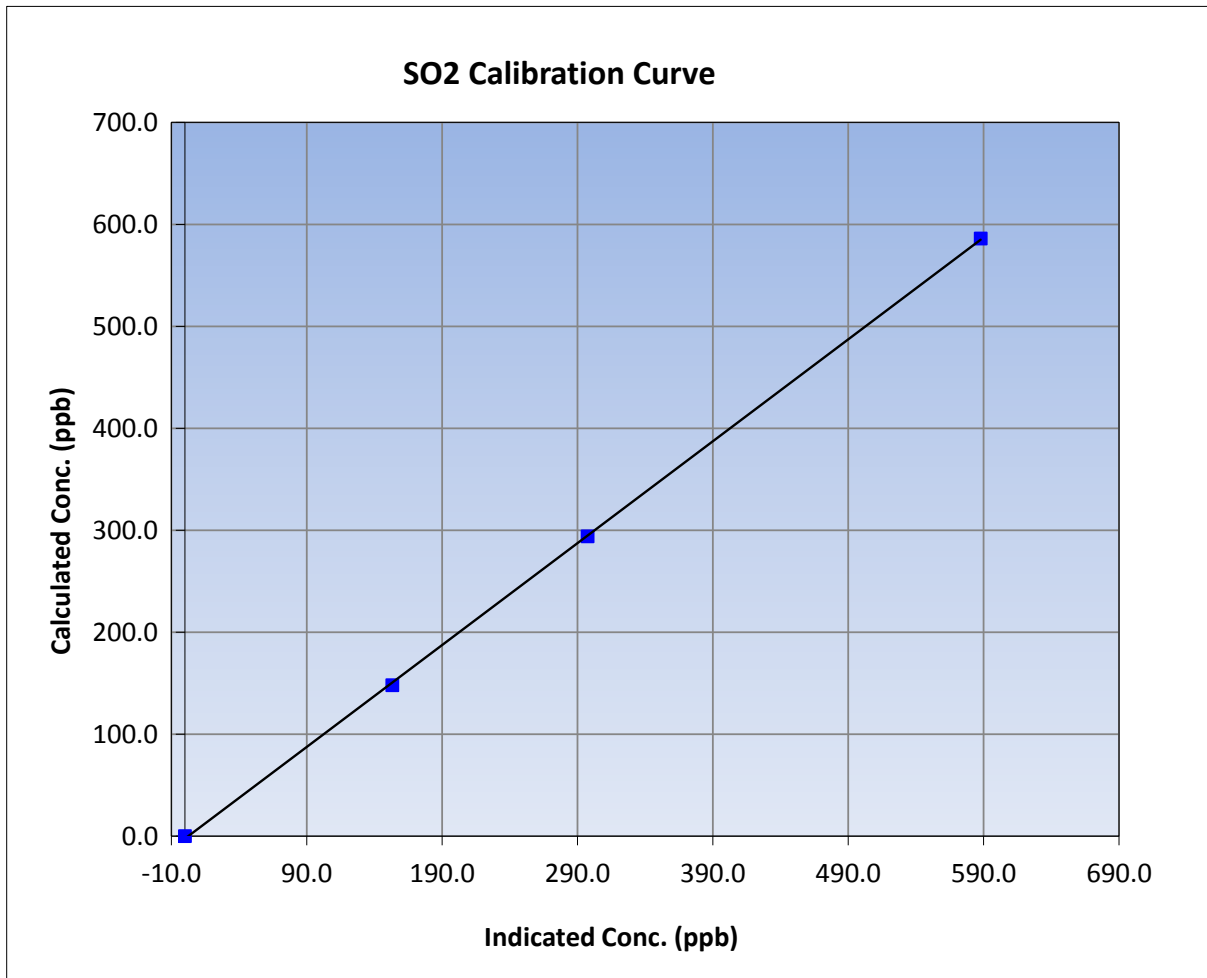
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 6, 2017	Previous Calibration	February 14, 2017
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:55	End Time (MST)	15:43
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

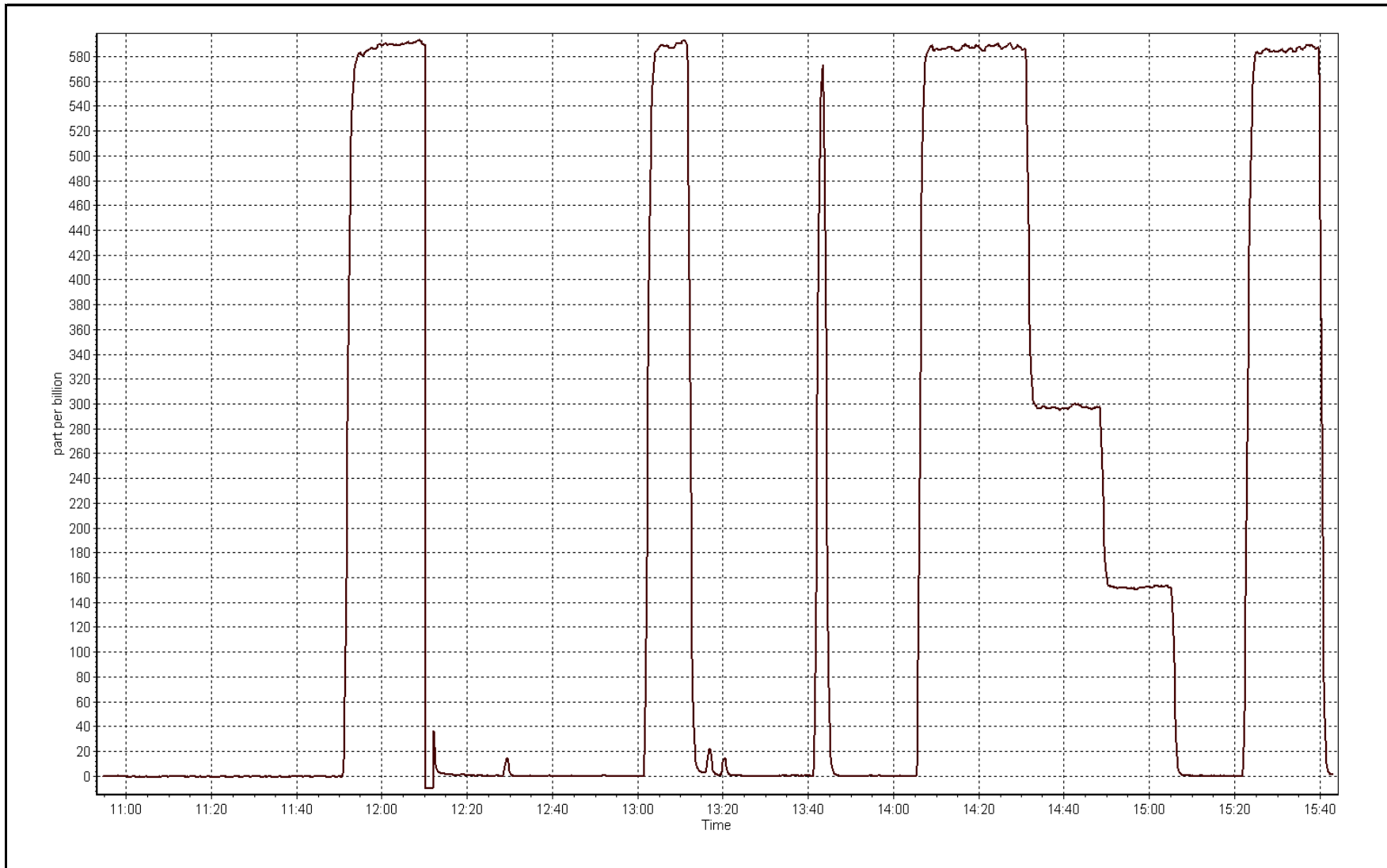
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999922
586.0	587.8	0.9971		
294.0	297.4	0.9886	Slope	0.999351
148.0	153.2	0.9659		
			Intercept	-2.431625



SO2 Calibration Plot

Date: March 6, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	March 24, 2017	Last Calibration	February 14, 2017
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:03	End Time (MST)	12:12
Gas Cert Reference	LL77486	Station temp.	22 Deg C
Cal Gas Concentration	5.3 ppm	Cal Gas Exp Date	February 13, 2018
Calibrator Make/Model	API T700	Serial Number	996
ZAG air Make/Model	API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	Serial Number	6466
SO2 gas concentration	49 ppm	SO2 gas cert/exp	EY0000652 February-14-17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-573.5	-573.5
Analyzer IP address	192.168.1.45		Lamp voltage	935	933
Calculated slope	1.004780	1.007499	Chamber temp	45.1	45.0
Calculated intercept	-0.402816	-0.445986	Pressure	538.3	534.0
Analyzer Background	13.7	13.7	Flow	0.949	0.954
Analyzer Coefficient	1.157	1.157	Intensity	86	86
			Converter temp.	335	335

Analyzer make/model	Thermo 450i	Analyzer serial #	815129098
Converter make/model	NA	Converter serial #	NA

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	75.6	80.1	79.8	1.005
SO2 scrubber check	5000	15.1	148.0	1.4	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	75.6	80.1	79.8	1.005
second point	5000	37.8	40.1	40.6	0.987
third point	5000	19.0	20.1	20.6	0.979
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	75.6	80.1	80.1	1.000
Average Correction Factor					0.990

Corrected As found	79.6	Previous response	80.2	% change	0.7%
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Notes:

Changed inlet filter after as founds. No adjustments made.

Calibration Performed By: Jayme Marcoux



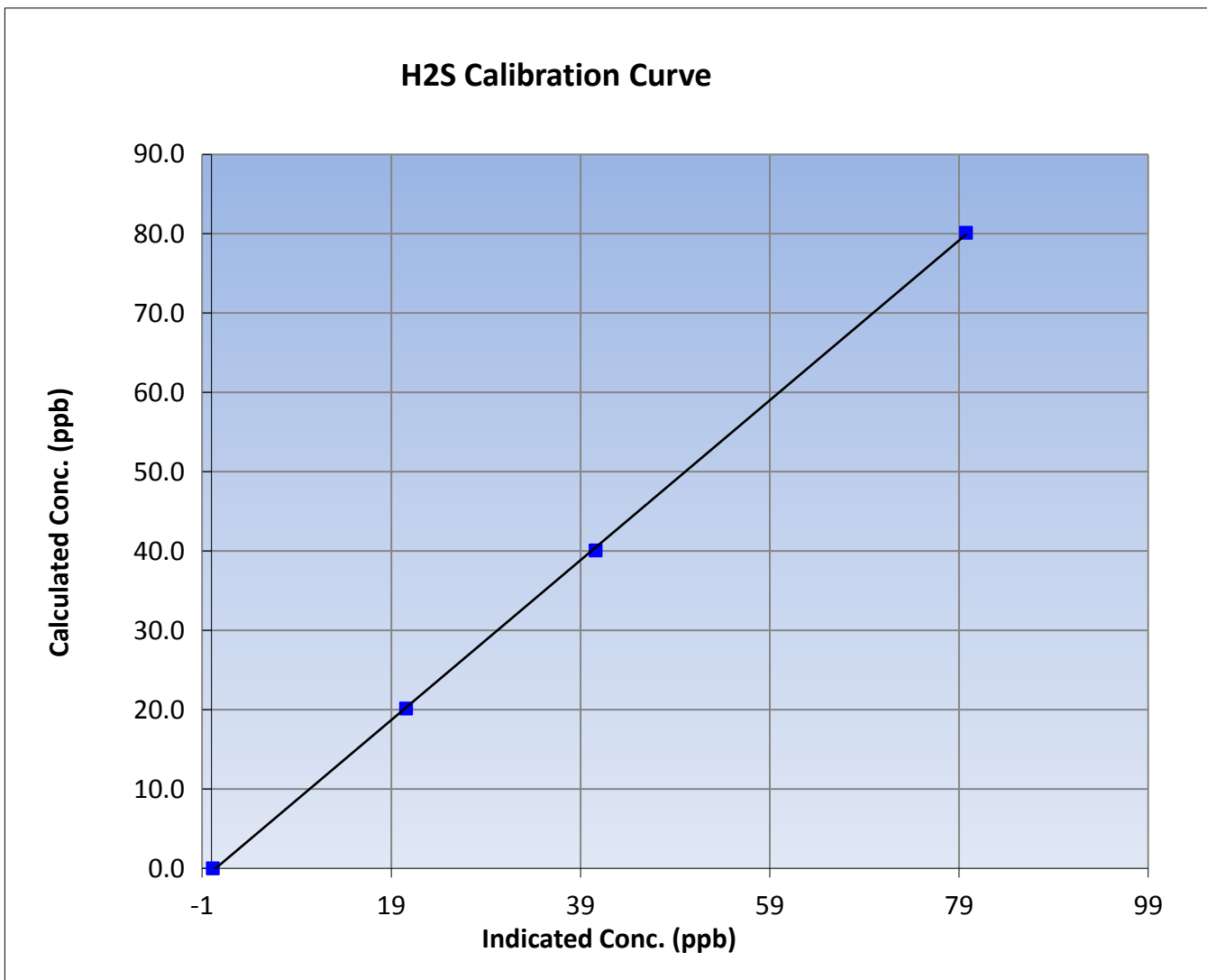
Wood Buffalo Environmental Association H2S Calibration Report

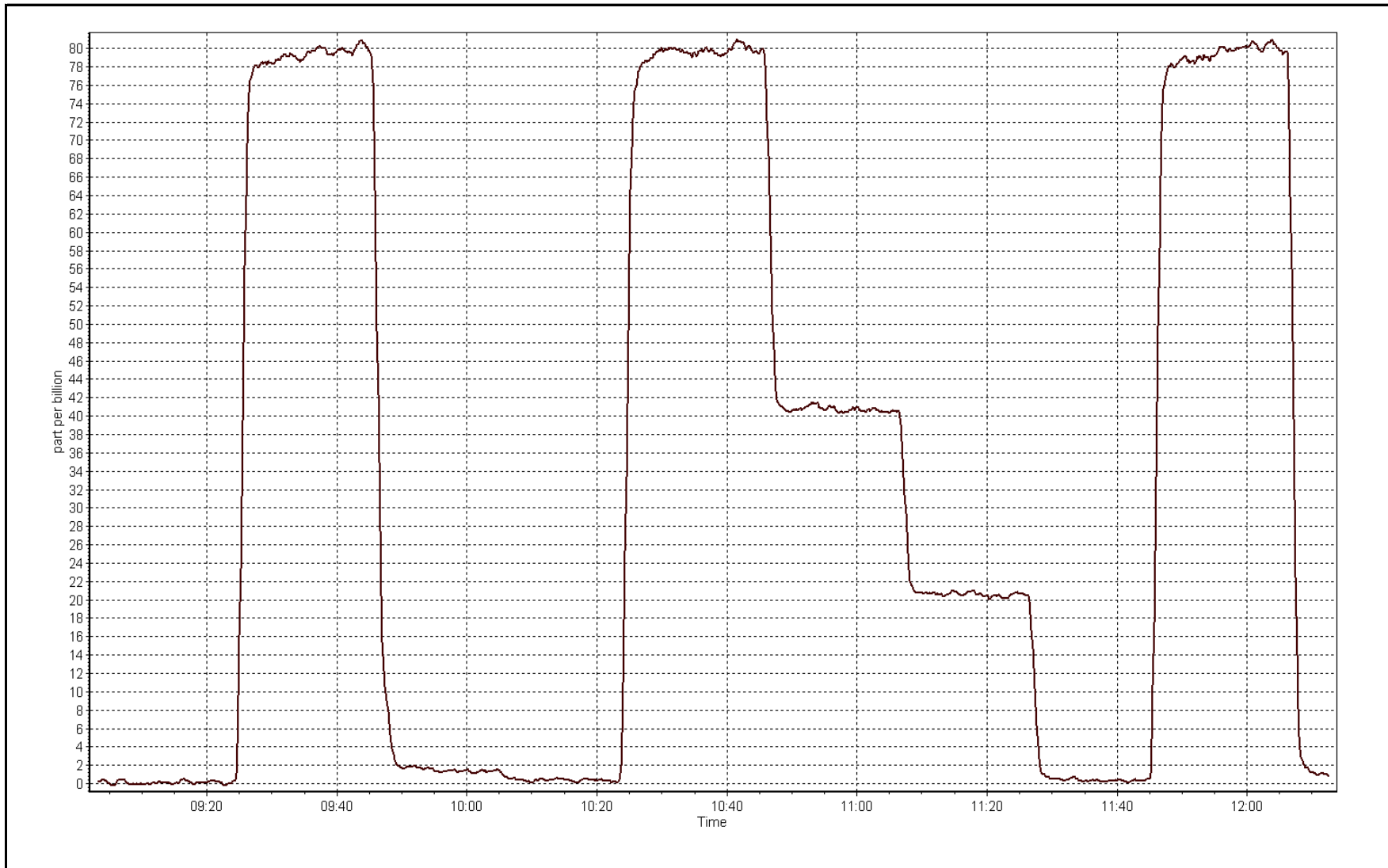
Station Information

Calibration Date	March 24, 2017	Previous Calibration	February 14, 2017
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:03	End Time (MST)	12:12
Analyzer make	Thermo 450i	Analyzer serial #	815129098

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999911
80.1	79.8	1.0048		
40.1	40.6	0.9869	Slope	1.007499
20.1	20.6	0.9791		
			Intercept	-0.445986







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	March 6, 2017	Last Calibration	February 14, 2017
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:55	End Time (MST)	15:41
Gas Cert Reference	EY0000652	Cal Gas Expiry Date	November 4, 2019
CH4 Cal Gas Conc.	513 ppm	CH4 Equiv Conc.	1057.5 ppm
C3H8 Cal Gas Conc.	198 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	996
ZAG make/model	Teledyne API 701	Serial Number	201
DACS make/model	Campbell Scientific CR3000	Serial Number	6466

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.9	34.9
Calculated slope	0.997099	0.996051	Fuel Pressure	23.0	22.9
Calculated intercept	-0.039658	-0.018847	Analyzer Coeff	3.723	3.625
			Analyzer BKG	5.22	1.84

Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.01	----
as found span	5000	59.8	12.65	11.44	1.106
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	59.8	12.65	12.72	0.994
second point	5000	30.0	6.35	6.37	0.996
third point	5000	15.1	3.19	3.25	0.983
as left zero	5000	0.0	0.00	0.01	----
as left span	5000	59.8	12.65	12.70	0.996
Average Correction Factor					0.991

Corrected As found	11.45	Previous response	12.72	% change	11.1%
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Notes:

Replaced zero air generator. As found span was low. Replaced the pump. Span was low after pump change. Coefficient values were very different after a small zero adjustment. Completed input board calibration. Inlet filter changed after as founds. Adjusted the zero and span.

Calibration Performed By:

Jayme Marcoux



Wood Buffalo Environmental Association THC Calibration Report

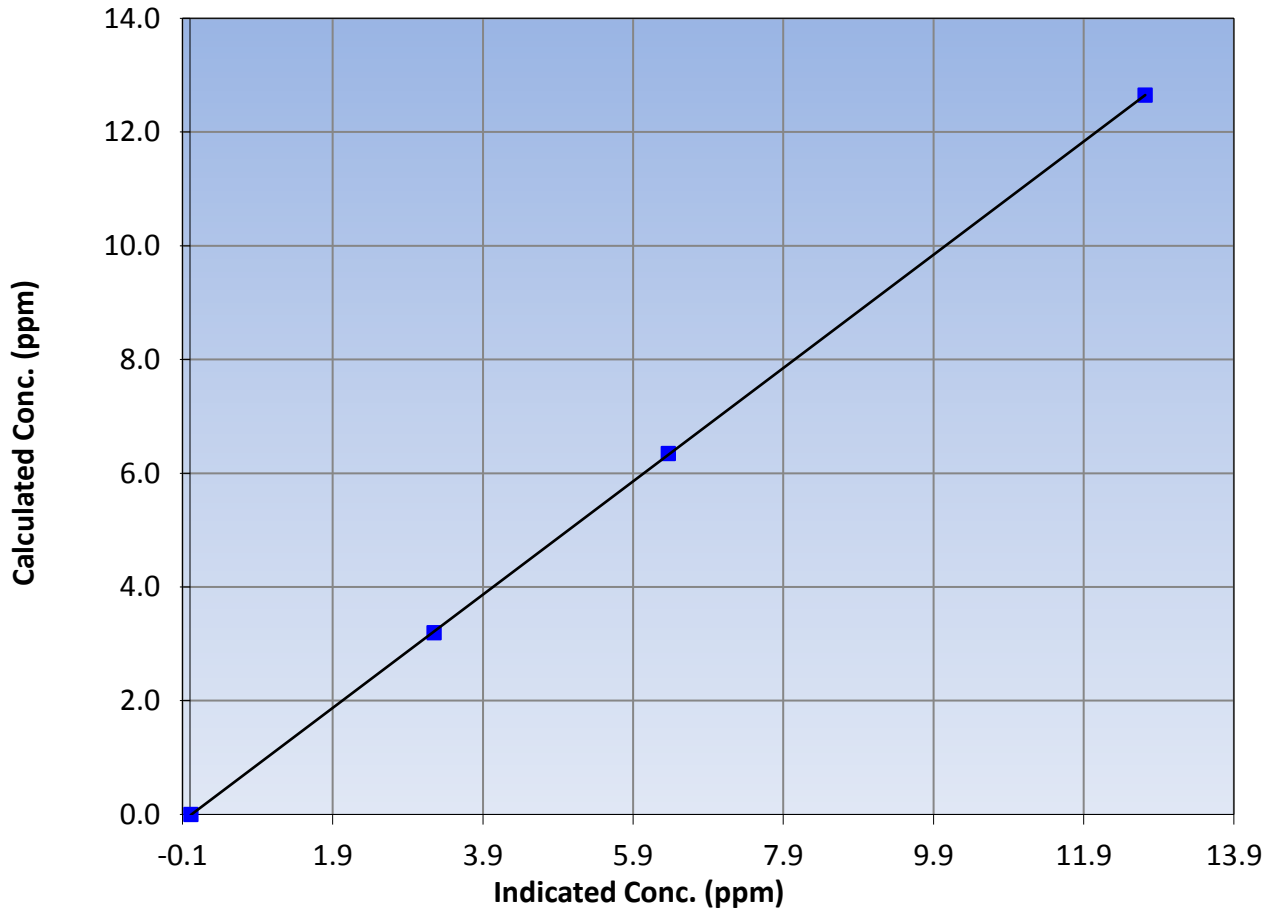
Station Information

Calibration Date	March 6, 2017	Previous Calibration	February 14, 2017
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:55	End Time (MST)	15:41
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

Calibration Data

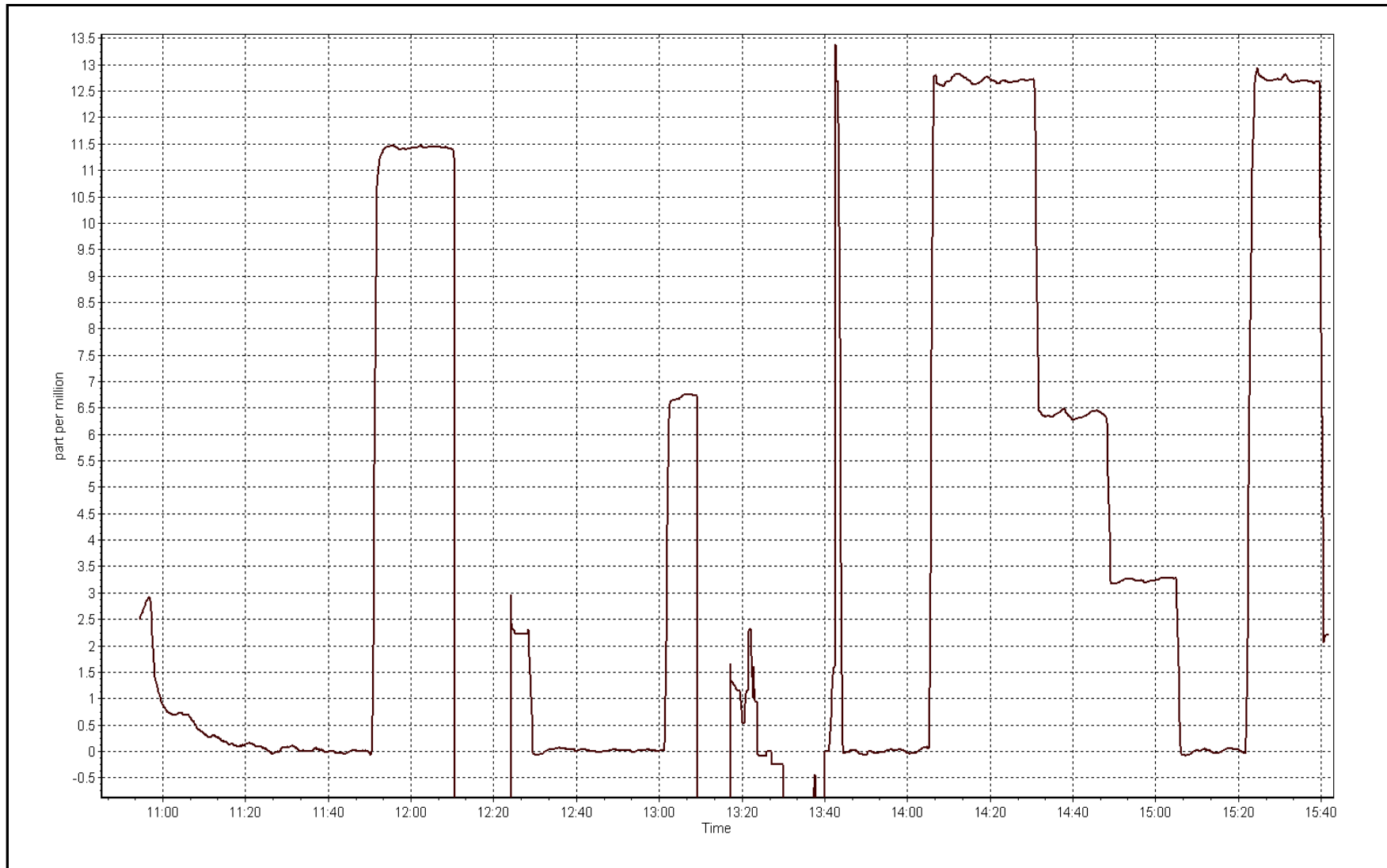
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999988
12.65	12.72	0.9943		
6.35	6.37	0.9961	Slope	0.996051
3.19	3.25	0.9827		
			Intercept	-0.018847

THC Calibration Curve



THC Calibration Plot

Date: March 6, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 23, 2017	Previous Calibration	February 14, 2017
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	8:49	End Time (MST)	12:57
NO Cal Gas Conc	50.2 ppm	Gas Cert Reference	EY0000652
NOx Cal Gas Conc	50.2 ppm	Cal Gas Expiry Date	November 4, 2017
Calibrator	API T700	Serial Number	996
Zero air Generator	Teledyne API T701	Serial Number	4891

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	6466
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.001447	1.000470	0.996683
	Data Offset	-1.513527	-1.370273	-0.255995
Current Calibration	Data Slope	1.003685	1.003036	0.997718
	Data Offset	-1.774161	-1.640401	1.224732

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661309
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.933		0.942	
NOx coefficient	1.000		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	4.1		4.1	
NOx bkgrnd	4.1		4.2	
Chamber Temp	50.7	Deg C	50.6	Deg C
Moly Temp	322.4	Deg C	327.6	Deg C
PMT voltage	-780.3	V	-780.3	V
PMT Temp	-2.7	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	160.5	mmHg	163.6	mmHg
R Cell Press Nox	150.8	mmHg	163.6	mmHg
NO sample flow	0.622	lpm	0.630	lpm
Nox sample Flow	0.621	lpm	0.628	lpm

Notes:

Inlet filter changed after as founds. Adjusted the span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

March 23, 2017

Station Number:

AMS 19

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as found span	5000	59.8	600.4	600.4	0.0	595.5	594.9	0.6	1.0082	1.0092
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	5000	59.8	600.4	600.4	0.0	598.8	599.2	-0.4	1.0027	1.0021
second point	5000	30.0	301.2	301.2	0.0	303.3	303.3	0.1	0.9930	0.9932
third point	5000	15.1	151.6	151.6	0.0	154.4	154.3	0.2	0.9818	0.9827
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.6	0.0	----	----
as left span	5000	59.8	600.4	285.0	315.4	596.4	280.4	316.0	1.0068	1.0163
Average Correction Factor									0.9925	0.9927

Corrced As found NO_x= 595.7 NO= 595.1 Percent Change NO_x= 0.9% NO= 1.1%
 Previous Response NO_x= 601.0 NO= 601.5

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 59.80 ccm NOx ref calc conc = 600.4 ppb NO ref calc conc = 600.4 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	597.7	597.0	0.0	1.0045	1.0057	----	----
1st NO2 (300)	285.0	312.0	597.6	285.0	312.6	1.0047	----	0.9980	100.2%
2nd NO2 (200)	385.1	211.9	595.5	385.1	210.1	1.0083	----	1.0084	99.2%
3rd NO2 (100)	486.8	110.1	594.6	486.8	107.8	1.0097	----	1.0215	97.9%
2nd NO ref point	----	0.0	593.8	593.3	0.5	1.0111	1.0120	----	----
Average Correction Factor						1.0084		1.0093	99.1%

Calibration Performed By: Jayne Marcoux



Wood Buffalo Environmental Association

NO_x Calibration Summary

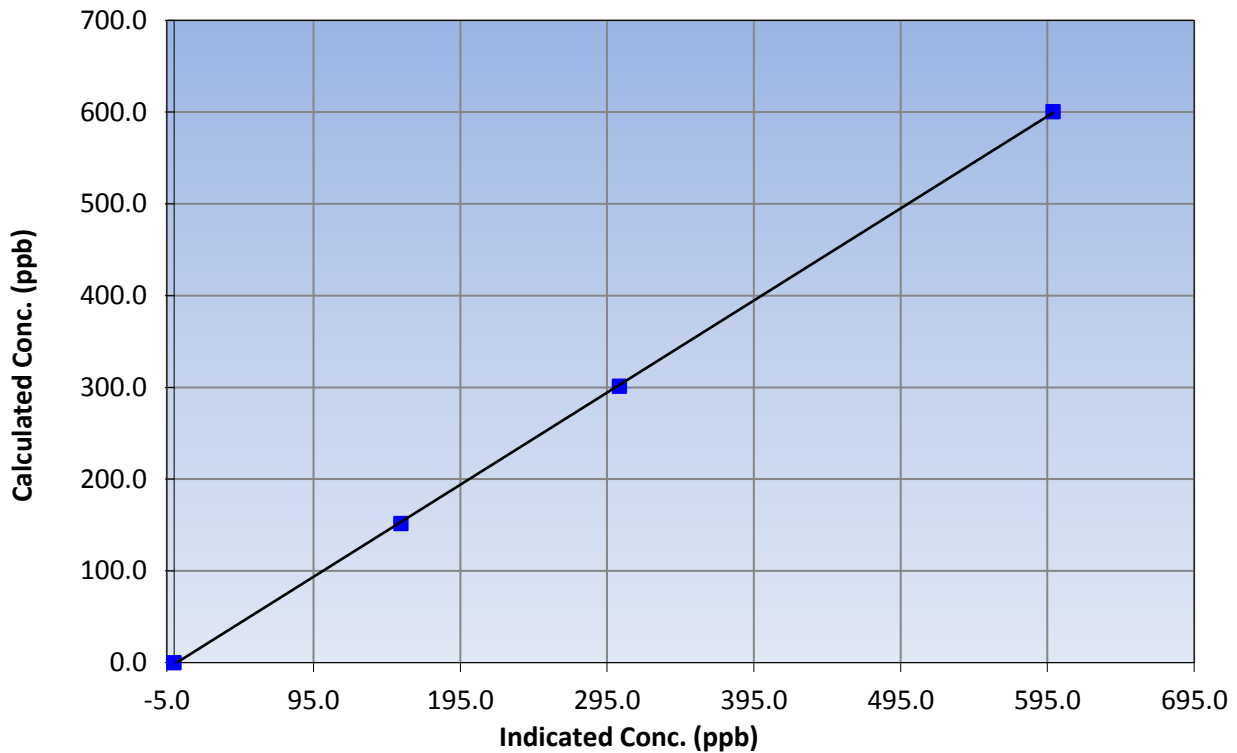
Station Information

Calibration Date	March 23, 2017	Previous Calibration	February 14, 2017
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	8:49	End Time (MST)	12:57
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999951
600.4	598.8	1.0027		
301.2	303.3	0.9930	Slope	1.003685
151.6	154.4	0.9818		
			Intercept	-1.774161

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

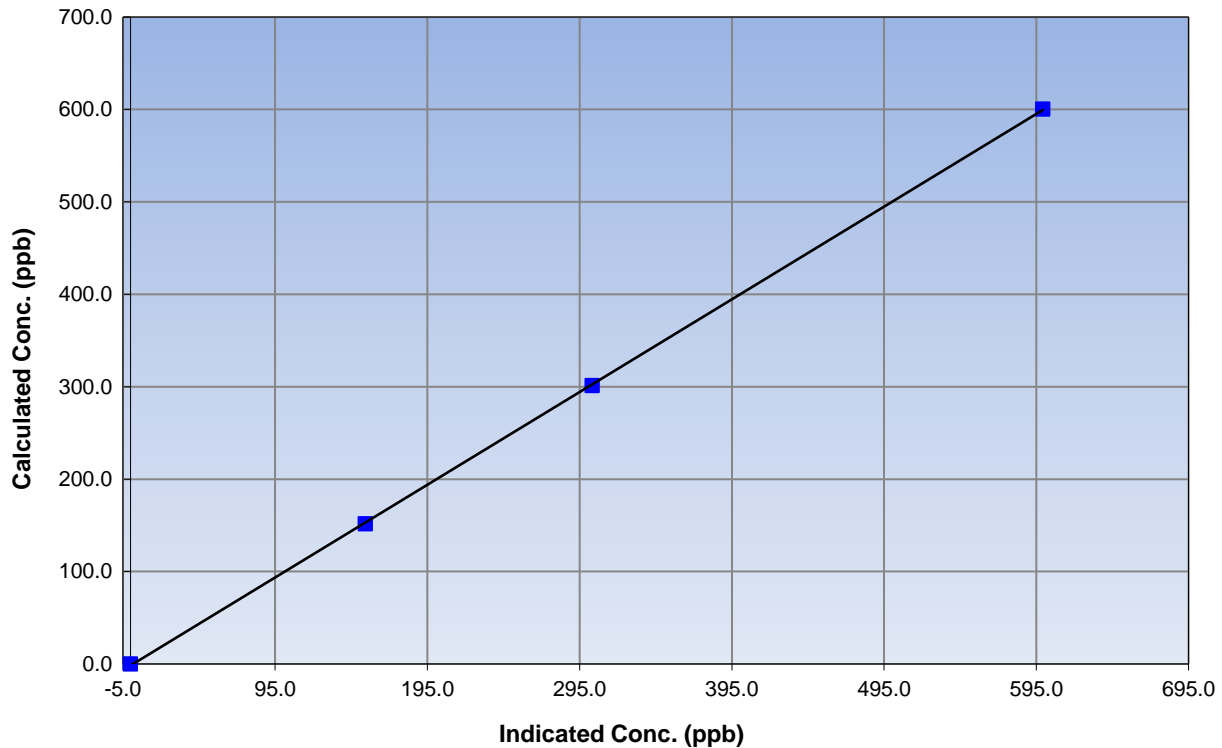
Station Information

Calibration Date	March 23, 2017	Previous Calibration	February 14, 2017
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	8:49	End Time (MST)	12:57
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999958
600.4	599.2	1.0021		
301.2	303.3	0.9932	Slope	1.003036
151.6	154.3	0.9827		
			Intercept	-1.640401

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

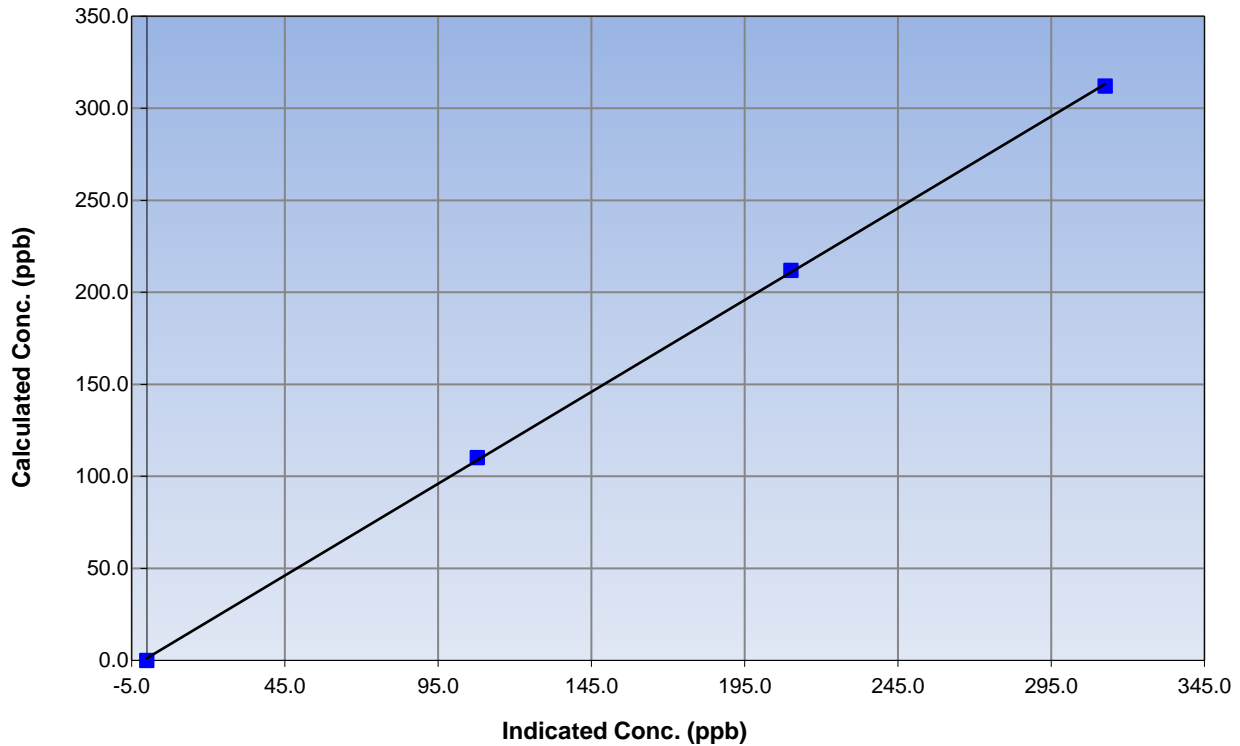
Station Information

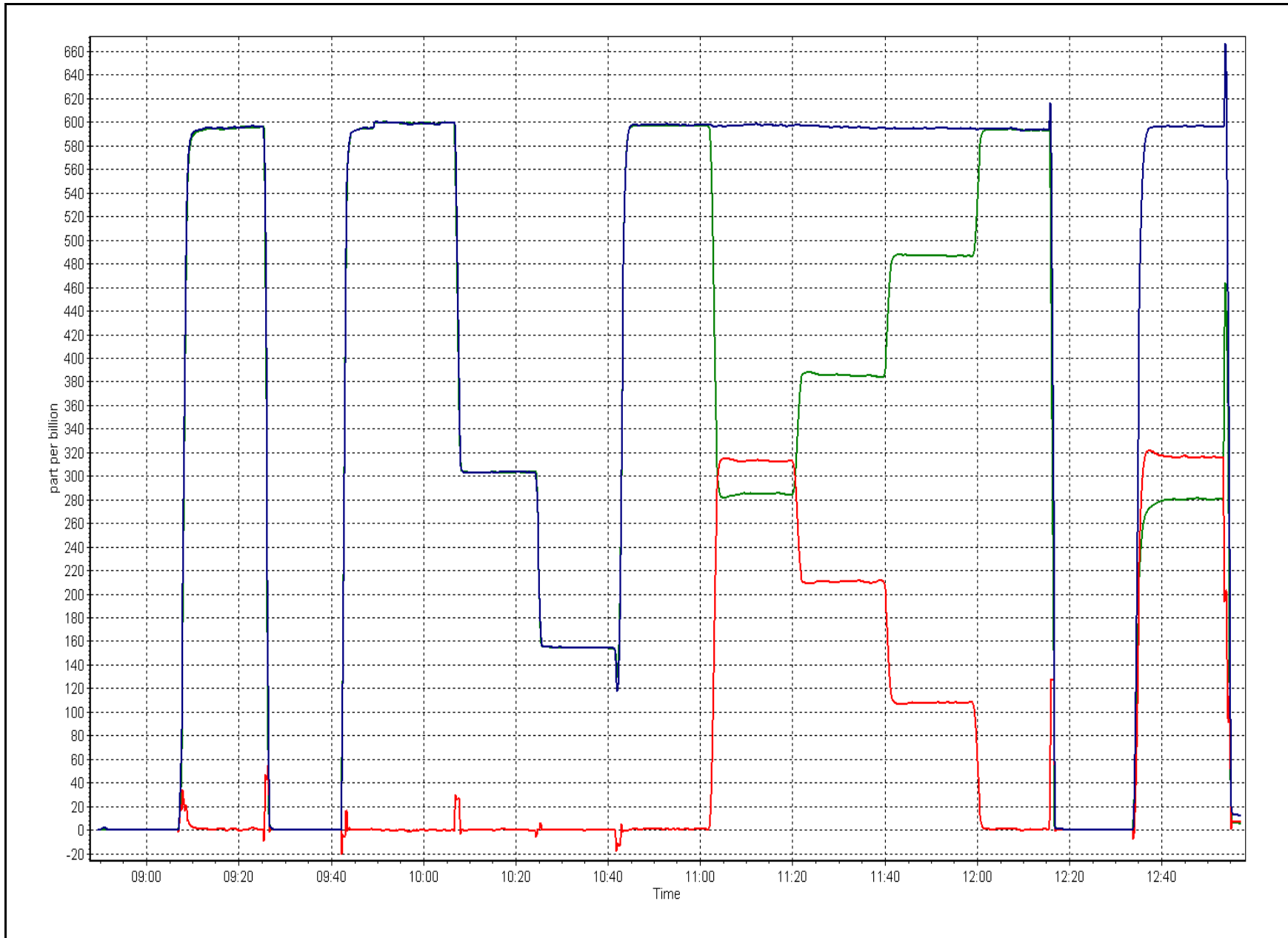
Calibration Date	March 23, 2017	Previous Calibration	February 14, 2017
Station Number	Firebag	Station Number	AMS 19
Start Time (MST)	8:49	End Time (MST)	12:57
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999895
312.0	312.6	0.9980		
211.9	210.1	1.0084	Slope	0.997718
110.1	107.8	1.0215		
			Intercept	1.224732

NO₂ Calibration Curve







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 20
BRION MACKAY RIVER
MARCH 2017

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MACKAY RIVER (AMS 20)
MARCH 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	14	0	4	0
H2S (ppb) Average	710	34	34	100	1	0	1	0
THC (ppm) Average	707	37	37	100	2.7	-	2.4	-
NO2 (ppb) Average	707	37	37	100	32	0	13	-
NO (ppb) Average	707	37	37	100	17	-	3	-
NOX (ppb) Average	707	37	37	100	37	-	16	-
Temperature 2 m (C) Average	744	0	0	100	12	-	6	-
Relative Humidity (%) Average	744	0	0	100	99	-	91	-
Precipitation (mm) Total	743	0	1	99.87	1.9	-	3.3	-
Wind Speed 10 m (km/h) Average	734	0	10	98.66	20	-	15	-
Wind Direction 10 m (deg) Average	734	0	10	98.66	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
MARCH 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	0.9	2	-	0	0	0	0	1	2	14
H2S (ppb) Average	710	0.3	0	-	0	0	0	0	0	1	1
THC (ppm) Average	707	2.26	0.1	-	2.1	2.2	2.2	2.2	2.3	2.4	2.7
NO2 (ppb) Average	707	3.9	5	-	0	1	1	2	5	11	32
NO (ppb) Average	707	0.4	1	-	0	0	0	0	0	1	17
NOX (ppb) Average	707	4.4	6	-	0	1	1	2	5	11	37
Temperature 2 m (C) Average	744	-8.63	10.9	-	-35.1	-23.5	-17.3	-7	0	4.1	12
Relative Humidity (%) Average	744	68.2	17	-	23	43	56	70	81	93	99
Precipitation (mm) Total	743	-	-	8.63	-	-	-	-	-	-	-
Wind Speed 10 m (km/h) Average	734	7	4	-	0	2	4	7	9	13	20
Wind Direction 10 m (deg) Average	734	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Precipitation Collector	18 Mar 2017 17:00	18 Mar 2017 17:00	1	Data logger program uploaded - data not recorded
Wind Speed, Wind Direction	05 Mar 2017 22:00	05 Mar 2017 23:00	2	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	08 Mar 2017 04:00	08 Mar 2017 04:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	27 Mar 2017 05:00	27 Mar 2017 09:00	5	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	30 Mar 2017 06:00	30 Mar 2017 07:00	2	Flat line in sensor output signal - sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Brion MacKay River - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 14 ppb on Mar 22 19:00	Maximum Daily Average: 3.6 ppb on Mar 16		Hours of Data:	707
Minimum Value: 0 ppb on Mar 4 11:00	Minimum Daily Average: 0.0 ppb on Mar 19		Hours of Missing Data:	37
Maximum Diurnal Average: 1.8 ppb at hour 21	Minimum Diurnal Average: 0.3 ppb at hour 5		Hours of Calibration:	37
Monthly Average: 0.9 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 9		Percent Operational Time:	100.0

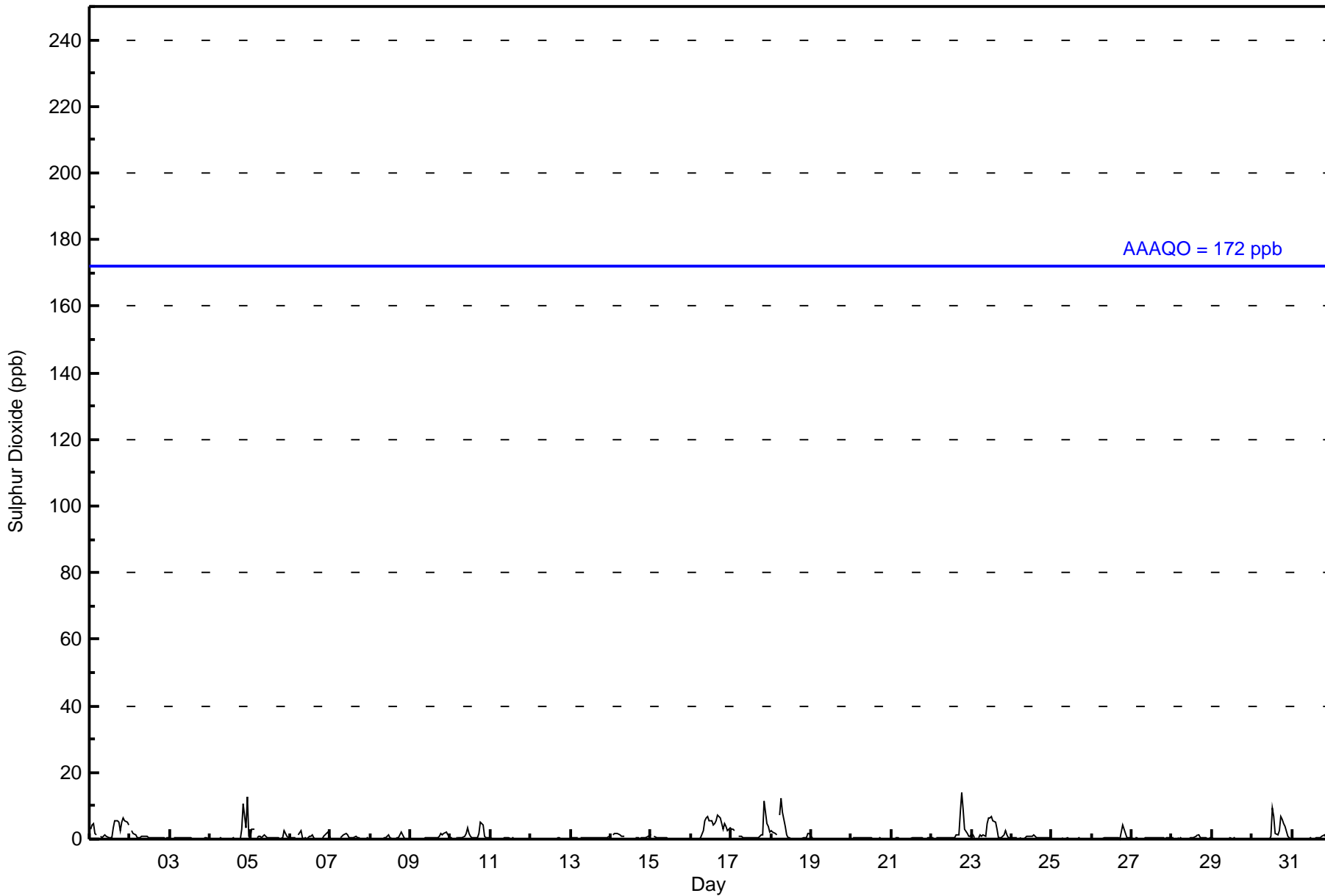
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	3	4	5	2	1	Z	1	1	1	1	1	1	0	0	4	6	5	5	3	5	6	5	5	4	3.0	6
2-Mar	Z	2	2	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0.7	2
3-Mar	0	Z	1	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	11	3	13	1	1.4	13
5-Mar	0	3	3	Z	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	2	2	1	0	0.8	3
6-Mar	0	0	0	0	Z	1	3	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	2	1	0.7	3
7-Mar	0	0	0	0	0	Z	0	1	1	2	1	0	0	1	0	1	1	0	0	0	0	0	0	0	0.5	2
8-Mar	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	2	1	0	0	0	0	0.4	2
9-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	2	1	2	2	1	1	0.6	2
10-Mar	0	0	Z	0	0	0	0	1	1	2	3	2	1	0	1	0	0	2	5	4	1	0	0	0	1.1	5
11-Mar	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-Mar	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
13-Mar	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	1	1	0.4	1
14-Mar	Z	1	2	2	1	1	1	1	1	1	C	C	C	C	C	C	0	0	0	0	0	0	1	1	--	2
15-Mar	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
16-Mar	0	0	Z	0	0	0	0	3	5	6	7	6	5	4	5	5	7	6	5	3	4	4	3	4	3.6	7
17-Mar	3	3	3	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	12	5	4	2	1.7	12
18-Mar	2	2	2	1	Z	7	12	8	4	1	0	0	0	0	0	0	0	0	0	0	1	0	2	2	2.0	12
19-Mar	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
20-Mar	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
21-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.2	1
22-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	8	14	9	3	2	1	1	1.9	14
23-Mar	2	1	0	Z	0	1	1	1	1	5	6	6	7	6	5	3	0	0	0	1	2	1	1	0	2.3	7
24-Mar	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1
25-Mar	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
26-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	2	0	0	0	0.6	4
27-Mar	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
28-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.4	1
29-Mar	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
30-Mar	0	0	0	0	Z	0	0	0	0	0	0	1	9	7	2	1	3	7	6	5	4	1	0	0	2.0	9
31-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0.3	1
	0.6	0.8	0.8	0.4	0.3	0.6	0.8	0.6	0.7	0.8	0.9	0.8	1.0	0.9	0.8	0.8	0.8	1.1	1.5	1.4	1.8	1.0	1.2	0.7	Diurnal Average	
	3	4	5	2	1	7	12	8	5	6	7	6	9	7	5	6	7	8	14	9	12	5	13	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
Brion MacKay River - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Brion MacKay River - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	702	99.29	99.29
11 - 20	5	0.71	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
Brion MacKay River - March 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	29	62	80	40	47	103	86	68	43	29	8	6	19	23	26	23	692
11 - 20	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	5
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	29	63	82	42	47	103	86	68	43	29	8	6	19	23	26	23	697

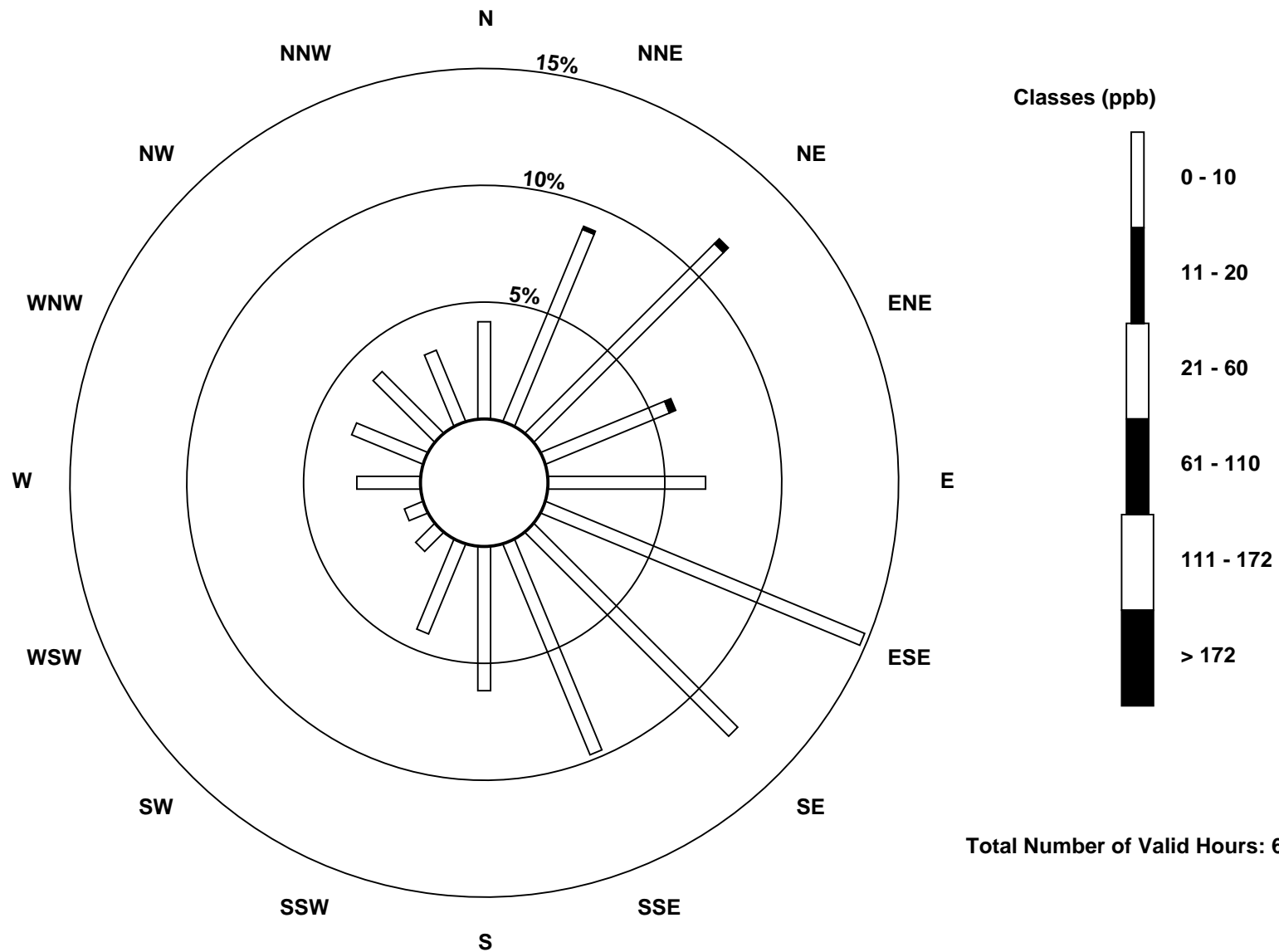
Total Number of Valid Hours: 697

Total Number of Hours: 744

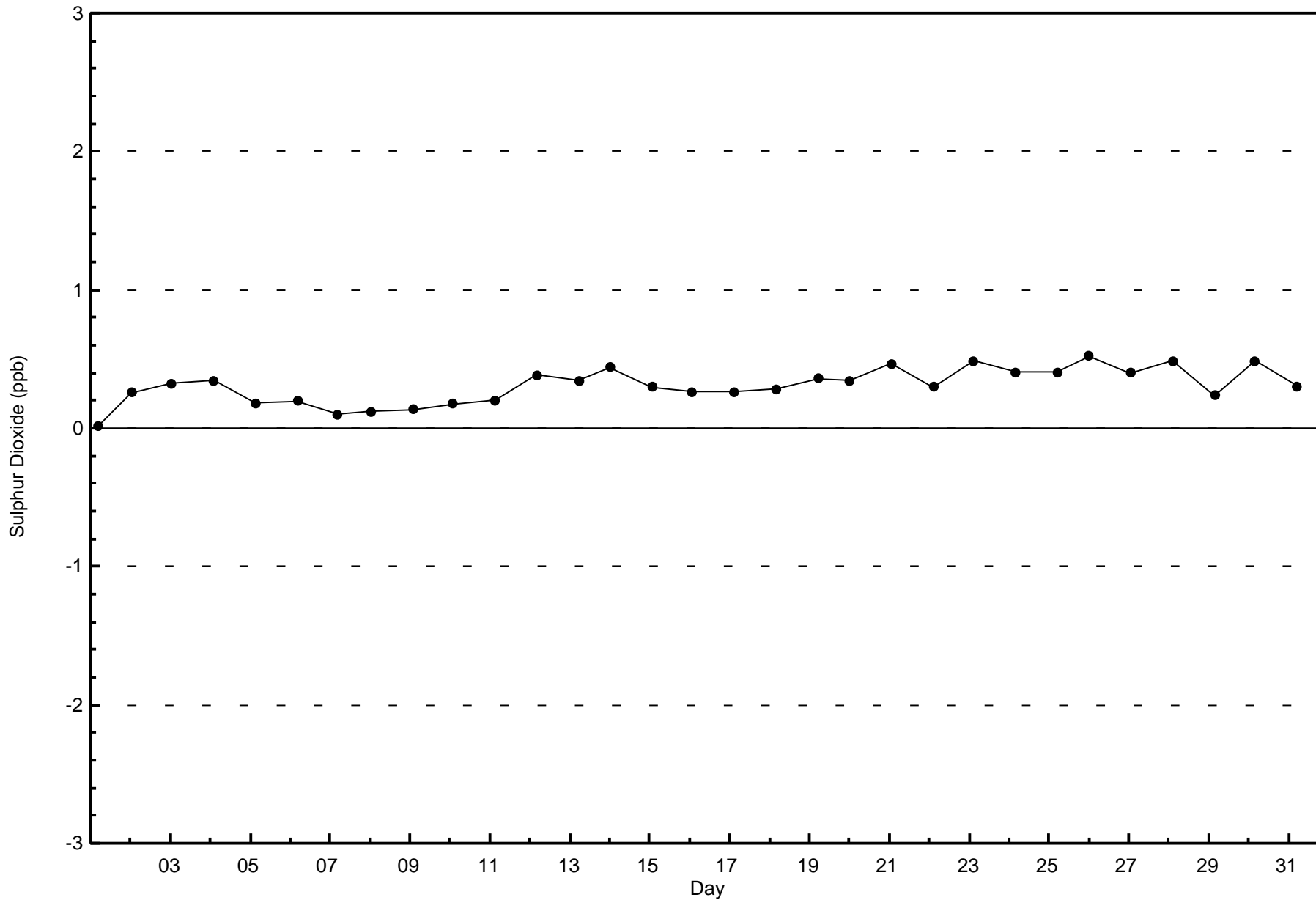


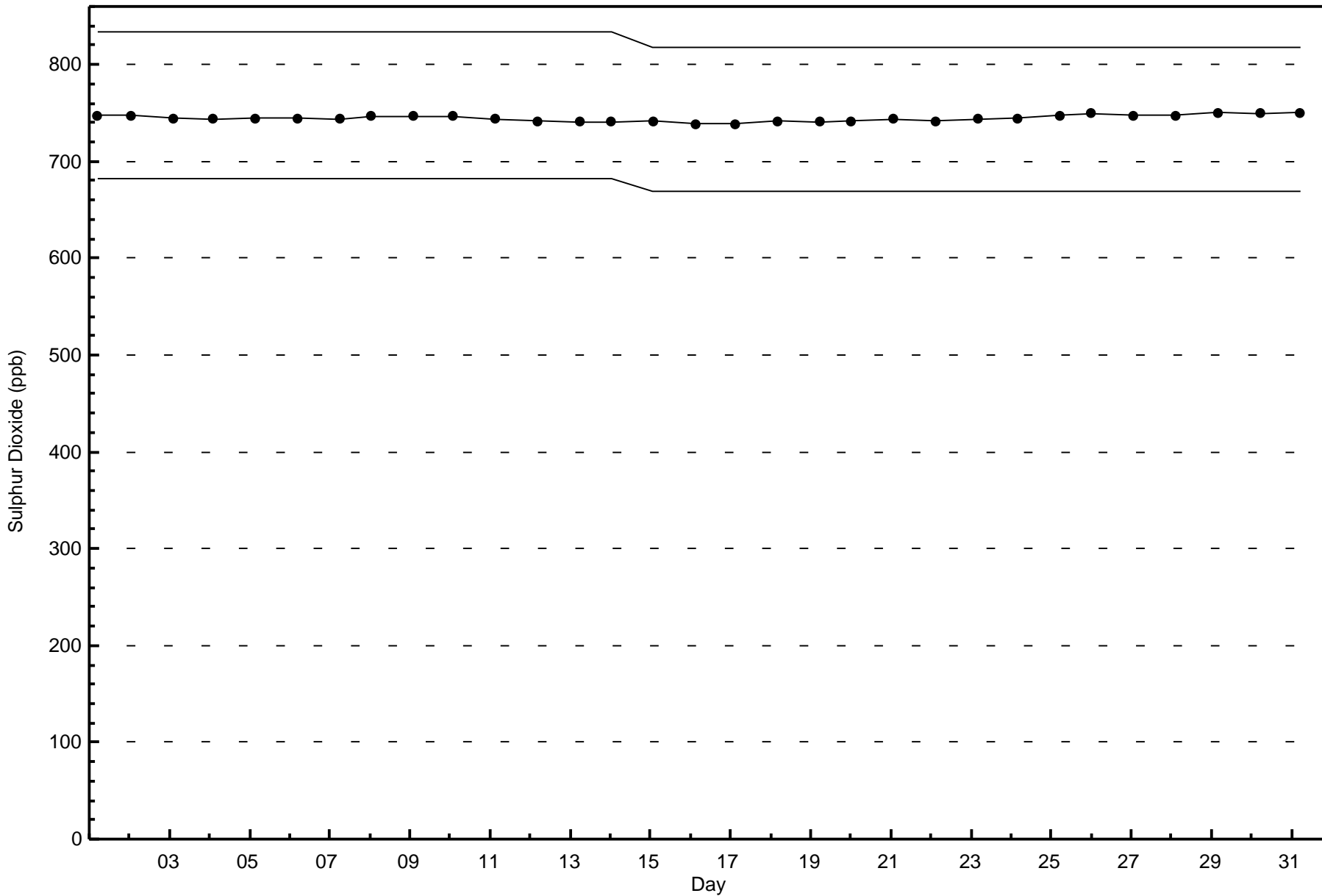
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Sulphur Dioxide (SO₂) - ppb
Brion MacKay River (AMS 20)



Total Number of Valid Hours: 697







Wood Buffalo Environmental Association
Summary of Hour Averages

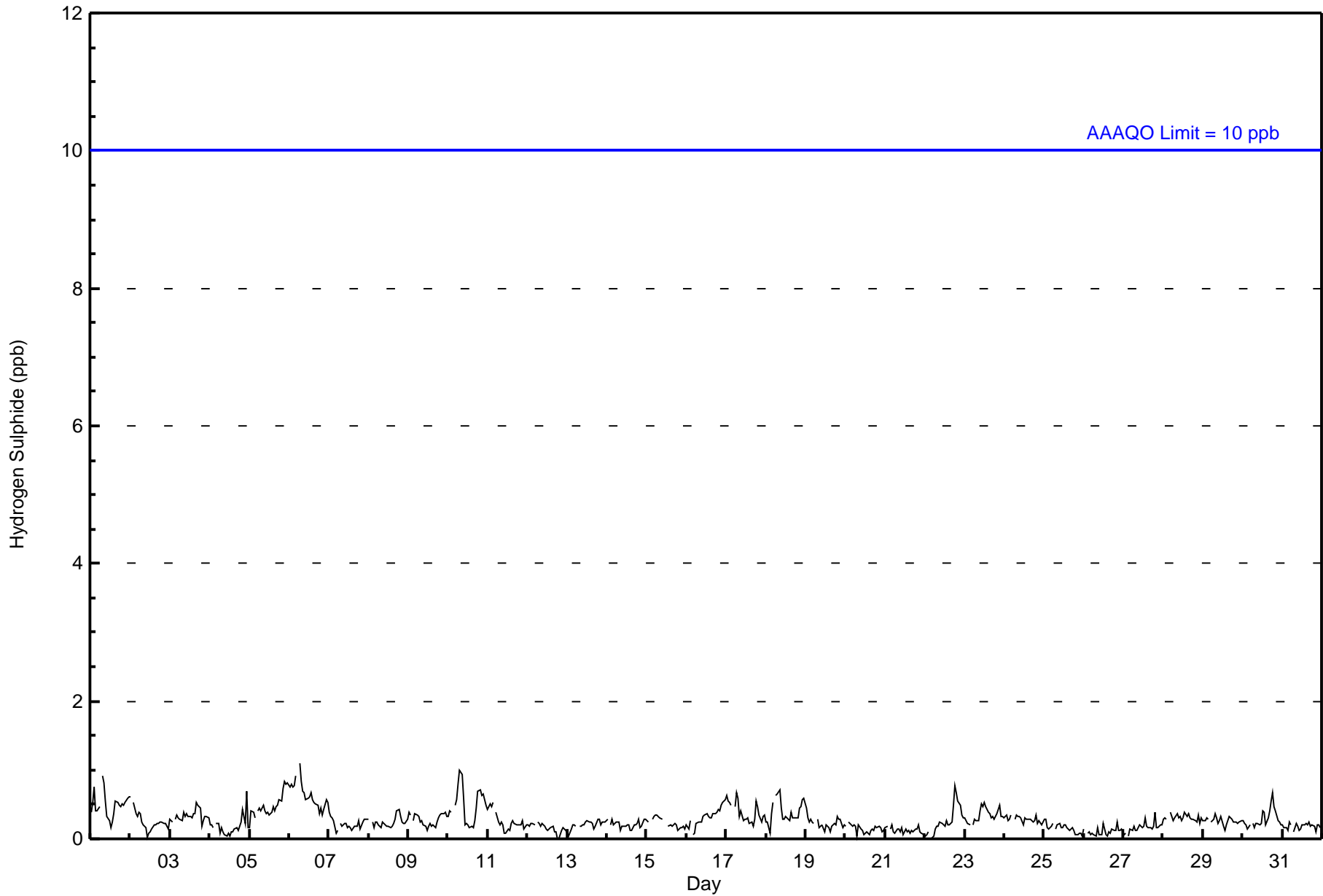
Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 1 ppb on Mar 6 07:00 Maximum Daily Average: 0.6 ppb on Mar 6																	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 Mar 12 19:00 Minimum Daily Average: 0.1 ppb on Mar 26 Maximum Diurnal Average: 0.3 ppb at hour 7 Minimum Diurnal Average: 0.2 ppb at hour 12 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																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0	1	1	0	0	0	Z	1	1	1	0	0	0	0	0	1	1	0	0	1	0	1	1	1	0.5	1
2-Mar	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
3-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	1
4-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1
5-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.5	1
6-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	0.6	1
7-Mar	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
8-Mar	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
9-Mar	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
10-Mar	0	0	0	Z	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0.5	1
11-Mar	0	1	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Mar	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
13-Mar	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
14-Mar	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
15-Mar	0	0	Z	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
17-Mar	1	1	1	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.4	1
18-Mar	0	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
19-Mar	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-Mar	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
21-Mar	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
22-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0.3	1
23-Mar	0	0	0	0	Z	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
24-Mar	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-Mar	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-Mar	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
27-Mar	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
28-Mar	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
29-Mar	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-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.3	1
31-Mar	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
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3																								Diurnal Average		
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
Brion MacKay River - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - March 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
Brion MacKay River - March 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	29	60	85	40	47	106	85	69	45	31	10	5	16	23	27	23	701
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	29	60	85	40	47	106	85	69	45	31	10	5	16	23	27	23	701

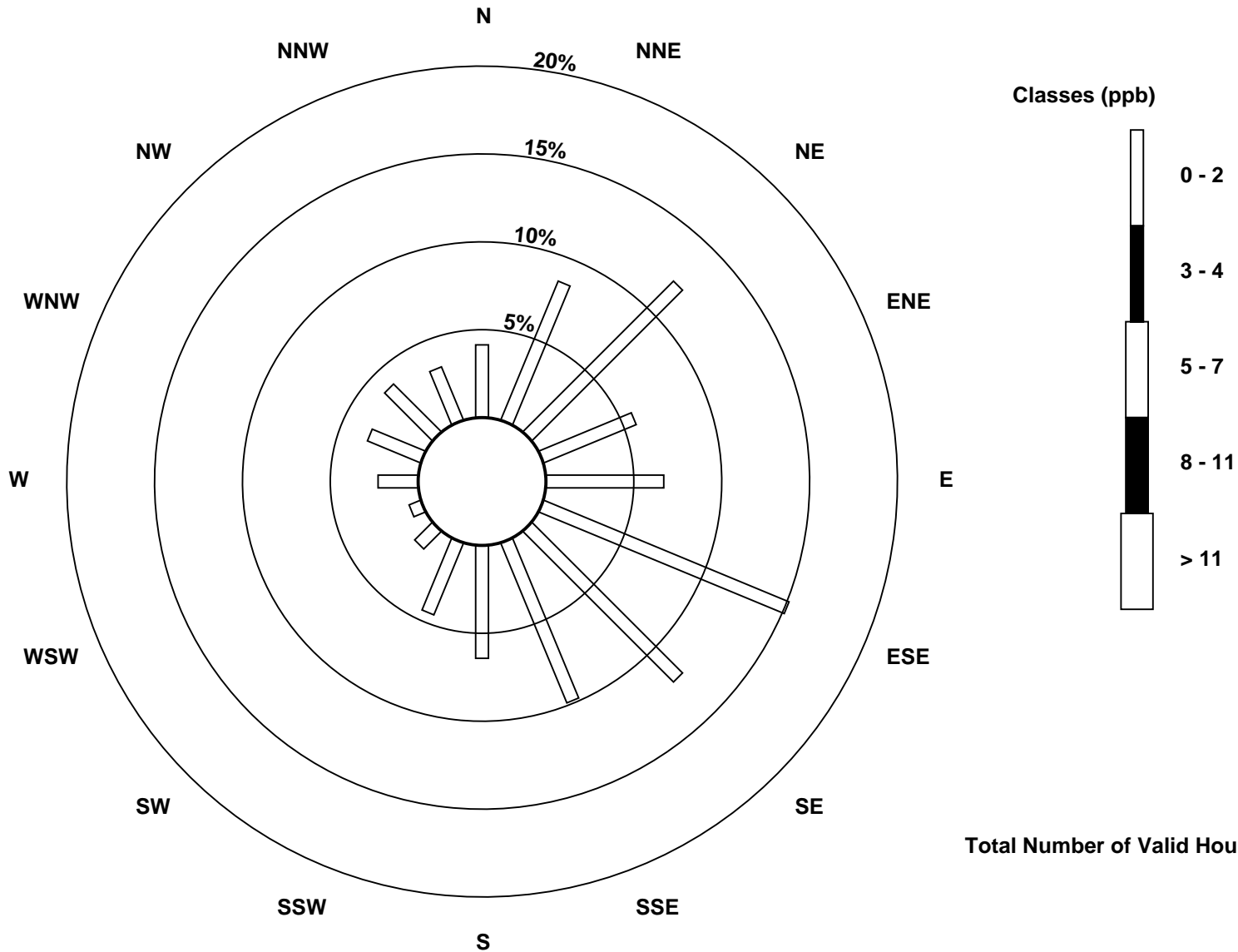
Total Number of Valid Hours: 701

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

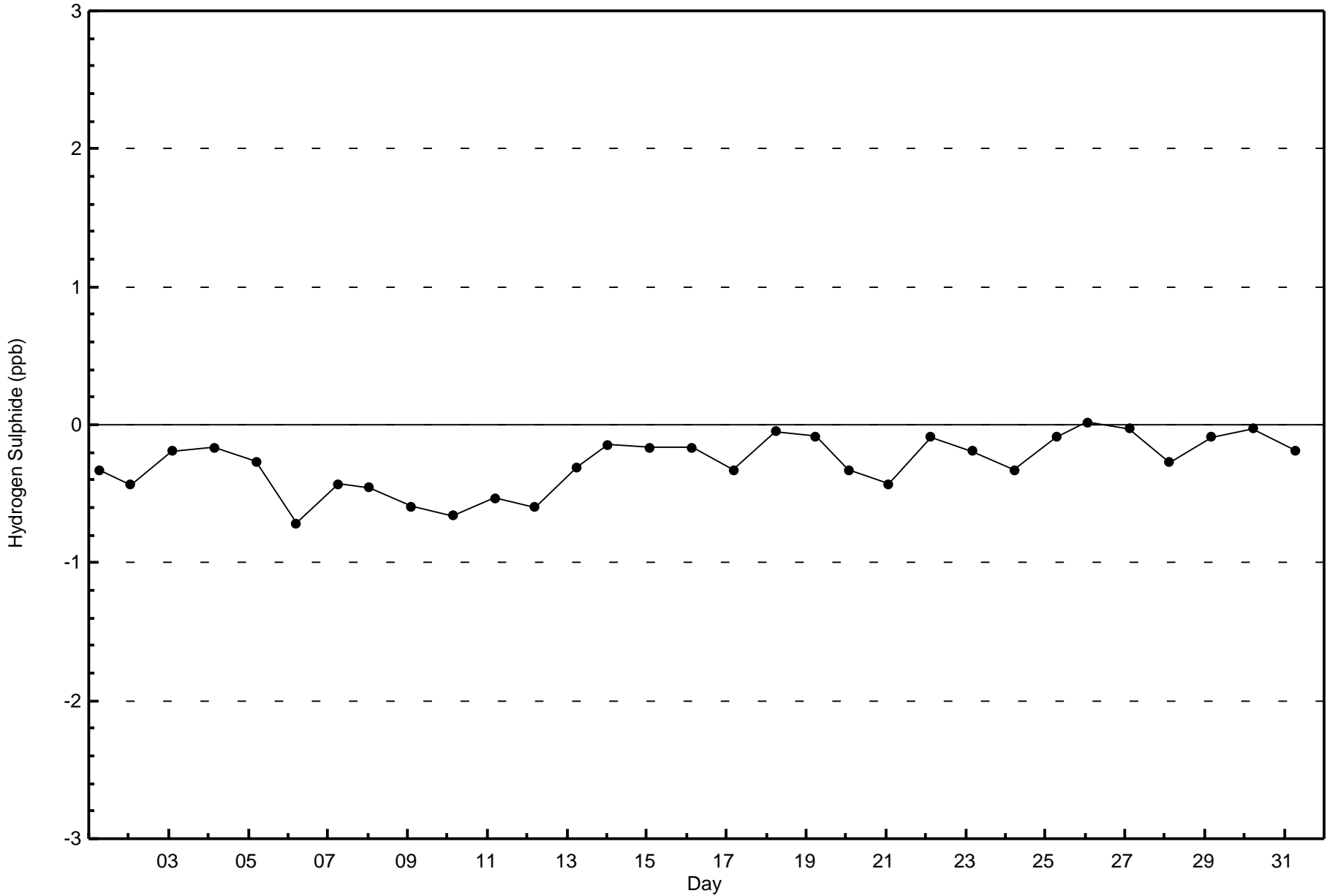
Hydrogen Sulphide (H_2S) - ppb
Brion MacKay River (AMS 20)

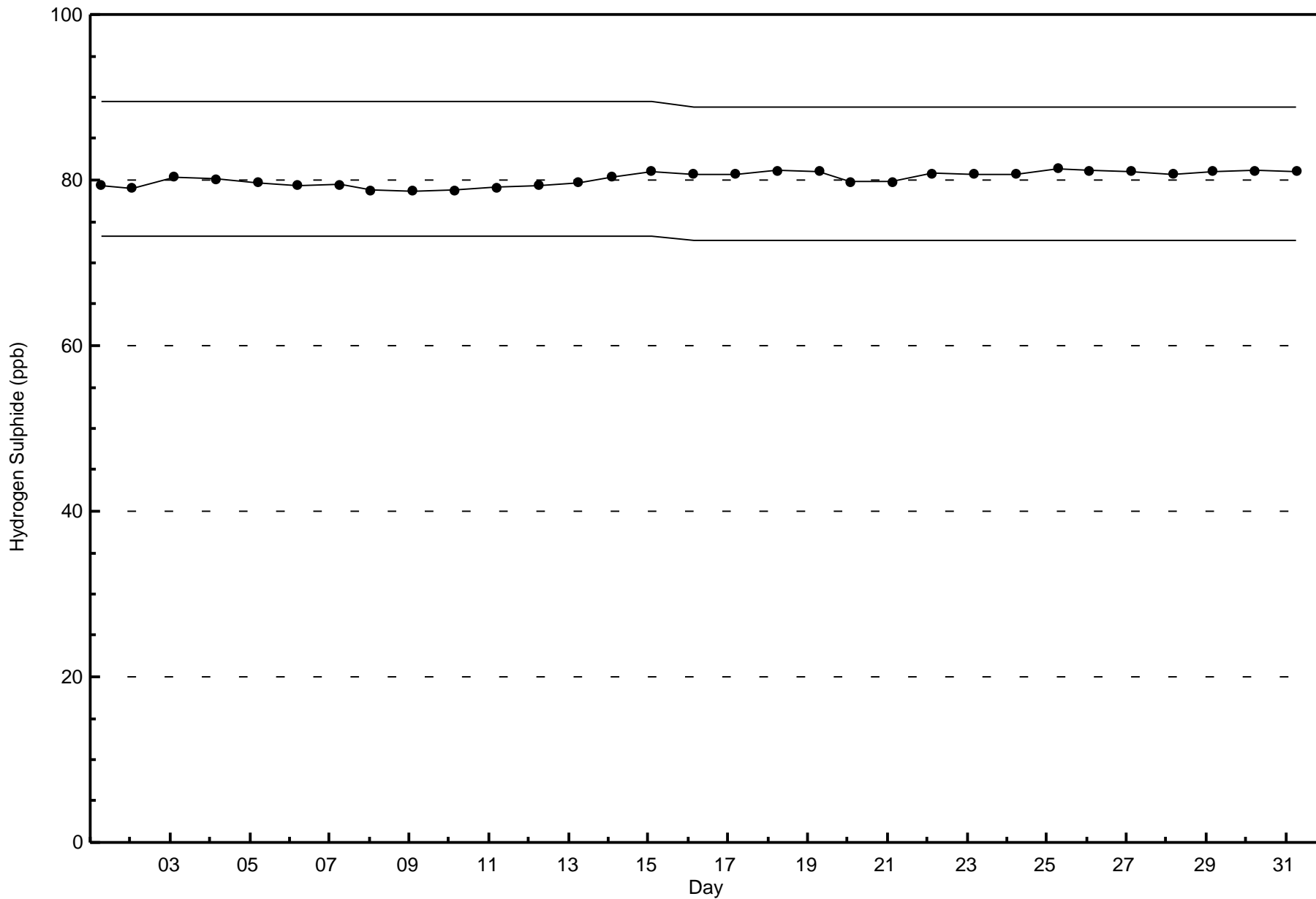




Wood Buffalo Environmental Association
Zero Responses

Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - March 2017







Wood Buffalo Environmental Association
Summary of Hour Averages

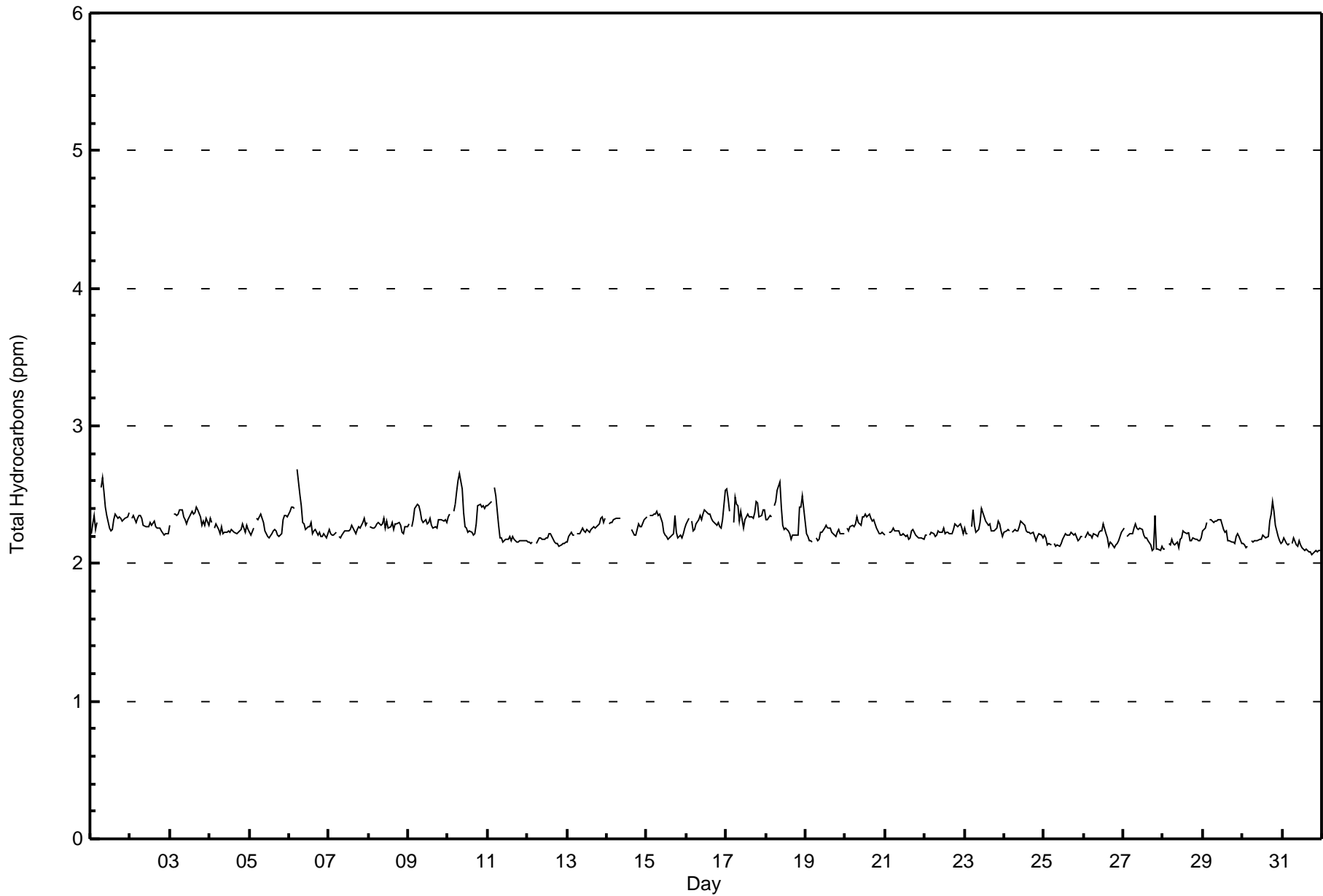
Total Hydrocarbons (THC) - ppm
Brion MacKay River - March 2017

Maximum Value: 2.7 ppm on Mar 6 06:00 Maximum Daily Average: 2.4 ppm on Mar 17		Hours in Service: 744 Hours of Data: 707 Hours of Missing Data: 37 Hours of Calibration: 37 Percent Operational Time: 100.0																																															
Minimum Value: 2.1 ppm on Mar 31 19:00 Maximum Diurnal Average: 2.3 ppm at hour 6 Monthly Average: 2.26 ppm		Minimum Daily Average: 2.1 ppm on Mar 31 Minimum Diurnal Average: 2.2 ppm at hour 17 Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.2 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.4 P ₉₉ = 2.6																																															
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-Mar	2.2	2.3	2.4	2.3	2.3	Z	2.6	2.6	2.5	2.4	2.3	2.3	2.2	2.2	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3																							
2-Mar	Z	2.3	2.3	2.3	2.3	2.3	2.4	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	2.2	2.2	2.2	2.2	2.2	2.3																							
3-Mar	2.3	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3																							
4-Mar	2.3	2.3	Z	2.3	2.3	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2																							
5-Mar	2.2	2.2	2.3	Z	2.3	2.3	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3																							
6-Mar	2.4	2.4	2.4	2.4	Z	2.7	2.5	2.4	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	2.3																							
7-Mar	2.2	2.2	2.2	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	2.3	2.3	2.3	2.3	2.3	2.3	2.3																							
8-Mar	Z	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	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3																							
9-Mar	2.3	Z	2.3	2.3	2.4	2.4	2.4	2.4	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	2.3	2.3	2.3																							
10-Mar	2.3	2.4	Z	2.4	2.4	2.5	2.6	2.7	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4																							
11-Mar	2.4	2.4	2.5	Z	2.6	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2																							
12-Mar	2.2	2.2	2.1	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2																							
13-Mar	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	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																							
14-Mar	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	C	C	C	C	C	C	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	--																							
15-Mar	2.3	Z	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3																							
16-Mar	2.3	2.3	Z	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.5																							
17-Mar	2.5	2.5	2.4	Z	2.3	2.5	2.4	2.4	2.3	2.4	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.4	2.5	2.4	2.3	2.3	2.4	2.4	2.4	2.4																							
18-Mar	2.3	2.3	2.3	2.3	Z	2.4	2.5	2.5	2.6	2.4	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.5	2.4	2.3	2.6																							
19-Mar	2.2	2.2	2.2	2.2	2.2	Z	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	2.2	2.2	2.2	2.2																							
20-Mar	Z	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3																							
21-Mar	2.2	Z	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2																							
22-Mar	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	2.3	2.3	2.3	2.3	2.3	2.2	2.2																							
23-Mar	2.3	2.2	2.2	Z	2.3	2.4	2.3	2.2	2.2	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.3																							
24-Mar	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	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																							
25-Mar	2.2	2.2	2.1	2.2	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2																							
26-Mar	Z	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	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2																							
27-Mar	2.3	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.3	2.1	2.1	2.1	2.1	2.1	2.2																							
28-Mar	2.1	2.1	Z	2.2	2.1	2.2	2.1	2.1	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	2.2	2.2	2.2																							
29-Mar	2.2	2.3	2.3	Z	2.3	2.3	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	2.1	2.2	2.2	2.2	2.1	2.2	2.3																							
30-Mar	2.1	2.1	2.1	2.1	Z	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	2.5	2.4	2.3	2.2	2.2	2.1	2.2	2.5																							
31-Mar	2.2	2.2	2.1	2.1	2.2	Z	2.1	2.2	2.1	2.1	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																							
																								2.3	2.3	2.3	2.2	2.3	2.3	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	2.3	2.3	Diurnal Average	
																								2.5	2.5	2.5	2.4	2.6	2.7	2.6	2.7	2.6	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.4	2.4	2.5	2.5	Diurnal Maximum
Z - zerospan C - Calibration																																																	



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Brion MacKay River - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Brion MacKay River - March 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	707	100.00	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
Brion MacKay River - March 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	63	82	42	47	103	86	68	43	29	8	6	19	23	26	23	697
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	29	63	82	42	47	103	86	68	43	29	8	6	19	23	26	23	697

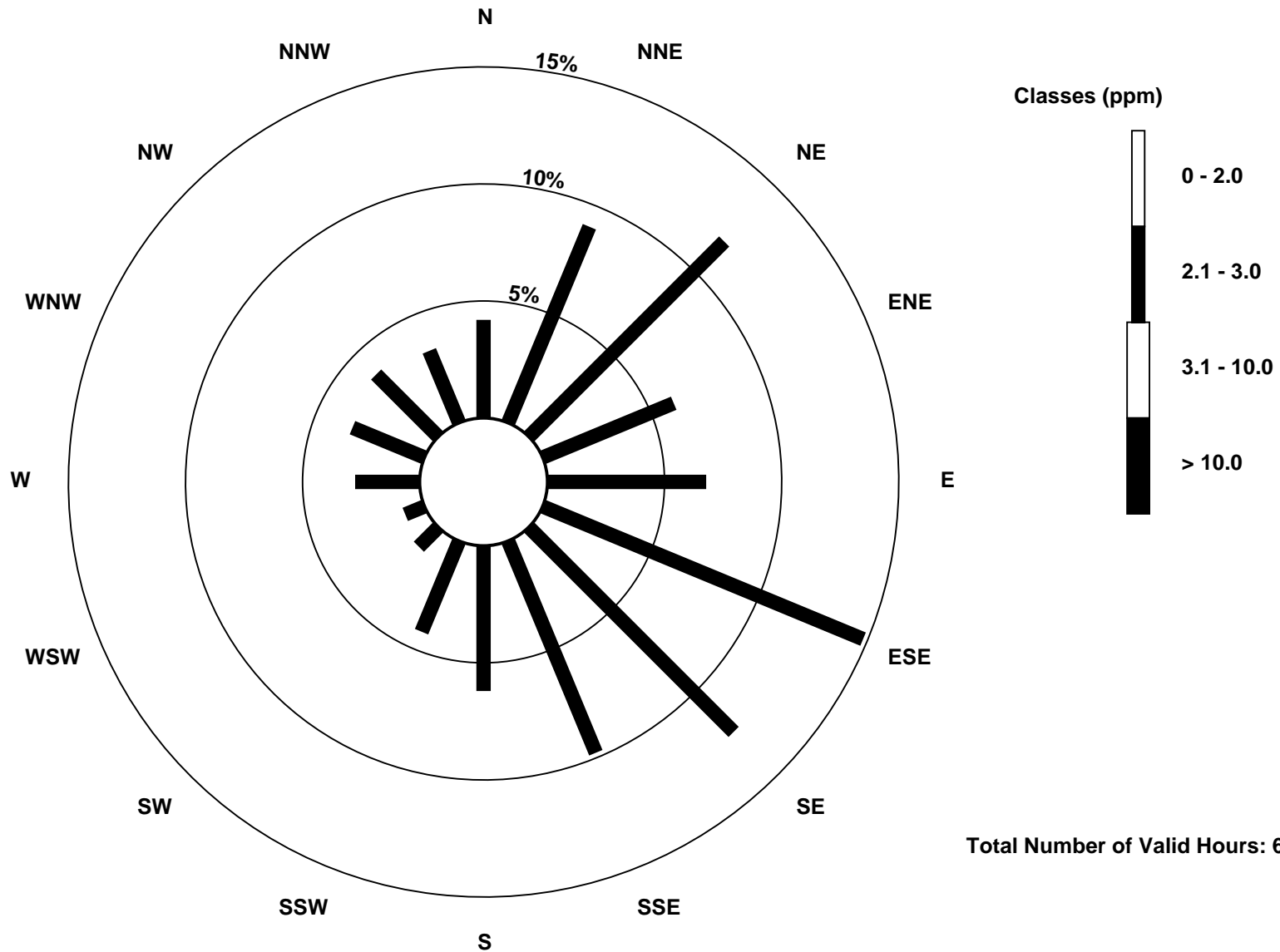
Total Number of Valid Hours: 697

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Hydrocarbons (THC) - ppm
Brion MacKay River (AMS 20)

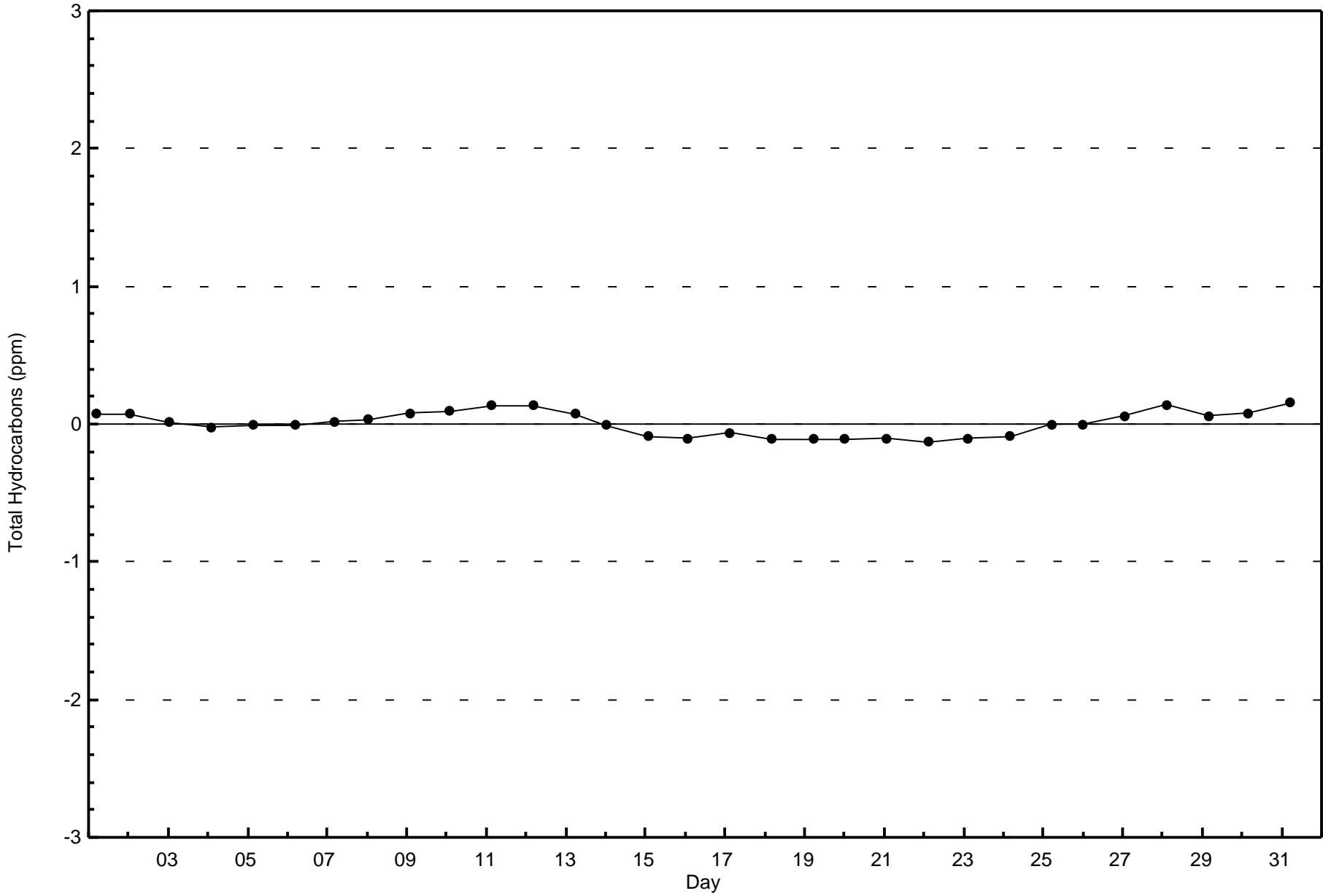


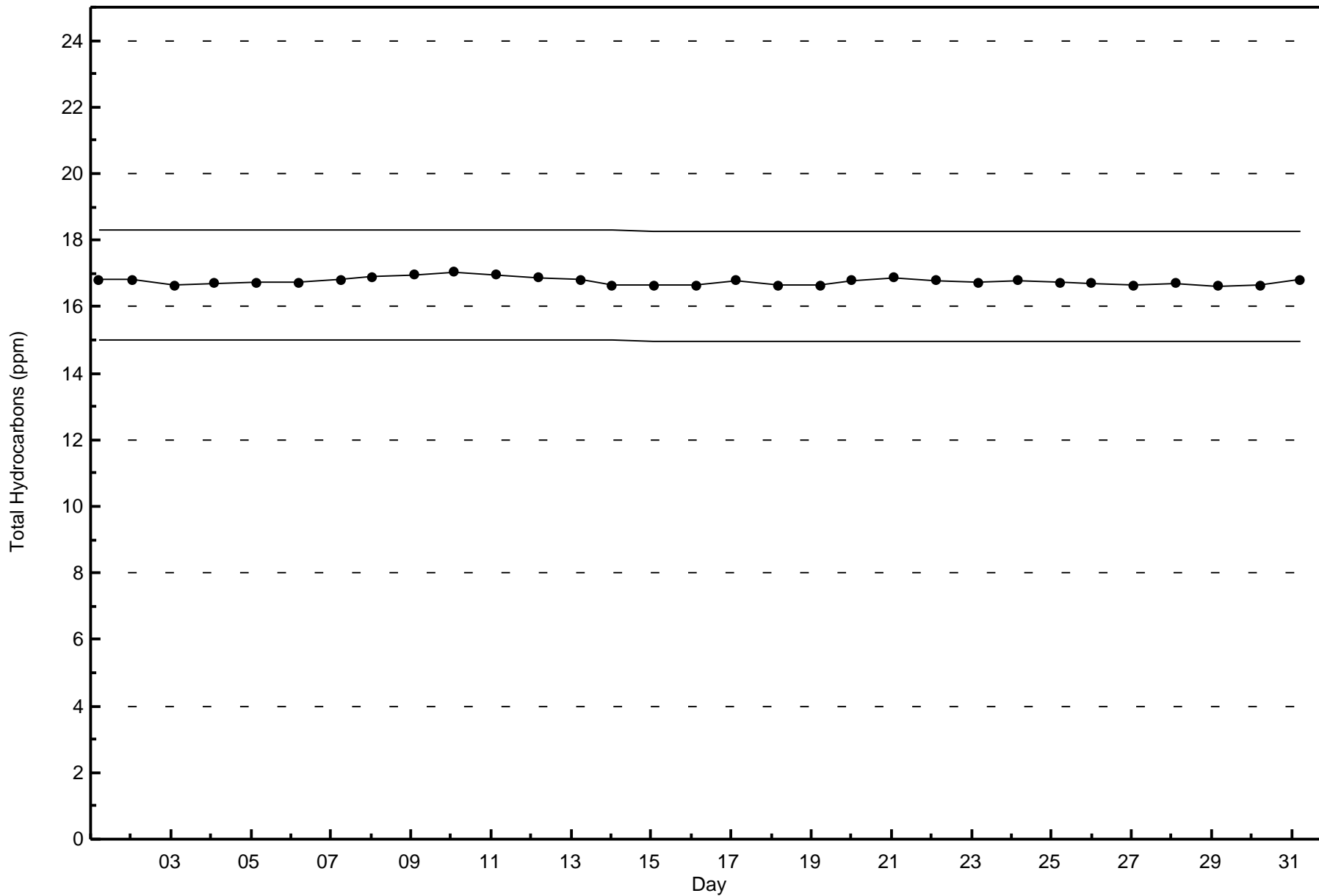
Total Number of Valid Hours: 697



Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Brion MacKay River - March 2017





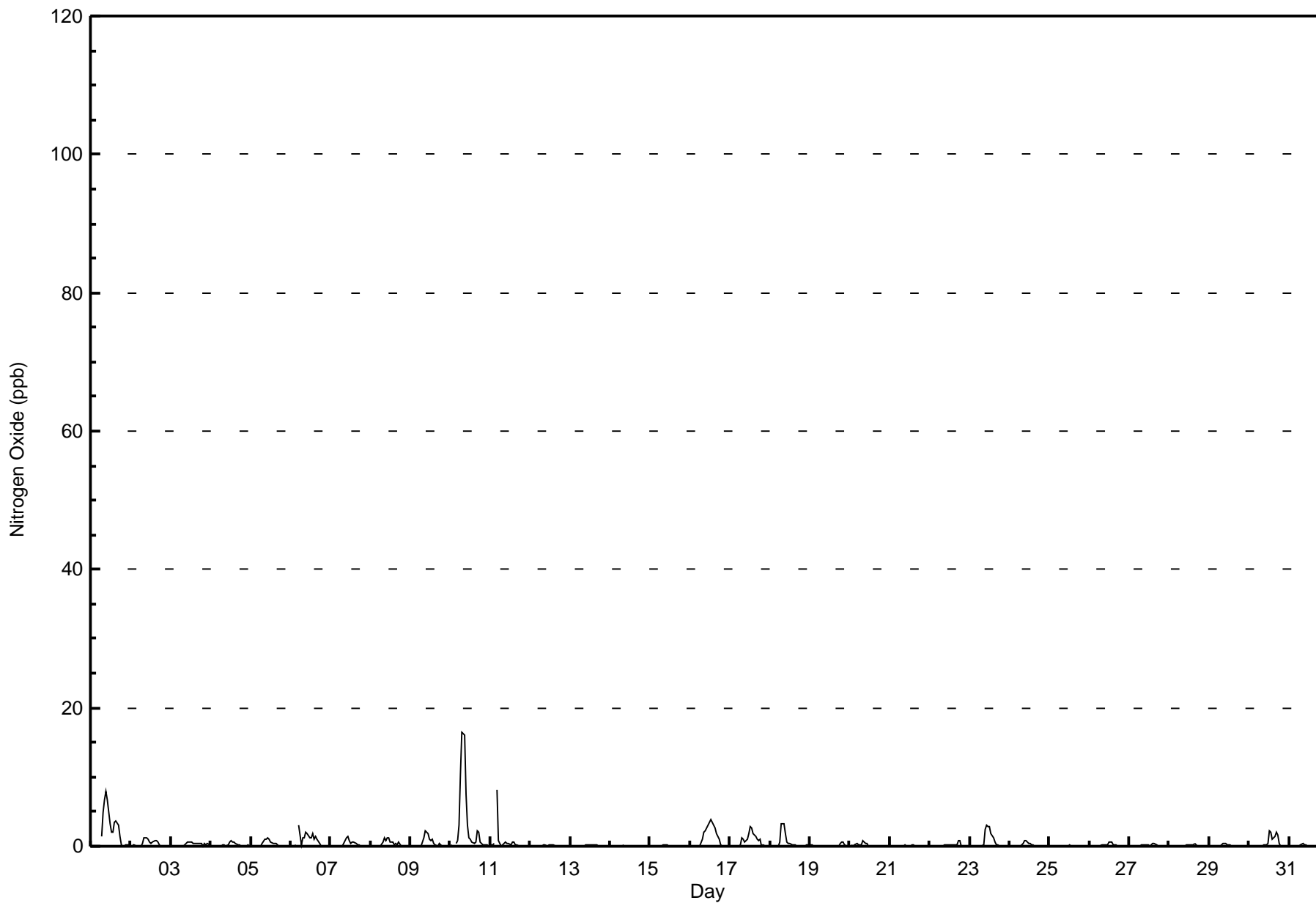


Maximum Value: 17 ppb on Mar 10 08:00																		Maximum Daily Average: 2.9 ppb on Mar 10																		Hours in Service: 744			
Minimum Value: 0 ppb on Mar 2 20:00																		Minimum Daily Average: 0.0 ppb on Mar 15																		Hours of Data: 707			
Maximum Diurnal Average: 1.3 ppb at hour 9																		Minimum Diurnal Average: 0.0 ppb at hour 1																		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 = 6																		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-Mar	0	0	0	0	0	Z	1	5	7	8	7	3	2	2	3	4	3	1	0	0	0	0	0	0	2.1	8													
2-Mar	Z	0	0	0	0	0	0	0	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0.4	1													
3-Mar	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1													
4-Mar	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1													
5-Mar	0	0	0	Z	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1													
6-Mar	0	0	0	0	Z	3	0	1	1	2	2	1	1	2	1	1	1	0	0	0	0	0	0	0	0.8	3													
7-Mar	0	0	0	0	0	Z	0	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1													
8-Mar	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0.4	1													
9-Mar	0	Z	0	0	0	0	0	1	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	2													
10-Mar	0	0	Z	0	1	3	10	17	16	8	3	1	1	1	0	1	2	2	1	0	0	0	0	2.9	17														
11-Mar	0	0	0	Z	8	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0.6	8														
12-Mar	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														
13-Mar	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														
14-Mar	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0														
15-Mar	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														
16-Mar	0	0	Z	0	0	0	0	1	2	2	3	3	4	3	3	3	2	1	0	0	0	0	0	1.2	4														
17-Mar	0	0	0	Z	0	0	0	1	1	1	1	2	3	3	2	1	1	1	1	0	0	0	0	0.8	3														
18-Mar	0	0	0	0	Z	0	1	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3														
19-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.1	1														
20-Mar	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														
21-Mar	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														
22-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.1	1														
23-Mar	0	0	0	Z	0	0	0	0	0	2	3	3	3	2	1	1	0	0	0	0	0	0	0	0.7	3														
24-Mar	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1														
25-Mar	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														
26-Mar	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.1	1														
27-Mar	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														
28-Mar	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														
29-Mar	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														
30-Mar	0	0	0	0	Z	0	0	0	0	0	0	2	2	1	1	2	2	0	0	0	0	0	0	0.5	2														
31-Mar	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														
																								Diurnal Average															
																								Diurnal Maximum															
Z - zerospan C - Calibration																																							



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Brion MacKay River - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
Brion MacKay River - March 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
Brion MacKay River - March 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	29	63	82	42	47	103	86	68	43	29	8	6	19	23	26	23	697
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	29	63	82	42	47	103	86	68	43	29	8	6	19	23	26	23	697

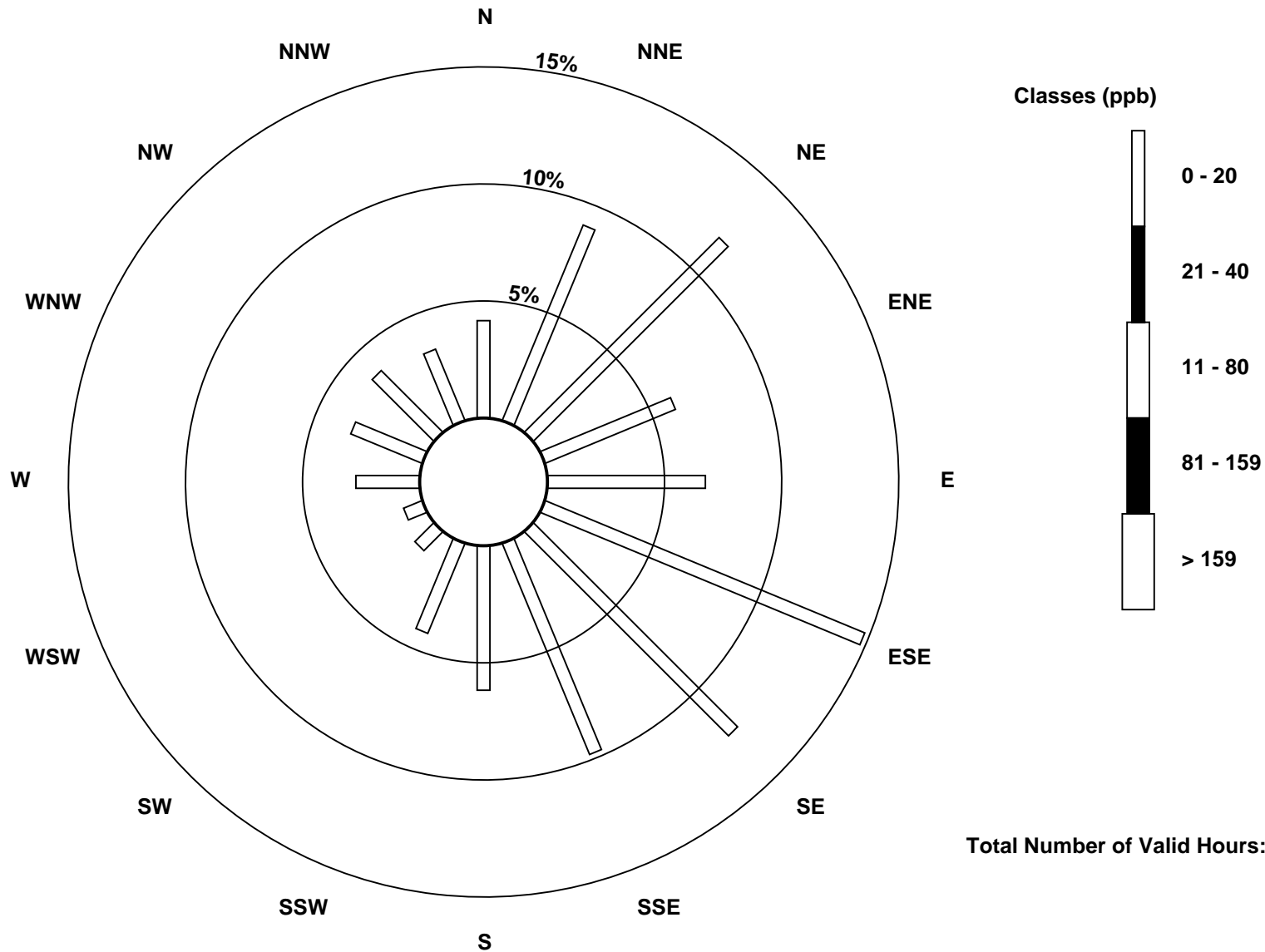
Total Number of Valid Hours: 697

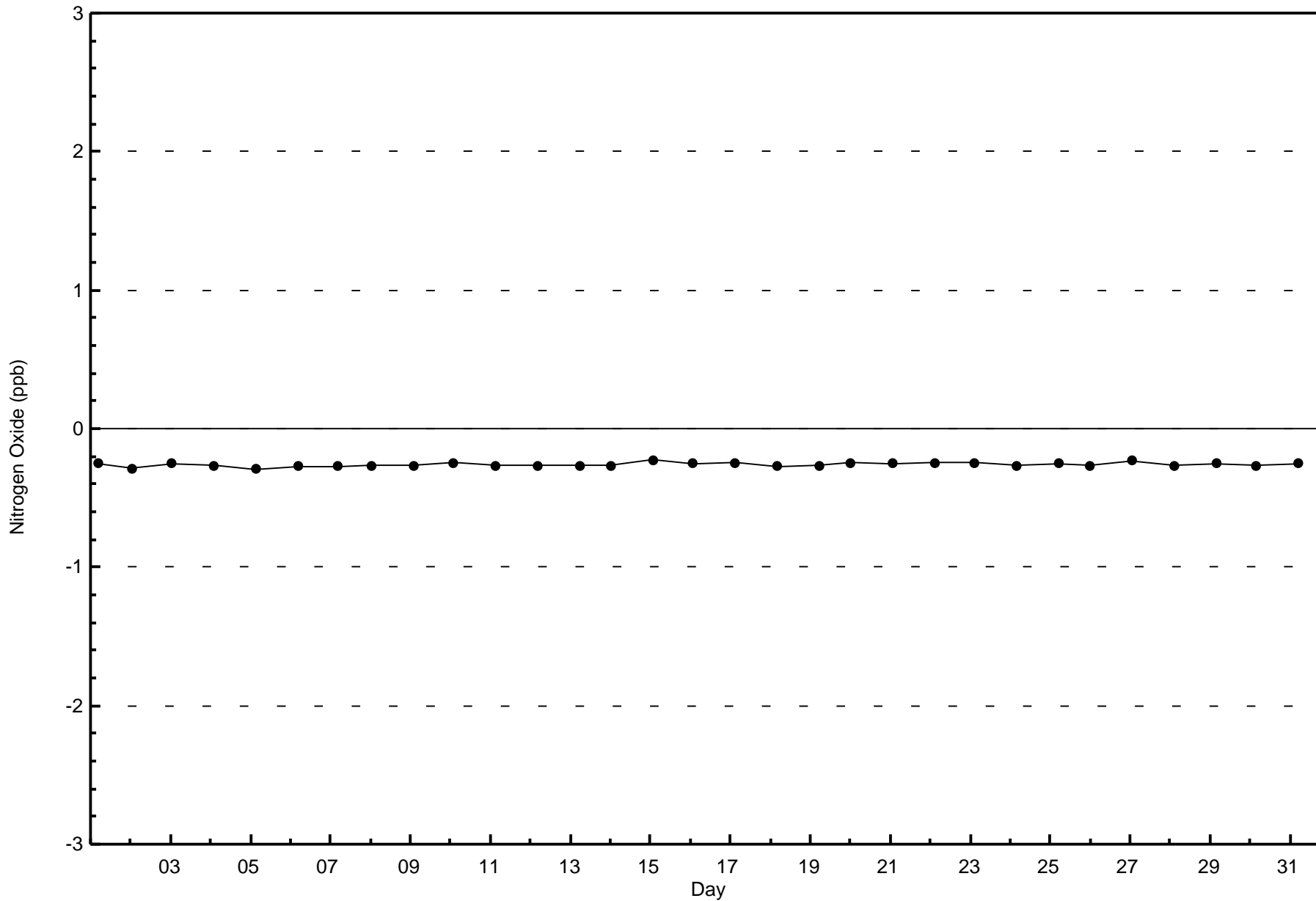
Total Number of Hours: 744

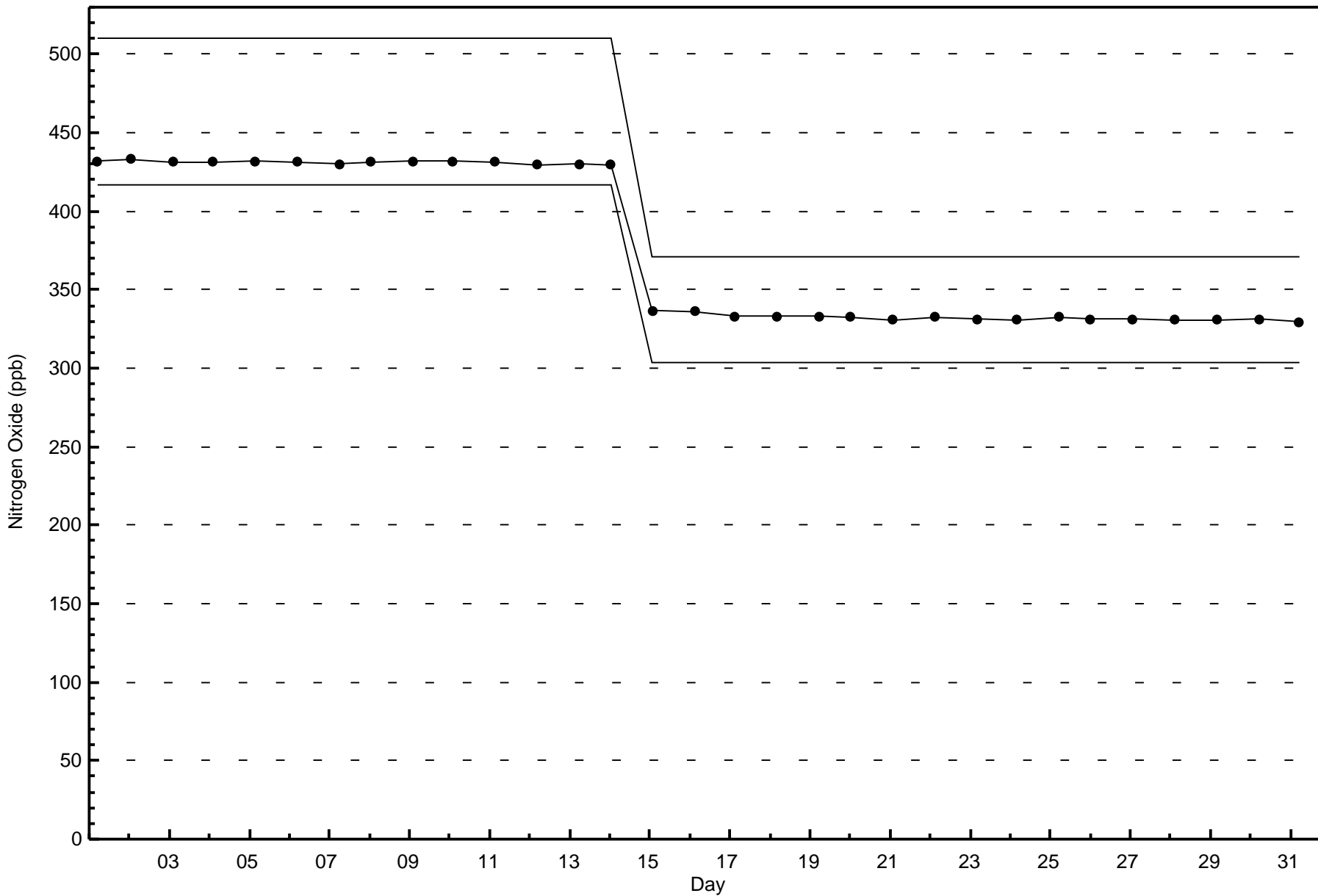


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Oxide (NO) - ppb
Brion MacKay River (AMS 20)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Brion MacKay River - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 32 ppb on Mar 1 08:00	Maximum Daily Average: 13.4 ppb on Mar 1		Hours of Data:	707
Minimum Value: 0 ppb on Mar 15 20:00	Minimum Daily Average: 0.8 ppb on Mar 21		Hours of Missing Data:	37
Maximum Diurnal Average: 6.2 ppb at hour 6	Minimum Diurnal Average: 1.8 ppb at hour 15		Hours of Calibration:	37
Monthly Average: 3.9 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 11 P ₉₉ = 21		Percent Operational Time:	100.0

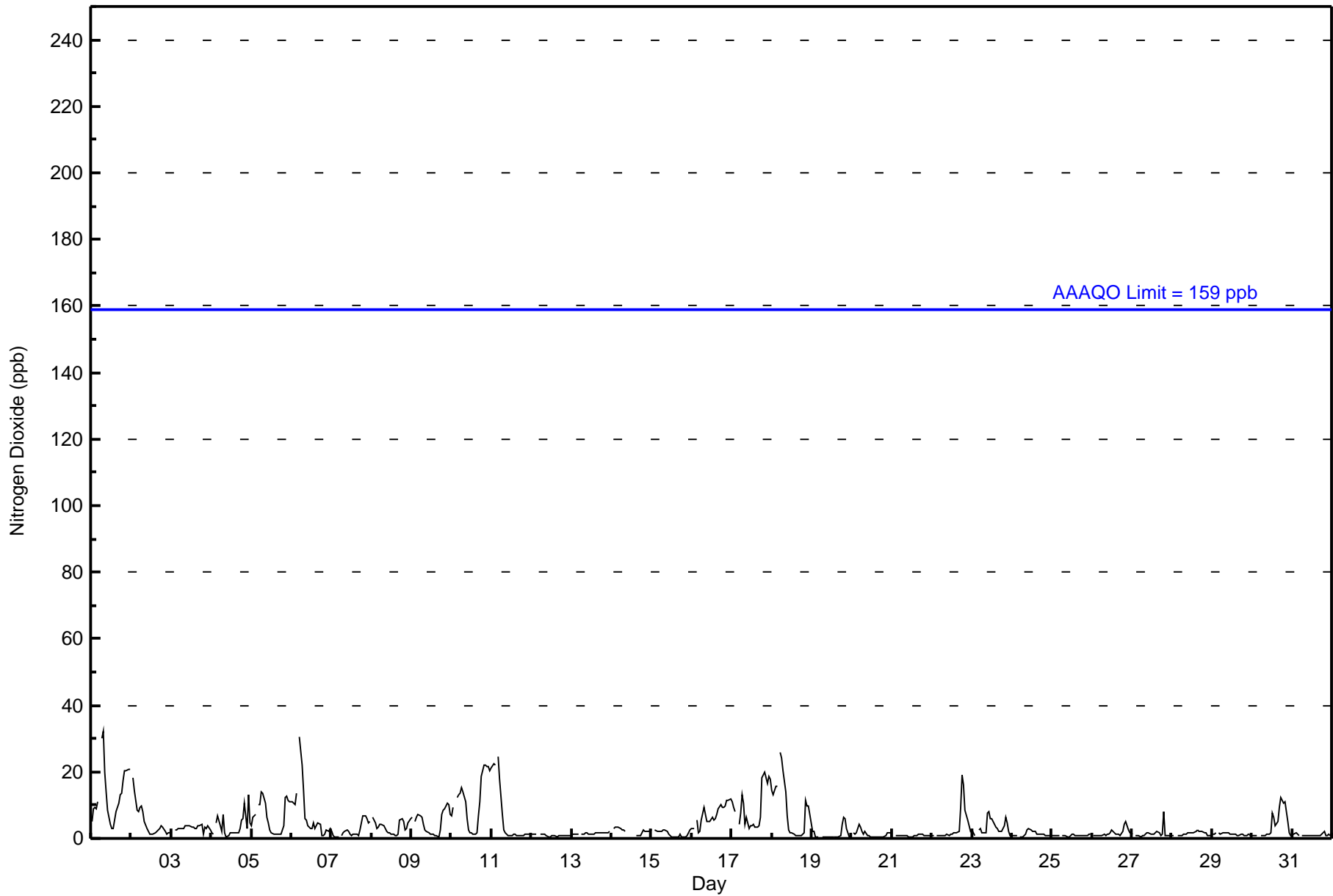
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Mar	5	9	10	9	11	Z	30	32	20	14	9	4	3	3	6	8	11	13	14	17	20	20	21	21	13.4	32	
2-Mar	Z	18	15	8	8	9	10	8	5	3	2	1	1	1	2	2	3	3	4	3	2	1	2	2	4.9	18	
3-Mar	2	Z	3	3	3	3	3	3	4	4	4	4	4	3	3	3	4	4	4	1	4	3	4	3	3.2	4	
4-Mar	2	1	Z	5	7	4	2	7	2	1	1	2	2	2	2	2	2	3	6	6	11	3	13	5	3.8	13	
5-Mar	4	6	7	Z	10	10	14	14	11	6	5	3	2	1	1	1	1	1	1	4	12	13	12	11	6.5	14	
6-Mar	11	11	10	14	Z	31	22	15	6	5	4	3	3	5	3	4	5	4	1	1	1	2	2	3	7.2	31	
7-Mar	2	1	1	1	1	Z	1	2	2	3	2	1	1	1	1	1	1	3	5	7	7	6	5	5	2.5	7	
8-Mar	Z	6	5	3	3	4	4	4	3	2	2	2	1	1	1	1	1	5	6	5	2	3	5	6	3.3	6	
9-Mar	6	Z	5	7	7	7	6	4	2	2	2	1	1	1	1	1	1	3	7	9	9	11	10	7	4.8	11	
10-Mar	7	9	Z	12	13	14	15	14	11	6	3	2	2	1	1	2	7	11	19	22	22	22	22	20	11.1	22	
11-Mar	21	22	22	Z	25	18	7	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5.9	25	
12-Mar	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1	
13-Mar	1	1	1	1	1	Z	1	1	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1.5	2	
14-Mar	Z	3	3	4	3	3	3	2	2	C	C	C	C	C	C	1	1	1	2	2	2	2	2	3	--	4	
15-Mar	2	Z	2	2	2	2	2	3	3	2	1	1	1	0	0	0	0	0	1	0	0	1	2	3	1.4	3	
16-Mar	3	3	Z	6	2	2	5	9	7	5	5	5	6	6	6	7	9	10	9	9	10	11	12	12	6.9	12	
17-Mar	11	10	8	Z	4	8	13	11	4	6	3	4	4	4	4	3	4	7	18	19	20	17	19	18	9.5	20	
18-Mar	14	13	16	16	Z	26	24	20	14	7	3	2	2	1	1	1	1	1	1	2	11	10	10	7	8.8	26	
19-Mar	2	2	1	1	0	Z	1	0	0	1	0	0	0	0	0	0	0	0	1	4	6	6	3	1	1	1.4	6
20-Mar	Z	2	1	2	4	3	2	1	2	1	1	0	1	0	0	0	0	0	0	0	1	2	2	2	1.2	4	
21-Mar	1	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	
22-Mar	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	2	2	2	9	19	16	8	6	4	2	3.6	19	
23-Mar	3	2	1	Z	3	3	2	2	2	8	8	6	6	5	4	3	2	2	2	4	6	5	2	1	3.4	8	
24-Mar	1	1	1	1	Z	1	1	1	1	3	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1.3	3	
25-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1	
26-Mar	Z	1	1	1	1	1	1	1	1	1	1	2	3	2	1	1	1	1	2	4	5	4	3	2	1.7	5	
27-Mar	1	Z	1	1	1	1	1	1	1	2	2	1	1	1	2	2	2	1	1	8	1	1	1	1	1.4	8	
28-Mar	1	1	Z	1	1	1	1	1	1	2	2	2	2	2	2	3	2	2	2	2	2	1	1	1	1.5	3	
29-Mar	1	1	2	Z	2	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	2	
30-Mar	1	1	1	1	Z	1	1	1	1	1	1	2	8	6	4	5	9	12	11	11	11	5	2	1	4.1	12	
31-Mar	1	1	2	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1.0	2	
4.1 4.9 4.6 3.9 4.4 6.2 5.7 5.3 3.7 3.1 2.3 1.9 2.0 2.0 1.8 2.0 2.5 3.5 4.8 5.4 5.9 5.1 5.2 4.7																								Diurnal Average			
21 22 22 16 25 31 30 32 20 14 9 6 8 6 6 8 11 13 19 22 22 22 22 21																								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
Brion MacKay River - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	691	97.74	97.74
21 - 40	16	2.26	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
Brion MacKay River - March 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	29	62	74	39	45	103	84	68	43	29	8	6	19	23	26	23	681
21 - 40	0	1	8	3	2	0	2	0	0	0	0	0	0	0	0	0	16
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	29	63	82	42	47	103	86	68	43	29	8	6	19	23	26	23	697

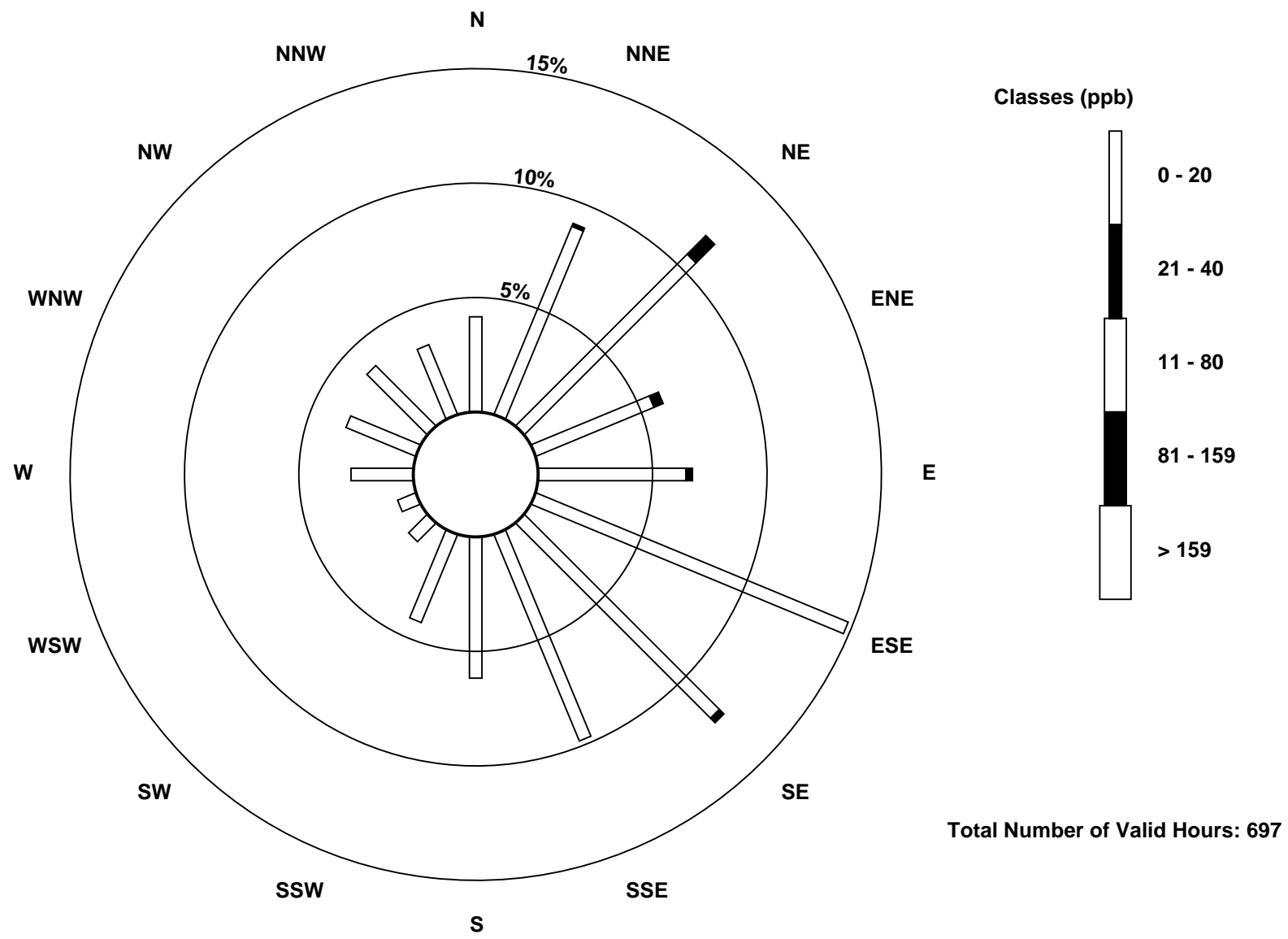
Total Number of Valid Hours: 697

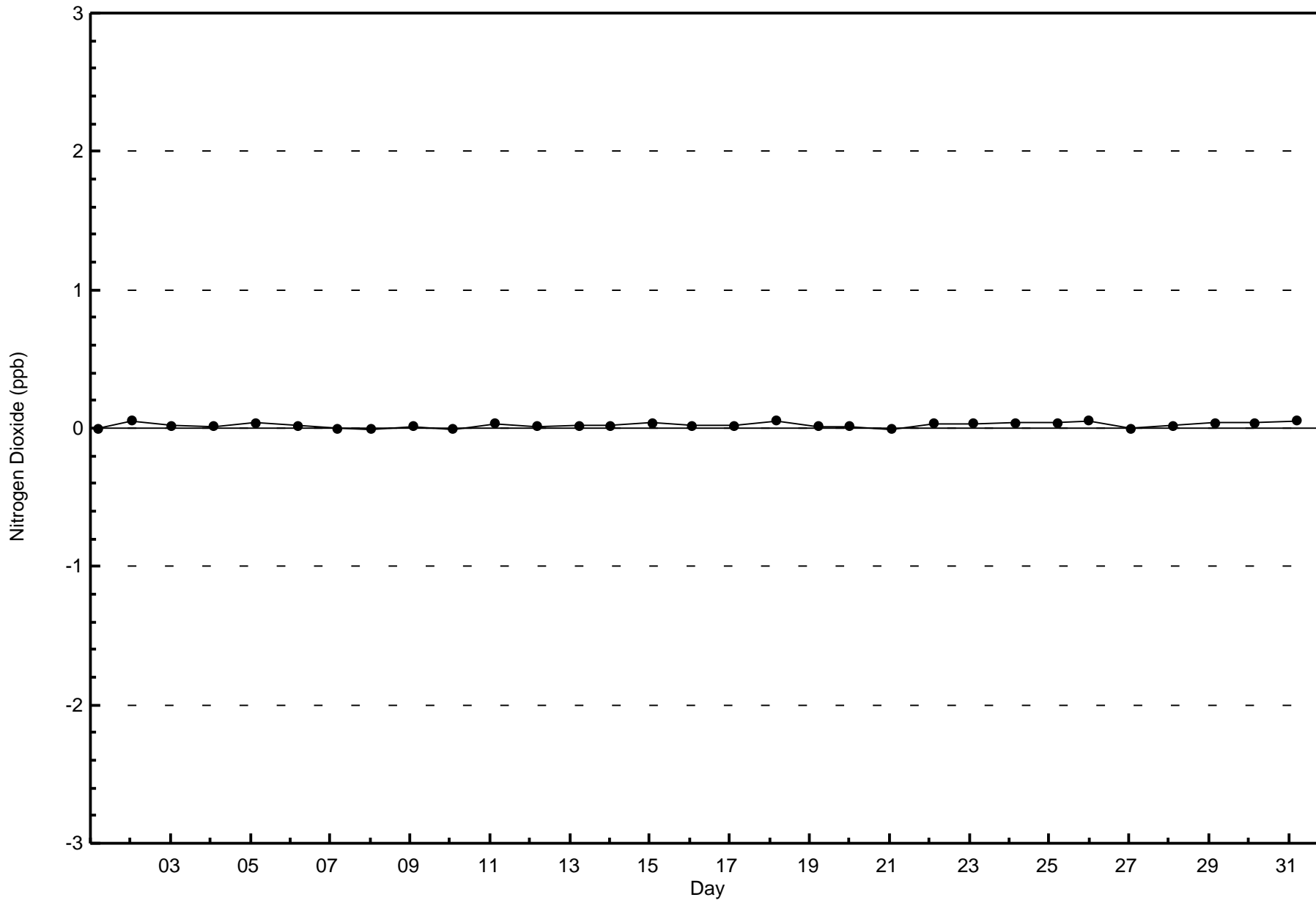
Total Number of Hours: 744

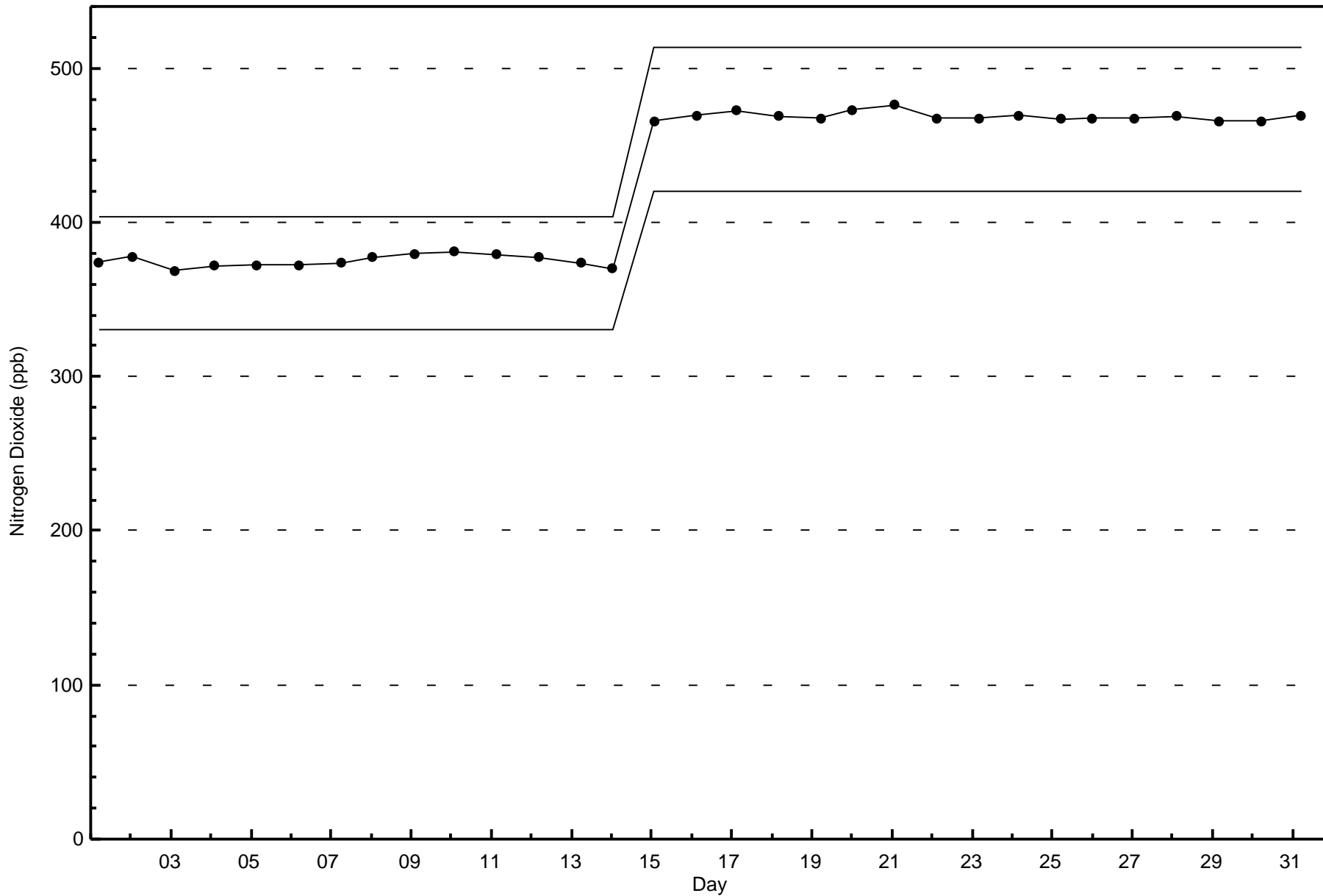


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River (AMS 20)









Wood Buffalo Environmental Association
Summary of Hour Averages

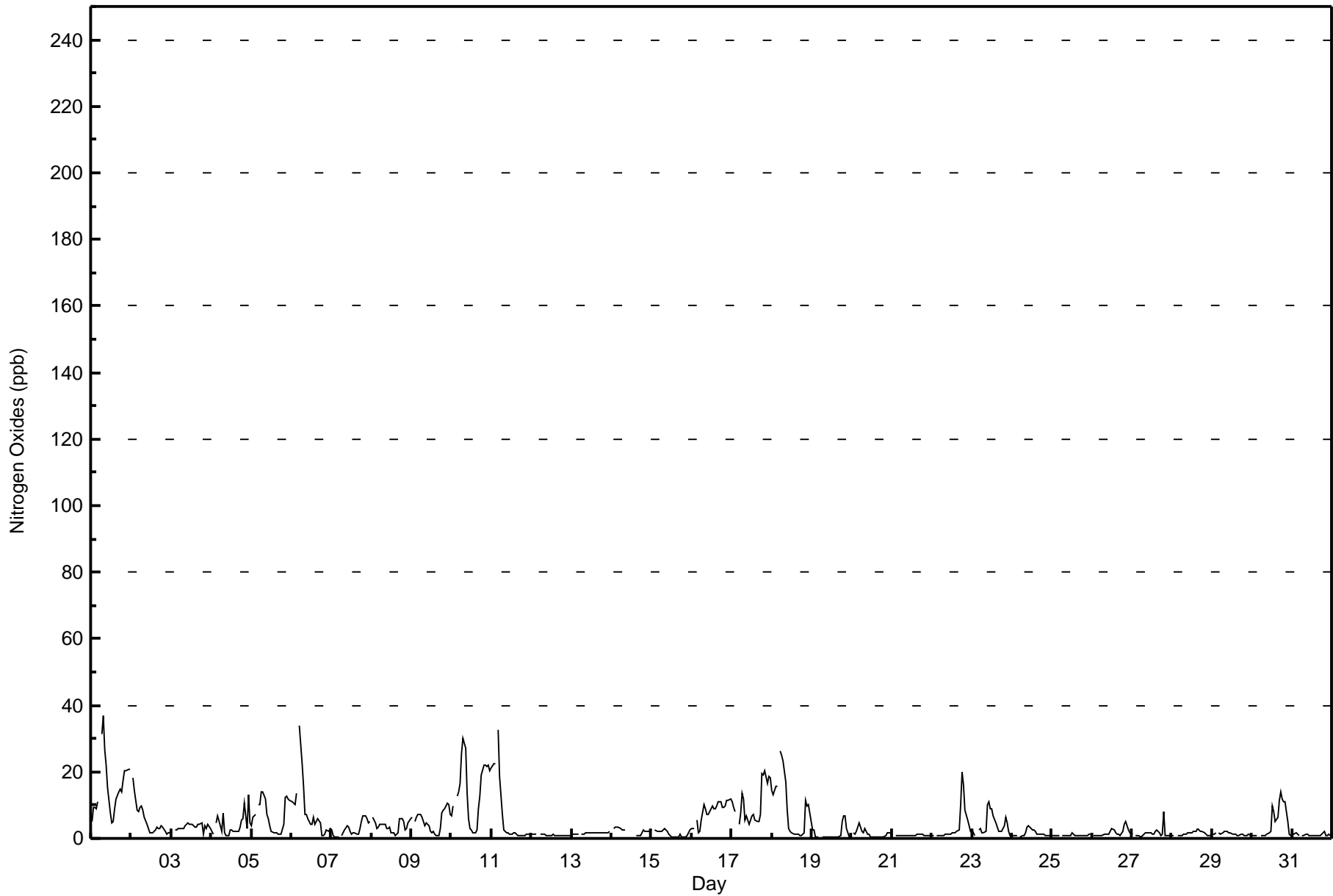
Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - March 2017

Maximum Value: 37 ppb on Mar 1 08:00																	Maximum Daily Average: 15.5 ppb on Mar 1																	Hours in Service: 744	
Minimum Value: 0 ppb on Mar 20 20:00																	Minimum Daily Average: 0.9 ppb on Mar 21																	Hours of Data: 707	
Maximum Diurnal Average: 6.5 ppb at hour 6																	Minimum Diurnal Average: 2.5 ppb at hour 15																	Hours of Missing Data: 37	
Monthly Average: 4.4 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 11 P ₉₉ = 26																	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-Mar	5	9	10	9	11	Z	31	37	27	22	15	8	5	5	9	12	14	15	14	17	20	20	21	21	15.5	37									
2-Mar	Z	18	15	8	8	9	10	9	6	4	3	2	2	2	3	3	3	3	4	3	2	1	1	2	5.3	18									
3-Mar	2	Z	3	3	3	3	3	3	4	4	4	4	4	4	3	4	4	5	1	4	3	4	3	3.5	5										
4-Mar	2	1	Z	5	7	4	2	8	2	1	1	3	3	2	2	2	2	3	6	6	11	3	13	5	4.0	13									
5-Mar	4	6	7	Z	10	10	14	14	12	7	6	4	2	2	2	2	1	1	1	4	12	13	12	11	6.8	14									
6-Mar	11	11	10	14	Z	34	23	16	7	7	6	4	4	6	4	5	6	5	1	1	1	2	2	3	8.0	34									
7-Mar	2	1	1	0	1	Z	1	2	3	4	3	2	1	2	2	1	1	3	5	7	7	6	5	5	2.8	7									
8-Mar	Z	6	4	3	3	4	4	4	4	3	3	3	2	2	1	1	2	6	6	5	2	3	5	6	3.6	6									
9-Mar	6	Z	5	6	7	7	7	5	4	4	4	2	2	2	1	1	1	3	8	9	9	11	10	7	5.2	11									
10-Mar	7	10	Z	13	14	17	25	30	27	14	6	3	3	2	2	2	9	13	19	22	22	22	22	21	14.0	30									
11-Mar	21	22	23	Z	33	19	7	3	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1	6.5	33									
12-Mar	1	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	1									
13-Mar	1	1	1	1	1	Z	1	1	1	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1.6	2									
14-Mar	Z	3	3	3	3	3	3	2	3	C	C	C	C	C	C	1	1	1	2	2	2	2	2	3	--	3									
15-Mar	2	Z	2	2	2	2	2	3	3	2	1	1	1	0	0	0	0	0	0	0	0	1	1	3	1.4	3									
16-Mar	3	3	Z	6	2	2	5	10	9	7	7	8	10	9	9	10	11	11	10	9	10	11	11	12	8.1	12									
17-Mar	11	10	8	Z	4	8	13	12	5	7	4	6	7	7	6	5	5	7	19	19	20	17	19	18	10.3	20									
18-Mar	14	13	16	16	Z	26	25	23	17	9	3	2	2	1	1	1	1	1	1	2	11	10	10	7	9.3	26									
19-Mar	2	2	1	1	0	Z	1	0	1	0	0	0	0	0	0	0	0	0	1	5	7	7	3	0	1	1.5	7								
20-Mar	Z	2	1	2	5	3	2	2	3	1	1	1	1	0	0	0	0	0	0	0	1	2	2	2	1.4	5									
21-Mar	1	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									
22-Mar	1	1	Z	1	1	1	1	1	1	1	1	1	2	2	2	2	2	10	20	16	8	6	4	2	3.8	20									
23-Mar	3	2	1	Z	3	3	2	2	2	10	11	9	9	7	5	3	2	2	2	4	6	5	2	1	4.1	11									
24-Mar	1	1	1	1	Z	1	1	1	2	3	4	3	3	2	2	1	1	1	1	1	1	1	1	1	1.5	4									
25-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0.9	2									
26-Mar	Z	1	1	1	1	1	1	1	1	1	1	2	3	2	2	1	1	1	2	4	5	4	3	2	1.9	5									
27-Mar	1	Z	1	1	1	1	1	1	2	2	2	2	1	1	2	3	2	1	1	8	1	1	1	1	1.5	8									
28-Mar	1	1	Z	1	1	1	1	1	1	2	2	2	2	2	2	3	2	2	2	2	1	1	1	1	1.5	3									
29-Mar	1	1	2	Z	2	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1.3	2									
30-Mar	1	1	1	1	Z	1	1	1	1	1	2	2	10	8	5	6	11	14	12	11	11	5	1	1	4.7	14									
31-Mar	1	1	2	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1.1	2									
4.1																	5.0																	Diurnal Average	
21																	23																	Diurnal Maximum	
Z - zerospan																	C - Calibration																		



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	684	96.75	96.75
21 - 40	23	3.25	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
Brion MacKay River - March 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	29	60	71	37	45	103	84	68	43	29	8	6	19	23	26	23	674
21 - 40	0	3	11	5	2	0	2	0	0	0	0	0	0	0	0	0	23
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	29	63	82	42	47	103	86	68	43	29	8	6	19	23	26	23	697

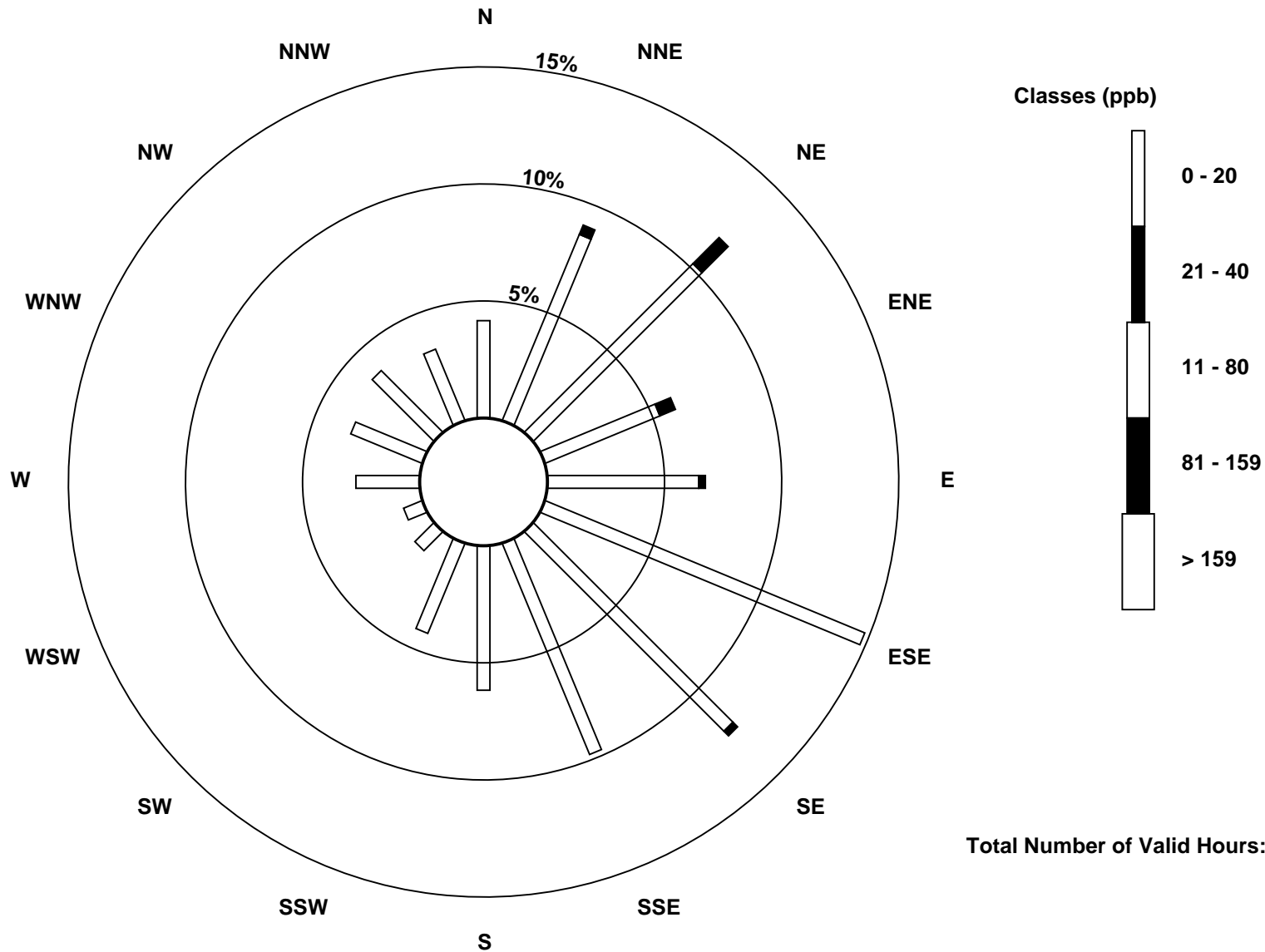
Total Number of Valid Hours: 697

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

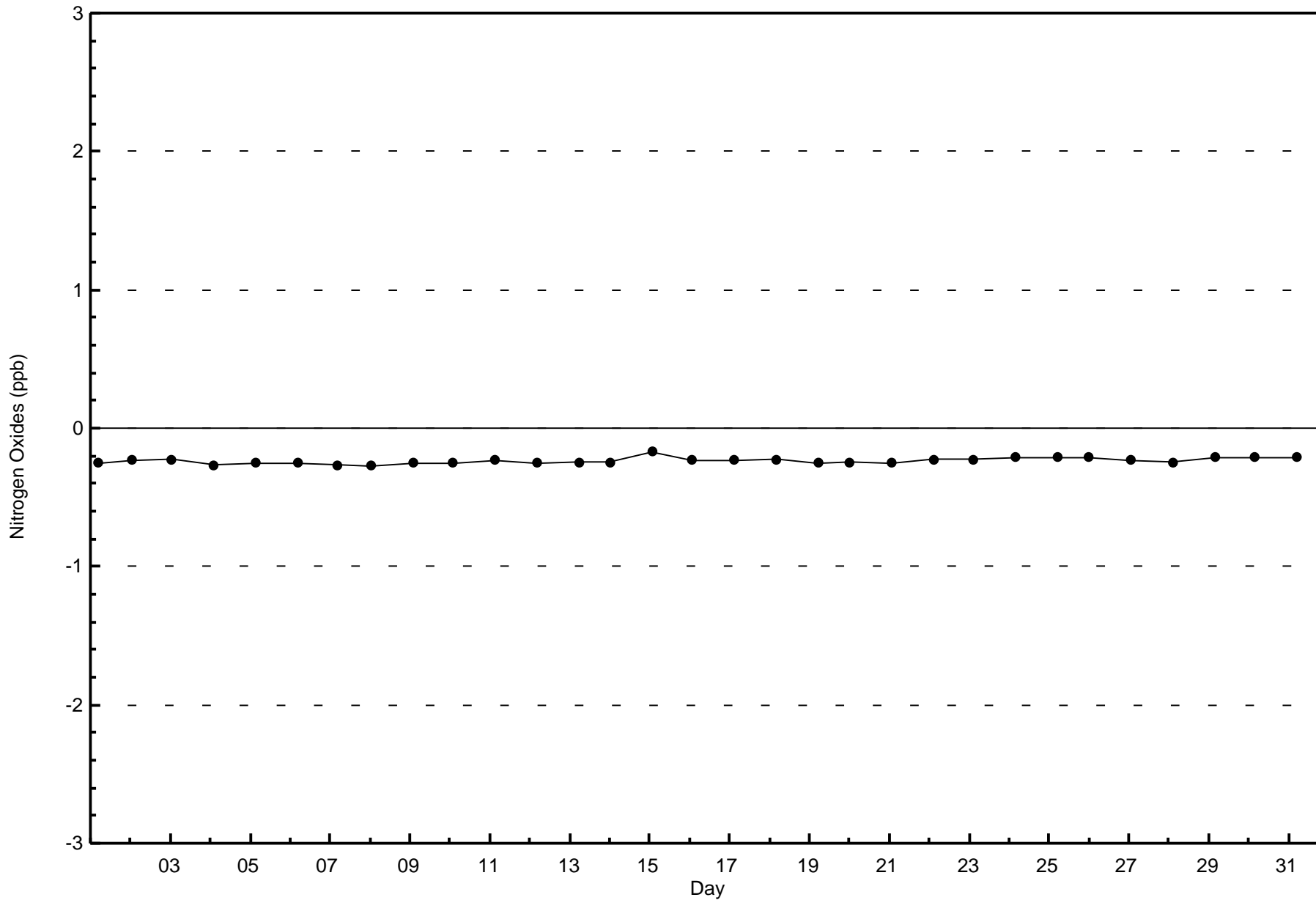
Nitrogen Oxides (NO_x) - ppb
Brion MacKay River (AMS 20)

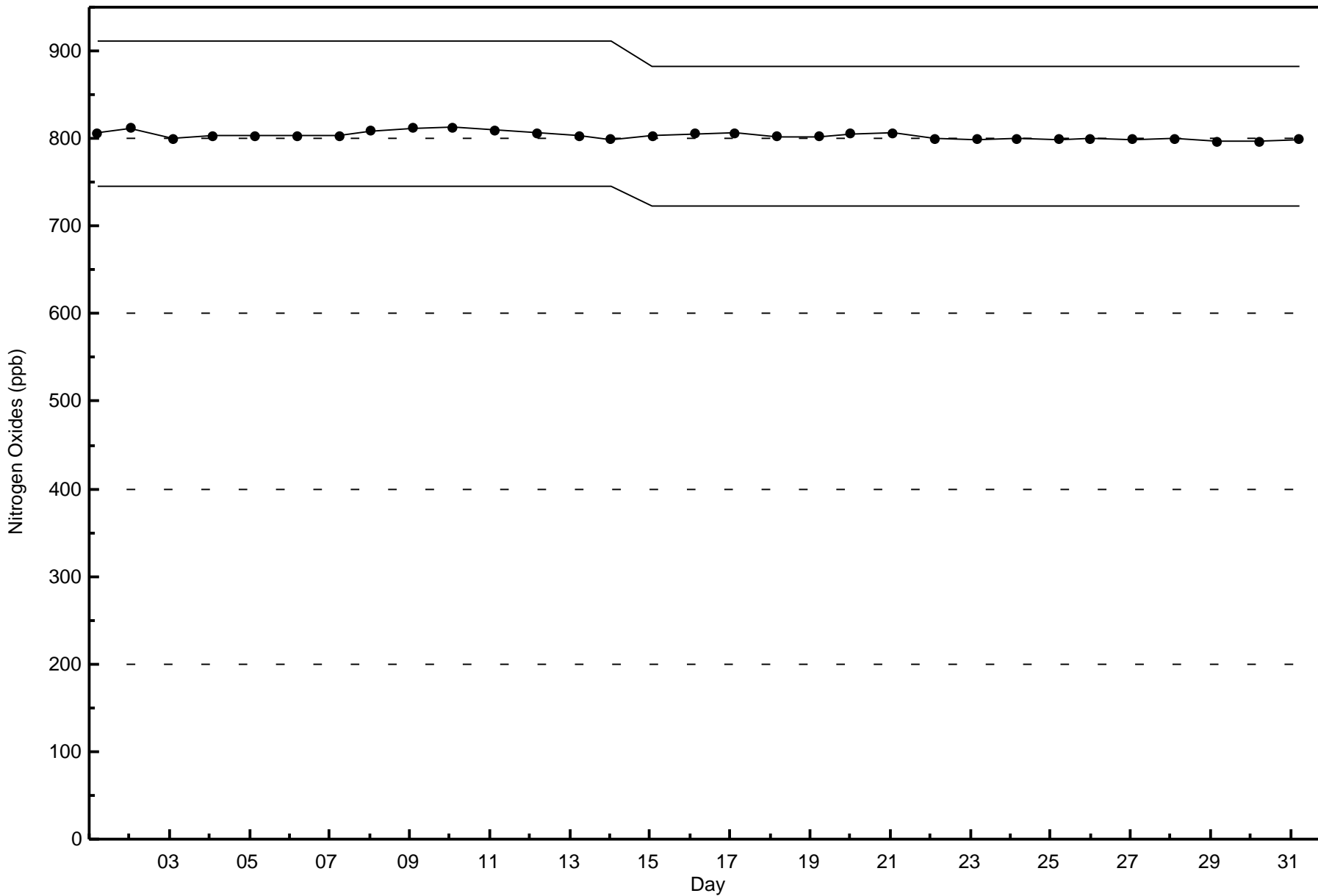




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - March 2017



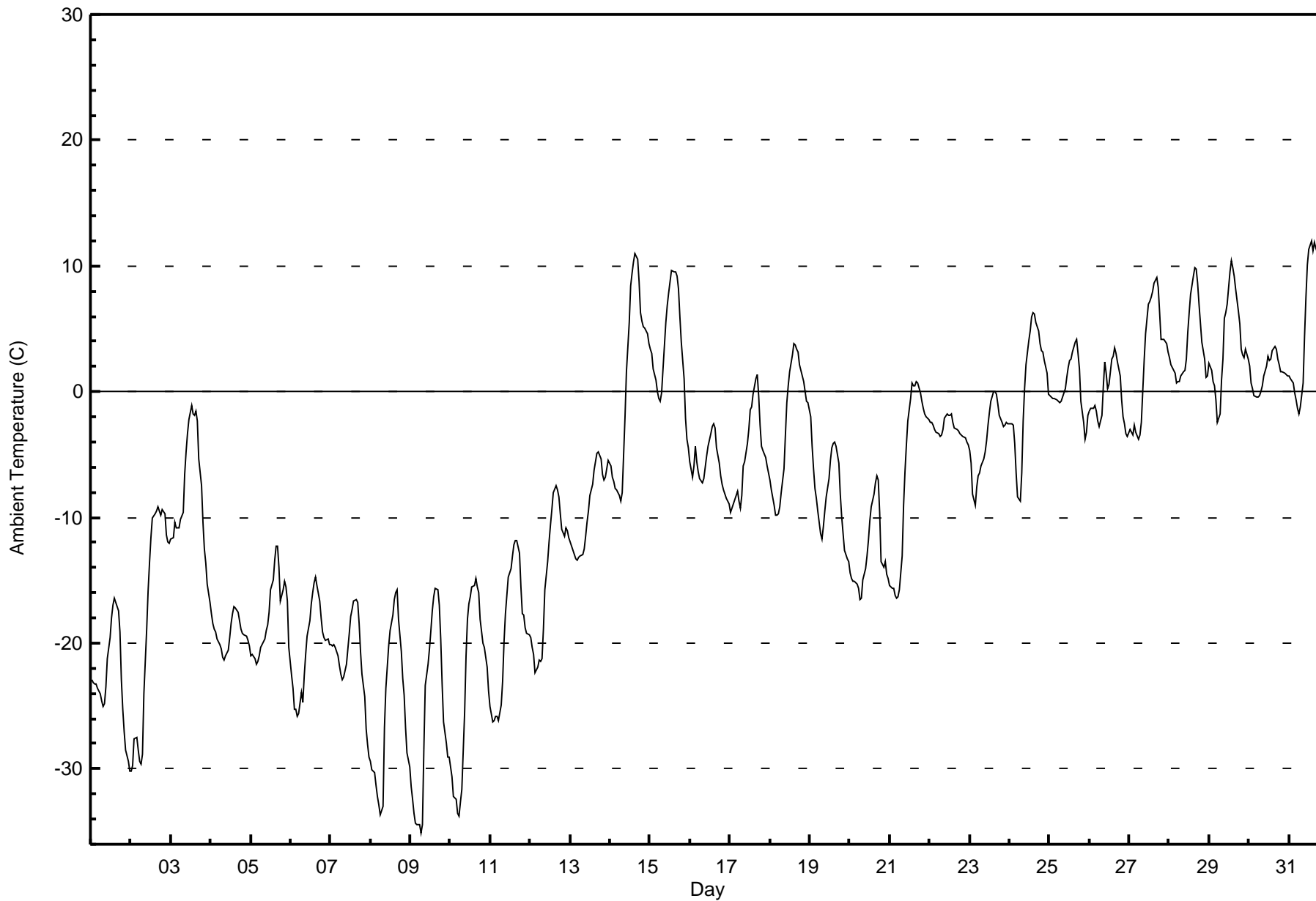




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Brion MacKay River - March 2017

Maximum Value: 12.0 C on Mar 31 14:00		Maximum Daily Average: 6.0 C on Mar 31		Hours in Service: 744																						
Minimum Value: -35.1 C on Mar 9 07:00		Minimum Daily Average: -25.9 C on Mar 9		Hours of Data: 744																						
Maximum Diurnal Average: -3.0 C at hour 16		Minimum Diurnal Average: -13.5 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -8.63 C		Percentiles: P ₁ = -33.5 P ₁₀ = -23.5 Q ₁ = -17.3 Median = -7.0 Q ₃ = 0.0 P ₉₀ = 4.1 P ₉₉ = 10.8		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-Mar	-22.9	-23.1	-23.3	-23.3	-23.6	-24.0	-24.6	-25.0	-24.8	-23.5	-21.3	-19.5	-18.0	-17.0	-16.5	-16.8	-17.4	-19.1	-22.9	-25.3	-27.0	-28.6	-29.5	-30.2	-22.8	-16.5
2-Mar	-30.1	-29.7	-27.7	-27.4	-28.6	-29.4	-29.6	-28.9	-24.0	-18.9	-15.8	-13.7	-11.6	-10.0	-9.7	-9.5	-9.1	-9.5	-9.9	-9.3	-9.7	-11.3	-11.9	-12.1	-17.8	-9.1
3-Mar	-11.8	-11.6	-10.4	-10.9	-10.8	-10.8	-10.1	-9.6	-6.6	-4.8	-3.4	-2.2	-1.1	-1.7	-1.8	-1.5	-2.3	-5.3	-7.4	-10.3	-12.5	-13.6	-15.3	-16.8	-8.0	-1.1
4-Mar	-17.6	-18.5	-18.9	-19.1	-19.7	-20.1	-20.5	-21.2	-21.4	-21.0	-20.5	-19.5	-18.5	-17.7	-17.1	-17.2	-17.5	-18.3	-18.9	-19.2	-19.3	-19.4	-19.8	-20.2	-19.2	-17.1
5-Mar	-21.0	-20.9	-21.3	-21.7	-21.5	-21.0	-20.4	-20.1	-19.7	-19.1	-18.5	-17.6	-15.8	-15.0	-13.4	-12.2	-12.3	-14.0	-16.7	-15.7	-15.1	-15.6	-16.6	-20.4	-17.7	-12.2
6-Mar	-22.5	-23.6	-25.2	-25.3	-25.8	-25.6	-23.9	-24.7	-22.5	-21.0	-19.5	-18.3	-16.9	-16.0	-15.2	-14.8	-15.5	-16.7	-18.0	-19.1	-19.6	-19.7	-19.6	-20.1	-20.4	-14.8
7-Mar	-20.1	-20.2	-20.2	-20.4	-21.0	-21.8	-22.5	-22.9	-22.7	-21.7	-20.4	-19.3	-17.9	-17.3	-16.7	-16.5	-16.8	-18.4	-20.7	-22.5	-24.3	-26.8	-28.1	-29.1	-21.2	-16.5
8-Mar	-29.4	-30.0	-30.3	-31.3	-32.2	-32.9	-33.7	-32.9	-26.7	-23.5	-21.9	-20.2	-19.0	-17.8	-16.6	-15.9	-15.8	-18.1	-20.6	-22.8	-24.1	-26.7	-28.8	-29.9	-25.1	-15.8
9-Mar	-31.4	-32.4	-33.5	-34.3	-34.4	-34.5	-35.1	-34.5	-28.5	-23.4	-21.6	-20.5	-18.9	-17.5	-16.3	-15.7	-15.7	-17.0	-19.7	-23.3	-26.3	-27.9	-29.0	-29.1	-25.9	-15.7
10-Mar	-29.9	-30.7	-32.2	-32.4	-33.5	-33.8	-32.6	-31.7	-25.5	-21.0	-18.1	-16.9	-16.3	-15.6	-15.4	-14.9	-15.5	-16.0	-18.1	-20.0	-20.3	-21.1	-21.9	-23.8	-23.2	-14.9
11-Mar	-25.1	-26.3	-26.2	-25.8	-25.8	-26.1	-25.0	-23.0	-19.9	-17.6	-16.3	-14.7	-14.0	-13.1	-12.2	-11.8	-11.8	-12.8	-15.6	-17.7	-17.8	-18.8	-19.2	-19.3	-19.0	-11.8
12-Mar	-19.6	-20.3	-20.9	-22.3	-21.9	-21.4	-21.5	-21.3	-18.9	-15.7	-13.5	-11.9	-10.6	-9.4	-8.1	-7.5	-7.8	-8.4	-9.7	-10.9	-11.6	-10.9	-11.0	-11.6	-14.4	-7.5
13-Mar	-12.0	-12.3	-12.9	-13.3	-13.4	-13.2	-13.1	-12.9	-12.5	-11.5	-10.3	-9.5	-8.3	-7.3	-6.2	-5.6	-4.9	-4.8	-5.4	-6.6	-7.0	-6.8	-6.1	-5.5	-9.2	-4.8
14-Mar	-6.0	-6.8	-7.2	-7.7	-7.8	-8.3	-8.7	-8.0	-5.0	-2.0	1.5	5.6	8.4	9.4	10.3	10.9	10.5	8.8	6.3	5.7	5.2	5.1	4.7	3.8	1.2	10.9
15-Mar	3.3	3.0	1.8	0.9	0.0	-0.5	-0.8	-0.1	1.8	5.5	6.8	7.9	8.8	9.7	9.5	9.6	9.2	8.2	6.0	4.0	1.1	-2.1	-3.8	-4.4	3.6	9.7
16-Mar	-5.6	-6.8	-5.9	-4.4	-5.5	-6.3	-6.9	-7.3	-6.9	-6.0	-5.2	-4.3	-3.3	-2.7	-2.5	-2.9	-4.4	-5.7	-6.7	-7.4	-7.8	-8.2	-8.5	-8.9	-5.8	-2.5
17-Mar	-9.6	-9.3	-8.9	-8.6	-8.0	-8.7	-9.3	-8.3	-5.9	-5.6	-4.1	-3.0	-1.4	-1.2	-0.2	1.0	1.4	-0.3	-2.7	-4.3	-4.7	-5.3	-5.9	-6.5	-5.0	1.4
18-Mar	-7.1	-7.9	-9.0	-9.8	-9.8	-9.7	-9.2	-8.0	-6.2	-3.4	-0.9	0.5	1.6	2.9	3.8	3.8	3.4	3.1	2.2	1.2	0.8	0.1	-0.7	-0.9	-2.5	3.8
19-Mar	-2.0	-4.4	-6.1	-7.7	-8.5	-9.5	-11.3	-11.7	-10.7	-9.5	-8.3	-6.9	-5.4	-4.5	-4.1	-4.0	-4.3	-5.7	-8.1	-9.9	-11.2	-12.6	-13.3	-13.5	-8.1	-2.0
20-Mar	-14.4	-14.9	-15.1	-15.1	-15.3	-15.6	-16.5	-16.4	-15.0	-14.1	-13.0	-11.8	-10.3	-9.1	-8.1	-7.3	-6.7	-7.0	-9.6	-13.5	-14.0	-13.6	-14.5	-14.9	-12.7	-6.7
21-Mar	-15.4	-15.6	-15.7	-16.2	-16.5	-16.3	-15.8	-13.0	-9.0	-6.3	-4.3	-2.3	-0.5	0.7	0.4	0.5	0.8	0.6	-0.1	-0.7	-1.3	-1.8	-2.0	-2.3	-6.3	0.8
22-Mar	-2.4	-2.5	-2.6	-3.0	-3.3	-3.3	-3.5	-3.5	-3.0	-2.1	-1.8	-1.8	-1.9	-1.8	-2.5	-2.9	-3.0	-3.1	-3.3	-3.4	-3.5	-3.7	-4.0	-4.2	-2.9	-1.8
23-Mar	-4.6	-5.6	-8.2	-9.0	-7.6	-6.6	-6.4	-5.9	-5.4	-4.8	-3.9	-2.7	-1.6	-0.8	0.0	0.0	-0.2	-1.0	-1.9	-2.5	-2.8	-2.7	-2.5	-2.5	-3.7	0.0
24-Mar	-2.6	-2.5	-2.7	-4.1	-6.5	-8.4	-8.7	-6.5	-2.3	0.2	2.2	4.0	4.8	5.9	6.3	6.2	5.5	4.8	3.8	3.3	3.2	2.4	1.5	-0.2	0.4	6.3
25-Mar	-0.3	-0.4	-0.5	-0.5	-0.7	-0.8	-0.8	-0.7	-0.5	0.2	1.2	1.9	2.5	2.5	3.2	4.0	4.1	3.0	1.9	-0.7	-2.4	-3.8	-3.2	-1.9	0.3	4.1
26-Mar	-1.6	-1.4	-1.3	-1.1	-1.6	-2.3	-2.7	-1.9	0.5	2.4	1.5	0.2	0.5	2.6	2.8	3.5	3.1	2.4	1.2	-0.6	-2.0	-2.6	-3.3	-3.6	-0.2	3.5
27-Mar	-2.9	-3.2	-3.4	-2.7	-3.3	-3.8	-3.5	-2.4	0.1	2.5	4.6	7.0	7.2	7.5	7.9	8.6	9.1	8.3	6.3	4.1	4.2	4.1	3.8	3.2	2.6	9.1
28-Mar	2.7	2.1	1.9	1.5	0.7	0.8	0.8	1.2	1.6	1.7	2.6	4.7	6.3	7.7	9.2	9.9	9.8	8.7	6.9	3.9	3.3	2.6	1.1	1.2	3.9	9.9
29-Mar	2.2	1.6	0.8	0.4	-0.6	-2.4	-1.8	0.9	2.6	5.8	6.3	6.9	9.5	10.4	9.9	9.2	8.2	6.4	5.4	3.4	2.9	2.8	3.4	2.6	4.0	10.4
30-Mar	2.0	0.6	0.3	-0.3	-0.4	-0.4	-0.3	0.0	0.5	1.3	2.0	2.8	2.4	2.6	3.2	3.6	3.3	2.5	2.1	1.6	1.5	1.5	1.4	1.2	1.5	3.6
31-Mar	1.2	1.0	0.7	0.0	-0.7	-1.3	-1.8	-1.2	0.7	4.4	7.5	10.1	11.3	12.0	11.2	11.9	11.4	11.1	10.3	9.7	9.4	9.2	8.7	7.7	6.0	12.0
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Brion MacKay River - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	135	18.15	18.15
-20 - 0	424	56.99	75.13
0 - 10	173	23.25	98.39
10 - 20	12	1.61	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

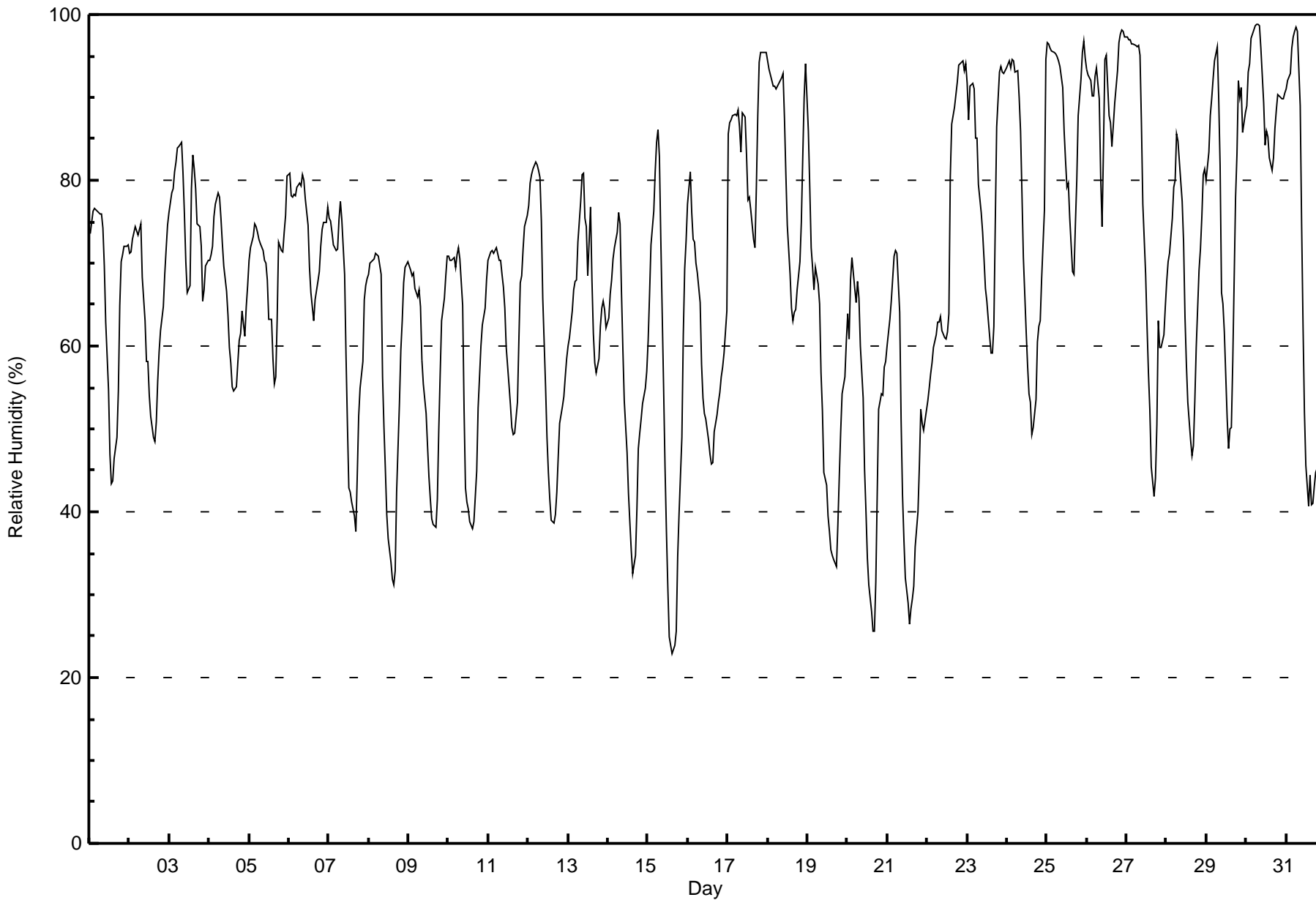
Brion MacKay River - March 2017

Maximum Value: 99 % on Mar 30 07:00 Maximum Daily Average: 90.8 % on Mar 30																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 23 % on Mar 15 15:00 Minimum Daily Average: 48.6 % on Mar 21 Maximum Diurnal Average: 80.5 % at hour 7 Minimum Diurnal Average: 51.2 % at hour 16 Monthly Average: 68.2 % Percentiles: P ₁ = 26 P ₁₀ = 43 Q ₁ = 56 Median = 70 Q ₃ = 81 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-Mar	74	75	76	77	77	76	76	76	74	70	63	55	47	43	44	46	49	55	65	70	71	72	72	72	65.6	77
2-Mar	71	71	73	74	74	73	74	75	68	63	58	58	54	51	49	48	51	56	59	62	65	69	72	75	64.3	75
3-Mar	76	79	79	81	82	84	84	85	81	76	70	67	67	79	83	81	79	75	74	72	65	67	70	70	76.1	85
4-Mar	70	71	72	76	77	78	78	75	72	70	67	64	60	58	55	55	55	58	61	62	64	61	65	67	66.3	78
5-Mar	70	72	73	75	74	74	73	72	71	70	70	68	63	63	58	55	56	63	73	72	71	74	76	81	69.5	81
6-Mar	81	78	78	78	78	79	80	79	81	80	78	75	70	66	65	63	66	68	69	72	74	75	75	77	74.3	81
7-Mar	75	75	74	72	71	72	75	77	75	69	59	50	43	42	41	39	38	44	51	55	58	66	67	68	60.8	77
8-Mar	69	70	70	71	71	71	71	69	56	50	45	40	37	34	32	31	33	42	53	59	63	68	70	70	56.0	71
9-Mar	70	69	68	69	67	66	67	65	58	55	52	48	44	42	39	38	38	42	50	57	63	66	69	71	57.2	71
10-Mar	71	70	70	71	70	71	72	71	65	52	43	41	40	39	38	39	42	45	53	60	63	63	65	68	57.5	72
11-Mar	70	71	72	71	72	72	70	70	69	67	65	60	55	53	50	49	50	53	61	68	68	72	74	76	64.9	76
12-Mar	77	80	81	81	82	82	81	80	75	66	55	49	45	42	39	39	40	42	47	51	53	54	56	58	60.6	82
13-Mar	60	61	64	67	68	68	73	77	81	81	75	74	69	77	68	61	58	57	58	62	65	65	64	62	67.3	81
14-Mar	63	66	68	70	72	74	76	75	67	60	53	47	42	39	35	32	35	40	48	49	51	53	55	57	55.3	76
15-Mar	61	66	72	76	81	85	86	83	73	55	45	38	31	25	23	23	24	26	35	40	49	61	69	73	54.1	86
16-Mar	77	81	76	73	73	70	69	65	58	54	52	51	49	47	46	46	50	52	53	54	56	57	59	64	59.7	81
17-Mar	86	87	87	88	88	88	88	87	83	88	88	83	78	78	76	73	72	79	88	94	95	96	96	95	85.8	96
18-Mar	94	93	92	91	91	91	91	92	92	93	87	81	75	69	64	63	64	64	67	70	75	83	90	94	82.0	94
19-Mar	86	79	72	69	67	70	67	65	57	52	45	43	39	38	35	35	34	33	39	44	50	54	56	60	53.8	86
20-Mar	64	61	68	71	67	65	68	66	60	54	45	40	34	31	28	26	26	31	42	52	54	54	57	58	50.9	71
21-Mar	60	63	65	68	71	72	71	64	51	42	37	32	29	26	28	29	31	36	40	46	52	51	50	52	48.6	72
22-Mar	53	55	57	58	60	61	63	63	64	62	61	61	62	64	80	87	89	90	92	94	94	94	93	94	73.0	94
23-Mar	92	87	91	92	91	85	85	80	76	74	70	67	65	63	59	59	62	75	86	93	94	93	93	93	80.3	94
24-Mar	94	94	94	95	94	93	93	90	86	78	71	62	58	54	53	49	50	53	60	62	63	68	76	95	74.4	95
25-Mar	97	96	96	96	95	95	95	94	94	91	86	82	79	80	75	69	69	75	80	88	92	95	97	95	87.9	97
26-Mar	93	93	92	90	90	93	94	90	81	74	84	95	95	88	87	84	87	89	93	97	98	98	98	97	90.8	98
27-Mar	97	97	97	96	96	96	96	96	95	87	77	69	62	57	52	45	42	44	51	63	60	60	61	65	73.4	97
28-Mar	68	70	71	75	79	80	86	85	80	78	72	64	58	53	49	47	48	53	60	69	72	76	81	81	68.9	86
29-Mar	80	83	88	90	92	94	96	90	82	66	65	62	51	48	50	50	58	78	83	92	90	91	86	88	77.3	96
30-Mar	89	93	94	97	98	99	99	99	99	96	89	84	86	85	83	81	83	86	88	90	90	90	90	90	90.8	99
31-Mar	91	92	93	96	97	98	98	98	89	75	62	52	46	41	44	41	41	43	45	46	44	43	49	52	65.7	98
																			76.7 77.4 78.2 79.2 79.6 79.8 80.5 79.1 74.6 69.3 64.2 60.0 55.9 54.0 52.6 51.2 52.2 56.4 62.0 66.6 68.5 70.6 72.6 74.8					Diurnal Average		
																			97 97 97 97 98 99 99 99 99 99 96 89 95 95 88 87 87 89 90 93 97 98 98 98 97					Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Brion MacKay River - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Brion MacKay River - March 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	52	6.99	6.99
40 - 60	178	23.92	30.91
60 - 80	320	43.01	73.92
80 - 100	194	26.08	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

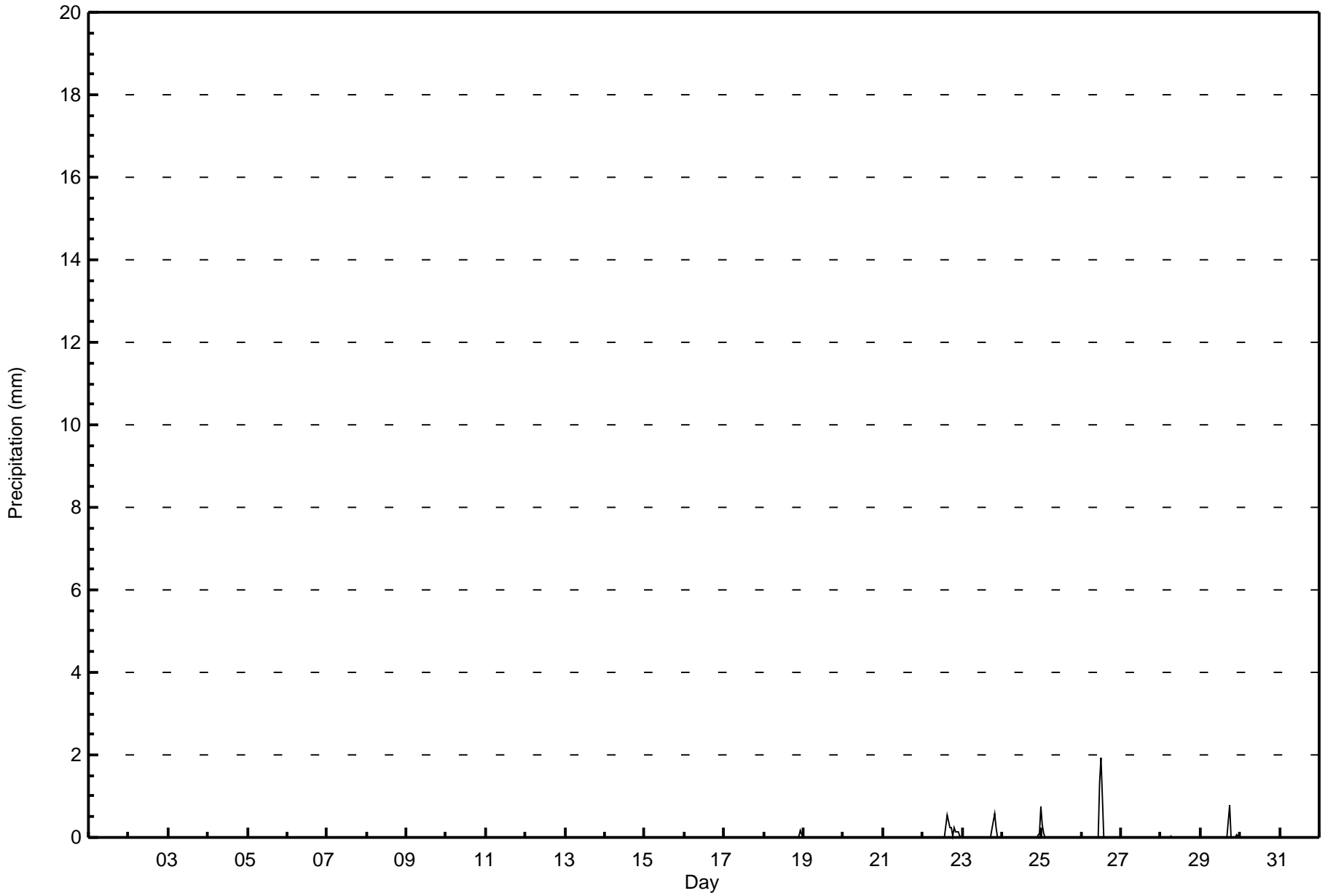
Brion MacKay River - March 2017

Maximum Value: 1.9 mm on Mar 26 13:00 Maximum Daily Total: 3.3 mm on Mar 26		Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9																											
Minimum Value: 0.0 mm on Mar 1 01:00 Maximum Diurnal Total: 1.9 mm at hour 13 Monthly Total: 8.63 mm		Minimum Daily Total: 0.0 mm on Mar 1 Minimum Diurnal Total: 0.0 mm at hour 3 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																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
16-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	M	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.3	0.2		
19-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.0	1.9	0.5		
23-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.0	0.0	0.0	1.0	0.6			
24-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8	0.9	0.8			
25-Mar	0.3	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	0.4	0.3			
26-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	1.9			
27-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	
29-Mar	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.1	0.0	0.9	0.8	0.9	0.8	
30-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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					
M - Maintenance																													



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Brion MacKay River - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Brion MacKay River - March 2017

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	737	99.19	99.19
0.4 - 0.5	1	0.13	99.33
0.6 - 0.7	1	0.13	99.46
0.8 - 1.4	3	0.40	99.87
1.5 - 10	1	0.13	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

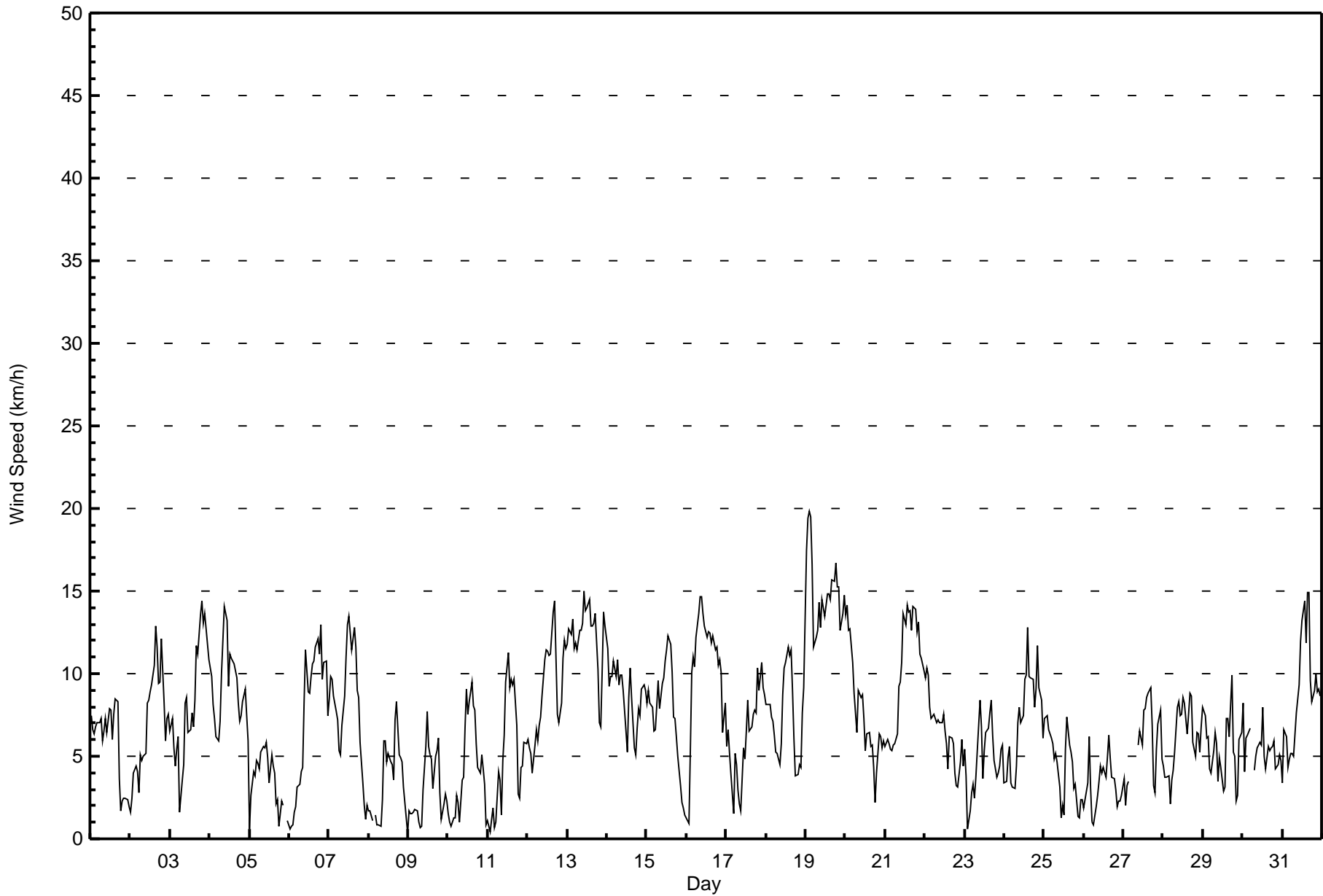
Wind Speed (WS) - km/h
Brion MacKay River - March 2017

Maximum Speed: 20 km/h on Mar 19 03:00	Maximum Daily Speed Average: 14.7 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 9 00:00	Minimum Daily Speed Average: 1.2 km/h on Mar 9	Hours of Data: 734
Maximum Diurnal Speed Average: 3.3 km/h at hour 18	Minimum Diurnal Speed Average: 1.1 km/h at hour 2	Hours of Missing Data: 10
Monthly Average Velocity: 1.9 km/h 100.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 9 P ₉₀ = 13 P ₉₉ = 15	Percent Operational Time: 98.7

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-Mar	NE7	NE7	NE6	NE7	NE7	NE7	NE7	NE6	NNE7	NNE7	NE6	ENE8	ENE8	ENE6	N8	NNE8	NNE8	ENE4	ESE2	SE2	SE2	SE2	SE2	SE2	NE5.0	NNE8
2-Mar	SSE2	SE2	SSE4	SSE4	SSE4	SSE3	SSE5	SSE5	SSE5	SSE5	SE8	SE8	SE9	SE9	ESE10	ESE13	ESE12	ESE9	ESE9	SE12	SE8	ESE6	SE7	SE8	SE6.8	ESE13
3-Mar	SE7	SE7	SE5	SE4	SE5	SSE6	ESE2	SE4	S5	S8	SSW9	SSW6	WSW7	W8	W7	W8	NW12	NW11	NW14	NNW14	NW13	NW14	NW13	NW11	WNW3.2	NNW14
4-Mar	NW10	NW10	NNW8	NNE7	NE6	NNE6	NNE7	NE10	NNE12	NNE14	NNE13	NNE9	NNE11	NNE11	NNE11	NNE11	NNE10	NNE8	NNE7	NE7	ENE8	NE9	ENE7	ENE6	NNE8.3	NNE14
5-Mar	WSW1	N3	NNE4	NE4	NE5	NE5	E4	E5	E6	ESE5	SE6	SE5	SSE3	SE5	ESE4	ENE4	ESE2	ENE2	NNW1	NNE2	E2	AF	AF	WNW1	E2.6	SE6
6-Mar	S1	SE1	NNE1	NE2	NNE2	NE3	NNE3	N4	N4	NNE8	N11	NNE9	NNE9	NNE10	NNE11	NNE11	NNE12	NNE12	NNE11	NNE13	NNE10	NNE11	N11	N7	NNE7.2	NNE13
7-Mar	NNW8	NNW10	NNW10	NNW9	NNW8	NW7	NNW5	N5	N7	NNW9	NNW11	N13	N13	N12	N11	NNE13	NE12	NE9	NE9	NE6	NE3	ENE2	E1	ENE2	N7.3	N13
8-Mar	NE2	NNE2	NE1	AF	SSW1	SSW1	SSE1	SW1	WNW2	NNW6	NNW6	NW5	NNW5	NNW5	NNE4	N4	NNE7	NE8	NE5	NE5	NE5	NE3	NE2	SSE0	N2.6	NE8
9-Mar	SSE2	SSE1	SE2	SSE2	SSE2	SSE2	SE1	SSE1	W1	SW3	NW6	N8	N6	N5	N5	NE3	N5	ESE5	SE6	ESE3	E1	ENE2	NE3	NE2	NE1.2	N8
10-Mar	NE1	ESE1	ESE1	ESE1	ENE1	NE3	ENE2	NE1	NE4	NE4	E7	ENE9	ESE8	E8	ESE9	ENE8	E8	ENE6	NE4	NE4	NE5	NE4	ENE3	ENE1	ENE4.0	ESE9
11-Mar	E1	E0	ENE1	ESE2	ENE1	SE1	SSE4	SE4	SE1	SE5	SE6	ESE9	ESE11	ESE9	ESE10	E9	E10	E7	E3	E2	ESE4	ESE4	ESE6	ESE6	ESE4.7	ESE11
12-Mar	ESE6	ESE5	ESE5	ESE4	ESE6	ESE7	ESE6	ESE7	ESE7	SE9	SE11	SE11	SE11	ESE11	ESE11	SE14	SSE14	SSE11	SE8	SE7	SE8	SSE11	SSE12	SSE12	SE8.6	SSE14
13-Mar	SSE12	S13	SSE12	SSE13	SSE11	SSE12	SSE11	SSE13	SSE13	SSE13	S15	S14	S14	S14	S13	S13	S14	S10	SSE7	S7	S10	SSW14	SSW13	S11.9	S15	
14-Mar	SSW12	SSW9	SSW10	S10	SSW11	S10	S11	S9	SSW10	SSW10	SSW9	SW7	SW5	S9	S10	S9	SSE5	ESE5	ESE7	ESE8	ESE7	SE9	SE9	SSE9	S7.3	SSW12
15-Mar	SE8	SSE9	SSE8	S8	SSE7	S7	SSW8	SSW10	SW8	SW9	W10	W11	WSW11	WSW12	W12	WNW10	W7	NW7	NNE6	NNE5	ENE3	SSE2	SE2	SSE1	SW4.1	WSW12
16-Mar	SSE1	E1	NE5	NNE10	NNE11	NNE10	NE12	NE14	NE15	NE15	NE14	NE13	NNE12	NE13	NE12	NE12	NNE12	NE11	NE12	NE10	NE11	NE10	NE6	NE8	NE10.3	NE15
17-Mar	NE6	ENE7	ENE5	NE4	NNE2	NNW5	NNE5	NE3	SE2	NNW2	ESE6	NNW5	NNW7	NNW8	N7	N7	NNE8	NNE8	NE8	NE10	NE9	NE11	NE9	NE9	NNE5.2	NE11
18-Mar	NE8	NE8	NE8	NNE7	NE7	NE6	NE5	NE5	NE5	E6	ESE9	ESE10	ESE11	ESE12	ESE11	ESE11	ESE9	E6	ENE4	NNW4	N5	N4	NW8	WNW9	ENE4.8	ESE12
19-Mar	NW17	WNW19	WNW20	WNW19	WNW17	W12	W12	W13	WNW14	W13	W14	W13	W14	W15	WNW15	W14	WNW16	WNW16	NW17	NW15	NW15	NW13	WNW14	WNW15	WNW14.7	WNW20
20-Mar	WNW14	WNW14	WNW13	NW13	NW11	NW9	NW8	NW6	NW9	WNW9	NW9	WNW7	NW5	WNW6	WNW6	WNW6	W6	WSW4	SSE2	SE4	SE6	SE6	SE6	SE6	WNW5.1	WNW14
21-Mar	SSE6	SSE6	SSE6	SSE5	SSE5	SSE6	SE6	SSE6	SSE9	SSE9	SSE11	SSE14	SE13	SSE14	SE14	SE14	ESE13	SE14	SE14	SE13	SSE13	SE11	SE11	SE10	SE9.9	SSE14
22-Mar	SE10	SE10	SE10	SE8	ESE7	ESE8	ESE7	ESE7	ESE7	ESE7	E7	ESE8	ESE7	SE6	E4	NNE6	N6	N6	NNE4	NNW3	N3	NNW5	NNE6	NNE4	E4.2	SE10
23-Mar	NNE5	NNE4	ENE1	ESE2	W3	NNW3	NNE2	NNE4	NE7	NE8	NE7	NNE4	NE5	NE6	E7	E8	ESE8	ESE6	ESE5	ENE4	ENE4	E4	ESE5	SE6	ENE3.7	NE8
24-Mar	SE3	S3	SSW5	S6	SE3	ESE3	ESE3	SE4	SE7	SSE8	S7	SSE7	SE10	ESE10	ESE13	SE10	ESE10	ESE10	ESE8	ESE9	ESE12	SE9	ESE8	ESE6	SE6.7	ESE13
25-Mar	ESE7	ESE7	ESE7	ESE7	ESE6	ESE6	SE5	ESE5	SE5	SSE3	SSW1	SW2	WNW1	N5	N7	N6	NE5	ESE5	ESE3	E3	E1	ENE1	ENE2	E2	E2.8	ESE7
26-Mar	NE2	ENE2	ENE3	ESE6	ESE3	ESE1	NNE1	NE2	SE3	WSW3	W4	WNW4	NNE4	NNE4	ESE5	E6	E5	E4	ENE4	E3	ENE2	E2	E2	E3	E1.9	E6
27-Mar	E4	E2	E3	E4	AF	AF	AF	AF	AF	ESE6	ESE7	E6	ESE8	E8	E9	E9	ESE9	ESE7	ENE3	ENE3	ESE5	SE7	SE8	SE5	ESE5.5	ESE9
28-Mar	SE4	SSE4	SSE4	SSE4	SE2	SSE4	S4	SSE5	S8	SSE8	S7	SSE8	SSE9	SE8	S6	ESE8	ESE9	E9	ESE6	ESE5	SE6	SE6	SSE5	S7	SE5.5	ESE9
29-Mar	S8	S7	S6	S6	S4	SSE4	S5	S6	S6	SSW3	S5	SSW4	E3	NE3	ESE7	SE7	S6	SE10	SE5	ESE5	ENE2	ENE3	E6	SE6	SSE4.3	SE10
30-Mar	ESE8	SE4	SE6	ESE6	ESE7	AF	AF	E4	E5	ENE5	ENE6	NE6	N8	ENE5	NE4	NE6	NE5	E5	ESE6	ESE6	ESE4	ESE5	SE5	SSE5	E4.6	ESE8
31-Mar	SSE3	SE7	SSE6	S4	SW5	S5	S5	S5	S8	SSW8	SSW9	SSW12	SSW13	SSW14	SSW12	SSW15	SSW15	SSW10	S8	SSW9	SW10	SSW9	SSW9	SW9	SSW8.4	SSW15

ESE1.3 SE1.1 ESE1.2 ESE1.5 ESE1.2 ESE1.2 ESE1.5 ESE1.9 ESE1.6 SE1.4 SE1.5 SE1.6 E1.9 E2.3 E2.8 E2.9 E2.9 E3.3 ENE3.1 ENE3.1 E2.7 E2.4 ESE2.3 SE1.7	Diurnal Average
NW17WNW19WNW20WNW19WNW17 SSE12 W12 NE14 NE15 NE15 S15 S14 W14 W15WNW15 SSW15WNW16WNW16 NW17 NW15 NW15 NW14 SSW14WNW15	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
Brion MacKay River - March 2017

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	277	37.74	37.74
6 - 11	353	48.09	85.83
12 - 19	103	14.03	99.86
20 - 28	1	0.14	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 734

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Brion MacKay River - March 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	20	37	31	29	33	33	37	11	6	5	3	3	4	2	11	277
6 - 11	14	35	41	11	19	70	48	24	27	17	5	2	7	7	14	12	353
12 - 19	3	9	11	0	0	6	8	13	9	9	0	1	10	12	11	1	103
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
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	29	64	89	42	48	109	89	74	47	32	10	6	20	24	27	24	734

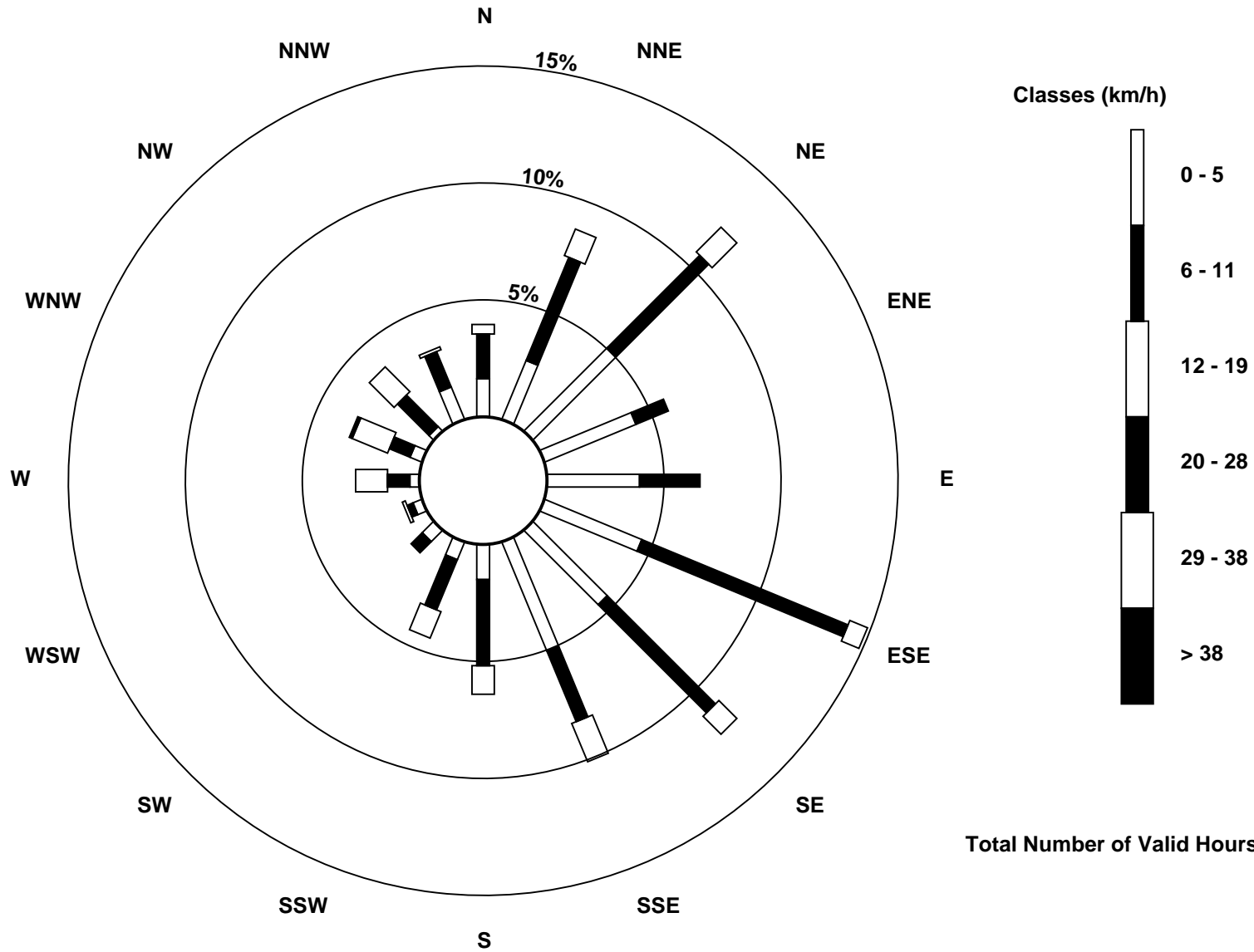
Total Number of Valid Hours: 734

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Wind Speed (WS) - km/h
Brion MacKay River (AMS 20)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Brion MacKay River - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Mar 19 02:00	Hours in Service: 744 Hours of Data: 734 Hours of Missing Data: 10 Hours of Calibration: 0 Percent Operational Time: 98.7
Minimum Value: 0 km/h on Mar 1 21:00	
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-Mar	2	2	2	2	2	2	2	2	2	2	2	3	3	2	3	2	3	3	1	1	0	1	0	0	3
2-Mar	1	0	1	1	1	1	1	1	2	1	3	3	3	3	3	3	4	3	3	3	3	2	2	2	4
3-Mar	2	2	2	2	2	2	2	1	2	3	3	3	3	3	4	4	4	4	4	4	4	4	4	3	4
4-Mar	3	3	2	3	2	2	2	4	4	5	4	3	4	4	4	4	3	3	2	3	3	3	3	3	5
5-Mar	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	AF	AF	1	2
6-Mar	1	1	1	1	1	2	1	1	1	3	3	4	3	3	3	3	4	4	4	4	4	4	3	2	4
7-Mar	3	3	3	3	2	2	1	1	2	2	3	4	4	4	4	4	4	3	3	2	1	1	1	1	4
8-Mar	1	1	1	AF	1	1	1	1	1	2	2	2	2	2	3	2	3	3	2	1	1	1	1	1	3
9-Mar	0	1	0	1	1	1	1	1	1	1	3	3	3	2	2	2	2	3	1	2	1	1	1	1	3
10-Mar	1	1	1	1	1	1	1	1	1	2	3	3	3	3	3	3	3	2	1	1	2	1	1	1	3
11-Mar	1	1	1	1	1	1	1	1	2	2	2	3	3	3	4	4	3	3	1	1	1	1	1	1	4
12-Mar	1	1	1	1	1	2	1	2	2	3	3	4	4	4	4	4	5	4	2	2	2	3	4	4	5
13-Mar	4	4	4	4	4	4	4	4	4	5	5	4	4	5	4	4	4	4	4	2	2	3	4	4	5
14-Mar	4	3	3	3	3	3	3	3	3	3	3	2	2	3	3	3	2	1	2	2	2	2	3	3	4
15-Mar	2	3	3	3	2	2	2	3	3	4	4	5	5	5	5	4	4	2	2	1	1	1	1	1	5
16-Mar	1	1	2	3	4	4	4	5	5	5	4	4	4	4	4	4	4	4	4	4	4	3	3	3	5
17-Mar	2	2	1	1	1	2	1	1	2	2	4	2	2	2	2	2	2	2	3	3	3	4	3	3	4
18-Mar	3	3	2	2	2	2	1	1	2	4	3	3	3	4	4	3	3	2	1	2	1	2	2	3	4
19-Mar	6	7	7	7	6	5	5	5	6	5	6	5	6	6	6	6	6	6	6	5	5	5	4	5	7
20-Mar	4	5	4	4	3	3	2	2	3	3	3	3	3	3	3	3	3	2	1	1	1	2	1	2	5
21-Mar	1	1	1	1	1	1	1	2	3	3	4	4	4	4	4	4	4	5	5	4	4	3	3	3	5
22-Mar	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	1	3
23-Mar	2	1	1	1	1	1	1	1	2	3	2	2	2	2	3	2	3	2	2	1	1	2	1	1	3
24-Mar	1	1	1	1	1	1	1	1	2	3	2	2	3	3	4	3	3	3	2	4	3	3	3	1	4
25-Mar	2	2	2	2	1	2	1	1	2	1	1	1	1	2	2	3	2	2	1	1	1	1	1	1	3
26-Mar	1	1	1	2	2	2	1	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2
27-Mar	1	1	1	2	AF	AF	AF	AF	AF	2	2	2	3	3	3	3	3	2	1	1	2	2	2	1	3
28-Mar	1	1	1	1	1	1	1	2	3	3	3	3	3	3	3	4	3	3	2	1	2	1	1	2	4
29-Mar	2	2	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	5	1	1	1	2	2	2	5
30-Mar	3	1	2	3	2	AF	AF	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	1	3
31-Mar	2	2	2	2	2	2	2	1	2	3	3	4	5	5	4	5	5	3	3	3	4	3	2	3	5
	6	7	7	7	6	5	5	5	6	5	6	5	6	6	6	6	6	6	6	5	5	5	4	5	
	Diurnal Maximum																								

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

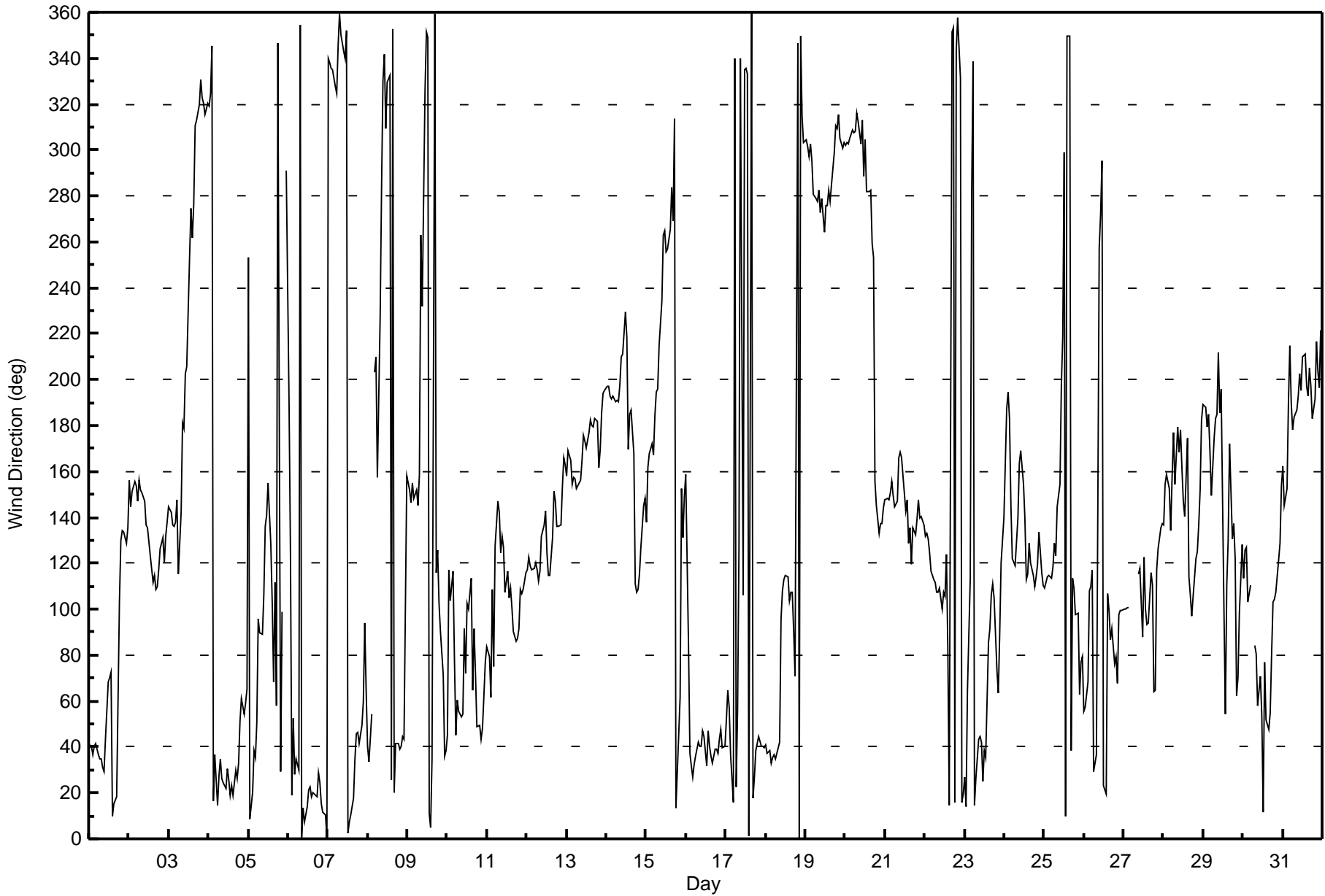
Wind Direction (WD) - deg
Brion MacKay River - March 2017

Direction of Maximum Speed: 297 deg on Mar 19 03:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 291.8 deg on Mar 19	Hours of Data: 734
Direction of Minimum Speed: 158 deg on Mar 9 00:00	Hours of Missing Data: 10
Direction of Minimum Daily Speed Average: 1.2 deg on Mar 9	Percent Operational Time: 98.7
Monthly Average Direction: 149.9 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-Mar	41	40	36	40	42	36	35	35	31	29	43	68	70	73	10	15	18	61	104	130	134	133	129	135	45.4
2-Mar	156	145	151	156	154	147	156	152	151	147	136	136	130	124	112	114	108	110	117	127	131	120	132	138	129.4
3-Mar	144	142	137	136	138	148	115	142	181	179	203	206	253	275	262	277	310	313	320	331	322	320	316	320	283.3
4-Mar	319	325	345	16	37	15	27	35	26	25	22	30	26	19	23	19	30	26	33	51	61	55	59	65	24.5
5-Mar	253	9	20	38	35	51	96	90	89	106	136	141	155	128	103	68	112	58	347	29	99	AF	AF	291	86.2
6-Mar	190	124	19	52	28	35	30	354	1	13	7	14	21	23	18	20	19	18	29	24	16	12	10	1	17.2
7-Mar	340	338	336	335	328	324	346	360	350	343	340	352	3	7	10	18	35	46	46	41	49	60	94	65	1.8
8-Mar	41	33	54	AF	203	210	158	227	284	330	342	310	329	333	26	353	20	41	42	39	40	44	43	158	8.9
9-Mar	155	152	146	155	148	152	145	159	263	232	326	352	349	11	5	35	359	116	126	102	90	71	36	38	41.3
10-Mar	45	117	104	117	78	45	60	55	53	54	92	72	103	100	114	65	91	72	49	49	43	48	62	77	76.3
11-Mar	84	79	61	109	75	128	147	142	125	132	127	107	117	105	109	101	91	86	87	91	109	107	109	116	108.6
12-Mar	117	123	119	117	118	120	117	112	117	132	137	143	124	115	115	131	151	147	136	136	137	153	166	163	134.1
13-Mar	158	169	165	155	157	157	153	155	156	165	176	174	170	177	182	180	179	183	182	162	170	186	194	195	171.2
14-Mar	197	197	193	191	193	190	191	190	198	210	211	229	218	170	185	187	168	111	107	109	115	127	145	148	178.5
15-Mar	138	161	168	172	167	184	195	196	215	235	263	265	256	257	265	284	269	314	13	29	62	153	131	149	227.5
16-Mar	159	83	38	32	27	32	36	42	40	40	47	45	32	47	40	36	33	39	39	37	43	48	40	40	39.4
17-Mar	52	65	58	36	16	340	22	56	127	340	106	335	335	333	1	360	18	27	39	42	45	40	40	40	28.6
18-Mar	41	37	38	33	35	36	35	37	42	96	108	113	115	114	104	108	107	91	71	347	0	350	315	303	66.1
19-Mar	304	301	297	302	296	281	279	278	283	273	279	264	276	276	283	278	285	299	310	309	315	305	301	303	291.8
20-Mar	302	303	303	305	309	308	308	316	313	303	313	289	305	282	282	282	260	253	156	145	133	137	137	144	295.0
21-Mar	148	148	148	151	156	150	145	147	166	168	166	158	143	147	129	135	120	136	133	139	148	140	140	136	144.1
22-Mar	132	133	131	125	117	113	111	107	107	109	100	107	106	124	83	14	351	353	16	343	358	331	16	19	93.5
23-Mar	27	14	65	113	281	339	15	26	43	44	42	25	38	35	85	92	106	111	105	74	63	89	120	130	65.3
24-Mar	140	187	194	183	145	122	119	129	140	164	169	155	139	113	116	129	120	115	110	114	120	133	116	110	132.0
25-Mar	109	112	114	115	114	118	129	123	144	154	198	219	299	9	349	350	39	113	109	98	98	63	77	79	98.9
26-Mar	56	57	68	108	110	117	29	37	142	257	272	296	23	19	107	99	87	92	76	80	68	98	100	100	80.4
27-Mar	100	100	100	101	AF	AF	AF	AF	AF	116	118	88	123	100	93	94	116	111	64	65	117	126	135	137	108.7
28-Mar	136	154	159	152	134	157	177	154	179	168	178	162	147	141	174	114	106	97	106	122	125	137	152	183	145.8
29-Mar	189	188	179	185	169	149	174	183	185	211	186	196	99	54	110	130	172	130	137	122	63	70	98	128	153.7
30-Mar	114	126	127	103	110	AF	AF	84	81	58	71	54	11	77	52	47	55	81	103	104	107	122	129	154	89.0
31-Mar	162	145	153	190	215	190	178	184	187	193	203	195	210	211	197	193	205	197	183	192	216	204	197	221	196.2

117.7 130.8 122.6 113.2 111.1 109.5 116.0 113.0 122.4 129.5 128.6 124.1 99.8 95.7 90.9 84.4 82.6 84.1 77.3 74.5 83.5 95.5 111.6 129.0
 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
Brion MacKay River - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 91 deg on Mar 17 10:00 Minimum Value: 0 deg on Mar 27 00:00 Percentiles: P ₁ = 10 P ₁₀ = 18 Q ₁ = 22 Median = 26 Q ₃ = 33 P ₉₀ = 47 P ₉₉ = 79		Hours in Service: 744 Hours of Data: 734 Hours of Missing Data: 10 Hours of Calibration: 0 Percent Operational Time: 98.7																							
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-Mar	23	26	23	23	22	22	21	22	24	25	31	42	44	46	40	28	26	38	22	19	19	20	15	14	46
2-Mar	15	11	14	13	10	26	8	9	14	28	23	31	32	31	27	20	21	22	19	21	23	19	17	20	32
3-Mar	23	22	32	24	28	30	72	27	50	24	32	32	46	43	45	44	25	25	21	21	22	19	19	20	72
4-Mar	20	18	21	27	26	21	23	23	25	25	26	31	27	28	29	26	25	25	25	28	28	25	26	31	31
5-Mar	82	22	19	25	25	30	29	30	33	36	36	46	67	46	55	56	87	47	54	41	35	AF	AF	46	87
6-Mar	71	70	81	47	20	38	23	23	31	24	25	34	30	27	26	25	25	24	23	24	27	24	24	23	81
7-Mar	24	20	22	21	19	20	22	23	22	24	24	26	29	28	30	27	27	23	23	21	24	27	39	28	39
8-Mar	16	22	75	AF	34	64	59	54	45	30	36	66	51	64	69	76	36	25	23	21	18	21	18	81	81
9-Mar	20	25	18	30	13	14	18	27	61	68	51	37	57	64	63	77	47	62	15	29	45	36	14	13	77
10-Mar	22	32	74	29	34	14	34	48	26	56	40	31	34	34	31	31	32	32	19	21	23	22	26	56	74
11-Mar	29	39	30	10	39	36	12	15	51	32	32	31	25	31	38	37	32	32	30	28	14	15	13	15	51
12-Mar	15	14	14	13	13	14	14	15	16	24	26	28	27	28	29	26	27	25	19	18	20	25	27	25	29
13-Mar	26	25	25	25	27	26	26	25	25	27	24	25	26	25	26	26	25	23	24	27	29	22	20	23	29
14-Mar	22	22	22	19	20	20	18	21	23	26	31	43	61	32	27	29	30	18	17	18	18	19	22	25	61
15-Mar	24	26	26	25	26	33	18	20	31	36	51	49	48	44	47	44	45	28	25	22	32	26	23	63	63
16-Mar	66	72	20	24	22	25	24	24	25	26	26	29	30	27	27	28	26	25	23	22	25	24	28	24	72
17-Mar	28	24	25	32	68	26	30	26	72	91	47	65	31	25	30	32	29	22	22	24	25	24	23	22	91
18-Mar	23	23	21	21	24	23	21	21	33	52	28	20	22	26	28	24	23	30	28	25	31	42	20	23	52
19-Mar	23	23	26	23	27	35	38	37	36	45	41	45	42	42	40	43	36	28	21	21	20	21	22	23	45
20-Mar	22	23	23	22	20	22	21	22	25	35	36	49	69	58	51	60	52	60	30	13	13	14	15	20	69
21-Mar	18	17	17	15	15	15	16	19	24	29	27	30	30	25	24	24	22	23	23	24	24	24	21	21	30
22-Mar	20	21	21	20	19	17	19	20	24	29	32	27	25	32	42	23	26	26	22	23	28	20	23	24	42
23-Mar	24	25	71	36	35	25	34	28	28	27	32	70	50	40	43	34	26	27	24	29	24	31	19	22	71
24-Mar	23	32	19	13	17	18	17	18	19	30	35	35	27	22	21	23	20	19	21	19	24	20	20	15	35
25-Mar	19	17	17	18	18	18	22	19	22	43	78	80	80	41	26	35	38	35	22	26	41	37	25	33	80
26-Mar	51	44	39	19	52	81	71	47	54	53	38	31	53	46	30	31	31	27	33	25	34	11	28	0	81
27-Mar	0	0	0	0	AF	AF	AF	AF	AF	25	30	41	29	28	30	33	25	18	35	39	21	18	20	19	41
28-Mar	18	22	24	22	21	27	25	29	29	31	33	41	39	39	58	40	31	29	23	16	16	16	14	20	58
29-Mar	18	18	19	17	21	19	17	20	34	57	52	51	78	72	30	24	41	31	18	15	44	42	31	18	78
30-Mar	21	27	21	27	25	AF	AF	35	33	33	38	46	27	43	68	35	35	38	30	26	31	25	20	26	68
31-Mar	38	24	30	29	28	24	26	29	27	28	33	30	36	30	27	24	26	26	23	22	31	25	21	34	38
82 72 81 47 68 81 72 54 72 91 78 80 80 72 69 77 87 62 54 41 45 42 39 81																								Diurnal Maximum	
AF - Analyzer Failure																									



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 14, 2017	Last Calibration	February 14, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	9:35	End Time (MST)	14:03
Gas Cert Reference	EY0000657	Station temp.	22 Deg C
Cal Gas Concentration	48 ppm	Cal Gas Exp Date	November 4, 2019
Calibrator Make/Model	API T700	Serial Number	1220
ZAG Make/Model	API 701	Serial Number	4766
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9627

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-634	-634
Analyzer IP address	192.168.1.43		Lamp voltage	844	846
Calculated slope	0.999654	1.000712	Chamber temp	45	45.2
Calculated intercept	0.339064	1.005926	Pressure	662.9	663.8
Analyzer Background	12.4	12.4	Flow	0.481	0.483
Analyzer Coefficient	0.922	0.907	Intensity	88	88

Analyzer make Thermo 43i Analyzer serial # 1501301450

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	78.6	754.6	748.0	1.009
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	78.6	754.6	753.9	1.001
second point	5000	39.3	377.3	374.6	1.007
third point	5000	19.6	188.2	186.5	1.009
as left zero	5000	0.0	0.0	0.8	----
as left span	5000	78.6	754.6	752.9	1.002
Average Correction Factor					1.006

Corrected As found 747.7 Previous response 754.5 % change 0.9%

Notes:

Sample inlet filter replaced after as founds. Slightly adjusted span.

Calibration Performed By: Asad Hidayat



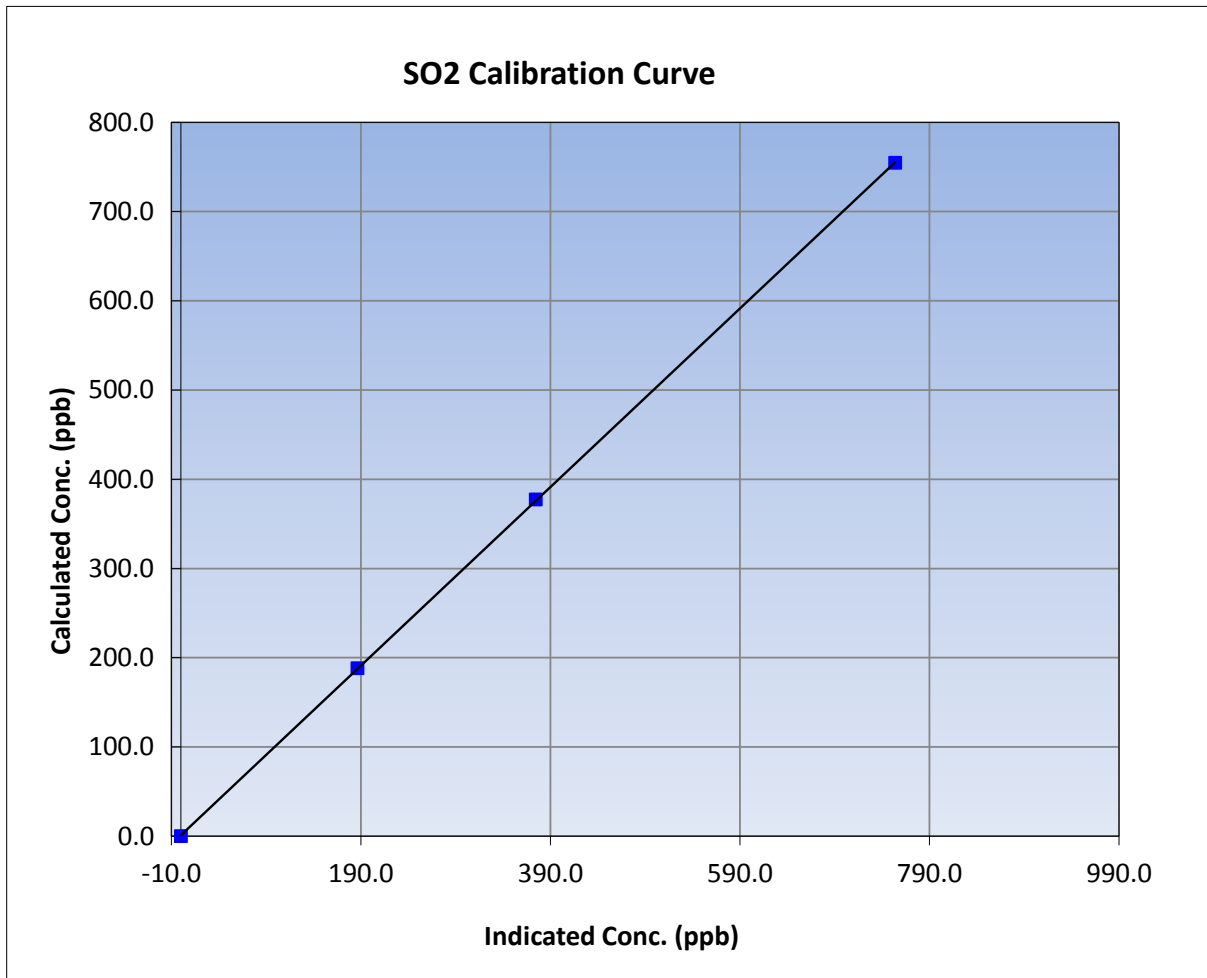
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 14, 2017	Previous Calibration	February 14, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	9:35	End Time (MST)	14:03
Analyzer make	Thermo 43i	Analyzer serial #	1501301450

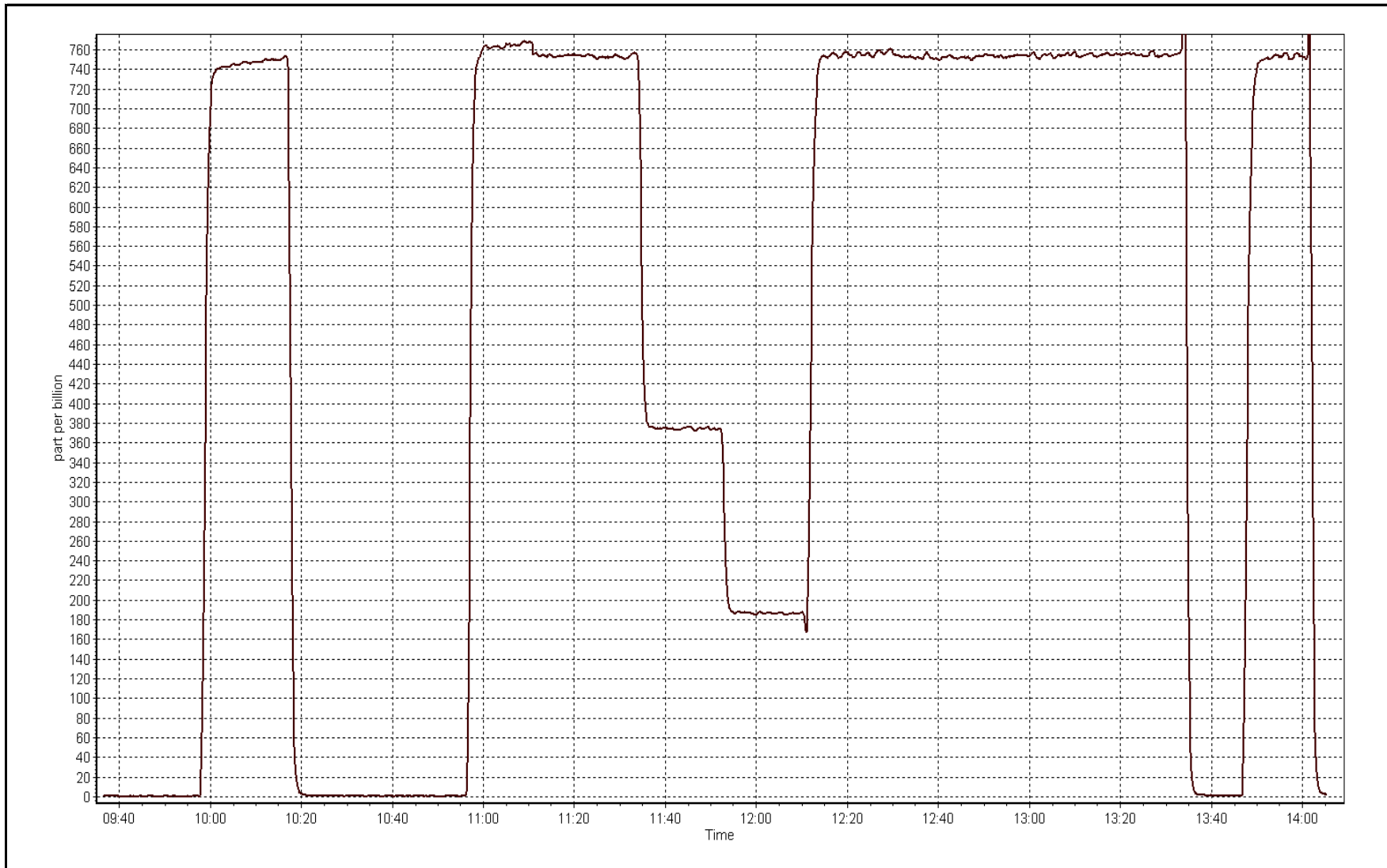
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999985
754.6	753.9	1.0009		
377.3	374.6	1.0073	Slope	1.000712
188.2	186.5	1.0091		
			Intercept	1.005926



SO2 Calibration Plot

Date: March 14, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	March 15, 2017	Last Calibration	February 17, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	10:34	End Time (MST)	12:40
Gas Cert Reference	LL119508	Station temp.	22 Deg C
Cal Gas Concentration	5.35 ppm	Cal Gas Exp Date	February 13, 2018
Calibrator Make/Model	API 700	Serial Number	1220
ZAG air Make/Model	API 701	Serial Number	4766
DACS make/model	Campbell Scientific CR3000	Serial Number	9627
SO2 gas concentration	50 ppm	SO2 gas cert/exp	NA NA

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	505	505
Analyzer IP address	192.168.1.75		Lamp voltage	2492	2466
Calculated slope	0.995621	0.993988	Chamber temp	50	50
Calculated intercept	0.028264	0.123566	Pressure	22.3	22.5
Analyzer Background	25.4	25.4	Flow	0.587	0.597
Analyzer Coefficient	0.990	0.99	Intensity	62	61
			Converter temp.	314	314

Analyzer make/model	API T101	Analyzer serial #	196
Converter make/model	NA	Converter serial #	NA

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	75.6	80.9	81.3	0.995
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	75.6	80.9	81.3	0.995
second point	5000	37.8	40.4	40.4	1.000
third point	5000	18.9	20.2	20.2	1.002
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	75.6	80.9	80.9	1.001
Average Correction Factor					0.999

Corrected As found	81.4	Previous response	81.2	% change	-0.2%
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Notes:

Sample inlet filter replaced after as founds. No adjustments.

Calibration Performed By: Asad Hidayat



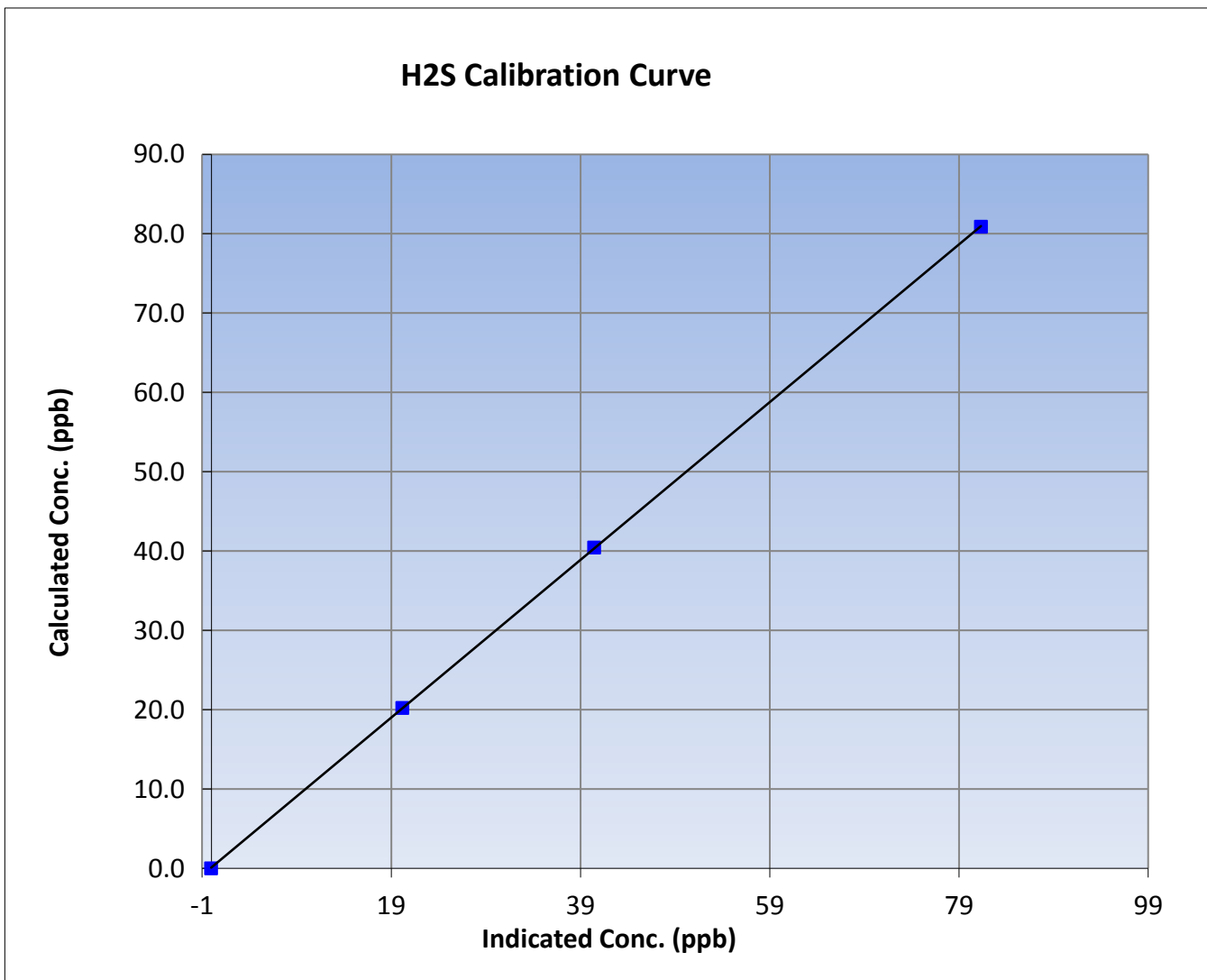
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	March 15, 2017	Previous Calibration	February 17, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	10:34	End Time (MST)	12:40
Analyzer make	API T101	Analyzer serial #	196

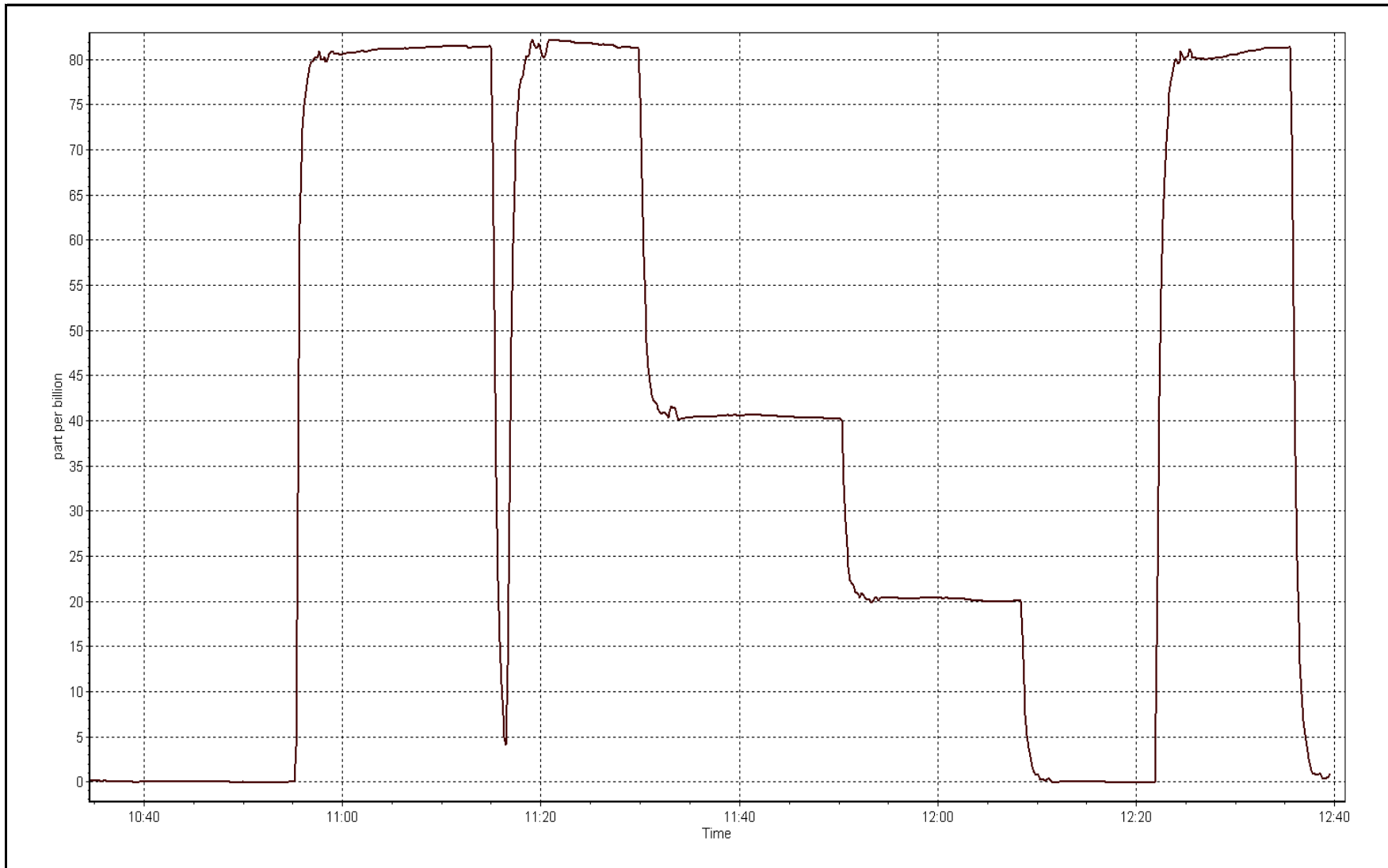
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999991
80.9	81.3	0.9946		
40.4	40.4	1.0001	Slope	0.993988
20.2	20.2	1.0021		
			Intercept	0.123566



H2S Calibration Plot

Date: March 15, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	March 14, 2017	Last Calibration	February 14, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	9:35	End Time (MST)	14:03
Gas Cert Reference	EY0000657	Cal Gas Expiry Date	November 4, 2019
CH4 Cal Gas Conc.	513 ppm	CH4 Equiv Conc.	1060.3 ppm
C3H8 Cal Gas Conc.	199 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1220
ZAG make/model	Teledyne API 701	Serial Number	4766
DACS make/model	Campbell Scientific CR3000	Serial Number	9627

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.6	8.6
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.3	34.3
Calculated slope	0.994795	1.007863	Fuel Pressure	23.9	23.9
Calculated intercept	0.049598	-0.050542	Analyzer Coeff	4.32	4.35
			Analyzer BKG	2.000	2.150

Analyzer make	51i-LT	Analyzer serial #	1501663727
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.10	----
as found span	5000	78.6	16.67	16.65	1.001
calibrator zero	5000	0.0	0.00	0.07	----
high point	5000	78.6	16.67	16.60	1.004
second point	5000	39.3	8.33	8.30	1.004
third point	5000	19.6	4.16	4.16	0.999
as left zero	5000	0.0	0.00	0.03	----
as left span	5000	78.6	16.67	16.69	0.999
Average Correction Factor					1.002

Corrected As found	16.55	Previous response	16.70	% change	0.9%
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Notes:

Sample inlet filter replaced after as founds. Adjusted zero and span.

Calibration Performed By: Asad Hidayat



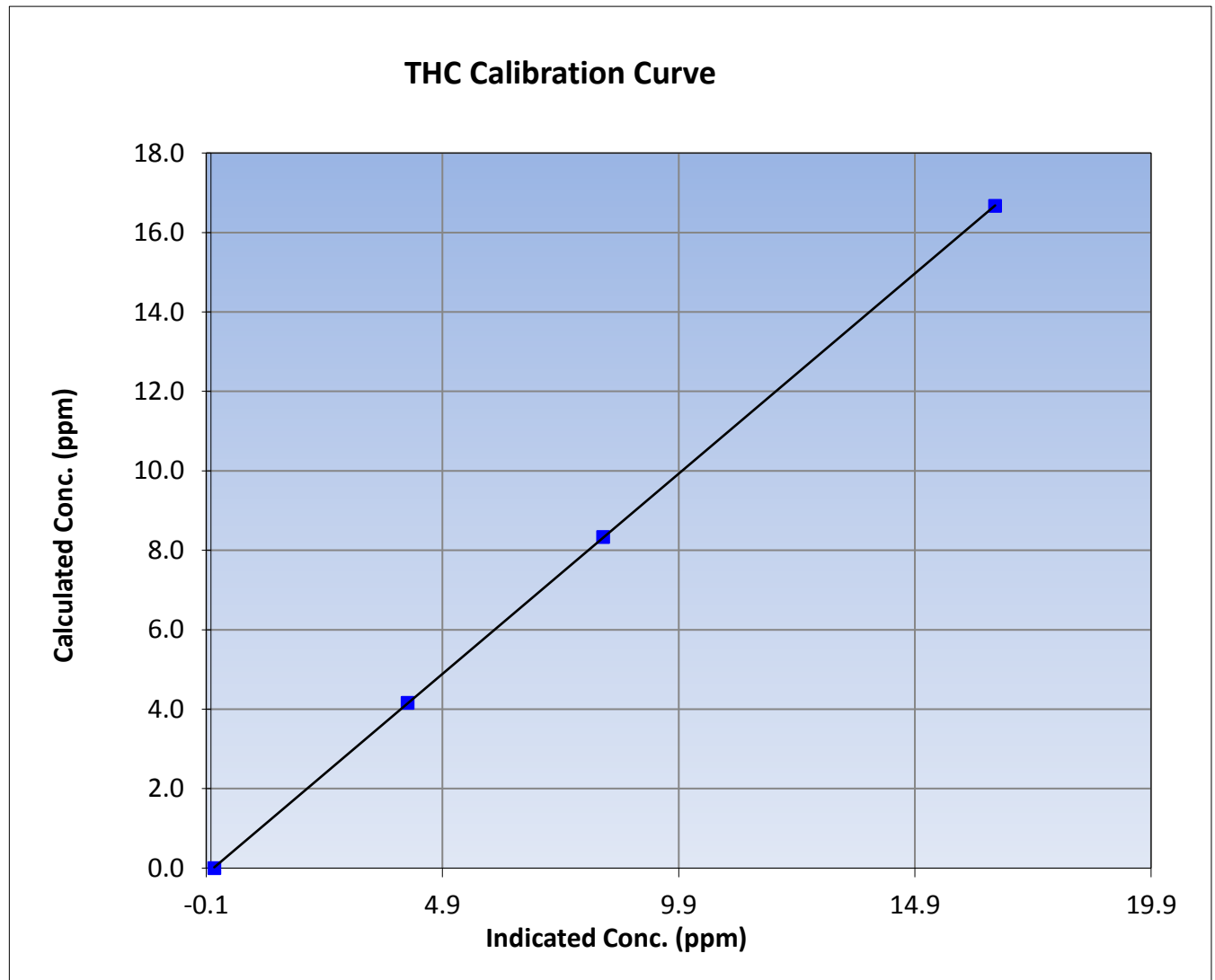
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	March 14, 2017	Previous Calibration	February 14, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	9:35	End Time (MST)	14:03
Analyzer make	51i-LT	Analyzer serial #	1501663727

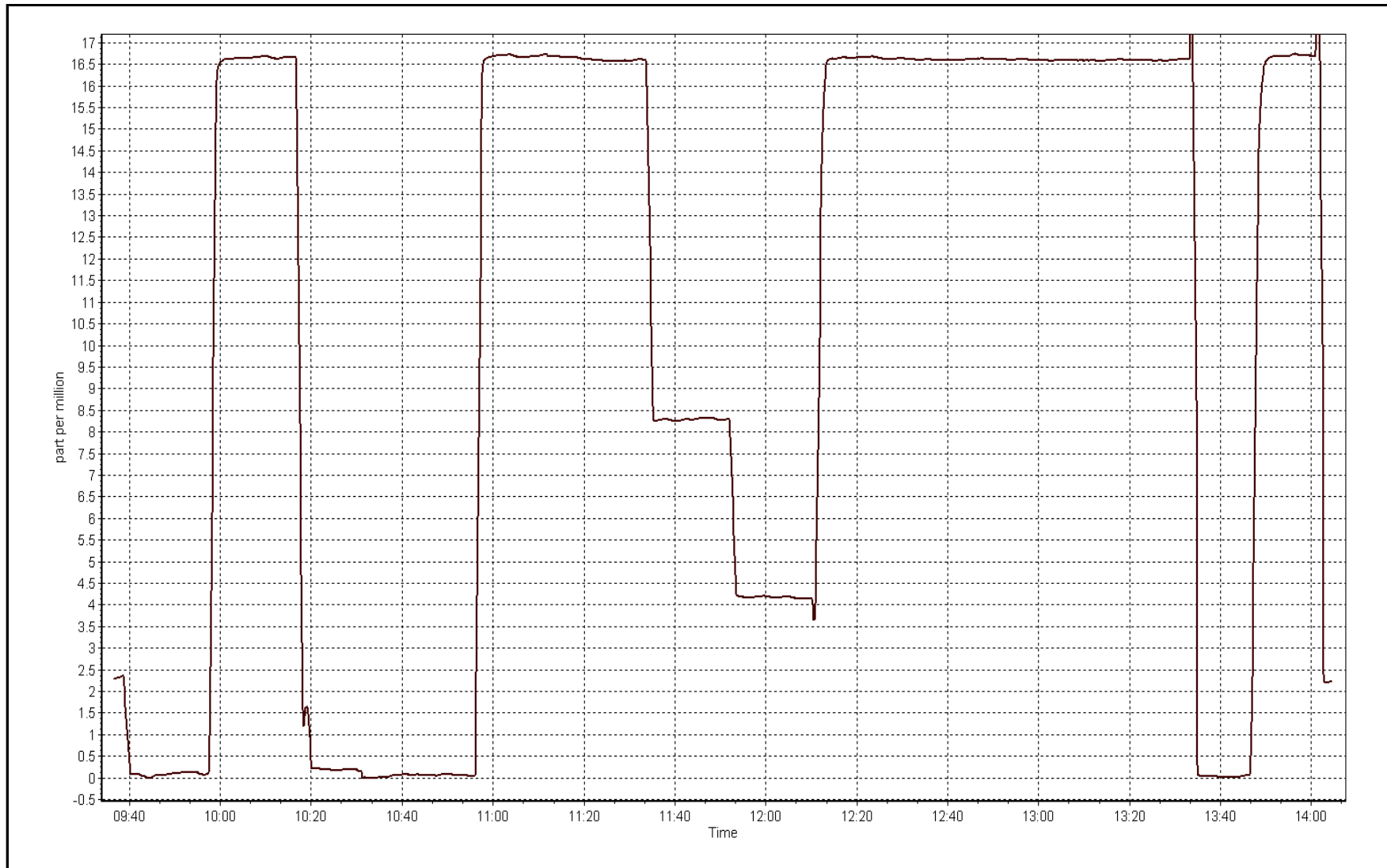
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.07	----	Correlation Coefficient	0.999993
16.67	16.60	1.0040		
8.33	8.30	1.0040	Slope	1.007863
4.16	4.16	0.9991		
			Intercept	-0.050542



THC Calibration Plot

Date: March 14, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 14, 2017	Previous Calibration	February 14, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	9:35	End Time (MST)	14:03
NO Cal Gas Conc	50.9 ppm	Gas Cert Reference	EY0000372
NOx Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	November 4, 2019
Calibrator	API T700	Serial Number	1220
Zero air Generator	Teledyne API T701	Serial Number	4766

DACS Information

DACS make & model	Cambell Scientific CR3000	DACS serial No.	9627
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999728	0.998970	0.981201
	Data Offset	0.192770	0.532811	-2.899586
Current Calibration	Data Slope	1.000043	0.999348	0.994316
	Data Offset	0.375004	1.037757	-0.280629

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1505164379
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.099		1.052	
NOx coefficient	0.998		0.999	
NO2 coefficient	0.995		0.995	
NO bkgnd	3.2		3.0	
NOx bkgnd	3.2		3.1	
Chamber Temp	50.6	Deg C	50.7	Deg C
Moly Temp	324.7	Deg C	324.7	Deg C
PMT voltage	-767.4	V	-767.4	V
PMT Temp	-2.8	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	165.1	mmHg	165.7	mmHg
R Cell Press Nox	165.1	mmHg	165.7	mmHg
NO sample flow	0.816	lpm	0.824	lpm
Nox sample Flow	0.813	lpm	0.822	lpm

Notes:

Sample inlet filter replaced after as founds. Bypassed the gooseneck after as founds, to eliminate NO drift issue during GPT; seems to have fixed the issue. Adjusted span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

March 14, 2017

Station Number:

AMS 20

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.3	0.1	----	----
as found span	5000	78.6	800.1	800.1	0.0	799.9	799.0	0.9	1.0003	1.0014
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.3	0.1	----	----
high point	5000	78.6	800.1	800.1	0.0	800.1	800.2	-0.1	1.0001	0.9999
second point	5000	39.3	400.1	400.1	0.0	399.0	398.4	0.6	1.0027	1.0042
third point	5000	19.6	199.5	199.5	0.0	199.2	198.2	1.1	1.0014	1.0069
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
as left span	5000	78.6	800.1	336.3	463.8	801.5	334.9	466.5	0.9984	1.0042
Average Correction Factor									1.0014	1.0037

Corrced As found NO_x= 800.0 NO= 799.3 Percent Change NO_x= 0.0% NO= 0.1%
 Previous Response NO_x= 800.2 NO= 800.4

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 78.60 ccm NOX ref calc conc = 800.1 ppb NO ref calc conc = 800.1 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	801.8	799.7	0.1	0.9979	1.0006	----	----
1st NO2 (300)	336.3	463.4	802.4	336.3	466.1	0.9972	----	0.9942	100.6%
2nd NO2 (200)	561.9	237.9	801.9	561.9	240.1	0.9978	----	0.9907	100.9%
3rd NO2 (100)	676.8	122.9	800.5	676.8	123.7	0.9996	----	0.9936	100.6%
2nd NO ref point		0.0	799.6	796.9	2.8	1.0007	1.0041	----	----
Average Correction Factor						0.9988		0.9929	100.7%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

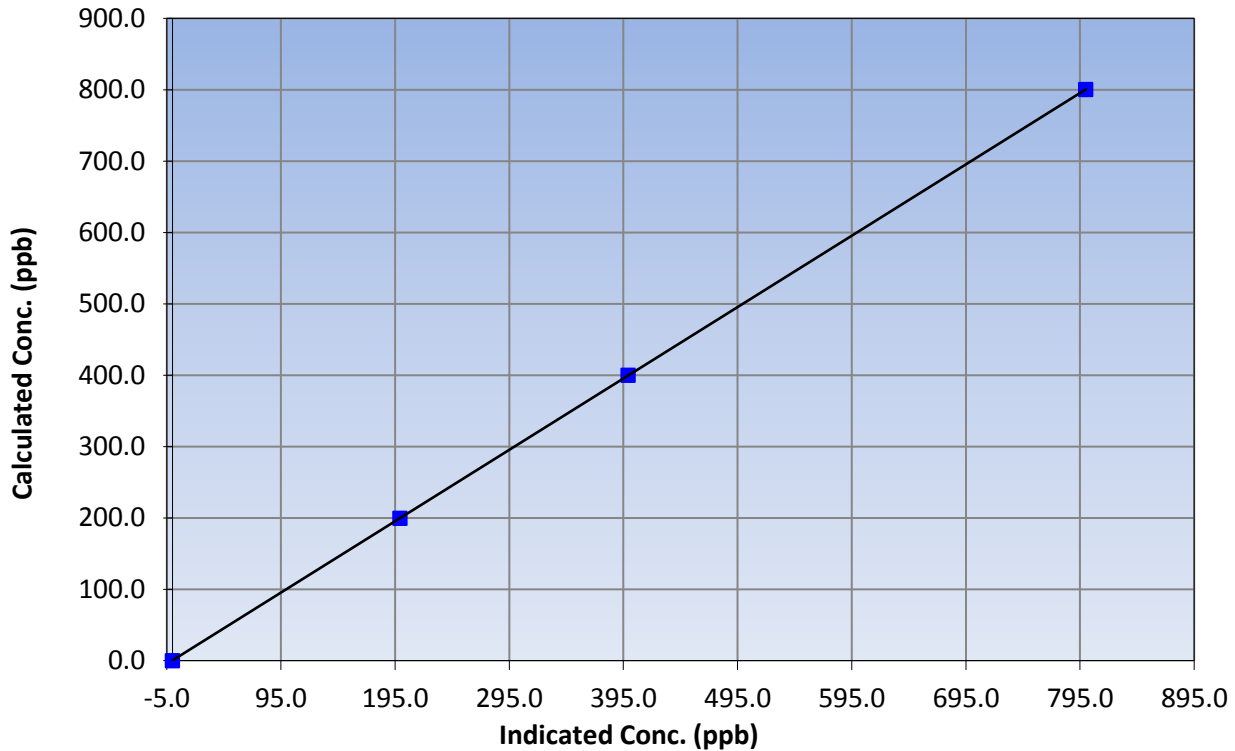
Station Information

Calibration Date	March 14, 2017	Previous Calibration	February 14, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	9:35	End Time (MST)	14:03
Analyzer make	Thermo 42i	Analyzer serial #	1505164379

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999998
800.1	800.1	1.0001		
400.1	399.0	1.0027	Slope	1.000043
199.5	199.2	1.0014		
			Intercept	0.375004

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

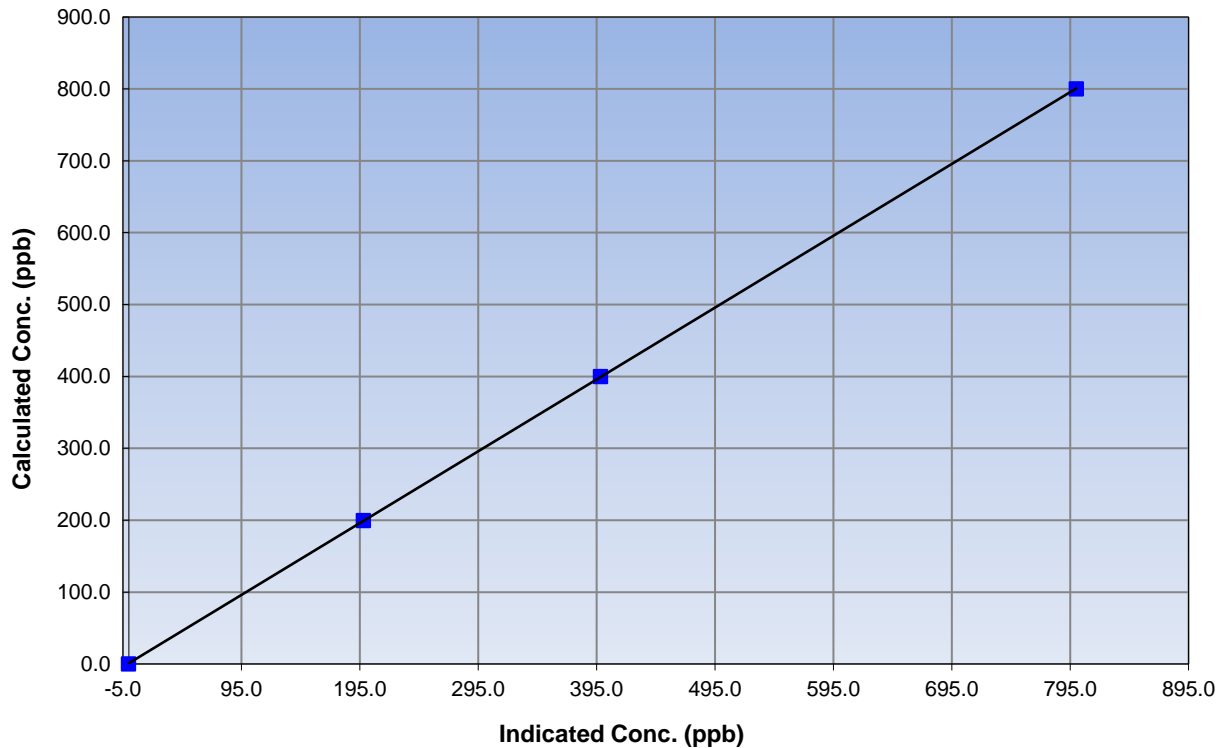
Station Information

Calibration Date	March 14, 2017	Previous Calibration	February 14, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	9:35	End Time (MST)	14:03
Analyzer make	Thermo 42i	Analyzer serial #	1505164379

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999994
800.1	800.2	0.9999		
400.1	398.4	1.0042	Slope	0.999348
199.5	198.2	1.0069		
			Intercept	1.037757

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

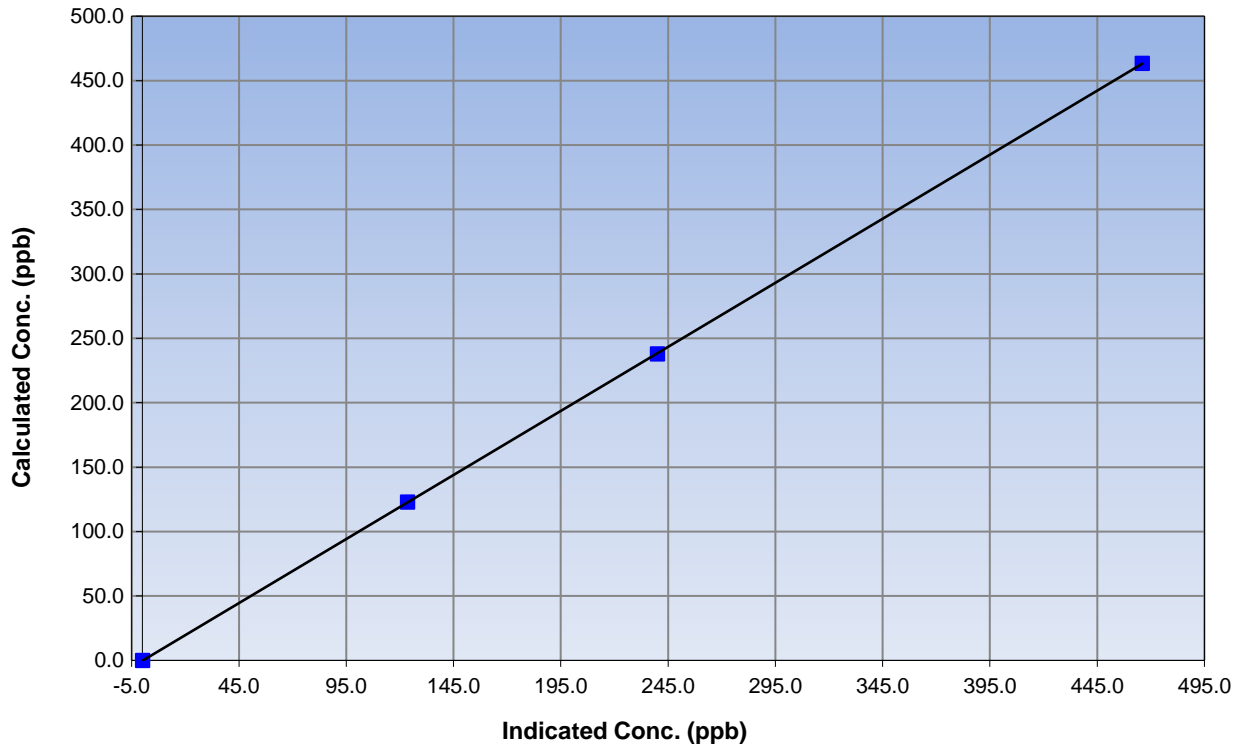
Station Information

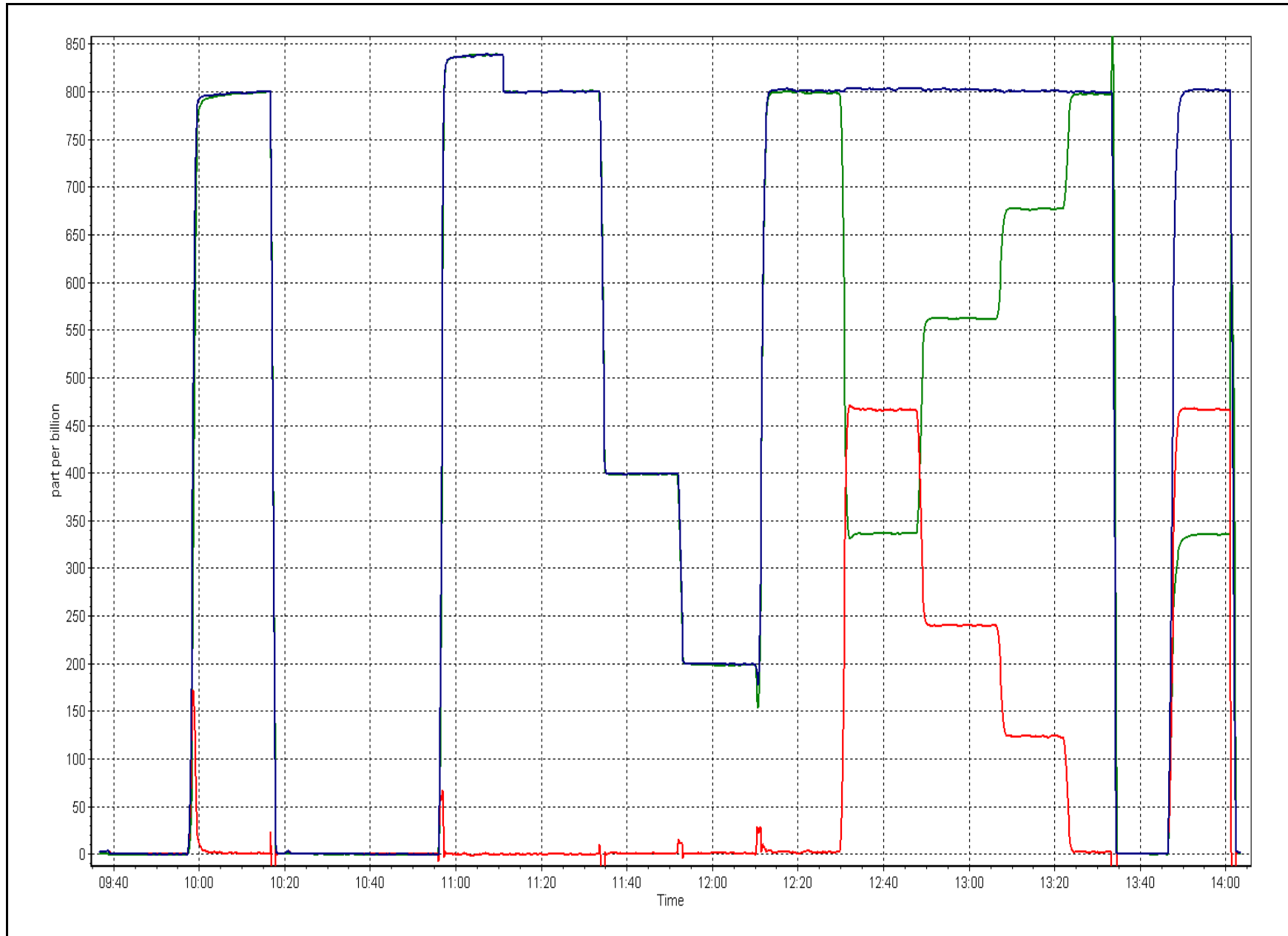
Calibration Date	March 14, 2017	Previous Calibration	February 14, 2017
Station Number	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	9:35	End Time (MST)	14:03
Analyzer make	Thermo 42i	Analyzer serial #	1505164379

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999996
463.4	466.1	0.9942		
237.9	240.1	0.9907	Slope	0.994316
122.9	123.7	0.9936		
			Intercept	-0.280629

NO₂ Calibration Curve







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 21
CONKLIN COMMUNITY
MARCH 2017**

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS 21)
MARCH 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	7	0	2	0
TRS(ppb) Average	707	34	37	99.6	1	0	0	0
THC(ppm) Average	704	37	40	99.6	2.3	-	2.1	-
NMHC(ppm) Average	704	37	40	99.6	0.025	-	0.002	-
CH4(ppm) Average	704	37	40	99.6	2.3	-	2.1	-
O3 (ppb) Average	710	34	34	100	56	0	46	-
NO2 (ppb) Average	707	37	37	100	16	0	5	-
NO (ppb) Average	707	37	37	100	8	-	1	-
NOX (ppb) Average	707	37	37	100	17	-	6	-
PM2.5 (ug/m3) Average	740	1	4	99.6	71.8	-	13.8	0
Wind Speed 10 m (km/h) Average	726	0	18	97.58	19	-	15	-
Wind Direction 10 m (deg) Average	726	0	18	97.58	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100	12	-	4.3	-
Relative Humidity (%) Average	744	0	0	100	98	-	93.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS 21)
MARCH 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	0.5	1	-	0	0	0	0	1	1	7
TRS (ppb) Average	707	0.4	0	-	0	0	0	0	0	0	1
THC (ppm) Average	704	1.97	0.1	-	1.9	1.9	1.9	2	2	2.1	2.3
NMHC(ppm) Average	704	0	0.002	-	0	0	0	0	0	0	0.025
CH4(ppm) Average	704	1.97	0.1	-	1.9	1.9	1.9	2	2	2.1	2.3
O3 (ppb) Average	710	36.3	11	-	6	20	31	39	44	47	56
NO2 (ppb) Average	707	2.4	2	-	0	1	1	2	3	5	16
NO (ppb) Average	707	0.4	1	-	0	0	0	0	0	1	8
NOX (ppb) Average	707	2.8	2	-	0	1	1	2	3	5	17
PM2.5 (ug/m3) Average	740	3.97	4.2	-	0.3	1.2	2	3.1	4.8	7.2	71.8
Wind Speed 10 m (km/h) Average	726	7.2	4	-	0	2	4	7	11	13	19
Wind Direction 10 m (deg) Average	726	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-7.61	10.7	-	-36.9	-21.5	-15.8	-5.1	0.6	5.3	12
Relative Humidity (%) Average	744	67.9	17	-	28	43	56	70	80	91	98

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS 21)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	10 Mar 2017 10:00	10 Mar 2017 12:00	3	Maintenance - aborted calibration
NMHC, CH4, THC	05 Mar 2017 21:00	05 Mar 2017 21:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	17 Mar 2017 11:00	17 Mar 2017 12:00	2	Maintenance - replaced carrier gas
PM2.5	02 Mar 2017 08:00	02 Mar 2017 08:00	1	Unstable operation - excessive baseline drift
PM2.5	10 Mar 2017 11:00	10 Mar 2017 12:00	2	Maintenance - aborted calibration
Wind Speed, Wind Direction	02 Mar 2017 02:00	02 Mar 2017 02:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	08 Mar 2017 21:00	08 Mar 2017 21:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	12 Mar 2017 05:00	12 Mar 2017 06:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	20 Mar 2017 19:00	20 Mar 2017 20:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	20 Mar 2017 23:00	20 Mar 2017 23:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	27 Mar 2017 00:00	27 Mar 2017 09:00	10	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	29 Mar 2017 05:00	29 Mar 2017 05:00	1	Flat line in sensor output signal - Sensor frozen



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 7 ppb on Mar 7 11:00	Maximum Daily Average: 2.2 ppb on Mar 7		Hours of Data:	707
Minimum Value: 0 ppb on Mar 5 01:00	Minimum Daily Average: 0.1 ppb on Mar 19		Hours of Missing Data:	37
Maximum Diurnal Average: 0.8 ppb at hour 11	Minimum Diurnal Average: 0.3 ppb at hour 3		Hours of Calibration:	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 = 3		Percent Operational Time:	100.0

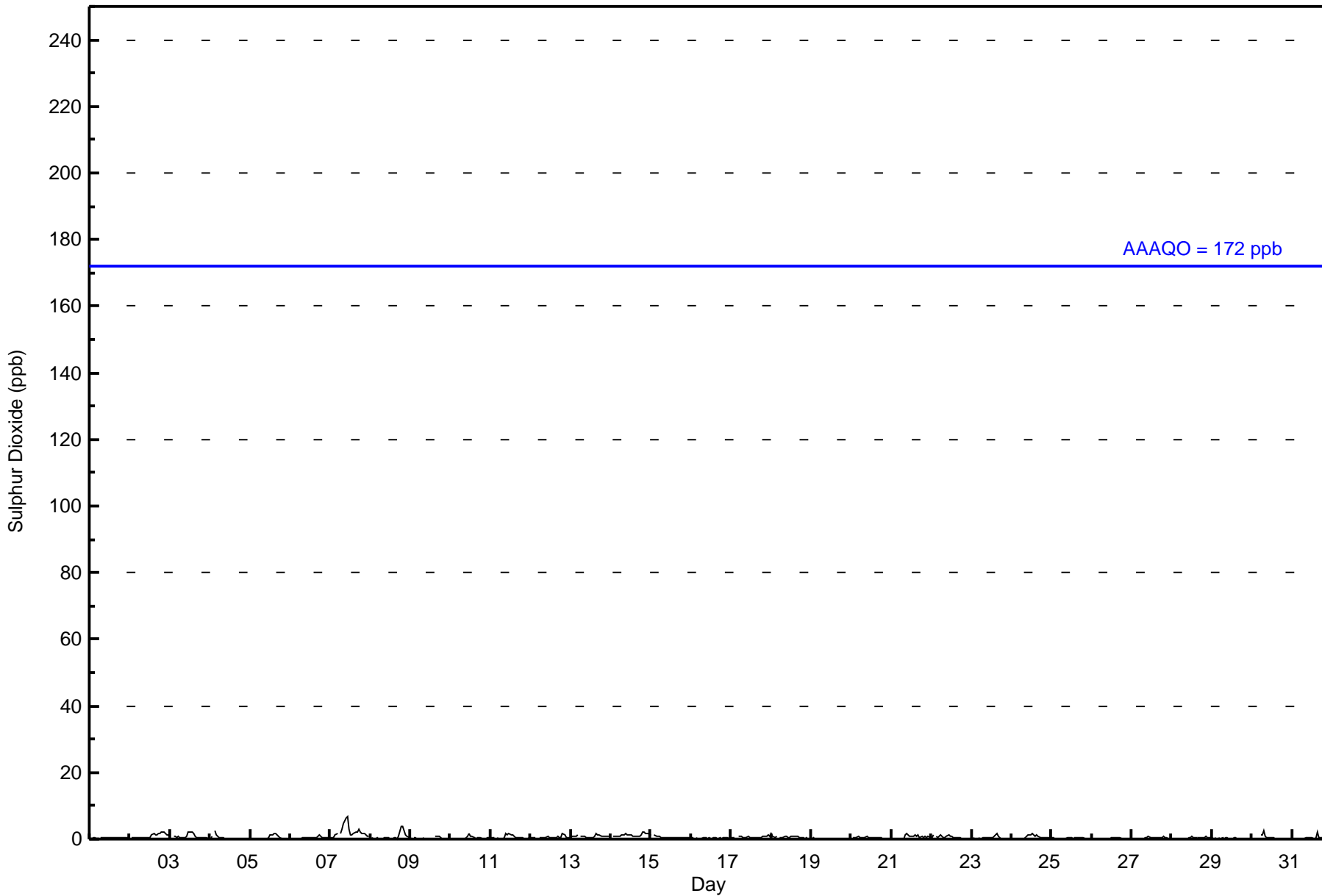
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
2-Mar	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	2	1	1	2	2	2	2	2	1	1	0.9	2
3-Mar	1	Z	1	1	1	1	1	1	1	1	1	2	2	2	2	1	0	0	0	0	0	0	0	0	0.8	2
4-Mar	0	1	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
5-Mar	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	2	2	1	1	0	0	0	0	0	0	0.4	2
6-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0.4	1
7-Mar	0	0	0	1	2	Z	2	3	5	7	7	3	1	1	2	2	2	3	2	2	2	1	1	1	2.2	7
8-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	4	2	1	1	0	0.7	4
9-Mar	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	1	1	1	0	0	0	0	0	0	--	1
10-Mar	0	0	Z	0	0	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0.3	2
11-Mar	1	0	0	Z	0	0	0	0	1	2	1	2	1	1	1	0	1	0	0	0	0	0	0	0	0.6	2
12-Mar	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	0	2	1	1	0	0	0.5	2
13-Mar	0	1	1	1	1	Z	1	1	1	1	0	0	0	1	1	2	1	1	1	1	1	1	1	1	0.8	2
14-Mar	Z	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1.2	2
15-Mar	1	Z	1	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
16-Mar	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
17-Mar	0	0	1	Z	1	1	1	0	0	0	1	1	1	1	0	0	0	1	0	1	1	1	1	1	0.6	1
18-Mar	2	1	0	1	Z	1	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0.6	2
19-Mar	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-Mar	Z	1	0	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
21-Mar	0	Z	0	0	0	0	0	0	1	2	1	1	1	1	1	1	1	1	1	0	1	0	1	1	0.7	2
22-Mar	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0.6	1
23-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.4	1
24-Mar	0	0	0	0	Z	0	0	0	1	1	1	2	1	1	1	1	1	0	0	1	0	0	0	0	0.6	2
25-Mar	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
26-Mar	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
27-Mar	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0.3	1
28-Mar	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	1	0	0	0	0.3	1
29-Mar	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
30-Mar	0	0	0	0	Z	1	1	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
31-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0.3	2
																								Diurnal Average		
																								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
Conklin Community - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Conklin Community - March 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 Community - March 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	56	26	24	22	27	74	82	67	70	55	19	13	12	32	43	69	691
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	56	26	24	22	27	74	82	67	70	55	19	13	12	32	43	69	691

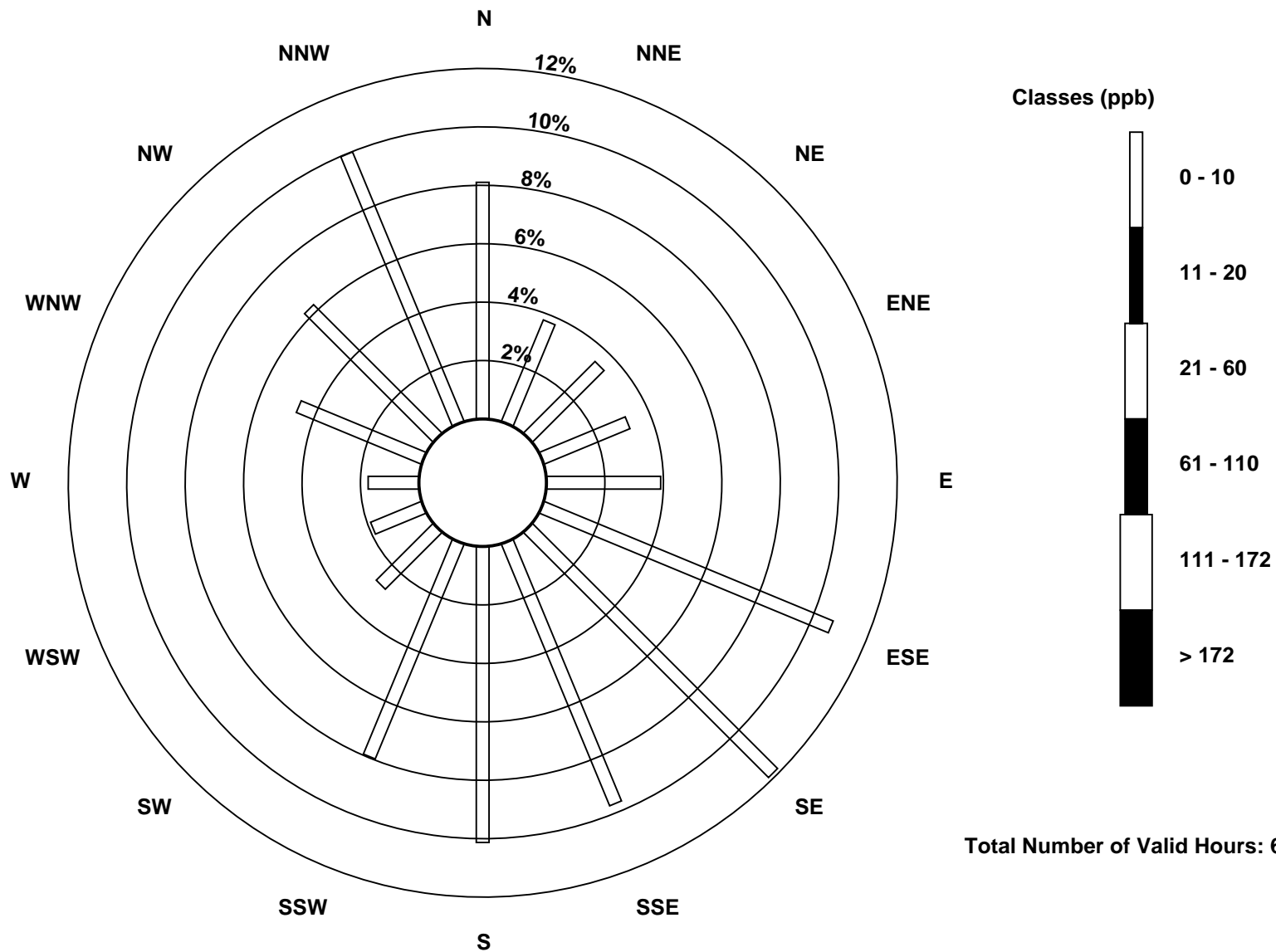
Total Number of Valid Hours: 691

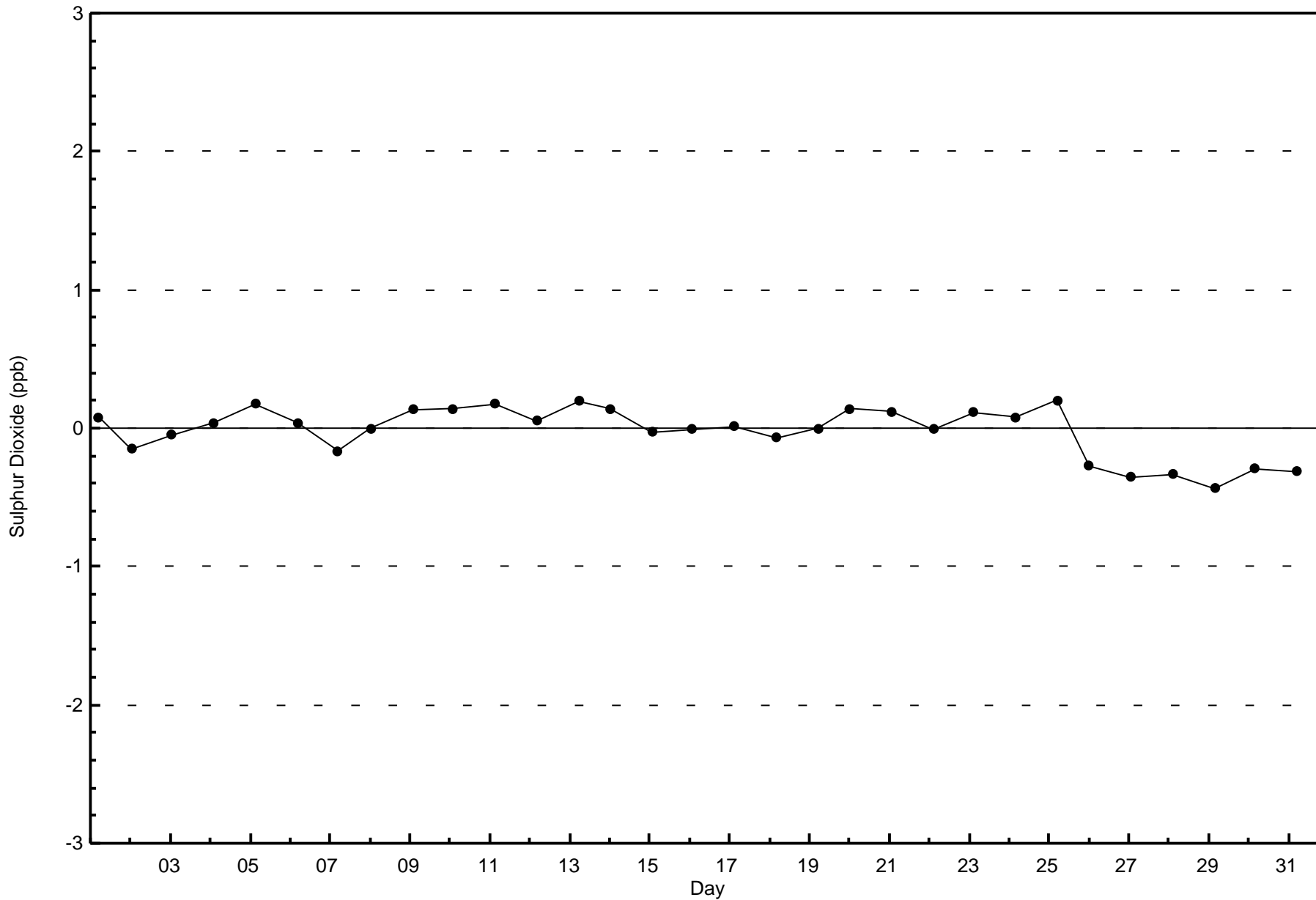
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Sulphur Dioxide (SO₂) - ppb
Conklin Community (AMS 21)

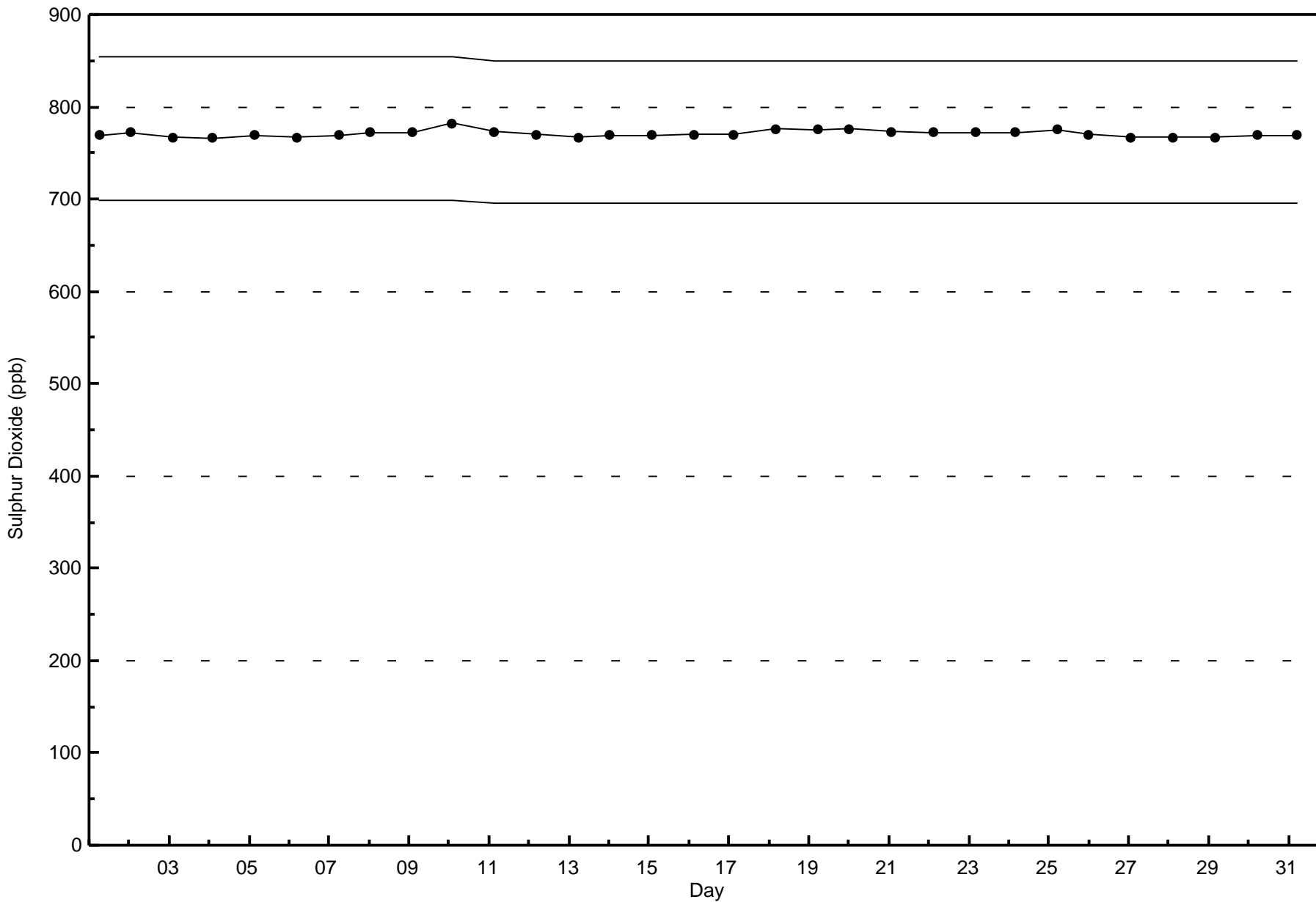






Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Conklin Community - March 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

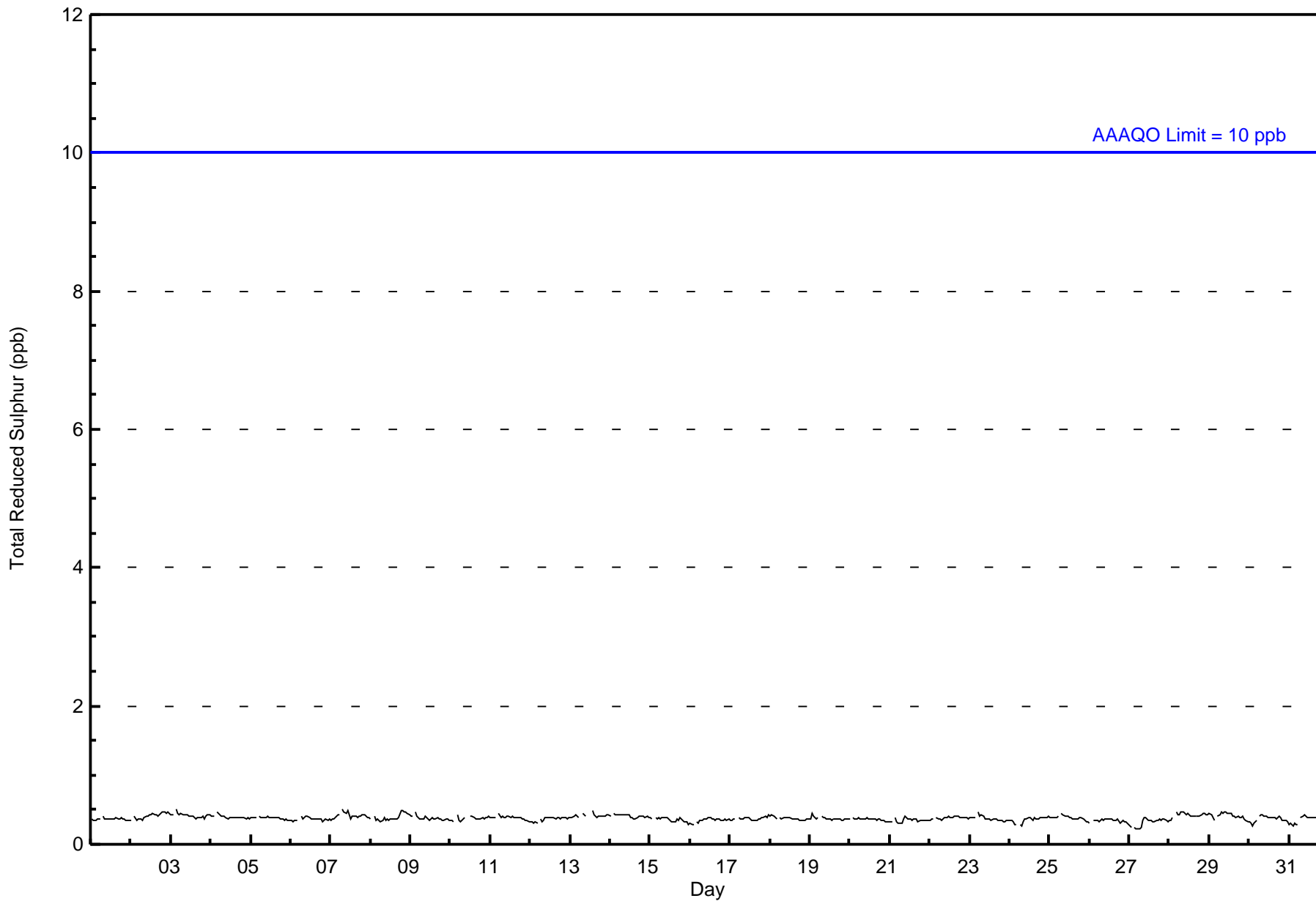
Conklin Community - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 1 ppb on Mar 7 08:00 Maximum Daily Average: 0.4 ppb on Mar 28		Hours in Service: 744 Hours of Data: 707 Hours of Missing Data: 37 Hours of Calibration: 34 Percent Operational Time: 99.6																									
Minimum Value: 0 ppb on Mar 27 06:00 Maximum Diurnal Average: 0.4 ppb at hour 11 Monthly Average: 0.4 ppb		Minimum Daily Average: 0.3 ppb on Mar 27 Minimum Diurnal Average: 0.4 ppb at hour 1 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-Mar	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	0.4	0
2-Mar	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	0.4	0
3-Mar	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	0.4	1
4-Mar	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	0
5-Mar	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	0.4	0
6-Mar	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	0.4	0
7-Mar	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	0.4	1
8-Mar	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	0.4	0
9-Mar	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	0.4	0
10-Mar	0	0	0	Z	0	0	0	0	0	M	M	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
11-Mar	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	0.4	0
12-Mar	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	0.4	0
13-Mar	0	0	0	0	0	0	Z	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
14-Mar	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	0.4	0
15-Mar	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	0.4	0
16-Mar	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
17-Mar	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	0.4	0
18-Mar	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	0.4	0
19-Mar	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	0.4	0
20-Mar	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	0.4	0
21-Mar	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	0
22-Mar	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	0
23-Mar	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	0.4	0
24-Mar	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	0.4	0
25-Mar	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	0.4	0
26-Mar	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
27-Mar	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	0
28-Mar	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	0
29-Mar	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	0.4	0
30-Mar	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	0.4	0
31-Mar	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	0.4	0
0.4																								Diurnal Average			
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 Community - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Conklin Community - March 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**

**Total Reduced Sulphur (TRS) - ppb
Conklin Community - March 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	55	28	25	21	25	74	83	65	68	56	18	14	12	35	44	70	693
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	55	28	25	21	25	74	83	65	68	56	18	14	12	35	44	70	693

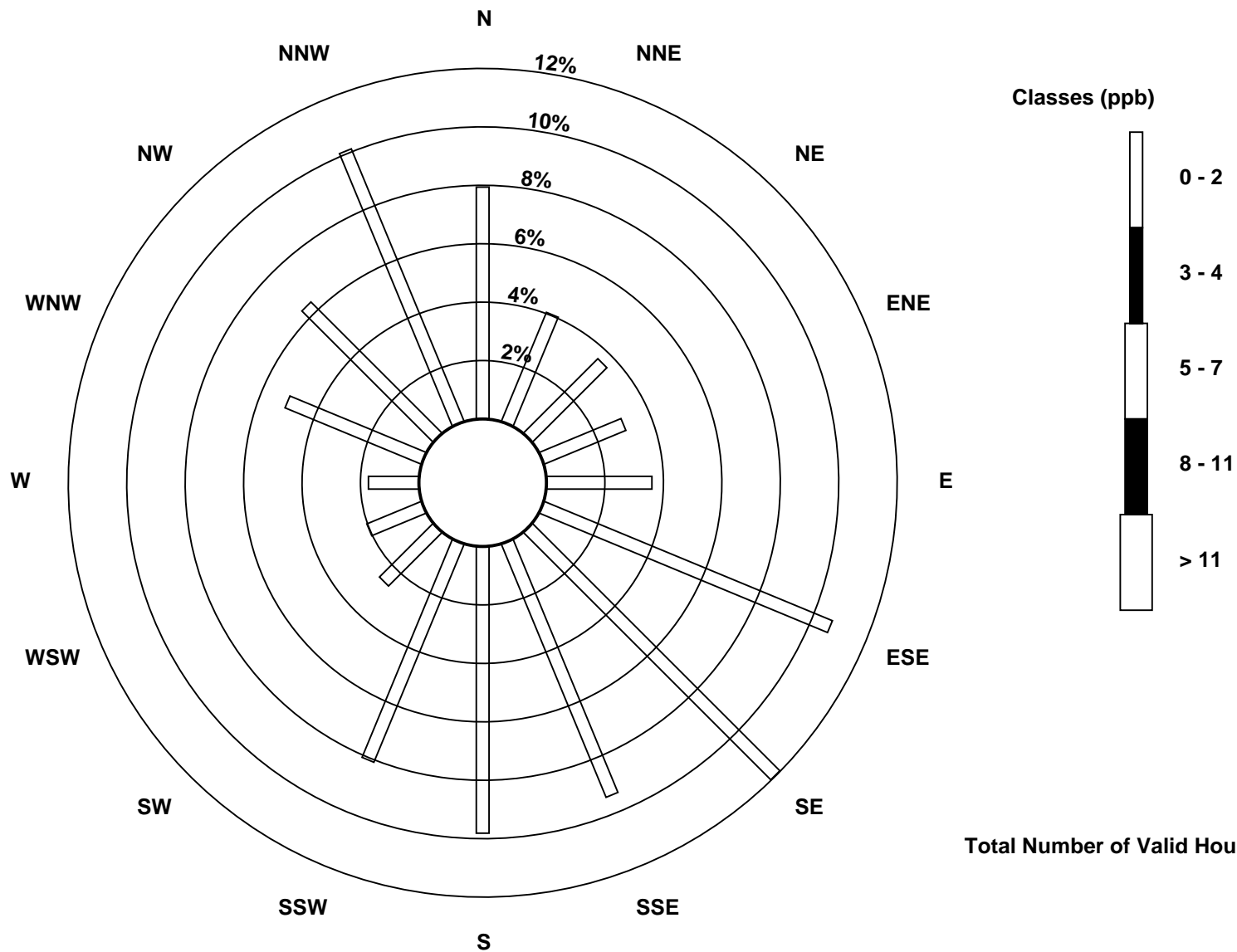
Total Number of Valid Hours: 693

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

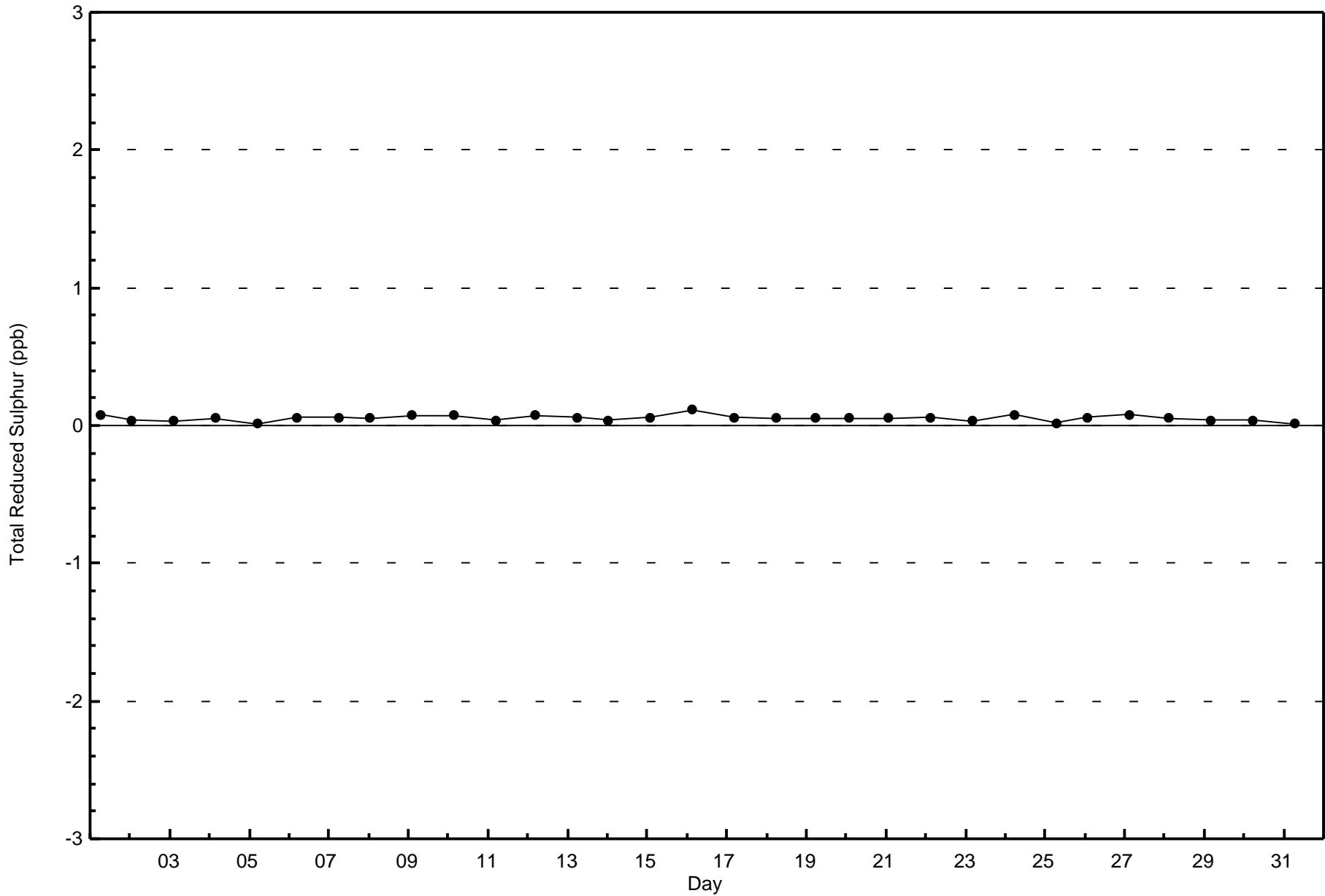
Total Reduced Sulphur (TRS) - ppb
Conklin Community (AMS 21)

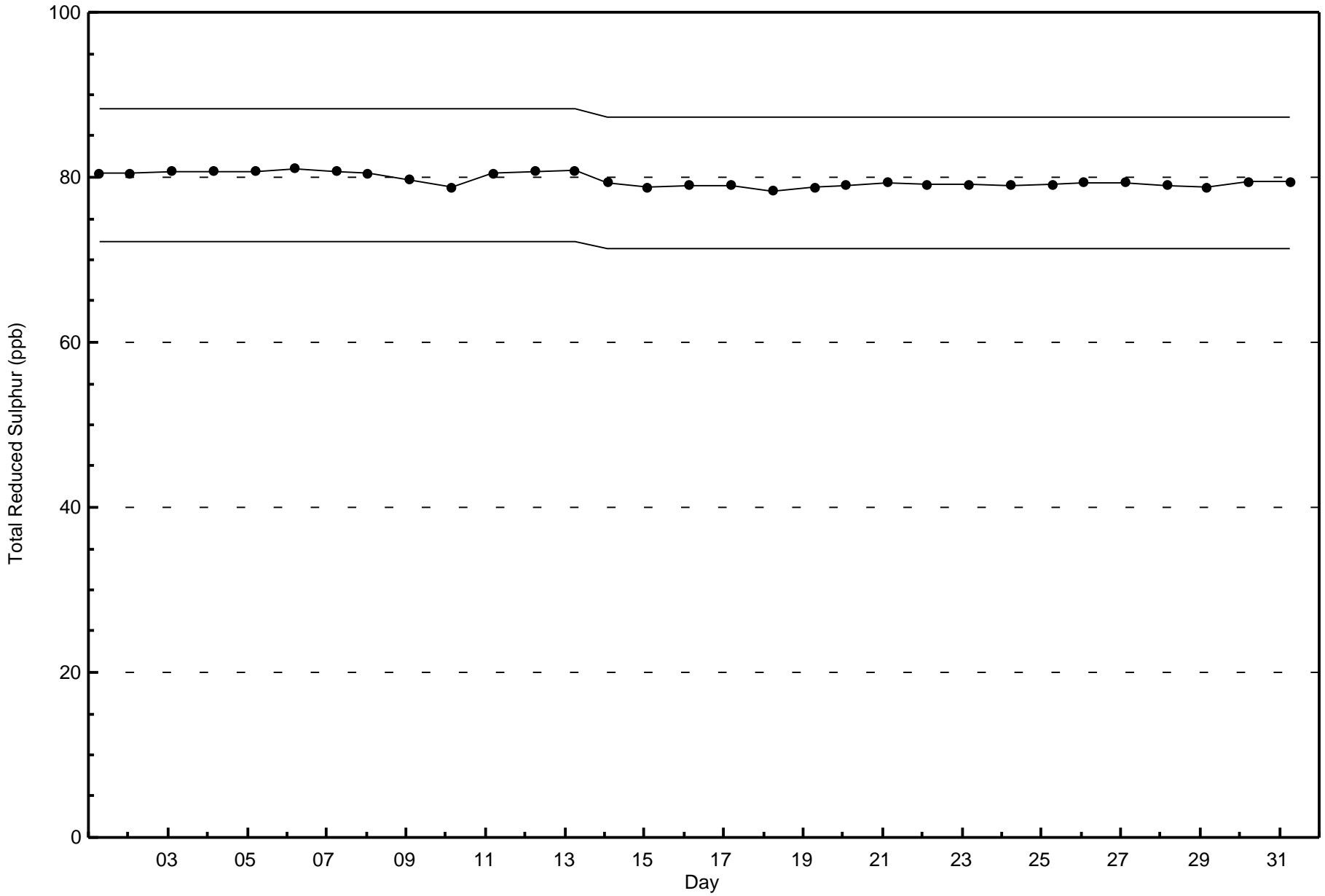




Wood Buffalo Environmental Association
Zero Responses

Total Reduced Sulphur (TRS) - ppb
Conklin Community - March 2017







Wood Buffalo Environmental Association
Summary of Hour Averages

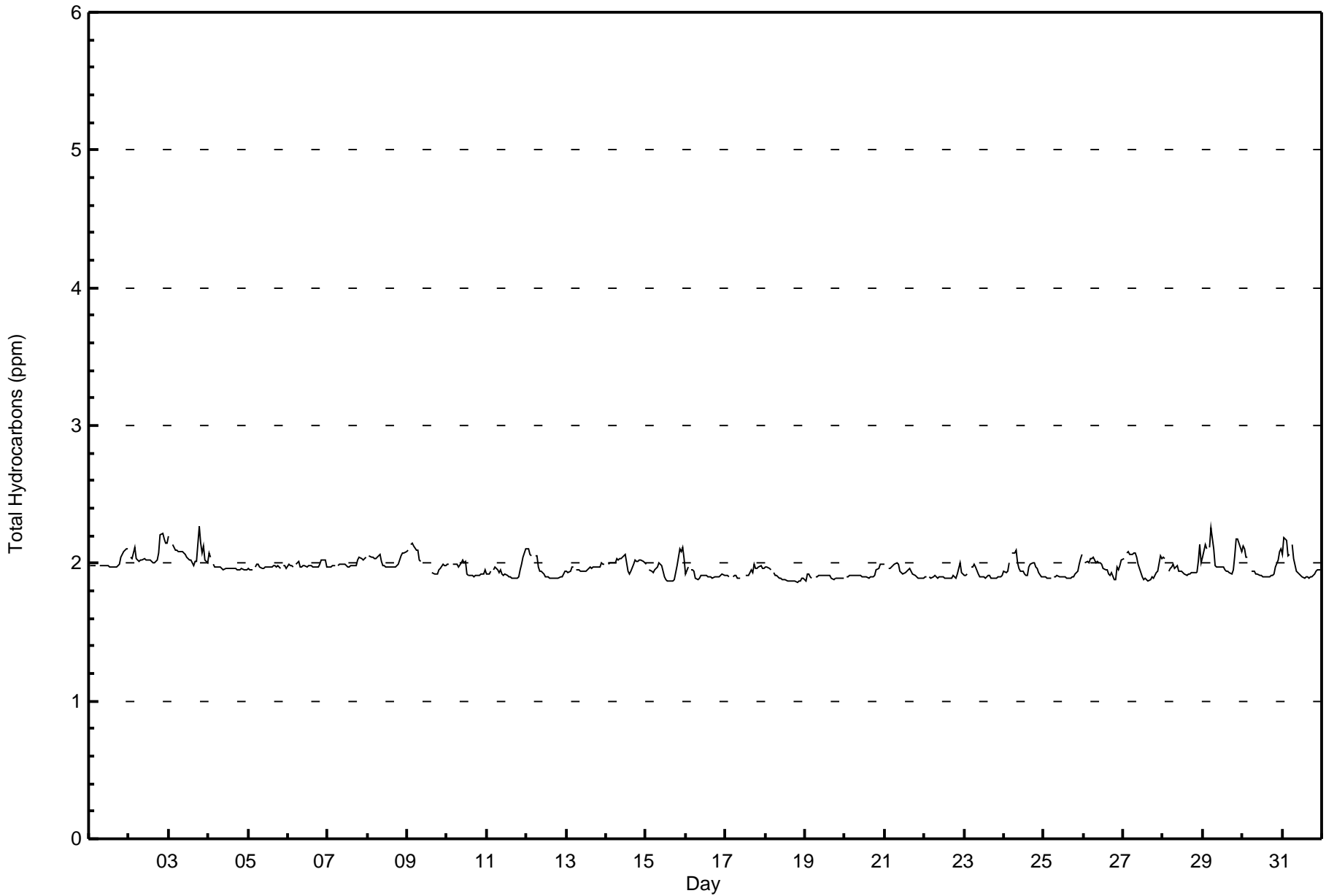
Total Hydrocarbons (THC) - ppm
Conklin Community - March 2017

Maximum Value: 2.3 ppm on Mar 3 19:00		Maximum Daily Average: 2.1 ppm on Mar 3		Hours in Service: 744																									
Minimum Value: 1.9 ppm on Mar 18 20:00		Minimum Daily Average: 1.9 ppm on Mar 18		Hours of Data: 704																									
Maximum Diurnal Average: 2.0 ppm at hour 6		Minimum Diurnal Average: 1.9 ppm at hour 15		Hours of Missing Data: 40																									
Monthly Average: 1.97 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		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-Mar	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	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-Mar	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	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.2		
3-Mar	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.1	2.1	2.1	2.0	2.0	2.1	2.3		
4-Mar	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1		
5-Mar	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	UO	2.0	2.0	2.0	2.0	2.0		
6-Mar	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	2.0	2.0		
7-Mar	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	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		
8-Mar	Z	2.0	2.0	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	2.1	2.1	2.1	2.1	2.1	2.0	2.1		
9-Mar	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	--	2.1		
10-Mar	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	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0		
11-Mar	1.9	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	1.9	2.0	2.0	2.1	1.9	2.1	2.1		
12-Mar	2.1	2.1	2.1	2.1	Z	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	1.9	1.9	1.9	1.9	2.0	2.1		
13-Mar	1.9	1.9	1.9	2.0	2.0	Z	1.9	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	2.0	2.0	2.0	2.0	2.0		
14-Mar	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1		
15-Mar	2.0	Z	1.9	1.9	1.9	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	2.1	2.1	2.1	2.0	2.0	2.1		
16-Mar	1.9	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	1.9	1.9	1.9	1.9	2.0		
17-Mar	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	M	M	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0			
18-Mar	2.0	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0		
19-Mar	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	1.9	1.9		
20-Mar	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	2.0	2.0	2.0	1.9	2.0	2.0		
21-Mar	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	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		
22-Mar	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	1.9	1.9	1.9	1.9	2.0		
23-Mar	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	1.9	2.0		
24-Mar	1.9	1.9	1.9	2.0	Z	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	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.1		
25-Mar	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	2.0	2.0	2.1	1.9	1.9	2.1		
26-Mar	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	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		
27-Mar	2.0	Z	2.1	2.1	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	1.9	1.9	1.9	1.9	2.1	2.0	2.0	2.1		
28-Mar	2.0	2.0	Z	1.9	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	2.1	2.0	2.0	2.0	2.1		
29-Mar	2.0	2.1	2.1	Z	2.1	2.3	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	2.1	2.2	2.2	2.1	2.1	2.0	2.3		
30-Mar	2.1	2.1	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	2.0	2.0	2.1	2.1	2.0	2.0	2.1		
31-Mar	2.1	2.2	2.2	2.1	2.1	Z	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	1.9	1.9	1.9	2.0	2.0	2.2		
																								Diurnal Average					
																								Diurnal Maximum					
Z - zerospan																								C - Calibration		M - Maintenance		UO - Unstable Operation	



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Conklin Community - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Conklin Community - March 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	625	88.78	88.78
2.1 - 3.0	79	11.22	100.00
3.1 - 10.0	0	0.00	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
Conklin Community - March 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	55	26	24	22	27	73	73	59	56	43	17	11	9	30	36	56	617
2.1 - 3.0	1	0	0	0	0	1	9	8	13	11	2	2	3	2	7	12	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	56	26	24	22	27	74	82	67	69	54	19	13	12	32	43	68	688

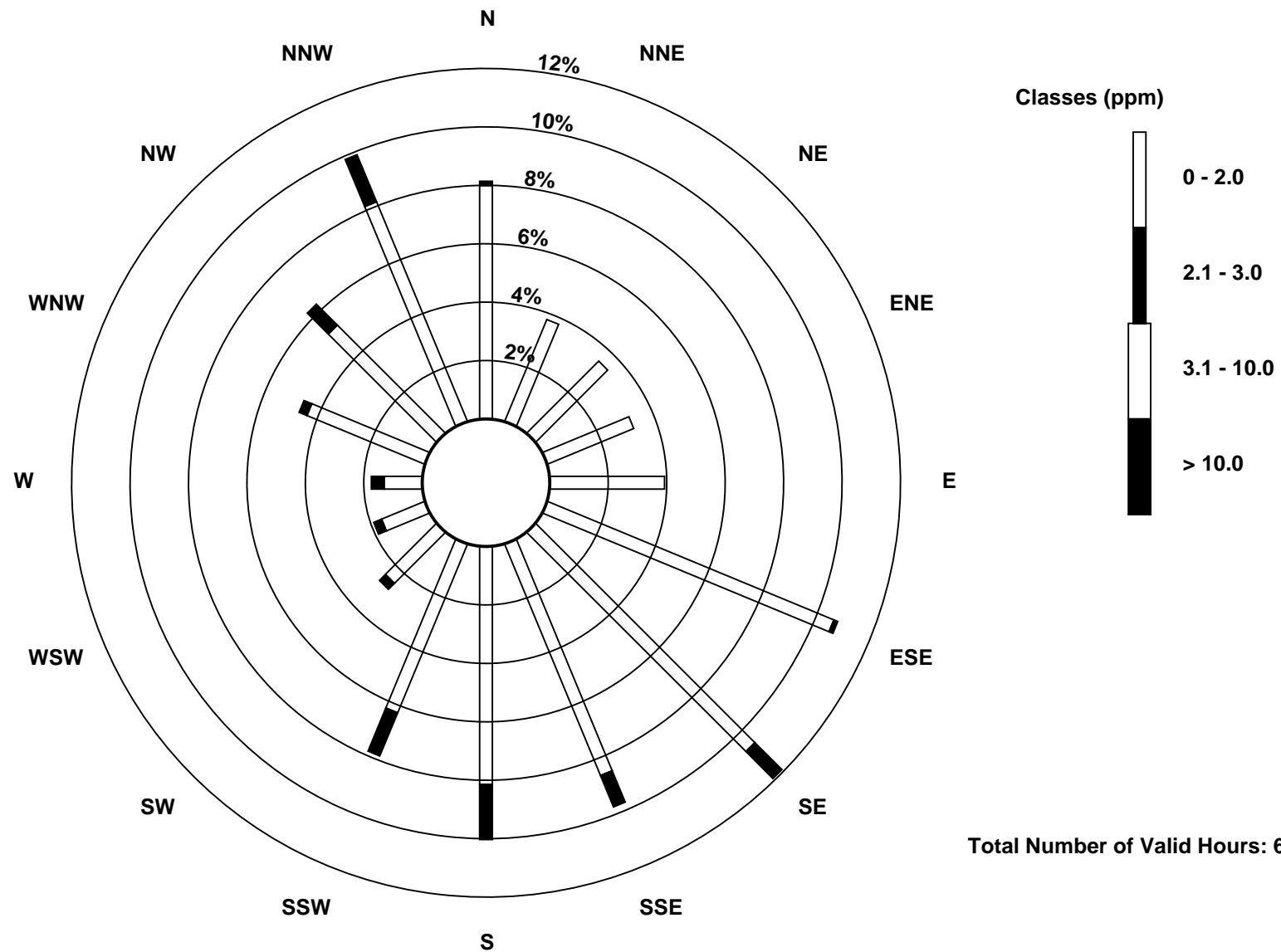
Total Number of Valid Hours: 688

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

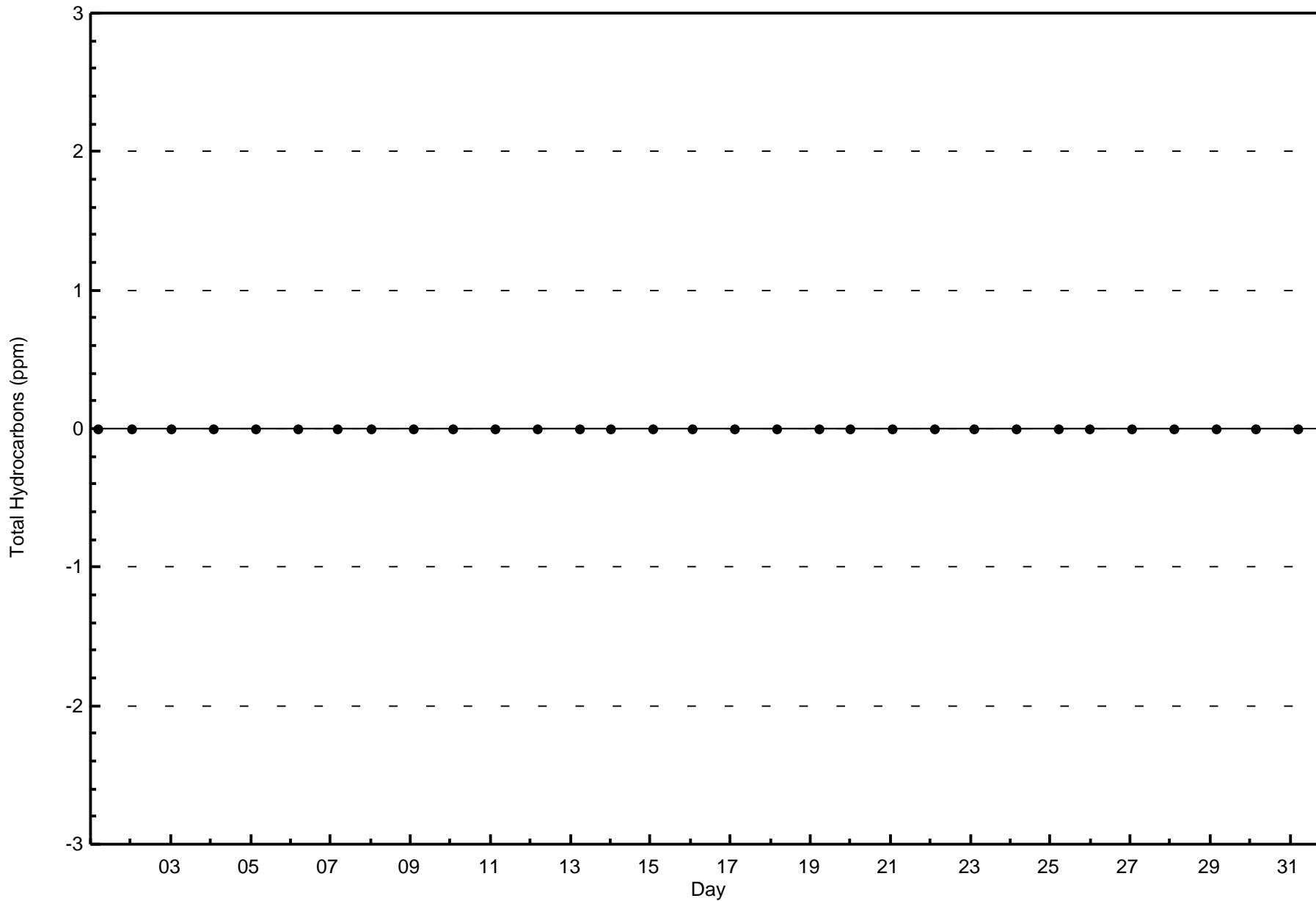
Total Hydrocarbons (THC) - ppm
Conklin Community (AMS 21)

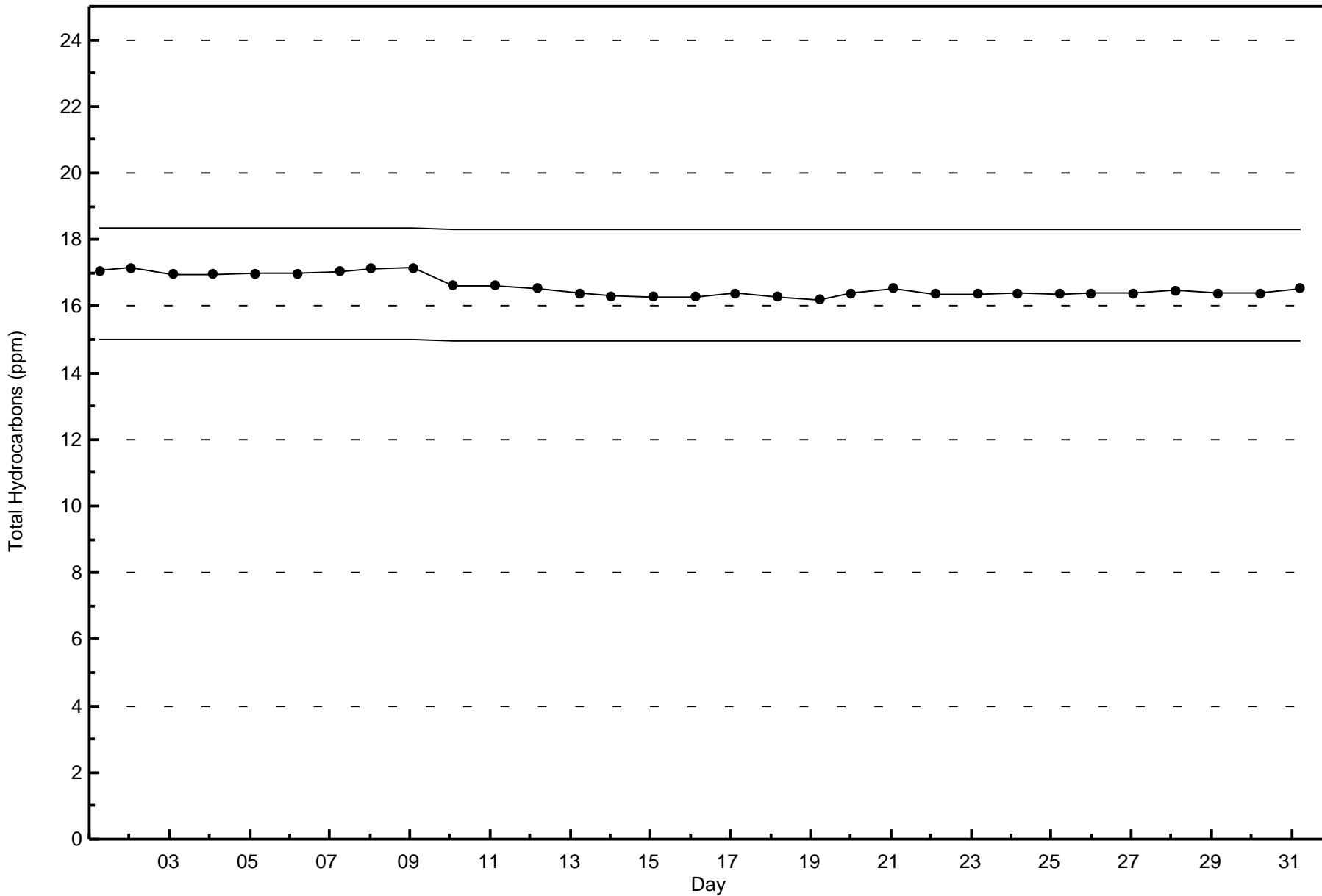




Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Conklin Community - March 2017

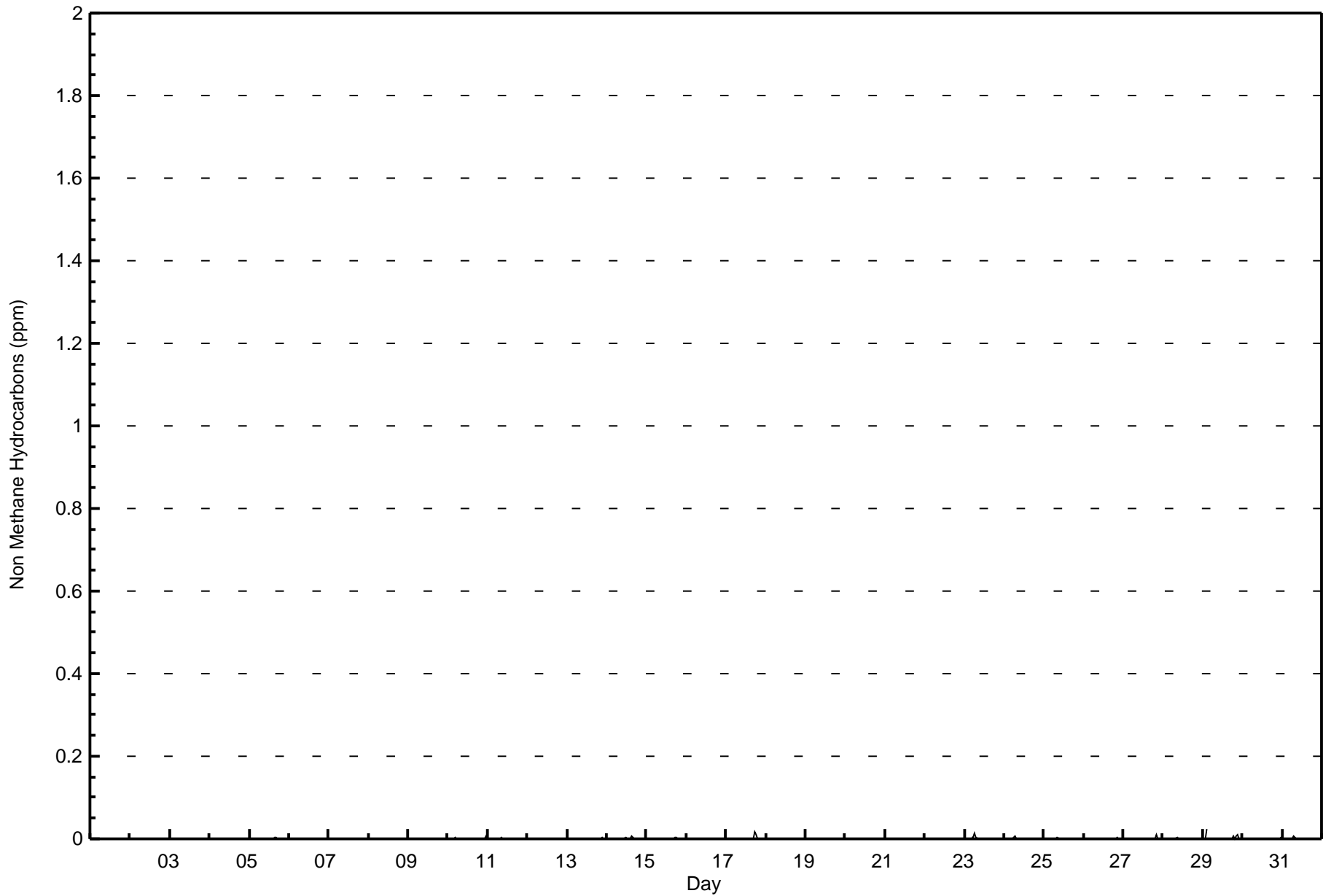






Wood Buffalo Environmental Association
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community - March 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	694	98.58	98.58
0.006 - 0.05	10	1.42	100.00
0.06 - 0.1	0	0.00	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community - March 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	56	26	24	22	27	73	82	66	66	53	19	13	11	32	43	65	678
0.006 - 0.05	0	0	0	0	0	1	0	1	3	1	0	0	1	0	0	3	10
0.06 - 0.1	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
Totals	56	26	24	22	27	74	82	67	69	54	19	13	12	32	43	68	688

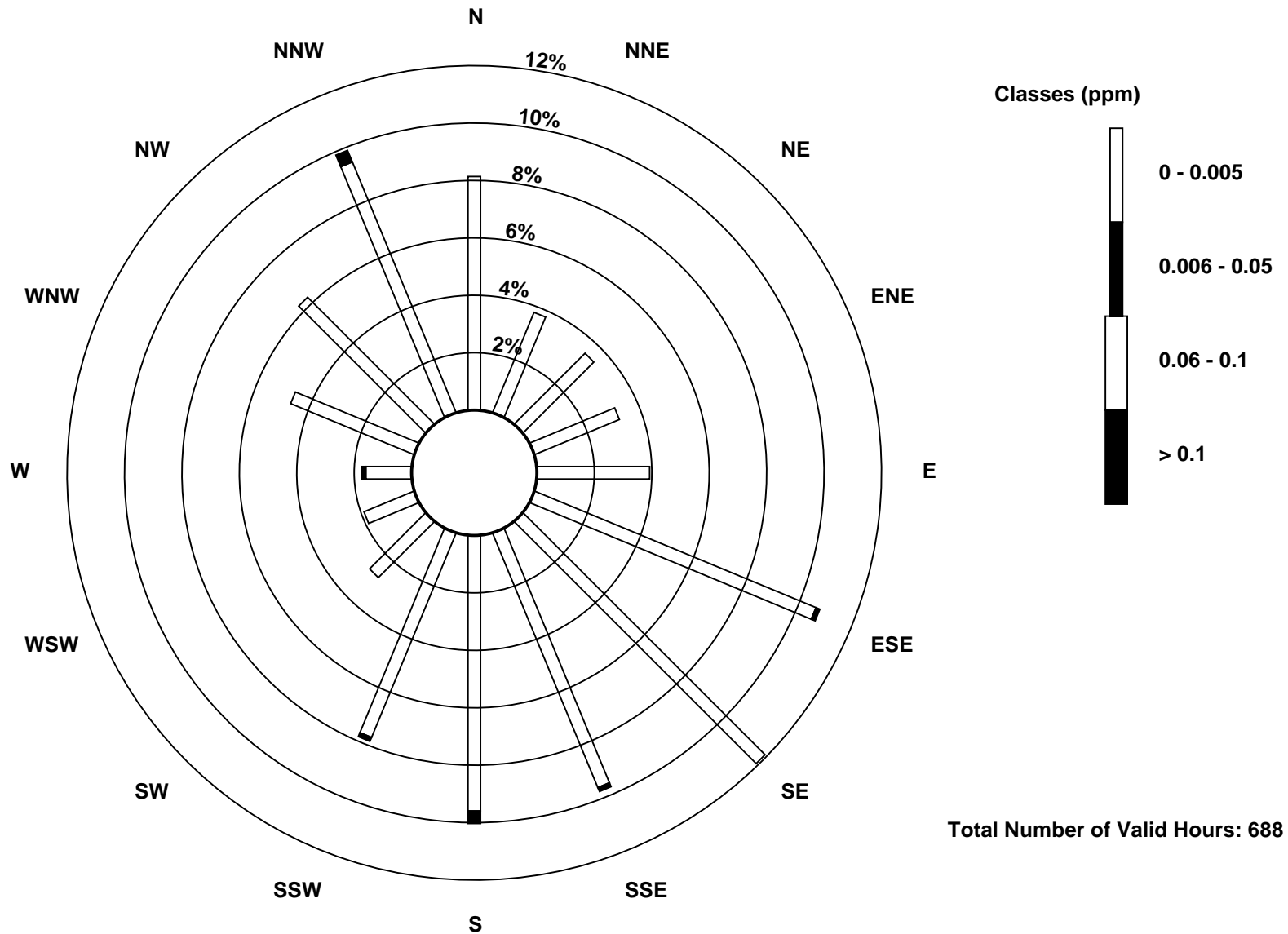
Total Number of Valid Hours: 688

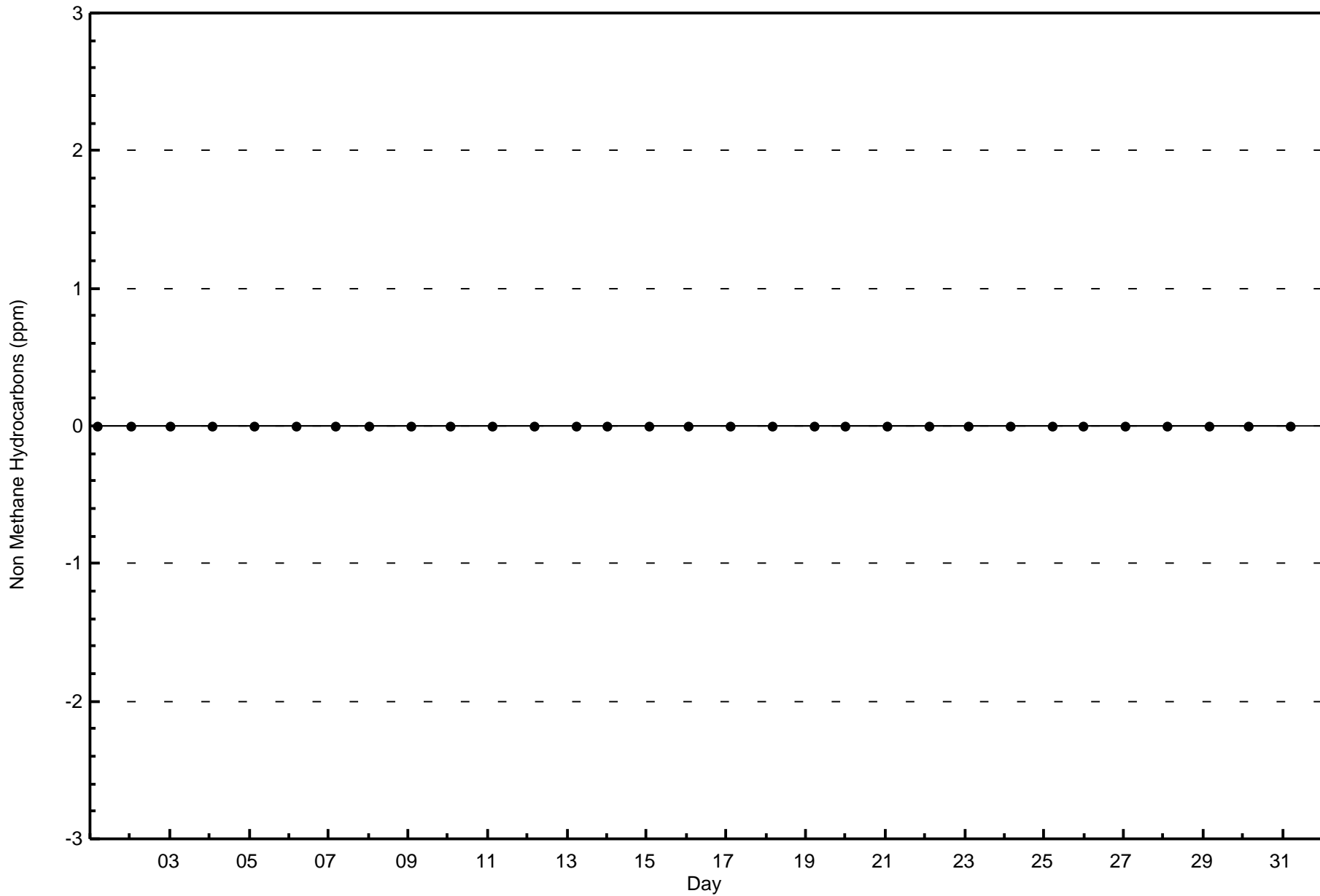
Total Number of Hours: 744

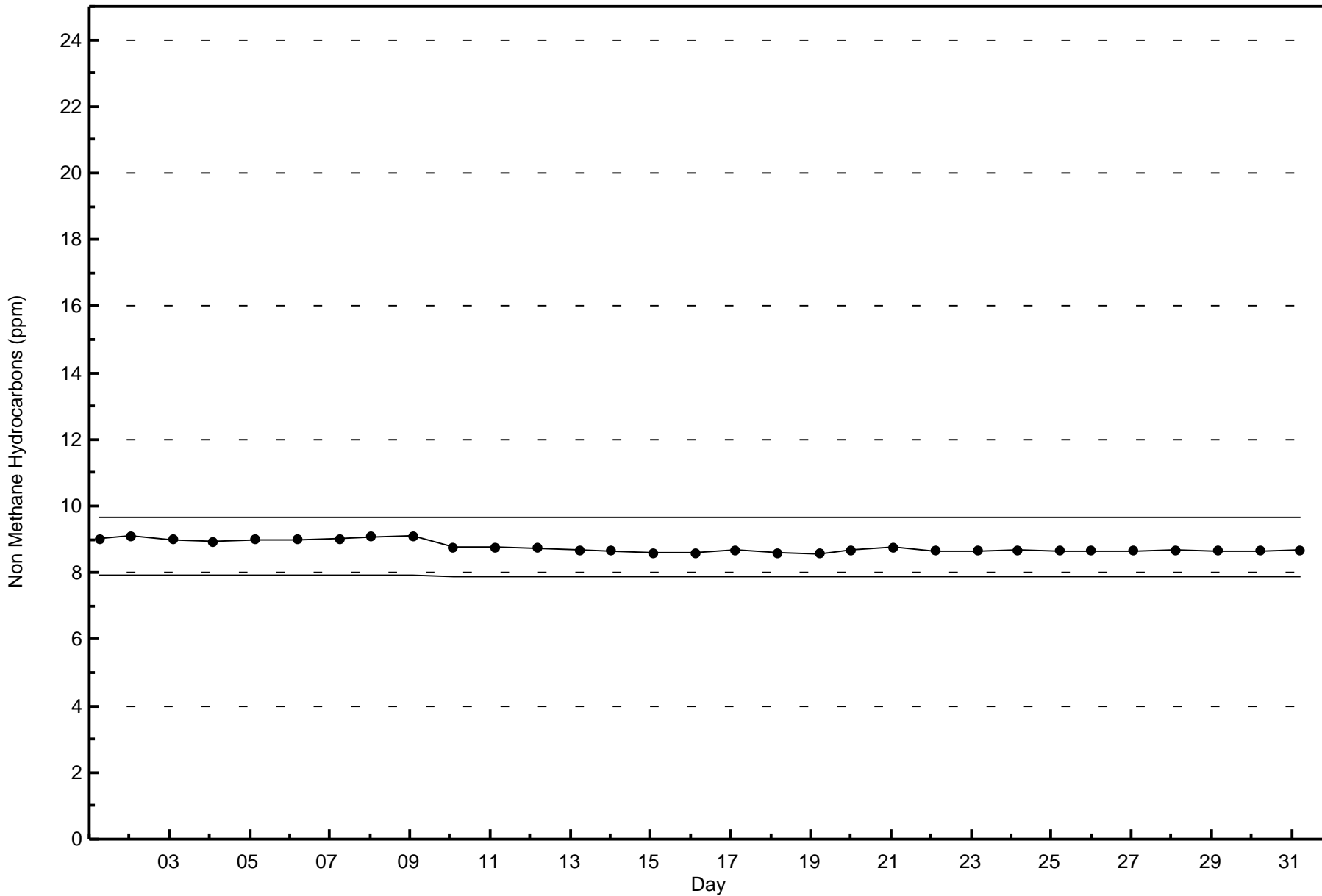


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community (AMS 21)









Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

Conklin Community - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2.3 ppm on Mar 3 19:00	Maximum Daily Average: 2.1 ppm on Mar 3		Hours of Data:	704
Minimum Value: 1.9 ppm on Mar 18 20:00	Minimum Daily Average: 1.9 ppm on Mar 18		Hours of Missing Data:	40
Maximum Diurnal Average: 2.0 ppm at hour 6	Minimum Diurnal Average: 1.9 ppm at hour 15		Hours of Calibration:	37
Monthly Average: 1.97 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		Percent Operational Time:	99.6

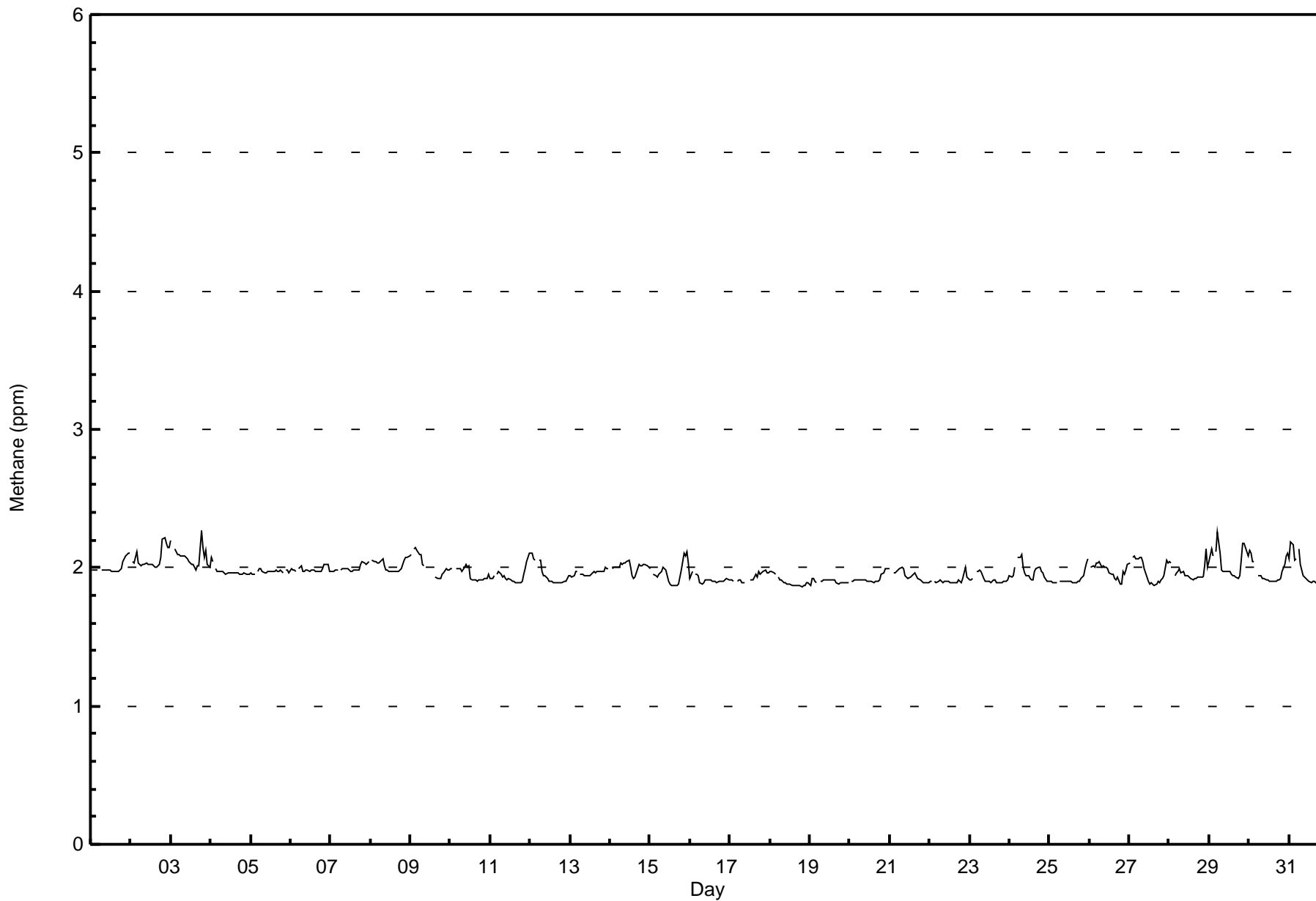
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Mar	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.1																								
2-Mar	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	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2																						
3-Mar	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.1	2.1	2.1	2.0	2.0	2.1	2.3																							
4-Mar	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																							
5-Mar	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	UO	2.0	2.0	2.0	2.0	2.0																							
6-Mar	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	2.0	2.0																							
7-Mar	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	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																							
8-Mar	Z	2.0	2.0	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	2.1	2.1	2.1	2.1	2.1	2.0	2.1																							
9-Mar	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	--	2.1																							
10-Mar	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0																							
11-Mar	1.9	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	1.9	2.0	2.0	2.1	1.9	2.1																								
12-Mar	2.1	2.1	2.1	2.1	Z	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	1.9	1.9	1.9	1.9	2.0	2.1																							
13-Mar	1.9	1.9	1.9	2.0	2.0	Z	1.9	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	2.0	2.0	2.0	2.0	2.0																							
14-Mar	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																							
15-Mar	2.0	Z	1.9	1.9	1.9	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	2.1	2.1	2.1	2.0	2.0	2.1																							
16-Mar	1.9	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	1.9	1.9	1.9	1.9	2.0																							
17-Mar	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	M	M	1.9	1.9	1.9	2.0	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0																								
18-Mar	2.0	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0																							
19-Mar	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	1.9	1.9																							
20-Mar	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	2.0	2.0	2.0	1.9	2.0																								
21-Mar	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	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																							
22-Mar	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	1.9	1.9	1.9	1.9	2.0																							
23-Mar	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	1.9	2.0																							
24-Mar	1.9	1.9	1.9	2.0	Z	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	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.1																							
25-Mar	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	2.0	2.0	2.1	1.9	2.1	2.1																							
26-Mar	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	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																							
27-Mar	2.0	Z	2.1	2.1	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	1.9	1.9	1.9	1.9	2.1	2.0	2.0	2.1																							
28-Mar	2.0	2.0	Z	1.9	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	2.1	2.0	2.0	2.0	2.1																							
29-Mar	2.0	2.1	2.1	Z	2.1	2.3	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	2.1	2.2	2.2	2.1	2.1	2.0	2.3																							
30-Mar	2.1	2.1	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	2.0	2.0	2.1	2.1	2.0	2.1	2.1																							
31-Mar	2.1	2.2	2.2	2.1	2.1	Z	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	1.9	1.9	1.9	2.0	2.0	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	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	Diurnal Average	
																								2.2	2.2	2.2	2.1	2.1	2.3	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	2.3	2.2	2.2	2.2	2.1	2.1	2.1	Diurnal Maximum

Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation



Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Conklin Community - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Conklin Community - March 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	625	88.78	88.78
2.1 - 3.0	79	11.22	100.00
3.1 - 10.0	0	0.00	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

Methane (CH₄) - ppm
Conklin Community - March 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	55	26	24	22	27	73	73	59	56	43	17	11	9	30	36	56	617
2.1 - 3.0	1	0	0	0	0	1	9	8	13	11	2	2	3	2	7	12	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	56	26	24	22	27	74	82	67	69	54	19	13	12	32	43	68	688

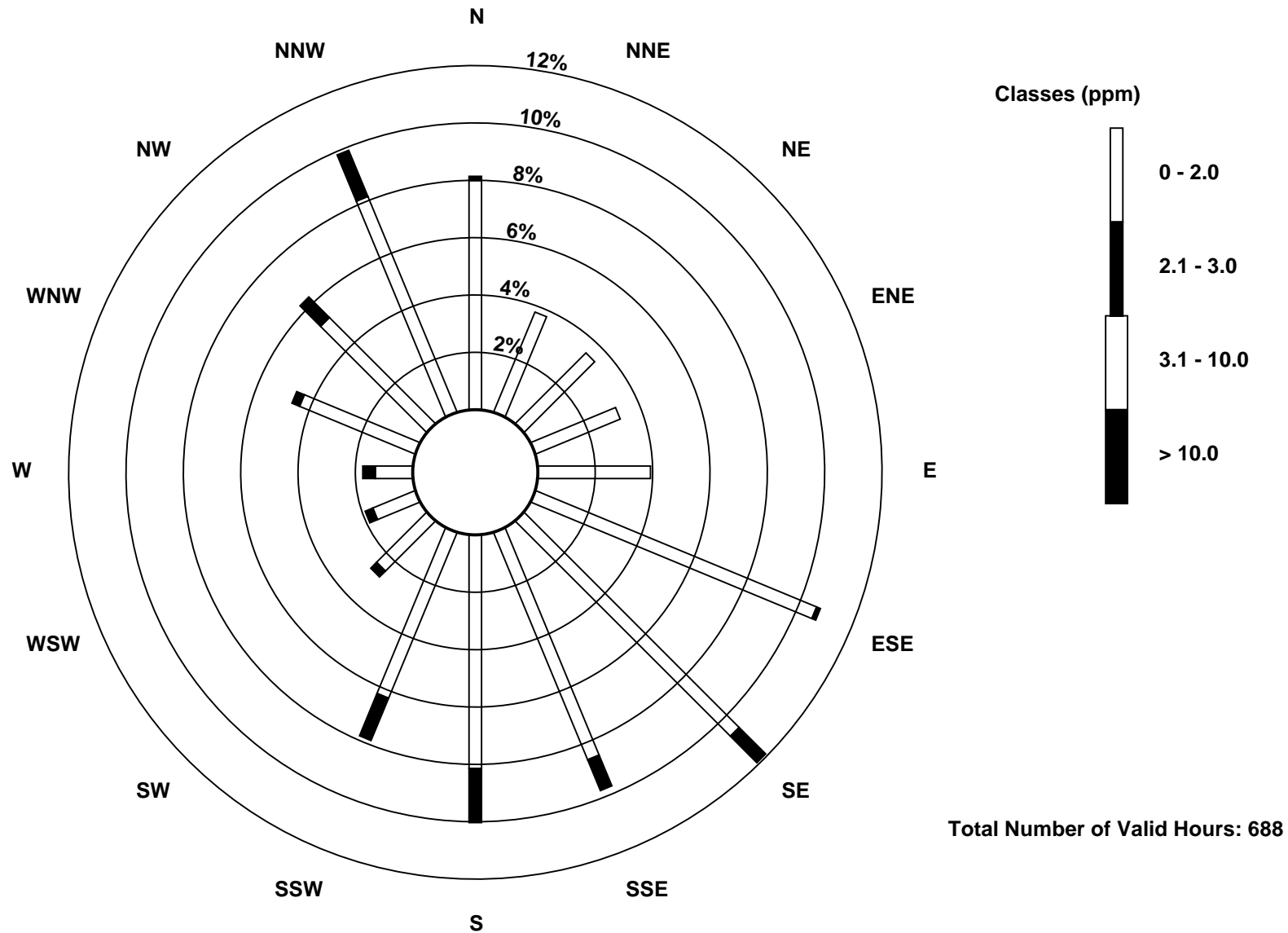
Total Number of Valid Hours: 688

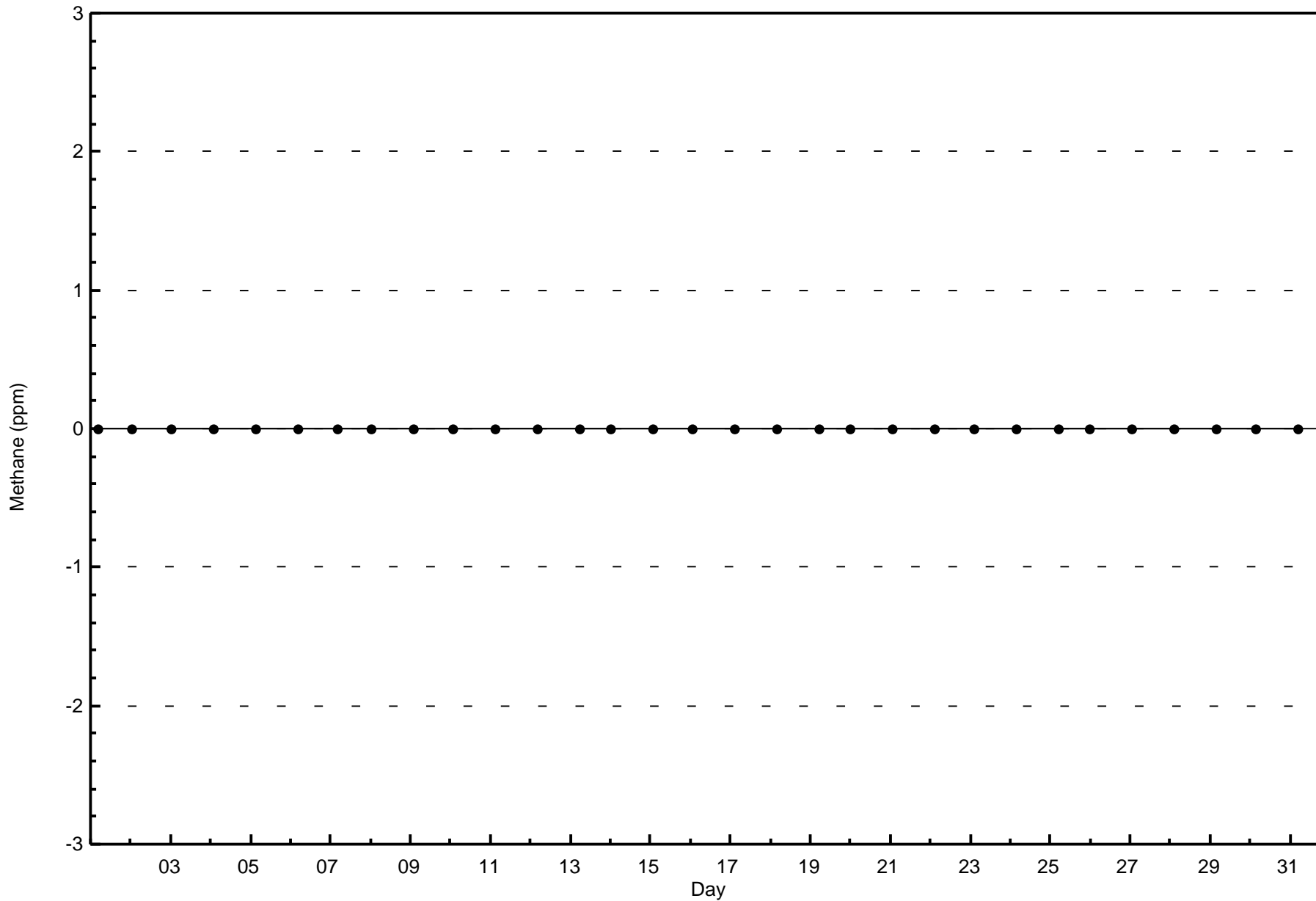
Total Number of Hours: 744

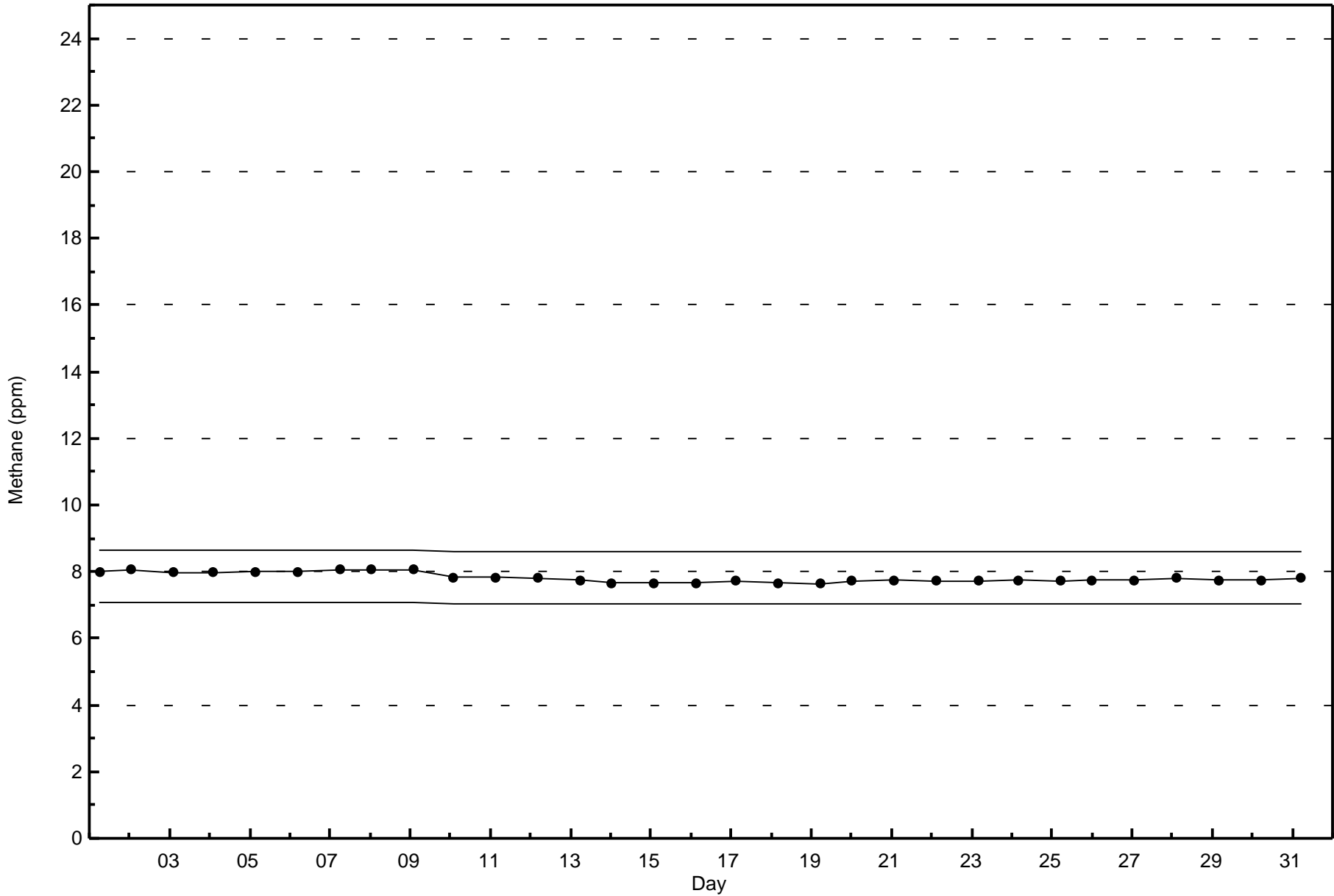


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Methane (CH₄) - ppm
Conklin Community (AMS 21)







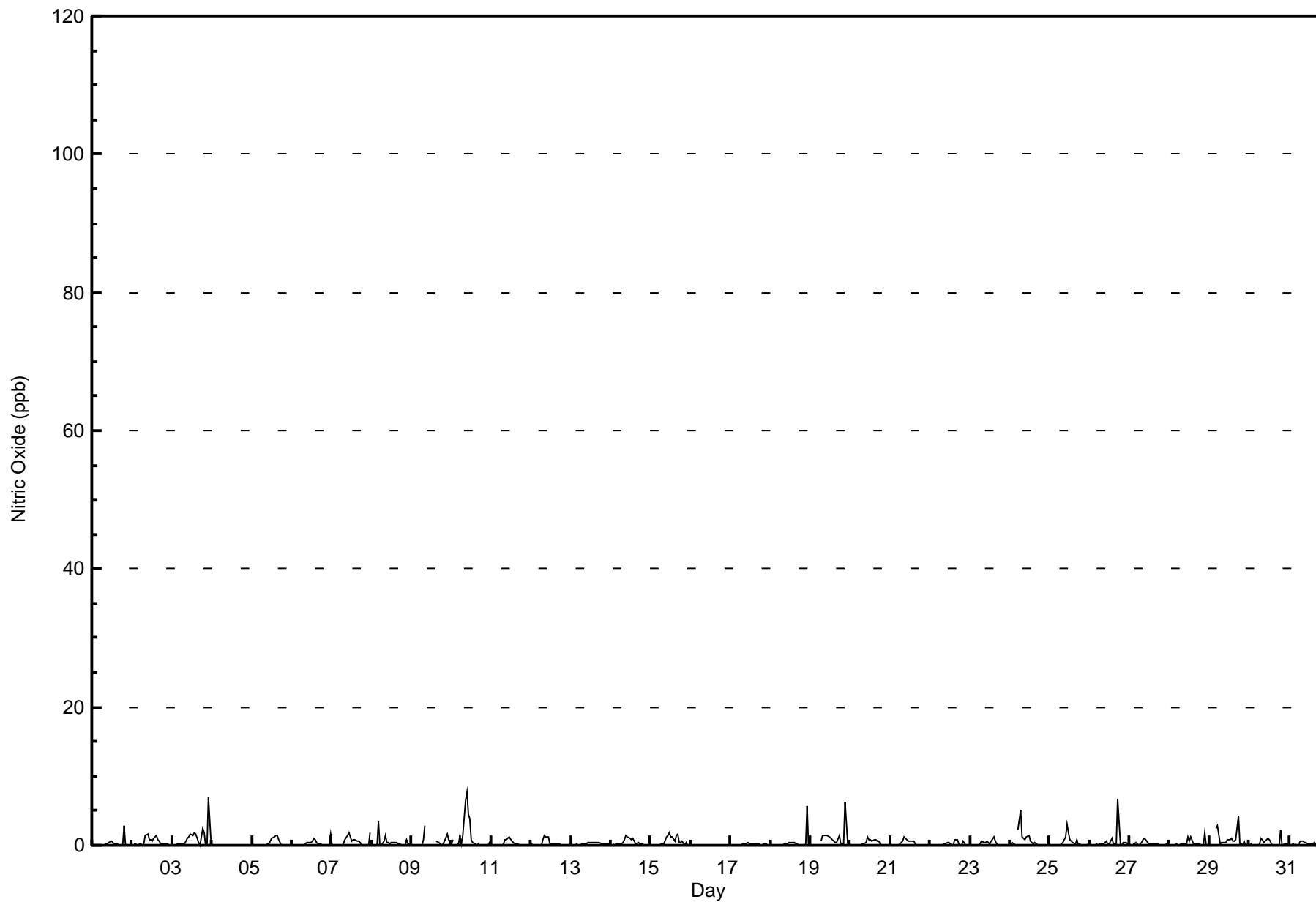


Maximum Value: 8 ppb on Mar 10 10:00																	Maximum Daily Average: 1.3 ppb on Mar 10																	Hours in Service: 744	
Minimum Value: 0 ppb on Mar 3 21:00																	Minimum Daily Average: 0.0 ppb on Mar 4																	Hours of Data: 707	
Maximum Diurnal Average: 0.9 ppb at hour 11																	Minimum Diurnal Average: 0.1 ppb at hour 3																	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 = 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-Mar	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	0	0.3	3									
2-Mar	Z	0	0	0	0	0	0	0	2	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	2									
3-Mar	0	Z	0	0	0	0	0	0	1	1	1	2	1	2	2	1	0	0	2	2	0	0	7	0	1.0	7									
4-Mar	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									
5-Mar	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0.3	1									
6-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	2	0.3	2									
7-Mar	0	0	0	0	0	Z	0	0	1	1	2	1	1	1	1	1	1	0	0	0	0	0	0	2	0.5	2									
8-Mar	Z	0	0	0	3	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	3									
9-Mar	0	Z	0	0	0	0	0	1	3	C	C	C	C	C	C	1	0	0	0	0	1	2	1	0	--	3									
10-Mar	0	1	Z	0	0	1	0	1	7	8	4	4	1	0	0	0	0	0	0	0	0	0	0	0	1.3	8									
11-Mar	0	0	0	Z	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1									
12-Mar	0	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1									
13-Mar	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									
14-Mar	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1									
15-Mar	0	Z	0	0	0	0	0	0	0	1	1	2	1	1	1	1	2	0	0	1	0	0	0	0	0.6	2									
16-Mar	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									
17-Mar	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-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0.4	6									
19-Mar	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	6	0	0	0.8	6									
20-Mar	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.3	1									
21-Mar	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1									
22-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0.2	1									
23-Mar	0	0	0	Z	0	0	0	1	0	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0.3	1									
24-Mar	0	0	0	0	Z	2	5	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.7	5									
25-Mar	0	0	0	0	0	Z	0	0	0	1	3	2	1	1	0	0	1	0	0	0	0	0	0	0	0.5	3									
26-Mar	Z	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	7	0	0	0	0	0	0	0.5	7									
27-Mar	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
28-Mar	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	2	0	0	0.3	2									
29-Mar	0	0	0	Z	2	3	0	0	0	0	0	1	1	1	1	1	1	4	0	0	0	1	0	0	0.7	4									
30-Mar	0	0	0	0	Z	0	0	1	1	0	1	1	1	0	0	0	0	0	0	2	0	0	0	0	0.4	2									
31-Mar	0	0	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1									
																	0.1 0.1 0.1 0.1 0.3 0.3 0.3 0.4 0.8 0.9 0.9 0.8 0.6 0.6 0.5 0.4 0.3 0.6 0.2 0.3 0.1 0.4 0.5 0.2																	Diurnal Average	
																	0 1 0 0 3 3 5 1 7 8 4 4 1 2 2 1 2 7 2 3 1 6 7 2																	Diurnal Maximum	
Z - zerospan		C - Calibration																																	



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Conklin Community - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Conklin Community - March 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
Conklin Community - March 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	56	26	24	22	27	74	82	67	70	55	19	13	12	32	43	69	691
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	56	26	24	22	27	74	82	67	70	55	19	13	12	32	43	69	691

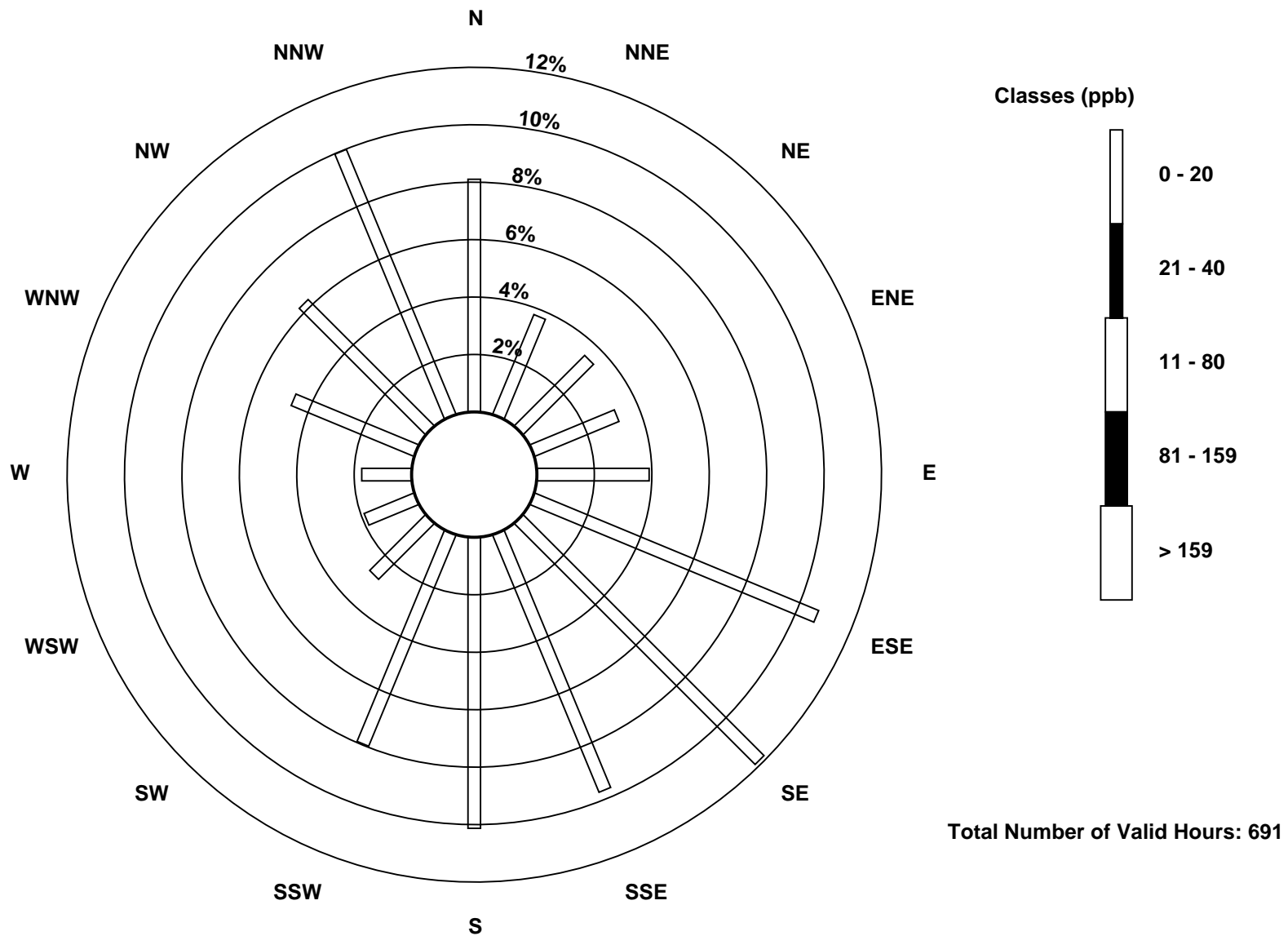
Total Number of Valid Hours: 691

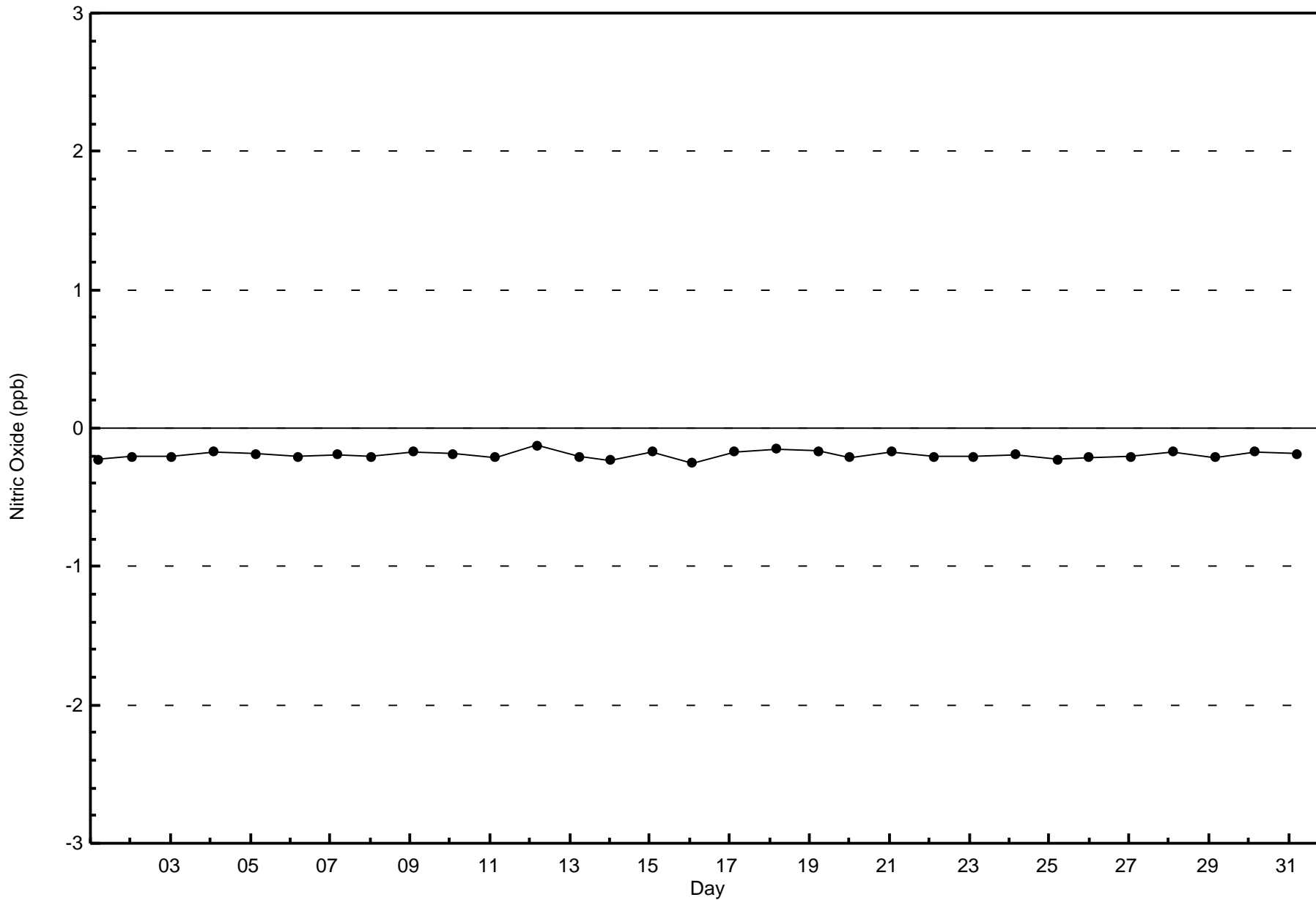
Total Number of Hours: 744

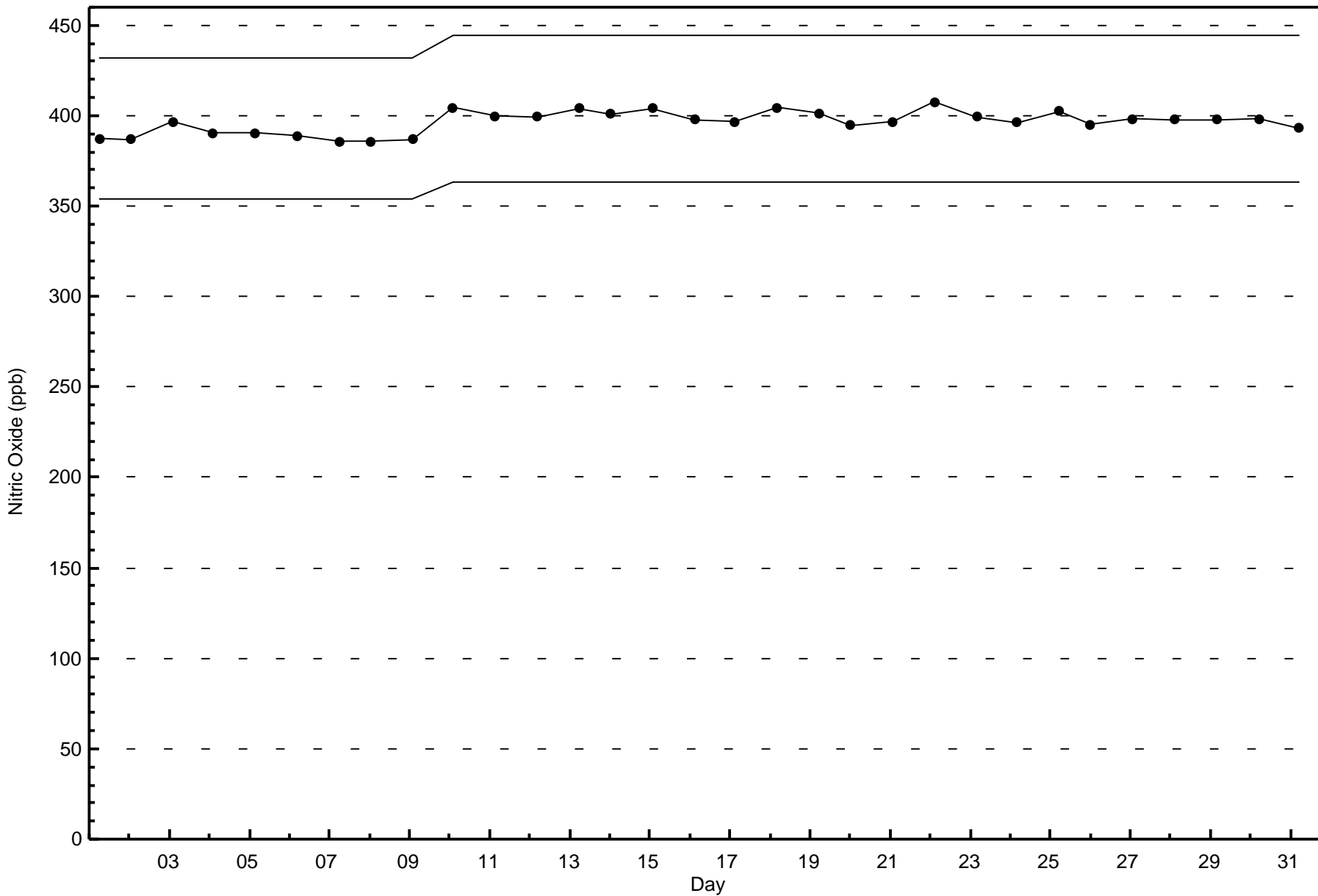


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitric Oxide (NO) - ppb
Conklin Community (AMS 21)









Wood Buffalo Environmental Association
Summary of Hour Averages

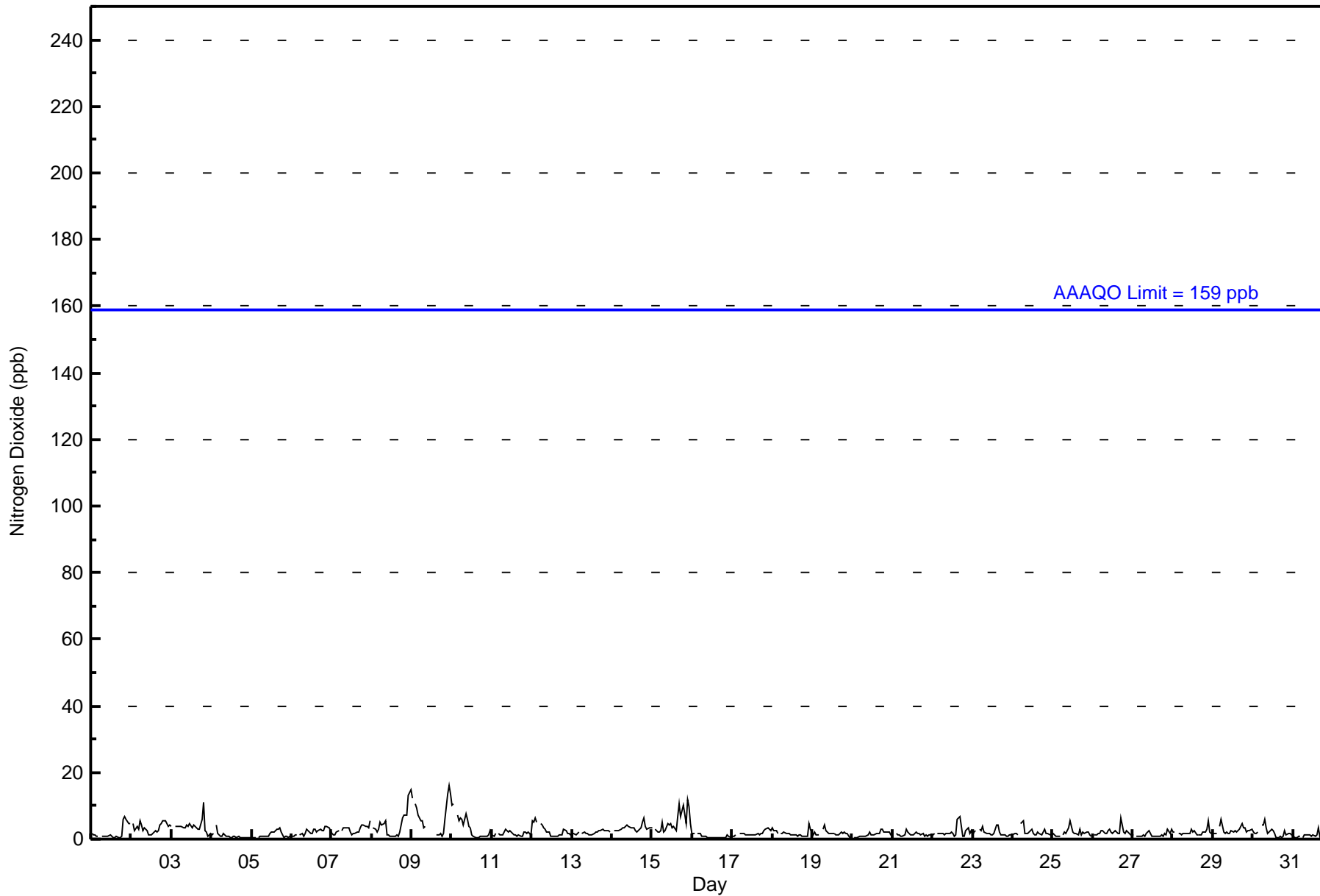
Nitrogen Dioxide (NO₂) - ppb
Conklin Community - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 16 ppb on Mar 9 23:00 Maximum Daily Average: 5.2 ppb on Mar 15																	Hours in Service: 744 Hours of Data: 707 Hours of Missing Data: 37 Hours of Calibration: 37 Percent Operational Time: 100.0									
Minimum Value: 0 ppb on Mar 5 01:00 Minimum Daily Average: 0.9 ppb on Mar 16 Maximum Diurnal Average: 3.2 ppb at hour 22 Minimum Diurnal Average: 1.6 ppb at hour 13 Monthly Average: 2.4 ppb Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 12																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	2	1	1	1	1	Z	1	1	1	1	1	1	1	1	0	1	1	1	1	6	7	6	5	5	1.9	7
2-Mar	Z	5	3	4	3	6	4	3	3	2	1	1	2	2	2	3	4	5	6	6	5	4	4	3.4	6	
3-Mar	4	Z	4	4	4	4	4	4	4	4	5	4	4	4	3	3	3	6	11	3	2	1	2	3.8	11	
4-Mar	1	2	Z	4	2	1	1	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.9	4	
5-Mar	0	0	0	Z	0	1	1	1	1	1	1	2	2	2	3	3	4	2	1	1	1	1	1	1.3	4	
6-Mar	1	1	1	1	Z	1	2	1	2	3	3	2	2	3	3	2	3	3	3	3	4	4	3	3	2.2	4
7-Mar	2	1	1	2	3	Z	3	4	4	4	3	2	1	2	2	2	3	4	4	4	4	4	6	2.8	6	
8-Mar	Z	4	3	2	3	5	4	5	6	1	1	1	1	1	1	1	1	2	6	7	7	7	13	15	4.2	15
9-Mar	12	Z	10	10	7	5	5	4	4	C	C	C	C	C	C	1	1	2	1	2	6	14	16	14	--	16
10-Mar	10	10	Z	7	6	7	6	4	8	6	4	3	1	1	1	0	1	1	1	1	1	1	3	3.6	10	
11-Mar	1	1	2	Z	2	1	1	2	3	3	2	3	2	1	1	1	1	1	1	2	2	2	2	1	1.6	3
12-Mar	5	5	6	5	Z	5	4	3	3	2	2	1	1	1	1	1	1	1	1	3	3	2	2	1	2.6	6
13-Mar	2	2	1	2	2	Z	2	2	2	2	1	1	1	2	2	2	3	3	3	3	3	3	2	2.0	3	
14-Mar	Z	2	2	2	3	3	4	4	4	4	4	3	3	3	2	3	4	5	6	4	3	3	3	3.4	6	
15-Mar	4	Z	3	2	2	3	5	2	2	5	4	5	3	4	3	7	11	7	8	10	5	12	10	5	5.2	12
16-Mar	2	2	Z	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0.9	2
17-Mar	1	1	1	Z	2	2	2	2	1	1	1	1	1	1	1	2	1	2	2	3	3	3	3	1.7	3	
18-Mar	4	3	2	2	Z	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	5	3	1.8	5	
19-Mar	1	2	1	1	1	Z	3	4	3	2	2	2	2	2	1	1	1	2	2	2	2	2	0	1	1.7	4
20-Mar	Z	1	1	1	1	1	1	1	1	1	2	1	1	1	2	2	2	3	3	2	2	2	1	1.5	3	
21-Mar	1	Z	2	1	1	1	1	1	3	2	2	1	1	2	2	2	2	1	2	1	1	1	1	1	1.5	3
22-Mar	1	2	Z	2	2	2	2	1	2	2	2	2	2	1	1	6	7	4	1	1	2	3	2	2	2.2	7
23-Mar	1	2	3	Z	3	3	4	2	2	2	2	1	1	2	4	4	2	1	1	1	1	1	1	1.9	4	
24-Mar	1	2	2	1	Z	5	5	2	2	2	2	3	2	1	1	2	2	1	2	3	2	2	1	1	2.0	5
25-Mar	2	1	1	1	1	Z	1	2	2	4	5	4	2	2	2	1	3	1	2	2	2	1	1	1.9	5	
26-Mar	Z	1	1	2	2	3	3	2	2	3	3	2	2	3	2	2	2	6	2	2	3	2	2	1	2.1	6
27-Mar	1	Z	1	1	1	1	1	1	2	2	3	1	1	1	1	1	1	1	1	2	1	3	2	3	1.4	3
28-Mar	2	2	Z	2	2	1	2	2	2	2	2	3	2	2	1	1	1	1	2	2	3	6	2	2	2.0	6
29-Mar	2	2	2	Z	4	6	2	2	2	2	2	3	2	3	2	3	3	5	3	4	2	3	2	3	2.7	6
30-Mar	2	2	2	2	Z	4	4	6	4	2	2	3	2	2	1	1	1	1	1	3	1	2	2	1	2.1	6
31-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	3	1	2	1	1	2	2	2	3	1.3	3
2.5 2.1 2.2 2.4 2.2 2.9 2.6 2.3 2.4 2.2 2.2 2.0 1.6 1.7 1.6 2.0 2.1 2.2 2.3 3.0 2.6 3.2 3.1 3.0																								Diurnal Average		
12 10 10 10 7 7 6 6 8 6 5 5 4 4 4 7 11 7 8 11 7 14 16 15																								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
Conklin Community - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Conklin Community - March 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
Conklin Community - March 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	56	26	24	22	27	74	82	67	70	55	19	13	12	32	43	69	691
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	56	26	24	22	27	74	82	67	70	55	19	13	12	32	43	69	691

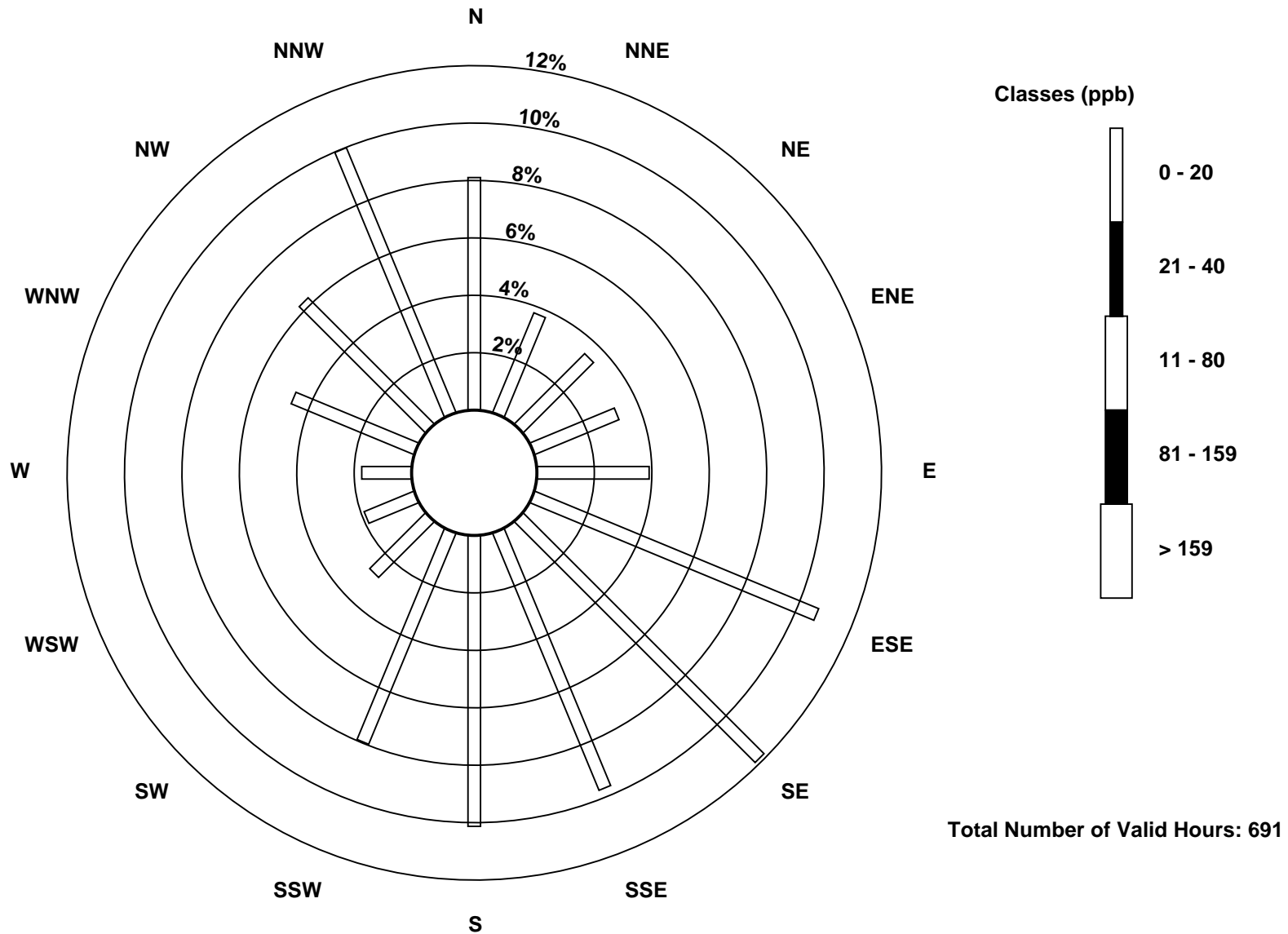
Total Number of Valid Hours: 691

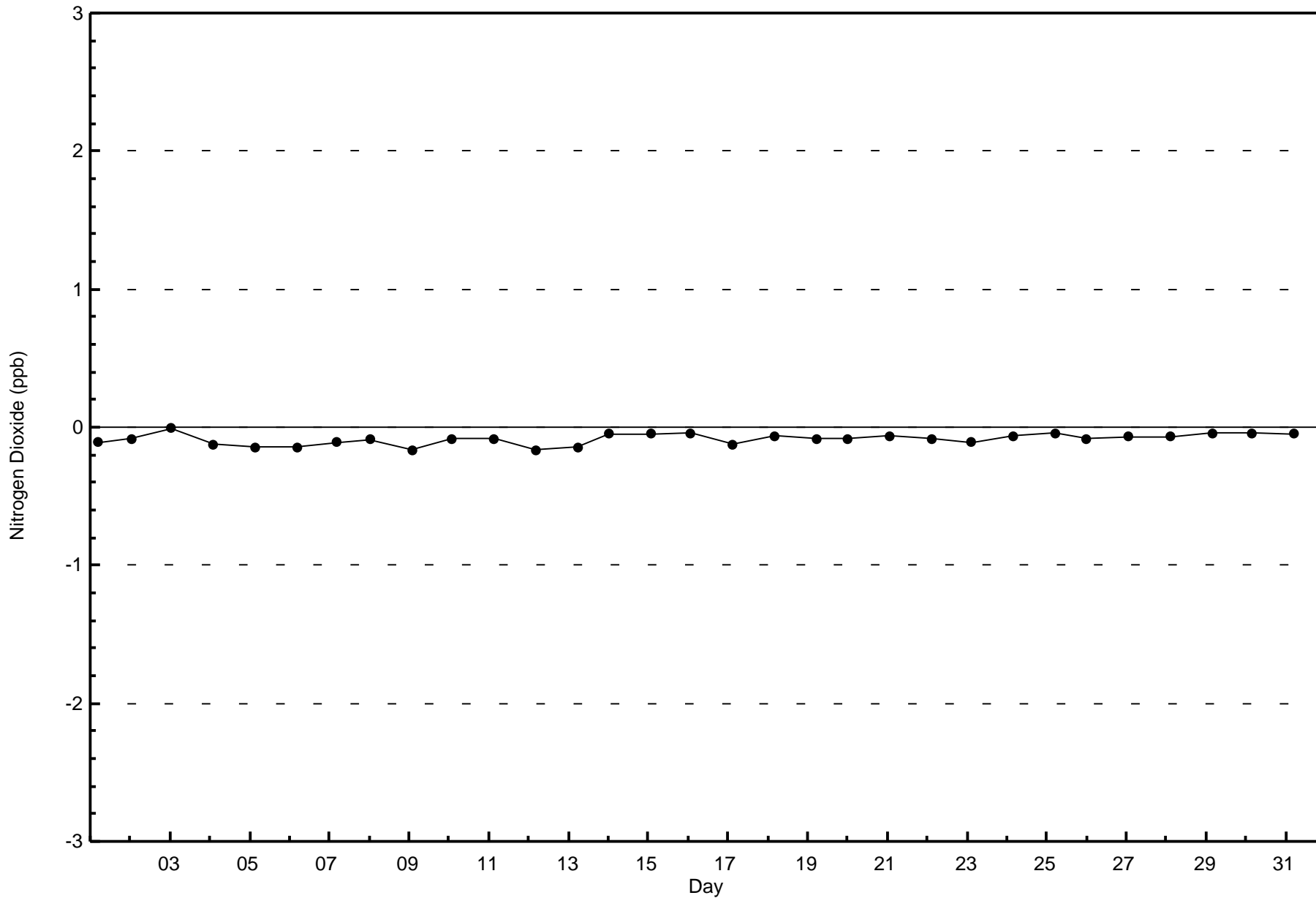
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Dioxide (NO₂) - ppb
Conklin Community (AMS 21)

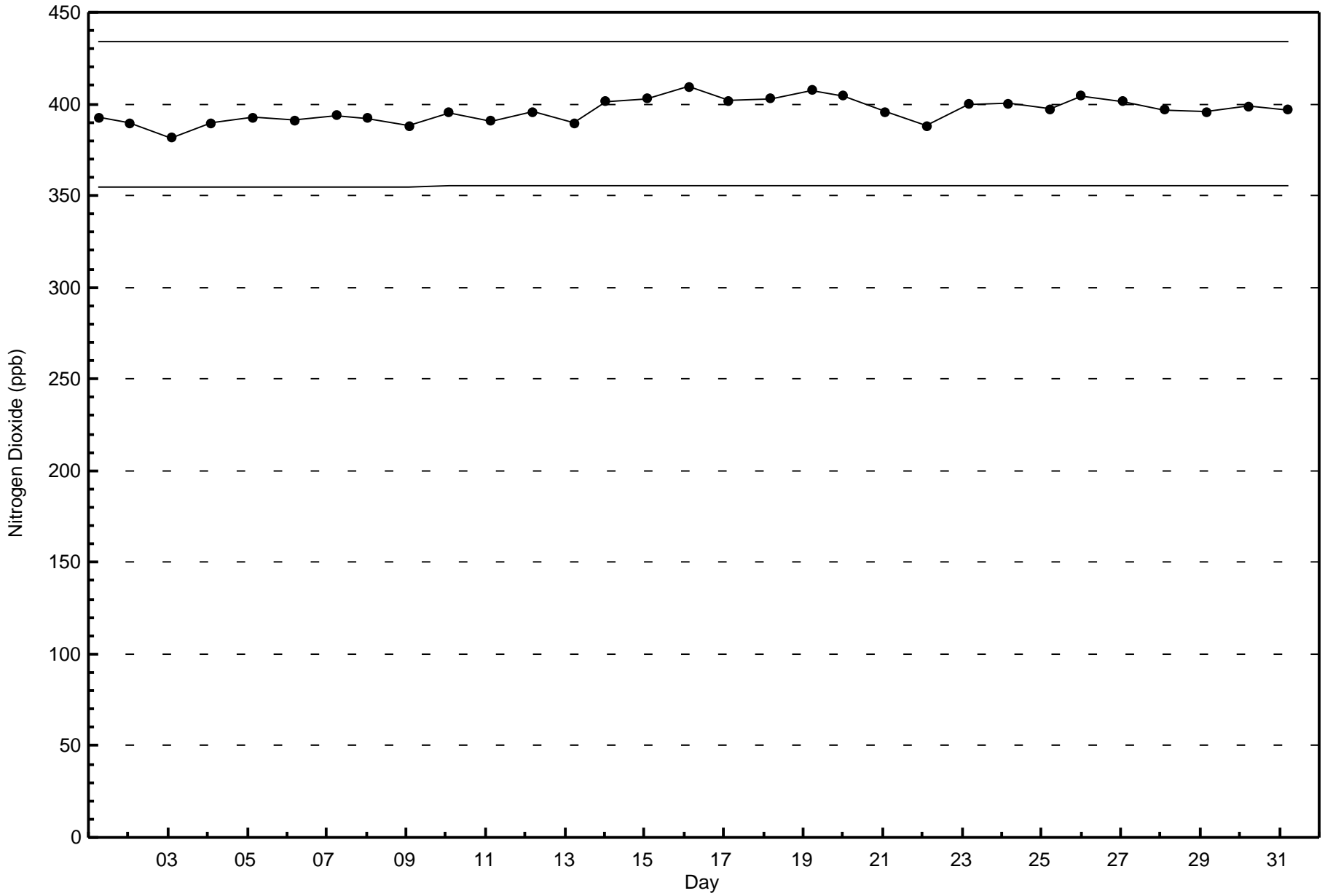






Wood Buffalo Environmental Association
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Conklin Community - March 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

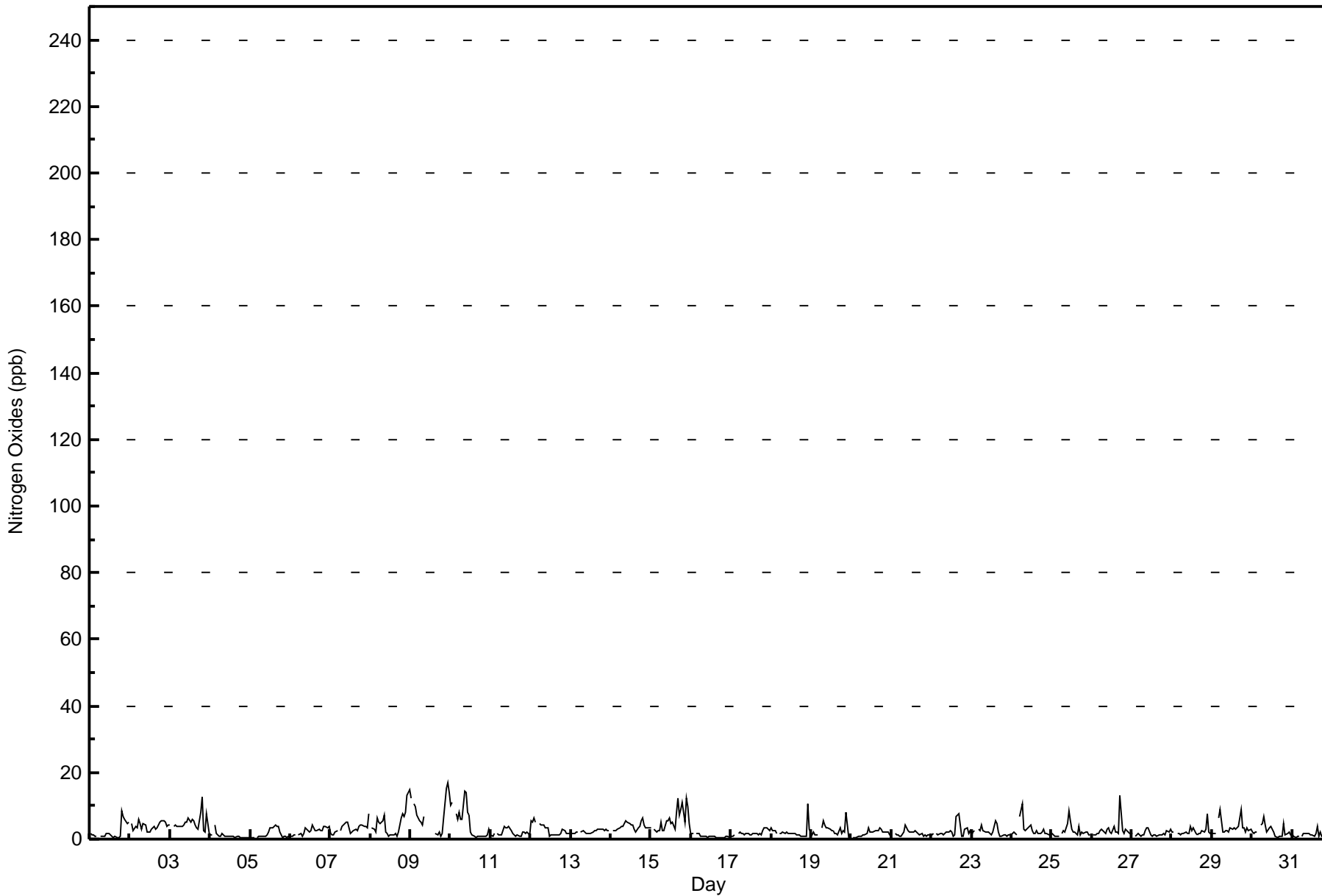
Nitrogen Oxides (NO_x) - ppb
Conklin Community - March 2017

Maximum Value: 17 ppb on Mar 9 23:00																		Maximum Daily Average: 5.8 ppb on Mar 15						Hours in Service: 744		
Minimum Value: 0 ppb on Mar 5 01:00																		Minimum Daily Average: 0.9 ppb on Mar 16						Hours of Data: 707		
Maximum Diurnal Average: 3.6 ppb at hour 22																		Minimum Diurnal Average: 2.2 ppb at hour 15						Hours of Missing Data: 37		
Monthly Average: 2.8 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 13						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-Mar	2	1	1	1	1	Z	1	1	1	1	2	2	1	1	1	1	1	1	1	9	7	6	5	5	2.1	9
2-Mar	Z	5	3	4	3	6	5	3	5	4	2	2	2	3	4	3	3	4	5	6	6	5	4	4	3.9	6
3-Mar	4	Z	4	4	4	4	4	4	4	5	5	6	5	6	5	4	3	3	8	13	2	2	8	2	4.8	13
4-Mar	1	1	Z	4	2	1	1	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1.0	4
5-Mar	0	0	0	Z	0	1	1	1	1	1	1	2	3	3	4	4	4	4	2	1	1	1	1	1	1.6	4
6-Mar	1	1	1	1	Z	1	2	1	2	4	3	2	3	4	4	3	3	3	3	3	4	4	3	4	2.5	4
7-Mar	2	1	1	2	3	Z	3	4	4	5	5	3	2	2	3	3	2	4	4	4	4	4	4	8	3.3	8
8-Mar	Z	4	3	2	6	5	4	5	7	2	1	1	1	1	1	2	1	2	7	7	7	8	13	15	4.6	15
9-Mar	12	Z	10	10	7	5	5	4	7	C	C	C	C	C	C	2	1	2	1	2	6	15	17	14	--	17
10-Mar	10	11	Z	7	6	8	6	6	14	14	8	7	2	1	1	1	1	1	1	1	1	1	1	3	4.9	14
11-Mar	1	1	2	Z	2	1	1	2	4	3	3	4	2	2	1	1	1	1	1	2	2	2	2	1	1.9	4
12-Mar	6	5	6	5	Z	5	4	4	4	3	3	1	1	1	1	1	1	1	1	3	3	2	2	2	2.9	6
13-Mar	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	2	2.3	3
14-Mar	Z	3	2	3	3	3	4	4	5	6	5	5	4	4	3	2	3	4	5	6	4	3	3	3	3.8	6
15-Mar	3	Z	3	2	2	2	5	2	3	6	6	6	4	5	3	8	12	7	9	11	5	12	10	4	5.8	12
16-Mar	2	2	Z	2	2	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	0.9	2
17-Mar	1	1	1	Z	2	2	2	2	1	2	2	1	1	2	2	2	1	2	1	2	3	3	3	3	1.8	3
18-Mar	4	3	2	2	Z	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	11	3	2.1	11	
19-Mar	1	2	1	1	1	Z	4	5	4	3	3	3	3	2	2	2	1	3	2	2	8	0	1	2.5	8	
20-Mar	Z	1	1	1	1	1	1	1	1	2	3	2	2	2	2	3	2	3	3	2	2	2	2	1	1.8	3
21-Mar	1	Z	2	1	1	1	1	2	4	3	3	2	2	2	3	2	2	1	2	1	1	1	1	1	1.7	4
22-Mar	1	2	Z	2	1	2	2	1	2	2	2	2	2	1	1	7	8	4	1	1	3	3	2	2	2.4	8
23-Mar	1	2	2	Z	3	3	4	3	2	2	2	2	1	2	5	5	2	1	1	1	1	1	1	1	2.2	5
24-Mar	1	2	2	1	Z	7	10	3	3	3	4	4	2	2	2	2	2	2	2	3	2	2	1	1	2.7	10
25-Mar	2	1	1	1	1	Z	2	2	2	5	8	6	3	2	2	1	4	1	2	2	2	1	1	1	2.4	8
26-Mar	Z	1	1	2	2	3	3	2	2	3	3	2	2	4	2	2	2	13	2	2	3	3	2	2	2.7	13
27-Mar	2	Z	1	1	1	1	1	1	3	3	3	1	1	1	1	1	1	1	1	2	1	3	2	3	1.6	3
28-Mar	2	2	Z	2	2	1	2	2	2	2	2	4	3	4	2	1	1	2	2	2	3	7	2	2	2.3	7
29-Mar	2	2	2	Z	6	9	2	2	3	2	2	4	3	4	3	3	4	9	3	4	2	3	2	3	3.4	9
30-Mar	2	2	2	2	Z	4	4	7	4	2	3	4	3	2	1	1	1	1	1	5	1	2	2	1	2.5	7
31-Mar	2	1	1	1	1	Z	1	2	2	2	2	1	1	1	2	4	1	2	1	1	2	2	2	3	1.5	4
2.6 2.2 2.2 2.5 2.5 3.2 2.9 2.7 3.2 3.1 3.1 2.8 2.2 2.3 2.2 2.4 2.4 2.8 2.5 3.3 2.7 3.6 3.6 3.2																								Diurnal Average		
12 11 10 10 7 9 10 7 14 14 8 7 5 6 5 8 12 13 9 13 7 15 17 15																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Conklin Community - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Conklin Community - March 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
Conklin Community - March 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	56	26	24	22	27	74	82	67	70	55	19	13	12	32	43	69	691
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	56	26	24	22	27	74	82	67	70	55	19	13	12	32	43	69	691

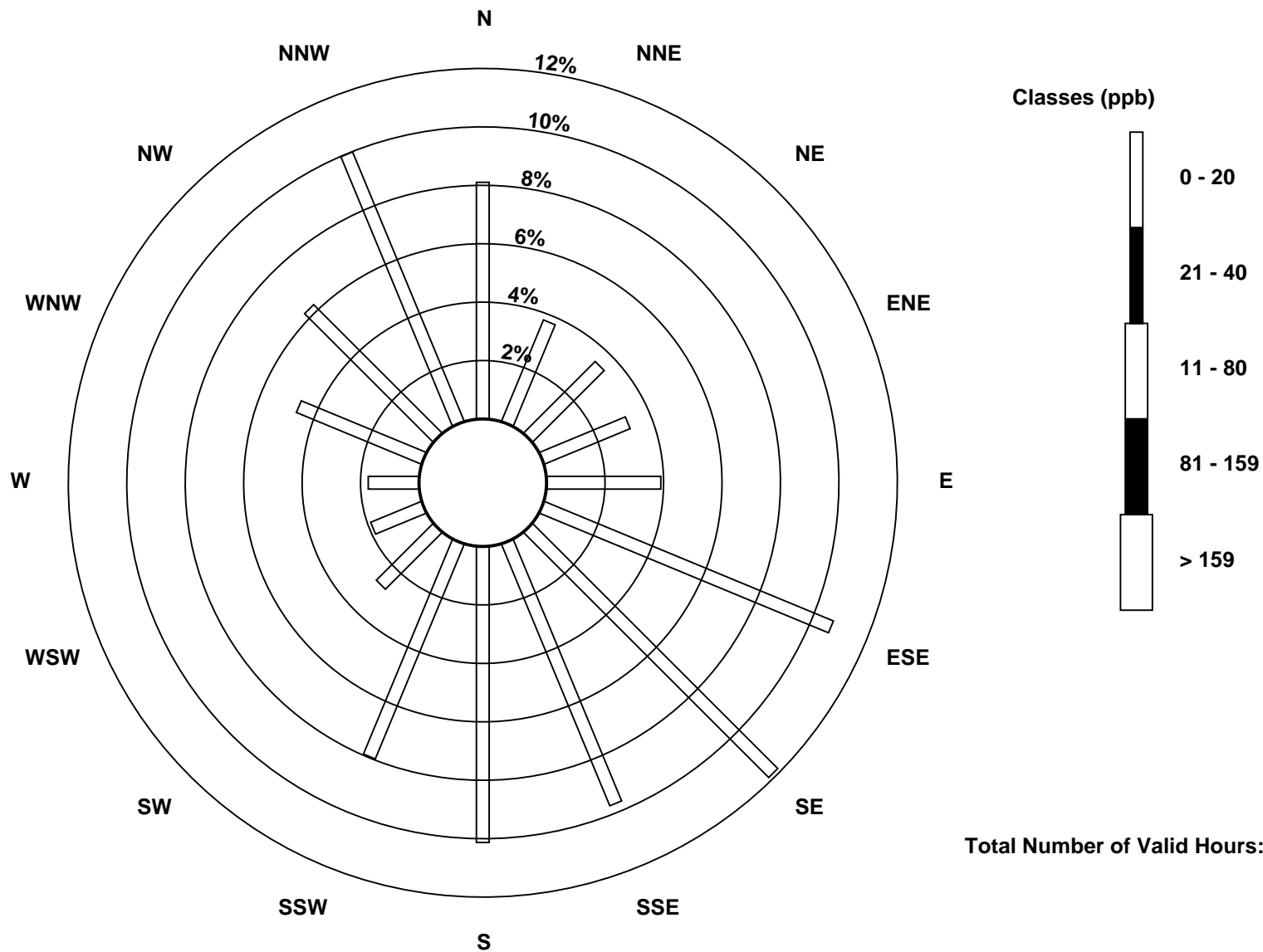
Total Number of Valid Hours: 691

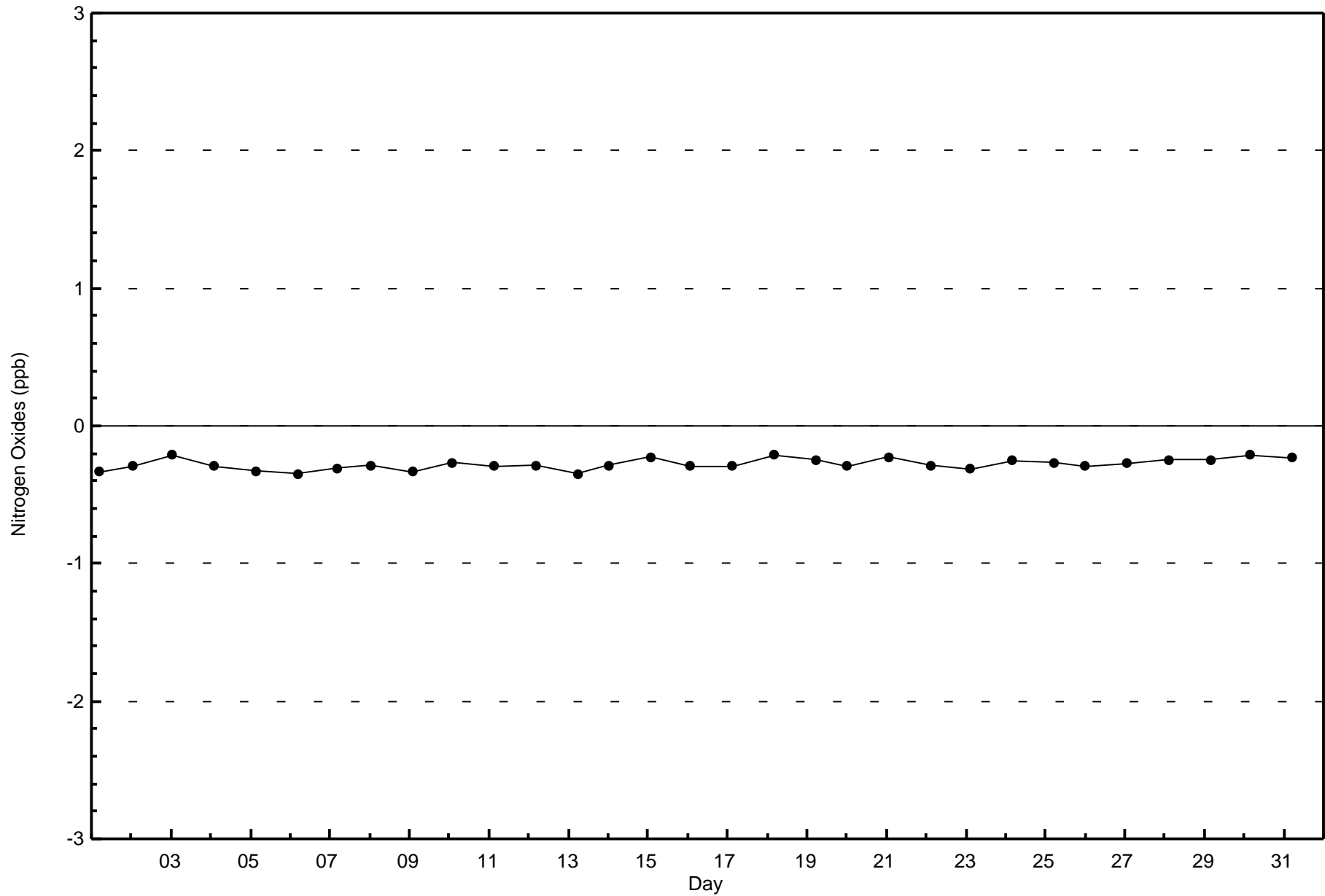
Total Number of Hours: 744

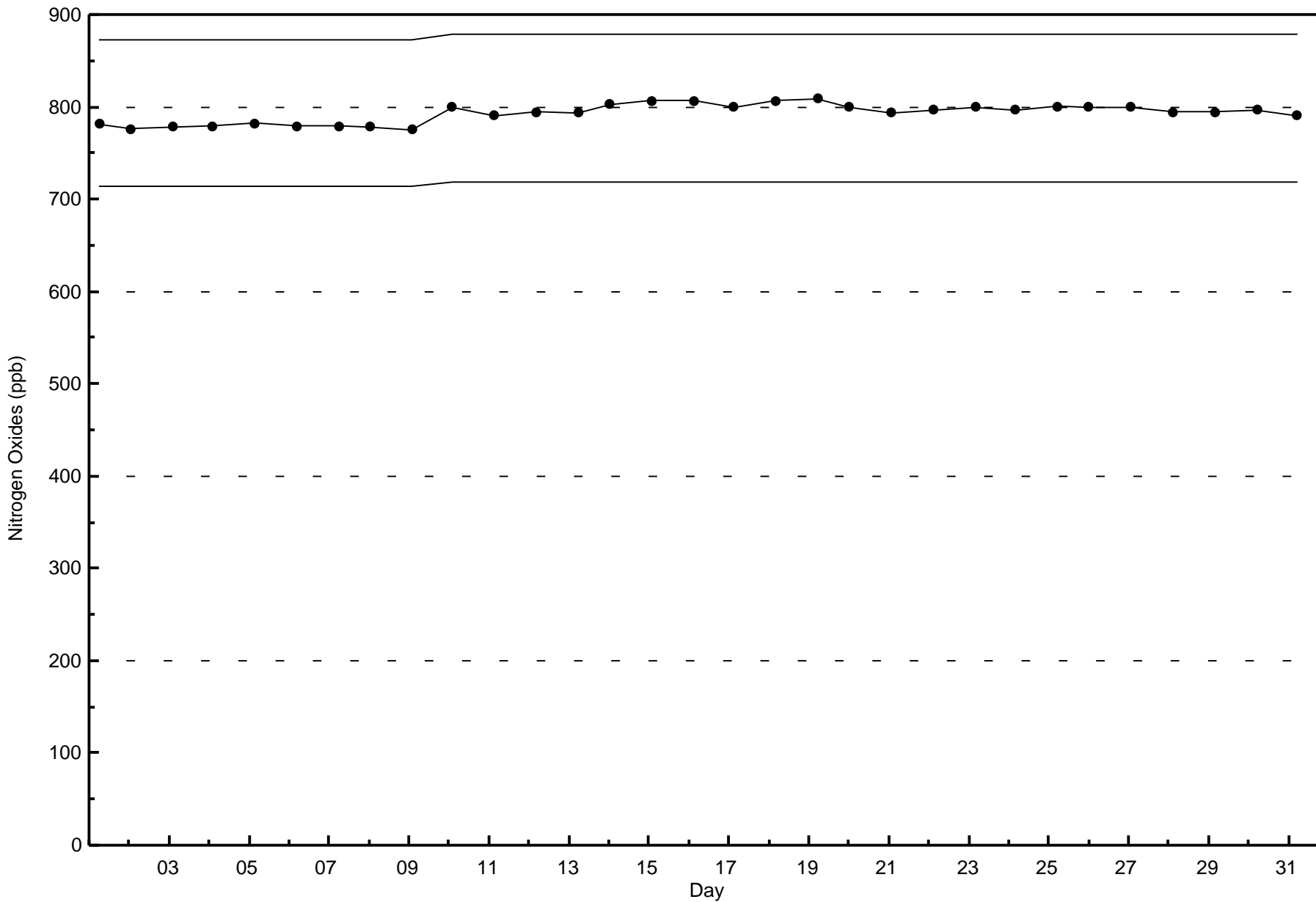


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Oxides (NO_x) - ppb
Conklin Community (AMS 21)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

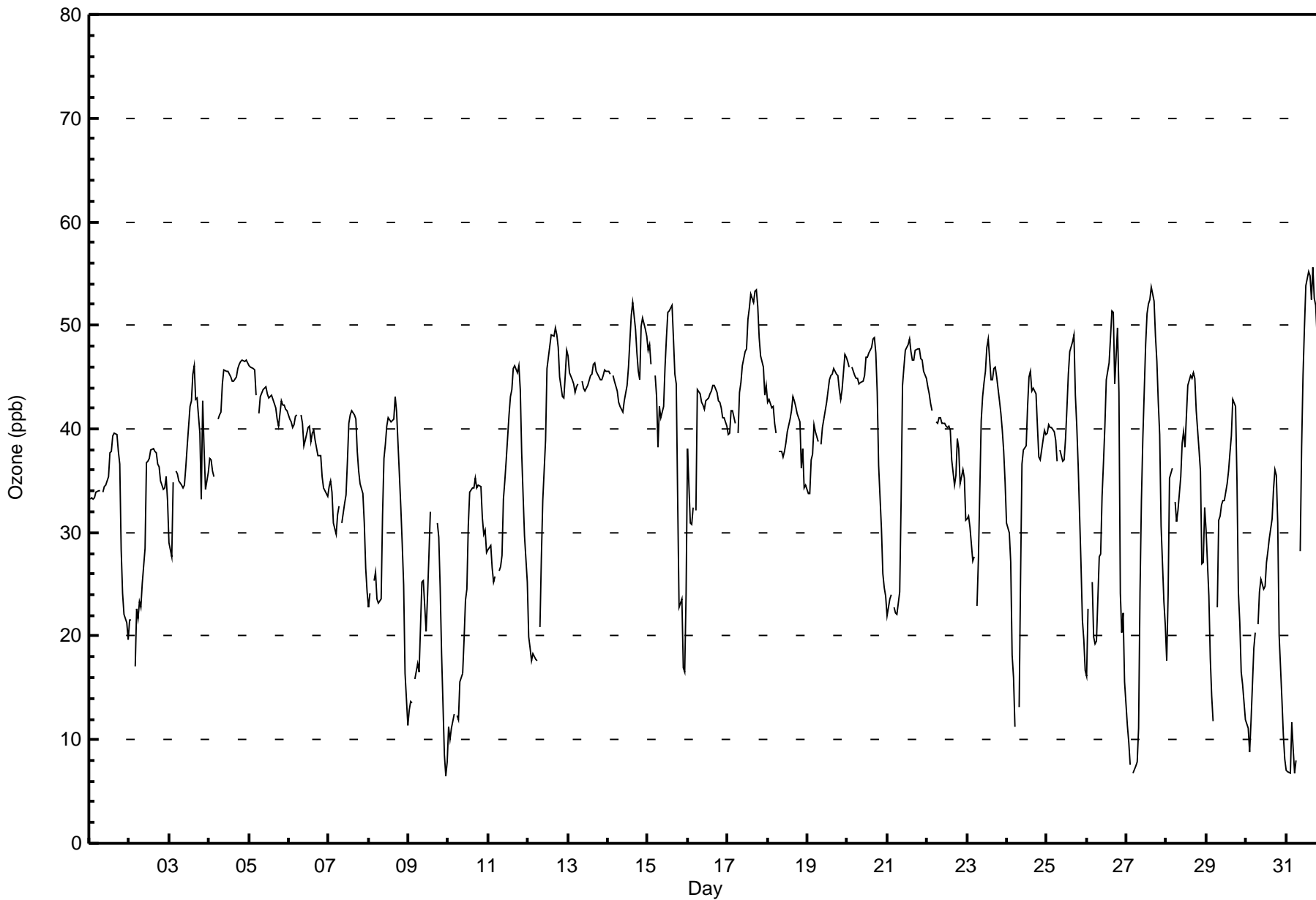
Conklin Community - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 56 ppb on Mar 31 17:00										Maximum Daily Average: 46.4 ppb on Mar 17										Hours of Data: 710																												
Minimum Value: 6 ppb on Mar 9 23:00										Minimum Daily Average: 19.6 ppb on Mar 9										Hours of Missing Data: 34																												
Maximum Diurnal Average: 44.6 ppb at hour 17										Minimum Diurnal Average: 29.4 ppb at hour 6										Hours of Calibration: 34																												
Monthly Average: 36.3 ppb										Percentiles: P ₁ = 8 P ₁₀ = 20 Q ₁ = 31 Median = 39 Q ₃ = 44 P ₉₀ = 47 P ₉₉ = 53										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-Mar	33	33	33	33	34	34	34	Z	34	34	35	35	38	38	39	40	39	38	37	28	24	22	21	20	32.9	40																						
2-Mar	22	22	Z	17	23	22	23	23	25	28	37	37	37	38	38	38	38	37	36	35	34	34	35	33	30.9	38																						
3-Mar	29	28	35	Z	36	36	35	35	34	35	36	38	42	43	45	46	43	43	40	33	43	38	34	36	37.5	46																						
4-Mar	37	37	36	35	Z	41	41	42	44	46	46	46	45	45	45	45	46	46	46	47	47	47	47	46	43.5	47																						
5-Mar	46	46	46	46	43	Z	42	43	44	44	44	43	43	43	43	42	42	41	40	43	42	42	42	42	43.2	46																						
6-Mar	41	41	40	40	41	41	Z	41	40	38	39	40	40	39	40	40	39	37	37	37	35	34	34	33	38.7	41																						
7-Mar	34	35	34	31	30	32	33	Z	31	33	34	37	41	41	42	41	41	38	36	35	34	31	27	24	34.5	42																						
8-Mar	23	24	Z	25	26	24	23	24	32	37	39	40	41	41	41	41	43	42	36	32	29	25	16	11	31.1	43																						
9-Mar	13	14	14	Z	16	17	17	21	25	25	21	24	28	32	C	C	C	31	30	25	18	9	6	8	19.6	32																						
10-Mar	11	10	11	12	Z	12	12	16	16	20	24	25	31	34	34	34	35	34	35	34	31	30	30	28	24.4	35																						
11-Mar	28	29	27	25	26	Z	26	27	28	33	35	37	41	43	44	46	46	45	46	44	38	34	30	25	34.9	46																						
12-Mar	20	19	18	18	18	18	Z	21	27	33	39	46	47	48	49	49	50	49	48	45	43	43	45	48	36.5	50																						
13-Mar	47	45	45	44	44	44	44	Z	45	44	44	44	44	45	45	46	46	46	45	45	45	45	46	46	44.9	47																						
14-Mar	46	45	Z	45	45	44	43	42	42	42	43	44	46	49	51	52	50	47	46	45	50	51	50	49	46.3	52																						
15-Mar	48	48	46	Z	45	43	38	42	41	42	46	49	51	51	52	49	45	44	33	23	24	17	17	24	39.9	52																						
16-Mar	38	31	31	32	Z	32	44	43	43	42	42	43	43	43	44	44	44	44	43	43	42	41	41	40	40.6	44																						
17-Mar	39	40	42	42	41	Z	40	43	44	46	47	48	51	52	53	52	53	53	52	49	47	46	43	44	46.4	53																						
18-Mar	43	43	42	42	41	40	Z	38	38	37	38	39	40	41	42	43	43	42	42	41	36	38	34	35	39.8	43																						
19-Mar	34	34	37	38	40	40	39	Z	38	40	41	43	44	45	45	45	46	45	45	44	43	44	47	47	41.9	47																						
20-Mar	46	46	Z	46	45	45	45	44	44	45	45	47	47	47	48	49	49	47	44	36	30	26	25	24	42.2	49																						
21-Mar	22	24	24	Z	23	22	22	24	33	44	46	48	48	49	47	47	47	48	48	48	47	47	46	45	39.0	49																						
22-Mar	44	43	42	42	Z	41	41	41	41	41	40	40	40	40	40	37	35	36	39	38	35	36	35	31	39.1	44																						
23-Mar	31	32	31	27	28	Z	23	27	41	43	44	46	48	49	45	45	46	46	45	43	41	40	38	35	38.8	49																						
24-Mar	31	30	27	18	16	11	Z	13	26	37	38	38	42	45	46	44	44	43	40	37	37	38	40	39	33.9	46																						
25-Mar	40	40	40	40	40	39	37	Z	38	37	37	39	42	45	47	48	49	43	40	36	27	21	20	17	37.6	49																						
26-Mar	16	23	Z	25	20	19	20	28	28	33	37	40	45	46	49	51	51	44	50	43	24	20	22	16	32.7	51																						
27-Mar	11	10	8	Z	7	7	8	11	24	33	39	48	51	52	53	54	52	49	47	43	39	31	23	21	31.3	54																						
28-Mar	18	24	35	36	Z	33	31	32	35	39	40	38	41	44	45	45	45	45	42	38	36	27	27	32	36.0	45																						
29-Mar	30	24	18	14	12	Z	23	31	32	33	33	33	35	36	38	39	43	42	35	24	21	17	15	12	27.8	43																						
30-Mar	12	11	9	12	19	20	Z	21	24	26	25	25	27	28	29	31	34	36	35	31	20	14	10	8	22.1	36																						
31-Mar	7	7	7	12	9	7	8	Z	28	38	45	50	54	55	55	52	56	53	52	46	42	40	39	37	34.7	56																						
																								30.3	30.2	29.8	30.8	29.4	29.4	30.4	30.9	34.4	37.0	38.6	40.3	42.3	43.5	44.4	44.5	44.6	43.0	41.5	38.4	35.6	33.1	31.8	30.9	Diurnal Average
																								48	48	46	46	45	45	45	44	45	46	47	50	54	55	55	54	56	53	52	49	50	51	50	49	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 Community - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Conklin Community - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	74	10.42	10.42
21 - 50	609	85.77	96.20
51 - 82	27	3.80	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 Community - March 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	0	1	0	1	7	6	7	12	4	2	2	6	5	8	63
21 - 50	55	27	26	20	26	75	72	56	55	35	12	10	10	26	37	61	603
51 - 82	0	0	0	0	1	0	4	3	7	7	1	1	1	2	0	0	27
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	28	26	21	27	76	83	65	69	54	17	13	13	34	42	69	693

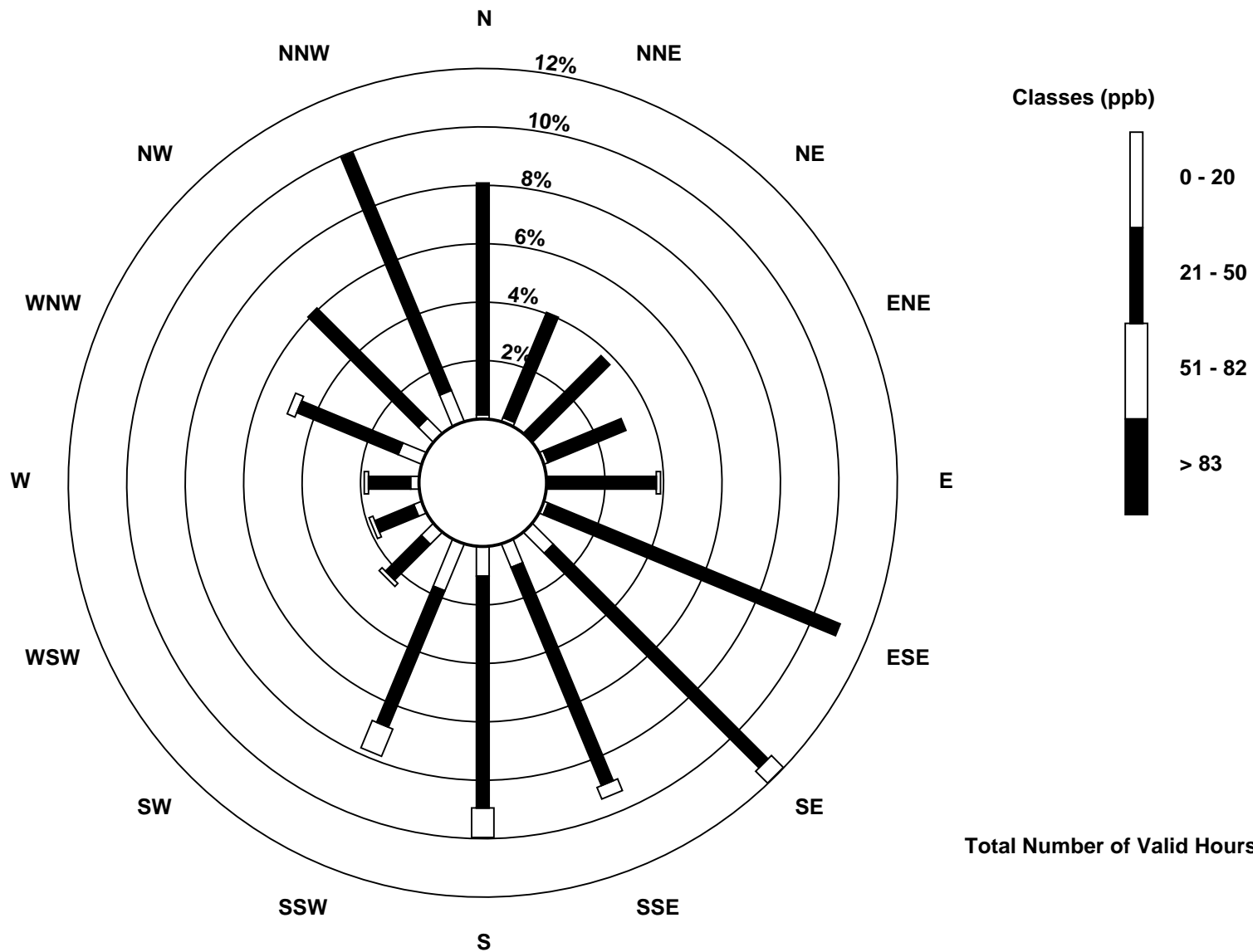
Total Number of Valid Hours: 693

Total Number of Hours: 744

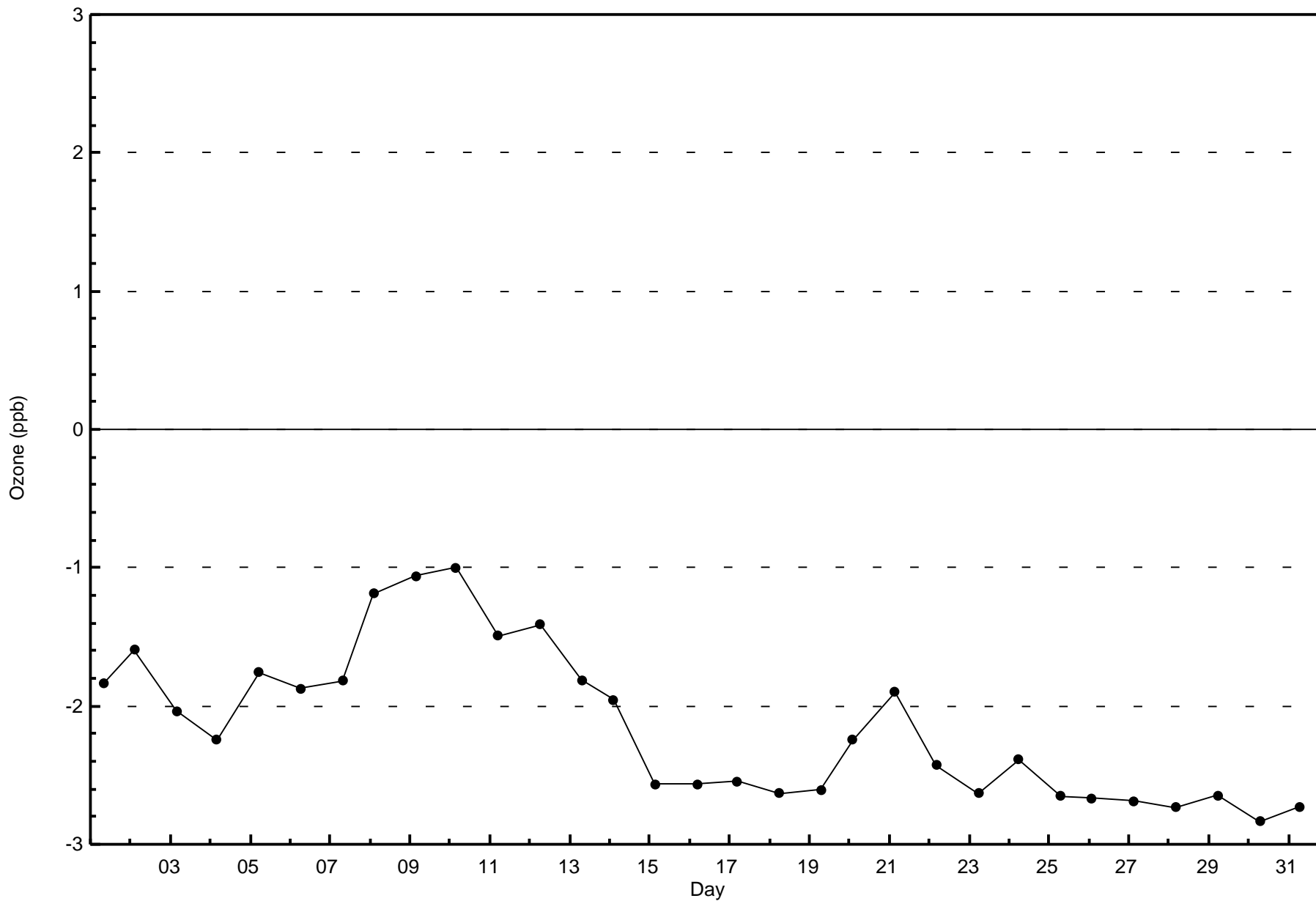


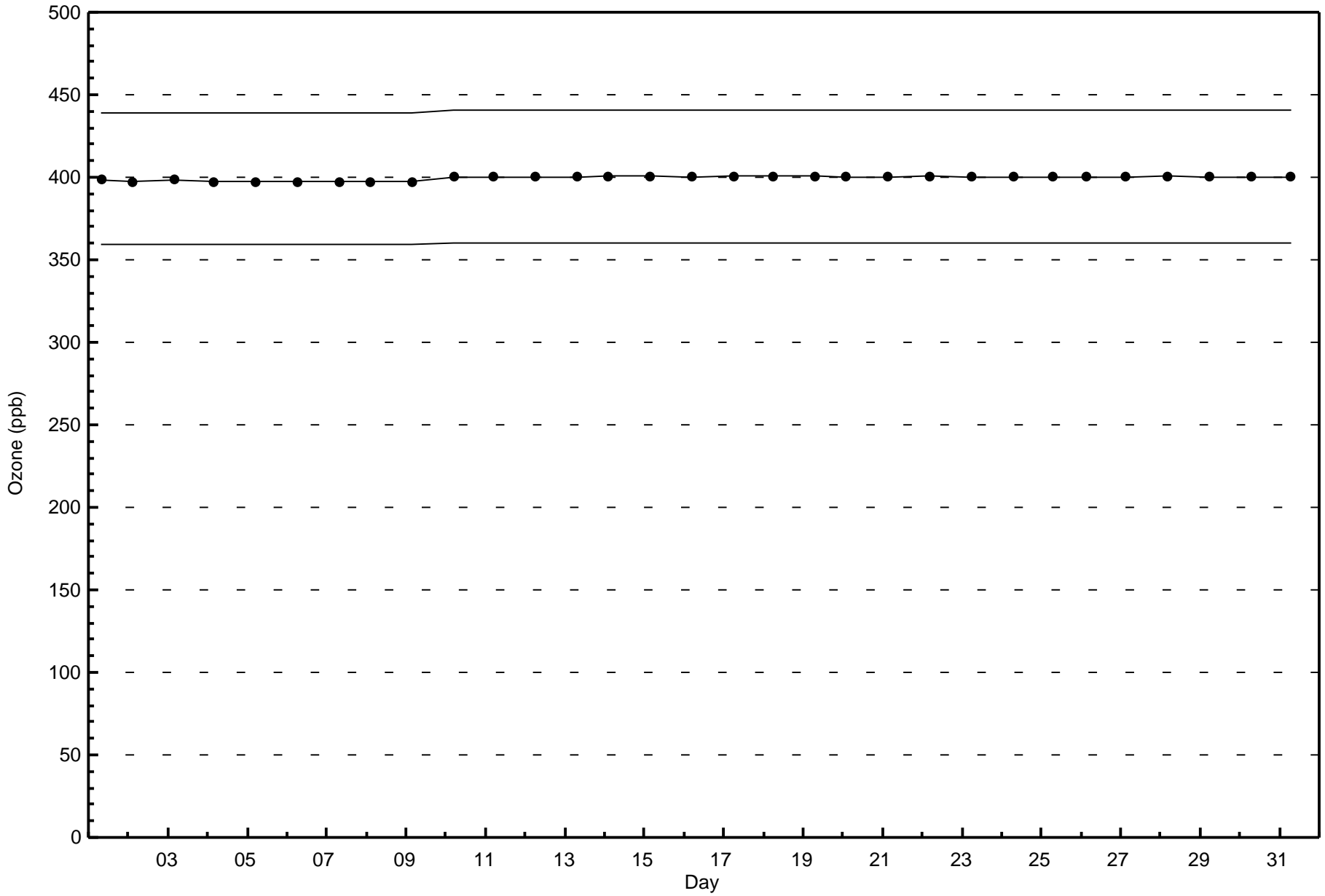
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Ozone (O₃) - ppb
Conklin Community (AMS 21)



Total Number of Valid Hours: 693







Wood Buffalo Environmental Association

Summary of Hour Averages

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

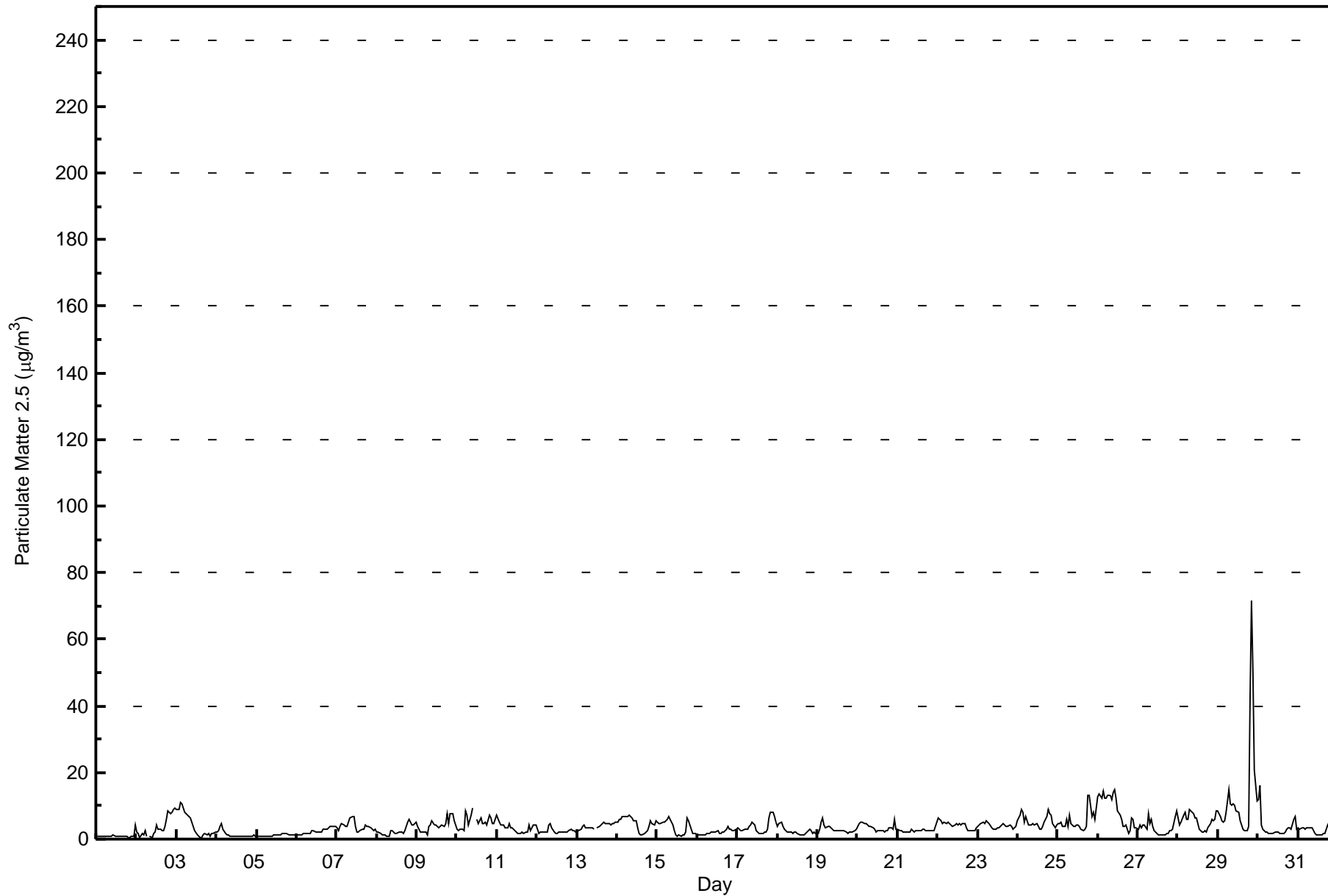
Conklin Community - March 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 71.8 µg/m ³ on Mar 29 21:00 Maximum Daily Average: 13.8 µg/m ³ on Mar 29		Hours in Service: 744 Hours of Data: 740 Hours of Missing Data: 4 Hours of Calibration: 1 Percent Operational Time: 99.6																								
Minimum Value: 0.3 µg/m ³ on Mar 1 21:00 Maximum Diurnal Average: 6.4 µg/m ³ at hour 21 Monthly Average: 3.97 µg/m ³		Minimum Daily Average: 1.0 µg/m ³ on Mar 1 Minimum Diurnal Average: 2.5 µg/m ³ at hour 16 Percentiles: P ₁ = 0.6 P ₁₀ = 1.2 Q ₁ = 2.0 Median = 3.1 Q ₃ = 4.8 P ₉₀ = 7.2 P ₉₉ = 14.6																								
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-Mar	1.0	1.0	0.9	0.9	0.8	0.8	0.8	0.8	0.8	1.0	1.1	0.9	0.7	0.9	0.8	1.0	0.8	0.8	0.6	0.6	0.3	0.9	0.9	4.4	1.0	4.4
2-Mar	2.0	1.6	0.3	1.5	1.1	2.4	0.7	UO	0.6	0.5	1.7	2.3	4.2	3.2	2.8	2.5	2.5	3.6	6.0	8.5	7.6	8.2	8.8	9.4	3.6	9.4
3-Mar	8.9	9.0	10.8	10.5	9.3	8.1	7.4	6.8	6.4	5.2	3.7	2.4	1.5	0.9	0.6	0.6	1.2	1.6	1.5	1.5	1.0	1.8	1.7	2.0	4.4	10.8
4-Mar	2.2	2.6	3.7	4.6	3.0	1.7	1.3	1.2	1.0	0.9	0.9	1.0	1.0	1.0	1.1	1.0	1.0	0.9	0.9	0.9	0.9	1.4	0.9	1.5	1.5	4.6
5-Mar	1.0	0.8	0.8	0.9	0.7	1.0	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.3	1.4	1.6	1.6	1.6	1.6	1.4	1.4	1.4	1.4	1.4	1.2	1.6
6-Mar	1.4	1.4	1.4	1.4	1.5	1.6	1.6	1.6	1.9	2.5	2.6	2.3	2.0	2.0	2.1	2.3	2.8	3.1	3.1	3.2	3.8	3.9	3.8	3.6	2.4	3.9
7-Mar	3.5	2.7	3.7	4.5	4.1	3.7	3.7	5.2	6.5	6.9	6.6	3.7	2.0	2.2	2.6	3.1	2.9	4.1	3.9	3.7	3.6	3.2	2.6	2.8	3.8	6.9
8-Mar	2.2	2.0	1.8	1.4	1.5	1.2	0.9	1.0	2.7	2.6	2.2	1.7	1.6	1.9	2.0	2.0	1.8	2.4	5.2	5.9	5.2	4.2	4.4	5.1	2.6	5.9
9-Mar	3.6	2.9	2.3	2.2	1.9	1.9	1.5	3.7	4.0	5.3	4.3	4.1	3.9	3.3	3.9	4.3	3.9	4.7	7.7	4.8	7.8	7.6	5.3	4.4	4.1	7.8
10-Mar	2.8	2.5	3.1	3.0	2.4	8.5	7.2	4.4	7.3	9.2	M	M	5.9	4.8	6.3	4.8	4.8	5.2	4.2	7.3	6.3	4.6	4.9	6.1	5.3	9.2
11-Mar	7.3	4.9	4.3	4.4	4.4	3.6	3.5	4.5	3.6	3.5	2.8	2.6	1.9	1.9	1.9	2.3	1.7	2.1	2.2	4.0	2.6	3.5	4.2	4.3	3.4	7.3
12-Mar	3.0	1.9	1.9	2.1	2.1	2.2	2.3	4.0	4.6	3.4	2.1	1.6	1.8	2.0	2.1	2.2	2.2	2.3	2.3	2.5	2.9	2.7	2.6	2.3	2.5	4.6
13-Mar	2.2	2.5	3.0	3.6	4.2	3.3	3.3	3.5	3.3	3.4	3.0	C	3.5	3.8	4.4	4.8	4.9	4.5	4.8	4.7	4.4	4.8	4.8	5.3	3.9	5.3
14-Mar	5.1	6.0	5.9	6.6	6.9	6.6	6.9	7.2	6.8	6.4	5.6	5.4	3.5	1.8	1.3	1.1	1.6	2.3	2.7	3.9	5.5	4.7	4.2	5.4	4.7	7.2
15-Mar	5.2	4.8	4.8	4.9	5.2	5.6	5.9	6.8	5.9	4.3	2.4	1.3	1.0	1.1	1.0	1.2	1.4	1.9	6.3	5.5	2.9	1.8	1.8	1.8	3.5	6.8
16-Mar	1.4	1.3	1.3	1.3	1.3	1.3	1.5	1.7	2.0	2.2	2.1	2.2	2.4	1.8	1.6	1.9	2.2	3.0	3.7	3.0	3.0	2.7	2.4	3.0	2.1	3.7
17-Mar	3.4	3.1	2.6	2.4	2.9	2.9	3.0	4.0	4.2	5.1	4.0	2.7	2.1	1.8	1.8	1.8	2.1	2.3	3.1	6.3	8.0	8.2	6.8	5.0	3.7	8.2
18-Mar	3.9	4.6	5.0	3.8	3.2	2.7	2.3	2.2	2.0	1.9	2.1	2.0	1.8	1.4	1.4	1.3	1.4	1.8	2.2	2.8	2.5	1.8	2.1	1.6	2.4	5.0
19-Mar	1.8	3.1	5.1	6.5	4.3	3.5	3.9	3.9	3.3	3.0	2.5	2.6	2.7	2.3	2.5	2.5	2.5	2.3	1.9	2.2	2.0	2.3	2.3	3.2	3.0	6.5
20-Mar	4.0	4.8	5.0	4.9	4.8	4.6	4.2	3.9	3.7	3.6	3.1	2.3	2.5	2.4	2.5	2.4	2.1	2.5	2.7	3.3	3.3	3.1	6.0	3.1	3.5	6.0
21-Mar	3.2	2.5	2.4	2.3	2.1	2.2	1.9	2.3	2.9	2.5	2.3	2.4	2.4	2.4	2.4	2.8	3.0	2.6	2.6	2.4	2.5	2.5	2.7	5.1	2.6	5.1
22-Mar	6.5	5.8	5.3	4.8	5.2	4.8	5.1	4.5	4.2	3.9	4.0	4.5	4.3	4.5	4.1	4.6	4.5	3.2	2.7	2.6	2.6	2.4	2.3	3.2	4.2	6.5
23-Mar	3.8	4.4	4.7	5.1	4.8	5.5	5.2	4.6	3.4	3.1	3.0	3.2	3.6	3.6	4.1	4.8	4.4	3.8	3.7	4.1	3.6	3.0	3.3	4.0	4.0	5.5
24-Mar	5.7	7.4	8.9	7.9	5.0	6.8	4.2	4.1	4.1	4.6	4.3	4.6	3.9	2.9	2.8	3.9	5.3	6.6	8.8	7.8	7.3	4.8	3.4	4.1	5.4	8.9
25-Mar	4.5	4.5	5.0	3.8	4.0	6.1	4.0	7.2	4.8	3.7	3.8	4.2	4.3	3.7	3.0	2.5	3.1	4.0	13.3	13.3	6.7	7.9	6.1	9.1	5.5	13.3
26-Mar	12.8	13.6	12.5	14.2	12.1	12.1	13.3	13.1	11.8	14.1	14.7	12.3	8.6	7.1	5.9	3.8	3.7	4.2	1.8	2.5	6.6	5.8	3.4	3.2	8.9	14.7
27-Mar	2.8	4.3	3.5	4.4	4.0	3.2	7.8	4.7	6.0	3.7	2.6	1.8	1.4	1.4	1.2	1.2	1.3	1.7	1.9	2.5	2.6	3.0	6.7	8.7	3.4	8.7
28-Mar	6.2	4.2	5.0	7.3	8.0	5.9	5.9	9.1	8.0	7.5	6.4	6.2	4.6	2.9	2.1	2.1	2.3	2.3	3.5	4.8	6.1	5.7	5.9	8.5	5.4	9.1
29-Mar	8.4	6.6	5.6	5.1	5.6	8.2	14.7	10.4	10.3	10.5	10.3	8.4	8.2	5.6	4.3	2.8	2.4	2.5	4.0	42.1	71.8	50.7	20.9	11.4	13.8	71.8
30-Mar	11.7	16.3	4.1	3.0	2.3	1.9	1.8	1.5	1.6	1.9	2.1	2.1	2.1	1.9	1.7	1.8	2.1	3.0	3.5	3.4	3.0	5.8	6.6	2.9	3.7	16.3
31-Mar	3.4	3.1	3.4	3.3	3.2	3.3	3.4	3.4	3.2	2.6	1.6	1.3	1.2	1.2	1.5	1.7	1.7	2.8	4.3	6.1	10.0	8.3	8.3	8.0	3.8	10.0
																								Diurnal Average		
4.3 4.4 4.1 4.3 3.9 4.1 4.2 4.4 4.3 4.2 3.6 3.2 3.0 2.5 2.5 2.5 2.6 2.9 3.8 5.4 6.4 5.6 4.6 4.6																								Diurnal Maximum		
12.8 16.3 12.5 14.2 12.1 12.1 14.7 13.1 11.8 14.1 14.7 12.3 8.6 7.1 6.3 4.8 5.3 6.6 13.3 42.1 71.8 50.7 20.9 11.4																										
C - Calibration M - Maintenance 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}) - $\mu\text{g}/\text{m}^3$
Conklin Community - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin Community - March 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	557	75.27	75.27
6 - 15	131	17.70	92.97
16 - 25	2	0.27	93.24
26 - 80	3	0.41	93.65
> 81.0	0	0.00	93.65

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
Conklin Community - March 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	54	19	13	13	24	66	70	48	48	31	8	6	12	32	38	61	543
6 - 15	1	0	0	5	2	8	14	22	23	24	9	7	0	3	3	6	127
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
26 - 80	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	3
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	19	13	18	26	74	84	70	71	56	17	13	13	35	44	67	675

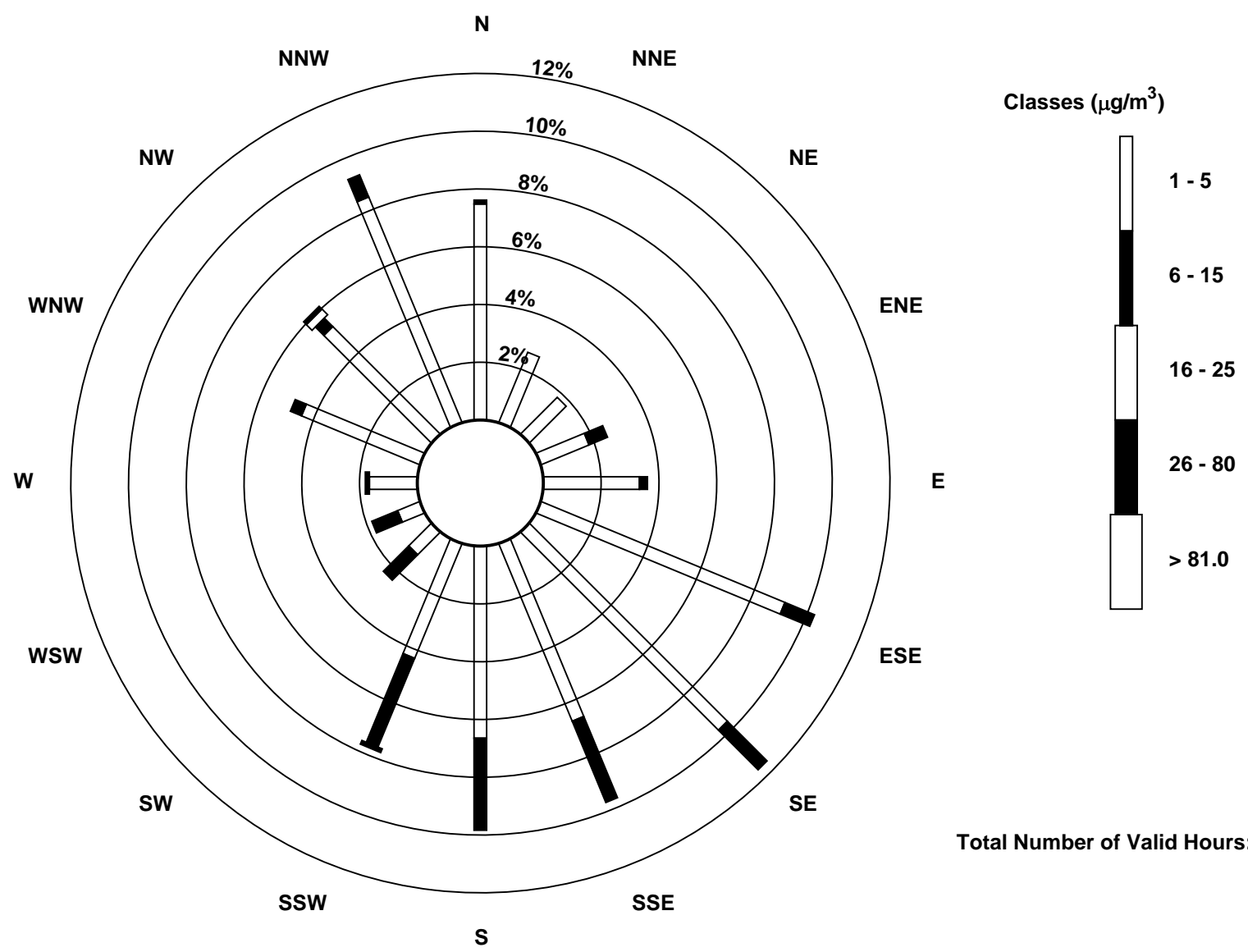
Total Number of Valid Hours: 722

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin Community (AMS 21)



Total Number of Valid Hours: 722



Wood Buffalo Environmental Association
Summary of Hour Averages

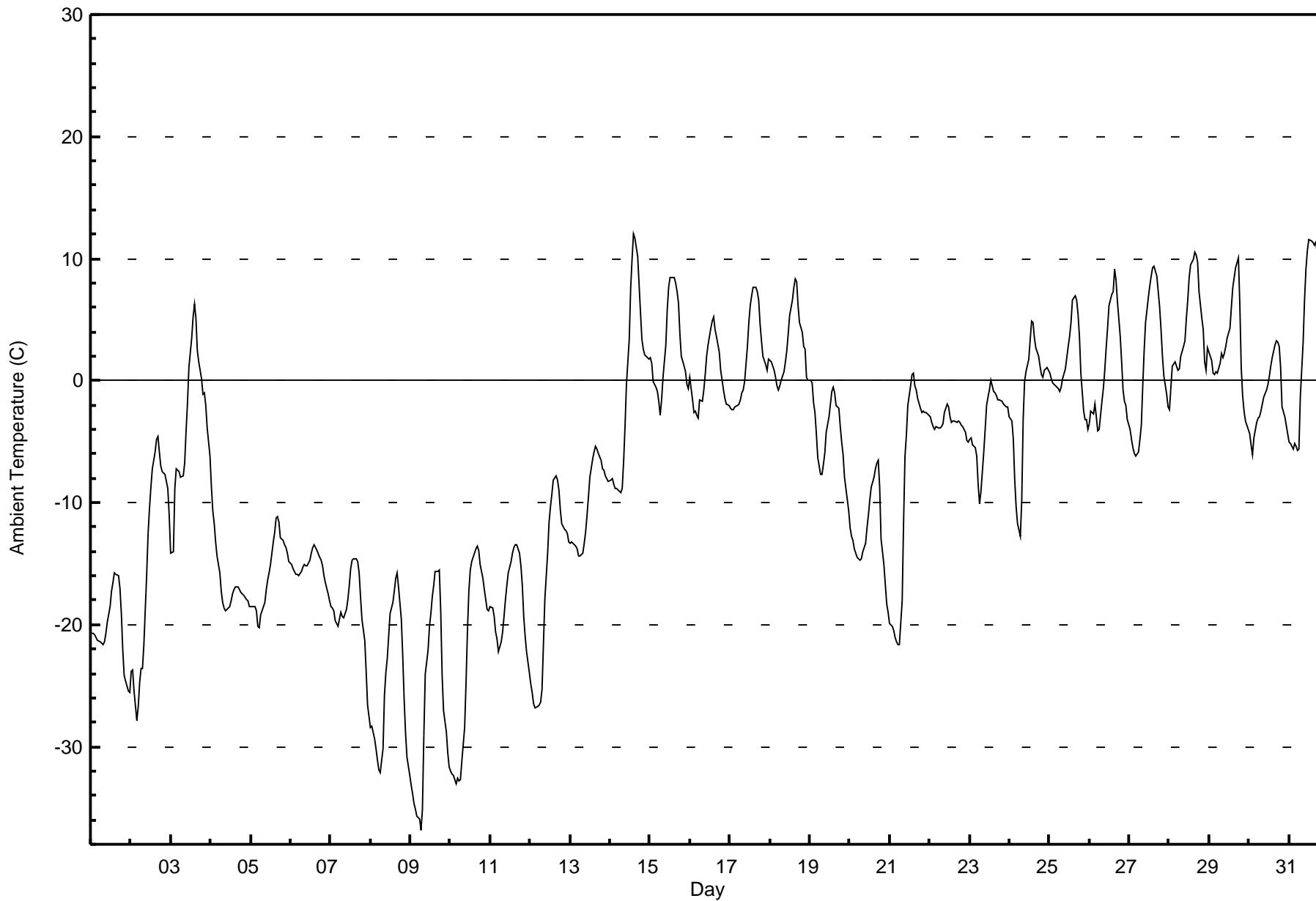
Ambient Temperature (AT) - C
Conklin Community - March 2017

Maximum Value: 12.0 C on Mar 14 15:00 Maximum Daily Average: 4.3 C on Mar 28																								Hours in Service:	744																								
Minimum Value: -36.9 C on Mar 9 07:00 Minimum Daily Average: -26.6 C on Mar 9																								Hours of Data:	744																								
Maximum Diurnal Average: -1.8 C at hour 16 Minimum Diurnal Average: -12.6 C at hour 7																								Hours of Missing Data:	0																								
Monthly Average: -7.61 C Percentiles: $P_1 = -33.2$ $P_{10} = -21.5$ $Q_1 = -15.8$ Median = -5.1 $Q_3 = 0.6$ $P_{90} = 5.3$ $P_{99} = 10.8$																								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-Mar	-20.7	-20.7	-20.8	-21.0	-21.3	-21.4	-21.5	-21.6	-21.4	-20.7	-19.8	-18.5	-17.3	-16.6	-15.8	-15.8	-16.0	-17.0	-19.1	-22.1	-24.1	-24.7	-25.4	-25.6	-20.4	-15.8																							
2-Mar	-23.8	-23.7	-25.4	-27.8	-26.8	-24.7	-23.5	-23.6	-21.6	-15.8	-12.6	-10.4	-8.7	-7.2	-5.9	-4.8	-4.6	-5.8	-7.0	-7.5	-7.7	-8.3	-8.9	-11.0	-14.5	-4.6																							
3-Mar	-14.1	-14.0	-8.9	-7.3	-7.3	-7.5	-7.9	-7.8	-6.8	-4.1	-1.8	1.0	3.5	5.2	6.2	5.1	2.5	1.5	0.2	-1.1	-1.0	-2.1	-3.9	-6.2	-3.2	6.2																							
4-Mar	-8.8	-10.6	-11.7	-13.2	-14.4	-15.8	-17.3	-18.2	-18.7	-18.9	-18.7	-18.6	-18.1	-17.5	-17.1	-16.9	-16.9	-17.2	-17.3	-17.5	-17.6	-17.9	-18.1	-18.5	-16.5	-8.8																							
5-Mar	-18.5	-18.5	-18.5	-18.8	-20.2	-20.2	-19.2	-18.8	-18.2	-17.1	-16.4	-15.7	-15.0	-13.3	-12.4	-11.3	-11.1	-11.6	-12.9	-13.2	-13.4	-13.7	-14.2	-14.9	-15.7	-11.1																							
6-Mar	-15.1	-15.4	-15.7	-15.9	-15.9	-16.0	-15.6	-15.3	-15.1	-15.2	-15.2	-14.7	-14.2	-13.6	-13.5	-13.6	-14.0	-14.5	-14.7	-15.2	-16.0	-16.6	-17.5	-18.1	-15.3	-13.5																							
7-Mar	-18.5	-18.7	-18.9	-19.6	-20.1	-19.6	-19.0	-19.4	-19.4	-18.7	-18.0	-16.8	-15.4	-14.7	-14.6	-14.6	-14.8	-15.7	-17.7	-19.5	-21.3	-23.8	-26.6	-27.5	-18.9	-14.6																							
8-Mar	-28.4	-28.3	-29.3	-30.2	-31.1	-31.9	-32.2	-30.1	-25.8	-24.0	-22.8	-20.9	-19.2	-18.1	-17.3	-16.2	-15.7	-16.9	-19.6	-22.5	-26.2	-28.9	-30.8	-32.4	-25.0	-15.7																							
9-Mar	-33.2	-33.9	-34.6	-35.1	-35.7	-35.9	-36.9	-35.1	-29.2	-24.1	-22.0	-20.1	-19.1	-17.8	-16.7	-15.6	-15.6	-15.5	-18.9	-24.2	-27.0	-28.8	-30.5	-31.7	-26.6	-15.5																							
10-Mar	-32.0	-32.3	-32.4	-33.0	-32.6	-32.8	-32.7	-31.1	-28.4	-24.8	-20.5	-17.3	-15.5	-14.8	-14.2	-13.8	-13.6	-13.9	-15.0	-16.2	-17.2	-17.9	-18.7	-18.9	-22.5	-13.6																							
11-Mar	-18.5	-18.7	-19.3	-20.5	-21.1	-22.2	-21.4	-20.6	-19.4	-18.0	-16.8	-15.8	-14.8	-14.2	-13.7	-13.4	-13.5	-14.1	-15.1	-16.8	-19.4	-20.9	-22.2	-23.9	-18.1	-13.4																							
12-Mar	-24.8	-25.6	-26.4	-26.9	-26.7	-26.5	-26.4	-25.3	-21.7	-17.9	-14.2	-11.6	-10.3	-9.3	-8.2	-7.8	-8.2	-8.9	-10.5	-11.7	-12.2	-12.3	-12.5	-13.2	-16.6	-7.8																							
13-Mar	-13.3	-13.2	-13.4	-13.6	-13.8	-14.4	-14.4	-14.1	-13.3	-12.4	-11.0	-9.6	-7.9	-6.4	-5.9	-5.4	-5.6	-6.0	-6.6	-7.2	-7.4	-7.8	-8.0	-8.3	-10.0	-5.4																							
14-Mar	-8.1	-8.0	-8.5	-8.8	-8.8	-9.1	-9.2	-8.8	-6.7	-3.7	-0.3	3.4	7.6	9.9	12.0	11.7	10.2	7.8	5.5	3.3	2.6	2.1	1.8	1.7	0.0	12.0																							
15-Mar	1.9	1.4	0.0	-0.6	-0.8	-1.7	-2.9	-1.6	0.3	2.9	5.8	7.6	8.4	8.5	8.4	8.0	7.2	6.4	3.9	2.0	1.2	0.7	-0.3	-0.7	2.7	8.5																							
16-Mar	0.3	-1.6	-2.6	-2.5	-2.9	-3.1	-1.5	-1.7	-0.8	0.5	1.9	3.0	4.3	4.8	5.2	4.2	3.6	2.3	0.9	0.0	-0.8	-1.5	-1.9	-2.1	0.3	5.2																							
17-Mar	-2.2	-2.4	-2.4	-2.2	-2.0	-1.9	-1.6	-1.0	-0.8	-0.1	2.8	4.8	6.1	7.0	7.6	7.6	7.2	6.6	4.7	3.3	2.1	1.3	0.8	1.8	2.0	7.6																							
18-Mar	1.7	1.5	0.8	0.3	-0.5	-0.8	-0.4	0.0	0.7	1.5	2.5	3.8	5.4	6.7	7.6	8.3	8.1	6.2	4.8	4.0	2.8	2.6	0.3	0.0	2.8	8.3																							
19-Mar	0.0	-0.2	-1.9	-2.6	-4.3	-6.3	-7.7	-7.7	-6.8	-5.9	-4.2	-2.9	-1.9	-0.9	-0.5	-1.0	-2.0	-2.3	-3.8	-5.0	-6.1	-7.9	-9.7	-10.7	-4.3	0.0																							
20-Mar	-12.1	-12.8	-13.1	-13.8	-14.5	-14.6	-14.7	-14.6	-14.1	-13.4	-12.1	-11.0	-9.8	-8.8	-7.9	-7.2	-6.8	-6.5	-8.7	-13.0	-15.1	-16.6	-18.3	-19.0	-12.4	-6.5																							
21-Mar	-19.9	-20.2	-20.5	-21.1	-21.4	-21.7	-21.6	-18.1	-11.6	-6.2	-4.5	-2.1	-0.5	0.5	0.6	-0.4	-0.8	-1.5	-2.2	-2.6	-2.5	-2.6	-2.6	-2.8	-8.6	0.6																							
22-Mar	-3.0	-3.4	-3.8	-4.0	-3.8	-3.9	-3.9	-3.8	-3.6	-2.6	-1.9	-2.1	-2.9	-3.5	-3.3	-3.4	-3.4	-3.3	-3.5	-3.7	-3.8	-4.2	-4.9	-5.1	-3.5	-1.9																							
23-Mar	-4.8	-4.7	-5.3	-5.5	-6.2	-8.5	-10.1	-9.1	-5.9	-4.0	-2.1	-1.3	-0.8	0.0	-0.9	-1.0	-1.2	-1.5	-1.6	-1.7	-1.9	-2.1	-2.1	-2.1	-3.5	0.0																							
24-Mar	-2.9	-3.3	-4.8	-8.2	-10.3	-11.7	-12.8	-9.7	-3.2	0.0	0.7	1.8	3.3	4.8	4.8	3.5	2.7	2.0	1.1	0.5	0.3	0.8	1.1	0.8	-1.6	4.8																							
25-Mar	0.6	0.2	-0.2	-0.3	-0.5	-0.7	-0.8	-0.6	0.2	0.9	1.9	2.8	3.6	4.7	6.6	6.9	6.6	5.4	3.6	0.6	-2.5	-3.2	-3.2	-4.1	1.2	6.9																							
26-Mar	-3.6	-2.5	-2.8	-2.0	-2.9	-4.2	-4.1	-1.7	-0.7	0.9	2.7	4.3	6.2	7.1	7.3	9.2	8.2	6.5	3.6	1.5	-0.7	-1.7	-2.0	-3.2	1.1	9.2																							
27-Mar	-4.0	-4.8	-5.5	-6.0	-6.2	-5.8	-4.8	-3.7	-0.4	2.4	4.8	6.9	7.8	8.6	9.3	9.3	8.6	7.3	6.0	4.1	2.0	0.4	-1.1	-2.2	1.4	9.3																							
28-Mar	-2.4	-0.6	1.2	1.6	1.2	0.8	1.0	2.0	2.8	3.3	5.1	6.6	8.5	9.4	9.9	10.5	10.3	9.7	7.3	5.1	4.2	1.6	0.9	2.7	4.3	10.5																							
29-Mar	2.4	1.7	0.6	0.5	0.7	0.6	1.4	2.2	1.9	2.2	2.8	3.5	4.3	6.0	7.7	8.4	9.3	10.0	6.2	1.0	-1.2	-2.5	-3.3	-4.0	2.6	10.0																							
30-Mar	-4.4	-5.2	-6.0	-4.7	-3.4	-3.0	-2.9	-2.5	-1.9	-1.3	-0.7	-0.3	0.3	1.2	1.9	2.9	3.3	3.1	2.8	1.1	-2.1	-3.0	-3.6	-4.4	-1.4	3.3																							
31-Mar	-5.0	-5.2	-5.6	-5.1	-5.4	-5.7	-5.6	-1.4	3.2	6.6	9.1	10.6	11.5	11.5	11.4	11.1	11.3	10.4	9.2	7.8	6.9	6.3	5.8	4.7	4.1	11.5																							
																								-10.8	-11.1	-11.5	-11.9	-12.2	-12.6	-12.6	-11.7	-9.9	-8.0	-6.3	-4.8	-3.6	-2.6	-2.0	-1.8	-2.1	-2.8	-4.3	-6.0	-7.3	-8.2	-9.0	-9.6	Diurnal Average	
																								2.4	1.7	1.2	1.6	1.2	0.8	1.4	2.2	3.2	6.6	9.1	10.6	11.5	11.5	12.0	11.7	11.3	10.4	9.2	7.8	6.9	6.3	5.8	4.7	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Conklin Community - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Conklin Community - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	99	13.31	13.31
-20 - 0	439	59.01	72.31
0 - 10	193	25.94	98.25
10 - 20	13	1.75	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



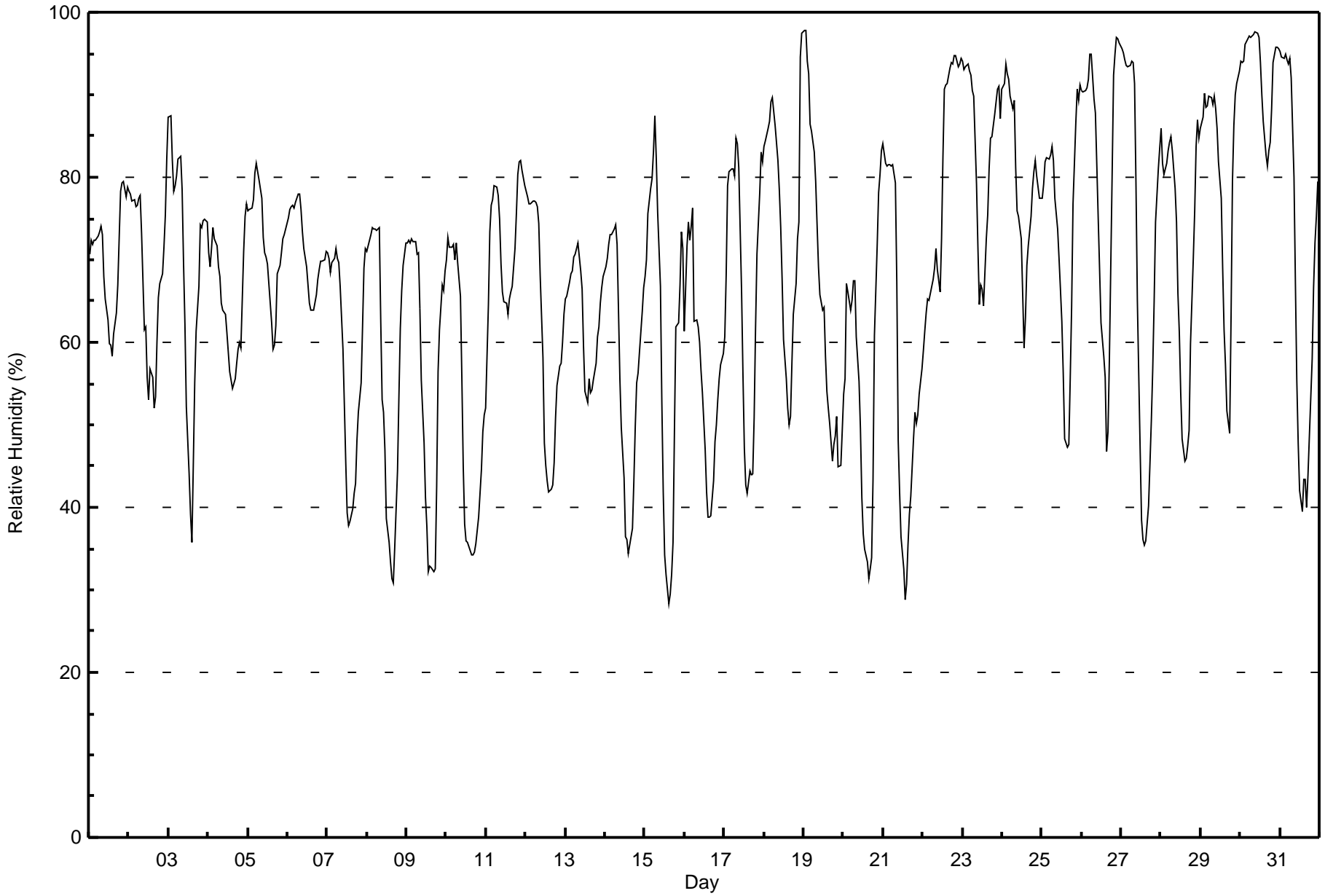
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Conklin Community - March 2017

Maximum Value: 98 % on Mar 19 01:00 Maximum Daily Average: 92.8 % on Mar 30																			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 Mar 15 15:00 Minimum Daily Average: 51.8 % on Mar 10 Maximum Diurnal Average: 80.5 % at hour 6 Minimum Diurnal Average: 50.0 % at hour 16 Monthly Average: 67.9 % Percentiles: P ₁ = 32 P ₁₀ = 43 Q ₁ = 56 Median = 70 Q ₃ = 80 P ₉₀ = 91 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-Mar	71	72	72	72	72	73	73	74	73	68	65	63	60	60	58	61	64	67	73	78	79	80	78	79	70.2	80
2-Mar	78	78	77	77	76	77	77	78	73	62	62	56	53	57	56	52	53	60	65	67	68	72	75	82	68.0	82
3-Mar	87	88	82	78	79	80	82	83	79	70	62	52	44	39	36	45	55	61	67	74	74	75	75	74	68.4	88
4-Mar	71	69	71	74	72	72	69	68	65	64	63	61	59	56	55	54	56	57	59	60	59	71	75	77	65.0	77
5-Mar	76	76	76	77	81	82	81	80	77	73	71	70	70	65	62	59	60	62	68	69	71	73	73	74	71.9	82
6-Mar	75	76	76	77	76	77	78	78	76	73	71	69	67	65	64	64	64	66	68	69	70	70	70	71	71.2	78
7-Mar	71	70	68	70	70	71	70	70	67	59	52	45	39	38	38	40	42	43	48	52	55	62	69	71	57.5	71
8-Mar	71	72	73	74	74	74	74	74	63	53	52	47	39	36	33	31	31	35	44	53	62	66	69	72	57.1	74
9-Mar	72	72	72	73	72	72	71	71	64	55	48	41	38	32	33	33	32	33	42	56	61	67	66	69	56.1	73
10-Mar	70	73	71	72	72	70	72	70	66	56	45	38	36	36	35	34	34	35	36	39	42	45	49	51	51.8	73
11-Mar	52	65	73	77	77	79	79	78	75	70	66	65	65	63	65	66	67	71	76	80	82	82	81	79	72.2	82
12-Mar	78	78	77	77	77	77	77	76	74	68	58	48	45	43	42	42	43	45	51	55	57	57	60	63	61.2	78
13-Mar	65	66	67	68	69	70	71	72	70	69	67	60	54	53	56	54	54	55	57	61	62	65	67	68	63.3	72
14-Mar	69	70	72	73	73	74	74	72	64	56	50	44	37	36	34	36	38	43	50	55	56	59	64	67	56.8	74
15-Mar	68	70	76	79	80	83	87	82	76	67	53	42	34	32	28	30	32	36	49	62	62	67	73	71	59.9	87
16-Mar	61	72	75	72	74	76	63	63	62	60	57	54	47	42	39	39	39	43	48	50	53	56	57	59	56.6	76
17-Mar	61	68	79	81	81	81	80	85	84	81	66	56	47	43	42	44	44	44	51	62	71	78	83	82	66.4	85
18-Mar	84	84	86	87	89	90	88	86	82	78	74	68	60	56	52	50	51	57	63	67	73	75	94	97	74.7	97
19-Mar	98	98	94	92	86	86	83	79	74	69	66	64	64	58	54	52	50	46	48	49	51	45	45	49	66.7	98
20-Mar	54	56	67	66	64	65	67	68	61	55	49	41	37	35	33	31	33	34	43	61	72	78	80	83	55.6	83
21-Mar	84	82	81	82	81	81	82	79	67	48	42	36	32	29	31	35	39	41	49	52	50	51	54	57	56.9	84
22-Mar	59	61	64	65	65	67	68	69	71	69	66	73	82	91	91	91	93	94	94	95	95	93	94	94	79.3	95
23-Mar	94	93	93	94	93	92	91	90	79	72	65	67	66	64	72	75	81	85	85	88	89	91	91	87	83.2	94
24-Mar	91	91	94	93	92	90	88	89	81	76	75	73	66	59	63	69	72	75	79	81	82	80	78	77	79.7	94
25-Mar	77	79	82	82	82	83	84	82	77	74	70	66	62	56	48	47	48	56	64	77	87	91	89	91	73.2	91
26-Mar	91	90	90	91	92	95	95	90	88	82	75	69	62	58	56	47	49	58	81	92	95	97	97	96	80.6	97
27-Mar	96	95	94	94	93	94	94	94	91	79	65	47	38	36	35	36	40	45	50	57	65	75	81	84	69.9	96
28-Mar	86	82	80	82	83	84	85	83	79	75	66	61	54	48	46	46	48	49	60	70	76	84	87	85	70.7	87
29-Mar	86	87	90	89	89	90	90	89	90	88	86	82	77	69	61	57	52	49	63	80	86	90	91	93	80.2	93
30-Mar	94	94	94	96	97	97	97	97	97	98	98	97	94	90	87	83	81	83	84	88	94	96	96	96	92.8	98
31-Mar	95	95	94	95	94	94	94	92	80	67	56	48	42	40	43	43	40	44	49	58	67	72	75	80	69.0	95
	76.9	78.1	79.4	79.9	79.9	80.5	80.1	79.3	75.0	68.8	63.2	58.1	53.9	51.1	50.0	50.0	51.0	54.0	60.1	66.3	69.9	72.9	75.4	76.7	Diurnal Average	
	98	98	94	96	97	97	97	97	97	98	98	97	94	91	91	91	93	94	94	95	95	97	97	97	Diurnal Maximum	





Maximum Speed: 19 km/h on Mar 31 14:00	Maximum Daily Speed Average: 14.4 km/h on Mar 13	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 12 04:00	Minimum Daily Speed Average: 0.8 km/h on Mar 25	Hours of Data: 726
Maximum Diurnal Speed Average: 2.8 km/h at hour 13	Minimum Diurnal Speed Average: 0.4 km/h at hour 6	Hours of Missing Data: 18
Monthly Average Velocity: 1.3 km/h 133.1 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 11 P ₉₀ = 13 P ₉₉ = 18	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-Mar	ENE5	ENE6	NE7	NE7	NE8	NE7	NE7	ENE7	NE8	ENE8	NE8	ENE8	NE10	ENE8	E8	E7	NNE5	N6	NNW3	NNW2	NNW1	SW1	NNW0	W0	NE5.1	NE10	
2-Mar	SSW0	AF	SSW2	WNW0	SSW2	SW1	SE2	SE3	SE3	ESE4	S10	S10	SSW9	S8	SE9	ESE9	ESE11	SE12	SE11	SSE10	SSE9	SSE8	SE8	ESE5	SSE5.7	SE12	
3-Mar	SE5	SSE8	S11	S13	S13	S13	S10	S11	S10	S8	S8	S12	SSW14	SW10	WSW7	WNW10	NW10	NW10	NNW5	NW2	NNW8	NNW14	NNW16	NNW14	SW3.9	NNW16	
4-Mar	NNW16	NNW13	N14	N13	N13	N15	N15	NNE13	NNE11	NNE11	N13	NNE13	N12	N13	N13	NNE13	NNE11	NNE12	NNE12	NNE10	NNE11	NE8	NE7	NE5	NNE11.7	NNW16	
5-Mar	NE6	NE5	NE5	NE3	N3	NW2	NW5	NNW5	NNE5	ESE5	ESE5	SE5	SE6	SE7	SE8	SE5	SE5	SE4	N4	N4	NNW4	N5	N6	N5	ENE2.2	SE8	
6-Mar	N6	N7	N6	N6	N7	N8	N7	N7	NNE8	N9	N11	NNE12	N11	N13	N13	N13	NNE10	NNE9	N10	NNW12	NNW13	NNW14	NNW13	NNW11	N9.5	NNW14	
7-Mar	NNW11	NNW13	NNW13	NNW13	NW12	NNW9	NNW12	NNW14	NNW14	NNW15	NNW15	NNW16	NNW17	NNW16	NNW16	NNW16	N14	N12	NNW9	N9	NNW7	NNW4	NNW5	NNW2	NNW11.7	NNW17	
8-Mar	N4	N4	N4	N4	N4	N3	N2	N2	NNW4	N6	N6	NNW6	N7	NE5	N5	N4	N10	N11	NNE8	NNW3	AF	NW2	NNW2	NNW3	N4.6	N11	
9-Mar	NNW2	WNW1	W0	SW1	SSW2	SSW3	SSW1	SSW2	S1	NW2	NNE3	W1	WSW5	WNW4	WNW6	SW2	NNW5	NNE1	E4	NNW1	WNW1	WNW1	SW0	SW0	WNW0.9	WNW6	
10-Mar	S1	S2	S1	S1	S2	WSW1	SSW1	SSW2	WNW1	SW2	ESE5	E7	ESE9	ESE10	SE10	SE10	ESE7	E5	ENE4	ENE4	ENE4	ESE5	ESE3	SSE6	ESE3.4	SE10	
11-Mar	SSE5	SSE4	SE3	E2	E2	SSE2	SE4	ESE4	SE5	SE7	E7	E7	E9	ESE10	ESE9	E9	ESE10	ESE8	ESE6	ESE4	ENE1	ESE2	S2	S2	ESE4.8	ESE10	
12-Mar	S3	WSW1	NNW1	WNW0	AF	AF	NW0	WSW1	N1	ESE4	E8	SE12	SE12	SE12	SSE12	SE15	SSE15	SSE12	SSE8	SSE9	SSE12	SSE12	SSE14	SSE13	SSE7.4	SSE15	
13-Mar	SSE13	SSE14	SSE14	SSE14	SSE14	SSE11	SSE13	SSE12	S15	SSE16	SSE15	S18	S19	S19	S16	S19	S16	S14	S14	S12	S9	SSW16	SSW13	S14.4	S19		
14-Mar	SSW11	SSW10	SSW7	SSW8	SSW8	SSW9	SSW7	SSW12	SW11	SW7	SW8	SSW7	S3	SW5	SSW4	S11	S10	SE7	SE6	SE6	SSE8	SSE7	SE6	SE7	S6.7	SSW12	
15-Mar	SSE7	SSE10	SE7	SSE9	SSE9	SSE5	WSW1	SW10	SW8	W6	WNW7	W11	W8	WNW8	WNW8	WNW6	W5	W2	WSW1	SSE1	S2	SSW2	NW0	NNW4	SW3.0	W11	
16-Mar	NNW3	NNW4	NNW4	N4	N3	NNW4	N7	NNE7	NNE8	NE11	NNE11	NE11	ENE10	NE11	NE11	NE12	NE11	NE10	NNE6	ENE5	E6	E5	E3	NNE2	NE6.3	NE12	
17-Mar	ESE3	SE5	SE7	SE6	ESE5	SE5	SE6	SSE8	S11	S11	SSW12	S12	S13	SSW12	SSW12	S13	S14	S10	S7	S10	S7	SSE5	SSE4	SSE10	S8.2	SSE14	
18-Mar	SSE11	SE11	SE10	ESE8	ESE6	ESE7	ESE7	ESE7	ESE9	SE10	SE10	SE12	ESE12	ESE11	ESE12	ESE13	ESE11	ESE8	ESE8	E5	NNW3	N8	NW6	NNW6	ESE6.8	ESE13	
19-Mar	NW7	NW13	NW12	NW10	WNW10	WNW8	WNW7	WNW7	WNW9	WNW9	W9	W11	WNW11	W13	W16	WNW15	WNW10	WNW11	WNW8	WNW7	NW8	NW16	NW18	NW13	WNW10.3	NW18	
20-Mar	NW13	NW13	NW13	NW14	NW14	NW12	NW11	NW11	NW12	NW11	WNW8	WNW9	WNW8	WNW8	WNW8	WNW8	WNW8	NW7	WNW5	AF	AF	S3	SSE4	AF	SSE2	NW8.4	NW14
21-Mar	SE3	SE5	SE6	SE6	SE5	SE4	SE3	SE2	SE4	S14	SSE14	SSE15	SSE16	SSE17	SSE16	SE15	SE14	ESE14	ESE17	SE15	SE14	SE13	SE12	SE11	SE10.3	SSE17	
22-Mar	SE10	ESE10	SE9	SE8	SE8	ESE6	E5	E7	ESE8	ESE6	ESE8	ESE9	ESE9	ESE6	ESE4	NW1	WNW2	NW3	N5	NNW3	NNW4	NNW5	NNW3	NW2	ESE3.9	SE10	
23-Mar	NW3	NNW3	NW2	NNW2	NNW3	NNW2	NNW3	NNW4	N5	NE4	E1	NE4	SE8	ESE7	ESE8	ESE6	E5	ESE5	E3	E3	SE2	ESE4	SE3	SSW2	E1.9	SE8	
24-Mar	SSE3	S5	S4	SE2	ESE4	SSE4	SSE2	SE3	ESE4	SE10	SE12	ESE10	ESE10	ESE12	SE13	ESE13	ESE10	ESE8	ESE9	ESE4	ENE3	ESE7	ESE8	ESE8	ESE6.6	SE13	
25-Mar	ESE6	ESE5	E4	ESE5	ESE5	ESE3	E1	SSW1	SSW1	NW3	WNW5	WNW5	NW5	NNW5	SW1	NNE2	NW8	NNE9	ENE4	E2	NW1	SW1	SSE2	SSE3	NE0.8	NNE9	
26-Mar	SE2	SE6	SE5	SSE4	SSE5	NW1	S4	SSE5	ESE3	SSW3	WSW5	S4	ENE4	N2	W2	WSW2	E3	NNW5	NNW8	N2	S3	SSW4	S5	AF	SSE1.3	NNW8	
27-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	ESE6	ESE5	SE11	SE15	SE14	SE11	SE12	SSE13	SSE12	SSE9	SE7	ESE2	S1	SSW1	SSE1	----	SE15	
28-Mar	SW1	SE4	S6	S10	S4	SE3	SE4	SSE5	S7	S8	S9	S7	S8	S11	S12	S11	S11	S10	S7	SSE9	SSE6	S2	SE4	SSE5	S6.7	S12	
29-Mar	SE3	SE2	NNW2	N1	AF	WSW1	SSW4	SSW7	SW8	SSW7	SSW6	SSW5	SSW7	WSW7	WSW4	NW4	WNW3	WSW3	NNW2	NW1	W1	SSW1	NW1	NNW1	SW2.4	SW8	
30-Mar	S2	NW1	NNW3	NNW3	NNE4	ENE3	E3	E3	ENE4	ENE3	ESE6	ENE4	ESE4	E2	NNE4	NE4	ENE5	ENE4	E3	N2	NW2	SSW1	SSW1	SSW1	ENE2.1	ESE6	
31-Mar	SSW1	SSE3	SE4	SE5	SE4	SE2	SE6	SSE5	SSW4	SSW7	SSW11	SSW14	SW17	SSW19	SSW18	SSW15	SSW17	S15	S12	S12	S11	SSW9	SSW8	SSW9	SSW8.7	SSW19	

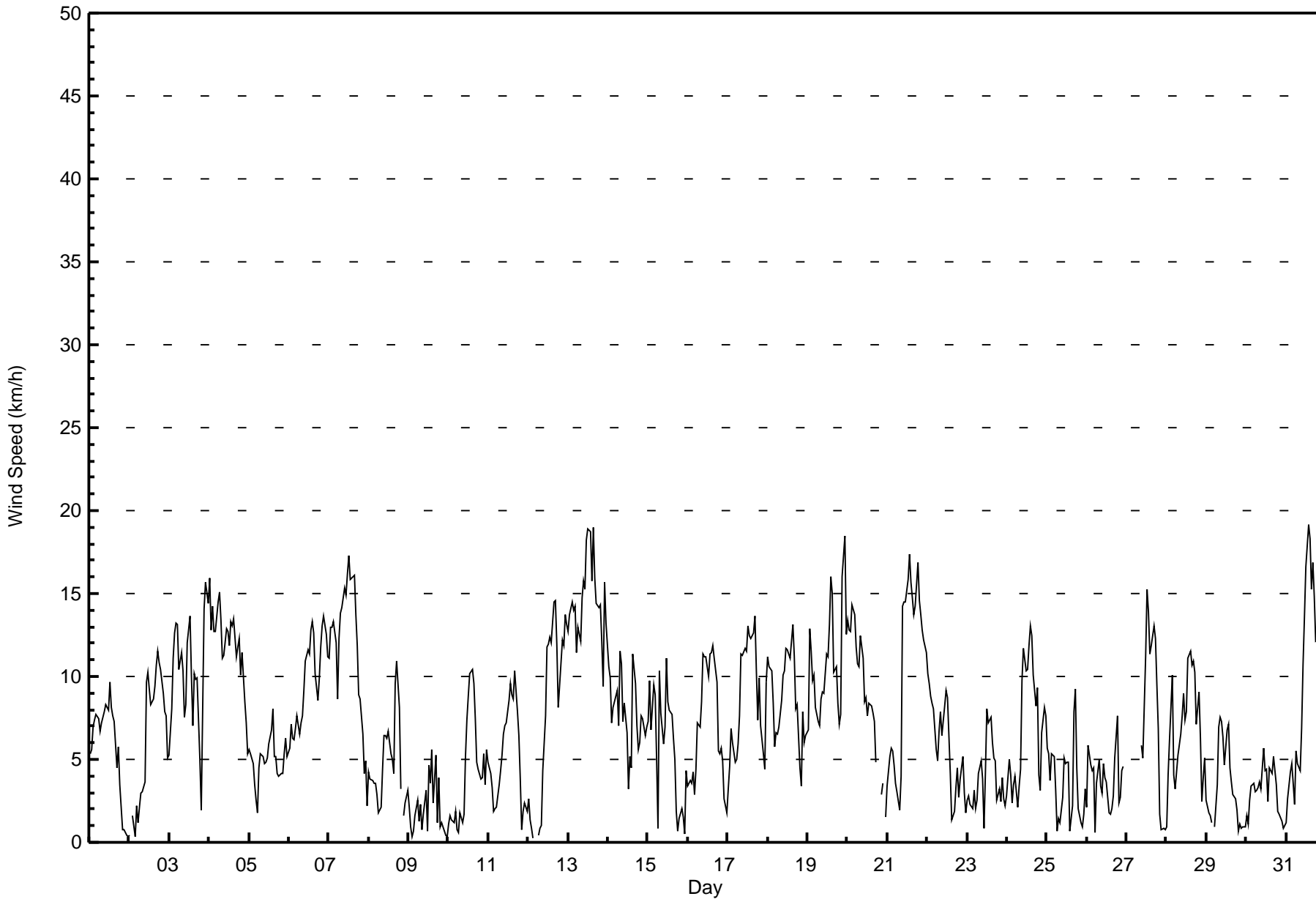
ESE0.6 SE0.8 ESE0.8 SE0.9 ESE0.8 ESE0.4 ENE0.5 SSE0.8 SE0.7 SE1.4 SE1.9 SE2.7 SSE2.8 SSE2.4 SSE2.3 SE2.4 ESE2.2 ESE2.2 E2.3 SE1.9 SE1.0 ESE0.6 SSE0.4 SSE0.7	Diurnal Average
NNW16 SSE14 SSE14 NW14 SSE14 N15 N15 NNW14 S15 SSE16 SSE15 S18 SSE19 SSW19 SSW18 S19 SSW17 S15 ESE17 SE15 SE14 NW16 NW18 NNW14	Diurnal 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 Community - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Conklin Community - March 2017

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	310	42.70	42.70
6 - 11	273	37.60	80.30
12 - 19	143	19.70	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: 726

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Conklin Community - March 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	24	8	8	16	18	28	35	23	20	27	11	12	6	12	21	41	310
6 - 11	22	14	17	6	10	42	35	21	31	18	7	2	5	23	11	9	273
12 - 19	14	6	1	0	0	7	17	26	21	12	1	0	2	1	13	22	143
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	60	28	26	22	28	77	87	70	72	57	19	14	13	36	45	72	726

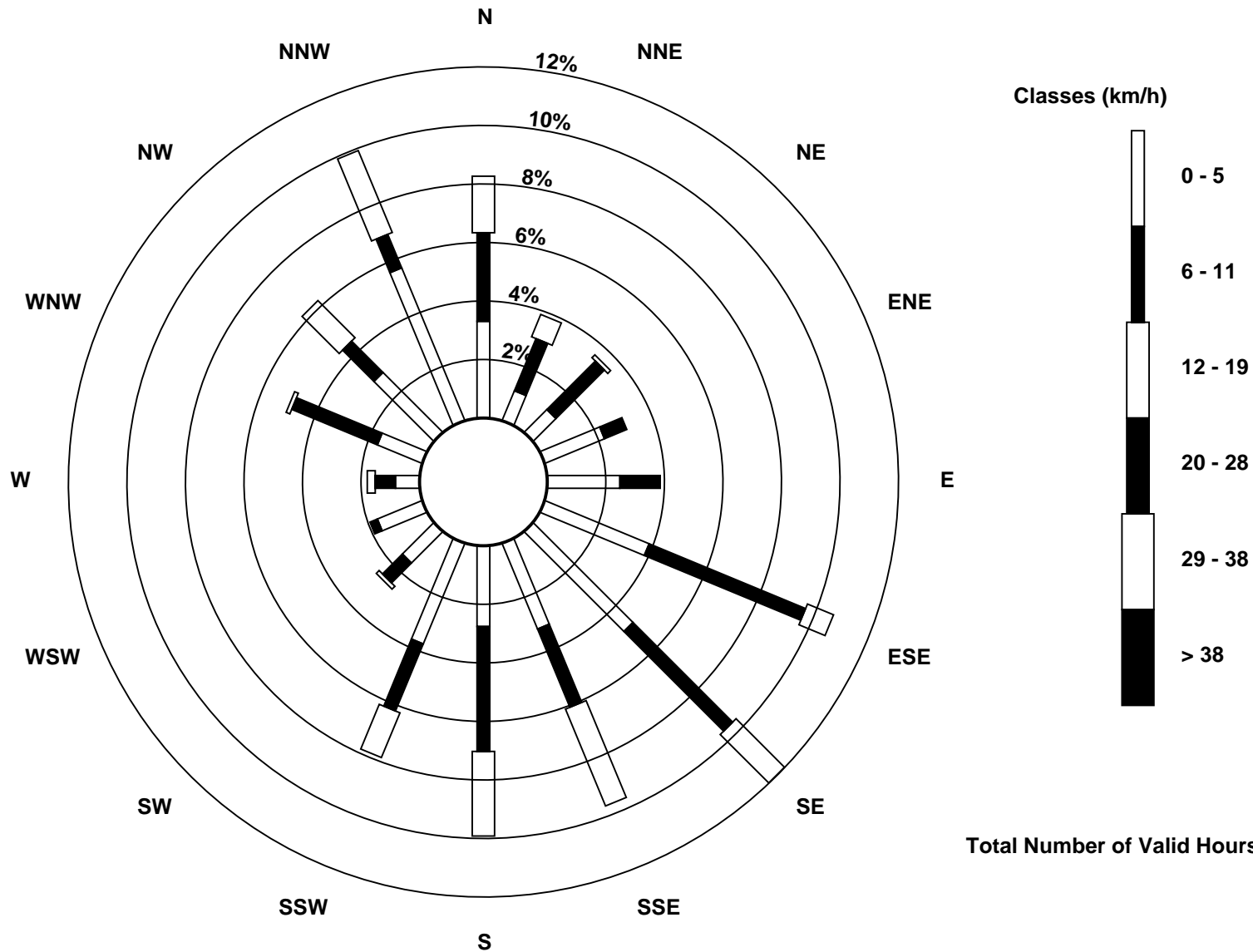
Total Number of Valid Hours: 726

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Wind Speed (WS) - km/h
Conklin Community (AMS 21)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Conklin Community - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 km/h on Mar 19 15:00 Minimum Value: 0 km/h on Mar 20 21:00 Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 1 Median = 2 O ₃ = 3 P ₉₀ = 4 P ₉₉ = 5																		Hours in Service: 744 Hours of Data: 726 Hours of Missing Data: 18 Hours of Calibration: 0 Percent Operational Time: 97.6							
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-Mar	2	2	2	3	3	3	2	2	3	3	3	3	3	3	3	2	3	2	1	1	1	1	1	1	3
2-Mar	1	AF	1	1	1	1	1	1	1	1	3	3	3	3	3	3	2	3	2	3	2	2	2	1	3
3-Mar	2	2	3	3	3	3	2	3	3	4	2	4	5	5	3	4	3	2	2	1	4	3	4	4	5
4-Mar	4	3	4	4	4	5	5	4	3	3	4	4	4	4	4	4	3	4	4	3	4	3	2	2	5
5-Mar	2	2	1	1	1	1	1	1	1	2	1	1	2	3	2	2	2	2	2	1	1	1	2	2	3
6-Mar	1	2	2	2	2	2	2	2	3	3	3	4	3	4	4	4	4	3	3	4	4	4	3	3	4
7-Mar	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	3	2	2	2	1	2	1	4
8-Mar	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	3	3	3	1	AF	1	1	2	3
9-Mar	2	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	1	2	1	1	1	2
10-Mar	2	1	1	1	1	1	1	1	1	1	2	3	3	3	3	2	2	2	2	1	1	2	1	2	3
11-Mar	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	3	2	2	1	1	1	1	1	3
12-Mar	1	1	1	1	AF	AF	1	1	1	2	2	4	3	4	4	4	4	4	2	2	3	3	4	4	4
13-Mar	4	4	4	4	4	3	4	4	4	4	4	5	5	5	5	5	4	4	4	4	4	4	6	5	6
14-Mar	4	4	3	3	4	3	3	4	3	3	2	3	2	2	3	3	3	2	2	3	3	2	2	3	4
15-Mar	3	3	2	2	4	2	2	4	3	3	3	4	3	3	3	3	2	2	2	1	2	1	1	1	4
16-Mar	2	1	2	1	1	2	2	2	3	3	3	4	4	4	4	4	3	3	2	2	2	2	2	1	4
17-Mar	1	4	2	2	1	2	1	2	3	3	3	3	4	4	4	3	4	4	2	3	2	2	3	3	4
18-Mar	3	3	3	3	2	2	2	2	2	3	3	3	3	3	4	4	3	2	2	2	1	3	2	2	4
19-Mar	4	5	5	4	4	3	3	3	4	4	4	5	5	5	6	5	4	5	3	2	4	5	5	4	6
20-Mar	4	5	6	4	4	4	4	4	4	4	3	3	3	4	3	3	3	2	AF	AF	0	1	AF	1	6
21-Mar	1	1	1	0	1	1	1	1	1	6	4	4	5	4	4	4	4	4	5	4	4	3	3	3	6
22-Mar	3	3	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	1	1	2	1	1	1	3
23-Mar	1	1	1	1	1	1	2	1	1	2	1	2	3	3	2	2	2	1	1	1	1	1	1	2	3
24-Mar	1	1	1	1	2	2	1	1	2	3	3	3	3	3	4	3	3	2	3	2	2	2	2	2	4
25-Mar	2	2	2	1	1	1	1	1	1	2	2	2	2	3	2	2	3	3	2	1	1	1	1	1	3
26-Mar	1	1	2	2	1	1	3	1	1	3	1	2	2	1	1	1	2	4	3	2	1	1	1	AF	4
27-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	2	5	4	4	3	3	4	3	3	2	2	1	1	1	5
28-Mar	1	1	3	3	2	1	1	1	2	2	3	2	3	3	3	4	3	3	2	3	3	1	2	2	4
29-Mar	1	1	1	1	AF	1	2	2	2	2	2	2	3	3	2	2	1	2	1	1	1	1	2	2	3
30-Mar	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2
31-Mar	1	1	1	1	1	1	1	1	2	3	3	4	5	6	5	5	6	5	4	3	3	2	2	2	6
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

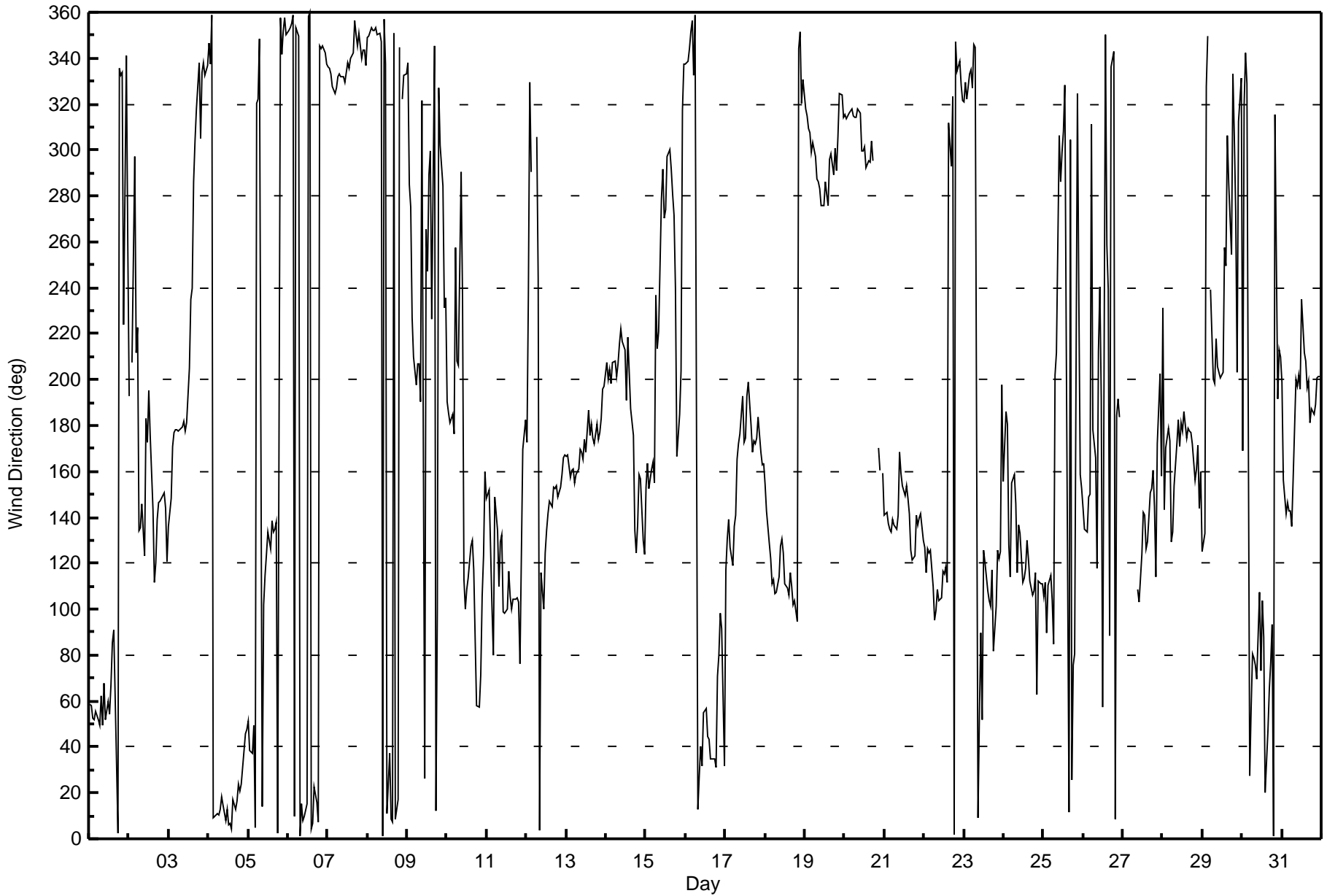
Conklin Community - March 2017

Direction of Maximum Speed: 212 deg on Mar 31 14:00																						Hours in Service: 744			
Direction of Maximum Daily Speed Average: 172.5 deg on Mar 13																						Hours of Data: 726			
Direction of Minimum Speed: 290 deg on Mar 12 04:00											Direction of Minimum Daily Speed Average: 0.8 deg on Mar 25											Hours of Missing Data: 18			
Monthly Average Direction: 271.5 deg																						Percent Operational Time: 97.6			
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-Mar	58	58	52	52	56	52	49	62	49	67	52	60	54	67	85	91	33	2	335	332	334	224	341	259	53.9
2-Mar	193	AF	207	297	212	222	134	135	146	123	183	173	195	176	144	112	120	139	146	147	150	150	144	121	151.1
3-Mar	136	148	171	177	178	178	177	179	180	182	177	181	205	235	240	286	304	318	338	305	334	338	332	337	218.3
4-Mar	347	337	359	9	10	11	10	13	18	15	8	13	6	6	4	17	13	17	24	21	24	38	46	47	11.4
5-Mar	51	39	37	49	5	321	322	348	14	102	115	124	134	127	139	134	135	138	3	358	342	352	358	350	56.5
6-Mar	352	353	355	359	10	353	350	1	15	8	10	15	358	360	4	6	23	16	7	345	344	345	343	337	359.1
7-Mar	336	336	333	327	325	327	332	333	332	332	329	334	338	335	340	342	356	350	346	351	340	343	343	337	336.8
8-Mar	349	350	353	352	352	353	351	351	347	1	357	337	11	37	9	7	351	8	17	345	AF	322	332	333	358.1
9-Mar	338	285	275	227	210	198	207	207	191	321	26	266	247	289	300	226	346	12	100	327	302	284	231	236	284.7
10-Mar	191	185	181	185	176	258	208	206	290	235	113	100	109	113	127	130	117	87	58	57	71	105	123	160	117.9
11-Mar	148	152	127	101	80	149	134	110	130	132	99	98	100	116	105	100	104	104	105	103	76	123	170	182	113.9
12-Mar	172	237	330	290	AF	AF	306	244	4	116	100	124	134	142	147	144	153	152	154	149	153	158	166	167	148.0
13-Mar	167	167	158	161	161	155	158	161	170	168	165	174	169	187	176	181	175	172	181	174	177	183	196	197	172.5
14-Mar	207	200	204	198	207	208	201	207	215	222	216	213	191	218	203	188	175	134	124	137	159	157	130	124	189.2
15-Mar	153	164	152	161	164	155	237	214	221	279	291	270	274	297	300	292	280	271	240	167	185	204	317	338	231.1
16-Mar	338	339	344	352	356	332	359	13	28	40	32	55	57	44	43	35	35	35	31	70	80	98	92	32	34.6
17-Mar	117	130	139	127	119	136	141	166	172	177	193	173	175	193	199	180	169	173	172	174	183	168	163	164	169.6
18-Mar	154	143	129	122	111	113	107	108	114	127	130	124	111	109	106	116	110	102	104	94	344	351	320	331	113.1
19-Mar	318	315	309	308	299	303	297	288	286	283	276	276	286	280	276	296	298	289	301	291	306	325	324	314	298.6
20-Mar	315	314	315	316	318	315	315	314	318	316	300	299	301	292	295	295	304	295	AF	AF	170	160	AF	159	308.3
21-Mar	141	142	138	135	134	139	136	135	141	169	159	154	150	154	148	142	126	122	123	141	136	140	141	130	141.8
22-Mar	127	116	126	125	126	110	95	100	108	104	105	116	115	119	112	312	293	323	2	347	334	339	328	321	104.7
23-Mar	321	329	322	333	335	327	346	345	9	54	90	52	125	120	108	103	101	117	82	101	126	122	125	198	82.3
24-Mar	156	186	181	128	114	155	159	146	116	137	133	112	113	118	130	122	112	106	108	116	63	112	111	111	122.8
25-Mar	105	111	90	110	115	104	85	202	212	306	286	299	308	328	219	12	305	25	76	81	325	235	159	153	44.3
26-Mar	144	135	134	149	150	311	178	166	118	212	240	191	58	350	259	239	88	336	343	8	184	192	184	AF	165.7
27-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	109	103	124	142	141	126	129	150	152	160	145	114	172	203	158	--
28-Mar	231	143	171	179	173	129	134	154	172	182	171	181	178	186	175	179	177	177	172	156	161	171	144	160	170.8
29-Mar	125	133	328	350	AF	239	200	198	218	205	203	201	203	258	249	306	285	254	333	306	273	203	313	331	226.6
30-Mar	169	319	342	329	27	57	80	79	76	69	108	73	104	88	20	47	65	77	93	1	315	192	213	210	64.6
31-Mar	199	156	142	146	143	143	136	157	200	197	202	196	235	212	208	196	199	181	187	185	189	201	202	201	194.3
115.1 135.4 114.3 124.4 117.5 102.1 78.1 157.8 142.0 141.0 145.6 142.2 146.7 157.7 147.6 135.0 122.2 105.0 98.4 125.8 138.3 123.0 154.6 167.0																									
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 Community - March 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Conklin Community - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 109 deg on Mar 23 11:00	Hours of Data: 726
Minimum Value: 6 deg on Mar 21 04:00	Hours of Missing Data: 18
Percentiles: P ₁ = 10 P ₁₀ = 16 Q ₁ = 19 Median = 25 Q ₃ = 38 P ₉₀ = 62 P ₉₉ = 93	Hours of Calibration: 0
	Percent Operational Time: 97.6

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-Mar	33	31	29	29	32	31	30	32	29	35	33	39	36	44	40	31	70	21	16	20	30	65	33	64	70
2-Mar	83	AF	46	49	25	53	43	23	26	35	24	24	23	27	35	24	17	14	14	17	16	14	15	17	83
3-Mar	28	13	16	16	15	15	15	16	18	35	26	21	22	35	36	32	25	19	24	43	19	18	18	19	43
4-Mar	19	18	24	22	23	23	21	23	24	25	22	24	25	24	26	23	24	22	23	23	23	26	26	28	28
5-Mar	33	26	26	30	23	47	15	19	27	45	31	27	26	50	35	37	42	20	16	24	18	19	21	26	50
6-Mar	14	16	20	21	28	22	18	23	24	24	23	24	25	23	22	22	21	21	20	19	17	15	17	16	28
7-Mar	17	16	16	16	15	15	16	17	17	17	19	20	20	21	20	20	23	20	13	16	14	9	9	25	25
8-Mar	9	9	7	10	13	11	12	11	24	27	33	48	58	75	58	76	23	27	22	17	AF	33	24	39	76
9-Mar	13	43	42	66	33	25	63	34	76	72	68	104	53	67	50	78	44	86	36	73	65	74	54	72	104
10-Mar	92	49	77	79	57	53	72	62	45	62	47	39	33	34	23	21	20	37	32	37	42	24	25	13	92
11-Mar	15	17	38	56	50	41	18	22	26	26	28	29	29	24	26	29	21	22	19	23	93	59	43	58	93
12-Mar	28	23	34	45	AF	AF	57	38	50	41	26	25	25	26	27	23	21	18	14	13	15	17	17	17	57
13-Mar	18	18	18	16	17	16	17	18	18	18	19	19	19	21	21	19	20	18	19	19	22	35	23	30	35
14-Mar	40	36	45	37	43	26	31	22	21	28	23	36	61	38	69	25	21	18	21	35	25	18	34	39	69
15-Mar	27	19	18	17	26	31	108	30	22	38	30	28	31	29	28	27	39	52	74	87	66	50	63	12	108
16-Mar	19	14	14	10	27	35	21	26	27	25	28	35	40	35	33	22	24	22	27	38	37	38	80	66	80
17-Mar	44	66	17	19	25	27	20	19	21	24	26	27	26	30	24	26	19	18	14	18	19	22	50	17	66
18-Mar	18	17	17	21	22	19	22	21	18	20	21	21	23	26	25	21	19	26	22	40	23	18	20	21	40
19-Mar	21	24	28	27	33	32	32	32	30	30	30	28	29	29	28	28	29	30	26	28	25	19	18	20	33
20-Mar	21	22	20	19	19	21	21	21	23	24	32	31	45	34	34	35	29	29	AF	AF	24	24	AF	76	76
21-Mar	22	10	9	6	10	16	17	45	24	26	21	23	22	21	22	21	18	19	19	17	16	16	17	18	45
22-Mar	18	19	15	16	16	30	35	27	21	30	27	19	20	24	40	44	26	17	21	15	14	14	12	12	44
23-Mar	17	15	13	15	13	21	39	14	31	55	109	70	31	43	30	24	31	17	44	41	52	20	58	85	109
24-Mar	33	19	29	50	44	24	53	19	18	23	20	21	19	21	19	22	20	21	49	46	22	21	22	53	53
25-Mar	22	37	40	21	20	36	93	75	74	32	28	35	40	69	102	73	33	31	39	62	46	73	72	31	102
26-Mar	59	13	22	35	24	85	80	17	50	83	30	50	72	77	57	77	69	47	41	48	65	12	13	AF	85
27-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	23	32	23	19	21	22	24	19	15	14	14	73	91	83	96	96
28-Mar	75	35	35	19	40	30	10	25	30	35	31	44	43	33	26	33	23	20	17	14	17	84	39	34	84
29-Mar	57	61	16	46	AF	62	40	23	26	21	33	57	37	37	69	56	42	36	27	42	51	89	85	80	89
30-Mar	67	62	11	12	34	39	49	40	48	58	30	49	50	79	73	60	44	49	41	58	33	72	81	64	81
31-Mar	65	33	15	16	14	41	18	26	42	36	23	24	21	22	22	22	20	20	20	18	19	23	17	17	65
	92	66	77	79	57	85	108	75	76	83	109	104	72	79	102	78	70	86	74	87	93	91	85	96	
	Diurnal Maximum																								

AF - Analyzer Failure



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 9, 2017	Last Calibration	February 16, 2017
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	14:27
Gas Cert Reference	EY0000359	Station temp.	22 Deg C
Cal Gas Concentration	51.4 ppm	Cal Gas Exp Date	February 9, 2018
Calibrator Make/Model	API T700	Serial Number	2658
ZAG Make/Model	API 701	Serial Number	5611
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9628

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-655	-655
Analyzer IP address	192.168.1.43		Lamp voltage	852	852
Calculated slope	0.998292	0.997548	Chamber temp	44.9	44.9
Calculated intercept	0.640903	0.759310	Pressure	638.5	676.9
Analyzer Background	22.4	21.9	Flow	0.471	0.496
Analyzer Coefficient	0.908	0.908	Intensity	92	92

Analyzer make Thermo 43i Analyzer serial # JC1428701363

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	76.5	786.4	782.2	1.005
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	76.5	786.4	788.0	0.998
second point	5000	38.2	392.7	392.3	1.001
third point	5000	19.1	196.3	195.7	1.003
as left zero	5000	0.0	0.0	0.6	----
as left span	5000	76.5	786.4	787.4	0.999
Average Correction Factor					1.001

Corrected As found 782.1 Previous response 787.1 % change 0.6%

Notes:

Sample inlet filter replaced after as founds. No adjustments made. Performed preventative maintenance on NMHC, hence why some points were longer. Took a new "high point" average after replacing the filter.

Calibration Performed By: Asad Hidayat



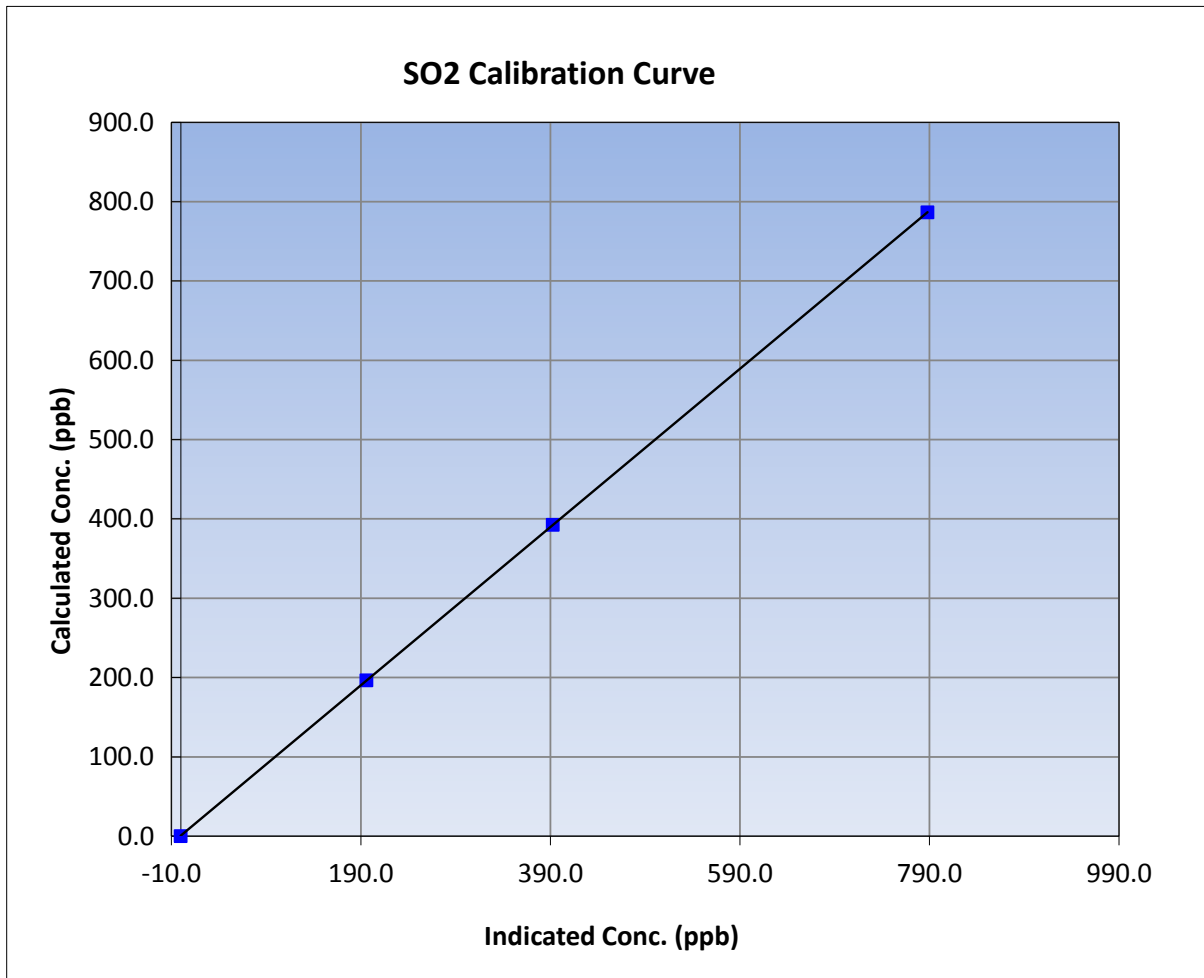
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 16, 2017	Previous Calibration	February 16, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	9:00	End Time (MST)	14:27
Analyzer make	Thermo 43i	Analyzer serial #	JC1428701363

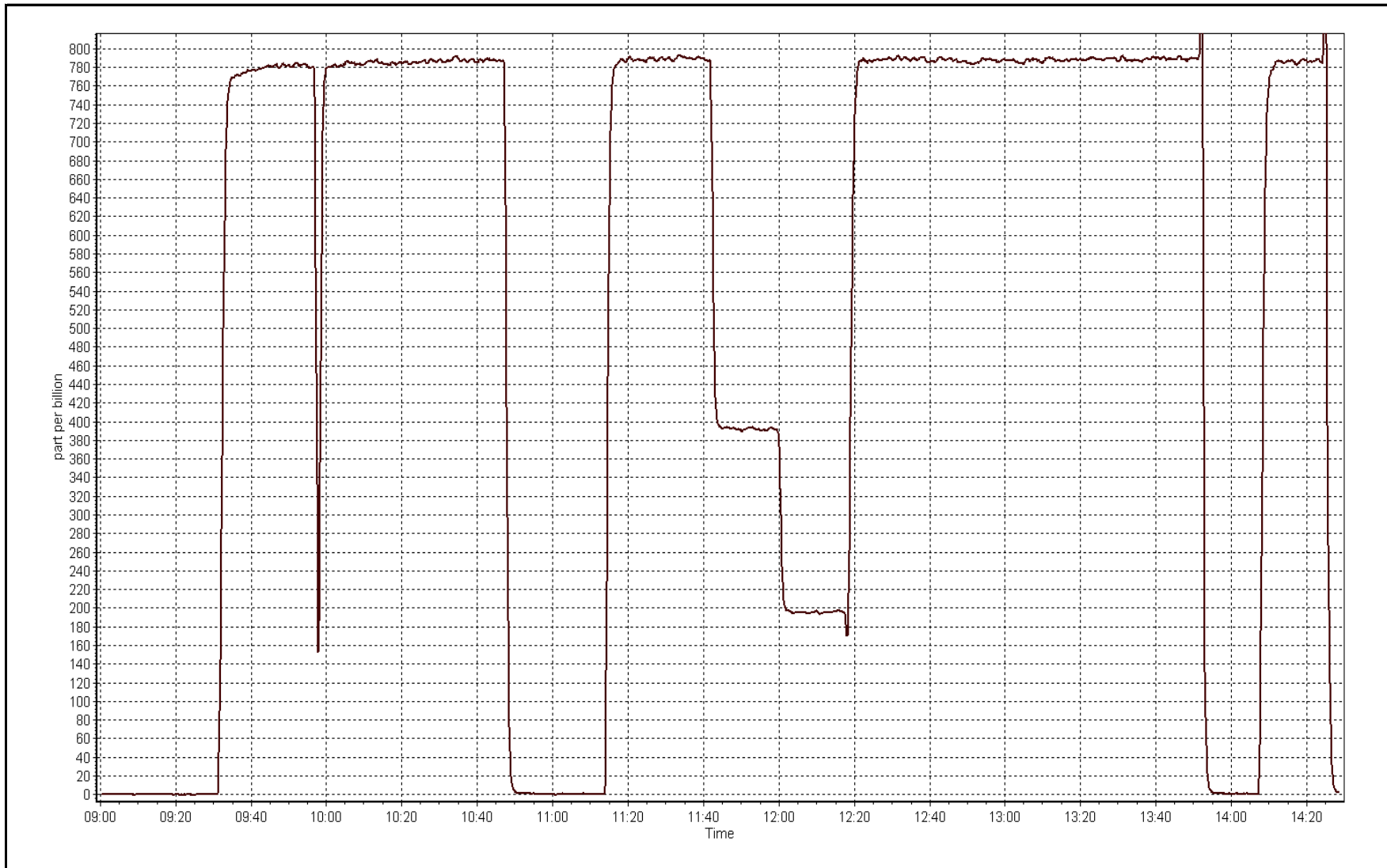
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999997
786.4	788.0	0.9980		
392.7	392.3	1.0009	Slope	0.997548
196.3	195.7	1.0033		
			Intercept	0.759310



SO2 Calibration Plot

Date: March 9, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	March 13, 2017	Last Calibration	February 16, 2017
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	10:25	End Time (MST)	12:50
Gas Cert Reference	LL119411	Station temp.	22 Deg C
Cal Gas Concentration	4.97 ppm	Cal Gas Exp Date	February 12, 2019
Calibrator Make/Model	API T700	Serial Number	2658
Dil air Make/Model	API 701	Serial Number	5611
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9628
SO2 gas concentration	51.4 ppm	SO2 gas cert/exp	EY0000359 February 9, 2018

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-732	-732
Analyzer IP address	192.168.1.44		Lamp voltage	1046	1051
Calculated slope	0.995666	0.999384	Chamber temp	45	45
Calculated intercept	-0.023977	-0.010163	Pressure	643.5	664.5
Analyzer Background	1.53	1.47	Flow	0.418	0.432
Analyzer Coefficient	1.012	0.994	Intensity	93	91
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1236656116	
Converter make/model	CDN-101		Converter serial #	NA	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	80.6	80.1	81.2	0.986
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	80.6	80.1	80.2	0.999
second point	5000	40.4	40.2	40.1	1.001
third point	5000	20.2	20.1	20.1	1.001
as left zero	6000	0.0	0.0	0.2	----
as left span	5000	80.6	80.1	79.7	1.005
Average Correction Factor					1.000

Corrected As found	81.2	Previous response	80.5	% change	-0.8%
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Notes:

Sample inlet filter inspected after as founds, looked clean. Did not replace the sample inlet filter because it was changed on Mar 10, 2017 during aborted cal. Slightly adjusted span.

Calibration Performed By:

Asad Hidayat



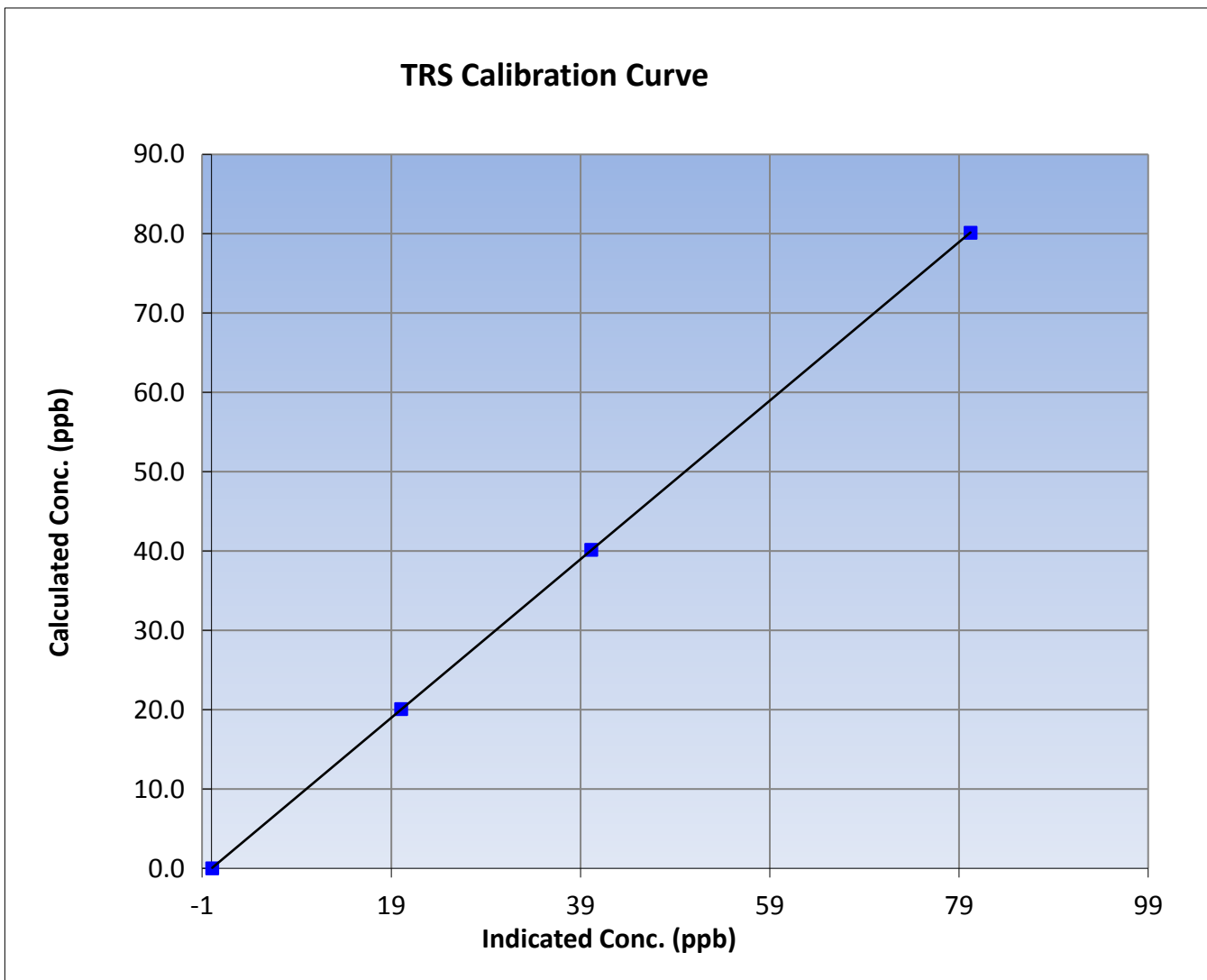
Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	March 13, 2017	Previous Calibration	February 16, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	10:25	End Time (MST)	12:50
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1236656116

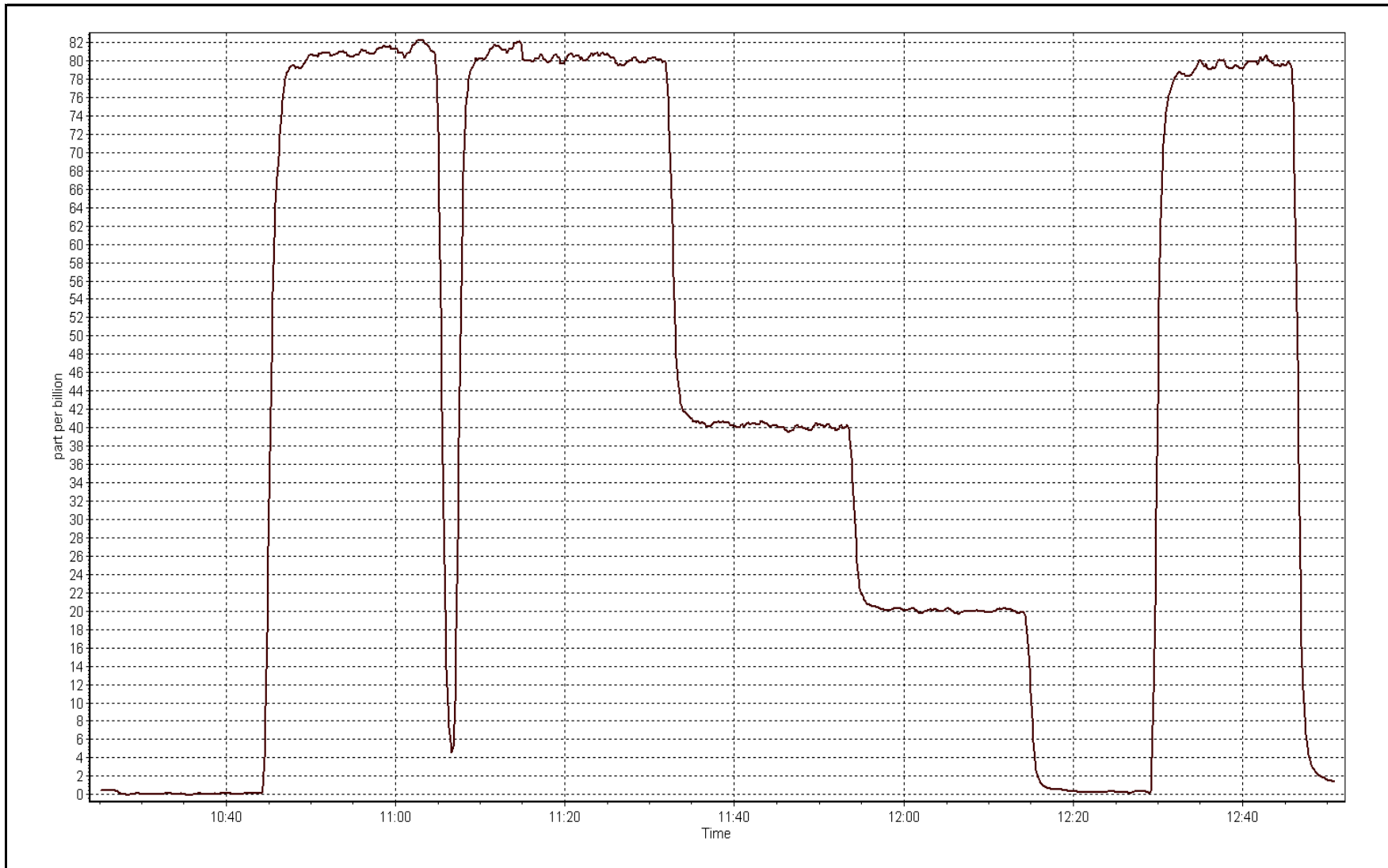
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999996
80.1	80.2	0.9987		
40.2	40.1	1.0007	Slope	0.999384
20.1	20.1	1.0014		
			Intercept	-0.010163



TRS Calibration Plot

Date: March 13, 2017





Wood Buffalo Environmental Association

THC / NMHC Calibration Report

version 02-2017

Station Information

Calibration Date	March 9, 2017	Last Calibration	February 16, 2017
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	14:27
Gas Cert Reference	EY0000359	Cal Gas Expiry Date	February 9, 2018
CH4 Cal Gas Conc.	512.0 ppm	CH4 Equiv Conc.	1084.0 ppm
C3H8 Cal Gas Conc.	208.0 ppm	Station temp.	21 Deg C
Calibrator Model	API T700	Serial Number	2658
ZAG make/model	Teledyne API 701	Serial Number	5611
DACS make/model	Campbell Scientific CR3000	Serial Number	9628

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.998095	0.997788	Carrier Pressure	37.0	37.0
THC Calc intercept	0.068169	0.080357	Fuel Pressure	49.7	49.7
NMHC Calc slope	0.998089	0.996745	Air Pressure	34.3	34.3
NMHC Calc intercept	0.040430	0.044031			

Analyzer make Thermo 55i Analyzer serial # 1152430011

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	76.5	16.59	17.20	0.964
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	76.5	16.59	16.59	1.000
second point	5000	38.2	8.28	8.15	1.016
third point	5000	19.1	4.14	4.01	1.033
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	76.5	16.59	16.57	1.001
Average Correction Factor					1.016

Corrected As found 17.20 Previous response 16.55 % change -3.8%

Notes:

Sample inlet filter replaced after as founds. Actuator replaced for preventative maintenance. Zero, span, and blank chromatograms taken during as founds and post maintenance as well. Adjusted span.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	76.5	8.75	9.13	0.959
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	76.5	8.75	8.76	0.999
second point	5000	38.2	4.37	4.31	1.014
third point	5000	19.1	2.19	2.11	1.036
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	76.5	8.75	8.76	0.999
Average Correction Factor					1.016

Corrected As found 9.13 Previous response 8.73 % change -4.4%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	76.5	7.83	8.07	0.971
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	76.5	7.83	7.83	1.000
second point	5000	38.2	3.91	3.84	1.019
third point	5000	19.1	1.96	1.90	1.029
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	76.5	7.83	7.82	1.002
Average Correction Factor					1.016

Corrected As found 8.07 Previous response 7.82 % change -3.1%



Wood Buffalo Environmental Association

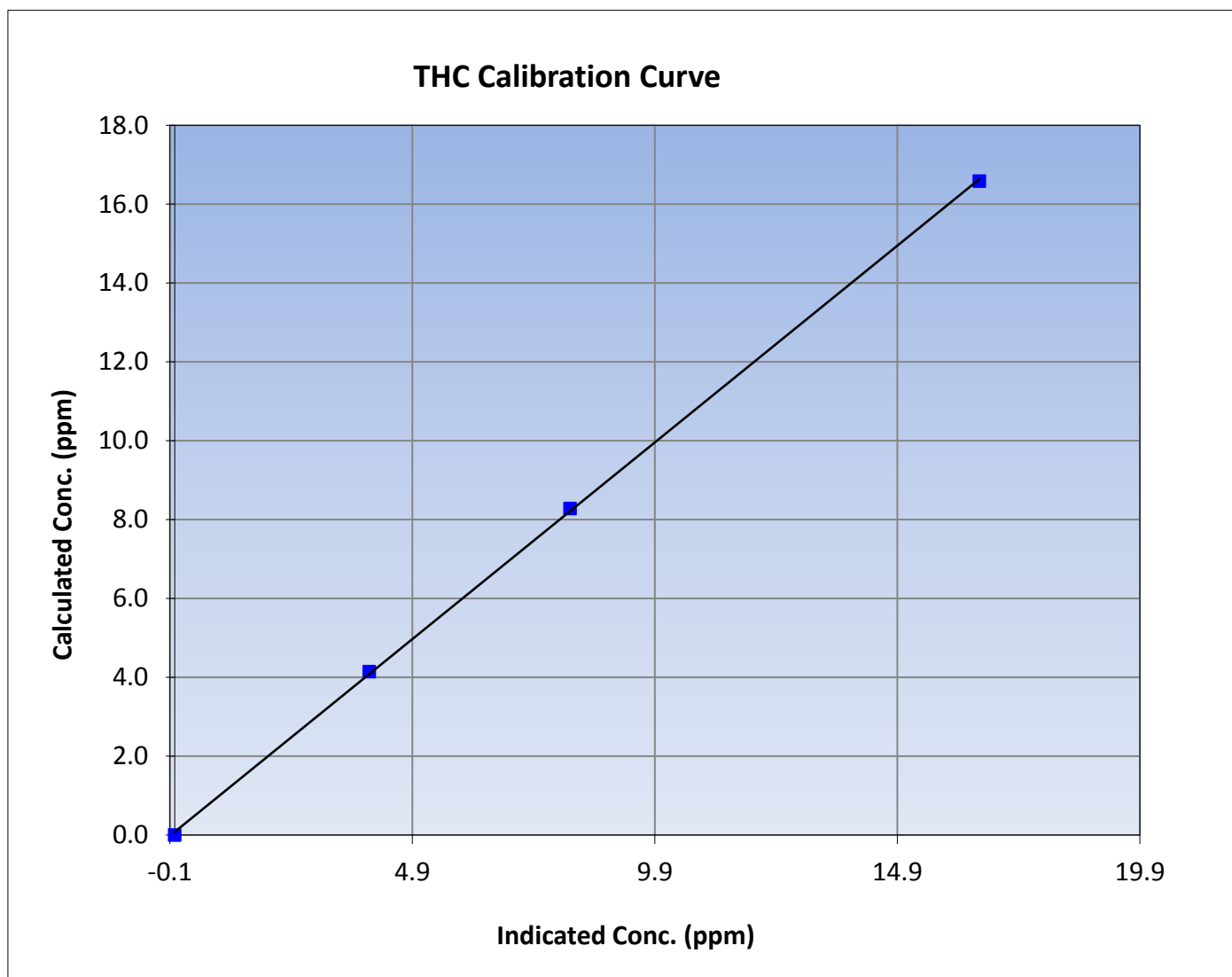
THC Calibration Summary

Station Information

Calibration Date	March 9, 2017	Previous Calibration	February 16, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	9:00	End Time (MST)	14:27
Analyzer make	Thermo 55i	Analyzer serial #	1152430011

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999886
16.59	16.59	0.9997		
8.28	8.15	1.0162	Slope	0.997788
4.14	4.01	1.0326		
			Intercept	0.080357





Wood Buffalo Environmental Association

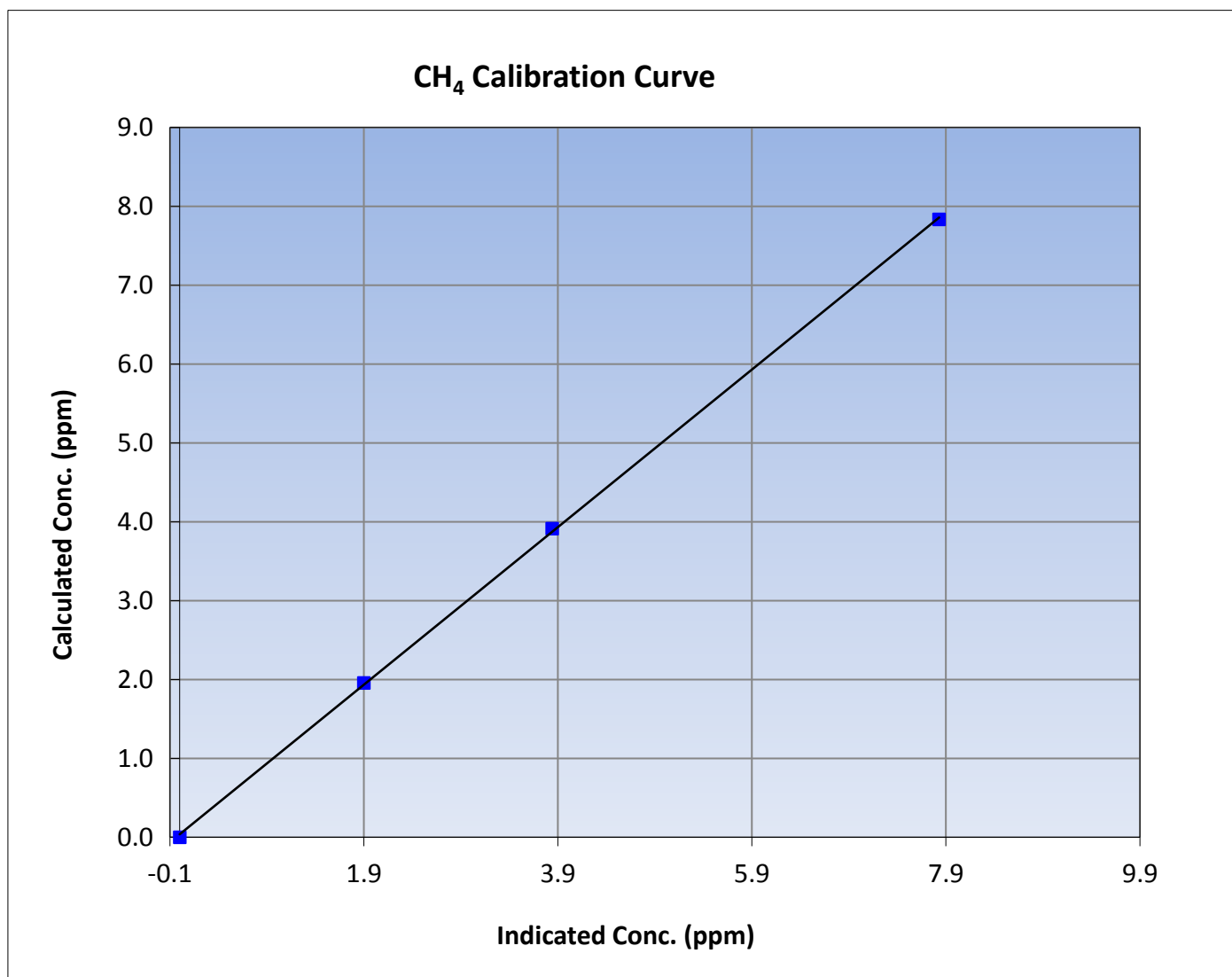
CH₄ Calibration Summary

Station Information

Calibration Date	March 9, 2017	Previous Calibration	February 16, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	9:00	End Time (MST)	14:27
Analyzer make	Thermo 55i	Analyzer serial #	1152430011

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999883
7.83	7.83	1.0005		
3.91	3.84	1.0187	Slope	0.998951
1.96	1.90	1.0294		
			Intercept	0.036340





Wood Buffalo Environmental Association

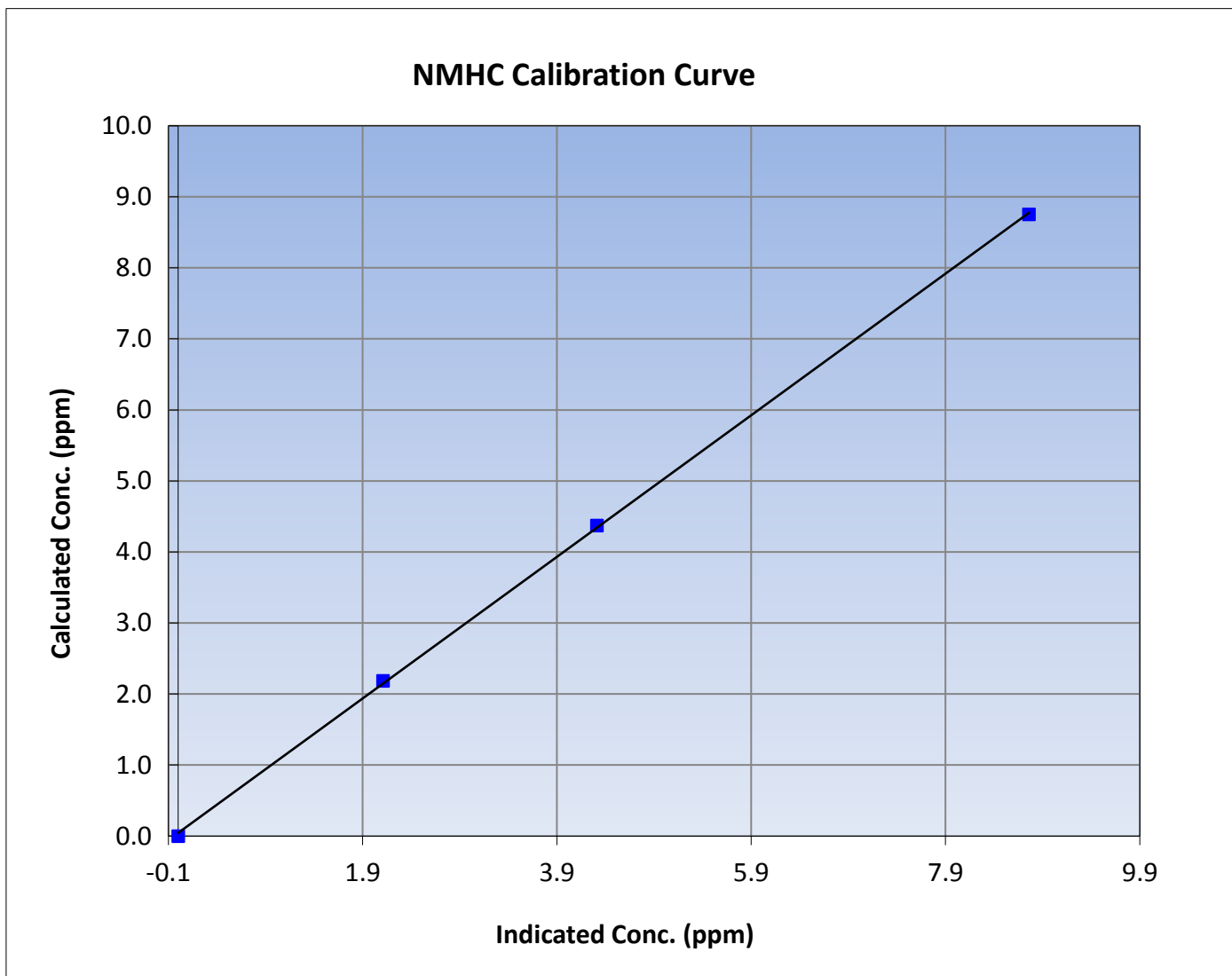
NMHC Calibration Summary

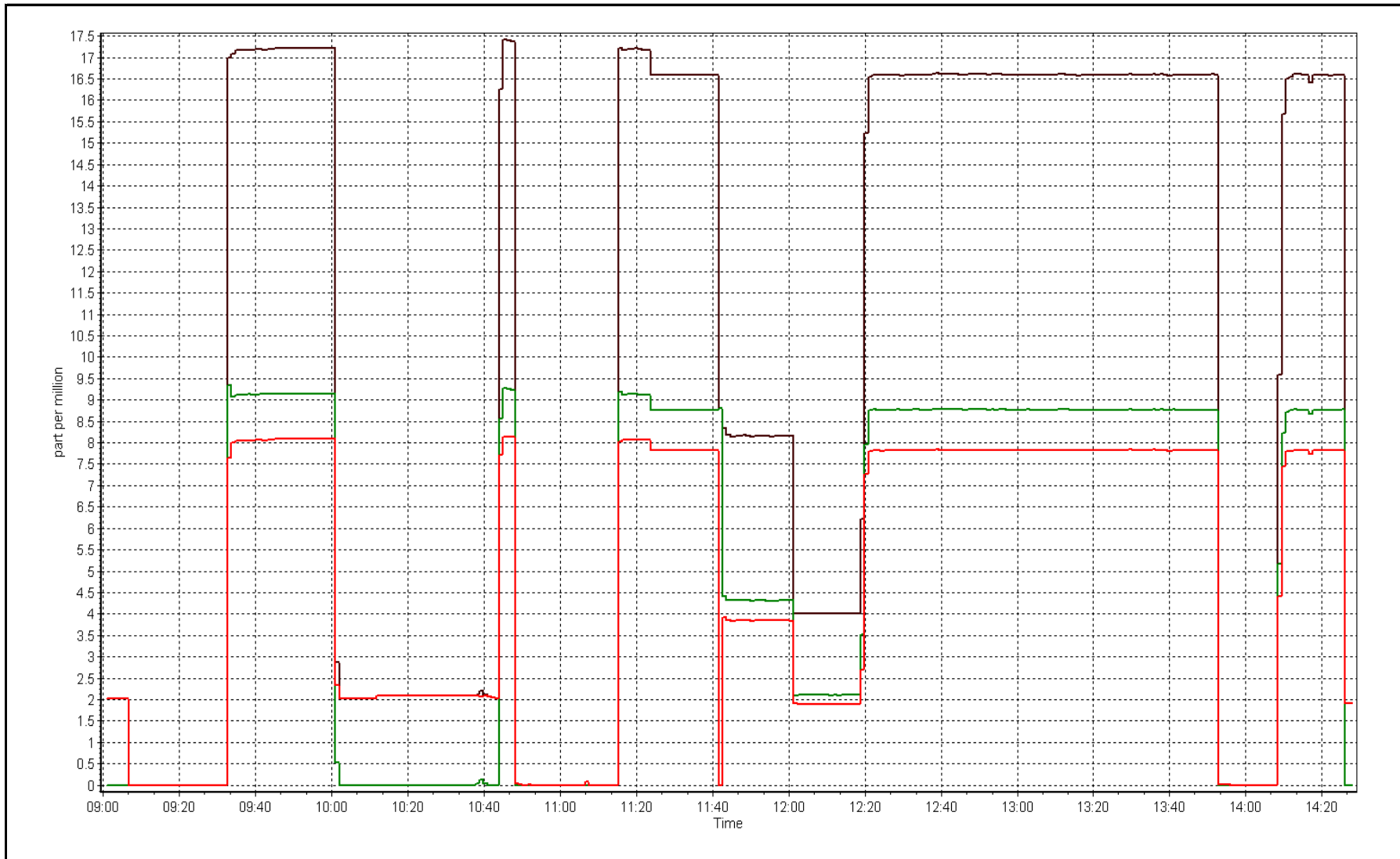
Station Information

Calibration Date	March 9, 2017	Previous Calibration	February 16, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	9:00	End Time (MST)	14:27
Analyzer make	Thermo 55i	Analyzer serial #	1152430011

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999884
8.75	8.76	0.9990		
4.37	4.31	1.0139	Slope	0.996745
2.19	2.11	1.0356		
			Intercept	0.044031







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 9, 2017	Previous Calibration	February 9, 2017
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	14:30	End Time (MST)	17:10
NO2 GPT Ref date	NA	Transfer Standard	Calibrator Photometer
Calibrator Make/Model	Teledyne API 700	Station temp.	21 Deg C
ZAG make/model	Teledyne API 701	Serial Number	2658
DACS make/model	Campbell Scientific CR3000	Serial Number	5611
		Serial Number	9628

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	26.3	25.9
Analyzer IP address	192.168.1.49		Lamp temp.	53.4	53.3
Calculated slope	1.000256	0.999645	Pressure	635.3	665.2
Calculated intercept	-0.758571	-0.607664	Flow cell A	0.725	0.747
Analyzer Background	-1.4	-1.3	Flow cell B	0.715	0.739
Analyzer Coefficient	1.029	1.036	Cell A Intensity	70671	70339
			Cell B Intensity	67665	66990

Analyzer make	Thermo 49i	Analyzer serial #	1501663734
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	800.00	0.0	0.0	----
as found span	5000	1116.50	400.0	396.9	1.008
calibrator zero	5000	800.00	0.0	0.0	----
high point	5000	1116.50	400.0	400.4	0.999
second point	5000	914.90	200.0	201.0	0.995
third point	5000	773.20	100.0	101.3	0.987
as left zero	6000	800.00	0.0	-0.4	----
as left span	5000	1114.60	400.0	400.6	0.998
Average Correction Factor					0.994

Corrected As found	396.9	Previous response	400.7	% change	0.9%
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Notes:

Sample inlet filter replaced after as founds. Adjusted span only.

Calibration Performed By: Asad Hidayat



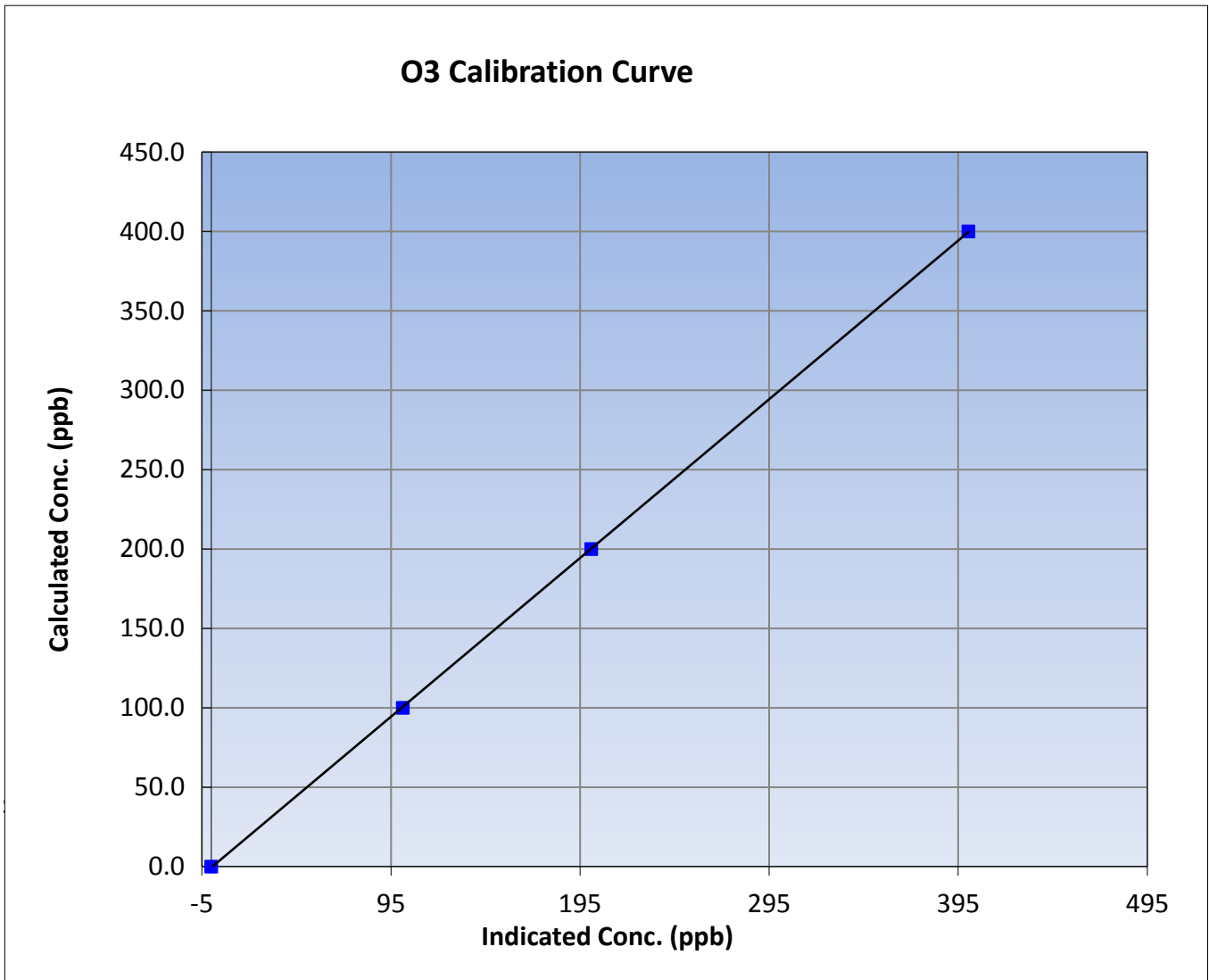
Wood Buffalo Environmental Association O3 Calibration Report

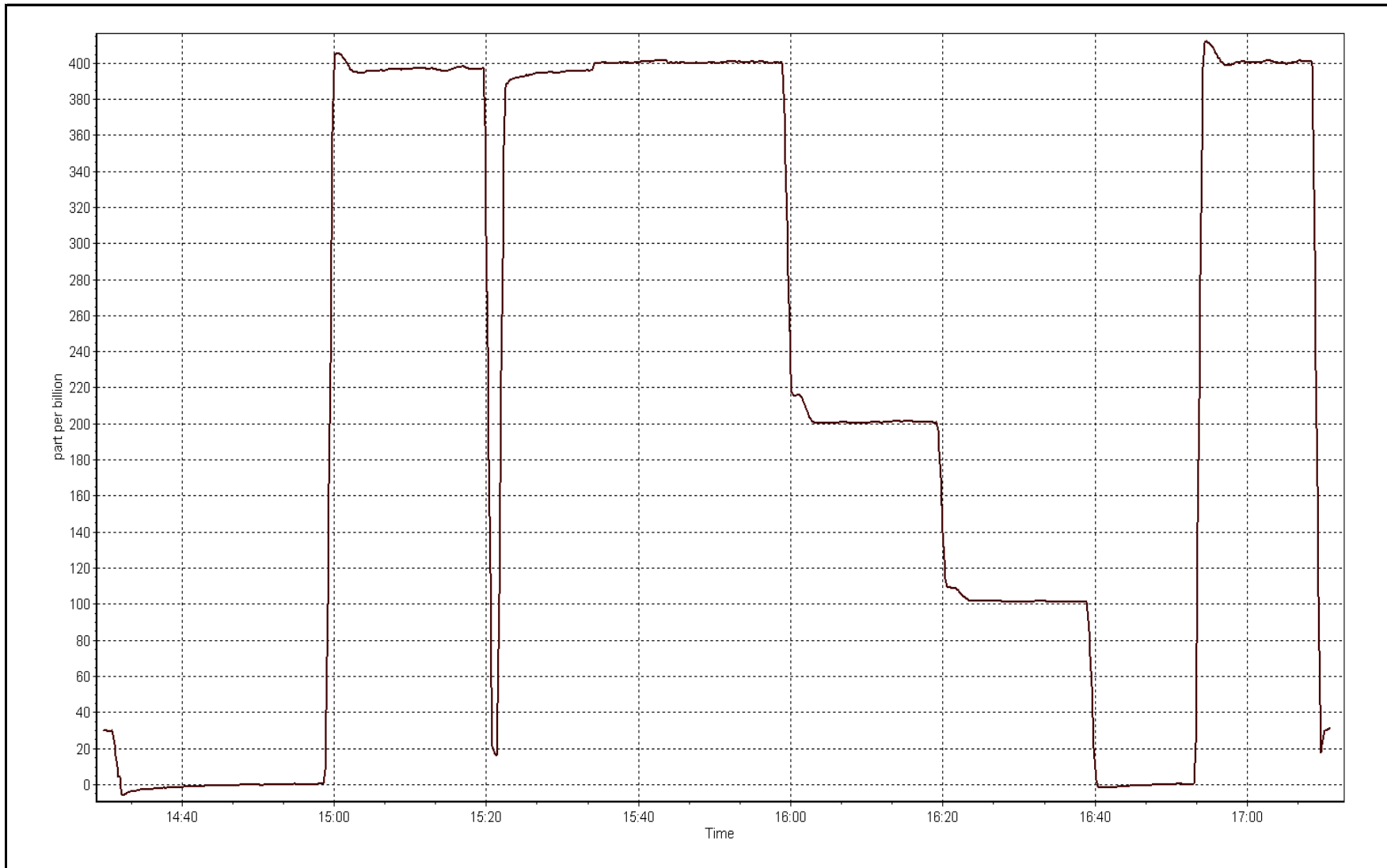
Station Information

Calibration Date	Thursday, March 09, 2017	Previous Calibration	Thursday, February 09, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	14:30	End Time (MST)	17:10
Analyzer make	Thermo 49i	Analyzer serial #	1501663734

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999988
400.0	400.4	0.9989		
200.0	201.0	0.9953	Slope	0.999645
100.0	101.3	0.9869		
			Intercept	-0.607664







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 9, 2017	Previous Calibration	February 16, 2017
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	14:27
NO Cal Gas Conc	52.4 ppm	Gas Cert Reference	EY0000359
NOx Cal Gas Conc	52.4 ppm	Cal Gas Expiry Date	February 9, 2018
Calibrator	API T700	Serial Number	2658
Zero air Generator	API 701	Serial Number	5611

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9628
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998275	0.997863	1.002598
	Data Offset	1.366985	1.732972	-0.210507
Current Calibration	Data Slope	0.997119	0.997515	0.997292
	Data Offset	1.055747	1.341042	-0.580117

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1501663731
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000 ppb		0-1000 ppb	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.418		1.462	
NOx coefficient	0.998		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	9.2		9.5	
NOx bkgrnd	9.3		9.6	
Chamber Temp	49.9	Deg C	49.9	Deg C
Moly Temp	327.4	Deg C	327.1	Deg C
PMT voltage	-840.6	V	-840.6	V
PMT Temp	-3.1	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	156.6	mmHg	166.4	mmHg
R Cell Press Nox	156.6	mmHg	166.7	mmHg
NO sample flow	0.681	lpm	0.716	lpm
Nox sample Flow	0.682	lpm	0.718	lpm

Notes:

Sample inlet filter replaced after as founds. Adjusted span. Performed preventative maintenance on NMHC, hence why some points were longer.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

March 9, 2017

Station Number:

AMS 21

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
as found span	5000	76.5	801.7	801.7	0.0	774.3	774.0	0.3	1.0354	1.0358
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	0.0	----	----
high point	5000	76.5	801.7	801.7	0.0	803.6	803.1	0.5	0.9977	0.9983
second point	5000	38.2	400.3	400.3	0.0	399.5	399.1	0.5	1.0020	1.0032
third point	5000	19.1	200.2	200.2	0.0	199.1	198.4	0.7	1.0054	1.0092
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
as left span	5000	76.5	801.7	400.6	401.2	792.5	395.0	397.4	1.0117	1.0141
Average Correction Factor									1.0017	1.0036

Corrced As found NO_x= 774.7 NO= 774.2 Percent Change NO_x= 3.5% NO= 3.6%
 Previous Response NO_x= 801.7 NO= 801.7

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 76.50 ccm NOx ref calc conc = 801.7 ppb NO ref calc conc = 801.7 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	798.4	795.9	0.0	1.0042	1.0073	----	----
1st NO2 (400)	400.6	395.4	797.2	400.6	396.5	1.0057	----	0.9970	100.3%
2nd NO2 (200)	580.3	215.6	797.8	580.3	217.4	1.0050	----	0.9916	100.8%
3rd NO2 (100)	687.5	108.4	797.2	687.5	109.7	1.0057	----	0.9883	101.2%
2nd NO ref point		0.0	795.9	793.9	2.1	1.0073	1.0099	----	----
Average Correction Factor						1.0059		0.9923	100.8%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

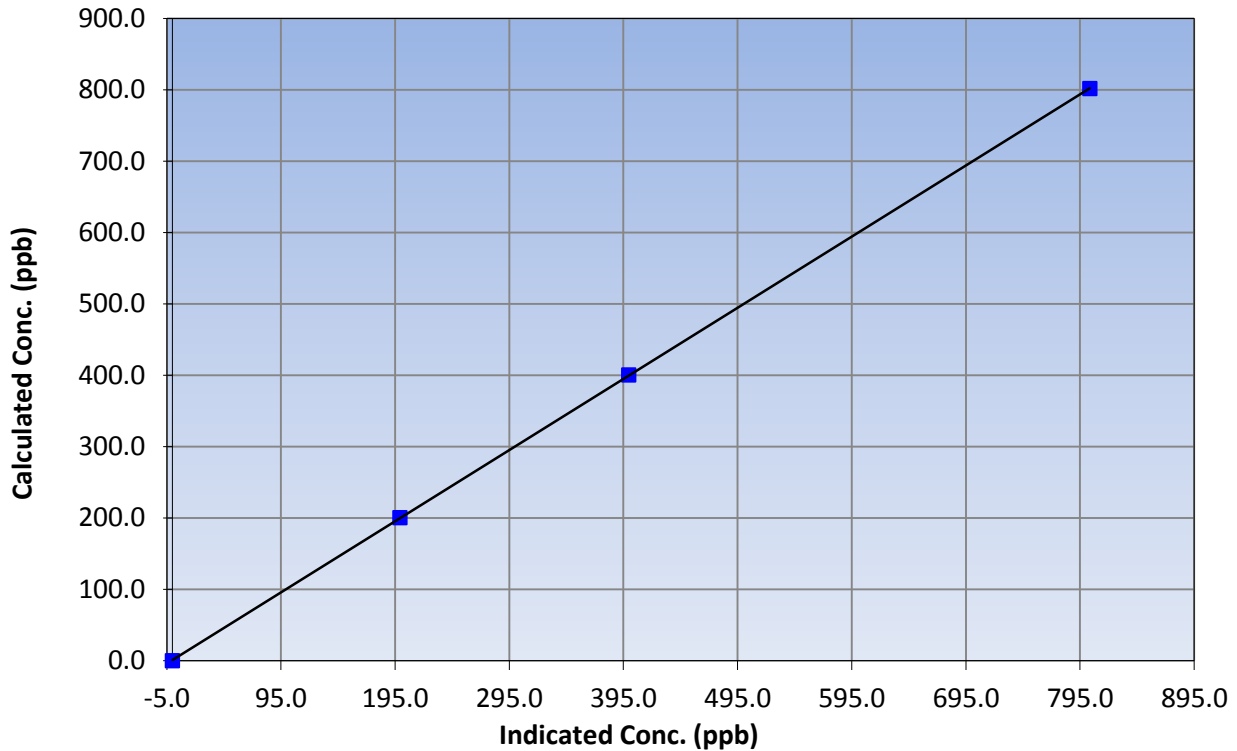
Station Information

Calibration Date	March 9, 2017	Previous Calibration	February 16, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	9:00	End Time (MST)	14:27
Analyzer make	Thermo 42i	Analyzer serial #	1501663731

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999993
801.7	803.6	0.9977		
400.3	399.5	1.0020	Slope	0.997119
200.2	199.1	1.0054		
			Intercept	1.055747

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

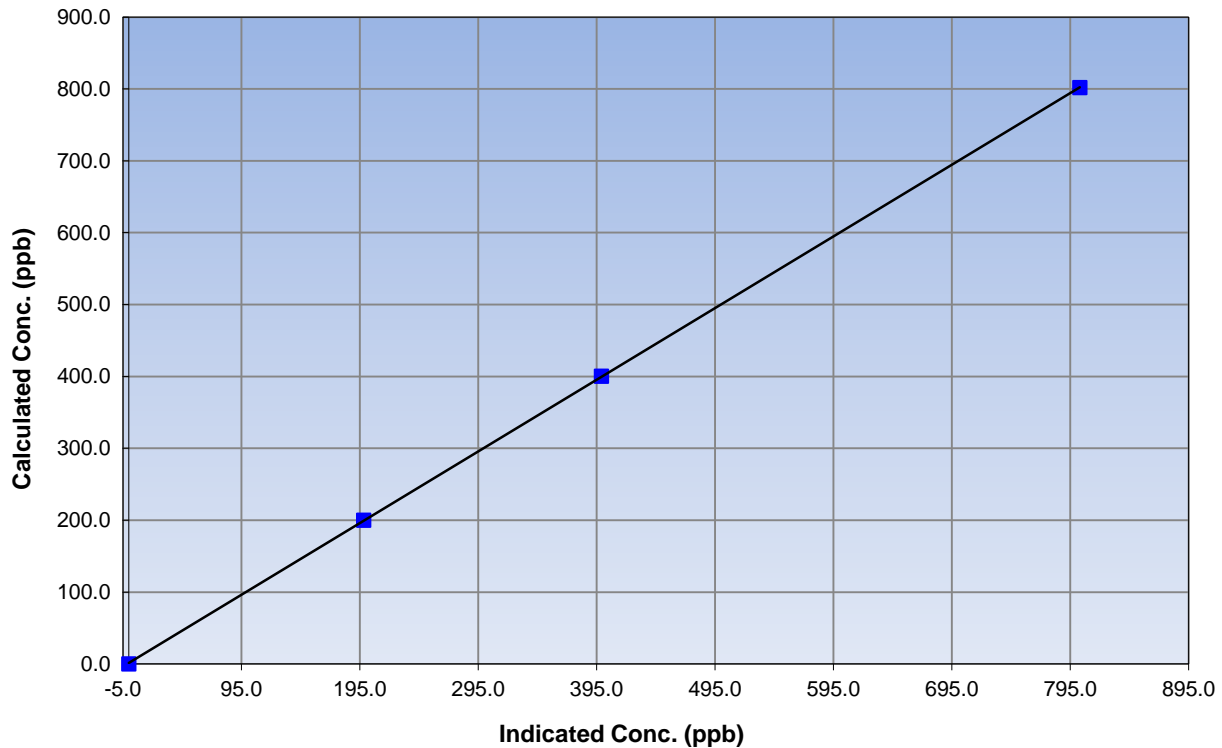
Station Information

Calibration Date	March 9, 2017	Previous Calibration	February 16, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	9:00	End Time (MST)	14:27
Analyzer make	Thermo 42i	Analyzer serial #	1501663731

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999989
801.7	803.1	0.9983		
400.3	399.1	1.0032	Slope	0.997515
200.2	198.4	1.0092		
			Intercept	1.341042

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

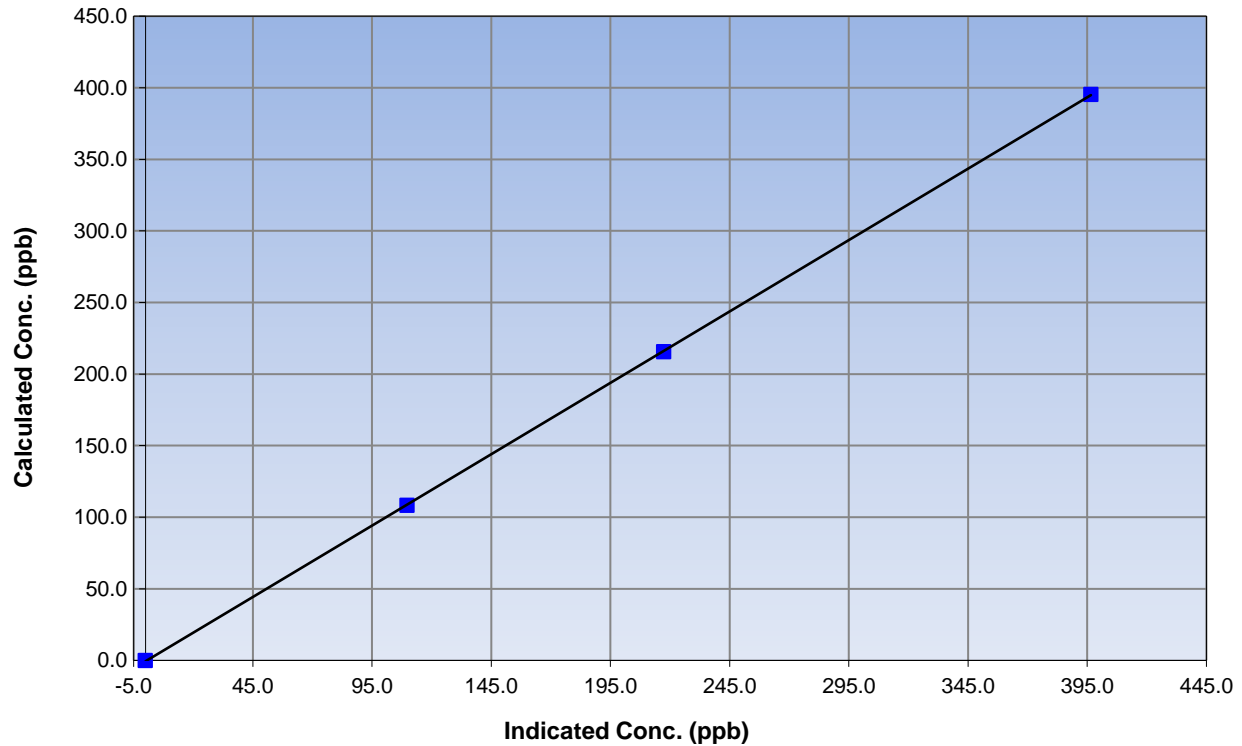
Station Information

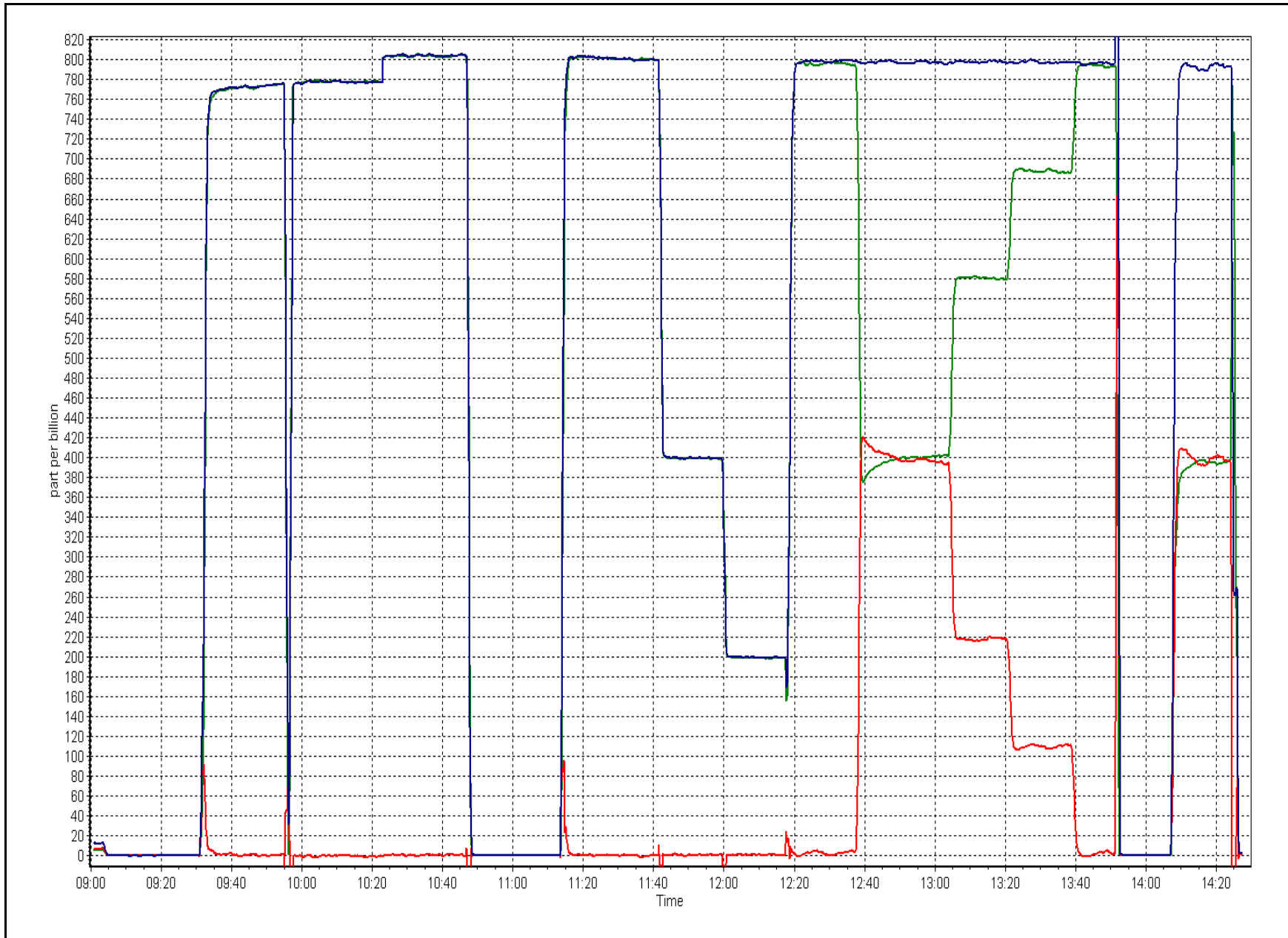
Calibration Date	March 9, 2017	Previous Calibration	February 16, 2017
Station Number	Conklin Community	Station Number	AMS 21
Start Time (MST)	9:00	End Time (MST)	14:27
Analyzer make	Thermo 42i	Analyzer serial #	1501663731

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999986
395.4	396.5	0.9970		
215.6	217.4	0.9916	Slope	0.997292
108.4	109.7	0.9883		
			Intercept	-0.580117

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Conklin Community	Station number:	AMS 21
Calibration Date:	March 13, 2017	Last Cal Date:	February 16, 2017
Start time (MST):	10:50	End time (MST):	11:45
Sharp Model:	5030	S/N:	7494
Particulate Fraction:	PM2.5	C14 Source S/N:	CM-0404
Flow Standard Model:	Delta Cal	S/N:	1019
Temp/RH standard:	Delta Cal	S/N:	1019

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)	-9	-9.4	-9	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	947	944	947	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1005	1000	<input 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"/>	
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

			<u>Tolerance</u>
Leak Test:	Date of check: <u>February 16, 2017</u>	Last Cal Date: <u>October 12, 2016</u>	
	Flow w/o adaptor: <u>16.96</u>	Flow w/ adaptor: <u>16.86</u>	0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass: <u>1265</u>	S/N: <u>2598</u>
	Date of check: <u>October 12, 2016</u>	Last Cal Date: <u>June 14, 2016</u>
	New Correction Factor: <u>7119</u>	Previous Correction Factor: <u>5603</u>

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
T2 (°C)	17		17	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	20		20	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	18		18	<input type="checkbox"/>	+/- 2 °C
RH (%)	9		9	<input type="checkbox"/>	+/- 10%

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
MARCH 2017**

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS 22)
MARCH 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	4	0	1	0
TRS(ppb) Average	706	35	38	99.6	1	0	0	0
THC(ppm) Average	702	37	42	99.33	2.1	-	2	-
NMHC(ppm) Average	702	37	42	99.33	0.07	-	0.003	-
CH4(ppm) Average	702	37	42	99.33	2.1	-	2	-
O3 (ppb) Average	709	35	35	100	58	0	49	-
NO2 (ppb) Average	703	37	41	99.46	13	0	5	-
NO (ppb) Average	703	37	41	99.46	8	-	1	-
NOX (ppb) Average	703	37	41	99.46	14	-	6	-
PM2.5 (ug/m3) Average	678	4	66	91.67	25.9	-	7.6	0
Wind Speed 10 m (km/h) Average	744	0	0	100	18	-	15	-
Wind Direction 10 m (deg) Average	744	0	0	100	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100	12.9	-	5.4	-
Relative Humidity (%) Average	744	0	0	100	98	-	89.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS 22)
MARCH 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	0.3	0	-	0	0	0	0	0	1	4
TRS (ppb) Average	706	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	702	1.96	0	-	1.9	1.9	1.9	2	2	2	2.1
NMHC(ppm) Average	702	0	0.004	-	0	0	0	0	0	0	0.07
CH4(ppm) Average	702	1.96	0	-	1.9	1.9	1.9	2	2	2	2.1
O3 (ppb) Average	709	39.6	9	-	10	26	34	42	46	49	58
NO2 (ppb) Average	703	1.9	2	-	0	0	1	1	3	4	13
NO (ppb) Average	703	0.4	1	-	0	0	0	0	0	1	8
NOX (ppb) Average	703	2.3	2	-	0	1	1	2	3	5	14
PM2.5 (ug/m3) Average	678	3.95	2.7	-	0.3	1.5	2.2	3.3	4.9	7	25.9
Wind Speed 10 m (km/h) Average	744	6.6	4	-	0	1	3	6	9	12	18
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-7.11	10.8	-	-32.9	-22.1	-16.7	-3.9	1.3	5.8	12.9
Relative Humidity (%) Average	744	64.6	17	-	24	39	52	66	77	88	98

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS 22)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NMHC, CH4, THC	10 Mar 2017 15:00	10 Mar 2017 16:00	2	Maintenance - replaced fuel gas
NMHC, CH4, THC	22 Mar 2017 11:00	22 Mar 2017 13:00	3	Maintenance - WBEA audit
NO2, NO, NOX	21 Mar 2017 11:00	21 Mar 2017 14:00	4	Maintenance - WBEA audit
SO2	22 Mar 2017 09:00	22 Mar 2017 10:00	2	Maintenance - WBEA audit
TRS	21 Mar 2017 14:00	21 Mar 2017 16:00	3	Maintenance - WBEA audit
PM 2.5	24 Mar 2017 12:00	25 Mar 2017 08:00	21	Flat line in sensor output signal
PM 2.5	30 Mar 2017 08:00	01 Apr 2017 00:00	41	Flat line in sensor output signal



Summary of Hour Averages

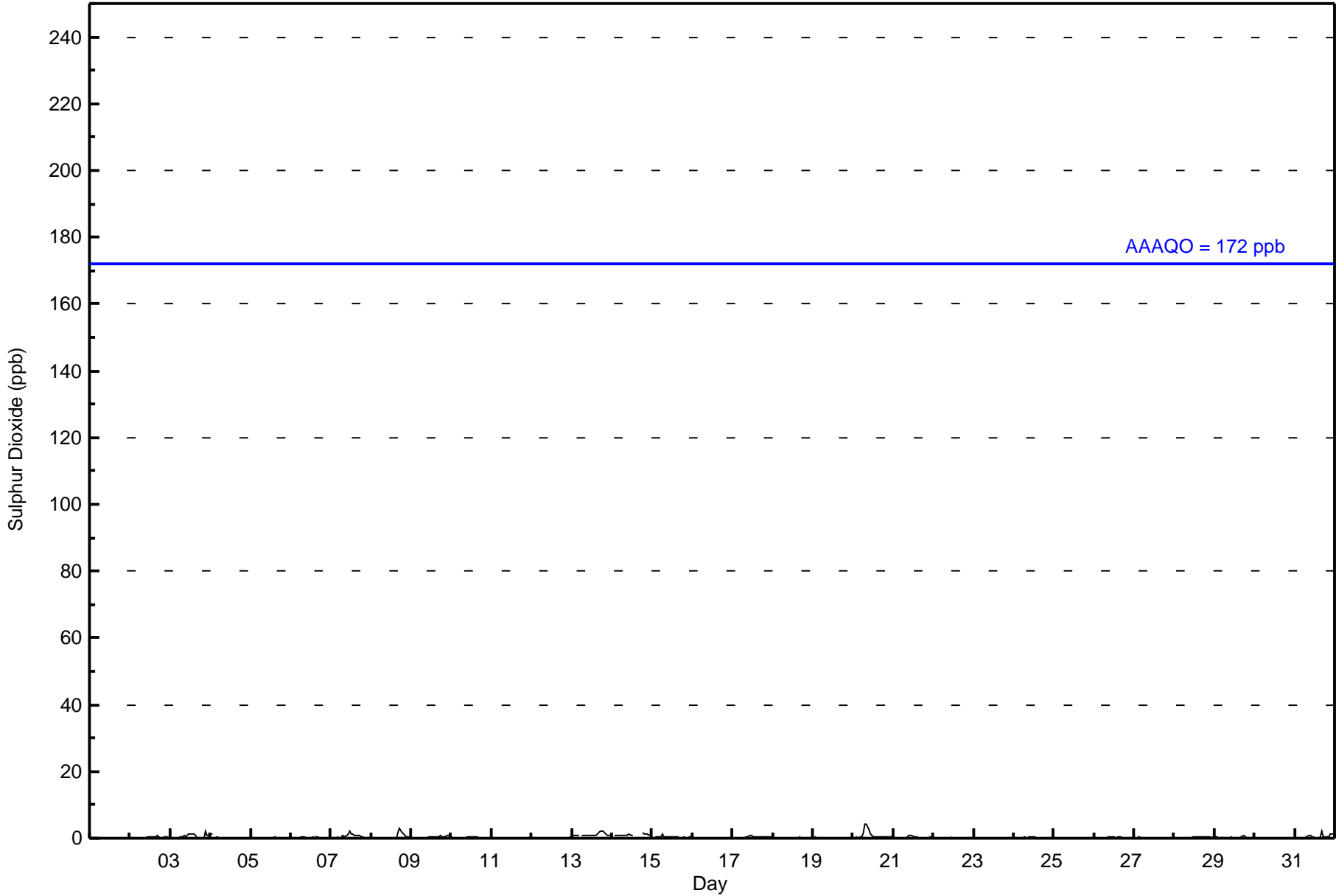
Janvier - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 4 ppb on Mar 20 09:00										Maximum Daily Average: 1.0 ppb on Mar 13										Hours of Data: 706																													
Minimum Value: 0 ppb on Mar 2 05:00										Minimum Daily Average: 0.0 ppb on Mar 25										Hours of Missing Data: 38																													
Maximum Diurnal Average: 0.4 ppb at hour 11										Minimum Diurnal Average: 0.1 ppb at hour 4										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 = 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-Mar	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																							
2-Mar	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0.2	1																							
3-Mar	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	2	1	1	0.6	2																							
4-Mar	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																							
5-Mar	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-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1																							
7-Mar	0	0	0	0	0	Z	0	1	1	1	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0.6	2																							
8-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	1	1	0	0	0	0	0.4	3																							
9-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	0.3	1																								
10-Mar	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																							
11-Mar	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-Mar	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																							
13-Mar	0	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1.0	2																							
14-Mar	Z	1	1	1	1	1	1	1	1	1	1	1	1	C	C	C	C	C	2	1	1	1	1	1	0.9	2																							
15-Mar	0	Z	1	0	0	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
16-Mar	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-Mar	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0.3	1																							
18-Mar	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-Mar	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-Mar	Z	0	0	0	0	0	2	4	4	3	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0.9	4																							
21-Mar	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
22-Mar	0	0	Z	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
23-Mar	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																							
24-Mar	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-Mar	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-Mar	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
27-Mar	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-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1																							
29-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1																							
30-Mar	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																							
31-Mar	0	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	1	2	1	0	1	1	1	1	1	0.5	2																							
																								0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.2	0.3	0.2	0.2	Diurnal Average
																								1	1	1	1	1	1	2	4	4	3	1	2	1	1	1	1	1	2	3	2	2	1	2	1	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
Janvier - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Janvier - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	706	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: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Janvier - March 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	71	136	47	48	29	35	42	58	99	42	20	15	31	19	5	9	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	71	136	47	48	29	35	42	58	99	42	20	15	31	19	5	9	706

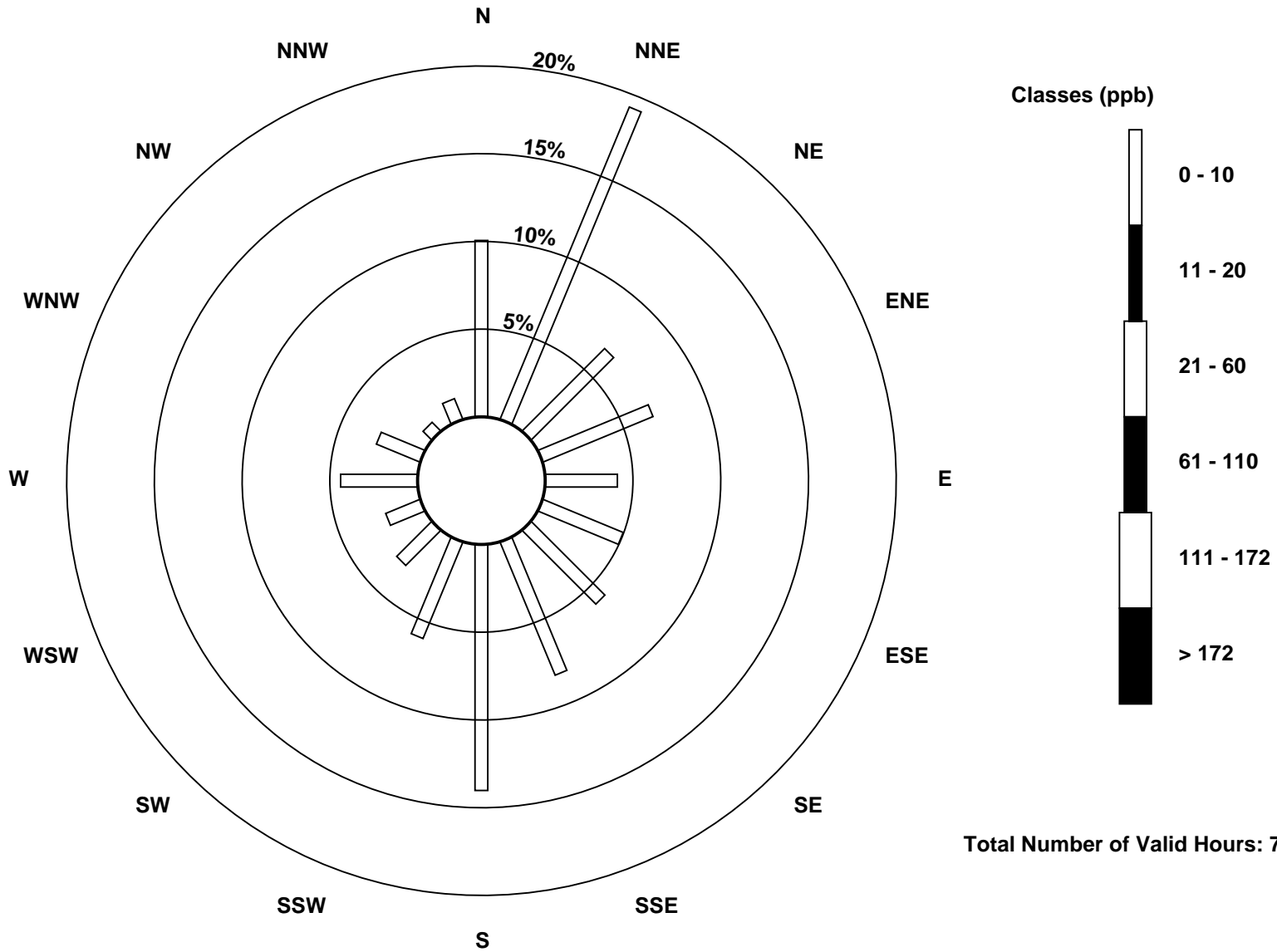
Total Number of Valid Hours: 706

Total Number of Hours: 744

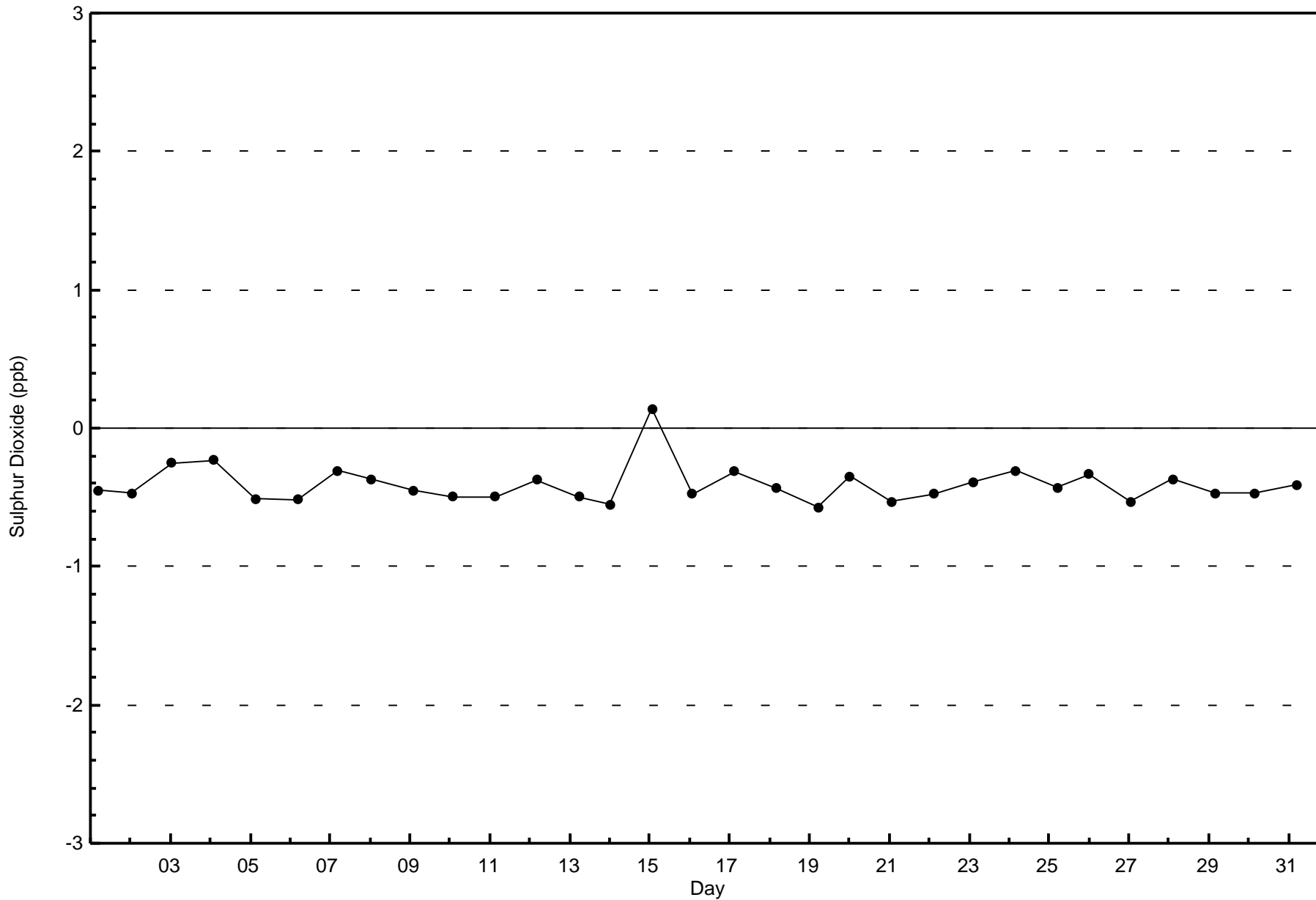


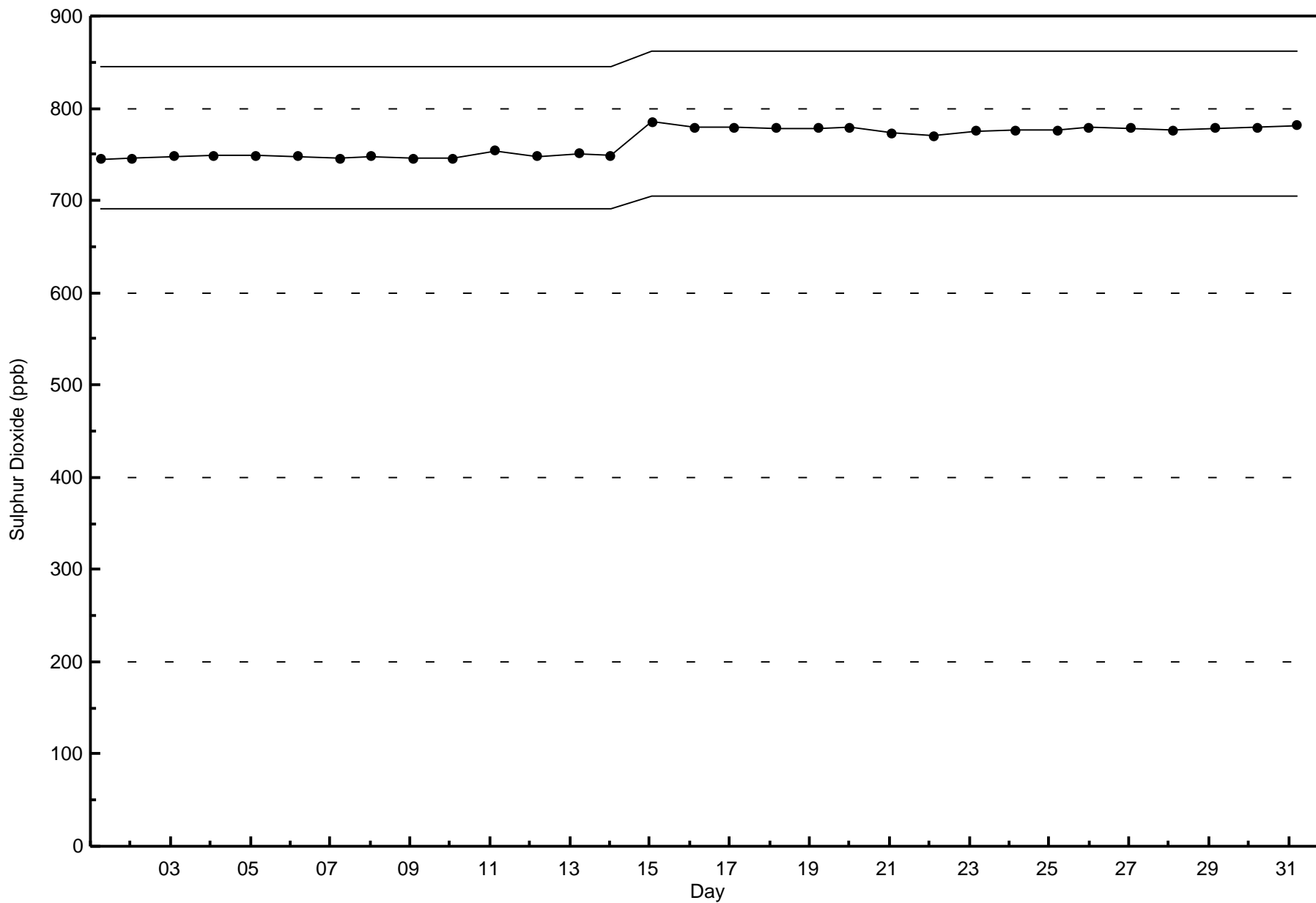
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Sulphur Dioxide (SO₂) - ppb
Janvier (AMS 22)



Total Number of Valid Hours: 706







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

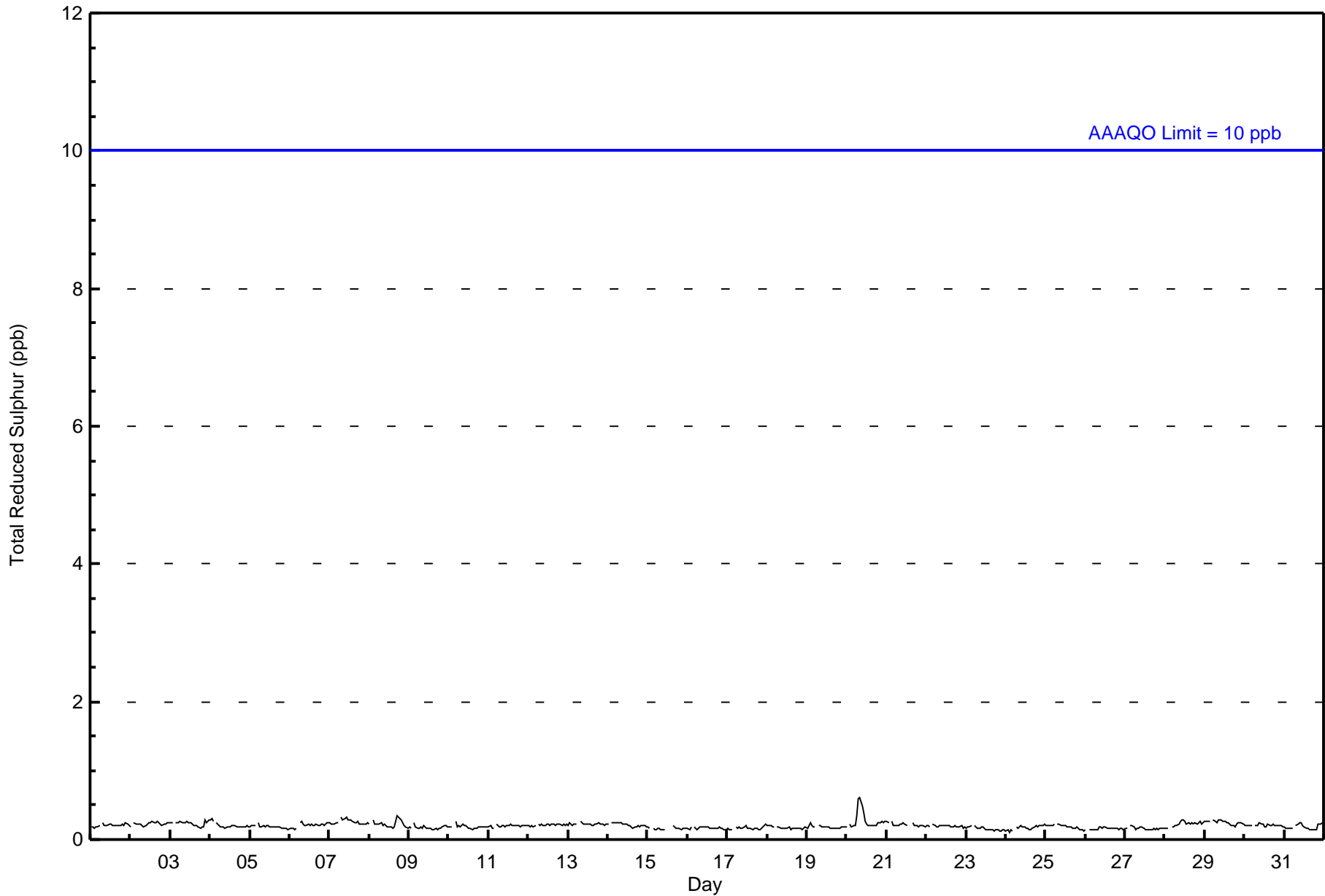
Janvier - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 1 ppb on Mar 20 09:00 Maximum Daily Average: 0.3 ppb on Mar 20																	Hours in Service: 744 Hours of Data: 706										
Minimum Value: 0 ppb on Mar 24 03:00 Minimum Daily Average: 0.2 ppb on Mar 26 Maximum Diurnal Average: 0.2 ppb at hour 8 Minimum Diurnal Average: 0.2 ppb at hour 16 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																	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-Mar	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
2-Mar	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
3-Mar	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
4-Mar	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
5-Mar	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
6-Mar	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
7-Mar	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
8-Mar	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
9-Mar	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
10-Mar	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
11-Mar	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
12-Mar	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
13-Mar	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
14-Mar	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
15-Mar	0	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Mar	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
17-Mar	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
18-Mar	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
19-Mar	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
20-Mar	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	0.3	1
21-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	M	M	M	0	0	0	0	0	0	0	0	0	0.2	0
22-Mar	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
23-Mar	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
24-Mar	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
25-Mar	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
26-Mar	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
27-Mar	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
28-Mar	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
29-Mar	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
30-Mar	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
31-Mar	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
0.2 0.2																								Diurnal Average			
0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 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 - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Janvier - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	706	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: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Janvier - March 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	74	136	47	48	32	34	43	55	98	45	17	16	28	19	5	9	706
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	74	136	47	48	32	34	43	55	98	45	17	16	28	19	5	9	706

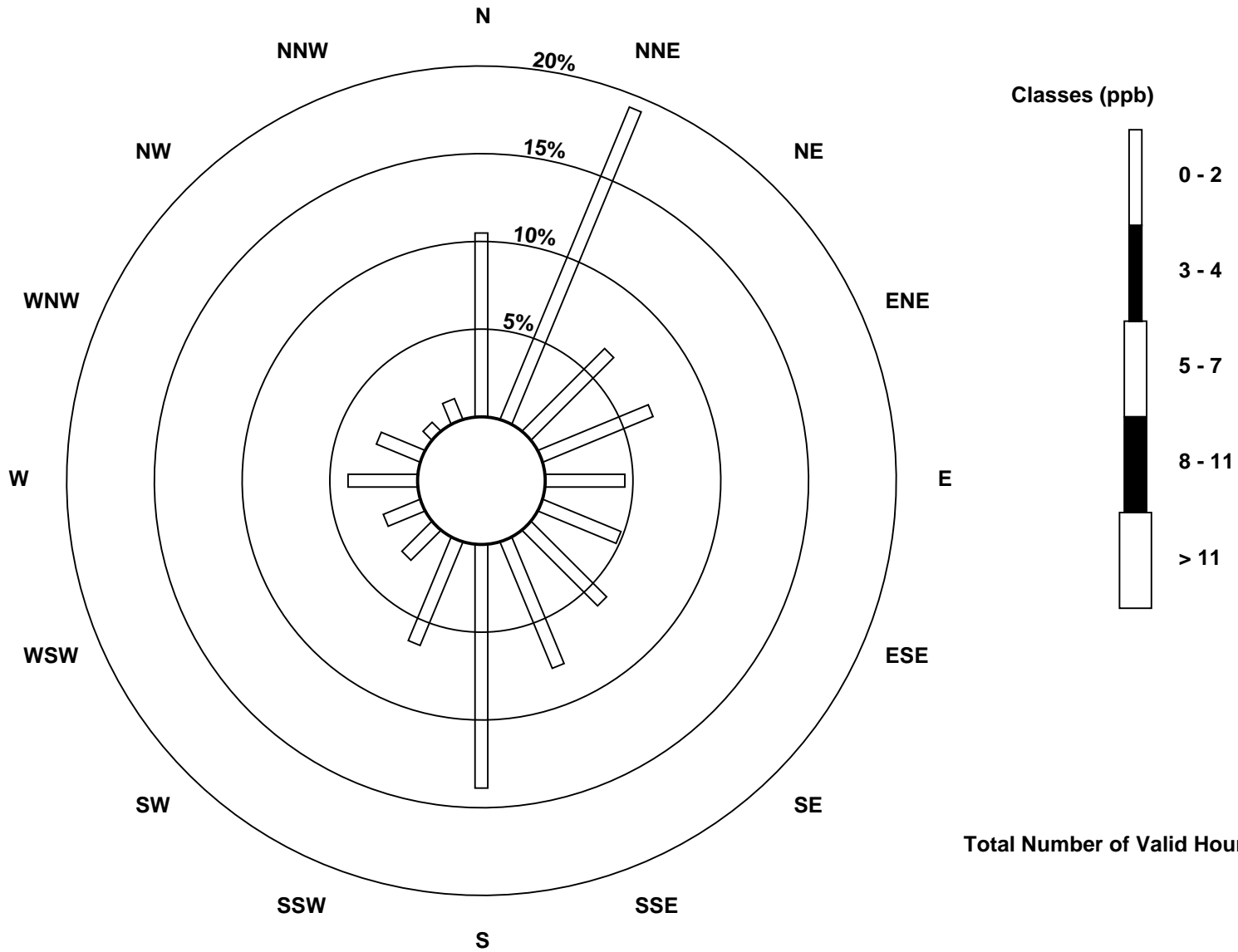
Total Number of Valid Hours: 706

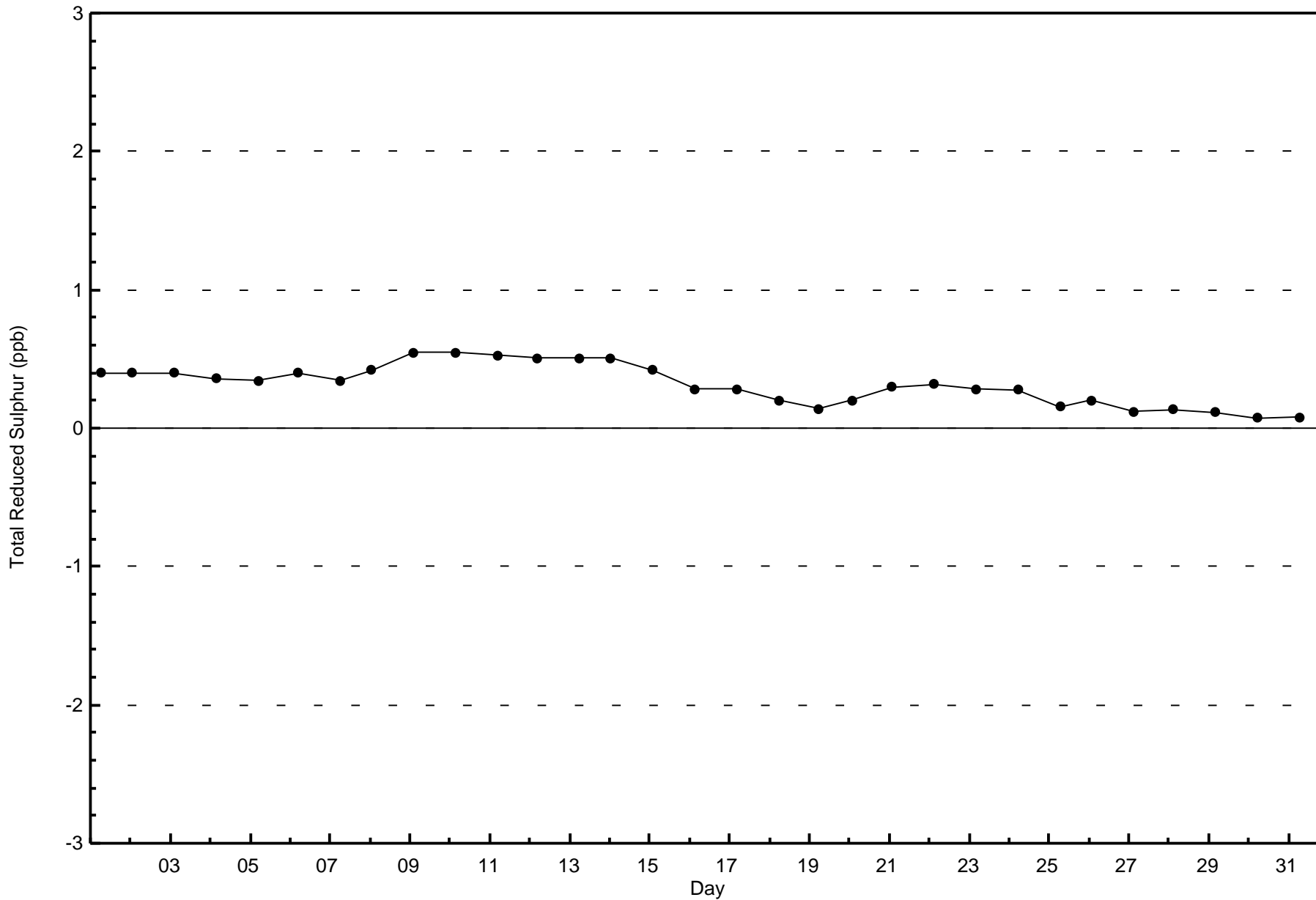
Total Number of Hours: 744

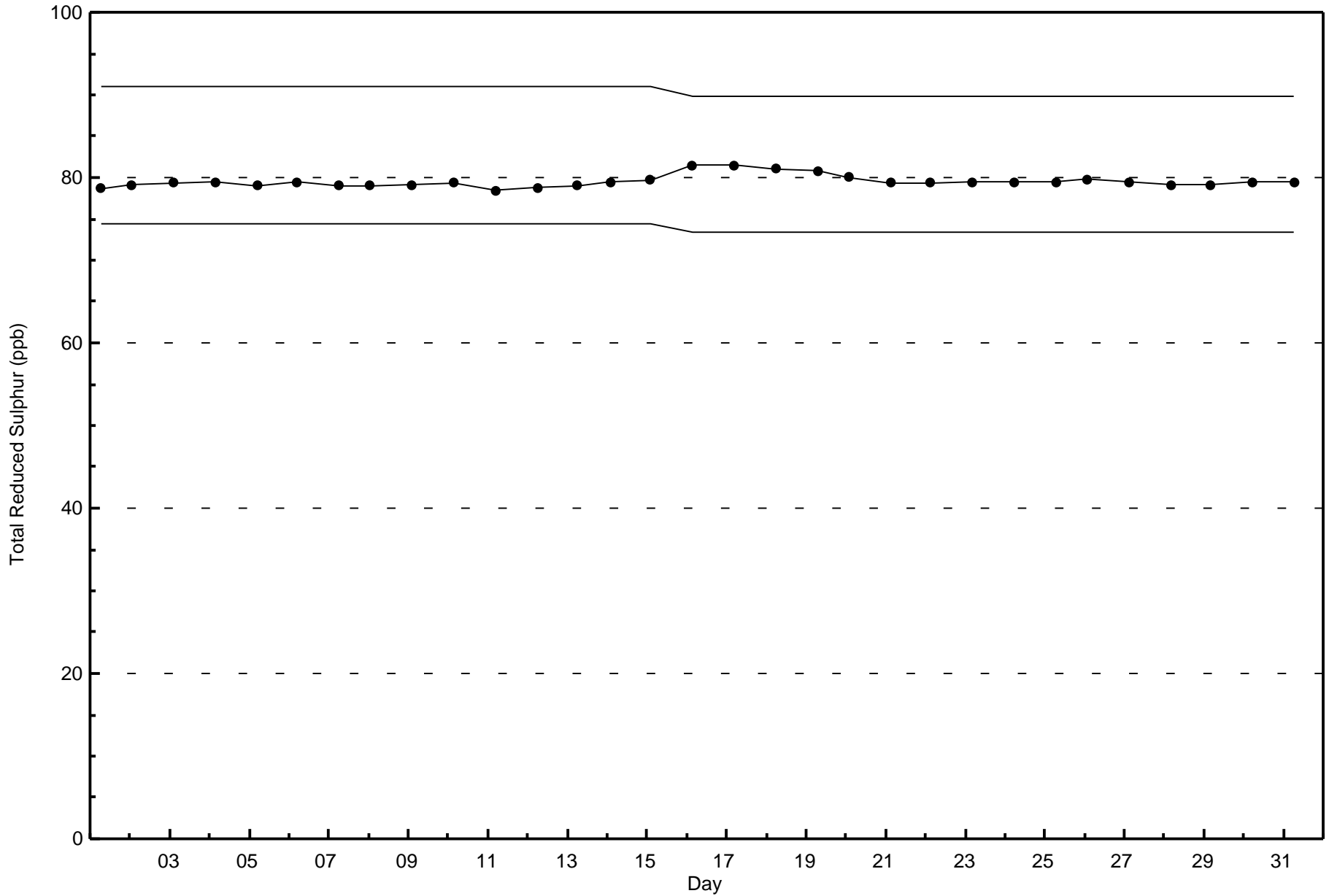


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Reduced Sulphur (TRS) - ppb
Janvier (AMS 22)







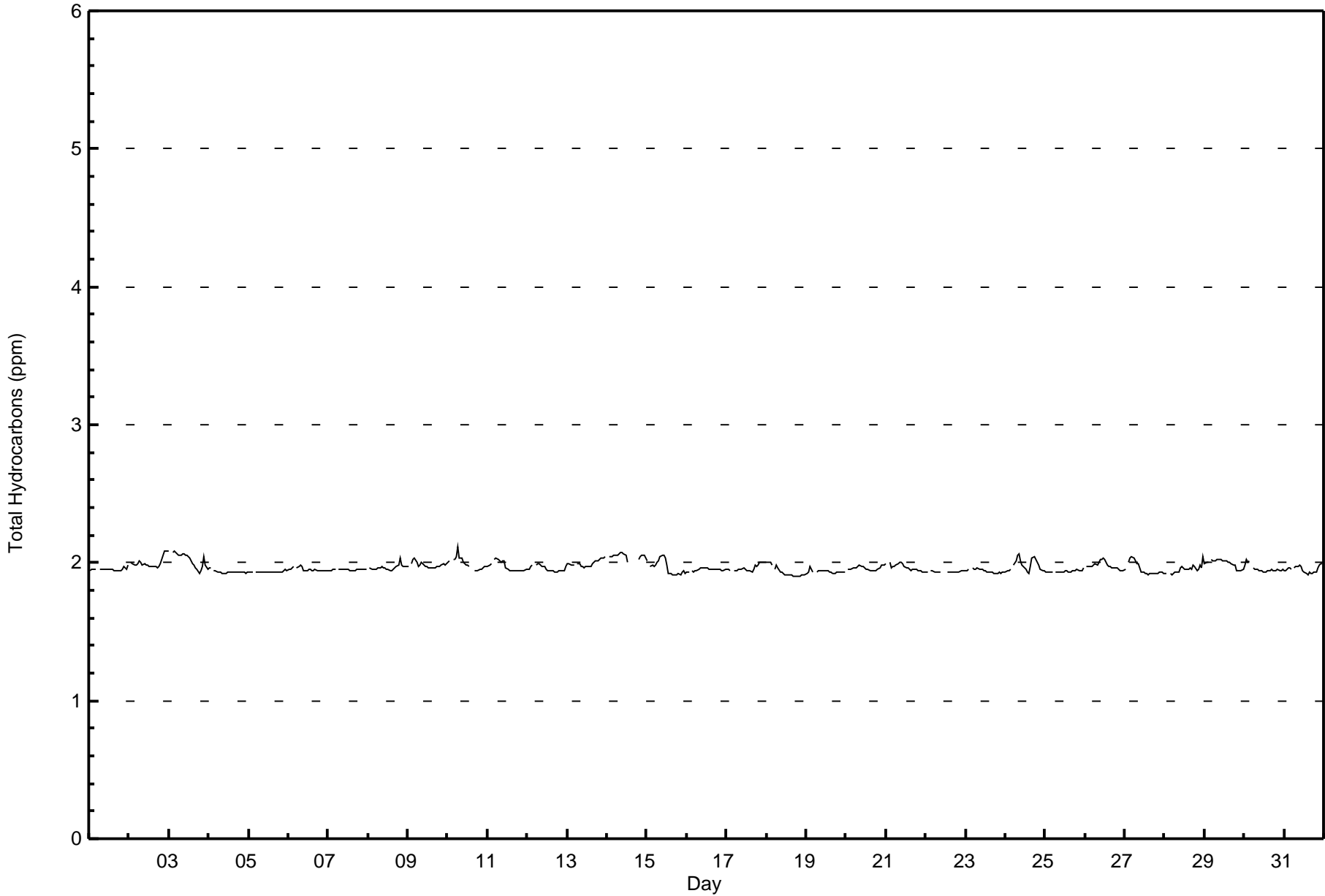


Maximum Value: 2.1 ppm on Mar 10 07:00																				Maximum Daily Average: 2.0 ppm on Mar 3					Hours in Service: 744			
Minimum Value: 1.9 ppm on Mar 18 20:00																				Minimum Daily Average: 1.9 ppm on Mar 4					Hours of Data: 702			
Maximum Diurnal Average: 2.0 ppm at hour 9																				Minimum Diurnal Average: 1.9 ppm at hour 15					Hours of Missing Data: 42			
Monthly Average: 1.96 ppm																				Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.0 P ₉₀ = 2.0 P ₉₉ = 2.1					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-Mar	1.9	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	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-Mar	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	2.1	2.1	2.1	2.1	2.1	2.0	2.1
3-Mar	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
4-Mar	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	1.9	1.9	1.9	1.9	2.0
5-Mar	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	1.9
6-Mar	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	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	2.0	2.0
7-Mar	1.9	1.9	1.9	1.9	2.0	Z	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	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0
8-Mar	Z	2.0	2.0	1.9	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
9-Mar	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	2.0	2.0	2.0	2.0
10-Mar	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	M	M	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
11-Mar	2.0	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
12-Mar	1.9	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	1.9	1.9	1.9	1.9	1.9	2.0	2.0
13-Mar	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	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
14-Mar	Z	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	C	C	C	C	C	C	C	2.0	2.0	2.1	2.1	2.0	--	2.1	
15-Mar	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	1.9	2.0	2.1
16-Mar	1.9	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0
17-Mar	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	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	2.0	2.0	2.0	2.0	2.0	2.0
18-Mar	2.0	2.0	2.0	2.0	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	1.9	1.9	1.9	1.9	2.0
19-Mar	1.9	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	1.9	1.9	1.9	2.0
20-Mar	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	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
21-Mar	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	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	2.0
22-Mar	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	M	M	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
23-Mar	1.9	1.9	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	1.9	1.9	1.9	1.9	2.0
24-Mar	1.9	1.9	1.9	2.0	Z	2.0	2.0	2.1	2.1	2.0	2.0	2.0	1.9	1.9	2.0	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
25-Mar	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	1.9	2.0	2.0
26-Mar	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	1.9	1.9	1.9	1.9	2.0	2.0
27-Mar	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
28-Mar	1.9	1.9	Z	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	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0
29-Mar	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	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0
30-Mar	2.0	2.0	2.0	2.0	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	2.0
31-Mar	1.9	1.9	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	2.0
																								Diurnal Average				
																								Diurnal Maximum				
Z - zerospan C - Calibration M - Maintenance																												



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Janvier - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Janvier - March 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	674	96.01	96.01
2.1 - 3.0	28	3.99	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Janvier - March 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	71	135	44	47	31	35	41	53	90	33	18	14	31	18	5	8	674
2.1 - 3.0	0	0	0	0	0	0	1	4	9	9	2	1	0	1	0	1	28
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	71	135	44	47	31	35	42	57	99	42	20	15	31	19	5	9	702

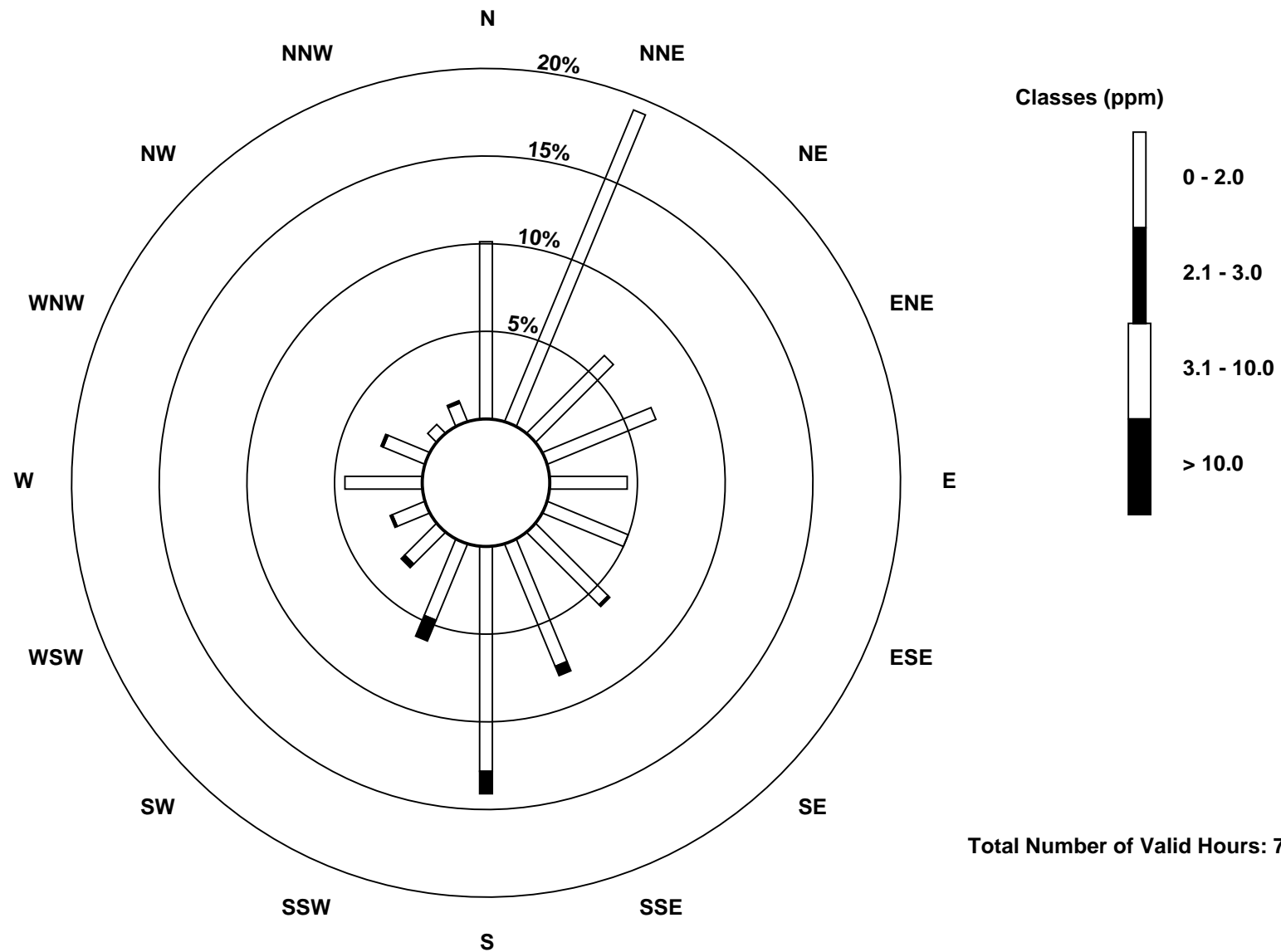
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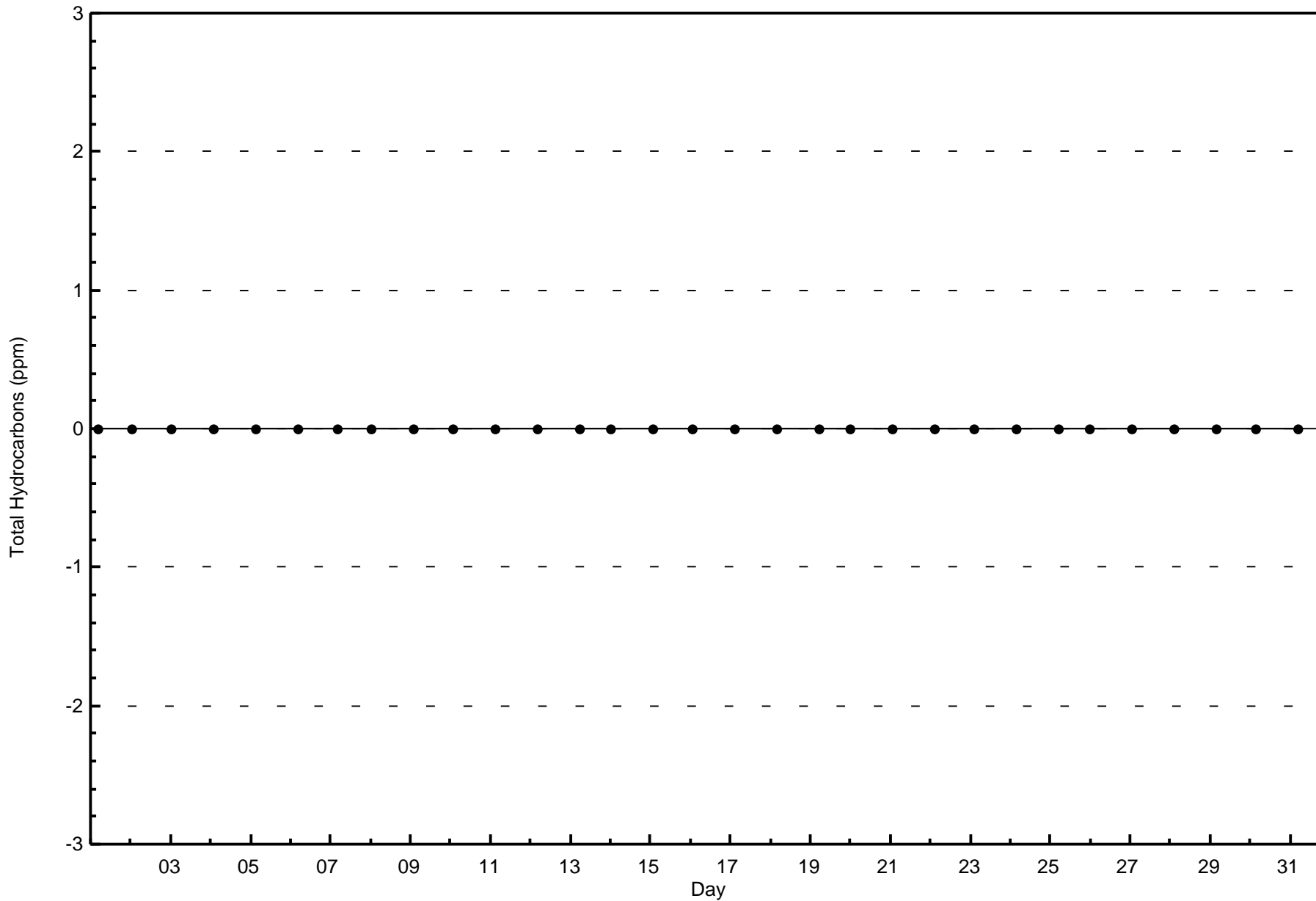
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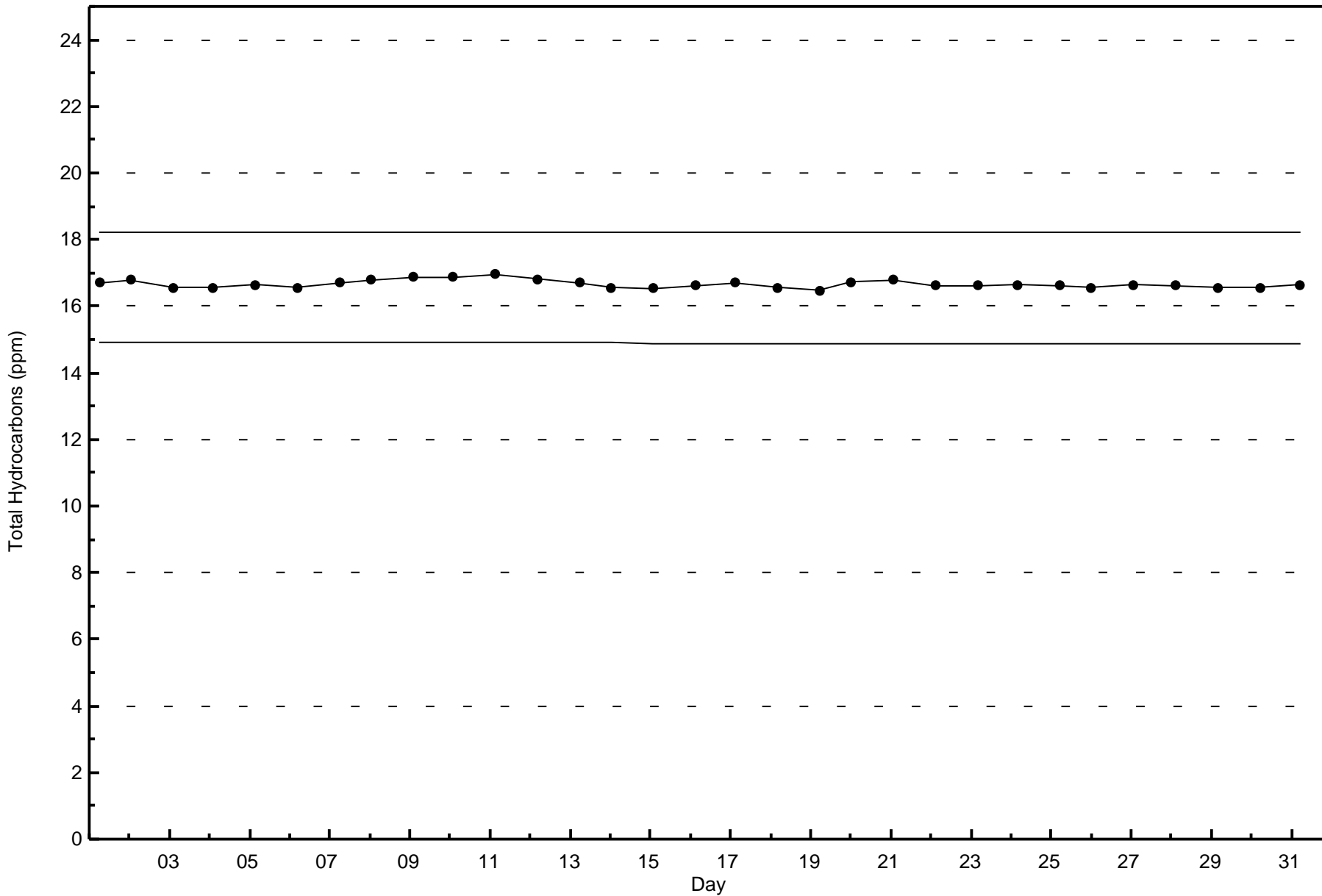


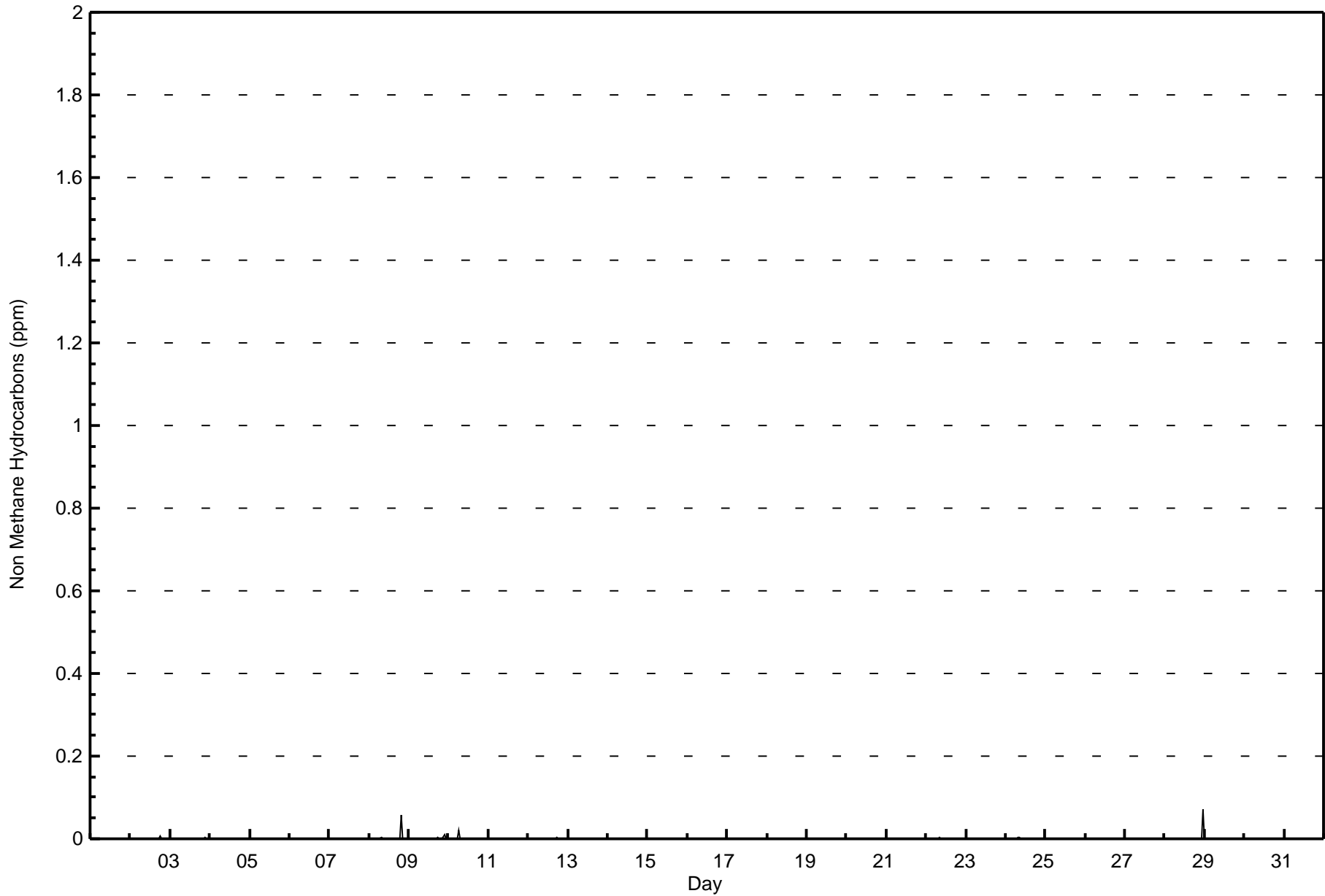
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Total Hydrocarbons (THC) - ppm
Janvier (AMS 22)











**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Janvier - March 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	697	99.29	99.29
0.006 - 0.05	3	0.43	99.72
0.06 - 0.1	2	0.28	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Janvier - March 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	71	135	44	47	31	33	41	57	98	42	20	15	31	19	5	8	697
0.006 - 0.05	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	3
0.06 - 0.1	0	0	0	0	0	1	0	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	71	135	44	47	31	35	42	57	99	42	20	15	31	19	5	9	702

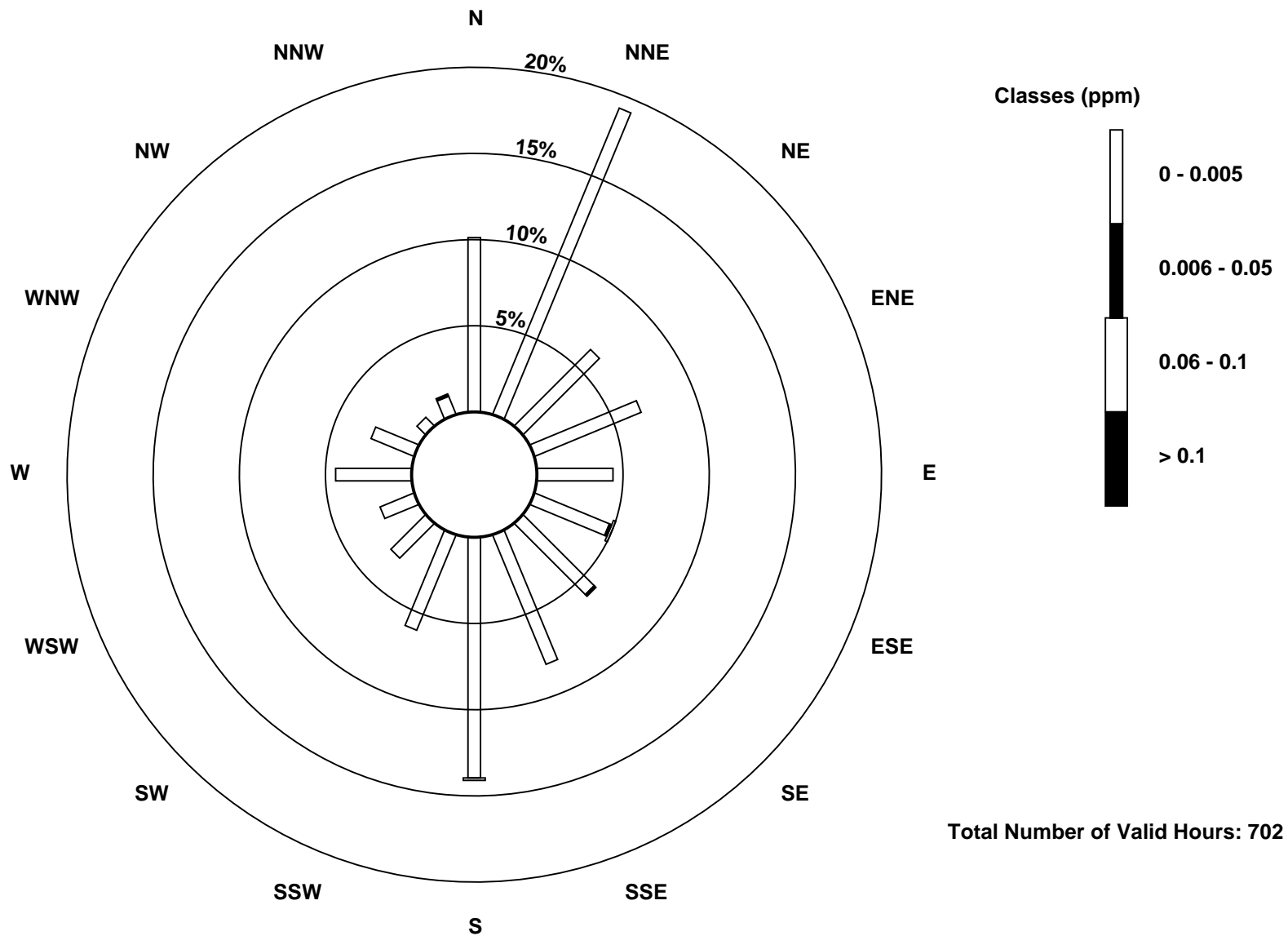
Total Number of Valid Hours: 702

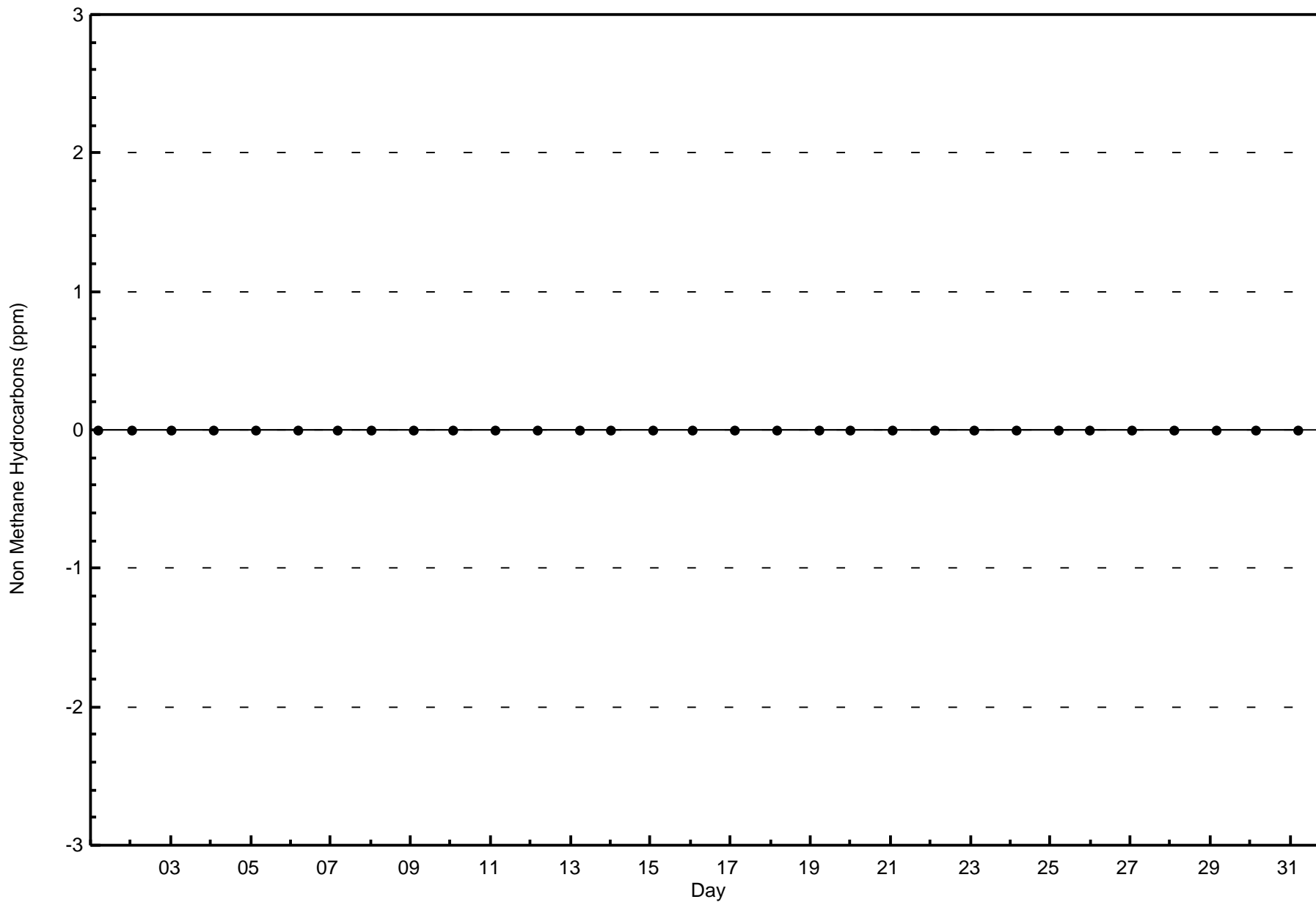
Total Number of Hours: 744

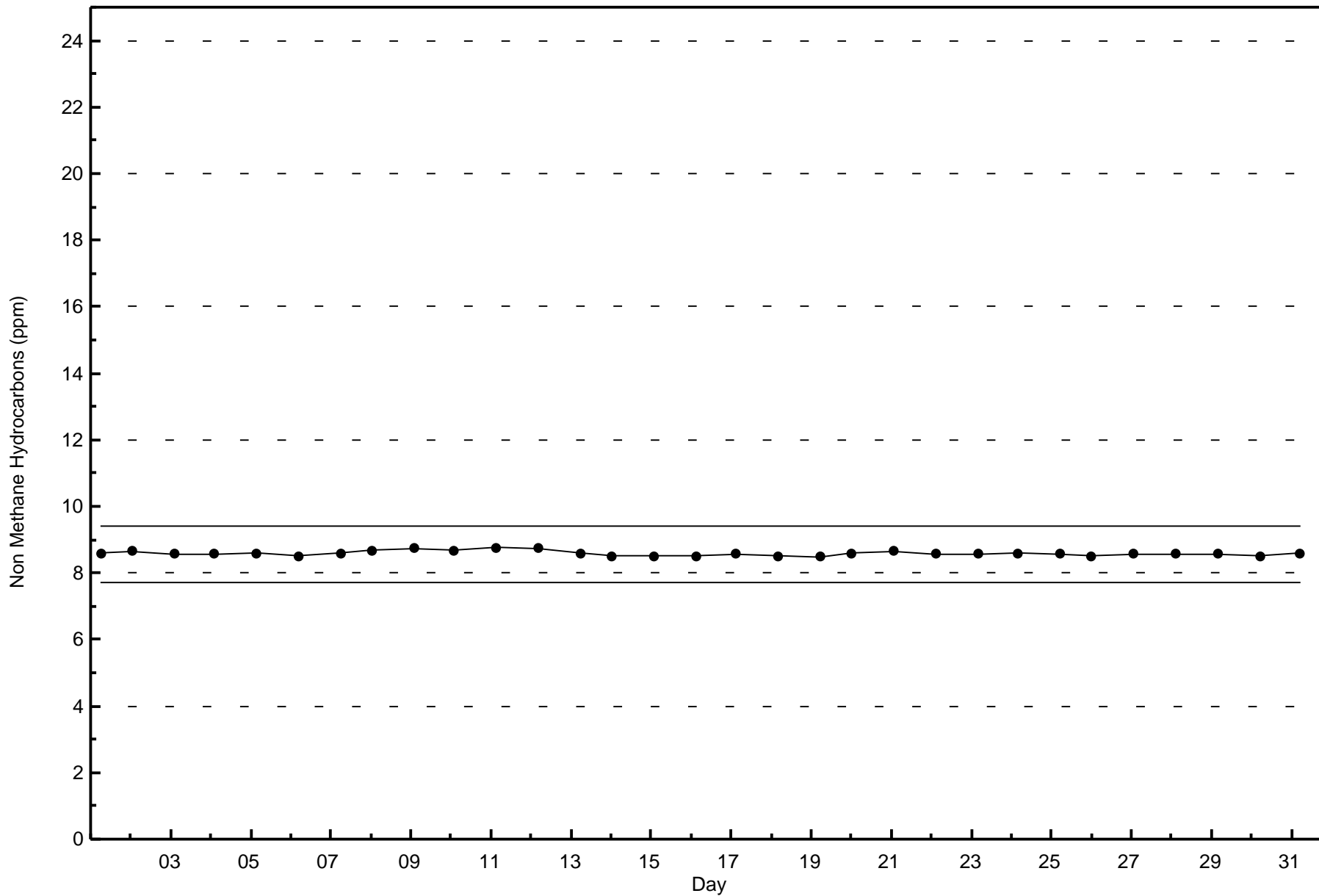


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Non Methane Hydrocarbons (NMHC) - ppm
Janvier (AMS 22)









Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

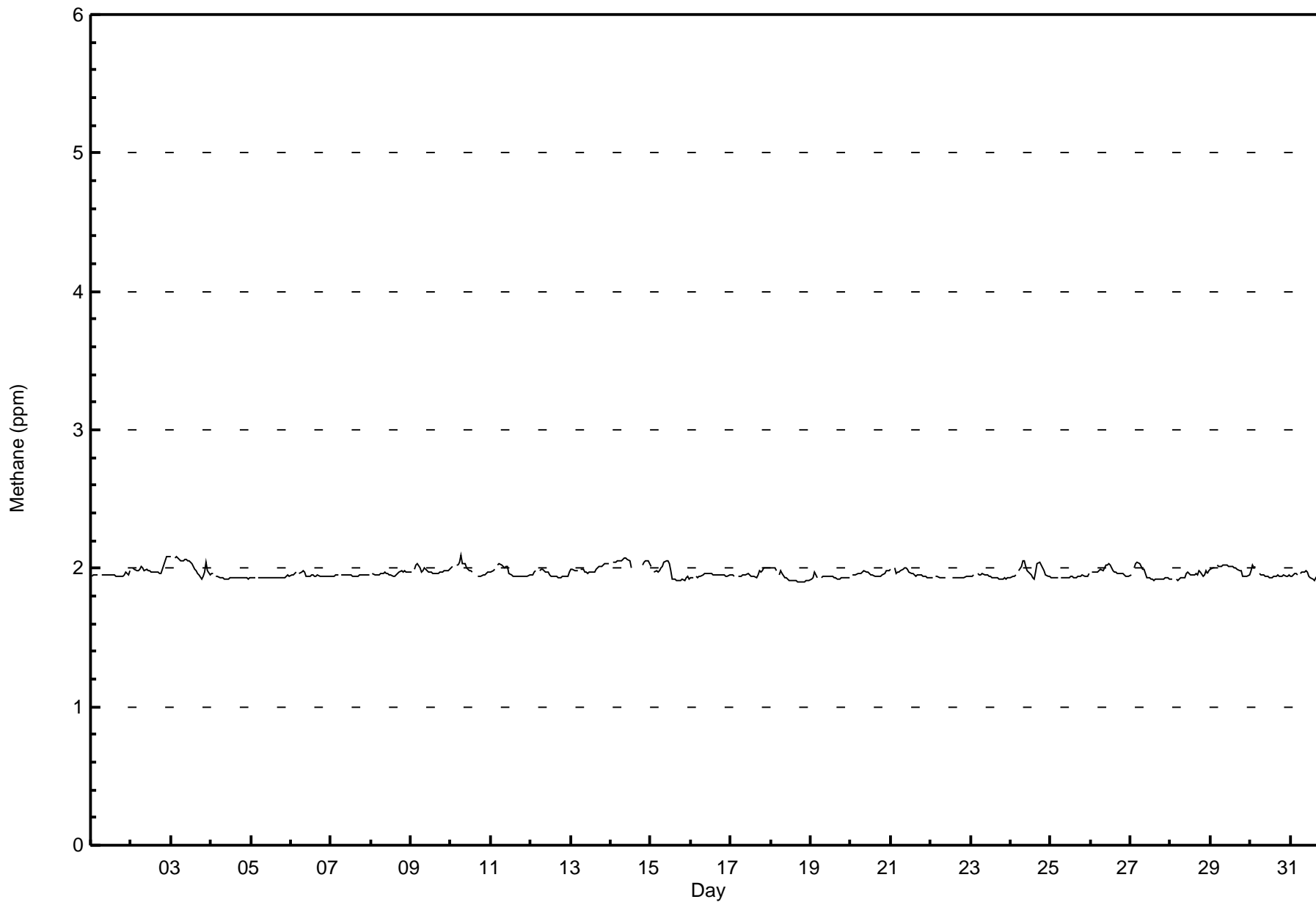
Janvier - March 2017

Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0	Hours in Service: 744																		Daily Average		Daily Maximum																											
Maximum Value: 2.1 ppm on Mar 10 07:00		Maximum Daily Average: 2.0 ppm on Mar 3																		Hours of Data: 702		Hours of Missing Data: 42																													
Minimum Value: 1.9 ppm on Mar 18 20:00		Minimum Daily Average: 1.9 ppm on Mar 4																		Hours of Calibration: 37		Percent Operational Time: 99.3																													
Maximum Diurnal Average: 2.0 ppm at hour 9		Minimum Diurnal Average: 1.9 ppm at hour 15																																																	
Monthly Average: 1.96 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.0 P ₉₀ = 2.0 P ₉₉ = 2.1																																																	
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-Mar	1.9	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	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-Mar	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	2.1	2.1	2.1	2.1	2.1	2.0	2.1																								
3-Mar	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1																								
4-Mar	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	1.9	1.9	1.9	2.0																								
5-Mar	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																								
6-Mar	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	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	2.0																								
7-Mar	1.9	1.9	1.9	1.9	2.0	Z	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0																								
8-Mar	Z	2.0	2.0	1.9	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																								
9-Mar	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	2.0	2.0	2.0																								
10-Mar	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	M	M	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1																								
11-Mar	2.0	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0																								
12-Mar	1.9	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	1.9	1.9	1.9	2.0	2.0																									
13-Mar	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	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																								
14-Mar	Z	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	C	C	C	C	C	C	C	2.0	2.0	2.1	2.0	2.0	--	2.1																								
15-Mar	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	1.9	2.0																								
16-Mar	1.9	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0																								
17-Mar	1.9	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	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	2.0	2.0	2.0	2.0	2.0																								
18-Mar	2.0	2.0	2.0	2.0	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	1.9	1.9	1.9	2.0																								
19-Mar	1.9	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	1.9	1.9	2.0																								
20-Mar	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	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																								
21-Mar	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	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																								
22-Mar	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	M	M	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9																								
23-Mar	1.9	1.9	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	1.9	1.9	1.9	2.0																								
24-Mar	1.9	1.9	1.9	2.0	Z	2.0	2.0	2.1	2.1	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.1																								
25-Mar	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	2.0	2.0																								
26-Mar	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	1.9	1.9	1.9	1.9	2.0																								
27-Mar	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0																								
28-Mar	1.9	1.9	Z	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	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0																								
29-Mar	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	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0																								
30-Mar	2.0	2.0	2.0	2.0	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	2.0																								
31-Mar	1.9	1.9	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	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	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	Diurnal Average	
																								2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	Diurnal Maximum
Z - zerospan		C - Calibration					M - Maintenance																																												



Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Janvier - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Janvier - March 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	674	96.01	96.01
2.1 - 3.0	28	3.99	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Janvier - March 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	71	135	44	47	31	35	41	53	90	33	18	14	31	18	5	8	674
2.1 - 3.0	0	0	0	0	0	0	1	4	9	9	2	1	0	1	0	1	28
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	71	135	44	47	31	35	42	57	99	42	20	15	31	19	5	9	702

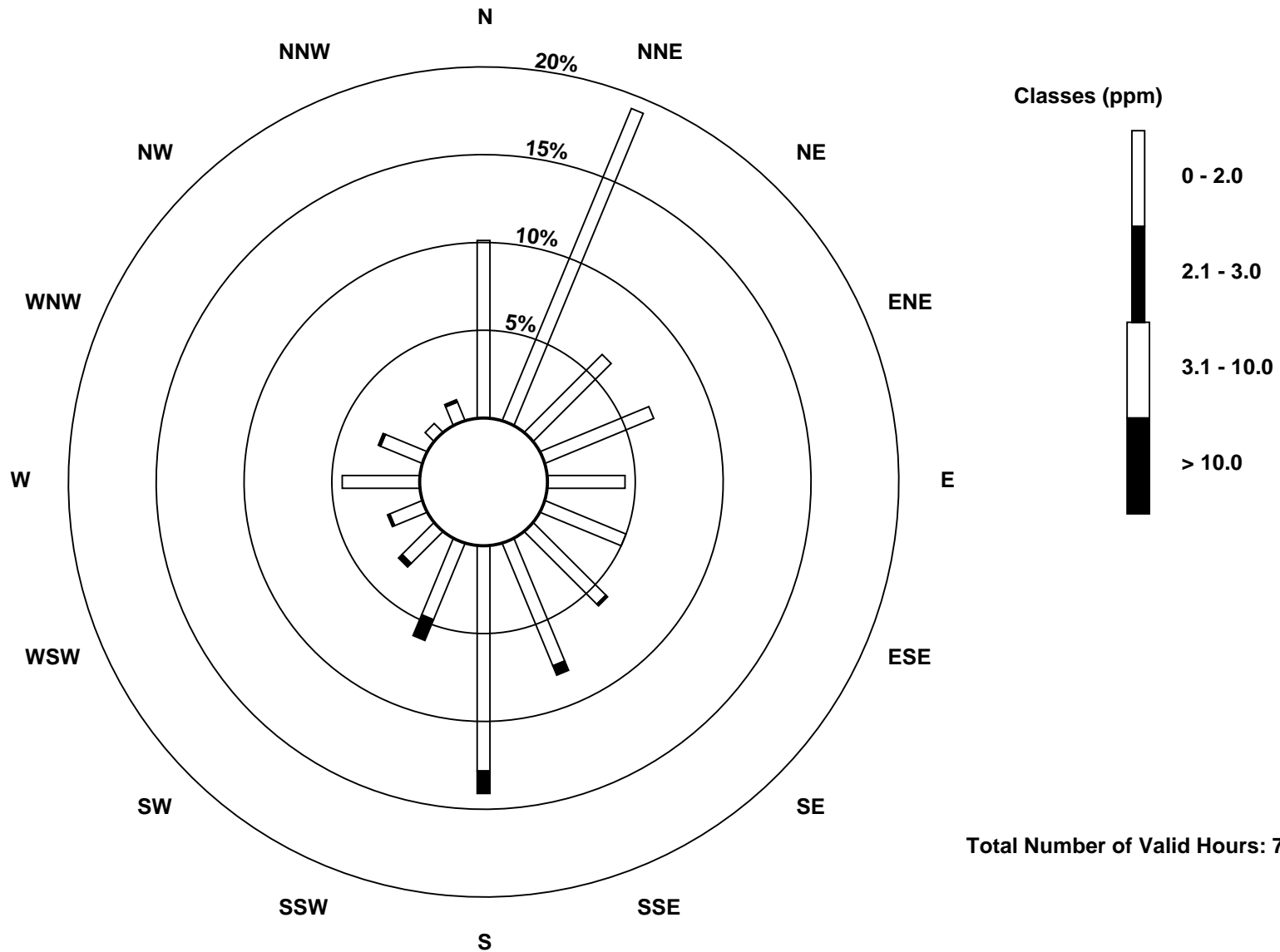
Total Number of Valid Hours: 702

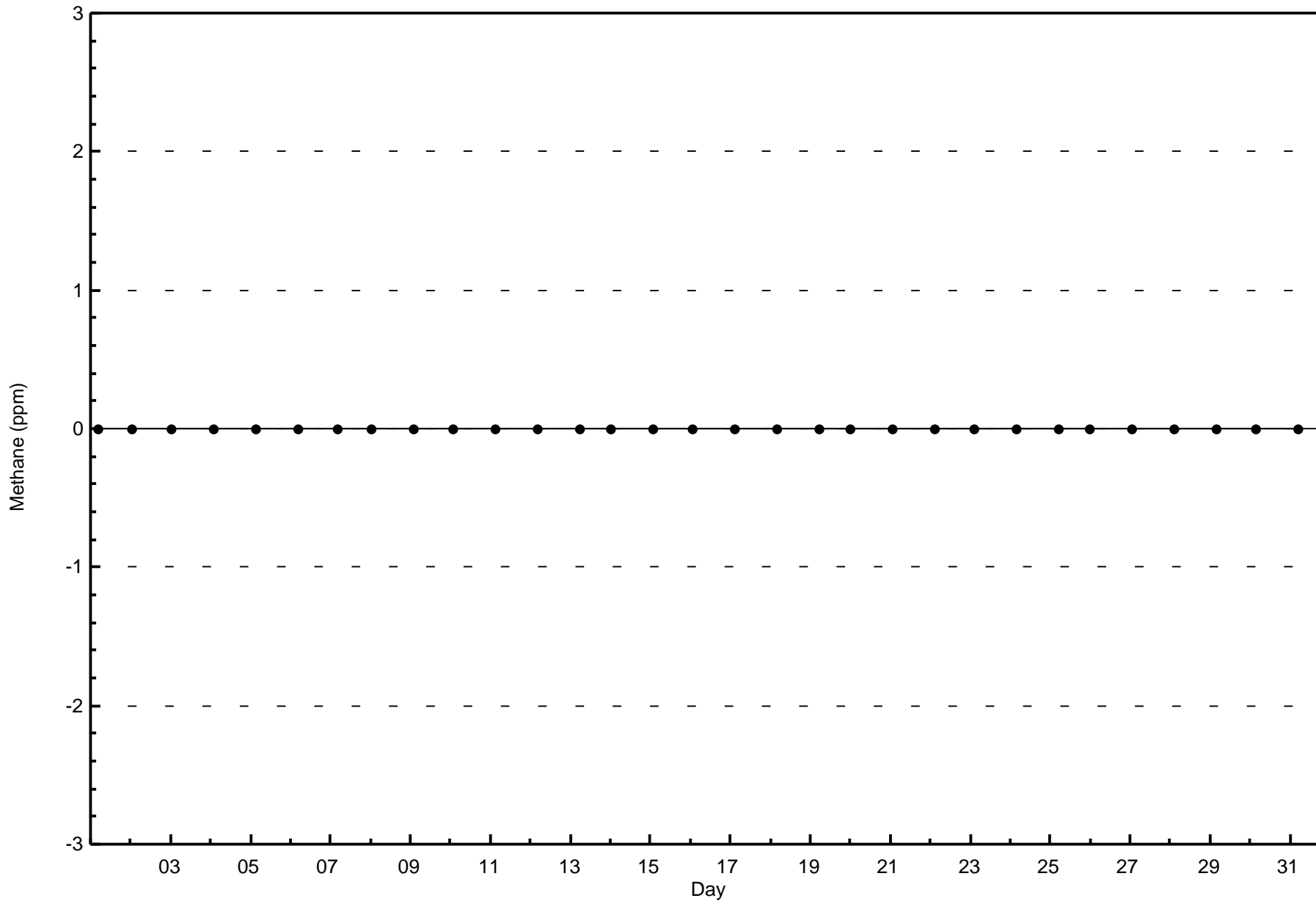
Total Number of Hours: 744

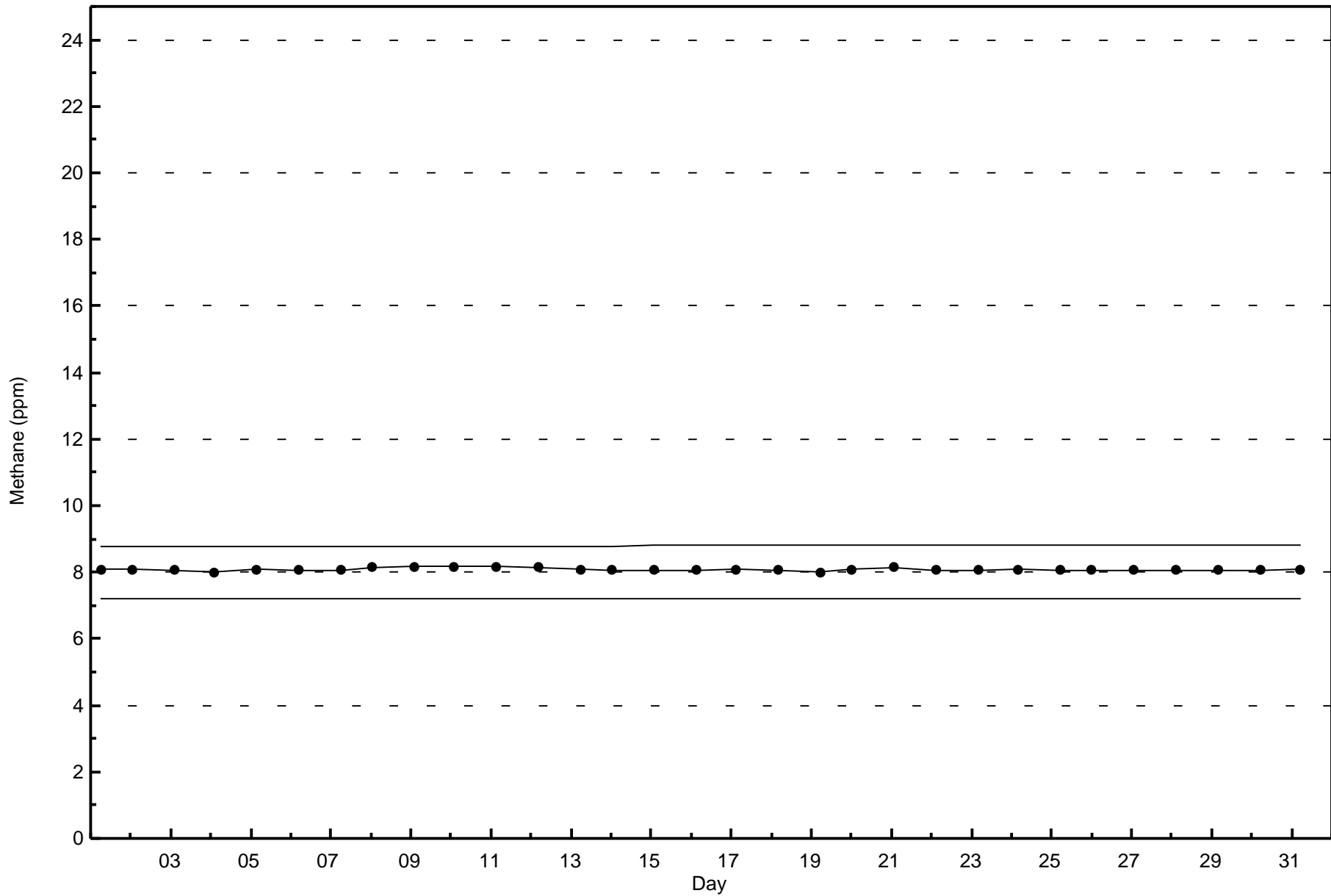


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Methane (CH₄) - ppm
Janvier (AMS 22)









Wood Buffalo Environmental Association
Summary of Hour Averages

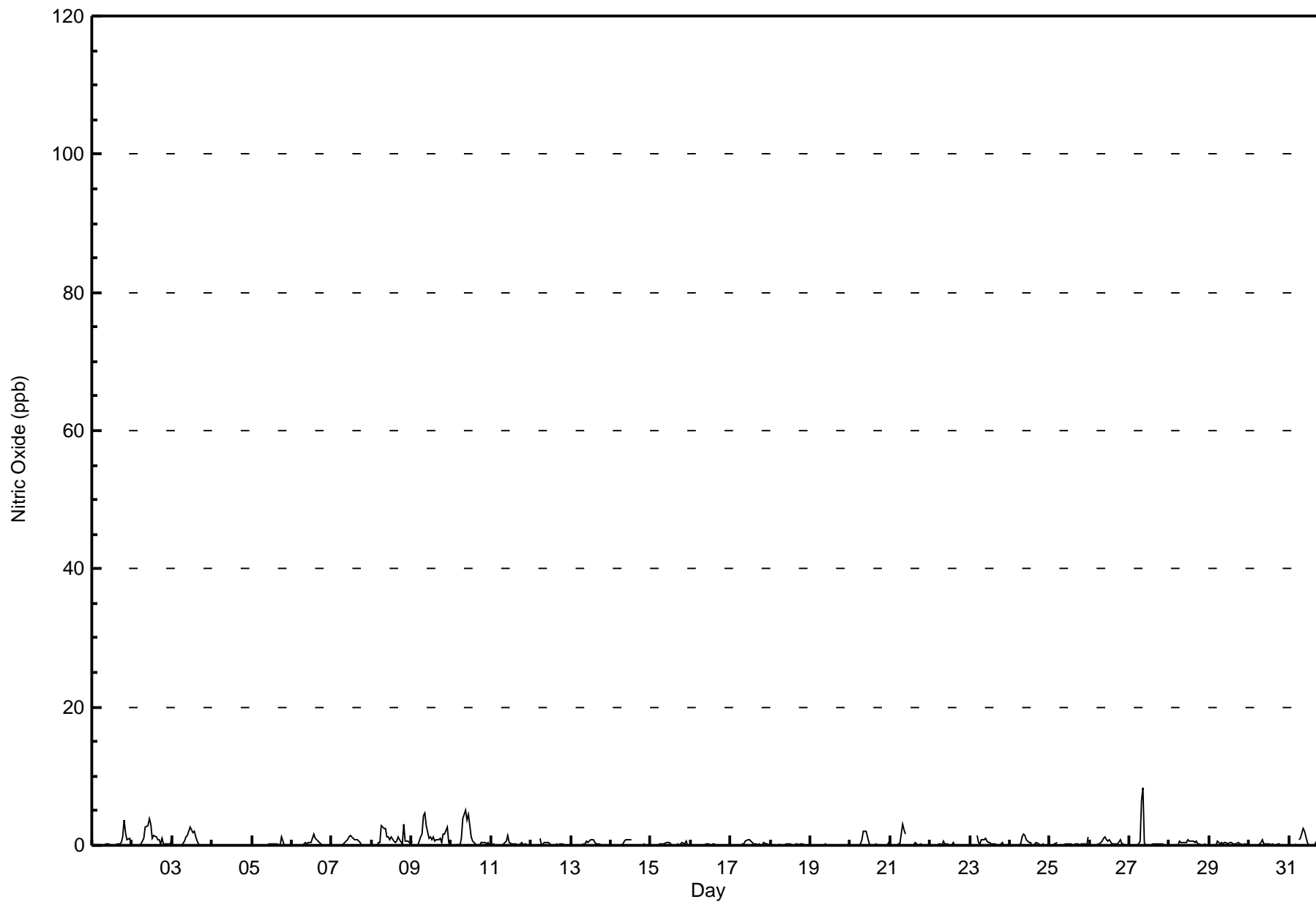
Nitric Oxide (NO) - ppb
Janvier - March 2017

Maximum Value: 8 ppb on Mar 27 09:00		Maximum Daily Average: 1.3 ppb on Mar 9		Hours in Service: 744																							
Minimum Value: 0 ppb on Mar 3 20:00		Minimum Daily Average: 0.0 ppb on Mar 4		Hours of Data: 703																							
Maximum Diurnal Average: 1.3 ppb at hour 9		Minimum Diurnal Average: 0.0 ppb at hour 3		Hours of Missing Data: 41																							
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: 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-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	4	2	1	1	0	0.4	4	
2-Mar	Z	0	0	0	0	0	1	1	3	3	4	3	1	1	1	1	1	0	1	0	0	0	0	0	0.9	4	
3-Mar	1	Z	0	0	0	0	0	1	1	1	2	3	2	2	1	1	0	0	0	0	0	0	0	0	0.7	3	
4-Mar	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	
5-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.1	1	
6-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	1	2	1	1	1	0	0	0	0	0	0	0	0.3	2	
7-Mar	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1	
8-Mar	Z	0	0	0	0	0	3	2	2	1	1	1	1	1	0	1	1	1	0	3	1	1	1	0	1.0	3	
9-Mar	1	Z	0	0	0	1	2	4	5	3	1	1	1	1	1	1	1	1	0	2	2	3	0	0	1.3	5	
10-Mar	0	0	Z	0	0	0	1	4	5	4	4	3	1	1	0	0	0	0	0	0	0	0	0	0	1.1	5	
11-Mar	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	
12-Mar	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	
13-Mar	0	0	0	0	0	Z	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1	
14-Mar	Z	0	0	0	0	0	0	1	1	1	1	1	C	C	C	C	C	C	0	0	0	0	0	0	--	1	
15-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1	
16-Mar	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-Mar	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
18-Mar	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-Mar	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	
20-Mar	Z	0	0	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2	
21-Mar	1	Z	0	0	0	0	0	3	2	2	M	M	M	M	0	0	0	0	0	0	0	0	0	0	0.5	3	
22-Mar	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
23-Mar	0	0	0	Z	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
24-Mar	0	0	0	0	Z	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2	
25-Mar	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	
26-Mar	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0.3	1	
27-Mar	0	Z	0	0	0	0	1	7	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	8	
28-Mar	0	0	Z	0	0	0	1	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0.3	1	
29-Mar	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
30-Mar	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
31-Mar	0	0	0	0	0	Z	1	1	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3	
		0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.9	1.3	0.9	0.8	0.7	0.5	0.4	0.3	0.3	0.3	0.2	0.3	0.4	0.2	0.2	0.1	0.1	Diurnal Average	
		1	0	0	0	1	1	3	7	8	4	4	3	2	2	1	1	1	1	1	1	4	2	3	1	1	Diurnal Maximum
Z - zerospan		C - Calibration				M - Maintenance																					



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Janvier - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Janvier - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	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: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Janvier - March 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	71	136	47	48	31	35	42	54	98	42	20	15	31	19	5	9	703
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	71	136	47	48	31	35	42	54	98	42	20	15	31	19	5	9	703

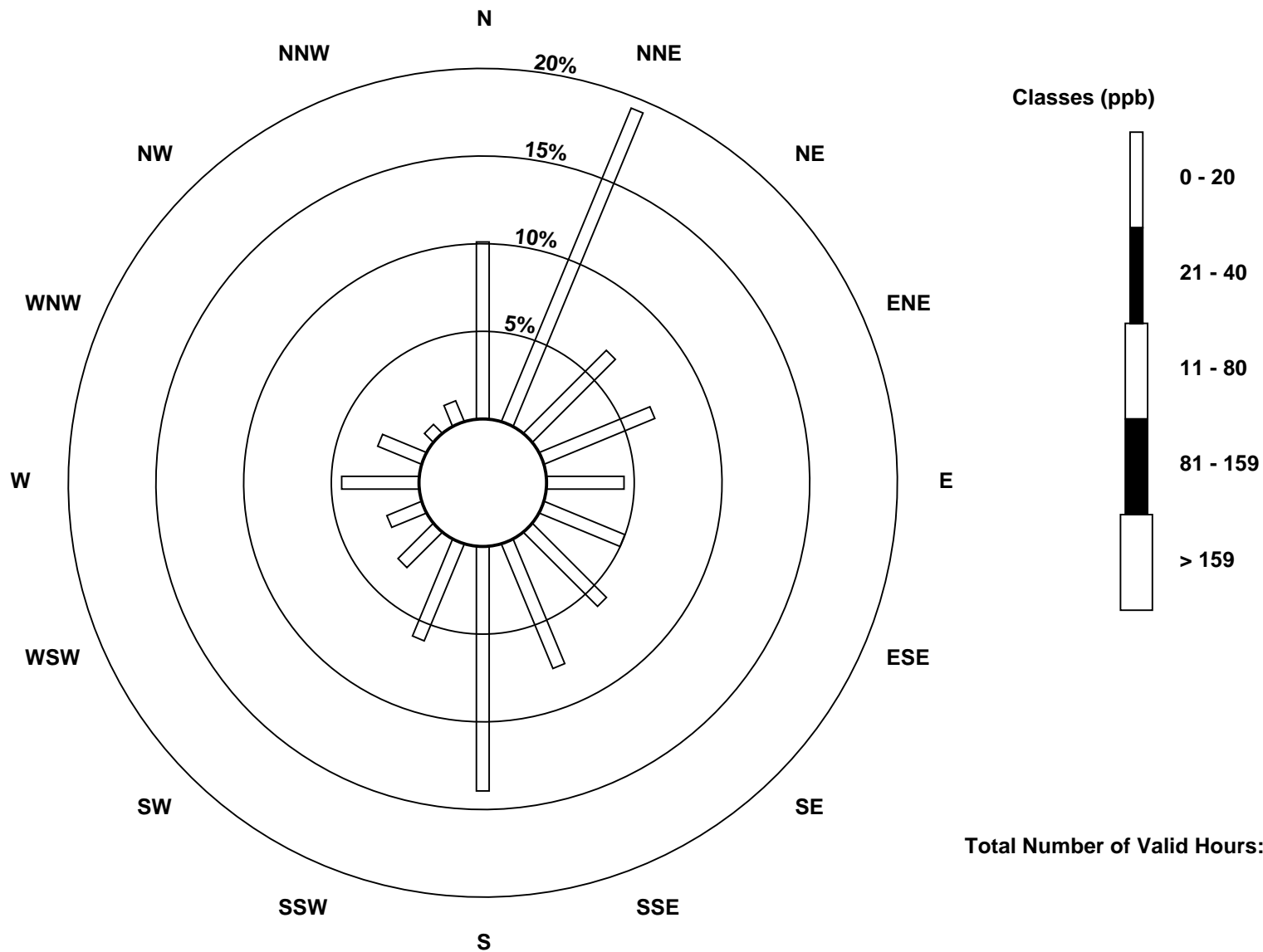
Total Number of Valid Hours: 703

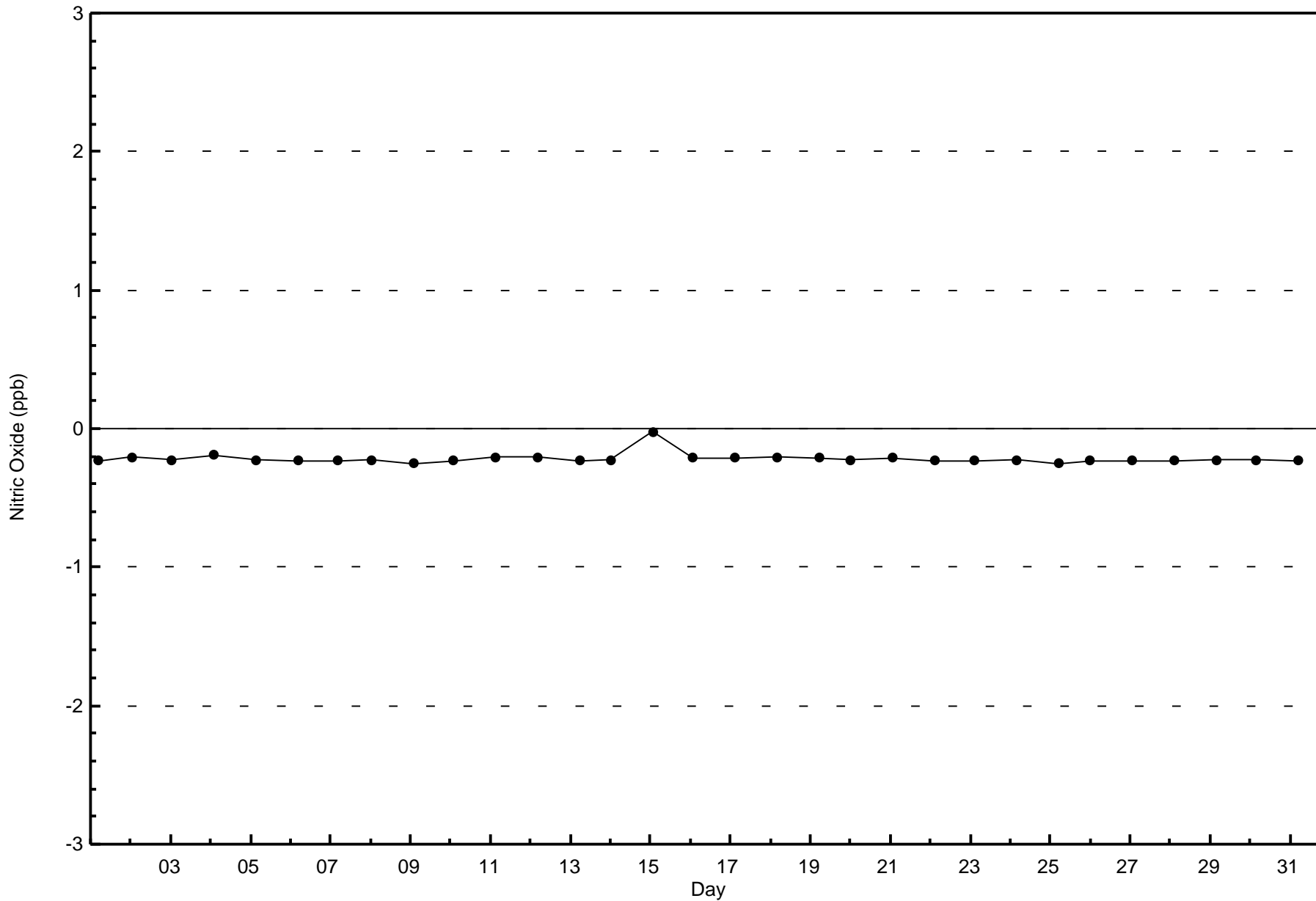
Total Number of Hours: 744

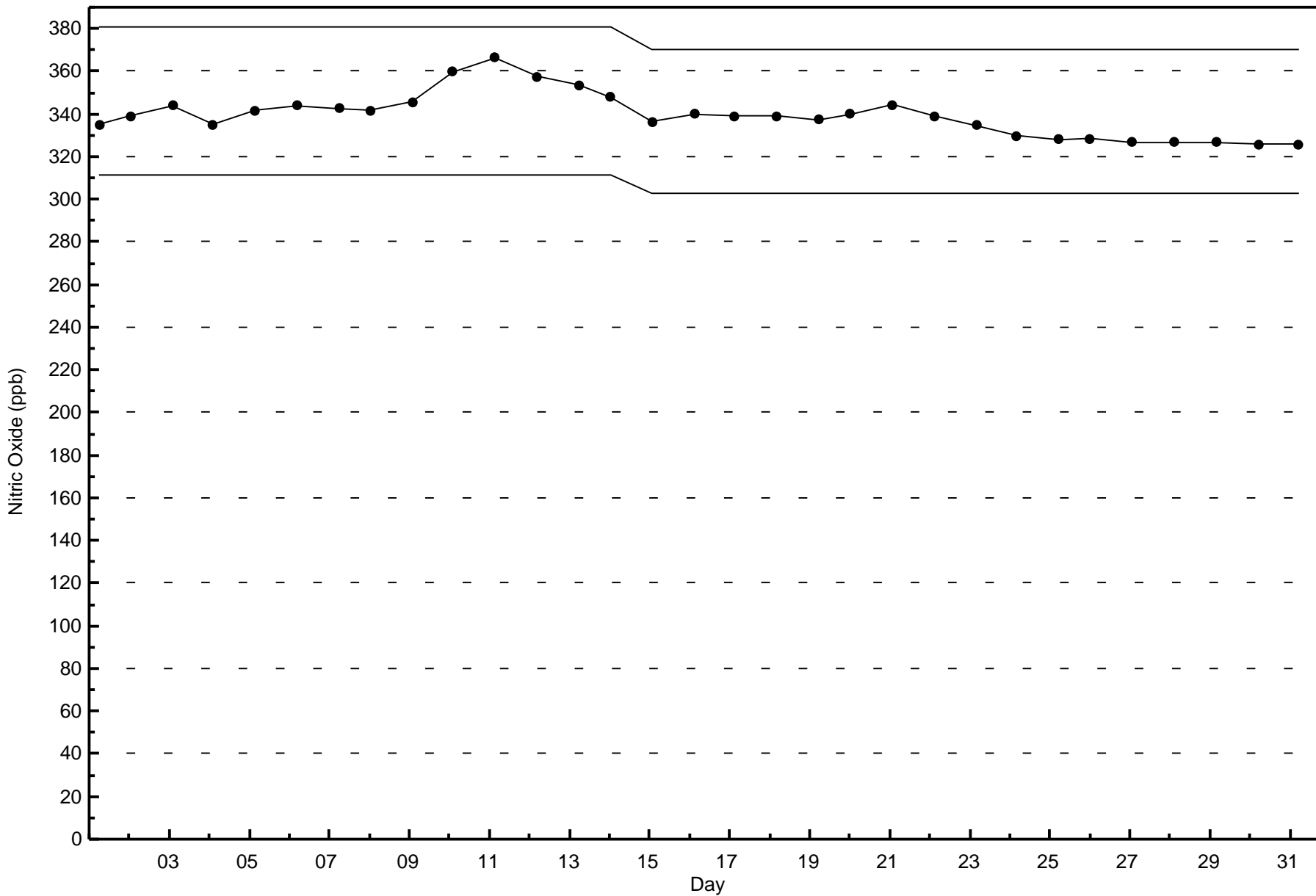


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitric Oxide (NO) - ppb
Janvier (AMS 22)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

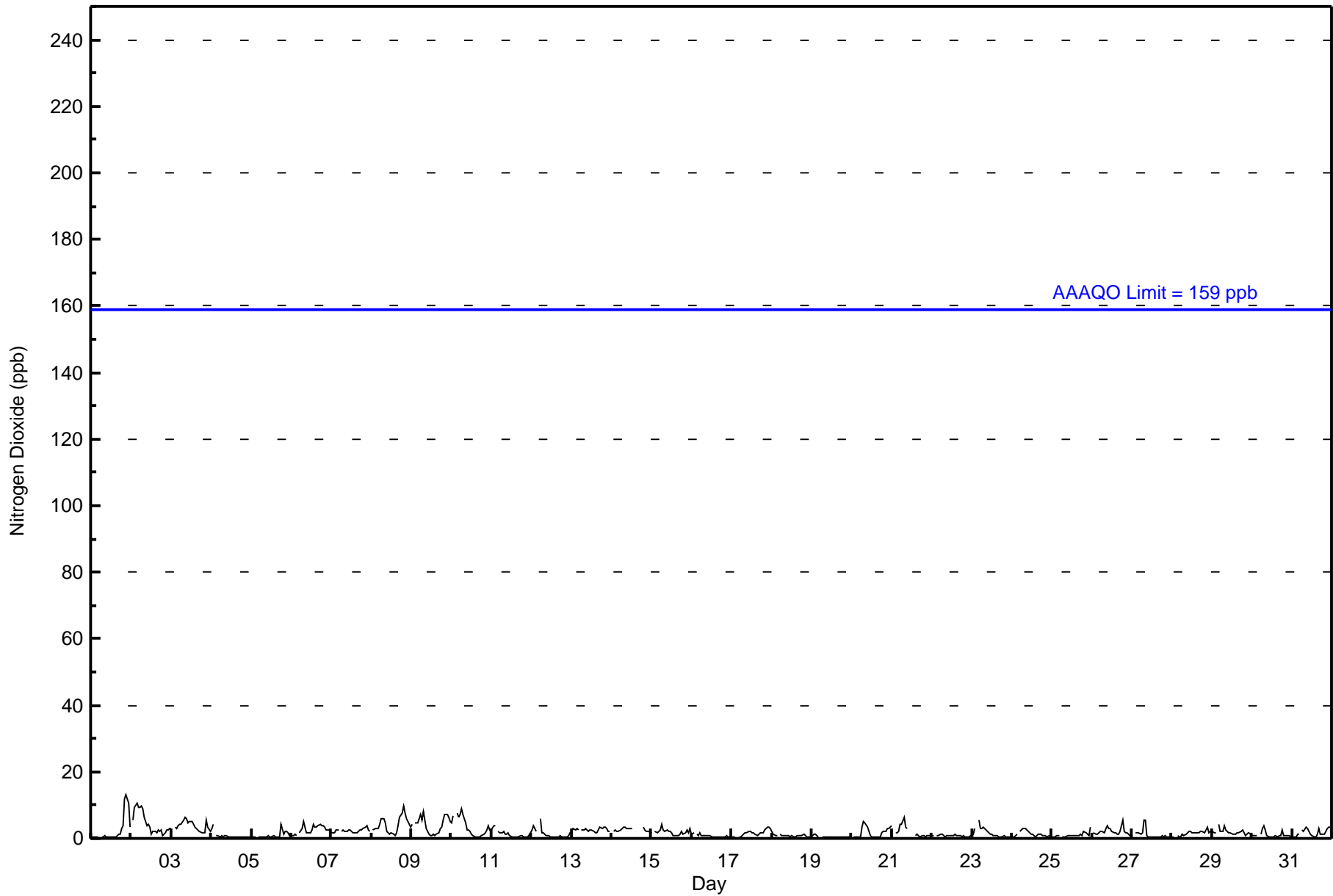
Janvier - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 13 ppb on Mar 1 22:00										Maximum Daily Average: 4.6 ppb on Mar 2										Hours of Data: 703						
Minimum Value: 0 ppb on Mar 4 12:00										Minimum Daily Average: 0.5 ppb on Mar 19										Hours of Missing Data: 41						
Maximum Diurnal Average: 3.1 ppb at hour 8										Minimum Diurnal Average: 1.1 ppb at hour 15										Hours of Calibration: 37						
Monthly Average: 1.9 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 9										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-Mar	0	0	1	1	0	Z	1	1	1	1	1	0	0	0	0	1	1	1	3	4	12	13	11	4	2.4	13
2-Mar	Z	5	9	10	9	10	10	9	6	4	4	3	1	2	2	2	3	2	3	1	2	2	3	3	4.6	10
3-Mar	3	Z	4	3	4	4	4	5	7	6	5	5	4	4	3	3	2	2	2	2	6	3	2	3.7	7	
4-Mar	3	4	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.8	4
5-Mar	0	0	1	Z	1	1	0	0	0	0	1	1	1	1	1	1	0	4	1	2	2	2	1	0.9	4	
6-Mar	1	1	1	1	Z	2	3	5	4	2	2	2	4	3	3	4	4	4	4	4	4	3	3	2	2.7	5
7-Mar	2	2	2	3	3	Z	2	3	2	2	2	2	2	2	2	2	2	3	3	3	3	4	3	2	2.3	4
8-Mar	Z	3	3	3	3	4	6	6	5	2	2	1	2	1	1	2	4	7	8	10	8	6	5	4	4.0	10
9-Mar	4	Z	5	5	5	7	5	8	6	3	1	1	1	1	1	2	3	4	6	7	7	7	5	4.1	8	
10-Mar	5	7	Z	8	7	7	9	7	5	3	3	2	1	1	1	0	1	1	1	1	2	3	4	3	3.4	9
11-Mar	3	4	4	Z	2	2	2	2	1	1	2	1	1	1	0	1	1	1	1	1	1	1	0	2	1.3	4
12-Mar	3	4	3	2	Z	6	2	2	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	2	1.4	6
13-Mar	2	3	3	3	3	Z	3	3	3	3	2	2	3	2	2	3	3	3	3	3	3	3	2	2	2.6	3
14-Mar	Z	2	2	2	2	3	3	3	3	3	3	3	C	C	C	C	C	C	C	4	3	2	2	2	--	4
15-Mar	2	Z	2	2	2	3	4	3	2	3	2	2	2	1	1	1	1	1	2	1	2	2	2	3	1.9	4
16-Mar	1	2	Z	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	2
17-Mar	0	0	0	Z	1	1	1	1	2	2	2	2	2	2	1	1	1	1	2	2	2	3	3	3	1.5	3
18-Mar	2	1	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
19-Mar	1	1	1	1	1	Z	1	1	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0.5	1
20-Mar	Z	1	0	0	0	0	4	5	5	3	2	1	1	0	0	0	0	1	2	2	2	3	3	3	1.7	5
21-Mar	4	Z	2	2	2	4	4	6	4	3	M	M	M	M	1	1	1	1	1	1	1	1	1	1	2.0	6
22-Mar	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.8	1
23-Mar	1	1	3	Z	6	3	3	3	3	2	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1.5	6
24-Mar	0	1	1	1	Z	2	3	3	3	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	3
25-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	0.9	4
26-Mar	Z	2	1	1	2	2	2	2	3	4	3	3	2	2	2	1	1	2	6	2	2	2	1	1	2.1	6
27-Mar	1	Z	2	2	2	1	2	6	6	1	1	0	0	0	1	1	1	1	1	1	1	1	0	0	1.2	6
28-Mar	0	0	Z	1	0	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	3	3	2	2	1.6	3
29-Mar	2	2	2	Z	4	2	2	4	2	2	2	2	1	1	1	2	2	2	2	2	1	1	2	1	1.9	4
30-Mar	1	1	1	1	Z	1	3	4	3	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1.1	4
31-Mar	0	0	0	1	1	Z	3	2	3	3	2	1	1	1	1	1	3	1	1	1	2	3	3	3	1.7	3
1.6 1.8 2.0 2.2 2.4 2.8 2.8 3.1 2.6 2.0 1.7 1.5 1.3 1.1 1.1 1.1 1.3 1.5 2.0 1.9 2.2 2.5 2.1 1.9																								Diurnal Average		
5 7 9 10 9 10 10 9 7 6 5 5 5 4 4 4 3 4 7 8 10 12 13 11 5																								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
Janvier - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Janvier - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	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: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Janvier - March 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	71	136	47	48	31	35	42	54	98	42	20	15	31	19	5	9	703
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	71	136	47	48	31	35	42	54	98	42	20	15	31	19	5	9	703

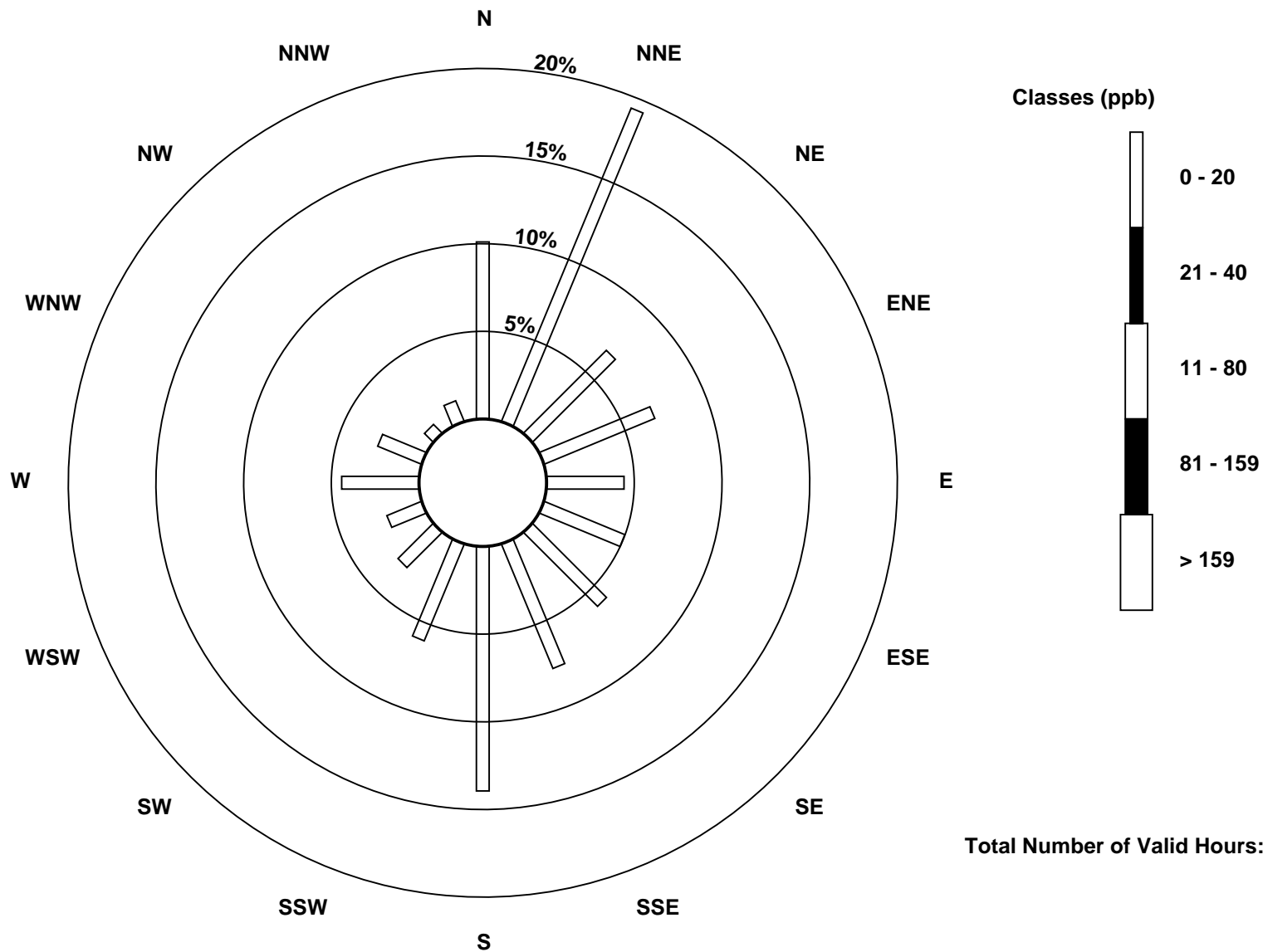
Total Number of Valid Hours: 703

Total Number of Hours: 744

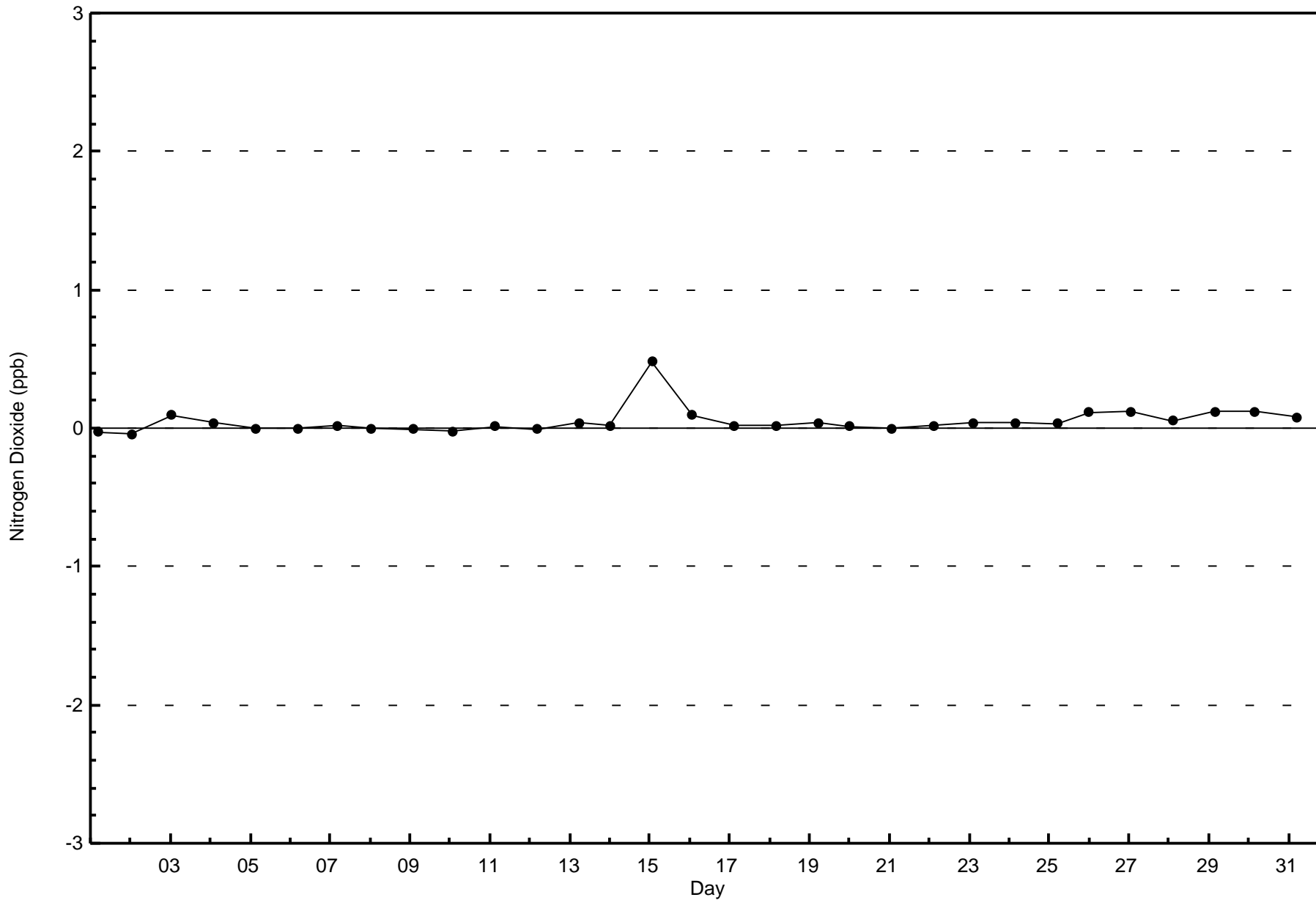


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Dioxide (NO₂) - ppb
Janvier (AMS 22)



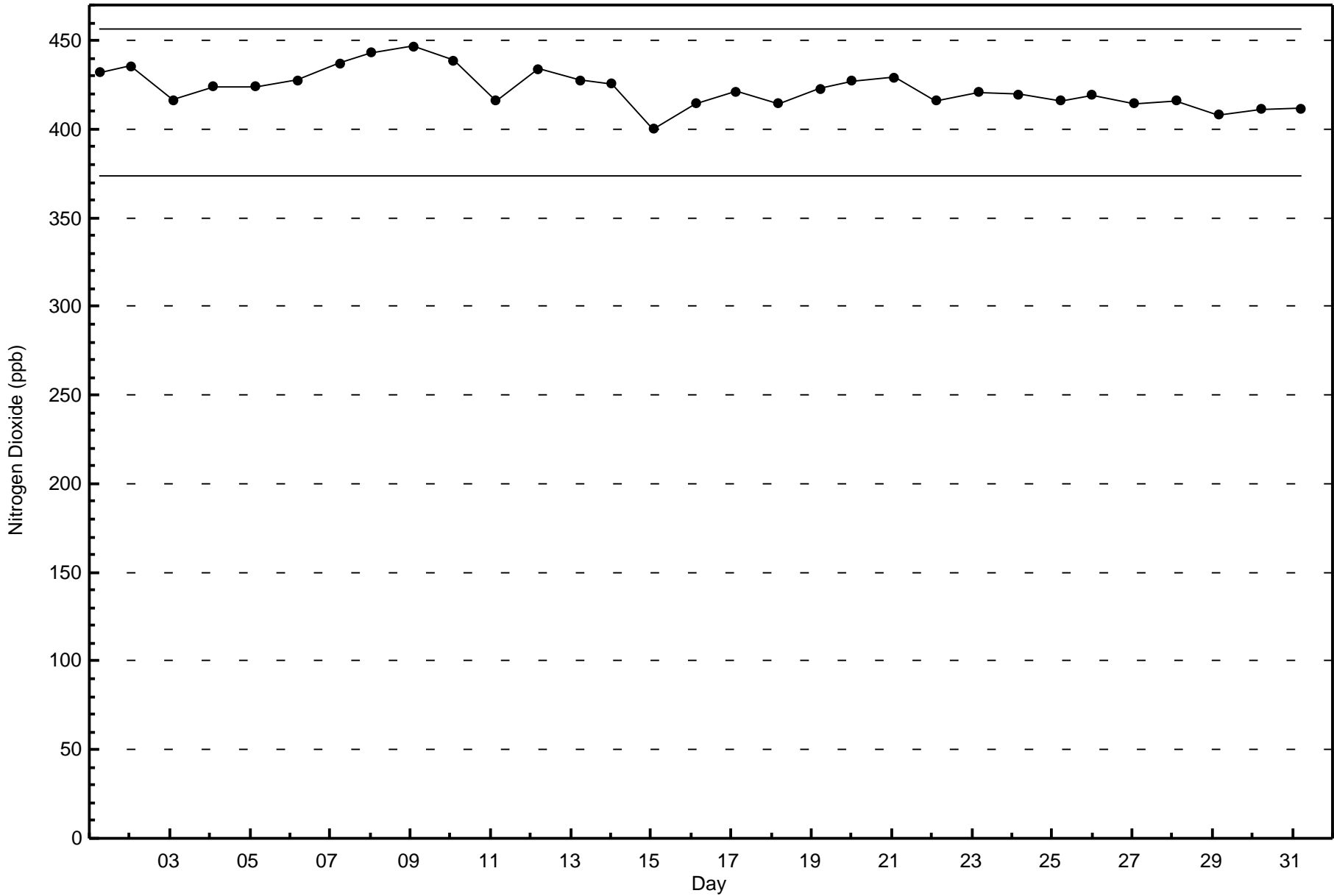
Total Number of Valid Hours: 703





Wood Buffalo Environmental Association
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Janvier - March 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

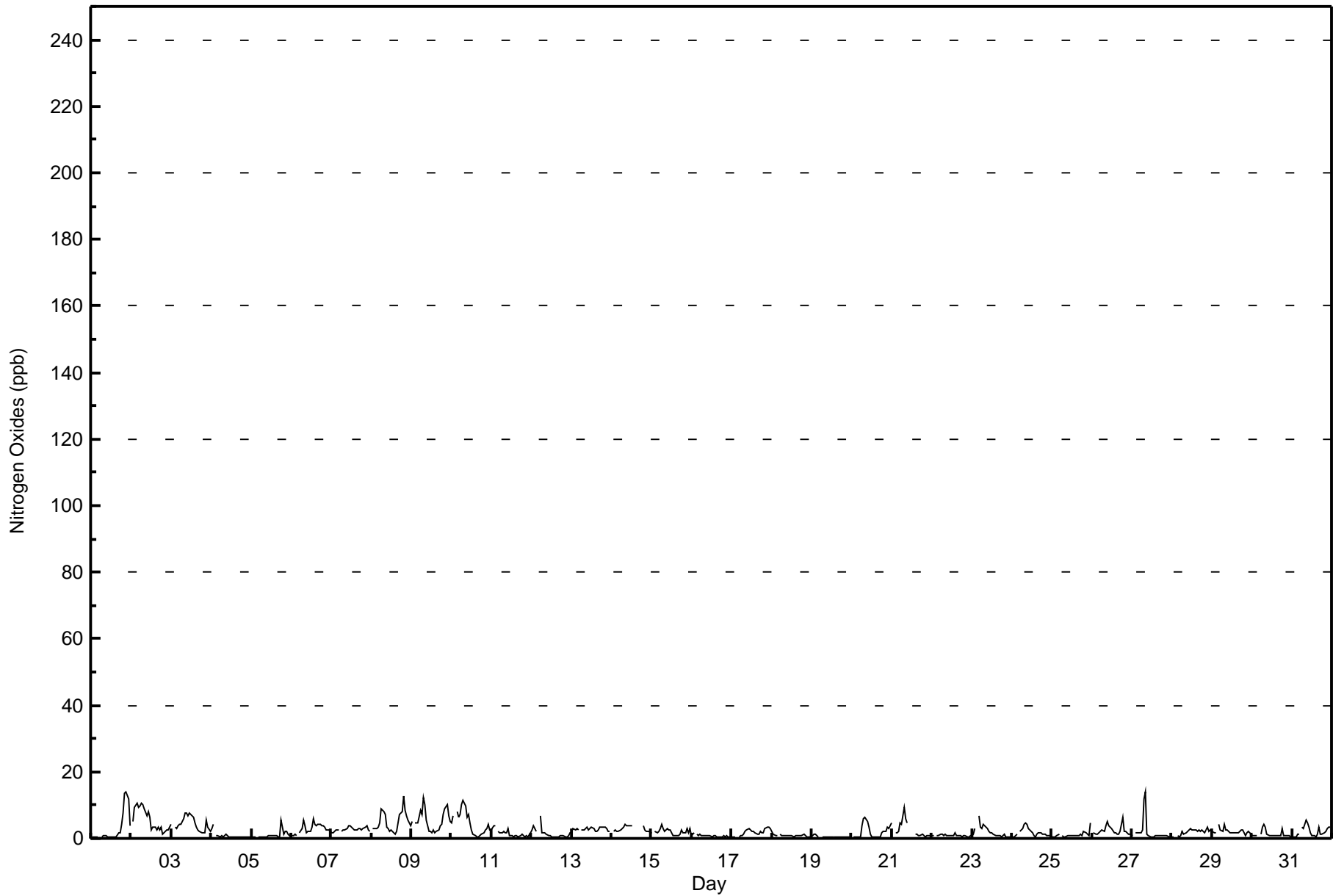
Janvier - March 2017

Maximum Value: 14 ppb on Mar 27 09:00		Maximum Daily Average: 5.6 ppb on Mar 2		Hours in Service: 744																						
Minimum Value: 0 ppb on Mar 17 03:00		Minimum Daily Average: 0.6 ppb on Mar 19		Hours of Data: 703																						
Maximum Diurnal Average: 4.1 ppb at hour 8		Minimum Diurnal Average: 1.3 ppb at hour 16		Hours of Missing Data: 41																						
Monthly Average: 2.3 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 12		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-Mar	0	0	1	0	0	Z	1	1	1	1	1	0	0	1	1	1	2	2	4	8	14	14	12	4	2.9	14
2-Mar	Z	5	9	10	9	10	11	10	9	7	8	6	2	3	3	3	3	3	4	1	2	3	3	3	5.6	11
3-Mar	4	Z	3	3	4	4	4	6	8	7	7	8	7	6	5	4	3	2	2	1	2	6	3	2	4.4	8
4-Mar	3	4	Z	1	1	1	1	1	1	1	1	0	0	1	0	0	0	1	1	0	0	0	0	0	0.8	4
5-Mar	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	0	5	1	2	2	1	1	1.0	5
6-Mar	1	1	1	1	Z	2	3	5	4	2	2	2	3	6	4	4	4	4	4	4	4	3	3	3	3.0	6
7-Mar	2	2	2	3	3	Z	2	3	3	3	4	4	3	3	3	2	3	3	3	3	3	3	4	3	2.7	4
8-Mar	Z	3	3	3	4	5	9	8	7	3	3	2	3	2	1	2	5	7	8	13	8	7	6	4	5.0	13
9-Mar	5	Z	5	5	5	8	7	12	10	6	2	2	2	2	2	2	3	4	4	7	9	10	7	5	5.4	12
10-Mar	5	7	Z	8	6	7	10	11	10	6	7	5	3	1	1	1	1	1	1	2	2	3	4	3	4.5	11
11-Mar	3	4	4	Z	2	2	2	2	2	2	3	1	1	1	1	1	1	1	1	1	1	1	0	2	1.5	4
12-Mar	3	4	3	2	Z	7	2	2	2	1	1	1	0	1	0	1	0	1	1	1	1	1	1	2	1.5	7
13-Mar	2	3	3	3	3	Z	3	3	3	3	3	3	4	3	2	3	4	3	4	3	3	2	2	2	2.8	4
14-Mar	Z	2	2	2	2	2	3	4	4	4	4	4	4	C	C	C	C	C	C	4	3	2	2	2	--	4
15-Mar	2	Z	2	2	2	3	4	3	2	3	3	2	2	1	1	1	1	1	3	2	2	3	2	3	2.1	4
16-Mar	1	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.8	2
17-Mar	0	0	0	Z	1	1	1	1	2	2	3	3	2	2	2	1	1	2	2	2	3	3	3	3	1.8	3
18-Mar	2	1	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
19-Mar	1	1	1	1	0	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.6	1
20-Mar	Z	0	0	0	0	0	4	6	7	5	3	1	0	0	0	1	1	1	2	2	2	3	3	4	2.0	7
21-Mar	5	Z	2	2	2	5	4	9	6	4	M	M	M	M	1	1	1	1	1	1	1	1	1	1	2.5	9
22-Mar	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0	0	1	0.8	2
23-Mar	1	1	3	Z	7	4	3	4	3	3	2	2	2	1	1	1	1	1	1	1	1	1	0	1	1.8	7
24-Mar	0	1	1	1	Z	2	3	4	4	4	3	2	2	1	1	1	1	2	2	1	1	1	1	1	1.7	4
25-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	5	1.1	5
26-Mar	Z	2	1	1	2	2	2	4	5	4	4	3	2	2	1	1	2	6	2	2	2	1	1	1	2.4	6
27-Mar	1	Z	2	2	2	2	2	12	14	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	2.0	14
28-Mar	0	0	Z	1	0	1	2	1	2	2	3	3	3	2	2	2	2	2	2	2	3	3	2	2	1.9	3
29-Mar	2	2	2	Z	4	3	2	4	3	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2.1	4
30-Mar	1	1	1	1	Z	1	3	4	3	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1.3	4
31-Mar	0	0	1	1	1	Z	3	3	6	5	3	2	1	1	1	1	3	1	1	2	2	3	3	3	2.1	6
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Janvier - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Janvier - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	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: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Janvier - March 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	71	136	47	48	31	35	42	54	98	42	20	15	31	19	5	9	703
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	71	136	47	48	31	35	42	54	98	42	20	15	31	19	5	9	703

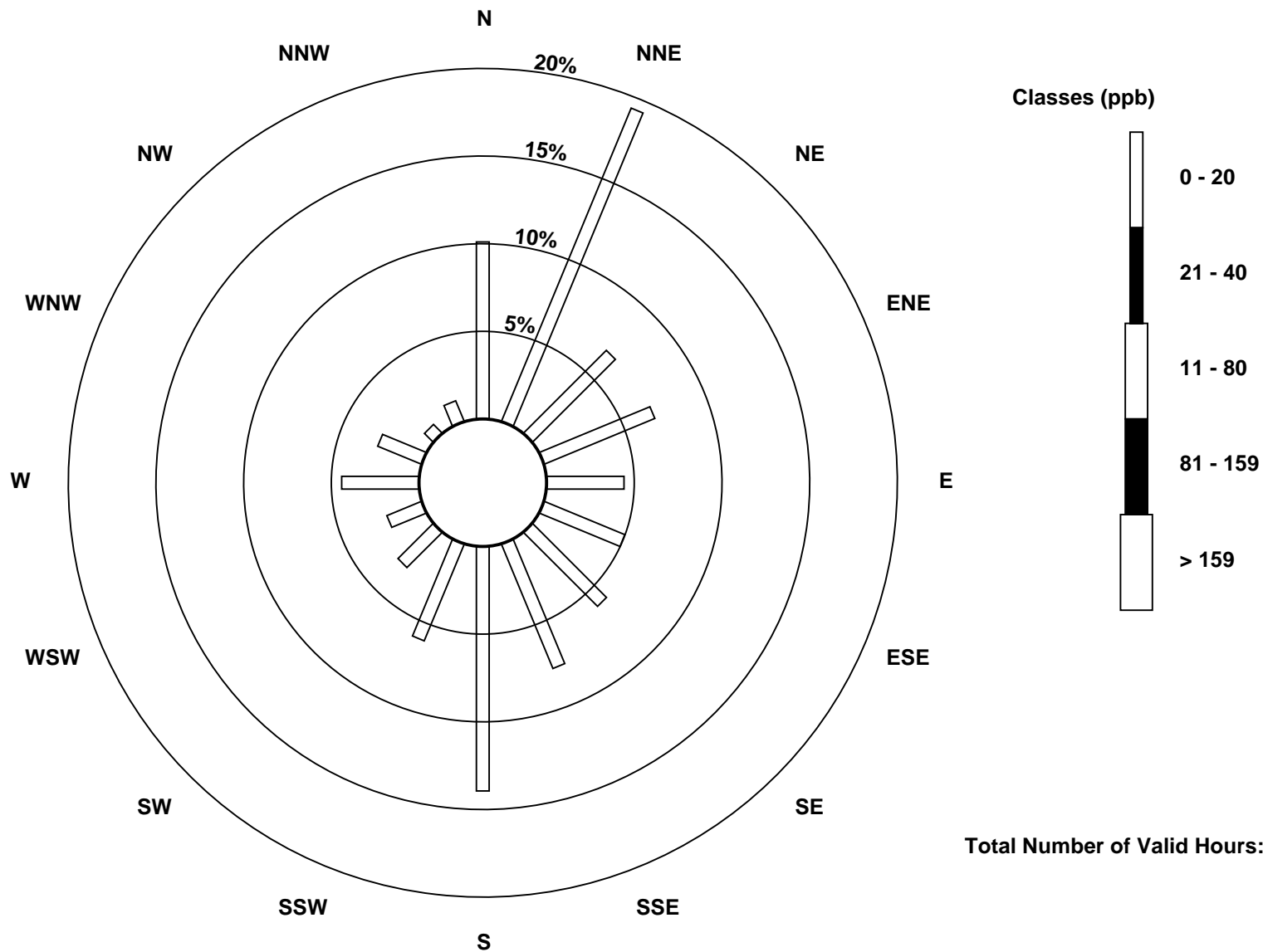
Total Number of Valid Hours: 703

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Oxides (NO_x) - ppb
Janvier (AMS 22)

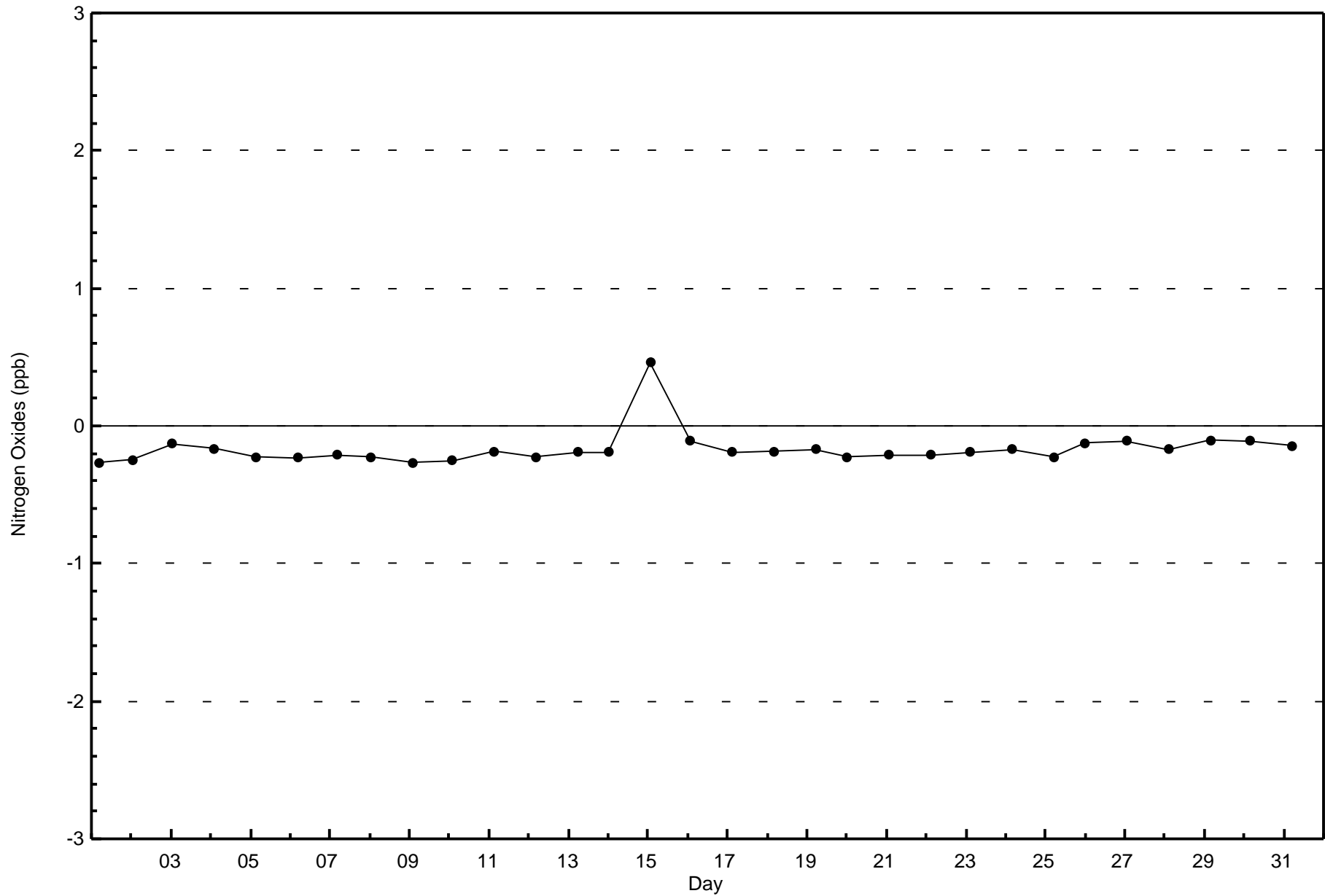


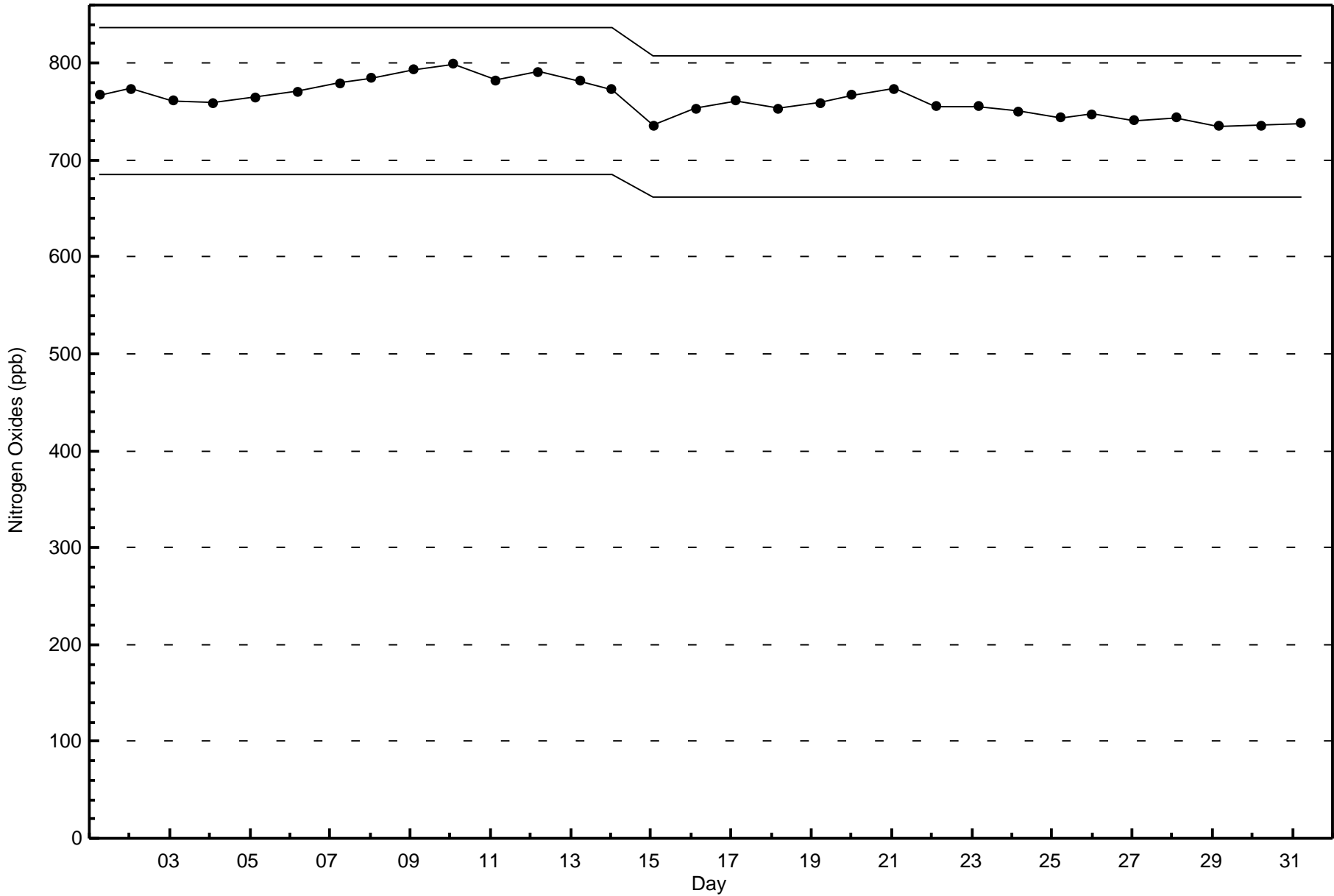
Total Number of Valid Hours: 703



Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Janvier - March 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

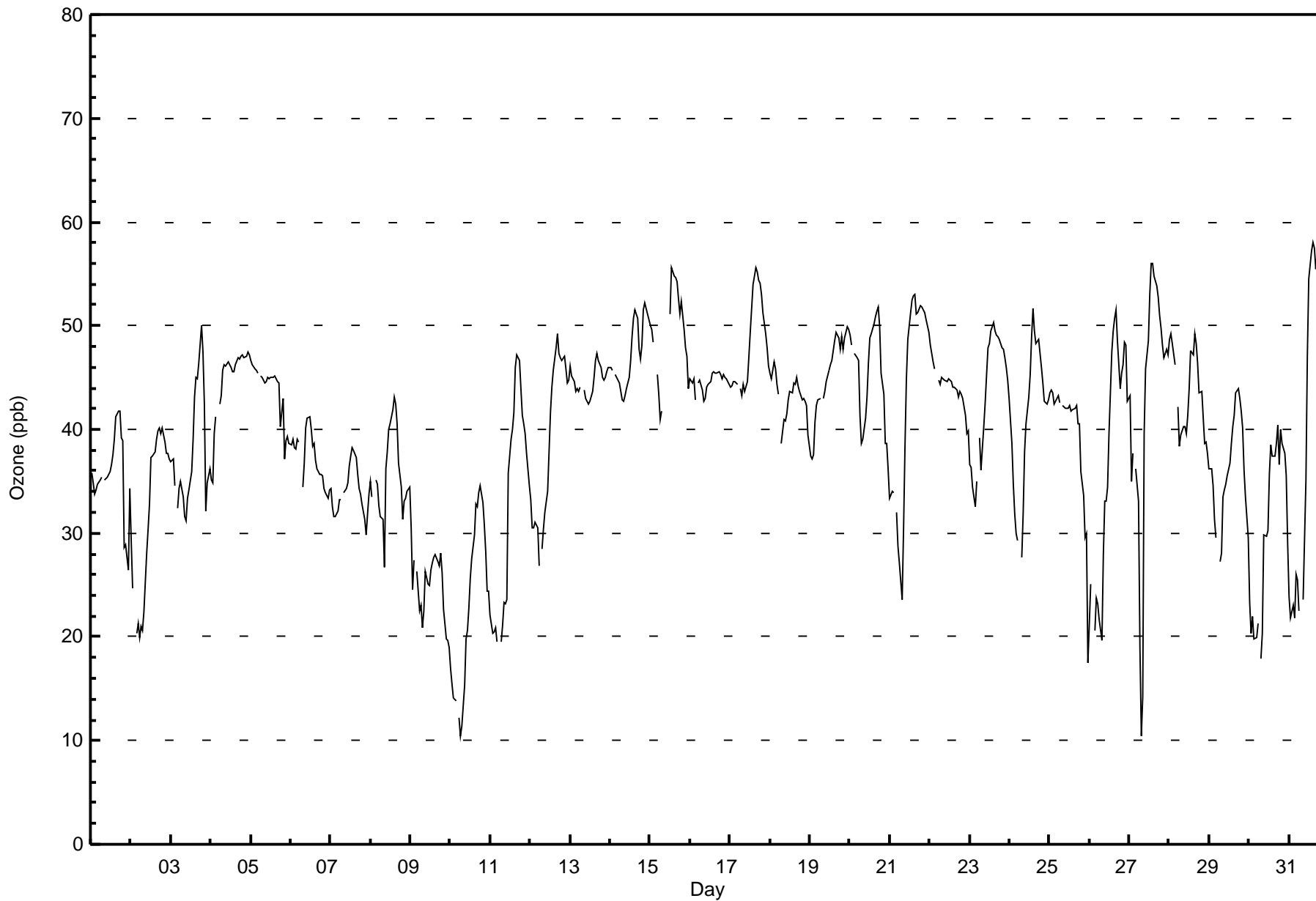
Janvier - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 58 ppb on Mar 31 15:00										Maximum Daily Average: 49.2 ppb on Mar 15										Hours of Data: 709																												
Minimum Value: 10 ppb on Mar 10 07:00										Minimum Daily Average: 23.1 ppb on Mar 10										Hours of Missing Data: 35																												
Maximum Diurnal Average: 45.6 ppb at hour 16										Minimum Diurnal Average: 31.6 ppb at hour 8										Hours of Calibration: 35																												
Monthly Average: 39.6 ppb										Percentiles: P ₁ = 15 P ₁₀ = 26 Q ₁ = 34 Median = 42 Q ₃ = 46 P ₉₀ = 49 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-Mar	36	35	34	34	35	35	35	Z	35	35	35	36	37	38	39	41	42	42	39	39	29	29	26	34	35.6	42																						
2-Mar	29	25	Z	20	21	20	21	21	22	28	30	33	37	37	38	39	40	40	40	40	39	38	38	37	31.9	40																						
3-Mar	37	37	35	Z	32	34	35	34	32	31	33	34	36	39	43	45	45	46	50	47	42	32	35	36	37.9	50																						
4-Mar	35	35	40	41	Z	42	43	46	46	46	47	46	46	46	46	46	47	47	47	47	47	47	47	47	44.7	47																						
5-Mar	47	46	46	46	45	Z	45	45	45	45	45	45	45	45	45	45	45	44	40	43	37	39	39	39	43.7	47																						
6-Mar	38	39	38	38	39	39	Z	34	37	40	41	41	40	38	39	37	36	36	36	35	34	34	33	34	37.3	41																						
7-Mar	34	32	32	32	32	33	33	Z	34	34	35	36	37	38	38	37	36	34	34	33	31	30	32	34	34.0	38																						
8-Mar	35	33	Z	35	35	33	32	31	27	36	38	40	41	42	43	42	41	37	34	31	33	33	34	34	35.7	43																						
9-Mar	30	25	27	Z	26	22	23	21	22	26	25	25	26	27	28	28	27	27	28	26	23	20	20	19	24.9	30																						
10-Mar	17	15	14	14	Z	12	10	11	15	20	21	23	26	27	30	33	33	34	35	33	31	28	24	24	23.1	35																						
11-Mar	22	20	20	21	20	Z	19	21	23	23	24	36	39	40	42	46	47	47	44	41	41	40	38	35	32.5	47																						
12-Mar	33	31	31	31	30	27	Z	28	30	32	34	38	42	44	46	48	49	47	47	47	47	46	44	45	39.0	49																						
13-Mar	46	45	45	44	44	44	44	Z	44	43	43	42	43	44	45	47	47	47	46	45	45	45	46	46	44.7	47																						
14-Mar	46	46	Z	45	45	44	44	43	43	43	44	45	47	49	51	52	51	48	47	48	52	52	51	51	47.2	52																						
15-Mar	50	50	48	Z	45	43	41	42	C	C	C	C	51	56	55	55	54	53	51	52	50	48	44	44	49.2	56																						
16-Mar	45	44	45	43	Z	45	45	44	43	43	44	44	45	45	46	45	45	46	45	45	45	45	44	44	44.6	46																						
17-Mar	44	44	45	45	44	Z	44	43	44	44	44	45	47	49	52	54	56	55	54	54	53	51	49	48	46	48.3	56																					
18-Mar	45	45	47	46	44	43	Z	39	41	41	41	43	44	44	44	44	45	44	44	43	43	43	42	39	43.2	47																						
19-Mar	37	37	38	41	42	43	43	Z	43	44	45	46	46	47	48	49	49	49	48	49	48	49	50	50	45.1	50																						
20-Mar	49	48	Z	47	47	47	41	39	39	41	43	46	49	49	50	51	51	52	50	45	43	39	39	36	45.3	52																						
21-Mar	33	34	34	Z	32	29	27	24	30	38	45	49	51	52	53	53	51	51	52	52	52	51	51	49	43.2	53																						
22-Mar	48	47	47	46	Z	45	44	45	45	45	45	45	45	45	44	44	44	43	44	43	43	41	40	40	44.2	48																						
23-Mar	37	36	34	33	35	Z	39	36	40	43	45	48	48	49	50	50	49	49	49	48	48	47	46	45	43.6	50																						
24-Mar	43	39	35	32	30	29	Z	28	32	38	40	43	45	49	52	50	48	49	47	46	44	43	42	43	41.2	52																						
25-Mar	44	44	43	42	43	43	43	Z	42	42	42	42	42	42	42	42	42	42	41	41	36	34	30	18	39.5	44																						
26-Mar	21	25	Z	21	24	23	22	20	28	33	33	34	40	47	50	51	52	49	44	45	46	48	48	43	36.8	52																						
27-Mar	43	35	38	Z	36	33	19	10	14	40	46	49	53	56	56	55	54	53	51	50	48	47	48	47	42.6	56																						
28-Mar	49	49	48	46	Z	42	38	40	40	40	40	41	44	48	47	49	48	46	44	44	41	39	39	38	43.5	49																						
29-Mar	36	36	35	31	30	Z	27	28	33	34	35	36	37	39	40	41	44	44	43	42	40	36	34	30	36.1	44																						
30-Mar	23	20	22	20	20	21	Z	18	20	30	30	30	36	38	37	37	39	40	37	40	39	38	35	29	30.4	40																						
31-Mar	24	22	23	22	26	25	23	Z	24	29	35	47	54	57	58	57	55	57	55	53	48	43	41	40	39.9	58																						
																								37.4	36.2	36.2	35.2	34.8	34.5	33.9	31.6	33.8	36.9	38.2	40.3	42.6	44.2	45.0	45.6	45.5	45.0	44.0	43.3	41.7	40.2	39.7	38.6	Diurnal Average
																								50	50	48	47	47	47	45	46	46	46	47	49	54	57	58	57	55	57	55	53	52	52	51	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
Janvier - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Janvier - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	28	3.95	3.95
21 - 50	626	88.29	92.24
51 - 82	55	7.76	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 - March 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	4	1	3	0	3	1	1	3	2	0	5	0	1	0	2	28
21 - 50	69	134	45	45	32	31	30	48	80	34	16	7	28	16	4	7	626
51 - 82	0	1	0	0	0	1	9	11	15	7	3	2	4	1	1	0	55
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	71	139	46	48	32	35	40	60	98	43	19	14	32	18	5	9	709

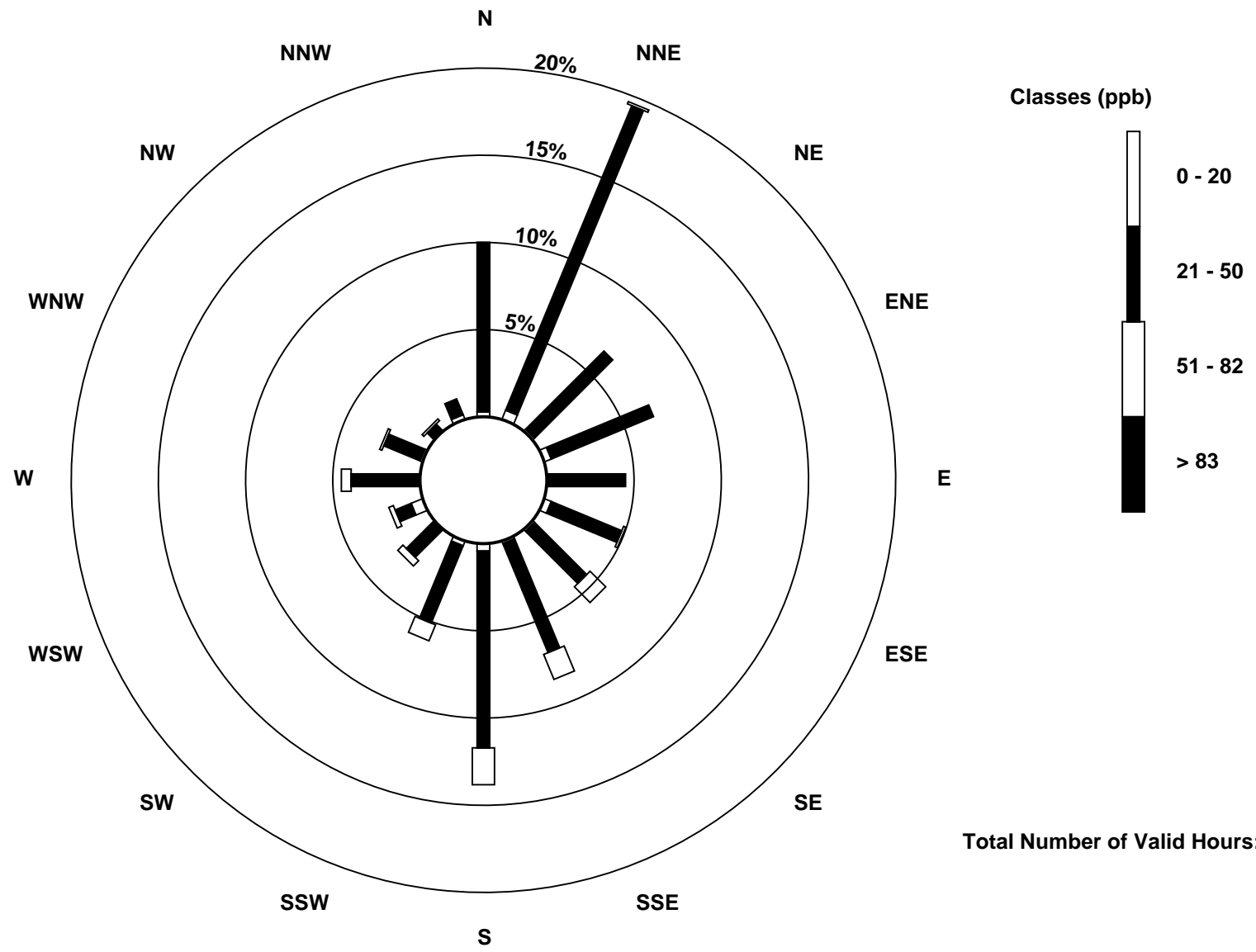
Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

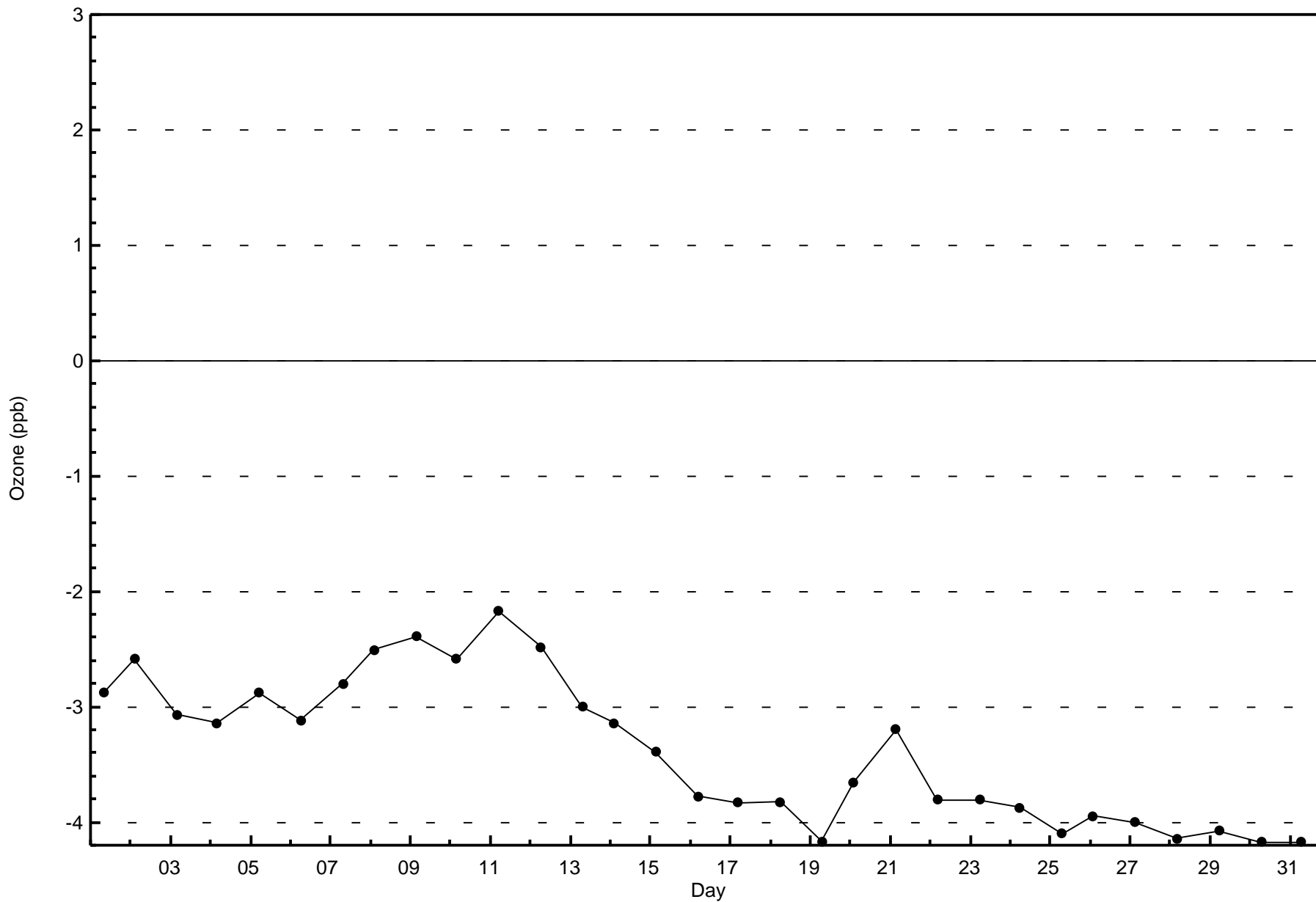
Ozone (O₃) - ppb
Janvier (AMS 22)





Wood Buffalo Environmental Association
Zero Responses

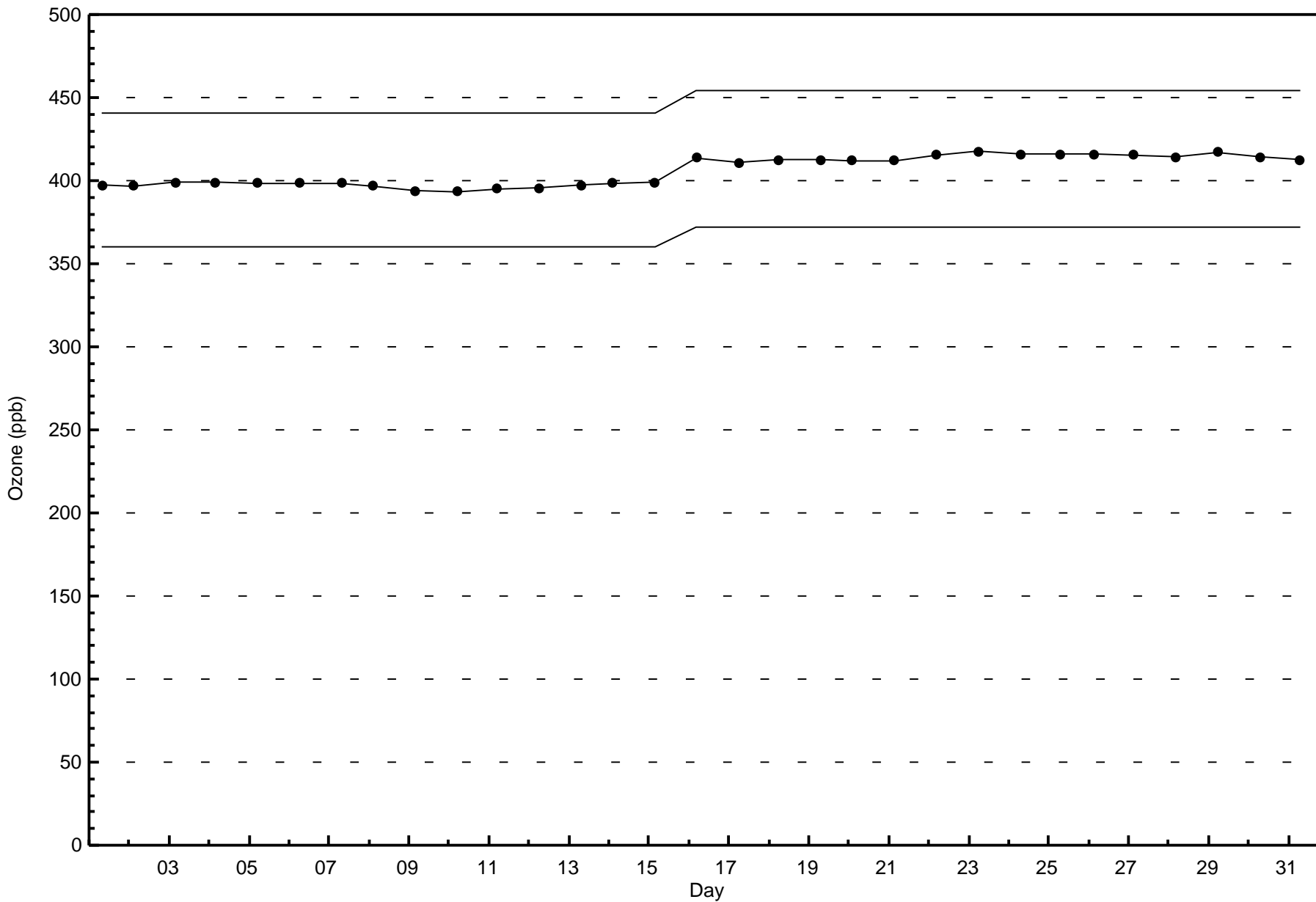
Ozone (O₃) - ppb
Janvier - March 2017





Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Janvier - March 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

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

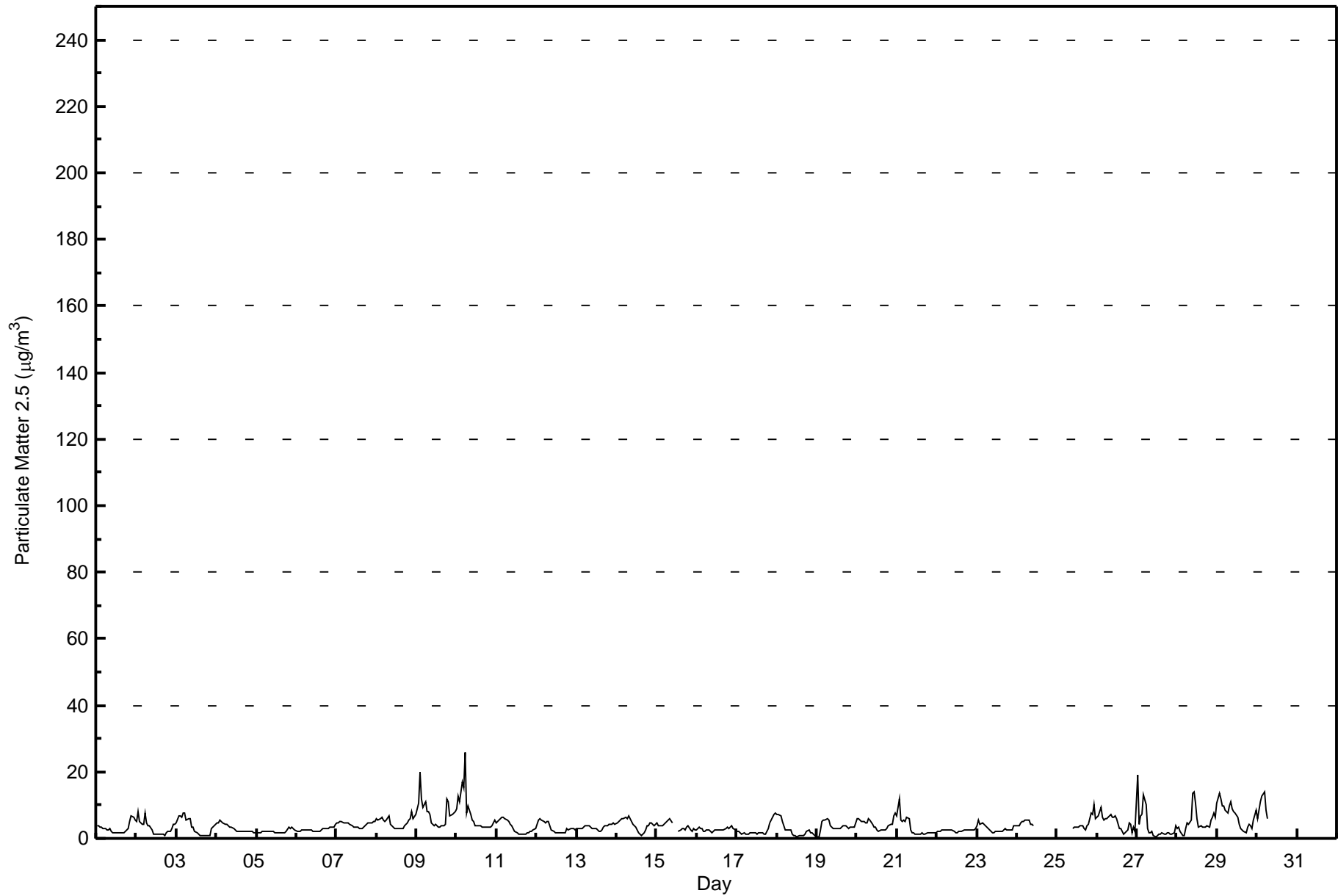
Janvier - March 2017

Number of Exceedences (AAAQO):		24-hr: 0		Hours in Service:		744																																										
Maximum Value: 25.9 µg/m ³ on Mar 10 06:00		Maximum Daily Average: 7.6 µg/m ³ on Mar 9		Hours of Data:		678																																										
Minimum Value: 0.3 µg/m ³ on Mar 19 01:00		Minimum Daily Average: 2.1 µg/m ³ on Mar 5		Hours of Missing Data:		66																																										
Maximum Diurnal Average: 5.8 µg/m ³ at hour 3		Minimum Diurnal Average: 2.2 µg/m ³ at hour 15		Hours of Calibration:		4																																										
Monthly Average: 3.95 µg/m ³		Percentiles: P ₁ = 0.8 P ₁₀ = 1.5 Q ₁ = 2.2 Median = 3.3 Q ₃ = 4.9 P ₉₀ = 7.0 P ₉₉ = 13.8		Percent Operational Time:		91.7																																										
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-Mar	3.8	3.8	3.5	3.3	2.9	2.8	2.7	2.7	2.8	2.1	1.9	1.8	1.8	1.8	1.7	1.8	1.9	2.1	2.6	3.0	4.9	6.6	6.2	5.6	3.1	6.6																						
2-Mar	5.2	8.0	5.1	4.4	4.3	7.6	4.8	3.9	3.7	2.4	1.4	1.3	1.3	1.3	1.2	1.2	1.1	1.0	1.5	2.0	2.3	3.0	4.2	4.4	3.2	8.0																						
3-Mar	4.8	6.6	6.8	6.2	7.4	7.4	5.7	5.8	5.8	3.6	3.2	2.1	1.5	1.4	1.0	0.9	0.9	1.0	0.8	0.8	1.0	2.8	3.2	4.1	3.5	7.4																						
4-Mar	4.8	4.7	5.6	4.9	4.6	4.4	4.1	3.8	3.4	3.2	3.0	2.5	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.1	2.0	2.0	1.9	1.9	3.1	5.6																						
5-Mar	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	1.9	1.7	1.6	1.6	1.7	1.7	1.7	2.2	3.2	3.1	3.3	3.0	2.5	2.1	3.3																						
6-Mar	2.1	2.3	2.3	2.4	2.4	2.6	2.6	2.6	2.7	2.4	2.1	2.0	2.0	2.1	2.2	2.4	2.8	2.8	3.1	3.1	3.4	3.3	3.6	4.2	2.7	4.2																						
7-Mar	4.7	4.8	4.9	4.9	4.7	4.5	4.5	4.5	4.4	3.9	3.5	3.4	3.4	3.2	3.1	3.0	3.4	3.7	4.1	4.5	4.6	4.8	4.9	5.1	4.2	5.1																						
8-Mar	5.7	5.7	5.9	6.2	5.4	5.1	5.6	7.0	4.3	3.6	3.4	3.1	3.1	2.9	3.1	3.0	3.2	3.9	4.8	5.4	6.0	8.2	5.8	7.2	4.9	8.2																						
9-Mar	8.9	10.6	20.1	12.0	9.4	10.8	8.0	8.0	7.2	4.8	3.7	4.3	3.8	3.3	3.3	3.6	3.9	4.4	11.7	11.0	6.8	7.3	7.7	7.9	7.6	20.1																						
10-Mar	8.7	12.6	10.9	16.9	15.3	25.9	7.8	9.8	7.1	5.3	4.9	3.9	3.9	3.9	3.7	3.5	3.4	3.3	3.2	3.5	3.6	3.9	4.8	5.3	7.3	25.9																						
11-Mar	4.8	5.5	6.1	6.4	6.2	6.1	5.4	5.1	4.2	3.8	3.1	1.9	1.5	1.3	1.2	1.2	1.3	1.4	1.7	1.9	2.2	2.1	2.5	2.9	3.3	6.4																						
12-Mar	4.3	5.6	5.9	5.7	4.9	4.9	5.1	5.2	3.7	2.7	1.9	1.8	1.9	1.9	1.8	1.8	1.7	1.7	3.0	2.6	2.9	3.0	2.9	2.7	3.3	5.9																						
13-Mar	2.9	3.0	2.9	3.1	3.4	3.7	3.8	3.7	3.4	3.1	3.0	2.9	2.8	2.2	2.2	2.6	3.2	3.7	3.9	4.0	4.3	4.4	4.6	4.4	3.4	4.6																						
14-Mar	4.6	4.9	5.4	6.1	6.0	6.1	6.1	6.6	5.9	4.9	4.1	3.3	2.6	1.6	1.1	1.0	1.5	2.6	3.7	3.8	4.7	4.5	3.9	4.1	4.1	6.6																						
15-Mar	4.5	3.8	3.9	3.8	4.2	4.8	5.2	5.4	5.9	4.9	C	C	C	2.0	2.5	3.0	2.9	2.6	3.3	3.6	2.5	2.0	3.0	2.6	3.6	5.9																						
16-Mar	2.7	3.4	3.0	2.9	2.3	2.2	2.4	2.7	2.2	1.9	2.2	2.7	2.6	2.5	2.5	2.5	2.7	3.2	3.3	3.2	3.3	3.6	3.1	2.4	2.7	3.6																						
17-Mar	2.2	2.2	1.8	1.5	1.5	1.4	1.3	1.4	1.6	1.6	1.7	1.7	1.4	1.5	1.7	1.5	1.4	1.4	2.0	3.0	4.5	6.4	7.3	7.7	2.5	7.7																						
18-Mar	7.2	7.2	6.7	5.2	4.0	2.7	2.4	2.6	2.7	1.3	0.9	0.8	0.6	0.7	0.9	0.9	0.9	1.1	2.2	2.6	1.8	1.9	1.4	0.8	2.5	7.2																						
19-Mar	0.3	0.5	2.4	5.2	5.3	5.4	5.8	5.7	3.8	3.2	3.1	2.9	2.8	2.8	3.0	3.4	3.8	3.9	3.4	3.0	3.6	3.5	3.4	4.6	3.5	5.8																						
20-Mar	6.0	5.9	5.4	5.2	5.0	4.5	4.8	5.9	5.4	4.2	3.4	3.2	2.5	2.3	2.4	2.4	2.4	2.5	3.2	3.9	4.1	4.0	6.9	7.6	4.3	7.6																						
21-Mar	6.8	11.9	5.6	5.1	5.4	4.9	6.3	6.0	2.7	1.9	1.5	1.4	1.5	1.4	1.4	1.6	1.4	1.3	1.5	1.6	1.5	1.7	1.7	1.8	3.2	11.9																						
22-Mar	2.0	2.1	2.3	2.4	2.6	2.7	2.5	2.7	2.5	2.5	2.2	1.8	1.9	2.1	2.1	2.1	2.4	2.7	2.5	2.6	2.6	2.4	2.5	3.0	2.4	3.0																						
23-Mar	3.6	5.4	4.4	4.9	4.4	3.8	3.3	3.2	2.3	1.8	1.9	2.0	1.9	2.0	2.1	2.1	2.7	3.2	2.6	2.6	2.5	2.5	3.6	3.9	3.0	5.4																						
24-Mar	3.6	3.7	4.8	5.0	5.0	5.5	5.7	5.7	4.2	4.1	4.0	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	5.7																					
25-Mar	AF	AF	AF	AF	AF	AF	AF	AF	C	2.8	3.4	3.5	3.4	3.3	3.6	3.8	2.9	2.7	3.7	4.1	7.8	7.3	10.3	6.0	--	10.3																						
26-Mar	6.2	7.0	9.4	6.3	5.7	5.7	5.9	6.8	7.4	6.4	6.6	6.7	5.8	3.1	3.2	2.3	1.1	1.7	2.5	4.8	4.2	1.7	3.4	2.1	4.8	9.4																						
27-Mar	19.0	4.2	6.9	7.1	13.1	10.3	3.0	1.7	1.5	2.0	0.7	0.5	1.0	1.4	1.3	1.6	1.4	1.4	1.8	1.8	1.4	1.2	1.5	3.7	3.7	19.0																						
28-Mar	2.9	3.5	2.0	1.0	0.7	2.8	4.6	4.3	5.6	13.5	13.9	10.6	5.9	3.3	3.8	3.4	3.4	3.5	3.7	3.6	5.7	6.3	7.8	6.3	5.1	13.9																						
29-Mar	10.7	13.5	11.7	9.6	9.8	8.3	7.8	9.9	11.0	8.9	8.2	7.5	6.5	4.3	3.0	2.5	2.0	1.8	3.5	4.4	3.7	3.0	5.4	8.5	6.9	13.5																						
30-Mar	5.8	8.5	11.0	12.8	14.1	8.5	5.9	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	14.1																					
31-Mar	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	--	--																					
																								5.2	5.6	5.8	5.6	5.6	5.8	4.6	4.8	4.3	3.8	3.4	3.0	2.6	2.3	2.2	2.3	2.3	2.4	3.1	3.4	3.6	3.8	4.3	4.4	Diurnal Average
																								19.0	13.5	20.1	16.9	15.3	25.9	8.0	9.9	11.0	13.5	13.9	10.6	6.5	4.3	3.8	3.8	3.9	4.4	11.7	11.0	7.8	8.2	10.3	8.5	Diurnal Maximum
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 - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Janvier - March 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	523	77.14	77.14
6 - 15	131	19.32	96.46
16 - 25	3	0.44	96.90
26 - 80	1	0.15	97.05
> 81.0	0	0.00	97.05

Total Number of Valid Hours: 678

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Janvier - March 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	64	123	45	30	17	22	26	46	64	19	9	6	25	16	5	6	523
6 - 15	6	15	1	5	6	7	10	9	28	21	7	5	7	0	0	4	131
16 - 25	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	3
26 - 80	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	70	139	46	35	23	29	36	56	93	41	16	11	32	16	5	10	658

Total Number of Valid Hours: 678

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

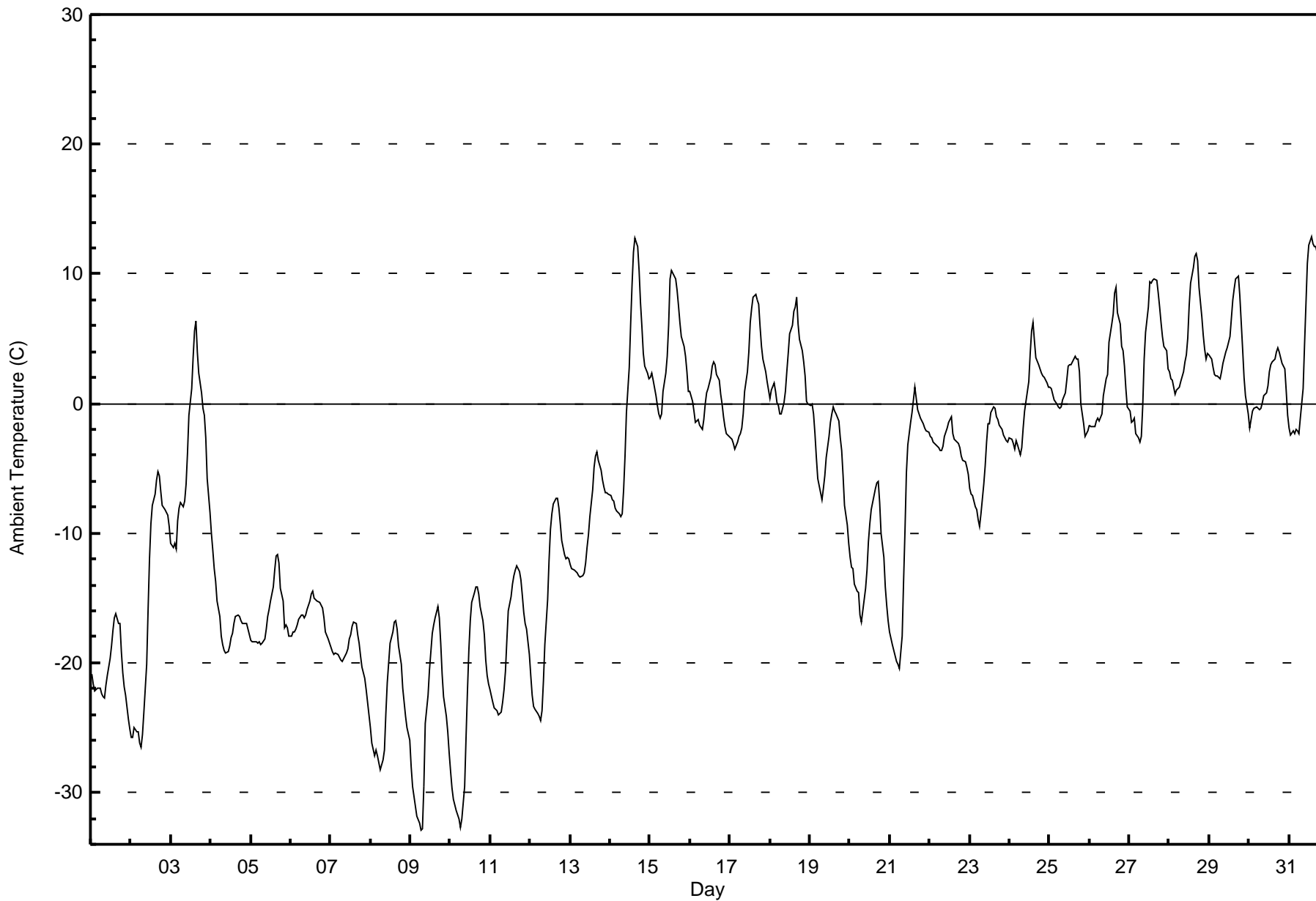
Ambient Temperature (AT) - C
Janvier - March 2017

Maximum Value: 12.9 C on Mar 31 14:00 Maximum Daily Average: 5.4 C on Mar 31		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -32.9 C on Mar 9 07:00 Maximum Diurnal Average: -1.7 C at hour 16 Monthly Average: -7.11 C		Minimum Daily Average: -24.5 C on Mar 9 Minimum Diurnal Average: -11.8 C at hour 7 Percentiles: P ₁ = -31.7 P ₁₀ = -22.1 Q ₁ = -16.7 Median = -3.9 Q ₃ = 1.3 P ₉₀ = 5.8 P ₉₉ = 12.0																								
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-Mar	-20.9	-21.6	-22.2	-22.0	-21.9	-22.0	-22.4	-22.6	-22.7	-21.8	-21.0	-19.7	-18.7	-17.6	-16.6	-16.3	-17.0	-17.0	-19.2	-20.7	-21.8	-22.5	-24.4	-25.1	-20.7	-16.3
2-Mar	-25.8	-25.7	-25.0	-25.3	-25.4	-26.2	-26.5	-25.6	-23.8	-20.2	-15.9	-12.0	-9.3	-7.8	-7.0	-5.9	-5.3	-5.5	-6.8	-7.9	-8.2	-8.4	-8.6	-9.5	-15.3	-5.3
3-Mar	-10.8	-11.1	-10.8	-11.2	-9.1	-8.1	-7.7	-8.0	-7.5	-6.2	-3.8	-0.9	1.1	3.6	5.5	6.4	3.9	2.3	0.8	-0.3	-0.9	-2.7	-5.8	-8.4	-3.7	6.4
4-Mar	-10.0	-11.3	-12.7	-13.8	-15.2	-16.5	-18.0	-18.6	-19.0	-19.2	-19.2	-18.7	-18.1	-17.7	-17.0	-16.4	-16.3	-16.5	-16.8	-17.0	-17.0	-17.0	-17.4	-17.8	-16.5	-10.0
5-Mar	-18.3	-18.4	-18.4	-18.4	-18.4	-18.4	-18.6	-18.5	-18.2	-17.4	-16.5	-15.9	-15.2	-14.2	-12.9	-11.7	-11.7	-12.3	-14.2	-15.2	-17.3	-17.1	-17.3	-17.9	-16.3	-11.7
6-Mar	-18.0	-17.6	-17.7	-17.4	-17.0	-16.7	-16.4	-16.3	-16.5	-16.3	-15.9	-15.3	-14.7	-14.5	-15.1	-15.1	-15.2	-15.4	-15.6	-15.8	-16.5	-17.6	-18.1	-18.5	-16.4	-14.5
7-Mar	-18.8	-19.1	-19.3	-19.3	-19.4	-19.6	-19.8	-19.9	-19.7	-19.3	-19.0	-18.2	-17.8	-17.2	-16.9	-16.9	-17.9	-18.5	-19.4	-20.3	-21.2	-22.1	-23.1	-24.1	-19.4	-16.9
8-Mar	-25.0	-26.2	-27.2	-26.8	-27.1	-27.7	-28.3	-27.5	-26.7	-23.9	-21.6	-20.0	-18.5	-17.7	-16.9	-16.7	-17.4	-18.7	-20.2	-22.0	-23.1	-24.1	-25.0	-25.9	-23.1	-16.7
9-Mar	-28.0	-29.6	-30.3	-31.0	-31.9	-32.4	-32.9	-32.8	-29.5	-24.7	-22.5	-20.6	-19.1	-17.7	-17.0	-16.5	-15.7	-16.6	-18.5	-20.8	-22.6	-24.1	-25.4	-27.0	-24.5	-15.7
10-Mar	-28.4	-29.6	-30.6	-31.4	-31.7	-32.0	-32.7	-32.0	-29.6	-25.7	-22.2	-19.1	-16.7	-15.3	-14.6	-14.1	-14.1	-14.7	-15.6	-16.7	-17.8	-19.7	-21.0	-21.6	-22.8	-14.1
11-Mar	-22.1	-23.0	-23.5	-23.5	-23.7	-24.0	-23.9	-23.0	-22.1	-20.6	-18.3	-16.0	-14.9	-13.9	-13.3	-12.8	-12.6	-12.9	-13.6	-14.8	-16.2	-16.9	-17.4	-19.3	-18.4	-12.6
12-Mar	-21.0	-22.5	-23.3	-23.6	-23.9	-24.1	-24.4	-23.7	-21.5	-18.6	-15.1	-12.1	-9.7	-8.5	-7.8	-7.4	-7.4	-8.1	-9.2	-10.6	-11.6	-12.0	-11.9	-12.0	-15.4	-7.4
13-Mar	-12.4	-12.8	-12.9	-13.0	-13.1	-13.3	-13.4	-13.3	-13.0	-12.3	-11.1	-10.2	-8.7	-6.6	-5.0	-4.0	-3.8	-4.4	-5.2	-6.0	-6.5	-6.8	-6.9	-6.9	-9.2	-3.8
14-Mar	-7.1	-7.4	-7.6	-8.1	-8.3	-8.5	-8.7	-8.5	-6.7	-4.0	-0.7	2.8	6.1	9.2	11.7	12.8	12.1	10.3	7.8	6.0	3.9	2.9	2.4	2.0	0.6	12.8
15-Mar	2.1	2.3	1.8	0.6	-0.2	-0.8	-1.2	-0.8	0.9	2.4	3.6	6.1	9.6	10.3	9.8	9.6	8.8	7.6	6.2	5.1	4.4	3.7	2.5	0.9	4.0	10.3
16-Mar	0.9	0.2	-0.6	-1.4	-1.3	-1.2	-1.7	-2.0	-1.3	-0.1	0.8	1.2	2.0	2.9	3.2	2.9	2.2	1.8	0.7	-0.1	-1.0	-1.8	-2.3	-2.6	0.1	3.2
17-Mar	-2.7	-2.7	-3.1	-3.5	-3.0	-2.6	-2.4	-1.9	-0.8	0.9	2.5	3.9	6.2	7.3	8.2	8.5	8.0	7.7	5.9	4.4	3.4	2.4	1.7	1.0	2.1	8.5
18-Mar	0.4	1.0	1.5	0.9	0.1	-0.1	-0.8	-0.8	0.1	0.9	2.4	3.8	5.4	6.0	7.1	7.5	8.1	6.2	5.0	4.1	3.2	2.1	0.2	-0.1	2.7	8.1
19-Mar	-0.1	-0.1	-0.8	-2.3	-4.1	-5.8	-6.8	-7.4	-6.6	-5.6	-4.1	-2.5	-1.4	-0.8	-0.3	-0.6	-0.9	-1.3	-2.6	-3.6	-5.5	-7.8	-9.4	-10.8	-3.8	-0.1
20-Mar	-11.9	-12.6	-12.8	-13.9	-14.4	-14.6	-16.3	-16.9	-16.0	-14.3	-12.8	-10.7	-9.3	-8.2	-7.2	-6.6	-6.2	-6.0	-7.6	-10.0	-11.8	-14.1	-15.5	-16.7	-11.9	-6.0
21-Mar	-17.6	-18.6	-19.0	-19.4	-19.9	-20.2	-20.4	-18.0	-13.7	-9.8	-5.4	-3.2	-1.5	-0.7	0.3	1.3	0.4	-0.5	-1.2	-1.3	-1.6	-1.8	-2.1	-2.3	-8.2	1.3
22-Mar	-2.5	-2.7	-3.0	-3.1	-3.2	-3.4	-3.6	-3.6	-3.3	-2.5	-1.9	-1.4	-1.2	-1.1	-2.3	-2.7	-3.0	-3.1	-3.4	-4.1	-4.4	-4.5	-4.9	-5.5	-3.1	-1.1
23-Mar	-6.6	-7.0	-7.1	-8.0	-8.2	-9.0	-9.5	-8.5	-6.2	-4.8	-2.9	-1.6	-1.5	-0.7	-0.2	-0.4	-1.0	-1.3	-1.7	-2.0	-2.4	-2.7	-2.9	-3.0	-4.1	-0.2
24-Mar	-2.6	-2.7	-3.1	-3.5	-2.8	-3.2	-4.0	-3.4	-1.9	-0.6	0.2	1.7	3.8	5.5	6.2	4.8	3.6	3.0	2.7	2.3	2.1	2.0	1.6	1.2	0.5	6.2
25-Mar	1.3	1.1	0.8	0.2	0.0	-0.3	-0.3	-0.2	0.3	0.8	1.8	2.8	3.0	3.0	3.2	3.6	3.5	3.4	2.4	-0.1	-1.5	-2.5	-2.3	-2.1	0.9	3.6
26-Mar	-1.6	-1.8	-1.8	-1.8	-1.4	-1.1	-1.4	-0.9	0.6	1.3	1.9	2.2	4.7	6.1	6.9	8.5	9.0	7.0	6.1	4.4	4.1	2.9	1.1	-0.3	2.3	9.0
27-Mar	-0.6	-1.4	-1.4	-1.1	-2.3	-2.7	-2.9	-2.5	-0.2	3.4	5.5	7.5	9.4	9.3	9.5	9.6	9.5	8.5	7.5	6.3	5.2	4.4	4.0	2.6	3.6	9.6
28-Mar	2.5	1.9	1.8	0.7	1.0	1.2	1.2	1.7	2.4	3.3	3.8	5.0	7.6	9.3	10.5	11.3	11.5	11.0	9.0	6.7	5.3	4.1	3.4	3.9	5.0	11.5
29-Mar	3.7	3.4	2.8	2.3	2.1	2.2	1.9	2.5	3.1	3.6	3.9	4.3	5.1	6.6	8.0	8.9	9.7	9.8	8.3	6.2	4.2	2.0	0.6	-0.8	4.3	9.8
30-Mar	-1.9	-1.2	-0.6	-0.4	-0.3	-0.4	-0.5	-0.3	0.1	0.6	0.9	1.4	2.5	2.9	3.2	3.4	4.0	4.3	4.0	3.6	3.1	2.7	0.9	-0.9	1.3	4.3
31-Mar	-1.9	-2.4	-2.2	-2.3	-2.0	-2.1	-2.4	-1.1	1.2	4.5	7.6	10.8	12.2	12.9	12.3	12.1	12.1	11.6	10.2	9.1	8.5	7.7	7.3	6.8	5.4	12.9
	-9.9	-10.3	-10.6	-11.0	-11.2	-11.4	-11.8	-11.4	-10.2	-8.6	-6.9	-5.3	-3.8	-2.7	-2.1	-1.7	-1.9	-2.5	-3.7	-4.9	-5.9	-6.8	-7.6	-8.4	Diurnal Average	
	3.7	3.4	2.8	2.3	2.1	2.2	1.9	2.5	3.1	4.5	7.6	10.8	12.2	12.9	12.3	12.8	12.1	11.6	10.2	9.1	8.5	7.7	7.3	6.8	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Janvier - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Janvier - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	99	13.31	13.31
-20 - 0	419	56.32	69.62
0 - 10	209	28.09	97.72
10 - 20	17	2.28	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

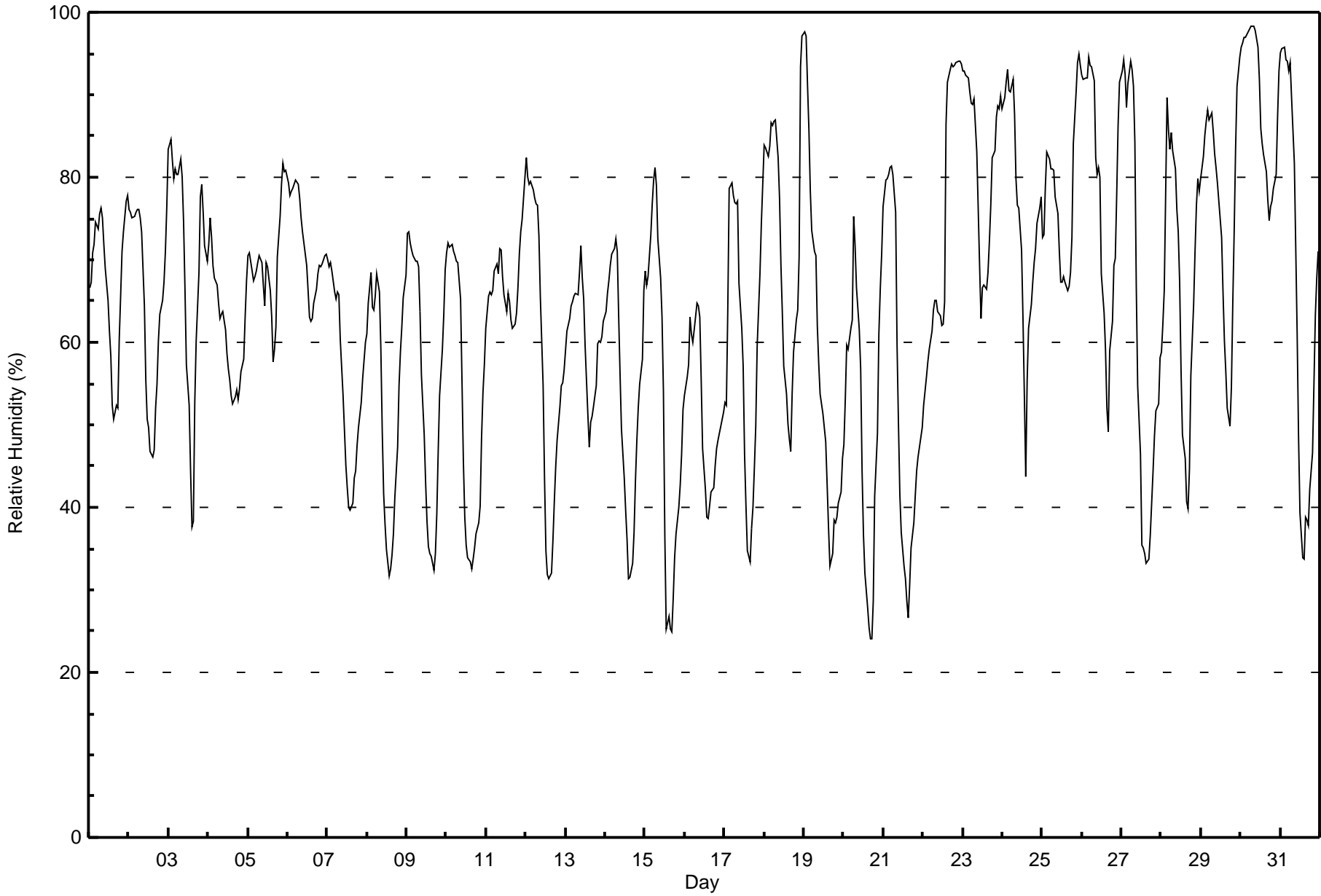
Janvier - March 2017

Maximum Value: 98 % on Mar 30 09:00 Maximum Daily Average: 89.2 % on Mar 30																			Hours in Service: 744							
Minimum Value: 24 % on Mar 20 17:00 Minimum Daily Average: 50.3 % on Mar 20																			Hours of Data: 744							
Maximum Diurnal Average: 77.9 % at hour 7 Minimum Diurnal Average: 46.7 % at hour 16																			Hours of Missing Data: 0							
Monthly Average: 64.6 % Percentiles: P₁ = 27 P₁₀ = 39 Q₁ = 52 Median = 66 Q₃ = 77 P₉₀ = 88 P₉₉ = 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-Mar	67	67	71	72	75	74	76	76	75	72	69	65	61	58	52	51	52	52	60	66	71	73	77	78	67.1	78
2-Mar	76	76	75	75	76	76	76	75	73	64	55	51	50	47	46	47	52	55	60	63	65	67	71	76	64.5	76
3-Mar	83	85	82	80	81	80	80	82	80	75	66	57	52	44	38	38	53	60	68	78	79	76	72	70	69.2	85
4-Mar	72	75	73	69	68	67	65	63	63	64	61	59	57	55	54	53	53	54	53	54	56	58	63	68	61.5	75
5-Mar	71	71	69	67	68	69	70	71	70	67	64	70	69	66	63	58	59	62	70	75	79	82	81	81	69.6	82
6-Mar	79	78	78	79	79	80	79	77	75	73	72	69	66	63	63	63	65	66	68	69	69	69	71	71	71.8	80
7-Mar	70	69	70	69	66	65	66	66	60	54	49	45	42	40	40	40	44	44	47	50	53	56	58	60	55.1	70
8-Mar	61	65	69	64	64	66	68	66	59	49	42	38	35	32	32	34	37	41	47	55	59	62	65	68	53.3	69
9-Mar	73	73	72	71	71	70	70	69	64	56	49	43	38	35	34	34	32	34	39	47	54	59	63	69	55.0	73
10-Mar	71	72	72	72	71	71	70	70	65	55	46	39	35	34	33	33	34	35	37	38	40	48	54	57	52.1	72
11-Mar	62	66	66	66	66	69	69	68	71	71	68	66	64	66	65	63	62	62	64	67	71	73	75	80	67.4	80
12-Mar	82	80	79	80	79	77	77	77	73	66	55	44	35	32	31	32	36	41	45	48	52	55	55	57	57.7	82
13-Mar	59	61	63	64	65	66	66	66	69	72	68	65	60	51	47	50	51	52	55	60	60	60	61	63	60.6	72
14-Mar	64	66	67	69	71	71	72	71	63	56	50	44	40	36	31	32	33	37	43	48	52	55	58	66	54.0	72
15-Mar	69	67	68	73	77	80	81	79	73	68	63	54	37	25	27	25	25	29	34	37	40	43	46	52	52.9	81
16-Mar	54	56	57	63	61	60	61	65	64	63	55	47	42	39	39	40	42	42	45	47	48	49	50	52	51.7	65
17-Mar	53	52	64	79	79	78	77	77	77	67	62	57	47	40	35	33	37	40	45	50	59	68	74	79	59.6	79
18-Mar	84	83	83	84	87	86	87	87	82	77	69	64	57	54	50	48	47	54	59	63	64	70	93	97	72.0	97
19-Mar	98	97	91	86	78	74	71	71	62	57	54	51	50	48	43	38	33	34	39	38	39	41	42	46	57.5	98
20-Mar	48	53	60	59	62	63	75	72	67	61	57	44	37	32	28	25	24	24	29	41	49	61	66	71	50.3	75
21-Mar	76	80	80	80	81	81	80	76	60	50	41	37	33	31	29	27	31	35	38	41	44	46	47	50	53.1	81
22-Mar	52	54	56	58	59	61	64	65	65	64	63	62	62	65	86	91	93	94	93	94	94	94	94	94	74.1	94
23-Mar	93	93	92	92	90	89	89	90	83	76	69	63	67	67	66	68	72	77	82	83	87	89	88	90	81.5	93
24-Mar	88	90	92	93	91	90	92	88	80	77	76	71	63	53	44	55	62	65	67	70	71	74	76	78	75.2	93
25-Mar	73	73	79	83	82	81	81	81	78	76	71	67	67	68	67	66	67	69	73	84	90	94	95	94	77.4	95
26-Mar	92	92	92	92	95	94	93	92	82	80	81	80	68	64	59	52	49	59	63	69	70	78	86	92	78.1	95
27-Mar	93	94	93	89	91	94	93	91	84	67	55	47	35	35	34	33	34	37	40	44	49	52	53	58	62.3	94
28-Mar	59	62	66	90	86	83	85	83	81	76	73	67	57	49	46	41	40	45	56	65	71	77	80	78	67.3	90
29-Mar	80	83	85	87	88	87	88	86	83	81	79	77	73	66	60	56	52	50	55	65	74	84	91	95	75.9	95
30-Mar	96	96	97	97	98	98	98	98	98	98	96	92	86	84	83	81	77	75	76	77	79	80	87	93	89.2	98
31-Mar	95	96	96	94	94	93	94	90	82	71	61	49	39	34	34	39	38	38	42	47	55	63	68	71	65.9	96
	73.9	75.0	76.0	77.3	77.3	77.2	77.9	76.9	73.0	67.9	62.6	57.5	52.4	48.9	47.1	46.7	47.9	50.4	54.6	59.1	62.7	66.3	69.7	72.6	Diurnal Average	
	98	97	97	97	98	98	98	98	98	98	96	92	86	84	86	91	93	94	93	94	94	94	95	97	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Janvier - March 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Janvier - March 2017

Maximum Speed: 18 km/h on Mar 13 16:00	Maximum Daily Speed Average: 14.8 km/h on Mar 13	Hours in Service: 744
Minimum Speed Value: 0 km/h on Mar 10 09:00	Minimum Daily Speed Average: 0.9 km/h on Mar 26	Hours of Data: 744
Maximum Diurnal Speed Average: 2.7 km/h at hour 19	Minimum Diurnal Speed Average: 0.2 km/h at hour 9	Hours of Missing Data: 0
Monthly Average Velocity: 1.0 km/h 103.9 deg	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 3 Median = 6 Q ₃ = 9 P ₉₀ = 12 P ₉₉ = 18	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-Mar	NE6	NNE7	NNE5	NNE7	NNE7	NNE8	NNE7	NNE7	NNE8	NNE8	NNE8	NNE7	NNE9	NNE9	NNE10	NNE10	NNE5	ENE2	E1	ESE2	S1	ENE1	W1	SSW1	NNE5.2	NNE10	
2-Mar	ENE0	W1	NNW1	NNW1	W1	S2	S2	S1	NNE1	W2	WNW3	NW2	S8	SSE7	ESE9	SE8	SSE8	ESE6	ESE8	ESE8	SE5	SSE6	SSE6	S4	SSE2.8	ESE9	
3-Mar	SSE2	SSE3	SSE4	S4	S7	S7	S10	S6	SW4	WSW5	SW5	WNW5	WNW2	SW5	SW9	WSW9	W11	WNW8	N5	N4	N5	N10	N12	N11	WSW2.1	N12	
4-Mar	N11	N11	N12	NNE12	N12	N12	N15	NNE14	NNE13	NNE14	N10	N11	NNE11	NNE13	NNE12	N11	N10	NNE11	NNE16	NNE12	NNE10	NNE14	NNE14	NNE10	NNE12.1	NNE16	
5-Mar	NNE6	NNE6	N4	NNE5	NNE5	N4	N4	NNE5	NNE6	NE4	ENE5	NE4	NNE5	NNE6	ENE5	ENE6	NNE7	N4	NE2	NE3	N1	NNE4	N4	N3	NNE4.2	NNE7	
6-Mar	NNW1	NNE1	NNE4	NNE4	N3	N3	N5	N6	N8	NNE10	NNE11	NNE14	NNE12	N9	NNE11	N9	N9	N10	N9	N10	N10	N10	N10	N9	N7.9	NNE14	
7-Mar	N8	N7	N9	N7	N9	N9	N10	N9	N9	N9	N11	NNE11	N13	N12	NNE12	NNE11	NNE11	N9	NNE8	N7	N6	N6	N7	N6	N9.0	NNE13	
8-Mar	NNW3	NNW1	SE1	NNE4	NNE3	NNE2	ENE1	NNE3	NW1	NNE8	NNE6	NNE10	NNE9	NNE9	NNE12	NNE13	NNE12	N8	NNE4	ESE1	ESE1	NNW1	NNE1	E1	NNE4.5	NNE13	
9-Mar	E1	N0	SSW1	S2	S2	S3	S2	S2	SW2	WNW0	NE7	NE4	NE3	E4	ENE4	E7	E5	ENE6	E4	NNE3	NNE1	SE1	ENE1	SSE1	E1.7	E7	
10-Mar	NNE0	SSW1	NNE1	S1	SE0	NNE1	NNW0	S1	WSW0	NE1	N1	NNE5	NNE7	NNE8	NNE10	NE9	NE9	NE7	ENE6	NE5	NE4	NNE2	NNE2	NE2	NE3.1	NNE10	
11-Mar	ENE1	ENE1	ESE1	NNE1	NNE2	N1	N2	N2	N3	NNE4	N3	NE6	NE6	NE8	NE9	ENE7	E7	E7	E6	E7	E7	ESE7	ESE7	NNE2	ENE3.7	NE9	
12-Mar	NNE3	NNE2	NNE1	NNE3	NNE2	NNE2	NNE2	NNE2	NNE4	N3	NNE5	NE7	ESE8	SE9	SSE10	SSE10	S13	SSE11	SE8	SE8	SSE9	SSE8	SSE11	S13	SE3.9	S13	
13-Mar	S12	S12	S13	S11	SSE13	S13	S11	S13	S15	S14	S16	S18	S16	S18	S16	S18	S18	S18	S18	S16	S15	S15	SSW16	SSW15	S14.8	S18	
14-Mar	SSW15	SSW14	SSW12	SSW12	SSW12	SSW11	SSW11	SSW11	SSW11	SSW11	SSW11	SSW11	SSW11	SSW11	SSW11	SSW7	S5	SSE7	SE9	SSE9	SSE8	S10	S8	SSE5	SE2	SSW9.1	SSW15
15-Mar	S7	S7	S8	SSE6	S6	S8	S7	SSW11	SSW11	SSW9	SSW9	SSW10	SSW9	SSW10	SSW7	W10	W6	W7	WSW6	SW4	S4	SSW5	SSW5	SW3	N1	SSW5.8	SSW11
16-Mar	NNE5	N4	NNE3	NNE3	NNE4	NNE8	N7	NNE9	NNE12	NNE14	NNE18	NNE17	NNE14	NNE15	NNE14	NNE13	NNE12	NNE12	NNE10	NE9	NE7	NE7	NE6	NE5	NNE9.4	NNE18	
17-Mar	NE4	ENE3	ESE6	ESE8	SSE5	SSE6	SSE7	SSE8	S10	S10	S10	S7	SSE10	SSE11	S11	SSW13	SSW11	S12	SSE6	S10	S11	SSW7	S4	ESE2	SSE7.1	SSW13	
18-Mar	ESE3	SSE4	SE6	E6	E5	ENE5	NE4	NE4	ENE6	ENE7	E7	SE10	SE9	ENE9	E9	ENE10	ENE9	NE6	ENE6	ENE6	NE7	NNE7	NNW3	N2	ENE5.1	ENE10	
19-Mar	WNW2	W5	W10	W11	W15	W14	W15	W12	W11	W12	WSW13	W14	W17	W18	W18	W17	W16	W13	W12	W12	WNW11	NW8	WNW10	W12	W12.2	W18	
20-Mar	W15	W11	WNW8	WNW9	WNW9	WNW7	NNE8	NNE7	NNE10	NNE8	NE7	NNW2	WNW5	WNW3	WSW6	W8	WNW6	NW4	NNE3	NE6	NNE3	NNW1	SE1	SSW0	NW3.9	W15	
21-Mar	S1	SSW2	S2	S2	S2	SSE2	S2	S1	WNW2	NW2	S7	SSE11	SSE13	SSE13	SSE13	SE10	SSE10	SE11	ESE11	SE10	SE10	SE10	SSE10	SE8	SSE6.3	SSE13	
22-Mar	SE8	SE7	ESE6	ESE5	ESE5	ENE4	NE4	ENE6	E6	E6	ENE6	NE9	NE9	NE8	NE6	NNE7	NNE6	NNE5	NNE8	NNE5	N4	N2	W1	ENE1	ENE4.1	NE9	
23-Mar	S3	SSW2	SW1	SW2	SW0	NE2	SE1	SSE1	NNE4	NNE5	NNE2	NE2	N5	N4	NE6	NE8	ENE8	ENE7	ENE5	ENE6	E6	E5	ESE4	SSE2	ENE2.6	NE8	
24-Mar	SSE3	S2	SW1	SSE2	SSE3	SSE5	S6	S5	S8	S10	S10	SE8	ESE7	ESE10	SE12	SSE12	SE8	ESE7	SE4	ENE5	E5	E6	ENE5	ENE5	SE5.0	SE12	
25-Mar	ENE4	ENE6	ENE5	ENE6	E5	E5	ESE3	E3	SE3	WSW1	W1	N5	NE7	ENE7	ENE9	NE9	NE8	NE6	ESE6	NNE1	E2	SSE1	E1	ENE1	ENE3.7	ENE9	
26-Mar	N1	E1	WSW1	NE0	ENE2	ESE3	ESE1	SW1	SW3	SSW6	WSW3	W3	S2	S5	SSW5	WSW2	NNE3	NNE3	NNE3	S3	SE2	S1	SSE1	SSE3	S0.9	SSW6	
27-Mar	SSE2	S3	SSE4	SE4	SE3	ESE3	ESE1	ESE1	WNW1	E5	SE7	E6	SE9	SE12	S12	S11	SE9	S9	SSE9	SSE9	SSE5	SSE6	SE5	SE3	SE5.2	SE12	
28-Mar	SE4	ESE6	SE6	ESE6	ESE5	ESE5	ESE4	SE6	SE6	S9	S9	S9	S6	S7	SE8	SSE10	S10	SSE9	SE10	SSE11	SSW8	S6	SSE3	S7	SSE6.5	SSE11	
29-Mar	SSW8	S5	SE4	SSW2	SSE1	SE3	S2	SSW4	SW4	SW6	SSW7	SSW6	SW5	W6	W4	NNE5	NNE5	NE6	NE5	ENE7	E6	NNE2	NNE3	NNE2	S1.0	SSW8	
30-Mar	NNE3	N2	N1	WSW1	WSW2	SW2	SW3	WSW2	WSW1	ENE5	E4	E4	ESE3	ENE2	NNE4	N3	N4	NNE3	NNE2	ENE4	NE3	E3	ESE2	S2	NE1.2	ENE5	
31-Mar	SSE2	SSE2	SSE3	S4	SSE3	SSE4	S3	W3	SW5	SW5	WSW5	SSW9	SW12	SSW17	SSW18	SSW18	SSW17	S16	S15	S11	S14	S11	S9	S8	SSW8.4	SSW18	

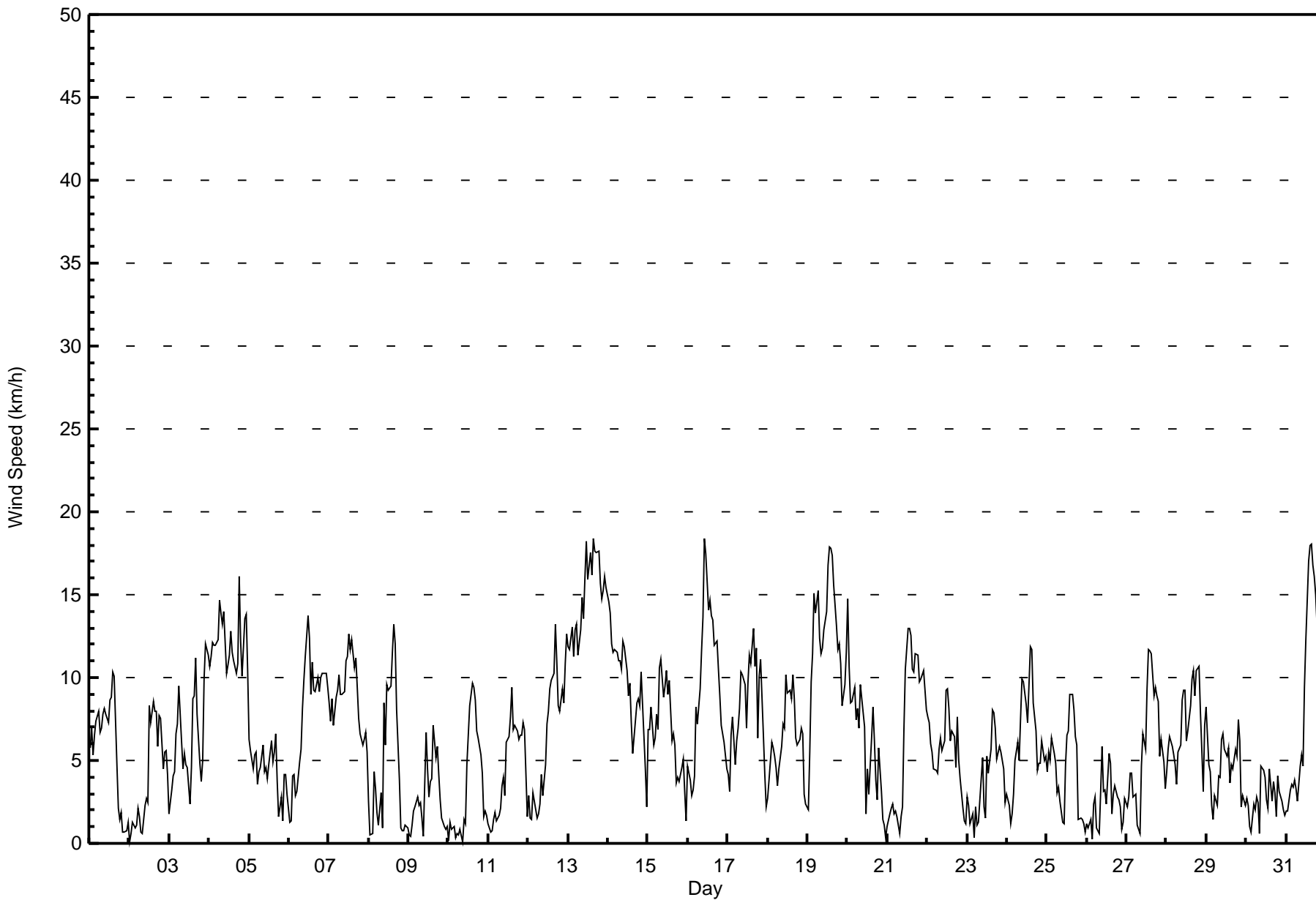
SE0.5 SSE0.6 SE0.8 ESE0.7 ESE0.5 ESE0.7 ESE0.3 ESE0.3 NE0.2 NE0.5 E0.6 ENE1.2 E1.3 ESE1.4 ESE1.6 ESE1.1 E1.3 E2.0 E2.7 ESE2.6 ESE1.8 ESE1.4 ESE1.2 ESE0.7	Diurnal Average
W15 SSW14 S13 NNE12 W15 W14 W15 NNE14 S15 NNE14 NNE18 S18 W17 W18 SSW18 S18 S18 S18 S18 S18 S18 S16 S15 S15 SSW16 SSW15	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Janvier - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Janvier - March 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	334	44.89	44.89
6 - 11	312	41.94	86.83
12 - 19	98	13.17	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
Janvier - March 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	33	64	18	27	19	20	17	27	36	13	16	12	7	11	4	10	334
6 - 11	38	50	29	22	14	17	25	30	41	20	4	3	10	8	1	0	312
12 - 19	5	28	0	0	0	0	2	5	26	14	1	1	16	0	0	0	98
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	76	142	47	49	33	37	44	62	103	47	21	16	33	19	5	10	744

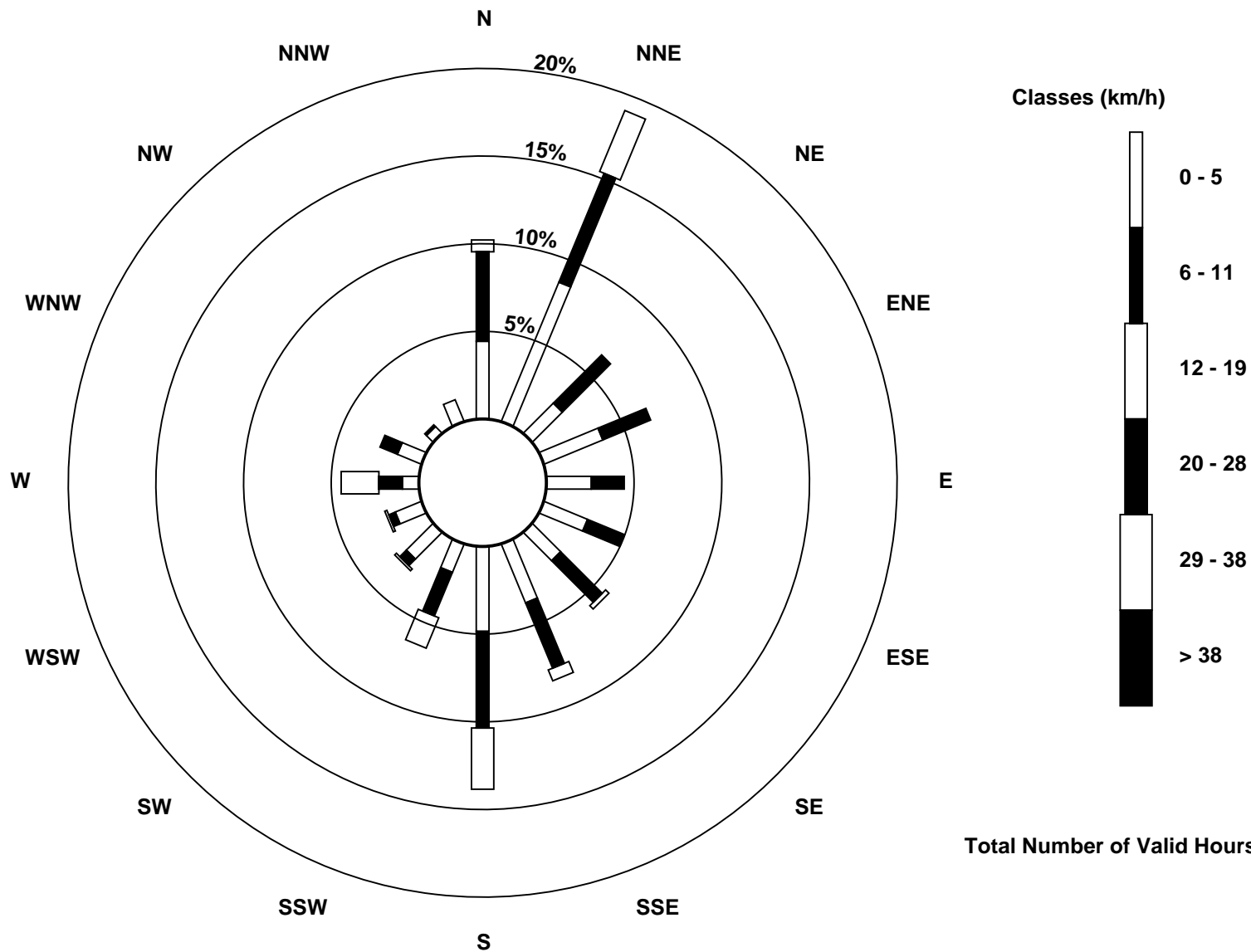
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Wind Speed (WS) - km/h
Janvier (AMS 22)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Janvier - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 km/h on Mar 31 14:00																	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 Mar 21 05:00																										
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-Mar	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	1	1	1	1	1	1	1	3	
2-Mar	1	1	1	1	1	1	1	1	1	1	1	2	3	3	3	3	3	2	3	3	2	2	2	1	3	
3-Mar	1	1	1	2	2	2	3	2	2	1	1	1	2	2	3	3	4	3	3	2	2	4	4	4	4	
4-Mar	4	3	4	4	4	4	5	5	5	4	3	3	4	4	3	3	3	3	4	4	3	3	3	3	5	
5-Mar	2	2	1	2	1	1	1	2	2	2	2	1	2	2	2	2	2	2	1	1	1	1	1	1	2	
6-Mar	1	1	1	1	1	2	2	2	3	3	3	4	4	3	4	3	3	4	3	4	4	4	4	4	4	
7-Mar	3	3	4	3	4	4	4	3	3	3	4	4	4	4	4	4	4	3	2	2	2	2	2	2	4	
8-Mar	2	1	1	1	2	1	1	2	2	2	2	3	4	3	4	4	4	3	2	1	1	1	1	1	4	
9-Mar	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	
10-Mar	1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3	2	2	2	1	1	1	1	1	3	
11-Mar	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	
12-Mar	1	1	1	1	1	1	1	1	1	1	2	3	4	4	3	4	4	3	3	2	3	3	3	4	4	
13-Mar	3	3	4	3	4	4	3	4	4	4	5	5	5	5	5	5	6	5	6	4	5	4	4	4	6	
14-Mar	4	4	3	3	3	3	3	3	4	4	3	3	3	3	3	3	2	2	3	3	3	4	1	2	4	
15-Mar	3	2	2	2	2	2	2	3	4	3	3	3	3	3	2	3	2	1	1	1	1	1	1	1	4	
16-Mar	2	1	1	1	1	2	3	2	3	4	4	4	4	4	3	3	3	3	2	2	2	2	2	1	4	
17-Mar	2	2	2	2	2	2	2	2	3	3	3	3	4	3	4	5	4	4	2	3	3	2	2	1	5	
18-Mar	2	2	3	2	2	1	1	1	2	2	3	3	3	4	3	3	3	2	2	2	2	2	2	2	4	
19-Mar	2	3	4	4	6	5	5	3	4	4	4	5	6	6	6	6	5	4	4	4	5	5	4	5	6	
20-Mar	6	4	3	3	4	3	2	2	2	2	3	3	3	3	3	3	3	2	2	1	1	1	1	1	6	
21-Mar	1	1	1	1	0	1	1	1	1	1	6	3	4	4	4	4	3	4	4	3	4	4	4	3	6	
22-Mar	3	3	2	2	2	1	1	2	2	2	3	2	2	2	2	2	1	1	3	2	1	1	1	1	3	
23-Mar	1	1	1	1	1	1	1	1	2	2	1	2	3	2	3	2	2	2	2	1	1	2	2	1	3	
24-Mar	1	1	1	1	1	1	1	1	2	3	2	3	3	3	4	4	3	2	2	2	2	2	1	2	4	
25-Mar	1	2	2	2	2	1	1	2	1	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	
26-Mar	1	1	1	1	1	2	1	1	1	2	1	1	2	2	2	2	2	1	1	2	2	1	1	1	2	
27-Mar	1	1	1	1	1	1	1	1	1	2	2	3	4	4	4	5	3	3	3	3	2	2	2	1	5	
28-Mar	1	1	2	1	1	1	1	2	2	3	3	3	3	3	3	3	3	3	3	3	2	2	1	2	3	
29-Mar	2	2	1	1	1	1	1	1	2	2	3	2	3	2	2	2	2	2	1	2	2	1	1	1	3	
30-Mar	1	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2	2	2	1	2	1	1	1	1	2	
31-Mar	1	1	1	1	1	1	1	1	1	2	2	4	4	6	6	6	6	5	5	5	3	4	3	2	2	6
																	Diurnal Maximum									



Wood Buffalo Environmental Association
Summary of Hour Averages

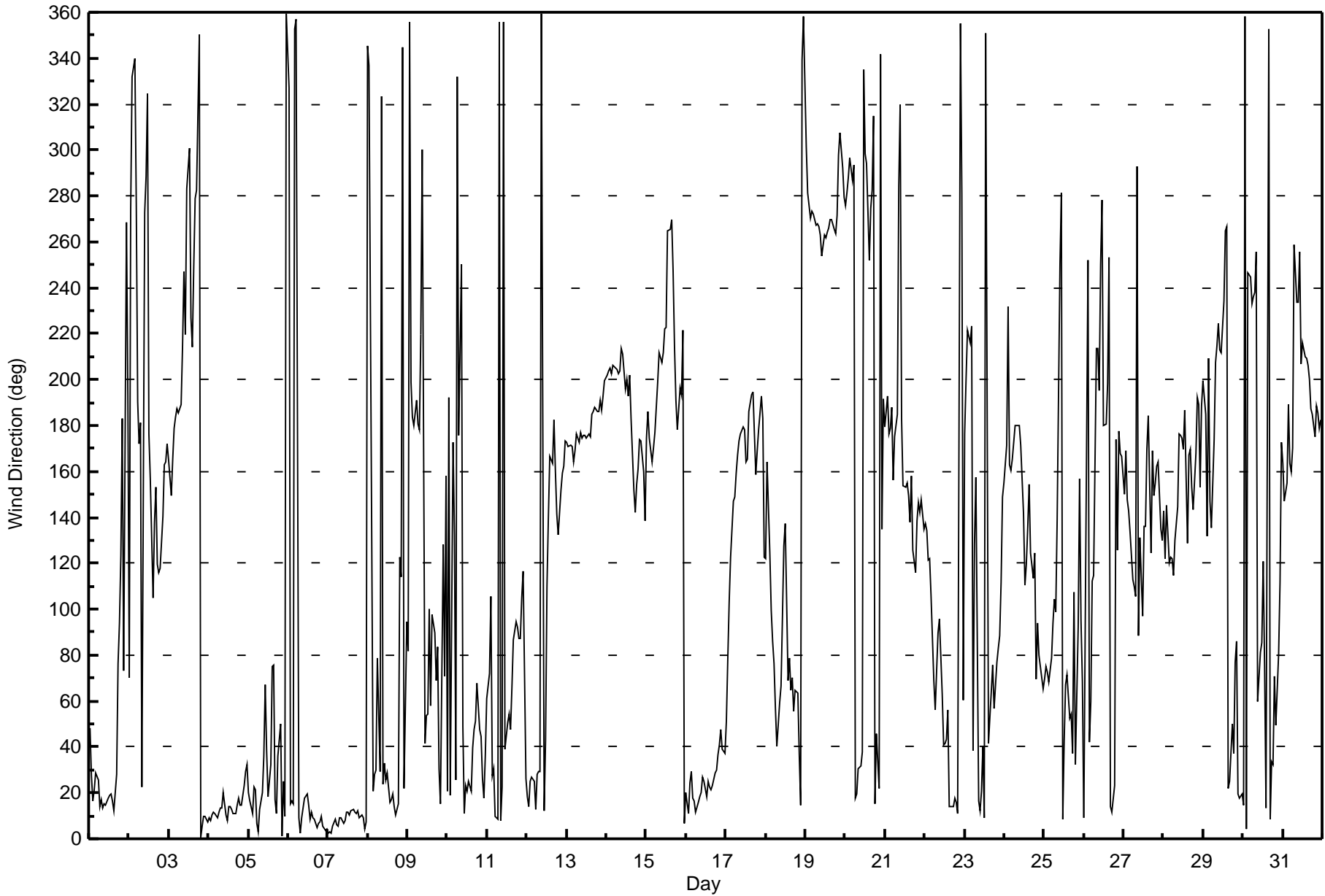
Wind Direction (WD) - deg
Janvier - March 2017

Direction of Maximum Speed: 185 deg on Mar 13 16:00 Direction of Maximum Daily Speed Average: 179.8 deg on Mar 13																						Hours in Service: 744			
Direction of Minimum Speed: 250 deg on Mar 10 09:00 Direction of Minimum Daily Speed Average: 0.9 deg on Mar 26																						Hours of Data: 744			
Monthly Average Direction: 192.6 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-Mar	48	27	17	21	29	25	14	17	13	15	15	18	19	19	17	12	28	76	94	123	183	73	269	193	22.3
2-Mar	70	273	332	340	276	190	172	181	22	272	289	325	176	157	105	138	153	119	116	118	140	163	164	172	146.8
3-Mar	165	150	165	179	184	187	186	189	214	247	220	283	301	227	214	249	279	282	350	0	6	10	10	7	254.8
4-Mar	9	8	10	12	11	9	11	13	13	20	10	8	14	14	13	11	11	14	18	15	15	23	29	33	14.6
5-Mar	20	16	11	23	22	7	3	13	20	36	67	39	18	32	75	75	17	11	36	50	1	25	10	359	26.5
6-Mar	327	15	17	15	353	357	9	2	9	13	18	19	14	8	12	9	8	5	6	7	10	5	4	4	9.3
7-Mar	2	3	3	5	8	6	5	9	9	7	8	12	11	11	12	13	12	11	12	9	10	9	4	7	8.6
8-Mar	345	337	129	21	28	30	78	29	324	24	33	26	29	16	17	19	14	10	15	123	114	345	22	95	21.1
9-Mar	82	356	199	184	180	191	180	178	219	300	42	54	54	100	58	98	89	69	84	30	15	128	71	158	87.5
10-Mar	21	192	19	173	133	26	332	176	250	49	11	23	21	25	21	40	48	51	68	48	45	26	18	36	38.0
11-Mar	61	72	105	27	30	10	8	356	8	22	356	39	51	54	48	66	87	95	92	87	87	105	116	27	65.2
12-Mar	18	14	25	27	25	13	28	30	29	360	12	43	110	140	166	163	182	161	141	132	152	159	162	173	140.5
13-Mar	173	171	171	171	164	169	176	173	177	175	176	176	175	177	175	185	186	188	186	186	191	187	193	200	179.8
14-Mar	202	204	205	203	206	205	204	203	204	214	211	196	200	193	202	183	152	142	154	161	174	173	160	138	192.6
15-Mar	175	186	174	164	170	177	188	199	212	207	211	222	223	265	265	269	247	214	191	178	197	193	221	6	207.3
16-Mar	20	11	24	29	18	17	11	16	19	20	27	25	19	25	23	22	23	28	30	37	41	48	39	38	24.8
17-Mar	51	78	103	123	147	149	159	167	173	176	179	178	164	166	186	193	195	176	159	169	178	193	183	123	168.0
18-Mar	122	164	124	99	86	76	56	41	59	67	96	127	137	69	79	65	70	55	65	63	37	15	339	358	76.7
19-Mar	301	281	276	270	273	272	267	268	267	263	254	263	262	264	266	270	270	266	263	271	298	308	292	280	270.8
20-Mar	276	281	288	296	286	294	18	20	31	32	38	335	298	294	252	274	282	315	15	45	22	342	135	192	317.2
21-Mar	180	193	177	179	188	156	175	185	284	320	183	154	153	155	149	138	158	126	116	138	146	142	147	135	148.2
22-Mar	137	134	122	122	106	69	56	73	90	96	63	41	41	43	56	14	14	14	18	16	11	355	281	60	60.2
23-Mar	176	200	222	216	224	38	128	158	17	12	21	40	9	351	41	53	64	76	57	77	83	88	112	149	61.7
24-Mar	155	172	232	163	161	165	180	180	180	180	171	142	111	120	136	155	125	113	124	69	94	80	70	65	138.2
25-Mar	69	75	73	68	79	94	104	99	139	250	281	9	42	67	72	52	54	37	107	32	92	157	95	68	68.7
26-Mar	9	91	252	42	60	112	115	214	214	195	250	278	180	181	198	253	14	12	23	174	126	177	168	167	185.6
27-Mar	150	169	148	143	134	113	110	106	293	88	131	97	136	136	169	184	125	169	149	155	162	164	135	130	146.1
28-Mar	143	122	145	120	123	122	115	130	144	176	176	174	169	187	129	167	170	153	143	168	193	189	153	189	157.9
29-Mar	199	185	132	210	147	135	174	207	215	224	213	212	234	265	267	22	25	50	37	77	86	20	18	20	179.3
30-Mar	15	358	4	246	244	233	236	238	256	60	81	85	121	75	13	353	9	33	32	71	50	81	111	173	50.4
31-Mar	163	147	155	189	163	160	170	259	234	233	256	207	216	210	209	206	200	187	185	175	188	186	179	183	196.8
137.3 150.4 135.5 111.4 117.9 122.5 116.1 101.6 39.9 36.6 93.7 68.1 93.0 106.3 101.8 101.8 93.0 97.5 97.0 104.7 119.1 110.1 105.9 121.1																									
Diurnal Average																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Janvier - March 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Janvier - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Mar 25 11:00 Minimum Value: 0 deg on Mar 27 08:00 Percentiles: P ₁ = 11 P ₁₀ = 17 Q ₁ = 21 Median = 27 Q ₃ = 37 P ₉₀ = 59 P ₉₉ = 92																			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-Mar	21	23	20	18	14	14	16	15	16	23	23	35	24	29	25	20	18	28	70	47	76	70	36	55	76
2-Mar	93	52	40	29	29	33	28	93	72	64	36	69	39	40	30	33	32	21	21	23	36	25	22	20	93
3-Mar	38	22	26	28	20	16	13	28	30	21	36	27	67	66	32	28	32	34	54	47	47	34	29	34	67
4-Mar	35	32	28	24	23	25	22	21	23	19	27	27	24	23	22	23	23	21	15	20	19	15	14	13	35
5-Mar	15	15	18	17	17	35	27	24	18	41	33	30	37	31	54	39	20	22	26	18	30	17	19	26	54
6-Mar	66	75	21	27	37	41	26	33	27	24	20	17	23	40	24	39	33	35	33	33	33	38	33	33	75
7-Mar	35	44	40	52	42	39	36	34	32	42	34	32	27	33	25	35	26	24	30	27	26	28	29	27	52
8-Mar	51	85	47	9	31	44	48	17	80	14	53	18	31	28	27	18	24	29	40	75	65	44	17	43	85
9-Mar	36	41	48	32	24	14	22	15	31	83	17	55	78	61	72	30	34	22	14	30	24	38	61	53	83
10-Mar	91	73	92	64	64	86	75	29	88	67	79	36	35	23	23	24	21	19	20	21	19	17	8	26	92
11-Mar	23	37	28	9	23	22	12	34	26	17	38	28	26	29	22	35	31	24	21	21	18	18	20	69	69
12-Mar	11	58	36	16	36	13	13	16	19	46	34	27	42	45	37	34	21	24	22	21	23	24	22	19	58
13-Mar	20	21	19	21	22	22	19	21	18	20	19	18	21	22	21	17	19	16	16	16	20	16	16	19	22
14-Mar	19	19	19	18	18	16	17	17	22	20	22	23	25	18	38	47	28	22	22	20	21	27	82	82	
15-Mar	33	23	20	20	22	16	25	17	22	25	21	23	27	26	35	36	31	29	23	18	18	12	38	78	78
16-Mar	12	18	32	22	14	15	22	15	18	15	13	15	18	18	17	17	14	14	13	14	19	21	20	20	32
17-Mar	47	65	29	20	34	30	26	24	24	25	26	35	33	30	27	23	21	19	20	19	17	15	35	56	65
18-Mar	55	54	34	29	18	26	36	25	24	23	27	31	45	38	35	27	30	24	19	21	16	20	62	50	62
19-Mar	57	36	31	23	25	23	20	22	24	22	27	25	22	22	25	25	24	22	21	20	52	69	44	37	69
20-Mar	25	27	41	42	37	50	16	19	12	19	25	93	73	84	60	42	56	65	62	17	35	52	58	91	93
21-Mar	38	35	29	29	33	32	29	66	52	46	95	38	30	29	30	29	29	22	24	26	27	28	29	29	95
22-Mar	30	27	26	23	30	24	22	23	31	35	44	22	19	23	22	22	19	17	16	19	22	43	56	33	56
23-Mar	26	36	32	48	84	26	59	40	43	39	93	97	57	65	45	25	22	21	28	21	21	26	39	42	97
24-Mar	35	26	21	52	24	18	16	16	18	22	28	35	33	34	28	27	26	31	33	32	38	25	25	26	52
25-Mar	27	23	31	21	22	19	25	35	53	81	103	65	27	35	24	21	19	28	45	60	61	50	43	60	103
26-Mar	92	72	59	89	42	55	77	85	38	18	38	20	86	47	45	90	66	25	16	58	72	67	52	30	92
27-Mar	20	23	14	14	11	12	6	0	90	53	38	49	42	34	28	22	27	22	26	25	24	20	23	24	90
28-Mar	19	16	24	15	13	21	26	19	22	24	25	26	45	51	40	30	27	28	23	20	15	24	26	21	51
29-Mar	17	26	19	44	29	12	37	20	27	29	35	31	53	45	69	46	46	26	19	20	20	38	15	28	69
30-Mar	20	27	4	81	33	30	30	20	83	32	34	43	68	87	58	78	53	47	20	16	28	33	35	41	87
31-Mar	27	21	25	37	26	25	31	21	27	32	41	33	27	27	23	23	23	16	16	19	16	14	14	14	41
	93	85	92	89	84	86	77	93	90	83	103	97	86	87	72	90	66	65	70	75	76	70	62	91	
Diurnal Maximum																									



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	March 14, 2017	Last Calibration	February 1, 2017
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	13:13	End Time (MST)	18:12
Gas Cert Reference	LL107937	Station temp.	22 Deg C
Cal Gas Concentration	49.7 ppm	Cal Gas Exp Date	September 8, 2018
Calibrator Make/Model	API T700	Serial Number	2462
ZAG Make/Model	API T701	Serial Number	135
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2586

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-637	-637
Analyzer IP address	192.168.1.43		Lamp voltage	788	788
Calculated slope	1.014298	1.000070	Chamber temp	45.0	45.2
Calculated intercept	-1.021111	-0.178672	Pressure	703.1	698.2
Analyzer Background	15.6	15.9	Flow	0.496	0.493
Analyzer Coefficient	0.969	0.989	Intensity	90	91

Analyzer make Thermo 43i Analyzer serial # 1152430006

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
As Found Zero	5000	0.0	0.0	-0.4	----
As Found Span	5007	78.6	780.2	758.4	1.029
calibrator zero	5000	0.0	0.0	-0.4	----
high point	5007	78.6	780.2	780.5	1.000
second point	5007	39.3	390.1	389.1	1.002
third point	5009	19.6	194.5	196.1	0.992
as left zero	5000	0.0	0.0	0.4	----
as left span	5009	78.6	779.9	782.5	0.997
Average Correction Factor					0.998

Corrected As found 758.8 Previous response 770.2 % change 1.5%

Notes:

Sample inlet filter changed after as founds & Adjusted span.

Calibration Performed By: Aswin Sasi Kumar



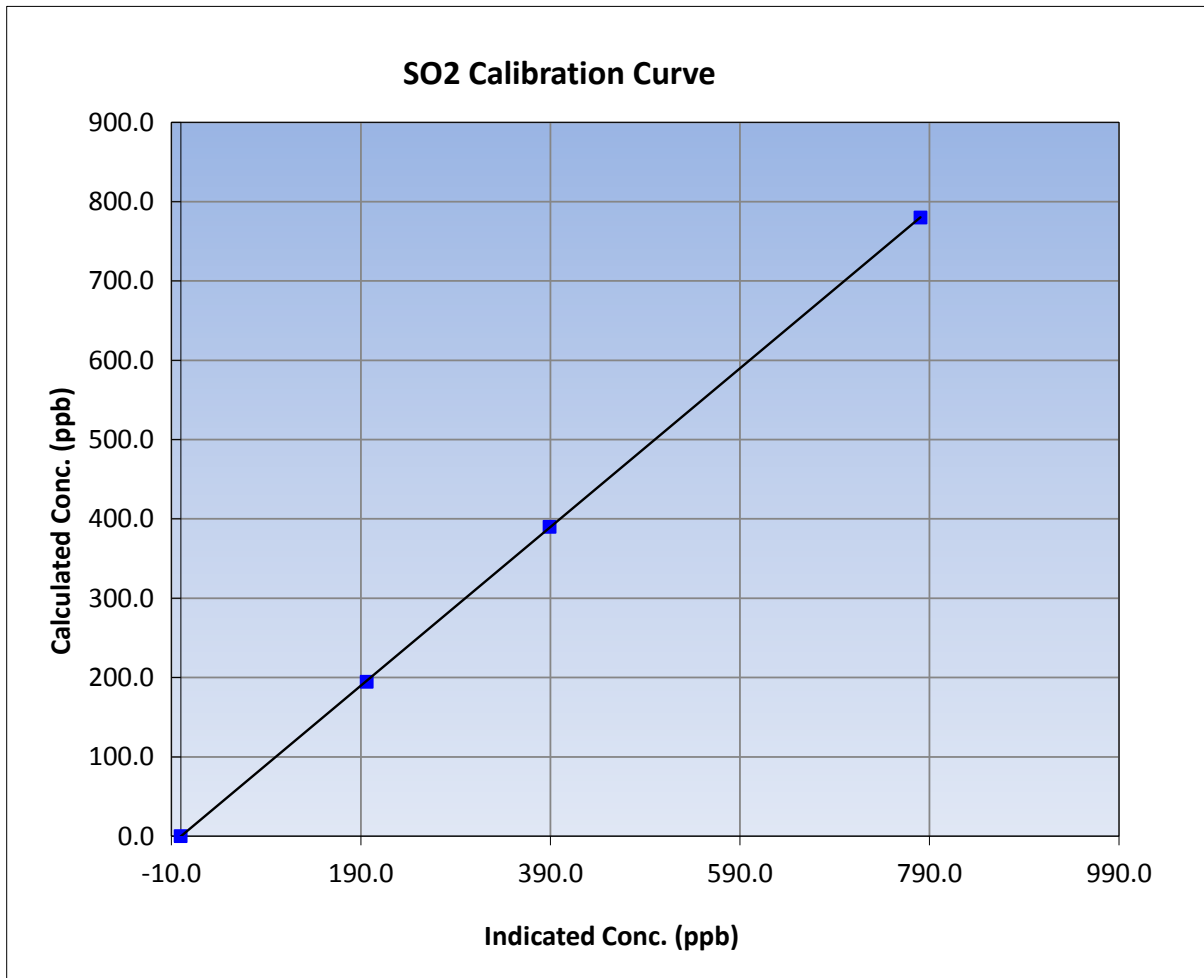
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 14, 2017	Previous Calibration	February 1, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	13:13	End Time (MST)	18:12
Analyzer make	Thermo 43i	Analyzer serial #	1152430006

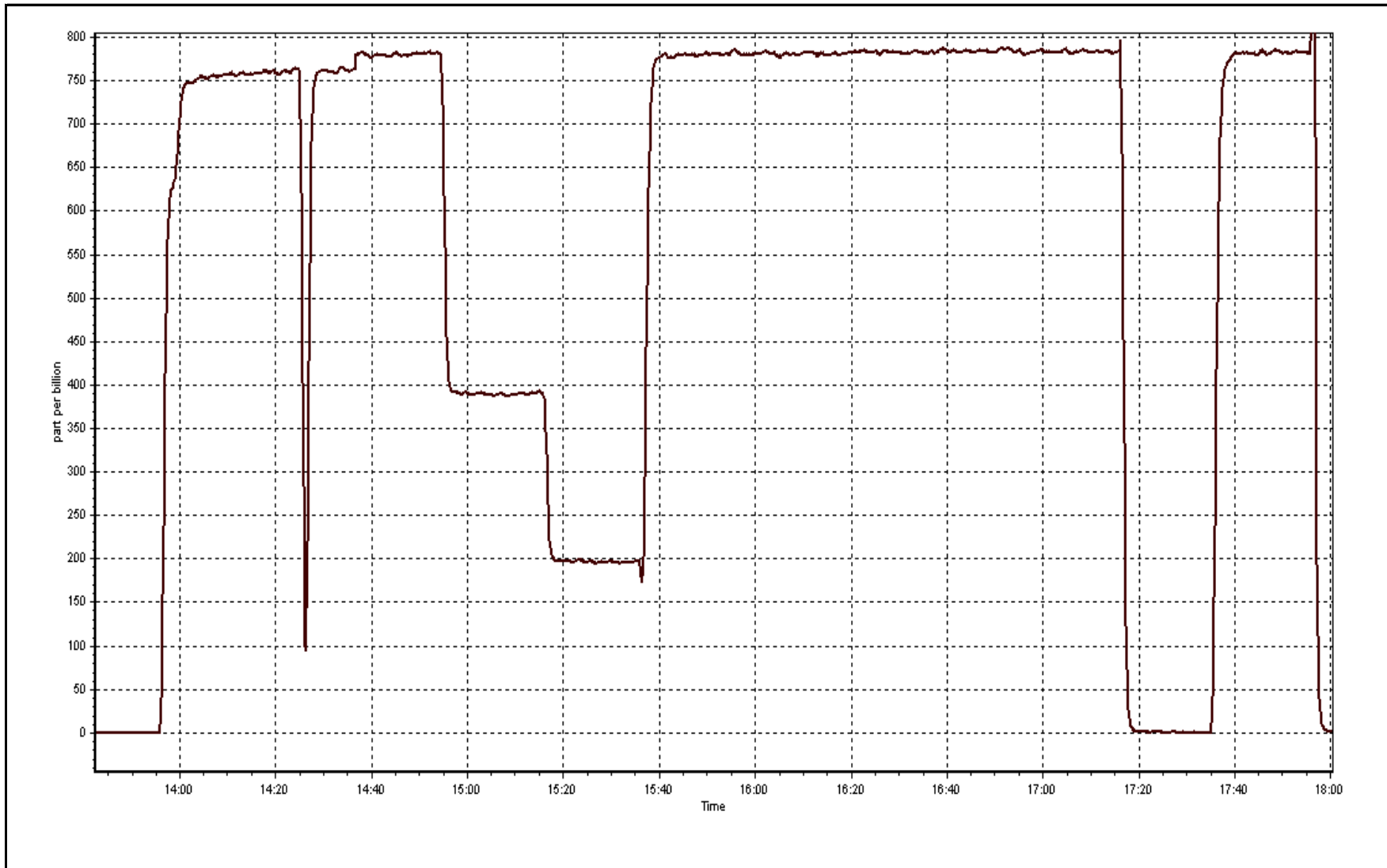
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999989
780.2	780.5	0.9996		
390.1	389.1	1.0025	Slope	1.000070
194.5	196.1	0.9917		
			Intercept	-0.178672



SO2 Calibration Plot

Date: March 14, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	March 15, 2017	Last Calibration	February 7, 2017
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	11:38	End Time (MST)	14:15
Gas Cert Reference	LL36481	Station temp.	22 Deg C
Cal Gas Concentration	5.35 ppm	Cal Gas Exp Date	2/13/2018
Calibrator Make/Model	API T700	Serial Number	2658
Dil air Make/Model	API T701	Serial Number	135
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2586
SO2 gas concentration	49.7 ppm	SO2 gas cert/exp	LL107937 09/08/2018

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-648	-648
Analyzer IP address	192.168.1.44		Lamp voltage	1010	1007
Calculated slope	0.990441	1.000421	Chamber temp	45	45
Calculated intercept	-0.476702	-0.304125	Pressure	666.7	663.7
Analyzer Background	3.81	3.69	Flow	0.421	0.415
Analyzer Coefficient	1.281	1.245	Intensity	90	91
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1151680031
Converter make/model	CDN-101	Converter serial #	503

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
As Found Zero	5000	0.0	0.0	0.3	----
As Found Span	5000	74.8	80.0	81.8	0.978
SO2 Scrubber					
calibrator zero	5000	0.0	0.0	0.3	----
High point	5000	74.8	80.0	80.3	0.997
Second point	5000	37.4	40.0	40.3	0.993
Third point	5000	18.7	20.0	20.3	0.986
As Left Zero	5000	0.0	0.0	0.4	----
As Left Span	5000	74.8	80.0	80.5	0.994
Average Correction Factor					0.992

Corrected As found	81.5	Previous response	81.3	% change	-0.3%
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Notes:

Sample inlet filter changed after as founds. Adjusted span.

Calibration Performed By: Aswin Sasi Kumar



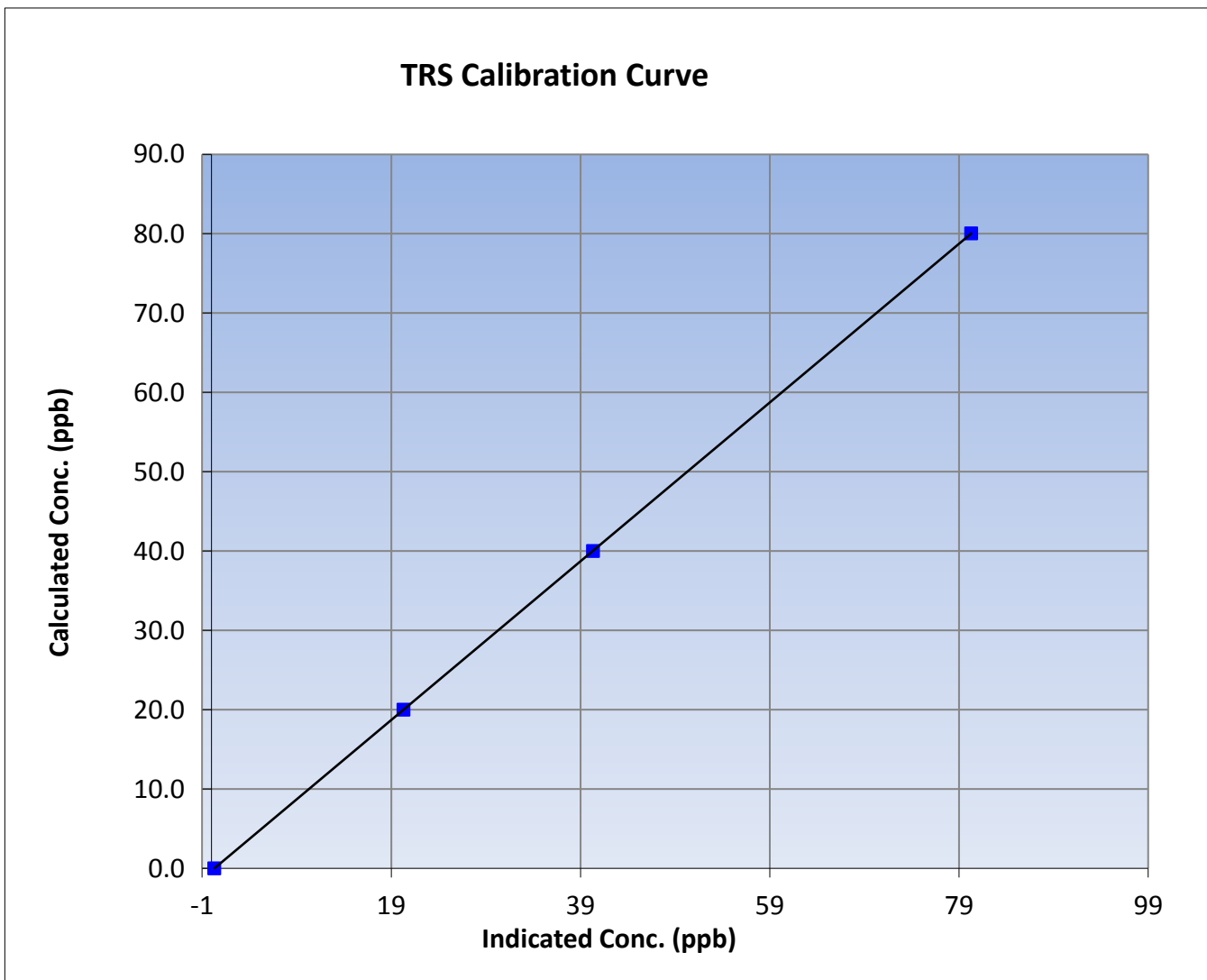
Wood Buffalo Environmental Association TRS Calibration Report

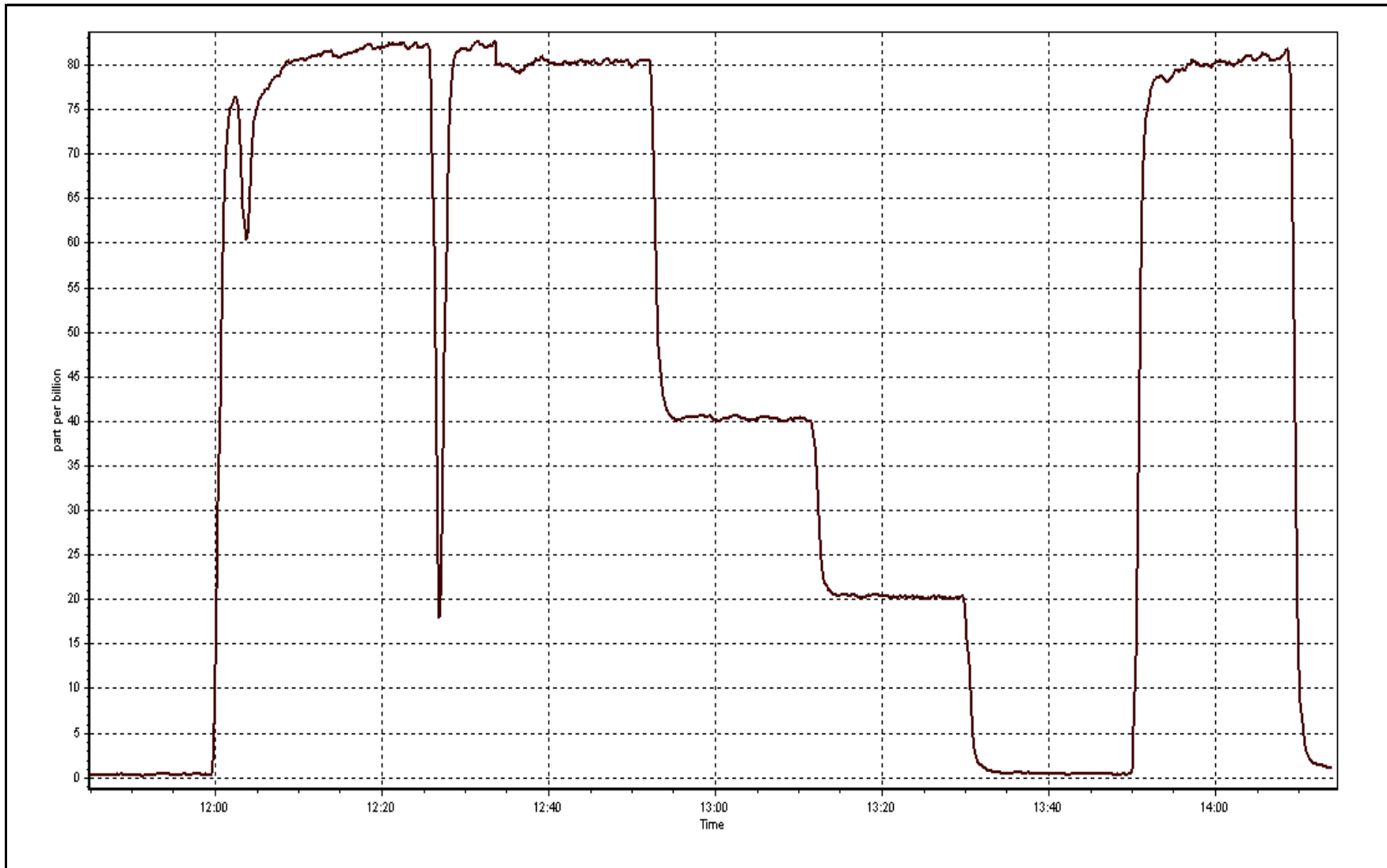
Station Information

Calibration Date	March 15, 2017	Previous Calibration	February 7, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	11:38	End Time (MST)	14:57
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1151680031

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	1.000000
80.0	80.3	0.9967		
40.0	40.3	0.9925	Slope	1.000421
20.0	20.3	0.9857		
			Intercept	-0.304125







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	March 10, 2017	Last Calibration	February 15, 2017
Station Name	Janvier	Station Number	AMS 22
Reason:	Other: <input type="checkbox"/> Cylinder Change		
Start Time (MST)	14:07	End Time (MST)	15:35
Gas Cert Reference	LL107937	Cal Gas Expiry Date	Sept 8 2018
CH4 Cal Gas Conc.	509.0 ppm	CH4 Equiv Conc.	1056.3 ppm
C3H8 Cal Gas Conc.	199.0 ppm	Station temp.	21 Deg C
Calibrator Model	Teledyne API T700	Serial Number	2447
ZAG make/model	Teledyne API T701	Serial Number	135
DACS make/model	Campbell Scientific CR3000	Serial Number	2586

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	75.2
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	174.9	174.7
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	1.013072	0.988348	Carrier Pressure	36.7	36.7
THC Calc intercept	0.000000	0.000000	Fuel Pressure	44.9	44.9
NMHC Calc slope	1.020495	0.991103	Air Pressure	33.7	33.7
NMHC Calc intercept	0.000000	0.000000			

Analyzer make Thermo 55i Analyzer serial # 1501663728

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
As Found Zero	5000	0.0	0.00	0.00	----
As Found Span	5000	78.6	16.60	16.90	0.983
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	16.60	16.80	0.988
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.988

Corrected As found 16.90 Previous response 16.39 % change -3.0%

Notes:

Replacing H2 cylinder. Zero and span response remained almost the same after the change. No adjustments made.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
	5000	0	0.00	0.00	----
	5000	78.6	8.60	8.74	0.984
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	8.60	8.68	0.991
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.991

Corrected As found 8.74 Previous response 8.43 % change -3.5%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
	5000	0	0.00	0.00	----
	5000	78.6	8.00	8.16	0.981
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	8.00	8.12	0.985
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.985

Corrected As found 8.16 Previous response 7.96 % change -2.5%



Wood Buffalo Environmental Association

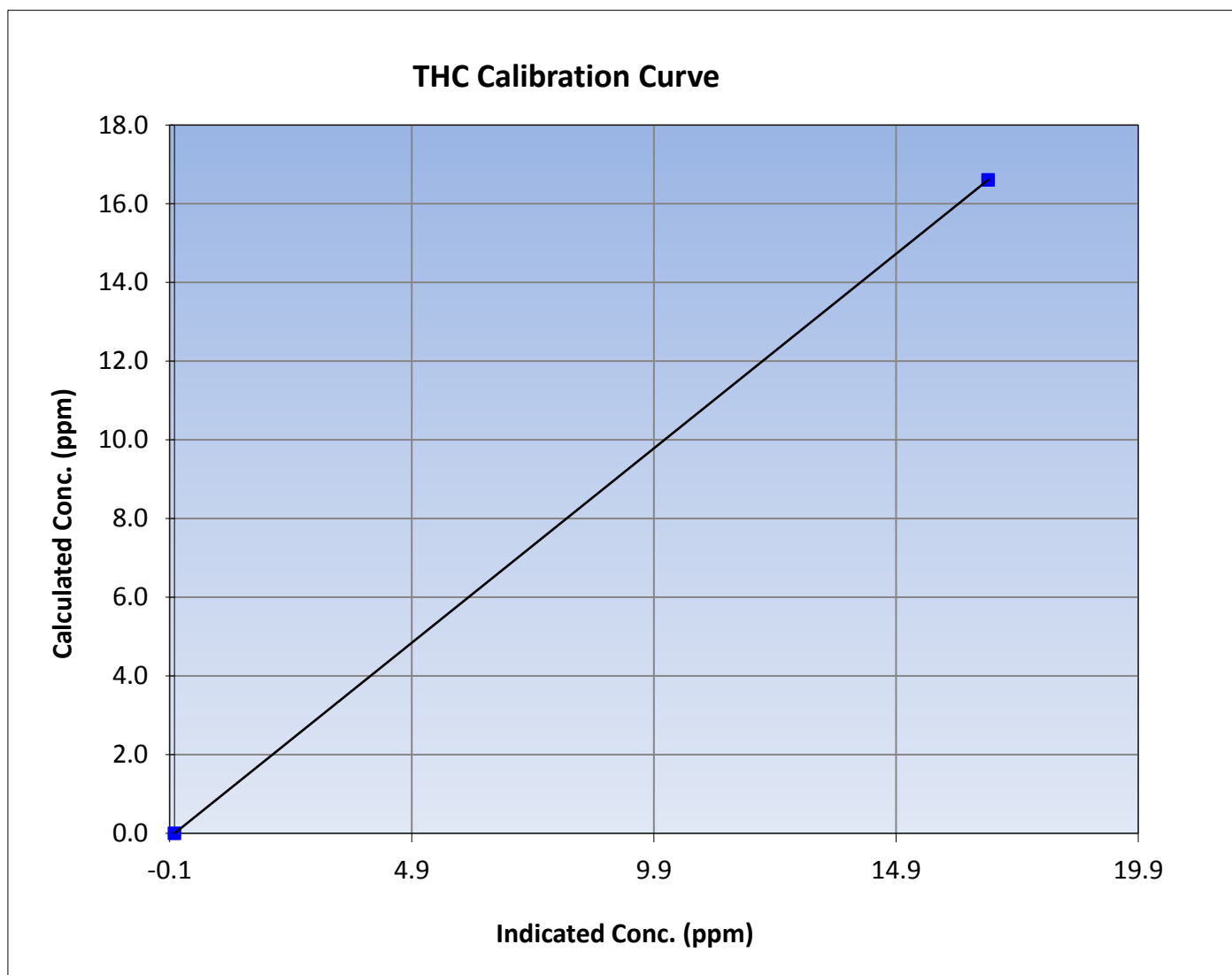
THC Calibration Summary

Station Information

Calibration Date	March 10, 2017	Previous Calibration	February 15, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	14:07	End Time (MST)	15:35
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	1.000000
16.60	16.80	0.9883		
			Slope	0.988348
			Intercept	0.000000





Wood Buffalo Environmental Association

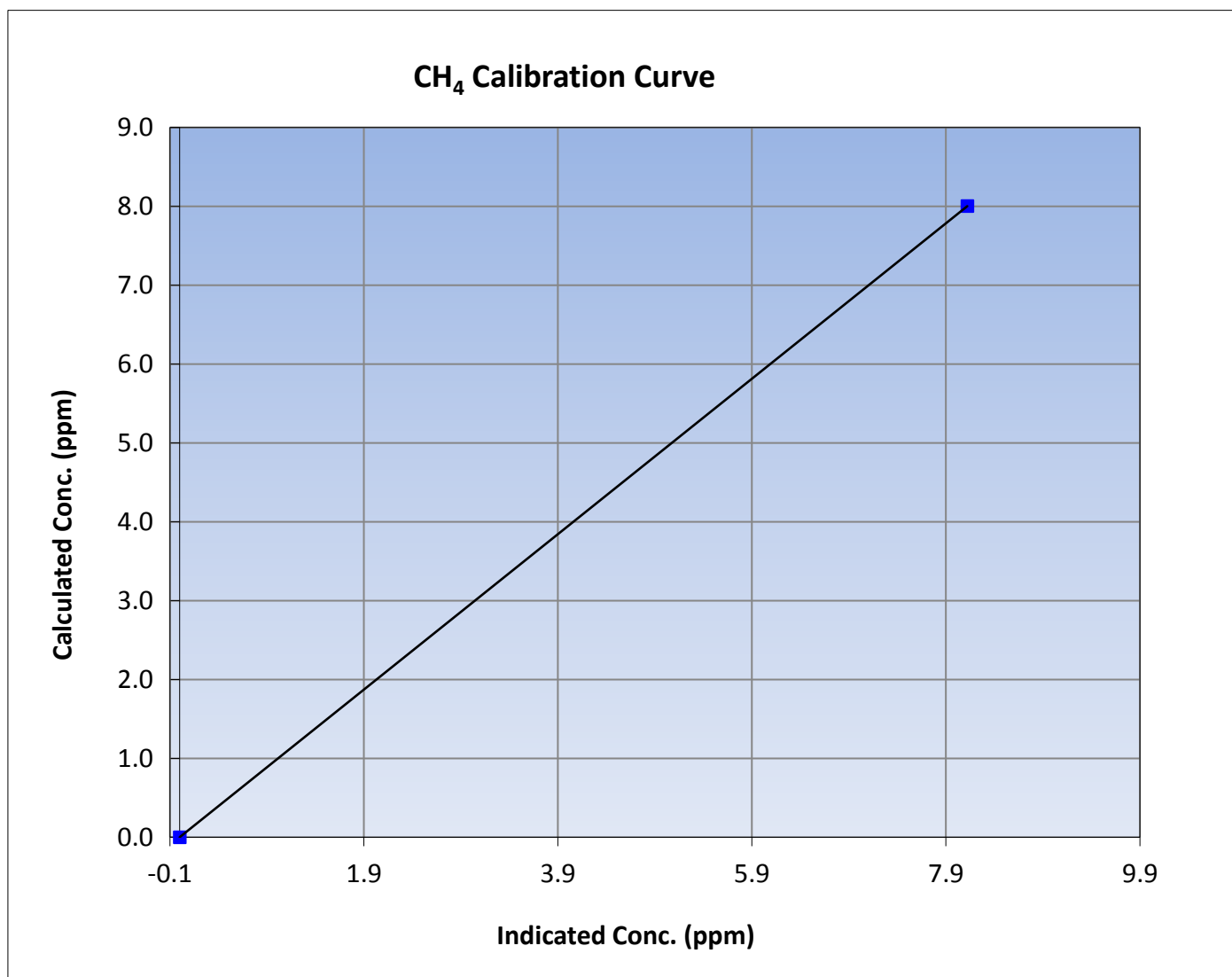
CH₄ Calibration Summary

Station Information

Calibration Date	March 10, 2017	Previous Calibration	February 15, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	14:07	End Time (MST)	15:35
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	1.000000
8.00	8.12	0.9854		
			Slope	0.985404
			Intercept	0.000000





Wood Buffalo Environmental Association

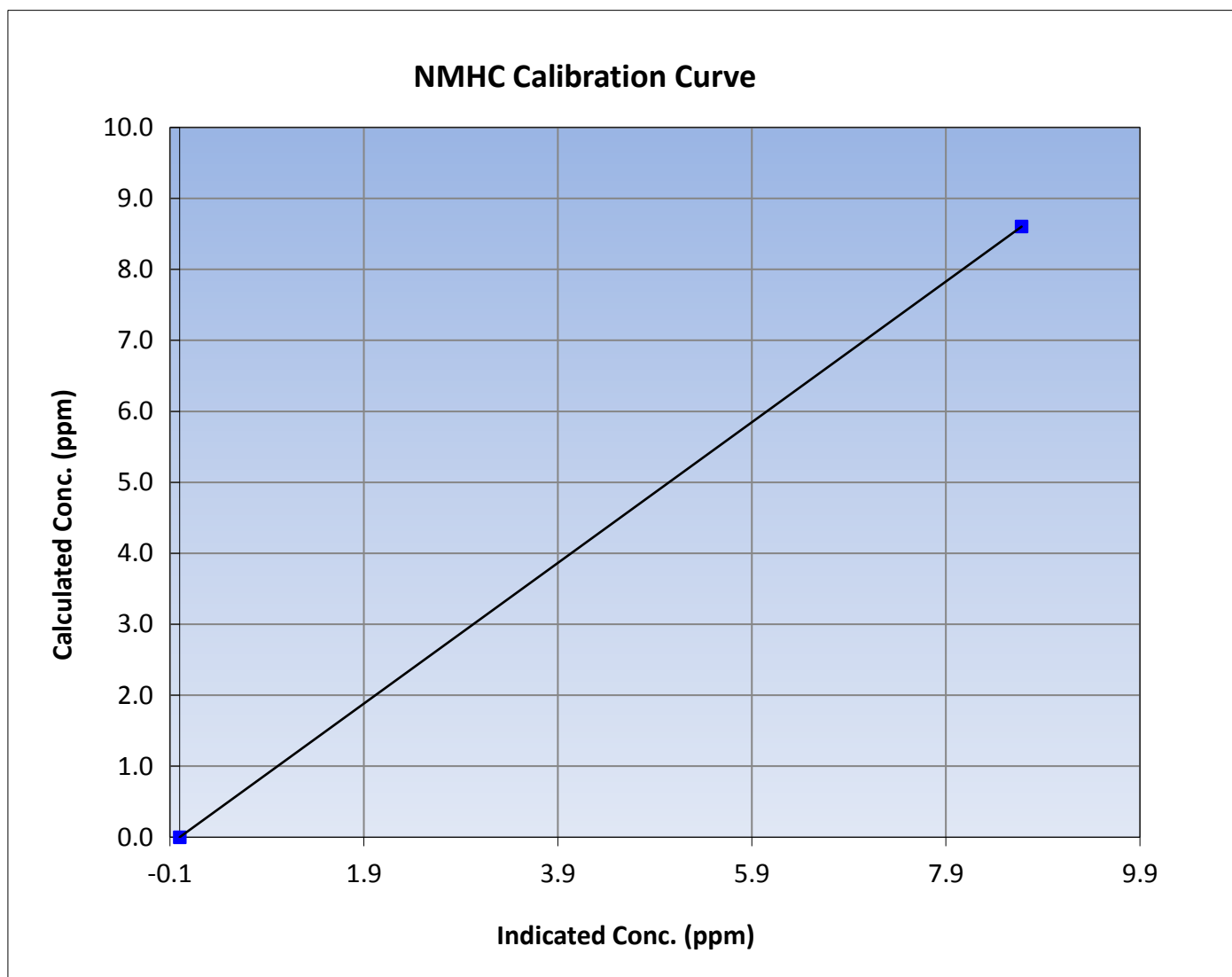
NMHC Calibration Summary

Station Information

Calibration Date	March 10, 2017	Previous Calibration	February 15, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	14:07	End Time (MST)	15:35
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

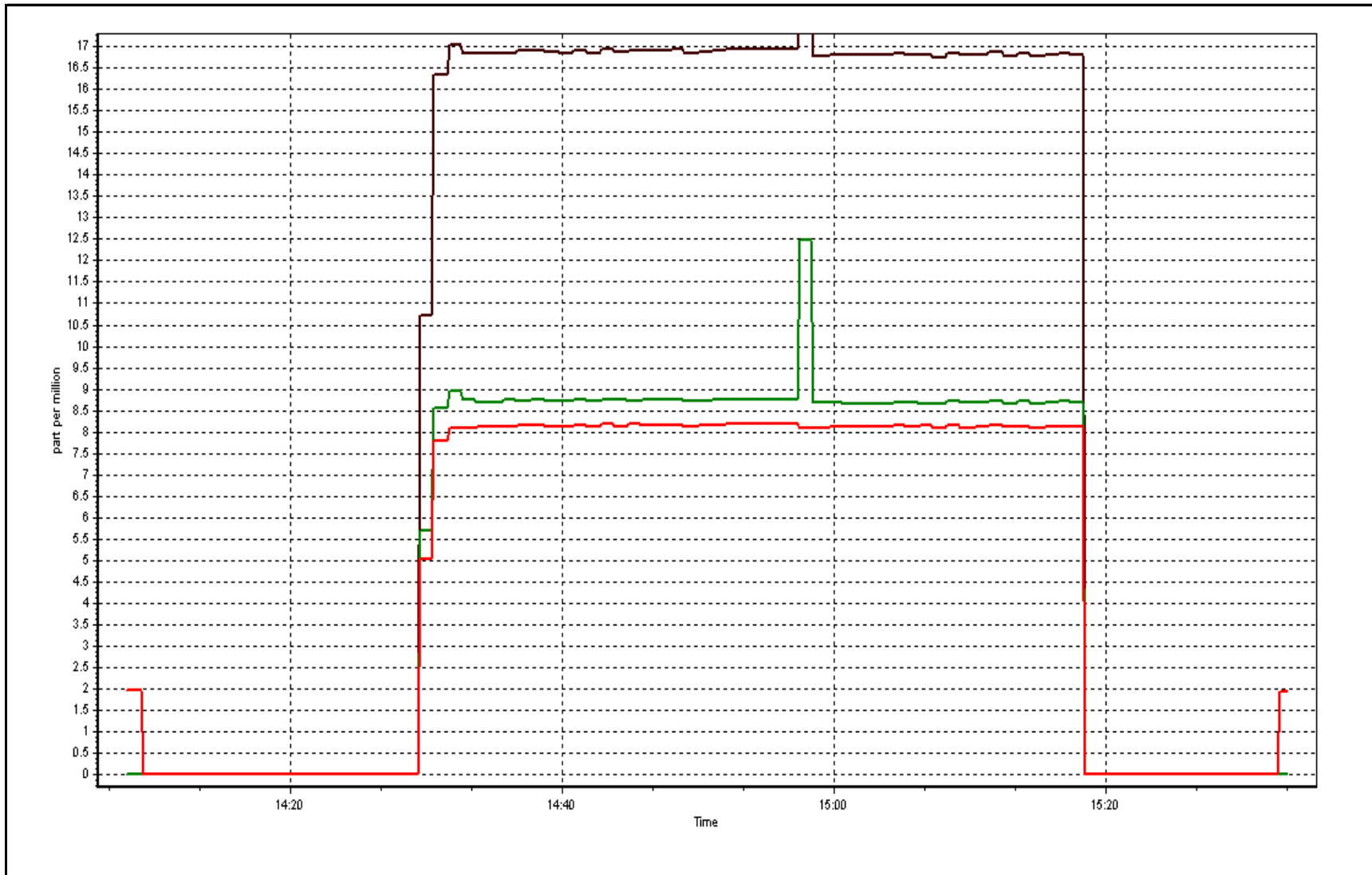
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	1.000000
8.60	8.68	0.9911		
			Slope	0.991103
			Intercept	0.000000



THC Calibration Plot

Date: March 10, 2017





Wood Buffalo Environmental Association THC / NMHC Calibration Report

version 02-2017

Station Information

Calibration Date	March 14, 2017	Last Calibration	February 2, 2017
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	13:13	End Time (MST)	18:23
Gas Cert Reference	LL107937	Cal Gas Expiry Date	September 8, 2018
CH4 Cal Gas Conc.	509.0 ppm	CH4 Equiv Conc.	1056.3 ppm
C3H8 Cal Gas Conc.	199.0 ppm	Station temp.	21 Deg C
Calibrator Model	Teledyne API 700	Serial Number	2447
ZAG make/model	Teledyne API 701	Serial Number	135
DACS make/model	Campbell Scientific CR3000	Serial Number	2586

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	75.2
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.1
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.993719	1.004024	Carrier Pressure	36.7	36.7
THC Calc intercept	0.052286	0.030235	Fuel Pressure	44.9	44.9
NMHC Calc slope	0.994411	1.014681	Air Pressure	33.7	33.7
NMHC Calc intercept	0.005957	-0.012268			

Analyzer make Thermo 55i Analyzer serial # 1501663728

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	78.6	16.60	16.54	1.004
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	16.60	16.54	1.004
second point	5000	39.3	8.30	8.17	1.016
third point	5000	19.6	4.14	4.10	1.010
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	78.6	16.60	16.57	1.002
Average Correction Factor					1.010

Corrected As found 16.54 Previous response 16.66 % change 0.7%

Notes:

Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	78.6	8.60	8.49	1.013
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	8.60	8.49	1.013
second point	5000	39.3	4.30	4.24	1.014
third point	5000	19.6	2.15	2.15	0.998
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	78.6	8.60	8.55	1.006
Average Correction Factor					1.009

Corrected As found 8.49 Previous response 8.65 % change 1.8%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	78.6	8.00	8.05	0.994
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	8.00	8.05	0.994
second point	5000	39.3	4.00	3.93	1.018
third point	5000	19.6	2.00	1.95	1.023
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	78.6	8.00	8.02	0.998
Average Correction Factor					1.012

Corrected As found 8.05 Previous response 8.01 % change -0.5%



Wood Buffalo Environmental Association

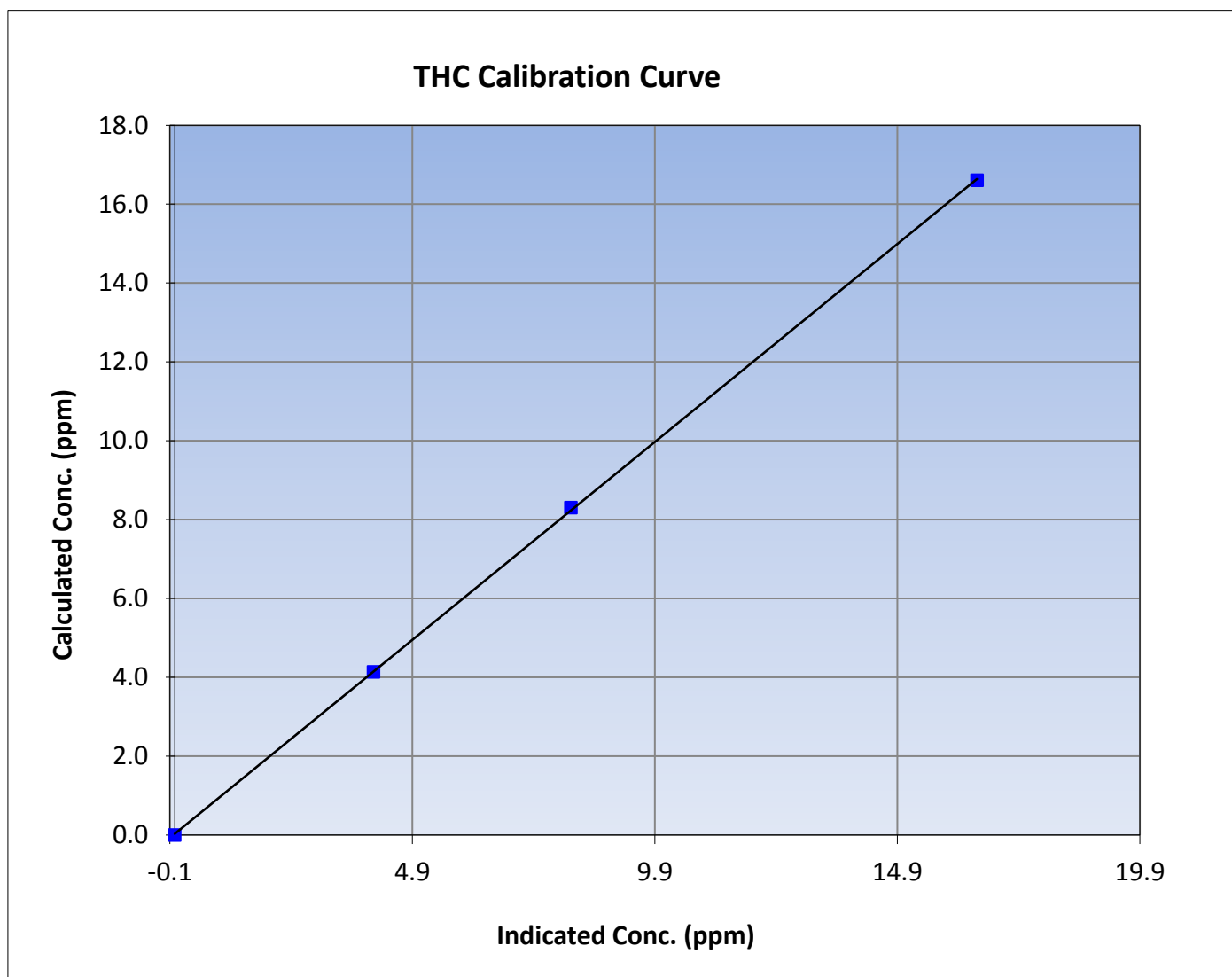
THC Calibration Summary

Station Information

Calibration Date	March 14, 2017	Previous Calibration	February 2, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	13:13	End Time (MST)	18:23
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999955
16.60	16.54	1.0039		
8.30	8.17	1.0162	Slope	1.004024
4.14	4.10	1.0099		
			Intercept	0.030235





Wood Buffalo Environmental Association

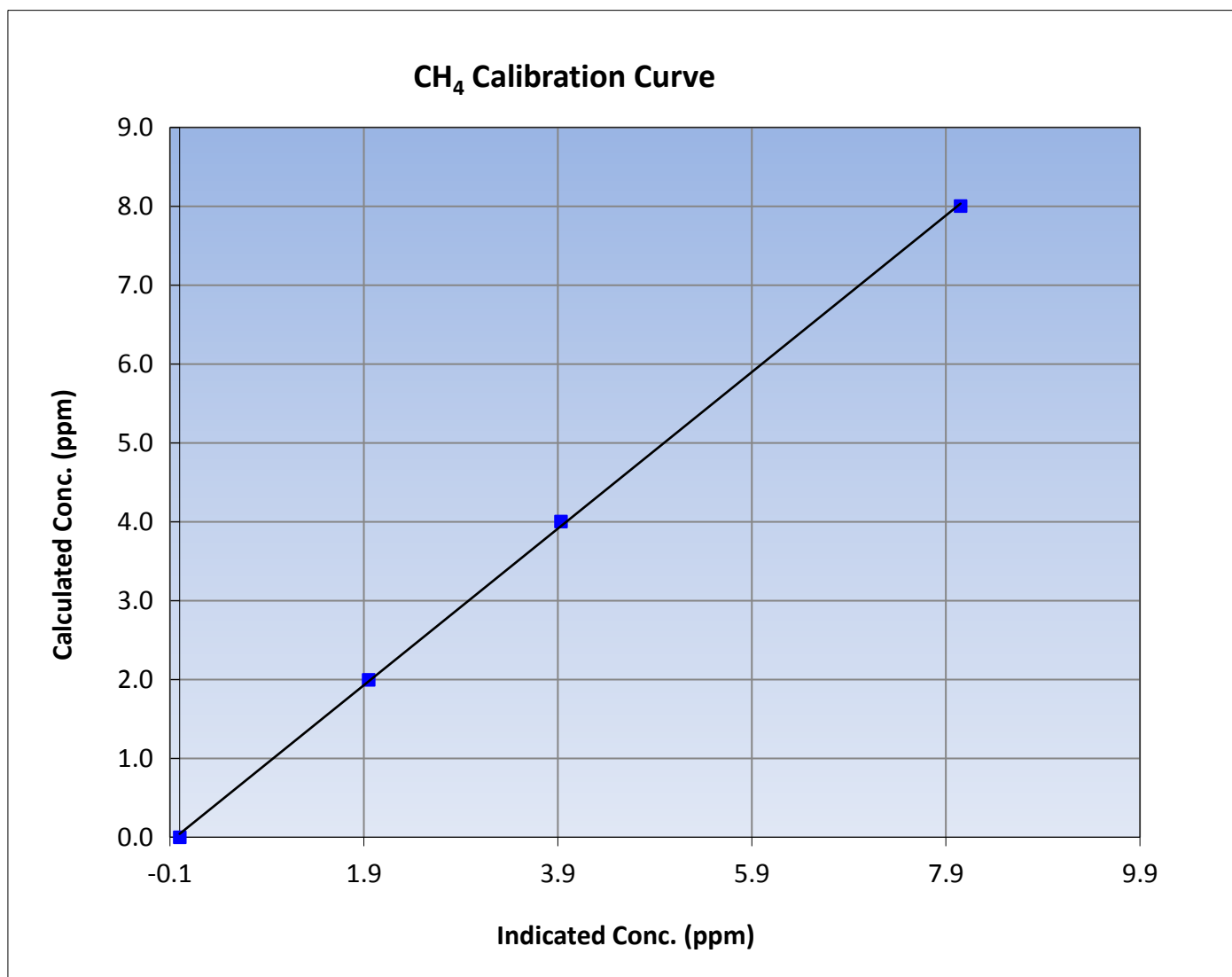
CH₄ Calibration Summary

Station Information

Calibration Date	March 14, 2017	Previous Calibration	February 2, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	13:13	End Time (MST)	18:23
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999818
8.00	8.05	0.9940		
4.00	3.93	1.0180	Slope	0.992702
2.00	1.95	1.0232		
			Intercept	0.042289





Wood Buffalo Environmental Association

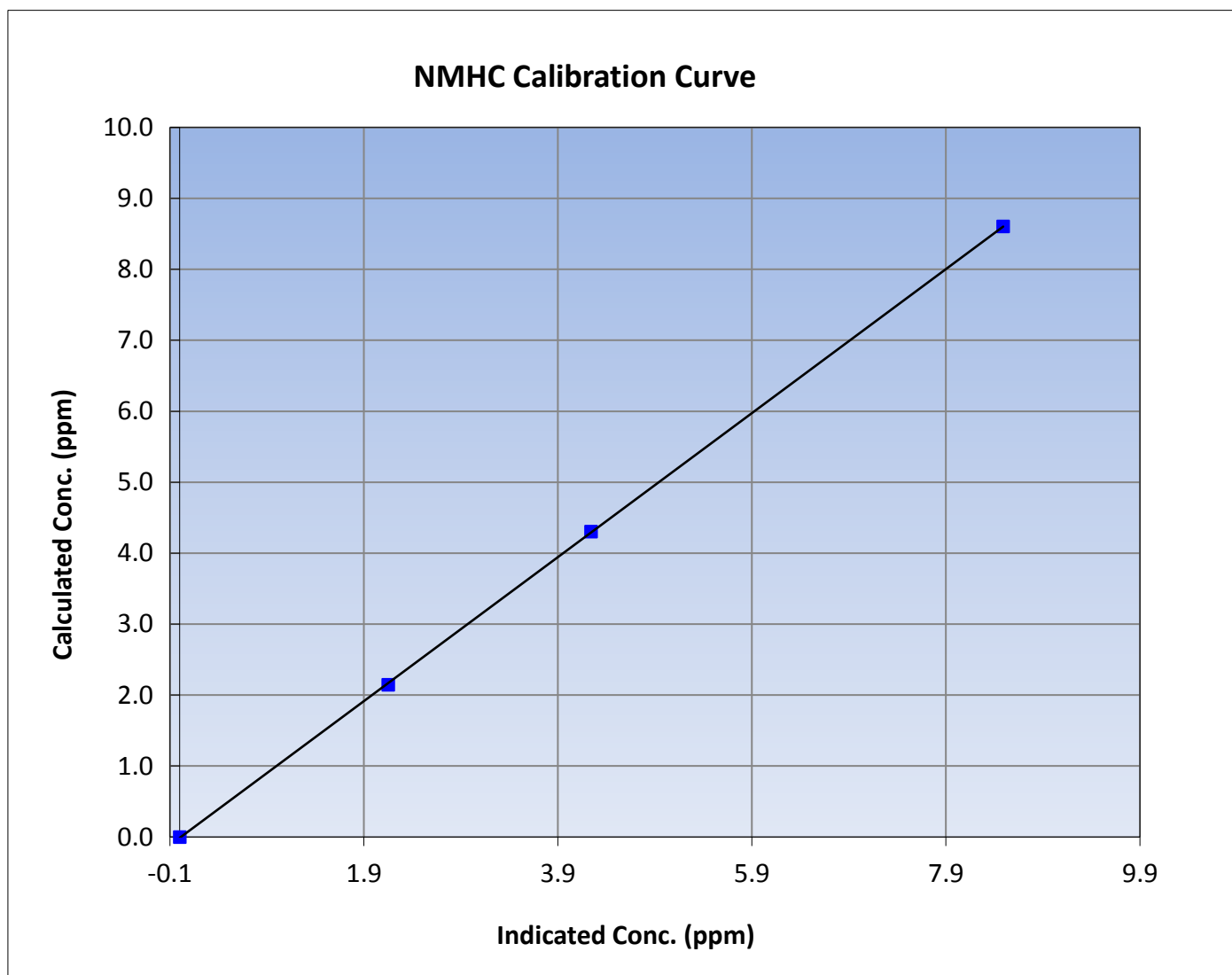
NMHC Calibration Summary

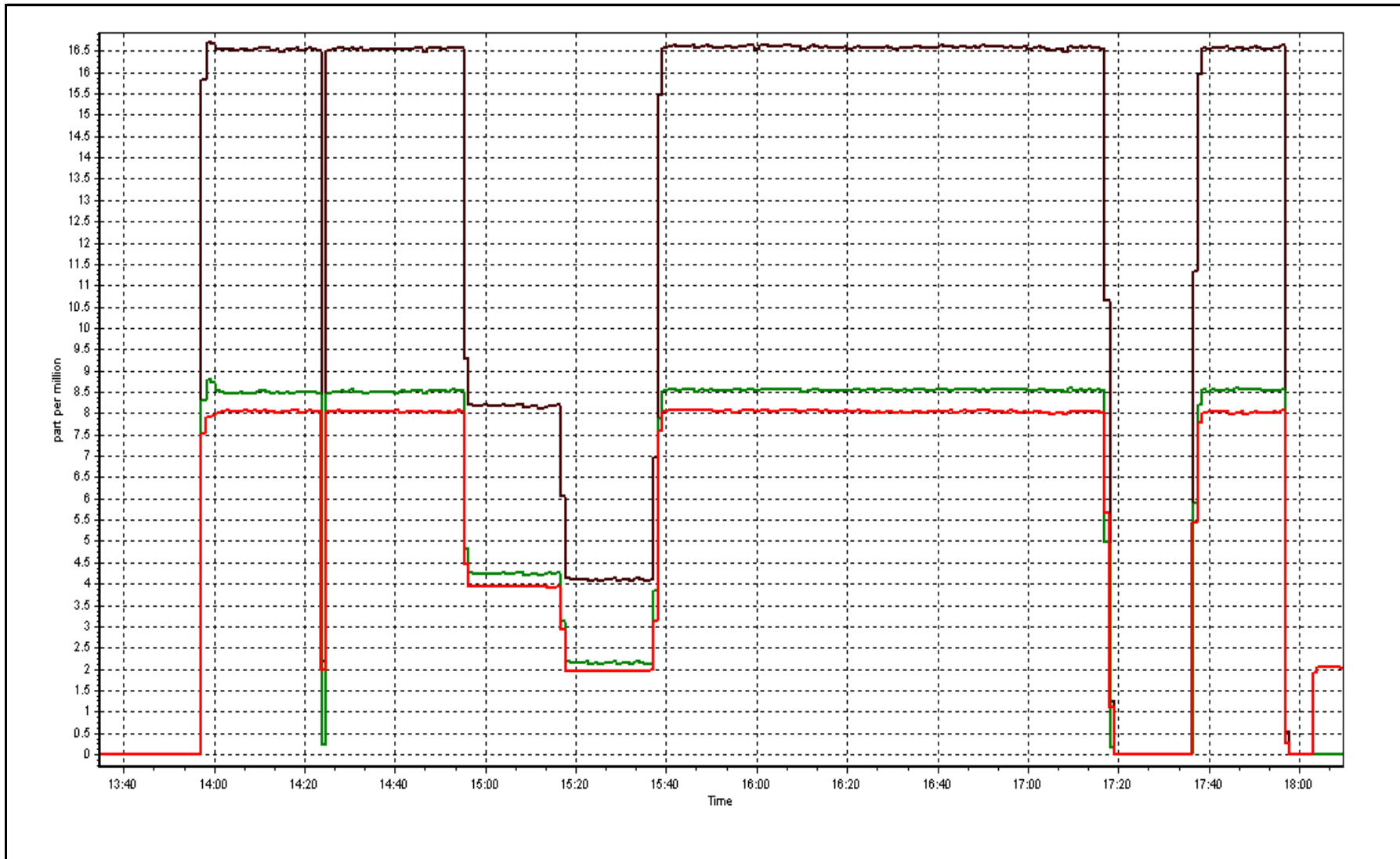
Station Information

Calibration Date	March 14, 2017	Previous Calibration	February 2, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	13:13	End Time (MST)	18:23
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999979
8.60	8.49	1.0133		
4.30	4.24	1.0145	Slope	1.014681
2.15	2.15	0.9978		
			Intercept	-0.012268







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	March 15, 2017	Previous Calibration	February 3, 2017
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	8:04	End Time (MST)	11:39
O3 Source	T700 Calibrator (W/P)	Last O3 Gen Cal	Oct 31 2016
Reference GPT Date:	3/14/2017	Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	2462
ZAG make/model	Teledyne API T701	Serial Number	135
DACS make/model	Campbell Scientific CR3000	Serial Number	2586

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	26.5	25.2
Analyzer IP address	192.168.1.48		Lamp temp.	53.6	53.6
Calculated slope	1.037902	1.008758	Pressure	688.7	688.4
Calculated intercept	-4.996894	-3.812804	Flow cell A	0.764	0.764
Analyzer Background	-2.6	-2.6	Flow cell B	0.738	0.737
Analyzer Coefficient	1.047	1.088	Cell A Intensity	90944	90979
			Cell B Intensity	84114	84109

Analyzer make Thermo 49i Analyzer serial # 1227254861

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp O3 Gen Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
As Found Zero	5000	0.00	0.0	0.0	----
As Found Span	5000	1012	413.5	394.5	1.048
calibrator zero	5000	0.00	0.0	0.0	----
high point (400ppb)	5000	1012	413.5	410.6	1.007
second point (200ppb)	5000	854	201.3	208.6	0.965
third point (100ppb)	5000	740	101.5	106.0	0.958
As Left Zero	5000	0.00	0.0	-1.3	----
As Left Span	5000	1004	413.5	415.4	0.995
Average Correction Factor					0.977

Corrected As found 394.5 Previous response 403.4 % change 2.3%

Notes:

Sample inlet filter changed after as founds. Adjusted Span. Third point done before the midpoint. Both mid and third points were much higher than the calculated value. Will discuss with senior techs to solve the issue.

Calibration Performed By:

Aswin Sasi Kumar



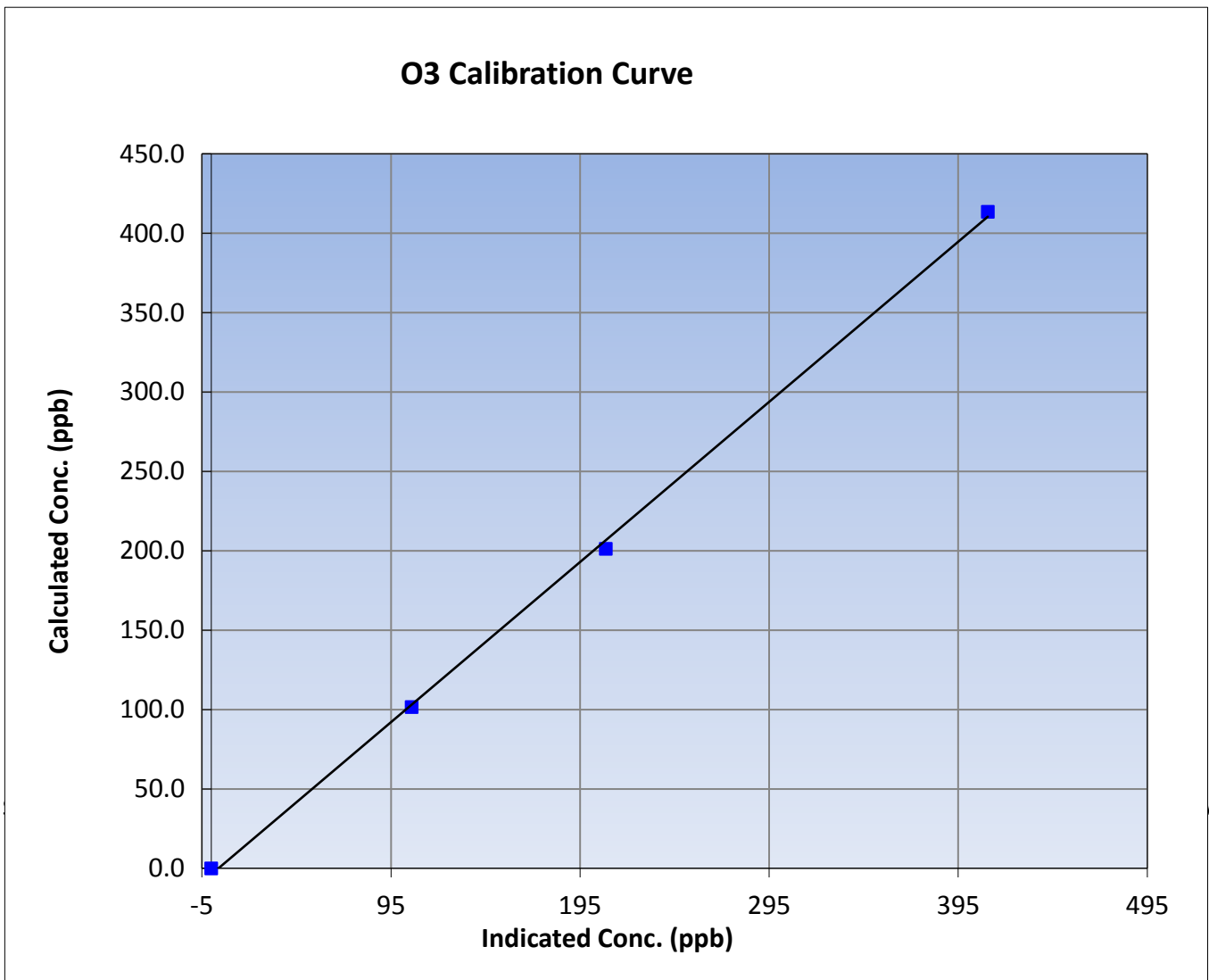
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	March 15, 2017	Previous Calibration	February 3, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	8:04	End Time (MST)	11:39
Analyzer make	Thermo 49i	Analyzer serial #	1227254861

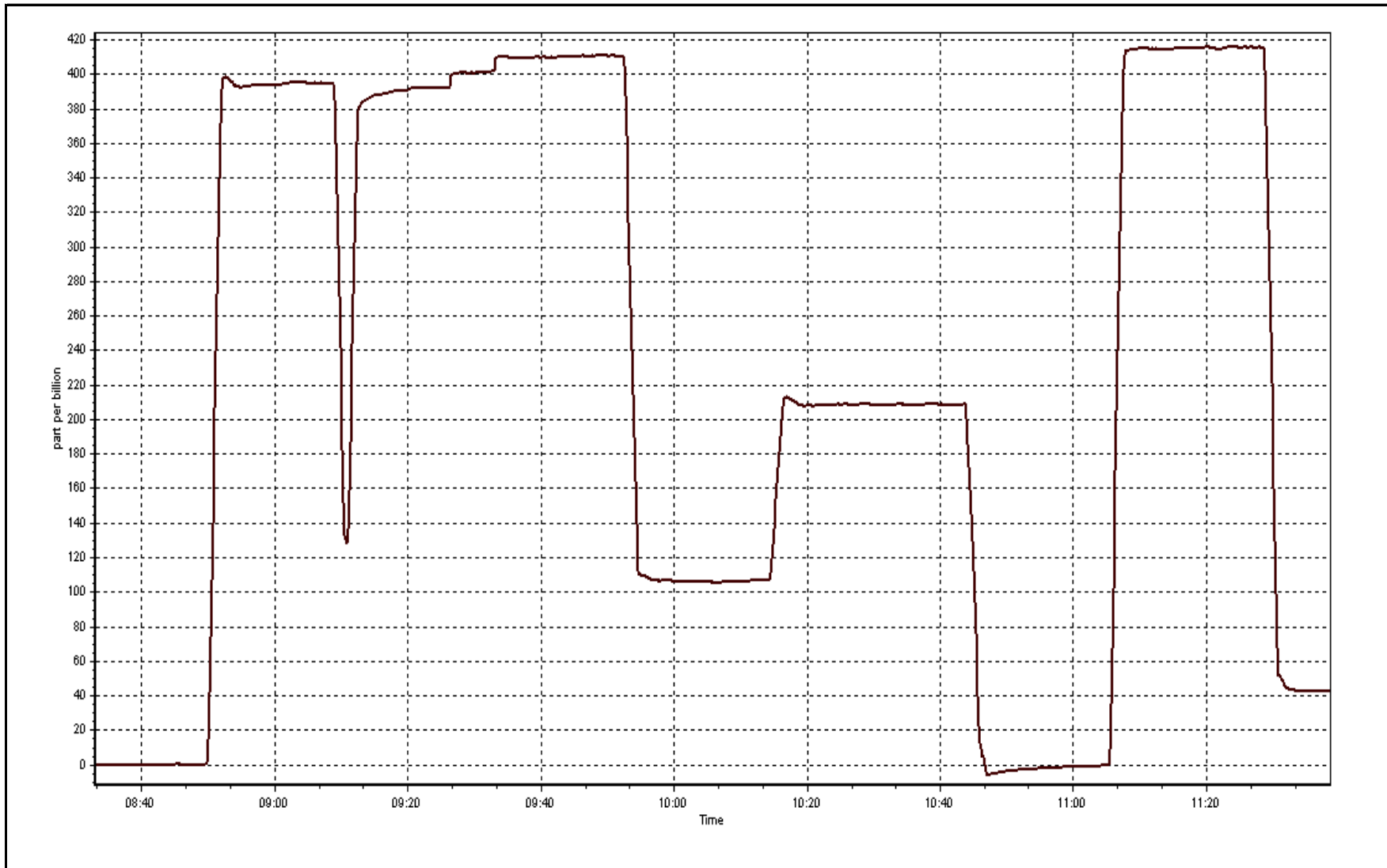
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999411
413.5	410.6	1.0071		
201.3	208.6	0.9650	Slope	1.008758
101.5	106.0	0.9575		
			Intercept	-3.812804



O3 Calibration Plot

Date: March 15, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 14, 2017	Previous Calibration	February 2, 2017
Station Name	Janvier	Station Number	AMS 22
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	13:13	End Time (MST)	18:19
NO Cal Gas Conc	50.9 ppm	Gas Cert Reference	LL107937
NOx Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	September 8, 2018
Calibrator	API T700	Serial Number	2462
Zero air Generator	Teledyne API T701	Serial Number	135

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2586
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998747	0.997848	0.993731
	Data Offset	0.780641	1.850506	-0.624931
Current Calibration	Data Slope	1.008205	1.013410	0.981439
	Data Offset	1.020829	1.923415	-0.310110

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1229254994
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.923		0.923	
NOx coefficient	0.998		0.998	
NO2 coefficient	0.995		0.995	
NO bkgnd	2.6		2.6	
NOx bkgnd	2.7		2.7	
Chamber Temp	50.6	Deg C	50.4	Deg C
Moly Temp	342.1	Deg C	342.6	Deg C
PMT voltage	-762.2	V	-761.8	V
PMT Temp	-3.1	Deg C	-3.0	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	186.1	mmHg	186.4	mmHg
R Cell Press Nox	186.4	mmHg	186.7	mmHg
NO sample flow	0.815	lpm	0.812	lpm
Nox sample Flow	0.816	lpm	0.815	lpm

Notes:

Sample inlet filter changed after as founds. No adjustments made. During as lefts, span dipped significantly. Discussed with senior tech and came to the conclusion that it is most likely caused by a faulty solenoid valve. Will replace solenoid valve during next visit.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

March 14, 2017

Station Number:

AMS 22

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5009	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1	----	----
as found span	5009	78.6	798.7	798.7	0.0	792.4	787.5	4.9	1.008	1.014
calibrator zero	5009	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1	----	----
high point	5009	78.6	798.7	798.7	0.0	792.4	787.5	4.9	1.008	1.014
second point	5007	39.3	399.5	399.5	0.0	392.6	390.1	2.5	1.018	1.024
third point	5006	19.6	199.3	199.3	0.0	197.2	194.0	3.2	1.011	1.027
as left zero	5008	0.0	0.0	0.0	0.0	0.2	0.0	0.2	----	----
as left span	5007	78.6	799.0	374.6	424.4	715.0	330.2	385.2	1.118	1.134
Average Correction Factor									1.012	1.022

Corrected As found

NO_x= 792.5

NO= 787.8

Percent Change

NO_x= 0.8%

NO= 1.4%

Previous Response

NO_x= 798.9

NO= 798.6

GPT Calibration Data

Dilution Flow (total) 5009 ccm

Source Gas Flow 78.60 ccm

NOx ref calc conc = 798.7 ppb

NO ref calc conc = 798.7 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	792.3	788.1	0.1	1.008	1.0135	----	----
1st NO2 (400)	374.6	413.5	796.4	374.6	421.6	1.003	----	0.981	102.0%
2nd NO2 (200)	586.9	201.3	792.3	586.9	205.2	1.008	----	0.981	102.0%
3rd NO2 (100)	686.6	101.5	790.7	686.6	104.1	1.010	----	0.975	102.5%
2nd NO ref point		0.0	787.9	790.0	-2.1	1.0138	1.0110	----	----
Average Correction Factor						1.0087		0.979	102.2%

Calibration Performed By:

Aswin Sasi Kumar



Wood Buffalo Environmental Association

NO_x Calibration Summary

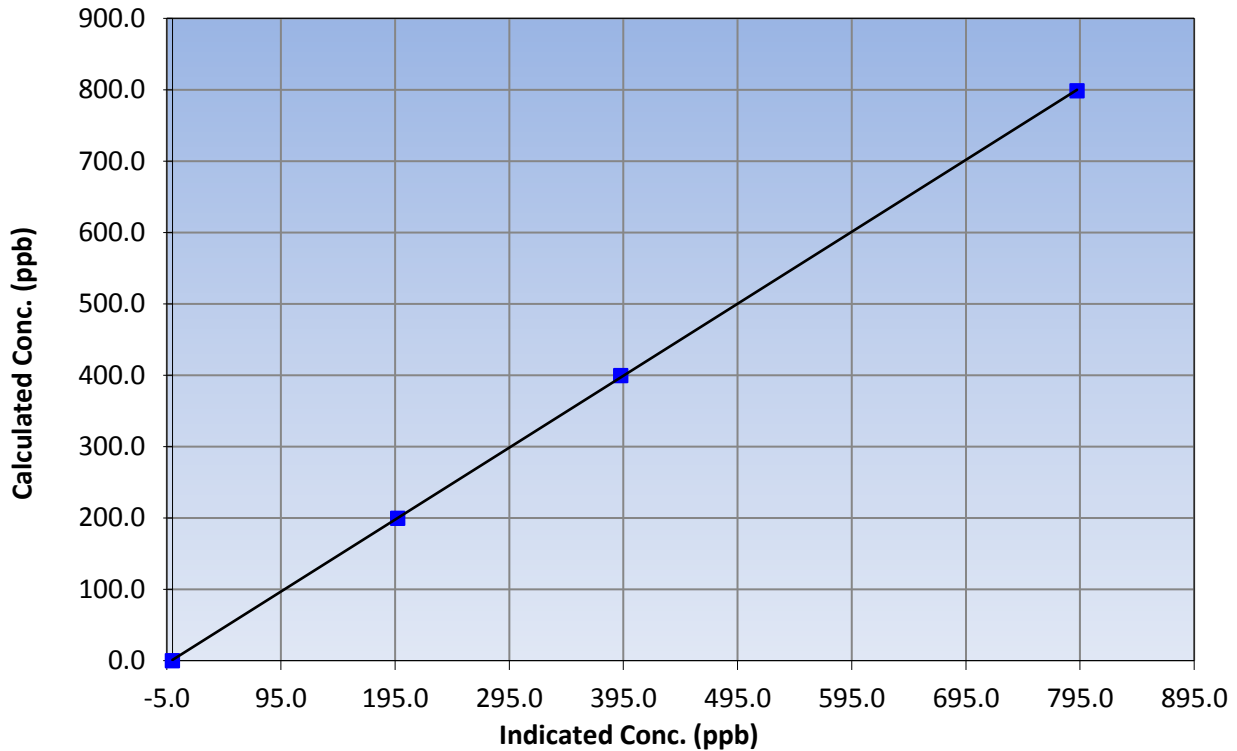
Station Information

Calibration Date	March 14, 2017	Previous Calibration	February 2, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	13:13	End Time (MST)	18:19
Analyzer make	Thermo 42i	Analyzer serial #	1229254994

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999972
798.7	792.4	1.0080		
399.5	392.6	1.0176	Slope	1.008205
199.3	197.2	1.0106		
			Intercept	1.020829

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

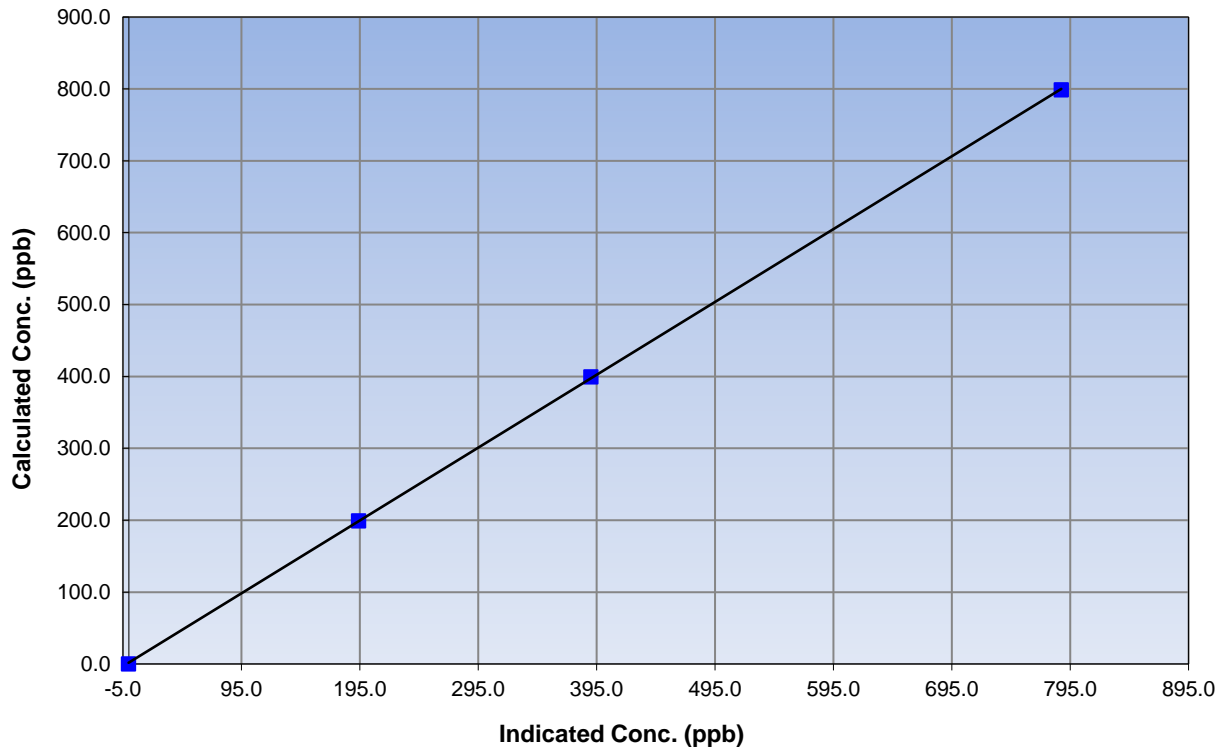
Station Information

Calibration Date	March 14, 2017	Previous Calibration	February 2, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	13:13	End Time (MST)	18:19
Analyzer make	Thermo 42i	Analyzer serial #	1229254994

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999971
798.7	787.5	1.0142		
399.5	390.1	1.0241	Slope	1.013410
199.3	194.0	1.0272		
			Intercept	1.923415

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

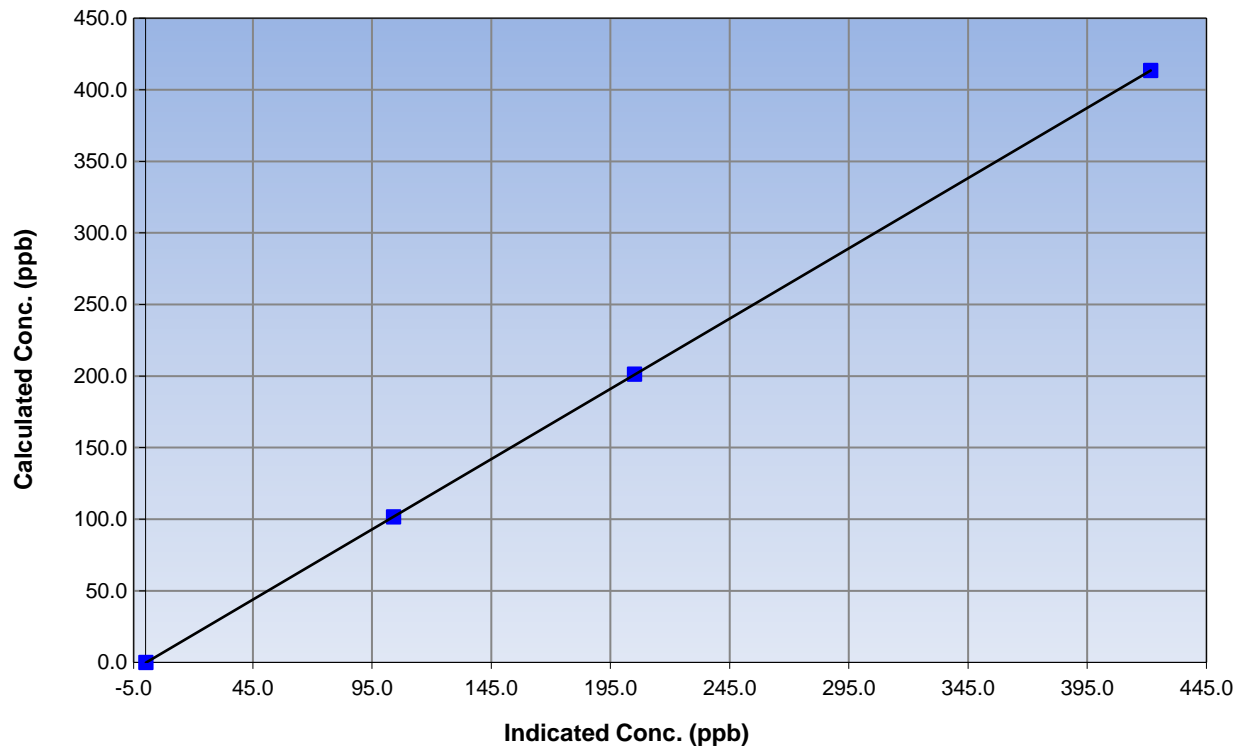
Station Information

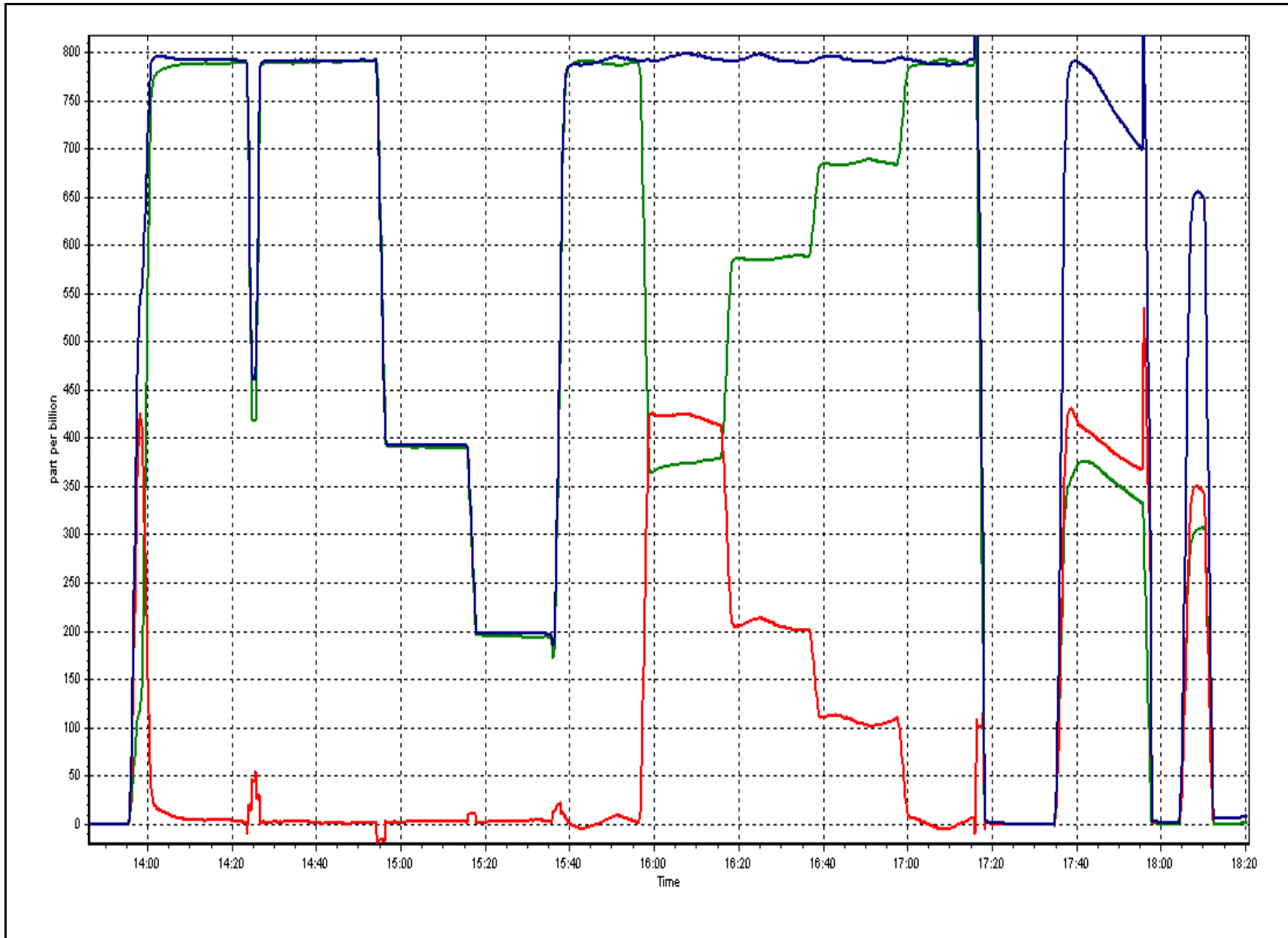
Calibration Date	March 14, 2017	Previous Calibration	February 2, 2017
Station Number	Janvier	Station Number	AMS 22
Start Time (MST)	13:13	End Time (MST)	18:19
Analyzer make	Thermo 42i	Analyzer serial #	1229254994

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999998
413.5	421.6	0.9807		
201.3	205.2	0.9807	Slope	0.981439
101.5	104.1	0.9752		
			Intercept	-0.310110

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	March 15, 2017	Last Cal Date:	February 3, 2017
Start time (MST):	10:30	End time (MST):	12:48
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

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	7.6	6.5	7.6	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	947	945	947	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1000.2	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	1.6	0	0.1	<input checked="" type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input checked="" type="checkbox"/>	3			
Cyclone cleaning:	PM10 Cyclone <input checked="" type="checkbox"/>		PM2.5 Cyclone <input checked="" type="checkbox"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

				Tolerance
Leak Test:	Date of check:	<u>Nov 17 2016</u>	Last Cal Date:	<u>NA</u>
	Flow w/o adaptor:	<u>16.53</u>	Flow w/ adaptor:	<u>16.4</u> 0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass:	<u>1202</u>	S/N:	<u>5332</u>
	Date of check:	<u>Nov 17 2016</u>	Last Cal Date:	<u>NA</u>
	New Correction Factor:	<u>7065</u>		<u>7036</u>

Parameter	As found	Measured	As left	Adjusted	Tolerance
T2 (°C)	16	NA	16	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	18	NA	18	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	12	NA	12	<input type="checkbox"/>	+/- 2 °C
RH (%)	10	NA	10	<input type="checkbox"/>	+/- 10%

Notes: NEPH zero was adjusted.

Calibration by: Aswin Sasi Kumar



Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	March 25, 2017	Last Cal Date:	February 3, 2017
Start time (MST):	8:00	End time (MST):	8:53
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:	628
Temp/RH standard:	Delta-Cal	S/N:	628

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)	2.6	0.7	0.7	<input checked="" type="checkbox"/>	+/- 2 °C
P3 (hPa)	948	936	936	<input checked="" type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	906.6	1000	<input checked="" type="checkbox"/>	+/- 50 LPH
Nephelometer zero	1.6	0	-0.1	<input checked="" type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input checked="" type="checkbox"/>	3			
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>Nov 17 2016</u>	Last Cal Date: <u>NA</u>		
	Flow w/o adaptor: <u>16.53</u>	Flow w/ adaptor: <u>16.4</u>		0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass: <u>1202</u>	S/N: <u>5332</u>
	Date of check: <u>Nov 17 2016</u>	Last Cal Date: <u>NA</u>
	New Correction Factor: <u>7065</u>	<u>7036</u>

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
T2 (°C)	16	NA	16	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	18	NA	18	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	12	NA	12	<input type="checkbox"/>	+/- 2 °C
RH (%)	10	NA	10	<input type="checkbox"/>	+/- 10%

Notes: Replaced the pump. Adjusted T1, P3, the flow and the nephelometer.

Calibration by: Jayne Marcoux



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 500
CENOVUS
CHRISTINA LAKE
MARCH 2017**

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
MARCH 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	25	0	4	0
H2S (ppb) Average	710	34	34	100	3	0	1	0
NO2 (ppb) Average	710	34	34	100	20	0	7	-
NO (ppb) Average	710	34	34	100	18	-	4	-
NOX (ppb) Average	710	34	34	100	37	-	10	-
Temperature 2 m (C) Average	744	0	0	100	12.2	-	5.2	-
Relative Humidity (%) Average	744	0	0	100	98	-	93	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	25	-	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 - CENOVUS CHRISTINA LAKE (AMS 500)
MARCH 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	0.8	2	-	0	0	0	0	1	2	25
H2S (ppb) Average	710	0.2	0	-	0	0	0	0	0	1	3
NO2 (ppb) Average	710	3	3	-	0	1	1	2	4	7	20
NO (ppb) Average	710	1	2	-	0	0	0	0	1	2	18
NOX (ppb) Average	710	4	4	-	0	1	1	3	5	9	37
Temperature 2 m (C) Average	744	-6.94	10.2	-	-33.7	-20.7	-15.9	-4	1.3	5.4	12.2
Relative Humidity (%) Average	744	67.2	16	-	27	43	56	69	78	89	98
Wind Speed 10 m (km/h) Average	743	10.6	6	-	1	4	6	10	15	19	25
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	14 Mar 2017 14:00	14 Mar 2017 14:00	1	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Cenovus - Christina Lake - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 25 ppb on Mar 19 04:00	Maximum Daily Average: 4.2 ppb on Mar 20		Hours of Data:	710
Minimum Value: 0 ppb on Mar 1 04:00	Minimum Daily Average: 0.0 ppb on Mar 22		Hours of Missing Data:	34
Maximum Diurnal Average: 1.6 ppb at hour 6	Minimum Diurnal Average: 0.3 ppb at hour 24		Hours of Calibration:	34
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 = 9		Percent Operational Time:	100.0

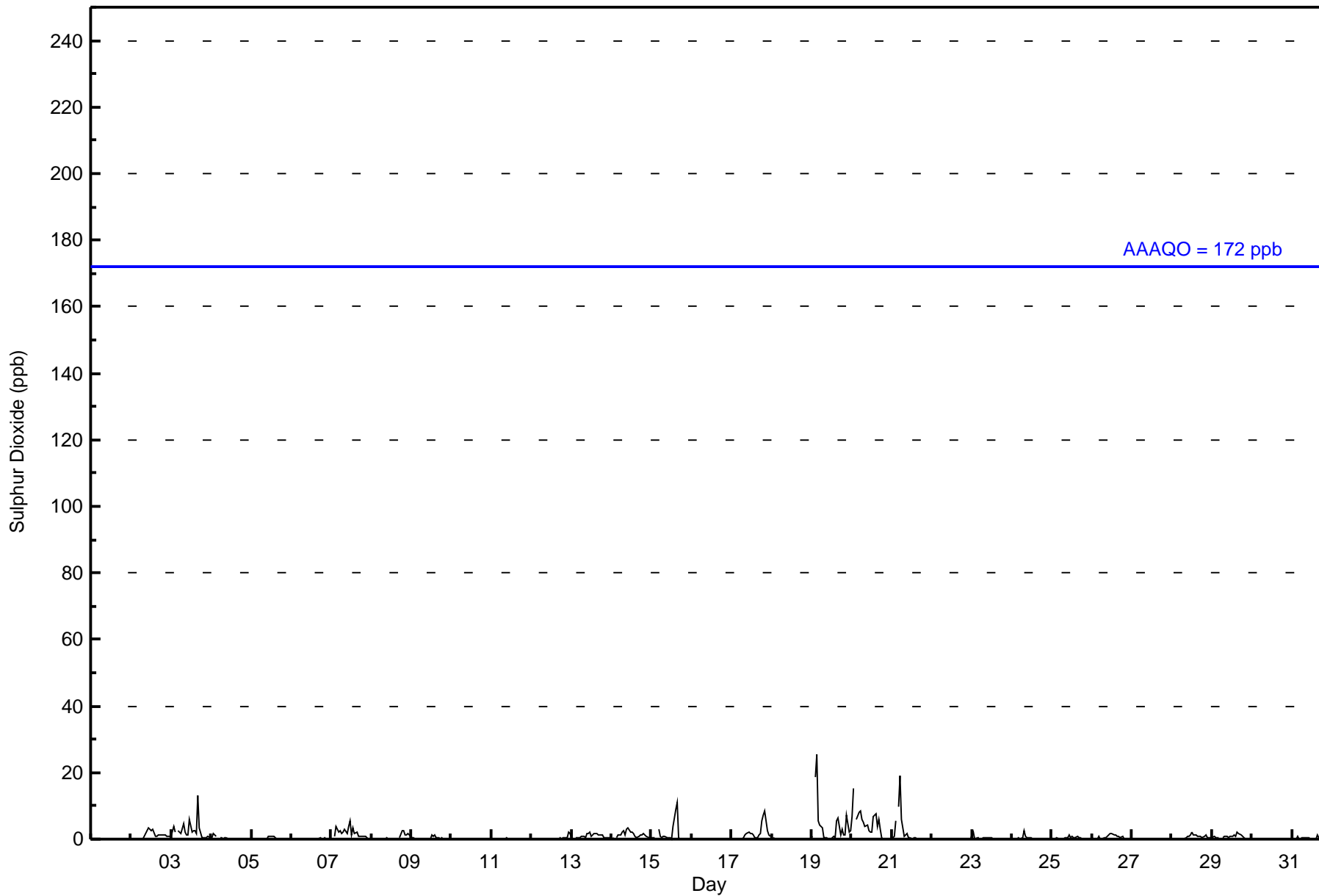
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Mar	0	0	Z	0	0	0	0	0	1	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1.1	3
3-Mar	1	4	2	Z	2	2	2	5	2	1	1	6	2	3	3	2	13	3	1	0	0	0	1	0	2.4	13
4-Mar	0	2	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
5-Mar	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1
6-Mar	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
7-Mar	0	Z	1	4	2	2	2	2	3	2	4	6	1	3	2	2	1	1	1	1	1	1	1	0	1.7	6
8-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	C	C	C	1	2	3	1	1	2	1	0.6	3
9-Mar	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0.3	1
10-Mar	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
11-Mar	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
12-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0.2	2
13-Mar	0	Z	0	0	0	1	1	1	1	2	2	2	1	2	2	1	1	1	1	0	0	0	0	0	0.9	2
14-Mar	0	1	Z	0	1	1	2	2	1	3	3	2	2	2	1	0	1	1	1	2	1	1	1	0	1.3	3
15-Mar	0	0	0	Z	3	1	0	1	1	1	0	0	4	9	11	0	0	0	0	0	0	0	0	0	1.4	11
16-Mar	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
17-Mar	0	0	0	0	0	Z	0	0	1	2	2	2	2	1	0	0	1	2	6	7	8	3	1	1	1.7	8
18-Mar	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
19-Mar	1	Z	18	25	5	4	3	1	0	0	0	0	1	0	5	6	1	3	1	1	1	7	2	2	4.0	25
20-Mar	7	15	Z	6	8	9	6	5	4	4	3	2	2	7	8	4	6	3	0	0	0	0	0	0	4.2	15
21-Mar	0	1	5	Z	10	19	6	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2.0	19
22-Mar	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
23-Mar	1	2	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
24-Mar	Z	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3
25-Mar	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0.3	1
26-Mar	0	0	Z	0	1	0	0	0	0	1	1	2	2	1	1	1	1	1	1	0	0	0	0	0	0.6	2
27-Mar	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-Mar	0	0	0	0	Z	0	0	0	0	1	1	1	2	1	1	1	1	1	0	1	1	0	0	0	0.6	2
29-Mar	0	1	0	0	0	Z	0	1	1	1	0	1	1	1	1	2	2	1	1	1	0	0	0	0	0.7	2
30-Mar	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
31-Mar	0	Z	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1

Z - zerospan	C - Calibration	Diurnal Average	0.5	1.1	1.2	1.5	1.4	1.6	0.8	0.7	0.6	0.8	0.8	1.0	0.7	1.0	1.1	1.1	1.2	0.6	0.6	0.6	0.6	0.5	0.3	0.3
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb		Diurnal Maximum	7	15	18	25	10	19	6	5	4	4	4	6	3	7	9	11	13	3	6	7	8	7	2	2



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	704	99.15	99.15
11 - 20	5	0.70	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: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - March 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	48	62	45	43	73	59	89	88	78	16	14	10	16	12	26	24	703
11 - 20	0	0	0	0	0	0	0	1	0	0	0	0	0	3	1	0	5
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	48	62	45	43	73	59	89	89	78	16	14	10	16	16	27	24	709

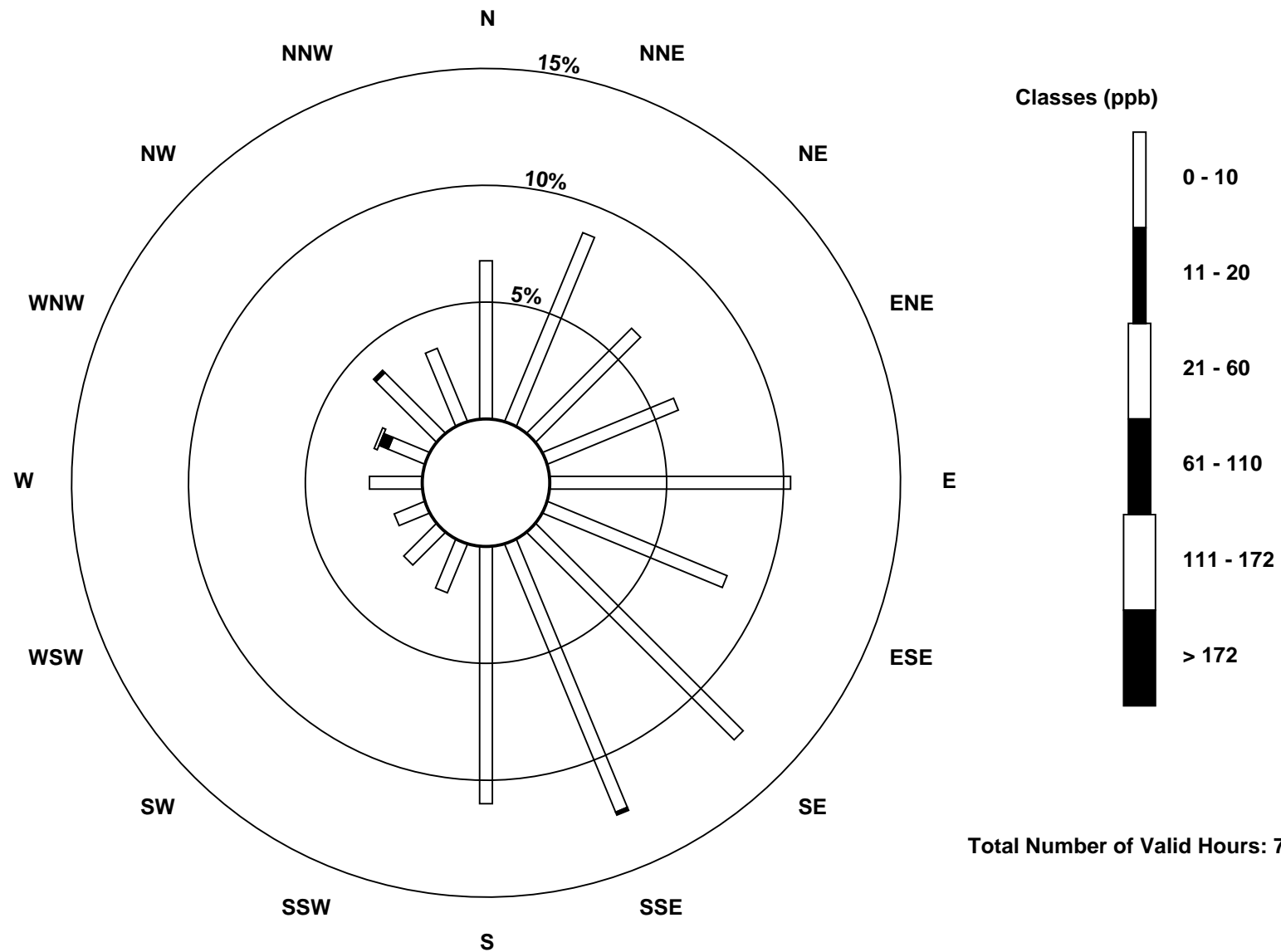
Total Number of Valid Hours: 709

Total Number of Hours: 744

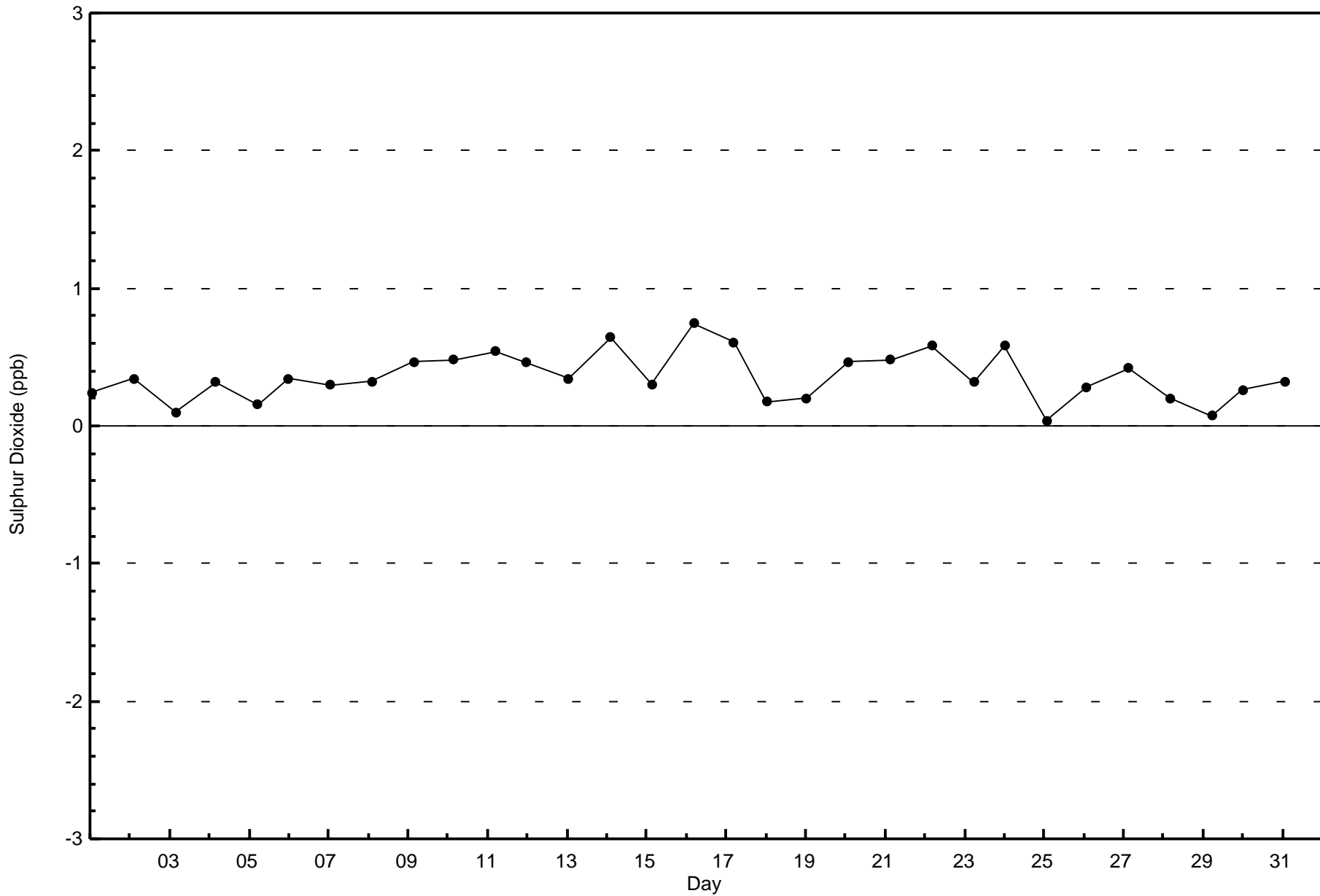


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake (AMS500)



Total Number of Valid Hours: 709



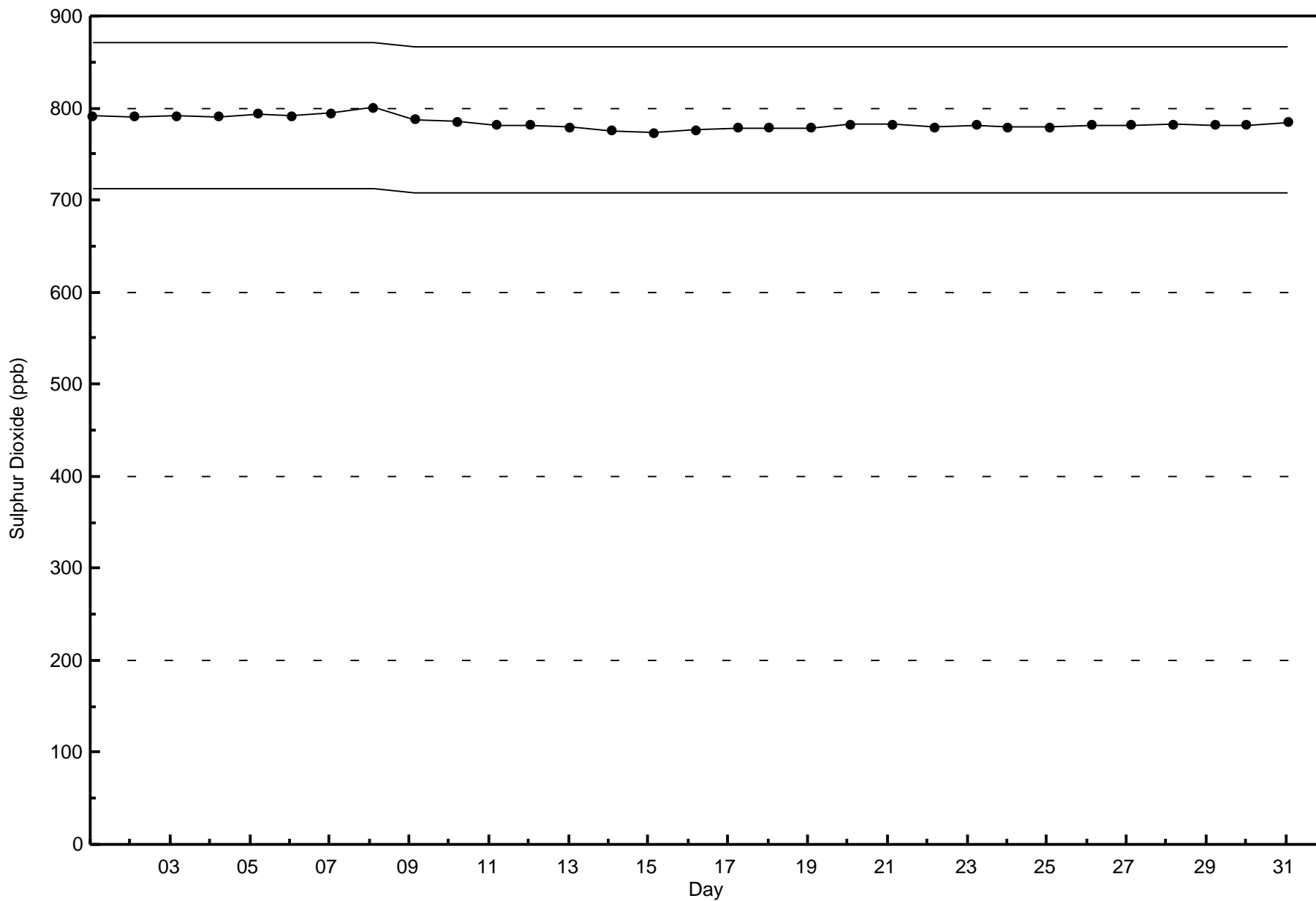


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO₂) - ppb

Cenovus - Christina Lake - March 2017





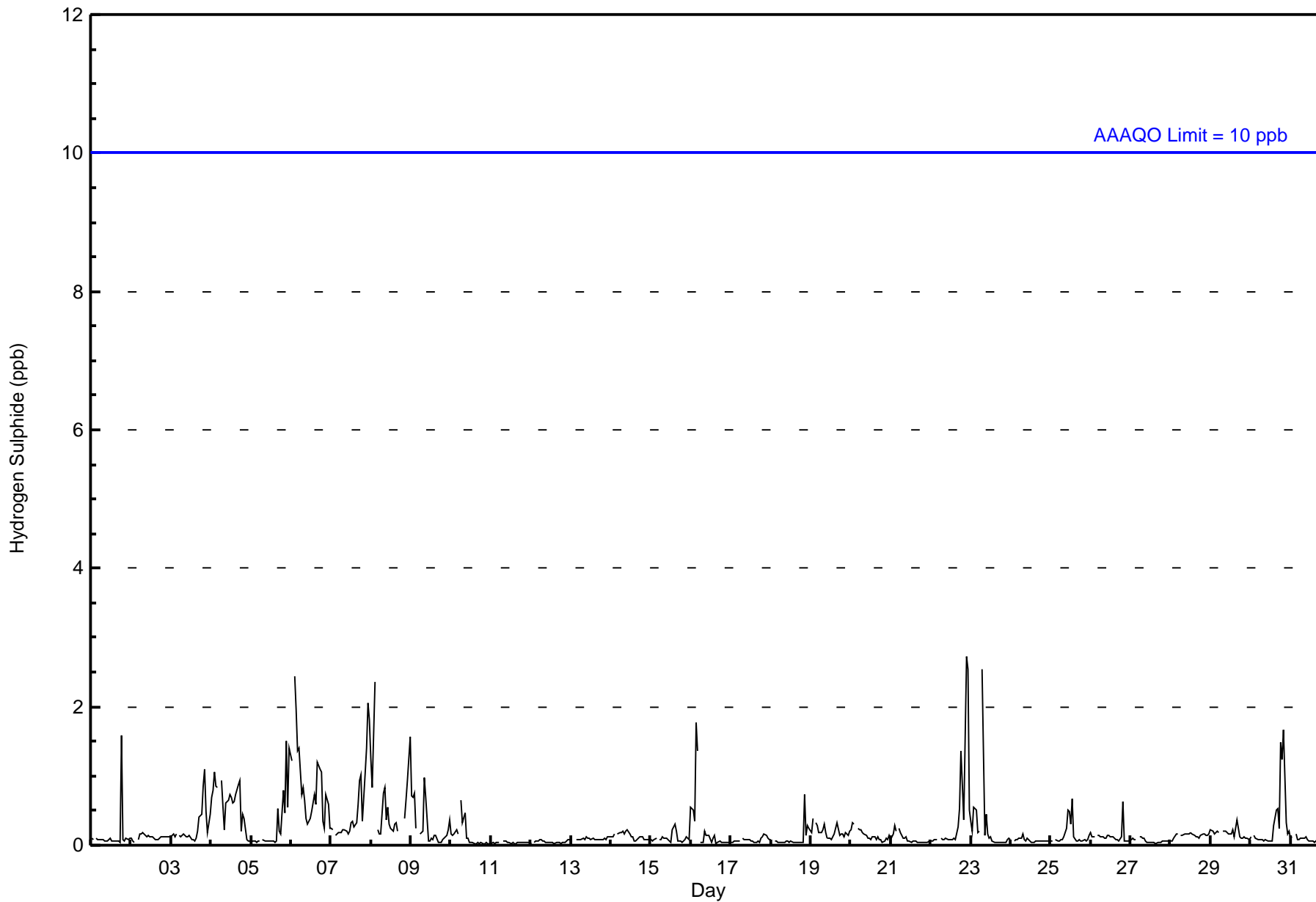
Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

Cenovus - Christina Lake - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3 ppb on Mar 22 22:00 Maximum Daily Average: 0.9 ppb on Mar 6																	Hours in Service: 744 Hours of Data: 710										
Minimum Value: 0 ppb on Mar 11 01:00 Minimum Daily Average: 0.0 ppb on Mar 11 Maximum Diurnal Average: 0.4 ppb at hour 3 Minimum Diurnal Average: 0.1 ppb at hour 13 Monthly Average: 0.2 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 2																	Hours of Missing Data: 34 Hours of Calibration: 34 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-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0.1	2	
2-Mar	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-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1	
4-Mar	1	1	1	1	1	Z	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.6	1	
5-Mar	0	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	1	0	0	1	0	2	1	1	0.3	2	
6-Mar	1	Z	2	2	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0	0	1	1	0	0.9	2	
7-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	2	2	0.5	2	
8-Mar	1	1	2	Z	0	0	0	1	1	0	1	0	0	0	0	0	0	C	C	C	0	1	1	2	0.6	2	
9-Mar	1	1	1	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
10-Mar	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
11-Mar	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	
12-Mar	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-Mar	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-Mar	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-Mar	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-Mar	1	1	0	2	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2	
17-Mar	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	
18-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1	
19-Mar	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-Mar	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-Mar	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-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	3	3	1	0.5	3
23-Mar	0	0	1	1	0	0	Z	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3	
24-Mar	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-Mar	0	0	Z	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1	
26-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1	1	
27-Mar	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-Mar	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-Mar	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	
30-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	2	0	0	0	0.3	2	
31-Mar	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 0.4 0.3 0.2 0.2 0.2 0.3 0.2 0.2 0.2 0.1 0.1 0.2 0.1 0.1 0.2 0.2 0.3 0.2 0.3 0.3 0.3 0.3 1 1 2 2 1 1 1 3 1 1 1 1 1 1 1 1 1 1 1 2 1 2 3 3 2																								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
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	707	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: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - March 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	44	63	43	43	75	57	89	88	79	17	14	10	16	17	26	25	706
3 - 4	1	2	0	0	0	0	0	0	0	0	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	45	65	43	43	75	57	89	88	79	17	14	10	16	17	26	25	709

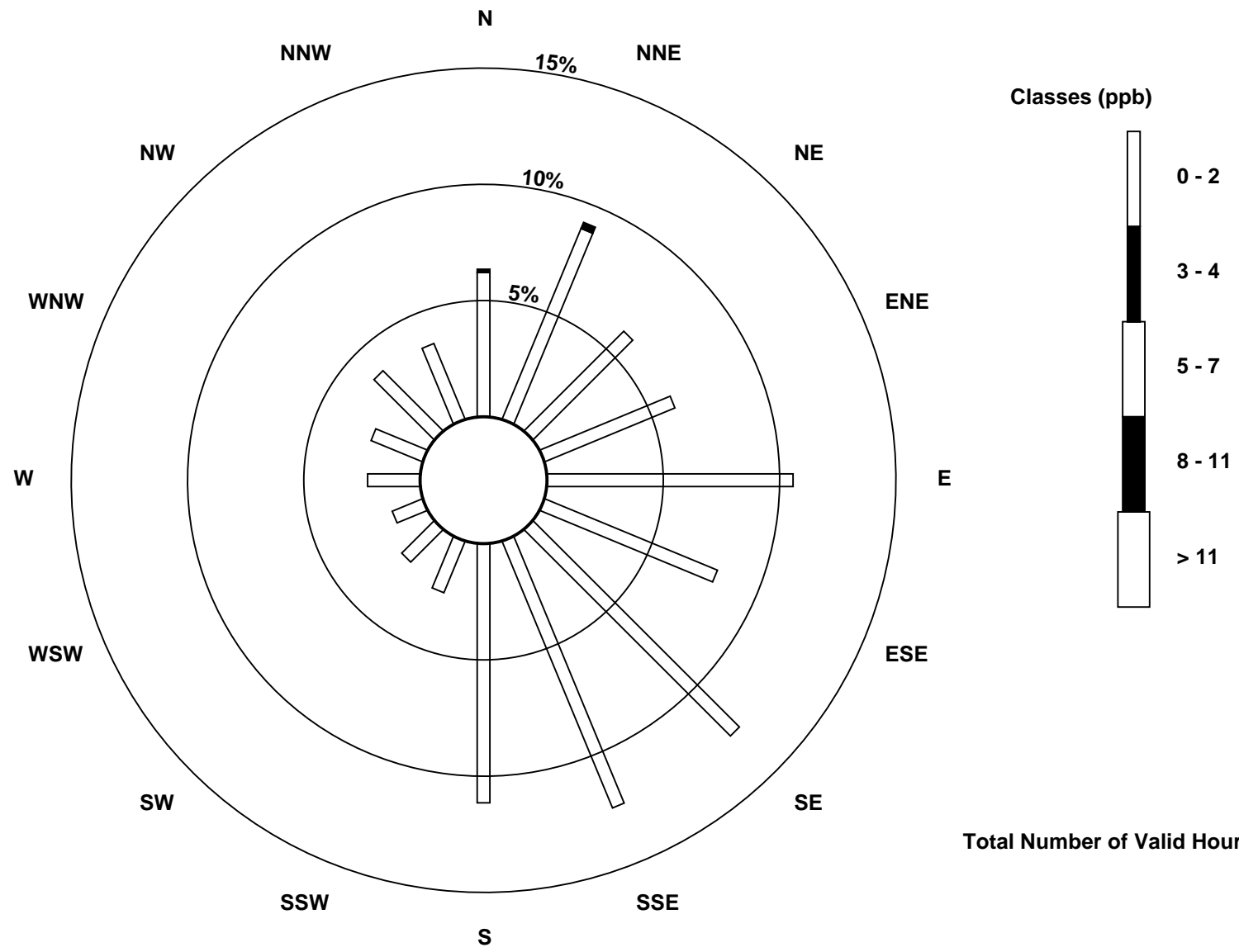
Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake (AMS500)

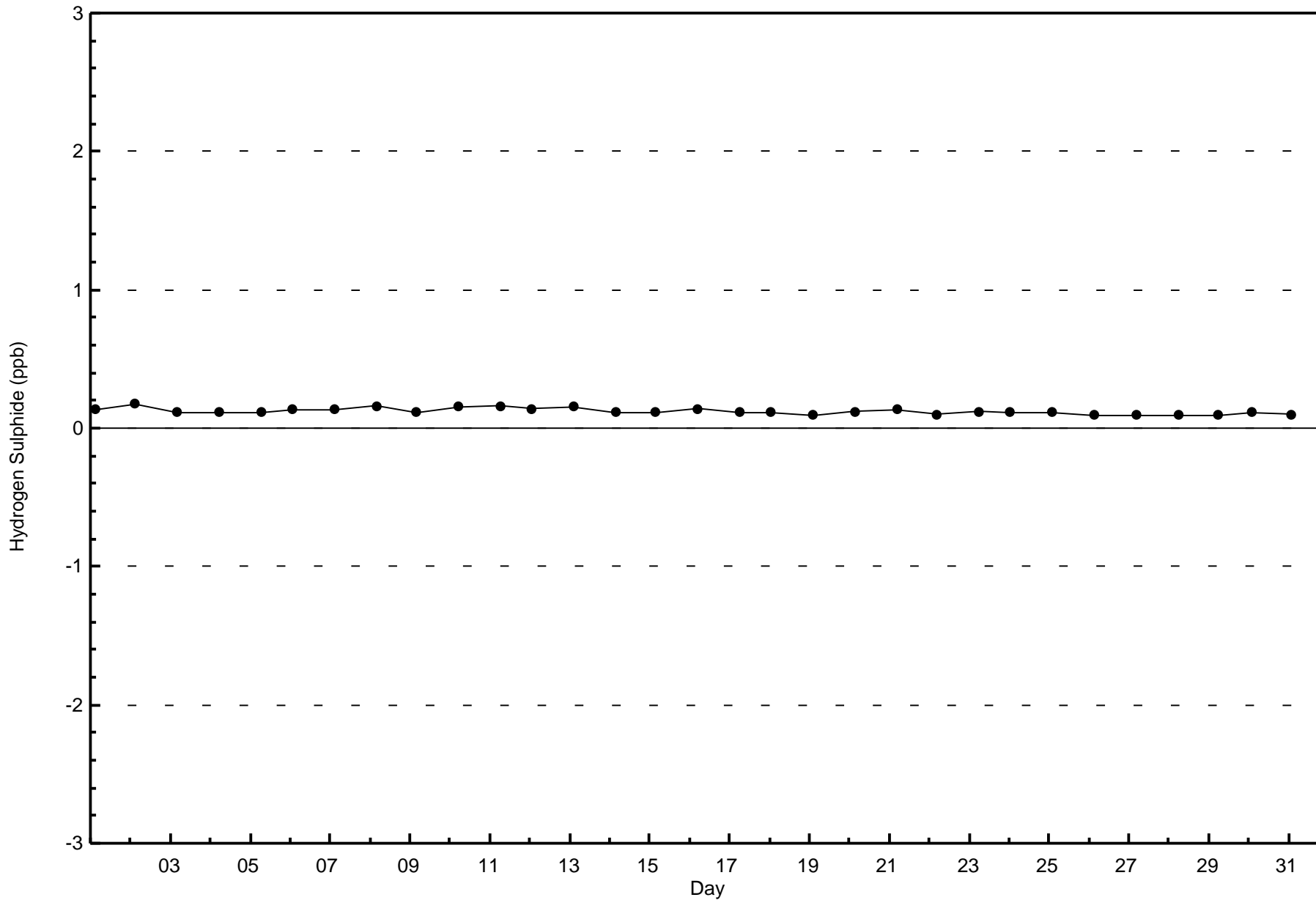


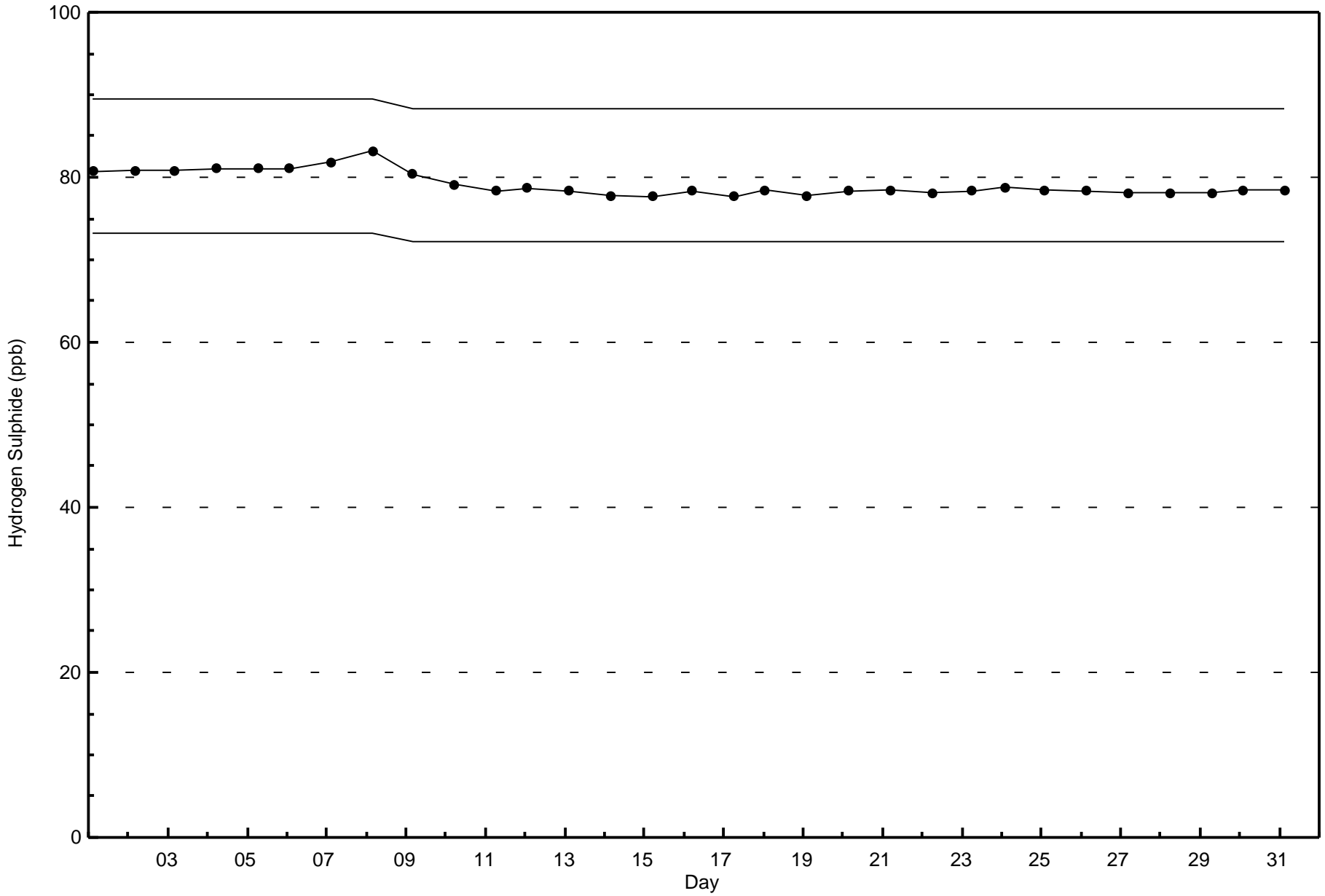
Total Number of Valid Hours: 709



Wood Buffalo Environmental Association
Zero Responses

Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - March 2017







Maximum Value: 18 ppb on Mar 19 04:00		Maximum Daily Average: 3.6 ppb on Mar 10		Hours in Service: 744																							
Minimum Value: 0 ppb on Mar 1 01:00		Minimum Daily Average: 0.1 ppb on Mar 4		Hours of Data: 710																							
Maximum Diurnal Average: 1.8 ppb at hour 9		Minimum Diurnal Average: 0.4 ppb at hour 19		Hours of Missing Data: 34																							
Monthly Average: 1.0 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 9		Hours of Calibration: 34																							
				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-Mar	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	2	0	1	0.3	2	
2-Mar	1	1	Z	1	0	2	2	3	6	2	3	2	2	2	1	1	1	1	1	0	0	0	0	0	1.3	6	
3-Mar	0	0	1	Z	0	0	0	1	1	1	1	3	2	1	2	1	9	2	1	1	1	0	2	1	1.5	9	
4-Mar	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-Mar	0	0	0	0	0	Z	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1	
6-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	1	0	1	1	0.5	1	
7-Mar	1	Z	2	2	3	3	3	3	3	3	3	4	1	2	3	2	1	0	0	0	0	0	0	1	0	1.6	4
8-Mar	1	0	Z	0	2	2	1	0	0	0	0	0	0	0	C	C	C	1	0	0	1	1	2	0	0.7	2	
9-Mar	0	0	2	Z	1	2	2	4	9	3	1	0	2	2	2	1	1	1	1	5	3	5	3	9	2.6	9	
10-Mar	1	3	3	9	Z	12	11	15	14	5	3	1	1	1	1	1	1	1	0	0	0	0	1	0	3.6	15	
11-Mar	0	0	0	1	1	Z	1	1	1	2	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0.6	2	
12-Mar	Z	0	0	0	0	1	2	3	3	1	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0.7	3	
13-Mar	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1	
14-Mar	0	0	Z	0	0	0	0	1	2	3	3	2	2	3	1	1	1	1	1	0	1	1	0	1	1.1	3	
15-Mar	0	1	0	Z	1	0	1	1	1	1	1	0	2	4	5	0	0	0	0	0	0	0	0	0	0.9	5	
16-Mar	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
17-Mar	0	0	0	1	1	Z	1	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.6	2	
18-Mar	Z	0	0	0	0	0	0	0	0	1	1	1	3	1	0	1	0	0	1	1	1	1	1	2	0.7	3	
19-Mar	1	Z	15	18	5	4	3	2	2	1	0	1	1	2	1	5	5	1	2	1	0	5	2	1	3.5	18	
20-Mar	2	6	Z	3	4	3	2	2	2	3	2	2	2	4	4	2	3	1	0	0	0	0	0	0	2.0	6	
21-Mar	0	0	0	Z	0	0	3	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.6	3	
22-Mar	0	1	1	1	Z	1	1	1	1	1	0	1	1	1	1	0	1	1	1	0	2	0	0	1	0.6	2	
23-Mar	1	2	1	3	3	Z	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.7	3	
24-Mar	Z	0	0	0	0	1	0	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
25-Mar	0	Z	0	0	0	0	0	0	1	0	1	2	2	1	0	1	1	1	0	0	0	0	0	1	0.5	2	
26-Mar	1	0	Z	1	0	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.9	2	
27-Mar	0	1	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0.7	1	
28-Mar	1	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.7	1	
29-Mar	0	0	0	0	0	Z	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0.6	1	
30-Mar	Z	0	1	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-Mar	0	Z	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
		0.5	0.7	1.2	1.6	0.8	1.3	1.4	1.6	1.8	1.3	1.1	1.0	0.9	1.0	1.0	1.0	1.0	0.5	0.4	0.5	0.5	0.7	0.5	0.7	Diurnal Average	
		2	6	15	18	5	12	11	15	14	5	3	4	3	4	4	5	9	2	2	5	3	5	3	9	Diurnal Maximum	
Z - zerospan		C - Calibration																									

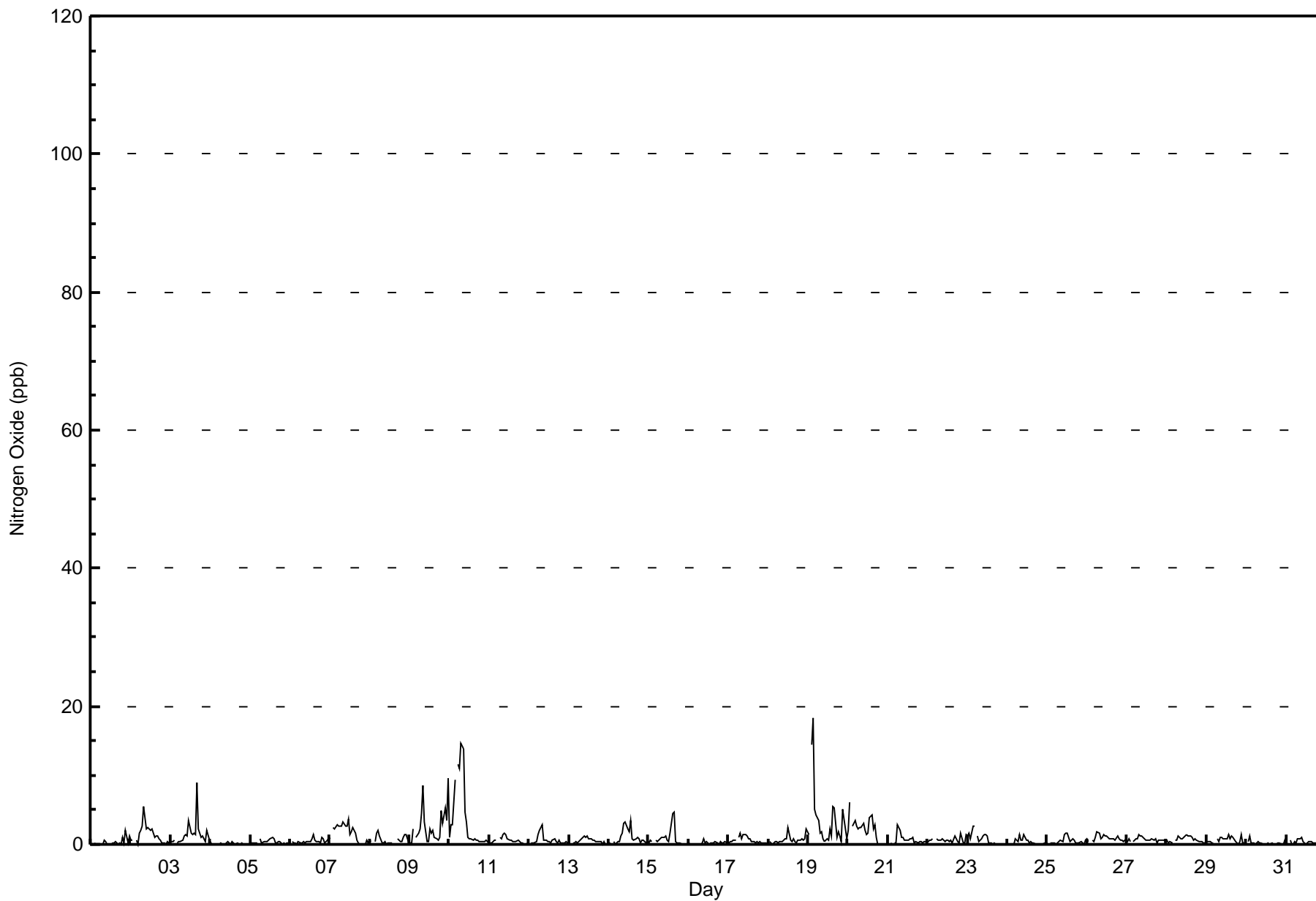


Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxide (NO) - ppb

Cenovus - Christina Lake - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	710	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: 710

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - March 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	48	62	45	43	73	59	89	89	78	16	14	10	16	16	27	24	709
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	48	62	45	43	73	59	89	89	78	16	14	10	16	16	27	24	709

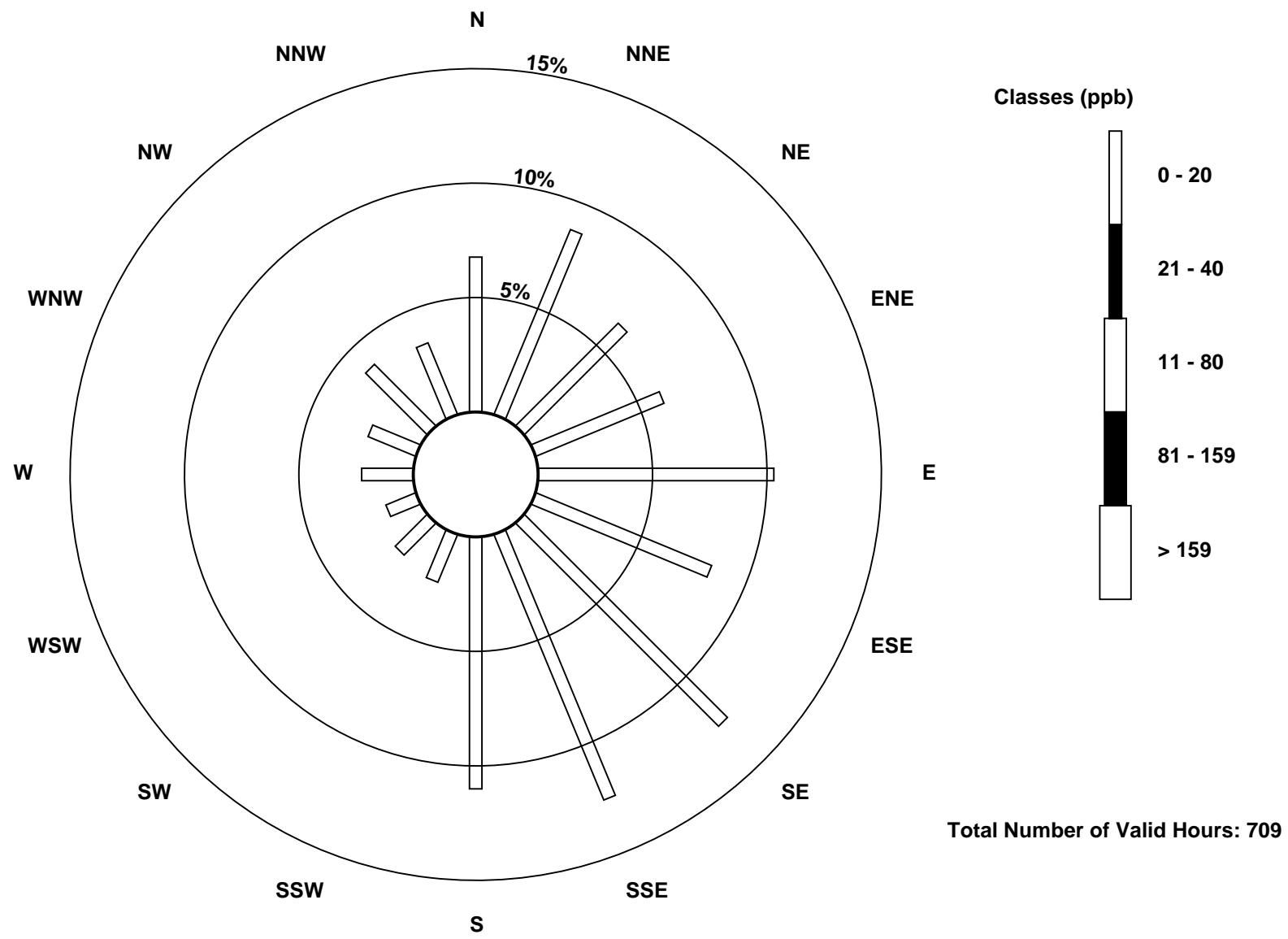
Total Number of Valid Hours: 709

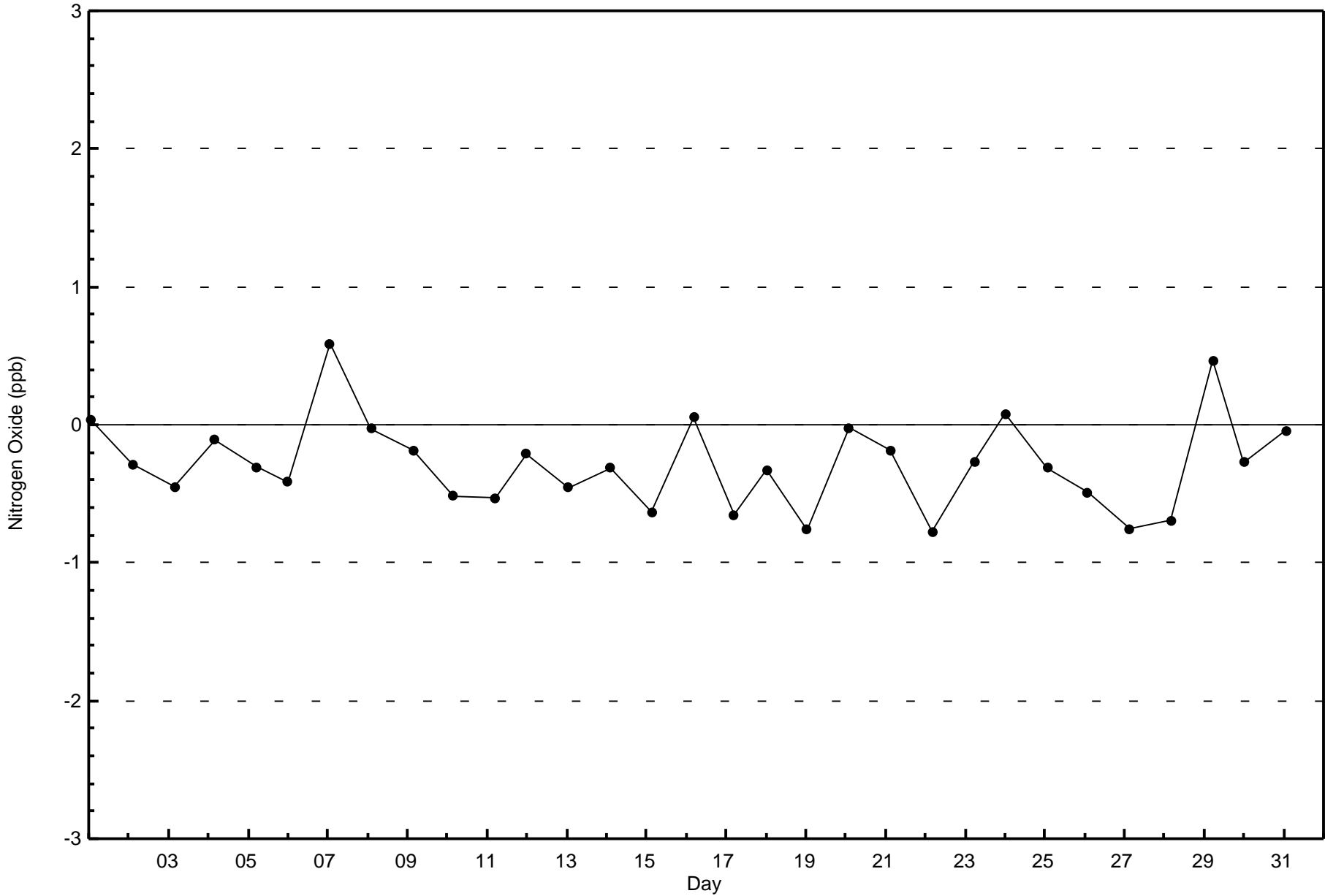
Total Number of Hours: 744

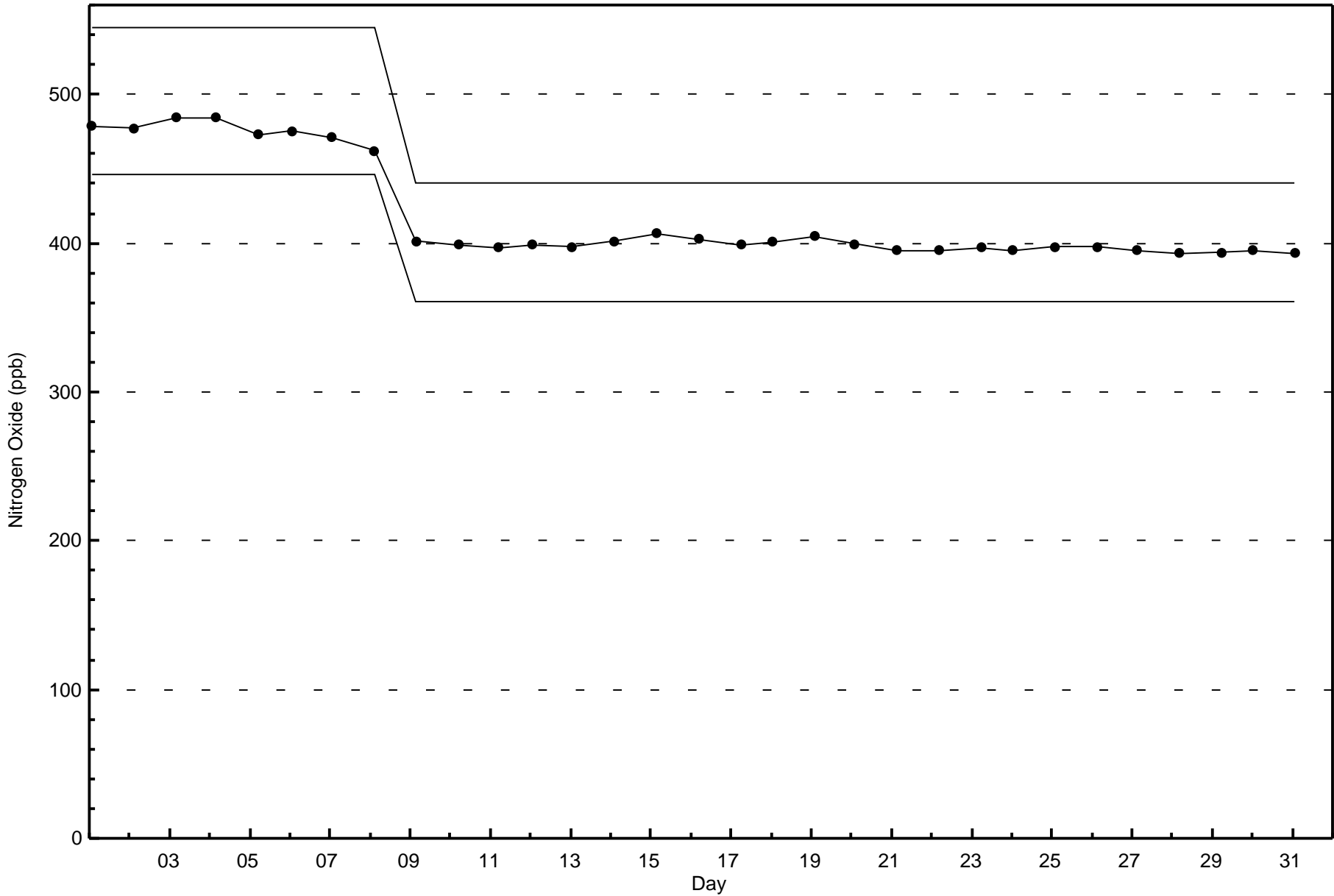


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake (AMS500)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Cenovus - Christina Lake - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 20 ppb on Mar 10 04:00	Maximum Daily Average: 7.3 ppb on Mar 9		Hours of Data:	710
Minimum Value: 0 ppb on Mar 22 07:00	Minimum Daily Average: 0.9 ppb on Mar 4		Hours of Missing Data:	34
Maximum Diurnal Average: 5.4 ppb at hour 6	Minimum Diurnal Average: 1.7 ppb at hour 13		Hours of Calibration:	34
Monthly Average: 3.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 7 P ₉₉ = 17		Percent Operational Time:	100.0

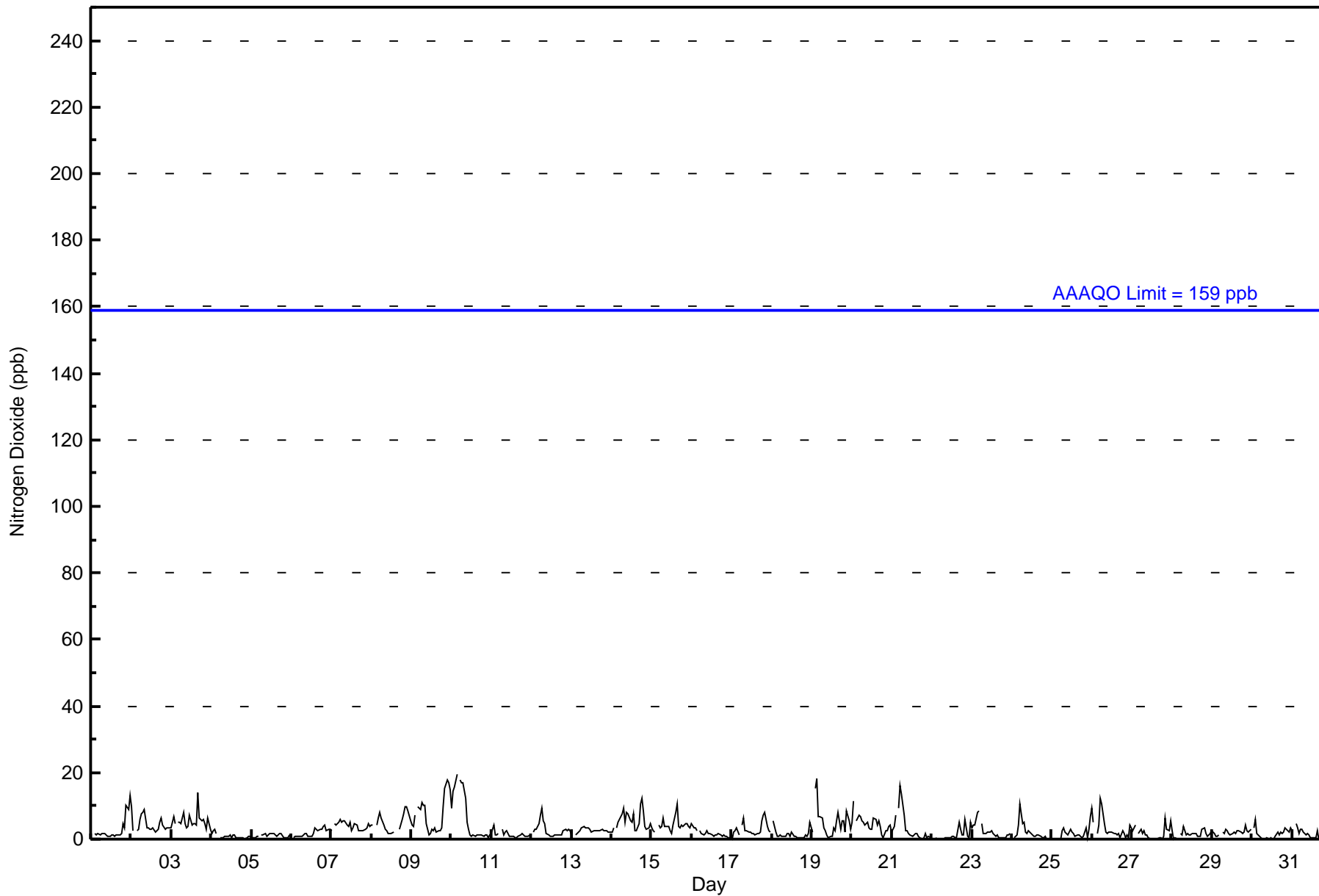
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Mar	2	Z	2	1	2	1	2	2	2	1	1	1	1	1	1	1	1	1	2	5	4	10	9	13	2.8	13																						
2-Mar	10	3	Z	2	3	6	8	8	9	3	3	3	3	3	2	2	3	5	6	4	3	3	3	4	4.3	10																						
3-Mar	3	7	5	Z	5	5	5	8	5	4	4	7	4	5	5	4	14	6	5	6	5	3	6	3	5.4	14																						
4-Mar	2	3	3	2	Z	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	0.9	3																						
5-Mar	1	1	0	1	1	Z	1	1	2	1	1	2	2	2	1	1	1	2	2	1	1	1	1	1	1.1	2																						
6-Mar	Z	0	1	1	1	1	1	1	2	2	1	1	1	2	4	3	3	3	3	4	4	3	3	3	2.0	4																						
7-Mar	3	Z	5	4	5	6	5	6	6	4	4	5	3	3	5	4	3	3	3	3	3	3	5	4	4.0	6																						
8-Mar	4	4	Z	4	6	8	6	4	3	2	2	2	2	C	C	C	3	6	8	10	10	8	5	5.0	10																							
9-Mar	4	4	7	Z	10	9	11	10	10	5	1	2	3	3	3	2	3	3	4	10	15	18	17	15	7.3	18																						
10-Mar	10	14	16	20	Z	18	17	17	12	5	3	1	1	1	1	1	1	1	1	1	1	1	1	1	6.3	20																						
11-Mar	2	4	1	1	2	Z	3	1	2	3	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1.4	4																						
12-Mar	Z	2	3	3	5	7	9	6	5	2	1	1	1	1	1	1	1	1	1	2	3	3	3	3	2.8	9																						
13-Mar	1	Z	1	2	2	3	3	4	3	4	3	3	2	2	3	3	2	2	3	2	3	3	2	2	2.5	4																						
14-Mar	2	3	Z	3	5	7	8	10	5	8	8	6	5	8	3	2	5	11	12	9	4	3	3	5	5.8	12																						
15-Mar	4	3	2	Z	4	3	4	6	4	4	4	3	2	4	8	11	4	4	4	4	5	5	4	3	4.2	11																						
16-Mar	5	3	3	3	Z	3	2	1	2	3	2	2	1	1	1	1	2	1	1	1	1	1	0	1.7	5																							
17-Mar	0	2	3	4	1	Z	4	6	3	3	2	2	2	2	1	2	2	2	6	7	8	4	3	2	3.0	8																						
18-Mar	Z	6	2	1	1	1	1	1	1	2	2	1	2	1	1	1	0	0	0	0	1	1	2	5	1.4	6																						
19-Mar	2	Z	15	18	7	7	6	3	3	1	1	1	1	4	2	6	8	3	6	5	2	9	5	3	5.1	18																						
20-Mar	5	12	Z	6	7	7	6	5	4	5	3	3	3	6	6	4	6	4	1	1	3	3	4	4	4.6	12																						
21-Mar	2	4	7	Z	10	16	14	7	3	3	2	1	1	1	2	2	1	1	0	1	2	1	1	1	3.4	16																						
22-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	5	3	1	1	6	1	1	5	1.2	6																						
23-Mar	3	4	4	8	9	Z	5	2	2	2	2	2	2	1	1	1	0	0	0	1	1	1	2	2.4	9																							
24-Mar	Z	0	1	1	4	11	5	5	2	2	3	2	1	1	1	1	1	1	1	0	1	0	0	0	1.9	11																						
25-Mar	0	Z	0	0	0	0	3	3	2	1	2	3	2	2	1	1	1	1	1	1	3	0	3	7	1.6	7																						
26-Mar	10	5	Z	2	4	12	11	5	2	2	2	2	2	2	1	2	1	3	2	0	1	1	4	3.3	12																							
27-Mar	3	3	4	Z	2	3	2	3	1	1	1	0	0	0	0	0	0	0	0	1	6	3	3	5	1.8	6																						
28-Mar	3	0	0	0	Z	2	1	4	1	2	1	1	2	2	2	1	1	1	3	3	2	1	1	2	1.5	4																						
29-Mar	2	2	1	1	1	Z	2	2	3	2	2	1	2	2	2	3	3	2	2	2	4	3	2	3	2.1	4																						
30-Mar	Z	3	6	2	1	0	0	0	0	0	0	0	0	0	1	2	1	2	2	2	3	3	2	3	1.5	6																						
31-Mar	3	Z	5	3	2	3	3	2	1	2	1	1	1	1	1	3	0	0	0	1	1	1	1	1	1.4	5																						
																								3.3	3.7	3.7	3.5	3.8	5.4	4.7	4.3	3.2	2.5	2.1	1.9	1.7	2.1	2.0	2.2	2.5	2.2	2.6	2.8	3.4	3.1	3.1	3.6	Diurnal Average
																								10	14	16	20	10	18	17	17	12	8	8	7	5	8	8	11	14	11	12	10	15	18	17	15	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
Cenovus - Christina Lake - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	710	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: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - March 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	48	62	45	43	73	59	89	89	78	16	14	10	16	16	27	24	709
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	48	62	45	43	73	59	89	89	78	16	14	10	16	16	27	24	709

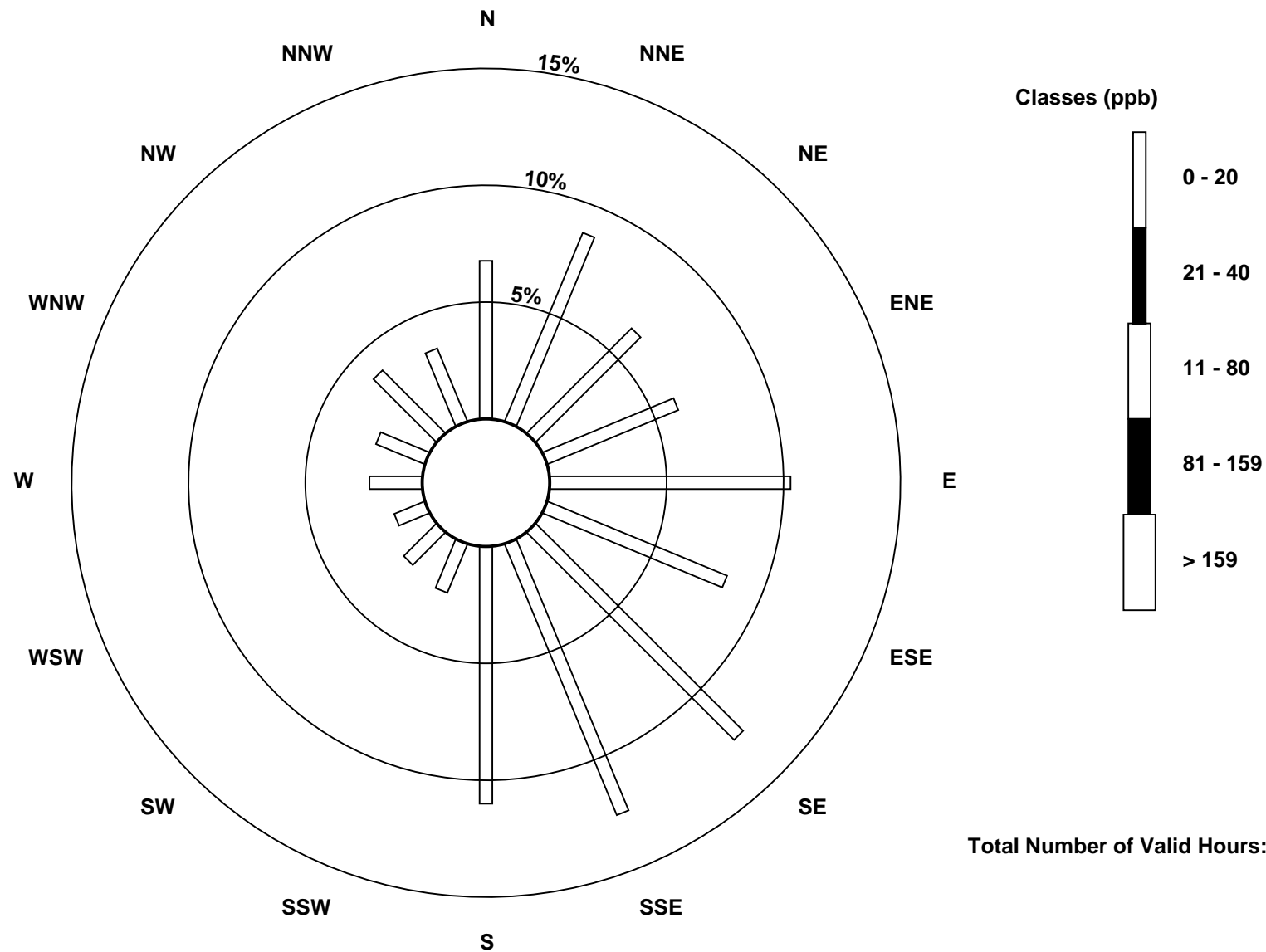
Total Number of Valid Hours: 709

Total Number of Hours: 744

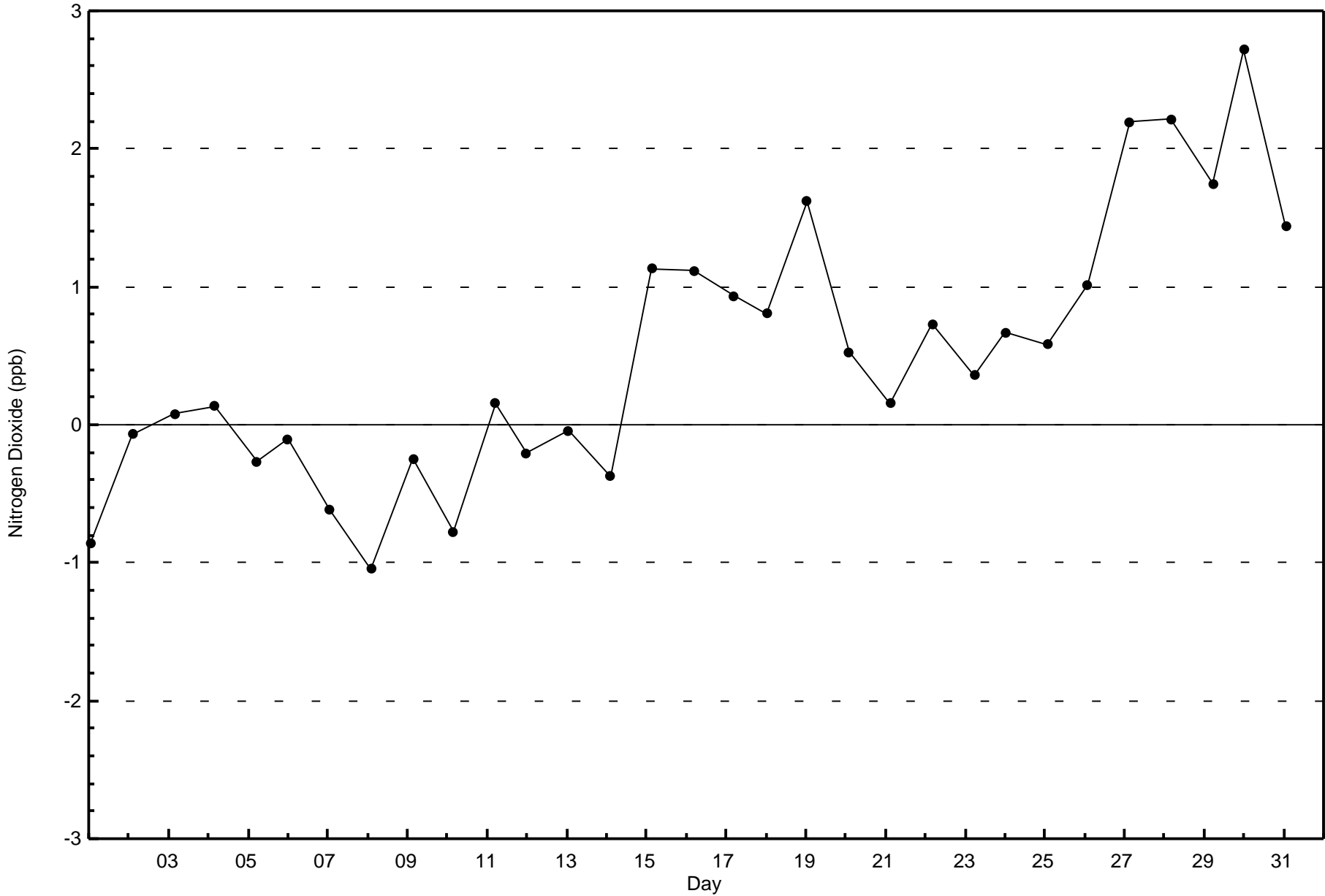


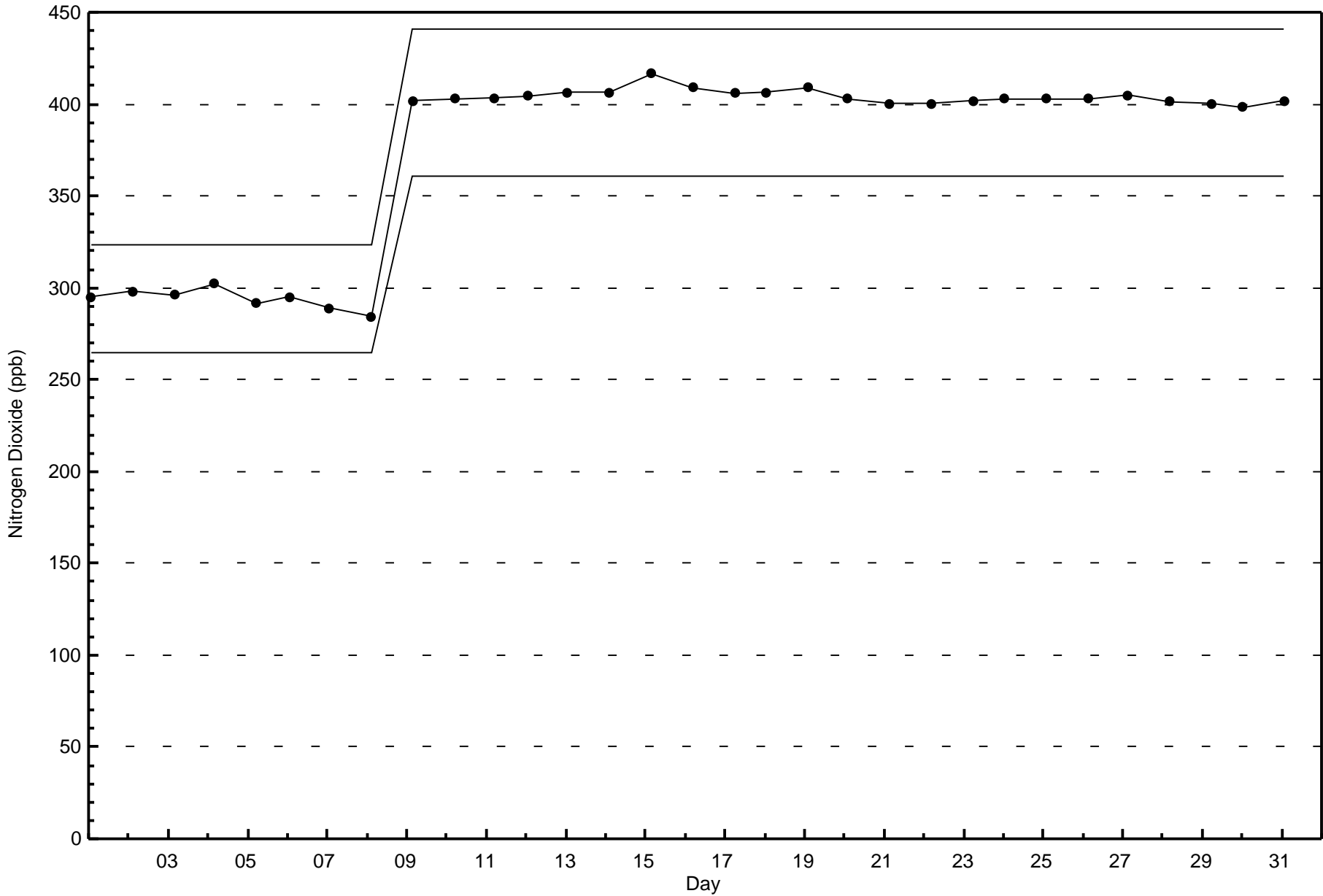
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake (AMS500)



Total Number of Valid Hours: 709







Wood Buffalo Environmental Association
Summary of Hour Averages

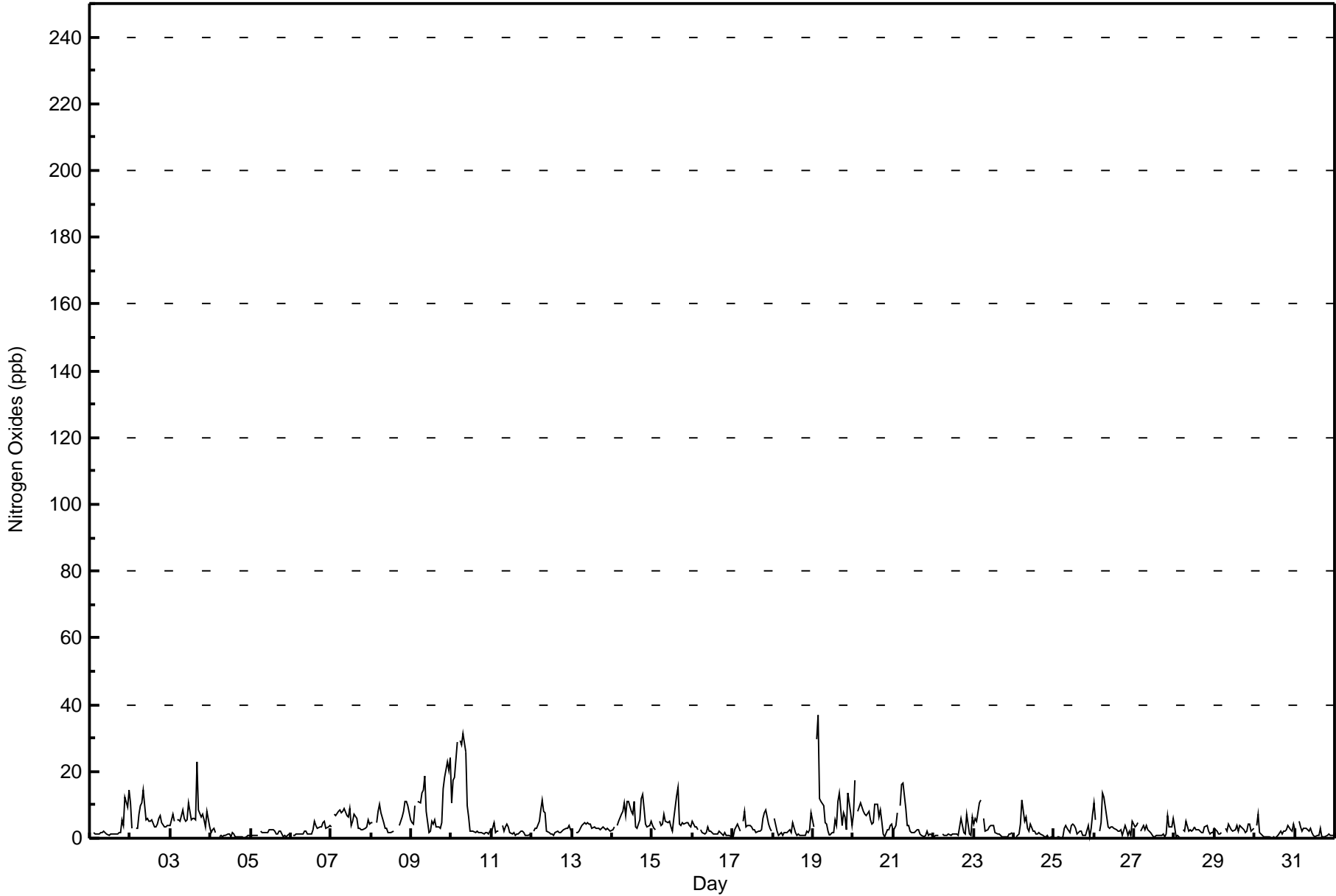
Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - March 2017

Maximum Value: 37 ppb on Mar 19 04:00		Maximum Daily Average: 9.9 ppb on Mar 10		Hours in Service: 744																																													
Minimum Value: 0 ppb on Mar 30 13:00		Minimum Daily Average: 1.0 ppb on Mar 4		Hours of Data: 710																																													
Maximum Diurnal Average: 6.7 ppb at hour 6		Minimum Diurnal Average: 2.6 ppb at hour 13		Hours of Missing Data: 34																																													
Monthly Average: 4.0 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 3 Q ₃ = 5 P ₉₀ = 9 P ₉₉ = 25		Hours of Calibration: 34																																													
				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-Mar	2	Z	2	1	1	1	2	2	2	2	1	1	1	1	1	1	1	2	2	6	4	12	9	15	3.1	15																							
2-Mar	11	3	Z	3	3	7	10	11	14	6	6	5	5	5	3	3	4	6	7	5	3	3	4	4	5.7	14																							
3-Mar	4	7	5	Z	5	6	5	9	6	5	5	10	6	6	6	6	23	8	6	7	6	3	8	4	6.8	23																							
4-Mar	2	3	3	2	Z	1	1	1	1	1	1	0	2	1	1	1	1	0	1	0	1	0	1	1	1.0	3																							
5-Mar	1	1	1	1	1	Z	2	2	2	2	2	3	3	3	2	1	1	2	2	1	1	1	1	1	1.4	3																							
6-Mar	Z	1	1	1	1	1	1	1	2	2	1	1	1	2	5	4	3	3	3	5	5	3	3	4	2.5	5																							
7-Mar	4	Z	7	7	8	9	8	8	9	7	7	9	4	5	7	6	3	3	3	3	3	3	5	4	5.6	9																							
8-Mar	5	5	Z	5	8	10	8	4	3	3	2	2	2	2	C	C	C	4	6	8	11	11	10	6	5.7	11																							
9-Mar	5	4	10	Z	11	11	13	14	19	8	2	2	5	4	5	3	3	3	5	15	18	23	21	24	9.9	24																							
10-Mar	11	17	18	29	Z	29	28	31	26	10	6	2	2	2	1	2	2	2	2	1	2	1	1	2	9.9	31																							
11-Mar	2	5	2	2	2	Z	4	2	3	4	3	2	1	2	1	1	1	2	2	2	1	1	1	1	2.0	5																							
12-Mar	Z	2	3	3	5	9	11	8	8	2	2	1	1	1	2	2	2	2	2	3	3	3	4	3	3.5	11																							
13-Mar	2	Z	2	2	2	3	4	5	4	5	4	4	3	3	3	3	3	3	3	3	2	3	2	2	3.1	5																							
14-Mar	3	3	Z	4	5	7	8	11	7	11	11	8	7	11	3	3	6	12	13	9	4	4	4	5	6.8	13																							
15-Mar	4	3	3	Z	5	4	4	7	5	5	5	3	2	6	13	15	4	4	5	4	5	5	4	3	5.1	15																							
16-Mar	5	3	3	3	Z	3	1	1	2	3	2	2	1	1	1	1	2	1	1	2	1	1	1	1	1.9	5																							
17-Mar	1	3	3	4	2	Z	5	8	3	4	4	3	3	2	2	2	2	3	6	8	8	4	3	2	3.7	8																							
18-Mar	Z	6	2	1	1	2	1	2	2	3	2	4	2	1	1	1	1	1	1	1	2	2	3	7	2.1	7																							
19-Mar	3	Z	30	37	12	11	10	5	4	2	1	2	2	6	4	11	13	4	8	6	3	14	7	4	8.6	37																							
20-Mar	7	18	Z	8	10	9	8	7	7	8	5	4	5	10	10	6	9	5	1	1	3	3	4	4	6.6	18																							
21-Mar	2	4	8	Z	10	16	16	9	4	4	2	2	2	2	2	2	1	1	0	1	2	1	1	1	4.1	16																							
22-Mar	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	6	4	2	1	7	1	1	6	1.8	7																							
23-Mar	4	6	5	11	11	Z	6	2	2	3	4	4	4	2	1	1	1	0	0	0	0	1	1	2	3.2	11																							
24-Mar	Z	0	1	1	4	11	5	7	3	2	4	2	2	1	1	2	1	1	1	0	1	0	0	0	2.3	11																							
25-Mar	0	Z	0	0	0	0	3	4	3	2	4	4	4	4	3	1	2	2	1	1	1	4	0	3	7	2.2	7																						
26-Mar	10	6	Z	2	5	13	12	6	3	3	4	3	3	3	2	2	3	1	4	3	1	2	1	5	4.2	13																							
27-Mar	3	4	5	Z	2	4	2	4	2	2	2	1	1	1	1	1	1	1	1	1	7	4	3	6	2.5	7																							
28-Mar	3	0	1	0	Z	2	2	5	2	2	2	3	3	3	3	2	2	2	4	4	2	1	2	2	2.2	5																							
29-Mar	3	2	1	1	2	Z	3	2	4	3	3	2	3	4	2	4	3	3	2	2	4	4	2	3	2.7	4																							
30-Mar	Z	4	7	2	1	1	0	0	0	0	0	0	0	0	1	2	1	2	2	2	4	3	2	4	1.7	7																							
31-Mar	3	Z	5	3	2	3	3	3	2	3	2	1	1	1	1	3	0	0	1	1	1	1	1	1	1.8	5																							
																								3.8	4.4	4.9	5.1	4.6	6.7	6.1	5.9	5.0	3.8	3.2	2.9	2.6	3.1	3.0	3.2	3.5	2.7	3.0	3.3	3.8	3.8	3.6	4.3	Diurnal Average	
																								11	18	30	37	12	29	28	31	26	11	11	10	7	11	13	15	23	12	13	15	18	23	21	24	Diurnal Maximum	
Z - zerospan		C - Calibration																																															



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	699	98.45	98.45
21 - 40	11	1.55	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: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - March 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	48	62	45	40	73	58	86	88	78	16	14	10	16	13	27	24	698
21 - 40	0	0	0	3	0	1	3	1	0	0	0	0	0	3	0	0	11
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	48	62	45	43	73	59	89	89	78	16	14	10	16	16	27	24	709

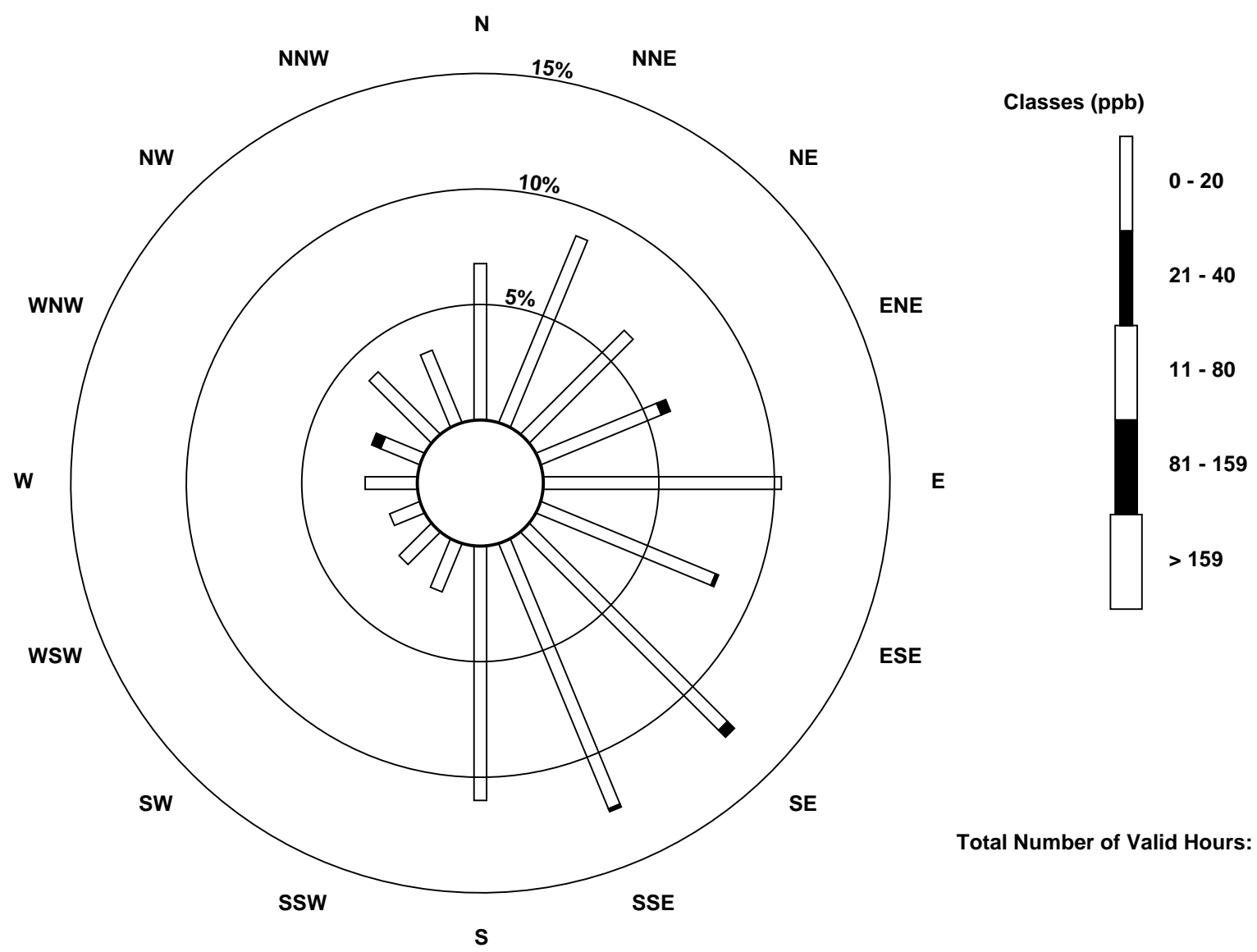
Total Number of Valid Hours: 709

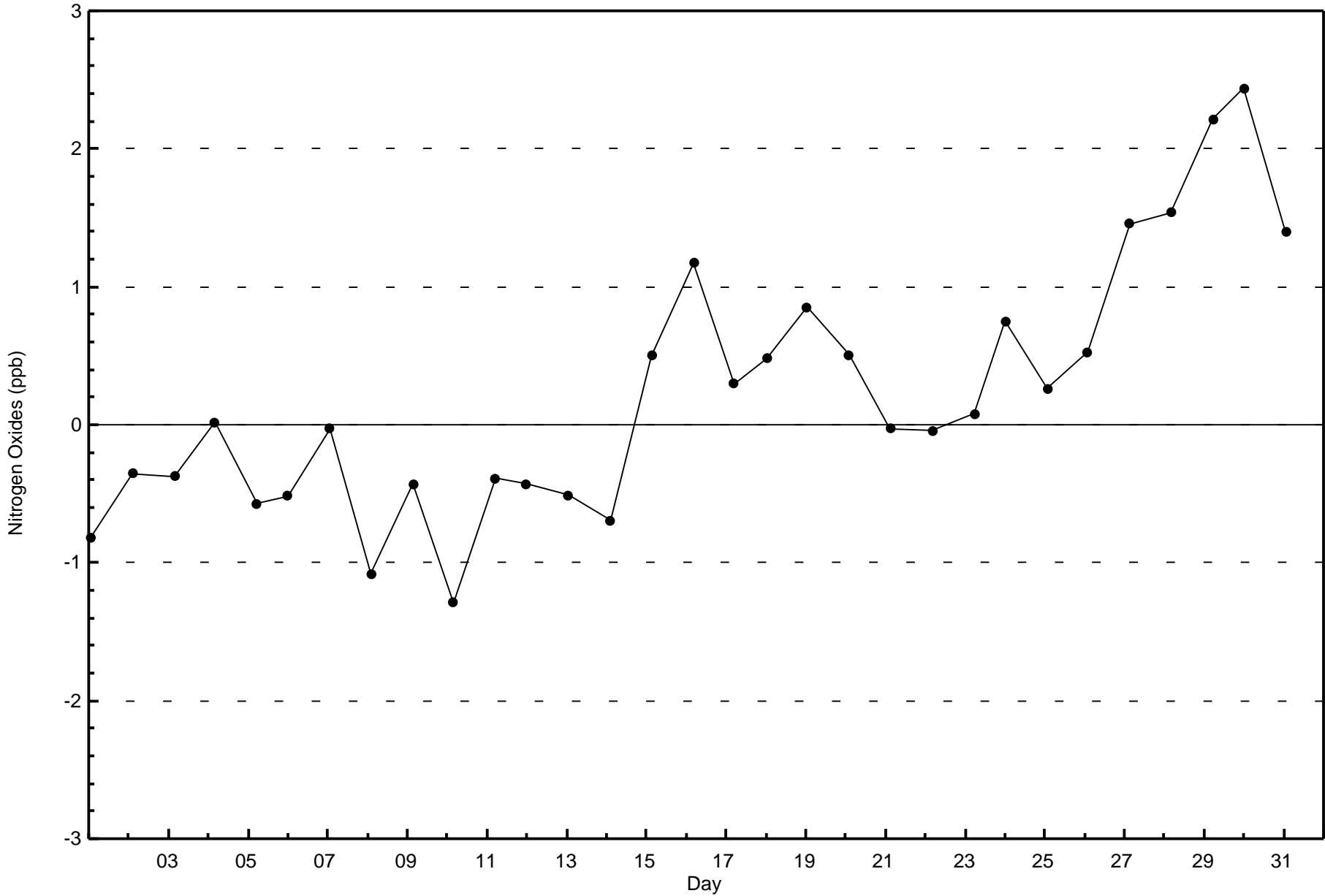
Total Number of Hours: 744

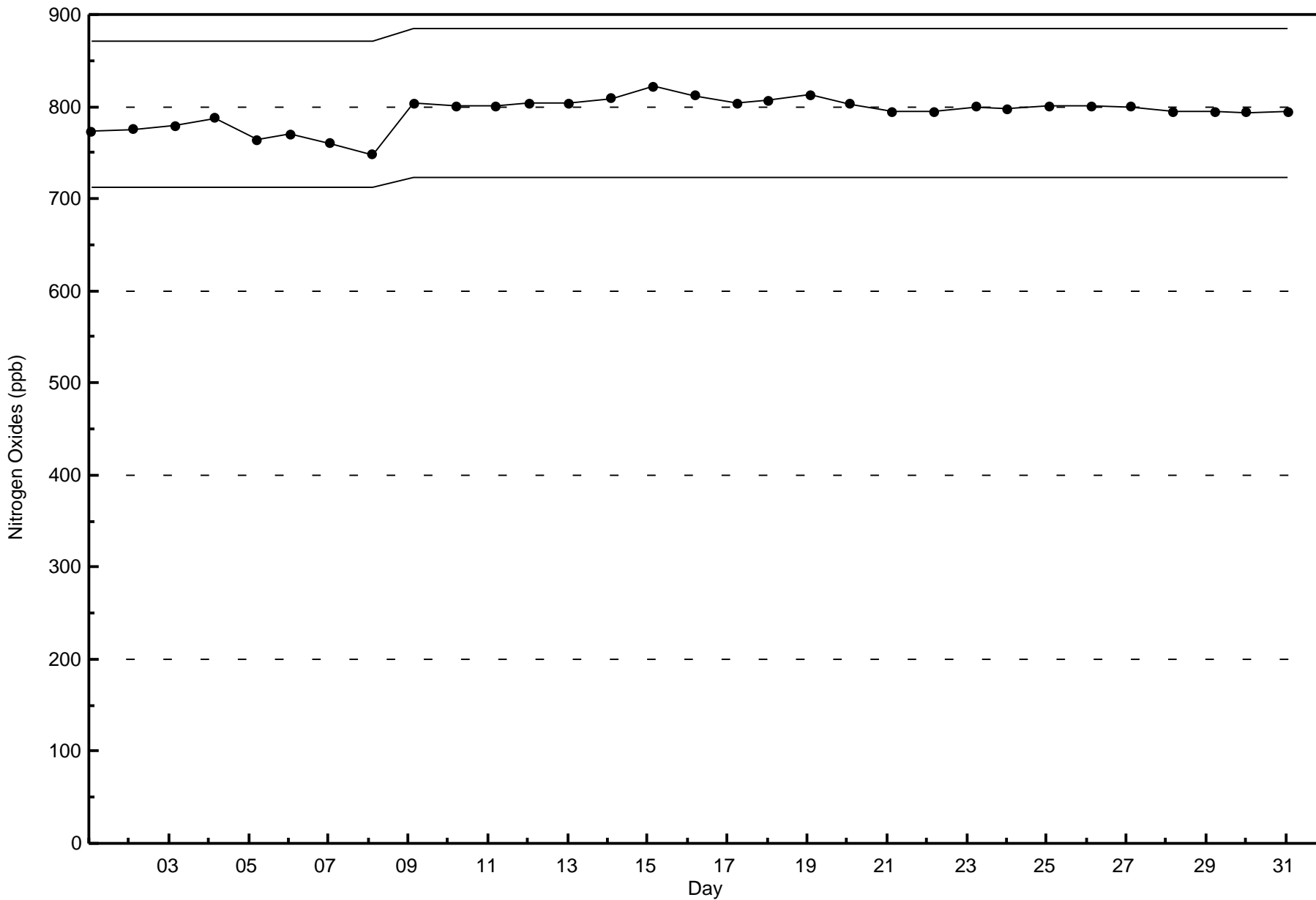


Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake (AMS500)







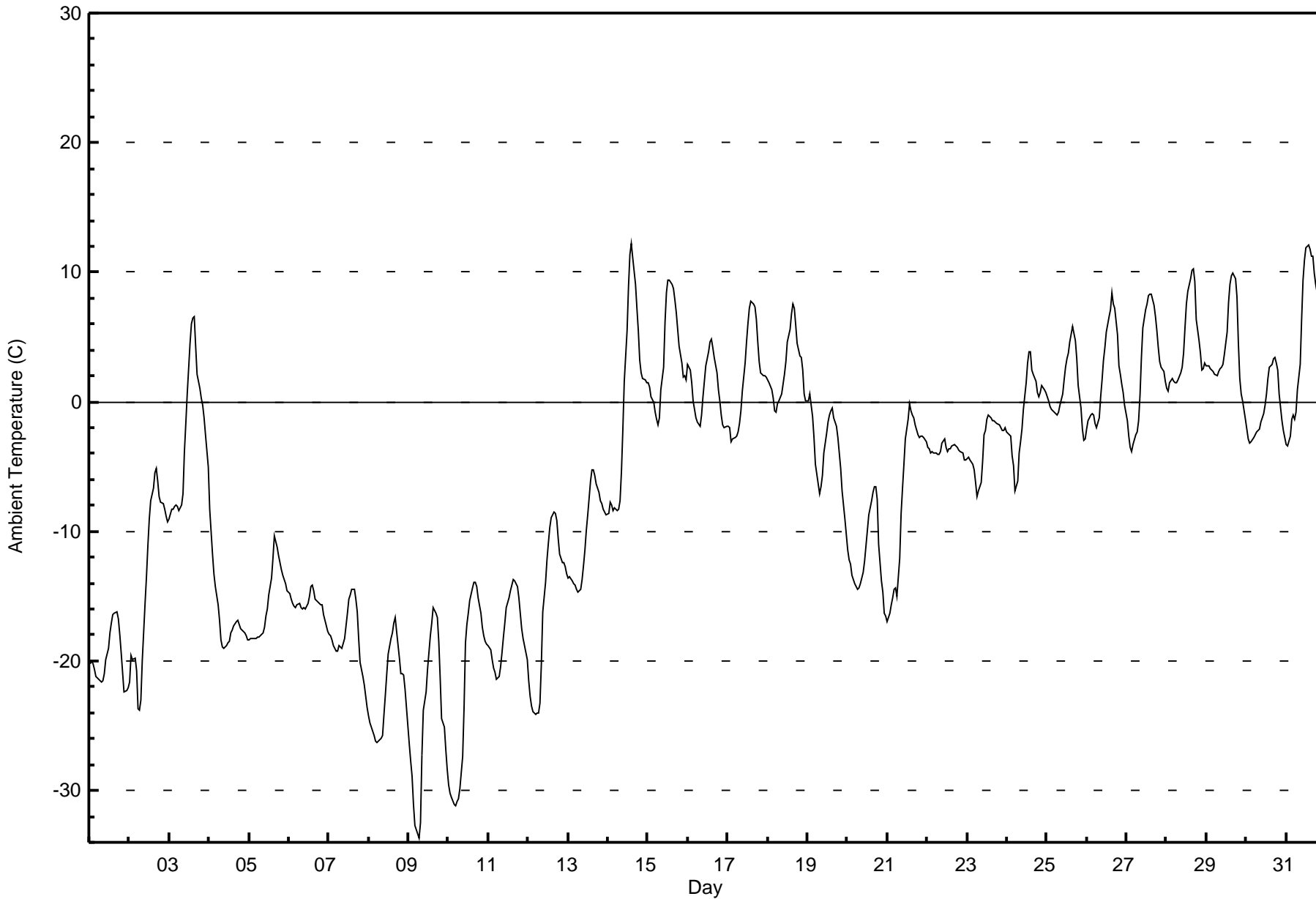


Maximum Value: 12.2 C on Mar 14 15:00 Maximum Daily Average: 5.2 C on Mar 31																						Hours in Service: 744 Hours of Data: 744																										
Minimum Value: -33.7 C on Mar 9 07:00 Minimum Daily Average: -24.5 C on Mar 9 Maximum Diurnal Average: -2.0 C at hour 16 Minimum Diurnal Average: -11.2 C at hour 7 Monthly Average: -6.94 C Percentiles: P ₁ = -30.9 P ₁₀ = -20.7 Q ₁ = -15.9 Median = -4.0 Q ₃ = 1.3 P ₉₀ = 5.4 P ₉₉ = 11.2																						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-Mar	-20.2	-20.0	-20.3	-20.7	-21.2	-21.4	-21.5	-21.7	-21.6	-21.0	-19.9	-19.1	-17.9	-17.1	-16.4	-16.3	-16.3	-16.8	-18.0	-19.3	-20.9	-22.4	-22.3	-22.1	-19.8	-16.3																						
2-Mar	-21.6	-19.6	-19.9	-19.8	-20.8	-23.6	-23.8	-23.1	-20.0	-15.6	-13.5	-11.1	-9.0	-7.7	-6.6	-5.5	-5.1	-6.1	-7.4	-7.7	-7.8	-8.3	-8.8	-9.2	-13.4	-5.1																						
3-Mar	-9.0	-8.3	-8.3	-8.0	-8.0	-8.0	-8.4	-7.9	-7.0	-3.8	-1.7	0.7	4.5	6.0	6.5	6.6	4.2	2.1	1.0	0.3	-0.3	-1.2	-2.6	-5.0	-2.3	6.6																						
4-Mar	-8.3	-10.0	-11.7	-13.3	-14.3	-15.6	-16.9	-18.4	-18.9	-19.0	-18.8	-18.6	-18.4	-17.8	-17.6	-17.3	-16.9	-16.8	-17.2	-17.5	-17.6	-17.8	-18.1	-18.4	-16.5	-8.3																						
5-Mar	-18.4	-18.2	-18.7	-18.2	-18.2	-18.2	-18.2	-18.1	-17.8	-17.4	-16.5	-15.9	-15.0	-13.6	-12.1	-10.3	-10.8	-11.2	-11.9	-13.0	-13.4	-13.7	-14.0	-14.5	-15.3	-10.3																						
6-Mar	-14.8	-15.2	-15.6	-15.8	-15.9	-15.6	-15.6	-15.8	-16.0	-15.9	-16.0	-15.5	-15.0	-14.2	-14.1	-14.6	-15.2	-15.5	-15.6	-15.6	-15.7	-16.4	-17.3	-17.8	-15.6	-14.1																						
7-Mar	-18.0	-18.1	-18.4	-18.9	-19.3	-19.3	-18.8	-19.0	-19.1	-18.3	-17.3	-16.3	-15.3	-14.9	-14.5	-14.5	-15.2	-16.2	-18.2	-20.2	-21.2	-21.9	-22.7	-23.6	-18.3	-14.5																						
8-Mar	-24.2	-24.8	-25.4	-25.7	-26.1	-26.3	-26.2	-25.9	-25.7	-24.1	-22.6	-21.0	-19.4	-18.3	-17.8	-17.1	-16.6	-17.7	-19.8	-21.0	-21.0	-21.0	-22.2	-25.0	-22.3	-16.6																						
9-Mar	-26.4	-27.7	-28.9	-31.1	-32.7	-33.3	-33.7	-32.5	-27.3	-23.8	-22.4	-20.7	-19.3	-18.0	-17.1	-15.9	-16.3	-16.6	-18.5	-21.3	-24.4	-25.1	-26.8	-28.4	-24.5	-15.9																						
10-Mar	-29.6	-30.2	-30.5	-31.1	-31.2	-30.9	-30.6	-29.8	-27.4	-23.6	-18.6	-17.2	-16.3	-15.4	-14.4	-13.9	-13.9	-14.2	-15.2	-16.3	-17.4	-18.0	-18.5	-18.7	-21.8	-13.9																						
11-Mar	-18.8	-19.1	-19.9	-20.5	-20.9	-21.4	-21.2	-20.5	-19.3	-18.2	-17.0	-15.9	-15.1	-14.6	-14.1	-13.7	-13.8	-14.2	-15.1	-16.3	-17.5	-18.3	-18.8	-19.9	-17.7	-13.7																						
12-Mar	-21.5	-22.8	-23.5	-23.9	-24.1	-24.0	-24.0	-23.3	-20.2	-16.2	-13.9	-12.2	-10.9	-9.7	-8.9	-8.5	-8.6	-9.2	-10.6	-11.7	-12.5	-12.4	-12.7	-13.3	-15.8	-8.5																						
13-Mar	-13.6	-13.5	-13.8	-14.0	-14.2	-14.5	-14.7	-14.5	-13.7	-12.6	-11.4	-10.0	-8.8	-6.1	-5.3	-5.2	-5.7	-6.4	-7.0	-7.6	-7.9	-8.3	-8.5	-8.7	-10.2	-5.2																						
14-Mar	-8.6	-7.7	-8.0	-8.4	-8.2	-8.4	-8.3	-7.7	-5.4	-2.1	1.5	5.5	8.8	11.3	12.2	11.1	9.1	7.3	5.4	3.2	2.2	1.8	1.7	1.5	0.4	12.2																						
15-Mar	1.4	1.1	0.3	0.0	-0.8	-1.3	-1.8	-1.2	1.0	2.6	6.1	8.5	9.4	9.4	9.0	8.7	7.9	6.9	5.6	4.3	3.0	1.9	2.1	1.7	3.6	9.4																						
16-Mar	2.9	2.4	1.5	0.0	-0.6	-1.2	-1.6	-1.9	-1.0	0.3	1.6	2.8	3.8	4.6	4.9	4.2	3.5	2.2	0.9	0.0	-1.1	-1.8	-2.0	-1.9	0.9	4.9																						
17-Mar	-1.9	-2.0	-3.1	-2.9	-2.8	-2.7	-2.4	-1.7	-0.7	0.9	3.0	4.6	6.1	7.2	7.8	7.5	7.3	6.3	4.6	3.1	2.2	2.0	2.0	1.9	1.9	7.8																						
18-Mar	1.6	1.5	1.0	0.3	-0.7	-0.8	-0.2	0.1	0.6	1.3	2.1	3.1	4.6	5.6	6.8	7.6	7.2	5.9	4.5	3.6	3.4	2.5	0.6	0.0	2.6	7.6																						
19-Mar	0.0	0.6	-0.3	-1.1	-2.8	-4.8	-6.4	-7.1	-6.6	-5.6	-4.0	-2.4	-1.6	-1.0	-0.7	-0.5	-1.2	-1.8	-2.8	-3.9	-5.2	-6.9	-9.1	-10.3	-3.6	0.6																						
20-Mar	-11.4	-12.2	-12.5	-13.4	-14.1	-14.3	-14.5	-14.4	-14.1	-13.2	-12.3	-11.1	-9.9	-8.7	-7.7	-6.9	-6.5	-6.6	-7.6	-11.0	-13.8	-14.6	-16.3	-16.6	-11.8	-6.5																						
21-Mar	-16.9	-16.3	-15.7	-15.2	-14.5	-14.4	-15.0	-12.1	-8.6	-6.6	-4.8	-2.9	-1.4	-0.1	-0.7	-1.0	-1.2	-1.8	-2.5	-2.7	-2.6	-2.6	-2.8	-3.1	-6.9	-0.1																						
22-Mar	-3.5	-3.7	-3.9	-3.9	-3.9	-4.0	-4.0	-4.1	-3.8	-3.2	-2.9	-3.5	-3.9	-3.6	-3.6	-3.4	-3.3	-3.4	-3.5	-3.8	-3.8	-4.0	-4.5	-4.5	-3.7	-2.9																						
23-Mar	-4.4	-4.3	-4.5	-4.8	-5.2	-6.2	-7.3	-6.8	-6.3	-4.6	-2.6	-2.2	-1.3	-1.0	-1.3	-1.4	-1.4	-1.5	-1.7	-1.8	-2.0	-2.2	-2.3	-2.0	-3.3	-1.0																						
24-Mar	-2.4	-2.5	-2.6	-4.2	-4.9	-6.9	-6.1	-4.0	-3.1	-2.2	-0.6	1.5	2.9	3.9	3.9	2.5	2.1	1.6	0.7	0.4	0.8	1.3	1.0	0.7	-0.7	3.9																						
25-Mar	0.4	0.1	-0.4	-0.6	-0.8	-0.9	-1.0	-0.8	-0.2	0.6	1.7	2.6	3.3	3.7	4.6	5.8	5.2	4.7	3.3	1.2	-0.4	-2.1	-3.0	-2.9	1.0	5.8																						
26-Mar	-2.1	-1.5	-1.0	-1.0	-1.0	-1.7	-2.0	-1.3	0.4	1.6	3.2	4.2	5.3	6.5	7.1	8.4	7.6	7.2	5.1	2.8	2.1	1.4	0.7	-0.3	2.2	8.4																						
27-Mar	-1.5	-2.6	-3.5	-3.9	-3.3	-2.6	-2.4	-1.4	0.5	3.5	5.7	7.1	7.5	8.1	8.3	8.3	7.4	6.5	5.5	4.1	3.0	2.6	2.3	1.6	2.5	8.3																						
28-Mar	1.0	0.8	1.5	1.8	1.6	1.5	1.5	1.7	2.2	2.7	3.8	5.7	7.6	8.6	9.5	10.1	10.3	9.3	6.4	4.7	3.7	2.4	2.6	3.0	4.3	10.3																						
29-Mar	2.8	2.7	2.6	2.4	2.3	2.1	2.0	2.4	2.6	2.6	2.9	3.7	5.3	7.7	9.1	9.8	10.0	9.5	8.1	4.5	1.8	0.6	0.1	-1.4	4.0	10.0																						
30-Mar	-2.1	-2.9	-3.2	-3.1	-2.8	-2.5	-2.4	-2.2	-2.1	-1.5	-0.9	-0.2	0.6	1.8	2.6	2.9	3.3	3.4	3.0	2.4	0.6	-1.5	-2.3	-2.7	-0.5	3.4																						
31-Mar	-3.3	-3.4	-2.7	-1.4	-1.1	-1.4	-0.9	1.0	2.9	6.3	9.4	11.0	11.9	12.1	11.8	11.2	11.3	9.9	9.0	7.8	6.8	6.4	6.1	5.0	5.2	12.1																						
																								-9.4	-9.6	-10.0	-10.3	-10.7	-11.1	-11.2	-10.7	-9.5	-7.9	-6.3	-5.0	-3.8	-2.7	-2.2	-2.0	-2.3	-3.0	-4.2	-5.4	-6.3	-7.0	-7.6	-8.2	Diurnal Average
																								2.9	2.7	2.6	2.4	2.3	2.1	2.0	2.4	2.9	6.3	9.4	11.0	11.9	12.1	12.2	11.2	11.3	9.9	9.0	7.8	6.8	6.4	6.1	5.0	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Cenovus - Christina Lake - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Cenovus - Christina Lake - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	81	10.89	10.89
-20 - 0	438	58.87	69.76
0 - 10	214	28.76	98.52
10 - 20	11	1.48	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

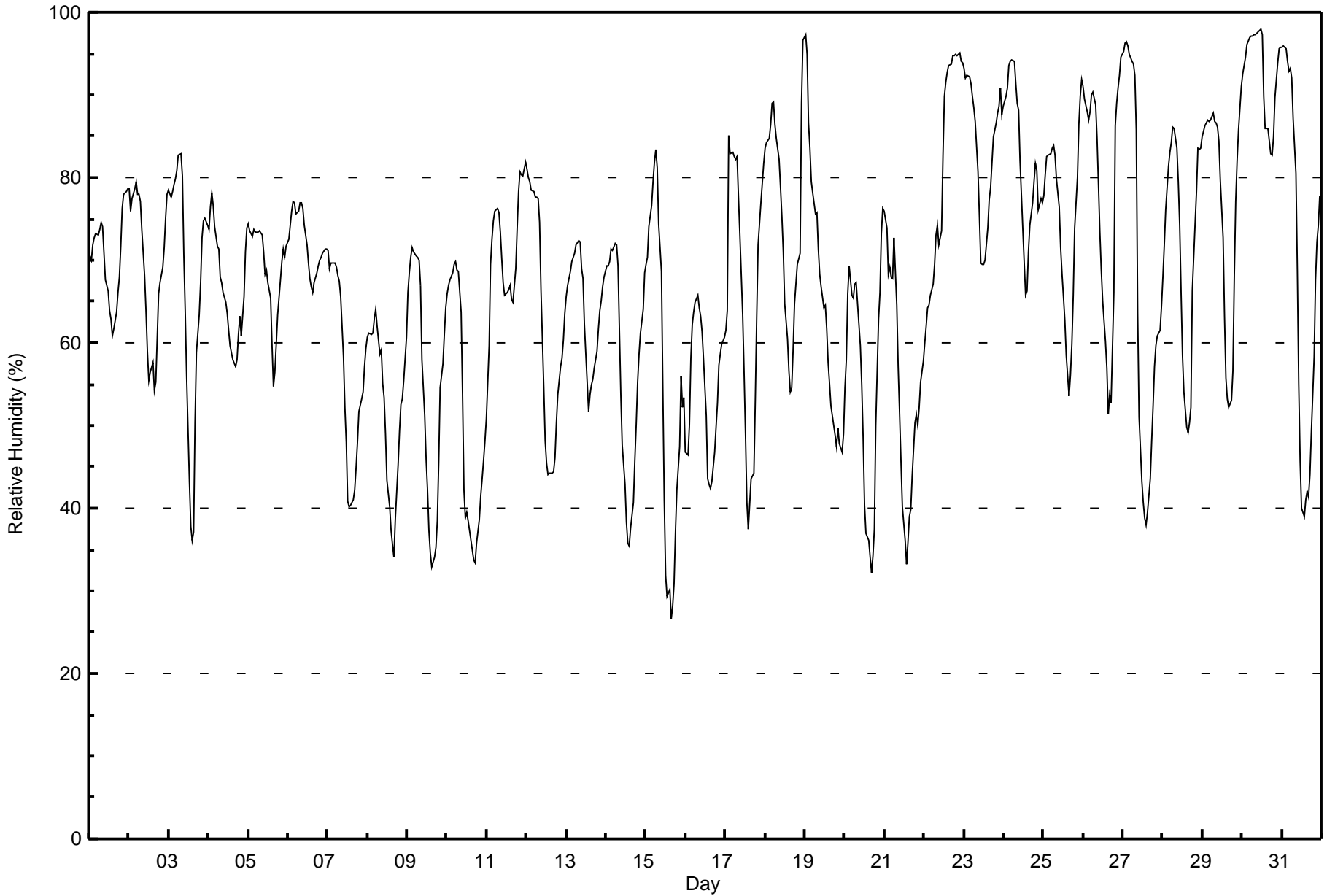
Cenovus - Christina Lake - March 2017

Maximum Value: 98 % on Mar 30 12:00																			Maximum Daily Average: 92.7 % on Mar 30						Hours in Service: 744																			
Minimum Value: 27 % on Mar 15 16:00																			Minimum Daily Average: 50.6 % on Mar 10						Hours of Data: 744																			
Maximum Diurnal Average: 78.6 % at hour 7																			Minimum Diurnal Average: 51.3 % at hour 16						Hours of Missing Data: 0																			
Monthly Average: 67.2 %																			Percentiles: P ₁ = 33 P ₁₀ = 43 Q ₁ = 56 Median = 69 Q ₃ = 78 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-Mar	71	70	72	73	73	73	74	75	74	71	68	66	64	63	61	62	64	66	68	72	76	78	78	79	70.4	79																		
2-Mar	79	76	78	79	79	78	78	77	74	68	64	59	55	56	58	54	55	61	66	67	69	72	75	78	68.9	79																		
3-Mar	78	78	78	79	80	81	83	83	80	71	64	56	43	38	36	37	50	59	63	67	73	75	75	74	66.7	83																		
4-Mar	74	76	78	77	74	72	71	68	67	66	65	64	62	60	59	58	57	58	61	63	61	66	71	74	66.7	78																		
5-Mar	74	73	73	74	73	73	73	74	73	71	68	69	67	65	60	55	56	60	63	68	70	71	70	72	68.6	74																		
6-Mar	73	74	76	77	77	76	76	77	77	76	74	72	70	68	67	66	67	68	69	70	70	71	71	71	72.2	77																		
7-Mar	71	69	70	70	70	69	68	67	66	58	52	48	41	40	41	42	45	48	52	53	54	57	59	56.3	71																			
8-Mar	61	61	61	61	63	64	62	59	59	55	53	49	43	40	37	36	34	39	45	49	53	53	55	61	52.2	64																		
9-Mar	66	68	70	72	71	71	70	70	67	58	51	46	42	37	35	33	34	35	39	46	54	57	61	64	54.9	72																		
10-Mar	66	67	68	68	70	70	69	69	64	54	42	39	40	38	36	35	34	33	36	39	41	44	46	48	50.6	70																		
11-Mar	51	60	70	73	75	76	76	76	73	70	67	66	66	66	67	65	65	69	74	78	81	80	80	82	71.1	82																		
12-Mar	81	80	79	78	78	78	78	77	75	66	55	48	45	44	44	44	44	46	50	54	57	58	60	64	61.9	81																		
13-Mar	66	67	69	70	70	71	72	72	72	69	68	62	59	52	54	55	56	57	59	62	64	65	67	68	64.3	72																		
14-Mar	69	69	70	71	71	72	72	69	62	54	48	43	38	36	35	38	41	46	50	55	59	61	64	69	56.7	72																		
15-Mar	70	70	74	77	79	82	83	81	74	69	54	41	32	29	30	27	28	31	37	42	48	56	52	53	55.0	83																		
16-Mar	47	46	50	58	62	64	65	66	64	63	61	58	51	44	43	42	43	47	50	53	57	59	60	61	54.8	66																		
17-Mar	61	64	85	83	83	82	82	82	78	73	63	56	49	41	38	44	44	44	53	63	72	77	79	82	65.8	85																		
18-Mar	84	84	85	86	89	89	87	85	82	79	75	71	65	60	57	54	55	59	65	69	70	71	89	97	75.3	97																		
19-Mar	97	95	87	84	80	78	76	76	71	68	67	64	64	62	58	55	52	50	49	47	50	48	47	49	65.5	97																		
20-Mar	55	58	66	69	66	65	67	67	65	60	55	49	40	37	36	34	32	34	38	50	63	66	73	76	55.1	76																		
21-Mar	76	74	68	69	68	68	73	65	57	51	46	40	36	33	36	39	40	44	50	51	50	52	55	58	54.2	76																		
22-Mar	60	62	64	65	66	67	69	73	74	72	74	83	90	92	93	93	94	95	95	95	95	95	94	94	81.3	95																		
23-Mar	93	92	92	92	91	90	88	87	81	75	70	69	70	70	74	77	79	82	85	87	88	89	91	88	83.3	93																		
24-Mar	89	90	91	94	94	94	91	89	88	82	74	70	66	66	71	74	77	79	82	81	76	77	77	77	81.9	94																		
25-Mar	78	80	82	83	83	84	84	83	80	77	72	68	66	63	59	54	56	60	66	74	80	86	90	92	74.9	92																		
26-Mar	91	90	88	87	88	90	90	89	85	79	73	69	65	60	57	51	54	53	66	86	89	91	92	95	78.2	95																		
27-Mar	95	96	96	96	95	94	94	92	86	64	51	43	41	39	38	40	44	48	52	57	60	61	62	64	67.0	96																		
28-Mar	68	72	76	81	83	84	86	86	84	80	74	66	59	54	50	49	50	52	66	74	78	84	83	84	71.8	86																		
29-Mar	85	86	87	87	87	87	88	87	87	86	84	80	73	63	56	53	52	53	57	68	77	82	86	91	76.7	91																		
30-Mar	93	94	95	96	97	97	97	97	97	97	98	98	97	90	86	86	84	83	83	85	90	94	96	96	92.7	98																		
31-Mar	96	96	96	94	93	93	92	87	80	69	55	46	40	39	41	42	41	44	49	58	68	72	74	78	68.5	96																		
																			74.7	75.4	77.2	78.1	78.3	78.4	78.6	77.6	74.7	69.6	64.3	60.1	56.2	53.1	51.7	51.3	52.3	54.7	59.1	64.0	67.6	69.8	72.0	74.0	Diurnal Average	
																			97	96	96	96	97	97	97	97	97	97	98	98	97	92	93	93	94	95	95	95	95	95	96	97	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Cenovus - Christina Lake - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Cenovus - Christina Lake - March 2017**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	50	6.72	6.72
40 - 60	185	24.87	31.59
60 - 80	344	46.24	77.82
80 - 100	165	22.18	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

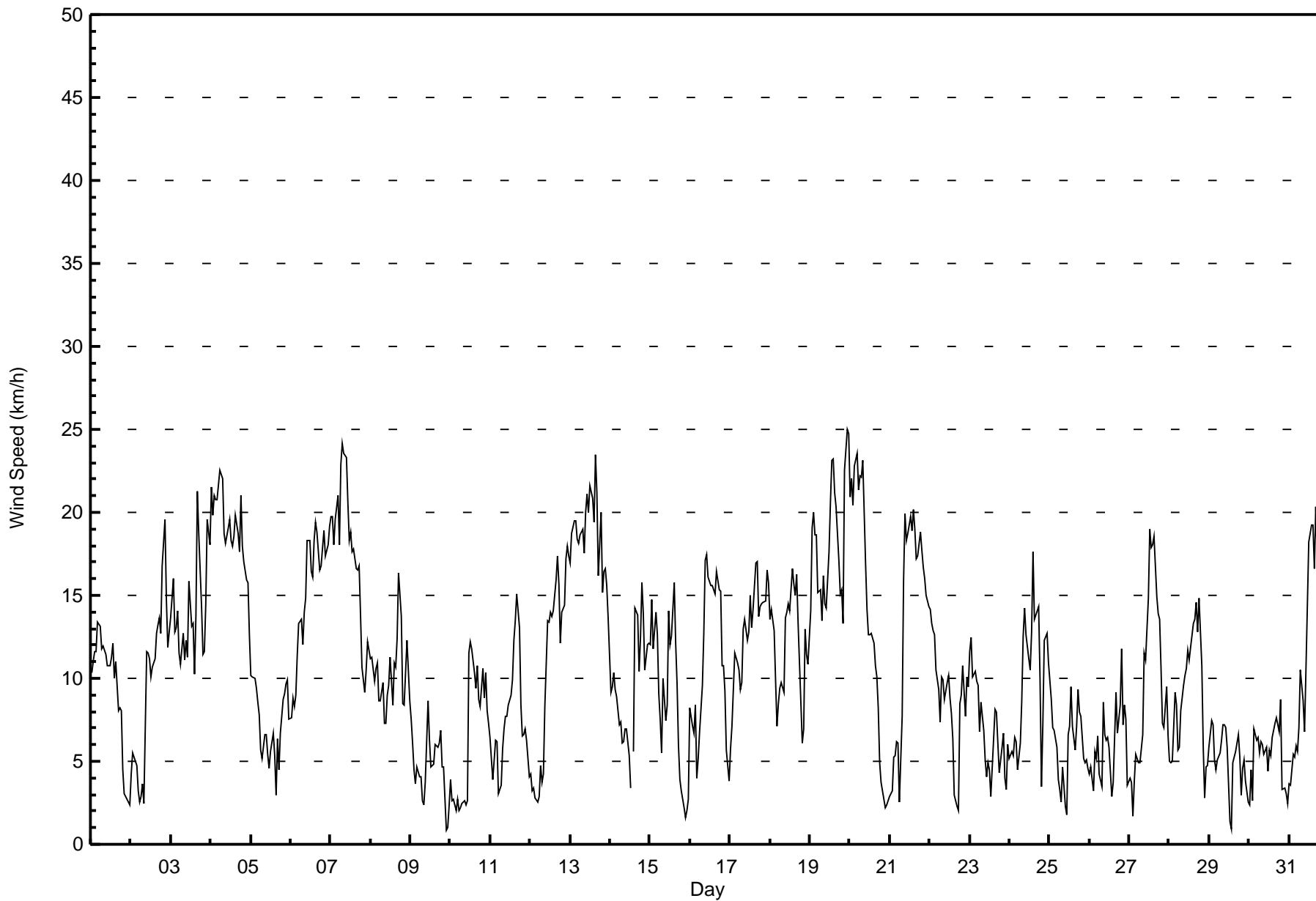


Maximum Speed: 25 km/h on Mar 19 23:00	Maximum Daily Speed Average: 18.7 km/h on Mar 4	Hours in Service: 744
Minimum Speed Value: 1 km/h on Mar 9 22:00	Minimum Daily Speed Average: 2.3 km/h on Mar 29	Hours of Data: 743
Maximum Diurnal Speed Average: 3.9 km/h at hour 17	Minimum Diurnal Speed Average: 1.2 km/h at hour 3	Hours of Missing Data: 1
Monthly Average Velocity: 2.4 km/h 106.3 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 10 Q ₃ = 15 P ₉₀ = 19 P ₉₉ = 23	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-Mar	ENE10	ENE11	NE12	NE12	NE13	NE13	NE12	NE12	NE12	NE11	NE11	NE11	NE11	NE12	NE10	NE11	ENE8	NE8	NEE8	NE4	SE3	E3	SSE3	SSE2	NE8.8	NE13
2-Mar	ESE4	ESE6	E5	E5	ENE3	E3	ESE3	ENE4	E2	S12	SSE12	SSE11	SSE10	SSE11	ESE11	SE13	SE13	SE14	SE13	SE17	SSE20	SE15	SE12	SE13	SE8.9	SSE20
3-Mar	SSE14	S16	S13	S13	S14	S12	S11	S13	S11	S12	S11	S16	S13	SW13	SW10	WSW14	WNW21	WNW19	NNW14	NNW11	NNW12	NNW15	NW20	N18	SW5.1	WNW21
4-Mar	NNE22	N20	N21	N21	NNE21	N23	N22	NNE22	NNE19	NNE18	N19	N20	N18	N18	N19	NNE20	NNE19	NNE18	NNE21	NNE18	NNE17	NNE16	NE16	NE13	NNE18.7	N23
5-Mar	NE10	NE10	ENE10	ENE9	E9	E8	E6	E5	ENE7	ENE7	ENE5	ENE5	ENE6	E7	ENE5	NE3	N6	ENE4	NNE7	NNE9	NNE9	NNE10	NNE10	NNE8	NE6.5	NE10
6-Mar	NNE8	NNE9	N8	N9	N11	N13	N14	NNE12	NNE14	NNE15	NNE18	NNE18	N16	N16	N18	N19	N19	N17	N17	NNW18	NNW19	N17	NNW18	NNW19	N14.7	N19
7-Mar	NNW20	NNW20	NW18	NW20	NNW21	NNW18	NW23	NNW24	NW24	NNW23	NW21	NW18	N19	NNW18	NNW18	NNW17	NNE17	NNE17	NNE14	NNE11	NNE9	NNE10	N12	N12	NNW16.4	NNW24
8-Mar	N11	N11	NNE10	N11	N11	NNW9	N9	N10	NNE7	NNE7	NNE9	NNE10	NNE11	NNE8	NNE11	NNE11	NNE12	NNE16	NNE14	NNE9	NNW8	N10	N12	N9	N9.9	NNE16
9-Mar	NNE8	NNE6	NE4	S4	S5	S4	S4	S3	E2	ENE4	NE9	NE6	SSE5	E5	NE5	NNE6	E6	ESE6	ESE7	ESE5	E5	ENE1	SE1	SE2	E2.8	NE9
10-Mar	S4	SSE3	S3	SE2	S3	ESE2	ENE2	SSE2	ENE3	NE2	NNE3	E12	ESE12	E12	E10	ESE9	ESE11	ESE9	E8	E11	E9	ESE10	ESE8	SE7	ESE5.9	ESE12
11-Mar	SSE6	ESE4	ENE5	E6	ENE6	E3	ESE4	ESE6	SE7	SE8	ESE8	ESE8	ESE9	E10	E12	E13	E15	E13	E8	E7	E7	E7	ESE6	ENE4	ESE7.2	E15
12-Mar	NE4	NE3	NE3	ENE3	ENE3	E3	ENE5	E4	ENE4	SE8	SE13	SE13	SSE14	SE14	SE14	SE16	SE17	SSE16	SSE12	SSE14	SSE14	SSE17	SSE18	SSE17	SE9.2	SSE18
13-Mar	SSE17	SSE19	SSE20	SSE19	SSE18	SSE18	SSE19	SSE19	SSE18	SSE20	SSE21	SSE20	SSE22	S21	S19	S24	S21	S16	S20	S15	S16	S17	S16	S14	S18.3	S24
14-Mar	S9	SSW10	SSW10	S9	SSW9	SSW7	SSW7	S6	SSE6	S7	SSW7	SW5	SW3	AF	S6	SSE14	SSE14	SE10	SE12	SE16	SE14	SSE11	SE12	SE12	SSE8.4	SE16
15-Mar	SE12	SSE15	SSE12	SSE14	S13	S9	S8	SSW6	SW10	SW7	SW8	WSW14	WSW12	WNW13	NW16	WNW12	WSW10	SW6	SSW4	SSE3	SE2	SSE2	ESE2	S3	SSW5.5	NW16
16-Mar	NW8	WNW7	NNW7	N8	NNE4	NE5	NNE7	NNE10	NNE13	NNE17	NE17	NE16	ENE16	NE16	NE15	NE15	NE16	NNE15	NE15	NE11	ENE11	E9	E6	E4	NE9.8	NE17
17-Mar	E6	SE7	SE9	SE12	SSE11	SE11	SE9	SE10	S13	S14	SSE12	SSE13	S15	S13	SSW14	S17	S17	S14	S14	S15	S15	SSE15	SSE17	SSE16	SSE12.1	S17
18-Mar	SE14	SE14	SE13	ESE10	E7	E8	E9	ESE10	ESE9	SE14	SE14	SE15	ESE14	E17	E16	ESE15	E16	E13	E11	ENE6	NE7	NNE13	NNW11	NW11	ESE9.0	E17
19-Mar	NW14	WNW19	WNW20	NNW19	W19	W15	W15	W13	W16	WSW15	WSW14	W18	WSW21	W23	W23	W21	W20	W17	W15	W15	WSW13	NW23	NW25	NW25	W17.3	NW25
20-Mar	NW21	NW22	WNW20	NW23	NW24	NW21	NW22	NW22	NW23	WNW17	WNW14	WNW13	WNW13	WNW13	WNW12	W11	W10	W8	W5	SSE4	S3	SSE2	ESE2	SE3	WNW12.4	NW24
21-Mar	SE3	S3	SSE5	SE5	SSE6	SSE6	SE3	SE8	SSE16	SSE20	SSE18	SSE19	SE20	SE19	SE20	SE19	SE17	ESE17	ESE19	SE18	SE17	SE16	SE15	SE14	SE13.1	SE20
22-Mar	SE14	ESE13	SE13	SE13	ESE11	ESE9	E7	E10	ESE10	ESE9	ESE10	E10	ENE9	ENE8	ENE6	NE3	WSW2	WNW2	N8	N9	NNW11	N8	NNE10	NW9	E5.3	SE14
23-Mar	WNW12	NW12	NW10	NW10	NW10	NW10	N7	NNE9	NNE7	NNE5	NE4	NE5	NE5	E3	E6	ESE8	E8	ESE6	ESE4	E6	ESE7	SSE4	SSE3	SSW6	NNE2.5	NW12
24-Mar	S5	S6	S5	SSE6	SE6	SE4	SSE6	SSE9	SSE13	SSE14	SE13	ESE11	ESE13	SE18	SE14	E14	E14	ESE10	E4	E7	ESE12	ESE13	ESE11	SE9.0	SE18	
25-Mar	ESE10	E9	E7	E7	ESE6	E4	SSE3	SSW5	SSW2	NNE2	NNW7	NW7	N10	NE7	ENE6	ESE7	ENE9	ENE8	E8	E5	ENE5	E5	ESE5	E4.0	ESE10	
26-Mar	ESE4	SSE5	S3	SSE6	SE5	SE6	ESE4	SE3	S9	SSW7	SSE6	SSE6	SE6	SSE3	SE4	NNE6	NE9	E7	WNW8	N12	E7	ESE8	SE8	SSE4	ESE3.5	N12
27-Mar	E4	ENE4	SE2	E4	E5	E5	E5	ENE6	E7	SE12	SE11	SE15	SE19	SE18	SE18	SE19	SE15	SSE14	SSE14	SE11	SE7	SE7	SE10	SE7	SE9.0	SE19
28-Mar	ESE5	ENE5	SSE5	S9	SSE8	SE6	SE6	SE8	SSE10	SSE10	SSE11	SSE12	SSE11	SSE12	SSE13	SSE14	SSE15	S13	SE15	SSE11	SSE6	SE3	S5	S5	SSE8.5	SE15
29-Mar	SE6	SSE7	SSE7	S5	S4	S5	S6	SSW6	SW7	SW7	S7	SW6	NW1	N1	SW5	N5	NNE6	NNE7	NE5	ESE3	E5	E5	ESE4	ESE3	SSE2.3	SSE7
30-Mar	S2	SSE5	E3	ESE7	E6	E6	E6	E6	E6	ENE5	ENE6	ENE4	NE6	ENE5	NNE6	NNE7	NE8	NE7	N7	N9	NNE3	S3	SSE3	SSE2	ENE3.8	N9
31-Mar	S4	SE4	SE5	SE5	S6	S6	S7	S10	S9	S7	S10	SSW14	SW18	SW19	SSW19	SSW17	S20	S17	S15	S17	S16	S14	S16	S12	S11.4	S20

ENE2.0	E1.2	E1.2	ESE1.5	ESE1.3	E1.4	ENE1.4	E1.9	ESE1.9	SE2.8	SE3.1	SE3.1	ESE3.3	ESE2.6	ESE2.6	ESE2.9	ESE3.9	E3.9	E3.7	E3.4	ESE3.2	E3.1	ESE2.3	ESE1.6	Diurnal Average	
NNE22	NW22	N21	NW23	NW24	N23	NNW23	NNW24	NNW24	NNW23	SSE21	SSE20	SSE22	W23	W23	S24	WNW21	WNW19	NNE21	NNE18	SSE20	NW23	NW25	NW25	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
Cenovus - Christina Lake - March 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	156	21.00	21.00
6 - 11	277	37.28	58.28
12 - 19	256	34.45	92.73
20 - 28	54	7.27	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
Cenovus - Christina Lake - March 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	6	13	22	26	16	18	21	22	3	3	2	0	1	1	0	156
6 - 11	20	36	16	21	40	35	24	24	22	10	8	1	3	2	8	7	277
12 - 19	20	22	17	1	12	9	49	40	36	4	3	6	9	12	5	11	256
20 - 28	6	5	0	0	0	0	2	7	5	0	0	1	4	3	14	7	54
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	48	69	46	44	78	60	93	92	85	17	14	10	16	18	28	25	743

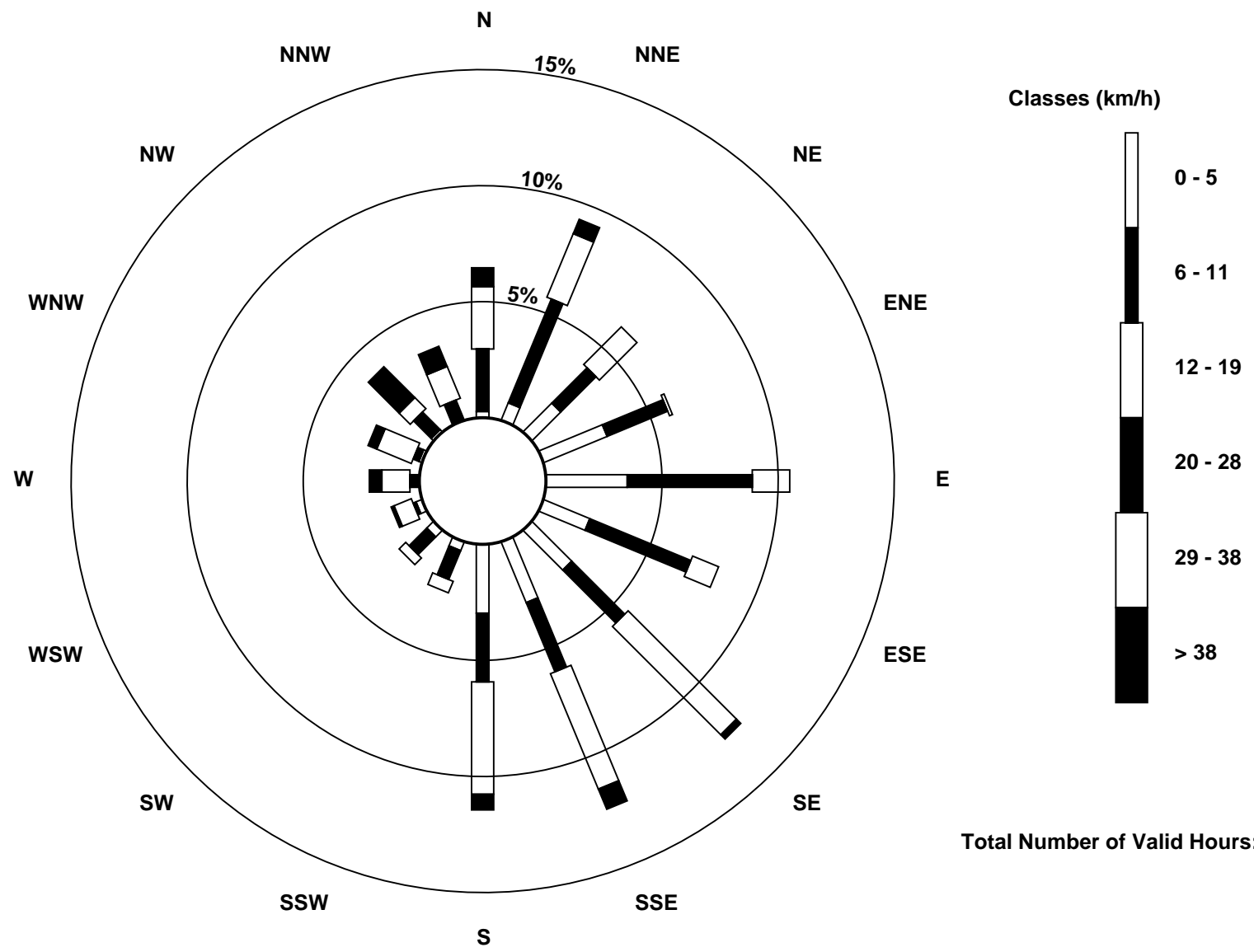
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Wind Speed (WS) - km/h
Cenovus - Christina Lake (AMS500)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Cenovus - Christina Lake - March 2017

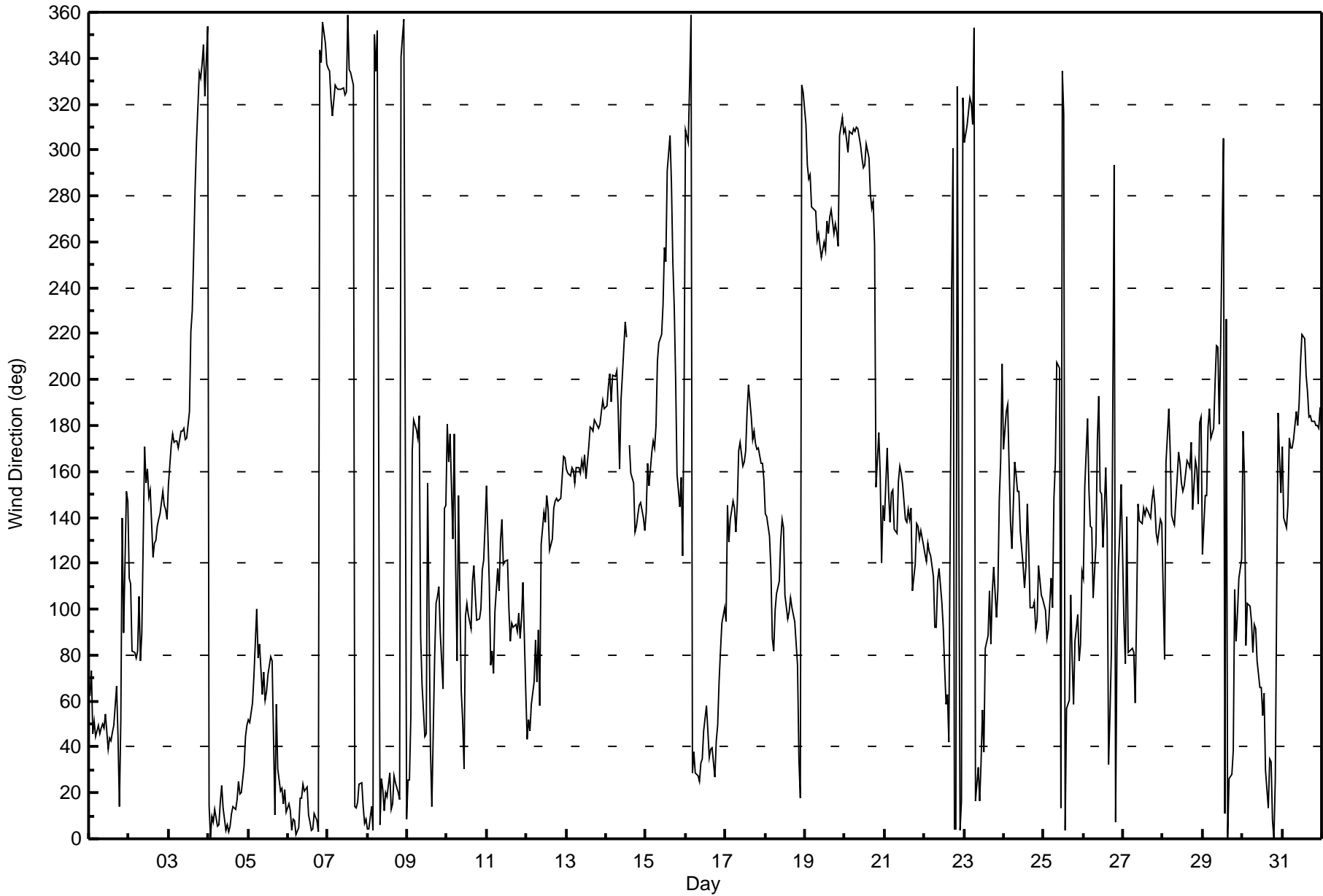
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Mar 26 19:00 Minimum Value: 0 km/h on Mar 12 05:00 Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 2 Median = 2 O ₃ = 4 P ₉₀ = 4 P ₉₉ = 6																		Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 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-Mar	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	2	1	2	1	1	1	1	1	3
2-Mar	2	1	1	1	1	1	1	1	1	3	2	2	3	3	3	2	3	3	3	4	4	3	3	2	4
3-Mar	3	4	3	3	4	3	4	5	4	4	3	4	4	4	5	5	4	3	3	3	4	4	4	5	
4-Mar	4	4	4	4	4	4	5	5	4	3	3	4	3	3	4	3	3	4	4	3	3	3	2	5	
5-Mar	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	1	2	1	2	2	2	1	2	2	
6-Mar	2	1	2	2	3	2	3	2	3	3	3	3	4	3	4	3	3	3	3	5	4	4	4	5	
7-Mar	4	4	3	4	4	4	4	4	4	4	4	4	5	4	4	4	3	3	3	2	1	2	2	5	
8-Mar	3	2	2	2	3	2	2	2	1	2	2	3	4	3	4	4	3	3	3	2	2	3	3	4	
9-Mar	1	1	1	1	1	1	1	1	1	2	2	3	2	3	2	3	2	1	1	1	1	1	1	3	
10-Mar	1	2	1	1	1	1	1	1	1	1	1	4	3	3	3	3	2	2	2	2	1	2	1	4	
11-Mar	1	1	1	1	1	2	2	1	2	2	2	3	2	3	3	2	3	3	1	1	1	1	1	3	
12-Mar	1	1	0	1	0	0	1	1	2	5	3	4	4	4	4	4	4	3	2	3	3	4	5	5	
13-Mar	4	4	4	5	4	4	4	4	4	5	4	5	4	5	6	5	5	5	5	4	4	5	4	6	
14-Mar	3	3	4	3	3	2	2	2	1	2	2	1	2	AF	5	3	3	3	3	3	3	3	4	5	
15-Mar	3	3	3	4	4	2	3	2	3	2	3	4	3	5	4	4	3	3	2	2	2	2	2	5	
16-Mar	3	3	3	3	1	2	2	2	3	3	3	3	3	4	4	3	3	3	3	2	2	2	2	4	
17-Mar	1	3	2	2	2	2	2	2	3	3	3	4	4	4	4	5	4	4	3	4	3	3	3	5	
18-Mar	3	3	3	2	2	2	2	2	2	3	4	4	3	4	3	4	3	3	2	2	2	2	3	4	
19-Mar	3	5	6	6	6	5	4	4	4	4	4	6	6	6	6	6	6	5	5	4	5	5	6	6	
20-Mar	5	5	6	5	4	5	5	5	4	5	5	5	4	4	4	4	4	3	2	2	2	1	1	6	
21-Mar	1	1	1	2	2	2	2	3	4	6	5	4	4	5	4	4	4	4	4	4	4	4	3	6	
22-Mar	3	3	3	3	3	2	1	2	2	2	2	2	2	1	1	2	2	2	1	2	3	1	1	3	
23-Mar	2	3	2	3	2	3	3	2	2	2	2	1	3	2	2	1	2	1	1	1	2	1	1	3	
24-Mar	1	1	1	1	1	1	1	3	3	3	3	3	3	3	4	3	3	3	3	2	4	3	3	4	
25-Mar	2	2	1	1	1	1	1	1	2	2	2	3	3	2	3	1	2	2	1	2	1	1	1	3	
26-Mar	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	3	2	1	8	3	2	1	1	8	
27-Mar	1	1	1	1	1	1	1	1	3	3	3	5	4	4	4	4	4	3	3	2	1	1	1	5	
28-Mar	1	1	3	2	2	1	1	2	2	3	3	3	3	3	4	3	3	3	4	4	2	1	1	4	
29-Mar	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	
30-Mar	1	1	1	1	2	1	1	1	2	2	2	2	2	2	3	2	3	2	2	2	1	2	1	3	
31-Mar	1	2	2	2	1	1	1	2	2	2	3	4	5	6	6	5	6	5	4	4	4	3	3	6	
Diurnal Maximum																								5	
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Cenovus - Christina Lake - March 2017

Direction of Maximum Speed: 314 deg on Mar 19 23:00																				Hours in Service: 744							
Direction of Maximum Daily Speed Average: 14.4 deg on Mar 4																				Hours of Data: 743							
Direction of Minimum Speed: 65 deg on Mar 9 22:00										Direction of Minimum Daily Speed Average: 2.3 deg on Mar 29										Hours of Missing Data: 1							
Monthly Average Direction: 162.9 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-Mar	62	73	46	51	44	49	46	48	50	48	54	39	44	42	46	50	67	45	14	51	140	90	152	147	51.3		
2-Mar	114	111	81	81	78	82	105	78	90	171	155	161	149	152	123	129	130	136	139	142	151	146	143	139	137.1		
3-Mar	154	171	176	173	173	173	170	178	177	179	174	175	186	221	230	254	282	303	333	331	337	346	323	354	222.0		
4-Mar	15	1	10	7	13	5	6	16	23	14	3	6	3	5	11	14	13	17	25	20	20	32	44	50	14.4		
5-Mar	52	50	59	71	86	100	79	85	63	73	61	64	71	79	77	44	11	59	31	21	22	15	22	12	52.4		
6-Mar	15	12	4	8	8	2	5	18	18	23	21	23	11	7	3	4	11	8	3	343	338	355	346	338	4.1		
7-Mar	336	334	322	315	328	327	326	327	326	327	324	325	359	335	334	329	14	13	16	24	25	14	7	8	339.9		
8-Mar	4	4	14	4	350	334	352	6	26	21	12	20	18	29	13	15	27	24	20	17	340	349	357	8	9.2		
9-Mar	26	26	53	169	183	178	174	184	88	67	44	46	155	97	39	14	79	103	106	110	90	65	144	145	84.4		
10-Mar	181	164	176	130	177	118	78	149	64	51	31	97	102	98	92	112	119	106	95	96	100	117	121	137	108.7		
11-Mar	154	111	76	82	72	99	118	108	130	139	119	121	122	100	86	94	92	93	90	98	87	96	112	64	101.8		
12-Mar	43	52	47	58	68	87	68	91	58	128	142	138	149	143	126	130	144	147	148	147	148	157	166	166	138.6		
13-Mar	161	159	158	162	160	155	161	162	160	165	161	167	157	171	180	179	178	183	180	179	180	186	191	187	169.5		
14-Mar	188	197	202	191	202	201	204	187	161	191	202	225	218	AF	172	160	155	134	136	141	145	147	140	134	167.8		
15-Mar	142	163	154	168	173	170	180	208	216	220	233	258	252	291	307	286	252	232	200	158	145	157	123	190	212.0		
16-Mar	309	303	329	359	29	38	29	27	25	33	35	47	58	47	36	39	40	27	43	50	69	82	94	100	36.8		
17-Mar	95	145	129	139	147	144	134	146	169	173	163	164	169	186	198	184	174	177	172	170	170	164	164	156	163.8		
18-Mar	142	140	132	117	87	82	99	107	112	130	139	135	106	96	99	105	101	98	94	76	34	18	328	325	103.4		
19-Mar	311	294	287	289	275	275	273	260	264	258	253	260	256	269	264	271	274	263	268	264	258	306	314	307	277.2		
20-Mar	309	304	299	308	307	310	308	310	310	302	297	293	294	303	297	281	274	278	259	153	177	159	120	145	300.1		
21-Mar	139	170	151	138	151	152	135	133	156	162	159	154	139	138	143	139	144	108	119	138	136	131	135	128	140.4		
22-Mar	124	121	129	125	123	114	92	92	112	118	103	92	74	58	63	42	241	301	4	4	328	3	16	323	84.4		
23-Mar	303	307	310	323	320	311	354	17	31	17	34	56	38	83	89	108	85	107	118	96	108	148	165	207	15.0		
24-Mar	169	186	189	163	138	126	164	159	151	151	133	119	109	119	146	127	100	100	103	91	95	119	106	104	128.2		
25-Mar	102	100	87	91	113	101	148	163	207	205	13	335	315	3	56	60	106	78	59	86	98	77	85	117	81.1		
26-Mar	113	153	183	152	136	135	105	128	173	193	151	150	127	162	135	32	54	81	293	7	85	118	133	155	122.9		
27-Mar	94	76	141	81	82	83	81	59	98	146	139	138	144	141	144	143	140	147	152	146	133	129	139	137	133.3		
28-Mar	107	78	164	188	168	141	138	137	157	168	163	155	151	154	165	164	162	173	144	165	161	146	181	184	157.9		
29-Mar	124	150	149	180	187	174	179	198	215	214	181	216	305	11	226	0	26	28	38	109	86	98	113	122	157.6		
30-Mar	178	158	84	102	101	95	81	94	91	77	66	66	54	63	30	13	35	34	8	0	26	185	166	151	66.1		
31-Mar	171	140	135	145	174	170	170	174	186	180	189	207	220	218	202	194	184	185	182	182	180	180	179	188	187.4		
77.9 98.5 95.4 102.2 102.4 85.7 65.7 86.8 117.3 141.0 125.7 128.5 121.5 109.2 112.7 112.8 108.7 94.8 89.0 99.5 108.9 98.7 105.3 113.5																								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
Cenovus - Christina Lake - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Mar 29 14:00		Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9																							
Minimum Value: 7 deg on Mar 11 05:00																									
Percentiles: P ₁ = 8 P ₁₀ = 11 Q ₁ = 13 Median = 16 Q ₃ = 22 P ₉₀ = 31 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-Mar	9	10	12	10	10	9	10	10	10	11	12	17	17	17	19	14	19	17	15	19	21	42	37	30	42
2-Mar	17	28	7	10	20	22	31	15	39	13	16	20	18	19	22	16	14	12	13	13	11	13	14	12	39
3-Mar	12	15	15	15	14	17	16	20	19	19	17	15	17	22	26	21	17	18	21	23	26	24	11	24	26
4-Mar	14	16	16	17	15	17	16	14	13	15	17	17	17	18	15	14	15	14	11	13	12	10	10	9	18
5-Mar	10	13	12	11	12	19	14	18	14	16	20	23	20	31	28	54	24	36	25	10	11	13	10	15	54
6-Mar	14	11	14	15	16	15	15	13	12	11	12	14	19	20	18	17	14	15	17	21	17	18	22	17	22
7-Mar	15	15	12	14	10	12	10	9	11	11	14	15	24	30	23	24	17	14	13	8	9	12	14	14	30
8-Mar	19	15	13	20	18	15	19	12	14	17	18	18	21	24	24	22	13	10	9	13	21	20	14	23	24
9-Mar	9	13	25	25	10	10	11	30	24	28	14	55	55	58	59	42	23	27	11	10	16	85	62	45	85
10-Mar	25	47	29	31	19	34	27	28	23	38	60	26	20	23	22	25	15	12	10	10	11	11	9	16	60
11-Mar	12	29	8	8	7	28	14	15	24	23	21	20	18	21	17	15	12	12	10	9	8	16	13	12	29
12-Mar	16	19	10	15	19	18	14	13	15	36	16	24	22	22	20	21	17	12	10	10	12	14	13	11	36
13-Mar	12	12	12	12	13	13	13	13	13	12	12	15	13	16	15	14	14	15	14	15	15	16	16	14	16
14-Mar	22	21	20	17	21	18	21	16	17	29	29	32	57	AF	16	15	11	13	13	11	11	13	16	15	57
15-Mar	13	10	14	13	13	15	33	23	21	21	28	21	19	29	27	19	21	40	67	50	66	63	75	60	75
16-Mar	24	19	23	16	18	12	10	11	13	14	17	22	16	21	20	15	9	11	9	13	9	14	19	29	29
17-Mar	22	23	13	13	12	13	12	21	19	16	19	22	17	29	22	19	16	16	11	11	11	11	11	12	29
18-Mar	11	11	12	14	12	11	13	12	18	16	17	19	19	18	17	18	14	12	10	10	17	20	25	16	25
19-Mar	9	14	15	14	16	18	16	17	15	17	18	17	17	16	17	21	19	17	19	17	21	13	14	10	21
20-Mar	12	12	15	10	10	11	11	10	14	23	34	34	30	34	28	33	34	30	23	39	66	50	30	26	66
21-Mar	18	23	15	16	15	11	36	22	13	13	16	15	16	16	14	14	16	16	14	15	13	13	16	15	36
22-Mar	13	14	13	12	15	14	14	13	16	18	24	19	11	10	12	17	48	86	17	23	16	15	11	17	86
23-Mar	10	13	13	17	13	13	26	11	16	24	26	26	40	79	28	23	12	17	12	10	17	28	28	29	79
24-Mar	10	15	12	10	13	8	16	17	13	13	18	18	19	20	16	13	13	13	15	56	32	14	11	13	56
25-Mar	12	12	13	14	16	19	16	18	26	81	86	47	40	27	30	21	24	29	16	12	15	9	15	23	86
26-Mar	17	46	37	25	15	9	35	41	15	23	24	23	29	63	49	31	17	18	90	25	26	15	13	39	90
27-Mar	24	9	27	27	13	9	8	10	30	14	17	16	14	17	14	14	13	11	12	12	9	12	10	14	30
28-Mar	18	9	43	15	17	13	11	12	15	19	23	17	20	21	21	18	15	14	13	19	13	18	15	27	43
29-Mar	17	10	9	15	13	23	19	17	22	25	26	39	94	103	56	49	29	14	21	39	29	22	24	69	103
30-Mar	25	26	19	15	15	15	18	21	31	34	27	34	30	35	35	31	21	19	18	11	34	29	27	72	72
31-Mar	15	20	17	25	16	13	12	14	18	27	23	21	21	20	20	19	17	15	14	13	12	12	12	15	27
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	March 8, 2017	Last Calibration	February 15, 2017
Station Name	Cenovus - Christina Lake	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	13:45	End Time (MST)	17:00
Gas Cert Reference	LL107928	Station temp.	22 Deg C
Cal Gas Concentration	50.0 ppm	Cal Gas Exp Date	September 8, 2018
Calibrator Make/Model	API T700	Serial Number	1221
ZAG Make/Model	API 701	Serial Number	4604
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2575

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-698	-698
Analyzer IP address	192.168.1.43		Lamp voltage	846	844
Calculated slope	0.994500	1.003317	Chamber temp	45.1	45.1
Calculated intercept	0.854264	0.183436	Pressure	663.4	685.9
Analyzer Background	13.6	13.3	Flow	0.585	0.595
Analyzer Coefficient	1.053	1.039	Intensity	91	90

Analyzer make Thermo 43i Analyzer serial # 1118148497

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.4	----
as found span	5000	79.3	793.0	803.4	0.987
calibrator zero	5000	0.0	0.0	0.4	----
high point	5000	79.3	793.0	790.9	1.003
second point	5000	39.7	397.0	393.9	1.008
third point	5000	19.8	198.0	197.4	1.003
as left zero					
as left span					
Average Correction Factor					1.004

Corrected As found 803.0 Previous response 796.5 % change -0.8%

Notes:

Sample inlet filter replaced after as founds. Adjusted span. As lefts were not completed due to running low on time.

Calibration Performed By: Asad Hidayat



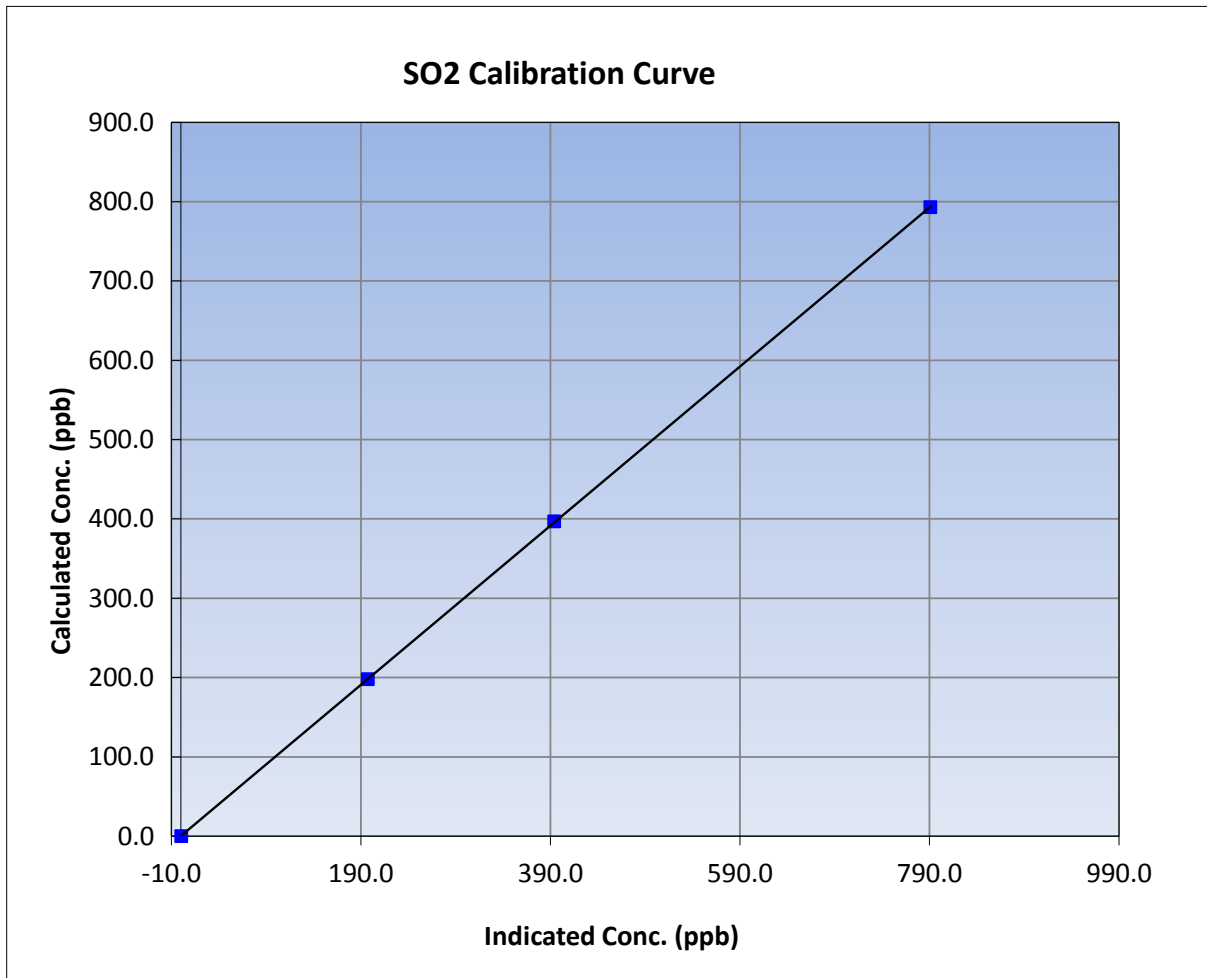
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 8, 2017	Previous Calibration	February 15, 2017
Station Name	Cenovus - Christina Lake	Station Number	AMS 500
Start Time (MST)	13:45	End Time (MST)	17:00
Analyzer make	Thermo 43i	Analyzer serial #	1118148497

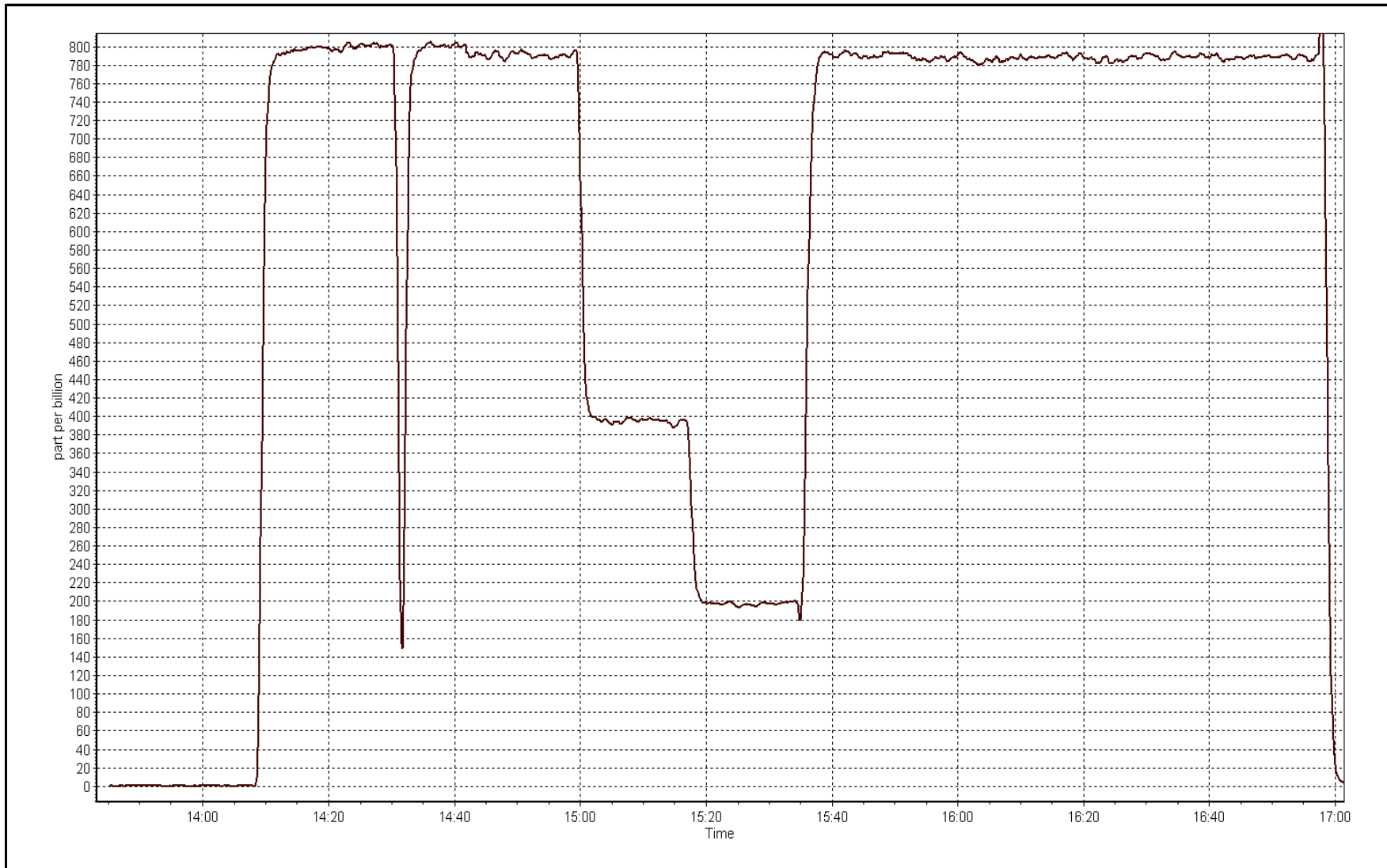
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999989
793.0	790.9	1.0026		
397.0	393.9	1.0079	Slope	1.003317
198.0	197.4	1.0028		
			Intercept	0.183436



SO2 Calibration Plot

Date: March 8, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	March 8, 2017	Last Calibration	February 15, 2017
Station Name	Cenovus	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	17:00	End Time (MST)	20:00
Gas Cert Reference	LL30650	Station temp.	22 Deg C
Cal Gas Concentration	5.1 ppm	Cal Gas Exp Date	February 12, 2019
Calibrator Make/Model	API 700	Serial Number	1221
ZAG air Make/Model	API 701	Serial Number	4604
DACS make/model	Campbell Scientific CR3000	Serial Number	2575
SO2 gas concentration	50 ppm	SO2 gas cert/exp	LL107928 September 8, 2018

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-680	-680
Analyzer IP address	192.168.1.35		Lamp voltage	981	979
Calculated slope	0.992344	0.994527	Chamber temp	45	45
Calculated intercept	-0.031070	-0.053598	Pressure	640.6	667.1
Analyzer Background	1.58	1.56	Flow	0.429	0.442
Analyzer Coefficient	0.886	0.867	Intensity	91	90
			Converter temp.	310	310

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1008841400
Converter make/model	Thermo 340	Converter serial #	328702539

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	78.5	80.1	82.0	0.976
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	78.5	80.1	80.6	0.994
second point	5000	39.3	40.1	40.4	0.992
third point	5000	19.8	20.2	20.2	0.999
as left zero					
as left span					
Average Correction Factor					0.995

Corrected As found	81.9	Previous response	80.7	% change	-1.4%
--------------------	------	-------------------	------	----------	-------

Notes:

Sample inlet filter replaced and scrubber check completed after as founds. Had issues with the ZAG after the first "as found zero" point (see docit note). No scrubber check done since it is only required quarterly moving forward. Adjusted span. "as lefts" were not completed because work permit was expiring soon.

Calibration Performed By: Asad Hidayat



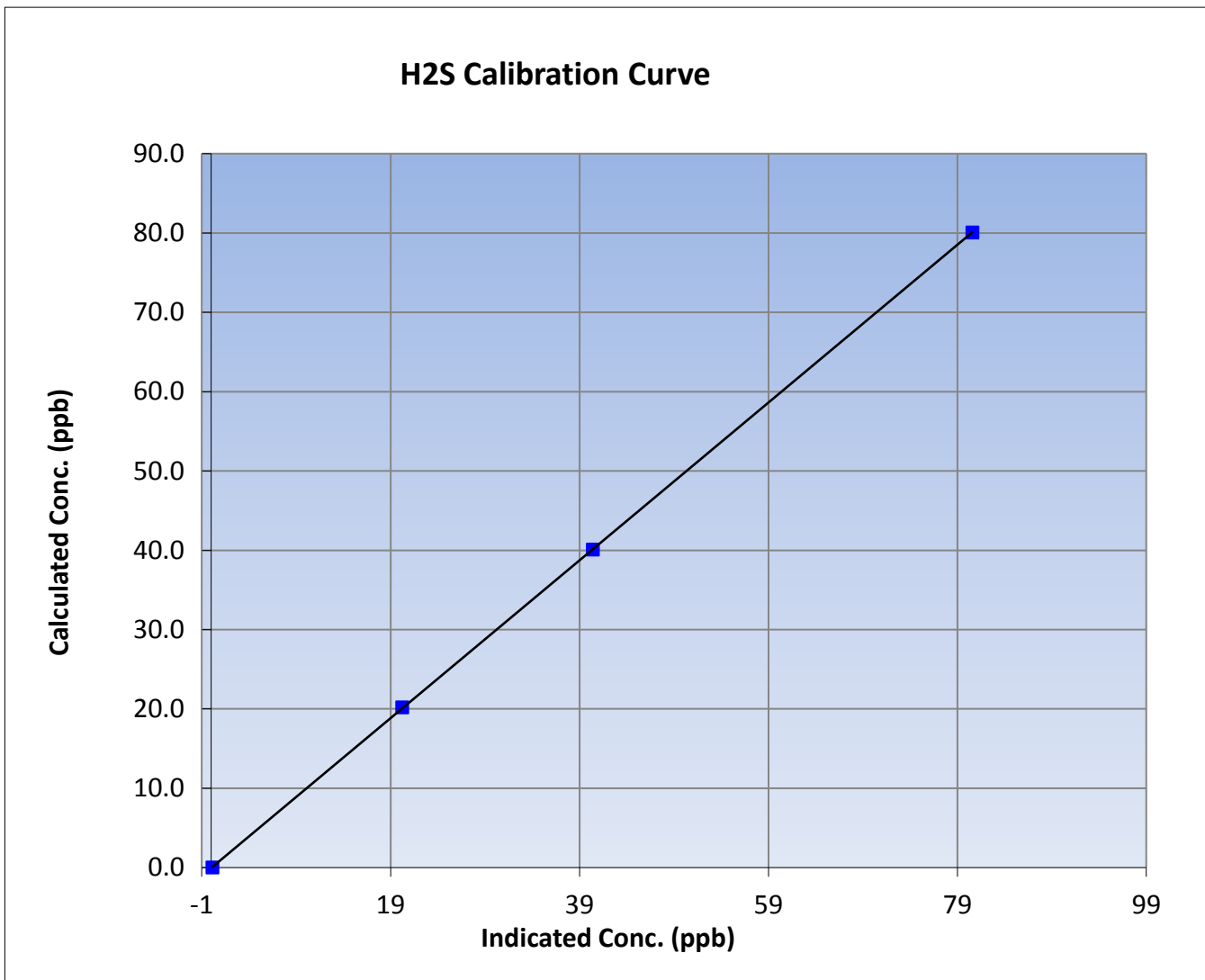
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	March 8, 2017	Previous Calibration	February 15, 2017
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	17:00	End Time (MST)	20:00
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1008841400

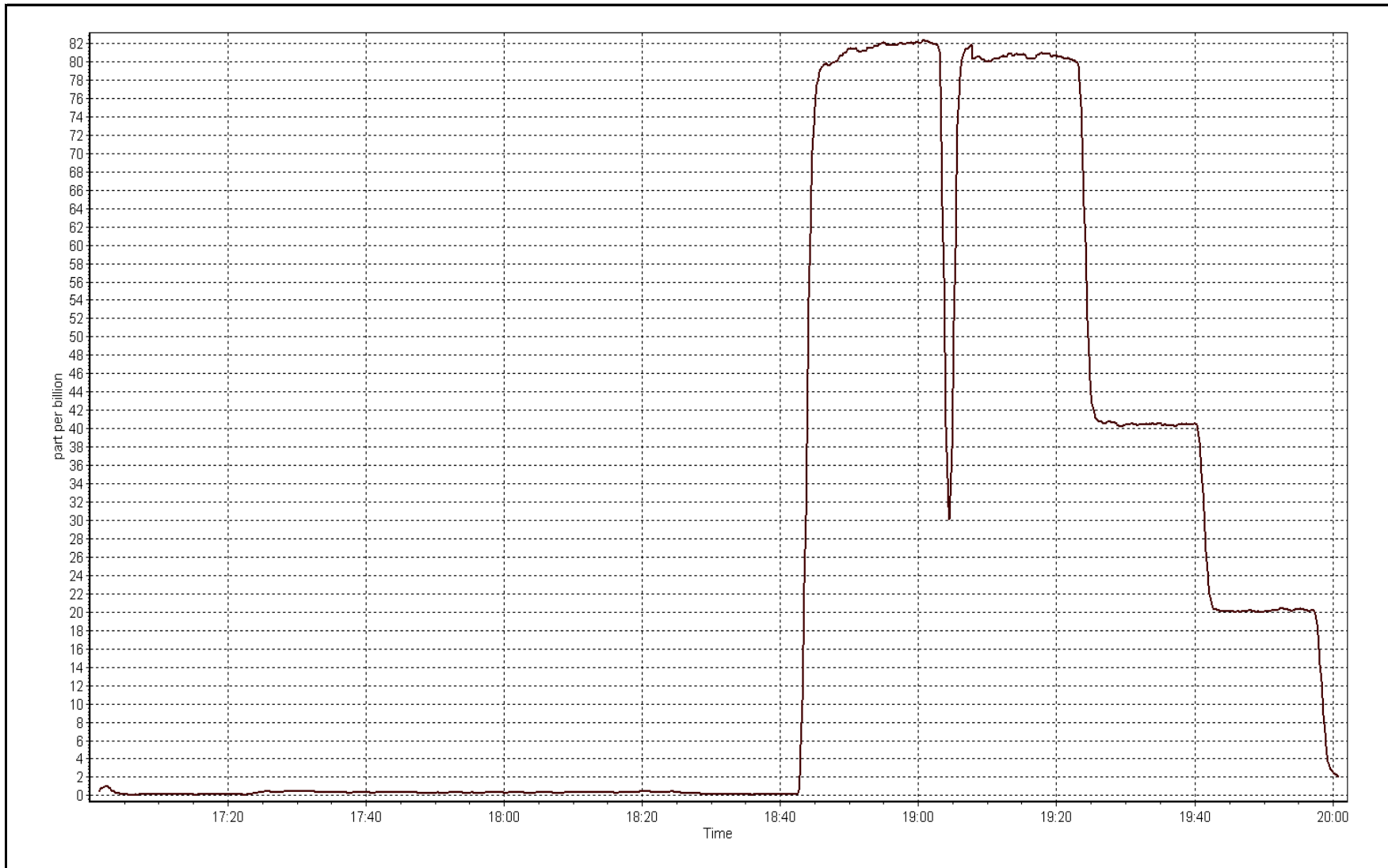
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999992
80.1	80.6	0.9937		
40.1	40.4	0.9922	Slope	0.994527
20.2	20.2	0.9988		
			Intercept	-0.053598



H2S Calibration Plot

Date: March 8, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 8, 2017	Previous Calibration	February 15, 2017
Station Name	Cenovus	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	13:45	End Time (MST)	17:00
NO Cal Gas Conc	50.5 ppm	Gas Cert Reference	LL107928
NOx Cal Gas Conc	50.8 ppm	Cal Gas Expiry Date	September 8, 2018
Calibrator	API T700	Serial Number	1221
Zero air Generator	Teledyne API T701	Serial Number	4604

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2575
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Calibration Statistics

Parameter	NOx	NO	NO2	
As Found (last calibration results)	Data Slope	1.000271	0.998927	1.005379
	Data Offset	1.383011	1.105016	0.025620
Current Calibration	Data Slope	0.997736	1.000677	0.997368
	Data Offset	1.429163	0.065459	-0.446117

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	723
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	1.072		1.105	
NOX coefficient	1.077		1.113	
NO2 coefficient	1.000		1.000	
NO bkgrnd	0.4		0.4	
NOX bkgrnd	1.4		1.4	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	315.4	Deg C	314.4	Deg C
PMT voltage	826	v	826	v
PMT Temp	6.9	Deg C	6.9	Deg C
O3 flow	84	ccm	86	ccm
R Cell press NO	5.6	mmHg	6.7	mmHg
R Cell Press Nox	5.5	mmHg	6.7	mmHg
NO sample flow	0.476	lpm	0.495	lpm
Nox sample Flow	0.481	lpm	0.491	lpm

Notes:

Sample inlet filter replaced after as founds. Adjusted span. As lefts were not completed due to running low on time.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 8, 2017 Station Number: AMS 500

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	0.3	-0.5	----	----
as found span	5000	79.3	805.7	800.9	4.8	775.7	770.9	4.8	1.0387	1.0389
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	0.3	-0.5	----	----
high point	5000	79.3	805.7	800.9	4.8	806.6	800.0	6.6	0.9989	1.0012
second point	5000	39.6	402.3	400.0	2.4	401.5	400.9	0.6	1.0020	0.9976
third point	5000	19.8	201.2	200.0	1.2	198.8	198.5	0.4	1.0118	1.0076
as left zero										
as left span										
Average Correction Factor									1.0042	1.0021

Corrected As found NO_x= 775.9 NO= 770.7 Percent Change NO_x= 3.6% NO= 3.9%
 Previous Response NO_x= 804.1 NO= 800.7

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 79.30 ccm NOx ref calc conc = 805.7 ppb NO ref calc conc = 800.9 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		4.8	807.3	801.3	-0.5	0.9980	0.9995	----	----
1st NO2 (300)	404.8	401.3	807.3	404.8	402.5	0.9981	----	0.9971	100.3%
2nd NO2 (200)	603.3	202.8	807.1	603.3	203.7	0.9983	----	0.9952	100.5%
3rd NO2 (100)	702.7	103.4	808.1	702.7	105.4	0.9970	----	0.9809	101.9%
2nd NO ref point		4.8	809.0	801.0	7.6	0.9959	0.9999	----	----
Average Correction Factor						0.9973		0.9911	100.9%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

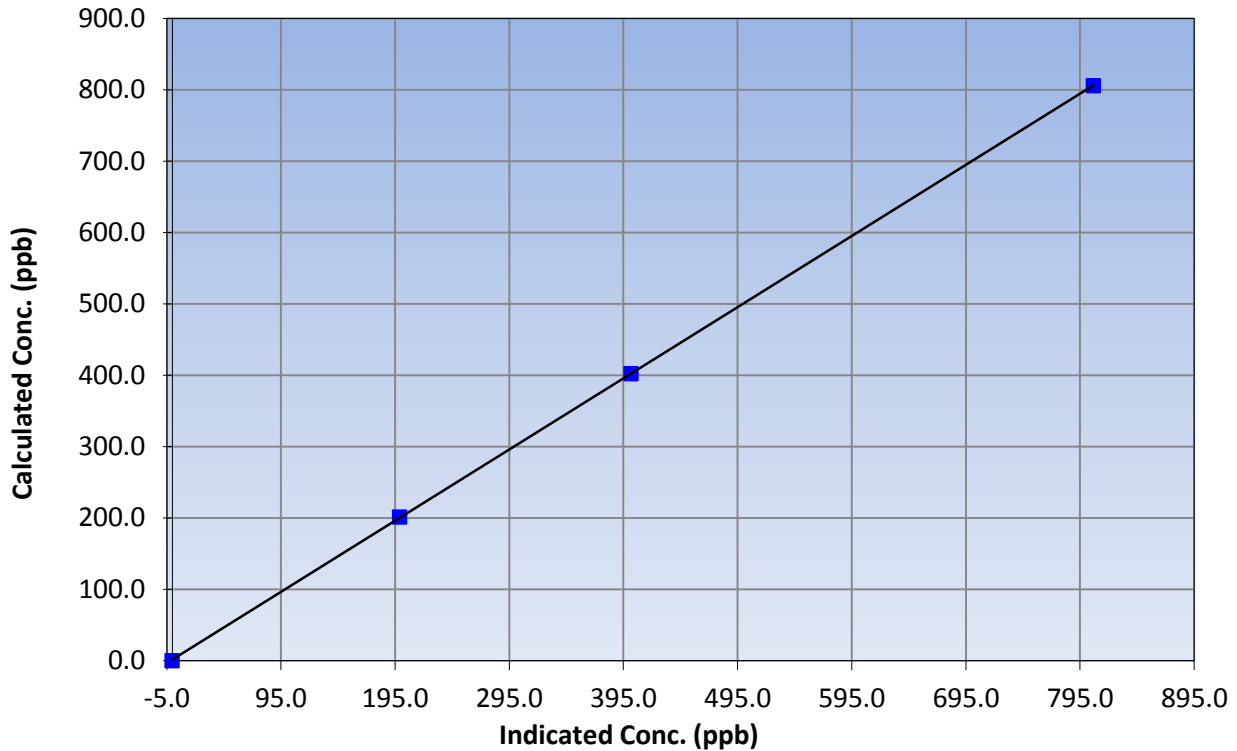
Station Information

Calibration Date	March 8, 2017	Previous Calibration	February 15, 2017
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	13:45	End Time (MST)	17:00
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999990
805.7	806.6	0.9989		
402.3	401.5	1.0020	Slope	0.997736
201.2	198.8	1.0118		
			Intercept	1.429163

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

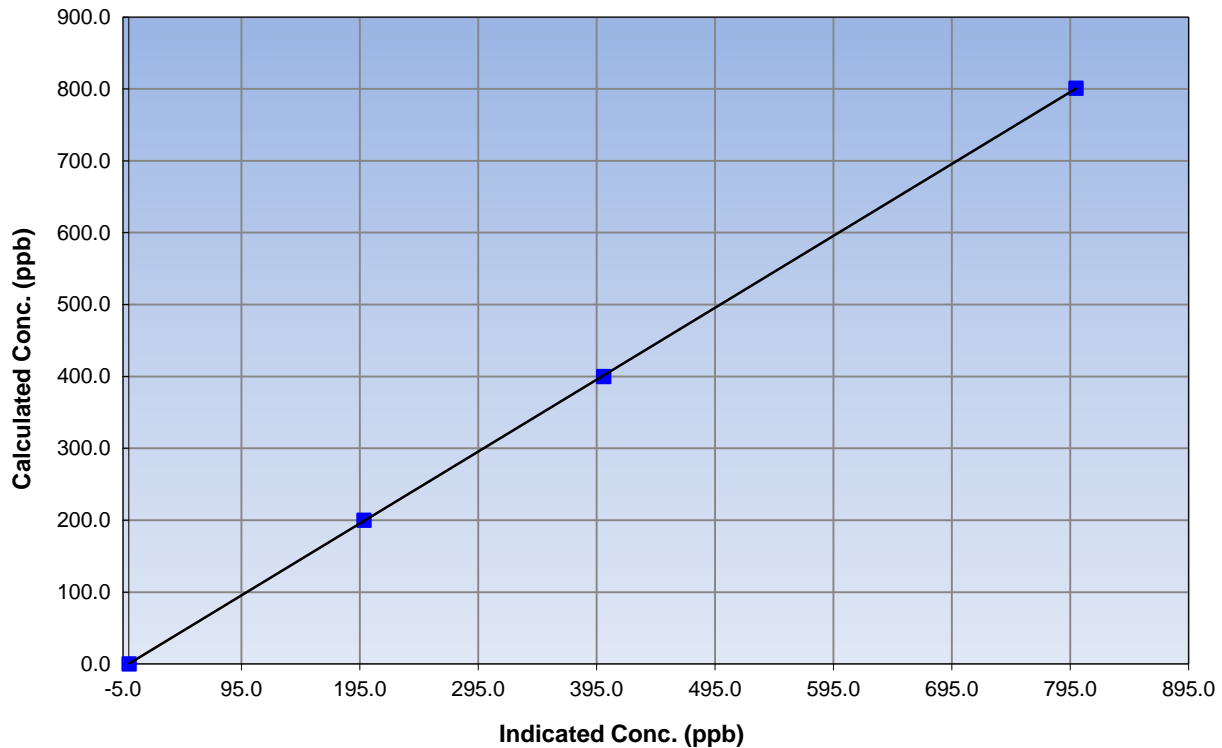
Station Information

Calibration Date	March 8, 2017	Previous Calibration	February 15, 2017
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	13:45	End Time (MST)	17:00
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999990
800.9	800.0	1.0012		
400.0	400.9	0.9976	Slope	1.000677
200.0	198.5	1.0076		
			Intercept	0.065459

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

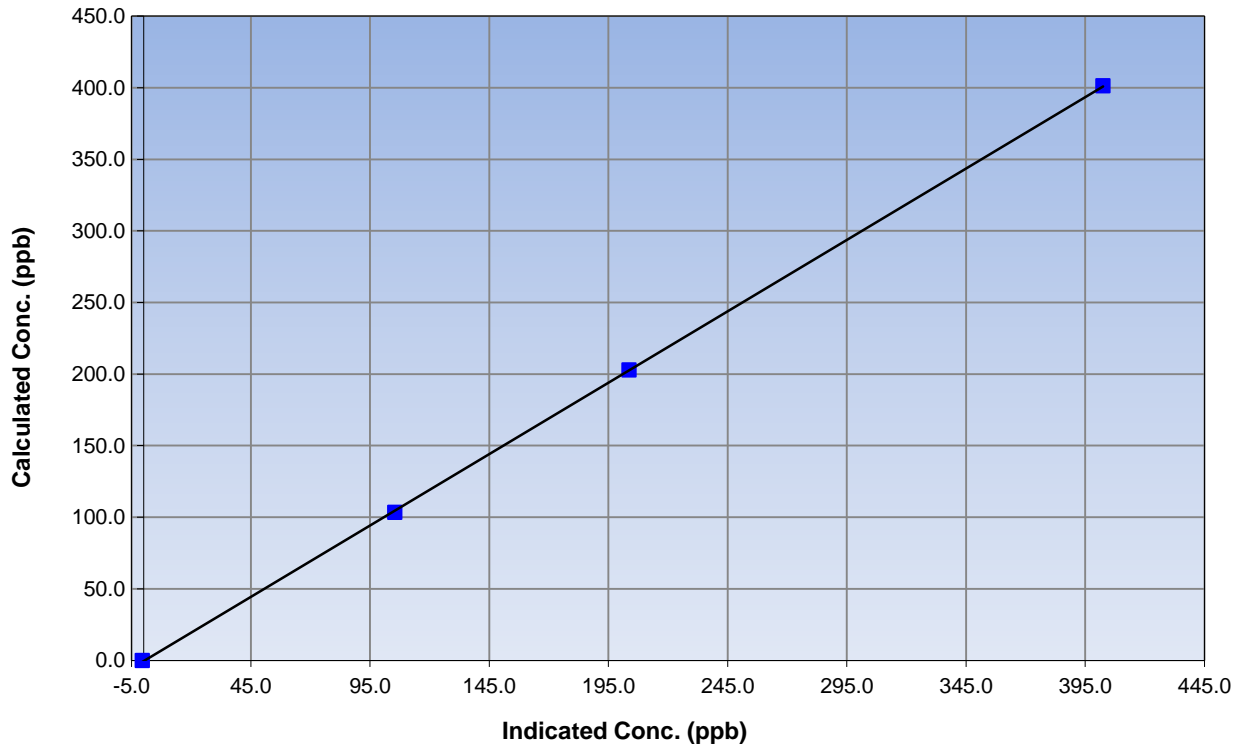
Station Information

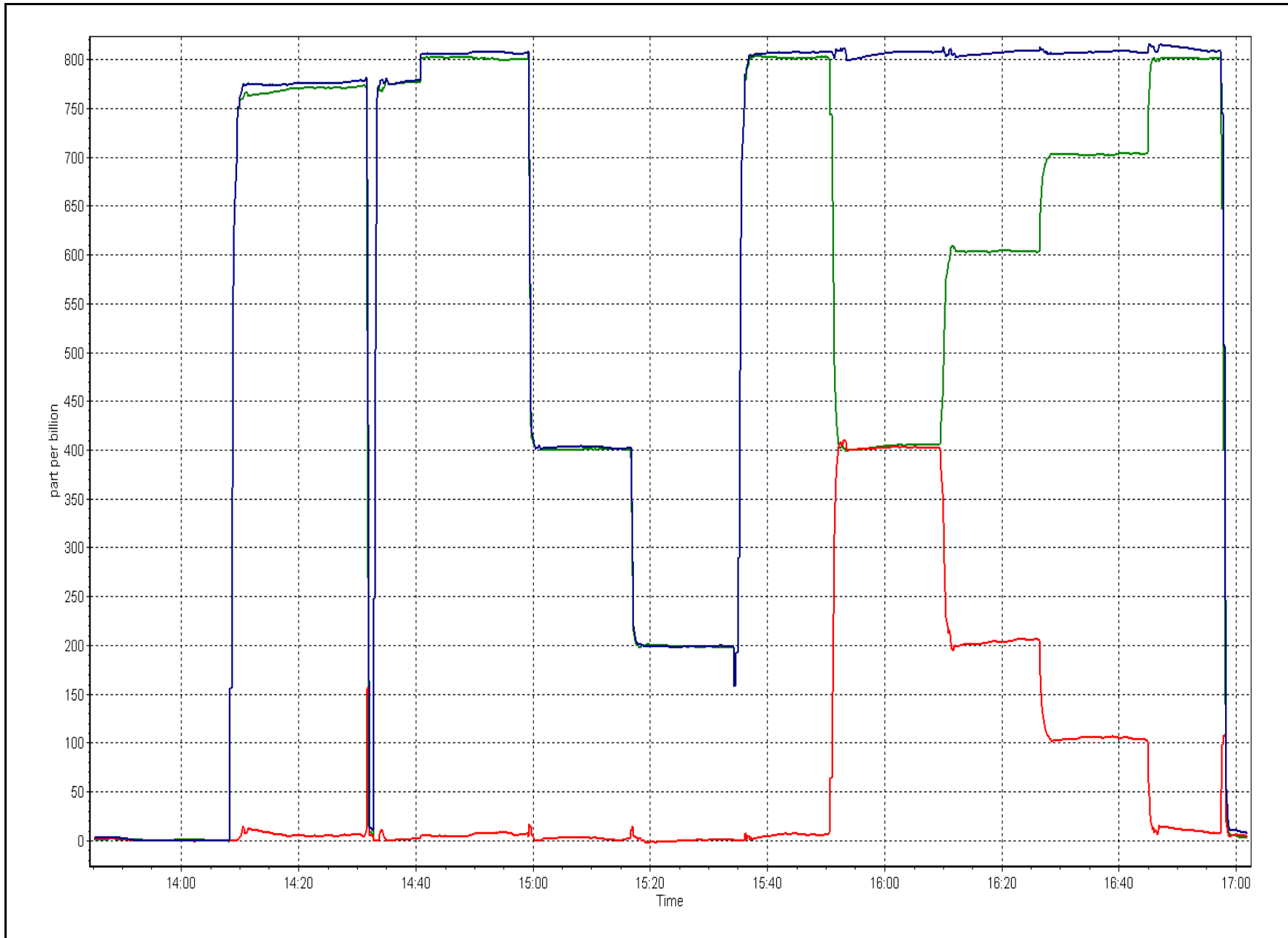
Calibration Date	March 8, 2017	Previous Calibration	February 15, 2017
Station Number	Cenovus	Station Number	AMS 500
Start Time (MST)	13:45	End Time (MST)	17:00
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	N/A	Correlation Coefficient	0.999970
401.3	402.5	0.9971		
202.8	203.7	0.9952	Slope	0.997368
103.4	105.4	0.9809		
			Intercept	-0.446117

NO₂ Calibration Curve







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 502
CONOCOPHILLIPS
SURMONT
MARCH 2017**

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

April 27, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
MARCH 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	684	36	60	96.77	10	0	4	0
H2S (ppb) Average	710	34	34	100	4	0	1	0
NO2 (ppb) Average	709	35	35	100	19	0	7	-
NO (ppb) Average	709	35	35	100	26	-	7	-
NOX (ppb) Average	709	35	35	100	44	-	13	-
Temperature 2 m (C) Average	744	0	0	100	11.4	-	6	-
Relative Humidity (%) Average	744	0	0	100	100	-	95	-
Wind Speed 10 m (km/h) Average	741	0	3	99.6	33	-	27	-
Wind Direction 10 m (deg) Average	741	0	3	99.6	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
MARCH 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	684	1.1	1	-	0	0	0	1	1	3	10
H2S (ppb) Average	710	0.3	0	-	0	0	0	0	0	1	4
NO2 (ppb) Average	709	3.8	3	-	1	1	2	3	5	7	19
NO (ppb) Average	709	2.1	3	-	0	0	1	1	2	5	26
NOX (ppb) Average	709	5.9	5	-	1	2	3	4	7	13	44
Temperature 2 m (C) Average	744	-7.63	10	-	-27.9	-20.8	-17.9	-4.9	0.7	4.4	11.4
Relative Humidity (%) Average	744	69.2	17	-	29	46	55	71	82	91	100
Wind Speed 10 m (km/h) Average	741	13.4	7	-	1	6	8	12	18	23	33
Wind Direction 10 m (deg) Average	741	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
MARCH 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	04 Mar 2017 04:00	05 Mar 2017 03:00	24	Unstable Operation - shelter temp fluctuation
Wind Speed, Wind Direction	30 Mar 2017 08:00	30 Mar 2017 10:00	3	Flat line in sensor output signal - sensor frozen



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 10 ppb on Mar 9 16:00	Maximum Daily Average: 4.4 ppb on Mar 9		Hours of Data:	684
Minimum Value: 0 ppb on Mar 1 04:00	Minimum Daily Average: 0.2 ppb on Mar 25		Hours of Missing Data:	60
Maximum Diurnal Average: 1.5 ppb at hour 17	Minimum Diurnal Average: 0.8 ppb at hour 6		Hours of Calibration:	36
Monthly Average: 1.1 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 7		Percent Operational Time:	96.8

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-Mar	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	2	2	2	2	2	2	1	1	1	1		
2-Mar	Z	0	0	0	1	0	0	0	0	0	0	1	1	1	2	2	2	1	1	1	1	1	2	4		
3-Mar	3	Z	2	2	1	1	1	1	2	2	3	2	2	2	4	7	3	2	5	5	2	2	2	7		
4-Mar	2	1	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO		
5-Mar	UO	UO	UO	Z	0	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1	1		
6-Mar	1	1	1	1	Z	3	3	2	2	2	2	2	1	1	2	1	0	0	0	0	0	0	0	1		
7-Mar	1	1	2	5	4	Z	5	4	4	4	4	4	4	3	3	3	3	3	3	2	1	1	1	1		
8-Mar	Z	0	0	0	0	1	1	1	1	2	4	4	4	6	8	8	5	6	7	6	5	4	3	8		
9-Mar	3	Z	3	3	3	1	1	1	2	1	2	4	6	7	9	10	9	8	6	6	5	4	4	4		
10-Mar	3	3	Z	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	3		
11-Mar	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	1		
12-Mar	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	1	1	1	1	1	0	0	1	1	1		
13-Mar	2	2	2	1	3	Z	3	3	3	3	2	3	3	3	2	1	2	2	2	1	1	1	1	3		
14-Mar	Z	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	2	2		
15-Mar	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1		
16-Mar	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
17-Mar	0	0	0	Z	1	1	1	1	1	1	1	0	1	1	1	0	1	0	0	1	1	1	1	1		
18-Mar	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1		
19-Mar	1	2	2	1	1	Z	1	0	0	0	0	0	0	0	0	0	1	2	1	3	4	5	4	3		
20-Mar	Z	3	3	2	1	2	2	2	1	1	2	2	2	2	2	2	0	1	1	1	1	1	1	1		
21-Mar	1	Z	1	1	1	0	0	1	0	1	1	C	C	C	C	C	0	0	0	0	0	0	0	0		
22-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
23-Mar	1	1	2	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0		
24-Mar	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0		
25-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
26-Mar	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
27-Mar	1	Z	1	0	0	0	0	1	1	1	1	1	0	0	1	1	0	0	0	0	0	1	0	0		
28-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0		
29-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
30-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
31-Mar	0	0	0	0	1	Z	0	0	0	0	0	1	1	1	1	1	2	2	1	0	0	1	0	0		

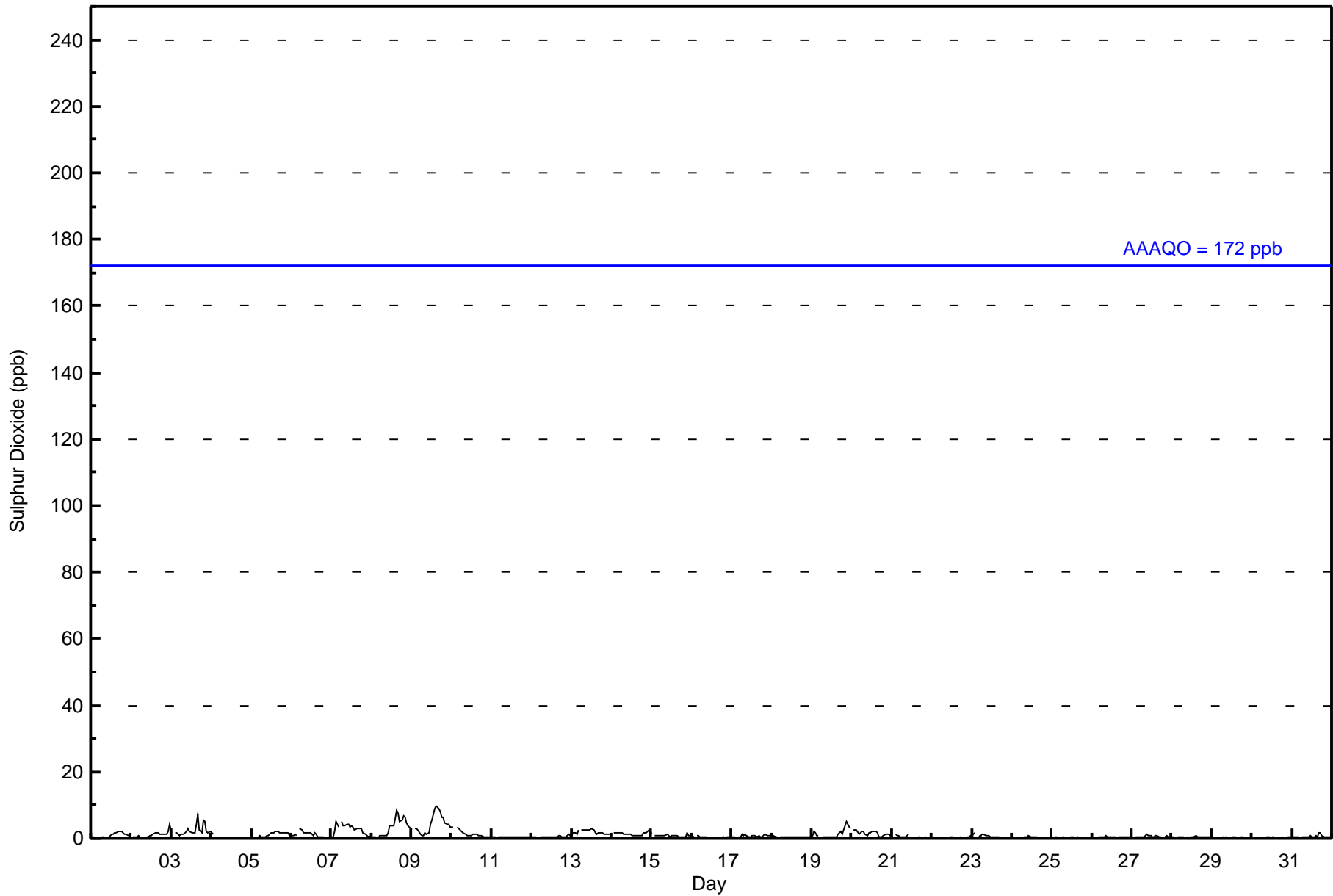
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3	3	3	5	4	3	5	4	4	4	4	4	4	4	6	7	9	10	9	8	6	7	6	5	4	4	Diurnal Maximum

Z - zeronan C - Calibration UO - Unstable Operation
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surrmont - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	684	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: 684

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - March 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	31	19	18	25	32	54	110	82	77	60	16	17	16	22	21	81	681
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	31	19	18	25	32	54	110	82	77	60	16	17	16	22	21	81	681

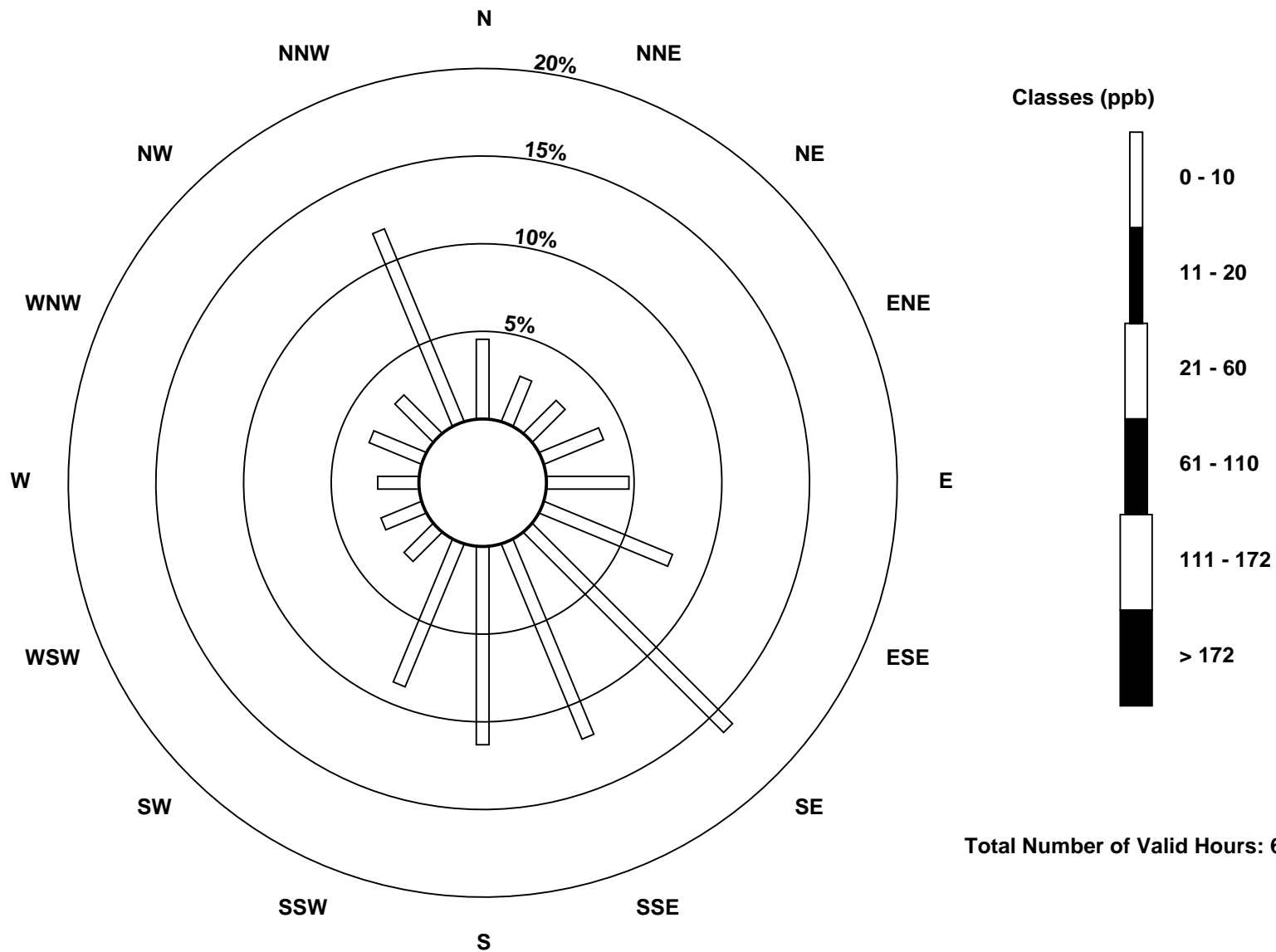
Total Number of Valid Hours: 681

Total Number of Hours: 744

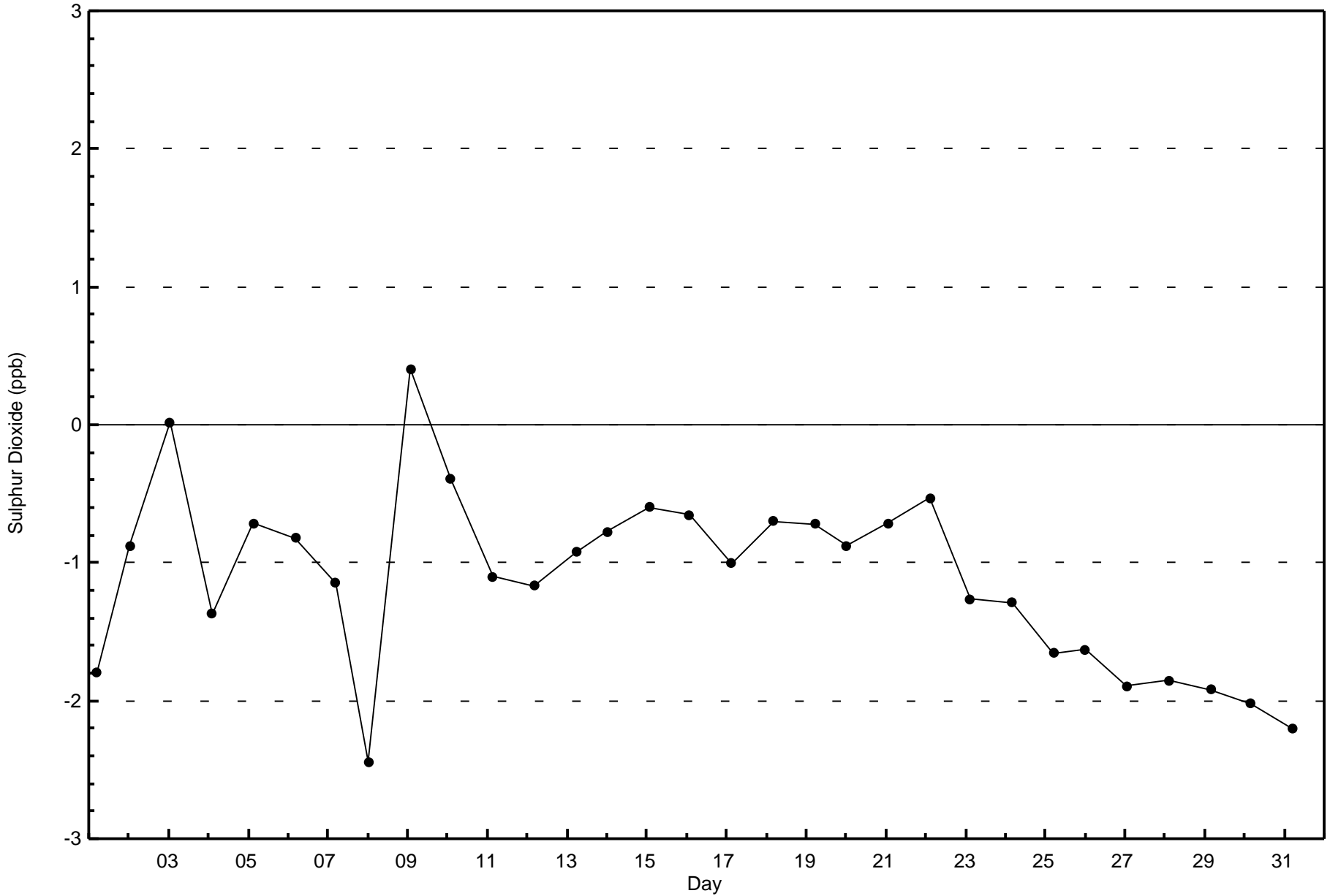


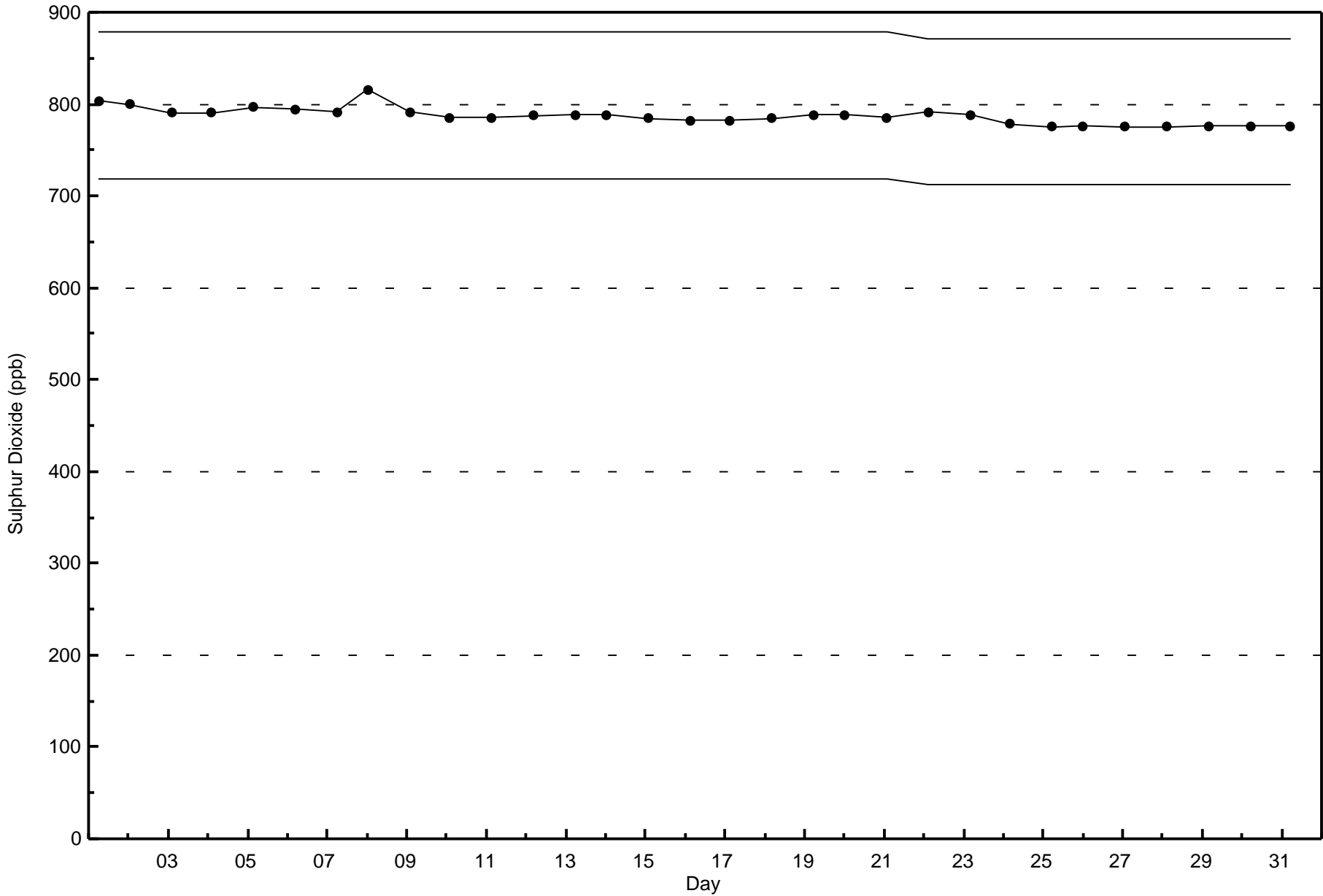
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont (AMS502)



Total Number of Valid Hours: 681







Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

ConocoPhillips - Surmont - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 4 ppb on Mar 16 05:00	Maximum Daily Average: 1.0 ppb on Mar 8		Hours of Data:	710
Minimum Value: 0 ppb on Mar 24 07:00	Minimum Daily Average: 0.1 ppb on Mar 24		Hours of Missing Data:	34
Maximum Diurnal Average: 0.5 ppb at hour 5	Minimum Diurnal Average: 0.3 ppb at hour 14		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:	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-Mar	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
2-Mar	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
3-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1	0.5	1
4-Mar	1	1	1	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.5	1
5-Mar	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	
6-Mar	0	1	1	1	2	Z	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0.8	2
7-Mar	1	1	0	1	1	1	Z	1	1	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0.6	1
8-Mar	1	Z	1	1	1	1	0	0	1	1	1	1	1	0	0	0	1	1	1	2	2	2	2	2	1	1.0	2
9-Mar	0	1	Z	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	0.5	1
10-Mar	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
11-Mar	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
12-Mar	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
13-Mar	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
14-Mar	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
15-Mar	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	0.4	3
16-Mar	2	0	0	Z	4	2	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	4
17-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1
18-Mar	0	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
19-Mar	1	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.3	1
20-Mar	0	Z	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
21-Mar	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
22-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	C	C	C	1	0	0	0	2	1	1	1	0.5	2	
23-Mar	1	1	1	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
24-Mar	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
25-Mar	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
26-Mar	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
27-Mar	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
28-Mar	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
29-Mar	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	0.3	0
30-Mar	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
31-Mar	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

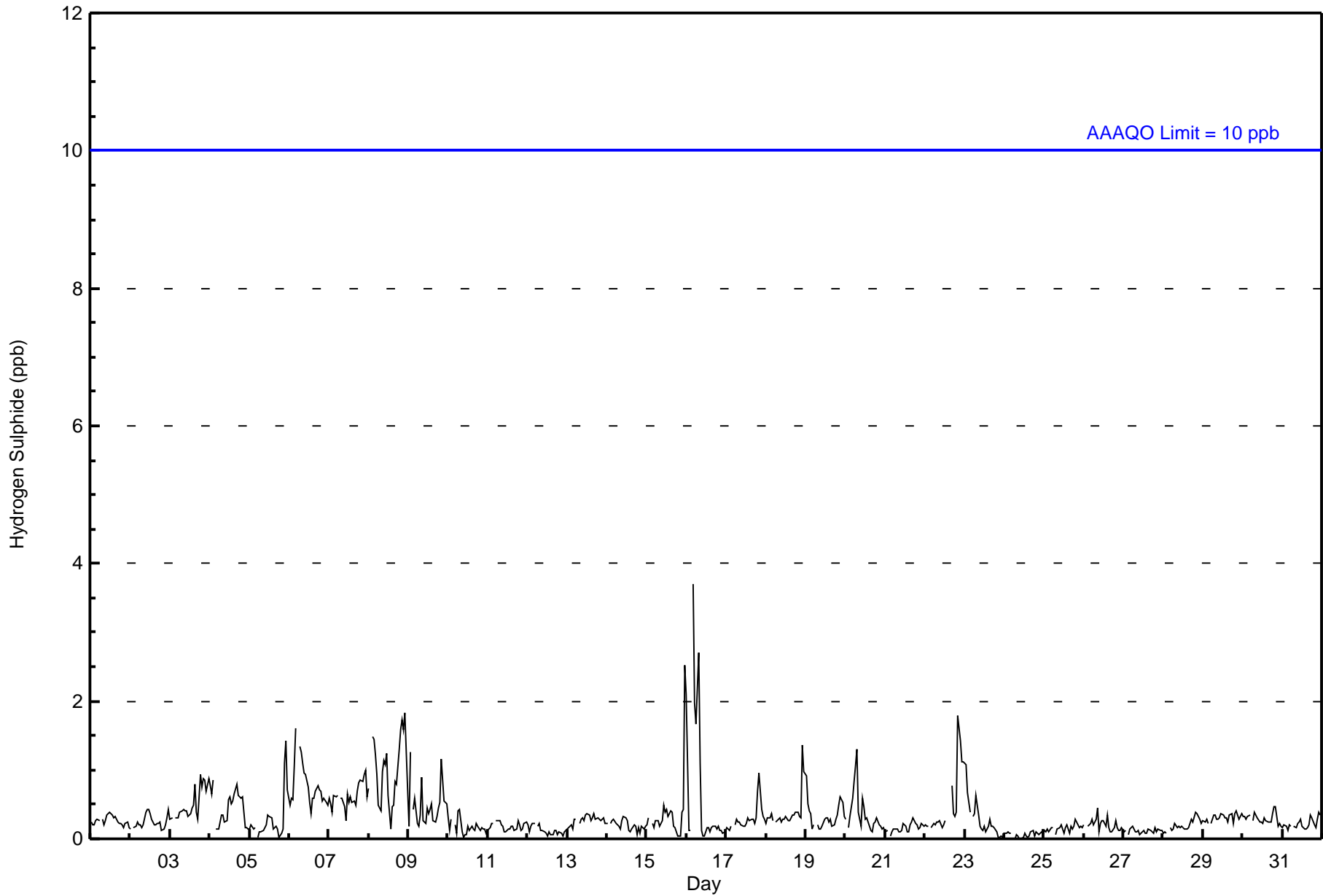
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2	1	1	1	4	2	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	Diurnal Maximum

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
ConocoPhillips - Surmont - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	707	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: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - March 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	45	19	18	27	31	57	109	87	77	62	14	17	16	22	21	82	704
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	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	45	19	18	27	31	57	109	87	77	62	14	17	16	22	21	85	707

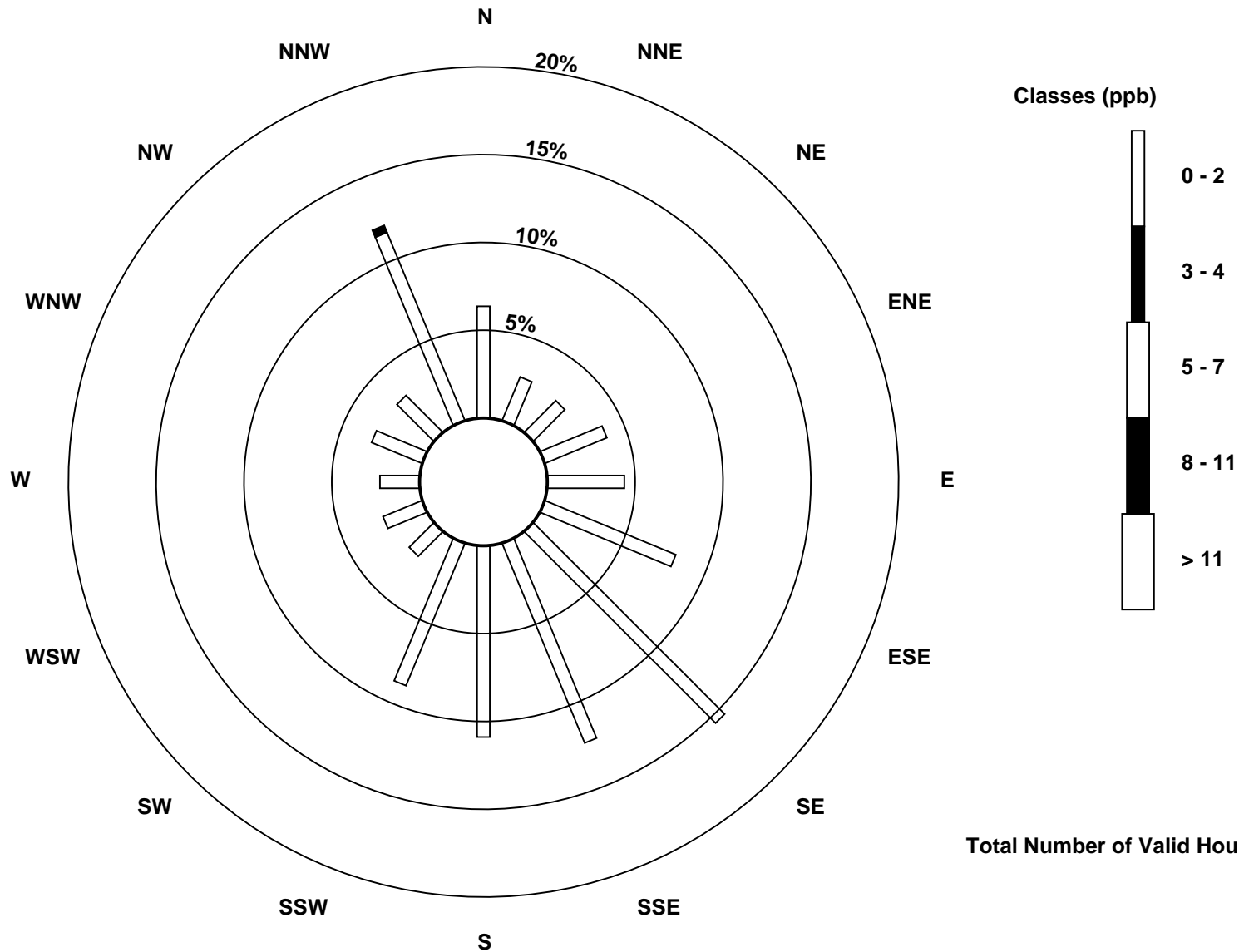
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont (AMS502)

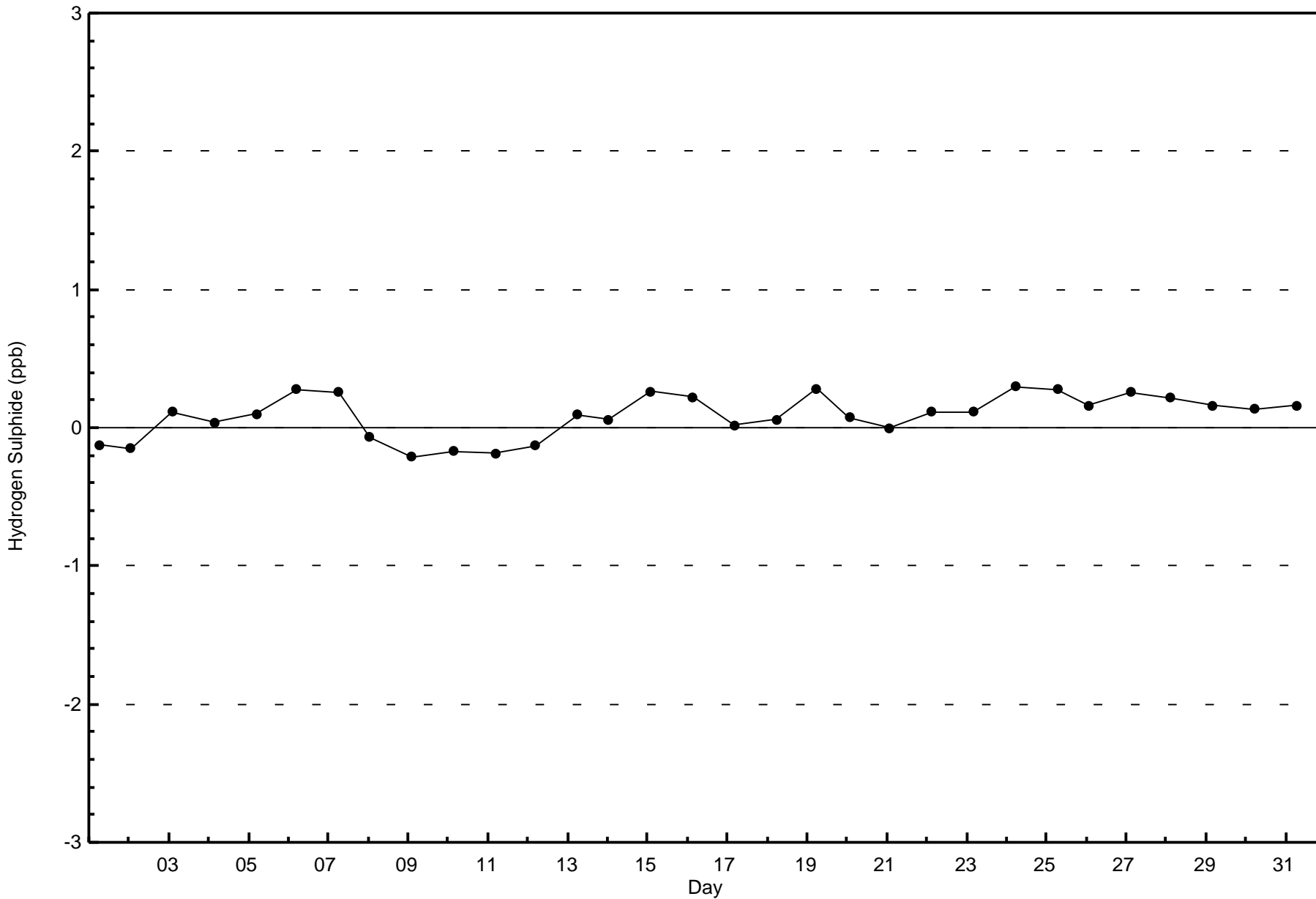


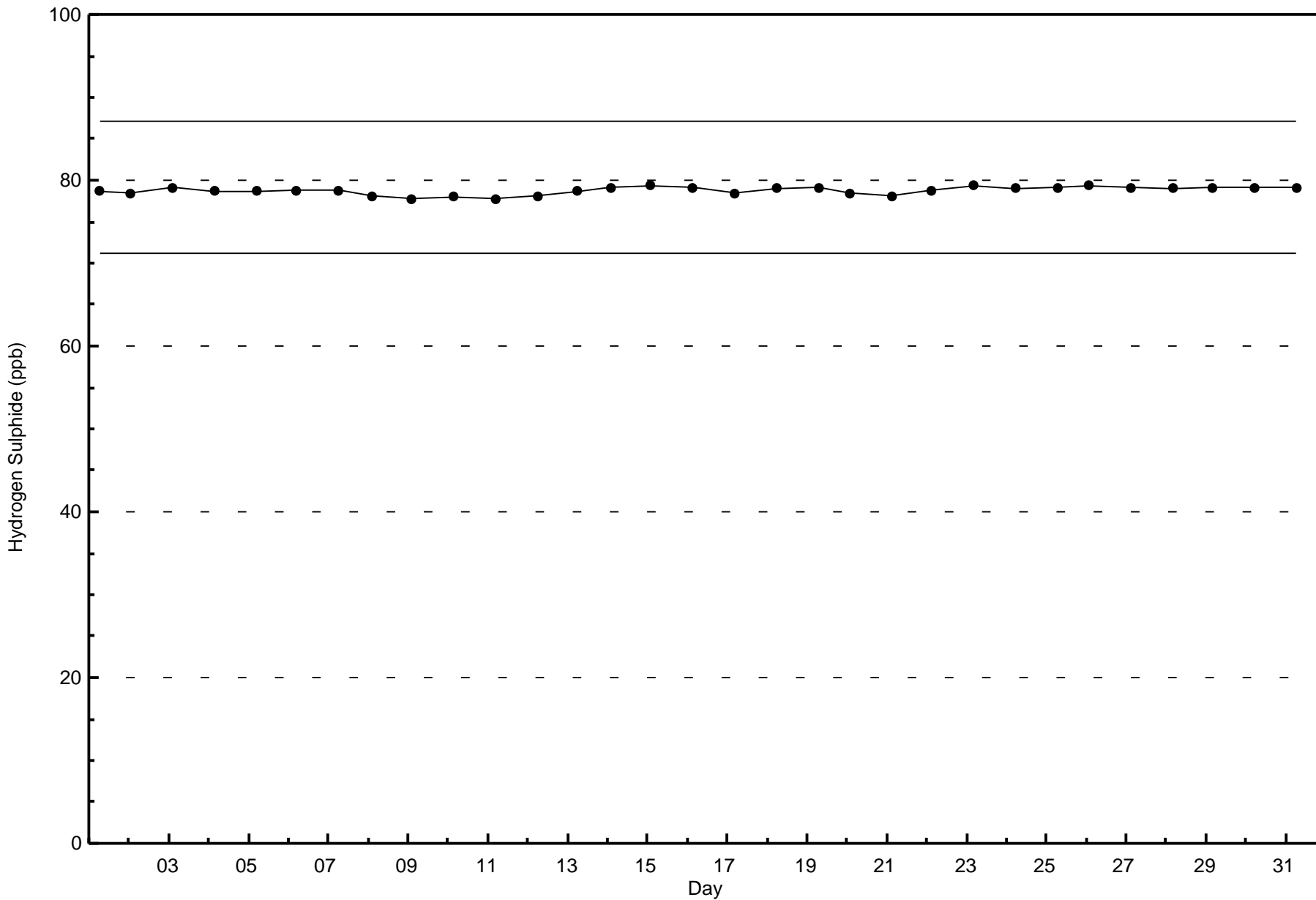
Total Number of Valid Hours: 707



Wood Buffalo Environmental Association
Zero Responses

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surrmont - March 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - March 2017

Maximum Value: 26 ppb on Mar 17 21:00																		Maximum Daily Average: 7.0 ppb on Mar 9																		Hours in Service: 744			
Minimum Value: 0 ppb on Mar 1 04:00																		Minimum Daily Average: 0.3 ppb on Mar 16																		Hours of Data: 709			
Maximum Diurnal Average: 3.2 ppb at hour 9																		Minimum Diurnal Average: 1.1 ppb at hour 19																		Hours of Missing Data: 35			
Monthly Average: 2.1 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 5 P ₉₉ = 15																		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-Mar	0	0	0	0	0	Z	1	1	1	2	2	1	1	1	1	1	1	2	2	4	2	3	1	1	1.2	4													
2-Mar	Z	0	0	2	0	0	3	0	3	2	3	3	2	2	3	3	3	3	4	1	1	2	2	7	2.2	7													
3-Mar	4	Z	1	1	0	0	1	1	1	2	2	2	3	9	7	8	8	7	1	9	0	1	0	1	3.0	9													
4-Mar	0	1	Z	1	1	0	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	0	0	0.8	2													
5-Mar	1	1	1	Z	1	1	2	1	1	1	0	1	3	1	1	1	1	1	1	1	4	12	1	0	1.7	12													
6-Mar	7	11	4	4	Z	1	1	1	2	3	4	3	2	2	2	2	2	1	2	2	2	3	3	4	2.8	11													
7-Mar	4	5	10	15	7	Z	7	6	4	5	5	2	4	3	3	2	1	1	1	1	1	1	1	2	4.0	15													
8-Mar	Z	0	1	1	1	1	3	2	1	1	2	2	1	1	2	3	3	1	0	1	0	0	0	1	1.3	3													
9-Mar	0	Z	1	7	24	18	2	12	22	2	1	4	4	4	5	6	5	3	3	3	4	7	15	7	7.0	24													
10-Mar	2	1	Z	1	1	1	8	9	6	2	2	1	2	1	3	1	1	2	2	1	2	1	1	1	2.2	9													
11-Mar	1	1	2	Z	1	1	2	2	2	3	3	2	2	2	1	1	2	1	3	0	1	0	1	0	1.5	3													
12-Mar	1	0	1	2	Z	1	7	2	2	2	1	1	1	1	0	2	1	1	0	0	0	1	1	1	1.3	7													
13-Mar	2	2	2	1	4	Z	3	3	4	5	4	5	5	4	3	1	1	0	0	0	0	0	0	0	2.3	5													
14-Mar	Z	1	1	0	0	0	1	1	2	4	5	6	5	3	1	1	0	5	0	1	0	0	1	1	1.7	6													
15-Mar	0	Z	0	0	0	0	0	6	7	6	19	11	11	11	16	14	3	1	1	0	0	2	0	0	4.7	19													
16-Mar	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1													
17-Mar	0	0	0	Z	1	1	3	1	2	1	1	1	1	1	2	1	1	1	2	17	26	0	1	1	2.8	26													
18-Mar	1	1	1	1	Z	1	2	1	3	2	2	2	1	1	2	1	2	1	0	1	2	1	1	1	1.4	3													
19-Mar	3	10	8	5	4	Z	5	4	4	6	8	7	7	8	7	6	5	4	4	5	7	7	5	5	5.9	10													
20-Mar	Z	5	5	4	0	0	0	1	1	1	7	12	8	11	5	3	1	2	0	0	1	1	0	0	3.0	12													
21-Mar	0	Z	1	0	0	0	0	1	2	2	2	4	4	2	3	2	2	3	1	0	1	0	1	1	1.5	4													
22-Mar	1	1	Z	0	1	1	1	3	1	C	C	C	C	1	0	1	1	3	0	0	0	0	1	1	1.0	3													
23-Mar	2	2	2	Z	2	6	4	2	1	1	2	2	1	1	2	2	2	2	0	0	1	0	0	0	1.6	6													
24-Mar	0	1	1	1	Z	0	1	2	2	1	3	2	2	2	1	2	1	3	0	1	2	0	0	0	1.3	3													
25-Mar	0	0	1	0	3	Z	4	3	2	2	2	1	1	1	1	0	0	3	0	2	1	0	1	0	1.4	4													
26-Mar	Z	0	1	0	1	2	1	2	14	1	3	3	3	1	8	3	1	2	1	1	1	0	0	0	2.1	14													
27-Mar	0	Z	0	0	0	0	1	3	1	3	1	2	2	1	2	2	0	1	0	0	0	1	1	0	0.9	3													
28-Mar	0	0	Z	1	0	1	1	3	1	1	0	1	2	2	2	1	2	1	0	0	0	0	0	0	0.8	3													
29-Mar	0	0	0	Z	0	0	0	2	0	0	1	1	3	1	3	1	1	1	1	1	1	0	1	0	0.8	3													
30-Mar	0	1	0	1	Z	1	1	5	4	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	5													
31-Mar	0	0	0	0	1	Z	0	2	3	2	3	3	1	1	1	0	0	0	0	0	0	0	0	0	0.8	3													
																		1.2 1.7 1.7 1.9 2.0 1.6 2.1 2.7 3.2 2.2 3.0 2.9 3.0 2.7 2.8 2.4 1.8 1.9 1.1 1.9 1.9 1.5 1.3 1.3																		Diurnal Average			
																		7 11 10 15 24 18 8 12 22 6 19 12 11 11 16 14 8 7 4 17 26 12 15 7																		Diurnal Maximum			
Z - zerospan		C - Calibration																																					

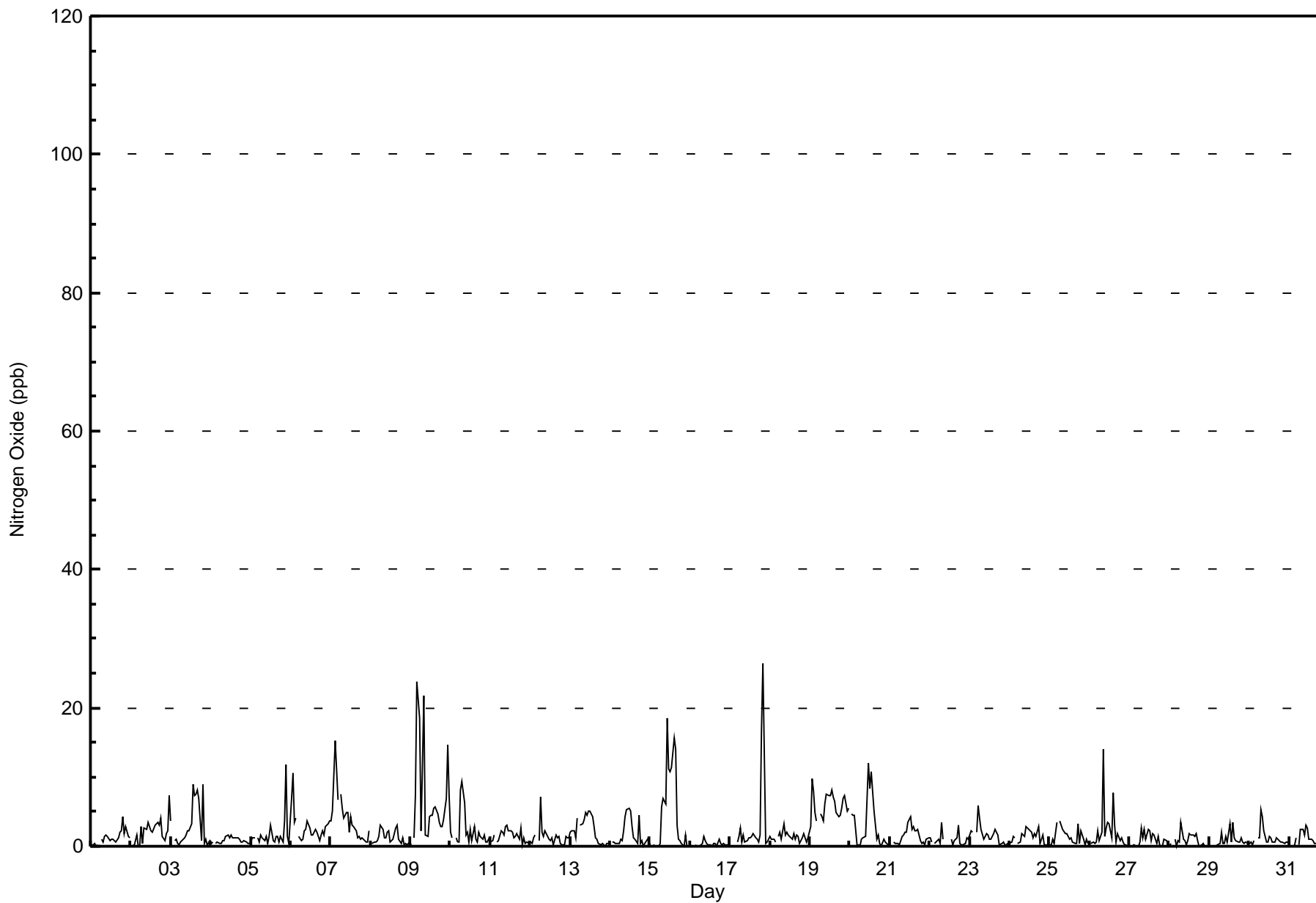


Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - March 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	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: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - March 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	46	20	19	26	34	52	109	87	77	60	16	16	16	21	20	84	703
21 - 40	0	0	0	0	0	0	0	0	0	0	0	1	0	1	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	46	20	19	26	34	52	109	87	77	60	16	17	16	22	21	84	706

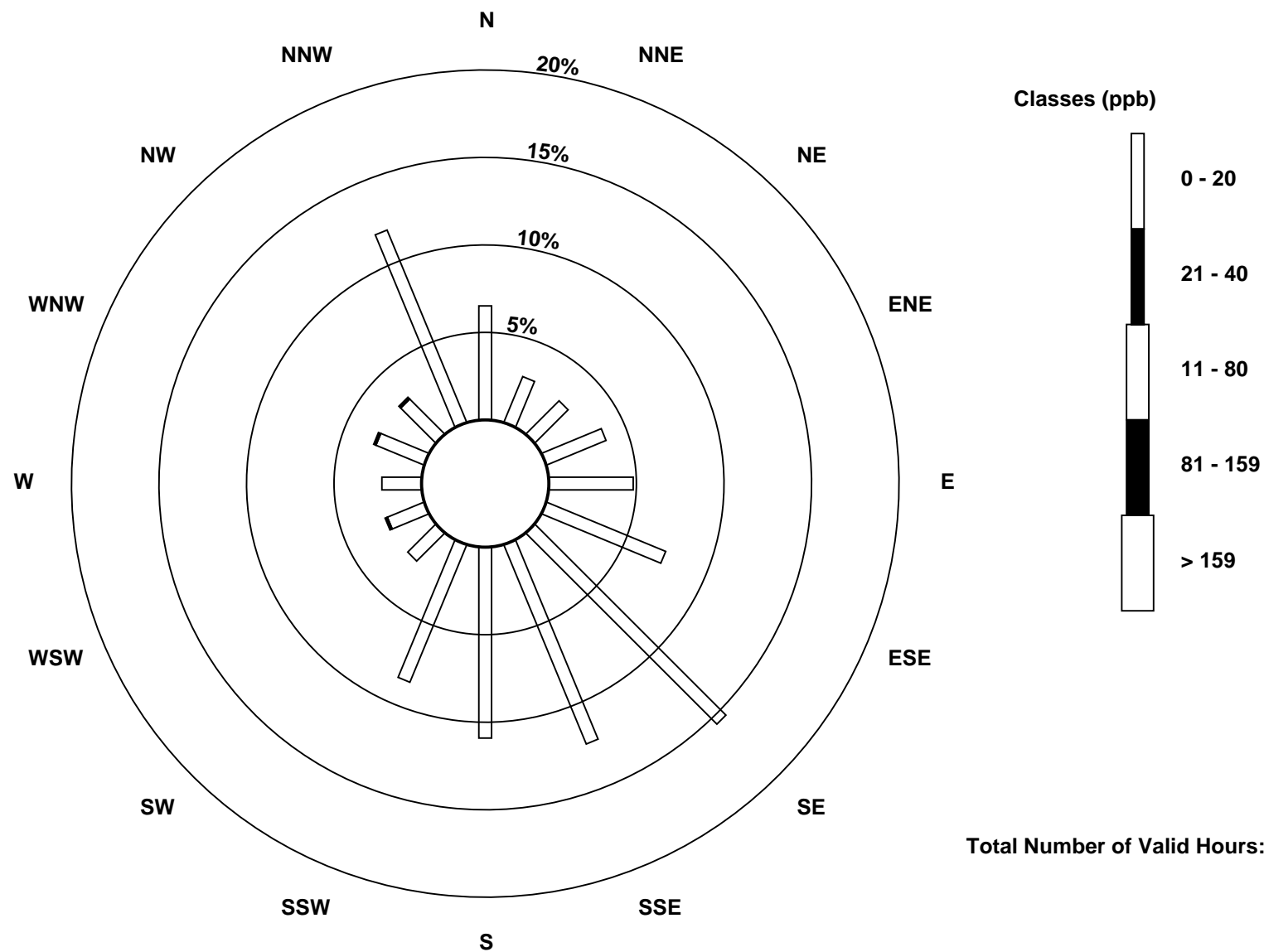
Total Number of Valid Hours: 706

Total Number of Hours: 744

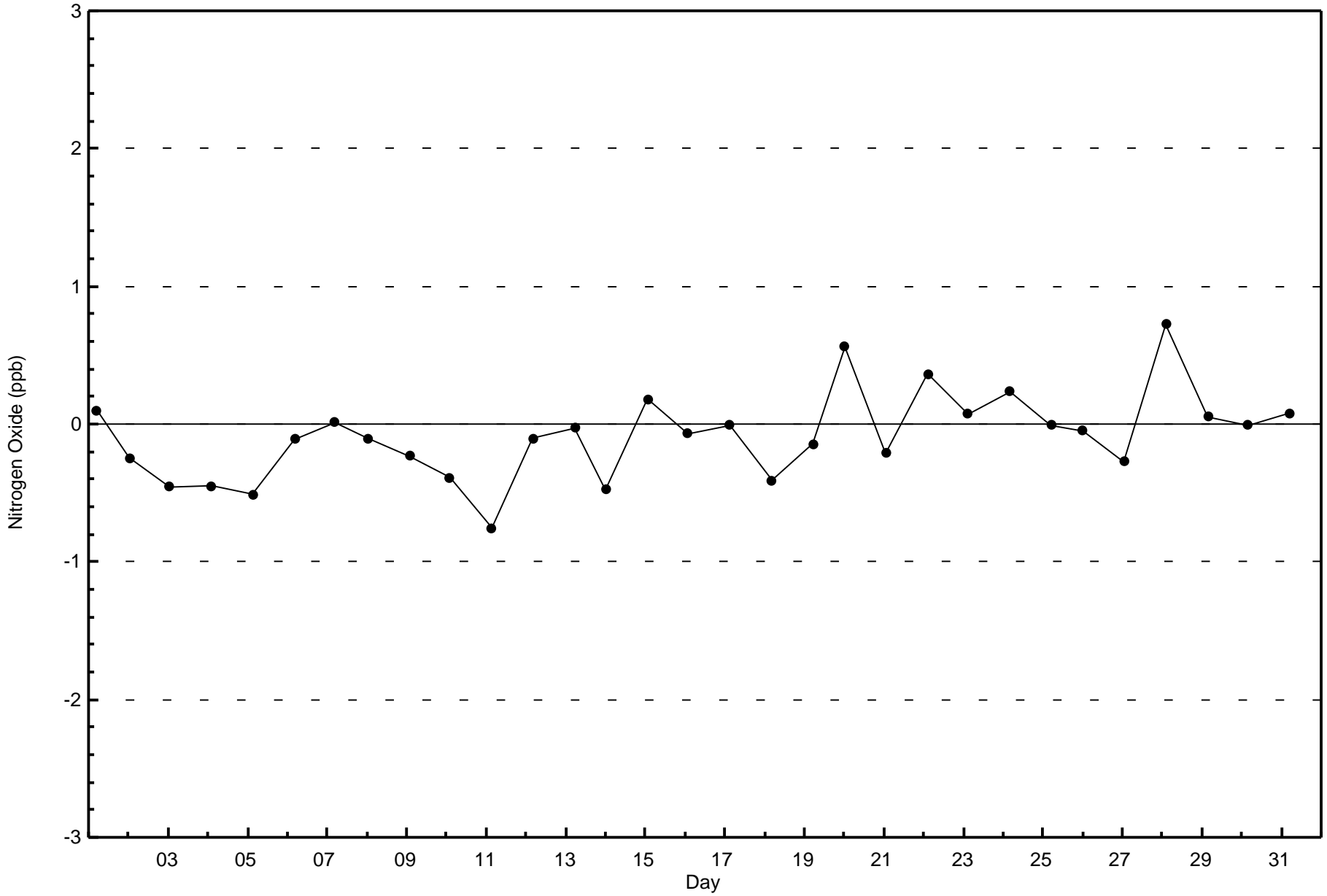


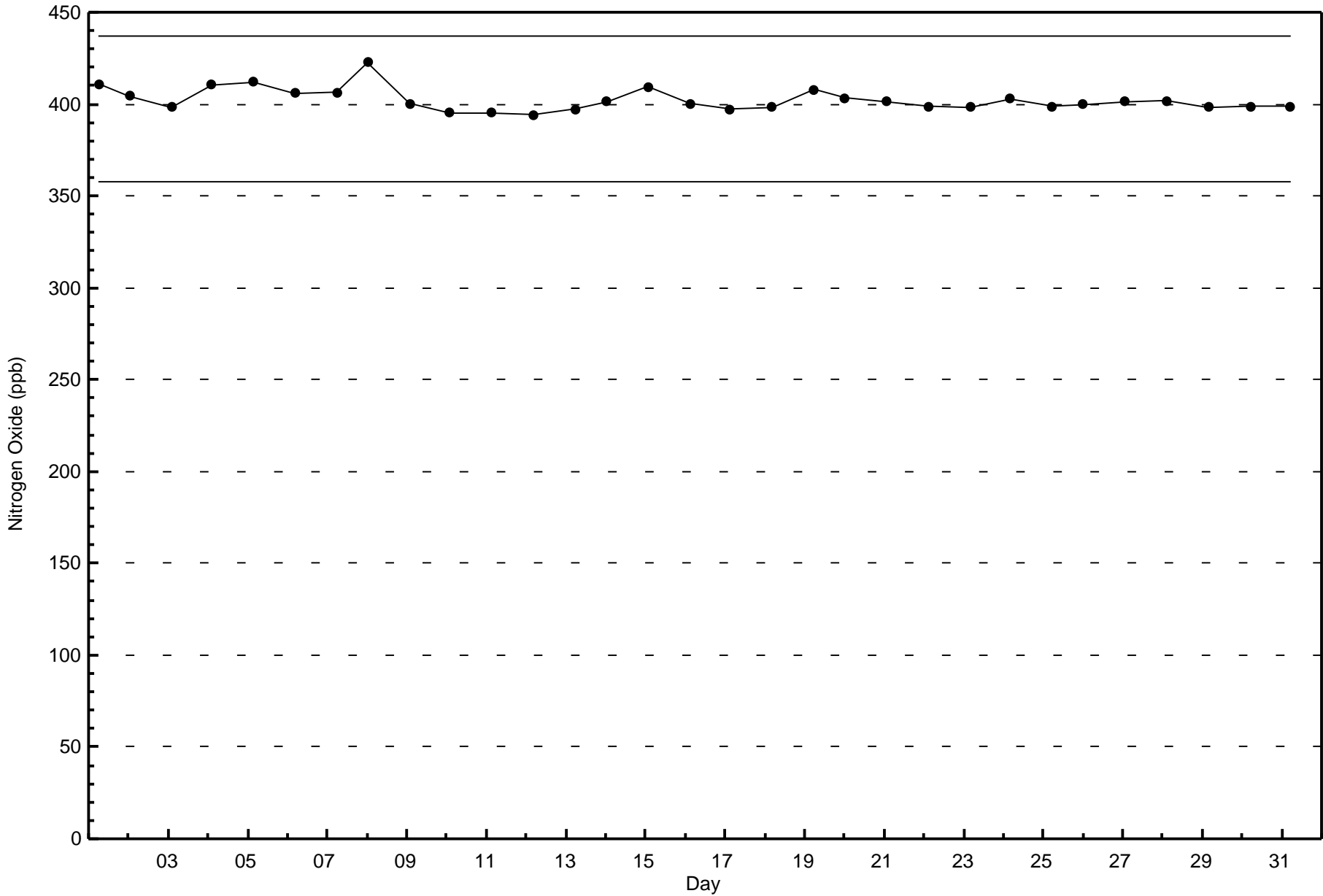
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont (AMS502)



Total Number of Valid Hours: 706







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

ConocoPhillips - Surmont - March 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 19 ppb on Mar 6 07:00	Maximum Daily Average: 6.8 ppb on Mar 6		Hours of Data:	709
Minimum Value: 1 ppb on Mar 17 02:00	Minimum Daily Average: 1.7 ppb on Mar 30		Hours of Missing Data:	35
Maximum Diurnal Average: 4.9 ppb at hour 8	Minimum Diurnal Average: 3.3 ppb at hour 17		Hours of Calibration:	35
Monthly Average: 3.8 ppb	Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 7 P ₉₉ = 12		Percent Operational Time:	100.0

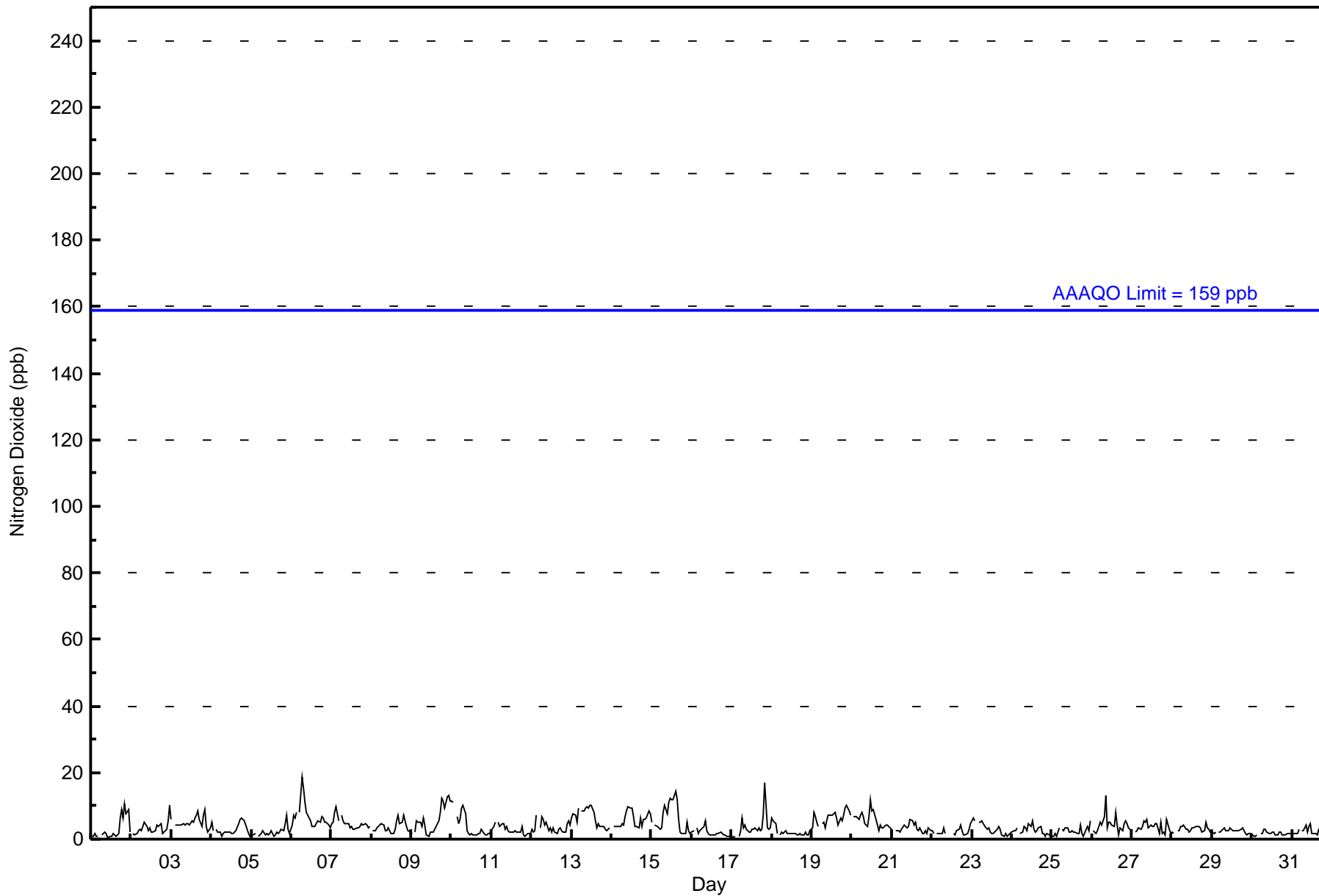
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Mar	1	1	2	1	1	Z	1	2	2	2	1	1	1	2	1	1	2	6	9	7	11	8	9	2	3.0	11
2-Mar	Z	2	1	2	3	3	3	4	5	4	3	4	2	2	3	4	4	4	5	2	2	3	5	10	3.4	10
3-Mar	6	Z	4	4	4	4	4	5	4	5	5	4	6	5	6	7	8	6	4	7	9	4	2	3	5.1	9
4-Mar	5	3	Z	3	2	2	1	2	2	2	2	2	2	2	2	3	5	6	6	6	6	3	2	1	3.0	6
5-Mar	1	1	2	Z	1	1	2	3	1	2	1	2	3	1	1	2	2	2	3	3	5	7	3	2	2.2	7
6-Mar	4	7	6	8	Z	8	19	15	11	8	7	5	4	4	4	5	5	5	7	7	5	5	4	3	6.8	19
7-Mar	5	5	8	10	6	Z	7	6	5	5	5	4	4	3	3	4	3	4	5	4	5	4	3	4	4.7	10
8-Mar	Z	2	3	4	4	4	5	4	3	3	3	3	2	2	3	6	7	5	5	7	5	4	2	2	3.8	7
9-Mar	2	Z	2	5	5	5	4	7	4	1	1	2	2	2	3	4	6	8	12	12	10	13	13	11	5.8	13
10-Mar	11	11	Z	7	5	6	9	10	8	3	2	1	2	1	1	1	2	2	3	2	1	1	2	2	4.0	11
11-Mar	3	4	5	Z	5	4	5	5	3	4	3	2	2	2	2	2	2	2	4	1	1	1	2	2	2.8	5
12-Mar	3	2	3	7	Z	4	7	6	4	5	3	3	2	3	2	2	3	4	3	2	2	5	6	4	3.6	7
13-Mar	6	8	7	5	9	Z	8	9	9	10	9	10	10	8	6	4	5	4	4	4	3	3	3	3	6.3	10
14-Mar	Z	4	4	4	4	4	5	4	7	9	10	10	9	7	4	4	3	6	4	6	6	6	9	8	5.8	10
15-Mar	5	Z	4	4	3	3	3	8	10	8	11	12	12	12	14	12	6	2	2	2	2	5	2	2	6.3	14
16-Mar	2	3	Z	4	2	3	3	4	5	2	2	1	1	1	1	2	2	2	2	1	1	1	1	1	2.0	5
17-Mar	1	1	1	Z	1	3	6	4	4	3	2	2	3	3	3	2	3	3	3	7	17	3	3	3	3.5	17
18-Mar	7	5	5	2	Z	1	2	2	2	2	2	2	2	2	1	1	2	1	1	2	1	1	2	2	2.2	7
19-Mar	4	8	7	5	4	Z	5	5	3	5	7	7	7	8	8	7	4	6	6	7	10	10	8	7	6.5	10
20-Mar	Z	7	7	7	6	7	8	7	5	4	7	12	9	9	6	4	3	4	4	3	4	4	4	4	5.8	12
21-Mar	3	Z	3	3	3	2	3	4	4	4	4	6	6	4	5	3	2	3	2	2	3	2	3	3	3.2	6
22-Mar	3	2	Z	2	2	2	2	4	2	C	C	C	C	2	1	2	3	4	3	1	1	2	3	5	2.3	5
23-Mar	6	6	5	Z	5	5	5	5	3	3	3	2	2	2	3	3	4	3	1	1	2	1	1	2	3.2	6
24-Mar	2	3	2	3	Z	2	2	4	3	2	5	4	6	3	2	3	4	4	2	2	1	2	1	1	2.7	6
25-Mar	1	1	2	1	4	Z	3	2	4	3	2	2	3	2	2	2	2	4	2	1	3	4	2	5	2.4	5
26-Mar	Z	3	2	3	4	5	4	7	13	3	5	5	4	4	8	4	1	4	2	5	6	5	3	3	4.5	13
27-Mar	3	Z	2	2	3	3	4	5	5	6	4	4	4	4	5	5	2	5	2	2	1	6	3	2	3.5	6
28-Mar	2	2	Z	3	3	4	4	4	3	3	2	3	3	3	4	4	4	3	2	3	5	3	3	2	3.1	5
29-Mar	2	2	2	Z	2	2	3	3	3	2	3	3	3	3	3	2	2	3	3	3	2	1	2	2	2.4	3
30-Mar	1	1	1	1	Z	2	2	3	3	2	2	2	2	2	1	1	2	2	1	1	1	2	2	2	1.7	3
31-Mar	2	2	2	2	3	Z	3	3	4	2	4	5	2	2	2	1	3	3	1	1	1	2	3	2	2.3	5
	3.4	3.6	3.5	3.8	3.5	3.6	4.5	4.9	4.6	3.8	3.9	4.1	3.9	3.5	3.6	3.4	3.3	3.9	3.5	3.6	4.2	3.9	3.6	3.4	Diurnal Average	
	11	11	8	10	9	8	19	15	13	10	11	12	12	12	14	12	8	8	12	12	17	13	13	11	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
ConocoPhillips - Surmont - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - March 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
ConocoPhillips - Surmont - March 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	46	20	19	26	34	52	109	87	77	60	16	17	16	22	21	84	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	46	20	19	26	34	52	109	87	77	60	16	17	16	22	21	84	706

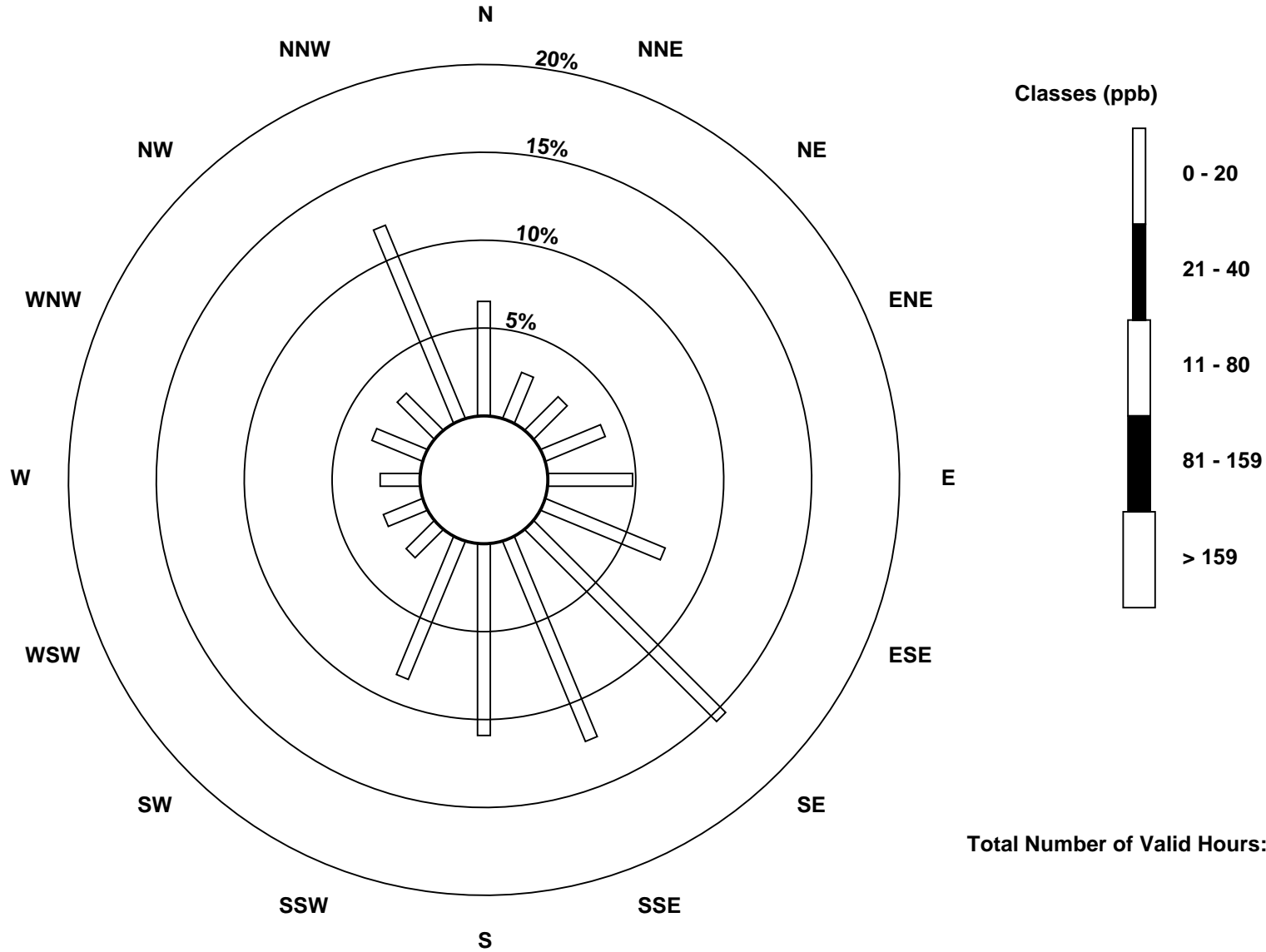
Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

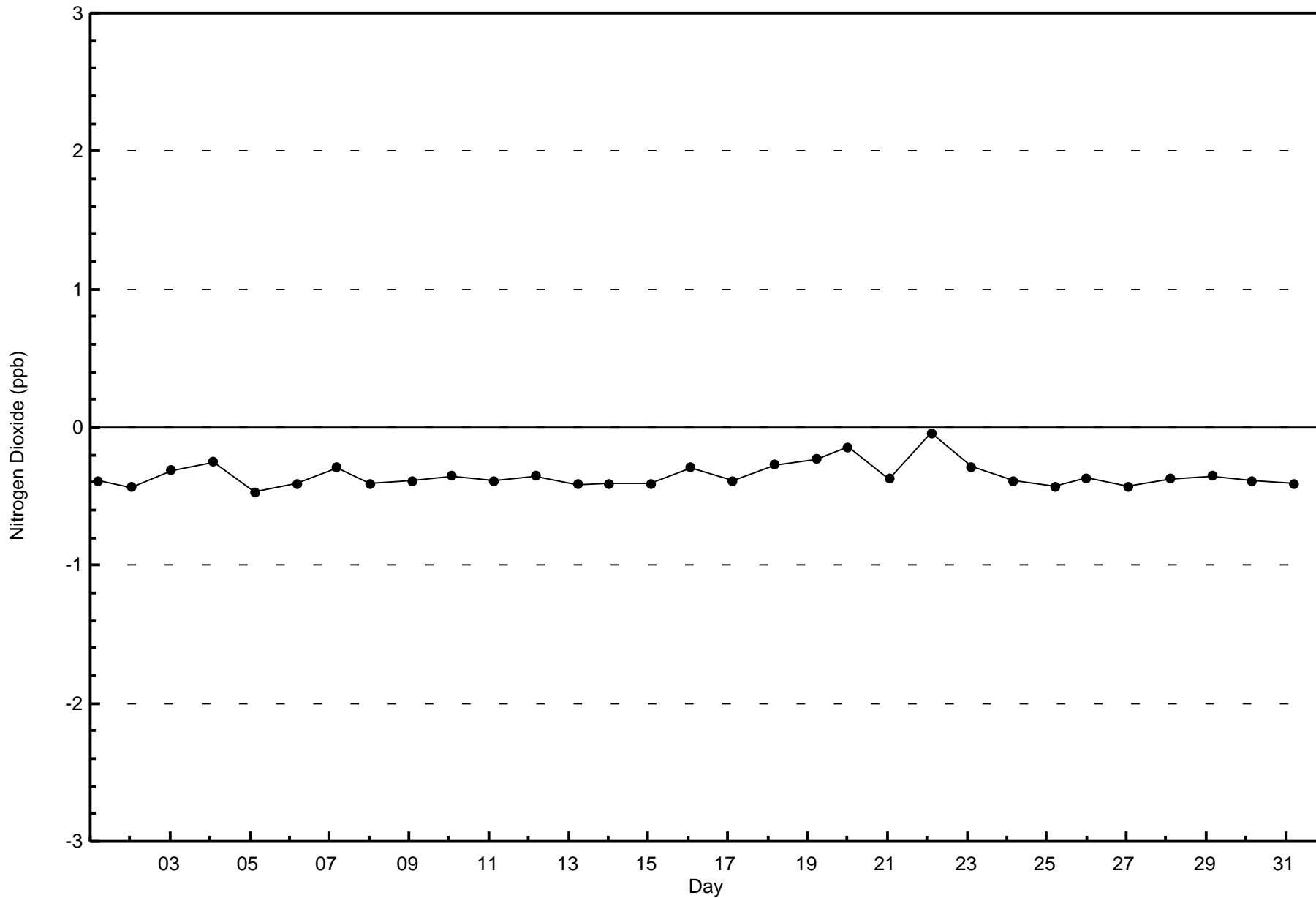
Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont (AMS502)

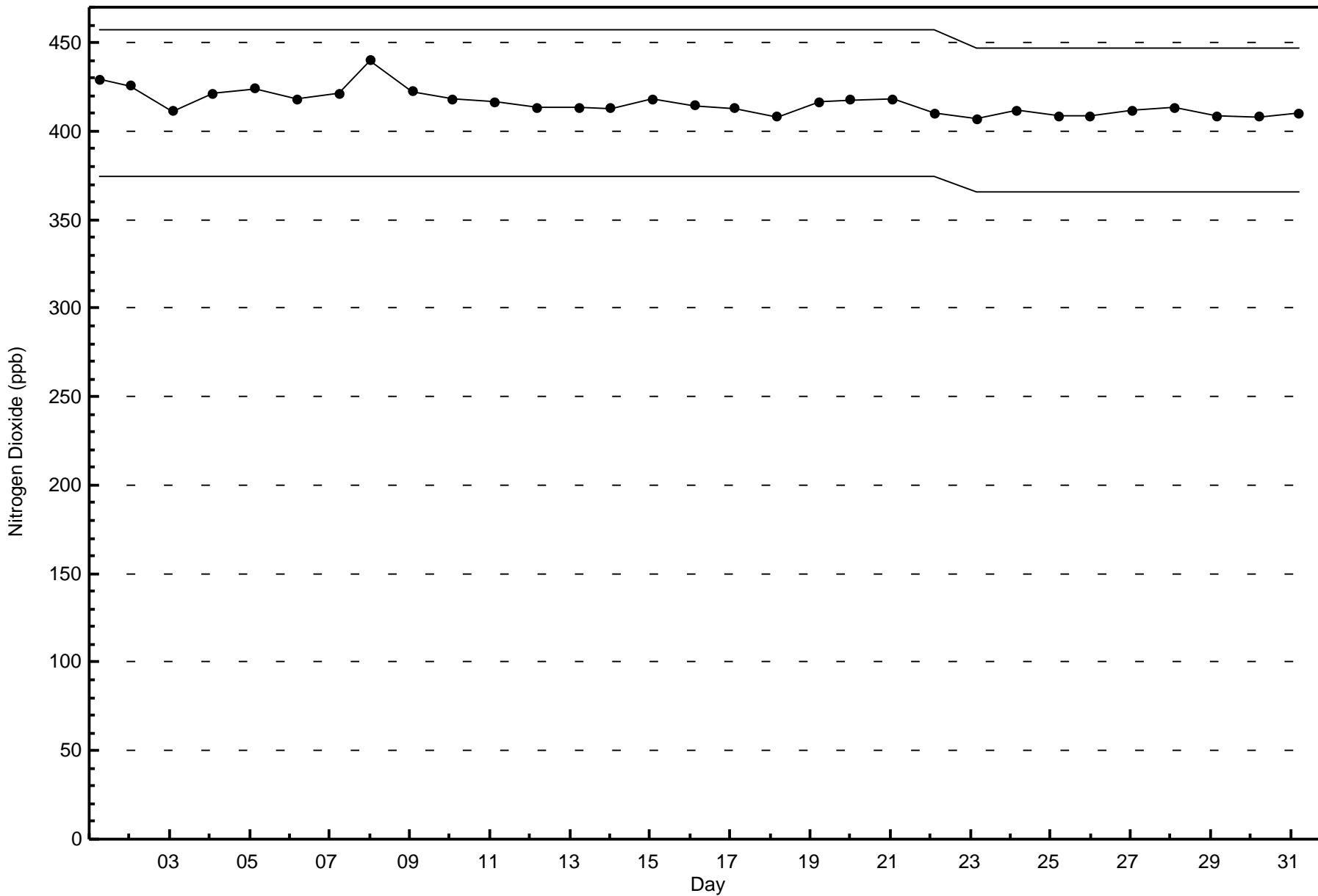




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - March 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

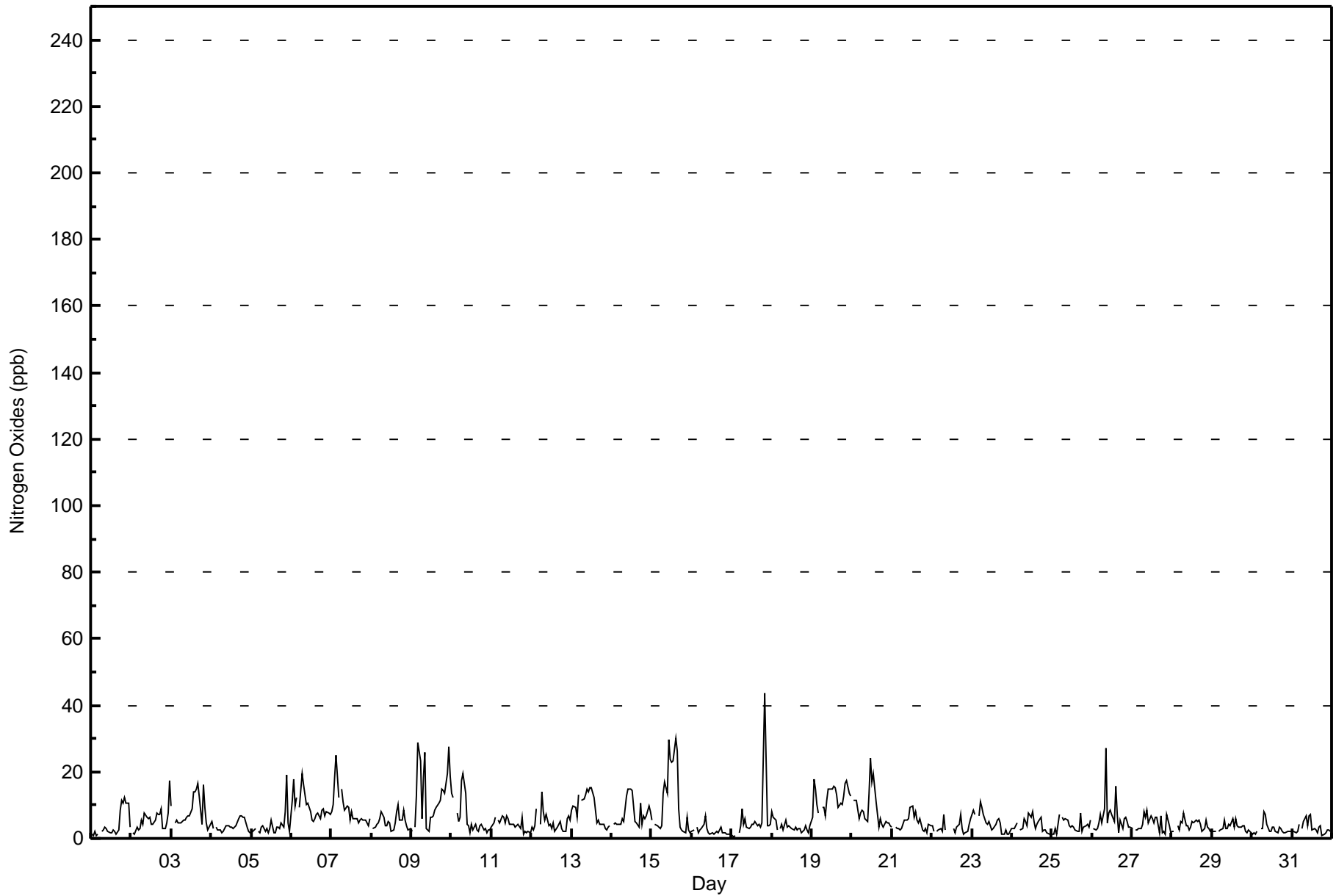
ConocoPhillips - Surmont - March 2017

Maximum Value: 44 ppb on Mar 17 21:00		Maximum Daily Average: 12.8 ppb on Mar 9		Hours in Service: 744																																												
Minimum Value: 1 ppb on Mar 17 02:00		Minimum Daily Average: 2.3 ppb on Mar 16		Hours of Data: 709																																												
Maximum Diurnal Average: 7.9 ppb at hour 9		Minimum Diurnal Average: 4.6 ppb at hour 19		Hours of Missing Data: 35																																												
Monthly Average: 5.9 ppb		Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 4 Q ₃ = 7 P ₉₀ = 13 P ₉₉ = 26		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-Mar	1	1	2	1	1	Z	2	2	3	3	2	2	2	3	2	1	3	8	11	11	12	10	10	3	4.3	12																						
2-Mar	Z	2	1	4	3	3	5	4	8	6	6	6	4	4	6	8	7	7	9	3	3	5	8	17	5.6	17																						
3-Mar	10	Z	5	5	5	5	5	6	5	6	7	7	9	14	14	15	17	13	4	16	9	5	2	4	8.1	17																						
4-Mar	5	3	Z	3	3	3	2	2	3	4	4	3	3	3	3	4	6	7	7	7	6	3	2	2	3.8	7																						
5-Mar	2	2	3	Z	2	2	3	4	2	3	2	3	6	2	2	3	3	3	5	3	8	19	4	2	3.8	19																						
6-Mar	11	18	10	12	Z	9	19	16	13	10	11	8	5	5	6	7	7	6	8	9	7	8	7	7	9.6	19																						
7-Mar	8	10	18	25	12	Z	15	11	9	10	9	6	8	6	6	6	5	5	6	5	6	5	4	6	8.7	25																						
8-Mar	Z	3	3	4	5	6	8	7	4	4	5	5	2	3	5	8	10	6	6	8	5	4	2	3	5.0	10																						
9-Mar	2	Z	3	13	29	23	6	18	26	3	2	6	7	7	8	9	10	12	15	14	13	19	28	18	12.8	29																						
10-Mar	13	12	Z	8	5	7	17	19	14	4	4	2	4	2	4	2	2	4	4	3	3	2	2	3	6.2	19																						
11-Mar	3	5	6	Z	6	5	7	7	5	7	6	4	4	4	4	4	4	3	6	1	2	2	2	2	4.2	7																						
12-Mar	3	3	4	9	Z	4	14	8	6	7	4	4	3	4	2	3	4	5	3	2	2	6	7	6	5.0	14																						
13-Mar	8	10	9	6	13	Z	11	12	13	15	14	15	15	12	9	5	6	4	4	4	3	3	3	4	8.7	15																						
14-Mar	Z	4	5	4	4	4	6	5	9	13	15	15	14	10	5	5	4	11	4	7	6	7	10	8	7.5	15																						
15-Mar	5	Z	4	4	3	3	4	14	17	14	30	24	23	23	30	26	9	3	3	2	2	6	2	2	11.0	30																						
16-Mar	2	3	Z	4	2	2	3	4	7	3	2	1	2	1	2	2	2	3	2	2	2	1	1	1	2.3	7																						
17-Mar	1	1	1	Z	2	4	9	4	6	4	3	3	4	4	5	4	4	3	5	24	44	4	4	4	6.3	44																						
18-Mar	8	6	6	3	Z	3	4	2	6	3	4	3	3	3	3	2	3	3	2	3	4	2	2	4	3.5	8																						
19-Mar	6	18	15	10	8	Z	9	9	7	11	15	15	15	16	15	13	9	10	10	13	16	18	13	13	12.4	18																						
20-Mar	Z	11	11	11	6	8	8	8	6	5	13	24	17	20	11	7	3	6	4	3	5	5	4	4	8.8	24																						
21-Mar	3	Z	3	3	3	3	3	6	5	6	6	9	10	6	8	5	5	6	2	2	3	2	4	4	4.7	10																						
22-Mar	4	2	Z	2	2	3	2	7	3	C	C	C	C	3	2	3	4	7	3	1	2	2	4	6	3.3	7																						
23-Mar	7	8	7	Z	7	11	9	7	5	4	5	4	3	3	4	5	6	5	1	1	3	1	1	2	4.8	11																						
24-Mar	3	3	4	5	Z	2	3	6	5	4	7	6	8	5	3	4	5	6	2	3	2	2	1	1	4.0	8																						
25-Mar	1	1	3	1	7	Z	6	5	6	5	4	3	4	3	3	2	2	8	2	3	4	4	3	6	3.8	8																						
26-Mar	Z	3	3	3	5	7	5	9	27	5	8	9	7	5	16	7	2	5	3	6	6	5	4	3	6.6	27																						
27-Mar	3	Z	2	3	3	3	4	8	6	9	5	7	6	5	7	6	2	7	2	2	1	7	4	2	4.4	9																						
28-Mar	2	2	Z	4	2	5	5	8	4	4	2	4	5	5	5	5	5	4	2	3	6	3	3	2	4.0	8																						
29-Mar	2	2	2	Z	2	2	3	5	3	3	4	4	6	3	6	4	3	4	4	4	2	2	3	2	3.2	6																						
30-Mar	1	2	1	2	Z	3	3	8	7	4	2	2	3	3	2	2	3	3	2	2	2	2	2	2	2.9	8																						
31-Mar	2	2	2	2	4	Z	3	5	7	4	7	7	2	3	2	2	3	4	1	1	2	2	3	2	3.1	7																						
																								4.6	5.3	5.1	5.8	5.6	5.2	6.6	7.6	7.9	6.1	6.9	7.1	6.8	6.2	6.4	5.9	5.1	5.8	4.6	5.4	6.2	5.4	4.9	4.7	Diurnal Average
																								13	18	18	25	29	23	19	19	27	15	30	24	23	23	30	26	17	13	15	24	44	19	28	18	Diurnal Maximum
Z - zerospan																								C - Calibration																								



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - March 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	694	97.88	97.88
21 - 40	14	1.97	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: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - March 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	46	20	19	26	34	52	109	87	76	60	14	16	10	19	20	83	691
21 - 40	0	0	0	0	0	0	0	0	1	0	2	0	6	3	1	1	14
11 - 80	0	0	0	0	0	0	0	0	0	0	0	1	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	46	20	19	26	34	52	109	87	77	60	16	17	16	22	21	84	706

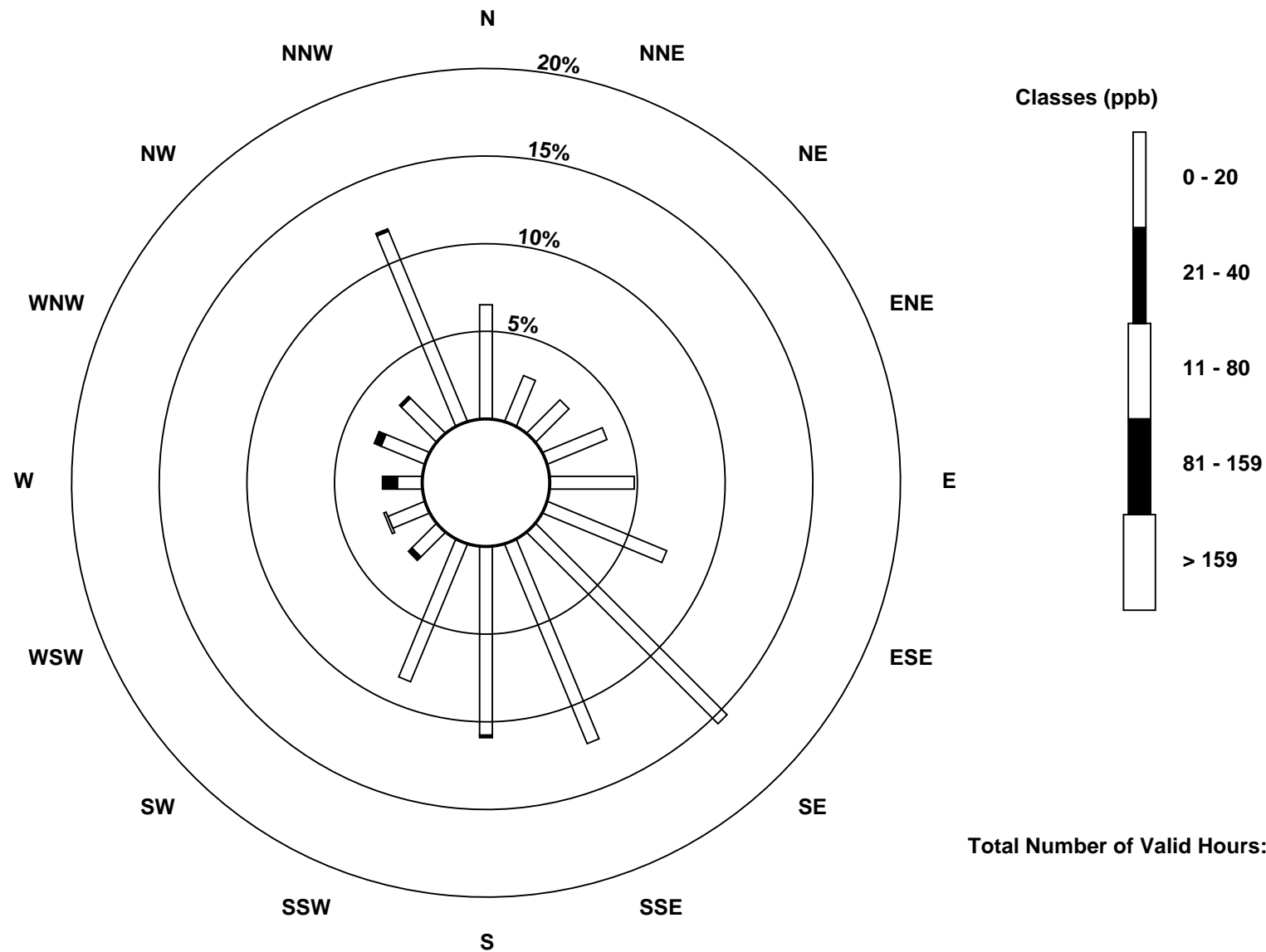
Total Number of Valid Hours: 706

Total Number of Hours: 744

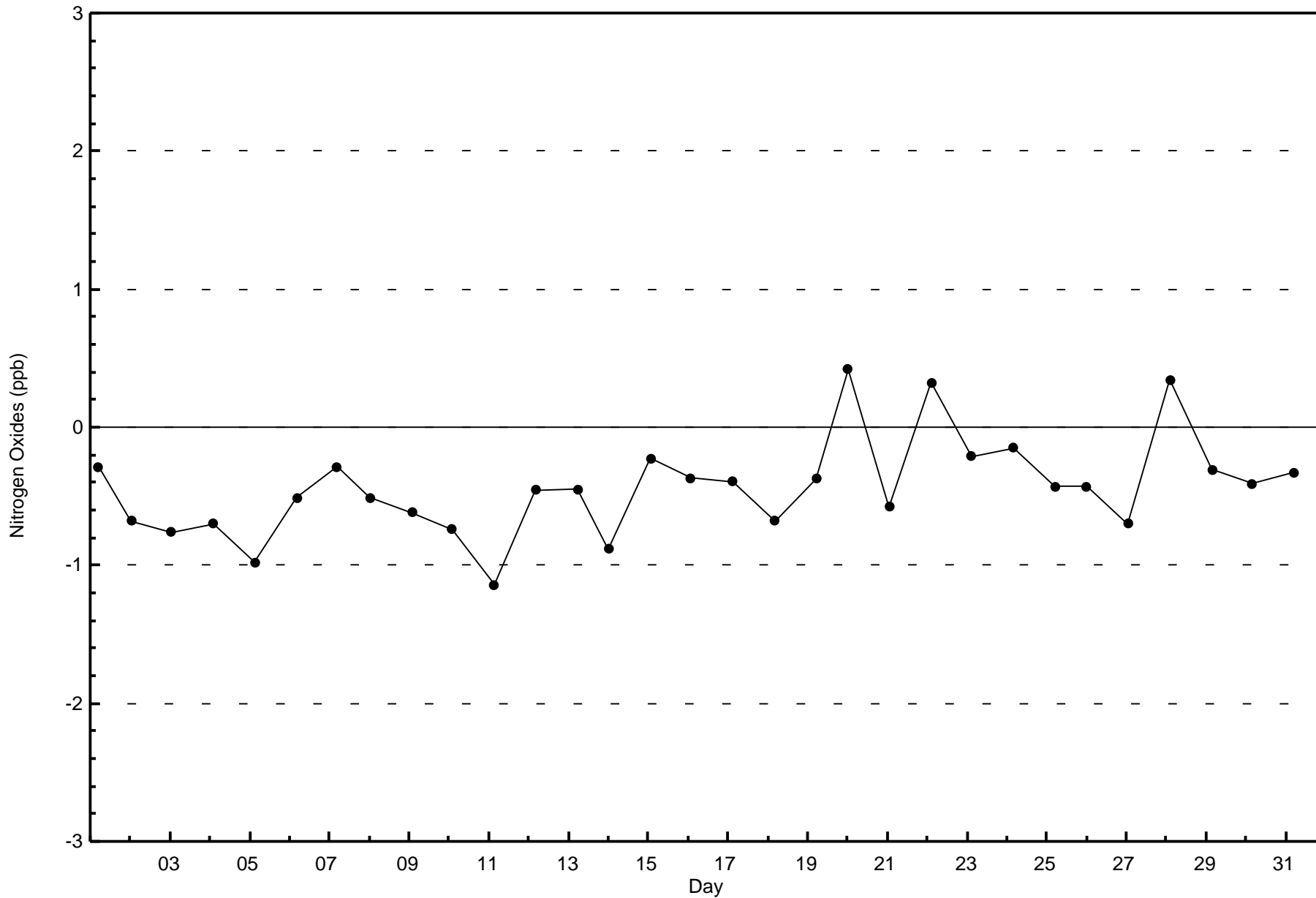


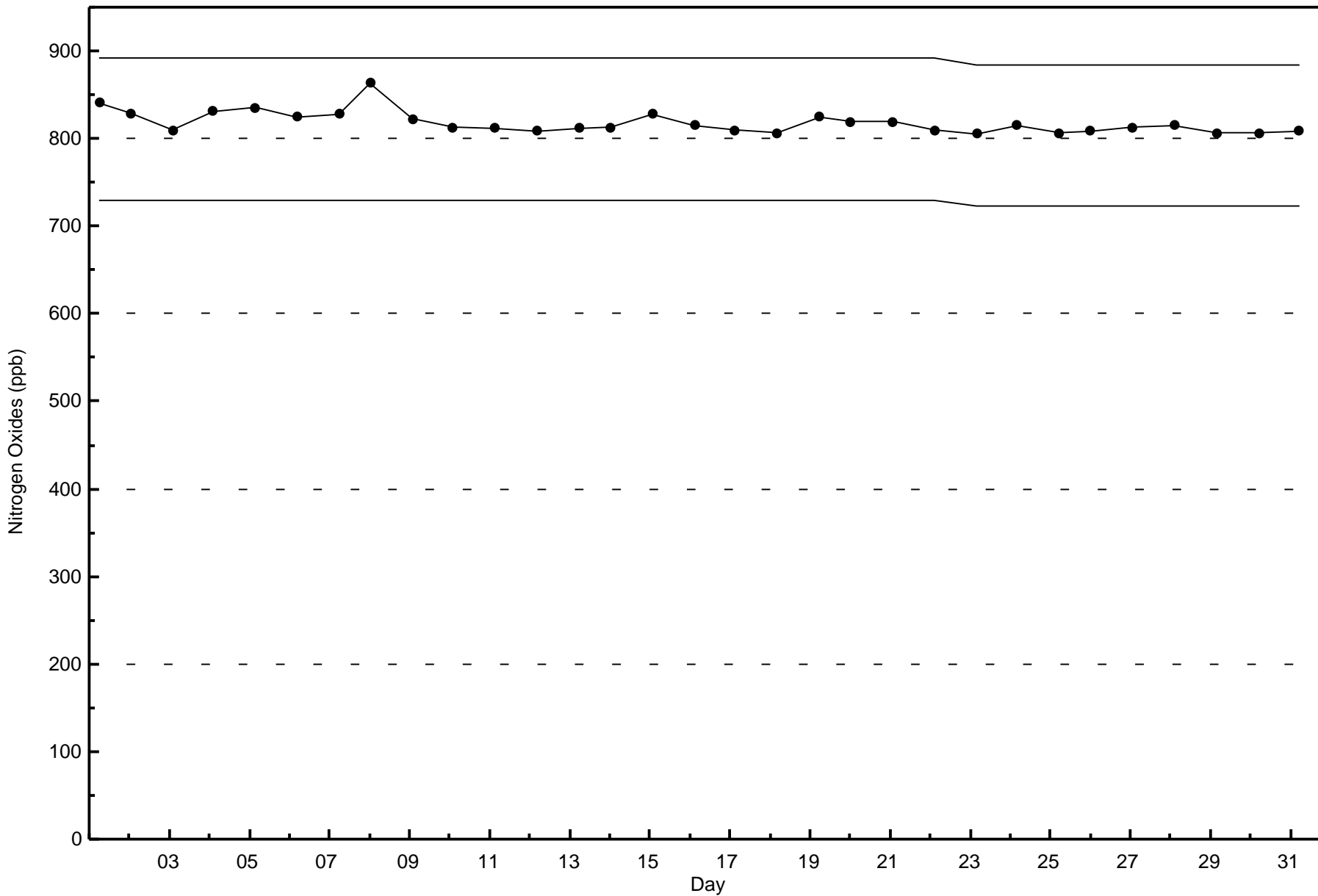
Wood Buffalo Environmental Association
Wind Rose Mar 2017

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont (AMS502)



Total Number of Valid Hours: 706







Wood Buffalo Environmental Association
Summary of Hour Averages

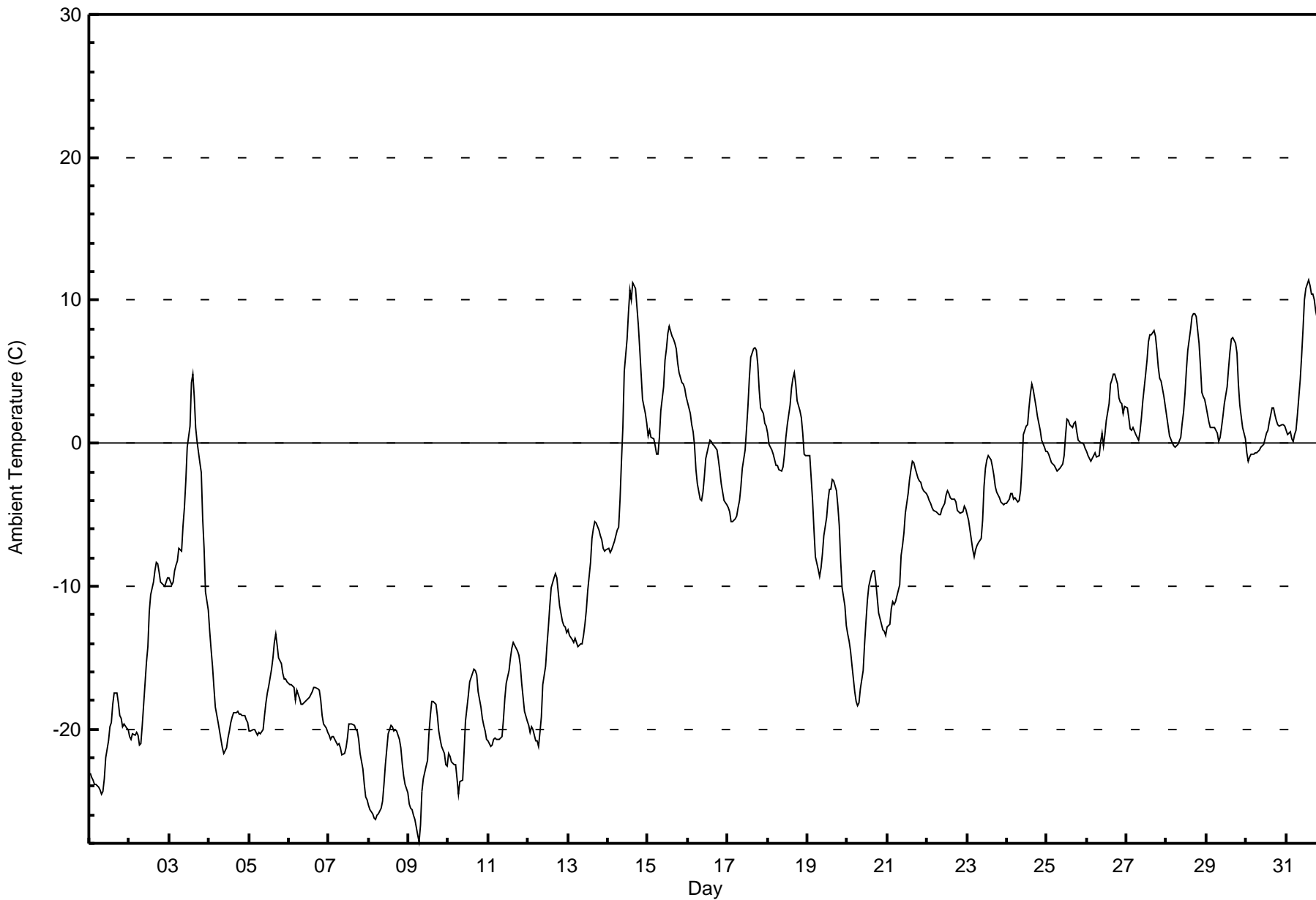
Ambient Temperature (AT) - C
ConocoPhillips - Surmont - March 2017

Maximum Value: 11.4 C on Mar 31 14:00 Maximum Daily Average: 6.0 C on Mar 31																						Hours in Service:	744			
Minimum Value: -27.9 C on Mar 9 07:00 Minimum Daily Average: -23.2 C on Mar 8																						Hours of Data:	744			
Maximum Diurnal Average: -3.8 C at hour 16 Minimum Diurnal Average: -10.9 C at hour 7																						Hours of Missing Data:	0			
Monthly Average: -7.63 C Percentiles: P ₁ = -26.0 P ₁₀ = -20.8 Q ₁ = -17.9 Median = -4.9 Q ₃ = 0.7 P ₉₀ = 4.4 P ₉₉ = 10.2																						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-Mar	-23.1	-23.4	-23.6	-23.8	-23.9	-24.1	-24.2	-24.6	-24.4	-23.5	-22.0	-20.8	-19.8	-19.5	-18.2	-17.5	-17.5	-18.2	-19.0	-19.3	-19.8	-19.7	-20.0	-20.1	-21.2	-17.5
2-Mar	-20.6	-20.7	-20.3	-20.4	-20.2	-20.5	-21.2	-21.0	-19.8	-16.8	-15.3	-14.2	-11.8	-10.6	-9.7	-9.0	-8.4	-8.4	-9.1	-9.7	-9.9	-10.0	-9.7	-9.4	-14.4	-8.4
3-Mar	-9.4	-10.0	-9.7	-8.9	-8.5	-8.2	-7.4	-7.5	-5.8	-4.5	-2.6	-0.2	1.2	4.2	4.9	3.2	1.1	0.1	-1.4	-2.0	-5.3	-7.4	-10.4	-11.7	-4.4	4.9
4-Mar	-13.1	-14.5	-15.6	-17.1	-18.5	-19.5	-20.1	-20.7	-21.3	-21.8	-21.3	-20.6	-20.1	-19.5	-19.1	-18.8	-18.8	-18.8	-19.0	-19.0	-19.1	-19.0	-19.3	-19.6	-18.9	-13.1
5-Mar	-20.1	-20.1	-20.0	-20.1	-20.3	-20.5	-20.3	-20.4	-20.1	-19.1	-18.2	-17.5	-17.0	-15.8	-15.0	-13.9	-13.4	-14.1	-15.1	-15.4	-16.1	-16.5	-16.5	-16.7	-17.6	-13.4
6-Mar	-16.9	-16.9	-17.0	-17.1	-18.0	-17.3	-17.9	-18.3	-18.3	-18.2	-18.1	-17.8	-17.8	-17.6	-17.4	-17.1	-17.0	-17.2	-17.3	-17.9	-19.0	-19.6	-19.9	-20.2	-17.9	-16.9
7-Mar	-20.4	-20.7	-20.6	-20.5	-20.9	-21.1	-21.0	-21.3	-21.8	-21.7	-21.3	-20.6	-19.7	-19.7	-19.7	-19.7	-20.0	-20.2	-20.8	-21.7	-22.8	-23.8	-24.8	-25.0	-21.2	-19.7
8-Mar	-25.3	-25.7	-25.9	-26.2	-26.3	-26.1	-25.9	-25.6	-25.1	-23.9	-22.5	-21.4	-20.4	-19.8	-19.9	-20.1	-20.0	-20.2	-20.8	-21.3	-22.4	-23.3	-23.9	-24.5	-23.2	-19.8
9-Mar	-25.3	-25.5	-25.7	-26.0	-26.4	-27.4	-27.9	-26.8	-24.4	-23.4	-22.6	-22.2	-20.4	-19.1	-18.1	-18.0	-18.3	-19.0	-20.1	-20.7	-21.2	-21.7	-22.5	-22.6	-22.7	-18.0
10-Mar	-21.7	-21.9	-22.3	-22.5	-22.5	-23.5	-24.6	-23.7	-23.6	-21.6	-19.5	-18.6	-17.7	-16.7	-16.2	-15.8	-15.9	-16.2	-17.4	-18.5	-19.3	-19.8	-20.2	-20.7	-20.0	-15.8
11-Mar	-20.8	-21.2	-21.2	-20.7	-20.7	-20.7	-20.7	-20.6	-20.5	-19.4	-17.9	-16.8	-15.9	-15.1	-14.4	-14.0	-14.1	-14.6	-14.8	-15.5	-16.8	-17.8	-18.8	-19.4	-18.0	-14.0
12-Mar	-19.8	-20.2	-19.8	-20.0	-20.8	-20.8	-21.2	-20.2	-19.1	-16.9	-15.6	-14.1	-12.9	-11.3	-10.1	-9.4	-9.1	-9.4	-10.4	-11.4	-12.5	-12.7	-12.9	-13.2	-15.2	-9.1
13-Mar	-13.0	-13.5	-13.7	-13.9	-13.6	-14.0	-14.2	-14.1	-14.1	-13.5	-12.7	-11.7	-10.3	-8.3	-6.7	-5.9	-5.5	-5.6	-6.0	-6.5	-6.8	-7.4	-7.5	-7.4	-10.2	-5.5
14-Mar	-7.4	-7.6	-7.5	-7.1	-6.8	-6.1	-5.8	-4.0	-1.3	1.1	5.1	7.3	9.1	10.7	10.1	11.2	10.8	9.6	8.3	6.6	4.8	3.0	2.1	1.4	2.0	11.2
15-Mar	0.5	0.9	0.4	0.3	-0.2	-0.8	-0.8	0.4	2.3	4.0	5.9	6.6	7.7	8.2	7.5	7.2	7.0	6.6	5.6	5.0	4.2	4.1	3.9	3.2	3.7	8.2
16-Mar	2.9	2.0	1.3	0.8	-0.1	-1.9	-2.8	-3.9	-4.0	-3.4	-2.3	-1.1	-0.2	0.2	0.1	-0.1	-0.2	-0.4	-1.2	-2.0	-2.8	-3.4	-4.0	-4.3	-1.3	2.9
17-Mar	-4.5	-4.8	-5.5	-5.5	-5.3	-5.0	-4.5	-4.0	-3.0	-1.7	-0.5	1.0	2.6	4.5	6.0	6.6	6.7	6.5	5.5	3.8	2.5	2.1	1.4	1.2	0.3	6.7
18-Mar	0.7	-0.1	-0.4	-0.7	-1.2	-1.5	-1.6	-1.8	-1.9	-1.6	-0.7	0.4	1.3	2.7	3.9	4.5	4.9	4.1	3.0	2.3	1.8	0.7	-0.8	-0.9	0.7	4.9
19-Mar	-0.9	-0.8	-2.5	-4.1	-6.1	-7.9	-8.8	-9.3	-8.8	-7.7	-6.5	-5.2	-4.0	-3.2	-3.2	-2.6	-2.6	-3.4	-4.4	-5.8	-8.2	-10.1	-11.4	-12.7	-5.8	-0.8
20-Mar	-13.4	-13.8	-14.5	-15.5	-17.4	-18.0	-18.4	-18.2	-17.2	-15.9	-14.1	-12.4	-11.0	-10.0	-9.1	-8.9	-8.9	-9.7	-10.8	-11.9	-12.7	-13.0	-13.2	-13.4	-13.4	-8.9
21-Mar	-12.9	-12.6	-11.6	-11.1	-11.3	-11.1	-10.7	-9.9	-7.9	-7.1	-6.3	-4.9	-3.5	-2.5	-1.8	-1.3	-1.4	-1.7	-2.4	-2.6	-2.8	-3.1	-3.3	-3.5	-6.1	-1.3
22-Mar	-3.7	-4.0	-4.2	-4.5	-4.7	-4.8	-4.9	-5.0	-5.0	-4.6	-4.2	-3.6	-3.3	-3.5	-3.8	-4.0	-4.0	-4.1	-4.7	-4.8	-4.9	-4.8	-4.4	-4.6	-4.3	-3.3
23-Mar	-5.0	-5.4	-6.1	-7.4	-7.9	-7.5	-7.1	-6.9	-6.7	-5.4	-3.0	-1.7	-1.2	-0.8	-1.1	-1.6	-2.2	-3.0	-3.4	-3.8	-4.1	-4.2	-4.3	-4.2	-4.3	-0.8
24-Mar	-4.2	-3.9	-3.5	-3.6	-3.9	-3.8	-4.1	-4.0	-3.3	-1.7	0.6	1.2	1.3	2.5	3.5	4.1	3.8	2.6	1.8	1.4	0.9	0.2	-0.3	-0.6	-0.5	4.1
25-Mar	-0.6	-0.8	-1.1	-1.4	-1.6	-1.8	-1.9	-1.8	-1.7	-1.5	-0.9	0.5	1.7	1.6	1.3	1.1	1.4	1.5	0.8	0.2	0.0	0.0	-0.1	-0.4	-0.2	1.7
26-Mar	-0.6	-0.9	-1.3	-1.1	-0.8	-0.6	-1.0	-0.8	0.1	0.7	-0.2	0.6	1.6	2.7	4.1	4.4	4.8	4.8	4.2	3.1	2.9	2.8	2.0	2.6	1.4	4.8
27-Mar	2.5	1.8	1.0	0.9	1.1	0.6	0.4	0.2	0.8	1.8	2.9	4.8	5.9	7.1	7.6	7.6	7.9	7.5	6.5	5.3	4.5	4.3	3.3	2.6	3.7	7.9
28-Mar	1.9	1.2	0.6	0.0	-0.1	-0.2	-0.2	0.0	0.4	1.4	2.2	3.5	5.1	6.5	8.0	8.8	9.0	9.1	8.9	7.0	5.4	3.6	3.2	3.1	3.7	9.1
29-Mar	2.6	1.5	1.1	1.1	1.1	1.1	0.8	0.1	0.4	1.1	1.9	2.8	3.9	5.2	6.4	7.3	7.4	7.0	6.3	4.1	2.7	1.9	1.1	0.3	2.9	7.4
30-Mar	-0.7	-1.3	-0.9	-0.8	-0.7	-0.7	-0.6	-0.6	-0.4	-0.3	0.0	0.3	0.7	0.9	1.5	2.5	2.5	2.0	1.6	1.3	1.2	1.3	1.2	1.2	0.5	2.5
31-Mar	0.9	0.6	0.8	0.3	0.1	0.6	0.9	2.0	4.4	6.1	8.0	10.0	10.8	11.4	11.0	10.5	10.4	10.0	9.3	8.3	7.6	6.8	6.4	5.8	6.0	11.4
																						Diurnal Average				
																						Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
ConocoPhillips - Surmont - March 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
ConocoPhillips - Surmont - March 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	125	16.80	16.80
-20 - 0	403	54.17	70.97
0 - 10	205	27.55	98.52
10 - 20	11	1.48	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

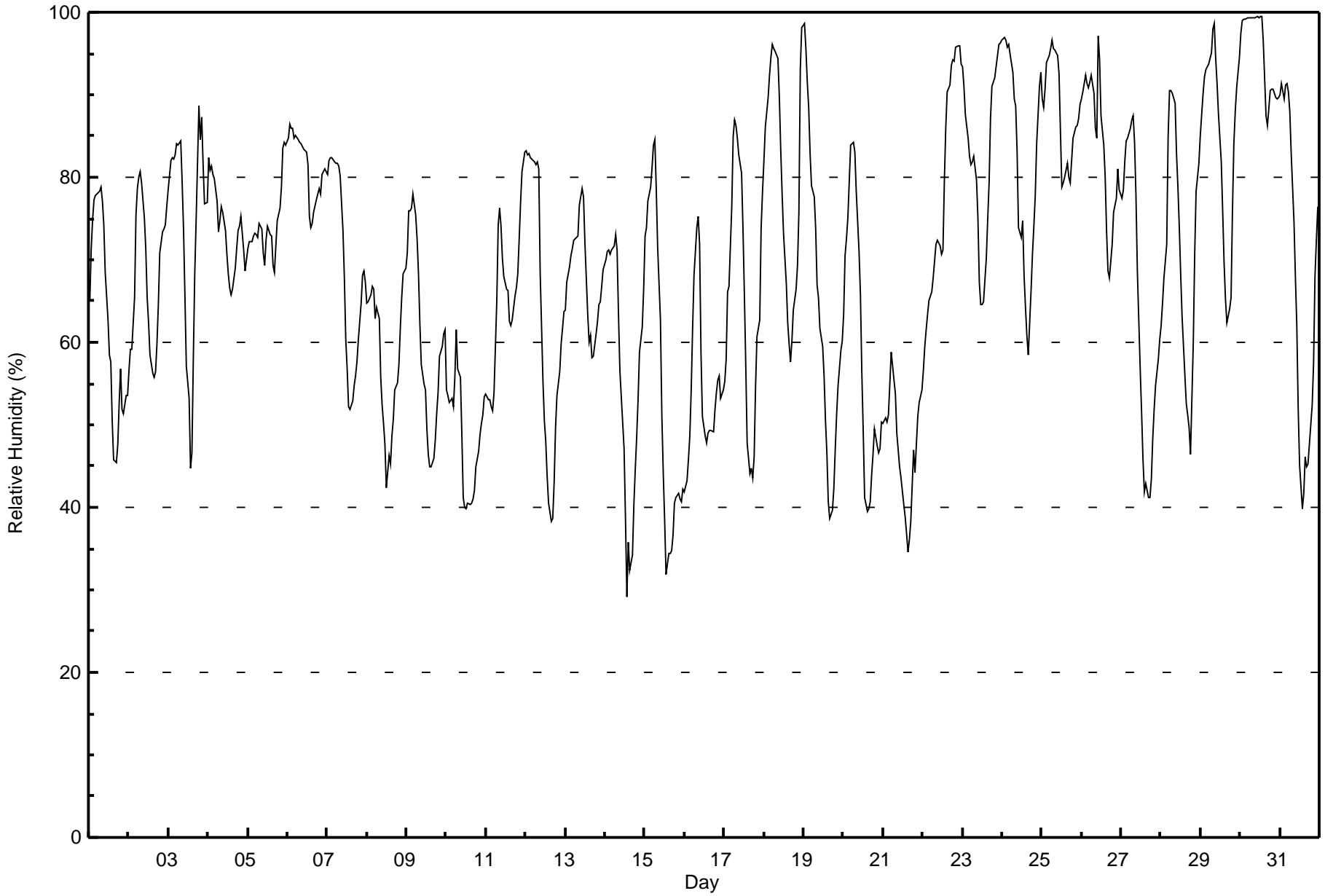
ConocoPhillips - Surmont - March 2017

Maximum Value: 100 % on Mar 30 14:00																			Maximum Daily Average: 95.3 % on Mar 30						Hours in Service: 744																			
Minimum Value: 29 % on Mar 14 14:00																			Minimum Daily Average: 47.2 % on Mar 21						Hours of Data: 744																			
Maximum Diurnal Average: 80.3 % at hour 7																			Minimum Diurnal Average: 55.7 % at hour 16						Hours of Missing Data: 0																			
Monthly Average: 69.2 %																			Percentiles: P ₁ = 35 P ₁₀ = 46 Q ₁ = 55 Median = 71 Q ₃ = 82 P ₉₀ = 91 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-Mar	65	71	75	77	78	78	78	79	77	74	69	63	58	58	51	46	45	48	53	57	52	51	54	54	62.9	79																		
2-Mar	57	59	59	65	75	79	80	81	79	75	71	66	62	59	56	56	56	60	65	71	73	74	74	76	67.9	81																		
3-Mar	79	82	82	82	83	84	84	84	79	74	66	57	53	45	47	58	68	75	89	85	87	81	77	77	74.1	89																		
4-Mar	82	81	81	80	80	77	73	75	76	76	74	71	68	67	66	66	69	71	74	74	75	71	69	70	73.6	82																		
5-Mar	71	72	72	73	73	73	73	74	74	71	69	72	74	73	73	69	68	72	75	76	79	83	84	84	74.1	84																		
6-Mar	85	86	86	86	85	85	85	84	84	84	83	83	81	75	74	74	76	77	78	79	78	80	81	81	81.3	86																		
7-Mar	80	82	82	82	82	82	82	81	80	74	68	60	57	52	52	53	55	56	58	60	65	68	69	67	68.6	82																		
8-Mar	65	65	66	67	66	63	64	63	56	52	50	48	42	46	45	49	51	54	55	57	62	65	68	69	57.9	69																		
9-Mar	71	76	76	76	78	75	73	68	62	57	55	54	49	46	45	45	46	48	51	54	58	60	61	62	60.3	78																		
10-Mar	54	54	53	53	52	56	62	57	56	49	41	40	40	41	40	40	41	42	45	47	49	50	51	53	48.6	62																		
11-Mar	54	53	53	52	52	54	65	74	76	74	70	68	66	66	63	62	63	66	67	68	73	77	81	83	65.8	83																		
12-Mar	83	83	83	82	82	82	82	82	81	69	55	51	48	44	40	38	39	43	50	54	57	60	62	64	63.0	83																		
13-Mar	64	67	69	70	71	72	73	73	77	78	79	78	72	63	60	61	58	58	61	63	65	65	67	69	68.0	79																		
14-Mar	70	71	71	71	71	72	73	71	63	57	53	47	39	29	36	32	34	40	45	48	53	59	62	66	55.6	73																		
15-Mar	73	74	77	79	81	84	85	79	71	63	51	44	39	32	34	34	35	37	41	41	42	41	41	42	54.9	85																		
16-Mar	42	43	46	49	54	62	68	74	75	72	59	51	49	48	49	49	49	49	52	54	55	56	53	54	54.7	75																		
17-Mar	55	58	66	67	76	85	87	86	85	83	80	74	66	57	48	44	45	44	46	55	61	63	74	78	65.9	87																		
18-Mar	82	86	90	92	95	96	96	95	94	90	83	78	73	67	62	60	58	60	64	67	69	76	93	98	80.2	98																		
19-Mar	99	96	92	88	83	79	78	74	67	65	62	60	56	50	47	41	39	40	42	47	51	55	59	60	63.7	99																		
20-Mar	63	71	73	75	84	84	84	83	78	71	66	56	49	41	40	40	41	44	46	50	48	47	47	50	59.6	84																		
21-Mar	50	51	50	51	55	59	57	54	49	47	45	44	40	39	37	35	36	38	47	44	48	51	53	54	47.2	59																		
22-Mar	57	59	62	63	65	66	68	70	72	72	72	71	71	79	86	90	91	94	94	94	96	96	96	94	78.2	96																		
23-Mar	93	91	88	85	83	82	82	83	80	75	67	64	65	65	70	75	79	87	91	92	93	95	96	96	82.3	96																		
24-Mar	97	97	97	96	96	95	93	89	89	83	74	73	75	68	64	61	58	66	71	74	78	84	91	93	81.7	97																		
25-Mar	90	88	91	94	95	96	97	96	95	95	93	86	79	79	80	82	80	79	82	85	86	86	87	89	87.8	97																		
26-Mar	89	90	92	91	91	92	92	90	86	85	97	94	88	84	80	73	69	68	72	76	77	77	81	78	83.9	97																		
27-Mar	77	79	82	84	85	86	87	88	84	78	69	57	52	46	42	43	41	41	43	48	52	55	58	60	64.0	88																		
28-Mar	62	65	68	72	85	91	91	90	89	83	79	74	68	63	56	52	51	50	46	60	71	78	80	82	71.0	91																		
29-Mar	85	90	92	93	93	94	95	98	99	94	91	88	82	76	70	65	62	64	65	76	84	88	91	95	84.6	99																		
30-Mar	98	99	99	99	99	99	99	99	99	99	99	99	100	100	97	87	86	88	91	91	91	90	89	90	95.3	100																		
31-Mar	90	91	90	91	91	90	88	83	75	68	62	52	45	40	42	46	45	45	48	52	58	68	72	76	67.0	91																		
																			73.6	75.2	76.2	77.1	78.7	79.7	80.3	79.9	77.7	73.7	69.4	65.2	61.5	58.0	56.4	55.7	56.0	58.2	61.4	64.4	67.2	69.4	71.6	73.0	Diurnal Average	
																			99	99	99	99	99	99	99	99	99	99	99	99	100	100	97	90	91	94	94	94	96	96	96	98	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
ConocoPhillips - Surmont - March 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
ConocoPhillips - Surmont - March 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	24	3.23	3.23
40 - 60	212	28.49	31.72
60 - 80	284	38.17	69.89
80 - 100	224	30.11	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

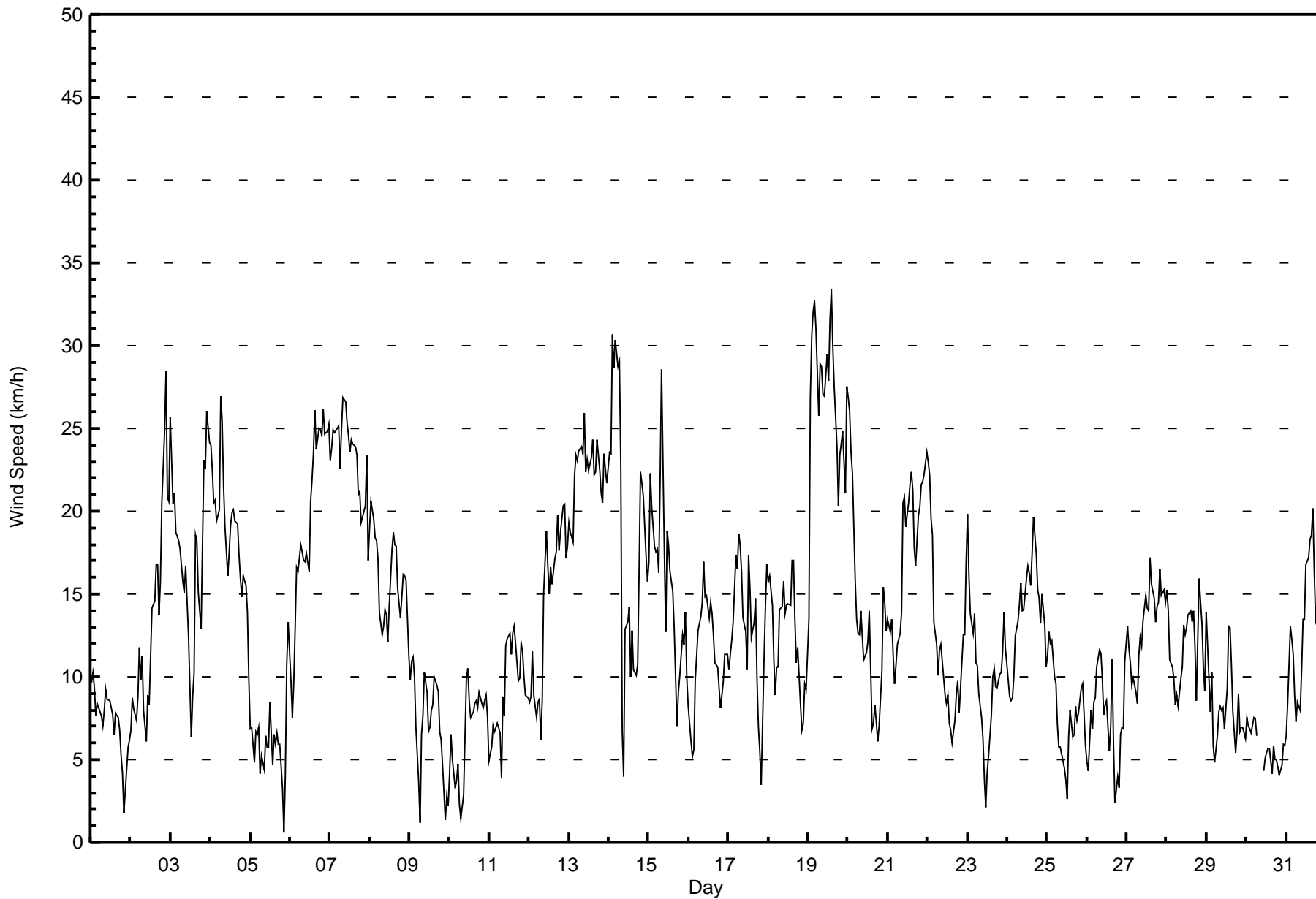


Maximum Speed: 33 km/h on Mar 19 15:00	Maximum Daily Speed Average: 26.4 km/h on Mar 19	Hours in Service: 744
Minimum Speed Value: 1 km/h on Mar 5 21:00	Minimum Daily Speed Average: 1.4 km/h on Mar 23	Hours of Data: 741
Maximum Diurnal Speed Average: 3.4 km/h at hour 8	Minimum Diurnal Speed Average: 1.5 km/h at hour 16	Hours of Missing Data: 3
Monthly Average Velocity: 2.1 km/h 169.8 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 8 Median = 12 Q ₃ = 18 P ₉₀ = 23 P ₉₉ = 31	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-Mar	ESE10	ESE10	E9	E8	E8	E8	E8	ENE7	ENE8	E9	ENE9	ENE9	ENE8	ENE8	NE7	NNE8	NNE8	NE7	N5	NNW4	SE2	S3	SSE6	S6	ENE5.6	ESE10
2-Mar	SSW7	SW9	SW8	SSW7	SSW9	SSW12	SSW10	SSW11	SW8	SSW6	SSE9	SSE8	SSE11	SE14	SE15	SE17	SE17	SE14	SE16	SE21	SSE25	SSE28	SSE21	S21	SSE12.0	SSE28
3-Mar	S26	S20	S21	S19	S18	S18	S18	S16	SSW15	SSW17	SSW15	S13	SE6	WSW9	W10	NW19	NW18	NNW15	NNW13	NNW18	NNW23	NNW23	NNW26	NNW24	WSW5.7	NNW26
4-Mar	NNW24	N22	NNW21	N21	N19	N20	N27	N25	N21	N19	N16	N18	N19	N20	N20	NNW19	NNW19	NNW17	N16	N15	N16	NNE16	NE14	ENE10	N18.4	N27
5-Mar	E7	ESE7	E5	ENE7	E7	E7	ENE4	ENE5	E4	ENE6	E6	ESE6	SE8	ESE5	E6	ENE6	ESE7	E6	ESE6	E3	NW1	NW4	NNW11	NNW13	ENE4.2	NNW13
6-Mar	NNW10	NW8	NNW10	NNW13	NNW17	NNW16	NNW18	NNW18	NNW17	NNW17	NNW17	N16	NNW21	N22	NNW23	NNW26	NNW24	NNW25	NNW25	NNW25	NNW25	NNW26	NNW25	NNW25	NNW19.4	NNW26
7-Mar	NNW23	NNW24	NNW25	NNW25	NNW25	NNW25	NNW23	NNW25	NNW27	NNW27	NNW25	NNW25	NNW24	NNW24	NNW24	NNW23	NNW21	NNW21	NNW21	NNW19	NNW20	NNW20	NNW23	NNW17	NNW23.2	NNW27
8-Mar	NNW19	NNW21	NNW19	NNW18	NNW18	NNW17	NNW14	NNW13	NNW13	NNW14	N14	N12	N14	N18	N19	N18	N18	N15	N14	NNW15	NNW16	NNW16	NNW16	N11	NNW15.8	NNW21
9-Mar	N10	NNW11	NNW11	NNW10	NW7	W4	W1	W7	WNW8	N10	NNE9	NE7	ENE7	NNE8	NNE8	NNE10	NNE9	NNE9	NNE7	N6	N5	NNE1	SW3	WSW2	N5.4	NNW11
10-Mar	SE4	SE7	ESE5	E3	E4	E5	NE2	ENE1	ESE3	ESE6	ESE10	ESE10	ESE9	ESE8	E8	ENE8	ENE9	E8	E9	ESE8	ESE8	SE9	SE9	SE8	ESE6.3	ESE10
11-Mar	SSE5	SSE6	SSE7	S7	S7	SSW7	S7	SSE4	SE9	SSE8	SE12	SE12	SE13	SE11	SE13	SE13	SE12	ESE10	ESE10	ESE12	SE11	SE10	SE9	ESE9	SE8.7	SE13
12-Mar	ESE8	SE9	SE12	SE9	SE8	SE8	SE9	S6	SSE9	SSE15	SSE19	SE17	SE15	SSE17	SSE16	SE17	SSE18	SSE20	SE18	SE19	SSE20	SSE20	SSE17	SSE18	SSE14.0	SSE20
13-Mar	S19	S19	SSE18	SSE22	S23	S23	S24	S24	S24	S26	S22	S23	SSE22	S23	S24	S22	S22	S24	S22	S21	SSW21	SSW23	SSW23	SSW22	S21.9	S26
14-Mar	SSW24	SW23	WSW31	WSW29	WSW30	WSW29	WSW29	WSW29	SW7	SSE4	WSW13	WSW13	WSW14	SW10	SE13	SSE10	S10	SE11	SE16	SSE22	SSE22	SSE21	SSE17	SSE16	SSW13.6	WSW31
15-Mar	S17	S22	S20	S18	S18	SSW18	SW16	WSW22	W29	NNW18	NNW13	W19	W18	W16	W15	W13	WSW10	SW7	SW9	WSW10	WSW13	NW12	NNW14	NNW10	WSW10.6	W29
16-Mar	N8	NE6	ENE5	NNE6	NNW10	N11	NNW13	NNW14	N14	NNE17	NNE15	NE15	NE14	NE14	NE14	NE12	NE11	NE11	NE9	ENE8	E9	E10	ESE11	SE11	NE8.8	NNE17
17-Mar	SE10	SE11	SE12	SE13	SE17	SSE16	S19	S18	S16	SSW14	SE13	SSE10	SSE17	SSE15	S12	SSW13	S15	SSW10	SW7	SW6	WSW4	SSW11	S14	S17	S11.8	S19
18-Mar	S16	SSE16	SE14	SE11	ESE9	ESE11	ESE11	ESE14	SE14	SE16	SE14	SE14	ESE14	ESE14	ESE17	SE17	ESE14	ESE11	ESE12	ESE8	ENE7	NE7	N10	NW9	ESE10.3	ESE17
19-Mar	NW14	NW27	NW31	WNW32	WNW33	WNW31	WNW26	WNW29	WNW29	WNW27	WNW27	W29	W28	W32	W33	WNW30	WNW28	WNW24	WNW20	NW23	NW24	NW25	NW21	NW28	WNW26.4	W33
20-Mar	NW27	NW26	NW24	NW22	N16	N14	NNW13	N13	N14	N11	NW11	WNW11	WNW12	WNW14	NNW7	NNE7	NNE8	ENE7	E6	SE7	SE10	SSE15	SSE14	SSW13	NW6.9	NW27
21-Mar	SSW14	SSW13	SSW13	SSW11	SSW10	SSW11	SSW12	S13	S14	S21	S21	SSE19	SSE21	SSE22	SSE22	SSE21	SE18	SE17	SE20	SE20	SSE22	SSE22	SSE22	SSE24	SSE16.2	SSE24
22-Mar	SSE23	SSE22	SSE20	SSE19	SE13	SE12	SE10	SE12	ESE12	SE11	SE9	ESE8	ESE9	E7	ENE7	NE6	NNE7	NE9	NNE10	N8	N9	N13	NNW13	NNW17	ESE5.8	SSE23
23-Mar	NNW20	NNW16	NW14	WNW13	WNW14	WNW11	WNW11	NNW9	N8	NNE6	N4	ENE2	E4	ENE5	ESE8	SE10	ESE11	ESE9	SE9	ESE10	SE10	SE12	SSE14	S12	NE1.4	NNW20
24-Mar	S11	S9	S9	S9	S10	S12	S13	S14	S16	S14	SSE14	SSE16	SSE17	SSE16	SE16	SE17	SSE20	SE17	SE15	SE15	SE13	SE15	SE13	SE11	SSE13.1	SSE20
25-Mar	ESE11	ESE13	ESE12	SE12	SE10	SE10	SE7	SE6	SE6	SSE5	SE4	E4	E3	E6	ESE8	E6	ESE7	SE8	SE7	SE8	SE9	SE10	SE8	SE6	SE7.4	ESE13
26-Mar	SE5	SE4	SSE8	SSE7	S8	SSE9	S11	S12	S11	S10	SSE8	SSE8	SSE9	SE6	W7	W11	W6	SSW2	WSW4	ESE3	SE7	SSE7	SSW7	SSW11	S5.9	S12
27-Mar	SSW13	SSW12	SW11	SW9	SSW10	SSW9	S8	S11	S12	S12	SE13	SSE15	SE14	SE14	SSE17	SSE16	SE15	SE13	SE14	SE14	SSE17	S15	SE15	SE14	SSE12.0	SSE17
28-Mar	SE15	SE14	SE11	SE11	SSE10	SSE8	SSE9	SSE8	SSE10	S11	S13	SSE13	SSE13	SE14	SSE14	SE13	SE14	SE12	S9	SSE16	S14	SSW13	SSW11	SSW9	SSE11.0	SSE16
29-Mar	S14	SSW10	SSW8	SSW10	SSW6	SSW5	SW6	SW8	SSW8	SSW8	SSW8	S7	SE9	SE13	SE13	SE11	SE8	E5	E7	ESE9	ESE7	ESE7	SE7	ESE6	SSE6.4	S14
30-Mar	ESE8	SE7	ESE7	ESE7	ESE8	ESE7	ESE6	AF	AF	AF	E4	E5	NE5	NE6	NE6	NNE4	ENE6	ENE5	ENE5	E5	E4	SE5	SSE6	SSW6	E4.5	ESE8
31-Mar	SSW6	SSW8	S13	SSW12	SSW11	SSW9	SSW7	SSW9	SSW8	SSE10	SSE13	S14	SW17	SW17	SSW18	SSW19	SSW20	SSW16	S13	S14	SSW15	SSW14	SSW14	SSW12	SSW12.4	SSW20

S2.9	SSW3.0	SSW3.0	SSW2.6	SSW2.5	SSW2.6	SW3.1	SW3.4	SW2.3	S1.9	SSE2.7	SSE3.0	SSE2.8	SE2.4	SE2.5	SE1.5	ESE2.0	ESE2.6	ESE2.9	ESE3.3	SE2.8	SSE2.9	SSE2.3	S2.5	Diurnal Average
NNW27	NNW27	WSW31	WNW32	WNW33	WNW31	WSW29	WNW29	WNW29	WNW27	WNW27	W29	W28	W32	W33	WNW30	WNW28	NNW25	NNW25	NNW25	NNW26	SSE28	NNW26	NW28	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
ConocoPhillips - Surmont - March 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	55	7.42	7.42
6 - 11	287	38.73	46.15
12 - 19	258	34.82	80.97
20 - 28	125	16.87	97.84
29 - 38	16	2.16	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 741

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
ConocoPhillips - Surmont - March 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	2	1	9	14	4	6	4	1	2	1	3	2	0	2	1	55
6 - 11	11	15	12	19	21	45	48	24	20	35	11	3	4	5	4	10	287
12 - 19	23	3	6	0	0	10	57	37	38	23	3	4	5	7	5	37	258
20 - 28	9	0	0	0	0	0	3	23	23	6	1	2	1	6	10	41	125
29 - 38	0	0	0	0	0	0	0	0	0	0	0	5	4	6	1	0	16
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	46	20	19	28	35	59	114	88	82	66	16	17	16	24	22	89	741

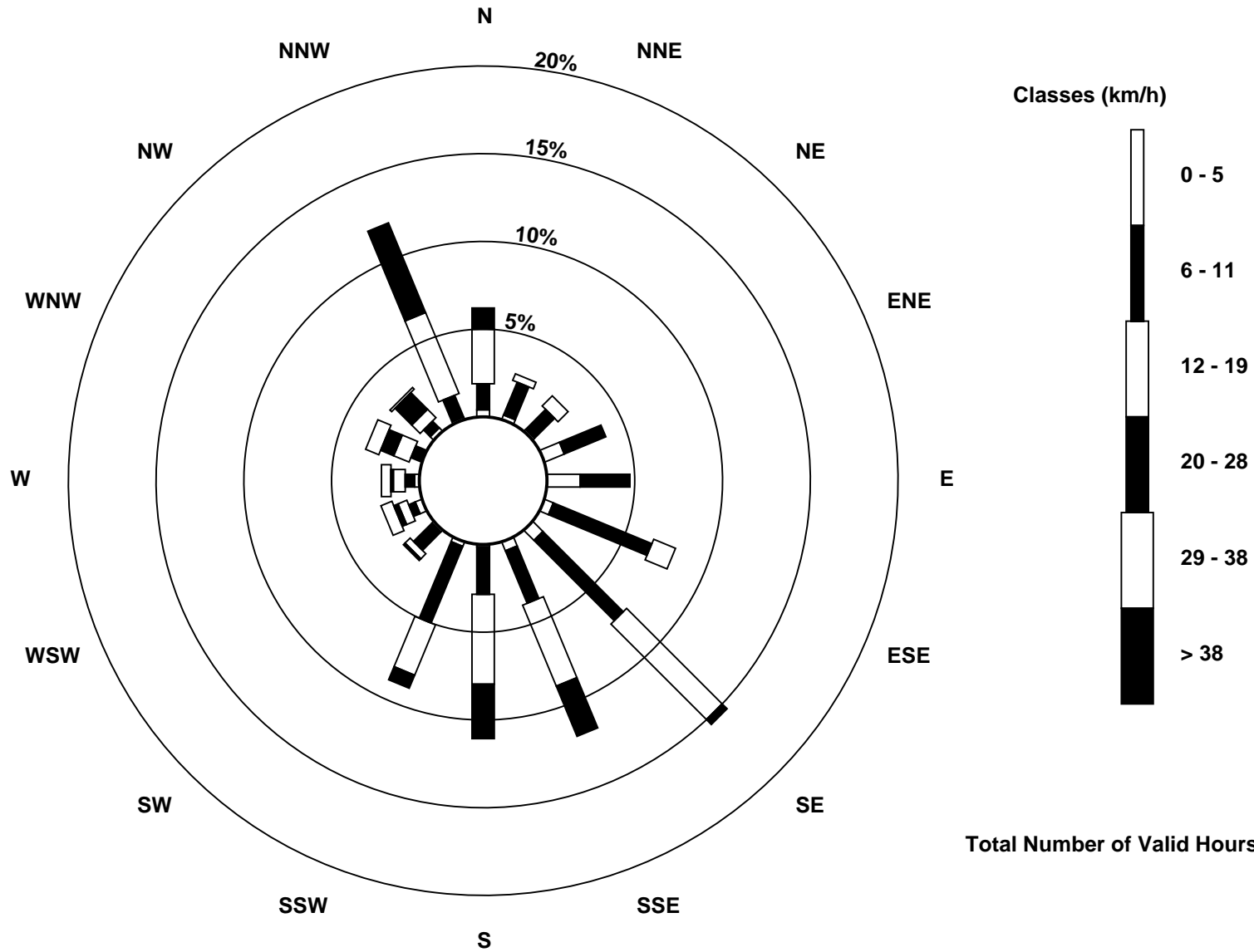
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Mar 2017

Wind Speed (WS) - km/h
ConocoPhillips - Surmont (AMS502)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Mar 15 09:00 Minimum Value: 1 km/h on Mar 10 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: 741 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 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-Mar	2	2	2	1	2	1	1	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	2
2-Mar	1	2	1	2	2	2	2	2	2	1	2	2	3	3	3	3	4	3	3	3	4	4	4	4	4
3-Mar	5	4	4	4	4	4	4	5	3	4	4	3	2	4	5	4	4	3	3	4	4	5	5	5	
4-Mar	5	5	4	5	4	4	5	6	5	4	3	3	4	4	4	4	4	3	3	2	3	3	4	2	
5-Mar	1	1	1	1	1	1	2	1	1	2	2	2	1	1	2	2	1	1	2	2	1	1	3	3	
6-Mar	5	3	3	4	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	5	4	5	
7-Mar	4	5	5	5	5	5	4	5	5	5	5	4	5	4	4	5	4	4	4	3	3	4	3	4	
8-Mar	4	2	2	2	3	2	3	3	2	3	3	3	3	4	4	4	4	3	3	2	2	2	2	2	
9-Mar	2	2	2	3	2	2	1	3	1	2	3	2	2	3	2	2	2	2	1	2	3	1	1	1	
10-Mar	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	2	2	2	1	1	1	1	1	
11-Mar	1	2	2	2	2	1	2	2	2	3	3	3	3	3	4	2	3	2	3	2	2	2	1	1	
12-Mar	1	2	2	2	1	1	1	2	2	5	3	3	3	4	4	4	4	4	3	3	4	5	4	4	
13-Mar	5	5	5	4	6	5	6	6	6	7	6	6	6	6	6	6	6	6	5	5	5	6	6	5	
14-Mar	6	5	7	6	5	4	4	6	4	3	4	4	5	4	3	4	3	2	4	4	3	4	4	4	
15-Mar	4	5	5	4	4	4	5	6	8	3	3	4	4	4	4	3	2	2	1	2	1	3	2	1	
16-Mar	1	1	1	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	
17-Mar	2	2	2	3	3	3	4	4	4	4	4	3	4	4	4	4	4	4	2	2	2	3	4	3	
18-Mar	3	3	2	2	2	2	2	3	3	3	3	3	3	3	3	4	4	2	3	3	1	1	3	2	
19-Mar	4	8	6	7	8	7	5	6	6	6	6	7	7	7	6	5	5	5	5	6	5	6	7	6	
20-Mar	6	6	6	6	3	3	3	2	2	3	3	4	4	4	4	3	2	2	1	1	2	3	3	3	
21-Mar	3	2	3	2	2	2	3	3	3	6	5	4	4	5	4	4	4	5	4	4	4	4	4	4	
22-Mar	4	4	3	3	3	2	2	3	2	2	2	2	2	1	1	1	2	2	2	1	2	2	2	3	
23-Mar	3	3	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
24-Mar	3	2	2	2	2	2	2	2	3	3	4	3	3	3	3	4	4	4	3	2	3	3	3	2	
25-Mar	2	3	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	1	1	1	2	2	2	
26-Mar	1	1	2	2	2	2	3	3	3	2	2	2	2	1	4	2	3	1	2	2	2	2	3	2	
27-Mar	3	2	2	2	2	2	2	2	3	3	3	3	3	4	4	5	4	3	3	2	3	4	2	2	
28-Mar	3	2	2	2	2	2	2	2	3	3	3	4	3	3	3	4	3	3	2	4	3	3	2	2	
29-Mar	3	4	2	3	2	2	3	2	2	2	2	2	3	3	2	3	2	1	2	2	1	1	1	1	
30-Mar	2	2	1	1	2	2	2	AF	AF	AF	3	2	1	2	2	2	2	2	2	2	1	2	2	2	
31-Mar	2	2	3	3	2	2	2	2	2	2	4	3	5	5	5	6	5	5	3	3	4	4	4	3	
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
ConocoPhillips - Surmont - March 2017

Direction of Maximum Speed: 278 deg on Mar 19 15:00															Hours in Service: 744	
Direction of Maximum Daily Speed Average: 296.2 deg on Mar 19															Hours of Data: 741	
Direction of Minimum Speed: 326 deg on Mar 5 21:00															Hours of Missing Data: 3	
Direction of Minimum Daily Speed Average: 1.4 deg on Mar 23															Percent Operational Time: 99.6	
Monthly Average Direction: 229.7 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-Mar	107	102	97	86	91	83	81	70	78	88	75	63	73	63	55	26	22	35	11	342	125	187	160	186	77.3
2-Mar	200	214	214	213	203	202	208	213	218	200	168	162	166	143	146	146	145	140	139	145	150	151	158	173	166.1
3-Mar	183	186	182	185	186	188	186	187	193	195	193	182	146	248	261	310	308	296	346	329	347	348	347	344	238.3
4-Mar	347	350	346	3	4	360	352	349	357	5	7	353	351	353	351	346	347	348	349	352	351	18	40	64	356.5
5-Mar	93	114	86	62	80	92	69	60	79	59	80	109	142	113	87	66	111	90	103	89	326	320	338	340	75.6
6-Mar	329	319	327	334	342	343	343	345	346	348	348	349	348	349	344	343	344	344	342	342	342	341	341	340	342.6
7-Mar	340	338	331	327	335	339	332	336	340	340	338	344	340	346	345	345	345	343	344	346	346	346	343	340	340.2
8-Mar	343	342	342	341	342	344	338	334	346	347	350	356	2	8	357	357	349	352	351	347	343	344	345	356	348.0
9-Mar	0	340	339	333	322	269	273	269	282	11	15	34	58	30	31	29	22	23	22	8	355	31	222	237	359.5
10-Mar	134	139	116	98	95	79	54	76	111	111	116	115	109	108	93	66	65	97	98	103	116	128	129	126	106.1
11-Mar	161	156	162	188	170	193	187	164	138	149	137	133	141	125	136	136	127	120	114	120	129	131	125	122	139.4
12-Mar	120	131	143	133	124	132	137	178	167	152	147	141	146	148	148	140	152	148	146	146	148	161	158	160	147.4
13-Mar	178	169	161	150	173	175	182	178	179	178	175	177	165	177	183	188	183	184	188	185	195	198	200	208	180.5
14-Mar	212	221	241	241	242	244	246	245	223	161	242	249	222	136	165	178	144	143	148	149	154	167	163	163	208.9
15-Mar	169	181	185	183	183	194	220	256	270	293	284	268	278	272	277	266	249	222	231	240	252	324	340	344	245.2
16-Mar	354	36	59	22	346	350	343	342	353	13	32	41	39	43	36	35	37	53	55	70	79	88	122	131	33.8
17-Mar	132	131	131	135	145	150	175	182	181	192	187	148	150	160	182	198	183	201	214	223	242	192	186	182	170.9
18-Mar	169	147	137	139	123	120	118	123	128	126	136	129	123	118	115	125	119	109	107	102	68	35	353	326	121.5
19-Mar	325	308	304	298	296	298	294	291	296	286	282	280	281	278	278	283	296	303	301	313	324	312	316	304	296.2
20-Mar	305	305	309	315	351	349	348	350	353	2	321	294	297	290	338	17	31	61	90	125	143	157	160	198	324.8
21-Mar	199	203	201	207	202	202	198	191	188	180	183	158	152	150	153	148	137	138	145	145	151	151	152	153	164.9
22-Mar	153	150	149	148	145	139	131	129	123	136	124	117	112	88	71	34	12	37	32	11	355	350	335	344	109.0
23-Mar	343	339	322	301	302	294	301	334	6	24	11	74	81	66	114	132	122	119	128	123	132	140	148	174	37.7
24-Mar	185	188	177	170	171	177	178	177	179	175	167	147	151	148	141	140	151	146	145	145	132	131	125	125	155.3
25-Mar	121	120	123	127	126	124	129	140	135	152	127	97	90	85	104	92	123	134	129	131	139	145	146	136	125.5
26-Mar	140	144	151	164	186	161	187	172	175	177	158	166	154	146	281	278	260	196	242	121	145	157	192	199	178.5
27-Mar	201	203	218	215	192	194	190	181	183	169	146	149	146	139	154	152	138	144	144	146	152	183	144	145	163.8
28-Mar	146	146	139	134	151	150	154	147	160	182	183	164	151	146	151	144	143	146	171	147	187	207	206	203	159.7
29-Mar	190	202	202	199	210	207	216	216	192	210	206	177	144	142	134	133	139	84	88	114	111	123	124	122	163.0
30-Mar	109	127	120	114	122	120	113	AF	AF	AF	88	98	56	50	45	16	60	66	70	82	85	142	149	199	99.4
31-Mar	208	201	188	202	209	211	196	202	196	164	151	179	231	219	209	209	204	204	191	183	194	210	201	197	199.5

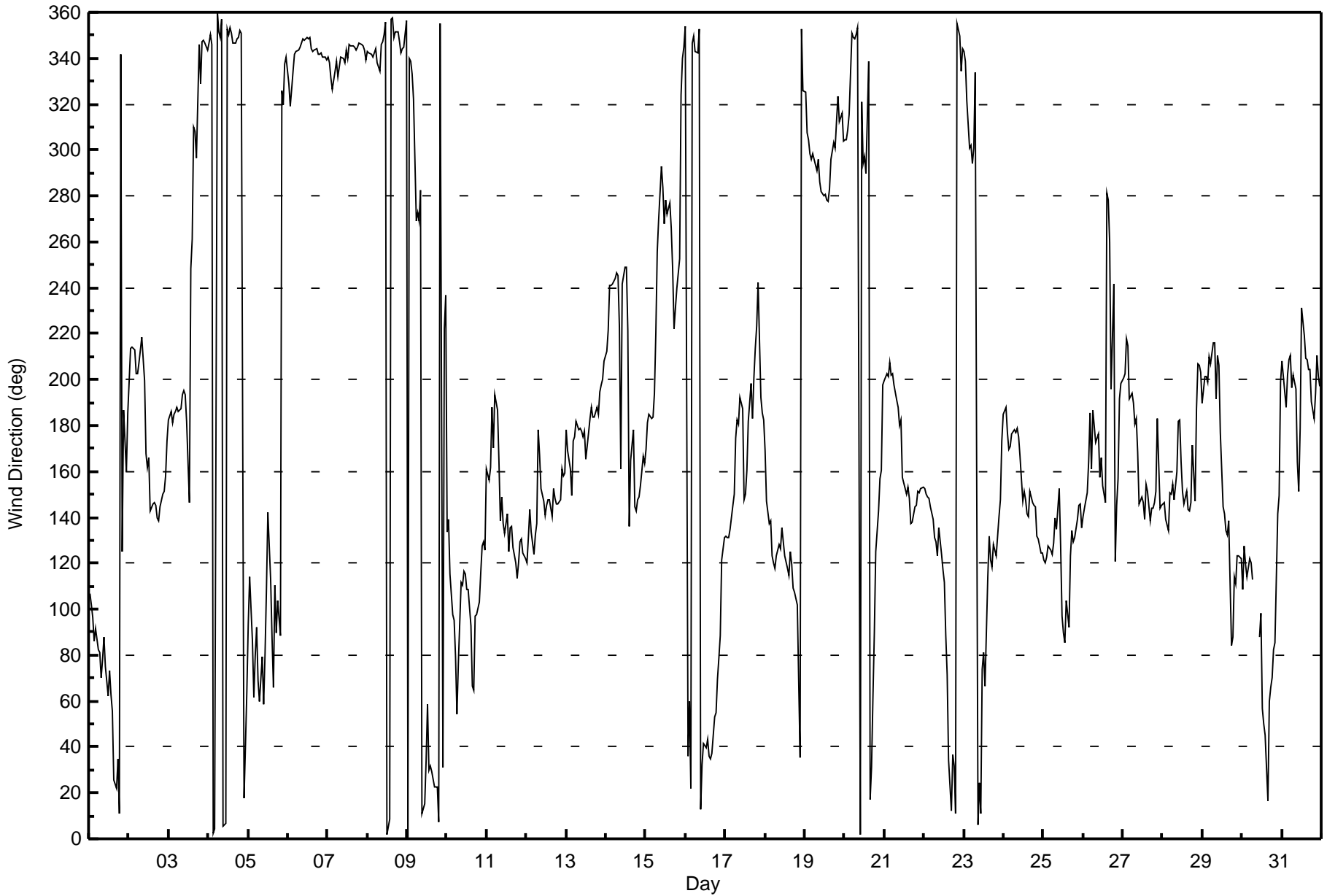
186.4	195.1	205.1	213.3	213.6	210.5	225.7	235.9	223.5	177.7	165.6	154.6	147.0	136.0	133.1	124.4	122.7	111.6	112.5	122.7	133.6	153.8	154.2	186.8
Diurnal Average																							

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
ConocoPhillips - Surmont - March 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
ConocoPhillips - Surmont - March 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 93 deg on Mar 5 21:00 Minimum Value: 6 deg on Mar 15 21:00 Percentiles: P ₁ = 8 P ₁₀ = 10 Q ₁ = 12 Median = 15 Q ₃ = 19 P ₉₀ = 27 P ₉₉ = 66																		Hours in Service: 744 Hours of Data: 741 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 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-Mar	16	12	14	14	12	12	12	11	13	16	20	22	21	27	32	22	21	16	27	25	63	33	20	17	63
2-Mar	15	11	11	15	15	13	11	10	11	24	16	21	23	16	13	13	12	10	10	10	9	8	12	14	24
3-Mar	12	14	13	13	13	13	13	16	15	15	15	16	42	39	35	25	15	10	21	17	13	15	13	13	42
4-Mar	13	15	13	17	16	16	16	15	18	17	18	16	15	17	15	12	13	14	14	14	15	14	14	14	18
5-Mar	13	8	25	12	17	14	30	26	26	24	28	25	15	28	23	23	21	19	30	58	93	34	15	8	93
6-Mar	28	23	19	19	9	11	10	10	11	13	12	14	13	13	13	11	11	10	11	12	11	12	12	12	28
7-Mar	13	13	15	13	13	11	14	14	13	13	12	12	14	12	13	13	12	14	11	11	11	10	9	14	15
8-Mar	10	7	8	7	9	9	17	19	11	10	15	20	18	18	17	17	16	16	12	11	8	9	8	15	20
9-Mar	12	12	12	22	36	49	83	39	31	14	22	35	30	21	22	22	19	10	7	15	36	69	47	52	83
10-Mar	38	12	22	13	11	13	48	78	46	15	17	14	27	27	28	24	29	24	14	10	9	10	8	10	78
11-Mar	21	20	32	21	23	19	22	43	12	20	16	19	16	22	18	17	20	11	11	10	11	11	10	9	43
12-Mar	8	11	12	12	8	12	14	27	23	17	11	13	16	17	21	15	17	11	11	9	10	19	17	17	27
13-Mar	17	18	18	11	17	15	15	15	15	14	15	15	18	17	17	17	16	16	16	16	17	15	15	16	18
14-Mar	15	14	11	11	10	8	8	10	62	68	30	16	22	38	16	26	20	15	9	9	9	13	17	19	68
15-Mar	23	14	14	15	14	15	23	14	16	12	13	13	14	15	12	13	13	16	13	8	6	23	7	10	23
16-Mar	15	17	18	30	10	13	12	9	17	16	19	16	17	19	16	14	14	13	12	10	13	15	13	12	30
17-Mar	13	12	12	11	10	14	16	13	16	19	20	27	13	21	33	29	18	26	20	45	53	16	14	13	53
18-Mar	17	12	9	10	11	10	11	12	13	13	15	16	17	19	16	16	14	12	12	14	11	29	14	25	29
19-Mar	21	11	12	13	12	11	12	11	13	13	13	13	15	14	12	12	14	12	12	16	18	14	17	12	21
20-Mar	13	11	13	22	14	14	13	13	15	21	32	30	31	20	65	53	21	23	13	13	10	10	15	14	65
21-Mar	13	12	14	13	14	14	15	16	17	15	16	19	15	13	13	12	14	14	12	12	11	11	10	10	19
22-Mar	11	10	10	10	11	12	12	14	12	16	18	20	17	18	17	27	20	12	11	15	13	13	14	10	27
23-Mar	10	12	14	8	9	8	11	30	19	23	59	89	58	52	23	20	15	12	11	11	12	11	11	19	89
24-Mar	18	17	22	19	17	12	10	11	12	12	18	11	12	12	14	14	11	10	11	10	14	12	11	11	22
25-Mar	11	13	13	12	11	11	14	17	16	22	40	23	58	17	16	21	26	14	11	10	9	9	15	16	58
26-Mar	17	25	10	22	21	16	18	19	16	16	20	18	17	20	76	10	35	49	29	48	19	24	24	13	76
27-Mar	13	14	11	11	17	16	22	15	14	18	13	13	14	16	17	17	12	11	10	10	13	17	9	9	22
28-Mar	9	9	11	11	14	18	23	17	21	21	19	29	22	16	19	20	12	20	22	10	19	14	16	20	29
29-Mar	16	19	16	17	18	22	24	19	23	22	26	29	25	16	15	18	12	18	15	11	11	10	14	20	29
30-Mar	21	16	17	18	18	16	18	AF	AF	AF	23	37	22	24	31	53	34	38	25	24	19	32	25	28	53
31-Mar	21	16	15	13	13	16	16	14	18	15	16	23	22	24	21	20	20	20	18	14	19	17	17	16	24
38 25 32 30 36 49 83 78 62 68 59 89 58 52 76 53 35 49 30 58 93 69 47 52																								Diurnal Maximum	
AF - Analyzer Failure																									



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 21, 2017	Last Calibration	February 24, 2017
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Install		
Start Time (MST)	13:30	End Time (MST)	15:53
Gas Cert Reference	LL104215	Station temp.	21 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	February 12, 2018
Calibrator Make/Model	API T700	Serial Number	622
ZAG Make/Model	API 701	Serial Number	196
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9035

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-619	-619
Analyzer IP address	192.168.1.73		Lamp voltage	771	778
Calculated slope	0.999937	0.998229	Chamber temp	45.3	45.0
Calculated intercept	1.753568	2.186287	Pressure	690.9	689.4
Analyzer Background	15.2	17.6	Flow	0.414	0.413
Analyzer Coefficient	1.006	1.033	Intensity	90	91
Analyzer make	Thermo 43i		Analyzer serial #	1160290011	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	83.2	803.7	804.3	0.999
second point	5000	41.6	401.9	398.1	1.009
third point	5000	20.8	200.9	198.0	1.015
as left zero	5000	0.0	0.0	-0.4	----
as left span	5000	83.2	803.7	802.5	1.002
Average Correction Factor					1.008

Corrected As found NA Previous response NA % change NA

Notes:

Installing Thermo 43i. WBEA Asset number:12914. Serial Number : 1160290011. Sample inlet filter changed. Adjusted zero and span.

Calibration Performed By:

Aswin Sasi Kumar



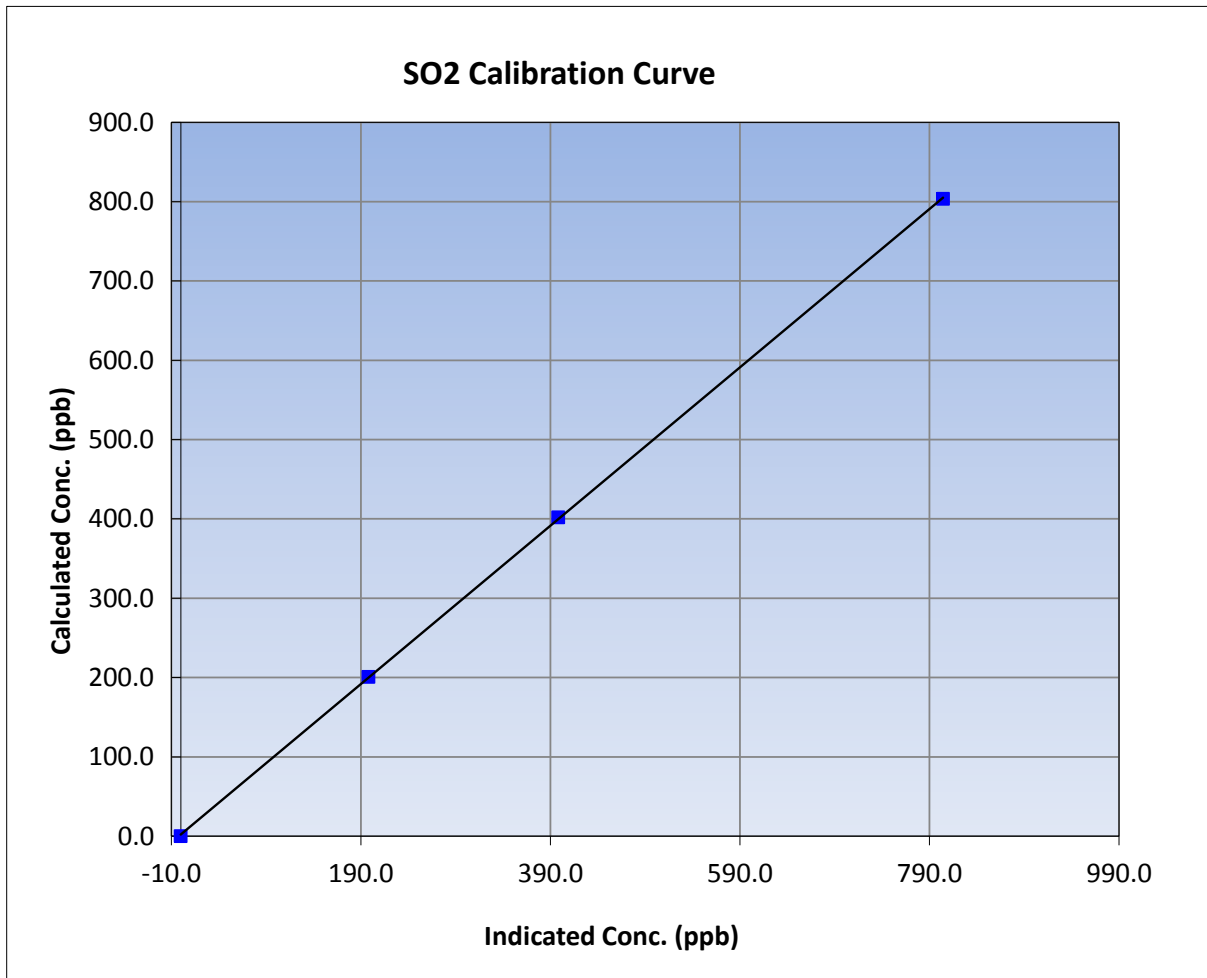
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 21, 2017	Previous Calibration	February 24, 2017
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	13:30	End Time (MST)	15:53
Analyzer make	Thermo 43i	Analyzer serial #	1160290011

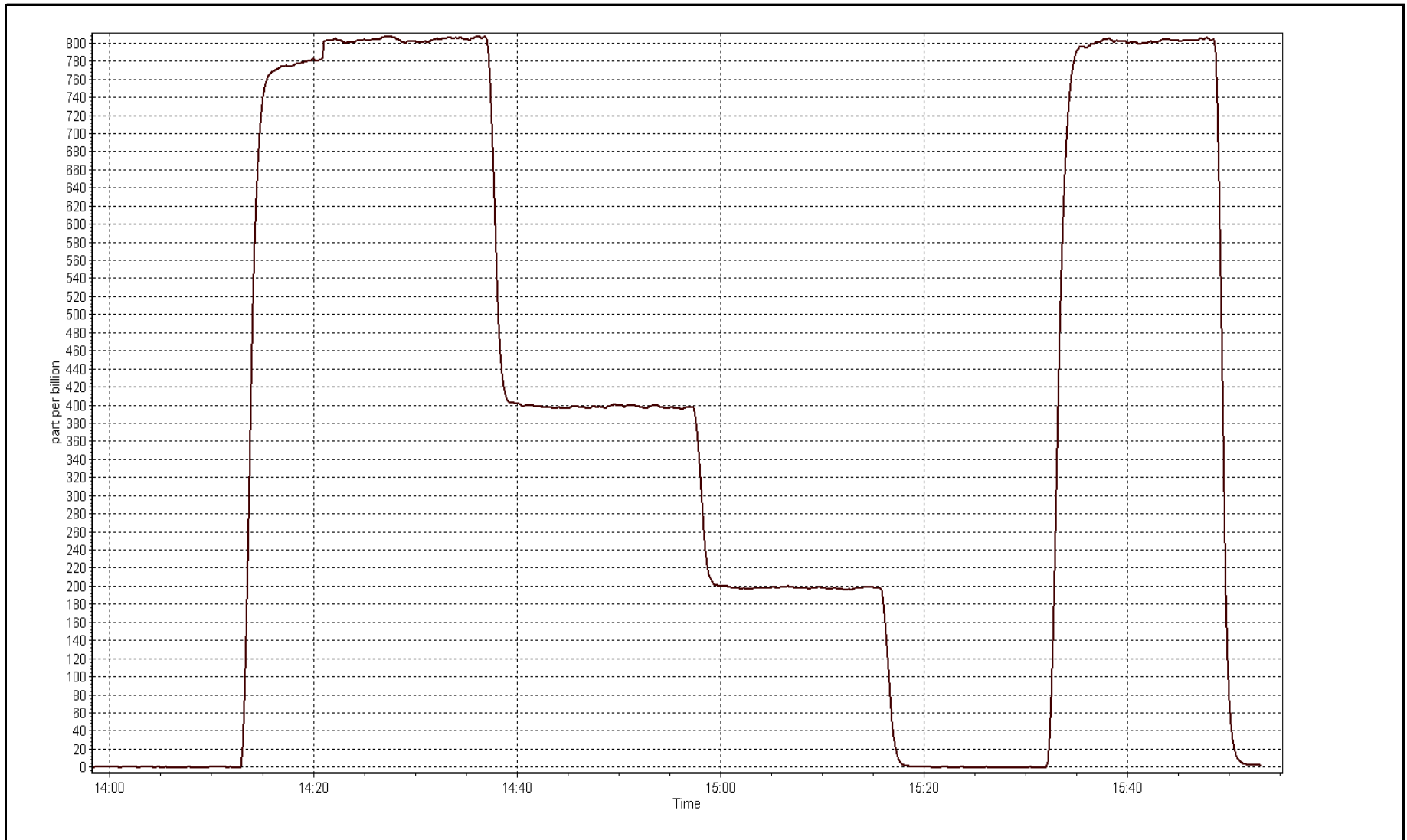
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999965
803.7	804.3	0.9992		
401.9	398.1	1.0094	Slope	0.998229
200.9	198.0	1.0150		
			Intercept	2.186287



SO2 Calibration Plot

Date: March 21, 2017





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 21, 2017	Last Calibration	February 24, 2017
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Removal		
Start Time (MST)	11:30	End Time (MST)	13:09
Gas Cert Reference	LL104215	Station temp.	21 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	February 12, 2018
Calibrator Make/Model	API T700	Serial Number	622
ZAG Make/Model	API 701	Serial Number	196
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9035

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	518	518
Analyzer IP address	192.168.1.73		Lamp voltage	1436	1435
Calculated slope	0.999937	0.996160	Chamber temp	50.0	50.0
Calculated intercept	1.753568	2.943270	Pressure	21.4	21.3
Analyzer Background	26.8	26.8	Flow	0.528	0.521
Analyzer Coefficient	1.037	1.037	Intensity	35	35
Analyzer make	API T100		Analyzer serial #	598	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-1.0	----
as found span	5000	83.2	803.7	805.1	0.998
calibrator zero	5000	0.0	0.0	-1.0	----
high point	5000	83.2	803.7	805.1	0.998
second point	5000	41.6	401.9	398.6	1.008
third point	5000	20.8	200.9	197.3	1.018
as left zero					
as left span					
Average Correction Factor					1.008

Corrected As found 806.1 Previous response 802.0 % change -0.5%

Notes:

Removal of API SO2 analyzer model T100- WBEA asset number: 12751- Serial Number: 598. Replaced with Thermo 43i. WBEA Asset number:12914. Serial Number : 1160290011.

Calibration Performed By:

Aswin Sasi Kumar



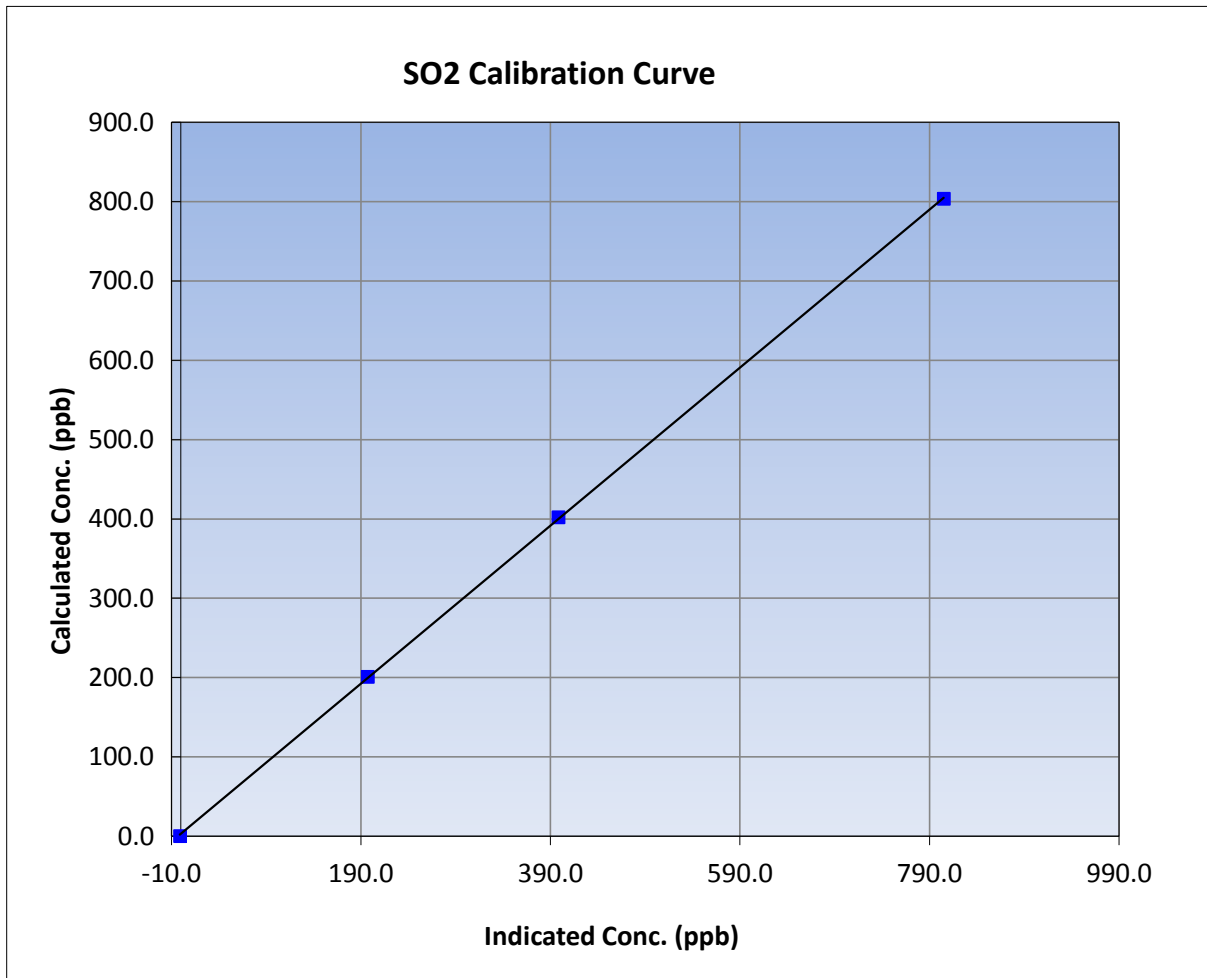
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	March 21, 2017	Previous Calibration	February 24, 2017
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	11:30	End Time (MST)	13:09
Analyzer make	API T100	Analyzer serial #	598

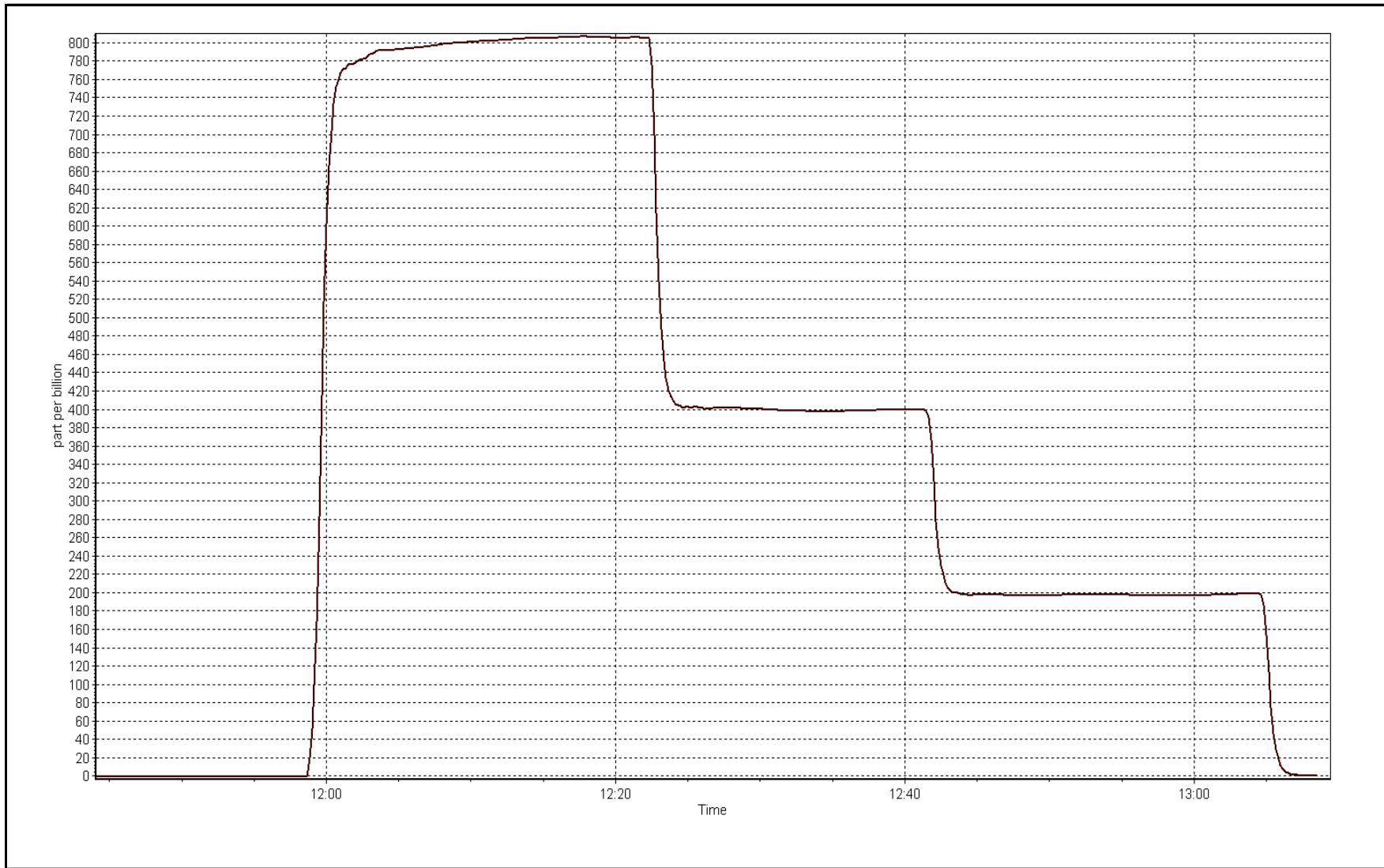
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.0	----	Correlation Coefficient	0.999970
803.7	805.1	0.9983		
401.9	398.6	1.0081	Slope	0.996160
200.9	197.3	1.0182		
			Intercept	2.943270



SO2 Calibration Plot

Date: March 21, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	March 22, 2017	Last Calibration	February 23, 2017
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	13:04	End Time (MST)	15:32
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	May 30, 2016
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	196
DACS make/model	Campbell Scientific CR3000	Serial Number	9035
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104215 February 12, 2018

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	497	496
Analyzer IP address	192.168.1.75		Lamp voltage	2257	2258
Calculated slope	1.007086	1.006896	Chamber temp	50.0	49.9
Calculated intercept	0.234751	-0.093218	Pressure	23.0	23.0
Analyzer Background	21.2	21.2	Flow (SLPM)	0.595	0.595
Analyzer Coefficient	0.982	0.982	Intensity	51	50
			Converter temp.	316	314

Analyzer make/model	API T101	Analyzer serial #	197
Converter make/model	N/A	Converter serial #	N/A

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	38.5	80.1	79.7	1.005
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	38.5	80.1	79.7	1.005
second point	5000	19.3	40.1	39.9	1.005
third point	5000	12.0	25.0	24.7	1.012
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	38.5	80.1	79.3	1.009
Average Correction Factor					1.007

Corrected As found	79.4	Previous response	79.3	% change	-0.2%
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Notes:

Sample inlet filter replaced after as founds. No Adjustments made.

Calibration Performed By: Aswin Sasi Kumar



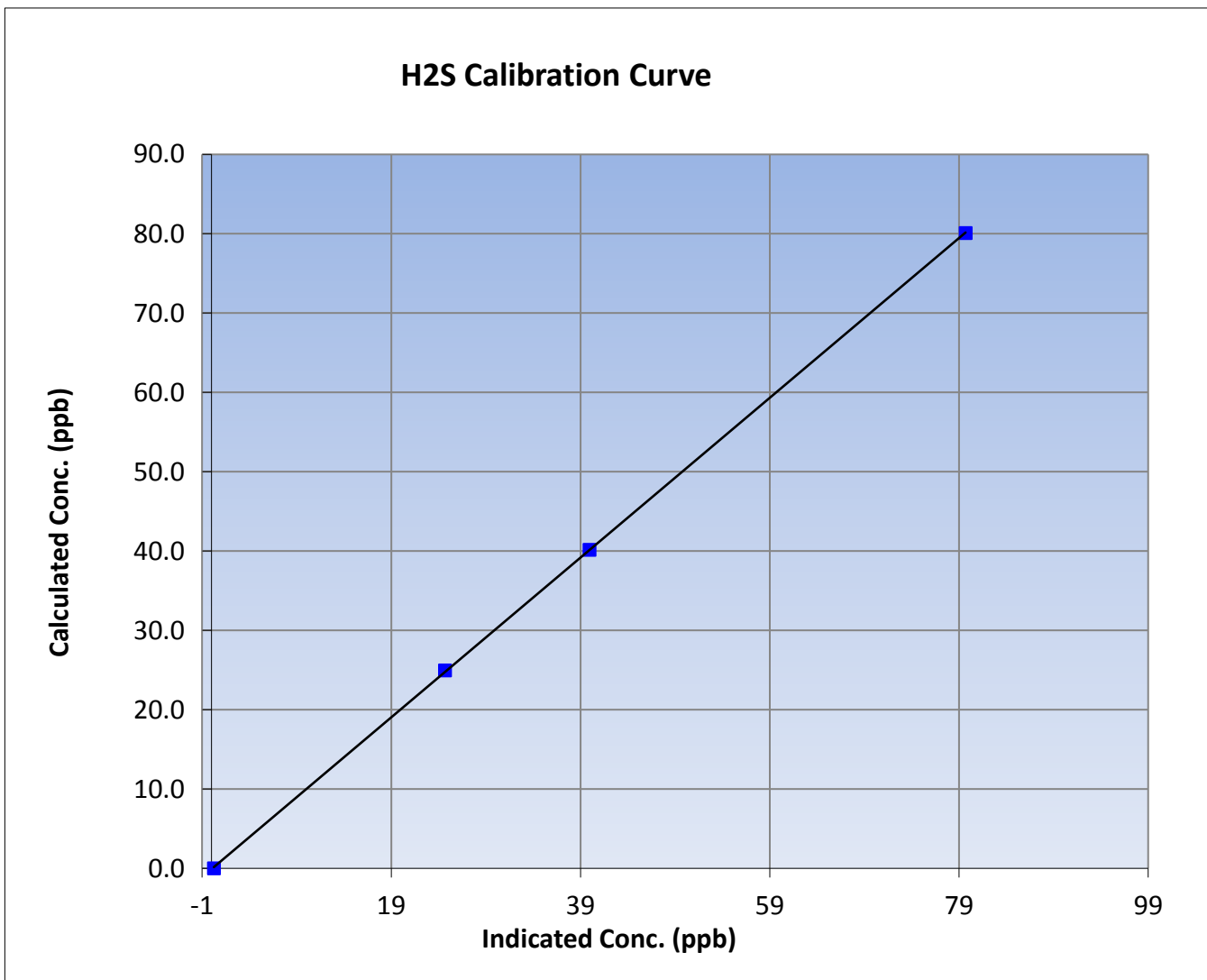
Wood Buffalo Environmental Association H2S Calibration Report

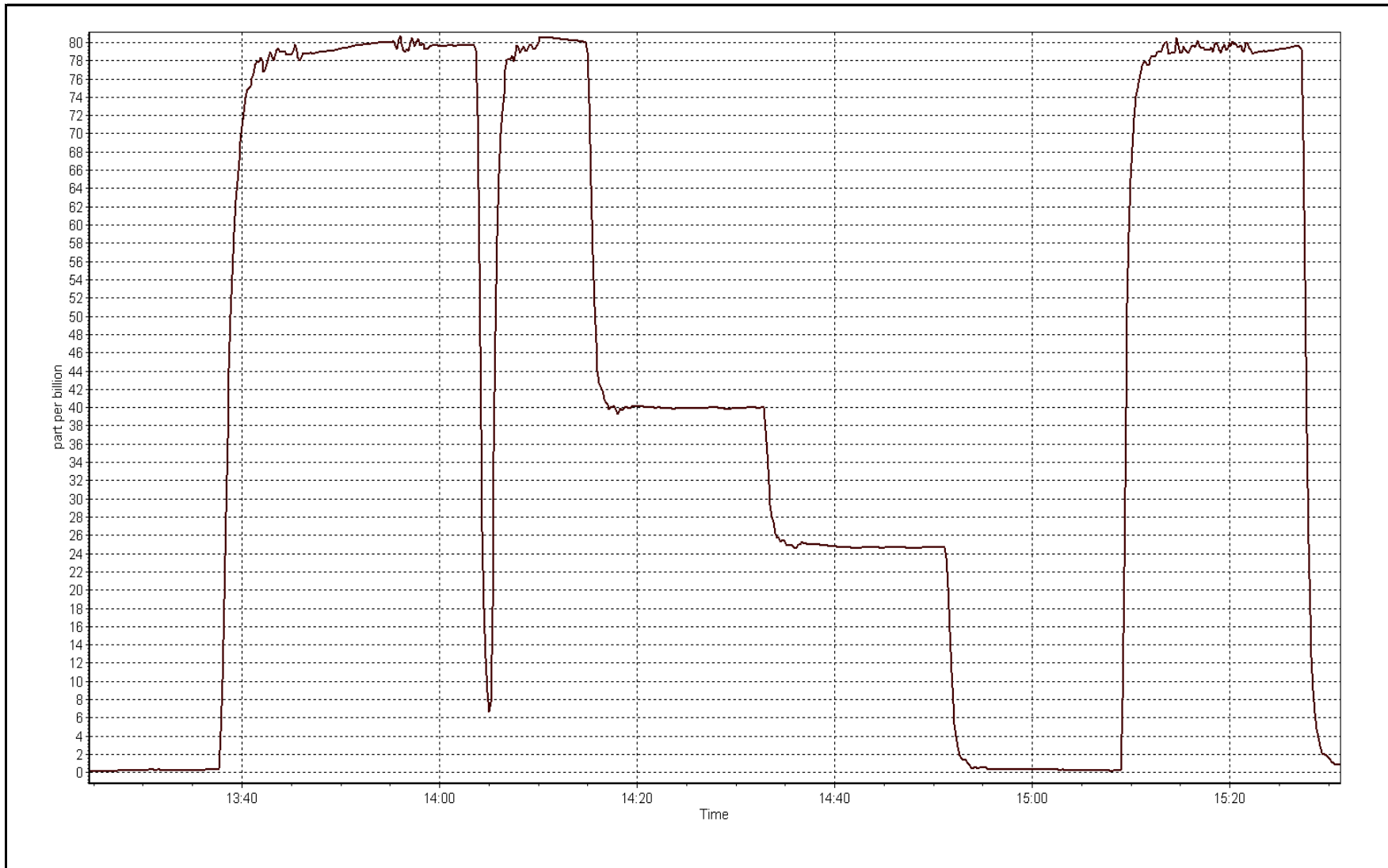
Station Information

Calibration Date	March 22, 2017	Previous Calibration	February 23, 2017
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	13:04	End Time (MST)	15:32
Analyzer make	API T101	Analyzer serial #	197

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999977
80.1	79.7	1.0048		
40.1	39.9	1.0051	Slope	1.006896
25.0	24.7	1.0118		
			Intercept	-0.093218







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 22, 2017	Previous Calibration	February 24, 2017
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	9:11	End Time (MST)	13:01
NO Cal Gas Conc	48.1 ppm	Gas Cert Reference	LL104215
NOX Cal Gas Conc	48.1 ppm	Cal Gas Expiry Date	February 12, 2018
Calibrator	API T700	Serial Number	622
Zero air Generator	Teledyne API T701	Serial Number	196

DACs Information

DACs make & model	Campbell Scientific CR3000	DACs serial No.	9035
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.993636	0.993659	0.996971
	Data Offset	1.910886	1.912773	-1.774536
Current Calibration	Data Slope	0.991022	0.991468	1.002361
	Data Offset	2.145800	1.937096	0.079748

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153356
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.969		0.969	
NOX coefficient	1.000		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	5.4		5.4	
NOX bkgrnd	5.9		5.9	
Chamber Temp	50.3	Deg C	50.5	Deg C
Moly Temp	325.8	Deg C	326	Deg C
PMT voltage	-866.5	V	-866.9	V
PMT Temp	-2.9	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	158.2	mmHg	157	mmHg
R Cell Press Nox	157.9	mmHg	157.6	mmHg
NO sample flow	0.673	lpm	0.666	lpm
Nox sample Flow	0.672	lpm	0.667	lpm

Notes:

Sample inlet filter replaced after as founds. No adjustments made.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

March 22, 2017

Station Number:

AMS 502

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.1	0.5	-0.4	----	----
as found span	5000	83.2	800.4	800.4	0.0	806.8	806.8	0.0	0.9920	0.9921
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.5	-0.4	----	----
high point	5000	83.2	800.4	800.4	0.0	806.8	806.8	0.0	0.9920	0.9921
second point	5000	41.6	400.2	400.2	0.0	399.9	399.6	0.2	1.0008	1.0014
third point	5000	20.8	200.1	200.1	0.0	197.9	198.0	0.0	1.0109	1.0107
as left zero	5000	0.0	0.0	0.0	0.0	-0.3	0.1	-0.3	----	----
as left span	5000	83.2	800.4	399.7	400.7	807.8	401.6	406.3	0.9908	0.9952
Average Correction Factor									1.0013	1.0014

Corrected As found

NO_x= 806.7

NO= 806.3

Percent Change

NO_x= -0.4%

NO= -0.3%

Previous Response

NO_x= 803.6

NO= 803.6

GPT Calibration Data

Dilution Flow (total) 5000 ccm

Source Gas Flow 83.20 ccm

NOx ref calc conc = 800.4 ppb

NO ref calc conc = 800.4 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	806.2	805.0	-0.4	0.9928	0.9943	----	----
1st NO2 (300)	399.7	405.3	803.7	399.7	404.0	0.9959	----	1.0033	99.7%
2nd NO2 (200)	592.4	212.5	804.9	592.4	212.5	0.9944	----	1.0004	100.0%
3rd NO2 (100)	691.8	113.2	804.7	691.8	112.9	0.9946	----	1.0020	99.8%
2nd NO ref point		0.0	803.5	803.1	0.4	0.9962	0.9966	----	----
Average Correction Factor						0.9953		1.0019	99.8%

Calibration Performed By:

Aswin Sasi Kumar



Wood Buffalo Environmental Association

NO_x Calibration Summary

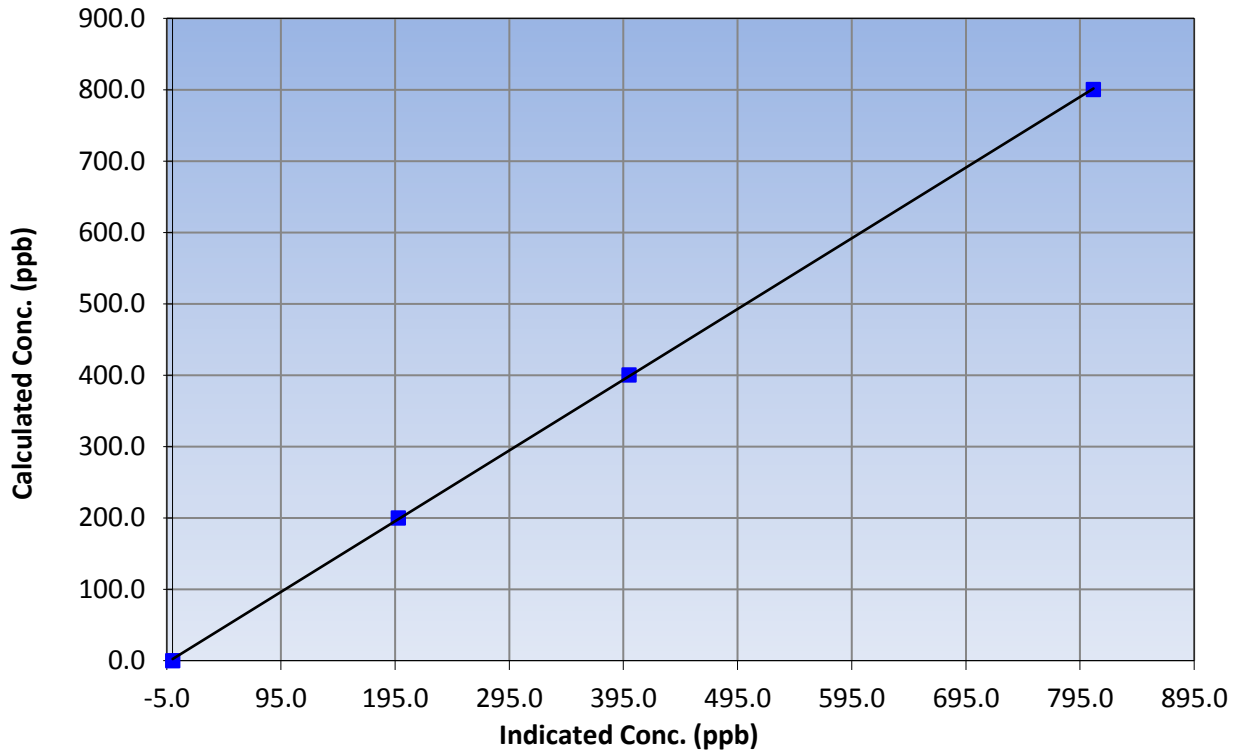
Station Information

Calibration Date	March 22, 2017	Previous Calibration	February 24, 2017
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	9:11	End Time (MST)	13:01
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999963
800.4	806.8	0.9920		
400.2	399.9	1.0008	Slope	0.991022
200.1	197.9	1.0109		
			Intercept	2.145800

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

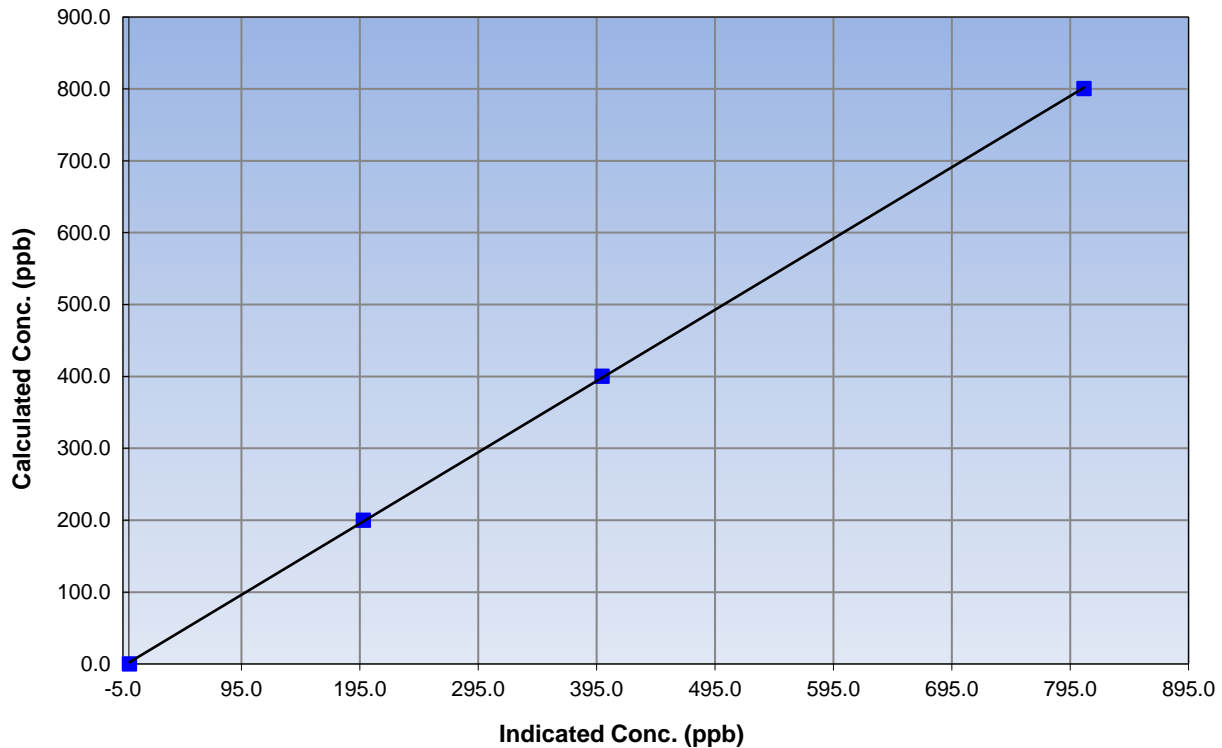
Station Information

Calibration Date	March 22, 2017	Previous Calibration	February 24, 2017
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	9:11	End Time (MST)	13:01
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	N/A	Correlation Coefficient	0.999955
800.4	806.8	0.9921		
400.2	399.6	1.0014	Slope	0.991468
200.1	198.0	1.0107		
			Intercept	1.937096

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

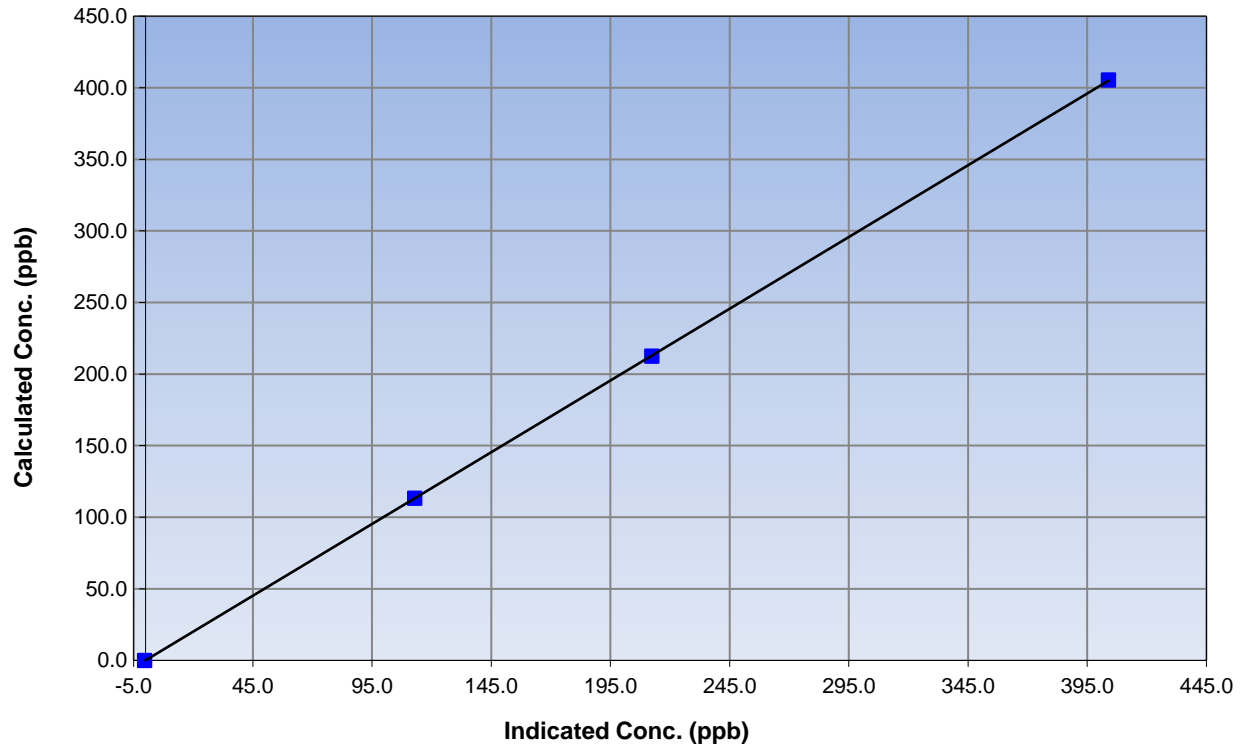
Station Information

Calibration Date	March 22, 2017	Previous Calibration	February 24, 2017
Station Number	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	9:11	End Time (MST)	13:01
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

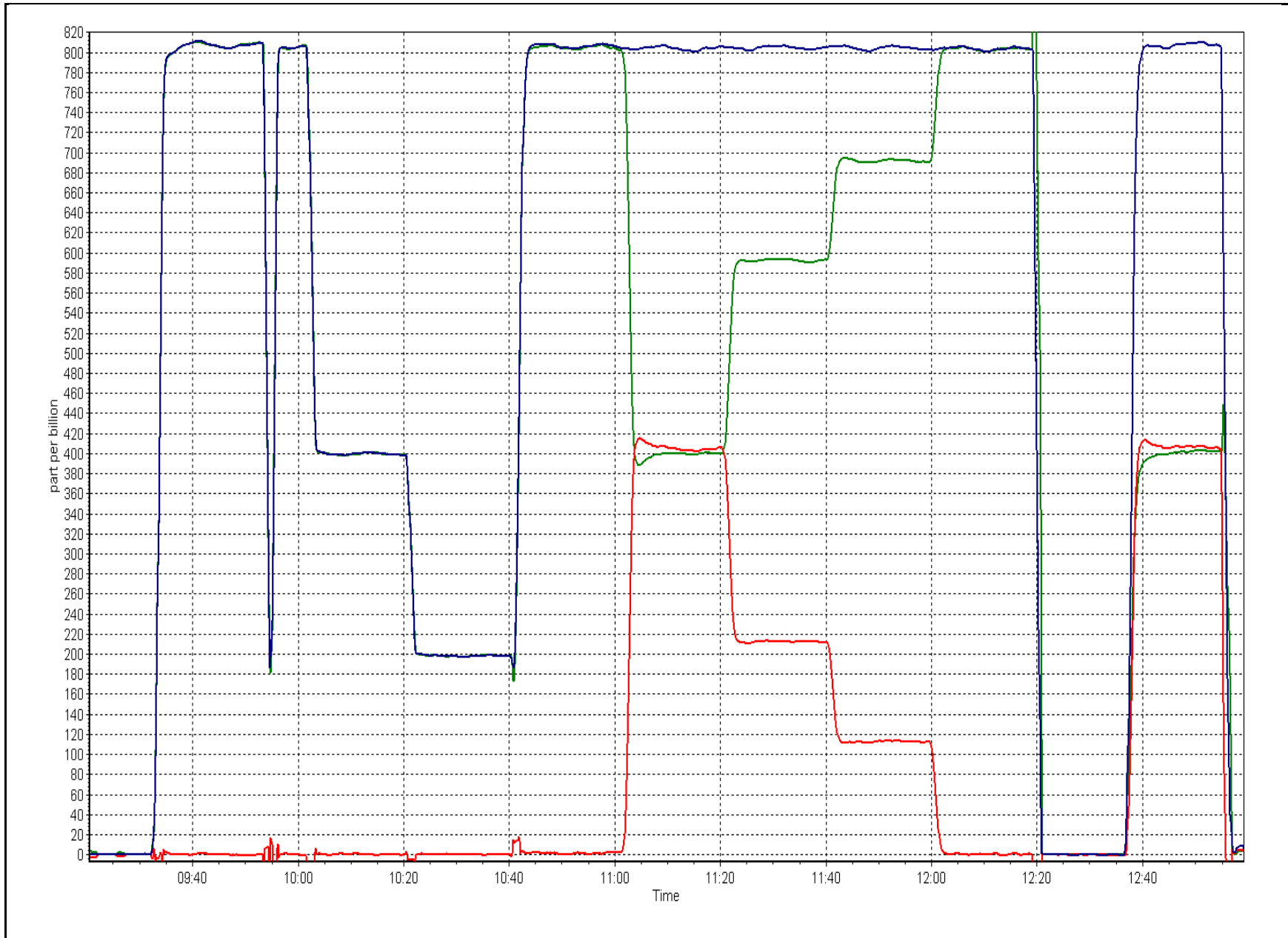
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999995
405.3	404.0	1.0033		
212.5	212.5	1.0004	Slope	1.002361
113.2	112.9	1.0020		
			Intercept	0.079748

NO₂ Calibration Curve



NOX Calibration Plot

Date: March 22, 2017





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

DATA SUMMARY FEBRUARY 2017

Prepared
April 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



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

**INTEGRATED MONITORING PROGRAM
MONTHLY REPORT**

**HNO₃, NH₃, NO₂, O₃ AND SO₂ PASSIVE MEASUREMENTS
DATA SUMMARY
JANUARY 2017**

Prepared
April 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 Remote sites

Site ID	Start Date/Time	End Date/Time	Ammonia	Nitric Acid	Nitrogen Dioxide	Ozone	Sulfur Dioxide	RH	Temp	Wind Speed
			ppb	ug/m3	ppb	ppb	ppb	%	°K	cm/sec
AS103	2016/11/28 15:10	03/02/2017 12:20	0.2	0.5	2.3	25.8	0.9	77	258	130
AS103	2016/11/28 15:10	03/02/2017 12:20	0.2	0.5	3.6	27.1	1.1	77	258	130
AS107	2016/11/28 12:15	03/02/2017 10:50	0.7	0.5	2.1	26.3	1.6	77	258	130
AS107	2016/11/28 12:15	03/02/2017 10:50	M2	0.3	2.1	28.3	1.9	77	258	130
JP101	2016/11/28 11:25	03/02/2017 10:10	0.3	0.4	1.5	27	1.3	77	258	130
JP101	2016/11/28 11:25	03/02/2017 10:10	0.2	0.3	1.3	27.6	1.3	77	258	130
JP102	2016/11/28 13:10	03/02/2017 11:20	0.3	0.3	3.9	29.2	1.2	77	258	130
JP102	2016/11/28 13:10	03/02/2017 11:20	0.2	0.3	4.1	23.4	1.3	77	258	130
JP104	2016/12/01 13:45	27/01/2017 12:50	0.5	M2	9.5	17.4	2.3	77	258	130
JP104	2016/12/01 13:45	27/01/2017 12:50	0.6	0.3	9.4	22.8	2	77	258	130
JP107	2016/12/03 13:40	30/01/2017 13:25	0.4	0.8	4.9	24.7	1.3	81	255	130
JP107	2016/12/03 13:40	30/01/2017 13:25	0.3	0.7	6	25.7	2.1	81	255	130
JP108	2016/11/30 14:15	02/02/2017 10:35	0.2	M2	M1	22.4	0.4	81	256	130
JP108	2016/11/30 14:15	02/02/2017 10:35	0.2	0.2	1.4	23.1	0.4	81	256	130
JP201	2016/12/02 10:40	01/02/2017 12:05	0.2	0.3	0.5	29.9	0.3	77	258	130
JP201	2016/12/02 10:40	01/02/2017 12:05	0.3	0.2	0.7	33.8	0.4	77	258	130
JP205	2016/12/03 12:30	30/01/2017 14:25	0.2	0.3	2.2	30.9	2.2	81	255	130
JP205	2016/12/03 12:30	30/01/2017 14:25	0.2	0.5	2.5	26.3	2.1	81	255	130
JP210	2016/11/30 10:50	02/02/2017 12:50	0.2	0.3	1.2	24.5	0.7	78	261	130
JP210	2016/11/30 10:50	02/02/2017 12:50	0.2	0.5	1.2	26	0.7	78	261	130
JP213	2016/12/03 10:50	02/02/2017 9:45	2.3	0.3	0.9	31.6	1.4	81	255	130
JP213	2016/12/03 10:50	02/02/2017 9:45	1.6	0.4	0.8	33.6	1.2	81	255	130
JP309	2016/12/02 13:00	01/02/2017 14:55	0.2	0.2	1.5	26.2	0.8	77	257	130
JP309	2016/12/02 13:00	01/02/2017 14:55	0.2	0.3	1.5	27.7	0.6	77	257	130
JP311	2016/11/28 10:25	03/02/2017 9:40	0.3	0.3	1.6	29.3	1.7	77	258	130
JP311	2016/11/28 10:25	03/02/2017 9:40	0.5	0.3	1.4	33.1	1.7	77	258	130
JP316	2016/11/30 12:50	02/02/2017 11:40	0.2	0.4	1.5	27.5	0.8	78	261	130
JP316	2016/11/30 12:50	02/02/2017 11:40	0.3	0.4	1	27.4	0.8	78	261	130
BM7	2016/12/03 14:30	30/01/2017 12:35	0.3	0.2	0.2	29.4	0.2	81	255	130
BM10	2016/12/02 12:15	01/02/2017 13:55	0.2	0.3	0.4	26.3	0.2	77	258	130
BM11	2016/12/03 14:55	30/01/2017 12:05	0.3	0.3	0.2	27.8	0.3	81	255	130
JE306	2016/12/03 11:50	30/01/2017 14:55	0.2	0.4	4.9	24.9	2	81	255	130
JE308	2016/12/02 11:35	01/02/2017 13:25	0.2	0.4	0.6	23.7	0.4	77	258	130
JE312	2016/11/30 15:00	03/02/2017 9:00	0.3	0.4	0.9	24.2	0.7	78	261	130
JE316	2016/11/30 11:40	02/02/2017 12:15	0.2	0.3	0.7	27.6	0.6	78	261	130
JE323	2016/11/28 14:25	03/02/2017 12:00	0.2	0.3	1.8	19.2	0.6	77	258	130
JP212	2016/11/28 13:40	01/02/2017 16:30	0.5	0.4	5.8	18.4	0.8	77	258	130
NE7	2016/12/02 14:30	01/02/2017 16:15	0.2	0.4	2.3	24.6	2.4	77	257	130
NE10	2016/11/30 13:40	02/02/2017 11:10	0.3	0.3	0.7	30	0.5	78	261	130
NE11	2016/12/02 14:10	30/01/2017 15:25	0.2	0.5	3.2	19.9	0.4	77	257	130
R2	2016/12/01 15:50	27/01/2017 14:15	0.4	0.6	6.6	16.2	1.5	77	258	130
SM7	2016/12/08 11:45	02/02/2017 14:00	0.2	0.8	1	29.3	0.4	77	257	130
SM8	2016/12/08 11:05	02/02/2017 14:20	0.3	0.2	0.7	32.4	0.6	77	257	130
WF4	2016/12/02 13:25	01/02/2017 14:20	0.2	M2	1.3	21.5	0.6	77	257	130
BLANK	23/01/2017		0.9	0.3	<0.1	<0.1	<0.1	77	258	130
BLANK	23/01/2017		0.7	0.3	<0.1	<0.1	<0.1	77	258	130
BLANK	23/01/2017		0.6	0.2	0.2	<0.1	<0.1	77	258	130



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 ug/m3	Nitrogen Dioxide ppb	Ozone ppb	Sulfur Dioxide ppb	RH %	Temp °K	Wind Speed cm/sec
AMS 1	Fort McKay-Bertha Ganter	2016/11/29 13:10	27/01/2017 11:30	<0.1	0.5	8.6	17.2	1.3	80	258	130
AMS 1	Fort McKay-Bertha Ganter	2016/11/29 13:10	27/01/2017 11:30	<0.1	0.5	8.8	15.5	1.4	80	258	130
AMS 1	Fort McKay-Bertha Ganter	2016/11/29 13:10	27/01/2017 11:30	<0.1	0.4	7.7	17.3	1.4	80	258	130
AMS 2	Mildred Lake	2016/11/29 11:40	27/01/2017 10:05	0.8	0.6	8.4	15.9	3.8	80	258	130
AMS 2	Mildred Lake	2016/11/29 11:40	27/01/2017 10:05	0.4	0.5	9.2	16.7	3.7	80	258	130
AMS 2	Mildred Lake	2016/11/29 11:40	27/01/2017 10:05	0.7	0.7	9.5	18.1	3.8	80	258	130



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

VOLATILE ORGANIC COMPOUNDS DATA SUMMARY FEBRUARY 2017

Prepared
April 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-Feb			06-Feb	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.03	V0	0.05	V0
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	0.03	V0
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.19	V0	0.16	V0
1-Pentene	0.01	0.02	V0	0.01	V0
2,2,4-Trimethylpentane	0.01	0.05	V0	0.09	V0
2,2-Dimethylbutane	0.01	0.08	V0	0.02	V0
2,3,4-Trimethylpentane	0.01	0.03	V0	0.03	V0
2,3-Dimethylbutane	0.02	0.13	V0	0.04	V0
2,3-Dimethylpentane	0.02	0.13	V0	0.09	V0
2,4-Dimethylpentane	0.01	0.02	V0	0.03	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.4	V0	0.03	V0
2-Methylhexane	0.01	0.17	V0	0.07	V0
2-Methylpentane	0.01	0.23	V0	0.1	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	0.14	V0	0.02	V0
3-Methylhexane	0.02	0.23	V0	0.08	V0
3-Methylpentane	0.01	0.16	V0	0.08	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.2	V0	1.1	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.25	V0	0.25	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.04	V0	0.05	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.12	V0	< 0.02	V1
Cyclopentane	0.01	0.05	V0	0.01	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	2.5	V0	2	V0
Ethylbenzene	0.01	0.09	V0	0.05	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.7	V0	0.69	V0
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Isopentane	0.03	0.69	V0	0.56	V0
Isoprene	0.01	< 0.01	V1	0.01	V0
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	0.24	V0	0.16	V0
Methanol	3	5	V0	11	V0
Methylcyclohexane	0.01	0.31	V0	0.04	V0
Methylcyclopentane	0.02	0.21	V0	0.07	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1
n-Butane	0.03	0.93	V0	1.27	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.59	V0	0.09	V0
n-Hexane	0.01	0.36	V0	0.1	V0
n-Nonane	0.01	0.13	V0	0.02	V0
n-Octane	0.02	0.57	V0	0.05	V0
n-Pentane	0.1	0.4	V0	0.3	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.08	V0	0.07	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.43	V0	0.25	V0
trans-2-Butene	0.01	< 0.01	V1	0.03	V0
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	0.02	V0



Station Name	Athabasca Valley			Anzac	
Station #	AMS 7			AMS 14	
Sample Date	06-Feb			06-Feb	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.09	V0	0.09	V0
1-Pentene	0.01	< 0.01	V1	< 0.01	V1
2,2,4-Trimethylpentane	0.01	0.06	V0	0.07	V0
2,2-Dimethylbutane	0.01	0.03	V0	0.01	V0
2,3,4-Trimethylpentane	0.01	0.02	V0	0.03	V0
2,3-Dimethylbutane	0.02	0.04	V0	< 0.02	V1
2,3-Dimethylpentane	0.02	0.07	V0	0.07	V0
2,4-Dimethylpentane	0.01	0.03	V0	0.02	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.04	V0	0.01	V0
2-Methylhexane	0.01	0.06	V0	0.03	V0
2-Methylpentane	0.01	0.09	V0	0.05	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	0.02	V0	< 0.02	V1
3-Methylhexane	0.02	0.06	V0	0.04	V0
3-Methylpentane	0.01	0.08	V0	0.04	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	0.9	V0	0.8	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.18	V0	0.12	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1	0.03	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.03	V0	< 0.02	V1
Cyclopentane	0.01	0.02	V0	0.01	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	0.9	V0	< 0.3	V1
Ethylbenzene	0.01	0.02	V0	< 0.01	V1
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.62	V0	0.36	V0
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Isopentane	0.03	0.51	V0	0.26	V0
Isoprene	0.01	< 0.01	V1	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	0.06	V0	< 0.03	V1
Methanol	3	9	V0	4	V0
Methylcyclohexane	0.01	0.04	V0	0.02	V0
Methylcyclopentane	0.02	0.06	V0	< 0.02	V1
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1
n-Butane	0.03	0.86	V0	0.51	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.09	V0	0.04	V0
n-Hexane	0.01	0.1	V0	0.05	V0
n-Nonane	0.01	0.01	V0	< 0.01	V1
n-Octane	0.02	0.05	V0	< 0.02	V1
n-Pentane	0.1	0.3	V0	0.2	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.02	V0	< 0.01	V1
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.14	V0	0.06	V0
trans-2-Butene	0.01	< 0.01	V1	0.02	V0
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1



Station Name Station # Sample Date	Barge Landing AMS 9 06-Feb	Fort McKay South AMS 13 06-Feb			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.21	V0	0.12	V0
1-Pentene	0.01	0.03	V0	0.02	V0
2,2,4-Trimethylpentane	0.01	0.04	V0	< 0.01	V1
2,2-Dimethylbutane	0.01	0.24	V0	0.07	V0
2,3,4-Trimethylpentane	0.01	0.02	V0	0.03	V0
2,3-Dimethylbutane	0.02	0.27	V0	0.1	V0
2,3-Dimethylpentane	0.02	0.1	V0	0.15	V0
2,4-Dimethylpentane	0.01	0.02	V0	0.03	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.19	V0	0.59	V0
2-Methylhexane	0.01	0.13	V0	0.22	V0
2-Methylpentane	0.01	0.76	V0	0.18	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	0.07	V0	0.2	V0
3-Methylhexane	0.02	0.16	V0	0.28	V0
3-Methylpentane	0.01	0.5	V0	0.15	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.6	V0	0.8	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.27	V0	0.19	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1	0.04	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.09	V0	0.13	V0
Cyclopentane	0.01	0.16	V0	0.04	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	1.5	V0	< 0.3	V1
Ethylbenzene	0.01	0.05	V0	0.09	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.94	V0	0.76	V0
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Isopentane	0.03	1.8	V0	0.45	V0
Isoprene	0.01	0.02	V0	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	0.12	V0	0.2	V0
Methanol	3	81	V4	3	V0
Methylcyclohexane	0.01	0.17	V0	0.45	V0
Methylcyclopentane	0.02	0.21	V0	0.24	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1
n-Butane	0.03	1.03	V0	0.93	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.34	V0	0.87	V0
n-Hexane	0.01	0.52	V0	0.42	V0
n-Nonane	0.01	0.08	V0	0.15	V0
n-Octane	0.02	0.27	V0	0.85	V0
n-Pentane	0.1	1.4	V0	0.3	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.05	V0	0.06	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.3	V0	0.43	V0
trans-2-Butene	0.01	< 0.01	V1	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1



Station Name Station # Sample Date	CNRL Horizon AMS 15 06-Feb		
Compound Name	MDL (ppbv)	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1
1-Butene	0.02	0.05	V0
1-Pentene	0.01	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1
2,2-Dimethylbutane	0.01	0.12	V0
2,3,4-Trimethylpentane	0.01	0.03	V0
2,3-Dimethylbutane	0.02	0.18	V0
2,3-Dimethylpentane	0.02	0.14	V0
2,4-Dimethylpentane	0.01	0.03	V0
2-Methyl-1-pentene	0.3	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1
2-Methylheptane	0.01	0.29	V0
2-Methylhexane	0.01	0.13	V0
2-Methylpentane	0.01	0.28	V0
3-Methyl-1-butene	0.3	< 0.3	V1
3-Methylheptane	0.02	0.11	V0
3-Methylhexane	0.02	0.19	V0
3-Methylpentane	0.01	0.3	V0
4-Methyl-1-pentene	0.3	< 0.3	V1
Acetaldehyde	3	< 3	V1
Acetone	0.4	1	V0
alpha-Pinene	0.3	< 0.3	V1
Benzene	0.01	0.19	V0
beta-Pinene	0.3	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1
Cyclohexane	0.02	0.21	V0
Cyclopentane	0.01	0.12	V0
Cyclopentene	0.3	< 0.3	V1
Ethanol	0.3	0.4	V0
Ethylbenzene	0.01	0.06	V0
Formaldehyde	3	< 3	V1
Isobutane	0.02	1.19	V0
Isobutylene	0.3	< 0.3	V1
Isopentane	0.03	1.37	V0
Isoprene	0.01	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1
m,p-Xylene	0.03	0.13	V0
Methanol	3	< 3	V1
Methylcyclohexane	0.01	0.34	V0
Methylcyclopentane	0.02	0.22	V0
Methylethylketone	0.3	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1
Methylvinylketone	0.3	< 0.3	V1
n-Butane	0.03	0.61	V0
n-Decane	0.06	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1
n-Heptane	0.01	0.49	V0
n-Hexane	0.01	0.21	V0
n-Nonane	0.01	0.11	V0
n-Octane	0.02	0.42	V0
n-Pentane	0.1	0.7	V0
n-Propylbenzene	0.05	< 0.05	V1
n-Undecane	0.5	< 0.5	V1
Naphthalene	0.5	< 0.5	V1
o-Xylene	0.01	0.04	V0
Styrene	0.04	< 0.04	V1
Toluene	0.01	0.23	V0
trans-2-Butene	0.01	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1



Station Name Station # Sample Date	Bertha Ganter -		Flag	Patricia McInnes	
	Fort McKay			AMS 6	
	AMS 1			AMS 6	
	12-Feb			12-Feb	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.05	V0	0.03	V0
1-Pentene	0.01	< 0.01	V1	< 0.01	V1
2,2,4-Trimethylpentane	0.01	0.01	V0	< 0.01	V1
2,2-Dimethylbutane	0.01	< 0.01	V1	< 0.01	V1
2,3,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,3-Dimethylbutane	0.02	< 0.02	V1	< 0.02	V1
2,3-Dimethylpentane	0.02	0.02	V0	< 0.02	V1
2,4-Dimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.03	V0	< 0.01	V1
2-Methylhexane	0.01	< 0.01	V1	< 0.01	V1
2-Methylpentane	0.01	0.02	V0	0.01	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	< 0.02	V1
3-Methylhexane	0.02	0.03	V0	< 0.02	V1
3-Methylpentane	0.01	0.02	V0	0.01	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.5	V0	1.2	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.1	V0	0.08	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.02	V0	0.03	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	< 0.02	V1	< 0.02	V1
Cyclopentane	0.01	< 0.01	V1	< 0.01	V1
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	2.2	V0	0.6	V0
Ethylbenzene	0.01	0.02	V0	< 0.01	V1
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.26	V0	0.18	V0
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Isopentane	0.03	0.16	V0	0.1	V0
Isoprene	0.01	< 0.01	V1	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	0.04	V0	< 0.03	V1
Methanol	3	3	V0	4	V0
Methylcyclohexane	0.01	0.03	V0	< 0.01	V1
Methylcyclopentane	0.02	0.02	V0	< 0.02	V1
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1
n-Butane	0.03	0.37	V0	0.35	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.04	V0	< 0.01	V1
n-Hexane	0.01	0.03	V0	0.02	V0
n-Nonane	0.01	0.01	V0	< 0.01	V1
n-Octane	0.02	0.05	V0	< 0.02	V1
n-Pentane	0.1	< 0.1	V1	< 0.1	V1
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.02	V0	< 0.01	V1
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.08	V0	0.02	V0
trans-2-Butene	0.01	0.02	V0	0.02	V0
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1



Station Name	Athabasca Valley			Anzac	
Station #	AMS 7			AMS 14	
Sample Date	12-Feb			12-Feb	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	< 0.05	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.05	V0	0.03	V0
1-Pentene	0.01	< 0.01	V1	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,2-Dimethylbutane	0.01	< 0.01	V1	< 0.01	V1
2,3,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,3-Dimethylbutane	0.02	< 0.02	V1	< 0.02	V1
2,3-Dimethylpentane	0.02	< 0.02	V1	< 0.02	V1
2,4-Dimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	< 0.01	V1	< 0.01	V1
2-Methylhexane	0.01	< 0.01	V1	< 0.01	V1
2-Methylpentane	0.01	0.02	V0	0.01	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	< 0.02	V1
3-Methylhexane	0.02	< 0.02	V1	< 0.02	V1
3-Methylpentane	0.01	0.01	V0	< 0.01	V1
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.5	V0	1.5	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.1	V0	0.09	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.05	V0	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	< 0.02	V1	< 0.02	V1
Cyclopentane	0.01	< 0.01	V1	< 0.01	V1
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	1	V0	0.8	V0
Ethylbenzene	0.01	< 0.01	V1	< 0.01	V1
Formaldehyde	3	< 3	V1	< 0.03	V1
Isobutane	0.02	0.21	V0	0.23	V0
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Isopentane	0.03	0.09	V0	0.11	V0
Isoprene	0.01	< 0.01	V1	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	< 0.03	V1	< 0.03	V1
Methanol	3	8	V0	5	V0
Methylcyclohexane	0.01	< 0.01	V1	< 0.01	V1
Methylcyclopentane	0.02	< 0.02	V1	< 0.02	V1
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1
n-Butane	0.03	0.37	V0	0.29	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	< 0.01	V1	< 0.01	V1
n-Hexane	0.01	0.02	V0	0.02	V0
n-Nonane	0.01	< 0.01	V1	< 0.01	V1
n-Octane	0.02	< 0.02	V1	< 0.02	V1
n-Pentane	0.1	< 0.1	V1	< 0.1	V1
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.01	V0	< 0.01	V1
Styrene	0.04	< 0.04	V1	< 0.3	V1
Toluene	0.01	0.03	V0	0.04	V0
trans-2-Butene	0.01	< 0.01	V1	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1



Station Name Station # Sample Date	Barge Landing AMS 9 12-Feb	Fort McKay South AMS 13 12-Feb			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.05	V1	< 0.05	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	< 0.02	V1	< 0.02	V1
1-Pentene	0.01	< 0.01	V1	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,2-Dimethylbutane	0.01	0.01	V0	0.02	V0
2,3,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,3-Dimethylbutane	0.02	< 0.02	V1	0.03	V0
2,3-Dimethylpentane	0.02	< 0.02	V1	< 0.02	V1
2,4-Dimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.01	V0	0.02	V0
2-Methylhexane	0.01	< 0.01	V1	< 0.01	V1
2-Methylpentane	0.01	0.02	V0	0.02	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	< 0.02	V1
3-Methylhexane	0.02	< 0.02	V1	0.02	V0
3-Methylpentane	0.01	0.01	V0	0.02	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.1	V0	1.2	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.09	V0	0.09	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	< 0.02	V1	< 0.02	V1
Cyclopentane	0.01	< 0.01	V1	< 0.01	V1
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	0.8	V0	0.4	V0
Ethylbenzene	0.01	0.01	V0	0.02	V0
Formaldehyde	3	< 0.03	V1	< 0.03	V1
Isobutane	0.02	0.25	V0	0.28	V0
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Isopentane	0.03	0.15	V0	0.13	V0
Isoprene	0.01	< 0.01	V1	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	0.03	V0	0.05	V0
Methanol	3	4	V0	4	V0
Methylcyclohexane	0.01	0.02	V0	0.02	V0
Methylcyclopentane	0.02	< 0.02	V1	< 0.02	V1
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1
n-Butane	0.03	0.27	V0	0.29	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.03	V0	0.02	V0
n-Hexane	0.01	0.03	V0	0.02	V0
n-Nonane	0.01	0.02	V0	0.02	V0
n-Octane	0.02	0.03	V0	0.02	V0
n-Pentane	0.1	< 0.1	V1	< 0.1	V1
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.01	V0	0.02	V0
Styrene	0.04	< 0.3	V1	< 0.3	V1
Toluene	0.01	0.05	V0	0.05	V0
trans-2-Butene	0.01	< 0.01	V1	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1



Station Name Station # Sample Date	CNRL Horizon AMS 15 12-Feb		
Compound Name	MDL (ppbv)	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.05	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1
1-Butene	0.02	0.03	V0
1-Pentene	0.01	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1
2,2-Dimethylbutane	0.01	0.02	V0
2,3,4-Trimethylpentane	0.01	< 0.01	V1
2,3-Dimethylbutane	0.02	0.03	V0
2,3-Dimethylpentane	0.02	0.03	V0
2,4-Dimethylpentane	0.01	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1
2-Methylheptane	0.01	0.01	V0
2-Methylhexane	0.01	< 0.01	V1
2-Methylpentane	0.01	0.01	V0
3-Methyl-1-butene	0.3	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1
3-Methylhexane	0.02	< 0.02	V1
3-Methylpentane	0.01	0.06	V0
4-Methyl-1-pentene	0.3	< 0.3	V1
Acetaldehyde	3	< 3	V1
Acetone	0.4	1.8	V0
alpha-Pinene	0.3	< 0.3	V1
Benzene	0.01	0.08	V0
beta-Pinene	0.3	< 0.3	V1
cis-2-Butene	0.02	0.03	V0
cis-2-Hexene	0.3	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1
Cyclohexane	0.02	0.05	V0
Cyclopentane	0.01	0.02	V0
Cyclopentene	0.3	< 0.3	V1
Ethanol	0.3	0.6	V0
Ethylbenzene	0.01	< 0.01	V1
Formaldehyde	3	< 0.03	V1
Isobutane	0.02	0.54	V0
Isobutylene	0.3	< 0.3	V1
Isopentane	0.03	0.46	V0
Isoprene	0.01	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1
m,p-Xylene	0.03	< 0.03	V1
Methanol	3	3	V0
Methylcyclohexane	0.01	0.03	V0
Methylcyclopentane	0.02	0.05	V0
Methylethylketone	0.3	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1
Methylvinylketone	0.3	< 0.3	V1
n-Butane	0.03	0.3	V0
n-Decane	0.06	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1
n-Heptane	0.01	0.01	V0
n-Hexane	0.01	0.03	V0
n-Nonane	0.01	< 0.01	V1
n-Octane	0.02	< 0.02	V1
n-Pentane	0.1	< 0.1	V1
n-Propylbenzene	0.05	< 0.05	V1
n-Undecane	0.5	< 0.5	V1
Naphthalene	0.5	< 0.5	V1
o-Xylene	0.01	< 0.01	V1
Styrene	0.04	< 0.3	V1
Toluene	0.01	0.03	V0
trans-2-Butene	0.01	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	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	V1	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.04	V0	0.21	V0
1-Pentene	0.01	< 0.01	V1	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,2-Dimethylbutane	0.01	0.12	V0	< 0.01	V1
2,3,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,3-Dimethylbutane	0.02	0.16	V0	0.03	V0
2,3-Dimethylpentane	0.02	< 0.02	V1	0.03	V0
2,4-Dimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.02	V0	0.04	V0
2-Methylhexane	0.01	< 0.01	V1	0.04	V0
2-Methylpentane	0.01	0.68	V0	0.07	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	< 0.02	V1
3-Methylhexane	0.02	0.04	V0	0.06	V0
3-Methylpentane	0.01	0.37	V0	0.05	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.5	V0	1.6	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.23	V0	0.12	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.02	V0	0.06	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.04	V0	0.03	V0
Cyclopentane	0.01	0.17	V0	0.02	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	1.5	V0	2.1	V0
Ethylbenzene	0.01	0.01	V0	0.02	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.34	V0	0.57	V0
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Isopentane	0.03	1.32	V0	0.46	V0
Isoprene	0.01	< 0.01	V1	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	< 0.03	V1	0.05	V0
Methanol	3	5	V0	10	V0
Methylcyclohexane	0.01	0.02	V0	0.04	V0
Methylcyclopentane	0.02	0.08	V0	0.05	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1
n-Butane	0.03	0.43	V0	1.55	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.04	V0	0.08	V0
n-Hexane	0.01	0.28	V0	0.12	V0
n-Nonane	0.01	< 0.01	V1	0.02	V0
n-Octane	0.02	0.02	V0	0.05	V0
n-Pentane	0.1	1.7	V0	0.3	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.01	V0	0.02	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.07	V0	0.1	V0
trans-2-Butene	0.01	< 0.01	V1	0.04	V0
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1



Station Name	Athabasca Valley			Anzac	
Station #	AMS 7			AMS 14	
Sample Date	18-Feb			18-Feb	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.11	V0	0.07	V0
1-Pentene	0.01	< 0.01	V1	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,2-Dimethylbutane	0.01	0.03	V0	0.03	V0
2,3,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,3-Dimethylbutane	0.02	0.03	V0	0.03	V0
2,3-Dimethylpentane	0.02	0.02	V0	0.02	V0
2,4-Dimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.02	V0	0.04	V0
2-Methylhexane	0.01	0.02	V0	0.02	V0
2-Methylpentane	0.01	0.05	V0	0.06	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	< 0.02	V1
3-Methylhexane	0.02	0.04	V0	0.03	V0
3-Methylpentane	0.01	0.03	V0	0.05	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.7	V0	1.4	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.11	V0	0.1	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.06	V0	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	< 0.02	V1	0.03	V0
Cyclopentane	0.01	0.02	V0	0.02	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	10	V0	0.7	V0
Ethylbenzene	0.01	0.01	V0	0.02	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.39	V0	0.22	V0
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Isopentane	0.03	0.41	V0	0.25	V0
Isoprene	0.01	< 0.01	V1	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	0.03	V0	< 0.03	V1
Methanol	3	9	V0	4	V0
Methylcyclohexane	0.01	0.03	V0	0.04	V0
Methylcyclopentane	0.02	0.03	V0	0.04	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1
n-Butane	0.03	1.08	V0	0.33	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.05	V0	0.08	V0
n-Hexane	0.01	0.06	V0	0.07	V0
n-Nonane	0.01	0.01	V0	0.01	V0
n-Octane	0.02	0.03	V0	0.05	V0
n-Pentane	0.1	0.3	V0	0.2	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.02	V0	0.01	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.07	V0	0.09	V0
trans-2-Butene	0.01	< 0.01	V1	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1



Station Name Station # Sample Date	Barge Landing AMS 9 18-Feb	Fort McKay South AMS 13 18-Feb			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	< 0.02	V1	0.04	V0
1-Pentene	0.01	< 0.01	V1	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,2-Dimethylbutane	0.01	0.13	V0	0.08	V0
2,3,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,3-Dimethylbutane	0.02	0.15	V0	0.09	V0
2,3-Dimethylpentane	0.02	0.02	V0	0.03	V0
2,4-Dimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.02	V0	0.06	V0
2-Methylhexane	0.01	0.02	V0	0.04	V0
2-Methylpentane	0.01	0.6	V0	0.32	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	0.03	V0
3-Methylhexane	0.02	0.04	V0	0.06	V0
3-Methylpentane	0.01	0.36	V0	0.2	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.1	V0	1.5	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.21	V0	0.17	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1	0.03	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.03	V0	0.03	V0
Cyclopentane	0.01	0.17	V0	0.1	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	0.7	V0	0.7	V0
Ethylbenzene	0.01	< 0.01	V1	0.02	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.26	V0	0.34	V0
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Isopentane	0.03	1.12	V0	0.74	V0
Isoprene	0.01	< 0.01	V1	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	< 0.03	V1	0.05	V0
Methanol	3	3	V0	4	V0
Methylcyclohexane	0.01	0.02	V0	0.06	V0
Methylcyclopentane	0.02	0.07	V0	0.08	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1
n-Butane	0.03	0.34	V0	0.41	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.04	V0	0.09	V0
n-Hexane	0.01	0.25	V0	0.18	V0
n-Nonane	0.01	0.02	V0	0.03	V0
n-Octane	0.02	0.02	V0	0.11	V0
n-Pentane	0.1	1.5	V0	0.9	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.01	V0	0.02	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.05	V0	0.1	V0
trans-2-Butene	0.01	< 0.01	V1	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1



Station Name Station # Sample Date	CNRL Horizon AMS 15 18-Feb		
Compound Name	MDL (ppbv)	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1
1-Butene	0.02	0.08	V0
1-Pentene	0.01	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1
2,2-Dimethylbutane	0.01	0.05	V0
2,3,4-Trimethylpentane	0.01	< 0.01	V1
2,3-Dimethylbutane	0.02	0.07	V0
2,3-Dimethylpentane	0.02	< 0.02	V1
2,4-Dimethylpentane	0.01	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1
2-Methylheptane	0.01	0.01	V0
2-Methylhexane	0.01	< 0.01	V1
2-Methylpentane	0.01	0.14	V0
3-Methyl-1-butene	0.3	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1
3-Methylhexane	0.02	0.04	V0
3-Methylpentane	0.01	0.1	V0
4-Methyl-1-pentene	0.3	< 0.3	V1
Acetaldehyde	3	< 3	V1
Acetone	0.4	1.8	V0
alpha-Pinene	0.3	< 0.3	V1
Benzene	0.01	0.13	V0
beta-Pinene	0.3	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1
Cyclohexane	0.02	0.02	V0
Cyclopentane	0.01	0.04	V0
Cyclopentene	0.3	< 0.3	V1
Ethanol	0.3	0.9	V0
Ethylbenzene	0.01	< 0.01	V1
Formaldehyde	3	< 3	V1
Isobutane	0.02	0.46	V0
Isobutylene	0.3	< 0.3	V1
Isopentane	0.03	0.47	V0
Isoprene	0.01	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1
m,p-Xylene	0.03	< 0.03	V1
Methanol	3	3	V0
Methylcyclohexane	0.01	0.02	V0
Methylcyclopentane	0.02	0.05	V0
Methylethylketone	0.3	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1
Methylvinylketone	0.3	< 0.3	V1
n-Butane	0.03	0.47	V0
n-Decane	0.06	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1
n-Heptane	0.01	0.03	V0
n-Hexane	0.01	0.08	V0
n-Nonane	0.01	< 0.01	V1
n-Octane	0.02	0.02	V0
n-Pentane	0.1	0.5	V0
n-Propylbenzene	0.05	< 0.05	V1
n-Undecane	0.5	< 0.5	V1
Naphthalene	0.5	< 0.5	V1
o-Xylene	0.01	< 0.01	V1
Styrene	0.04	< 0.04	V1
Toluene	0.01	0.04	V0
trans-2-Butene	0.01	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1



Station Name Station # Sample Date	Bertha Ganter -			Patricia McInnes	
	Fort McKay			AMS 6	
	AMS 1			AMS 6	
	24-Feb			24-Feb	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.06	V0	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	0.04	V0	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.1	V0	0.03	V0
1-Pentene	0.01	0.04	V0	< 0.01	V1
2,2,4-Trimethylpentane	0.01	0.06	V0	< 0.01	V1
2,2-Dimethylbutane	0.01	0.07	V0	0.04	V0
2,3,4-Trimethylpentane	0.01	0.05	V0	< 0.01	V1
2,3-Dimethylbutane	0.02	0.11	V0	0.05	V0
2,3-Dimethylpentane	0.02	< 0.02	V1	0.04	V0
2,4-Dimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.13	V0	0.04	V0
2-Methylhexane	0.01	0.08	V0	0.03	V0
2-Methylpentane	0.01	< 0.01	V1	0.14	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	0.08	V0	< 0.02	V1
3-Methylhexane	0.02	0.11	V0	0.06	V0
3-Methylpentane	0.01	0.09	V0	0.1	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.2	V0	1.3	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.21	V0	0.15	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.05	V0	0.04	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	0.04	V0	< 0.02	V1
Cyclohexane	0.02	0.12	V0	0.03	V0
Cyclopentane	0.01	0.06	V0	0.04	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	1	V0	0.5	V0
Ethylbenzene	0.01	0.07	V0	0.02	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.34	V0	0.3	V0
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Isopentane	0.03	0.31	V0	0.39	V0
Isoprene	0.01	< 0.01	V1	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	0.03	V0	< 0.01	V1
m,p-Xylene	0.03	0.09	V0	0.04	V0
Methanol	3	5	V0	< 3	V1
Methylcyclohexane	0.01	0.15	V0	0.05	V0
Methylcyclopentane	0.02	0.11	V0	0.06	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1
n-Butane	0.03	0.52	V0	0.46	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.2	V0	0.11	V0
n-Hexane	0.01	0.12	V0	0.15	V0
n-Nonane	0.01	0.07	V0	0.02	V0
n-Octane	0.02	0.18	V0	0.06	V0
n-Pentane	0.1	0.1	V0	0.4	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.06	V0	0.02	V0
Styrene	0.04	0.05	V0	< 0.04	V1
Toluene	0.01	0.26	V0	0.08	V0
trans-2-Butene	0.01	0.06	V0	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	0.04	V0	< 0.02	V1



Station Name	Athabasca Valley			Anzac	
Station #	AMS 7			AMS 14	
Sample Date	24-Feb			24-Feb	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	0.04	V0
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	0.05	V0
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.03	V0	0.09	V0
1-Pentene	0.01	< 0.01	V1	0.04	V0
2,2,4-Trimethylpentane	0.01	0.03	V0	0.05	V0
2,2-Dimethylbutane	0.01	0.03	V0	0.06	V0
2,3,4-Trimethylpentane	0.01	< 0.01	V1	0.04	V0
2,3-Dimethylbutane	0.02	0.03	V0	0.09	V0
2,3-Dimethylpentane	0.02	0.04	V0	< 0.02	V1
2,4-Dimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.03	V0	0.06	V0
2-Methylhexane	0.01	0.05	V0	0.06	V0
2-Methylpentane	0.01	0.09	V0	< 0.01	V1
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	0.05	V0
3-Methylhexane	0.02	0.06	V0	0.09	V0
3-Methylpentane	0.01	0.06	V0	0.12	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.1	V0	1	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.14	V0	0.2	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.02	V0	0.05	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	0.04	V0
Cyclohexane	0.02	0.03	V0	0.1	V0
Cyclopentane	0.01	0.03	V0	0.08	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	0.6	V0	< 0.3	V1
Ethylbenzene	0.01	0.01	V0	0.04	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.4	V0	0.5	V0
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Isopentane	0.03	0.31	V0	0.52	V0
Isoprene	0.01	< 0.01	V1	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	0.03	V0
m,p-Xylene	0.03	0.04	V0	0.04	V0
Methanol	3	5	V0	4	V0
Methylcyclohexane	0.01	0.04	V0	0.09	V0
Methylcyclopentane	0.02	0.06	V0	0.1	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1
n-Butane	0.03	0.48	V0	1.11	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.1	V0	0.11	V0
n-Hexane	0.01	0.12	V0	0.18	V0
n-Nonane	0.01	0.01	V0	0.03	V0
n-Octane	0.02	0.04	V0	0.07	V0
n-Pentane	0.1	0.2	V0	0.4	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.02	V0	0.03	V0
Styrene	0.04	< 0.04	V1	0.04	V0
Toluene	0.01	0.09	V0	0.16	V0
trans-2-Butene	0.01	< 0.01	V1	0.05	V0
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	0.03	V0



Station Name Station # Sample Date	Barge Landing AMS 9 24-Feb	Fort McKay South AMS 13 24-Feb			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.08	V0	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	0.06	V0	< 0.02	V1
1,3-Butadiene	0.02	0.06	V0	< 0.02	V1
1-Butene	0.02	0.1	V0	0.08	V0
1-Pentene	0.01	< 0.01	V1	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,2-Dimethylbutane	0.01	0.04	V0	0.04	V0
2,3,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,3-Dimethylbutane	0.02	0.06	V0	0.03	V0
2,3-Dimethylpentane	0.02	< 0.02	V1	0.02	V0
2,4-Dimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.06	V0	0.03	V0
2-Methylhexane	0.01	0.04	V0	< 0.01	V1
2-Methylpentane	0.01	< 0.01	V1	0.03	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	0.03	V0	< 0.02	V1
3-Methylhexane	0.02	0.06	V0	0.03	V0
3-Methylpentane	0.01	0.06	V0	0.03	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.3	V0	1.1	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.22	V0	0.11	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1	0.05	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.1	V0	0.04	V0
Cyclopentane	0.01	0.02	V0	0.02	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	1.4	V0	0.3	V0
Ethylbenzene	0.01	0.07	V0	0.01	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.27	V0	0.48	V0
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Isopentane	0.03	0.21	V0	0.23	V0
Isoprene	0.01	< 0.01	V1	< 0.01	V1
Isopropylalcohol	0.4	0.6	V0	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	0.14	V0	< 0.03	V1
Methanol	3	6	V0	< 3	V1
Methylcyclohexane	0.01	0.08	V0	0.03	V0
Methylcyclopentane	0.02	0.05	V0	0.03	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1
n-Butane	0.03	0.44	V0	0.44	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.17	V0	0.04	V0
n-Hexane	0.01	0.15	V0	0.02	V0
n-Nonane	0.01	0.04	V0	0.02	V0
n-Octane	0.02	0.09	V0	0.03	V0
n-Pentane	0.1	0.1	V0	0.1	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.07	V0	< 0.01	V1
Styrene	0.04	0.09	V0	< 0.04	V1
Toluene	0.01	0.19	V0	0.05	V0
trans-2-Butene	0.01	< 0.01	V1	0.01	V0
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1



Station Name Station # Sample Date	CNRL Horizon AMS 15 24-Feb		
Compound Name	MDL (ppbv)	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.06	V0
1,3,5-Trimethylbenzene	0.02	0.03	V0
1,3-Butadiene	0.02	< 0.02	V1
1-Butene	0.02	0.05	V0
1-Pentene	0.01	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1
2,2-Dimethylbutane	0.01	0.05	V0
2,3,4-Trimethylpentane	0.01	0.01	V0
2,3-Dimethylbutane	0.02	0.1	V0
2,3-Dimethylpentane	0.02	< 0.02	V1
2,4-Dimethylpentane	0.01	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1
2-Methylheptane	0.01	0.1	V0
2-Methylhexane	0.01	0.03	V0
2-Methylpentane	0.01	< 0.01	V1
3-Methyl-1-butene	0.3	< 0.3	V1
3-Methylheptane	0.02	0.02	V0
3-Methylhexane	0.02	0.07	V0
3-Methylpentane	0.01	0.14	V0
4-Methyl-1-pentene	0.3	< 0.3	V1
Acetaldehyde	3	< 3	V1
Acetone	0.4	1.5	V0
alpha-Pinene	0.3	< 0.3	V1
Benzene	0.01	0.15	V0
beta-Pinene	0.3	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1
Cyclohexane	0.02	0.18	V0
Cyclopentane	0.01	0.05	V0
Cyclopentene	0.3	< 0.3	V1
Ethanol	0.3	0.4	V0
Ethylbenzene	0.01	0.02	V0
Formaldehyde	3	< 3	V1
Isobutane	0.02	0.63	V0
Isobutylene	0.3	< 0.3	V1
Isopentane	0.03	0.72	V0
Isoprene	0.01	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1
m,p-Xylene	0.03	0.03	V0
Methanol	3	3	V0
Methylcyclohexane	0.01	0.14	V0
Methylcyclopentane	0.02	0.12	V0
Methylethylketone	0.3	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1
Methylvinylketone	0.3	< 0.3	V1
n-Butane	0.03	0.56	V0
n-Decane	0.06	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1
n-Heptane	0.01	0.13	V0
n-Hexane	0.01	0.04	V0
n-Nonane	0.01	0.04	V0
n-Octane	0.02	0.08	V0
n-Pentane	0.1	< 0.1	V1
n-Propylbenzene	0.05	< 0.05	V1
n-Undecane	0.5	< 0.5	V1
Naphthalene	0.5	< 0.5	V1
o-Xylene	0.01	0.02	V0
Styrene	0.04	< 0.04	V1
Toluene	0.01	0.09	V0
trans-2-Butene	0.01	0.01	V0
trans-2-Hexene	0.3	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
Volatile Organic Compounds (VOCs) - Summary

2017
Indicated Sites and Dates

Station Name Station # Sample Date Compound Name	Bertha Ganter - Fort McKay AMS 1 Feb 06 - Feb 24 Average	Bertha Ganter - Fort McKay AMS 1 Feb 06 - Feb 24 Std Dev	Bertha Ganter - Fort McKay AMS 1 Feb 06 - Feb 24 Total Samples (#)	Bertha Ganter - Fort McKay AMS 1 Feb 06 - Feb 24 Total ≥ MDL (#)
	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.02	0.03	4	2
1,3,5-Trimethylbenzene	0.01	0.02	4	1
1,3-Butadiene	0.00	0.00	4	0
1-Butene	0.10	0.07	4	4
1-Pentene	0.02	0.02	4	2
2,2,4-Trimethylpentane	0.03	0.03	4	3
2,2-Dimethylbutane	0.07	0.05	4	3
2,3,4-Trimethylpentane	0.02	0.02	4	2
2,3-Dimethylbutane	0.10	0.07	4	3
2,3-Dimethylpentane	0.04	0.06	4	2
2,4-Dimethylpentane	0.01	0.01	4	1
2-Methyl-1-pentene	0.00	0.00	4	0
2-Methyl-2-butene	0.00	0.00	4	0
2-Methylheptane	0.15	0.18	4	4
2-Methylhexane	0.06	0.08	4	2
2-Methylpentane	0.23	0.32	4	3
3-Methyl-1-butene	0.00	0.00	4	0
3-Methylheptane	0.06	0.07	4	2
3-Methylhexane	0.10	0.09	4	4
3-Methylpentane	0.16	0.15	4	4
4-Methyl-1-pentene	0.00	0.00	4	0
Acetaldehyde	0.00	0.00	4	0
Acetone	1.35	0.17	4	4
alpha-Pinene	0.00	0.00	4	0
Benzene	0.20	0.07	4	4
beta-Pinene	0.00	0.00	4	0
cis-2-Butene	0.03	0.02	4	4
cis-2-Hexene	0.00	0.00	4	0
cis-2-Pentene	0.01	0.02	4	1
Cyclohexane	0.07	0.06	4	3
Cyclopentane	0.07	0.07	4	3
Cyclopentene	0.00	0.00	4	0
Ethanol	1.80	0.68	4	4
Ethylbenzene	0.05	0.04	4	4
Formaldehyde	0.00	0.00	4	0
Isobutane	0.41	0.20	4	4
Isobutylene	0.00	0.00	4	0
Isopentane	0.62	0.52	4	4
Isoprene	0.00	0.00	4	0
Isopropylalcohol	0.00	0.00	4	0
Isopropylbenzene	0.01	0.02	4	1
m,p-Xylene	0.09	0.11	4	3
Methanol	4.50	1.00	4	4
Methylcyclohexane	0.13	0.14	4	4
Methylcyclopentane	0.11	0.08	4	4
Methylethylketone	0.00	0.00	4	0
Methylisobutylketone	0.00	0.00	4	0
Methylvinylketone	0.00	0.00	4	0
n-Butane	0.56	0.25	4	4
n-Decane	0.00	0.00	4	0
n-Dodecane	0.00	0.00	4	0
n-Heptane	0.22	0.26	4	4
n-Hexane	0.20	0.15	4	4
n-Nonane	0.05	0.06	4	3
n-Octane	0.21	0.25	4	4
n-Pentane	0.55	0.79	4	3
n-Propylbenzene	0.00	0.00	4	0
n-Undecane	0.00	0.00	4	0
Naphthalene	0.00	0.00	4	0
o-Xylene	0.04	0.03	4	4
Styrene	0.01	0.03	4	1
Toluene	0.21	0.17	4	4
trans-2-Butene	0.02	0.03	4	2
trans-2-Hexene	0.00	0.00	4	0
trans-2-Pentene	0.01	0.02	4	1



Station Name Station # Sample Date	Patricia McInnes AMS 6 Feb 06 - Feb 24 Average	Patricia McInnes AMS 6 Feb 06 - Feb 24 Std Dev	Patricia McInnes AMS 6 Feb 06 - Feb 24 Total Samples (#)	Patricia McInnes AMS 6 Feb 06 - Feb 24 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.01	0.03	4	1
1,3,5-Trimethylbenzene	0.01	0.02	4	1
1,3-Butadiene	0.00	0.00	4	0
1-Butene	0.11	0.09	4	4
1-Pentene	0.00	0.01	4	1
2,2,4-Trimethylpentane	0.02	0.05	4	1
2,2-Dimethylbutane	0.02	0.02	4	2
2,3,4-Trimethylpentane	0.01	0.02	4	1
2,3-Dimethylbutane	0.03	0.02	4	3
2,3-Dimethylpentane	0.04	0.04	4	3
2,4-Dimethylpentane	0.01	0.02	4	1
2-Methyl-1-pentene	0.00	0.00	4	0
2-Methyl-2-butene	0.00	0.00	4	0
2-Methylheptane	0.03	0.02	4	3
2-Methylhexane	0.04	0.03	4	3
2-Methylpentane	0.08	0.05	4	4
3-Methyl-1-butene	0.00	0.00	4	0
3-Methylheptane	0.01	0.01	4	1
3-Methylhexane	0.05	0.03	4	3
3-Methylpentane	0.06	0.04	4	4
4-Methyl-1-pentene	0.00	0.00	4	0
Acetaldehyde	0.00	0.00	4	0
Acetone	1.30	0.22	4	4
alpha-Pinene	0.00	0.00	4	0
Benzene	0.15	0.07	4	4
beta-Pinene	0.00	0.00	4	0
cis-2-Butene	0.05	0.01	4	4
cis-2-Hexene	0.00	0.00	4	0
cis-2-Pentene	0.00	0.00	4	0
Cyclohexane	0.02	0.02	4	2
Cyclopentane	0.02	0.02	4	3
Cyclopentene	0.00	0.00	4	0
Ethanol	1.30	0.87	4	4
Ethylbenzene	0.02	0.02	4	3
Formaldehyde	0.00	0.00	4	0
Isobutane	0.44	0.24	4	4
Isobutylene	0.00	0.00	4	0
Isopentane	0.38	0.20	4	4
Isoprene	0.00	0.01	4	1
Isopropylalcohol	0.00	0.00	4	0
Isopropylbenzene	0.00	0.00	4	0
m,p-Xylene	0.06	0.07	4	3
Methanol	6.25	5.19	4	3
Methylcyclohexane	0.03	0.02	4	3
Methylcyclopentane	0.05	0.03	4	3
Methylethylketone	0.00	0.00	4	0
Methylisobutylketone	0.00	0.00	4	0
Methylvinylketone	0.00	0.00	4	0
n-Butane	0.91	0.59	4	4
n-Decane	0.00	0.00	4	0
n-Dodecane	0.00	0.00	4	0
n-Heptane	0.07	0.05	4	3
n-Hexane	0.10	0.06	4	4
n-Nonane	0.02	0.01	4	3
n-Octane	0.04	0.03	4	3
n-Pentane	0.25	0.17	4	3
n-Propylbenzene	0.00	0.00	4	0
n-Undecane	0.00	0.00	4	0
Naphthalene	0.00	0.00	4	0
o-Xylene	0.03	0.03	4	3
Styrene	0.00	0.00	4	0
Toluene	0.11	0.10	4	4
trans-2-Butene	0.02	0.02	4	3
trans-2-Hexene	0.00	0.00	4	0
trans-2-Pentene	0.01	0.01	4	1



Station Name Station # Sample Date	Athabasca Valley AMS 7 Feb 06 - Feb 24 Average	Athabasca Valley AMS 7 Feb 06 - Feb 24 Std Dev	Athabasca Valley AMS 7 Feb 06 - Feb 24 Total Samples (#)	Athabasca Valley AMS 7 Feb 06 - Feb 24 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.00	0.00	4	0
1,3,5-Trimethylbenzene	0.00	0.00	4	0
1,3-Butadiene	0.00	0.00	4	0
1-Butene	0.07	0.04	4	4
1-Pentene	0.00	0.00	4	0
2,2,4-Trimethylpentane	0.02	0.03	4	2
2,2-Dimethylbutane	0.02	0.02	4	3
2,3,4-Trimethylpentane	0.01	0.01	4	1
2,3-Dimethylbutane	0.03	0.02	4	3
2,3-Dimethylpentane	0.03	0.03	4	3
2,4-Dimethylpentane	0.01	0.02	4	1
2-Methyl-1-pentene	0.00	0.00	4	0
2-Methyl-2-butene	0.00	0.00	4	0
2-Methylheptane	0.02	0.02	4	3
2-Methylhexane	0.03	0.03	4	3
2-Methylpentane	0.06	0.03	4	4
3-Methyl-1-butene	0.00	0.00	4	0
3-Methylheptane	0.01	0.01	4	1
3-Methylhexane	0.04	0.03	4	3
3-Methylpentane	0.05	0.03	4	4
4-Methyl-1-pentene	0.00	0.00	4	0
Acetaldehyde	0.00	0.00	4	0
Acetone	1.30	0.37	4	4
alpha-Pinene	0.00	0.00	4	0
Benzene	0.13	0.04	4	4
beta-Pinene	0.00	0.00	4	0
cis-2-Butene	0.03	0.03	4	3
cis-2-Hexene	0.00	0.00	4	0
cis-2-Pentene	0.00	0.00	4	0
Cyclohexane	0.02	0.02	4	2
Cyclopentane	0.02	0.01	4	3
Cyclopentene	0.00	0.00	4	0
Ethanol	3.13	4.59	4	4
Ethylbenzene	0.01	0.01	4	3
Formaldehyde	0.00	0.00	4	0
Isobutane	0.41	0.17	4	4
Isobutylene	0.00	0.00	4	0
Isopentane	0.33	0.18	4	4
Isoprene	0.00	0.00	4	0
Isopropylalcohol	0.00	0.00	4	0
Isopropylbenzene	0.00	0.00	4	0
m,p-Xylene	0.03	0.03	4	3
Methanol	7.75	1.89	4	4
Methylcyclohexane	0.03	0.02	4	3
Methylcyclopentane	0.04	0.03	4	3
Methylethylketone	0.00	0.00	4	0
Methylisobutylketone	0.00	0.00	4	0
Methylvinylketone	0.00	0.00	4	0
n-Butane	0.70	0.33	4	4
n-Decane	0.00	0.00	4	0
n-Dodecane	0.00	0.00	4	0
n-Heptane	0.06	0.05	4	3
n-Hexane	0.08	0.04	4	4
n-Nonane	0.01	0.01	4	3
n-Octane	0.03	0.02	4	3
n-Pentane	0.20	0.14	4	3
n-Propylbenzene	0.00	0.00	4	0
n-Undecane	0.00	0.00	4	0
Naphthalene	0.00	0.00	4	0
o-Xylene	0.02	0.01	4	4
Styrene	0.00	0.00	4	0
Toluene	0.08	0.05	4	4
trans-2-Butene	0.00	0.00	4	0
trans-2-Hexene	0.00	0.00	4	0
trans-2-Pentene	0.00	0.00	4	0



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
Volatile Organic Compounds (VOCs) - Summary

2017
Indicated Sites and Dates

Station Name Station # Sample Date	Anzac AMS 14 Feb 06 - Feb 24 Average	Anzac AMS 14 Feb 06 - Feb 24 Std Dev	Anzac AMS 14 Feb 06 - Feb 24 Total Samples (#)	Anzac AMS 14 Feb 06 - Feb 24 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.01	0.02	4	1
1,3,5-Trimethylbenzene	0.01	0.03	4	1
1,3-Butadiene	0.00	0.00	4	0
1-Butene	0.07	0.03	4	4
1-Pentene	0.01	0.02	4	1
2,2,4-Trimethylpentane	0.03	0.04	4	2
2,2-Dimethylbutane	0.03	0.03	4	3
2,3,4-Trimethylpentane	0.02	0.02	4	2
2,3-Dimethylbutane	0.03	0.04	4	2
2,3-Dimethylpentane	0.02	0.03	4	2
2,4-Dimethylpentane	0.01	0.01	4	1
2-Methyl-1-pentene	0.00	0.00	4	0
2-Methyl-2-butene	0.00	0.00	4	0
2-Methylheptane	0.03	0.03	4	3
2-Methylhexane	0.03	0.03	4	3
2-Methylpentane	0.03	0.03	4	3
3-Methyl-1-butene	0.00	0.00	4	0
3-Methylheptane	0.01	0.03	4	1
3-Methylhexane	0.04	0.04	4	3
3-Methylpentane	0.05	0.05	4	3
4-Methyl-1-pentene	0.00	0.00	4	0
Acetaldehyde	0.00	0.00	4	0
Acetone	1.18	0.33	4	4
alpha-Pinene	0.00	0.00	4	0
Benzene	0.13	0.05	4	4
beta-Pinene	0.00	0.00	4	0
cis-2-Butene	0.02	0.02	4	2
cis-2-Hexene	0.00	0.00	4	0
cis-2-Pentene	0.01	0.02	4	1
Cyclohexane	0.03	0.05	4	2
Cyclopentane	0.03	0.04	4	3
Cyclopentene	0.00	0.00	4	0
Ethanol	0.38	0.43	4	2
Ethylbenzene	0.02	0.02	4	2
Formaldehyde	0.00	0.00	4	0
Isobutane	0.33	0.13	4	4
Isobutylene	0.00	0.00	4	0
Isopentane	0.29	0.17	4	4
Isoprene	0.00	0.00	4	0
Isopropylalcohol	0.00	0.00	4	0
Isopropylbenzene	0.01	0.02	4	1
m,p-Xylene	0.01	0.02	4	1
Methanol	4.25	0.50	4	4
Methylcyclohexane	0.04	0.04	4	3
Methylcyclopentane	0.04	0.05	4	2
Methylethylketone	0.00	0.00	4	0
Methylisobutylketone	0.00	0.00	4	0
Methylvinylketone	0.00	0.00	4	0
n-Butane	0.56	0.38	4	4
n-Decane	0.00	0.00	4	0
n-Dodecane	0.00	0.00	4	0
n-Heptane	0.06	0.05	4	3
n-Hexane	0.08	0.07	4	4
n-Nonane	0.01	0.01	4	2
n-Octane	0.03	0.04	4	2
n-Pentane	0.20	0.16	4	3
n-Propylbenzene	0.00	0.00	4	0
n-Undecane	0.00	0.00	4	0
Naphthalene	0.00	0.00	4	0
o-Xylene	0.01	0.01	4	2
Styrene	0.01	0.02	4	1
Toluene	0.09	0.05	4	4
trans-2-Butene	0.02	0.02	4	2
trans-2-Hexene	0.00	0.00	4	0
trans-2-Pentene	0.01	0.02	4	1



Station Name Station # Sample Date	Barge Landing AMS 9 Feb 06 - Feb 24 Average	Barge Landing AMS 9 Feb 06 - Feb 24 Std Dev	Barge Landing AMS 9 Feb 06 - Feb 24 Total Samples (#)	Barge Landing AMS 9 Feb 06 - Feb 24 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.02	0.04	4	1
1,3,5-Trimethylbenzene	0.02	0.03	4	1
1,3-Butadiene	0.02	0.03	4	1
1-Butene	0.08	0.10	4	2
1-Pentene	0.01	0.02	4	1
2,2,4-Trimethylpentane	0.01	0.02	4	1
2,2-Dimethylbutane	0.11	0.10	4	4
2,3,4-Trimethylpentane	0.01	0.01	4	1
2,3-Dimethylbutane	0.12	0.12	4	3
2,3-Dimethylpentane	0.03	0.05	4	2
2,4-Dimethylpentane	0.01	0.01	4	1
2-Methyl-1-pentene	0.00	0.00	4	0
2-Methyl-2-butene	0.00	0.00	4	0
2-Methylheptane	0.07	0.08	4	4
2-Methylhexane	0.05	0.06	4	3
2-Methylpentane	0.35	0.39	4	3
3-Methyl-1-butene	0.00	0.00	4	0
3-Methylheptane	0.03	0.03	4	2
3-Methylhexane	0.07	0.07	4	3
3-Methylpentane	0.23	0.24	4	4
4-Methyl-1-pentene	0.00	0.00	4	0
Acetaldehyde	0.00	0.00	4	0
Acetone	1.28	0.24	4	4
alpha-Pinene	0.00	0.00	4	0
Benzene	0.20	0.08	4	4
beta-Pinene	0.00	0.00	4	0
cis-2-Butene	0.00	0.00	4	0
cis-2-Hexene	0.00	0.00	4	0
cis-2-Pentene	0.00	0.00	4	0
Cyclohexane	0.06	0.05	4	3
Cyclopentane	0.09	0.09	4	3
Cyclopentene	0.00	0.00	4	0
Ethanol	1.10	0.41	4	4
Ethylbenzene	0.03	0.03	4	3
Formaldehyde	0.00	0.00	4	0
Isobutane	0.43	0.34	4	4
Isobutylene	0.00	0.00	4	0
Isopentane	0.82	0.79	4	4
Isoprene	0.01	0.01	4	1
Isopropylalcohol	0.15	0.30	4	1
Isopropylbenzene	0.00	0.00	4	0
m,p-Xylene	0.07	0.07	4	3
Methanol	23.50	38.35	4	4
Methylcyclohexane	0.07	0.07	4	4
Methylcyclopentane	0.08	0.09	4	3
Methylethylketone	0.00	0.00	4	0
Methylisobutylketone	0.00	0.00	4	0
Methylvinylketone	0.00	0.00	4	0
n-Butane	0.52	0.35	4	4
n-Decane	0.00	0.00	4	0
n-Dodecane	0.00	0.00	4	0
n-Heptane	0.15	0.14	4	4
n-Hexane	0.24	0.21	4	4
n-Nonane	0.04	0.03	4	4
n-Octane	0.10	0.12	4	4
n-Pentane	0.75	0.81	4	3
n-Propylbenzene	0.00	0.00	4	0
n-Undecane	0.00	0.00	4	0
Naphthalene	0.00	0.00	4	0
o-Xylene	0.04	0.03	4	4
Styrene	0.02	0.05	4	1
Toluene	0.15	0.12	4	4
trans-2-Butene	0.00	0.00	4	0
trans-2-Hexene	0.00	0.00	4	0
trans-2-Pentene	0.00	0.00	4	0



Station Name Station # Sample Date	Fort McKay South AMS 13 Feb 06 - Feb 24 Average	Fort McKay South AMS 13 Feb 06 - Feb 24 Std Dev	Fort McKay South AMS 13 Feb 06 - Feb 24 Total Samples (#)	Fort McKay South AMS 13 Feb 06 - Feb 24 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.00	0.00	4	0
1,3,5-Trimethylbenzene	0.00	0.00	4	0
1,3-Butadiene	0.00	0.00	4	0
1-Butene	0.06	0.05	4	3
1-Pentene	0.01	0.01	4	1
2,2,4-Trimethylpentane	0.00	0.00	4	0
2,2-Dimethylbutane	0.05	0.03	4	4
2,3,4-Trimethylpentane	0.01	0.02	4	1
2,3-Dimethylbutane	0.06	0.04	4	4
2,3-Dimethylpentane	0.05	0.07	4	3
2,4-Dimethylpentane	0.01	0.02	4	1
2-Methyl-1-pentene	0.00	0.00	4	0
2-Methyl-2-butene	0.00	0.00	4	0
2-Methylheptane	0.18	0.28	4	4
2-Methylhexane	0.07	0.11	4	2
2-Methylpentane	0.14	0.14	4	4
3-Methyl-1-butene	0.00	0.00	4	0
3-Methylheptane	0.06	0.10	4	2
3-Methylhexane	0.10	0.12	4	4
3-Methylpentane	0.10	0.09	4	4
4-Methyl-1-pentene	0.00	0.00	4	0
Acetaldehyde	0.00	0.00	4	0
Acetone	1.15	0.29	4	4
alpha-Pinene	0.00	0.00	4	0
Benzene	0.14	0.05	4	4
beta-Pinene	0.00	0.00	4	0
cis-2-Butene	0.03	0.02	4	3
cis-2-Hexene	0.00	0.00	4	0
cis-2-Pentene	0.00	0.00	4	0
Cyclohexane	0.05	0.06	4	3
Cyclopentane	0.04	0.04	4	3
Cyclopentene	0.00	0.00	4	0
Ethanol	0.35	0.29	4	3
Ethylbenzene	0.04	0.04	4	4
Formaldehyde	0.00	0.00	4	0
Isobutane	0.47	0.21	4	4
Isobutylene	0.00	0.00	4	0
Isopentane	0.39	0.27	4	4
Isoprene	0.00	0.00	4	0
Isopropylalcohol	0.00	0.00	4	0
Isopropylbenzene	0.00	0.00	4	0
m,p-Xylene	0.08	0.09	4	3
Methanol	2.75	1.89	4	3
Methylcyclohexane	0.14	0.21	4	4
Methylcyclopentane	0.09	0.11	4	3
Methylethylketone	0.00	0.00	4	0
Methylisobutylketone	0.00	0.00	4	0
Methylvinylketone	0.00	0.00	4	0
n-Butane	0.52	0.28	4	4
n-Decane	0.00	0.00	4	0
n-Dodecane	0.00	0.00	4	0
n-Heptane	0.26	0.41	4	4
n-Hexane	0.16	0.19	4	4
n-Nonane	0.06	0.06	4	4
n-Octane	0.25	0.40	4	4
n-Pentane	0.33	0.40	4	3
n-Propylbenzene	0.00	0.00	4	0
n-Undecane	0.00	0.00	4	0
Naphthalene	0.00	0.00	4	0
o-Xylene	0.03	0.03	4	3
Styrene	0.00	0.00	4	0
Toluene	0.16	0.18	4	4
trans-2-Butene	0.00	0.01	4	1
trans-2-Hexene	0.00	0.00	4	0
trans-2-Pentene	0.00	0.00	4	0



Station Name Station # Sample Date	CNRL Horizon AMS 15 Feb 06 - Feb 24 Average	CNRL Horizon AMS 15 Feb 06 - Feb 24 Std Dev	CNRL Horizon AMS 15 Feb 06 - Feb 24 Total Samples (#)	CNRL Horizon AMS 15 Feb 06 - Feb 24 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.02	0.03	4	1
1,3,5-Trimethylbenzene	0.01	0.02	4	1
1,3-Butadiene	0.00	0.00	4	0
1-Butene	0.05	0.02	4	4
1-Pentene	0.00	0.00	4	0
2,2,4-Trimethylpentane	0.00	0.00	4	0
2,2-Dimethylbutane	0.06	0.04	4	4
2,3,4-Trimethylpentane	0.01	0.01	4	2
2,3-Dimethylbutane	0.10	0.06	4	4
2,3-Dimethylpentane	0.04	0.07	4	2
2,4-Dimethylpentane	0.01	0.02	4	1
2-Methyl-1-pentene	0.00	0.00	4	0
2-Methyl-2-butene	0.00	0.00	4	0
2-Methylheptane	0.10	0.13	4	4
2-Methylhexane	0.04	0.06	4	2
2-Methylpentane	0.11	0.13	4	3
3-Methyl-1-butene	0.00	0.00	4	0
3-Methylheptane	0.03	0.05	4	2
3-Methylhexane	0.08	0.08	4	3
3-Methylpentane	0.15	0.11	4	4
4-Methyl-1-pentene	0.00	0.00	4	0
Acetaldehyde	0.00	0.00	4	0
Acetone	1.53	0.38	4	4
alpha-Pinene	0.00	0.00	4	0
Benzene	0.14	0.05	4	4
beta-Pinene	0.00	0.00	4	0
cis-2-Butene	0.01	0.02	4	1
cis-2-Hexene	0.00	0.00	4	0
cis-2-Pentene	0.00	0.00	4	0
Cyclohexane	0.12	0.09	4	4
Cyclopentane	0.06	0.04	4	4
Cyclopentene	0.00	0.00	4	0
Ethanol	0.58	0.24	4	4
Ethylbenzene	0.02	0.03	4	2
Formaldehyde	0.00	0.00	4	0
Isobutane	0.71	0.33	4	4
Isobutylene	0.00	0.00	4	0
Isopentane	0.76	0.43	4	4
Isoprene	0.00	0.00	4	0
Isopropylalcohol	0.00	0.00	4	0
Isopropylbenzene	0.00	0.00	4	0
m,p-Xylene	0.04	0.06	4	2
Methanol	2.25	1.50	4	3
Methylcyclohexane	0.13	0.15	4	4
Methylcyclopentane	0.11	0.08	4	4
Methylethylketone	0.00	0.00	4	0
Methylisobutylketone	0.00	0.00	4	0
Methylvinylketone	0.00	0.00	4	0
n-Butane	0.49	0.14	4	4
n-Decane	0.00	0.00	4	0
n-Dodecane	0.00	0.00	4	0
n-Heptane	0.17	0.22	4	4
n-Hexane	0.09	0.08	4	4
n-Nonane	0.04	0.05	4	2
n-Octane	0.13	0.20	4	3
n-Pentane	0.30	0.36	4	2
n-Propylbenzene	0.00	0.00	4	0
n-Undecane	0.00	0.00	4	0
Naphthalene	0.00	0.00	4	0
o-Xylene	0.02	0.02	4	2
Styrene	0.00	0.00	4	0
Toluene	0.10	0.09	4	4
trans-2-Butene	0.00	0.01	4	1
trans-2-Hexene	0.00	0.00	4	0
trans-2-Pentene	0.00	0.00	4	0



Wood Buffalo Environmental Association

VOC (ppb) summary

2017 February

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	21.4%	28	22	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.06	0.06	0.08	0.08	0.01	0.02	0.00	0.13
1,3,5-Trimethylbenzene	17.9%	28	23	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
1,3-Butadiene	3.6%	28	27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.01	0.00	0.06
1-Butene	89.3%	28	3	0.00	0.00	0.03	0.07	0.08	0.10	0.11	0.19	0.21	0.21	0.21	0.08	0.06	0.07	0.37
1-Pentene	21.4%	28	22	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.04	0.04	0.04	0.01	0.01	0.00	0.07
2,2,4-Trimethylpentane	32.1%	28	19	0.00	0.00	0.00	0.00	0.04	0.05	0.06	0.07	0.09	0.09	0.02	0.03	0.00	0.15	
2,2-Dimethylbutane	82.1%	28	5	0.00	0.02	0.04	0.04	0.07	0.08	0.12	0.13	0.24	0.24	0.05	0.05	0.04	0.31	
2,3,4-Trimethylpentane	35.7%	28	18	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.04	0.05	0.05	0.01	0.02	0.00	0.09	
2,3-Dimethylbutane	78.6%	28	6	0.00	0.03	0.04	0.06	0.10	0.11	0.16	0.18	0.27	0.27	0.07	0.07	0.04	0.40	
2,3-Dimethylpentane	60.7%	28	11	0.00	0.00	0.02	0.03	0.07	0.07	0.13	0.14	0.15	0.15	0.04	0.05	0.02	0.27	
2,4-Dimethylpentane	25.0%	28	21	0.00	0.00	0.00	0.00	0.02	0.02	0.03	0.03	0.03	0.03	0.01	0.01	0.00	0.06	
2-Methyl-1-pentene	0.0%	28	28	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%	28	28	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	89.3%	28	3	0.00	0.02	0.03	0.04	0.06	0.10	0.29	0.40	0.59	0.59	0.08	0.14	0.03	0.76	
2-Methylhexane	64.3%	28	10	0.00	0.00	0.03	0.04	0.06	0.07	0.13	0.17	0.22	0.22	0.04	0.06	0.03	0.33	
2-Methylpentane	85.7%	28	4	0.00	0.02	0.06	0.09	0.18	0.23	0.60	0.68	0.76	0.76	0.14	0.21	0.06	1.19	
3-Methyl-1-butene	0.0%	28	28	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	39.3%	28	17	0.00	0.00	0.00	0.00	0.03	0.05	0.11	0.14	0.20	0.20	0.03	0.05	0.00	0.28	
3-Methylhexane	82.1%	28	5	0.00	0.03	0.06	0.06	0.08	0.09	0.19	0.23	0.28	0.28	0.07	0.07	0.06	0.42	
3-Methylpentane	96.4%	28	1	0.00	0.01	0.03	0.08	0.09	0.15	0.16	0.36	0.37	0.50	0.50	0.11	0.13	0.74	
4-Methyl-1-pentene	0.0%	28	28	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	0.0%	28	28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	
Acetone	100.0%	28	0	0.80	0.90	1.10	1.30	1.40	1.50	1.50	1.70	1.80	1.80	1.80	1.30	0.28	1.30	2.71
alpha-Pinene	0.0%	28	28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	
Benzene	100.0%	28	0	0.08	0.09	0.10	0.15	0.17	0.21	0.21	0.25	0.25	0.27	0.27	0.15	0.06	0.15	0.45
beta-Pinene	0.0%	28	28	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-Butene	60.7%	28	11	0.00	0.00	0.03	0.03	0.05	0.05	0.05	0.06	0.06	0.06	0.02	0.02	0.03	0.13	
cis-2-Hexene	0.0%	28	28	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	7.1%	28	26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.04	0.00	0.01	0.00	0.06	
Cyclohexane	67.9%	28	9	0.00	0.00	0.03	0.03	0.10	0.10	0.13	0.18	0.21	0.21	0.05	0.06	0.03	0.34	
Cyclopentane	78.6%	28	6	0.00	0.01	0.02	0.04	0.06	0.08	0.16	0.17	0.17	0.17	0.05	0.05	0.02	0.31	
Cyclopentene	0.0%	28	28	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	89.3%	28	3	0.00	0.50	0.80	0.90	1.50	1.50	2.20	2.50	10.00	10.00	1.23	1.84	0.80	10.45	
Ethylbenzene	75.0%	28	7	0.00	0.01	0.02	0.02	0.05	0.05	0.07	0.09	0.09	0.09	0.03	0.03	0.02	0.17	
Formaldehyde	0.0%	28	28	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%	28	0	0.18	0.22	0.27	0.39	0.46	0.62	0.63	0.76	0.94	1.19	1.19	0.45	0.24	0.39	1.66
Isobutylene	0.0%	28	28	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%	28	0	0.09	0.11	0.23	0.45	0.46	0.69	0.72	1.32	1.37	1.80	1.80	0.51	0.43	0.45	2.64
Isoprene	7.1%	28	26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.00	0.00	0.00	0.02	
Isopropylalcohol	3.6%	28	27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.60	0.02	0.11	0.00	0.59	
Isopropylbenzene	7.1%	28	26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.00	0.01	0.00	0.04	
m,p-Xylene	64.3%	28	10	0.00	0.00	0.04	0.04	0.09	0.12	0.16	0.20	0.24	0.24	0.06	0.07	0.04	0.39	
Methanol	89.3%	28	3	0.00	3.00	4.00	5.00	6.00	8.00	10.00	11.00	81.00	81.00	7.32	14.70	4.00	80.82	
Methylcyclohexane	89.3%	28	3	0.00	0.02	0.04	0.04	0.09	0.14	0.31	0.34	0.45	0.45	0.08	0.11	0.04	0.64	
Methylcyclopentane	78.6%	28	6	0.00	0.03	0.06	0.06	0.10	0.11	0.21	0.22	0.24	0.24	0.07	0.07	0.06	0.42	
Methylethylketone	0.0%	28	28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	
Methylisobutylketone	0.0%	28	28	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	0.0%	28	28	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-Butane	100.0%	28	0	0.27	0.29	0.37	0.47	0.51	0.93	0.93	1.11	1.27	1.55	1.55	0.61	0.34	0.47	2.33
n-Decane	0.0%	28	28	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%	28	28	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	89.3%	28	3	0.00	0.04	0.08	0.09	0.13	0.17	0.49	0.59	0.87	0.87	0.14	0.20	0.08	1.14	
n-Hexane	100.0%	28	0	0.02	0.02	0.03	0.10	0.12	0.18	0.21	0.36	0.42	0.52	0.52	0.13	0.13	0.10	0.78
n-Nonane	75.0%	28	7	0.00	0.01	0.02	0.02	0.04	0.04	0.11	0.13	0.15	0.15	0.03	0.04	0.02	0.23	
n-Octane	82.1%	28	5	0.00	0.02	0.05	0.05	0.09	0.11	0.42	0.57	0.85	0.85	0.11	0.19	0.05	1.09	
n-Pentane	71.4%	28	8	0.00	0.00	0.30	0.30	0.40	0.50	1.40	1.50	1.70	1.70	0.37	0.47	0.30	2.71	
n-Propylbenzene	0.0%	28	28	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%	28	28	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%	28	28	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	78.6%	28	6	0.00	0.01	0.02	0.02	0.04	0.05	0.07	0.07	0.08	0.08	0.02	0.02	0.02	0.14	
Styrene	10.7%	28	25	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.05	0.09	0.09	0.01	0.02	0.00	0.11	
Toluene	100.0%	28	0	0.02	0.03	0.05	0.09	0.19	0.23	0.30	0.43	0.43	0.43	0.13	0.11	0.09	0.70	
trans-2-Butene	32.1%	28	19	0.00	0.00	0.00	0.00	0.02	0.02	0.04	0.05	0.06	0.06	0.01	0.02	0.00	0.09	
trans-2-Hexene	0.0%	28	28	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	10.7%	28	25	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.04	0.04	0.00	0.01	0.00	0.05	



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PARTICULATE MATTER - IONS DATA SUMMARY FEBRUARY 2017

Prepared
April 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 FEBRUARY 2017

Prepared
April 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-Feb			06-Feb		06-Feb	
Particulate Size	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	11.56	V0	5.05	V0	0.16	V0
Calcium	0.16	0.11	V0	0.07	V0	0.01	V0
Magnesium	0.03	0.07	V0	0.04	V0	0.00	V0
Potassium	0.09	0.05	V0	0.01	V0	0.00	V1
Sodium	0.05	0.22	V0	0.21	V0	0.00	V1
Chloride	0.12	0.02	V0	0.15	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.00	V1
Nitrate	0.20	0.30	V0	0.60	V0	0.00	V1
Sulphate	0.25	3.21	V0	0.48	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.70	V0	0.16	V0	0.00	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		06-Feb	
Sample Date	06-Feb			06-Feb		06-Feb	
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	6.86	V0	2.85	V0	0.16	V0
Calcium	0.16	0.08	V0	0.05	V0	0.01	V0
Magnesium	0.03	0.05	V0	0.04	V0	0.00	V0
Potassium	0.09	0.02	V0	0.01	V0	0.00	V1
Sodium	0.05	0.35	V0	0.17	V0	0.00	V1
Chloride	0.12	0.37	V0	0.16	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.00	V1
Nitrate	0.20	0.94	V0	0.24	V0	0.00	V1
Sulphate	0.25	0.78	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	0.09	V0	0.00	V1



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6			
Sample Date	12-Feb			12-Feb		12-Feb	
Particulate Size	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	1.14	V4	0.66	V4	0.07	V0
Calcium	0.16	0.08	V0	0.05	V0	0.01	V0
Magnesium	0.03	0.01	V0	0.01	V0	0.00	V0
Potassium	0.09	0.01	V0	0.00	V1	0.00	V1
Sodium	0.05	0.01	V0	0.01	V0	0.00	V0
Chloride	0.12	0.01	V0	0.01	V0	0.01	V0
Fluoride	0.15	0.00	V1	0.01	V0	0.01	V0
Nitrate	0.20	0.03	V0	0.02	V0	0.00	V1
Sulphate	0.25	0.07	V0	0.06	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	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		12-Feb	
Sample Date	12-Feb			12-Feb		12-Feb	
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	0.95	V0	0.81	V4	0.07	V0
Calcium	0.16	0.05	V0	0.04	V0	0.01	V0
Magnesium	0.03	0.01	V0	0.01	V0	0.00	V0
Potassium	0.09	0.01	V0	0.00	V0	0.00	V1
Sodium	0.05	0.06	V0	0.01	V0	0.00	V0
Chloride	0.12	0.08	V0	0.01	V0	0.01	V0
Fluoride	0.15	0.00	V1	0.01	V0	0.01	V0
Nitrate	0.20	0.04	V0	0.02	V0	0.00	V1
Sulphate	0.25	0.06	V0	0.05	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



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6			
Sample Date	18-Feb			18-Feb		18-Feb	
Particulate Size	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	2.48	V0	4.93	V0	0.31	V0
Calcium	0.16	0.04	V0	0.05	V0	0.02	V0
Magnesium	0.03	0.01	V0	0.01	V0	0.01	V0
Potassium	0.09	0.01	V0	0.01	V0	0.00	V1
Sodium	0.05	0.05	V0	0.02	V0	0.00	V1
Chloride	0.12	0.01	V0	0.01	V0	0.00	V1
Fluoride	0.15	-9999	M2	0.00	V1	0.01	V0
Nitrate	0.20	0.09	V0	0.53	V0	0.09	V0
Sulphate	0.25	0.39	V0	1.36	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.11	V0	0.52	V0	0.00	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		18-Feb	
Sample Date	18-Feb			18-Feb		18-Feb	
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	4.18	V0	4.68	V0	0.31	V0
Calcium	0.16	0.05	V0	0.09	V0	0.02	V0
Magnesium	0.03	0.01	V0	-9999	M2	0.01	V0
Potassium	0.09	0.02	V0	0.00	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	-9999	M2	0.01	V0
Nitrate	0.20	0.53	V0	0.02	V0	0.09	V0
Sulphate	0.25	0.78	V0	2.11	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.34	V0	0.60	V0	0.00	V0



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6			
Sample Date	24-Feb			24-Feb		24-Feb	
Particulate Size	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	3.62	V0	3.34	V0	0.07	V0
Calcium	0.16	0.05	V0	0.07	V0	0.00	V1
Magnesium	0.03	0.02	V0	0.02	V0	0.00	V1
Potassium	0.09	0.01	V0	0.01	V0	0.00	V1
Sodium	0.05	0.10	V0	0.09	V0	0.00	V1
Chloride	0.12	0.04	V0	0.03	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.21	V0	0.35	V0	0.00	V1
Sulphate	0.25	0.50	V0	0.66	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.15	V0	0.22	V0	0.00	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		24-Feb	
Sample Date	24-Feb			24-Feb		24-Feb	
Particulate Size	PM2.5			PM2.5		24	
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	5.53	V0	3.06	V0	0.07	V0
Calcium	0.16	0.10	V0	0.13	V0	0.00	V1
Magnesium	0.03	0.03	V0	0.02	V0	0.00	V1
Potassium	0.09	0.04	V0	0.01	V0	0.00	V1
Sodium	0.05	0.31	V0	0.08	V0	0.00	V1
Chloride	0.12	0.31	V0	0.02	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.00	V1	0.00	V1
Nitrate	0.20	0.51	V0	0.19	V0	0.00	V1
Sulphate	0.25	0.76	V0	0.75	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.24	V0	0.21	V0	0.00	V0



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

Particulate Matter (PM2.5) - IONS - 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	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m³	Std Dev µg/m³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	4.70	4.68	4	4
Calcium	0.07	0.03	4	4
Magnesium	0.03	0.03	4	4
Potassium	0.02	0.02	4	4
Sodium	0.10	0.09	4	4
Chloride	0.02	0.02	4	4
Fluoride	0.00	0.01	3	1
Nitrate	0.16	0.12	4	4
Sulphate	1.04	1.46	4	4
Phosphate	0.00	0.00	4	0
Ammonium (as N)	0.24	0.31	4	4



Station Name	Patricia McInnes	Patricia McInnes	Patricia McInnes	Patricia McInnes
Station #	AMS 6	AMS 6	AMS 6	AMS 6
Sample Date	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
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	3.50	2.04	4	4
Calcium	0.06	0.01	4	4
Magnesium	0.02	0.02	4	4
Potassium	0.01	0.01	4	3
Sodium	0.08	0.09	4	4
Chloride	0.05	0.07	4	4
Fluoride	0.00	0.00	4	2
Nitrate	0.37	0.26	4	4
Sulphate	0.64	0.54	4	4
Phosphate	0.00	0.00	4	0
Ammonium (as N)	0.23	0.21	4	4



Station Name	Athabasca Valley	Athabasca Valley	Athabasca Valley	Athabasca Valley
Station #	AMS 7	AMS 7	AMS 7	AMS 7
Sample Date	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
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	4.38	2.54	4	4
Calcium	0.07	0.03	4	4
Magnesium	0.02	0.02	4	4
Potassium	0.02	0.01	4	4
Sodium	0.18	0.17	4	4
Chloride	0.19	0.17	4	4
Fluoride	0.00	0.01	4	2
Nitrate	0.50	0.37	4	4
Sulphate	0.59	0.35	4	4
Phosphate	0.00	0.00	4	0
Ammonium (as N)	0.23	0.15	4	4



Station Name	Anzac	Anzac	Anzac	Anzac
Station #	AMS 14	AMS 14	AMS 14	AMS 14
Sample Date	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average	Std Dev	Total Samples (#)	Total ≥ MDL (#)
	µg/m³	µg/m³		
Particulate Matter	2.85	1.59	4	4
Calcium	0.08	0.04	4	4
Magnesium	0.02	0.02	3	3
Potassium	0.01	0.00	4	4
Sodium	0.07	0.08	4	4
Chloride	0.05	0.07	4	4
Fluoride	0.01	0.01	3	2
Nitrate	0.12	0.12	4	4
Sulphate	0.83	0.90	4	4
Phosphate	0.00	0.00	4	0
Ammonium (as N)	0.23	0.26	4	4



Wood Buffalo Environmental Association

PM2.5 Ion (µg/sample) Summary

2017 February

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%	16	0	16	19	60	87	100	121	121	165	277	277	277	93	66	87	423
Calcium	100.0%	16	0	0.87	0.87	1.20	1.71	1.74	2.07	2.07	2.64	3.00	3.00	3.00	1.65	0.64	1.71	4.87
Magnesium	100.0%	16	0	0.12	0.12	0.24	0.45	0.48	0.87	0.87	1.17	1.68	1.68	1.68	0.52	0.45	0.45	2.76
Potassium	93.8%	16	1	0.06	0.09	0.15	0.21	0.21	0.36	0.36	0.87	1.08	1.08	1.08	0.30	0.29	0.21	1.74
Sodium	100.0%	16	0	0.21	0.24	0.39	1.89	2.25	5.04	5.04	7.47	8.34	8.34	8.34	2.59	2.69	1.89	16.03
Chloride	100.0%	16	0	0.21	0.24	0.27	0.57	0.75	3.57	3.57	7.41	8.79	8.79	8.79	1.90	2.70	0.57	15.38
Fluoride	56.3%	16	7	0.09	0.09	0.09	0.15	0.21	0.24	0.24	0.27	0.27	0.27	0.27	0.17	0.07	0.15	0.51
Nitrate	100.0%	16	0	0.39	0.45	0.87	5.82	7.29	12.60	12.60	14.49	22.50	22.50	22.50	6.91	6.49	5.82	39.35
Sulphate	100.0%	16	0	1.17	1.32	9.42	15.72	18.03	18.63	18.63	50.64	76.98	76.98	76.98	18.58	20.14	15.72	119.30
Phosphate	0.0%	16	16	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%	16	0	0.37	0.40	2.21	4.99	5.26	8.27	8.27	14.44	16.82	16.82	16.82	5.60	5.16	4.99	31.39



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PARTICULATE MATTER (PM₁₀) - IONS DATA SUMMARY FEBRUARY 2017

Prepared
April 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-Feb			06-Feb		06-Feb	
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	20.17	V0	9.01	V0	0.22	V0
Calcium	0.16	0.42	V0	0.17	V0	0.01	V0
Magnesium	0.03	0.10	V0	0.07	V0	0.00	V0
Potassium	0.09	0.07	V0	0.03	V0	0.00	V1
Sodium	0.05	0.56	V0	0.69	V0	0.01	V0
Chloride	0.12	0.52	V0	0.99	V0	0.01	V0
Fluoride	0.15	0.01	V0	0.01	V0	0.00	V1
Nitrate	0.20	0.83	V0	0.83	V0	0.03	V0
Sulphate	0.25	3.44	V0	0.50	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.77	V0	0.22	V0	0.00	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		06-Feb	
Sample Date	06-Feb			06-Feb		06-Feb	
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	18.79	V0	3.47	V0	0.22	V0
Calcium	0.16	0.38	V0	0.05	V0	0.01	V0
Magnesium	0.03	0.12	V0	0.04	V0	0.00	V0
Potassium	0.09	0.07	V0	0.01	V0	0.00	V1
Sodium	0.05	2.91	V0	0.26	V0	0.01	V0
Chloride	0.12	4.27	V0	0.31	V0	0.01	V0
Fluoride	0.15	0.03	V0	0.01	V0	0.00	V1
Nitrate	0.20	1.22	V0	0.29	V0	0.03	V0
Sulphate	0.25	0.85	V0	0.38	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.26	V0	0.09	V0	0.00	V1



Station Name	Fort McKay South			CNRL Horizon		Travel Blank	
Station #	AMS 13			AMS 15		06-Feb	
Sample Date	06-Feb			06-Feb		06-Feb	
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	13.16	V0	16.14	V0	0.22	V0
Calcium	0.16	0.28	V0	0.16	V0	0.01	V0
Magnesium	0.03	0.07	V0	0.07	V0	0.00	V0
Potassium	0.09	0.04	V0	0.02	V0	0.00	V1
Sodium	0.05	0.53	V0	0.31	V0	0.01	V0
Chloride	0.12	0.50	V0	0.17	V0	0.01	V0
Fluoride	0.15	0.02	V0	0.01	V0	0.00	V1
Nitrate	0.20	0.68	V0	0.71	V0	0.03	V0
Sulphate	0.25	2.32	V0	0.96	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.54	V0	0.21	V0	0.00	V1



Station Name	Albian Muskeg River			Travel Blank	
Station #	AMS 16			06-Feb	
Sample Date	06-Feb			06-Feb	
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	48.48	V0	0.22	V0
Calcium	0.16	1.13	V0	0.01	V0
Magnesium	0.03	0.19	V0	0.00	V0
Potassium	0.09	0.06	V0	0.00	V1
Sodium	0.05	0.49	V0	0.01	V0
Chloride	0.12	0.38	V0	0.01	V0
Fluoride	0.15	0.01	V0	0.00	V1
Nitrate	0.20	1.18	V0	0.03	V0
Sulphate	0.25	2.55	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.47	V0	0.00	V1



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6			
Sample Date	12-Feb			12-Feb		12-Feb	
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	3.54	V0	1.87	V0	0.24	V0
Calcium	0.16	0.10	V0	0.06	V0	0.01	V0
Magnesium	0.03	0.01	V0	0.01	V0	0.00	V1
Potassium	0.09	0.01	V0	0.00	V0	0.01	V0
Sodium	0.05	0.03	V0	0.03	V0	0.00	V0
Chloride	0.12	0.04	V0	0.04	V0	0.01	V0
Fluoride	0.15	0.01	V0	0.00	V1	0.01	V0
Nitrate	0.20	0.07	V0	0.03	V0	0.02	V0
Sulphate	0.25	0.09	V0	0.08	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	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		12-Feb	
Sample Date	12-Feb			12-Feb		12-Feb	
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	6.87	V0	1.49	V0	0.24	V0
Calcium	0.16	0.16	V0	0.04	V0	0.01	V0
Magnesium	0.03	0.03	V0	0.01	V0	0.00	V1
Potassium	0.09	0.04	V0	0.00	V0	0.01	V0
Sodium	0.05	1.37	V0	0.03	V0	0.00	V0
Chloride	0.12	2.10	V0	0.03	V0	0.01	V0
Fluoride	0.15	0.01	V0	0.01	V0	0.01	V0
Nitrate	0.20	0.03	V0	0.03	V0	0.02	V0
Sulphate	0.25	0.09	V0	0.06	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	V0



Station Name	Fort McKay South			CNRL Horizon		Travel Blank	
Station #	AMS 13			AMS 15		12-Feb	
Sample Date	12-Feb			12-Feb		12-Feb	
Particulate Size	PM10			PM10		24	
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	3.26	V0	2.56	V0	0.24	V0
Calcium	0.16	0.06	V0	0.04	V0	0.01	V0
Magnesium	0.03	0.01	V0	0.01	V0	0.00	V1
Potassium	0.09	0.01	V0	0.00	V0	0.01	V0
Sodium	0.05	0.02	V0	0.02	V0	0.00	V0
Chloride	0.12	0.01	V0	0.01	V0	0.01	V0
Fluoride	0.15	0.01	V0	0.01	V0	0.01	V0
Nitrate	0.20	0.05	V0	0.03	V0	0.02	V0
Sulphate	0.25	0.07	V0	0.08	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	V0



Station Name	Albian Muskeg River			Travel Blank	
Station #	AMS 16			12-Feb	
Sample Date	12-Feb			12-Feb	
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	7.15	V0	0.24	V0
Calcium	0.16	0.11	V0	0.01	V0
Magnesium	0.03	0.01	V0	0.00	V1
Potassium	0.09	0.01	V0	0.01	V0
Sodium	0.05	0.05	V0	0.00	V0
Chloride	0.12	0.05	V0	0.01	V0
Fluoride	0.15	0.01	V0	0.01	V0
Nitrate	0.20	0.06	V0	0.02	V0
Sulphate	0.25	0.20	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.04	V0	0.00	V0



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6			
Sample Date	18-Feb			18-Feb		18-Feb	
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	5.99	V0	7.35	V0	0.35	V0
Calcium	0.16	0.12	V0	0.12	V0	0.01	V0
Magnesium	0.03	0.03	V0	0.02	V0	0.00	V1
Potassium	0.09	0.01	V0	0.01	V0	0.00	V1
Sodium	0.05	0.08	V0	0.14	V0	0.00	V1
Chloride	0.12	0.05	V0	0.13	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.00	V1	0.01	V0
Nitrate	0.20	0.25	V0	0.70	V0	0.00	V1
Sulphate	0.25	0.44	V0	1.41	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.12	V0	0.51	V0	0.00	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		18-Feb	
Sample Date	18-Feb			18-Feb		18-Feb	
Particulate Size	PM10			PM10		24	
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	6.93	V0	4.93	V0	0.35	V0
Calcium	0.16	0.17	V0	0.07	V0	0.01	V0
Magnesium	0.03	0.02	V0	0.01	V0	0.00	V1
Potassium	0.09	0.03	V0	0.01	V0	0.00	V1
Sodium	0.05	0.19	V0	0.01	V0	0.00	V1
Chloride	0.12	0.19	V0	0.02	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.01	V0	0.01	V0
Nitrate	0.20	0.67	V0	0.03	V0	0.00	V1
Sulphate	0.25	0.85	V0	2.13	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.30	V0	0.60	V0	0.00	V0



Station Name	Fort McKay South			CNRL Horizon		Travel Blank	
Station #	AMS 13			AMS 15		18-Feb	
Sample Date	18-Feb			18-Feb		18-Feb	
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	5.88	V0	3.76	V0	0.35	V0
Calcium	0.16	0.14	V0	0.07	V0	0.01	V0
Magnesium	0.03	0.02	V0	0.01	V0	0.00	V1
Potassium	0.09	0.01	V0	0.01	V0	0.00	V1
Sodium	0.05	0.09	V0	0.06	V0	0.00	V1
Chloride	0.12	0.07	V0	0.02	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.00	V1	0.01	V0
Nitrate	0.20	0.21	V0	0.17	V0	0.00	V1
Sulphate	0.25	0.49	V0	0.42	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.13	V0	0.11	V0	0.00	V0



Station Name	Albian Muskeg River			Travel Blank	
Station #	AMS 16			18-Feb	
Sample Date	18-Feb			18-Feb	
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	6.87	V0	0.35	V0
Calcium	0.16	0.14	V0	0.01	V0
Magnesium	0.03	0.03	V0	0.00	V1
Potassium	0.09	0.01	V0	0.00	V1
Sodium	0.05	0.04	V0	0.00	V1
Chloride	0.12	0.01	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.01	V0
Nitrate	0.20	0.20	V0	0.00	V1
Sulphate	0.25	0.51	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.13	V0	0.00	V0



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6			
Sample Date	24-Feb			24-Feb		24-Feb	
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	12.01	V0	7.29	V0	0.14	V0
Calcium	0.16	0.23	V0	0.14	V0	0.00	V1
Magnesium	0.03	0.04	V0	0.04	V0	0.00	V1
Potassium	0.09	0.02	V0	0.01	V0	0.00	V1
Sodium	0.05	0.25	V0	0.54	V0	0.00	V1
Chloride	0.12	0.29	V0	0.71	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.00	V1
Nitrate	0.20	0.33	V0	0.45	V0	0.00	V1
Sulphate	0.25	0.55	V0	0.69	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.16	V0	0.22	V0	0.00	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		24-Feb	
Sample Date	24-Feb			24-Feb		24-Feb	
Particulate Size	PM10			PM10		24	
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	38.54	V0	6.48	V0	0.14	V0
Calcium	0.16	1.14	V0	0.27	V0	0.00	V1
Magnesium	0.03	0.12	V0	0.04	V0	0.00	V1
Potassium	0.09	0.12	V0	0.01	V0	0.00	V1
Sodium	0.05	4.80	V0	0.15	V0	0.00	V1
Chloride	0.12	7.36	V0	0.11	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.00	V1
Nitrate	0.20	0.65	V0	0.33	V0	0.00	V1
Sulphate	0.25	0.91	V0	0.78	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.18	V0	0.20	V0	0.00	V0



Station Name	Fort McKay South			CNRL Horizon		Travel Blank	
Station #	AMS 13			AMS 15		24-Feb	
Sample Date	24-Feb			24-Feb		24-Feb	
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	9.88	V0	3.47	V0	0.14	V0
Calcium	0.16	0.24	V0	0.12	V0	0.00	V1
Magnesium	0.03	0.04	V0	0.02	V0	0.00	V1
Potassium	0.09	0.01	V0	0.01	V0	0.00	V1
Sodium	0.05	0.19	V0	0.13	V0	0.00	V1
Chloride	0.12	0.19	V0	0.13	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.00	V1	0.00	V1
Nitrate	0.20	0.24	V0	0.18	V0	0.00	V1
Sulphate	0.25	0.44	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	0.10	V0	0.00	V0



Station Name	Albian Muskeg River			Travel Blank	
Station #	AMS 16			24-Feb	
Sample Date	24-Feb			24-Feb	
Particulate Size	PM10			24	
Total Air Volume (m ³)	24.1			24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	26.43	V0	0.14	V0
Calcium	0.16	1.11	V4	0.00	V1
Magnesium	0.03	0.08	V4	0.00	V1
Potassium	0.09	0.02	V4	0.00	V1
Sodium	0.05	0.15	V4	0.00	V1
Chloride	0.12	0.12	V4	0.00	V1
Fluoride	0.15	0.00	V4	0.00	V1
Nitrate	0.20	0.41	V4	0.00	V1
Sulphate	0.25	0.60	V4	0.00	V1
Phosphate	0.26	0.00	V4	0.00	V1
Ammonium (as N)	0.02	0.14	V4	0.00	V0



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
Particulate Matter (PM10) - IONS - 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	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	10.43	7.41	4	4
Calcium	0.22	0.15	4	4
Magnesium	0.05	0.04	4	4
Potassium	0.03	0.03	4	4
Sodium	0.23	0.24	4	4
Chloride	0.22	0.23	4	4
Fluoride	0.01	0.00	4	4
Nitrate	0.37	0.33	4	4
Sulphate	1.13	1.55	4	4
Phosphate	0.00	0.00	4	0
Ammonium (as N)	0.27	0.34	4	4



Station Name	Patricia McInnes	Patricia McInnes	Patricia McInnes	Patricia McInnes
Station #	AMS 6	AMS 6	AMS 6	AMS 6
Sample Date	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	6.38	3.11	4	4
Calcium	0.12	0.05	4	4
Magnesium	0.03	0.03	4	4
Potassium	0.01	0.01	4	4
Sodium	0.35	0.32	4	4
Chloride	0.47	0.46	4	4
Fluoride	0.00	0.01	4	2
Nitrate	0.50	0.36	4	4
Sulphate	0.67	0.55	4	4
Phosphate	0.00	0.00	4	0
Ammonium (as N)	0.24	0.20	4	4



Station Name	Athabasca Valley	Athabasca Valley	Athabasca Valley	Athabasca Valley
Station #	AMS 7	AMS 7	AMS 7	AMS 7
Sample Date	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	17.78	14.93	4	4
Calcium	0.46	0.46	4	4
Magnesium	0.07	0.05	4	4
Potassium	0.06	0.04	4	4
Sodium	2.31	2.00	4	4
Chloride	3.48	3.08	4	4
Fluoride	0.01	0.01	4	3
Nitrate	0.64	0.48	4	4
Sulphate	0.67	0.39	4	4
Phosphate	0.00	0.00	4	0
Ammonium (as N)	0.19	0.13	4	4



Station Name	Anzac	Anzac	Anzac	Anzac
Station #	AMS 14	AMS 14	AMS 14	AMS 14
Sample Date	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average	Std Dev	Total Samples (#)	Total ≥ MDL (#)
	µg/m³	µg/m³		
Particulate Matter	4.09	2.13	4	4
Calcium	0.11	0.11	4	4
Magnesium	0.02	0.02	4	4
Potassium	0.01	0.00	4	4
Sodium	0.11	0.12	4	4
Chloride	0.12	0.14	4	4
Fluoride	0.01	0.00	4	4
Nitrate	0.17	0.17	4	4
Sulphate	0.84	0.91	4	4
Phosphate	0.00	0.00	4	0
Ammonium (as N)	0.23	0.26	4	4



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	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	8.04	4.36	4	4
Calcium	0.18	0.10	4	4
Magnesium	0.04	0.03	4	4
Potassium	0.02	0.02	4	4
Sodium	0.21	0.22	4	4
Chloride	0.19	0.22	4	4
Fluoride	0.01	0.00	4	4
Nitrate	0.30	0.27	4	4
Sulphate	0.83	1.01	4	4
Phosphate	0.00	0.00	4	0
Ammonium (as N)	0.20	0.23	4	4



Station Name	CNRL Horizon	CNRL Horizon	CNRL Horizon	CNRL Horizon
Station #	AMS 15	AMS 15	AMS 15	AMS 15
Sample Date	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	6.48	6.46	4	4
Calcium	0.10	0.05	4	4
Magnesium	0.03	0.03	4	4
Potassium	0.01	0.01	4	4
Sodium	0.13	0.13	4	4
Chloride	0.08	0.08	4	4
Fluoride	0.00	0.00	4	2
Nitrate	0.27	0.30	4	4
Sulphate	0.46	0.37	4	4
Phosphate	0.00	0.00	4	0
Ammonium (as N)	0.11	0.08	4	4



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

Particulate Matter (PM10) - IONS - Summary

2017

Indicated Sites and Dates

	Albian Muskeg	Albian Muskeg	Albian Muskeg	Albian Muskeg
Station Name	River	River	River	River
Station #	AMS 16	AMS 16	AMS 16	AMS 16
Sample Date	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average	Std Dev	Total Samples (#)	Total ≥ MDL (#)
	µg/m ³	µg/m ³		
Particulate Matter	22.23	19.75	4	4
Calcium	0.62	0.58	4	4
Magnesium	0.08	0.08	4	4
Potassium	0.02	0.02	4	4
Sodium	0.18	0.21	4	4
Chloride	0.14	0.17	4	4
Fluoride	0.00	0.01	4	2
Nitrate	0.46	0.50	4	4
Sulphate	0.96	1.07	4	4
Phosphate	0.00	0.00	4	0
Ammonium (as N)	0.20	0.19	4	4



Wood Buffalo Environmental Association

PM10 Ion (µg/sample) Summary

2017 February

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%	28	0	36	61	90	166	175	316	387	637	925	1164	1164	259	266	166	1588
Calcium	100.0%	28	0	0.87	1.26	2.34	3.39	3.84	6.48	6.78	26.85	27.00	27.39	27.39	6.19	7.72	3.39	44.77
Magnesium	100.0%	28	0	0.12	0.15	0.27	0.78	0.90	1.74	1.77	2.76	2.82	4.59	4.59	1.08	1.07	0.78	6.41
Potassium	100.0%	28	0	0.09	0.09	0.15	0.24	0.33	0.69	0.96	1.56	1.74	2.76	2.76	0.54	0.63	0.24	3.71
Sodium	100.0%	28	0	0.27	0.51	1.26	3.69	4.62	12.66	12.96	32.82	69.78	115.11	115.11	12.08	24.54	3.69	134.79
Chloride	100.0%	28	0	0.24	0.30	0.84	3.03	4.47	12.03	12.57	50.37	102.54	176.58	176.58	16.12	37.72	3.03	204.70
Fluoride	75.0%	28	7	0.09	0.09	0.15	0.18	0.18	0.24	0.27	0.33	0.36	0.60	0.60	0.20	0.11	0.18	0.74
Nitrate	100.0%	28	0	0.60	0.66	1.71	6.93	8.01	16.38	16.71	20.01	28.23	29.25	29.25	9.30	8.43	6.93	51.44
Sulphate	100.0%	28	0	1.47	1.86	9.06	12.12	14.46	21.84	22.92	55.59	61.08	82.56	82.56	19.06	20.20	12.12	120.08
Phosphate	0.0%	28	28	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%	28	0	0.40	0.42	2.17	3.42	4.31	6.34	7.15	13.07	14.37	18.54	18.54	4.92	4.78	3.42	28.83



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PARTICULATE MATTER - METALS DATA SUMMARY FEBRUARY 2017

Prepared
April 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 FEBRUARY 2017

Prepared
April 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			06-Feb		
	Sample Date	06-Feb		06-Feb					
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	11.55	V0	5.78	V0	0.17	V0		
Aluminum	0.1380326	0.0175915	V0	0.0103639	V0	0.0000000	V1		
Antimony	0.0001784	0.0000492	V0	0.0001587	V0	0.0000000	V1		
Arsenic	0.0001060	0.0001456	V0	0.0000681	V0	0.0000047	V0		
Barium	0.0092847	0.0005269	V0	0.0007341	V0	0.0000000	V1		
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1		
Bismuth	0.0000093	0.0000146	V0	0.0000339	V0	0.0000062	V0		
Cadmium	0.0000174	0.0000126	V0	0.0000128	V0	0.0000008	V0		
Calcium	0.4112124	0.0558595	V0	0.0668964	V0	0.0000000	V1		
Cerium	0.0000174	0.0000380	V0	0.0000322	V0	0.0000000	V1		
Cesium	0.0000100	0.0000025	V0	0.0000012	V0	0.0000000	V1		
Chromium	0.0022262	0.0002091	V0	0.0004512	V0	0.0007171	V0		
Cobalt	0.0000273	0.0000846	V0	0.0008226	V0	0.0000361	V0		
Copper	0.0017171	0.0004930	V0	0.0005972	V0	0.0001831	V0		
Iron	0.0393063	0.0288256	V0	0.0195152	V0	0.0043504	V0		
Lanthanum	0.0000130	0.0000168	V0	0.0000118	V0	0.0000015	V0		
Lead	0.0008577	0.0002492	V0	0.0003557	V0	0.0000000	V1		
Lithium	0.0000374	0.0000336	V0	0.0000144	V0	0.0000019	V0		
Magnesium	0.0091409	0.0276478	V0	0.0339768	V0	0.0021883	V0		
Manganese	0.0006949	0.0012068	V0	0.0004188	V0	0.0000673	V0		
Molybdenum	0.0007116	0.0008905	V0	-9999	M2	0.0000897	V0		
Neodymium	0.0000140	0.0000125	V0	0.0000052	V0	0.0000000	V1		
Nickel	0.0005429	0.0006362	V0	-9999	M2	0.0005016	V0		
Niobium	0.0000202	0.0000054	V0	0.0000045	V0	0.0000009	V0		
Palladium	0.0000632	0.0000060	V0	0.0000077	V0	0.0000106	V0		
Phosphorus	0.0459574	0.0111443	V0	0.0095152	V0	0.0100354	V0		
Platinum	0.0000088	0.0000018	V0	0.0000026	V0	0.0000017	V0		
Potassium	0.0061261	0.0480882	V0	0.0319247	V0	0.0026419	V0		
Praseodymium	0.0000070	0.0000032	V0	0.0000015	V0	0.0000000	V1		
Rubidium	0.0000184	0.0000760	V0	0.0000384	V0	0.0000046	V0		
Samarium	0.0000133	0.0000019	V0	0.0000000	V1	0.0000000	V1		
Selenium	0.0003366	0.0001061	V0	0.0000864	V0	0.0000000	V1		
Silicon	0.7676322	0.1196927	V0	0.1038730	V0	0.0769659	V0		
Silver	0.0000100	0.0000029	V0	0.0000021	V0	0.0000000	V1		
Sodium	0.0169447	0.1524892	V0	0.1813369	V0	0.0020168	V0		
Strontium	0.0003375	0.0002674	V0	0.0002595	V0	0.0000158	V0		
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1		
Thallium	0.0000090	0.0000015	V0	0.0000010	V0	0.0000000	V1		
Thorium	0.0000059	0.0000037	V0	0.0000013	V0	0.0000000	V1		
Tin	0.0004414	0.0002205	V0	0.0001261	V0	0.0000403	V0		
Titanium	0.0015201	0.0018298	V0	-9999	M2	0.0008356	V0		
Tungsten	0.0000938	0.0000624	V0	0.0000250	V0	0.0000313	V0		
Uranium	0.0000048	0.0000038	V0	0.0000005	V0	0.0000000	V1		
Vanadium	0.0007697	0.0038982	V0	0.0001123	V0	0.0000000	V1		
Zinc	0.0055897	0.0057340	V0	0.0035714	V0	0.0007715	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-Feb PM2.5 24 Results (µg/m ³)	QC Flag	AMS 14 06-Feb PM2.5 24 Results (µg/m ³)	QC Flag	06-Feb 24 Results (µg/m ³)	QC Flag
Particulate Matter	1.00	6.98	V0	3.13	V0	0.17	V0	
Aluminum	0.1380326	0.0098279	V0	0.0145449	V0	0.0000000	V1	
Antimony	0.0001784	0.0001368	V0	0.0000393	V0	0.0000000	V1	
Arsenic	0.0001060	0.0000495	V0	0.0000347	V0	0.0000047	V0	
Barium	0.0092847	0.0009994	V0	0.0000000	V1	0.0000000	V1	
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1	
Bismuth	0.0000093	0.0000333	V0	0.0000052	V0	0.0000062	V0	
Cadmium	0.0000174	0.0000098	V0	0.0000097	V0	0.0000008	V0	
Calcium	0.4112124	0.0346071	V0	0.0482043	V0	0.0000000	V1	
Cerium	0.0000174	0.0000200	V0	0.0000140	V0	0.0000000	V1	
Cesium	0.0000100	0.0000012	V0	0.0000014	V0	0.0000000	V1	
Chromium	0.0022262	0.0001992	V0	0.0001760	V0	0.0007171	V0	
Cobalt	0.0000273	0.0000227	V0	0.0000213	V0	0.0000361	V0	
Copper	0.0017171	0.0012578	V0	0.0003523	V0	0.0001831	V0	
Iron	0.0393063	0.0515551	V0	0.0179409	V0	0.0043504	V0	
Lanthanum	0.0000130	0.0000076	V0	0.0000074	V0	0.0000015	V0	
Lead	0.0008577	0.0002483	V0	0.0001972	V0	0.0000000	V1	
Lithium	0.0000374	0.0000195	V0	0.0000184	V0	0.0000019	V0	
Magnesium	0.0091409	0.0304979	V0	0.0356799	V0	0.0021883	V0	
Manganese	0.0006949	0.0007831	V0	0.0002634	V0	0.0000673	V0	
Molybdenum	0.0007116	0.0001670	V0	0.0000525	V0	0.0000897	V0	
Neodymium	0.0000140	0.0000053	V0	0.0000046	V0	0.0000000	V1	
Nickel	0.0005429	0.0002352	V0	0.0001879	V0	0.0005016	V0	
Niobium	0.0000202	0.0000032	V0	0.0000021	V0	0.0000009	V0	
Palladium	0.0000632	0.0000058	V0	0.0000000	V1	0.0000106	V0	
Phosphorus	0.0459574	0.0102435	V0	0.0102359	V0	0.0100354	V0	
Platinum	0.0000088	0.0000022	V0	0.0000015	V0	0.0000017	V0	
Potassium	0.0061261	0.0246028	V0	0.0209906	V0	0.0026419	V0	
Praseodymium	0.0000070	0.0000016	V0	0.0000010	V0	0.0000000	V1	
Rubidium	0.0000184	0.0000278	V0	0.0000279	V0	0.0000046	V0	
Samarium	0.0000133	0.0000006	V0	0.0000006	V0	0.0000000	V1	
Selenium	0.0003366	0.0000390	V0	0.0000194	V0	0.0000000	V1	
Silicon	0.7676322	0.1427450	V0	0.1685135	V0	0.0769659	V0	
Silver	0.0000100	0.0000013	V0	0.0000032	V0	0.0000000	V1	
Sodium	0.0169447	0.2637047	V0	0.1804686	V0	0.0020168	V0	
Strontium	0.0003375	0.0002590	V0	0.0002291	V0	0.0000158	V0	
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1	
Thallium	0.0000090	0.0000009	V0	0.0000007	V0	0.0000000	V1	
Thorium	0.0000059	0.0000013	V0	-9999	M2	0.0000000	V1	
Tin	0.0004414	0.0001572	V0	-9999	M2	0.0000403	V0	
Titanium	0.0015201	0.0018639	V0	0.0008774	V0	0.0008356	V0	
Tungsten	0.0000938	0.0000310	V0	0.0000792	V0	0.0000313	V0	
Uranium	0.0000048	0.0000007	V0	0.0000007	V0	0.0000000	V1	
Vanadium	0.0007697	0.0002488	V0	0.0001190	V0	0.0000000	V1	
Zinc	0.0055897	0.0034958	V0	-9999	M2	0.0007715	V0	



Compound Name	Bertha Ganter - Fort							
	Station Name	McKay			Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6		12-Feb		
	Sample Date	12-Feb		12-Feb				
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	1.05	V4	0.58	V0	0.22	V0	
Aluminum	0.1380326	0.0084717	V0	0.0090756	V0	0.0000000	V1	
Antimony	0.0001784	0.0000166	V0	0.0000174	V0	0.0000000	V1	
Arsenic	0.0001060	0.0000099	V0	0.0000128	V0	0.0000000	V1	
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	0.0000171	V0	0.0000142	V0	0.0000035	V0	
Cadmium	0.0000174	0.0000049	V0	0.0000029	V0	0.0000000	V1	
Calcium	0.4112124	0.0220299	V0	0.0246277	V0	0.0000000	V1	
Cerium	0.0000174	0.0000107	V0	0.0000065	V0	0.0000000	V1	
Cesium	0.0000100	0.0000007	V0	0.0000009	V0	0.0000000	V1	
Chromium	0.0022262	0.0005114	V0	0.0001481	V0	0.0001087	V0	
Cobalt	0.0000273	0.0000793	V0	0.0000314	V0	0.0000498	V0	
Copper	0.0017171	0.0002581	V0	0.0005565	V0	0.0001648	V0	
Iron	0.0393063	0.0093820	V0	0.0065312	V0	0.0020386	V0	
Lanthanum	0.0000130	0.0000048	V0	0.0000035	V0	0.0000012	V0	
Lead	0.0008577	0.0000507	V0	0.0000516	V0	0.0000000	V1	
Lithium	0.0000374	0.0000063	V0	0.0000071	V0	0.0000020	V0	
Magnesium	0.0091409	0.0030924	V0	0.0037358	V0	0.0010478	V0	
Manganese	0.0006949	0.0001361	V0	0.0001283	V0	0.0000305	V0	
Molybdenum	0.0007116	0.0000524	V0	0.0000401	V0	0.0000000	V1	
Neodymium	0.0000140	0.0000023	V0	0.0000022	V0	0.0000000	V1	
Nickel	0.0005429	0.0003070	V0	0.0001030	V0	0.0002814	V0	
Niobium	0.0000202	0.0000022	V0	0.0000016	V0	0.0000000	V1	
Palladium	0.0000632	0.0000000	V1	0.0000000	V1	0.0000000	V1	
Phosphorus	0.0459574	0.0088013	V0	0.0095256	V0	0.0084412	V0	
Platinum	0.0000088	0.0000017	V0	0.0000008	V0	0.0000009	V0	
Potassium	0.0061261	0.0096526	V0	0.0159850	V0	0.0013224	V0	
Praseodymium	0.0000070	0.0000005	V0	0.0000005	V0	0.0000000	V1	
Rubidium	0.0000184	0.0000181	V0	0.0000163	V0	0.0000027	V0	
Samarium	0.0000133	0.0000000	V1	0.0000000	V1	0.0000000	V1	
Selenium	0.0003366	0.0000256	V0	0.0000306	V0	0.0000167	V0	
Silicon	0.7676322	0.1365312	V0	0.1691780	V0	0.1144543	V0	
Silver	0.0000100	0.0000000	V1	-9999	M2	0.0000000	V1	
Sodium	0.0169447	0.0108368	V0	0.0106626	V0	0.0013239	V0	
Strontium	0.0003375	0.0000490	V0	0.0000603	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	0.0000008	V0	0.0000000	V1	
Tin	0.0004414	0.0000631	V0	0.0000707	V0	0.0000000	V1	
Titanium	0.0015201	0.0009024	V0	0.0015283	V0	0.0003329	V0	
Tungsten	0.0000938	-9999	M2	-9999	M2	0.0000630	V0	
Uranium	0.0000048	0.0000000	V1	0.0000000	V1	0.0000000	V1	
Vanadium	0.0007697	0.0000570	V0	0.0000000	V1	0.0000000	V1	
Zinc	0.0055897	0.0011882	V0	0.0008680	V0	0.0007291	V0	



Station Name Station # Sample Date Particulate Size Total Air Volume (m ³)	Athabasca Valley			Anzac		Travel Blank	
	AMS 7	AMS 14		AMS 7	AMS 14	AMS 7	AMS 14
	12-Feb	12-Feb		12-Feb	12-Feb	12-Feb	12-Feb
	PM2.5	PM2.5		PM2.5	PM2.5	PM2.5	PM2.5
	24	24		24	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	1.08	V0	0.57	V4	0.22	V0
Aluminum	0.1380326	0.0130142	V0	0.0116223	V0	0.0000000	V1
Antimony	0.0001784	0.0000432	V0	0.0000000	V1	0.0000000	V1
Arsenic	0.0001060	0.0000158	V0	0.0000121	V0	0.0000000	V1
Barium	0.0092847	0.0005906	V0	0.0000000	V1	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000048	V0	0.0000020	V0	0.0000035	V0
Cadmium	0.0000174	0.0000035	V0	0.0000034	V0	0.0000000	V1
Calcium	0.4112124	0.0292036	V0	0.0319900	V0	0.0000000	V1
Cerium	0.0000174	0.0000110	V0	0.0000206	V0	0.0000000	V1
Cesium	0.0000100	0.0000016	V0	0.0000012	V0	0.0000000	V1
Chromium	0.0022262	0.0001300	V0	0.0001461	V0	0.0001087	V0
Cobalt	0.0000273	0.0000278	V0	0.0000113	V0	0.0000498	V0
Copper	0.0017171	0.0005087	V0	0.0002273	V0	0.0001648	V0
Iron	0.0393063	0.0157977	V0	0.0084061	V0	0.0020386	V0
Lanthanum	0.0000130	0.0000052	V0	0.0000160	V0	0.0000012	V0
Lead	0.0008577	0.0000407	V0	0.0000437	V0	0.0000000	V1
Lithium	0.0000374	0.0000115	V0	0.0000100	V0	0.0000020	V0
Magnesium	0.0091409	0.0073206	V0	0.0053593	V0	0.0010478	V0
Manganese	0.0006949	0.0002596	V0	0.0001814	V0	0.0000305	V0
Molybdenum	0.0007116	0.0000354	V0	0.0000000	V1	0.0000000	V1
Neodymium	0.0000140	0.0000039	V0	0.0000027	V0	0.0000000	V1
Nickel	0.0005429	0.0001750	V0	-9999	M2	0.0002814	V0
Niobium	0.0000202	0.0000028	V0	0.0000015	V0	0.0000000	V1
Palladium	0.0000632	0.0000028	V0	-9999	M2	0.0000000	V1
Phosphorus	0.0459574	0.0092483	V0	0.0090832	V0	0.0084412	V0
Platinum	0.0000088	0.0000019	V0	0.0000012	V0	0.0000009	V0
Potassium	0.0061261	0.0146426	V0	0.0099095	V0	0.0013224	V0
Praseodymium	0.0000070	0.0000013	V0	0.0000006	V0	0.0000000	V1
Rubidium	0.0000184	0.0000255	V0	0.0000193	V0	0.0000027	V0
Samarium	0.0000133	0.0000000	V1	0.0000000	V1	0.0000000	V1
Selenium	0.0003366	0.0000356	V0	0.0000291	V0	0.0000167	V0
Silicon	0.7676322	0.1356320	V0	0.1141856	V0	0.1144543	V0
Silver	0.0000100	-9999	M2	-9999	M2	0.0000000	V1
Sodium	0.0169447	0.0570424	V0	0.0116230	V0	0.0013239	V0
Strontium	0.0003375	0.0000985	V0	0.0000675	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	0.0000014	V0	0.0000010	V0	0.0000000	V1
Tin	0.0004414	0.0000650	V0	0.0000385	V0	0.0000000	V1
Titanium	0.0015201	0.0016594	V0	0.0006088	V0	0.0003329	V0
Tungsten	0.0000938	0.0000580	V0	0.0000447	V0	0.0000630	V0
Uranium	0.0000048	0.0000003	V0	0.0000002	V0	0.0000000	V1
Vanadium	0.0007697	0.0000000	V1	0.0000000	V1	0.0000000	V1
Zinc	0.0055897	0.0013783	V0	0.0013206	V0	0.0007291	V0



Compound Name	Bertha Ganter - Fort								
	Station Name	McKay			Patricia McInnes			Travel Blank	
	Station #	AMS 1		AMS 6			18-Feb		
	Sample Date	18-Feb		18-Feb					
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	2.75	V0	5.33	V0	0.23	V0		
Aluminum	0.1380326	0.0199523	V0	0.0240328	V0	0.0227302	V0		
Antimony	0.0001784	0.0000197	V0	0.0000728	V0	0.0000000	V1		
Arsenic	0.0001060	0.0000402	V0	0.0000836	V0	0.0000000	V1		
Barium	0.0092847	0.0000000	V1	0.0008567	V0	0.0000000	V1		
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1		
Bismuth	0.0000093	-9999	M2	-9999	M2	0.0000066	V0		
Cadmium	0.0000174	0.0000057	V0	0.0000064	V0	0.0000000	V1		
Calcium	0.4112124	0.0435241	V0	0.0476555	V0	0.0000000	V1		
Cerium	0.0000174	0.0000160	V0	0.0000232	V0	0.0000000	V1		
Cesium	0.0000100	0.0000014	V0	0.0000012	V0	0.0000000	V1		
Chromium	0.0022262	-9999	M2	0.0005682	V0	0.0001919	V0		
Cobalt	0.0000273	0.0000921	V0	0.0000637	V0	0.0000332	V0		
Copper	0.0017171	0.0011129	V0	-9999	M2	0.0018116	V0		
Iron	0.0393063	0.0646182	V0	0.0303430	V0	0.0044844	V0		
Lanthanum	0.0000130	0.0000079	V0	0.0000096	V0	0.0000000	V1		
Lead	0.0008577	0.0001495	V0	0.0001638	V0	0.0000000	V1		
Lithium	0.0000374	0.0000163	V0	0.0000143	V0	0.0000000	V1		
Magnesium	0.0091409	0.0133607	V0	0.0082750	V0	0.0020306	V0		
Manganese	0.0006949	0.0010583	V0	0.0010667	V0	0.0001964	V0		
Molybdenum	0.0007116	-9999	M2	0.0005010	V0	0.0000416	V0		
Neodymium	0.0000140	0.0000066	V0	0.0000078	V0	0.0000000	V1		
Nickel	0.0005429	0.0003557	V0	0.0006555	V0	0.0001823	V0		
Niobium	0.0000202	0.0000072	V0	0.0000042	V0	0.0000011	V0		
Palladium	0.0000632	-9999	M2	0.0000101	V0	0.0000000	V1		
Phosphorus	0.0459574	0.0122600	V0	0.0111017	V0	0.0079531	V0		
Platinum	0.0000088	0.0000016	V0	0.0000018	V0	0.0000014	V0		
Potassium	0.0061261	0.0181854	V0	0.0221396	V0	0.0020664	V0		
Praseodymium	0.0000070	0.0000015	V0	0.0000021	V0	0.0000000	V1		
Rubidium	0.0000184	0.0000276	V0	0.0000332	V0	0.0000026	V0		
Samarium	0.0000133	0.0000010	V0	0.0000008	V0	0.0000000	V1		
Selenium	0.0003366	0.0000676	V0	0.0000846	V0	0.0000226	V0		
Silicon	0.7676322	0.1811620	V0	0.0000000	V1	0.0000000	V1		
Silver	0.0000100	0.0000007	V0	-9999	M2	0.0000000	V1		
Sodium	0.0169447	0.0472533	V0	0.0230314	V0	0.0021395	V0		
Strontium	0.0003375	0.0001312	V0	0.0001137	V0	0.0000183	V0		
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1		
Thallium	0.0000090	0.0000007	V0	0.0000006	V0	0.0000000	V1		
Thorium	0.0000059	0.0000019	V0	0.0000019	V0	0.0000000	V1		
Tin	0.0004414	0.0001118	V0	0.0001645	V0	0.0000000	V1		
Titanium	0.0015201	0.0019886	V0	0.0020980	V0	0.0006990	V0		
Tungsten	0.0000938	-9999	M2	0.0000944	V0	0.0000395	V0		
Uranium	0.0000048	0.0000006	V0	0.0000024	V0	0.0000000	V1		
Vanadium	0.0007697	0.0002017	V0	0.0024641	V0	0.0000715	V0		
Zinc	0.0055897	0.0025892	V0	0.0031144	V0	0.0005450	V0		



Station Name Station # Sample Date Particulate Size Total Air Volume (m ³)	Athabasca Valley			Anzac		Travel Blank	
	AMS 7	AMS 14	AMS 14	AMS 14	AMS 14	AMS 14	AMS 14
	18-Feb	18-Feb	18-Feb	18-Feb	18-Feb	18-Feb	18-Feb
	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5
	24	24	24	24	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	4.16	V0	4.74	V0	0.23	V0
Aluminum	0.1380326	0.0210772	V0	0.0132749	V0	0.0227302	V0
Antimony	0.0001784	0.0000639	V0	0.0000140	V0	0.0000000	V1
Arsenic	0.0001060	0.0000321	V0	0.0000387	V0	0.0000000	V1
Barium	0.0092847	0.0008448	V0	0.0003957	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000098	V0	0.0000044	V0	0.0000066	V0
Cadmium	0.0000174	0.0000046	V0	0.0000051	V0	0.0000000	V1
Calcium	0.4112124	0.0310727	V0	0.0325871	V0	0.0000000	V1
Cerium	0.0000174	0.0000139	V0	0.0000103	V0	0.0000000	V1
Cesium	0.0000100	0.0000014	V0	0.0000006	V0	0.0000000	V1
Chromium	0.0022262	0.0002190	V0	0.0002289	V0	0.0001919	V0
Cobalt	0.0000273	0.0000187	V0	0.0000143	V0	0.0000332	V0
Copper	0.0017171	0.0018066	V0	-9999	M2	0.0018116	V0
Iron	0.0393063	0.0214392	V0	0.0068667	V0	0.0044844	V0
Lanthanum	0.0000130	0.0000052	V0	0.0000049	V0	0.0000000	V1
Lead	0.0008577	0.0002589	V0	0.0001033	V0	0.0000000	V1
Lithium	0.0000374	0.0000090	V0	0.0000084	V0	0.0000000	V1
Magnesium	0.0091409	0.0069136	V0	0.0041945	V0	0.0020306	V0
Manganese	0.0006949	0.0008355	V0	0.0002133	V0	0.0001964	V0
Molybdenum	0.0007116	0.0002552	V0	0.0002796	V0	0.0000416	V0
Neodymium	0.0000140	0.0000036	V0	0.0000037	V0	0.0000000	V1
Nickel	0.0005429	0.0002626	V0	0.0005618	V0	0.0001823	V0
Niobium	0.0000202	0.0000036	V0	0.0000025	V0	0.0000011	V0
Palladium	0.0000632	0.0000036	V0	0.0000063	V0	0.0000000	V1
Phosphorus	0.0459574	0.0112396	V0	0.0100250	V0	0.0079531	V0
Platinum	0.0000088	0.0000013	V0	0.0000007	V0	0.0000014	V0
Potassium	0.0061261	0.0337318	V0	0.0103222	V0	0.0020664	V0
Praseodymium	0.0000070	0.0000011	V0	0.0000008	V0	0.0000000	V1
Rubidium	0.0000184	0.0000536	V0	0.0000140	V0	0.0000026	V0
Samarium	0.0000133	0.0000000	V1	0.0000007	V0	0.0000000	V1
Selenium	0.0003366	0.0000695	V0	0.0000661	V0	0.0000226	V0
Silicon	0.7676322	0.0000000	V1	0.1752697	V0	0.0000000	V1
Silver	0.0000100	0.0000007	V0	0.0000037	V0	0.0000000	V1
Sodium	0.0169447	0.0192909	V0	0.0117972	V0	0.0021395	V0
Strontium	0.0003375	0.0000964	V0	0.0000533	V0	0.0000183	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000005	V0	0.0000004	V0	0.0000000	V1
Thorium	0.0000059	0.0000012	V0	0.0000010	V0	0.0000000	V1
Tin	0.0004414	0.0002462	V0	0.0001168	V0	0.0000000	V1
Titanium	0.0015201	0.0051229	V0	0.0008281	V0	0.0006990	V0
Tungsten	0.0000938	0.0000186	V0	0.0000189	V0	0.0000395	V0
Uranium	0.0000048	0.0000007	V0	0.0000013	V0	0.0000000	V1
Vanadium	0.0007697	0.0005051	V0	0.0015107	V0	0.0000715	V0
Zinc	0.0055897	0.0037553	V0	0.0016019	V0	0.0005450	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6			
	Sample Date	24-Feb		24-Feb		24-Feb	
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	3.73	V0	3.37	V0	0.09	V0
Aluminum	0.1380326	0.0302466	V0	0.0157080	V0	0.0147379	V0
Antimony	0.0001784	0.0000273	V0	0.0000329	V0	0.0000000	V1
Arsenic	0.0001060	0.0000386	V0	0.0000412	V0	0.0000000	V1
Barium	0.0092847	0.0000000	V1	0.0000000	V1	0.0000000	V1
Beryllium	0.0000946	0.0000048	V0	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000078	V0	0.0000065	V0	0.0000039	V0
Cadmium	0.0000174	0.0000070	V0	0.0000064	V0	0.0000000	V1
Calcium	0.4112124	0.0458529	V0	0.0336396	V0	0.0000000	V1
Cerium	0.0000174	0.0000307	V0	0.0000149	V0	0.0000013	V0
Cesium	0.0000100	0.0000025	V0	0.0000017	V0	0.0000000	V1
Chromium	0.0022262	0.0002172	V0	0.0002825	V0	0.0001343	V0
Cobalt	0.0000273	0.0000715	V0	0.0000373	V0	0.0000029	V0
Copper	0.0017171	0.0005370	V0	0.0003985	V0	0.0004810	V0
Iron	0.0393063	0.0315105	V0	0.0151370	V0	0.0021797	V0
Lanthanum	0.0000130	0.0000152	V0	0.0000074	V0	0.0000006	V0
Lead	0.0008577	0.0001431	V0	0.0002071	V0	0.0000000	V1
Lithium	0.0000374	0.0000231	V0	0.0000121	V0	0.0000000	V1
Magnesium	0.0091409	0.0183707	V0	0.0183585	V0	0.0013335	V0
Manganese	0.0006949	0.0006632	V0	0.0004216	V0	0.0001085	V0
Molybdenum	0.0007116	0.0000749	V0	0.0000807	V0	0.0001065	V0
Neodymium	0.0000140	0.0000111	V0	0.0000046	V0	0.0000000	V1
Nickel	0.0005429	0.0002668	V0	0.0002286	V0	0.0000677	V0
Niobium	0.0000202	0.0000047	V0	0.0000034	V0	0.0000000	V1
Palladium	0.0000632	-9999	M2	0.0000000	V1	0.0000255	V0
Phosphorus	0.0459574	0.0098179	V0	0.0108821	V0	0.0100380	V0
Platinum	0.0000088	0.0000018	V0	0.0000014	V0	0.0000025	V0
Potassium	0.0061261	0.0254249	V0	0.0200821	V0	0.0017839	V0
Praseodymium	0.0000070	0.0000030	V0	0.0000014	V0	0.0000000	V1
Rubidium	0.0000184	0.0000535	V0	0.0000344	V0	0.0000017	V0
Samarium	0.0000133	0.0000020	V0	0.0000006	V0	0.0000000	V1
Selenium	0.0003366	0.0000463	V0	0.0000406	V0	0.0000152	V0
Silicon	0.7676322	0.1299116	V0	0.0000000	V1	0.0722804	V0
Silver	0.0000100	0.0000005	V0	0.0000000	V1	0.0000000	V1
Sodium	0.0169447	0.0861864	V0	0.0954877	V0	0.0022525	V0
Strontium	0.0003375	0.0001771	V0	0.0001463	V0	0.0000159	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000015	V0	0.0000015	V0	0.0000000	V1
Thorium	0.0000059	0.0000035	V0	0.0000016	V0	0.0000000	V1
Tin	0.0004414	0.0000910	V0	0.0000946	V0	0.0000338	V0
Titanium	0.0015201	0.0020011	V0	0.0011285	V0	0.0005640	V0
Tungsten	0.0000938	0.0000671	V0	0.0000580	V0	0.0000000	V1
Uranium	0.0000048	0.0000012	V0	0.0000009	V0	0.0000000	V1
Vanadium	0.0007697	0.0001949	V0	0.0002270	V0	0.0000753	V0
Zinc	0.0055897	0.0019048	V0	0.0018319	V0	0.0004096	V0



Station Name Station # Sample Date Particulate Size Total Air Volume (m ³)	Athabasca Valley AMS 7 24-Feb PM2.5			Anzac AMS 14 24-Feb PM2.5		Travel Blank 24-Feb	
	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Compound Name							
Particulate Matter	1.00	5.57	V0	2.98	V0	0.09	V0
Aluminum	0.1380326	0.0406653	V0	0.0209735	V0	0.0147379	V0
Antimony	0.0001784	0.0001227	V0	0.0000360	V0	0.0000000	V1
Arsenic	0.0001060	0.0000521	V0	0.0001015	V0	0.0000000	V1
Barium	0.0092847	0.0014104	V0	0.0004868	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	-9999	M2	0.0000000	V1
Bismuth	0.0000093	0.0000140	V0	0.0000072	V0	0.0000039	V0
Cadmium	0.0000174	0.0000082	V0	0.0000124	V0	0.0000000	V1
Calcium	0.4112124	0.1188226	V0	0.0360247	V0	0.0000000	V1
Cerium	0.0000174	0.0000525	V0	0.0000244	V0	0.0000013	V0
Cesium	0.0000100	0.0000033	V0	0.0000017	V0	0.0000000	V1
Chromium	0.0022262	0.0005752	V0	-9999	M2	0.0001343	V0
Cobalt	0.0000273	0.0000299	V0	0.0000250	V0	0.0000029	V0
Copper	0.0017171	0.0012782	V0	-9999	M2	0.0004810	V0
Iron	0.0393063	0.0680433	V0	0.0234602	V0	0.0021797	V0
Lanthanum	0.0000130	0.0000243	V0	0.0000115	V0	0.0000006	V0
Lead	0.0008577	0.0026546	V0	0.0002242	V0	0.0000000	V1
Lithium	0.0000374	0.0000320	V0	0.0000156	V0	0.0000000	V1
Magnesium	0.0091409	0.0288304	V0	0.0178362	V0	0.0013335	V0
Manganese	0.0006949	0.0015494	V0	0.0004769	V0	0.0001085	V0
Molybdenum	0.0007116	0.0001496	V0	0.0001605	V0	0.0001065	V0
Neodymium	0.0000140	0.0000178	V0	0.0000058	V0	0.0000000	V1
Nickel	0.0005429	0.0004866	V0	0.0003589	V0	0.0000677	V0
Niobium	0.0000202	0.0000085	V0	0.0000029	V0	0.0000000	V1
Palladium	0.0000632	0.0000079	V0	-9999	M2	0.0000255	V0
Phosphorus	0.0459574	0.0119037	V0	0.0124799	V0	0.0100380	V0
Platinum	0.0000088	0.0000013	V0	0.0000020	V0	0.0000025	V0
Potassium	0.0061261	0.0538275	V0	0.0214155	V0	0.0017839	V0
Praseodymium	0.0000070	0.0000050	V0	0.0000012	V0	0.0000000	V1
Rubidium	0.0000184	0.0000908	V0	0.0000392	V0	0.0000017	V0
Samarium	0.0000133	0.0000028	V0	0.0000008	V0	0.0000000	V1
Selenium	0.0003366	0.0000643	V0	0.0000653	V0	0.0000152	V0
Silicon	0.7676322	0.0502916	V0	0.1425042	V0	0.0722804	V0
Silver	0.0000100	0.0000018	V0	0.0000023	V0	0.0000000	V1
Sodium	0.0169447	0.3077028	V0	0.0843222	V0	0.0022525	V0
Strontium	0.0003375	0.0003836	V0	0.0001520	V0	0.0000159	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000019	V0	0.0000014	V0	0.0000000	V1
Thorium	0.0000059	0.0000056	V0	0.0000017	V0	0.0000000	V1
Tin	0.0004414	0.0001501	V0	-9999	M2	0.0000338	V0
Titanium	0.0015201	0.0023882	V0	0.0014057	V0	0.0005640	V0
Tungsten	0.0000938	0.0000624	V0	0.0000189	V0	0.0000000	V1
Uranium	0.0000048	0.0000020	V0	0.0000008	V0	0.0000000	V1
Vanadium	0.0007697	0.0003731	V0	0.0003495	V0	0.0000753	V0
Zinc	0.0055897	0.0043704	V0	0.0025065	V0	0.0004096	V0



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	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
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	4.77	4.65	4	4
Aluminum	0.0190655	0.0089481	4	4
Antimony	0.0000282	0.0000147	4	4
Arsenic	0.0000586	0.0000596	4	4
Barium	0.0001317	0.0002635	4	1
Beryllium	0.0000012	0.0000024	4	1
Bismuth	0.0000132	0.0000048	3	3
Cadmium	0.0000076	0.0000035	4	4
Calcium	0.0418166	0.0142352	4	4
Cerium	0.0000239	0.0000127	4	4
Cesium	0.0000018	0.0000009	4	4
Chromium	0.0003126	0.0001723	3	3
Cobalt	0.0000819	0.0000087	4	4
Copper	0.0006003	0.0003630	4	4
Iron	0.0335841	0.0229187	4	4
Lanthanum	0.0000111	0.0000057	4	4
Lead	0.0001481	0.0000811	4	4
Lithium	0.0000198	0.0000115	4	4
Magnesium	0.0156179	0.0102352	4	4
Manganese	0.0007661	0.0004786	4	4
Molybdenum	0.0003392	0.0004775	3	3
Neodymium	0.0000081	0.0000046	4	4
Nickel	0.0003914	0.0001672	4	4
Niobium	0.0000049	0.0000021	4	4
Palladium	0.0000030	0.0000043	2	1
Phosphorus	0.0105059	0.0015125	4	4
Platinum	0.0000017	0.0000001	4	4
Potassium	0.0253378	0.0164800	4	4
Praseodymium	0.0000020	0.0000013	4	4
Rubidium	0.0000438	0.0000262	4	4
Samarium	0.0000012	0.0000009	4	3
Selenium	0.0000614	0.0000344	4	4
Silicon	0.1418244	0.0271243	4	4
Silver	0.0000010	0.0000013	4	3
Sodium	0.0741914	0.0605912	4	4
Strontium	0.0001562	0.0000911	4	4
Tantalum	0.0000000	0.0000000	4	0
Thallium	0.0000009	0.0000007	4	3
Thorium	0.0000025	0.0000013	4	4
Tin	0.0001216	0.0000689	4	4
Titanium	0.0016805	0.0005246	4	4
Tungsten	0.0000648	0.0000033	2	2
Uranium	0.0000014	0.0000017	4	3
Vanadium	0.0010880	0.0018747	4	4
Zinc	0.0028541	0.0020034	4	4



Station Name	Patricia McInnes	Patricia McInnes	Patricia McInnes	Patricia McInnes
Station #	AMS 6	AMS 6	AMS 6	AMS 6
Sample Date	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
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	3.76	2.37	4	4
Aluminum	0.0147951	0.0067950	4	4
Antimony	0.0000705	0.0000633	4	4
Arsenic	0.0000514	0.0000312	4	4
Barium	0.0003977	0.0004620	4	2
Beryllium	0.0000000	0.0000000	4	0
Bismuth	0.0000182	0.0000141	3	3
Cadmium	0.0000071	0.0000041	4	4
Calcium	0.0432048	0.0184183	4	4
Cerium	0.0000192	0.0000110	4	4
Cesium	0.0000013	0.0000004	4	4
Chromium	0.0003625	0.0001849	4	4
Cobalt	0.0002388	0.0003895	4	4
Copper	0.0005174	0.0001050	3	3
Iron	0.0178816	0.0099049	4	4
Lanthanum	0.0000081	0.0000036	4	4
Lead	0.0001946	0.0001259	4	4
Lithium	0.0000120	0.0000034	4	4
Magnesium	0.0160865	0.0134013	4	4
Manganese	0.0005089	0.0003966	4	4
Molybdenum	0.0002073	0.0002552	3	3
Neodymium	0.0000050	0.0000023	4	4
Nickel	0.0003290	0.0002896	3	3
Niobium	0.0000034	0.0000013	4	4
Palladium	0.0000044	0.0000052	4	2
Phosphorus	0.0102561	0.0008543	4	4
Platinum	0.0000017	0.0000008	4	4
Potassium	0.0225329	0.0067637	4	4
Praseodymium	0.0000014	0.0000007	4	4
Rubidium	0.0000306	0.0000098	4	4
Samarium	0.0000004	0.0000004	4	2
Selenium	0.0000606	0.0000291	4	4
Silicon	0.0682628	0.0832098	4	2
Silver	0.0000011	0.0000015	2	1
Sodium	0.0776297	0.0786122	4	4
Strontium	0.0001449	0.0000842	4	4
Tantalum	0.0000000	0.0000000	4	0
Thallium	0.0000008	0.0000006	4	3
Thorium	0.0000014	0.0000005	4	4
Tin	0.0001140	0.0000406	4	4
Titanium	0.0015849	0.0004872	3	3
Tungsten	0.0000591	0.0000347	3	3
Uranium	0.0000009	0.0000011	4	3
Vanadium	0.0007009	0.0011791	4	3
Zinc	0.0023464	0.0012303	4	4



Station Name	Athabasca Valley	Athabasca Valley	Athabasca Valley	Athabasca Valley
Station #	AMS 7	AMS 7	AMS 7	AMS 7
Sample Date	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
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	4.45	2.52	4	4
Aluminum	0.0211462	0.0138472	4	4
Antimony	0.0000917	0.0000452	4	4
Arsenic	0.0000374	0.0000169	4	4
Barium	0.0009613	0.0003436	4	4
Beryllium	0.0000000	0.0000000	4	0
Bismuth	0.0000155	0.0000124	4	4
Cadmium	0.0000065	0.0000029	4	4
Calcium	0.0534265	0.0436550	4	4
Cerium	0.0000243	0.0000191	4	4
Cesium	0.0000018	0.0000010	4	4
Chromium	0.0002808	0.0001999	4	4
Cobalt	0.0000248	0.0000051	4	4
Copper	0.0012128	0.0005337	4	4
Iron	0.0392088	0.0248173	4	4
Lanthanum	0.0000106	0.0000092	4	4
Lead	0.0008006	0.0012401	4	4
Lithium	0.0000180	0.0000104	4	4
Magnesium	0.0183906	0.0130364	4	4
Manganese	0.0008569	0.0005299	4	4
Molybdenum	0.0001518	0.0000903	4	4
Neodymium	0.0000076	0.0000068	4	4
Nickel	0.0002898	0.0001362	4	4
Niobium	0.0000045	0.0000027	4	4
Palladium	0.0000050	0.0000023	4	4
Phosphorus	0.0106588	0.0011617	4	4
Platinum	0.0000017	0.0000005	4	4
Potassium	0.0317012	0.0166841	4	4
Praseodymium	0.0000022	0.0000019	4	4
Rubidium	0.0000494	0.0000304	4	4
Samarium	0.0000009	0.0000013	4	2
Selenium	0.0000521	0.0000173	4	4
Silicon	0.0821672	0.0690306	4	3
Silver	0.0000013	0.0000006	3	3
Sodium	0.1619352	0.1448622	4	4
Strontium	0.0002094	0.0001389	4	4
Tantalum	0.0000000	0.0000000	4	0
Thallium	0.0000008	0.0000008	4	3
Thorium	0.0000024	0.0000022	4	4
Tin	0.0001546	0.0000740	4	4
Titanium	0.0027586	0.0016058	4	4
Tungsten	0.0000425	0.0000211	4	4
Uranium	0.0000009	0.0000007	4	4
Vanadium	0.0002817	0.0002150	4	3
Zinc	0.0032499	0.0013005	4	4



Station Name	Anzac	Anzac	Anzac	Anzac
Station #	AMS 14	AMS 14	AMS 14	AMS 14
Sample Date	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
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	2.86	1.72	4	4
Aluminum	0.0151039	0.0040919	4	4
Antimony	0.0000223	0.0000186	4	3
Arsenic	0.0000468	0.0000383	4	4
Barium	0.0002206	0.0002575	4	2
Beryllium	0.0000000	0.0000000	3	0
Bismuth	0.0000047	0.0000022	4	4
Cadmium	0.0000076	0.0000041	4	4
Calcium	0.0372015	0.0075476	4	4
Cerium	0.0000173	0.0000064	4	4
Cesium	0.0000012	0.0000005	4	4
Chromium	0.0001837	0.0000419	3	3
Cobalt	0.0000180	0.0000063	4	4
Copper	0.0002898	0.0000884	2	2
Iron	0.0141685	0.0078970	4	4
Lanthanum	0.0000100	0.0000049	4	4
Lead	0.0001421	0.0000836	4	4
Lithium	0.0000131	0.0000047	4	4
Magnesium	0.0157675	0.0146407	4	4
Manganese	0.0002837	0.0001331	4	4
Molybdenum	0.0001231	0.0001239	4	3
Neodymium	0.0000042	0.0000013	4	4
Nickel	0.0003695	0.0001872	3	3
Niobium	0.0000023	0.0000006	4	4
Palladium	0.0000032	0.0000045	2	1
Phosphorus	0.0104560	0.0014393	4	4
Platinum	0.0000013	0.0000005	4	4
Potassium	0.0156594	0.0064057	4	4
Praseodymium	0.0000009	0.0000003	4	4
Rubidium	0.0000251	0.0000110	4	4
Samarium	0.0000005	0.0000004	4	3
Selenium	0.0000450	0.0000243	4	4
Silicon	0.1501182	0.0278095	4	4
Silver	0.0000031	0.0000007	3	3
Sodium	0.0720527	0.0799730	4	4
Strontium	0.0001255	0.0000817	4	4
Tantalum	0.0000000	0.0000000	4	0
Thallium	0.0000006	0.0000006	4	3
Thorium	0.0000012	0.0000004	3	3
Tin	0.0000776	0.0000554	2	2
Titanium	0.0009300	0.0003379	4	4
Tungsten	0.0000404	0.0000285	4	4
Uranium	0.0000008	0.0000004	4	4
Vanadium	0.0004948	0.0006926	4	3
Zinc	0.0018097	0.0006197	3	3



Wood Buffalo Environmental Association

PM2.5 Metal (µg/sample) Summary

2017 February

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%	16	0	0	14	14	66	90	100	134	134	167	277	277	277	95	67	90	432
Aluminum	100.0%	16	0	0.2033	0.2178	0.2789	0.3770	0.4222	0.5059	0.5059	0.7259	0.9760	0.9760	0.9760	0.4207	0.2073	0.3770	1.4573	
Antimony	93.8%	16	1	0.0002	0.0003	0.0005	0.0009	0.0010	0.0017	0.0017	0.0033	0.0038	0.0038	0.0038	0.0013	0.0011	0.0009	0.0069	
Arsenic	100.0%	16	0	0.0002	0.0003	0.0008	0.0010	0.0010	0.0016	0.0016	0.0024	0.0035	0.0035	0.0035	0.0012	0.0009	0.0010	0.0055	
Barium	56.3%	16	7	0.0046	0.0049	0.0062	0.0117	0.0126	0.0203	0.0203	0.0240	0.0339	0.0339	0.0339	0.0130	0.0083	0.0117	0.0545	
Beryllium	12.5%	16	14	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0013	0.0013	0.0013	0.0001	0.0003	0.0001	0.0017	
Bismuth	100.0%	16	0	0.0000	0.0001	0.0002	0.0003	0.0003	0.0007	0.0007	0.0008	0.0012	0.0012	0.0012	0.0004	0.0003	0.0003	0.0020	
Cadmium	100.0%	16	0	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0004	0.0004	0.0003	0.0003	0.0003	0.0002	0.0001	0.0002	0.0006
Calcium	100.0%	16	0	0.5287	0.5911	0.7678	0.8646	1.0446	1.1569	1.1569	1.6055	2.8517	2.8517	2.8517	1.0539	0.5569	0.8646	3.8382	
Cerium	100.0%	16	0	0.0002	0.0002	0.0003	0.0005	0.0005	0.0007	0.0007	0.0009	0.0013	0.0013	0.0013	0.0005	0.0003	0.0005	0.0020	
Cesium	100.0%	16	0	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	
Chromium	100.0%	16	0	0.0031	0.0033	0.0048	0.0055	0.0068	0.0136	0.0136	0.0201	0.0821	0.0821	0.0821	0.0125	0.0192	0.0055	0.1084	
Cobalt	100.0%	16	0	0.0003	0.0003	0.0005	0.0008	0.0009	0.0019	0.0019	0.0022	0.0197	0.0197	0.0197	0.0022	0.0047	0.0008	0.0258	
Copper	100.0%	16	0	0.0055	0.0062	0.0118	0.0143	0.0267	0.0351	0.0351	0.0952	0.1365	0.1365	0.1365	0.0307	0.0359	0.0143	0.2101	
Iron	100.0%	16	0	0.1567	0.1648	0.3633	0.5145	0.5630	0.7563	0.7563	1.5508	1.6330	1.6330	1.6330	0.6291	0.4660	0.5145	2.9592	
Lanthanum	100.0%	16	0	0.0001	0.0001	0.0001	0.0002	0.0002	0.0004	0.0004	0.0004	0.0006	0.0006	0.0006	0.0002	0.0001	0.0002	0.0009	
Lead	100.0%	16	0	0.0010	0.0010	0.0025	0.0047	0.0050	0.0060	0.0060	0.0085	0.0637	0.0637	0.0637	0.0077	0.0151	0.0047	0.0832	
Lithium	100.0%	16	0	0.0002	0.0002	0.0002	0.0003	0.0004	0.0005	0.0005	0.0008	0.0008	0.0008	0.0008	0.0004	0.0002	0.0003	0.0014	
Magnesium	100.0%	16	0	0.0742	0.0897	0.1659	0.4281	0.4406	0.6919	0.6919	0.8154	0.8563	0.8563	0.8563	0.3952	0.2789	0.4281	1.7899	
Manganese	100.0%	16	0	0.0031	0.0033	0.0062	0.0114	0.0159	0.0254	0.0254	0.0290	0.0372	0.0372	0.0372	0.0145	0.0105	0.0114	0.0669	
Molybdenum	93.8%	16	1	0.0003	0.0008	0.0013	0.0039	0.0040	0.0097	0.0097	0.0120	0.0214	0.0214	0.0214	0.0054	0.0057	0.0039	0.0336	
Neodymium	100.0%	16	0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0004	0.0004	0.0001	0.0001	0.0001	0.0007	
Nickel	100.0%	16	0	0.0025	0.0042	0.0056	0.0085	0.0086	0.0153	0.0153	0.0291	0.0322	0.0322	0.0322	0.0111	0.0086	0.0085	0.0541	
Niobium	100.0%	16	0	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0001	0.0000	0.0001	0.0003	
Palladium	75.0%	16	4	0.0000	0.0000	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0001	0.0001	0.0001	0.0005	
Phosphorus	100.0%	16	0	0.2112	0.2180	0.2286	0.2458	0.2612	0.2697	0.2697	0.2942	0.2995	0.2995	0.2995	0.2513	0.0275	0.2458	0.3886	
Platinum	100.0%	16	0	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	
Potassium	100.0%	16	0	0.2317	0.2378	0.3836	0.5140	0.5314	0.7662	0.7662	1.1541	1.2919	1.2919	1.2919	0.5714	0.3062	0.5140	2.1021	
Praseodymium	100.0%	16	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	
Rubidium	100.0%	16	0	0.0003	0.0004	0.0006	0.0008	0.0008	0.0013	0.0013	0.0018	0.0022	0.0022	0.0022	0.0009	0.0005	0.0008	0.0035	
Samarium	62.5%	16	6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0001	
Selenium	100.0%	16	0	0.0005	0.0006	0.0009	0.0015	0.0016	0.0017	0.0017	0.0021	0.0025	0.0025	0.0025	0.0013	0.0006	0.0015	0.0043	
Silicon	81.3%	16	3	0.0000	0.0000	2.4930	3.2552	3.2767	4.0443	4.0443	4.2065	4.3479	4.3479	4.3479	2.6654	1.4995	3.2552	10.1629	
Silver	87.5%	16	2	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%	16	0	0.2559	0.2601	0.4630	2.0237	2.0685	4.3312	4.3312	6.3289	7.3849	7.3849	7.3849	2.3149	2.2737	2.0237	13.6834	
Strontium	100.0%	16	0	0.0012	0.0013	0.0023	0.0035	0.0036	0.0062	0.0062	0.0064	0.0092	0.0092	0.0092	0.0038	0.0023	0.0035	0.0154	
Tantalum	0.0%	16	16	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%	16	4	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	0.0001	
Thorium	100.0%	16	0	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	0.0002	
Tin	100.0%	16	0	0.0009	0.0015	0.0022	0.0028	0.0030	0.0039	0.0039	0.0059	0.0074	0.0074	0.0074	0.0032	0.0017	0.0028	0.0119	
Titanium	100.0%	16	0	0.0146	0.0199	0.0271	0.0439	0.0447	0.0504	0.0504	0.1229	0.1576	0.1576	0.1576	0.0492	0.0382	0.0439	0.2402	
Tungsten	100.0%	16	0	0.0004	0.0005	0.0007	0.0014	0.0015	0.0019	0.0019	0.0087	0.0090	0.0090	0.0090	0.0021	0.0027	0.0014	0.0155	
Uranium	87.5%	16	2	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	
Vanadium	81.3%	16	3	0.0005	0.0006	0.0027	0.0054	0.0060	0.0121	0.0121	0.0591	0.0936	0.0936	0.0936	0.0155	0.0260	0.0054	0.1455	
Zinc	100.0%	16	0	0.0208	0.0285	0.0384	0.0602	0.0621	0.0857	0.0857	0.1049	0.1376	0.1376	0.1376	0.0623	0.0320	0.0602	0.2221	



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

**INTEGRATED MONITORING PROGRAM
MONTHLY REPORT**

**PARTICULATE MATTER (PM₁₀) - METALS
DATA SUMMARY
FEBRUARY 2017**

Prepared
April 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	QC Flag	AMS 6	QC Flag	06-Feb	
	Sample Date	06-Feb		06-Feb			
Particulate Size	PM10		PM10				
Total Air Volume (m ³)	23.9		24		24		
MDL (µg/sample)	1.00	20.66	V0	9.30	V0	0.30	V0
Results (µg/m ³)							
Particulate Matter	1.00	20.66	V0	9.30	V0	0.30	V0
Aluminum	0.1380326	0.1677590	V0	0.0581042	V0	0.0000000	V1
Antimony	0.0001784	0.0001201	V0	0.0003545	V0	0.0000000	V1
Arsenic	0.0001060	0.0001671	V0	0.0000613	V0	0.0000000	V1
Barium	0.0092847	0.0028332	V0	0.0032803	V0	0.0000000	V1
Beryllium	0.0000946	0.0000078	V0	0.0000052	V0	0.0000000	V1
Bismuth	0.0000093	0.0000291	V0	0.0000196	V0	0.0000203	V0
Cadmium	0.0000174	0.0000179	V0	0.0000123	V0	0.0000000	V1
Calcium	0.4112124	0.4039612	V0	0.1703507	V0	0.0232646	V0
Cerium	0.0000174	0.0002433	V0	0.0001339	V0	0.0000008	V0
Cesium	0.0000100	0.0000120	V0	0.0000042	V0	0.0000000	V1
Chromium	0.0022262	0.0007759	V0	0.0003422	V0	0.0001671	V0
Cobalt	0.0000273	0.0001074	V0	0.0001215	V0	0.0000326	V0
Copper	0.0017171	0.0011330	V0	0.0022271	V0	0.0002034	V0
Iron	0.0393063	0.1930123	V0	0.0988430	V0	0.0072564	V0
Lanthanum	0.0000130	0.0001135	V0	0.0000535	V0	0.0000000	V1
Lead	0.0008577	0.0003234	V0	0.0004189	V0	0.0000000	V1
Lithium	0.0000374	0.0001863	V0	0.0000574	V0	0.0000024	V0
Magnesium	0.0091409	0.0858343	V0	0.0762942	V0	0.0022619	V0
Manganese	0.0006949	0.0055249	V0	0.0017796	V0	0.0000597	V0
Molybdenum	0.0007116	0.0012442	V0	0.0002099	V0	0.0000000	V1
Neodymium	0.0000140	0.0000979	V0	0.0000377	V0	0.0000006	V0
Nickel	0.0005429	0.0014625	V0	0.0003365	V0	0.0001107	V0
Niobium	0.0000202	0.0000332	V0	0.0000101	V0	0.0000009	V0
Palladium	0.0000632	0.0000162	V0	0.0000147	V0	0.0000061	V0
Phosphorus	0.0459574	0.0139875	V0	0.0115553	V0	0.0081196	V0
Platinum	0.0000088	0.0000027	V0	0.0000035	V0	0.0000021	V0
Potassium	0.0061261	0.1082965	V0	0.0584647	V0	0.0022949	V0
Praseodymium	0.0000070	0.0000265	V0	0.0000120	V0	0.0000000	V1
Rubidium	0.0000184	0.0002757	V0	0.0001064	V0	0.0000039	V0
Samarium	0.0000133	0.0000169	V0	0.0000051	V0	0.0000000	V1
Selenium	0.0003366	0.0002394	V0	0.0000817	V0	0.0000000	V1
Silicon	0.7676322	0.7392503	V0	0.2956339	V0	0.0516780	V0
Silver	0.0000100	0.0000057	V0	0.0000027	V0	0.0000006	V0
Sodium	0.0169447	0.4273420	V0	0.6775785	V0	0.0019867	V0
Strontium	0.0003375	0.0013010	V0	0.0007600	V0	0.0000226	V0
Tantalum	0.0000394	0.0000017	V0	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000033	V0	0.0000016	V0	0.0000000	V1
Thorium	0.0000059	0.0000300	V0	0.0000092	V0	0.0000004	V0
Tin	0.0004414	0.0002880	V0	0.0002895	V0	0.0000351	V0
Titanium	0.0015201	0.0133309	V0	0.0036834	V0	0.0007494	V0
Tungsten	0.0000938	0.0002585	V0	0.0001477	V0	0.0000369	V0
Uranium	0.0000048	0.0000115	V0	0.0000027	V0	0.0000003	V0
Vanadium	0.0007697	0.0060129	V0	0.0003199	V0	0.0000000	V1
Zinc	0.0055897	0.0078470	V0	0.0045636	V0	0.0010386	V0



Compound Name	MDL (µg/sample)	Athabasca Valley		Anzac		Travel Blank	
		AMS 7	QC Flag	AMS 14	QC Flag	06-Feb	QC Flag
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
Results (µg/m ³)	Results (µg/m ³)	Results (µg/m ³)	Results (µg/m ³)	Results (µg/m ³)	Results (µg/m ³)	Results (µg/m ³)	Results (µg/m ³)
Particulate Matter	1.00	18.15	V0	3.71	V0	0.30	V0
Aluminum	0.1380326	0.1003658	V0	0.0080704	V0	0.0000000	V1
Antimony	0.0001784	0.0005645	V0	0.0000406	V0	0.0000000	V1
Arsenic	0.0001060	0.0000881	V0	0.0000418	V0	0.0000000	V1
Barium	0.0092847	0.0059701	V0	0.0004299	V0	0.0000000	V1
Beryllium	0.0000946	0.0000064	V0	0.0000075	V0	0.0000000	V1
Bismuth	0.0000093	0.0000210	V0	0.0000037	V0	0.0000203	V0
Cadmium	0.0000174	0.0000132	V0	0.0000095	V0	0.0000000	V1
Calcium	0.4112124	0.3218353	V0	0.0365405	V0	0.0232646	V0
Cerium	0.0000174	0.0001692	V0	0.0000117	V0	0.0000008	V0
Cesium	0.0000100	0.0000070	V0	0.0000011	V0	0.0000000	V1
Chromium	0.0022262	0.0004742	V0	0.0001929	V0	0.0001671	V0
Cobalt	0.0000273	0.0001125	V0	0.0000462	V0	0.0000326	V0
Copper	0.0017171	0.0036147	V0	0.0005881	V0	0.0002034	V0
Iron	0.0393063	0.1976997	V0	0.0216449	V0	0.0072564	V0
Lanthanum	0.0000130	0.0000769	V0	0.0000052	V0	0.0000000	V1
Lead	0.0008577	0.0003608	V0	0.0002502	V0	0.0000000	V1
Lithium	0.0000374	0.0000961	V0	0.0000133	V0	0.0000024	V0
Magnesium	0.0091409	0.1072357	V0	0.0405354	V0	0.0022619	V0
Manganese	0.0006949	0.0033320	V0	0.0002894	V0	0.0000597	V0
Molybdenum	0.0007116	0.0002648	V0	0.0000614	V0	0.0000000	V1
Neodymium	0.0000140	0.0000612	V0	0.0000032	V0	0.0000006	V0
Nickel	0.0005429	0.0004482	V0	0.0001959	V0	0.0001107	V0
Niobium	0.0000202	0.0000181	V0	0.0000044	V0	0.0000009	V0
Palladium	0.0000632	0.0000193	V0	0.0000146	V0	0.0000061	V0
Phosphorus	0.0459574	0.0133341	V0	0.0101717	V0	0.0081196	V0
Platinum	0.0000088	0.0000043	V0	0.0000020	V0	0.0000021	V0
Potassium	0.0061261	0.1097052	V0	0.0215026	V0	0.0022949	V0
Praseodymium	0.0000070	0.0000170	V0	0.0000007	V0	0.0000000	V1
Rubidium	0.0000184	0.0001587	V0	0.0000215	V0	0.0000039	V0
Samarium	0.0000133	0.0000095	V0	0.0000000	V1	0.0000000	V1
Selenium	0.0003366	0.0001287	V0	0.0000286	V0	0.0000000	V1
Silicon	0.7676322	0.5093978	V0	0.1473992	V0	0.0516780	V0
Silver	0.0000100	0.0000031	V0	0.0000030	V0	0.0000006	V0
Sodium	0.0169447	2.3531454	V0	0.2428761	V0	0.0019867	V0
Strontium	0.0003375	0.0012411	V0	0.0002682	V0	0.0000226	V0
Tantalum	0.0000394	0.0000017	V0	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000023	V0	0.0000006	V0	0.0000000	V1
Thorium	0.0000059	0.0000152	V0	0.0000007	V0	0.0000004	V0
Tin	0.0004414	0.0003932	V0	0.0000689	V0	0.0000351	V0
Titanium	0.0015201	0.0065603	V0	0.0010392	V0	0.0007494	V0
Tungsten	0.0000938	0.0004086	V0	0.0001028	V0	0.0000369	V0
Uranium	0.0000048	0.0000051	V0	0.0000005	V0	0.0000003	V0
Vanadium	0.0007697	0.0005774	V0	0.0001026	V0	0.0000000	V1
Zinc	0.0055897	0.0068028	V0	0.0014999	V0	0.0010386	V0



Station Name Station # Sample Date Particulate Size Total Air Volume (m ³)	Fort McKay South			CNRL Horizon		Travel Blank	
	AMS 13 06-Feb PM10 24	Results (µg/m ³)	QC Flag	AMS 15 06-Feb PM10 24	Results (µg/m ³)	QC Flag	Results (µg/m ³) 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	12.31	V0	17.30	V0	0.30	V0
Aluminum	0.1380326	0.0757540	V0	0.5342978	V0	0.0000000	V1
Antimony	0.0001784	0.0000957	V0	0.0000446	V0	0.0000000	V1
Arsenic	0.0001060	0.0001055	V0	0.0001210	V0	0.0000000	V1
Barium	0.0092847	0.0013934	V0	0.0045183	V0	0.0000000	V1
Beryllium	0.0000946	0.0000056	V0	0.0000160	V0	0.0000000	V1
Bismuth	0.0000093	0.0000179	V0	0.0000089	V0	0.0000203	V0
Cadmium	0.0000174	0.0000093	V0	0.0000112	V0	0.0000000	V1
Calcium	0.4112124	0.1777567	V0	0.1754550	V0	0.0232646	V0
Cerium	0.0000174	0.0001106	V0	0.0005331	V0	0.0000008	V0
Cesium	0.0000100	0.0000061	V0	0.0000389	V0	0.0000000	V1
Chromium	0.0022262	0.0006088	V0	0.0009972	V0	0.0001671	V0
Cobalt	0.0000273	0.0001799	V0	0.0001703	V0	0.0000326	V0
Copper	0.0017171	0.0009800	V0	0.0007912	V0	0.0002034	V0
Iron	0.0393063	0.0946991	V0	0.3527635	V0	0.0072564	V0
Lanthanum	0.0000130	0.0000512	V0	0.0002529	V0	0.0000000	V1
Lead	0.0008577	0.0002166	V0	0.0003586	V0	0.0000000	V1
Lithium	0.0000374	0.0000917	V0	0.0005780	V0	0.0000024	V0
Magnesium	0.0091409	0.0490917	V0	0.1143120	V0	0.0022619	V0
Manganese	0.0006949	0.0028842	V0	0.0072904	V0	0.0000597	V0
Molybdenum	0.0007116	0.0007520	V0	0.0002135	V0	0.0000000	V1
Neodymium	0.0000140	0.0000443	V0	0.0002332	V0	0.0000006	V0
Nickel	0.0005429	0.0014680	V0	0.0009749	V0	0.0001107	V0
Niobium	0.0000202	0.0000153	V0	0.0000741	V0	0.0000009	V0
Palladium	0.0000632	0.0000055	V0	0.0000106	V0	0.0000061	V0
Phosphorus	0.0459574	0.0121694	V0	0.0146923	V0	0.0081196	V0
Platinum	0.0000088	0.0000032	V0	0.0000015	V0	0.0000021	V0
Potassium	0.0061261	0.0569322	V0	0.1453019	V0	0.0022949	V0
Praseodymium	0.0000070	0.0000124	V0	0.0000595	V0	0.0000000	V1
Rubidium	0.0000184	0.0001334	V0	0.0006452	V0	0.0000039	V0
Samarium	0.0000133	0.0000076	V0	0.0000439	V0	0.0000000	V1
Selenium	0.0003366	0.0001405	V0	0.0003632	V0	0.0000000	V1
Silicon	0.7676322	0.4622297	V0	1.7095346	V0	0.0516780	V0
Silver	0.0000100	0.0000022	V0	0.0000040	V0	0.0000006	V0
Sodium	0.0169447	0.3423498	V0	0.2756723	V0	0.0019867	V0
Strontium	0.0003375	0.0006404	V0	0.0015924	V0	0.0000226	V0
Tantalum	0.0000394	0.0000000	V1	0.0000052	V0	0.0000000	V1
Thallium	0.0000090	0.0000016	V0	0.0000047	V0	0.0000000	V1
Thorium	0.0000059	0.0000134	V0	0.0000682	V0	0.0000004	V0
Tin	0.0004414	0.0001552	V0	0.0001055	V0	0.0000351	V0
Titanium	0.0015201	0.0049066	V0	0.0207881	V0	0.0007494	V0
Tungsten	0.0000938	0.0001753	V0	0.0002727	V0	0.0000369	V0
Uranium	0.0000048	0.0000050	V0	0.0000188	V0	0.0000003	V0
Vanadium	0.0007697	0.0031246	V0	0.0015141	V0	0.0000000	V1
Zinc	0.0055897	0.0052880	V0	0.0048290	V0	0.0010386	V0



Compound Name	Albian Muskeg River			Travel Blank	
	MDL (µg/sample)	Results (µg/m³)	QC Flag	Results (µg/m³)	QC Flag
Particulate Matter	1.00	46.33	V0	0.30	V0
Aluminum	0.1380326	1.8938587	V0	0.0000000	V1
Antimony	0.0001784	0.0001174	V0	0.0000000	V1
Arsenic	0.0001060	0.0004257	V0	0.0000000	V1
Barium	0.0092847	0.0133511	V0	0.0000000	V1
Beryllium	0.0000946	0.0000521	V0	0.0000000	V1
Bismuth	0.0000093	0.0000189	V0	0.0000203	V0
Cadmium	0.0000174	0.0000164	V0	0.0000000	V1
Calcium	0.4112124	1.5954185	V0	0.0232646	V0
Cerium	0.0000174	0.0021932	V0	0.0000008	V0
Cesium	0.0000100	0.0001246	V0	0.0000000	V1
Chromium	0.0022262	0.0028393	V0	0.0001671	V0
Cobalt	0.0000273	0.0004756	V0	0.0000326	V0
Copper	0.0017171	0.0023100	V0	0.0002034	V0
Iron	0.0393063	1.0855018	V0	0.0072564	V0
Lanthanum	0.0000130	0.0010575	V0	0.0000000	V1
Lead	0.0008577	0.0008597	V0	0.0000000	V1
Lithium	0.0000374	0.0023757	V0	0.0000024	V0
Magnesium	0.0091409	0.3117690	V0	0.0022619	V0
Manganese	0.0006949	0.0216479	V0	0.0000597	V0
Molybdenum	0.0007116	0.0017459	V0	0.0000000	V1
Neodymium	0.0000140	0.0009276	V0	0.0000006	V0
Nickel	0.0005429	0.0031082	V0	0.0001107	V0
Niobium	0.0000202	0.0002863	V0	0.0000009	V0
Palladium	0.0000632	0.0000329	V0	0.0000061	V0
Phosphorus	0.0459574	0.0291996	V0	0.0081196	V0
Platinum	0.0000088	0.0000030	V0	0.0000021	V0
Potassium	0.0061261	0.4890147	V0	0.0022949	V0
Praseodymium	0.0000070	0.0002467	V0	0.0000000	V1
Rubidium	0.0000184	0.0021733	V0	0.0000039	V0
Samarium	0.0000133	0.0001678	V0	0.0000000	V1
Selenium	0.0003366	0.0013883	V0	0.0000000	V1
Silicon	0.7676322	4.0330075	V0	0.0516780	V0
Silver	0.0000100	0.0000104	V0	0.0000006	V0
Sodium	0.0169447	0.4880654	V0	0.0019867	V0
Strontium	0.0003375	0.0054361	V0	0.0000226	V0
Tantalum	0.0000394	0.0000206	V0	0.0000000	V1
Thallium	0.0000090	0.0000161	V0	0.0000000	V1
Thorium	0.0000059	0.0003023	V0	0.0000004	V0
Tin	0.0004414	0.0003667	V0	0.0000351	V0
Titanium	0.0015201	0.0712495	V0	0.0007494	V0
Tungsten	0.0000938	0.0008862	V0	0.0000369	V0
Uranium	0.0000048	0.0000793	V0	0.0000003	V0
Vanadium	0.0007697	0.0098533	V0	0.0000000	V1
Zinc	0.0055897	0.0150647	V0	0.0010386	V0



Compound Name	Bertha Ganter - Fort								
	Station Name	McKay			Patricia McInnes			Travel Blank	
	Station #	AMS 1		AMS 6			12-Feb		
	Sample Date	12-Feb		12-Feb					
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	3.13	V0	1.82	V0	0.16	V0		
Aluminum	0.1380326	0.0876058	V0	0.0435125	V0	0.0000000	V1		
Antimony	0.0001784	0.0000324	V0	0.0000312	V0	0.0000000	V1		
Arsenic	0.0001060	0.0000277	V0	0.0000186	V0	0.0000000	V1		
Barium	0.0092847	0.0011361	V0	0.0008793	V0	0.0000000	V1		
Beryllium	0.0000946	0.0000042	V0	0.0000000	V1	0.0000000	V1		
Bismuth	0.0000093	0.0000201	V0	0.0000164	V0	0.0000040	V0		
Cadmium	0.0000174	0.0000056	V0	0.0000037	V0	0.0000000	V1		
Calcium	0.4112124	0.0900417	V0	0.0503811	V0	0.0000000	V1		
Cerium	0.0000174	0.0000737	V0	0.0001453	V0	0.0000000	V1		
Cesium	0.0000100	0.0000071	V0	0.0000046	V0	0.0000000	V1		
Chromium	0.0022262	0.0005751	V0	0.0002488	V0	0.0000000	V1		
Cobalt	0.0000273	0.0000582	V0	0.0000329	V0	0.0000236	V0		
Copper	0.0017171	0.0005298	V0	0.0004021	V0	0.0001587	V0		
Iron	0.0393063	0.0479977	V0	0.0246967	V0	0.0000000	V1		
Lanthanum	0.0000130	0.0000365	V0	0.0000166	V0	0.0000016	V0		
Lead	0.0008577	0.0000803	V0	0.0000450	V0	0.0000000	V1		
Lithium	0.0000374	0.0000764	V0	0.0000334	V0	0.0000000	V1		
Magnesium	0.0091409	0.0179398	V0	0.0117740	V0	0.0010631	V0		
Manganese	0.0006949	0.0009024	V0	0.0005696	V0	0.0000000	V1		
Molybdenum	0.0007116	0.0001420	V0	0.0000662	V0	0.0000000	V1		
Neodymium	0.0000140	0.0000325	V0	0.0000181	V0	0.0000000	V1		
Nickel	0.0005429	0.0003688	V0	0.0001834	V0	0.0000897	V0		
Niobium	0.0000202	0.0000119	V0	0.0000051	V0	0.0000000	V1		
Palladium	0.0000632	0.0000000	V1	0.0000000	V1	0.0000000	V1		
Phosphorus	0.0459574	0.0108082	V0	0.0109068	V0	0.0085742	V0		
Platinum	0.0000088	0.0000018	V0	0.0000016	V0	0.0000008	V0		
Potassium	0.0061261	0.0428545	V0	0.0216887	V0	0.0031864	V0		
Praseodymium	0.0000070	0.0000078	V0	0.0000035	V0	0.0000000	V1		
Rubidium	0.0000184	0.0001205	V0	0.0000657	V0	0.0000013	V0		
Samarium	0.0000133	0.0000053	V0	0.0000022	V0	0.0000000	V1		
Selenium	0.0003366	0.0000851	V0	0.0000449	V0	0.0000000	V1		
Silicon	0.7676322	0.3975383	V0	0.2364144	V0	0.1433203	V0		
Silver	0.0000100	0.0000015	V0	0.0000004	V0	0.0000000	V1		
Sodium	0.0169447	0.0348224	V0	0.0313299	V0	0.0010245	V0		
Strontium	0.0003375	0.0002878	V0	0.0001774	V0	0.0000000	V1		
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1		
Thallium	0.0000090	0.0000008	V0	0.0000004	V0	0.0000000	V1		
Thorium	0.0000059	0.0000106	V0	0.0000048	V0	0.0000000	V1		
Tin	0.0004414	0.0000781	V0	0.0000489	V0	0.0000000	V1		
Titanium	0.0015201	0.0066022	V0	0.0029801	V0	0.0002779	V0		
Tungsten	0.0000938	0.0000493	V0	0.0000131	V0	0.0000665	V0		
Uranium	0.0000048	0.0000029	V0	0.0000012	V0	0.0000000	V1		
Vanadium	0.0007697	0.0002191	V0	0.0000883	V0	0.0000000	V1		
Zinc	0.0055897	0.0020966	V0	0.0013843	V0	0.0003351	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 12-Feb PM10 24 Results (µg/m ³)	QC Flag	AMS 14 12-Feb PM10 24 Results (µg/m ³)	QC Flag	24 Results (µg/m ³)	QC Flag
Particulate Matter	1.00	5.18	V0	2.07	V0	0.16	V0	
Aluminum	0.1380326	0.0640221	V0	0.0435256	V0	0.0000000	V1	
Antimony	0.0001784	0.0001160	V0	0.0000103	V0	0.0000000	V1	
Arsenic	0.0001060	0.0000276	V0	0.0000241	V0	0.0000000	V1	
Barium	0.0092847	0.0021798	V0	0.0007948	V0	0.0000000	V1	
Beryllium	0.0000946	0.0000048	V0	0.0000000	V1	0.0000000	V1	
Bismuth	0.0000093	0.0000334	V0	0.0000038	V0	0.0000040	V0	
Cadmium	0.0000174	0.0000046	V0	0.0000039	V0	0.0000000	V1	
Calcium	0.4112124	0.1371064	V0	0.0495756	V0	0.0000000	V1	
Cerium	0.0000174	0.0000720	V0	0.0000371	V0	0.0000000	V1	
Cesium	0.0000100	0.0000059	V0	0.0000049	V0	0.0000000	V1	
Chromium	0.0022262	0.0002325	V0	0.0002488	V0	0.0000000	V1	
Cobalt	0.0000273	0.0000986	V0	0.0000561	V0	0.0000236	V0	
Copper	0.0017171	0.0009539	V0	0.0002012	V0	0.0001587	V0	
Iron	0.0393063	0.0778331	V0	0.0382781	V0	0.0000000	V1	
Lanthanum	0.0000130	0.0000366	V0	0.0000180	V0	0.0000016	V0	
Lead	0.0008577	0.0000886	V0	0.0000784	V0	0.0000000	V1	
Lithium	0.0000374	0.0000538	V0	0.0000361	V0	0.0000000	V1	
Magnesium	0.0091409	0.0306135	V0	0.0128121	V0	0.0010631	V0	
Manganese	0.0006949	0.0014573	V0	0.0008205	V0	0.0000000	V1	
Molybdenum	0.0007116	0.0000472	V0	0.0000000	V1	0.0000000	V1	
Neodymium	0.0000140	0.0000307	V0	0.0000142	V0	0.0000000	V1	
Nickel	0.0005429	0.0003742	V0	0.0002063	V0	0.0000897	V0	
Niobium	0.0000202	0.0000080	V0	0.0000053	V0	0.0000000	V1	
Palladium	0.0000632	0.0000029	V0	0.0000041	V0	0.0000000	V1	
Phosphorus	0.0459574	0.0104479	V0	0.0107843	V0	0.0085742	V0	
Platinum	0.0000088	0.0000027	V0	0.0000012	V0	0.0000008	V0	
Potassium	0.0061261	0.0802102	V0	0.0219019	V0	0.0031864	V0	
Praseodymium	0.0000070	0.0000079	V0	0.0000037	V0	0.0000000	V1	
Rubidium	0.0000184	0.0001031	V0	0.0000710	V0	0.0000013	V0	
Samarium	0.0000133	0.0000052	V0	0.0000024	V0	0.0000000	V1	
Selenium	0.0003366	0.0000612	V0	0.0000483	V0	0.0000000	V1	
Silicon	0.7676322	0.2838251	V0	0.2469113	V0	0.1433203	V0	
Silver	0.0000100	0.0000005	V0	0.0000010	V0	0.0000000	V1	
Sodium	0.0169447	0.8825685	V0	0.0401212	V0	0.0010245	V0	
Strontium	0.0003375	0.0005100	V0	0.0002022	V0	0.0000000	V1	
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1	
Thallium	0.0000090	0.0000009	V0	0.0000006	V0	0.0000000	V1	
Thorium	0.0000059	0.0000088	V0	0.0000053	V0	0.0000000	V1	
Tin	0.0004414	0.0000923	V0	0.0000306	V0	0.0000000	V1	
Titanium	0.0015201	0.0027772	V0	0.0019471	V0	0.0002779	V0	
Tungsten	0.0000938	0.0001218	V0	0.0000796	V0	0.0000665	V0	
Uranium	0.0000048	0.0000023	V0	0.0000016	V0	0.0000000	V1	
Vanadium	0.0007697	0.0001514	V0	0.0000936	V0	0.0000000	V1	
Zinc	0.0055897	0.0021717	V0	0.0012684	V0	0.0003351	V0	



Compound Name	Station Name	Fort McKay South		CNRL Horizon		Travel Blank	
	Station #	AMS 13		AMS 15			
	Sample Date	12-Feb		12-Feb		12-Feb	
	Particulate Size	PM10		PM10			
Total Air Volume (m ³)	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
		24		24		24	
Particulate Matter	1.00	4.36	V0	2.84	V0	0.16	V0
Aluminum	0.1380326	0.1474646	V0	0.0916726	V0	0.0000000	V1
Antimony	0.0001784	0.0000088	V0	0.0000000	V1	0.0000000	V1
Arsenic	0.0001060	0.0000391	V0	0.0000230	V0	0.0000000	V1
Barium	0.0092847	0.0013547	V0	0.0010376	V0	0.0000000	V1
Beryllium	0.0000946	0.0000066	V0	0.0000063	V0	0.0000000	V1
Bismuth	0.0000093	0.0000109	V0	0.0000039	V0	0.0000040	V0
Cadmium	0.0000174	0.0000038	V0	0.0000054	V0	0.0000000	V1
Calcium	0.4112124	0.0559020	V0	0.0424110	V0	0.0000000	V1
Cerium	0.0000174	0.0001268	V0	0.0000759	V0	0.0000000	V1
Cesium	0.0000100	0.0000122	V0	0.0000080	V0	0.0000000	V1
Chromium	0.0022262	0.0002447	V0	0.0002048	V0	0.0000000	V1
Cobalt	0.0000273	0.0000932	V0	0.0000441	V0	0.0000236	V0
Copper	0.0017171	0.0038667	V0	0.0001949	V0	0.0001587	V0
Iron	0.0393063	0.0775150	V0	0.0495106	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000616	V0	0.0000375	V0	0.0000016	V0
Lead	0.0008577	0.0000739	V0	0.0000732	V0	0.0000000	V1
Lithium	0.0000374	0.0001423	V0	0.0000851	V0	0.0000000	V1
Magnesium	0.0091409	0.0235477	V0	0.0179392	V0	0.0010631	V0
Manganese	0.0006949	0.0014278	V0	0.0009624	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000496	V0	0.0000373	V0	0.0000000	V1
Neodymium	0.0000140	0.0000566	V0	0.0000335	V0	0.0000000	V1
Nickel	0.0005429	0.0002989	V0	0.0003397	V0	0.0000897	V0
Niobium	0.0000202	0.0000167	V0	0.0000096	V0	0.0000000	V1
Palladium	0.0000632	0.0000000	V1	0.0000041	V0	0.0000000	V1
Phosphorus	0.0459574	0.0112842	V0	0.0099741	V0	0.0085742	V0
Platinum	0.0000088	0.0000011	V0	0.0000007	V0	0.0000008	V0
Potassium	0.0061261	0.0480867	V0	0.0341080	V0	0.0031864	V0
Praseodymium	0.0000070	0.0000144	V0	0.0000083	V0	0.0000000	V1
Rubidium	0.0000184	0.0002012	V0	0.0001233	V0	0.0000013	V0
Samarium	0.0000133	0.0000104	V0	0.0000055	V0	0.0000000	V1
Selenium	0.0003366	0.0001084	V0	0.0000576	V0	0.0000000	V1
Silicon	0.7676322	0.5979136	V0	0.3623133	V0	0.1433203	V0
Silver	0.0000100	0.0000031	V0	0.0000016	V0	0.0000000	V1
Sodium	0.0169447	0.0226468	V0	0.0206911	V0	0.0010245	V0
Strontium	0.0003375	0.0004179	V0	0.0002701	V0	0.0000000	V1
Tantalum	0.0000394	0.0000016	V0	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000013	V0	0.0000008	V0	0.0000000	V1
Thorium	0.0000059	0.0000179	V0	0.0000110	V0	0.0000000	V1
Tin	0.0004414	0.0000345	V0	0.0000353	V0	0.0000000	V1
Titanium	0.0015201	0.0051052	V0	0.0028970	V0	0.0002779	V0
Tungsten	0.0000938	0.0000296	V0	0.0000444	V0	0.0000665	V0
Uranium	0.0000048	0.0000053	V0	0.0000032	V0	0.0000000	V1
Vanadium	0.0007697	0.0003305	V0	0.0001908	V0	0.0000000	V1
Zinc	0.0055897	0.0013105	V0	0.0012874	V0	0.0003351	V0



Compound Name	Albian Muskeg River			Travel Blank	
	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	4.46	V0	0.16	V0
Aluminum	0.1380326	0.1328549	V0	0.0000000	V1
Antimony	0.0001784	0.0000292	V0	0.0000000	V1
Arsenic	0.0001060	0.0000520	V0	0.0000000	V1
Barium	0.0092847	0.0013676	V0	0.0000000	V1
Beryllium	0.0000946	0.0000049	V0	0.0000000	V1
Bismuth	0.0000093	0.0000055	V0	0.0000040	V0
Cadmium	0.0000174	0.0000047	V0	0.0000000	V1
Calcium	0.4112124	0.0853334	V0	0.0000000	V1
Cerium	0.0000174	0.0001543	V0	0.0000000	V1
Cesium	0.0000100	0.0000105	V0	0.0000000	V1
Chromium	0.0022262	0.0003644	V0	0.0000000	V1
Cobalt	0.0000273	0.0001054	V0	0.0000236	V0
Copper	0.0017171	0.0005956	V0	0.0001587	V0
Iron	0.0393063	0.1677063	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000677	V0	0.0000016	V0
Lead	0.0008577	0.0000910	V0	0.0000000	V1
Lithium	0.0000374	0.0001538	V0	0.0000000	V1
Magnesium	0.0091409	0.0207981	V0	0.0010631	V0
Manganese	0.0006949	0.0114850	V0	0.0000000	V1
Molybdenum	0.0007116	0.0005143	V0	0.0000000	V1
Neodymium	0.0000140	0.0000610	V0	0.0000000	V1
Nickel	0.0005429	0.0003104	V0	0.0000897	V0
Niobium	0.0000202	0.0000192	V0	0.0000000	V1
Palladium	0.0000632	0.0000060	V0	0.0000000	V1
Phosphorus	0.0459574	0.0114790	V0	0.0085742	V0
Platinum	0.0000088	0.0000019	V0	0.0000008	V0
Potassium	0.0061261	0.0465794	V0	0.0031864	V0
Praseodymium	0.0000070	0.0000164	V0	0.0000000	V1
Rubidium	0.0000184	0.0001703	V0	0.0000013	V0
Samarium	0.0000133	0.0000101	V0	0.0000000	V1
Selenium	0.0003366	0.0001213	V0	0.0000000	V1
Silicon	0.7676322	0.4928645	V0	0.1433203	V0
Silver	0.0000100	0.0000012	V0	0.0000000	V1
Sodium	0.0169447	0.0517435	V0	0.0010245	V0
Strontium	0.0003375	0.0003985	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000013	V0	0.0000000	V1
Thorium	0.0000059	0.0000188	V0	0.0000000	V1
Tin	0.0004414	0.0000710	V0	0.0000000	V1
Titanium	0.0015201	0.0060645	V0	0.0002779	V0
Tungsten	0.0000938	0.0000862	V0	0.0000665	V0
Uranium	0.0000048	0.0000047	V0	0.0000000	V1
Vanadium	0.0007697	0.0002676	V0	0.0000000	V1
Zinc	0.0055897	0.0029657	V0	0.0003351	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6			
	Sample Date	18-Feb		18-Feb		18-Feb	
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	
Particulate Matter	1.00	5.40	V0	6.60	V0	0.30	V0
Aluminum	0.1380326	0.1317630	V0	0.0444827	V0	0.0140750	V0
Antimony	0.0001784	0.0000252	V0	0.0001996	V0	0.0000000	V1
Arsenic	0.0001060	0.0000511	V0	0.0000655	V0	0.0000000	V1
Barium	0.0092847	0.0014894	V0	0.0022940	V0	0.0000000	V1
Beryllium	0.0000946	0.0000243	V0	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000173	V0	0.0000171	V0	0.0000047	V0
Cadmium	0.0000174	0.0000043	V0	0.0000059	V0	0.0000000	V1
Calcium	0.4112124	0.1979673	V0	0.1214852	V0	0.0000000	V1
Cerium	0.0000174	0.0001653	V0	0.0000674	V0	0.0000008	V0
Cesium	0.0000100	0.0000089	V0	0.0000027	V0	0.0000000	V1
Chromium	0.0022262	0.0005050	V0	0.0004982	V0	0.0001272	V0
Cobalt	0.0000273	0.0000768	V0	0.0000813	V0	0.0000266	V0
Copper	0.0017171	0.0018091	V0	0.0020742	V0	0.0007427	V0
Iron	0.0393063	0.1544024	V0	0.0680666	V0	0.0019516	V0
Lanthanum	0.0000130	0.0000794	V0	0.0000299	V0	0.0000000	V1
Lead	0.0008577	0.0001668	V0	0.0001521	V0	0.0000000	V1
Lithium	0.0000374	0.0001228	V0	0.0000373	V0	0.0000000	V1
Magnesium	0.0091409	0.0397731	V0	0.0180839	V0	0.0015894	V0
Manganese	0.0006949	0.0031406	V0	0.0017840	V0	0.0000975	V0
Molybdenum	0.0007116	0.0001100	V0	0.0005098	V0	0.0000437	V0
Neodymium	0.0000140	0.0000665	V0	0.0000285	V0	0.0000000	V1
Nickel	0.0005429	0.0003163	V0	0.0009227	V0	0.0001290	V0
Niobium	0.0000202	0.0000163	V0	0.0000101	V0	0.0000011	V0
Palladium	0.0000632	0.0000029	V0	0.0000084	V0	0.0000000	V1
Phosphorus	0.0459574	0.0114944	V0	0.0113566	V0	0.0097604	V0
Platinum	0.0000088	0.0000018	V0	0.0000024	V0	0.0000015	V0
Potassium	0.0061261	0.0515452	V0	0.0297982	V0	0.0021213	V0
Praseodymium	0.0000070	0.0000182	V0	0.0000074	V0	0.0000000	V1
Rubidium	0.0000184	0.0001620	V0	0.0000638	V0	0.0000014	V0
Samarium	0.0000133	0.0000114	V0	0.0000040	V0	0.0000000	V1
Selenium	0.0003366	0.0001090	V0	0.0000931	V0	0.0000209	V0
Silicon	0.7676322	0.2741062	V0	0.0860558	V0	0.0000000	V1
Silver	0.0000100	0.0000012	V0	0.0000004	V0	0.0000000	V1
Sodium	0.0169447	0.0849402	V0	0.1154980	V0	0.0016539	V0
Strontium	0.0003375	0.0005283	V0	0.0003447	V0	0.0000142	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000019	V0	0.0000009	V0	0.0000000	V1
Thorium	0.0000059	0.0000210	V0	0.0000074	V0	0.0000000	V1
Tin	0.0004414	0.0000816	V0	0.0002406	V0	0.0000203	V0
Titanium	0.0015201	0.0052121	V0	0.0033325	V0	0.0005528	V0
Tungsten	0.0000938	0.0000771	V0	0.0000740	V0	0.0000282	V0
Uranium	0.0000048	0.0000053	V0	0.0000035	V0	0.0000000	V1
Vanadium	0.0007697	0.0003409	V0	0.0028636	V0	0.0000365	V0
Zinc	0.0055897	0.0021679	V0	0.0029200	V0	0.0009917	V0



Station Name	Anzac		Travel Blank		
Station #	AMS 14		18-Feb		
Sample Date	18-Feb		18-Feb		
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	4.85	V0	0.30	V0
Aluminum	0.1380326	0.0201424	V0	0.0140750	V0
Antimony	0.0001784	0.0000339	V0	0.0000000	V1
Arsenic	0.0001060	0.0000476	V0	0.0000000	V1
Barium	0.0092847	0.0004686	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000093	V0	0.0000047	V0
Cadmium	0.0000174	0.0000056	V0	0.0000000	V1
Calcium	0.4112124	0.0558602	V0	0.0000000	V1
Cerium	0.0000174	0.0000214	V0	0.0000008	V0
Cesium	0.0000100	0.0000013	V0	0.0000000	V1
Chromium	0.0022262	0.0005066	V0	0.0001272	V0
Cobalt	0.0000273	0.0000281	V0	0.0000266	V0
Copper	0.0017171	0.0003877	V0	0.0007427	V0
Iron	0.0393063	0.0212351	V0	0.0019516	V0
Lanthanum	0.0000130	0.0000099	V0	0.0000000	V1
Lead	0.0008577	0.0000889	V0	0.0000000	V1
Lithium	0.0000374	0.0000150	V0	0.0000000	V1
Magnesium	0.0091409	0.0064120	V0	0.0015894	V0
Manganese	0.0006949	0.0004144	V0	0.0000975	V0
Molybdenum	0.0007116	0.0003636	V0	0.0000437	V0
Neodymium	0.0000140	0.0000079	V0	0.0000000	V1
Nickel	0.0005429	0.0008683	V0	0.0001290	V0
Niobium	0.0000202	0.0000080	V0	0.0000011	V0
Palladium	0.0000632	0.0000062	V0	0.0000000	V1
Phosphorus	0.0459574	0.0111452	V0	0.0097604	V0
Platinum	0.0000088	0.0000011	V0	0.0000015	V0
Potassium	0.0061261	0.0131078	V0	0.0021213	V0
Praseodymium	0.0000070	0.0000019	V0	0.0000000	V1
Rubidium	0.0000184	0.0000234	V0	0.0000014	V0
Samarium	0.0000133	0.0000011	V0	0.0000000	V1
Selenium	0.0003366	0.0000831	V0	0.0000209	V0
Silicon	0.7676322	0.2150087	V0	0.0000000	V1
Silver	0.0000100	0.0000033	V0	0.0000000	V1
Sodium	0.0169447	0.0171814	V0	0.0016539	V0
Strontium	0.0003375	0.0001131	V0	0.0000142	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000000	V1	0.0000000	V1
Thorium	0.0000059	0.0000027	V0	0.0000000	V1
Tin	0.0004414	0.0000818	V0	0.0000203	V0
Titanium	0.0015201	0.0011983	V0	0.0005528	V0
Tungsten	0.0000938	0.0000635	V0	0.0000282	V0
Uranium	0.0000048	0.0000018	V0	0.0000000	V1
Vanadium	0.0007697	0.0020161	V0	0.0000365	V0
Zinc	0.0055897	0.0023203	V0	0.0009917	V0



Compound Name	MDL (µg/sample)	Fort McKay South		CNRL Horizon		Travel Blank		
		AMS 13	AMS 15	AMS 15	AMS 15	AMS 13	AMS 15	
Station Name	Station #	Sample Date	Particulate Size	Total Air Volume (m ³)	Sample Date	Particulate Size	Total Air Volume (m ³)	
			PM10	24	18-Feb	PM10	24	
			Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00		5.67	V0	4.05	V0	0.30	V0
Aluminum	0.1380326		0.0948548	V0	0.0940721	V0	0.0140750	V0
Antimony	0.0001784		0.0000669	V0	0.0000165	V0	0.0000000	V1
Arsenic	0.0001060		0.0000564	V0	0.0000534	V0	0.0000000	V1
Barium	0.0092847		0.0013760	V0	0.0012163	V0	0.0000000	V1
Beryllium	0.0000946		0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093		0.0000358	V0	0.0000070	V0	0.0000047	V0
Cadmium	0.0000174		0.0000259	V0	0.0000055	V0	0.0000000	V1
Calcium	0.4112124		0.1523786	V0	0.1256303	V0	0.0000000	V1
Cerium	0.0000174		0.0001029	V0	0.0001060	V0	0.0000008	V0
Cesium	0.0000100		0.0000070	V0	0.0000071	V0	0.0000000	V1
Chromium	0.0022262		0.0004404	V0	0.0003249	V0	0.0001272	V0
Cobalt	0.0000273		0.0000652	V0	0.0000494	V0	0.0000266	V0
Copper	0.0017171		0.0020901	V0	0.0004897	V0	0.0007427	V0
Iron	0.0393063		0.1447307	V0	0.0918185	V0	0.0019516	V0
Lanthanum	0.0000130		0.0000503	V0	0.0000514	V0	0.0000000	V1
Lead	0.0008577		0.0001648	V0	0.0001567	V0	0.0000000	V1
Lithium	0.0000374		0.0000879	V0	0.0000869	V0	0.0000000	V1
Magnesium	0.0091409		0.0276845	V0	0.0346051	V0	0.0015894	V0
Manganese	0.0006949		0.0033622	V0	0.0019264	V0	0.0000975	V0
Molybdenum	0.0007116		0.0001666	V0	0.0000529	V0	0.0000437	V0
Neodymium	0.0000140		0.0000414	V0	0.0000439	V0	0.0000000	V1
Nickel	0.0005429		0.0005341	V0	0.0002879	V0	0.0001290	V0
Niobium	0.0000202		0.0000183	V0	0.0000108	V0	0.0000011	V0
Palladium	0.0000632		0.0000029	V0	0.0000047	V0	0.0000000	V1
Phosphorus	0.0459574		0.0106387	V0	0.0117373	V0	0.0097604	V0
Platinum	0.0000088		0.0000013	V0	0.0000015	V0	0.0000015	V0
Potassium	0.0061261		0.0389942	V0	0.0397213	V0	0.0021213	V0
Praseodymium	0.0000070		0.0000109	V0	0.0000117	V0	0.0000000	V1
Rubidium	0.0000184		0.0001222	V0	0.0001170	V0	0.0000014	V0
Samarium	0.0000133		0.0000067	V0	0.0000076	V0	0.0000000	V1
Selenium	0.0003366		0.0000870	V0	0.0001343	V0	0.0000209	V0
Silicon	0.7676322		0.2549718	V0	0.4357071	V0	0.0000000	V1
Silver	0.0000100		0.0000000	V1	0.0000009	V0	0.0000000	V1
Sodium	0.0169447		0.0814226	V0	0.0718426	V0	0.0016539	V0
Strontium	0.0003375		0.0004309	V0	0.0004006	V0	0.0000142	V0
Tantalum	0.0000394		0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090		0.0000013	V0	0.0000015	V0	0.0000000	V1
Thorium	0.0000059		0.0000137	V0	0.0000134	V0	0.0000000	V1
Tin	0.0004414		0.0001811	V0	0.0000758	V0	0.0000203	V0
Titanium	0.0015201		0.0042084	V0	0.0034894	V0	0.0005528	V0
Tungsten	0.0000938		0.0000465	V0	0.0000438	V0	0.0000282	V0
Uranium	0.0000048		0.0000036	V0	0.0000035	V0	0.0000000	V1
Vanadium	0.0007697		0.0002784	V0	0.0001940	V0	0.0000365	V0
Zinc	0.0055897		0.0053304	V0	0.0022192	V0	0.0009917	V0



Compound Name	Albian Muskeg River			Travel Blank	
	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	6.39	V0	0.30	V0
Aluminum	0.1380326	0.1532819	V0	0.0140750	V0
Antimony	0.0001784	0.0000138	V0	0.0000000	V1
Arsenic	0.0001060	0.0000489	V0	0.0000000	V1
Barium	0.0092847	0.0013437	V0	0.0000000	V1
Beryllium	0.0000946	0.0000079	V0	0.0000000	V1
Bismuth	0.0000093	0.0000044	V0	0.0000047	V0
Cadmium	0.0000174	0.0000047	V0	0.0000000	V1
Calcium	0.4112124	0.2013084	V0	0.0000000	V1
Cerium	0.0000174	0.0001789	V0	0.0000008	V0
Cesium	0.0000100	0.0000108	V0	0.0000000	V1
Chromium	0.0022262	0.0003815	V0	0.0001272	V0
Cobalt	0.0000273	0.0000742	V0	0.0000266	V0
Copper	0.0017171	0.0004868	V0	0.0007427	V0
Iron	0.0393063	0.1083097	V0	0.0019516	V0
Lanthanum	0.0000130	0.0000866	V0	0.0000000	V1
Lead	0.0008577	0.0001408	V0	0.0000000	V1
Lithium	0.0000374	0.0001584	V0	0.0000000	V1
Magnesium	0.0091409	0.0460243	V0	0.0015894	V0
Manganese	0.0006949	0.0021566	V0	0.0000975	V0
Molybdenum	0.0007116	0.0000738	V0	0.0000437	V0
Neodymium	0.0000140	0.0000739	V0	0.0000000	V1
Nickel	0.0005429	0.0003562	V0	0.0001290	V0
Niobium	0.0000202	0.0000273	V0	0.0000011	V0
Palladium	0.0000632	0.0000053	V0	0.0000000	V1
Phosphorus	0.0459574	0.0124427	V0	0.0097604	V0
Platinum	0.0000088	0.0000021	V0	0.0000015	V0
Potassium	0.0061261	0.0600390	V0	0.0021213	V0
Praseodymium	0.0000070	0.0000197	V0	0.0000000	V1
Rubidium	0.0000184	0.0002015	V0	0.0000014	V0
Samarium	0.0000133	0.0000126	V0	0.0000000	V1
Selenium	0.0003366	0.0001821	V0	0.0000209	V0
Silicon	0.7676322	0.7377889	V0	0.0000000	V1
Silver	0.0000100	0.0000007	V0	0.0000000	V1
Sodium	0.0169447	0.0502462	V0	0.0016539	V0
Strontium	0.0003375	0.0005493	V0	0.0000142	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000019	V0	0.0000000	V1
Thorium	0.0000059	0.0000251	V0	0.0000000	V1
Tin	0.0004414	0.0001132	V0	0.0000203	V0
Titanium	0.0015201	0.0073692	V0	0.0005528	V0
Tungsten	0.0000938	0.0001083	V0	0.0000282	V0
Uranium	0.0000048	0.0000070	V0	0.0000000	V1
Vanadium	0.0007697	0.0003150	V0	0.0000365	V0
Zinc	0.0055897	0.0018769	V0	0.0009917	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay			Patricia McInnes		Travel Blank
	Station #	AMS 1		AMS 6			
	Sample Date	24-Feb		24-Feb			24-Feb
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	12.84	V0	8.25	V0	0.06	V0
Aluminum	0.1380326	0.3682060	V0	0.1469192	V0	0.0000000	V1
Antimony	0.0001784	0.0000549	V0	0.0000980	V0	0.0000000	V1
Arsenic	0.0001060	0.0001036	V0	0.0000582	V0	0.0000000	V1
Barium	0.0092847	0.0033694	V0	0.0020192	V0	0.0000000	V1
Beryllium	0.0000946	0.0000133	V0	0.0000093	V0	0.0000000	V1
Bismuth	0.0000093	0.0000239	V0	0.0000100	V0	0.0000004	V0
Cadmium	0.0000174	0.0000079	V0	0.0000054	V0	0.0000000	V1
Calcium	0.4112124	0.3711687	V0	0.1974091	V0	0.0000000	V1
Cerium	0.0000174	0.0003998	V0	0.0001773	V0	0.0000000	V1
Cesium	0.0000100	0.0000270	V0	0.0000107	V0	0.0000000	V1
Chromium	0.0022262	0.0006738	V0	0.0008068	V0	0.0001926	V0
Cobalt	0.0000273	0.0001564	V0	0.0000605	V0	0.0000020	V0
Copper	0.0017171	0.0007725	V0	0.0009743	V0	0.0001147	V0
Iron	0.0393063	0.3519305	V0	0.1334937	V0	0.0000000	V1
Lanthanum	0.0000130	0.0001941	V0	0.0000851	V0	0.0000000	V1
Lead	0.0008577	0.0002475	V0	0.0002687	V0	0.0000000	V1
Lithium	0.0000374	0.0003234	V0	0.0001466	V0	0.0000025	V0
Magnesium	0.0091409	0.0822382	V0	0.0530281	V0	0.0005511	V0
Manganese	0.0006949	0.0054819	V0	0.0023250	V0	0.0000466	V0
Molybdenum	0.0007116	0.0001402	V0	0.0001331	V0	0.0001056	V0
Neodymium	0.0000140	0.0001733	V0	0.0000715	V0	0.0000000	V1
Nickel	0.0005429	0.0006945	V0	0.0006392	V0	0.0000831	V0
Niobium	0.0000202	0.0000457	V0	0.0000260	V0	0.0000000	V1
Palladium	0.0000632	0.0000079	V0	0.0000172	V0	0.0000108	V0
Phosphorus	0.0459574	0.0122330	V0	0.0121159	V0	0.0113919	V0
Platinum	0.0000088	0.0000019	V0	0.0000020	V0	0.0000032	V0
Potassium	0.0061261	0.1198143	V0	0.0692346	V0	0.0005881	V0
Praseodymium	0.0000070	0.0000462	V0	0.0000198	V0	0.0000000	V1
Rubidium	0.0000184	0.0004836	V0	0.0001909	V0	0.0000010	V0
Samarium	0.0000133	0.0000322	V0	0.0000133	V0	0.0000000	V1
Selenium	0.0003366	0.0002648	V0	0.0001471	V0	0.0000000	V1
Silicon	0.7676322	1.1674286	V0	0.4755254	V0	0.0384370	V0
Silver	0.0000100	0.0000018	V0	0.0000011	V0	0.0000005	V0
Sodium	0.0169447	0.2141776	V0	0.5999951	V0	0.0011569	V0
Strontium	0.0003375	0.0012546	V0	0.0006569	V0	0.0000000	V1
Tantalum	0.0000394	0.0000030	V0	0.0000018	V0	0.0000000	V1
Thallium	0.0000090	0.0000046	V0	0.0000028	V0	0.0000000	V1
Thorium	0.0000059	0.0000519	V0	0.0000208	V0	0.0000000	V1
Tin	0.0004414	0.0000835	V0	0.0001996	V0	0.0000000	V1
Titanium	0.0015201	0.0143633	V0	0.0085767	V0	0.0003729	V0
Tungsten	0.0000938	0.0001867	V0	0.0000801	V0	0.0000000	V1
Uranium	0.0000048	0.0000138	V0	0.0000061	V0	0.0000000	V1
Vanadium	0.0007697	0.0014109	V0	0.0009100	V0	0.0000000	V1
Zinc	0.0055897	0.0025445	V0	0.0036729	V0	0.0000000	V1



Station Name	Anzac	Travel Blank			
Station #	AMS 14				
Sample Date	24-Feb	24-Feb			
Particulate Size	PM10				
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	6.16	V0	0.06	V0
Aluminum	0.1380326	0.1118323	V0	0.0000000	V1
Antimony	0.0001784	0.0000508	V0	0.0000000	V1
Arsenic	0.0001060	0.0001247	V0	0.0000000	V1
Barium	0.0092847	0.0018180	V0	0.0000000	V1
Beryllium	0.0000946	0.0000059	V0	0.0000000	V1
Bismuth	0.0000093	0.0001540	V0	0.0000004	V0
Cadmium	0.0000174	0.0000118	V0	0.0000000	V1
Calcium	0.4112124	0.3477330	V0	0.0000000	V1
Cerium	0.0000174	0.0001214	V0	0.0000000	V1
Cesium	0.0000100	0.0000085	V0	0.0000000	V1
Chromium	0.0022262	0.0003792	V0	0.0001926	V0
Cobalt	0.0000273	0.0000711	V0	0.0000020	V0
Copper	0.0017171	0.0008099	V0	0.0001147	V0
Iron	0.0393063	0.1388385	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000599	V0	0.0000000	V1
Lead	0.0008577	0.0002336	V0	0.0000000	V1
Lithium	0.0000374	0.0000928	V0	0.0000025	V0
Magnesium	0.0091409	0.0459794	V0	0.0005511	V0
Manganese	0.0006949	0.0027479	V0	0.0000466	V0
Molybdenum	0.0007116	0.0001469	V0	0.0001056	V0
Neodymium	0.0000140	0.0000494	V0	0.0000000	V1
Nickel	0.0005429	0.0003986	V0	0.0000831	V0
Niobium	0.0000202	0.0000148	V0	0.0000000	V1
Palladium	0.0000632	0.0000045	V0	0.0000108	V0
Phosphorus	0.0459574	0.0112065	V0	0.0113919	V0
Platinum	0.0000088	0.0000018	V0	0.0000032	V0
Potassium	0.0061261	0.0563103	V0	0.0005881	V0
Praseodymium	0.0000070	0.0000122	V0	0.0000000	V1
Rubidium	0.0000184	0.0001619	V0	0.0000010	V0
Samarium	0.0000133	0.0000089	V0	0.0000000	V1
Selenium	0.0003366	0.0001072	V0	0.0000000	V1
Silicon	0.7676322	0.2588248	V0	0.0384370	V0
Silver	0.0000100	0.0000022	V0	0.0000005	V0
Sodium	0.0169447	0.1438150	V0	0.0011569	V0
Strontium	0.0003375	0.0006738	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000025	V0	0.0000000	V1
Thorium	0.0000059	0.0000144	V0	0.0000000	V1
Tin	0.0004414	0.0001175	V0	0.0000000	V1
Titanium	0.0015201	0.0045191	V0	0.0003729	V0
Tungsten	0.0000938	0.0000895	V0	0.0000000	V1
Uranium	0.0000048	0.0000051	V0	0.0000000	V1
Vanadium	0.0007697	0.0006418	V0	0.0000000	V1
Zinc	0.0055897	0.0028982	V0	0.0000000	V1



Compound Name	Station Name	Fort McKay South		CNRL Horizon		Travel Blank	
	Station #	AMS 13		AMS 15		24-Feb	
	Sample Date	24-Feb		24-Feb			
	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	
Particulate Matter	1.00	9.70	V0	3.42	V0	0.06	V0
Aluminum	0.1380326	0.3504228	V0	0.0324568	V0	0.0000000	V1
Antimony	0.0001784	0.0001350	V0	0.0000093	V0	0.0000000	V1
Arsenic	0.0001060	0.0001129	V0	0.0000288	V0	0.0000000	V1
Barium	0.0092847	0.0032726	V0	0.0000000	V1	0.0000000	V1
Beryllium	0.0000946	0.0000112	V0	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000249	V0	0.0000039	V0	0.0000004	V0
Cadmium	0.0000174	0.0000068	V0	0.0000042	V0	0.0000000	V1
Calcium	0.4112124	0.1672081	V0	0.0438527	V0	0.0000000	V1
Cerium	0.0000174	0.0003801	V0	0.0000469	V0	0.0000000	V1
Cesium	0.0000100	0.0000260	V0	0.0000038	V0	0.0000000	V1
Chromium	0.0022262	0.0006165	V0	0.0001012	V0	0.0001926	V0
Cobalt	0.0000273	0.0001275	V0	0.0000178	V0	0.0000020	V0
Copper	0.0017171	0.0006199	V0	0.0003782	V0	0.0001147	V0
Iron	0.0393063	0.3151164	V0	0.0403187	V0	0.0000000	V1
Lanthanum	0.0000130	0.0001945	V0	0.0000223	V0	0.0000000	V1
Lead	0.0008577	0.0002485	V0	0.0001166	V0	0.0000000	V1
Lithium	0.0000374	0.0003117	V0	0.0000328	V0	0.0000025	V0
Magnesium	0.0091409	0.0687027	V0	0.0203267	V0	0.0005511	V0
Manganese	0.0006949	0.0045994	V0	0.0007443	V0	0.0000466	V0
Molybdenum	0.0007116	0.0001314	V0	0.0000742	V0	0.0001056	V0
Neodymium	0.0000140	0.0001682	V0	0.0000217	V0	0.0000000	V1
Nickel	0.0005429	0.0005284	V0	0.0001080	V0	0.0000831	V0
Niobium	0.0000202	0.0000490	V0	0.0000038	V0	0.0000000	V1
Palladium	0.0000632	0.0000126	V0	0.0000000	V1	0.0000108	V0
Phosphorus	0.0459574	0.0120756	V0	0.0106918	V0	0.0113919	V0
Platinum	0.0000088	0.0000013	V0	0.0000037	V0	0.0000032	V0
Potassium	0.0061261	0.1141317	V0	0.0176252	V0	0.0005881	V0
Praseodymium	0.0000070	0.0000441	V0	0.0000056	V0	0.0000000	V1
Rubidium	0.0000184	0.0004791	V0	0.0000564	V0	0.0000010	V0
Samarium	0.0000133	0.0000315	V0	0.0000041	V0	0.0000000	V1
Selenium	0.0003366	0.0002586	V0	0.0000387	V0	0.0000000	V1
Silicon	0.7676322	0.9666890	V0	0.0881526	V0	0.0384370	V0
Silver	0.0000100	0.0000022	V0	0.0000007	V0	0.0000005	V0
Sodium	0.0169447	0.1607078	V0	0.1000571	V0	0.0011569	V0
Strontium	0.0003375	0.0010593	V0	0.0001977	V0	0.0000000	V1
Tantalum	0.0000394	0.0000032	V0	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000045	V0	0.0000011	V0	0.0000000	V1
Thorium	0.0000059	0.0000527	V0	0.0000075	V0	0.0000000	V1
Tin	0.0004414	0.0001103	V0	0.0000388	V0	0.0000000	V1
Titanium	0.0015201	0.0146030	V0	0.0012580	V0	0.0003729	V0
Tungsten	0.0000938	0.0001230	V0	0.0000314	V0	0.0000000	V1
Uranium	0.0000048	0.0000135	V0	0.0000025	V0	0.0000000	V1
Vanadium	0.0007697	0.0008584	V0	0.0001395	V0	0.0000000	V1
Zinc	0.0055897	0.0025564	V0	0.0009667	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	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	10.50	7.94	4	4
Aluminum	0.1888335	0.1239929	4	4
Antimony	0.0000582	0.0000432	4	4
Arsenic	0.0000873	0.0000619	4	4
Barium	0.0022070	0.0010654	4	4
Beryllium	0.0000124	0.0000088	4	4
Bismuth	0.0000226	0.0000051	4	4
Cadmium	0.0000089	0.0000062	4	4
Calcium	0.2657847	0.1479677	4	4
Cerium	0.0002206	0.0001382	4	4
Cesium	0.0000138	0.0000091	4	4
Chromium	0.0006325	0.0001181	4	4
Cobalt	0.0000997	0.0000429	4	4
Copper	0.0010611	0.0005569	4	4
Iron	0.1868357	0.1259925	4	4
Lanthanum	0.0001059	0.0000667	4	4
Lead	0.0002045	0.0001046	4	4
Lithium	0.0001772	0.0001074	4	4
Magnesium	0.0564463	0.0331140	4	4
Manganese	0.0037624	0.0022083	4	4
Molybdenum	0.0004091	0.0005569	4	4
Neodymium	0.0000925	0.0000601	4	4
Nickel	0.0007105	0.0005285	4	4
Niobium	0.0000268	0.0000156	4	4
Palladium	0.0000067	0.0000071	4	3
Phosphorus	0.0121308	0.0013677	4	4
Platinum	0.0000021	0.0000004	4	4
Potassium	0.0806276	0.0390459	4	4
Praseodymium	0.0000247	0.0000163	4	4
Rubidium	0.0002604	0.0001626	4	4
Samarium	0.0000165	0.0000115	4	4
Selenium	0.0001746	0.0000906	4	4
Silicon	0.6445808	0.4002556	4	4
Silver	0.0000025	0.0000021	4	4
Sodium	0.1903205	0.1751504	4	4
Strontium	0.0008429	0.0005120	4	4
Tantalum	0.0000012	0.0000015	4	2
Thallium	0.0000027	0.0000017	4	4
Thorium	0.0000284	0.0000176	4	4
Tin	0.0001328	0.0001035	4	4
Titanium	0.0098771	0.0046383	4	4
Tungsten	0.0001429	0.0000973	4	4
Uranium	0.0000084	0.0000051	4	4
Vanadium	0.0019960	0.0027310	4	4
Zinc	0.0036640	0.0027956	4	4



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

Particulate Matter (PM10) - METALS - Summary

2017

Indicated Sites and Dates

Station Name	Patricia McInnes	Patricia McInnes	Patricia McInnes	Patricia McInnes
Station #	AMS 6	AMS 6	AMS 6	AMS 6
Sample Date	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	6.49	3.31	4	4
Aluminum	0.0732547	0.0495595	4	4
Antimony	0.0001708	0.0001407	4	4
Arsenic	0.0000509	0.0000217	4	4
Barium	0.0021182	0.0009876	4	4
Beryllium	0.0000036	0.0000045	4	2
Bismuth	0.0000158	0.0000041	4	4
Cadmium	0.0000068	0.0000038	4	4
Calcium	0.1349065	0.0645175	4	4
Cerium	0.0001310	0.0000462	4	4
Cesium	0.0000055	0.0000035	4	4
Chromium	0.0004740	0.0002446	4	4
Cobalt	0.0000740	0.0000373	4	4
Copper	0.0014194	0.0008783	4	4
Iron	0.0812750	0.0462277	4	4
Lanthanum	0.0000463	0.0000301	4	4
Lead	0.0002212	0.0001604	4	4
Lithium	0.0000687	0.0000530	4	4
Magnesium	0.0397951	0.0303527	4	4
Manganese	0.0016146	0.0007422	4	4
Molybdenum	0.0002298	0.0001957	4	4
Neodymium	0.0000389	0.0000231	4	4
Nickel	0.0005204	0.0003283	4	4
Niobium	0.0000128	0.0000091	4	4
Palladium	0.0000101	0.0000077	4	3
Phosphorus	0.0114836	0.0005013	4	4
Platinum	0.0000024	0.0000008	4	4
Potassium	0.0447965	0.0226786	4	4
Praseodymium	0.0000107	0.0000070	4	4
Rubidium	0.0001067	0.0000595	4	4
Samarium	0.0000061	0.0000049	4	4
Selenium	0.0000917	0.0000423	4	4
Silicon	0.2734074	0.1610536	4	4
Silver	0.0000012	0.0000011	4	4
Sodium	0.3561004	0.3297465	4	4
Strontium	0.0004847	0.0002705	4	4
Tantalum	0.0000004	0.0000009	4	1
Thallium	0.0000014	0.0000010	4	4
Thorium	0.0000106	0.0000070	4	4
Tin	0.0001946	0.0001039	4	4
Titanium	0.0046432	0.0026381	4	4
Tungsten	0.0000787	0.0000551	4	4
Uranium	0.0000034	0.0000020	4	4
Vanadium	0.0010454	0.0012605	4	4
Zinc	0.0031352	0.0013468	4	4



Station Name	Athabasca Valley	Athabasca Valley	Athabasca Valley	Athabasca Valley
Station #	AMS 7	AMS 7	AMS 7	AMS 7
Sample Date	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	11.67	9.17	2	2
Aluminum	0.0821939	0.0256989	2	2
Antimony	0.0003402	0.0003171	2	2
Arsenic	0.0000579	0.0000428	2	2
Barium	0.0040749	0.0026801	2	2
Beryllium	0.0000056	0.0000012	2	2
Bismuth	0.0000272	0.0000088	2	2
Cadmium	0.0000089	0.0000061	2	2
Calcium	0.2294708	0.1306230	2	2
Cerium	0.0001206	0.0000687	2	2
Cesium	0.0000064	0.0000008	2	2
Chromium	0.0003534	0.0001709	2	2
Cobalt	0.0001056	0.0000098	2	2
Copper	0.0022843	0.0018815	2	2
Iron	0.1377664	0.0847585	2	2
Lanthanum	0.0000568	0.0000285	2	2
Lead	0.0002247	0.0001925	2	2
Lithium	0.0000750	0.0000299	2	2
Magnesium	0.0689246	0.0541801	2	2
Manganese	0.0023947	0.0013256	2	2
Molybdenum	0.0001560	0.0001539	2	2
Neodymium	0.0000459	0.0000216	2	2
Nickel	0.0004112	0.0000524	2	2
Niobium	0.0000130	0.0000071	2	2
Palladium	0.0000111	0.0000116	2	2
Phosphorus	0.0118910	0.0020409	2	2
Platinum	0.0000035	0.0000011	2	2
Potassium	0.0949577	0.0208561	2	2
Praseodymium	0.0000124	0.0000064	2	2
Rubidium	0.0001309	0.0000393	2	2
Samarium	0.0000074	0.0000030	2	2
Selenium	0.0000950	0.0000477	2	2
Silicon	0.3966114	0.1595040	2	2
Silver	0.0000018	0.0000019	2	2
Sodium	1.6178569	1.0398548	2	2
Strontium	0.0008755	0.0005170	2	2
Tantalum	0.0000008	0.0000012	2	1
Thallium	0.0000016	0.0000010	2	2
Thorium	0.0000120	0.0000045	2	2
Tin	0.0002427	0.0002128	2	2
Titanium	0.0046687	0.0026751	2	2
Tungsten	0.0002652	0.0002028	2	2
Uranium	0.0000037	0.0000020	2	2
Vanadium	0.0003644	0.0003013	2	2
Zinc	0.0044872	0.0032747	2	2



Station Name	Anzac	Anzac	Anzac	Anzac
Station #	AMS 14	AMS 14	AMS 14	AMS 14
Sample Date	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	4.20	1.73	4	4
Aluminum	0.0458927	0.0463582	4	4
Antimony	0.0000339	0.0000172	4	4
Arsenic	0.0000595	0.0000446	4	4
Barium	0.0008778	0.0006478	4	4
Beryllium	0.0000033	0.0000039	4	2
Bismuth	0.0000427	0.0000742	4	4
Cadmium	0.0000077	0.0000036	4	4
Calcium	0.1224273	0.1504191	4	4
Cerium	0.0000479	0.0000501	4	4
Cesium	0.0000040	0.0000035	4	4
Chromium	0.0003319	0.0001402	4	4
Cobalt	0.0000504	0.0000180	4	4
Copper	0.0004967	0.0002618	4	4
Iron	0.0549992	0.0564540	4	4
Lanthanum	0.0000232	0.0000250	4	4
Lead	0.0001628	0.0000917	4	4
Lithium	0.0000393	0.0000371	4	4
Magnesium	0.0264347	0.0197257	4	4
Manganese	0.0010681	0.0011426	4	4
Molybdenum	0.0001430	0.0001590	4	3
Neodymium	0.0000187	0.0000210	4	4
Nickel	0.0004173	0.0003148	4	4
Niobium	0.0000082	0.0000047	4	4
Palladium	0.0000074	0.0000049	4	4
Phosphorus	0.0108269	0.0004749	4	4
Platinum	0.0000015	0.0000004	4	4
Potassium	0.0282057	0.0191702	4	4
Praseodymium	0.0000046	0.0000052	4	4
Rubidium	0.0000695	0.0000658	4	4
Samarium	0.0000031	0.0000040	4	3
Selenium	0.0000668	0.0000351	4	4
Silicon	0.2170360	0.0499741	4	4
Silver	0.0000024	0.0000010	4	4
Sodium	0.1109984	0.1037527	4	4
Strontium	0.0003143	0.0002479	4	4
Tantalum	0.0000000	0.0000000	4	0
Thallium	0.0000009	0.0000011	4	3
Thorium	0.0000058	0.0000061	4	4
Tin	0.0000747	0.0000359	4	4
Titanium	0.0021759	0.0016115	4	4
Tungsten	0.0000839	0.0000166	4	4
Uranium	0.0000022	0.0000020	4	4
Vanadium	0.0007135	0.0009054	4	4
Zinc	0.0019967	0.0007516	4	4



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	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	8.01	3.66	4	4
Aluminum	0.1671241	0.1259051	4	4
Antimony	0.0000766	0.0000531	4	4
Arsenic	0.0000785	0.0000363	4	4
Barium	0.0018492	0.0009491	4	4
Beryllium	0.0000058	0.0000046	4	3
Bismuth	0.0000224	0.0000106	4	4
Cadmium	0.0000115	0.0000099	4	4
Calcium	0.1383114	0.0559170	4	4
Cerium	0.0001801	0.0001337	4	4
Cesium	0.0000128	0.0000092	4	4
Chromium	0.0004776	0.0001752	4	4
Cobalt	0.0001165	0.0000494	4	4
Copper	0.0018892	0.0014593	4	4
Iron	0.1580153	0.1085457	4	4
Lanthanum	0.0000894	0.0000702	4	4
Lead	0.0001760	0.0000762	4	4
Lithium	0.0001584	0.0001052	4	4
Magnesium	0.0422566	0.0208845	4	4
Manganese	0.0030684	0.0013109	4	4
Molybdenum	0.0002749	0.0003218	4	4
Neodymium	0.0000776	0.0000607	4	4
Nickel	0.0007073	0.0005188	4	4
Niobium	0.0000248	0.0000161	4	4
Palladium	0.0000052	0.0000054	4	3
Phosphorus	0.0115420	0.0007213	4	4
Platinum	0.0000017	0.0000010	4	4
Potassium	0.0645362	0.0338650	4	4
Praseodymium	0.0000204	0.0000158	4	4
Rubidium	0.0002340	0.0001671	4	4
Samarium	0.0000141	0.0000117	4	4
Selenium	0.0001486	0.0000765	4	4
Silicon	0.5704510	0.2994427	4	4
Silver	0.0000019	0.0000013	4	3
Sodium	0.1517817	0.1390709	4	4
Strontium	0.0006371	0.0002994	4	4
Tantalum	0.0000012	0.0000015	4	2
Thallium	0.0000022	0.0000016	4	4
Thorium	0.0000244	0.0000189	4	4
Tin	0.0001203	0.0000642	4	4
Titanium	0.0072058	0.0049465	4	4
Tungsten	0.0000936	0.0000679	4	4
Uranium	0.0000068	0.0000045	4	4
Vanadium	0.0011480	0.0013435	4	4
Zinc	0.0036213	0.0020143	4	4



Station Name Station # Sample Date Particulate Size Compound Name	CNRL Horizon AMS 15 Feb 06 - Feb 24 PM10 Average $\mu\text{g}/\text{m}^3$	CNRL Horizon AMS 15 Feb 06 - Feb 24 PM10 Std Dev $\mu\text{g}/\text{m}^3$	CNRL Horizon AMS 15 Feb 06 - Feb 24 PM10 Total Samples (#)	CNRL Horizon AMS 15 Feb 06 - Feb 24 PM10 Total \geq MDL (#)
Particulate Matter	6.90	6.95	4	4
Aluminum	0.1881248	0.2325347	4	4
Antimony	0.0000176	0.0000192	4	3
Arsenic	0.0000565	0.0000449	4	4
Barium	0.0016931	0.0019584	4	3
Beryllium	0.0000056	0.0000076	4	2
Bismuth	0.0000059	0.0000025	4	4
Cadmium	0.0000065	0.0000031	4	4
Calcium	0.0968372	0.0652671	4	4
Cerium	0.0001905	0.0002297	4	4
Cesium	0.0000144	0.0000164	4	4
Chromium	0.0004070	0.0004039	4	4
Cobalt	0.0000704	0.0000680	4	4
Copper	0.0004635	0.0002500	4	4
Iron	0.1336028	0.1478183	4	4
Lanthanum	0.0000911	0.0001086	4	4
Lead	0.0001763	0.0001262	4	4
Lithium	0.0001957	0.0002561	4	4
Magnesium	0.0467958	0.0456084	4	4
Manganese	0.0027309	0.0030828	4	4
Molybdenum	0.0000945	0.0000808	4	4
Neodymium	0.0000831	0.0001005	4	4
Nickel	0.0004276	0.0003781	4	4
Niobium	0.0000246	0.0000331	4	4
Palladium	0.0000048	0.0000044	4	3
Phosphorus	0.0117739	0.0020760	4	4
Platinum	0.0000018	0.0000013	4	4
Potassium	0.0591891	0.0581694	4	4
Praseodymium	0.0000213	0.0000256	4	4
Rubidium	0.0002355	0.0002748	4	4
Samarium	0.0000153	0.0000191	4	4
Selenium	0.0001484	0.0001490	4	4
Silicon	0.6489269	0.7227186	4	4
Silver	0.0000018	0.0000015	4	4
Sodium	0.1170658	0.1107227	4	4
Strontium	0.0006152	0.0006569	4	4
Tantalum	0.0000013	0.0000026	4	1
Thallium	0.0000020	0.0000018	4	4
Thorium	0.0000250	0.0000289	4	4
Tin	0.0000638	0.0000333	4	4
Titanium	0.0071081	0.0091687	4	4
Tungsten	0.0000981	0.0001166	4	4
Uranium	0.0000070	0.0000079	4	4
Vanadium	0.0005096	0.0006701	4	4
Zinc	0.0023256	0.0017515	4	4



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

Particulate Matter (PM10) - METALS - Summary

2017

Indicated Sites and Dates

Station Name	Albian Muskeg River	Albian Muskeg River	Albian Muskeg River	Albian Muskeg River
Station #	AMS 16	AMS 16	AMS 16	AMS 16
Sample Date	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average $\mu\text{g}/\text{m}^3$	Std Dev $\mu\text{g}/\text{m}^3$	Total Samples (#)	Total \geq MDL (#)
Particulate Matter	21.35	19.84	4	4
Aluminum	0.8489931	0.8608696	4	4
Antimony	0.0000485	0.0000467	4	4
Arsenic	0.0001898	0.0001792	4	4
Barium	0.0061663	0.0058834	4	4
Beryllium	0.0000257	0.0000231	4	4
Bismuth	0.0000096	0.0000066	4	4
Cadmium	0.0000087	0.0000055	4	4
Calcium	0.9154519	0.8960020	4	4
Cerium	0.0009556	0.0009820	4	4
Cesium	0.0000575	0.0000565	4	4
Chromium	0.0013442	0.0012003	4	4
Cobalt	0.0002402	0.0001875	4	4
Copper	0.0011269	0.0008351	4	4
Iron	0.6011564	0.5356269	4	4
Lanthanum	0.0004632	0.0004771	4	4
Lead	0.0003992	0.0003583	4	4
Lithium	0.0010213	0.0010759	4	4
Magnesium	0.1525264	0.1417654	4	4
Manganese	0.0132412	0.0084909	4	4
Molybdenum	0.0006665	0.0007419	4	4
Neodymium	0.0004046	0.0004179	4	4
Nickel	0.0013074	0.0013119	4	4
Niobium	0.0001244	0.0001269	4	4
Palladium	0.0000157	0.0000130	4	4
Phosphorus	0.0184882	0.0082846	4	4
Platinum	0.0000025	0.0000006	4	4
Potassium	0.2291887	0.2144131	4	4
Praseodymium	0.0001074	0.0001110	4	4
Rubidium	0.0010030	0.0009867	4	4
Samarium	0.0000735	0.0000764	4	4
Selenium	0.0006222	0.0005950	4	4
Silicon	2.0763651	1.7377930	4	4
Silver	0.0000048	0.0000046	4	4
Sodium	0.1924315	0.2062135	4	4
Strontium	0.0025763	0.0025059	4	4
Tantalum	0.0000080	0.0000100	4	2
Thallium	0.0000079	0.0000075	4	4
Thorium	0.0001322	0.0001364	4	4
Tin	0.0001620	0.0001376	4	4
Titanium	0.0338843	0.0324608	4	4
Tungsten	0.0003323	0.0003762	4	4
Uranium	0.0000349	0.0000358	4	4
Vanadium	0.0033236	0.0045183	4	4
Zinc	0.0061720	0.0060483	4	4



Wood Buffalo Environmental Association

PM10 Metal (µg/sample) Summary

2017 February

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%	27	0	10	50	89	136	158	295	308	494	689	1112	1112	226	237	136	1411
Aluminum	100.0%	27	0	0.1937	0.4834	1.0676	2.2765	3.1623	3.6788	4.0094	12.8231	29.6698	45.4526	45.4526	5.5515	9.8967	2.2765	55.0351
Antimony	96.3%	27	1	0.0002	0.0002	0.0004	0.0010	0.0013	0.0028	0.0028	0.0048	0.0085	0.0135	0.0135	0.0021	0.0029	0.0010	0.0166
Arsenic	100.0%	27	0	0.0001	0.0006	0.0007	0.0013	0.0015	0.0025	0.0027	0.0040	0.0057	0.0102	0.0102	0.0020	0.0021	0.0013	0.0122
Barium	92.6%	27	2	0.0031	0.0103	0.0249	0.0334	0.0485	0.0785	0.0787	0.1433	0.2099	0.3204	0.3204	0.0608	0.0687	0.0334	0.4044
Beryllium	74.1%	27	7	0.0000	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0006	0.0009	0.0013	0.0013	0.0002	0.0003	0.0001	0.0016
Bismuth	100.0%	27	0	0.0001	0.0001	0.0001	0.0004	0.0004	0.0005	0.0006	0.0008	0.0009	0.0037	0.0037	0.0005	0.0007	0.0004	0.0039
Cadmium	96.3%	27	1	0.0000	0.0001	0.0001	0.0001	0.0002	0.0003	0.0003	0.0004	0.0004	0.0006	0.0006	0.0002	0.0001	0.0001	0.0008
Calcium	100.0%	27	0	0.5162	1.0179	1.3406	3.6571	4.2109	4.8314	7.7240	9.6547	38.2900	43.4258	43.4258	6.4029	10.2737	3.6571	57.7717
Cerium	100.0%	27	0	0.0001	0.0005	0.0017	0.0030	0.0037	0.0043	0.0058	0.0128	0.0316	0.0526	0.0526	0.0064	0.0111	0.0030	0.0619
Cesium	100.0%	27	0	0.0000	0.0000	0.0001	0.0002	0.0002	0.0003	0.0003	0.0009	0.0020	0.0030	0.0030	0.0004	0.0007	0.0002	0.0037
Chromium	100.0%	27	0	0.0024	0.0046	0.0060	0.0106	0.0121	0.0148	0.0162	0.0239	0.0437	0.0681	0.0681	0.0138	0.0136	0.0106	0.0819
Cobalt	100.0%	27	0	0.0004	0.0007	0.0012	0.0018	0.0024	0.0029	0.0031	0.0043	0.0075	0.0114	0.0114	0.0025	0.0023	0.0018	0.0140
Copper	100.0%	27	0	0.0047	0.0091	0.0118	0.0190	0.0234	0.0434	0.0498	0.0554	0.0868	0.0928	0.0928	0.0275	0.0234	0.0190	0.1445
Iron	100.0%	27	0	0.2072	0.5195	1.1519	2.3722	3.3321	4.6130	4.7448	8.4663	25.4518	26.0520	26.0520	4.5905	6.5115	2.3722	37.1480
Lanthanum	100.0%	27	0	0.0001	0.0002	0.0007	0.0013	0.0016	0.0021	0.0027	0.0061	0.0156	0.0254	0.0254	0.0030	0.0054	0.0013	0.0301
Lead	96.3%	27	1	0.0003	0.0018	0.0021	0.0040	0.0056	0.0064	0.0077	0.0101	0.0123	0.0206	0.0206	0.0052	0.0043	0.0040	0.0266
Lithium	100.0%	27	0	0.0001	0.0004	0.0009	0.0022	0.0029	0.0038	0.0045	0.0139	0.0341	0.0570	0.0570	0.0061	0.0122	0.0022	0.0669
Magnesium	100.0%	27	0	0.0815	0.2826	0.4340	0.9546	1.1046	1.8311	1.9737	2.7435	5.6489	7.4825	7.4825	1.4238	1.6645	0.9546	9.7463
Manganese	100.0%	27	0	0.0032	0.0099	0.0217	0.0518	0.0692	0.1104	0.1316	0.2756	0.4313	0.5195	0.5195	0.0952	0.1253	0.0518	0.7219
Molybdenum	92.6%	27	2	0.0005	0.0009	0.0015	0.0034	0.0040	0.0081	0.0087	0.0180	0.0297	0.0419	0.0419	0.0068	0.0095	0.0034	0.0544
Neodymium	100.0%	27	0	0.0001	0.0002	0.0007	0.0011	0.0015	0.0018	0.0023	0.0056	0.0136	0.0223	0.0223	0.0026	0.0047	0.0011	0.0264
Nickel	100.0%	27	0	0.0026	0.0044	0.0072	0.0090	0.0127	0.0208	0.0221	0.0352	0.0355	0.0746	0.0746	0.0154	0.0152	0.0090	0.0916
Niobium	100.0%	27	0	0.0001	0.0001	0.0002	0.0004	0.0004	0.0007	0.0008	0.0018	0.0040	0.0069	0.0069	0.0008	0.0014	0.0004	0.0080
Palladium	81.5%	27	5	0.0000	0.0000	0.0001	0.0001	0.0002	0.0004	0.0004	0.0005	0.0005	0.0008	0.0008	0.0002	0.0002	0.0001	0.0011
Phosphorus	100.0%	27	0	0.2394	0.2507	0.2594	0.2755	0.2817	0.2936	0.2986	0.3526	0.5083	0.7008	0.7008	0.3021	0.0948	0.2755	0.7761
Platinum	100.0%	27	0	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0002
Potassium	100.0%	27	0	0.3146	0.5161	0.8186	1.2371	1.4032	2.5883	2.6329	3.4872	7.8354	11.7364	11.7364	2.0063	2.4511	1.2371	14.2617
Praseodymium	100.0%	27	0	0.0000	0.0000	0.0002	0.0003	0.0004	0.0005	0.0006	0.0014	0.0036	0.0059	0.0059	0.0007	0.0013	0.0003	0.0070
Rubidium	100.0%	27	0	0.0003	0.0006	0.0017	0.0032	0.0039	0.0048	0.0066	0.0155	0.0358	0.0522	0.0522	0.0071	0.0114	0.0032	0.0643
Samarium	92.6%	27	2	0.0000	0.0000	0.0001	0.0002	0.0002	0.0003	0.0004	0.0011	0.0025	0.0040	0.0040	0.0005	0.0009	0.0002	0.0048
Selenium	100.0%	27	0	0.0004	0.0009	0.0015	0.0026	0.0031	0.0044	0.0057	0.0087	0.0195	0.0333	0.0333	0.0046	0.0068	0.0026	0.0388
Silicon	96.3%	27	1	0.0000	2.1157	5.9259	9.5409	11.4126	17.6681	17.7069	41.0288	74.2199	96.7922	96.7922	#####	21.9384	9.5409	126.1934
Silver	92.6%	27	2	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0002	0.0003	0.0003	0.0001	0.0001	0.0000	0.0003
Sodium	100.0%	27	0	0.1505	0.4966	0.9629	2.7720	4.3840	8.2164	10.2135	16.2619	21.1816	56.4755	56.4755	6.8604	11.3149	2.7720	63.4350
Strontium	100.0%	27	0	0.0008	0.0043	0.0065	0.0122	0.0154	0.0254	0.0298	0.0382	0.0957	0.1305	0.1305	0.0211	0.0286	0.0122	0.1641
Tantalum	33.3%	27	18	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0003	0.0005	0.0005	0.0001	0.0001	0.0000	0.0006
Thallium	92.6%	27	2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0003	0.0004	0.0004	0.0001	0.0001	0.0005
Thorium	100.0%	27	0	0.0000	0.0001	0.0002	0.0003	0.0004	0.0006	0.0007	0.0016	0.0045	0.0073	0.0073	0.0008	0.0015	0.0003	0.0086
Tin	96.3%	27	1	0.0003	0.0008	0.0017	0.0022	0.0026	0.0043	0.0048	0.0069	0.0088	0.0094	0.0094	0.0031	0.0025	0.0022	0.0155
Titanium	100.0%	27	0	0.0241	0.0288	0.0695	0.1178	0.1455	0.2058	0.3186	0.4989	1.2408	1.7100	1.7100	0.2406	0.3795	0.1178	2.1381
Tungsten	100.0%	27	0	0.0003	0.0008	0.0011	0.0021	0.0026	0.0042	0.0045	0.0065	0.0098	0.0213	0.0213	0.0035	0.0042	0.0021	0.0244
Uranium	100.0%	27	0	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0003	0.0005	0.0012	0.0019	0.0019	0.0002	0.0004	0.0001	0.0023
Vanadium	100.0%	27	0	0.0021	0.0025	0.0046	0.0079	0.0154	0.0363	0.0484	0.0750	0.1437	0.2365	0.2365	0.0318	0.0523	0.0079	0.2932
Zinc	100.0%	27	0	0.0232	0.0304	0.0360	0.0611	0.0701	0.1159	0.1166	0.1633	0.1875	0.3616	0.3616	0.0833	0.0705	0.0611	0.4357



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

POLYCYCLIC AROMATIC HYDROCARBONS DATA SUMMARY FEBRUARY 2017

Prepared
April 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



Compound Name	Bertha Ganter -						
	Station Name	Fort McKay			Patricia McInnes		Travel Blank
	Station #	AMS 1		AMS 6			
	Sample Date	06-Feb		06-Feb		06-Feb	
Total Air Volume (m ³)		316		316		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	29.183	V0	43.600	V0	0.060	V0
Acenaphthylene	0.011	5.719	V0	4.202	V0	0.041	V0
Acenaphthene	0.006	1.736	V0	3.335	V0	0.022	V0
Fluorene	0.007	2.125	V0	2.816	V0	0.017	V0
Phenanthrene	0.007	7.487	V0	6.739	V0	0.021	V0
Anthracene	0.017	0.864	V0	0.404	V0	0.009	V1
Acridine	0.019	0.101	V0	0.079	V0	0.004	V1
Fluoranthene	0.007	0.808	V0	1.069	V0	0.014	V0
Pyrene	0.008	1.507	V0	1.652	V0	0.010	V0
Benzo(c)phenanthrene	0.015	0.042	V0	0.020	V0	0.005	V1
Benz(a)anthracene	0.014	0.334	V0	0.293	V0	0.006	V1
Chrysene	0.013	0.256	V0	0.068	V0	0.005	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.027	V0	0.031	V0	0.002	V1
Benzo(b)fluoranthene	0.020	0.281	V0	0.265	V0	0.003	V1
Benzo(k)fluoranthene	0.013	0.297	V0	0.266	V0	0.004	V1
Benzo(a)pyrene	0.016	0.155	V0	0.107	V0	0.003	V1
3-Methylcholanthrene	0.022	0.025	V0	0.012	V1	0.003	V1
Indeno(123-cd)pyrene	0.017	0.126	V0	0.121	V0	0.005	V1
Dibenz(a,h)anthracene	0.020	0.073	V0	0.085	V0	0.004	V1
Benzo(ghi)perylene	0.020	0.175	V0	0.180	V0	0.003	V1
Dibenzo(a,l)pyrene	0.024	0.024	V1	0.028	V0	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.027	V0	0.020	V1	0.001	V1
Dibenzo(a,h)pyrene	0.020	0.014	V1	0.008	V1	0.003	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		06-Feb	
Sample Date	06-Feb			06-Feb		06-Feb	
Total Air Volume (m ³)	316.02			316		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	28.749	V0	21.131	V0	0.060	V0
Acenaphthylene	0.011	2.848	V0	0.491	V0	0.041	V0
Acenaphthene	0.006	2.271	V0	1.889	V0	0.022	V0
Fluorene	0.007	2.176	V0	0.495	V0	0.017	V0
Phenanthrene	0.007	4.459	V0	1.601	V0	0.021	V0
Anthracene	0.017	0.376	V0	0.062	V0	0.009	V1
Acridine	0.019	0.064	V0	0.030	V0	0.004	V1
Fluoranthene	0.007	0.725	V0	0.356	V0	0.014	V0
Pyrene	0.008	1.271	V0	0.286	V0	0.010	V0
Benzo(c)phenanthrene	0.015	0.047	V0	0.038	V0	0.005	V1
Benz(a)anthracene	0.014	0.237	V0	0.087	V0	0.006	V1
Chrysene	0.013	0.423	V0	0.181	V0	0.005	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.031	V0	0.010	V1	0.002	V1
Benzo(b)fluoranthene	0.020	0.298	V0	0.123	V0	0.003	V1
Benzo(k)fluoranthene	0.013	0.299	V0	0.124	V0	0.004	V1
Benzo(a)pyrene	0.016	0.163	V0	0.052	V0	0.003	V1
3-Methylcholanthrene	0.022	0.010	V1	0.002	V1	0.003	V1
Indeno(123-cd)pyrene	0.017	0.132	V0	0.084	V0	0.005	V1
Dibenz(a,h)anthracene	0.020	0.072	V0	0.134	V0	0.004	V1
Benzo(ghi)perylene	0.020	0.178	V0	0.090	V0	0.003	V1
Dibenzo(a,l)pyrene	0.024	0.027	V0	0.022	V1	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.017	V1	0.025	V0	0.001	V1
Dibenzo(a,h)pyrene	0.020	0.008	V1	0.013	V1	0.003	V1



Compound Name	Bertha Ganter -						
	Station Name	Fort McKay			Patricia McInnes		Travel Blank
	Station #	AMS 1		AMS 6		12-Feb	
	Sample Date	12-Feb		12-Feb		12-Feb	
Total Air Volume (m ³)	315.98		315.99		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	1.483	V0	0.250	V0	0.034	V0
Acenaphthylene	0.011	1.052	V0	0.139	V0	0.034	V0
Acenaphthene	0.006	0.100	V0	0.070	V0	0.038	V0
Fluorene	0.007	0.550	V0	0.106	V0	0.034	V0
Phenanthrene	0.007	0.743	V0	0.092	V0	0.022	V0
Anthracene	0.017	0.074	V0	0.023	V0	0.010	V1
Acridine	0.019	0.068	V0	0.011	V1	0.007	V1
Fluoranthene	0.007	0.348	V0	0.075	V0	0.008	V0
Pyrene	0.008	0.317	V0	0.054	V0	0.005	V1
Benzo(c)phenanthrene	0.015	0.185	V0	0.068	V0	0.004	V1
Benz(a)anthracene	0.014	0.224	V0	0.046	V0	0.006	V1
Chrysene	0.013	0.279	V0	0.062	V0	0.003	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.040	V0	0.027	V0	0.002	V1
Benzo(b)fluoranthene	0.020	0.050	V0	0.022	V0	0.003	V1
Benzo(k)fluoranthene	0.013	0.051	V0	0.022	V0	0.003	V1
Benzo(a)pyrene	0.016	0.025	V0	0.018	V0	0.002	V1
3-Methylcholanthrene	0.022	0.075	V0	0.002	V1	0.002	V1
Indeno(123-cd)pyrene	0.017	0.268	V0	0.024	V0	0.003	V1
Dibenz(a,h)anthracene	0.020	0.169	V0	0.024	V0	0.003	V1
Benzo(ghi)perylene	0.020	0.075	V0	0.014	V1	0.003	V1
Dibenzo(a,l)pyrene	0.024	0.031	V0	0.012	V1	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.029	V0	0.012	V1	0.003	V1
Dibenzo(a,h)pyrene	0.020	0.043	V0	0.025	V0	0.001	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		12-Feb	
Sample Date	12-Feb			12-Feb		12-Feb	
Total Air Volume (m ³)	316			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	1.476	V0	1.025	V0	0.034	V0
Acenaphthylene	0.011	0.496	V0	0.357	V0	0.034	V0
Acenaphthene	0.006	0.304	V0	0.482	V0	0.038	V0
Fluorene	0.007	0.434	V0	0.786	V0	0.034	V0
Phenanthrene	0.007	0.632	V0	0.422	V0	0.022	V0
Anthracene	0.017	0.121	V0	0.122	V0	0.010	V1
Acridine	0.019	0.192	V0	0.019	V0	0.007	V1
Fluoranthene	0.007	0.511	V0	0.638	V0	0.008	V0
Pyrene	0.008	0.462	V0	0.607	V0	0.005	V1
Benzo(c)phenanthrene	0.015	0.252	V0	0.148	V0	0.004	V1
Benz(a)anthracene	0.014	0.145	V0	0.336	V0	0.006	V1
Chrysene	0.013	0.217	V0	0.240	V0	0.003	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.075	V0	0.019	V0	0.002	V1
Benzo(b)fluoranthene	0.020	0.081	V0	0.194	V0	0.003	V1
Benzo(k)fluoranthene	0.013	0.082	V0	0.195	V0	0.003	V1
Benzo(a)pyrene	0.016	0.047	V0	0.059	V0	0.002	V1
3-Methylcholanthrene	0.022	0.009	V1	0.041	V0	0.002	V1
Indeno(123-cd)pyrene	0.017	0.305	V0	0.603	V0	0.003	V1
Dibenz(a,h)anthracene	0.020	0.184	V0	0.578	V0	0.003	V1
Benzo(ghi)perylene	0.020	0.065	V0	0.247	V0	0.003	V1
Dibenzo(a,l)pyrene	0.024	0.040	V0	0.064	V0	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.019	V1	0.077	V0	0.003	V1
Dibenzo(a,h)pyrene	0.020	0.050	V0	0.066	V0	0.001	V1



Compound Name	Bertha Ganter -						
	Station Name	Fort McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6			
	Sample Date	18-Feb		18-Feb		18-Feb	
Total Air Volume (m ³)	315.99		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	4.658	V0	4.267	V0	0.028	V0
Acenaphthylene	0.011	0.608	V0	1.157	V0	0.030	V0
Acenaphthene	0.006	0.432	V0	0.513	V0	0.039	V0
Fluorene	0.007	0.498	V0	0.652	V0	0.034	V0
Phenanthrene	0.007	0.486	V0	0.711	V0	0.029	V0
Anthracene	0.017	0.145	V0	0.189	V0	0.014	V1
Acridine	0.019	0.037	V0	0.125	V0	0.005	V1
Fluoranthene	0.007	0.266	V0	0.500	V0	0.004	V1
Pyrene	0.008	0.286	V0	0.546	V0	0.011	V0
Benzo(c)phenanthrene	0.015	0.064	V0	0.081	V0	0.002	V1
Benz(a)anthracene	0.014	0.075	V0	0.076	V0	0.006	V1
Chrysene	0.013	0.074	V0	0.104	V0	0.005	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.073	V0	0.041	V0	0.002	V1
Benzo(b)fluoranthene	0.020	0.125	V0	0.061	V0	0.005	V1
Benzo(k)fluoranthene	0.013	0.126	V0	0.061	V0	0.003	V1
Benzo(a)pyrene	0.016	0.042	V0	0.037	V0	0.003	V1
3-Methylcholanthrene	0.022	0.002	V1	0.012	V1	0.002	V1
Indeno(123-cd)pyrene	0.017	0.442	V0	0.057	V0	0.002	V1
Dibenz(a,h)anthracene	0.020	0.377	V0	0.274	V0	0.003	V1
Benzo(ghi)perylene	0.020	0.063	V0	0.043	V0	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.040	V0	0.033	V0	0.003	V1
Dibenzo(a,i)pyrene	0.025	0.088	V0	0.065	V0	0.001	V1
Dibenzo(a,h)pyrene	0.020	0.031	V0	0.030	V0	0.001	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		18-Feb	
Sample Date	18-Feb			18-Feb		18-Feb	
Total Air Volume (m ³)	316			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	2.185	V0	1.752	V0	0.028	V0
Acenaphthylene	0.011	1.800	V0	0.761	V0	0.030	V0
Acenaphthene	0.006	0.470	V0	0.550	V0	0.039	V0
Fluorene	0.007	0.496	V0	0.513	V0	0.034	V0
Phenanthrene	0.007	0.461	V0	0.495	V0	0.029	V0
Anthracene	0.017	0.049	V0	0.094	V0	0.014	V1
Acridine	0.019	0.080	V0	0.104	V0	0.005	V1
Fluoranthene	0.007	0.397	V0	0.633	V0	0.004	V1
Pyrene	0.008	0.265	V0	0.133	V0	0.011	V0
Benzo(c)phenanthrene	0.015	0.092	V0	0.077	V0	0.002	V1
Benz(a)anthracene	0.014	0.055	V0	0.062	V0	0.006	V1
Chrysene	0.013	0.073	V0	0.079	V0	0.005	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.041	V0	0.059	V0	0.002	V1
Benzo(b)fluoranthene	0.020	0.044	V0	0.056	V0	0.005	V1
Benzo(k)fluoranthene	0.013	0.045	V0	0.057	V0	0.003	V1
Benzo(a)pyrene	0.016	0.045	V0	0.046	V0	0.003	V1
3-Methylcholanthrene	0.022	0.099	V0	0.065	V0	0.002	V1
Indeno(123-cd)pyrene	0.017	0.416	V0	0.022	V0	0.002	V1
Dibenz(a,h)anthracene	0.020	0.556	V0	0.240	V0	0.003	V1
Benzo(ghi)perylene	0.020	0.012	V1	0.034	V0	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.008	V1	0.043	V0	0.003	V1
Dibenzo(a,i)pyrene	0.025	0.037	V0	0.025	V0	0.001	V1
Dibenzo(a,h)pyrene	0.020	0.054	V0	0.063	V0	0.001	V1



Compound Name	Bertha Ganter -						
	Station Name	Fort McKay			Patricia McInnes		Travel Blank
	Station #	AMS 1		AMS 6			
	Sample Date	24-Feb		24-Feb		24-Feb	
Total Air Volume (m ³)	316.01		316		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	5.296	V0	3.416	V0	0.043	V0
Acenaphthylene	0.011	0.600	V0	0.921	V0	0.014	V0
Acenaphthene	0.006	0.249	V0	0.469	V0	0.016	V0
Fluorene	0.007	0.691	V0	0.528	V0	0.015	V0
Phenanthrene	0.007	0.583	V0	0.782	V0	0.016	V0
Anthracene	0.017	0.151	V0	0.148	V0	0.012	V1
Acridine	0.019	0.042	V0	0.274	V0	0.003	V1
Fluoranthene	0.007	0.416	V0	0.882	V0	0.005	V1
Pyrene	0.008	0.395	V0	0.468	V0	0.013	V0
Benzo(c)phenanthrene	0.015	0.240	V0	0.179	V0	0.003	V1
Benz(a)anthracene	0.014	0.159	V0	0.074	V0	0.005	V1
Chrysene	0.013	0.119	V0	0.111	V0	0.003	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.019	V0	0.087	V0	0.002	V1
Benzo(b)fluoranthene	0.020	0.119	V0	0.171	V0	0.003	V1
Benzo(k)fluoranthene	0.013	0.120	V0	0.171	V0	0.002	V1
Benzo(a)pyrene	0.016	0.056	V0	0.032	V0	0.002	V1
3-Methylcholanthrene	0.022	0.008	V1	0.038	V0	0.001	V1
Indeno(123-cd)pyrene	0.017	0.136	V0	0.168	V0	0.003	V1
Dibenz(a,h)anthracene	0.020	0.106	V0	0.112	V0	0.001	V1
Benzo(ghi)perylene	0.020	0.060	V0	0.048	V0	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.032	V0	0.014	V1	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.047	V0	0.041	V0	0.002	V1
Dibenzo(a,h)pyrene	0.020	0.038	V0	0.039	V0	0.002	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		24-Feb	
Sample Date	24-Feb			24-Feb		24-Feb	
Total Air Volume (m ³)	315.96			316		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	8.881	V0	2.908	V0	0.043	V0
Acenaphthylene	0.011	1.152	V0	0.824	V0	0.014	V0
Acenaphthene	0.006	0.569	V0	0.473	V0	0.016	V0
Fluorene	0.007	0.480	V0	0.388	V0	0.015	V0
Phenanthrene	0.007	0.581	V0	0.162	V0	0.016	V0
Anthracene	0.017	0.107	V0	0.016	V1	0.012	V1
Acridine	0.019	0.084	V0	0.025	V0	0.003	V1
Fluoranthene	0.007	0.644	V0	0.304	V0	0.005	V1
Pyrene	0.008	0.552	V0	0.058	V0	0.013	V0
Benzo(c)phenanthrene	0.015	0.127	V0	0.308	V0	0.003	V1
Benz(a)anthracene	0.014	0.083	V0	0.057	V0	0.005	V1
Chrysene	0.013	0.200	V0	0.076	V0	0.003	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.060	V0	0.049	V0	0.002	V1
Benzo(b)fluoranthene	0.020	0.117	V0	0.082	V0	0.003	V1
Benzo(k)fluoranthene	0.013	0.117	V0	0.083	V0	0.002	V1
Benzo(a)pyrene	0.016	0.053	V0	0.071	V0	0.002	V1
3-Methylcholanthrene	0.022	0.030	V0	0.045	V0	0.001	V1
Indeno(123-cd)pyrene	0.017	0.166	V0	0.121	V0	0.003	V1
Dibenz(a,h)anthracene	0.020	0.094	V0	0.068	V0	0.001	V1
Benzo(ghi)perylene	0.020	0.124	V0	0.093	V0	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.029	V0	0.079	V0	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.057	V0	0.088	V0	0.002	V1
Dibenzo(a,h)pyrene	0.020	0.071	V0	0.080	V0	0.002	V1



Station Name Station # Sample Date	Bertha Ganter - Fort McKay AMS 1 Feb 06 - Feb 24	Bertha Ganter - Fort McKay AMS 1 Feb 06 - Feb 24	Bertha Ganter - Fort McKay AMS 1 Feb 06 - Feb 24	Bertha Ganter - Fort McKay AMS 1 Feb 06 - Feb 24
	Average ng/m ³	Std Dev ng/m ³	Total Samples (#)	Total ≥ MDL (#)
Compound Name				
Naphthalene	10.155	12.794	4	4
Acenaphthylene	1.995	2.492	4	4
Acenaphthene	0.629	0.750	4	4
Fluorene	0.966	0.777	4	4
Phenanthrene	2.325	3.443	4	4
Anthracene	0.308	0.372	4	4
Acridine	0.062	0.029	4	4
Fluoranthene	0.459	0.240	4	4
Pyrene	0.626	0.589	4	4
Benzo(c)phenanthrene	0.133	0.095	4	4
Benz(a)anthracene	0.198	0.109	4	4
Chrysene	0.182	0.101	4	4
7,12-Dimethylbenz(a)anthracene	0.040	0.024	4	4
Benzo(b)fluoranthene	0.144	0.097	4	4
Benzo(k)fluoranthene	0.148	0.105	4	4
Benzo(a)pyrene	0.069	0.058	4	4
3-Methylcholanthrene	0.027	0.033	4	2
Indeno(123-cd)pyrene	0.243	0.148	4	4
Dibenz(a,h)anthracene	0.181	0.136	4	4
Benzo(ghi)perylene	0.093	0.055	4	4
Dibenzo(a,l)pyrene	0.032	0.007	4	3
Dibenzo(a,i)pyrene	0.048	0.028	4	4
Dibenzo(a,h)pyrene	0.031	0.012	4	3



Station Name Station # Sample Date	Patricia McInnes AMS 6 Feb 06 - Feb 24 Average ng/m ³	Patricia McInnes AMS 6 Feb 06 - Feb 24 Std Dev ng/m ³	Patricia McInnes AMS 6 Feb 06 - Feb 24 Total Samples (#)	Patricia McInnes AMS 6 Feb 06 - Feb 24 Total ≥ MDL (#)
Compound Name				
Naphthalene	12.883	20.551	4	4
Acenaphthylene	1.605	1.785	4	4
Acenaphthene	1.097	1.506	4	4
Fluorene	1.025	1.216	4	4
Phenanthrene	2.081	3.121	4	4
Anthracene	0.191	0.159	4	4
Acridine	0.122	0.112	4	3
Fluoranthene	0.631	0.440	4	4
Pyrene	0.680	0.683	4	4
Benzo(c)phenanthrene	0.087	0.067	4	4
Benz(a)anthracene	0.122	0.115	4	4
Chrysene	0.086	0.025	4	4
7,12-Dimethylbenz(a)anthracene	0.047	0.028	4	4
Benzo(b)fluoranthene	0.130	0.110	4	4
Benzo(k)fluoranthene	0.130	0.110	4	4
Benzo(a)pyrene	0.049	0.040	4	4
3-Methylcholanthrene	0.016	0.015	4	1
Indeno(123-cd)pyrene	0.093	0.064	4	4
Dibenz(a,h)anthracene	0.124	0.107	4	4
Benzo(ghi)perylene	0.071	0.074	4	3
Dibenzo(a,l)pyrene	0.022	0.010	4	2
Dibenzo(a,i)pyrene	0.034	0.024	4	2
Dibenzo(a,h)pyrene	0.025	0.013	4	3



Station Name	Athabasca Valley	Athabasca Valley	Athabasca Valley	Athabasca Valley
Station #	AMS 7	AMS 7	AMS 7	AMS 7
Sample Date	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24	Feb 06 - Feb 24
Compound Name	Average ng/m ³	Std Dev ng/m ³	Total Samples (#)	Total ≥ MDL (#)
Naphthalene	10.323	12.729	4	4
Acenaphthylene	1.574	1.002	4	4
Acenaphthene	0.904	0.918	4	4
Fluorene	0.896	0.853	4	4
Phenanthrene	1.533	1.952	4	4
Anthracene	0.163	0.145	4	4
Acridine	0.105	0.058	4	4
Fluoranthene	0.570	0.145	4	4
Pyrene	0.637	0.439	4	4
Benzo(c)phenanthrene	0.129	0.088	4	4
Benz(a)anthracene	0.130	0.081	4	4
Chrysene	0.228	0.145	4	4
7,12-Dimethylbenz(a)anthracene	0.052	0.020	4	4
Benzo(b)fluoranthene	0.135	0.113	4	4
Benzo(k)fluoranthene	0.136	0.113	4	4
Benzo(a)pyrene	0.077	0.057	4	4
3-Methylcholanthrene	0.037	0.043	4	2
Indeno(123-cd)pyrene	0.255	0.131	4	4
Dibenz(a,h)anthracene	0.227	0.225	4	4
Benzo(ghi)perylene	0.095	0.072	4	3
Dibenzo(a,l)pyrene	0.026	0.013	4	3
Dibenzo(a,i)pyrene	0.032	0.019	4	2
Dibenzo(a,h)pyrene	0.046	0.027	4	3



Station Name Station # Sample Date	Anzac AMS 14 Feb 06 - Feb 24 Average ng/m ³	Anzac AMS 14 Feb 06 - Feb 24 Std Dev ng/m ³	Anzac AMS 14 Feb 06 - Feb 24 Total Samples (#)	Anzac AMS 14 Feb 06 - Feb 24 Total ≥ MDL (#)
Compound Name				
Naphthalene	6.704	9.649	4	4
Acenaphthylene	0.608	0.221	4	4
Acenaphthene	0.848	0.694	4	4
Fluorene	0.545	0.170	4	4
Phenanthrene	0.670	0.637	4	4
Anthracene	0.073	0.046	4	3
Acridine	0.044	0.040	4	4
Fluoranthene	0.483	0.178	4	4
Pyrene	0.271	0.243	4	4
Benzo(c)phenanthrene	0.143	0.119	4	4
Benz(a)anthracene	0.135	0.134	4	4
Chrysene	0.144	0.080	4	4
7,12-Dimethylbenz(a)anthracene	0.034	0.023	4	3
Benzo(b)fluoranthene	0.114	0.060	4	4
Benzo(k)fluoranthene	0.114	0.060	4	4
Benzo(a)pyrene	0.057	0.011	4	4
3-Methylcholanthrene	0.038	0.026	4	3
Indeno(123-cd)pyrene	0.207	0.267	4	4
Dibenz(a,h)anthracene	0.255	0.227	4	4
Benzo(ghi)perylene	0.116	0.091	4	4
Dibenzo(a,l)pyrene	0.052	0.025	4	3
Dibenzo(a,i)pyrene	0.054	0.033	4	4
Dibenzo(a,h)pyrene	0.056	0.029	4	3



Wood Buffalo Environmental Association

PAH (ng/m³) Summary

2017 February

Compound	% Det	N	N < Det.	Min.	10%	25%	50%	60%	75%	80%	90%	95%	99% Max.	Mean	Std. Dev.	Median	Outlier Test
3-Methylcholanthrene	50.0%	16	8	0.0016	0.0021	0.0091	0.0246	0.0298	0.0451	0.0451	0.0747	0.0992	0.0992	0.0296	0.0291	0.0246	0.1753
7,12-Dimethylbenz(a)anthracene	93.8%	16	1	0.0100	0.0186	0.0272	0.0409	0.0414	0.0603	0.0603	0.0746	0.0874	0.0874	0.0430	0.0224	0.0409	0.1550
Acenaphthene	100.0%	16	0	0.0701	0.0999	0.4318	0.4820	0.5129	1.7361	1.7361	2.2715	3.3354	3.3354	0.8695	0.9277	0.4820	5.5081
Acenaphthylene	100.0%	16	0	0.1388	0.3568	0.6001	0.9213	1.0516	1.7998	1.7998	4.2019	5.7194	5.7194	1.4454	1.5391	0.9213	9.1408
Acridine	93.8%	16	1	0.0112	0.0191	0.0365	0.0789	0.0803	0.1035	0.1035	0.1915	0.2742	0.2742	0.0833	0.0687	0.0789	0.4268
Anthracene	93.8%	16	1	0.0158	0.0233	0.0739	0.1222	0.1453	0.1894	0.1894	0.4044	0.8636	0.8636	0.1842	0.2117	0.1222	1.2427
Benz(a)anthracene	100.0%	16	0	0.0456	0.0550	0.0739	0.0874	0.1450	0.2373	0.2373	0.3340	0.3356	0.3356	0.1464	0.1044	0.0874	0.6683
Benzo(a)pyrene	100.0%	16	0	0.0184	0.0246	0.0416	0.0525	0.0531	0.0709	0.0709	0.1548	0.1629	0.1629	0.0630	0.0425	0.0525	0.2756
Benzo(b)fluoranthene	100.0%	16	0	0.0224	0.0442	0.0610	0.1193	0.1229	0.1942	0.1942	0.2807	0.2982	0.2982	0.1307	0.0878	0.1193	0.5697
Benzo(c)phenanthrene	100.0%	16	0	0.0198	0.0377	0.0640	0.0915	0.1266	0.1845	0.1845	0.2524	0.3083	0.3083	0.1230	0.0872	0.0915	0.5588
Benzo(ghi)perylene	87.5%	16	2	0.0124	0.0142	0.0478	0.0748	0.0895	0.1750	0.1750	0.1796	0.2468	0.2468	0.0938	0.0682	0.0748	0.4350
Benzo(k)fluoranthene	100.0%	16	0	0.0224	0.0446	0.0614	0.1197	0.1237	0.1946	0.1946	0.2971	0.2990	0.2990	0.1322	0.0898	0.1197	0.5811
Chrysene	100.0%	16	0	0.0624	0.0678	0.0764	0.1188	0.1809	0.2399	0.2399	0.2792	0.4230	0.4230	0.1602	0.1026	0.1188	0.6729
Dibenz(a,h)anthracene	100.0%	16	0	0.0236	0.0676	0.0852	0.1336	0.1695	0.2738	0.2738	0.5560	0.5781	0.5781	0.1967	0.1704	0.1336	1.0486
Dibenzo(a,h)pyrene	75.0%	16	4	0.0076	0.0080	0.0248	0.0386	0.0429	0.0628	0.0628	0.0710	0.0804	0.0804	0.0395	0.0231	0.0386	0.1549
Dibenzo(a,i)pyrene	75.0%	16	4	0.0120	0.0168	0.0252	0.0374	0.0409	0.0651	0.0651	0.0877	0.0878	0.0878	0.0420	0.0255	0.0374	0.1694
Dibenzo(a,l)pyrene	68.8%	16	5	0.0083	0.0116	0.0237	0.0314	0.0324	0.0404	0.0404	0.0636	0.0794	0.0794	0.0329	0.0183	0.0314	0.1242
Fluoranthene	100.0%	16	0	0.0753	0.2663	0.3560	0.5112	0.6332	0.7253	0.7253	0.8817	1.0688	1.0688	0.5358	0.2565	0.5112	1.8184
Fluorene	100.0%	16	0	0.1058	0.3875	0.4950	0.5277	0.5503	0.7858	0.7858	2.1755	2.8158	2.8158	0.8583	0.7778	0.5277	4.7475
Indeno(123-cd)pyrene	100.0%	16	0	0.0222	0.0239	0.1212	0.1356	0.1659	0.3052	0.3052	0.4421	0.6026	0.6026	0.1993	0.1650	0.1356	1.0244
Naphthalene	100.0%	16	0	0.2503	1.0252	1.7516	4.2671	4.6579	21.1306	21.1306	29.1826	43.6001	43.6001	10.0162	13.1674	4.2671	75.8533
Phenanthrene	100.0%	16	0	0.0921	0.1618	0.4856	0.6317	0.7107	1.6008	1.6008	6.7392	7.4870	7.4870	1.6523	2.3649	0.6317	13.4768
Pyrene	100.0%	16	0	0.0539	0.0578	0.2860	0.4617	0.4677	0.6071	0.6071	1.5067	1.6524	1.6524	0.5536	0.4918	0.4617	3.0128



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PRECIPITATION DATA SUMMARY FEBRUARY 2017

Prepared
April 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	Weekly	
EXPLANATION OF ZERO VALUES	Zero values are contained in this file and should be treated as values below detection	
UNITS	mg/L (milligram per liter)	
OBSERVATION TYPE	Wet Precipitation Measurement of ions, pH and conductivity	
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	2000-2016 March	MIC precipitation collector
	2016 March- 2016 Sep	NTN Precip N-CON Sampler Total Precipitation Collector (TPC-3000)
	2016 Sep- current	
FLAGS USED		
M1	Missing value because no value is available	
M2	Missing value because invalidated by Data Originator	



Wood Buffalo Environmental Association
Precipitation summary

														2017 February		
		Compound	Acidity	Ammonium	Bicarbonate	Calcium	Chloride	Conductivity (25°C)	Magnesium	Nitrate	pH	Phosphate	Potassium	Sodium	Sulfate	
		unit	µeq/L	mg/L	µeq/L	mg/L	mg/L	µS/cm	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	
START DATE	END DATE	DRY WEEK	PRECIP													
02-Feb-17	09-Feb-17		X	17	0.105	61.4	1.66	0.674	14	0.207	2.34	7.08	<0.015	0.134	0.407	0.726
09-Feb-17	15-Feb-17	X		M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1	M1
15-Feb-17	22-Feb-17		X	M1	M1	M1	M1	M1	M1	M1	M1	4.86	M1	M1	M1	M1
22-Feb-17	28-Feb-17		X	12	0.009	232	5.49	1.71	M1	0.393	4.41	7.65	<0.04	0.278	1.3	1.79

*MDL for phosphate was 0.15 mg/L and was changed to 0.4 mg/L beginning on 22-Feb-17.



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