Wood Buffalo Environmental Association

MARCH 2016
MONTHLY REPORT

CONTINUOUS MONITORING
INTEGRATED MONITORING
April 25, 2016

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

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April 25, 2016

Director, Environmental Monitoring and Evaluation Branch
Alberta Environment and Parks
11th Floor, Oxbridge Place
9820 106 Street
Edmonton, Alberta T5K 2J6

RE: Monthly Ambient Air Quality Monitoring Report March 2016
Wood Buffalo Environmental Association

Enclosed is the March 2016 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 - Conklin Lookout
AMS 19 - Firebag
AMS 20 - Brion MacKay River
AMS 500 - Cenovus Christina Lake
AMS 501 - Statoil Leismer
AMS 502 - ConocoPhillips Surmont

WBEA commissioned an ambient air quality survey at the Statoil Leismer facility from October 1, 2015 – March 31, 2016 to fulfill Alberta Environment's Environmental Protection and Enhancement Act facility approval number 241311-00-02. This station was equipped with ambient air quality analyzers for SO_2, H_2S, NO, NO_2, NO_X and meteorological sensors for ambient temperature, relative humidity, and wind speed and direction. The station was removed from site on April 8, 2016.

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

Member	EPEA Approval No.
Athabasca Oil Corporation	289664-00-00
Brion Energy	254465-00-00
Canadian Natural Resources Ltd.	149968-00-01
Member	**EPEA Approval No.**
Cenovus Energy	48522-01-00
Connacher Oil and Gas Ltd.	240008-00-03
ConocoPhillips Canada	48263-00-00
Devon Canada Corporation	224816-00-03
Finning Canada Ltd.	Not Applicable
Hammerstone Corporation	189942-00-02
Husky Oil Operations Ltd.	206355-00-00
Imperial Oil Ltd.	00046586-00-00
MEG Energy Corporation	00216466-00-04
Nexen Energy ULC.	137467-00-00
Shell Canada Energy	20809-01-00
Statoil Canada Ltd.	241311-00-02
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
Williams Energy (Canada) Inc.	73203-01-00

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

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

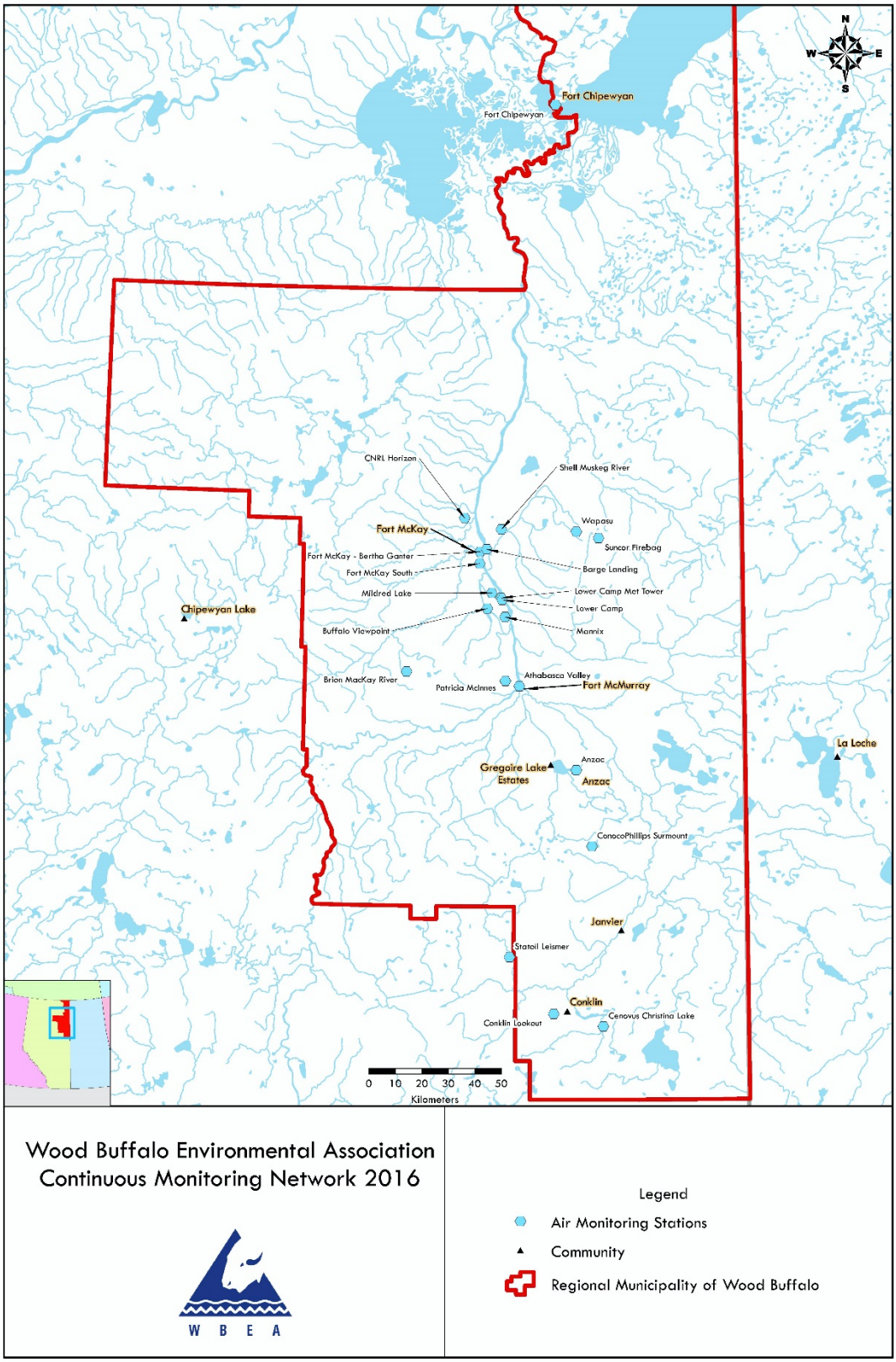

Figure 1: Map of WBEA Air Monitoring Network.

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 SO_2, H_2S, CO, NO_2, NH_3, O_3, and $PM_{2.5}$.

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, NO_2 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 NO_2 concentration. In cases where the NO_X and/or NO values exceeded the operating range of the analyzer, values reported for NO_2 were determined as the largest of either the difference between baseline-corrected NO_X and NO values, or the NO_2 value reported by the data acquisition system with baseline correction applied.

1.2 Revisions to AEMERA Airdata Warehouse

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

A revision to the February 2016 report for AMS 502 – Statoil Leismer to address un-flagged data for wind speed and direction standard deviations is included at the end of this report. This correction does not impact the previous data summary, statistics, or downtime for the affected station.

2.0 Operational Status

Continuous Monitoring

In March 2016, there were no incidents resulting in compliance monitoring instruments operating less than 90% of the time.

In March 2016, there were no incidents of a monitoring instrument not required for air quality compliance operating less than 90% of the time.

Intermittent Monitoring

The results for passive and integrated monitoring of PAH, VOC, RSC, $PM_{2.5}$ and PM_{10} samples were not available in time for submission with this report. These results will be submitted at a later date.

3.0 Monitoring Notes

General Network Notes

The Ammonia (NH_3) analyzer currently operates on a 0 to 2500 ppb operating range with a detection level of 5 ppb in the WBEA network. In data processing, values less than 5 ppb have been considered below detection levels and are reported as zero.

The WBEA monitoring region experienced meteorological conditions which resulted in freezing temperatures and ice buildup on wind sensors. Periods affecting individual sensors at the stations are provided below.

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

Station 1, Fort McKay - Bertha Ganter

The NH_3 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 NH_3 gas is an inherent behavior in the NH_3 analyzer operations resulting from the properties of the NH_3 gas. Data for 1 to 2 hours following the daily spans have been reported as invalid for a total of 48 hours this month.

A station power outage on March 1 interrupted the normal operations of all air quality analyzers for 2 hours. The THC analyzer required an additional 1 hour to stabilize following the station power outage.

Maintenance to the calibration system following a power outage on March 1 interrupted the routine operations of the SO_2, THC, and NO_2 analyzers for 1 hour. The on-site calibrator required a reset by the station operator and a follow up function check interrupted the normal operations of the THC analyzer for an additional 1 hour.

Maintenance and cleaning of the sample manifold on March 22 interrupted the normal operations of all air quality analyzers for 2 hours.

Maintenance to confirm calibration points for the ozone calibration on March 22 interrupted the routine operations of the NO_2 analyzer for 3 hours.

Three instances of intermittent baseline drifts affected the normal operations of the $PM_{2.5}$ analyzer for 11 hours 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

A station power outage on March 1 interrupted the normal operations of all air quality analyzers for 4 hours.

Maintenance to verify analyzer response following a station power outage on March 1 interrupted all air quality analyzers for 1 hour.

Station 3, Lower Camp B - Meteorology

Flat lines in output signals of the sonic wind sensors at 100 and 167 m elevations resulted in 9 and 17 hours of downtime for each respective sensor.

Station 4, Buffalo Viewpoint

No operational issues to report this month.

Station 5, Mannix

A station power outage on March 4 interrupted the normal operations of all air quality analyzers for 1 hour. The THC analyzer required an additional hour to stabilize following the power outage.

Localized brown-out power conditions following the station power outage on March 4 interrupted the collection of data from the SO_2 and H_2S for 6 and 2 hours, respectively.

Maintenance and cleaning of the sample manifold on March 15 interrupted the normal operations of the SO_2 and THC analyzers for 1 hour.

Flat lines in output signals of the sonic wind sensors at 20, 45, 75, and 90 m elevations resulted in 1, 4, 13, and 9 hours of downtime for each respective sensor.

Station 6, Patricia McInnes

The NH_3 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 NH_3 gas is an inherent behavior in the NH_3 analyzer operations resulting from the properties of the NH_3 gas. Data for 1 to 2 hours following each daily span has been reported as invalid for a total of 32 hours this month.

Maintenance to the zero air generator on March 8 interrupted the normal operations of the THC analyzer for 1 hour.

Deterioration of the UV lamp output on March 9 interrupted the routine operations of the O_3 analyzer for 28 hours. This resulted in a lamp replacement and a follow-up calibration the following day.

Depletion and replacement of the fuel and carrier gas cylinders at the station on March 30 interrupted the normal operations of the THC analyzer for 2 hours.

Three instances of intermittent baseline drifts on March 17 and 18 affected the normal operations of the $PM_{2.5}$ analyzer for 9 hours.

Station 7, Athabasca Valley

Station power outages on March 2 and 6 interrupted the normal operations of all air quality analyzers for 2 hours on each occurrence.

Maintenance to verify analyzer responses following a station power outage on March 6 interrupted all air quality analyzers for 1 hour.

Maintenance to verify analyzer response following the interruption of the zero air generator on March 9 interrupted all air quality analyzers for a period of 2 to 6 hours.

Depletion and replacement of the carrier gas and fuel cylinders at the station on March 14 interrupted the normal operations of the THC analyzer for 2 hours.

Multiple instances of unstable operation due to baseline drift affected the normal operations of the $PM_{2.5}$ analyzer for 9 hours this reporting period.

Station 8, Fort Chipewyan

Maintenance to the leaf wetness sensor on March 10 resulted in 2 hours of invalid data.

Multiple instances of baseline drift on March 18 affected the normal operations of the $PM_{2.5}$ analyzer for 5 hours. Maintenance to adjust the baseline on March 18 interrupted an additional 1 hour of routine operations.

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

Station 9, Barge Landing

A station power outage on March 1 interrupted the normal operations of all air quality analyzers for 3 hours. The THC analyzer required an additional 8 hours of stabilization following the power outage.

Station 11, Lower Camp

Maintenance and cleaning of the sample manifold on March 10 interrupted the normal operations of the SO_2, H_2S, and THC analyzers for 1 hour.

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

A station power outage on March 1 interrupted the normal operations of all air quality analyzers for 2 hours.

Verification of the daily zero and span response on March 1 interrupted the routine operations of the SO_2, TRS, THC, and NO_2 analyzers for 1 hour.

Maintenance and cleaning of the sample manifold on March 3 interrupted the normal operations of the TRS and O_3 analyzers for 1 hour.

Flat-lines in the output signal of the wind sensor resulted in 4 hours of invalid data this reporting period.

Station 14, Anzac

The automated daily zero and span check system required a reset on March 8. Verification of the daily zero and span responses interrupted the routine operations of all air quality analyzers for 1-2 hours.

A station power outage on March 14 interrupted the normal operations of all air quality analyzers for 2-3 hours.

Depletion and replacement of the carrier gas cylinder at the station on March 23 interrupted the normal operations of the THC analyzer for 2 hours.

Station 15, CNRL Horizon

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

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

Station 16, Shell Muskeg River

Maintenance to clean and re-organize station wiring and analyzer racks on March 16 interrupted the routine operations of all analyzers for 1-6 hours.

A malfunctioning sample solenoid on March 16 interrupted the normal operations of the THC analyzer for 19 hours. The analyzer was repaired during a routine monthly calibration.

Station 17, Wapasu

Unstable operation due to baseline drift on March 21 affected the normal operations of the $PM_{2.5}$ analyzer for 5 hours.

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

Station 18, Conklin Lookout

Maintenance to the sample inlet, flow and zero reference checks on March 13 interrupted the normal operation of the $PM_{2.5}$ analyzer for 2 hours. Multiple instances of intermittent baseline drift affected the normal operations of the $PM_{2.5}$ analyzer for 50 hours this reporting period.

Flat-lines in the output signal of the wind sensor resulted in 22 hours of invalid data this reporting period.

Station 19, Firebag

Flat-lines in the output signal of the wind sensor resulted in 37 hours of invalid data this reporting period.

Station 20, Brion MacKay River

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

Station 500, Cenovus Christina Lake

Maintenance and cleaning of the sample manifold on March 24 interrupted the normal operations of the SO_2 and NO_2 analyzers for 1 hour.

Flat-lines in the output signal of the wind sensor resulted in 11 hours of invalid data this reporting period.

Station 501, Statoil Leismer

The SO_2 analyzer experienced multiple instances of intermittent baseline drift resulting in 22 hours of invalid data this reporting period.

Maintenance and cleaning of the sample manifold on March 21 interrupted the normal operations of the H_2S analyzer for 1 hour.

Station 502, ConocoPhillips Surmont

The H_2S analyzer experienced an instance of unstable operations due to excessive baseline drift on March 18 resulting in 1 hour of invalid data.

If additional information is required, please contact either Sanjay Prasad at (780) 215 4800 or the Wood Buffalo Environmental Association at (780) 799 4420.

Yours sincerely,

Wood Buffalo Environmental Association

Mike Martineau
Data Technician

Sanjay Prasad
Air Quality Scientist

R00_1603_L01

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

MARCH 2016

Prepared: Apr 20 2016 11:33

APPROVAL NUMBERS	REPORT DATE MONTH	YEAR
289664-00-00	3	2016
254465-00-00		
149968-00-01		
48522-01-00		
240008-00-03		
48263-00-00		
224816-00-03		
189942-00-02		
206355-00-00		
46586-00-00		
216466-00-04		
137467-00-00		
20809-01-00		
241311-00-00		
094-02-00		
305529-00-00		
026-02-00		
228044-00-00		
73203-01-00		

CONTINUOUS AMBIENT MONITORING

PARAMETER	STN. NO.	% TIME OPERATIONAL	ONE-HOUR AVERAGE MAXIMUM CONCENTRATION	ONE-HOUR AVERAGE NO. READINGS > REGULATION	24-HOUR AVERAGE MAXIMUM CONCENTRATION	24-HOUR AVERAGE NO. READINGS > REGULATION
SO2(ppm)	1	99.33	0.055	0	0.008	0
SO2(ppm)	2	99.33	0.102	0	0.015	0
SO2(ppm)	4	100.00	0.068	0	0.008	0
SO2(ppm)	5	98.92	0.117	0	0.021	0
SO2(ppm)	6	100.00	0.047	0	0.009	0
SO2(ppm)	7	98.92	0.035	0	0.008	0
SO2(ppm)	8	100.00	0.003	0	0.001	0
SO2(ppm)	11	99.87	0.140	0	0.015	0
SO2(ppm)	13	99.60	0.052	0	0.010	0
SO2(ppm)	14	99.46	0.014	0	0.002	0
SO2(ppm)	15	100.00	0.030	0	0.009	0
SO2(ppm)	16	99.19	0.029	0	0.010	0
SO2(ppm)	17	100.00	0.024	0	0.002	0
SO2(ppm)	18	100.00	0.004	0	0.002	0
SO2(ppm)	19	100.00	0.012	0	0.002	0
SO2(ppm)	20	100.00	0.023	0	0.007	0
SO2(ppm)	500	99.87	0.018	0	0.003	0
SO2(ppm)	501	97.04	0.011	0	0.003	0
SO2(ppm)	502	100.00	0.022	0	0.005	0
H2S(ppm)	2	99.33	0.008	0	0.002	0
H2S(ppm)	4	100.00	0.004	0	0.001	0
H2S(ppm)	5	99.60	0.009	0	0.002	0
H2S(ppm)	11	99.87	0.008	0	0.002	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	0.001	0	0.000	0
H2S(ppm)	501	99.87	0.000	0	0.000	0
H2S(ppm)	502	99.87	0.002	0	0.001	0
TRS(ppm)	1	99.46	0.003	0	0.001	0
TRS(ppm)	6	100.00	0.005	0	0.001	0
TRS(ppm)	7	99.06	0.004	0	0.001	0
TRS(ppm)	9	99.60	0.002	0	0.001	0
TRS(ppm)	13	99.46	0.004	0	0.001	0
TRS(ppm)	14	99.33	0.002	0	0.000	0
TRS(ppm)	15	99.87	0.002	0	0.001	0
TRS(ppm)	18	100.00	0.001	0	0.000	0
THC(ppm)	1	99.06	3.0	-	2.2	-
THC(ppm)	2	99.33	5.6	-	3.2	-
THC(ppm)	4	100.00	5.3	-	3.1	-
THC(ppm)	5	99.60	5.3	-	3.0	-
THC(ppm)	6	99.60	2.5	-	2.2	-
THC(ppm)	7	98.25	2.6	-	2.1	-
THC(ppm)	9	98.52	4.0	-	2.8	-
THC(ppm)	11	99.87	4.5	-	2.8	-
THC(ppm)	13	99.60	4.0	-	2.6	-
THC(ppm)	14	99.19	2.6	-	2.1	-
THC(ppm)	15	100.00	7.4	-	3.2	-
THC(ppm)	16	96.77	11.8	-	3.9	-
THC(ppm)	17	100.00	2.5	-	2.3	-
THC(ppm)	18	100.00	2.2	-	2.1	-
THC(ppm)	19	100.00	2.4	-	2.3	-
THC(ppm)	20	100.00	2.9	-	2.5	-
O3(ppm)	1	99.46	0.051	0	0.040	-
O3(ppm)	6	96.24	0.054	0	0.046	-
O3(ppm)	7	98.92	0.045	0	0.038	-
O3(ppm)	8	100.00	0.051	0	0.046	-

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

Prepared: Apr 20 2016 11:33

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46586-00-00		
216466-00-04		
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20809-01-00		
241311-00-02		
094-02-00		
305529-00-00		
026-02-00		
228044-00-00		
73203-01-00		

CONTINUOUS AMBIENT MONITORING

PARAMETER	STN. NO.	% TIME OPERATIONAL	ONE-HOUR AVERAGE MAXIMUM CONCENTRATION	ONE-HOUR AVERAGE NO. READINGS > REGULATION	24-HOUR AVERAGE MAXIMUM CONCENTRATION	24-HOUR AVERAGE NO. READINGS > REGULATION
O3(ppm)	13	99.60	0.049	0	0.036	-
O3(ppm)	14	99.33	0.051	0	0.046	-
O3(ppm)	17	100.00	0.048	0	0.045	-
O3(ppm)	18	100.00	0.055	0	0.052	-
NO2(ppm)	1	99.19	0.038	0	0.021	-
NO2(ppm)	6	100.00	0.040	0	0.018	-
NO2(ppm)	7	98.92	0.037	0	0.015	-
NO2(ppm)	8	99.73	0.009	0	0.002	-
NO2(ppm)	13	99.60	0.036	0	0.020	-
NO2(ppm)	14	99.46	0.022	0	0.008	-
NO2(ppm)	15	100.00	0.043	0	0.019	-
NO2(ppm)	16	99.19	0.043	0	0.03	-
NO2(ppm)	17	100.00	0.025	0	0.008	-
NO2(ppm)	18	100.00	0.012	0	0.006	-
NO2(ppm)	19	100.00	0.019	0	0.006	-
NO2(ppm)	20	100.00	0.036	0	0.018	-
NO2(ppm)	500	99.87	0.015	0	0.007	-
NO2(ppm)	501	100.00	0.012	0	0.004	-
NO2(ppm)	502	100.00	0.020	0	0.006	-
CO(ppm)	7	99.33	0.4	0	0.1	-
NH3(ppm)	1	93.01	0.000	0	0.000	-
NH3(ppm)	6	95.70	0.013	0	0.001	-
PM2.5(ug/m3)	1	98.25	31.4	-	12.8	0
PM2.5(ug/m3)	6	98.79	26.3	-	9.8	0
PM2.5(ug/m3)	7	98.25	22.6	-	10.9	0
PM2.5(ug/m3)	8	99.19	17	-	4.8	0
PM2.5(ug/m3)	13	99.73	51.1	-	14.6	0
PM2.5(ug/m3)	14	99.73	26.8	-	7.5	0
PM2.5(ug/m3)	15	100.00	28.3	-	11.4	0
PM2.5(ug/m3)	16	99.87	34.5	-	18.3	0
PM2.5(ug/m3)	17	99.33	12.9	-	6.1	0
PM2.5(ug/m3)	18	93.01	13.5	-	6.4	0
WIND	1	100.00	-	-	-	-
WIND	2	100.00	-	-	-	-
WIND	4	100.00	-	-	-	-
WIND	5	99.87	-	-	-	-
WIND	6	100.00	-	-	-	-
WIND	7	100.00	-	-	-	-
WIND	8	99.87	-	-	-	-
WIND	9	100.00	-	-	-	-
WIND	11	99.87	-	-	-	-
WIND	13	99.46	-	-	-	-
WIND	14	100.00	-	-	-	-
WIND	15	99.06	-	-	-	-
WIND	16	99.87	-	-	-	-
WIND	17	99.60	-	-	-	-
WIND	18	97.04	-	-	-	-
WIND	19	95.03	-	-	-	-
WIND	20	99.60	-	-	-	-
WIND	500	98.52	-	-	-	-
WIND	501	100.00	-	-	-	-
WIND	502	100.00	-	-	-	-

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 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT McKAY - BERTHA GANTER (AMS 1)
MARCH 2016

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	704	35	40	99.33	55	0	8	0
TRS(ppb) Average	704	36	40	99.46	3	0	1	0
THC(ppm) Average	702	35	42	99.06	3	-	2.2	-
NMHC(ppm) Average	702	35	42	99.06	0.445	-	0.101	-
CH4(ppm) Average	702	35	42	99.06	2.7	-	2.1	-
O3 (ppb) Average	701	39	43	99.46	51	0	40	-
NO2 (ppb) Average	701	37	43	99.19	38	0	21	-
NO (ppb) Average	701	37	43	99.19	49	-	9	-
NOX (ppb) Average	701	37	43	99.19	71	-	27	-
NH3 (ppb) Average	650	42	94	93.01	0	0	0	-
PM2.5 (ug/m3) Average	728	3	16	98.25	31.4	-	12.8	0
Wind Speed 10 m (km/h) Average	744	0	0	100.00	17	-	10	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	14.1	-	5.1	-
Temperature 10 m (C) Average	744	0	0	100.00	13.3	-	6.1	-
Relative Humidity (%) Average	744	0	0	100.00	94	-	88	-
Precipitation (mm) Total	744	0	0	100.00	1.3	-	8.6	-
Leaf Wetness (% of range) Average	744	0	0	100.00	12	-	2	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	632	-	200	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER FORT McKAY (AMS 1)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	704	1.7	5	-	0	0	0	0	1	4	55
TRS (ppb) Average	704	0.6	0	-	0	0	0	0	1	1	3
THC (ppm) Average	702	2.02	0.2	-	1.9	1.9	1.9	2	2.1	2.2	3
NMHC(ppm) Average	702	0.023	0.059	-	0	0	0	0	0	0.1	0.445
CH4(ppm) Average	702	2	0.1	-	1.9	1.9	1.9	2	2	2.2	2.7
O3 (ppb) Average	701	28.3	11	-	4	12	21	29	37	43	51
NO2 (ppb) Average	701	9.2	7	-	0	1	3	7	14	19	38
NO (ppb) Average	701	2.3	5	-	0	0	0	0	2	7	49
NOX (ppb) Average	701	11.5	11	-	0	2	4	8	16	26	71
NH3 (ppb) Average	650	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	728	4.25	4.1	-	0.1	1	1.5	2.8	5.7	9.1	31.4
Wind Speed 10 m (km/h) Average	744	6.1	3	-	0	2	3	6	9	10	17
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-3.97	5.6	-	-21.4	-10.1	-7.8	-4.5	-0.7	2.7	14.1
Temperature 10 m (C) Average	744	-3.62	5.4	-	-18.5	-9.8	-7.4	-4.4	-0.3	2.9	13.3
Relative Humidity (%) Average	744	70	17	-	14	47	58	74	84	89	94
Precipitation (mm) Total	744	-	-	23.54	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	744	0.2	1	-	-1	-1	0	0	0	1	12
Global Solar Radiation (W/m2) Average	744	101.8	159	-	0	0	0	3	146	392	632

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER Fort McKAY (AMS 1)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	01 Mar 2016 01:00	01 Mar 2016 02:00	2	Station power failure
SO2, THC, NO2	01 Mar 2016 10:00	01 Mar 2016 10:00	1	Maintenance - attempted to reinitiate daily QA check
AIR QUALITY ANALYZERS	22 Mar 2016 09:00	22 Mar 2016 10:00	2	Maintenance - manifold cleaning
NMHC, CH4, THC	01 Mar 2016 03:00	01 Mar 2016 03:00	1	Stabilization following power failure
NMHC, CH4, THC	01 Mar 2016 15:00	01 Mar 2016 15:00	1	Maintenance - reinitiated daily QA check
NO2, NO, NOX	22 Mar 2016 09:00	22 Mar 2016 11:00	3	Maintenance - confirmed calibration points for Ozone
NH3	01 Mar 2016 04:00	31 Mar 2016 05:00	48	Stabilization after daily span
PM2.5	19 Mar 2016 19:00	19 Mar 2016 20:00	2	Unstable operation - excessive baseline drift
PM2.5	28 Mar 2016 16:00	28 Mar 2016 21:00	6	Unstable operation - excessive baseline drift
PM2.5	30 Mar 2016 14:00	30 Mar 2016 16:00	3	Unstable operation - excessive baseline drift

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Fort McKay - Bertha Ganter - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 55 ppb on Mar 27 11:00 Maximum Daily Average: 8.3 ppb on Mar 22

Minimum Value: 0 ppb on Mar 21 00:00 Minimum Daily Average: 0.1 ppb on Mar 20

Maximum Diurnal Average: 4.0 ppb at hour 13 Minimum Diurnal Average: 0.3 ppb at hour 4

Monthly Average: 1.7 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 4$ $P_{99} = 25$

Hours in Service:	744
Hours of Data:	704
Hours of Missing Data:	40
Hours of Calibration:	35
Percent Operational Time:	99.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	2	1	0	0	0	0	0	M	7	7	12	10	6	5	4	1	1	1	1	1	1	1	2.9	12
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	0.3	1
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	0.2	0
4-Mar	0	0	0	Z	0	0	0	0	0	1	5	21	28	12	4	4	2	0	0	0	0	0	0	13	4.1	28
5-Mar	13	17	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1.8	17
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	0.3	0
7-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0.4	1
8-Mar	0	Z	0	0	0	0	0	0	1	2	4	10	7	6	6	6	6	5	5	5	5	3	2	2	3.3	10
9-Mar	2	1	Z	0	0	0	0	0	0	0	0	1	6	5	3	4	7	5	2	1	1	1	0	0	1.8	7
10-Mar	0	0	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0.5	1
11-Mar	1	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	0.4	1
12-Mar	1	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1
13-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
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	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
16-Mar	0	0	0	Z	0	0	0	0	C	C	C	C	C	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	0.2	0
18-Mar	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	6	26	21	6	2	2	2	1	0	0	3.0	26
19-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0.3	1
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	0.2	0
22-Mar	0	0	0	Z	0	0	0	0	M	M	16	16	28	20	17	21	21	11	5	7	5	3	2	1	8.3	28
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	0.2	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	0.3	0
25-Mar	Z	0	0	0	0	0	0	0	1	1	2	6	12	20	31	28	19	5	7	4	3	2	2	1	6.4	31
26-Mar	1	Z	0	0	0	0	1	1	1	1	1	1	1	0	0	4	7	11	20	9	4	3	2	1	3.0	20
27-Mar	1	1	Z	0	0	0	0	0	3	22	55	34	16	16	8	7	5	3	1	1	0	0	0	4	7.7	55
28-Mar	8	3	4	Z	3	2	2	2	2	2	2	3	4	0	0	0	0	0	0	0	0	0	0	0	1.7	8
29-Mar	0	0	0	0	Z	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1
30-Mar	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
31-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	13	15	22	14	11	5	3	2	1	3.9	22
	1.2	1.1	0.4	0.3	0.4	0.3	0.3	0.3	0.5	1.3	3.3	3.6	4.0	3.1	2.9	4.0	3.7	2.5	2.0	1.4	1.0	0.6	0.5	1.0	Diurnal Average	
	13	17	4	1	3	2	2	2	3	22	55	34	28	20	31	28	21	22	20	11	5	3	2	13	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance PF - Power Failure

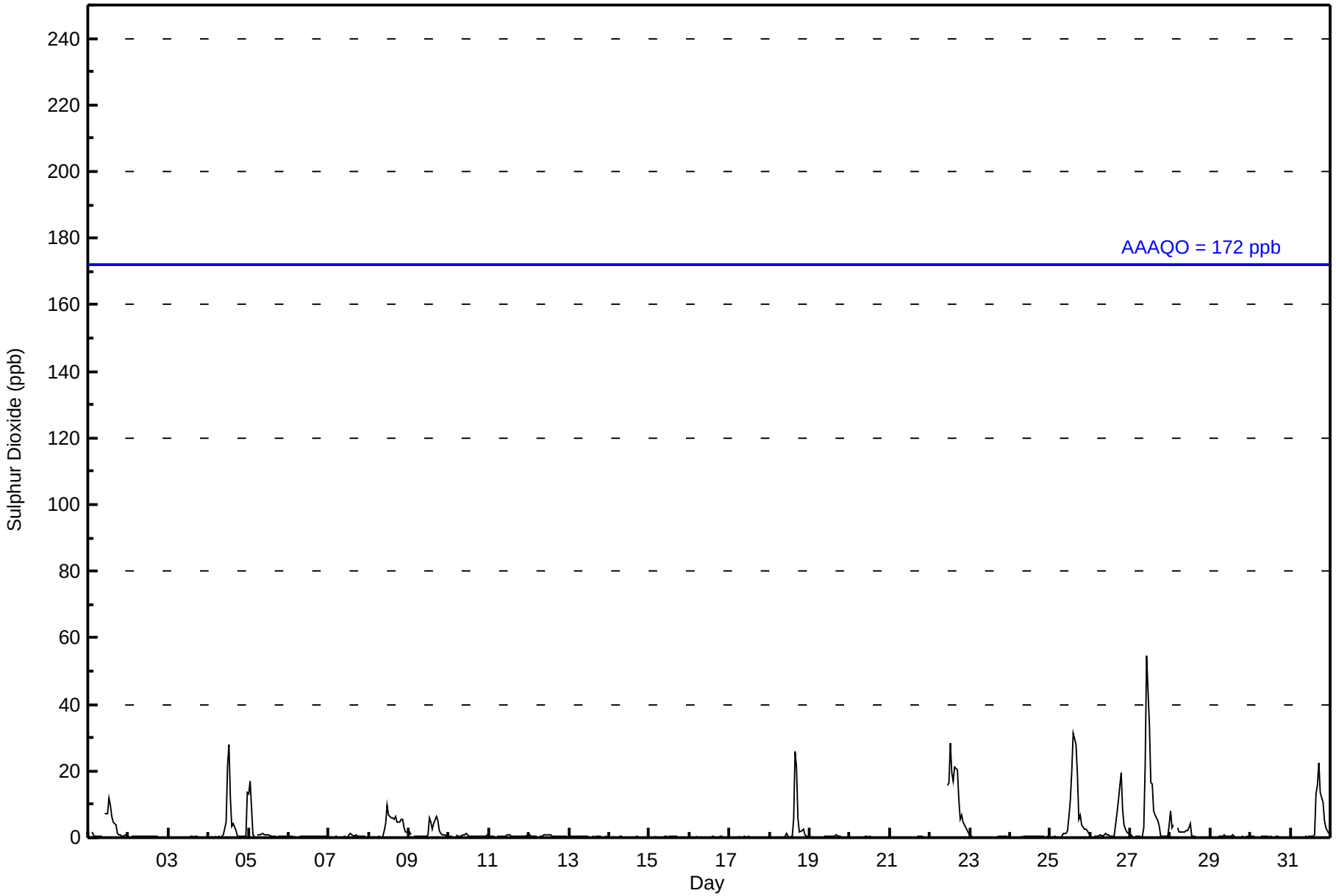
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Fort McKay - Bertha Ganter - March 2016



Sulphur Dioxide (SO_2) - ppb

Fort McKay - Bertha Ganter - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	670	95.17	95.17
11 - 20	21	2.98	98.15
21 - 60	13	1.85	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Fort McKay - Bertha Ganter - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	245	73	23	15	15	12	17	40	45	17	11	19	15	21	31	71	670
11 - 20	0	0	0	0	0	1	0	6	14	0	0	0	0	0	0	0	21
21 - 60	0	0	0	0	0	0	0	2	9	2	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	245	73	23	15	15	13	17	48	68	19	11	19	15	21	31	71	704

Total Number of Valid Hours: 704

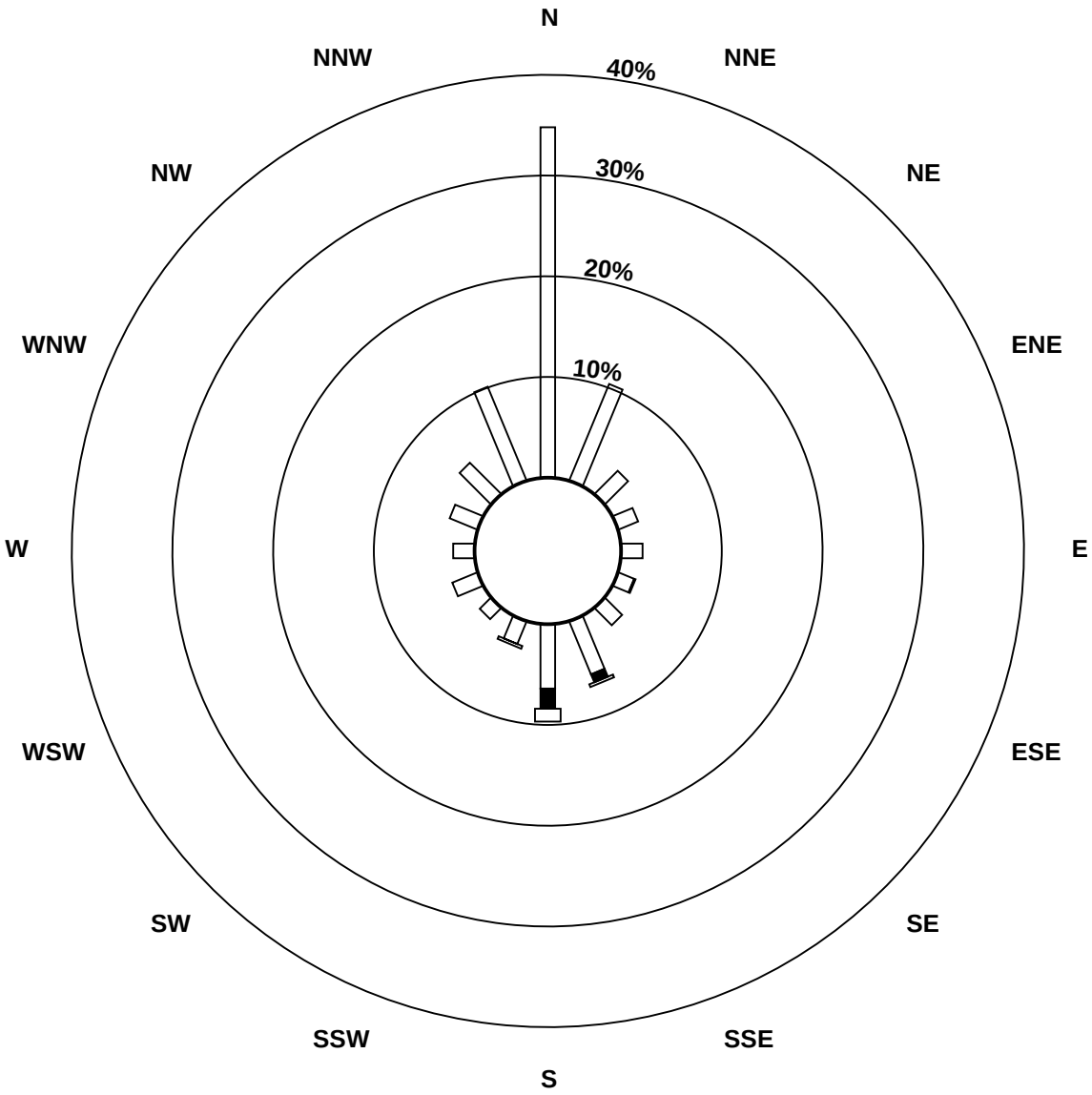
Total Number of Hours: 744

Wood Buffalo Environmental Association

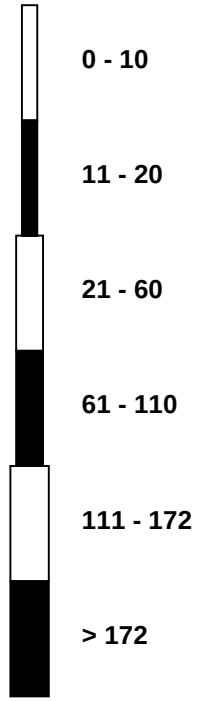
Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppb)



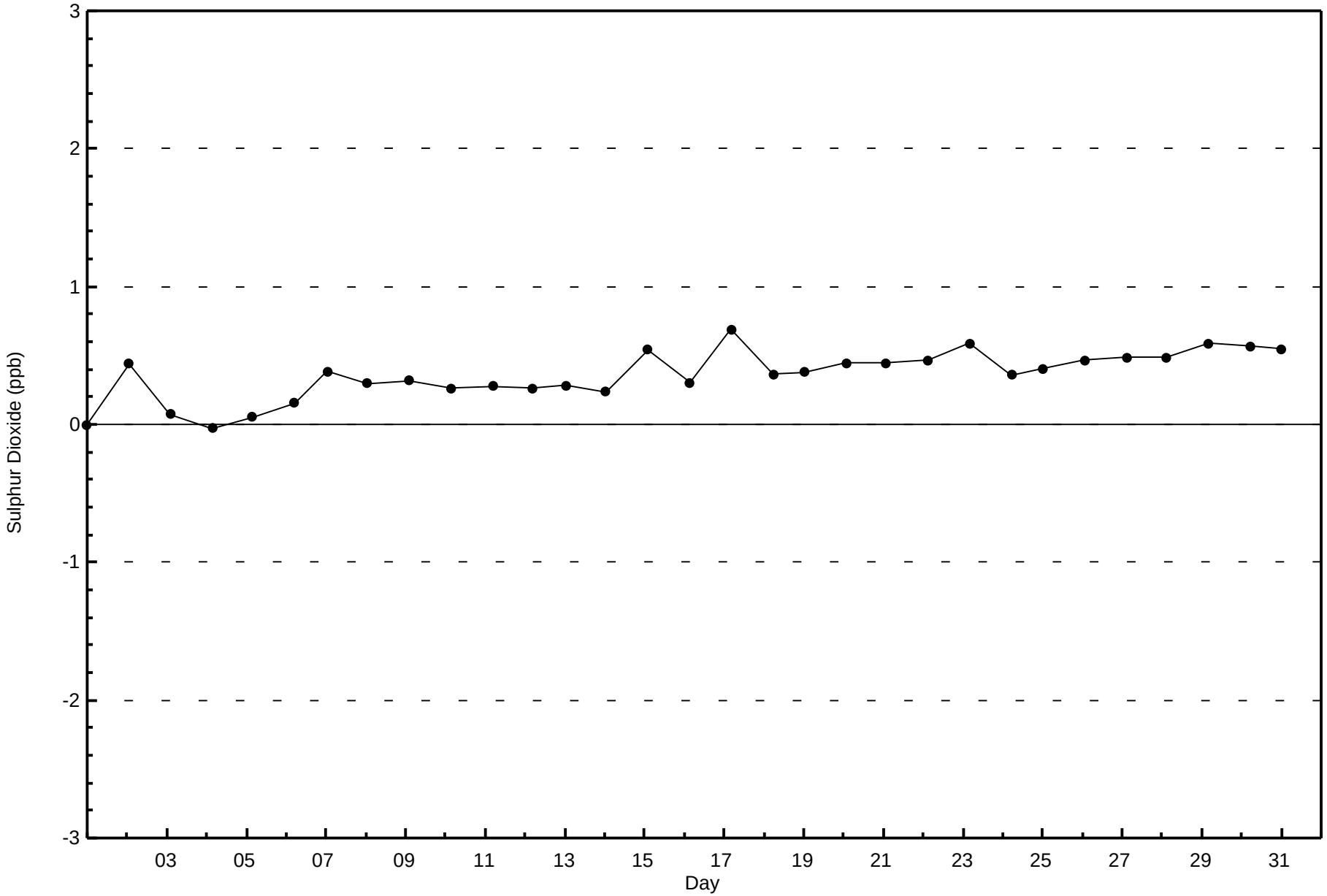
Total Number of Valid Hours: 704

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Fort McKay - Bertha Ganter - March 2016

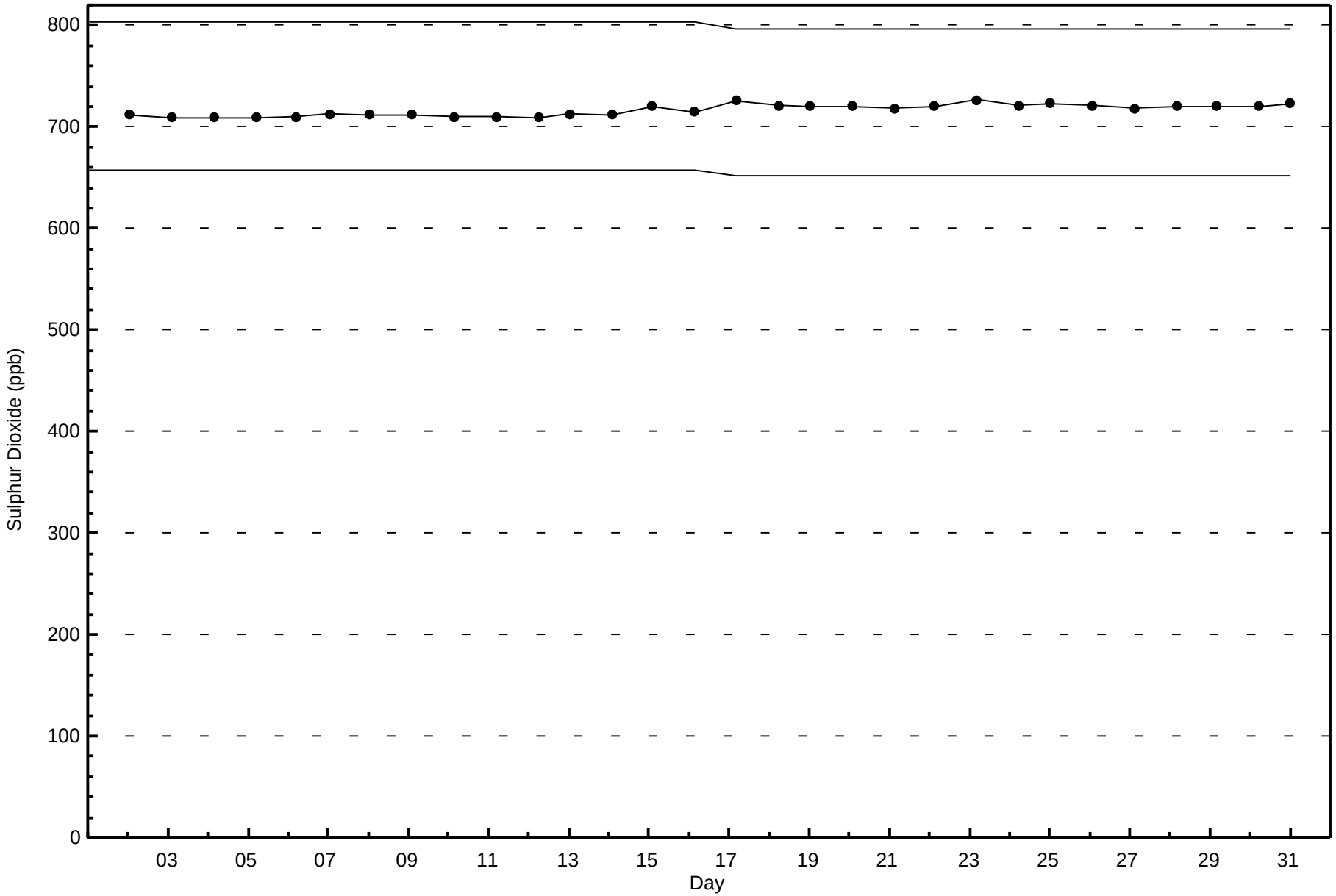


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Fort McKay - Bertha Ganter - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Fort McKay - Bertha Ganter - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 3 ppb on Mar 27 10:00

Maximum Daily Average: 1.1 ppb on Mar 25

Minimum Value: 0 ppb on Mar 7 23:00

Minimum Daily Average: 0.4 ppb on Mar 14

Maximum Diurnal Average: 0.7 ppb at hour 12

Minimum Diurnal Average: 0.5 ppb at hour 5

Monthly Average: 0.6 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 2$

Hours in Service:	744
Hours of Data:	704
Hours of Missing Data:	40
Hours of Calibration:	36
Percent Operational Time:	99.5

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

Z - zerospan C - Calibration M - Maintenance PF - Power Failure

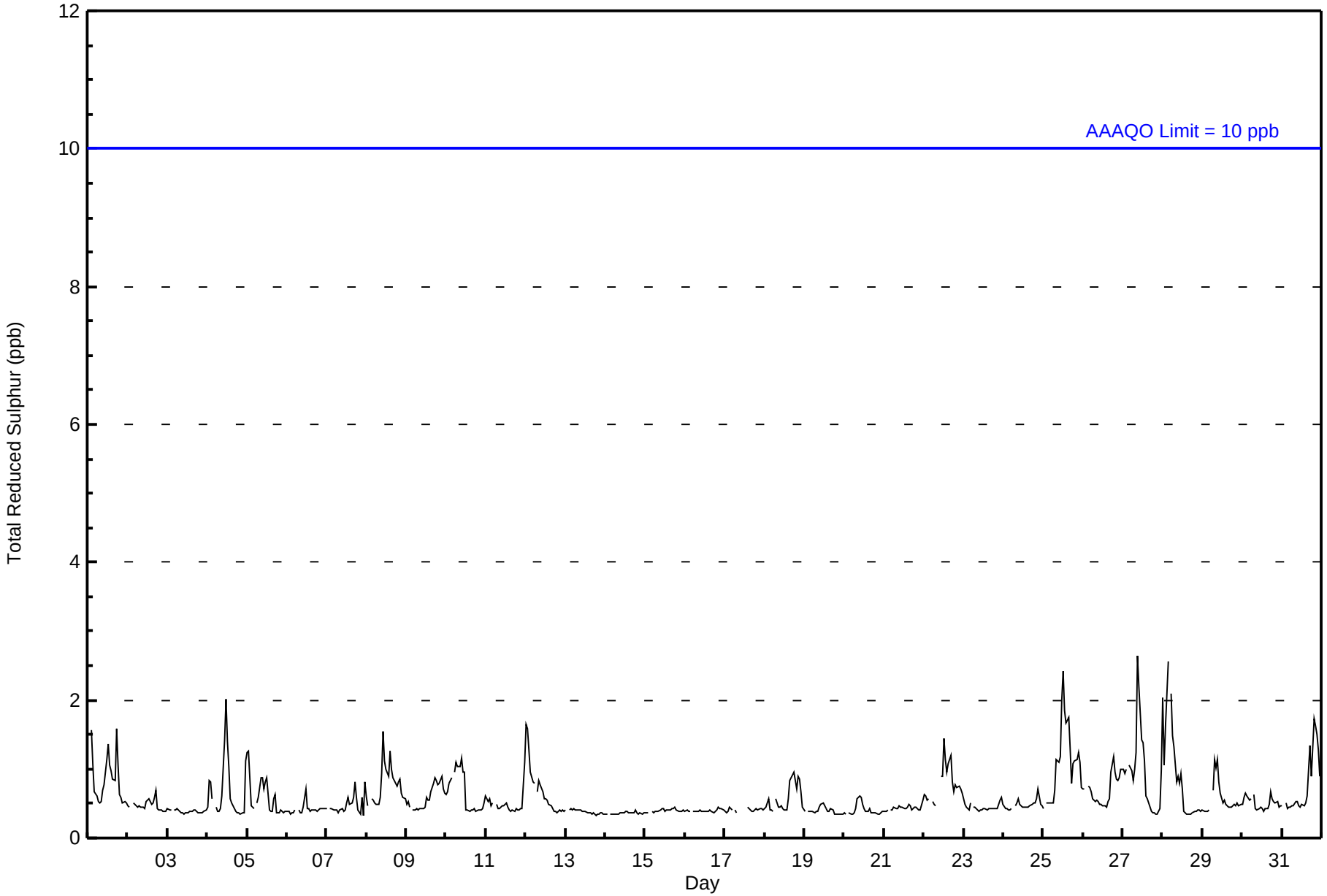
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Total Reduced Sulphur (TRS) - ppb

Fort McKay - Bertha Ganter - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	702	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: 704

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Fort McKay - Bertha Ganter - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	253	71	23	15	15	13	17	50	66	19	11	18	16	18	29	68	702
3 - 4	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	253	71	23	15	15	13	17	51	67	19	11	18	16	18	29	68	704

Total Number of Valid Hours: 704

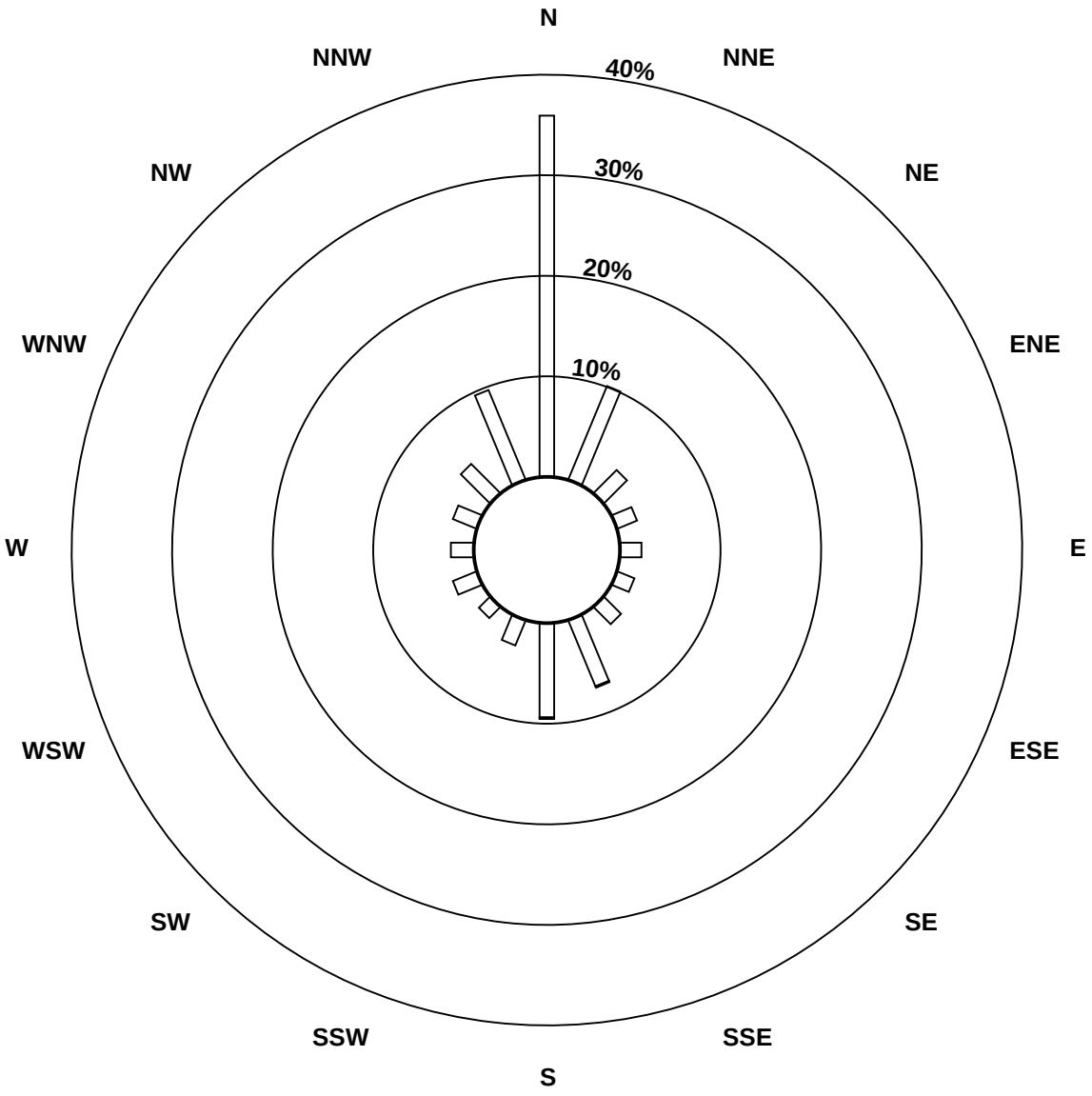
Total Number of Hours: 744

Wood Buffalo Environmental Association

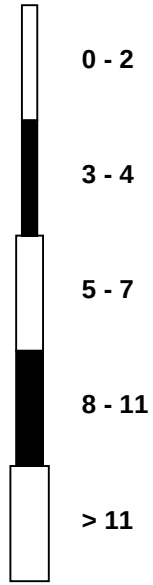
Wind Rose Mar 2016

Total Reduced Sulphur (TRS) - ppb

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppb)



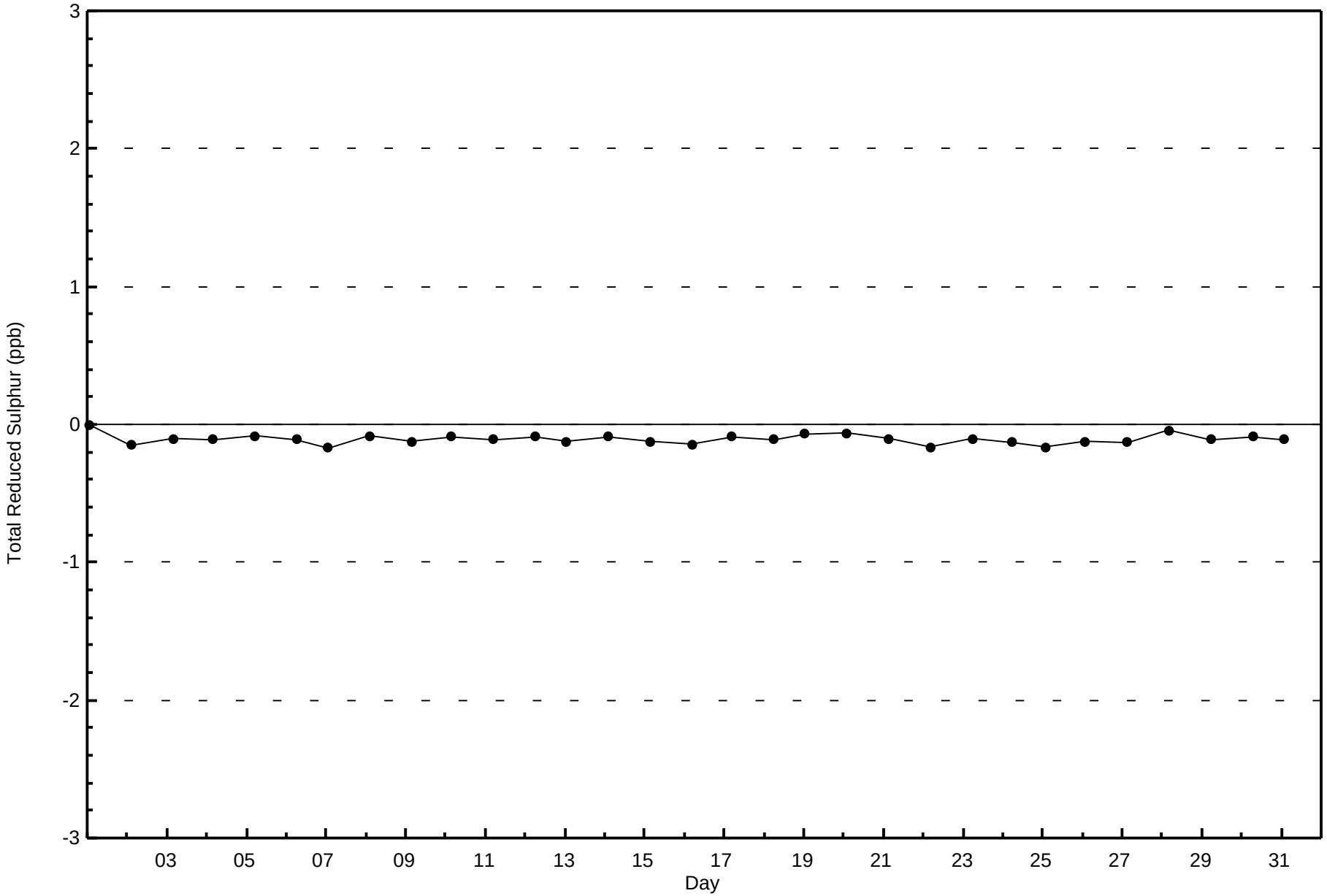
Total Number of Valid Hours: 704

Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

Fort McKay - Bertha Ganter - March 2016

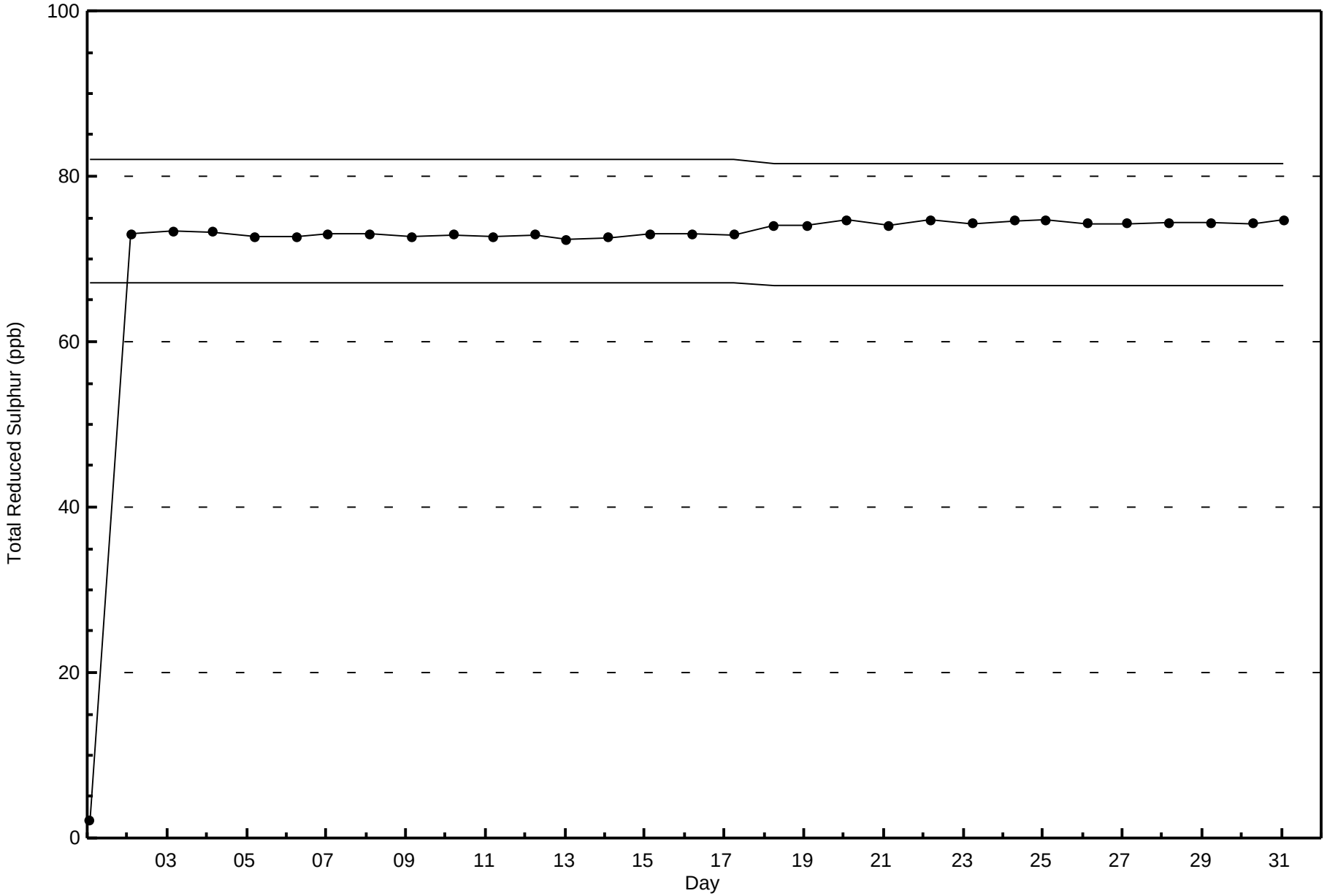


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

Fort McKay - Bertha Ganter - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter - March 2016

Maximum Value: 3.0 ppm on Mar 30 03:00

Maximum Daily Average: 2.2 ppm on Mar 25

Minimum Value: 1.9 ppm on Mar 12 18:00

Minimum Daily Average: 1.9 ppm on Mar 14

Maximum Diurnal Average: 2.1 ppm at hour 10

Minimum Diurnal Average: 2.0 ppm at hour 15

Monthly Average: 2.02 ppm

Percentiles: P_1 = 1.9 P_{10} = 1.9 Q_1 = 1.9 Median = 2.0 Q_3 = 2.1 P_{90} = 2.2 P_{99} = 2.7

Hours in Service:	744
Hours of Data:	702
Hours of Missing Data:	42
Hours of Calibration:	35
Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	PF	2.1	2.1	2.1	2.1	2.0	2.1	M	2.3	2.2	2.1	2.0	M	2.2	2.3	2.6	2.3	2.3	2.1	2.0	1.9	2.0	2.1	2.6
2-Mar	1.9	Z	1.9	2.1	2.1	2.0	1.9	2.0	1.9	1.9	2.0	2.2	2.3	2.3	2.1	2.2	2.2	2.2	2.1	1.9	1.9	2.0	2.0	2.0	2.0	2.3
3-Mar	2.0	2.1	Z	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	1.9	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	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2
5-Mar	1.9	2.0	2.1	2.1	Z	1.9	2.1	2.2	2.2	2.5	2.4	2.6	2.4	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.1	2.6
6-Mar	2.0	1.9	1.9	2.0	1.9	Z	2.0	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	1.9	1.9	1.9	1.9	2.0
7-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	2.1	1.9	1.9	2.2	2.5	2.3	1.9	1.9	2.0	1.9	2.0	2.0	2.5
8-Mar	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.1	2.0	2.1	2.4	2.3	2.2	2.1	2.0	2.0	2.1	2.1	2.2	2.1	2.1	2.4
9-Mar	2.0	2.0	Z	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.2	2.2	2.2	2.1	2.0	2.2
10-Mar	2.2	2.2	2.2	Z	2.5	2.4	2.5	2.6	2.6	2.7	2.4	2.5	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2	2.7
11-Mar	2.0	2.0	2.1	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.0	2.1	2.0	2.1
12-Mar	2.3	2.4	2.4	2.4	2.4	Z	2.2	2.3	2.8	2.7	2.4	2.1	2.2	2.2	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2	2.8
13-Mar	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
14-Mar	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
15-Mar	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0
16-Mar	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	2.0	2.0	2.0	2.0	1.9	2.0
17-Mar	2.0	2.0	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	1.9	2.0	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.1
18-Mar	2.0	2.0	2.0	1.9	1.9	Z	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	2.5	2.4	2.3	2.0	2.0	2.5
19-Mar	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.2	2.1	2.0	2.0	2.0	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2
20-Mar	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.2
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	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0
22-Mar	2.0	2.0	2.0	Z	2.0	2.0	2.0	1.9	M	M	2.0	2.0	2.0	2.0	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
23-Mar	2.0	1.9	1.9	1.9	Z	2.1	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.0	2.1
24-Mar	2.1	2.0	2.0	1.9	1.9	Z	1.9	1.9	2.1	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.4	2.1	2.0	2.0	2.4
25-Mar	Z	1.9	2.0	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.5	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.6	2.8	2.8	2.5	2.1	2.2	2.8
26-Mar	2.1	Z	2.4	2.3	2.3	2.4	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.4
27-Mar	2.1	2.1	Z	2.1	2.1	2.1	2.0	2.1	2.2	2.2	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.2
28-Mar	2.0	2.0	2.0	Z	2.1	2.1	2.4	2.9	2.2	2.2	2.2	2.2	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.9
29-Mar	1.9	1.9	1.9	1.9	Z	2.0	2.1	2.2	2.3	2.3	2.3	2.1	2.0	2.4	2.1	2.1	1.9	1.9	1.9	2.0	2.0	2.1	2.2	2.2	2.1	2.4
30-Mar	2.3	2.8	3.0	2.7	2.7	Z	2.6	2.6	2.0	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	2.1	3.0
31-Mar	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	2.1	2.1	2.0	2.0	2.0	2.0	2.3	2.4	2.4	2.3	2.0	2.4
	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	Diurnal Average	
	2.3	2.8	3.0	2.7	2.7	2.4	2.6	2.9	2.8	2.7	2.5	2.6	2.4	2.4	2.4	2.3	2.3	2.6	2.3	2.6	2.8	2.8	2.5	2.3	Diurnal Maximum	

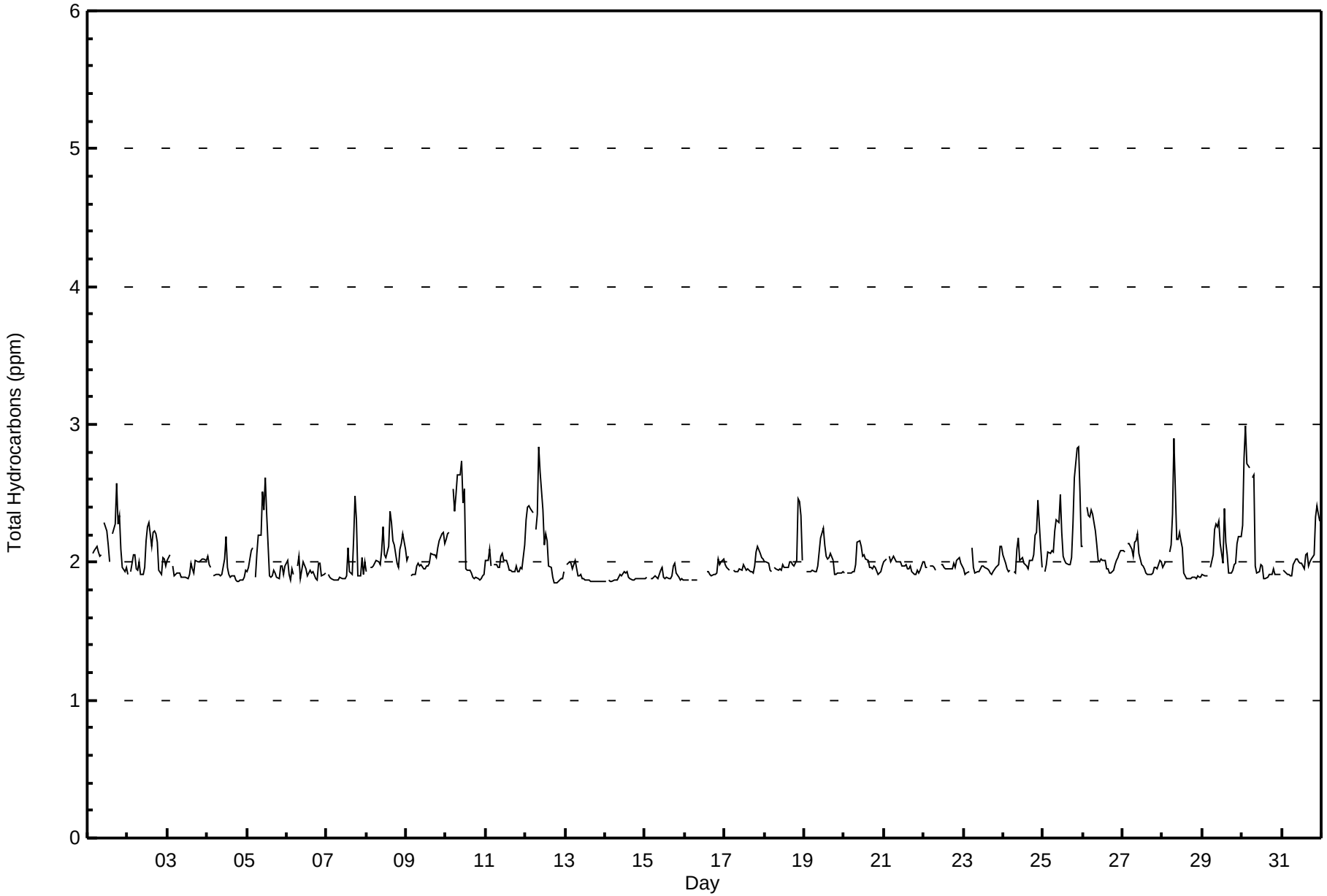
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter - March 2016



Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	523	74.50	74.50
2.1 - 3.0	179	25.50	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

Fort McKay - Bertha Ganter - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	208	53	19	11	11	12	15	31	39	11	5	10	10	19	21	48	523
2.1 - 3.0	37	20	4	4	3	1	2	17	29	7	6	9	5	2	10	23	179
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	245	73	23	15	14	13	17	48	68	18	11	19	15	21	31	71	702

Total Number of Valid Hours: 702

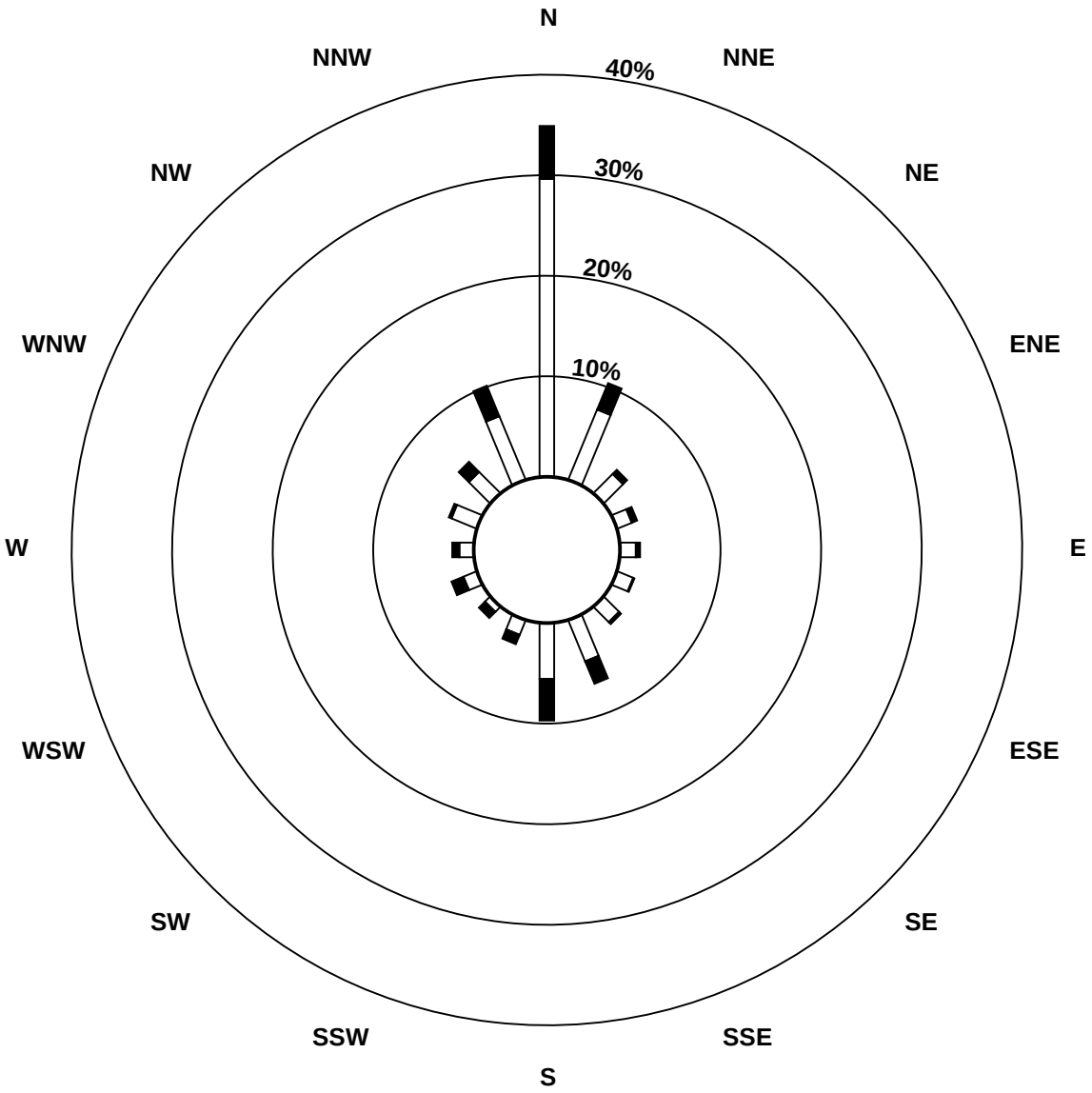
Total Number of Hours: 744

Wood Buffalo Environmental Association

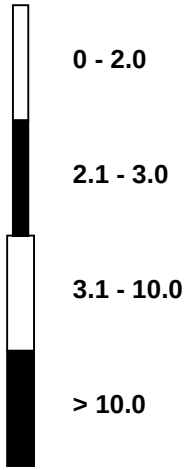
Wind Rose Mar 2016

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppm)



0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

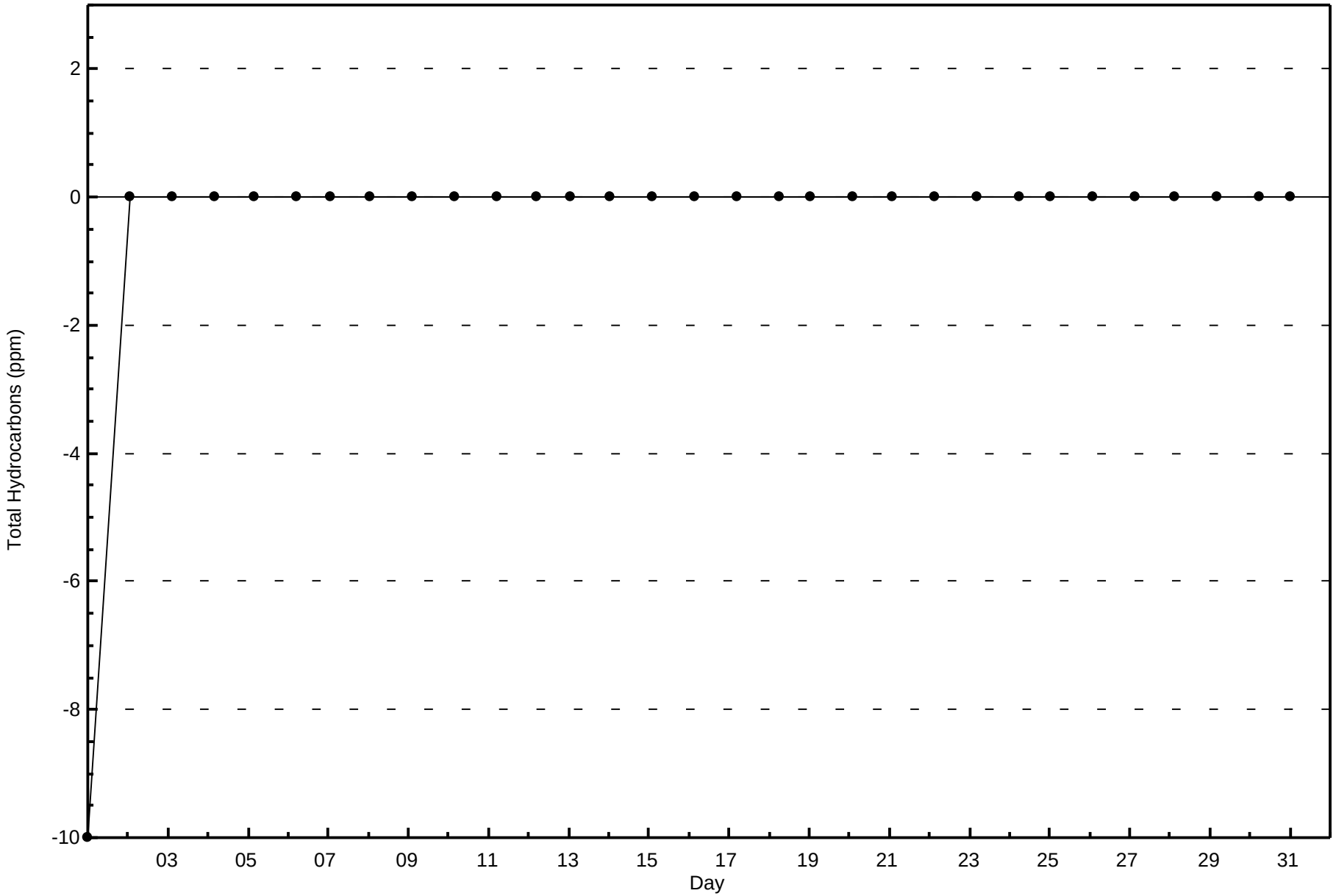
Total Number of Valid Hours: 702

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter - March 2016

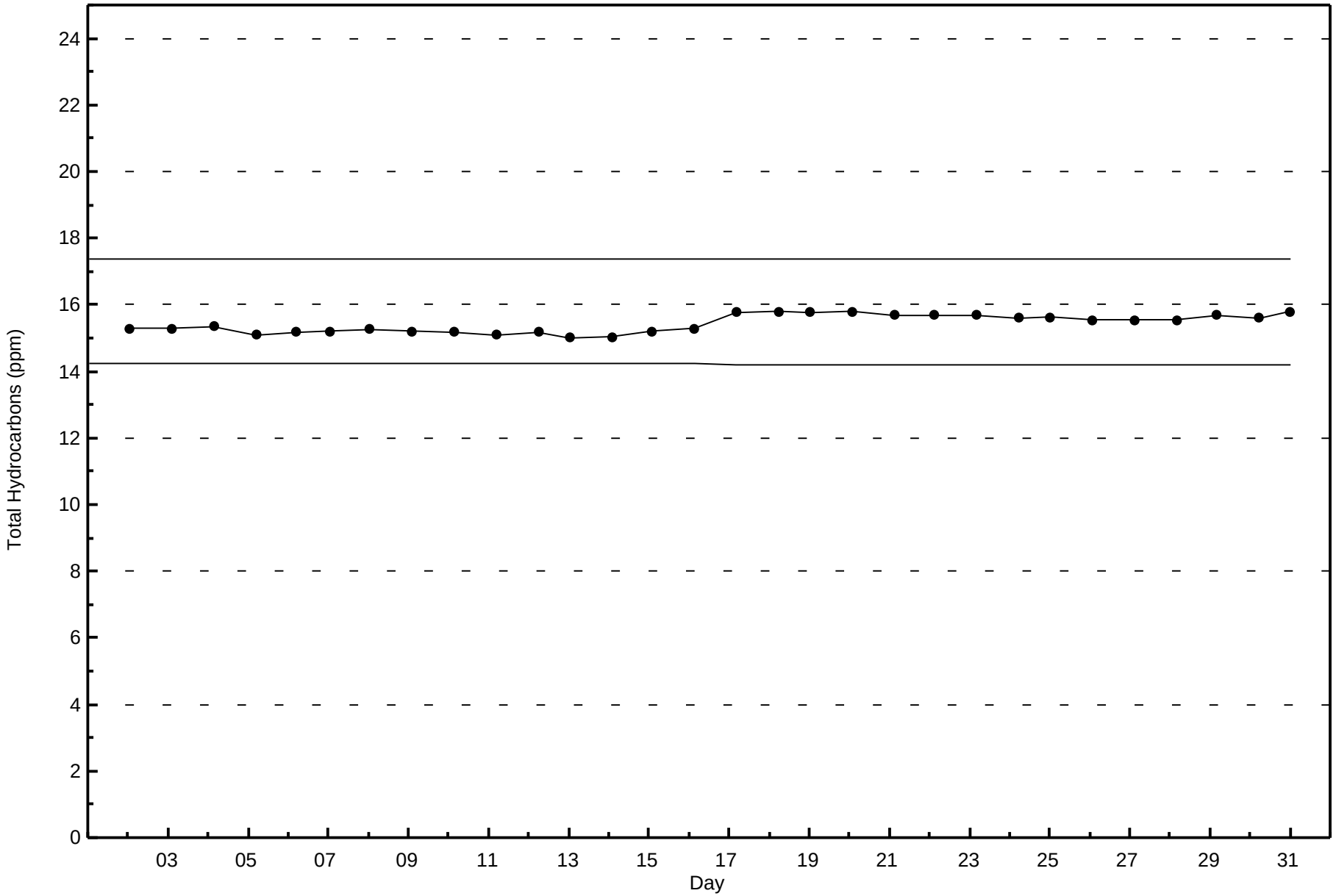


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Non Methane Hydrocarbons (NMHC) - ppm

Fort McKay - Bertha Ganter - March 2016

Maximum Value: 0.445 ppm on Mar 30 03:00

Maximum Daily Average: 0.101 ppm on Mar 30

Minimum Value: 0.000 ppm on Mar 1 07:00

Minimum Daily Average: 0.000 ppm on Mar 3

Maximum Diurnal Average: 0.043 ppm at hour 8

Minimum Diurnal Average: 0.011 ppm at hour 15

Monthly Average: 0.023 ppm

Percentiles: P_1 = 0.0 P_{10} = 0.0 Q_1 = 0.0 Median = 0.0 Q_3 = 0.0 P_{90} = 0.1 P_{99} = 0.3

Hours in Service:	744
Hours of Data:	702
Hours of Missing Data:	42
Hours of Calibration:	35
Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	PF	0.008	0.013	0.001	0.000	0.000	0.000	M	0.095	0.057	0.031	0.000	M	0.066	0.094	0.219	0.073	0.027	0.014	0.000	0.000	0.000	0.037	0.219
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	0.021	0.030	0.003	0.004	0.073	0.068	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.073
3-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
4-Mar	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.078	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.078
5-Mar	0.000	0.000	0.000	0.000	Z	0.000	0.028	0.041	0.062	0.149	0.065	0.127	0.083	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.024	0.149
6-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
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	0.093	0.004	0.000	0.052	0.151	0.114	0.000	0.000	0.000	0.000	0.000	0.018	0.151
8-Mar	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.031	0.090	0.013	0.004	0.035	0.120	0.090	0.051	0.045	0.005	0.000	0.006	0.000	0.005	0.001	0.022	0.120
9-Mar	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.021	0.061	0.053	0.058	0.036	0.089	0.095	0.092	0.105	0.074	0.030	0.105
10-Mar	0.078	0.104	0.104	Z	0.178	0.100	0.142	0.186	0.188	0.224	0.109	0.128	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.067	0.224
11-Mar	0.000	0.000	0.041	0.000	Z	0.000	0.000	0.000	0.000	0.039	0.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.031	0.000	0.000	0.013	0.001	0.018	0.007	0.041
12-Mar	0.112	0.174	0.169	0.123	0.090	Z	0.067	0.096	0.175	0.123	0.073	0.032	0.053	0.096	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.061	0.175
13-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
14-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
15-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
16-Mar	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	C	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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	0.001	0.002	0.000	0.000	0.000	0.000	0.007	0.043	0.064	0.020	0.010	0.003	0.007	0.064
18-Mar	0.001	0.001	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.002	0.097	0.126	0.127	0.002	0.016	0.127
19-Mar	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.018	0.036	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.036
20-Mar	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.023	0.026	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	0.003	0.026
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	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
22-Mar	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	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	0.000
23-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
24-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	0.001	0.036	0.000	0.000	0.002	0.036
25-Mar	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.083	0.144	0.175	0.329	0.101	0.000	0.000	0.000	0.001	0.001	0.027	0.138	0.245	0.298	0.303	0.180	0.057	0.090	0.329
26-Mar	0.047	Z	0.186	0.158	0.150	0.179	0.168	0.133	0.068	0.000	0.000	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.024	0.031	0.037	0.052	0.186
27-Mar	0.035	0.030	Z	0.048	0.045	0.034	0.017	0.058	0.048	0.074	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.074
28-Mar	0.000	0.000	0.000	Z	0.016	0.048	0.163	0.392	0.085	0.071	0.091	0.074	0.062	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.044	0.392
29-Mar	0.000	0.000	0.000	0.000	Z	0.000	0.020	0.071	0.053	0.066	0.101	0.066	0.023	0.306	0.129	0.075	0.000	0.000	0.000	0.000	0.001	0.001	0.066	0.101	0.051	0.306
30-Mar	0.129	0.347	0.445	0.363	0.372	Z	0.311	0.287	0.003	0.000	0.000	0.028	0.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.101	0.445
31-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	0.027	0.063	0.009	0.000	0.000	0.012	0.240	0.285	0.238	0.175	0.046	0.285
	0.016	0.026	0.038	0.027	0.033	0.014	0.030	0.043	0.029	0.035	0.035	0.025	0.011	0.018	0.011	0.012	0.011	0.018	0.013	0.014	0.027	0.031	0.026	0.015	Diurnal Average	
	0.129	0.347	0.445	0.363	0.372	0.179	0.311	0.392	0.188	0.224	0.329	0.128	0.083	0.306	0.129	0.090	0.094	0.219	0.138	0.245	0.298	0.303	0.238	0.175	Diurnal Maximum	

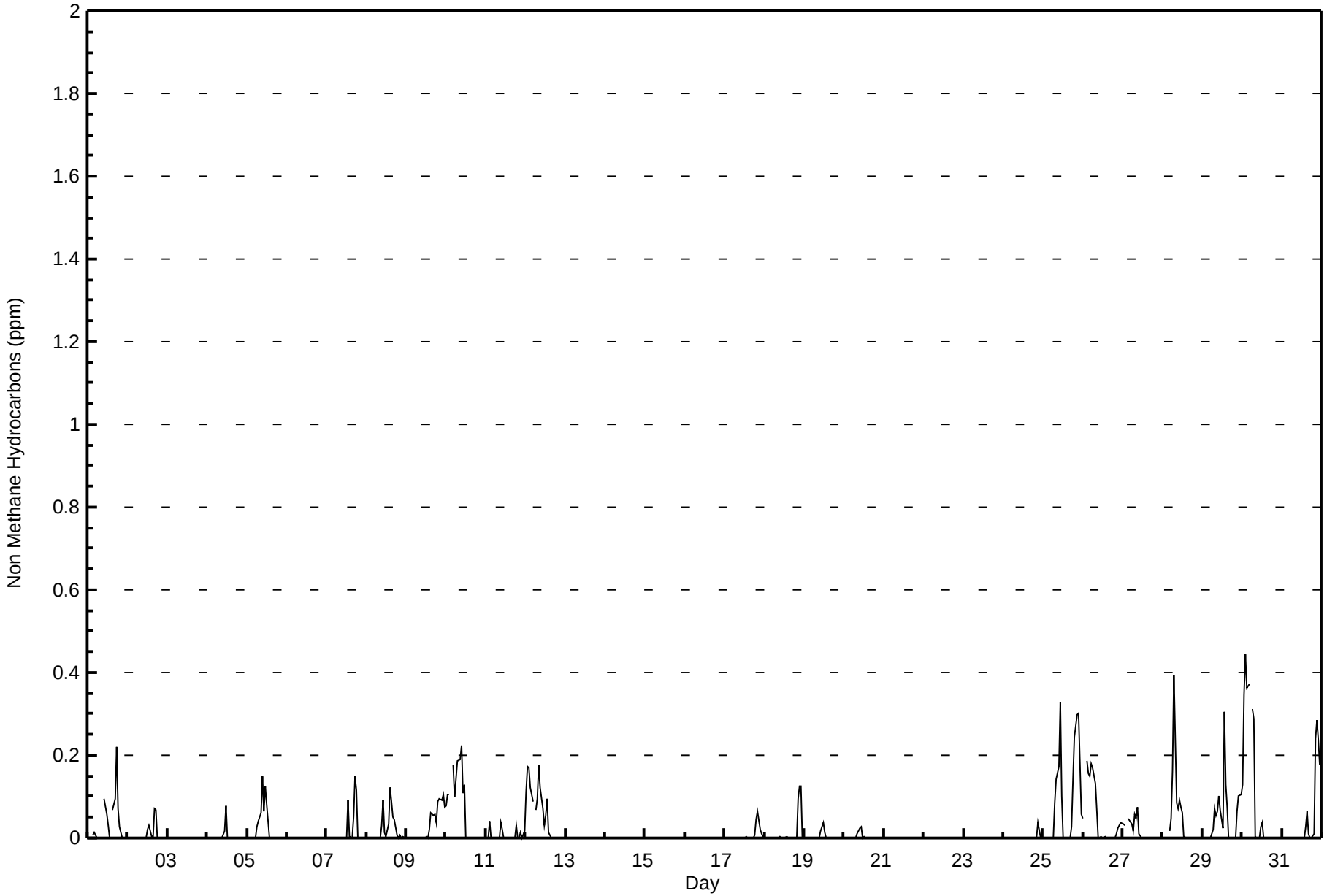
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm

Fort McKay - Bertha Ganter - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Fort McKay - Bertha Ganter - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	536	76.35	76.35
0.006 - 0.05	64	9.12	85.47
0.06 - 0.1	69	9.83	95.30
> 0.1	33	4.70	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Fort McKay - Bertha Ganter - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 0.005	221	57	19	11	11	11	14	26	43	11	3	12	10	19	18	50	536
0.006 - 0.05	9	10	0	1	0	1	1	10	9	3	5	3	1	1	5	5	64
0.06 - 0.1	10	3	3	2	3	1	1	10	12	1	2	3	3	0	4	11	69
> 0.1	5	3	1	1	0	0	1	2	4	3	1	1	1	1	4	5	33
Totals	245	73	23	15	14	13	17	48	68	18	11	19	15	21	31	71	702

Total Number of Valid Hours: 702

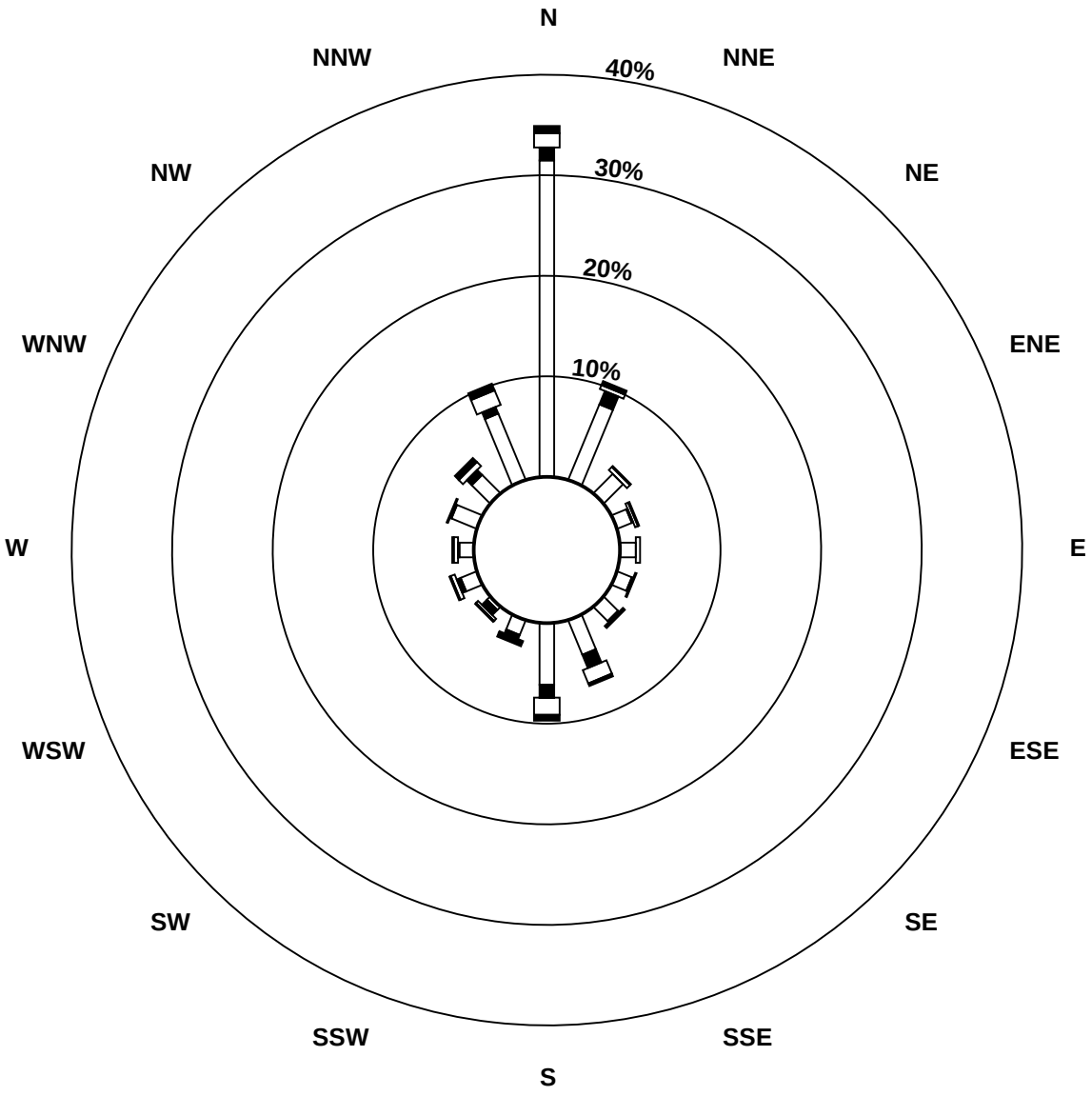
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Mar 2016

Non Methane Hydrocarbons (NMHC) - ppm

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppm)

0 - 0.005

0.006 - 0.05

0.06 - 0.1

> 0.1

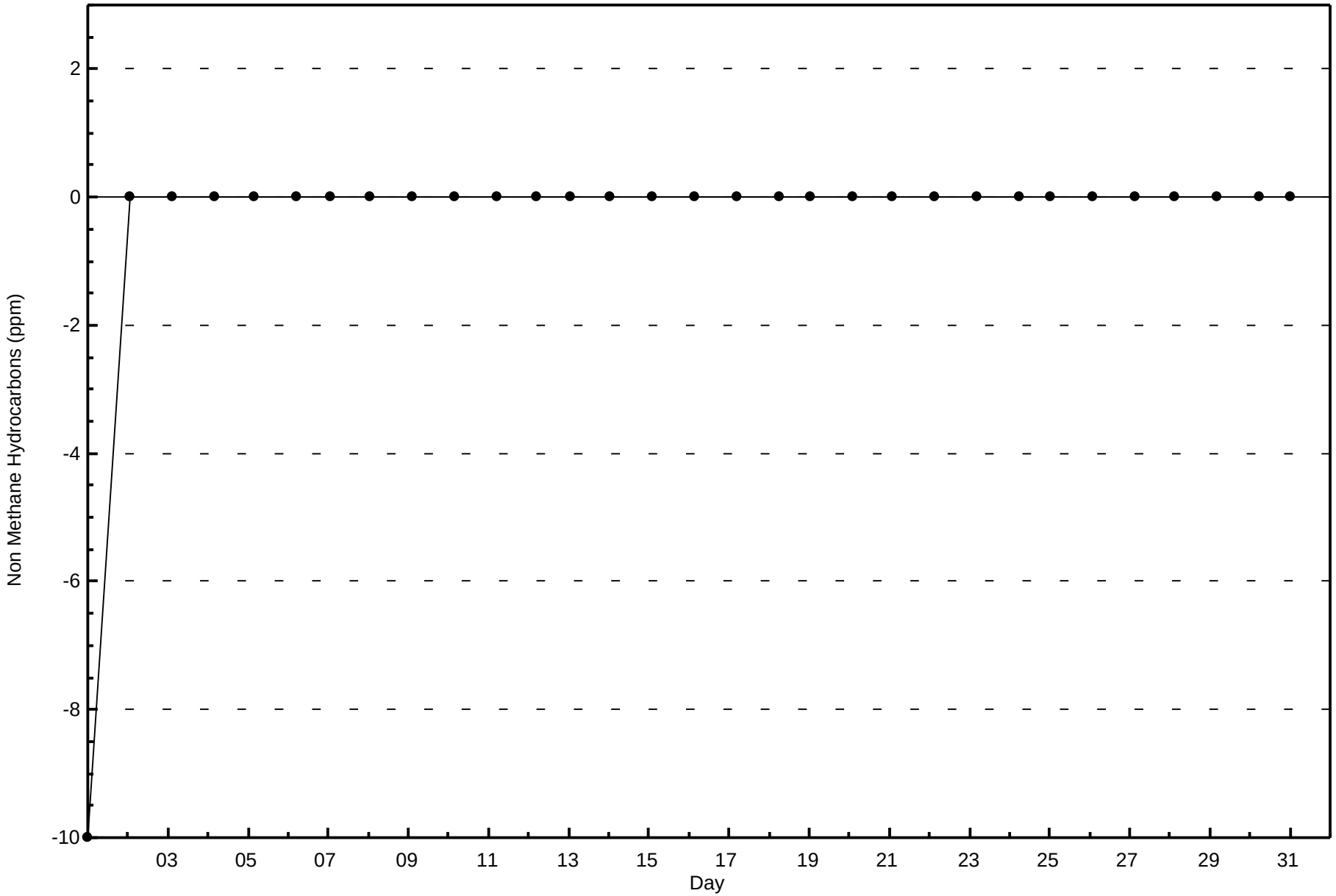
Total Number of Valid Hours: 702

Wood Buffalo Environmental Association

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

Fort McKay - Bertha Ganter - March 2016

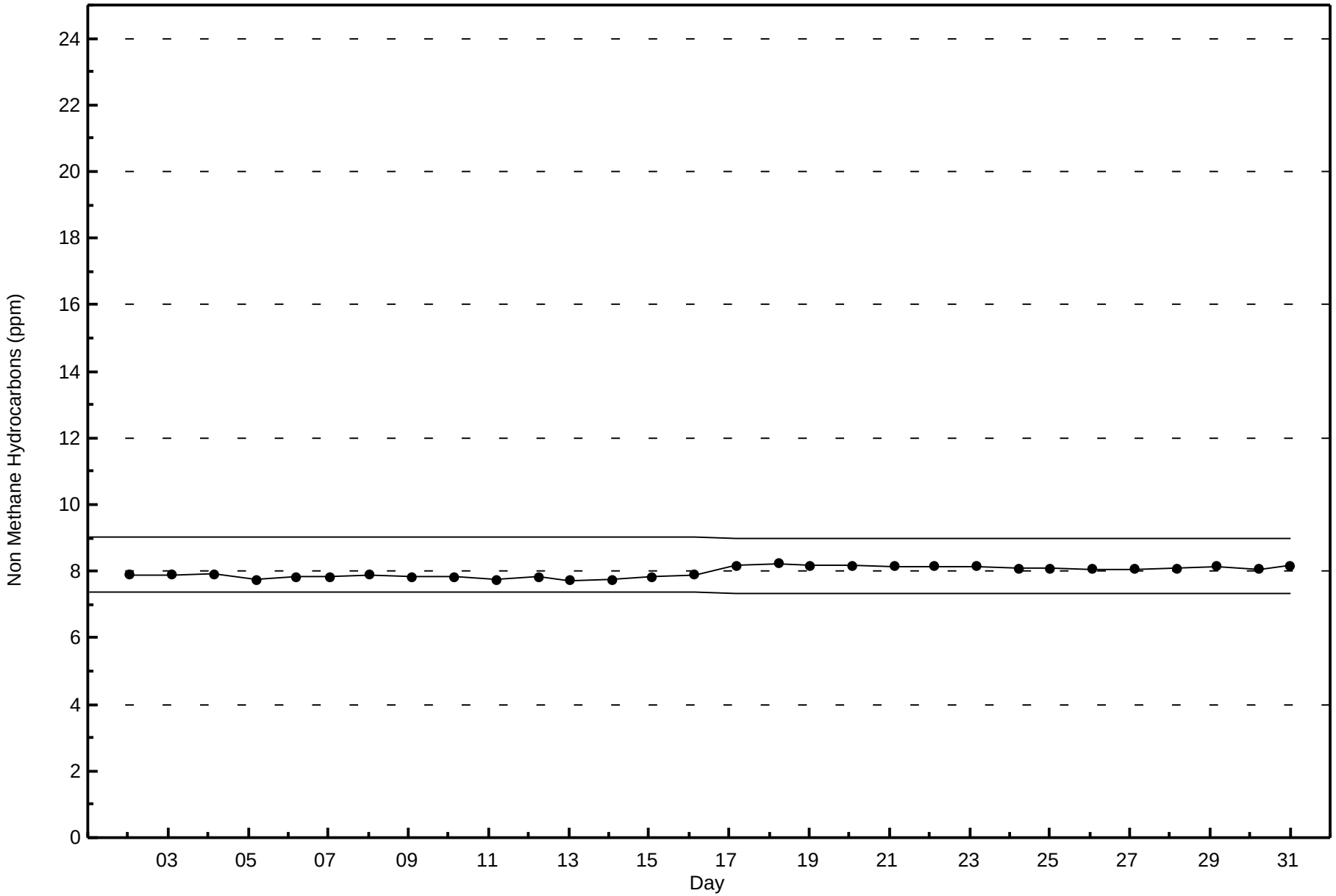


Wood Buffalo Environmental Association

Span Responses

Non Methane Hydrocarbons (NMHC) - ppm

Fort McKay - Bertha Ganter - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH_4) - ppm

Fort McKay - Bertha Ganter - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 2.7 ppm on Mar 12 09:00

Maximum Daily Average: 2.1 ppm on Mar 25

Minimum Value: 1.9 ppm on Mar 12 18:00

Minimum Daily Average: 1.9 ppm on Mar 14

Maximum Diurnal Average: 2.1 ppm at hour 10

Minimum Diurnal Average: 2.0 ppm at hour 15

Monthly Average: 2.00 ppm

Percentiles: P_1 = 1.9 P_{10} = 1.9 Q_1 = 1.9 Median = 2.0 Q_3 = 2.0 P_{90} = 2.2 P_{99} = 2.5

Hours in Service:	744
Hours of Data:	702
Hours of Missing Data:	42
Hours of Calibration:	35
Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	PF	2.1	2.1	2.1	2.1	2.0	2.1	M	2.2	2.2	2.1	2.0	M	2.1	2.2	2.3	2.2	2.3	2.1	2.0	1.9	2.0	2.1	2.3
2-Mar	1.9	Z	1.9	2.1	2.1	2.0	1.9	2.0	1.9	1.9	2.0	2.2	2.2	2.3	2.1	2.2	2.2	2.1	2.1	1.9	1.9	2.0	2.0	2.0	2.0	2.3
3-Mar	2.0	2.1	Z	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	1.9	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	1.9	1.9	1.9	1.9	1.9	1.9	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	2.1
5-Mar	1.9	2.0	2.1	2.1	Z	1.9	2.0	2.2	2.1	2.4	2.3	2.5	2.3	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.5
6-Mar	2.0	1.9	1.9	2.0	1.9	Z	2.0	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	1.9	1.9	1.9	1.9	2.0
7-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	2.0	1.9	1.9	2.1	2.3	2.2	1.9	1.9	2.0	1.9	2.0	1.9	2.3
8-Mar	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.0	2.0	2.1	2.2	2.2	2.1	2.1	2.0	2.0	2.1	2.1	2.2	2.1	2.1	2.2
9-Mar	2.0	2.0	Z	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	2.1	2.1	2.1	2.1	2.0	2.1
10-Mar	2.1	2.1	2.1	Z	2.4	2.3	2.4	2.5	2.4	2.5	2.3	2.4	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.5
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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.0	2.1
12-Mar	2.2	2.2	2.2	2.3	2.3	Z	2.2	2.3	2.7	2.5	2.3	2.1	2.2	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.7
13-Mar	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
14-Mar	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
15-Mar	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0
16-Mar	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	2.0	2.0	2.0	2.0	1.9	2.0
17-Mar	2.0	2.0	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	1.9	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
18-Mar	2.0	2.0	2.0	1.9	1.9	Z	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	2.4	2.3	2.2	2.0	2.0	2.4
19-Mar	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.2	2.1	2.0	2.0	2.0	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2
20-Mar	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.1
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	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0
22-Mar	2.0	2.0	2.0	Z	2.0	2.0	2.0	1.9	M	M	2.0	2.0	2.0	2.0	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
23-Mar	2.0	1.9	1.9	1.9	Z	2.1	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.0	2.1
24-Mar	2.1	2.0	2.0	1.9	1.9	Z	1.9	1.9	2.1	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.4	2.1	2.0	2.0	2.4
25-Mar	Z	1.9	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.4	2.5	2.5	2.3	2.1	2.1	2.5
26-Mar	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.2
27-Mar	2.1	2.0	Z	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1
28-Mar	2.0	2.0	2.0	Z	2.1	2.1	2.2	2.5	2.1	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.5
29-Mar	1.9	1.9	1.9	1.9	Z	2.0	2.0	2.2	2.2	2.2	2.2	2.1	2.0	2.1	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.1	2.0	2.2
30-Mar	2.1	2.4	2.5	2.4	2.3	Z	2.3	2.3	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	2.0	2.5
31-Mar	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	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.1
	2.0	2.0	2.0	2.0	2.0	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	Diurnal Average	
	2.2	2.4	2.5	2.4	2.4	2.3	2.4	2.5	2.7	2.5	2.3	2.5	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.4	2.5	2.5	2.3	2.1	Diurnal Maximum	

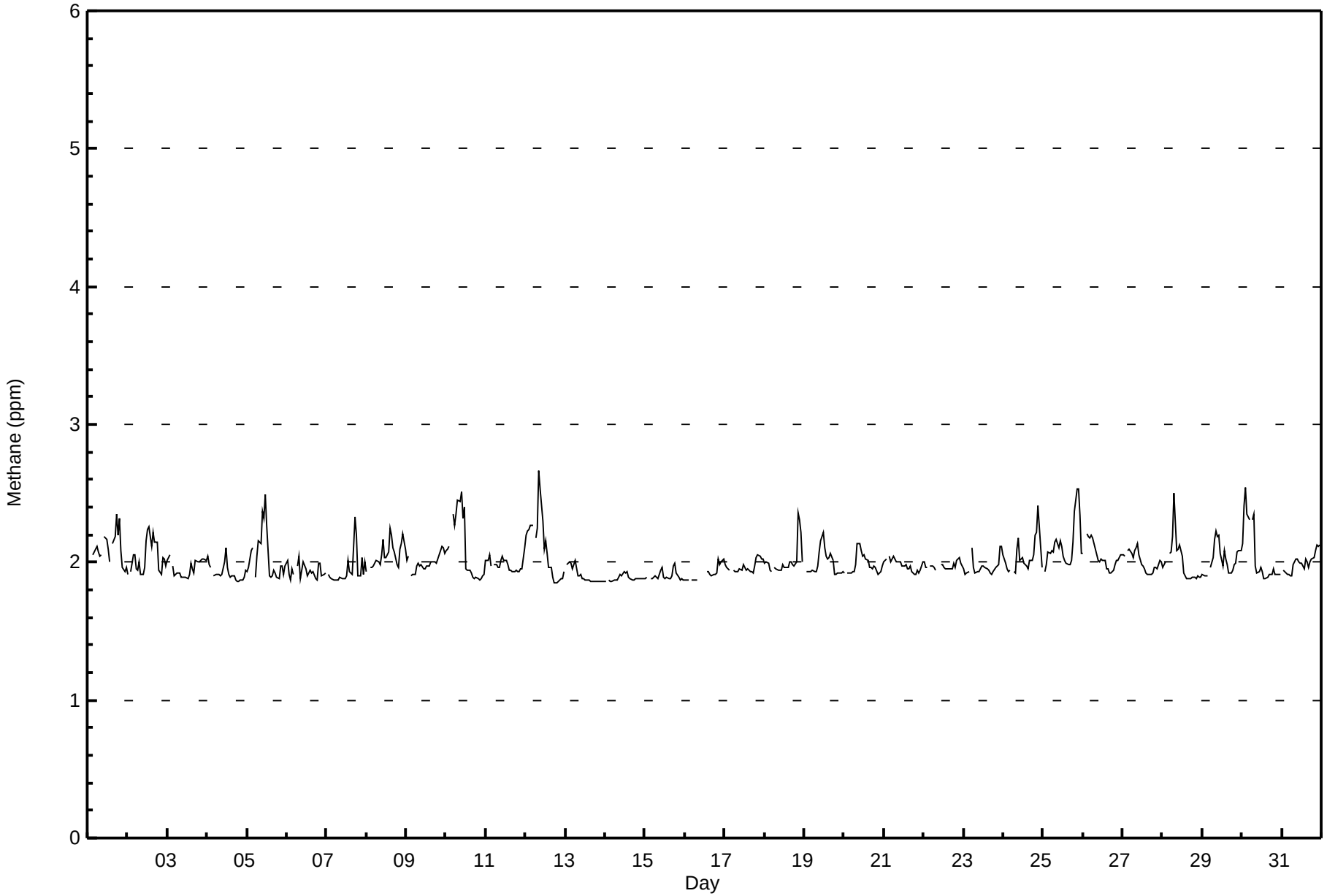
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Methane (CH_4) - ppm

Fort McKay - Bertha Ganter - March 2016



Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	543	77.35	77.35
2.1 - 3.0	159	22.65	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 | **Methane (CH_4) - ppm**

Frequency Distribution | **Fort McKay - Bertha Ganter - March 2016**

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	209	53	19	11	13	12	15	34	42	12	6	11	12	19	23	52	543
2.1 - 3.0	36	20	4	4	1	1	2	14	26	6	5	8	3	2	8	19	159
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	245	73	23	15	14	13	17	48	68	18	11	19	15	21	31	71	702

Total Number of Valid Hours: 702

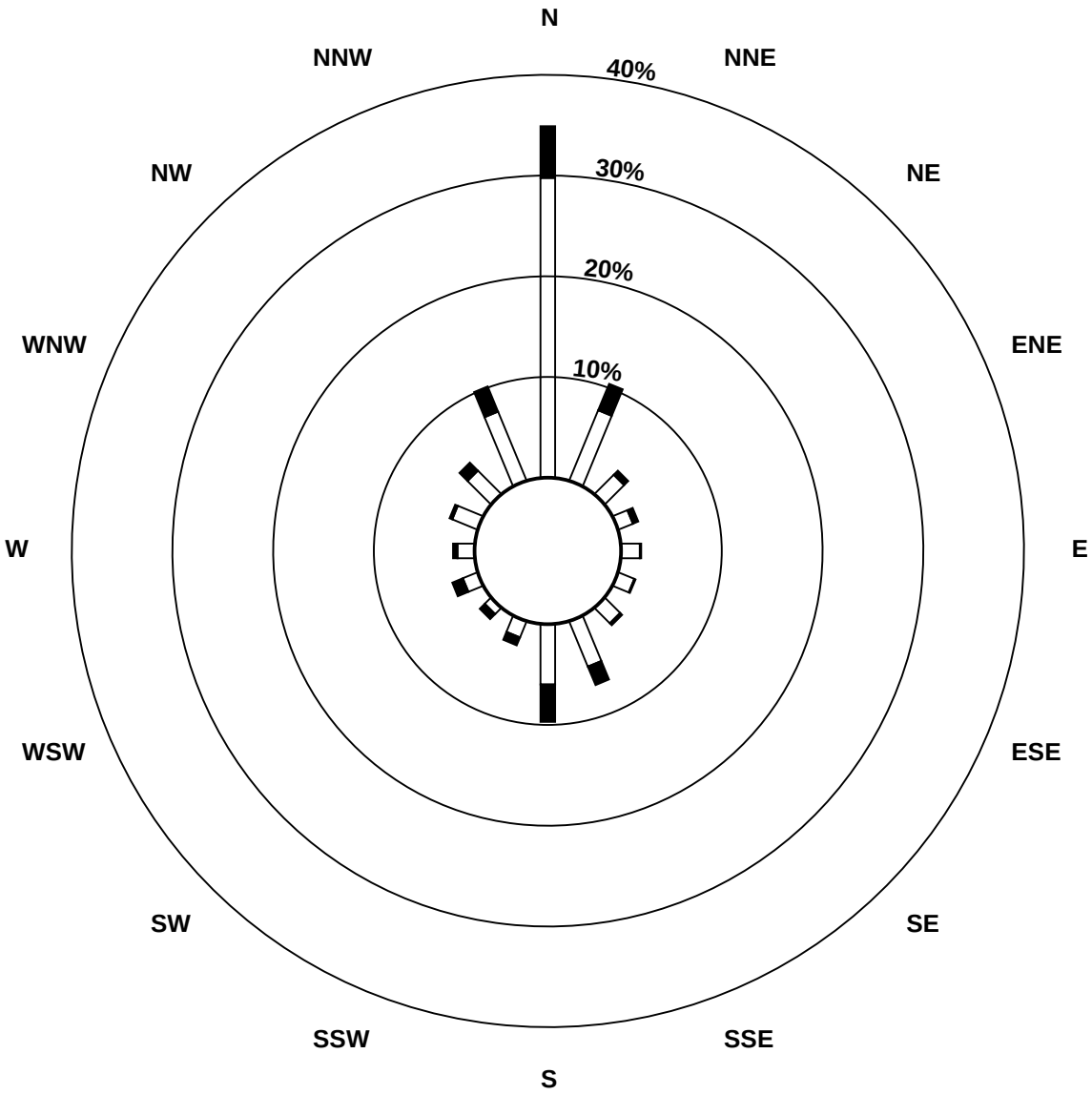
Total Number of Hours: 744

Wood Buffalo Environmental Association

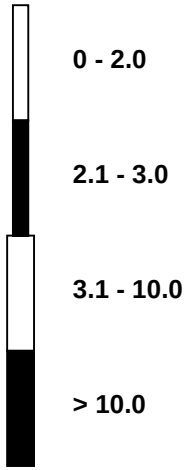
Wind Rose Mar 2016

Methane (CH_4) - ppm

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppm)



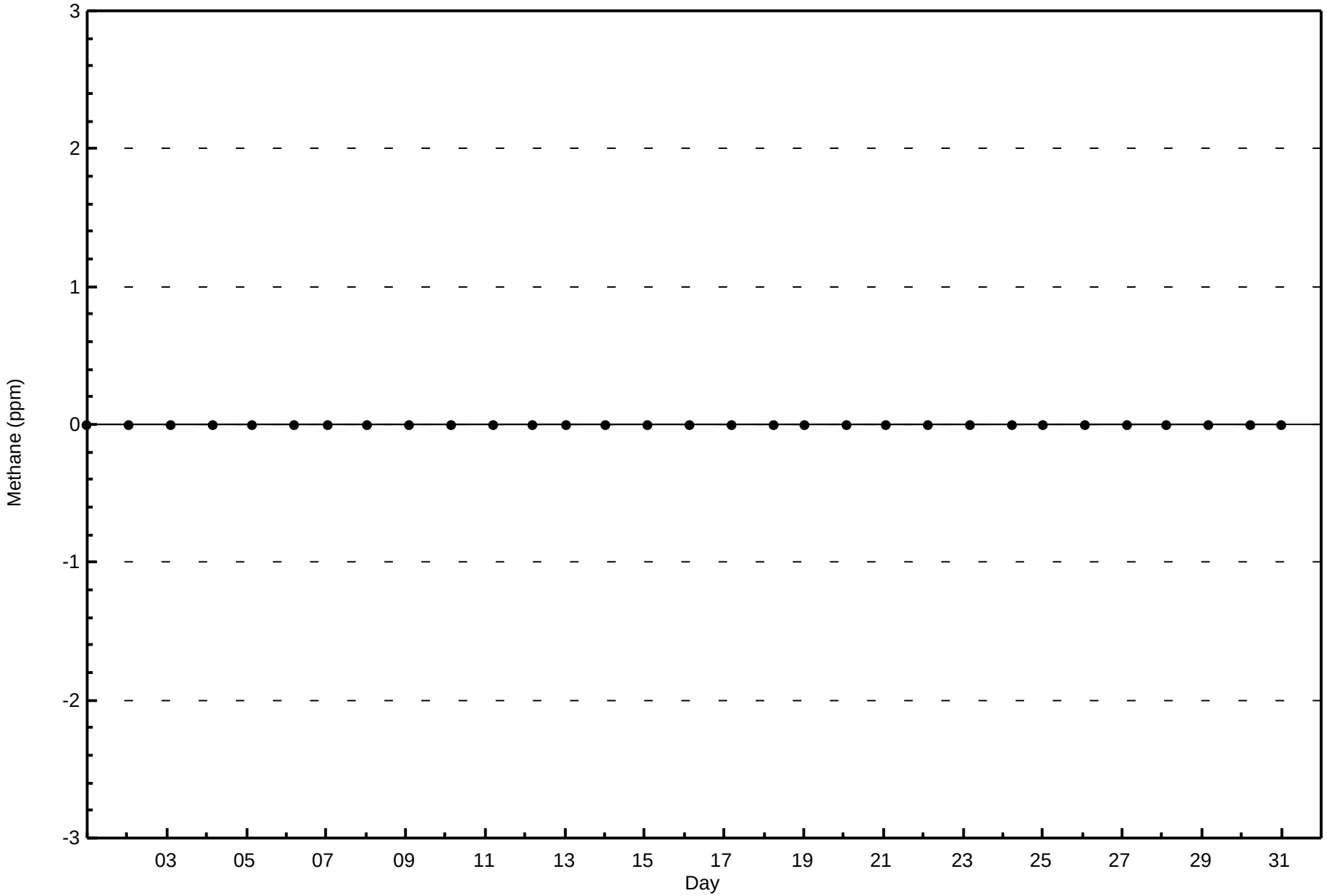
Total Number of Valid Hours: 702

Wood Buffalo Environmental Association

Zero Responses

Methane (CH_4) - ppm

Fort McKay - Bertha Ganter - March 2016

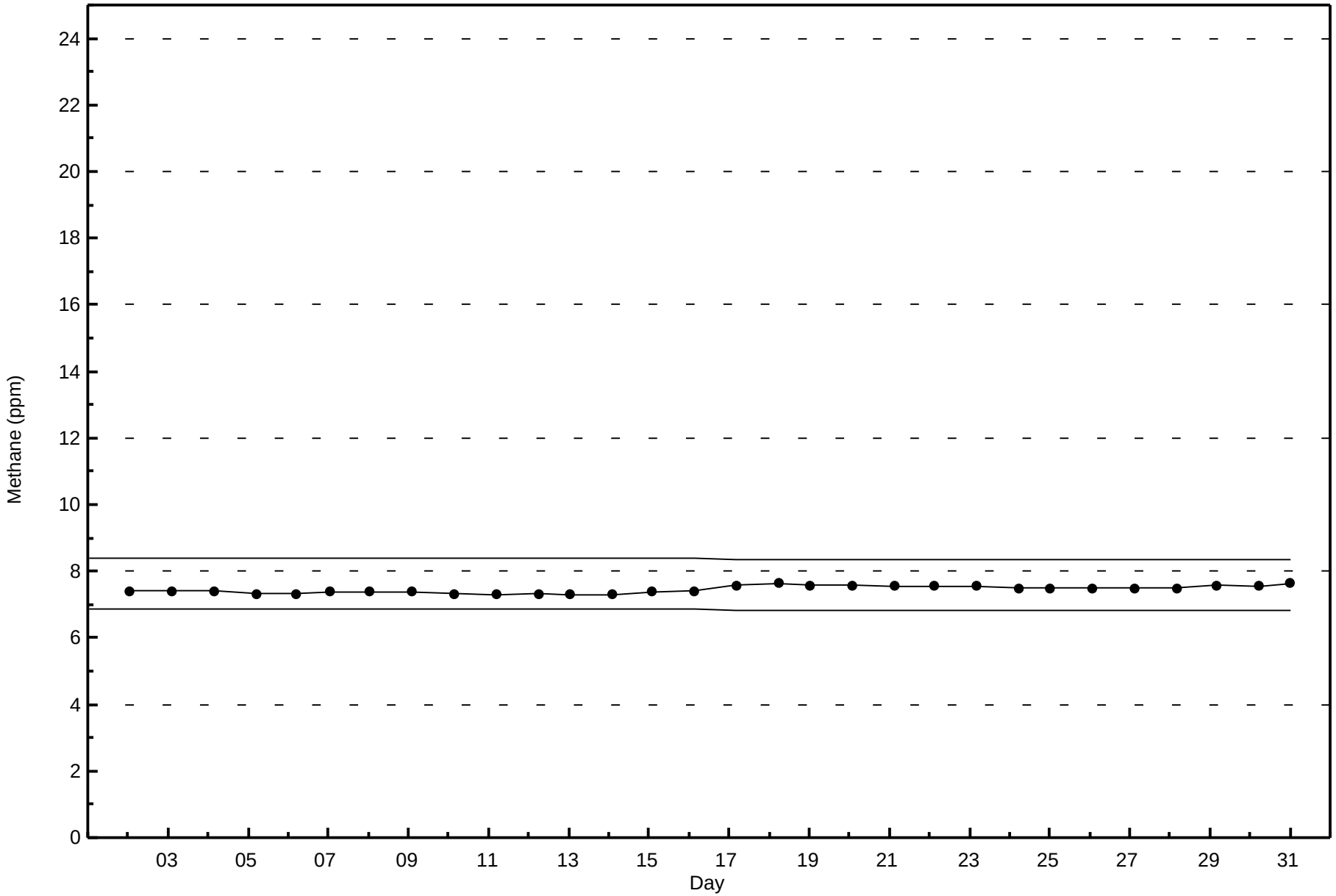


Wood Buffalo Environmental Association

Span Responses

Methane (CH_4) - ppm

Fort McKay - Bertha Ganter - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Fort McKay - Bertha Ganter - March 2016

Maximum Value: 49 ppb on Mar 12 10:00

Maximum Daily Average: 9.2 ppb on Mar 12

Minimum Value: 0 ppb on Mar 1 03:00

Minimum Daily Average: 0.1 ppb on Mar 16

Maximum Diurnal Average: 7.4 ppb at hour 11

Minimum Diurnal Average: 0.2 ppb at hour 24

Monthly Average: 2.3 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 2$ $P_{90} = 7$ $P_{99} = 23$

Hours in Service:	744
Hours of Data:	701
Hours of Missing Data:	43
Hours of Calibration:	37
Percent Operational Time:	99.2

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	0	0	1	3	0	2	6	M	27	19	13	6	7	5	3	12	2	2	0	0	0	0	5.2	27
2-Mar	0	Z	0	1	0	0	0	0	1	2	6	16	16	17	9	9	12	8	0	0	0	0	0	0	4.2	17
3-Mar	0	0	Z	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0.3	1
4-Mar	0	0	0	Z	0	0	0	2	6	2	7	13	14	6	2	1	1	0	0	0	0	0	0	0	2.4	14
5-Mar	0	0	0	0	Z	0	0	2	4	5	12	11	12	1	1	1	1	0	0	0	0	0	0	0	2.1	12
6-Mar	0	0	0	0	0	Z	0	0	0	2	5	5	3	3	1	1	1	0	0	0	0	0	0	0	1.0	5
7-Mar	Z	0	0	0	0	0	0	0	1	1	1	1	2	3	1	2	5	15	14	0	0	0	0	0	2.0	15
8-Mar	0	Z	0	0	0	0	0	1	5	11	14	13	12	9	25	20	14	9	2	0	1	1	4	0	6.2	25
9-Mar	0	0	Z	0	0	0	0	1	1	3	4	5	7	6	4	5	3	1	0	0	0	7	1	2	2.2	7
10-Mar	4	5	4	Z	16	13	20	23	22	23	16	20	1	0	0	0	0	0	0	0	0	0	0	0	7.3	23
11-Mar	0	0	0	0	Z	0	0	0	0	1	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0.4	3
12-Mar	0	0	3	9	10	Z	3	6	40	49	43	18	15	9	4	3	1	0	0	0	0	0	0	0	9.2	49
13-Mar	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
14-Mar	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0
15-Mar	0	0	Z	0	0	0	0	0	1	5	8	3	2	1	1	1	0	1	0	0	0	0	0	0	1.1	8
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	0	0	0	0	Z	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
18-Mar	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	2	9	6	2	0	0	3	2	3	0	1.4	9
19-Mar	Z	0	0	0	0	0	0	1	3	8	12	12	8	4	3	4	3	1	0	0	0	0	0	0	2.6	12
20-Mar	0	Z	0	0	0	0	0	2	10	13	9	5	4	2	2	1	1	0	0	0	0	0	0	0	2.2	13
21-Mar	0	0	Z	0	0	0	0	1	2	3	3	2	2	2	2	2	1	0	0	0	0	0	0	0	0.9	3
22-Mar	0	0	0	Z	0	0	0	1	M	M	M	8	12	9	6	5	3	1	0	0	0	0	0	0	2.3	12
23-Mar	0	0	0	0	Z	0	0	1	1	1	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0.6	2
24-Mar	0	0	0	0	0	Z	0	1	9	13	7	4	3	2	1	1	1	1	0	0	0	2	0	0	2.0	13
25-Mar	Z	0	0	0	0	0	2	8	11	5	3	4	6	6	7	6	3	1	2	2	7	24	14	0	4.8	24
26-Mar	0	Z	0	0	0	0	1	2	3	3	3	3	2	2	1	2	2	1	1	0	0	0	0	0	1.1	3
27-Mar	0	0	Z	0	0	0	1	5	9	16	18	10	5	5	2	2	1	1	0	0	0	0	0	0	3.3	18
28-Mar	0	0	0	Z	0	0	1	2	3	3	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0.7	3
29-Mar	0	0	0	0	Z	0	1	5	12	7	5	3	1	2	1	1	1	0	0	0	0	0	0	0	1.7	12
30-Mar	0	2	5	1	1	Z	3	10	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1.1	10
31-Mar	Z	0	0	0	0	0	0	2	4	4	2	2	2	1	1	1	1	2	2	0	0	0	0	2	1.1	4
	0.2	0.4	0.5	0.5	1.1	0.7	1.1	2.6	5.2	6.6	7.4	6.3	5.0	3.4	3.0	2.8	2.1	1.9	0.8	0.2	0.4	1.2	0.7	0.2	Diurnal Average	
	4	5	5	9	16	13	20	23	40	49	43	20	16	17	25	20	14	15	14	2	7	24	14	2	Diurnal Maximum	

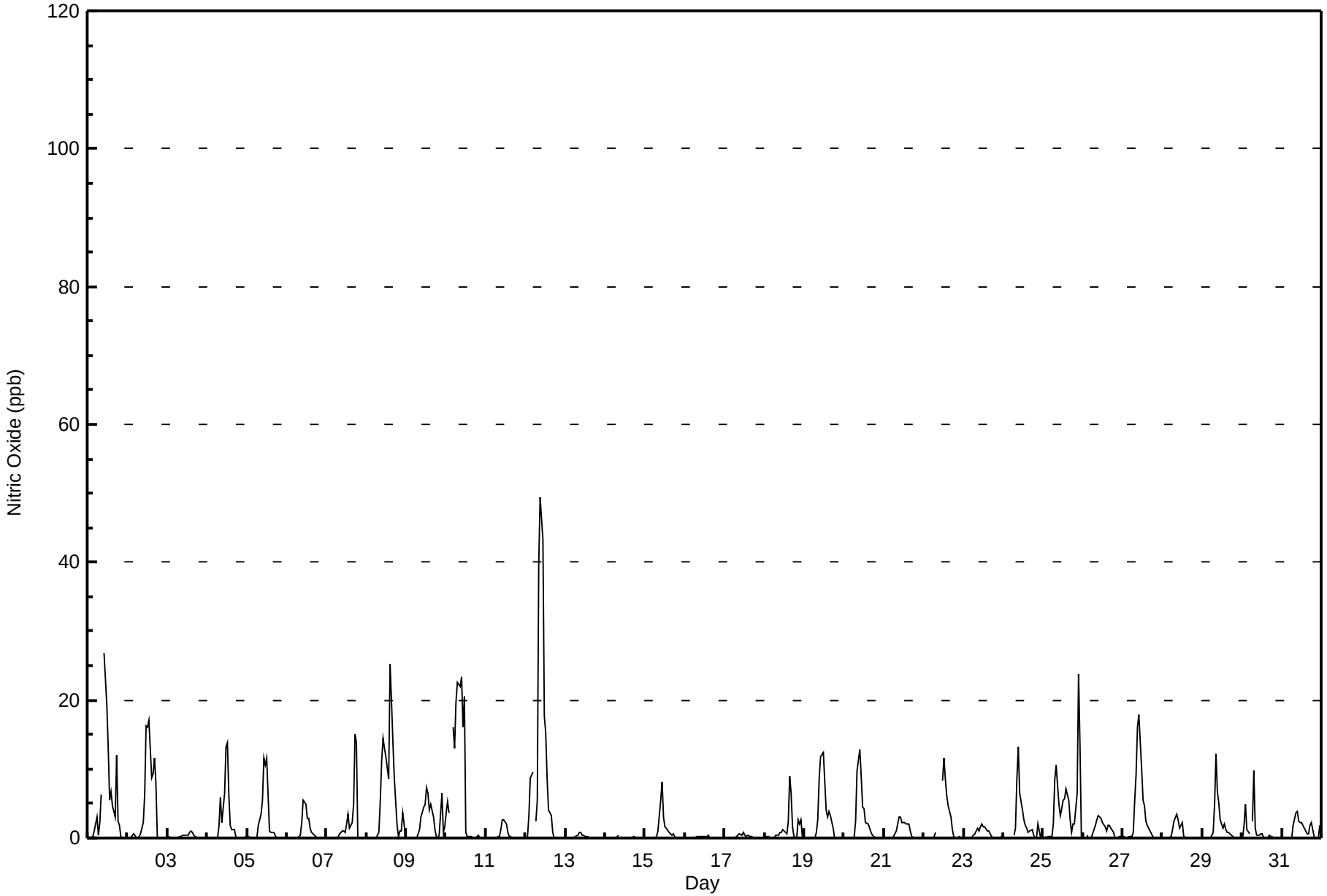
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Fort McKay - Bertha Ganter - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	692	98.72	98.72
21 - 40	7	1.00	99.71
11 - 80	2	0.29	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitric Oxide (NO) - ppb

Fort McKay - Bertha Ganter - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	240	69	23	15	15	13	17	47	67	19	11	19	15	21	31	70	692
21 - 40	3	2	0	0	0	0	0	1	0	0	0	0	0	0	0	1	7
11 - 80	2	0	0	0	0	0	0	0	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	245	71	23	15	15	13	17	48	67	19	11	19	15	21	31	71	701

Total Number of Valid Hours: 701

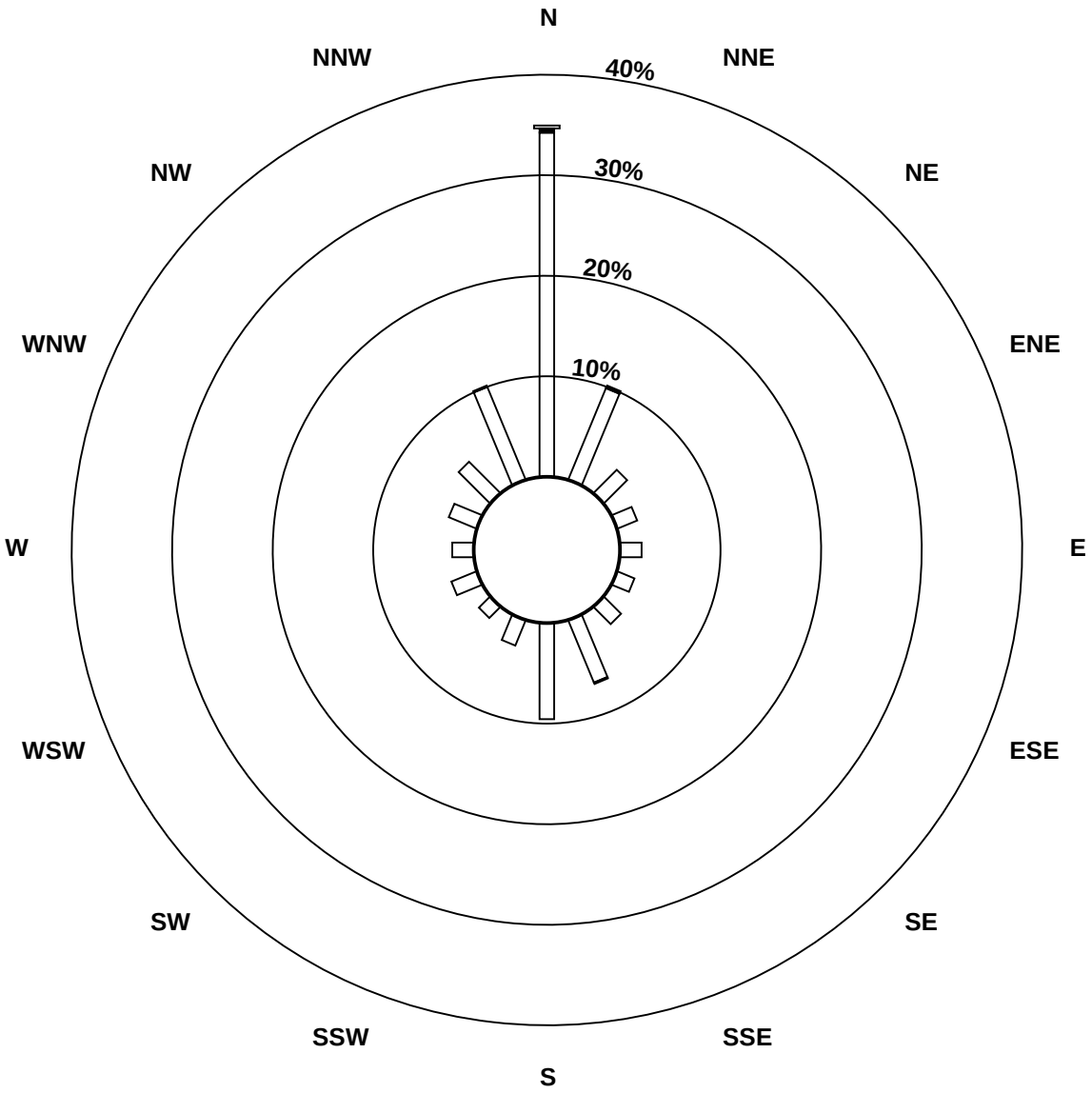
Total Number of Hours: 744

Wood Buffalo Environmental Association

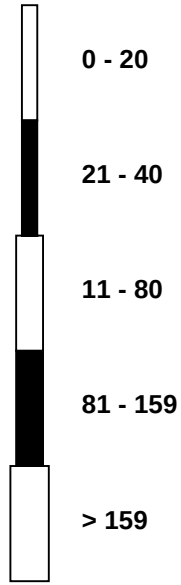
Wind Rose Mar 2016

Nitric Oxide (NO) - ppb

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppb)



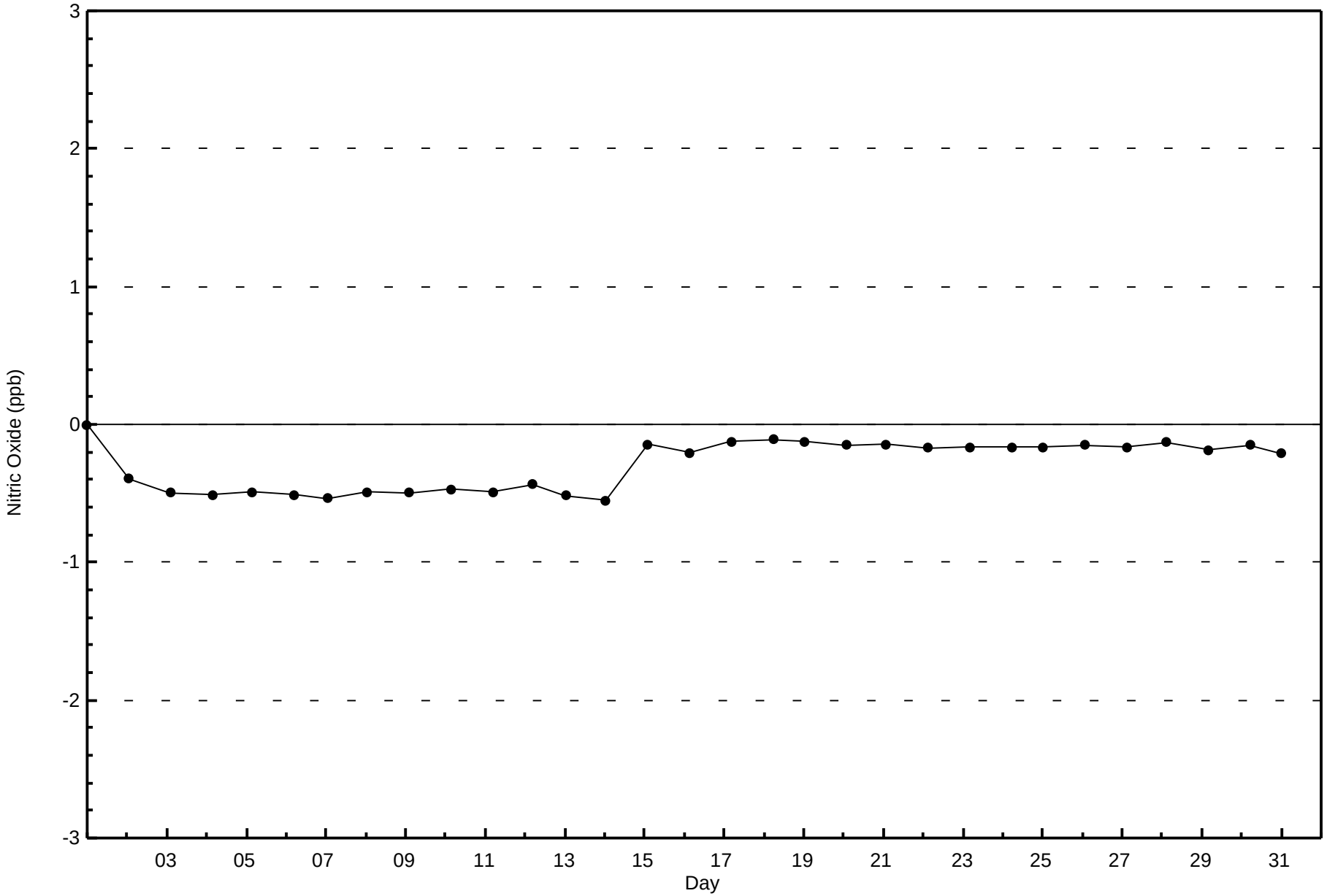
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Fort McKay - Bertha Ganter - March 2016

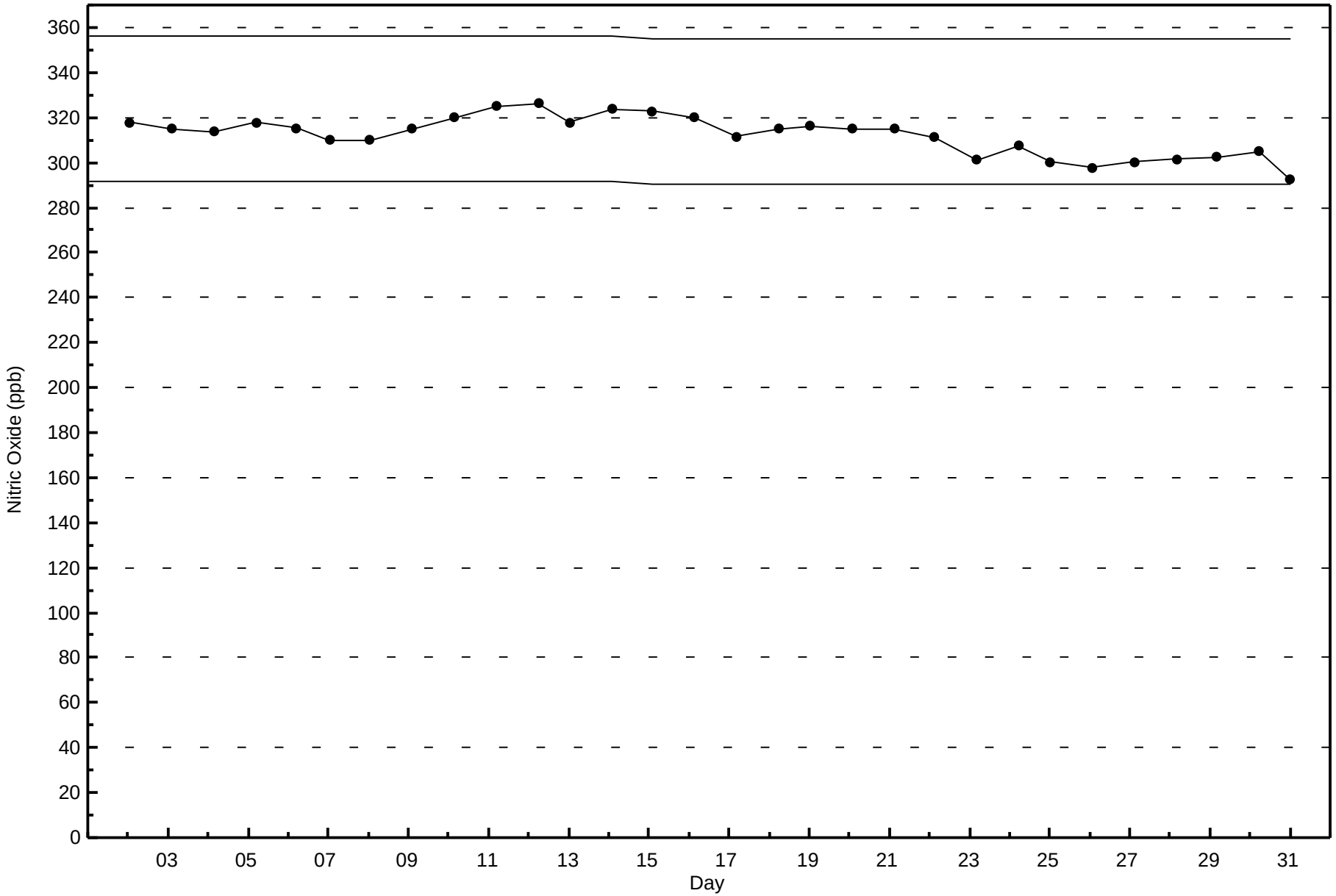


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Fort McKay - Bertha Ganter - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Fort McKay - Bertha Ganter - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 38 ppb on Mar 24 22:00 Maximum Daily Average: 20.6 ppb on Mar 8

Minimum Value: 0 ppb on Mar 13 21:00 Minimum Daily Average: 2.6 ppb on Mar 16

Maximum Diurnal Average: 11.0 ppb at hour 24 Minimum Diurnal Average: 6.2 ppb at hour 15

Monthly Average: 9.2 ppb Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 3$ Median = 7 $Q_3 = 14$ $P_{90} = 19$ $P_{99} = 31$

Hours in Service:	744
Hours of Data:	701
Hours of Missing Data:	43
Hours of Calibration:	37
Percent Operational Time:	99.2

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	14	15	22	28	19	18	13	M	20	16	13	9	14	14	16	33	31	31	22	11	7	9	17.8	33
2-Mar	4	Z	9	19	18	10	12	12	7	9	14	21	19	22	17	19	25	26	19	8	7	13	15	12	14.6	26
3-Mar	16	20	Z	12	6	7	8	8	5	4	4	3	2	3	4	5	3	6	6	6	7	10	11	10	7.2	20
4-Mar	12	13	12	Z	5	5	7	12	16	8	12	18	17	9	4	5	8	3	1	3	3	2	5	22	8.8	22
5-Mar	25	25	7	4	Z	4	10	23	13	11	15	19	19	6	5	6	7	8	5	5	8	6	4	7	10.4	25
6-Mar	9	5	1	4	4	Z	12	11	3	7	10	8	5	5	5	4	5	4	3	8	7	6	7	8	6.1	12
7-Mar	Z	9	7	5	3	5	5	6	8	7	5	3	5	9	5	5	17	32	27	7	6	16	4	14	9.1	32
8-Mar	15	Z	14	13	13	13	13	14	18	19	21	18	16	15	26	26	25	28	29	28	28	28	31	23	20.6	31
9-Mar	14	15	Z	7	6	6	12	13	11	11	9	8	11	10	9	13	13	13	13	13	17	21	14	14	11.9	21
10-Mar	14	13	16	Z	19	18	19	17	16	19	16	17	3	2	2	2	2	1	2	3	2	3	5	6	9.4	19
11-Mar	6	6	9	6	Z	3	3	2	2	4	8	8	7	4	2	2	2	2	4	3	2	5	5	11	4.5	11
12-Mar	13	14	16	15	14	Z	12	12	19	21	22	17	13	13	9	9	3	1	1	2	4	3	2	4	10.4	22
13-Mar	Z	5	7	8	5	9	12	6	6	5	3	3	2	1	1	1	1	1	0	0	0	0	1	1	3.3	12
14-Mar	1	Z	1	1	1	1	1	3	3	C	C	C	C	C	C	C	2	2	1	1	2	2	2	2	--	3
15-Mar	3	3	Z	3	4	5	5	6	7	14	14	6	3	3	2	1	2	7	10	3	2	1	1	1	4.7	14
16-Mar	1	2	1	Z	1	2	1	2	2	1	1	1	1	2	2	1	1	1	1	2	7	10	12	8	2.6	12
17-Mar	6	4	2	2	Z	3	1	2	1	2	1	2	1	1	2	1	2	1	3	7	7	8	8	11	3.5	11
18-Mar	7	8	7	1	1	Z	4	3	2	3	2	2	2	1	4	14	14	8	7	11	28	26	28	11	8.4	28
19-Mar	Z	4	6	5	3	5	6	7	9	13	14	15	11	7	7	10	12	10	2	2	3	4	7	7	7.3	15
20-Mar	6	Z	5	6	7	9	10	14	22	21	15	10	9	6	6	5	3	4	5	4	2	3	4	9	8.0	22
21-Mar	11	13	Z	16	12	14	14	11	11	10	8	6	5	5	5	6	5	3	4	4	7	3	2	11	8.0	16
22-Mar	16	15	14	Z	13	11	9	8	M	M	M	14	19	14	12	13	13	12	13	14	17	21	20	15	14.2	21
23-Mar	8	3	3	3	Z	23	17	6	6	4	4	4	4	4	4	4	4	3	4	5	7	14	27	28	8.2	28
24-Mar	22	18	14	5	10	Z	9	6	16	20	12	8	6	5	4	3	5	11	15	19	16	38	19	11	12.6	38
25-Mar	Z	9	11	14	16	19	19	22	22	13	12	11	12	15	16	18	13	7	24	30	34	36	31	18	18.2	36
26-Mar	14	Z	19	15	16	17	15	11	9	8	6	6	5	5	3	5	7	9	14	18	20	23	24	25	12.7	25
27-Mar	23	20	Z	17	18	15	11	9	12	18	19	14	11	9	7	5	4	4	5	10	9	7	11	16	11.9	23
28-Mar	11	19	22	Z	16	19	16	12	9	7	4	6	6	1	1	1	0	0	0	0	0	1	1	1	6.7	22
29-Mar	3	1	1	1	Z	7	10	13	19	12	10	6	4	6	5	4	5	6	7	8	7	7	7	7	6.7	19
30-Mar	14	26	29	23	22	Z	15	15	5	2	2	3	2	0	1	1	4	3	3	2	1	0	0	1	7.6	29
31-Mar	Z	2	1	1	1	1	1	7	9	7	5	4	6	4	6	6	8	16	27	22	10	12	15	20	8.3	27
	11.0	10.9	9.6	8.5	9.8	9.8	9.9	10.0	9.9	10.0	9.9	9.2	7.9	6.5	6.2	6.8	7.4	8.5	9.2	9.0	9.4	11.0	10.6	11.0	Diurnal Average	
	25	26	29	23	22	28	19	23	22	21	22	21	19	22	26	26	25	33	31	31	34	38	31	28	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance PF - Power Failure

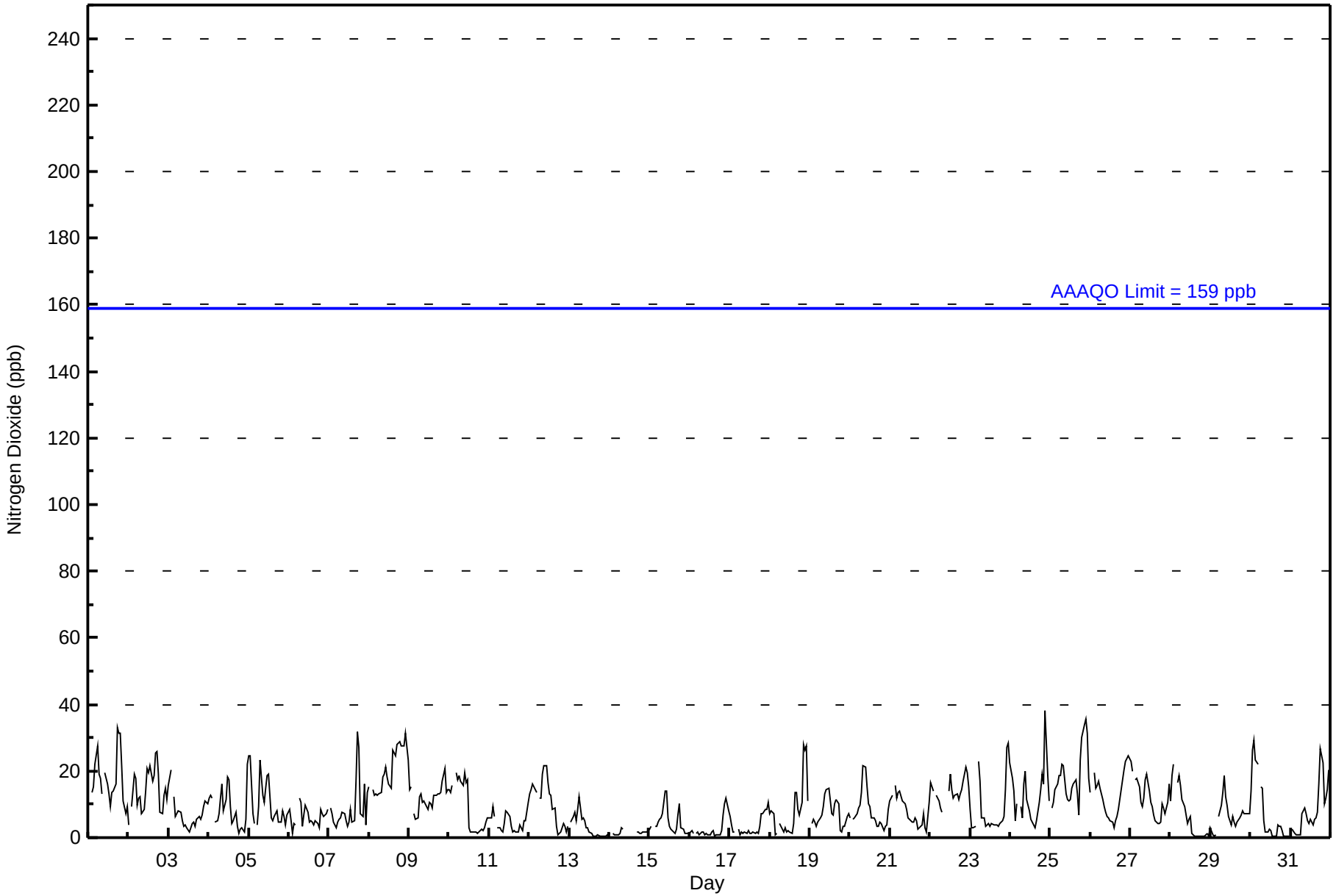
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Fort McKay - Bertha Ganter - March 2016



Nitrogen Dioxide (NO_2) - ppb

Fort McKay - Bertha Ganter - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	642	91.58	91.58
21 - 40	59	8.42	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: 701

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Fort McKay - Bertha Ganter - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	223	64	21	14	15	13	17	47	59	18	9	18	14	20	29	61	642
21 - 40	22	7	2	1	0	0	0	1	8	1	2	1	1	1	2	10	59
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	245	71	23	15	15	13	17	48	67	19	11	19	15	21	31	71	701

Total Number of Valid Hours: 701

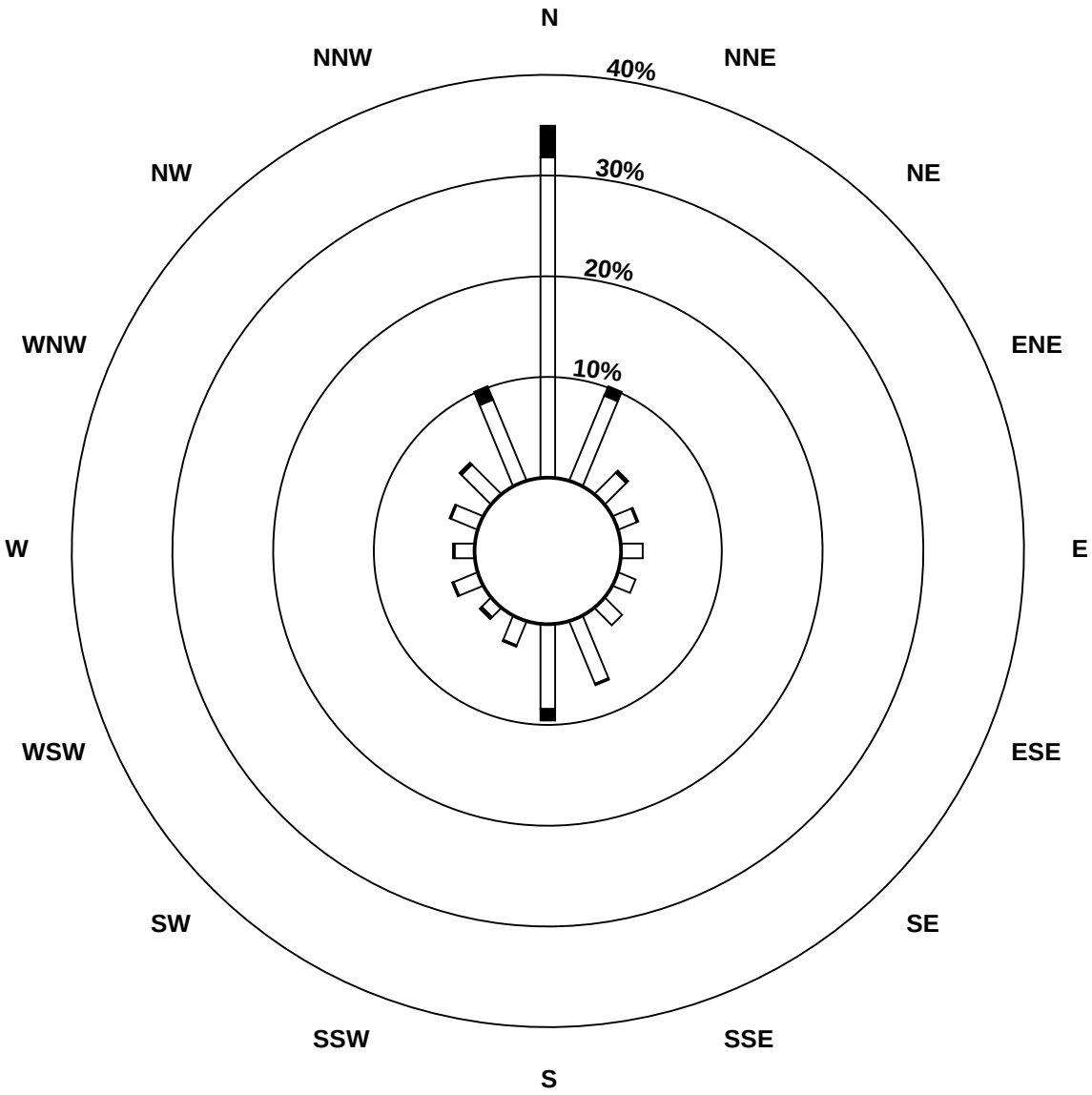
Total Number of Hours: 744

Wood Buffalo Environmental Association

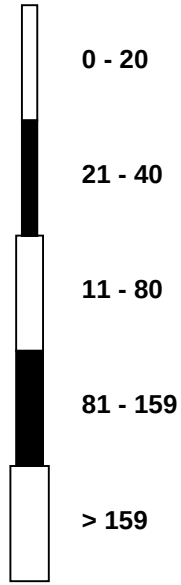
Wind Rose Mar 2016

Nitrogen Dioxide (NO_2) - ppb

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppb)



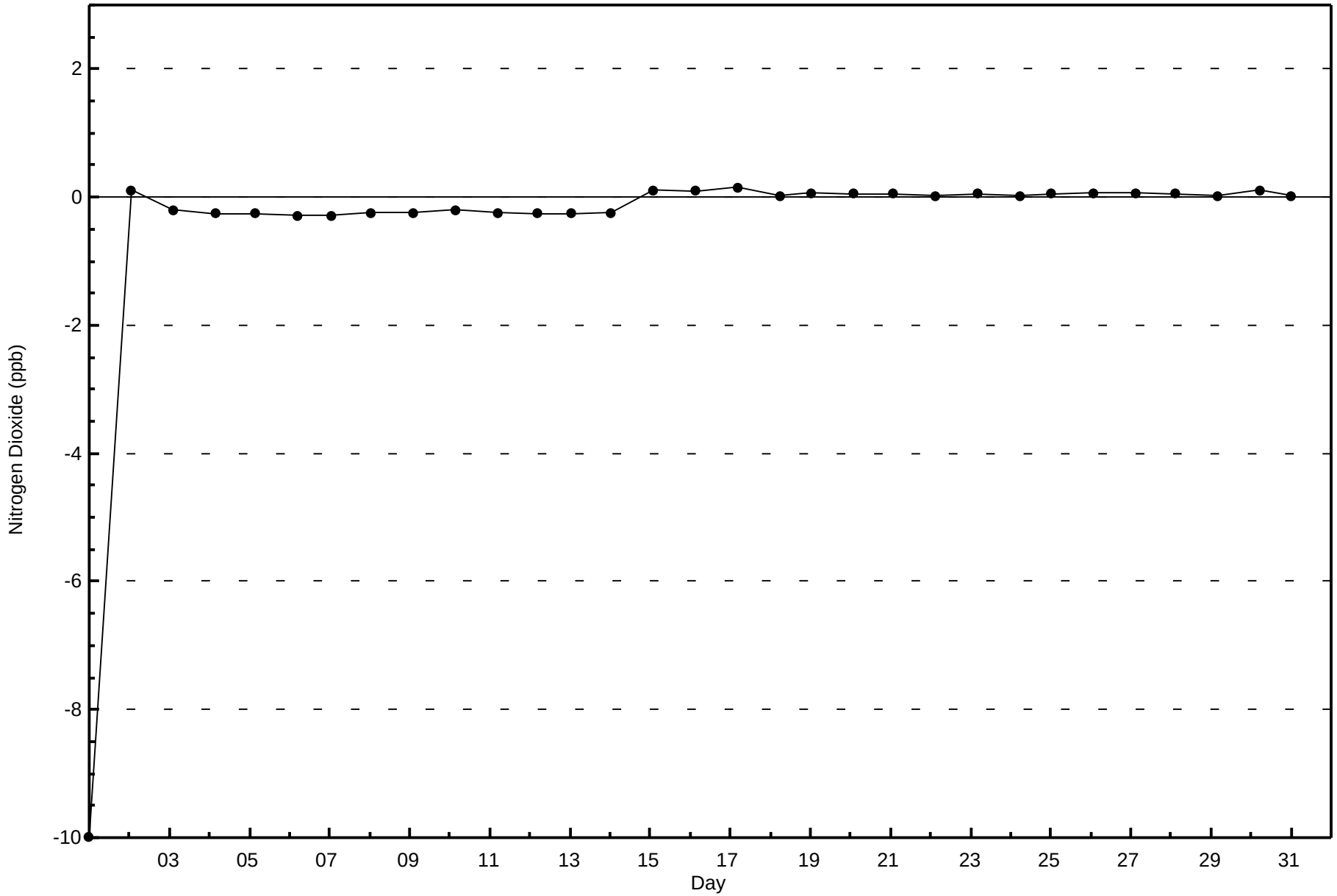
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Fort McKay - Bertha Ganter - March 2016

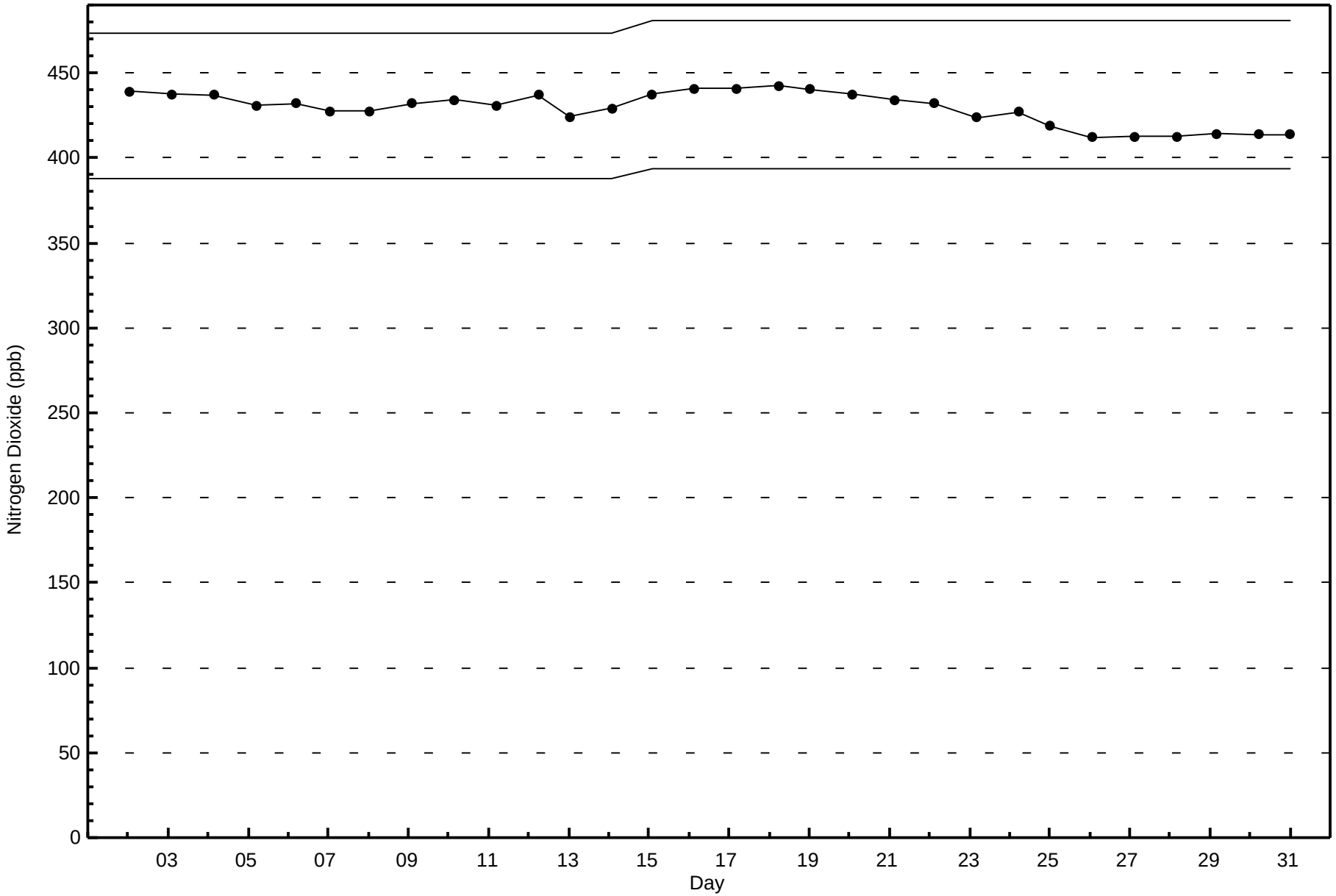


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Fort McKay - Bertha Ganter - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Fort McKay - Bertha Ganter - March 2016

Maximum Value: 71 ppb on Mar 12 10:00

Maximum Daily Average: 26.8 ppb on Mar 8

Minimum Value: 0 ppb on Mar 30 14:00

Minimum Daily Average: 2.7 ppb on Mar 16

Maximum Diurnal Average: 17.3 ppb at hour 11

Minimum Diurnal Average: 8.9 ppb at hour 4

Monthly Average: 11.5 ppb

Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 4$ Median = 8 $Q_3 = 16$ $P_{90} = 26$ $P_{99} = 46$

Hours in Service:	744
Hours of Data:	701
Hours of Missing Data:	43
Hours of Calibration:	37
Percent Operational Time:	99.2

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	14	15	23	31	20	20	19	M	46	35	26	15	20	19	19	45	34	33	22	11	7	9	23.0	46
2-Mar	4	Z	9	20	18	10	12	12	8	11	20	37	35	39	25	28	37	34	19	8	7	13	15	12	18.8	39
3-Mar	16	20	Z	12	6	7	8	8	5	4	4	4	2	4	5	6	4	6	6	6	7	9	11	10	7.4	20
4-Mar	12	13	12	Z	5	5	8	14	22	10	18	32	31	16	6	6	9	3	1	3	3	2	5	22	11.2	32
5-Mar	25	25	7	4	Z	4	10	25	16	16	26	29	30	7	6	7	8	8	5	5	8	6	4	7	12.5	30
6-Mar	8	5	1	4	4	Z	12	11	4	9	15	13	8	8	6	5	6	5	3	8	7	6	7	8	7.1	15
7-Mar	Z	9	7	5	3	5	5	6	8	8	6	4	7	12	6	7	22	47	41	7	6	16	4	14	11.1	47
8-Mar	15	Z	14	13	13	13	13	14	24	30	35	31	28	23	51	45	39	37	31	28	29	29	35	24	26.8	51
9-Mar	14	15	Z	7	6	6	12	14	12	14	14	13	18	17	13	17	16	14	13	14	17	27	14	16	14.1	27
10-Mar	18	19	19	Z	35	31	39	39	38	43	32	38	4	2	2	2	2	1	2	3	2	3	5	6	16.7	43
11-Mar	6	6	9	6	Z	3	3	2	2	5	11	10	8	4	2	2	2	2	4	3	2	5	5	11	5.0	11
12-Mar	13	14	19	24	23	Z	14	18	58	71	65	34	28	21	13	12	4	1	1	2	4	3	2	4	19.6	71
13-Mar	Z	5	7	8	5	9	13	6	7	6	3	3	2	1	1	1	1	1	0	0	0	0	1	1	3.5	13
14-Mar	1	Z	1	1	1	1	1	3	3	C	C	C	C	C	C	C	2	2	2	1	2	2	2	2	--	3
15-Mar	3	3	Z	3	4	5	5	6	8	19	22	9	5	4	3	2	3	7	11	3	3	1	1	1	5.7	22
16-Mar	1	2	1	Z	1	2	1	2	2	1	1	1	1	2	3	1	1	1	1	2	7	10	12	8	2.7	12
17-Mar	6	4	2	1	Z	3	1	2	2	2	2	3	2	1	2	2	2	1	3	7	7	8	8	11	3.6	11
18-Mar	7	8	7	1	1	Z	4	4	2	4	3	4	3	2	7	23	20	10	7	11	31	28	30	11	9.9	31
19-Mar	Z	4	6	4	3	5	6	7	12	22	26	27	19	11	10	14	15	12	2	2	3	4	6	7	9.9	27
20-Mar	6	Z	5	6	7	9	10	16	32	34	24	15	13	8	8	6	4	4	5	4	2	3	4	9	10.2	34
21-Mar	11	13	Z	16	12	14	14	12	13	13	11	8	7	7	7	8	6	3	4	4	7	3	2	11	8.9	16
22-Mar	16	16	14	Z	13	11	9	9	M	M	M	22	31	23	18	18	16	13	13	14	17	21	20	15	16.5	31
23-Mar	8	3	3	3	Z	23	17	7	7	5	6	6	5	6	5	5	5	4	4	5	6	14	27	28	8.8	28
24-Mar	23	18	14	5	10	Z	10	7	25	33	18	12	8	6	5	4	6	12	15	19	16	40	19	11	14.6	40
25-Mar	Z	9	11	15	16	19	21	30	32	18	15	15	17	21	23	23	16	7	26	32	40	59	45	18	23.0	59
26-Mar	14	Z	20	15	16	17	15	13	12	11	10	9	7	6	4	7	8	10	15	18	20	23	24	25	13.8	25
27-Mar	23	20	Z	17	18	16	11	15	21	34	37	24	16	14	9	7	5	5	5	10	9	7	11	16	15.2	37
28-Mar	11	19	22	Z	17	19	17	14	13	9	6	7	8	1	1	1	0	0	0	0	0	1	1	1	7.3	22
29-Mar	3	1	1	1	Z	7	11	18	31	19	15	9	5	9	6	5	6	6	7	8	7	7	7	7	8.5	31
30-Mar	14	28	34	25	23	Z	18	25	7	2	2	3	3	0	1	1	4	3	3	2	1	0	0	1	8.6	34
31-Mar	Z	2	1	1	1	1	1	9	13	11	7	6	8	5	7	6	8	18	29	23	10	12	15	22	9.4	29
	11.2	11.2	10.1	8.9	10.9	10.4	11.0	12.5	15.1	16.6	17.3	15.5	12.9	9.9	9.1	9.5	9.5	10.4	10.1	9.2	9.8	12.2	11.3	11.2	Diurnal Average	
	25	28	34	25	35	31	39	39	58	71	65	38	35	39	51	45	39	47	41	33	40	59	45	28	Diurnal Maximum	

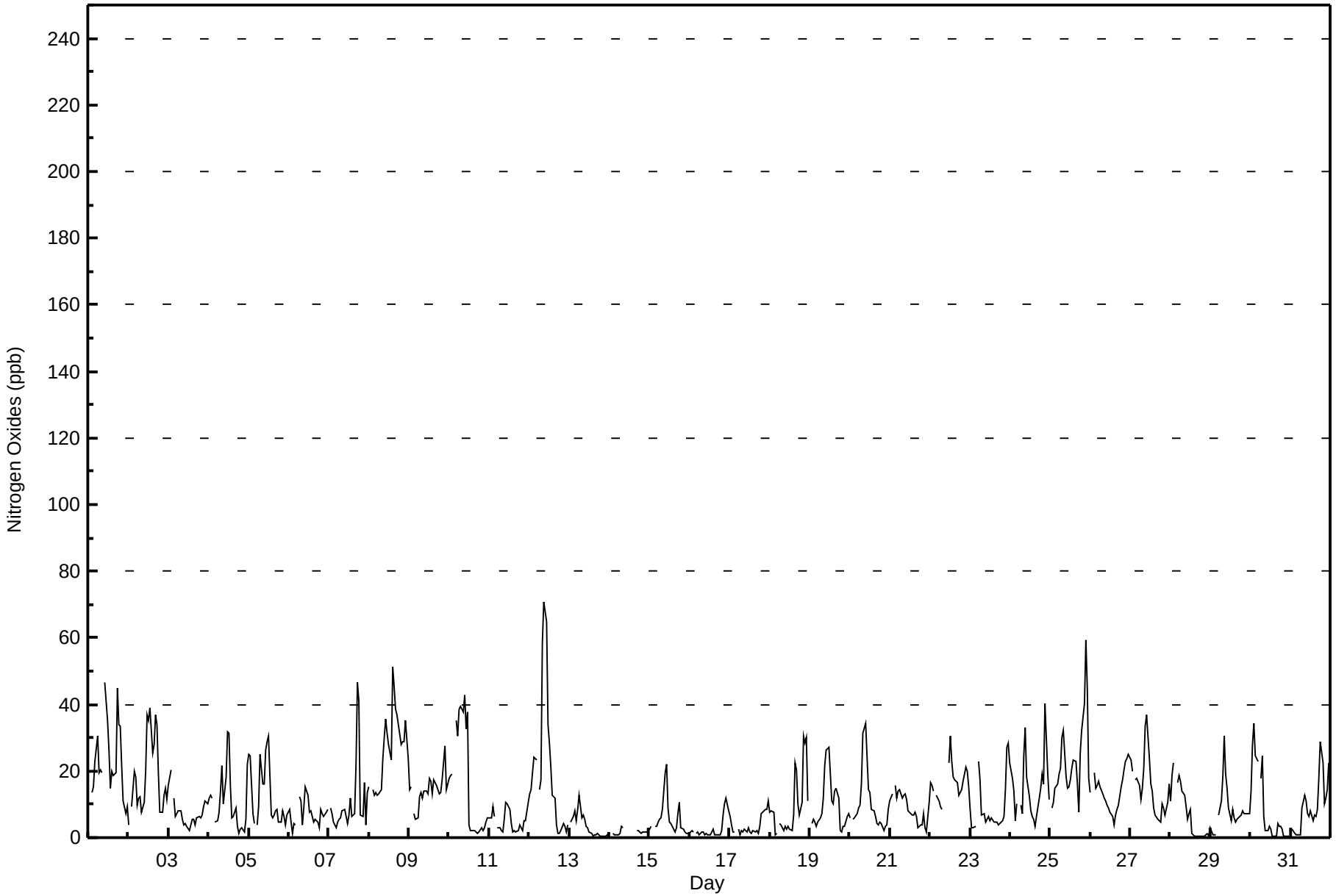
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Fort McKay - Bertha Ganter - March 2016



Nitrogen Oxides (NO_X) - ppb

Fort McKay - Bertha Ganter - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	588	83.88	83.88
21 - 40	101	14.41	98.29
11 - 80	12	1.71	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Fort McKay - Bertha Ganter - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	216	51	19	13	15	12	14	39	44	17	8	17	14	20	29	60	588
21 - 40	24	18	3	1	0	1	3	8	23	2	3	2	1	1	2	9	101
11 - 80	5	2	1	1	0	0	0	1	0	0	0	0	0	0	0	2	12
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	245	71	23	15	15	13	17	48	67	19	11	19	15	21	31	71	701

Total Number of Valid Hours: 701

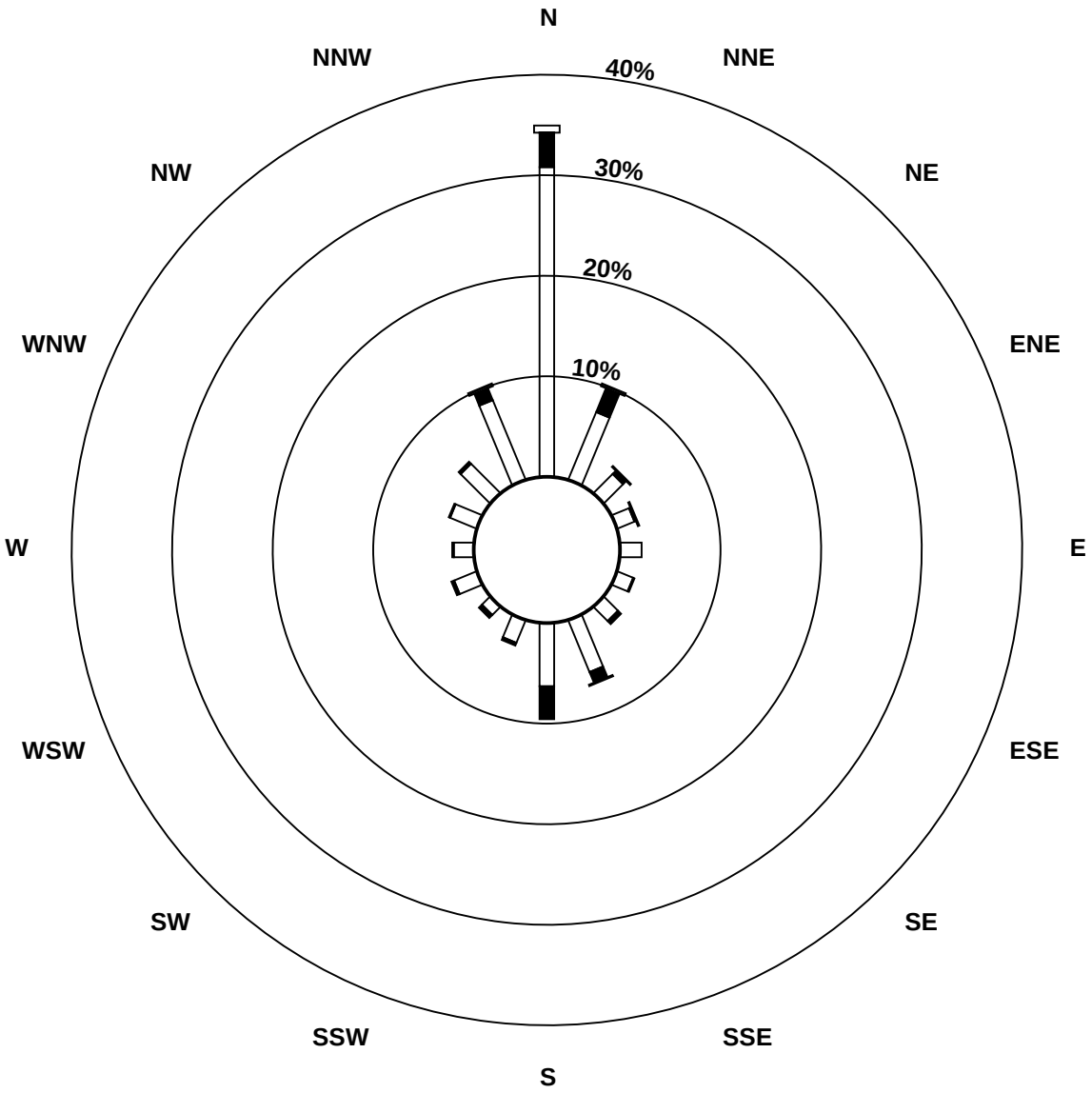
Total Number of Hours: 744

Wood Buffalo Environmental Association

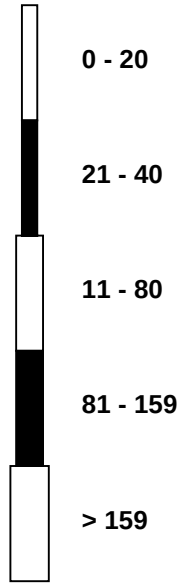
Wind Rose Mar 2016

Nitrogen Oxides (NO_X) - ppb

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppb)



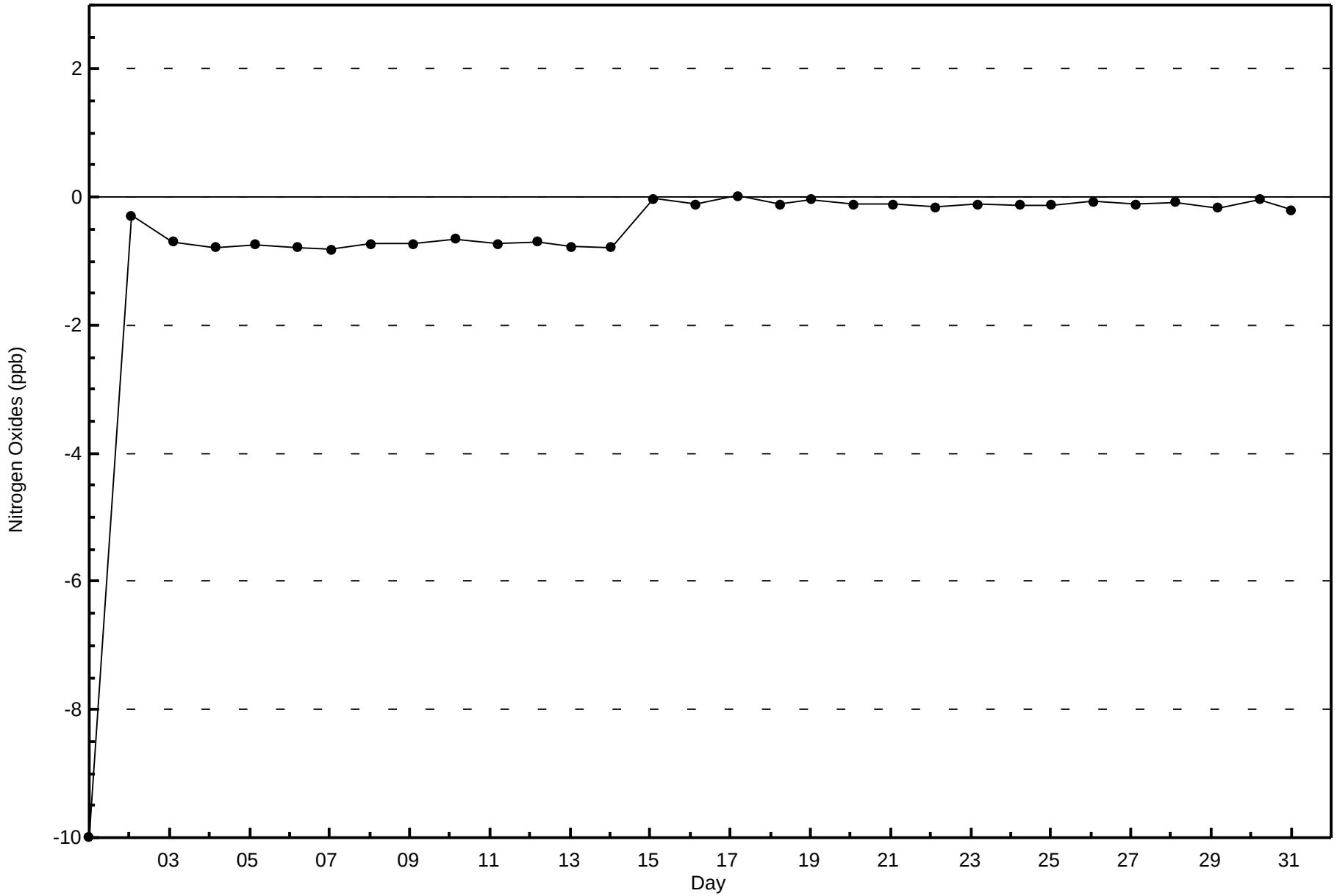
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Fort McKay - Bertha Ganter - March 2016

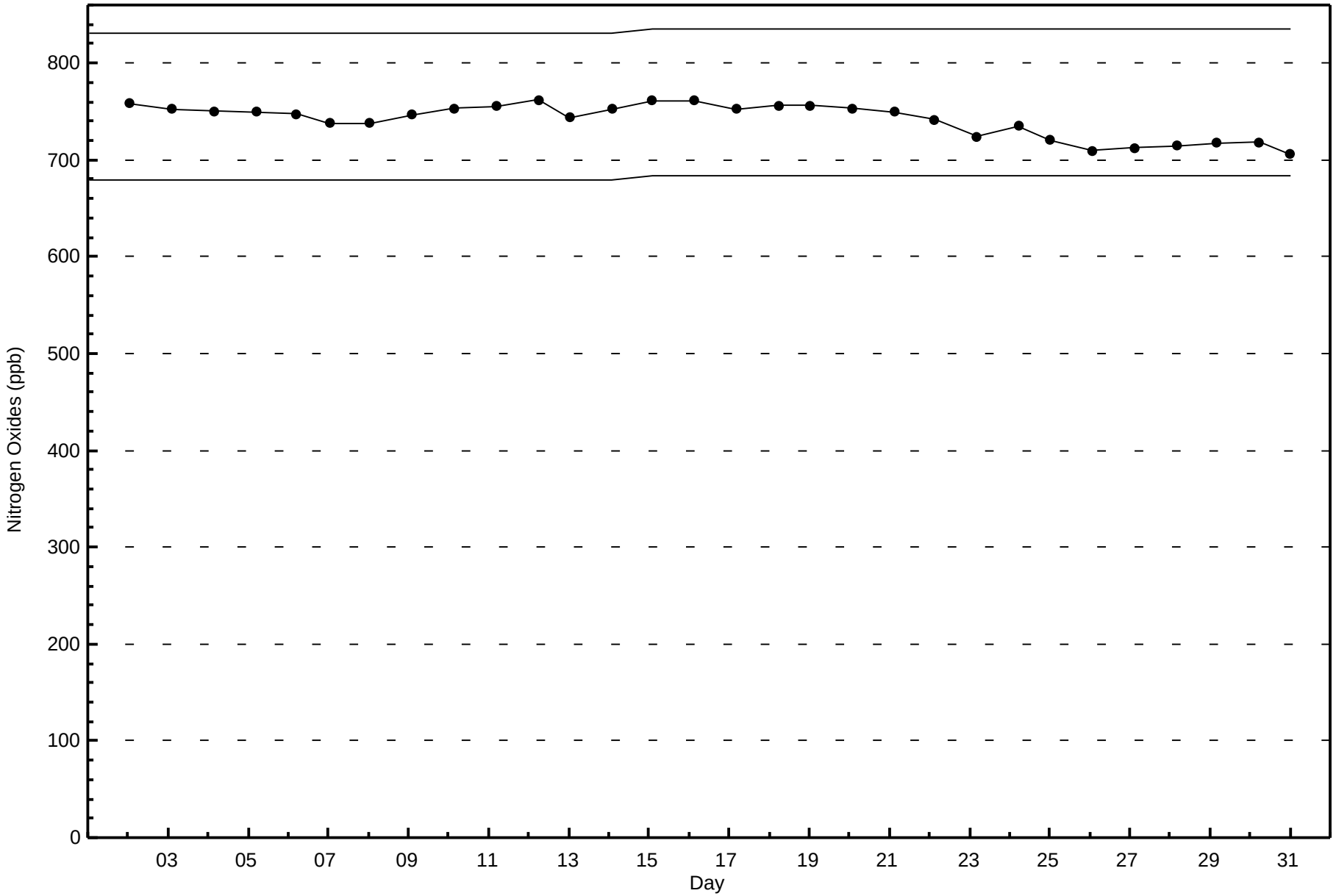


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Fort McKay - Bertha Ganter - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O_3) - ppb

Fort McKay - Bertha Ganter - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 51 ppb on Mar 28 17:00 Maximum Daily Average: 40.4 ppb on Mar 16

Minimum Value: 4 ppb on Mar 25 22:00
Maximum Diurnal Average: 35.1 ppb at hour 15
Monthly Average: 28.3 ppb

Minimum Daily Average: 13.0 ppb on Mar 8
Minimum Diurnal Average: 21.8 ppb at hour 6
Percentiles: P_1 = 4 P_{10} = 12 Q_1 = 21 Median = 29 Q_3 = 37 P_{90} = 43 P_{99} = 49

Hours in Service:	744
Hours of Data:	701
Hours of Missing Data:	43
Hours of Calibration:	39
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	17	15	Z	4	10	10	14	11	16	19	23	26	23	22	21	7	6	5	13	21	24	22	15.6	26
2-Mar	25	25	21	13	Z	21	18	19	24	23	19	15	16	14	17	16	11	11	16	26	26	22	19	21	19.0	26
3-Mar	18	15	19	21	26	Z	24	25	27	29	29	30	31	31	30	30	32	31	30	32	32	29	26	22	26.9	32
4-Mar	20	23	22	26	26	27	Z	22	21	28	26	23	23	29	34	33	31	34	35	33	33	35	31	19	27.6	35
5-Mar	17	16	30	32	31	32	26	Z	24	27	23	19	20	31	32	32	31	30	32	32	29	31	32	30	27.7	32
6-Mar	28	31	34	32	33	28	27	28	Z	32	29	31	33	32	32	33	33	34	36	31	31	32	30	29	31.3	36
7-Mar	29	28	29	Z	32	30	29	29	27	27	29	29	28	25	27	26	18	7	11	25	27	20	31	23	25.5	32
8-Mar	21	20	18	17	Z	15	16	16	14	13	12	14	15	17	11	12	12	9	7	8	7	7	4	11	13.0	21
9-Mar	18	18	18	25	26	Z	21	20	23	24	25	25	23	23	23	20	20	18	14	13	8	4	6	5	18.3	26
10-Mar	4	4	4	4	4	4	Z	5	5	6	9	11	26	29	30	31	31	31	31	30	30	28	24	20	17.5	31
11-Mar	20	16	15	18	19	18	17	Z	20	18	18	22	23	28	32	31	31	30	25	25	23	19	20	15	21.9	32
12-Mar	10	7	5	4	4	4	5	7	Z	7	8	13	17	19	23	23	32	39	37	35	30	30	29	22	17.8	39
13-Mar	18	15	13	Z	15	11	11	23	26	28	29	29	28	28	28	28	28	27	28	28	28	28	28	30	24.2	30
14-Mar	30	30	31	31	Z	32	31	30	31	31	32	31	30	31	31	30	29	30	32	32	32	32	31	30	30.9	32
15-Mar	29	28	28	27	27	Z	26	26	25	21	22	28	C	C	C	C	38	33	29	36	37	38	38	38	30.1	38
16-Mar	39	38	39	39	39	38	Z	39	40	42	42	45	46	45	44	45	46	46	44	38	37	36	31	33	40.4	46
17-Mar	33	38	34	34	28	32	35	Z	37	37	39	39	41	43	43	43	42	42	39	33	29	28	25	19	35.3	43
18-Mar	21	18	23	33	32	30	25	24	Z	39	42	42	42	44	43	35	35	38	35	29	11	7	8	26	29.6	44
19-Mar	32	31	29	Z	34	32	33	33	32	29	28	28	32	37	38	36	35	36	45	45	43	42	39	38	35.1	45
20-Mar	39	38	39	37	Z	33	31	28	22	24	31	37	38	41	42	43	44	43	42	41	42	40	39	34	36.8	44
21-Mar	32	30	30	27	31	Z	29	33	34	35	37	40	42	42	44	43	43	46	44	44	39	44	45	35	37.8	46
22-Mar	28	29	28	25	26	25	Z	34	M	M	C	C	C	C	36	35	34	35	32	29	24	18	17	19	--	36
23-Mar	25	33	29	27	20	10	19	Z	39	42	43	43	44	44	45	45	45	45	44	44	43	32	20	17	34.7	45
24-Mar	22	26	28	36	31	29	29	31	Z	29	38	42	45	47	48	50	49	44	37	30	31	10	26	32	34.4	50
25-Mar	33	29	22	Z	16	12	11	13	18	30	36	36	35	31	30	29	32	38	17	9	4	4	8	20	22.3	38
26-Mar	22	18	10	9	Z	13	20	25	33	39	42	43	44	44	45	45	43	41	34	28	21	16	12	10	28.5	45
27-Mar	10	10	11	13	11	Z	14	13	22	24	26	32	38	40	43	45	45	44	43	35	35	37	31	25	28.2	45
28-Mar	29	20	16	17	19	16	Z	28	33	39	43	42	42	48	49	49	51	50	49	47	47	44	43	43	37.5	51
29-Mar	35	42	41	41	31	27	24	Z	24	33	37	42	46	47	47	48	47	44	42	39	36	32	28	24	37.3	48
30-Mar	18	5	4	6	6	7	9	13	Z	42	44	45	46	48	47	47	41	38	38	40	42	41	42	41	30.8	48
31-Mar	40	38	39	Z	39	38	38	31	30	32	36	38	37	38	37	38	35	26	16	18	28	21	17	13	31.4	40
	24.8	24.0	23.4	23.5	24.2	21.8	22.3	23.3	25.7	28.0	29.7	31.1	32.9	34.6	35.1	34.7	34.3	33.2	31.3	30.3	28.9	26.6	25.9	24.7	Diurnal Average	
	40	42	41	41	39	38	38	39	40	42	44	45	46	48	49	50	51	50	49	47	47	44	45	43	Diurnal Maximum	

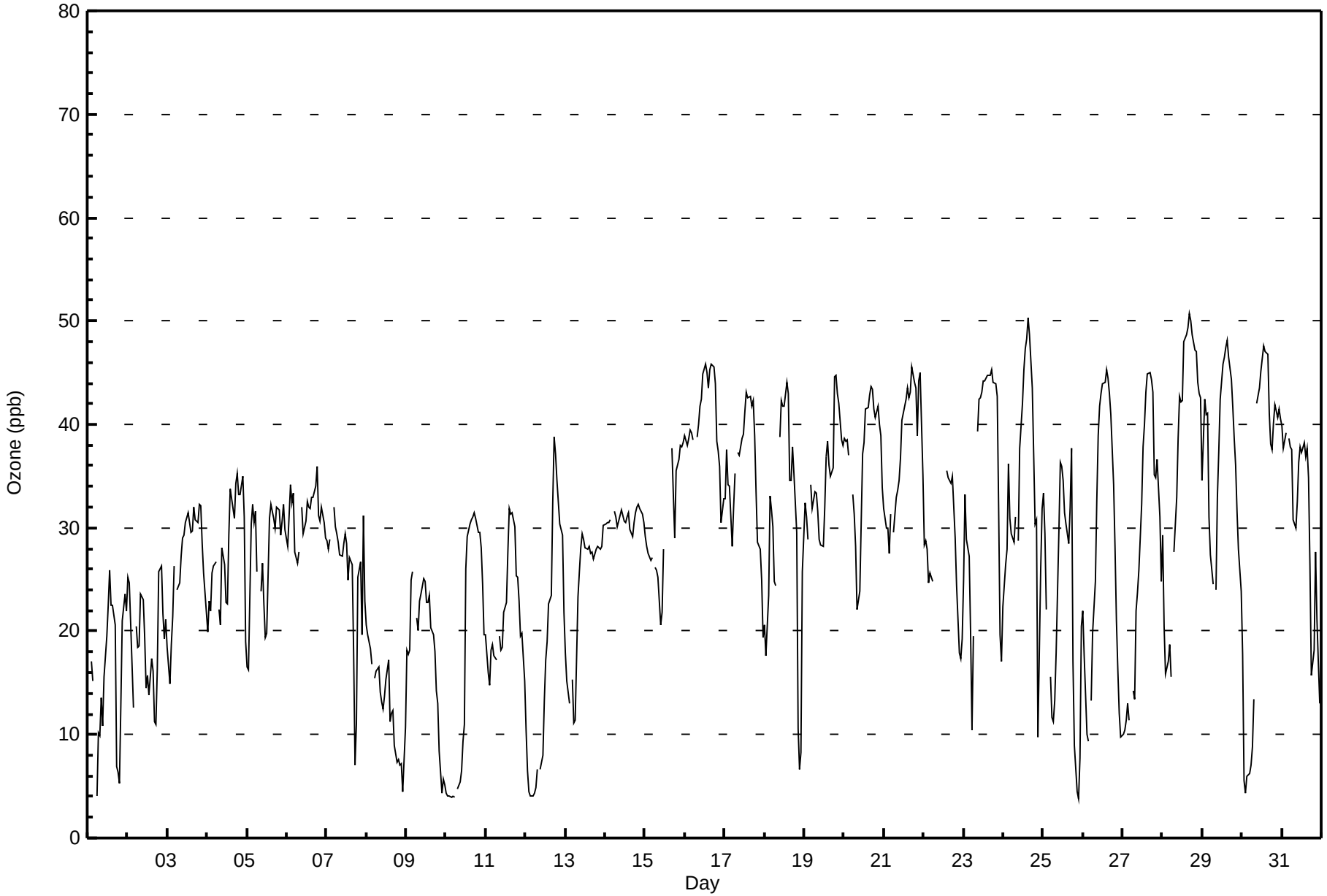
Z - zerospan C - Calibration M - Maintenance PF - Power Failure
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ozone (O_3) - ppb

Fort McKay - Bertha Ganter - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	175	24.96	24.96
21 - 50	525	74.89	99.86
51 - 82	1	0.14	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Ozone (O_3) - ppb

Fort McKay - Bertha Ganter - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	49	16	4	1	1	0	2	8	22	10	6	10	4	8	6	28	175
21 - 50	199	52	18	14	14	14	14	41	42	8	5	8	12	15	24	45	525
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	248	68	22	15	15	14	16	49	64	18	11	18	16	23	31	73	701

Total Number of Valid Hours: 701

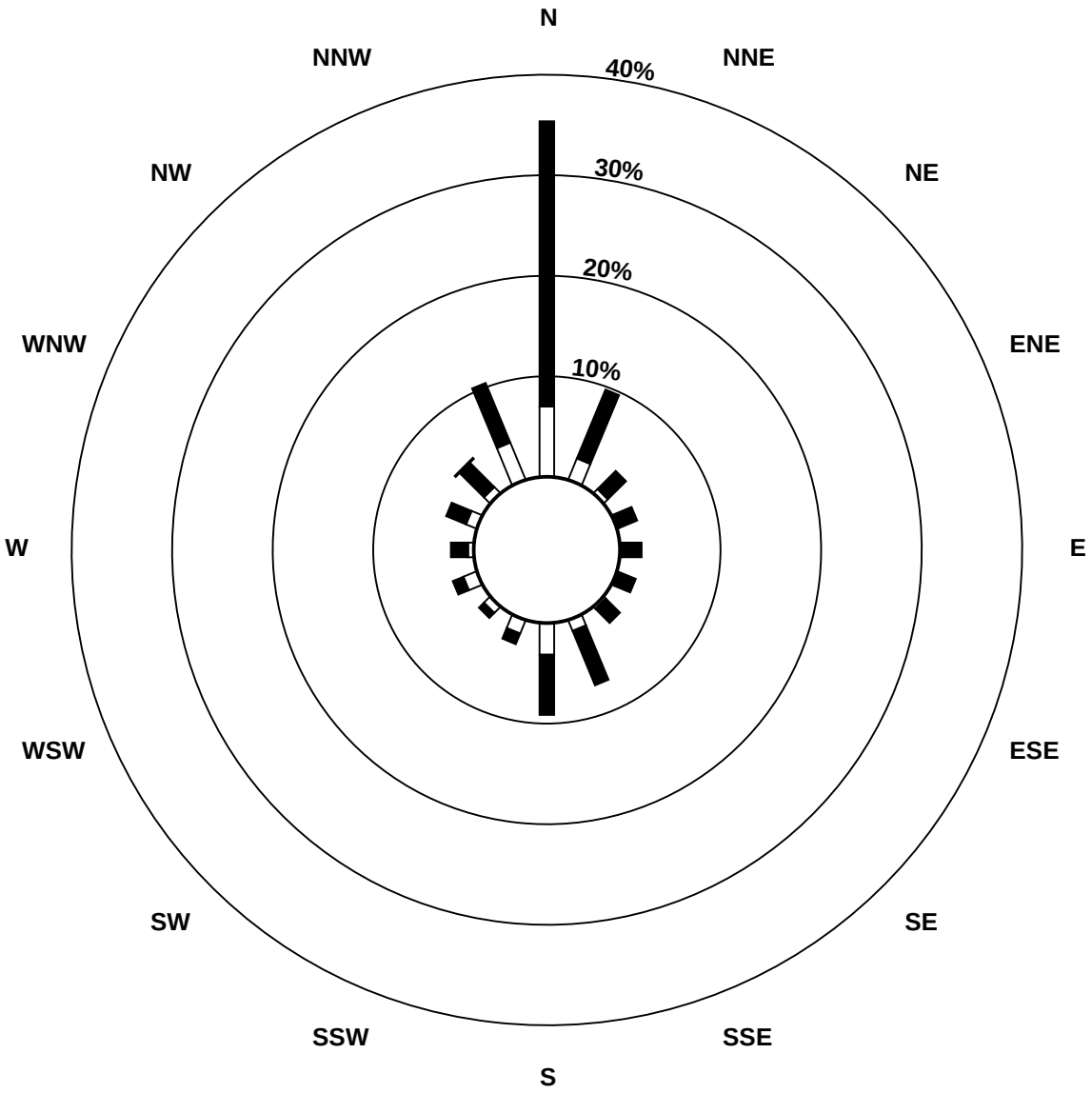
Total Number of Hours: 744

Wood Buffalo Environmental Association

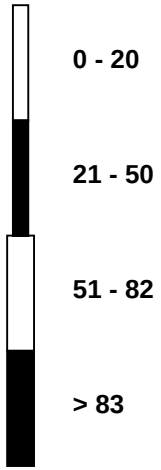
Wind Rose Mar 2016

Ozone (O_3) - ppb

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppb)



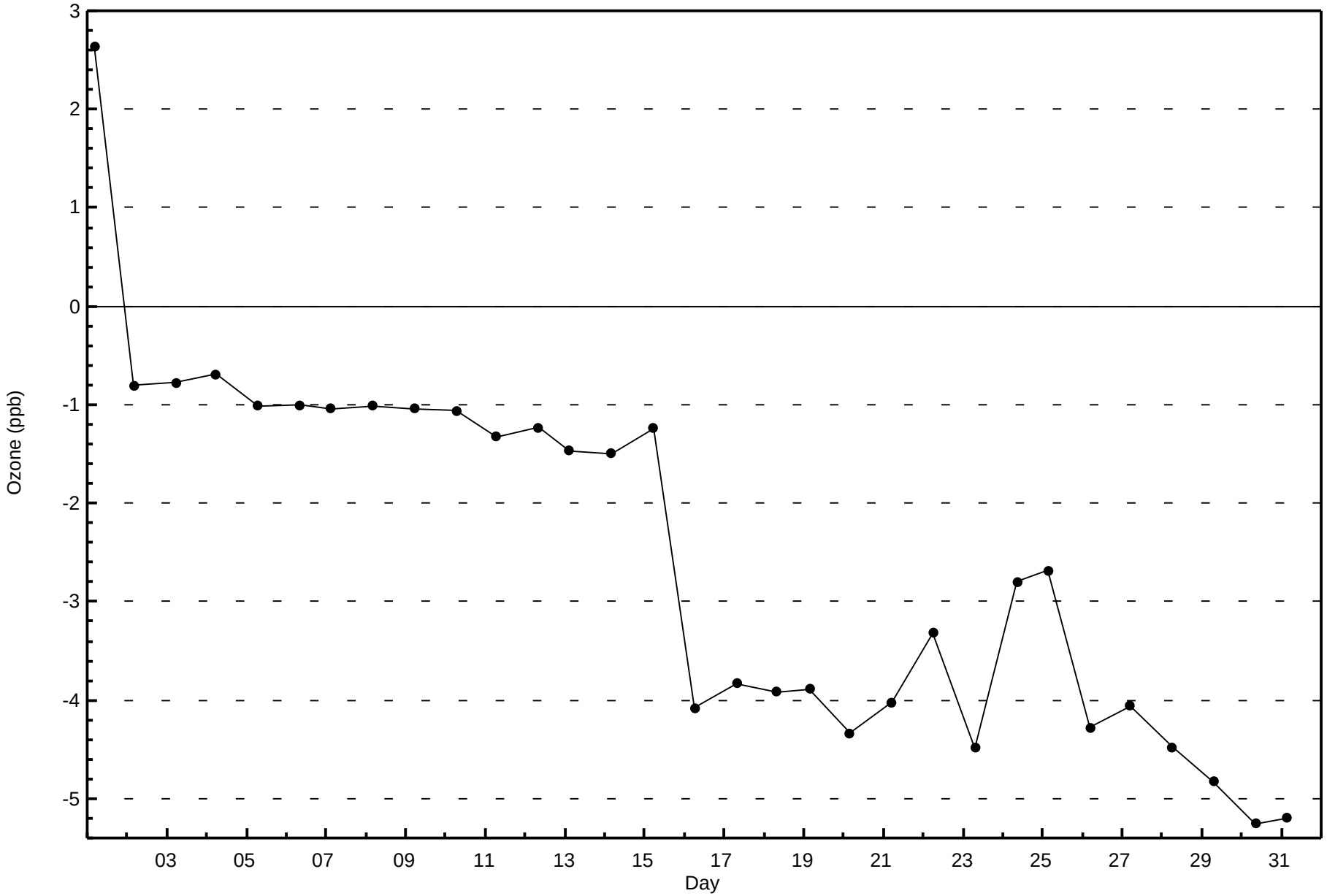
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Ozone (O_3) - ppb

Fort McKay - Bertha Ganter - March 2016

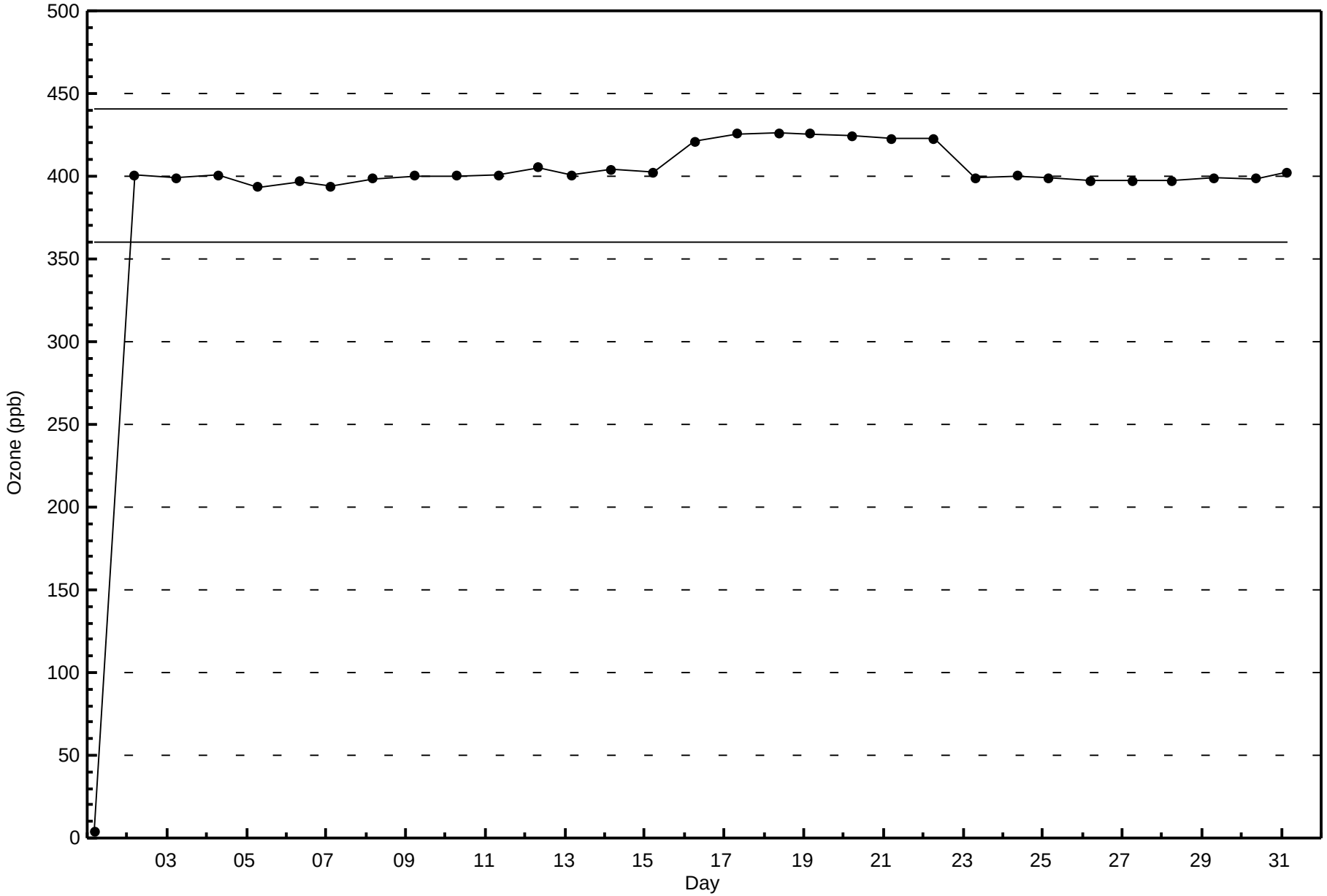


Wood Buffalo Environmental Association

Span Responses

Ozone (O_3) - ppb

Fort McKay - Bertha Ganter - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Fort McKay - Bertha Ganter - March 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 31.4 $\mu g/m^3$ on Mar 10 05:00

Maximum Daily Average: 12.8 $\mu g/m^3$ on Mar 10

Minimum Value: 0.1 $\mu g/m^3$ on Mar 28 15:00

Minimum Daily Average: 1.1 $\mu g/m^3$ on Mar 19

Maximum Diurnal Average: 5.2 $\mu g/m^3$ at hour 3

Minimum Diurnal Average: 3.0 $\mu g/m^3$ at hour 15

Monthly Average: 4.25 $\mu g/m^3$

Percentiles: P_1 = 0.4 P_{10} = 1.0 Q_1 = 1.5 Median = 2.8 Q_3 = 5.7 P_{90} = 9.1 P_{99} = 22.3

Hours in Service:	744
Hours of Data:	728
Hours of Missing Data:	16
Hours of Calibration:	3
Percent Operational Time:	98.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	9.4	10.5	7.4	5.4	4.3	4.4	5.5	7.1	26.7	19.4	4.4	2.3	3.6	3.7	3.7	4.1	3.5	3.5	3.7	3.9	4.0	3.2	6.5	26.7
2-Mar	2.9	2.9	3.5	3.7	3.7	3.5	3.5	3.5	3.1	3.0	3.0	3.5	3.7	3.9	3.8	3.9	5.0	5.1	4.2	3.2	3.0	3.5	3.9	4.6	3.7	5.1
3-Mar	4.1	4.9	4.3	3.7	3.0	3.0	3.0	2.6	2.5	2.4	2.5	3.3	2.7	2.8	2.9	3.0	3.5	3.5	3.1	2.6	2.1	2.2	2.2	2.2	3.0	4.9
4-Mar	2.1	2.4	2.3	2.4	2.0	1.8	1.9	1.7	2.1	2.3	4.3	5.7	4.6	4.1	2.7	2.6	2.4	1.9	1.8	1.8	1.9	2.4	2.2	4.2	2.6	5.7
5-Mar	4.9	6.3	3.7	3.2	3.9	3.5	4.2	4.9	5.4	5.7	5.2	6.1	5.7	3.0	2.7	3.1	3.1	2.5	2.0	2.0	2.2	2.1	2.0	1.9	3.7	6.3
6-Mar	1.9	1.8	1.7	1.7	1.6	1.7	1.7	1.9	1.5	1.6	1.8	1.8	1.6	1.8	1.9	1.8	1.7	1.6	1.4	1.8	2.0	1.9	2.2	2.2	1.8	2.2
7-Mar	2.2	2.5	2.4	2.3	2.1	2.2	2.2	2.2	2.7	2.1	2.1	2.1	3.1	4.1	4.3	4.3	6.2	6.9	7.3	4.7	2.6	2.4	1.8	2.1	3.2	7.3
8-Mar	2.4	2.7	3.7	2.8	2.7	2.5	2.4	2.7	4.4	5.9	7.9	7.1	7.2	6.8	8.3	8.0	7.9	8.1	9.8	10.6	10.6	7.8	6.4	5.8	6.0	10.6
9-Mar	5.5	6.0	5.2	4.1	3.9	3.8	3.4	3.1	4.1	5.0	4.9	5.7	8.8	7.9	8.7	10.4	9.5	8.6	8.6	9.0	9.8	8.6	8.4	9.0	6.8	10.4
10-Mar	13.0	23.2	24.0	20.4	31.4	27.7	28.1	26.4	26.3	23.6	18.8	14.7	4.2	3.5	2.7	2.0	1.6	1.3	1.7	2.5	2.7	2.7	2.7	2.6	12.8	31.4
11-Mar	3.5	3.8	4.8	4.7	5.3	4.9	4.8	4.2	3.4	3.6	3.8	3.6	3.7	2.7	2.0	2.1	2.1	1.9	3.6	2.8	2.6	4.5	4.3	8.0	3.8	8.0
12-Mar	11.4	13.0	13.0	10.6	9.8	8.6	6.5	6.5	7.0	7.7	6.0	4.1	3.0	2.2	2.5	2.6	1.3	0.6	0.7	0.9	1.0	1.4	1.4	1.6	5.1	13.0
13-Mar	1.8	1.6	1.9	2.9	3.0	3.0	3.1	3.1	2.8	2.2	2.1	2.2	1.8	1.3	1.0	0.8	0.8	0.8	1.2	1.3	1.3	1.5	2.0	1.9	1.9	3.1
14-Mar	2.0	2.2	2.4	2.1	1.9	1.8	1.8	1.8	1.8	1.6	1.5	1.5	1.5	1.4	1.3	1.3	1.3	1.3	1.4	1.5	1.5	1.6	1.5	1.4	1.6	2.4
15-Mar	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.5	1.7	2.0	2.2	1.8	1.5	1.3	1.0	1.0	1.0	1.1	1.1	1.5	1.4	1.4	1.4	1.3	1.4	2.2
16-Mar	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.5	1.4	1.3	1.3	1.4	1.3	1.5	1.5	1.4	1.4	1.8	1.4	1.8
17-Mar	1.6	1.5	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.7	0.8	C	C	C	0.6	0.5	0.6	0.6	0.7	0.8	0.8	1.2	17.1	7.8	2.2	17.1
18-Mar	2.7	2.6	1.4	0.6	0.7	0.6	0.8	1.0	0.8	0.6	0.4	0.5	0.5	0.7	3.0	5.5	4.8	4.2	3.8	4.7	5.3	4.8	5.4	2.4	2.4	5.5
19-Mar	1.5	1.3	1.1	1.2	1.1	1.1	1.2	1.5	1.8	2.1	1.9	1.9	1.3	0.5	0.2	0.5	0.8	0.6	UO	UO	0.4	0.4	0.5	0.7	1.1	2.1
20-Mar	1.4	1.6	1.4	1.5	1.7	1.7	1.7	2.5	3.6	3.5	2.8	1.5	1.1	0.7	0.5	0.5	0.5	0.6	0.7	0.7	1.1	1.4	1.5	1.8	1.5	3.6
21-Mar	2.0	2.2	2.2	2.2	2.2	2.3	2.7	3.2	3.9	3.5	3.9	2.4	1.7	1.4	1.0	1.3	1.3	0.9	0.9	1.2	1.5	1.1	1.0	2.3	2.0	3.9
22-Mar	3.0	3.2	3.0	3.3	3.2	3.0	3.4	4.1	4.3	5.3	4.8	6.0	7.7	10.1	8.1	5.5	5.0	4.5	5.4	8.2	9.0	7.4	7.0	6.3	5.5	10.1
23-Mar	6.6	6.2	6.3	6.3	7.1	7.9	6.6	5.9	5.1	4.0	3.0	2.7	2.9	3.3	3.4	3.2	3.5	3.7	4.0	5.1	5.8	7.0	8.3	8.9	5.3	8.9
24-Mar	10.1	9.2	7.7	5.4	6.1	5.5	5.1	6.9	8.2	12.2	10.3	8.4	5.5	5.0	4.8	4.3	6.1	7.4	9.0	9.9	8.0	10.6	7.4	6.3	7.5	12.2
25-Mar	5.7	8.1	19.2	7.5	7.0	8.5	7.8	9.5	12.4	9.8	9.1	10.5	10.2	9.0	7.0	10.3	10.1	6.7	10.7	12.3	12.0	13.1	11.1	7.9	9.8	19.2
26-Mar	6.9	7.1	8.4	7.0	7.2	6.8	6.2	5.8	5.6	4.6	4.0	3.9	4.0	3.2	2.5	8.3	7.4	7.9	8.7	8.1	13.7	17.5	9.9	8.9	7.2	17.5
27-Mar	8.6	8.2	9.3	12.0	11.1	10.2	7.9	9.1	9.3	11.7	9.3	6.5	4.8	4.3	2.9	3.3	2.8	2.5	3.3	5.8	4.6	4.4	9.2	9.2	7.1	12.0
28-Mar	9.3	9.8	11.4	12.9	12.1	11.4	11.7	11.3	6.0	5.3	5.4	6.4	6.4	0.7	0.1	UO	UO	UO	UO	UO	UO	0.4	0.3	0.3	6.7	12.9
29-Mar	2.4	0.3	0.4	0.8	2.6	1.9	2.8	3.1	3.3	2.3	2.1	1.7	0.9	1.0	0.5	0.5	0.7	0.8	0.9	1.0	1.1	1.0	1.3	1.7	1.5	3.3
30-Mar	2.0	2.4	2.8	2.8	2.9	3.1	3.2	3.6	0.9	0.6	0.7	0.7	0.4	UO	UO	UO	0.4	0.8	0.7	0.7	0.5	0.5	0.8	0.9	1.5	3.6
31-Mar	1.0	1.4	1.6	1.4	1.5	1.6	1.7	2.2	2.1	2.1	1.7	1.3	1.6	1.6	3.1	6.1	9.0	7.7	10.9	13.1	8.9	13.7	12.4	12.4	5.0	13.7
	4.2	4.7	5.2	4.6	4.9	4.6	4.4	4.6	4.7	4.7	5.0	4.6	3.6	3.2	3.0	3.5	3.5	3.3	3.9	4.2	4.1	4.3	4.5	4.2	Diurnal Average	
	13.0	23.2	24.0	20.4	31.4	27.7	28.1	26.4	26.3	23.6	26.7	19.4	10.2	10.1	8.7	10.4	10.1	8.6	10.9	13.1	13.7	17.5	17.1	12.4	Diurnal Maximum	

C - Calibration UO - Unstable Operation PF - Power Failure

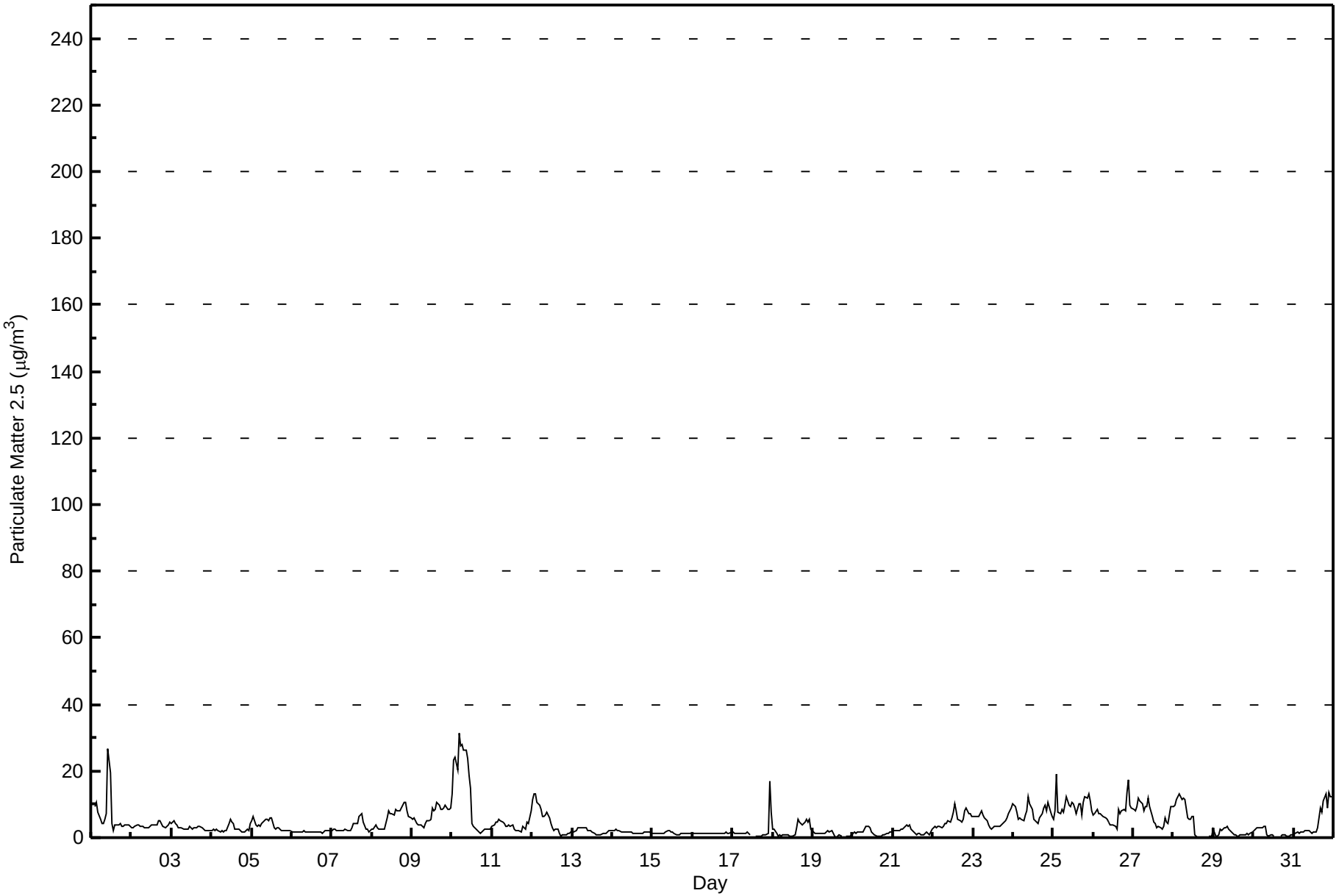
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Fort McKay - Bertha Ganter - March 2016



Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Fort McKay - Bertha Ganter - March 2016

Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	468	64.29	64.29
6 - 15	172	23.63	87.91
16 - 25	9	1.24	89.15
26 - 80	6	0.82	89.97
> 81.0	0	0.00	89.97

Total Number of Valid Hours: 728

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Fort McKay - Bertha Ganter - March 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	196	53	18	9	11	11	13	22	31	9	5	11	8	16	8	47	468
6 - 15	35	12	3	3	1	0	1	24	37	8	4	5	3	4	9	23	172
16 - 25	2	0	0	0	0	0	0	1	2	2	2	0	0	0	0	0	9
26 - 80	2	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	6
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	235	65	21	12	12	11	15	48	71	19	12	16	11	20	17	70	655

Total Number of Valid Hours: 728

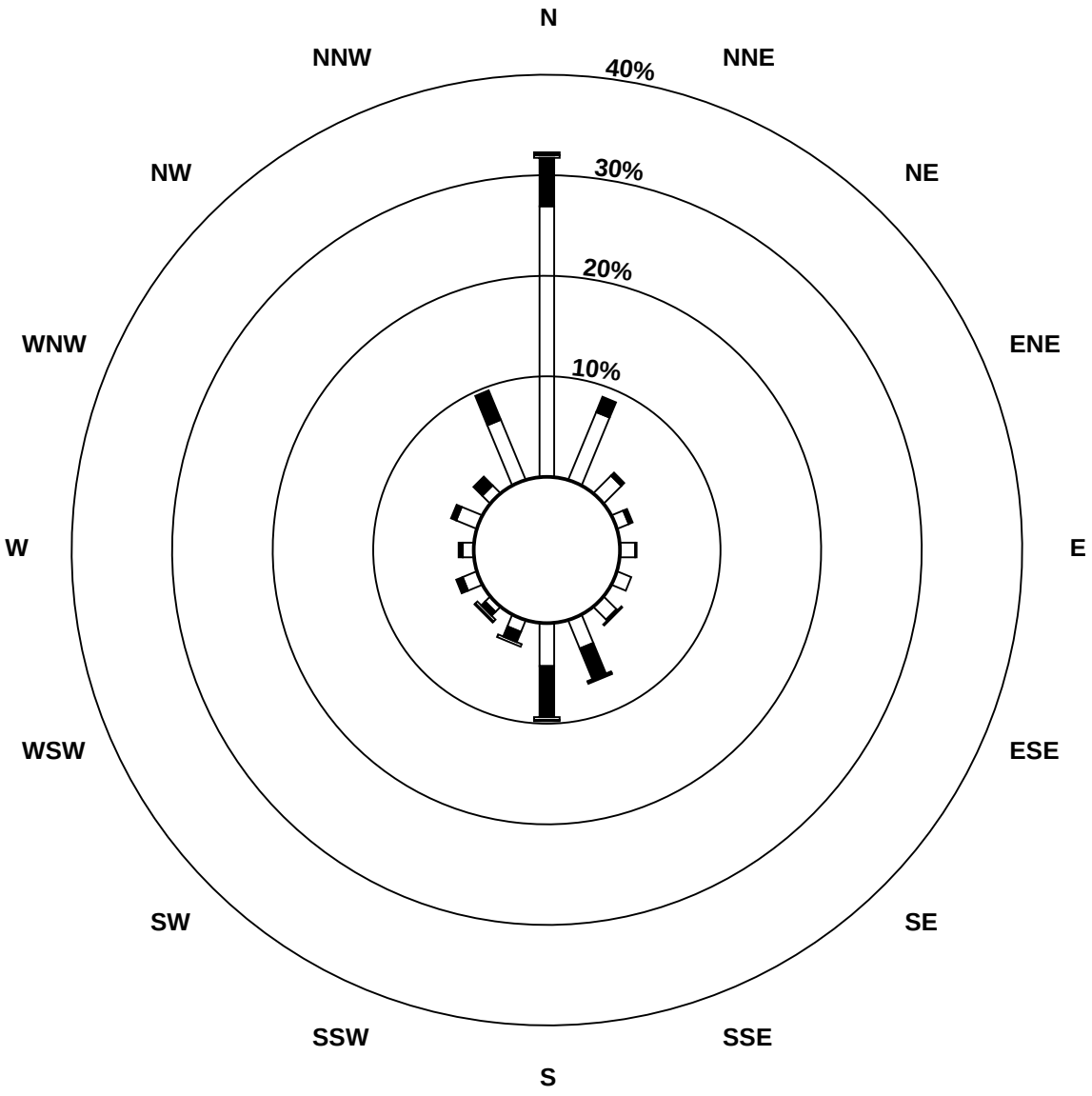
Total Number of Hours: 744

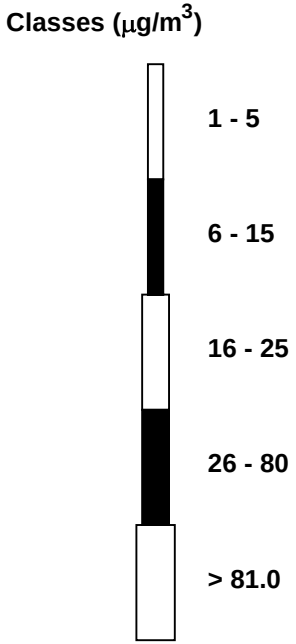
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Fort McKay - Bertha Ganter (AMS 1)





Total Number of Valid Hours: 728

Wood Buffalo Environmental Association

Summary of Hour Averages

Ammonia (NH_3) - ppb

Fort McKay - Bertha Ganter - March 2016

Number of Exceedences (AAAQO): 1-hr: 0

Maximum Value: 0 ppb on Mar 1 06:00

Maximum Daily Average: 0.0 ppb on Mar 1

Minimum Value: 0 ppb on Mar 1 06:00

Minimum Daily Average: 0.0 ppb on Mar 1

Maximum Diurnal Average: 0.0 ppb at hour 1

Minimum Diurnal Average: 0.0 ppb at hour 1

Monthly Average: 0.0 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 0$

Hours in Service:	744
Hours of Data:	650
Hours of Missing Data:	94
Hours of Calibration:	42
Percent Operational Time:	93.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	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
2-Mar	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Mar	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
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
5-Mar	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
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
7-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
8-Mar	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
9-Mar	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
10-Mar	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
11-Mar	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Mar	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
13-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
14-Mar	0	0	0	Z	RE	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	0	0	0	0	--	0
15-Mar	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
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
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
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
19-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
20-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
21-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
22-Mar	0	0	0	0	0	Z	RE	RE	M	M	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
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
25-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
26-Mar	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
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
28-Mar	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
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
30-Mar	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
31-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
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance PF - Power Failure RE - Recovery

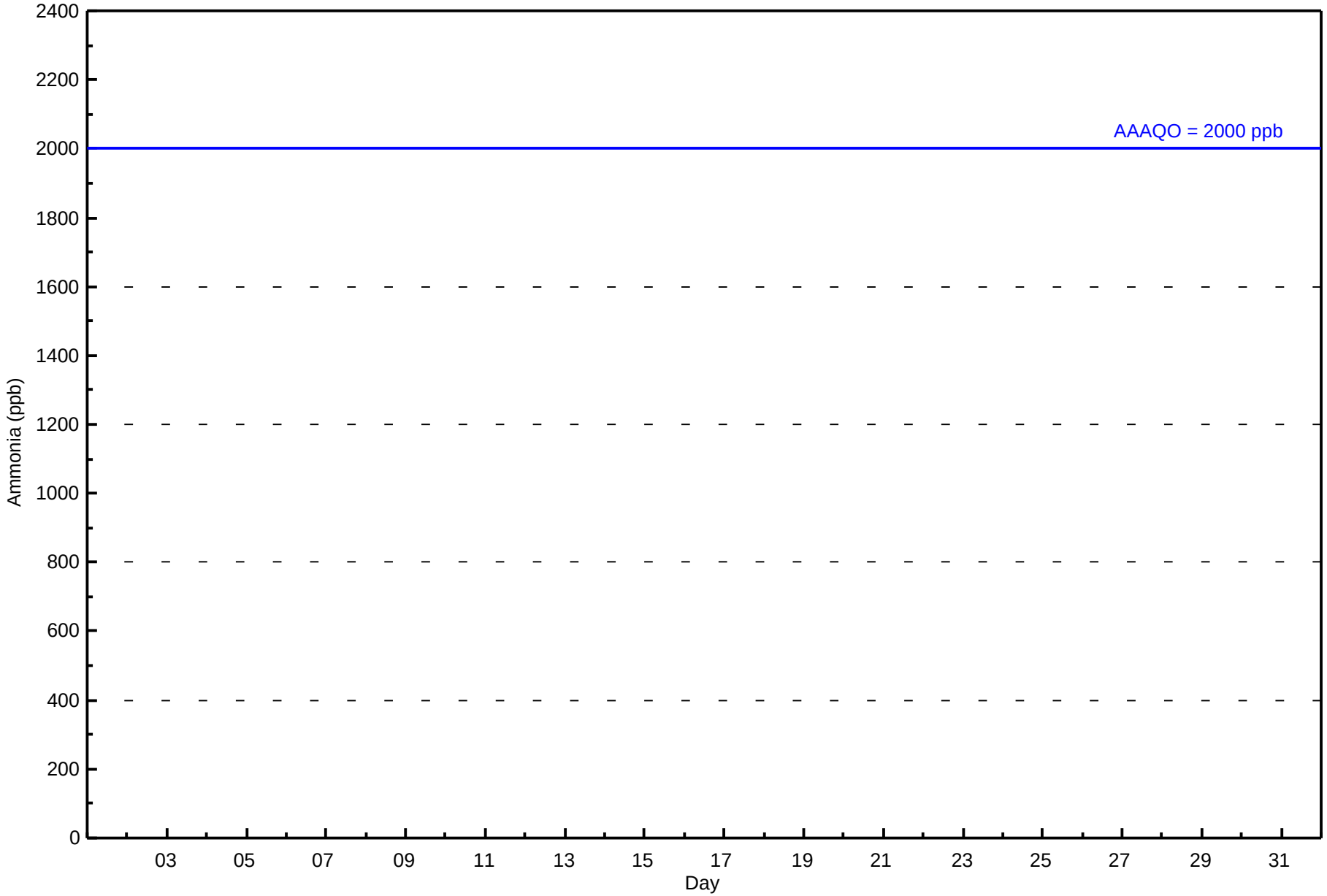
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ammonia (NH_3) - ppb

Fort McKay - Bertha Ganter - March 2016



Ammonia (NH_3) - ppb

Fort McKay - Bertha Ganter - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	650	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: 650

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Ammonia (NH_3) - ppb

Fort McKay - Bertha Ganter - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	220	65	23	14	15	14	15	50	62	16	8	17	16	19	30	66	650
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	220	65	23	14	15	14	15	50	62	16	8	17	16	19	30	66	650

Total Number of Valid Hours: 650

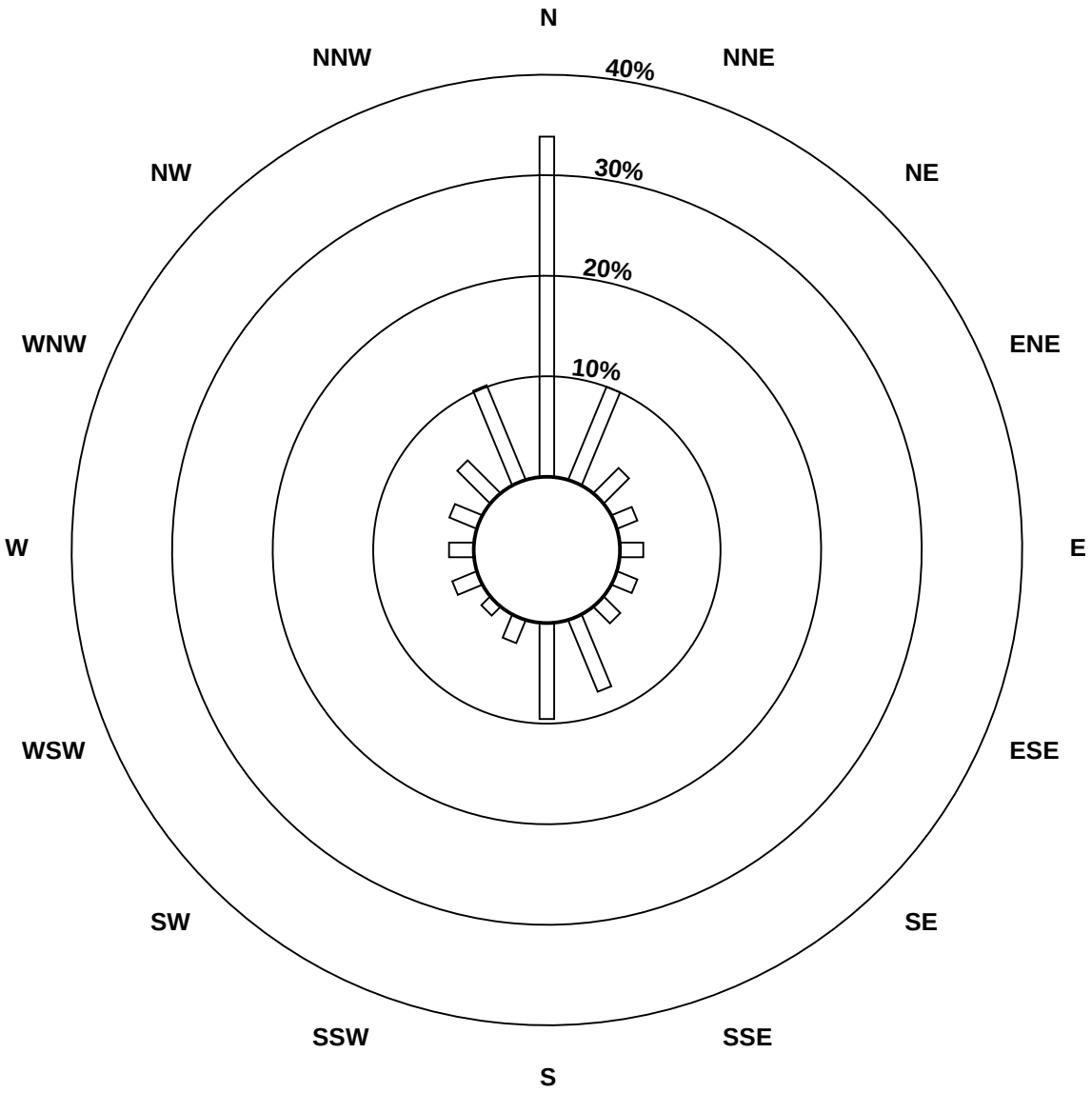
Total Number of Hours: 744

Wood Buffalo Environmental Association

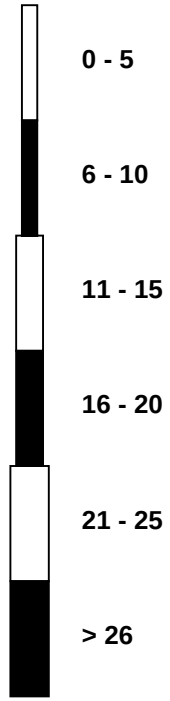
Wind Rose Mar 2016

Ammonia (NH_3) - ppb

Fort McKay - Bertha Ganter (AMS 1)



Classes (ppb)



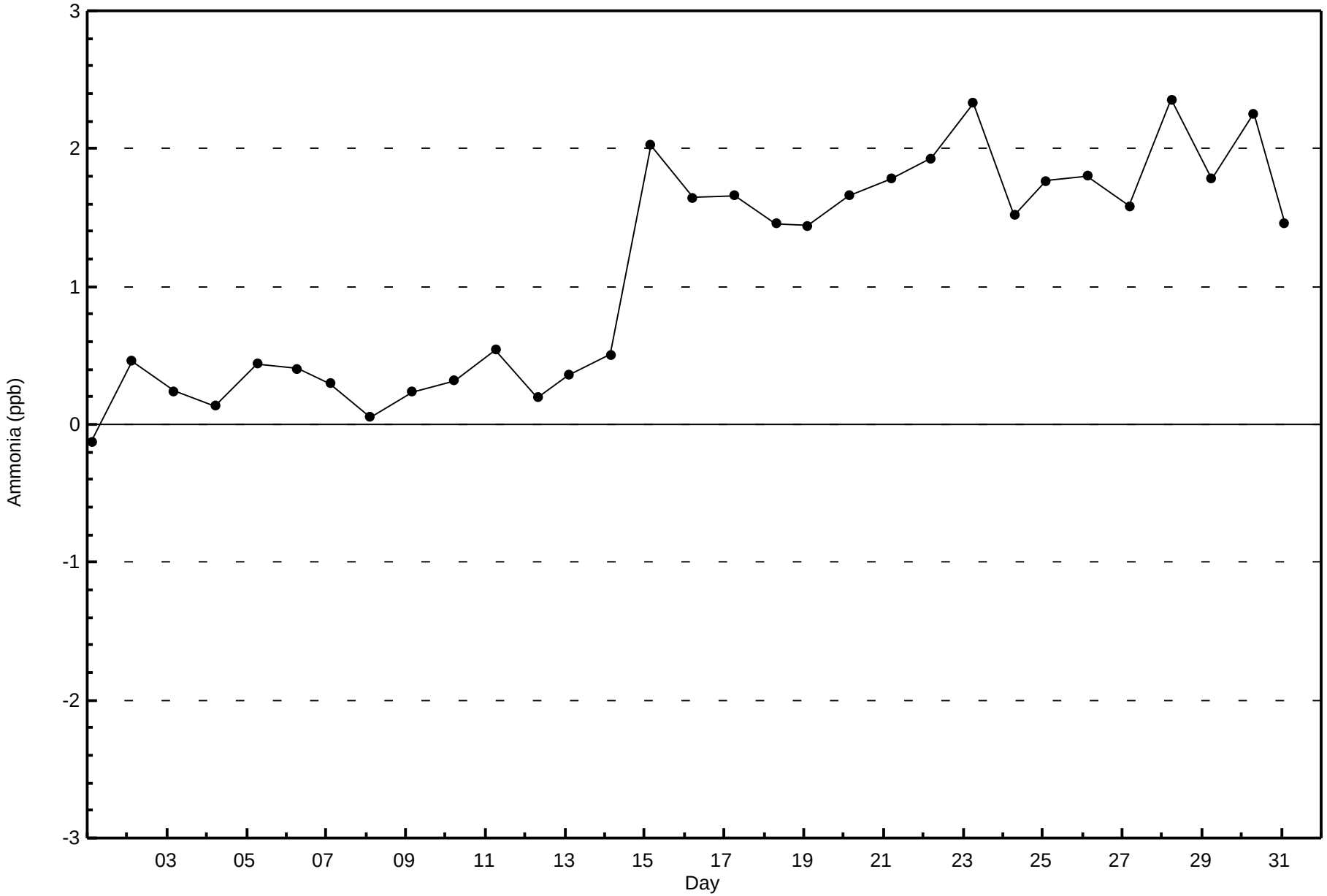
Total Number of Valid Hours: 650

Wood Buffalo Environmental Association

Zero Responses

Ammonia (NH_3) - ppb

Fort McKay - Bertha Ganter - March 2016

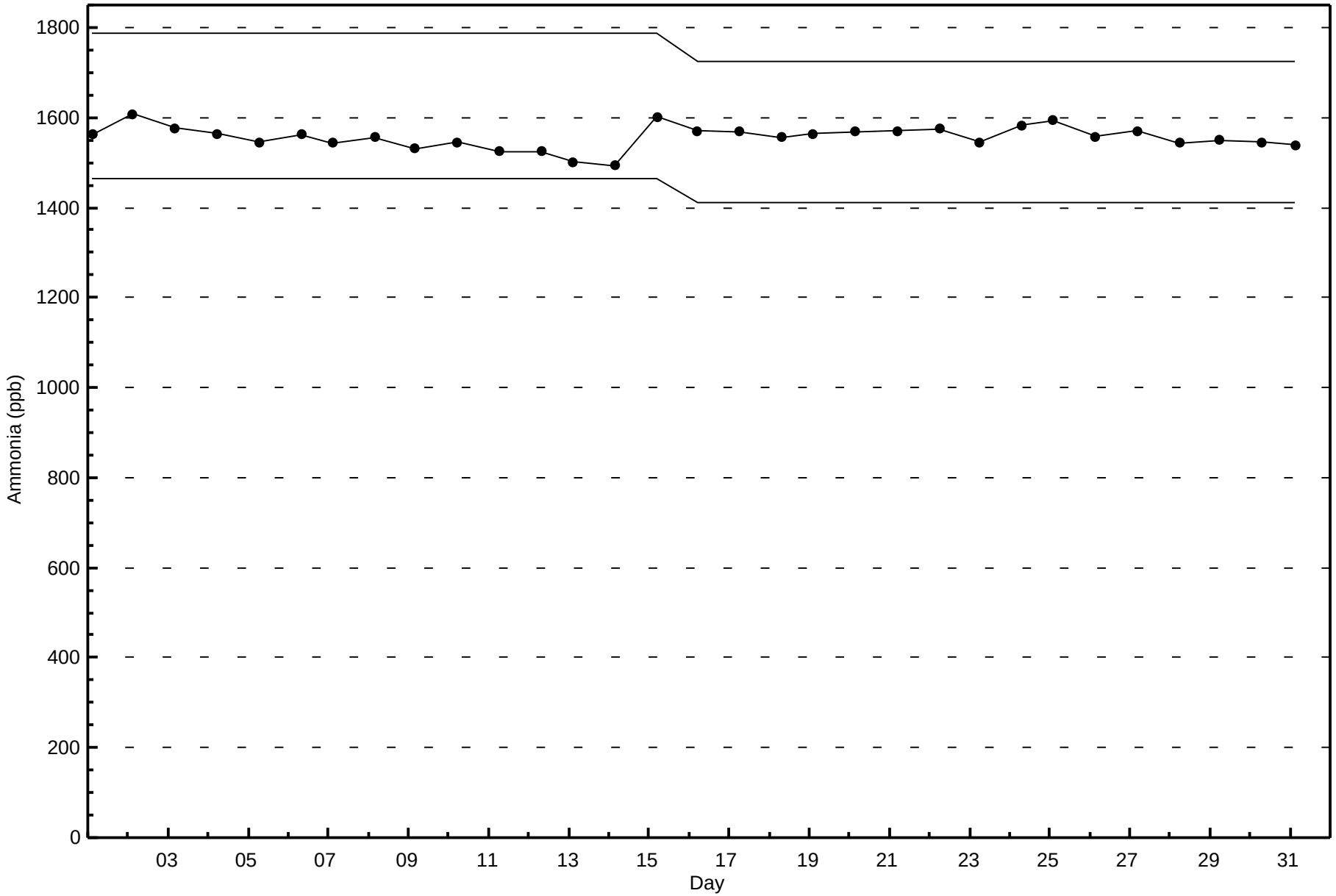


Wood Buffalo Environmental Association

Span Responses

Ammonia (NH_3) - ppb

Fort McKay - Bertha Ganter - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 10 m (AT 10m) - C

Fort McKay - Bertha Ganter - March 2016

Maximum Value: 13.3 C on Mar 28 14:00

Maximum Daily Average: 6.1 C on Mar 29

Minimum Value: -18.5 C on Mar 24 07:00

Minimum Daily Average: -8.8 C on Mar 24

Maximum Diurnal Average: 0.5 C at hour 17

Minimum Diurnal Average: -7.6 C at hour 7

Monthly Average: -3.62 C

Percentiles: P_1 = -14.4 P_{10} = -9.8 Q_1 = -7.4 Median = -4.4 Q_3 = -0.3 P_{90} = 2.9 P_{99} = 12.2

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

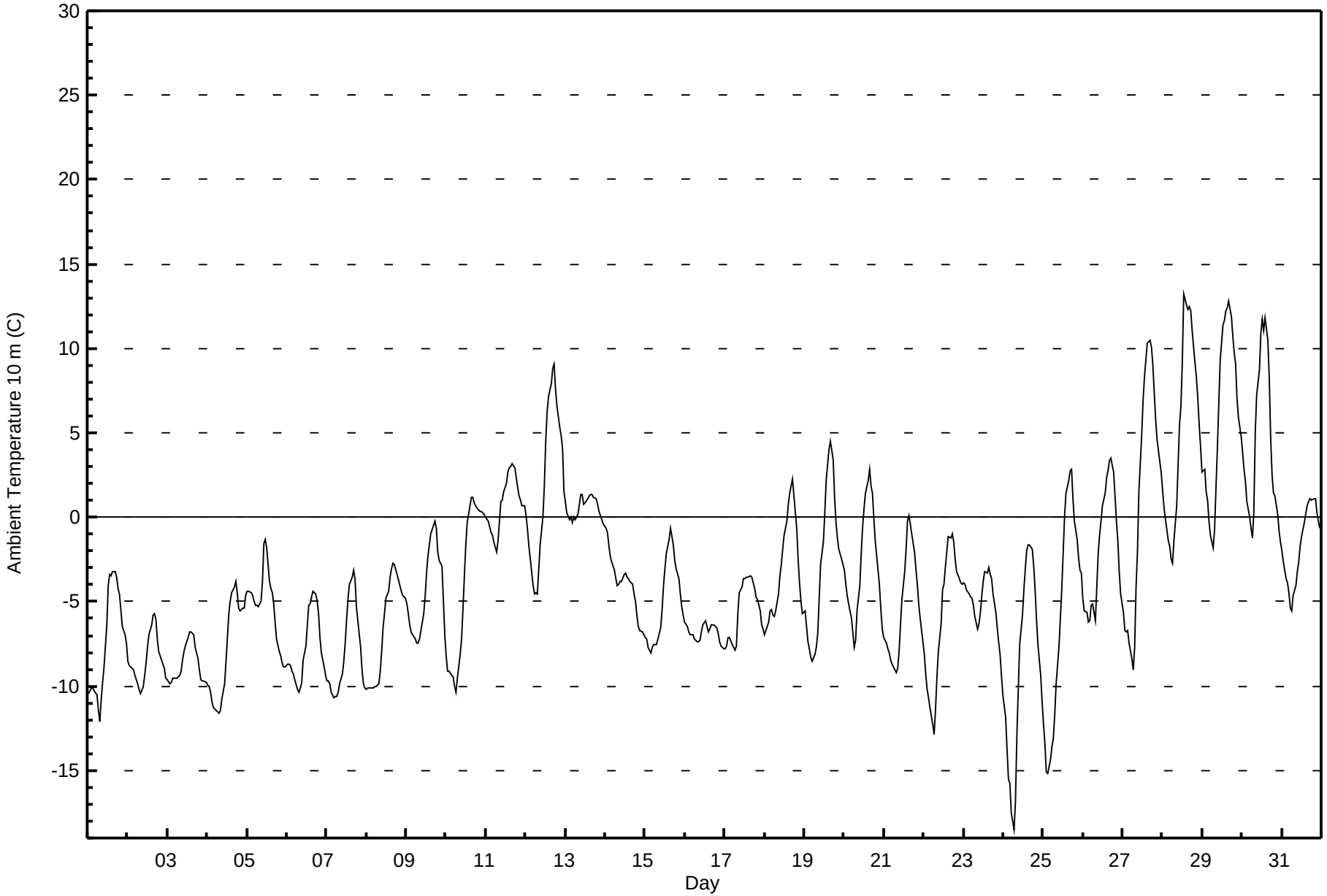
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.4	-10.3	-10.1	-10.1	-10.3	-10.5	-11.4	-12.1	-10.8	-9.8	-8.8	-6.4	-4.1	-3.4	-3.4	-3.3	-3.2	-3.6	-4.2	-4.5	-5.4	-6.4	-6.9	-7.5	-7.4	-3.2
2-Mar	-8.6	-8.8	-8.8	-9.0	-9.4	-9.6	-9.9	-10.2	-10.4	-10.1	-9.4	-8.6	-7.7	-7.0	-6.4	-5.8	-5.7	-6.0	-7.2	-7.9	-8.5	-8.7	-8.9	-9.5	-8.4	-5.7
3-Mar	-9.6	-9.9	-9.8	-9.5	-9.6	-9.5	-9.5	-9.4	-9.1	-8.5	-8.0	-7.6	-7.1	-6.8	-6.8	-6.8	-7.0	-7.7	-8.4	-9.1	-9.6	-9.7	-9.7	-9.8	-8.7	-6.8
4-Mar	-9.9	-10.1	-10.4	-10.9	-11.2	-11.5	-11.5	-11.6	-11.4	-10.8	-9.9	-8.6	-7.1	-5.7	-5.0	-4.5	-4.1	-3.8	-4.5	-5.4	-5.5	-5.4	-5.4	-4.6	-7.9	-3.8
5-Mar	-4.4	-4.4	-4.4	-4.6	-5.0	-5.3	-5.2	-5.3	-5.0	-3.8	-1.5	-1.3	-1.8	-3.8	-4.2	-4.5	-5.1	-6.2	-7.2	-7.9	-8.2	-8.6	-8.9	-8.9	-5.2	-1.3
6-Mar	-8.7	-8.7	-8.8	-9.1	-9.3	-9.6	-10.2	-10.3	-10.1	-9.8	-8.5	-7.6	-6.4	-5.2	-5.1	-4.7	-4.4	-4.5	-5.0	-5.7	-7.1	-8.1	-8.8	-9.4	-7.7	-4.4
7-Mar	-9.7	-9.7	-9.9	-10.4	-10.7	-10.6	-10.6	-10.4	-9.9	-9.3	-8.5	-7.5	-6.0	-4.8	-4.0	-3.6	-3.2	-3.6	-5.3	-6.2	-7.7	-9.0	-9.9	-10.1	-7.9	-3.2
8-Mar	-10.2	-10.2	-10.1	-10.1	-10.1	-10.0	-10.0	-9.8	-9.1	-8.0	-6.6	-5.7	-4.8	-4.4	-3.6	-3.1	-2.7	-2.8	-3.4	-3.7	-4.0	-4.4	-4.6	-4.8	-6.5	-2.7
9-Mar	-5.1	-5.7	-6.4	-6.8	-6.9	-7.2	-7.4	-7.5	-7.2	-6.7	-5.7	-4.7	-3.3	-2.3	-1.6	-0.9	-0.4	-0.2	-0.7	-2.0	-2.5	-2.9	-4.9	-7.0	-4.4	-0.2
10-Mar	-8.2	-9.1	-9.1	-9.3	-9.4	-10.0	-10.3	-9.6	-8.1	-7.2	-5.4	-3.5	-1.7	-0.3	0.7	1.2	1.2	0.9	0.7	0.4	0.4	0.3	0.2	0.2	-4.0	1.2
11-Mar	0.1	-0.2	-0.6	-0.9	-1.1	-1.5	-2.0	-1.4	-0.3	1.0	1.0	1.5	2.0	2.7	2.9	3.0	3.2	2.9	2.3	1.7	1.2	1.0	0.7	0.6	0.8	3.2
12-Mar	0.1	-0.7	-1.7	-2.5	-4.0	-4.5	-4.4	-4.6	-3.1	-1.6	0.0	1.8	4.5	6.3	7.1	7.9	8.8	9.1	7.6	6.6	5.4	4.8	4.1	1.5	2.0	9.1
13-Mar	0.9	0.3	-0.1	0.0	-0.3	0.0	-0.2	0.2	0.8	1.4	1.4	0.8	0.8	1.1	1.3	1.3	1.4	1.2	1.1	0.8	0.4	0.1	-0.1	-0.4	0.6	1.4
14-Mar	-0.7	-0.9	-1.7	-2.3	-2.6	-3.1	-3.6	-4.0	-3.9	-3.8	-3.8	-3.4	-3.3	-3.6	-3.6	-3.8	-4.0	-4.6	-4.9	-5.8	-6.5	-6.7	-6.8	-7.0	-3.9	-0.7
15-Mar	-7.1	-7.2	-7.7	-8.0	-7.7	-7.6	-7.5	-7.5	-7.2	-6.6	-5.5	-4.1	-3.1	-2.1	-1.3	-0.7	-1.1	-1.7	-2.6	-3.1	-3.6	-4.5	-5.3	-5.8	-4.9	-0.7
16-Mar	-6.2	-6.5	-6.8	-7.0	-7.0	-7.0	-7.2	-7.4	-7.4	-7.3	-6.8	-6.4	-6.1	-6.5	-6.8	-6.6	-6.4	-6.4	-6.4	-6.5	-6.9	-7.4	-7.6	-7.8	-6.8	-6.1
17-Mar	-7.8	-7.6	-7.1	-7.1	-7.5	-7.7	-7.9	-7.7	-5.7	-4.5	-4.1	-3.7	-3.6	-3.6	-3.5	-3.5	-3.6	-3.9	-4.2	-4.7	-4.9	-5.6	-6.3	-6.7	-5.5	-3.5
18-Mar	-6.9	-6.7	-6.2	-5.5	-5.5	-5.8	-5.8	-5.6	-4.5	-3.5	-2.8	-1.9	-1.1	-0.2	0.8	1.5	1.9	2.3	1.2	-0.6	-2.5	-3.9	-5.0	-5.7	-3.0	2.3
19-Mar	-5.6	-6.5	-7.4	-7.8	-8.3	-8.5	-8.1	-7.7	-6.9	-4.9	-2.8	-1.5	0.2	2.2	3.1	4.0	4.5	3.5	1.2	-0.3	-1.2	-1.9	-2.5	-2.8	-2.8	4.5
20-Mar	-3.2	-4.0	-4.6	-5.1	-6.0	-6.8	-7.7	-7.3	-5.5	-4.0	-2.1	-0.5	0.5	1.5	2.2	2.8	1.8	1.4	-0.1	-1.4	-3.1	-4.1	-5.4	-6.6	-2.8	2.8
21-Mar	-7.1	-7.5	-7.8	-8.0	-8.5	-8.7	-8.8	-9.2	-9.0	-7.9	-6.4	-4.8	-3.2	-1.9	-0.2	0.1	-0.4	-1.0	-2.1	-3.0	-4.0	-5.1	-6.0	-7.4	-5.3	0.1
22-Mar	-8.1	-9.3	-10.2	-10.7	-11.3	-12.3	-12.9	-11.4	-9.5	-8.0	-6.3	-4.3	-3.9	-3.0	-2.0	-1.2	-1.2	-1.0	-1.5	-2.4	-3.2	-3.6	-3.9	-4.0	-6.0	-1.0
23-Mar	-3.9	-4.0	-4.3	-4.6	-4.7	-4.8	-5.2	-5.9	-6.6	-6.3	-5.6	-4.6	-3.8	-3.2	-3.3	-3.0	-3.4	-3.6	-4.6	-5.6	-6.6	-7.4	-8.1	-9.4	-5.1	-3.0
24-Mar	-10.5	-11.8	-13.8	-15.5	-15.8	-17.5	-18.5	-16.8	-12.9	-10.2	-7.5	-5.8	-4.3	-3.1	-2.0	-1.6	-1.7	-1.9	-2.9	-4.3	-6.1	-7.5	-9.4	-11.0	-8.8	-1.6
25-Mar	-12.2	-13.4	-15.1	-15.2	-14.4	-13.6	-13.1	-11.7	-9.9	-7.7	-6.0	-4.3	-2.1	0.0	1.4	2.2	2.8	2.9	1.1	-0.2	-1.3	-2.4	-3.2	-3.3	-5.8	2.9
26-Mar	-4.8	-5.6	-5.6	-6.2	-6.1	-5.2	-5.2	-6.1	-4.2	-2.1	-1.1	-0.3	0.7	1.4	2.4	2.8	3.4	3.5	2.7	1.3	-0.3	-1.4	-3.2	-4.6	-1.8	3.5
27-Mar	-5.6	-6.7	-6.8	-6.7	-7.5	-8.4	-9.0	-7.7	-4.1	-2.0	1.5	4.8	6.9	8.3	9.3	10.3	10.5	10.0	9.0	7.4	5.7	4.6	3.2	2.6	1.2	10.5
28-Mar	1.5	0.5	-0.2	-1.4	-1.7	-2.5	-2.7	-1.4	0.7	3.2	5.5	6.6	9.3	13.3	12.5	12.3	12.5	12.2	11.1	9.2	8.3	7.0	5.5	4.1	5.2	13.3
29-Mar	2.7	2.8	1.5	1.0	-0.2	-1.1	-1.8	-0.7	1.8	4.1	6.8	9.3	11.4	11.7	12.2	12.4	12.8	11.9	10.7	9.8	9.0	7.0	5.9	4.8	6.1	12.8
30-Mar	3.9	2.9	2.1	0.9	0.0	-0.6	-1.2	0.4	5.0	7.3	8.7	10.9	11.7	11.1	11.8	10.5	8.3	4.7	2.5	1.4	1.3	0.2	-0.8	-1.5	4.2	11.8
31-Mar	-2.0	-2.7	-3.6	-3.9	-4.5	-5.4	-5.6	-4.7	-4.0	-3.2	-2.6	-1.7	-1.2	-0.3	0.2	0.7	0.9	1.1	1.0	1.1	1.1	0.3	-0.3	-0.6	-1.7	1.1
	-5.4	-5.9	-6.3	-6.7	-7.0	-7.3	-7.6	-7.2	-6.1	-4.9	-3.6	-2.4	-1.2	-0.4	0.2	0.5	0.5	0.2	-0.7	-1.6	-2.4	-3.2	-3.9	-4.6	Diurnal Average	
	3.9	2.9	2.1	1.0	0.0	0.0	-0.2	0.4	5.0	7.3	8.7	10.9	11.7	13.3	12.5	12.4	12.8	12.2	11.1	9.8	9.0	7.0	5.9	4.8	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 10 m (AT 10m) - C

Fort McKay - Bertha Ganter - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	572	76.88	76.88
0 - 10	151	20.30	97.18
10 - 20	21	2.82	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 14.1 C on Mar 29 17:00

Maximum Daily Average: 5.1 C on Mar 29

Minimum Value: -21.4 C on Mar 24 07:00

Minimum Daily Average: -10.5 C on Mar 24

Maximum Diurnal Average: 0.9 C at hour 16

Minimum Diurnal Average: -8.2 C at hour 7

Monthly Average: -3.97 C

Percentiles: P_1 = -16.3 P_{10} = -10.1 Q_1 = -7.8 Median = -4.5 Q_3 = -0.7 P_{90} = 2.7 P_{99} = 12.5

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

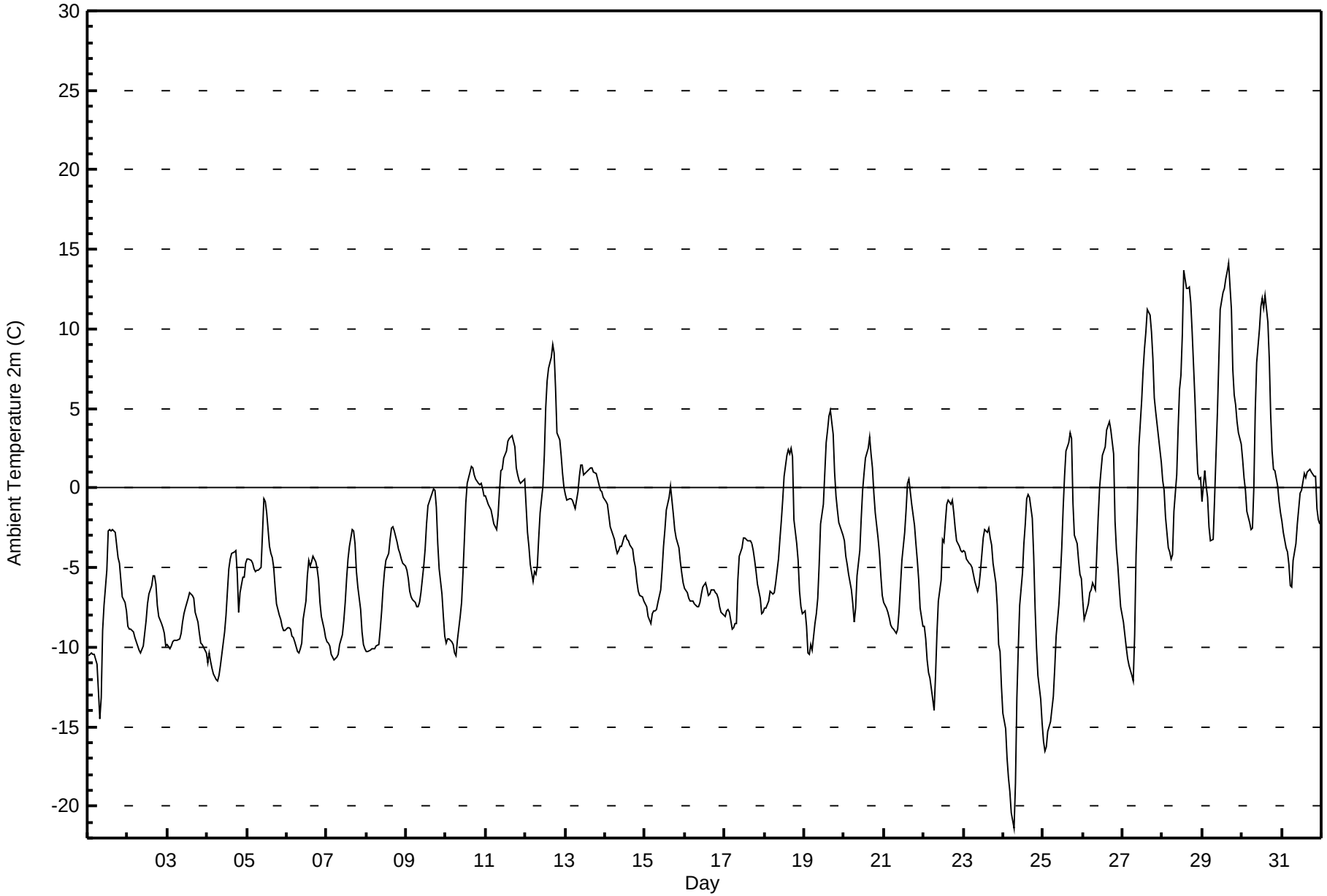
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.5	-10.5	-10.4	-10.4	-10.4	-11.1	-12.7	-14.5	-13.1	-8.9	-7.4	-5.2	-2.7	-2.6	-2.7	-2.6	-2.8	-3.5	-4.3	-4.7	-5.8	-6.8	-7.2	-7.7	-7.4	-2.6
2-Mar	-8.7	-8.9	-8.9	-9.0	-9.4	-9.7	-9.9	-10.2	-10.4	-9.9	-9.1	-8.3	-7.3	-6.7	-6.1	-5.5	-5.5	-6.1	-7.4	-8.1	-8.5	-8.7	-9.1	-9.9	-8.4	-5.5
3-Mar	-9.9	-10.1	-9.9	-9.6	-9.6	-9.6	-9.6	-9.4	-9.1	-8.4	-7.9	-7.5	-7.0	-6.6	-6.6	-6.7	-6.9	-7.8	-8.4	-9.1	-9.7	-9.9	-10.0	-10.4	-8.7	-6.6
4-Mar	-10.9	-10.3	-10.9	-11.3	-11.7	-12.0	-12.1	-11.8	-11.2	-10.5	-9.1	-8.0	-6.5	-5.0	-4.5	-4.1	-4.0	-3.9	-5.4	-7.8	-6.6	-5.6	-5.6	-4.7	-8.1	-3.9
5-Mar	-4.5	-4.4	-4.5	-4.7	-5.1	-5.3	-5.2	-5.2	-5.0	-2.9	-0.7	-0.8	-1.5	-3.6	-4.1	-4.4	-5.0	-6.2	-7.3	-8.0	-8.3	-8.7	-9.0	-9.0	-5.1	-0.7
6-Mar	-8.8	-8.8	-8.9	-9.3	-9.4	-9.7	-10.3	-10.4	-10.1	-9.7	-8.3	-7.1	-5.5	-4.6	-4.9	-4.7	-4.3	-4.6	-5.1	-5.8	-7.2	-8.1	-8.9	-9.4	-7.7	-4.3
7-Mar	-9.7	-9.8	-9.9	-10.4	-10.8	-10.7	-10.7	-10.5	-9.9	-9.2	-8.3	-7.2	-5.7	-4.5	-3.7	-2.6	-2.7	-3.5	-5.3	-6.2	-7.7	-9.0	-9.8	-10.1	-7.8	-2.6
8-Mar	-10.3	-10.3	-10.2	-10.1	-10.1	-10.1	-10.0	-9.8	-8.9	-7.7	-6.3	-5.2	-4.5	-4.1	-3.2	-2.6	-2.5	-2.7	-3.4	-3.8	-4.1	-4.5	-4.7	-4.9	-6.4	-2.5
9-Mar	-5.2	-5.7	-6.4	-6.8	-7.0	-7.2	-7.5	-7.5	-7.2	-6.6	-4.9	-3.8	-2.3	-1.1	-0.9	-0.6	-0.1	-0.1	-1.2	-3.4	-5.1	-6.7	-8.0	-9.3	-4.8	-0.1
10-Mar	-9.8	-9.5	-9.5	-9.6	-9.8	-10.4	-10.6	-9.6	-8.1	-7.2	-5.3	-3.2	-1.0	0.3	1.0	1.4	1.3	0.9	0.6	0.3	0.2	0.3	0.0	-0.5	-4.1	1.4
11-Mar	-0.5	-1.0	-1.2	-1.4	-1.8	-2.3	-2.7	-1.8	-0.2	1.1	1.2	1.9	2.4	2.9	3.2	3.2	3.3	2.6	1.3	0.8	0.5	0.3	0.3	0.5	0.5	3.3
12-Mar	-1.1	-2.8	-3.7	-4.9	-5.9	-5.2	-5.4	-4.9	-3.1	-1.6	0.1	2.0	5.1	6.7	7.5	8.2	9.0	8.5	6.3	3.5	3.1	2.1	1.0	0.0	1.0	9.0
13-Mar	-0.4	-0.7	-0.7	-0.6	-0.8	-1.0	-1.3	-0.2	0.8	1.4	1.4	0.8	0.9	1.1	1.2	1.2	1.2	1.0	0.9	0.6	0.2	-0.2	-0.3	-0.6	0.3	1.4
14-Mar	-0.8	-1.0	-1.8	-2.4	-2.7	-3.2	-3.7	-4.1	-3.9	-3.7	-3.7	-3.0	-3.0	-3.2	-3.3	-3.6	-3.8	-4.6	-5.0	-5.9	-6.5	-6.8	-6.9	-7.1	-3.9	-0.8
15-Mar	-7.3	-7.4	-8.1	-8.5	-7.9	-7.7	-7.7	-7.6	-7.2	-6.4	-5.2	-3.6	-2.6	-1.4	-0.6	0.1	-0.7	-1.6	-2.6	-3.1	-3.7	-4.6	-5.4	-5.9	-4.9	0.1
16-Mar	-6.3	-6.6	-6.9	-7.1	-7.1	-7.1	-7.3	-7.5	-7.4	-7.2	-6.7	-6.2	-5.9	-6.3	-6.7	-6.7	-6.4	-6.4	-6.5	-6.7	-6.9	-7.5	-7.8	-8.0	-6.9	-5.9
17-Mar	-8.1	-7.7	-7.6	-7.8	-8.9	-8.8	-8.5	-8.5	-5.8	-4.2	-3.8	-3.1	-3.2	-3.3	-3.3	-3.3	-3.5	-3.9	-4.5	-5.2	-6.1	-6.9	-7.9	-7.8	-5.9	-3.1
18-Mar	-7.5	-7.5	-7.1	-6.5	-6.6	-6.7	-6.6	-5.9	-4.5	-3.2	-2.1	-0.7	0.8	2.1	2.4	2.2	2.5	1.9	-2.0	-3.5	-4.6	-6.5	-7.5	-7.9	-3.5	2.5
19-Mar	-7.8	-8.7	-10.4	-10.5	-9.9	-10.2	-8.5	-7.9	-6.9	-4.9	-2.3	-1.0	0.9	2.9	3.7	4.5	4.9	3.4	1.0	-0.5	-1.4	-2.1	-2.7	-3.0	-3.2	4.9
20-Mar	-3.3	-4.3	-4.8	-5.4	-6.4	-7.3	-8.4	-7.5	-5.5	-3.9	-1.9	-0.2	0.9	1.9	2.5	3.2	2.2	1.3	-0.3	-1.5	-3.2	-4.1	-5.5	-6.8	-2.9	3.2
21-Mar	-7.2	-7.5	-7.8	-8.1	-8.6	-8.8	-8.9	-9.2	-8.9	-7.7	-6.1	-4.5	-2.8	-1.4	0.3	0.6	-0.2	-1.0	-2.4	-3.5	-4.5	-5.8	-7.6	-8.7	-5.4	0.6
22-Mar	-8.7	-9.5	-10.8	-11.6	-11.9	-13.3	-14.0	-11.8	-9.1	-7.1	-5.8	-3.2	-3.4	-2.1	-1.1	-0.8	-1.0	-0.7	-1.5	-2.5	-3.3	-3.7	-3.9	-4.0	-6.0	-0.7
23-Mar	-4.0	-4.0	-4.4	-4.7	-4.8	-5.0	-5.4	-5.9	-6.5	-6.1	-5.2	-4.2	-3.1	-2.6	-2.8	-2.5	-3.1	-3.6	-4.7	-6.0	-7.4	-9.9	-10.3	-12.5	-5.4	-2.5
24-Mar	-14.2	-15.1	-16.9	-18.2	-19.1	-20.4	-21.4	-18.6	-13.2	-10.1	-7.4	-5.4	-3.5	-2.3	-0.7	-0.4	-0.6	-1.9	-4.2	-7.6	-10.0	-11.8	-13.3	-14.8	-10.5	-0.4
25-Mar	-15.9	-16.6	-16.3	-15.3	-14.7	-13.9	-13.1	-11.4	-9.3	-7.2	-5.6	-3.7	-1.3	0.7	2.3	2.8	3.4	3.1	-0.9	-2.9	-3.5	-4.6	-5.4	-5.7	-6.5	3.4
26-Mar	-7.1	-8.2	-7.7	-7.2	-6.6	-6.4	-6.0	-6.4	-4.1	-1.8	0.1	1.1	2.1	2.6	3.7	4.0	4.2	3.7	2.1	-2.1	-3.9	-4.9	-6.2	-7.4	-2.6	4.2
27-Mar	-8.4	-9.2	-10.0	-10.7	-11.1	-11.7	-12.1	-9.2	-4.2	-1.3	2.6	5.5	7.4	8.8	9.8	11.2	10.9	9.8	8.2	5.7	4.8	4.0	2.4	1.6	0.2	11.2
28-Mar	0.5	-0.2	-1.8	-3.7	-4.1	-4.4	-4.2	-1.4	0.8	3.7	6.2	7.1	9.7	13.7	12.5	12.5	12.6	11.7	9.8	5.6	3.0	0.9	0.6	0.7	3.8	13.7
29-Mar	-0.8	1.1	0.1	-0.6	-2.5	-3.3	-3.2	-0.7	2.0	4.7	8.0	11.2	12.3	12.6	13.2	13.6	14.1	11.2	7.4	5.8	5.2	4.2	3.5	2.8	5.1	14.1
30-Mar	1.8	0.6	-0.2	-1.5	-2.2	-2.6	-2.6	0.1	4.9	7.9	10.0	11.4	11.9	11.4	12.1	10.4	8.2	4.6	2.3	1.2	1.1	0.1	-0.9	-1.5	3.7	12.1
31-Mar	-2.1	-2.8	-3.7	-4.1	-4.8	-6.2	-6.2	-4.6	-3.5	-2.3	-1.3	-0.3	-0.1	0.9	0.6	1.0	1.1	1.1	1.0	0.7	0.7	-1.3	-2.0	-2.3	-1.7	1.1
	-6.4	-6.7	-7.1	-7.5	-7.8	-8.1	-8.2	-7.5	-6.1	-4.5	-3.0	-1.8	-0.6	0.2	0.7	0.9	0.8	0.1	-1.3	-2.7	-3.5	-4.4	-5.1	-5.6	Diurnal Average	
	1.8	1.1	0.1	-0.6	-0.8	-1.0	-1.3	0.1	4.9	7.9	10.0	11.4	12.3	13.7	13.2	13.6	14.1	11.7	9.8	5.8	5.2	4.2	3.5	2.8	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 2m (AT 2m) - C

Fort McKay - Bertha Ganter - March 2016



Ambient Temperature 2m (AT 2m) - C
Fort McKay - Bertha Ganter - March 2016

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	2	0.27	0.27
-20 - 0	582	78.23	78.49
0 - 10	141	18.95	97.45
10 - 20	19	2.55	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 94 % on Mar 12 03:00

Maximum Daily Average: 87.7 % on Mar 13

Minimum Value: 14 % on Mar 24 16:00

Minimum Daily Average: 40.3 % on Mar 24

Maximum Diurnal Average: 82.7 % at hour 7

Minimum Diurnal Average: 56.6 % at hour 16

Monthly Average: 70.0 %

Percentiles: $P_1 = 20$ $P_{10} = 47$ $Q_1 = 58$ Median = 74 $Q_3 = 84$ $P_{90} = 89$ $P_{99} = 94$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

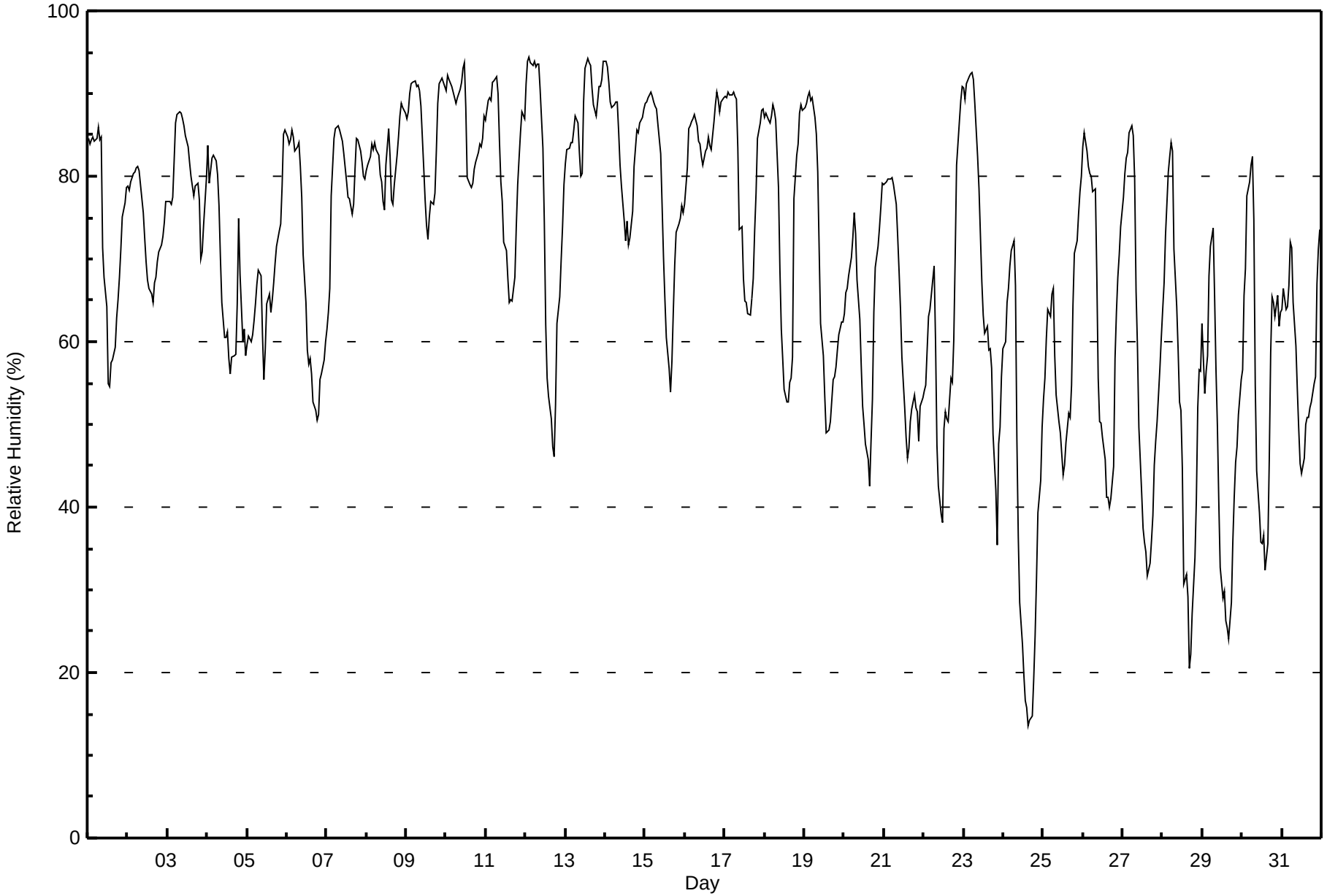
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	85	84	84	85	84	85	86	84	85	71	68	64	55	55	57	58	59	63	65	68	71	75	77	79	72.8	86
2-Mar	79	78	79	80	81	81	81	81	79	76	73	70	68	66	66	65	67	68	70	71	72	73	74	77	73.9	81
3-Mar	77	77	77	78	82	87	87	88	88	87	86	85	84	82	80	79	78	79	79	77	70	71	74	80	80.4	88
4-Mar	84	79	81	82	83	82	80	76	70	65	60	61	61	58	56	58	58	58	65	75	68	60	62	58	68.4	84
5-Mar	60	61	60	61	63	65	67	69	68	61	55	59	65	66	63	65	67	69	71	73	74	79	85	86	67.1	86
6-Mar	85	84	84	86	85	83	83	84	81	77	71	65	59	57	58	56	53	52	51	51	55	56	58	60	68.1	86
7-Mar	62	64	66	78	85	86	86	86	86	84	83	81	79	77	77	75	77	81	85	84	83	82	80	80	79.4	86
8-Mar	81	81	82	84	83	84	83	83	80	79	77	76	81	86	82	77	77	79	82	85	87	89	88	88	82.3	89
9-Mar	87	88	90	91	91	92	91	91	90	88	81	77	74	72	75	77	77	78	83	89	91	92	91	91	85.3	92
10-Mar	90	92	92	91	90	89	89	89	90	91	93	94	88	80	79	79	79	81	82	83	84	84	85	87	86.7	94
11-Mar	87	89	89	89	91	92	92	90	84	79	77	72	71	68	65	65	65	68	74	79	82	85	88	87	80.3	92
12-Mar	91	94	94	94	93	94	93	94	94	91	83	74	62	56	53	51	47	46	52	62	65	70	74	79	75.3	94
13-Mar	81	83	83	84	84	86	87	87	83	80	80	89	93	94	94	93	91	89	87	89	91	91	92	94	87.7	94
14-Mar	94	93	91	89	88	89	89	89	85	81	79	75	72	75	72	73	76	81	83	86	85	86	87	88	83.6	94
15-Mar	89	89	89	90	90	89	89	88	86	83	77	70	65	61	57	54	58	64	69	73	74	75	76	76	76.3	90
16-Mar	77	81	86	86	87	87	87	86	84	84	82	81	83	83	85	84	83	87	89	90	89	88	89	89	85.3	90
17-Mar	90	90	90	90	90	90	90	89	83	74	74	68	65	65	63	63	65	68	73	78	85	86	88	88	79.3	90
18-Mar	87	88	87	86	87	89	88	87	79	69	62	58	54	53	53	55	56	58	77	83	84	88	89	88	75.1	89
19-Mar	88	89	90	90	89	89	87	85	81	71	62	58	53	49	49	49	50	55	56	57	59	61	62	62	68.5	90
20-Mar	63	66	66	68	70	73	76	73	67	63	57	52	50	48	46	43	48	53	64	69	71	74	76	79	63.1	79
21-Mar	79	79	80	80	80	80	79	77	73	68	64	58	52	49	46	47	50	52	53	52	52	48	52	53	62.6	80
22-Mar	54	55	59	63	64	67	69	60	47	43	39	38	50	52	51	50	56	55	60	70	81	87	89	91	60.4	91
23-Mar	91	89	91	92	92	92	92	89	82	78	73	67	63	61	62	59	59	57	49	42	35	48	50	56	69.6	92
24-Mar	59	60	65	66	69	71	72	67	48	36	28	23	20	17	16	14	14	15	19	24	31	39	43	50	40.3	72
25-Mar	53	56	60	64	63	66	66	58	54	50	49	46	44	45	48	51	51	55	64	71	72	75	78	80	59.2	80
26-Mar	83	85	83	81	80	80	78	78	68	56	50	50	48	46	41	41	40	41	45	58	64	68	70	74	62.9	85
27-Mar	77	80	82	83	85	86	85	80	66	59	50	42	37	36	35	32	33	36	39	45	48	50	57	61	57.6	86
28-Mar	64	67	73	81	82	84	83	71	64	59	53	52	45	31	32	29	21	22	27	34	41	52	57	56	53.3	84
29-Mar	62	54	57	58	68	72	74	66	57	50	41	33	29	30	26	25	24	28	36	41	45	47	51	55	47.0	74
30-Mar	57	66	69	78	79	81	82	75	55	44	39	36	36	37	32	36	46	59	65	65	63	66	62	64	57.9	82
31-Mar	64	66	64	64	67	72	71	65	60	54	50	45	44	46	50	51	51	52	53	55	56	67	71	73	58.8	73
	76.7	77.6	78.9	80.4	81.5	82.6	82.7	80.1	74.8	69.5	65.0	61.9	59.7	58.0	57.1	56.6	57.2	59.6	63.5	67.1	68.7	71.3	73.4	75.1	Diurnal Average	
	94	94	94	94	93	94	93	94	94	91	93	94	93	94	94	93	91	89	89	90	91	92	92	94	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Fort McKay - Bertha Ganter - March 2016



Maximum Value: 1.3 mm on Mar 7 05:00

Maximum Daily Total: 8.6 mm on Mar 16

Minimum Value: 0.0 mm on Mar 1 01:00

Minimum Daily Total: 0.0 mm on Mar 1

Maximum Diurnal Total: 2.2 mm at hour 7

Minimum Diurnal Total: 0.1 mm at hour 1

Monthly Total: 23.54 mm

Percentiles: P_1 = 0.0 P_{10} = 0.0 Q_1 = 0.0 Median = 0.0 Q_3 = 0.0 P_{90} = 0.1 P_{99} = 0.7

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

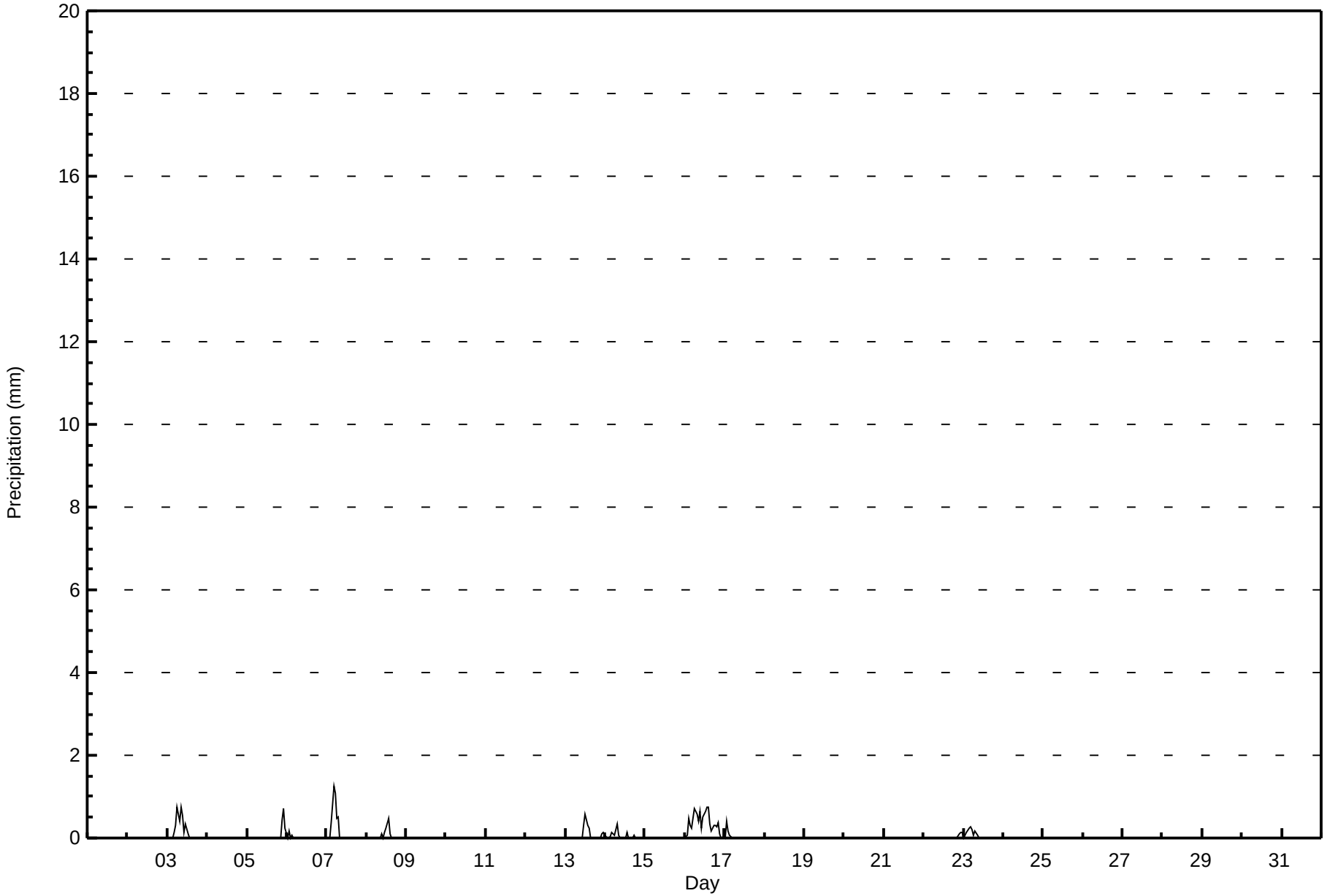
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
3-Mar	0.0	0.0	0.0	0.0	0.1	0.3	0.7	0.4	0.7	0.6	0.2	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	3.5	0.7
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
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	0.4	0.7	0.3	1.4	0.7
6-Mar	0.0	0.2	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	0.3	0.2
7-Mar	0.0	0.0	0.0	0.4	1.3	1.1	0.5	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	3.7	1.3
8-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.2	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5
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
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
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
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
13-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.6	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	1.7	0.6
14-Mar	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.3
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
16-Mar	0.0	0.1	0.5	0.3	0.2	0.5	0.7	0.6	0.4	0.6	0.2	0.5	0.6	0.8	0.7	0.3	0.2	0.3	0.3	0.3	0.4	0.1	0.0	0.1	8.6	0.8
17-Mar	0.0	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.4
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
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
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
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
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	0.1	0.1	0.1	0.4	0.1
23-Mar	0.0	0.1	0.1	0.2	0.3	0.2	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.3
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
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
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
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
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
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
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
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
	0.1	0.7	0.8	1.1	2.0	2.2	2.2	2.0	1.3	1.3	0.4	1.3	1.5	1.7	1.1	0.3	0.2	0.4	0.3	0.3	0.4	0.6	1.0	0.6	Diurnal Average	
	0.1	0.4	0.5	0.4	1.3	1.1	0.7	0.6	0.7	0.6	0.2	0.5	0.6	0.8	0.7	0.3	0.2	0.3	0.3	0.3	0.4	0.4	0.7	0.3	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Precipitation (PC) - mm

Fort McKay - Bertha Ganter - March 2016



Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	719	96.64	96.64
0.4 - 0.5	12	1.61	98.25
0.6 - 0.7	10	1.34	99.60
0.8 - 1.4	3	0.40	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

Maximum Value: 12 % on Mar 13 14:00

Maximum Daily Average: 2.5 % on Mar 13

Minimum Value: -1 % on Mar 29 17:00

Minimum Daily Average: -0.6 % on Mar 29

Maximum Diurnal Average: 0.6 % at hour 7

Minimum Diurnal Average: -0.2 % at hour 12

Monthly Average: 0.2 %

Percentiles: $P_1 = -1$ $P_{10} = -1$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 3$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

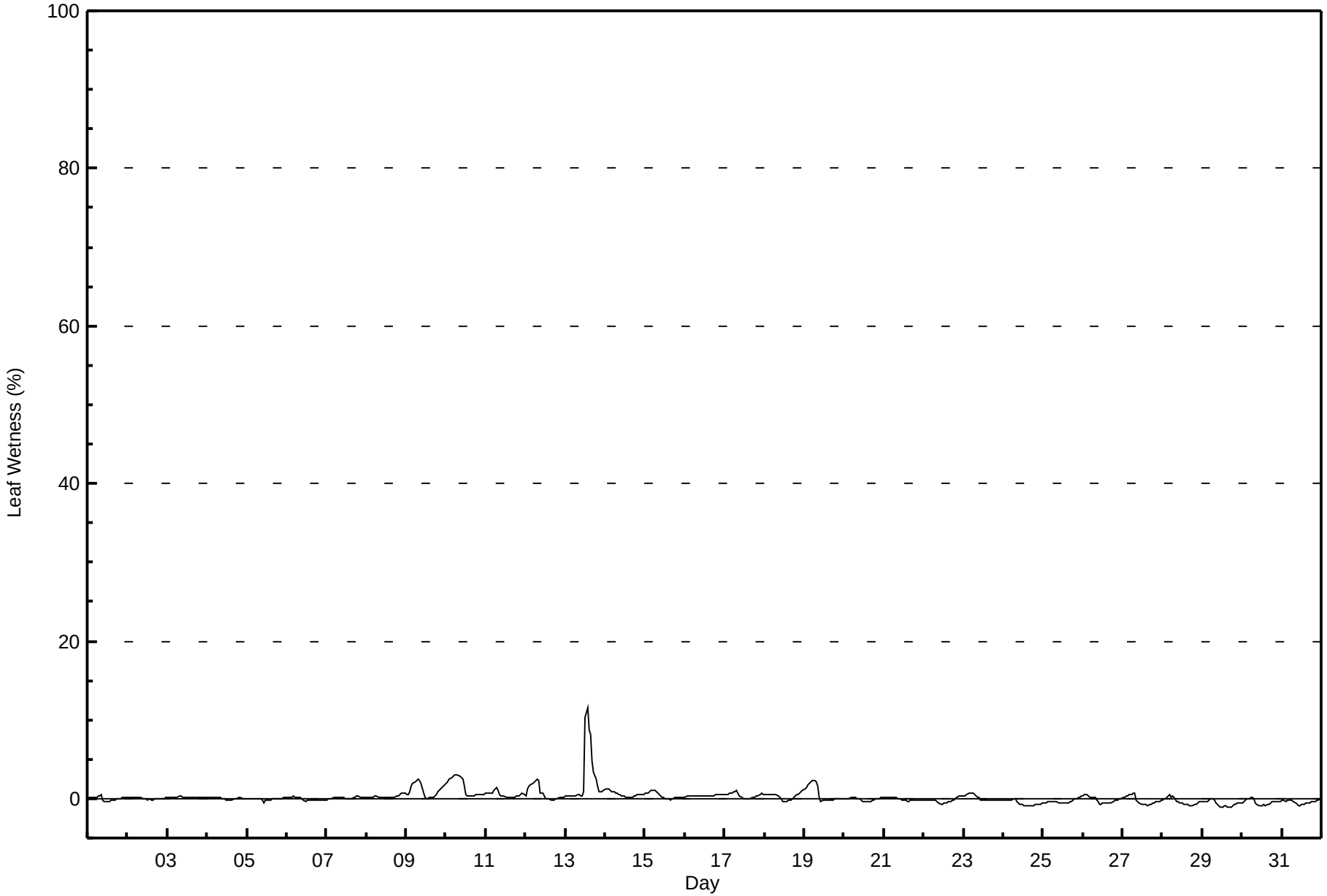
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	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
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
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
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	0.1	0
8-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.3	1
9-Mar	1	1	1	2	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0	1	1	1	2	2	1.1	2
10-Mar	2	2	2	3	3	3	3	3	3	3	2	2	0	0	0	0	0	0	0	0	1	1	1	1	1.5	3
11-Mar	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.5	1
12-Mar	0	1	2	2	2	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2
13-Mar	0	0	0	0	0	0	0	1	0	0	0	1	10	12	9	8	5	3	2	2	1	1	1	1	2.5	12
14-Mar	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.6	1
15-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
16-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0.4	1
17-Mar	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
18-Mar	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.3	1
19-Mar	1	1	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
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	-0.1	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	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	0	-0.2	0
23-Mar	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
24-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	-0.6	0
25-Mar	-1	-1	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	0	-0.3	0
26-Mar	0	1	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	-0.2	1
27-Mar	0	0	0	0	0	1	1	1	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	-0.2	1
28-Mar	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	-0.4	0
29-Mar	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-0.6	0
30-Mar	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	-0.4	0
31-Mar	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	0	-0.4	0
	0.3	0.3	0.4	0.4	0.5	0.6	0.6	0.6	0.4	0.1	-0.1	-0.2	0.1	0.1	0.0	0.0	-0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.2	Diurnal Average	
	2	2	2	3	3	3	3	3	3	3	2	2	10	12	9	8	5	3	2	2	1	1	2	2	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Leaf Wetness (LW) - %

Fort McKay - Bertha Ganter - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	239	55.84	55.84
0.4 - 0.5	74	17.29	73.13
0.6 - 0.7	39	9.11	82.24
0.8 - 1.4	32	7.48	89.72
1.5 - 10	41	9.58	99.30
> 10	2	0.47	99.77

Total Number of Valid Hours: 428

Total Number of Hours: 744

Maximum Value: 632 W/m2 on Mar 29 13:00

Maximum Daily Average: 199.8 W/m2 on Mar 29

Minimum Value: 0 W/m2 on Mar 1 01:00

Minimum Daily Average: 19.3 W/m2 on Mar 3

Maximum Diurnal Average: 363.9 W/m2 at hour 13

Minimum Diurnal Average: 0.0 W/m2 at hour 4

Monthly Average: 101.8 W/m2

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 3 $Q_3 = 146$ $P_{90} = 392$ $P_{99} = 569$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

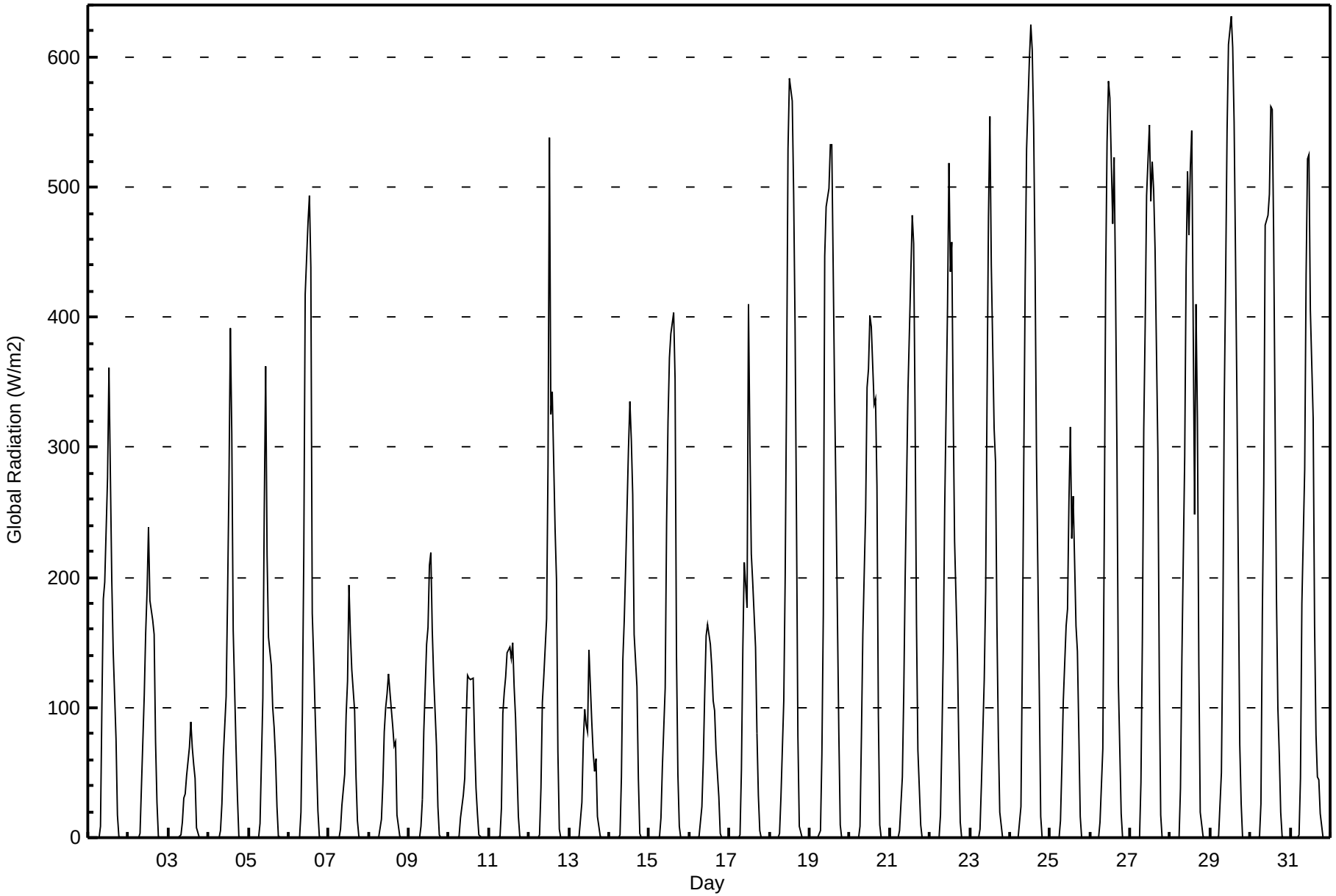
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0	0	0	0	0	0	0	8	102	184	196	277	361	279	198	143	76	17	1	0	0	0	0	0	76.7	361
2-Mar	0	0	0	0	0	0	0	4	39	110	157	190	238	183	167	156	74	27	1	0	0	0	0	0	56.0	238
3-Mar	0	0	0	0	0	0	0	3	12	31	33	47	70	89	69	56	45	8	0	0	0	0	0	0	19.3	89
4-Mar	0	0	0	0	0	0	0	5	26	63	109	185	274	392	310	159	69	31	1	0	0	0	0	0	67.6	392
5-Mar	0	0	0	0	0	0	0	11	108	252	362	217	154	132	100	85	61	24	1	0	0	0	0	0	62.7	362
6-Mar	0	0	0	0	0	0	0	20	96	217	418	472	493	439	173	138	98	21	1	0	0	0	0	0	107.7	493
7-Mar	0	0	0	0	0	0	0	6	25	48	94	120	194	157	129	98	46	13	1	0	0	0	0	0	38.8	194
8-Mar	0	0	0	0	0	0	0	15	42	82	100	110	126	99	86	71	74	17	1	0	0	0	0	0	34.2	126
9-Mar	0	0	0	0	0	0	0	8	29	82	149	162	210	219	160	123	71	24	2	0	0	0	0	0	51.6	219
10-Mar	0	0	0	0	0	0	1	16	32	46	89	124	123	122	123	73	38	18	2	0	0	0	0	0	33.6	124
11-Mar	0	0	0	0	0	0	1	23	96	111	123	142	147	138	149	116	92	16	1	0	0	0	0	0	48.1	149
12-Mar	0	0	0	0	0	0	2	38	104	123	168	287	538	326	343	238	199	67	6	0	0	0	0	0	101.6	538
13-Mar	0	0	0	0	0	0	1	27	73	99	87	81	144	89	65	51	61	16	1	0	0	0	0	0	33.2	144
14-Mar	0	0	0	0	0	0	2	47	137	167	208	299	335	305	264	156	116	45	3	0	0	0	0	0	86.9	335
15-Mar	0	0	0	0	0	0	1	15	54	115	242	320	368	388	404	352	140	49	8	0	0	0	0	0	102.4	404
16-Mar	0	0	0	0	0	0	1	24	60	111	155	164	148	131	105	98	67	31	4	0	0	0	0	0	45.8	164
17-Mar	0	0	0	0	0	0	3	53	145	211	177	410	304	218	196	146	80	33	5	0	0	0	0	0	82.5	410
18-Mar	0	0	0	0	0	0	3	32	105	201	349	529	583	566	495	393	245	78	8	0	0	0	0	0	149.5	583
19-Mar	0	0	0	0	0	0	6	64	171	447	485	499	532	533	438	341	260	80	10	0	0	0	0	0	161.1	533
20-Mar	0	0	0	0	0	0	9	78	156	252	345	360	402	393	333	338	270	94	10	0	0	0	0	0	126.7	402
21-Mar	0	0	0	0	0	0	6	46	112	200	272	345	434	478	457	327	165	67	10	0	0	0	0	0	121.7	478
22-Mar	0	0	0	0	0	0	17	74	145	254	408	519	436	458	329	227	141	71	12	0	0	0	0	0	128.8	519
23-Mar	0	0	0	0	0	0	6	41	122	190	340	477	554	441	315	289	163	77	19	0	0	0	0	0	126.4	554
24-Mar	0	0	0	0	0	0	24	139	289	428	529	598	625	606	546	440	294	113	16	0	0	0	0	0	193.7	625
25-Mar	0	0	0	0	0	0	13	55	106	162	176	258	316	230	263	162	143	80	16	0	0	0	0	0	82.5	316
26-Mar	0	0	0	0	0	0	12	69	230	428	535	582	569	472	523	425	297	120	19	0	0	0	0	0	178.3	582
27-Mar	0	0	0	0	0	0	42	152	314	394	493	548	489	520	498	452	296	123	18	0	0	0	0	0	180.8	548
28-Mar	0	0	0	0	0	0	38	138	293	437	513	464	516	544	248	410	322	134	20	1	0	0	0	0	169.9	544
29-Mar	0	0	0	0	0	1	50	160	333	431	542	610	632	607	550	446	337	71	26	0	0	0	0	0	199.8	632
30-Mar	0	0	0	0	0	1	26	173	271	471	478	494	562	560	463	184	100	63	19	1	0	0	0	0	161.1	562
31-Mar	0	0	0	0	0	2	45	180	283	433	522	525	406	322	163	79	46	45	19	1	0	0	0	0	127.9	525
	0.0	0.0	0.0	0.0	0.0	0.1	10.0	55.6	132.6	218.6	285.6	336.0	363.9	336.5	279.3	218.5	144.7	54.0	8.4	0.1	0.0	0.0	0.0	0.0	Diurnal Average	
	0	0	0	0	0	2	50	180	333	471	542	610	632	607	550	452	337	134	26	1	0	0	0	0	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Global Radiation (GR) - W/m2

Fort McKay - Bertha Ganter - March 2016



Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	415	55.78	55.78
21 - 100	98	13.17	68.95
101 - 300	127	17.07	86.02
301 - 600	99	13.31	99.33
601 - 900	5	0.67	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 McKay - Bertha Ganter - March 2016

Maximum Speed: 17 km/h on Mar 30 13:00

Maximum Daily Speed Average: 9.9 km/h on Mar 14

Minimum Speed Value: 0 km/h on Mar 27 08:00

Minimum Daily Speed Average: 0.1 km/h on Mar 22

Maximum Diurnal Speed Average: 3.8 km/h at hour 20

Minimum Diurnal Speed Average: 2.2 km/h at hour 12

Monthly Average Velocity: 2.7 km/h 7.5 deg

Percentiles: $P_1 = 1$ $P_{10} = 2$ $Q_1 = 3$ Median = 6 $Q_3 = 9$ $P_{90} = 10$ $P_{99} = 14$

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	S5	S2	SSW3	SW3	SW3	SSW2	WSW2	WSW3	WSW1	SSE4	SE6	S5	SSE3	WSW2	E4	E5	ENE5	NE4	N5	N4	N5	NNW6	N6	NNW7	ENE0.3	NNW7
2-Mar	N6	N6	N6	N6	N6	N6	N6	NNW6	N6	N5	N6	N5	NNE5	NNE5	NNE4	NNE5	NE4	N5	N7	N7	N6	N5	N4	NNW4	N5.3	N7
3-Mar	N5	N6	NNW6	NNW6	N8	N6	N6	N7	NNW8	N7	N7	N8	N9	N9	N10	N10	N10	N9	NNE8	NNE8	NNE6	N4	NNE3	NNW3	N6.9	N10
4-Mar	N2	NNE4	NE1	ESE3	ESE1	SSW2	SSW3	S2	SSE4	S4	SSE6	S8	S8	S11	S12	SSE12	SSE11	SE10	ESE4	ENE3	SE5	SE6	SSE4	S10	SSE4.7	S12
5-Mar	S10	S9	S10	S10	S9	S6	SW3	S7	S8	SSE6	ESE4	NE6	NNE9	NE9	NNE9	NNE9	NE8	NE9	NNE8	NNE10	NNE10	N9	N8	N7	ENE2.1	S10
6-Mar	N6	N6	N7	N7	N7	N7	N6	N7	N8	N9	NNE8	NE8	NE8	NNE9	N9	N10	N10	N11	N10	N10	N9	N9	N8	N8	N7.9	N11
7-Mar	N8	N8	N7	N7	N8	N7	N8	N6	N6	NNW5	NNW5	NW5	NW2	W3	SW4	SE5	SSE6	N3	N7	N6	N7	NNE5	ENE5	NNE3	N4.0	N8
8-Mar	NNW3	SW1	WNW1	N2	NNE1	NNW1	E1	NNE1	S1	S1	NNE2	SE1	NNE3	N5	NNE3	ENE3	NNE2	N3	NNE3	N3	N4	N4	N3	N4	N1.8	N5
9-Mar	N5	N6	N6	N5	N5	N5	N4	N4	N4	N3	ESE3	SSE3	SSE3	SSE5	SSE7	S6	SSE2	NNW1	N3	NNW1	NNW2	NW3	NW2	WSW1	N1.2	SSE7
10-Mar	SW2	S2	SSW3	SSE1	SW2	S2	SE2	N1	N3	N5	N4	NE2	SE12	SE11	SE12	SE11	ESE10	ESE9	SE9	SE10	SSE10	S8	SSW3	S1	SE4.2	SE12
11-Mar	SSW2	WSW1	SSW4	WSW4	WNW6	WNW6	WNW6	W6	WNW6	NNW5	N4	ESE1	WNW3	NW5	NW5	NW6	NNW5	NW3	SW1	WSW2	N1	SSW3	S4	S5	WNW2.5	WNW6
12-Mar	SW2	SSE2	NNE2	NNW2	WSW0	N4	NNW3	N4	NNE4	N5	N7	NNE7	NNE7	N7	N9	N7	E6	SE14	SE8	ESE6	SE6	ESE4	NNE1	N5	NE2.4	SE14
13-Mar	N4	NNW4	N3	NNE2	N4	NNW3	NNW4	N7	N9	N9	N8	N7	N7	N9	N10	N10	N13	N11	N12	NNW12	NNW12	NNW11	NNW9	N9	N7.7	N13
14-Mar	N8	N7	N10	N12	N10	N11	N10	N11	N11	N12	N12	NNE10	NNE12	N12	N12	N12	N10	N11	N10	N9	N8	N7	N6	N5	N9.9	N12
15-Mar	NNW5	N6	NNW5	NNW5	N5	N5	N5	NNW5	N5	N4	NNE5	N5	N5	NE5	NNE7	N6	NE6	NNE7	N7	N7	N10	N9	N8	N8	N5.9	N10
16-Mar	N9	N7	N10	N10	N9	N9	N9	N9	N10	N10	N8	N9	N7	NNE9	NNE9	N11	N9	NNW7	NW4	WNW3	NE3	N3	WNW3	W2	N7.2	N11
17-Mar	WSW2	SW2	WNW5	WNW5	WNW4	WNW5	WNW4	WNW4	W3	WNW5	NW6	NW12	NW12	NNW9	NW10	NW8	NNW7	NW5	NW5	NW4	NW2	WSW3	SSW3	SSW3	NW4.7	NW12
18-Mar	SSE2	SSW3	W3	W3	W2	W3	WSW2	WNW2	NNW3	NNE4	ESE2	SSE4	SSE6	SSE9	SSE11	S14	S12	S7	ENE2	N5	N5	NNW3	NNW3	NNW5	S1.5	S14
19-Mar	NNW5	NNW3	NNW4	N4	NNE3	N4	N6	N6	N6	N6	ENE5	NNE7	NNE6	NNE8	N9	N10	N9	N10	N11	N11	N11	N9	N7	N7	N6.7	N11
20-Mar	N8	N7	N6	NNW6	N5	N5	N6	N5	N6	NNE6	NNE7	NNE7	N10	N11	NNE10	NNE10	N13	N11	N11	N11	N12	N11	N11	N10	N8.5	N13
21-Mar	N11	N10	N10	N9	N8	N7	N8	N9	N10	N10	N9	NNE10	NNE10	N12	NNE11	NNE12	NE10	ENE9	ENE7	ENE5	NE4	NE4	NNE3	N5	NNE7.9	N12
22-Mar	N5	N6	N3	N2	N4	N3	NNW3	NNE2	S3	SSE4	S4	SSE6	S11	S9	S6	SSW7	SSW5	ESE2	N4	NNW4	N4	N3	N3	N4	SSE0.1	S11
23-Mar	ENE2	E2	N3	N3	N3	N4	NNW6	N9	N8	N9	N10	NNE9	NNE9	NNE9	NNE9	NE8	NE9	NE6	NNE6	N6	N5	NNW5	N6	NNW5	NNE5.9	N10
24-Mar	N5	NNW2	N3	N4	NNW2	N2	N2	NNE1	NNE6	NNE8	NNE8	N9	N7	N6	NE5	NE6	ENE7	NE5	N4	NNW4	NNW4	N3	NNW3	NNW2	NNE4.1	N9
25-Mar	NW1	WNW1	SW2	S2	S2	SSW2	S2	S3	SSE5	S7	SSE9	S7	S4	SSE2	SSE3	S3	SSE3	SSE3	N3	W1	NNW3	NNW4	NNW5	NNW5	S1.6	SSE9
26-Mar	NW1	WNW2	WNW2	N2	NW2	NW3	NW5	NW4	NNW3	NE5	E8	E7	E7	ENE6	SE4	S10	S10	S8	S7	S4	SSE2	SW2	NNW3	NNW2	SE1.1	S10
27-Mar	WNW2	W1	W1	NNW1	W1	W2	NW1	WSW0	SSE3	S7	S8	S9	S11	S13	SSE12	SSE12	SSE14	SSE12	SSE8	SSE6	S9	S9	S6	SSW7	S5.8	SSE14
28-Mar	S6	S6	S5	SSE3	S4	S3	S5	S7	S10	SSE12	S11	SSE13	S10	WSW7	WNW13	WNW11	NW16	NW12	NW9	NW6	NW6	WNW5	WNW6	W6	SW3.7	NW16
29-Mar	W4	W5	W4	WSW1	S3	S4	S5	SSE7	S9	SSE11	SSE8	SSE8	ESE5	ENE10	E10	E10	E6	NE3	N2	N1	WSW2	NNW3	W1	NNW2	SE2.4	SSE11
30-Mar	W1	NW1	NNW2	WSW3	NNW2	NNW3	NNE2	SE2	N5	ENE3	SSE5	NW6	NNW17	N14	N13	NNW15	NNE9	NNE11	NNE12	N13	N8	N13	N14	N12	N6.7	NNW17
31-Mar	N10	NNE10	N10	N8	NNW5	NNW4	NNW4	NE4	E7	E7	E9	ESE7	E7	SSE8	SSE9	SSE7	SSE6	SSE8	S6	S4	SSW5	SSW2	S3	SSW4	E2.0	N10
	NNW2.6	N2.4	NNW2.8	NNW2.8	NNW2.6	NNW2.8	NNW2.9	N2.6	N2.5	NNE2.6	NE2.6	NE2.2	NNE2.8	NNE3.1	NNE2.9	NE2.6	NE2.9	NE3.1	N3.6	N3.8	N3.5	N3.2	N3.1	NNW2.9	Diurnal Average	
	N11	N10	N10	N12	N10	N11	N10	N11	N11	N12	N12	SSE13	NNW17	N14	N13	NNW15	NW16	SE14	NNE12	N13	N12	N13	N14	N12	Diurnal Maximum	

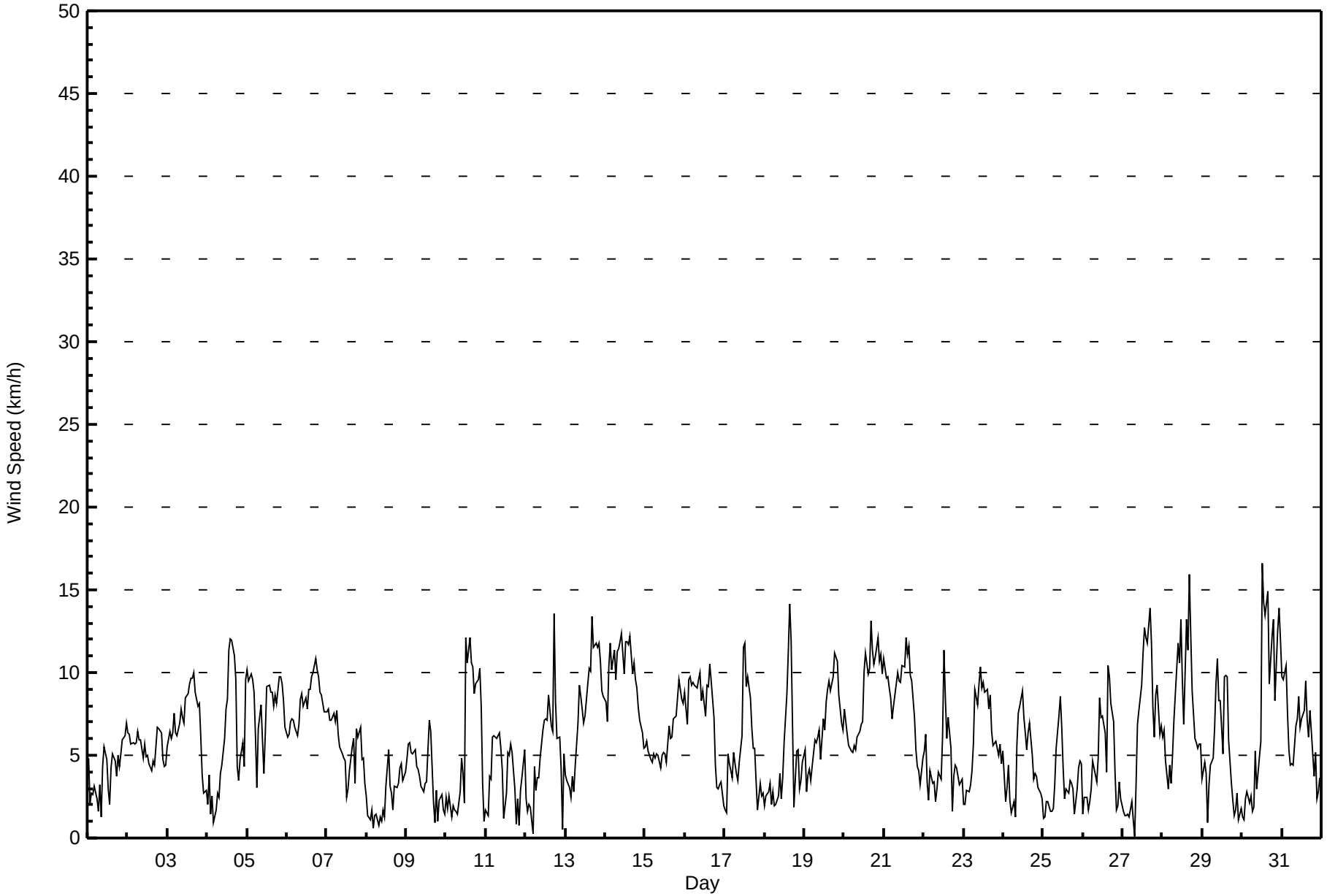
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Fort McKay - Bertha Ganter - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	358	48.12	48.12
6 - 11	343	46.10	94.22
12 - 19	43	5.78	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

Fort McKay - Bertha Ganter - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	83	26	13	9	4	10	6	22	30	17	12	18	15	17	20	56	358
6 - 11	165	44	10	6	11	4	8	23	39	2	0	1	2	6	8	14	343
12 - 19	16	3	0	0	0	0	3	7	4	0	0	0	0	1	4	5	43
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	264	73	23	15	15	14	17	52	73	19	12	19	17	24	32	75	744

Total Number of Valid Hours: 744

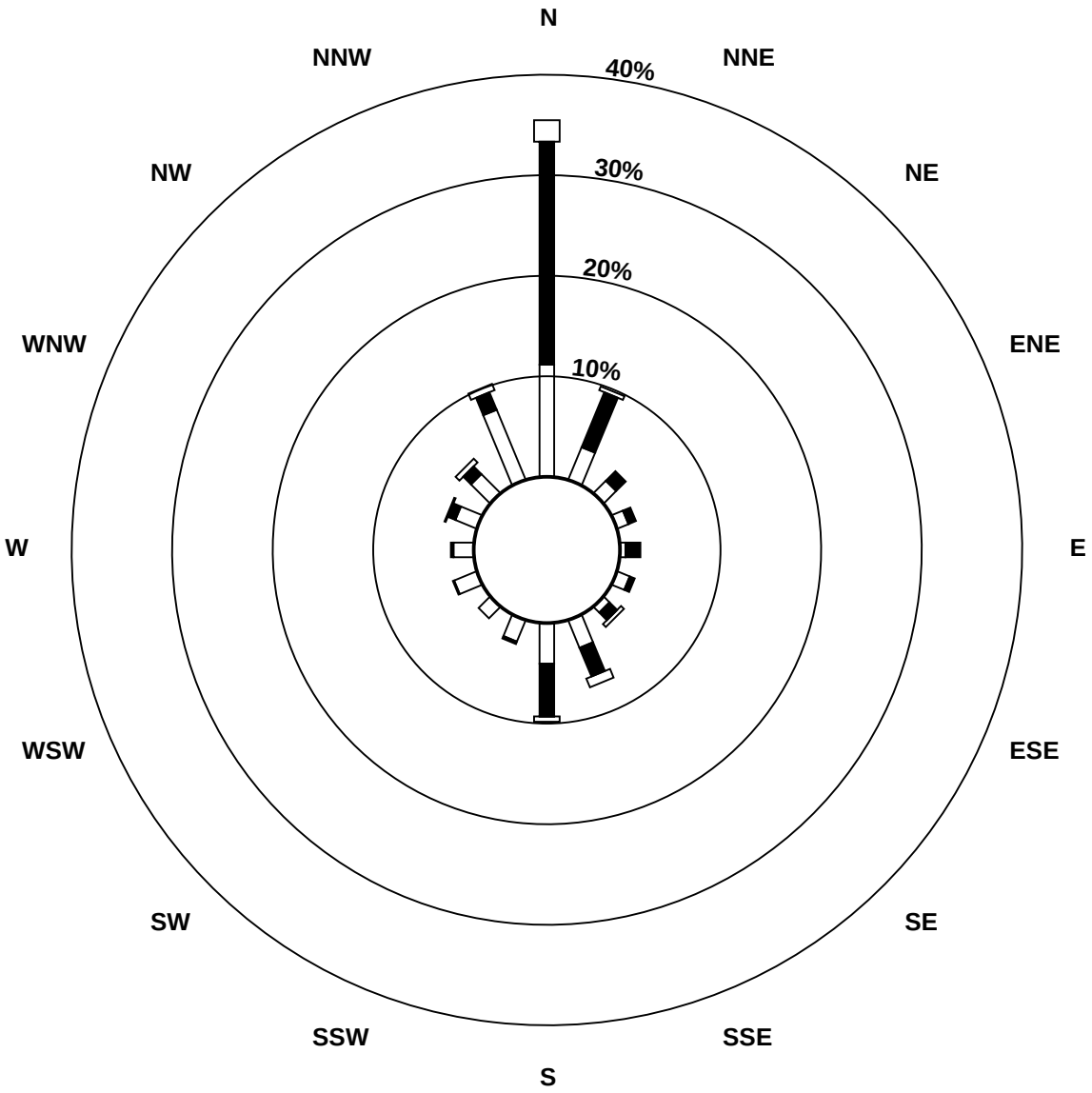
Total Number of Hours: 744

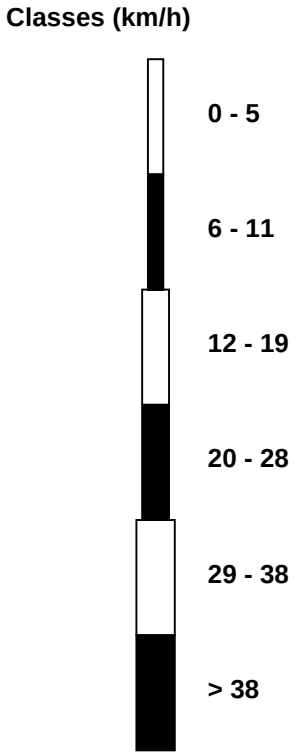
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Wind Speed (WS) - km/h

Fort McKay - Bertha Ganter (AMS 1)





Total Number of Valid Hours: 744

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 7 km/h on Mar 30 13:00

Minimum Value: 0 km/h on Mar 1 02:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 5$

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	1	0	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	2	2	2
2-Mar	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2
3-Mar	1	2	1	2	2	2	2	2	2	2	2	3	3	3	4	4	4	3	3	3	2	2	1	1	4
4-Mar	1	2	1	1	1	1	1	1	1	1	1	1	2	2	3	3	2	2	3	1	2	2	2	2	3
5-Mar	2	2	2	2	2	2	2	2	2	2	2	2	4	4	4	3	3	4	3	4	4	3	3	2	4
6-Mar	2	2	2	2	2	3	2	2	3	3	3	3	3	3	3	4	4	4	3	3	3	3	3	3	4
7-Mar	2	3	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	2	2	2	2	2	2	1	3
8-Mar	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2
9-Mar	1	2	2	2	2	2	1	1	1	1	1	1	1	2	2	2	1	1	1	3	1	0	1	1	3
10-Mar	1	1	1	1	1	1	1	1	1	1	1	2	3	2	3	3	3	3	3	2	2	2	2	1	3
11-Mar	1	1	1	2	2	2	2	2	2	2	2	1	2	2	2	2	2	1	1	1	1	1	1	1	2
12-Mar	1	1	1	1	1	1	1	1	2	2	2	3	3	2	2	2	5	3	3	2	1	2	1	2	5
13-Mar	2	1	1	1	1	1	1	2	3	3	3	3	3	3	3	3	5	4	4	4	4	4	3	3	5
14-Mar	3	2	4	4	4	4	3	4	4	5	5	5	4	4	4	4	4	4	3	3	3	2	2	2	5
15-Mar	1	2	2	1	1	1	1	1	2	2	2	2	2	2	2	3	2	3	2	2	3	3	3	2	3
16-Mar	3	2	3	3	3	3	3	3	3	3	3	3	3	4	4	3	3	2	2	1	2	1	1	1	4
17-Mar	1	1	1	1	1	1	1	1	1	2	4	4	4	3	3	3	2	2	2	2	1	1	1	1	4
18-Mar	1	1	1	1	1	1	1	1	1	2	2	3	2	2	2	3	2	2	1	1	1	1	1	1	3
19-Mar	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	4	3	3	4	3	2	4
20-Mar	2	2	2	2	2	2	1	2	2	2	2	3	3	4	4	5	5	4	3	4	4	3	4	3	5
21-Mar	3	3	3	3	3	2	3	3	3	3	3	4	4	4	5	5	4	3	2	2	2	2	1	1	5
22-Mar	1	1	1	0	1	1	1	1	1	1	1	4	2	2	2	2	2	1	1	1	1	1	1	1	4
23-Mar	1	1	1	1	1	1	2	3	3	4	3	3	4	3	4	3	3	3	2	2	2	1	1	1	4
24-Mar	1	1	1	1	1	1	1	1	2	2	3	3	3	3	2	2	2	2	1	1	1	1	1	1	3
25-Mar	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	2	1	1	1	2	2	2
26-Mar	1	2	1	1	1	1	1	2	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2
27-Mar	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	2	1	3	2	1	1	3
28-Mar	1	1	1	1	1	1	1	1	3	2	2	3	3	4	5	4	5	4	3	1	1	1	1	1	5
29-Mar	2	2	2	1	1	1	1	1	3	2	2	1	3	3	3	3	2	2	1	1	1	2	1	1	3
30-Mar	1	1	1	1	1	2	1	1	2	2	1	3	7	6	5	5	5	5	5	5	4	5	5	5	7
31-Mar	4	4	4	3	2	1	1	2	2	3	3	2	2	2	2	2	1	2	2	1	2	1	1	1	4
	4	4	4	4	4	4	3	4	4	5	5	5	7	6	5	5	5	5	5	5	4	5	5	5	
	Diurnal Maximum																								

Direction of Maximum Speed: 348 deg on Mar 30 13:00
Direction of Maximum Daily Speed Average: 2.9 deg on Mar 14

Direction of Minimum Speed: 256 deg on Mar 27 08:00

Direction of Minimum Daily Speed Average: 0.1 deg on Mar 22

Monthly Average Direction: 331.5 deg

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	187	177	204	228	224	211	240	244	238	148	146	174	157	246	91	87	76	48	7	1	357	348	3	345	75.3
2-Mar	349	354	352	354	356	353	358	348	353	9	352	7	24	12	29	23	43	6	355	359	5	3	357	348	1.5
3-Mar	352	351	334	348	355	353	359	356	347	356	1	1	4	11	11	7	10	11	14	15	16	5	18	336	1.7
4-Mar	10	19	43	112	110	194	213	172	160	177	156	171	171	171	169	152	147	126	102	61	132	134	166	171	152.6
5-Mar	179	179	184	183	187	183	216	179	174	147	122	52	29	34	26	25	49	34	16	17	14	6	4	2	65.7
6-Mar	357	354	357	3	1	9	6	358	5	9	25	46	53	15	3	6	4	1	3	4	2	5	5	359	7.8
7-Mar	359	0	355	350	356	355	358	353	349	348	342	310	304	266	228	144	160	4	350	354	8	29	67	29	356.1
8-Mar	328	227	283	359	21	336	96	16	177	176	20	124	15	6	13	64	20	6	13	2	352	353	355	4	6.0
9-Mar	4	1	349	359	352	357	356	349	354	2	122	151	163	152	160	175	165	343	351	329	348	323	305	237	4.1
10-Mar	217	184	194	156	220	170	144	353	6	7	2	48	134	131	139	134	122	122	134	142	158	170	192	188	138.6
11-Mar	208	253	201	237	285	285	286	279	292	331	8	110	298	316	315	323	338	306	214	255	356	200	177	170	286.2
12-Mar	218	156	30	337	241	0	342	356	13	7	4	18	24	7	350	359	99	136	135	122	128	113	14	10	44.3
13-Mar	3	346	3	13	349	337	340	351	3	6	11	358	355	352	350	352	353	351	349	346	345	337	334	351	351.5
14-Mar	354	356	1	358	1	0	1	4	8	8	6	16	15	6	8	0	6	3	3	360	356	355	356	349	2.9
15-Mar	346	350	346	346	358	349	349	348	354	350	14	2	4	39	30	7	45	14	6	3	2	2	4	354	2.9
16-Mar	356	359	357	354	352	357	0	6	359	2	10	350	2	12	14	6	1	339	305	295	36	354	302	271	356.8
17-Mar	256	231	299	296	294	296	296	286	276	295	313	318	325	328	323	324	327	324	311	311	312	258	211	200	307.3
18-Mar	161	199	269	276	275	277	250	289	328	28	114	154	157	151	162	172	172	171	65	1	1	338	343	348	175.2
19-Mar	339	338	337	350	12	359	1	358	5	6	60	14	16	23	7	2	360	3	356	354	350	1	5	351	1.9
20-Mar	355	353	360	347	360	359	5	1	11	13	20	13	360	10	15	14	3	5	0	356	359	358	358	360	3.1
21-Mar	359	0	357	358	359	7	8	3	2	5	5	12	17	6	22	30	35	71	72	67	50	44	25	10	16.8
22-Mar	8	8	355	353	350	349	348	33	169	159	175	163	186	183	177	193	194	105	4	346	355	1	8	10	156.5
23-Mar	74	90	3	357	356	349	347	360	3	4	4	14	17	29	21	39	34	35	20	8	2	348	356	345	12.1
24-Mar	351	338	5	360	330	7	9	29	15	13	14	5	5	7	39	56	69	53	355	345	344	349	347	342	12.1
25-Mar	320	288	216	177	184	194	172	181	165	170	166	172	172	164	147	170	151	161	1	266	329	330	342	334	180.2
26-Mar	315	294	291	354	325	306	316	313	332	39	92	84	87	77	124	169	176	173	179	170	163	221	343	333	127.8
27-Mar	290	272	274	336	259	259	305	256	155	173	169	183	177	173	165	166	156	163	164	167	174	171	174	193	173.2
28-Mar	181	177	176	167	179	182	174	176	171	167	172	166	181	253	300	290	307	311	305	323	304	287	283	280	234.6
29-Mar	272	268	276	256	170	184	178	168	171	161	155	150	118	77	81	90	88	54	5	358	251	332	272	329	137.3
30-Mar	275	324	333	258	347	341	13	131	5	58	151	317	348	356	352	343	16	32	21	8	354	6	5	7	1.0
31-Mar	3	14	9	1	345	336	345	37	83	87	93	114	87	154	158	163	168	165	180	191	193	207	182	203	98.4
	346.2	348.9	342.0	345.1	342.6	341.1	346.0	350.5	4.2	24.0	44.1	35.7	33.2	27.2	28.8	34.6	43.7	35.0	10.8	4.1	2.9	356.3	354.3	347.6	
	Diurnal Average																								

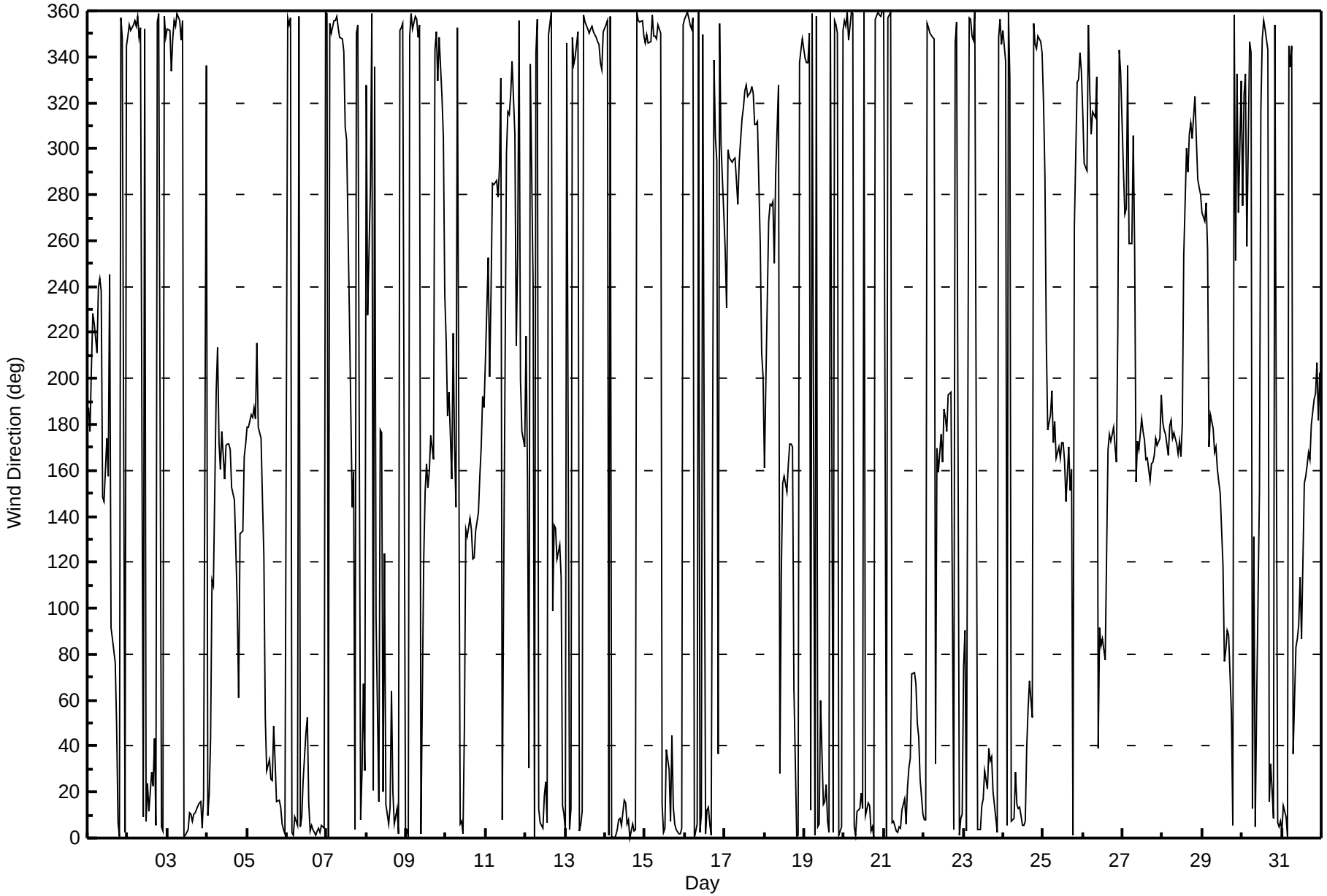
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Fort McKay - Bertha Ganter - March 2016



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Fort McKay - Bertha Ganter - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 99 deg on Mar 12 23:00

Minimum Value: 7 deg on Mar 28 21:00

Percentiles: P_1 = 11 P_{10} = 15 Q_1 = 22 Median = 29 Q_3 = 40 P_{90} = 53 P_{99} = 86

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	13	28	14	22	22	21	43	15	63	13	11	32	53	72	45	21	30	43	28	33	27	23	25	20	72
2-Mar	25	22	23	24	26	29	24	25	28	41	32	44	49	53	53	48	50	28	25	24	27	31	26	17	53
3-Mar	21	19	21	25	24	23	26	26	25	31	30	28	31	37	35	34	33	33	36	36	38	41	45	21	45
4-Mar	43	43	65	24	72	45	20	45	20	21	18	16	17	15	15	17	14	18	38	25	41	24	25	14	72
5-Mar	13	15	16	15	15	21	47	14	16	10	45	41	44	44	42	39	46	50	38	37	32	31	31	29	50
6-Mar	29	26	26	28	32	35	31	26	30	34	44	46	45	36	30	29	31	28	29	32	33	29	29	25	46
7-Mar	28	29	28	26	25	24	24	26	26	27	27	33	74	74	41	10	12	88	26	27	32	44	41	46	88
8-Mar	33	42	58	40	76	47	61	84	74	85	71	74	60	27	49	62	83	40	39	32	22	26	31	28	85
9-Mar	29	35	27	28	26	28	29	25	31	54	52	25	22	24	17	19	77	76	31	89	32	21	42	31	89
10-Mar	25	22	15	33	36	39	54	57	27	24	35	65	15	17	15	16	19	16	16	14	19	14	21	85	85
11-Mar	65	51	17	50	21	23	26	29	26	41	41	83	82	36	38	30	30	32	79	35	86	32	39	17	86
12-Mar	42	42	40	34	88	16	40	30	42	33	31	35	40	42	26	38	67	15	15	14	14	24	99	25	99
13-Mar	44	36	26	25	19	20	27	28	29	32	37	31	29	25	24	27	26	25	26	24	26	23	24	28	44
14-Mar	28	28	31	27	30	29	30	30	33	35	33	46	35	31	34	28	35	30	30	29	26	31	28	25	46
15-Mar	22	22	20	18	23	20	20	22	31	41	45	46	52	62	47	53	44	35	35	29	29	32	29	25	62
16-Mar	27	27	27	28	26	28	30	32	31	29	34	31	34	38	38	30	30	26	18	17	60	36	18	39	60
17-Mar	33	60	13	12	18	13	15	19	36	38	42	25	24	23	24	23	24	19	16	50	44	14	28	29	60
18-Mar	62	27	49	24	45	24	51	62	48	53	86	78	32	17	15	12	12	19	44	19	19	25	58	25	86
19-Mar	20	25	17	21	27	23	24	31	31	40	61	41	46	39	34	29	32	28	26	25	23	37	37	26	61
20-Mar	22	23	27	25	33	18	18	24	27	30	35	41	30	32	38	43	31	30	26	27	28	30	26	27	43
21-Mar	26	29	25	26	28	31	28	31	28	29	30	36	37	30	41	41	46	30	27	28	42	34	35	16	46
22-Mar	17	16	23	18	17	12	11	57	19	30	33	29	19	29	30	24	25	81	38	29	23	26	23	21	81
23-Mar	42	44	18	24	21	19	22	28	37	34	32	43	44	44	44	50	38	46	43	31	25	15	19	12	50
24-Mar	16	71	31	19	40	37	44	59	28	36	41	38	51	50	65	54	33	42	23	19	19	12	53	21	71
25-Mar	25	56	25	37	30	28	32	25	18	13	12	19	25	46	36	29	39	50	31	43	35	19	21	47	56
26-Mar	48	59	52	25	40	38	20	34	53	58	18	34	33	34	60	14	16	13	12	13	29	52	24	49	60
27-Mar	54	70	67	54	64	16	33	76	36	17	19	21	15	14	18	18	16	15	15	15	13	12	15	12	76
28-Mar	15	14	14	16	11	14	10	12	13	12	19	12	29	54	26	30	23	20	17	15	7	11	12	17	54
29-Mar	47	53	56	91	29	15	13	15	13	12	13	11	57	22	22	17	29	34	28	84	53	54	75	50	91
30-Mar	61	71	60	22	70	46	54	51	39	71	29	70	31	33	33	28	44	44	41	35	29	32	32	33	71
31-Mar	35	35	33	31	25	15	20	44	29	41	29	40	30	21	15	15	14	16	15	19	15	46	28	37	46
	65	71	67	91	88	47	61	84	74	85	86	83	82	74	65	62	83	88	79	89	86	54	99	85	
	Diurnal Maximum																								

Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	March 16, 2016	Last Calibration	February 19, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	12:55
Gas Cert Reference	LL107945	Station temp.	21 Deg C
Cal Gas Concentration	49.7 ppm	Cal Gas Exp Date	08/09/2018
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.	2582

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-614	-614
Analyzer IP address	192.168.1.43		Lamp voltage	819	820
Calculated slope	0.995834	0.998936	Chamber temp	45.1	45.3
Calculated intercept	1.469391	-0.391058	Pressure	685.1	689.2
Analyzer Background	12.4	12.5	Flow	0.501	0.503
Analyzer Coefficient	0.942	0.950	Intensity	90	90

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	0.4	----
as found span	5500	81.3	734.7	727.3	1.010
calibrator zero	5500	0.0	0.0	1.0	----
high point	5500	81.3	734.7	735.8	0.998
second point	5500	45.6	412.1	413.6	0.996
third point	5500	22.8	206.0	205.4	1.003
as left zero	5500	0.0	0.0	0.9	----
as left span	5500	81.3	734.7	732.7	1.003
				Average Correction Factor	0.999

Corrected As found	726.8	Previous response	736.3	% change	1.3%

Notes:

Span adjusted. Long high point due to maintenance being conducted on NMHC analyzer during calibration.

Calibration Performed By: Devin Russell

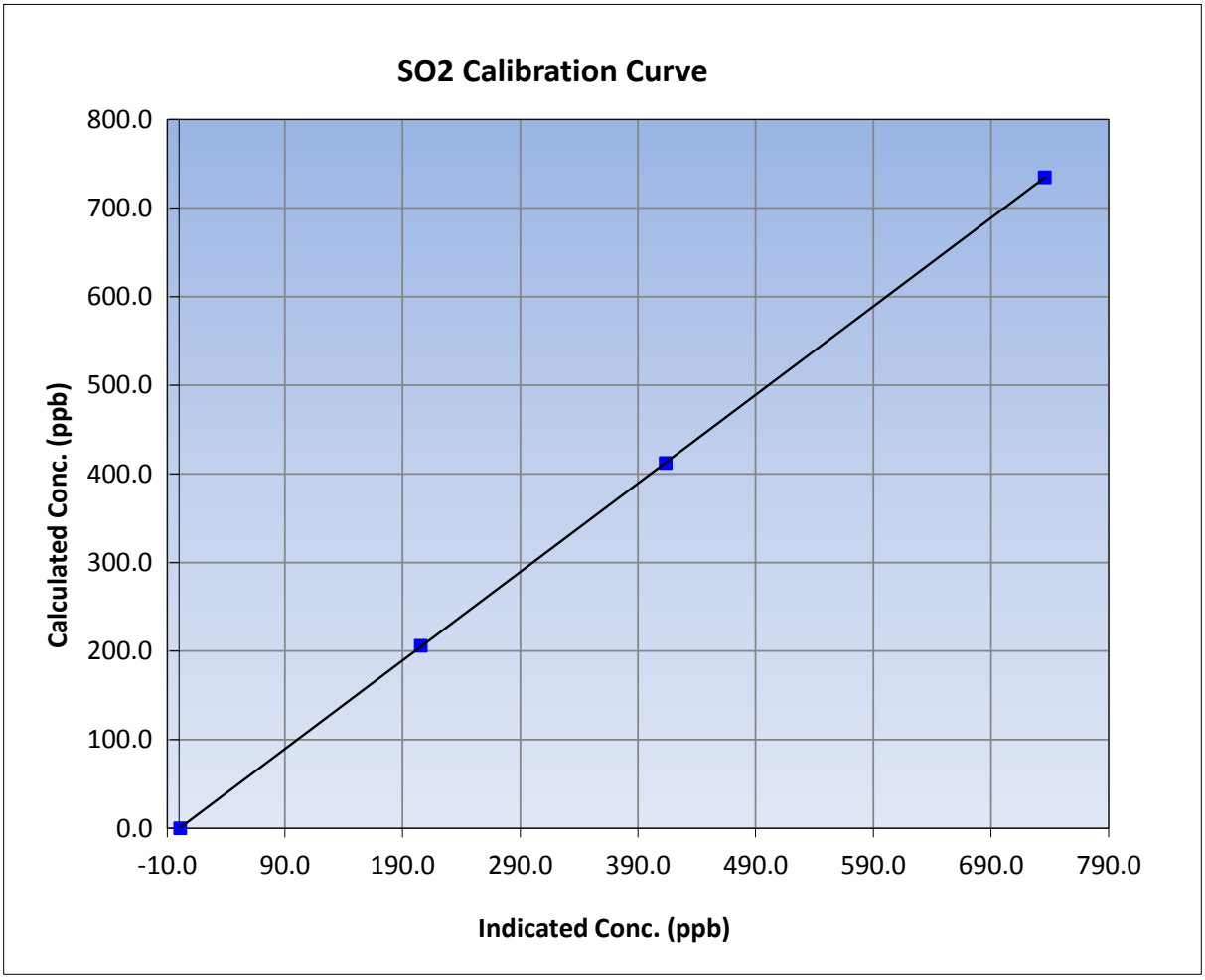
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

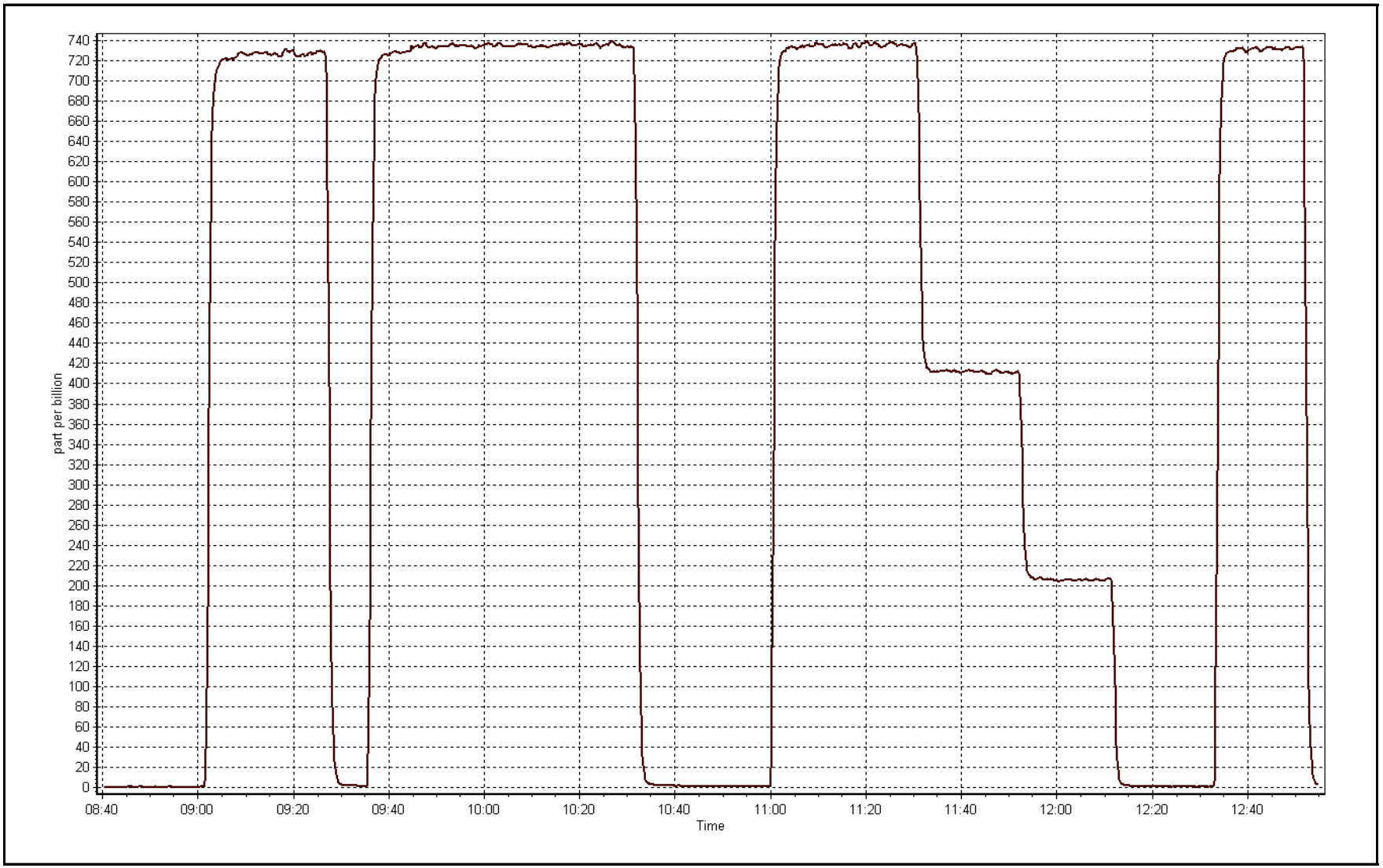
Calibration Date	March 16, 2016	Previous Calibration	February 19, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:40	End Time (MST)	12:55
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301448

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.0	----	Correlation Coefficient	0.999992
734.7	735.8	0.9985		
412.1	413.6	0.9963	Slope	0.998936
206.0	205.4	1.0030		
			Intercept	-0.391058



SO2 Calibration Plot Date: March 16, 2016



Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

Calibration Date	March 17, 2016	Last Calibration	February 18, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	8:30	End Time (MST)	13:30
Gas Cert Reference	LL27480	Station temp.	21 Deg C
Cal Gas Concentration	10.6 ppm	Cal Gas Exp Date	21/12/2012
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.	2582
SO2 gas concentration	49.7 ppm	SO2 gas cert/exp	SA140071A 26/Sep/17

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-859	-860
Analyzer IP address	192.168.1.42		Lamp voltage	1164	1168
Calculated slope	1.000829	0.994107	Chamber temp	45	45
Calculated intercept	0.147310	0.147164	Pressure	664.2	676.3
Analyzer Background	1.88	1.9	Flow	0.402	0.439
Analyzer Coefficient	1.018	1.029	Intensity	80	80
			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	-0.2	----
as found span	6500	46.0	75.0	73.7	1.018
SO2 scrubber check	5500	22.8	206.0	0.4	----
calibrator zero	6500	0.0	0.0	-0.1	----
high point	6500	46.0	75.0	75.4	0.996
second point	6500	24.6	40.1	40.1	1.000
third point	6500	12.3	20.1	20.1	0.999
as left zero	6000	0.0	0.0	0.0	----
as left span	6500	46.0	75.0	75.1	0.999
				Average Correction Factor	0.998

Corrected As found	73.8	Previous response	74.8	% change	1.3%

Notes:

Internal pump bypassed and external pump installed after as founds. Scrubber check completed after as founds. Span adjusted.

Calibration Performed By: Devin Russell

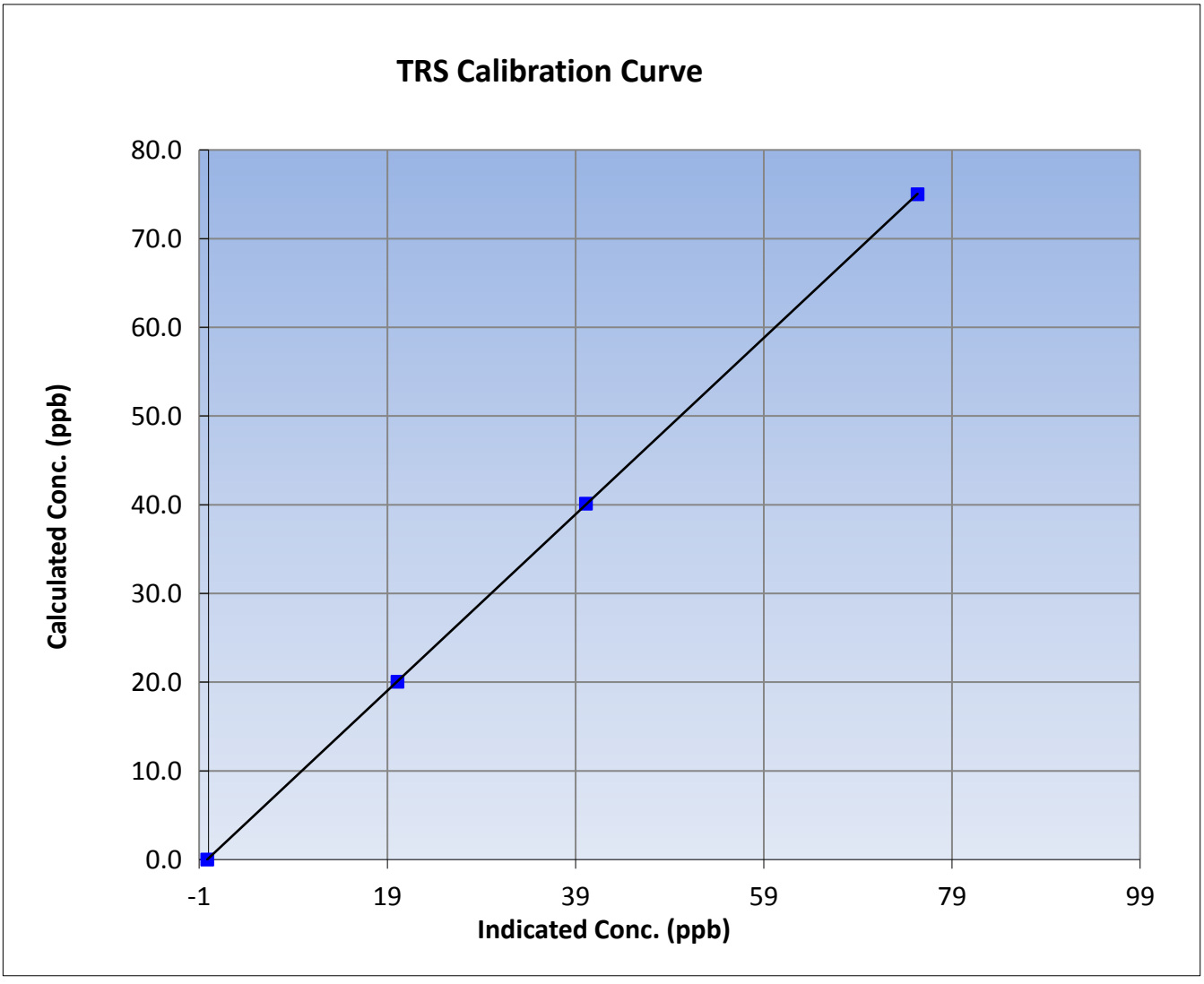
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

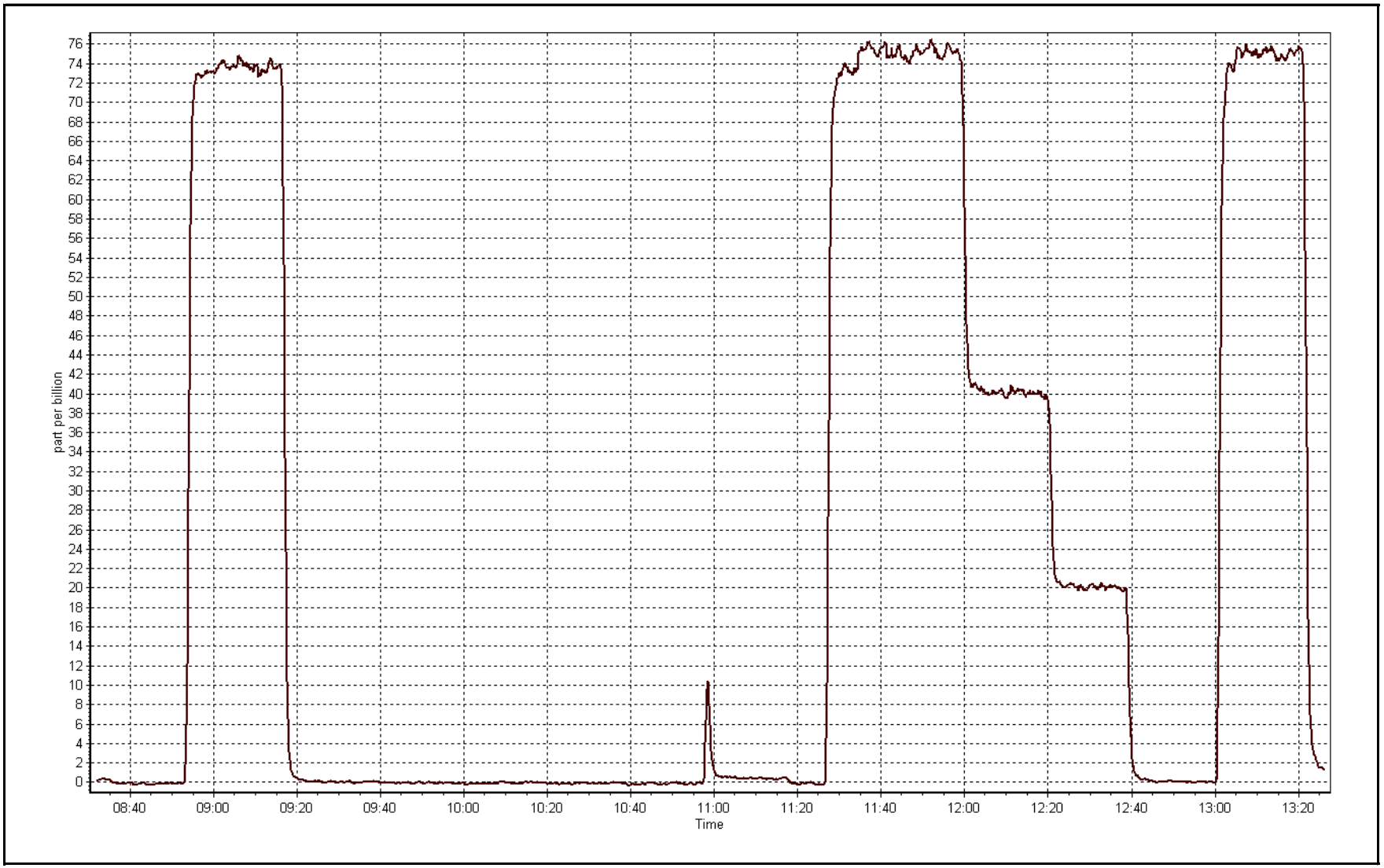
Calibration Date	March 17, 2016	Previous Calibration	February 18, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:30	End Time (MST)	13:30
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999996
75.0	75.4	0.9956		
40.1	40.1	1.0002	Slope	0.994107
20.1	20.1	0.9989		
			Intercept	0.147164



TRS Calibration Plot Date: March 17, 2016



Wood Buffalo Environmental Association
THC / NMHC Calibration Report

W B E A

Station Information

Calibration Date	March 16, 2016	Last Calibration	February 18, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	12:55
Gas Cert Reference	SA140071A	Cal Gas Expiry Date	September-26-17
CH4 Cal Gas Conc.	515.0 ppm	CH4 Equiv Conc.	1065.0 ppm
C3H8 Cal Gas Conc.	200.0 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	2582

Analyzer Information

	Before	*After*		*Before*	*After*
THC Range (ppm)	0 - 50 ppm		Column Temp	74.9	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	0.998709	0.998019	Carrier Pressure	37.3	37.3
THC Calc intercept	0.066623	0.041141	Fuel Pressure	42.3	44.3
NMHC Calc slope	0.999035	0.998372	Air Pressure	35.0	39.0
NMHC Calc intercept	0.011102	-0.003891			

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	81.3	15.74	15.40	1.022
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	15.74	15.77	0.998
second point	5500	45.6	8.83	8.75	1.009
third point	5500	22.8	4.41	4.36	1.013
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	15.74	15.80	0.996
				Average Correction Factor	1.007

Corrected As found	15.40	Previous response	15.70	% change	1.9%

Notes:

H2 and N2 cylinder changed after as founds. Span response had no change from cylinder change. Flame optimized after cylinder changeout. Flame optimization increased span response and improved linearity. Span adjusted.

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	81.3	8.13	7.92	1.027
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	8.13	8.15	0.998
second point	5500	45.6	4.56	4.56	1.000
third point	5500	22.8	2.28	2.30	0.991
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	8.13	8.17	0.995
				Average Correction Factor	0.996

Corrected As found	7.92	Previous response	8.13	% change	2.6%

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	81.3	7.61	7.48	1.018
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	7.61	7.63	0.998
second point	5500	45.6	4.27	4.18	1.021
third point	5500	22.8	2.13	2.06	1.034
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	7.61	7.63	0.998
				Average Correction Factor	1.018

Corrected As found	7.48	Previous response	7.57	% change	1.2%

Wood Buffalo Environmental Association

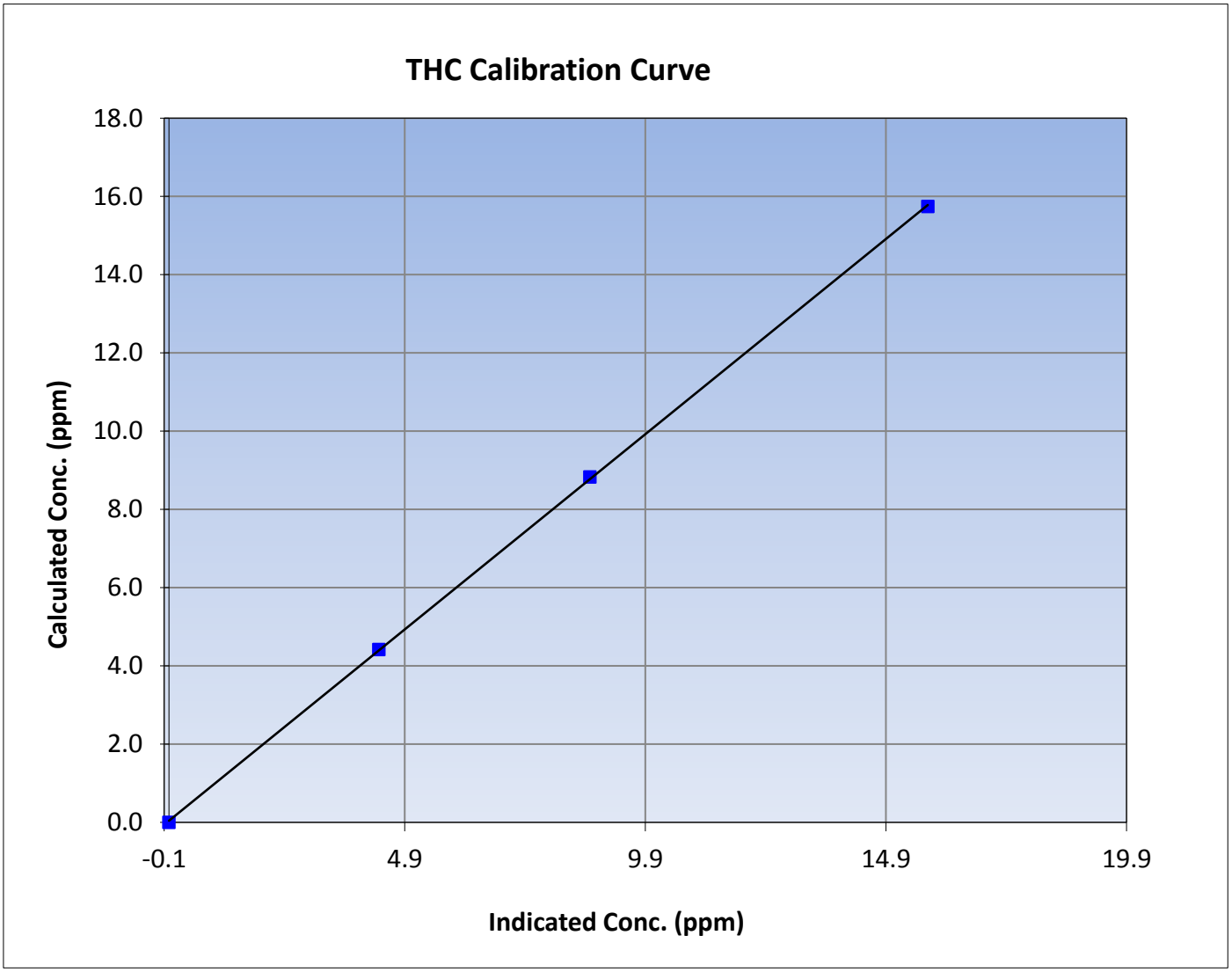
THC Calibration Summary

Station Information

Calibration Date	March 16, 2016	Previous Calibration	February 18, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:40	End Time (MST)	12:55
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	0.999950
15.74	15.77	0.9983		
8.83	8.75	1.0091	Slope	0.998019
4.41	4.36	1.0126		
			Intercept	0.041141



Wood Buffalo Environmental Association

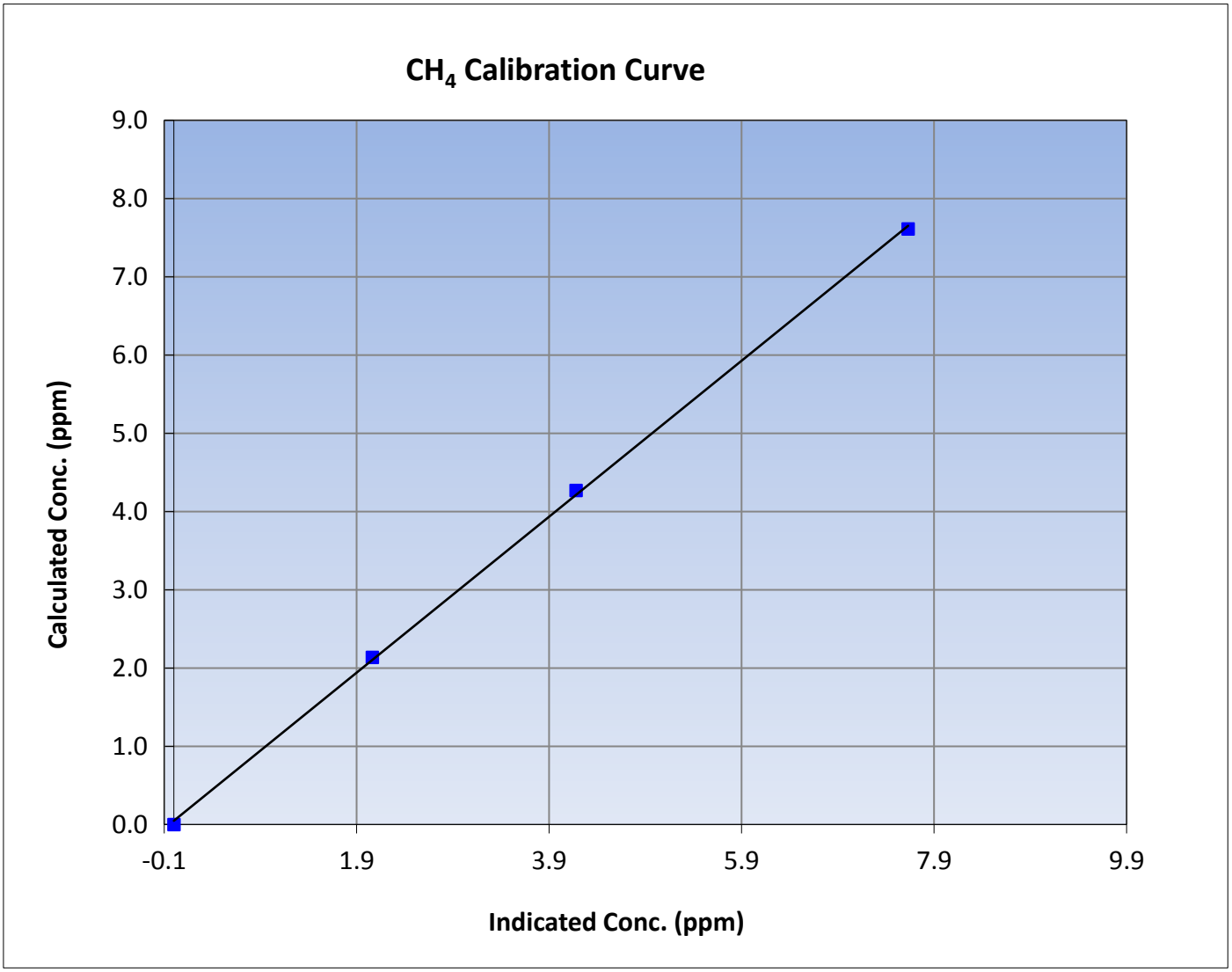
CH_4 Calibration Summary

Station Information

Calibration Date	March 16, 2016	Previous Calibration	February 18, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:40	End Time (MST)	12:55
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	0.999750
7.61	7.63	0.9977		
4.27	4.18	1.0215	Slope	0.996608
2.13	2.06	1.0344		
			Intercept	0.047605



Wood Buffalo Environmental Association

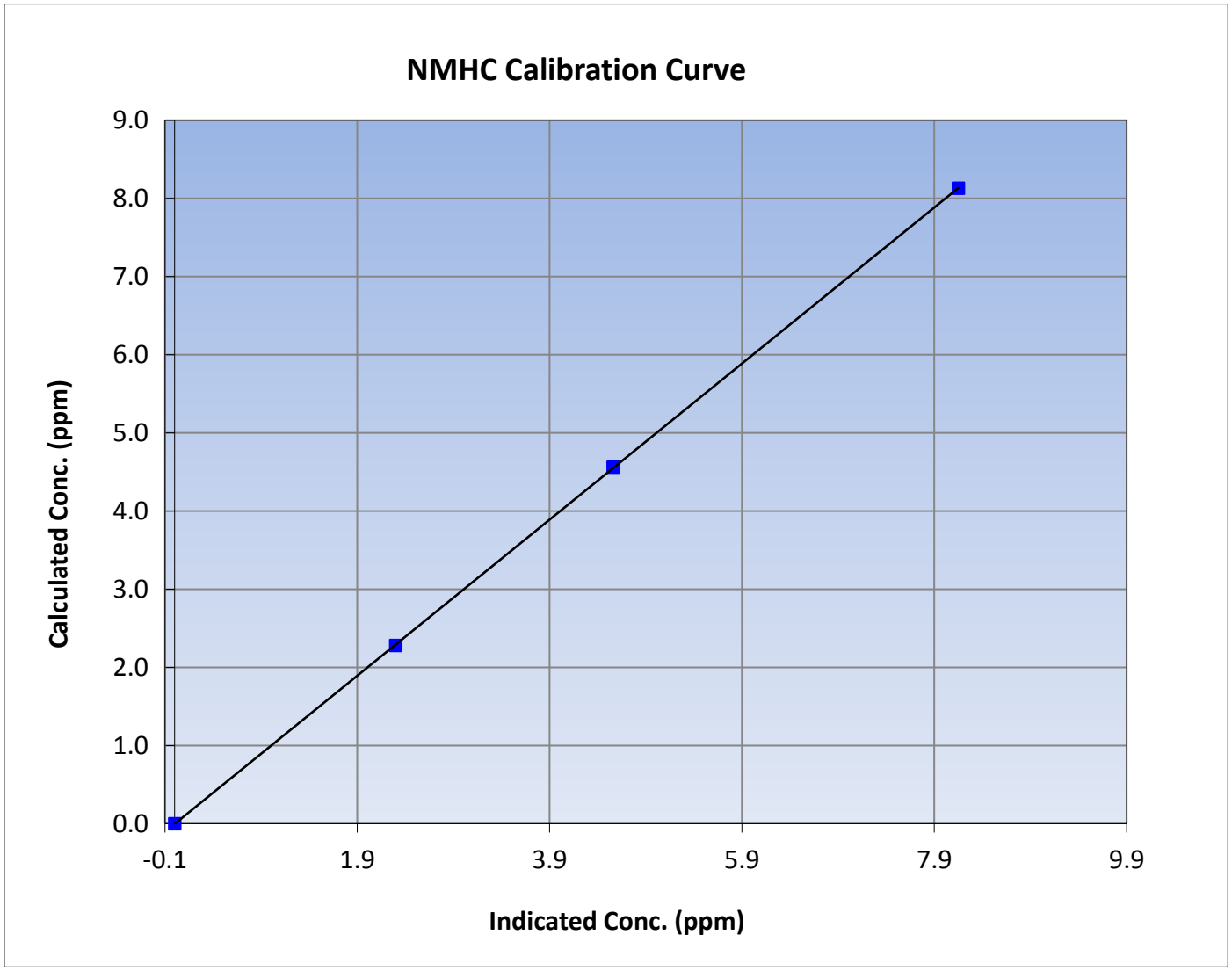
NMHC Calibration Summary

Station Information

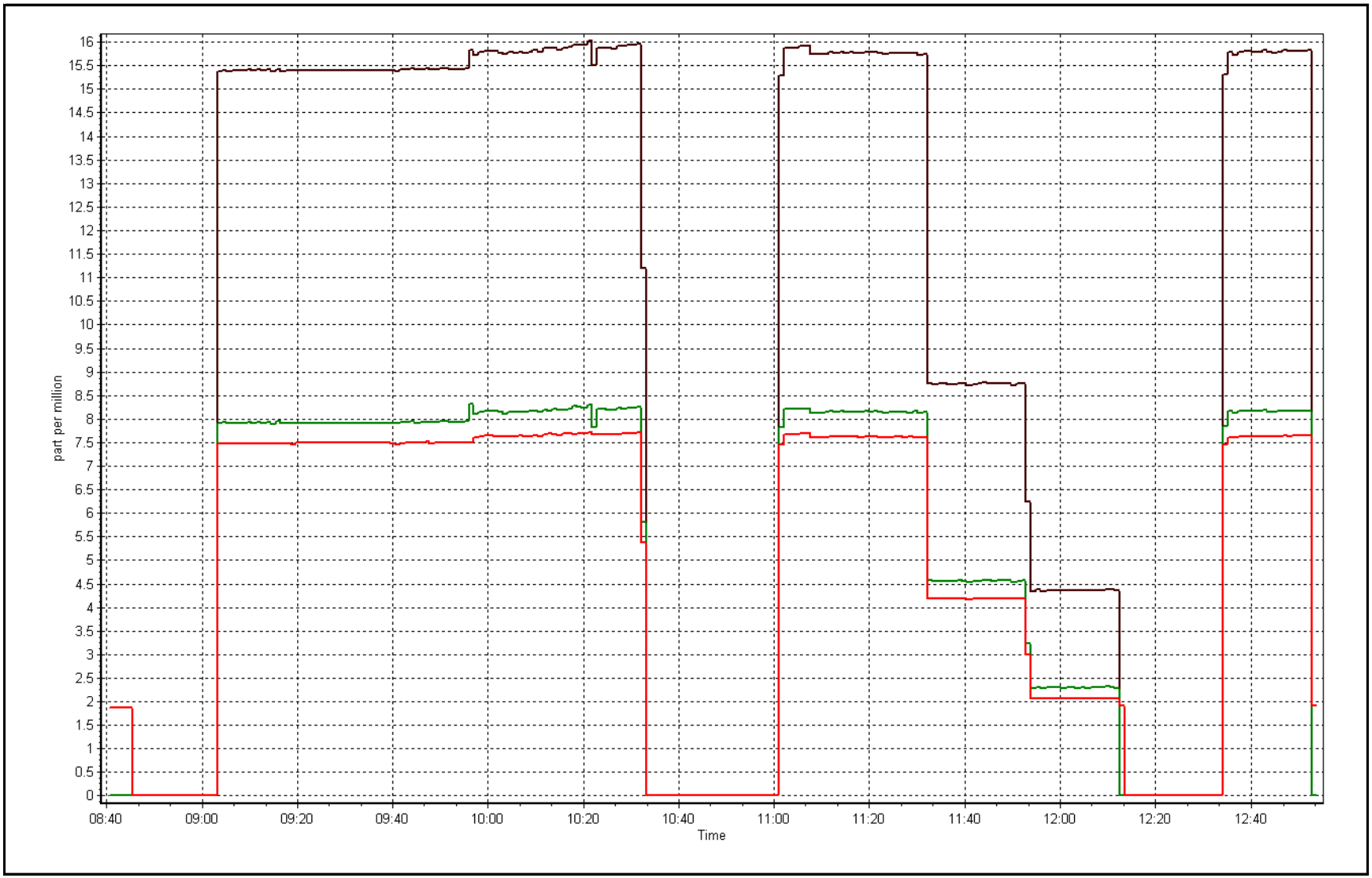
Calibration Date	March 16, 2016	Previous Calibration	February 18, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	8:40	End Time (MST)	12:55
Analyzer make	Thermo 55i	Analyzer serial #	1152430012

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999992
8.13	8.15	0.9975		
4.56	4.56	1.0000	Slope	0.998372
2.28	2.30	0.9913		
			Intercept	-0.003891



THC Calibration Plot Date: March 16, 2016



Wood Buffalo Environmental Association
O_3 Calibration Report

Station Information

Calibration Date	March 15, 2016	Previous Calibration	February 5, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	12:30	End Time (MST)	15:50
NO2 GPT Ref date	March-14-16	Transfer Standard	N/A
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 500 ppb		Bench temp.	28.3	27.8
Analyzer IP address	192.168.1.48		Lamp temp.	53.6	53.5
Calculated slope	1.003637	0.997801	Pressure	711.9	722.6
Calculated intercept	-0.345932	-3.087787	Flow cell A	0.756	0.764
Analyzer Background	-2.6	-4.9	Flow cell B	0.760	0.766
Analyzer Coefficient	1.056	1.062	Cell A Intensity	71455	96722
			Cell B Intensity	67793	97221

Analyzer make	Thermo 49i	Analyzer serial #	1300156233

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	0.8	----
as found span	5000	0.98	407.0	385.3	1.056
calibrator zero	5000	0.00	0.0	1.1	----
high point	5000	0.98	407.0	409.2	0.995
second point	5000	0.56	240.7	246.5	0.977
third point	5000	0.34	124.3	129.3	0.961
as left zero	5500	0.00	0.0	1.2	----
as left span	5000	0.98	407.0	421.0	0.967
				Average Correction Factor	0.978

Corrected As found	384.5	Previous response	405.9	% change	5.5%

Notes:

As founds span was 5.6% low. Cell Intensities are very low. Lamp replaced and O3 scrubber replaced after as founds. Inlet filter changed after as founds. Zero and span adjusted.

Calibration Performed By: Devin Russell

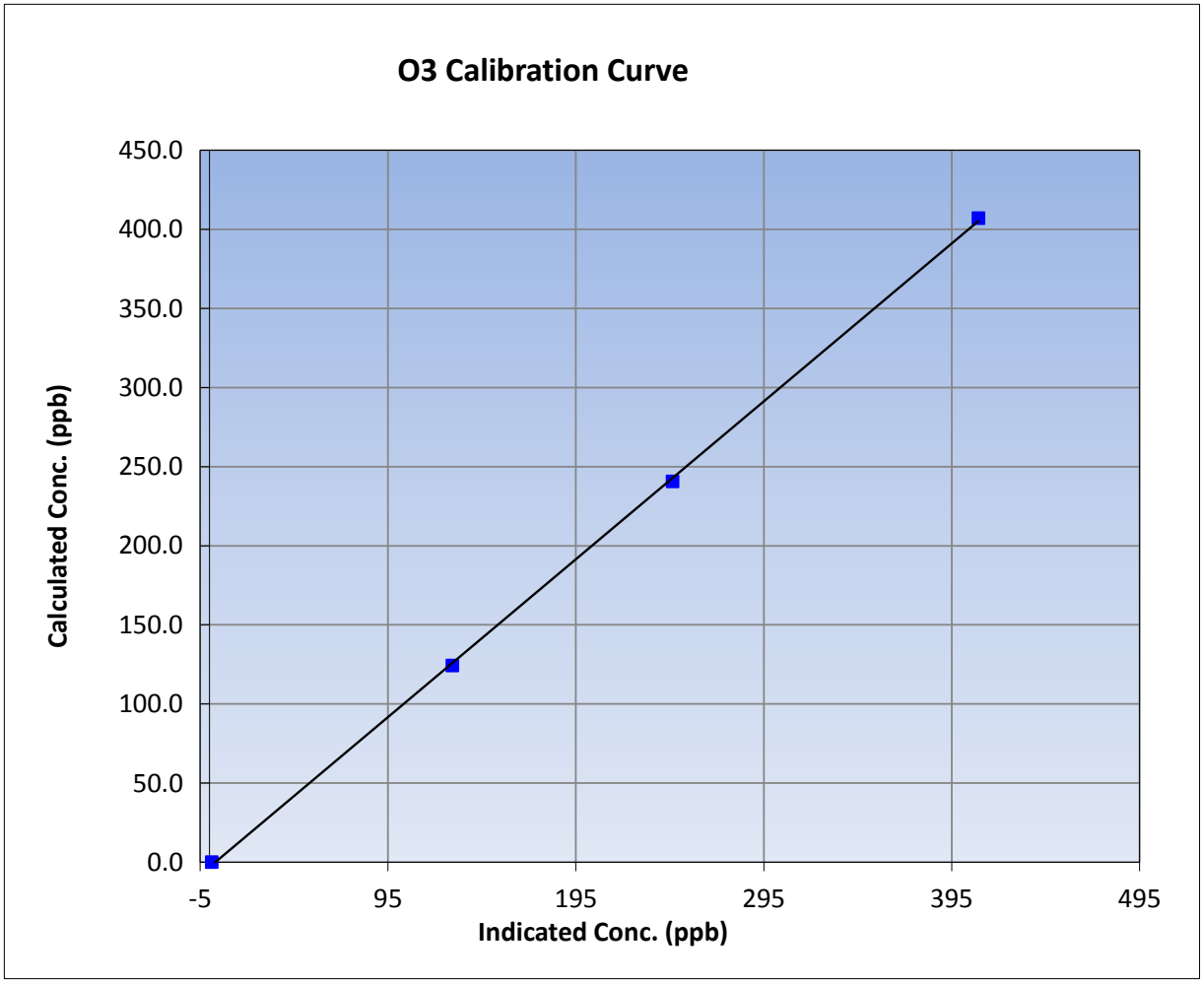
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

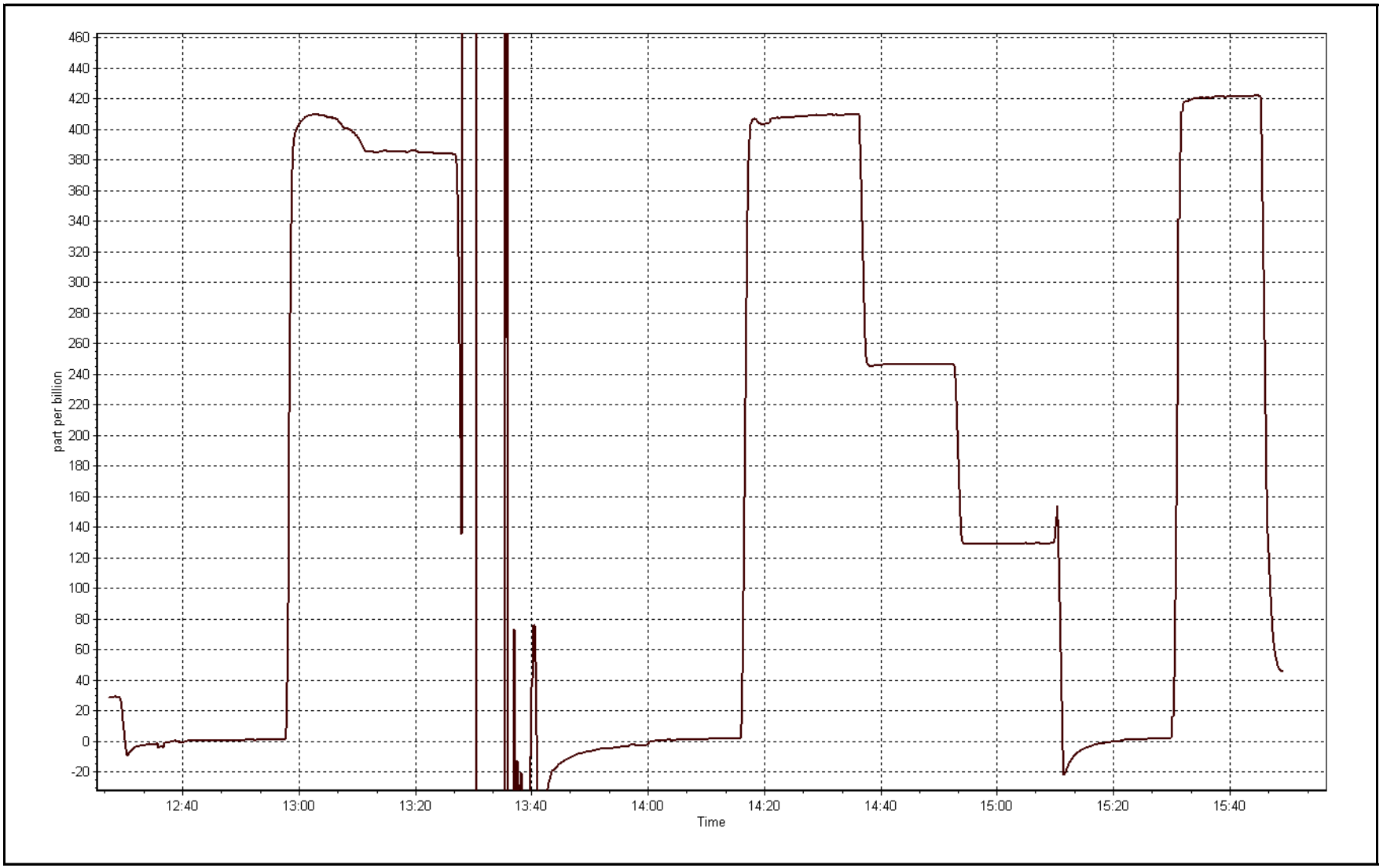
Calibration Date	March-15-16	Previous Calibration	February 5, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:30	End Time (MST)	15:50
Analyzer make	Thermo 49i	Analyzer serial #	1300156233

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.1	----	Correlation Coefficient	0.999841
407.0	409.2	0.9946		
240.7	246.5	0.9765	Slope	0.997801
124.3	129.3	0.9615		
			Intercept	-3.087787



O3 Calibration Plot Date: March 15, 2016



Wood Buffalo Environmental Association
O_3 Calibration Report

Station Information

Calibration Date	March 22, 2016	Previous Calibration	March 15, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	10:20	End Time (MST)	13:37
NO2 GPT Ref date	March-22-16	Transfer Standard	N/A
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 500 ppb		Bench temp.	27.8	26.9
Analyzer IP address	192.168.1.48		Lamp temp.	53.5	53.6
Calculated slope	0.997801	1.003317	Pressure	722.6	721.7
Calculated intercept	-3.087787	-4.323129	Flow cell A	0.764	0.764
Analyzer Background	-4.9	-4.6	Flow cell B	0.766	0.766
Analyzer Coefficient	1.062	0.998	Cell A Intensity	96722	100513
			Cell B Intensity	97221	100251

Analyzer make	Thermo 49i	Analyzer serial #	1300156233

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	2.2	----
as found span	5000	0.98	388.9	413.7	0.940
calibrator zero	5000	0.00	0.0	2.1	----
high point	5000	0.98	388.9	390.1	0.997
second point	5000	0.56	229.8	235.2	0.977
third point	5000	0.34	118.0	124.0	0.952
as left zero	5500	0.00	0.0	1.6	----
as left span	5000	0.98	388.9	401.1	0.970
				Average Correction Factor	0.975

Corrected As found	411.5	Previous response	392.8	% change	-4.5%

Notes:

Leak check completed, and a small leak was noticed. A loose fitting was found on the reference valve on the line connecting the sample valve to the reference valve. Fitting was tightened and a second leack test proved the leak was fixed. Lamp setting increased to peak lamp intensities. Detector calibration completed. Span adjusted.

Calibration Performed By: Devin Russell

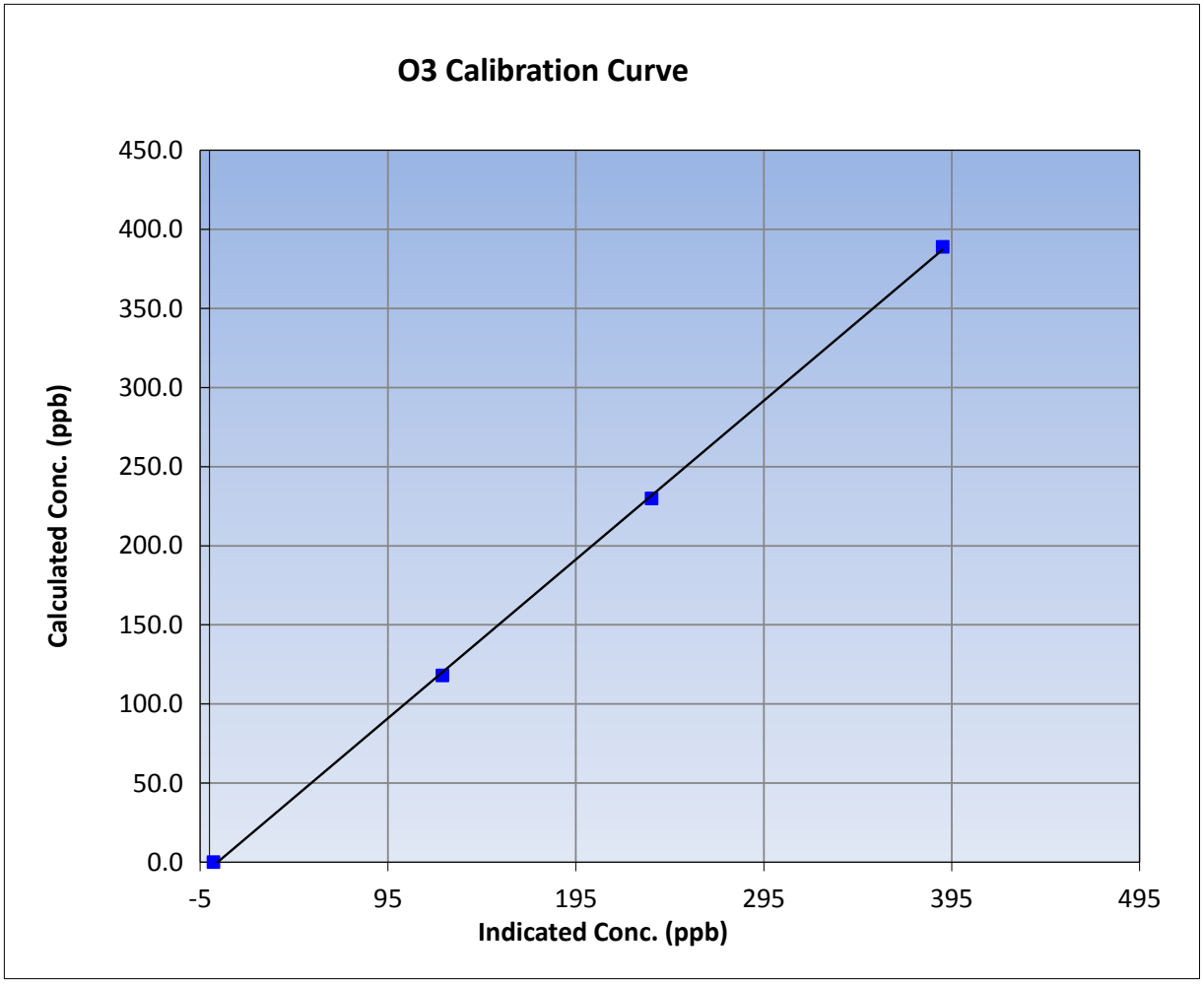
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

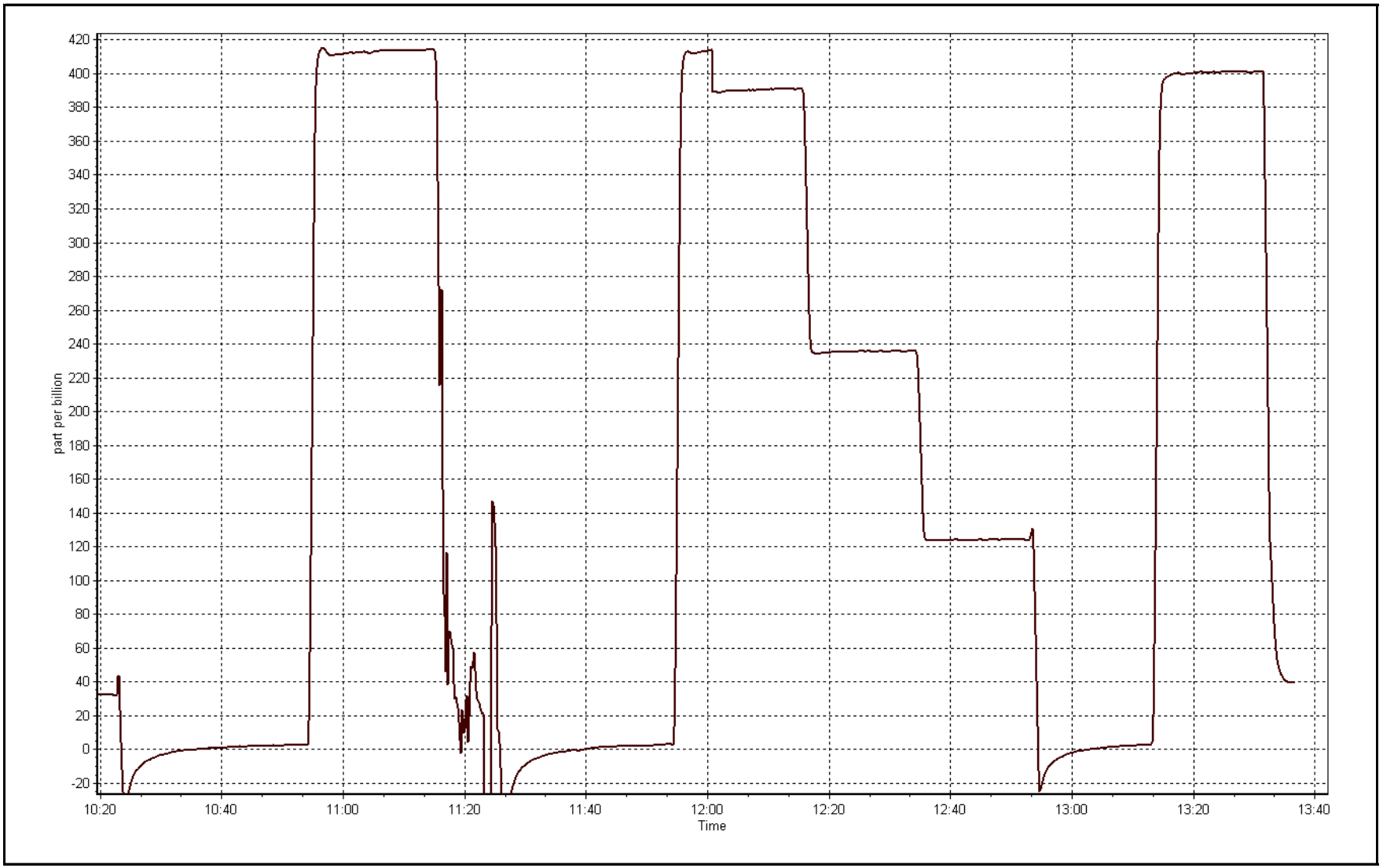
Calibration Date	March-22-16	Previous Calibration	March 15, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:20	End Time (MST)	13:37
Analyzer make	Thermo 49i	Analyzer serial #	1300156233

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	2.1	----	Correlation Coefficient	0.999808
388.9	390.1	0.9968		
229.8	235.2	0.9769	Slope	1.003317
118.0	124.0	0.9518		
			Intercept	-4.323129



O3 Calibration Plot Date: March 22, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 14, 2016	Previous Calibration	February 22, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	15:20
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	LL107945
NOx Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	09/08/2018
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.	2582

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999933	1.000643	1.003293
	Data Offset	3.148099	3.048577	-0.931894
Current Calibration	Data Slope	0.999985	0.999766	1.004769
	Data Offset	0.003052	0.104022	0.588582

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153357

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	1.050		1.109	
NOX coefficient	1.004		1.002	
NO2 coefficient	1.000		1.000	
NO bkgrnd	6.5		6.5	
NOX bkgrnd	6.9		6.5	
Chamber Temp	50.3	Deg C	50.3	Deg C
Moly Temp	327.6	Deg C	323.4	Deg C
PMT voltage	-816.6	V	-817	V
PMT Temp	-3	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	189.2	mmHg	189.8	mmHg
R Cell Press Nox	189.2	mmHg	189.8	mmHg
NO sample flow	0.535	lpm	0.512	lpm
Nox sample Flow	0.535	lpm	0.512	lpm

Notes:

Inlet filter changed after as founds. Zero and span adjusted.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 14, 2016 Station Number: AMS 1

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	-0.7	-0.4	-0.3	----	----
as found span	5500	81.4	753.3	750.4	3.0	721.5	716.6	5.0	1.0441	1.0472
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.1	-0.1	0.1	----	----
high point	5500	81.4	753.3	750.4	3.0	753.0	750.1	2.9	1.0005	1.0004
second point	5500	45.6	422.0	420.3	1.7	422.9	421.2	1.6	0.9979	0.9979
third point	5500	22.8	211.0	210.2	0.8	210.5	209.6	0.9	1.0022	1.0027
as left zero	5500	0.0	0.0	0.0	0.0	0.1	-0.1	0.2	----	----
as left span	5500	81.4	753.3	343.4	409.9	749.3	331.6	417.6	1.0053	1.0356
								Average Correction Factor	1.0002	1.0003

Corrcted As found NO_X= 722.2 NO= 717.0 Percent Change NO_X= 3.9% NO= 4.2%

Previous Response NO_X= 750.2 NO= 746.8

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 81.40 ccm NOX ref calc conc = 753.3 ppb NO ref calc conc = 750.4 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		3.0	753.2	750.5	0.1	1.0002	0.9999	----	----
1st NO2 (300)	343.4	410.0	751.4	343.4	408.0	1.0026	----	1.0050	99.5%
2nd NO2 (200)	509.8	243.6	751.2	509.8	241.4	1.0028	----	1.0094	99.1%
3rd NO2 (100)	626.2	127.3	751.6	626.2	125.4	1.0023	----	1.0147	98.6%
2nd NO ref point	----	3.0	751.4	749.2	2.2	1.0025	1.0016	----	----
				Average Correction Factor		1.0026		1.0097	99.0%

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

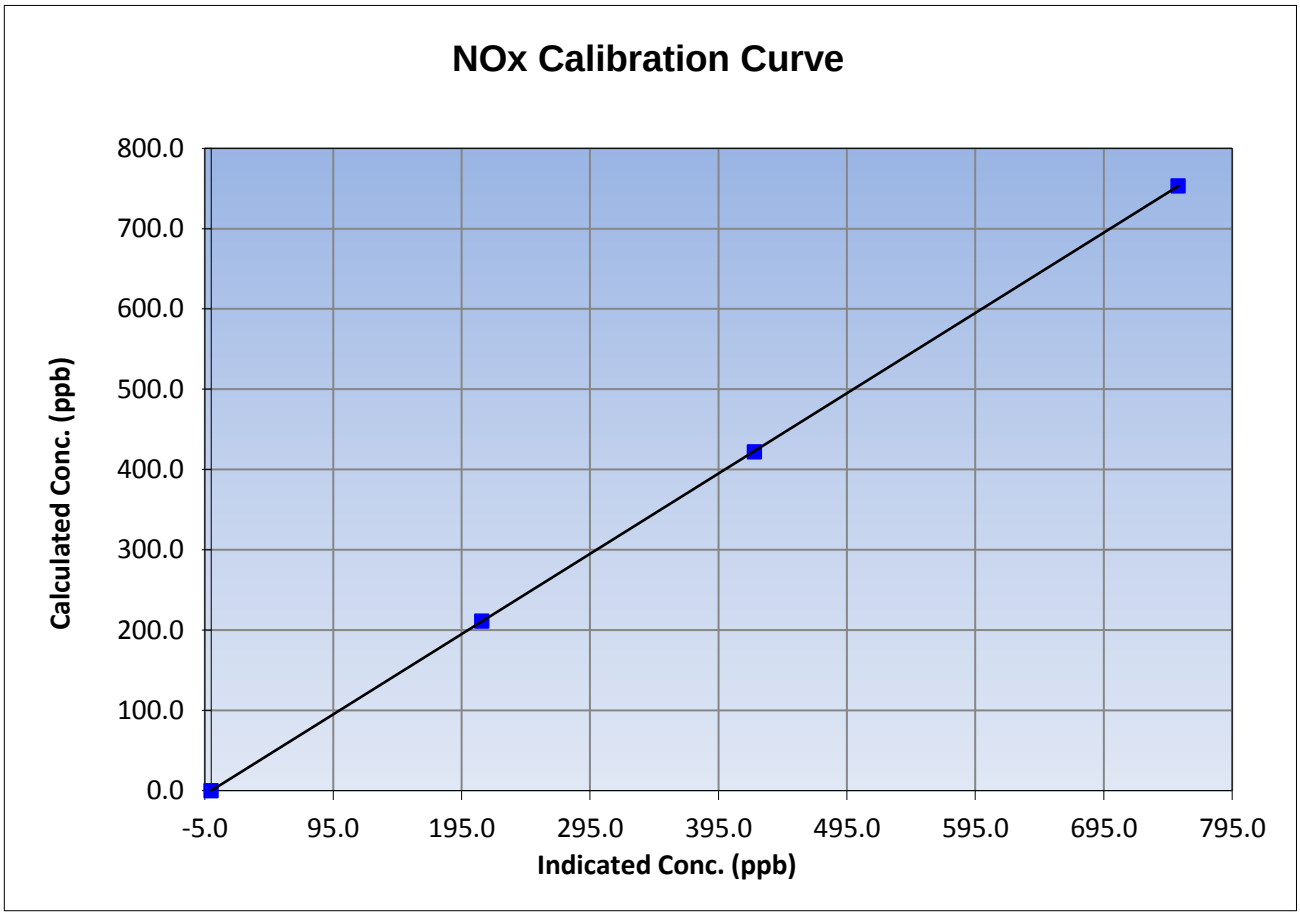
NO_X Calibration Summary

Station Information

Calibration Date	March 14, 2016	Previous Calibration	February 22, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	15:20
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999996
753.3	753.0	1.0005		
422.0	422.9	0.9979	Slope	0.999985
211.0	210.5	1.0022		
			Intercept	0.003052



Wood Buffalo Environmental Association

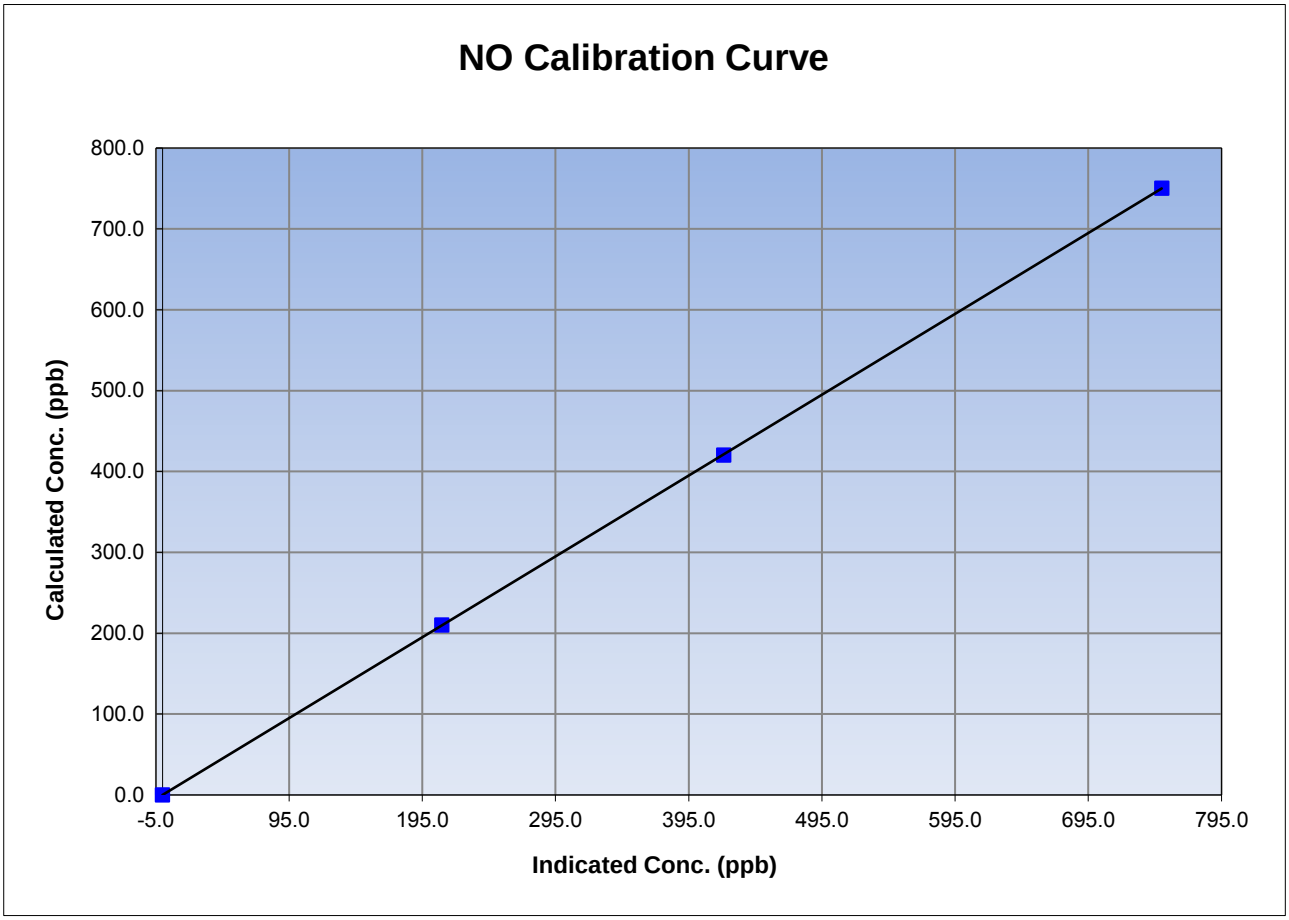
NO Calibration Summary

Station Information

Calibration Date	March 14, 2016	Previous Calibration	February 22, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	15:20
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

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
750.4	750.1	1.0004		
420.3	421.2	0.9979	Slope	0.999766
210.2	209.6	1.0027		
			Intercept	0.104022



Wood Buffalo Environmental Association

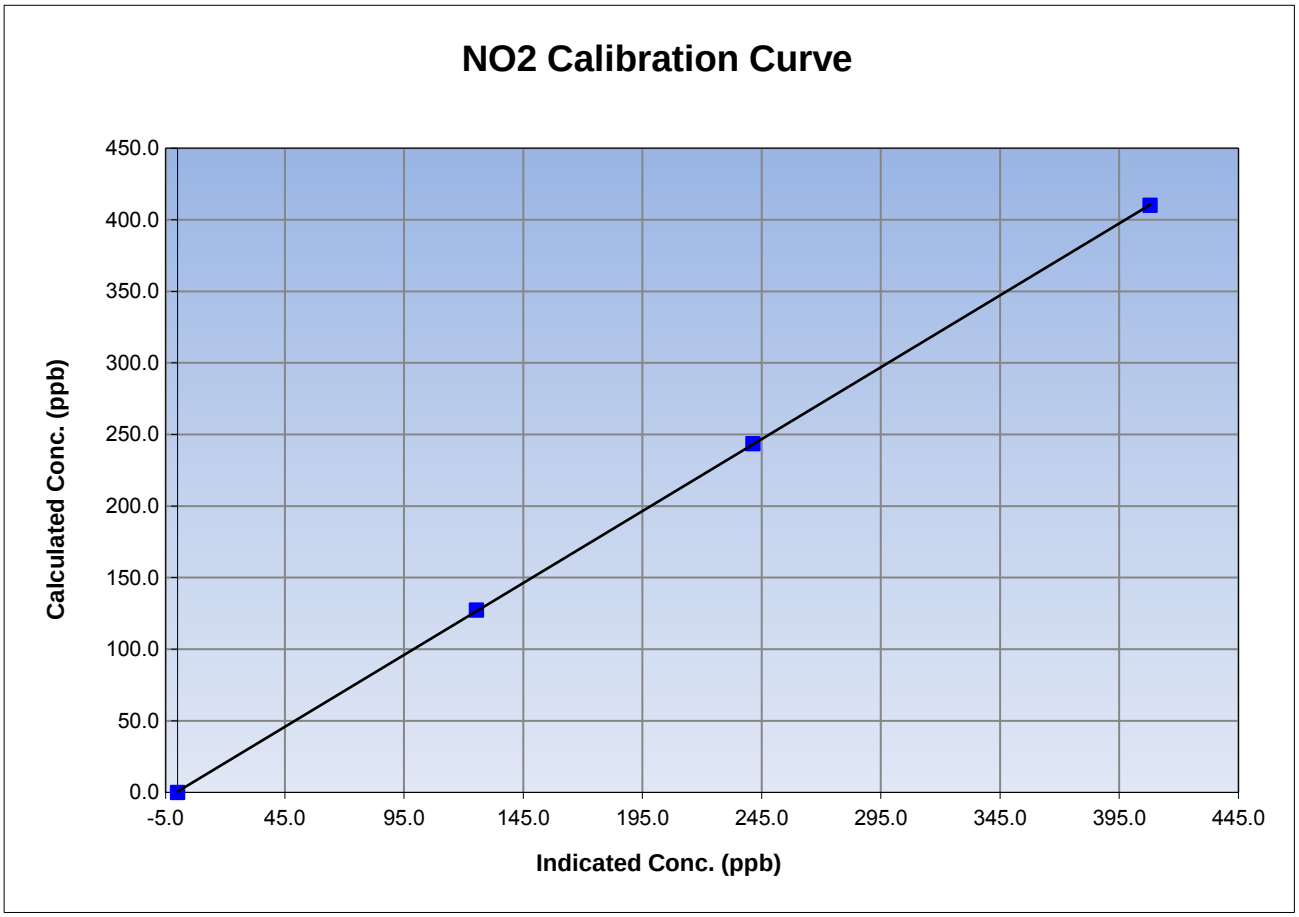
NO_2 Calibration Summary

Station Information

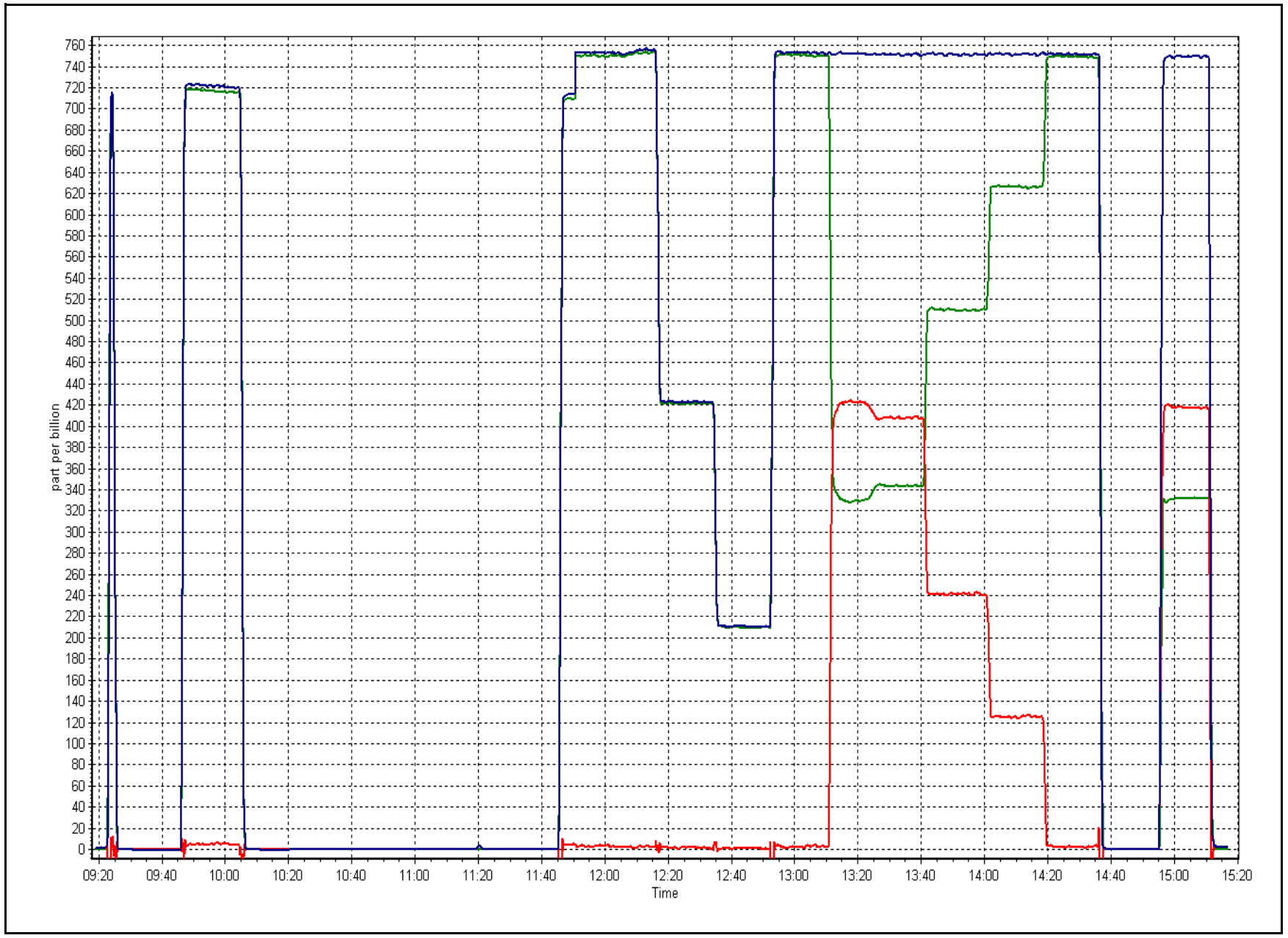
Calibration Date	March 14, 2016	Previous Calibration	February 22, 2016
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	15:20
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999984
410.0	408.0	1.0050		
243.6	241.4	1.0094	Slope	1.004769
127.3	125.4	1.0147		
			Intercept	0.588582



NOX Calibration Plot Date: March 14, 2016



Wood Buffalo Environmental Association
N_t-NO_X-NH_3 Calibration Report

Station Information

Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
NOX Calibration Date	March 14, 2016	NOX Previous Cal Date	February 10, 2016
NH3 Calibration Date	March 14, 2016	NH3 Previous Cal Date	February 11, 2016
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	17:30
		Station Temperature	21.0 Deg C
Calibrator	Sabio 4010	Serial Number	14300410
NH3 Cal Gas Conc	30.6 ppm	NH3 Expiry Date / SN	21/Dec/2012 LL76495
NOx Cal Gas Conc	50.9 ppm	NO Expiry Date / SN	14/Jan/2016 3222140
NO Cal Gas Conc	50.7 ppm		

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2582

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.999146	0.985628	0.998201	0.996400	1.015272
	Data Offset	-12.76345	-13.97112	2.031045	2.992312	-0.383661
Cal Stats After	Data Slope	1.000703	0.990975	0.997805	1.000650	0.998440
	Data Offset	-8.15	-9.18	-1.057435	-0.431213	-0.653179
IP address		192.168.1.17				

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	0.0	ppb	-0.2	ppb
NOx BKG	0.0	ppb	-0.1	ppb
Nt BKG	0.0		-0.2	
NO coefficient	1.239		1.200	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.371		1.328	
NH3 coefficient	0.929		0.926	
Nt coefficient	1.376		1.330	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	315.2	Deg C	314.4	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	86.0	ccm	84.0	ccm
R Cell Press	4.8	mmHg	4.8	mmHg
PMT Voltage	645.0	v	645.0	v
Sample Flow 1 NO	528.0	ccm	518.0	ccm
Sample Flow 2 Nox	532.0	ccm	528.0	ccm
Sample Flow 3 Nt	534.0	ccm	546.0	ccm

Notes:

Inlet filter changed after as founds. Critical flow orifices checked, and all o-rings and sintered filters replaced in critical flow paths. NO/Nox zero and span adjusted. NH3 span adjusted.

Wood Buffalo Environmental Association

NH_3 Calibration Report

Station Information

Calibration Date: March 14, 2016 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 NH3 conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH3 conc (ppb)	Nt Correction factor	NH3 Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.3	0.3	0.0	----	----
as found NO	5500	81.3	752.4	752.4	----	738.9	742.3	-3.1	1.018	----
calibrator zero	5500	0.0	0.0	0.0	0.0	0.2	-0.2	0.4	----	----
high NO point	5500	81.3	752.4	752.4	----	749.4	755.0	-5.6	1.004	----
NO/O3 point	5500	81.3	752.4	752.4	----	756.9	757.8	-0.7	0.994	----
as found NH3	1500	88.2	1799.3	NA	1799.3	1778.8	16.8	1761.7	1.012	1.021
first NH3	1500	88.2	1799.3	NA	1799.3	1819.0	17.7	1801.3	0.989	0.999
second NH3	1500	49.0	999.6	NA	999.6	1024.0	12.4	1011.6	0.976	0.988
third NH3	1500	24.6	501.8	NA	501.8	524.7	7.1	517.6	0.956	0.969
								Average Correction Factor	0.9990	0.9855

Nt Corrected As Found	Nt =	738.6	ppb	Previous Response	Nt =	777.3	ppb	Nt percent change	5.2%
NOx Corrected As Found	NOx =	741.9	ppb	Previous Response	NOx =	751.7	ppb	NOx percent change	1.3%
NH3 Previous Converter Efficiency =		92.9	%	NH3 Current Converter Efficiency =		92.6	%	NH3 percent change	-0.4%

Wood Buffalo Environmental Association

$NO_X(NH_3)$ Calibration Report

Station Information

Calibration Date: March 14, 2016 Station Number: AMS 1

NOX / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.3	0.1	0.3	----	----
as found span	5500	81.4	753.3	750.4	753.3	742.3	733.9	738.9	1.0149	1.0224
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.2	0.0	0.2	----	----
high point	5500	81.4	753.3	750.4	753.3	755.0	750.0	749.4	0.9978	1.0004
second point	5500	45.6	422.0	420.3	422.0	425.3	420.7	424.6	0.9922	0.9991
third point	5500	22.8	211.0	210.2	211.0	213.5	211.0	213.2	0.9883	0.9963
								Average Correction Factor	0.9928	0.9986

	Nt	NOX	NO	NO2
Corrected As found	738.6	741.9	733.8	----
Previous Response	778.3	752.6	750.1	----
Percent Change	5.4%	1.4%	2.2%	-0.8%

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 81.4 ccm NOX ref calc conc = 753.3 ppb NO ref calc conc = 750.4 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	----	3.0	757.8	751.1	6.8	0.9941	0.9990	----	----
1st NO2 (300)	341.7	412.3	755.5	341.7	413.7	0.9971	----	0.9968	100.3%
2nd NO2 (200)	510.3	243.8	754.0	510.3	243.8	0.9991	----	1.0002	100.0%
3rd NO2 (100)	627.2	126.9	756.8	627.2	129.6	0.9954	----	0.9789	102.2%
2nd NO ref point	----	3.0	755.3	750.1	5.3	0.9973	1.0004	----	----
				Average Correction Factor		0.9972	0.9997	0.9919	100.8%

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

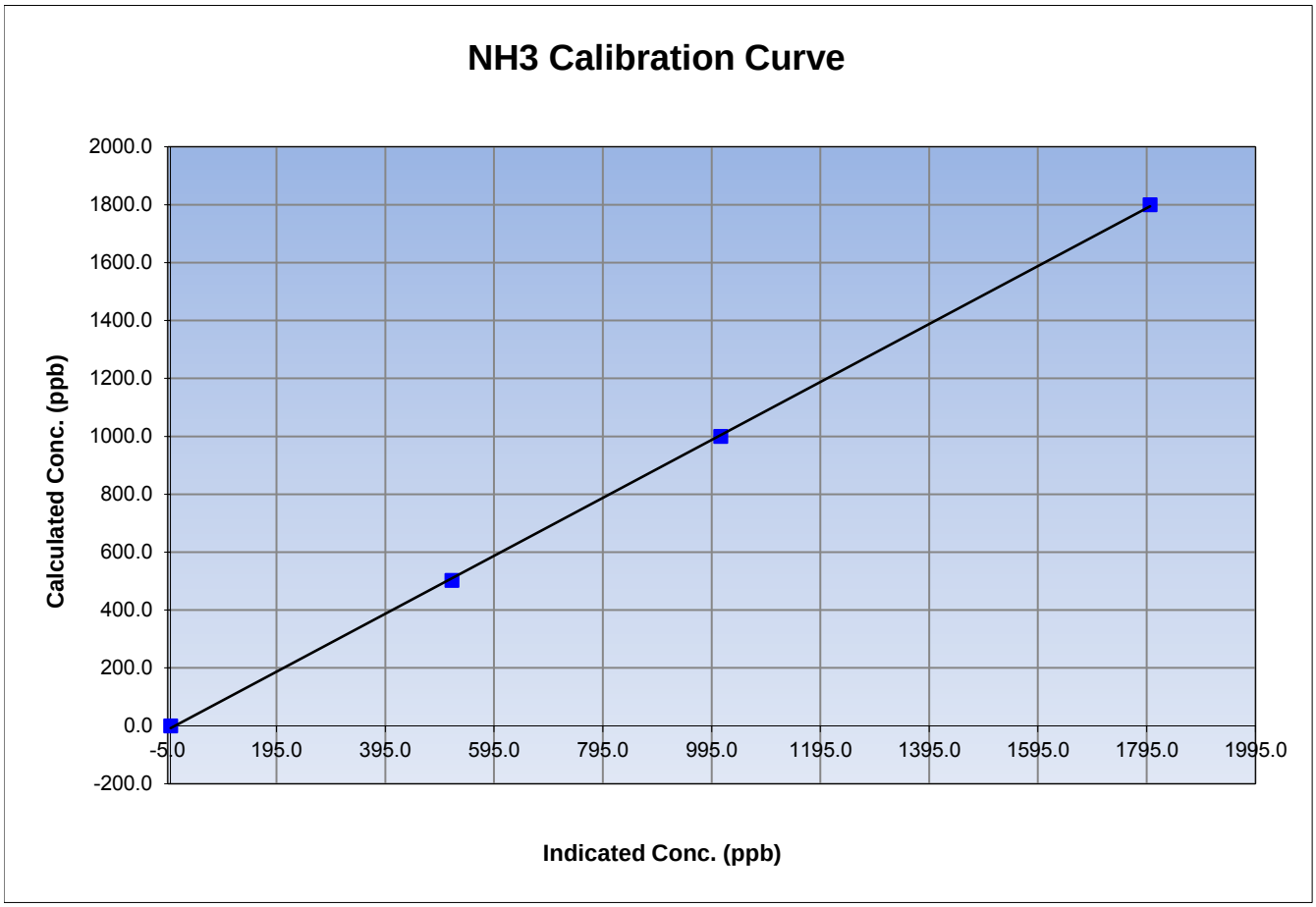
NH3 Calibration Summary

Station Information

Calibration Date	March 14, 2016	Previous Calibration	February 10, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	17:30
Analyzer make	API T201	Analyzer serial #	152

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999904
1799.3	1801.3	0.9989		
999.6	1011.6	0.9881	Slope	1.000703
501.8	517.6	0.9695		
			Intercept	-8.148077



Wood Buffalo Environmental Association

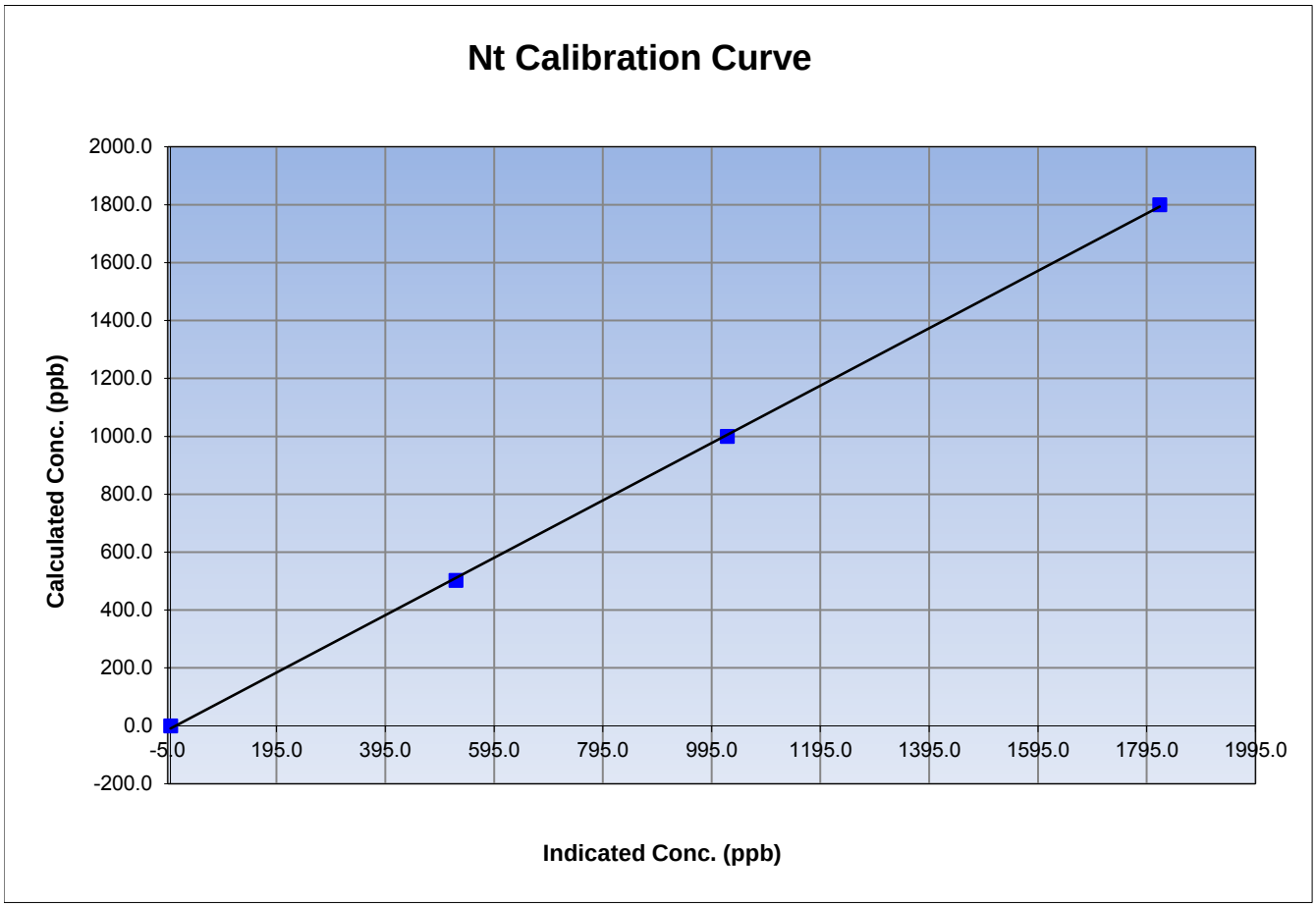
Nt Calibration Summary

Station Information

Calibration Date	March 14, 2016	Previous Calibration	February 10, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	17:30
Analyzer make	API T201	Analyzer serial #	152

Nt (NH_3) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999869
1799.3	1819.0	0.9892		
999.6	1024.0	0.9762	Slope	0.990975
501.8	524.7	0.9564		
			Intercept	-9.176072



Wood Buffalo Environmental Association

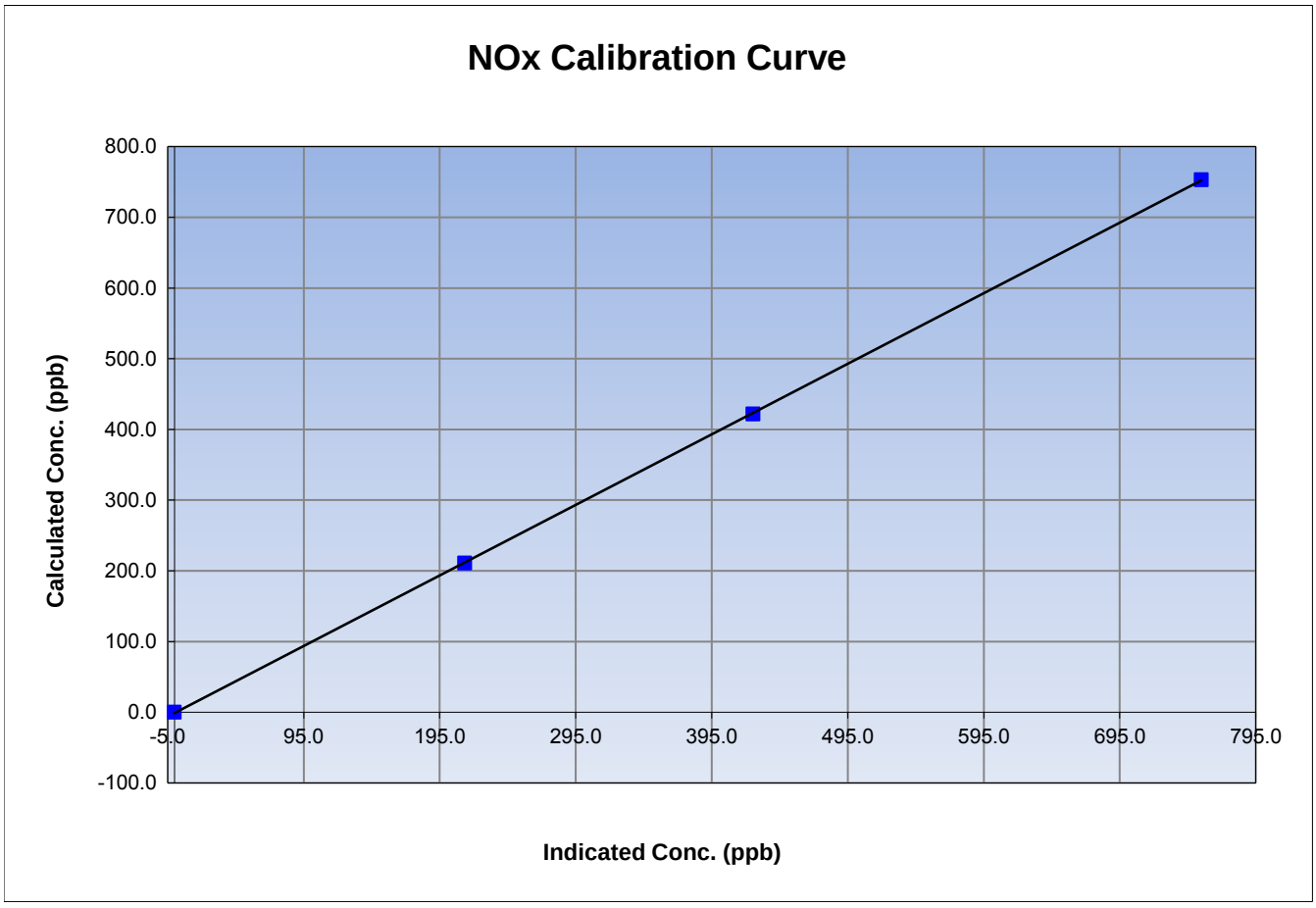
NOx Calibration Summary

Station Information

Calibration Date	March 14, 2016	Previous Calibration	February 10, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	17:30
Analyzer make	API T201	Analyzer serial #	152

NO_X Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999983
753.3	755.0	0.9978		
422.0	425.3	0.9922	Slope	0.997805
211.0	213.5	0.9883		
			Intercept	-1.057435



Wood Buffalo Environmental Association

NO Calibration Summary

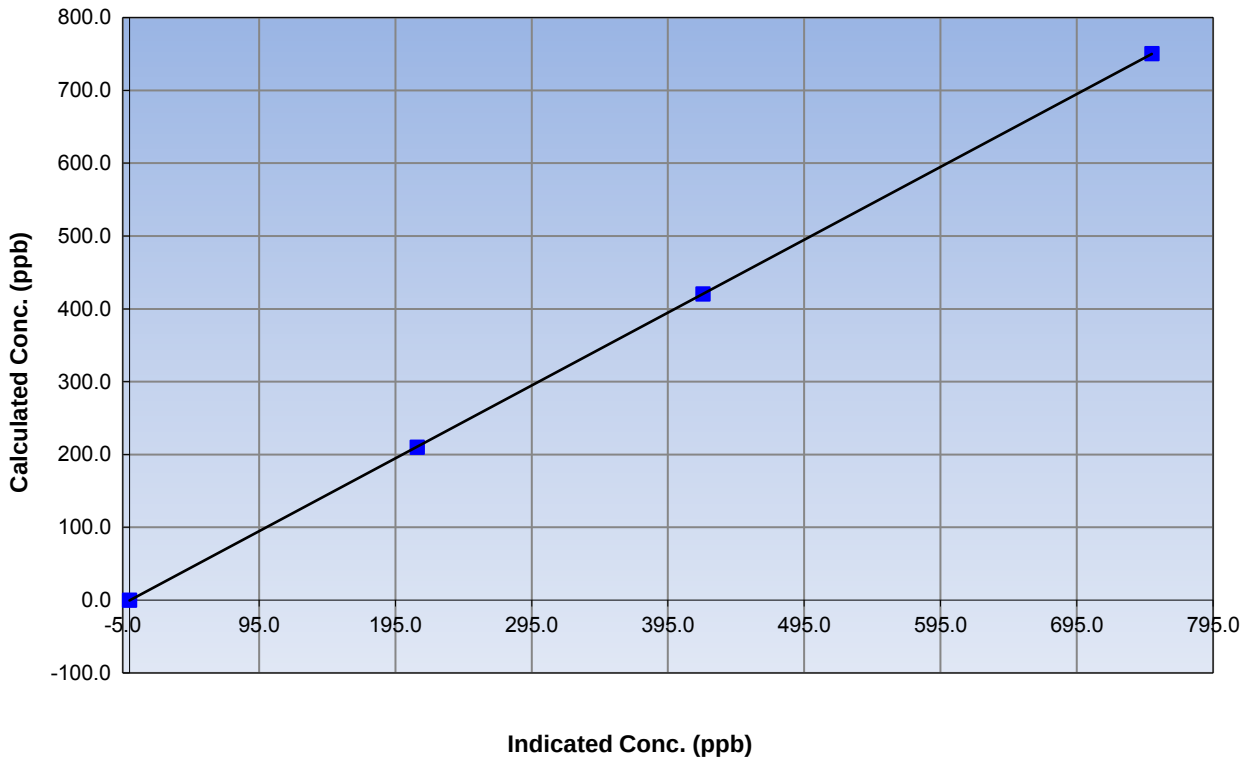
Station Information

Calibration Date	March 14, 2016	Previous Calibration	February 10, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	17:30
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999998
750.4	750.0	1.0004		
420.3	420.7	0.9991	Slope	1.000650
210.2	211.0	0.9963		
			Intercept	-0.431213

NO Calibration Curve



Wood Buffalo Environmental Association

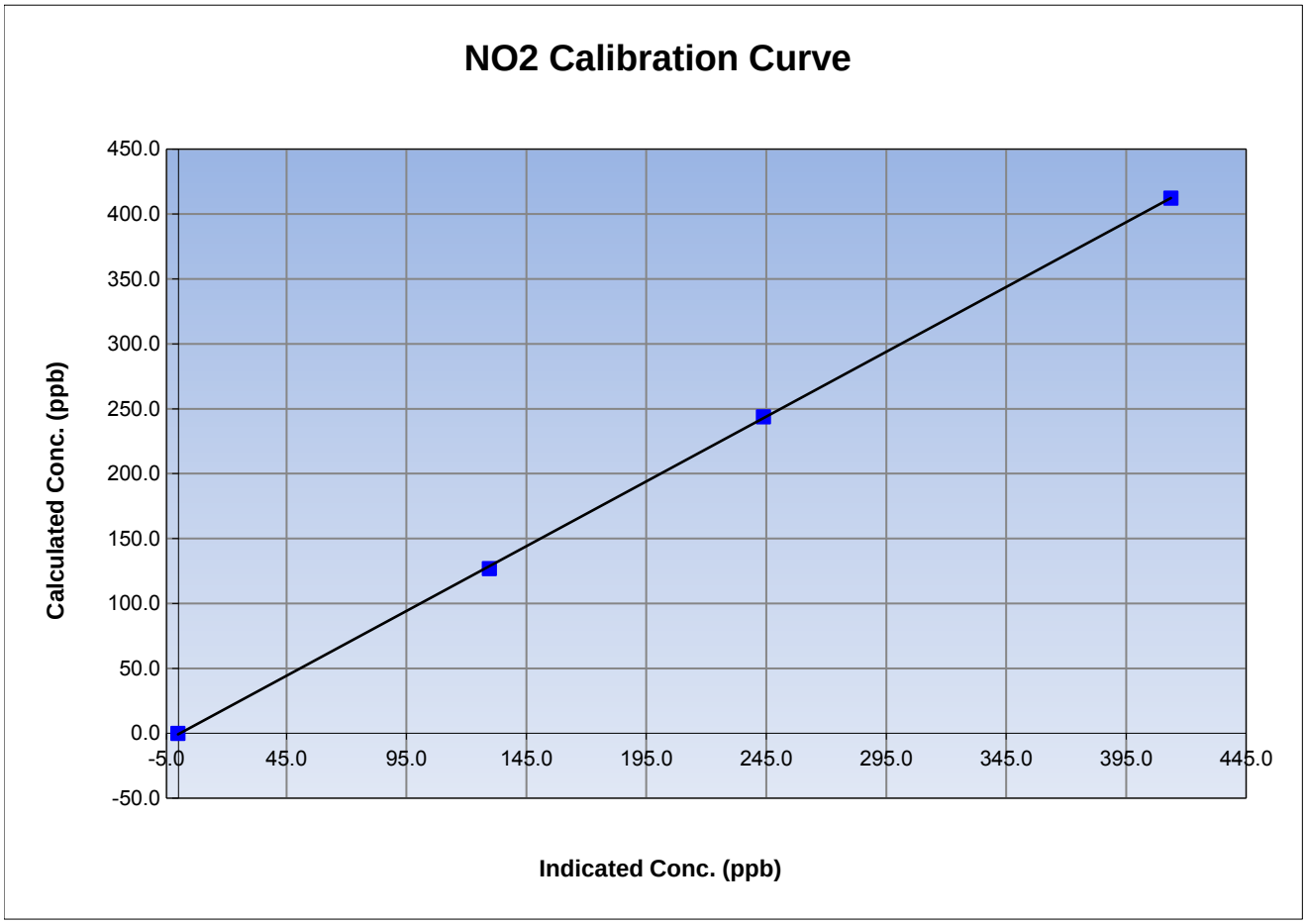
NO_2 Calibration Summary

Station Information

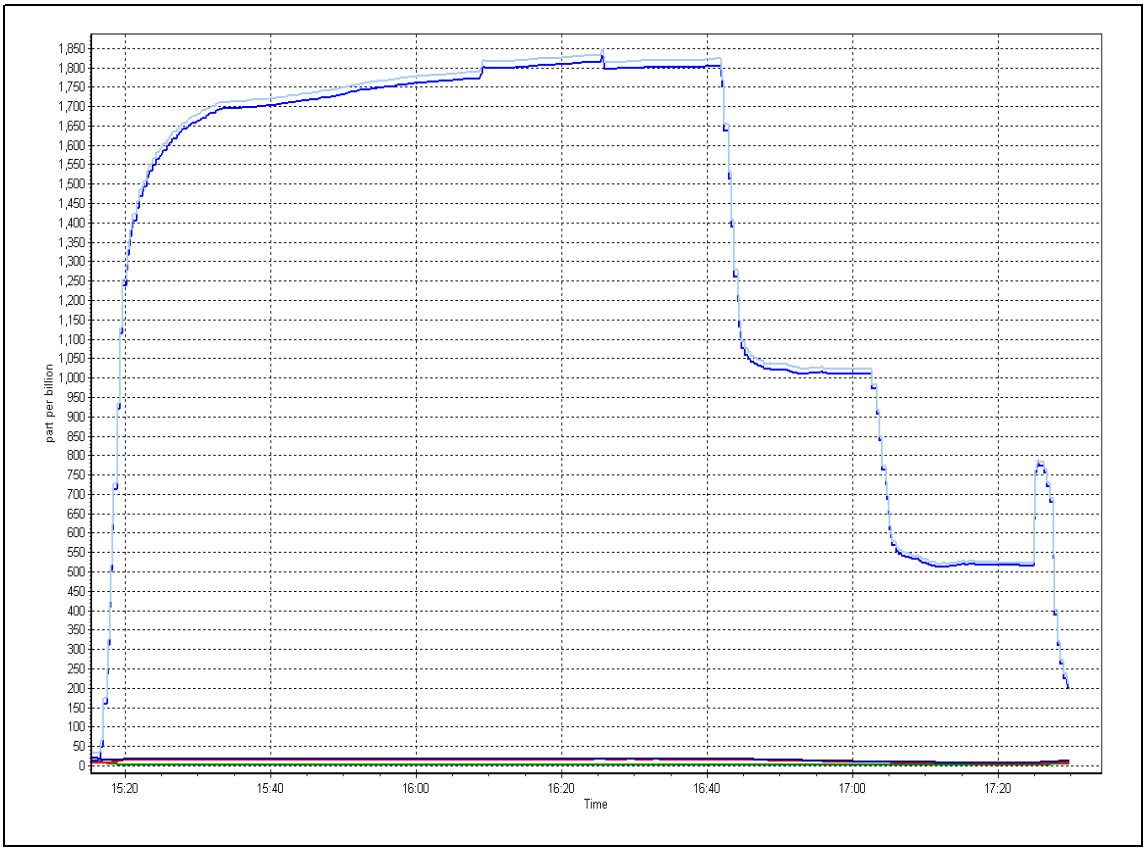
Calibration Date	March 14, 2016	Previous Calibration	February 10, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	17:30
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

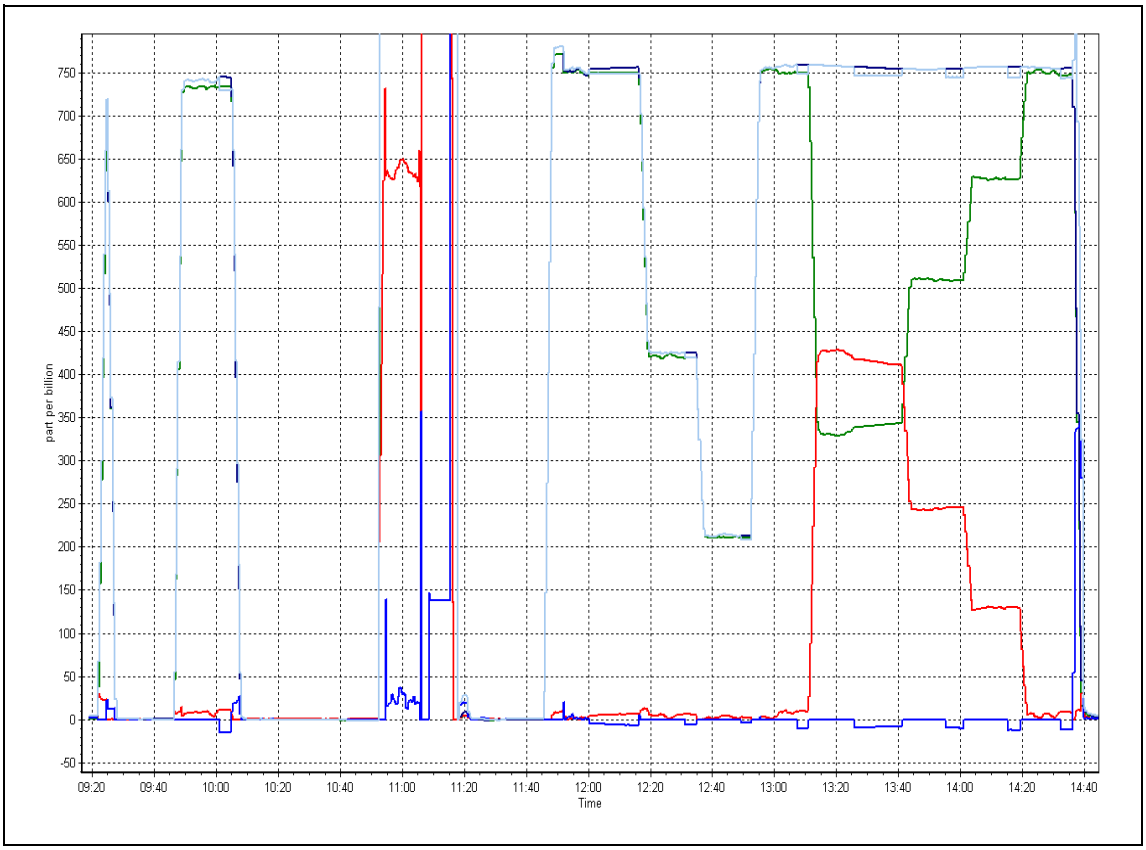
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999941
412.3	413.7	0.9968		
243.8	243.8	1.0002	Slope	0.998440
126.9	129.6	0.9789		
			Intercept	-0.653179



NH_3 Calibration Plot Date: March 14, 2016



NOX Calibration Plot Date: March 14, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	March 17, 2016	Previous Calibration:	February 5, 2016
Station Name:	Bertha Ganter - Fort McKay	Station Number:	AMS 1
Start Time (MST):	11:32	End Time (MST):	13:23
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	141228

SHARP INFORMATION

Particulate Fraction:	PM2.5							
Make/Model:	Thermo / SHARP 5030							
Serial Number								
C_{14} Source SN:								
Confirmation of Time settings:	Yes ☑	No ☐						
Paremeters Checked:	T1 ☑	T2 ☐	T3 ☐	T4 ☐	P3 ☑	Main Flow ☑	Beta ☐	Neph ☑

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-3.0	-1.5	1.5	-3.0
T2	20.0	na	na	
T3	23.0	na	na	
T4	18.0	na	na	
RH (%)	13.0	na	na	

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	993	992.2	-0.8	993

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1004	4	1004	1000

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	220		220
Neph	0.9		0
C14	5.3		6.9
Indicated Concentration (ug/m3)	**0.6**	**yes**	**0**
Offset 1	219.1		219.7
Offset 2	34.2		34.2

Leak Check (Quarterly)

Leak Check Date:	February 5, 2016	Previous Leak Check Date:	April 20, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.63	0.14
*Flow with adaptor (LPM):	16.49	

**Note - do not attach adaptor without shutting off the pump first*

Mass Foil Calibration (Annualy)

Foil Calibration Date:		Previous Foil Calibration:	
Zeroed?:			
Foil Mass:		Mass foil set S/N:	
Previous Correction Factor:			
New Correction Factor:			

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good/cleaned	05/02/2016
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Filter tape still 75% full. Nephalometer zeroed.

Calibration Performed By: **Devin Russell**

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 2
MILDRED LAKE
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
MARCH 2016

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	705	34	39	99.33	102	0	15	0
H2S (ppb) Average	706	33	38	99.33	8	0	2	0
THC (ppm) Average	705	34	39	99.33	5.6	-	3.2	-
Temperature (C) Average	744	0	0	100.00	12.9	-	5.4	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	90	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	24	-	15	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	705	3.2	8	-	0	0	0	0	2	9	102
H2S (ppb) Average	706	0.5	1	-	0	0	0	0	0	1	8
THC (ppm) Average	705	2.46	0.4	-	2	2.2	2.2	2.4	2.6	2.9	5.6
Temperature 2 m (C) Average	744	-3.62	5.2	-	-15.8	-9.6	-7.4	-4.3	-0.2	2.7	12.9
Relative Humidity (%) Average	744	71.6	17	-	21	47	60	74	87	91	98
Wind Speed 10 m (km/h) Average	744	9.1	4	-	0	4	6	9	12	15	24
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, H2S, THC	01 Mar 2016 01:00	01 Mar 2016 04:00	4	Station power failure
SO2, THC	01 Mar 2016 10:00	01 Mar 2016 10:00	1	Maintenance - reinitiated daily QA check
H2S	01 Mar 2016 15:00	01 Mar 2016 15:00	1	Maintenance - reinitiated daily QA check

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Mildred Lake - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 102 ppb on Mar 19 11:00 Maximum Daily Average: 15.4 ppb on Mar 27

Minimum Value: 0 ppb on Mar 13 16:00
Maximum Diurnal Average: 5.4 ppb at hour 11
Monthly Average: 3.2 ppb

Minimum Daily Average: 0.0 ppb on Mar 14
Minimum Diurnal Average: 0.5 ppb at hour 5
Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 2$ $P_{90} = 9$ $P_{99} = 41$

Hours in Service:	744
Hours of Data:	705
Hours of Missing Data:	39
Hours of Calibration:	34
Percent Operational Time:	99.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	PF	PF	0	0	0	0	0	M	1	14	18	20	19	17	24	14	3	1	1	1	1	1	7.2	24
2-Mar	1	1	Z	0	0	0	0	0	0	0	0	1	1	1	3	8	6	3	1	0	0	0	0	0	1.3	8
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	0	0	0	Z	0	0	0	9	15	1	6	4	4	1	6	8	2	9	5	17	22	13	3	5.5	22
5-Mar	5	0	0	0	0	Z	0	0	0	0	9	4	2	1	1	1	0	0	0	0	0	0	0	0	1.2	9
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	0.2	0
7-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	1	3	1	3	1	1	1	1	0	0	0	0	0.7	3
8-Mar	0	0	Z	0	1	8	9	9	14	8	3	C	C	C	C	2	3	3	3	3	4	2	2	1	3.8	14
9-Mar	1	1	1	Z	0	0	0	0	0	0	0	1	4	9	4	8	6	4	2	2	1	1	2	1	2.2	9
10-Mar	1	1	0	1	Z	0	3	12	7	4	1	0	0	1	0	0	0	0	1	1	1	4	8	1	2.0	12
11-Mar	0	0	1	1	1	Z	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	2	1	0.6	2
12-Mar	Z	19	9	2	1	4	1	0	0	1	1	1	1	0	3	9	2	12	3	19	38	33	26	19	8.8	38
13-Mar	18	Z	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	18
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	0.0	0
15-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0.2	2
16-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.1	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	0	0	0.1	0
18-Mar	Z	0	0	0	0	0	0	1	0	0	0	4	6	8	43	23	14	3	0	2	6	1	1	1	5.0	43
19-Mar	0	Z	0	0	0	0	0	0	0	19	102	69	3	0	0	0	0	0	0	0	0	0	0	0	8.5	102
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	0.1	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	0.1	0
22-Mar	0	0	1	1	Z	5	1	4	10	5	15	13	2	4	3	15	6	1	1	0	6	1	3	11	4.7	15
23-Mar	22	15	3	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.9	22
24-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	1	0	0	0	0	0	0	0	0.5	5
25-Mar	0	Z	0	0	0	0	0	1	2	0	2	7	16	10	13	13	5	3	2	1	1	1	6	4	3.8	16
26-Mar	2	1	Z	1	1	1	1	1	1	1	2	4	13	28	11	30	40	30	31	30	18	6	6	11	11.7	40
27-Mar	20	14	19	Z	4	2	2	6	13	10	2	2	1	6	7	10	19	21	12	14	41	37	42	54	15.4	54
28-Mar	49	31	52	5	1	1	1	1	Z	2	25	4	6	3	2	0	0	0	0	0	0	0	0	1	7.9	52
29-Mar	0	0	0	1	0	Z	0	0	1	2	1	0	3	8	4	2	1	1	2	5	6	2	1	1	1.8	8
30-Mar	Z	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
31-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	3	15	1	11	12	11	6	3	1	1	1	0	2.9	15
	4.9	3.4	3.7	0.6	0.5	0.9	0.7	1.2	2.0	2.3	5.4	4.5	2.8	4.1	4.1	5.4	4.8	3.6	2.5	2.9	4.6	3.8	3.6	3.6	Diurnal Average	
	49	31	52	5	4	8	9	12	14	19	102	69	18	28	43	30	40	30	31	30	41	37	42	54	Diurnal Maximum	

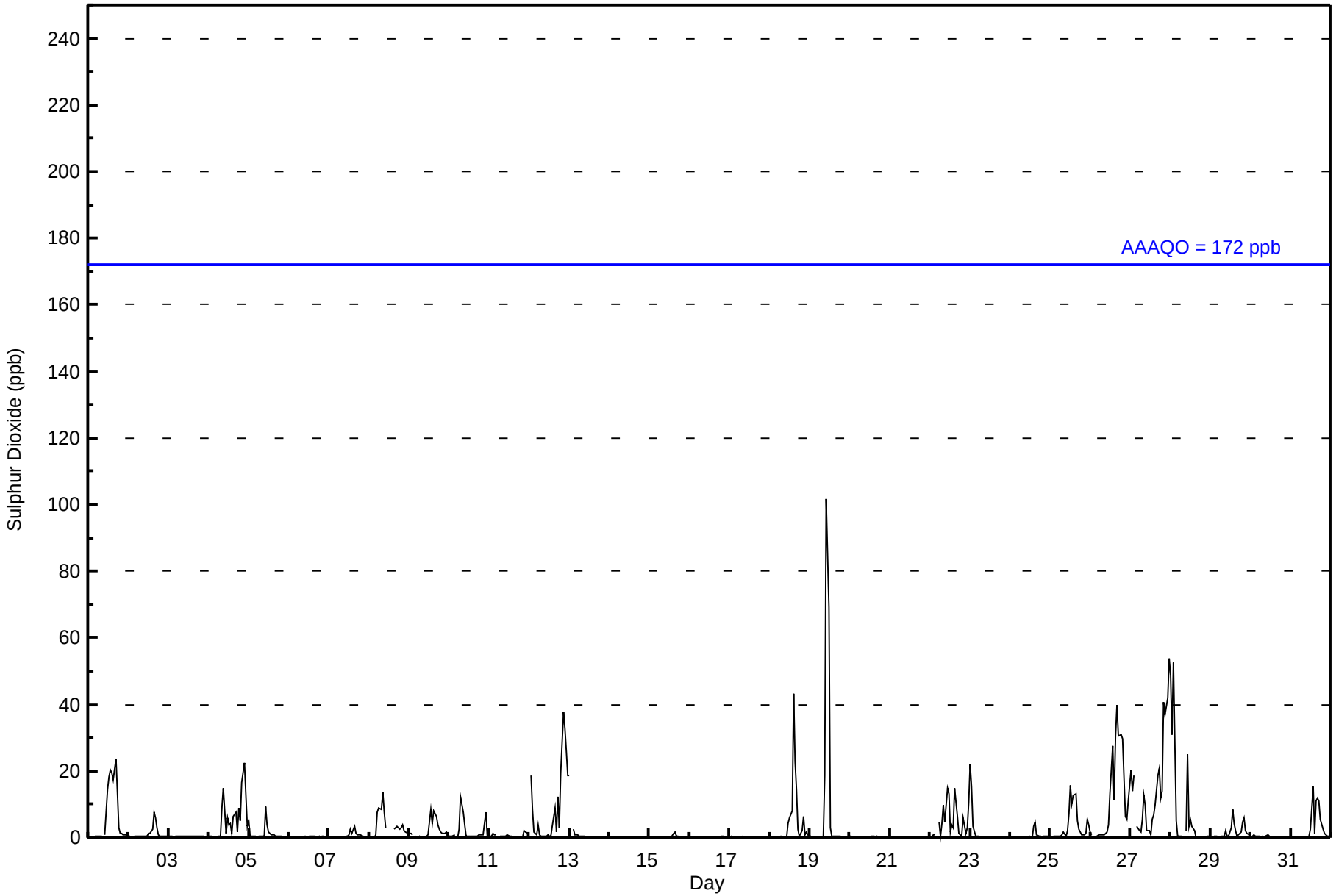
Z - zerospan C - Calibration M - Maintenance PF - Power Failure
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Mildred Lake - March 2016



Sulphur Dioxide (SO_2) - ppb
Mildred Lake - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	639	90.64	90.64
11 - 20	41	5.82	96.45
21 - 60	23	3.26	99.72
61 - 110	2	0.28	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Mildred Lake - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	193	121	20	3	14	18	33	43	40	31	22	6	8	10	28	49	639
11 - 20	0	1	0	0	0	0	7	21	4	3	2	2	0	0	0	1	41
21 - 60	0	0	0	0	0	0	2	17	2	0	1	0	0	0	0	1	23
61 - 110	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
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	193	122	20	3	14	18	42	81	46	34	27	8	8	10	28	51	705

Total Number of Valid Hours: 705

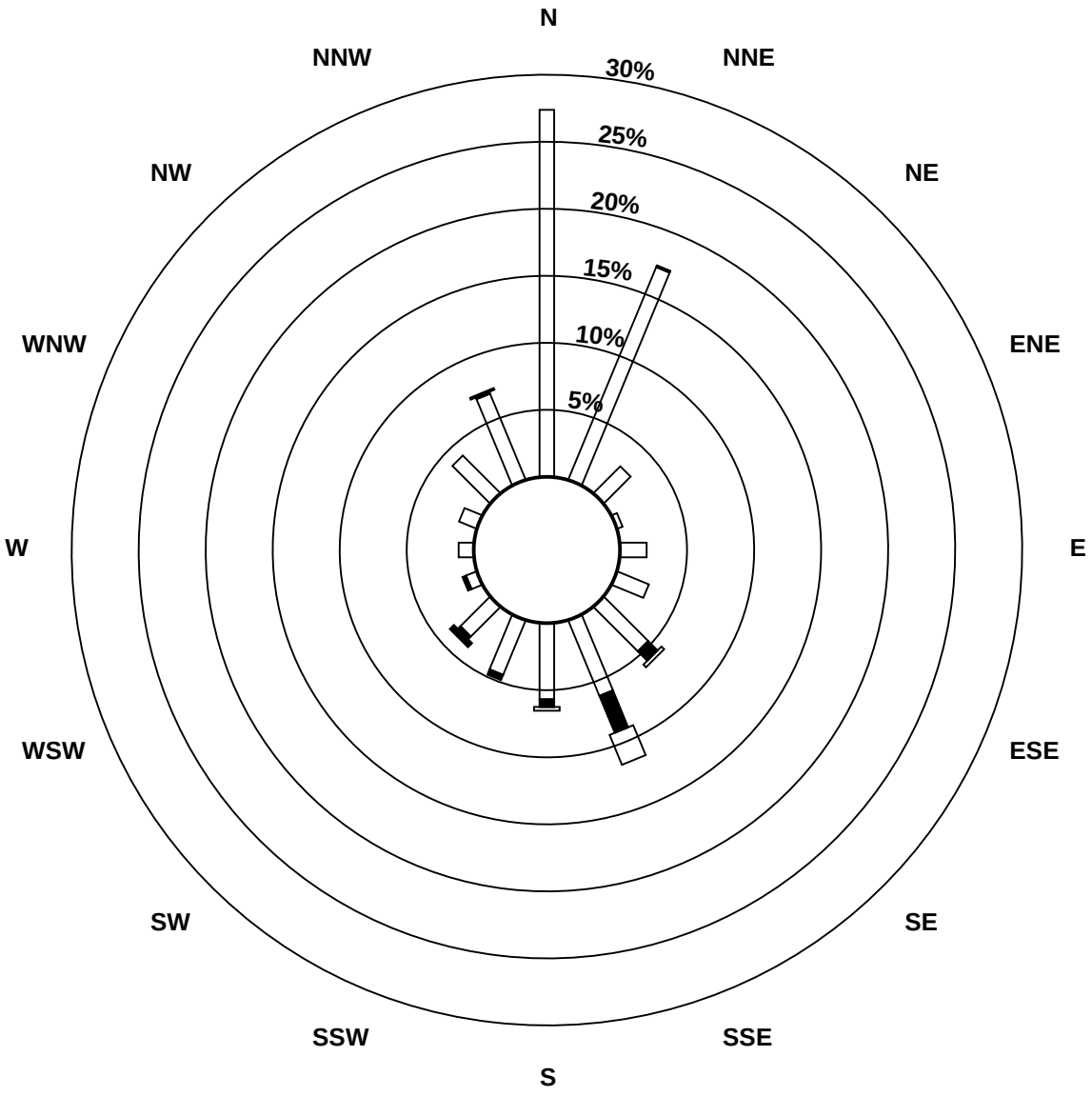
Total Number of Hours: 744

Wood Buffalo Environmental Association

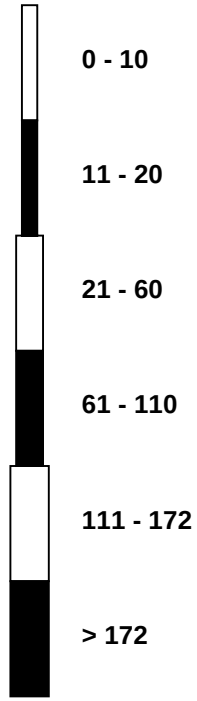
Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Mildred Lake (AMS 2)



Classes (ppb)



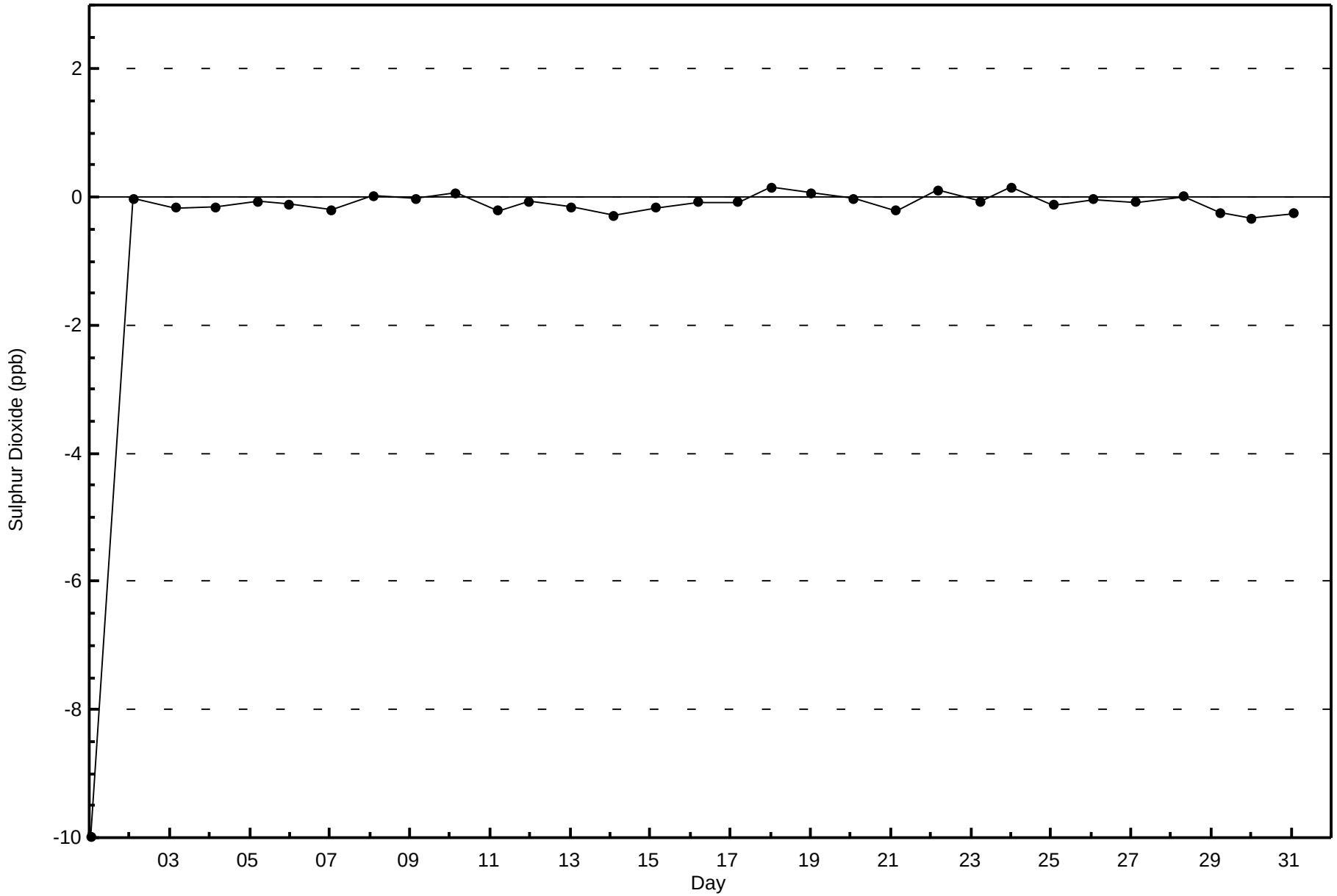
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Mildred Lake - March 2016

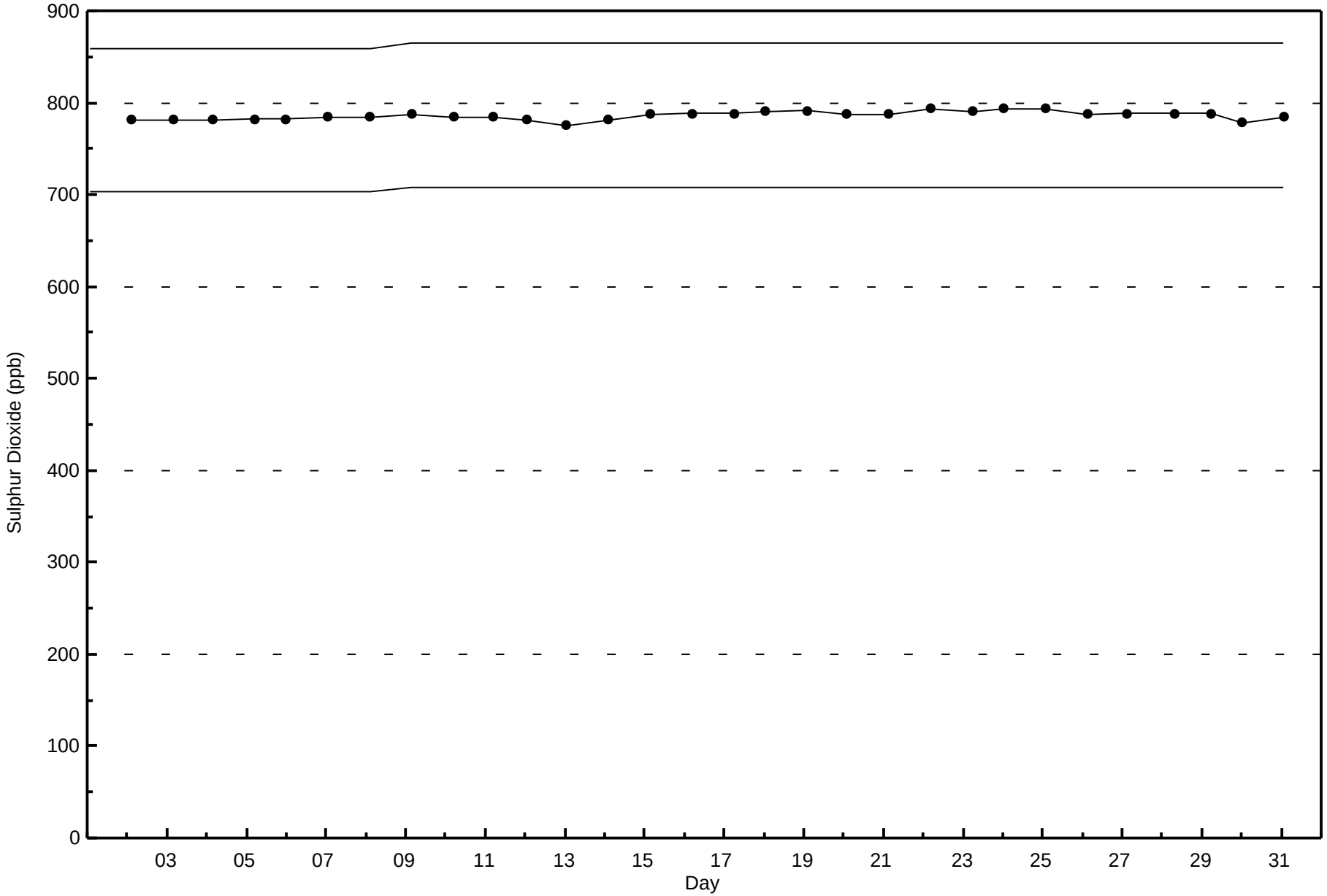


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Mildred Lake - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Mildred Lake - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 8 ppb on Mar 28 03:00

Maximum Daily Average: 2.5 ppb on Mar 27

Minimum Value: 0 ppb on Mar 11 16:00

Minimum Daily Average: 0.0 ppb on Mar 30

Maximum Diurnal Average: 0.9 ppb at hour 1

Minimum Diurnal Average: 0.3 ppb at hour 5

Monthly Average: 0.5 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 4$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	33
Percent Operational Time:	99.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	PF	PF	0	0	0	0	0	1	0	2	1	0	M	0	1	1	1	0	0	0	0	0	0.5	2
2-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	0.3	1
3-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
4-Mar	0	0	0	0	0	Z	0	0	2	3	0	1	1	1	0	1	1	0	1	0	1	2	2	1	0.8	3
5-Mar	1	0	0	0	0	0	Z	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	2
6-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
7-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.4	1
8-Mar	0	0	0	Z	1	2	3	3	4	2	1	1	3	1	C	C	C	1	1	1	1	0	0	0	1.3	4
9-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	0.5	2
10-Mar	2	2	1	1	1	Z	1	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.7	3
11-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.2	1
12-Mar	2	Z	3	1	1	1	1	0	0	0	0	0	0	0	0	1	0	1	0	1	2	2	2	1	0.9	3
13-Mar	2	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
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	0.2	0
16-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
17-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
18-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	2	3	1	0	1	2	0	1	0	0.6	3
19-Mar	0	0	Z	0	0	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
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	2	1	0	1	1	0	0	0	1	0	0	0	0	1	0	1	3	0.7	3
23-Mar	5	3	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	5
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	0.2	0
25-Mar	0	0	Z	1	0	0	0	0	1	0	1	1	3	2	2	3	1	1	1	1	1	1	1	1	0.9	3
26-Mar	1	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	1	2	2	5	4	2	1	1	2	1.1	5
27-Mar	4	3	3	3	Z	1	1	1	3	2	0	0	0	1	1	2	3	4	2	1	3	4	6	7	2.5	7
28-Mar	7	4	8	1	1	0	1	1	0	Z	4	0	1	0	0	0	0	0	0	0	0	0	0	1	1.4	8
29-Mar	1	1	0	1	1	1	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
30-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
31-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	2	1	0	0	0	0.4	2
	0.9	0.7	0.8	0.5	0.3	0.4	0.4	0.5	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.6	0.5	0.5	0.4	0.5	0.6	0.5	0.6	0.7	Diurnal Average	
	7	4	8	3	1	2	3	3	4	3	4	2	3	2	2	3	3	4	5	4	3	4	6	7	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance PF - Power Failure

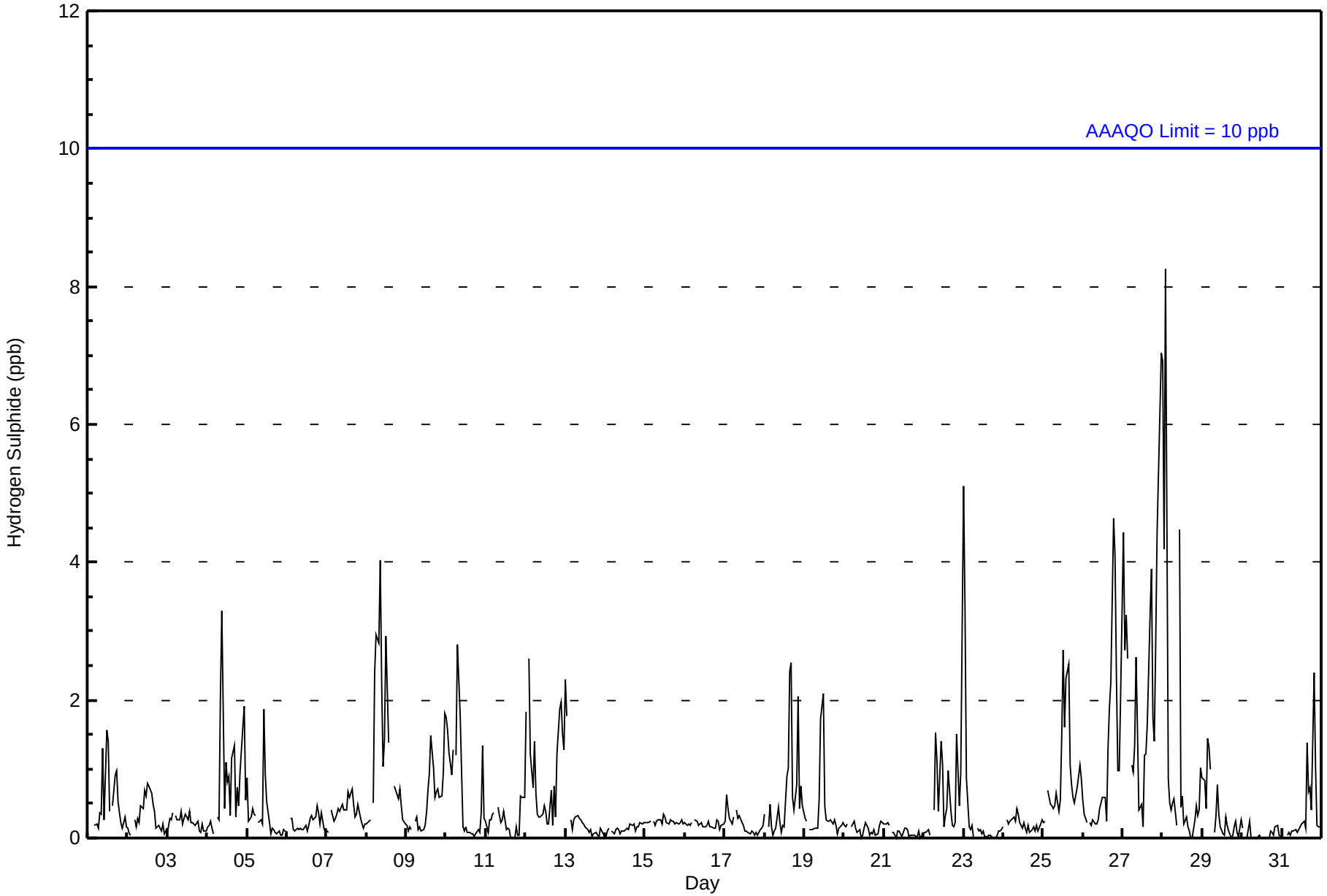
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Mildred Lake - March 2016



Hydrogen Sulphide (H_2S) - ppb
Mildred Lake - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	676	95.75	95.75
3 - 4	24	3.40	99.15
5 - 7	5	0.71	99.86
8 - 11	1	0.14	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Mildred Lake - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	191	121	20	4	12	18	38	60	47	32	26	9	8	10	29	51	676
3 - 4	0	0	0	0	1	1	3	17	2	0	0	0	0	0	0	0	24
5 - 7	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5
8 - 11	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	191	121	20	4	13	19	41	83	49	32	26	9	8	10	29	51	706

Total Number of Valid Hours: 706

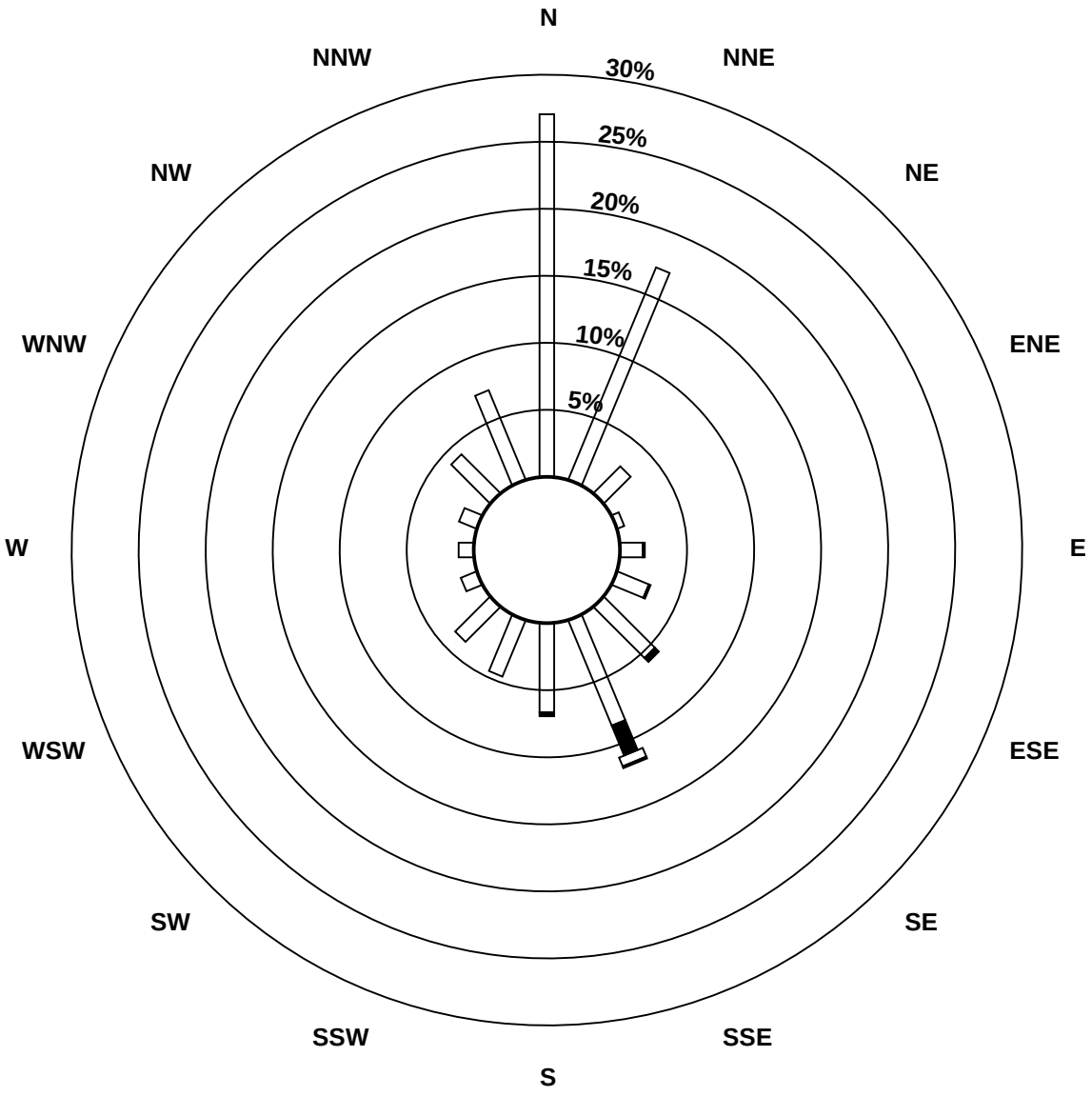
Total Number of Hours: 744

Wood Buffalo Environmental Association

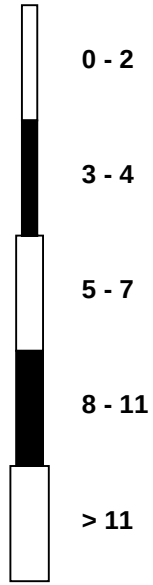
Wind Rose Mar 2016

Hydrogen Sulphide (H_2S) - ppb

Mildred Lake (AMS 2)



Classes (ppb)



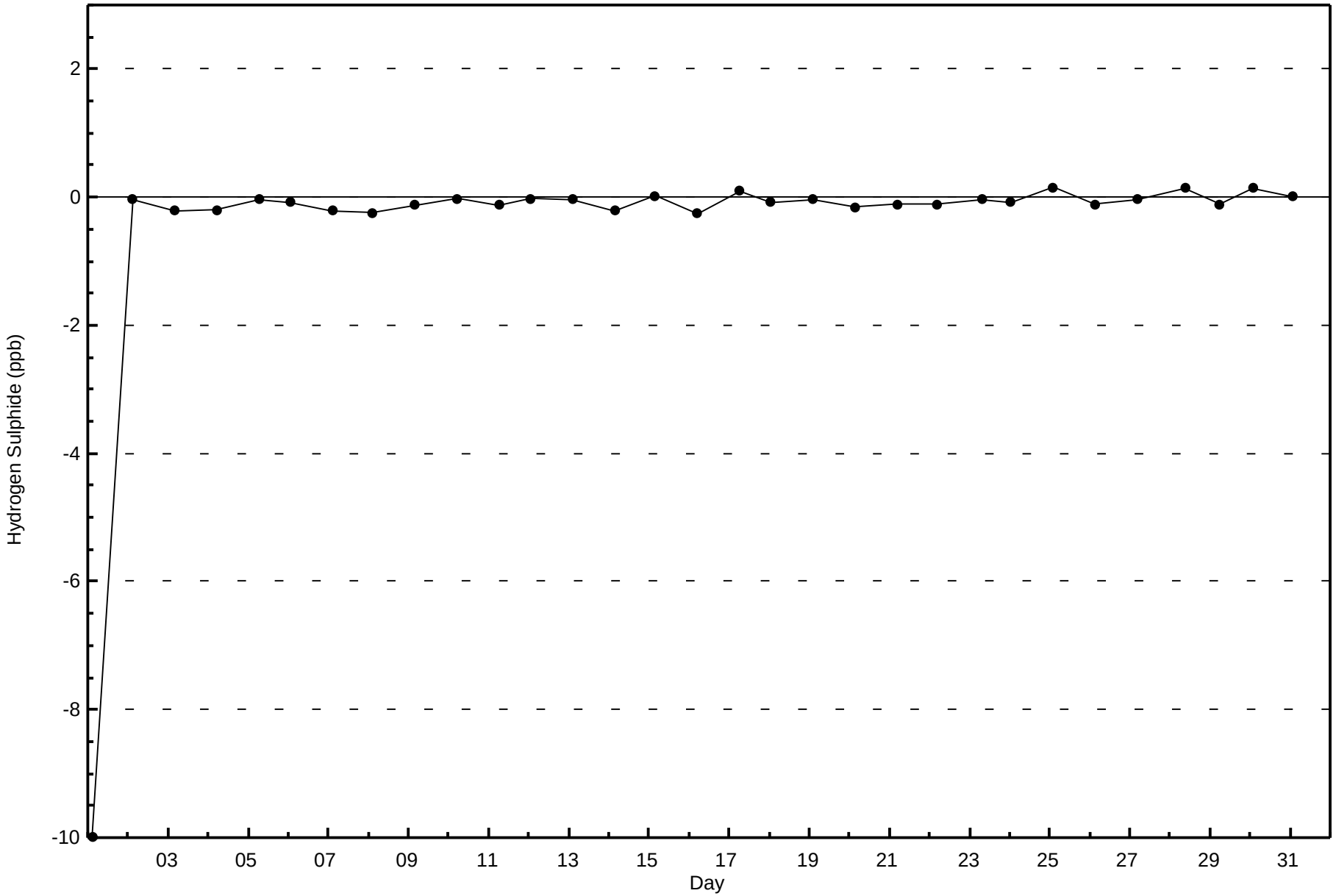
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Mildred Lake - March 2016

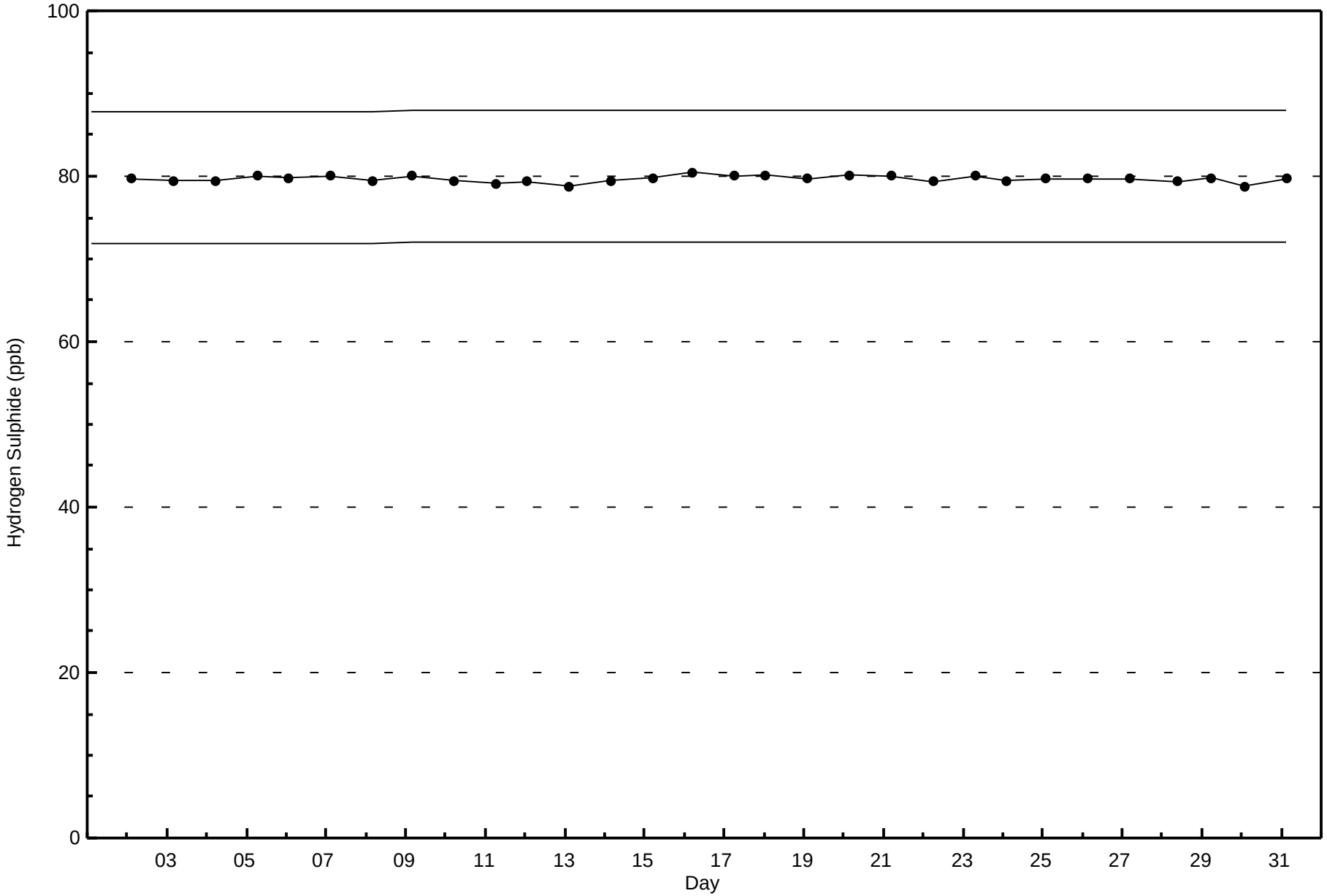


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Mildred Lake - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Mildred Lake - March 2016

Maximum Value: 5.6 ppm on Mar 10 02:00

Maximum Daily Average: 3.2 ppm on Mar 28

Minimum Value: 2.0 ppm on Mar 29 18:00

Minimum Daily Average: 2.2 ppm on Mar 14

Maximum Diurnal Average: 2.6 ppm at hour 3

Minimum Diurnal Average: 2.4 ppm at hour 18

Monthly Average: 2.46 ppm

Percentiles: P_1 = 2.1 P_{10} = 2.2 Q_1 = 2.2 Median = 2.4 Q_3 = 2.6 P_{90} = 2.9 P_{99} = 4.5

Hours in Service:	744
Hours of Data:	705
Hours of Missing Data:	39
Hours of Calibration:	34
Percent Operational Time:	99.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	PF	PF	2.2	2.3	2.3	2.2	2.2	M	2.7	2.4	2.3	2.4	2.2	2.2	2.9	2.5	2.5	2.4	2.3	2.3	2.5	2.4	2.4	2.9
2-Mar	2.4	2.4	Z	2.4	2.5	2.4	2.5	2.4	2.5	2.7	2.7	2.8	2.8	2.8	2.7	2.5	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.5	2.8
3-Mar	2.3	2.5	2.6	Z	2.5	2.4	2.4	2.3	2.5	2.4	2.4	2.5	2.5	2.4	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.4	2.6
4-Mar	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.3	2.4	2.9	2.9	2.6	2.5	2.4	2.4	2.3	2.4	2.3	2.5	2.6	2.4	2.3	2.3	2.3	2.4	2.9
5-Mar	2.3	2.6	3.3	3.2	3.0	Z	2.3	2.3	2.4	2.4	2.8	2.8	2.7	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	3.3
6-Mar	Z	2.2	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.5
7-Mar	2.3	Z	2.2	2.4	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.5	2.8	3.0	3.1	2.9	2.6	2.3	2.4	2.8	2.5	2.3	2.2	2.2	2.5	3.1
8-Mar	2.3	2.3	Z	2.3	2.3	2.7	2.8	2.8	2.9	2.9	2.8	C	C	C	C	2.4	2.4	2.5	2.6	2.7	2.8	2.6	2.4	2.3	2.6	2.9
9-Mar	2.2	2.2	2.2	Z	2.4	2.5	2.5	2.3	2.2	2.3	2.2	2.2	2.3	2.5	2.6	2.4	2.4	2.4	2.4	2.3	2.4	2.5	3.0	4.8	2.5	4.8
10-Mar	4.7	5.6	4.5	3.1	Z	2.7	3.0	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.4	2.5	2.4	2.8	2.8	5.6
11-Mar	2.6	2.3	2.7	2.6	2.8	Z	2.4	2.4	2.6	2.7	2.8	2.4	2.4	2.9	2.7	2.4	2.4	2.6	2.9	2.9	2.5	2.4	2.9	2.9	2.6	2.9
12-Mar	Z	2.8	2.9	3.0	2.8	2.6	2.8	2.6	2.6	2.5	2.7	2.8	2.7	2.3	2.2	2.1	2.2	2.4	2.6	2.6	2.5	2.4	2.5	2.5	2.6	3.0
13-Mar	2.4	Z	2.4	2.6	2.4	2.5	2.7	2.6	2.5	2.4	2.4	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	2.3	2.7
14-Mar	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.3	2.3	2.3	2.2	2.3
15-Mar	2.2	2.2	2.2	Z	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.4
16-Mar	2.2	2.2	2.2	2.2	Z	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.5	2.8	2.1	2.0	2.1	2.2	2.8
17-Mar	2.3	2.9	2.8	2.2	2.4	Z	2.9	3.1	3.3	2.9	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.4	3.3
18-Mar	Z	2.1	2.2	3.2	2.3	2.2	2.2	2.3	3.0	2.5	2.2	2.3	2.3	2.4	2.5	2.5	2.4	2.9	3.9	3.4	3.2	2.6	2.9	2.6	2.6	3.9
19-Mar	2.3	Z	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.6	2.9	2.5	2.5	2.6	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.9
20-Mar	2.3	2.3	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.2	2.4	2.3	2.3	2.2	2.3	2.2	2.3	2.3	2.5	2.5	2.4	2.3	2.5
21-Mar	2.4	2.4	2.4	Z	2.3	2.2	2.3	2.3	2.2	2.2	2.1	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	2.4
22-Mar	2.2	2.2	2.3	2.3	Z	2.3	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.6	2.4	2.3	2.6
23-Mar	2.5	2.6	2.4	2.1	2.1	2.2	Z	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.6
24-Mar	Z	2.3	2.4	2.3	2.4	2.5	2.5	2.5	2.6	2.6	2.7	2.6	2.5	2.4	2.3	2.3	2.3	2.3	2.4	2.2	2.3	2.3	2.5	2.4	2.4	2.7
25-Mar	2.3	Z	2.9	2.8	2.7	2.7	2.5	2.8	3.0	2.8	2.8	2.7	2.3	2.3	2.3	2.4	2.6	3.2	2.9	2.8	3.1	3.9	3.6	3.0	2.8	3.9
26-Mar	2.7	2.6	Z	3.4	2.7	2.6	2.6	2.6	2.5	2.5	2.7	2.8	2.8	2.5	2.4	2.5	2.6	2.5	2.7	2.6	2.9	3.3	3.0	2.8	2.7	3.4
27-Mar	2.8	2.6	2.6	Z	2.9	3.1	2.9	2.8	2.7	2.6	2.7	3.1	2.7	2.5	2.6	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.7	3.1
28-Mar	2.6	2.5	2.7	2.9	3.3	3.1	3.3	3.2	Z	2.7	2.5	2.5	2.5	2.5	3.2	3.6	3.5	2.4	2.5	4.0	5.2	4.7	4.5	3.5	3.2	5.2
29-Mar	2.6	2.6	2.6	3.0	2.6	Z	2.4	2.3	2.7	3.0	2.8	2.3	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.4	2.9	2.8	2.8	3.0	2.5	3.0
30-Mar	Z	2.7	2.6	2.1	4.1	2.5	2.2	2.2	2.1	2.2	2.5	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.3	4.1
31-Mar	2.1	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.4	2.2	2.1	2.4	2.3	2.4	2.3	3.3	2.2	2.1	2.1	2.1	2.3	3.3
	2.5	2.5	2.6	2.5	2.5	2.4	2.5	2.4	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.5	Diurnal Average	
	4.7	5.6	4.5	3.4	4.1	3.1	3.3	3.2	3.3	3.0	2.9	3.1	2.8	3.0	3.2	3.6	3.5	3.2	3.9	4.0	5.2	4.7	4.5	4.8	Diurnal Maximum	

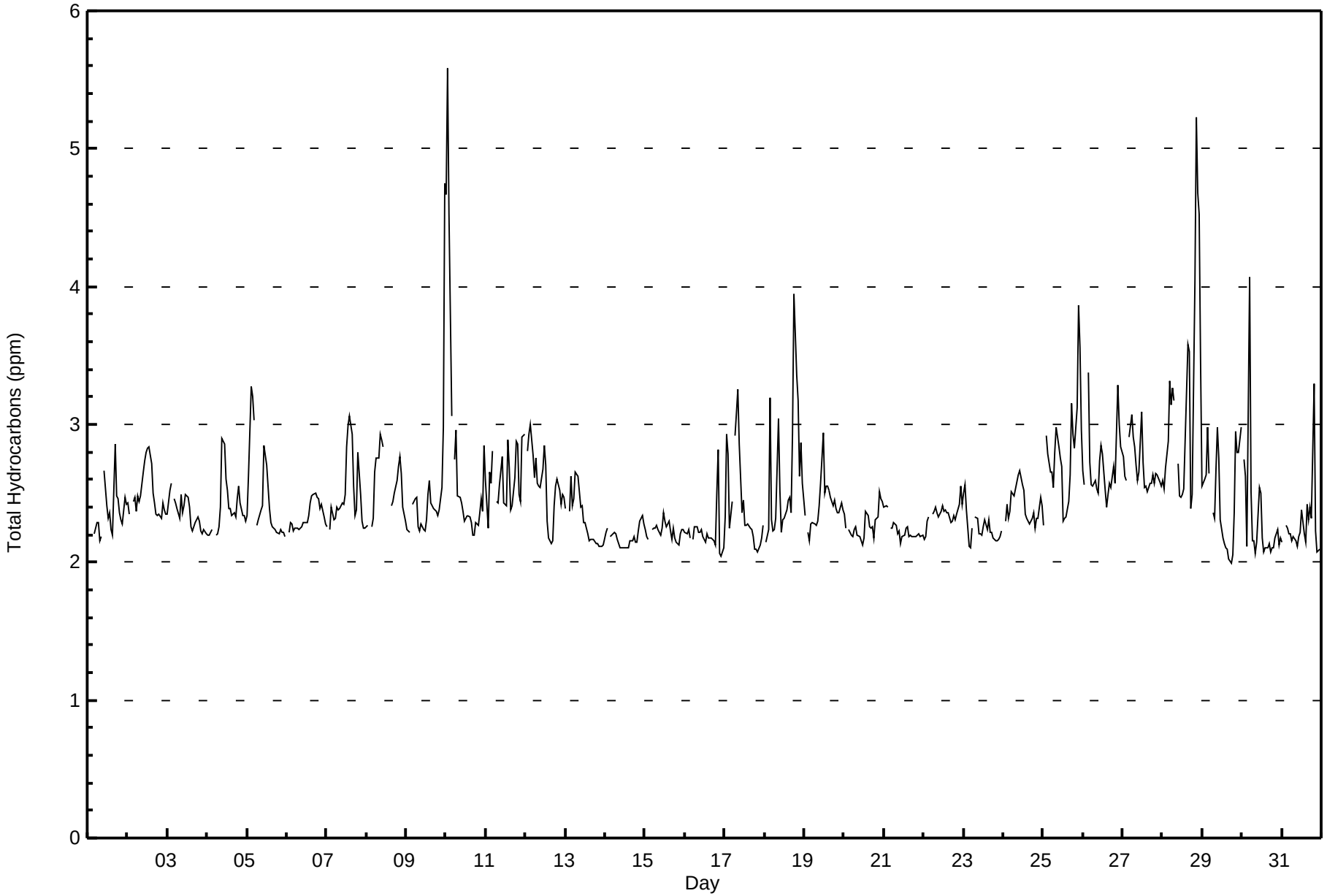
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Mildred Lake - March 2016



Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	3	0.43	0.43
2.1 - 3.0	666	94.47	94.89
3.1 - 10.0	36	5.11	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

Mildred Lake - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	3
2.1 - 3.0	191	122	20	3	14	18	42	75	39	29	23	8	8	9	17	48	666
3.1 - 10.0	1	0	0	0	0	0	0	6	7	4	3	0	0	1	11	3	36
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	193	122	20	3	14	18	42	81	46	34	27	8	8	10	28	51	705

Total Number of Valid Hours: 705

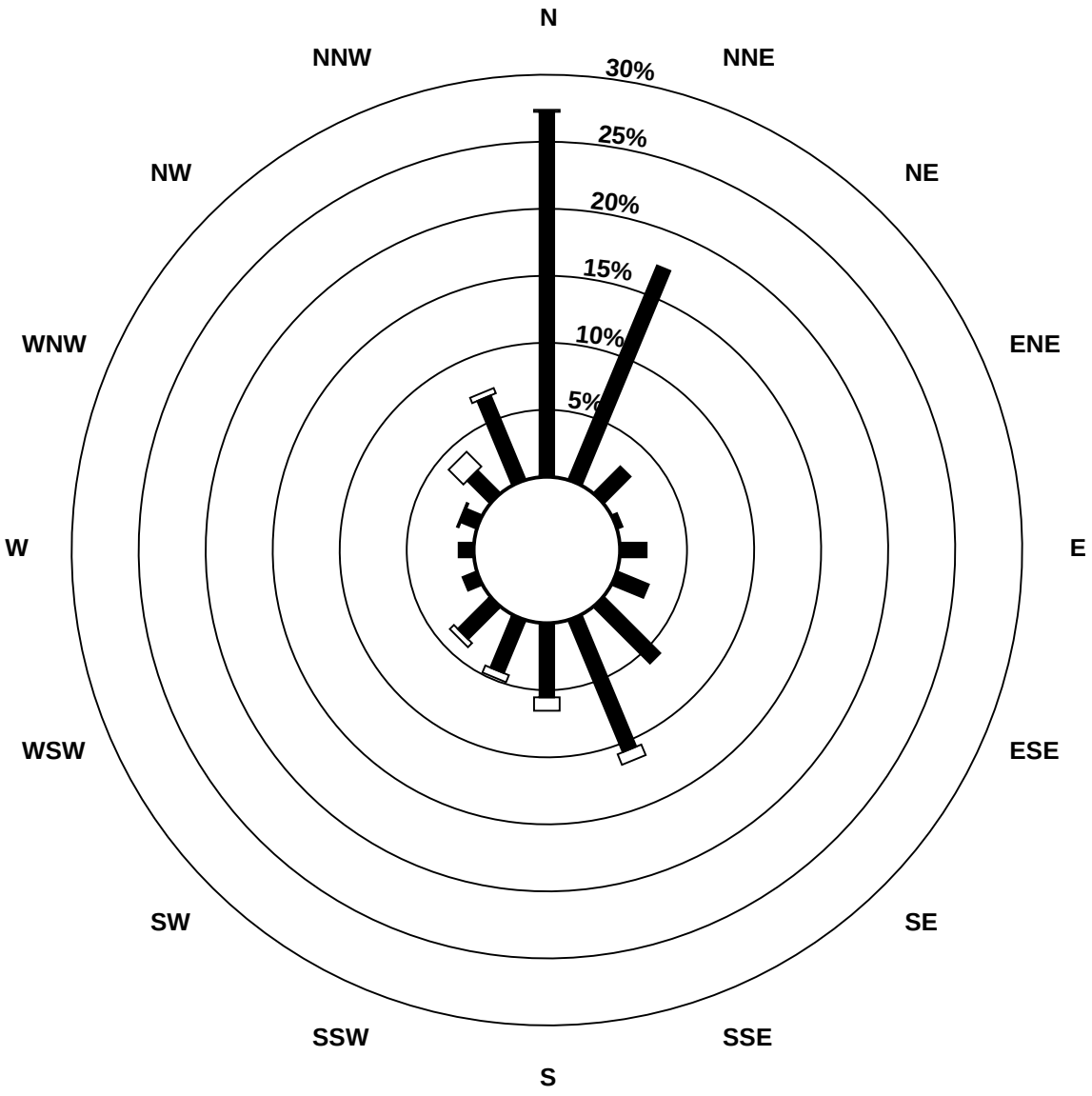
Total Number of Hours: 744

Wood Buffalo Environmental Association

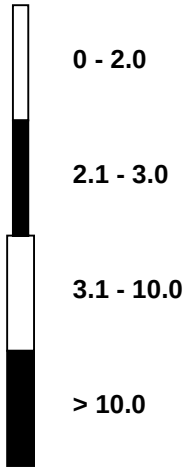
Wind Rose Mar 2016

Total Hydrocarbons (THC) - ppm

Mildred Lake (AMS 2)



Classes (ppm)



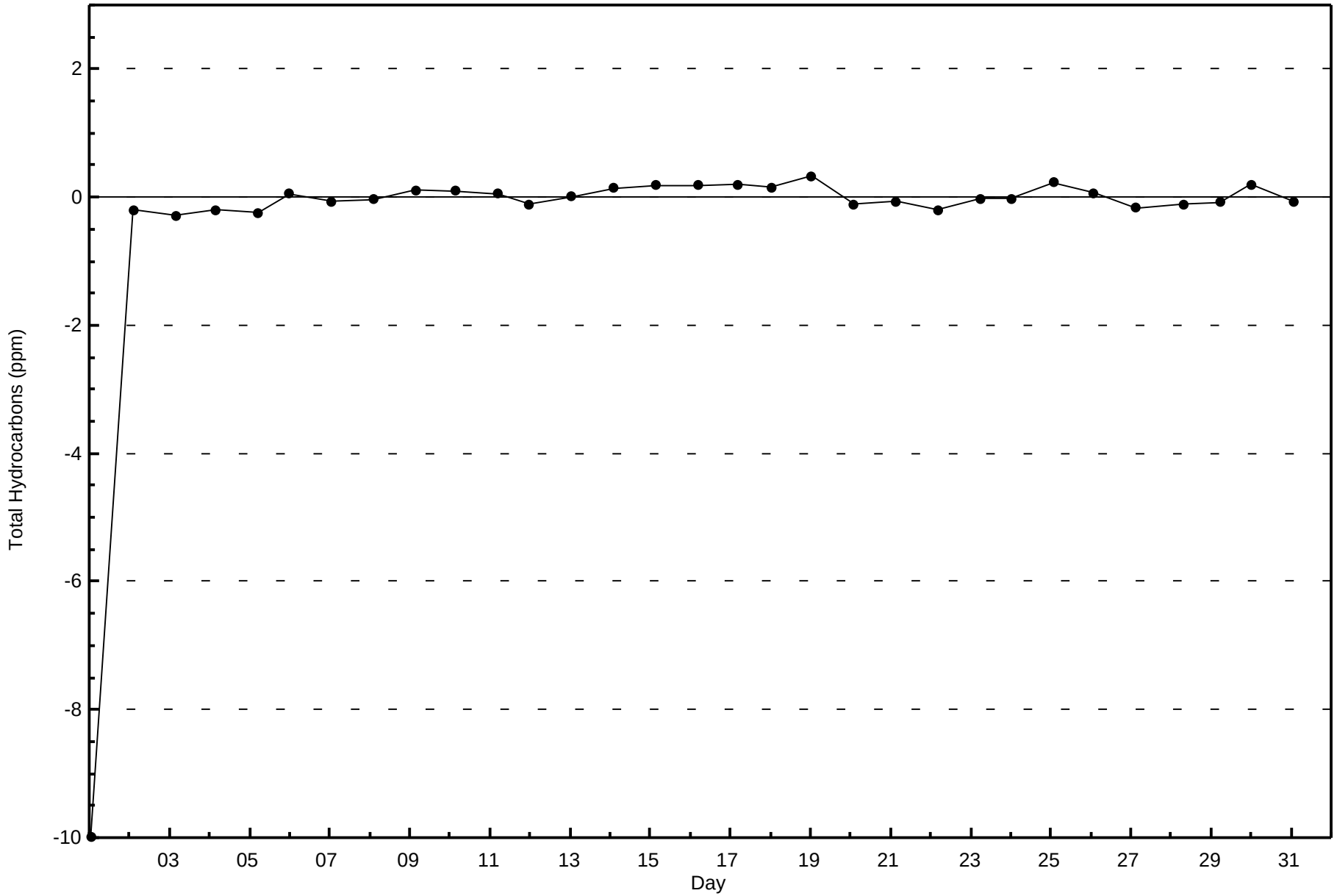
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Mildred Lake - March 2016

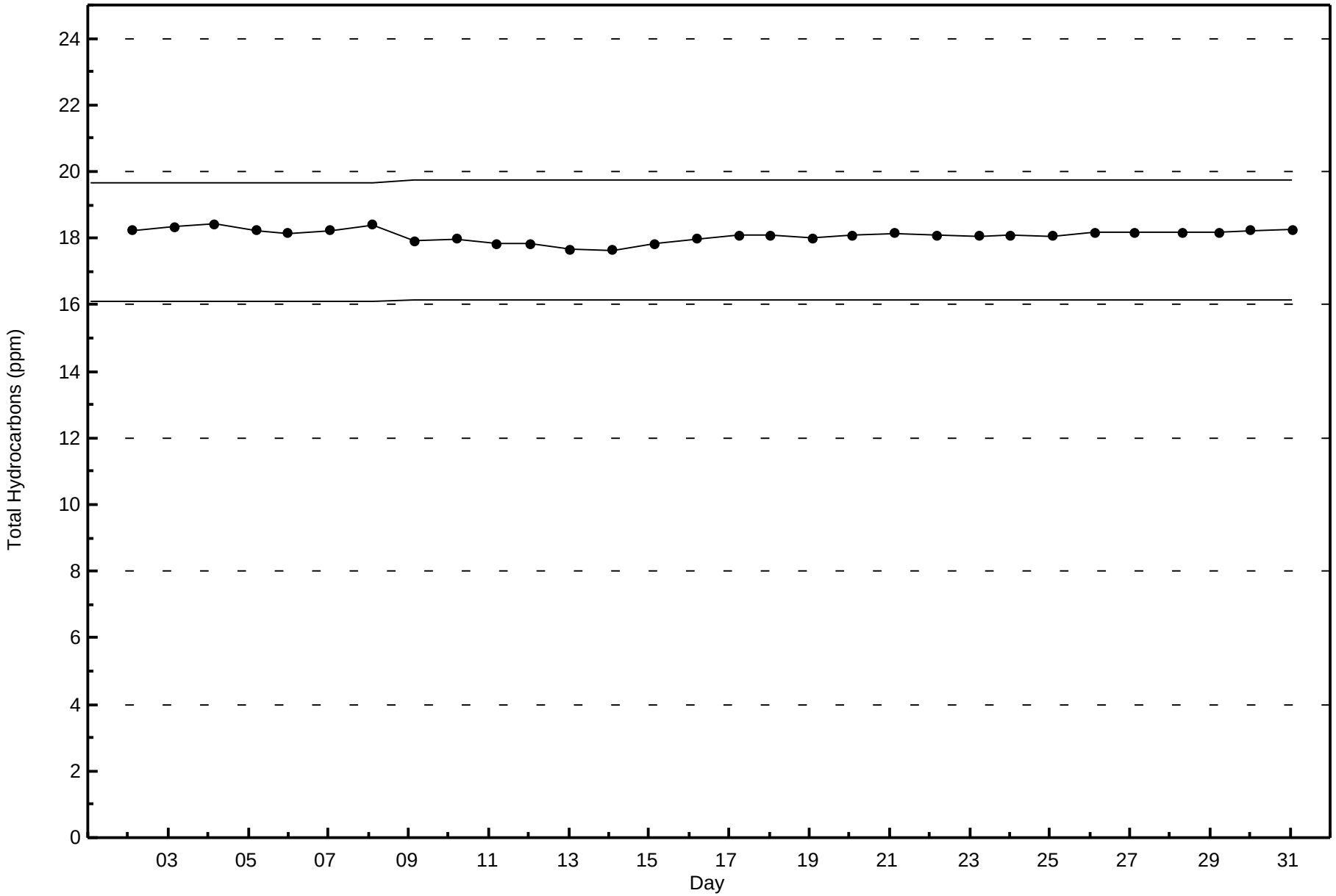


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Mildred Lake - March 2016



Maximum Value: 12.9 C on Mar 29 16:00

Maximum Daily Average: 5.4 C on Mar 29

Minimum Value: -15.8 C on Mar 24 07:00

Minimum Daily Average: -9.1 C on Mar 3

Maximum Diurnal Average: 0.3 C at hour 17

Minimum Diurnal Average: -7.1 C at hour 7

Monthly Average: -3.62 C

Percentiles: P_1 = -13.5 P_{10} = -9.6 Q_1 = -7.4 Median = -4.3 Q_3 = -0.2 P_{90} = 2.7 P_{99} = 11.4

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

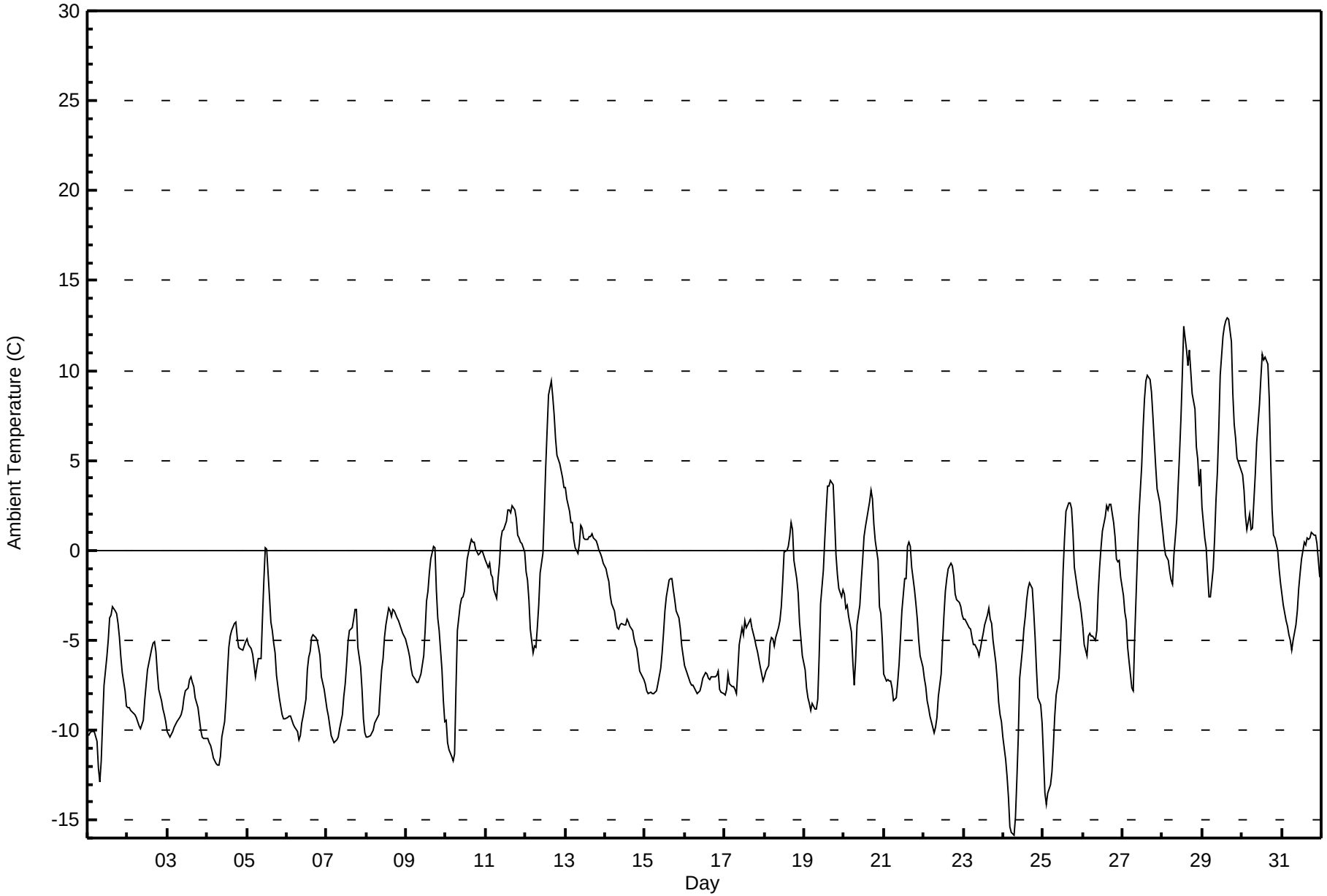
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.3	-10.1	-10.0	-10.1	-10.1	-10.7	-12.1	-12.9	-11.7	-9.5	-7.5	-6.0	-5.0	-3.8	-3.6	-3.1	-3.3	-3.5	-4.1	-4.8	-5.9	-6.8	-7.8	-8.7	-7.6	-3.1
2-Mar	-8.8	-8.8	-8.9	-9.1	-9.2	-9.3	-9.5	-9.8	-9.9	-9.4	-8.4	-7.5	-6.6	-6.3	-5.5	-5.2	-5.1	-5.6	-6.8	-7.8	-8.4	-8.9	-9.1	-9.5	-8.0	-5.1
3-Mar	-10.0	-10.4	-10.3	-10.1	-9.8	-9.7	-9.5	-9.3	-9.2	-8.8	-8.2	-7.8	-7.6	-7.2	-7.1	-7.3	-7.6	-8.2	-8.8	-9.4	-10.0	-10.4	-10.5	-10.5	-9.1	-7.1
4-Mar	-10.5	-10.7	-10.8	-11.2	-11.6	-11.8	-11.9	-11.9	-11.5	-10.4	-9.5	-8.4	-6.8	-5.4	-4.8	-4.4	-4.1	-4.0	-4.8	-5.4	-5.5	-5.6	-5.3	-5.1	-8.0	-4.0
5-Mar	-5.0	-5.3	-5.5	-5.8	-6.4	-7.0	-6.5	-6.0	-6.0	-3.8	-1.7	0.1	0.1	-2.6	-4.0	-4.5	-5.1	-5.7	-7.0	-8.2	-8.7	-9.1	-9.4	-9.3	-5.5	0.1
6-Mar	-9.3	-9.2	-9.2	-9.4	-9.7	-9.8	-10.1	-10.5	-10.3	-9.6	-9.2	-8.3	-6.7	-6.0	-5.6	-4.9	-4.7	-4.8	-5.0	-5.4	-5.8	-7.0	-7.7	-8.2	-7.8	-4.7
7-Mar	-8.8	-9.2	-9.8	-10.3	-10.7	-10.6	-10.5	-10.4	-9.9	-9.1	-8.1	-7.4	-6.3	-5.1	-4.4	-4.3	-3.8	-3.3	-3.3	-5.4	-6.5	-7.8	-9.4	-10.2	-7.7	-3.3
8-Mar	-10.4	-10.4	-10.3	-10.2	-10.0	-9.6	-9.4	-9.2	-7.8	-6.6	-6.0	-4.9	-4.1	-3.2	-3.4	-3.7	-3.3	-3.4	-3.7	-3.9	-4.2	-4.4	-4.6	-4.9	-6.3	-3.2
9-Mar	-5.2	-5.5	-6.0	-6.6	-6.9	-7.2	-7.3	-7.4	-7.1	-6.9	-5.9	-4.4	-2.8	-2.2	-1.3	-0.5	0.2	0.1	-2.2	-3.8	-4.5	-6.6	-8.4	-9.5	-4.9	0.2
10-Mar	-9.5	-10.7	-11.1	-11.4	-11.7	-11.4	-7.7	-4.5	-3.1	-2.7	-2.6	-2.3	-1.4	-0.5	0.3	0.6	0.5	0.4	0.0	-0.2	-0.2	0.0	-0.1	-0.3	-3.7	0.6
11-Mar	-0.6	-1.0	-0.7	-1.4	-1.5	-2.2	-2.7	-1.6	-0.7	0.6	1.1	1.2	1.6	2.2	2.2	2.1	2.5	2.2	1.8	0.8	0.7	0.4	0.3	-0.1	0.3	2.5
12-Mar	-1.2	-1.7	-2.8	-4.4	-5.7	-5.3	-5.4	-4.3	-3.1	-1.3	-0.2	2.2	4.7	6.7	8.6	9.4	8.6	7.5	6.2	5.3	4.8	4.5	4.1	3.5	1.7	9.4
13-Mar	3.5	2.9	2.2	1.5	1.5	0.6	0.2	-0.1	0.3	1.4	1.2	0.7	0.6	0.6	0.7	0.8	0.9	0.7	0.5	0.3	0.0	-0.2	-0.4	-0.7	0.8	3.5
14-Mar	-1.0	-1.4	-1.7	-2.5	-2.9	-3.4	-3.9	-4.3	-4.4	-4.2	-4.1	-4.1	-4.1	-3.9	-4.0	-4.2	-4.5	-4.9	-5.2	-5.5	-6.1	-6.8	-7.0	-7.2	-4.2	-1.0
15-Mar	-7.4	-7.8	-8.0	-7.9	-8.0	-8.0	-7.9	-7.8	-7.4	-6.6	-5.7	-4.6	-3.4	-2.6	-1.7	-1.6	-1.6	-2.2	-2.8	-3.4	-3.7	-4.4	-5.3	-5.9	-5.2	-1.6
16-Mar	-6.4	-6.9	-7.1	-7.4	-7.5	-7.5	-7.7	-7.9	-7.9	-7.8	-7.5	-7.1	-6.8	-6.9	-7.1	-7.2	-7.0	-7.0	-7.0	-6.9	-6.7	-7.7	-7.9	-8.0	-7.3	-6.4
17-Mar	-8.0	-7.7	-6.9	-7.4	-7.6	-7.6	-7.7	-8.0	-6.6	-5.3	-4.3	-4.7	-3.9	-4.3	-4.1	-3.9	-4.3	-4.6	-4.9	-5.3	-5.7	-6.5	-6.9	-7.2	-6.0	-3.9
18-Mar	-7.0	-6.7	-6.4	-5.1	-4.8	-4.9	-5.3	-4.8	-4.3	-3.9	-3.2	-1.8	-0.1	0.0	0.2	0.7	1.5	1.2	-0.6	-1.6	-2.3	-4.0	-5.0	-5.9	-3.1	1.5
19-Mar	-6.6	-7.6	-8.2	-8.5	-8.9	-8.5	-8.8	-8.8	-8.3	-5.9	-2.9	-1.1	0.6	2.2	3.6	3.6	3.9	3.6	1.8	-0.2	-1.3	-2.1	-2.6	-2.2	-3.1	3.9
20-Mar	-2.4	-3.2	-3.0	-3.6	-4.6	-6.1	-7.5	-6.1	-4.1	-3.1	-1.8	-0.6	0.8	1.3	2.2	2.7	3.4	2.9	1.5	0.5	-0.6	-3.1	-3.5	-4.9	-1.8	3.4
21-Mar	-6.9	-7.3	-7.2	-7.3	-7.3	-7.7	-8.3	-8.2	-7.4	-6.3	-4.9	-3.3	-1.6	-1.6	0.2	0.4	0.2	-0.9	-2.2	-3.0	-3.9	-5.0	-5.9	-6.5	-4.6	0.4
22-Mar	-7.1	-7.6	-8.3	-8.7	-9.2	-9.8	-10.1	-9.8	-9.3	-8.1	-6.9	-5.2	-3.6	-2.3	-1.6	-1.0	-0.7	-0.9	-1.4	-2.4	-2.7	-2.9	-3.2	-3.6	-5.3	-0.7
23-Mar	-3.8	-3.8	-4.0	-4.3	-4.4	-4.9	-5.2	-5.2	-5.5	-5.9	-5.5	-5.0	-4.6	-4.2	-3.6	-3.2	-3.8	-4.1	-5.0	-6.2	-7.2	-8.4	-9.2	-9.6	-5.3	-3.2
24-Mar	-10.4	-11.6	-12.6	-13.7	-15.4	-15.7	-15.8	-14.9	-12.7	-10.4	-7.1	-5.5	-4.4	-3.7	-2.8	-2.1	-1.8	-2.1	-3.4	-4.9	-6.7	-8.2	-8.6	-9.6	-8.5	-1.8
25-Mar	-11.4	-13.5	-14.1	-13.5	-13.0	-12.4	-10.9	-9.2	-8.0	-7.1	-5.6	-3.4	-1.1	0.7	2.2	2.6	2.7	2.4	1.0	-1.0	-2.0	-2.6	-2.9	-3.5	-5.2	2.7
26-Mar	-4.2	-5.3	-5.9	-4.8	-4.6	-4.8	-4.8	-5.0	-4.5	-2.3	-1.0	0.1	1.1	1.9	2.4	2.2	2.5	2.5	1.5	0.8	-0.5	-0.7	-0.6	-1.5	-1.5	2.5
27-Mar	-2.5	-3.4	-3.9	-5.4	-6.2	-7.6	-7.8	-4.9	-2.6	-0.3	1.9	4.7	6.7	8.4	9.4	9.7	9.5	8.8	7.5	6.0	4.7	3.4	2.6	1.8	1.7	9.7
28-Mar	1.1	0.3	-0.2	-0.6	-1.2	-1.7	-1.9	-0.2	1.7	3.6	5.3	7.3	9.8	12.4	11.2	10.3	11.1	10.0	8.7	7.8	5.7	5.0	3.6	4.5	4.7	12.4
29-Mar	2.4	0.7	0.1	-1.3	-2.6	-2.6	-1.0	0.6	2.8	4.4	6.8	9.7	11.9	12.5	12.7	12.9	12.9	11.6	8.7	7.0	6.2	5.1	4.9	4.4	5.4	12.9
30-Mar	4.2	3.4	2.0	1.2	2.0	1.1	1.2	2.7	4.2	6.0	8.1	9.6	10.9	10.6	10.8	10.3	8.4	5.0	2.2	0.8	0.7	0.0	-1.1	-1.8	4.3	10.9
31-Mar	-2.5	-3.0	-3.9	-4.3	-4.7	-5.0	-5.5	-5.0	-4.2	-3.3	-2.1	-1.3	-0.5	0.4	0.3	0.7	0.6	0.7	1.0	0.8	0.8	0.4	-0.5	-1.5	-1.7	1.0
	-5.4	-5.9	-6.2	-6.6	-6.9	-7.1	-7.1	-6.6	-5.8	-4.6	-3.4	-2.2	-1.1	-0.4	0.1	0.3	0.3	-0.2	-1.1	-2.1	-2.8	-3.5	-4.1	-4.6	Diurnal Average	
	4.2	3.4	2.2	1.5	2.0	1.1	1.2	2.7	4.2	6.0	8.1	9.7	11.9	12.5	12.7	12.9	12.9	11.6	8.7	7.8	6.2	5.1	4.9	4.5	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Mildred Lake - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	567	76.21	76.21
0 - 10	163	21.91	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 2016

Maximum Value: 98 % on Mar 10 11:00

Maximum Daily Average: 90.3 % on Mar 9

Minimum Value: 21 % on Mar 24 18:00

Minimum Daily Average: 37.4 % on Mar 24

Maximum Diurnal Average: 81.9 % at hour 7

Minimum Diurnal Average: 61.0 % at hour 17

Monthly Average: 71.6 %

Percentiles: $P_1 = 27$ $P_{10} = 47$ $Q_1 = 60$ Median = 74 $Q_3 = 87$ $P_{90} = 91$ $P_{99} = 96$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

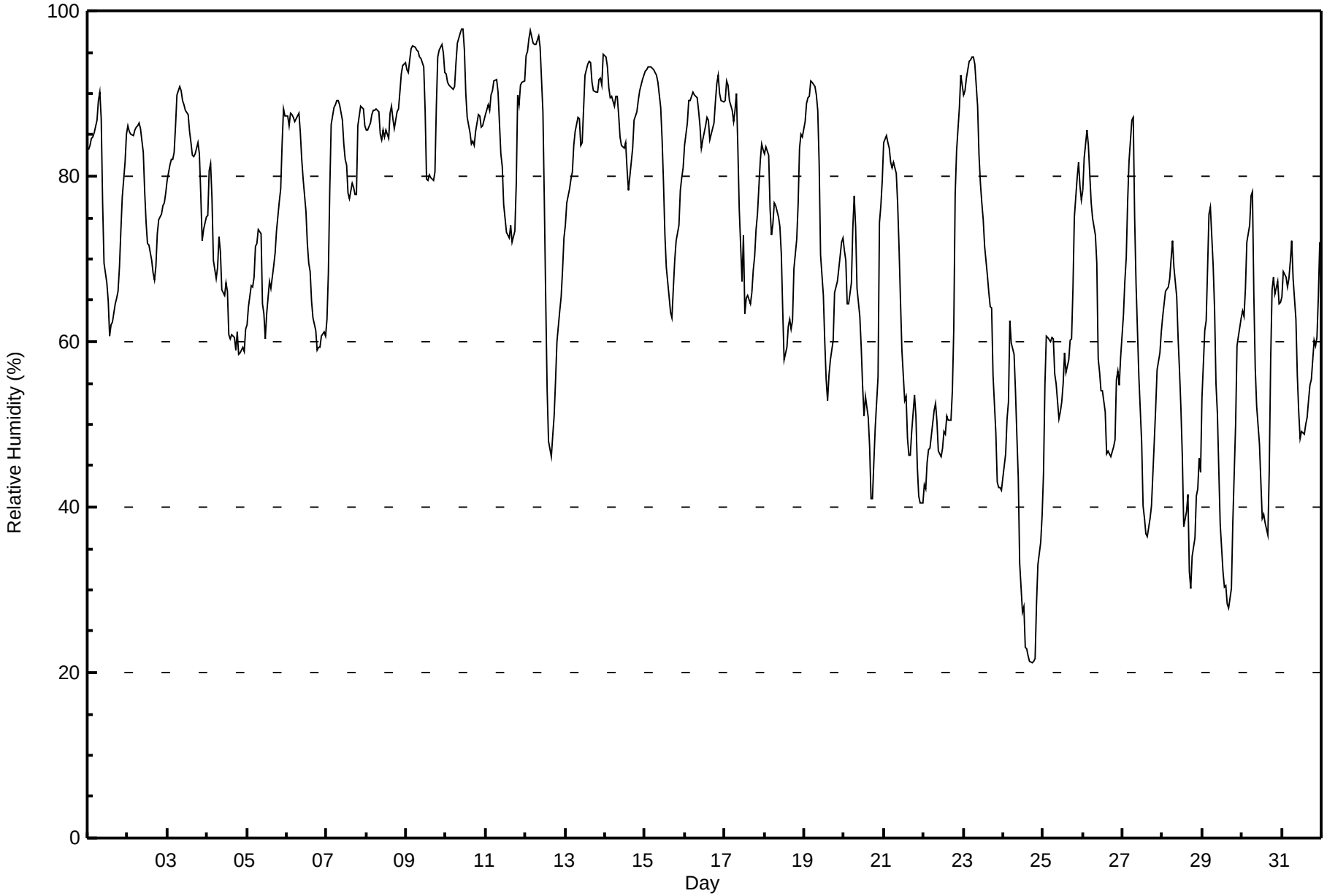
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	83	84	85	85	85	87	89	90	87	77	70	67	65	61	62	62	65	65	66	69	73	77	82	85	75.8	90
2-Mar	86	85	85	85	86	86	86	86	86	83	78	74	72	72	70	68	67	69	73	75	75	76	77	78	78.3	86
3-Mar	79	81	82	82	83	86	90	91	90	89	89	88	87	85	84	83	82	83	84	83	78	72	74	75	83.4	91
4-Mar	75	81	82	77	70	68	69	73	71	66	66	67	66	61	60	61	60	59	61	59	59	59	59	62	66.2	82
5-Mar	62	64	67	67	68	72	72	74	73	65	63	60	63	67	67	68	69	71	73	77	78	84	88	87	70.8	88
6-Mar	87	86	88	88	87	87	87	88	85	82	80	76	72	70	69	65	63	61	59	59	59	61	61	61	74.1	88
7-Mar	63	68	79	86	88	89	89	89	89	87	84	82	81	78	77	79	79	78	78	86	89	88	88	86	82.5	89
8-Mar	86	86	86	87	88	88	88	88	85	84	86	85	86	85	88	89	87	86	88	88	90	92	93	94	87.6	94
9-Mar	93	93	94	95	96	96	95	95	94	94	93	88	80	79	80	80	79	81	89	94	95	96	95	92	90.3	96
10-Mar	92	91	91	91	90	91	94	96	97	98	98	95	90	87	85	84	84	84	85	87	87	86	86	87	89.9	98
11-Mar	87	89	88	90	90	92	92	90	87	83	81	77	73	73	73	74	72	73	79	90	89	91	91	92	83.9	92
12-Mar	95	95	97	98	96	96	96	96	97	96	88	77	65	54	48	46	49	51	55	60	64	66	69	73	76.0	98
13-Mar	74	77	78	80	81	84	85	87	87	84	84	88	92	94	94	94	91	90	90	90	92	92	91	95	87.2	95
14-Mar	94	93	91	90	90	89	90	90	87	85	84	83	84	81	78	80	83	87	87	88	89	90	92	92	87.4	94
15-Mar	93	93	93	93	93	93	93	92	91	88	84	79	73	69	65	64	63	66	70	72	74	78	80	81	80.9	93
16-Mar	84	86	89	89	90	90	90	90	88	86	83	84	86	87	87	84	85	86	89	91	92	90	89	89	87.8	92
17-Mar	89	91	91	89	88	87	88	90	84	76	67	73	63	65	66	65	66	69	70	74	75	82	84	83	78.1	91
18-Mar	83	84	82	76	73	74	77	76	75	74	71	64	58	59	62	63	62	62	69	72	77	83	85	85	72.7	85
19-Mar	87	89	90	90	92	91	91	90	88	82	70	66	60	55	53	56	58	60	66	67	67	69	72	72	74.1	92
20-Mar	71	70	65	65	67	74	78	74	66	63	59	55	51	53	51	47	41	41	45	50	56	74	76	79	61.3	79
21-Mar	84	85	84	83	82	81	82	80	77	71	65	59	53	53	48	46	46	49	54	51	45	41	41	40	62.5	85
22-Mar	43	42	45	47	47	50	52	53	50	47	46	47	49	49	51	51	50	54	62	78	83	88	92	91	57.0	92
23-Mar	90	90	92	94	94	94	94	94	88	82	79	77	75	72	68	66	64	64	56	49	43	42	42	42	73.0	94
24-Mar	44	46	51	53	63	60	59	54	49	44	33	27	28	23	23	22	21	21	21	22	28	33	36	39	37.4	63
25-Mar	44	55	61	61	60	60	60	56	55	51	52	53	55	59	56	58	60	60	66	75	80	82	79	77	61.4	82
26-Mar	78	82	86	84	80	77	75	73	69	58	56	54	54	51	46	47	46	46	47	48	55	56	55	58	61.8	86
27-Mar	63	67	70	77	82	87	87	75	67	61	56	48	40	39	37	36	39	40	44	48	52	57	59	61	58.0	87
28-Mar	63	65	66	67	68	70	72	69	65	60	56	52	46	38	40	42	32	30	34	36	41	42	46	44	51.9	72
29-Mar	53	61	63	69	75	76	69	64	55	51	45	38	32	30	30	28	28	30	38	44	50	59	61	63	50.6	76
30-Mar	64	63	66	72	74	78	78	66	57	52	48	43	39	39	38	37	45	58	66	68	66	67	65	65	58.8	78
31-Mar	65	68	68	67	68	70	72	68	63	56	52	48	49	49	50	51	53	55	55	60	59	60	65	72	60.1	72
	75.9	77.8	79.1	79.8	80.4	81.3	81.9	80.5	77.5	73.4	69.8	66.9	64.1	62.5	61.5	61.1	61.0	62.3	65.2	68.1	69.7	72.2	73.3	74.2	Diurnal Average	
	95	95	97	98	96	96	96	96	97	98	98	95	92	94	94	94	91	90	90	94	95	96	95	95	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Mildred Lake - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Mildred Lake - March 2016

Maximum Speed: 24 km/h on Mar 30 14:00

Maximum Daily Speed Average: 15.0 km/h on Mar 14

Minimum Speed Value: 0 km/h on Mar 25 20:00

Minimum Daily Speed Average: 1.2 km/h on Mar 1

Maximum Diurnal Speed Average: 5.2 km/h at hour 20

Minimum Diurnal Speed Average: 2.5 km/h at hour 12

Monthly Average Velocity: 3.6 km/h 21.2 deg

Percentiles: P_1 = 1 P_{10} = 4 Q_1 = 6 Median = 9 Q_3 = 12 P_{90} = 15 P_{99} = 19

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	S8	SSE9	S7	S4	S4	SSW5	SSW5	S4	SSW4	S5	SSW4	S6	SSW7	SSW4	SW5	WSW2	NNW4	NNE6	NNE6	NNE9	NNE6	N8	N6	NNW6	S1.2	SSE9
2-Mar	N9	N8	N8	N9	N10	N8	N9	N11	N11	NNE9	N7	N7	NNW8	NNW10	N8	NNE9	NNE9	NNE7	N8	N11	NNE11	NNE9	NNE8	NNE9	N8.7	N11
3-Mar	N9	N11	N8	N10	NNE9	NNE7	N10	N12	N13	N13	N9	N13	N14	NNE15	N15	NNE17	NNE15	NNE14	NNE14	NNE14	NNE14	NNE8	NNE6	NE7	NNE11.4	NNE17
4-Mar	NE8	NE7	NNE4	NE4	NE4	NE4	SSE1	SSE3	SE4	S6	SSE9	SSE12	SSE12	SSE14	SSE13	SSE12	SE12	SE13	SE11	SE11	SE14	SSE14	SSE17	SSE16	SE7.6	SSE17
5-Mar	SSE17	SSE15	S9	S8	S8	S7	S6	SSW5	SSW7	S6	SSW4	NNE1	NNE13	NNE19	NNE16	NE16	NE14	NNE10	NNE14	NNE15	NNE14	NNE13	NNE13	NNE10	NE4.1	NNE19
6-Mar	NNE10	NNE10	N11	NNE13	NNE12	NE9	NNE10	NNE11	NNE13	NNE11	NE12	NNE12	NNE9	N11	N13	N13	N13	N13	N12	N10	N11	N14	N12	NNE11	NNE11.3	N14
7-Mar	N14	N14	N15	N14	N13	N13	N14	N12	N10	N8	NNW6	NNW8	NNW7	NW2	NNW3	S4	SW7	W8	WNW9	N14	N8	N9	NE8	NNE7	N7.8	N15
8-Mar	N5	NE1	SE2	E3	E2	NW1	E3	SE1	S5	SE5	ESE5	SSE7	SSE9	E1	N6	NNE5	N8	NNE4	NE3	NNE6	NNE5	NNE5	NNE6	NNE8	NE2.3	SSE9
9-Mar	NNE7	NNE7	N9	NNE11	N10	N9	NNE7	NNE5	N4	N6	NNE4	SW4	SSW3	S4	SSE6	SE6	SE4	E3	NNE5	NNE5	NNE6	W0	SW1	SSW3	NNE2.9	NNE11
10-Mar	SW2	SW4	SW2	S2	SSW3	SSW4	S6	SSE9	SSE10	SE9	SE12	ESE16	SE19	SE15	SE16	SE16	ESE17	SE14	SE12	ESE10	SE12	SE11	SSE13	S10	SE9.2	SE19
11-Mar	S6	WSW3	W5	W7	WNW8	WNW11	WNW13	WNW11	WNW12	NW9	NNW10	NNE7	E3	NW5	NNW9	NNW11	NNW9	WNW5	WSW5	ENE4	ESE4	SSW5	SSE6	SSE7	WNW4.2	WNW13
12-Mar	SE7	SSE8	ESE5	S2	S5	NNE3	N5	N7	N6	N6	N8	N9	NE7	ESE11	SE6	SE12	SE15	SE14	SE11	SE9	SE9	SSE11	SSE9	SSE9	ESE4.6	SE15
13-Mar	SSE7	NNW1	N6	N6	NE4	NNE5	N9	N11	N13	N14	N15	N17	N17	N18	N15	N16	N18	N17	N16	N18	N17	N19	N16	N15	N12.2	N19
14-Mar	N14	N12	NNE17	NNE17	N15	N17	N17	NNE17	NNE16	NNE15	NNE14	NNE15	NNE15	NNE17	NNE17	NNE17	NNE16	NNE16	NNE14	NNE14	N14	NNE13	NNE11	N10	NNE15.0	NNE17
15-Mar	N10	N10	N10	N10	N9	N8	N9	N8	N8	NNE8	NNW10	NNW10	NNW11	NNW12	NW12	NNW12	N11	N9	NNE11	NNE11	NNE12	N13	N12	N13	N10.0	N13
16-Mar	N15	N15	N15	N16	N15	N14	NNE14	NNE10	N14	N16	N16	N15	N12	NNE12	NNE14	NNE15	NNE14	N13	NNW10	NW7	NNW6	NNE6	N6	N6	N12.1	N16
17-Mar	NNW2	WNW3	NW10	NW11	NW9	NW8	NW8	NW8	NW8	NW8	NNW10	NW13	NNW16	NNW15	NNW14	N10	NNW13	NNW11	NNW8	NNW6	N3	NNW3	SW2	SSW5	NNW7.9	NNW16
18-Mar	SW5	SW4	SW5	NW7	WSW6	SW5	SW4	W3	NW5	N9	N4	S4	S5	SSE9	SSE11	SSE13	SSE12	SSE9	SSE9	SSE8	S2	SW2	N8	N11	S2.2	SSE13
19-Mar	N9	N8	N8	N7	NNE6	NNE6	N7	NNE8	N6	NNW3	SW4	SW5	N11	N12	N12	N14	N13	N11	N13	N13	N14	N11	N8	NNE6	N8.3	N14
20-Mar	NNE6	NE6	ENE7	E8	ENE4	N8	N8	NE6	E8	E8	E10	ESE10	ENE4	N12	N13	N11	ESE9	ESE11	E11	E8	NE8	N11	N11	N11	NE6.3	N13
21-Mar	N11	N12	N12	N9	NNE10	NNE11	N11	N11	N11	N9	NE8	NNE8	SW3	NNW8	WSW2	ESE11	ESE13	ESE14	ESE12	E13	ESE13	ESE14	E12	E11	NE6.2	ESE14
22-Mar	ESE8	SE9	SE8	SE8	ESE6	SE7	SE7	SE7	SSE8	SSE10	SSE8	S6	S9	S7	S6	SE5	SSE6	SSE6	SSE6	SSE6	SE6	SE6	SE7	SSE9	SE6.7	SSE10
23-Mar	SSE8	SSE6	S5	S4	SE1	N7	N8	N10	N14	N14	N14	N14	N16	NNE14	NNE12	NNE14	NE13	NNE10	NNE11	NNE9	NNE9	N8	N8	NNE8	NNE7.8	N16
24-Mar	NNE9	N8	N11	N9	NNW5	N7	N5	N9	N11	N10	N12	NNW12	NNW14	NNW12	NNW11	NNW11	N10	N8	N7	NNE6	NNE6	N8	N11	N9	N9.0	NNW14
25-Mar	N6	WSW2	SSW3	SSW4	SSW4	SSW4	SSW7	S8	S8	S9	SSE10	SSE9	SSE9	SSE8	SSE8	SSE7	SSW4	SSW1	NW1	W0	SSE2	NNW4	N8	N11	S3.0	N11
26-Mar	N8	N5	NW3	NNW7	N7	N6	N7	N8	NNW8	NNW7	W5	SW9	WSW8	SW7	SW6	S7	S8	SSE9	SSE9	SSE10	SSE9	SSE11	S13	SSE13	SSW1.8	S13
27-Mar	SSE8	SSE10	SSE9	SSE5	SE4	SSW3	SSE2	S3	SSE9	SSE9	S9	SSW6	S12	SSE13	SSE15	SE16	SE16	SSE14	SSE13	SE11	SE9	SSE11	SSE12	SSE12	SSE9.3	SE16
28-Mar	SSE11	SSE10	SSE9	SSE13	SSE12	S11	S7	S8	S9	SSE12	SSE11	S9	S8	W4	NW13	NW12	NW10	NNW13	NNW12	NW10	NW7	NW7	NW6	WNW9	SW2.9	NW13
29-Mar	WSW6	WSW8	SW7	SSW2	SSE1	SSW5	SSW6	SW7	S8	SSE10	S7	SW6	SSW5	SSW7	SSW6	SSW6	SSW5	SW3	SW3	NNW2	SW4	SW3	WNW1	SSW2	SSW4.4	SSE10
30-Mar	NNW2	NNW3	N3	NW5	NW8	NNW4	NNW10	N14	N13	NNW7	WNW6	NW6	NNW18	N24	N20	N24	N17	NE17	NNE19	NNE19	NNE17	N19	NNE21	NNE18	N12.1	N24
31-Mar	NNE16	NNE13	NNE12	NNE13	N10	N7	N5	NNE7	NNE7	N8	NW8	NW7	SW6	SSW4	S5	SE9	SE9	SSE9	SSE10	S5	S9	S7	S5	SSW3	NE1.5	NNE16
	NNE3.2	NNE2.8	NNE3.3	N3.9	N3.5	N3.7	N4.2	N4.3	N4.0	NNE3.5	NNE2.7	NNE2.5	N2.7	N4.0	N4.1	NNE4.5	NE4.5	NE4.2	NE4.0	NE5.2	NE4.4	NNE4.0	NNE3.8	NNE3.5	Diurnal Average	
	SSE17	N15	NNE17	NNE17	N15	N17	N17	NNE17	NNE16	N16	N16	N17	SE19	N24	N20	N24	N18	N17	NNE19	NNE19	NNE17	N19	NNE21	NNE18	Diurnal Maximum	

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 7 km/h on Mar 30 13:00

Minimum Value: 1 km/h on Mar 17 22:00

Percentiles: P_1 = 1 P_{10} = 1 Q_1 = 1 Median = 2 Q_3 = 3 P_{90} = 3 P_{99} = 5

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

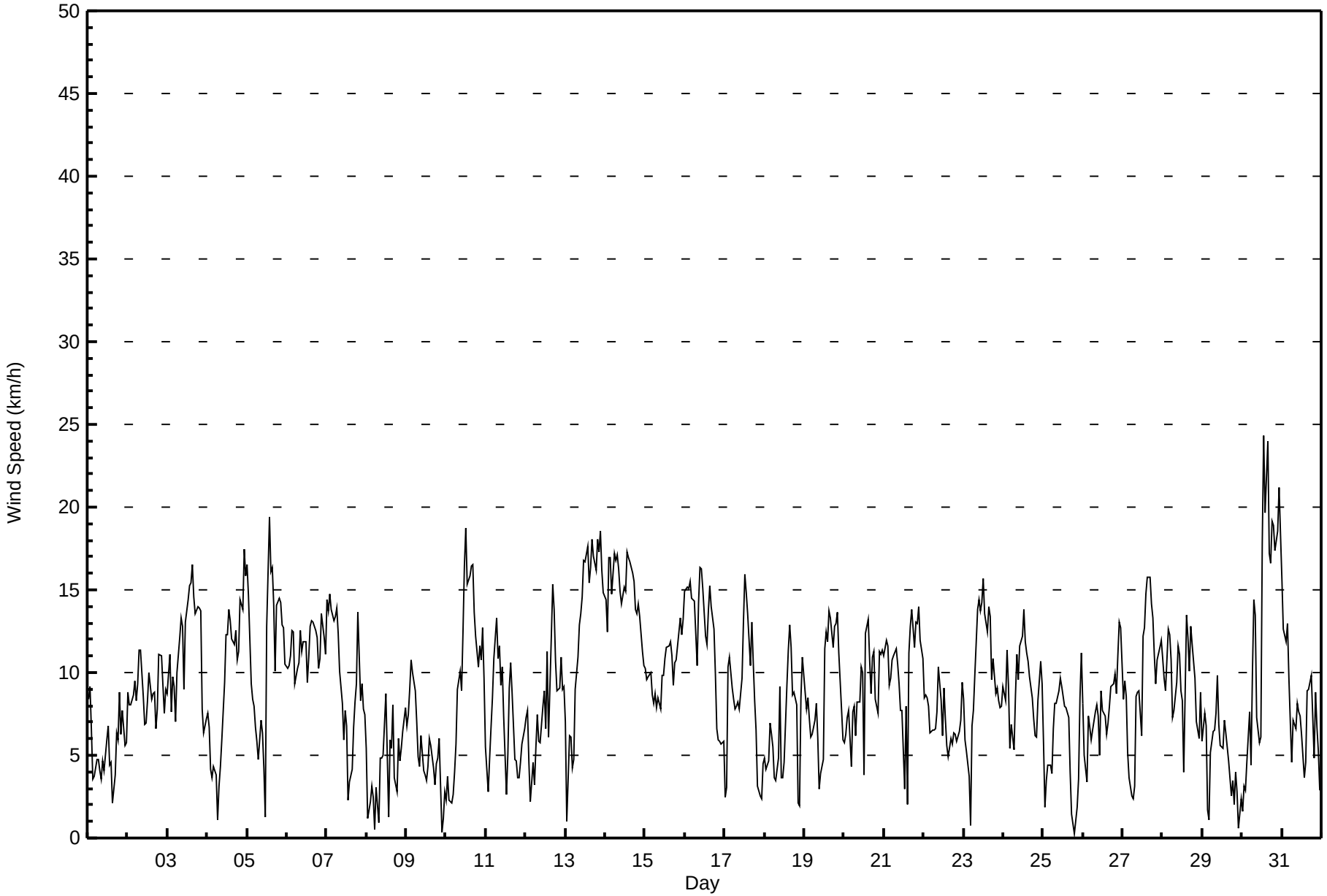
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	2	1	2	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	2	2	1	2	3	2	3
2-Mar	1	1	1	1	1	2	2	2	2	3	1	2	2	1	2	2	2	2	2	2	3	2	2	2	3
3-Mar	2	2	2	2	2	2	1	2	2	2	2	3	3	3	3	4	4	3	3	3	3	2	1	2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

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Mildred Lake - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	152	20.43	20.43
6 - 11	383	51.48	71.91
12 - 19	205	27.55	99.46
20 - 28	4	0.54	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Mildred Lake - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	9	12	6	3	6	3	8	6	19	27	20	5	6	3	7	12	152
6 - 11	111	62	10	1	7	8	21	56	31	9	8	4	2	6	20	27	383
12 - 19	79	52	5	0	2	8	14	24	2	0	0	0	0	2	3	14	205
20 - 28	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
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	202	127	21	4	15	19	43	86	52	36	28	9	8	11	30	53	744

Total Number of Valid Hours: 744

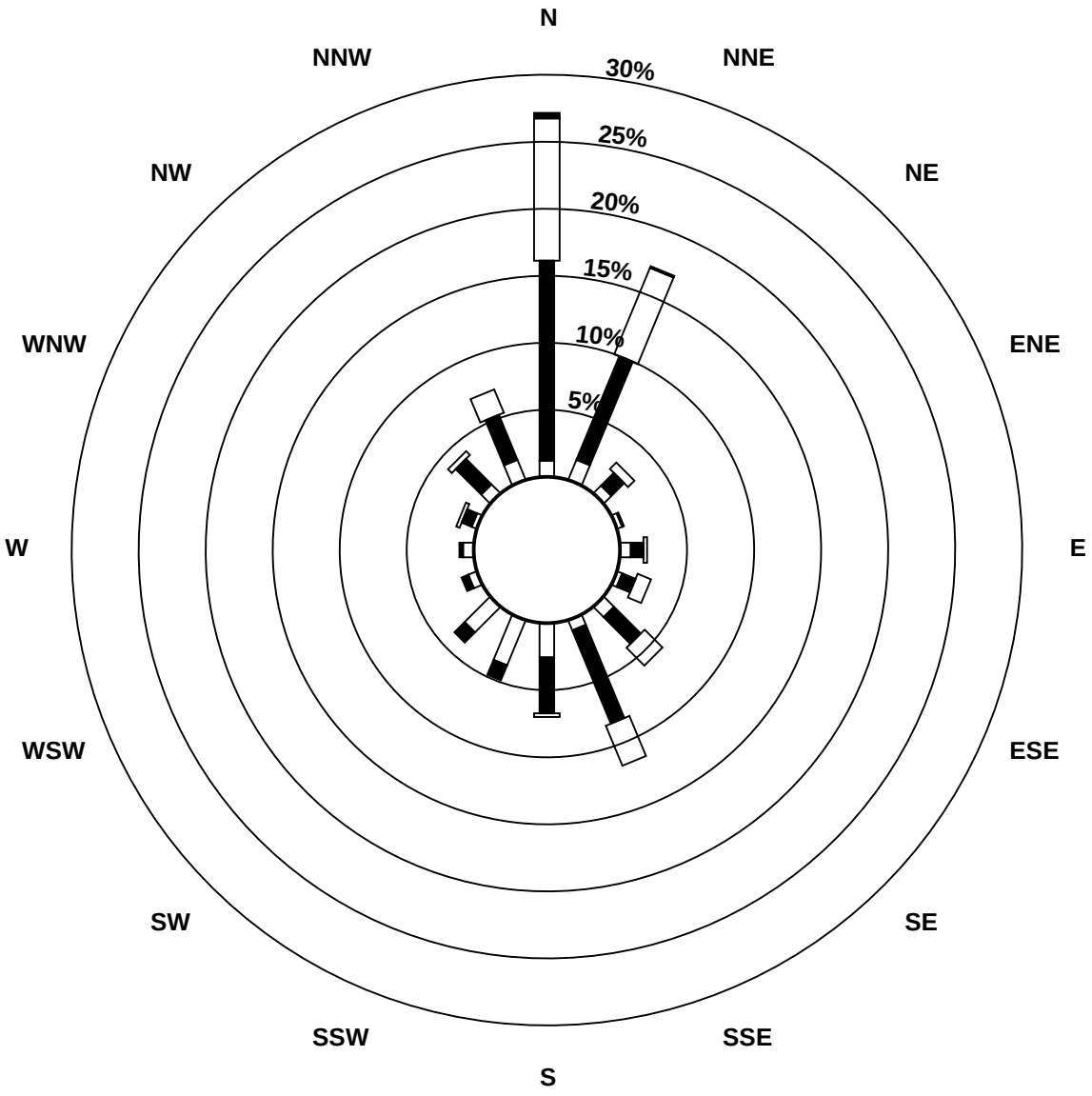
Total Number of Hours: 744

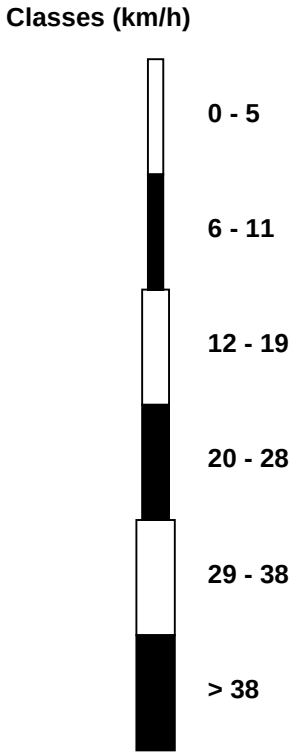
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Wind Speed (WS) - km/h

Mildred Lake (AMS 2)





Total Number of Valid Hours: 744

Direction of Maximum Speed: 357 deg on Mar 30 14:00
Direction of Maximum Daily Speed Average: 13.5 deg on Mar 14

Direction of Minimum Speed: 274 deg on Mar 25 20:00

Direction of Minimum Daily Speed Average: 1.2 deg on Mar 1

Monthly Average Direction: 301.7 deg

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	170	164	176	180	191	203	199	184	197	187	203	182	204	207	229	247	348	21	16	24	28	6	8	344	187.9
2-Mar	356	9	4	4	7	9	7	6	9	14	7	358	339	342	357	13	29	24	10	11	14	26	24	13	8.0
3-Mar	11	7	8	10	12	17	5	1	358	3	9	6	11	13	10	13	20	16	16	22	21	25	29	37	12.7
4-Mar	54	45	22	37	37	39	151	147	126	173	164	154	158	154	163	150	137	128	132	130	146	155	159	159	141.2
5-Mar	161	167	169	169	181	172	191	199	197	188	194	25	16	27	24	34	40	26	13	22	27	22	19	18	50.2
6-Mar	16	15	11	21	22	39	28	15	17	22	39	32	12	352	353	4	5	6	10	5	2	7	9	16	13.7
7-Mar	10	10	4	5	7	5	5	5	6	0	339	334	344	317	343	170	216	261	285	353	359	11	41	12	356.8
8-Mar	10	34	128	97	91	321	94	133	188	130	123	153	158	88	4	24	358	20	53	30	33	12	13	24	54.7
9-Mar	24	19	10	14	8	8	13	16	3	1	28	219	202	184	155	146	143	88	27	28	16	265	223	204	24.0
10-Mar	227	218	223	176	204	213	175	158	161	127	126	123	124	124	125	125	119	124	127	122	125	139	164	173	137.3
11-Mar	186	246	278	274	287	293	298	289	300	305	340	12	101	325	332	339	332	299	250	64	119	197	160	161	301.4
12-Mar	146	149	117	169	182	32	358	358	10	353	350	11	44	114	127	132	124	135	130	142	146	149	155	163	119.8
13-Mar	152	331	358	11	36	24	357	359	3	4	8	7	3	3	1	2	1	359	358	357	353	349	350	357	1.1
14-Mar	359	3	14	12	8	11	8	15	19	20	26	19	13	13	17	13	18	14	17	18	9	13	15	11	13.5
15-Mar	8	6	2	2	6	8	6	8	8	20	346	346	336	332	323	346	6	11	18	16	16	10	7	1	0.8
16-Mar	359	4	2	1	1	4	14	21	8	10	7	358	7	15	14	14	12	3	334	320	333	23	360	355	4.3
17-Mar	328	282	322	325	326	317	309	308	308	314	341	326	328	330	336	355	338	336	339	343	351	338	228	201	326.8
18-Mar	218	227	217	311	252	218	234	276	325	353	350	172	179	161	151	154	154	150	163	148	178	220	1	2	184.3
19-Mar	6	4	357	0	13	25	8	14	8	336	220	224	350	11	360	352	359	3	360	3	0	1	3	19	1.2
20-Mar	26	49	77	98	65	4	9	49	86	89	99	102	61	349	357	4	119	105	101	81	44	3	4	7	49.8
21-Mar	2	3	3	7	20	14	8	6	356	0	38	33	222	333	257	123	108	112	104	101	110	110	100	101	53.2
22-Mar	116	131	126	127	121	130	129	131	150	164	164	178	174	184	173	139	168	154	166	148	131	130	133	147	146.2
23-Mar	152	161	169	171	131	360	4	2	2	4	5	353	356	14	28	21	36	33	29	24	19	5	8	16	15.9
24-Mar	15	11	9	6	345	8	11	6	4	356	2	345	340	333	333	341	8	7	7	13	17	9	6	7	359.2
25-Mar	360	241	199	203	195	204	198	179	181	169	164	157	152	157	149	157	193	198	316	274	166	337	3	1	171.7
26-Mar	4	359	318	340	6	352	350	4	345	331	265	215	239	220	220	179	169	156	156	152	163	164	169	161	193.1
27-Mar	159	149	166	152	144	198	156	183	164	168	180	196	169	153	150	141	143	148	153	138	138	147	148	156	154.6
28-Mar	158	153	166	167	166	171	176	177	169	160	161	175	186	261	310	309	317	332	327	319	321	322	317	295	217.3
29-Mar	254	249	235	212	163	207	212	220	184	168	183	214	202	200	212	206	210	228	228	330	227	227	286	198	211.7
30-Mar	344	344	9	304	317	343	345	0	354	327	283	312	348	357	2	357	7	41	31	19	15	11	14	23	3.0
31-Mar	19	29	20	12	10	3	356	27	31	356	305	313	232	193	180	142	142	155	161	175	187	188	188	208	39.0
	29.9	26.7	12.2	10.1	7.7	3.8	359.3	5.6	7.8	13.3	19.8	11.6	3.8	8.6	8.4	31.8	44.0	46.7	37.2	35.1	35.7	29.6	32.7	30.8	
	Diurnal Average																								

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Mildred Lake - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 109 deg on Mar 8 06:00

Minimum Value: 7 deg on Mar 17 19:00

Percentiles: $P_1 = 9$ $P_{10} = 11$ $Q_1 = 13$ Median = 16 $Q_3 = 22$ $P_{90} = 37$ $P_{99} = 83$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

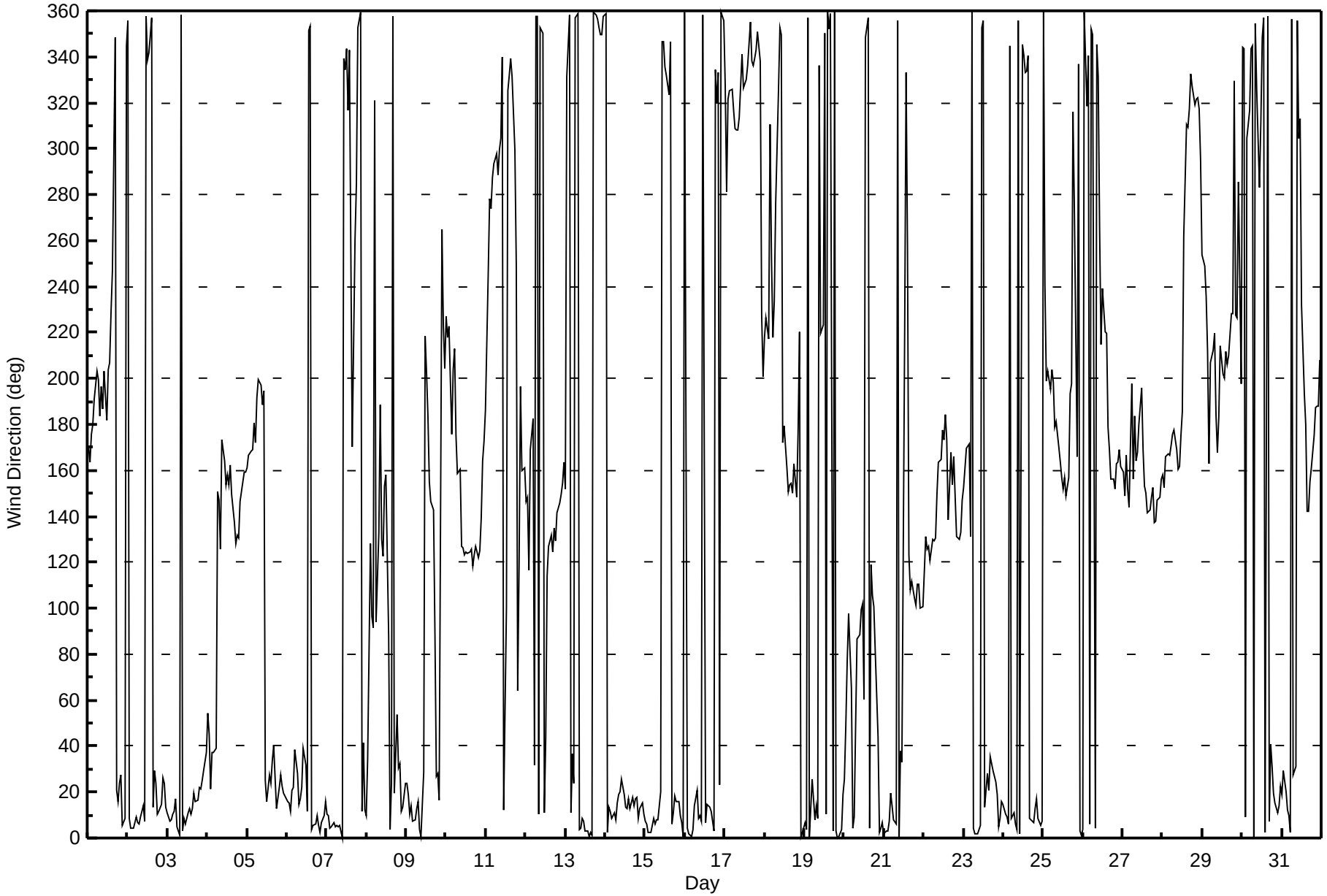
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	13	10	17	26	15	12	24	17	24	18	24	37	21	23	17	77	36	17	15	21	15	13	37	23	77
2-Mar	10	12	9	10	11	17	12	10	11	17	20	23	14	14	18	19	18	14	14	13	14	17	16	15	23
3-Mar	14	14	15	14	17	16	11	14	11	13	15	13	15	15	15	16	18	16	16	15	16	16	14	16	18
4-Mar	18	36	25	22	20	21	69	36	22	20	14	16	17	17	17	17	18	15	16	14	20	18	13	12	69
5-Mar	13	15	16	15	20	19	27	22	13	27	42	104	26	18	17	18	19	21	14	17	17	16	16	16	104
6-Mar	15	15	13	15	19	18	17	14	16	18	23	22	21	20	15	13	12	13	13	16	11	12	11	15	23
7-Mar	11	12	11	10	13	12	12	11	12	12	11	14	9	63	71	43	25	35	23	11	15	19	17	18	71
8-Mar	15	73	43	21	31	109	42	95	18	36	37	17	20	79	28	21	14	23	24	15	16	13	12	14	109
9-Mar	18	17	14	13	13	13	16	19	17	15	33	37	50	28	20	28	27	38	13	17	8	88	69	40	88
10-Mar	24	13	17	28	33	10	23	16	15	20	16	16	16	15	15	15	15	16	15	14	16	16	13	15	33
11-Mar	19	53	24	23	25	20	15	23	16	19	27	28	62	62	14	8	15	32	33	33	33	32	15	17	62
12-Mar	16	11	29	58	47	46	21	11	16	22	15	16	48	19	49	29	19	16	14	16	15	15	14	11	58
13-Mar	40	87	21	29	28	42	10	10	13	13	15	13	14	14	15	15	14	16	14	13	14	12	11	13	87
14-Mar	14	14	16	15	16	16	14	16	17	19	20	17	15	16	17	17	16	15	16	15	14	13	12	13	20
15-Mar	11	11	12	11	13	11	13	16	14	19	13	13	16	15	20	17	17	16	16	15	16	16	12	13	20
16-Mar	14	14	13	13	13	13	17	17	15	15	15	15	17	18	18	17	17	15	14	17	35	17	11	11	35
17-Mar	49	28	13	12	11	13	15	14	14	22	16	21	17	13	14	18	15	9	7	11	21	14	46	15	49
18-Mar	22	32	22	35	28	37	38	32	37	16	75	83	54	18	17	14	15	14	9	12	77	71	10	12	83
19-Mar	11	10	9	9	14	17	12	15	18	47	64	19	17	17	16	12	12	13	12	12	12	11	9	21	64
20-Mar	18	30	18	17	35	11	10	25	15	17	18	21	77	17	16	32	31	19	10	23	27	11	13	19	77
21-Mar	12	11	11	18	24	13	12	12	14	34	28	45	86	21	82	21	22	13	15	14	12	11	11	11	86
22-Mar	19	17	11	12	15	12	14	21	19	17	27	33	25	29	35	46	32	28	23	23	16	16	16	17	46
23-Mar	15	17	16	61	75	12	12	13	13	14	14	16	16	18	22	22	18	20	17	13	13	15	13	11	75
24-Mar	12	11	11	12	19	12	13	11	11	15	17	18	14	15	16	22	17	17	12	10	10	9	11	10	22
25-Mar	12	57	17	16	13	22	15	15	16	12	15	19	17	17	20	16	29	60	71	99	46	61	13	11	99
26-Mar	11	13	33	8	12	17	16	13	12	20	53	17	25	20	16	28	19	16	13	13	12	10	11	11	53
27-Mar	13	12	16	22	21	18	44	26	16	26	23	28	12	17	16	18	17	16	14	16	15	15	14	12	44
28-Mar	13	13	11	9	9	12	12	16	13	15	20	14	18	57	41	17	19	9	10	12	12	14	22	23	57
29-Mar	25	17	21	75	94	22	14	20	19	12	18	22	23	30	24	19	38	75	33	63	32	49	82	49	94
30-Mar	102	15	28	16	21	29	12	14	13	33	31	26	23	19	17	17	24	20	18	18	17	17	17	18	102
31-Mar	18	19	17	16	13	11	22	23	31	35	38	36	51	83	58	19	18	15	13	12	13	18	50	54	83
	102	87	43	75	94	109	69	95	37	47	75	104	86	83	82	77	38	75	71	99	77	88	82	54	
	Diurnal Maximum																								

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Mildred Lake - March 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	March 8, 2016	Last Calibration	February 1, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	10:45	End Time (MST)	14:10
Gas Cert Reference	SA1301009	Station temp.	22 Deg C
Cal Gas Concentration	47.2 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	1185
ZAG Make/Model	API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8346

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-653	-653
Analyzer IP address	192.168.1.43		Lamp voltage	799	799
Calculated slope	0.999629	0.991737	Chamber temp	45.2	45.2
Calculated intercept	1.429048	1.067322	Pressure	699.1	687.6
Analyzer Background	20.8	21.1	Flow	0.496	0.489
Analyzer Coefficient	0.941	0.941	Intensity	90	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	0.0	----
as found span	5000	82.7	780.7	786.7	0.992
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	82.7	780.7	786.7	0.992
second point	5000	41.5	391.8	393.2	0.996
third point	5000	20.8	196.4	196.0	1.002
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	82.7	780.7	786.1	0.993
				Average Correction Factor	0.997

Corrected As found	786.7	Previous response	779.5	% change	-0.9%

Notes:

Changed pump for preventative maintenance after as founds. Changed inlet filter after pump change. Allowed some time for the pump to warm up before proceeding with calibration. No adjustments.

Calibration Performed By: Evan Magill

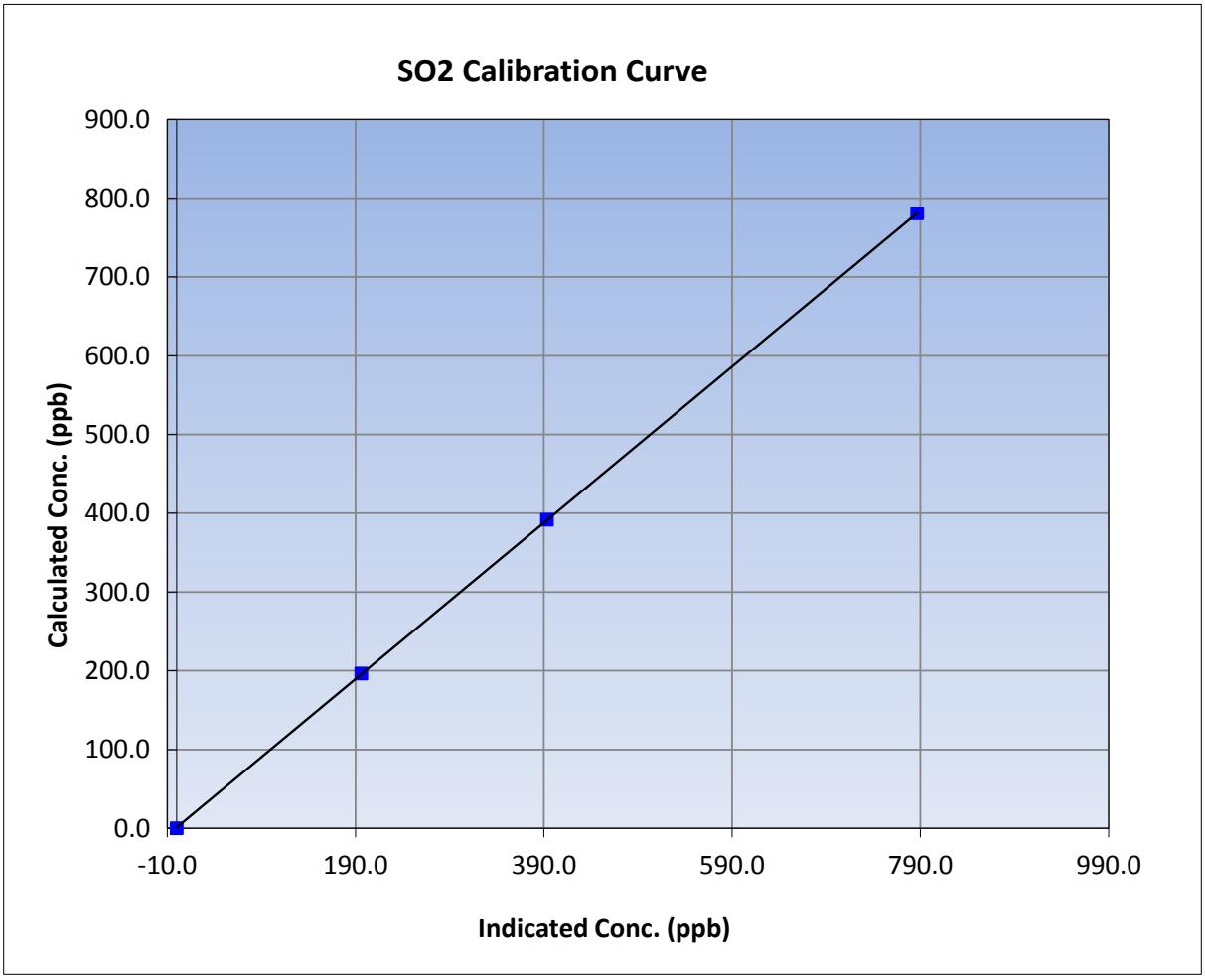
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

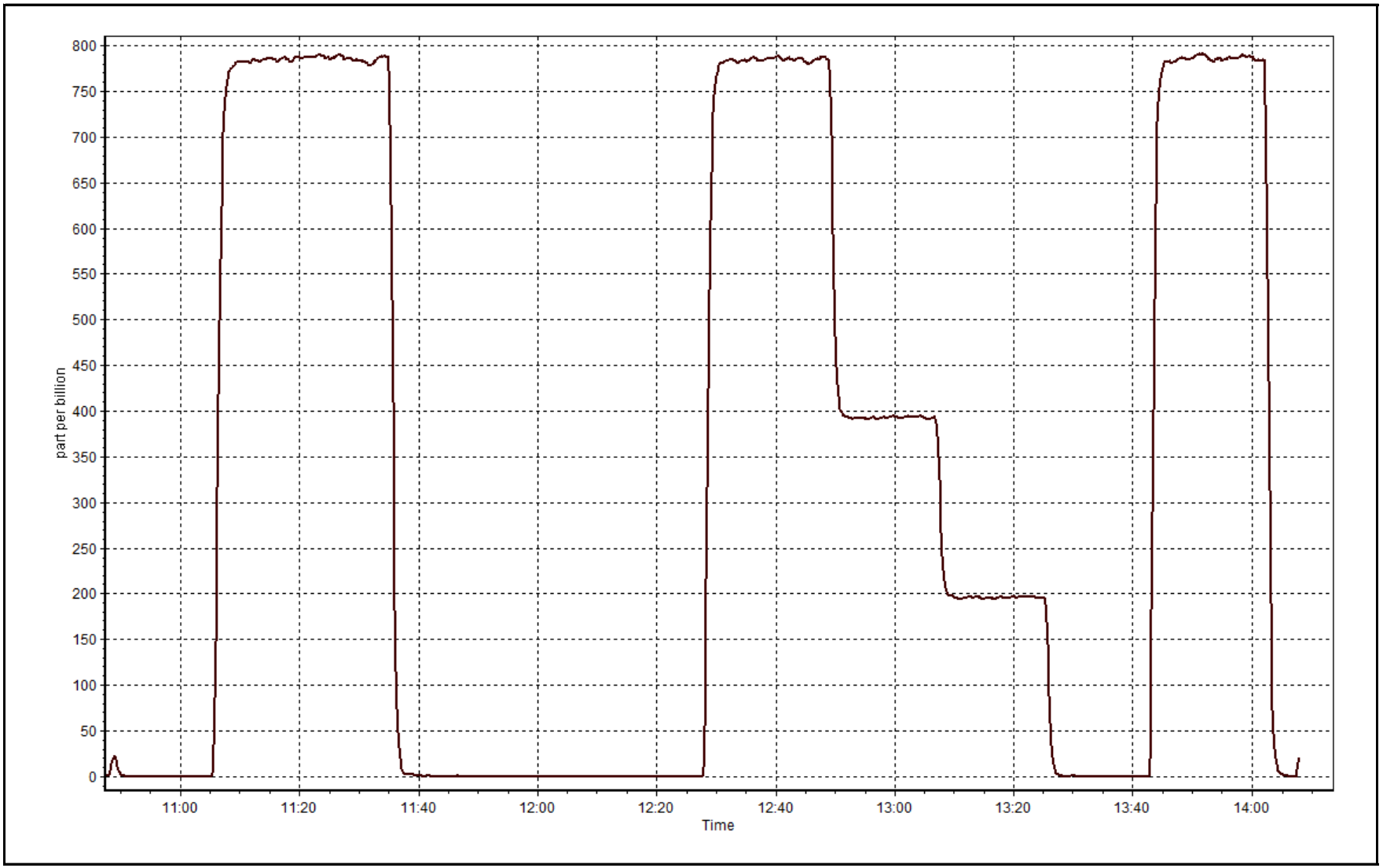
Calibration Date	March 8, 2016	Previous Calibration	February 1, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	10:45	End Time (MST)	14:10
Analyzer make	TEI 43i	Analyzer serial #	JC1404901075

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999992
780.7	786.7	0.9923		
391.8	393.2	0.9963	Slope	0.991737
196.4	196.0	1.0018		
			Intercept	1.067322



SO2 Calibration Plot Date: March 8, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	March 8, 2016	Last Calibration	February 12, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	14:15	End Time (MST)	16:55
Gas Cert Reference	ALM028262	Station temp.	22 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	09/09/2017
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	8346
SO2 gas concentration	47.2 ppm	SO2 gas cert/exp	SA1301009 12-Dec-16

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-601	-601
Analyzer IP address	192.168.1.42		Lamp voltage	787	788
Calculated slope	0.996020	0.998537	Chamber temp	45	45
Calculated intercept	0.202556	0.383260	Pressure	548.4	541.7
Analyzer Background	15.7	15.8	Flow	1.048	1.035
Analyzer Coefficient	0.954	0.954	Intensity	88	87
			Converter temp.	325	324

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	-0.1	----
as found span	4000	64.1	80.8	80.7	1.001
SO2 scrubber check	5000	21.2	200.1	1.5	----
calibrator zero	4000	0.0	0.0	-0.1	----
high point	4000	64.1	80.8	80.7	1.001
second point	4000	32.1	40.4	39.9	1.013
third point	4000	16.1	20.3	19.7	1.028
as left zero	5000	0.0	0.0	-0.1	----
as left span	4000	64.1	80.8	81.0	0.997
				Average Correction Factor	1.014

Corrected As found	80.8	Previous response	80.9	% change	0.1%

Notes:

Changed inlet filter after as founds. Scrubber check done after filter change. No adjustments.

Calibration Performed By: Evan Magill

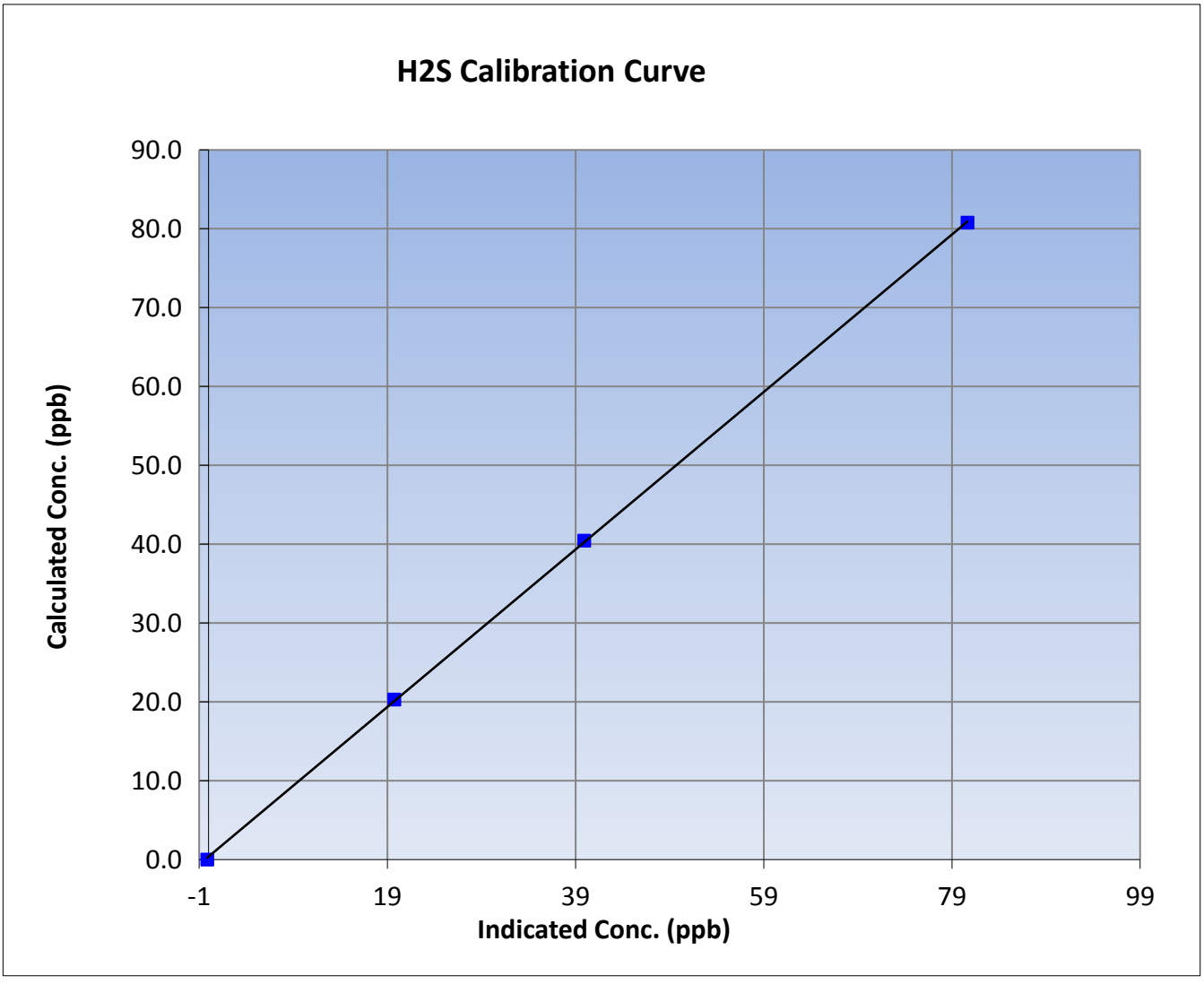
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

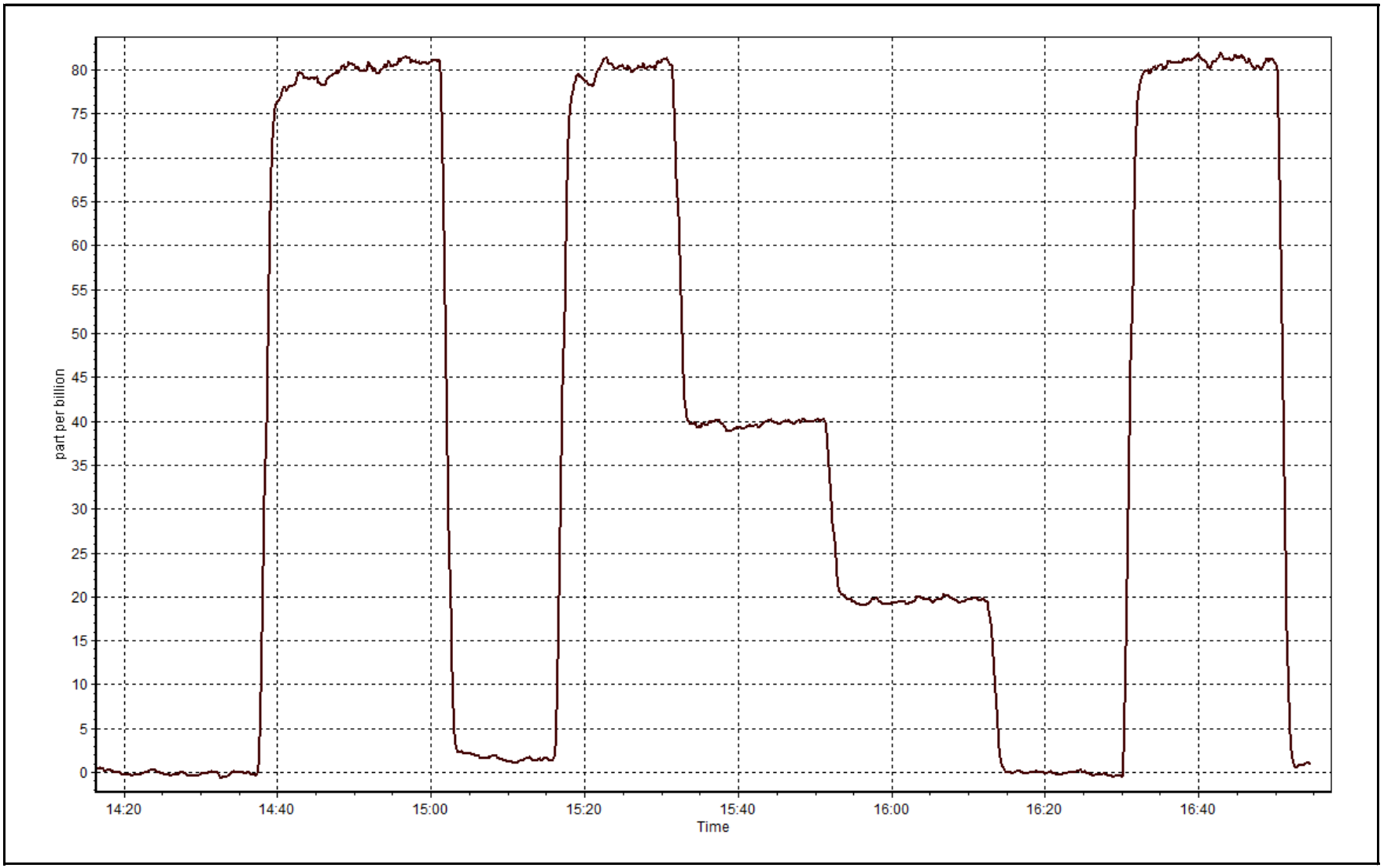
Calibration Date	March 8, 2016	Previous Calibration	February 12, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	14:15	End Time (MST)	16:55
Analyzer make	TEI 450i	Analyzer serial #	815129107

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999953
80.8	80.7	1.0014		
40.4	39.9	1.0132	Slope	0.998537
20.3	19.7	1.0282		
			Intercept	0.383260



H2S Calibration Plot Date: March 8, 2016



Wood Buffalo Environmental Association
THC Calibration Report

Station Information

Calibration Date	March-08-16	Last Calibration	February-01-16
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	10:45	End Time (MST)	14:10
Gas Cert Reference	SA1301009	Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	510 ppm	CH4 Equiv Conc.	1087.5 ppm
C3H8 Cal Gas Conc.	210 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1185
ZAG make/model	Teledyne API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	Serial Number	8346

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	39.8	39.8
Calculated slope	1.001389	1.000928	Fuel Pressure	25.6	25.6
Calculated intercept	0.033486	0.029591	Analyzer Coeff	4.651	4.540
			Analyzer BKG	2.40	2.23

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	-0.05	----
as found span	5000	82.7	17.99	18.35	0.980
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	82.7	17.99	17.97	1.001
second point	5000	41.5	9.03	8.95	1.009
third point	5000	20.8	4.52	4.45	1.017
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	82.7	17.99	17.80	1.011
				Average Correction Factor	1.009

Corrected As found	18.40	Previous response	17.93	% change	-2.6%

Notes:

Changed hydrogen cylinder after as founds, no change in span and flame did not go out. Changed inlet filter after hydrogen change. Adjusted zero and span.

Calibration Performed By: Evan Magill

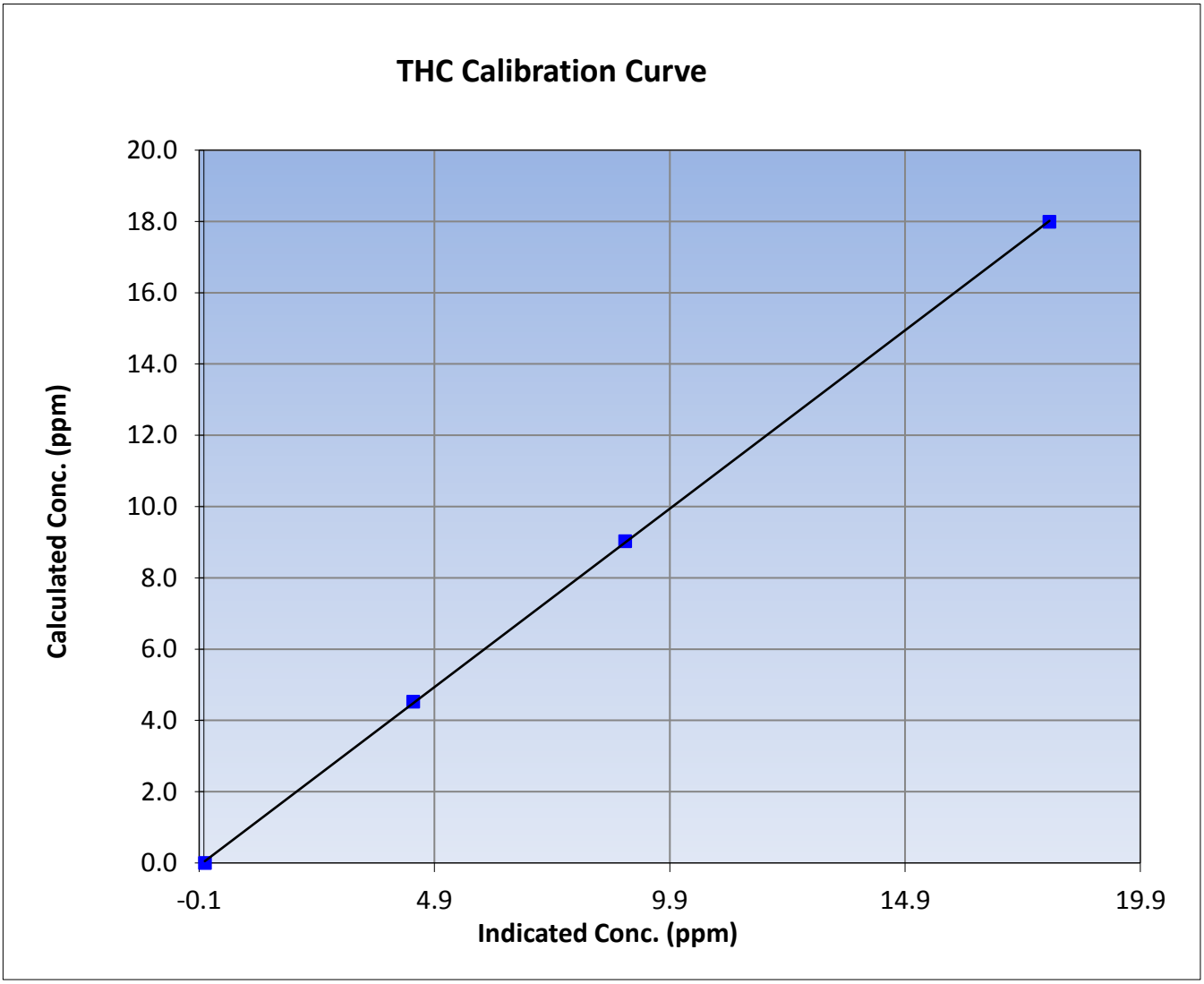
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

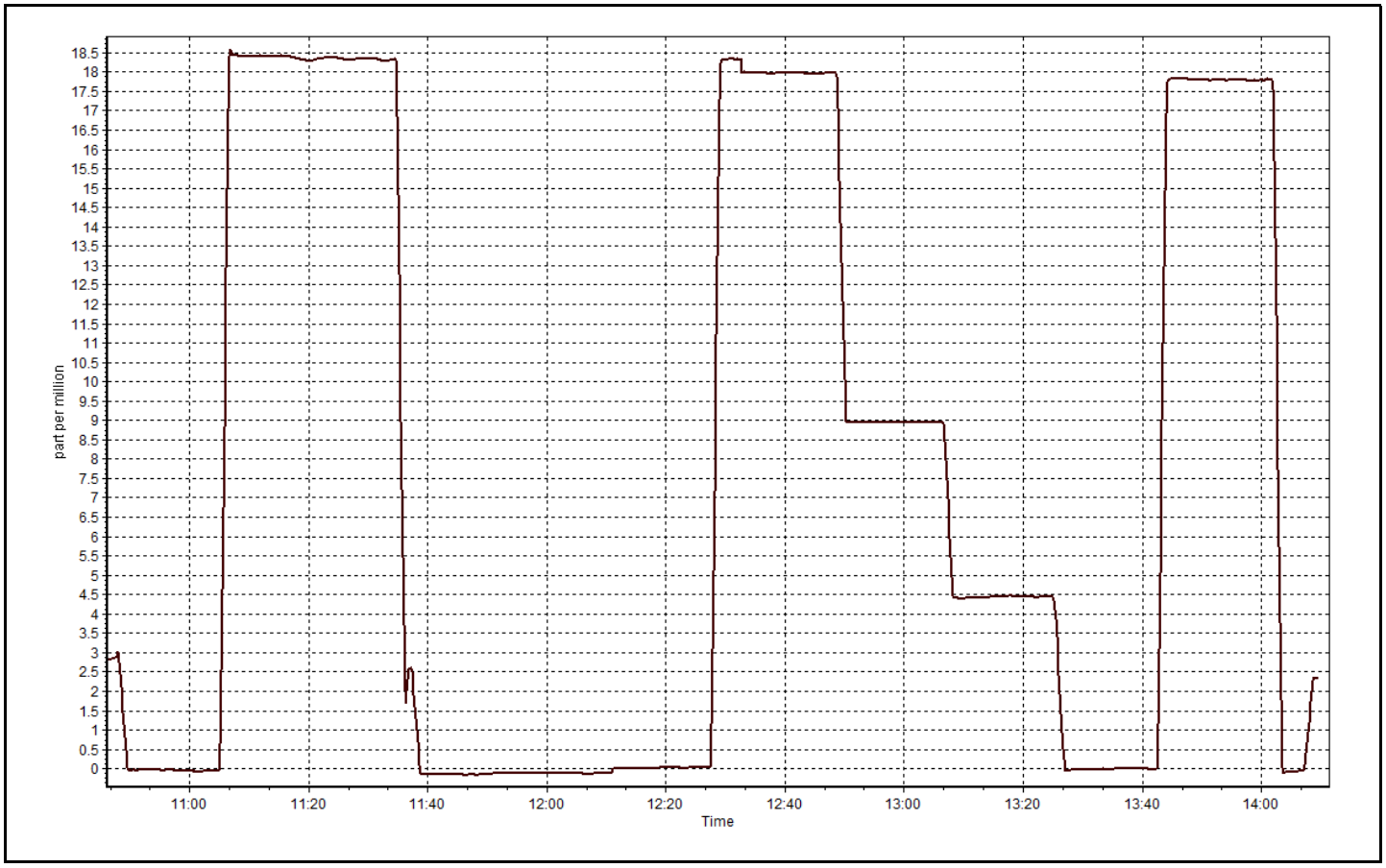
Calibration Date	March 8, 2016	Previous Calibration	February 1, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	10:45	End Time (MST)	14:10
Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999964
17.99	17.97	1.0010		
9.03	8.95	1.0085	Slope	1.000928
4.52	4.45	1.0166		
			Intercept	0.029591



THC Calibration Plot Date: March 8, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 3
LOWER CAMP METEOROLOGY
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)
MARCH 2016

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	100.00	14.1	-	6.0	-
Temperature 45 m (C) Average	744	0	0	100.00	13.4	-	6.2	-
Temperature 100 m (C) Average	744	0	0	100.00	12.7	-	6.7	-
Temperature 167 m (C) Average	744	0	0	100.00	13.1	-	7.0	-
Relative Humidity 20 m (%) Average	744	0	0	100.00	97	-	87.0	-
Relative Humidity 45 m (%) Average	744	0	0	100.00	96	-	87.0	-
Relative Humidity 100 m (%) Average	744	0	0	100.00	96	-	90.0	-
Relative Humidity 167 m (%) Average	744	0	0	100.00	96	-	91.0	-
Wind Speed 20 m (km/h) Average	744	0	0	100.00	18	-	11.0	-
Wind Speed 45 m (km/h) Average	744	0	0	100.00	25	-	15.0	-
Wind Speed 100 m (km/h) Average	735	0	9	98.79	36	-	21.0	-
Wind Speed 167 m (km/h) Average	727	0	17	97.72	39	-	24.0	-
Wind Direction 20 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 45 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 100 m (deg) Average	735	0	9	98.79	-	-	-	-
Wind Direction 167 m (deg) Average	727	0	17	97.72	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	0	0	100.00	0.4	-	0.0	-
Vertical Wind Speed 45 m (km/h) Average	744	0	0	100.00	1.3	-	0.4	-
Vertical Wind Speed 100 m (km/h) Average	735	0	9	98.79	3.1	-	1.1	-
Vertical Wind Speed 167 m (km/h) Average	727	0	17	97.72	5.1	-	1.7	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
Temperature 20 m (C) Average	744	-3.28	5.3	-	-18.9	-9.4	-6.9	-3.8	-0.1	3.2	14.1
Temperature 45 m (C) Average	744	-3.29	5.3	-	-18.5	-9.5	-7	-4	0	3.2	13.4
Temperature 100 m (C) Average	744	-3.32	5.3	-	-15.9	-9.7	-7.3	-4.3	0.1	3.6	12.7
Temperature 167 m (C) Average	744	-3.42	5.3	-	-14.3	-9.6	-7.5	-4.4	-0.3	3.9	13.1
Relative Humidity 20 m (%) Average	744	69.3	17	-	18	45	58	72	84	89	97
Relative Humidity 45 m (%) Average	744	68.3	17	-	18	44	56	70	83	88	96
Relative Humidity 100 m (%) Average	744	68.5	18	-	17	43	55	70	85	90	96
Relative Humidity 167 m (%) Average	744	68.9	19	-	16	42	55	70	86	91	96
Wind Speed 20 m (km/h) Average	744	6.3	4	-	0	2	3	6	9	11	18
Wind Speed 45 m (km/h) Average	744	8.6	5	-	0	3	5	8	12	16	25
Wind Speed 100 m (km/h) Average	735	12.8	7	-	0	4	8	12	17	23	36
Wind Speed 167 m (km/h) Average	727	14.8	8	-	1	5	9	14	20	25	39
Wind Direction 20 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	735	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	727	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	-0.08	0.2	-	-0.8	-0.3	-0.2	-0.1	0	0.1	0.4
Vertical Wind Speed 45 m (km/h) Average	744	0.03	0.4	-	-1.2	-0.4	-0.2	0	0.3	0.6	1.3
Vertical Wind Speed 100 m (km/h) Average	735	0.28	0.6	-	-2.6	-0.3	-0.1	0.1	0.5	1.1	3.1
Vertical Wind Speed 167 m (km/h) Average	727	0.49	0.7	-	-1.8	-0.2	0.1	0.3	0.8	1.4	5.1

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	09 Mar 2016 06:00	09 Mar 2016 11:00	6	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	10 Mar 2016 04:00	10 Mar 2016 06:00	3	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	09 Mar 2016 04:00	09 Mar 2016 13:00	10	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	10 Mar 2016 08:00	10 Mar 2016 14:00	7	Flat line in sensor output signal - Sensor frozen

Maximum Value: 14.1 C on Mar 29 17:00

Maximum Daily Average: 6.0 C on Mar 29

Minimum Value: -18.9 C on Mar 24 07:00

Minimum Daily Average: -9.0 C on Mar 24

Maximum Diurnal Average: 0.9 C at hour 17

Minimum Diurnal Average: -7.3 C at hour 7

Monthly Average: -3.28 C

Percentiles: P_1 = -14.9 P_{10} = -9.4 Q_1 = -6.9 Median = -3.8 Q_3 = -0.1 P_{90} = 3.2 P_{99} = 11.9

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

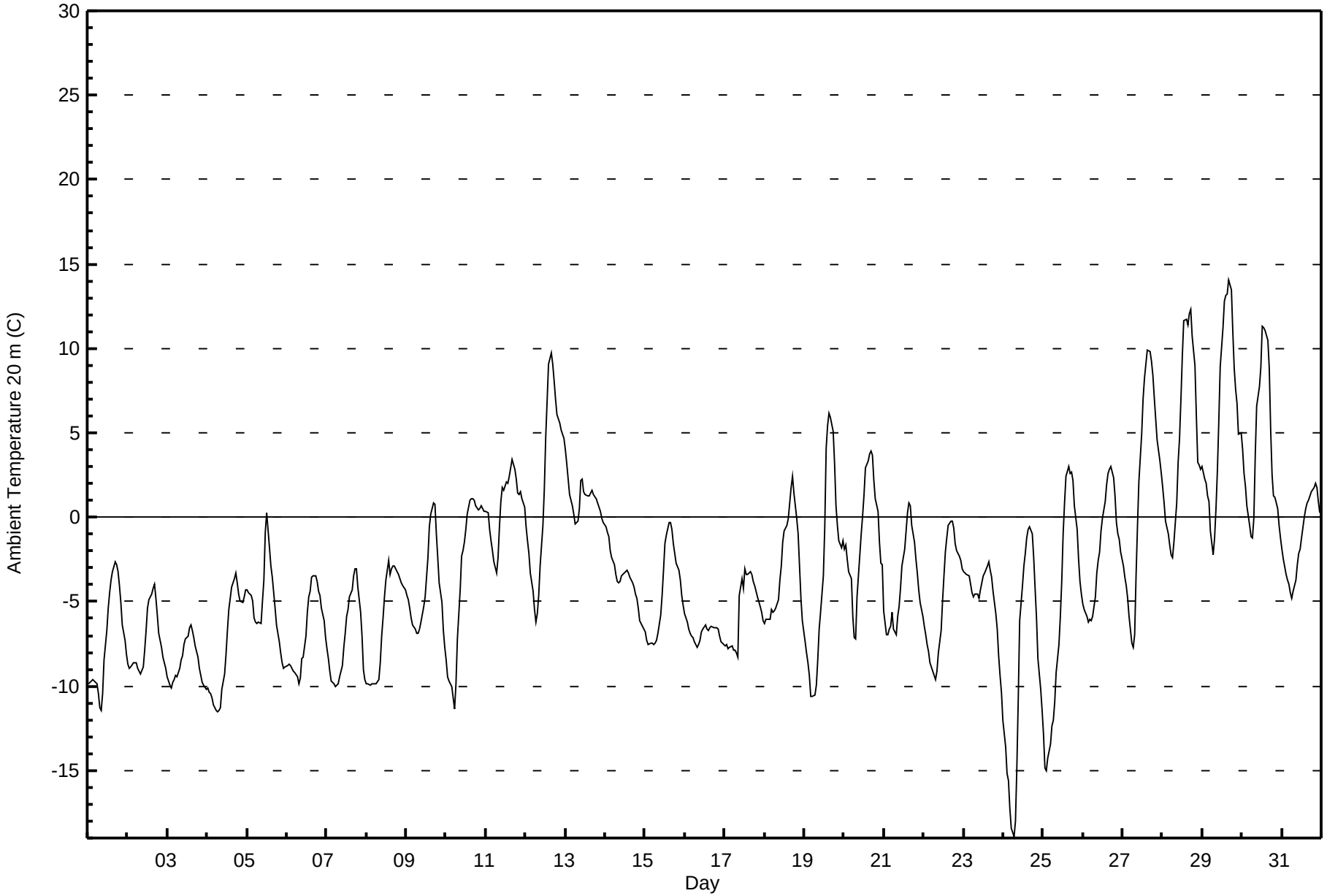
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-9.9	-9.8	-9.7	-9.6	-9.7	-9.8	-10.4	-11.3	-11.4	-10.5	-8.5	-6.7	-5.4	-4.5	-3.7	-3.2	-2.7	-2.8	-3.2	-4.0	-5.1	-6.4	-7.3	-8.1	-7.2	-2.7
2-Mar	-8.7	-9.0	-8.9	-8.6	-8.6	-8.6	-9.0	-9.1	-9.3	-8.8	-7.8	-6.7	-5.4	-4.9	-4.5	-4.2	-4.0	-4.8	-5.8	-6.9	-7.7	-8.3	-8.6	-8.9	-7.4	-4.0
3-Mar	-9.4	-10.0	-10.1	-9.8	-9.6	-9.4	-9.4	-9.0	-8.4	-8.2	-7.5	-7.2	-7.0	-6.6	-6.3	-6.7	-7.1	-7.6	-8.3	-9.0	-9.4	-9.8	-10.0	-10.2	-8.6	-6.3
4-Mar	-10.2	-10.3	-10.5	-10.7	-11.1	-11.4	-11.5	-11.5	-11.2	-10.2	-9.3	-8.1	-6.7	-5.4	-4.8	-4.1	-3.6	-3.3	-3.9	-4.6	-5.0	-5.0	-4.7	-4.3	-7.6	-3.3
5-Mar	-4.3	-4.5	-4.7	-4.9	-6.0	-6.2	-6.3	-6.2	-6.3	-5.0	-3.7	-0.9	0.3	-1.8	-2.9	-3.6	-4.5	-5.3	-6.4	-7.4	-8.0	-8.6	-9.0	-8.9	-5.2	0.3
6-Mar	-8.8	-8.7	-8.8	-8.9	-9.1	-9.2	-9.4	-9.9	-9.6	-8.3	-8.3	-7.0	-5.6	-4.7	-4.4	-3.6	-3.4	-3.5	-3.8	-4.4	-4.6	-5.4	-6.1	-7.1	-6.8	-3.4
7-Mar	-7.8	-8.4	-9.1	-9.7	-9.9	-10.0	-10.0	-9.8	-9.4	-8.8	-7.7	-6.8	-5.9	-5.5	-4.7	-4.3	-3.5	-3.0	-3.1	-4.1	-5.6	-7.0	-9.0	-9.6	-7.2	-3.0
8-Mar	-9.8	-9.9	-10.0	-9.9	-9.9	-9.8	-9.9	-9.6	-8.6	-7.1	-6.0	-4.7	-3.8	-2.6	-3.4	-3.1	-2.9	-2.8	-3.2	-3.4	-3.6	-3.9	-4.1	-4.3	-6.1	-2.6
9-Mar	-4.6	-4.9	-5.4	-5.9	-6.4	-6.6	-6.8	-6.9	-6.7	-6.3	-5.3	-4.8	-3.6	-2.4	-0.6	0.1	0.8	0.8	-0.9	-2.4	-3.9	-5.0	-6.7	-7.7	-4.2	0.8
10-Mar	-8.5	-9.4	-9.7	-10.0	-10.7	-11.4	-9.9	-7.2	-4.3	-2.3	-1.9	-1.5	-0.7	0.2	1.0	1.1	1.1	1.0	0.7	0.5	0.5	0.7	0.5	0.4	-3.3	1.1
11-Mar	0.4	0.2	-0.7	-1.4	-2.0	-2.7	-3.3	-2.4	-0.5	0.9	1.8	1.6	2.1	2.0	2.4	2.9	3.4	2.8	2.3	1.5	1.4	1.5	1.1	0.6	0.7	3.4
12-Mar	-0.5	-1.4	-2.2	-3.3	-4.4	-5.5	-6.2	-5.7	-4.6	-2.9	-0.5	1.7	4.8	6.9	9.1	9.7	9.1	8.1	7.0	6.1	5.6	5.1	4.9	4.7	1.9	9.7
13-Mar	4.0	3.2	1.4	1.0	0.7	0.2	-0.4	-0.2	0.5	2.2	2.2	1.5	1.4	1.2	1.2	1.4	1.6	1.3	1.1	0.9	0.6	0.4	-0.1	-0.3	1.1	4.0
14-Mar	-0.6	-0.9	-1.2	-1.9	-2.4	-2.8	-3.4	-3.8	-3.9	-3.8	-3.5	-3.3	-3.3	-3.1	-3.3	-3.6	-3.9	-4.2	-4.6	-4.8	-5.4	-6.1	-6.4	-6.6	-3.6	-0.6
15-Mar	-6.8	-7.3	-7.5	-7.5	-7.4	-7.5	-7.4	-7.3	-6.8	-5.8	-4.6	-3.1	-1.6	-1.1	-0.4	-0.4	-0.7	-1.5	-2.2	-2.7	-3.1	-3.7	-4.7	-5.2	-4.4	-0.4
16-Mar	-5.7	-6.2	-6.6	-6.9	-7.0	-7.1	-7.4	-7.7	-7.5	-7.3	-6.8	-6.6	-6.4	-6.6	-6.7	-6.6	-6.5	-6.6	-6.6	-6.6	-6.6	-7.1	-7.4	-7.6	-6.8	-5.7
17-Mar	-7.6	-7.5	-7.8	-7.7	-7.7	-7.9	-7.8	-8.1	-8.3	-4.6	-3.6	-4.2	-3.0	-3.4	-3.4	-3.3	-3.4	-3.8	-4.0	-4.4	-4.7	-5.3	-5.6	-6.2	-5.6	-3.0
18-Mar	-6.3	-6.0	-6.0	-6.0	-5.4	-5.7	-5.6	-5.4	-4.9	-3.7	-2.9	-1.5	-0.8	-0.5	-0.1	0.9	1.8	2.4	1.4	-0.1	-1.0	-2.9	-4.8	-6.2	-2.9	2.4
19-Mar	-7.3	-8.0	-8.6	-9.4	-10.6	-10.6	-10.5	-9.9	-8.5	-6.6	-5.7	-3.5	-0.5	4.1	5.4	6.2	5.9	5.1	3.2	0.7	-0.5	-1.4	-1.8	-1.4	-3.1	6.2
20-Mar	-1.9	-1.6	-2.5	-3.2	-3.6	-5.9	-7.1	-7.2	-4.7	-2.2	-1.0	0.1	1.4	2.9	3.4	3.8	3.9	3.7	2.1	1.1	0.3	-1.5	-2.7	-2.8	-1.0	3.9
21-Mar	-5.5	-6.9	-6.9	-6.6	-6.4	-5.7	-6.6	-6.9	-5.9	-5.3	-4.3	-2.9	-1.9	-0.8	0.3	0.8	0.7	-0.5	-1.5	-2.4	-3.3	-4.3	-5.1	-5.8	-3.9	0.8
22-Mar	-6.5	-7.0	-7.5	-8.0	-8.6	-9.1	-9.4	-9.6	-9.1	-8.1	-6.7	-5.0	-3.5	-2.0	-1.2	-0.5	-0.3	-0.2	-0.6	-1.6	-2.0	-2.3	-2.5	-3.0	-4.8	-0.2
23-Mar	-3.2	-3.3	-3.4	-3.5	-4.0	-4.5	-4.7	-4.6	-4.5	-4.8	-4.3	-3.9	-3.5	-3.3	-2.9	-2.6	-3.2	-3.5	-4.4	-5.7	-6.7	-8.2	-9.4	-10.4	-4.7	-2.6
24-Mar	-12.1	-13.6	-15.2	-15.6	-17.3	-18.4	-18.9	-18.0	-14.7	-10.7	-6.2	-4.1	-2.9	-2.2	-1.3	-0.8	-0.5	-0.9	-2.4	-4.2	-6.0	-8.4	-10.2	-11.4	-9.0	-0.5
25-Mar	-12.8	-14.9	-15.0	-14.3	-13.5	-12.4	-12.0	-11.0	-9.2	-7.5	-5.9	-3.8	-1.0	0.9	2.4	3.0	2.6	2.7	2.2	0.7	-0.7	-2.4	-3.8	-4.6	-5.4	3.0
26-Mar	-5.2	-5.5	-5.9	-6.2	-6.1	-6.1	-5.9	-4.7	-3.3	-2.6	-2.1	-0.8	-0.1	0.9	1.9	2.6	2.9	3.0	2.3	1.2	-0.3	-1.0	-1.3	-2.1	-1.8	3.0
27-Mar	-2.9	-3.6	-4.0	-4.8	-5.9	-7.4	-7.7	-6.9	-3.5	-0.5	2.1	4.9	7.0	8.3	9.1	9.9	9.8	9.3	8.4	7.1	5.8	4.6	3.3	2.6	1.9	9.9
28-Mar	1.8	0.8	-0.2	-1.0	-1.6	-2.2	-2.4	-1.5	0.8	3.3	4.7	7.0	9.6	11.7	11.7	11.4	12.1	12.3	10.8	9.0	6.0	3.2	3.1	2.9	4.7	12.3
29-Mar	3.0	2.3	2.0	1.3	0.9	-0.9	-2.2	-1.2	0.5	2.7	5.6	8.9	11.3	12.8	13.2	13.2	14.1	13.4	11.0	8.8	7.6	6.7	4.9	5.0	6.0	14.1
30-Mar	4.0	2.6	1.9	0.7	-0.5	-1.2	-1.3	-0.1	3.7	6.5	7.7	8.9	11.3	11.2	11.1	10.5	8.8	5.2	2.5	1.3	1.2	0.5	-0.5	-1.2	4.0	11.3
31-Mar	-1.9	-2.5	-3.4	-3.7	-4.0	-4.4	-4.8	-4.4	-3.7	-2.8	-2.2	-1.9	-1.2	0.0	0.5	0.8	1.0	1.3	1.5	1.8	2.0	1.8	1.0	0.3	-1.2	2.0
	-5.0	-5.5	-6.0	-6.3	-6.7	-7.1	-7.3	-7.0	-5.9	-4.5	-3.3	-2.1	-0.8	0.1	0.6	0.9	0.9	0.6	-0.3	-1.2	-2.0	-2.9	-3.6	-4.1	Diurnal Average	
	4.0	3.2	2.0	1.3	0.9	0.2	-0.4	-0.1	3.7	6.5	7.7	8.9	11.3	12.8	13.2	13.2	14.1	13.4	11.0	9.0	7.6	6.7	4.9	5.0	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 20 m (AT20m) - C

Lower Camp Met Tower - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	560	75.27	75.27
0 - 10	167	22.45	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: 13.4 C on Mar 29 17:00

Maximum Daily Average: 6.2 C on Mar 29

Minimum Value: -18.5 C on Mar 24 08:00

Minimum Daily Average: -8.9 C on Mar 24

Maximum Diurnal Average: 0.7 C at hour 17

Minimum Diurnal Average: -7.1 C at hour 7

Monthly Average: -3.29 C

Percentiles: P_1 = -13.1 P_{10} = -9.5 Q_1 = -7.0 Median = -4.0 Q_3 = 0.0 P_{90} = 3.2 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

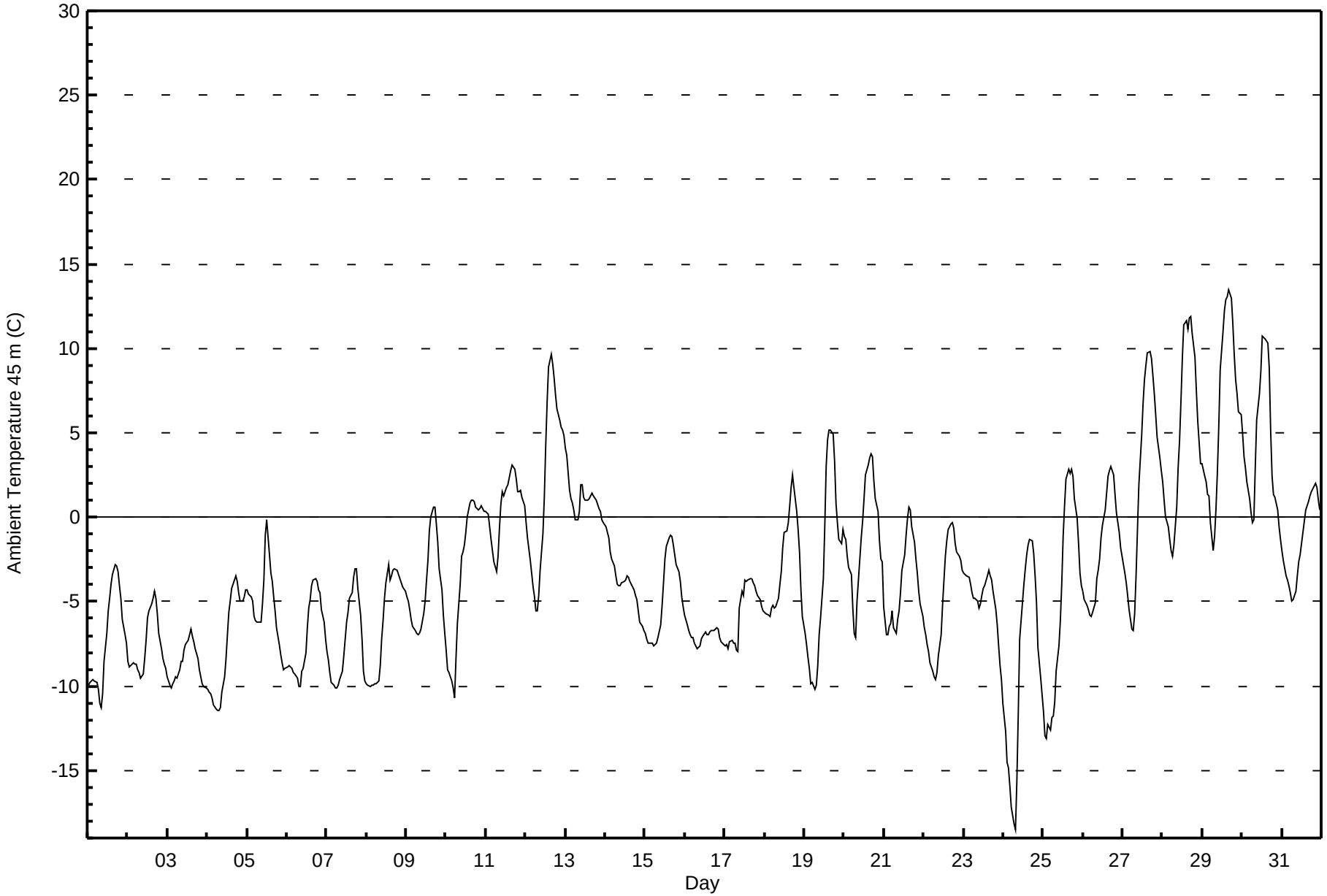
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-9.9	-9.8	-9.7	-9.6	-9.7	-9.8	-10.2	-11.1	-11.2	-10.5	-8.6	-6.9	-5.6	-4.8	-3.9	-3.3	-2.8	-2.9	-3.2	-4.0	-4.8	-6.0	-7.0	-7.5	-7.2	-2.8
2-Mar	-8.5	-8.8	-8.8	-8.6	-8.7	-8.7	-9.0	-9.2	-9.5	-9.3	-8.4	-7.3	-6.0	-5.5	-5.1	-4.8	-4.3	-4.8	-5.7	-6.9	-7.8	-8.4	-8.7	-8.9	-7.6	-4.3
3-Mar	-9.4	-9.9	-10.1	-9.9	-9.7	-9.5	-9.5	-9.0	-8.6	-8.5	-7.9	-7.5	-7.3	-6.9	-6.7	-7.0	-7.4	-7.8	-8.4	-9.0	-9.4	-9.8	-10.0	-10.1	-8.7	-6.7
4-Mar	-10.2	-10.4	-10.5	-10.7	-11.1	-11.4	-11.4	-11.4	-11.3	-10.3	-9.5	-8.4	-7.0	-5.7	-5.0	-4.2	-3.7	-3.4	-3.8	-4.5	-5.0	-5.0	-4.7	-4.3	-7.6	-3.4
5-Mar	-4.3	-4.5	-4.7	-5.0	-5.9	-6.1	-6.3	-6.2	-6.2	-5.1	-3.7	-1.0	-0.1	-2.2	-3.3	-3.8	-4.7	-5.5	-6.5	-7.5	-8.2	-8.7	-9.0	-8.9	-5.3	-0.1
6-Mar	-8.9	-8.8	-8.9	-8.9	-9.2	-9.3	-9.5	-10.0	-10.0	-9.1	-8.9	-8.0	-6.6	-5.4	-4.8	-4.1	-3.7	-3.6	-3.8	-4.3	-4.5	-5.4	-6.2	-7.2	-7.1	-3.6
7-Mar	-7.9	-8.5	-9.2	-9.8	-10.0	-10.1	-10.1	-10.0	-9.6	-9.1	-8.2	-7.2	-6.2	-5.6	-4.8	-4.4	-3.5	-3.0	-3.0	-4.2	-5.8	-7.2	-9.2	-9.7	-7.3	-3.0
8-Mar	-9.9	-10.0	-10.0	-10.0	-9.9	-9.9	-9.9	-9.7	-8.7	-7.2	-6.1	-4.8	-3.9	-2.8	-3.7	-3.5	-3.1	-3.0	-3.2	-3.4	-3.6	-3.9	-4.1	-4.3	-6.2	-2.8
9-Mar	-4.7	-5.0	-5.4	-6.0	-6.4	-6.7	-6.9	-7.0	-6.9	-6.7	-5.7	-4.9	-3.7	-2.6	-0.8	0.0	0.6	0.6	-0.4	-1.5	-3.1	-4.3	-5.8	-6.9	-4.2	0.6
10-Mar	-7.9	-9.0	-9.2	-9.7	-10.2	-10.7	-8.4	-6.3	-3.9	-2.3	-2.1	-1.7	-0.9	0.0	0.9	1.0	1.0	0.9	0.6	0.4	0.5	0.7	0.5	0.3	-3.1	1.0
11-Mar	0.3	0.2	-0.6	-1.3	-1.9	-2.6	-3.3	-2.3	-0.6	0.8	1.5	1.3	1.8	2.0	2.3	2.8	3.1	2.9	2.3	1.5	1.5	1.6	1.1	0.7	0.6	3.1
12-Mar	-0.4	-1.2	-1.9	-2.6	-4.1	-4.7	-5.5	-5.5	-4.7	-3.2	-1.0	1.2	4.3	6.8	8.9	9.6	9.1	8.2	7.3	6.4	5.8	5.3	5.2	4.9	2.0	9.6
13-Mar	4.1	3.7	1.6	1.1	0.9	0.4	-0.2	-0.2	0.3	1.9	2.0	1.2	1.0	1.0	1.1	1.3	1.5	1.3	1.1	0.8	0.5	0.3	-0.1	-0.3	1.1	4.1
14-Mar	-0.6	-0.9	-1.2	-2.0	-2.5	-2.9	-3.5	-3.9	-4.1	-4.0	-3.9	-3.8	-3.7	-3.5	-3.6	-3.8	-4.1	-4.3	-4.6	-4.9	-5.5	-6.2	-6.5	-6.7	-3.8	-0.6
15-Mar	-6.8	-7.2	-7.4	-7.5	-7.5	-7.6	-7.5	-7.4	-7.1	-6.4	-5.2	-3.9	-2.5	-1.8	-1.2	-1.0	-1.2	-1.7	-2.2	-2.8	-3.2	-3.8	-4.7	-5.3	-4.7	-1.0
16-Mar	-5.8	-6.3	-6.7	-6.9	-7.1	-7.2	-7.4	-7.8	-7.7	-7.6	-7.2	-7.0	-6.8	-6.9	-7.0	-6.8	-6.7	-6.7	-6.6	-6.6	-6.6	-7.1	-7.4	-7.6	-7.0	-5.8
17-Mar	-7.6	-7.5	-7.8	-7.3	-7.3	-7.4	-7.5	-7.8	-8.0	-5.4	-4.4	-4.6	-3.7	-3.8	-3.8	-3.6	-3.6	-3.9	-4.1	-4.4	-4.6	-4.9	-5.3	-5.6	-5.6	-3.6
18-Mar	-5.7	-5.7	-5.8	-5.9	-5.3	-5.3	-5.4	-5.3	-4.8	-4.0	-3.2	-1.8	-0.9	-0.8	-0.4	0.7	1.8	2.5	1.8	0.4	-0.7	-2.1	-4.3	-5.9	-2.7	2.5
19-Mar	-6.8	-7.6	-8.3	-9.0	-9.9	-9.8	-10.2	-9.9	-8.8	-7.0	-6.0	-3.7	-0.6	3.0	4.6	5.1	5.1	4.9	3.4	0.8	-0.3	-1.3	-1.5	-0.7	-3.1	5.1
20-Mar	-1.1	-1.3	-2.3	-3.0	-3.4	-5.4	-6.9	-7.1	-5.0	-2.5	-1.3	-0.2	1.1	2.5	3.1	3.5	3.8	3.6	2.2	1.1	0.3	-1.4	-2.4	-2.6	-1.0	3.8
21-Mar	-5.3	-6.9	-6.9	-6.4	-6.3	-5.6	-6.5	-6.9	-6.0	-5.5	-4.5	-3.2	-2.2	-1.1	-0.1	0.6	0.4	-0.6	-1.5	-2.5	-3.3	-4.4	-5.1	-5.9	-4.0	0.6
22-Mar	-6.5	-7.0	-7.6	-8.0	-8.6	-9.1	-9.4	-9.7	-9.2	-8.2	-6.9	-5.2	-3.7	-2.3	-1.4	-0.7	-0.4	-0.3	-0.7	-1.6	-2.1	-2.3	-2.6	-3.1	-4.9	-0.3
23-Mar	-3.3	-3.4	-3.4	-3.5	-4.0	-4.5	-4.8	-4.8	-5.0	-5.4	-5.1	-4.6	-4.2	-4.0	-3.5	-3.2	-3.5	-3.7	-4.4	-5.5	-6.3	-7.6	-8.8	-9.6	-4.8	-3.2
24-Mar	-11.1	-12.6	-14.5	-14.8	-15.9	-17.2	-18.1	-18.5	-15.6	-11.6	-7.2	-5.1	-4.0	-3.0	-2.2	-1.6	-1.3	-1.4	-2.2	-3.5	-5.0	-7.7	-9.6	-10.5	-8.9	-1.3
25-Mar	-11.5	-12.9	-13.1	-12.2	-12.6	-11.9	-11.7	-11.0	-9.1	-7.6	-6.1	-4.0	-1.2	0.7	2.2	2.8	2.6	2.8	2.4	1.1	0.0	-1.6	-3.3	-4.0	-5.0	2.8
26-Mar	-4.4	-4.9	-5.2	-5.5	-5.8	-5.9	-5.6	-5.0	-3.6	-3.1	-2.5	-1.3	-0.5	0.5	1.4	2.4	2.7	3.0	2.5	1.4	0.3	-0.3	-0.9	-1.8	-1.8	3.0
27-Mar	-2.8	-3.3	-3.9	-4.6	-5.5	-6.6	-6.7	-5.7	-3.4	-0.8	1.9	4.8	6.8	8.2	9.0	9.8	9.8	9.4	8.4	7.3	6.1	4.8	3.5	2.8	2.1	9.8
28-Mar	2.1	1.0	0.0	-0.6	-1.3	-2.0	-2.3	-1.6	0.6	2.9	4.5	6.9	9.4	11.4	11.6	11.2	11.8	11.9	10.9	9.5	7.5	5.6	4.4	3.2	4.9	11.9
29-Mar	3.2	2.4	2.1	1.4	1.2	-0.3	-2.0	-1.2	0.5	2.6	5.4	8.7	11.0	12.2	12.9	13.0	13.4	13.0	11.5	9.6	8.2	7.4	6.3	6.1	6.2	13.4
30-Mar	4.9	3.6	3.0	2.1	1.1	0.3	-0.3	-0.1	2.9	5.8	7.3	8.6	10.8	10.6	10.5	10.3	8.8	5.1	2.4	1.3	1.2	0.4	-0.6	-1.3	4.1	10.8
31-Mar	-2.0	-2.6	-3.5	-3.7	-4.0	-4.5	-4.9	-4.9	-4.3	-3.4	-2.6	-2.2	-1.6	-0.2	0.4	0.7	0.9	1.2	1.5	1.9	2.0	1.8	1.0	0.5	-1.4	2.0
	-4.8	-5.3	-5.8	-6.1	-6.5	-6.8	-7.1	-7.0	-6.1	-4.8	-3.7	-2.4	-1.2	-0.3	0.2	0.6	0.7	0.5	-0.2	-1.1	-1.8	-2.6	-3.4	-3.9	Diurnal Average	
	4.9	3.7	3.0	2.1	1.2	0.4	-0.2	-0.1	2.9	5.8	7.3	8.7	11.0	12.2	12.9	13.0	13.4	13.0	11.5	9.6	8.2	7.4	6.3	6.1	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 45 m (AT45m) - C

Lower Camp Met Tower - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	559	75.13	75.13
0 - 10	168	22.58	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: 12.7 C on Mar 29 17:00

Maximum Daily Average: 6.7 C on Mar 29

Minimum Value: -15.9 C on Mar 24 08:00

Minimum Daily Average: -9.2 C on Mar 3

Maximum Diurnal Average: 0.2 C at hour 17

Minimum Diurnal Average: -6.6 C at hour 8

Monthly Average: -3.32 C

Percentiles: P_1 = -11.9 P_{10} = -9.7 Q_1 = -7.3 Median = -4.3 Q_3 = 0.1 P_{90} = 3.6 P_{99} = 11.3

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

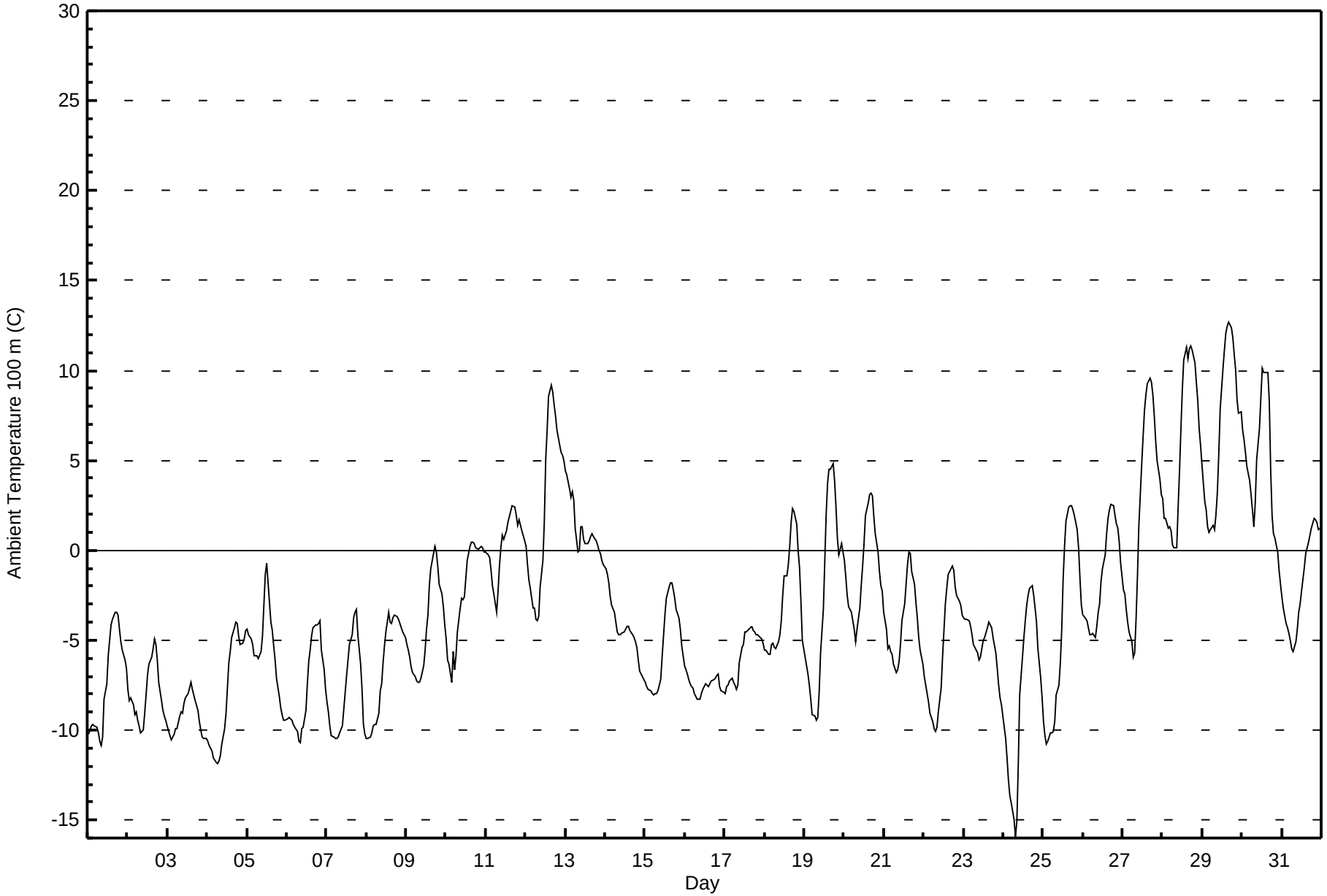
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.2	-10.0	-9.7	-9.7	-9.7	-9.8	-10.1	-10.7	-10.9	-10.4	-8.3	-7.5	-5.9	-5.0	-4.1	-3.9	-3.4	-3.4	-3.6	-4.4	-5.0	-5.5	-6.1	-6.6	-7.2	-3.4
2-Mar	-7.8	-8.4	-8.2	-8.6	-9.1	-9.0	-9.4	-9.8	-10.2	-10.0	-9.1	-8.0	-6.9	-6.3	-5.9	-5.5	-4.9	-5.2	-6.1	-7.3	-8.3	-8.9	-9.2	-9.4	-8.0	-4.9
3-Mar	-9.8	-10.3	-10.6	-10.4	-10.2	-9.9	-9.9	-9.2	-9.0	-9.1	-8.5	-8.2	-8.0	-7.6	-7.4	-7.7	-8.0	-8.3	-8.9	-9.6	-10.0	-10.4	-10.4	-10.5	-9.2	-7.4
4-Mar	-10.6	-10.8	-11.0	-11.2	-11.5	-11.8	-11.9	-11.7	-11.4	-10.8	-10.0	-9.1	-7.7	-6.3	-5.6	-4.9	-4.3	-4.0	-4.1	-4.7	-5.2	-5.1	-4.9	-4.5	-8.0	-4.0
5-Mar	-4.4	-4.7	-4.9	-5.2	-5.8	-5.9	-5.9	-6.0	-5.6	-4.8	-3.1	-1.4	-0.7	-2.9	-4.0	-4.5	-5.3	-6.1	-7.1	-8.1	-8.7	-9.2	-9.5	-9.4	-5.6	-0.7
6-Mar	-9.4	-9.3	-9.4	-9.4	-9.7	-9.8	-10.1	-10.6	-10.7	-9.9	-9.8	-8.9	-7.4	-6.2	-5.6	-4.7	-4.3	-4.1	-4.1	-4.1	-3.9	-5.5	-6.6	-7.7	-7.6	-3.9
7-Mar	-8.4	-9.0	-9.8	-10.3	-10.4	-10.5	-10.5	-10.4	-10.2	-9.8	-8.9	-7.9	-7.0	-6.1	-5.3	-4.7	-3.8	-3.4	-3.3	-4.7	-6.3	-7.7	-9.7	-10.3	-7.8	-3.3
8-Mar	-10.5	-10.5	-10.4	-10.1	-9.7	-9.7	-9.7	-9.1	-7.8	-7.5	-6.3	-5.4	-4.6	-3.4	-4.0	-4.1	-3.7	-3.6	-3.7	-3.8	-4.0	-4.3	-4.5	-4.9	-6.5	-3.4
9-Mar	-5.2	-5.5	-6.0	-6.5	-6.8	-7.0	-7.3	-7.4	-7.3	-7.1	-6.4	-5.5	-4.3	-3.6	-2.0	-1.0	-0.2	0.2	-0.1	-0.8	-1.9	-2.4	-3.1	-4.1	-4.2	0.2
10-Mar	-4.9	-6.1	-6.4	-7.3	-5.6	-6.7	-5.9	-4.5	-3.2	-2.6	-2.8	-2.6	-1.5	-0.6	0.3	0.4	0.4	0.4	0.1	0.1	0.2	0.2	0.1	-0.1	-2.4	0.4
11-Mar	-0.1	-0.2	-0.4	-1.1	-1.9	-2.5	-3.4	-2.3	-0.9	0.2	0.9	0.6	1.1	1.5	1.8	2.2	2.5	2.4	2.0	1.4	1.7	1.4	1.1	0.5	0.3	2.5
12-Mar	0.2	-0.8	-1.6	-2.1	-3.2	-3.2	-3.9	-3.9	-3.6	-2.0	-0.5	1.6	5.0	6.7	8.6	9.1	8.8	8.1	7.4	6.7	5.9	5.4	5.3	5.0	2.5	9.1
13-Mar	4.5	4.2	3.4	2.9	3.3	2.8	1.2	-0.1	0.0	1.3	1.3	0.6	0.4	0.4	0.5	0.7	0.9	0.8	0.6	0.3	0.0	-0.2	-0.6	-0.8	1.2	4.5
14-Mar	-1.1	-1.4	-1.8	-2.6	-3.0	-3.5	-4.0	-4.5	-4.7	-4.7	-4.6	-4.5	-4.4	-4.2	-4.3	-4.5	-4.7	-4.9	-5.1	-5.4	-6.1	-6.8	-7.0	-7.2	-4.4	-1.1
15-Mar	-7.3	-7.6	-7.8	-7.8	-8.0	-8.1	-8.0	-8.0	-7.8	-7.2	-5.9	-4.8	-3.6	-2.7	-2.1	-1.8	-1.8	-2.2	-2.7	-3.3	-3.7	-4.4	-5.3	-5.9	-5.3	-1.8
16-Mar	-6.4	-6.9	-7.2	-7.5	-7.6	-7.7	-7.9	-8.3	-8.3	-8.3	-8.0	-7.7	-7.4	-7.5	-7.6	-7.4	-7.3	-7.2	-7.1	-6.9	-6.9	-7.6	-7.8	-7.9	-7.5	-6.4
17-Mar	-8.0	-7.6	-7.5	-7.3	-7.1	-7.3	-7.5	-7.7	-7.5	-6.3	-5.4	-5.2	-4.5	-4.5	-4.5	-4.3	-4.3	-4.5	-4.5	-4.7	-4.7	-4.8	-5.0	-5.1	-5.8	-4.3
18-Mar	-5.5	-5.5	-5.8	-5.8	-5.2	-5.2	-5.4	-5.4	-5.1	-4.7	-3.9	-2.5	-1.4	-1.4	-0.8	0.2	1.5	2.3	2.1	1.5	0.0	-0.9	-2.8	-5.0	-2.7	2.3
19-Mar	-5.9	-6.4	-6.9	-7.5	-8.3	-9.1	-9.2	-9.4	-9.3	-7.9	-5.7	-3.3	-0.7	2.0	3.8	4.5	4.5	4.8	3.9	2.4	0.7	-0.3	0.4	-0.1	-2.6	4.8
20-Mar	-0.5	-1.5	-2.5	-3.1	-3.5	-3.9	-4.4	-5.1	-4.4	-3.2	-2.0	-0.9	0.4	1.9	2.6	3.1	3.2	3.0	1.9	0.9	-0.1	-1.2	-2.0	-2.3	-1.0	3.2
21-Mar	-3.4	-4.4	-5.5	-5.3	-5.6	-5.8	-6.4	-6.8	-6.6	-6.2	-5.2	-3.9	-3.0	-1.9	-0.8	-0.1	-0.2	-1.2	-1.9	-2.9	-3.8	-4.8	-5.5	-6.4	-4.1	-0.1
22-Mar	-7.0	-7.5	-8.0	-8.4	-9.1	-9.6	-9.9	-10.1	-9.9	-9.0	-7.6	-5.9	-4.4	-3.0	-2.2	-1.4	-1.0	-0.9	-1.1	-2.0	-2.5	-2.8	-3.1	-3.6	-5.4	-0.9
23-Mar	-3.8	-3.8	-3.9	-3.9	-4.2	-4.7	-5.2	-5.4	-5.7	-6.1	-6.0	-5.4	-5.0	-4.8	-4.3	-4.0	-4.1	-4.3	-4.8	-5.7	-6.6	-7.5	-8.2	-8.6	-5.3	-3.8
24-Mar	-9.2	-10.5	-11.6	-12.8	-13.6	-14.1	-15.0	-15.9	-15.1	-12.0	-8.0	-5.9	-4.8	-3.9	-3.1	-2.5	-2.1	-2.0	-2.5	-3.2	-4.0	-5.4	-7.1	-8.2	-8.0	-2.0
25-Mar	-9.5	-10.3	-10.8	-10.6	-10.1	-10.2	-10.1	-9.5	-8.1	-7.5	-6.2	-4.4	-1.6	0.2	1.6	2.4	2.5	2.5	2.3	1.9	1.1	0.1	-1.6	-3.0	-4.1	2.5
26-Mar	-3.6	-3.7	-3.9	-4.3	-4.7	-4.7	-4.6	-4.9	-4.2	-3.4	-2.9	-1.7	-1.0	-0.2	0.9	1.7	2.2	2.6	2.5	1.9	1.5	1.3	0.5	-0.8	-1.4	2.6
27-Mar	-2.2	-2.4	-3.3	-4.0	-4.5	-5.1	-5.9	-5.7	-3.8	-1.4	1.4	4.7	6.3	7.7	8.6	9.3	9.6	9.3	8.6	7.5	6.0	5.0	4.0	3.1	2.2	9.6
28-Mar	2.9	1.8	1.8	1.3	1.3	1.1	0.3	0.2	0.1	2.4	4.4	6.8	8.9	10.6	11.3	10.7	11.2	11.3	11.1	10.5	9.3	8.4	6.7	5.8	5.8	11.3
29-Mar	4.7	2.7	2.2	1.3	1.0	1.1	1.4	1.1	2.0	3.2	5.4	7.9	10.1	11.1	12.1	12.4	12.7	12.4	11.8	10.9	10.0	8.4	7.7	7.7	6.7	12.7
30-Mar	6.7	6.1	5.4	4.7	3.9	3.1	2.3	1.3	2.7	5.1	6.7	8.5	10.1	9.9	9.9	9.9	8.3	4.5	1.9	0.9	0.7	-0.1	-1.1	-1.9	4.6	10.1
31-Mar	-2.6	-3.2	-4.0	-4.3	-4.6	-5.0	-5.5	-5.6	-5.1	-4.4	-3.4	-3.0	-2.3	-1.0	-0.2	0.2	0.4	0.9	1.2	1.7	1.7	1.6	1.1	1.3	-1.8	1.7
	-4.5	-4.9	-5.4	-5.7	-5.9	-6.2	-6.5	-6.6	-6.2	-5.3	-4.1	-3.0	-1.8	-1.0	-0.4	0.0	0.2	0.0	-0.4	-1.1	-1.7	-2.4	-3.0	-3.6	Diurnal Average	
	6.7	6.1	5.4	4.7	3.9	3.1	2.3	1.3	2.7	5.1	6.7	8.5	10.1	11.1	12.1	12.4	12.7	12.4	11.8	10.9	10.0	8.4	7.7	7.7	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 100 m (AT100m) - C

Lower Camp Met Tower - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	553	74.33	74.33
0 - 10	174	23.39	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 167 m (AT167m) - C

Lower Camp Met Tower - March 2016

Maximum Value: 13.1 C on Mar 29 17:00

Maximum Daily Average: 7.0 C on Mar 29

Minimum Value: -14.3 C on Mar 24 07:00

Minimum Daily Average: -9.4 C on Mar 3

Maximum Diurnal Average: -0.2 C at hour 17

Minimum Diurnal Average: -6.3 C at hour 8

Monthly Average: -3.42 C

Percentiles: P_1 = -12.1 P_{10} = -9.6 Q_1 = -7.5 Median = -4.4 Q_3 = -0.3 P_{90} = 3.9 P_{99} = 10.7

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

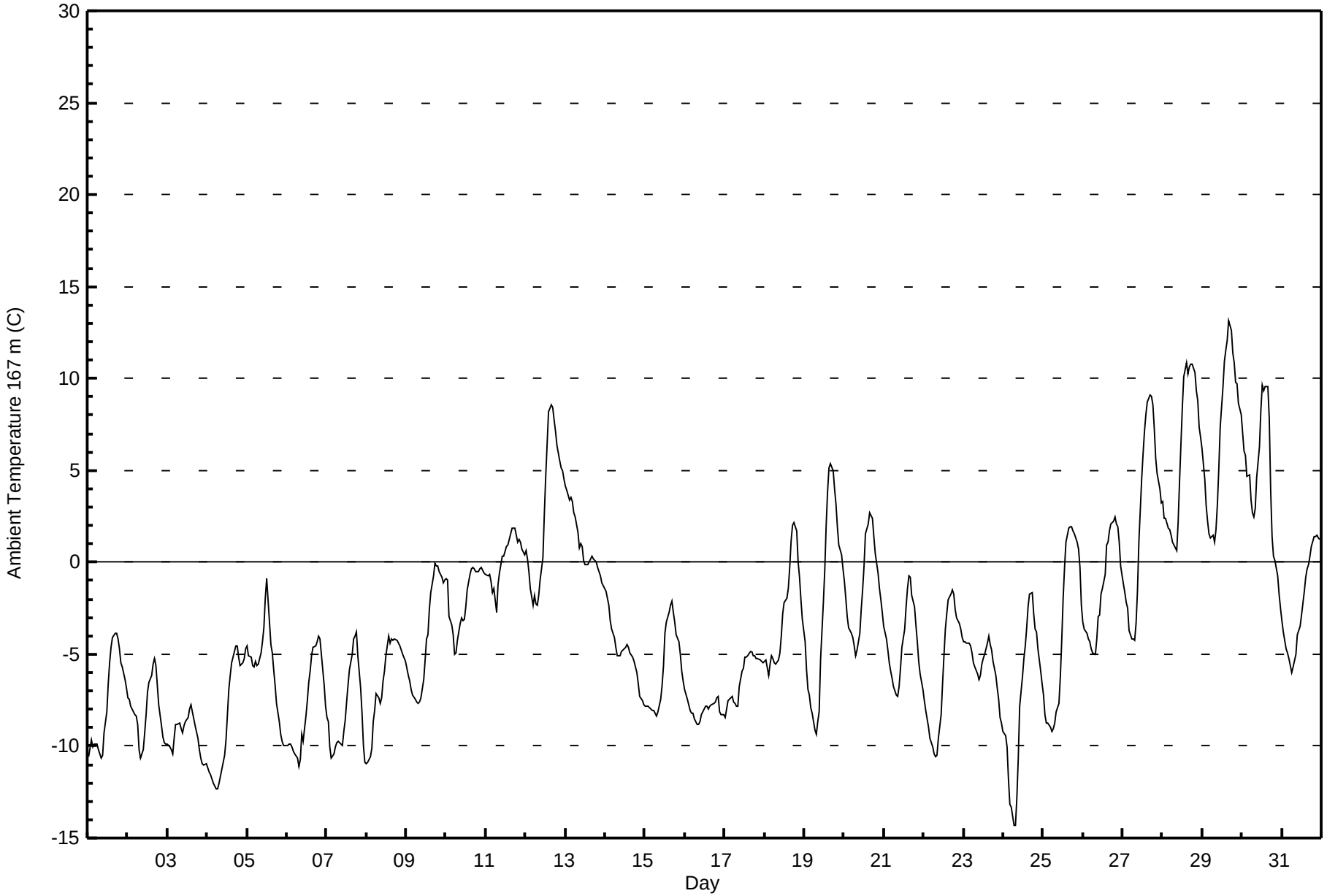
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.6	-10.1	-9.7	-10.0	-9.9	-9.9	-10.2	-10.4	-10.7	-10.5	-9.3	-8.1	-6.6	-5.4	-4.6	-4.1	-3.9	-3.9	-4.1	-4.7	-5.4	-5.7	-6.4	-6.8	-7.5	-3.9
2-Mar	-7.4	-7.5	-7.9	-8.1	-8.3	-8.4	-8.8	-10.2	-10.6	-10.2	-9.2	-8.3	-7.1	-6.5	-6.2	-5.5	-5.2	-5.6	-6.7	-7.8	-8.9	-9.5	-9.8	-9.9	-8.1	-5.2
3-Mar	-9.9	-10.0	-10.2	-10.4	-9.6	-8.8	-8.8	-8.8	-9.1	-9.3	-8.9	-8.7	-8.4	-8.0	-7.8	-8.1	-8.5	-8.9	-9.5	-10.2	-10.6	-11.0	-11.0	-11.0	-9.4	-7.8
4-Mar	-11.2	-11.4	-11.6	-11.8	-12.0	-12.3	-12.4	-12.1	-11.6	-11.2	-10.5	-9.6	-8.3	-6.9	-6.2	-5.5	-4.9	-4.6	-4.5	-5.2	-5.6	-5.5	-5.2	-4.7	-8.5	-4.5
5-Mar	-4.6	-5.1	-5.2	-5.6	-5.7	-5.4	-5.6	-5.5	-5.0	-4.4	-3.5	-2.0	-0.9	-3.2	-4.5	-4.9	-5.9	-6.7	-7.7	-8.7	-9.3	-9.7	-10.0	-10.0	-5.8	-0.9
6-Mar	-9.9	-9.9	-9.9	-10.0	-10.3	-10.4	-10.7	-11.1	-10.7	-9.4	-9.7	-8.4	-7.6	-6.5	-6.0	-5.1	-4.6	-4.6	-4.4	-4.0	-4.2	-5.0	-6.7	-7.8	-7.8	-4.0
7-Mar	-8.4	-8.7	-10.0	-10.7	-10.4	-10.0	-9.8	-9.7	-9.8	-9.9	-9.2	-8.6	-7.6	-6.7	-5.9	-5.0	-4.2	-4.0	-3.8	-5.1	-6.8	-8.2	-10.0	-10.8	-8.1	-3.8
8-Mar	-11.0	-10.9	-10.6	-10.2	-8.7	-8.1	-7.2	-7.4	-7.7	-7.3	-6.5	-5.9	-5.1	-4.0	-4.4	-4.2	-4.3	-4.2	-4.2	-4.4	-4.6	-4.8	-5.0	-5.4	-6.5	-4.0
9-Mar	-5.8	-6.1	-6.5	-6.9	-7.2	-7.4	-7.6	-7.7	-7.6	-7.4	-6.4	-5.3	-4.2	-3.9	-2.6	-1.6	-0.7	-0.1	-0.2	-0.2	-0.5	-0.8	-1.1	-0.9	-4.1	-0.1
10-Mar	-0.9	-1.0	-2.9	-3.4	-3.9	-5.0	-5.0	-4.2	-3.3	-3.0	-3.2	-3.1	-2.4	-1.5	-0.6	-0.4	-0.3	-0.3	-0.5	-0.5	-0.4	-0.3	-0.4	-0.6	-2.0	-0.3
11-Mar	-0.6	-0.8	-0.7	-1.0	-1.6	-1.5	-2.7	-1.2	-0.6	-0.1	0.3	0.3	0.8	1.0	1.3	1.6	1.9	1.8	1.5	1.1	1.3	1.1	0.7	0.4	0.2	1.9
12-Mar	0.6	0.2	-0.5	-1.4	-2.3	-1.8	-2.3	-2.3	-1.8	-1.0	0.3	2.7	4.7	6.4	8.2	8.6	8.4	7.7	7.1	6.4	5.5	5.2	5.0	4.6	2.8	8.6
13-Mar	4.2	3.9	3.4	3.5	3.3	2.7	2.5	1.6	0.8	1.0	0.9	0.1	-0.1	-0.1	0.0	0.2	0.3	0.2	0.0	-0.3	-0.5	-0.7	-1.1	-1.3	1.0	4.2
14-Mar	-1.6	-1.9	-2.4	-3.2	-3.7	-4.1	-4.6	-5.1	-5.1	-5.1	-4.9	-4.7	-4.6	-4.5	-4.7	-4.9	-5.2	-5.4	-5.7	-6.0	-6.6	-7.3	-7.5	-7.7	-4.8	-1.6
15-Mar	-7.8	-7.9	-7.8	-8.0	-8.0	-8.0	-8.2	-8.4	-8.2	-7.5	-6.7	-5.6	-3.9	-3.3	-2.7	-2.3	-2.1	-2.7	-3.2	-3.9	-4.3	-5.0	-5.9	-6.5	-5.8	-2.1
16-Mar	-6.9	-7.4	-7.8	-8.0	-8.2	-8.2	-8.5	-8.8	-8.8	-8.6	-8.3	-8.1	-7.9	-7.8	-8.0	-7.9	-7.7	-7.7	-7.6	-7.4	-7.3	-8.1	-8.3	-8.3	-8.0	-6.9
17-Mar	-8.5	-8.0	-7.5	-7.5	-7.3	-7.6	-7.7	-7.8	-7.8	-6.8	-5.9	-5.8	-5.1	-5.2	-5.1	-4.9	-4.9	-5.1	-5.1	-5.2	-5.2	-5.3	-5.4	-5.5	-6.3	-4.9
18-Mar	-5.4	-5.3	-6.2	-5.6	-5.1	-5.2	-5.5	-5.5	-5.3	-5.0	-4.0	-2.8	-2.2	-2.0	-1.4	-0.3	1.1	2.0	2.2	1.7	0.0	-0.8	-2.1	-3.1	-2.7	2.2
19-Mar	-4.3	-5.9	-6.9	-7.2	-7.9	-8.2	-9.1	-9.3	-8.6	-8.1	-5.3	-2.2	-0.4	2.0	3.9	5.1	5.4	5.0	4.0	3.1	1.9	0.9	0.4	-0.3	-2.2	5.4
20-Mar	-1.1	-1.9	-3.0	-3.6	-3.8	-4.1	-4.5	-5.1	-4.8	-3.8	-2.6	-1.5	-0.2	1.6	2.1	2.7	2.6	2.4	1.4	0.5	-0.6	-1.4	-2.1	-2.7	-1.4	2.7
21-Mar	-3.5	-4.2	-4.8	-5.4	-5.9	-6.3	-6.8	-7.2	-7.3	-6.8	-5.8	-4.6	-3.6	-2.5	-1.4	-0.7	-0.8	-1.8	-2.4	-3.4	-4.3	-5.4	-6.1	-6.9	-4.5	-0.7
22-Mar	-7.6	-8.0	-8.5	-9.0	-9.6	-10.1	-10.4	-10.6	-10.5	-9.6	-8.3	-6.6	-5.0	-3.7	-2.8	-2.0	-1.7	-1.5	-1.8	-2.6	-3.1	-3.4	-3.6	-4.1	-6.0	-1.5
23-Mar	-4.3	-4.3	-4.4	-4.4	-4.6	-4.9	-5.5	-5.7	-6.1	-6.4	-6.2	-5.6	-5.3	-5.0	-4.4	-4.0	-4.5	-4.8	-5.4	-6.2	-6.9	-7.5	-8.5	-8.8	-5.6	-4.0
24-Mar	-9.2	-9.4	-10.1	-11.8	-13.2	-13.3	-14.3	-14.3	-12.8	-10.6	-7.9	-6.3	-5.3	-4.5	-3.6	-2.4	-1.7	-1.6	-2.8	-3.7	-3.8	-4.7	-5.9	-6.6	-7.5	-1.6
25-Mar	-7.2	-8.3	-8.8	-8.8	-9.0	-9.2	-9.0	-8.7	-8.1	-7.7	-6.2	-4.3	-2.0	-0.3	1.1	1.9	1.9	1.9	1.7	1.6	1.1	0.7	-0.2	-2.4	-3.7	1.9
26-Mar	-3.3	-3.6	-3.9	-4.2	-4.3	-4.7	-4.9	-5.0	-4.2	-3.0	-2.9	-1.8	-1.4	-0.6	0.9	1.1	1.7	2.1	2.3	2.4	2.1	1.9	1.1	-0.2	-1.3	2.4
27-Mar	-1.2	-1.7	-2.2	-2.5	-3.7	-4.1	-4.2	-4.2	-3.3	-1.6	1.1	4.5	5.9	7.2	8.0	8.7	9.1	9.0	8.6	7.3	5.7	4.8	4.0	3.2	2.4	9.1
28-Mar	3.3	2.4	2.4	1.9	1.8	1.5	1.1	0.9	0.7	2.1	4.4	6.5	8.4	10.1	10.8	10.3	10.6	10.8	10.8	10.3	9.4	8.8	7.3	6.8	6.0	10.8
29-Mar	6.2	4.5	3.1	2.3	1.6	1.3	1.5	1.1	1.8	3.2	5.0	7.4	9.5	11.0	11.6	12.1	13.1	12.6	11.4	10.8	9.8	9.7	8.6	8.1	7.0	13.1
30-Mar	7.0	6.0	5.8	4.7	4.8	3.4	2.7	2.5	2.9	4.6	6.3	8.2	9.6	9.3	9.6	9.5	7.8	3.9	1.4	0.3	0.1	-0.7	-1.8	-2.5	4.4	9.6
31-Mar	-3.2	-3.8	-4.7	-4.9	-5.2	-5.7	-6.0	-5.7	-5.0	-4.0	-3.7	-3.5	-2.9	-1.6	-0.8	-0.4	-0.1	0.4	0.8	1.4	1.4	1.5	1.3	1.2	-2.2	1.5
	-4.3	-4.7	-5.2	-5.5	-5.7	-5.9	-6.2	-6.3	-6.1	-5.4	-4.4	-3.3	-2.2	-1.5	-0.8	-0.4	-0.2	-0.4	-0.9	-1.4	-2.0	-2.5	-3.1	-3.6	Diurnal Average	
	7.0	6.0	5.8	4.7	4.8	3.4	2.7	2.5	2.9	4.6	6.3	8.2	9.6	11.0	11.6	12.1	13.1	12.6	11.4	10.8	9.8	9.7	8.6	8.1	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 167 m (AT167m) - C

Lower Camp Met Tower - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	568	76.34	76.34
0 - 10	162	21.77	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 20m (RH20m) - %

Lower Camp Met Tower - March 2016

Maximum Value: 97 % on Mar 10 10:00

Maximum Daily Average: 87.5 % on Mar 9

Minimum Value: 18 % on Mar 24 16:00

Minimum Daily Average: 41.5 % on Mar 24

Maximum Diurnal Average: 81.1 % at hour 7

Minimum Diurnal Average: 57.2 % at hour 16

Monthly Average: 69.3 %

Percentiles: P_1 = 21 P_{10} = 45 Q_1 = 58 Median = 72 Q_3 = 84 P_{90} = 89 P_{99} = 95

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

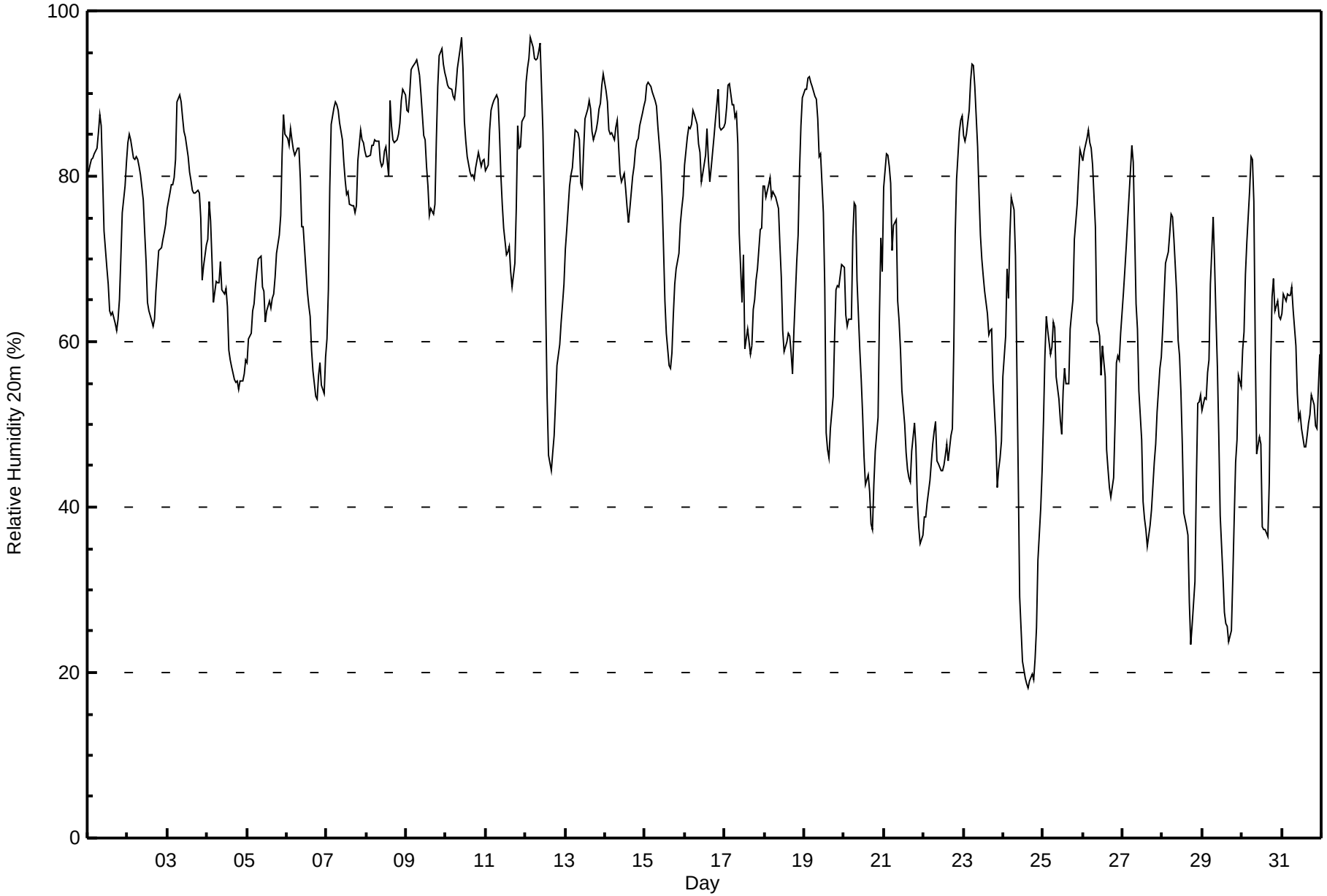
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	81	81	82	82	83	83	85	87	86	80	73	69	67	64	63	64	62	61	63	65	70	76	79	82	74.5	87
2-Mar	84	85	84	82	82	82	82	81	80	77	73	70	65	64	63	62	63	66	69	71	71	72	73	74	74.0	85
3-Mar	76	78	79	79	80	82	89	90	89	87	85	85	82	80	79	78	78	78	78	78	75	68	69	72	79.8	90
4-Mar	72	77	75	70	65	67	67	67	70	66	66	66	64	59	58	57	55	55	55	54	55	55	56	58	62.9	77
5-Mar	57	60	61	64	65	67	68	70	70	67	66	62	64	65	64	65	66	68	71	73	75	83	88	85	68.5	88
6-Mar	85	84	86	84	83	83	83	83	80	74	74	69	66	64	63	59	57	53	53	56	57	55	54	58	69.3	86
7-Mar	60	66	79	86	88	89	89	88	86	84	82	79	78	78	77	76	76	76	77	82	86	84	84	83	80.6	89
8-Mar	82	82	83	84	84	84	84	84	82	81	81	83	84	80	89	86	84	84	84	85	87	89	90	90	84.5	90
9-Mar	88	88	90	93	93	94	94	93	92	90	85	84	81	79	75	76	75	77	84	91	95	95	94	93	87.5	95
10-Mar	92	91	91	90	90	89	91	93	95	97	93	87	84	82	81	80	80	80	81	83	82	81	82	82	86.5	97
11-Mar	81	81	86	88	89	89	90	89	85	80	77	74	70	71	71	68	67	69	76	86	83	84	87	87	80.4	90
12-Mar	91	93	94	97	96	94	94	94	95	96	85	76	64	53	46	44	47	49	53	57	60	62	65	67	73.9	97
13-Mar	71	74	79	80	81	83	86	85	84	79	79	83	87	88	89	88	85	84	86	87	88	89	91	92	84.1	92
14-Mar	90	89	86	85	85	84	86	87	84	80	79	80	78	76	74	76	80	81	83	84	85	86	88	88	83.2	90
15-Mar	89	91	91	91	90	90	89	89	86	82	77	71	65	61	57	57	59	63	67	69	71	74	76	78	76.3	91
16-Mar	81	85	86	86	86	88	87	86	84	83	79	80	83	86	82	79	81	85	87	89	90	86	86	86	84.6	90
17-Mar	87	88	91	91	89	89	87	88	84	73	65	71	59	60	61	58	60	64	65	67	69	74	74	79	74.6	91
18-Mar	79	77	79	80	78	78	78	77	76	72	68	61	59	60	61	61	59	56	61	70	73	81	86	90	71.6	90
19-Mar	91	91	92	92	91	91	90	89	87	82	83	76	67	49	47	46	49	53	61	66	67	67	69	69	73.5	92
20-Mar	69	63	62	63	63	73	77	76	67	59	55	51	46	43	44	42	38	37	43	47	51	63	73	69	57.2	77
21-Mar	79	83	83	81	79	71	74	75	65	62	59	54	50	47	45	44	43	47	50	47	41	38	36	37	57.8	83
22-Mar	39	39	40	42	43	48	49	50	46	45	44	44	45	46	48	46	49	49	59	73	80	85	87	87	53.5	87
23-Mar	85	84	85	88	92	94	93	91	84	78	73	70	68	66	63	61	61	62	55	48	42	45	46	48	70.1	94
24-Mar	56	61	69	65	73	78	76	70	57	44	29	21	20	19	19	18	19	20	19	22	25	34	40	44	41.5	78
25-Mar	50	58	63	61	58	59	62	62	56	53	50	49	54	57	55	55	61	63	65	72	77	80	83	83	62.0	83
26-Mar	82	83	85	86	84	83	81	74	62	62	61	56	59	56	47	45	42	41	44	50	58	58	58	61	63.2	86
27-Mar	66	69	72	75	78	84	82	73	65	61	54	48	41	39	37	35	38	40	43	45	48	52	57	58	56.5	84
28-Mar	61	66	70	71	73	75	75	72	66	60	58	54	47	39	38	37	29	23	26	31	43	53	53	54	53.0	75
29-Mar	52	53	53	56	58	67	75	69	63	57	49	39	32	27	26	26	24	25	32	39	45	48	56	54	46.8	75
30-Mar	59	61	68	72	78	82	82	77	59	46	48	48	38	37	37	37	43	57	66	68	64	65	63	63	59.1	82
31-Mar	63	66	65	66	66	66	67	64	60	54	51	51	49	47	47	49	50	51	53	52	50	49	54	58	56.2	67
	74.1	75.7	77.6	78.4	78.7	80.2	81.1	79.9	75.6	71.4	67.8	64.9	61.8	59.5	58.3	57.2	57.4	58.7	61.5	64.7	66.5	68.7	70.8	71.9	Diurnal Average	
	92	93	94	97	96	94	94	94	95	97	93	87	87	88	89	88	85	85	87	91	95	95	94	93	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 20m (RH20m) - %

Lower Camp Met Tower - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	6	0.81	0.81
20 - 40	39	5.24	6.05
40 - 60	166	22.31	28.36
60 - 80	268	36.02	64.38
80 - 100	265	35.62	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 2016

Maximum Value: 96 % on Mar 10 10:00

Maximum Daily Average: 87.1 % on Mar 9

Minimum Value: 18 % on Mar 24 19:00

Minimum Daily Average: 38.8 % on Mar 24

Maximum Diurnal Average: 79.4 % at hour 7

Minimum Diurnal Average: 57.0 % at hour 17

Monthly Average: 68.3 %

Percentiles: $P_1 = 21$ $P_{10} = 44$ $Q_1 = 56$ Median = 70 $Q_3 = 83$ $P_{90} = 88$ $P_{99} = 94$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

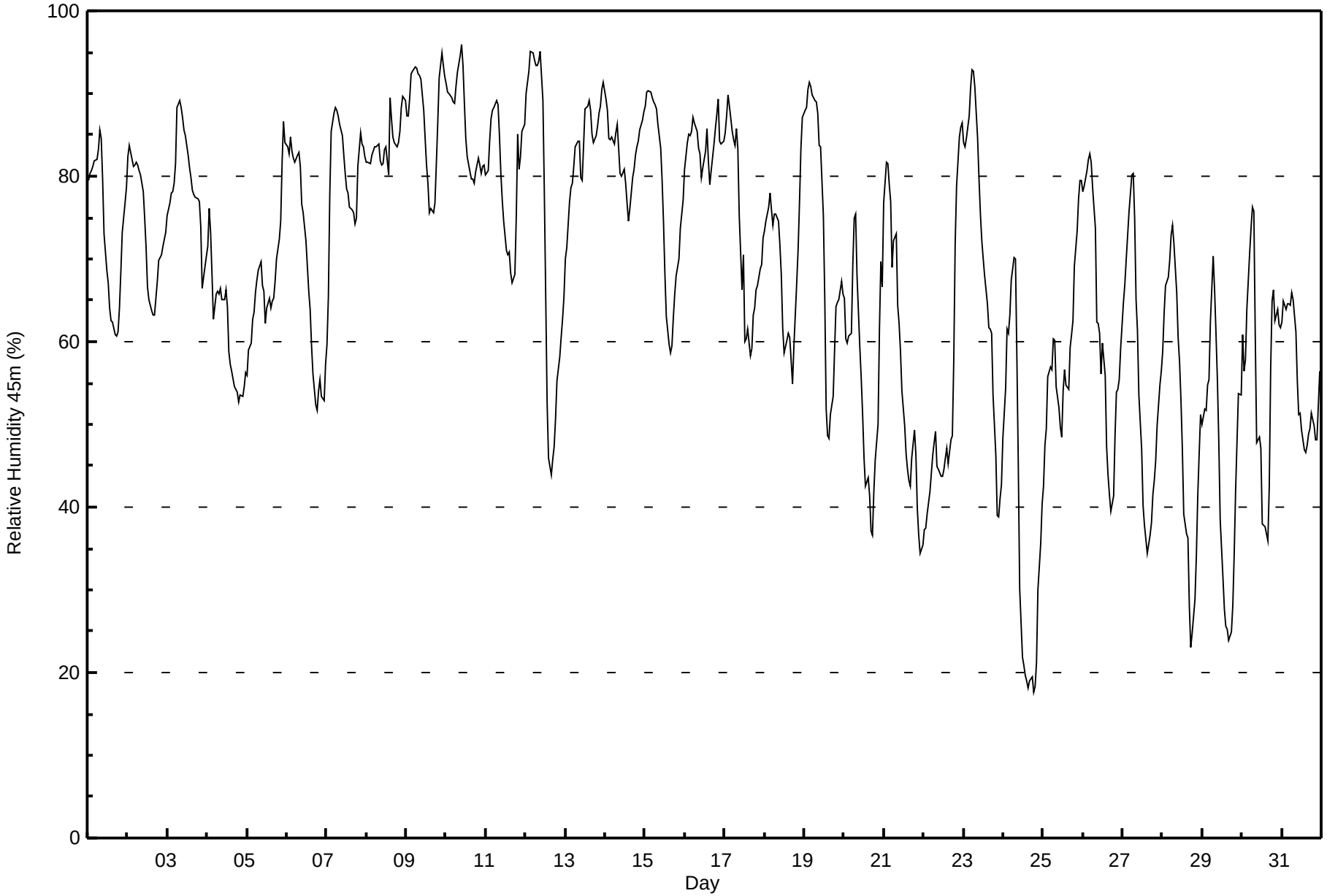
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	80	80	81	81	82	82	83	86	85	80	73	69	67	64	63	62	61	61	61	64	68	73	77	79	73.3	86
2-Mar	82	84	83	81	81	82	81	81	80	78	75	71	67	65	64	63	63	65	67	70	71	72	72	73	73.8	84
3-Mar	75	77	78	78	79	82	88	89	88	87	86	85	82	81	80	78	78	77	77	77	74	66	68	70	79.3	89
4-Mar	71	76	73	68	63	66	66	66	67	65	65	66	64	59	57	56	55	54	54	53	54	53	55	56	61.8	76
5-Mar	56	59	60	63	64	66	67	69	70	67	66	62	64	65	64	65	65	67	70	72	75	82	87	84	67.8	87
6-Mar	84	83	85	83	82	82	83	83	81	77	76	72	69	66	64	60	56	52	52	54	55	53	53	57	69.2	85
7-Mar	60	65	78	85	88	88	88	87	86	85	83	80	78	78	76	76	76	74	75	81	85	84	84	82	80.1	88
8-Mar	82	82	82	83	83	84	84	84	82	81	82	83	84	80	90	87	85	84	84	84	85	88	90	89	84.1	90
9-Mar	87	87	90	92	93	93	93	92	92	92	88	85	81	79	76	76	76	77	81	87	92	95	93	92	87.1	95
10-Mar	91	90	90	89	89	89	91	93	95	96	93	89	85	82	80	80	80	79	80	82	81	80	81	81	86.1	96
11-Mar	80	81	84	87	88	88	89	89	85	80	77	75	71	70	71	68	67	68	75	85	81	82	86	86	79.8	89
12-Mar	90	91	93	95	95	94	93	93	94	95	89	78	65	53	46	44	46	47	51	55	58	61	63	65	73.1	95
13-Mar	70	71	77	79	79	81	84	84	84	80	79	84	88	88	89	88	85	84	85	86	88	88	90	91	83.5	91
14-Mar	89	88	85	84	85	84	85	86	83	80	80	81	79	77	75	76	80	81	83	84	84	86	87	88	82.9	89
15-Mar	88	90	90	90	89	89	89	88	86	83	79	74	68	63	60	59	59	63	66	68	70	74	75	77	76.6	90
16-Mar	81	84	85	85	85	87	86	85	83	83	80	81	83	86	82	79	81	84	86	87	89	84	84	84	84.0	89
17-Mar	85	87	90	88	85	84	84	86	83	75	66	70	60	60	62	58	59	63	64	66	67	69	69	73	73.2	90
18-Mar	73	75	76	78	76	74	75	75	75	72	68	62	59	60	61	61	58	55	59	67	71	77	83	87	69.9	87
19-Mar	88	88	91	91	91	90	89	89	88	84	84	75	65	52	49	48	51	53	59	64	65	65	67	66	73.0	91
20-Mar	65	60	60	61	61	69	75	75	68	59	56	51	46	43	43	41	37	37	42	46	50	62	70	67	56.0	75
21-Mar	77	82	82	79	77	69	72	73	64	62	59	54	50	46	45	43	43	46	49	46	40	37	34	35	56.8	82
22-Mar	37	37	39	40	42	46	48	49	45	45	44	44	45	46	47	45	48	49	58	72	79	85	86	86	52.6	86
23-Mar	84	84	85	87	91	93	93	91	85	80	76	72	70	68	65	62	61	61	54	46	39	39	41	43	69.5	93
24-Mar	48	54	61	61	63	67	70	70	58	45	30	22	21	20	19	18	19	20	18	18	21	30	36	40	38.8	70
25-Mar	43	47	50	56	57	57	60	60	55	52	50	48	54	57	55	54	59	61	62	69	73	77	79	79	59.0	79
26-Mar	78	79	81	82	83	82	79	74	62	62	61	56	60	56	47	44	42	40	41	49	54	54	55	59	61.6	83
27-Mar	65	67	70	73	76	80	80	75	65	61	53	47	40	38	36	34	37	38	42	43	46	50	55	56	55.3	80
28-Mar	59	63	67	68	70	73	74	72	66	61	58	53	47	39	37	36	28	23	25	29	34	41	47	51	50.8	74
29-Mar	50	52	52	55	55	62	70	66	61	55	48	39	31	28	26	25	24	25	28	34	42	48	54	54	45.2	70
30-Mar	61	56	58	64	71	74	76	76	61	48	48	47	38	38	38	36	42	57	65	66	63	64	62	62	57.1	76
31-Mar	62	65	64	65	64	64	66	65	61	55	51	51	49	47	47	47	49	49	51	50	48	48	52	56	55.4	66
	72.3	73.7	75.4	76.5	77.0	78.1	79.4	79.1	75.4	71.8	68.5	65.4	62.3	59.8	58.4	57.2	57.0	57.9	60.1	63.1	64.6	66.7	68.9	70.1	Diurnal Average	
	91	91	93	95	95	94	93	93	95	96	93	89	88	88	90	88	85	84	86	87	92	95	93	92	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 45m (RH45m) - %

Lower Camp Met Tower - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	7	0.94	0.94
20 - 40	44	5.91	6.85
40 - 60	170	22.85	29.70
60 - 80	271	36.42	66.13
80 - 100	252	33.87	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 2016

Maximum Value: 96 % on Mar 10 10:00

Maximum Daily Average: 89.9 % on Mar 9

Minimum Value: 17 % on Mar 24 20:00

Minimum Daily Average: 32.1 % on Mar 24

Maximum Diurnal Average: 78.1 % at hour 8

Minimum Diurnal Average: 58.6 % at hour 17

Monthly Average: 68.5 %

Percentiles: $P_1 = 20$ $P_{10} = 43$ $Q_1 = 55$ Median = 70 $Q_3 = 85$ $P_{90} = 90$ $P_{99} = 95$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

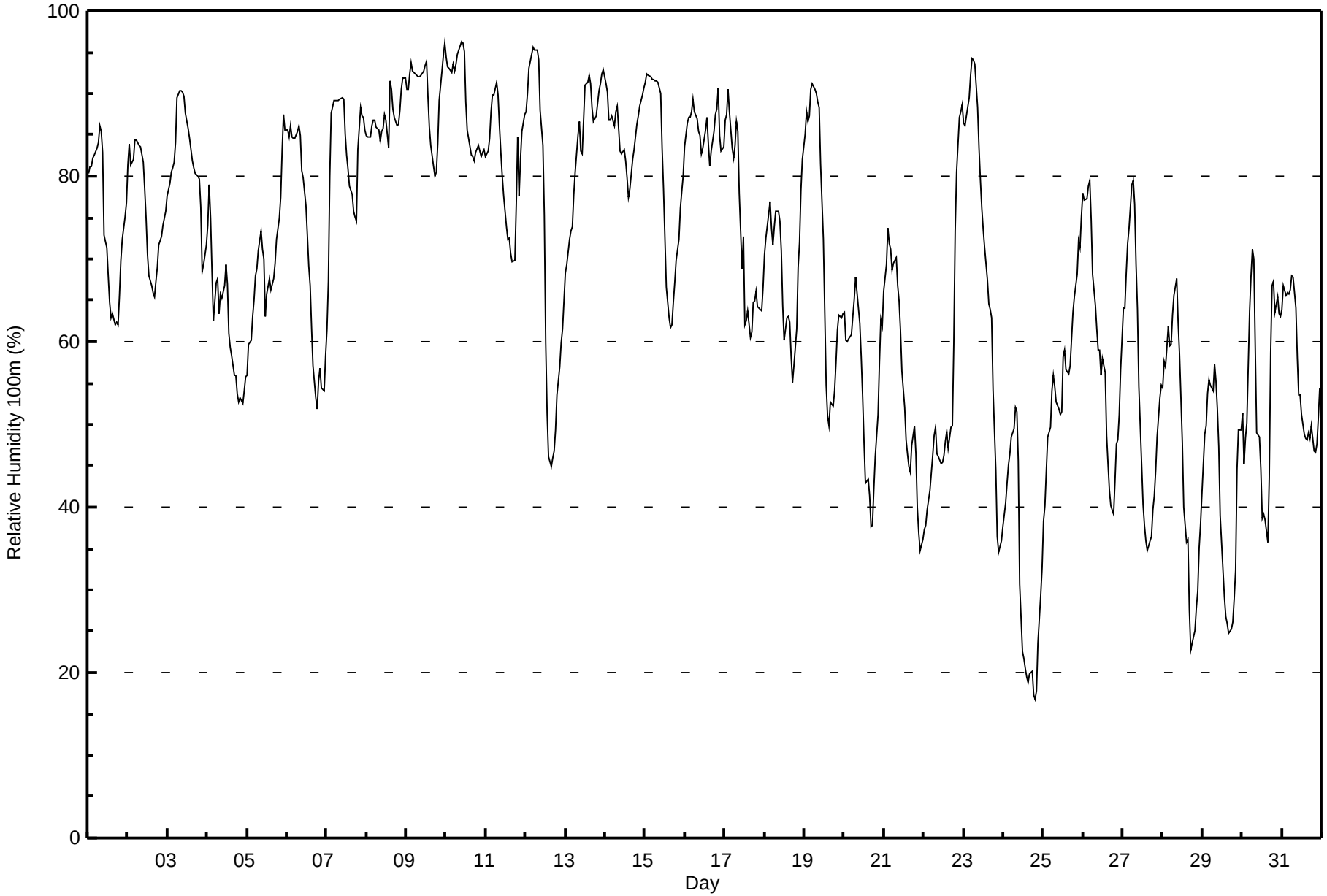
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	80	81	81	82	83	83	84	86	85	83	73	71	68	65	63	63	62	62	62	66	70	72	75	77	74.1	86
2-Mar	81	84	81	82	84	84	84	84	84	82	78	75	70	68	67	66	65	67	69	72	73	74	75	76	76.1	84
3-Mar	78	79	81	81	82	84	90	90	90	90	90	88	86	85	83	82	81	80	80	80	76	68	69	72	81.8	90
4-Mar	74	79	75	68	63	67	68	63	66	65	67	69	67	61	59	58	56	56	54	53	53	52	54	56	62.7	79
5-Mar	56	60	60	63	65	68	69	71	73	71	70	63	66	68	66	67	68	69	72	75	77	83	87	86	69.7	87
6-Mar	86	85	86	85	85	85	85	86	85	81	80	76	73	69	67	62	57	53	52	55	57	54	54	58	71.5	86
7-Mar	62	67	80	88	89	89	89	89	89	90	89	85	83	81	79	78	76	75	75	83	88	87	87	86	82.6	90
8-Mar	85	85	85	86	87	87	86	86	84	85	86	87	87	83	92	90	88	87	86	86	88	91	92	92	87.1	92
9-Mar	90	91	92	94	93	92	92	92	92	92	93	93	94	90	86	84	81	80	80	84	89	93	95	96	89.9	96
10-Mar	94	93	93	92	94	93	93	95	96	96	96	95	89	86	84	83	82	82	83	84	83	82	83	83	88.9	96
11-Mar	82	83	85	88	90	90	91	90	86	83	80	78	74	72	73	71	70	70	77	85	78	82	85	88	81.2	91
12-Mar	88	90	93	94	96	95	95	95	94	88	84	75	60	51	46	45	46	47	49	53	57	60	61	65	72.0	96
13-Mar	68	69	72	73	74	78	80	85	87	83	83	87	91	91	92	91	88	87	87	89	90	91	92	93	84.3	93
14-Mar	91	90	87	87	87	86	88	88	86	83	83	83	82	80	77	79	82	83	85	86	87	88	90	91	85.4	91
15-Mar	91	92	92	92	92	92	92	92	91	90	83	78	73	67	63	62	62	65	67	70	72	76	78	80	79.7	92
16-Mar	84	87	87	87	88	89	88	87	85	85	83	83	86	87	84	81	83	86	87	88	91	85	83	84	85.7	91
17-Mar	87	87	90	88	83	82	84	87	85	78	69	73	62	63	64	60	61	65	65	66	64	64	64	67	73.2	90
18-Mar	70	73	75	77	74	72	74	76	76	75	71	64	60	63	63	62	58	55	57	61	69	72	78	82	69.1	82
19-Mar	85	88	87	87	91	91	91	90	89	88	81	72	64	55	51	50	53	52	54	57	61	63	63	63	71.9	91
20-Mar	63	60	60	60	61	63	65	68	66	62	58	53	48	43	43	41	38	38	42	46	51	58	63	62	54.7	68
21-Mar	66	69	74	72	71	69	69	70	67	65	61	56	52	48	46	45	44	47	50	46	40	37	35	36	55.7	74
22-Mar	37	38	40	41	42	46	49	50	46	46	45	45	46	48	49	47	50	50	60	73	81	87	88	89	53.8	89
23-Mar	86	86	87	89	92	94	94	93	88	83	79	76	74	71	68	65	64	63	54	44	36	35	35	36	70.6	94
24-Mar	38	41	43	45	46	49	50	52	52	46	31	23	22	21	20	19	20	20	17	17	18	24	29	33	32.1	52
25-Mar	38	40	44	49	50	54	56	55	53	52	51	51	58	59	57	56	57	60	63	65	68	72	71	75	56.5	75
26-Mar	78	77	77	79	80	75	68	64	62	59	59	56	58	56	49	45	42	40	39	43	48	48	51	57	58.7	80
27-Mar	64	64	68	72	74	79	80	77	69	64	55	45	40	38	36	35	36	36	40	41	44	48	53	55	54.7	80
28-Mar	54	58	57	62	59	60	63	66	68	62	59	53	48	40	36	36	28	23	24	25	28	30	35	38	46.2	68
29-Mar	42	49	50	54	55	55	54	57	55	52	47	39	32	29	27	26	25	25	26	29	32	45	49	49	41.8	57
30-Mar	51	45	48	50	64	68	71	70	59	49	48	45	39	39	38	36	43	59	67	67	64	65	63	63	54.7	71
31-Mar	64	67	66	66	66	66	68	68	64	58	54	54	51	49	48	48	49	48	50	47	47	48	51	54	56.2	68
	71.5	72.8	74.1	75.3	76.0	76.9	77.7	78.1	76.5	73.8	70.5	67.6	64.5	62.1	60.5	59.1	58.6	59.1	60.4	62.5	63.9	65.7	67.4	69.0	Diurnal Average	
	94	93	93	94	96	95	95	95	96	96	96	95	94	91	92	91	88	87	87	89	91	93	95	96	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 100m (RH100m) - %

Lower Camp Met Tower - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	6	0.81	0.81
20 - 40	55	7.39	8.20
40 - 60	172	23.12	31.32
60 - 80	240	32.26	63.58
80 - 100	271	36.42	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 2016

Maximum Value: 96 % on Mar 10 10:00

Maximum Daily Average: 91.3 % on Mar 10

Minimum Value: 16 % on Mar 24 21:00

Minimum Daily Average: 29.7 % on Mar 24

Maximum Diurnal Average: 77.0 % at hour 7

Minimum Diurnal Average: 59.7 % at hour 17

Monthly Average: 68.9 %

Percentiles: $P_1 = 21$ $P_{10} = 42$ $Q_1 = 55$ Median = 70 $Q_3 = 86$ $P_{90} = 91$ $P_{99} = 95$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

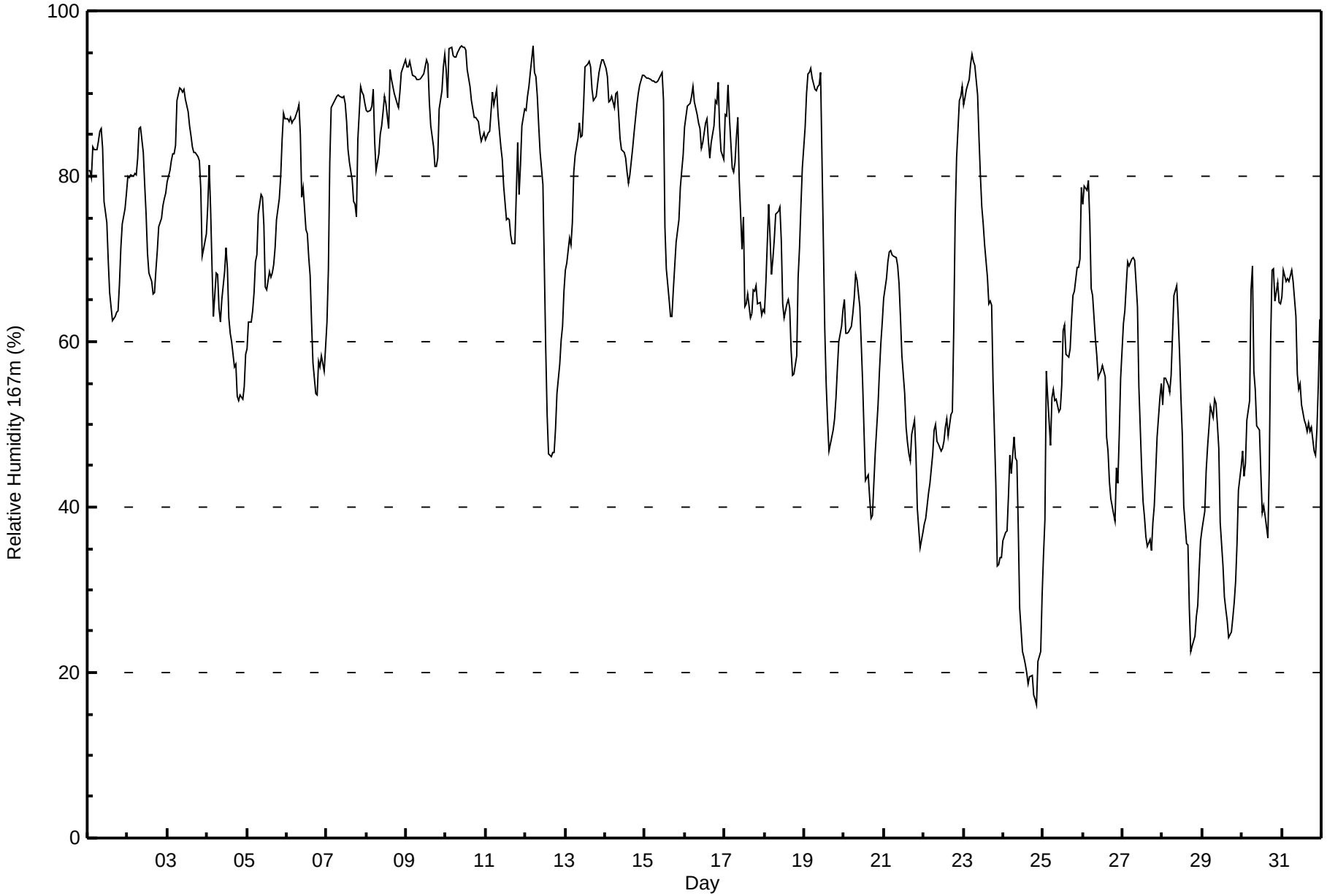
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	81	81	80	84	83	83	84	85	86	83	77	74	70	66	64	63	63	64	64	67	71	74	76	78	75.0	86
2-Mar	80	80	80	80	80	80	82	86	86	83	79	75	71	68	67	66	66	69	71	74	75	76	77	78	76.2	86
3-Mar	79	81	82	83	83	84	89	91	90	90	90	89	88	86	85	84	83	83	82	82	79	70	71	73	83.2	91
4-Mar	76	81	76	69	63	68	68	64	62	65	68	71	69	63	61	60	57	57	53	53	54	53	55	58	63.6	81
5-Mar	59	62	62	64	66	70	70	75	78	78	74	67	66	69	68	68	69	71	75	77	80	84	88	87	72.0	88
6-Mar	87	87	87	86	87	87	88	89	85	78	79	74	73	70	68	62	58	54	53	58	57	58	56	59	72.5	89
7-Mar	62	69	82	88	89	89	90	90	90	90	90	89	87	83	82	79	77	77	75	84	91	90	90	89	84.2	91
8-Mar	88	88	88	88	91	84	81	83	85	86	88	90	89	86	93	92	91	90	89	88	90	93	93	94	88.6	94
9-Mar	93	93	94	93	92	92	92	92	92	92	92	93	94	94	89	86	84	81	81	82	88	90	93	95	90.3	95
10-Mar	93	90	95	96	95	94	94	95	96	96	96	96	95	93	91	89	88	87	87	87	85	84	85	85	91.3	96
11-Mar	84	85	85	88	90	89	91	87	85	83	82	79	75	75	75	73	72	72	78	84	78	81	86	88	81.9	91
12-Mar	88	90	91	93	96	93	92	90	86	83	79	69	59	51	46	46	47	47	49	54	57	60	62	66	70.5	96
13-Mar	69	69	73	72	74	80	83	85	86	85	85	89	93	93	94	93	91	89	90	91	93	93	94	94	85.7	94
14-Mar	93	92	89	89	90	88	90	90	87	85	83	83	82	81	79	80	83	85	87	89	90	91	92	92	87.2	93
15-Mar	92	92	92	92	92	92	91	91	92	92	92	89	74	69	65	63	63	66	69	72	75	79	81	83	81.5	92
16-Mar	86	88	89	89	90	91	89	88	87	86	83	84	86	87	84	82	84	86	89	89	91	86	83	82	86.6	91
17-Mar	88	87	91	87	81	80	82	85	87	80	71	75	64	65	66	63	63	66	66	67	65	65	63	64	73.8	91
18-Mar	64	67	77	73	68	70	72	75	76	76	72	65	63	65	65	64	59	56	56	58	68	71	77	81	68.2	81
19-Mar	86	90	92	93	93	92	91	90	91	91	93	72	61	55	51	47	48	49	51	53	57	60	62	64	72.1	93
20-Mar	65	61	61	61	62	63	65	68	67	64	60	55	49	43	44	41	39	39	43	47	52	56	60	62	55.4	68
21-Mar	65	68	70	71	71	70	70	70	69	67	63	58	54	50	48	46	46	49	50	46	40	37	35	37	56.3	71
22-Mar	38	39	40	42	43	47	49	50	48	48	47	47	48	50	51	49	51	52	62	75	82	89	90	91	55.2	91
23-Mar	89	89	90	92	94	95	94	93	90	85	80	76	74	72	68	65	65	64	55	43	33	33	34	34	71.1	95
24-Mar	36	37	37	41	46	44	48	46	46	37	28	23	22	21	20	19	19	20	17	17	16	21	23	29	29.7	48
25-Mar	34	38	56	53	47	53	54	53	53	52	52	55	61	62	58	58	59	63	66	66	69	69	70	79	57.6	79
26-Mar	77	79	78	79	75	66	66	60	58	56	56	56	57	56	48	47	43	41	39	38	45	43	49	56	57.0	79
27-Mar	62	64	67	70	69	70	70	70	67	64	55	45	41	39	36	35	36	35	38	40	44	49	53	55	53.1	70
28-Mar	52	56	56	55	54	56	61	66	67	63	59	53	49	40	36	35	28	23	23	24	27	28	32	36	44.9	67
29-Mar	37	40	44	47	50	52	51	53	53	50	47	38	33	29	28	26	24	25	27	29	31	36	42	45	39.0	53
30-Mar	47	44	45	50	53	66	69	56	54	50	49	44	39	40	39	36	45	60	69	69	65	67	65	65	53.6	69
31-Mar	65	69	67	68	67	68	69	67	63	56	54	55	52	50	50	49	50	49	50	47	46	49	55	63	57.5	69
	71.5	72.7	74.8	75.3	75.2	76.1	77.0	76.9	76.2	73.9	71.7	68.6	65.8	63.5	61.9	60.2	59.7	60.3	61.4	62.9	64.3	65.8	67.4	69.7	Diurnal Average	
	93	93	95	96	96	95	94	95	96	96	96	96	95	94	94	93	91	90	90	91	93	93	94	95	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 167m (RH167m) - %

Lower Camp Met Tower - March 2016



Relative Humidity 167m (RH167m) - %
Lower Camp Met Tower - March 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	6	0.81	0.81
20 - 40	60	8.06	8.87
40 - 60	166	22.31	31.18
60 - 80	233	31.32	62.50
80 - 100	279	37.50	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 2016

Maximum Speed: 18 km/h on Mar 30 16:00

Maximum Daily Speed Average: 10.8 km/h on Mar 14

Minimum Speed Value: 0 km/h on Mar 30 06:00

Minimum Daily Speed Average: 0.4 km/h on Mar 31

Maximum Diurnal Speed Average: 2.3 km/h at hour 20

Minimum Diurnal Speed Average: 0.4 km/h at hour 11

Monthly Average Velocity: 1.4 km/h 16.8 deg

Percentiles: $P_1 = 1$ $P_{10} = 2$ $Q_1 = 3$ Median = 6 $Q_3 = 9$ $P_{90} = 11$ $P_{99} = 15$

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	SSE9	SSE8	SE6	SE3	SE2	SSE1	SSE3	SSE4	SSE3	SSE8	SSE5	S4	WSW5	WSW5	WSW5	W3	NW2	N5	N5	N6	NNW2	NNW2	N2	NNW4	S1.3	SSE9
2-Mar	NW2	N2	NNW3	N4	N4	NNW4	NNW5	NNW5	N6	N6	N5	N5	N5	N6	N6	N7	N6	N6	N6	NNW5	N7	N6	N5	N5	N5.0	N7
3-Mar	NNW5	NNW4	NNW4	NNW5	NNW4	N3	N4	NNW5	NNW7	NNW5	NNW5	N8	N10	N10	N11	NNE11	NNE9	N10	N12	N10	N9	N6	N4	N2	N6.6	N12
4-Mar	NNW1	NNE3	NNW3	NNW3	N4	N2	WSW1	NE1	SE2	SSE6	SSE9	SSE8	SSE13	SSE13	SSE13	SE11	SE14	SE11	SE12	SE11	SSE15	SSE16	SE16	SE15	SE7.0	SE16
5-Mar	SSE15	SSE13	S10	S7	SSE4	SSE7	SSE4	SSE7	SSE11	SSE8	SSE8	SW3	N6	NNE14	NNE9	NNE10	NNE12	N11	N12	NNE12	NNE10	N9	N8	N6	ENE2.6	SSE15
6-Mar	N6	N7	N7	N7	N7	NNE5	N6	N8	N9	N9	NNE8	N8	NNW7	NNW6	NNW6	NNW6	NNW6	N6	N6	NNW4	N4	N7	N8	N7	N6.6	N9
7-Mar	N9	N9	NNW6	N5	NNW4	NNW4	NNW3	NNW5	NNW5	NNW5	N4	NNW3	NNW2	SSW2	SSW1	SSW2	WSW5	WSW8	WSW8	NW7	NNW8	NNE7	N6	NNW4	NNW3.7	N9
8-Mar	NNW3	NW2	NE1	N1	NW2	N2	N2	NNW1	NNW2	N1	WNW2	S2	SSE5	S1	N6	N4	NNW4	N3	NW2	NNW3	NW3	NNW3	N3	N5	NNW1.9	N6
9-Mar	N6	N5	N6	N6	NNW5	NNW5	NNW4	NNW3	NNW3	NNW4	NNW3	WSW4	SW4	SSW2	ESE2	SSE3	ESE2	NNE2	N2	NW2	NNW2	W2	WNW2	WSW2	NNW2.1	N6
10-Mar	WNW1	WSW1	NW1	NW1	NNW1	NNW1	NW1	N1	SSE3	SE11	SE13	SE15	SE15	SE14	SE13	SE14	SE13	SE12	SE11	SE11	SE12	SE12	SE8	SSE7	SE7.3	SE15
11-Mar	S6	SW3	WSW3	W2	WNW4	WNW4	N3	WNW6	W5	WNW5	NNW7	N5	NNW2	SSW2	WSW6	WNW5	NNW5	W5	WSW4	NNE2	SSE2	S4	SE4	SSE4	W2.0	NNW7
12-Mar	SE6	SE6	ESE1	WSW2	SE4	NNW3	NNW3	NNW3	NNW2	NNW3	N3	N6	N3	SE5	SSE6	SE9	SE11	SE14	SE9	SE6	SE10	SSE12	SE11	SE8	SE4.0	SE14
13-Mar	ESE3	NNE3	N5	NNW3	NNW4	NNW5	N3	NNW4	NNW4	NNW5	NNW7	N10	NNW9	NNW11	NNW10	NNW10	NNW12	NNW12	NNW10	NNW13	NNW13	NNW13	NNW11	NNW10	NNW7.6	NNW13
14-Mar	NNW10	NNW8	N11	N12	N10	N11	N13	N12	N13	N13	N12	N11	N12	N13	N13	N12	N12	N11	N10	N9	N10	N9	N7	NNW6	N10.8	N13
15-Mar	N4	N4	NNW3	N3	NNW3	NNW4	NNW4	NNW5	NNW5	NNW5	NW6	NNW6	NNW6	NW8	NW9	NNW9	N8	N9	N7	N7	N9	N9	N8	N9	NNW6.2	NW9
16-Mar	NNW9	NNW9	NNW10	NNW10	N9	N8	N10	N9	N10	N9	N10	N11	N9	N9	N12	N12	N9	NNW8	NW7	NW6	NNE4	N4	NW5	NNW3	N8.3	N12
17-Mar	WNW2	WNW3	NE1	NNW3	NNW5	NNW4	NNW5	NW2	W4	NW3	NW6	WNW7	NNW10	NW12	NW9	NNW8	NNW8	NW8	NNW5	NW5	NW2	W1	SW2	SSE4	NW4.2	NW12
18-Mar	SE3	SSE3	SE4	SE2	W2	SSE6	SSE4	SSE3	S1	NNE3	NE2	ESE3	SSW4	SSE9	SSE11	SSE11	SSE14	SSE11	SSE9	SSE7	S2	NNW3	NNW4	NNW2	SSE3.8	SSE14
19-Mar	NNW2	NNW2	NW2	WNW3	NNW3	NNW3	NNW2	NNW2	NNW2	NNW2	WSW7	WSW6	W5	NNW6	NW6	NNW6	N6	N5	N6	N8	NNW5	NNW5	NW7	NW6	NNW3.8	N8
20-Mar	NW5	NE4	NNE2	E2	NNE2	N6	N7	NW2	NW2	ESE3	ESE7	E8	ESE7	WNW2	W3	SW2	SE8	ESE10	E10	E7	E6	NNE5	N4	NE4	ENE2.7	ESE10
21-Mar	N8	N10	N8	N7	N6	ENE5	NNE4	N4	ESE9	SE7	SE5	SE6	SE10	SE11	ESE9	SE10	ESE11	ESE11	ESE9	ESE9	ESE8	SE8	ESE8	ESE5	E5.2	ESE11
22-Mar	SE8	SE12	SE13	SE10	SE7	SSE3	SE3	SSE3	SE8	SSE8	SSE7	SSE6	SSE8	SSE6	SSE5	SSE4	SE8	SE7	SSE10	SSE7	S5	SSE3	SSE6	SSE6	SSE6.7	SE13
23-Mar	ESE3	SSE5	S7	SSE5	SSW1	N3	NNW4	NNW5	NNW9	N10	N9	N8	N10	N10	NNE9	N10	NNE8	N7	N8	N6	N6	N6	NNW2	NNW4	N4.7	N10
24-Mar	NNW2	NNW4	NNW2	N4	NNW4	NW4	NNW4	NW3	NNW3	N4	N6	NNW8	NNW9	NW10	NNW8	N8	N7	N7	NNE5	N4	NNW3	NNW4	NNW4	NNW4	NNW4.8	NW10
25-Mar	NW3	NNW1	SSW1	NNW1	SSE1	S3	SSE3	SE3	SSE8	SSE6	SSE7	SE5	SSE7	SSE6	SSE5	SSE6	SSW4	WSW4	W2	WSW1	N1	NNW3	NNW3	N3	SSE2.0	SSE8
26-Mar	NNW3	NNW2	NNW3	NW4	NW3	NW3	NNW3	N4	NNW4	W8	WSW10	WSW8	W11	WSW8	WSW6	S5	SSE8	SSE10	SSE10	SSE9	SE7	SE7	SSE8	SSE9	SSW2.7	W11
27-Mar	SSE4	SE8	SE4	SE4	SE1	S1	NW1	NNW2	SSE2	SSE4	SSE7	SSW4	SSE8	SSE11	SSE11	SE14	SSE13	SSE12	SSE10	SSE11	SSE16	SE16	SE13	SSE8	SSE7.4	SSE16
28-Mar	SSE12	SSE6	SSE7	SSE10	SSE10	SE9	SE7	SE10	SE5	SE8	SSE13	SSE11	SSE8	WSW5	WNW13	NW14	WNW10	NW8	NW10	NW8	SSW1	SSW1	SW3	W4	S2.8	NW14
29-Mar	WNW4	WNW3	NW1	SW3	S4	SSE9	SSE9	SSE10	SSE11	SSE12	SSE8	SSW3	SW1	NNE3	S1	SSW2	NNW2	NNW4	W5	WSW2	WSW2	SSE1	W0	SSE2	S2.4	SSE12
30-Mar	WNW1	NNW1	NW2	NNW2	N1	ENE0	NW3	WNW2	N3	N5	W5	W7	NNW8	N18	N15	N18	N12	NNE13	NNE13	N15	N15	N16	NNE16	N15	N7.7	N18
31-Mar	NNE12	NNE10	N10	N9	N8	N6	N4	N6	N5	N5	WNW2	WSW8	WSW8	WSW4	SW2	SSE8	SE8	SSE8	SSE9	SSE8	S10	S10	SSE5	SE4	E0.4	NNE12
	NNE1.1	NNE1.3	N1.4	N1.6	N1.8	N1.6	N2.1	N1.9	NNE1.3	NE1.2	NE0.4	NNW0.7	NNW0.8	NNW1.6	N1.9	NNE2.1	NE2.1	NE2.1	NE1.6	NNE2.3	NE1.6	NE1.7	NNE1.5	NNE1.3	Diurnal Average	
	SSE15	SSE13	SE13	N12	SSE10	N11	N13	N12	N13	N13	SE13	SE15	SE15	N18	N15	N18	SE14	SE14	NNE13	N15	SSE16	SE16	NNE16	N15	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 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 7 km/h on Mar 30 14:00

Minimum Value: 0 km/h on Mar 17 22:00

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:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

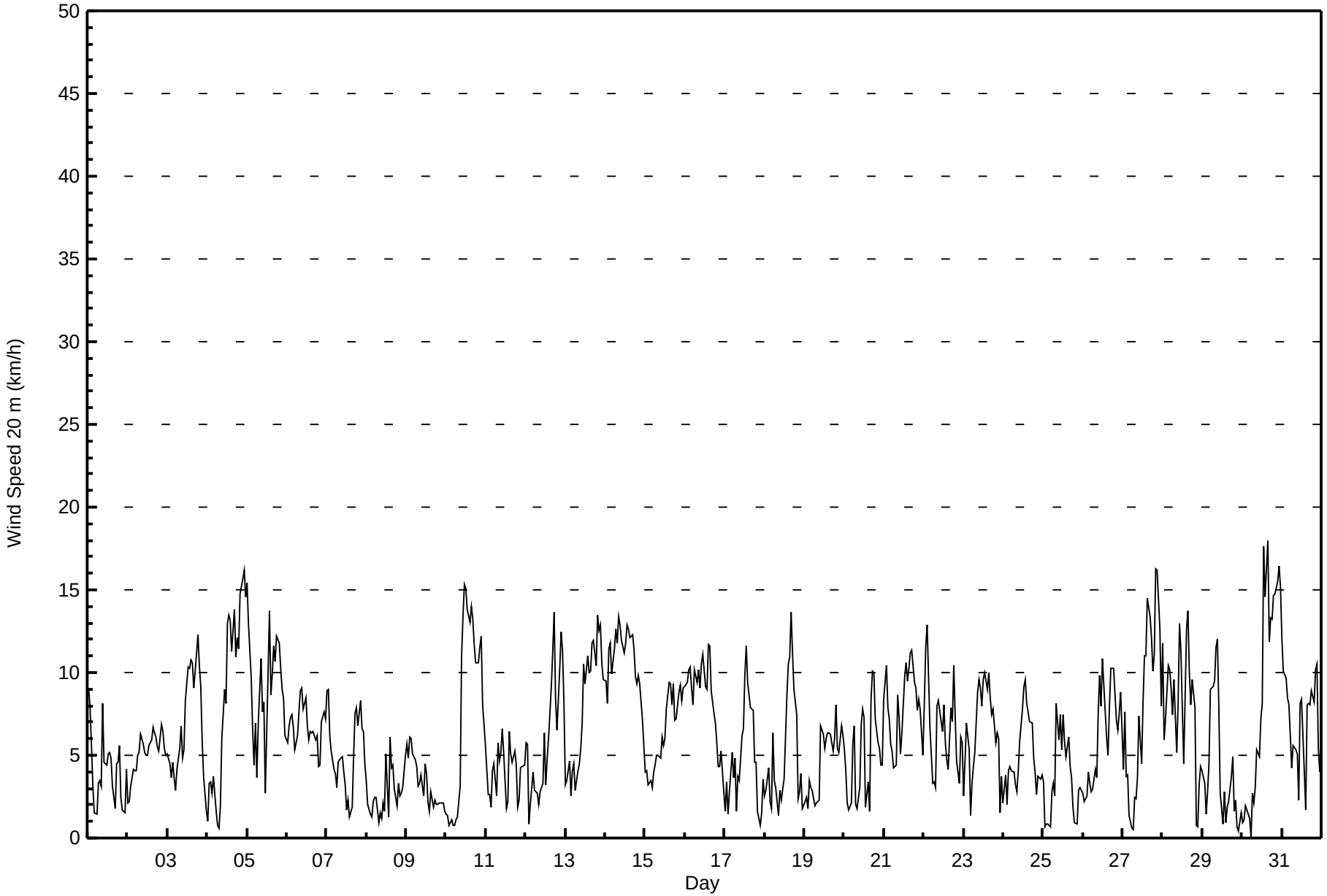
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	3	2	3	1	1	1	1	1	2	2	2	2	2	2	2	1	1	2	1	2	1	1	1	1	3
2-Mar	1	1	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	3	3	2	2	3
3-Mar	2	2	1	2	2	1	2	3	3	2	2	3	3	4	3	4	4	5	4	4	3	2	1	1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

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed 20 m (WS20m) - km/h

Lower Camp Met Tower - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	361	48.52	48.52
6 - 11	310	41.67	90.19
12 - 19	73	9.81	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

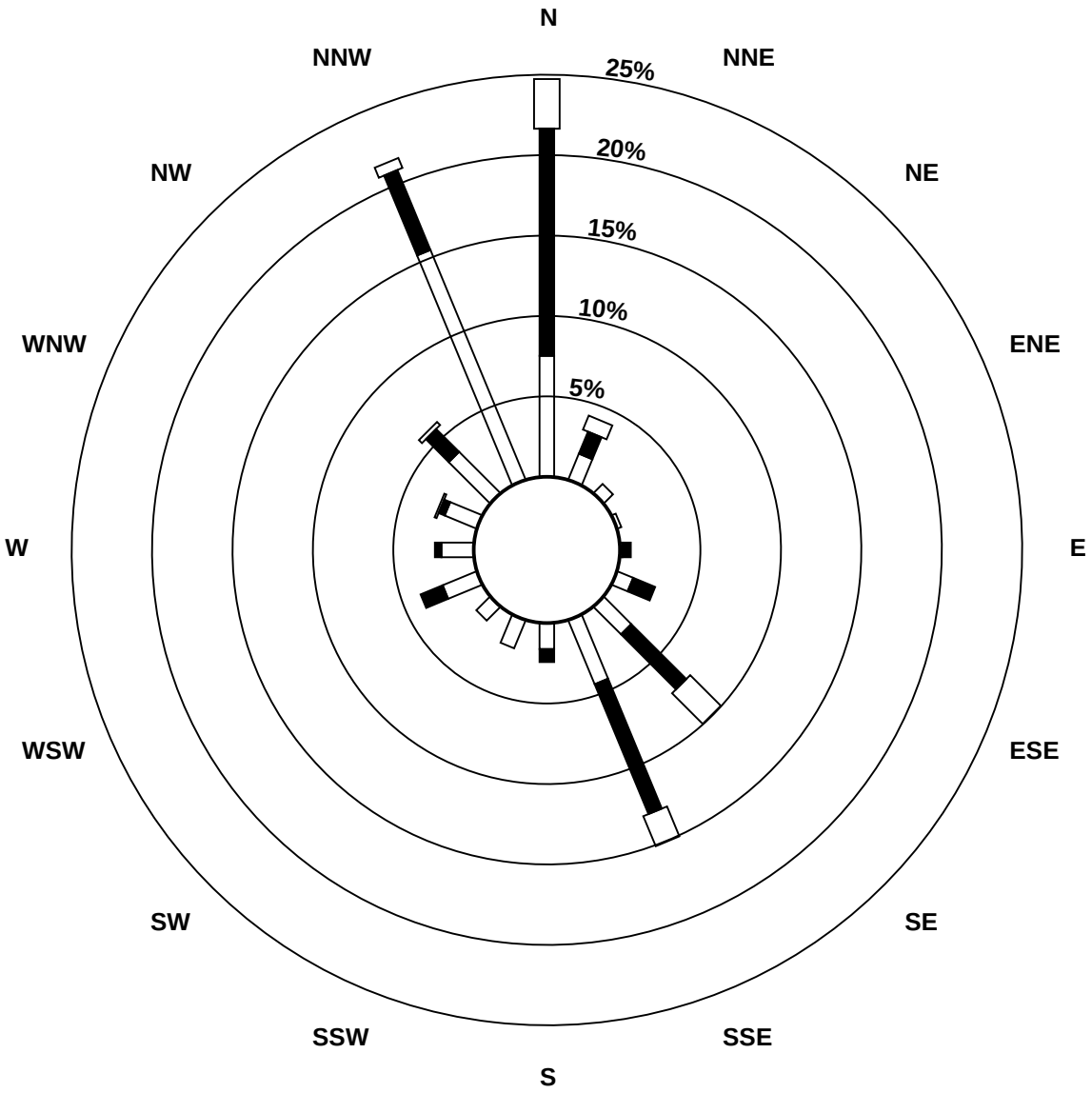
Total Number of Hours: 744

Wood Buffalo Environmental Association

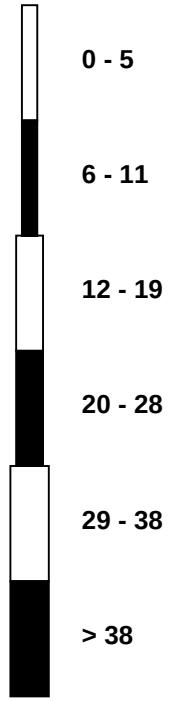
Wind Rose Mar 2016

Wind Speed 20 m (WS20m) - km/h

Lower Camp Met Tower (AMS 3)



Classes (km/h)



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 2016

Maximum Speed: 25 km/h on Mar 30 16:00

Maximum Daily Speed Average: 15.1 km/h on Mar 14

Minimum Speed Value: 0 km/h on Mar 27 08:00

Minimum Daily Speed Average: 1.2 km/h on Mar 31

Maximum Diurnal Speed Average: 3.6 km/h at hour 20

Minimum Diurnal Speed Average: 1.2 km/h at hour 11

Monthly Average Velocity: 2.4 km/h 14.5 deg

Percentiles: $P_1 = 1$ $P_{10} = 3$ $Q_1 = 5$ Median = 8 $Q_3 = 12$ $P_{90} = 16$ $P_{99} = 22$

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	SSE11	SE11	SE8	SE4	SE2	SSE3	SE5	SSE5	SSE5	SSE10	SSE5	S5	SW6	WSW6	WSW5	W3	NNW3	NNW6	N7	NNW8	NNW4	NNW4	N4	NNW7	SSE1.3	SSE11
2-Mar	NNW4	N5	NNW5	NNW6	NNW6	NNW6	NNW8	NNW7	NNW9	NNW8	NNW6	N6	N5	N7	N8	N9	N8	N9	NNW8	NNW8	NNW9	N10	N8	NNW7	NNW7.1	N10
3-Mar	NNW7	NNW7	NNW5	NNW6	NNW5	N4	N6	NNW8	NNW9	NNW7	NNW7	NNW11	N14	N14	N15	N17	N14	N14	N18	N16	N13	NNW8	N6	N3	N9.6	N18
4-Mar	N2	NNE5	NNW5	NNW4	N6	N3	NW0	ENE1	ESE3	SSE7	SE11	SE10	SE15	SSE15	SSE16	SE14	SE17	ESE14	SE17	SE15	SE20	SE23	SE22	SE20	SE9.2	SE23
5-Mar	SE22	SE18	SSE12	SSE8	SE6	SSE9	SE5	SE8	SE12	SE9	SE9	SW3	N10	N21	NNE14	N15	NNE17	N16	N18	N18	N16	N13	N12	NNW9	NE4.9	SE22
6-Mar	NNW8	NNW9	N11	N11	N10	N8	N10	N10	N12	N12	N11	N11	NNW9	NNW7	NW8	NNW9	NNW9	NNW8	NNW10	NNW7	N6	N10	NNW11	N10	N9.3	N12
7-Mar	N12	N12	NNW9	NNW8	NNW6	NNW6	NNW4	NNW7	NNW6	NNW6	N5	NNW4	NNW2	SSW2	SW1	S2	WSW8	WSW10	WSW11	NW9	NNW12	NNE10	N10	NNW6	NNW5.1	N12
8-Mar	NNW5	NW2	NNE2	N2	NW3	NNW3	N4	NNW1	NNW2	NNE1	WNW2	SSE2	SE6	SSE1	N9	NNW5	NNW6	N4	NNW3	NNW5	NNW4	NNW5	NNW4	N8	NNW2.8	N9
9-Mar	N8	NNW7	NNW9	NNW8	NNW7	NNW7	NNW6	NNW4	NNW4	NNW5	NNW3	WSW5	SW4	SSW2	E2	SE3	E2	NNE3	N5	N3	NNW4	NW2	W3	W2	NNW3.2	NNW9
10-Mar	W3	WSW2	WSW1	W1	W1	WSW1	SSE3	SE3	SE6	ESE15	SE17	SE20	SE19	SE18	SE16	SE18	ESE17	SE15	ESE14	ESE14	SE15	SE17	SE11	SSE8	SE9.9	ESE20
11-Mar	SSE6	SW3	WSW4	W3	W6	W7	NW4	W10	W8	W8	NNW9	N7	NNW2	SSW2	WSW9	WNW6	NNW6	W6	WSW6	NNE3	ESE3	S5	SE6	SE6	W2.9	W10
12-Mar	SE9	SE7	ESE2	SW2	SE6	NNW4	NW4	NW4	NNW3	NNW4	N5	N8	N4	SE7	SE8	SE12	SE15	SE19	SE12	SE10	SE14	SE18	SE17	SE13	SE5.8	SE19
13-Mar	ESE7	NE3	N7	NNW4	NNW6	NNW7	NNW6	NNW6	NNW7	NNW7	NNW9	NNW15	NNW13	NNW15	NNW14	NNW14	NNW17	NNW17	NNW15	NNW19	NNW17	NW16	NNW15	NNW13	NNW10.5	NNW19
14-Mar	NNW14	NNW12	N17	N17	N14	N16	N18	N16	N18	N18	N17	N16	N16	N18	N18	N17	N17	N16	N14	N13	NNW13	N13	NNW10	NNW8	N15.1	N18
15-Mar	NNW6	NNW5	NNW5	NNW5	NNW5	NNW6	NNW6	NNW7	NNW7	NNW6	NW7	NNW6	NNW6	WNW9	NW11	NNW12	NNW11	N12	N11	N11	N12	N13	NNW12	NNW13	NNW8.3	N13
16-Mar	NNW13	NNW14	NNW14	NNW14	NNW13	NNW11	N14	N13	N14	N14	N14	NNW15	N12	N13	N16	N16	N13	NNW10	NW9	WNW8	N7	N6	NW7	NNW4	NNW11.7	N16
17-Mar	W2	WNW5	NNE2	NW5	NW9	NW7	NW7	NW3	W4	NW5	NW8	W9	NNW13	NW14	NW12	NNW11	NW10	NW10	NW6	NW6	NW3	NW1	SW3	SSE4	NW5.9	NW14
18-Mar	SE3	SSE3	SE4	S2	WSW3	SSE6	S3	S3	SSW1	N3	NE3	E3	SSW4	SE9	SE12	SE14	SSE16	SSE14	SE12	SE12	SSE3	NW3	NNW6	NNW2	SSE4.3	SSE16
19-Mar	NW4	NW3	WNW2	WNW4	NNW5	N5	N5	NNW4	NNW3	NNW3	WSW7	WSW7	W5	NNW7	NW8	NNW9	NNW8	N7	NNW9	N11	NNW9	NNW8	NW8	NNW5	NNW5.2	N11
20-Mar	N5	ENE7	ENE3	E4	NE3	N8	NNW10	NNW4	NW2	E4	ESE9	E11	ESE9	WNW2	WSW4	SSW1	ESE11	E14	E15	E11	E9	NNE8	NNW6	NE7	ENE4.3	E15
21-Mar	N12	N14	N12	N9	N8	ENE8	NNE6	N6	E11	ESE9	SE6	SE7	ESE12	SE13	ESE12	ESE13	ESE15	ESE16	E13	E12	ESE10	ESE11	ESE11	ESE7	E7.2	ESE16
22-Mar	SE11	SE15	SE16	SE13	SE10	SE4	SE5	SE5	SE10	SE9	SE8	SE7	SSE9	SSE6	SSE5	SE5	SE10	SE9	SSE12	SSE9	SSE5	SE4	SE8	SE8	SE8.4	SE16
23-Mar	SE5	SE7	SSE8	SSE6	SSE2	NNW5	NNW7	NNW8	NNW12	NNW13	N12	N11	NNW13	N13	N13	N14	NNE13	N11	N12	N9	N10	NNW9	NNW4	NNW5	N6.9	N14
24-Mar	NNW4	NNW6	NNW5	N5	NNW6	NW6	NW5	NNW5	NNW4	NNW6	NNW7	NW9	NNW11	NW11	NNW10	N10	N9	N9	NNE8	N6	N6	N7	NNW6	NNW5	NNW6.8	NW11
25-Mar	NNW5	N3	S1	SSW2	SSE4	SSE6	SSE6	SE5	SE10	SE7	SE9	SE6	SSE9	SE7	SE6	SE8	SSW5	SW3	WSW2	WSW2	NNW1	NNW4	NNW5	NNW5	SSE2.7	SE10
26-Mar	NW5	NW4	WNW4	NNW5	NW4	NNW4	N5	NNW7	NNW5	WSW9	WSW11	WSW9	WSW13	WSW10	WSW8	SSE5	SSE9	SE13	SE13	SE10	SE11	SE11	SE12	SSE13	SSW2.9	SE13
27-Mar	SE5	SE10	SE6	SE6	SE4	SE4	SE3	SE0	SE4	SSE5	SSE8	S5	SE10	SE13	SE14	SE19	SE18	SE17	SSE12	SE15	SE22	SE22	SE19	SE12	SE10.4	SE22
28-Mar	SE17	SE10	SE11	SE12	SE14	SE16	SE12	SE14	SE7	SE11	SE17	SE15	SSE9	WSW5	WNW16	WNW17	WNW13	NW10	NW13	NW12	N2	WNW2	WSW6	W6	SSE3.7	WNW17
29-Mar	W6	W6	WSW3	SW5	SSW4	SSE9	SE12	SE11	SE14	SE15	SE9	SSW3	WSW1	N4	SW0	S2	NNW3	NNW5	W5	WSW2	WSW4	SW1	SSW1	SSW3	S2.7	SE15
30-Mar	SW2	NNW3	WNW3	NW2	NW2	WNW2	NW4	NW3	NNW4	NNW7	W6	W9	NNW11	NNW24	N20	N25	N18	NNE20	NNE20	N22	N21	N24	N25	N22	N11.2	N25
31-Mar	N19	NNE15	N14	N12	N11	N9	N6	N7	NNW6	N6	W3	WSW9	WSW10	WSW4	SSW1	SE9	SE12	SE12	SE12	SSE10	S12	SSE11	SSE7	SSE5	NE1.2	N19
	NNE1.9	NNE2.1	N2.3	N2.4	N2.6	N2.4	N3.0	N2.6	N2.1	NNE1.9	NNE1.2	N1.3	N1.6	N2.5	N3.1	NNE3.5	NE3.5	NE3.5	NNE3.1	NNE3.6	NNE2.9	NNE2.9	NNE2.4	NNE2.1	Diurnal Average	
	SE22	SE18	N17	N17	SE14	N16	N18	N16	N18	N18	SE17	ESE20	SE19	NNW24	N20	N25	N18	NNE20	NNE20	N22	SE22	N24	N25	N22	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 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 8 km/h on Mar 30 22:00

Minimum Value: 1 km/h on Mar 10 04:00

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

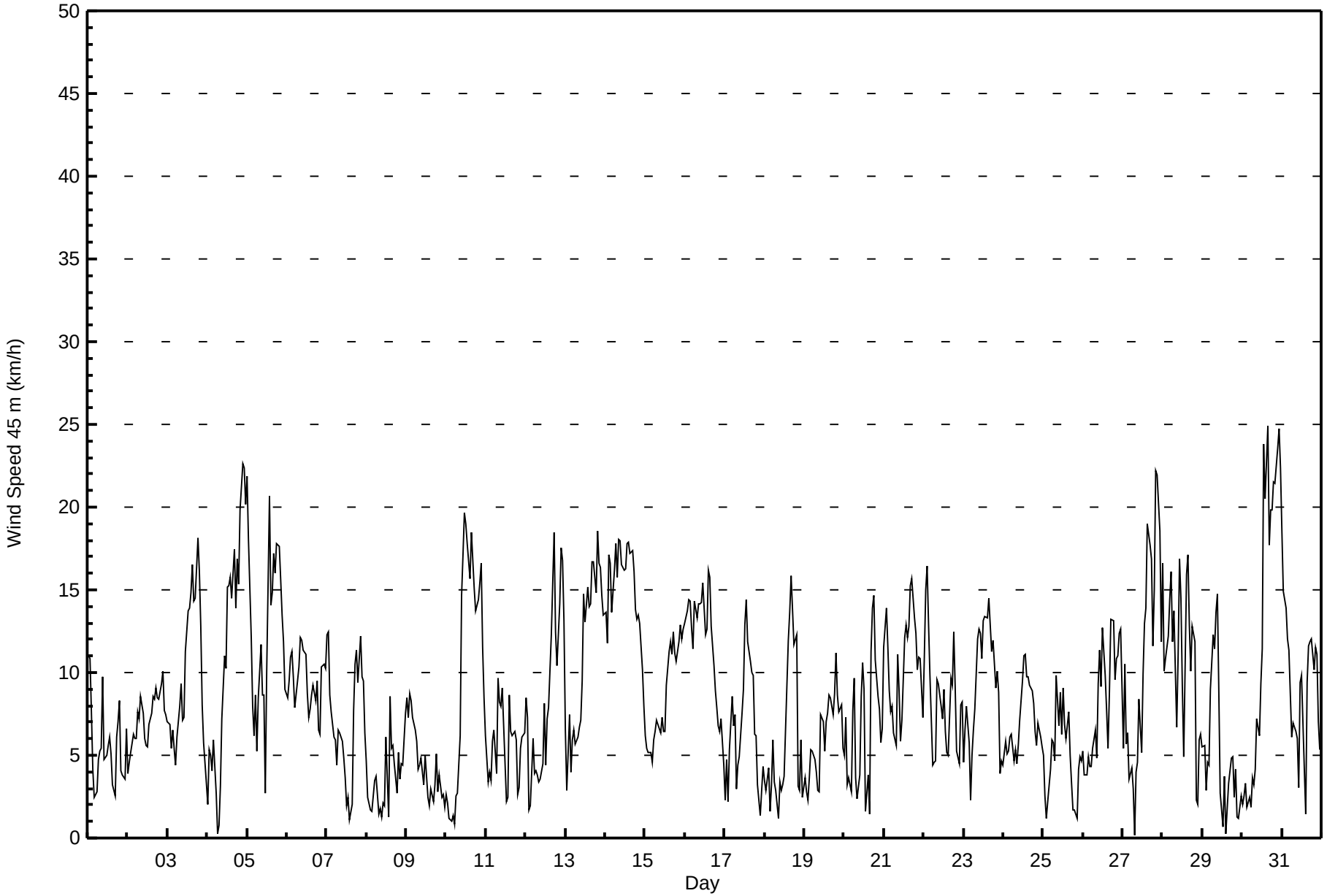
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	2	2	3	1	2	1	2	1	2	2	3	2	2	2	1	1	1	2	1	3	2	2	2	2	3
2-Mar	2	2	2	2	2	2	3	2	2	3	2	2	2	2	2	2	2	2	2	2	3	3	2	2	3
3-Mar	2	2	2	2	2	2	2	3	3	3	2	4	3	3	4	5	4	5	5	4	4	3	1	1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

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed 45 m (WS45m) - km/h

Lower Camp Met Tower - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	239	32.12	32.12
6 - 11	301	40.46	72.58
12 - 19	185	24.87	97.45
20 - 28	19	2.55	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

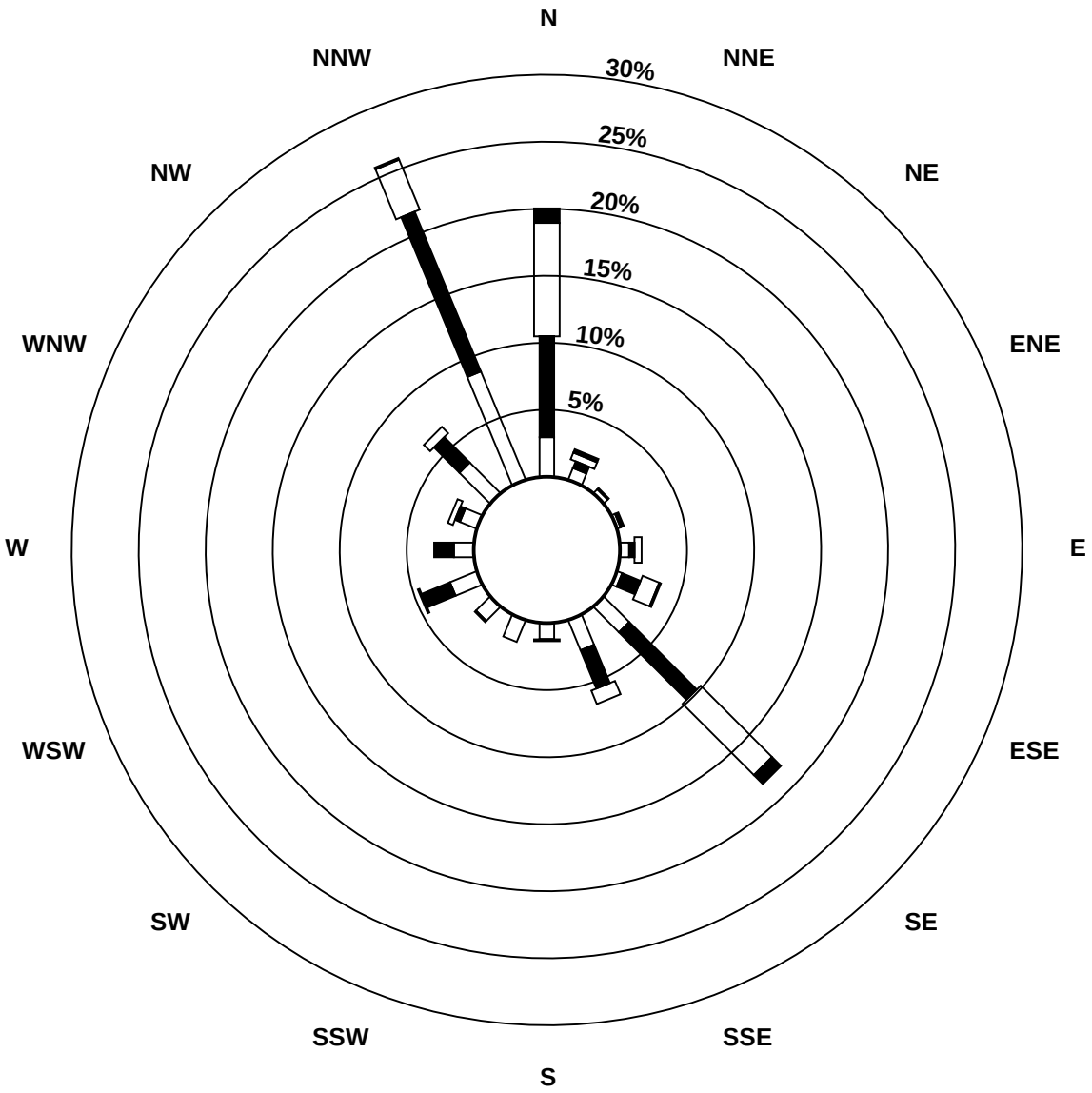
Total Number of Hours: 744

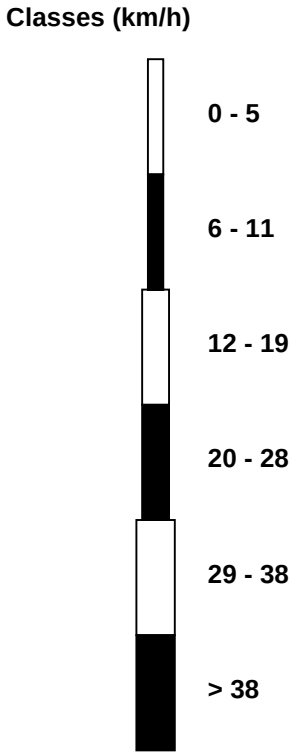
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Wind Speed 45 m (WS45m) - km/h

Lower Camp Met Tower (AMS 3)





Total Number of Valid Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 100 m (WS100m) - km/h

Lower Camp Met Tower - March 2016

Maximum Speed: 36 km/h on Mar 30 16:00

Maximum Daily Speed Average: 21.2 km/h on Mar 14

Minimum Speed Value: 0 km/h on Mar 8 03:00

Minimum Daily Speed Average: 1.8 km/h on Mar 31

Maximum Diurnal Speed Average: 5.5 km/h at hour 18

Minimum Diurnal Speed Average: 2.2 km/h at hour 12

Monthly Average Velocity: 3.5 km/h 29.1 deg

Percentiles: $P_1 = 1$ $P_{10} = 4$ $Q_1 = 8$ Median = 12 $Q_3 = 17$ $P_{90} = 23$ $P_{99} = 33$

Hours in Service:	744
Hours of Data:	735
Hours of Missing Data:	9
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	SSE15	SSE14	SSE11	SSE6	SSE5	S3	SSE4	SSE5	SSE5	SSE9	SE3	SSE7	S4	SSW3	SW3	WNW3	NNW4	N8	NNE9	N13	NNE6	N7	ENE3	N3	SE2.1	SSE15
2-Mar	NNW11	N9	N6	N9	N11	N10	N11	NNW11	NNW12	N9	NNW6	N6	N6	N8	NNW9	N10	NNE10	NNE10	N13	N13	N14	N13	N11	N12	N9.8	N14
3-Mar	N11	NNW12	NNW10	NNW12	NNW8	N8	N10	N14	NNW15	NNW12	N10	NNW15	N18	N19	N20	N23	N20	N21	N25	N22	N17	N11	N9	N9	N14.4	N25
4-Mar	NNE6	NNE9	N7	N7	N8	NNE5	E1	ESE2	SE6	SSE9	SSE11	SE15	SE19	SSE16	SSE18	SE19	SE24	SE20	SE27	SE24	SE29	SE33	SE33	SE31	SE13.1	SE33
5-Mar	SE31	SE28	SSE18	SSE13	SE12	SSE9	SSE7	SE9	SSE8	SE7	SSE3	WNW2	N15	NNE26	NNE20	NNE21	NNE24	N22	N24	N24	NNE21	N20	N17	N14	NE6.9	SE31
6-Mar	N13	N14	N17	N17	N15	NNE11	N14	N14	N15	N14	NNE16	N13	NNW11	NNW9	NNW9	NNW12	N14	N13	N15	NNE9	ENE8	N15	N14	N13	N12.7	N17
7-Mar	N15	N16	N14	N13	N11	N11	N10	NNW10	NNW8	NNW6	NW4	WNW4	WNW3	WSW3	WNW1	SSW2	WSW14	WSW14	WSW17	NW14	NNW17	NNE12	N11	N8	NNW7.1	NNW17
8-Mar	N6	NNW2	SE0	ESE4	ESE3	W2	NW1	SE3	S4	ESE5	ESE3	SE6	SE10	SE3	NNW6	NNW7	NNW7	N5	N6	N7	NNE6	N7	N7	N10	NNE2.3	N10
9-Mar	N11	N10	N12	N12	NNW11	AF	AF	AF	AF	AF	AF	W2	SSW1	SSE2	ESE3	SE6	ESE4	NE3	NE3	ENE4	NE3	NE2	ENE1	ESE4	NNE3.3	N12
10-Mar	SE7	ESE6	SE13	AF	AF	AF	SE17	SE21	SE21	SE21	SE25	SE27	SE26	SE24	SE23	SE25	SE23	SE21	SE21	SE22	SE24	SE25	SE21	SE16	SE20.4	SE27
11-Mar	SSE9	SSW6	WSW10	W13	W14	W15	W15	W23	W16	W14	NW12	N8	N4	WSW2	WSW9	WNW7	NNW9	WNW6	WSW7	N3	ENE8	S7	SSE9	SSE12	W5.8	W23
12-Mar	SSE14	SE16	SE9	SE6	SSE14	E6	NNW8	NNW9	N8	N6	NNW5	N6	E5	SE17	SE14	SE19	SE26	SE26	SE22	SE23	SE26	SE28	SE27	SE25	SE11.8	SE28
13-Mar	SE20	SE11	NNW6	NNE5	ENE8	NE6	NNW13	NNW15	NNW12	NNW11	NNW14	NNW20	NNW18	NNW22	NNW21	NNW22	NNW25	NNW25	NNW23	NNW29	NNW25	NNW24	NNW24	NNW23	NNW14.5	NNW29
14-Mar	NNW21	N18	N25	N24	N19	N24	N24	N22	N23	N24	N23	N22	N21	N24	N23	N24	N24	N23	N20	N18	N19	N18	N14	N12	N21.2	N25
15-Mar	N11	N9	NNW11	NNW9	NNW7	NNW8	NNW10	NNW11	N9	NNW7	NNW8	NNW8	NNW8	NW11	NW13	NNW14	NNW13	N18	NNE17	N16	N17	N18	N17	NNW17	NNW11.6	N18
16-Mar	NNW20	NNW21	NNW22	NNW22	N19	N17	N21	N19	N20	N20	N19	NNW20	NNW16	N18	N22	N22	N18	NNW16	NW14	WNW14	NNW9	NNE10	NNW10	NNW9	N17.0	NNW22
17-Mar	WNW4	W8	NW8	NW14	NW18	NW15	NW14	WNW11	WNW7	WNW9	NW10	WNW11	NNW17	NW18	NW15	NNW14	NW13	NW14	NW12	NW12	NNW8	NNW6	W3	SSW5	NW10.4	NW18
18-Mar	SW5	SW8	SSW4	WSW8	WSW10	SW8	SW7	WSW5	W4	N4	NNE3	E3	SSW3	SE9	SE12	SE16	SSE18	SSE17	SSE14	SSE18	SE12	SW1	NNW6	NNW12	S4.6	SSE18
19-Mar	NNW12	NNW12	NNW12	NNW12	N11	NNE7	NNW9	N9	NNW4	NW3	WNW3	NW5	NNW6	NNW9	NNW8	NNW9	N11	N10	N11	NNE10	N11	N10	E4	E4	N7.8	NNW12
20-Mar	E3	E14	E9	ESE11	ESE7	ENE8	E10	E9	E6	ESE8	ESE11	E13	ESE12	NE3	SW2	SSE3	ESE16	E18	E25	E22	E15	ENE10	NE7	E13	E9.9	E25
21-Mar	ENE12	ENE11	NE10	ENE9	E11	E14	E11	E10	E14	ESE12	ESE7	ESE9	ESE16	ESE17	ESE15	ESE17	ESE20	ESE21	ESE21	E20	ESE17	ESE17	ESE18	ESE11	ESE13.4	ESE21
22-Mar	SE16	SE21	SE22	SE18	SE18	SE11	SE9	SE10	SE13	SE12	SE9	SE9	SE11	SE8	SE7	SE7	SE13	SE14	SSE15	SE14	SE10	SE9	SE13	SE15	SE12.7	SE22
23-Mar	SE11	SE14	SSE12	SSE8	SSE5	NNW5	N9	N12	NNW16	NNW15	NNW15	N13	NNW16	N16	N17	N19	NNE17	NNE17	N17	NNE15	N16	N13	N11	N11	N9.4	N19
24-Mar	N12	N11	NNW17	NNW11	NNW10	NNW14	N13	N10	NNW9	NW8	NNW8	NW10	NNW13	NW12	NNW11	NNW12	N11	N11	NNE11	N10	NNE10	N10	N12	N8	NNW10.5	NNW17
25-Mar	NNW9	WNW2	SSE2	SE6	SSE7	SSE9	SSE10	SSE14	SSE11	SE9	SE11	SE11	SE14	SE10	SE10	SSE8	S6	S4	S1	SSW2	S1	NNW4	NNW16	NNW18	SSE3.9	NNW18
26-Mar	NNW14	NNW10	NW8	NW7	NNW9	NNW9	NNW10	N12	N8	W5	WSW8	WSW6	WSW11	WSW9	SW5	SSE6	SE9	SE14	SE20	SE19	SE20	SSE18	SE23	SE23	SSE2.6	SE23
27-Mar	SSE16	SE20	SE16	SE13	SE14	SE14	SE12	SE10	SE13	SE9	SE12	SSE11	SE16	SE18	SE22	SE27	SE28	SE28	SE21	SE25	SE31	SE33	SE30	SE23	SE19.2	SE33
28-Mar	SE28	SE23	SE23	SSE16	SSE19	SSE22	SSE21	SSE20	SE15	SE15	SE17	SE14	SSE9	W7	WNW23	WNW25	WNW17	NW17	NW22	NW25	NW16	NW15	WNW9	W19	SSW4.9	SE28
29-Mar	WSW19	WSW19	WSW14	WSW12	SW10	SW9	SSW5	S5	SSE8	SSE10	SSE7	SW5	W1	NNE5	N1	SE1	N4	N7	NNW4	W5	W4	WSW8	SW3	SW4	WSW4.5	WSW19
30-Mar	WNW6	NW8	NNW7	NW5	WNW10	NW6	NW11	NNW16	NNW11	NNW9	WNW6	WNW9	NNW16	NNW32	N28	N36	N26	NNE29	NNE27	N32	N31	N34	N35	N33	N17.7	N36
31-Mar	N27	NNE21	N20	N18	N17	N12	N8	N9	N8	N6	WNW4	SW9	WSW9	W4	S1	SE11	SE17	SE18	SE17	SSE14	S18	S16	S12	S11	ENE1.8	N27
	NE2.6	NE2.7	NNE2.8	N3.4	N2.8	N2.9	N3.6	N3.6	NNE3.0	NNE2.4	NNE2.2	NNE2.2	NNE2.6	N3.7	N4.2	NNE5.1	NE5.1	NE5.5	NE5.1	NE5.4	NE4.9	NE4.5	NE4.0	NE3.2	Diurnal Average	
	SE31	SE28	N25	N24	N19	N24	N24	W23	N23	N24	SE25	SE27	SE26	NNW32	N28	N36	SE28	NNE29	NNE27	N32	N31	N34	N35	N33	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 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 11 km/h on Mar 28 15:00

Minimum Value: 1 km/h on Mar 25 19:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 2$ Median = 2 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 7$

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	3	2	3	2	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	3	2	3
2-Mar	1	3	2	2	2	3	2	2	1	3	1	1	1	2	1	1	1	1	1	2	2	2	1	1	3
3-Mar	1	1	1	3	2	2	1	2	3	3	2	3	2	2	3	3	4	5	3	3	3	2	1	2	5
4-Mar	2	3	2	1	1	2	1	1	2	2	3	2	3	4	3	4	3	5	4	4	4	4	3	3	5
5-Mar	4	4	6	3	2	3	2	3	2	2	2	2	7	4	4	4	5	4	3	4	3	3	3	2	7
6-Mar	2	2	2	3	2	3	2	2	2	2	3	3	2	3	2	3	3	4	2	3	3	3	2	2	4
7-Mar	1	2	2	2	2	2	2	1	3	2	1	2	2	2	1	1	4	3	3	3	2	2	2	3	4
8-Mar	1	1	1	1	1	2	1	2	2	1	2	2	3	4	2	2	2	1	2	2	1	1	1	2	4
9-Mar	1	2	2	2	2	AF	AF	AF	AF	AF	AF	1	1	1	2	2	2	1	1	1	1	1	1	3	3
10-Mar	2	3	2	AF	AF	AF	4	5	4	4	4	6	7	5	5	4	5	5	4	3	3	4	3	3	7
11-Mar	3	2	3	4	7	6	7	6	8	3	3	3	2	1	2	2	3	1	3	3	1	2	3	2	8
12-Mar	2	1	3	2	3	3	2	2	2	2	2	3	4	4	5	5	7	5	2	3	3	2	2	3	7
13-Mar	3	5	3	2	2	3	2	3	2	2	3	4	4	4	3	4	5	5	5	5	5	4	4	3	5
14-Mar	4	4	4	4	4	4	3	3	3	3	3	3	3	2	2	3	3	2	3	2	2	2	1	1	4
15-Mar	1	1	1	2	1	1	1	1	2	1	2	2	3	3	3	3	2	2	3	2	3	4	3	3	4
16-Mar	4	3	3	3	3	3	3	3	4	3	3	4	3	3	4	5	3	3	2	2	4	3	2	3	5
17-Mar	2	1	3	3	2	2	3	4	1	2	3	4	5	5	3	3	3	3	2	1	2	1	1	2	5
18-Mar	2	3	2	4	3	2	2	2	2	2	2	1	2	2	1	3	3	3	3	2	4	1	4	1	4
19-Mar	1	1	1	1	2	1	2	1	2	1	1	2	2	2	2	2	2	2	3	2	2	2	2	2	3
20-Mar	2	4	4	4	3	1	1	1	1	2	3	3	3	3	2	4	3	3	4	5	3	3	2	5	5
21-Mar	3	2	2	4	3	3	4	4	3	3	3	3	3	3	3	4	4	4	3	3	4	4	3	3	4
22-Mar	6	4	4	3	2	3	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	2	6
23-Mar	4	5	2	2	2	3	2	2	3	3	3	2	3	3	3	3	3	3	2	2	2	1	2	2	5
24-Mar	2	2	1	1	2	2	2	1	1	2	2	3	3	3	3	2	2	1	2	1	1	1	1	2	3
25-Mar	2	1	2	1	1	2	2	2	3	2	2	2	2	2	2	2	2	2	1	1	1	5	3	2	5
26-Mar	1	2	1	1	2	2	2	2	4	2	2	2	3	2	1	3	2	3	2	2	2	2	4	3	4
27-Mar	3	2	3	1	1	1	2	2	3	3	3	4	3	4	4	4	4	4	3	4	3	3	3	3	4
28-Mar	2	2	2	2	3	3	3	3	2	2	2	2	4	2	11	6	6	5	4	3	2	2	2	3	11
29-Mar	3	5	8	4	3	4	2	2	2	2	2	2	2	2	3	2	2	2	2	3	2	2	1	1	8
30-Mar	1	1	1	1	2	2	2	3	3	3	3	3	9	6	6	4	6	7	6	8	5	7	6	5	9
31-Mar	6	5	4	3	3	3	2	2	2	3	3	3	2	2	2	3	3	2	4	3	4	3	3	3	6
	6	5	8	4	7	6	7	6	8	4	4	6	9	6	11	6	7	7	6	8	5	7	6	5	
	Diurnal Maximum																								

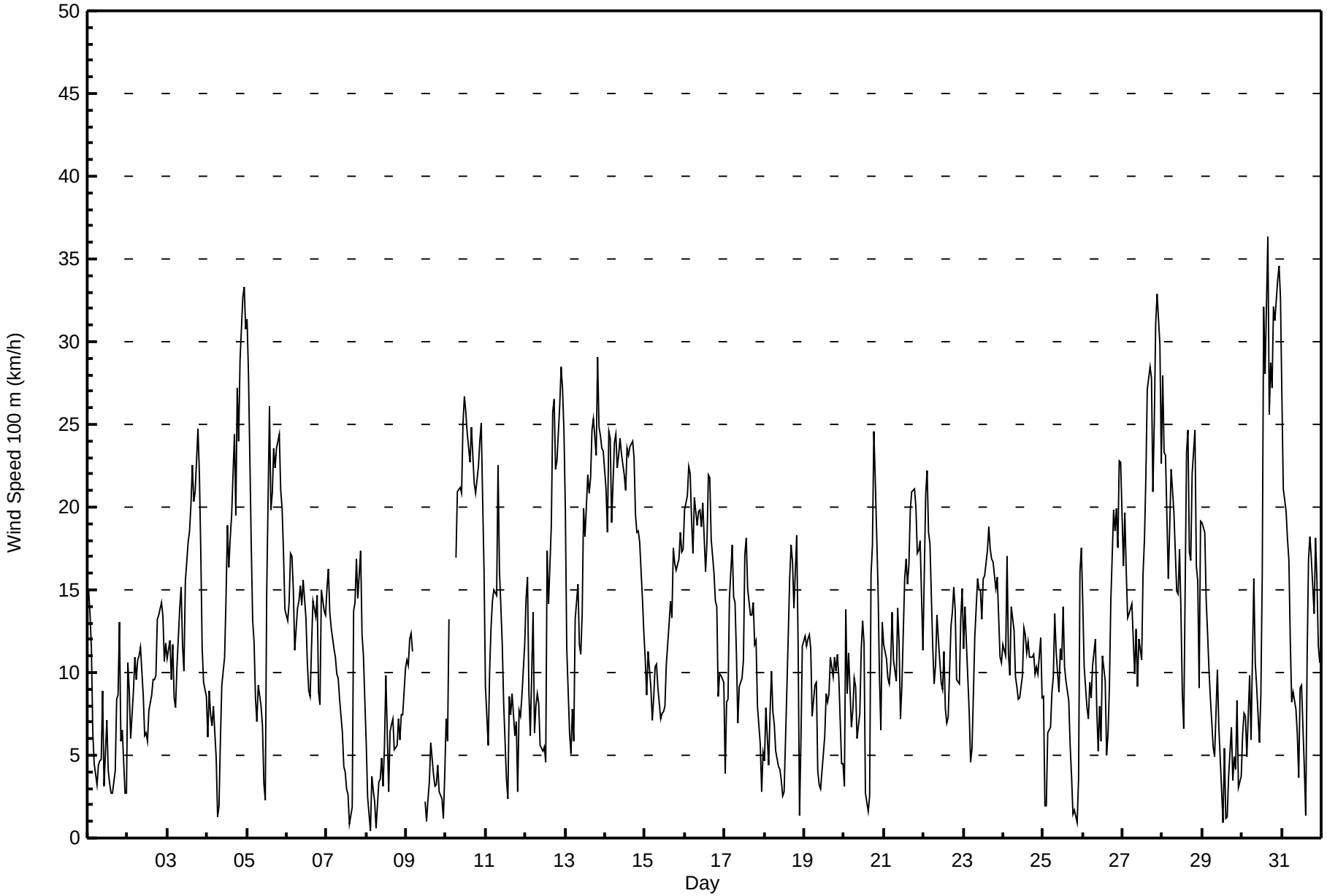
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed 100 m (WS100m) - km/h

Lower Camp Met Tower - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	104	14.15	14.15
6 - 11	262	35.65	49.80
12 - 19	232	31.56	81.36
20 - 28	120	16.33	97.69
29 - 38	17	2.31	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 735

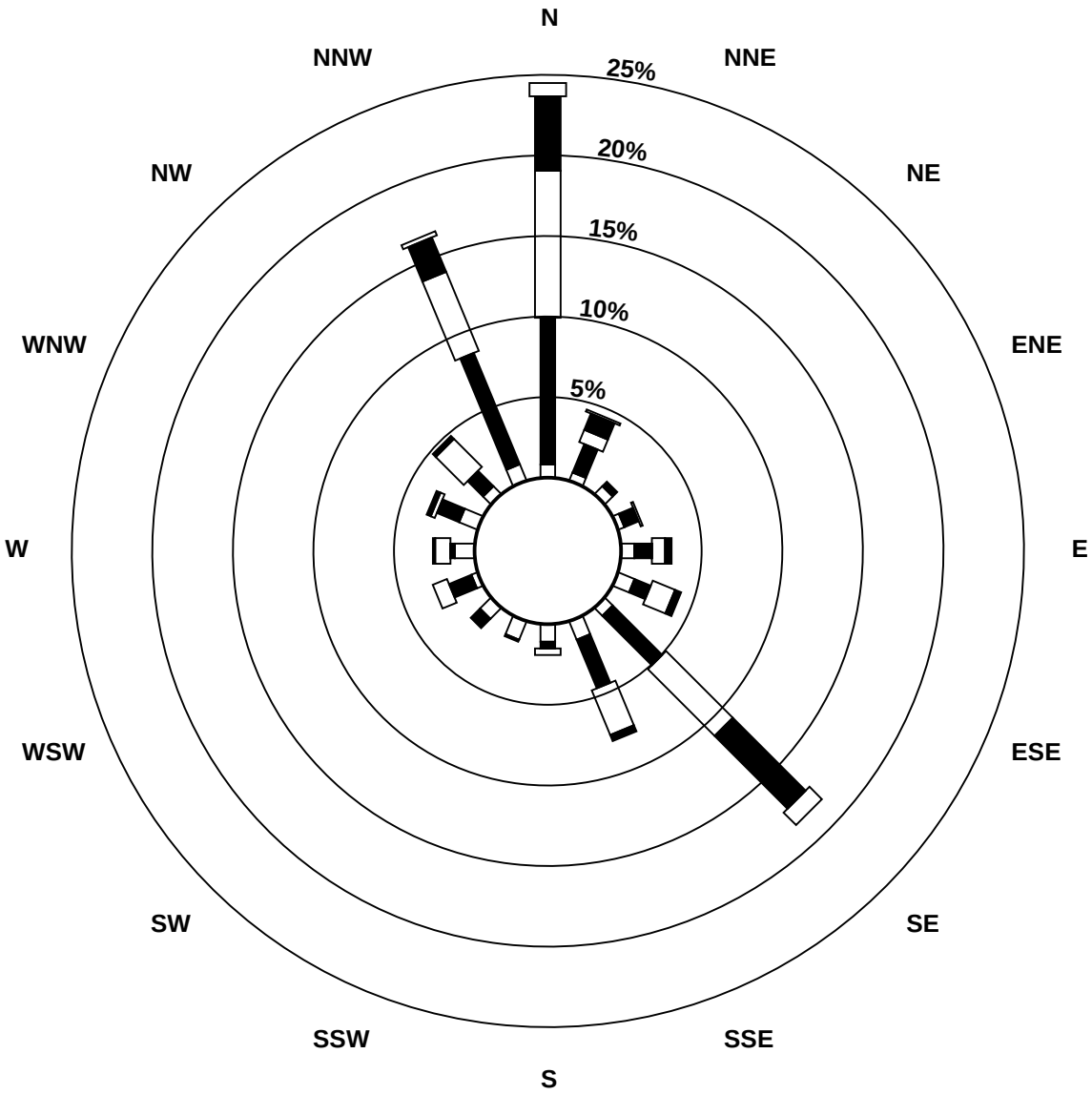
Total Number of Hours: 744

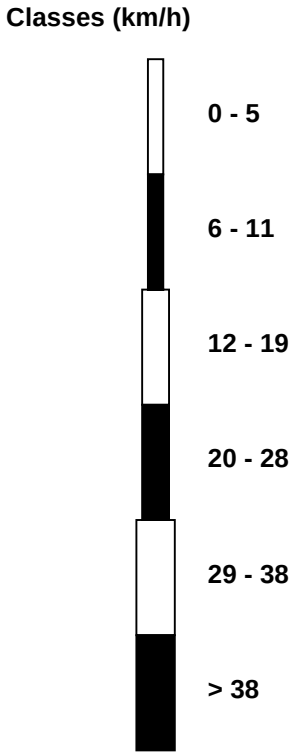
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Wind Speed 100 m (WS100m) - km/h

Lower Camp Met Tower (AMS 3)





Total Number of Valid Hours: 735

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 167 m (WS167m) - km/h

Lower Camp Met Tower - March 2016

Maximum Speed: 39 km/h on Mar 30 16:00

Maximum Daily Speed Average: 23.9 km/h on Mar 27

Minimum Speed Value: 1 km/h on Mar 30 00:00

Minimum Daily Speed Average: 1.2 km/h on Mar 31

Maximum Diurnal Speed Average: 6.5 km/h at hour 20

Minimum Diurnal Speed Average: 2.4 km/h at hour 5

Monthly Average Velocity: 3.9 km/h 43.2 deg

Percentiles: $P_1 = 2$ $P_{10} = 5$ $Q_1 = 9$ Median = 14 $Q_3 = 20$ $P_{90} = 25$ $P_{99} = 36$

Hours in Service:	744
Hours of Data:	727
Hours of Missing Data:	17
Percent Operational Time:	97.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	S17	S13	S12	SSW6	SSW4	SSW4	SSW5	SSW3	SSW4	SSE5	SE3	SE8	SSE7	SSE5	WSW2	NNW4	N5	N9	NNE9	NNE15	ENE7	SE3	SE8	SE4	SSE2.8	S17
2-Mar	N5	E8	ESE7	ENE6	NE10	ENE9	NE8	N11	N11	N8	N6	NNW6	NNW6	NNW8	NNW9	N9	NNE9	NNE10	N14	N14	N14	NNE14	NNE12	NNE14	NNE8.4	N14
3-Mar	NNE14	NNE13	NNE9	N13	NE11	NE8	NE12	NNE16	N16	N14	N12	N17	N18	N19	N22	N23	N21	N21	N27	N24	N19	N13	N13	NNE14	N15.7	N27
4-Mar	NE12	NE13	N9	N8	NNE7	NE5	SE1	SSE2	SSE7	SSE9	SSE9	SE15	SE20	SSE17	SSE17	SE21	SE27	SE22	SE32	SE29	SE33	SE36	SE38	SSE32	SE14.2	SE38
5-Mar	SSE29	SSE25	SSE19	SSE13	SSE16	SSE15	S13	S9	SSW10	SSW9	SW5	NW5	N16	NNE26	NNE20	NNE20	NNE25	NNE23	N23	NNE26	NNE22	NNE22	NNE21	N16	NE6.3	SSE29
6-Mar	N15	N16	N20	NNE20	NNE18	NNE14	NNE15	N15	N16	N14	NNE15	N12	NNW11	NNW9	NNW9	N14	N17	N16	NNE16	ENE14	E14	ENE13	NE13	NNE13	NNE13.1	NNE20
7-Mar	NNE15	NNE16	NNE14	N15	NNE15	NNE14	NNE13	NNE11	N10	NNW7	WNW6	WNW5	W4	W4	WNW3	W5	WSW18	WSW18	WSW22	NW16	N18	NNE11	N10	N9	NNW7.0	WSW22
8-Mar	NNE6	NE3	SSE2	SE3	SE7	SSW3	S3	ESE6	SSE6	SE10	ESE10	SE9	SE12	SE4	NW6	N6	NNW8	NNW5	N7	NNE10	NE9	NNE9	NNE9	NNE11	ENE2.8	SE12
9-Mar	NNE12	N11	N12	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SSE2	SE5	SE7	SE5	ENE2	E4	E8	ESE9	SSE10	SSE12	SSE18	----	SSE18
10-Mar	SSE21	SSE16	SSE19	SE21	SE17	SSE17	SE27	AF	AF	AF	AF	AF	AF	AF	SE26	SE27	SE26	SE24	SE25	SE27	SE29	SE29	SE25	SSE18	----	SE29
11-Mar	S12	SSW8	W15	W21	W22	W23	W25	W29	W21	W18	NW13	N8	N4	WNW3	W8	NW8	NNW10	WNW7	W7	NNE5	NE8	SSE8	SSE10	S12	W8.5	W29
12-Mar	SSE15	SSE17	SE16	SE12	SSE21	SE18	ESE7	SE7	ESE7	ESE8	E5	E10	ESE12	SE24	SE19	SE23	SE32	SE31	SE28	SE28	SE31	SE34	SE32	SE29	SE19.0	SE34
13-Mar	SE25	SE17	NNE2	ENE8	E12	ENE12	NE10	N15	N21	N15	N16	N21	N21	N25	NNW25	N26	N30	N30	NNW28	NNW35	NNW31	NNW30	NNW29	N28	N16.6	NNW35
14-Mar	N26	N23	N27	N27	N22	N27	N26	N24	N24	N24	N23	NNE22	N21	N23	N23	N24	N25	N24	N21	NNE19	N19	N18	N15	N13	N22.6	N27
15-Mar	N13	N13	N14	N13	NNE10	NNE9	N10	N11	N10	N7	NNW8	NNW8	NNW8	NW11	NW14	NNW15	NNW14	N19	NNE18	NNE18	N18	N20	N19	N21	N13.0	N21
16-Mar	N25	N26	N27	N27	N24	N20	N24	N22	N22	N21	N20	NNW22	NNW18	N20	N25	N24	N21	N20	NNW18	NW17	NW13	NNE14	N12	N12	N20.0	N27
17-Mar	NW6	WNW7	NW18	NW22	NW21	NW19	NW20	WNW16	NW12	NW11	NW11	WNW13	NNW19	NW19	NW16	NNW15	NNW15	NW16	NW14	NNW14	NNW11	N7	WNW2	SSW5	NW13.1	NW22
18-Mar	SW10	WSW11	SW9	W16	WSW14	WSW11	WSW11	W11	WNW7	NW4	NNE4	E1	SSW3	SE8	SE12	SSE14	S17	S14	S16	S21	SSE15	SSW4	WNW1	NNW6	SSW6.1	S21
19-Mar	N4	NNE5	N7	N9	NNE11	ENE12	NNE7	NNE7	NNE2	NW4	NNE2	N7	NNW9	N9	N8	NNE6	NNE10	NE9	NE7	E10	E5	E8	ESE6	SE2	NNE5.4	ENE12
20-Mar	ESE4	ESE17	ESE12	ESE15	SE12	E9	E15	ESE15	ESE9	ESE9	ESE11	E13	E12	ENE5	SE2	SE3	ESE17	E19	E29	E28	E20	E14	E11	E17	ESE12.9	E29
21-Mar	E17	E16	E16	ESE16	E15	E16	E15	ESE15	E14	ESE11	E7	ESE10	ESE15	ESE17	ESE15	ESE17	ESE20	ESE24	E25	E25	ESE23	ESE21	ESE20	SE13	ESE16.6	E25
22-Mar	SE17	SE23	SE23	SE20	SE20	SE16	SE14	SE13	SE14	SE13	SE9	SE9	SE12	SE8	SE7	SE9	SE14	SE15	SSE15	SE16	SE14	SE13	SE17	SE18	SE14.3	SE23
23-Mar	SE16	SSE14	SSE10	S9	S3	NW4	N9	N15	N17	N16	NNW16	N13	N16	N16	NNE18	NNE19	NNE18	NNE18	NNE18	NNE21	NNE23	NE22	NNE17	NNE16	NNE10.9	NNE23
24-Mar	NNE16	NE13	NNE14	NNE11	NNE6	NNE10	NNE14	N19	NNE13	N14	NNW11	NNW11	NNW14	NNW13	NNW12	NNW12	N11	N10	NNE12	NNE13	NE15	NE15	ENE11	SE5	NNE10.7	N19
25-Mar	SSE4	S5	SSE8	SSE9	SSE12	SSE11	SSE13	SSE15	SSE13	SSE9	SSE12	SSE11	SSE15	SE13	SE10	SSE8	S7	S4	SSW2	SSW2	SSE3	WNW4	NNW15	N19	SSE6.1	N19
26-Mar	N17	N11	N8	NNW10	N13	N13	N14	NNE16	N11	NNW4	W4	W4	W9	WSW9	SSW3	SE7	SE9	SE14	SE21	SSE23	SSE21	SSE23	SSE22	SSE23	ESE2.9	SSE23
27-Mar	SSE24	SSE19	SSE21	SSE19	SE21	SE22	SE21	SE22	SE22	SE14	SE16	SSE15	SE19	SE20	SE24	SE30	SE31	SE34	SSE27	SE31	SE35	SSE34	SSE29	SSE23	SE23.9	SE35
28-Mar	SSE23	SSE21	SSE20	SSE21	S25	S24	S22	S18	S15	SSE12	SSE15	SSE11	S8	W11	WNW28	WNW30	WNW20	NW21	NW27	NW30	NW23	NW26	NW19	WNW23	WSW7.5	WNW30
29-Mar	WNW24	W29	WSW24	W17	WSW19	WSW18	SW11	SW12	SSW8	S7	SSW7	WSW10	W3	N6	N2	E1	N4	N8	N5	W5	NW1	W7	NW4	WSW1	W7.5	W29
30-Mar	NW9	NW7	NNW13	NW9	NW13	NW13	NNW20	NNW23	NNW15	NW11	WNW6	NW10	NNW19	NNW36	N30	N39	N30	NNE33	NNE31	N37	N35	N36	N38	N35	N21.3	N39
31-Mar	NNE30	NNE23	N22	N20	N19	N13	N10	NNE10	N8	N6	NW5	WSW9	WSW9	W5	S2	SE11	SE17	SSE17	SSE16	S17	S19	SSW17	SSW14	SW12	NNE1.2	NNE30
	ENE3.8	E3.5	NE2.5	NNE2.5	NE2.4	NE2.6	NE2.9	NNE4.4	NNE3.9	N3.1	NNE2.9	N3.1	NNE3.5	N4.7	NNE4.7	NNE5.5	NE5.6	NE6.3	NE5.6	NE6.5	ENE6.5	ENE5.6	ENE4.9	ENE4.2	Diurnal Average	
	NNE30	W29	N27	N27	S25	N27	SE27	W29	N24	N24	N23	NNE22	N21	NNW36	N30	N39	SE32	SE34	SE32	N37	SE35	N36	SE38	N35	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 167 m (WS167m) - km/h

Lower Camp Met Tower - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 12 km/h on Mar 28 15:00

Minimum Value: 1 km/h on Mar 4 05:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 2$ Median = 2 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 7$

Hours in Service:	744
Hours of Data:	727
Hours of Missing Data:	17
Hours of Calibration:	0
Percent Operational Time:	97.7

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

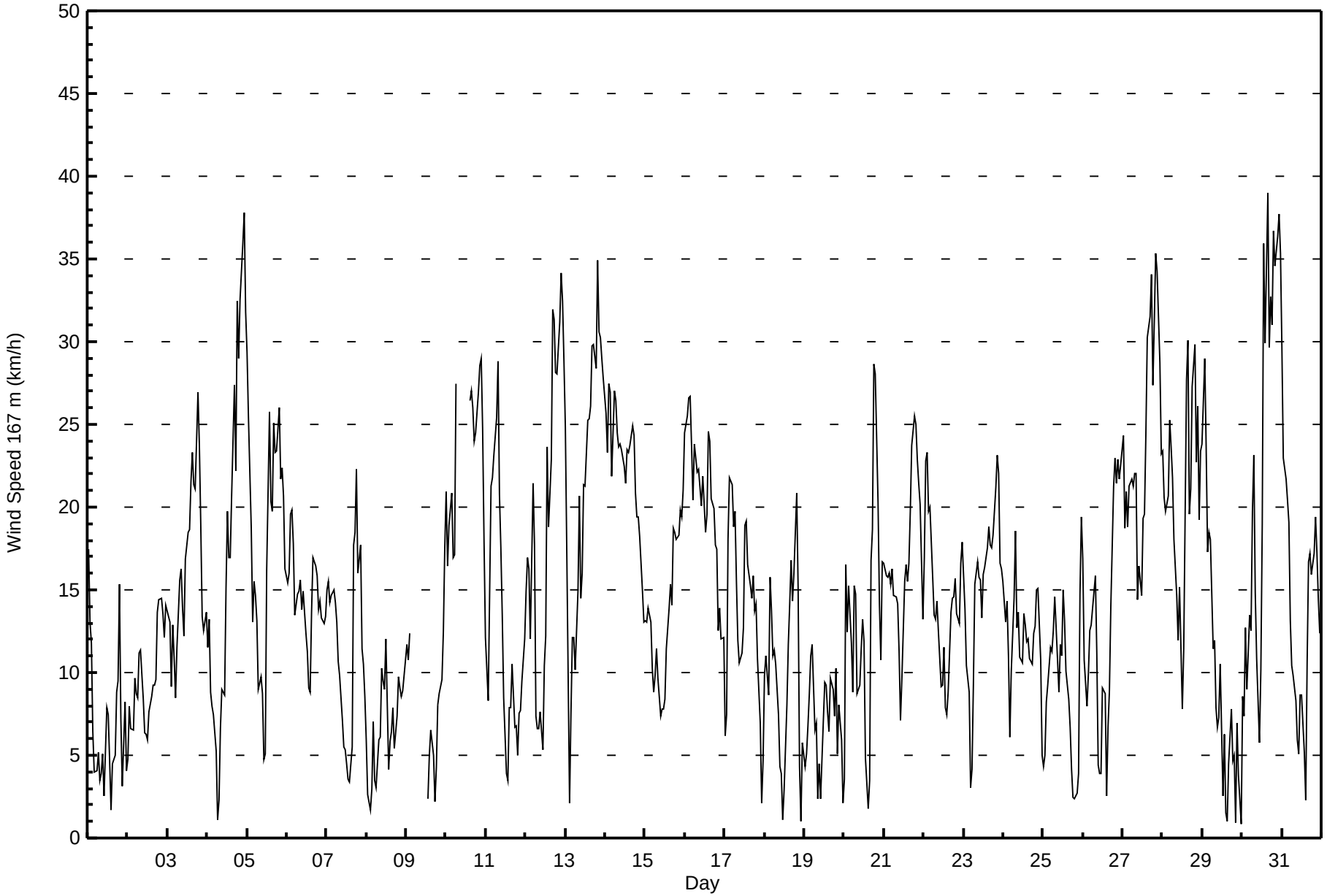
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed 167 m (WS167m) - km/h

Lower Camp Met Tower - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	86	11.83	11.83
6 - 11	189	26.00	37.83
12 - 19	258	35.49	73.31
20 - 28	149	20.50	93.81
29 - 38	44	6.05	99.86
> 38	1	0.14	100.00

Total Number of Valid Hours: 727

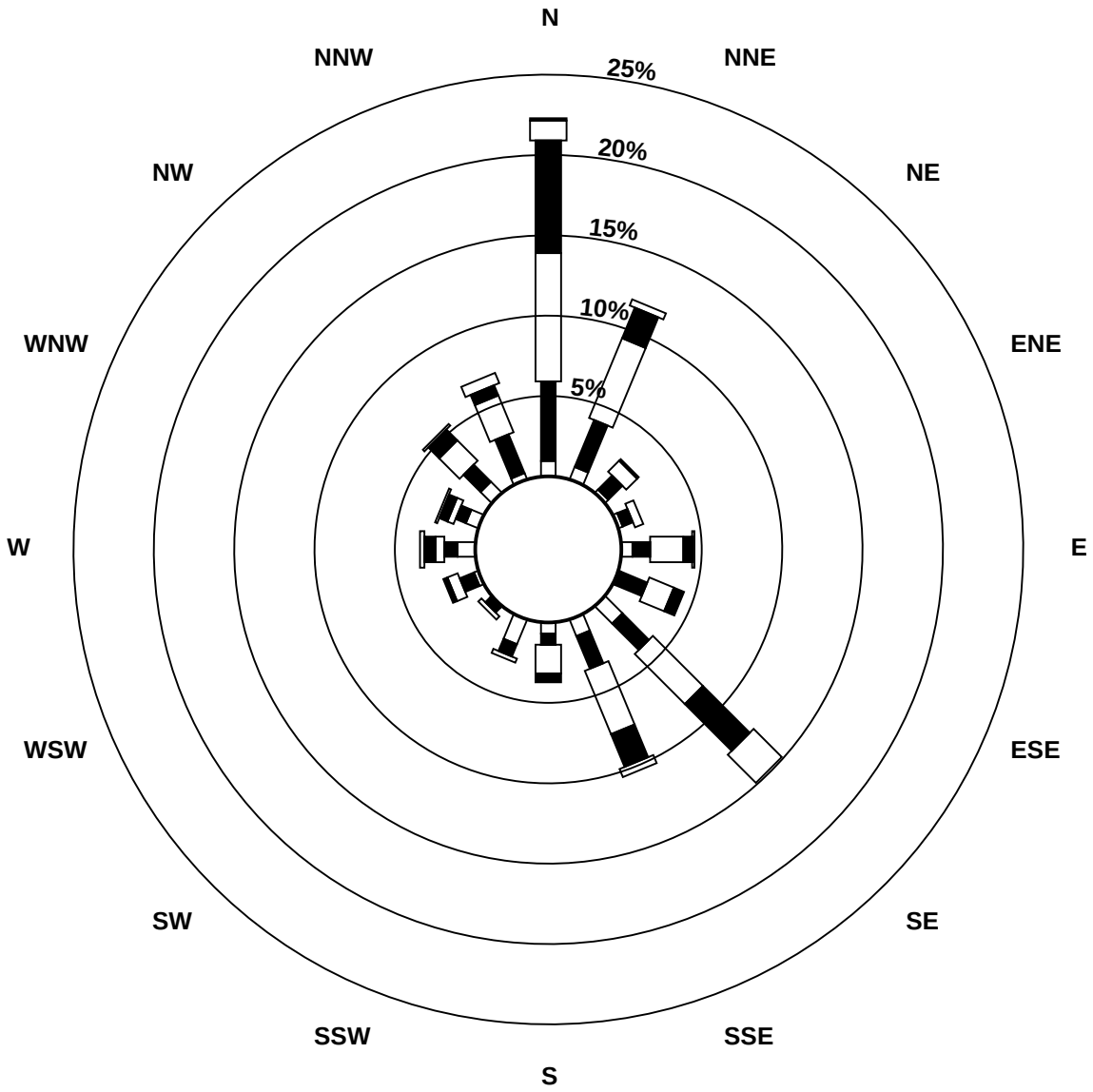
Total Number of Hours: 744

Wood Buffalo Environmental Association

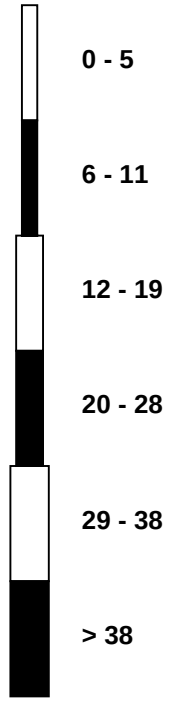
Wind Rose Mar 2016

Wind Speed 167 m (WS167m) - km/h

Lower Camp Met Tower (AMS 3)



Classes (km/h)



Total Number of Valid Hours: 727

Direction of Maximum Speed: 360 deg on Mar 30 16:00
Direction of Maximum Daily Speed Average: 359.6 deg on Mar 14

Direction of Minimum Speed: 65 deg on Mar 30 06:00

Direction of Minimum Daily Speed Average: 0.4 deg on Mar 31

Monthly Average Direction: 334.3 deg

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	157	156	145	132	124	161	154	160	167	160	166	185	240	252	254	267	316	352	354	355	341	340	354	344	183.1
2-Mar	307	351	345	352	351	344	346	343	351	352	350	354	8	2	1	357	4	1	349	340	353	3	358	349	353.1
3-Mar	333	338	333	342	343	353	351	346	334	338	347	351	355	356	3	15	14	3	6	9	360	354	358	359	356.0
4-Mar	345	14	338	347	360	349	258	42	126	156	153	152	154	166	162	140	134	129	142	140	147	147	142	142	144.1
5-Mar	150	156	175	170	151	162	154	152	153	149	154	230	352	15	28	15	17	9	3	13	14	7	357	353	62.1
6-Mar	349	349	353	3	359	13	359	357	1	4	13	360	342	338	331	341	346	350	349	345	358	354	353	356	354.0
7-Mar	357	357	345	349	345	345	337	332	336	333	6	343	334	209	204	198	249	248	249	316	347	21	8	347	333.1
8-Mar	341	318	40	0	322	352	358	348	348	10	297	181	156	169	10	350	336	4	322	348	321	346	351	358	348.6
9-Mar	360	351	354	351	345	335	335	335	338	344	332	244	227	212	115	150	105	18	352	317	331	280	292	257	333.0
10-Mar	288	245	305	306	328	339	317	4	159	124	134	133	134	133	135	137	132	135	128	124	137	135	138	165	134.7
11-Mar	178	228	238	265	284	292	355	298	277	285	337	1	342	211	253	296	348	272	255	30	155	179	139	151	274.8
12-Mar	134	139	107	241	136	339	333	334	340	336	359	6	8	140	154	137	139	145	143	135	144	149	144	141	135.9
13-Mar	105	26	356	330	332	346	350	341	347	335	343	354	346	346	345	346	346	346	339	343	335	331	336	341	343.9
14-Mar	345	346	6	357	357	0	357	360	1	4	6	7	3	6	3	4	1	359	1	360	354	354	355	348	359.6
15-Mar	351	360	346	352	339	340	337	344	348	341	326	342	340	309	323	336	351	354	11	5	356	357	351	351	345.5
16-Mar	344	348	344	347	352	352	0	2	357	8	359	353	356	3	356	2	356	344	325	311	12	355	326	340	352.0
17-Mar	290	299	43	337	333	341	328	313	260	324	320	288	335	321	326	346	329	323	328	326	323	274	233	153	322.2
18-Mar	136	149	139	143	269	157	163	167	176	16	40	104	211	158	156	155	158	158	153	151	169	338	340	332	154.3
19-Mar	335	345	309	295	335	344	331	327	341	345	245	249	260	347	326	345	350	0	2	2	346	344	320	320	328.6
20-Mar	322	56	23	95	17	358	354	307	313	108	113	98	121	283	260	219	129	104	99	93	83	24	359	49	73.2
21-Mar	3	356	354	1	5	66	30	9	108	126	133	141	128	135	118	128	109	110	107	104	113	130	115	111	97.2
22-Mar	134	134	132	136	137	163	140	150	146	153	157	161	159	166	167	159	138	141	161	164	179	155	147	147	148.9
23-Mar	121	160	173	168	192	1	348	343	346	354	355	3	355	355	12	11	15	11	8	2	357	357	339	348	2.3
24-Mar	334	344	329	355	343	310	339	324	343	2	350	329	335	323	336	357	357	358	15	1	338	339	328	338	342.2
25-Mar	316	346	205	342	149	173	167	132	152	153	150	144	159	162	150	150	205	253	265	256	353	345	334	354	164.3
26-Mar	348	333	333	319	311	324	345	353	328	262	249	250	260	248	248	180	164	157	157	153	146	146	159	160	210.4
27-Mar	148	146	132	124	145	184	310	330	153	161	167	195	158	158	156	139	148	150	166	154	148	140	140	151	150.5
28-Mar	154	160	156	155	156	146	131	144	138	144	153	153	159	246	298	310	296	320	316	318	207	206	234	275	182.1
29-Mar	298	289	305	217	179	152	149	150	150	153	153	197	231	22	184	192	327	330	265	253	241	152	261	157	172.6
30-Mar	295	344	307	342	8	65	324	294	357	349	265	261	341	351	357	360	10	24	17	6	3	8	12	8	358.5
31-Mar	15	20	3	359	359	356	1	2	350	0	297	245	248	240	218	150	145	149	151	159	180	171	158	144	90.5
	18.3	22.6	9.4	358.6	353.2	0.2	359.5	354.0	11.8	34.9	44.4	330.8	338.1	343.6	348.9	27.6	48.8	40.6	34.4	28.6	41.8	44.0	32.9	27.1	
	Diurnal Average																								

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 106 deg on Mar 29 03:00

Minimum Value: 7 deg on Mar 5 09:00

Percentiles: P_1 = 9 P_{10} = 14 Q_1 = 18 Median = 22 Q_3 = 36 P_{90} = 61 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

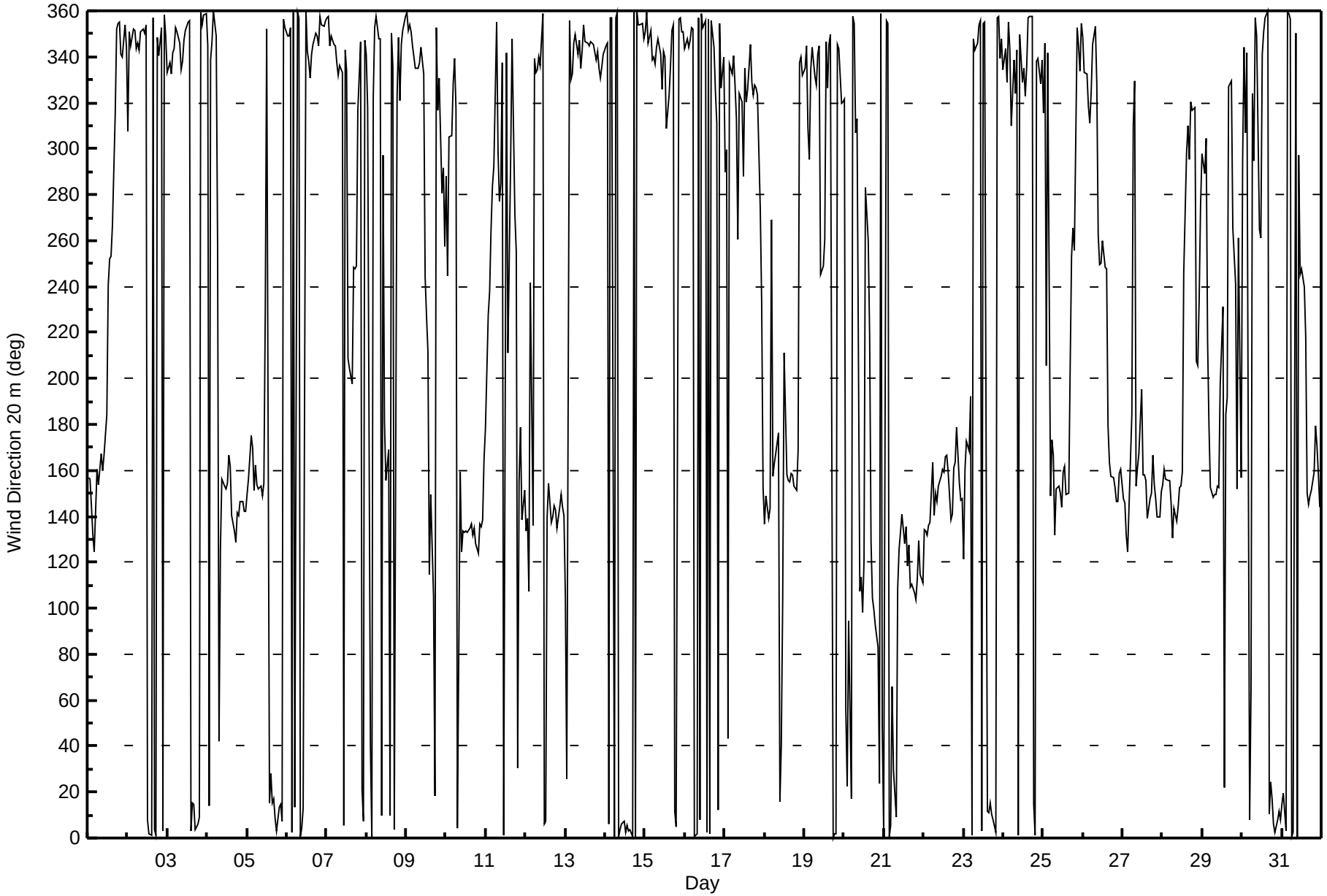
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	14	12	22	16	82	42	24	12	23	10	26	19	24	20	15	27	52	20	15	27	49	67	64	29	82
2-Mar	39	36	40	20	22	16	24	19	20	22	24	28	30	26	25	21	19	17	15	16	18	23	18	20	40
3-Mar	19	17	22	20	37	37	24	26	20	21	22	18	16	16	21	23	23	21	18	18	18	18	15	39	39
4-Mar	66	32	33	27	18	29	81	74	59	19	15	23	16	17	15	21	17	19	15	13	13	14	13	17	81
5-Mar	16	17	20	21	34	16	22	13	7	12	13	70	51	22	28	26	23	22	18	23	23	19	18	19	70
6-Mar	20	17	18	20	25	28	23	16	18	19	28	27	22	37	29	21	23	23	17	51	17	15	20	17	51
7-Mar	15	16	22	21	23	21	22	17	18	21	27	55	77	65	72	18	39	19	23	39	19	28	21	22	77
8-Mar	38	33	36	47	18	31	29	82	71	51	43	41	22	80	19	23	23	26	44	17	24	21	20	16	82
9-Mar	19	20	16	19	19	23	19	24	25	29	61	22	38	55	70	56	76	29	57	59	35	25	36	56	76
10-Mar	43	45	64	48	61	71	80	81	69	20	22	18	20	18	20	18	17	18	17	18	17	19	23	21	81
11-Mar	18	43	27	88	53	61	87	69	90	80	38	22	55	26	19	29	26	23	24	61	61	30	39	24	90
12-Mar	19	13	85	51	52	33	47	45	71	51	48	19	70	58	32	25	22	13	12	16	13	11	12	17	85
13-Mar	50	47	37	46	27	31	52	20	22	20	20	17	20	18	17	18	18	18	17	17	16	14	16	17	52
14-Mar	18	18	21	18	19	19	17	17	18	20	21	22	20	19	19	19	18	17	17	17	17	16	17	18	22
15-Mar	23	14	19	20	18	18	17	20	22	22	28	30	35	28	22	23	19	16	23	21	18	18	16	17	35
16-Mar	18	17	17	17	19	19	18	18	19	23	19	18	21	22	20	19	20	20	14	23	22	26	14	49	49
17-Mar	67	30	49	41	17	18	18	78	39	51	38	45	20	20	24	20	21	15	14	12	77	65	21	31	78
18-Mar	53	62	41	63	56	32	32	36	55	61	61	62	31	15	12	15	9	9	8	18	60	44	21	41	63
19-Mar	23	17	30	16	18	17	51	32	37	51	14	19	43	28	28	20	18	25	19	13	27	16	12	13	51
20-Mar	16	38	68	91	77	12	14	65	47	50	25	28	24	83	63	83	23	19	17	20	22	36	23	46	91
21-Mar	17	13	17	15	26	40	37	34	23	26	33	29	21	19	24	23	21	19	18	19	21	22	22	25	40
22-Mar	24	16	14	15	30	35	30	46	18	19	24	23	17	24	42	41	25	26	12	14	17	30	19	29	46
23-Mar	86	37	12	13	55	25	17	19	18	20	21	24	23	20	27	25	25	27	20	15	12	12	86	23	86
24-Mar	53	19	69	18	17	14	22	21	35	30	25	25	24	19	23	25	23	19	21	12	28	16	20	17	69
25-Mar	24	82	53	71	70	19	24	51	13	21	14	21	17	21	26	14	38	24	72	81	83	18	30	38	83
26-Mar	28	22	37	14	15	25	24	23	53	38	15	14	15	16	17	36	13	12	9	8	12	13	22	20	53
27-Mar	68	14	24	16	64	89	93	19	99	37	17	39	16	15	19	18	23	19	12	10	11	13	15	18	99
28-Mar	11	26	13	7	14	19	19	19	29	25	11	12	23	45	32	18	25	21	11	21	73	71	32	44	73
29-Mar	44	66	106	53	27	16	7	10	10	9	11	50	89	61	94	66	84	32	36	84	53	102	92	80	106
30-Mar	101	50	48	42	84	97	30	46	46	40	58	29	57	19	18	18	31	25	23	21	19	22	22	21	101
31-Mar	23	26	22	19	21	20	24	24	37	39	83	37	19	46	68	17	19	19	14	11	12	9	35	37	83
	101	82	106	91	84	97	93	82	99	80	83	70	89	83	94	83	84	32	72	84	83	102	92	80	
	Diurnal Maximum																								

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction 20 m (WD20m) - deg

Lower Camp Met Tower - March 2016



Direction of Maximum Speed: 354 deg on Mar 30 16:00
Direction of Maximum Daily Speed Average: 355.3 deg on Mar 14

Direction of Minimum Speed: 146 deg on Mar 27 08:00

Direction of Minimum Daily Speed Average: 1.2 deg on Mar 31

Monthly Average Direction: 335.1 deg

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	147	145	139	132	124	149	139	147	149	148	151	169	229	244	246	264	329	345	353	348	346	348	355	340	154.6
2-Mar	335	349	344	344	343	336	344	337	344	348	342	350	1	357	355	351	1	360	343	337	348	0	354	345	348.4
3-Mar	331	332	330	336	338	351	350	342	330	334	342	345	350	352	359	11	9	359	2	5	354	347	351	352	351.8
4-Mar	7	14	340	345	357	356	326	77	121	147	143	140	143	156	150	129	126	120	133	132	138	138	135	133	132.5
5-Mar	138	141	162	153	136	150	139	137	140	135	139	234	355	9	20	9	13	6	1	9	9	4	352	347	46.5
6-Mar	345	344	350	359	356	11	357	352	358	1	9	356	337	333	325	336	343	345	344	342	349	350	348	350	350.0
7-Mar	351	351	341	341	340	342	336	330	331	327	354	331	333	211	218	188	241	238	238	308	342	17	3	343	327.9
8-Mar	337	321	20	355	320	343	355	329	331	20	292	161	143	148	1	345	330	357	327	346	333	339	341	353	345.6
9-Mar	356	346	348	344	340	333	331	331	332	340	336	241	219	197	100	135	98	15	352	354	340	307	271	275	336.4
10-Mar	274	243	248	279	279	252	149	126	137	119	126	124	126	126	127	129	123	126	121	120	129	129	131	150	128.3
11-Mar	168	218	240	262	273	279	318	273	262	272	330	357	346	209	247	288	340	268	248	23	119	172	136	141	266.4
12-Mar	131	128	108	226	132	336	325	317	341	330	351	355	355	129	139	128	129	135	131	130	136	139	136	134	126.9
13-Mar	115	44	353	333	338	346	346	334	336	332	338	348	342	341	339	341	341	340	334	337	330	326	330	335	339.3
14-Mar	340	340	2	355	353	356	352	356	356	360	2	5	359	2	358	0	357	354	356	356	348	349	348	345	355.3
15-Mar	345	347	336	341	335	335	333	340	345	340	319	338	335	302	316	332	345	350	9	3	351	352	345	344	341.1
16-Mar	338	343	338	341	345	347	357	360	354	5	354	346	351	360	351	358	352	340	319	301	6	352	324	333	347.4
17-Mar	278	283	24	325	320	322	318	305	267	307	312	280	330	312	318	339	322	317	322	319	319	308	227	163	313.6
18-Mar	143	163	140	175	254	167	182	172	206	7	35	89	208	146	143	143	149	152	145	140	147	326	339	330	148.2
19-Mar	311	315	303	302	328	349	349	338	330	340	239	247	269	345	322	339	342	349	347	351	337	335	322	332	327.3
20-Mar	349	73	60	92	38	349	348	334	324	98	106	91	111	289	254	204	119	96	94	90	80	23	345	52	70.1
21-Mar	358	352	351	355	5	69	32	11	101	115	124	124	119	124	109	118	103	103	101	98	106	120	111	105	88.3
22-Mar	126	126	126	129	126	138	130	134	136	141	144	146	147	152	151	145	128	133	148	148	164	140	136	136	136.8
23-Mar	128	143	161	161	158	345	341	338	341	348	349	357	348	349	8	5	12	9	5	359	349	348	333	332	357.4
24-Mar	336	343	341	350	340	311	320	335	330	343	338	320	328	315	330	353	353	355	12	350	350	349	341	336	339.0
25-Mar	327	354	179	197	158	154	148	132	140	140	138	133	147	146	135	139	192	226	253	250	330	333	338	329	149.3
26-Mar	326	321	301	338	324	340	349	346	330	256	244	244	253	243	240	168	153	145	145	141	146	143	146	148	198.1
27-Mar	137	141	127	126	132	135	138	146	146	148	153	172	144	144	139	130	134	136	153	142	139	133	129	135	138.3
28-Mar	141	143	142	144	142	140	134	136	131	135	141	142	148	247	293	301	288	317	310	308	352	288	242	263	167.7
29-Mar	265	272	247	218	192	148	138	136	137	141	140	194	249	11	227	178	334	331	262	258	242	235	208	196	170.9
30-Mar	233	342	299	307	309	303	326	307	346	342	263	259	338	343	351	354	5	21	13	3	358	5	7	4	353.5
31-Mar	10	15	360	355	356	351	357	360	344	355	281	239	241	243	208	138	135	138	139	153	172	165	154	149	53.5
	19.8	20.4	4.5	354.7	351.3	357.4	359.1	353.8	7.2	25.9	28.3	349.6	355.4	350.3	352.8	22.3	38.2	36.6	28.9	22.4	30.4	33.4	28.4	25.3	
	Diurnal Average																								

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction 45 m (WD45m) - deg

Lower Camp Met Tower - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 107 deg on Mar 27 08:00

Minimum Value: 4 deg on Mar 29 07:00

Percentiles: $P_1 = 6$ $P_{10} = 10$ $Q_1 = 13$ Median = 16 $Q_3 = 28$ $P_{90} = 47$ $P_{99} = 85$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

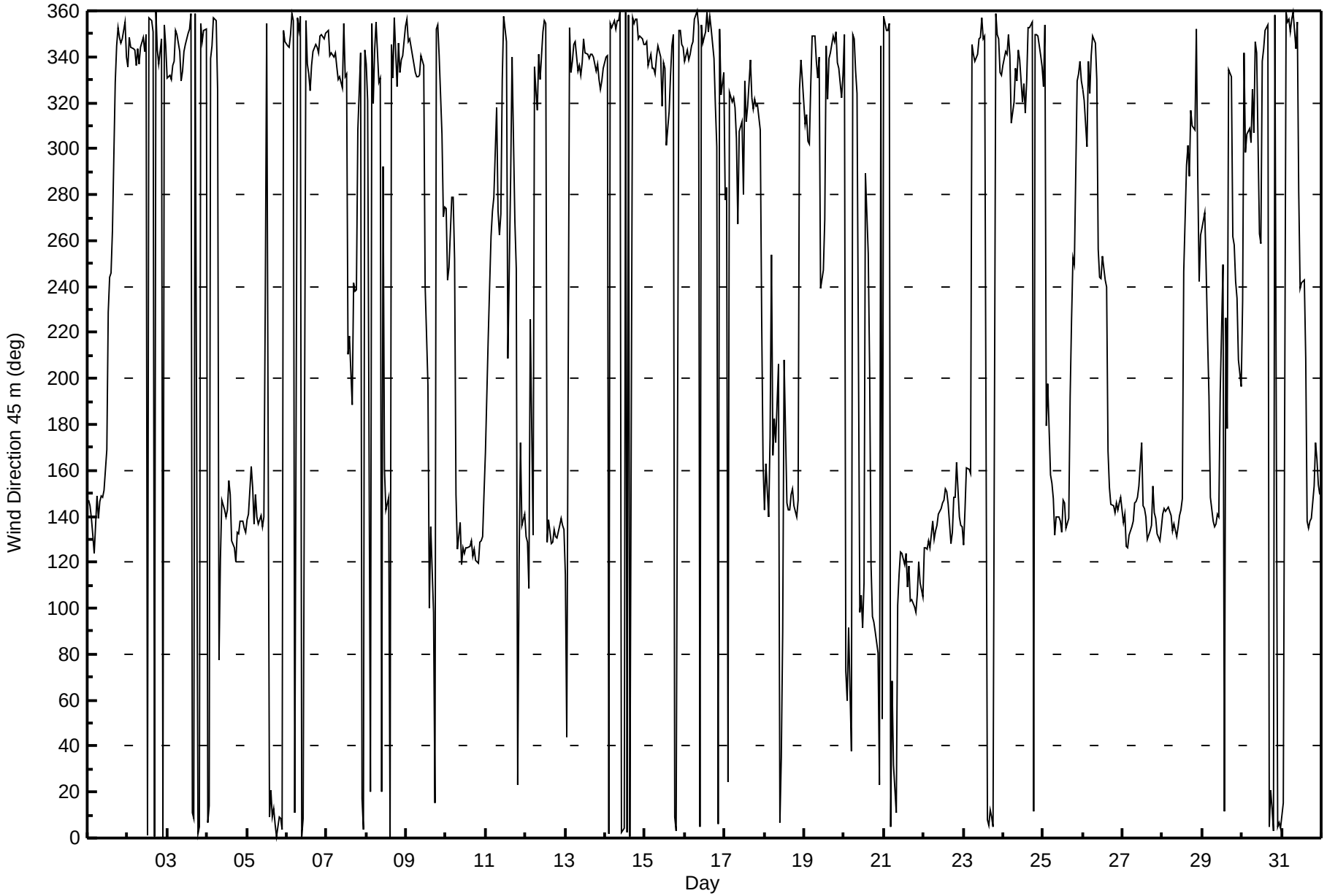
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	12	8	14	15	36	22	19	7	11	7	27	16	22	13	10	23	39	16	11	20	39	45	30	18	45
2-Mar	21	17	24	15	15	12	18	15	15	17	20	25	24	21	21	15	15	13	12	13	14	17	13	14	25
3-Mar	15	13	17	15	26	29	20	20	16	17	16	13	11	13	16	15	16	16	13	12	14	14	11	20	29
4-Mar	64	22	26	21	15	21	99	87	34	14	11	17	14	16	12	16	12	15	10	8	9	8	8	11	99
5-Mar	9	12	17	20	22	10	13	8	4	9	12	82	48	16	19	17	17	15	13	15	16	14	13	13	82
6-Mar	14	13	14	15	21	21	18	13	14	15	21	22	17	30	25	17	18	18	13	28	11	12	14	13	30
7-Mar	10	12	17	16	16	15	16	12	13	17	23	46	80	60	79	17	32	15	17	39	14	23	14	17	80
8-Mar	20	26	34	34	14	25	22	65	61	59	43	40	19	85	12	17	18	16	33	13	18	14	15	13	85
9-Mar	13	16	12	14	14	17	16	19	20	23	53	23	46	55	59	63	74	25	11	44	18	26	33	44	74
10-Mar	30	36	46	36	30	64	45	84	50	14	16	14	16	14	17	12	13	14	13	12	12	12	15	17	84
11-Mar	15	35	25	75	48	52	77	42	83	40	35	18	48	29	15	25	19	24	19	46	47	26	25	15	83
12-Mar	13	8	81	49	21	34	39	28	43	40	38	12	51	47	29	16	17	8	7	10	8	6	6	10	81
13-Mar	28	63	26	38	23	20	18	13	14	17	15	13	15	14	13	14	15	14	14	13	14	12	13	13	63
14-Mar	14	14	16	13	15	14	13	13	13	15	15	16	14	14	13	14	13	13	13	14	12	12	11	12	16
15-Mar	15	12	14	14	14	12	13	16	17	16	23	28	37	23	18	19	13	14	17	17	14	15	13	13	37
16-Mar	14	13	13	13	13	14	13	15	14	15	15	14	14	15	15	15	14	16	11	17	18	21	12	43	43
17-Mar	75	22	21	21	11	12	12	71	36	36	35	40	18	17	23	14	18	14	12	10	32	50	17	33	75
18-Mar	30	55	21	68	38	32	29	31	67	56	53	67	38	13	10	11	9	7	8	9	49	41	18	31	68
19-Mar	20	25	38	14	16	7	10	15	29	46	9	13	44	21	25	14	14	16	13	10	13	12	8	15	46
20-Mar	27	19	80	65	83	11	7	38	34	37	19	22	20	86	65	84	18	13	11	14	17	36	15	45	86
21-Mar	16	7	10	14	20	33	34	33	16	21	30	29	17	15	19	20	15	13	13	14	18	17	14	18	34
22-Mar	18	12	9	11	21	33	20	29	15	16	20	23	15	23	44	37	23	20	11	12	15	27	15	18	44
23-Mar	59	29	9	11	49	19	12	13	14	15	17	16	18	14	19	17	19	17	14	10	9	8	58	33	59
24-Mar	19	17	37	13	10	16	18	15	24	25	22	21	20	16	21	22	16	14	14	8	15	8	12	13	37
25-Mar	13	30	71	24	24	8	12	19	6	19	11	15	12	17	21	10	37	25	59	56	78	17	21	25	78
26-Mar	19	13	29	11	11	21	14	14	51	42	10	9	9	10	12	36	10	9	7	6	7	7	10	13	51
27-Mar	53	10	15	9	16	14	28	107	56	30	15	44	13	13	16	13	16	14	10	7	6	8	9	13	107
28-Mar	7	16	6	5	6	8	11	11	23	20	8	7	27	38	28	15	20	17	8	12	57	32	15	30	57
29-Mar	38	53	85	35	28	27	4	5	6	4	7	53	90	45	101	68	58	30	46	72	20	69	69	54	101
30-Mar	64	22	20	33	52	32	26	43	32	32	55	24	43	16	14	14	27	19	17	15	14	16	15	16	64
31-Mar	16	17	17	15	16	15	18	19	30	32	76	30	13	45	71	14	11	13	10	10	8	7	30	28	76
	75	63	85	75	83	64	99	107	83	59	76	82	90	86	101	84	74	30	59	72	78	69	69	54	
	Diurnal Maximum																								

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction 45 m (WD45m) - deg

Lower Camp Met Tower - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 100 m (WD100m) - deg

Lower Camp Met Tower - March 2016

Direction of Maximum Speed: 355 deg on Mar 30 16:00
Direction of Maximum Daily Speed Average: 359.5 deg on Mar 14

Direction of Minimum Speed: 142 deg on Mar 8 03:00

Direction of Minimum Daily Speed Average: 1.8 deg on Mar 31

Monthly Average Direction: 339.3 deg

Hours in Service:	744
Hours of Data:	735
Hours of Missing Data:	9
Percent Operational Time:	98.8

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	156	150	162	163	153	172	161	163	153	150	135	149	177	213	236	302	345	352	17	7	19	359	58	356	135.1
2-Mar	331	358	3	353	351	352	360	346	348	352	344	350	350	351	348	355	16	12	355	350	354	5	7	358	354.7
3-Mar	353	344	340	339	348	353	352	350	338	343	350	347	353	354	360	9	9	2	4	6	359	354	358	6	355.5
4-Mar	28	27	358	356	10	31	94	111	138	153	150	137	140	155	149	130	130	125	136	136	141	141	139	139	132.4
5-Mar	142	144	155	150	146	161	165	144	167	145	162	285	4	12	24	14	17	11	5	11	12	9	3	360	44.6
6-Mar	356	354	357	6	6	20	4	358	3	4	15	360	340	337	333	344	355	355	2	30	74	9	9	6	2.3
7-Mar	4	3	352	349	353	351	350	346	342	328	306	293	296	239	302	211	240	237	240	313	343	17	7	352	332.0
8-Mar	355	340	142	103	113	277	321	133	169	111	106	145	137	137	336	348	337	353	351	10	18	359	358	4	21.2
9-Mar	9	356	353	351	348	AF	AF	AF	AF	AF	AF	262	202	154	117	128	114	35	56	58	39	50	57	123	20.5
10-Mar	131	123	139	AF	AF	AF	142	137	135	126	130	128	128	129	130	130	125	128	127	129	134	134	136	146	131.5
11-Mar	165	211	248	259	261	262	270	260	263	269	326	357	11	248	255	300	337	287	249	7	74	169	150	147	261.3
12-Mar	152	139	125	142	150	92	336	337	350	351	336	1	94	131	133	130	129	133	133	141	141	141	138	140	132.1
13-Mar	140	136	338	22	68	55	341	336	343	345	345	348	345	345	343	346	346	345	340	339	336	331	334	341	345.9
14-Mar	346	349	3	358	356	358	356	0	1	4	6	7	4	5	1	2	359	359	4	4	354	355	355	353	359.5
15-Mar	352	349	342	344	346	344	342	347	350	344	327	337	336	309	317	332	346	353	14	11	358	356	351	348	347.0
16-Mar	344	348	344	347	349	350	0	3	357	3	352	347	347	1	352	359	356	346	322	303	340	12	344	343	349.9
17-Mar	283	279	311	314	312	309	306	293	299	298	312	293	327	313	319	336	325	320	322	324	339	339	260	209	312.3
18-Mar	214	227	202	249	242	222	232	250	270	356	25	84	198	134	131	141	156	159	160	152	143	233	333	332	176.3
19-Mar	338	341	337	337	349	14	345	351	343	314	293	321	346	346	332	348	350	358	1	20	352	5	82	90	350.4
20-Mar	84	96	101	106	115	75	81	83	89	113	107	94	106	51	233	149	116	99	97	97	90	64	42	91	95.4
21-Mar	73	57	43	78	81	89	83	85	101	112	111	115	117	122	109	118	106	106	102	101	109	118	117	117	102.0
22-Mar	129	130	132	131	129	132	132	134	133	135	135	137	144	142	140	137	131	133	148	143	141	132	133	135	134.6
23-Mar	131	139	153	161	150	336	353	349	344	347	346	355	347	352	11	8	15	12	10	14	11	6	356	2	7.3
24-Mar	5	353	347	344	328	345	355	354	341	315	334	325	327	320	328	348	355	3	22	7	29	11	352	352	348.4
25-Mar	334	292	164	146	151	157	157	153	156	143	143	138	142	132	131	148	179	169	178	209	189	330	337	338	146.3
26-Mar	338	343	318	318	337	345	333	3	358	279	244	244	254	237	222	151	146	141	143	141	146	154	146	145	164.3
27-Mar	148	144	143	142	136	145	134	135	139	141	144	147	138	136	133	131	133	135	142	141	143	142	143	142	139.7
28-Mar	143	141	144	153	158	159	160	159	146	145	144	144	149	259	301	300	294	320	312	307	312	312	293	265	200.0
29-Mar	258	250	245	242	232	217	193	190	159	152	152	226	268	12	349	143	354	356	332	272	272	250	218	227	236.9
30-Mar	282	316	339	319	295	311	318	341	336	329	283	298	338	342	352	355	4	25	17	6	360	6	7	4	353.1
31-Mar	11	16	4	0	2	359	1	8	350	359	293	235	241	267	176	132	136	141	145	163	177	175	169	177	65.9
	48.1	53.0	16.4	359.6	2.1	7.3	358.7	3.5	12.6	25.3	28.5	20.4	24.9	9.2	7.9	26.4	44.0	43.2	44.1	38.9	50.7	46.4	51.3	46.5	
	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 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 99 deg on Mar 20 16:00

Minimum Value: 2 deg on Mar 24 06:00

Percentiles: P_1 = 3 P_{10} = 5 Q_1 = 7 Median = 10 Q_3 = 17 P_{90} = 34 P_{99} = 86

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	8	8	10	14	11	30	18	25	12	10	26	10	30	27	27	30	15	10	8	21	26	20	64	83	83
2-Mar	4	27	26	13	7	12	15	9	7	12	15	14	17	12	13	7	13	10	5	7	7	10	8	7	27
3-Mar	8	6	7	8	16	14	7	10	8	10	12	8	5	6	9	8	8	8	6	6	10	10	8	11	16
4-Mar	17	14	15	12	13	16	63	37	8	8	10	9	7	16	11	10	6	9	4	5	4	3	3	4	63
5-Mar	4	4	12	9	11	11	12	9	12	26	37	76	36	10	12	10	9	9	6	8	9	7	8	9	76
6-Mar	9	8	8	9	15	15	11	7	8	10	13	15	13	28	18	12	14	12	7	27	28	10	11	8	28
7-Mar	6	5	10	7	7	6	7	6	9	12	23	35	52	57	95	66	11	8	8	37	8	22	13	16	95
8-Mar	12	25	92	12	18	68	81	47	39	15	55	17	10	89	19	11	12	12	13	8	11	11	10	8	92
9-Mar	10	9	7	7	7	AF	AF	AF	AF	AF	AF	41	93	53	52	24	62	28	21	28	33	38	54	35	93
10-Mar	6	14	4	AF	AF	AF	8	8	8	9	9	7	9	7	9	7	8	8	7	6	6	5	5	7	14
11-Mar	13	24	8	14	20	22	36	11	20	13	30	11	39	36	13	24	13	25	18	40	14	29	13	9	40
12-Mar	7	4	16	17	13	29	12	19	17	32	30	35	51	9	15	10	10	5	4	4	3	3	3	3	51
13-Mar	4	41	22	46	14	39	7	5	8	11	11	7	10	8	8	9	10	9	9	8	9	7	7	9	46
14-Mar	9	9	10	7	10	8	7	8	7	8	9	7	10	7	7	7	6	7	8	8	7	5	4	5	10
15-Mar	6	7	4	8	7	5	5	9	9	10	19	20	27	18	12	14	8	9	9	11	10	10	8	8	27
16-Mar	9	8	7	8	8	8	7	8	8	7	10	9	9	8	10	9	9	11	6	10	33	14	8	28	33
17-Mar	44	9	12	7	5	6	7	10	13	17	24	34	15	13	18	12	13	8	5	5	11	7	47	25	47
18-Mar	19	16	21	14	11	14	11	19	40	35	44	79	50	9	7	6	6	6	10	7	12	59	44	5	79
19-Mar	4	5	3	3	10	10	7	6	26	33	26	19	20	15	20	14	9	16	14	15	12	19	35	22	35
20-Mar	34	8	20	13	30	10	9	13	18	14	13	13	10	77	84	99	9	9	5	6	10	34	33	20	99
21-Mar	22	18	23	27	24	11	21	29	11	12	25	18	11	9	14	13	9	8	10	9	9	10	6	11	29
22-Mar	11	6	4	6	5	8	9	8	7	9	13	14	11	22	28	26	14	13	9	7	10	12	8	7	28
23-Mar	12	8	6	9	10	39	10	8	9	11	11	11	12	10	14	11	12	8	8	8	7	10	12	11	39
24-Mar	12	7	3	5	7	2	7	5	13	16	17	17	12	12	18	16	11	11	8	6	8	9	7	9	18
25-Mar	6	40	49	7	9	8	9	7	8	12	7	12	7	9	11	11	25	18	22	23	60	89	5	5	89
26-Mar	4	5	11	6	7	16	11	9	30	46	16	15	6	8	17	21	13	5	3	4	5	6	5	3	46
27-Mar	8	4	5	4	3	2	6	7	11	15	11	17	8	9	8	6	5	5	7	5	3	4	4	4	17
28-Mar	2	3	3	6	5	4	4	6	7	9	6	5	38	29	15	10	16	10	6	4	6	9	16	10	38
29-Mar	12	14	35	14	17	21	17	19	11	9	19	28	87	31	86	78	53	21	56	41	20	12	40	46	87
30-Mar	32	8	6	16	18	10	8	7	10	22	50	27	32	12	8	7	24	12	11	8	8	9	9	9	50
31-Mar	10	10	10	8	8	10	10	13	17	27	70	38	14	43	73	8	6	4	8	7	5	6	9	12	73
	44	41	92	46	30	68	81	47	40	46	70	79	93	89	95	99	62	28	56	41	60	89	64	83	
	Diurnal Maximum																								

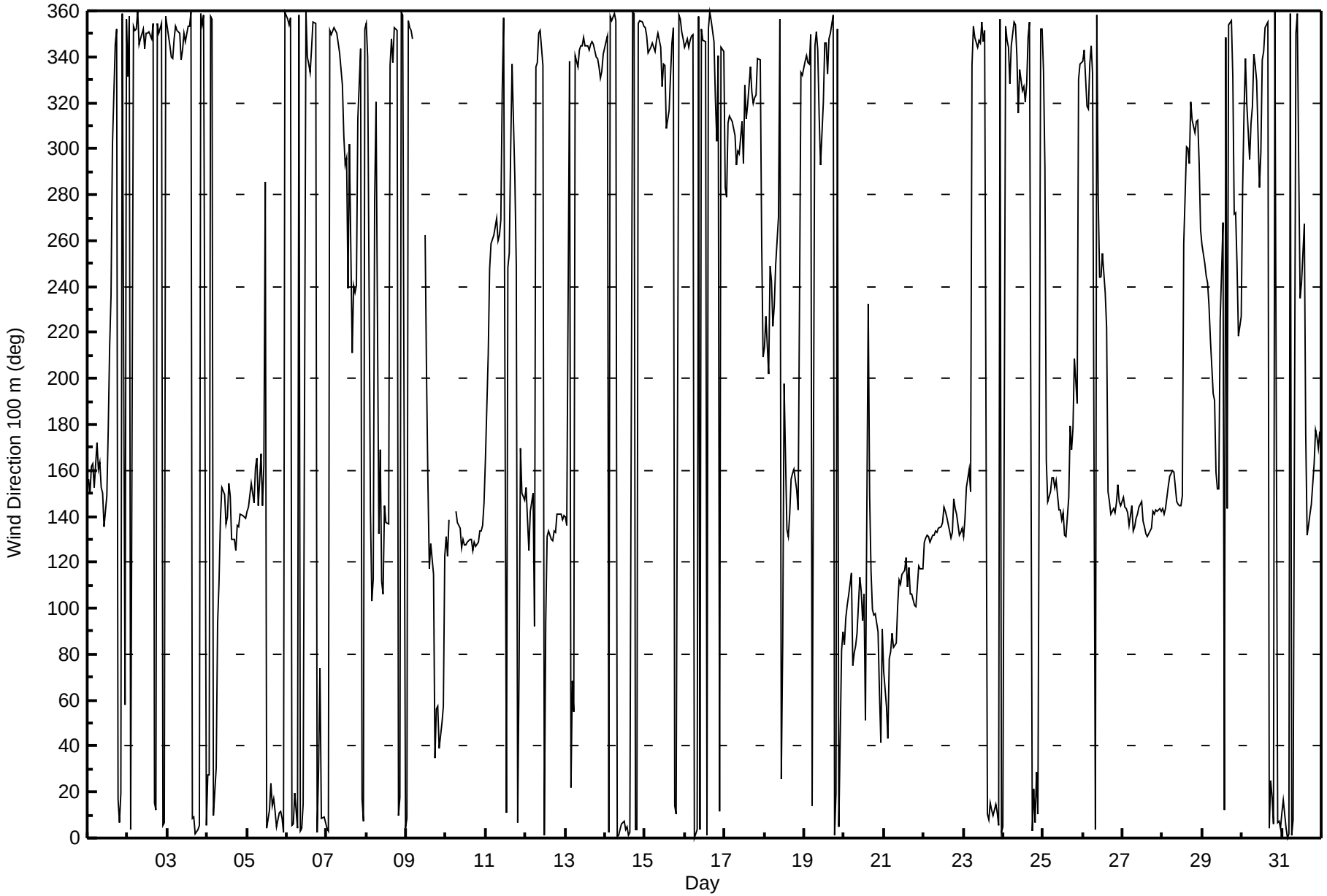
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction 100 m (WD100m) - deg

Lower Camp Met Tower - March 2016



Maximum Value: 0.4 km/h on Mar 29 17:00

Maximum Daily Average: 0.0 km/h on Mar 18

Minimum Value: -0.8 km/h on Mar 21 02:00

Minimum Daily Average: -0.3 km/h on Mar 14

Maximum Diurnal Average: 0.0 km/h at hour 7

Minimum Diurnal Average: -0.2 km/h at hour 15

Monthly Average: -0.08 km/h

Percentiles: P_1 = -0.5 P_{10} = -0.3 Q_1 = -0.2 Median = -0.1 Q_3 = 0.0 P_{90} = 0.1 P_{99} = 0.3

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0.0	-0.1	-0.2	0.0	0.0	0.1	0.1	0.1	0.1	0.0	-0.1	0.1	-0.2	0.0	-0.2	0.1	0.2	-0.1	-0.1	0.1	-0.1	0.0	0.0	-0.3	0.0	0.2
2-Mar	0.0	0.0	-0.1	0.0	0.0	0.1	0.1	0.1	-0.1	-0.1	-0.3	-0.1	-0.2	-0.2	-0.1	-0.3	-0.2	-0.1	0.0	0.2	-0.1	0.0	-0.1	0.0	-0.1	0.2
3-Mar	0.0	0.1	0.1	0.1	-0.1	0.0	0.0	-0.1	0.0	0.2	-0.2	-0.2	-0.5	-0.4	-0.5	-0.2	0.1	-0.2	-0.1	-0.1	-0.2	-0.1	0.0	0.0	-0.1	0.2
4-Mar	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	-0.1	0.0	-0.1	-0.2	-0.3	-0.3	-0.2	-0.2	-0.3	-0.3	-0.1	-0.3	-0.1	0.1
5-Mar	-0.1	0.0	0.1	-0.1	-0.1	0.1	0.1	0.1	-0.1	0.0	0.1	0.0	0.2	-0.1	0.1	0.1	-0.1	0.1	-0.3	-0.2	0.0	-0.1	-0.2	0.0	0.0	0.2
6-Mar	0.0	-0.2	0.0	-0.1	-0.1	-0.1	0.2	-0.3	-0.4	-0.5	0.2	-0.3	0.0	0.0	-0.2	0.1	0.1	0.0	0.2	-0.2	-0.2	0.1	-0.2	-0.1	-0.1	0.2
7-Mar	-0.2	-0.4	-0.1	0.0	0.0	0.1	0.2	0.2	0.0	0.0	-0.1	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.1	0.3	0.0	-0.1	-0.2	0.0	0.0	0.3
8-Mar	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	-0.1	0.1	-0.1	-0.2	-0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
9-Mar	-0.1	0.1	-0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.0	-0.1	-0.3	-0.3	-0.1	0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
10-Mar	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.1	-0.4	-0.3	-0.4	-0.3	-0.2	-0.5	-0.2	-0.3	-0.3	-0.2	-0.3	-0.1	-0.2	0.0	0.1	-0.1	0.1
11-Mar	-0.1	0.0	0.0	-0.1	-0.1	-0.4	-0.3	-0.1	0.1	-0.1	-0.1	-0.2	0.2	-0.1	-0.1	-0.2	0.0	-0.1	-0.1	-0.1	0.1	0.3	-0.1	0.0	-0.1	0.3
12-Mar	0.0	0.0	0.1	0.1	0.1	-0.1	-0.2	-0.1	-0.1	0.0	0.0	-0.4	0.1	0.0	-0.1	-0.1	0.0	-0.3	-0.1	-0.1	-0.2	-0.2	-0.1	-0.2	-0.1	0.1
13-Mar	-0.1	-0.1	-0.1	0.0	-0.1	-0.1	0.1	0.1	0.1	0.0	0.0	-0.3	-0.2	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	-0.2	-0.3	0.0	0.1	-0.1	0.1
14-Mar	0.0	0.0	-0.2	-0.2	-0.2	-0.4	-0.3	-0.4	-0.7	-0.4	-0.2	-0.1	-0.5	-0.6	-0.4	-0.2	-0.5	-0.3	-0.3	-0.1	-0.3	-0.3	-0.1	0.0	-0.3	0.0
15-Mar	0.0	-0.2	0.1	0.0	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	-0.2	-0.2	-0.2	-0.3	0.1	0.0	-0.3	-0.2	-0.2	-0.2	-0.1	0.2
16-Mar	0.1	0.1	-0.1	-0.2	-0.1	-0.1	-0.3	-0.4	-0.4	0.0	-0.5	-0.2	-0.2	-0.2	-0.4	-0.4	-0.3	-0.3	-0.3	-0.1	-0.1	0.0	0.0	0.0	-0.2	0.1
17-Mar	0.0	-0.1	-0.1	0.0	0.0	0.0	-0.1	0.0	-0.2	0.2	0.0	-0.2	0.0	-0.3	-0.2	0.0	-0.1	-0.1	0.0	0.0	0.1	0.1	0.0	0.1	-0.1	0.2
18-Mar	0.1	0.0	0.1	0.1	0.0	0.2	0.1	0.2	0.0	0.2	0.2	0.1	-0.2	-0.1	0.0	-0.1	0.0	0.1	0.3	0.1	0.0	-0.1	-0.2	0.0	0.0	0.3
19-Mar	0.0	0.0	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.1	0.2	-0.3	-0.2	0.2	-0.1	-0.1	-0.1	0.0	-0.1	-0.1	-0.3	0.1	-0.1	-0.5	-0.6	-0.1	0.2
20-Mar	-0.3	-0.1	0.0	0.0	0.0	-0.1	-0.2	0.1	0.0	0.0	-0.3	-0.4	-0.1	-0.2	-0.1	0.0	-0.1	-0.4	-0.3	-0.2	-0.1	-0.2	-0.3	-0.2	-0.2	0.1
21-Mar	-0.6	-0.8	-0.6	-0.5	-0.3	-0.1	0.0	-0.1	-0.4	0.0	0.3	-0.1	0.0	0.0	-0.3	-0.1	-0.2	-0.4	-0.2	-0.2	-0.3	-0.1	-0.3	-0.1	-0.2	0.3
22-Mar	-0.2	-0.3	-0.3	-0.2	-0.1	0.0	0.1	0.0	0.1	0.0	-0.1	0.0	-0.2	0.1	0.0	-0.2	0.0	0.0	-0.1	0.0	0.1	0.0	0.0	0.0	-0.1	0.1
23-Mar	0.1	0.1	-0.1	0.2	0.1	0.0	0.1	0.2	-0.1	-0.3	-0.1	0.0	-0.2	-0.3	0.0	-0.1	0.0	0.0	-0.1	-0.1	0.0	-0.2	0.0	-0.2	0.0	0.2
24-Mar	0.0	-0.1	0.0	-0.2	-0.1	-0.1	-0.1	0.0	-0.1	-0.2	-0.3	0.0	-0.3	-0.4	-0.3	-0.3	-0.3	-0.2	-0.1	-0.2	-0.1	-0.2	-0.1	-0.1	-0.2	0.0
25-Mar	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	-0.2	0.1	0.0	-0.1	0.0	0.0	0.0	-0.1	0.0	0.1	0.1	0.0	-0.1	-0.1	0.0	0.1
26-Mar	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	-0.4	-0.2	-0.4	0.0	-0.1	-0.1	0.0	-0.1	-0.1	0.0	0.1	0.2	0.1	0.0	-0.1	0.2
27-Mar	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.0	-0.3	0.1	0.2	0.0	-0.2	0.0	0.0	-0.1	0.0	-0.2	-0.4	-0.4	-0.1	-0.1	0.2
28-Mar	-0.1	0.1	-0.1	0.1	0.0	0.0	0.0	-0.2	0.1	0.0	-0.3	-0.2	-0.1	-0.2	-0.5	-0.5	-0.2	-0.1	-0.4	-0.2	0.0	0.1	0.0	-0.2	-0.1	0.1
29-Mar	-0.4	-0.2	-0.1	-0.1	0.2	0.3	0.1	0.1	-0.1	-0.2	0.0	-0.3	-0.1	0.4	-0.1	0.0	0.4	0.0	-0.2	0.0	0.0	0.1	0.1	0.1	0.0	0.4
30-Mar	0.1	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	-0.1	-0.1	0.2	-0.1	-0.2	-0.5	-0.5	-0.6	0.0	0.0	-0.2	-0.1	-0.2	-0.3	-0.4	-0.1	-0.1	0.2
31-Mar	-0.1	-0.3	-0.1	-0.3	-0.2	0.0	0.0	-0.4	-0.1	-0.1	-0.2	-0.2	-0.2	-0.1	0.1	0.0	0.0	0.0	-0.1	0.2	0.3	0.4	0.1	-0.1	0.0	0.4
	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	Diurnal Average	
	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.1	0.2	0.3	0.1	0.2	0.4	0.2	0.1	0.4	0.1	0.3	0.3	0.3	0.4	0.1	0.1	Diurnal Maximum	

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Vertical Wind Speed 20 m (VW20m) - km/h

Lower Camp Met Tower - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 4.1 km/h on Mar 30 23:00

Minimum Value: 0.1 km/h on Mar 17 22:00

Percentiles: P_1 = 0.2 P_{10} = 0.4 Q_1 = 0.7 Median = 1.2 Q_3 = 1.8 P_{90} = 2.3 P_{99} = 3.5

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	1.4	1.2	0.9	0.4	0.3	0.3	0.4	0.3	0.3	1.1	1.1	1.0	1.3	1.3	1.0	0.9	0.7	0.9	0.7	1.1	0.5	0.5	0.4	0.5	1.4
2-Mar	0.4	0.4	0.5	0.8	0.8	0.9	1.1	1.1	1.3	1.4	1.3	1.4	1.6	1.6	1.6	1.5	1.4	1.1	1.1	1.0	1.4	1.5	1.1	1.0	1.6
3-Mar	0.9	0.8	0.8	1.0	0.9	0.8	0.9	1.2	1.5	1.3	1.3	1.8	1.9	2.1	2.4	2.7	2.5	2.3	2.7	2.3	1.9	1.2	0.7	0.4	2.7
4-Mar	0.5	0.9	0.8	0.6	0.6	0.3	0.2	0.2	0.5	1.0	1.6	1.8	2.2	2.0	2.0	2.3	2.5	2.2	2.3	1.7	2.4	2.7	2.8	2.7	2.8
5-Mar	2.9	2.6	1.8	1.3	1.0	0.6	0.6	0.9	0.9	1.1	1.1	1.2	2.4	3.3	2.5	2.6	3.0	2.7	2.6	3.0	2.6	2.1	1.7	1.3	3.3
6-Mar	1.3	1.3	1.5	1.7	1.6	1.3	1.4	1.4	1.8	2.1	2.2	2.2	1.7	1.6	1.5	1.5	1.5	1.4	1.2	0.8	0.7	1.3	1.5	1.5	2.2
7-Mar	1.6	1.7	1.3	1.2	1.0	0.9	0.7	0.9	1.1	1.1	1.3	1.2	1.3	1.0	0.8	0.5	1.1	1.1	1.1	1.6	1.7	1.6	1.4	0.9	1.7
8-Mar	0.7	0.4	0.3	0.2	0.3	0.5	0.5	0.4	0.6	0.7	0.8	0.6	1.2	1.0	1.5	1.1	1.0	0.7	0.4	0.5	0.4	0.5	0.5	1.0	1.5
9-Mar	1.2	1.0	1.2	1.2	1.1	1.0	0.9	0.7	0.9	1.1	1.3	1.1	1.0	0.9	1.0	1.1	0.8	0.5	0.4	0.2	0.2	0.2	0.2	0.2	1.3
10-Mar	0.3	0.3	0.2	0.2	0.2	0.2	0.5	0.7	1.4	2.3	2.9	3.1	3.0	2.8	2.6	2.7	2.5	2.3	2.1	2.0	2.2	2.3	1.8	1.4	3.1
11-Mar	0.9	0.5	0.4	0.9	1.4	1.5	1.8	2.1	1.7	1.6	1.7	1.3	0.9	0.6	1.0	1.1	1.1	0.6	0.6	0.3	0.3	0.8	0.9	0.8	2.1
12-Mar	0.8	0.6	0.4	0.3	0.7	0.4	0.5	0.5	0.6	1.0	1.2	1.4	1.2	1.4	1.4	2.0	2.3	2.3	1.1	1.1	1.5	1.8	1.7	1.6	2.3
13-Mar	1.1	0.8	1.0	0.5	0.4	0.8	0.8	0.8	1.0	1.3	1.5	2.1	2.2	2.3	2.1	2.1	2.6	2.5	2.3	2.9	2.5	2.4	2.1	2.0	2.9
14-Mar	2.0	1.9	2.6	2.6	2.1	2.5	2.6	2.4	2.7	2.8	2.7	2.8	2.5	2.9	2.8	2.7	2.6	2.3	2.1	2.0	2.0	1.8	1.4	1.2	2.9
15-Mar	0.9	0.6	0.7	0.8	0.7	0.9	1.0	1.1	1.2	1.3	1.6	1.7	1.9	2.0	1.9	1.9	1.7	1.7	1.7	1.7	1.8	1.9	1.7	1.9	2.0
16-Mar	2.0	2.0	2.1	2.2	1.9	1.7	2.1	1.9	2.2	2.4	2.3	2.3	2.1	2.0	2.5	2.4	1.9	1.6	1.2	1.0	1.1	1.1	0.8	0.6	2.5
17-Mar	0.3	0.6	0.3	0.6	0.8	0.6	0.6	0.6	0.5	1.4	1.8	1.7	2.2	2.3	2.0	1.7	1.5	1.5	0.8	0.7	0.4	0.1	0.2	0.3	2.3
18-Mar	0.3	0.9	0.5	0.5	0.5	0.8	0.6	0.6	0.4	1.1	1.2	1.6	1.0	1.5	1.6	1.8	1.6	1.2	0.8	1.1	0.7	0.4	0.4	0.3	1.8
19-Mar	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.8	1.3	1.2	1.3	1.5	1.7	1.7	1.5	1.4	0.9	1.0	1.2	0.9	0.8	0.7	0.6	1.7
20-Mar	0.5	1.1	0.9	0.8	0.7	0.8	1.1	0.7	0.7	1.1	1.7	2.0	1.8	1.3	1.4	1.0	1.9	2.1	2.0	1.7	1.4	1.3	0.7	1.2	2.1
21-Mar	1.4	1.6	1.5	1.2	1.2	1.5	1.2	1.1	1.8	1.8	1.5	1.7	2.2	2.3	2.1	2.2	2.5	2.4	1.9	1.9	1.7	1.9	1.8	1.3	2.5
22-Mar	1.6	2.1	2.0	1.7	1.6	1.0	0.7	0.9	1.6	1.7	1.5	1.4	1.6	1.4	1.2	1.2	1.7	1.5	1.4	1.2	0.7	0.9	1.3	1.5	2.1
23-Mar	1.2	1.4	1.0	0.7	0.3	0.6	0.9	1.2	1.9	2.1	2.2	2.0	2.3	2.2	2.5	2.6	2.3	2.1	1.7	1.0	0.9	0.7	0.5	0.5	2.6
24-Mar	0.5	0.4	0.5	0.3	0.2	0.2	0.4	0.6	0.8	1.2	1.7	1.9	2.0	2.1	1.9	2.0	1.7	1.4	1.0	0.4	0.3	0.5	0.4	0.3	2.1
25-Mar	0.2	0.1	0.1	0.2	0.3	0.3	0.4	0.7	1.0	0.9	1.4	1.4	1.5	1.1	1.1	1.0	0.6	0.5	0.2	0.2	0.2	0.3	0.5	0.6	1.5
26-Mar	0.5	0.2	0.3	0.2	0.2	0.3	0.4	0.9	1.3	1.7	1.6	1.7	1.8	1.7	1.5	1.1	1.0	1.3	1.1	0.6	1.0	0.9	1.3	1.4	1.8
27-Mar	0.9	0.9	0.8	0.6	0.4	0.3	0.3	0.3	0.9	1.2	1.3	1.1	1.5	1.9	2.2	2.9	2.8	2.3	1.2	1.3	2.3	2.5	2.4	1.5	2.9
28-Mar	1.6	1.4	1.0	0.7	1.2	1.8	1.5	2.1	1.6	2.1	2.0	1.7	1.5	1.4	2.6	2.6	2.1	1.7	1.2	1.1	0.3	0.2	0.5	1.2	2.6
29-Mar	1.4	1.6	1.5	0.9	1.0	1.1	0.9	1.2	1.7	1.6	1.3	1.2	1.3	1.6	1.4	1.1	1.2	0.9	0.5	0.4	0.3	0.4	0.2	0.3	1.7
30-Mar	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.6	1.1	1.6	1.6	1.6	2.4	3.5	3.1	3.7	2.9	3.5	3.5	3.5	3.3	3.8	4.1	3.6	4.1
31-Mar	3.1	2.7	2.3	1.9	1.9	1.4	1.0	1.4	1.5	1.7	1.8	1.6	1.7	1.4	0.9	1.4	1.7	1.7	1.4	1.0	1.1	1.1	0.9	0.7	3.1
	3.1	2.7	2.6	2.6	2.1	2.5	2.6	2.4	2.7	2.8	2.9	3.1	3.0	3.5	3.1	3.7	3.0	3.5	3.5	3.5	3.3	3.8	4.1	3.6	
	Diurnal Maximum																								

Wood Buffalo Environmental Association

Summary of Hour Averages

Vertical Wind Speed 45 m (VW45m) - km/h

Lower Camp Met Tower - March 2016

Maximum Value: 1.3 km/h on Mar 28 06:00

Maximum Daily Average: 0.4 km/h on Mar 27

Minimum Value: -1.2 km/h on Mar 21 02:00

Minimum Daily Average: -0.4 km/h on Mar 14

Maximum Diurnal Average: 0.1 km/h at hour 17

Minimum Diurnal Average: -0.1 km/h at hour 15

Monthly Average: 0.03 km/h

Percentiles: P_1 = -0.8 P_{10} = -0.4 Q_1 = -0.2 Median = 0.0 Q_3 = 0.3 P_{90} = 0.6 P_{99} = 1.0

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0.5	0.4	0.2	0.2	0.2	0.2	0.4	0.4	0.3	0.5	0.1	0.1	-0.1	-0.2	-0.3	0.1	0.3	-0.1	-0.2	0.0	-0.2	-0.1	0.0	-0.5	0.1	0.5
2-Mar	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.4	0.0	0.0	-0.2	-0.1	-0.4	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0
3-Mar	-0.2	0.0	-0.1	0.0	-0.1	0.0	-0.1	-0.3	-0.3	0.0	-0.4	-0.3	-0.6	-0.4	-0.5	-0.1	-0.1	-0.2	-0.4	-0.2	-0.3	-0.2	-0.1	-0.1	-0.2	0.0
4-Mar	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.1	0.1	0.2	0.5	0.6	0.7	0.5	0.6	0.7	0.5	0.4	0.7	0.5	0.7	1.0	1.0	1.1	0.4	1.1
5-Mar	1.0	0.8	0.5	0.2	0.1	0.6	0.3	0.5	0.6	0.6	0.6	0.1	0.1	-0.2	0.2	0.1	0.1	-0.1	-0.4	-0.3	-0.3	-0.1	-0.4	-0.1	0.2	1.0
6-Mar	-0.1	-0.2	-0.2	-0.3	-0.2	0.0	0.0	-0.2	-0.4	-0.5	0.3	-0.2	-0.1	0.2	-0.1	-0.1	0.0	-0.1	0.0	-0.3	-0.4	-0.1	-0.2	-0.2	-0.2	0.3
7-Mar	-0.3	-0.3	-0.1	-0.1	-0.1	0.0	0.1	0.0	-0.1	-0.1	0.0	0.3	0.4	0.4	0.3	-0.1	0.1	0.1	0.3	0.1	-0.2	0.0	-0.2	-0.1	0.0	0.4
8-Mar	-0.1	0.1	0.0	0.0	-0.1	-0.1	-0.2	0.0	0.1	0.2	0.4	-0.1	0.4	0.1	-0.2	-0.1	-0.1	-0.1	0.0	-0.1	-0.1	0.0	0.0	-0.1	0.0	0.4
9-Mar	-0.2	0.0	-0.2	-0.2	0.0	-0.2	0.0	0.1	-0.1	0.1	0.1	-0.1	-0.2	-0.3	0.0	0.3	0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3
10-Mar	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.2	0.5	0.3	0.7	0.8	0.7	0.8	0.4	0.7	0.7	0.5	0.5	0.4	0.7	0.7	0.6	0.4	0.4	0.8
11-Mar	-0.1	0.0	0.1	-0.1	-0.2	-0.7	-0.3	0.2	0.2	0.0	-0.2	-0.1	0.3	-0.2	-0.1	-0.4	-0.1	-0.2	-0.1	0.0	0.2	0.4	0.2	0.4	0.0	0.4
12-Mar	0.5	0.5	0.1	0.1	0.4	-0.2	-0.3	-0.2	-0.1	0.0	0.1	-0.4	0.2	0.3	0.4	0.5	0.8	0.8	0.6	0.4	0.4	0.7	0.8	0.6	0.3	0.8
13-Mar	0.4	0.0	-0.3	-0.1	-0.3	-0.2	0.0	0.0	0.1	0.0	-0.1	-0.6	-0.3	-0.4	-0.3	0.0	-0.3	-0.4	-0.3	-0.6	-0.8	-0.7	-0.5	-0.1	-0.2	0.4
14-Mar	-0.4	-0.3	-0.3	-0.5	-0.4	-0.3	-0.4	-0.5	-0.7	-0.4	-0.3	-0.3	-0.5	-0.4	-0.5	-0.4	-0.6	-0.2	-0.3	-0.3	-0.4	-0.3	-0.2	-0.2	-0.4	-0.2
15-Mar	0.0	-0.1	-0.1	0.0	0.2	0.0	-0.1	0.0	-0.1	-0.2	0.0	0.1	0.1	0.0	-0.3	-0.4	-0.5	-0.3	0.0	-0.1	-0.3	-0.1	-0.3	-0.3	-0.1	0.2
16-Mar	-0.1	-0.2	-0.3	-0.4	-0.4	-0.3	-0.3	-0.3	-0.5	-0.2	-0.4	-0.6	-0.2	-0.3	-0.5	-0.6	-0.4	-0.5	-0.6	-0.5	-0.1	-0.1	-0.2	-0.1	-0.3	-0.1
17-Mar	-0.1	-0.1	-0.1	-0.2	-0.4	-0.3	-0.4	-0.2	-0.2	0.1	-0.3	-0.3	-0.2	-0.7	-0.6	-0.3	-0.4	-0.5	-0.2	-0.4	0.0	0.0	0.0	0.3	-0.2	0.3
18-Mar	0.3	0.1	0.3	0.1	-0.1	0.6	0.1	0.1	0.0	0.2	0.4	0.3	-0.1	0.4	0.6	0.7	0.8	0.9	1.2	1.0	0.1	-0.1	-0.3	0.0	0.3	1.2
19-Mar	-0.2	-0.1	-0.1	-0.2	-0.3	-0.2	-0.1	-0.1	0.1	0.3	-0.4	-0.2	0.3	0.0	-0.2	-0.2	-0.2	-0.2	-0.4	-0.5	-0.2	-0.4	-1.0	-0.7	-0.2	0.3
20-Mar	-0.4	0.1	0.0	0.2	0.0	-0.2	-0.5	0.0	0.0	0.2	0.2	0.2	0.4	-0.1	0.0	0.0	0.5	0.3	0.6	0.5	0.3	-0.3	-0.5	0.0	0.1	0.6
21-Mar	-0.7	-1.2	-1.1	-0.6	-0.5	0.3	0.2	-0.1	0.3	0.5	0.6	0.2	0.7	0.6	0.3	0.6	0.5	0.5	0.6	0.6	0.3	0.5	0.2	0.4	0.2	0.7
22-Mar	0.4	0.4	0.6	0.5	0.6	0.3	0.3	0.3	0.5	0.5	0.3	0.3	0.2	0.4	0.4	0.0	0.4	0.5	0.5	0.5	0.2	0.2	0.4	0.4	0.4	0.6
23-Mar	0.4	0.5	0.0	0.4	0.2	0.0	-0.1	-0.1	-0.2	-0.3	-0.3	-0.2	-0.3	-0.5	-0.1	-0.1	0.0	0.0	-0.1	-0.2	-0.2	-0.3	-0.1	-0.3	-0.1	0.5
24-Mar	-0.2	-0.2	-0.1	-0.2	-0.2	-0.3	-0.3	-0.2	-0.1	0.0	-0.2	-0.1	-0.3	-0.4	-0.4	-0.3	-0.2	-0.2	0.0	-0.2	-0.1	-0.3	-0.3	-0.3	-0.2	0.0
25-Mar	-0.2	0.1	0.1	0.0	0.2	0.3	0.4	0.4	0.8	0.3	0.2	0.4	0.3	0.4	0.3	0.3	0.1	0.0	0.0	0.1	0.0	-0.1	-0.1	-0.1	0.2	0.8
26-Mar	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	-0.3	0.0	0.1	0.0	-0.5	-0.4	-0.5	-0.3	-0.2	0.1	0.4	0.8	0.7	0.6	0.6	1.0	0.8	0.6	0.1	1.0
27-Mar	0.1	0.4	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.0	0.3	0.0	0.6	0.9	0.9	0.9	1.1	0.9	0.1	0.6	0.8	0.8	0.6	0.4	0.4	1.1
28-Mar	0.9	0.5	0.6	0.7	1.1	1.3	0.8	0.6	0.5	0.6	0.7	0.8	0.4	-0.1	-1.1	-1.0	-0.4	-0.4	-0.8	-0.7	0.0	0.0	-0.1	-0.6	0.2	1.3
29-Mar	-0.8	-0.2	0.0	-0.2	-0.1	0.7	1.0	1.0	0.9	0.8	0.5	-0.2	-0.1	0.5	0.2	0.1	0.5	0.1	-0.3	0.0	0.0	0.0	0.1	0.1	0.2	1.0
30-Mar	0.0	0.1	0.0	0.0	0.0	0.0	-0.2	0.0	-0.1	0.0	0.6	-0.1	-0.3	-0.9	-0.9	-0.6	0.1	0.2	-0.3	-0.3	-0.4	-0.2	-0.3	-0.2	-0.2	0.6
31-Mar	0.0	-0.1	-0.2	-0.3	-0.2	-0.1	0.1	-0.3	-0.1	-0.1	0.2	-0.1	-0.4	-0.2	0.3	0.5	0.6	0.6	0.5	0.7	0.1	0.6	0.4	0.2	0.1	0.7
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	-0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	Diurnal Average	
	1.0	0.8	0.6	0.7	1.1	1.3	1.0	1.0	0.9	0.8	0.7	0.8	0.7	0.9	0.9	0.9	1.1	0.9	1.2	1.0	0.8	1.0	1.0	1.1	Diurnal Maximum	

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Vertical Wind Speed 45 m (VW45m) - km/h

Lower Camp Met Tower - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 4.0 km/h on Mar 30 22:00

Minimum Value: 0.1 km/h on Mar 17 22:00

Percentiles: P_1 = 0.2 P_{10} = 0.4 Q_1 = 0.8 Median = 1.3 Q_3 = 1.9 P_{90} = 2.4 P_{99} = 3.7

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	1.3	1.0	0.9	0.6	0.4	0.3	0.4	0.3	0.3	0.9	1.1	1.1	1.3	1.2	0.8	0.9	0.8	0.8	0.7	1.2	0.6	0.6	0.5	0.6	1.3
2-Mar	0.5	0.5	0.6	0.8	1.0	1.0	1.1	1.3	1.5	1.4	1.4	1.5	1.8	1.6	1.6	1.4	1.4	1.0	1.3	1.3	1.5	1.5	1.2	1.2	1.8
3-Mar	1.0	1.1	0.9	1.1	0.8	0.8	1.0	1.2	1.7	1.5	1.3	1.9	1.9	2.1	2.3	2.6	2.6	2.5	2.7	2.2	1.9	1.3	0.7	0.5	2.7
4-Mar	0.6	1.0	0.9	0.8	0.6	0.3	0.2	0.2	0.3	0.9	1.4	1.8	2.0	2.0	1.8	2.2	2.2	2.1	2.1	1.4	2.1	2.2	2.4	2.5	2.5
5-Mar	2.5	2.5	1.8	1.4	1.1	0.7	0.7	0.7	0.7	1.0	0.9	1.3	2.4	3.2	2.5	2.7	3.0	2.9	2.6	2.9	2.6	2.3	1.7	1.5	3.2
6-Mar	1.4	1.5	1.6	1.8	1.8	1.5	1.6	1.5	1.8	1.9	2.3	2.2	1.8	1.7	1.7	1.7	1.8	1.5	1.4	0.8	0.7	1.4	1.5	1.5	2.3
7-Mar	1.5	1.7	1.5	1.4	1.1	1.0	0.8	1.1	1.2	1.2	1.1	1.3	1.5	1.1	0.8	0.4	1.1	1.0	1.1	1.9	1.9	1.5	1.3	1.0	1.9
8-Mar	0.7	0.4	0.2	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.9	0.7	1.3	1.2	1.3	1.1	1.1	0.6	0.5	0.5	0.4	0.5	0.6	1.0	1.3
9-Mar	1.1	1.1	1.2	1.4	1.3	1.1	1.0	0.8	0.9	1.2	1.4	1.1	0.9	0.9	1.2	1.1	0.8	0.5	0.3	0.3	0.2	0.3	0.3	0.2	1.4
10-Mar	0.3	0.4	0.3	0.2	0.3	0.2	0.8	1.1	1.8	2.3	2.8	3.1	3.0	2.7	2.6	2.5	2.5	2.2	2.0	2.0	2.0	2.2	1.9	1.6	3.1
11-Mar	1.0	0.6	0.6	1.2	1.7	1.9	2.3	2.5	1.7	1.7	1.8	1.2	1.1	0.5	0.9	1.2	1.2	0.6	0.6	0.3	0.4	0.8	1.1	0.9	2.5
12-Mar	0.8	0.5	0.6	0.4	0.9	0.5	0.5	0.6	0.7	0.9	1.2	1.1	1.2	1.5	1.4	2.0	2.3	2.0	1.0	1.2	1.4	1.5	1.3	1.4	2.3
13-Mar	1.2	0.9	1.0	0.6	0.4	0.8	0.8	1.1	1.1	1.4	1.7	2.1	2.5	2.6	2.4	2.5	2.9	3.0	2.8	3.3	3.0	2.7	2.5	2.4	3.3
14-Mar	2.3	2.1	2.8	2.7	2.1	2.6	2.7	2.4	2.6	2.9	2.9	2.8	2.4	2.8	2.6	2.6	2.6	2.4	2.1	2.1	2.0	1.9	1.4	1.3	2.9
15-Mar	1.1	0.6	0.9	0.9	0.8	1.0	1.1	1.2	1.2	1.3	1.7	1.9	2.1	2.3	2.3	2.3	1.6	1.8	1.9	1.8	1.9	2.1	2.0	2.1	2.3
16-Mar	2.3	2.2	2.5	2.5	2.0	1.9	2.3	2.0	2.2	2.4	2.5	2.4	2.2	2.1	2.5	2.5	2.0	1.7	1.3	1.2	1.1	1.3	0.9	0.7	2.5
17-Mar	0.4	0.7	0.3	0.8	1.0	0.8	0.8	0.8	0.5	1.6	2.0	1.8	2.5	2.6	2.2	1.9	1.8	1.7	1.0	0.8	0.6	0.1	0.2	0.4	2.6
18-Mar	0.5	1.1	0.7	0.7	0.7	0.9	0.6	0.7	0.4	1.1	1.4	1.7	1.3	1.4	1.4	1.6	1.4	1.1	0.8	1.0	0.8	0.5	0.4	0.5	1.7
19-Mar	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.5	0.8	1.5	1.0	1.0	1.5	1.8	1.9	1.5	1.4	1.0	1.1	1.0	1.1	1.0	0.7	0.5	1.9
20-Mar	0.6	1.2	1.1	1.0	0.8	0.7	0.9	0.8	0.8	1.2	1.6	2.0	1.7	1.4	1.5	1.2	1.7	1.9	2.0	1.7	1.5	1.3	0.7	1.3	2.0
21-Mar	1.3	1.4	1.4	1.2	1.4	1.5	1.5	1.4	1.8	1.7	1.6	1.8	2.2	2.2	2.1	2.2	2.4	2.3	1.9	1.9	1.8	2.0	1.9	1.4	2.4
22-Mar	1.6	1.8	1.6	1.5	1.7	1.2	0.8	1.1	1.6	1.7	1.6	1.6	1.6	1.5	1.4	1.3	1.7	1.5	1.3	1.2	0.9	1.0	1.4	1.5	1.8
23-Mar	1.5	1.6	1.0	0.8	0.4	0.6	0.9	1.4	2.0	2.1	2.2	2.1	2.3	2.1	2.5	2.6	2.2	2.1	1.7	1.0	1.0	0.6	0.6	0.7	2.6
24-Mar	0.8	0.4	0.7	0.3	0.3	0.3	0.5	0.7	0.9	1.2	1.7	2.1	2.2	2.4	2.2	2.0	1.8	1.4	0.9	0.4	0.3	0.5	0.5	0.4	2.4
25-Mar	0.3	0.2	0.2	0.3	0.4	0.3	0.5	0.8	0.9	0.8	1.2	1.4	1.3	1.2	1.2	0.9	0.7	0.5	0.2	0.2	0.2	0.3	0.6	0.9	1.4
26-Mar	0.6	0.2	0.4	0.3	0.3	0.4	0.4	0.9	1.4	1.4	1.3	1.4	1.7	1.3	1.2	1.1	1.0	1.0	0.9	0.6	0.9	0.8	1.2	1.3	1.7
27-Mar	1.1	0.9	0.9	0.6	0.5	0.5	0.4	0.3	0.9	1.3	1.3	1.1	1.6	1.9	2.4	2.7	2.7	2.4	1.3	1.3	1.7	2.2	2.2	1.6	2.7
28-Mar	1.4	1.5	0.9	0.6	0.9	1.5	1.6	1.8	1.7	2.0	1.6	1.3	1.3	1.6	2.9	3.0	2.3	2.0	1.3	1.2	0.4	0.3	0.6	1.6	3.0
29-Mar	1.9	2.1	1.9	1.2	1.3	1.3	0.5	0.8	1.2	1.1	1.1	1.3	1.3	1.9	1.6	1.2	1.3	1.0	0.5	0.5	0.4	0.5	0.4	0.4	2.1
30-Mar	0.3	0.1	0.1	0.1	0.3	0.1	0.3	0.7	1.1	1.8	1.7	1.5	2.6	3.9	3.1	3.8	3.2	3.7	3.5	3.7	3.4	4.0	4.0	3.7	4.0
31-Mar	3.2	2.7	2.4	2.1	1.9	1.5	1.0	1.4	1.7	1.8	2.0	1.8	1.7	1.6	1.0	1.2	1.7	1.7	1.4	1.0	1.3	1.1	1.0	0.9	3.2
	3.2	2.7	2.8	2.7	2.1	2.6	2.7	2.5	2.6	2.9	2.9	3.1	3.0	3.9	3.1	3.8	3.2	3.7	3.5	3.7	3.4	4.0	4.0	3.7	
	Diurnal Maximum																								

Wood Buffalo Environmental Association

Summary of Hour Averages

Vertical Wind Speed 100 m (VW100m) - km/h

Lower Camp Met Tower - March 2016

Maximum Value: 3.1 km/h on Mar 11 08:00

Maximum Daily Average: 1.1 km/h on Mar 27

Minimum Value: -2.6 km/h on Mar 29 01:00

Minimum Daily Average: -0.3 km/h on Mar 17

Maximum Diurnal Average: 0.5 km/h at hour 17

Minimum Diurnal Average: 0.2 km/h at hour 7

Monthly Average: 0.28 km/h

Percentiles: P_1 = -0.8 P_{10} = -0.3 Q_1 = -0.1 Median = 0.1 Q_3 = 0.5 P_{90} = 1.1 P_{99} = 2.4

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0.7	0.6	0.1	0.2	0.4	0.1	0.1	0.2	0.3	0.6	-0.1	0.4	0.1	-0.1	-0.2	0.1	0.6	0.1	0.1	0.3	0.1	0.2	0.1	0.1	0.2	0.7
2-Mar	-0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.1	0.0	-0.2	0.0	-0.3	0.1	-0.2	0.1	0.3	-0.3	0.0	0.1	0.1	0.3	0.2	0.0	0.1	0.1	0.0	0.3
3-Mar	0.1	0.0	-0.1	-0.3	-0.1	-0.1	-0.1	-0.1	0.0	0.1	-0.2	-0.3	0.0	-0.1	0.1	0.1	0.8	1.0	-0.3	-0.1	-0.1	-0.2	0.0	0.0	0.0	1.0
4-Mar	-0.1	0.2	0.0	-0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.5	1.3	1.0	0.5	1.4	1.6	0.9	0.7	1.2	0.4	1.1	1.2	1.6	2.4	0.7	2.4
5-Mar	2.2	2.8	2.1	1.5	0.2	0.5	0.2	0.4	-0.1	0.4	0.1	0.4	0.3	0.3	0.8	0.8	0.5	0.4	0.1	-0.1	0.2	0.2	0.0	0.1	0.6	2.8
6-Mar	0.0	0.0	0.0	0.2	0.1	-0.2	0.0	0.0	-0.1	-0.5	0.7	-0.2	-0.1	0.9	0.6	0.2	0.2	0.2	0.2	0.0	0.1	0.2	0.3	0.4	0.1	0.9
7-Mar	0.0	0.2	0.3	0.0	-0.1	-0.1	0.0	-0.1	0.1	0.1	0.0	1.3	0.9	1.1	0.1	0.1	1.3	0.4	1.1	0.0	0.0	0.2	0.0	0.0	0.3	1.3
8-Mar	0.0	0.1	0.0	0.2	0.1	-0.1	0.0	0.2	0.1	0.3	0.2	0.0	0.9	0.6	0.0	-0.1	-0.1	-0.2	0.0	0.0	0.1	0.0	-0.1	0.2	0.1	0.9
9-Mar	0.1	0.1	0.1	0.1	0.0	AF	AF	AF	AF	AF	AF	-0.2	-0.1	-0.1	-0.2	0.4	0.3	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.4
10-Mar	0.4	0.2	0.9	AF	AF	AF	0.5	1.3	2.8	0.8	1.3	1.4	1.2	0.9	1.2	0.8	0.8	0.5	0.8	0.5	1.0	1.0	1.7	1.4	1.0	2.8
11-Mar	-0.4	0.0	0.6	1.2	1.2	0.8	1.9	3.1	1.6	0.9	0.0	-0.2	0.0	-0.3	0.0	-0.9	0.0	-0.2	0.2	-0.1	0.2	0.4	0.3	0.8	0.5	3.1
12-Mar	0.9	0.7	0.3	0.2	0.5	0.4	0.0	0.1	-0.1	0.1	-0.1	-0.1	0.2	0.7	0.8	0.7	1.0	0.9	1.1	1.0	1.0	1.4	1.4	1.4	0.6	1.4
13-Mar	1.5	0.4	0.0	0.1	0.0	0.0	-0.1	-0.2	0.0	0.4	0.4	-0.2	-0.3	-0.5	-0.4	-0.2	0.2	-0.3	-0.5	-0.7	-0.7	-0.9	-0.7	-0.3	-0.1	1.5
14-Mar	-0.2	0.2	0.4	0.1	0.1	0.4	0.0	0.1	-0.1	0.2	0.5	0.0	0.1	0.0	-0.1	0.2	0.1	0.1	0.4	0.2	0.0	0.1	0.1	0.1	0.1	0.5
15-Mar	0.0	-0.1	-0.1	0.0	0.2	0.0	0.0	0.0	-0.1	-0.3	1.2	0.9	0.7	0.6	0.0	-0.4	-0.5	-0.2	0.6	0.4	0.0	0.3	0.2	-0.1	0.1	1.2
16-Mar	0.0	-0.1	-0.3	-0.1	-0.2	-0.1	0.1	0.1	-0.1	0.2	-0.2	-0.7	0.1	0.0	-0.4	0.2	0.0	-0.2	-0.5	-0.4	0.1	0.0	0.0	0.1	-0.1	0.2
17-Mar	-0.2	0.0	-0.4	-0.5	-0.4	-0.4	-0.7	-0.6	-0.4	0.0	-0.3	0.0	-0.1	-0.6	-0.4	-0.3	-0.5	-0.3	-0.2	-0.4	-0.1	-0.1	0.1	0.1	-0.3	0.1
18-Mar	0.0	0.5	-0.2	0.1	0.5	0.5	0.2	0.0	-0.1	-0.2	-0.1	0.5	0.2	0.2	0.6	0.9	1.0	0.6	1.3	1.6	0.2	0.1	-0.1	-0.2	0.3	1.6
19-Mar	-0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	0.0	-0.2	-0.1	0.9	0.6	0.1	0.0	-0.1	-0.2	-0.3	-0.3	0.1	-0.3	0.3	0.2	0.0	0.9
20-Mar	0.1	0.6	0.4	1.3	0.7	0.0	0.0	0.0	0.2	0.5	0.4	0.6	0.3	0.5	0.3	0.6	1.0	0.0	0.6	0.7	0.4	0.1	-0.2	0.5	0.4	1.3
21-Mar	0.1	-0.4	-0.2	0.1	0.5	0.6	0.9	0.6	0.4	0.6	0.8	0.3	0.4	0.7	0.3	1.2	0.6	1.0	0.6	0.6	0.8	0.6	0.4	0.7	0.5	1.2
22-Mar	0.5	0.2	0.2	0.3	1.7	1.2	0.1	0.9	0.5	1.1	0.9	0.9	0.6	0.5	0.5	0.3	0.7	0.8	1.2	1.1	1.1	0.7	0.4	1.2	0.7	1.7
23-Mar	1.5	1.6	-0.4	0.3	0.4	0.0	0.1	0.1	-0.2	0.0	-0.4	-0.5	-0.1	-0.4	-0.1	0.2	0.7	0.1	0.0	0.1	-0.1	0.0	-0.1	0.0	0.1	1.6
24-Mar	-0.1	-0.1	0.0	-0.1	-0.3	0.0	0.0	0.0	0.0	-0.1	0.2	0.7	-0.1	-0.1	0.8	-0.2	-0.2	0.0	0.2	0.0	0.1	0.1	0.1	0.1	0.0	0.8
25-Mar	-0.1	0.0	0.1	0.4	0.3	0.5	0.5	1.3	0.5	0.0	-0.2	0.0	0.9	0.6	0.6	0.4	0.1	0.0	0.0	0.0	0.1	0.0	-0.3	-0.3	0.2	1.3
26-Mar	-0.3	-0.1	-0.2	-0.2	-0.2	-0.1	-0.3	0.0	0.4	0.4	0.0	-0.6	-0.2	0.1	-0.4	0.1	0.3	0.9	1.0	0.9	1.7	1.6	2.3	2.0	0.4	2.3
27-Mar	0.8	1.2	0.4	0.4	0.4	0.7	0.6	0.5	0.3	0.1	0.9	1.0	1.0	2.0	2.6	1.7	2.6	2.3	0.9	1.0	0.7	1.5	2.3	1.6	1.1	2.6
28-Mar	1.6	2.4	1.8	0.9	1.2	1.8	1.8	2.0	1.0	1.2	1.2	0.7	0.2	0.0	-1.0	-0.9	-0.3	-0.3	-0.7	-0.7	-0.4	-0.3	-0.2	-1.4	0.5	2.4
29-Mar	-2.6	1.1	1.4	-0.8	-1.1	-0.7	0.0	0.0	0.3	0.4	0.3	-0.2	-0.1	-0.1	0.7	0.4	0.8	0.6	0.0	0.1	0.0	0.0	0.0	0.1	0.0	1.4
30-Mar	0.0	-0.1	-0.1	-0.1	-0.4	-0.2	-0.2	-0.1	-0.1	0.4	0.9	0.3	0.1	-0.8	-0.5	0.2	0.3	0.6	0.1	0.3	0.5	0.6	0.1	0.3	0.1	0.9
31-Mar	0.6	0.2	0.3	0.3	0.5	0.3	0.1	-0.2	-0.4	-0.5	1.1	0.4	-0.6	0.3	0.4	0.4	1.1	1.7	1.5	0.8	-0.3	0.3	0.3	0.1	0.4	1.7
	0.2	0.4	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.4	0.3	0.2	0.3	0.3	0.3	0.4	Diurnal Average	
	2.2	2.8	2.1	1.5	1.7	1.8	1.9	3.1	2.8	1.2	1.3	1.4	1.2	2.0	2.6	1.7	2.6	2.3	1.5	1.6	1.7	1.6	2.3	2.4	Diurnal Maximum	

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Vertical Wind Speed 100 m (VW100m) - km/h

Lower Camp Met Tower - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 4.3 km/h on Mar 30 18:00

Minimum Value: 0.1 km/h on Mar 17 22:00

Percentiles: P_1 = 0.2 P_{10} = 0.5 Q_1 = 0.8 Median = 1.3 Q_3 = 1.9 P_{90} = 2.4 P_{99} = 3.3

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	1.6	1.2	1.2	0.8	0.6	0.4	0.5	0.5	0.4	0.8	0.7	1.0	1.1	0.6	0.4	0.7	0.9	0.6	0.5	1.0	1.0	1.3	0.9	1.0	1.6
2-Mar	0.3	0.6	0.5	0.4	0.6	0.5	0.8	1.0	1.1	1.3	1.2	1.4	1.5	1.4	1.9	1.0	1.0	0.7	0.8	1.1	1.1	1.1	0.9	0.8	1.9
3-Mar	0.6	0.8	0.7	1.0	0.5	0.5	0.5	0.7	1.5	1.4	1.2	1.6	1.4	1.5	1.9	2.0	2.4	2.0	2.2	1.9	2.0	1.2	0.8	0.7	2.4
4-Mar	1.1	1.5	1.3	0.9	0.4	0.4	0.3	0.2	0.6	1.1	1.4	1.8	2.1	2.4	2.3	2.2	2.1	2.4	1.6	1.5	1.8	1.6	1.6	1.6	2.4
5-Mar	1.7	1.9	1.8	1.6	1.4	0.9	1.1	0.7	0.8	0.8	0.5	1.3	2.3	3.0	2.8	2.5	3.2	2.7	1.9	2.6	2.4	2.1	1.5	1.4	3.2
6-Mar	1.3	1.2	1.1	1.7	1.8	1.8	1.5	1.2	1.3	1.5	2.1	2.2	2.1	2.2	2.2	1.9	1.9	1.4	1.0	1.0	1.0	1.3	1.2	0.8	2.2
7-Mar	0.9	0.8	1.1	1.2	1.0	0.9	1.0	0.7	1.1	1.2	0.8	1.5	1.3	1.7	1.2	0.5	1.0	1.3	1.3	1.9	1.4	1.1	0.9	0.9	1.9
8-Mar	0.6	0.5	0.3	0.5	0.2	0.3	0.3	0.6	0.6	0.5	0.5	0.9	1.3	1.5	0.8	0.8	1.0	0.5	0.5	0.5	0.7	0.4	0.6	0.6	1.5
9-Mar	0.9	1.0	0.9	1.0	1.0	AF	AF	AF	AF	AF	AF	0.5	0.8	0.8	1.4	1.6	0.9	0.4	0.2	0.5	0.3	0.4	0.3	0.5	1.6
10-Mar	0.4	0.7	0.7	AF	AF	AF	2.1	1.8	2.3	2.1	2.6	3.0	3.0	2.6	2.7	2.5	2.6	2.4	2.1	1.8	1.9	1.8	1.6	1.8	3.0
11-Mar	1.3	0.7	0.7	1.2	2.4	2.8	3.3	2.5	2.0	1.8	1.8	1.1	0.9	0.7	1.3	1.3	1.5	0.9	0.8	0.3	0.4	1.0	1.4	1.3	3.3
12-Mar	1.1	0.7	0.9	0.8	1.0	0.9	0.8	1.5	0.9	0.9	1.1	0.8	1.1	1.9	1.8	2.2	2.4	1.8	1.0	1.2	1.3	1.2	1.0	1.1	2.4
13-Mar	1.1	1.1	0.8	0.6	0.7	0.8	0.6	1.0	1.1	1.5	1.9	1.7	2.3	2.5	2.4	2.6	3.4	3.3	2.7	3.2	3.1	2.6	2.4	2.2	3.4
14-Mar	2.4	2.2	2.6	2.2	2.1	2.6	2.0	2.3	2.3	2.5	2.6	2.3	2.1	2.3	2.1	1.8	1.8	1.9	1.8	1.3	1.5	1.3	0.9	0.8	2.6
15-Mar	0.8	0.7	0.6	0.9	0.7	0.5	0.6	0.8	1.1	1.2	2.1	2.1	2.4	2.9	3.0	2.5	1.6	1.2	1.8	1.8	1.9	2.0	1.6	1.9	3.0
16-Mar	2.2	2.3	2.2	2.5	2.1	1.8	1.9	1.9	2.0	2.1	2.1	2.4	2.2	1.8	2.3	2.3	1.8	1.7	1.1	1.0	1.4	1.5	0.7	0.5	2.5
17-Mar	0.6	0.8	1.0	1.2	1.0	1.0	1.3	1.1	0.6	1.7	2.1	2.5	3.0	2.5	2.4	2.2	1.8	1.4	0.7	0.6	0.6	0.1	0.4	0.5	3.0
18-Mar	0.7	1.6	0.9	1.0	1.2	1.4	0.8	0.9	0.6	0.8	1.0	1.8	1.7	1.1	1.2	1.6	1.4	0.9	1.4	1.6	1.8	0.6	0.4	0.6	1.8
19-Mar	0.6	0.5	0.2	0.2	0.3	0.5	0.4	0.3	0.6	1.1	0.7	1.3	1.9	2.0	2.1	1.6	1.3	1.6	1.4	1.2	1.2	1.2	0.8	1.0	2.1
20-Mar	0.8	1.5	1.5	1.4	1.2	0.7	0.5	0.8	0.6	1.6	2.5	2.7	1.9	1.6	1.9	1.8	1.9	2.0	1.6	1.5	1.9	1.7	1.4	1.6	2.7
21-Mar	1.3	1.2	1.5	1.8	1.8	1.7	1.8	2.0	2.3	1.9	1.8	2.1	2.5	2.3	2.5	2.5	2.6	2.6	1.7	1.9	2.0	2.4	1.7	1.6	2.6
22-Mar	1.6	1.8	1.3	1.3	1.6	1.5	1.0	1.2	1.6	1.8	1.7	1.7	1.8	1.7	1.7	1.7	2.1	1.8	1.8	1.4	1.3	1.4	1.7	1.5	2.1
23-Mar	1.6	1.5	1.3	0.9	0.5	0.4	0.5	1.1	2.0	2.3	2.5	2.1	2.6	2.2	2.4	2.3	2.2	1.8	1.6	1.2	1.2	0.8	1.0	1.2	2.6
24-Mar	1.5	0.7	0.4	0.3	0.3	0.2	0.3	0.2	0.5	1.2	2.1	2.7	2.9	2.9	2.9	2.1	1.7	1.2	0.9	0.3	0.6	0.6	0.6	0.5	2.9
25-Mar	0.4	0.2	0.3	0.4	0.5	0.6	0.8	1.0	0.9	1.1	0.9	1.0	1.3	1.3	1.3	1.1	0.8	0.6	0.2	0.2	0.3	0.3	0.4	0.9	1.3
26-Mar	0.5	0.2	0.6	0.3	0.5	0.7	0.7	0.8	1.7	1.3	1.2	0.8	1.3	1.1	0.9	0.9	0.9	0.8	1.0	1.0	1.0	1.3	1.4	1.4	1.7
27-Mar	1.4	1.1	1.2	0.8	0.4	0.5	0.9	0.9	1.7	1.5	1.5	1.6	1.8	2.2	2.5	2.7	2.3	2.0	1.8	1.5	1.5	2.2	2.1	1.5	2.7
28-Mar	1.4	1.1	1.2	1.1	1.5	1.7	1.5	1.5	1.4	1.6	1.2	1.1	1.3	1.9	2.6	2.7	2.4	2.0	1.2	1.0	0.8	0.7	0.7	2.0	2.7
29-Mar	1.7	3.3	3.0	2.0	2.1	1.7	0.6	0.6	0.8	0.8	0.9	1.2	1.3	1.8	2.0	1.6	1.6	1.1	0.7	0.8	0.4	1.2	0.5	0.5	3.3
30-Mar	0.5	0.2	0.3	0.2	0.5	0.3	0.6	0.9	1.2	2.2	1.8	2.1	3.1	3.9	2.9	2.8	3.3	4.3	3.8	3.3	3.1	3.7	3.5	3.3	4.3
31-Mar	3.2	2.7	2.3	1.8	1.9	1.5	1.1	1.6	1.9	1.7	2.5	2.6	2.0	2.1	1.2	1.0	1.4	1.3	1.4	1.2	1.1	0.9	1.1	1.0	3.2
Diurnal Maximum	3.2	3.3	3.0	2.5	2.4	2.8	3.3	2.5	2.3	2.5	2.6	3.0	3.1	3.9	3.0	2.8	3.4	4.3	3.8	3.3	3.1	3.7	3.5	3.3	

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Vertical Wind Speed 167 m (VW167m) - km/h

Lower Camp Met Tower - March 2016

Maximum Value: 5.1 km/h on Mar 11 07:00

Maximum Daily Average: 1.7 km/h on Mar 27

Minimum Value: -1.8 km/h on Mar 29 01:00

Minimum Daily Average: -0.2 km/h on Mar 17

Maximum Diurnal Average: 0.6 km/h at hour 2

Minimum Diurnal Average: 0.3 km/h at hour 10

Monthly Average: 0.49 km/h

Percentiles: P_1 = -0.7 P_{10} = -0.2 Q_1 = 0.1 Median = 0.3 Q_3 = 0.8 P_{90} = 1.4 P_{99} = 2.8

Hours in Service:	744
Hours of Data:	727
Hours of Missing Data:	17
Hours of Calibration:	0
Percent Operational Time:	97.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0.4	0.3	0.2	0.5	0.4	0.3	0.2	0.2	0.3	0.3	0.0	0.5	0.3	0.2	-0.1	0.1	0.4	0.3	0.2	0.5	0.4	0.4	0.4	0.2	0.3	0.5
2-Mar	0.1	0.3	0.4	0.2	0.0	0.1	-0.1	0.3	0.0	-0.1	-0.1	0.0	-0.5	0.1	0.4	-0.2	0.1	0.1	0.1	0.3	0.3	0.1	0.1	0.2	0.1	0.4
3-Mar	0.2	0.2	0.1	0.0	-0.1	0.0	0.1	0.2	0.4	0.2	-0.1	-0.1	0.1	0.1	0.3	0.1	0.8	1.4	-0.5	-0.2	-0.2	-0.2	0.0	0.1	0.1	1.4
4-Mar	0.0	0.3	0.1	-0.1	-0.1	0.1	0.1	0.2	0.3	0.1	0.3	1.8	0.8	0.6	1.3	2.0	1.2	0.8	2.0	0.6	0.9	1.1	1.6	2.5	0.8	2.5
5-Mar	1.5	2.4	2.2	1.4	0.2	0.7	0.1	0.4	0.7	1.4	0.1	0.1	0.3	0.3	1.2	1.1	0.4	0.6	0.2	-0.1	0.4	0.1	0.0	0.1	0.7	2.4
6-Mar	0.1	0.1	0.0	0.2	0.1	-0.1	0.0	0.1	-0.2	-0.5	1.2	-0.2	0.3	1.2	0.8	0.3	0.4	0.5	0.4	0.7	1.0	0.8	0.4	0.6	0.3	1.2
7-Mar	0.0	0.3	0.6	0.1	-0.1	-0.1	0.0	0.2	0.1	-0.1	-0.1	1.4	0.7	0.8	0.0	0.1	1.9	1.0	1.8	0.4	0.2	0.4	0.1	0.1	0.4	1.9
8-Mar	-0.1	0.2	0.1	0.3	0.6	0.2	0.2	0.4	0.4	0.8	0.6	0.2	1.3	0.9	0.2	0.1	-0.1	-0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.3	1.3
9-Mar	0.1	0.0	0.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.0	0.1	0.5	0.4	-0.1	0.2	0.7	0.7	0.4	0.6	1.1	--	1.1
10-Mar	1.2	0.9	1.4	1.5	1.1	1.3	1.4	AF	AF	AF	AF	AF	AF	AF	1.8	1.4	1.5	1.0	1.1	1.0	1.7	1.6	2.5	1.9	--	2.5
11-Mar	-0.2	0.7	1.0	2.6	3.0	1.8	5.1	4.5	3.3	1.5	0.3	-0.2	-0.1	-0.1	-0.1	-1.1	0.0	-0.3	0.5	0.1	0.2	0.6	0.3	0.3	1.0	5.1
12-Mar	0.9	1.2	1.0	0.5	1.8	1.0	0.3	0.0	0.4	0.4	0.2	0.6	0.6	0.9	0.8	1.0	1.9	1.7	1.7	1.1	1.3	1.7	1.8	1.7	1.0	1.9
13-Mar	2.0	0.8	0.3	0.5	0.4	0.1	0.1	0.2	0.3	0.8	0.5	0.0	0.2	-0.3	-0.2	-0.1	0.1	0.0	-0.2	-0.5	-0.5	-0.8	-0.6	0.0	0.1	2.0
14-Mar	0.1	0.2	0.4	0.1	0.3	0.2	0.1	0.1	0.0	0.5	0.4	-0.2	0.2	0.0	-0.3	0.3	0.3	0.1	0.4	0.3	0.2	0.2	0.2	0.3	0.2	0.5
15-Mar	0.1	0.0	0.0	0.0	0.3	0.1	0.0	0.1	-0.1	-0.1	1.3	1.3	1.2	1.0	0.0	-0.3	-0.4	-0.2	0.8	0.6	0.2	0.5	0.3	0.1	0.3	1.3
16-Mar	0.2	0.1	0.0	-0.1	0.0	0.4	0.1	0.0	-0.1	0.2	-0.2	-0.7	0.2	0.1	-0.5	0.2	0.1	-0.1	-0.5	-0.1	0.5	0.0	-0.1	0.3	0.0	0.5
17-Mar	-0.1	0.0	-0.4	-0.6	-0.4	-0.4	-0.5	-0.4	-0.3	0.2	-0.3	0.5	0.1	-0.6	-0.1	-0.3	-0.4	-0.2	-0.1	-0.2	-0.1	0.0	0.2	0.5	-0.2	0.5
18-Mar	0.6	1.1	0.4	0.8	1.0	0.9	0.6	0.3	-0.2	-0.3	-0.1	0.2	0.5	0.0	0.4	0.7	0.6	0.3	1.1	0.8	0.0	0.3	0.2	0.1	0.4	1.1
19-Mar	0.2	0.2	0.1	0.2	0.1	0.3	0.1	0.1	0.1	-0.2	-0.2	-0.4	0.5	0.8	0.1	0.1	0.2	0.1	0.1	0.3	0.5	0.6	0.4	0.5	0.2	0.8
20-Mar	0.2	1.4	1.1	2.6	1.4	0.5	0.6	0.6	0.5	0.8	0.5	0.7	0.2	0.9	0.2	1.3	1.1	0.2	1.4	1.7	1.0	0.9	0.7	1.0	0.9	2.6
21-Mar	0.9	0.7	1.3	1.3	1.5	0.8	1.5	1.5	0.8	0.4	0.9	0.4	0.3	0.6	0.2	1.8	0.8	1.4	1.4	1.3	1.5	1.1	1.0	0.9	1.0	1.8
22-Mar	0.6	0.6	0.1	0.3	2.6	1.8	0.4	1.6	0.8	0.9	1.0	1.0	0.3	0.5	0.3	0.6	0.9	1.1	1.2	1.4	2.0	1.3	0.9	2.1	1.0	2.6
23-Mar	2.9	1.6	-0.2	0.2	0.2	0.1	0.1	0.3	0.1	0.3	-0.1	-0.3	0.4	-0.4	0.2	0.5	0.8	0.3	0.3	0.5	0.1	0.2	0.1	0.2	0.3	2.9
24-Mar	0.2	0.0	0.2	0.0	0.0	0.2	0.3	0.1	0.3	0.3	0.5	0.8	0.0	-0.4	1.4	0.3	-0.1	0.0	0.3	0.3	0.3	0.4	0.5	0.3	0.3	1.4
25-Mar	0.3	0.3	0.4	0.4	0.5	0.5	0.7	1.3	0.7	-0.2	-0.1	0.2	1.5	1.0	0.6	0.4	0.4	0.2	0.2	0.1	0.3	0.1	0.0	0.1	0.4	1.5
26-Mar	0.2	0.1	0.0	-0.1	0.0	0.0	0.1	0.2	0.4	0.3	0.3	-0.7	-0.2	0.2	-0.2	0.0	0.4	0.6	1.1	1.1	1.6	1.3	1.8	2.0	0.4	2.0
27-Mar	1.5	0.9	0.7	0.8	1.7	1.7	1.8	1.8	1.3	0.5	1.9	1.2	1.5	2.5	3.7	2.4	3.4	3.4	2.1	1.4	0.5	1.1	2.3	1.6	1.7	3.7
28-Mar	1.4	2.1	1.3	0.7	0.8	0.4	0.8	1.2	0.8	0.8	0.9	0.4	0.1	0.3	-1.0	-0.7	-0.1	-0.3	-0.6	-0.2	-0.1	-0.2	-0.1	-0.9	0.3	2.1
29-Mar	-1.8	2.7	2.5	-0.5	-1.5	-0.7	0.6	0.2	0.5	0.3	0.7	0.4	0.2	-0.5	1.0	0.1	0.6	0.6	0.1	0.4	0.0	0.2	0.2	0.1	0.3	2.7
30-Mar	0.0	-0.1	-0.1	-0.1	-0.1	-0.2	-0.1	0.1	-0.1	0.4	1.2	0.8	0.7	-0.1	-0.7	0.1	0.7	1.2	0.2	0.3	0.9	0.6	0.2	0.3	0.3	1.2
31-Mar	0.6	0.5	0.4	0.3	0.7	0.5	0.2	-0.2	-0.7	-0.8	1.6	0.4	-0.7	-0.1	0.3	0.4	1.4	1.6	1.5	0.7	0.8	1.1	1.5	1.0	0.5	1.6
	0.5	0.6	0.5	0.5	0.6	0.4	0.5	0.5	0.4	0.3	0.5	0.3	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.6	Diurnal Average	
	2.9	2.7	2.5	2.6	3.0	1.8	5.1	4.5	3.3	1.5	1.9	1.8	1.5	2.5	3.7	2.4	3.4	3.4	2.1	1.7	2.0	1.7	2.5	2.5	Diurnal Maximum	

AF - Analyzer Failure

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 4.2 km/h on Mar 30 18:00

Minimum Value: 0.1 km/h on Mar 30 04:00

Percentiles: P_1 = 0.2 P_{10} = 0.5 Q_1 = 0.8 Median = 1.3 Q_3 = 1.9 P_{90} = 2.5 P_{99} = 3.3

Hours in Service:	744
Hours of Data:	727
Hours of Missing Data:	17
Hours of Calibration:	0
Percent Operational Time:	97.7

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	1.0	1.0	0.7	0.6	0.6	0.4	0.6	0.3	0.4	0.5	0.5	0.8	1.3	0.6	0.5	0.6	0.8	0.5	0.5	0.9	1.4	1.3	1.4	1.1	1.4
2-Mar	0.4	0.5	0.6	0.4	0.4	0.5	0.7	0.6	0.7	0.9	1.1	1.3	1.7	1.8	2.1	0.8	1.1	0.7	0.7	0.8	1.0	1.1	1.0	0.7	2.1
3-Mar	0.8	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.7	0.8	0.8	1.4	1.2	1.4	1.9	2.0	2.8	2.4	2.4	2.1	2.3	1.2	1.0	0.8	2.8
4-Mar	1.3	1.7	1.5	1.0	0.3	0.4	0.4	0.4	0.7	1.0	1.3	1.8	2.3	2.3	2.3	2.3	1.7	2.3	1.1	1.4	1.9	2.0	1.8	2.3	2.3
5-Mar	2.1	2.1	1.8	1.3	1.5	1.0	0.9	0.6	1.0	1.3	0.7	1.2	2.6	3.4	2.7	2.6	3.2	2.9	2.1	2.6	2.6	2.2	1.9	1.8	3.4
6-Mar	1.5	1.2	1.1	1.9	1.9	1.8	1.7	1.3	1.4	1.6	2.3	2.1	2.3	2.4	2.0	1.7	1.8	1.6	1.0	0.8	1.1	1.7	1.5	0.8	2.4
7-Mar	0.9	0.9	0.8	0.6	0.4	0.5	0.8	0.7	0.6	0.8	0.9	1.6	1.4	1.6	1.3	0.8	0.8	1.3	1.0	1.5	1.1	1.0	0.8	0.9	1.6
8-Mar	0.8	0.6	0.5	0.6	0.5	0.6	0.7	0.8	0.6	0.5	0.6	1.0	1.5	1.4	0.9	0.6	0.8	0.5	0.3	0.6	0.8	0.5	0.6	0.6	1.5
9-Mar	1.0	1.0	0.7	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.8	1.5	1.4	1.0	0.6	0.2	0.4	0.6	0.6	0.7	0.7	1.5
10-Mar	0.5	0.6	0.5	0.4	0.7	0.8	1.5	AF	AF	AF	AF	AF	AF	AF	2.4	2.2	2.6	2.5	1.8	1.5	1.6	1.8	1.8	2.3	2.6
11-Mar	1.0	0.8	0.8	1.1	2.3	2.2	2.5	2.4	2.8	1.8	2.0	1.0	0.9	0.8	1.5	1.3	1.5	0.9	0.9	0.6	0.4	0.9	1.2	1.1	2.8
12-Mar	1.0	1.1	0.6	0.9	1.2	0.6	1.3	1.7	1.2	1.2	1.3	0.8	1.3	2.0	2.4	2.5	2.2	1.6	1.2	1.4	1.5	1.3	1.1	1.1	2.5
13-Mar	1.1	1.1	1.2	0.8	0.7	0.8	0.4	0.6	0.9	1.4	1.8	1.3	2.0	2.1	2.2	2.4	3.4	3.0	2.5	2.6	2.9	2.1	1.8	1.8	3.4
14-Mar	2.2	2.3	2.5	2.2	2.1	2.7	2.0	2.5	2.6	3.0	2.7	2.3	2.3	2.4	2.3	2.2	1.9	2.0	2.1	1.7	1.4	1.1	0.6	0.6	3.0
15-Mar	0.4	0.3	0.3	0.5	0.4	0.3	0.3	0.4	0.7	1.0	2.0	2.2	2.6	2.9	2.8	2.6	1.8	1.0	1.7	2.0	2.1	2.1	1.8	1.9	2.9
16-Mar	1.9	1.8	1.8	1.7	1.6	1.6	2.2	2.0	2.0	2.3	2.3	2.4	2.1	1.7	2.1	2.4	1.9	1.4	1.0	1.2	1.9	1.4	0.9	0.8	2.4
17-Mar	0.6	0.8	0.9	0.9	0.6	0.8	1.2	0.8	0.9	1.7	2.5	2.8	3.0	2.8	2.6	2.2	2.0	1.1	0.6	0.4	0.8	0.2	0.4	0.5	3.0
18-Mar	1.0	1.2	1.0	1.1	1.2	1.7	0.9	0.9	0.6	0.9	0.9	1.5	1.6	1.0	1.3	1.7	0.9	0.7	0.9	1.1	1.8	0.6	0.4	0.5	1.8
19-Mar	0.3	0.3	0.2	0.3	0.3	0.5	0.4	0.4	0.5	0.9	0.8	0.9	1.8	2.0	2.1	1.6	1.6	1.8	1.7	1.6	1.4	1.2	1.5	1.1	2.1
20-Mar	1.0	1.3	1.8	1.4	1.4	1.2	0.5	0.7	1.0	2.0	2.9	2.9	2.0	2.3	2.0	2.2	2.0	2.1	1.0	0.9	1.6	1.7	1.4	1.7	2.9
21-Mar	1.2	1.0	1.3	1.6	1.7	1.5	1.8	1.9	2.3	1.8	1.8	2.3	2.5	2.4	3.0	3.0	2.8	2.4	1.2	1.7	2.0	2.3	1.7	1.9	3.0
22-Mar	1.6	1.6	1.3	1.3	1.7	1.8	1.1	1.2	1.4	1.6	1.7	1.8	2.1	1.9	1.6	2.1	2.1	2.1	1.9	1.5	1.4	1.5	1.5	1.5	2.1
23-Mar	1.6	1.8	1.3	0.7	0.2	0.3	0.3	0.8	1.8	2.5	2.7	2.5	2.9	2.3	2.8	2.8	2.6	1.7	1.6	1.0	0.9	0.6	1.3	1.4	2.9
24-Mar	1.7	0.8	0.3	0.4	0.2	0.3	0.4	0.3	0.3	1.0	2.1	2.8	2.9	2.6	3.2	2.5	2.2	1.3	0.9	0.4	0.4	0.6	0.8	0.5	3.2
25-Mar	0.5	0.4	0.5	0.4	0.5	0.6	0.8	0.8	1.1	1.0	0.7	0.9	1.3	1.6	1.6	0.8	0.8	0.4	0.3	0.2	0.3	0.3	0.4	0.7	1.6
26-Mar	0.6	0.4	0.7	0.4	0.8	0.8	0.8	1.0	1.4	1.2	0.9	0.9	1.0	0.6	0.6	1.1	0.9	0.7	1.0	0.9	1.4	1.3	1.4	1.8	1.8
27-Mar	1.6	1.4	1.0	1.0	0.6	0.6	0.6	1.0	1.4	1.5	1.4	1.7	2.0	2.6	2.3	2.6	2.2	1.6	2.0	1.5	1.6	2.6	2.5	1.6	2.6
28-Mar	1.6	1.6	1.4	1.1	0.9	0.9	0.9	1.0	0.9	1.3	1.0	1.2	1.4	1.6	2.7	2.6	2.6	1.8	0.9	1.0	0.9	0.7	0.6	1.2	2.7
29-Mar	1.0	3.1	2.5	1.1	1.5	2.3	0.9	0.8	0.6	0.8	1.0	0.9	1.1	1.7	2.2	1.6	1.6	1.2	0.7	0.8	0.4	0.7	0.5	0.5	3.1
30-Mar	0.8	0.2	0.3	0.1	0.5	0.6	0.7	0.5	0.8	2.3	1.8	2.5	3.6	3.6	3.0	2.7	3.2	4.2	4.0	3.6	3.3	3.8	3.4	3.4	4.2
31-Mar	3.2	2.7	2.4	2.0	1.9	1.4	1.1	1.7	1.9	1.9	2.7	2.7	1.9	2.0	1.3	1.1	1.5	1.7	1.4	0.7	0.8	0.9	1.0	1.1	3.2
	3.2	3.1	2.5	2.2	2.3	2.7	2.5	2.5	2.8	3.0	2.9	2.9	3.6	3.6	3.2	3.0	3.4	4.2	4.0	3.6	3.3	3.8	3.4	3.4	
	Diurnal Maximum																								

AF - Analyzer Failure

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 4
BUFFALO VIEWPOINT
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)
MARCH 2016

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	100.00	68	0	8	0
H2S (ppb) Average	709	35	35	100.00	4	0	1	0
THC (ppm) Average	710	34	34	100.00	5.3	-	3.1	-
Temperature (C) Average	744	0	0	100.00	14	-	6.3	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	90	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	31	-	21	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	710	1.7	5	-	0	0	0	0	1	3	68
H2S (ppb) Average	709	0.4	0	-	0	0	0	0	0	1	4
THC (ppm) Average	710	2.42	0.4	-	2.1	2.2	2.2	2.3	2.5	2.8	5.3
Temperature 2 m (C) Average	744	-3.69	5.4	-	-17.2	-9.9	-7.5	-4.4	-0.3	3.1	14
Relative Humidity (%) Average	744	72.1	18	-	22	46	60	76	87	92	97
Wind Speed 10 m (km/h) Average	744	10.3	6	-	1	5	6	9	13	19	31
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
				No operational issues to report

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Buffalo Viewpoint - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 68 ppb on Mar 19 12:00 Maximum Daily Average: 7.7 ppb on Mar 26

Minimum Value: 0 ppb on Mar 18 10:00
Minimum Daily Average: 0.2 ppb on Mar 16
Maximum Diurnal Average: 4.0 ppb at hour 12
Minimum Diurnal Average: 0.3 ppb at hour 2
Monthly Average: 1.7 ppb
Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 3$ $P_{99} = 23$

Hours in Service:	744
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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	1	1	0	0	0	0	0	0	0	0	8	15	8	18	17	14	14	15	2	2	1	1	1	5.3	18
2-Mar	1	Z	1	1	0	0	0	0	0	0	C	C	C	2	2	7	6	4	1	0	0	0	0	0	1.4	7
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	0.2	0
4-Mar	0	0	0	Z	0	0	0	0	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
5-Mar	0	0	0	0	Z	0	0	0	0	0	0	2	2	1	1	1	1	0	0	0	0	0	0	0	0.5	2
6-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1
7-Mar	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	1	1	1	0	0	0.4	1
8-Mar	0	Z	0	0	0	0	0	1	1	2	2	2	3	1	1	2	3	3	2	2	3	2	1	1	1.4	3
9-Mar	1	1	Z	1	0	0	0	0	0	0	0	1	2	4	12	14	6	5	6	10	4	3	1	1	3.2	14
10-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	0.3	1
11-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0.2	1
12-Mar	0	0	0	0	0	Z	1	1	1	3	3	1	2	1	0	0	0	0	0	0	0	0	0	0	0.7	3
13-Mar	Z	0	0	1	17	11	3	1	1	1	0	0	0	0	0	0	0	0	1	5	6	4	3	3	2.6	17
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	0	0	0	1	2	4	2	1	0	0	0	0	0	0	0.5	4
16-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	0.2	1
17-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1
18-Mar	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	1	0.4	1
19-Mar	Z	0	0	0	0	0	0	0	0	3	63	68	29	2	1	1	1	1	1	0	1	1	1	1	7.6	68
20-Mar	1	Z	1	0	0	0	0	1	0	0	0	0	5	2	0	0	1	4	13	1	2	0	0	0	1.5	13
21-Mar	0	0	Z	0	0	0	0	0	0	2	4	3	7	13	5	1	1	1	0	0	0	0	0	0	1.7	13
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	0.2	0
24-Mar	0	0	0	0	0	Z	0	0	0	0	1	3	3	12	7	7	3	1	0	0	0	0	0	0	1.8	12
25-Mar	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2	4	2	3	3	2	1	1	2	1.0	4
26-Mar	1	Z	1	0	0	0	1	1	1	3	4	2	16	6	24	44	21	18	9	11	6	4	2	2	7.7	44
27-Mar	1	1	Z	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
28-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	0.2	1
29-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	17	9	11	32	17	18	26	9	5	2	2	6.5	32
30-Mar	0	0	0	0	0	Z	0	1	2	1	0	5	4	4	1	2	2	0	0	0	0	0	0	0	1.1	5
31-Mar	Z	0	0	0	0	0	0	0	0	0	13	20	1	0	0	3	14	12	8	5	2	1	1	1	3.5	20
	0.4	0.3	0.3	0.3	0.9	0.6	0.4	0.3	0.4	0.7	3.2	4.0	3.2	2.5	2.9	3.8	3.7	2.7	2.6	2.3	1.4	0.9	0.6	0.6	Diurnal Average	
	1	1	1	1	17	11	3	1	2	3	63	68	29	17	24	44	32	18	18	26	9	5	3	3	Diurnal Maximum	

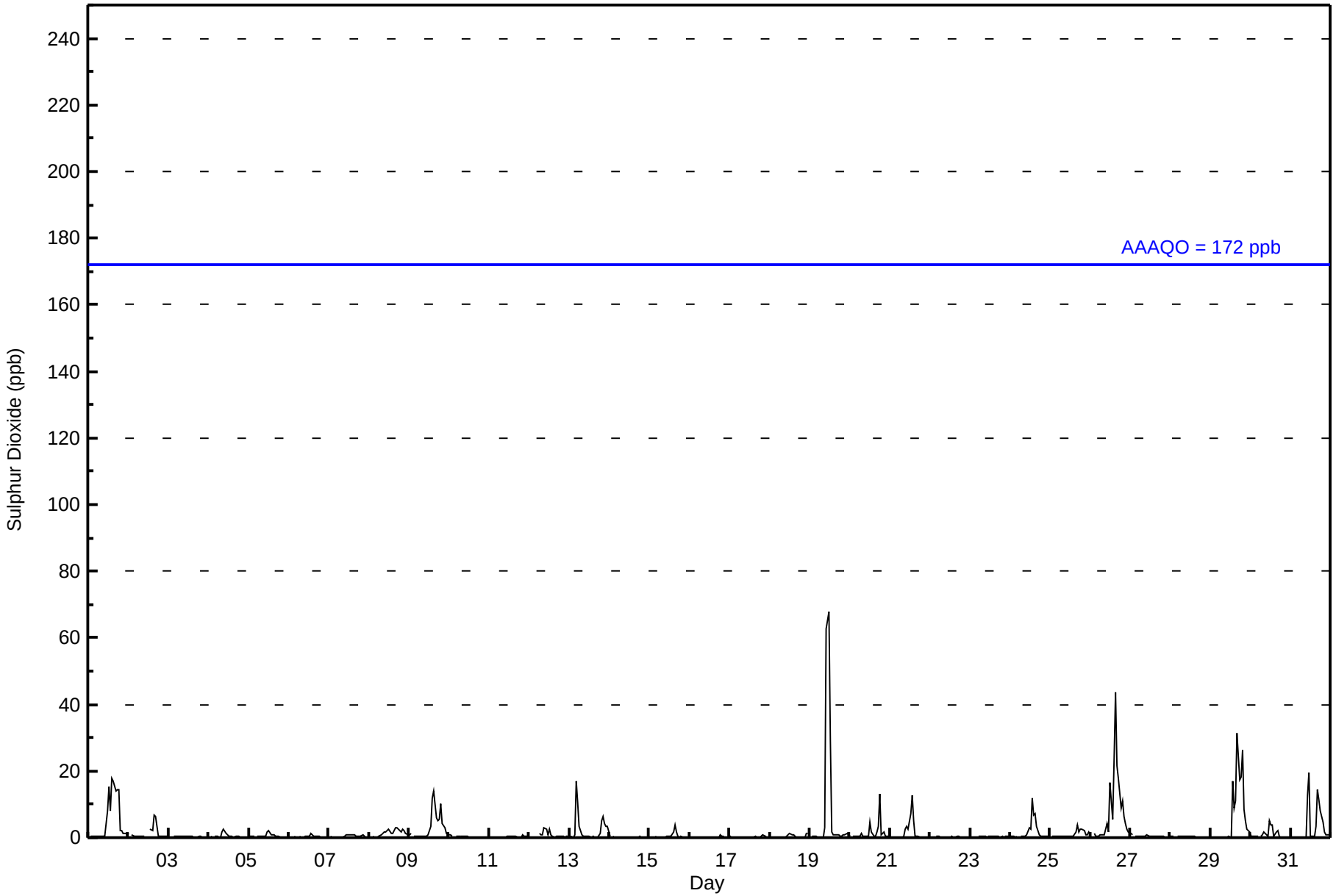
Z - zerospan C - Calibration
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Buffalo Viewpoint - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Buffalo Viewpoint - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	678	95.49	95.49
11 - 20	24	3.38	98.87
21 - 60	6	0.85	99.72
61 - 110	2	0.28	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 (SO_2) - ppb

Buffalo Viewpoint - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	198	55	15	7	15	57	72	62	13	2	9	13	17	38	37	68	678
11 - 20	5	2	6	1	0	1	3	0	0	0	1	0	1	1	0	3	24
21 - 60	0	2	1	0	0	1	0	0	0	0	0	1	0	0	1	0	6
61 - 110	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
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	205	59	22	8	15	59	75	62	13	2	10	14	18	39	38	71	710

Total Number of Valid Hours: 710

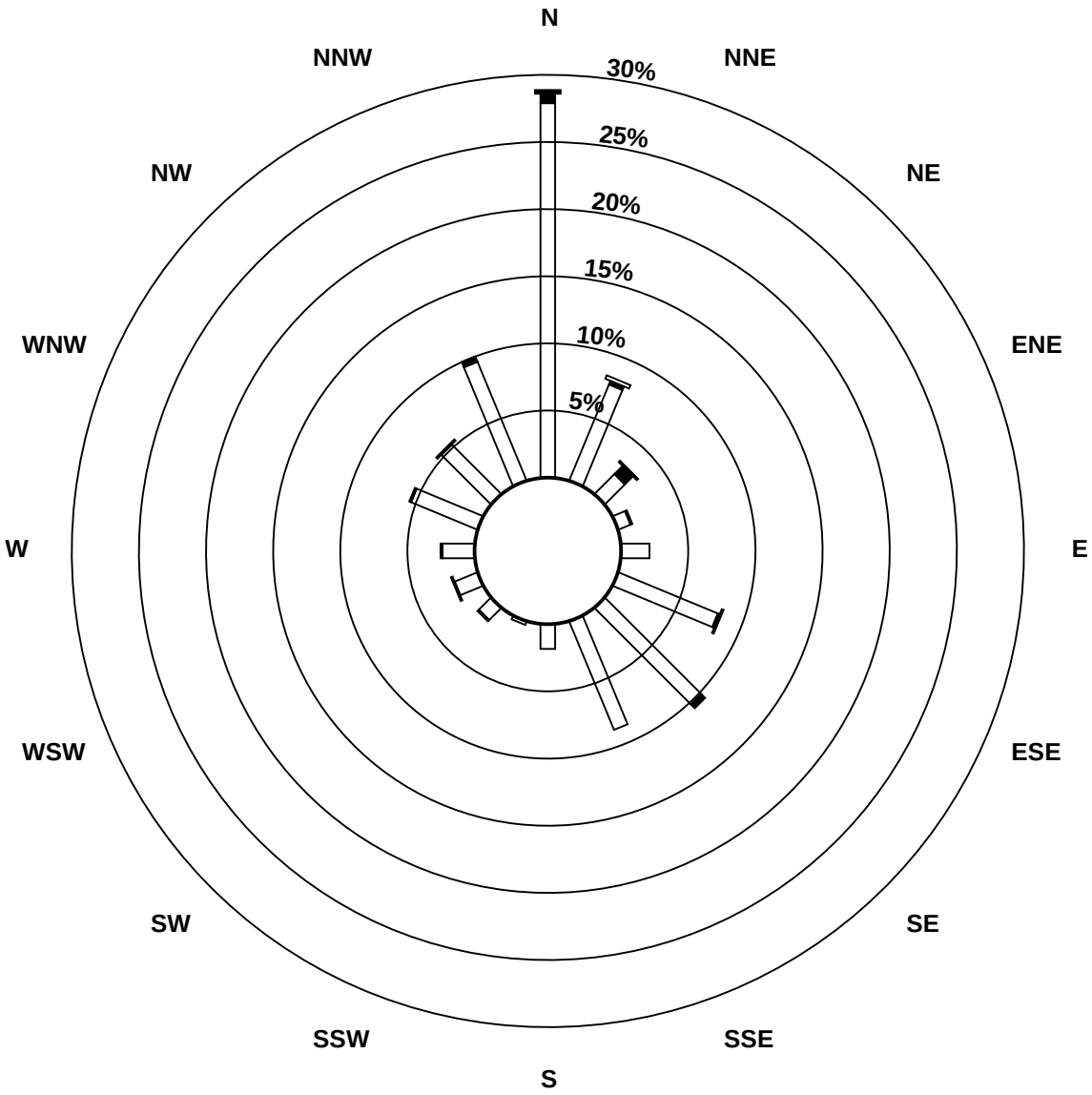
Total Number of Hours: 744

Wood Buffalo Environmental Association

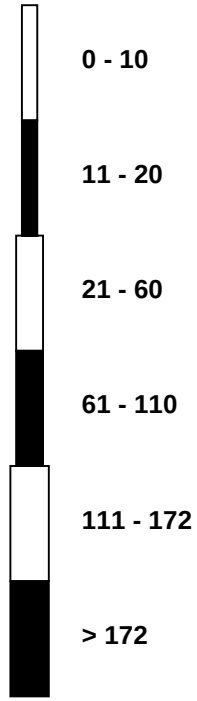
Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Buffalo Viewpoint (AMS 4)



Classes (ppb)



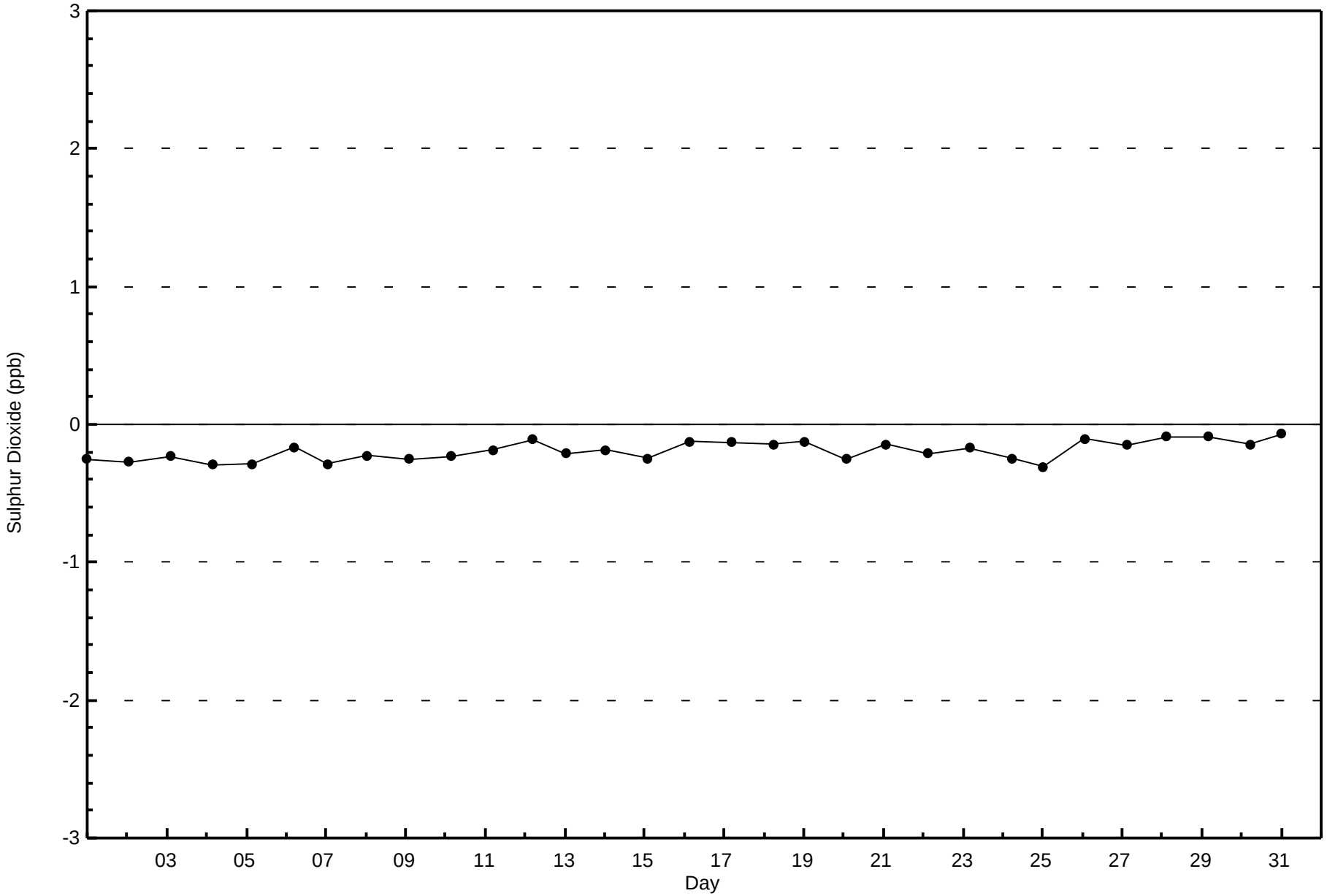
Total Number of Valid Hours: 710

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Buffalo Viewpoint - March 2016

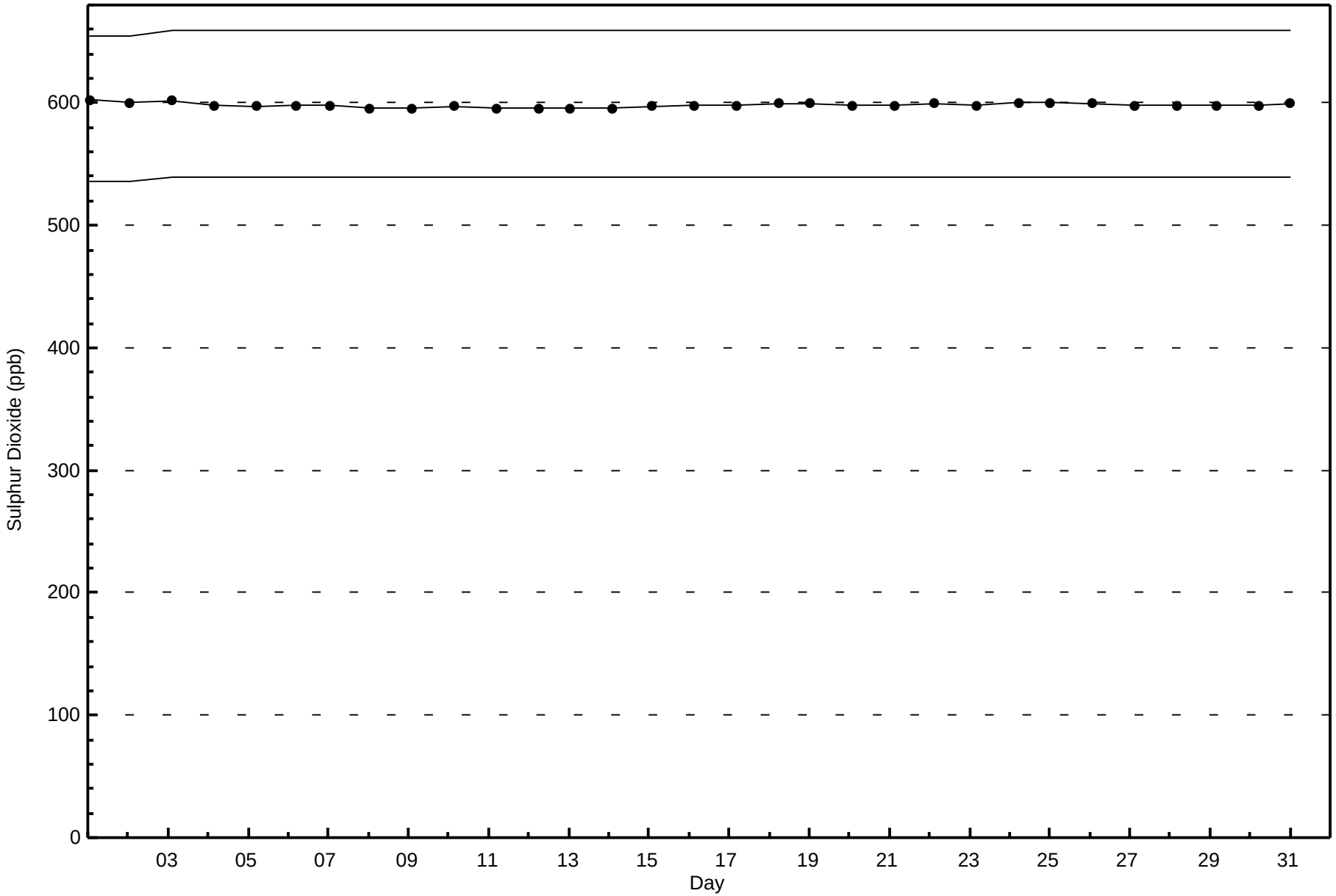


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Buffalo Viewpoint - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Buffalo Viewpoint - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 4 ppb on Mar 1 13:00 Maximum Daily Average: 1.2 ppb on Mar 9

Minimum Value: 0 ppb on Mar 12 19:00 Minimum Daily Average: 0.1 ppb on Mar 22
Maximum Diurnal Average: 0.5 ppb at hour 13 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 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 3$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0	Z	0	0	0	0	0	0	0	0	0	2	4	1	1	1	1	2	2	1	1	1	0	1	0.9	4
2-Mar	1	1	Z	0	0	0	0	1	0	1	1	1	C	C	C	C	1	0	1	1	0	0	0	0	0.5	1
3-Mar	0	0	1	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Mar	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
5-Mar	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
6-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1
7-Mar	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0.4	1
8-Mar	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1	1	1	0	0.6	1
9-Mar	0	0	0	Z	0	0	0	0	0	1	0	1	1	1	3	3	2	1	1	3	2	2	3	2	1.2	3
10-Mar	2	2	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
11-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.3	1
12-Mar	0	0	0	0	0	0	Z	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
13-Mar	0	Z	0	0	4	4	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.7	4
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	1	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	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	0.2	0
17-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1
18-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2	0.4	2
19-Mar	1	Z	1	1	1	1	0	0	0	1	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0.8	3
20-Mar	0	0	Z	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0.4	1
21-Mar	0	0	0	Z	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1
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	0.1	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	1	1	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
25-Mar	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	2	0.6	2
26-Mar	1	1	Z	0	1	0	0	1	1	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0.4	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	0.1	0
28-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0.3	1
29-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	0.3	1
30-Mar	0	1	0	1	0	0	Z	2	1	1	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0.5	2
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	0.3	0
	0.4	0.4	0.3	0.4	0.5	0.5	0.3	0.4	0.4	0.4	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	0.4	Diurnal Average	
	2	2	1	1	4	4	1	2	1	1	3	3	4	1	3	3	2	2	2	3	2	2	3	2	Diurnal Maximum	

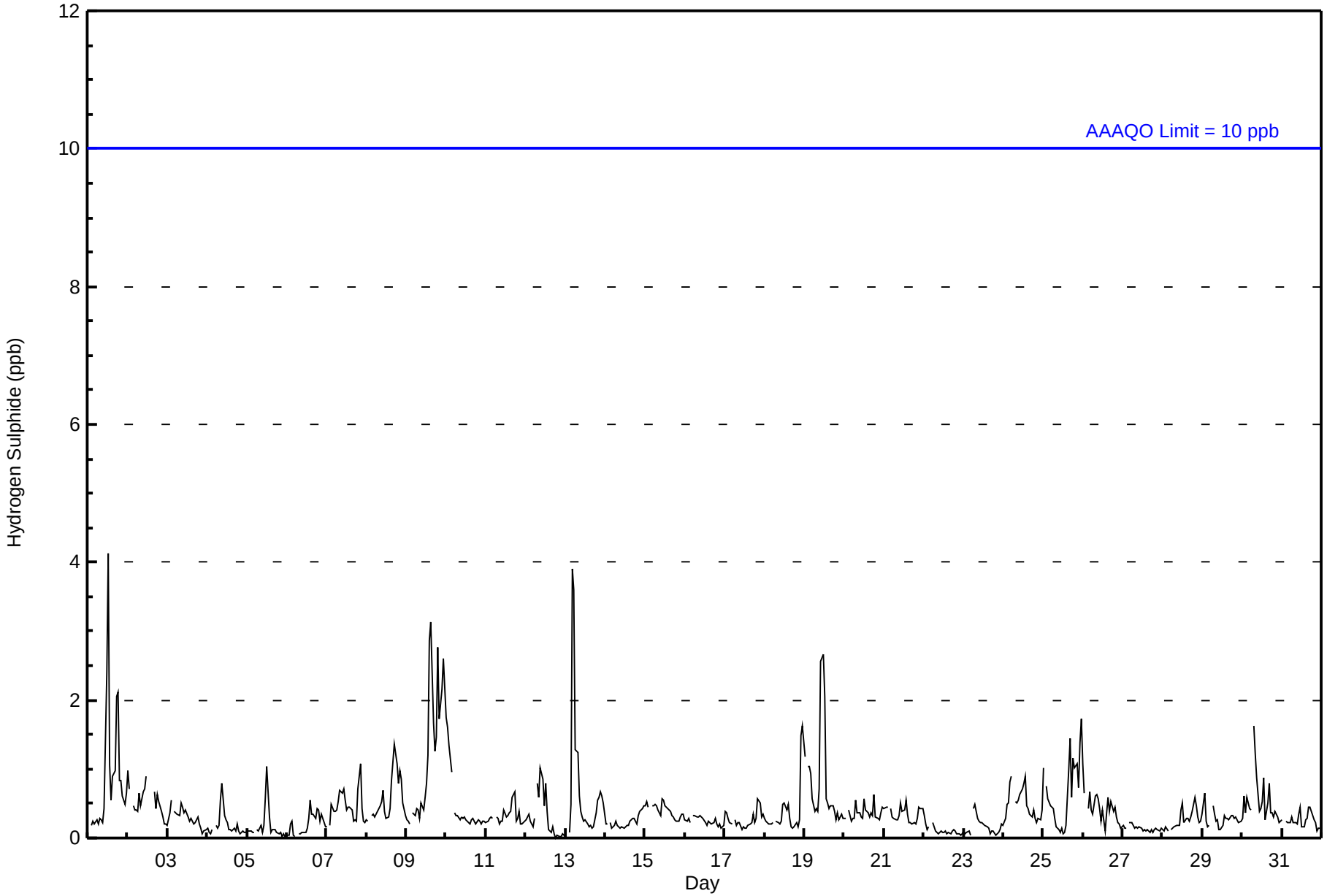
Z - zerospan C - Calibration
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Buffalo Viewpoint - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Buffalo Viewpoint - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	700	98.73	98.73
3 - 4	9	1.27	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 (H_2S) - ppb

Buffalo Viewpoint - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	202	56	20	8	15	59	75	61	13	1	10	14	19	39	38	70	700
3 - 4	3	2	3	0	0	0	0	0	0	1	0	0	0	0	0	0	9
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	205	58	23	8	15	59	75	61	13	2	10	14	19	39	38	70	709

Total Number of Valid Hours: 709

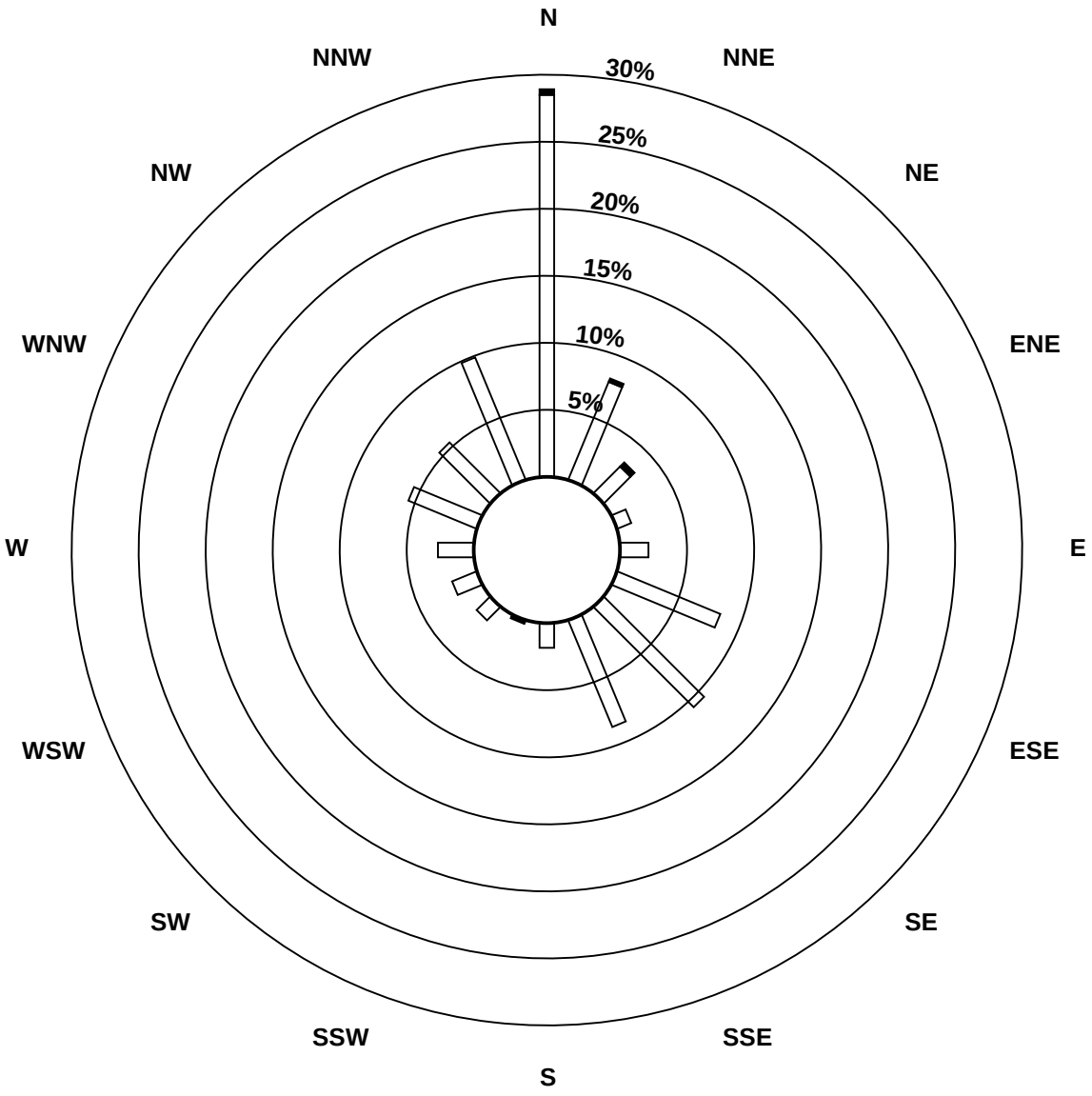
Total Number of Hours: 744

Wood Buffalo Environmental Association

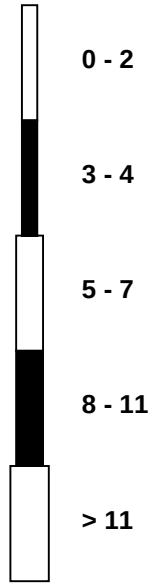
Wind Rose Mar 2016

Hydrogen Sulphide (H_2S) - ppb

Buffalo Viewpoint (AMS 4)



Classes (ppb)



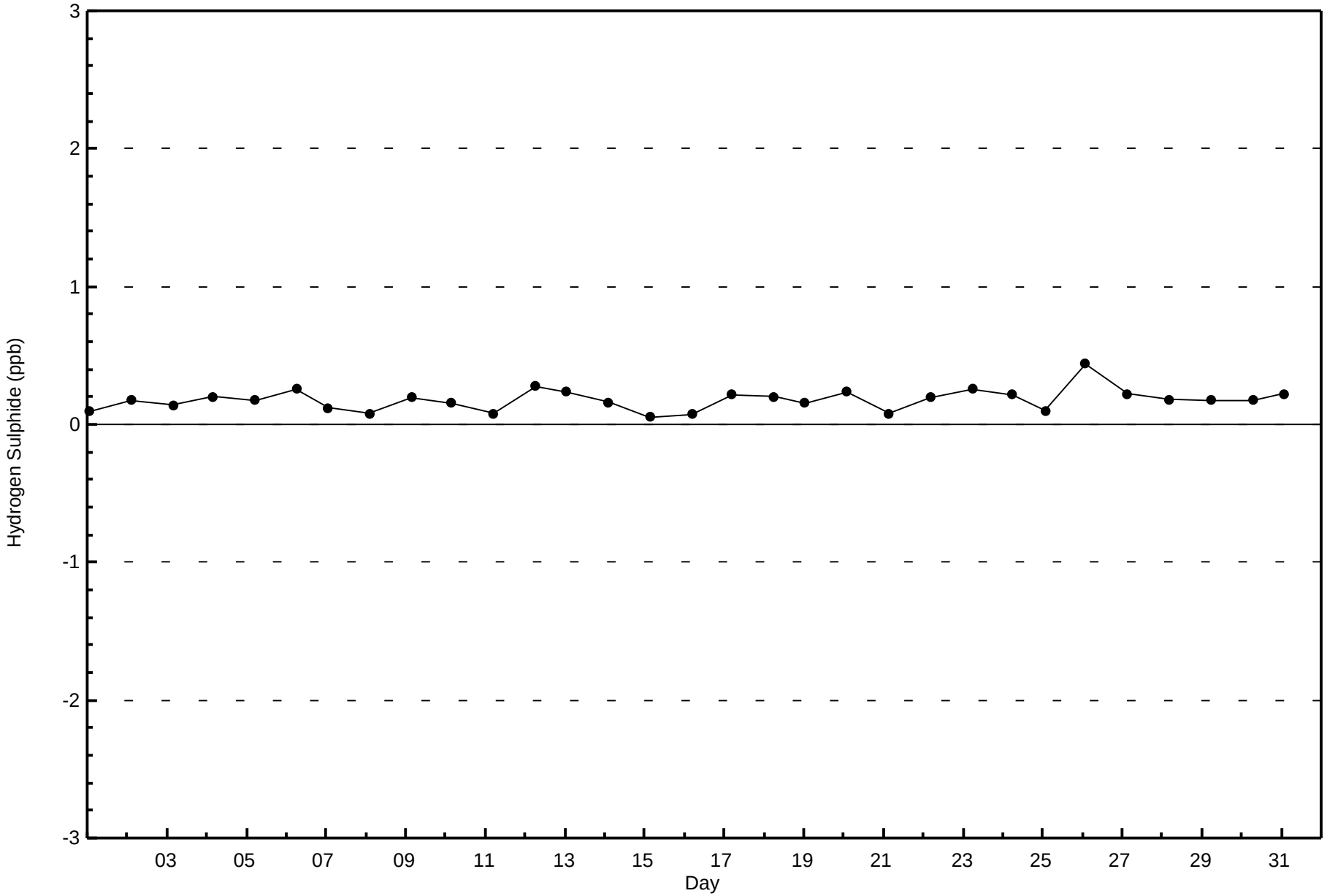
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Buffalo Viewpoint - March 2016

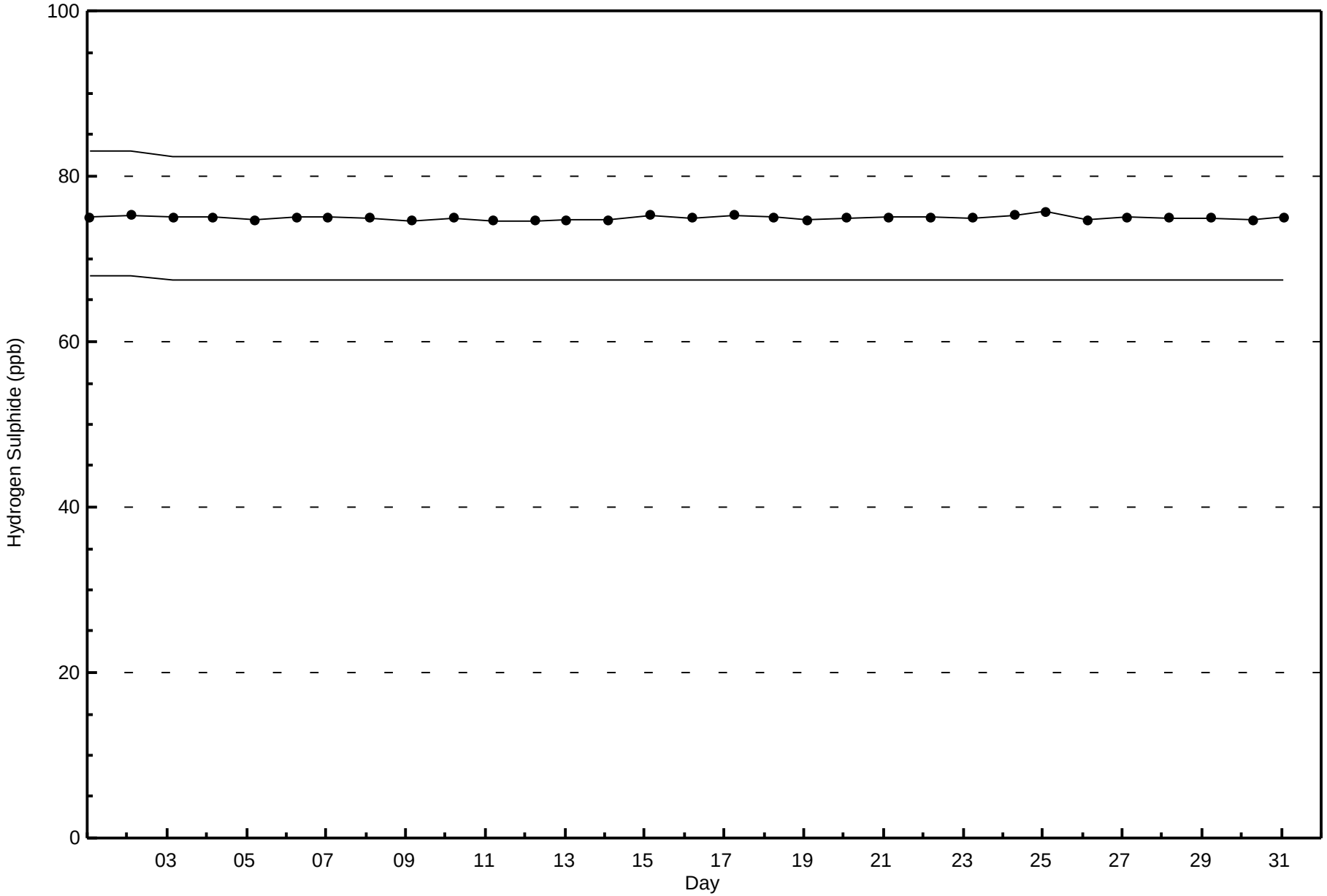


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Buffalo Viewpoint - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Buffalo Viewpoint - March 2016

Maximum Value: 5.3 ppm on Mar 25 23:00

Maximum Daily Average: 3.1 ppm on Mar 25

Minimum Value: 2.1 ppm on Mar 12 18:00

Minimum Daily Average: 2.2 ppm on Mar 22

Maximum Diurnal Average: 2.5 ppm at hour 12

Minimum Diurnal Average: 2.4 ppm at hour 6

Monthly Average: 2.42 ppm

Percentiles: P_1 = 2.1 P_{10} = 2.2 Q_1 = 2.2 Median = 2.3 Q_3 = 2.5 P_{90} = 2.8 P_{99} = 3.9

Hours in Service:	744
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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.8	3.5	2.9	2.8	2.5	2.7	2.8	3.9	3.8	2.7	2.5	2.5	2.5	2.7	2.7	3.9
2-Mar	3.1	Z	2.6	2.8	2.5	2.5	2.5	2.6	2.5	2.6	C	C	C	3.3	3.5	2.6	2.4	2.3	2.5	2.4	2.3	2.3	2.3	2.2	2.6	3.5
3-Mar	2.3	2.3	Z	2.7	2.4	2.4	2.3	2.3	2.4	2.4	2.3	2.4	2.4	2.4	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.7
4-Mar	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	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	2.1	2.2	2.2	2.4
5-Mar	2.1	2.2	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.9	3.3	3.0	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	3.3
6-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	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.4	2.3	2.2	2.3	2.5
7-Mar	Z	2.3	2.2	2.4	2.3	2.3	2.4	2.4	2.6	2.6	2.7	2.5	2.4	2.4	2.4	2.4	2.2	2.2	2.2	3.3	3.4	2.5	2.2	2.2	2.5	3.4
8-Mar	2.2	Z	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.4	2.2	2.2	2.2	2.5	2.5	3.0	3.2	3.1	2.7	2.8	2.7	2.6	2.3	2.5	3.2
9-Mar	2.3	2.3	Z	2.3	2.4	2.5	2.5	2.5	2.4	2.8	2.6	2.9	3.1	3.2	3.3	2.8	2.7	2.6	2.6	2.7	3.0	3.8	4.2	3.5	2.8	4.2
10-Mar	3.2	3.3	3.1	Z	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	3.3
11-Mar	2.2	2.2	2.4	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.6	2.6	2.9	3.1	2.4	2.4	2.5	2.5	2.4	2.5	2.5	2.5	3.1
12-Mar	2.5	2.5	2.5	2.5	2.4	Z	3.0	2.7	2.6	2.6	2.6	2.7	2.7	2.4	2.2	2.2	2.3	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.4	3.0
13-Mar	Z	2.2	2.2	2.9	2.6	2.5	2.7	4.5	3.1	2.6	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.5	2.5	2.4	2.4	2.5	4.5
14-Mar	2.2	Z	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.4	2.3	2.3	2.4
15-Mar	2.3	2.3	Z	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.7	2.7	2.6	2.5	2.5	2.4	2.4	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.7
16-Mar	2.3	2.2	2.2	Z	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	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3
17-Mar	2.5	2.5	2.3	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.4	2.4	2.3	2.5
18-Mar	2.3	2.3	2.2	2.2	2.2	Z	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.4	2.5	2.2	2.2	2.1	2.2	2.2	2.2	2.3	3.3	3.7	2.4	3.7
19-Mar	Z	3.1	3.0	3.0	2.9	2.5	2.3	2.3	2.3	2.4	3.0	3.0	3.2	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.4	2.3	2.6	3.2
20-Mar	2.3	Z	2.4	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.3	2.2	2.4	2.3	2.3	2.4	2.4	2.3	2.5
21-Mar	2.4	2.4	Z	2.4	2.4	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	2.5	2.4	2.5	2.5	2.3	2.4	2.3	2.5
22-Mar	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	2.3
23-Mar	2.2	2.2	2.2	2.2	Z	2.7	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.7
24-Mar	2.2	2.4	2.7	2.6	2.8	Z	2.8	2.5	2.5	2.5	2.9	3.4	3.3	3.4	2.7	2.3	2.3	2.5	2.5	2.4	2.3	2.3	2.4	2.5	2.6	3.4
25-Mar	Z	2.9	2.7	2.7	2.7	2.7	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	3.4	4.2	3.0	4.0	4.0	4.1	3.6	5.3	4.8	3.1	5.3
26-Mar	3.8	Z	3.4	3.5	3.5	2.9	2.8	3.0	3.0	2.9	2.7	2.4	2.4	2.2	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.7	3.8
27-Mar	2.2	2.2	Z	2.3	2.2	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	2.2	2.2	2.2	2.2	2.3
28-Mar	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.8	2.9	2.5	2.4	2.3	2.3	2.4	2.7	2.6	2.4	2.4	2.4	2.2	2.4	2.9
29-Mar	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	2.3	2.3	2.3	2.3	2.3	2.3	2.6	2.9	2.5	2.4	2.4	2.3	2.9
30-Mar	2.5	2.8	2.7	3.2	2.7	Z	2.7	2.9	2.8	2.8	2.5	2.4	2.4	2.6	2.2	2.5	2.5	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.5	3.2
31-Mar	Z	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4
	2.4	2.4	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	Diurnal Average	
	3.8	3.3	3.4	3.5	3.5	2.9	3.0	4.5	3.1	2.9	3.0	3.5	3.3	3.4	3.5	3.4	4.2	3.9	4.0	4.0	4.1	3.8	5.3	4.8	Diurnal Maximum	

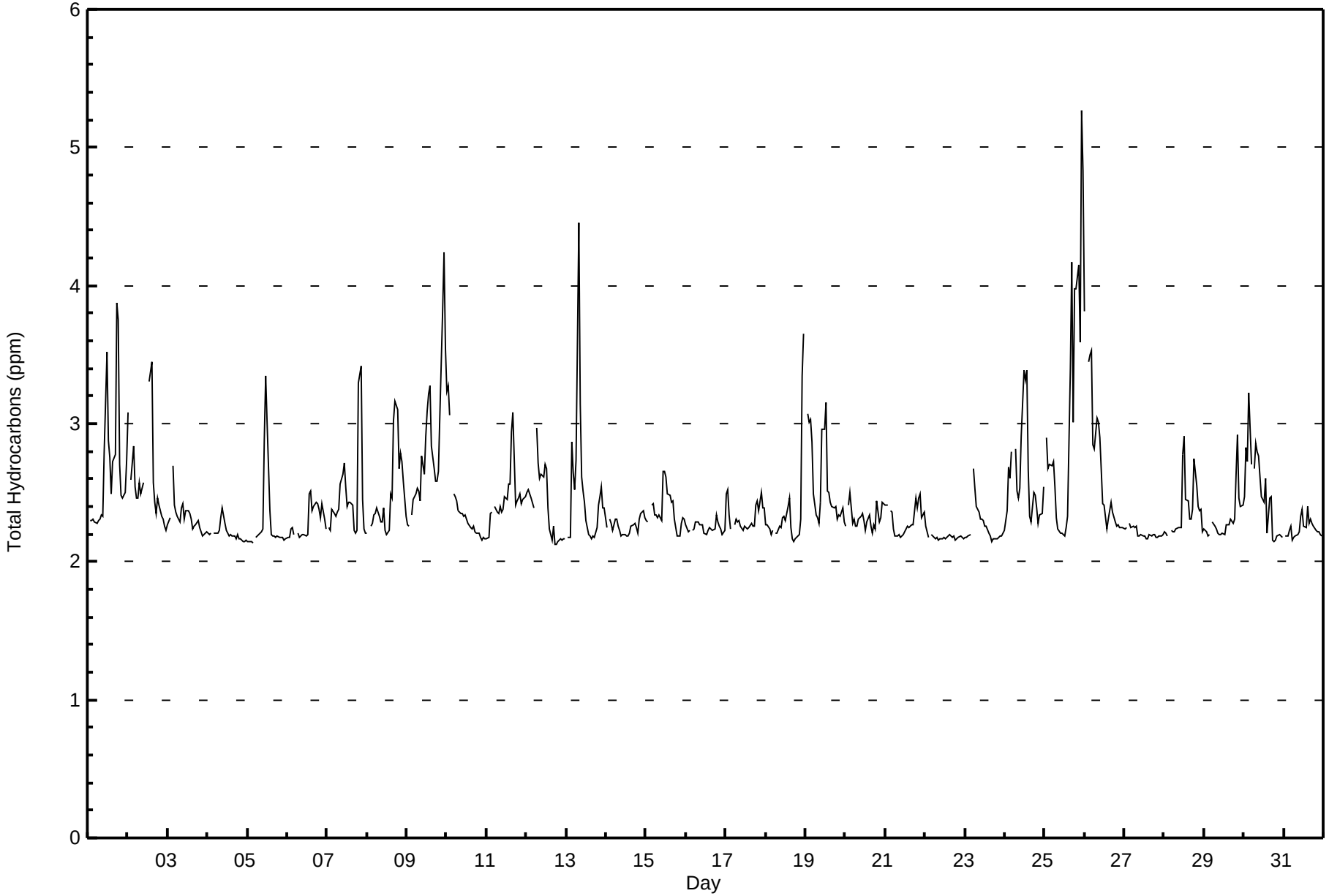
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Buffalo Viewpoint - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Buffalo Viewpoint - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	667	93.94	93.94
3.1 - 10.0	43	6.06	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 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	196	56	22	8	15	59	75	60	10	1	9	13	17	34	32	60	667
3.1 - 10.0	9	3	0	0	0	0	0	2	3	1	1	1	1	5	6	11	43
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	205	59	22	8	15	59	75	62	13	2	10	14	18	39	38	71	710

Total Number of Valid Hours: 710

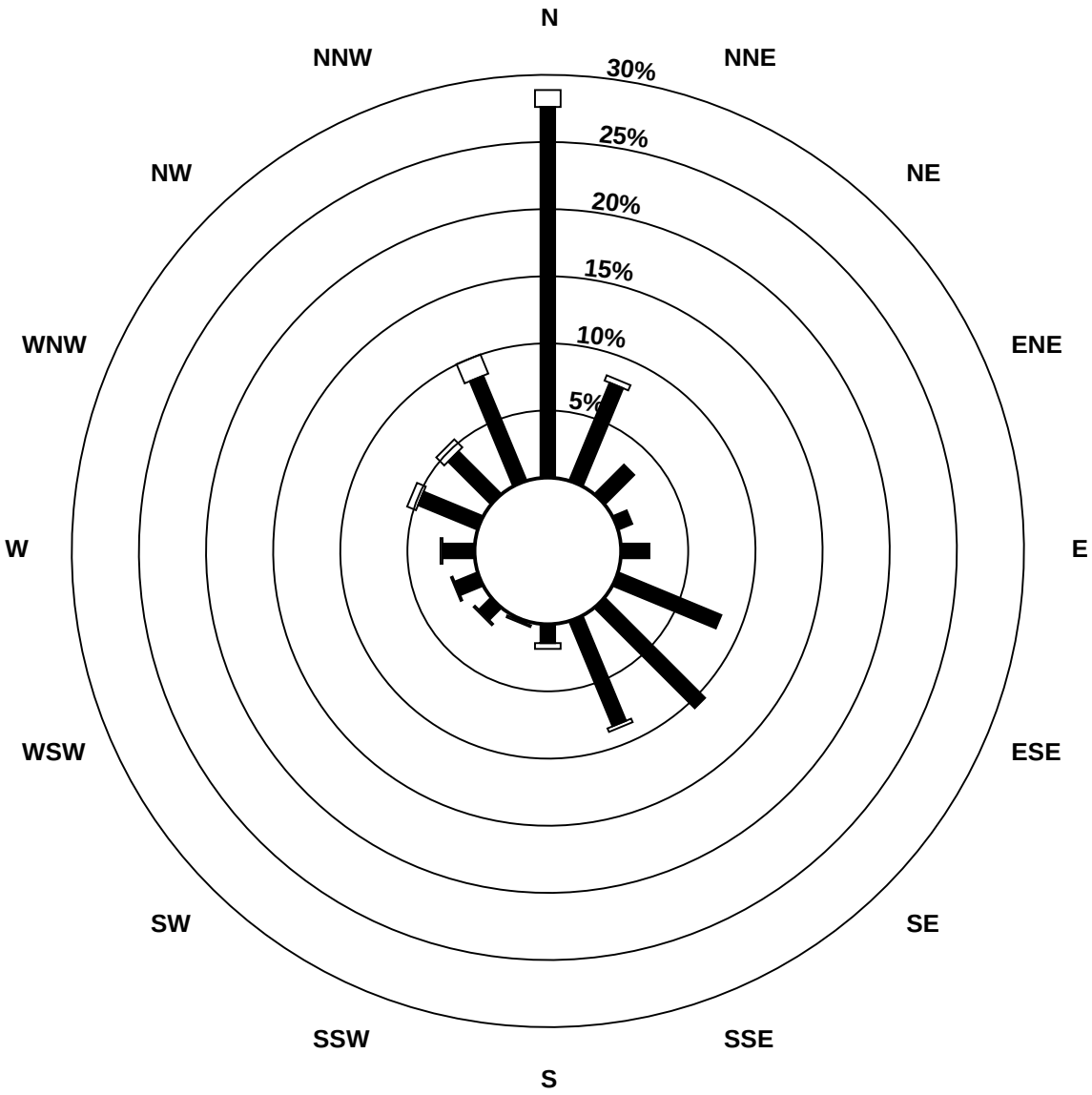
Total Number of Hours: 744

Wood Buffalo Environmental Association

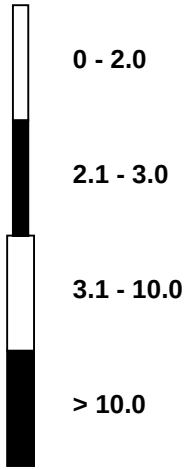
Wind Rose Mar 2016

Total Hydrocarbons (THC) - ppm

Buffalo Viewpoint (AMS 4)



Classes (ppm)



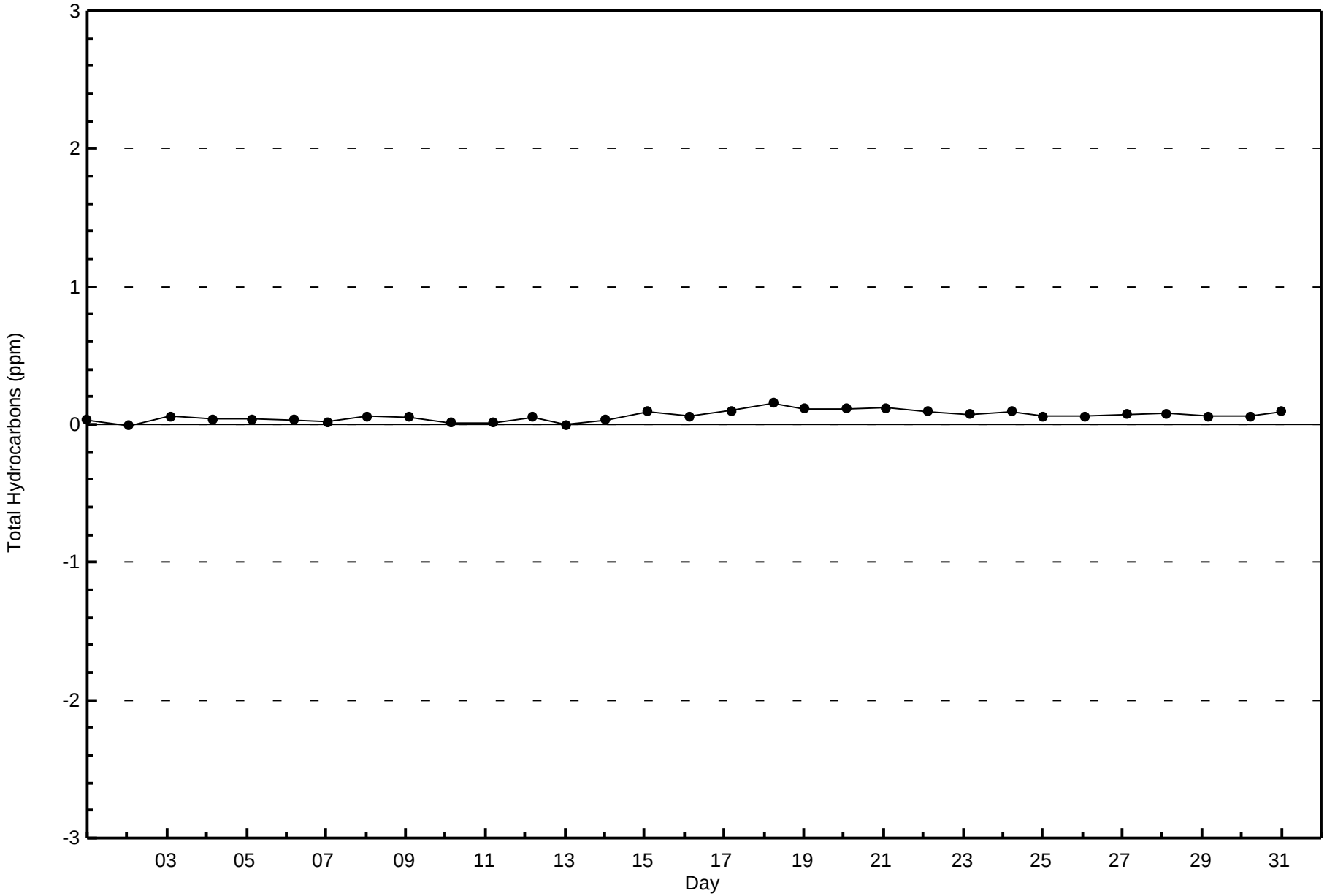
Total Number of Valid Hours: 710

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Buffalo Viewpoint - March 2016

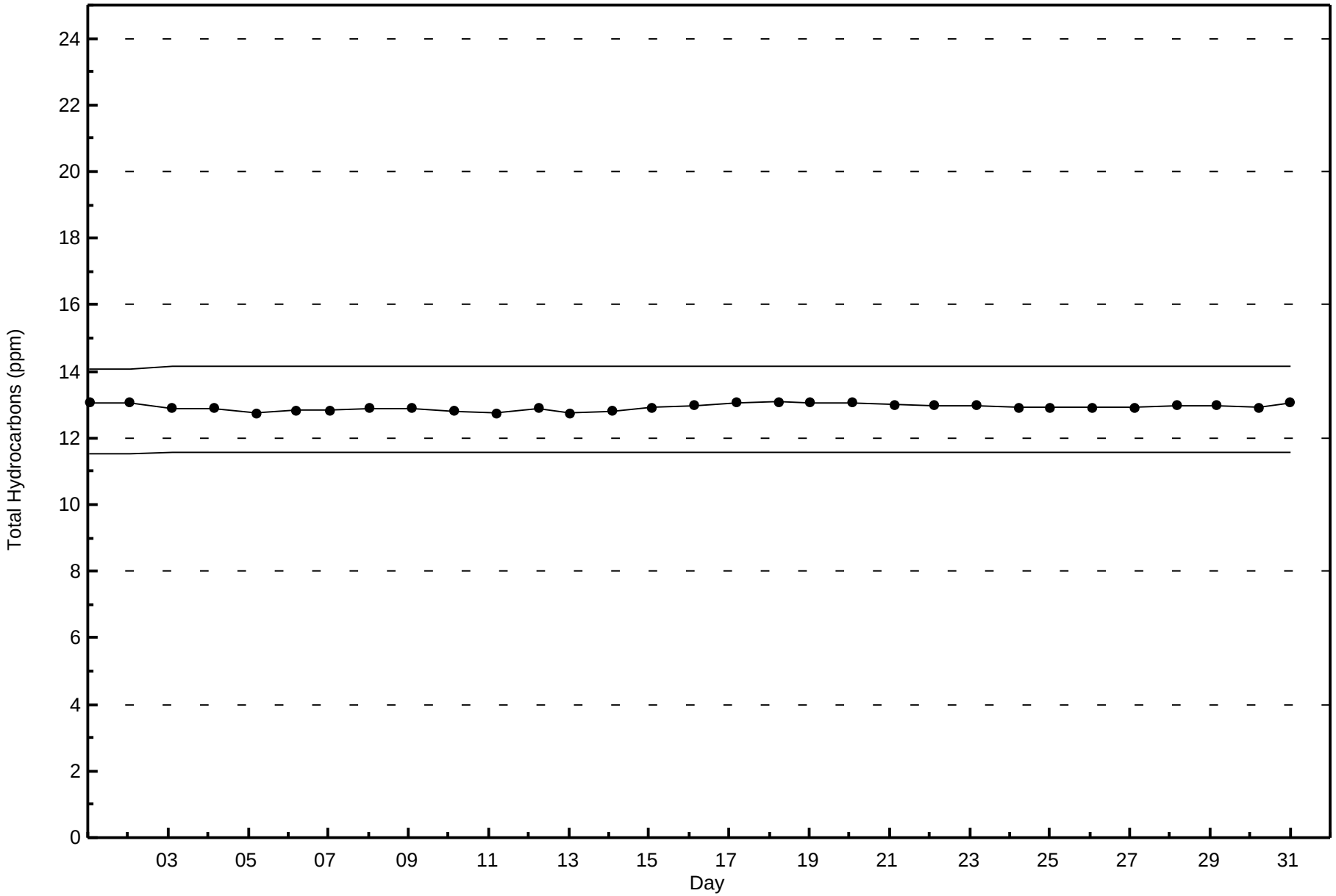


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Buffalo Viewpoint - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Buffalo Viewpoint - March 2016

Maximum Value: 14.0 C on Mar 29 16:00

Maximum Daily Average: 6.3 C on Mar 29

Minimum Value: -17.2 C on Mar 24 07:00

Minimum Daily Average: -9.0 C on Mar 3

Maximum Diurnal Average: 0.6 C at hour 16

Minimum Diurnal Average: -7.4 C at hour 7

Monthly Average: -3.69 C

Percentiles: P_1 = -15.3 P_{10} = -9.9 Q_1 = -7.5 Median = -4.4 Q_3 = -0.3 P_{90} = 3.1 P_{99} = 11.4

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

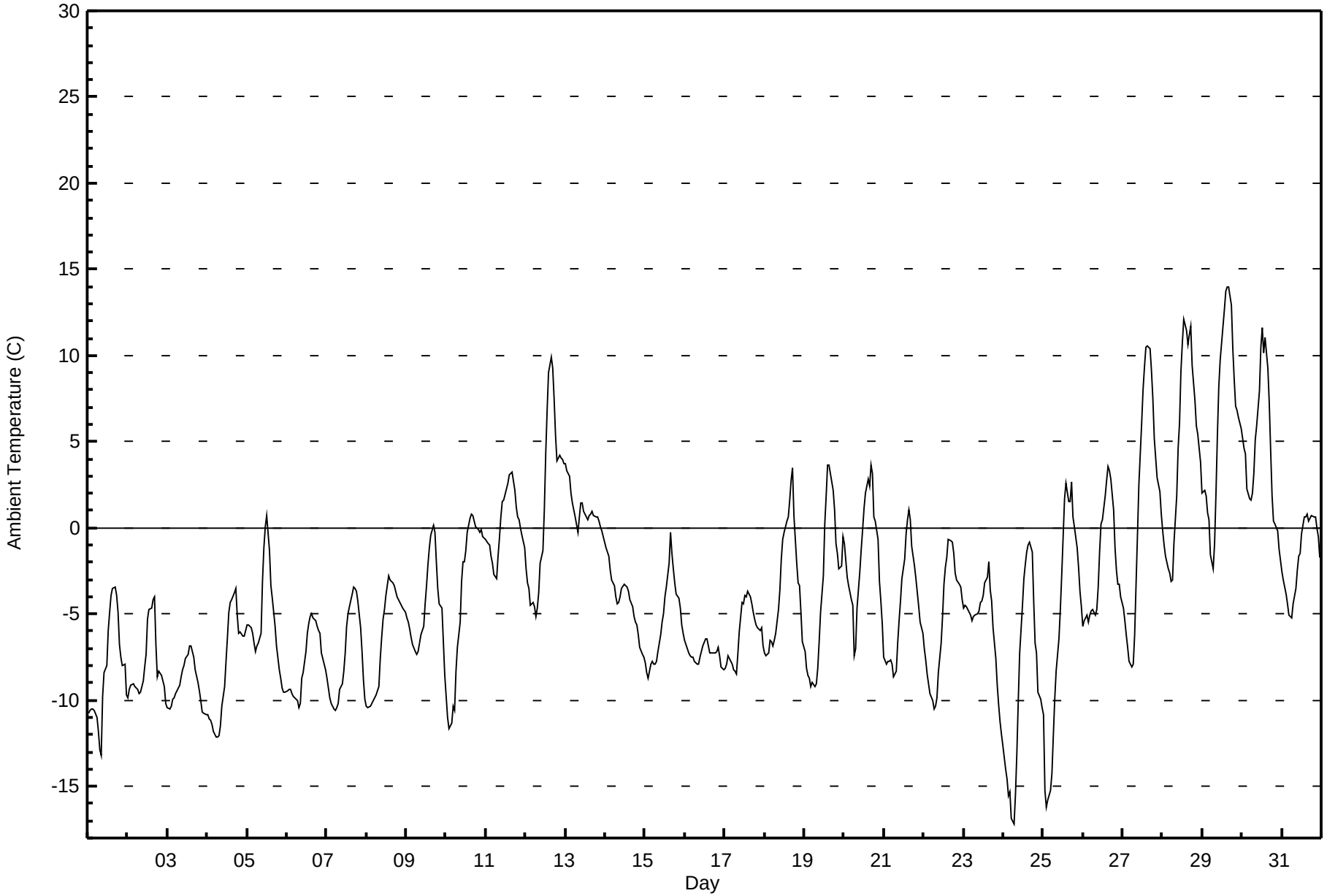
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.7	-10.6	-10.5	-10.5	-10.6	-11.0	-11.8	-12.9	-13.2	-9.8	-8.4	-8.0	-6.0	-4.9	-4.0	-3.5	-3.5	-3.9	-4.9	-6.8	-7.5	-8.0	-7.9	-9.7	-8.3	-3.5
2-Mar	-9.8	-9.4	-9.1	-9.0	-9.2	-9.3	-9.4	-9.7	-9.6	-8.9	-8.1	-7.3	-5.3	-4.7	-4.7	-4.2	-4.0	-6.7	-8.7	-8.3	-8.6	-8.9	-9.2	-10.1	-8.0	-4.0
3-Mar	-10.4	-10.5	-10.3	-9.9	-9.8	-9.7	-9.5	-9.2	-8.6	-8.3	-8.0	-7.6	-7.3	-6.9	-6.8	-7.2	-7.5	-8.3	-9.0	-9.4	-10.1	-10.6	-10.8	-10.8	-9.0	-6.8
4-Mar	-10.9	-11.1	-11.2	-11.4	-11.8	-12.1	-12.2	-12.1	-11.5	-10.4	-9.2	-7.8	-6.4	-4.9	-4.3	-4.2	-3.8	-3.5	-5.1	-6.1	-6.0	-6.3	-6.3	-6.0	-8.1	-3.5
5-Mar	-5.7	-5.6	-5.8	-6.1	-6.7	-7.2	-6.9	-6.7	-6.1	-3.1	-1.1	0.1	0.7	-1.4	-3.4	-4.1	-4.9	-5.7	-6.8	-8.2	-8.8	-9.3	-9.5	-9.5	-5.5	0.7
6-Mar	-9.4	-9.4	-9.4	-9.6	-9.8	-9.8	-10.0	-10.4	-10.2	-8.7	-8.4	-7.2	-6.1	-5.5	-5.1	-5.0	-5.3	-5.4	-5.7	-6.0	-6.1	-7.3	-7.9	-8.2	-7.7	-5.0
7-Mar	-8.7	-9.3	-9.8	-10.2	-10.5	-10.6	-10.5	-10.2	-9.3	-9.1	-8.3	-7.2	-5.7	-5.0	-4.6	-3.9	-3.5	-3.5	-3.7	-4.2	-5.8	-7.2	-8.8	-9.9	-7.5	-3.5
8-Mar	-10.3	-10.4	-10.3	-10.2	-10.0	-9.9	-9.7	-9.2	-7.6	-6.3	-5.3	-4.7	-3.9	-2.8	-3.0	-3.1	-3.2	-3.4	-4.0	-4.2	-4.3	-4.5	-4.7	-4.9	-6.2	-2.8
9-Mar	-5.2	-5.5	-5.9	-6.4	-6.8	-7.2	-7.3	-7.2	-6.7	-6.2	-5.7	-4.4	-3.3	-2.1	-1.1	-0.4	0.1	-0.3	-2.0	-3.6	-4.4	-4.7	-6.6	-8.6	-4.6	0.1
10-Mar	-9.8	-11.0	-11.7	-11.4	-10.3	-10.6	-8.3	-6.9	-5.4	-3.1	-1.9	-2.0	-1.3	-0.3	0.6	0.8	0.7	0.4	0.1	-0.1	-0.2	-0.1	-0.5	-0.6	-3.9	0.8
11-Mar	-0.6	-0.9	-1.0	-1.7	-2.1	-2.7	-3.0	-1.7	-0.6	0.6	1.5	1.6	2.2	2.6	3.1	3.1	3.2	2.1	1.2	0.6	0.4	0.0	-0.4	-1.2	0.3	3.2
12-Mar	-2.3	-3.2	-3.5	-4.5	-4.3	-4.5	-5.2	-4.6	-3.7	-2.1	-1.3	1.1	4.3	6.8	9.0	9.9	9.3	7.5	5.3	3.9	4.2	4.1	4.0	3.7	1.4	9.9
13-Mar	3.7	3.3	3.0	2.0	1.5	1.1	0.6	-0.3	0.6	1.4	1.4	0.9	0.8	0.4	0.7	0.8	0.9	0.7	0.6	0.6	0.4	0.1	-0.1	-0.5	1.0	3.7
14-Mar	-1.2	-1.4	-1.7	-2.5	-3.0	-3.4	-4.0	-4.4	-4.3	-4.0	-3.5	-3.3	-3.3	-3.4	-3.7	-4.2	-4.5	-5.1	-5.5	-5.6	-6.2	-6.9	-7.4	-7.5	-4.2	-1.2
15-Mar	-7.9	-8.4	-8.8	-7.9	-7.8	-7.9	-7.9	-7.7	-7.2	-6.2	-5.5	-5.0	-4.0	-3.4	-2.0	-0.3	-1.5	-2.3	-3.2	-3.9	-4.1	-4.6	-5.6	-6.1	-5.4	-0.3
16-Mar	-6.5	-7.0	-7.2	-7.5	-7.5	-7.5	-7.7	-7.9	-7.9	-7.5	-7.1	-6.8	-6.4	-6.5	-6.8	-7.2	-7.3	-7.3	-7.3	-7.2	-6.9	-7.4	-8.0	-8.2	-7.3	-6.4
17-Mar	-8.2	-7.9	-7.4	-7.6	-7.9	-8.3	-8.3	-8.4	-7.3	-6.0	-4.3	-4.4	-3.9	-4.0	-3.7	-4.0	-4.4	-4.9	-5.3	-5.6	-5.8	-5.9	-5.8	-6.9	-6.1	-3.7
18-Mar	-7.2	-7.4	-7.3	-6.5	-6.6	-6.9	-6.5	-6.1	-4.7	-3.6	-1.8	-0.7	-0.3	0.4	0.6	1.6	2.7	3.5	0.7	-2.1	-3.2	-3.3	-4.9	-6.6	-3.2	3.5
19-Mar	-7.2	-8.1	-8.6	-8.7	-9.2	-9.0	-9.2	-9.0	-8.2	-6.6	-4.9	-2.8	0.2	1.8	3.6	3.7	3.2	2.2	1.0	-0.9	-1.5	-2.4	-2.2	-0.5	-3.5	3.7
20-Mar	-0.9	-1.9	-2.9	-3.3	-4.2	-4.5	-7.4	-7.0	-4.7	-2.5	-1.2	-0.1	1.1	2.0	2.8	2.4	3.6	3.1	0.7	0.4	-0.7	-3.1	-4.3	-5.6	-1.6	3.6
21-Mar	-7.5	-7.9	-7.8	-7.7	-7.7	-7.9	-8.7	-8.3	-6.7	-5.4	-4.3	-3.0	-1.8	-0.4	0.5	1.0	0.5	-1.1	-2.2	-3.0	-3.8	-4.6	-5.5	-6.1	-4.6	1.0
22-Mar	-7.0	-7.7	-8.5	-9.1	-9.6	-10.1	-10.5	-10.4	-9.8	-8.4	-6.7	-5.1	-3.3	-2.3	-1.7	-0.7	-0.8	-0.9	-1.5	-2.6	-3.1	-3.3	-3.5	-4.2	-5.4	-0.7
23-Mar	-4.7	-4.5	-4.5	-4.9	-5.1	-5.4	-5.2	-5.1	-5.0	-4.8	-4.3	-4.3	-4.0	-3.2	-2.9	-2.0	-3.6	-4.3	-5.8	-7.6	-9.1	-10.2	-11.3	-12.0	-5.6	-2.0
24-Mar	-12.7	-14.0	-14.6	-15.6	-15.3	-16.9	-17.2	-15.5	-13.0	-10.0	-7.2	-4.5	-3.0	-2.2	-1.4	-1.0	-0.9	-1.4	-4.2	-6.7	-7.2	-9.5	-9.9	-10.4	-8.9	-0.9
25-Mar	-10.9	-15.2	-16.2	-15.8	-15.3	-14.3	-12.1	-9.9	-8.3	-6.5	-4.8	-2.7	-0.5	1.7	2.6	1.5	1.6	2.7	0.7	0.1	-1.2	-2.3	-3.7	-4.5	-5.6	2.7
26-Mar	-5.7	-5.4	-5.0	-5.5	-5.1	-4.8	-4.7	-5.1	-4.7	-3.4	-1.4	0.2	0.5	1.8	2.8	3.6	3.3	2.8	1.0	-1.1	-2.5	-3.3	-3.3	-4.0	-2.0	3.6
27-Mar	-4.7	-5.4	-6.2	-7.0	-7.7	-8.0	-7.9	-6.2	-3.2	-0.4	2.5	6.1	8.0	9.3	10.4	10.6	10.4	9.1	7.4	5.2	4.1	2.9	2.1	0.8	1.3	10.6
28-Mar	-0.2	-1.0	-1.6	-2.4	-2.7	-3.1	-3.0	-0.9	1.8	4.6	6.1	9.1	10.7	12.1	11.5	10.7	11.2	11.7	9.4	7.4	5.9	5.4	4.6	3.8	4.6	12.1
29-Mar	2.0	2.2	1.8	0.9	0.4	-1.6	-2.4	-0.9	2.0	5.3	8.2	9.7	11.7	12.7	13.7	14.0	14.0	12.9	10.4	8.6	7.0	6.8	6.4	5.7	6.3	14.0
30-Mar	5.2	4.7	4.3	2.2	1.7	1.6	2.0	3.2	5.1	5.9	8.0	10.5	11.6	10.1	11.1	9.2	7.2	4.4	1.8	0.4	0.2	-0.2	-1.3	-1.9	4.5	11.6
31-Mar	-2.5	-3.0	-3.8	-4.4	-5.1	-5.1	-5.2	-4.4	-3.5	-2.5	-1.6	-1.5	-0.4	0.6	0.7	0.8	0.4	0.5	0.7	0.6	0.6	0.0	-0.5	-1.7	-1.7	0.8
	-5.7	-6.2	-6.5	-6.8	-7.0	-7.3	-7.4	-6.9	-5.9	-4.4	-3.1	-2.0	-0.8	0.0	0.5	0.6	0.4	-0.1	-1.4	-2.4	-3.0	-3.7	-4.3	-4.9	Diurnal Average	
	5.2	4.7	4.3	2.2	1.7	1.6	2.0	3.2	5.1	5.9	8.2	10.5	11.7	12.7	13.7	14.0	14.0	12.9	10.4	8.6	7.0	6.8	6.4	5.7	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Buffalo Viewpoint - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	570	76.61	76.61
0 - 10	154	20.70	97.31
10 - 20	20	2.69	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) - %

Buffalo Viewpoint - March 2016

Maximum Value: 97 % on Mar 12 03:00

Maximum Daily Average: 89.7 % on Mar 9

Minimum Value: 22 % on Mar 24 17:00

Minimum Daily Average: 39.9 % on Mar 24

Maximum Diurnal Average: 81.9 % at hour 7

Minimum Diurnal Average: 61.1 % at hour 16

Monthly Average: 72.1 %

Percentiles: $P_1 = 26$ $P_{10} = 46$ $Q_1 = 60$ Median = 76 $Q_3 = 87$ $P_{90} = 92$ $P_{99} = 96$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

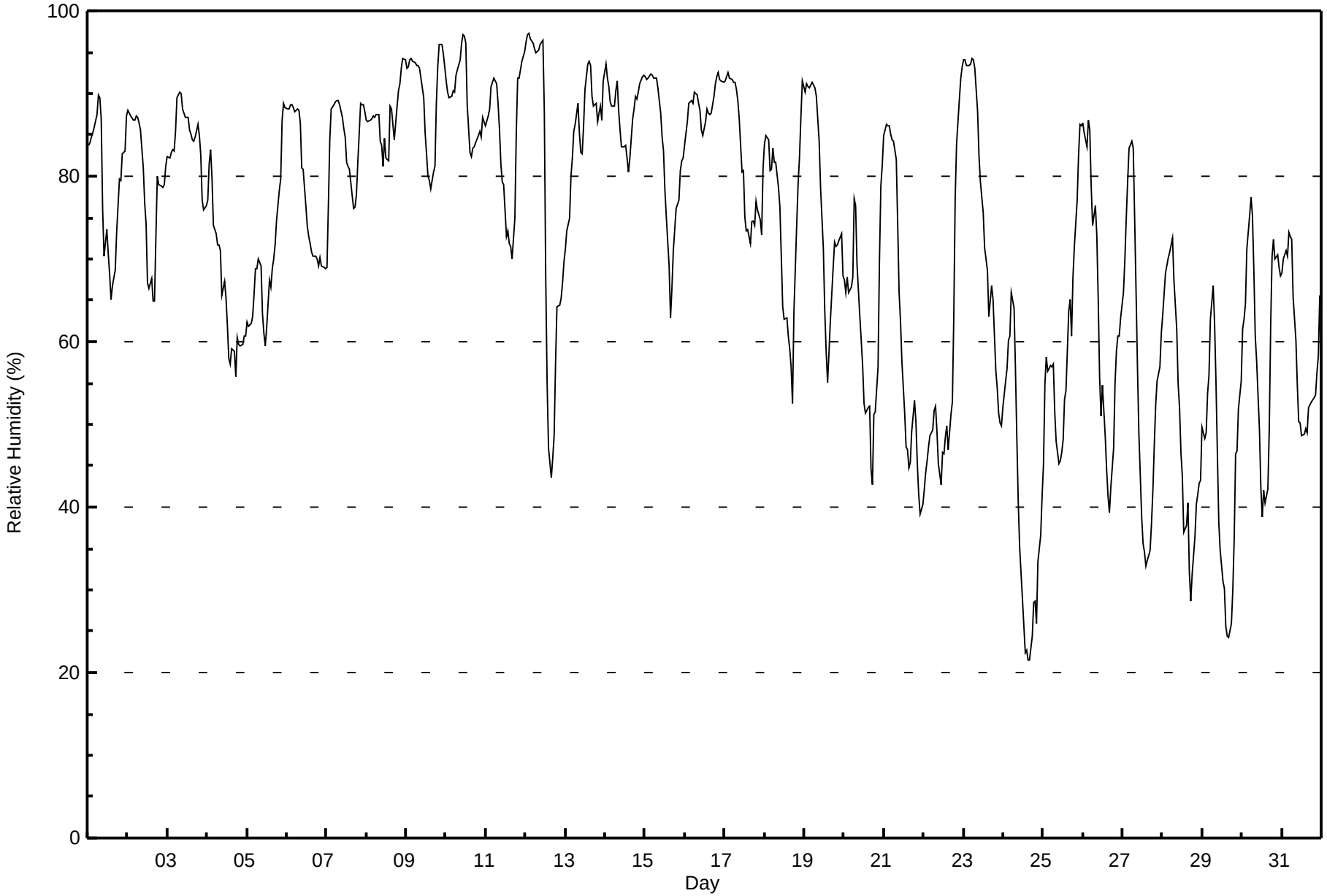
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	84	84	85	85	86	87	90	90	87	76	70	74	71	68	65	67	69	73	77	80	79	83	83	87	79.1	90
2-Mar	88	88	87	87	87	87	87	86	86	81	77	74	67	66	68	65	65	73	80	79	79	79	79	81	79.0	88
3-Mar	82	82	83	83	83	85	89	90	90	88	88	87	87	86	85	84	84	85	86	85	82	77	76	76	84.4	90
4-Mar	77	81	83	80	74	73	72	72	71	66	67	65	62	58	57	59	59	56	61	60	59	60	61	61	66.4	83
5-Mar	62	62	62	63	66	69	69	70	69	63	61	59	62	67	67	69	70	72	75	78	80	87	89	88	69.9	89
6-Mar	88	88	89	89	88	88	88	88	86	81	81	76	74	73	72	71	70	70	70	69	70	69	69	69	78.2	89
7-Mar	69	76	84	88	89	89	89	89	89	87	86	85	82	81	81	78	76	76	78	82	89	89	89	88	83.6	89
8-Mar	87	87	87	87	87	87	88	87	84	84	81	85	82	82	88	88	86	84	88	90	91	93	94	94	87.2	94
9-Mar	93	93	94	94	94	94	93	93	93	92	90	85	83	80	79	78	80	81	89	93	96	96	95	93	89.7	96
10-Mar	92	90	90	90	90	90	92	93	94	96	97	97	96	89	83	82	83	84	84	85	85	85	87	87	89.2	97
11-Mar	86	87	88	91	91	92	91	89	86	82	79	79	73	73	72	71	70	75	85	92	92	93	94	95	84.4	95
12-Mar	96	97	97	97	96	95	95	95	95	96	96	88	68	55	47	44	46	49	57	64	64	65	67	70	76.7	97
13-Mar	71	73	75	80	82	85	86	89	85	83	83	86	90	93	94	93	90	88	89	87	88	89	87	92	85.8	94
14-Mar	94	92	91	89	88	89	90	91	88	86	83	84	84	82	80	82	87	88	90	89	90	91	92	92	88.0	94
15-Mar	92	92	92	92	92	92	92	92	91	88	85	83	78	75	69	63	66	71	74	76	77	81	82	82	82.4	92
16-Mar	84	87	89	89	89	89	90	90	89	88	86	85	87	88	88	88	88	90	91	92	93	92	92	91	88.8	93
17-Mar	92	92	93	92	92	91	91	91	89	87	81	81	75	73	74	72	75	75	74	77	76	75	73	81	82.0	93
18-Mar	84	85	84	81	81	83	82	82	79	76	70	64	63	63	61	59	57	53	64	74	79	82	87	92	74.4	92
19-Mar	90	91	91	91	91	91	91	90	87	84	79	71	64	59	55	59	63	69	72	72	72	72	73	68	76.8	91
20-Mar	68	66	68	66	67	68	77	76	69	63	60	57	53	51	52	52	45	43	51	51	57	70	79	81	62.1	81
21-Mar	85	86	86	86	85	84	84	82	74	66	62	58	51	47	47	45	45	49	53	50	45	41	39	40	62.2	86
22-Mar	42	44	46	47	49	49	52	52	49	45	43	47	46	48	50	47	51	53	63	77	84	89	92	93	56.6	93
23-Mar	94	94	93	93	94	94	94	93	88	82	79	78	76	71	69	63	65	67	65	56	54	51	50	50	75.6	94
24-Mar	52	55	57	60	61	66	64	57	48	41	35	29	26	22	23	22	22	24	28	29	26	33	37	41	39.9	66
25-Mar	45	55	58	56	57	57	57	52	48	45	46	47	48	53	54	64	65	61	68	71	77	82	86	86	60.0	86
26-Mar	86	85	84	87	86	79	74	76	73	65	56	51	55	49	45	41	39	42	47	55	59	61	61	63	63.3	87
27-Mar	66	70	75	79	83	84	83	75	66	57	49	39	36	34	33	34	35	38	42	47	52	55	57	61	56.3	84
28-Mar	63	66	68	70	71	72	73	67	61	55	52	47	44	37	38	40	32	29	32	37	40	41	43	43	50.9	73
29-Mar	50	48	49	54	56	63	67	62	55	46	38	35	31	30	26	24	24	26	30	36	46	47	52	55	43.8	67
30-Mar	62	63	65	71	75	77	75	69	61	58	49	42	39	42	40	42	50	62	70	72	70	71	69	68	60.9	77
31-Mar	68	70	71	70	73	73	72	65	60	55	50	50	49	49	49	49	52	52	53	53	54	56	58	66	59.1	73
	77.2	78.4	79.4	80.2	80.8	81.4	81.9	80.4	77.1	73.0	69.6	67.3	64.5	62.8	61.6	61.1	61.6	63.1	67.3	69.7	71.2	72.7	73.9	75.3	Diurnal Average	
	96	97	97	97	96	95	95	95	95	96	97	97	96	93	94	93	90	90	91	93	96	96	95	95	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Buffalo Viewpoint - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Buffalo Viewpoint - March 2016

Maximum Speed: 31 km/h on Mar 13 18:00

Maximum Daily Speed Average: 20.8 km/h on Mar 14

Minimum Speed Value: 1 km/h on Mar 8 02:00

Minimum Daily Speed Average: 1.0 km/h on Mar 26

Maximum Diurnal Speed Average: 7.4 km/h at hour 16

Minimum Diurnal Speed Average: 3.4 km/h at hour 1

Monthly Average Velocity: 4.9 km/h 7.6 deg

Percentiles: $P_1 = 2$ $P_{10} = 5$ $Q_1 = 6$ Median = 9 $Q_3 = 13$ $P_{90} = 19$ $P_{99} = 29$

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	SSE10	SE7	SSE6	SSE5	SE6	SSE6	SSE6	SE6	SSE6	SE4	NNE5	NNE7	N6	N6	N4	NNW4	N4	NNW4	N4	NNE11	NNE7	N6	ENE5	WNW4	ENE1.7	NNE11
2-Mar	N5	NE8	NNW4	N6	NNE9	N6	N7	N11	N10	N9	N6	NNW6	N6	NNW7	N9	N9	N10	N10	N12	NNW13	N14	N14	N13	N13	N8.8	N14
3-Mar	N12	NNW14	NNW9	NNW8	N7	N6	N8	N11	N13	N13	NNW10	N16	N16	NNW19	N21	N25	N20	N17	N15	N17	N17	N11	NNW4	N4	N12.9	N25
4-Mar	NNE5	NNE6	NNE6	NNE6	NNE7	NNE4	SW2	SSE3	SE4	SSE7	SSE9	SE11	ESE12	SE13	SE12	SE13	ESE11	ESE12	ESE10	ESE10	SE13	SE11	SE8	SE7	ESE6.5	SE13
5-Mar	SE7	SSE9	SSE9	SSE8	SSE10	SSE9	SSE7	SSE9	SSE9	S6	E1	N6	NNW11	N22	N19	N21	N18	N18	N20	N24	N20	N19	N19	N17	NNE6.7	N24
6-Mar	N16	N17	N17	N16	N16	NNE11	N12	N15	N15	N14	N15	NNE12	N9	NW8	N13	NNW16	NNW17	NNW13	N10	NNE9	NNE9	N15	NNE13	NNE12	N13.0	N17
7-Mar	NNE15	NNE14	N12	NNE12	N13	N12	N11	NNW10	NNW6	WNW8	WNW8	NW8	NNW6	N5	NNE4	WSW4	WSW12	SW9	SW8	WNW9	NNW12	N11	NNE12	N9	NNW6.8	NNE15
8-Mar	N5	N1	ESE1	E1	S2	SW2	SE3	SE6	SSE5	SE7	SE6	SE8	SE8	NE3	N7	N7	NW7	NW4	N6	NNE8	N6	NNW5	N7	N11	NE2.1	N11
9-Mar	N8	N7	N10	N11	NNW10	NNW8	NNW7	NNW4	NNW4	NNW7	N4	N4	N5	NNE6	NNE7	NE4	NNE6	NE7	NE8	NNE6	N6	WNW4	SSW2	SSE5	N5.2	N11
10-Mar	S5	S5	SSE5	SSE5	SSE4	SSE5	SSE5	S3	S2	ESE4	ESE7	ESE9	ESE12	ESE16	ESE15	ESE14	ESE15	ESE15	ESE12	SE10	SE12	SE13	SSE10	SSE6	SE8.2	ESE16
11-Mar	SSE6	SW4	WSW8	W9	W11	W13	WSW18	WSW18	WSW13	W13	WNW13	N8	NNE5	NW6	NNW7	NNW6	NNW8	WNW4	SW3	E4	SE3	SSE5	SSE6	SE7	W4.8	WSW18
12-Mar	SE8	SE9	SE5	SSE6	SE8	ESE3	NNE4	NNE5	NE5	NE4	NNE6	NNE8	NE8	ESE10	ESE12	ESE14	ESE15	ESE15	SE11	SE9	SE12	SE13	SE11	SE10	ESE7.1	ESE15
13-Mar	SE13	SE6	ESE3	NE7	NE6	NE8	N7	NNW6	N11	NNW15	NNW17	NNW19	N20	N23	N22	N26	N31	N31	NNW27	NNW29	NNW27	NNW23	NNW24	NNW25	N15.6	N31
14-Mar	N25	N23	N25	N24	N24	N22	N27	N25	N24	N23	N21	N20	N21	N22	N22	N22	N20	N22	N17	N19	N16	N15	NNW11	N11	N20.8	N27
15-Mar	N9	NNW8	N10	NNW10	NNW9	NNW8	NNW9	N8	N8	NNW7	NW9	WNW9	WNW10	WNW10	WNW9	NW9	WNW12	NNW10	N16	N15	N17	N19	N18	N21	NNW10.3	N21
16-Mar	N25	N27	N27	N28	N30	N29	N21	N18	N19	N19	N22	N21	N16	N16	N20	N21	N22	N20	NW11	WNW8	WNW10	N9	NNW5	NW4	N18.2	N30
17-Mar	W4	W5	WNW11	NW13	WNW12	WNW12	WNW11	W9	WNW10	WNW11	NW7	NW11	NW15	NW14	NW12	NW11	NW14	NW14	NW13	NW13	NNW7	NW4	SSW5	SSE6	NW9.2	NW15
18-Mar	SSE6	SSE6	S4	SW5	S5	SE7	S4	S3	W6	WNW9	N5	NNE7	NE9	NE9	ESE10	SE12	SE10	S8	SE8	SE8	SE8	WNW3	WNW7	NW6	SE2.3	SE12
19-Mar	NW7	NW7	NW8	NW6	NNW9	N8	N6	N7	N5	N4	N6	N7	NW8	N14	N13	N14	N16	N14	NNE12	N9	N7	NNE8	NE5	ESE6	N7.6	N16
20-Mar	ESE8	E7	E5	ESE5	ESE7	E6	NNE7	NE7	E7	E9	ENE9	ENE10	NE8	N10	N12	N14	NNE5	ENE9	ENE13	E13	ENE12	NE10	NNE9	NNE10	NE7.0	N14
21-Mar	NNE11	NNE11	NNE10	NNE10	N11	N10	NNE11	N11	NE8	NE10	NNE8	NNE8	ENE9	NE8	NNE8	E11	E13	E14	E14	E14	E12	E11	ESE11	ESE9	NE8.4	E14
22-Mar	ESE10	ESE11	ESE11	SE9	ESE9	ESE9	SE9	ESE9	ESE8	ESE8	ESE8	ESE9	ESE8	ESE7	ESE7	ESE9	ESE9	ESE8	SE8	ESE6	ESE6	SE7	SE7	SE7	ESE8.2	ESE11
23-Mar	SSE6	SSE6	SSE7	SSE6	S3	WNW6	NNW8	N13	NNW17	NNW17	NNW14	NNW15	N17	N15	N14	N15	N14	N13	N15	NNE12	N12	NNE12	NNE9	N8	N8.8	NNW17
24-Mar	NNW7	NNW10	NNW8	NNW8	WNW8	NNW8	N12	N12	N9	NNW9	NW9	NNW10	NNW10	NNW11	N10	N10	N9	N8	N9	NNE9	NNE9	N8	N8	N6	N8.7	N12
25-Mar	WNW5	SSE4	SE8	SE7	SE6	SSE6	SSE9	SSE11	SSE10	SSE8	SE9	SE9	ESE7	E6	ESE5	W5	WSW3	S2	N5	SW3	S6	N1	NNW7	NW7	SSE3.2	SSE11
26-Mar	NNW8	NW4	WNW6	WNW8	NW7	NNW9	NNW11	WNW8	WNW8	W7	NW4	N6	WNW6	N6	NNE6	NNE7	ESE7	ESE10	SE8	SE8	SE9	SE9	SE11	SE13	N1.0	SE13
27-Mar	SSE11	SSE7	SE6	SE7	SE7	SSE8	SSE8	SSE8	SE10	SE8	ESE8	SE10	SE12	ESE13	SE14	ESE14	SE16	ESE13	SE11	SE12	SE14	SE13	SSE13	SSE9	SE10.2	SE16
28-Mar	SSE10	SSE9	SSE8	SE10	SE10	SSE7	SSE8	SSE10	SSE10	SE9	ESE10	NNE6	N6	W10	NW19	WNW16	WNW11	NW7	NW9	WNW9	WNW9	W8	WSW11	WSW12	WSW2.7	NW19
29-Mar	W8	W10	WSW9	W10	W8	SSE6	SSE8	SE7	SE7	SE5	WSW6	WSW8	W4	NE8	NNE6	NNE6	NE5	NE3	SW4	WSW6	WNW4	SW5	W4	WSW7	WSW2.4	W10
30-Mar	WNW7	NW5	WNW4	NNW7	W7	NW10	NW12	NW12	NW12	NW9	WNW10	NNW6	NW18	NNW30	N19	NNW27	N29	NNE26	NNE29	N31	N27	N31	N31	N29	NNW16.3	N31
31-Mar	N23	NNE20	N19	N19	N15	N14	N12	N12	NNE8	N6	N6	W5	WNW6	N6	ENE5	ESE9	SE10	SE9	SE8	SSE6	SSE8	SSE6	SSE7	SSE7	NNE4.9	N23
	NNE3.4	NNE3.5	N3.5	N3.9	N3.8	N3.8	N4.1	N3.8	N3.7	N3.8	N4.5	N5.6	N6.1	N7.3	N7.4	N7.4	N6.5	NNE5.9	NNE5.6	NNE6.1	NNE5.3	NNE5.2	NNE4.1	NNE3.8	Diurnal Average	
	NNW25	N27	N27	N28	N30	N29	N27	N25	N24	N23	N22	N21	N21	NNW30	N22	NNW27	N31	N31	NNE29	N31	NNW27	N31	N31	N29	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

Buffalo Viewpoint - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 10 km/h on Mar 30 13:00

Minimum Value: 0 km/h on Mar 1 08:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 6$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

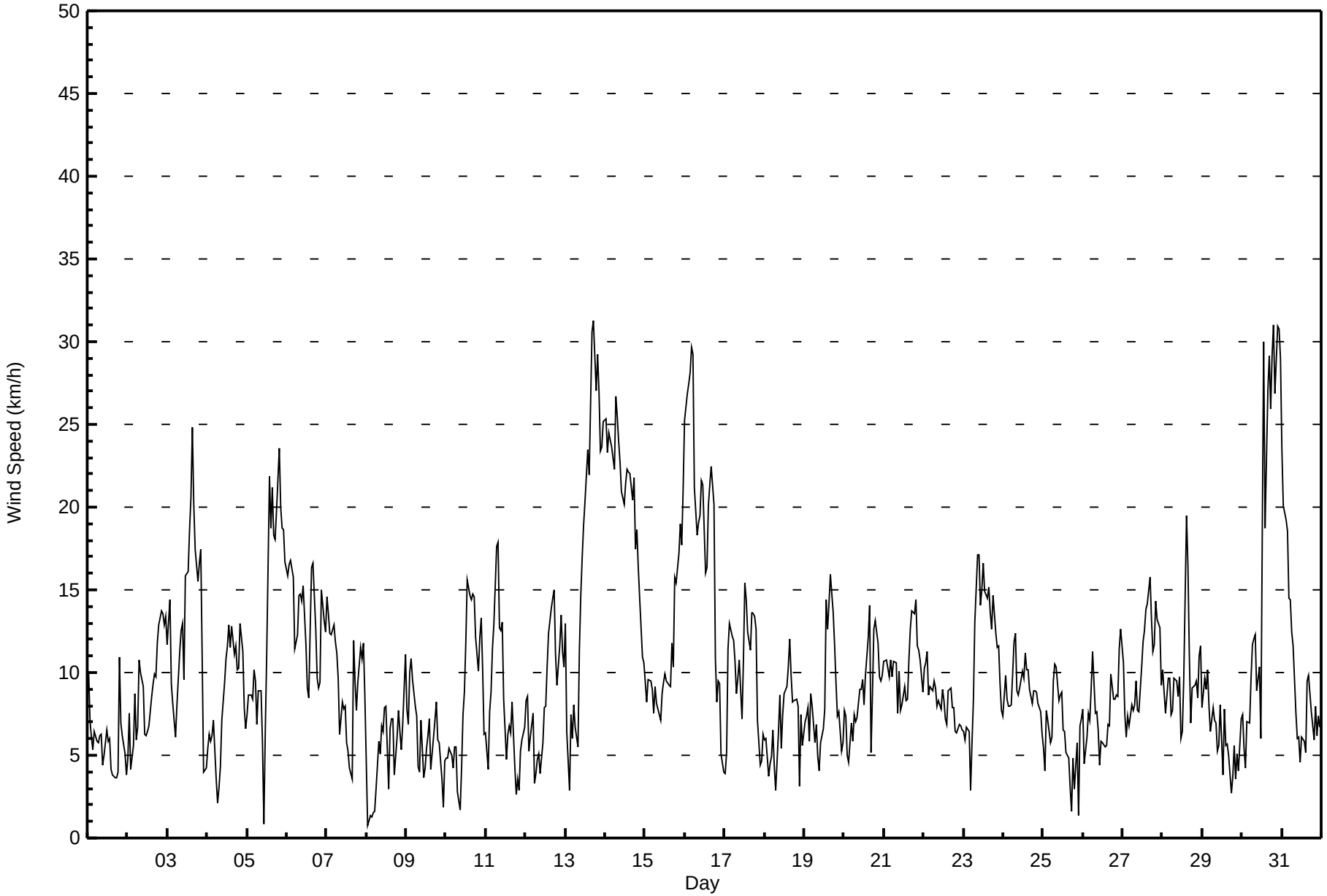
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	2	2	1	1	0	0	1	0	1	1	1	1	1	1	1	1	1	1	2	2	2	1	2	2	2
2-Mar	1	1	1	1	2	2	2	2	2	2	1	2	1	2	2	2	2	1	2	2	2	2	2	1	2
3-Mar	2	2	2	2	2	2	2	2	2	2	1	3	2	2	3	4	3	3	3	3	3	5	1	1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

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Buffalo Viewpoint - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	110	14.78	14.78
6 - 11	405	54.44	69.22
12 - 19	165	22.18	91.40
20 - 28	52	6.99	98.39
29 - 38	12	1.61	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Buffalo Viewpoint - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	16	8	7	2	4	6	6	11	11	2	8	2	6	7	6	8	110
6 - 11	72	41	16	4	6	39	56	53	3	0	2	7	12	29	22	43	405
12 - 19	73	11	0	2	6	16	17	1	0	0	0	5	2	6	12	14	165
20 - 28	43	2	0	0	0	0	0	0	0	0	0	0	0	0	0	7	52
29 - 38	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	12
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	213	63	23	8	16	61	79	65	14	2	10	14	20	42	40	74	744

Total Number of Valid Hours: 744

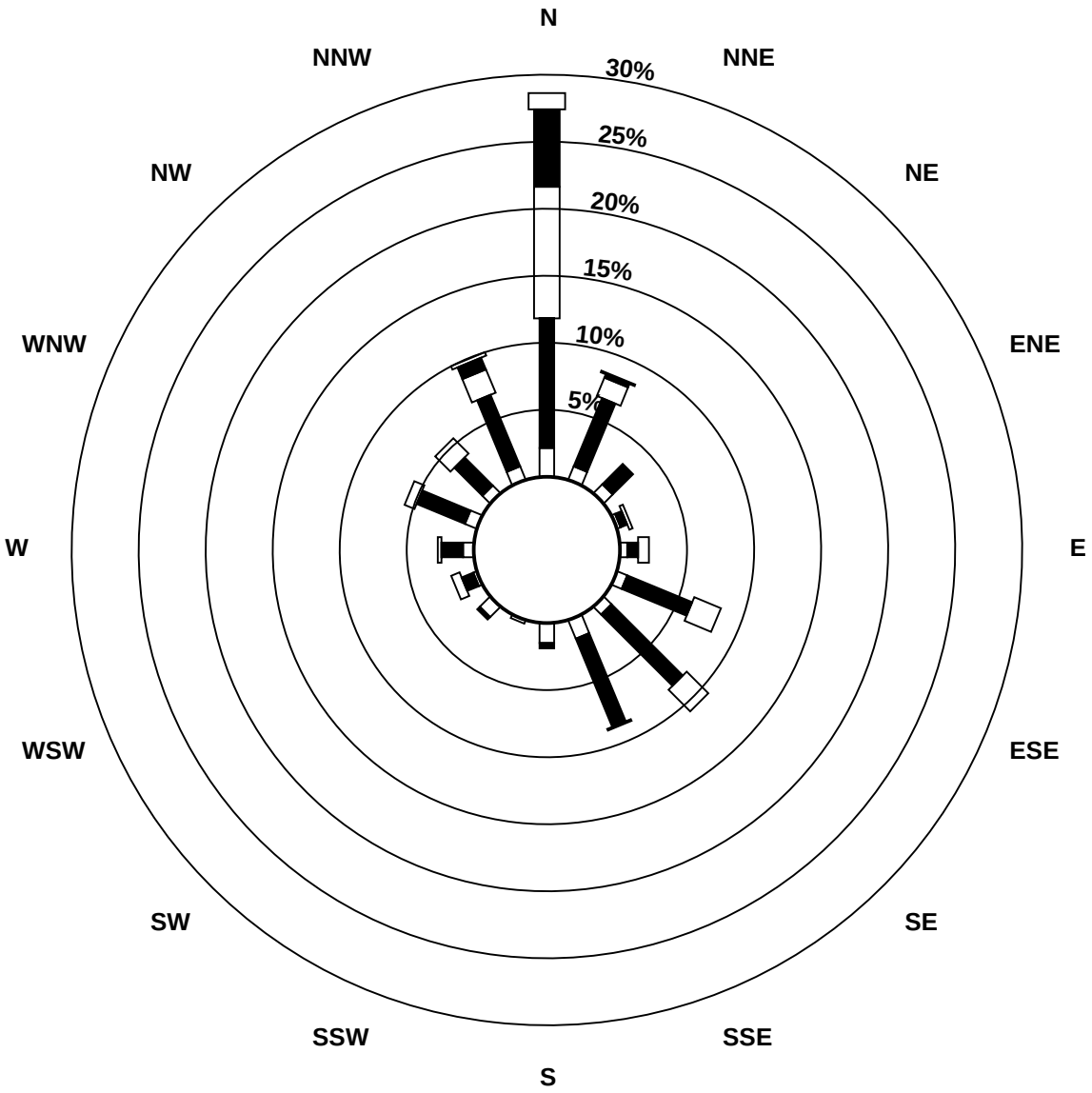
Total Number of Hours: 744

Wood Buffalo Environmental Association

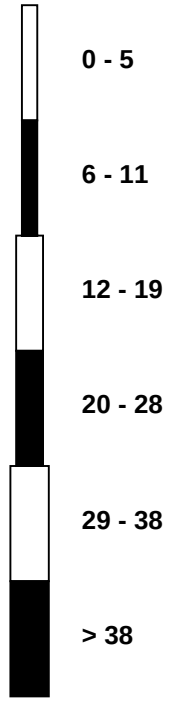
Wind Rose Mar 2016

Wind Speed (WS) - km/h

Buffalo Viewpoint (AMS 4)



Classes (km/h)



Total Number of Valid Hours: 744

Direction of Maximum Speed: 351 deg on Mar 13 18:00
Direction of Maximum Daily Speed Average: 356.3 deg on Mar 14

Direction of Minimum Speed: 6 deg on Mar 8 02:00

Direction of Minimum Daily Speed Average: 1.0 deg on Mar 26

Monthly Average Direction: 340.1 deg

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	150	143	158	148	142	168	165	140	153	145	18	21	10	6	358	327	351	337	349	13	16	8	65	302	69.7
2-Mar	351	40	340	349	17	0	358	353	355	356	356	332	354	347	352	354	10	3	350	346	357	3	6	0	357.8
3-Mar	350	348	343	347	355	4	9	4	350	354	345	350	349	348	351	357	2	6	358	4	7	9	338	1	355.9
4-Mar	23	21	20	33	28	25	225	149	135	151	150	131	113	141	140	126	123	120	117	122	127	131	140	146	119.8
5-Mar	142	153	167	159	154	158	165	153	155	172	92	4	347	10	356	8	9	7	352	358	4	2	3	2	14.7
6-Mar	358	358	355	2	4	18	6	357	2	355	1	19	354	315	349	348	342	341	11	24	18	8	13	15	0.3
7-Mar	16	13	10	14	10	357	354	348	339	301	298	306	337	8	20	242	246	224	223	301	336	6	13	9	343.9
8-Mar	353	6	108	91	170	215	133	143	153	127	125	125	129	49	357	0	318	307	358	22	7	348	357	10	37.5
9-Mar	4	350	350	359	347	347	348	343	344	340	360	355	6	21	33	56	24	41	47	21	352	292	192	157	4.5
10-Mar	191	176	157	152	166	159	157	177	184	121	120	118	118	121	116	117	110	117	114	124	128	134	148	160	130.6
11-Mar	161	224	255	271	278	270	257	251	258	264	291	359	14	314	328	346	335	295	222	93	129	157	149	140	270.7
12-Mar	132	134	126	157	137	109	18	32	41	34	29	30	43	109	118	119	120	122	124	129	132	138	140	136	114.7
13-Mar	138	130	104	50	48	41	9	330	351	343	344	348	350	351	351	352	352	351	345	344	341	333	335	347	351.0
14-Mar	349	352	357	355	351	354	354	0	4	4	4	1	357	358	1	353	350	351	356	1	355	359	348	350	356.3
15-Mar	352	344	351	347	346	338	343	351	351	347	304	298	296	297	303	322	302	329	6	5	3	357	356	350	340.6
16-Mar	351	350	351	349	350	351	356	359	357	353	351	354	358	8	0	1	3	358	314	290	291	7	348	321	351.7
17-Mar	271	270	299	304	302	302	301	271	285	295	307	305	316	317	321	306	318	321	309	314	334	308	212	149	304.4
18-Mar	167	161	177	226	175	144	177	178	281	288	357	27	39	52	114	125	138	178	141	135	146	301	302	318	140.9
19-Mar	309	317	307	314	336	351	353	353	352	354	5	5	324	351	352	357	0	7	19	9	8	16	47	108	354.6
20-Mar	104	92	92	111	110	88	28	38	80	101	70	61	41	359	353	350	12	71	74	82	71	35	29	20	54.7
21-Mar	24	23	21	20	11	11	14	9	37	50	26	28	69	53	18	88	94	88	94	89	93	101	105	107	56.0
22-Mar	106	116	120	124	121	115	126	120	114	116	111	109	115	113	113	109	116	113	139	119	122	126	133	131	118.2
23-Mar	148	158	148	149	169	302	333	353	344	345	343	348	351	349	358	5	10	6	8	16	11	14	23	0	0.0
24-Mar	346	347	348	334	300	341	358	5	359	342	324	332	336	333	357	351	353	357	355	18	24	1	353	351	348.9
25-Mar	294	168	134	143	143	161	155	151	152	150	145	129	102	93	113	278	245	185	7	232	187	349	338	319	148.0
26-Mar	344	317	296	289	317	347	341	294	293	279	325	358	294	359	20	30	116	123	127	135	142	143	146	140	1.0
27-Mar	149	149	146	137	142	158	151	153	144	130	122	128	137	121	126	119	129	120	132	132	134	139	147	157	136.0
28-Mar	152	153	159	145	146	152	155	155	157	132	121	33	5	274	308	298	287	309	308	289	287	276	255	257	237.2
29-Mar	260	260	255	268	267	157	147	138	134	139	238	249	281	38	29	32	41	35	228	244	288	223	278	243	242.0
30-Mar	291	315	297	337	275	304	315	319	319	315	300	345	324	341	359	348	352	17	12	5	1	360	3	5	347.8
31-Mar	4	13	5	359	359	356	356	11	25	1	1	279	296	5	71	121	128	136	144	147	158	155	151	160	23.5
	12.5	11.8	358.1	357.2	356.7	357.6	353.9	359.5	0.0	356.1	357.5	6.3	2.1	4.4	7.6	9.0	10.0	20.7	18.8	17.3	20.4	16.8	16.2	11.6	
	Diurnal Average																								

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 101 deg on Mar 5 11:00

Minimum Value: 5 deg on Mar 24 21:00

Percentiles: P_1 = 7 P_{10} = 12 Q_1 = 14 Median = 16 Q_3 = 21 P_{90} = 32 P_{99} = 77

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

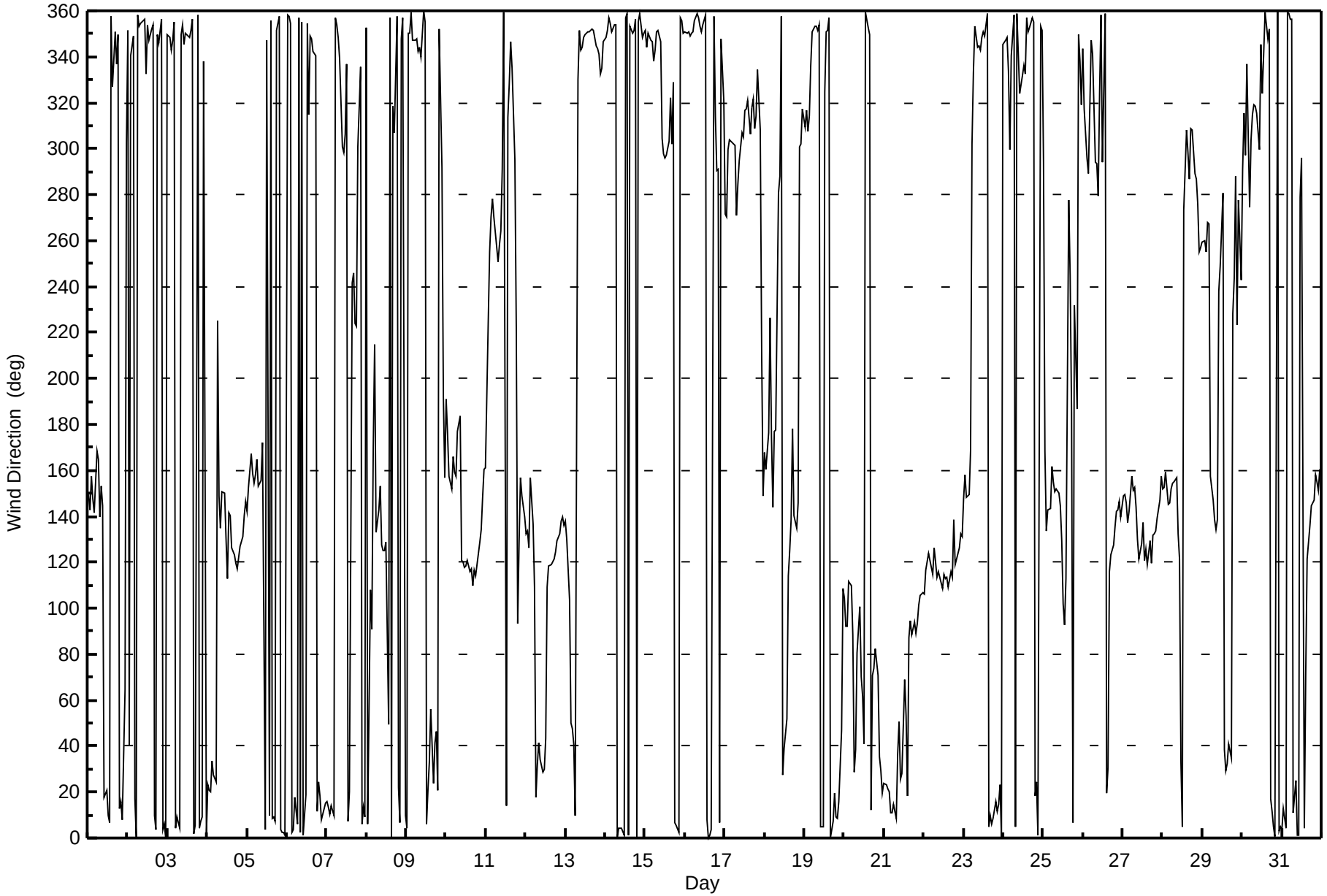
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	14	15	14	11	5	10	23	11	21	25	31	17	18	15	26	37	16	25	42	19	20	17	44	44	44
2-Mar	19	12	33	18	15	24	18	13	14	14	17	30	21	24	16	12	14	10	11	11	14	12	13	12	33
3-Mar	15	11	12	25	24	15	12	15	15	14	14	12	13	13	14	18	15	16	17	16	15	27	33	23	33
4-Mar	25	17	18	17	16	56	50	28	19	22	22	21	18	26	25	17	19	18	16	14	17	19	20	14	56
5-Mar	16	20	19	17	15	17	21	16	16	46	101	16	26	18	15	16	15	15	14	17	15	15	16	13	101
6-Mar	14	16	15	16	17	14	15	15	14	14	16	19	19	27	19	14	12	14	14	13	12	14	13	12	27
7-Mar	11	11	12	11	12	12	13	12	19	14	14	17	30	17	53	62	13	11	12	47	12	16	13	16	62
8-Mar	27	92	77	84	66	67	60	24	25	17	21	21	20	78	13	14	25	32	11	14	14	14	14	13	92
9-Mar	15	16	11	14	13	15	14	14	23	26	39	27	17	18	23	53	17	9	5	22	14	34	55	15	55
10-Mar	17	28	12	7	12	14	17	37	37	32	20	19	18	18	18	18	18	18	17	17	18	17	18	21	37
11-Mar	17	37	14	15	17	17	15	10	15	17	18	24	24	24	23	23	20	45	79	35	63	28	12	13	79
12-Mar	10	11	12	17	21	49	54	12	20	38	14	14	18	31	19	19	19	17	13	13	15	17	19	17	54
13-Mar	17	30	56	17	34	12	19	26	13	12	13	13	14	14	14	16	18	16	15	14	15	13	15	15	56
14-Mar	14	15	17	17	15	14	17	17	17	16	17	16	18	17	17	15	13	14	17	15	14	15	12	12	18
15-Mar	10	7	7	10	10	12	11	13	14	15	21	16	17	15	20	22	14	23	14	14	16	16	16	15	23
16-Mar	14	15	15	15	14	15	16	15	17	14	14	15	15	14	17	16	17	16	18	15	15	23	22	20	23
17-Mar	16	13	13	10	10	9	11	14	14	14	18	19	15	16	16	15	14	12	10	11	19	29	19	16	29
18-Mar	17	15	39	32	43	15	37	47	23	17	39	18	15	30	22	16	24	19	16	12	12	50	14	15	50
19-Mar	7	7	7	17	15	10	15	13	17	24	15	12	29	13	13	15	15	18	16	16	17	11	41	17	41
20-Mar	17	31	26	22	16	34	9	16	37	23	30	26	26	27	16	15	29	21	15	16	16	27	12	13	37
21-Mar	12	11	11	12	14	14	15	15	28	21	32	37	33	32	30	29	20	17	16	16	18	17	16	17	37
22-Mar	17	16	16	16	15	16	16	17	18	18	25	21	26	40	30	24	17	21	19	15	15	15	16	14	40
23-Mar	13	18	13	12	34	27	12	15	13	13	15	15	12	13	16	16	14	14	14	11	9	9	8	14	34
24-Mar	8	7	8	10	12	16	13	10	15	18	18	19	19	21	14	11	12	13	12	10	5	10	11	21	21
25-Mar	20	38	6	6	10	11	10	13	14	19	19	20	28	40	73	23	54	93	11	53	25	88	20	12	93
26-Mar	12	23	7	10	21	12	17	18	18	19	42	18	38	29	24	18	39	15	12	12	12	13	15	12	42
27-Mar	14	14	18	12	9	9	11	15	20	24	23	20	21	20	21	19	17	15	14	13	15	14	14	14	24
28-Mar	15	14	11	15	14	16	12	18	19	22	18	38	30	34	15	15	16	24	14	8	7	12	9	7	38
29-Mar	11	13	23	11	14	19	14	10	15	22	46	31	63	26	32	24	38	23	69	39	52	17	35	23	69
30-Mar	31	12	37	26	30	16	10	15	16	25	16	27	21	18	18	17	19	15	16	17	17	18	19	17	37
31-Mar	17	15	17	17	16	15	16	20	23	38	39	59	56	32	45	16	17	18	18	13	16	12	13	20	59
	31	92	77	84	66	67	60	47	37	46	101	59	63	78	73	62	54	93	79	53	63	88	55	44	
	Diurnal Maximum																								

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Buffalo Viewpoint - March 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	March 2, 2016	Last Calibration	February 5, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:19	End Time (MST)	12:39
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

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-593	-593
Analyzer IP address	192.168.1.43		Lamp voltage	842	838
Calculated slope	0.995175	0.995391	Chamber temp	45.0	45.0
Calculated intercept	0.908648	0.301890	Pressure	689.5	709.4
Analyzer Background	10.9	10.7	Flow	0.491	0.505
Analyzer Coefficient	0.819	0.819	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	601.7	0.998
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	60.4	600.4	602.2	0.997
second point	5000	30.2	300.2	303.2	0.990
third point	5000	15.1	150.1	149.3	1.006
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	60.4	600.4	603.9	0.994
				Average Correction Factor	0.998

Corrected As found	602.0	Previous response	602.4	% change	0.1%

Notes:

Sample inlet filter replaced after as founds. No adjustments.

Calibration Performed By: Asad Hidayat

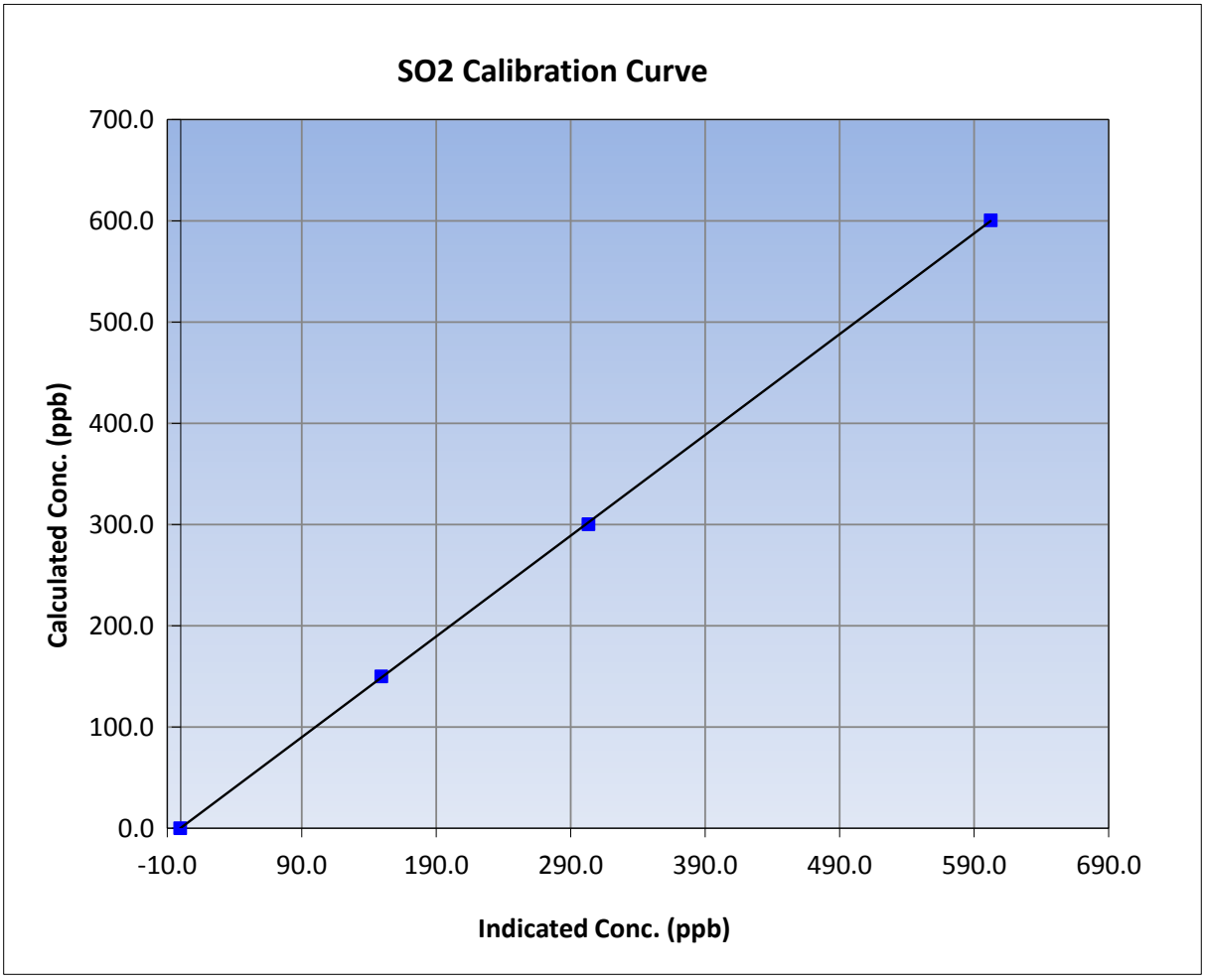
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

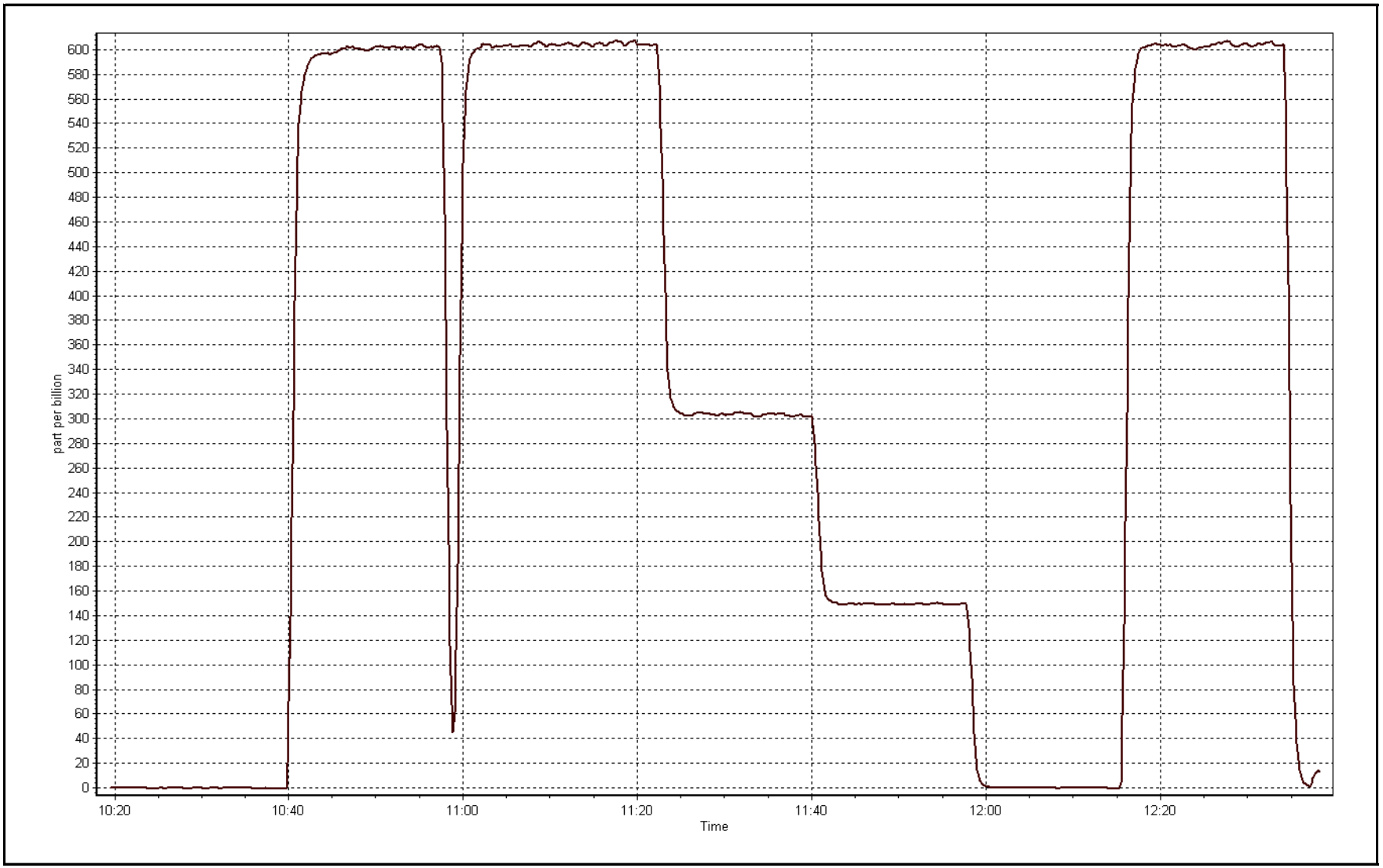
Calibration Date	March 2, 2016	Previous Calibration	February 5, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	10:19	End Time (MST)	12:39
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999972
600.4	602.2	0.9970		
300.2	303.2	0.9902	Slope	0.995391
150.1	149.3	1.0057		
			Intercept	0.301890



SO2 Calibration Plot Date: March 2, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	March 2, 2016	Last Calibration	February 3, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	12:40	End Time (MST)	15:10
Gas Cert Reference	LL101590	Station temp.	22 Deg C
Cal Gas Concentration	9.75 ppm	Cal Gas Exp Date	2/22/2016
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	49.8 ppm	SO2 gas cert/exp	LL107924 29-May-14

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-617	-617
Analyzer IP address	192.168.1.42		Lamp voltage	878	879
Calculated slope	0.991459	0.991852	Chamber temp	45	45
Calculated intercept	-0.030123	0.032663	Pressure	551.1	550.5
Analyzer Background	13.9	13.9	Flow	1.049	1.045
Analyzer Coefficient	0.862	0.862	Intensity	94	94
			Converter temp.	329	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	46.1	74.9	74.9	1.000
SO2 scrubber check	5000	15.1	150.4	1.6	----
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	46.1	74.9	75.6	0.991
second point	6000	25.9	42.1	42.3	0.994
third point	6000	15.4	25.0	25.1	0.997
as left zero	5000	0.0	0.0	0.3	----
as left span	6000	46.1	74.9	75.4	0.993
				Average Correction Factor	0.994

Corrected As found	74.8	Previous response	75.6	% change	1.1%

Notes:

Scrubber check done and sample inlet filter replaced after as founds. No adjustments.

Calibration Performed By: Asad Hidayat

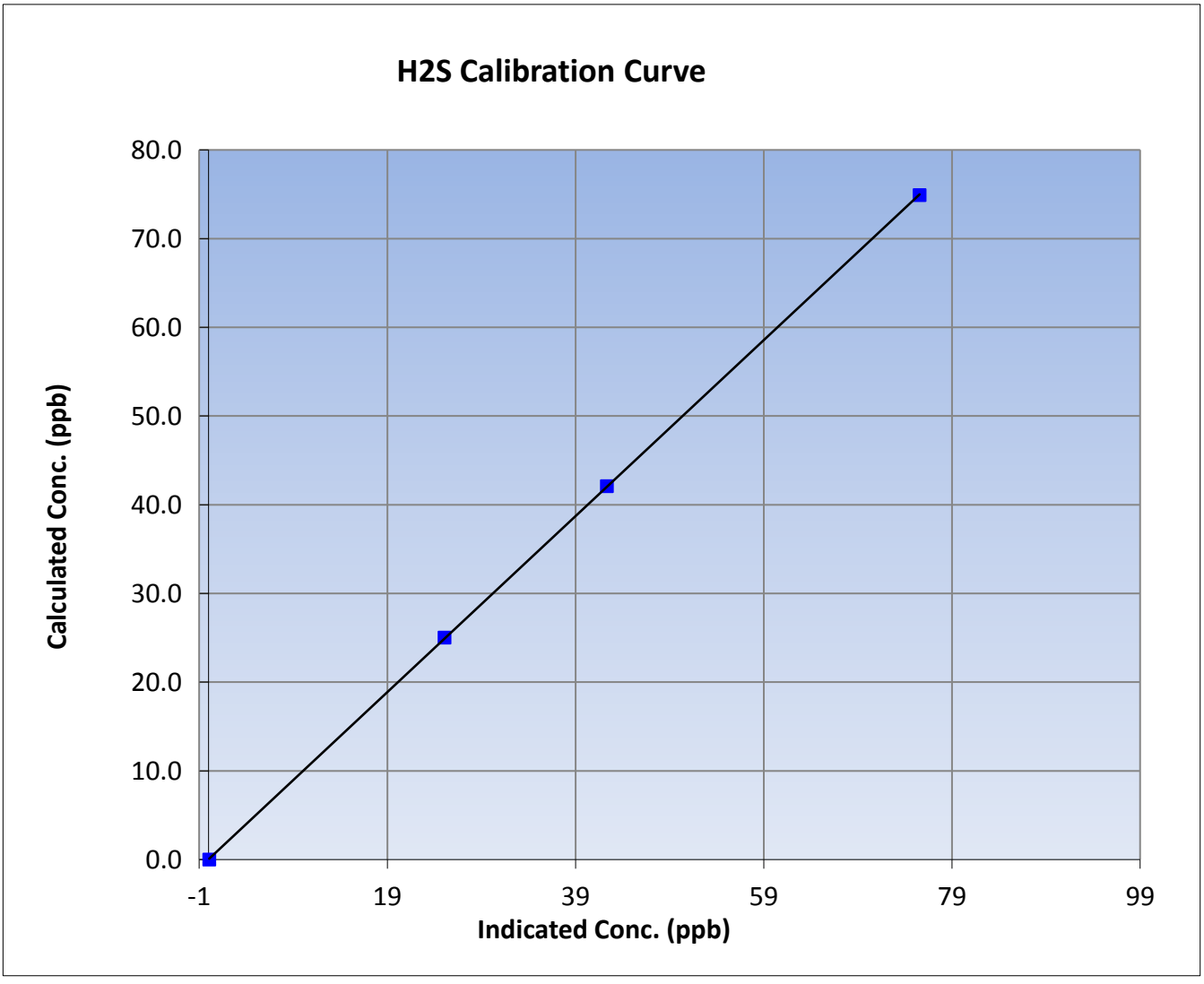
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

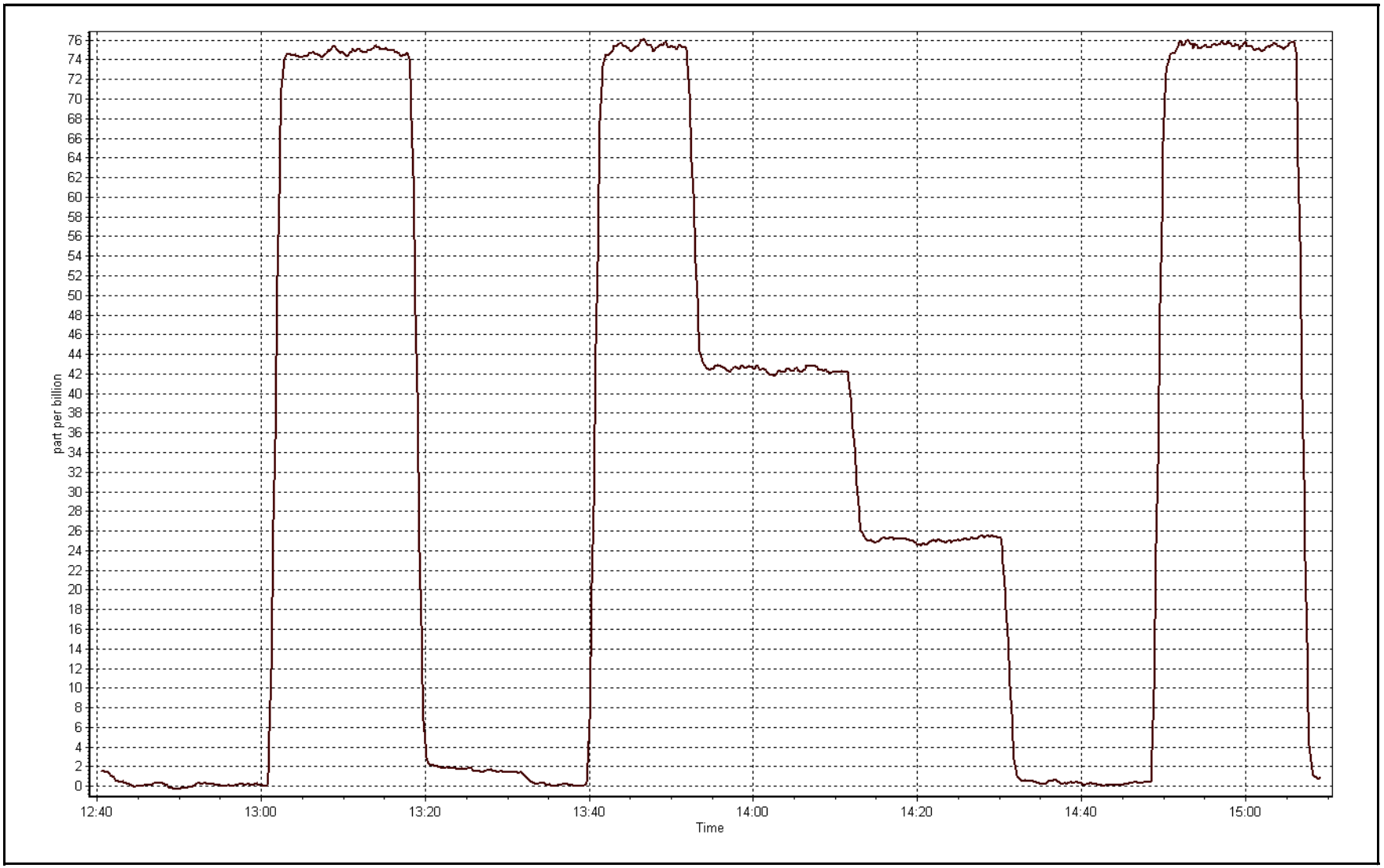
Calibration Date	March 2, 2016	Previous Calibration	February 3, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	12:40	End Time (MST)	15:10
Analyzer make	TEI 450i	Analyzer serial #	1336160094

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999989
74.9	75.6	0.9913		
42.1	42.3	0.9943	Slope	0.991852
25.0	25.1	0.9974		
			Intercept	0.032663



H2S Calibration Plot Date: March 2, 2016



Wood Buffalo Environmental Association
THC Calibration Report

Station Information

Calibration Date	March-02-16	Last Calibration	February-05-16
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:19	End Time (MST)	12:38
Gas Cert Reference	LL107929	Cal Gas Expiry Date	08-Sep-18
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	1.002427	1.001888	Fuel Pressure	19.9	19.9
Calculated intercept	-0.049994	-0.071999	Analyzer Coeff	4.2	4.2
			Analyzer BKG	0.890	0.880

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	0.06	----
as found span	5000	60.4	12.82	13.00	0.986
calibrator zero	5000	0.0	0.00	0.06	----
high point	5000	60.4	12.82	12.85	0.998
second point	5000	30.2	6.41	6.51	0.985
third point	5000	15.1	3.20	3.26	0.983
as left zero	5000	0.0	0.00	0.08	----
as left span	5000	60.4	12.82	12.95	0.990
				Average Correction Factor	0.988

Corrected As found	12.94	Previous response	12.84	% change	-0.8%

Notes:

Sample inlet filter replaced after as founds. Slightly adjusted span.

Calibration Performed By: Asad Hidayat

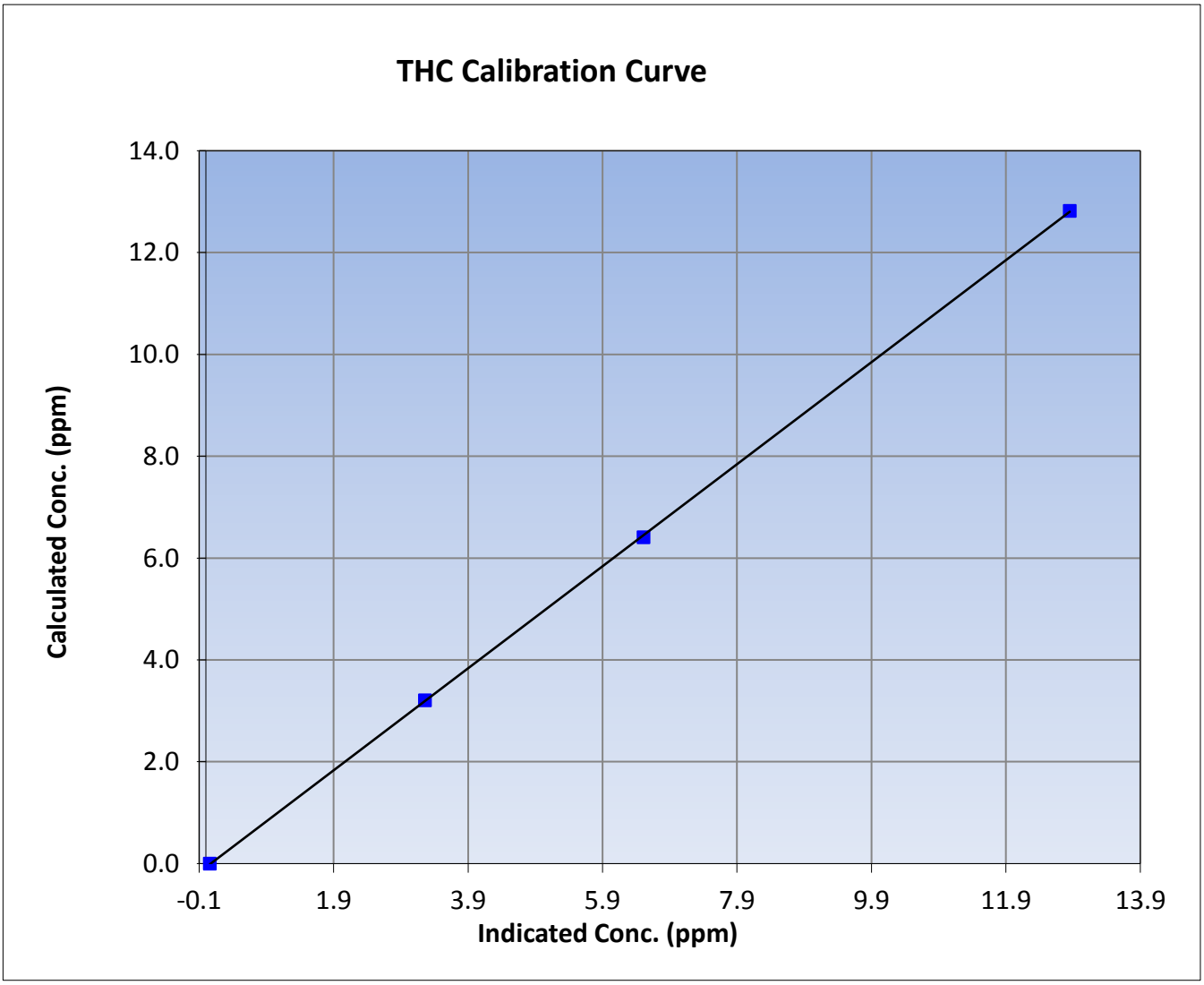
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

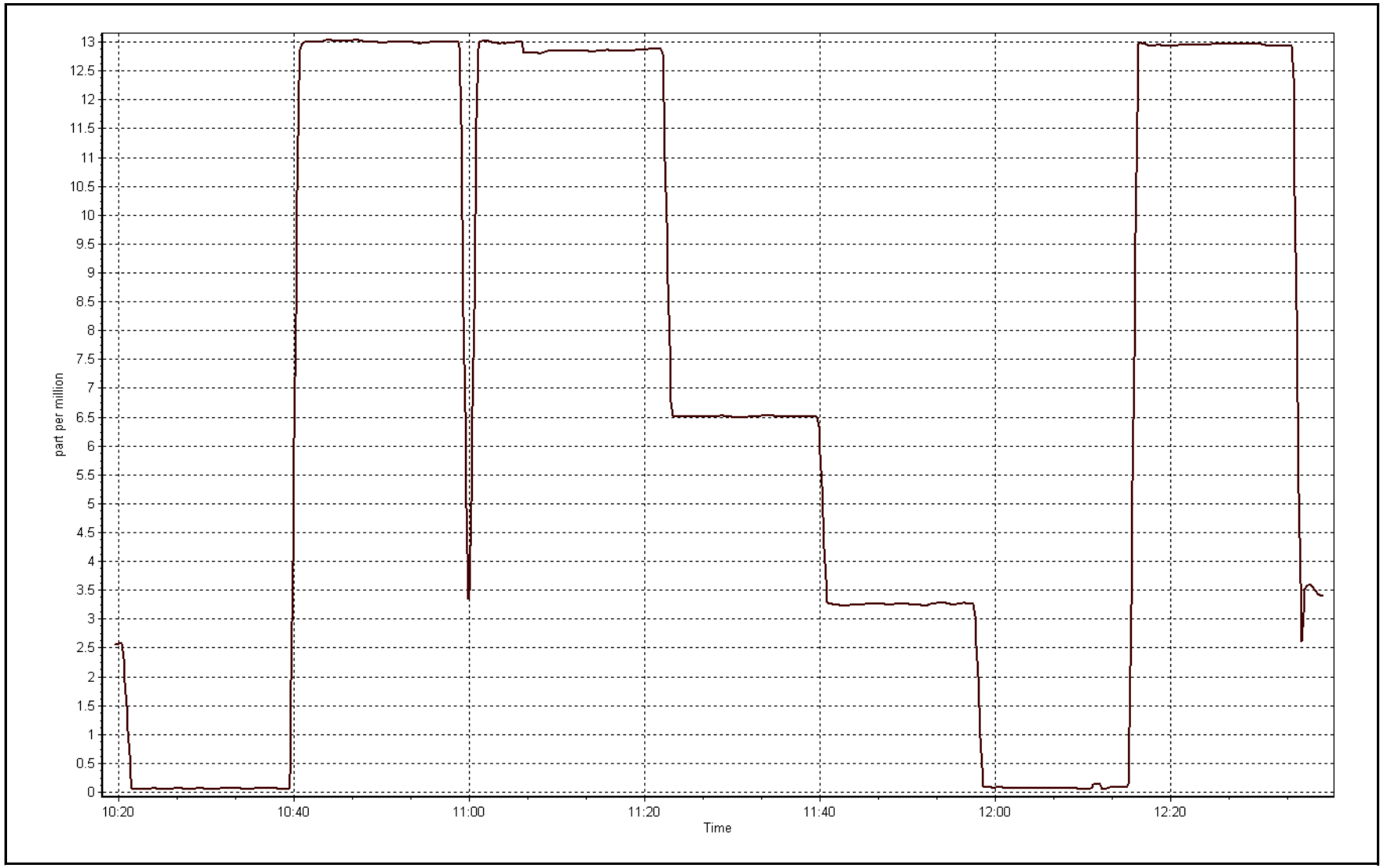
Calibration Date	March 2, 2016	Previous Calibration	February 5, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	10:19	End Time (MST)	12:38
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.06	----	Correlation Coefficient	0.999976
12.82	12.85	0.9977		
6.41	6.51	0.9846	Slope	1.001888
3.20	3.26	0.9831		
			Intercept	-0.071999



THC Calibration Plot Date: March 2, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 5
MANNIX
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
MARCH 2016

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	701	35	43	98.92	117	0	21	0
H2S (ppb) Average	706	35	38	99.60	9	0	2	0
THC (ppm) Average	706	35	38	99.60	5.3	-	3	-
Temperature 2 m (C) Average	744	0	0	100.00	12.6	-	5.5	-
Temperature 20 m (C) Average	744	0	0	100.00	12.7	-	6.5	-
Temperature 45 m (C) Average	744	0	0	100.00	12.3	-	6.8	-
Temperature 75 m (C) Average	744	0	0	100.00	12	-	6.9	-
Temperature 90 m (C) Average	744	0	0	100.00	11.9	-	6.9	-
Relative Humidity 2 m (%) Average	744	0	0	100.00	96	-	89	-
Relative Humidity 20 m (%) Average	744	0	0	100.00	96	-	89	-
Relative Humidity 45 m (%) Average	744	0	0	100.00	96	-	89	-
Relative Humidity 75 m (%) Average	744	0	0	100.00	96	-	90	-
Relative Humidity 90 m (%) Average	744	0	0	100.00	96	-	90	-
Wind Speed 20 m (km/h) Average	743	0	1	99.87	32	-	16	-
Wind Speed 45 m (km/h) Average	740	0	4	99.46	41	-	22	-
Wind Speed 75 m (km/h) Average	731	0	13	98.25	45	-	25	-
Wind Speed 90 m (km/h) Average	735	0	9	98.79	47	-	26	-
Wind Direction 20 m (deg) Average	743	0	1	99.87	-	-	-	-
Wind Direction 45 m (deg) Average	740	0	4	99.46	-	-	-	-
Wind Direction 75 m (deg) Average	731	0	13	98.25	-	-	-	-
Wind Direction 90 m (deg) Average	735	0	9	98.79	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	743	0	1	99.87	1	-	0.7	-
Vertical Wind Speed 45 m (km/h) Average	740	0	4	99.46	1.5	-	0.9	-
Vertical Wind Speed 75 m (km/h) Average	731	0	13	98.25	1.2	-	0.3	-
Vertical Wind Speed 90 m (km/h) Average	735	0	9	98.79	3.3	-	1.9	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	701	6	11	-	0	0	0	1	7	19	117
H2S (ppb) Average	706	1	1	-	0	0	0	1	1	2	9
THC (ppm) Average	706	2.48	0.4	-	2.1	2.2	2.3	2.3	2.6	2.9	5.3
Temperature 2 m (C) Average	744	-3.33	5.1	-	-15.4	-9.1	-7	-4	-0.2	3.1	12.6
Temperature 20 m (C) Average	744	-3.31	5.1	-	-14.9	-9.3	-7.2	-4.2	-0.1	3.5	12.7
Temperature 45 m (C) Average	744	-3.38	5.2	-	-15.2	-9.5	-7.2	-4.4	-0.2	3.5	12.3
Temperature 75 m (C) Average	744	-3.49	5.2	-	-15.1	-9.5	-7.4	-4.6	-0.3	3.4	12
Temperature 90 m (C) Average	744	-3.51	5.2	-	-14.3	-9.4	-7.5	-4.7	-0.3	3.3	11.9
Relative Humidity 2 m (%) Average	744	69.9	17	-	24	46	58	72	85	90	96
Relative Humidity 20 m (%) Average	744	68.9	18	-	20	43	56	70	84	90	96
Relative Humidity 45 m (%) Average	744	69	19	-	17	43	56	71	85	91	96
Relative Humidity 75 m (%) Average	744	69.3	19	-	15	41	55	71	86	91	96
Relative Humidity 90 m (%) Average	744	69.5	19	-	15	41	55	71	86	92	96
Wind Speed 20 m (km/h) Average	743	9.4	5	-	1	4	6	9	12	16	32
Wind Speed 45 m (km/h) Average	740	12.6	6	-	1	5	8	12	16	21	41
Wind Speed 75 m (km/h) Average	731	14	7	-	0	5	9	13	18	24	45
Wind Speed 90 m (km/h) Average	735	15.4	8	-	1	6	9	15	20	26	47
Wind Direction 20 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	740	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	731	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	735	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	743	0.12	0.3	-	-0.7	-0.3	-0.1	0.1	0.4	0.6	1
Vertical Wind Speed 45 m (km/h) Average	740	0.02	0.6	-	-2	-0.7	-0.4	0	0.5	0.8	1.5
Vertical Wind Speed 75 m (km/h) Average	731	0.06	0.3	-	-1.2	-0.4	-0.1	0.1	0.3	0.5	1.2
Vertical Wind Speed 90 m (km/h) Average	735	0.67	0.8	-	-1.4	-0.3	0.1	0.6	1.1	1.8	3.3

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, H2S	04 Mar 2016 12:00	04 Mar 2016 12:00	1	Station power failure
SO2	04 Mar 2016 13:00	04 Mar 2016 18:00	6	DAS collection error - data not recorded
H2S	04 Mar 2016 13:00	04 Mar 2016 14:00	2	DAS collection error - data not recorded
THC	04 Mar 2016 12:00	04 Mar 2016 13:00	2	Station power failure
SO2, THC	15 Mar 2016 14:00	15 Mar 2016 14:00	1	Maintenance - sample manifold cleaned
Wind Speed, Wind Direction, Vertical Wind Speed 20 m	04 Mar 2016 12:00	04 Mar 2016 12:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 45 m	04 Mar 2016 12:00	04 Mar 2016 12:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 45 m	10 Mar 2016 08:00	10 Mar 2016 10:00	3	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	04 Mar 2016 12:00	04 Mar 2016 12:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	09 Mar 2016 06:00	09 Mar 2016 10:00	5	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	10 Mar 2016 07:00	10 Mar 2016 13:00	7	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	04 Mar 2016 12:00	04 Mar 2016 12:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	10 Mar 2016 07:00	10 Mar 2016 14:00	8	Flat line in sensor output signal - Sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Mannix - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 117 ppb on Mar 30 20:00 Maximum Daily Average: 21.5 ppb on Mar 14

Minimum Value: 0 ppb on Mar 10 23:00
Maximum Diurnal Average: 9.6 ppb at hour 17
Monthly Average: 6.0 ppb

Minimum Daily Average: 0.1 ppb on Mar 22
Minimum Diurnal Average: 3.6 ppb at hour 1
Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 7$ $P_{90} = 19$ $P_{99} = 49$

Hours in Service:	744
Hours of Data:	701
Hours of Missing Data:	43
Hours of Calibration:	35
Percent Operational Time:	98.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	1	Z	1	1	1	1	1	1	1	1	1	1	7	20	15	21	33	34	31	18	1	1	1	1	8.2	34
2-Mar	0	3	Z	1	21	2	3	10	25	13	10	4	13	33	14	31	16	6	11	10	15	9	10	7	11.6	33
3-Mar	6	23	18	Z	13	17	3	9	6	3	9	6	7	5	8	20	32	27	37	30	32	30	23	27	17.1	37
4-Mar	1	0	4	11	Z	1	2	11	3	1	1	PF	DF	DF	DF	DF	DF	DF	0	0	0	0	0	0	--	11
5-Mar	0	0	0	0	0	Z	0	0	0	0	0	5	17	8	5	5	58	26	52	23	10	15	39	45	13.5	58
6-Mar	Z	49	40	23	45	1	14	18	13	1	1	23	3	1	1	6	5	12	23	5	0	1	1	1	12.4	49
7-Mar	5	Z	4	16	9	12	7	19	2	1	1	2	2	1	1	1	1	1	1	1	3	5	2	5	4.3	19
8-Mar	9	1	Z	2	5	4	4	3	3	2	2	3	2	1	1	14	6	3	10	16	6	3	1	1	4.4	16
9-Mar	1	4	11	Z	10	10	3	8	7	1	8	7	10	13	8	5	3	2	1	1	1	1	2	1	5.2	13
10-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	0.1	1
11-Mar	0	0	0	0	0	Z	0	0	0	0	0	2	5	4	1	1	1	1	0	0	1	0	0	0	0.7	5
12-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
13-Mar	0	Z	0	0	0	0	1	6	16	17	7	6	1	2	7	5	6	5	5	4	2	0	0	3	4.1	17
14-Mar	5	3	Z	7	2	1	8	30	45	27	30	15	C	C	C	C	18	42	35	30	56	20	11	23	21.5	56
15-Mar	31	23	12	Z	17	21	12	14	13	15	2	1	1	M	2	2	3	8	4	0	23	24	12	6	11.2	31
16-Mar	8	10	11	7	Z	4	4	49	5	1	1	5	5	7	3	7	5	4	1	1	1	0	6	5	6.5	49
17-Mar	1	0	0	2	1	Z	1	1	0	2	11	2	2	3	3	3	4	0	1	0	1	13	2	0	2.3	13
18-Mar	Z	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	1	0.4	2
19-Mar	1	Z	0	0	0	1	9	36	23	42	36	32	74	23	7	1	1	0	0	0	1	0	0	0	12.6	74
20-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0.2	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	0.1	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	0.1	0
23-Mar	0	0	0	0	0	Z	1	10	7	9	9	6	4	5	12	6	1	1	0	0	0	0	2	4	3.4	12
24-Mar	Z	4	7	9	3	1	17	12	24	6	1	1	1	0	0	3	3	4	2	0	0	0	1	5	4.6	24
25-Mar	2	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	9	0.9	9
26-Mar	12	8	Z	1	2	22	20	15	16	5	3	2	4	15	9	17	22	14	23	11	7	3	2	2	10.2	23
27-Mar	1	1	1	Z	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1
28-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0	0.5	4
29-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	4	27	15	26	51	38	11	10	19	12	9	5	10.0	51
30-Mar	Z	1	1	15	1	1	1	0	0	0	22	10	1	1	2	1	3	0	2	117	35	24	9	19	11.6	117
31-Mar	9	Z	22	5	3	1	1	2	13	8	2	12	33	1	3	15	15	9	6	2	1	1	1	1	7.2	33
	3.6	5.3	5.1	3.9	5.2	3.9	3.7	8.3	7.2	5.1	5.2	5.0	6.8	6.2	4.1	6.6	9.6	8.0	8.4	9.2	7.0	5.3	4.5	5.5	Diurnal Average	
	31	49	40	23	45	22	20	49	45	42	36	32	74	33	15	31	58	42	52	117	56	30	39	45	Diurnal Maximum	

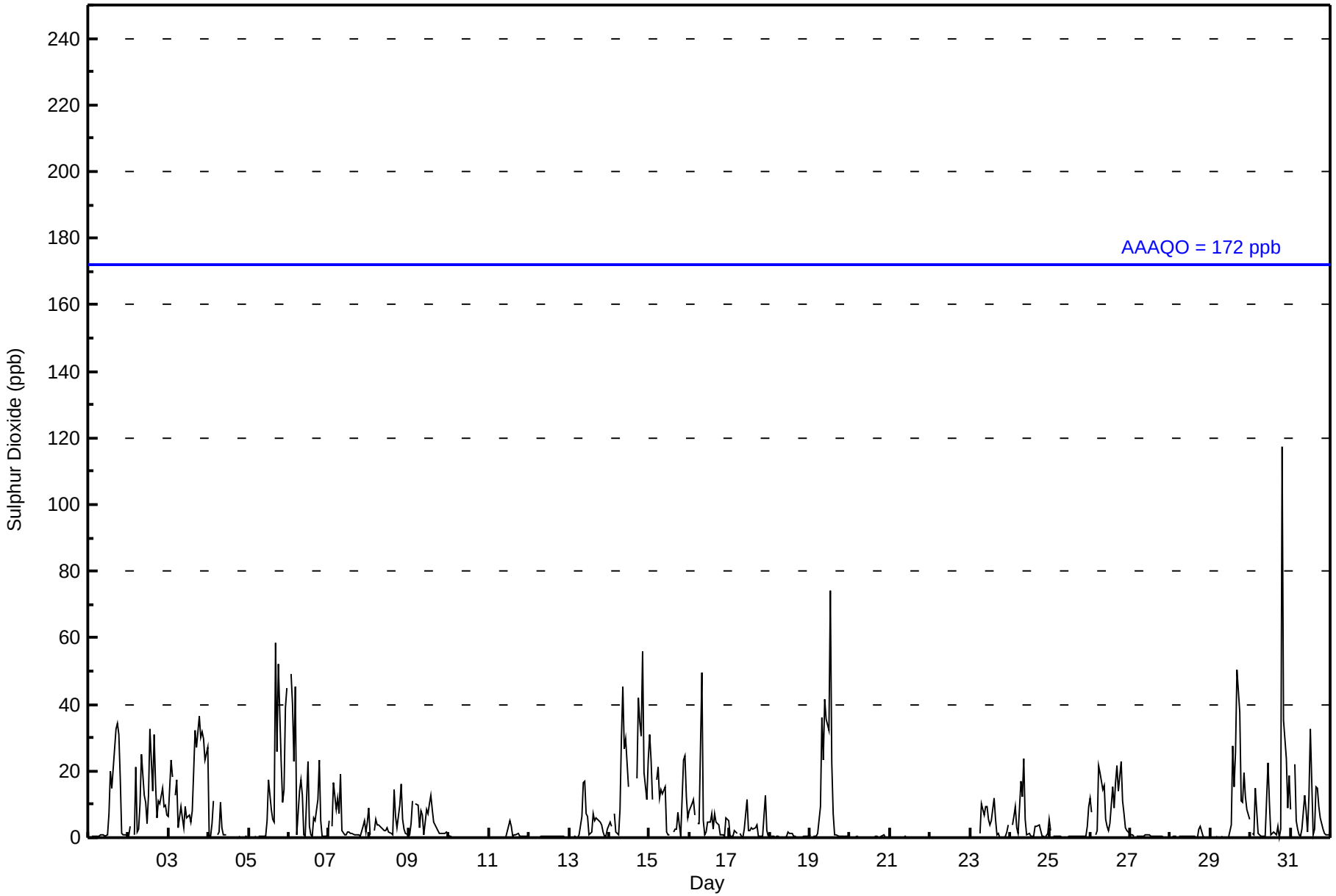
Z - zerospan C - Calibration M - Maintenance DF - DAS Failure PF - Power Failure
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Mannix - March 2016



Sulphur Dioxide (SO_2) - ppb

Mannix - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	571	81.46	81.46
11 - 20	65	9.27	90.73
21 - 60	63	8.99	99.71
61 - 110	1	0.14	99.86
111 - 172	1	0.14	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Mannix - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	39	30	12	23	38	34	110	57	6	8	15	19	27	44	48	61	571
11 - 20	20	2	0	0	1	1	4	0	1	0	0	2	1	6	8	19	65
21 - 60	33	6	1	0	0	1	1	0	0	0	0	0	5	2	5	9	63
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
111 - 172	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	93	38	13	23	39	36	115	57	7	8	15	21	33	52	62	89	701

Total Number of Valid Hours: 701

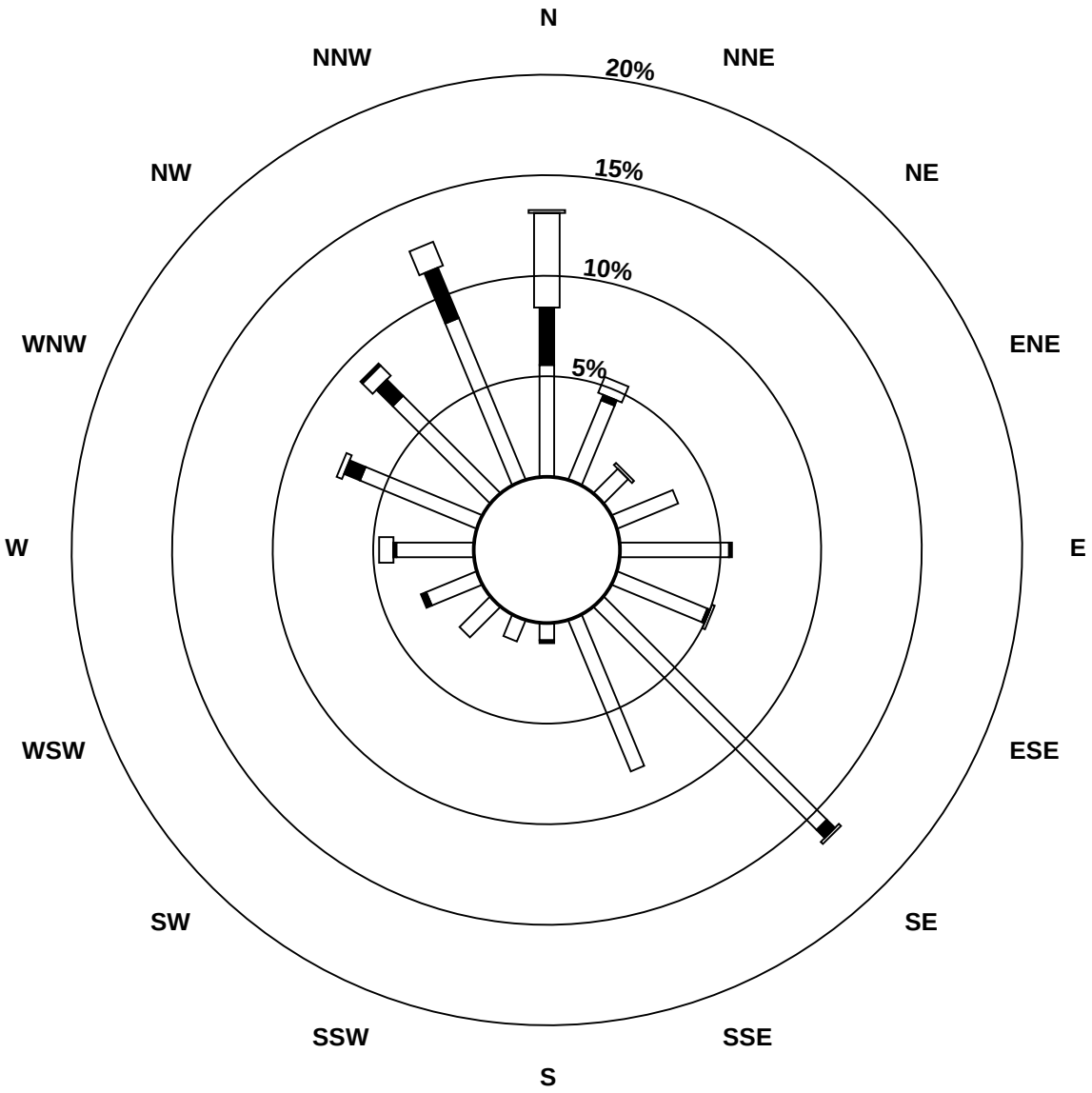
Total Number of Hours: 744

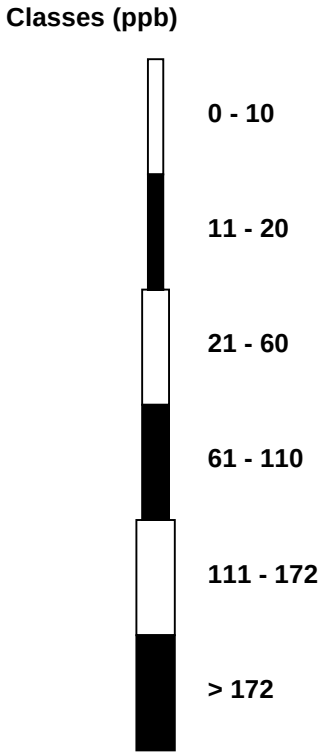
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Mannix (AMS 5)





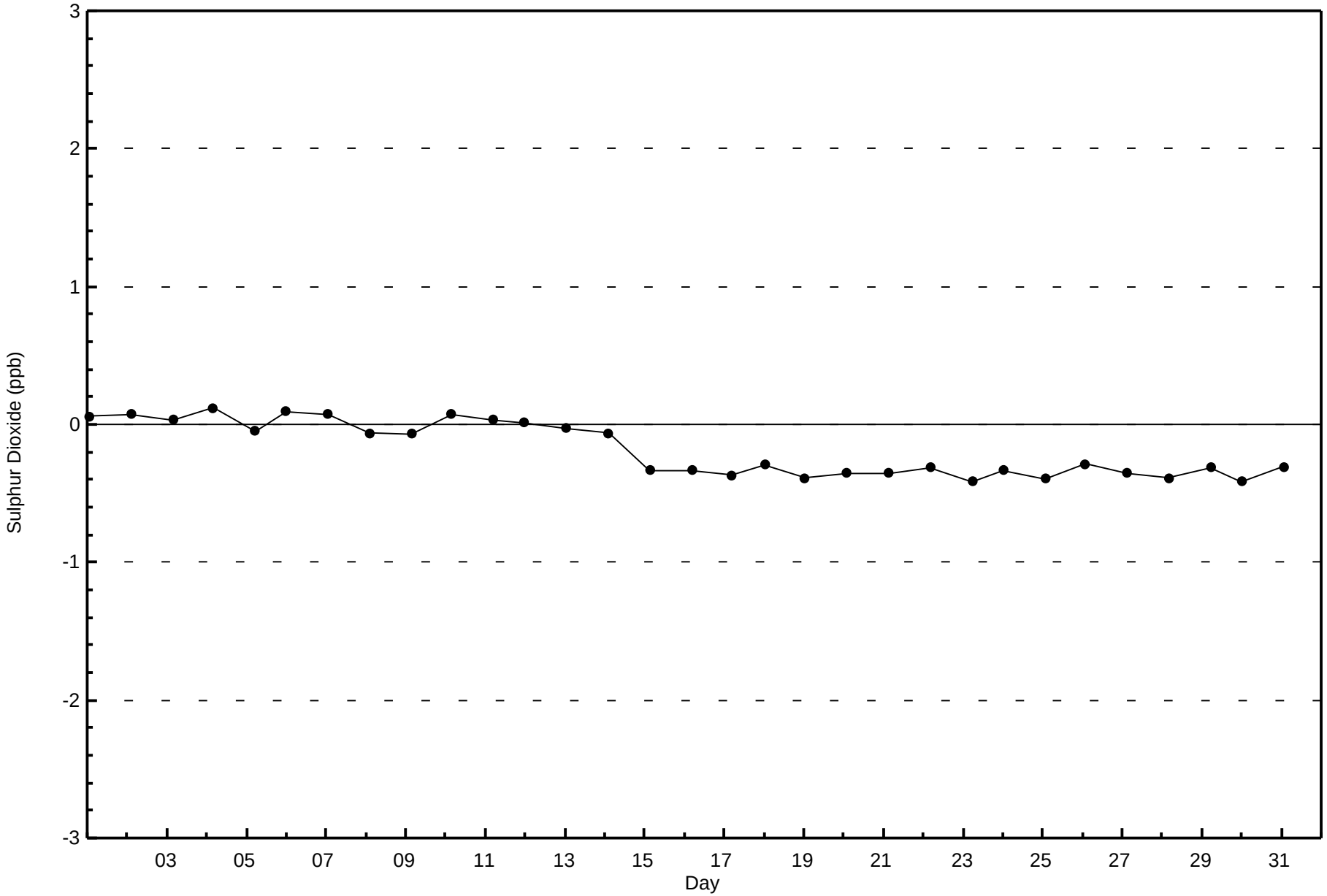
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Mannix - March 2016

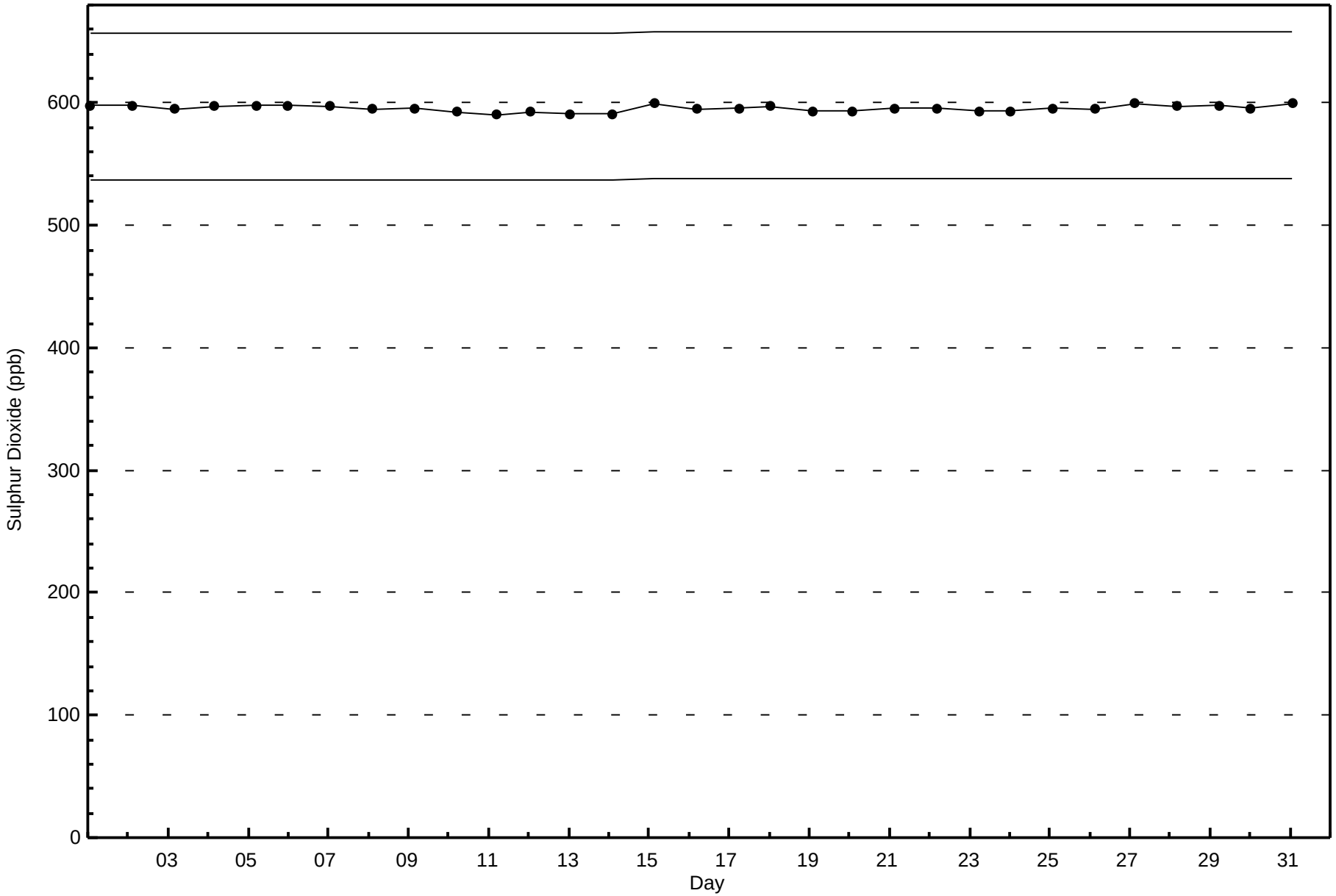


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Mannix - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Mannix - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 9 ppb on Mar 7 07:00 Maximum Daily Average: 2.1 ppb on Mar 15

Minimum Value: 0 ppb on Mar 23 04:00 Minimum Daily Average: 0.1 ppb on Mar 27
Maximum Diurnal Average: 1.9 ppb at hour 8 Minimum Diurnal Average: 0.6 ppb at hour 15
Monthly Average: 1.0 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 6$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	35
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0	0	Z	0	0	0	0	1	1	1	0	1	0	0	1	1	3	4	5	3	3	1	1	0	1.2	5
2-Mar	0	2	1	Z	6	1	3	3	5	3	2	1	2	2	2	2	3	1	2	2	3	1	1	1	2.0	6
3-Mar	1	5	4	1	Z	6	3	4	2	1	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1.9	6
4-Mar	2	2	1	1	1	Z	1	4	2	1	1	PF	DF	DF	0	0	0	1	0	0	0	0	0	0	0.9	4
5-Mar	0	0	0	0	0	0	Z	0	0	0	0	1	2	1	0	0	2	1	2	1	1	1	1	1	0.7	2
6-Mar	2	Z	1	1	1	1	1	1	1	0	0	2	1	0	1	1	1	2	2	1	1	1	1	1	1.1	2
7-Mar	2	1	Z	5	5	5	9	7	1	1	1	1	1	0	0	0	0	0	0	0	2	1	0	2	2.1	9
8-Mar	2	0	0	Z	2	1	1	1	1	1	1	0	0	0	0	5	2	2	3	4	1	1	0	1	1.4	5
9-Mar	0	1	3	2	Z	3	1	3	3	1	2	1	2	3	2	1	1	1	2	2	2	2	2	2	1.8	3
10-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	0.4	1
11-Mar	0	0	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	1	0	1	1	0	0	0	0.5	1
12-Mar	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
13-Mar	0	0	Z	1	2	1	1	4	5	4	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1.6	5
14-Mar	1	1	1	Z	0	0	1	1	1	1	1	1	2	0	0	1	1	1	2	7	1	1	3	2	1.2	7
15-Mar	2	3	4	3	Z	5	3	3	5	5	1	C	C	C	C	0	0	2	1	0	1	1	1	1	2.1	5
16-Mar	2	2	3	2	1	Z	0	1	1	0	0	1	1	1	0	1	1	1	0	0	0	0	0	1	0.9	3
17-Mar	0	0	0	1	1	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	3	1	0	0.5	3
18-Mar	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	1	0.4	1
19-Mar	2	1	Z	1	1	2	4	8	6	2	2	2	5	3	2	1	1	0	1	1	0	0	0	0	2.0	8
20-Mar	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	1	0.5	1
21-Mar	1	1	1	1	Z	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	1
22-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
23-Mar	0	0	0	0	0	0	Z	3	1	2	2	1	1	1	0	0	0	0	0	0	0	0	1	1	0.6	3
24-Mar	1	Z	3	3	1	1	6	5	5	1	1	1	0	1	0	1	1	1	1	0	1	0	1	2	1.6	6
25-Mar	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	4	0.7	4
26-Mar	3	2	1	Z	1	2	2	1	2	1	1	0	1	1	0	1	1	1	1	0	0	0	0	0	1.0	3
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	1	1	1	0	0	0	0.3	1
29-Mar	0	0	0	1	1	1	Z	0	0	0	0	0	0	1	1	0	0	1	2	2	1	0	1	1	0.6	2
30-Mar	0	Z	1	6	2	1	1	1	1	1	2	1	0	1	0	0	0	0	0	1	1	1	1	0	1.0	6
31-Mar	0	0	Z	0	0	0	1	1	1	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0.4	1
	0.9	1.0	1.0	1.2	1.1	1.4	1.6	1.9	1.5	1.0	0.9	0.8	0.9	0.7	0.6	0.7	0.8	0.8	1.0	1.1	0.8	0.6	0.7	0.9	Diurnal Average	
	3	5	4	6	6	6	9	8	6	5	3	2	5	3	2	5	3	4	5	7	3	3	3	4	Diurnal Maximum	

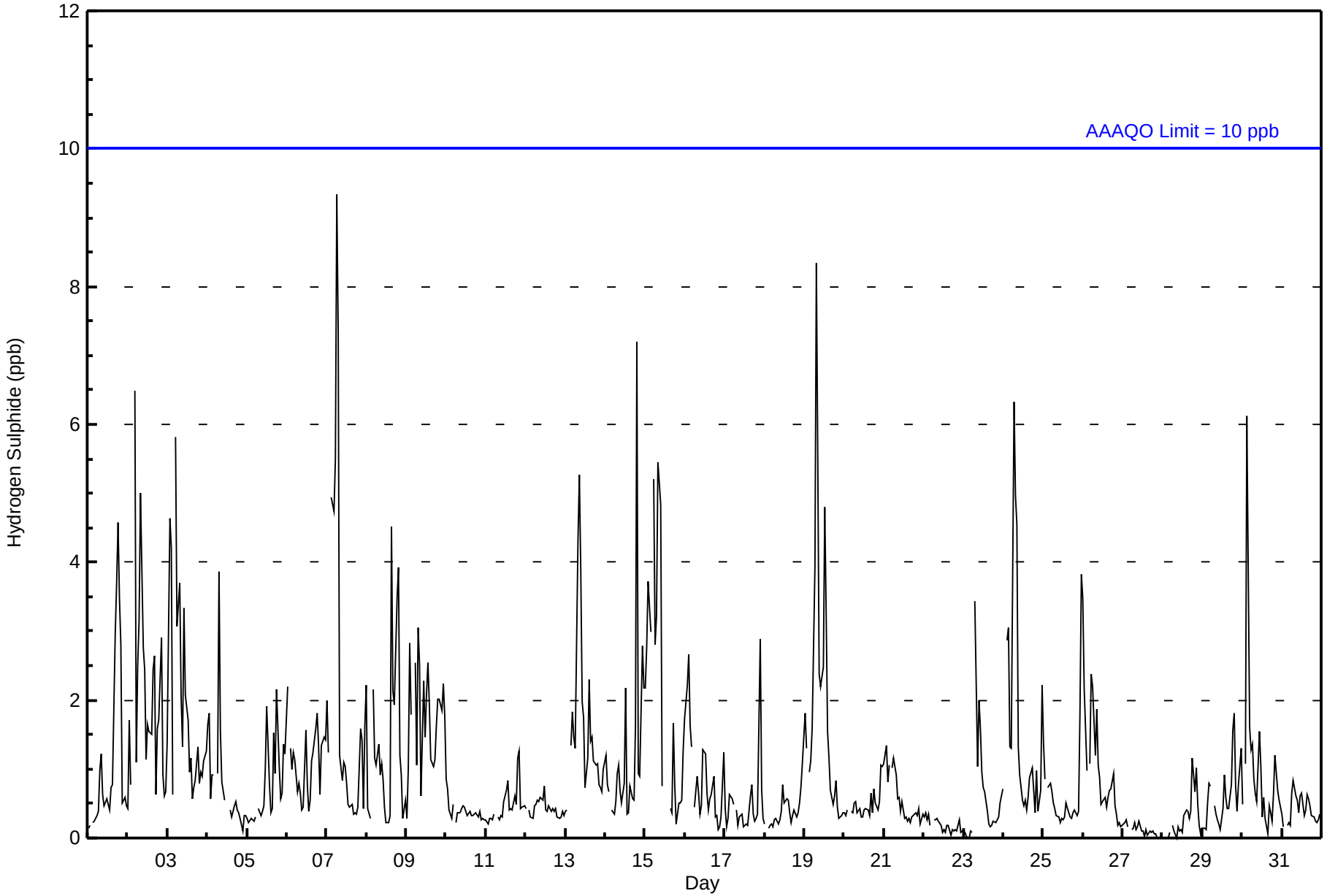
Z - zerospan C - Calibration DF - DAS Failure PF - Power Failure
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Mannix - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Mannix - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	645	91.36	91.36
3 - 4	38	5.38	96.74
5 - 7	21	2.97	99.72
8 - 11	2	0.28	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Mannix - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	80	36	13	22	39	37	118	56	6	7	16	23	31	47	51	63	645
3 - 4	9	4	0	1	0	1	0	0	1	0	0	0	1	2	5	14	38
5 - 7	6	0	0	0	0	0	0	0	0	0	0	0	0	2	5	8	21
8 - 11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	40	13	23	39	38	118	56	7	7	16	23	32	51	61	86	706

Total Number of Valid Hours: 706

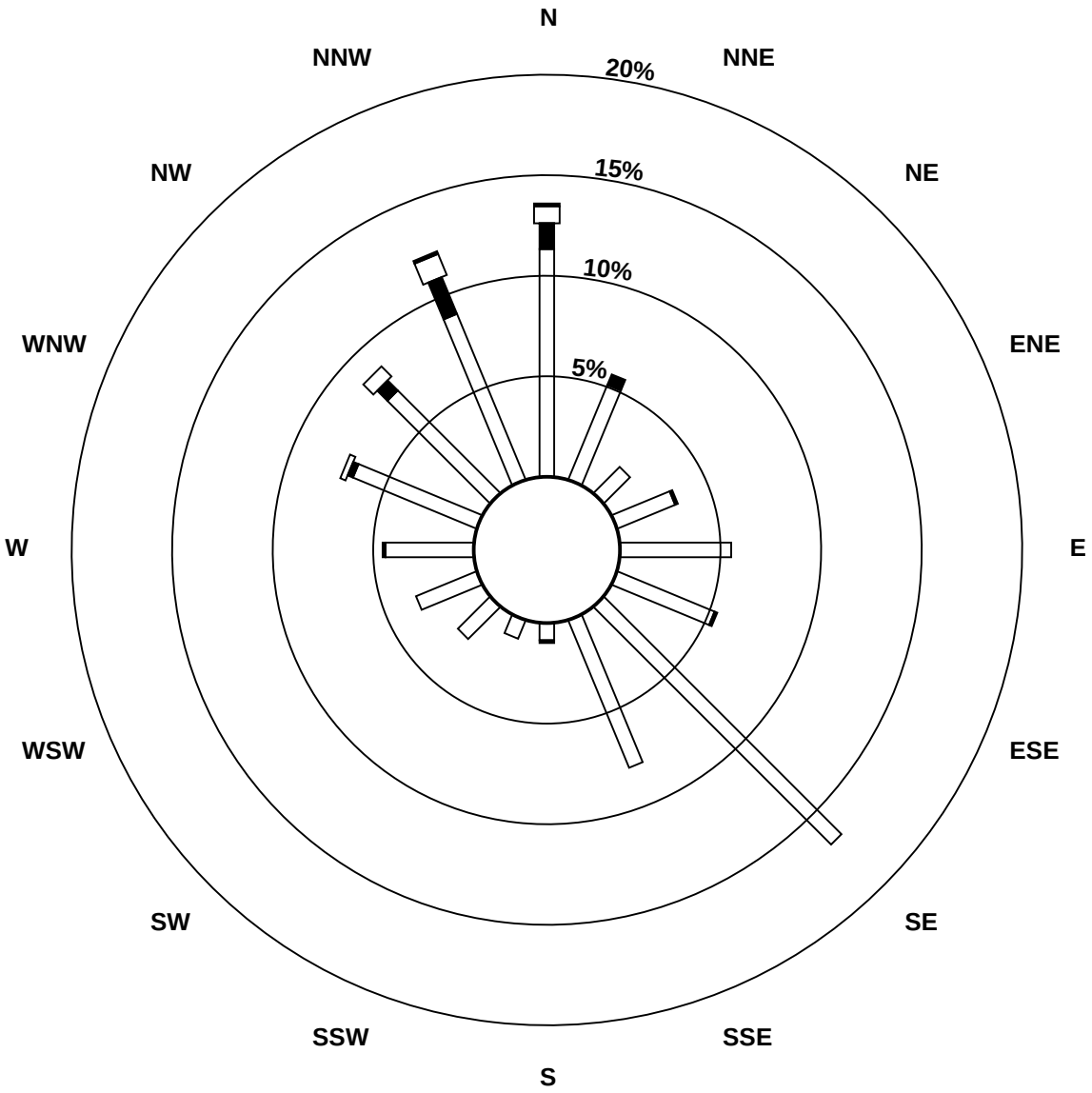
Total Number of Hours: 744

Wood Buffalo Environmental Association

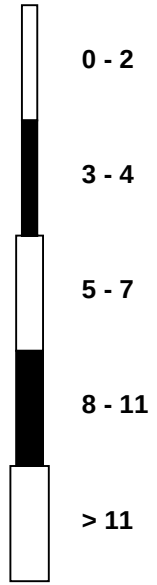
Wind Rose Mar 2016

Hydrogen Sulphide (H_2S) - ppb

Mannix (AMS 5)



Classes (ppb)



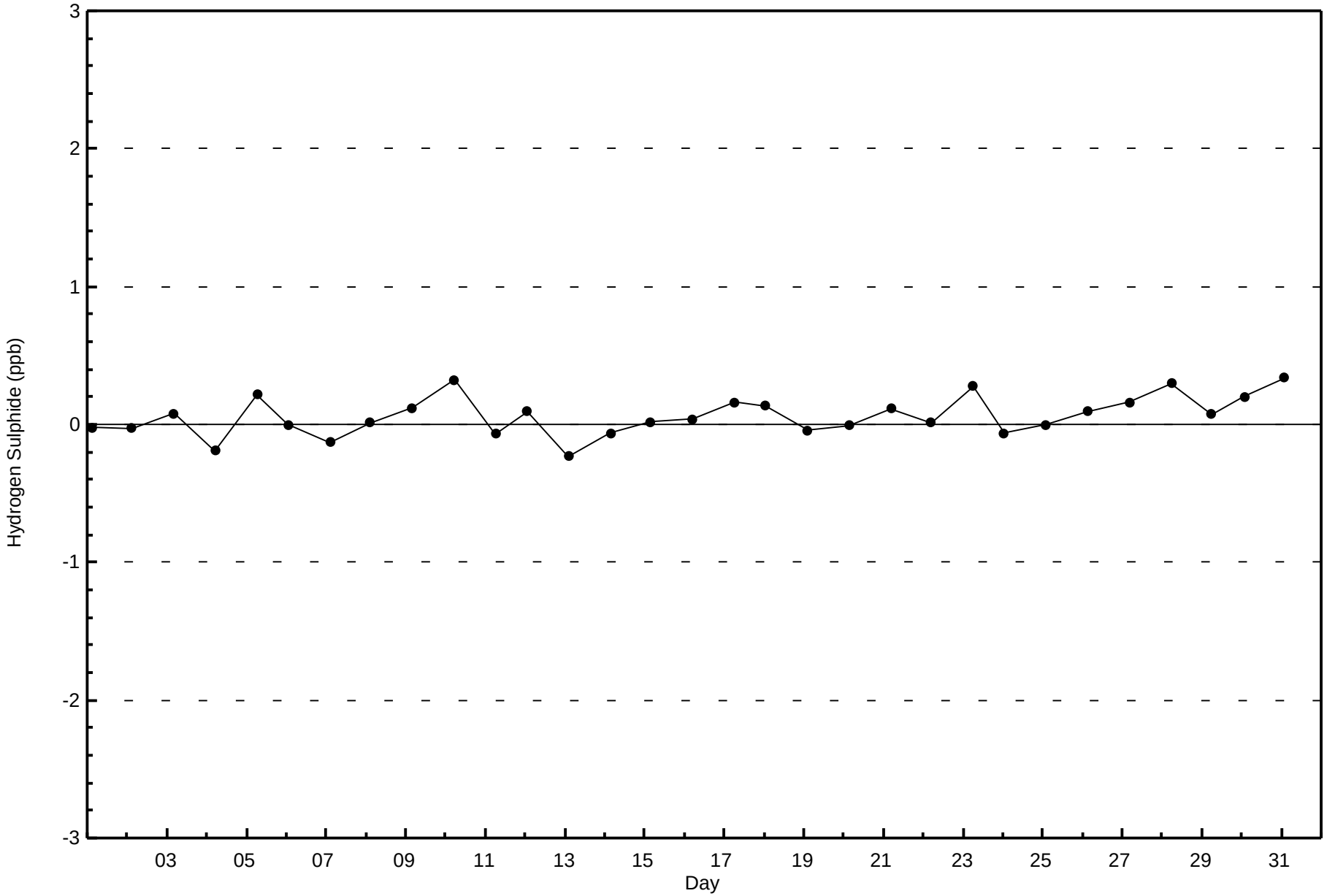
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Mannix - March 2016

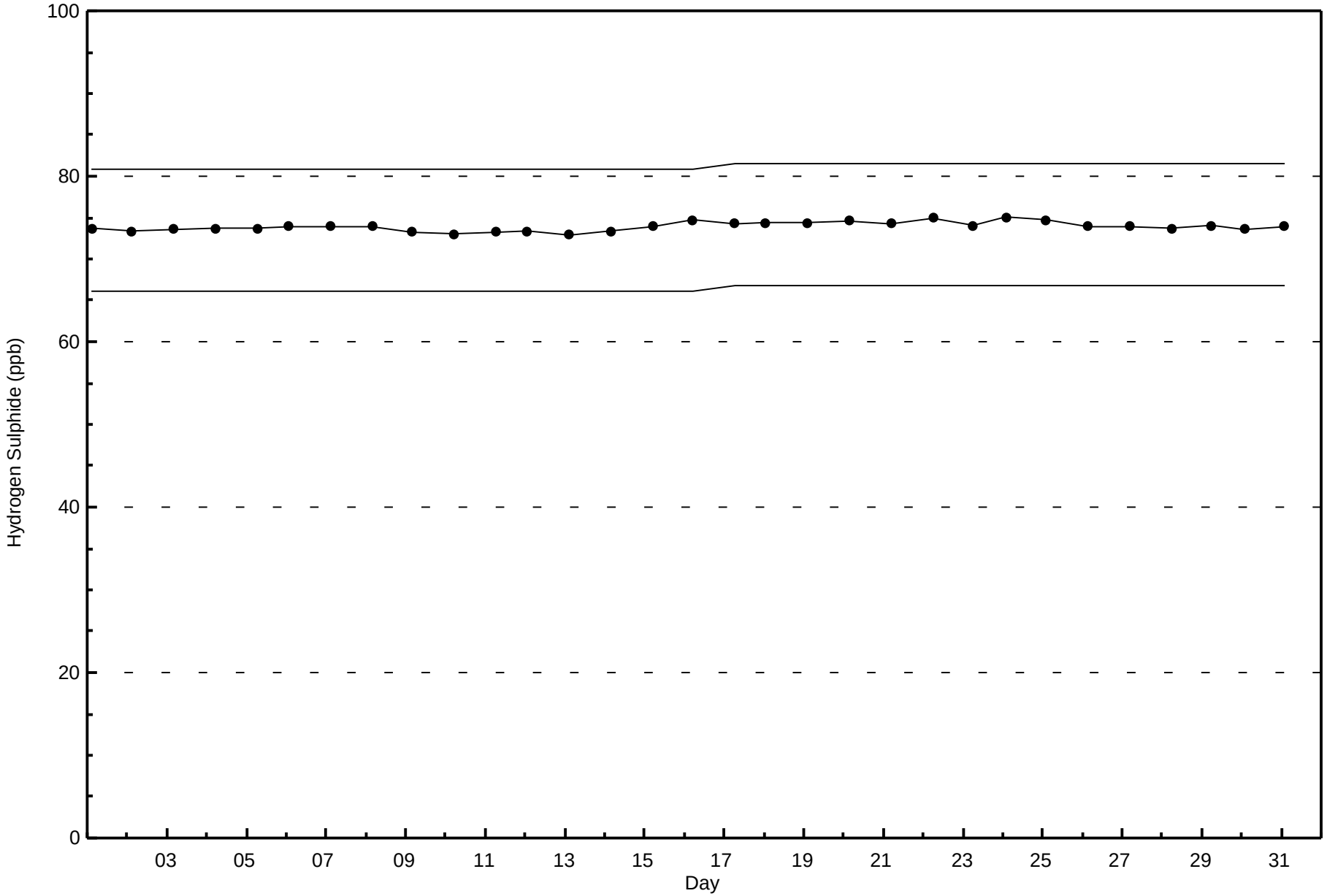


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Mannix - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Mannix - March 2016

Maximum Value: 5.3 ppm on Mar 30 02:00

Maximum Daily Average: 3.0 ppm on Mar 30

Minimum Value: 2.1 ppm on Mar 29 00:00

Minimum Daily Average: 2.2 ppm on Mar 22

Maximum Diurnal Average: 2.6 ppm at hour 5

Minimum Diurnal Average: 2.4 ppm at hour 22

Monthly Average: 2.48 ppm

Percentiles: P_1 = 2.2 P_{10} = 2.2 Q_1 = 2.3 Median = 2.3 Q_3 = 2.6 P_{90} = 2.9 P_{99} = 4.1

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	35
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	2.3	Z	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.3	2.4	2.3	2.3	2.4	3.6	2.9	2.6	2.9	2.6	2.6	2.5	2.4	2.3	2.5	3.6
2-Mar	2.3	2.7	Z	2.7	3.1	2.7	2.7	2.7	2.6	2.7	3.2	3.3	3.0	2.8	2.9	2.7	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.4	2.7	3.3
3-Mar	2.4	2.5	3.3	Z	2.9	3.5	2.7	2.7	3.9	3.6	2.8	2.7	2.3	2.3	2.3	2.2	2.3	2.2	2.3	2.3	2.3	2.4	2.2	2.2	2.6	3.9
4-Mar	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.7	2.5	2.3	2.3	PF	PF	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.7
5-Mar	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.8	3.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	3.5
6-Mar	Z	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.6	2.4	2.5	2.7	2.8	2.3	2.4	2.7	2.4	2.5	2.6	2.5	2.4	2.8
7-Mar	2.5	Z	2.6	2.5	2.6	2.6	2.8	3.7	2.8	2.5	2.7	2.8	2.7	2.4	2.3	2.4	2.2	2.2	2.2	2.4	3.2	2.3	2.3	2.4	2.6	3.7
8-Mar	2.5	2.3	Z	2.4	3.3	2.6	2.4	2.5	2.4	2.5	2.5	2.3	2.2	2.2	2.2	3.0	4.0	3.6	3.0	2.8	2.8	2.6	2.3	2.4	2.6	4.0
9-Mar	2.4	2.4	2.4	Z	2.4	2.6	2.7	2.5	3.5	3.4	2.8	3.1	2.8	2.8	2.8	2.7	2.8	3.0	3.0	3.4	3.6	3.3	3.2	3.1	2.9	3.6
10-Mar	2.5	2.4	2.4	2.3	Z	2.3	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.3	2.3	2.4	2.4	2.3	2.4	2.3	2.2	2.2	2.2	2.1	2.3	2.5
11-Mar	2.2	2.2	2.2	2.2	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.7	2.5	2.9	2.7	2.7	2.7	3.0	2.6	2.7	2.8	2.6	2.6	2.6	2.5	3.0
12-Mar	Z	2.6	2.5	2.4	2.5	2.6	2.5	2.4	2.6	2.7	2.6	2.8	2.4	2.4	2.3	2.4	2.3	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.4	2.8
13-Mar	2.1	Z	2.2	2.6	2.6	2.5	2.8	5.1	3.7	2.8	2.8	2.5	2.6	2.6	2.5	2.3	2.3	2.3	2.4	2.3	2.4	2.5	2.5	2.4	2.6	5.1
14-Mar	2.3	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	C	C	C	C	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.3
15-Mar	2.3	2.4	2.4	Z	2.4	2.5	2.5	2.3	2.3	2.6	2.6	2.7	2.6	M	2.6	2.5	2.5	2.6	2.3	2.3	2.3	2.3	2.2	2.3	2.4	2.7
16-Mar	2.4	2.4	2.4	2.4	Z	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.2	2.2	2.2	2.4	2.3	2.4
17-Mar	2.3	2.3	2.3	2.7	2.6	Z	2.2	2.3	2.2	2.3	2.3	2.4	2.4	2.4	2.3	2.5	2.4	2.6	2.3	2.4	2.4	2.5	2.7	2.4	2.4	2.7
18-Mar	Z	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.7	2.5	2.5	2.7	2.5	2.4	2.2	2.3	2.3	2.2	2.2	2.2	2.4	2.7	2.4	2.7
19-Mar	3.4	Z	3.1	2.9	2.9	3.1	3.5	2.9	3.3	2.8	3.0	3.4	3.4	3.1	2.5	2.6	2.5	2.4	2.5	2.6	2.4	2.3	2.3	2.3	2.8	3.5
20-Mar	2.3	2.3	Z	2.4	2.3	2.3	2.4	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.4	2.5	2.3	2.4	2.4	2.3	2.3	2.5	2.6	2.4	2.6
21-Mar	2.6	2.7	2.6	Z	2.7	2.8	2.8	2.7	2.5	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.8
22-Mar	2.3	2.3	2.2	2.3	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	2.4	2.3	2.2	2.2	2.2	2.4
23-Mar	2.3	2.2	2.2	2.2	2.2	Z	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4
24-Mar	Z	2.4	2.6	2.5	2.7	2.8	2.5	2.6	2.6	3.5	3.0	2.7	2.5	2.6	2.5	2.6	2.7	2.8	2.4	2.3	2.6	2.4	2.5	2.9	2.6	3.5
25-Mar	2.7	Z	3.0	2.7	2.7	2.4	2.3	2.3	2.2	2.3	2.3	2.2	2.3	2.3	2.5	2.4	2.3	2.3	2.2	2.2	2.3	2.3	3.1	4.4	2.5	4.4
26-Mar	2.9	3.3	Z	3.0	3.4	3.0	2.6	2.4	2.6	2.8	2.7	2.5	2.5	2.4	2.5	2.5	2.4	2.5	2.5	2.3	2.2	2.2	2.2	2.3	2.6	3.4
27-Mar	2.4	2.4	2.3	Z	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4
28-Mar	2.4	2.3	2.3	2.2	Z	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.6	2.6	2.4	2.2	2.5	4.1	2.7	3.1	2.4	2.3	2.1	2.5	4.1
29-Mar	2.1	2.1	2.2	2.7	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.3	2.3	2.3	2.3	4.1	4.2	2.6	2.4	2.6	3.3	2.5	4.2
30-Mar	Z	5.3	4.0	4.6	3.8	3.4	3.6	3.5	3.0	2.9	3.1	2.9	2.6	2.5	2.2	2.2	2.3	2.4	2.3	2.4	2.2	2.2	2.2	2.2	3.0	5.3
31-Mar	2.2	Z	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.4	2.3	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.5
	2.4	2.5	2.5	2.5	2.6	2.6	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.5	2.4	2.4	2.5	2.5	2.4	2.4	2.4	2.5	Diurnal Average	
	3.4	5.3	4.0	4.6	3.8	3.5	3.6	5.1	3.9	3.6	3.2	3.4	3.5	3.1	2.9	3.6	4.0	3.6	4.1	4.2	3.6	3.3	3.2	4.4	Diurnal Maximum	

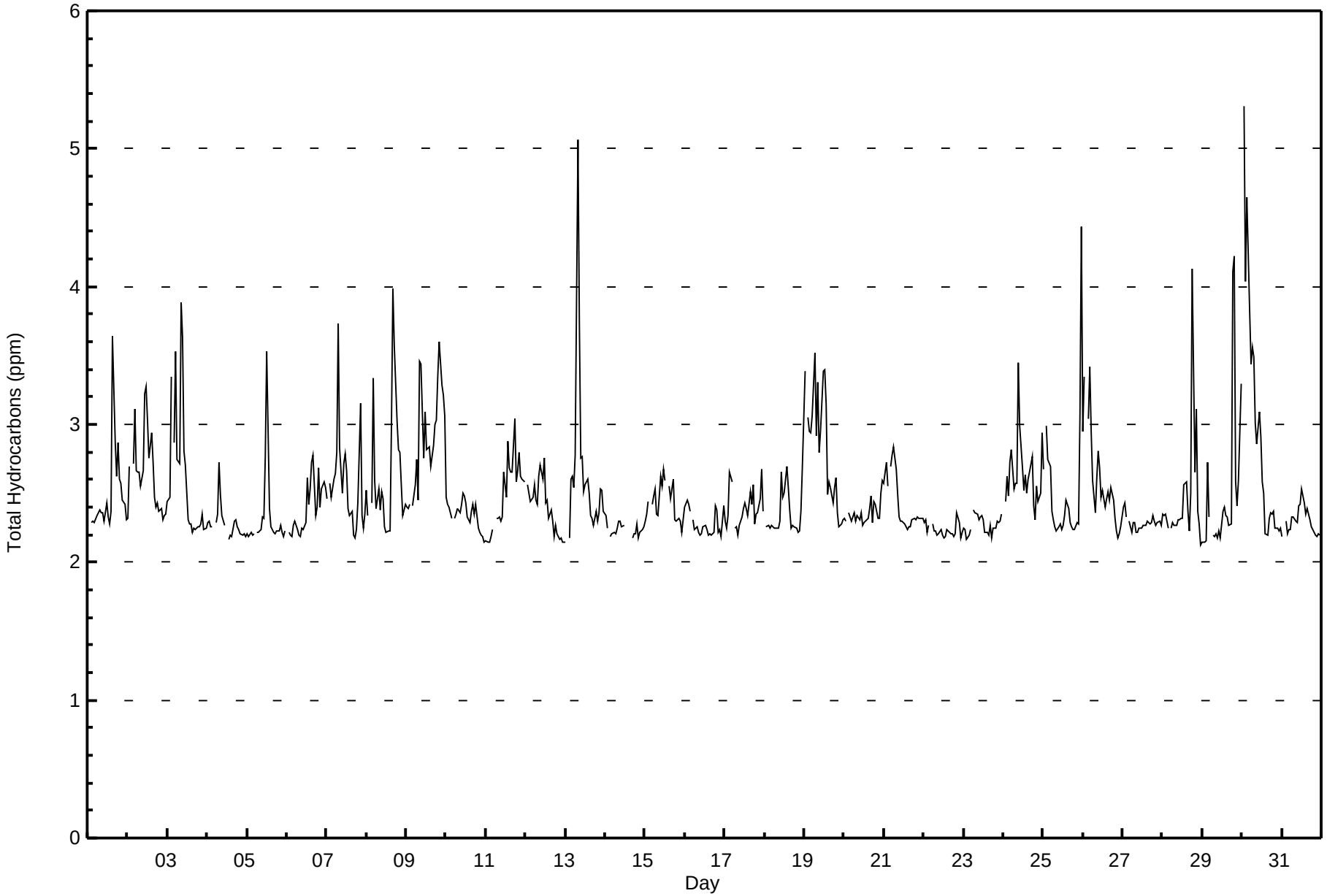
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Mannix - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Mannix - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	656	92.92	92.92
3.1 - 10.0	50	7.08	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

Mannix - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	92	38	12	22	39	38	116	55	7	8	12	21	28	37	48	83	656
3.1 - 10.0	1	0	1	1	0	0	1	3	0	0	3	0	5	15	14	6	50
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	93	38	13	23	39	38	117	58	7	8	15	21	33	52	62	89	706

Total Number of Valid Hours: 706

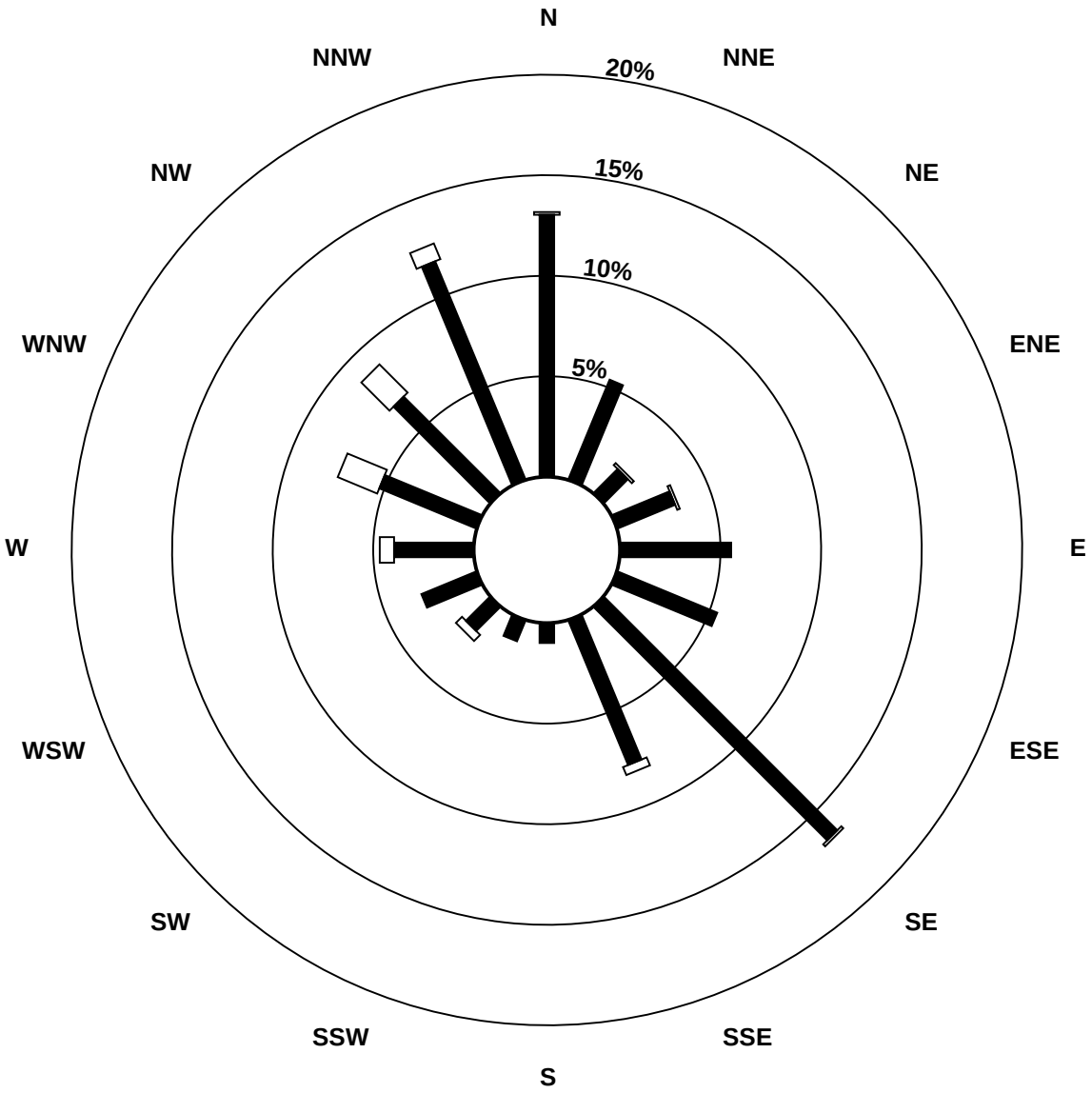
Total Number of Hours: 744

Wood Buffalo Environmental Association

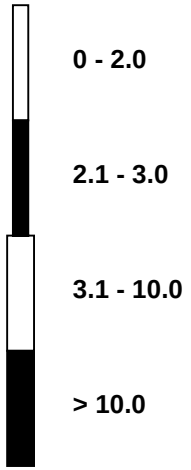
Wind Rose Mar 2016

Total Hydrocarbons (THC) - ppm

Mannix (AMS 5)



Classes (ppm)



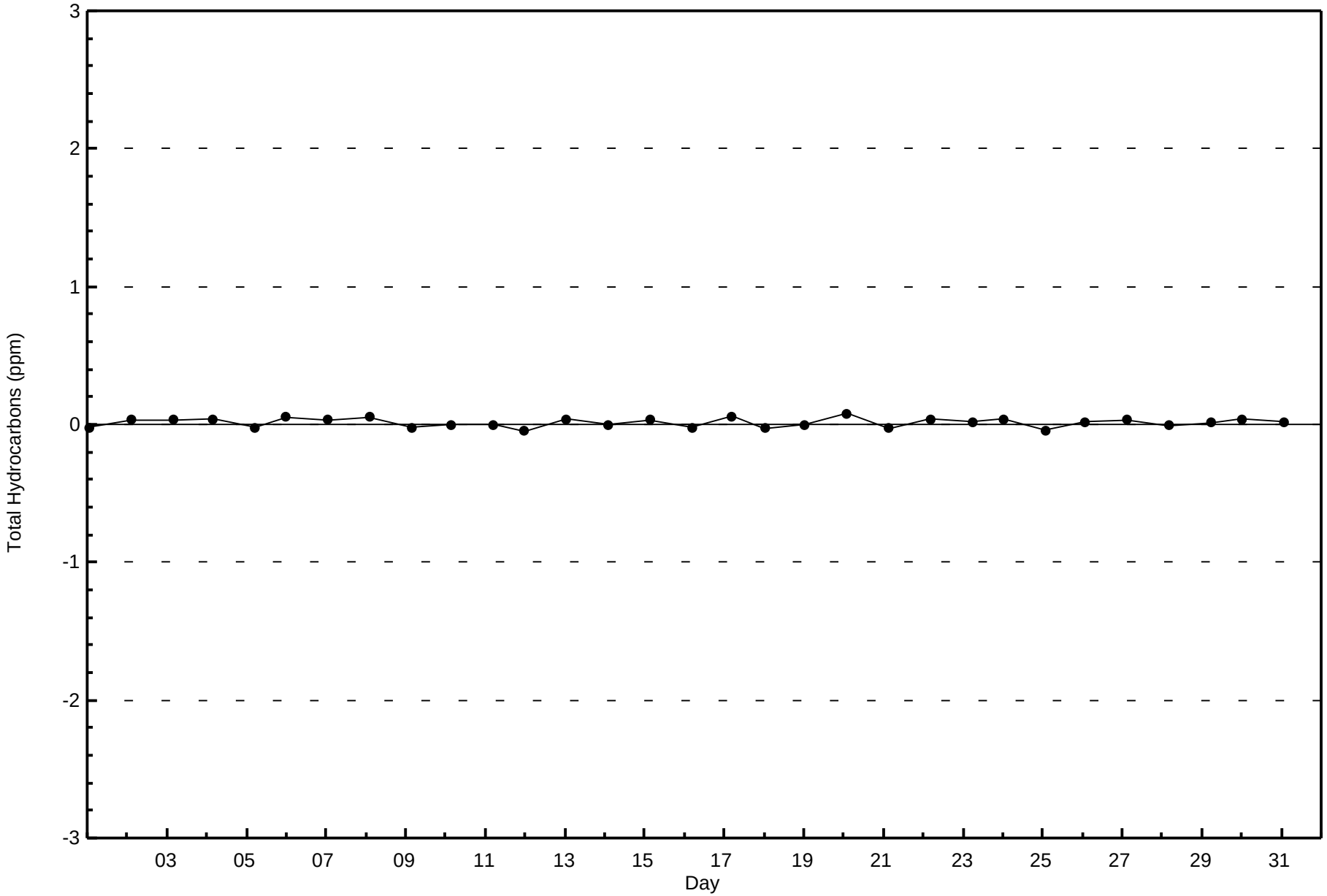
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Mannix - March 2016

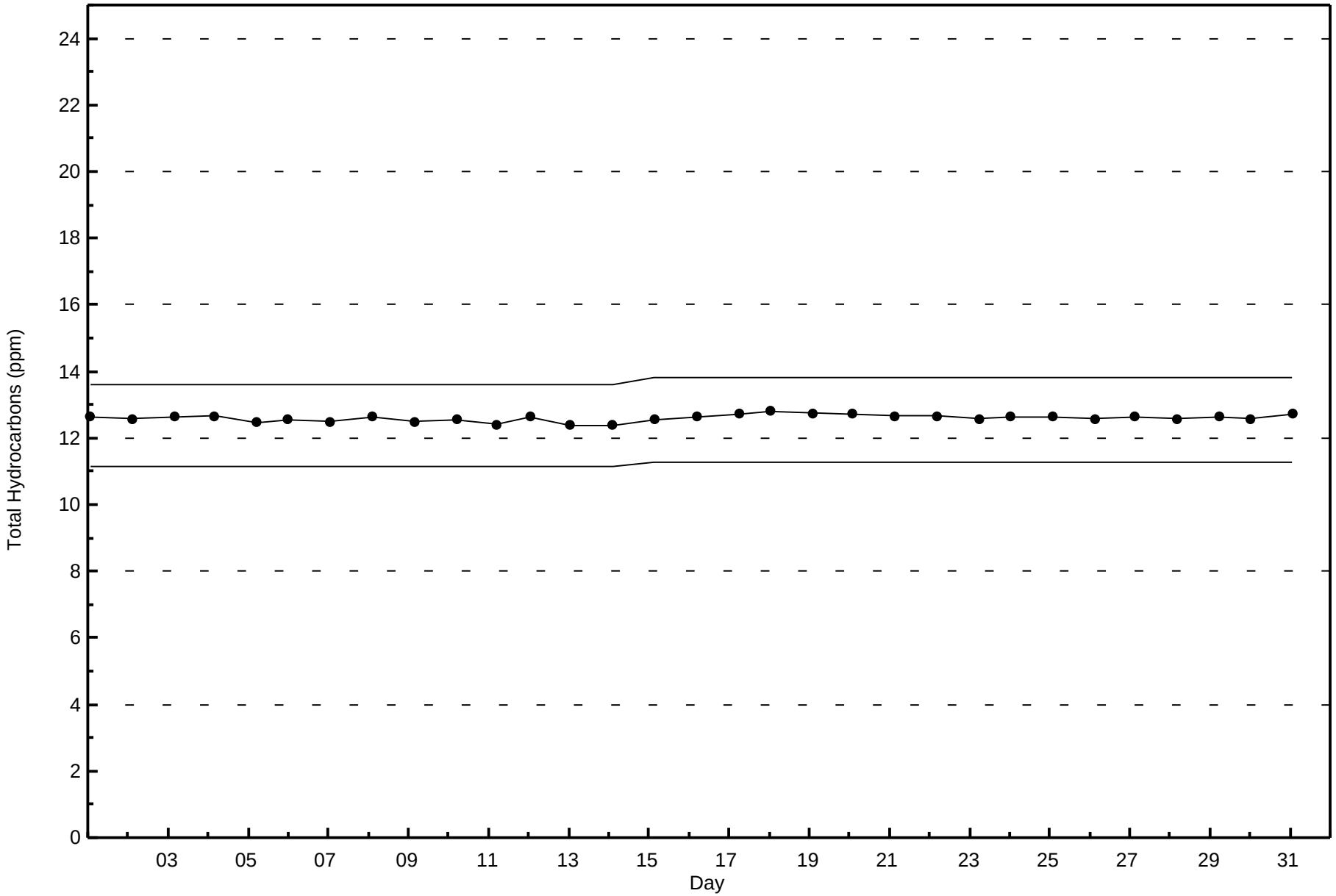


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Mannix - March 2016



Maximum Value: 12.6 C on Mar 29 17:00

Maximum Daily Average: 5.5 C on Mar 29

Minimum Value: -15.4 C on Mar 24 07:00

Minimum Daily Average: -8.6 C on Mar 3

Maximum Diurnal Average: 0.4 C at hour 16

Minimum Diurnal Average: -6.5 C at hour 7

Monthly Average: -3.33 C

Percentiles: P_1 = -12.6 P_{10} = -9.1 Q_1 = -7.0 Median = -4.0 Q_3 = -0.2 P_{90} = 3.1 P_{99} = 11.0

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

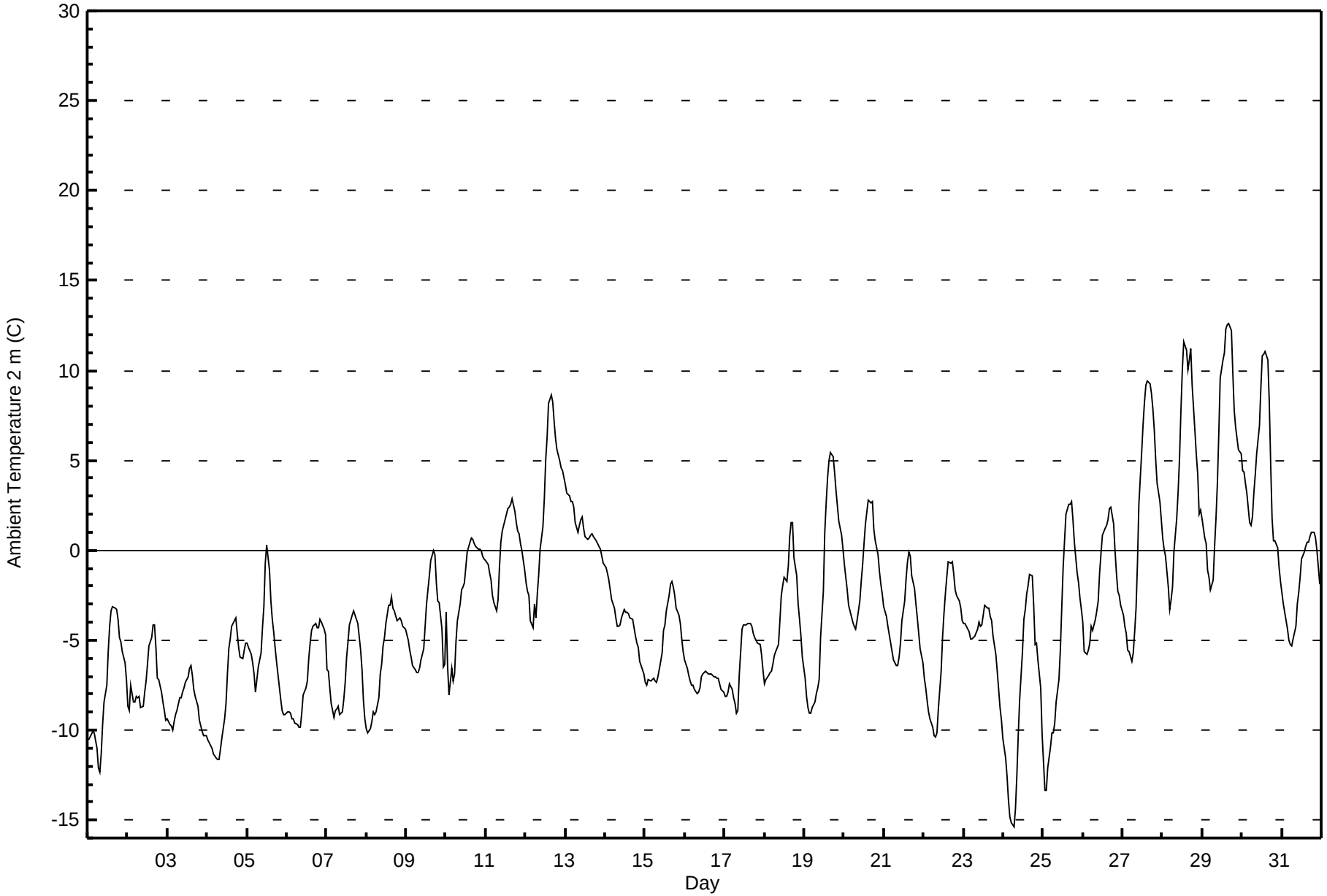
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.5	-10.4	-10.2	-10.1	-10.1	-11.0	-12.1	-12.3	-11.3	-9.7	-8.4	-7.5	-5.7	-4.2	-3.4	-3.2	-3.2	-3.3	-3.9	-4.8	-5.1	-5.6	-6.3	-7.2	-7.5	-3.2
2-Mar	-8.6	-8.9	-7.5	-8.4	-8.4	-8.2	-8.2	-8.2	-8.7	-8.7	-7.9	-7.3	-6.3	-5.3	-4.8	-4.2	-4.1	-5.4	-7.1	-7.2	-7.9	-8.4	-8.9	-9.5	-7.4	-4.1
3-Mar	-9.4	-9.7	-9.7	-10.0	-9.6	-9.1	-8.9	-8.2	-8.2	-7.9	-7.7	-7.4	-7.0	-6.5	-6.4	-7.0	-7.8	-8.1	-8.7	-9.5	-9.8	-10.1	-10.3	-10.3	-8.6	-6.4
4-Mar	-10.5	-10.7	-10.9	-11.0	-11.3	-11.6	-11.6	-11.6	-11.1	-10.5	-9.4	-8.5	-6.9	-5.4	-4.9	-4.2	-3.9	-3.8	-4.6	-5.4	-5.9	-6.0	-5.5	-5.1	-7.9	-3.8
5-Mar	-5.2	-5.4	-5.8	-6.2	-6.9	-7.9	-7.2	-6.5	-5.7	-4.3	-3.2	-0.8	0.3	-1.1	-2.9	-3.8	-4.5	-5.4	-6.2	-7.6	-8.3	-8.9	-9.1	-9.1	-5.5	0.3
6-Mar	-9.0	-9.0	-9.0	-9.4	-9.4	-9.6	-9.7	-9.8	-9.8	-9.1	-8.0	-7.7	-7.2	-6.0	-5.2	-4.4	-4.3	-4.1	-4.3	-4.3	-3.8	-4.0	-4.4	-4.7	-6.9	-3.8
7-Mar	-6.6	-6.7	-7.7	-8.5	-9.3	-8.9	-8.8	-8.7	-9.1	-9.0	-8.3	-7.3	-6.0	-5.1	-4.2	-3.6	-3.4	-3.6	-3.8	-4.1	-5.6	-6.7	-8.3	-9.4	-6.8	-3.4
8-Mar	-9.9	-10.1	-9.9	-9.6	-9.0	-9.1	-9.0	-8.2	-6.9	-6.3	-5.3	-4.8	-4.1	-3.1	-3.1	-2.6	-3.2	-3.4	-3.9	-3.8	-3.8	-4.0	-4.2	-4.4	-5.9	-2.6
9-Mar	-4.7	-5.0	-5.6	-5.9	-6.4	-6.6	-6.8	-6.8	-6.6	-6.1	-5.5	-4.2	-3.0	-2.2	-1.4	-0.5	0.0	-0.3	-1.8	-2.8	-2.9	-4.4	-6.5	-6.4	-4.3	0.0
10-Mar	-3.4	-6.4	-8.0	-6.6	-7.3	-6.8	-5.1	-3.9	-2.9	-2.2	-2.1	-1.8	-1.0	-0.1	0.5	0.7	0.6	0.4	0.2	0.1	0.1	0.0	-0.3	-0.5	-2.3	0.7
11-Mar	-0.5	-0.8	-1.3	-1.6	-2.5	-2.9	-3.4	-2.8	-0.9	0.4	1.1	1.4	2.0	2.4	2.4	2.6	2.9	2.1	1.5	1.0	0.9	0.4	0.0	-1.1	0.1	2.9
12-Mar	-1.8	-2.2	-2.5	-3.9	-4.3	-3.0	-3.7	-2.4	-1.3	0.1	1.3	2.9	5.0	6.3	8.2	8.6	8.3	7.1	6.2	5.6	5.0	4.6	4.4	4.0	2.2	8.6
13-Mar	3.7	3.2	3.0	2.7	2.7	2.4	1.5	1.0	1.4	1.7	1.9	1.2	0.8	0.6	0.7	0.8	0.9	0.7	0.6	0.4	0.2	0.0	-0.3	-0.7	1.3	3.7
14-Mar	-1.0	-1.2	-1.6	-2.2	-2.8	-3.2	-3.7	-4.2	-4.3	-4.2	-3.8	-3.3	-3.5	-3.4	-3.5	-3.7	-3.8	-4.3	-4.8	-5.1	-5.4	-6.2	-6.7	-6.9	-3.9	-1.0
15-Mar	-7.4	-7.5	-7.2	-7.2	-7.2	-7.1	-7.2	-7.3	-7.0	-6.2	-5.7	-4.5	-4.1	-3.3	-2.5	-1.8	-1.7	-2.0	-2.5	-3.2	-3.6	-4.1	-5.0	-5.6	-5.0	-1.7
16-Mar	-6.1	-6.6	-6.9	-7.3	-7.5	-7.5	-7.7	-7.9	-7.9	-7.7	-7.1	-6.9	-6.7	-6.8	-6.9	-6.9	-6.8	-7.0	-7.1	-7.1	-7.2	-7.4	-7.7	-7.9	-7.2	-6.1
17-Mar	-8.1	-8.2	-7.9	-7.4	-7.8	-8.2	-8.5	-9.1	-8.9	-7.0	-4.4	-4.1	-4.1	-4.2	-4.1	-4.1	-4.2	-4.6	-4.8	-5.0	-5.2	-5.2	-5.9	-6.7	-6.2	-4.1
18-Mar	-7.4	-7.2	-6.9	-6.8	-6.7	-6.4	-5.8	-5.6	-5.2	-3.9	-2.5	-2.0	-1.5	-1.7	-0.8	0.7	1.6	1.6	-0.4	-1.4	-3.0	-3.8	-4.8	-6.0	-3.6	1.6
19-Mar	-7.1	-8.1	-8.8	-9.0	-9.1	-8.7	-8.4	-8.0	-7.6	-7.2	-4.8	-2.3	1.0	2.7	4.0	5.0	5.5	5.2	4.4	3.3	2.5	1.6	0.8	0.0	-2.2	5.5
20-Mar	-0.8	-1.5	-2.2	-3.1	-3.7	-4.0	-4.2	-4.4	-3.9	-2.8	-1.8	-0.8	0.4	1.5	2.8	2.7	2.6	2.7	1.2	0.5	-0.2	-1.2	-1.9	-2.4	-1.0	2.8
21-Mar	-3.2	-3.7	-4.2	-4.7	-5.1	-5.6	-6.1	-6.4	-6.4	-5.9	-5.2	-3.9	-2.8	-1.6	-0.7	-0.1	-0.3	-1.4	-2.1	-3.0	-3.7	-4.6	-5.5	-6.3	-3.9	-0.1
22-Mar	-7.1	-7.7	-8.4	-9.0	-9.4	-9.8	-10.3	-10.4	-10.2	-8.8	-6.8	-4.8	-3.5	-2.5	-1.5	-0.6	-0.7	-0.6	-1.3	-2.2	-2.5	-2.9	-3.2	-3.9	-5.3	-0.6
23-Mar	-4.1	-4.1	-4.2	-4.5	-4.9	-4.9	-4.9	-4.8	-4.4	-4.0	-4.2	-4.1	-3.6	-3.0	-3.2	-3.2	-3.7	-3.9	-4.8	-5.8	-6.7	-7.7	-8.7	-9.5	-4.9	-3.0
24-Mar	-10.5	-11.6	-12.6	-13.9	-14.8	-15.2	-15.4	-14.3	-12.5	-10.2	-8.3	-5.6	-3.9	-3.3	-2.4	-2.0	-1.3	-1.4	-3.1	-5.2	-5.2	-6.1	-7.7	-10.2	-8.2	-1.3
25-Mar	-11.8	-13.3	-13.3	-12.1	-10.9	-10.1	-10.2	-9.6	-8.5	-7.2	-5.6	-3.2	-0.9	0.5	2.0	2.6	2.6	2.7	1.7	0.4	-1.3	-1.8	-2.6	-3.3	-4.7	2.7
26-Mar	-4.0	-5.6	-5.8	-5.6	-5.2	-4.3	-4.5	-3.8	-3.4	-2.8	-1.3	-0.2	0.8	1.2	1.4	1.7	2.3	2.4	1.5	0.0	-1.2	-2.3	-2.5	-3.0	-1.8	2.4
27-Mar	-3.6	-4.3	-4.6	-5.6	-5.6	-6.2	-5.7	-4.5	-3.2	-0.7	2.6	5.4	7.0	8.2	9.2	9.4	9.2	8.7	7.8	6.7	5.1	3.7	2.7	1.7	1.8	9.4
28-Mar	0.7	0.1	-0.4	-2.1	-3.3	-2.7	-2.1	-0.1	1.7	3.3	5.1	7.8	10.1	11.6	11.1	10.0	10.6	11.2	9.2	6.6	5.3	4.2	2.0	2.2	4.3	11.6
29-Mar	1.8	0.7	0.4	-1.1	-1.5	-2.2	-1.7	0.2	1.7	3.8	6.4	9.5	10.6	11.0	12.3	12.6	12.6	12.2	9.9	7.8	6.8	6.2	5.6	5.4	5.5	12.6
30-Mar	4.4	4.3	3.7	3.2	1.6	1.4	1.8	3.2	4.2	5.3	6.9	9.1	10.8	10.9	11.0	10.6	8.3	4.8	1.8	0.5	0.6	0.1	-1.0	-1.7	4.4	11.0
31-Mar	-2.4	-3.0	-3.9	-4.4	-5.0	-5.2	-5.3	-4.9	-4.2	-3.0	-2.4	-1.5	-0.5	-0.1	0.2	0.4	0.4	0.7	1.0	1.0	0.7	0.0	-1.0	-1.9	-1.8	1.0
	-5.0	-5.5	-5.8	-6.2	-6.5	-6.5	-6.5	-6.1	-5.5	-4.5	-3.4	-2.2	-1.1	-0.4	0.1	0.4	0.4	0.0	-0.9	-1.7	-2.3	-2.9	-3.6	-4.2	Diurnal Average	
	4.4	4.3	3.7	3.2	2.7	2.4	1.8	3.2	4.2	5.3	6.9	9.5	10.8	11.6	12.3	12.6	12.6	12.2	9.9	7.8	6.8	6.2	5.6	5.4	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 2 m (AT2m) - C

Mannix - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	564	75.81	75.81
0 - 10	164	22.04	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

Maximum Value: 12.7 C on Mar 29 17:00

Maximum Daily Average: 6.5 C on Mar 29

Minimum Value: -14.9 C on Mar 24 08:00

Minimum Daily Average: -9.0 C on Mar 3

Maximum Diurnal Average: 0.2 C at hour 17

Minimum Diurnal Average: -6.4 C at hour 7

Monthly Average: -3.31 C

Percentiles: P_1 = -11.7 P_{10} = -9.3 Q_1 = -7.2 Median = -4.2 Q_3 = -0.1 P_{90} = 3.5 P_{99} = 11.1

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

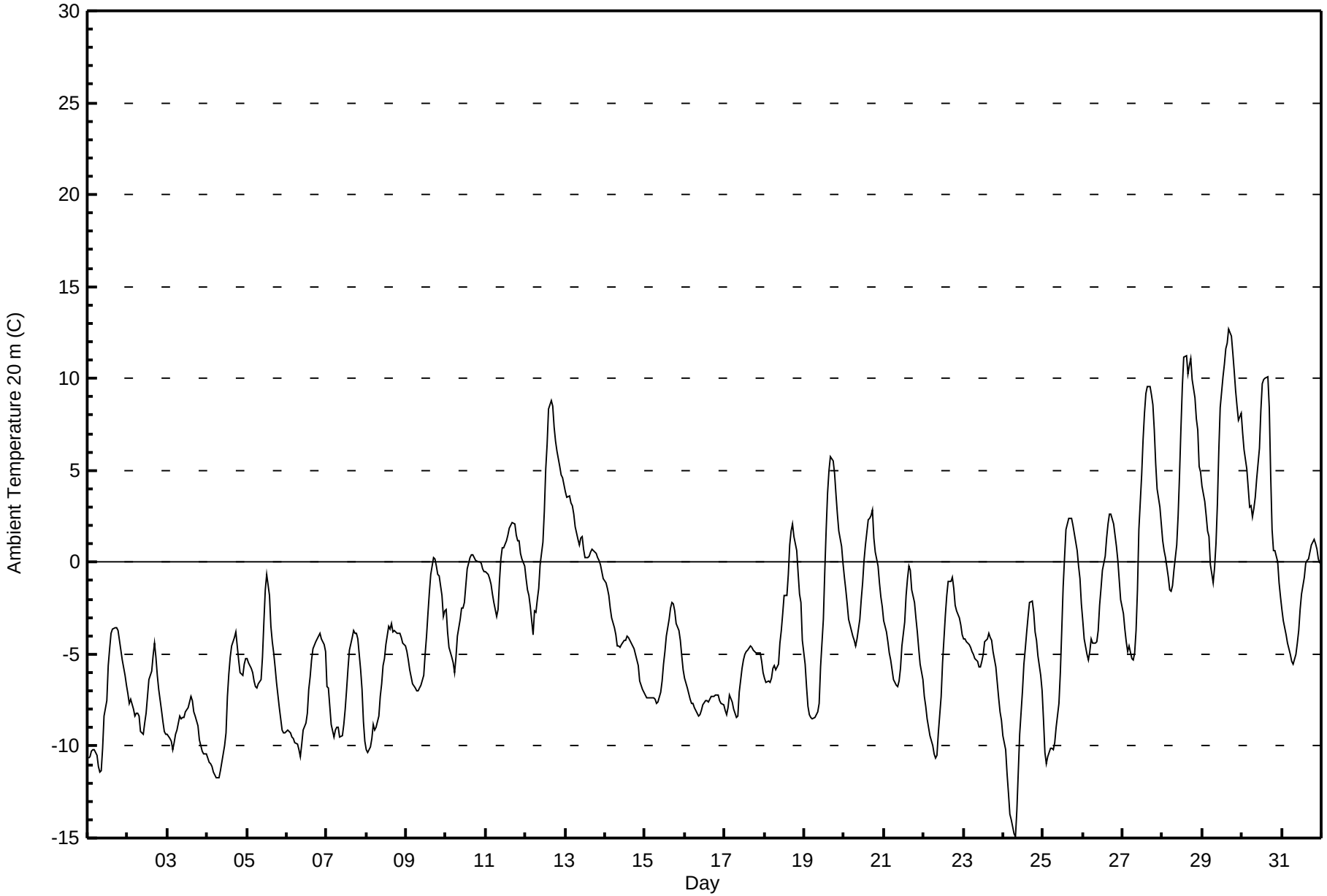
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.7	-10.5	-10.3	-10.2	-10.2	-10.5	-11.1	-11.4	-11.3	-10.1	-8.4	-7.6	-5.6	-4.7	-3.9	-3.6	-3.6	-3.6	-3.7	-4.2	-4.7	-5.3	-6.1	-6.7	-7.4	-3.6
2-Mar	-7.2	-7.7	-7.4	-8.0	-8.3	-8.2	-8.2	-8.4	-9.2	-9.4	-8.7	-8.2	-7.3	-6.4	-5.9	-5.1	-4.4	-5.1	-6.1	-6.9	-8.0	-8.7	-9.2	-9.4	-7.6	-4.4
3-Mar	-9.3	-9.6	-9.7	-10.2	-9.8	-9.3	-9.2	-8.4	-8.5	-8.4	-8.4	-8.2	-7.9	-7.6	-7.3	-7.6	-8.1	-8.4	-8.9	-9.7	-10.0	-10.2	-10.4	-10.4	-9.0	-7.3
4-Mar	-10.7	-10.9	-11.0	-11.1	-11.4	-11.7	-11.7	-11.7	-11.3	-10.9	-10.0	-9.3	-7.3	-6.1	-5.2	-4.6	-4.1	-3.8	-4.6	-5.3	-6.0	-6.1	-5.6	-5.2	-8.1	-3.8
5-Mar	-5.3	-5.5	-5.8	-6.0	-6.5	-6.8	-6.8	-6.6	-6.4	-5.1	-3.2	-1.5	-0.7	-1.8	-3.5	-4.3	-5.0	-5.7	-6.5	-7.9	-8.5	-9.1	-9.3	-9.3	-5.7	-0.7
6-Mar	-9.2	-9.2	-9.3	-9.5	-9.6	-9.8	-9.9	-10.2	-10.6	-9.9	-9.1	-8.8	-8.2	-6.9	-6.2	-5.3	-4.7	-4.3	-4.2	-4.0	-3.8	-4.2	-4.5	-4.8	-7.3	-3.8
7-Mar	-6.8	-6.8	-7.8	-8.8	-9.5	-9.1	-9.0	-9.0	-9.5	-9.4	-8.8	-8.0	-6.9	-5.8	-4.8	-4.1	-3.7	-3.8	-3.9	-4.1	-5.8	-6.9	-8.7	-9.7	-7.1	-3.7
8-Mar	-10.2	-10.4	-10.0	-9.6	-8.8	-9.1	-9.0	-8.4	-7.3	-6.6	-5.6	-5.2	-4.5	-3.5	-3.6	-3.3	-3.8	-3.7	-3.9	-3.9	-3.9	-4.1	-4.4	-4.6	-6.1	-3.3
9-Mar	-4.9	-5.3	-5.8	-6.2	-6.6	-6.8	-7.0	-7.0	-6.9	-6.7	-6.1	-5.0	-4.0	-2.8	-1.7	-0.7	0.3	0.1	-0.2	-0.6	-0.7	-1.8	-2.9	-2.7	-3.8	0.3
10-Mar	-2.6	-3.8	-4.7	-5.2	-5.5	-6.0	-5.1	-4.0	-3.1	-2.5	-2.5	-2.2	-1.2	-0.3	0.2	0.4	0.4	0.3	0.1	0.0	0.0	-0.1	-0.4	-0.5	-2.0	0.4
11-Mar	-0.5	-0.7	-0.9	-1.2	-1.7	-2.2	-3.0	-2.5	-1.1	0.2	0.8	0.8	1.1	1.5	1.9	2.0	2.2	2.1	1.5	1.2	1.2	0.5	0.2	-0.2	0.1	2.2
12-Mar	-0.9	-1.5	-1.8	-2.4	-4.0	-2.7	-2.7	-2.0	-1.5	-0.1	1.1	2.8	5.1	6.4	8.3	8.8	8.5	7.4	6.6	6.0	5.2	4.8	4.6	4.2	2.5	8.8
13-Mar	3.8	3.6	3.6	3.2	3.1	2.6	1.9	1.3	0.9	1.3	1.4	0.7	0.3	0.2	0.3	0.5	0.7	0.6	0.5	0.2	0.1	-0.1	-0.5	-0.9	1.2	3.8
14-Mar	-1.1	-1.4	-1.8	-2.5	-3.0	-3.5	-4.0	-4.5	-4.6	-4.6	-4.5	-4.2	-4.2	-4.0	-4.1	-4.3	-4.5	-4.7	-5.0	-5.3	-5.6	-6.5	-6.9	-7.0	-4.3	-1.1
15-Mar	-7.2	-7.4	-7.4	-7.4	-7.4	-7.4	-7.5	-7.7	-7.6	-7.0	-6.5	-5.5	-4.9	-4.0	-3.1	-2.5	-2.2	-2.3	-2.7	-3.4	-3.7	-4.3	-5.1	-5.8	-5.4	-2.2
16-Mar	-6.3	-6.9	-7.2	-7.5	-7.7	-7.7	-7.9	-8.2	-8.3	-8.3	-8.0	-7.8	-7.5	-7.5	-7.6	-7.5	-7.3	-7.3	-7.2	-7.3	-7.3	-7.6	-7.7	-7.8	-7.6	-6.3
17-Mar	-8.1	-8.3	-7.9	-7.2	-7.6	-8.0	-8.2	-8.4	-8.4	-7.0	-5.8	-5.3	-5.0	-4.8	-4.8	-4.6	-4.6	-4.8	-4.8	-4.9	-5.0	-4.9	-5.4	-6.0	-6.2	-4.6
18-Mar	-6.3	-6.5	-6.5	-6.5	-6.3	-5.8	-5.6	-5.9	-5.5	-4.4	-3.7	-2.8	-1.8	-1.8	-0.7	0.9	1.7	2.1	1.4	0.6	-0.6	-1.7	-2.2	-4.2	-3.0	2.1
19-Mar	-5.6	-6.7	-7.8	-8.3	-8.5	-8.5	-8.5	-8.3	-8.1	-7.6	-5.7	-3.1	-0.5	1.7	3.7	5.0	5.8	5.5	4.8	3.6	2.7	1.7	0.8	0.0	-2.2	5.8
20-Mar	-0.8	-1.5	-2.3	-3.1	-3.7	-4.0	-4.2	-4.6	-4.2	-3.1	-2.0	-1.1	0.1	1.0	2.3	2.4	2.6	2.8	1.3	0.6	-0.2	-1.1	-1.9	-2.4	-1.1	2.8
21-Mar	-3.2	-3.8	-4.3	-4.9	-5.3	-5.8	-6.4	-6.7	-6.7	-6.4	-5.7	-4.5	-3.2	-1.8	-0.9	-0.2	-0.4	-1.5	-2.2	-3.1	-3.8	-4.7	-5.5	-6.4	-4.1	-0.2
22-Mar	-7.3	-7.8	-8.5	-9.0	-9.4	-10.0	-10.4	-10.6	-10.5	-9.3	-7.3	-5.5	-4.2	-2.9	-1.8	-1.1	-1.0	-0.8	-1.5	-2.3	-2.6	-3.0	-3.4	-4.0	-5.6	-0.8
23-Mar	-4.2	-4.2	-4.4	-4.5	-4.6	-4.9	-5.0	-5.2	-5.4	-5.7	-5.7	-5.4	-5.0	-4.3	-4.2	-3.9	-4.1	-4.3	-4.9	-5.7	-6.6	-7.3	-8.1	-8.6	-5.3	-3.9
24-Mar	-9.4	-10.2	-11.5	-12.6	-13.7	-14.0	-14.8	-14.9	-13.4	-11.4	-9.3	-7.0	-5.5	-4.7	-3.8	-2.9	-2.2	-2.1	-2.7	-3.8	-4.2	-5.1	-6.1	-7.0	-8.0	-2.1
25-Mar	-8.6	-10.3	-11.0	-10.6	-10.1	-10.1	-10.2	-9.8	-9.0	-7.7	-6.0	-3.7	-1.3	0.2	1.8	2.4	2.4	2.4	2.0	1.6	0.6	-0.2	-0.9	-2.2	-4.1	2.4
26-Mar	-3.2	-4.2	-5.0	-5.3	-4.9	-4.2	-4.4	-4.4	-4.3	-3.7	-2.3	-1.4	-0.4	0.3	1.3	2.1	2.7	2.6	2.1	1.5	0.8	0.1	-1.0	-2.0	-1.6	2.7
27-Mar	-2.8	-3.6	-4.4	-4.8	-4.6	-5.2	-5.3	-4.9	-3.7	-1.5	1.8	4.8	6.6	8.1	9.1	9.6	9.6	9.1	8.5	7.2	5.4	4.0	3.0	2.1	2.0	9.6
28-Mar	1.2	0.7	0.3	-0.8	-1.5	-1.5	-1.3	-0.4	1.0	2.6	4.8	7.2	9.6	11.1	11.2	10.2	10.7	11.0	9.9	8.9	7.8	7.2	5.2	4.9	5.0	11.2
29-Mar	4.1	3.3	2.5	1.7	1.4	-0.1	-1.1	-0.3	1.0	3.1	6.1	8.4	10.1	10.8	11.6	12.0	12.7	12.3	11.4	10.4	9.4	8.5	7.7	8.1	6.5	12.7
30-Mar	7.1	6.1	5.6	5.0	3.0	3.1	2.5	2.9	3.5	4.5	6.2	8.3	9.7	10.0	10.0	10.1	8.4	4.7	1.8	0.7	0.6	0.0	-1.1	-1.9	4.6	10.1
31-Mar	-2.5	-3.2	-4.0	-4.4	-4.7	-5.0	-5.4	-5.5	-5.0	-4.4	-3.7	-2.6	-1.7	-0.8	-0.1	0.1	0.2	0.6	0.9	1.2	1.0	0.7	0.2	-0.1	-2.0	1.2
	-4.5	-5.0	-5.4	-5.7	-6.0	-6.2	-6.4	-6.3	-6.0	-5.2	-4.0	-2.9	-1.8	-1.0	-0.4	0.0	0.2	-0.1	-0.6	-1.3	-1.8	-2.4	-3.1	-3.6	Diurnal Average	
	7.1	6.1	5.6	5.0	3.1	3.1	2.5	2.9	3.5	4.5	6.2	8.4	10.1	11.1	11.6	12.0	12.7	12.3	11.4	10.4	9.4	8.5	7.7	8.1	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 20 m (AT20m) - C

Mannix - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	562	75.54	75.54
0 - 10	167	22.45	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

Maximum Value: 12.3 C on Mar 29 17:00

Maximum Daily Average: 6.8 C on Mar 29

Minimum Value: -15.2 C on Mar 24 08:00

Minimum Daily Average: -9.2 C on Mar 3

Maximum Diurnal Average: -0.1 C at hour 17

Minimum Diurnal Average: -6.4 C at hour 8

Monthly Average: -3.38 C

Percentiles: P_1 = -11.9 P_{10} = -9.5 Q_1 = -7.2 Median = -4.4 Q_3 = -0.2 P_{90} = 3.5 P_{99} = 10.7

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

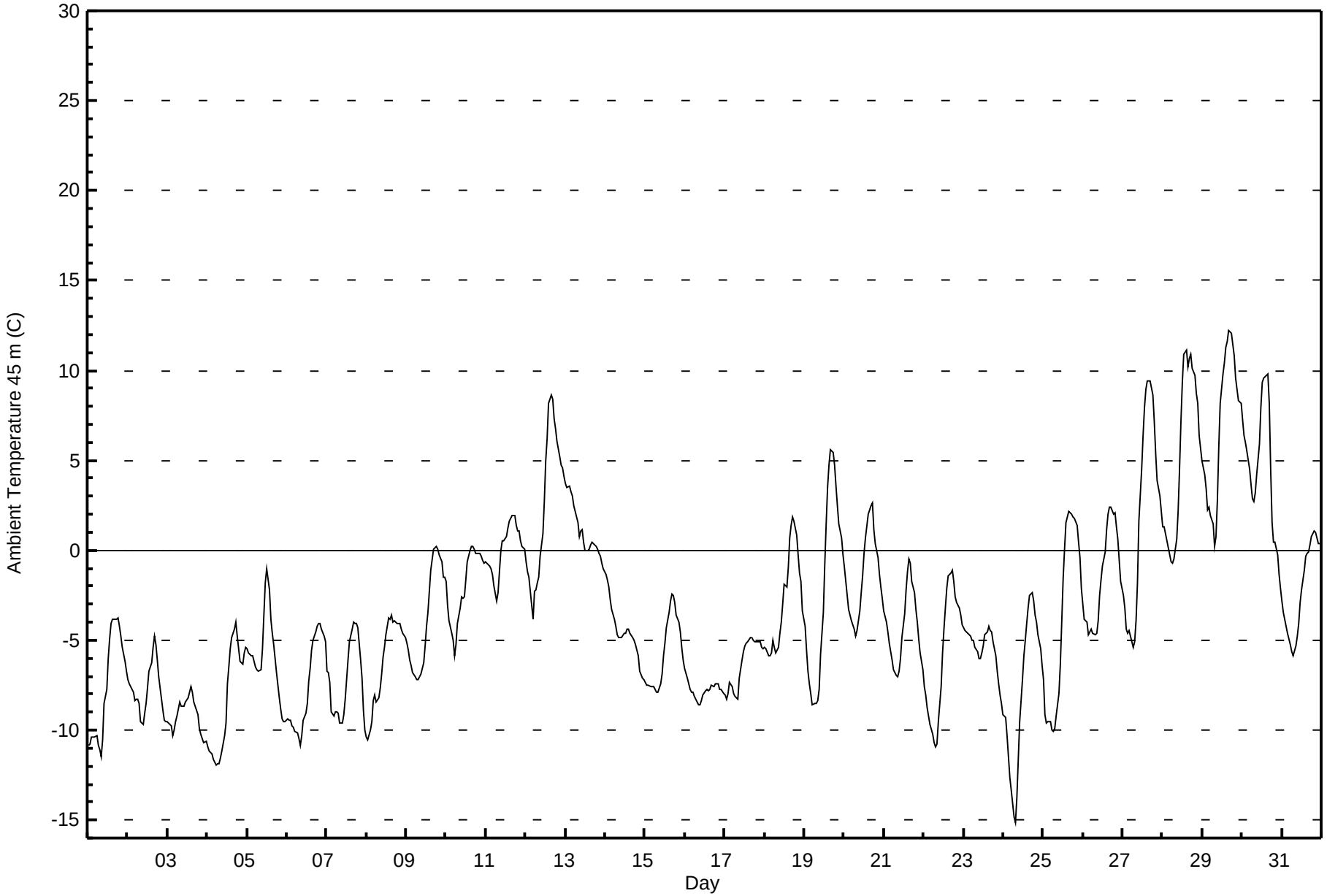
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.9	-10.8	-10.4	-10.4	-10.4	-10.3	-10.8	-11.1	-11.5	-10.5	-8.5	-7.7	-6.0	-5.0	-4.1	-3.9	-3.9	-3.8	-3.7	-4.2	-4.7	-5.4	-6.2	-6.7	-7.5	-3.7
2-Mar	-7.2	-7.5	-7.6	-7.9	-8.4	-8.3	-8.3	-8.6	-9.5	-9.7	-9.0	-8.5	-7.6	-6.7	-6.3	-5.4	-4.7	-5.2	-6.1	-7.1	-8.3	-8.9	-9.4	-9.6	-7.7	-4.7
3-Mar	-9.5	-9.7	-9.8	-10.3	-10.0	-9.5	-9.2	-8.5	-8.7	-8.6	-8.7	-8.4	-8.2	-7.9	-7.6	-7.9	-8.4	-8.7	-9.1	-9.9	-10.2	-10.5	-10.7	-10.6	-9.2	-7.6
4-Mar	-10.9	-11.1	-11.2	-11.4	-11.6	-11.9	-11.9	-11.9	-11.5	-11.2	-10.3	-9.6	-7.5	-6.5	-5.5	-4.8	-4.4	-4.0	-4.7	-5.5	-6.2	-6.3	-5.7	-5.4	-8.4	-4.0
5-Mar	-5.5	-5.7	-5.9	-5.9	-6.2	-6.5	-6.6	-6.8	-6.7	-5.4	-3.6	-1.8	-1.0	-2.2	-3.9	-4.6	-5.3	-6.0	-6.8	-8.2	-8.8	-9.4	-9.5	-9.5	-5.9	-1.0
6-Mar	-9.4	-9.4	-9.5	-9.8	-9.9	-10.1	-10.2	-10.5	-10.9	-10.3	-9.5	-9.1	-8.5	-7.2	-6.5	-5.6	-5.0	-4.5	-4.2	-4.1	-4.0	-4.4	-4.7	-5.1	-7.6	-4.0
7-Mar	-6.7	-6.8	-7.4	-9.0	-9.2	-9.0	-9.0	-9.1	-9.6	-9.6	-9.1	-8.3	-7.2	-6.1	-5.1	-4.4	-4.0	-4.0	-4.0	-4.3	-6.1	-7.1	-8.9	-10.0	-7.2	-4.0
8-Mar	-10.4	-10.5	-10.0	-9.5	-8.3	-8.0	-8.4	-8.2	-7.6	-6.8	-5.9	-5.4	-4.7	-3.8	-3.8	-3.6	-4.0	-3.9	-4.0	-4.1	-4.1	-4.4	-4.7	-4.8	-6.2	-3.6
9-Mar	-5.1	-5.5	-6.1	-6.4	-6.8	-7.0	-7.2	-7.2	-7.1	-6.9	-6.3	-5.3	-4.2	-3.5	-2.3	-1.1	0.1	0.1	0.2	0.1	-0.2	-0.6	-1.5	-1.5	-3.8	0.2
10-Mar	-1.7	-3.1	-3.9	-4.6	-5.0	-5.8	-5.2	-4.1	-3.2	-2.6	-2.7	-2.6	-1.6	-0.6	0.0	0.2	0.2	0.1	-0.1	-0.2	-0.2	-0.3	-0.6	-0.7	-2.0	0.2
11-Mar	-0.7	-0.8	-0.8	-1.0	-1.3	-1.9	-2.8	-2.3	-1.2	0.0	0.5	0.6	0.8	1.2	1.6	1.8	1.9	1.9	1.4	1.1	1.1	0.5	0.3	0.0	0.1	1.9
12-Mar	-0.6	-1.2	-1.5	-2.3	-3.8	-2.3	-2.2	-1.8	-1.5	-0.4	0.9	2.7	4.9	6.3	8.2	8.6	8.4	7.3	6.8	6.1	5.2	4.7	4.6	4.1	2.5	8.6
13-Mar	3.7	3.5	3.6	3.3	3.0	2.5	2.2	1.6	0.8	1.1	1.1	0.5	0.0	0.0	0.1	0.3	0.5	0.4	0.2	0.0	-0.2	-0.4	-0.7	-1.1	1.1	3.7
14-Mar	-1.3	-1.6	-2.1	-2.8	-3.3	-3.8	-4.2	-4.7	-4.8	-4.9	-4.8	-4.6	-4.6	-4.4	-4.4	-4.6	-4.8	-5.0	-5.2	-5.6	-5.9	-6.7	-7.1	-7.2	-4.5	-1.3
15-Mar	-7.4	-7.5	-7.5	-7.6	-7.6	-7.6	-7.7	-7.9	-7.9	-7.4	-6.9	-5.9	-5.1	-4.3	-3.4	-2.8	-2.5	-2.5	-2.9	-3.6	-4.0	-4.5	-5.4	-6.1	-5.7	-2.5
16-Mar	-6.6	-7.1	-7.4	-7.7	-7.9	-7.9	-8.1	-8.4	-8.6	-8.6	-8.3	-8.1	-7.8	-7.8	-7.8	-7.8	-7.5	-7.6	-7.4	-7.4	-7.4	-7.7	-7.8	-7.9	-7.8	-6.6
17-Mar	-8.1	-8.3	-7.9	-7.3	-7.6	-8.0	-8.1	-8.2	-8.3	-7.1	-6.1	-5.6	-5.3	-5.1	-5.1	-4.8	-4.9	-5.0	-5.1	-5.1	-5.0	-5.1	-5.4	-5.5	-6.3	-4.8
18-Mar	-5.4	-5.4	-5.9	-5.9	-5.7	-5.0	-5.4	-5.7	-5.4	-4.6	-4.0	-3.0	-1.9	-2.0	-1.0	0.7	1.4	1.9	1.6	0.8	-0.3	-1.2	-1.7	-3.4	-2.8	1.9
19-Mar	-4.2	-5.6	-6.7	-7.4	-7.9	-8.6	-8.5	-8.5	-8.3	-7.7	-5.8	-3.4	-0.8	1.4	3.5	4.8	5.6	5.4	4.7	3.6	2.5	1.5	0.7	-0.2	-2.1	5.6
20-Mar	-1.0	-1.7	-2.5	-3.3	-3.9	-4.2	-4.4	-4.8	-4.4	-3.4	-2.4	-1.4	-0.2	0.7	2.0	2.2	2.5	2.6	1.1	0.4	-0.4	-1.3	-2.1	-2.6	-1.4	2.6
21-Mar	-3.4	-4.0	-4.6	-5.2	-5.6	-6.1	-6.6	-7.0	-7.1	-6.7	-6.0	-4.9	-3.5	-2.2	-1.2	-0.5	-0.7	-1.7	-2.4	-3.3	-4.0	-4.9	-5.7	-6.7	-4.3	-0.5
22-Mar	-7.5	-8.1	-8.8	-9.2	-9.6	-10.2	-10.7	-10.9	-10.8	-9.6	-7.6	-5.7	-4.4	-3.2	-2.1	-1.4	-1.3	-1.1	-1.7	-2.6	-2.9	-3.2	-3.6	-4.2	-5.8	-1.1
23-Mar	-4.3	-4.5	-4.6	-4.7	-4.8	-5.0	-5.0	-5.4	-5.6	-6.0	-6.0	-5.7	-5.3	-4.7	-4.5	-4.2	-4.4	-4.6	-5.1	-5.9	-6.7	-7.4	-8.0	-8.5	-5.5	-4.2
24-Mar	-9.1	-9.3	-10.3	-11.4	-12.7	-13.4	-14.8	-15.2	-13.8	-11.7	-9.5	-7.2	-5.9	-5.0	-4.1	-3.2	-2.5	-2.4	-2.8	-3.6	-4.0	-4.7	-5.5	-6.4	-7.9	-2.4
25-Mar	-7.2	-9.1	-9.6	-9.5	-9.6	-10.0	-10.1	-9.9	-9.2	-8.0	-6.3	-4.0	-1.6	0.0	1.5	2.2	2.1	2.0	1.8	1.7	1.4	0.4	-0.4	-2.1	-3.9	2.2
26-Mar	-3.0	-3.8	-4.0	-4.7	-4.6	-4.4	-4.6	-4.7	-4.6	-4.0	-2.5	-1.7	-0.8	-0.1	1.2	2.0	2.4	2.4	2.0	2.1	1.3	0.6	-0.6	-1.7	-1.5	2.4
27-Mar	-2.5	-3.2	-4.4	-4.6	-4.5	-5.1	-5.4	-5.1	-3.9	-1.8	1.6	4.5	6.4	7.9	8.9	9.4	9.4	9.1	8.6	7.2	5.3	3.9	3.0	2.2	2.0	9.4
28-Mar	1.3	1.3	0.9	0.1	-0.3	-0.6	-0.7	-0.5	0.6	2.2	4.5	7.2	9.3	10.9	11.1	10.2	10.6	10.9	10.1	9.7	8.7	8.2	6.4	5.7	5.3	11.1
29-Mar	4.9	4.2	3.4	2.3	2.4	1.9	1.5	0.2	0.8	2.8	5.8	8.1	9.8	10.5	11.3	11.6	12.3	12.1	11.4	10.8	9.6	8.9	8.4	8.2	6.8	12.3
30-Mar	7.3	6.3	6.0	5.5	4.5	3.7	2.9	2.7	3.2	4.2	5.9	7.9	9.3	9.6	9.6	9.8	8.2	4.5	1.6	0.5	0.4	-0.2	-1.4	-2.1	4.6	9.8
31-Mar	-2.8	-3.5	-4.2	-4.6	-4.9	-5.2	-5.6	-5.8	-5.4	-4.8	-4.1	-2.9	-2.2	-1.1	-0.3	-0.2	-0.1	0.3	0.8	1.1	1.0	0.7	0.4	0.4	-2.2	1.1
	-4.4	-4.8	-5.2	-5.6	-5.9	-6.1	-6.3	-6.4	-6.2	-5.4	-4.3	-3.2	-2.1	-1.3	-0.6	-0.2	-0.1	-0.3	-0.7	-1.3	-1.8	-2.4	-3.0	-3.5	Diurnal Average	
	7.3	6.3	6.0	5.5	4.5	3.7	2.9	2.7	3.2	4.2	5.9	8.1	9.8	10.9	11.3	11.6	12.3	12.1	11.4	10.8	9.6	8.9	8.4	8.2	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 45 m (AT45m) - C

Mannix - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	566	76.08	76.08
0 - 10	165	22.18	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: 12.0 C on Mar 29 17:00

Maximum Daily Average: 6.9 C on Mar 29

Minimum Value: -15.1 C on Mar 24 08:00

Minimum Daily Average: -9.3 C on Mar 3

Maximum Diurnal Average: -0.4 C at hour 17

Minimum Diurnal Average: -6.4 C at hour 8

Monthly Average: -3.49 C

Percentiles: P_1 = -12.0 P_{10} = -9.5 Q_1 = -7.4 Median = -4.6 Q_3 = -0.3 P_{90} = 3.4 P_{99} = 10.7

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

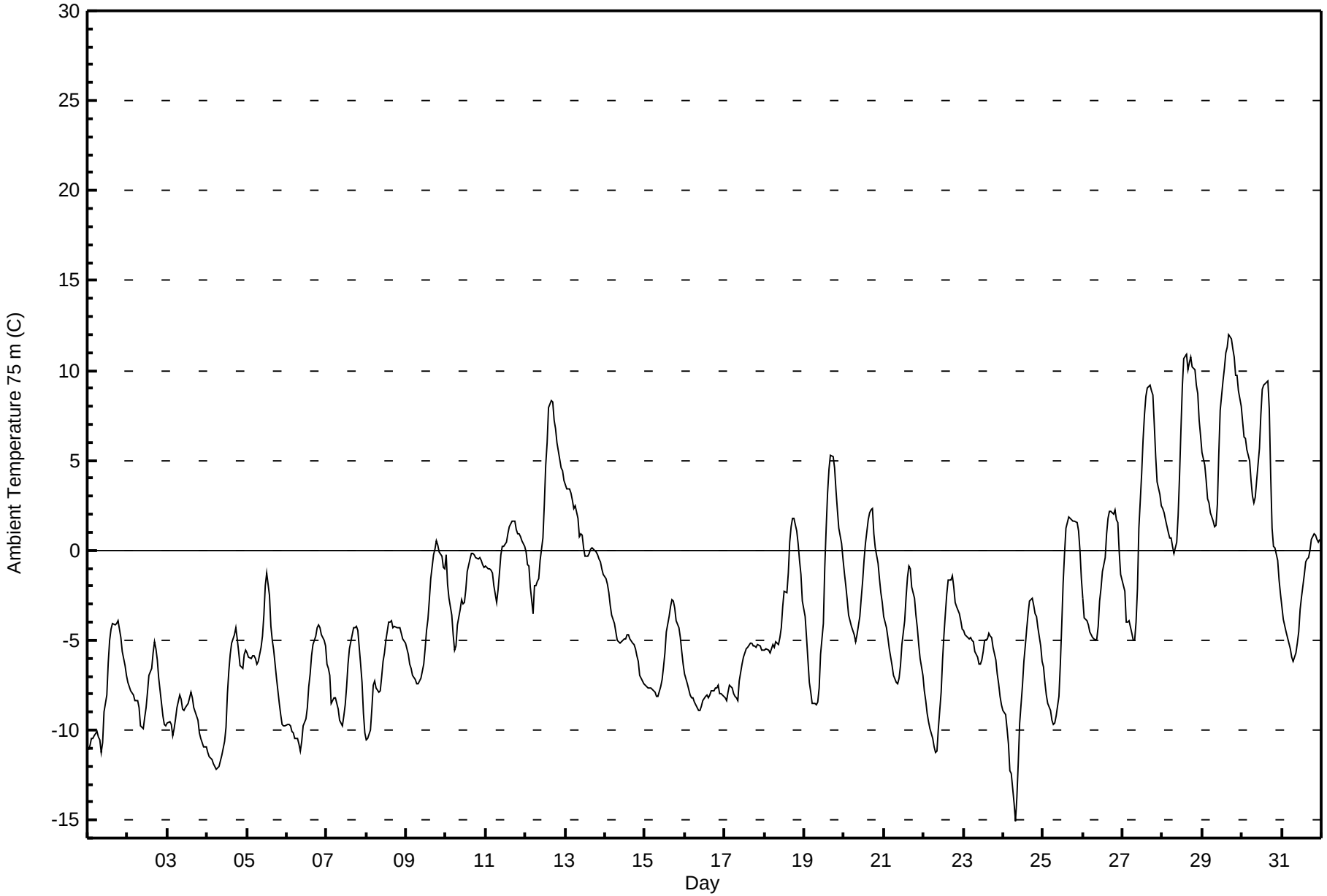
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-11.1	-10.9	-10.5	-10.5	-10.3	-10.0	-10.4	-10.6	-11.2	-10.7	-9.0	-8.1	-6.3	-5.0	-4.4	-4.1	-4.1	-4.1	-3.9	-4.4	-4.9	-5.6	-6.4	-6.9	-7.6	-3.9
2-Mar	-7.3	-7.6	-7.8	-8.1	-8.3	-8.4	-8.4	-8.7	-9.7	-9.9	-9.3	-8.8	-7.9	-7.0	-6.6	-5.7	-5.1	-5.4	-6.1	-7.1	-8.5	-9.2	-9.7	-9.7	-7.9	-5.1
3-Mar	-9.6	-9.5	-9.7	-10.3	-9.9	-9.4	-8.8	-8.1	-8.3	-8.9	-8.9	-8.7	-8.5	-8.2	-7.9	-8.2	-8.7	-9.0	-9.5	-10.2	-10.5	-10.7	-10.9	-10.9	-9.3	-7.9
4-Mar	-11.2	-11.5	-11.5	-11.7	-11.9	-12.2	-12.1	-12.0	-11.7	-11.4	-10.6	-9.9	-8.0	-6.8	-5.8	-5.2	-4.7	-4.3	-5.0	-5.6	-6.4	-6.5	-5.8	-5.5	-8.6	-4.3
5-Mar	-5.7	-5.9	-6.0	-5.8	-5.9	-6.1	-6.4	-6.2	-5.4	-4.8	-3.6	-2.0	-1.3	-2.5	-4.2	-5.0	-5.6	-6.4	-7.1	-8.5	-9.2	-9.7	-9.8	-9.8	-6.0	-1.3
6-Mar	-9.7	-9.7	-9.8	-10.0	-10.2	-10.4	-10.5	-10.8	-11.2	-10.6	-9.8	-9.4	-8.8	-7.5	-6.9	-5.9	-5.3	-4.8	-4.3	-4.2	-4.3	-4.7	-5.0	-5.3	-7.9	-4.2
7-Mar	-6.3	-6.6	-7.0	-8.5	-8.2	-8.2	-8.5	-8.8	-9.5	-9.8	-9.3	-8.6	-7.6	-6.4	-5.5	-4.7	-4.3	-4.3	-4.2	-4.5	-6.3	-7.4	-9.1	-10.1	-7.2	-4.2
8-Mar	-10.6	-10.5	-10.0	-8.8	-7.5	-7.2	-7.7	-7.9	-7.8	-7.0	-6.2	-5.7	-5.0	-4.0	-4.0	-3.9	-4.3	-4.2	-4.3	-4.3	-4.3	-4.6	-5.0	-5.1	-6.3	-3.9
9-Mar	-5.4	-5.8	-6.3	-6.6	-7.0	-7.2	-7.4	-7.4	-7.3	-7.1	-6.3	-5.4	-4.4	-3.8	-2.7	-1.6	-0.3	0.1	0.5	0.3	-0.1	-0.3	-1.0	-1.1	-3.9	0.5
10-Mar	-0.2	-1.9	-2.7	-3.6	-4.7	-5.6	-5.3	-4.1	-3.3	-2.8	-3.0	-2.9	-2.2	-1.2	-0.4	-0.2	-0.1	-0.2	-0.4	-0.5	-0.4	-0.6	-0.8	-1.0	-2.0	-0.1
11-Mar	-0.9	-1.0	-1.0	-1.1	-1.3	-1.9	-2.9	-2.2	-1.3	-0.3	0.2	0.2	0.5	0.9	1.3	1.5	1.6	1.6	1.2	0.9	0.9	0.8	0.5	0.2	-0.1	1.6
12-Mar	-0.1	-0.8	-0.9	-2.1	-3.5	-2.0	-1.9	-1.7	-1.5	-0.6	0.7	2.6	4.7	6.0	7.9	8.3	8.2	7.2	6.8	6.0	5.1	4.6	4.4	3.9	2.6	8.3
13-Mar	3.6	3.4	3.4	3.1	2.8	2.3	2.5	1.7	0.7	0.9	0.8	0.2	-0.4	-0.3	-0.2	0.0	0.2	0.1	-0.1	-0.3	-0.5	-0.7	-1.0	-1.3	0.9	3.6
14-Mar	-1.6	-1.9	-2.4	-3.1	-3.6	-4.1	-4.5	-5.0	-5.1	-5.2	-5.1	-4.9	-5.0	-4.7	-4.7	-4.9	-5.2	-5.3	-5.5	-5.9	-6.1	-7.0	-7.3	-7.4	-4.8	-1.6
15-Mar	-7.5	-7.6	-7.6	-7.7	-7.8	-7.8	-7.9	-8.1	-8.1	-7.6	-7.2	-6.5	-5.7	-4.6	-3.7	-3.1	-2.8	-2.8	-3.2	-3.9	-4.3	-4.8	-5.7	-6.4	-5.9	-2.8
16-Mar	-6.9	-7.4	-7.7	-8.0	-8.2	-8.2	-8.4	-8.7	-8.9	-8.9	-8.7	-8.4	-8.1	-8.1	-8.2	-8.1	-7.8	-7.8	-7.7	-7.7	-7.5	-8.0	-8.0	-8.2	-8.1	-6.9
17-Mar	-8.2	-8.3	-7.9	-7.5	-7.7	-8.0	-8.1	-8.2	-8.3	-7.3	-6.4	-5.9	-5.7	-5.5	-5.4	-5.2	-5.2	-5.3	-5.3	-5.4	-5.2	-5.3	-5.5	-5.6	-6.5	-5.2
18-Mar	-5.5	-5.4	-5.6	-5.7	-5.5	-5.2	-5.4	-5.1	-5.3	-4.8	-4.3	-3.1	-2.3	-2.4	-1.2	0.4	1.3	1.8	1.8	1.1	0.4	-0.6	-1.3	-2.9	-2.7	1.8
19-Mar	-3.7	-4.9	-6.1	-7.3	-7.9	-8.5	-8.5	-8.6	-8.5	-7.6	-5.8	-4.1	-1.0	1.3	3.2	4.5	5.3	5.2	4.6	3.3	2.3	1.2	0.4	-0.5	-2.2	5.3
20-Mar	-1.2	-2.0	-2.8	-3.6	-4.2	-4.4	-4.7	-5.1	-4.7	-3.7	-2.7	-1.7	-0.6	0.4	1.7	2.1	2.3	2.3	0.9	0.2	-0.7	-1.6	-2.3	-2.9	-1.6	2.3
21-Mar	-3.7	-4.3	-4.9	-5.5	-5.9	-6.4	-7.0	-7.3	-7.4	-7.1	-6.4	-5.3	-3.9	-2.6	-1.5	-0.9	-1.0	-2.0	-2.7	-3.6	-4.3	-5.2	-6.0	-7.0	-4.7	-0.9
22-Mar	-7.8	-8.4	-9.1	-9.5	-9.9	-10.5	-11.0	-11.3	-11.1	-9.9	-7.9	-6.1	-4.7	-3.5	-2.5	-1.7	-1.6	-1.4	-2.1	-2.9	-3.2	-3.5	-3.9	-4.4	-6.2	-1.4
23-Mar	-4.4	-4.7	-4.8	-4.9	-4.9	-5.0	-5.1	-5.6	-5.9	-6.4	-6.4	-6.1	-5.6	-5.0	-4.9	-4.6	-4.8	-4.9	-5.4	-6.1	-6.8	-7.5	-8.1	-8.6	-5.7	-4.4
24-Mar	-8.9	-9.1	-9.9	-10.8	-12.2	-12.4	-14.0	-15.1	-13.7	-11.8	-9.6	-7.5	-6.2	-5.3	-4.4	-3.5	-2.8	-2.6	-3.0	-3.5	-3.7	-4.3	-5.3	-6.2	-7.7	-2.6
25-Mar	-6.5	-7.3	-8.1	-8.5	-8.9	-9.4	-9.7	-9.6	-9.2	-8.2	-6.3	-4.1	-1.8	-0.1	1.2	1.8	1.7	1.7	1.6	1.6	1.6	1.0	0.0	-1.6	-3.6	1.8
26-Mar	-2.7	-3.7	-3.9	-4.1	-4.5	-4.7	-4.9	-5.0	-4.9	-4.2	-2.8	-2.1	-1.2	-0.4	0.9	1.8	2.1	2.1	2.0	2.3	1.7	1.5	-0.1	-1.3	-1.5	2.3
27-Mar	-2.0	-2.2	-4.0	-4.0	-3.9	-4.6	-5.0	-5.0	-4.0	-2.1	1.2	4.3	6.1	7.5	8.5	9.1	9.2	8.9	8.7	7.0	5.2	3.8	3.1	2.5	2.0	9.2
28-Mar	2.3	2.1	1.7	1.0	0.7	0.7	0.2	-0.2	0.4	1.9	4.1	6.7	9.1	10.6	10.9	10.0	10.4	10.7	10.2	10.1	9.1	8.7	7.2	6.4	5.6	10.9
29-Mar	5.4	4.8	3.9	2.9	2.6	2.1	1.6	1.3	1.4	2.6	5.4	7.8	9.4	10.1	11.0	11.3	12.0	11.8	11.2	10.8	9.7	9.7	8.9	8.0	6.9	12.0
30-Mar	7.2	6.3	6.2	5.6	5.0	3.9	3.0	2.6	2.9	3.9	5.7	7.6	9.0	9.2	9.3	9.5	7.9	4.2	1.3	0.2	0.1	-0.5	-1.7	-2.4	4.4	9.5
31-Mar	-3.1	-3.8	-4.5	-4.9	-5.2	-5.5	-5.9	-6.2	-5.7	-5.2	-4.5	-3.3	-2.6	-1.3	-0.7	-0.5	-0.4	0.0	0.6	0.9	0.8	0.6	0.5	0.6	-2.5	0.9
	-4.3	-4.7	-5.1	-5.5	-5.7	-6.0	-6.2	-6.4	-6.2	-5.6	-4.6	-3.5	-2.4	-1.6	-1.0	-0.5	-0.4	-0.6	-0.9	-1.4	-1.9	-2.5	-3.1	-3.6	Diurnal Average	
	7.2	6.3	6.2	5.6	5.0	3.9	3.0	2.6	2.9	3.9	5.7	7.8	9.4	10.6	11.0	11.3	12.0	11.8	11.2	10.8	9.7	9.7	8.9	8.0	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 75 m (AT75m) - C

Mannix - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	569	76.48	76.48
0 - 10	161	21.64	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

Maximum Value: 11.9 C on Mar 29 17:00

Maximum Daily Average: 6.9 C on Mar 29

Minimum Value: -14.3 C on Mar 24 08:00

Minimum Daily Average: -9.3 C on Mar 3

Maximum Diurnal Average: -0.5 C at hour 17

Minimum Diurnal Average: -6.3 C at hour 8

Monthly Average: -3.51 C

Percentiles: P_1 = -12.0 P_{10} = -9.4 Q_1 = -7.5 Median = -4.7 Q_3 = -0.3 P_{90} = 3.3 P_{99} = 10.7

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

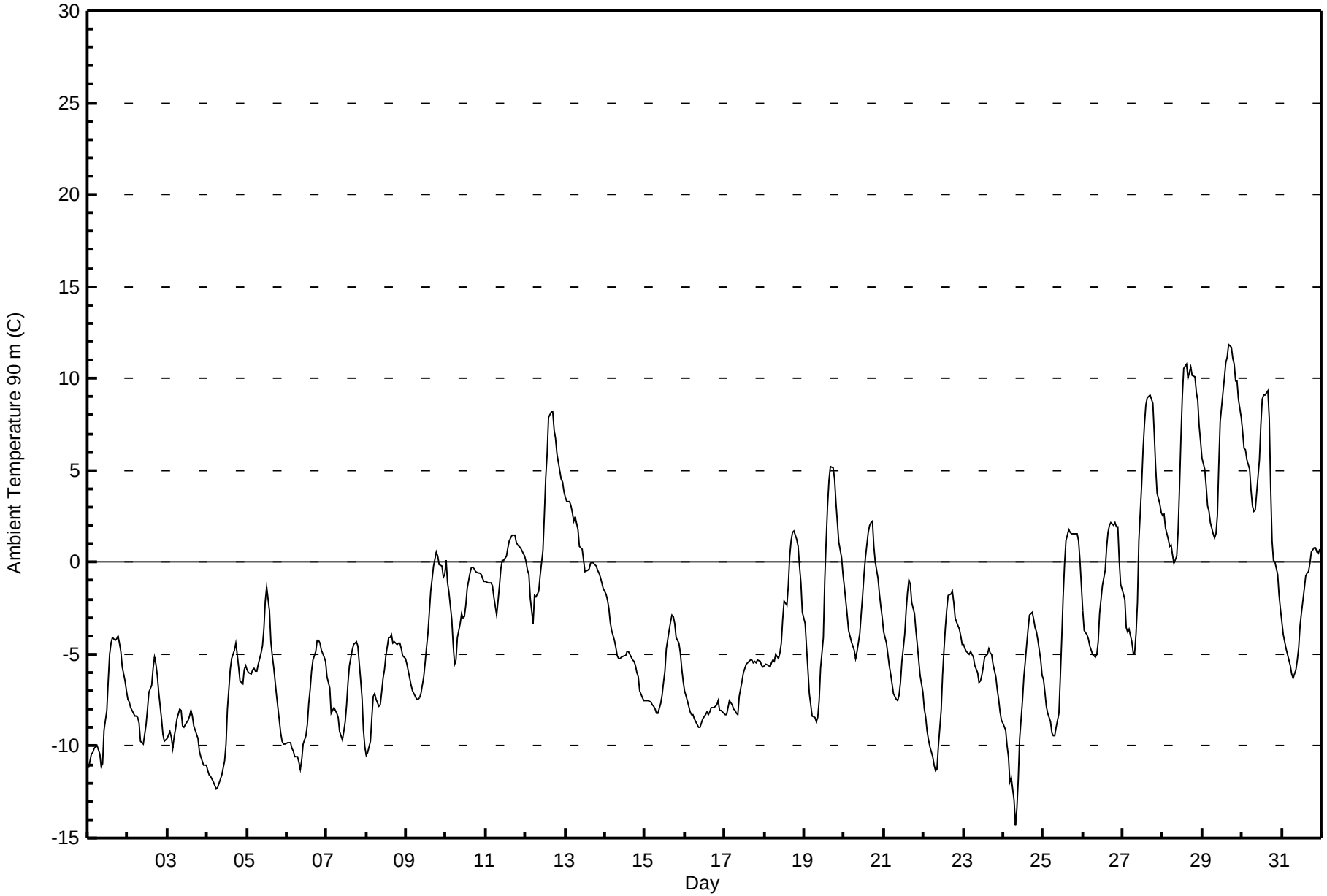
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-11.2	-10.8	-10.4	-10.4	-10.1	-10.0	-10.2	-10.4	-11.1	-11.0	-9.1	-8.1	-6.4	-5.0	-4.4	-4.1	-4.2	-4.1	-4.0	-4.4	-4.9	-5.7	-6.4	-7.0	-7.6	-4.0
2-Mar	-7.5	-7.6	-7.9	-8.2	-8.3	-8.4	-8.4	-8.7	-9.7	-9.9	-9.4	-8.8	-7.9	-7.0	-6.7	-5.8	-5.2	-5.5	-6.1	-7.1	-8.5	-9.3	-9.7	-9.7	-8.0	-5.2
3-Mar	-9.6	-9.2	-9.5	-10.1	-9.5	-9.0	-8.5	-8.0	-8.1	-8.9	-9.0	-8.8	-8.6	-8.4	-8.1	-8.3	-8.9	-9.1	-9.6	-10.2	-10.6	-10.8	-11.0	-11.0	-9.3	-8.0
4-Mar	-11.4	-11.6	-11.7	-11.8	-12.0	-12.3	-12.2	-12.0	-11.8	-11.5	-10.8	-9.9	-8.0	-6.9	-5.9	-5.3	-4.8	-4.4	-5.0	-5.7	-6.5	-6.6	-5.8	-5.6	-8.7	-4.4
5-Mar	-5.8	-6.0	-6.1	-5.8	-5.8	-5.9	-5.9	-5.5	-4.9	-4.6	-3.7	-2.1	-1.4	-2.7	-4.3	-5.1	-5.7	-6.5	-7.2	-8.6	-9.3	-9.8	-9.9	-9.9	-5.9	-1.4
6-Mar	-9.8	-9.8	-9.8	-10.2	-10.3	-10.6	-10.6	-10.9	-11.3	-10.7	-9.9	-9.4	-8.8	-7.6	-6.9	-6.0	-5.3	-4.9	-4.3	-4.2	-4.4	-4.8	-5.2	-5.4	-8.0	-4.2
7-Mar	-6.2	-6.5	-6.9	-8.2	-7.9	-8.0	-8.2	-8.4	-9.2	-9.6	-9.2	-8.7	-7.8	-6.5	-5.6	-4.8	-4.4	-4.4	-4.3	-4.5	-6.4	-7.4	-9.1	-10.0	-7.2	-4.3
8-Mar	-10.5	-10.3	-9.8	-8.5	-7.3	-7.2	-7.5	-7.9	-7.8	-7.1	-6.3	-5.8	-5.1	-4.1	-4.1	-4.0	-4.4	-4.3	-4.4	-4.4	-4.4	-4.7	-5.1	-5.2	-6.2	-4.0
9-Mar	-5.5	-5.9	-6.3	-6.7	-7.0	-7.3	-7.4	-7.4	-7.3	-7.2	-6.3	-5.5	-4.6	-3.9	-2.7	-1.6	-0.2	0.2	0.6	0.4	-0.1	-0.2	-0.8	-0.7	-3.9	0.6
10-Mar	0.1	-1.1	-1.6	-3.1	-4.5	-5.5	-5.3	-4.1	-3.3	-2.8	-3.0	-3.0	-2.3	-1.4	-0.6	-0.3	-0.3	-0.4	-0.5	-0.6	-0.5	-0.7	-0.9	-1.0	-2.0	0.1
11-Mar	-1.0	-1.2	-1.1	-1.2	-1.3	-1.9	-2.9	-2.1	-1.3	-0.4	0.1	0.1	0.4	0.8	1.2	1.3	1.5	1.5	1.1	0.9	0.8	0.8	0.6	0.3	-0.1	1.5
12-Mar	0.1	-0.4	-0.7	-2.0	-3.3	-1.8	-1.9	-1.7	-1.5	-0.7	0.6	2.6	4.6	5.9	7.9	8.2	8.2	7.2	6.8	5.9	5.0	4.5	4.3	3.8	2.6	8.2
13-Mar	3.5	3.3	3.3	3.1	2.7	2.2	2.5	1.8	0.8	0.8	0.7	0.1	-0.5	-0.4	-0.3	-0.1	0.1	0.0	-0.2	-0.4	-0.6	-0.8	-1.2	-1.4	0.8	3.5
14-Mar	-1.7	-2.0	-2.5	-3.2	-3.7	-4.2	-4.6	-5.1	-5.2	-5.3	-5.2	-5.0	-5.1	-4.8	-4.8	-5.0	-5.3	-5.4	-5.6	-6.0	-6.2	-7.0	-7.4	-7.5	-4.9	-1.7
15-Mar	-7.5	-7.5	-7.6	-7.6	-7.8	-7.8	-8.0	-8.2	-8.2	-7.6	-7.3	-6.6	-5.9	-4.7	-3.7	-3.2	-2.9	-2.9	-3.3	-4.1	-4.4	-5.0	-5.8	-6.5	-6.0	-2.9
16-Mar	-7.0	-7.5	-7.8	-8.1	-8.3	-8.3	-8.5	-8.9	-9.0	-9.0	-8.8	-8.5	-8.3	-8.2	-8.3	-8.2	-7.9	-7.9	-7.8	-7.7	-7.6	-8.0	-8.0	-8.2	-8.2	-7.0
17-Mar	-8.3	-8.3	-7.9	-7.6	-7.7	-8.0	-8.1	-8.2	-8.3	-7.3	-6.4	-6.0	-5.8	-5.6	-5.5	-5.3	-5.3	-5.4	-5.4	-5.5	-5.3	-5.4	-5.6	-5.7	-6.6	-5.3
18-Mar	-5.6	-5.5	-5.6	-5.7	-5.5	-5.3	-5.4	-5.0	-5.2	-4.9	-4.4	-3.1	-2.1	-2.3	-1.3	0.3	1.1	1.7	1.7	1.2	0.9	-0.2	-1.1	-2.8	-2.7	1.7
19-Mar	-3.3	-4.6	-5.8	-7.1	-7.7	-8.4	-8.4	-8.6	-8.4	-7.5	-5.8	-4.1	-1.0	1.2	3.1	4.4	5.2	5.1	4.6	3.2	2.1	1.1	0.2	-0.6	-2.1	5.2
20-Mar	-1.4	-2.1	-2.9	-3.7	-4.3	-4.6	-4.8	-5.2	-4.8	-3.8	-2.8	-1.8	-0.6	0.2	1.6	2.0	2.2	2.2	0.8	0.1	-0.9	-1.7	-2.4	-3.0	-1.7	2.2
21-Mar	-3.8	-4.4	-5.0	-5.6	-6.1	-6.6	-7.1	-7.5	-7.5	-7.2	-6.5	-5.4	-4.0	-2.7	-1.6	-1.0	-1.2	-2.2	-2.8	-3.7	-4.4	-5.3	-6.2	-7.1	-4.8	-1.0
22-Mar	-8.0	-8.5	-9.2	-9.6	-10.0	-10.6	-11.0	-11.4	-11.2	-10.0	-8.0	-6.1	-4.8	-3.6	-2.5	-1.8	-1.7	-1.6	-2.2	-3.0	-3.3	-3.6	-4.0	-4.5	-6.3	-1.6
23-Mar	-4.5	-4.7	-4.9	-5.0	-4.8	-5.0	-5.2	-5.6	-6.0	-6.5	-6.5	-6.2	-5.7	-5.1	-5.0	-4.7	-4.9	-5.0	-5.5	-6.2	-6.9	-7.5	-8.1	-8.6	-5.8	-4.5
24-Mar	-8.8	-9.2	-10.0	-10.6	-12.0	-11.7	-12.9	-14.3	-13.4	-11.8	-9.6	-7.5	-6.2	-5.4	-4.5	-3.6	-2.9	-2.7	-3.1	-3.6	-3.8	-4.2	-5.3	-6.1	-7.6	-2.7
25-Mar	-6.4	-7.1	-7.8	-8.2	-8.7	-9.3	-9.5	-9.5	-9.0	-8.2	-6.2	-4.2	-1.9	-0.1	1.1	1.7	1.6	1.6	1.5	1.6	1.6	1.2	0.1	-1.3	-3.5	1.7
26-Mar	-2.6	-3.7	-3.9	-4.2	-4.5	-4.8	-5.0	-5.2	-5.0	-4.3	-2.8	-2.1	-1.3	-0.4	0.8	1.6	2.0	2.2	2.0	2.2	1.9	1.9	0.1	-1.2	-1.5	2.2
27-Mar	-1.8	-2.1	-3.5	-3.8	-3.7	-4.3	-4.9	-4.9	-3.9	-2.2	1.2	4.2	6.1	7.5	8.6	9.0	9.1	8.9	8.6	6.9	5.1	3.8	3.2	2.7	2.1	9.1
28-Mar	2.5	2.6	1.9	1.2	0.9	0.9	0.4	-0.1	0.3	1.7	4.1	6.8	9.0	10.5	10.8	10.0	10.3	10.6	10.2	10.1	9.2	8.8	7.4	6.6	5.7	10.8
29-Mar	5.7	5.0	4.2	3.1	2.7	2.1	1.6	1.3	1.6	2.5	5.3	7.7	9.3	10.0	10.9	11.2	11.9	11.7	11.1	10.7	9.9	9.9	8.9	7.9	6.9	11.9
30-Mar	7.1	6.2	6.1	5.6	5.1	3.9	3.1	2.8	2.9	3.8	5.6	7.5	8.9	9.1	9.1	9.3	7.8	4.0	1.1	0.1	0.0	-0.6	-1.8	-2.5	4.3	9.3
31-Mar	-3.3	-3.9	-4.7	-5.0	-5.3	-5.6	-6.1	-6.3	-5.8	-5.3	-4.6	-3.4	-2.7	-1.4	-0.8	-0.6	-0.5	-0.1	0.6	0.8	0.8	0.6	0.5	0.7	-2.6	0.8
	-4.3	-4.7	-5.0	-5.4	-5.7	-5.9	-6.2	-6.3	-6.2	-5.7	-4.6	-3.6	-2.5	-1.7	-1.1	-0.6	-0.5	-0.6	-1.0	-1.5	-2.0	-2.5	-3.1	-3.6	Diurnal Average	
	7.1	6.2	6.1	5.6	5.1	3.9	3.1	2.8	2.9	3.8	5.6	7.7	9.3	10.5	10.9	11.2	11.9	11.7	11.1	10.7	9.9	9.9	8.9	7.9	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 90 m (AT90m) - C

Mannix - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	570	76.61	76.61
0 - 10	161	21.64	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: 96 % on Mar 12 05:00

Maximum Daily Average: 88.5 % on Mar 10

Minimum Value: 24 % on Mar 24 21:00

Minimum Daily Average: 39.1 % on Mar 24

Maximum Diurnal Average: 79.5 % at hour 7

Minimum Diurnal Average: 59.6 % at hour 16

Monthly Average: 69.9 %

Percentiles: P_1 = 26 P_{10} = 46 Q_1 = 58 Median = 72 Q_3 = 85 P_{90} = 90 P_{99} = 95

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

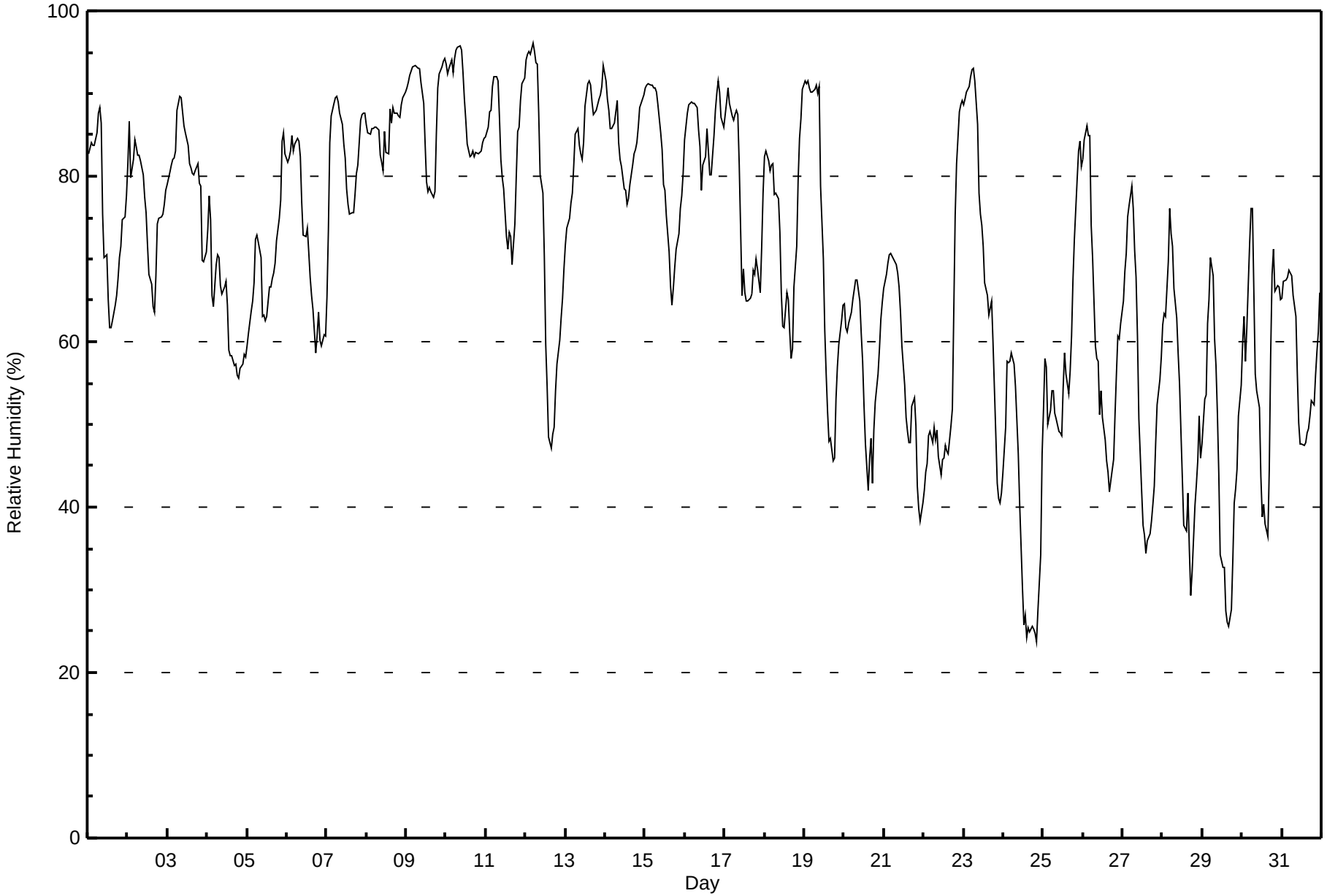
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	83	83	84	84	84	85	88	88	86	76	70	70	65	62	62	63	64	66	68	70	72	75	75	78	75.0	88
2-Mar	81	87	80	82	84	83	83	82	82	80	78	76	72	68	67	64	64	68	74	75	75	75	77	78	76.5	87
3-Mar	79	80	81	82	82	83	88	90	89	88	86	85	84	81	81	80	80	81	82	79	79	70	70	71	81.3	90
4-Mar	74	78	75	66	64	69	71	70	67	66	67	67	64	59	58	58	57	57	56	56	57	57	58	58	63.7	78
5-Mar	59	61	64	65	67	72	73	72	70	63	63	63	63	67	67	68	68	69	72	75	77	84	85	83	69.6	85
6-Mar	82	82	83	85	83	84	84	84	82	77	73	73	74	71	68	66	64	59	61	64	60	59	61	61	72.4	85
7-Mar	65	73	84	87	89	89	90	89	88	86	84	82	79	77	75	76	76	78	80	81	87	87	88	88	82.4	90
8-Mar	86	85	85	86	86	86	86	86	83	82	81	85	83	83	88	86	88	88	88	87	87	89	89	90	85.9	90
9-Mar	91	91	92	93	93	93	93	93	93	91	89	84	79	78	79	78	77	78	85	91	92	93	94	94	88.2	94
10-Mar	94	92	93	94	93	94	95	96	96	95	93	89	87	84	82	83	83	82	83	83	83	83	84	85	88.5	96
11-Mar	85	86	88	88	91	92	92	92	87	82	80	78	73	71	73	73	69	74	80	86	86	89	91	92	83.2	92
12-Mar	94	95	95	95	96	95	94	94	88	80	78	70	60	55	48	47	49	50	54	57	60	63	65	69	72.9	96
13-Mar	72	74	75	77	78	81	85	86	84	83	82	84	88	91	91	91	89	87	88	89	89	90	91	93	84.9	93
14-Mar	92	89	88	86	86	86	88	89	84	82	81	78	78	77	77	79	81	83	83	84	86	88	89	90	84.4	92
15-Mar	91	91	91	91	91	91	91	90	89	85	83	79	78	75	71	67	64	67	69	71	73	76	78	80	80.5	91
16-Mar	84	88	89	89	89	89	89	88	86	84	78	81	82	86	83	80	80	85	88	90	91	90	87	86	85.9	91
17-Mar	87	89	91	89	87	87	87	88	88	81	66	69	66	65	65	65	66	69	68	70	69	66	71	78	76.1	91
18-Mar	82	83	82	81	81	82	78	78	77	73	66	62	62	66	65	61	58	59	67	72	80	85	87	90	74.0	90
19-Mar	92	91	92	91	90	90	90	91	90	91	79	70	61	56	52	48	48	46	46	53	57	60	63	64	71.2	92
20-Mar	65	62	61	62	64	65	66	67	67	65	61	58	52	48	42	46	48	43	49	53	56	59	63	65	57.8	67
21-Mar	67	68	69	71	71	70	70	69	68	67	64	59	55	51	49	48	48	52	53	50	43	40	38	41	57.5	71
22-Mar	42	44	45	49	49	48	50	48	49	46	44	46	46	48	47	46	50	52	64	75	81	88	89	89	55.6	89
23-Mar	89	89	90	91	92	93	93	92	86	78	76	74	71	67	66	63	64	65	60	49	43	41	40	42	71.4	93
24-Mar	44	50	58	57	58	59	57	55	50	46	40	30	26	27	24	25	25	26	25	25	24	27	34	46	39.1	59
25-Mar	52	58	57	50	52	54	54	51	51	49	49	49	54	59	56	54	56	61	67	72	80	83	84	81	59.7	84
26-Mar	82	84	86	85	85	74	70	60	58	58	51	54	51	48	46	44	42	43	46	51	56	61	60	62	60.7	86
27-Mar	65	69	71	75	76	79	76	71	68	61	51	42	38	37	34	36	37	38	40	43	48	52	55	58	55.0	79
28-Mar	62	63	63	70	76	73	72	67	63	59	55	49	43	38	37	42	35	29	32	40	43	46	51	46	52.2	76
29-Mar	48	53	54	62	65	70	68	60	57	51	44	34	33	33	27	26	26	28	34	40	42	45	51	55	46.1	70
30-Mar	60	63	58	62	72	76	76	66	56	54	52	44	39	40	38	36	45	59	68	71	66	67	67	65	58.3	76
31-Mar	65	67	67	68	69	68	68	66	63	56	50	48	48	47	48	49	49	51	53	52	56	59	61	66	58.1	69
	74.6	76.4	77.1	77.7	78.8	79.4	79.5	78.0	75.6	72.1	68.1	65.6	63.0	61.7	60.2	59.6	59.7	61.0	64.0	66.2	67.6	69.3	70.9	72.4	Diurnal Average	
	94	95	95	95	96	95	95	96	96	95	93	89	88	91	91	91	89	88	88	91	92	93	94	94	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Mannix - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	36	4.84	4.84
40 - 60	173	23.25	28.09
60 - 80	256	34.41	62.50
80 - 100	279	37.50	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 96 % on Mar 10 10:00

Maximum Daily Average: 88.7 % on Mar 10

Minimum Value: 20 % on Mar 24 21:00

Minimum Daily Average: 35.9 % on Mar 24

Maximum Diurnal Average: 78.0 % at hour 7

Minimum Diurnal Average: 59.1 % at hour 17

Monthly Average: 68.9 %

Percentiles: P_1 = 24 P_{10} = 43 Q_1 = 56 Median = 70 Q_3 = 84 P_{90} = 90 P_{99} = 94

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

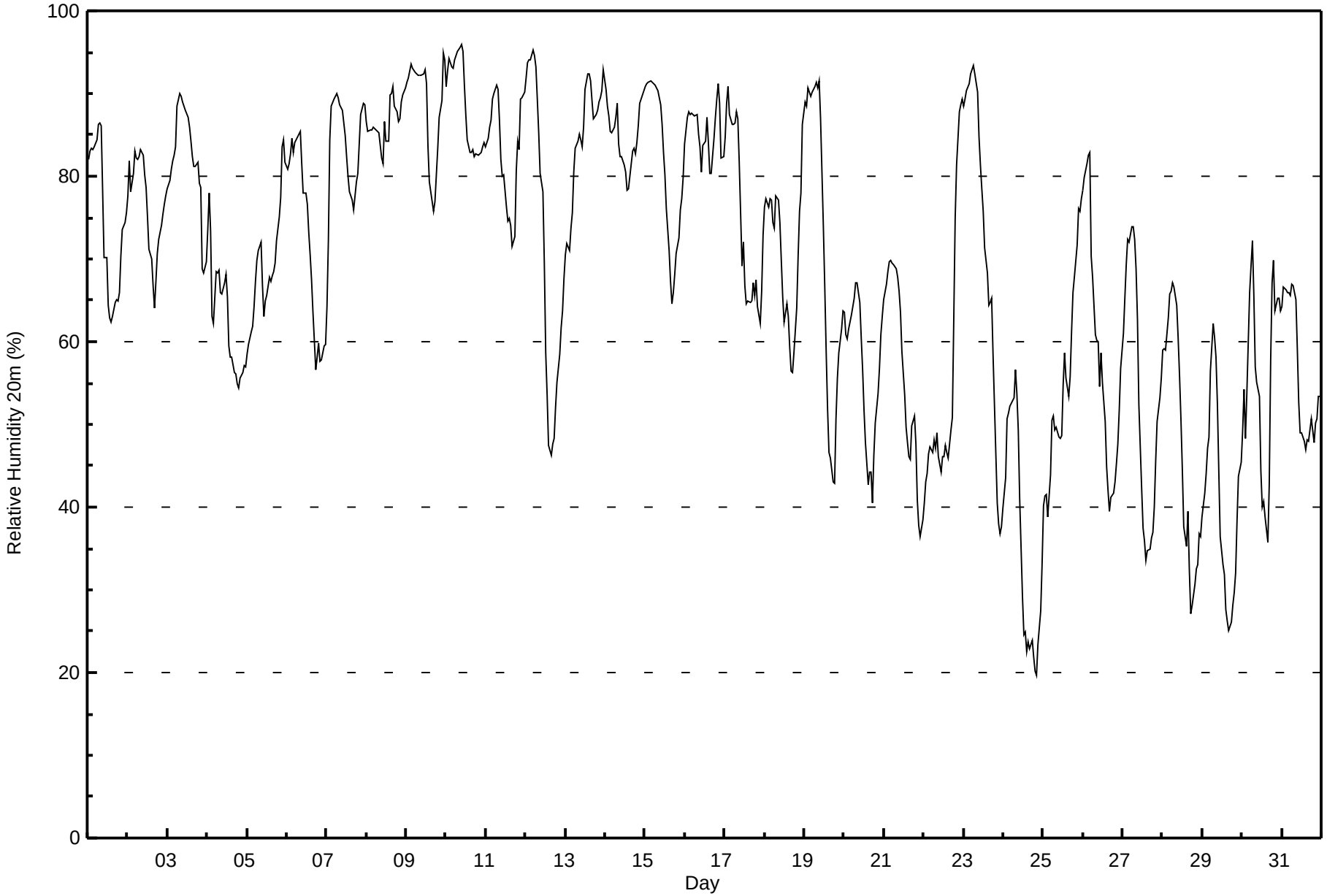
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	82	83	83	83	84	84	86	86	86	78	70	70	64	63	62	63	65	65	65	66	70	74	74	76	74.3	86
2-Mar	78	82	78	80	83	82	82	82	83	83	80	79	75	71	70	67	64	67	71	72	74	75	77	78	76.4	83
3-Mar	78	80	81	82	83	83	88	90	90	89	89	88	87	86	84	82	81	81	82	79	79	69	68	70	82.0	90
4-Mar	74	78	73	63	62	68	68	69	66	66	67	68	65	60	58	58	56	56	55	54	56	56	57	57	63.0	78
5-Mar	58	60	61	62	64	67	70	71	72	67	63	65	66	68	67	68	68	70	72	75	77	84	84	82	69.2	84
6-Mar	81	81	83	85	83	84	85	85	85	82	78	78	77	73	70	67	64	57	58	60	58	58	60	60	72.9	85
7-Mar	64	72	84	88	89	90	90	90	89	88	87	85	82	80	78	77	76	78	79	80	88	88	89	89	83.3	90
8-Mar	87	85	86	86	86	86	86	85	84	82	81	87	84	84	90	90	91	88	88	87	87	89	90	91	86.6	91
9-Mar	91	92	93	94	93	93	92	92	92	92	92	93	91	84	79	78	76	77	80	83	87	89	95	94	88.5	95
10-Mar	91	93	94	93	93	94	94	95	96	96	95	91	88	84	83	83	83	82	83	83	83	83	84	84	88.7	96
11-Mar	84	85	86	87	89	90	91	91	87	82	80	80	76	75	75	74	71	73	81	84	83	89	90	90	83.0	91
12-Mar	92	94	94	94	95	95	93	89	85	80	78	70	59	54	47	46	48	48	52	55	59	62	64	68	71.7	95
13-Mar	70	72	71	74	76	80	83	84	85	84	84	86	90	92	92	92	89	87	87	88	89	89	90	93	84.6	93
14-Mar	91	88	87	85	85	86	87	89	84	82	82	81	80	78	79	80	83	83	83	84	86	89	90	90	84.8	91
15-Mar	91	91	91	92	91	91	91	91	90	89	86	83	80	76	71	67	65	66	68	71	73	76	77	80	81.1	92
16-Mar	84	87	88	87	88	88	87	88	85	84	81	84	84	87	84	80	80	85	87	89	91	89	82	82	85.4	91
17-Mar	85	89	91	87	86	86	87	88	87	82	69	72	67	65	65	65	65	67	66	67	64	62	66	73	75.0	91
18-Mar	76	77	76	77	77	74	74	78	77	74	70	66	62	65	63	59	56	56	59	64	70	76	78	86	70.5	86
19-Mar	89	88	91	90	90	90	91	91	91	91	87	74	67	59	52	47	46	43	43	51	56	59	62	64	71.2	91
20-Mar	64	61	60	61	63	64	65	67	67	65	61	57	52	48	43	44	44	41	46	50	54	57	61	63	56.6	67
21-Mar	65	67	68	70	70	70	69	69	68	66	64	59	54	50	48	46	46	50	51	48	41	38	36	39	56.2	70
22-Mar	41	43	44	46	47	47	48	47	49	46	44	46	46	47	47	46	49	51	63	75	81	88	89	89	55.0	89
23-Mar	89	89	90	91	92	93	93	92	90	85	81	78	76	71	68	64	65	65	58	46	41	38	37	38	72.2	93
24-Mar	40	44	51	51	52	53	53	57	54	49	41	29	25	25	23	24	23	24	22	20	20	23	28	33	35.9	57
25-Mar	40	41	41	39	44	51	51	49	50	49	48	49	55	59	56	53	56	61	66	68	72	76	76	77	55.2	77
26-Mar	78	80	82	83	83	70	68	61	60	60	55	59	55	50	45	42	40	41	42	43	45	48	52	57	58.2	83
27-Mar	61	65	69	72	72	74	74	72	69	63	52	42	38	36	34	35	35	36	37	40	46	50	53	56	53.4	74
28-Mar	59	59	59	63	66	66	67	67	64	60	56	51	45	38	35	39	32	27	28	31	32	33	37	36	47.9	67
29-Mar	39	42	44	47	48	56	62	61	58	53	44	36	33	32	28	26	25	26	28	30	32	38	44	45	40.7	62
30-Mar	49	54	48	54	66	69	72	66	57	55	53	44	40	41	39	36	43	58	67	70	64	65	65	64	55.8	72
31-Mar	64	67	66	66	66	66	67	67	65	59	53	49	49	48	47	48	48	49	51	48	50	51	53	53	56.2	67
	72.0	73.8	74.7	75.3	76.4	77.1	78.0	77.7	76.3	73.6	70.0	67.7	64.9	62.8	60.7	59.6	59.1	60.0	61.8	63.3	64.7	66.5	67.9	69.5	Diurnal Average	
	92	94	94	94	95	95	94	95	96	96	95	93	91	92	92	92	91	88	88	89	91	89	95	94	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 20m (RH20m) - %

Mannix - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	1	0.13	0.13
20 - 40	53	7.12	7.26
40 - 60	173	23.25	30.51
60 - 80	240	32.26	62.77
80 - 100	277	37.23	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 2016

Maximum Value: 96 % on Mar 10 10:00

Maximum Daily Average: 89.4 % on Mar 10

Minimum Value: 17 % on Mar 24 21:00

Minimum Daily Average: 34.3 % on Mar 24

Maximum Diurnal Average: 77.8 % at hour 8

Minimum Diurnal Average: 59.6 % at hour 17

Monthly Average: 69.0 %

Percentiles: P_1 = 23 P_{10} = 43 Q_1 = 56 Median = 71 Q_3 = 85 P_{90} = 91 P_{99} = 95

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

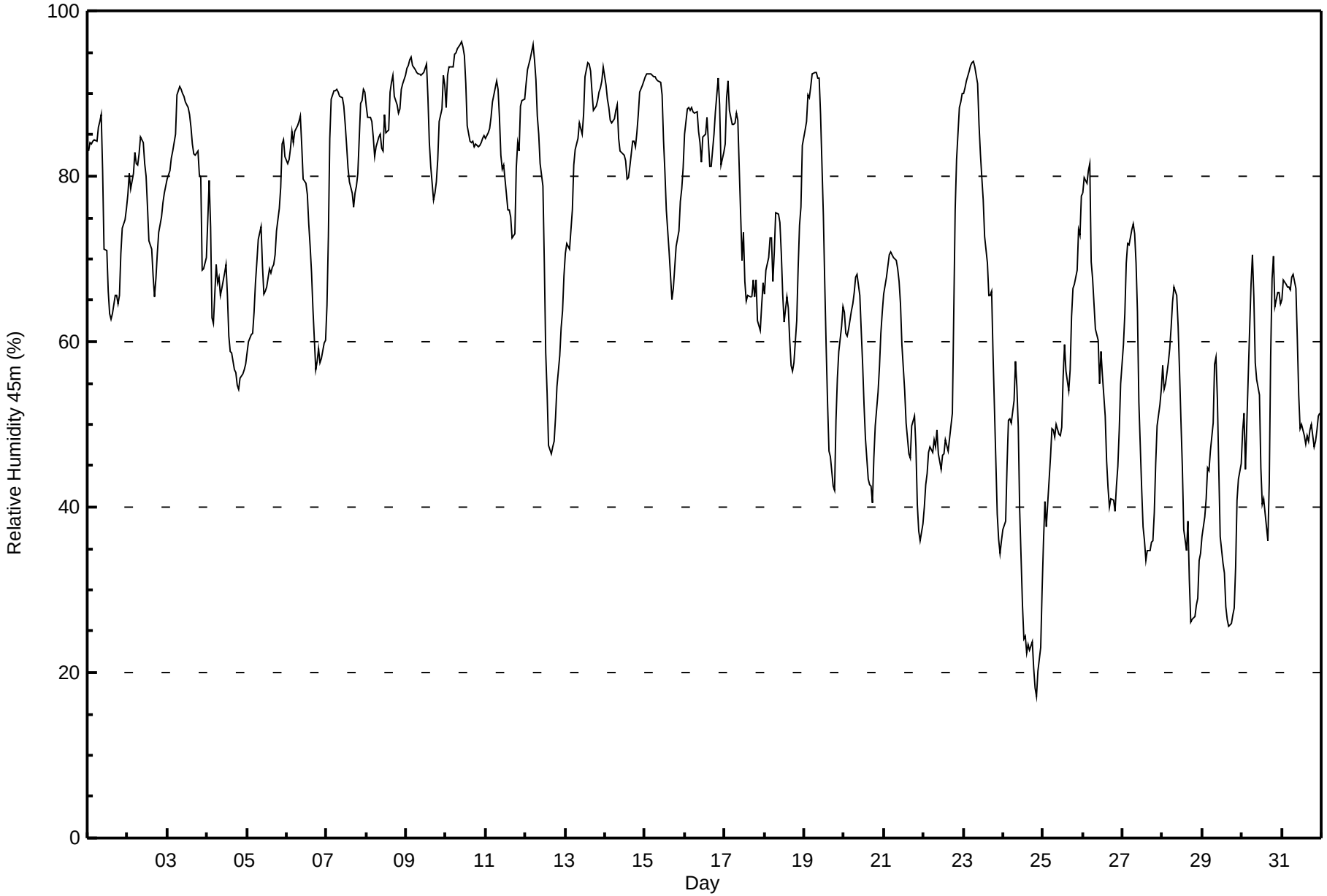
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	83	84	84	84	84	84	86	87	88	81	71	71	66	63	63	63	66	66	65	66	71	74	75	76	75.0	88
2-Mar	78	80	78	80	83	82	81	83	85	84	82	80	76	72	71	68	65	68	71	73	75	77	78	79	77.0	85
3-Mar	80	81	82	83	84	85	90	91	90	90	90	89	88	87	86	84	83	83	83	80	80	69	69	70	83.2	91
4-Mar	75	79	74	63	62	69	67	68	66	66	68	69	66	61	59	59	57	56	55	54	56	56	57	57	63.3	79
5-Mar	59	60	61	61	64	67	70	72	74	69	66	66	67	69	68	69	69	71	73	76	79	84	84	82	70.0	84
6-Mar	82	82	83	85	84	86	86	87	87	84	80	79	78	74	72	68	64	57	58	59	58	58	60	60	73.7	87
7-Mar	64	73	85	89	90	90	91	90	90	89	89	86	84	81	79	78	76	78	79	80	89	89	91	90	84.2	91
8-Mar	88	87	87	87	85	82	84	85	85	83	83	87	85	86	90	91	92	90	89	88	88	91	91	92	87.4	92
9-Mar	93	93	94	94	93	93	92	92	92	92	93	93	93	90	84	81	77	78	79	82	87	88	92	91	89.1	94
10-Mar	88	92	93	93	93	95	95	95	96	96	96	95	91	86	84	84	84	84	84	84	84	84	85	85	89.4	96
11-Mar	84	85	86	87	89	90	92	91	87	82	81	81	78	76	76	75	73	73	81	84	83	88	89	89	83.4	92
12-Mar	91	93	94	94	96	94	92	87	85	82	79	70	59	54	48	46	47	48	51	55	58	62	64	68	71.5	96
13-Mar	71	72	71	74	76	81	83	85	86	86	85	87	92	94	94	93	90	88	89	89	90	91	92	93	85.4	94
14-Mar	91	89	88	87	87	87	88	89	85	83	83	83	82	80	80	81	84	84	84	85	87	90	91	92	85.8	92
15-Mar	92	92	92	92	92	92	92	92	92	91	90	84	80	76	71	68	65	66	69	72	73	77	78	81	82.1	92
16-Mar	85	88	88	88	88	88	88	88	85	84	82	85	85	87	84	81	81	85	88	90	92	89	81	83	86.0	92
17-Mar	84	90	92	88	86	86	86	88	87	81	70	73	67	65	66	65	65	67	65	67	63	61	64	67	74.8	92
18-Mar	66	69	70	73	73	67	71	76	75	74	71	66	62	65	64	60	57	56	57	63	69	74	76	84	68.3	84
19-Mar	86	87	90	90	91	92	93	93	92	92	87	75	67	59	53	47	46	43	42	51	56	59	62	64	71.4	93
20-Mar	64	61	61	62	64	65	66	68	68	66	61	57	52	48	43	43	43	40	46	50	54	57	61	64	56.8	68
21-Mar	66	68	69	71	71	71	70	70	69	67	65	60	54	50	48	47	46	50	51	47	40	37	36	38	56.6	71
22-Mar	40	43	44	47	47	47	48	47	49	47	45	46	46	48	47	47	50	51	64	76	82	88	89	90	55.4	90
23-Mar	90	91	92	93	93	94	94	93	91	86	83	80	77	73	70	66	66	66	59	46	39	36	34	36	72.7	94
24-Mar	37	38	45	50	51	50	53	58	55	50	40	28	24	24	22	23	23	24	21	18	17	20	23	30	34.3	58
25-Mar	36	41	38	41	46	50	49	48	50	49	49	50	56	60	56	54	57	63	66	67	69	74	73	78	54.9	78
26-Mar	78	80	79	81	82	70	68	62	61	60	55	59	56	51	46	42	40	41	41	40	43	45	49	55	57.5	82
27-Mar	60	63	69	72	72	74	74	73	69	64	53	42	38	36	34	35	35	36	36	39	45	50	52	54	53.1	74
28-Mar	57	54	55	58	59	62	65	67	66	62	56	51	45	37	35	38	31	26	26	27	28	29	34	34	45.9	67
29-Mar	37	39	41	45	44	47	50	57	58	53	45	36	33	32	28	27	26	26	27	28	33	41	43	45	39.2	58
30-Mar	49	51	45	50	62	67	71	65	57	55	54	45	40	41	39	36	43	58	68	70	64	66	66	64	55.3	71
31-Mar	65	67	67	67	67	66	68	68	66	60	54	50	50	49	48	49	48	49	50	47	48	49	51	51	56.4	68
	71.6	73.3	74.1	75.1	76.0	76.5	77.5	77.8	77.0	74.5	71.0	68.5	65.8	63.7	61.5	60.3	59.6	60.3	61.8	63.0	64.5	66.2	67.4	69.2	Diurnal Average	
	93	93	94	94	96	95	95	95	96	96	96	95	93	94	94	93	92	90	89	90	92	91	92	93	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 45m (RH45m) - %

Mannix - March 2016



Relative Humidity 45m (RH45m) - %

Mannix - March 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	2	0.27	0.27
20 - 40	58	7.80	8.06
40 - 60	168	22.58	30.65
60 - 80	233	31.32	61.96
80 - 100	283	38.04	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 96 % on Mar 12 05:00

Maximum Daily Average: 89.9 % on Mar 10

Minimum Value: 15 % on Mar 24 21:00

Minimum Daily Average: 33.7 % on Mar 24

Maximum Diurnal Average: 77.7 % at hour 8

Minimum Diurnal Average: 60.4 % at hour 17

Monthly Average: 69.3 %

Percentiles: P_1 = 23 P_{10} = 41 Q_1 = 55 Median = 71 Q_3 = 86 P_{90} = 91 P_{99} = 95

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

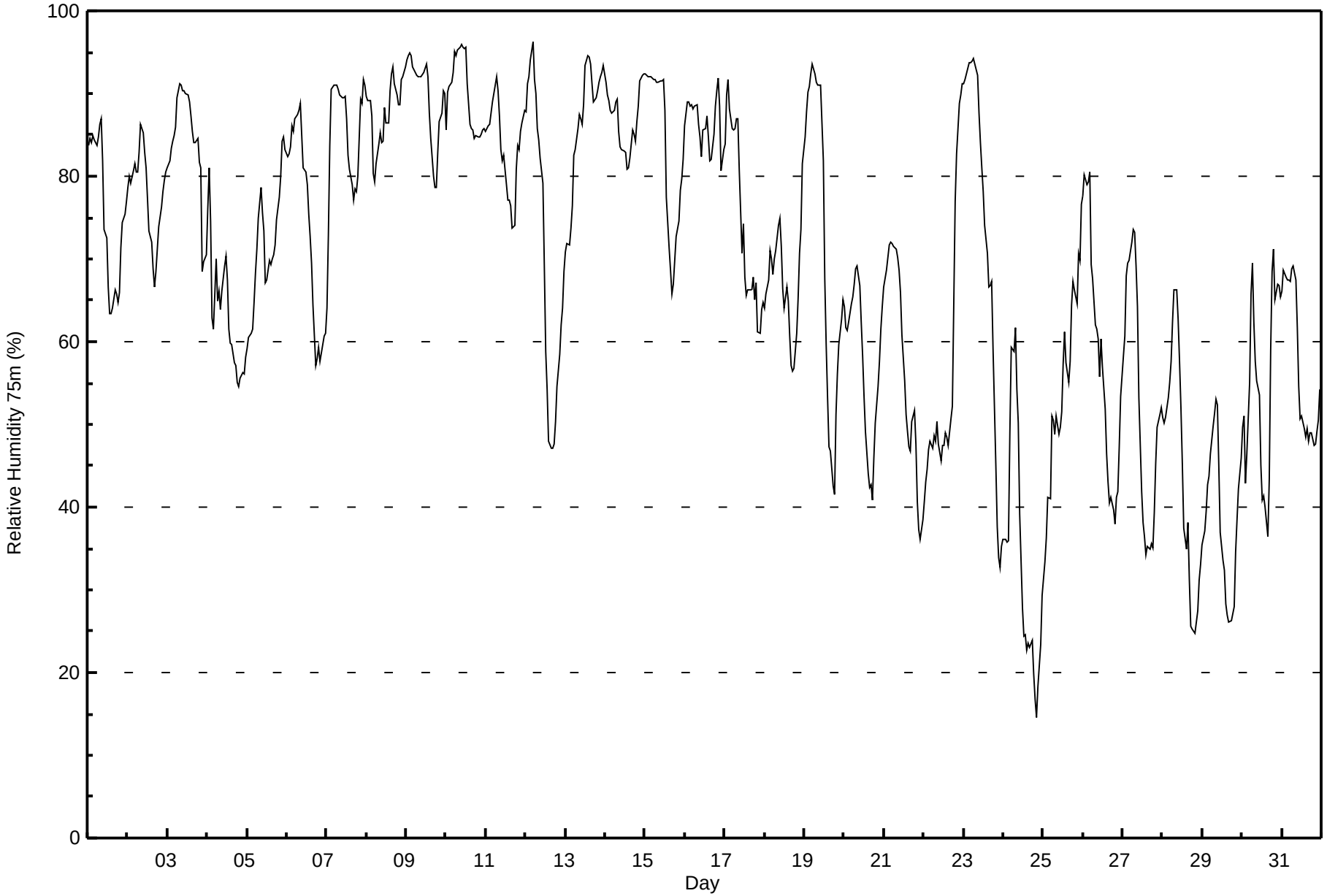
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	84	85	84	85	84	84	85	86	87	82	74	73	67	63	63	64	66	66	65	66	71	74	75	77	75.4	87
2-Mar	79	80	79	81	81	81	81	83	86	85	83	81	77	73	72	69	67	68	71	74	76	78	79	81	77.7	86
3-Mar	81	82	83	84	85	86	90	91	91	90	90	90	90	89	87	85	84	84	85	82	81	68	70	71	84.1	91
4-Mar	76	81	75	63	62	70	65	66	64	66	69	70	68	61	60	60	57	57	55	55	56	56	56	58	63.6	81
5-Mar	59	61	61	61	65	68	71	75	79	76	73	67	67	70	69	70	70	72	75	77	80	84	85	83	71.6	85
6-Mar	82	83	84	86	85	87	87	88	89	85	81	81	79	75	73	69	64	57	58	59	58	59	61	61	74.6	89
7-Mar	64	73	84	90	91	91	91	90	90	89	90	90	87	82	81	79	77	78	78	80	89	89	92	91	84.9	92
8-Mar	90	89	89	87	80	79	82	84	85	84	84	88	86	86	90	92	93	91	90	89	89	92	92	93	87.8	93
9-Mar	94	95	95	95	93	93	92	92	92	92	92	93	94	92	88	85	80	79	79	83	87	88	90	90	89.6	95
10-Mar	86	90	91	91	93	95	95	95	96	96	96	96	96	91	86	86	86	85	85	85	85	85	86	86	89.9	96
11-Mar	85	86	86	88	89	90	92	90	87	83	82	83	79	77	77	76	74	74	81	84	83	85	86	88	83.6	92
12-Mar	88	91	92	94	96	92	90	86	84	82	79	69	59	54	48	47	47	48	50	55	58	62	64	69	71.0	96
13-Mar	71	72	72	74	77	82	83	86	87	87	86	89	93	95	94	94	91	89	90	90	91	92	93	93	86.3	95
14-Mar	91	90	89	88	88	88	89	89	85	84	83	83	83	81	81	82	86	85	84	87	89	92	92	92	86.7	92
15-Mar	92	92	92	92	92	92	92	91	91	92	92	92	88	77	71	69	66	67	70	73	75	78	80	82	83.2	92
16-Mar	86	89	89	88	89	88	88	89	86	85	82	86	86	87	85	82	82	85	88	90	92	89	81	83	86.5	92
17-Mar	84	90	92	88	86	86	86	87	87	81	71	74	68	66	66	66	66	68	65	67	61	61	64	65	74.7	92
18-Mar	64	66	67	71	70	68	70	71	74	75	72	66	64	67	65	61	57	56	57	61	65	71	74	81	67.2	81
19-Mar	85	88	90	91	92	93	92	91	91	91	91	82	68	60	53	47	47	42	41	51	56	60	63	65	72.1	93
20-Mar	64	62	61	62	65	65	67	69	69	67	62	58	53	49	44	42	43	41	46	50	55	58	61	64	57.4	69
21-Mar	67	69	70	72	72	72	71	71	70	69	66	61	55	51	49	47	47	50	52	48	41	37	36	39	57.6	72
22-Mar	41	43	45	47	48	47	49	48	50	48	46	47	47	49	48	47	51	52	65	77	83	89	90	91	56.1	91
23-Mar	91	92	92	94	94	94	94	94	92	88	84	81	78	74	71	67	67	67	59	45	38	34	33	35	73.2	94
24-Mar	36	36	36	36	49	59	59	62	54	50	39	28	24	25	23	23	23	24	20	17	15	18	23	29	33.7	62
25-Mar	31	33	36	41	41	51	50	49	51	49	50	52	57	61	57	55	58	64	67	66	65	71	70	77	54.3	77
26-Mar	78	80	79	79	80	69	68	62	62	60	56	60	57	52	46	43	41	41	40	38	41	42	47	53	57.3	80
27-Mar	58	61	68	69	70	72	74	73	69	64	53	42	38	36	34	35	35	36	35	39	45	50	51	52	52.5	74
28-Mar	51	50	51	53	55	58	62	66	66	63	58	52	45	38	35	38	31	26	25	25	26	27	31	33	44.4	66
29-Mar	35	37	40	43	44	46	50	51	53	52	45	37	34	32	28	27	26	26	27	28	35	38	42	46	38.5	53
30-Mar	50	51	43	46	55	66	70	62	58	55	54	45	41	41	40	36	43	59	69	71	65	67	67	65	55.0	71
31-Mar	66	69	68	67	68	67	69	69	68	62	55	51	51	49	48	50	48	49	49	47	48	49	51	54	57.1	69
	71.3	73.0	73.6	74.5	75.4	76.7	77.5	77.7	77.3	75.2	72.1	69.9	67.1	64.7	62.4	61.1	60.4	60.9	61.9	63.2	64.4	65.9	67.2	69.3	Diurnal Average	
	94	95	95	95	96	95	95	95	96	96	96	96	96	95	94	94	93	91	90	90	92	92	93	93	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 75m (RH75m) - %

Mannix - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	4	0.54	0.54
20 - 40	61	8.20	8.74
40 - 60	159	21.37	30.11
60 - 80	226	30.38	60.48
80 - 100	294	39.52	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 96 % on Mar 12 05:00

Maximum Daily Average: 90.0 % on Mar 10

Minimum Value: 15 % on Mar 24 21:00

Minimum Daily Average: 33.6 % on Mar 24

Maximum Diurnal Average: 77.8 % at hour 8

Minimum Diurnal Average: 60.7 % at hour 17

Monthly Average: 69.5 %

Percentiles: P_1 = 24 P_{10} = 41 Q_1 = 55 Median = 71 Q_3 = 86 P_{90} = 92 P_{99} = 95

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

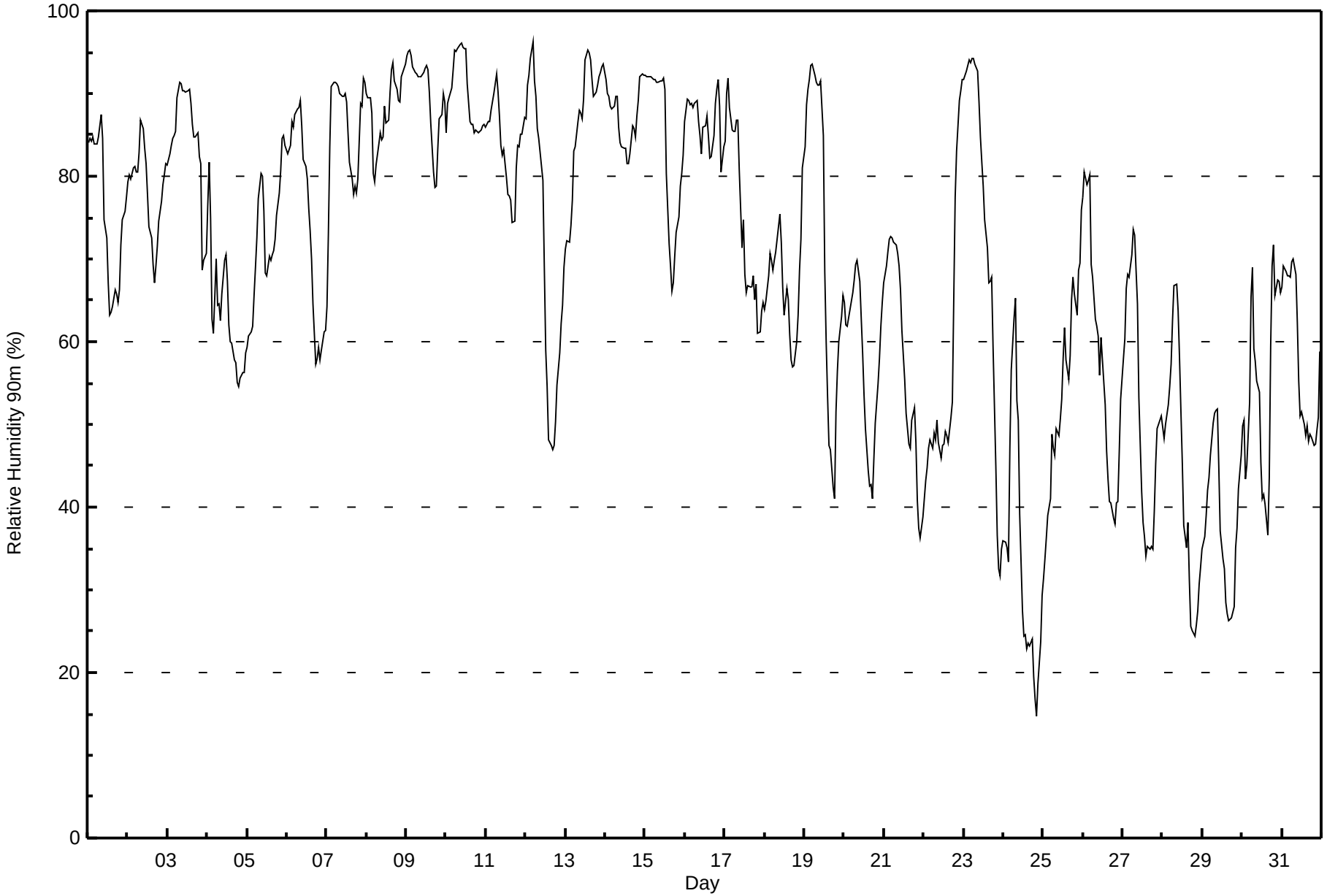
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	84	85	84	85	84	84	85	86	87	85	75	73	67	63	63	64	66	66	65	66	72	75	76	77	75.7	87
2-Mar	79	80	80	81	81	80	81	83	87	86	83	82	78	74	73	69	67	69	72	75	77	79	80	81	78.2	87
3-Mar	81	83	84	85	85	85	89	91	91	90	90	90	90	90	89	86	85	85	85	82	82	69	70	71	84.6	91
4-Mar	77	82	75	63	61	70	64	65	63	66	70	71	67	62	60	60	58	57	55	55	56	56	56	59	63.6	82
5-Mar	59	61	61	62	66	69	73	77	80	80	76	68	68	70	70	71	71	72	75	78	81	85	85	84	72.6	85
6-Mar	83	83	84	87	86	88	88	88	89	86	82	81	80	76	73	70	65	57	58	59	58	59	61	61	75.1	89
7-Mar	64	73	84	91	91	91	91	91	90	90	90	90	89	85	82	80	78	79	78	80	89	88	92	91	85.3	92
8-Mar	90	89	89	88	80	79	81	84	85	84	85	88	86	87	90	93	94	92	91	89	89	92	92	94	88.0	94
9-Mar	94	95	95	95	93	93	92	92	92	92	93	93	93	93	90	86	81	79	79	83	87	87	90	89	89.9	95
10-Mar	85	89	89	91	93	95	95	96	96	96	96	95	95	91	87	86	86	85	86	85	85	86	86	86	90.0	96
11-Mar	86	87	87	88	89	90	92	90	87	84	82	83	80	78	78	77	74	75	81	84	84	85	85	87	83.9	92
12-Mar	87	91	92	94	96	92	90	86	85	83	79	69	59	55	48	47	47	48	50	55	59	62	64	69	71.1	96
13-Mar	71	72	72	74	77	83	84	87	88	88	87	89	94	95	95	94	92	90	90	91	92	93	93	94	86.8	95
14-Mar	92	90	90	89	88	88	90	90	86	84	84	83	83	81	82	83	86	86	85	87	89	92	92	92	87.2	92
15-Mar	92	92	92	92	92	92	92	91	91	92	92	92	91	80	72	69	66	67	70	73	75	79	80	82	83.6	92
16-Mar	87	89	89	89	89	88	89	89	87	85	83	86	86	87	85	82	82	85	89	91	92	88	81	84	86.7	92
17-Mar	84	90	92	88	86	85	85	87	87	81	71	75	68	66	67	67	67	68	65	67	61	61	64	65	74.8	92
18-Mar	64	65	68	71	70	69	70	71	74	75	72	67	63	66	65	61	58	57	57	60	63	69	72	81	67.0	81
19-Mar	84	89	90	92	93	94	92	91	91	91	92	85	68	60	53	47	47	42	41	51	57	60	63	66	72.5	94
20-Mar	65	62	62	63	65	66	67	69	70	67	63	59	54	49	44	42	43	41	46	50	55	58	62	65	57.8	70
21-Mar	67	69	71	72	73	72	72	72	71	69	66	61	55	51	49	48	47	51	52	48	41	37	36	39	57.9	73
22-Mar	41	43	45	47	48	47	49	48	50	48	46	47	48	49	49	48	51	53	65	78	83	89	90	92	56.4	92
23-Mar	92	92	93	94	94	94	94	94	93	89	85	82	79	75	71	67	67	68	59	45	37	33	32	35	73.4	94
24-Mar	36	36	35	33	47	57	63	65	53	50	39	27	24	25	23	24	23	24	20	17	15	19	24	29	33.6	65
25-Mar	31	34	36	39	41	49	47	46	49	49	51	53	58	62	58	55	58	65	68	66	63	69	69	76	53.9	76
26-Mar	77	80	79	80	80	69	68	63	62	61	56	61	58	52	47	43	41	41	39	38	41	41	47	53	57.3	80
27-Mar	58	60	66	68	68	70	74	73	69	65	53	42	38	36	34	35	35	35	35	39	45	50	50	51	52.1	74
28-Mar	50	48	50	52	55	57	62	67	67	64	58	52	45	38	35	38	31	26	25	24	26	27	31	33	44.2	67
29-Mar	35	36	39	42	44	46	50	51	52	52	45	37	34	33	29	27	26	27	27	28	35	37	42	46	38.3	52
30-Mar	50	51	43	45	53	65	69	59	58	55	54	45	41	41	40	37	44	60	69	72	66	67	67	66	54.9	72
31-Mar	67	69	68	68	68	68	70	70	68	62	55	51	51	50	49	50	48	49	49	48	48	49	51	59	57.7	70
	71.4	73.1	73.7	74.3	75.3	76.7	77.7	77.8	77.3	75.7	72.6	70.2	67.5	65.3	62.9	61.5	60.7	61.1	62.1	63.3	64.5	65.9	67.3	69.6	Diurnal Average	
	94	95	95	95	96	95	95	96	96	96	96	95	95	95	95	94	94	92	91	91	92	93	93	94	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 90m (RH90m) - %

Mannix - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	4	0.54	0.54
20 - 40	61	8.20	8.74
40 - 60	157	21.10	29.84
60 - 80	223	29.97	59.81
80 - 100	299	40.19	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

Mannix - March 2016

Maximum Speed: 32 km/h on Mar 30 19:00

Maximum Daily Speed Average: 16.0 km/h on Mar 14

Minimum Speed Value: 1 km/h on Mar 9 13:00

Minimum Daily Speed Average: 0.5 km/h on Mar 8

Maximum Diurnal Speed Average: 4.4 km/h at hour 19

Minimum Diurnal Speed Average: 0.8 km/h at hour 7

Monthly Average Velocity: 2.3 km/h 21.1 deg

Percentiles: P_1 = 1 P_{10} = 4 Q_1 = 6 Median = 9 Q_3 = 12 P_{90} = 16 P_{99} = 22

Hours in Service: 744

Hours of Data: 743

Hours of Missing Data: 1

Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	SSE10	SE9	SSE9	SSE8	S5	SSW5	S4	SSE5	SSE3	SE4	ESE3	E5	SE2	W2	WNW2	NW3	NNE5	N4	NNW4	N7	ENE7	ESE8	ESE9	SE8	SE2.8	SSE10
2-Mar	E3	NE5	ESE5	NNW1	N6	NNE5	NNE5	NNW3	NNW4	NW7	WNW6	NW6	WNW6	NW7	NW8	NW6	NNE7	N8	NNW7	NNW8	NNW9	N8	N8	N8	NNW4.9	NNW9
3-Mar	NNW8	NNW5	WNW4	WNW6	NNW3	NNW1	NNE6	N6	WNW8	NW7	NNW6	NW11	NNW10	NNW10	N11	N15	N16	N15	N16	N20	N14	NNE18	N8	N9	N9.1	N20
4-Mar	NNE9	NE7	N7	N7	NNE4	N4	WSW2	S2	SE5	SSE9	SSE12	AF	SE9	SSE14	SE12	SE13	SE11	ESE12	SE13	SE13	SE15	SE13	SE10	SE8	ESE6.7	SE15
5-Mar	SE11	SE13	SE9	SSE10	SSE11	SSE9	SSE4	SSE5	SSE7	SSE6	SE3	NNW2	NW8	N21	N16	N20	N18	N14	N14	N21	N18	N19	N19	N17	NNE6.0	N21
6-Mar	N14	N14	N12	N17	NNE14	NNE10	N11	N10	N13	NNE11	N12	N10	WNW11	WNW9	NW9	NW9	NW9	NNW8	NNW3	E6	ENE12	ENE14	ENE10	ENE10	N8.4	N17
7-Mar	NNE10	NE8	NNE7	N5	N10	N6	N4	WNW5	W8	W9	W9	WNW10	WNW5	WNW3	WNW3	WSW6	WSW11	SW10	SW10	WSW9	NNW10	NNW10	N9	N6	NW4.5	WSW11
8-Mar	WNW4	W5	W1	ESE2	S1	SW3	SE2	SSE7	S5	ESE6	SE6	SE9	SE10	SSE5	WNW4	NNW4	NW8	WNW7	NNW6	N6	NNE6	NNE4	N6	NNE9	NE0.5	SE10
9-Mar	N6	NNW6	NNW8	NNW8	NNW8	NW5	NW6	NW3	WNW4	NW6	NNW2	SW1	W1	ESE3	E5	ESE4	E5	NE5	NE5	NE6	ENE5	SSE3	SSE3	SE6	N2.2	NNW8
10-Mar	ESE6	SSE6	SSE10	SE9	SE8	SE11	SE14	SE13	SE12	SE12	ESE12	ESE12	ESE14	SE17	SE16	ESE14	ESE14	SE13	ESE10	SE14	SE13	SE13	SE13	SSE11	SE11.7	SE17
11-Mar	SSE6	SSW5	WSW8	WSW11	W9	WSW11	WSW14	WSW13	WSW10	W11	WNW13	NNW8	NNW4	NW6	WNW9	NW6	NNW6	WNW5	SW3	NE3	E3	S8	SSE9	SSE7	W4.9	WSW14
12-Mar	SE8	SE8	SE5	SSE9	SE7	ESE8	SSE2	SE6	ESE5	ESE7	ESE8	E12	E15	ESE14	ESE14	ESE14	ESE15	SE16	SE11	SE12	SE14	SE14	SE13	SE13	ESE10.1	SE16
13-Mar	SE12	SE9	SE6	NE5	NE7	NE8	NNE5	NW5	NNW9	NNW6	NNW8	NNW12	NW14	NW16	NW16	NNW20	NNW20	NNW21	NNW19	NNW21	NNW20	NW18	NW18	NNW18	NNW10.2	NNW21
14-Mar	NNW18	NNW18	NNW17	NNW14	NNW17	NNW18	N15	N19	N22	NNE20	N20	N17	N16	N16	N17	N15	N12	N15	N21	N20	N16	N12	N10	N9	N16.0	N22
15-Mar	N5	N6	N6	N6	NNW4	NW5	NNW6	NNW6	NNW6	NW6	WNW9	WNW8	W12	W14	W15	WNW15	NW13	NW12	N12	N14	NNE18	NNE16	N13	NNW15	NNW8.1	NNE18
16-Mar	NNW16	NNW16	NNW17	NNW18	NNW15	NNW17	NNW13	N12	NNW13	NNW16	NNW17	NNW15	NNW15	NNW13	NNW15	N16	N15	NNW14	NW12	WNW11	W10	N10	N8	NW3	NNW13.0	NNW18
17-Mar	W5	WSW5	W7	WNW13	WNW11	WNW10	WNW11	W11	W11	W12	NW10	NW9	NW13	NW14	NW12	NW10	NW9	NW10	NNW9	NNW8	NNW8	NNW6	WSW5	SSW6	WNW8.5	NW14
18-Mar	SW7	SSW7	SSW4	WSW8	SW7	SSW9	SW10	SW7	W7	W5	NW6	NNE2	E6	E9	E8	SE8	SE11	SSE12	SSE11	SE10	SSE8	SSE8	SW2	N3	S4.0	SSE12
19-Mar	WNW4	W7	W8	W6	WNW3	W2	W3	NNW3	WNW4	W5	W3	NNW4	NW5	NNW5	NNE6	NE8	E10	E10	E9	E10	ESE11	E12	ESE12	ESE9	ENE1.7	E12
20-Mar	ESE11	ESE10	ESE8	ESE8	ESE7	E10	E12	E12	E9	ESE9	E12	E10	ENE6	NNE7	NNE3	NW3	NNE3	E12	ENE16	ENE11	ENE13	ENE14	ENE13	ENE13	E8.9	ENE16
21-Mar	ENE13	ENE12	E11	ENE12	ENE11	E13	ENE12	E14	E13	ENE12	NE10	ENE11	E12	E10	E11	E12	E14	ENE17	E16	ENE16	E14	E15	E12	E12	E12.4	ENE17
22-Mar	ESE11	ESE12	SE12	SE8	SE7	SE9	SE10	SE12	SE11	SE8	SE7	SE8	SE8	SE7	ESE3	SE6	SE7	SE7	SE10	SE10	SE8	SE9	SE11	SE10	SE8.7	SE12
23-Mar	SE8	SE7	SSE7	SSE5	SE3	WSW4	WNW4	NNW9	NNW10	NNW12	NW12	NW12	NW11	NNW9	N13	NNE15	NNE13	N12	N15	N16	NNE16	NNE13	N11	NNE9	N7.3	N16
24-Mar	N9	N10	N9	NNW5	WNW7	N8	NNW5	N5	NW3	WNW7	WNW9	WNW11	WNW12	NW13	NW12	NW12	NW9	NW8	N7	N8	NNE10	NNE10	NNE5	ENE4	NNW6.7	NW13
25-Mar	ENE1	SW3	SW5	SSW6	SSE7	SSE8	SSE9	SSE9	SSE8	SSE8	SE10	SE7	SE8	ESE7	SE8	SE5	S3	S4	SW1	SSW5	SW6	SW1	NW7	NW8	SSE4.0	SE10
26-Mar	NNW9	WNW6	W6	W6	WNW3	NNW5	NNW6	N7	NNW5	W6	WSW3	WSW4	WNW3	WNW4	NE2	E3	ESE4	SE7	SE8	SE10	SSE11	SSE12	SSE11	SSE12	S1.1	SSE12
27-Mar	SE10	SE11	SE7	SE9	SE9	SE10	SE9	SE9	SE13	SE9	SE7	SSE8	SE10	SE13	SE14	SE12	SE15	SE13	SE13	SE15	SE17	SE16	SE14	SE10	SE11.3	SE17
28-Mar	SE11	SE13	SE11	SSE10	SSE10	SSE12	SSE12	SSE12	SSE12	SE9	SE8	SE10	SE8	WNW11	WNW19	WNW19	WNW15	NW9	NW10	W13	WNW10	W10	WSW10	WSW11	SSW3.7	WNW19
29-Mar	WSW11	WSW12	WSW11	SSE2	SSE5	SSE9	SSE10	SSE7	SE8	SE7	SE3	W4	N2	NE6	NW6	NNW6	W3	W6	NW2	SW4	W4	WSW7	E2	SW2	SW2.4	WSW12
30-Mar	WSW3	NW6	NNW8	NW8	W9	WNW4	WNW9	NW10	WNW9	WNW11	W10	NW11	NW15	NW24	NNW18	NNW23	N21	NNE28	NNE32	N23	N23	N22	N21	N22	NNW13.5	NNE32
31-Mar	N16	NNE17	N17	N15	N13	NNW11	NNE10	NNE11	NNE6	NW7	WNW7	WNW5	WNW8	NNW2	ESE4	SE8	SE9	SE8	SE9	SSE8	SSE9	SSE9	SSE7	SSE8	NNE2.9	NNE17
	NE2.0	NE1.2	NNE1.0	N1.4	N1.3	NE0.8	NNE0.8	NE1.2	N0.8	NNW1.4	NNW1.7	N2.7	NNW2.4	N3.3	N3.7	N4.1	NNE3.6	NNE3.7	NNE4.4	NE4.3	NE4.2	NE4.3	NE3.4	NE2.9	Diurnal Average	
	NNW18	NNW18	N17	NNW18	NNW17	NNW18	N15	N19	N22	NNE20	N20	N17	N16	NW24	WNW19	NNW23	N21	NNE28	NNE32	N23	N23	N22	N21	N22	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 20 m (WS20m) - km/h

Mannix - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 8 km/h on Mar 30 19:00

Minimum Value: 1 km/h on Mar 25 04:00

Percentiles: P_1 = 1 P_{10} = 1 Q_1 = 2 Median = 3 Q_3 = 4 P_{90} = 5 P_{99} = 7

Hours in Service:	744
Hours of Data:	743
Hours of Missing Data:	1
Hours of Calibration:	0
Percent Operational Time:	99.9

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

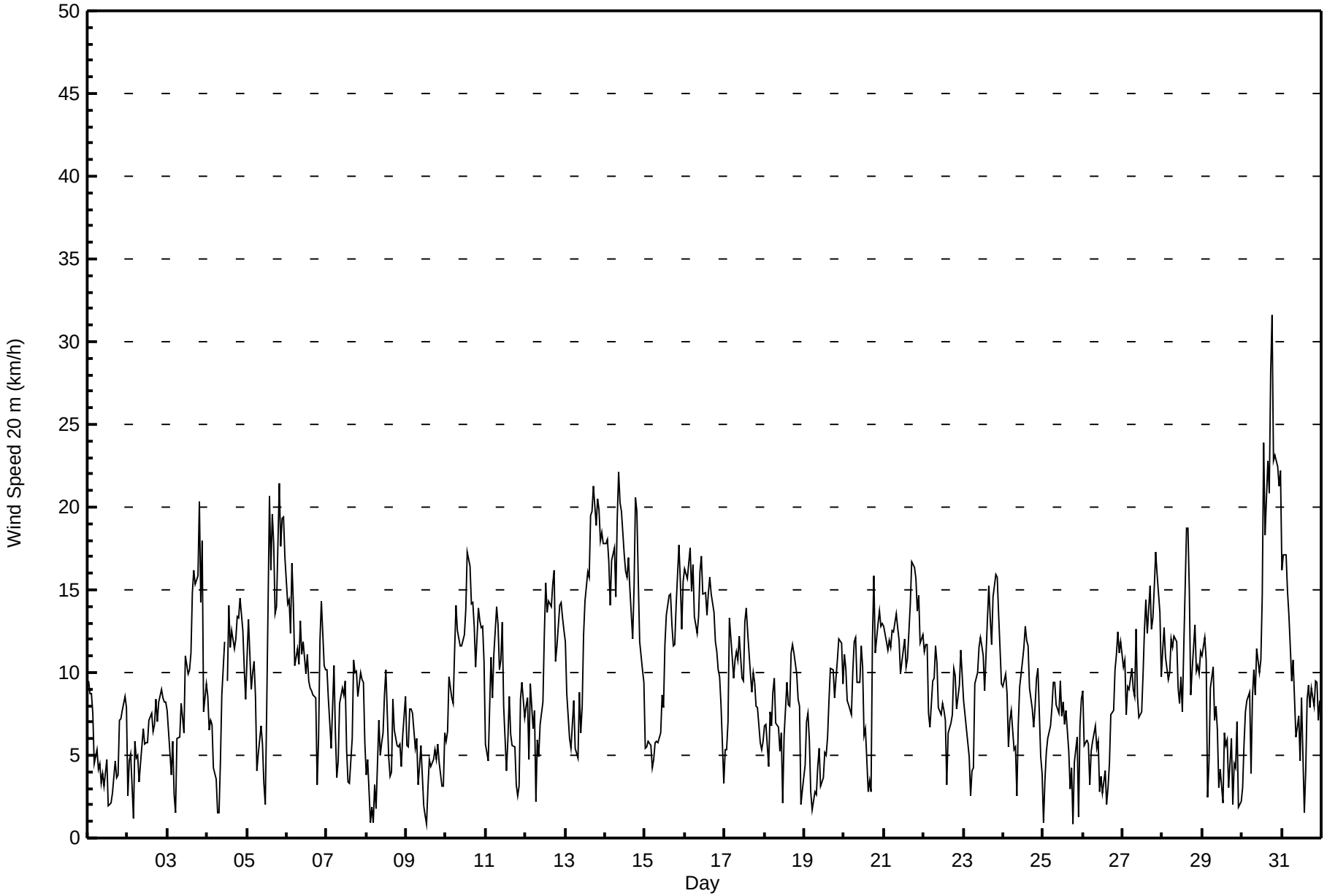
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed 20 m (WS20m) - km/h

Mannix - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	154	20.73	20.73
6 - 11	361	48.59	69.31
12 - 19	204	27.46	96.77
20 - 28	23	3.10	99.87
29 - 38	1	0.13	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 20 m (WS20m) - km/h

Mannix - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	8	10	6	3	7	9	9	12	6	4	10	8	12	19	10	21	154
6 - 11	36	18	7	7	14	19	76	40	1	4	7	13	20	28	35	36	361
12 - 19	43	9	0	14	18	12	39	9	0	0	0	3	5	7	16	29	204
20 - 28	13	3	0	0	0	0	0	0	0	0	0	0	0	0	1	6	23
29 - 38	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	100	41	13	24	39	40	124	61	7	8	17	24	37	54	62	92	743

Total Number of Valid Hours: 743

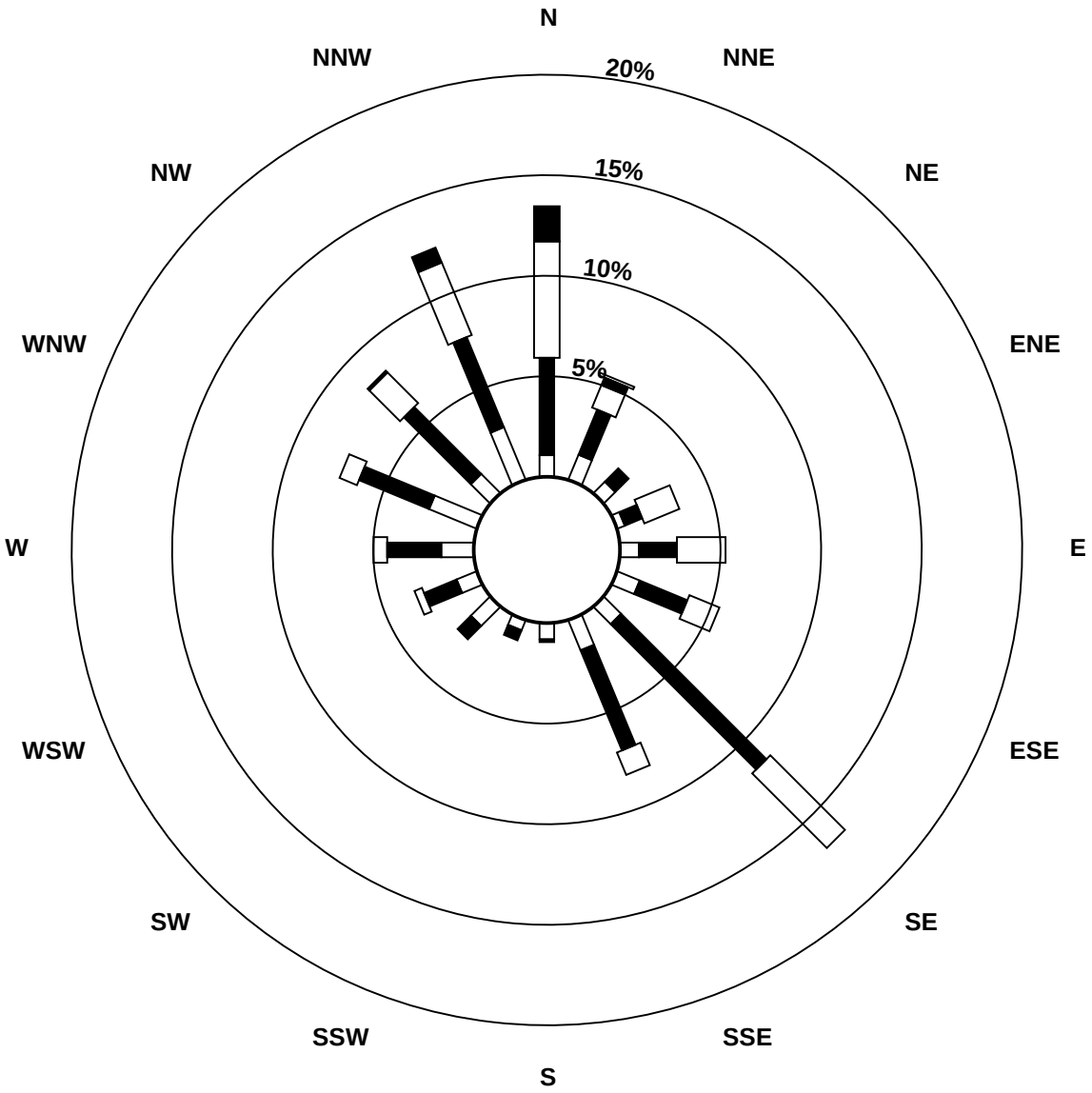
Total Number of Hours: 744

Wood Buffalo Environmental Association

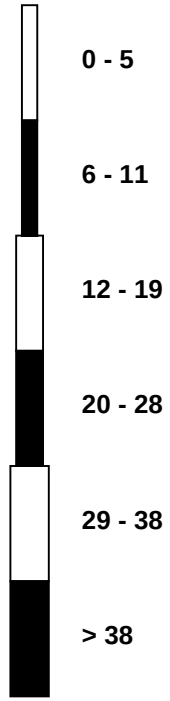
Wind Rose Mar 2016

Wind Speed 20 m (WS20m) - km/h

Mannix (AMS 5)



Classes (km/h)



Total Number of Valid Hours: 743

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 45 m (WS45m) - km/h

Mannix - March 2016

Maximum Speed: 41 km/h on Mar 30 19:00

Maximum Daily Speed Average: 21.6 km/h on Mar 14

Minimum Speed Value: 1 km/h on Mar 8 03:00

Minimum Daily Speed Average: 1.1 km/h on Mar 8

Maximum Diurnal Speed Average: 6.0 km/h at hour 20

Minimum Diurnal Speed Average: 1.4 km/h at hour 6

Monthly Average Velocity: 3.3 km/h 16.6 deg

Percentiles: $P_1 = 2$ $P_{10} = 5$ $Q_1 = 8$ Median = 12 $Q_3 = 16$ $P_{90} = 21$ $P_{99} = 29$

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	SSE13	SE13	SSE13	SSE11	SSE8	S11	SSE9	SSE9	SSE6	SE4	ESE3	E5	SE2	WSW2	WNW2	NW3	N5	N6	N5	N12	ENE10	ESE11	ESE12	SE11	SE4.5	SSE13
2-Mar	E6	ENE7	E7	NNE3	N9	NE7	NNE7	NNW4	NNW6	NW7	WNW6	WNW6	WNW6	NW8	NW9	NW8	N8	N12	N12	NNW12	NNW12	N12	N11	N12	N6.6	N12
3-Mar	NNW11	NNW9	NW5	NW7	N4	NNW3	NNE8	N10	NW11	NW8	NW8	NW13	NNW13	NNW13	NNW15	N20	N21	N21	N21	N28	N20	N24	N11	N14	NNW12.7	N28
4-Mar	NNE12	NNE8	N9	N10	N6	N4	WSW2	S2	SE5	SE10	SE14	AF	ESE11	SSE18	SE14	SE15	ESE14	ESE15	ESE17	ESE17	ESE18	ESE17	ESE14	ESE12	ESE8.4	ESE18
5-Mar	ESE14	SE18	SE13	SSE16	SSE17	SSE14	SSE9	SSE8	SSE11	SSE6	SSE4	NNW3	NW9	N27	N22	N25	N24	N19	N19	N29	N23	N26	N26	N24	NNE7.5	N29
6-Mar	N20	N20	N18	N23	N19	NNE13	N15	NNW14	N17	N14	N14	NNW12	WNW12	WNW11	NW11	NW10	NW11	NNW12	N6	ENE9	ENE15	ENE17	ENE12	ENE12	N11.2	N23
7-Mar	NNE12	NE11	NE9	N8	N16	N11	N7	NW4	WNW8	W9	W8	W11	WNW6	W4	WNW4	WSW8	SW14	SW14	SW16	WSW12	NW13	NNW13	N12	NNW8	NW5.5	N16
8-Mar	NW5	W5	W1	E3	SE2	S2	ESE3	SSE10	SSE8	ESE7	ESE7	SE10	SE12	SE6	W4	NNW5	NW10	W7	NNW8	N8	N8	N5	N8	N11	NE1.1	SE12
9-Mar	N8	NNW8	NNW10	NNW10	NNW10	NW7	NW7	NW4	WNW5	NW6	NW2	SSW2	SW1	E3	E5	ESE5	ESE5	NE6	ENE6	ENE8	E6	SE9	SE8	ESE11	NNE2.6	ESE11
10-Mar	ESE11	SE11	SE13	SE11	SE13	SE17	SE20	AF	AF	AF	ESE15	ESE15	ESE17	ESE22	ESE20	ESE18	ESE18	ESE17	ESE13	ESE17	ESE17	ESE17	SE17	SSE15	ESE15.6	ESE22
11-Mar	SSE9	S9	WSW12	WSW17	W15	WSW16	WSW19	WSW20	WSW14	W13	W16	NNW10	NNW5	WNW7	WNW11	NW8	NNW7	WNW7	SW5	NE4	E4	SSE15	SSE14	SSE12	WSW7.0	WSW20
12-Mar	SE13	SE13	ESE9	SE14	SE11	ESE12	ESE5	SE9	ESE7	ESE8	E11	E15	E18	ESE17	ESE18	ESE17	ESE21	ESE22	ESE16	ESE17	ESE19	ESE19	ESE18	SE18	ESE14.1	ESE22
13-Mar	SE16	SE13	ESE9	NE7	NE10	NE12	N10	NNW8	NNW12	NNW8	NW11	NNW17	NW18	NW20	NW21	NNW27	NNW27	NNW28	NNW25	NNW28	NW26	NW23	NW23	NW24	NNW13.6	NNW28
14-Mar	NNW24	NNW24	NNW23	NNW20	NNW22	NNW24	NNW20	N26	N29	N26	N25	N22	N21	N20	N22	N20	NNW16	N21	N28	N27	N21	NNW16	N14	N15	N21.6	N29
15-Mar	N10	N9	NNW9	NNW9	NNW6	NW6	NW8	NNW8	NNW7	NW7	WNW10	WNW9	W12	W15	W17	WNW18	WNW16	NW15	N16	N19	N23	N20	NNW17	NNW21	NNW10.7	N23
16-Mar	NNW22	NNW21	NNW22	NNW24	NNW20	NNW22	NNW19	N17	NNW18	NNW22	NNW22	NNW19	NNW18	NNW18	NNW20	NNW21	NNW21	NNW19	NW15	WNW14	W13	N12	N11	NW5	NNW17.5	NNW24
17-Mar	WNW6	WSW9	WNW12	WNW19	WNW17	WNW15	WNW17	W15	W14	WNW14	NW12	NW11	NW16	WNW17	NW15	NW12	NW11	NW13	NNW14	NW12	NNW12	NNW9	WSW5	SW7	WNW11.8	WNW19
18-Mar	SW9	SW12	SSW9	WSW12	WSW12	SSW14	SW15	SW12	W10	W7	NW7	NNE2	E6	E10	E9	SE9	SE14	SSE16	SSE17	SE15	SSE15	SSE14	S6	NNE5	S5.9	SSE17
19-Mar	NNW4	NW5	NW7	NW5	NNW5	NW3	NW3	NNW3	WNW4	W5	WNW2	NNW4	NNW6	NNW6	NNE7	NE10	ENE13	E12	E11	E13	ESE13	E15	E15	ESE12	ENE3.6	E15
20-Mar	E15	ESE14	ESE11	ESE11	ESE10	E14	E15	E15	E11	ESE12	E14	E12	ENE7	NNE8	NNE3	NNW3	NE5	E15	ENE20	ENE14	ENE15	ENE17	NE16	ENE16	E11.2	ENE20
21-Mar	ENE16	ENE14	ENE13	ENE13	ENE13	ENE15	ENE15	ENE16	E15	ENE13	NE12	NE12	ENE14	E12	E13	E15	E17	ENE20	ENE20	ENE19	E17	E18	E15	E15	ENE14.7	ENE20
22-Mar	ESE15	ESE15	ESE14	SE9	SE8	SE12	SE12	ESE14	ESE12	ESE8	ESE8	SE9	SE9	SE8	ESE4	SE7	ESE8	SE9	SE13	SE12	ESE10	ESE12	ESE15	ESE13	ESE10.6	ESE15
23-Mar	SE13	SE11	SSE9	SSE6	SE5	WSW5	NW5	NNW13	NNW12	NNW15	NW14	NW14	NW13	NNW11	N16	N19	N17	N15	N20	N21	N21	N19	N17	N14	N9.5	N21
24-Mar	N15	N14	N13	N12	NW9	NNW13	NNW10	NNW8	NW4	NW7	WNW10	WNW12	WNW13	WNW15	NW14	NW13	NW11	NW9	N11	N14	NNE16	NNE16	NE7	E6	NNW9.3	NNE16
25-Mar	E5	SE4	SE9	SSE10	SE12	SE12	SE14	SE13	SSE10	SE10	SE13	SE9	SE10	ESE8	SE10	SE6	S4	S6	SW2	SW6	SSW9	SW5	NW11	NNW14	SSE5.8	NNW14
26-Mar	NNW15	NW6	NW8	WNW9	NW8	NNW8	NNW9	N9	NNW7	W5	WSW3	WSW3	W3	WNW5	NNE2	E2	ESE5	SE9	SE12	SE17	SE18	SE20	SE18	SE19	SE1.3	SE20
27-Mar	SE16	SE19	SE12	SE14	SE14	SE15	SE13	SE11	SE15	SE10	SE8	SSE9	SE11	ESE15	SE17	ESE14	SE20	SE18	SE20	SE21	SE23	SE23	SE21	SE16	SE15.7	SE23
28-Mar	SE17	SE21	SE19	SE18	SE17	SE21	SSE19	SSE18	SSE16	SE11	ESE9	SE11	SE9	W14	WNW24	WNW25	W19	WNW12	NW16	WNW20	WNW17	WNW17	W16	WSW17	SSW5.2	WNW25
29-Mar	WSW18	WSW20	WSW17	WSW4	SW4	S9	S11	SSE10	SE10	SE7	SE3	WSW5	NNW3	NNE7	NW7	NW8	W3	WNW7	N2	SW5	W7	WSW12	NNW2	WSW3	WSW4.3	WSW20
30-Mar	W6	NW9	NNW13	NW13	WNW16	NW10	WNW14	NW14	WNW10	WNW14	W11	WNW12	NW18	NW31	NNW23	NNW30	NNW28	N36	N41	N30	NNW31	N30	N28	N29	NNW18.7	N41
31-Mar	N21	N22	N23	NNW20	NNW19	NNW16	N12	N12	N7	NW8	WNW8	W6	WNW10	NW2	ESE4	ESE9	SE11	SE11	SE13	SSE11	SSE15	SSE14	SSE13	SSE14	NNE3.3	N23
	NE3.3	ENE2.3	NNE2.1	N2.5	N2.3	NNE1.4	NNE1.6	N1.8	NNW1.8	NNW2.5	NNW2.3	NNW3.4	NNW3.2	NNW4.3	N4.9	N5.6	N4.9	NNE5.2	NNE5.9	NNE6.0	NE5.7	NE5.6	NE4.6	NE4.1	Diurnal Average	
	NNW24	NNW24	NNW23	NNW24	NNW22	NNW24	NNW20	N26	N29	N26	N25	N22	N21	NW31	WNW24	NNW30	NNW28	N36	N41	N30	NNW31	N30	N28	N29	Diurnal Maximum	

AF - Analyzer Failure

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed 45 m (WS45m) - km/h

Mannix - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 8 km/h on Mar 30 21:00

Minimum Value: 1 km/h on Mar 24 02:00

Percentiles: P_1 = 1 P_{10} = 1 Q_1 = 2 Median = 3 Q_3 = 4 P_{90} = 5 P_{99} = 7

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Hours of Calibration:	0
Percent Operational Time:	99.5

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

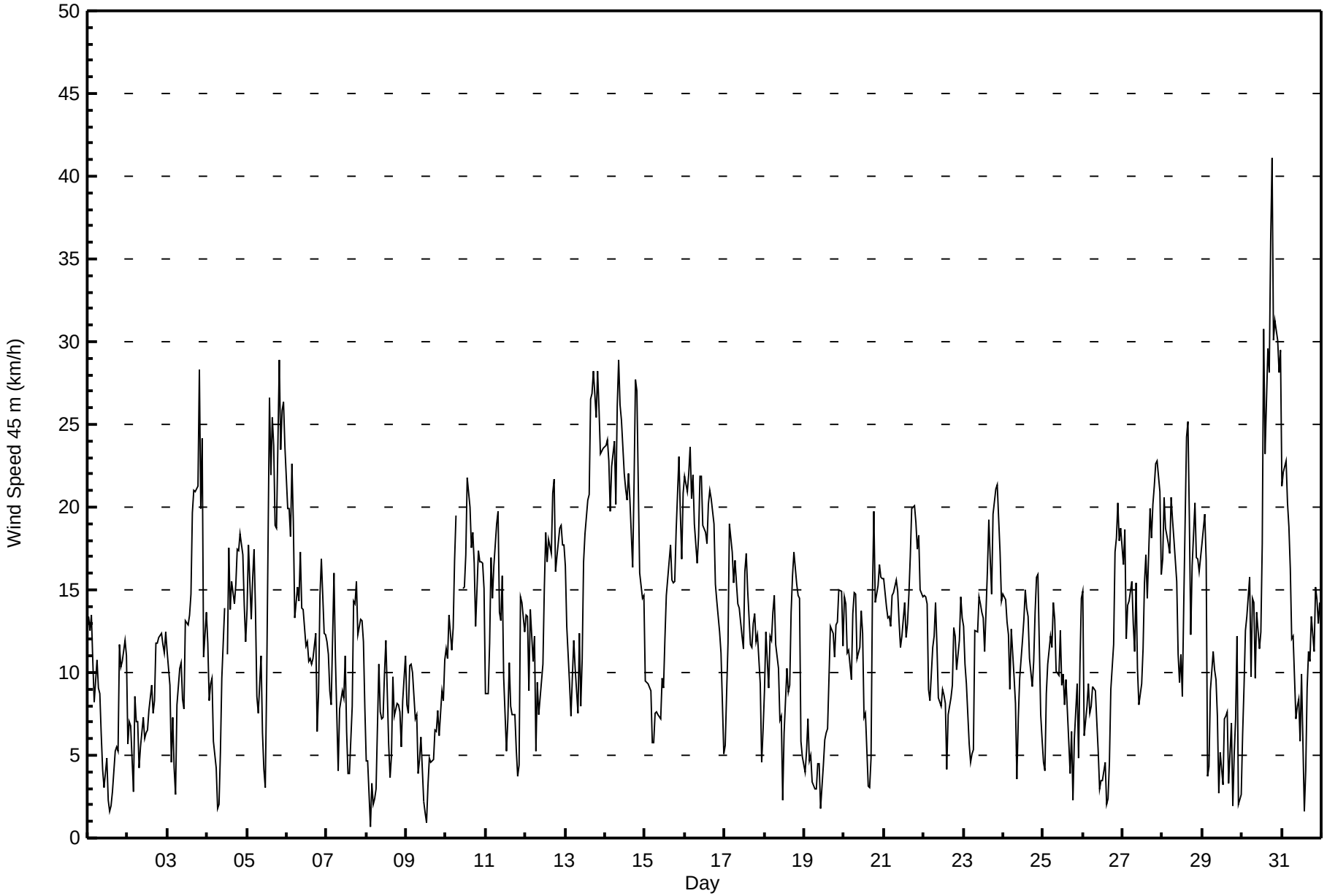
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed 45 m (WS45m) - km/h

Mannix - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	95	12.84	12.84
6 - 11	237	32.03	44.86
12 - 19	305	41.22	86.08
20 - 28	93	12.57	98.65
29 - 38	9	1.22	99.86
> 38	1	0.14	100.00

Total Number of Valid Hours: 740

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed 45 m (WS45m) - km/h

Mannix - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	6	5	2	0	7	8	7	1	3	1	6	9	8	6	14	12	95
6 - 11	25	6	8	6	9	22	36	19	5	3	3	2	8	22	35	28	237
12 - 19	35	6	4	20	22	44	50	21	0	1	6	12	12	21	20	31	305
20 - 28	39	0	0	3	0	4	9	0	0	0	0	2	0	3	6	27	93
29 - 38	6	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	9
> 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	112	17	14	29	38	78	102	41	8	5	15	25	28	52	76	100	740

Total Number of Valid Hours: 740

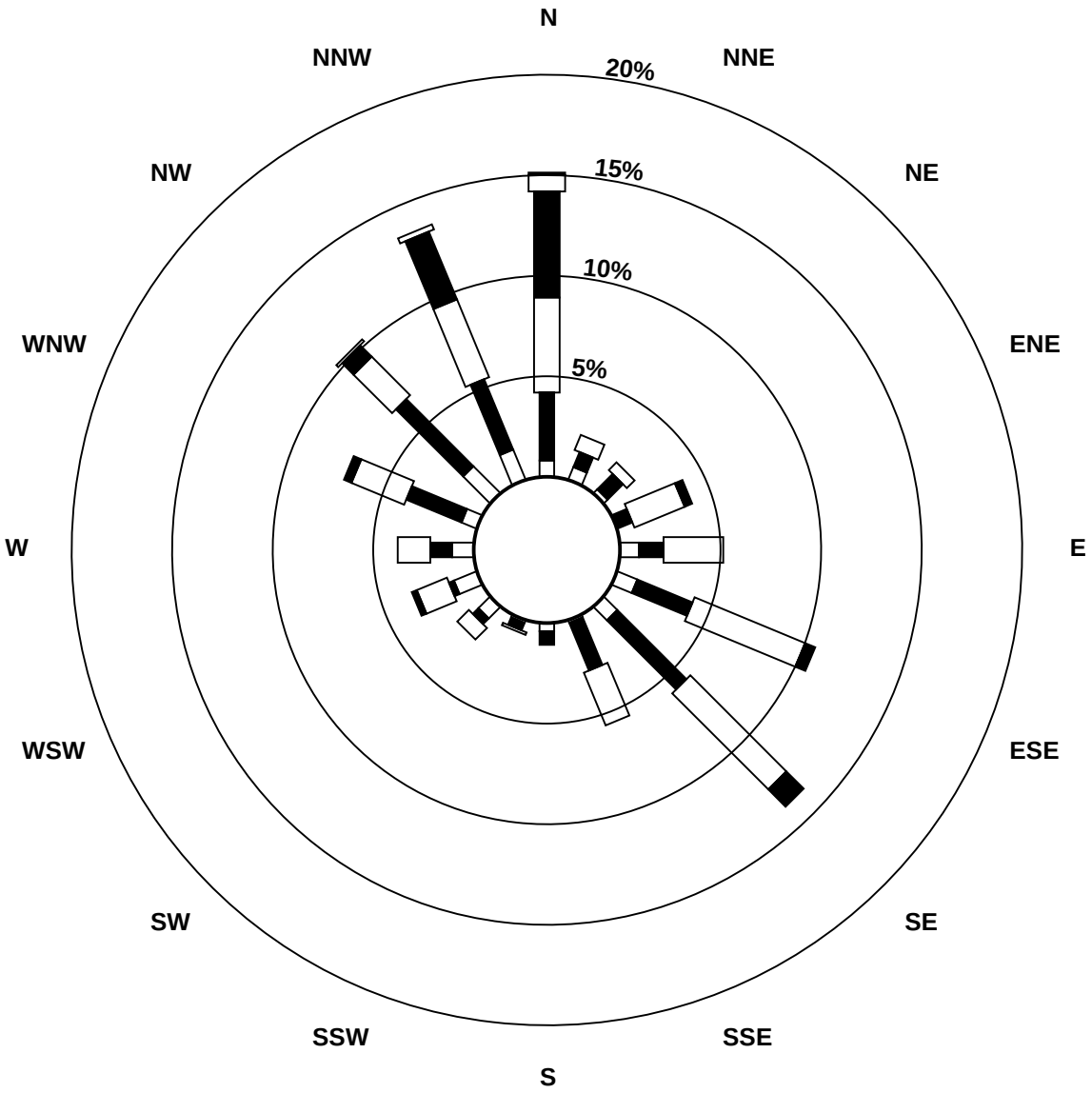
Total Number of Hours: 744

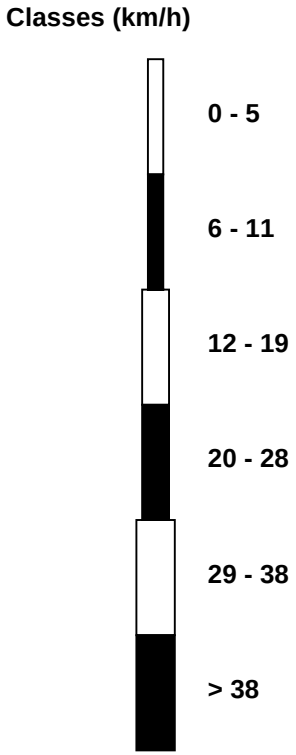
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Wind Speed 45 m (WS45m) - km/h

Mannix (AMS 5)





Total Number of Valid Hours: 740

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 75 m (WS75m) - km/h

Mannix - March 2016

Maximum Speed: 45 km/h on Mar 30 19:00

Maximum Daily Speed Average: 24.5 km/h on Mar 14

Minimum Speed Value: 0 km/h on Mar 8 03:00

Minimum Daily Speed Average: 1.9 km/h on Mar 8

Maximum Diurnal Speed Average: 7.3 km/h at hour 20

Minimum Diurnal Speed Average: 2.2 km/h at hour 9

Monthly Average Velocity: 4.1 km/h 17.1 deg

Percentiles: $P_1 = 2$ $P_{10} = 5$ $Q_1 = 9$ Median = 13 $Q_3 = 18$ $P_{90} = 24$ $P_{99} = 33$

Hours in Service:	744
Hours of Data:	731
Hours of Missing Data:	13
Percent Operational Time:	98.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	SSE17	SE16	SSE18	SSE15	SSE12	S14	S12	S8	SSE11	SSE5	SE3	E4	SE2	S1	NNW2	NNW3	NNE5	N7	NNE7	N13	ENE11	ESE8	ESE9	ESE9	SE5.4	SSE18
2-Mar	E7	ENE8	E5	NE4	NNE10	NE10	NE8	NNE4	NNW7	NNW7	NW6	NW6	WNW6	NW7	NNW9	NNW7	NNE10	N13	N14	N15	N15	N14	N13	N16	N7.5	N16
3-Mar	N15	N14	N7	NNW8	N7	NNE5	NE10	NNE11	NW10	NW8	NNW8	NW14	NNW15	NNW15	NNW17	N22	N24	N24	N24	N33	N24	N27	N13	N17	N14.9	N33
4-Mar	NNE15	NNE10	N11	N11	N7	NNE4	SW2	S3	SE6	SE10	SE14	AF	ESE9	SSE19	SE13	SE14	ESE12	ESE12	ESE14	ESE14	ESE16	ESE16	SE15	SE13	ESE7.9	SSE19
5-Mar	ESE13	SE20	SE16	SSE20	SE22	SSE18	SSE15	SSE13	SSE16	S9	S5	NNW3	NNW10	N29	N25	N28	N27	N21	N21	N32	N26	N29	N30	N27	NNE8.1	N32
6-Mar	N23	N22	N22	N25	N22	NNE16	N17	N16	N18	N15	N15	N12	WNW11	WNW10	NW11	NW10	NW12	NNW15	NNE10	ENE12	ENE17	ENE19	ENE13	ENE13	N12.8	N25
7-Mar	NE14	ENE14	ENE10	NNE9	NNE15	NNE12	NNE10	N4	NW7	WNW9	WNW7	W11	WNW6	W4	WNW5	WSW10	WSW16	SW16	SW18	WSW15	NNW16	NNW15	N13	N9	NW4.7	SW18
8-Mar	NW5	WNW4	SW0	SE2	E1	SSW1	E4	SE10	SSE10	ESE7	ESE7	SE9	SE11	SE5	W3	NNW5	NW10	WNW7	NNW9	N10	N9	NNE7	N9	NNE13	NE1.9	NNE13
9-Mar	N10	NNW8	NNW12	N12	NNW11	AF	AF	AF	AF	AF	NNW2	S1	SE1	E3	E4	ESE4	ESE5	ENE6	E5	E8	ESE6	SE14	SE13	SE13	ENE3.0	SE14
10-Mar	SE18	SE14	SE14	ESE9	ESE10	SE16	AF	AF	AF	AF	AF	AF	AF	ESE20	ESE16	ESE13	ESE13	ESE13	ESE10	ESE15	ESE14	ESE14	SE19	SE18	----	ESE20
11-Mar	SSE11	S11	WSW14	WSW21	W19	W20	WSW23	WSW25	WSW17	W15	W17	NNW11	NNW6	WNW8	WNW11	NW8	NNW8	WNW8	SW6	NNE5	ENE6	SSE16	SSE20	SSE18	WSW8.0	WSW25
12-Mar	SE20	SE16	ESE8	SE17	SE14	ESE9	ESE7	ESE9	ESE7	ESE7	ESE9	E13	E14	ESE13	ESE16	ESE14	ESE20	ESE20	ESE14	SE15	ESE17	ESE16	ESE15	SE16	ESE13.3	SE20
13-Mar	SE16	SE13	ESE9	ENE9	ENE12	NE15	NNE15	N11	NNW16	NNW9	NNW13	NNW19	NW21	NW23	NNW25	NNW31	NNW31	NNW32	NNW30	NNW33	NNW30	NW27	NW27	NNW28	NNW16.2	NNW33
14-Mar	NNW28	NNW29	NNW27	NNW23	NNW26	NNW28	NNW24	N30	N32	N29	N27	N24	N23	N23	N24	N23	N19	N25	N31	N30	N24	N18	N17	N17	N24.5	N32
15-Mar	N13	N13	N13	N12	NNW7	NNW6	NNW8	NNW9	NNW8	NW7	WNW9	WNW9	WNW11	W14	WNW17	WNW18	NW16	NNW18	N18	N22	N26	N22	N20	NNW24	NNW12.3	N26
16-Mar	NNW26	NNW25	NNW26	NNW28	NNW25	NNW26	NNW22	N19	NNW21	NNW25	NNW24	NNW20	NNW20	NNW20	NNW24	NNW24	N23	NNW24	NW18	WNW16	W16	N15	N14	NNW7	NNW20.5	NNW28
17-Mar	NW6	W11	WNW17	WNW21	WNW20	WNW18	WNW20	W18	W17	WNW15	NW12	NW12	NW18	NW18	NW16	NW12	NW12	NW15	NNW17	NNW15	NNW15	NNW11	W2	SW5	NW13.5	WNW21
18-Mar	SSW8	SSW12	SSW11	W15	WSW15	SW13	SW16	WSW14	W13	W8	NW7	NNE2	E6	E9	E7	SE10	SE14	SSE17	SSE21	SSE20	SSE22	SSE19	S8	E2	S7.2	SSE22
19-Mar	NE3	NNE1	NNW5	NNW7	NNW7	NW5	NNW4	NNW3	WNW4	WNW3	NNW2	N5	N7	N7	NNE7	ENE11	E12	E11	E11	E12	ESE11	E13	E12	ESE9	ENE4.2	E13
20-Mar	ESE11	ESE11	ESE8	ESE9	ESE8	E11	E14	E12	E8	ESE9	E12	E11	ENE8	NE8	NE4	N3	NE7	E14	ENE24	ENE17	ENE17	ENE18	ENE18	ENE17	E11.0	ENE24
21-Mar	ENE17	ENE15	ENE14	ENE14	ENE14	ENE16	ENE17	ENE15	E14	ENE14	NE13	NE13	ENE14	E12	E11	E13	E16	ENE22	ENE23	ENE21	E15	E15	E12	E11	ENE14.7	ENE23
22-Mar	ESE10	ESE11	ESE11	SE9	ESE7	ESE10	SE13	SE13	ESE9	ESE7	ESE7	SE8	SE8	SE7	ESE4	SE7	ESE8	SE9	SE13	SE12	ESE9	SE11	SE13	SE14	ESE9.6	SE14
23-Mar	SE17	SE14	SSE11	SSE7	SSE8	WSW6	NNW7	NNW14	NNW14	NNW16	NNW14	NW13	NW13	NNW12	N17	N21	NNE19	N16	N22	N24	N26	NNE24	NNE21	NNE17	N10.4	N26
24-Mar	NNE17	NNE14	NNE13	NNE13	N9	N13	N15	N12	NNW5	NNW6	NW9	NW12	WNW13	NW15	NW14	NW13	NW11	NNW9	NNE14	NNE19	NNE20	NNE19	ENE8	ESE6	N10.0	NNE20
25-Mar	SE7	SE8	SE11	SE14	SE14	SE17	SE17	SE15	SE13	SSE13	SE17	SE12	SE11	SE9	SE11	SE6	S4	S7	SW3	WSW6	SW9	WSW8	NW13	NNW20	SE6.9	NNW20
26-Mar	N18	N10	NNW9	NW11	NNW10	NNW10	N12	N10	NNW7	WNW4	WSW3	WSW3	WNW3	WNW5	NNE2	ENE2	ESE4	SE9	SE14	SE20	SE23	SE28	SE24	SE24	E2.4	SE28
27-Mar	SE23	SE25	SE14	ESE11	ESE10	SE13	ESE9	ESE9	SE15	SE10	SE8	SE12	SE11	SE15	SE16	SE13	SE21	SE19	SE26	SE22	SE22	SE25	SE26	SE21	SE16.3	SE26
28-Mar	SE23	SE28	SE26	SE25	SE24	SSE29	SSE28	SSE25	SSE18	SE13	SE9	SE10	SE9	W16	WNW27	WNW28	WNW21	NW14	NW21	WNW26	WNW22	WNW22	W21	W23	SSW6.7	SSE29
29-Mar	W23	WSW26	WSW23	WSW11	WSW11	SW10	SW11	SSW8	SSE9	SE9	SSE3	WSW6	NW4	NNE8	NW7	NNW8	WNW3	WNW7	N2	SW5	W11	W16	NW6	W4	WSW6.8	WSW26
30-Mar	WNW9	NW9	NNW15	NW13	WNW17	NW14	NW19	NNW18	NW10	NW15	WNW12	NW13	NW19	NW34	NNW26	NNW34	NNW33	N40	N45	N35	N35	N34	N32	N33	NNW21.5	N45
31-Mar	N24	N25	N26	N24	NNW22	NNW19	N13	NNE13	NNE7	NW8	WNW8	WNW6	WNW10	NW2	ESE4	ESE7	SE10	SE13	SE18	SSE14	SSE19	SSE18	SSE17	S15	NNE3.5	N26
	NE4.2	ENE3.3	NE2.6	N3.2	N3.1	NNE2.4	NNE2.7	NNE2.7	N2.2	NNW2.7	NNW3.0	NNW4.1	NNW4.3	N5.0	N5.8	N6.7	N5.9	NNE6.3	NNE6.8	NNE7.3	NNE6.5	NE6.1	NE5.1	NE4.6	Diurnal Average	
	NNW28	NNW29	NNW27	NNW28	NNW26	SSE29	SSE28	N30	N32	N29	N27	N24	N23	NW34	WNW27	NNW34	NNW33	NNE40	N45	N35	N35	N34	N32	N33	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 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 9 km/h on Mar 12 17:00

Minimum Value: 1 km/h on Mar 18 00:00

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:	731
Hours of Missing Data:	13
Hours of Calibration:	0
Percent Operational Time:	98.3

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

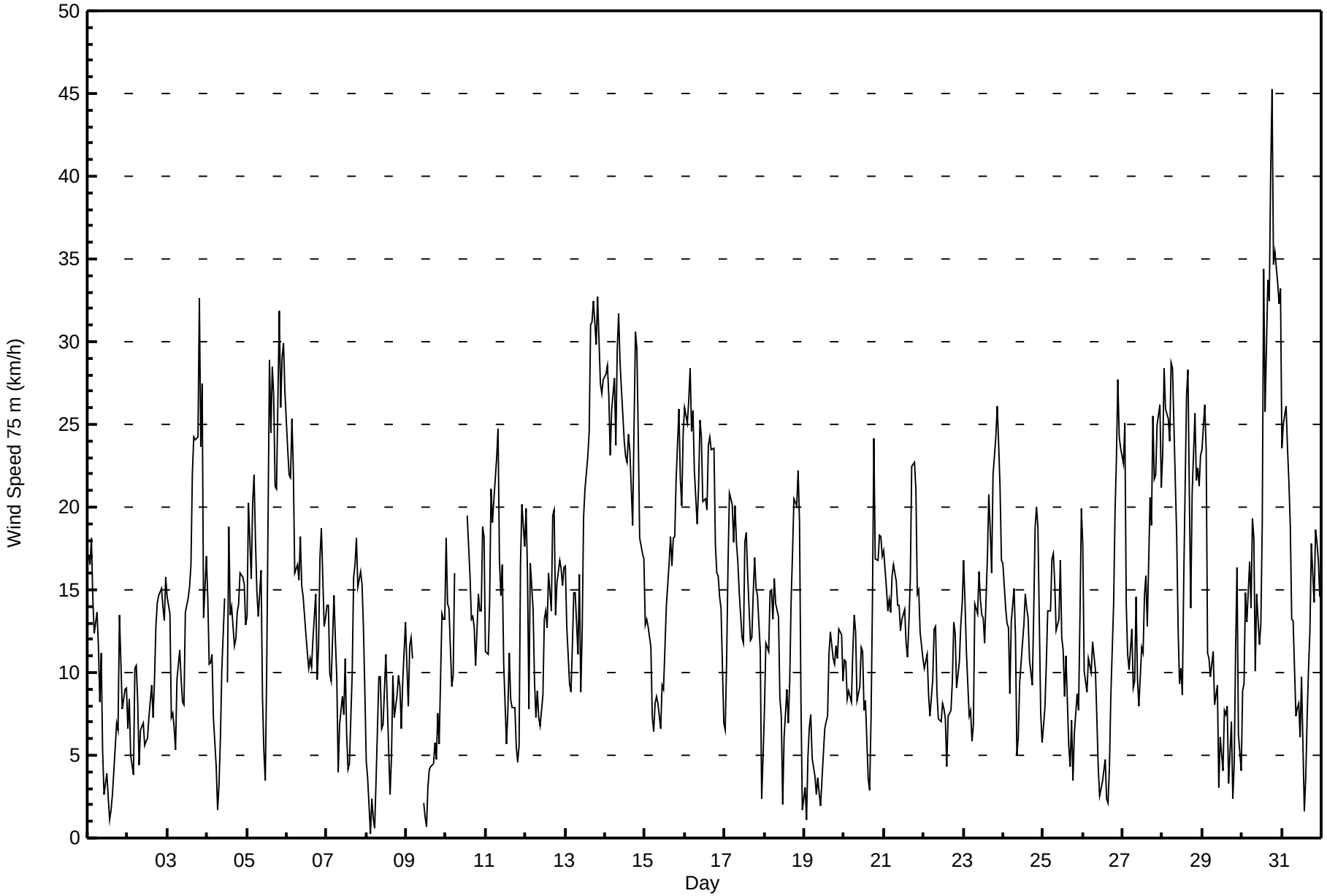
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed 75 m (WS75m) - km/h

Mannix - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	75	10.26	10.26
6 - 11	226	30.92	41.18
12 - 19	273	37.35	78.52
20 - 28	129	17.65	96.17
29 - 38	26	3.56	99.73
> 38	2	0.27	100.00

Total Number of Valid Hours: 731

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed 75 m (WS75m) - km/h

Mannix - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	4	8	3	1	7	6	5	2	4	2	5	2	4	9	2	11	75
6 - 11	17	12	5	9	12	43	28	7	5	3	3	8	4	18	21	31	226
12 - 19	40	16	4	22	17	22	49	21	3	1	4	6	9	12	24	23	273
20 - 28	38	3	0	4	0	3	22	7	0	0	0	5	4	9	5	29	129
29 - 38	15	0	0	0	0	0	0	1	0	0	0	0	0	0	1	9	26
> 38	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Totals	115	40	12	36	36	74	104	38	12	6	12	21	21	48	53	103	731

Total Number of Valid Hours: 731

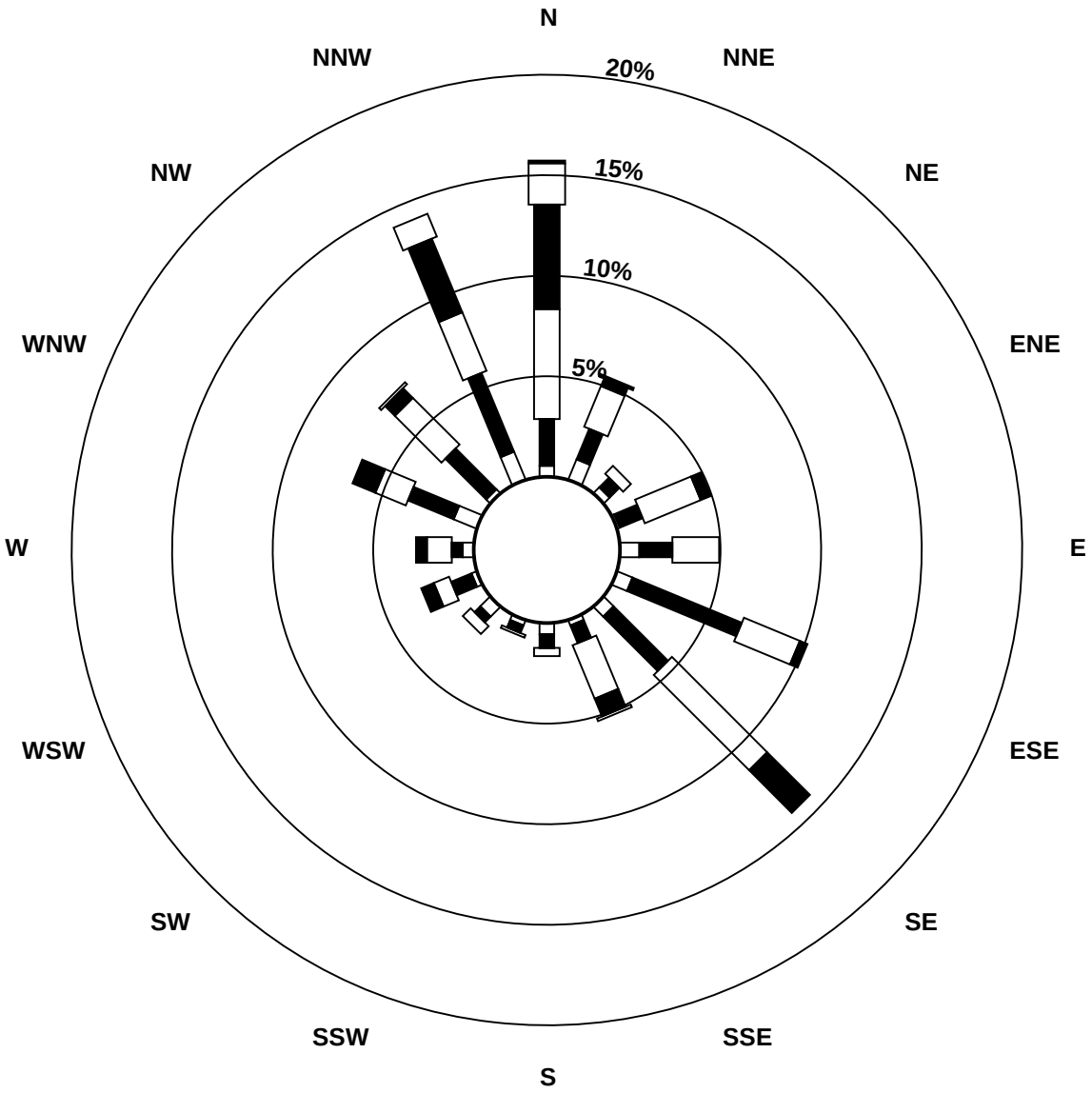
Total Number of Hours: 744

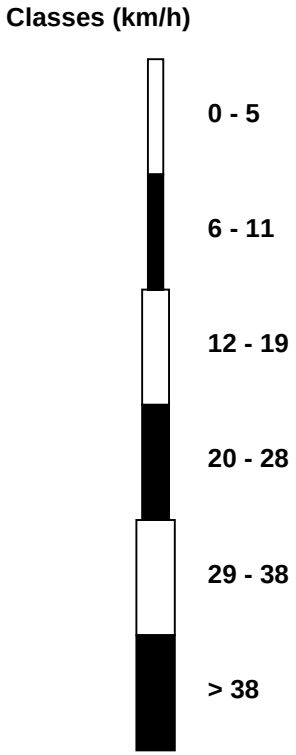
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Wind Speed 75 m (WS75m) - km/h

Mannix (AMS 5)





Total Number of Valid Hours: 731

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 90 m (WS90m) - km/h

Mannix - March 2016

Maximum Speed: 47 km/h on Mar 30 19:00

Maximum Daily Speed Average: 25.5 km/h on Mar 14

Minimum Speed Value: 1 km/h on Mar 8 05:00

Minimum Daily Speed Average: 2.2 km/h on Mar 8

Maximum Diurnal Speed Average: 7.6 km/h at hour 20

Minimum Diurnal Speed Average: 2.2 km/h at hour 9

Monthly Average Velocity: 4.2 km/h 32.8 deg

Percentiles: $P_1 = 2$ $P_{10} = 6$ $Q_1 = 9$ Median = 15 $Q_3 = 20$ $P_{90} = 26$ $P_{99} = 34$

Hours in Service:	744
Hours of Data:	735
Hours of Missing Data:	9
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	SSE19	SSE18	SSE20	SSE16	S12	S12	S10	S7	S11	SSE7	SSE3	ESE5	SSE3	SSE2	N1	N2	NNE6	N7	NNE7	N14	E13	ESE13	ESE16	ESE12	SE6.3	SSE20
2-Mar	E8	E10	ESE9	NE4	NNE10	NE11	ENE9	NNE4	N7	NNW7	NW5	NW5	NW6	NW7	NNW9	NNW7	NNE10	NNE13	N15	N15	N16	N15	N14	N17	N7.7	N17
3-Mar	N16	N16	N9	N8	NNE7	NE6	ENE11	NNE11	NW8	NNW8	NNW8	NNW14	NNW15	NNW16	N17	N23	N25	N25	N25	N34	N25	N28	N14	N18	N15.5	N34
4-Mar	NNE16	NNE11	N11	NNE12	NNE8	NNE4	SW2	S4	SE7	SSE11	SSE15	AF	ESE13	SSE20	SE15	SE17	ESE16	ESE18	ESE21	ESE20	ESE22	ESE22	SE20	SE17	ESE10.3	ESE22
5-Mar	SE18	SE24	SE17	SSE22	SE25	SSE20	SSE19	S15	S15	S9	S5	NW4	NNW10	N29	N25	N29	N28	N22	N22	N33	N27	N30	N31	N28	NE8.1	N33
6-Mar	N25	N23	N23	N26	N23	NNE17	N17	N16	N18	N16	NNE15	N12	NW11	WNW10	NW11	NNW10	NNW12	N16	NNE10	E14	ENE18	ENE20	E15	E15	NNE13.2	N26
7-Mar	ENE15	ENE16	E12	NE9	NE14	NE11	NE9	NE5	NNW5	NW8	WNW7	W10	WNW6	W4	WNW5	WSW11	WSW16	SW17	SW19	WSW16	NNW18	NNW16	N13	N9	NNW3.9	SW19
8-Mar	NNW5	NW3	SSE1	SSE3	ESE1	SW1	E3	SE10	SE11	ESE10	ESE8	SE11	SE13	SE6	WSW2	NNW4	NW9	WNW7	NNW8	N10	N9	NNE7	NNE10	NNE14	ENE2.2	NNE14
9-Mar	N11	NNW8	NNW11	N13	N11	NNW8	NNW8	NNW3	NW4	NW5	NNW2	S2	SE1	ESE4	ESE5	SE6	SE6	E6	ESE6	E9	ESE9	SSE17	SE16	SE19	ENE2.6	SE19
10-Mar	SE21	SE19	SE22	ESE15	ESE15	SE19	AF	AF	AF	AF	AF	AF	AF	AF	ESE21	ESE22	ESE24	ESE20	ESE16	ESE20	ESE20	ESE19	SE21	SSE21	----	ESE24
11-Mar	SSE13	S12	WSW15	WSW23	W21	W22	W25	W27	W18	W15	WNW16	NNW11	NNW6	WNW8	WNW11	NW8	NNW8	WNW8	WSW6	NNE4	ENE6	SSE16	SSE23	SSE21	WSW8.5	W27
12-Mar	SE23	SE20	ESE13	SE19	SE17	ESE19	ESE11	ESE13	ESE13	ESE10	ESE15	E20	ESE23	ESE22	ESE22	ESE21	ESE27	ESE26	ESE20	ESE20	ESE23	ESE22	ESE20	SE20	ESE18.7	ESE27
13-Mar	SE20	SE16	ESE12	ENE10	ENE12	NE16	NNE16	N12	N18	N9	NNW13	NNW20	NW22	NNW24	NNW26	NNW33	NNW33	NNW34	NNW32	NNW35	NNW32	NW29	NW28	NNW29	NNW16.9	NNW35
14-Mar	NNW30	NNW31	NNW28	NNW24	NNW27	NNW29	N25	N31	N33	N29	N28	N24	N23	N23	N25	N24	N19	N26	N31	N30	N25	N19	N18	N18	N25.5	N33
15-Mar	N14	N14	N13	N12	N8	N7	NNW8	NNW9	NNW8	NNW6	WNW9	WNW9	WNW11	WNW14	WNW16	WNW18	NW17	NNW19	N19	N23	N27	N22	N21	NNW26	NNW12.8	N27
16-Mar	NNW28	NNW27	NNW28	NNW30	NNW26	NNW28	NNW23	N20	NNW22	NNW27	NNW25	NNW21	NNW21	N21	NNW25	N25	N25	NNW25	NW18	WNW17	WNW17	N16	N15	NNW8	NNW21.7	NNW30
17-Mar	NNW7	W11	WNW18	NW21	NW20	NW18	NW20	WNW18	WNW18	WNW15	NW12	NW12	NW18	NW19	NW16	NW12	NW12	NW15	NNW18	NNW16	NNW15	NNW12	W2	SW5	NW13.8	NW21
18-Mar	SSW8	SSW12	SW11	W16	WSW16	SW13	SW16	WSW14	W14	W9	NW7	NNE2	E7	E11	ESE9	SE11	SE15	SSE18	SSE21	SSE23	SSE26	S21	SSW8	SE2	S7.9	SSE26
19-Mar	NE3	ESE1	NNW2	NNW7	NNW8	NNW5	NNW4	NNW2	WNW3	NW2	NNW2	N5	N7	N7	NE8	ENE12	E15	E17	E17	E17	ESE16	ESE19	ESE19	ESE15	ENE5.9	ESE19
20-Mar	ESE19	ESE19	ESE14	ESE15	ESE13	E18	E18	E18	ESE12	ESE14	E15	E14	ENE8	NE8	NE4	NNE3	ENE8	E17	ENE26	E20	E19	ENE20	ENE19	ENE19	E14.2	ENE26
21-Mar	ENE19	ENE17	E16	ENE16	ENE15	ENE17	ENE18	E17	E17	ENE15	ENE13	ENE14	E16	E14	E14	E18	E21	ENE24	ENE25	ENE24	E23	E23	ESE20	ESE17	E17.6	ENE25
22-Mar	ESE18	ESE17	ESE15	SE11	ESE9	ESE12	SE14	ESE16	ESE12	SE9	SE8	SE10	SE9	SE8	ESE5	SE8	ESE10	SE11	SE15	SE14	ESE12	SE13	SE16	SE18	SE12.1	ESE18
23-Mar	SE19	SE17	SSE13	SSE9	SSE9	W6	NNW7	N15	NNW14	NNW17	NNW14	NNW13	NNW13	NNW12	N17	NNE21	NNE19	N16	N23	N25	NNE28	NNE26	NNE23	NNE18	N10.5	NNE28
24-Mar	NNE17	NE14	NE13	NNE11	N9	N11	N15	N15	N8	NNW6	NW9	NW11	NW12	NW14	NW14	NW13	NNW11	NNW9	NNE14	NNE19	NNE20	NE19	E8	SE9	N9.8	NNE20
25-Mar	SSE9	SSE11	SE12	SE13	SE14	SE20	SE20	SE18	SE16	SSE16	SSE20	SE15	SE13	SE12	SE13	SE7	S5	S8	SW4	WSW7	WSW8	WSW8	NW13	N21	SSE8.3	N21
26-Mar	N19	N12	NNW9	NW11	NNW11	N11	N13	N11	N7	WNW4	WSW2	WSW3	WNW3	WNW4	NNE2	E2	ESE5	SE10	SE16	SE21	SE26	SSE31	SE28	SE26	ESE3.1	SSE31
27-Mar	SE26	SE29	SE18	SE15	ESE15	ESE16	ESE13	ESE13	SE17	SE12	SE10	SE13	SE13	SE18	SE19	SE17	SE24	SE23	SE29	SE26	SE27	SE29	SE30	SE24	SE19.7	SE30
28-Mar	SE27	SSE33	SE30	SSE30	SSE27	SSE31	SSE31	SSE28	SSE20	SSE14	SE13	SE12	SSE9	W16	WNW27	WNW29	WNW21	NW14	NW22	WNW27	WNW23	WNW24	WNW22	W24	SSW8.1	SSE33
29-Mar	W25	W29	WSW26	WSW15	W14	SW10	SW12	SW8	S8	SE11	S3	WSW7	NW5	NNE8	NNW7	NNW8	WNW3	NW7	NNE2	SW4	W13	W16	WNW7	W5	W7.9	W29
30-Mar	WNW10	NW9	NNW15	NW12	WNW15	NW15	NW21	NNW20	NW10	NW15	WNW12	NW13	NW19	NNW36	NNW26	NNW35	N34	NNE42	N47	N36	N37	N35	N34	N34	NNW22.4	N47
31-Mar	N25	NNE26	N27	N25	N22	N20	N13	NNE13	NNE7	NW8	WNW8	W6	WNW10	NW2	ESE4	ESE9	SE12	SE15	SE20	SSE16	SSE20	SSE20	S18	S13	NNE3.3	N27
	ENE4.9	E4.2	ENE3.0	NNE2.9	NNE2.9	NE2.9	NNE2.8	NNE3.0	N2.2	N2.4	N2.6	N3.6	N3.9	N5.2	N5.5	N6.4	NNE5.9	NNE6.5	NE7.1	NE7.6	NE7.1	ENE7.0	ENE5.9	ENE5.3	Diurnal Average	
	NNW30	SSE33	SE30	NNW30	SSE27	SSE31	SSE31	N31	N33	N29	N28	N24	N23	NNW36	WNW27	NNW35	N34	NNE42	N47	N36	N37	N35	N34	N34	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 90 m (WS90m) - km/h

Mannix - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 10 km/h on Mar 28 15:00

Minimum Value: 1 km/h on Mar 7 11:00

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:	735
Hours of Missing Data:	9
Hours of Calibration:	0
Percent Operational Time:	98.8

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

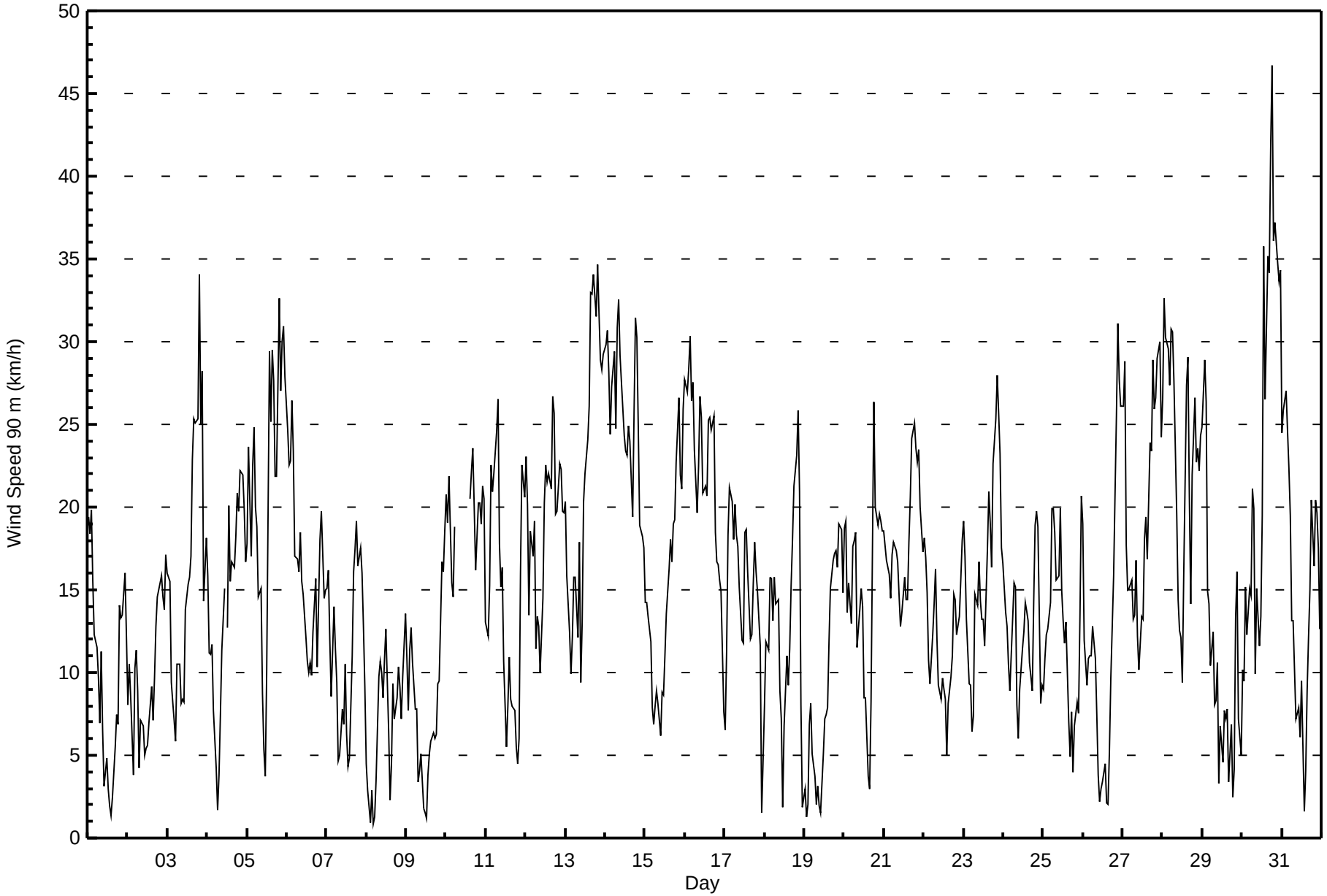
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed 90 m (WS90m) - km/h

Mannix - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	72	9.80	9.80
6 - 11	177	24.08	33.88
12 - 19	276	37.55	71.43
20 - 28	165	22.45	93.88
29 - 38	43	5.85	99.73
> 38	2	0.27	100.00

Total Number of Valid Hours: 735

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed 90 m (WS90m) - km/h

Mannix - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	3	7	4	0	2	8	2	5	5	0	5	3	3	6	9	10	72
6 - 11	21	14	7	6	7	13	19	7	6	3	2	6	5	14	16	31	177
12 - 19	41	14	5	16	21	41	45	14	6	1	5	6	8	12	22	19	276
20 - 28	41	6	0	6	5	23	23	16	1	0	0	2	6	7	6	23	165
29 - 38	17	0	0	0	0	0	5	5	0	0	0	0	1	1	1	13	43
> 38	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Totals	124	42	16	28	35	85	94	47	18	4	12	17	23	40	54	96	735

Total Number of Valid Hours: 735

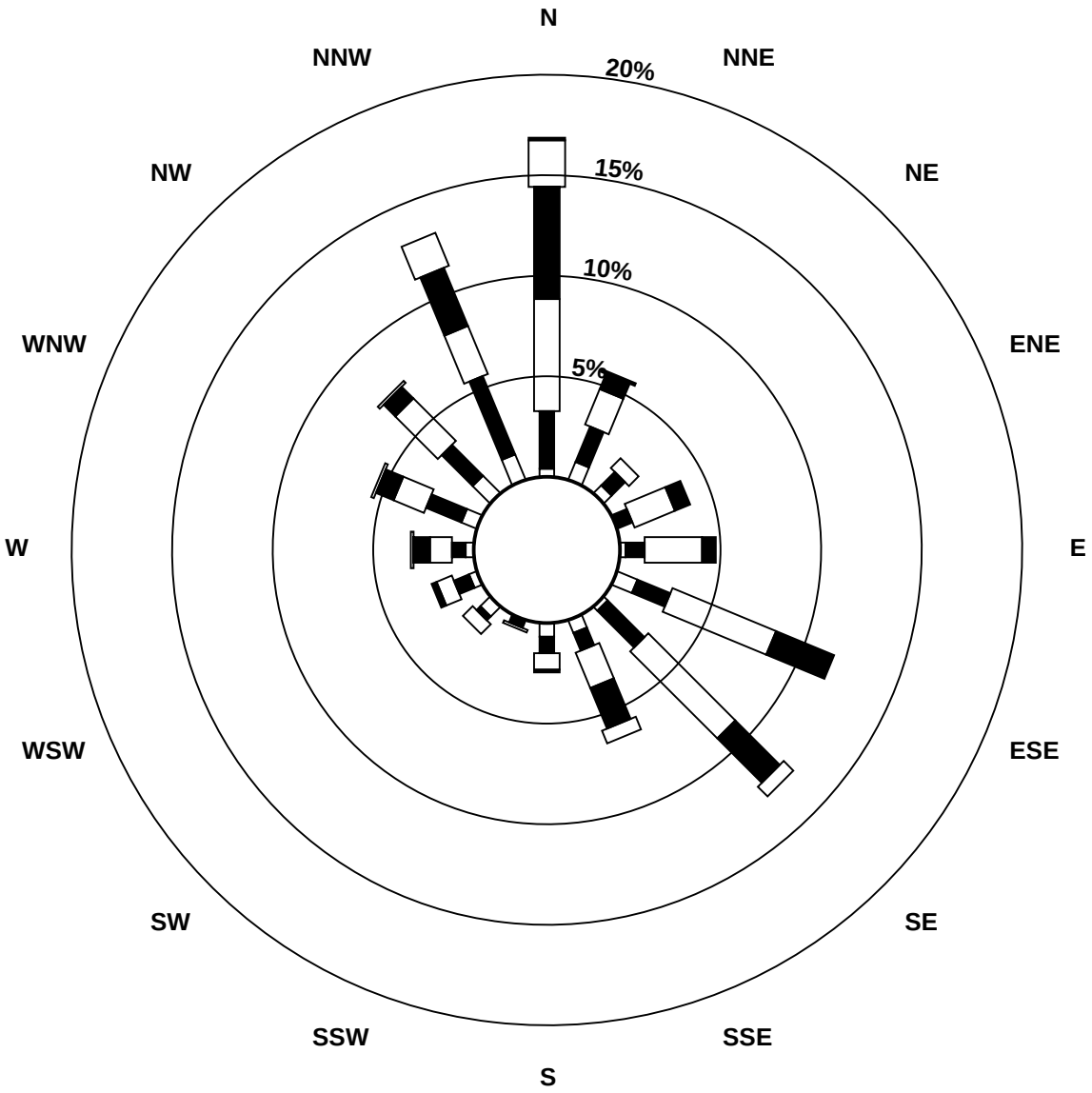
Total Number of Hours: 744

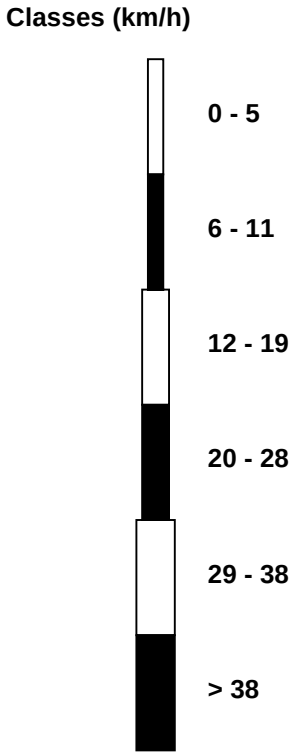
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Wind Speed 90 m (WS90m) - km/h

Mannix (AMS 5)





Total Number of Valid Hours: 735

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 20 m (WD20m) - deg

Mannix - March 2016

Direction of Maximum Speed: 12 deg on Mar 30 19:00
Direction of Maximum Daily Speed Average: 357.5 deg on Mar 14

Direction of Minimum Speed: 264 deg on Mar 9 13:00
Direction of Minimum Daily Speed Average: 0.5 deg on Mar 8

Monthly Average Direction: 316.5 deg

Hours in Service:	744
Hours of Data:	743
Hours of Missing Data:	1
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	155	146	158	155	171	194	174	157	160	139	105	94	131	264	283	312	13	352	339	352	72	115	116	134	133.3
2-Mar	101	44	106	332	2	26	26	346	328	315	297	304	298	308	319	322	19	5	348	337	339	355	4	355	346.1
3-Mar	348	330	291	294	346	344	20	353	302	311	328	319	340	342	349	359	4	357	1	8	8	13	352	5	350.5
4-Mar	27	34	11	9	12	359	258	183	140	148	148	AF	126	154	139	132	124	122	126	127	129	127	129	128	121.4
5-Mar	131	138	146	151	150	155	156	161	167	151	143	343	320	11	7	7	6	6	358	7	9	7	6	7	25.8
6-Mar	2	359	359	8	12	25	8	349	355	12	10	354	296	298	310	314	310	337	334	81	68	71	78	72	5.3
7-Mar	17	34	18	2	8	3	352	288	272	274	267	285	300	288	285	257	239	225	224	252	329	345	6	350	308.6
8-Mar	294	269	260	104	169	233	141	156	171	109	124	135	135	148	292	337	308	282	336	359	17	15	3	19	41.2
9-Mar	2	334	332	347	332	320	324	321	299	321	331	224	264	102	87	104	94	35	55	43	66	155	158	126	10.0
10-Mar	123	150	149	139	145	144	138	134	136	127	114	110	114	127	127	116	108	124	118	127	126	129	143	152	128.7
11-Mar	168	196	251	254	263	256	257	255	256	266	283	335	336	308	296	314	329	287	220	48	97	170	162	157	259.2
12-Mar	137	139	126	149	139	111	164	140	112	109	107	85	98	106	122	114	123	128	125	130	129	127	130	132	122.1
13-Mar	138	144	127	37	49	43	13	312	334	327	330	335	320	322	326	338	339	341	333	332	329	323	322	328	336.8
14-Mar	330	331	345	345	339	341	351	3	10	13	9	8	6	7	9	4	351	2	7	4	4	349	358	357	357.5
15-Mar	351	353	351	352	328	326	327	339	337	311	289	296	270	268	280	293	304	323	357	10	16	12	352	337	327.7
16-Mar	333	333	333	333	335	337	344	356	339	337	334	332	332	348	345	350	351	336	313	289	277	0	1	319	335.6
17-Mar	277	252	275	299	295	290	288	278	273	277	311	311	317	309	312	308	314	314	333	329	340	346	246	213	299.5
18-Mar	214	205	205	246	228	204	216	226	262	278	315	24	87	93	95	132	144	156	153	142	149	162	214	4	175.4
19-Mar	290	275	272	278	289	262	277	346	285	263	273	335	321	339	23	49	82	95	92	95	117	100	102	115	65.9
20-Mar	106	109	111	107	117	99	90	95	95	109	98	92	69	29	31	310	31	89	65	77	77	70	59	72	84.8
21-Mar	69	71	82	74	77	81	77	81	89	69	55	58	82	91	97	97	89	71	80	78	100	99	101	100	82.2
22-Mar	107	122	130	142	134	133	139	130	127	132	132	132	139	138	110	145	128	141	138	135	128	127	129	126	130.9
23-Mar	129	140	153	148	143	248	295	338	342	339	325	321	324	348	7	14	15	8	10	10	13	12	10	12	0.9
24-Mar	7	5	6	344	296	353	344	353	326	298	283	299	303	304	310	305	320	319	7	9	29	19	20	69	335.0
25-Mar	76	227	221	204	157	162	159	152	159	149	146	140	135	114	131	131	178	185	228	205	218	227	325	325	163.2
26-Mar	337	285	269	273	303	336	348	357	335	266	253	251	283	291	55	87	123	136	139	140	149	152	150	149	177.4
27-Mar	143	141	131	138	138	144	142	139	139	140	138	156	139	131	131	129	134	130	137	131	133	134	134	131	136.0
28-Mar	139	139	138	150	154	148	147	151	154	139	125	132	143	283	294	291	285	309	311	276	292	278	252	251	211.4
29-Mar	256	254	240	157	165	157	160	153	144	134	130	261	354	40	325	327	269	278	324	222	259	253	82	221	220.0
30-Mar	251	320	333	313	276	301	294	320	296	297	278	305	314	324	347	347	353	16	12	10	350	355	1	358	341.3
31-Mar	358	16	8	352	349	346	15	20	20	317	300	285	300	348	103	130	135	135	141	155	167	157	165	159	22.6
	45.1	50.5	20.1	349.9	358.8	39.3	25.0	34.6	354.0	335.9	343.3	349.7	348.0	351.4	355.6	1.5	15.6	24.8	30.4	34.4	45.2	51.9	53.6	53.4	
	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 20 m (WD20m) - deg

Mannix - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 103 deg on Mar 9 13:00

Minimum Value: 4 deg on Mar 17 09:00

Percentiles: P_1 = 6 P_{10} = 9 Q_1 = 11 Median = 14 Q_3 = 20 P_{90} = 34 P_{99} = 81

Hours in Service:	744
Hours of Data:	743
Hours of Missing Data:	1
Hours of Calibration:	0
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	10	10	10	9	17	9	23	14	19	22	35	22	51	56	67	44	16	21	17	14	39	16	14	16	67
2-Mar	65	15	17	92	23	17	23	27	24	20	18	16	22	15	17	20	26	11	12	12	14	15	17	14	92
3-Mar	23	18	32	26	60	60	17	32	13	13	16	13	16	14	17	15	15	16	14	12	15	9	24	22	60
4-Mar	17	24	16	16	21	27	71	51	15	12	13	AF	16	16	17	12	16	15	12	11	12	14	12	12	71
5-Mar	13	10	12	7	8	10	25	36	19	26	32	63	26	11	13	11	12	13	14	10	11	10	11	11	63
6-Mar	14	15	15	10	17	13	12	14	12	13	14	31	14	13	13	17	17	17	71	21	10	9	15	27	71
7-Mar	8	11	14	13	9	17	43	16	7	8	7	10	15	22	21	21	11	14	10	36	13	14	11	17	43
8-Mar	65	18	87	47	89	33	61	13	27	25	29	13	10	53	21	23	14	14	20	18	32	27	14	13	89
9-Mar	26	14	12	12	14	19	14	16	17	25	60	72	103	52	25	23	21	11	14	17	29	48	36	10	103
10-Mar	11	12	5	10	13	10	10	11	11	14	17	16	16	13	14	17	15	15	16	12	13	11	10	46	46
11-Mar	15	20	11	11	14	11	8	9	7	11	10	22	27	22	12	28	24	14	31	44	55	11	6	12	55
12-Mar	8	9	14	9	19	16	75	17	32	20	20	12	13	14	19	19	14	11	12	11	11	11	10	10	75
13-Mar	11	13	27	30	13	10	20	37	20	19	18	13	12	10	12	12	12	12	13	12	13	12	11	12	37
14-Mar	13	12	18	19	14	13	15	14	10	9	9	10	11	12	11	13	15	14	10	11	12	12	10	12	19
15-Mar	16	14	14	17	17	12	14	17	18	15	16	19	8	10	10	10	8	13	16	11	10	11	14	12	19
16-Mar	12	13	13	12	12	13	16	17	16	14	13	13	13	15	16	14	15	14	11	15	9	33	19	40	40
17-Mar	20	11	19	8	10	9	8	6	4	10	21	18	14	16	10	14	18	17	12	12	13	25	18	15	25
18-Mar	8	12	24	11	16	9	9	11	10	28	20	66	33	13	18	24	10	9	9	6	8	23	59	31	66
19-Mar	37	9	7	11	54	51	34	26	26	10	26	35	25	36	18	13	16	10	12	21	17	16	15	17	54
20-Mar	15	16	19	17	19	14	10	13	12	19	16	14	30	19	45	56	74	13	10	12	13	13	11	15	74
21-Mar	10	12	18	13	13	13	12	13	13	14	19	16	21	20	17	17	19	12	11	13	14	12	14	13	21
22-Mar	15	16	11	13	13	11	11	11	11	15	17	19	21	21	64	27	28	25	12	11	12	11	10	10	64
23-Mar	10	12	15	8	15	32	29	11	17	14	14	17	17	20	17	13	12	11	11	9	9	9	9	8	32
24-Mar	7	6	10	12	18	11	17	20	67	13	15	13	10	12	14	11	18	18	13	11	9	8	15	21	67
25-Mar	72	28	17	13	15	11	9	9	11	15	10	16	14	20	17	15	29	22	66	18	31	73	30	17	73
26-Mar	13	25	14	12	41	33	25	27	27	30	69	36	71	35	61	47	29	11	8	8	8	7	8	8	71
27-Mar	8	8	11	10	10	9	10	10	10	16	14	22	14	12	12	14	12	11	9	11	12	10	10	8	22
28-Mar	8	7	7	8	6	6	6	9	10	14	15	11	18	29	12	11	9	21	16	6	10	10	9	6	29
29-Mar	8	6	6	44	16	6	4	8	10	14	49	35	72	38	39	33	46	15	53	35	17	7	82	47	82
30-Mar	59	21	11	17	17	65	15	16	16	15	25	13	12	14	15	12	22	11	10	13	14	15	15	16	65
31-Mar	15	12	14	16	13	13	14	16	34	35	25	82	36	83	32	17	11	10	10	10	10	8	9	8	83
	72	28	87	92	89	65	75	51	67	35	69	82	103	83	67	56	74	25	71	44	55	73	82	47	
	Diurnal Maximum																								

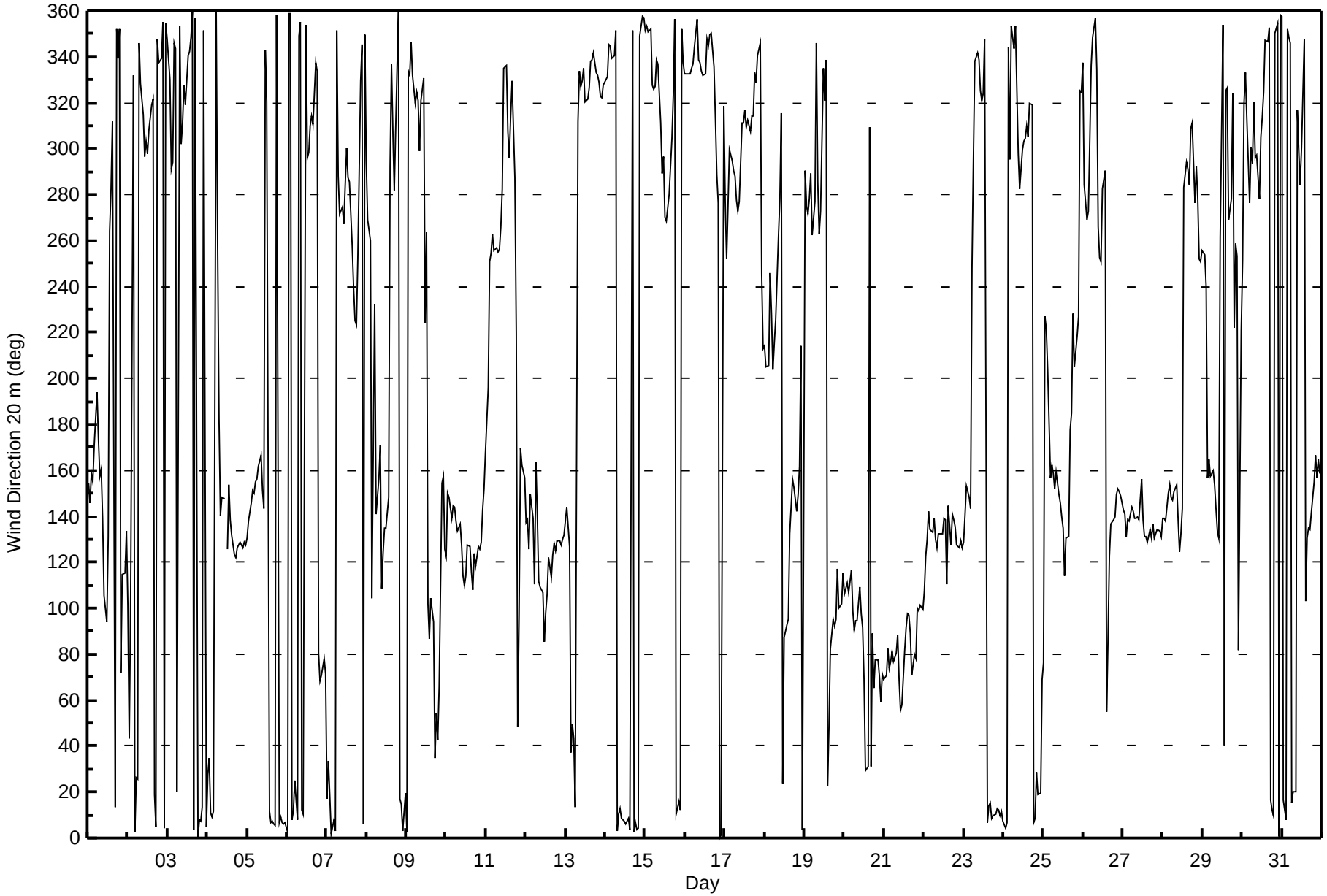
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction 20 m (WD20m) - deg

Mannix - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 45 m (WD45m) - deg

Mannix - March 2016

Direction of Maximum Speed: 5 deg on Mar 30 19:00
Direction of Maximum Daily Speed Average: 352.0 deg on Mar 14

Direction of Minimum Speed: 263 deg on Mar 8 03:00
Direction of Minimum Daily Speed Average: 1.1 deg on Mar 8

Monthly Average Direction: 323.5 deg

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	149	142	152	150	163	175	168	162	163	141	115	89	143	250	295	321	9	350	356	354	69	109	108	124	130.8
2-Mar	86	60	100	16	1	36	31	347	330	316	295	302	295	304	317	322	10	4	350	339	339	352	358	353	349.8
3-Mar	346	337	320	308	349	344	17	351	305	312	326	317	337	338	344	352	356	352	355	2	3	6	349	359	347.8
4-Mar	18	24	6	5	6	1	254	174	133	142	143	AF	118	148	133	125	116	115	118	120	122	120	122	122	113.5
5-Mar	122	130	142	150	147	154	158	157	165	157	156	327	321	4	1	1	359	359	353	1	4	1	0	360	21.1
6-Mar	357	354	355	2	3	17	2	347	351	6	5	347	295	293	305	314	312	337	355	76	62	65	72	68	1.1
7-Mar	23	39	37	354	5	1	357	305	287	281	270	277	293	281	284	252	236	223	220	246	325	340	359	345	310.6
8-Mar	305	277	263	97	133	174	120	148	160	108	118	126	127	138	278	335	304	281	333	353	9	10	360	11	48.3
9-Mar	358	332	329	345	331	320	322	321	301	319	322	207	225	93	85	108	102	40	64	58	87	126	125	119	22.2
10-Mar	119	130	129	124	128	133	130	AF	AF	AF	111	106	108	120	118	110	104	115	112	120	118	122	134	147	120.4
11-Mar	161	187	250	252	260	256	254	253	253	261	278	330	332	299	290	305	327	286	223	35	80	160	159	157	251.4
12-Mar	139	135	119	137	130	107	120	124	110	106	101	85	95	102	117	108	119	121	118	123	121	121	121	125	116.8
13-Mar	127	130	120	45	47	39	9	340	334	331	326	330	318	320	324	334	334	336	328	327	325	318	317	325	335.5
14-Mar	328	329	341	340	335	337	345	357	3	6	2	1	0	2	2	359	348	358	0	358	358	346	352	352	352.0
15-Mar	352	353	348	348	328	324	323	334	331	310	288	292	272	268	278	288	303	322	350	5	8	5	346	333	327.0
16-Mar	328	329	329	329	331	333	341	353	335	333	330	327	328	343	340	344	345	332	310	289	274	356	357	326	331.9
17-Mar	299	257	282	297	296	293	290	274	272	282	304	306	312	303	306	306	310	311	328	324	334	342	255	226	298.8
18-Mar	220	216	205	256	240	210	216	228	267	271	311	15	84	87	92	129	138	153	150	141	149	157	185	27	181.2
19-Mar	339	317	307	319	335	311	311	331	289	269	297	339	331	340	14	48	78	92	90	92	110	95	97	109	56.4
20-Mar	101	103	104	102	109	94	84	90	91	103	92	86	64	25	32	327	42	82	59	72	72	64	55	66	80.0
21-Mar	64	67	76	69	69	72	70	73	81	62	49	50	76	84	91	91	81	64	72	71	94	93	96	95	75.8
22-Mar	103	115	122	130	125	124	129	123	119	123	123	125	132	129	109	137	122	135	130	128	121	121	123	122	123.3
23-Mar	127	136	149	149	146	244	320	336	338	331	322	317	320	342	0	6	8	3	3	4	7	8	7	5	357.4
24-Mar	5	8	6	360	320	344	341	346	308	306	291	296	298	300	305	304	317	319	8	10	19	14	37	88	340.2
25-Mar	92	127	137	148	140	144	144	142	148	144	145	137	131	114	129	126	175	180	215	220	212	235	319	331	147.7
26-Mar	342	322	306	289	323	338	344	354	338	268	252	252	280	286	33	80	112	129	133	135	142	146	143	145	133.8
27-Mar	144	142	127	125	125	131	130	127	129	130	129	148	130	123	124	120	128	125	135	126	125	127	129	131	129.3
28-Mar	136	134	133	144	144	144	147	150	151	136	119	125	140	275	290	285	280	303	305	282	294	283	260	258	207.6
29-Mar	256	253	248	250	233	191	186	158	138	127	142	252	334	25	319	323	281	284	350	225	264	256	331	252	243.5
30-Mar	275	317	330	313	283	305	303	319	298	297	280	302	310	320	342	342	346	9	5	2	347	350	354	353	336.3
31-Mar	352	9	1	348	344	342	6	11	9	313	293	275	297	318	102	121	126	129	135	152	162	153	162	157	19.7
	44.3	56.7	31.9	359.5	357.9	28.1	16.2	11.1	344.3	336.1	343.5	345.7	346.9	347.3	349.8	355.4	9.1	18.6	25.0	27.5	37.8	48.1	50.6	47.6	
	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 45 m (WD45m) - deg

Mannix - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 96 deg on Mar 8 03:00

Minimum Value: 2 deg on Mar 10 03:00

Percentiles: P_1 = 3 P_{10} = 6 Q_1 = 8 Median = 11 Q_3 = 16 P_{90} = 28 P_{99} = 70

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Hours of Calibration:	0
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	7	7	7	6	9	4	15	8	19	20	31	21	51	70	53	40	13	12	14	8	39	13	11	9	70
2-Mar	19	18	14	51	19	12	18	29	21	17	20	16	18	13	13	16	20	8	7	9	10	10	14	7	51
3-Mar	18	12	29	16	50	42	14	26	11	12	14	11	11	10	14	12	11	13	11	7	10	6	19	16	50
4-Mar	12	18	12	11	15	25	70	50	12	11	10	AF	12	14	16	9	13	12	8	7	8	11	8	9	70
5-Mar	11	7	10	4	5	7	14	20	16	25	30	39	21	7	9	7	7	9	11	6	8	5	6	6	39
6-Mar	8	11	11	7	14	10	9	9	7	9	10	27	14	11	12	16	14	15	58	15	9	8	13	21	58
7-Mar	8	11	14	8	5	7	25	14	7	8	8	9	14	18	19	20	7	11	5	35	9	11	7	12	35
8-Mar	38	20	96	22	68	58	45	15	18	20	26	12	6	53	28	17	13	12	17	10	25	17	8	9	96
9-Mar	19	12	9	9	11	17	10	14	14	23	50	62	92	46	22	24	21	11	9	6	18	9	8	4	92
10-Mar	6	4	2	9	9	6	7	AF	AF	AF	14	11	13	10	10	13	11	13	13	8	10	8	8	25	25
11-Mar	11	14	8	7	7	7	4	5	6	8	9	19	21	18	10	23	21	12	24	38	49	8	4	9	49
12-Mar	6	6	10	6	14	12	45	11	20	16	15	11	10	11	15	16	10	7	7	7	8	8	7	6	45
13-Mar	8	10	21	32	9	7	14	18	14	17	14	10	9	9	9	8	8	8	9	9	9	10	9	10	32
14-Mar	10	9	14	13	10	9	12	10	6	6	5	6	7	7	7	9	11	10	5	5	7	8	6	6	14
15-Mar	10	8	9	8	13	11	9	11	12	13	12	15	9	8	8	9	7	10	14	8	7	8	12	8	15
16-Mar	9	9	10	9	9	10	13	13	12	10	10	10	10	12	11	12	11	10	9	14	6	31	12	19	31
17-Mar	26	5	12	4	5	5	5	7	4	9	16	17	12	14	8	13	16	14	8	9	9	19	26	12	26
18-Mar	6	6	14	9	12	6	5	8	9	25	15	68	30	11	17	21	8	7	7	4	5	16	40	47	68
19-Mar	40	13	6	12	20	32	28	20	18	12	44	24	18	23	18	12	14	9	11	16	15	12	12	15	44
20-Mar	10	11	15	11	16	11	8	9	11	15	14	11	29	19	59	55	65	10	8	11	10	12	10	12	65
21-Mar	8	11	18	11	11	11	10	13	11	13	15	14	20	20	15	14	19	9	10	11	11	9	10	9	20
22-Mar	10	12	8	10	8	7	8	9	8	11	16	18	21	21	45	26	23	23	9	9	7	6	6	5	45
23-Mar	5	8	12	9	12	33	22	8	14	10	12	13	13	17	12	9	8	7	7	6	6	5	5	5	33
24-Mar	3	3	5	3	12	7	8	13	31	15	12	9	7	9	10	10	15	16	9	6	6	6	9	17	31
25-Mar	14	14	7	7	4	6	6	7	8	11	7	13	12	18	13	15	28	11	23	10	7	32	20	8	32
26-Mar	7	20	11	9	17	23	17	20	21	32	61	37	45	29	55	52	27	8	6	4	7	3	6	4	61
27-Mar	5	6	7	5	5	5	6	7	7	14	14	17	11	9	9	13	9	7	6	8	9	6	5	5	17
28-Mar	4	3	4	4	4	3	5	6	7	13	12	10	23	29	10	11	6	18	11	4	7	13	8	4	29
29-Mar	4	3	4	74	23	11	10	6	8	14	53	30	64	36	29	26	42	14	70	35	17	4	68	62	74
30-Mar	24	14	6	12	4	19	10	13	14	12	20	10	11	11	11	9	19	8	7	10	10	12	12	13	24
31-Mar	13	9	11	12	10	9	12	14	23	29	21	69	33	82	37	15	7	7	8	7	5	5	4	4	82
	40	20	96	74	68	58	70	50	31	32	61	69	92	82	59	55	65	23	70	38	49	32	68	62	
	Diurnal Maximum																								

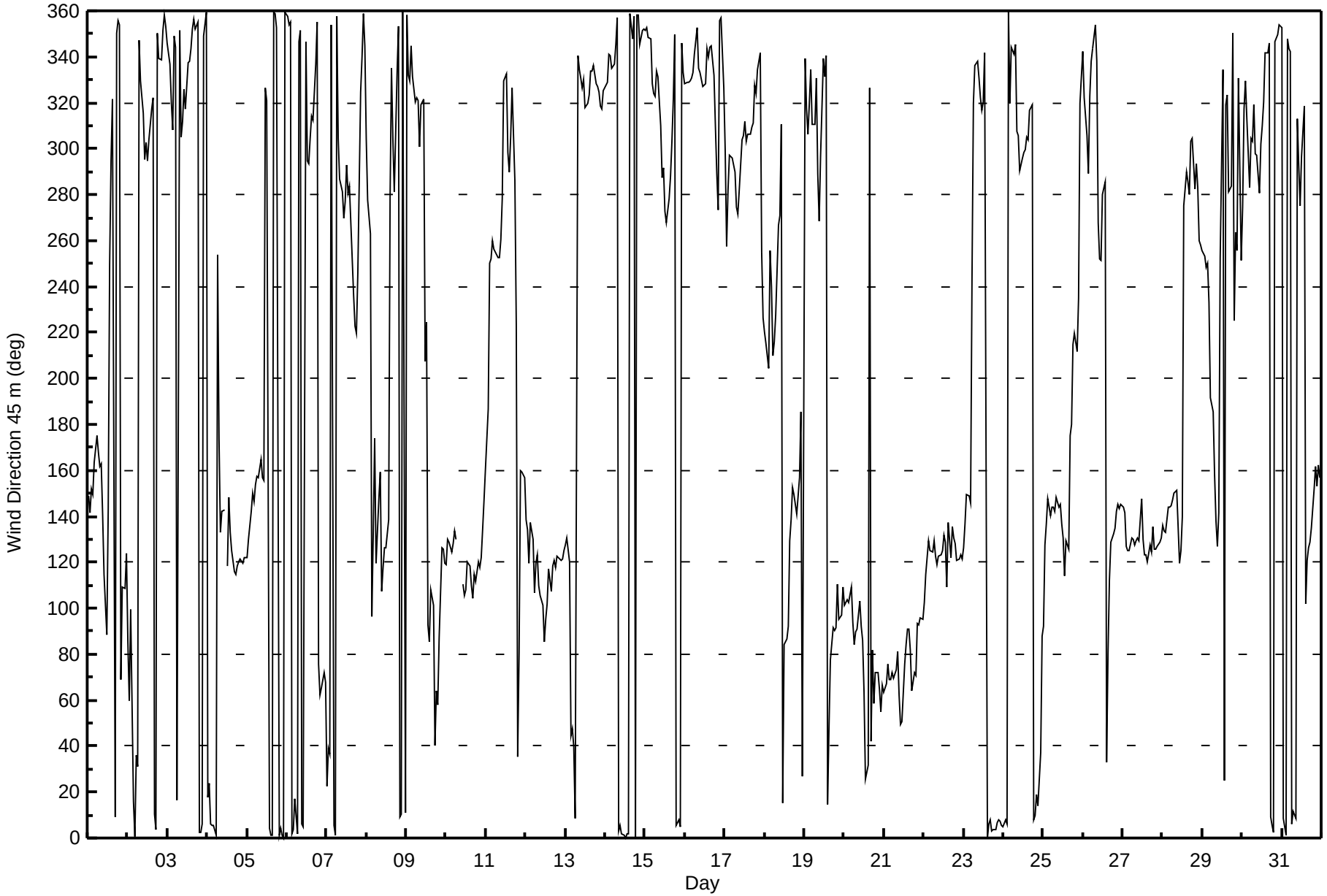
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction 45 m (WD45m) - deg

Mannix - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 75 m (WD75m) - deg

Mannix - March 2016

Direction of Maximum Speed: 7 deg on Mar 30 19:00
Direction of Maximum Daily Speed Average: 355.3 deg on Mar 14

Direction of Minimum Speed: 220 deg on Mar 8 03:00

Direction of Minimum Daily Speed Average: 1.9 deg on Mar 8

Monthly Average Direction: 328.7 deg

Hours in Service:	744
Hours of Data:	731
Hours of Missing Data:	13
Percent Operational Time:	98.3

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	151	146	154	155	163	172	172	171	167	150	140	100	141	178	334	345	22	2	14	2	69	107	110	123	136.8
2-Mar	84	76	101	38	19	49	51	13	345	328	304	316	301	311	327	335	15	11	1	352	349	358	2	360	2.4
3-Mar	358	353	359	335	6	15	43	14	318	323	334	324	344	342	347	354	359	355	358	4	5	8	356	4	355.7
4-Mar	20	27	10	11	10	13	236	176	134	142	143	AF	121	147	134	126	118	117	119	121	123	122	126	126	112.3
5-Mar	123	130	142	151	142	147	152	156	168	171	173	327	330	8	5	5	2	2	357	4	7	4	3	2	30.6
6-Mar	0	358	1	5	7	20	6	354	356	10	11	352	303	297	312	323	324	344	13	77	67	69	76	74	7.6
7-Mar	47	63	75	16	29	28	26	5	314	298	286	274	292	276	289	251	239	227	225	251	327	341	3	354	322.4
8-Mar	324	301	220	129	92	202	88	135	149	109	120	125	127	136	268	343	306	290	336	356	10	19	9	14	40.7
9-Mar	5	341	338	353	343	AF	AF	AF	AF	AF	331	191	134	100	93	117	120	68	92	82	115	140	137	128	71.1
10-Mar	130	127	126	121	122	129	AF	AF	AF	AF	AF	AF	AF	123	119	114	108	116	113	122	119	122	133	146	--
11-Mar	159	185	253	254	262	262	256	257	258	264	281	332	334	300	291	304	329	290	236	26	69	153	159	155	251.7
12-Mar	141	132	119	133	129	109	119	120	109	109	102	92	98	105	120	109	122	123	121	124	122	122	122	125	119.6
13-Mar	125	126	121	60	57	46	22	3	345	346	332	334	323	325	329	338	338	339	332	331	328	322	321	331	341.8
14-Mar	334	335	345	344	339	340	348	360	5	8	4	4	4	5	5	1	352	1	3	2	1	353	358	357	355.3
15-Mar	358	1	358	358	345	340	330	341	340	322	296	296	283	277	286	293	312	327	353	9	10	7	350	338	336.1
16-Mar	333	334	335	335	337	339	346	357	340	338	335	331	333	347	343	348	349	337	316	296	281	0	1	337	336.9
17-Mar	321	270	289	302	303	301	298	281	280	291	305	306	313	306	308	313	315	317	330	327	338	346	271	224	305.2
18-Mar	210	211	209	261	247	214	223	248	271	270	312	19	88	89	101	132	140	156	154	147	158	163	185	79	187.4
19-Mar	35	21	334	331	337	323	332	329	295	291	343	3	358	2	26	58	81	94	95	95	110	97	99	109	56.7
20-Mar	102	105	105	103	111	96	87	93	97	105	94	86	64	35	43	10	53	83	62	76	75	69	61	71	80.0
21-Mar	68	72	78	72	70	73	72	76	82	64	53	53	76	83	93	91	81	68	74	74	94	94	97	98	76.5
22-Mar	106	115	121	125	123	123	127	124	120	122	121	125	131	124	111	132	121	134	130	128	123	124	125	126	123.7
23-Mar	133	140	150	157	156	252	332	346	343	335	329	323	326	346	4	10	12	7	7	7	11	15	17	12	4.9
24-Mar	16	29	26	17	349	358	353	354	335	327	308	304	303	304	310	313	325	331	15	16	24	30	70	121	354.5
25-Mar	135	143	129	133	134	132	131	130	139	147	146	140	135	125	133	128	172	180	219	238	232	247	324	345	142.8
26-Mar	356	351	333	313	334	347	350	358	348	284	256	256	284	290	24	75	111	128	133	135	139	143	141	141	101.0
27-Mar	142	141	130	123	121	125	122	123	126	129	128	143	130	125	125	124	129	127	137	128	126	129	132	134	130.3
28-Mar	138	140	139	141	144	151	156	157	157	142	124	128	144	274	292	287	282	305	305	290	296	294	276	267	206.7
29-Mar	261	255	253	258	257	218	216	197	154	135	162	255	326	22	325	328	297	299	10	227	267	268	307	267	257.5
30-Mar	283	315	334	319	292	307	311	327	311	305	290	308	315	324	344	344	348	11	7	4	350	353	358	356	339.8
31-Mar	357	11	3	351	348	346	5	12	12	315	293	282	297	304	106	117	125	130	136	152	162	158	165	169	24.6
	54.8	69.4	35.5	9.4	6.9	33.4	14.0	12.8	354.2	347.3	342.7	344.1	343.7	349.5	350.3	355.3	6.9	16.1	24.9	25.0	31.1	44.1	50.9	45.6	
	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 75 m (WD75m) - deg

Mannix - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 98 deg on Mar 8 03:00

Minimum Value: 2 deg on Mar 26 22:00

Percentiles: P_1 = 2 P_{10} = 5 Q_1 = 7 Median = 10 Q_3 = 15 P_{90} = 24 P_{99} = 77

Hours in Service:	744
Hours of Data:	731
Hours of Missing Data:	13
Hours of Calibration:	0
Percent Operational Time:	98.3

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	5	4	4	3	3	5	9	6	10	17	37	23	41	88	49	39	10	9	13	5	34	16	14	11	88
2-Mar	16	14	16	36	16	8	17	32	19	17	17	19	19	14	12	15	16	9	5	7	7	8	11	5	36
3-Mar	13	8	10	16	34	24	12	27	12	11	16	10	10	9	13	11	10	11	9	5	8	4	15	12	34
4-Mar	11	15	10	9	13	28	76	39	10	11	9	AF	13	14	15	12	14	14	11	11	10	11	9	10	76
5-Mar	12	7	9	4	6	6	7	6	15	22	29	39	22	6	7	5	5	7	9	4	7	4	5	4	39
6-Mar	6	8	8	6	11	8	8	7	6	8	9	22	16	11	13	18	13	14	19	12	8	7	12	11	22
7-Mar	10	12	12	17	6	5	15	15	12	7	13	11	14	21	19	18	5	10	4	35	7	10	5	9	35
8-Mar	31	24	98	42	90	90	35	20	15	18	21	13	8	50	39	14	12	10	17	9	18	9	7	7	98
9-Mar	15	11	7	7	10	AF	AF	AF	AF	AF	41	80	84	38	22	20	17	13	16	12	17	6	4	7	84
10-Mar	5	6	6	13	11	8	AF	AF	AF	AF	AF	AF	AF	10	11	14	14	13	14	11	13	11	7	12	14
11-Mar	10	14	9	5	6	6	4	4	5	7	9	18	19	18	8	19	19	12	26	46	45	7	5	5	46
12-Mar	5	5	13	5	10	15	17	13	18	16	16	13	14	15	15	16	12	9	10	10	10	10	10	9	18
13-Mar	10	11	18	21	8	5	8	14	11	17	11	10	8	7	7	6	7	7	8	8	8	8	8	9	21
14-Mar	8	8	13	12	9	8	11	10	5	5	4	5	5	5	6	8	10	8	4	3	5	6	5	4	13
15-Mar	6	5	5	5	11	13	10	10	10	12	9	11	9	10	7	9	7	7	13	6	5	7	11	7	13
16-Mar	7	8	8	8	8	9	11	11	11	8	8	9	8	12	10	10	10	9	8	14	6	28	10	12	28
17-Mar	24	6	9	3	3	5	4	8	6	7	13	15	10	13	7	13	14	12	5	7	7	16	45	21	45
18-Mar	5	6	16	6	9	6	12	9	5	23	16	68	27	13	19	17	7	8	7	4	4	7	15	66	68
19-Mar	33	62	9	8	10	13	16	27	17	11	43	18	16	16	16	12	13	13	14	16	16	14	15	16	62
20-Mar	14	14	16	15	15	15	11	12	15	16	15	12	28	16	43	51	43	11	6	10	10	10	8	10	51
21-Mar	7	11	17	10	9	8	7	12	12	12	11	11	18	19	16	14	18	8	8	9	14	12	13	13	19
22-Mar	14	14	11	11	11	10	8	10	11	13	16	16	19	23	40	23	23	23	8	8	10	9	8	7	40
23-Mar	5	6	9	10	11	33	14	6	13	9	11	12	13	16	11	7	6	6	6	5	4	4	5	5	33
24-Mar	4	5	6	4	12	10	5	9	21	16	14	8	7	7	10	11	14	16	6	4	2	8	16	17	21
25-Mar	9	6	6	5	4	5	4	4	8	8	5	10	10	16	13	16	27	10	18	11	10	23	17	6	27
26-Mar	5	9	12	7	15	19	12	16	20	35	62	42	45	29	49	53	24	8	5	3	6	2	6	5	62
27-Mar	7	4	12	8	9	7	11	9	9	13	14	11	11	10	10	13	9	9	5	9	9	6	4	4	14
28-Mar	4	2	2	2	5	2	4	4	6	11	11	11	26	28	9	11	6	17	9	3	6	8	9	4	28
29-Mar	3	3	2	9	7	15	7	10	18	9	42	24	60	30	26	22	43	14	54	45	12	5	42	72	72
30-Mar	18	11	3	11	6	6	9	10	17	10	15	10	11	10	11	8	19	7	5	9	9	11	11	12	19
31-Mar	12	8	10	10	8	7	10	13	20	29	21	67	31	96	36	17	9	7	6	6	3	4	4	7	96
	33	62	98	42	90	90	76	39	21	35	62	80	84	96	49	53	43	23	54	46	45	28	45	72	
	Diurnal Maximum																								

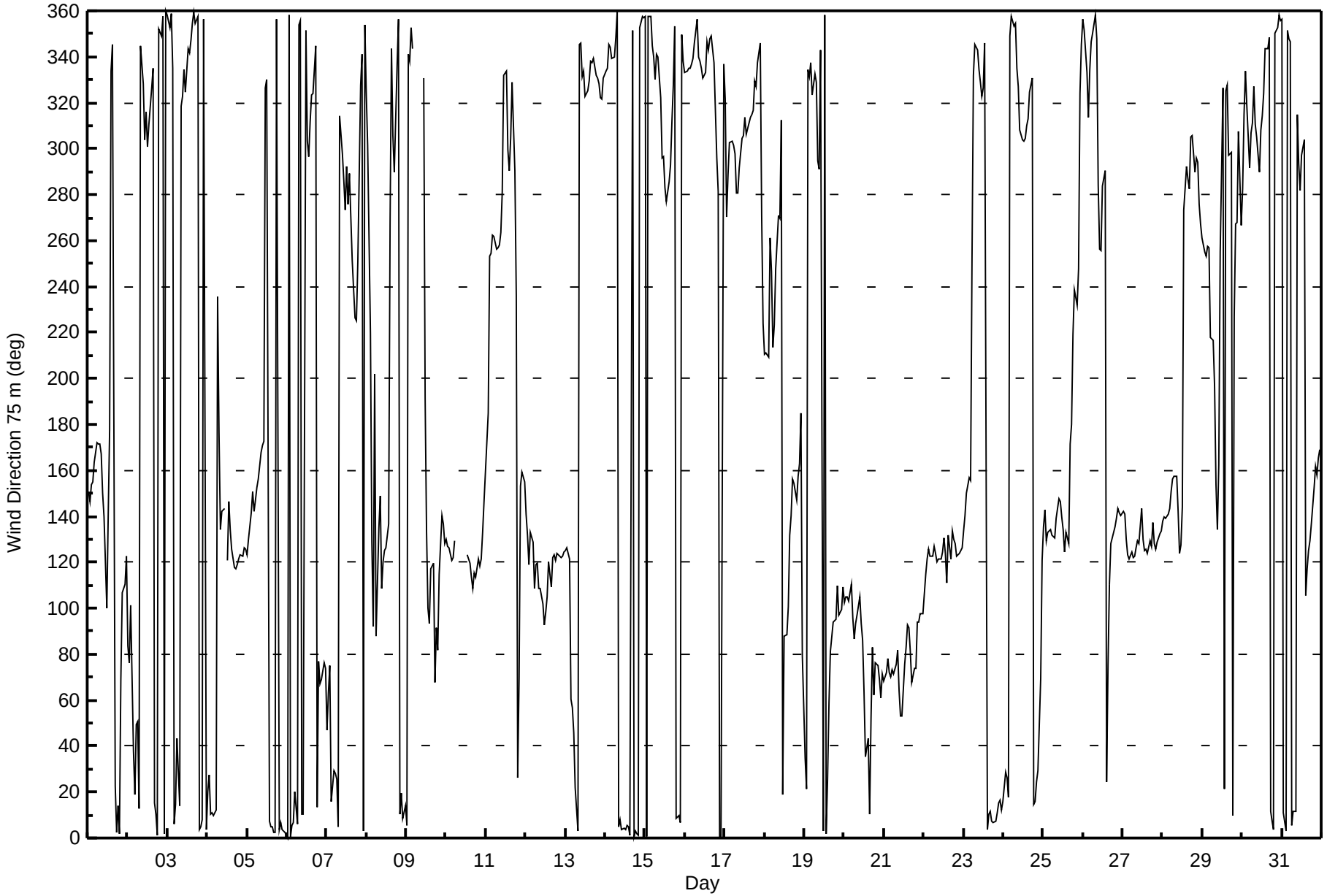
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction 75 m (WD75m) - deg

Mannix - March 2016



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction 90 m (WD90m) - deg

Mannix - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 91 deg on Mar 31 14:00

Minimum Value: 2 deg on Mar 26 22:00

Percentiles: P_1 = 2 P_{10} = 4 Q_1 = 6 Median = 9 Q_3 = 14 P_{90} = 24 P_{99} = 63

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	4	4	4	4	4	5	9	11	7	17	35	22	32	57	58	50	10	8	14	4	32	9	8	7	58
2-Mar	14	11	9	36	15	8	17	35	17	15	21	20	20	15	11	15	15	9	5	5	6	6	10	4	36
3-Mar	11	6	8	13	31	23	12	28	14	11	16	10	9	9	11	10	9	10	8	4	7	4	14	11	31
4-Mar	10	13	9	8	11	29	67	37	9	12	8	AF	10	14	14	10	10	9	6	5	7	8	6	7	67
5-Mar	8	5	8	4	5	5	4	6	11	17	24	45	22	5	6	4	5	7	9	4	6	4	4	4	45
6-Mar	6	7	7	5	11	8	7	6	5	7	8	21	18	11	14	20	12	14	17	10	8	8	12	10	21
7-Mar	9	12	11	21	7	5	8	22	23	8	15	12	14	19	16	15	5	10	4	33	6	10	4	9	33
8-Mar	30	32	84	44	89	74	27	21	14	11	17	14	6	47	51	14	12	9	17	9	17	8	7	8	89
9-Mar	14	13	7	6	9	19	7	18	13	28	53	78	67	35	22	18	12	13	9	10	9	5	4	5	78
10-Mar	5	5	4	7	7	7	AF	AF	AF	AF	AF	AF	AF	AF	11	10	9	9	10	6	8	7	7	9	11
11-Mar	8	14	9	5	6	6	4	4	5	7	9	18	20	18	8	18	18	12	24	45	44	6	6	5	45
12-Mar	4	5	6	6	7	7	12	8	11	13	11	8	8	9	12	11	8	5	4	6	6	6	5	6	13
13-Mar	6	8	14	19	8	5	7	13	9	17	11	10	7	6	6	5	6	6	7	7	7	8	6	8	19
14-Mar	8	7	12	10	8	7	10	8	5	4	4	4	5	5	6	7	10	7	3	3	4	6	5	4	12
15-Mar	5	5	6	5	10	13	10	9	10	13	9	11	10	10	7	10	6	6	12	5	5	7	10	7	13
16-Mar	6	6	7	7	7	8	10	11	10	7	8	8	8	11	8	9	10	8	7	13	6	27	9	13	27
17-Mar	24	6	7	3	3	5	3	7	6	7	13	15	9	12	7	13	14	12	4	6	6	15	51	24	51
18-Mar	6	5	18	6	8	6	14	9	4	22	17	68	29	12	15	15	7	8	6	4	4	6	15	49	68
19-Mar	22	30	51	8	8	12	16	33	24	19	86	15	14	15	16	13	12	8	8	12	14	11	10	13	86
20-Mar	7	8	11	9	12	10	8	7	13	15	15	11	29	16	44	58	34	9	6	9	9	10	8	10	58
21-Mar	7	11	15	10	10	8	7	11	11	12	12	12	18	19	14	12	17	8	7	9	9	6	8	7	19
22-Mar	7	8	7	9	7	7	5	6	6	11	17	17	20	24	37	22	20	22	7	7	6	5	5	4	37
23-Mar	4	4	8	10	17	29	11	5	12	9	11	12	12	15	10	7	6	6	5	4	4	3	4	5	29
24-Mar	4	5	6	5	8	7	4	9	15	16	15	10	7	7	10	11	13	17	5	4	2	10	19	15	19
25-Mar	6	4	10	4	4	5	3	3	6	6	4	8	9	12	12	14	25	10	16	14	10	22	16	6	25
26-Mar	4	6	12	7	15	17	11	14	19	38	65	44	39	31	59	67	24	7	5	3	6	2	5	5	67
27-Mar	5	3	9	6	3	3	4	4	6	11	12	10	10	8	8	12	8	7	5	8	7	5	4	2	12
28-Mar	4	2	2	2	5	3	3	4	6	10	8	10	28	26	9	11	6	17	8	4	6	6	7	4	28
29-Mar	3	5	2	6	5	14	6	9	20	9	42	22	58	31	26	22	48	14	50	43	11	4	36	43	58
30-Mar	15	12	3	11	8	5	9	10	17	10	13	10	10	10	10	7	18	6	5	8	8	10	10	11	18
31-Mar	11	7	8	9	8	7	10	13	22	32	22	68	30	91	34	13	7	5	6	5	2	3	5	9	91
	30	32	84	44	89	74	67	37	24	38	86	78	67	91	59	67	48	22	50	45	44	27	51	49	
	Diurnal Maximum																								

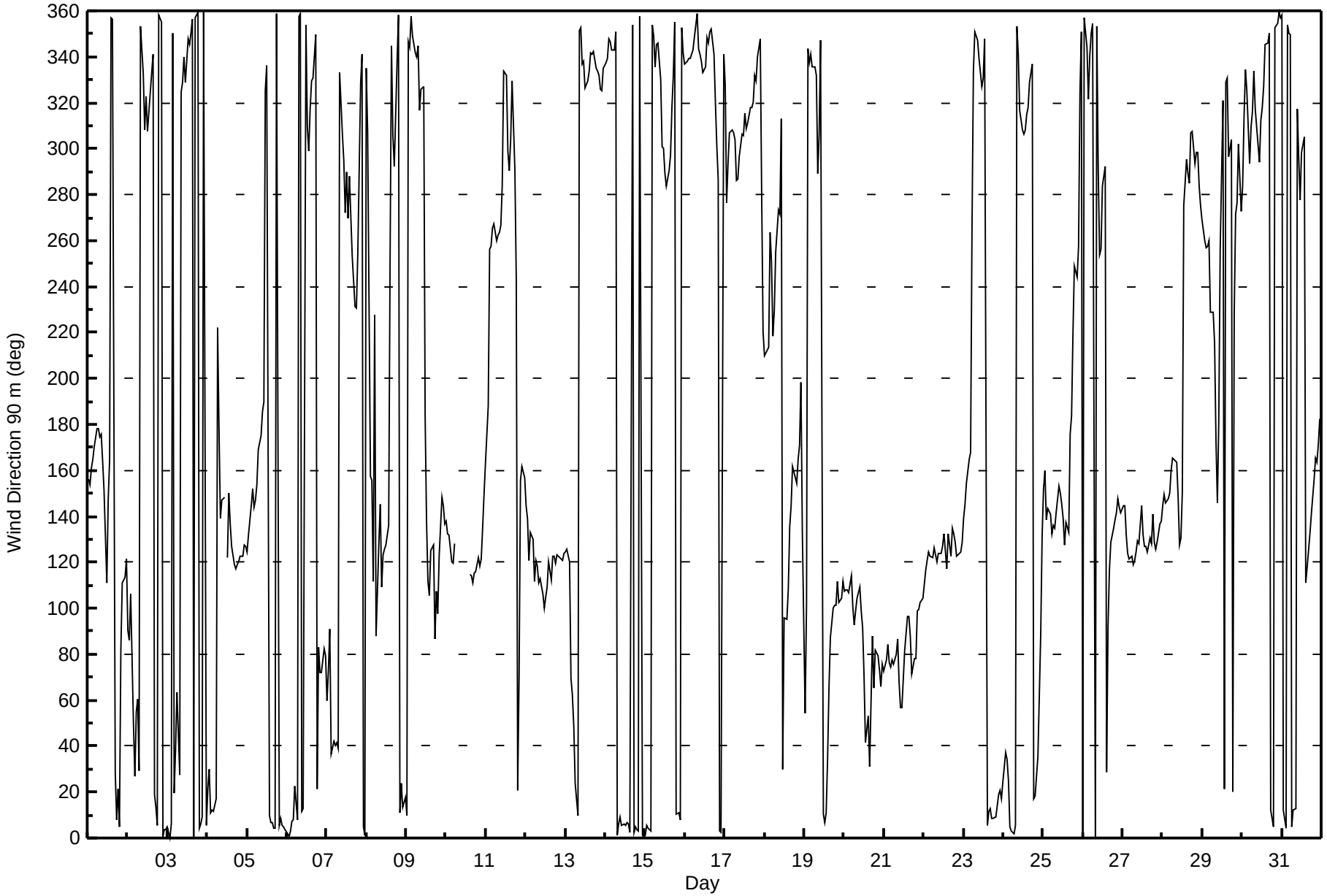
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction 90 m (WD90m) - deg

Mannix - March 2016



Maximum Value: 1.0 km/h on Mar 21 19:00

Maximum Daily Average: 0.7 km/h on Mar 21

Minimum Value: -0.7 km/h on Mar 30 14:00

Minimum Daily Average: -0.2 km/h on Mar 30

Maximum Diurnal Average: 0.2 km/h at hour 22

Minimum Diurnal Average: 0.1 km/h at hour 15

Monthly Average: 0.12 km/h

Percentiles: P_1 = -0.5 P_{10} = -0.3 Q_1 = -0.1 Median = 0.1 Q_3 = 0.4 P_{90} = 0.6 P_{99} = 0.9

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0.5	0.5	0.4	0.3	0.2	-0.1	0.0	0.2	0.2	0.3	0.2	0.4	0.3	0.2	0.2	0.2	0.2	0.1	0.0	-0.1	0.6	0.4	0.4	0.3	0.2	0.6
2-Mar	0.2	0.3	0.3	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	-0.1	0.2	0.1	0.5	-0.1	-0.2	-0.1	-0.1	0.0	0.1	-0.2	0.1	0.5
3-Mar	-0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	-0.1	0.0	-0.2	0.0	-0.1	0.0	-0.3	-0.2	0.0	-0.2	0.0	0.1	0.0	-0.1	0.2	0.0	0.2
4-Mar	0.3	0.3	0.1	0.2	0.0	0.0	0.0	0.0	0.4	0.3	0.6	AF	0.4	0.6	0.4	0.3	0.5	0.5	0.3	0.3	0.3	0.5	0.3	0.3	0.3	0.6
5-Mar	0.3	0.5	0.4	0.5	0.4	0.4	0.1	0.1	0.3	0.3	0.3	0.4	-0.1	0.0	-0.2	-0.3	-0.4	-0.1	-0.1	-0.1	-0.1	-0.3	-0.2	-0.1	0.1	0.5
6-Mar	0.0	-0.2	0.1	0.0	0.1	0.3	0.1	-0.1	-0.4	0.1	0.2	0.0	-0.1	-0.2	-0.1	-0.2	0.0	-0.1	0.1	0.4	0.8	0.8	0.8	0.7	0.1	0.8
7-Mar	0.1	0.2	0.2	-0.1	0.0	0.0	-0.1	0.1	0.0	0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	-0.3	-0.3	-0.2	-0.3	-0.2	-0.2	-0.1	0.1	-0.1	0.2
8-Mar	0.1	0.0	0.1	0.2	0.2	-0.1	0.1	0.2	0.2	0.3	0.4	0.3	0.2	0.2	0.1	0.4	-0.1	0.0	-0.1	-0.2	0.1	0.1	-0.1	0.2	0.1	0.4
9-Mar	0.2	0.1	-0.1	-0.1	0.0	0.1	-0.1	0.0	0.2	-0.1	0.2	0.4	0.3	0.6	0.4	0.5	0.4	0.2	0.2	0.2	0.2	0.1	0.1	0.3	0.2	0.6
10-Mar	0.3	0.4	0.7	0.3	0.2	0.5	0.4	0.3	0.6	0.4	0.5	0.5	0.6	0.4	0.4	0.5	0.6	0.8	0.7	0.2	0.3	0.3	0.5	0.5	0.5	0.8
11-Mar	0.1	0.0	-0.2	-0.3	-0.1	-0.5	-0.5	-0.5	-0.4	-0.1	-0.2	0.0	0.1	-0.1	-0.1	0.0	0.1	0.0	0.0	0.2	0.2	0.1	0.5	0.4	-0.1	0.5
12-Mar	0.5	0.4	0.3	0.4	0.2	0.3	0.1	0.4	0.3	0.5	0.4	0.7	0.6	0.4	0.6	0.7	0.5	0.3	0.4	0.4	0.5	0.3	0.4	0.6	0.4	0.7
13-Mar	0.5	0.4	0.4	0.3	0.4	0.3	0.0	0.0	-0.1	0.0	0.1	-0.1	-0.3	-0.4	-0.3	-0.4	-0.6	-0.7	-0.5	-0.4	-0.5	-0.4	-0.6	-0.4	-0.1	0.5
14-Mar	-0.4	-0.4	-0.2	0.0	-0.3	-0.1	0.1	-0.3	-0.3	-0.2	-0.3	-0.2	-0.2	-0.1	-0.1	0.1	-0.2	0.0	-0.4	-0.2	-0.1	-0.1	-0.2	-0.1	-0.2	0.1
15-Mar	0.0	0.0	-0.1	0.0	0.0	-0.2	-0.1	-0.1	0.1	0.0	0.0	0.2	-0.1	-0.1	0.0	-0.2	-0.2	-0.3	-0.2	0.1	0.1	-0.1	-0.3	-0.4	-0.1	0.2
16-Mar	-0.4	-0.4	-0.5	-0.5	-0.4	-0.4	0.0	-0.1	0.0	-0.1	-0.3	-0.3	-0.2	-0.2	-0.1	-0.1	-0.2	-0.2	-0.2	-0.1	0.0	-0.1	-0.2	-0.1	-0.2	0.0
17-Mar	0.1	-0.1	-0.1	-0.3	-0.2	-0.1	-0.2	-0.1	-0.1	-0.1	0.0	-0.1	-0.3	-0.3	-0.3	-0.3	0.0	-0.1	-0.3	-0.1	-0.3	0.0	-0.1	-0.1	-0.1	0.1
18-Mar	-0.1	-0.1	0.0	-0.3	-0.3	-0.3	-0.4	-0.2	-0.2	-0.2	-0.2	0.0	0.2	0.3	0.5	0.5	0.4	0.5	0.6	0.6	0.5	0.4	0.0	0.1	0.1	0.6
19-Mar	-0.1	0.0	-0.2	-0.2	-0.1	0.0	0.1	0.1	0.0	-0.1	-0.2	0.1	0.6	0.5	0.0	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.2	0.6
20-Mar	0.6	0.4	0.4	0.4	0.6	0.7	0.6	0.6	0.5	0.7	0.7	0.5	0.3	0.3	0.2	0.3	0.2	0.5	0.9	0.9	0.8	0.9	0.7	0.8	0.6	0.9
21-Mar	0.8	0.7	0.7	0.7	0.9	0.9	0.9	0.8	0.6	0.7	0.6	0.8	0.7	0.7	0.4	0.5	0.6	0.9	1.0	1.0	0.6	0.5	0.6	0.5	0.7	1.0
22-Mar	0.5	0.6	0.3	0.6	0.4	0.3	0.4	0.3	0.1	0.2	0.3	0.3	0.0	0.2	0.3	0.2	0.3	0.3	0.4	0.3	0.2	0.2	0.1	0.1	0.3	0.6
23-Mar	0.2	0.4	0.3	0.3	0.2	-0.1	0.0	-0.1	-0.1	-0.2	-0.3	-0.2	0.3	0.2	-0.1	0.0	0.1	-0.2	-0.2	-0.2	-0.1	-0.1	0.0	0.0	0.0	0.4
24-Mar	-0.1	-0.2	-0.1	-0.1	0.0	-0.1	-0.2	0.0	0.3	-0.1	-0.1	-0.1	-0.1	0.0	-0.2	-0.2	0.1	-0.1	0.1	-0.2	0.1	0.1	0.0	0.2	0.0	0.3
25-Mar	0.2	0.0	-0.1	-0.3	0.2	0.2	0.3	0.3	0.2	0.4	0.4	0.2	0.4	0.2	0.4	0.2	0.1	0.2	0.1	-0.1	0.0	0.1	-0.1	-0.1	0.1	0.4
26-Mar	-0.1	0.2	-0.1	-0.1	0.0	0.0	0.0	0.1	0.3	-0.1	0.0	-0.1	0.0	-0.2	0.1	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.2	0.6
27-Mar	0.5	0.6	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.3	0.1	0.1	0.3	0.3	0.3	0.5	0.5	0.4	0.6	0.4	0.5	0.7	0.7	0.4	0.4	0.7
28-Mar	0.6	0.6	0.7	0.4	0.5	0.5	0.6	0.6	0.7	0.5	0.5	0.3	0.3	-0.4	-0.4	-0.4	-0.3	-0.1	-0.3	-0.1	-0.3	-0.2	-0.3	-0.4	0.1	0.7
29-Mar	-0.4	-0.5	-0.5	0.1	0.1	0.0	0.1	0.1	0.3	0.3	0.4	-0.3	0.2	0.4	0.2	0.1	0.0	-0.1	-0.1	-0.1	0.0	-0.1	0.2	0.0	0.0	0.4
30-Mar	-0.1	-0.1	-0.2	-0.1	0.0	0.0	-0.1	-0.3	-0.3	-0.2	-0.4	-0.2	-0.6	-0.7	-0.4	-0.6	-0.4	-0.1	-0.1	0.2	-0.4	-0.5	-0.1	-0.2	-0.2	0.2
31-Mar	-0.3	0.0	0.1	-0.1	-0.2	-0.1	0.2	0.3	0.3	-0.1	0.0	0.4	0.1	0.0	0.2	0.3	0.4	0.3	0.4	0.4	0.3	0.5	0.2	0.4	0.2	0.5
	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	0.2	0.2	0.1	0.2	Diurnal Average	
	0.8	0.7	0.7	0.7	0.9	0.9	0.9	0.8	0.7	0.7	0.7	0.8	0.7	0.7	0.6	0.7	0.6	0.9	1.0	1.0	0.8	0.9	0.8	0.8	Diurnal Maximum	

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Vertical Wind Speed 20 m (VW20m) - km/h

Mannix - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 3.8 km/h on Mar 30 19:00

Minimum Value: 0.2 km/h on Mar 25 01:00

Percentiles: P_1 = 0.2 P_{10} = 0.5 Q_1 = 0.8 Median = 1.2 Q_3 = 1.8 P_{90} = 2.3 P_{99} = 3.3

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	1.1	1.1	0.9	0.8	0.7	0.4	0.4	0.3	0.5	0.8	0.9	1.0	0.8	1.0	0.7	0.7	0.7	0.6	0.3	0.8	1.2	1.4	1.6	1.3	1.6
2-Mar	0.5	0.4	0.9	0.5	0.6	0.6	0.6	0.6	0.8	0.9	0.8	0.9	1.0	0.9	1.2	1.0	1.3	0.9	0.8	1.0	1.2	1.3	1.2	1.2	1.3
3-Mar	1.1	0.7	0.4	0.5	0.7	0.5	0.7	1.0	0.9	0.9	0.9	1.4	1.6	1.7	1.8	2.4	2.6	2.6	2.5	3.0	2.2	2.2	1.4	1.6	3.0
4-Mar	1.4	1.3	1.0	1.1	0.6	0.5	0.4	0.4	0.8	1.1	1.4	AF	1.9	1.9	1.9	1.9	2.2	2.2	2.4	2.2	2.5	2.4	1.7	1.4	2.5
5-Mar	1.8	1.8	0.9	0.9	1.0	0.5	0.4	0.6	1.1	0.9	0.8	0.9	1.4	2.6	2.4	2.6	2.6	2.1	2.0	2.8	2.4	2.4	2.6	2.4	2.8
6-Mar	2.1	2.0	1.8	2.2	2.0	1.5	1.5	1.5	1.9	1.7	1.9	1.5	1.2	1.0	1.1	1.1	1.1	1.4	0.8	0.9	1.3	1.5	1.4	1.3	2.2
7-Mar	0.7	0.9	0.7	0.8	1.3	0.9	0.8	0.6	0.5	0.7	0.7	0.9	0.9	0.8	0.8	1.1	1.3	1.2	1.1	1.1	1.2	1.3	1.1	0.8	1.3
8-Mar	0.5	0.4	0.2	0.3	0.5	0.5	0.6	0.7	1.0	1.0	1.1	1.4	1.4	1.3	0.6	0.8	0.8	0.6	0.6	0.9	0.8	0.6	0.9	1.0	1.4
9-Mar	1.1	0.7	1.0	1.1	1.0	0.8	0.8	0.6	0.7	0.8	0.9	0.9	1.0	1.1	1.0	0.9	0.8	0.3	0.3	0.3	0.4	0.6	0.4	0.8	1.1
10-Mar	1.0	0.4	0.4	0.7	0.8	1.2	2.0	1.9	1.8	2.2	2.6	2.5	2.8	3.3	3.1	2.7	2.9	2.6	2.2	2.2	2.3	2.1	1.6	1.3	3.3
11-Mar	0.8	0.6	0.6	1.1	0.8	0.9	1.1	1.4	1.0	0.9	1.2	1.2	0.9	1.0	1.0	0.8	1.0	0.4	0.5	0.4	0.5	0.8	0.8	0.6	1.4
12-Mar	0.8	0.7	0.7	0.9	0.8	1.1	0.5	1.1	1.1	1.4	1.6	1.6	2.1	2.3	2.6	2.7	2.8	2.7	1.8	1.8	2.2	2.3	2.0	1.9	2.8
13-Mar	1.7	1.2	0.9	0.6	0.8	0.9	0.5	0.5	1.4	1.0	1.2	1.9	1.9	2.1	2.2	2.7	2.8	3.0	2.7	2.8	2.7	2.4	2.3	2.4	3.0
14-Mar	2.5	2.5	2.7	2.4	2.5	2.6	2.5	2.8	2.8	2.4	2.3	2.2	2.3	2.3	2.4	2.3	2.0	2.4	2.6	2.7	2.2	1.6	1.4	1.5	2.8
15-Mar	0.9	0.9	0.9	1.0	0.7	0.6	0.8	0.9	0.9	0.8	0.9	1.1	1.0	1.1	1.3	1.5	1.2	1.4	1.9	1.8	2.2	1.9	2.0	2.2	2.2
16-Mar	2.3	2.3	2.3	2.5	2.2	2.4	2.3	2.0	2.2	2.4	2.3	2.1	2.1	2.0	2.3	2.5	2.5	2.1	1.4	1.0	0.7	1.2	1.1	0.7	2.5
17-Mar	0.4	0.6	0.9	1.3	1.2	1.0	1.0	0.5	0.4	0.8	1.3	1.3	1.6	1.6	1.3	1.1	1.1	1.2	1.3	1.1	1.0	0.8	0.3	0.3	1.6
18-Mar	0.5	0.5	0.3	0.4	0.5	0.7	0.9	0.7	0.4	0.7	1.1	1.1	1.3	1.4	1.3	1.4	1.3	1.1	1.0	0.7	0.6	0.8	0.3	0.3	1.4
19-Mar	0.3	0.2	0.3	0.3	0.3	0.4	0.5	0.5	0.6	0.7	0.9	1.1	1.2	1.2	1.2	1.1	1.4	1.3	1.1	1.7	1.9	2.0	2.1	1.9	2.1
20-Mar	2.1	2.1	1.7	1.7	1.7	1.7	1.4	1.7	1.4	2.0	1.9	1.6	1.3	1.3	1.1	0.8	0.8	1.5	1.8	1.6	1.7	1.5	1.4	1.5	2.1
21-Mar	1.4	1.4	1.6	1.4	1.5	1.6	1.7	1.6	1.6	1.6	1.6	1.6	1.9	1.9	1.8	2.1	2.0	2.0	2.0	2.0	2.2	2.1	2.1	1.8	2.2
22-Mar	2.2	2.1	1.8	1.2	1.0	1.4	1.4	2.0	1.8	1.6	1.5	1.6	1.6	1.5	1.2	1.3	1.4	1.2	1.5	1.4	1.4	1.5	1.7	1.6	2.2
23-Mar	1.3	1.1	0.8	0.5	0.3	0.5	0.6	1.1	1.7	1.9	1.6	1.6	1.8	1.8	2.0	2.1	1.8	1.5	1.9	1.9	1.9	1.4	1.2	0.9	2.1
24-Mar	0.7	0.7	0.6	0.4	0.5	0.6	0.9	1.1	0.8	0.9	1.1	1.3	1.3	1.5	1.5	1.4	1.3	0.9	0.9	0.8	1.0	1.0	0.4	0.4	1.5
25-Mar	0.2	0.2	0.3	0.3	0.5	0.6	0.8	1.0	0.9	1.1	1.2	1.2	1.4	1.2	1.4	0.9	0.6	0.9	0.2	0.3	0.3	0.2	0.6	1.1	1.4
26-Mar	1.1	0.5	0.5	0.5	0.7	1.1	1.1	1.3	1.2	1.0	1.1	1.3	1.4	1.1	0.9	1.1	1.0	1.1	0.9	0.9	0.8	1.0	1.0	1.0	1.4
27-Mar	0.9	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.7	1.5	1.2	1.2	1.4	2.2	2.3	2.1	2.2	1.9	1.6	2.3	2.5	2.2	1.9	1.2	2.5
28-Mar	1.2	1.3	1.2	0.7	0.5	0.9	0.9	1.5	1.4	1.4	1.7	1.5	1.2	1.7	2.1	2.0	1.4	1.0	1.0	0.5	0.5	0.4	0.5	0.4	2.1
29-Mar	0.6	0.6	0.4	0.3	0.2	0.4	0.5	0.6	1.1	1.3	1.0	1.1	1.3	1.3	1.5	1.3	1.1	0.7	0.3	0.4	0.2	0.3	0.3	0.3	1.5
30-Mar	0.3	0.4	0.5	0.6	0.7	0.7	1.1	1.6	1.3	1.5	1.3	1.4	2.0	3.4	3.0	3.2	3.1	3.4	3.8	3.2	3.6	3.4	3.3	3.3	3.8
31-Mar	2.7	2.4	2.5	2.3	2.1	1.8	1.2	1.5	1.5	1.6	1.9	1.8	1.9	1.5	1.3	1.3	1.3	1.2	1.2	0.8	0.8	0.8	0.5	0.5	2.7
	2.7	2.5	2.7	2.5	2.5	2.6	2.5	2.8	2.8	2.4	2.6	2.5	2.8	3.4	3.1	3.2	3.1	3.4	3.8	3.2	3.6	3.4	3.3	3.3	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Vertical Wind Speed 45 m (VW45m) - km/h

Mannix - March 2016

Maximum Value: 1.5 km/h on Mar 28 03:00

Maximum Daily Average: 0.9 km/h on Mar 10

Minimum Value: -2.0 km/h on Mar 13 17:00

Minimum Daily Average: -1.0 km/h on Mar 14

Maximum Diurnal Average: 0.1 km/h at hour 2

Minimum Diurnal Average: -0.1 km/h at hour 15

Monthly Average: 0.02 km/h

Percentiles: P_1 = -1.5 P_{10} = -0.7 Q_1 = -0.4 Median = 0.0 Q_3 = 0.5 P_{90} = 0.8 P_{99} = 1.3

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Hours of Calibration:	0
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0.9	0.9	0.9	0.7	0.5	0.3	0.4	0.4	0.2	0.4	0.1	0.3	0.3	0.2	0.2	0.0	0.1	-0.2	-0.1	-0.3	0.5	0.7	0.7	0.7	0.4	0.9
2-Mar	0.4	0.2	0.5	0.1	-0.2	0.0	0.0	0.0	-0.2	0.0	0.1	0.0	-0.3	-0.2	0.3	-0.1	0.3	-0.3	-0.5	-0.5	-0.5	-0.3	-0.4	-0.6	-0.1	0.5
3-Mar	-0.5	-0.2	-0.1	-0.1	-0.2	0.0	-0.1	-0.5	-0.1	-0.2	-0.2	-0.5	-0.5	-0.6	-0.4	-0.7	-0.3	-0.2	-0.8	-0.7	-0.3	-0.8	-0.3	-0.2	-0.3	0.0
4-Mar	-0.1	0.0	-0.3	0.0	-0.1	-0.1	0.0	0.1	0.6	0.7	0.9	AF	0.4	1.4	0.9	0.6	0.9	0.7	0.3	0.6	0.6	0.9	0.6	0.5	0.4	1.4
5-Mar	0.5	1.0	0.8	0.9	1.0	0.8	0.3	0.3	0.7	0.5	0.3	0.3	-0.3	-1.1	-0.8	-1.1	-1.3	-0.8	-0.6	-1.5	-0.8	-1.4	-1.4	-1.1	-0.2	1.0
6-Mar	-0.6	-0.9	-0.4	-0.9	-0.5	-0.1	-0.4	-0.5	-1.3	-0.3	-0.1	0.0	-0.2	-0.3	-0.5	-0.5	-0.3	-0.7	0.0	0.2	0.4	0.3	1.0	0.6	-0.3	1.0
7-Mar	-0.1	0.2	0.2	-0.4	-0.5	-0.4	-0.3	0.0	-0.1	0.0	-0.1	-0.2	0.0	-0.2	-0.1	0.0	-0.2	-0.1	-0.1	-0.3	-0.6	-0.7	-0.5	-0.1	-0.2	0.2
8-Mar	0.1	0.0	0.1	0.2	0.1	0.1	0.2	0.5	0.5	0.4	0.6	0.7	0.2	0.4	0.0	0.4	-0.3	0.1	-0.4	-0.5	-0.2	-0.1	-0.4	-0.3	0.1	0.7
9-Mar	-0.2	-0.2	-0.4	-0.4	-0.4	0.0	-0.2	-0.2	0.3	-0.1	0.1	0.5	0.4	0.5	0.4	0.6	0.5	0.1	0.1	0.2	0.2	0.6	0.5	0.5	0.2	0.6
10-Mar	0.7	0.9	1.3	0.6	0.6	1.3	1.1	AF	AF	AF	1.2	0.8	0.9	1.0	0.6	1.1	0.6	1.1	1.3	0.6	0.5	0.5	1.0	1.2	0.9	1.3
11-Mar	0.5	0.2	-0.3	-0.2	-0.2	-0.5	-0.6	-0.5	-0.4	-0.2	-0.4	-0.4	-0.1	-0.2	-0.2	0.0	0.0	-0.2	0.0	0.0	0.1	0.6	0.8	0.8	-0.1	0.8
12-Mar	0.9	0.9	0.5	0.8	0.6	0.5	0.4	0.7	0.4	0.8	0.6	0.6	0.5	0.6	0.9	0.9	0.7	0.6	0.5	0.8	0.7	0.5	0.6	0.8	0.7	0.9
13-Mar	0.8	0.6	0.6	0.2	0.3	0.1	-0.3	-0.2	-0.4	0.0	-0.2	-0.6	-0.6	-0.9	-1.1	-1.7	-2.0	-1.9	-1.4	-1.4	-1.5	-0.8	-1.1	-1.2	-0.6	0.8
14-Mar	-1.4	-1.2	-0.9	-0.7	-1.2	-1.2	-0.4	-1.1	-1.4	-1.3	-1.3	-1.1	-1.1	-0.9	-0.8	-0.4	-0.6	-0.7	-1.3	-1.4	-0.7	-0.6	-0.7	-0.7	-1.0	-0.4
15-Mar	-0.3	-0.3	-0.4	-0.3	-0.2	-0.3	-0.3	-0.5	-0.3	0.0	0.0	0.2	-0.2	-0.2	0.0	-0.2	-0.4	-0.6	-0.6	-0.5	-0.9	-0.6	-0.7	-1.3	-0.4	0.2
16-Mar	-1.3	-1.2	-1.3	-1.5	-1.2	-1.1	-0.6	-0.4	-0.4	-0.9	-1.1	-0.9	-0.9	-1.0	-0.8	-0.7	-0.6	-0.9	-0.5	-0.4	-0.2	-0.5	-0.6	-0.4	-0.8	-0.2
17-Mar	-0.1	-0.1	-0.3	-0.5	-0.5	-0.6	-0.6	-0.3	-0.3	-0.2	-0.3	-0.4	-0.7	-0.5	-0.7	-0.5	-0.5	-0.3	-0.8	-0.4	-0.7	-0.4	0.0	0.0	-0.4	0.0
18-Mar	0.1	0.0	0.1	-0.3	-0.3	-0.1	-0.1	-0.3	-0.3	-0.1	-0.5	0.1	0.2	0.1	0.4	0.9	0.7	1.2	1.3	1.1	1.1	1.0	0.2	0.1	0.3	1.3
19-Mar	-0.1	-0.1	-0.3	-0.1	-0.1	-0.2	0.1	0.0	-0.1	-0.1	-0.3	-0.3	0.6	0.5	-0.1	0.5	0.3	0.5	0.3	0.4	0.5	0.6	0.6	0.8	0.2	0.8
20-Mar	0.7	0.4	0.7	0.7	1.4	0.6	0.2	0.7	0.6	1.0	0.9	0.1	-0.1	0.1	0.1	0.4	0.2	0.3	0.5	0.7	0.7	0.6	0.4	0.6	0.5	1.4
21-Mar	0.4	0.5	0.7	0.7	0.8	0.8	1.0	0.6	0.4	0.4	0.3	0.6	0.8	0.6	0.2	0.6	0.3	0.5	0.5	0.7	0.6	0.6	0.7	0.5	0.6	1.0
22-Mar	0.7	0.9	0.5	0.9	0.4	0.4	0.5	0.5	0.0	0.1	0.4	0.8	0.3	0.2	0.5	0.5	0.5	0.5	0.6	0.4	0.3	0.2	0.4	0.4	0.5	0.9
23-Mar	0.7	0.8	0.6	0.3	0.3	0.0	-0.2	-0.5	-0.7	-0.9	-0.5	-0.4	0.6	0.1	-0.7	-0.7	-0.4	-0.7	-0.8	-0.9	-0.9	-0.8	-0.5	-0.6	-0.3	0.8
24-Mar	-0.5	-0.4	-0.4	-0.3	-0.3	-0.5	-0.6	-0.2	0.1	-0.1	-0.2	-0.2	-0.3	-0.2	-0.5	-0.4	0.2	-0.4	-0.2	-0.5	-0.5	-0.5	0.0	0.2	-0.3	0.2
25-Mar	0.2	0.4	0.6	0.5	0.6	0.5	0.7	0.7	0.6	0.7	0.7	0.5	0.5	0.3	0.5	0.2	0.3	0.2	0.1	0.0	0.1	0.0	-0.4	-0.5	0.3	0.7
26-Mar	-0.5	0.0	-0.3	-0.2	-0.2	-0.2	-0.3	-0.3	0.1	-0.2	0.1	0.1	-0.1	-0.4	0.0	0.5	0.7	0.6	0.8	1.2	1.2	1.3	1.2	1.2	0.3	1.3
27-Mar	1.1	1.4	0.8	0.7	0.8	1.2	0.9	1.0	1.0	0.4	0.3	0.4	0.6	0.6	0.6	0.8	1.0	0.8	1.2	0.7	1.1	1.3	1.2	0.9	0.9	1.4
28-Mar	1.1	1.4	1.5	1.0	1.0	1.2	1.2	1.3	1.2	0.8	0.6	0.4	0.4	-0.3	-0.9	-0.7	-0.5	-0.5	-0.7	-0.7	-0.7	-0.6	-0.3	-0.5	0.3	1.5
29-Mar	-0.4	-0.6	-0.5	0.0	0.0	0.0	0.1	0.2	0.5	0.4	0.6	-0.3	0.0	0.2	0.2	-0.3	0.0	-0.3	0.0	0.0	-0.1	-0.2	0.0	0.0	0.0	0.6
30-Mar	-0.1	-0.4	-0.6	-0.5	-0.2	-0.3	-0.4	-0.5	-0.6	-0.3	-0.5	-0.5	-1.1	-1.7	-0.9	-1.7	-1.4	-1.4	-1.7	-0.6	-1.3	-1.2	-0.9	-1.1	-0.8	-0.1
31-Mar	-0.7	-0.6	-0.6	-0.7	-0.7	-0.6	-0.1	0.0	0.1	-0.3	-0.3	0.5	-0.1	-0.2	0.1	0.5	0.4	0.6	0.9	0.7	0.8	0.9	0.7	1.0	0.1	1.0
	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	-0.1	-0.1	0.0	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.1	0.1	Diurnal Average	
	1.1	1.4	1.5	1.0	1.4	1.3	1.2	1.3	1.2	1.0	1.2	0.8	0.9	1.4	0.9	1.1	1.0	1.2	1.3	1.2	1.2	1.3	1.2	1.2	Diurnal Maximum	

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Vertical Wind Speed 45 m (VW45m) - km/h

Mannix - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 4.0 km/h on Mar 30 21:00

Minimum Value: 0.2 km/h on Mar 18 00:00

Percentiles: P_1 = 0.2 P_{10} = 0.5 Q_1 = 0.8 Median = 1.3 Q_3 = 1.9 P_{90} = 2.4 P_{99} = 3.5

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Hours of Calibration:	0
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	1.2	1.1	0.8	0.8	0.6	0.3	0.4	0.3	0.5	0.9	0.9	1.1	1.1	0.9	0.8	0.7	0.7	0.5	0.3	0.6	1.3	1.5	1.8	1.2	1.8
2-Mar	0.8	0.7	0.9	0.6	0.6	0.6	0.6	0.6	0.9	1.0	1.0	1.1	1.1	1.1	1.5	1.2	1.5	0.6	0.6	0.9	1.2	1.4	1.1	1.1	1.5
3-Mar	1.0	0.9	0.5	0.5	0.6	0.6	0.7	0.9	1.0	1.1	1.2	1.7	1.9	1.8	2.2	2.6	3.0	3.1	2.6	2.7	2.2	1.9	1.7	1.8	3.1
4-Mar	1.6	1.5	1.3	1.2	0.7	0.5	0.3	0.4	0.9	1.3	1.6	AF	2.1	2.2	2.2	1.9	2.2	2.2	2.3	2.0	2.3	2.4	1.5	1.4	2.4
5-Mar	1.9	1.9	0.8	0.6	0.7	0.4	0.6	0.8	0.9	0.9	0.8	1.1	1.6	2.2	2.2	2.4	2.2	2.0	1.9	2.2	2.4	1.9	2.1	2.0	2.4
6-Mar	2.2	1.7	2.0	1.9	2.1	1.6	1.4	1.4	1.5	1.8	2.2	1.7	1.4	1.3	1.3	1.4	1.5	1.5	0.9	1.1	1.3	1.5	1.6	1.6	2.2
7-Mar	0.8	0.9	0.8	0.8	0.8	0.7	0.8	0.5	0.5	0.6	0.4	0.8	1.0	0.9	0.9	1.3	1.1	1.1	0.9	1.1	1.5	1.3	0.9	0.7	1.5
8-Mar	0.6	0.5	0.3	0.6	0.7	0.8	0.8	0.6	0.9	1.1	1.2	1.4	1.3	1.5	0.5	1.0	0.9	0.7	0.5	0.8	0.8	0.7	0.8	1.0	1.5
9-Mar	1.2	0.7	1.0	1.0	0.9	0.9	0.8	0.4	0.8	1.1	0.9	1.0	1.1	1.2	1.2	1.2	1.0	0.4	0.3	0.4	0.8	0.6	0.5	0.7	1.2
10-Mar	1.0	0.5	0.3	0.8	0.9	1.2	2.2	AF	AF	AF	2.4	2.4	2.8	3.2	3.1	2.7	2.8	2.8	2.5	2.0	2.3	2.0	1.9	1.4	3.2
11-Mar	1.0	0.6	0.5	0.8	0.6	0.7	0.9	0.9	0.8	1.0	1.1	1.5	1.2	1.2	1.1	0.9	1.2	0.5	0.5	0.4	0.5	0.5	0.6	0.5	1.5
12-Mar	0.6	0.5	1.0	1.0	0.8	1.3	0.8	1.4	1.4	1.6	1.7	1.7	2.0	2.5	2.8	2.9	2.7	2.4	1.6	1.7	2.2	2.3	1.9	1.8	2.9
13-Mar	2.0	1.3	1.2	0.7	0.8	0.7	0.5	0.5	1.5	1.3	1.6	2.2	2.4	2.4	2.6	2.8	3.2	3.2	3.3	3.5	3.4	3.0	2.7	2.8	3.5
14-Mar	3.0	3.1	2.8	2.8	2.9	3.1	3.0	2.8	2.4	2.0	1.8	1.8	1.9	2.0	2.0	2.2	2.3	2.5	2.0	2.0	1.9	1.7	1.3	1.1	3.1
15-Mar	1.0	1.0	1.0	0.9	0.7	0.6	0.8	0.9	1.0	1.0	1.1	1.4	1.1	1.1	1.6	1.7	1.4	1.7	1.9	1.9	2.1	1.9	2.2	2.4	2.4
16-Mar	2.6	2.7	2.9	2.9	2.5	3.0	2.6	2.4	2.8	2.9	2.8	2.7	2.5	2.2	2.7	2.8	3.0	2.5	1.7	1.0	0.6	1.2	1.1	0.8	3.0
17-Mar	0.6	0.3	0.9	1.0	1.0	0.8	0.8	0.4	0.5	1.0	1.6	1.7	2.0	1.9	1.6	1.4	1.4	1.6	1.4	1.3	1.0	0.9	0.3	0.2	2.0
18-Mar	0.2	0.2	0.3	0.3	0.4	0.2	0.4	0.4	0.2	0.8	1.3	1.4	1.5	1.4	1.5	1.6	1.4	1.1	0.7	0.6	0.6	0.7	0.4	0.3	1.6
19-Mar	0.4	0.2	0.3	0.2	0.4	0.5	0.6	0.5	0.7	0.4	0.5	1.1	1.4	1.5	1.3	1.2	1.5	1.6	1.4	1.9	2.3	2.3	2.4	2.1	2.4
20-Mar	1.9	2.1	1.8	1.7	1.9	1.6	1.4	1.8	1.5	2.2	2.2	1.6	1.4	1.4	1.3	1.1	1.0	1.6	1.9	2.0	2.0	1.6	1.5	1.7	2.2
21-Mar	1.4	1.6	1.7	1.6	1.8	1.8	1.9	1.7	1.8	1.9	1.9	1.9	2.3	2.2	2.0	2.3	2.1	2.1	2.2	2.2	2.2	2.2	2.2	1.9	2.3
22-Mar	2.1	2.1	1.7	1.4	1.2	1.4	1.4	2.0	1.6	1.6	1.9	2.0	2.1	2.0	1.7	1.8	1.6	1.5	1.5	1.5	1.2	1.3	1.4	1.1	2.1
23-Mar	0.9	1.1	0.8	0.5	0.4	0.2	0.6	1.2	2.0	2.3	2.1	2.1	2.5	2.3	2.2	1.9	1.8	1.3	1.6	1.8	1.8	1.3	1.0	0.8	2.5
24-Mar	0.5	0.3	0.4	0.3	0.3	0.3	0.9	1.2	0.8	1.1	1.2	1.5	1.7	1.9	1.9	1.8	1.8	1.2	0.9	0.8	1.2	0.9	0.5	0.6	1.9
25-Mar	0.3	0.4	0.4	0.3	0.5	0.6	0.8	0.9	1.0	1.4	1.3	1.5	1.4	1.1	1.6	1.1	0.6	0.8	0.2	0.3	0.2	0.3	0.7	1.2	1.6
26-Mar	1.0	0.8	0.5	0.4	1.0	1.4	1.4	1.7	1.5	1.1	1.4	1.6	1.6	1.3	1.2	1.2	1.3	1.1	0.8	0.6	0.6	0.8	1.0	0.9	1.7
27-Mar	0.8	0.8	1.1	1.2	1.1	1.1	1.1	1.3	1.7	1.6	1.4	1.4	1.7	2.2	2.4	2.3	2.2	1.8	1.6	2.3	2.7	2.1	1.7	1.0	2.7
28-Mar	0.9	0.9	0.9	0.6	0.6	0.8	1.1	1.5	1.6	1.6	1.7	1.5	1.3	1.9	2.2	1.9	1.3	1.2	1.0	0.6	0.5	0.6	0.4	0.4	2.2
29-Mar	0.3	0.4	0.5	0.4	0.5	0.5	0.5	0.5	0.9	1.3	1.2	1.2	1.5	1.7	2.0	1.8	1.4	0.9	0.5	0.5	0.3	0.2	0.5	0.6	2.0
30-Mar	0.5	0.3	0.4	0.4	0.4	0.7	1.2	1.9	1.6	1.8	1.5	1.7	2.5	3.7	3.3	3.4	3.1	3.1	3.4	3.5	4.0	3.6	3.5	3.6	4.0
31-Mar	3.1	2.4	2.5	2.4	2.3	1.9	1.3	1.7	1.9	1.9	2.4	2.3	2.5	1.8	1.5	1.5	1.3	1.2	1.1	0.8	0.6	0.6	0.5	0.3	3.1
	3.1	3.1	2.9	2.9	2.9	3.1	3.0	2.8	2.8	2.9	2.8	2.7	2.8	3.7	3.3	3.4	3.2	3.2	3.4	3.5	4.0	3.6	3.5	3.6	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

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

Mannix - March 2016

Maximum Value: 1.2 km/h on Mar 20 05:00

Maximum Daily Average: 0.3 km/h on Mar 21

Minimum Value: -1.2 km/h on Mar 13 17:00

Minimum Daily Average: -0.3 km/h on Mar 14

Maximum Diurnal Average: 0.1 km/h at hour 10

Minimum Diurnal Average: -0.1 km/h at hour 20

Monthly Average: 0.06 km/h

Percentiles: P_1 = -0.9 P_{10} = -0.4 Q_1 = -0.1 Median = 0.1 Q_3 = 0.3 P_{90} = 0.5 P_{99} = 0.9

Hours in Service:	744
Hours of Data:	731
Hours of Missing Data:	13
Hours of Calibration:	0
Percent Operational Time:	98.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0.6	0.6	0.8	0.7	0.4	0.2	0.3	0.3	0.2	0.2	-0.1	0.2	0.3	0.2	0.3	0.1	0.2	-0.1	0.1	0.0	0.3	0.5	0.6	-0.2	0.3	0.8
2-Mar	0.4	0.1	0.7	0.3	0.0	0.1	0.1	0.3	0.0	0.1	0.3	0.1	-0.2	0.1	0.5	0.2	0.4	-0.1	-0.1	0.0	0.0	0.0	0.0	-0.2	0.1	0.7
3-Mar	0.0	0.1	-0.1	0.1	0.0	0.0	0.1	0.0	0.4	0.2	0.0	0.0	0.2	-0.2	0.1	0.2	0.9	0.8	0.3	-0.1	0.3	-0.2	0.2	0.2	0.1	0.9
4-Mar	0.1	0.2	-0.1	0.2	0.0	0.0	0.1	0.1	0.1	0.3	0.2	AF	-0.1	1.0	0.3	-0.2	0.4	0.0	-0.6	-0.4	-0.4	0.0	-0.2	-0.3	0.0	1.0
5-Mar	-0.2	-0.2	0.3	0.7	0.3	0.6	0.4	0.2	0.5	0.3	0.1	0.5	0.1	-0.5	-0.3	-0.4	-0.7	-0.2	0.4	-0.9	-0.2	-0.8	-1.0	-0.6	-0.1	0.7
6-Mar	-0.1	-0.4	0.4	-0.5	-0.1	0.0	-0.1	-0.1	-0.9	0.0	0.4	0.4	0.3	0.2	0.0	-0.1	-0.1	-0.2	0.3	0.1	0.3	0.2	0.7	0.4	0.1	0.7
7-Mar	0.1	0.4	0.3	0.0	0.0	0.1	0.1	0.1	0.2	0.4	0.2	0.2	0.3	-0.1	0.0	0.3	0.1	0.0	-0.1	0.1	-0.2	-0.4	-0.3	0.2	0.1	0.4
8-Mar	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.4	0.2	0.3	0.2	-0.7	0.2	0.1	0.6	0.1	0.2	-0.1	-0.4	0.1	0.0	-0.2	-0.1	0.1	0.6
9-Mar	0.0	0.1	0.0	-0.1	0.0	AF	AF	AF	AF	AF	0.1	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.0	0.1	0.3	0.3	0.0	-0.2	0.1	0.4
10-Mar	0.1	-0.2	-0.3	-0.3	-0.3	-0.3	AF	AF	AF	AF	AF	AF	AF	-0.3	-0.2	0.5	0.5	0.4	1.2	-0.4	-0.3	-0.5	-0.1	0.8	--	1.2
11-Mar	0.3	0.2	0.1	0.3	0.3	0.0	-0.2	0.2	-0.1	0.2	0.2	-0.1	0.0	0.1	0.3	0.2	0.2	0.1	0.2	0.0	0.0	0.5	0.7	0.8	0.2	0.8
12-Mar	0.3	0.0	-0.1	-0.1	-0.1	0.4	0.1	0.2	0.4	0.8	0.5	0.2	0.1	0.2	0.1	0.3	-0.4	-0.5	-0.6	-0.3	-0.4	-0.6	-0.6	-0.4	0.0	0.8
13-Mar	-0.3	-0.2	0.2	0.4	0.3	0.1	-0.1	0.0	-0.1	0.5	0.3	0.0	0.0	-0.2	-0.5	-0.8	-1.2	-1.0	-0.7	-0.6	-0.5	0.0	-0.4	-0.7	-0.2	0.5
14-Mar	-0.7	-0.5	0.0	0.2	-0.5	-0.2	0.3	-0.3	-1.0	-1.0	-0.7	-0.7	-0.5	-0.3	-0.3	0.2	0.3	-0.1	-0.8	-0.7	-0.1	-0.2	-0.3	-0.2	-0.3	0.3
15-Mar	0.0	-0.1	0.0	0.1	0.1	-0.1	0.0	-0.2	0.0	0.4	0.4	0.5	0.1	0.1	0.5	0.6	0.2	-0.1	0.1	-0.1	-0.5	0.0	0.0	-0.4	0.1	0.6
16-Mar	-0.6	-0.7	-0.7	-0.8	-0.6	-0.6	0.1	0.5	-0.1	-0.3	-0.6	-0.1	-0.5	-0.2	-0.1	0.2	0.2	-0.5	0.0	0.2	0.3	-0.3	-0.5	-0.5	-0.3	0.5
17-Mar	0.0	0.2	0.2	0.3	0.3	0.2	0.3	0.2	0.1	0.3	0.2	0.1	-0.1	0.0	-0.2	-0.1	0.1	0.2	-0.3	0.0	-0.4	-0.1	0.1	0.1	0.1	0.3
18-Mar	0.1	0.1	0.1	0.0	-0.1	0.0	0.0	-0.1	0.0	0.1	-0.4	0.0	0.1	-0.2	0.3	0.3	0.1	0.7	0.9	0.7	1.0	0.9	0.2	0.2	0.2	1.0
19-Mar	0.1	0.1	0.0	0.0	0.0	-0.1	0.2	0.1	0.1	0.0	-0.2	-0.1	0.6	0.7	0.1	0.3	0.0	0.2	0.0	0.0	0.0	0.5	0.1	0.7	0.1	0.7
20-Mar	0.6	0.1	0.4	0.7	1.2	0.2	-0.3	0.3	0.6	0.9	0.7	-0.5	-0.2	0.2	0.0	0.4	0.3	-0.2	0.4	0.2	0.4	0.4	0.4	0.4	0.3	1.2
21-Mar	0.1	0.3	0.5	0.6	0.9	0.5	0.6	0.5	0.0	0.3	0.3	0.6	0.8	0.3	-0.3	0.1	-0.1	0.4	0.0	0.3	0.2	0.2	0.5	0.3	0.3	0.9
22-Mar	0.6	0.3	-0.3	0.2	-0.2	-0.4	-0.4	-0.4	-0.5	-0.2	0.1	0.6	0.0	-0.3	0.7	0.1	0.1	0.2	0.0	-0.3	-0.5	-0.4	-0.4	-0.4	-0.1	0.7
23-Mar	0.0	0.3	0.4	0.1	0.3	0.0	-0.1	-0.2	-0.3	-0.6	0.2	0.2	1.2	0.9	-0.1	-0.4	-0.4	-0.3	-0.3	-0.4	-0.5	-0.3	0.0	-0.3	0.0	1.2
24-Mar	-0.1	0.0	0.1	0.1	0.0	0.1	-0.4	-0.1	0.0	0.0	0.2	0.2	0.2	0.3	0.0	0.2	0.7	0.0	0.1	-0.1	-0.1	0.0	0.1	0.0	0.1	0.7
25-Mar	0.1	0.3	0.0	0.0	-0.1	-0.2	-0.1	0.0	0.1	0.6	0.4	-0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.0	0.2	0.1	0.6
26-Mar	-0.1	0.1	0.0	0.2	0.0	0.2	0.1	0.0	0.4	0.0	0.3	0.0	-0.2	-0.4	0.2	0.6	0.6	0.0	0.1	0.1	0.3	0.4	0.4	0.4	0.2	0.6
27-Mar	0.4	0.5	0.1	-0.4	-0.4	-0.3	-0.2	0.0	-0.1	-0.1	-0.1	0.0	0.1	-0.3	-0.3	0.2	-0.1	-0.4	0.0	-0.5	-0.3	-0.1	-0.3	-0.1	-0.1	0.5
28-Mar	0.1	0.2	0.4	0.2	0.4	1.0	0.8	0.8	0.7	0.3	-0.2	-0.1	0.2	0.5	0.1	0.4	0.4	0.1	0.0	0.1	0.1	0.2	0.2	0.0	0.3	1.0
29-Mar	0.1	0.0	-0.1	0.1	0.1	0.0	0.0	-0.2	0.2	0.1	0.4	0.0	0.3	0.2	0.5	0.1	0.0	-0.1	0.1	0.1	0.2	0.3	0.2	0.0	0.1	0.5
30-Mar	0.2	0.0	-0.2	0.0	0.6	0.1	0.3	0.1	-0.4	0.2	0.0	0.0	-0.4	-0.4	0.0	-0.9	-0.5	-0.7	-0.8	0.4	-0.4	0.3	0.3	0.2	-0.1	0.6
31-Mar	0.4	-0.2	0.1	-0.1	0.0	-0.1	0.3	0.4	0.3	0.0	-0.3	0.6	0.3	-0.2	-0.2	0.0	-0.5	-0.1	0.2	0.6	0.6	0.6	0.5	0.4	0.2	0.6
	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	Diurnal Average	
	0.6	0.6	0.8	0.7	1.2	1.0	0.8	0.8	0.7	0.9	0.7	0.6	1.2	1.0	0.7	0.6	0.9	0.8	1.2	0.7	1.0	0.9	0.7	0.8	Diurnal Maximum	

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

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

Mannix - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 3.8 km/h on Mar 10 17:00

Minimum Value: 0.1 km/h on Mar 18 01:00

Percentiles: P_1 = 0.2 P_{10} = 0.4 Q_1 = 0.7 Median = 1.4 Q_3 = 2.0 P_{90} = 2.6 P_{99} = 3.5

Hours in Service:	744
Hours of Data:	731
Hours of Missing Data:	13
Hours of Calibration:	0
Percent Operational Time:	98.3

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	1.0	0.7	0.6	0.6	0.5	0.3	0.3	0.3	0.4	0.7	0.9	1.3	1.2	0.9	0.9	0.7	0.6	0.4	0.3	0.5	1.5	2.2	2.5	1.5	2.5
2-Mar	1.1	1.0	1.4	0.7	0.4	0.6	0.6	0.6	0.8	0.8	1.0	1.0	1.0	1.3	1.5	1.3	1.4	0.4	0.4	0.7	0.9	1.1	0.8	0.9	1.5
3-Mar	0.9	0.7	0.7	0.4	0.5	0.3	0.5	0.8	0.8	1.1	1.1	1.6	1.8	1.8	2.1	2.4	2.9	3.1	2.4	2.2	2.0	1.6	2.0	1.6	3.1
4-Mar	1.6	1.6	1.5	1.3	0.8	0.6	0.3	0.4	0.8	1.2	1.4	AF	2.2	2.5	2.4	2.1	2.6	2.7	2.5	2.3	2.4	2.6	1.6	1.7	2.7
5-Mar	2.0	1.7	0.8	0.4	0.5	0.3	0.8	1.0	0.8	0.6	0.6	1.1	1.6	1.8	1.7	1.8	1.7	1.7	1.8	1.7	2.1	1.6	1.7	1.7	2.1
6-Mar	2.0	1.5	1.6	1.7	2.0	1.5	1.3	1.3	1.2	1.5	2.1	1.9	1.5	1.5	1.4	1.4	1.5	1.3	1.0	1.4	1.3	1.5	2.0	1.8	2.1
7-Mar	1.0	1.1	1.3	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.4	0.7	1.1	0.7	0.9	1.2	0.9	0.9	0.6	1.1	1.2	1.0	0.7	0.6	1.3
8-Mar	0.8	0.7	0.5	0.6	0.9	0.9	1.0	0.9	0.8	1.6	1.4	1.7	1.4	1.7	0.4	1.1	0.8	0.7	0.5	0.8	0.7	0.7	0.7	0.7	1.7
9-Mar	1.1	0.6	0.8	0.8	0.7	AF	AF	AF	AF	AF	0.8	0.9	1.0	1.2	1.2	1.2	1.1	0.6	1.0	0.9	1.3	0.6	0.4	1.2	1.3
10-Mar	1.0	1.3	1.5	1.6	1.5	1.5	AF	AF	AF	AF	AF	AF	AF	3.2	3.1	3.4	3.8	3.2	2.9	2.5	2.8	2.3	1.9	1.5	3.8
11-Mar	1.0	0.5	0.6	0.7	0.8	0.7	1.0	0.9	0.8	1.0	1.2	1.3	1.3	1.3	1.2	1.0	1.3	0.5	0.6	0.4	0.6	0.4	0.5	0.5	1.3
12-Mar	0.5	0.7	1.5	1.0	1.2	2.5	1.4	1.9	2.0	2.1	2.5	2.8	3.5	3.5	3.2	3.5	2.8	2.6	2.1	2.1	2.6	2.6	2.2	2.2	3.5
13-Mar	2.2	1.7	1.6	0.9	0.8	0.5	0.4	0.5	1.5	1.4	1.8	2.0	2.2	2.1	2.1	2.4	2.7	3.0	2.8	3.0	3.0	2.8	2.4	2.5	3.0
14-Mar	2.8	2.8	2.7	2.7	2.7	2.8	2.8	2.6	2.3	1.8	1.5	1.4	1.7	1.7	1.7	2.0	2.3	2.1	1.7	1.5	1.7	1.4	1.1	0.9	2.8
15-Mar	0.9	0.8	0.7	0.6	0.6	0.5	0.6	0.9	0.9	1.0	1.1	1.5	1.3	1.3	1.7	1.8	1.3	1.4	1.9	1.7	2.1	1.8	2.3	2.2	2.3
16-Mar	2.3	2.3	2.7	2.5	2.4	2.8	2.7	2.6	2.9	2.7	2.9	2.6	2.1	2.0	2.4	2.9	2.8	2.2	1.6	1.1	0.6	1.2	1.2	1.0	2.9
17-Mar	0.7	0.2	0.9	1.0	0.9	0.7	0.7	0.4	0.6	1.2	1.9	1.8	2.0	1.7	1.5	1.5	1.4	1.7	1.0	1.1	0.8	0.8	0.4	0.2	2.0
18-Mar	0.1	0.2	0.4	0.5	0.5	0.2	0.4	0.2	0.3	1.0	1.5	1.5	1.8	2.0	1.8	1.7	1.3	0.9	0.5	0.5	0.5	0.5	0.5	0.4	2.0
19-Mar	0.4	0.3	0.3	0.2	0.4	0.5	0.3	0.4	0.5	0.2	0.5	1.2	1.6	1.5	1.3	1.3	2.1	2.6	2.5	2.9	3.1	3.3	3.2	2.8	3.3
20-Mar	3.0	3.0	2.4	2.4	2.3	2.7	2.2	2.8	2.2	2.9	2.9	2.3	1.8	1.5	1.3	1.2	1.3	2.0	1.7	2.3	2.4	1.7	1.5	2.0	3.0
21-Mar	1.4	1.8	2.2	1.8	2.0	2.0	1.8	2.1	2.2	2.2	2.0	2.2	3.0	2.9	2.6	3.1	2.8	2.1	2.3	2.3	3.4	3.5	3.2	2.9	3.5
22-Mar	3.0	2.5	1.9	1.5	1.4	1.4	1.5	2.0	1.7	1.7	2.2	2.4	2.3	2.1	1.9	2.1	1.8	1.8	1.7	1.6	1.4	1.5	1.6	1.4	3.0
23-Mar	0.8	1.0	0.8	0.4	0.5	0.2	0.6	0.9	1.8	2.2	2.3	2.3	2.7	2.4	2.3	1.8	1.5	1.3	1.3	1.7	1.5	1.1	1.1	0.7	2.7
24-Mar	0.5	0.4	0.5	0.3	0.4	0.4	0.7	0.9	1.1	1.1	1.3	1.6	1.8	2.0	2.0	1.9	2.0	1.2	0.8	0.4	0.4	0.6	0.8	1.0	2.0
25-Mar	0.4	0.3	0.8	0.4	0.3	0.7	0.6	0.7	0.8	1.2	1.0	1.4	1.4	1.3	1.6	1.2	0.7	0.6	0.2	0.5	0.3	0.3	0.7	0.9	1.6
26-Mar	1.0	0.9	0.7	0.5	1.0	1.5	1.4	1.7	1.5	1.2	1.5	1.7	1.7	1.3	1.4	1.2	1.4	1.2	0.6	0.4	0.5	0.4	0.7	0.6	1.7
27-Mar	0.6	0.4	1.1	1.6	1.6	1.7	1.5	1.5	1.9	1.6	1.5	1.4	1.8	2.2	2.4	2.5	2.4	2.1	1.5	2.4	2.9	2.2	1.5	0.8	2.9
28-Mar	0.7	0.4	0.5	0.5	0.8	0.6	0.8	1.2	1.3	1.3	1.5	1.5	1.4	2.1	2.3	2.0	1.6	1.1	1.0	0.5	0.6	0.7	0.4	0.3	2.3
29-Mar	0.3	0.4	0.5	0.8	0.8	0.6	0.6	0.5	0.5	1.0	1.1	1.2	1.4	1.8	2.3	2.0	1.6	1.0	0.6	0.7	0.3	0.2	0.6	0.7	2.3
30-Mar	0.5	0.3	0.3	0.4	0.6	0.7	1.2	1.8	1.6	1.7	1.4	1.6	2.5	3.2	3.3	3.1	2.6	2.6	3.2	3.2	3.8	3.8	3.5	3.5	3.8
31-Mar	3.1	2.2	2.3	2.3	2.1	1.8	1.4	1.9	2.1	2.1	2.4	2.6	2.8	1.9	1.5	1.8	1.5	1.1	0.8	0.8	0.5	0.4	0.5	0.4	3.1
	3.1	3.0	2.7	2.7	2.7	2.8	2.8	2.8	2.9	2.9	2.9	2.8	3.5	3.5	3.3	3.5	3.8	3.2	3.2	3.2	3.8	3.8	3.5	3.5	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Vertical Wind Speed 90 m (VW90m) - km/h

Mannix - March 2016

Maximum Value: 3.3 km/h on Mar 30 22:00

Maximum Daily Average: 1.9 km/h on Mar 30

Minimum Value: -1.4 km/h on Mar 12 18:00

Minimum Daily Average: -0.4 km/h on Mar 12

Maximum Diurnal Average: 0.8 km/h at hour 16

Minimum Diurnal Average: 0.5 km/h at hour 6

Monthly Average: 0.67 km/h

Percentiles: P_1 = -1.1 P_{10} = -0.3 Q_1 = 0.1 Median = 0.6 Q_3 = 1.1 P_{90} = 1.8 P_{99} = 2.9

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0.6	0.7	0.7	0.6	0.3	0.2	0.3	0.3	0.3	0.2	-0.2	0.0	0.1	0.2	0.4	0.3	0.4	0.3	0.4	0.9	0.2	0.1	0.1	-0.5	0.3	0.9
2-Mar	0.4	0.1	0.3	0.4	0.4	0.2	0.3	0.5	0.6	0.7	0.8	0.6	0.2	0.7	1.1	0.9	0.9	0.5	0.8	1.2	1.3	1.1	1.0	1.0	0.7	1.3
3-Mar	1.1	1.4	0.5	0.7	0.4	0.2	0.4	0.5	1.2	1.0	0.7	1.3	1.6	1.2	1.7	2.1	3.1	3.1	2.4	2.2	2.1	1.6	1.4	1.6	1.4	3.1
4-Mar	0.9	0.6	0.6	1.0	0.4	0.2	0.1	0.1	0.1	0.4	0.3	AF	-0.6	1.2	0.3	-0.5	-0.2	-0.5	-1.2	-1.2	-1.1	-0.7	-0.4	-0.5	0.0	1.2
5-Mar	-0.5	-0.2	0.4	0.6	0.4	0.7	0.5	0.1	0.4	0.2	0.0	0.8	1.1	1.3	1.2	1.5	1.1	1.2	2.2	1.0	1.4	0.9	0.8	1.1	0.8	2.2
6-Mar	1.6	1.2	2.1	1.1	1.4	0.7	1.0	1.1	0.4	1.1	1.4	1.3	1.2	1.0	0.9	0.8	1.0	1.3	1.0	0.1	0.5	0.3	0.6	0.4	1.0	2.1
7-Mar	0.4	0.5	0.1	0.4	0.3	0.4	0.3	0.3	0.5	1.2	0.9	1.1	0.8	0.2	0.4	0.8	0.5	0.2	0.1	0.9	1.3	0.9	0.4	0.9	0.6	1.3
8-Mar	1.0	0.4	0.2	0.1	0.1	0.1	0.1	0.2	0.5	0.0	0.2	-0.1	-1.0	0.1	0.3	1.1	1.1	0.9	0.6	0.3	0.6	0.3	0.3	0.6	0.3	1.1
9-Mar	0.8	0.8	1.1	0.8	0.9	1.0	0.7	0.2	0.8	0.5	0.3	0.4	0.3	0.1	0.2	0.0	0.3	0.1	-0.1	-0.1	0.0	0.6	0.3	0.2	0.4	1.1
10-Mar	0.5	0.0	-0.1	-0.6	-0.5	-0.4	AF	AF	AF	AF	AF	AF	AF	AF	0.8	-0.3	-0.3	-0.3	0.3	-0.9	-1.0	-1.0	-0.2	0.8	--	0.8
11-Mar	0.3	0.2	0.8	1.5	1.6	1.5	1.1	1.7	1.0	1.3	1.7	0.8	0.6	0.7	1.3	1.1	0.9	0.9	0.4	0.2	0.1	0.4	0.6	0.7	0.9	1.7
12-Mar	0.6	0.3	-0.4	0.0	-0.3	-0.2	0.0	-0.1	0.0	0.3	-0.1	0.1	-0.3	-0.5	-0.5	-0.3	-1.0	-1.4	-1.4	-1.0	-1.1	-1.3	-1.3	-1.0	-0.4	0.6
13-Mar	-0.7	-0.5	0.0	0.4	0.5	0.4	0.6	0.8	1.5	1.4	1.4	1.8	1.9	1.9	1.7	1.9	1.6	1.8	2.0	2.5	2.3	2.5	2.1	1.9	1.3	2.5
14-Mar	1.9	2.0	2.6	2.5	1.8	2.4	2.6	1.8	1.0	0.6	0.9	0.7	0.8	1.1	1.2	2.1	2.0	1.8	1.0	1.1	1.6	1.2	1.0	1.0	1.5	2.6
15-Mar	1.0	0.9	1.0	1.0	0.7	0.5	0.7	0.6	0.7	0.8	1.2	1.2	0.9	1.2	1.8	2.3	1.6	1.6	1.7	1.3	1.0	1.6	1.8	1.9	1.2	2.3
16-Mar	1.8	1.6	1.8	1.7	1.7	1.7	2.1	1.9	1.7	2.0	1.5	1.7	1.2	1.4	2.1	2.3	2.3	1.7	1.5	1.6	1.7	0.7	0.3	0.1	1.6	2.3
17-Mar	0.7	1.1	2.0	2.3	2.2	1.9	2.2	1.9	1.7	1.7	1.2	1.1	1.5	1.6	1.2	1.1	1.2	1.6	1.3	1.5	0.9	0.9	0.3	0.2	1.4	2.3
18-Mar	0.0	0.0	0.1	0.9	0.5	0.0	0.2	0.6	1.1	0.8	0.1	0.0	0.0	-0.2	0.2	0.1	0.1	0.6	0.7	0.7	0.8	0.6	0.1	0.1	0.4	1.1
19-Mar	0.2	0.1	0.2	0.6	0.7	0.4	0.5	0.3	0.4	0.2	0.0	0.3	1.0	1.2	0.5	0.4	0.0	-0.1	-0.2	-0.3	-0.5	-0.1	-0.4	0.1	0.2	1.2
20-Mar	0.0	-0.2	0.0	0.3	0.8	0.0	-0.2	0.0	0.3	0.3	0.5	-0.5	-0.1	0.4	0.0	0.5	0.5	-0.1	0.8	0.2	0.3	0.4	0.5	0.5	0.2	0.8
21-Mar	0.3	0.4	0.5	0.6	0.8	0.4	0.6	0.5	0.0	0.4	0.4	0.8	0.7	0.2	-0.4	-0.1	-0.2	0.6	0.1	0.3	-0.3	-0.4	0.0	-0.3	0.2	0.8
22-Mar	0.0	-0.2	-0.7	-0.1	-0.5	-0.9	-0.6	-1.0	-1.2	-0.5	-0.1	0.2	-0.2	-0.6	0.4	-0.1	-0.2	0.0	0.0	-0.4	-0.9	-0.8	-0.8	-0.5	-0.4	0.4
23-Mar	0.3	0.6	0.4	0.1	0.3	0.4	0.6	1.1	0.9	0.9	1.5	1.5	2.3	2.0	1.1	0.8	0.6	0.7	1.0	1.1	1.1	1.1	1.1	0.6	0.9	2.3
24-Mar	0.6	0.3	0.4	0.5	0.5	0.9	0.8	1.1	0.4	0.4	1.0	1.3	1.3	1.5	1.1	1.3	1.7	0.8	0.9	0.8	0.6	0.5	0.0	0.0	0.8	1.7
25-Mar	0.3	0.4	0.2	0.1	0.2	-0.1	0.3	0.3	0.2	0.7	0.5	-0.1	0.1	-0.2	-0.1	-0.1	0.1	0.1	0.2	0.4	0.4	0.6	1.5	2.1	0.3	2.1
26-Mar	1.3	1.1	0.9	1.2	1.1	1.2	1.3	0.8	1.0	0.3	0.4	0.1	0.0	-0.1	0.4	0.4	0.4	-0.1	0.2	0.4	0.6	0.8	0.8	0.7	0.6	1.3
27-Mar	0.7	1.0	0.2	-0.9	-1.0	-0.7	-0.5	-0.4	-0.7	-0.3	-0.2	0.1	0.0	-0.5	-0.7	-0.3	-0.3	-0.6	0.2	-0.7	-1.0	-0.4	0.0	0.4	-0.3	1.0
28-Mar	0.5	0.9	1.0	0.7	0.6	0.8	0.6	0.8	0.7	0.4	-0.2	-0.2	0.2	1.5	2.4	2.9	2.2	1.4	2.2	2.8	2.4	2.4	2.2	1.9	1.3	2.9
29-Mar	1.7	1.4	1.1	0.9	0.9	0.1	0.2	-0.2	0.1	0.3	0.3	0.3	0.7	0.5	1.0	0.7	0.1	0.5	0.3	0.2	1.3	1.6	1.0	0.4	0.7	1.7
30-Mar	1.1	1.0	1.0	1.2	2.2	1.6	2.4	2.0	0.5	1.6	1.0	1.1	1.4	3.0	2.3	2.0	2.2	1.7	1.9	3.1	2.6	3.3	3.3	3.1	1.9	3.3
31-Mar	2.5	1.4	2.1	1.9	1.9	1.5	1.3	1.2	0.7	0.7	0.0	0.9	1.2	0.1	-0.4	-0.2	-0.8	0.0	0.4	0.6	0.6	0.5	0.4	0.3	0.8	2.5
	0.7	0.6	0.7	0.7	0.7	0.5	0.7	0.6	0.6	0.7	0.6	0.7	0.6	0.7	0.8	0.8	0.7	0.7	0.7	0.7	0.6	0.7	0.6	0.6	Diurnal Average	
	2.5	2.0	2.6	2.5	2.2	2.4	2.6	2.0	1.7	2.0	1.7	1.8	2.3	3.0	2.4	2.9	3.1	3.1	2.4	3.1	2.6	3.3	3.3	3.1	Diurnal Maximum	

AF - Analyzer Failure

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 3.9 km/h on Mar 30 22:00

Minimum Value: 0.2 km/h on Mar 18 01:00

Percentiles: P_1 = 0.3 P_{10} = 0.5 Q_1 = 0.7 Median = 1.3 Q_3 = 1.8 P_{90} = 2.4 P_{99} = 3.4

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	0.9	0.6	0.5	0.5	0.4	0.3	0.2	0.3	0.4	0.6	0.8	1.0	1.1	0.9	0.8	0.7	0.6	0.5	0.4	0.6	1.3	1.6	1.9	1.4	1.9
2-Mar	0.8	0.7	0.9	0.6	0.4	0.5	0.6	0.6	0.8	0.8	0.9	1.0	1.0	1.4	1.4	1.3	1.5	0.4	0.5	0.7	0.9	1.0	0.9	0.9	1.5
3-Mar	0.9	0.8	0.9	0.5	0.5	0.3	0.5	1.0	0.9	1.1	1.1	1.6	1.8	1.9	2.2	2.4	3.1	3.0	2.6	2.4	2.1	1.7	2.1	1.8	3.1
4-Mar	1.6	1.7	1.6	1.3	0.8	0.7	0.3	0.4	0.7	1.2	1.5	AF	1.9	2.6	2.5	2.0	2.2	2.2	2.2	2.1	2.1	2.3	1.3	1.4	2.6
5-Mar	2.0	1.4	0.6	0.4	0.5	0.3	0.9	1.3	0.6	0.5	0.5	1.1	1.7	1.8	1.7	1.9	1.7	1.8	2.0	1.8	2.2	1.7	1.7	1.8	2.2
6-Mar	2.1	1.7	1.6	1.8	2.1	1.6	1.4	1.4	1.3	1.5	2.0	1.9	1.5	1.4	1.4	1.4	1.5	1.4	1.3	1.1	1.1	1.2	1.5	1.6	2.1
7-Mar	1.1	1.0	1.1	0.7	0.6	0.6	0.5	0.8	0.7	0.7	0.4	0.7	1.1	0.7	0.9	1.1	1.0	0.9	0.7	1.2	1.2	0.9	0.7	0.7	1.2
8-Mar	1.0	0.8	0.5	0.5	0.9	0.7	0.8	0.9	0.8	1.1	1.2	1.5	1.2	1.6	0.6	1.1	0.8	0.7	0.5	0.8	0.7	0.7	0.7	0.8	1.6
9-Mar	1.1	0.6	0.8	0.8	0.7	0.7	0.7	0.4	0.6	0.7	0.7	0.9	1.0	1.0	0.9	1.1	0.9	0.5	0.6	0.8	1.1	0.6	0.4	0.5	1.1
10-Mar	0.4	0.7	0.6	1.3	1.2	1.3	AF	AF	AF	AF	AF	AF	AF	AF	3.4	2.6	2.7	2.7	2.4	2.1	2.4	2.2	1.8	1.5	3.4
11-Mar	1.0	0.5	0.8	0.8	0.9	0.9	1.0	0.9	0.9	1.1	1.3	1.3	1.2	1.3	1.2	1.1	1.4	0.6	0.6	0.4	0.6	0.3	0.4	0.5	1.4
12-Mar	0.3	0.4	1.3	0.9	0.9	1.5	1.2	1.8	1.7	1.7	1.7	1.6	2.1	2.6	2.9	2.6	2.4	2.4	1.6	1.9	2.4	2.5	2.1	1.9	2.9
13-Mar	2.1	1.6	1.5	0.8	0.8	0.5	0.5	0.6	1.4	1.6	1.8	1.9	2.1	1.9	2.1	2.2	2.7	3.0	2.6	2.9	2.8	2.8	2.4	2.6	3.0
14-Mar	2.8	2.7	2.7	2.8	2.7	2.8	2.9	2.8	2.7	2.0	1.6	1.4	1.7	1.8	1.8	2.1	2.3	2.2	1.8	1.6	1.8	1.6	1.1	0.9	2.9
15-Mar	0.9	0.8	0.7	0.8	0.6	0.5	0.7	0.9	0.9	1.0	1.2	1.5	1.3	1.5	1.7	1.9	1.3	1.3	2.0	1.7	2.2	2.0	2.3	2.2	2.3
16-Mar	2.3	2.2	2.6	2.5	2.4	2.9	2.7	2.7	3.1	2.6	2.8	2.4	2.0	2.1	2.4	2.8	3.1	2.2	1.6	1.2	0.7	1.4	1.3	1.0	3.1
17-Mar	0.7	0.4	1.0	1.1	0.9	0.8	0.8	0.6	0.7	1.3	1.9	1.8	1.9	1.7	1.5	1.6	1.5	1.6	0.9	1.1	0.8	1.0	0.5	0.3	1.9
18-Mar	0.2	0.2	0.4	0.7	0.6	0.3	0.5	0.4	0.5	1.1	1.5	1.5	1.4	1.4	1.3	1.6	1.3	0.9	0.5	0.4	0.4	0.4	0.6	0.4	1.6
19-Mar	0.5	0.3	0.4	0.3	0.4	0.5	0.4	0.4	0.5	0.3	0.5	1.0	1.5	1.4	1.2	1.2	1.5	1.6	1.6	2.1	2.7	2.4	2.4	2.3	2.7
20-Mar	2.0	2.0	1.8	1.6	1.9	1.6	1.3	1.7	1.5	2.1	2.2	1.6	1.6	1.4	1.3	1.2	1.4	1.4	1.4	1.8	2.0	1.5	1.4	1.7	2.2
21-Mar	1.2	1.4	1.7	1.5	1.7	1.7	1.5	1.6	1.7	2.1	1.9	2.1	2.4	2.3	2.1	2.1	1.9	1.8	1.8	1.9	2.1	2.0	2.1	1.9	2.4
22-Mar	2.0	2.1	1.9	1.5	1.3	1.3	1.2	1.8	1.4	1.6	2.0	2.2	2.2	1.9	1.7	2.0	1.8	1.7	1.6	1.4	1.3	1.2	1.4	0.9	2.2
23-Mar	0.7	0.9	0.9	0.5	0.4	0.4	0.6	1.0	1.7	2.2	2.4	2.4	2.7	2.4	2.4	1.9	1.6	1.3	1.2	1.8	1.4	1.1	1.2	0.7	2.7
24-Mar	0.5	0.4	0.6	0.4	0.4	0.5	0.7	0.9	1.2	1.2	1.4	1.6	1.7	1.9	2.0	2.0	2.2	1.3	0.7	0.2	0.3	0.6	0.7	0.9	2.2
25-Mar	0.3	0.3	0.4	0.2	0.3	0.6	0.5	0.4	0.6	1.0	1.0	1.3	1.4	1.2	1.6	1.2	0.7	0.7	0.2	0.6	0.3	0.5	0.8	0.9	1.6
26-Mar	1.2	1.0	0.9	0.7	1.2	1.6	1.5	1.8	1.5	1.2	1.4	1.7	1.8	1.3	1.4	1.2	1.3	1.1	0.5	0.4	0.4	0.3	0.6	0.5	1.8
27-Mar	0.5	0.3	1.0	1.0	1.1	1.3	1.2	1.3	1.7	1.5	1.4	1.4	1.7	2.1	2.2	2.3	2.3	1.7	1.4	2.4	2.9	1.7	1.2	0.7	2.9
28-Mar	0.7	0.4	0.5	0.6	0.8	0.6	0.7	0.9	1.1	1.3	1.2	1.3	1.5	2.2	2.6	2.1	1.7	1.1	1.2	0.6	0.8	0.9	0.6	0.4	2.6
29-Mar	0.4	0.5	0.6	0.8	0.8	0.6	0.6	0.4	0.5	0.8	1.1	1.2	1.4	1.9	2.3	2.1	1.6	1.1	0.7	0.7	0.5	0.2	1.0	0.8	2.3
30-Mar	0.7	0.5	0.4	0.5	0.9	0.8	1.2	1.7	1.6	1.6	1.5	1.6	2.4	3.2	3.4	3.1	2.6	2.7	3.3	3.4	3.9	3.9	3.5	3.5	3.9
31-Mar	3.3	2.2	2.4	2.5	2.2	1.8	1.4	2.0	2.1	2.2	2.4	2.7	2.9	2.0	1.2	1.4	1.4	0.8	0.6	0.8	0.4	0.4	0.5	0.4	3.3
	3.3	2.7	2.7	2.8	2.7	2.9	2.9	2.8	3.1	2.6	2.8	2.7	2.9	3.2	3.4	3.1	3.1	3.0	3.3	3.4	3.9	3.9	3.5	3.5	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	March 14, 2016	Last Calibration	February 5, 2016
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	12:10	End Time (MST)	15:15
Gas Cert Reference	S9610161A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
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	-635	-635
Analyzer IP address	192.168.1.43		Lamp voltage	828	826
Calculated slope	0.996005	0.996173	Chamber temp	45.1	45.1
Calculated intercept	1.026153	1.233694	Pressure	685.2	695.2
Analyzer Background	7.4	7.7	Flow	0.488	0.457
Analyzer Coefficient	0.984	0.974	Intensity	90	90

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	0.4	----
as found span	5000	60.0	600.0	607.6	0.988
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	60.0	600.0	601.3	0.998
second point	5000	30.0	300.0	300.4	0.999
third point	5000	15.0	150.0	147.5	1.017
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	60.0	600.0	601.4	0.998
				Average Correction Factor	1.004

Corrected As found	607.2	Previous response	601.4	% change	-1.0%

Notes:

Changed inlet filter after as founds. Changed pump for preventative maintenance after as founds. Adjusted zero and span.

Calibration Performed By: Evan Magill

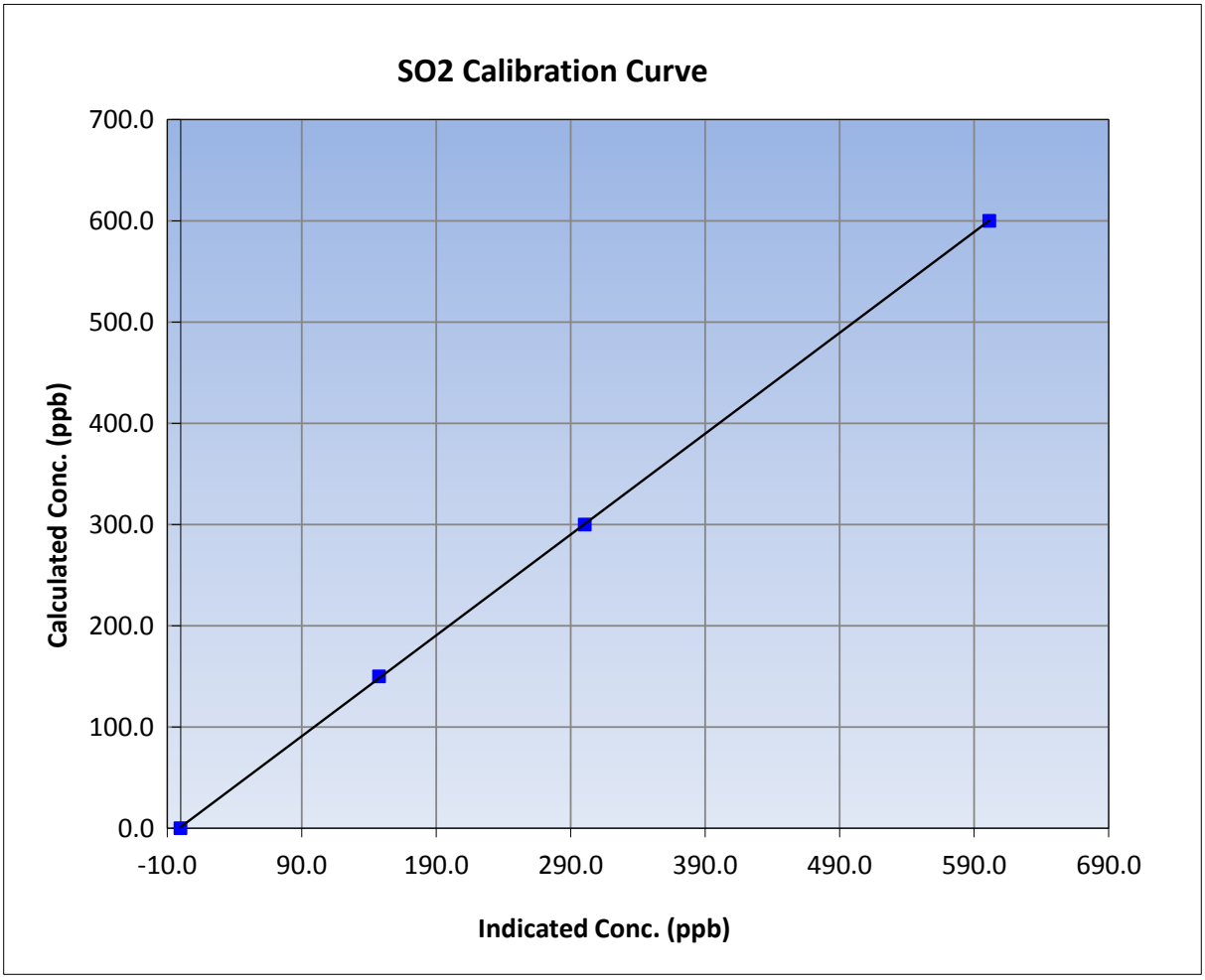
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

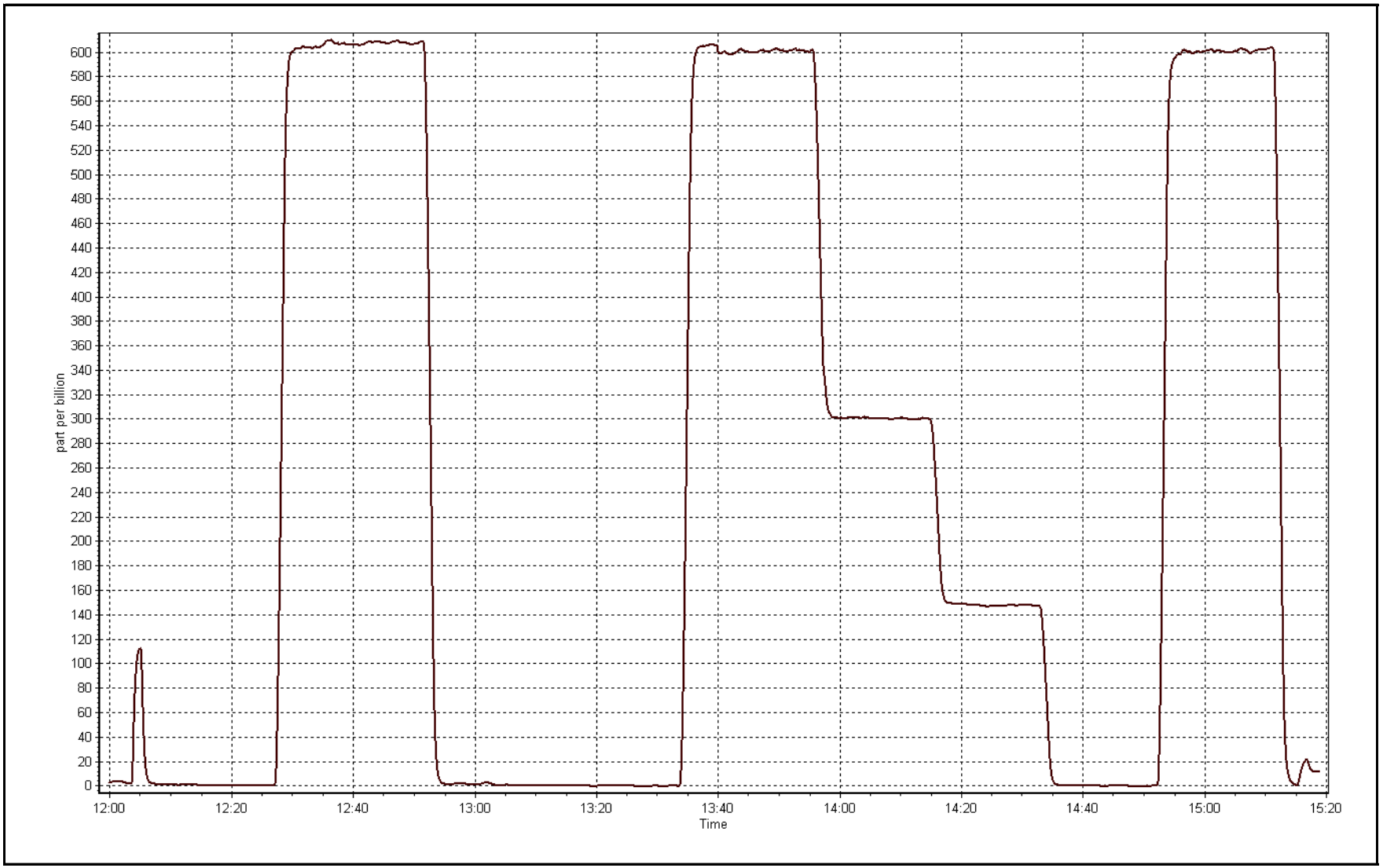
Calibration Date	March 14, 2016	Previous Calibration	February 5, 2016
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	12:10	End Time (MST)	15:15
Analyzer make	TEI 43i	Analyzer serial #	1008841399

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999976
600.0	601.3	0.9979		
300.0	300.4	0.9985	Slope	0.996173
150.0	147.5	1.0168		
			Intercept	1.233694



SO2 Calibration Plot Date: March 14, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	March 15, 2016	Last Calibration	February 5, 2016
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	14:15
Gas Cert Reference	CC62844	Station temp.	21 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
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	-657	-657
Analyzer IP address	192.168.1.42		Lamp voltage	818	817
Calculated slope	0.992482	0.996830	Chamber temp	45	45
Calculated intercept	0.097141	-0.302095	Pressure	497.7	507.4
Analyzer Background	19.7	19.4	Flow	1.034	1.009
Analyzer Coefficient	0.968	0.968	Intensity	103	104
			Converter temp.	325	324

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	5000	0.0	0.0	0.0	----
as found span	5000	74.4	75.0	74.5	1.007
SO2 scrubber check	5000	15.0	150.0	1.6	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	74.4	75.0	75.4	0.994
second point	5000	41.6	41.9	42.4	0.988
third point	5000	24.8	25.0	25.6	0.978
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	74.4	75.0	75.7	0.991
				Average Correction Factor	0.987

Corrected As found	74.5	Previous response	75.5	% change	1.4%

Notes:

Changed inlet filter and scrubber check done after as founds. Changed the pump after as founds for preventative maintenance. Allowed some time for the pump to stabilize. No adjustments.

Calibration Performed By: Evan Magill

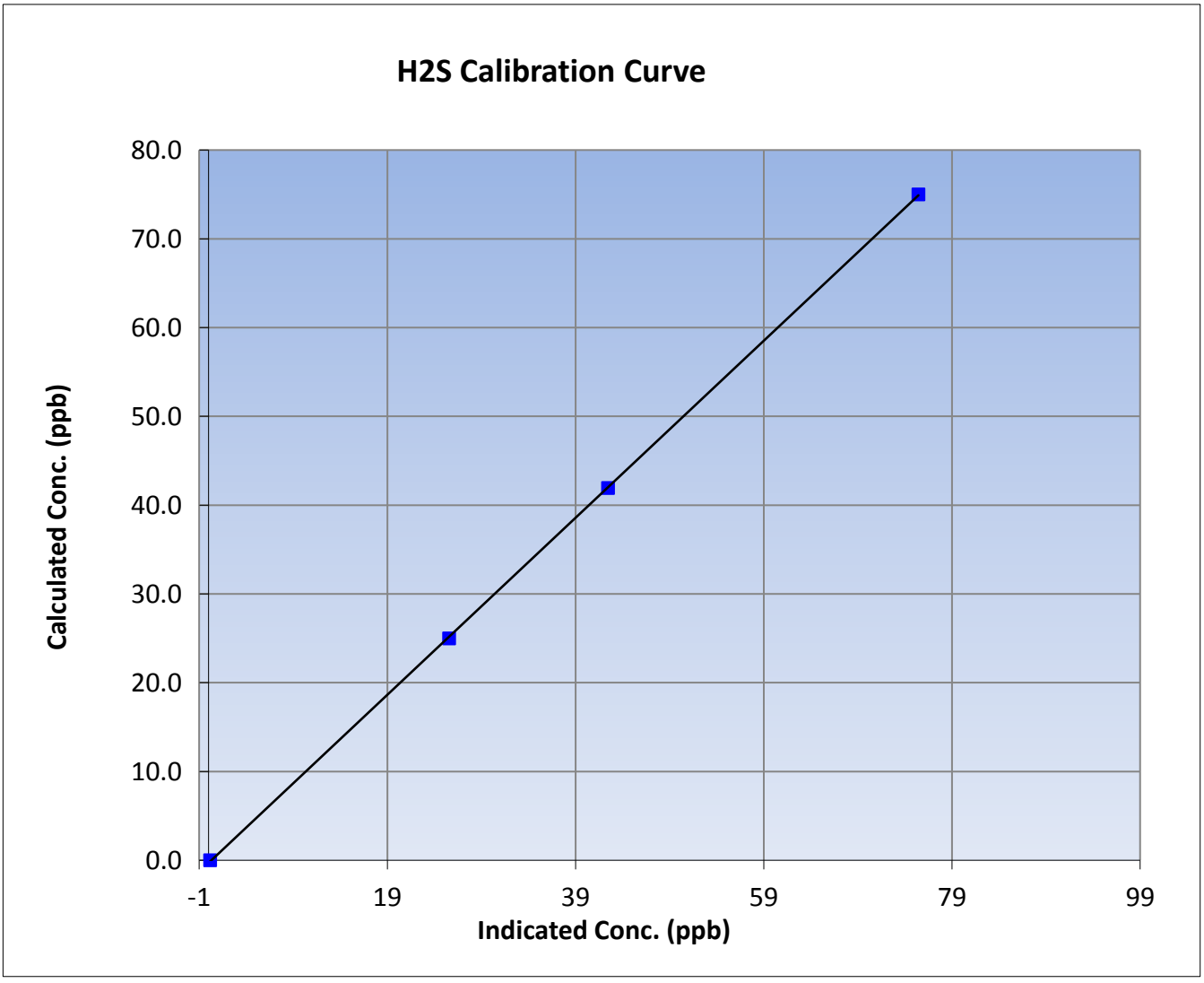
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

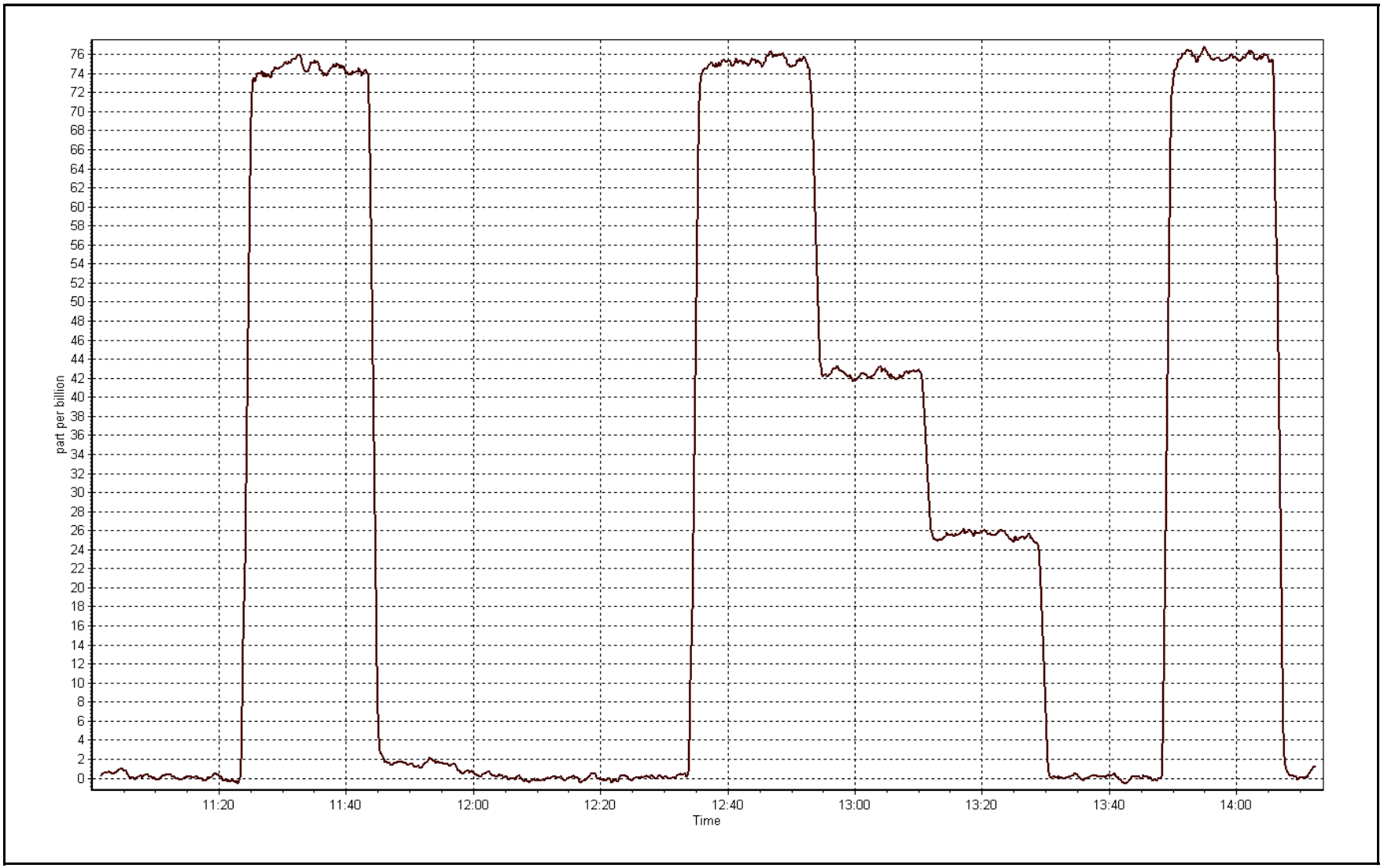
Calibration Date	March 15, 2016	Previous Calibration	February 5, 2016
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	11:00	End Time (MST)	14:15
Analyzer make	Thermo 450i	Analyzer serial #	815129108

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999979
75.0	75.4	0.9941		
41.9	42.4	0.9880	Slope	0.996830
25.0	25.6	0.9784		
			Intercept	-0.302095



H2S Calibration Plot Date: March 15, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	March-14-16	Last Calibration	February-05-16
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	12:10	End Time (MST)	15:15
Gas Cert Reference	S961061A	Cal Gas Expiry Date	Sept-26-2017
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG make/model	Teledyne API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

Analyzer Information

	Before	*After*		*Before*	*After*
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	1.006268	0.996795	Fuel Pressure	20.2	20.2
Calculated intercept	-0.001959	0.002017	Analyzer Coeff	3.4	3.4
			Analyzer BKG	2.800	2.820

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	0.05	----
as found span	5000	60.0	12.46	12.54	0.993
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.0	12.46	12.49	0.997
second point	5000	30.0	6.23	6.26	0.995
third point	5000	15.0	3.11	3.11	1.001
as left zero	5000	0.0	0.00	0.04	----
as left span	5000	60.0	12.46	12.52	0.995
				Average Correction Factor	0.998

Corrected As found	12.49	Previous response	12.38	% change	-0.9%

Notes:

Changed hydrogen after as founds, no change in span response and flame did not go out. Changed inlet filter after hydrogen change. Adjusted zero and span.

Calibration Performed By: Evan Magill

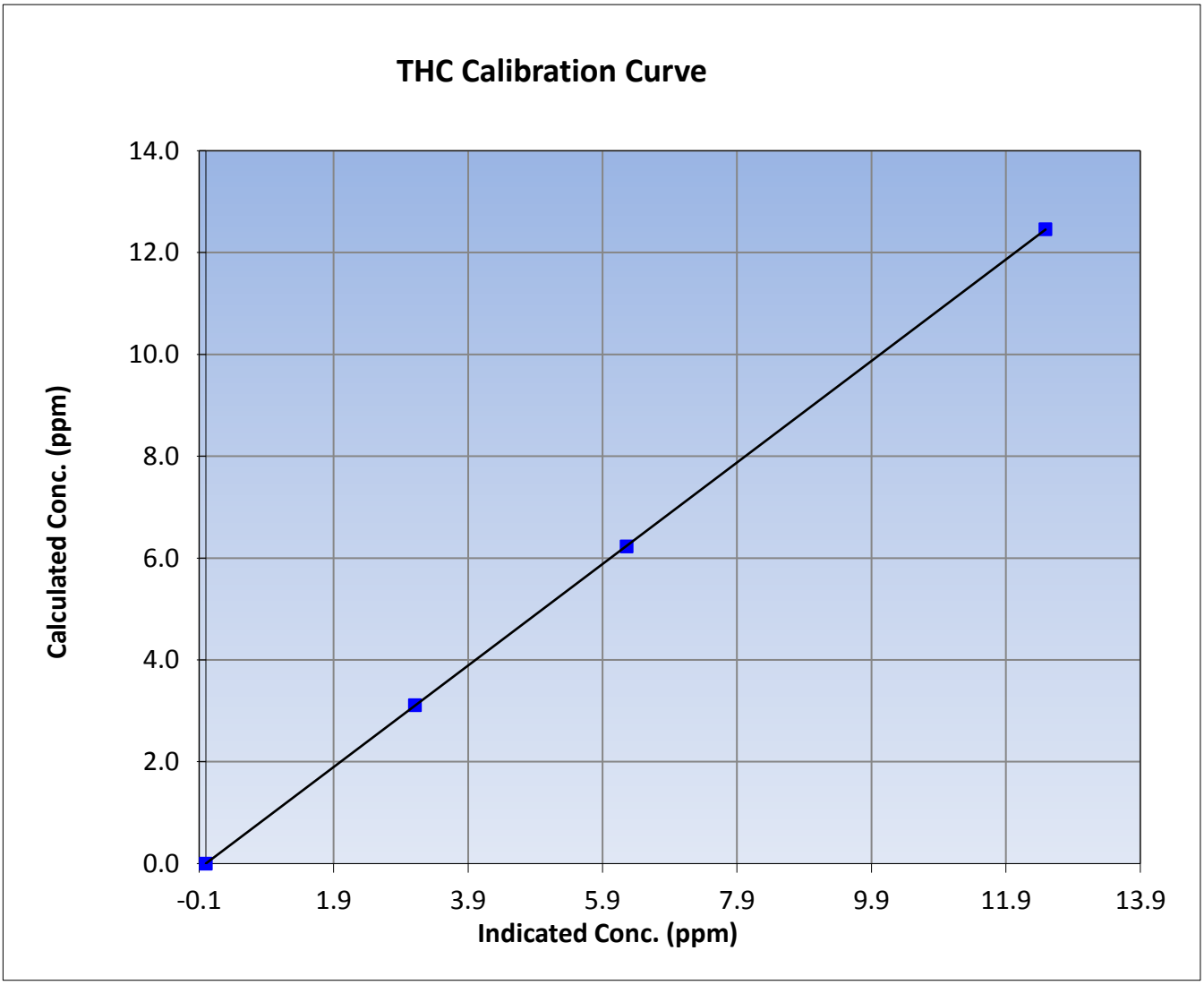
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

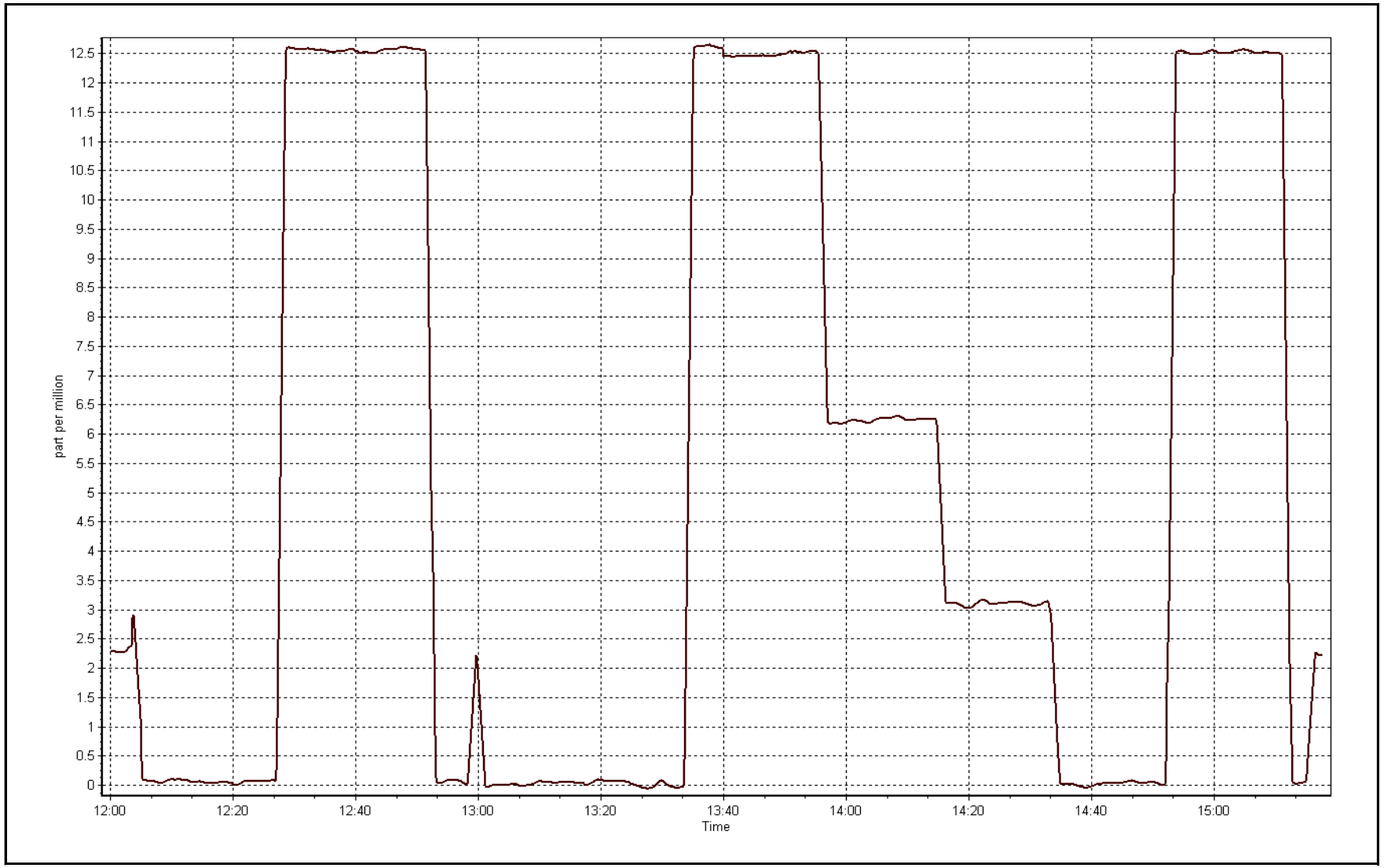
Calibration Date	March 14, 2016	Previous Calibration	February 5, 2016
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	12:10	End Time (MST)	15:15
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999996
12.46	12.49	0.9973		
6.23	6.26	0.9949	Slope	0.996795
3.11	3.11	1.0013		
			Intercept	0.002017



THC Calibration Plot Date: March 14, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 6
PATRICIA MCINNES
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
MARCH 2016

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	100.00	47	0	9	0
TRS (ppb) Average	709	35	35	100.00	5	0	1	0
THC (ppm) Average	706	35	38	99.60	2.5	-	2.2	-
NMHC(ppm) Average	706	35	38	99.60	0.036	-	0.003	-
CH4(ppm) Average	706	35	38	99.60	2.5	-	2.2	-
O3 (ppb) Average	682	34	62	96.24	54	0	46	-
NO2 (ppb) Average	708	36	36	100.00	40	0	18	-
NO (ppb) Average	708	36	36	100.00	40	-	6	-
NOX (ppb) Average	708	36	36	100.00	64	-	21	-
NH3 (ppb) Average	672	40	72	95.70	13	0	1	-
PM2.5 (ug/m3) Average	732	3	12	98.79	26.3	-	9.8	0
Temperature 2 m (C) Average	744	0	0	100.00	13	-	6.5	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	87	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	28	-	16	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	1.8	4	-	0	0	0	0	2	5	47
TRS (ppb) Average	709	0.2	0	-	0	0	0	0	0	0	5
THC (ppm) Average	706	2.08	0.1	-	2	2	2	2.1	2.1	2.2	2.5
NMHC(ppm) Average	706	0	0.002	-	0	0	0	0	0	0	0.036
CH4(ppm) Average	706	2.08	0.1	-	2	2	2	2.1	2.1	2.2	2.5
O3 (ppb) Average	682	31.2	11	-	1	15	24	32	40	44	54
NO2 (ppb) Average	708	8.1	7	-	0	2	3	6	11	17	40
NO (ppb) Average	708	2.4	4	-	0	0	0	1	3	7	40
NOX (ppb) Average	708	10.5	10	-	0	2	4	7	14	24	64
NH3 (ppb) Average	672	0	1	-	0	0	0	0	0	0	13
PM2.5 (ug/m3) Average	732	4.32	3.9	-	0	0.9	1.7	3.2	5.6	9.4	26.3
Temperature 2 m (C) Average	744	-3.18	5.3	-	-15.6	-9.3	-7	-3.9	0	3.5	13
Relative Humidity (%) Average	744	70.4	18	-	26	44	58	74	85	90	97
Wind Speed 10 m (km/h) Average	744	9.4	5	-	1	3	6	9	13	17	28
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NMHC, CH4, THC	08 Mar 2016 10:00	08 Mar 2016 10:00	1	Maintenance - zero air unit serviced
NMHC, CH4, THC	30 Mar 2016 08:00	30 Mar 2016 09:00	2	Maintenance - support gas cylinders replaced
O3	08 Mar 2016 07:00	09 Mar 2016 10:00	28	Analyzer Failure - UV lamp failed
NH3	01 Mar 2016 05:00	31 Mar 2016 05:00	32	Stabilization after daily span
PM2.5	17 Mar 2016 12:00	17 Mar 2016 15:00	4	Intermittent unstable operation - excessive baseline drift
PM2.5	17 Mar 2016 20:00	17 Mar 2016 22:00	3	Intermittent unstable operation - excessive baseline drift
PM2.5	18 Mar 2016 03:00	18 Mar 2016 04:00	2	Intermittent unstable operation - excessive baseline drift

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Patricia McInnes - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 47 ppb on Mar 15 16:00 Maximum Daily Average: 8.9 ppb on Mar 15

Minimum Value: 0 ppb on Mar 2 01:00 Minimum Daily Average: 0.1 ppb on Mar 10
Maximum Diurnal Average: 3.9 ppb at hour 16 Minimum Diurnal Average: 0.7 ppb at hour 7
Monthly Average: 1.8 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 2$ $P_{90} = 5$ $P_{99} = 18$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	1	Z	0	0	0	0	0	0	0	0	0	0	0	C	C	C	C	2	4	4	2	0	0	0	0.9	4
2-Mar	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	2	3	6	5	9	13	4	5	9	7	2.8	13
3-Mar	6	5	4	Z	3	2	2	1	1	1	1	1	2	2	6	4	5	8	9	6	8	4	2	4	3.8	9
4-Mar	2	0	0	0	Z	0	1	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4
5-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	2	5	2	1	1	6	16	8	0	0	0	1	2.0	16
6-Mar	Z	8	5	3	1	0	0	0	7	8	4	0	0	0	1	5	2	3	2	2	1	0	0	0	2.3	8
7-Mar	0	Z	0	0	0	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	2
8-Mar	3	3	Z	3	5	4	4	3	2	2	1	1	1	0	0	0	0	0	0	0	1	2	7	5	2.3	7
9-Mar	4	5	4	Z	2	4	2	1	2	4	5	5	2	2	2	2	1	1	0	0	0	0	0	0	2.1	5
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	0.1	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	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
13-Mar	0	Z	0	0	0	0	0	0	1	3	9	6	8	7	3	1	0	0	0	4	3	3	4	3	2.5	9
14-Mar	1	1	Z	3	3	2	4	7	4	1	0	5	4	1	1	3	5	5	3	2	3	5	6	3	3.1	7
15-Mar	3	5	4	Z	2	2	1	1	2	4	12	16	28	16	22	47	24	5	2	1	0	0	0	5	8.9	47
16-Mar	1	0	0	1	Z	0	1	4	7	4	6	1	1	1	10	9	4	11	1	2	1	0	0	1	2.9	11
17-Mar	1	1	1	0	0	Z	0	0	0	3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	5
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	0	Z	0	0	0	0	0	0	0	0	1	2	3	4	3	1	0	1	0	0	0	0	0	0	0.8	4
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	0.1	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	0.1	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	0.1	0
23-Mar	0	0	0	0	0	Z	0	0	1	6	12	13	5	5	8	8	1	1	0	0	0	0	0	0	2.7	13
24-Mar	Z	2	4	2	4	1	0	4	10	8	8	5	1	2	2	2	3	4	3	2	1	1	1	0	3.1	10
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	0.3	0
26-Mar	2	4	Z	1	1	1	1	1	3	2	4	9	9	7	7	6	6	6	4	2	1	1	1	0	3.4	9
27-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	0.3	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	2	10	13	8	5	0	0	0	0	0	1.7	13
30-Mar	Z	0	0	0	0	0	0	3	7	28	22	2	0	4	3	4	2	0	0	0	5	8	0	0	3.9	28
31-Mar	1	Z	0	7	3	1	1	1	3	6	20	17	13	9	11	7	4	2	1	0	0	0	0	0	4.7	20
	1.0	1.4	1.0	0.9	1.0	0.8	0.7	1.2	1.9	2.7	3.6	2.8	2.6	2.3	2.9	3.9	2.7	2.3	2.0	1.6	1.0	1.1	1.1	1.1	Diurnal Average	
	6	8	5	7	5	4	4	7	10	28	22	17	28	16	22	47	24	11	16	13	8	8	9	7	Diurnal Maximum	

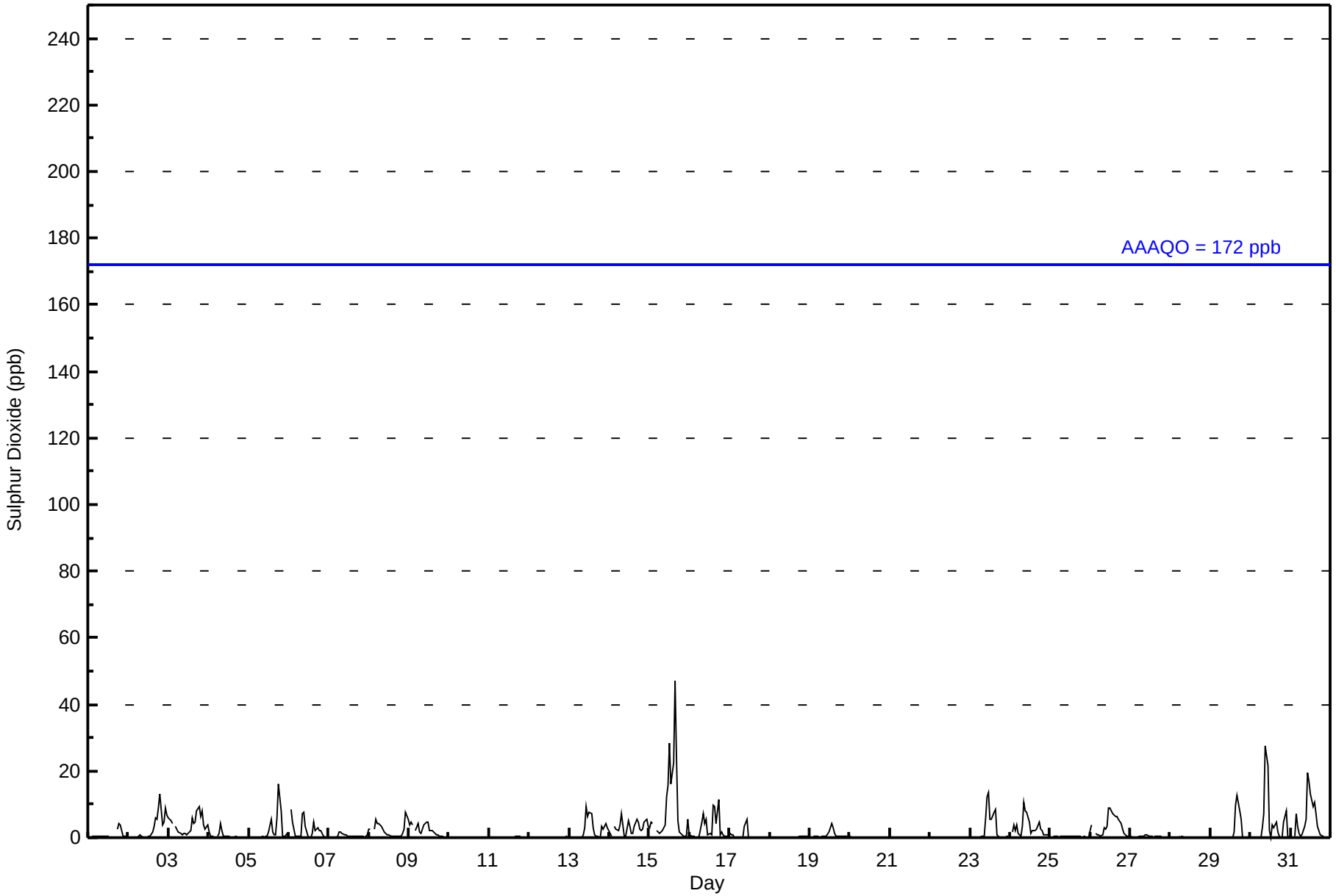
Z - zerospan C - Calibration
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Patricia McInnes - March 2016



Sulphur Dioxide (SO_2) - ppb

Patricia McInnes - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	690	97.32	97.32
11 - 20	13	1.83	99.15
21 - 60	6	0.85	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 (SO_2) - ppb

Patricia McInnes - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	102	44	16	39	39	93	52	30	18	16	13	23	22	30	21	132	690
11 - 20	4	0	1	2	2	0	0	0	0	0	0	0	0	0	0	4	13
21 - 60	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6
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	108	44	17	41	41	93	52	30	18	16	13	23	22	30	21	140	709

Total Number of Valid Hours: 709

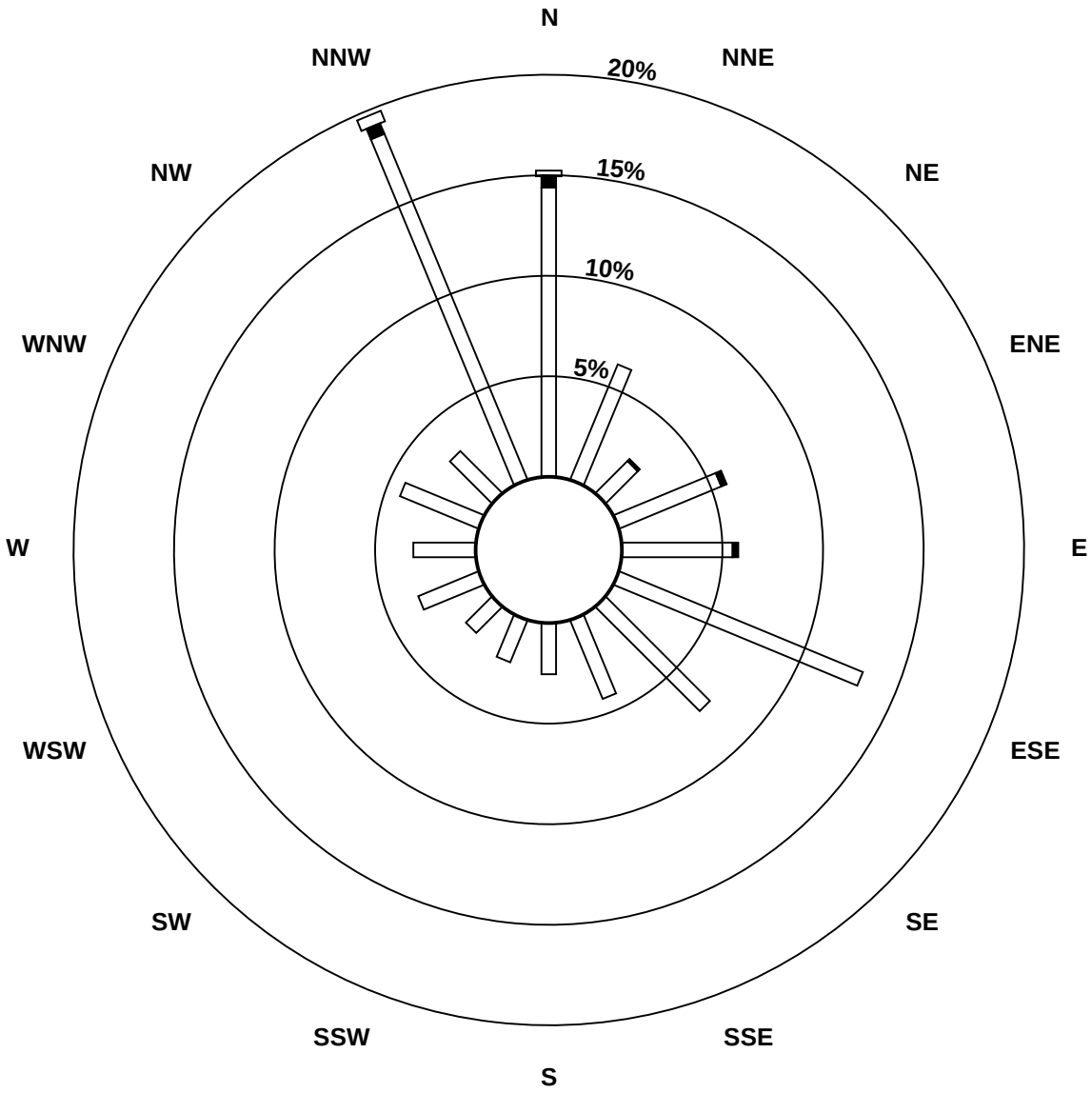
Total Number of Hours: 744

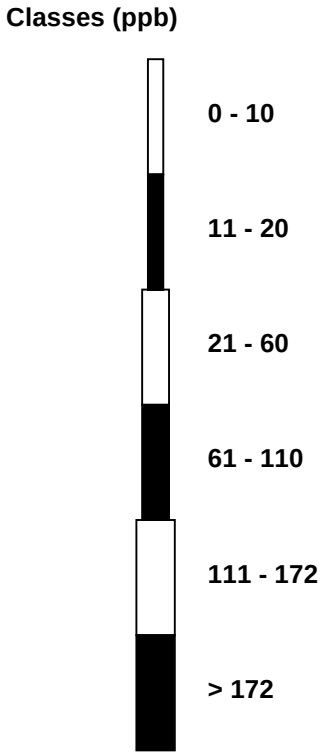
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Patricia McInnes (AMS 6)





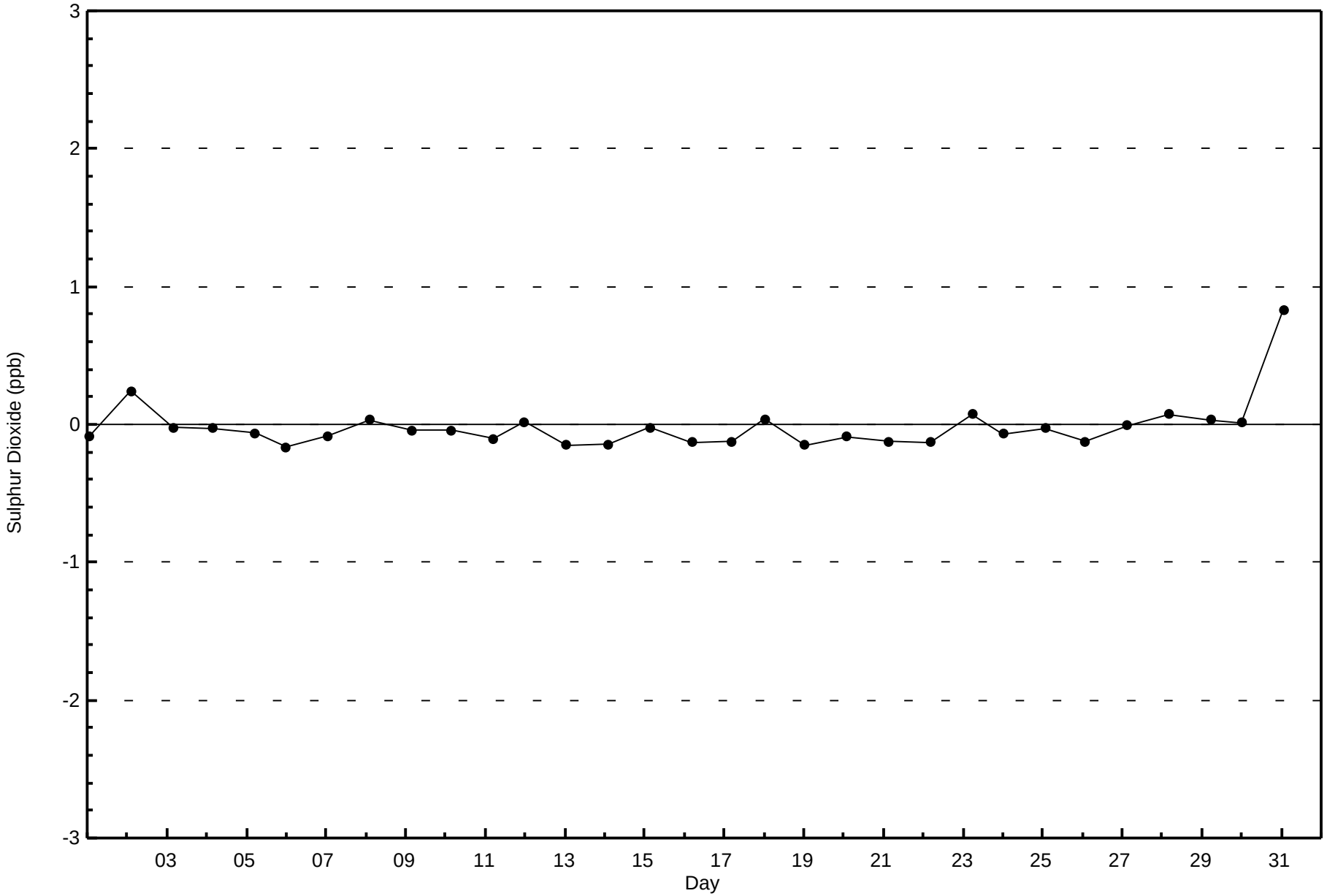
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Patricia McInnes - March 2016

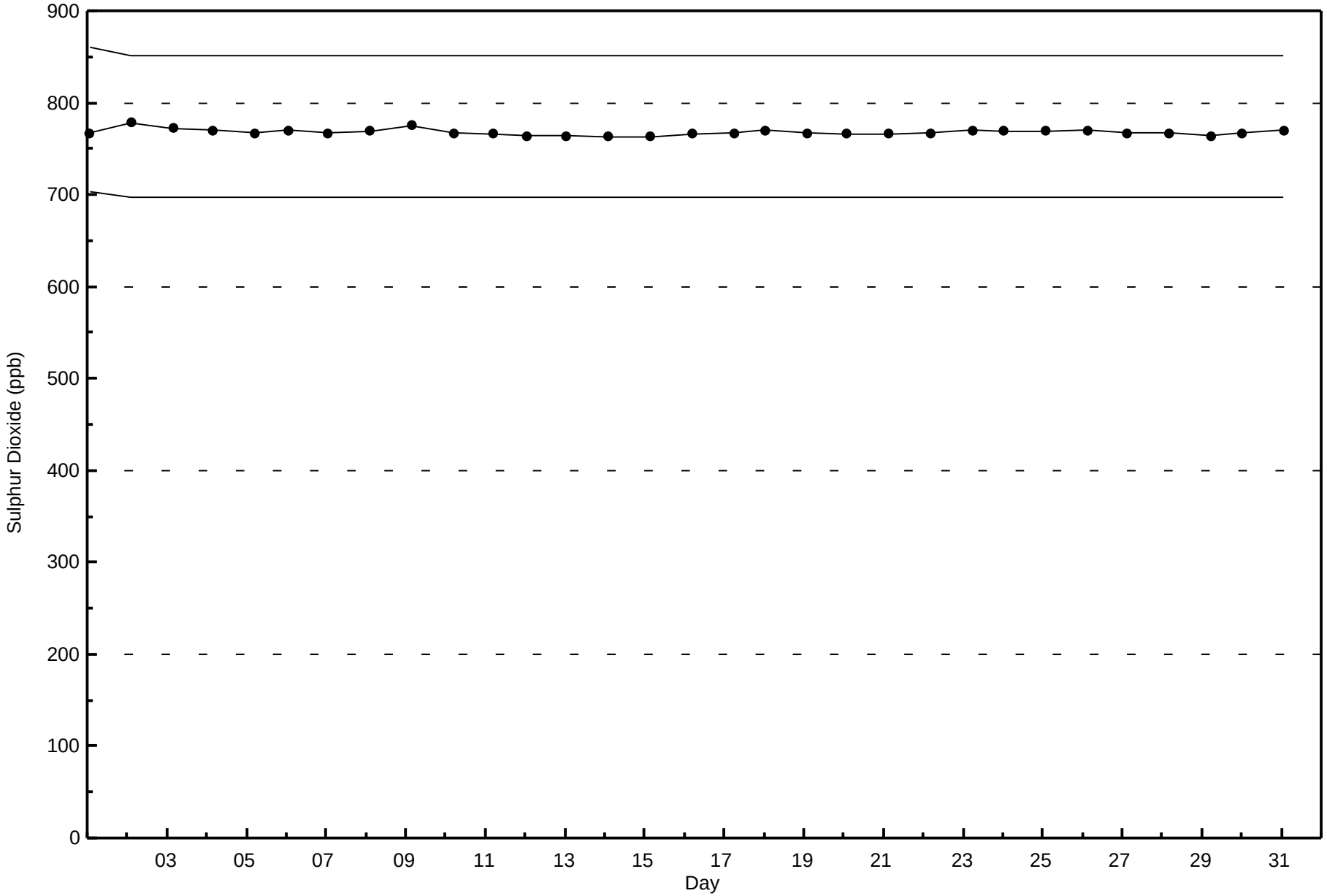


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Patricia McInnes - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Patricia McInnes - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 5 ppb on Mar 15 13:00

Maximum Daily Average: 0.6 ppb on Mar 15

Minimum Value: 0 ppb on Mar 25 20:00

Minimum Daily Average: 0.1 ppb on Mar 12

Maximum Diurnal Average: 0.4 ppb at hour 13

Minimum Diurnal Average: 0.2 ppb at hour 17

Monthly Average: 0.2 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 1$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-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
2-Mar	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	0.4	1
3-Mar	1	1	0	1	Z	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
4-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
5-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
6-Mar	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Mar	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
8-Mar	0	1	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
9-Mar	1	1	1	0	Z	1	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0.4	1
10-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
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	0.1	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	0.2	0
14-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
15-Mar	0	0	0	0	Z	0	0	0	0	0	0	1	5	1	1	1	0	0	0	0	0	0	0	0	0.6	5
16-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
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	0	0	0	0.2	0
19-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	0.2	1
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	0	0	0	0	0	0	0.1	0
23-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
24-Mar	0	Z	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	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	0.2	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	0.3	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	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
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	0.2	0
	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average	
	1	1	1	1	1	1	1	1	1	1	1	1	5	1	1	1	1	0	1	1	1	1	1	1	Diurnal Maximum	

Z - zerospan C - Calibration

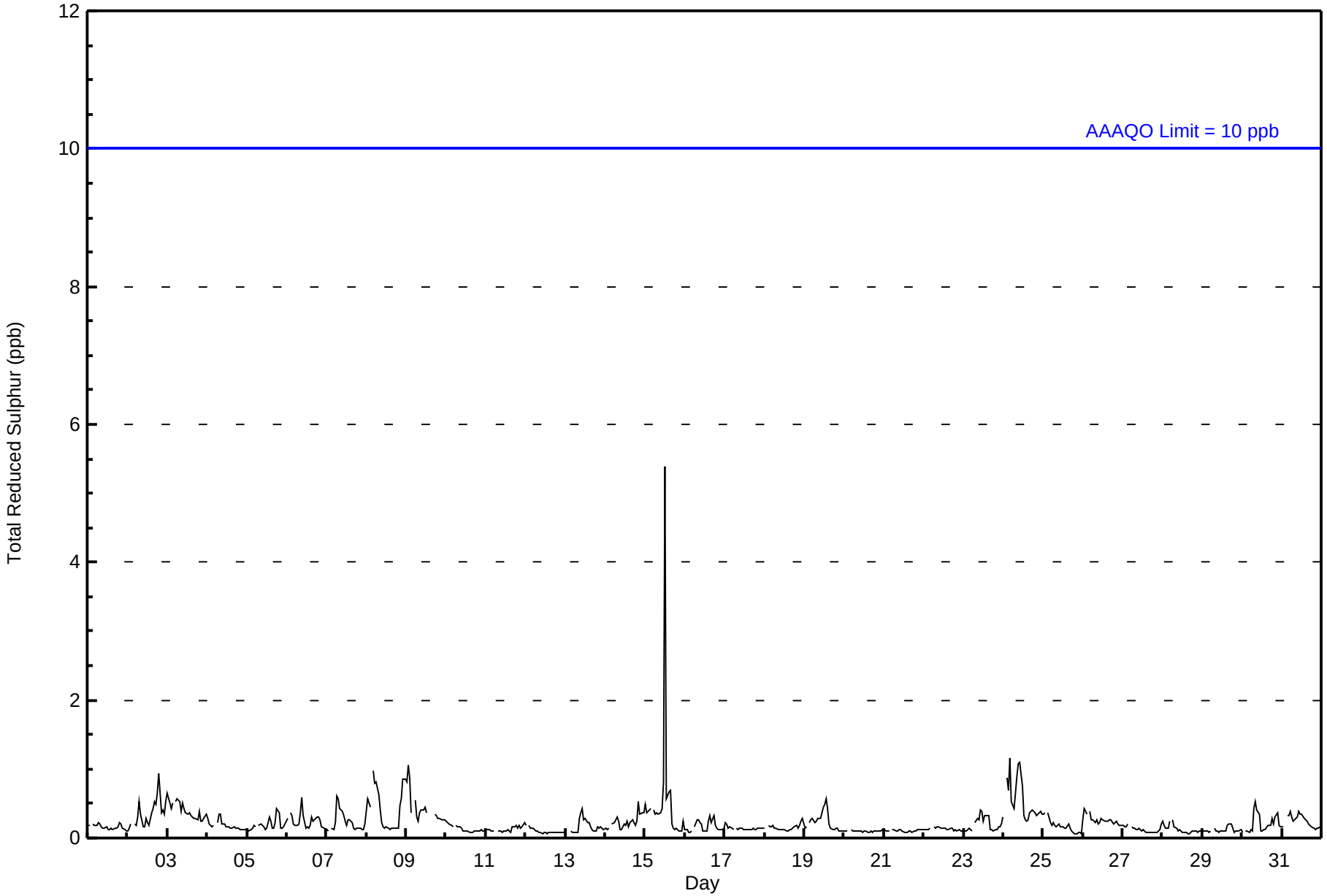
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Total Reduced Sulphur (TRS) - ppb

Patricia McInnes - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	708	99.86	99.86
3 - 4	0	0.00	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: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Patricia McInnes - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	108	48	17	39	39	94	50	31	17	16	14	22	22	30	21	140	708
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	108	48	17	39	39	94	50	31	17	16	14	22	22	30	21	141	709

Total Number of Valid Hours: 709

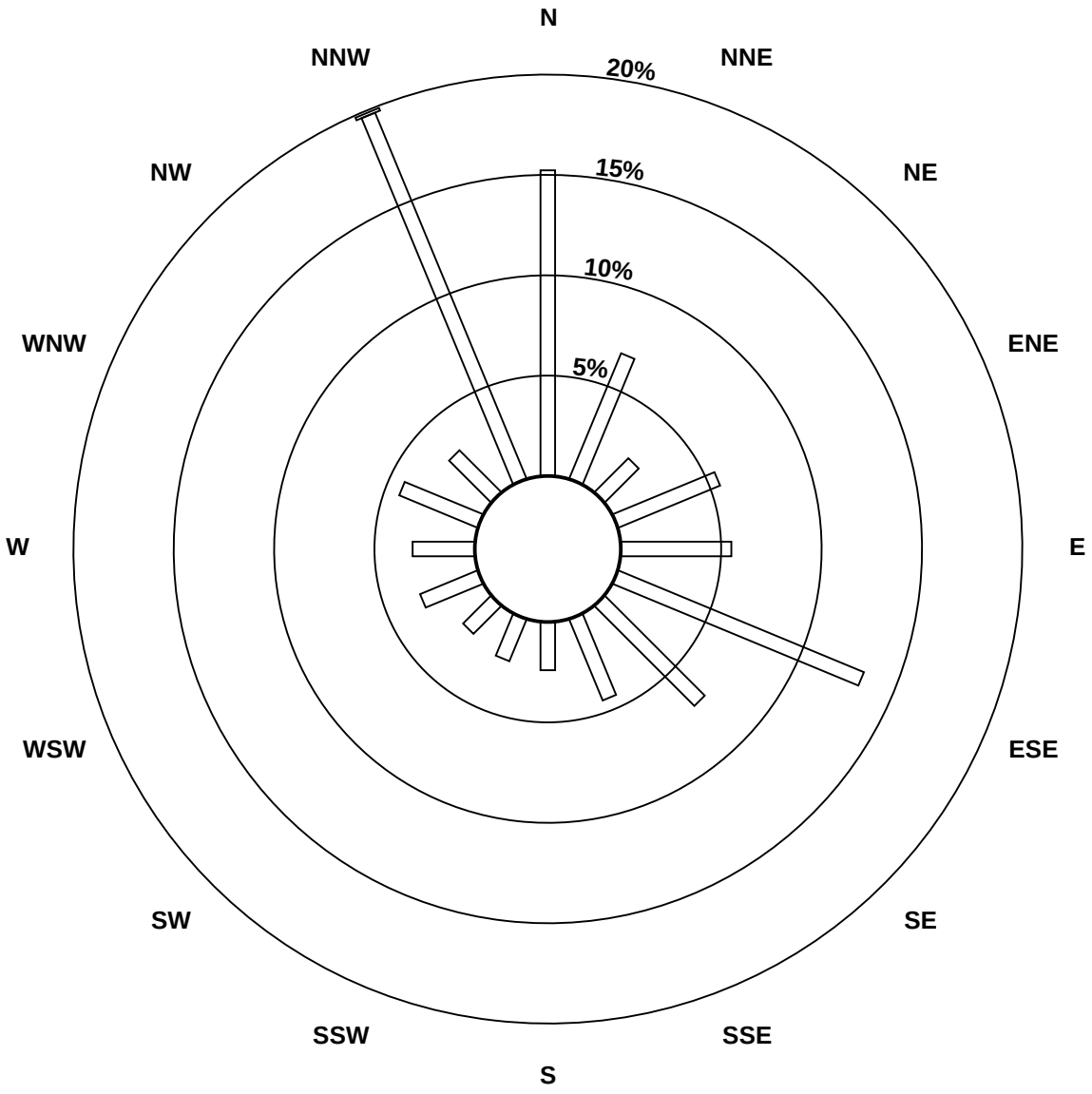
Total Number of Hours: 744

Wood Buffalo Environmental Association

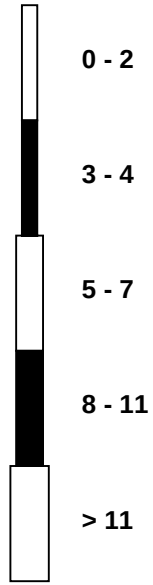
Wind Rose Mar 2016

Total Reduced Sulphur (TRS) - ppb

Patricia McInnes (AMS 6)



Classes (ppb)



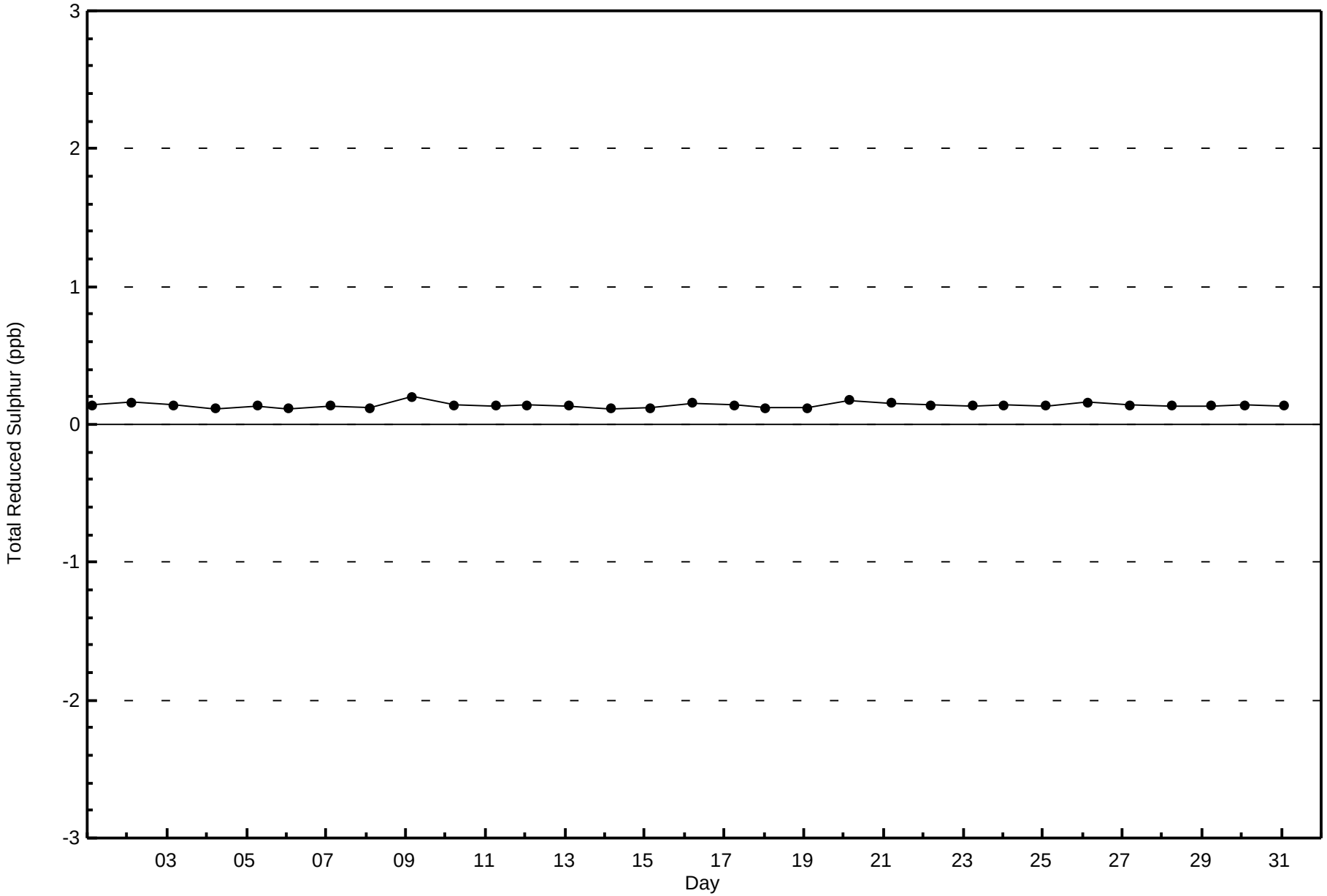
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

Patricia McInnes - March 2016

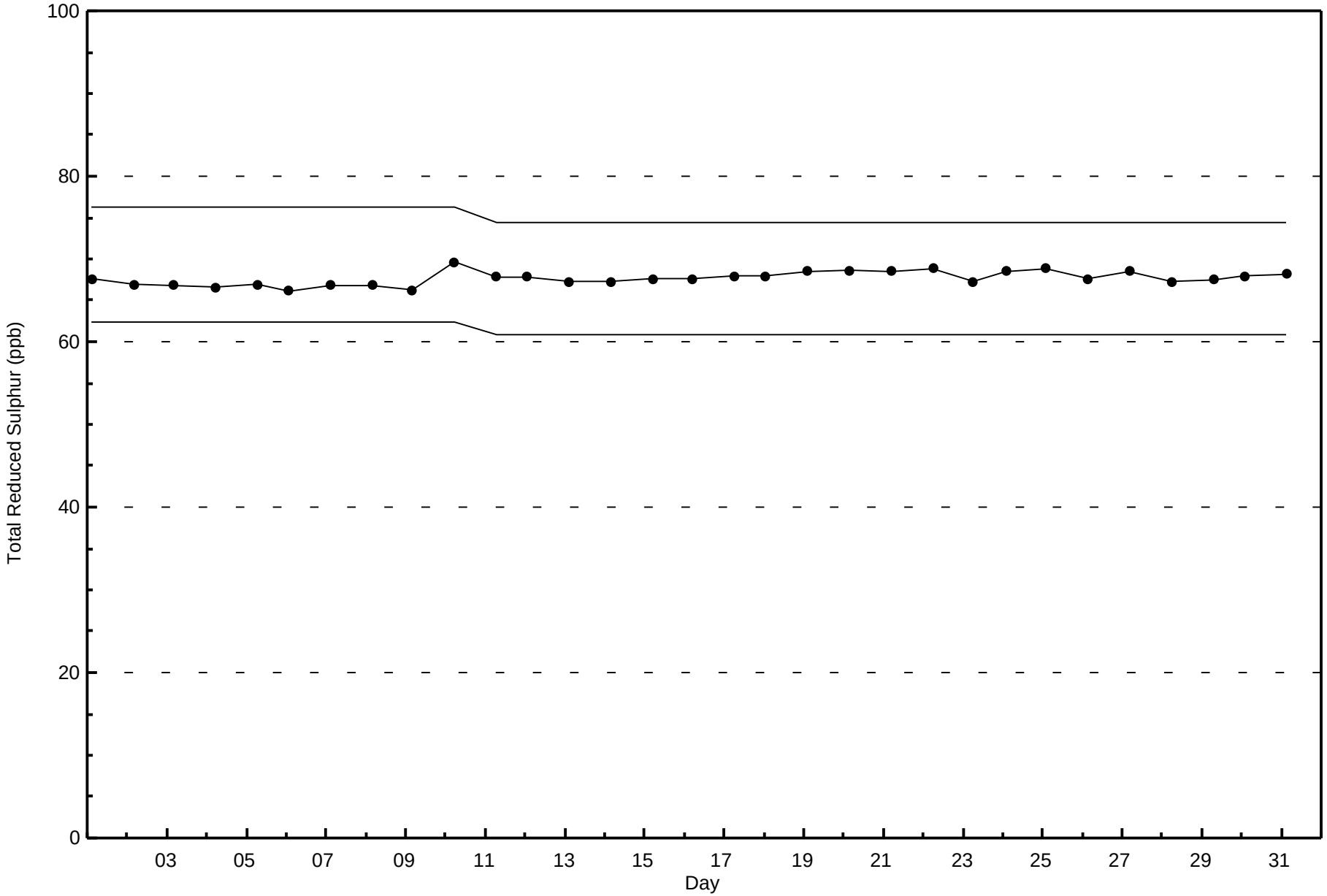


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

Patricia McInnes - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Patricia McInnes - March 2016

Maximum Value: 2.5 ppm on Mar 13 10:00

Maximum Daily Average: 2.2 ppm on Mar 9

Minimum Value: 2.0 ppm on Mar 29 14:00

Minimum Daily Average: 2.0 ppm on Mar 29

Maximum Diurnal Average: 2.1 ppm at hour 8

Minimum Diurnal Average: 2.0 ppm at hour 17

Monthly Average: 2.08 ppm

Percentiles: P_1 = 2.0 P_{10} = 2.0 Q_1 = 2.0 Median = 2.1 Q_3 = 2.1 P_{90} = 2.2 P_{99} = 2.4

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	35
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	2.1	Z	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	C	C	C	C	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2
2-Mar	2.1	2.1	Z	2.2	2.2	2.2	2.3	2.4	2.3	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.4
3-Mar	2.1	2.1	2.2	Z	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.4	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	2.4
4-Mar	2.1	2.1	2.1	2.1	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	2.0	2.0	2.0	2.1
5-Mar	2.0	2.0	2.0	2.1	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.2
6-Mar	Z	2.1	2.1	2.1	2.0	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	2.2	2.1	2.1	2.0	2.0	2.1	2.2
7-Mar	2.0	Z	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.3	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.3
8-Mar	2.1	2.2	Z	2.1	2.2	2.1	2.2	2.1	2.1	M	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.4	2.4	2.4	2.4	2.1	2.4
9-Mar	2.4	2.4	2.3	Z	2.1	2.1	2.1	2.1	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	2.2	2.2	2.4
10-Mar	2.2	2.2	2.2	2.2	Z	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.2
11-Mar	2.1	2.1	2.0	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.1	2.3
12-Mar	Z	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3
13-Mar	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.5	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.5
14-Mar	2.1	2.1	Z	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
15-Mar	2.1	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.2
16-Mar	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1
17-Mar	2.1	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	2.1
18-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	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1
19-Mar	2.1	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3
20-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
21-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
22-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
23-Mar	2.0	2.0	2.0	2.1	2.1	Z	2.0	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	2.1	2.1	2.1	2.2
24-Mar	Z	2.1	2.2	2.2	2.4	2.3	2.4	2.4	2.3	2.2	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	2.1	2.2	2.4
25-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	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.1	2.1
26-Mar	2.3	2.5	Z	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5
27-Mar	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
28-Mar	2.1	2.1	2.1	2.1	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	2.0	2.0	2.0	2.1
29-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
30-Mar	Z	2.0	2.0	2.1	2.1	2.1	2.1	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	2.0	2.1
31-Mar	2.0	Z	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.1
	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	Diurnal Average	
	2.4	2.5	2.3	2.4	2.4	2.3	2.4	2.4	2.3	2.5	2.3	2.4	2.2	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.4	2.4	2.4	2.4	Diurnal Maximum	

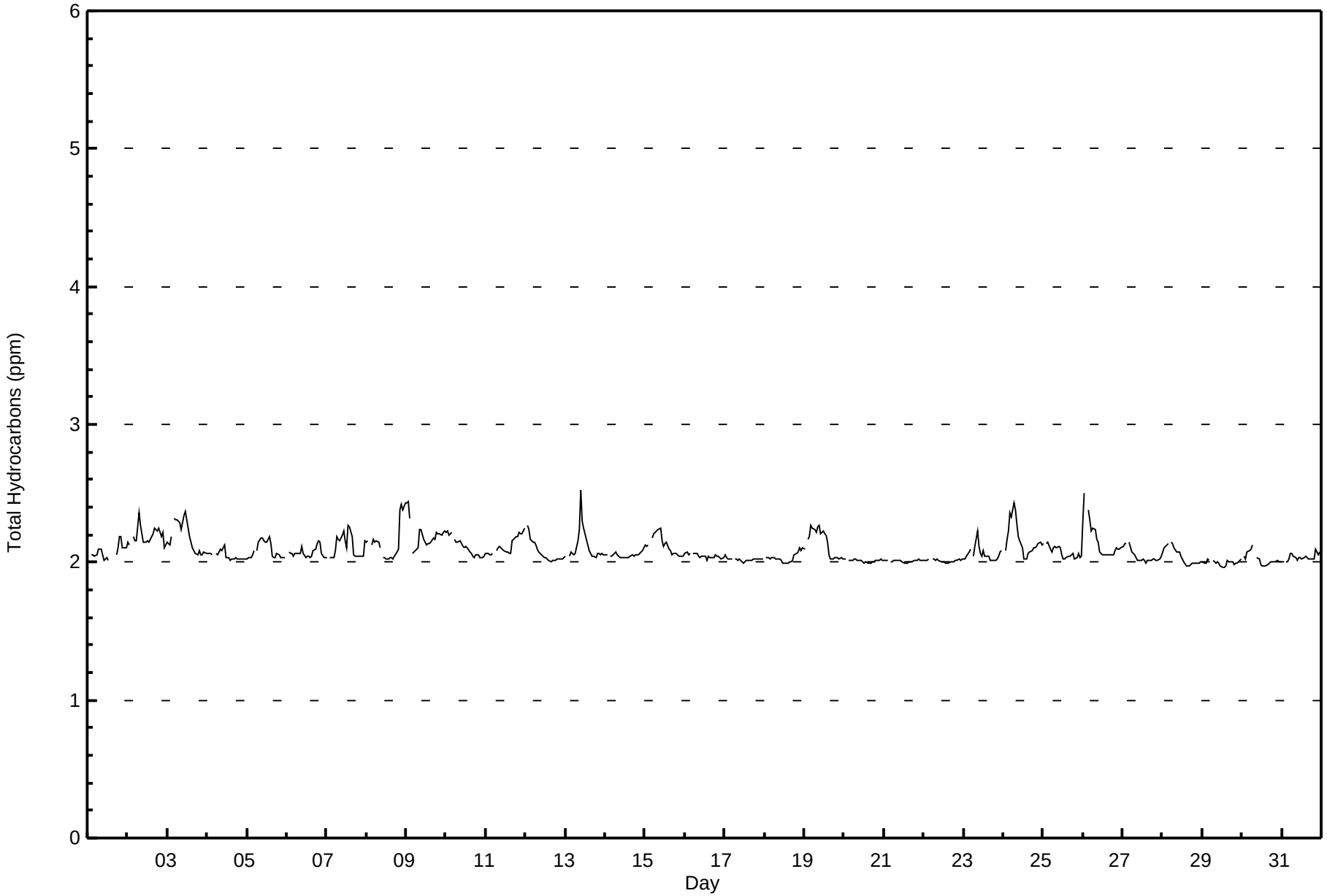
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Patricia McInnes - March 2016



Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	339	48.02	48.02
2.1 - 3.0	367	51.98	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

Patricia McInnes - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	45	10	5	33	29	71	26	4	3	8	9	13	20	15	7	41	339
2.1 - 3.0	63	34	12	8	12	21	26	26	15	8	4	10	2	15	14	97	367
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	108	44	17	41	41	92	52	30	18	16	13	23	22	30	21	138	706

Total Number of Valid Hours: 706

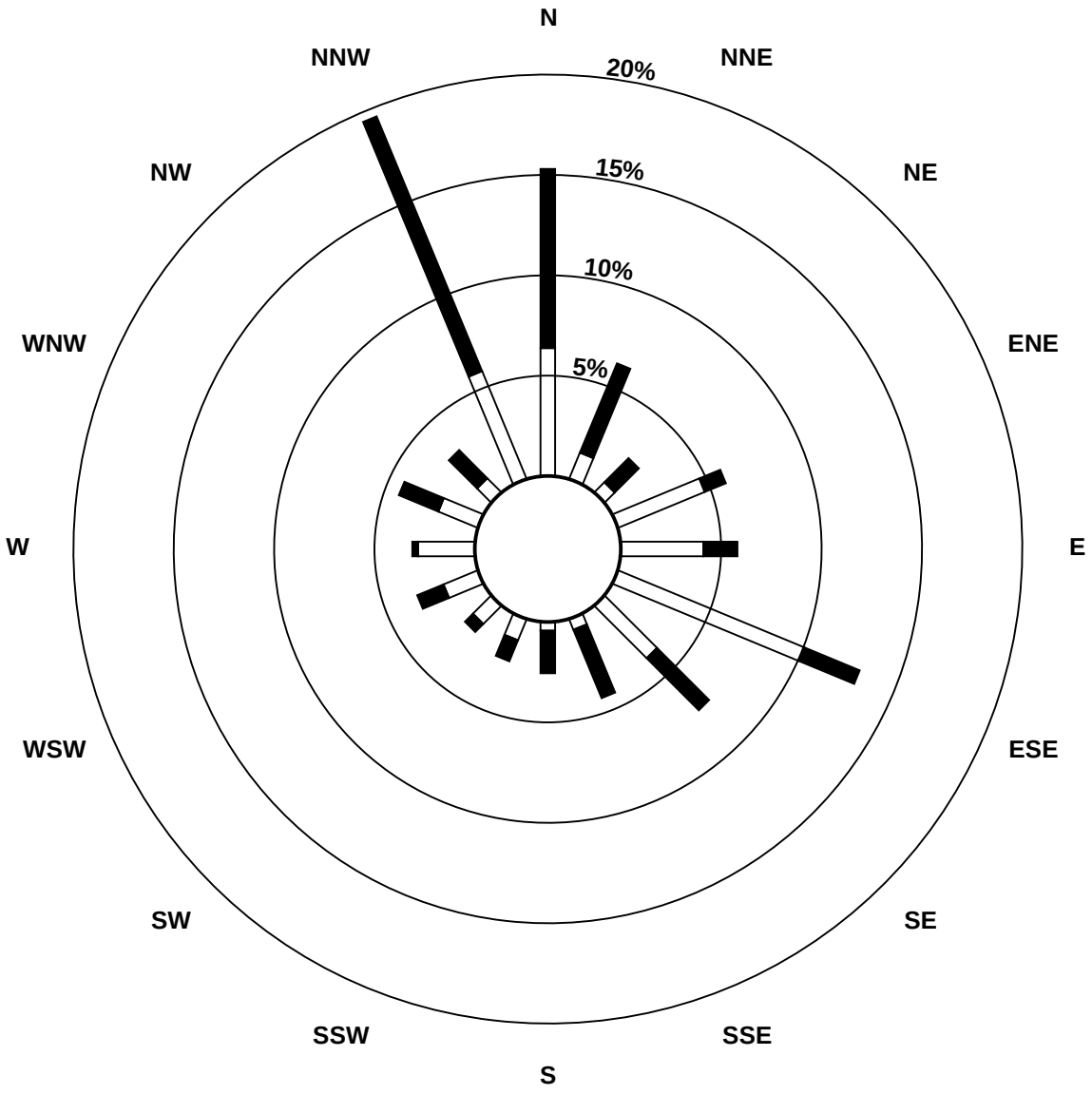
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Mar 2016

Total Hydrocarbons (THC) - ppm

Patricia McInnes (AMS 6)



Classes (ppm)

0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

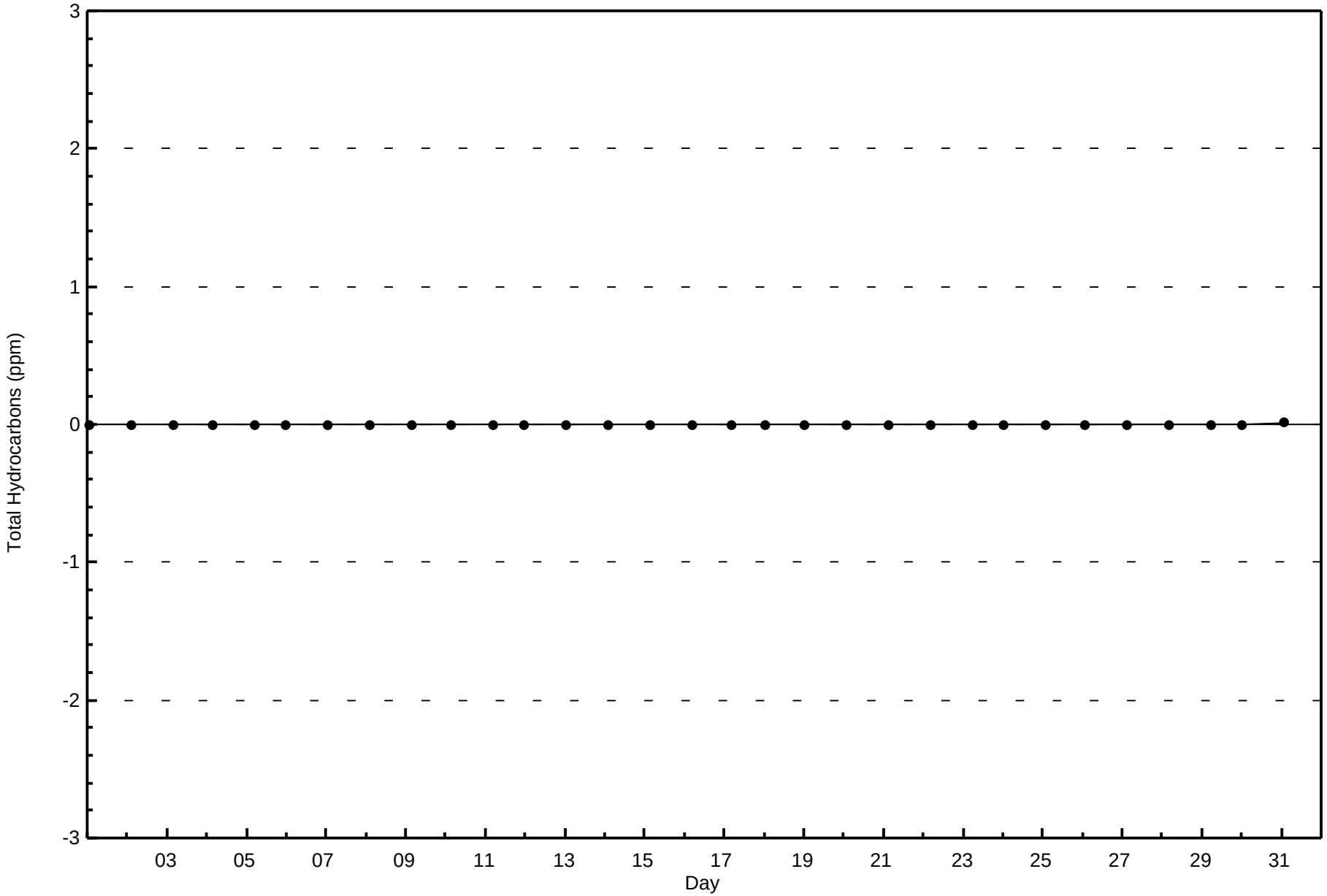
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Patricia McInnes - March 2016

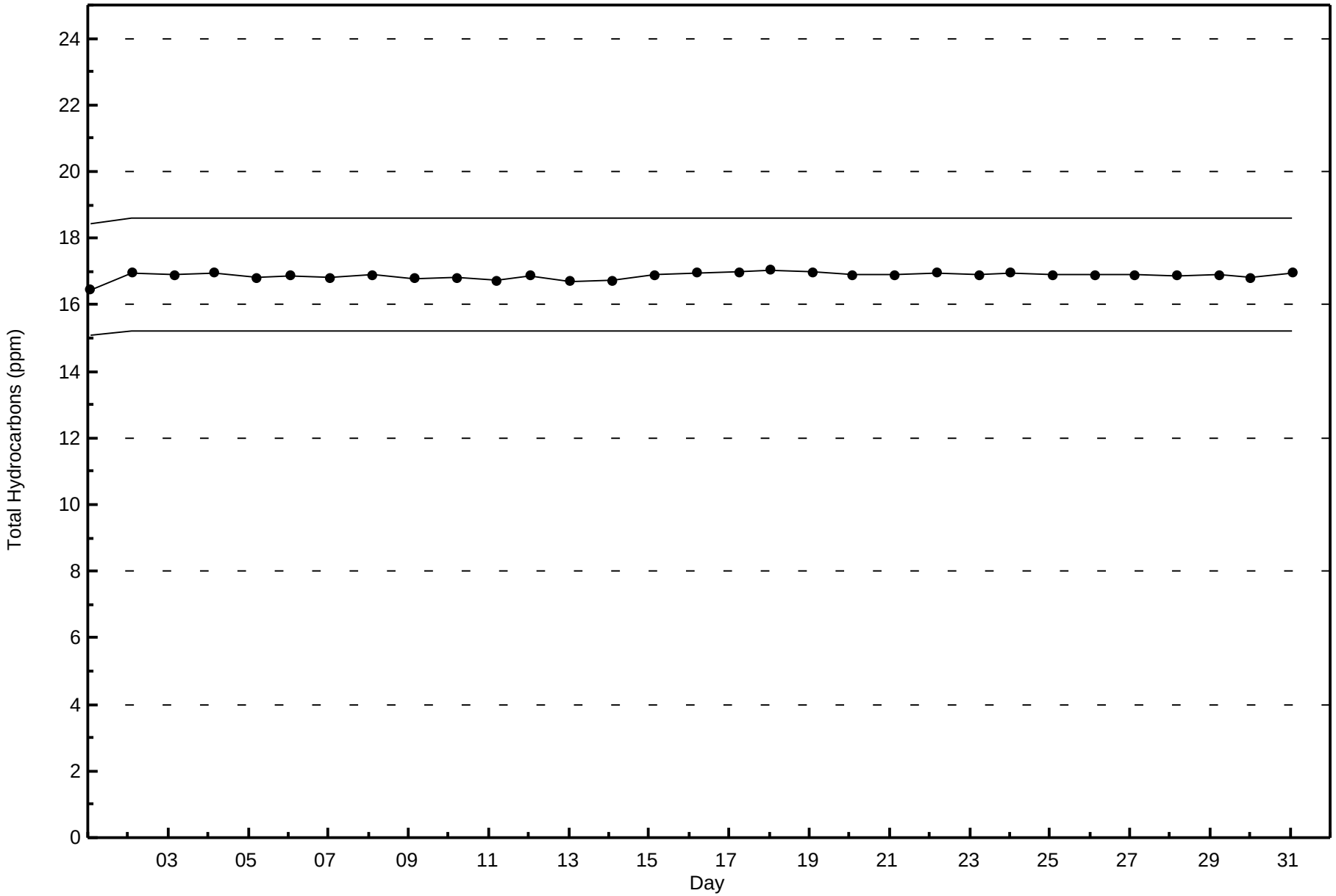


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Patricia McInnes - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - March 2016

Maximum Value: 0.036 ppm on Mar 24 07:00

Maximum Daily Average: 0.003 ppm on Mar 24

Minimum Value: 0.000 ppm on Mar 1 01:00

Minimum Daily Average: 0.000 ppm on Mar 1

Maximum Diurnal Average: 0.001 ppm at hour 11

Minimum Diurnal Average: 0.000 ppm at hour 6

Monthly Average: 0.000 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 in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	35
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-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	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2-Mar	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
3-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
4-Mar	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.034	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	0.034
5-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
6-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
7-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	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
8-Mar	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9-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	0.010	0.000	0.011	0.002	0.000	0.000	0.000	0.001	0.001	0.011
10-Mar	0.001	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	0.001
11-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	0.002	0.000	0.002
12-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
13-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
14-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
15-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
16-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
17-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
18-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	0.018	0.000	0.000	0.001	0.018
19-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	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.002
20-Mar	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.013
21-Mar	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
22-Mar	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	0.003
23-Mar	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011
24-Mar	Z	0.000	0.002	0.000	0.000	0.000	0.036	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.036
25-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
26-Mar	0.000	0.000	Z	0.002	0.002	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	0.004	0.000	0.000	0.000	0.000	0.004
27-Mar	0.000	0.000	0.000	Z	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	0.000	0.002
28-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
29-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
30-Mar	Z	0.000	0.000	0.000	0.000	0.000	0.000	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	0.001	0.000	0.000	0.001
31-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	0.000	0.000	0.001	0.001	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	0.001	0.000	0.000	Diurnal Average	
	0.001	0.001	0.002	0.002	0.002	0.000	0.036	0.030	0.011	0.003	0.034	0.003	0.002	0.013	0.000	0.000	0.010	0.000	0.011	0.002	0.004	0.018	0.001	0.002	Diurnal Maximum	

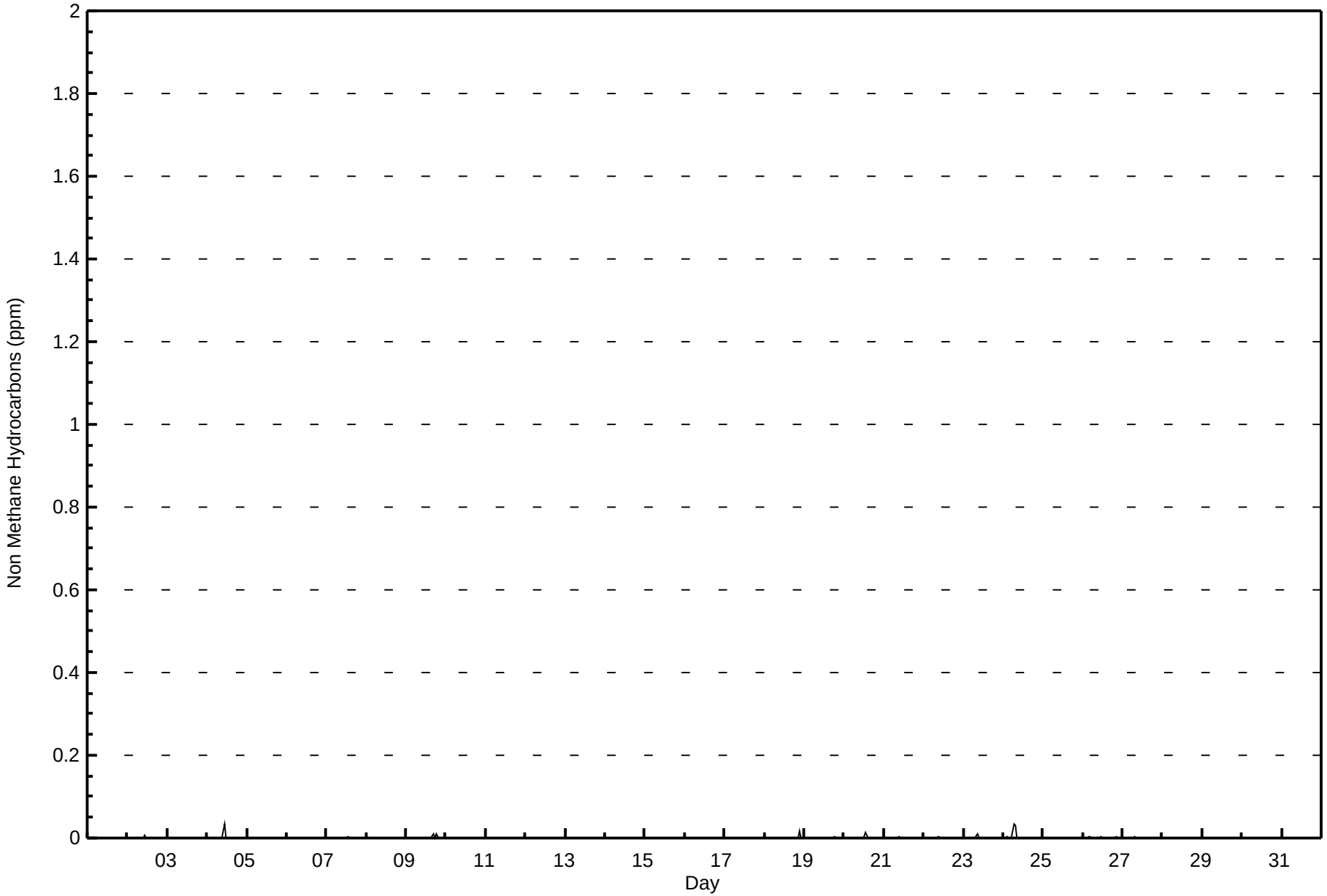
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	697	98.73	98.73
0.006 - 0.05	9	1.27	100.00
0.06 - 0.1	0	0.00	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association | **Non Methane Hydrocarbons (NMHC) - ppm**

Frequency Distribution | **Patricia McInnes - March 2016**

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 0.005	108	43	16	39	41	92	51	30	17	16	13	23	22	30	21	135	697
0.006 - 0.05	0	1	1	2	0	0	1	0	1	0	0	0	0	0	0	3	9
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	108	44	17	41	41	92	52	30	18	16	13	23	22	30	21	138	706

Total Number of Valid Hours: 706

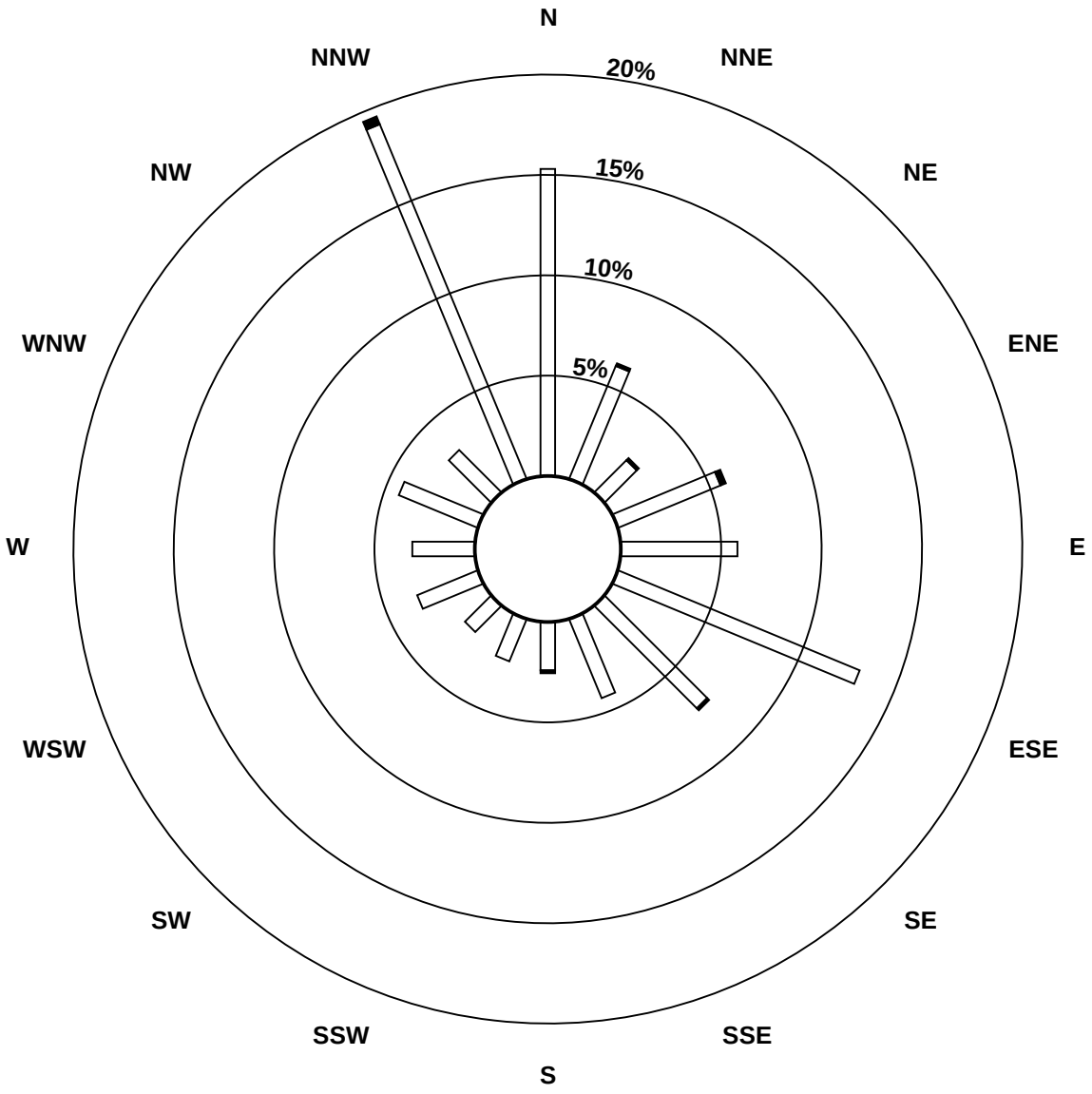
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Mar 2016

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes (AMS 6)



Classes (ppm)

0 - 0.005

0.006 - 0.05

0.06 - 0.1

> 0.1

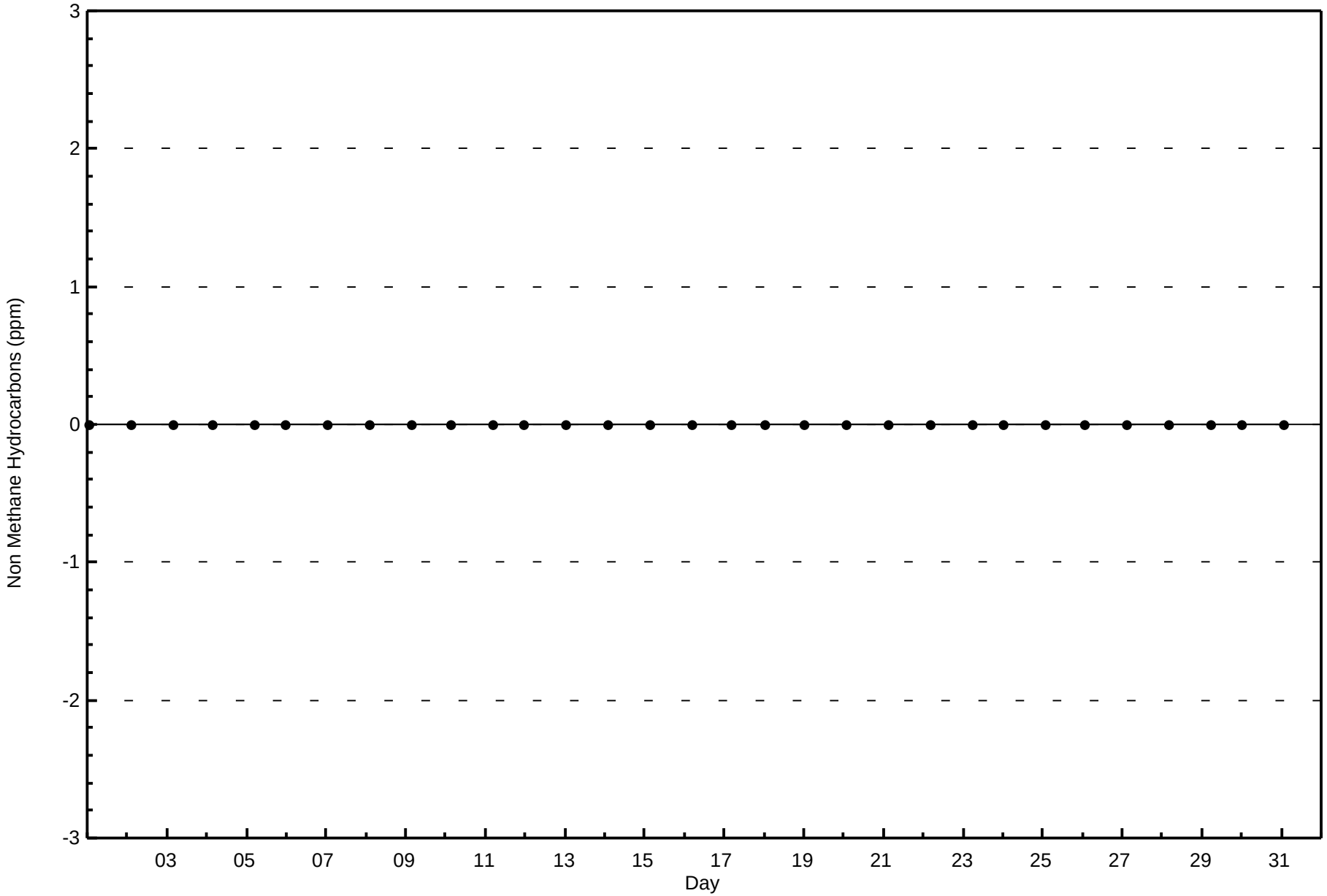
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - March 2016

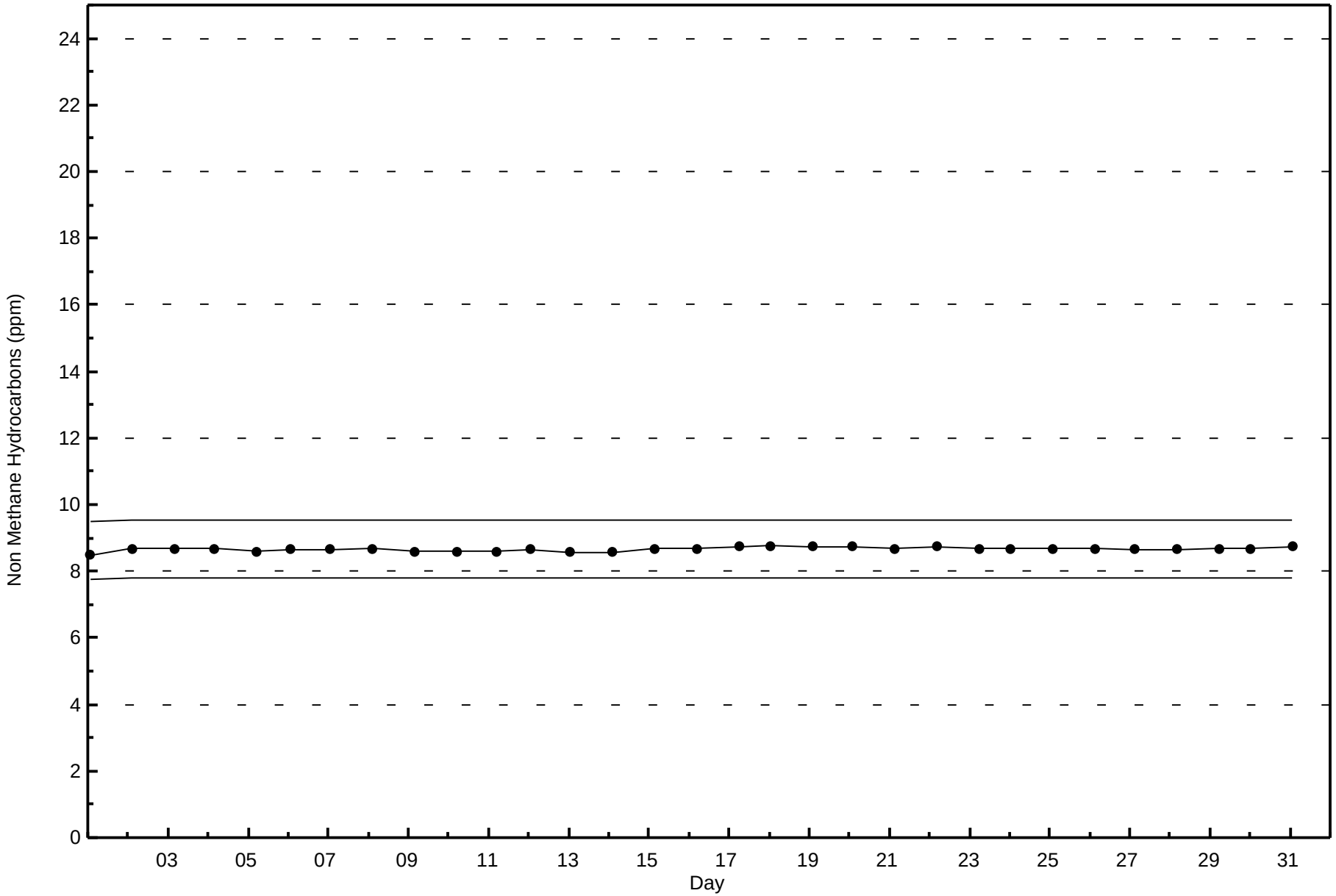


Wood Buffalo Environmental Association

Span Responses

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH_4) - ppm

Patricia McInnes - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 2.5 ppm on Mar 13 10:00

Maximum Daily Average: 2.2 ppm on Mar 9

Minimum Value: 2.0 ppm on Mar 29 14:00

Minimum Daily Average: 2.0 ppm on Mar 29

Maximum Diurnal Average: 2.1 ppm at hour 8

Minimum Diurnal Average: 2.0 ppm at hour 17

Monthly Average: 2.08 ppm

Percentiles: P_1 = 2.0 P_{10} = 2.0 Q_1 = 2.0 Median = 2.1 Q_3 = 2.1 P_{90} = 2.2 P_{99} = 2.4

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	35
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	2.1	Z	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	C	C	C	C	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2
2-Mar	2.1	2.1	Z	2.2	2.2	2.2	2.3	2.4	2.3	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.4
3-Mar	2.1	2.1	2.2	Z	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.4	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	2.4
4-Mar	2.1	2.1	2.1	2.1	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	2.0	2.0	2.0	2.1
5-Mar	2.0	2.0	2.0	2.1	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.2
6-Mar	Z	2.1	2.1	2.1	2.0	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	2.2	2.1	2.1	2.0	2.0	2.1	2.2
7-Mar	2.0	Z	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.3	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.3
8-Mar	2.1	2.2	Z	2.1	2.2	2.1	2.2	2.1	2.1	M	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.4	2.4	2.4	2.4	2.1	2.4
9-Mar	2.4	2.4	2.3	Z	2.1	2.1	2.1	2.1	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	2.2	2.2	2.4
10-Mar	2.2	2.2	2.2	2.2	Z	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.2
11-Mar	2.1	2.1	2.0	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2
12-Mar	Z	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3
13-Mar	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.5	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.5
14-Mar	2.1	2.1	Z	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	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
15-Mar	2.1	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.2
16-Mar	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1
17-Mar	2.1	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	2.1
18-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	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1
19-Mar	2.1	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3
20-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
21-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
22-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
23-Mar	2.0	2.0	2.0	2.1	2.1	Z	2.0	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	2.1	2.1	2.1	2.2
24-Mar	Z	2.1	2.2	2.2	2.4	2.3	2.4	2.4	2.3	2.2	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	2.1	2.2	2.4
25-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	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.1	2.1
26-Mar	2.3	2.5	Z	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5
27-Mar	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
28-Mar	2.1	2.1	2.1	2.1	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	2.0	2.0	2.0	2.1
29-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
30-Mar	Z	2.0	2.0	2.1	2.1	2.1	2.1	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	2.0	2.1
31-Mar	2.0	Z	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.1
	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	Diurnal Average	
	2.4	2.5	2.3	2.4	2.4	2.3	2.4	2.4	2.3	2.5	2.3	2.4	2.2	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.4	2.4	2.4	2.4	Diurnal Maximum	

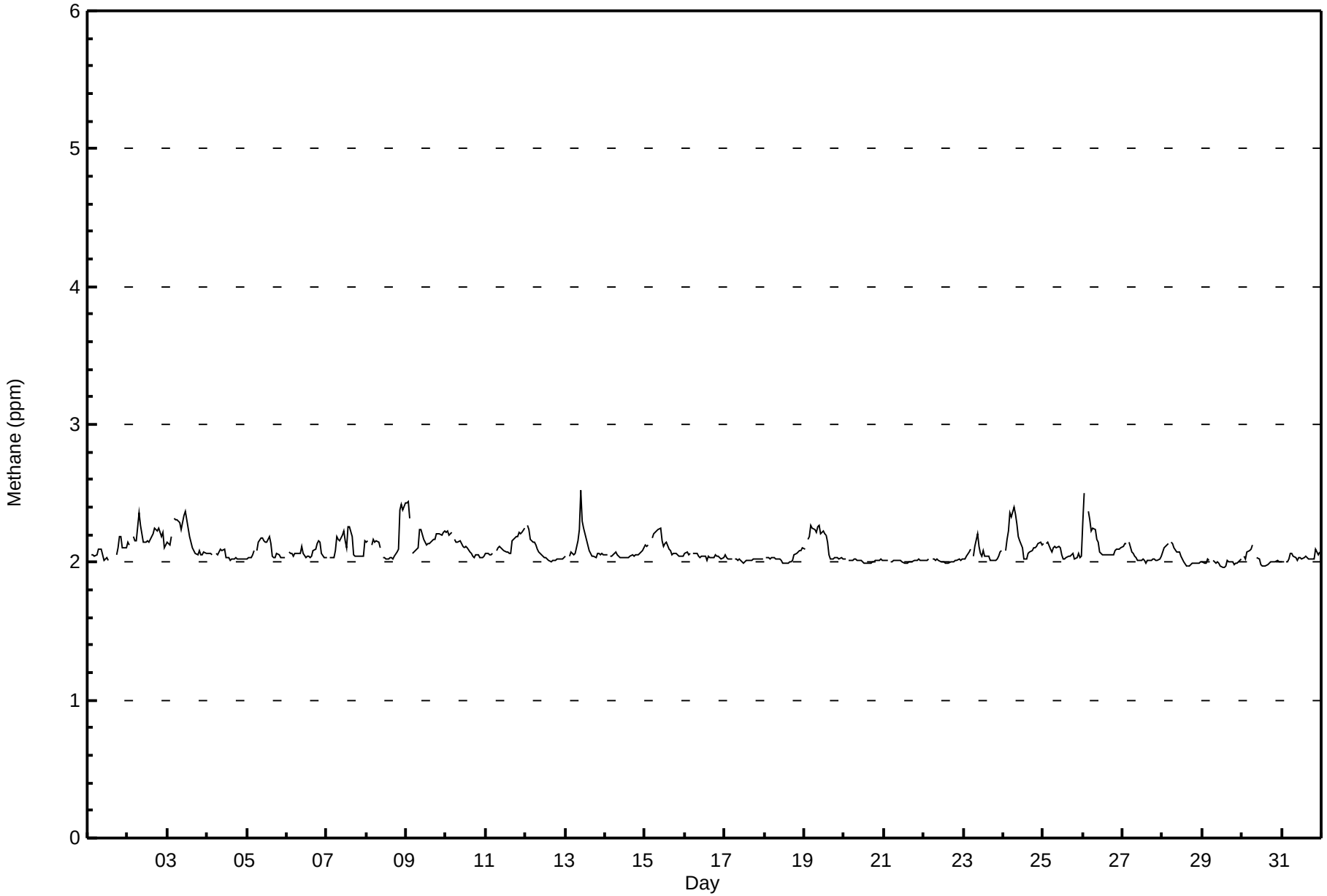
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Methane (CH_4) - ppm

Patricia McInnes - March 2016



Methane (CH_4) - ppm

Patricia McInnes - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	339	48.02	48.02
2.1 - 3.0	367	51.98	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 | **Methane (CH_4) - ppm**

Frequency Distribution | **Patricia McInnes - March 2016**

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	45	10	5	33	29	71	26	4	3	8	9	13	20	15	7	41	339
2.1 - 3.0	63	34	12	8	12	21	26	26	15	8	4	10	2	15	14	97	367
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	108	44	17	41	41	92	52	30	18	16	13	23	22	30	21	138	706

Total Number of Valid Hours: 706

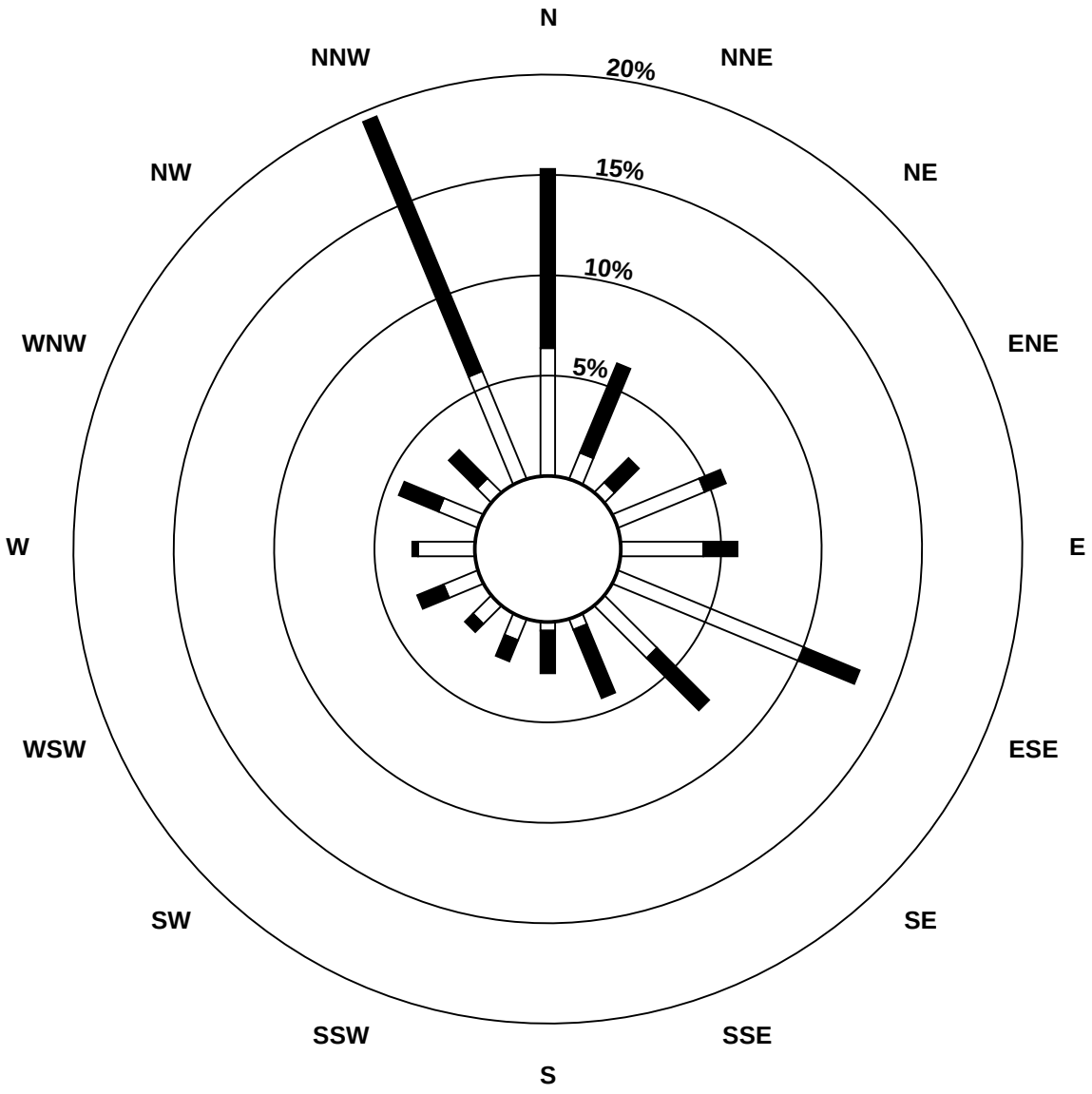
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Mar 2016

Methane (CH_4) - ppm

Patricia McInnes (AMS 6)



Classes (ppm)

0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

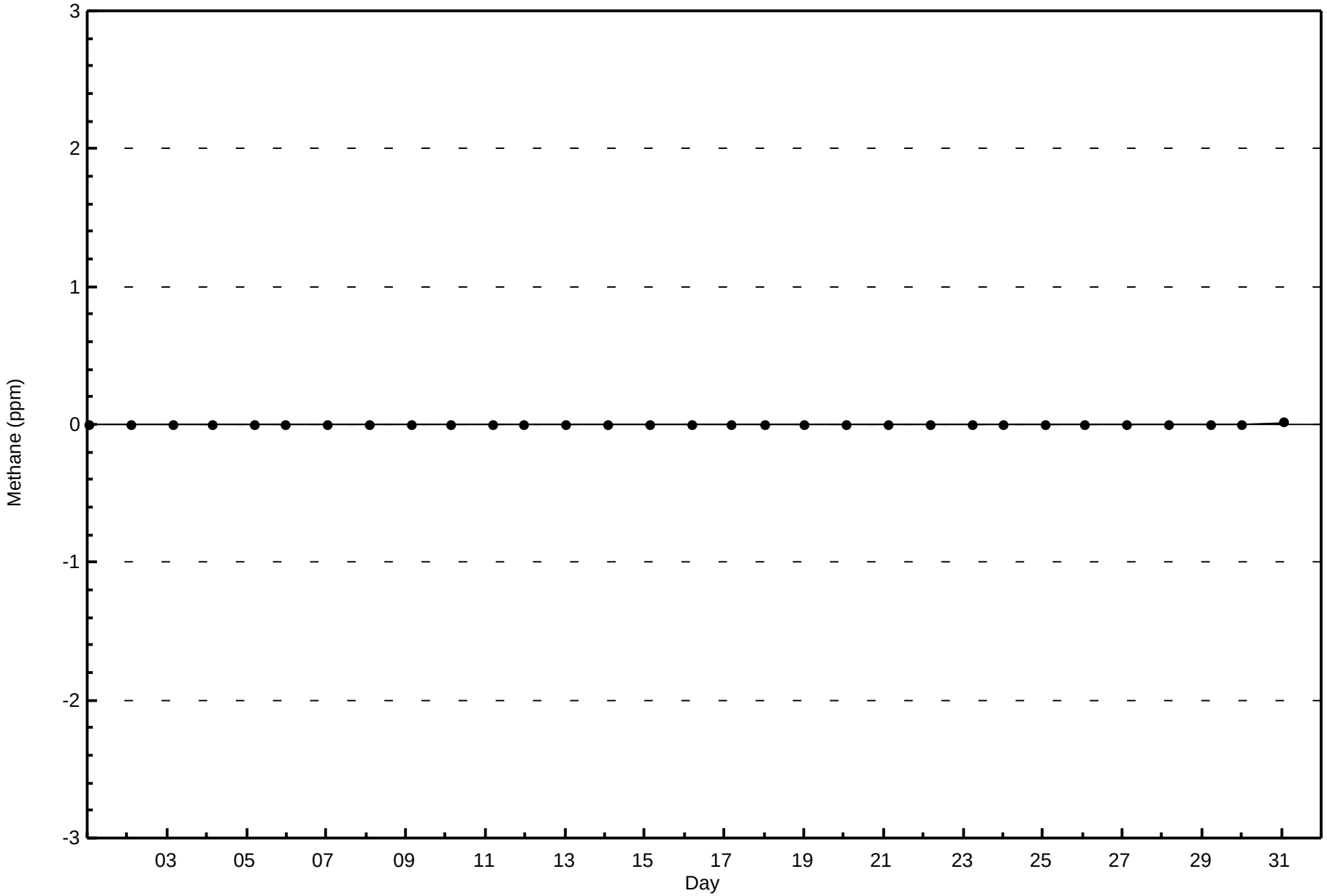
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Methane (CH_4) - ppm

Patricia McInnes - March 2016

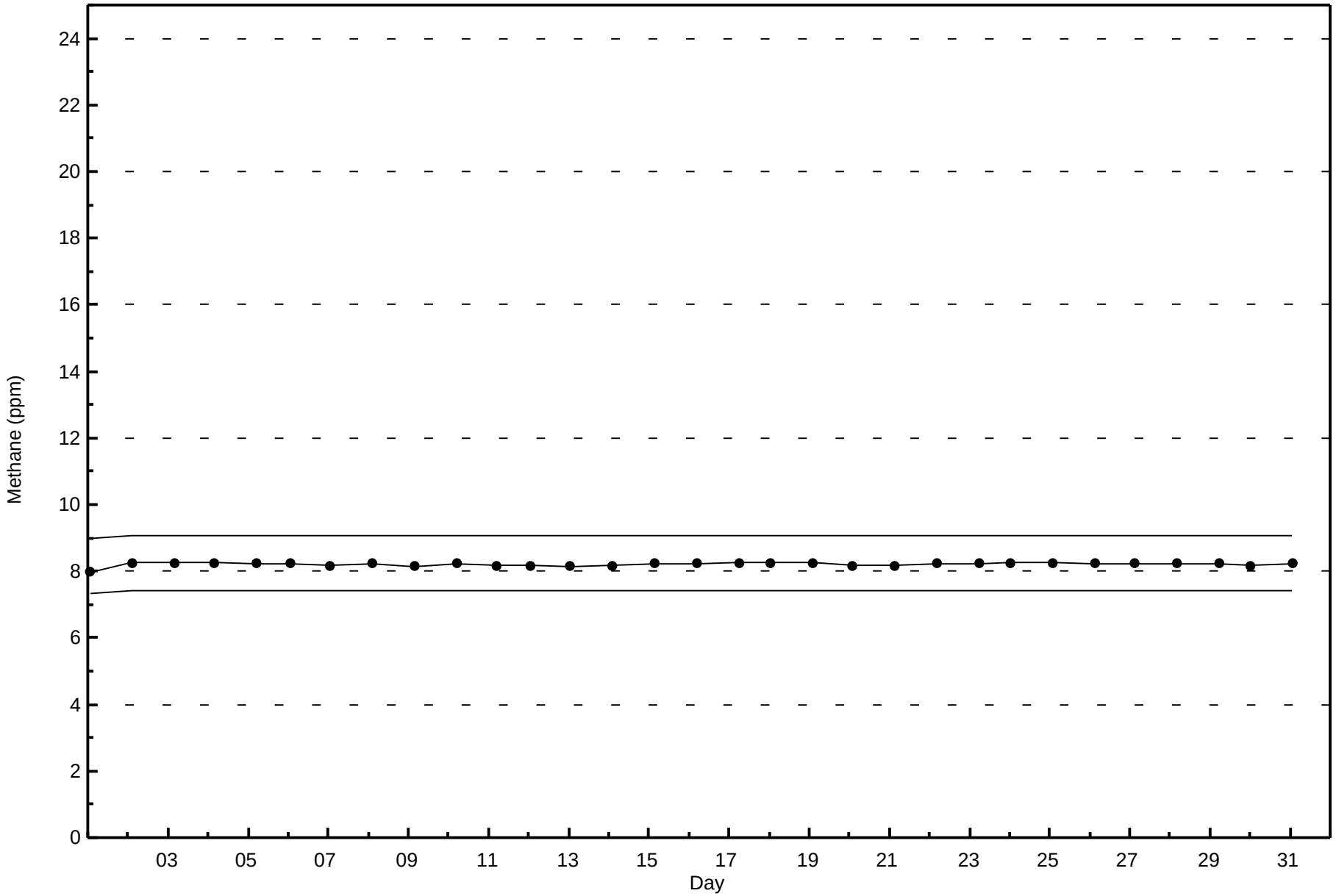


Wood Buffalo Environmental Association

Span Responses

Methane (CH_4) - ppm

Patricia McInnes - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O_3) - ppb

Patricia McInnes - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 54 ppb on Mar 28 18:00

Maximum Daily Average: 46.3 ppb on Mar 29

Minimum Value: 1 ppb on Mar 9 23:00

Minimum Daily Average: 18.6 ppb on Mar 2

Maximum Diurnal Average: 36.5 ppb at hour 14

Minimum Diurnal Average: 23.8 ppb at hour 6

Monthly Average: 31.2 ppb

Percentiles: $P_1 = 3$ $P_{10} = 15$ $Q_1 = 24$ Median = 32 $Q_3 = 40$ $P_{90} = 44$ $P_{99} = 52$

Hours in Service:	744
Hours of Data:	682
Hours of Missing Data:	62
Hours of Calibration:	34
Percent Operational Time:	96.2

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	23	24	23	21	Z	15	7	9	15	23	24	22	27	29	28	31	26	22	6	3	8	19	23	25	19.7	31
2-Mar	16	20	15	18	21	Z	8	8	14	23	25	21	25	26	24	23	18	10	12	15	19	18	23	25	18.6	26
3-Mar	26	25	20	11	6	4	Z	6	11	13	17	18	22	23	24	26	30	28	30	31	32	34	35	34	21.9	35
4-Mar	33	30	31	31	30	29	28	Z	15	23	26	30	33	35	37	35	35	37	36	34	37	37	37	37	32.1	37
5-Mar	37	35	35	32	25	22	25	18	Z	24	24	23	24	24	28	33	34	33	28	30	33	34	34	33	29.0	37
6-Mar	32	30	32	Z	32	30	28	30	29	32	33	34	33	31	32	31	29	27	23	21	20	27	31	33	29.6	34
7-Mar	32	32	30	29	Z	25	19	21	22	23	23	25	26	21	19	21	29	30	29	28	29	30	32	22	25.9	32
8-Mar	21	19	19	16	14	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	21
9-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	18	18	14	13	5	4	2	2	1	1	--	18
10-Mar	2	3	3	5	6	11	15	Z	18	22	26	28	30	32	34	32	33	33	31	30	29	28	28	29	22.1	34
11-Mar	27	27	27	28	27	23	22	20	Z	23	25	27	28	28	28	28	18	9	3	8	3	5	3	2	19.1	28
12-Mar	2	3	7	Z	15	8	11	17	22	25	29	30	31	35	39	42	41	39	38	34	34	34	34	34	26.2	42
13-Mar	33	32	30	24	Z	25	28	18	19	13	18	21	23	26	28	29	30	29	30	26	27	27	26	28	25.6	33
14-Mar	32	33	32	31	31	Z	28	28	30	32	32	31	32	32	32	32	31	31	31	31	29	28	29	25	30.5	33
15-Mar	24	24	24	19	15	14	Z	14	17	21	22	25	24	25	26	21	23	28	30	30	32	32	32	32	24.0	32
16-Mar	27	31	33	32	32	31	30	Z	34	36	36	37	39	41	36	37	39	34	38	38	37	37	38	41	35.4	41
17-Mar	38	40	38	36	36	36	36	36	Z	37	38	40	41	41	41	40	36	38	39	39	38	37	36	34	37.9	41
18-Mar	30	29	29	Z	32	29	30	32	33	37	41	41	41	41	41	41	40	37	23	11	14	8	14	16	30.0	41
19-Mar	18	18	14	11	Z	5	8	13	20	21	24	23	26	23	28	38	43	42	37	36	40	41	40	41	26.4	43
20-Mar	40	40	42	41	40	Z	36	37	39	40	40	41	41	42	42	41	40	40	40	39	38	39	38	40	39.9	42
21-Mar	40	40	40	40	39	37	Z	39	40	41	41	42	43	43	43	43	42	41	42	41	42	41	43	45	41.2	45
22-Mar	47	47	46	45	44	41	41	Z	44	43	44	44	45	45	46	46	44	44	44	42	41	42	43	41	43.9	47
23-Mar	40	41	36	30	22	25	30	24	Z	29	33	37	40	42	42	44	45	45	45	45	46	43	40	40	37.5	46
24-Mar	39	38	36	Z	19	16	17	26	32	36	38	41	47	47	48	46	41	44	41	39	39	39	36	28	36.3	48
25-Mar	28	28	24	21	Z	37	25	34	39	34	35	38	42	42	42	37	36	37	35	43	37	25	28	31	33.8	43
26-Mar	17	4	6	14	20	Z	22	26	36	35	41	41	42	43	44	44	42	39	34	23	17	22	23	22	28.5	44
27-Mar	21	18	19	15	18	35	Z	37	39	40	40	43	46	48	49	48	49	48	45	43	45	44	42	37	37.8	49
28-Mar	31	21	23	19	16	6	11	Z	39	41	45	47	49	52	54	51	52	54	52	51	51	49	49	48	39.6	54
29-Mar	47	48	49	36	43	36	40	42	Z	44	47	51	53	52	51	47	46	41	47	52	51	50	47	43	46.3	53
30-Mar	46	34	41	Z	35	25	27	44	43	39	43	48	50	49	49	48	47	44	41	42	41	41	43	43	41.8	50
31-Mar	42	41	40	37	Z	31	31	36	38	38	36	37	38	39	38	38	35	34	37	37	38	39	33	27	36.6	42
	29.8	28.5	28.1	25.6	25.7	23.8	24.0	25.7	28.6	30.6	32.6	34.0	35.8	36.5	36.4	36.4	35.6	34.4	32.3	31.6	31.7	31.7	32.1	31.2	Diurnal Average	
	47	48	49	45	44	41	41	44	44	44	47	51	53	52	54	51	52	54	52	52	51	50	49	48	Diurnal Maximum	

Z - zerospan C - Calibration AF - Analyzer Failure

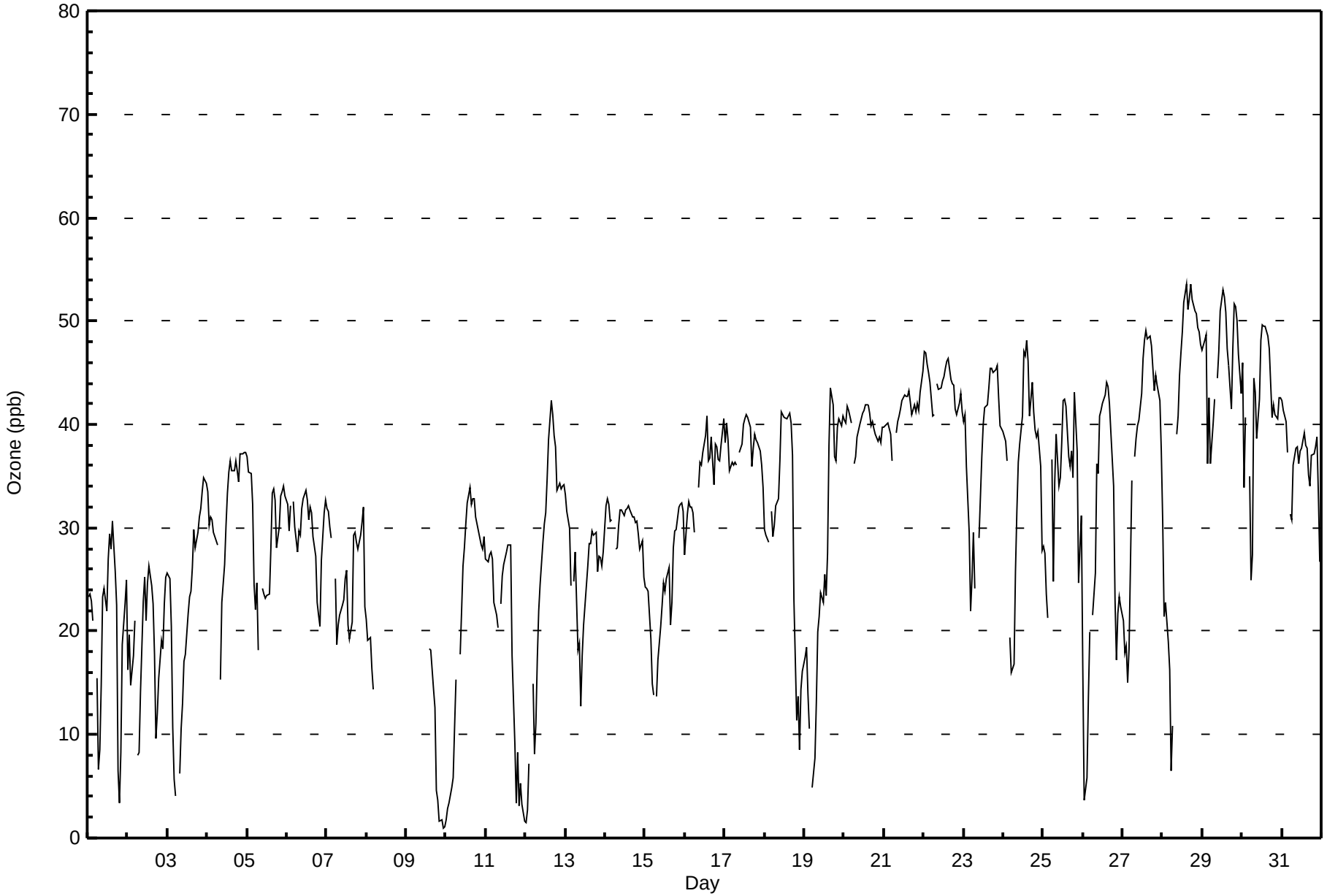
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ozone (O_3) - ppb

Patricia McInnes - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	112	16.42	16.42
21 - 50	556	81.52	97.95
51 - 82	14	2.05	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Ozone (O_3) - ppb

Patricia McInnes - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	13	14	3	2	5	6	11	11	7	5	2	2	0	1	7	23	112
21 - 50	86	28	11	38	36	82	38	21	10	10	13	18	16	28	12	109	556
51 - 82	0	0	0	0	0	0	0	0	0	0	1	1	5	4	2	1	14
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	99	42	14	40	41	88	49	32	17	15	16	21	21	33	21	133	682

Total Number of Valid Hours: 682

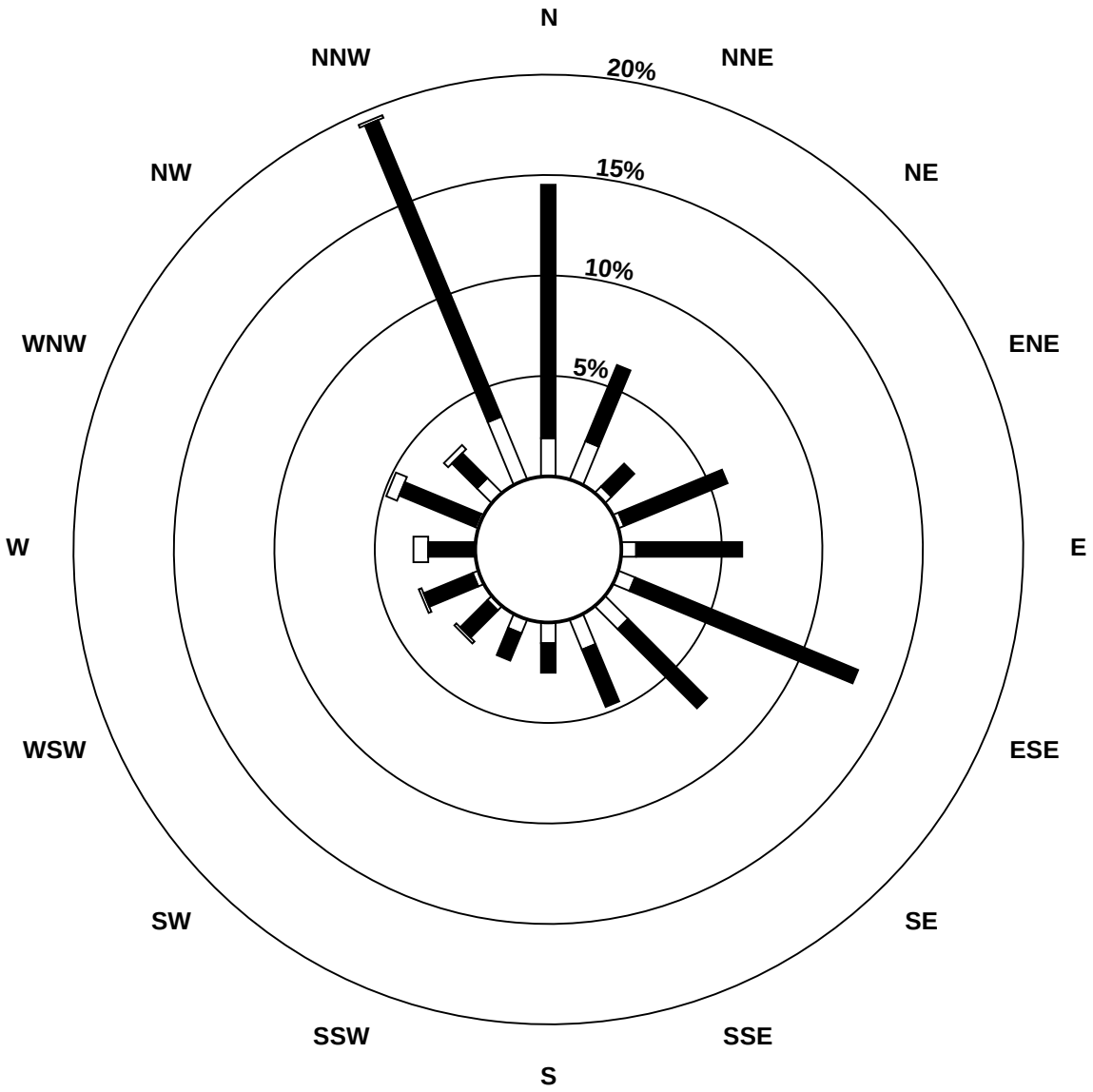
Total Number of Hours: 744

Wood Buffalo Environmental Association

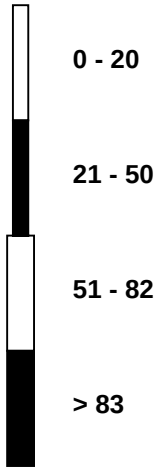
Wind Rose Mar 2016

Ozone (O_3) - ppb

Patricia McInnes (AMS 6)



Classes (ppb)



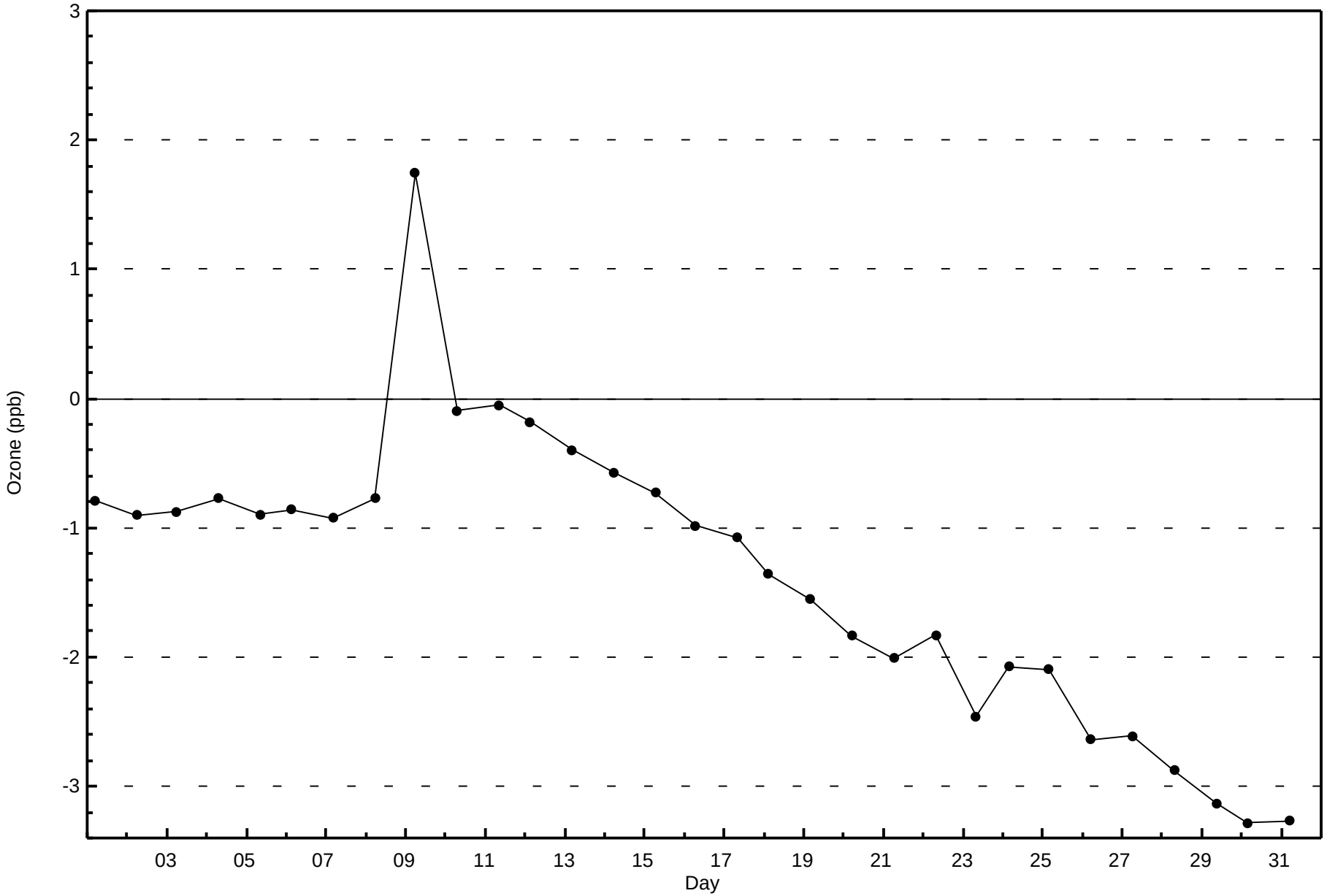
Total Number of Valid Hours: 682

Wood Buffalo Environmental Association

Zero Responses

Ozone (O_3) - ppb

Patricia McInnes - March 2016

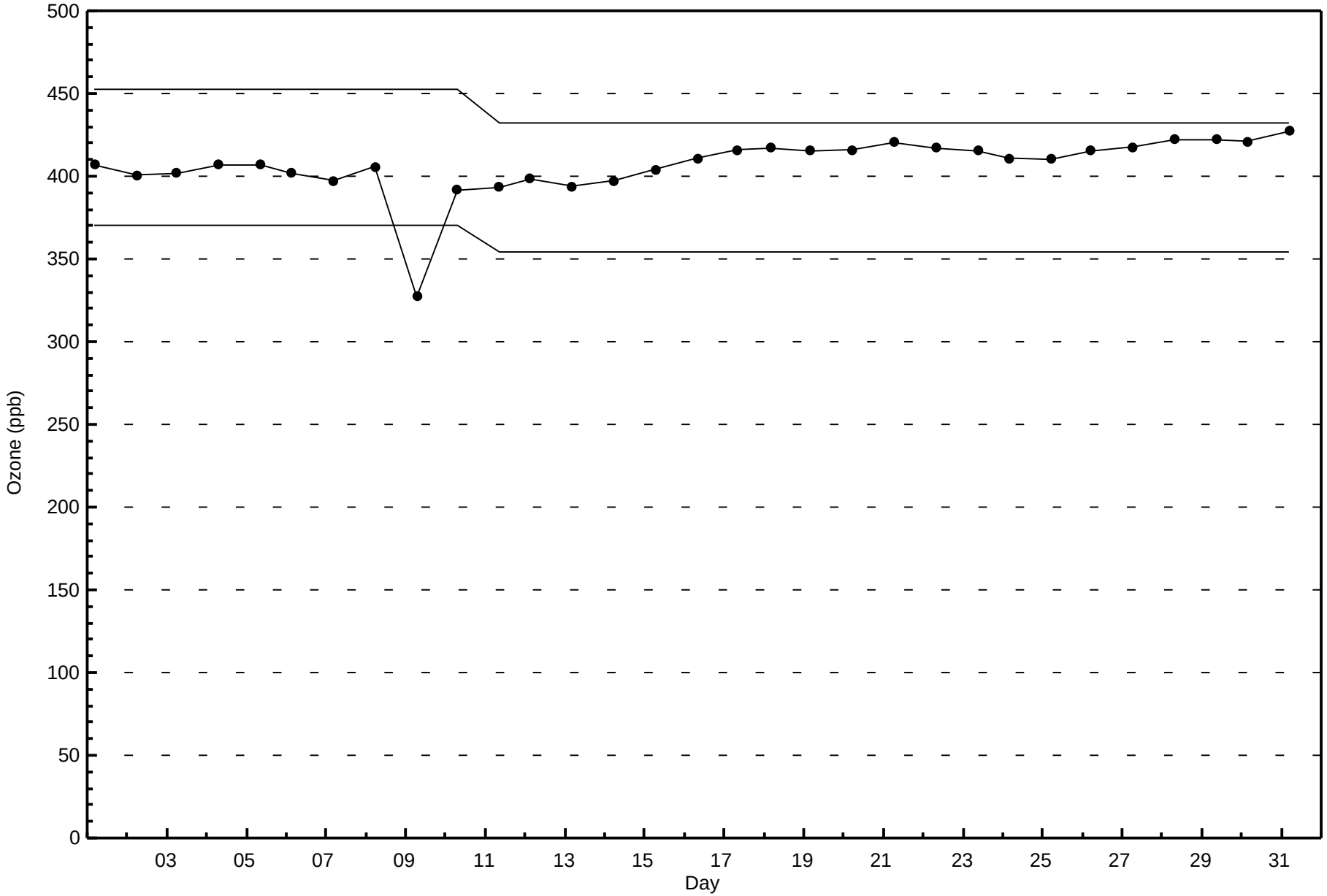


Wood Buffalo Environmental Association

Span Responses

Ozone (O_3) - ppb

Patricia McInnes - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Patricia McInnes - March 2016

Maximum Value: 40 ppb on Mar 24 17:00

Maximum Daily Average: 6.4 ppb on Mar 19

Minimum Value: 0 ppb on Mar 2 00:00

Minimum Daily Average: 0.4 ppb on Mar 17

Maximum Diurnal Average: 4.3 ppb at hour 17

Minimum Diurnal Average: 0.5 ppb at hour 2

Monthly Average: 2.4 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 3$ $P_{90} = 7$ $P_{99} = 15$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	1	Z	1	1	2	3	8	11	8	4	5	9	3	2	2	1	3	6	4	26	19	3	1	0	5.3	26
2-Mar	0	0	Z	0	0	1	4	5	8	4	5	8	5	5	8	9	10	10	2	1	0	0	0	0	3.8	10
3-Mar	0	0	0	Z	2	5	18	9	8	11	7	11	8	5	5	3	1	1	1	0	0	0	0	0	4.1	18
4-Mar	0	0	0	0	Z	0	0	4	12	6	7	4	3	3	1	3	2	2	2	2	1	1	0	0	2.3	12
5-Mar	0	0	0	0	1	Z	1	9	5	2	2	2	6	6	2	1	1	0	0	1	0	0	0	0	1.8	9
6-Mar	Z	0	0	0	0	0	0	0	2	2	3	2	3	4	3	3	2	1	1	0	1	1	1	0	1.3	4
7-Mar	0	Z	0	0	1	0	1	1	3	4	6	5	4	9	9	5	0	0	0	0	0	0	0	0	2.2	9
8-Mar	0	0	Z	1	1	0	9	8	8	C	C	C	C	C	2	1	1	0	0	0	8	6	9	11	3.7	11
9-Mar	5	2	0	Z	0	0	0	1	3	5	7	10	8	10	12	9	13	6	14	1	3	2	2	4	5.1	14
10-Mar	1	1	3	1	Z	4	2	3	4	2	2	2	1	2	1	2	2	2	2	2	2	2	1	1	1.9	4
11-Mar	0	0	0	0	0	Z	0	0	1	1	0	1	0	0	0	0	4	6	13	2	9	0	3	11	2.3	13
12-Mar	Z	1	2	1	1	2	2	3	2	3	1	1	1	1	2	1	1	2	1	2	1	1	1	1	1.5	3
13-Mar	0	Z	1	3	1	6	0	3	3	12	7	5	3	2	1	2	0	0	0	0	0	0	0	0	2.2	12
14-Mar	0	0	Z	0	0	0	0	1	1	1	1	2	1	1	1	1	1	1	0	0	0	0	0	0	0.7	2
15-Mar	0	0	0	Z	2	1	1	3	6	9	11	10	12	10	10	16	8	1	0	0	0	0	0	0	4.4	16
16-Mar	0	0	0	0	Z	0	1	1	1	1	2	2	1	1	3	2	1	1	0	0	0	0	0	0	0.8	3
17-Mar	0	0	0	1	0	Z	0	0	0	1	2	0	0	0	0	1	3	1	0	0	0	0	0	0	0.4	3
18-Mar	Z	0	0	0	0	1	0	0	0	0	0	1	1	1	1	1	1	2	3	4	4	6	4	2	1.4	6
19-Mar	0	Z	0	2	6	3	2	6	12	15	13	17	15	24	16	4	2	1	2	2	1	0	1	0	6.4	24
20-Mar	0	0	Z	1	1	2	1	2	1	1	1	1	1	1	1	2	5	2	2	1	1	0	0	0	1.2	5
21-Mar	0	0	0	Z	1	4	1	2	1	1	1	1	1	1	1	2	7	10	2	2	1	1	0	0	1.8	10
22-Mar	0	0	0	1	Z	1	1	2	1	2	2	2	1	2	1	2	11	3	1	1	1	0	0	1	1.6	11
23-Mar	0	0	0	1	1	Z	0	2	6	7	7	7	4	4	3	2	2	1	0	0	0	0	0	0	2.1	7
24-Mar	Z	0	0	0	3	1	4	8	11	10	9	8	3	4	3	4	40	15	1	0	0	0	0	0	5.4	40
25-Mar	0	Z	3	0	1	1	1	2	2	4	5	4	2	2	1	3	2	1	1	0	0	1	0	0	1.5	5
26-Mar	2	3	Z	0	0	0	1	4	4	6	5	5	5	4	4	3	4	4	2	2	1	0	0	0	2.6	6
27-Mar	0	0	0	Z	4	1	1	2	2	1	2	2	1	2	0	2	1	1	0	1	0	0	0	0	1.0	4
28-Mar	0	1	1	3	Z	14	10	5	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	14
29-Mar	0	0	0	1	0	Z	1	1	1	1	1	0	0	0	1	4	4	10	0	0	0	0	0	0	1.1	10
30-Mar	Z	0	0	0	0	6	2	1	2	6	5	1	0	1	1	1	0	0	0	0	0	0	0	0	1.1	6
31-Mar	0	Z	0	0	0	0	1	1	2	3	5	5	4	3	3	3	4	3	2	1	0	0	0	0	1.7	5
	0.5	0.5	0.5	0.6	1.1	2.2	2.4	3.3	3.9	4.2	4.2	4.3	3.4	3.6	3.2	2.9	4.3	3.0	1.9	1.7	1.7	0.9	0.8	1.1	Diurnal Average	
	5	3	3	3	6	14	18	11	12	15	13	17	15	24	16	16	40	15	14	26	19	6	9	11	Diurnal Maximum	

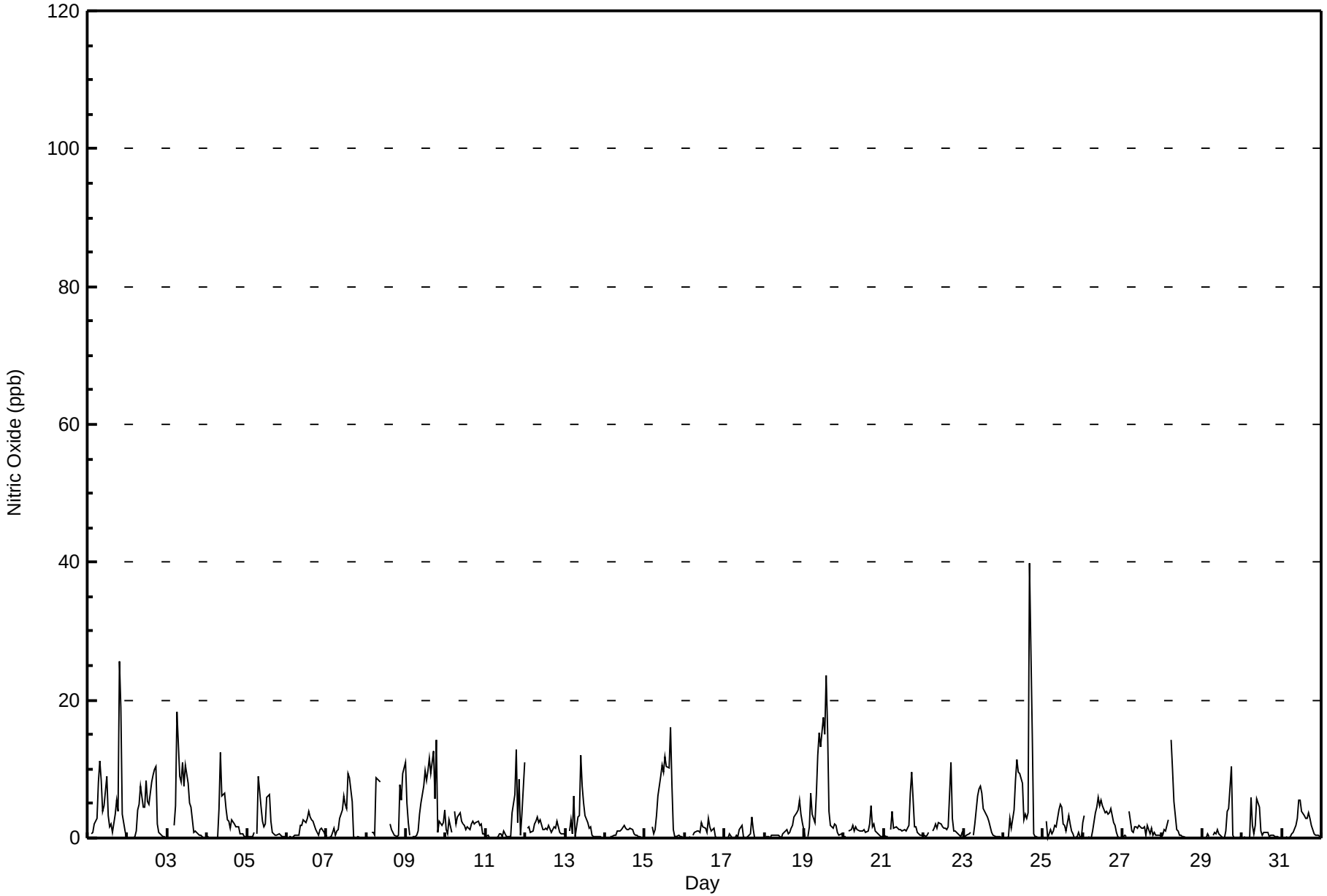
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Patricia McInnes - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	99.58	99.58
21 - 40	3	0.42	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: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitric Oxide (NO) - ppb

Patricia McInnes - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	109	43	17	41	40	89	52	30	18	16	13	23	22	30	22	140	705
21 - 40	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	109	46	17	41	40	89	52	30	18	16	13	23	22	30	22	140	708

Total Number of Valid Hours: 708

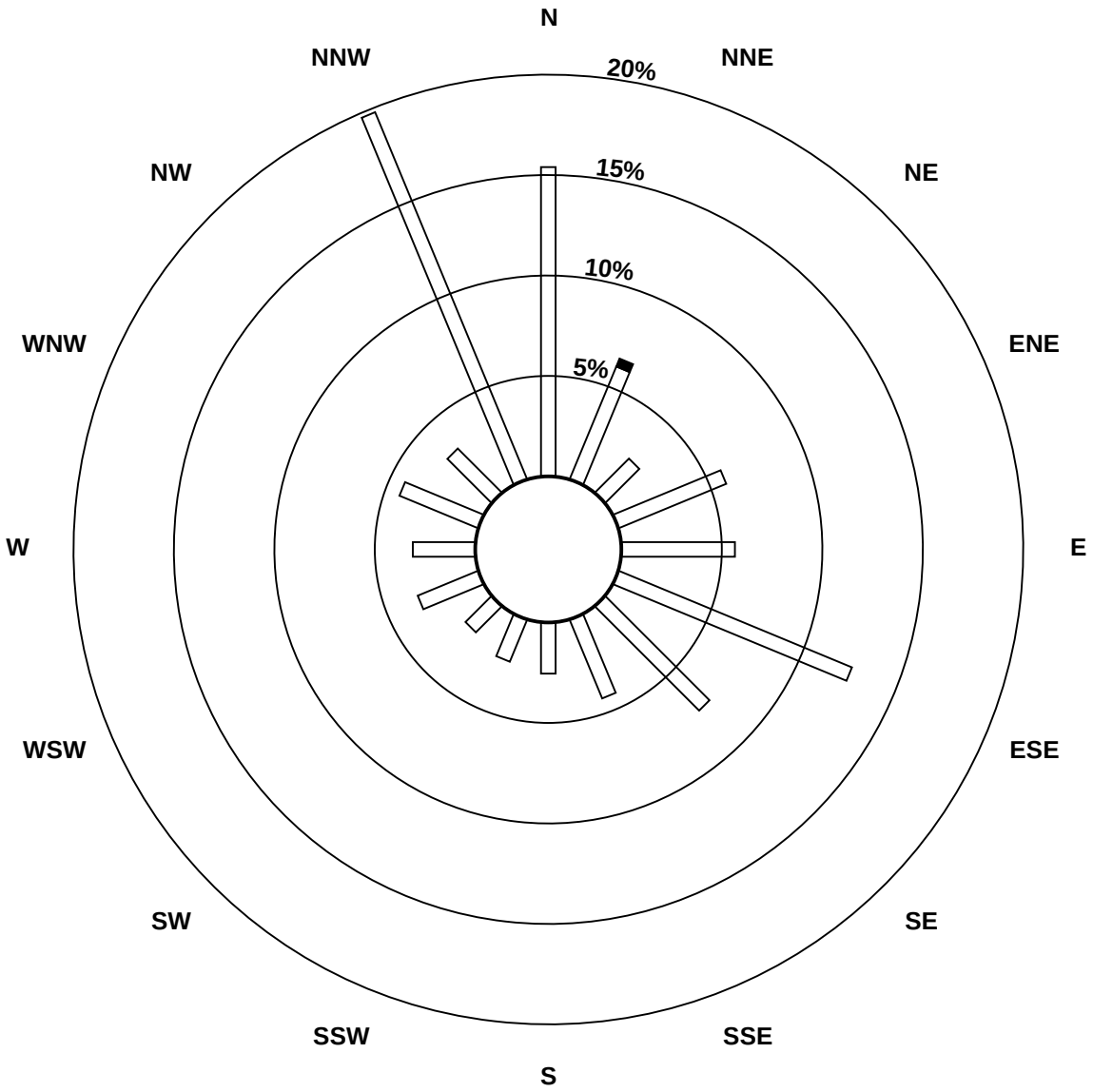
Total Number of Hours: 744

Wood Buffalo Environmental Association

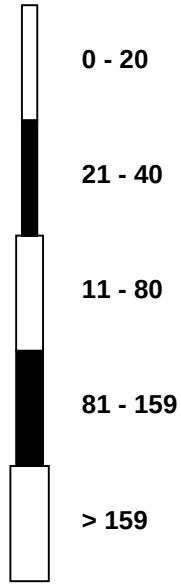
Wind Rose Mar 2016

Nitric Oxide (NO) - ppb

Patricia McInnes (AMS 6)



Classes (ppb)



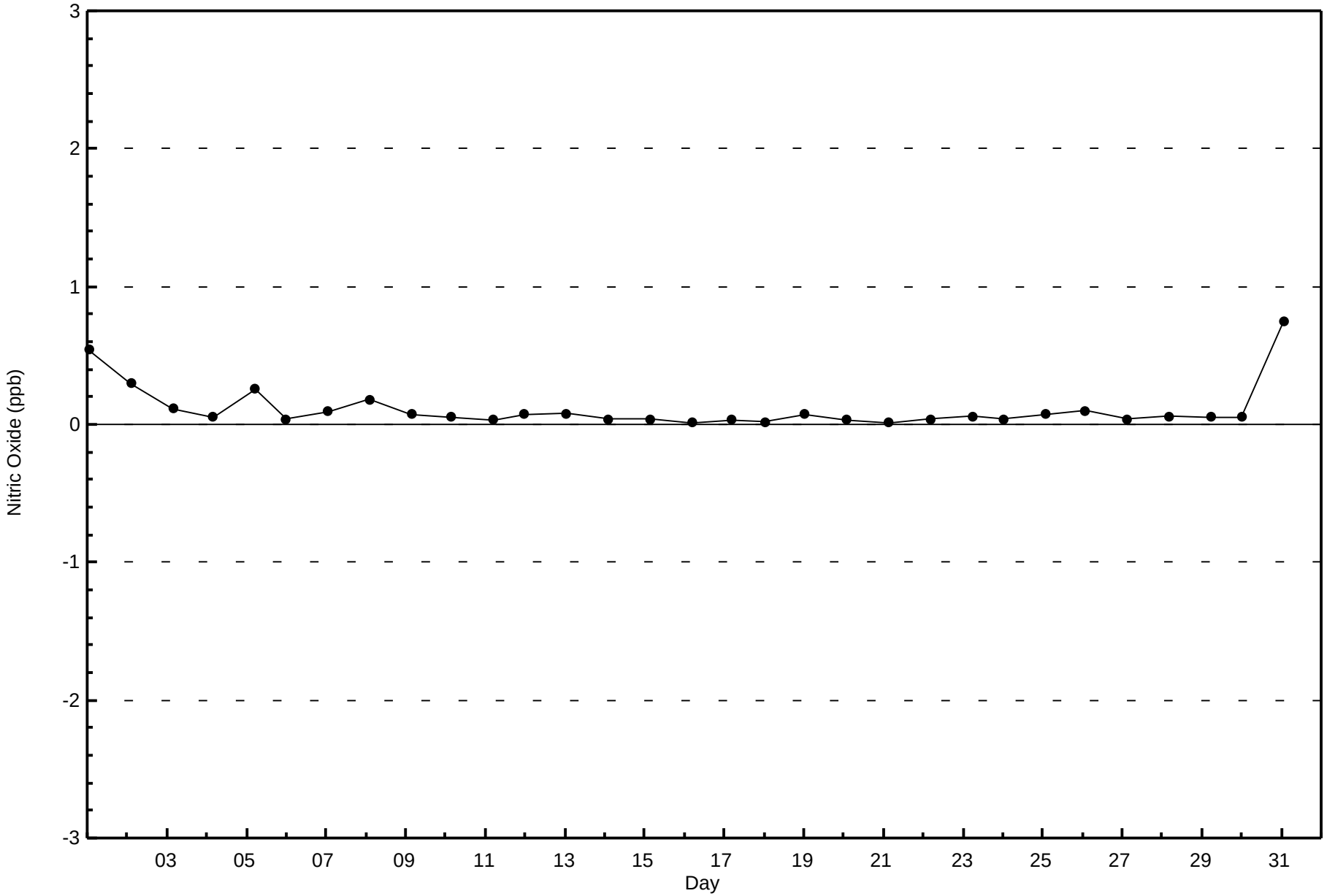
Total Number of Valid Hours: 708

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Patricia McInnes - March 2016

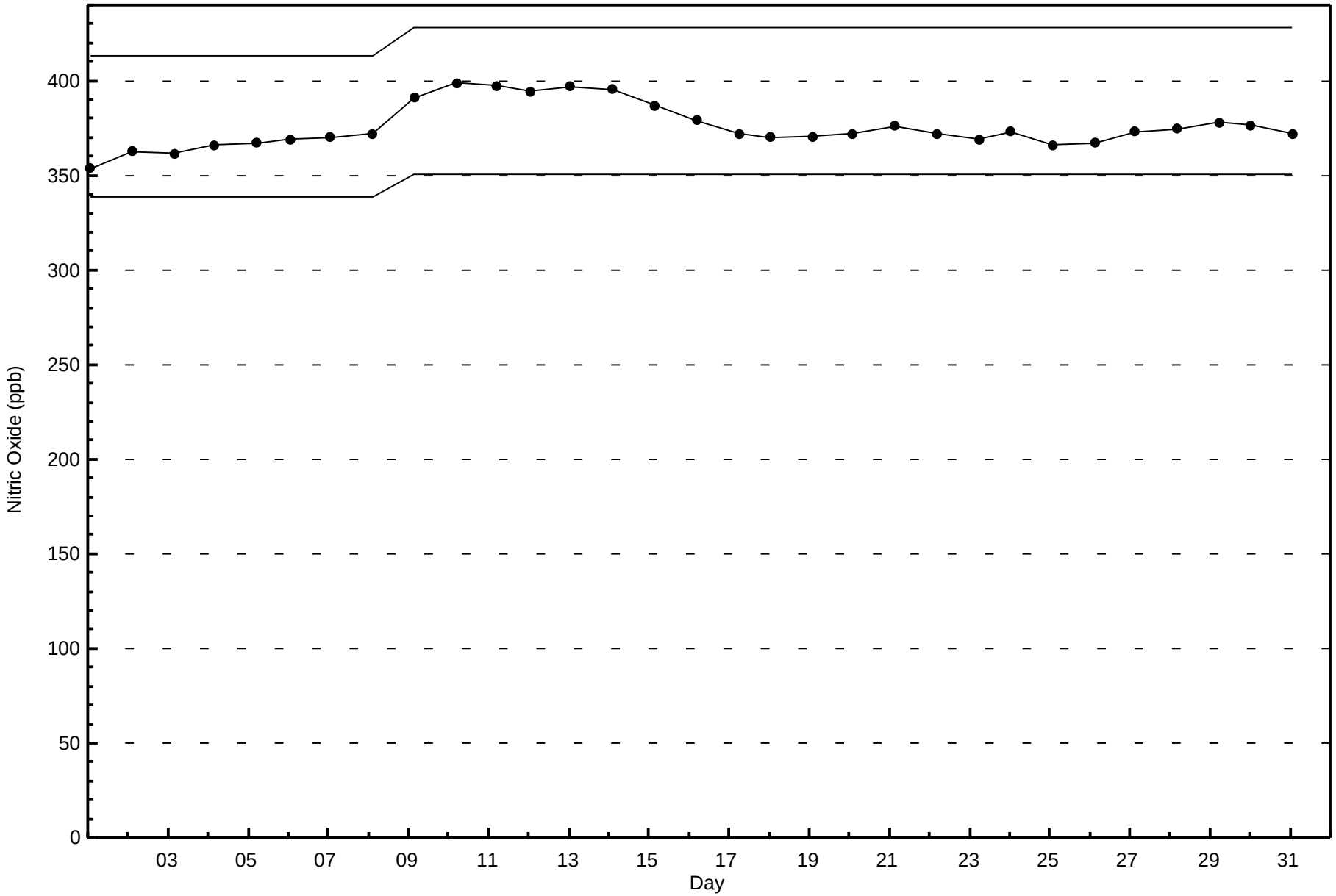


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Patricia McInnes - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Patricia McInnes - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 40 ppb on Mar 26 02:00 Maximum Daily Average: 17.7 ppb on Mar 8

Minimum Value: 0 ppb on Mar 18 11:00
Maximum Diurnal Average: 13.4 ppb at hour 6
Monthly Average: 8.1 ppb

Minimum Daily Average: 1.5 ppb on Mar 17
Minimum Diurnal Average: 5.3 ppb at hour 13
Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 3$ Median = 6 $Q_3 = 11$ $P_{90} = 17$ $P_{99} = 33$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	11	Z	10	12	13	20	27	22	12	6	6	11	6	4	6	5	10	16	33	37	31	17	12	7	14.5	37
2-Mar	8	6	Z	11	8	11	24	23	19	9	7	12	8	6	9	13	18	27	22	17	13	14	10	8	13.1	27
3-Mar	7	7	12	Z	29	31	34	28	24	20	14	17	14	12	12	9	6	9	8	6	7	5	4	4	13.9	34
4-Mar	5	8	5	4	Z	6	4	13	24	14	11	6	4	3	2	4	5	5	7	7	4	3	2	2	6.4	24
5-Mar	2	3	3	6	14	Z	7	14	12	5	2	3	8	11	8	4	4	6	12	8	4	3	3	4	6.4	14
6-Mar	Z	7	4	5	5	8	10	7	9	6	5	4	5	7	6	7	9	11	16	17	18	10	5	3	7.9	18
7-Mar	3	Z	3	4	6	8	15	12	10	10	10	8	7	15	16	14	3	2	3	4	2	2	3	11	7.3	16
8-Mar	11	13	Z	16	19	18	27	25	18	C	C	C	C	C	7	4	4	4	6	10	34	35	35	34	17.7	35
9-Mar	32	30	20	Z	9	9	8	10	12	11	11	11	11	14	15	12	15	14	23	17	15	15	12	12	14.6	32
10-Mar	11	9	11	10	Z	10	9	9	9	7	5	4	3	3	2	4	4	4	6	6	6	6	5	4	6.3	11
11-Mar	5	3	1	1	1	Z	1	1	2	1	1	1	1	1	1	1	12	21	28	20	23	14	16	18	7.6	28
12-Mar	Z	12	11	4	6	14	11	6	4	4	2	2	2	2	3	2	3	4	4	9	4	4	3	3	5.2	14
13-Mar	4	Z	7	12	11	10	4	15	15	23	18	16	13	9	6	4	3	2	2	5	4	5	6	5	8.6	23
14-Mar	4	4	Z	5	4	6	6	7	4	3	3	3	3	3	3	4	4	4	4	4	5	6	5	8	4.4	8
15-Mar	9	9	8	Z	16	17	19	17	15	12	11	10	14	12	11	19	14	7	5	5	4	4	3	4	10.6	19
16-Mar	8	5	4	5	Z	6	8	8	5	3	5	5	4	3	8	7	5	10	5	5	5	3	3	3	5.2	10
17-Mar	3	2	2	1	1	Z	0	2	1	2	3	1	0	0	1	2	6	3	1	1	1	1	1	2	1.5	6
18-Mar	Z	4	3	2	5	8	3	2	1	0	0	1	1	1	1	1	3	6	22	30	21	21	14	18	7.3	30
19-Mar	7	Z	11	12	25	26	16	15	16	15	12	14	13	20	18	7	4	5	11	10	5	4	4	3	11.9	26
20-Mar	3	3	Z	2	3	6	7	6	3	2	2	1	2	1	1	3	4	3	4	5	5	5	4	3	3.3	7
21-Mar	3	2	2	Z	4	8	5	4	3	3	2	1	1	1	2	2	5	8	4	5	4	4	3	2	3.3	8
22-Mar	2	2	2	3	Z	7	7	6	3	3	3	2	2	2	2	3	6	5	4	6	6	4	3	4	3.7	7
23-Mar	5	4	8	10	16	Z	4	8	12	14	12	11	10	9	8	7	5	5	5	5	4	8	10	8	8.0	16
24-Mar	Z	5	9	16	26	31	30	23	18	14	13	10	5	6	6	8	24	15	13	15	14	9	8	7	14.0	31
25-Mar	5	Z	6	8	13	10	20	11	7	11	10	7	4	4	5	10	11	9	10	2	4	11	4	2	8.0	20
26-Mar	22	40	Z	26	17	13	11	9	10	11	8	8	8	7	6	7	10	13	17	27	26	16	10	9	14.4	40
27-Mar	8	10	11	Z	21	8	6	5	3	2	3	3	3	3	1	3	2	3	5	6	3	3	3	7	5.3	21
28-Mar	11	20	18	24	Z	38	32	17	3	2	1	1	1	1	0	0	0	0	1	1	1	0	0	1	7.5	38
29-Mar	1	0	0	10	3	Z	5	3	2	3	1	1	0	0	2	8	11	15	6	0	0	1	2	5	3.4	15
30-Mar	Z	9	5	4	1	13	7	2	5	12	8	2	1	2	2	3	2	3	3	2	3	4	1	1	4.1	13
31-Mar	1	Z	2	5	5	8	8	4	4	5	9	9	9	7	9	9	12	13	9	9	8	6	9	9	7.2	13
	7.3	8.6	6.9	8.3	10.8	13.4	12.1	10.8	9.1	7.7	6.6	6.1	5.3	5.6	5.7	6.0	7.1	8.1	9.6	9.6	9.1	7.7	6.5	6.8	Diurnal Average	
	32	40	20	26	29	38	34	28	24	23	18	17	14	20	18	19	24	27	33	37	34	35	35	34	Diurnal Maximum	

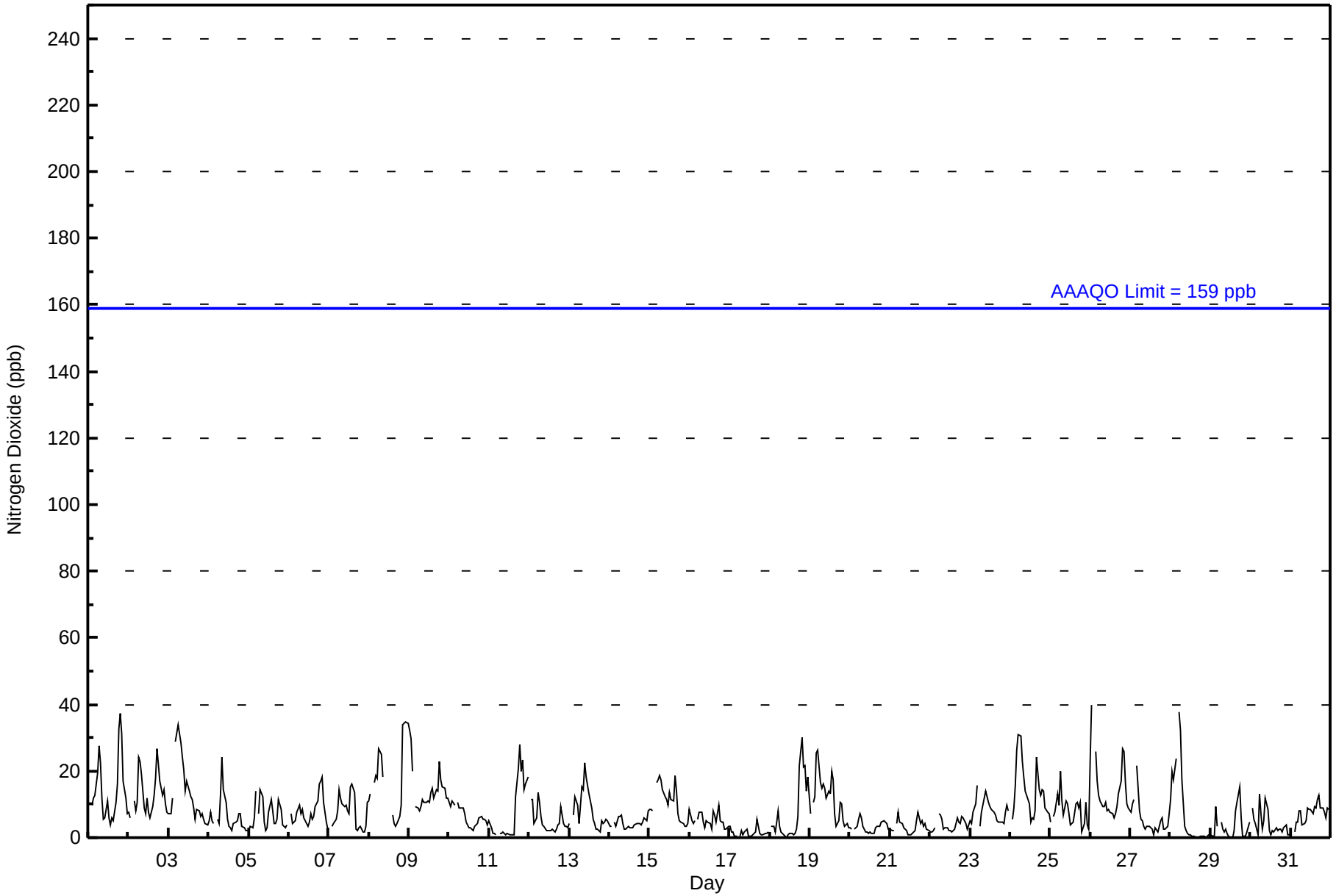
Z - zerospan C - Calibration
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Patricia McInnes - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	660	93.22	93.22
21 - 40	48	6.78	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: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Patricia McInnes - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	102	38	14	40	39	88	46	25	15	15	13	23	22	30	19	131	660
21 - 40	7	8	3	1	1	1	6	5	3	1	0	0	0	0	3	9	48
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	109	46	17	41	40	89	52	30	18	16	13	23	22	30	22	140	708

Total Number of Valid Hours: 708

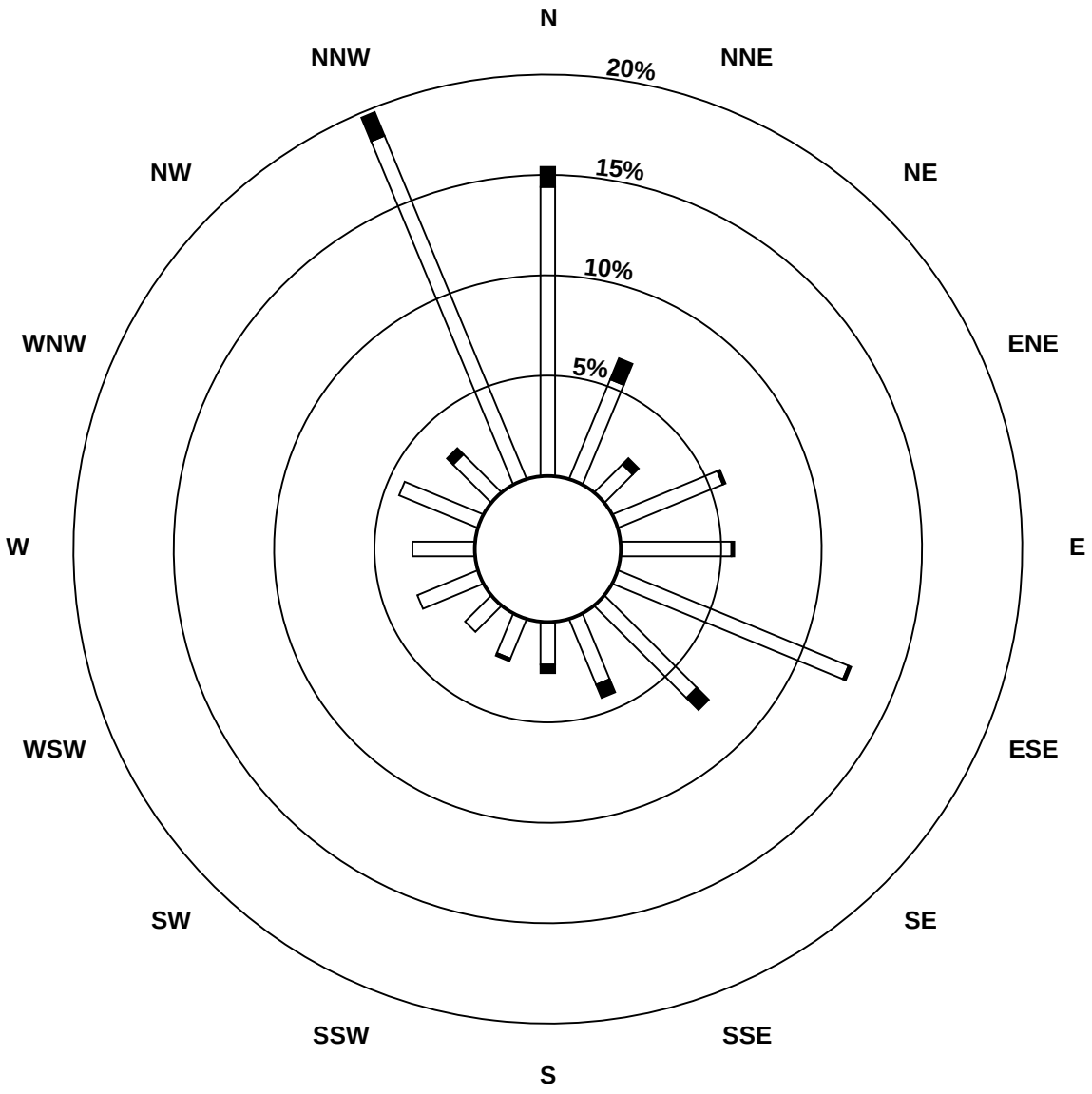
Total Number of Hours: 744

Wood Buffalo Environmental Association

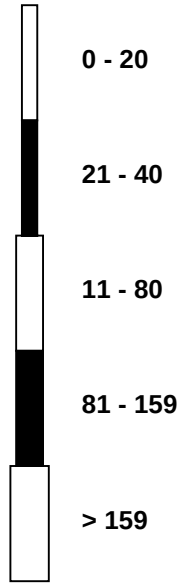
Wind Rose Mar 2016

Nitrogen Dioxide (NO_2) - ppb

Patricia McInnes (AMS 6)



Classes (ppb)



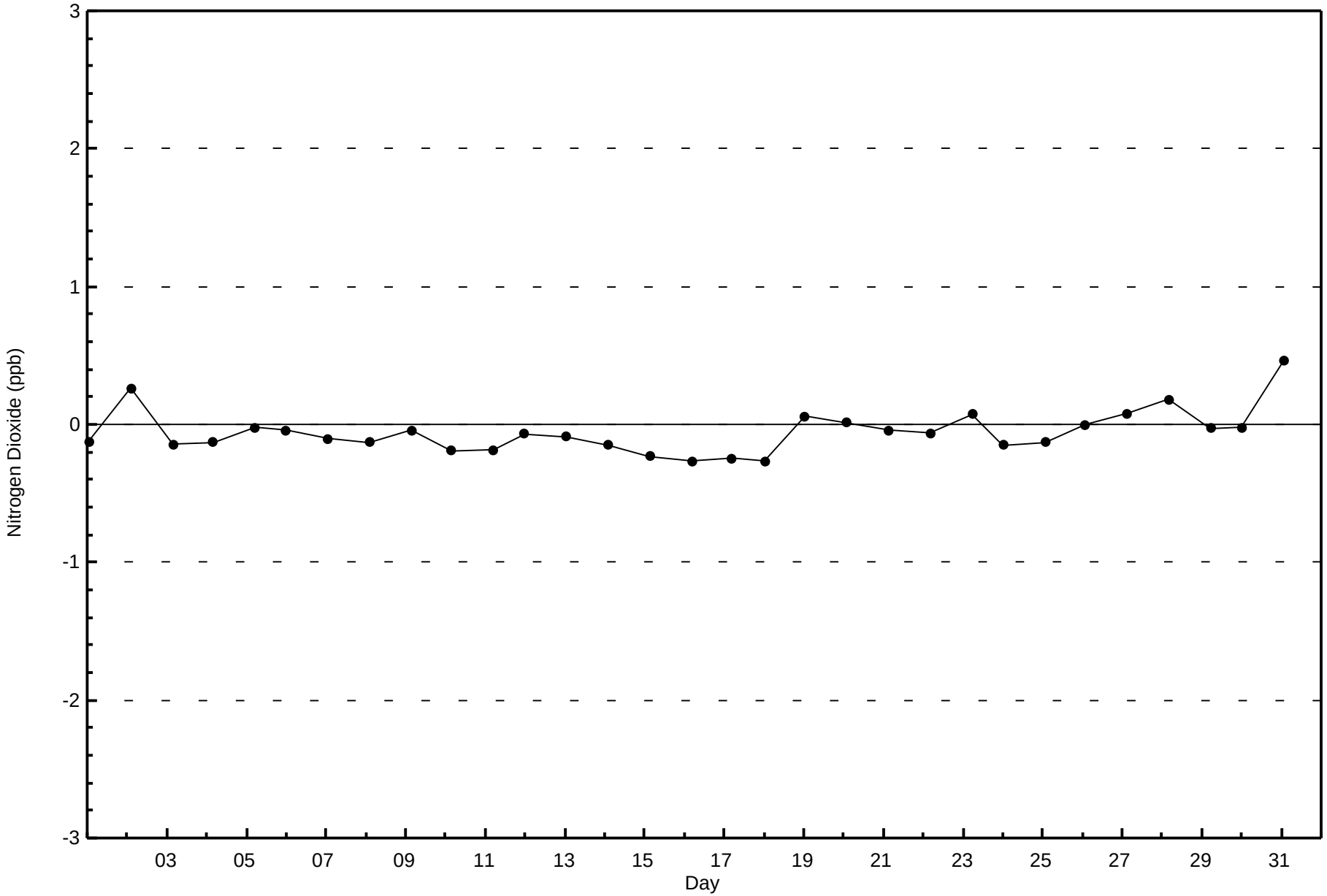
Total Number of Valid Hours: 708

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Patricia McInnes - March 2016

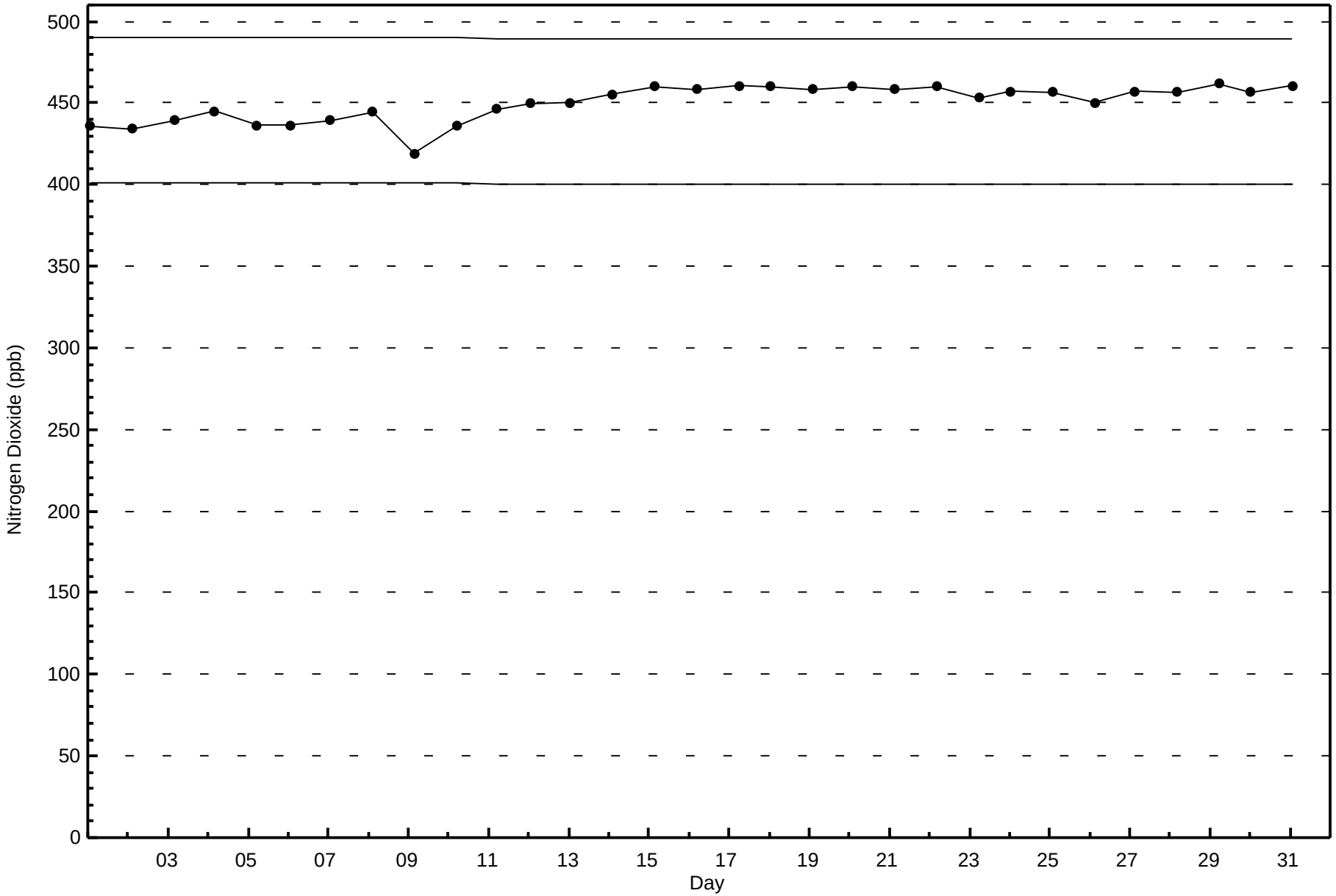


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Patricia McInnes - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Patricia McInnes - March 2016

Maximum Value: 64 ppb on Mar 24 17:00

Maximum Daily Average: 21.4 ppb on Mar 8

Minimum Value: 0 ppb on Mar 28 18:00

Minimum Daily Average: 1.9 ppb on Mar 17

Maximum Diurnal Average: 15.6 ppb at hour 6

Minimum Diurnal Average: 7.3 ppb at hour 23

Monthly Average: 10.5 ppb

Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 4$ Median = 7 $Q_3 = 14$ $P_{90} = 24$ $P_{99} = 43$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	11	Z	10	13	15	23	36	33	20	10	11	20	9	6	8	6	14	22	36	63	50	20	13	7	19.8	63
2-Mar	8	6	Z	11	8	12	28	28	26	14	12	20	13	11	18	22	28	37	24	18	13	15	11	8	16.9	37
3-Mar	7	7	12	Z	31	36	52	37	32	31	21	27	22	17	16	12	6	9	8	7	8	6	4	4	18.0	52
4-Mar	5	8	5	4	Z	6	4	17	36	20	17	10	6	5	4	7	7	7	9	9	4	4	3	2	8.6	36
5-Mar	2	3	3	6	15	Z	8	23	17	7	4	5	13	18	11	5	5	6	12	9	4	3	3	4	8.1	23
6-Mar	Z	7	4	5	5	8	10	8	10	8	8	6	8	11	9	9	12	12	17	18	19	12	5	3	9.3	19
7-Mar	3	Z	4	5	7	9	16	13	13	14	16	13	12	25	25	19	3	2	3	4	2	2	3	11	9.6	25
8-Mar	11	13	Z	17	19	18	35	33	26	C	C	C	C	C	9	6	4	5	6	10	41	40	44	45	21.4	45
9-Mar	37	32	20	Z	9	9	8	11	15	16	18	21	19	24	26	21	27	20	37	18	18	17	14	16	19.7	37
10-Mar	12	10	14	11	Z	14	11	12	13	10	7	6	4	5	3	6	6	6	8	9	7	7	6	4	8.2	14
11-Mar	5	3	1	1	1	Z	1	1	2	2	1	2	1	1	1	1	16	27	40	22	32	15	19	29	9.9	40
12-Mar	Z	13	13	5	7	15	13	9	6	6	3	3	4	3	4	2	4	5	6	12	5	4	4	4	6.6	15
13-Mar	4	Z	8	15	11	16	4	18	18	35	26	21	16	11	7	6	3	3	2	5	4	5	6	5	10.8	35
14-Mar	4	4	Z	5	4	7	7	8	5	4	4	5	5	4	4	5	6	5	5	4	5	6	5	8	5.1	8
15-Mar	9	9	8	Z	18	18	20	21	21	21	22	19	25	22	21	35	22	9	5	5	5	4	3	4	15.0	35
16-Mar	8	5	5	5	Z	6	8	9	6	4	7	6	6	4	11	9	6	11	5	5	5	3	3	3	6.0	11
17-Mar	3	2	2	1	1	Z	0	2	1	3	5	1	0	0	1	2	9	4	1	1	1	1	1	2	1.9	9
18-Mar	Z	4	4	2	5	8	4	2	1	1	0	1	2	3	1	2	4	8	25	34	25	27	17	20	8.7	34
19-Mar	8	Z	11	14	32	30	19	21	28	30	25	31	28	43	33	11	5	6	13	12	6	4	5	3	18.2	43
20-Mar	3	3	Z	3	5	7	8	7	5	3	3	2	3	2	2	5	8	5	6	6	6	5	4	3	4.5	8
21-Mar	3	2	2	Z	6	11	6	6	4	4	3	2	2	2	3	4	11	17	6	7	4	5	3	2	5.1	17
22-Mar	2	2	3	4	Z	8	8	8	4	5	5	4	4	3	4	4	17	7	5	7	7	4	3	5	5.3	17
23-Mar	5	4	8	11	17	Z	4	10	18	21	20	17	14	12	11	9	6	5	5	5	5	8	10	8	10.1	21
24-Mar	Z	5	9	16	29	32	34	31	30	23	22	18	7	10	8	12	64	29	13	15	14	9	8	7	19.4	64
25-Mar	4	Z	9	8	14	11	21	13	8	15	15	12	6	6	6	13	13	10	11	2	4	11	4	3	9.5	21
26-Mar	25	43	Z	26	17	13	12	13	14	16	13	14	12	11	10	11	13	17	19	28	27	17	10	9	17.0	43
27-Mar	8	10	12	Z	25	9	6	7	5	4	5	5	5	4	1	5	2	5	6	7	3	3	4	7	6.4	25
28-Mar	12	21	19	26	Z	52	42	23	5	3	2	1	1	1	0	0	0	0	0	1	0	0	0	1	9.2	52
29-Mar	1	0	0	10	4	Z	5	3	2	4	2	1	0	0	3	12	15	26	6	0	0	1	2	5	4.5	26
30-Mar	Z	9	5	4	1	19	9	3	7	17	13	3	1	3	2	4	2	3	3	2	3	4	1	1	5.2	19
31-Mar	1	Z	2	5	5	9	9	5	6	8	14	14	12	11	12	12	15	16	11	9	8	7	9	9	9.0	16
	7.8	9.0	7.4	8.9	11.9	15.6	14.5	14.0	13.1	11.9	10.8	10.4	8.7	9.3	8.9	8.9	11.4	11.1	11.5	11.3	10.8	8.6	7.3	7.8	Diurnal Average	
	37	43	20	26	32	52	52	37	36	35	26	31	28	43	33	35	64	37	40	63	50	40	44	45	Diurnal Maximum	

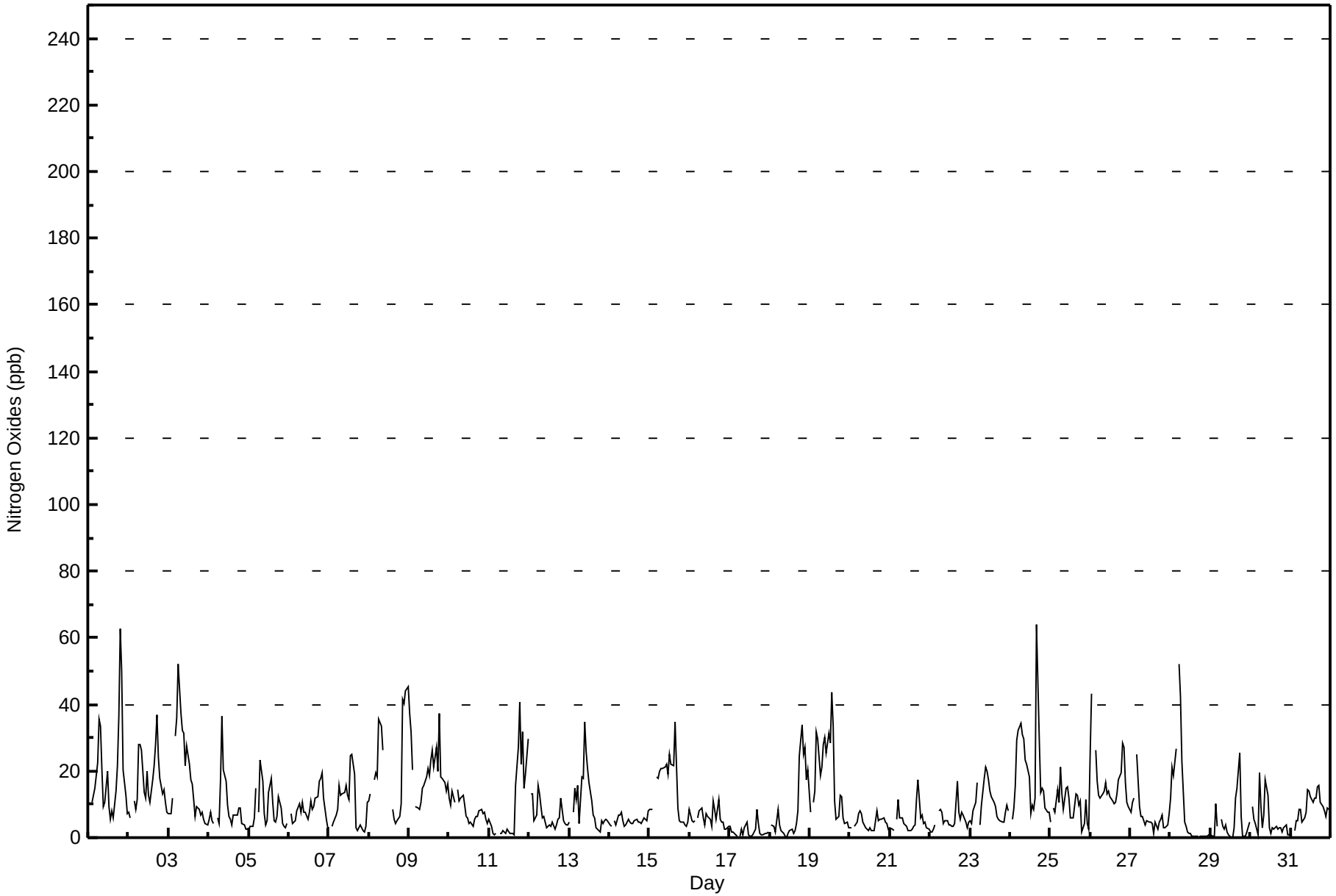
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Patricia McInnes - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	612	86.44	86.44
21 - 40	85	12.01	98.45
11 - 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

Patricia McInnes - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	95	25	10	37	38	87	45	20	15	15	13	22	22	30	19	119	612
21 - 40	13	17	5	4	1	2	7	8	3	1	0	1	0	0	2	21	85
11 - 80	1	4	2	0	1	0	0	2	0	0	0	0	0	0	1	0	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	109	46	17	41	40	89	52	30	18	16	13	23	22	30	22	140	708

Total Number of Valid Hours: 708

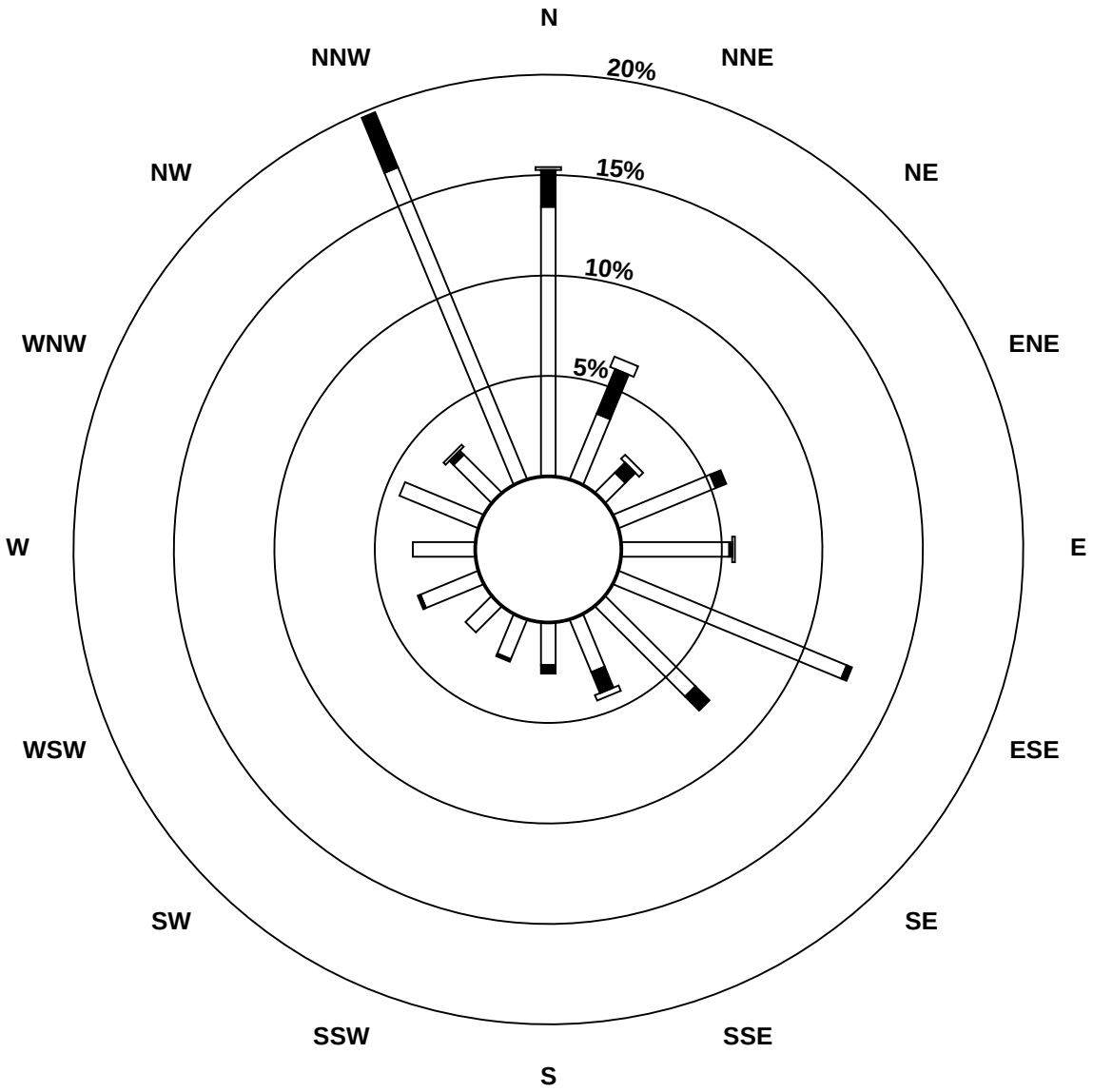
Total Number of Hours: 744

Wood Buffalo Environmental Association

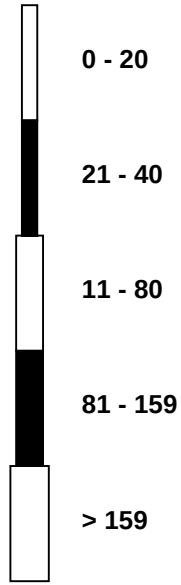
Wind Rose Mar 2016

Nitrogen Oxides (NO_X) - ppb

Patricia McInnes (AMS 6)



Classes (ppb)



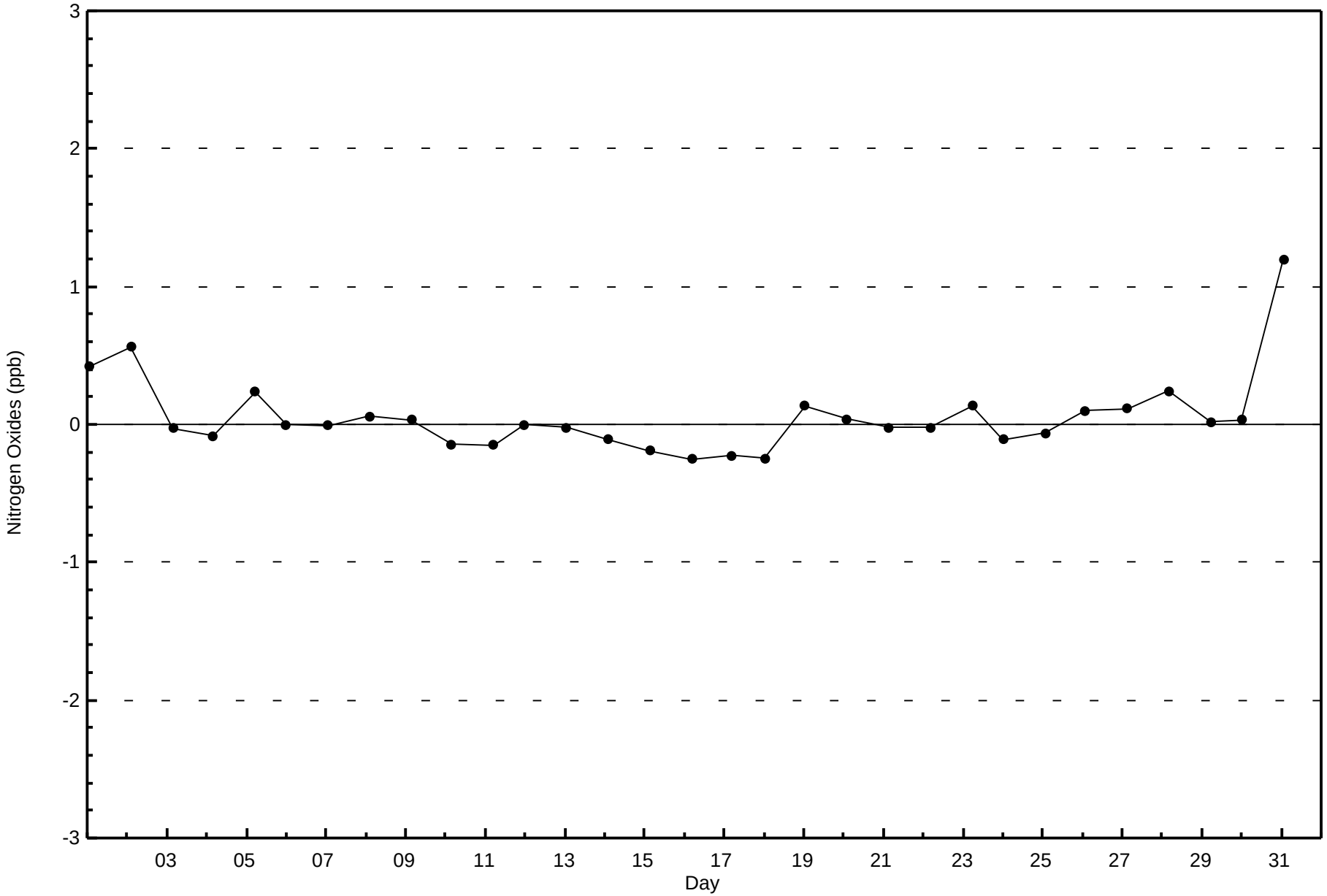
Total Number of Valid Hours: 708

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Patricia McInnes - March 2016

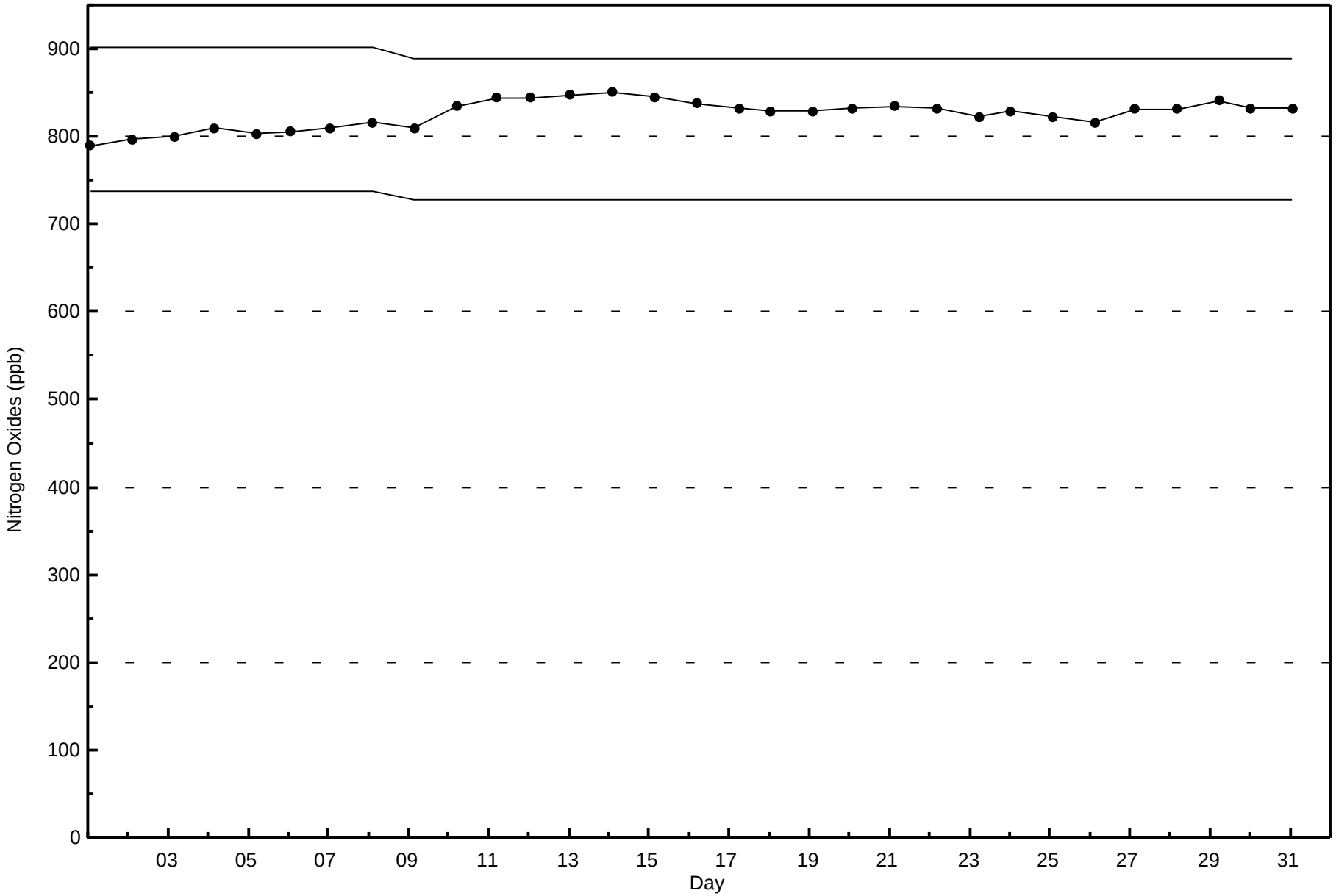


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Patricia McInnes - March 2016



Number of Exceedences (AAAQO): 1-hr: 0

Maximum Value: 13 ppb on Mar 24 17:00

Maximum Daily Average: 0.6 ppb on Mar 24

Minimum Value: 0 ppb on Mar 1 01:00

Minimum Daily Average: 0.0 ppb on Mar 1

Maximum Diurnal Average: 0.4 ppb at hour 17

Minimum Diurnal Average: 0.0 ppb at hour 1

Monthly Average: 0.0 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 0$

Hours in Service:	744
Hours of Data:	672
Hours of Missing Data:	72
Hours of Calibration:	40
Percent Operational Time:	95.7

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

Z - zerospan C - Calibration RE - Recovery

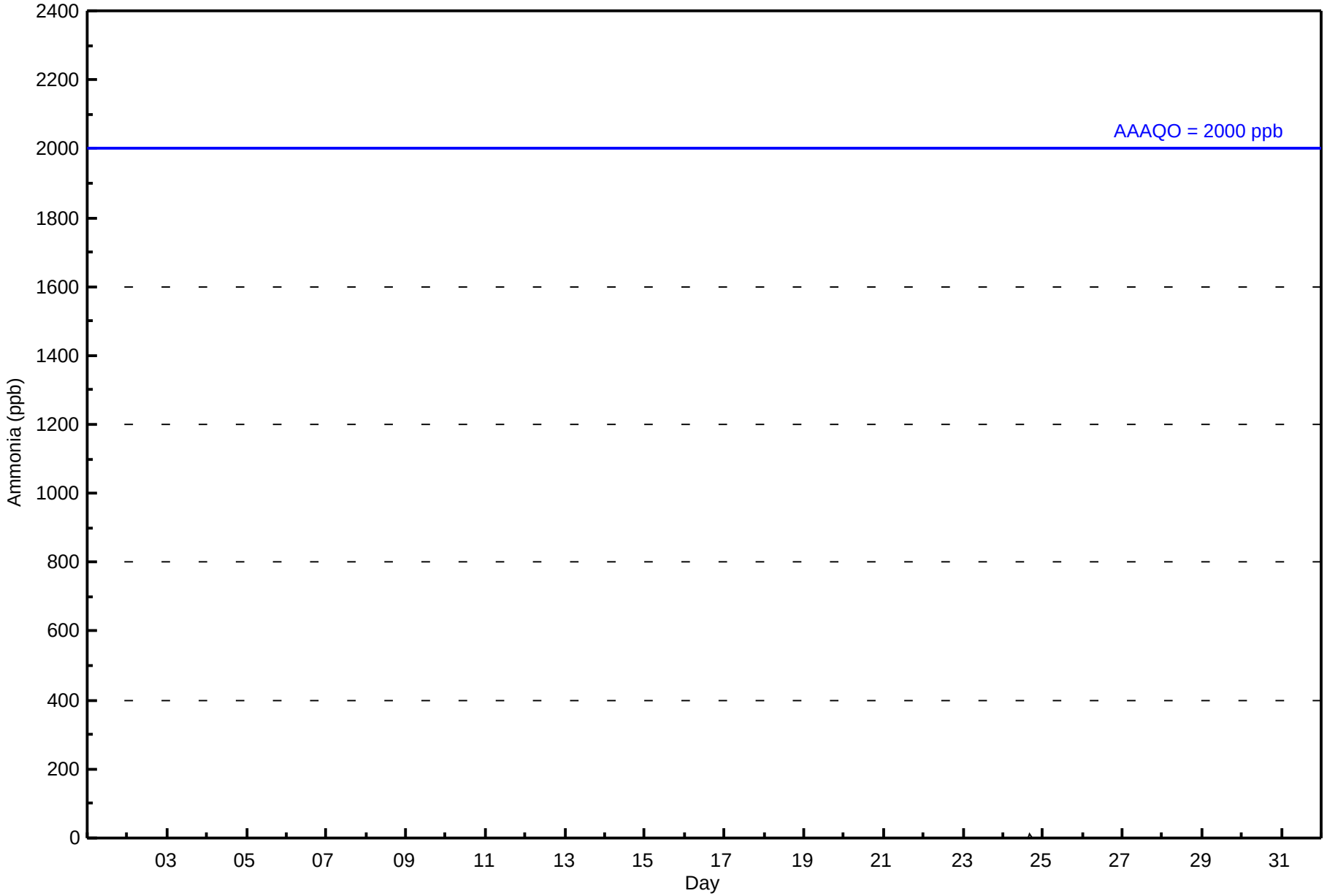
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ammonia (NH_3) - ppb

Patricia McInnes - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	671	99.85	99.85
6 - 10	0	0.00	99.85
11 - 15	1	0.15	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: 672

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Ammonia (NH_3) - ppb

Patricia McInnes - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	102	41	14	40	40	87	47	31	15	14	15	19	20	32	21	133	671
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	1	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	102	42	14	40	40	87	47	31	15	14	15	19	20	32	21	133	672

Total Number of Valid Hours: 672

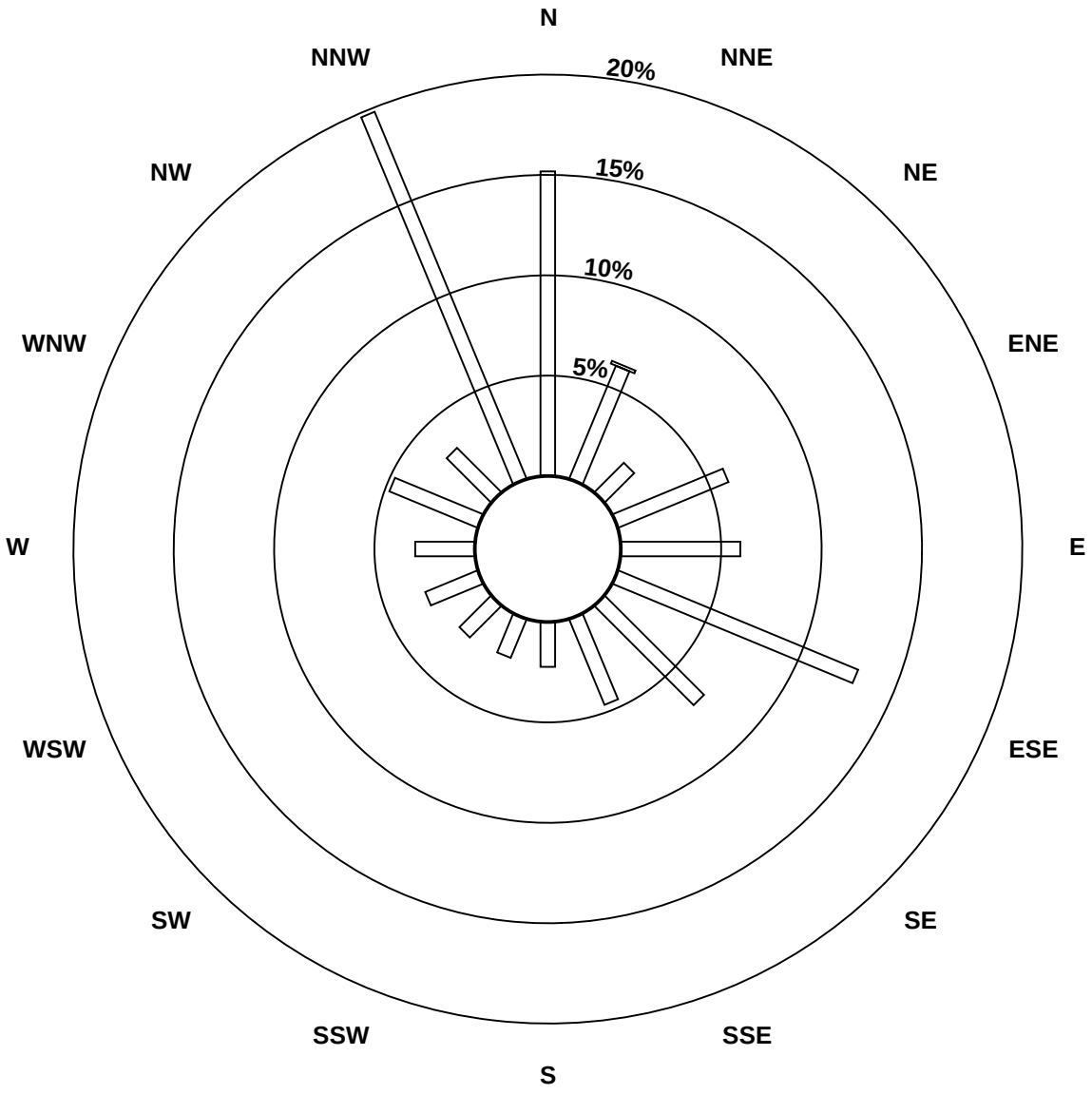
Total Number of Hours: 744

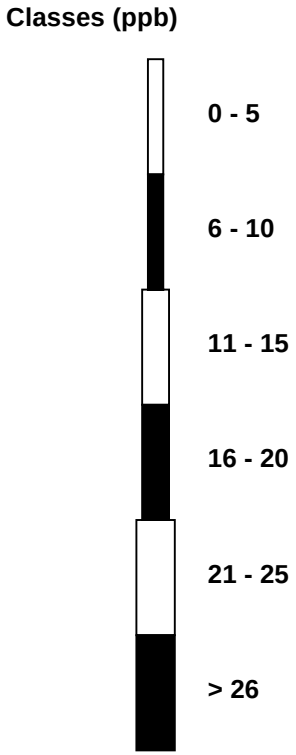
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Ammonia (NH_3) - ppb

Patricia McInnes (AMS 6)





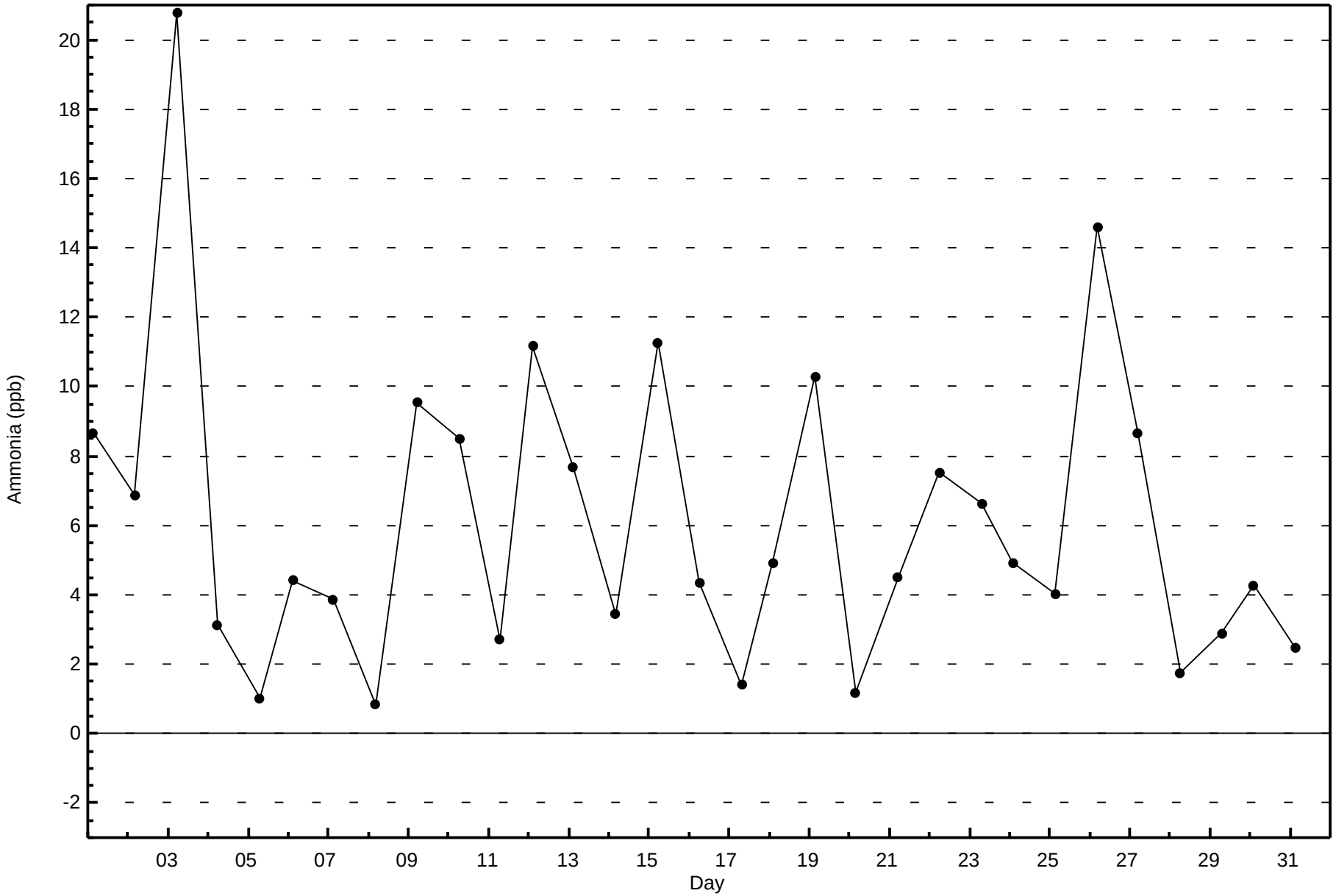
Total Number of Valid Hours: 672

Wood Buffalo Environmental Association

Zero Responses

Ammonia (NH_3) - ppb

Patricia McInnes - March 2016

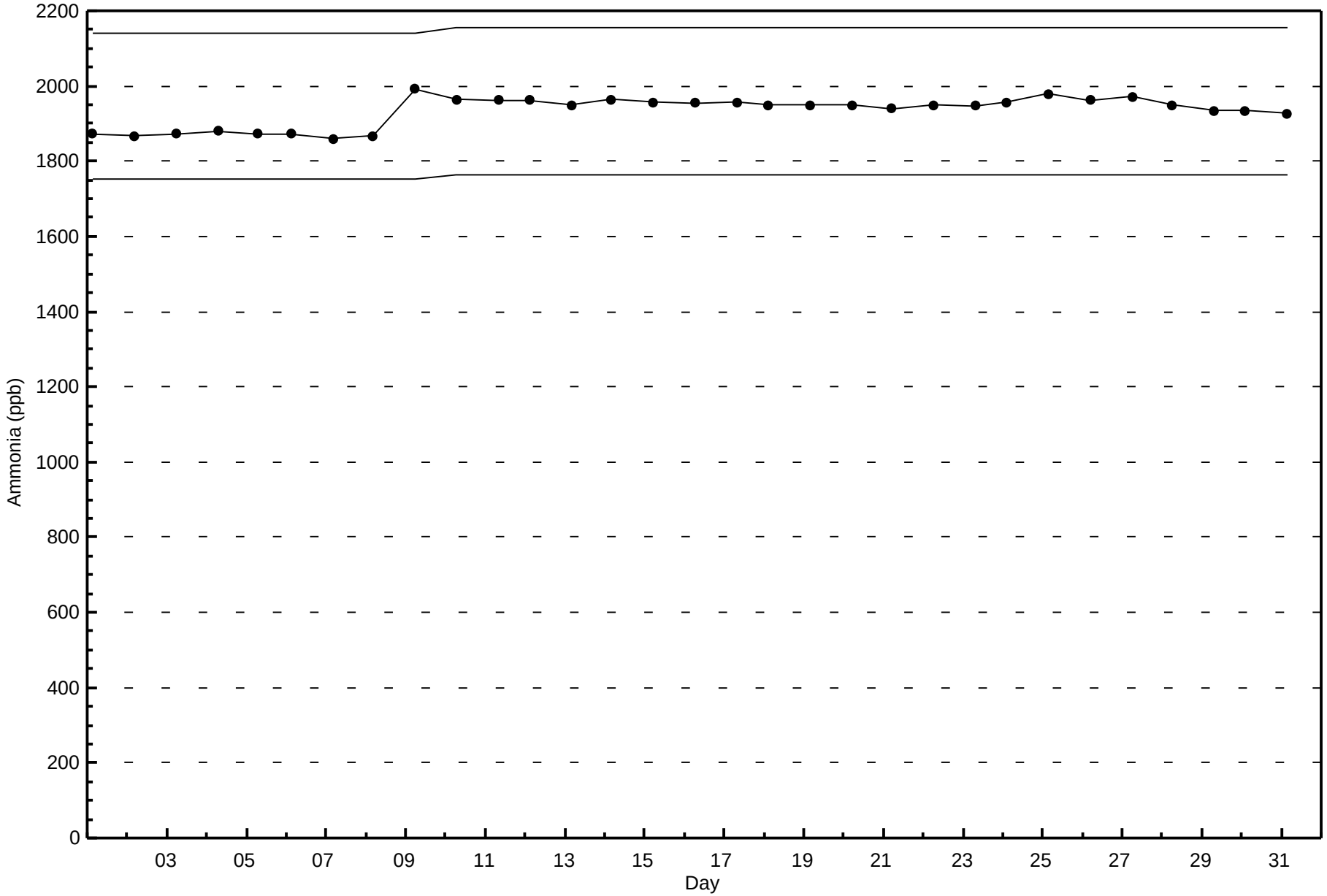


Wood Buffalo Environmental Association

Span Responses

Ammonia (NH_3) - ppb

Patricia McInnes - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Patricia McInnes - March 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 26.3 $\mu g/m^3$ on Mar 26 21:00

Maximum Daily Average: 9.8 $\mu g/m^3$ on Mar 26

Minimum Value: 0.0 $\mu g/m^3$ on Mar 18 02:00

Minimum Daily Average: 1.1 $\mu g/m^3$ on Mar 16

Maximum Diurnal Average: 6.4 $\mu g/m^3$ at hour 21

Minimum Diurnal Average: 3.0 $\mu g/m^3$ at hour 15

Monthly Average: 4.32 $\mu g/m^3$

Percentiles: P_1 = 0.1 P_{10} = 0.9 Q_1 = 1.7 Median = 3.2 Q_3 = 5.6 P_{90} = 9.4 P_{99} = 18.5

Hours in Service:	744
Hours of Data:	732
Hours of Missing Data:	12
Hours of Calibration:	3
Percent Operational Time:	98.8

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	2.8	3.9	3.2	3.7	3.4	3.4	3.7	6.2	4.4	3.2	2.7	2.6	2.4	2.3	2.3	2.7	3.7	4.8	6.1	9.4	8.1	5.6	4.7	4.6	4.2	9.4
2-Mar	4.2	4.5	6.2	5.8	4.9	4.9	6.7	7.4	5.9	3.9	3.5	3.9	3.6	2.9	3.3	4.5	5.8	8.8	10.7	20.0	9.0	5.2	3.9	4.2	6.0	20.0
3-Mar	5.2	4.4	5.9	8.4	9.7	8.9	8.2	7.2	6.4	6.4	5.3	5.6	6.2	3.7	3.4	3.0	2.9	3.3	4.0	4.6	3.2	2.4	2.9	2.2	5.1	9.7
4-Mar	1.8	2.4	1.6	1.6	1.6	1.8	1.7	2.3	3.2	3.3	3.2	1.6	1.2	1.2	1.4	1.4	1.5	1.6	2.1	2.1	1.8	1.9	1.6	1.3	1.9	3.3
5-Mar	2.5	2.8	1.7	2.2	2.7	3.2	3.2	4.5	4.1	15.5	13.6	8.3	6.5	6.9	4.2	2.7	2.7	3.0	2.8	2.3	1.6	1.6	1.3	1.4	4.2	15.5
6-Mar	1.4	1.9	1.6	1.5	1.4	1.7	1.8	1.8	1.9	2.6	1.8	1.3	1.3	1.6	1.6	1.5	1.9	2.6	2.6	3.4	4.3	2.1	1.8	1.7	2.0	4.3
7-Mar	2.1	2.3	2.4	1.8	1.7	2.3	3.6	3.5	3.2	3.0	4.6	3.1	2.6	3.7	4.9	5.4	4.2	4.5	4.8	4.7	4.0	3.6	2.9	6.5	3.6	6.5
8-Mar	13.8	18.5	13.3	13.2	10.5	11.6	13.5	12.3	7.6	4.8	4.6	4.4	4.4	4.3	4.0	5.1	5.2	6.9	7.5	7.5	11.8	11.6	9.3	10.3	9.0	18.5
9-Mar	10.2	12.3	12.8	7.8	6.7	6.6	8.1	7.2	9.2	8.1	C	C	C	7.1	7.7	7.1	8.4	8.7	19.2	10.5	9.9	9.9	9.8	10.3	9.4	19.2
10-Mar	11.6	12.9	11.5	9.4	9.5	8.4	10.4	10.5	11.1	8.6	5.8	4.4	3.4	2.3	1.8	1.2	0.8	1.0	1.5	2.2	2.5	2.6	2.3	2.1	5.7	12.9
11-Mar	3.8	1.7	1.6	1.4	1.6	1.8	2.2	2.6	2.5	2.9	3.0	2.7	2.5	2.3	2.6	2.5	5.6	8.2	9.6	10.9	13.3	10.4	10.7	17.7	5.2	17.7
12-Mar	11.2	8.2	7.0	3.1	3.3	3.4	3.0	3.3	3.1	2.7	1.6	1.5	1.5	1.2	0.7	0.5	0.5	1.2	0.9	1.8	1.4	1.5	1.5	1.7	2.7	11.2
13-Mar	1.4	1.6	1.6	2.7	3.2	2.0	2.9	3.9	5.1	4.2	3.9	7.1	7.1	9.0	7.0	3.4	0.8	0.7	0.6	4.0	3.3	4.5	3.9	3.3	3.6	9.0
14-Mar	3.2	2.6	3.2	3.2	2.4	3.3	3.0	3.9	3.3	2.4	1.8	1.7	2.5	1.8	1.5	1.5	1.4	1.1	1.0	2.1	3.0	3.8	3.4	2.1	2.5	3.9
15-Mar	2.5	2.9	3.4	4.2	5.1	7.3	11.4	12.3	11.2	5.5	2.9	3.0	6.5	6.1	5.2	16.9	10.3	1.8	1.7	1.6	1.4	1.5	1.1	0.8	5.3	16.9
16-Mar	0.7	0.7	0.4	0.5	0.5	0.5	0.8	1.0	1.0	0.7	0.8	0.7	4.1	2.3	1.3	1.5	1.3	1.3	0.9	1.3	0.8	0.2	0.9	2.2	1.1	4.1
17-Mar	0.7	0.6	1.3	0.2	0.1	0.1	0.1	0.3	0.4	1.2	2.5	UO	UO	UO	UO	2.6	0.4	0.1	0.1	UO	UO	UO	0.1	0.1	--	2.6
18-Mar	0.0	0.0	UO	UO	0.0	0.1	0.1	0.0	0.0	0.2	1.0	0.9	1.0	0.9	0.8	0.9	1.0	1.3	13.8	8.3	21.5	18.8	14.1	16.8	4.6	21.5
19-Mar	3.4	3.3	3.8	5.8	5.9	5.1	4.9	4.7	5.4	4.8	4.5	6.6	5.9	6.8	5.7	2.8	1.7	2.2	3.4	5.1	2.8	2.2	2.6	2.3	4.2	6.8
20-Mar	2.7	2.7	1.9	1.9	2.2	2.4	2.4	2.1	2.1	2.0	1.9	1.6	1.4	1.1	1.0	1.1	1.4	1.5	2.0	2.1	2.3	2.2	2.0	2.0	1.9	2.7
21-Mar	1.0	1.0	1.0	1.2	1.6	2.3	2.1	2.2	1.8	1.6	1.6	1.3	1.2	1.4	2.4	2.6	3.1	3.4	3.3	3.5	3.5	3.0	1.9	1.6	2.1	3.5
22-Mar	1.9	2.5	2.7	3.1	4.3	5.6	5.3	4.6	4.3	3.2	2.2	1.6	1.8	1.7	1.7	1.9	2.5	3.0	4.4	12.3	3.3	2.0	1.6	2.4	3.3	12.3
23-Mar	3.1	3.0	3.4	2.5	2.7	2.0	2.2	5.4	7.6	5.3	5.5	4.9	6.3	4.2	3.5	4.0	3.2	2.9	3.4	6.4	6.5	7.1	6.1	4.7	4.4	7.6
24-Mar	7.1	6.3	8.1	8.3	10.6	9.4	10.2	9.9	8.8	7.2	5.6	4.4	3.3	3.8	4.2	5.4	6.5	7.7	14.0	16.4	26.0	9.3	8.5	7.2	8.7	26.0
25-Mar	7.5	7.6	7.6	7.0	6.9	5.1	6.4	5.4	4.8	5.3	5.3	4.7	2.6	2.5	3.2	5.1	5.6	10.2	8.8	4.2	5.4	7.0	6.1	4.6	5.8	10.2
26-Mar	9.8	14.4	13.5	11.1	9.6	7.9	8.2	8.3	7.1	7.1	6.0	5.2	4.5	4.4	5.0	4.7	5.8	7.4	9.2	23.1	26.3	12.5	12.9	11.2	9.8	26.3
27-Mar	9.8	25.8	13.4	7.0	5.6	4.1	3.6	3.7	3.7	3.4	2.7	2.2	1.7	2.3	1.1	1.3	1.5	2.0	2.6	3.5	4.4	4.8	6.1	7.9	5.2	25.8
28-Mar	5.4	8.3	4.3	3.4	3.8	4.1	3.9	3.8	2.6	2.4	1.6	1.2	0.9	0.6	0.5	0.4	0.4	0.5	0.5	0.4	0.4	0.6	0.6	0.8	2.1	8.3
29-Mar	0.7	0.5	0.5	0.8	0.8	1.1	0.9	0.9	1.1	0.9	0.8	0.6	0.5	0.5	1.1	3.2	5.1	5.3	3.9	0.9	0.9	0.9	1.2	2.3	1.5	5.3
30-Mar	1.1	2.4	1.9	1.7	1.2	2.1	1.4	3.0	4.7	8.6	5.1	0.9	0.7	1.3	1.2	1.6	2.3	2.0	2.6	2.2	1.9	1.9	1.5	1.6	2.3	8.6
31-Mar	1.8	2.1	2.6	2.4	3.0	4.2	3.9	2.8	4.7	5.2	5.8	5.5	5.3	4.9	6.7	7.0	7.7	9.0	5.4	6.2	6.4	15.2	12.2	4.6	5.6	15.2
	4.3	5.3	4.8	4.2	4.1	4.1	4.5	4.7	4.6	4.4	3.7	3.2	3.2	3.2	3.0	3.4	3.4	3.8	4.9	6.1	6.4	5.2	4.5	4.6	Diurnal Average	
	13.8	25.8	13.5	13.2	10.6	11.6	13.5	12.3	11.2	15.5	13.6	8.3	7.1	9.0	7.7	16.9	10.3	10.2	19.2	23.1	26.3	18.8	14.1	17.7	Diurnal Maximum	

C - Calibration UO - Unstable Operation

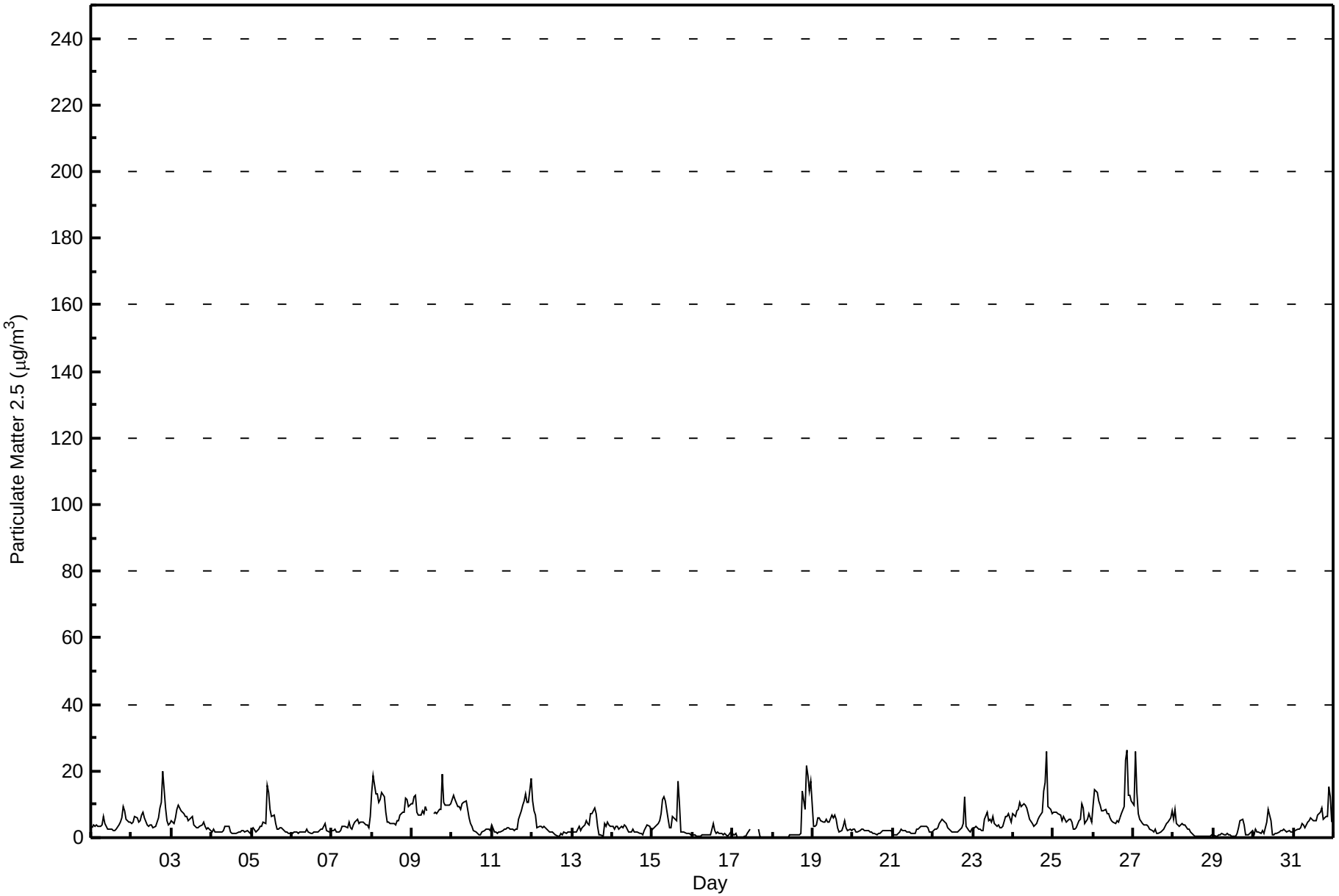
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Patricia McInnes - March 2016



Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	459	62.70	62.70
6 - 15	176	24.04	86.75
16 - 25	11	1.50	88.25
26 - 80	3	0.41	88.66
> 81.0	0	0.00	88.66

Total Number of Valid Hours: 732

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Patricia McInnes - March 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	84	26	12	35	34	81	34	15	9	5	4	12	5	16	8	79	459
6 - 15	25	19	5	5	8	9	18	15	6	5	2	4	1	5	8	41	176
16 - 25	1	1	0	0	0	0	2	1	1	1	1	0	0	0	0	3	11
26 - 80	0	0	0	0	0	0	0	2	0	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	110	46	17	40	42	90	54	33	16	11	7	16	6	21	16	124	649

Total Number of Valid Hours: 732

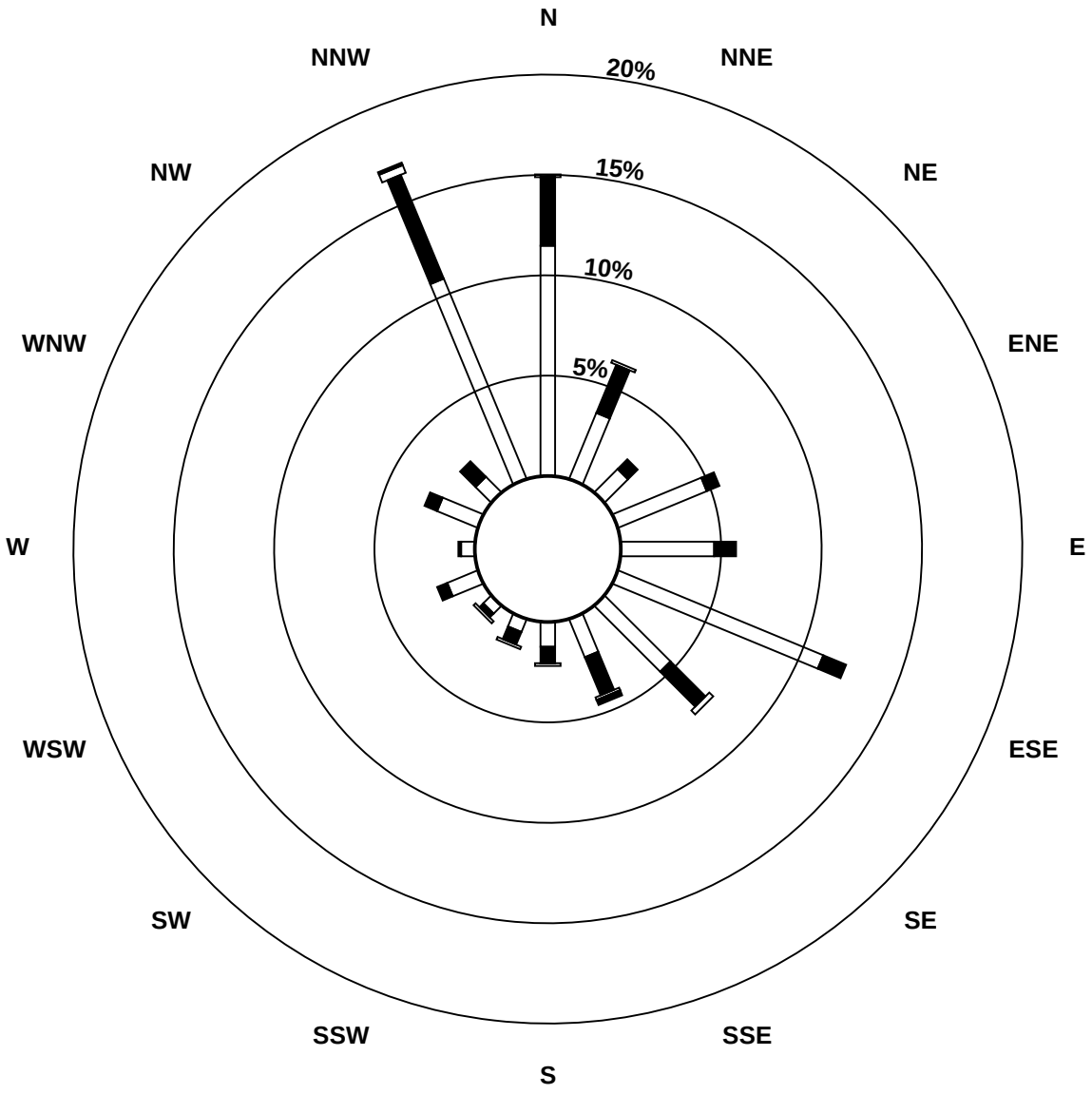
Total Number of Hours: 744

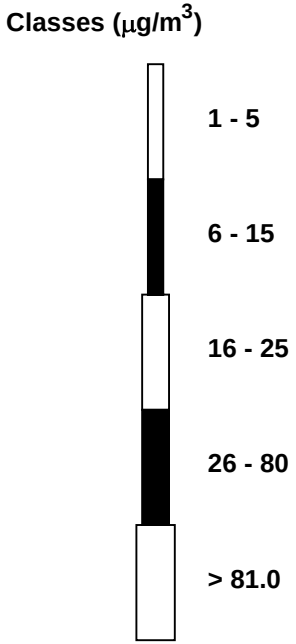
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Patricia McInnes (AMS 6)





Total Number of Valid Hours: 732

Maximum Value: 13.0 C on Mar 29 17:00

Maximum Daily Average: 6.5 C on Mar 29

Minimum Value: -15.6 C on Mar 24 07:00

Minimum Daily Average: -8.6 C on Mar 3

Maximum Diurnal Average: 1.0 C at hour 16

Minimum Diurnal Average: -6.9 C at hour 7

Monthly Average: -3.18 C

Percentiles: P_1 = -13.5 P_{10} = -9.3 Q_1 = -7.0 Median = -3.9 Q_3 = 0.0 P_{90} = 3.5 P_{99} = 11.3

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

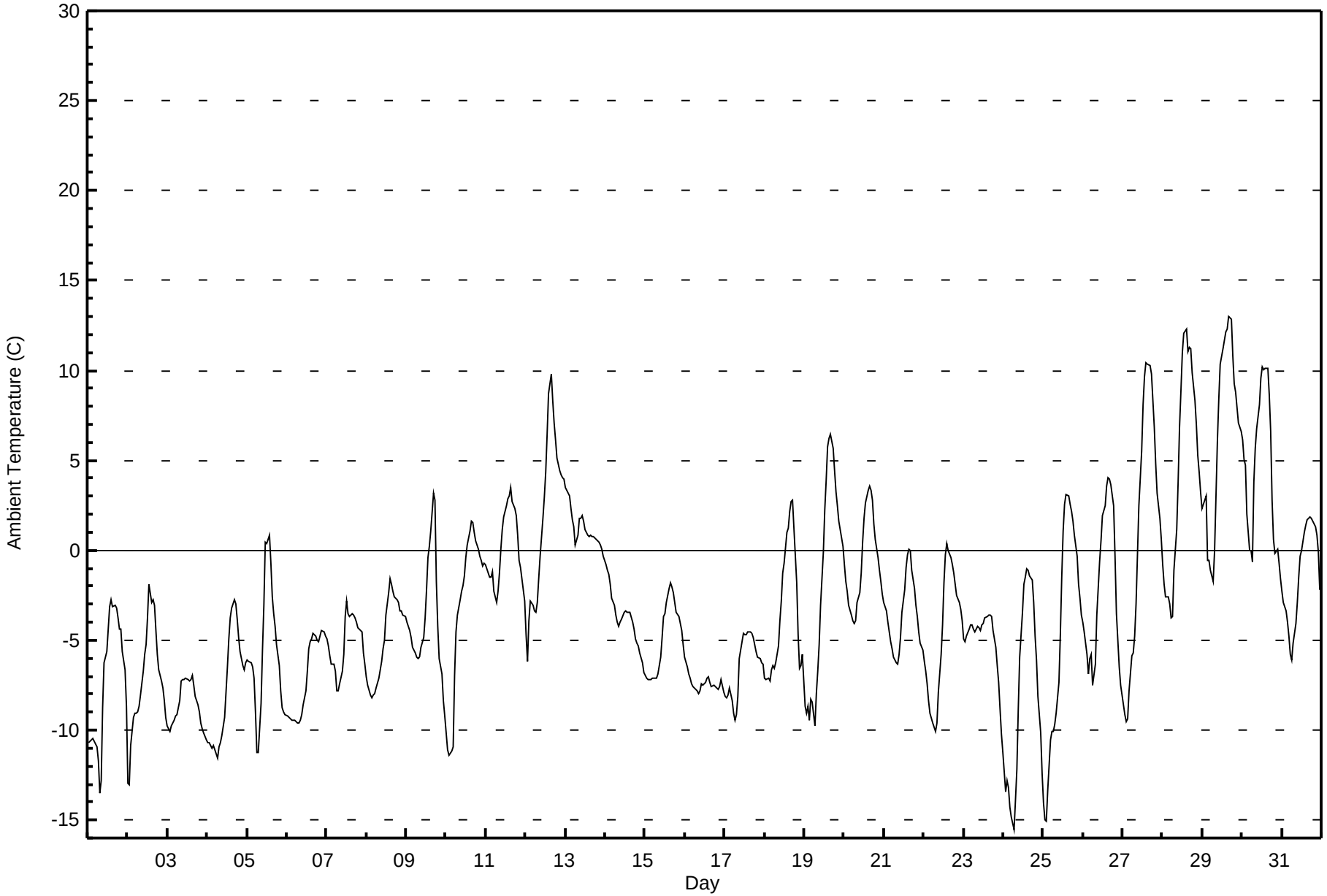
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.7	-10.6	-10.6	-10.5	-10.6	-10.9	-11.7	-13.5	-12.8	-8.8	-6.2	-5.6	-4.4	-3.1	-2.8	-3.1	-3.0	-3.2	-3.8	-4.4	-4.4	-5.6	-6.7	-8.6	-7.3	-2.8
2-Mar	-13.0	-13.0	-10.9	-9.3	-9.0	-9.1	-8.9	-8.7	-8.0	-6.7	-5.8	-5.2	-3.7	-1.9	-2.9	-2.7	-3.1	-4.4	-5.8	-6.6	-7.3	-7.7	-8.4	-9.3	-7.1	-1.9
3-Mar	-9.8	-10.1	-9.8	-9.6	-9.4	-9.2	-9.1	-8.4	-7.3	-7.2	-7.2	-7.1	-7.2	-7.3	-7.2	-7.0	-7.5	-8.1	-8.6	-9.0	-9.6	-9.9	-10.1	-10.5	-8.6	-7.0
4-Mar	-10.7	-10.7	-10.8	-11.0	-10.9	-11.3	-11.6	-10.9	-10.7	-10.3	-9.3	-7.9	-6.5	-5.0	-3.8	-3.2	-2.8	-3.0	-3.9	-4.8	-5.7	-6.4	-6.6	-6.2	-7.7	-2.8
5-Mar	-6.1	-6.2	-6.2	-6.5	-7.1	-9.0	-11.2	-11.3	-8.5	-5.6	-3.0	0.4	0.4	0.8	-0.7	-2.6	-3.5	-4.2	-5.2	-6.4	-7.8	-8.7	-9.0	-9.1	-5.7	0.8
6-Mar	-9.2	-9.3	-9.4	-9.4	-9.4	-9.5	-9.6	-9.6	-9.5	-9.2	-8.6	-7.8	-6.7	-5.5	-5.0	-4.9	-4.6	-4.7	-5.0	-5.1	-4.7	-4.4	-4.5	-4.8	-7.1	-4.4
7-Mar	-5.0	-5.3	-5.9	-6.3	-6.3	-6.7	-7.8	-7.8	-7.4	-6.8	-5.8	-3.7	-2.8	-3.6	-3.7	-3.6	-3.6	-3.7	-4.0	-4.3	-4.4	-4.5	-5.7	-6.4	-5.2	-2.8
8-Mar	-7.0	-7.5	-8.0	-8.2	-8.1	-7.9	-7.6	-7.1	-6.7	-6.2	-5.4	-5.0	-3.6	-2.3	-1.5	-1.9	-2.3	-2.6	-2.7	-2.9	-3.4	-3.4	-3.6	-3.7	-4.9	-1.5
9-Mar	-4.0	-4.2	-4.4	-4.9	-5.4	-5.7	-5.9	-6.0	-6.0	-5.4	-4.8	-3.8	-2.2	-0.4	0.2	1.1	3.2	2.8	-1.7	-4.2	-6.1	-6.9	-8.4	-9.2	-3.8	3.2
10-Mar	-10.1	-11.1	-11.4	-11.1	-10.9	-7.0	-4.6	-3.6	-2.8	-2.3	-2.0	-1.4	-0.4	0.3	1.1	1.6	1.6	1.0	0.5	0.0	-0.3	-0.6	-0.9	-0.7	-3.1	1.6
11-Mar	-0.8	-1.3	-1.5	-1.5	-1.2	-2.3	-2.9	-2.3	-1.3	0.1	1.2	1.9	2.5	2.9	3.0	3.5	2.7	2.3	1.9	0.9	-0.5	-0.9	-1.6	-2.8	0.1	3.5
12-Mar	-4.7	-6.1	-3.9	-2.8	-3.1	-3.3	-3.5	-2.9	-1.6	-0.3	1.8	2.9	4.4	6.5	8.7	9.8	8.4	7.1	6.2	5.2	4.4	4.2	4.0	3.9	1.9	9.8
13-Mar	3.5	3.3	3.0	2.3	1.7	1.3	0.3	0.8	1.7	1.8	1.9	1.6	1.2	0.8	0.7	0.8	0.8	0.8	0.6	0.6	0.4	0.3	0.0	-0.3	1.2	3.5
14-Mar	-0.8	-1.1	-1.3	-1.9	-2.7	-3.0	-3.6	-4.0	-4.2	-4.0	-3.8	-3.5	-3.3	-3.5	-3.5	-3.5	-4.0	-4.4	-4.9	-5.2	-5.3	-5.7	-6.3	-6.8	-3.8	-0.8
15-Mar	-7.0	-7.1	-7.2	-7.2	-7.1	-7.1	-7.1	-7.1	-6.9	-6.0	-4.8	-3.7	-3.6	-2.9	-2.1	-1.8	-2.0	-2.4	-2.9	-3.4	-3.7	-4.0	-4.5	-5.2	-4.9	-1.8
16-Mar	-5.9	-6.5	-6.9	-7.1	-7.4	-7.6	-7.7	-7.8	-8.0	-7.8	-7.4	-7.5	-7.4	-7.1	-7.0	-7.4	-7.6	-7.5	-7.6	-7.7	-7.7	-7.6	-7.2	-7.9	-7.4	-5.9
17-Mar	-8.1	-8.2	-8.0	-7.7	-8.4	-9.0	-9.4	-9.1	-8.1	-6.0	-5.1	-4.6	-4.7	-4.7	-4.6	-4.6	-4.6	-4.8	-5.2	-5.6	-6.0	-6.1	-6.3	-6.3	-6.5	-4.6
18-Mar	-7.1	-7.2	-7.1	-7.3	-6.7	-6.4	-6.6	-6.3	-5.3	-3.9	-2.8	-1.3	-0.7	1.0	1.2	2.1	2.7	2.8	1.2	-1.8	-4.7	-6.6	-6.4	-5.8	-3.5	2.8
19-Mar	-8.7	-9.1	-8.7	-9.5	-8.3	-8.5	-9.7	-7.9	-6.7	-5.2	-3.1	-0.1	2.2	3.9	5.7	6.2	6.5	5.6	4.4	3.2	2.5	1.6	0.7	0.2	-1.8	6.5
20-Mar	-0.8	-1.7	-2.3	-3.0	-3.6	-3.9	-4.1	-3.9	-2.9	-2.4	-1.2	0.5	1.8	2.6	3.3	3.6	3.3	2.8	1.5	0.6	-0.4	-1.1	-1.8	-2.4	-0.6	3.6
21-Mar	-2.9	-3.4	-4.0	-4.5	-5.1	-5.5	-5.9	-6.2	-6.3	-5.8	-4.8	-3.5	-2.2	-1.0	-0.3	0.0	-0.1	-1.1	-2.1	-3.1	-3.7	-4.6	-5.1	-5.6	-3.6	0.0
22-Mar	-6.2	-6.8	-7.4	-8.3	-9.1	-9.6	-9.8	-10.1	-9.6	-7.9	-5.8	-4.1	-1.8	-0.2	0.4	0.0	-0.4	-0.8	-1.3	-1.9	-2.5	-2.9	-3.3	-3.9	-4.7	0.4
23-Mar	-4.9	-5.1	-4.8	-4.4	-4.1	-4.2	-4.4	-4.5	-4.2	-4.3	-4.4	-4.2	-4.1	-3.8	-3.7	-3.6	-3.6	-3.7	-4.4	-5.4	-6.4	-7.4	-8.8	-10.3	-4.9	-3.6
24-Mar	-11.3	-13.4	-12.8	-13.2	-14.3	-14.9	-15.6	-13.9	-12.2	-8.8	-5.9	-3.5	-1.9	-1.5	-1.0	-1.1	-1.5	-1.6	-2.9	-4.7	-6.1	-8.1	-10.2	-12.4	-8.0	-1.0
25-Mar	-14.0	-15.0	-15.0	-13.3	-10.5	-10.1	-10.1	-9.7	-9.1	-7.3	-4.7	-1.5	1.1	2.6	3.1	3.0	2.5	2.2	1.7	0.8	-0.4	-1.9	-2.7	-3.6	-4.7	3.1
26-Mar	-4.0	-4.6	-5.8	-6.9	-6.0	-5.8	-7.5	-6.3	-3.6	-2.1	-0.6	0.5	1.9	2.5	3.6	4.0	3.9	3.6	2.5	-0.3	-3.5	-5.0	-6.5	-7.5	-2.2	4.0
27-Mar	-8.6	-9.1	-9.5	-9.4	-7.9	-5.9	-5.7	-4.8	-2.9	-0.3	2.5	5.5	8.1	9.6	10.4	10.4	10.3	9.8	8.4	6.9	4.8	3.2	1.8	0.6	1.2	10.4
28-Mar	-0.8	-1.9	-2.6	-2.6	-3.0	-3.8	-3.7	-1.1	1.1	3.8	6.9	8.9	11.0	12.0	12.3	11.0	11.3	11.2	9.9	8.3	7.0	5.3	4.3	3.2	4.5	12.3
29-Mar	2.3	2.8	3.0	-0.6	-0.5	-1.1	-1.7	0.0	3.0	6.1	8.4	10.3	11.2	11.7	12.1	12.3	13.0	12.8	10.8	9.3	8.8	7.9	7.1	6.6	6.5	13.0
30-Mar	6.2	5.0	4.8	2.0	0.0	0.0	-0.6	3.8	5.7	6.7	8.1	9.6	10.2	10.1	10.1	10.1	8.7	6.6	2.8	0.6	-0.2	0.1	-0.7	-1.6	4.5	10.2
31-Mar	-2.3	-2.9	-3.3	-4.0	-4.8	-5.8	-6.1	-5.2	-4.1	-2.9	-1.5	-0.4	-0.1	1.0	1.4	1.7	1.8	1.9	1.8	1.5	1.3	0.8	-0.1	-2.2	-1.3	1.9
	-5.6	-6.0	-6.1	-6.4	-6.4	-6.5	-6.9	-6.3	-5.3	-4.0	-2.7	-1.4	-0.4	0.5	0.9	1.0	0.9	0.4	-0.6	-1.6	-2.4	-3.1	-3.8	-4.5	Diurnal Average	
	6.2	5.0	4.8	2.3	1.7	1.3	0.3	3.8	5.7	6.7	8.4	10.3	11.2	12.0	12.3	12.3	13.0	12.8	10.8	9.3	8.8	7.9	7.1	6.6	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Patricia McInnes - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	560	75.27	75.27
0 - 10	163	21.91	97.18
10 - 20	21	2.82	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 2016

Maximum Value: 97 % on Mar 12 05:00

Maximum Daily Average: 87.3 % on Mar 16

Minimum Value: 26 % on Mar 24 18:00

Minimum Daily Average: 41.5 % on Mar 24

Maximum Diurnal Average: 81.5 % at hour 7

Minimum Diurnal Average: 58.9 % at hour 15

Monthly Average: 70.4 %

Percentiles: $P_1 = 29$ $P_{10} = 44$ $Q_1 = 58$ Median = 74 $Q_3 = 85$ $P_{90} = 90$ $P_{99} = 96$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

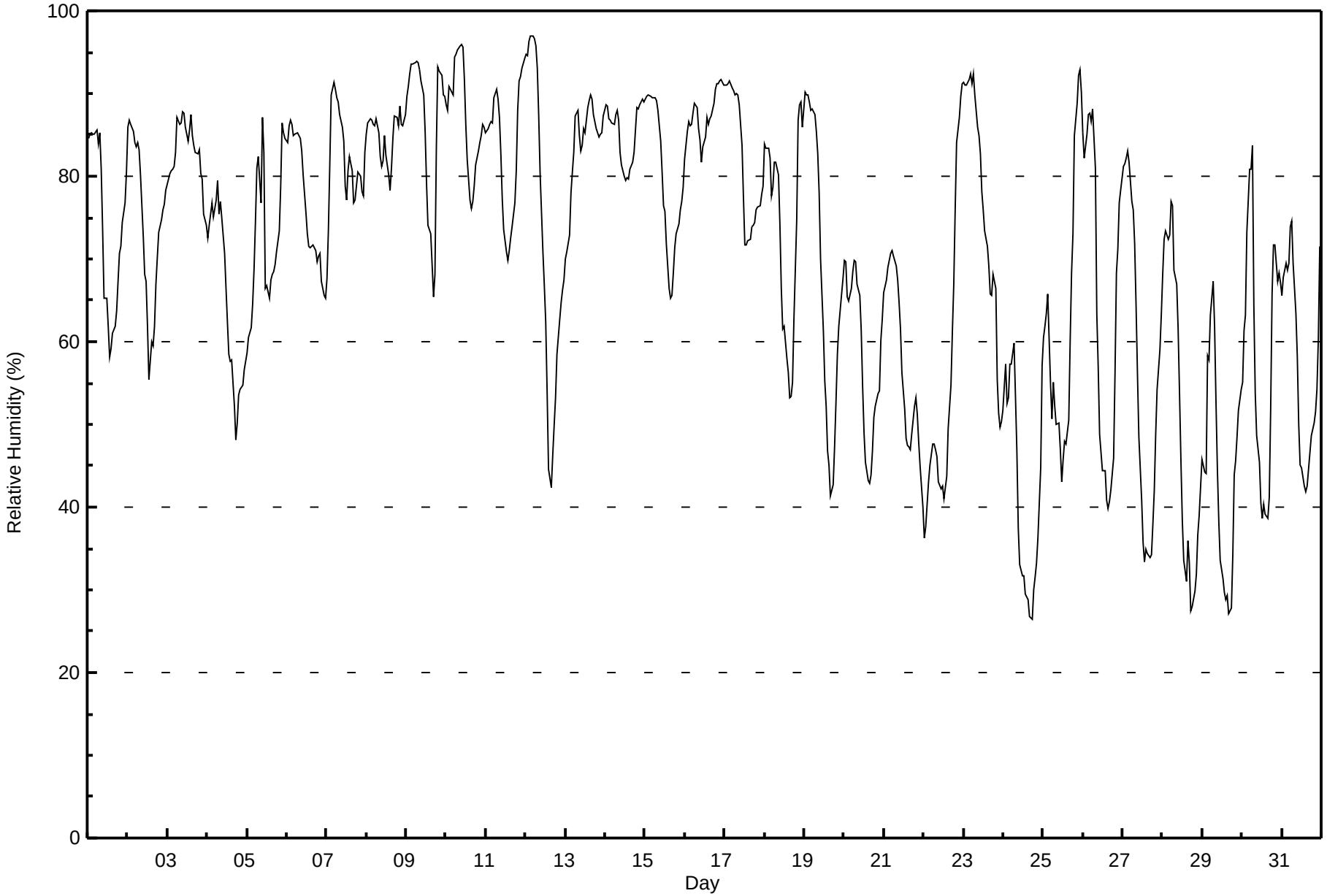
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	85	85	85	85	85	86	84	85	81	74	65	65	62	58	59	61	62	64	67	71	71	74	77	80	73.8	86
2-Mar	86	87	86	86	84	84	84	83	80	73	68	67	62	55	60	59	62	67	70	73	75	76	77	78	74.3	87
3-Mar	79	80	81	81	81	83	87	86	87	88	88	86	84	86	87	85	84	83	83	83	80	80	75	74	82.9	88
4-Mar	73	74	75	77	75	77	80	75	77	75	71	66	62	59	58	58	52	48	50	54	54	55	57	58	65.0	80
5-Mar	59	60	62	65	69	75	81	82	77	87	83	66	67	65	67	68	68	69	71	73	79	86	85	85	72.9	87
6-Mar	84	86	87	86	85	85	85	85	85	83	80	76	73	71	71	72	72	71	70	70	71	67	66	65	76.9	87
7-Mar	68	73	81	90	91	91	90	89	88	86	84	79	77	81	82	81	77	77	79	80	80	78	78	83	81.8	91
8-Mar	85	86	87	87	86	86	87	85	82	81	82	85	83	80	78	81	85	87	87	86	88	86	86	88	84.8	88
9-Mar	90	91	92	94	94	94	94	94	93	92	90	85	79	74	73	73	65	68	83	93	93	92	90	90	86.5	94
10-Mar	89	88	91	90	90	94	95	95	96	96	96	92	86	82	77	76	77	79	81	83	84	85	86	86	87.2	96
11-Mar	85	86	86	87	86	89	91	89	87	83	77	74	71	70	71	72	74	77	81	88	92	92	93	94	83.1	94
12-Mar	95	95	96	97	97	97	96	93	87	80	71	67	62	54	45	42	46	50	53	59	63	65	66	67	72.6	97
13-Mar	70	71	73	78	81	83	87	88	85	83	84	86	85	88	89	90	89	87	86	85	85	85	85	87	83.8	90
14-Mar	89	88	87	87	86	86	88	88	87	83	81	80	79	80	80	81	82	83	86	88	88	89	89	89	85.1	89
15-Mar	89	90	90	90	90	89	90	89	88	84	81	76	76	72	66	65	66	68	71	73	74	76	77	79	79.5	90
16-Mar	82	85	87	86	86	88	89	88	86	84	82	84	85	87	86	87	87	89	91	91	91	92	92	91	87.3	92
17-Mar	91	91	91	91	91	90	90	90	90	89	84	77	72	72	72	72	74	74	74	76	76	76	78	79	81.7	91
18-Mar	84	83	83	82	78	79	82	82	80	74	66	62	62	58	56	53	53	55	63	75	87	89	89	86	73.4	89
19-Mar	90	90	90	89	88	88	87	85	83	78	70	61	55	52	47	45	41	43	47	53	59	62	66	68	68.2	90
20-Mar	70	70	65	65	66	68	70	70	67	66	61	55	49	45	43	43	44	47	51	52	54	54	60	63	58.2	70
21-Mar	66	68	69	70	71	71	70	69	67	65	61	56	52	48	47	47	47	49	52	53	51	48	45	40	57.6	71
22-Mar	36	38	40	43	45	48	48	47	46	43	42	43	41	42	44	50	55	61	67	76	84	87	90	91	54.4	91
23-Mar	91	91	91	92	92	91	92	90	86	85	83	78	76	73	72	69	66	66	68	67	55	51	50	50	76.0	92
24-Mar	52	57	53	53	57	57	60	53	47	37	33	32	32	29	29	29	27	26	30	31	33	36	45	57	41.5	60
25-Mar	60	62	63	66	55	51	55	52	50	50	47	43	46	48	48	51	60	68	73	85	89	92	93	90	62.4	93
26-Mar	85	82	85	87	88	87	88	81	63	57	49	47	44	44	41	40	41	42	46	56	68	71	77	78	64.5	88
27-Mar	81	82	82	83	82	77	76	72	64	56	48	41	36	33	35	34	34	34	38	42	49	54	59	63	56.5	83
28-Mar	68	72	73	72	73	77	76	69	67	62	54	46	38	34	31	36	33	27	28	30	32	37	39	42	50.7	77
29-Mar	46	44	44	58	58	63	67	62	53	44	38	33	31	30	29	29	27	28	34	44	46	48	52	54	44.3	67
30-Mar	55	61	63	73	81	81	84	64	54	49	45	41	39	40	39	39	41	52	66	72	72	67	68	67	58.9	84
31-Mar	66	68	69	69	70	74	75	69	63	58	50	45	45	43	42	42	45	47	49	50	52	54	60	72	57.3	75
	75.7	76.9	77.7	79.3	79.3	80.2	81.5	79.1	75.6	72.4	68.2	64.3	61.7	59.8	58.9	59.1	59.2	60.9	64.4	68.2	70.1	71.2	72.5	74.0	Diurnal Average	
	95	95	96	97	97	97	96	95	96	96	96	92	86	88	89	90	89	89	91	93	93	92	93	94	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Patricia McInnes - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Patricia McInnes - March 2016

Maximum Speed: 28 km/h on Mar 30 14:00

Maximum Daily Speed Average: 16.2 km/h on Mar 14

Minimum Speed Value: 1 km/h on Mar 2 12:00

Minimum Daily Speed Average: 1.6 km/h on Mar 25

Maximum Diurnal Speed Average: 6.1 km/h at hour 17

Minimum Diurnal Speed Average: 2.1 km/h at hour 6

Monthly Average Velocity: 3.6 km/h 18.1 deg

Percentiles: P_1 = 2 P_{10} = 3 Q_1 = 6 Median = 9 Q_3 = 13 P_{90} = 17 P_{99} = 22

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	SE7	SE6	SE5	SE4	ESE5	SE4	S5	SE2	SSW4	SSE4	ESE3	ENE4	NE3	NW2	NNE4	N5	NNE5	NNE9	N5	NNE4	E4	ESE6	E8	E3	E2.7	NNE9
2-Mar	NW2	NNW6	NNE2	NNW3	NNW6	NNW5	N6	N5	NNE5	NE2	NE3	N1	NNW2	NNW2	NNE7	NE9	NNE11	N10	NNW10	NNW10	NNW12	N12	N10	NNW10	N5.9	NNW12
3-Mar	NNW9	NNW9	NNW8	NNW8	N7	NNE7	NE6	NNE2	N4	N7	N10	NNW13	NNW15	NNW16	NNW16	NNW17	NNW20	N17	N21	N17	N15	N12	N9	NNW9	N11.1	N21
4-Mar	NNE10	N7	NW4	WNW3	N4	WNW4	W4	NE2	ESE5	SE6	SE7	E11	ESE11	ESE13	SE12	ESE13	ESE14	ESE14	ESE12	ESE11	ESE15	SE14	SE13	SE13	ESE6.7	ESE15
5-Mar	SE12	SE6	SE8	SSE7	SSE5	SSE4	S3	WSW2	S5	SSW10	SSW5	ESE2	NNE9	N15	N20	N23	N19	N17	N18	N17	N20	N18	N17	N16	N6.3	N23
6-Mar	N15	NNW13	N14	N14	N15	N11	N12	N12	N13	NNW12	N12	NNE11	NNE10	NE7	NNE12	NNE13	N13	N12	N7	N7	NNE8	ENE11	ENE12	ENE13	N10.5	N15
7-Mar	ENE14	ENE14	ENE9	NNE8	NNE9	NNE8	N6	NNW6	N6	N6	NNE5	NNW3	ENE2	NE6	NE5	NNW3	WNW11	W8	WSW8	SW9	WSW10	W8	NNW11	NNW9	N3.8	ENE14
8-Mar	N7	N6	NNE6	E3	SE1	WSW3	SE3	SE5	ESE9	ESE11	ESE9	ESE9	E5	ESE7	NNE4	N8	NNW11	NNW10	NNW5	NNW4	NE4	NNW3	NNE5	N5	NE2.9	ESE11
9-Mar	NNW7	NNW7	N6	N8	N8	NNW8	N8	N5	N7	N5	NNE6	NNE7	NW2	ENE3	E3	SSE5	ENE3	NW2	NNE4	NNW4	WNW3	SW2	SSW3	S4	N3.4	N8
10-Mar	S3	S4	S4	SSE3	SSE2	SE6	SE6	SE7	ESE6	ESE11	ESE13	ESE15	ESE19	ESE19	ESE19	ESE15	ESE17	ESE15	ESE13	ESE13	ESE12	ESE11	ESE8	SE8	ESE9.9	ESE19
11-Mar	S5	SW9	WSW12	WSW13	WSW12	WSW10	WSW12	WSW11	WSW9	WSW8	WNW9	WNW11	WNW10	WNW11	WNW9	WNW11	NNE7	NE2	ENE4	NE5	SSW3	SSW2	SSE3	SSE3	W5.5	WSW13
12-Mar	SE2	SE4	ESE4	SE7	E6	E3	ESE6	ESE8	ESE9	ESE10	ESE15	ESE17	ESE17	ESE13	ESE14	ESE20	ESE18	ESE15	ESE13	ESE10	ESE11	ESE10	ESE9	ESE8	ESE10.3	ESE20
13-Mar	ESE6	ESE5	ESE5	NE3	NNE7	N5	NNW8	NNW8	NNW9	NNW11	NNW16	NNW17	NNW17	NNW18	NNW20	NNW20	NNW21	NNW21	NNW20	NNW18	NNW19	NNW18	NNW19	NNW16	NNW12.3	NNW21
14-Mar	NNW18	NNW16	NNW16	N17	N18	N16	N18	N17	N17	N17	N17	NNW17	NNW17	N17	N17	NNW16	NNW18	NNW18	NNW17	NNW16	N15	N13	NNW12	NNW13	N16.2	N18
15-Mar	NNW12	NNW11	NNW9	NNW8	NNW8	NNW8	NNW7	NNW9	NNW10	NNW9	N8	N9	NNW10	NNW9	NNW11	NNW11	NNW11	NW13	NW11	NNW11	N14	N13	N16	NNW17	NNW10.4	NNW17
16-Mar	NNW19	NNW20	NNW19	NNW20	NNW19	NNW15	N13	N14	NNW17	NNW18	NNW18	NNW17	NNW16	N14	N14	N15	N15	N12	NNW10	WNW7	WSW6	W6	NNW8	NNW5	NNW13.5	NNW20
17-Mar	WNW5	WNW5	WNW3	NW9	NW9	WNW9	WNW9	WNW7	W7	NNW9	NNW11	NNW11	NW15	NNW14	NNW12	NNW9	NNW9	NNW9	NW7	WNW5	WNW6	W5	W5	WSW3	NW7.5	NW15
18-Mar	SW4	SW5	SW8	WSW8	WSW6	SW6	SW8	WSW8	WSW8	W7	W8	SSW3	SSE5	SE7	S9	SSW8	SSW9	S8	SSE6	S6	SE3	S5	SSW6	SW3	SSW5.3	SSW9
19-Mar	NNW4	NNW4	N2	NNE4	N5	NNE3	N1	N3	NNE6	NNE6	NNE6	NNE5	NNE7	NNE8	NE8	E12	ESE13	ESE12	ESE9	ESE11	ESE13	ESE12	E10	ESE15	ENE5.3	ESE15
20-Mar	E13	ESE11	E13	E12	E11	ENE10	ENE10	E8	ESE9	ESE13	ESE15	ESE12	E9	ENE11	ENE12	ENE12	ENE13	E13	E13	E14	ENE13	ENE11	NE10	ENE14	E11.3	ESE15
21-Mar	ENE12	ENE12	ENE14	ENE15	ENE15	ENE14	ENE15	ENE15	ENE16	ENE13	ENE13	ENE14	E16	ENE15	E15	E15	E17	E17	E15	E14	E11	E10	E11	ESE12	ENE13.9	E17
22-Mar	ESE14	ESE12	ESE11	ESE11	ESE10	SE7	ESE9	ESE12	ESE10	E8	E6	SE5	E5	ESE7	E7	ESE8	ESE9	ESE11	ESE10	SE8	SE8	ESE8	SE9	ESE8	ESE8.8	ESE14
23-Mar	ESE6	SE6	SE3	S4	SSE3	SW2	NW5	NNW8	NNW12	N14	NNW13	NNW12	NNW11	NNW14	NNW12	NNW14	N12	N13	N12	N13	N12	N11	NNW9	NNW8	N7.6	N14
24-Mar	NNW6	NNW7	NNW9	NNW10	NNW7	NNW8	NNW8	NNW9	N9	NNE4	N2	NNW3	N3	NNE4	NNE7	NNE9	NNE11	NNE10	N8	NNW9	N8	NNW7	NW5	W2	N6.4	NNE11
25-Mar	WNW4	WNW4	WSW1	S3	SE6	SE7	SSE3	SE7	SSE7	SE5	ESE4	E4	ESE3	ENE5	NE3	E6	SE1	NNW3	WSW6	WSW10	W5	SW4	WSW6	W5	S1.6	WSW10
26-Mar	NW11	NW10	NW10	NW9	NW8	NW6	WNW5	WNW5	N7	NNE1	E6	E3	ENE4	ENE6	NNE4	NE5	ENE5	E6	ESE7	SE6	SSE5	SE4	SSE3	SSE3	N1.9	NW11
27-Mar	SSE4	SSE5	SE5	SE5	SE6	SE8	SE9	ESE8	SE12	SE11	SE10	SE9	ESE13	ESE16	SSE14	ESE16	SE16	SE14	SE11	SE13	ESE15	SE10	SE9	SSE6	SE9.9	SE16
28-Mar	SSE7	SSE7	SSE5	SSE8	SSE7	SSE7	SSE6	SSE7	S10	S10	SSW13	SSW12	SW12	WSW17	W19	WNW22	W16	WNW15	WNW9	W9	WNW11	WNW10	W9	W10	WSW6.3	WNW22
29-Mar	WSW12	W12	W11	SSW7	SW8	SW6	SW8	SSW9	SSW8	S10	SSW10	SW11	NW14	NW12	NNW10	NE10	ENE7	ENE6	WNW4	W8	W8	W8	WNW8	NNW4	W4.9	NW14
30-Mar	WNW6	WNW3	NNW5	NNW4	WNW4	NW4	NNW5	NNW15	NNW13	N13	N11	N15	NNW19	NNW28	NNW23	NNW22	NNW24	N22	N24	N23	N15	N16	N22	N21	N14.4	NNW28
31-Mar	N21	N18	N16	N16	N12	NNW8	NW6	NNW8	NNW7	NNE7	E3	E4	NE7	ENE7	ENE3	E6	E6	ESE7	SE9	SSE5	SSE5	SSE7	SSE3	S2	NNE4.4	N21
	NNE3.0	N3.0	N2.6	N2.5	N3.0	N2.1	N2.2	N2.4	NNE2.7	NNE2.8	NE3.3	NNE3.5	NNE4.4	NNE5.4	NNE5.5	NNE6.0	NNE6.1	NNE5.5	NNE4.4	NNE3.7	NNE3.3	NNE2.8	NNE3.6	NNE2.8	Diurnal Average	
	N21	NNW20	NNW19	NNW20	NNW19	N16	N18	N17	NNW17	NNW18	NNW18	NNW17	NNW19	NNW28	NNW23	N23	NNW24	N22	N24	N23	N20	NNW18	N22	N21	Diurnal Maximum	

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 7 km/h on Mar 30 14:00

Minimum Value: 1 km/h on Mar 26 20:00

Percentiles: P_1 = 1 P_{10} = 1 Q_1 = 1 Median = 2 Q_3 = 3 P_{90} = 4 P_{99} = 6

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

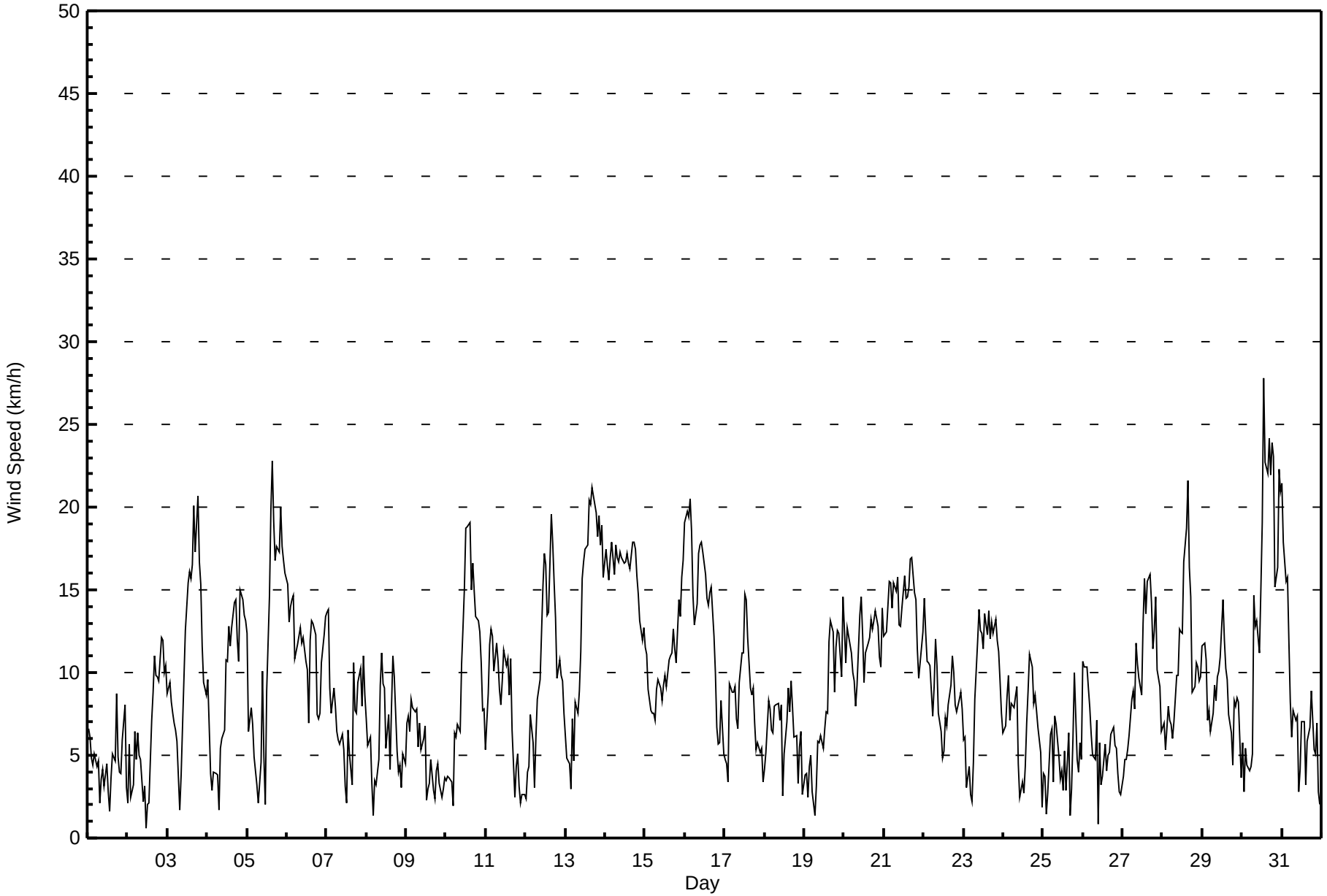
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	1	1	1	1	1	1	2	1	1	1	1	2	1	1	2	1	1	2	2	1	2	1	2	3	3
2-Mar	1	1	1	2	2	2	1	1	1	2	2	1	1	1	3	2	2	2	1	1	2	2	2	2	3
3-Mar	2	2	2	2	2	2	2	1	1	2	2	2	3	3	3	4	4	4	4	4	4	3	2	2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

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Patricia McInnes - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	185	24.87	24.87
6 - 11	319	42.88	67.74
12 - 19	216	29.03	96.77
20 - 28	24	3.23	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Patricia McInnes - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	15	18	10	10	11	9	17	20	12	6	6	4	6	14	8	19	185
6 - 11	29	28	7	10	18	43	30	12	6	8	9	14	13	17	11	64	319
12 - 19	59	2	0	23	13	42	8	1	0	2	1	6	3	1	4	51	216
20 - 28	10	0	0	0	0	1	0	0	0	0	0	0	0	1	0	12	24
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	113	48	17	43	42	95	55	33	18	16	16	24	22	33	23	146	744

Total Number of Valid Hours: 744

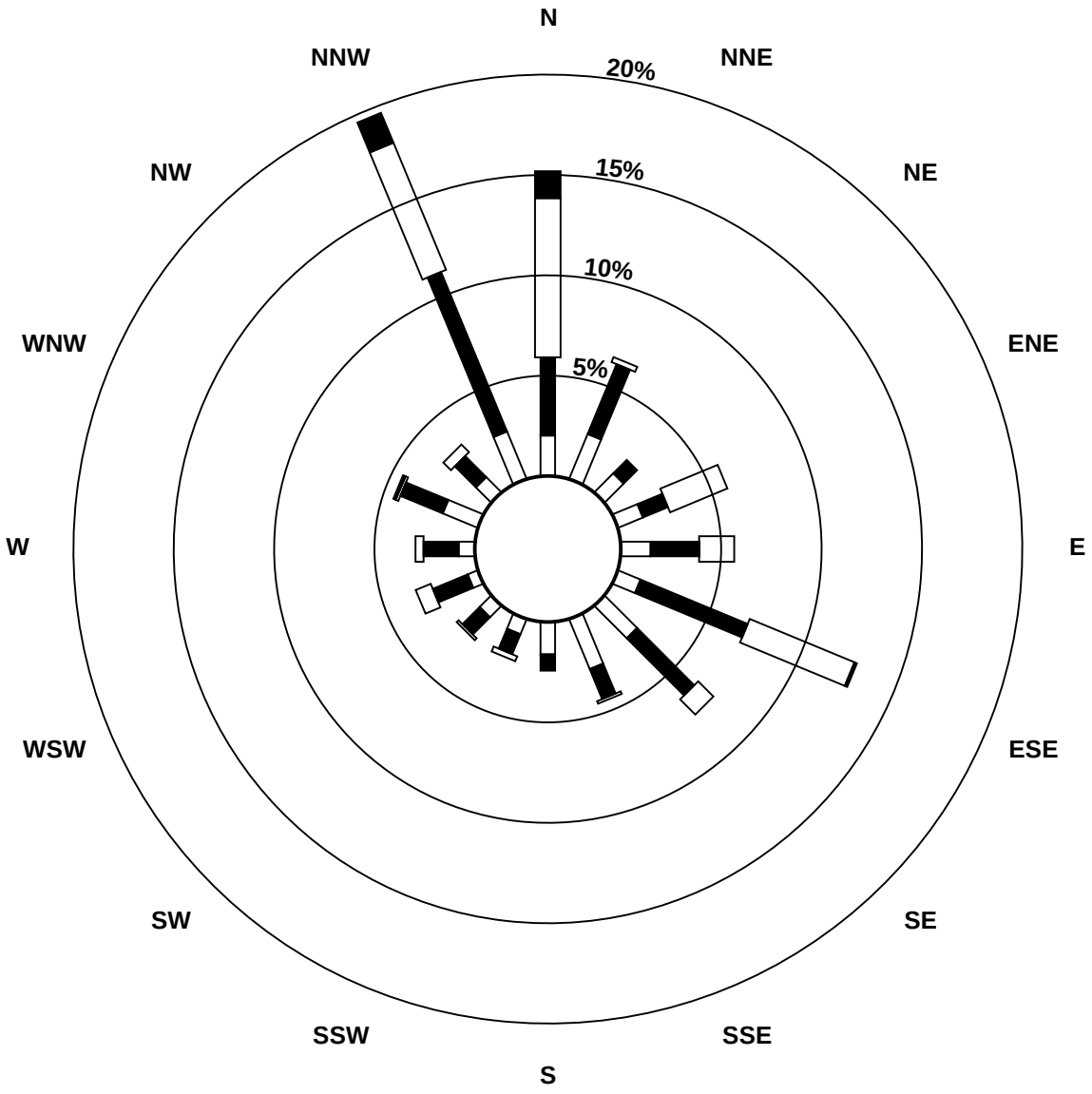
Total Number of Hours: 744

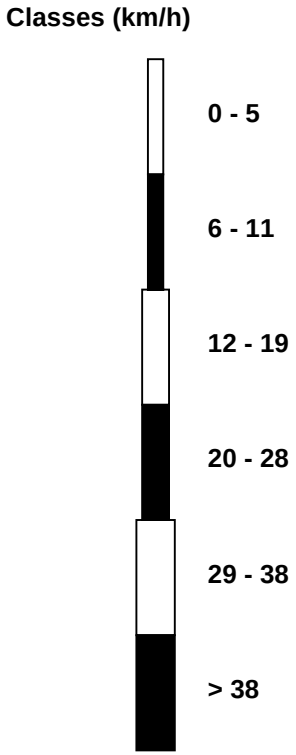
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Wind Speed (WS) - km/h

Patricia McInnes (AMS 6)





Total Number of Valid Hours: 744

Direction of Maximum Speed: 340 deg on Mar 30 14:00
Direction of Maximum Daily Speed Average: 349.1 deg on Mar 14

Direction of Minimum Speed: 2 deg on Mar 2 12:00

Direction of Minimum Daily Speed Average: 1.6 deg on Mar 25

Monthly Average Direction: 338.0 deg

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	145	124	137	131	119	130	183	125	196	149	103	62	53	318	24	8	31	23	355	24	82	109	86	94	91.1
2-Mar	308	346	24	340	341	338	6	354	20	52	39	2	348	338	32	34	17	4	344	335	341	351	358	344	357.7
3-Mar	341	333	345	345	3	12	34	15	11	6	359	348	344	347	343	341	346	355	357	356	353	355	354	331	351.0
4-Mar	17	353	308	291	9	284	267	34	102	145	130	101	111	104	134	121	112	121	119	123	119	125	126	129	113.6
5-Mar	128	130	139	163	148	150	177	244	189	212	192	114	19	5	358	357	357	352	356	3	357	355	354	353	4.7
6-Mar	353	344	350	358	0	11	351	350	1	348	2	14	12	34	33	13	10	3	359	356	22	59	75	73	10.1
7-Mar	72	76	68	33	28	14	359	343	349	358	18	339	65	40	39	336	296	274	246	234	247	278	343	341	357.0
8-Mar	352	10	33	81	140	245	143	132	115	107	117	111	91	108	14	352	348	341	330	336	37	331	32	359	47.3
9-Mar	334	346	352	2	349	339	349	4	355	355	23	20	310	65	79	153	74	309	13	328	289	218	211	181	354.7
10-Mar	173	186	184	156	152	126	131	126	122	113	119	113	110	115	116	107	105	108	104	107	112	113	121	137	117.0
11-Mar	172	223	248	250	251	239	255	252	241	252	283	299	286	298	286	298	25	50	67	34	198	208	165	156	263.1
12-Mar	146	126	112	125	98	99	120	115	109	109	113	110	107	110	105	113	110	107	116	118	120	119	117	116	112.7
13-Mar	115	105	120	51	16	10	343	347	345	334	339	333	333	330	336	337	338	340	338	334	334	336	330	333	340.0
14-Mar	339	340	341	357	356	351	353	354	352	356	355	348	348	353	349	346	345	346	345	348	351	354	346	342	349.1
15-Mar	343	343	340	337	338	345	345	345	346	346	3	353	343	339	333	338	333	325	319	332	357	357	359	340	342.6
16-Mar	340	342	342	338	345	343	352	351	347	342	342	340	348	354	359	351	359	350	333	288	257	278	343	340	342.5
17-Mar	291	291	284	308	306	298	295	283	273	328	340	327	319	327	335	335	333	330	313	300	293	276	272	240	311.7
18-Mar	231	230	226	248	250	223	236	242	239	262	280	202	156	144	188	205	192	174	167	175	136	179	211	223	212.3
19-Mar	333	338	5	19	3	21	349	8	23	27	16	20	16	29	54	91	111	117	114	102	106	112	97	107	74.2
20-Mar	101	108	98	98	90	77	71	81	105	107	104	102	84	67	63	67	70	90	89	79	77	65	52	72	84.4
21-Mar	70	70	74	74	75	72	75	76	73	67	72	64	80	75	83	82	86	82	85	80	89	82	82	110	78.1
22-Mar	115	118	119	121	122	131	115	118	116	94	87	125	95	108	90	120	117	119	123	127	124	120	124	121	116.5
23-Mar	120	127	131	188	157	229	308	327	338	358	348	345	343	348	345	345	11	7	357	354	350	351	348	335	351.3
24-Mar	337	335	340	343	337	340	339	348	352	19	10	341	349	27	30	29	31	17	356	346	349	331	316	267	353.6
25-Mar	291	294	245	174	135	143	168	141	154	144	115	100	106	73	56	85	131	341	237	255	269	222	239	280	174.5
26-Mar	324	322	308	309	322	322	294	295	8	27	84	80	74	57	27	55	78	87	109	139	147	144	156	163	9.7
27-Mar	167	157	141	145	136	131	131	123	124	128	127	128	112	103	151	121	129	133	134	129	122	124	131	152	128.9
28-Mar	166	148	159	152	153	152	151	147	177	181	196	201	223	258	279	299	279	287	294	281	283	283	273	260	240.3
29-Mar	255	274	269	202	230	215	224	213	197	187	194	233	307	305	334	49	77	65	295	280	277	267	284	329	259.2
30-Mar	299	293	334	338	298	323	341	328	346	358	360	351	338	340	346	344	346	1	6	7	1	6	6	5	350.8
31-Mar	4	8	7	354	351	339	326	337	346	21	84	87	44	60	68	98	98	118	126	147	158	160	167	185	26.6
	11.5	5.1	3.9	4.8	8.5	3.7	355.5	2.7	22.8	30.0	35.1	26.8	17.2	19.5	15.2	21.3	27.0	26.3	20.4	13.2	21.0	23.9	18.9	22.9	
	Diurnal Average																								

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Patricia McInnes - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 100 deg on Mar 26 10:00

Minimum Value: 5 deg on Mar 17 07:00

Percentiles: $P_1 = 7$ $P_{10} = 10$ $Q_1 = 12$ Median = 15 $Q_3 = 20$ $P_{90} = 39$ $P_{99} = 81$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

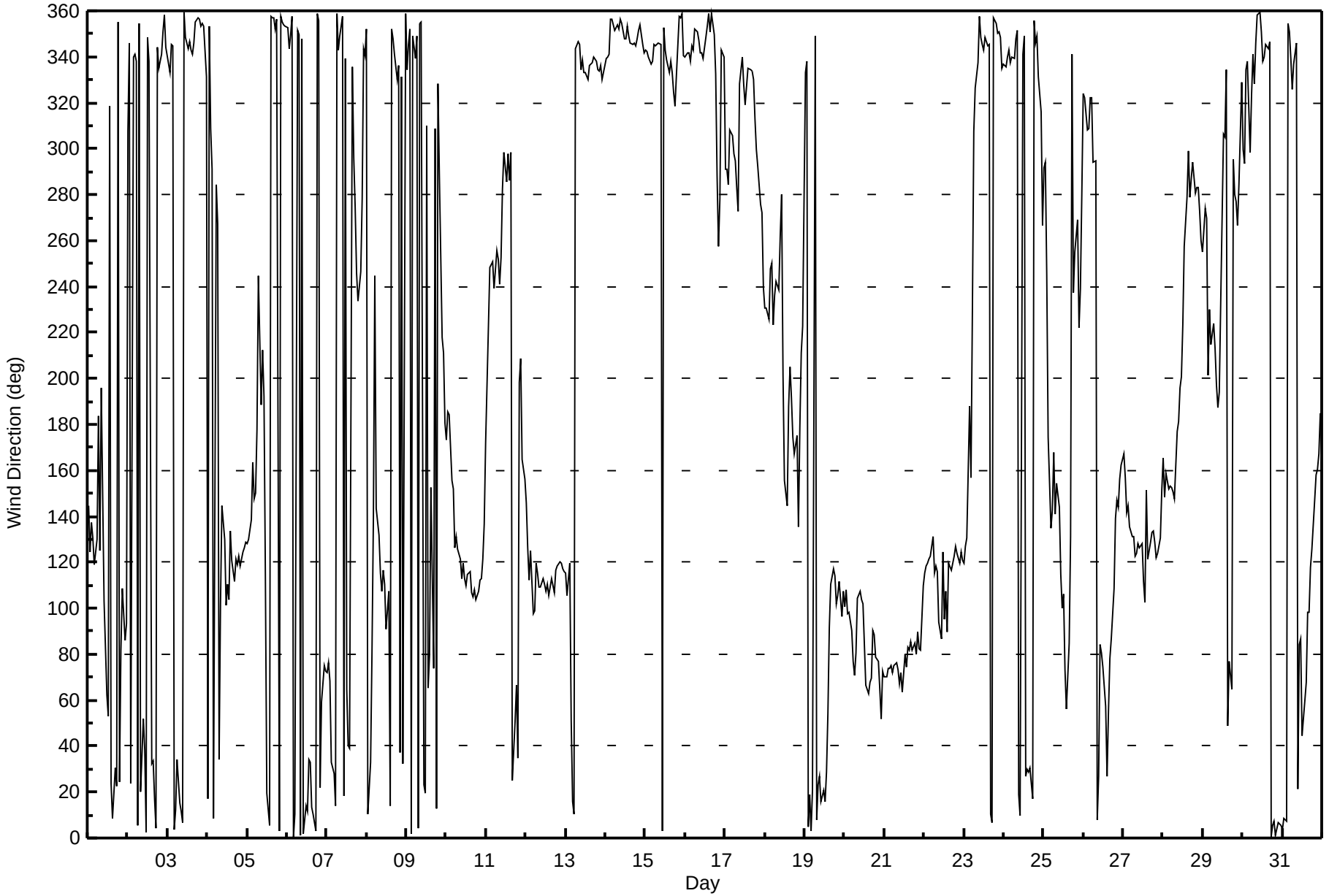
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	13	13	13	17	14	16	18	35	14	27	50	39	56	58	33	18	17	11	21	40	48	15	12	71	71
2-Mar	71	17	48	61	33	32	16	22	18	61	63	97	63	73	50	15	11	16	10	9	10	12	12	10	97
3-Mar	11	9	15	18	18	24	28	68	41	11	12	12	12	12	11	11	13	14	15	14	14	18	16	10	68
4-Mar	19	19	23	36	32	37	9	68	20	22	31	12	17	14	18	22	13	13	11	11	12	13	13	13	68
5-Mar	14	17	15	27	20	15	13	59	20	17	46	71	23	17	15	15	15	14	15	15	14	14	14	14	71
6-Mar	13	10	14	13	15	13	13	12	13	11	17	14	15	17	11	12	11	13	13	12	18	14	12	12	18
7-Mar	11	11	17	11	10	15	13	9	16	15	14	25	58	26	18	58	9	26	13	10	10	28	13	10	58
8-Mar	14	20	20	30	63	35	31	24	15	12	18	15	23	24	33	13	12	10	15	43	21	36	31	31	63
9-Mar	16	13	15	13	12	20	13	18	13	18	17	16	57	41	38	26	53	39	19	25	27	35	21	22	57
10-Mar	14	8	13	12	47	13	16	14	17	13	12	14	13	16	14	13	12	13	13	11	14	12	14	15	47
11-Mar	24	10	11	12	11	9	7	8	10	15	16	15	15	16	16	18	29	33	33	19	22	24	23	41	41
12-Mar	32	18	18	13	32	45	21	16	20	18	14	12	12	13	13	13	13	11	12	11	11	13	14	16	45
13-Mar	18	15	20	51	29	52	15	8	11	10	10	10	9	9	11	10	10	11	11	11	11	11	11	12	52
14-Mar	10	11	11	15	14	15	14	14	13	14	14	13	11	13	13	12	11	12	11	11	13	13	9	8	15
15-Mar	9	8	8	9	11	9	14	11	13	14	15	15	17	21	18	20	12	14	10	12	14	14	15	12	21
16-Mar	10	10	10	9	12	10	13	13	12	11	11	11	12	13	12	13	15	15	14	11	13	27	22	20	27
17-Mar	8	10	27	9	9	6	5	9	13	22	19	24	16	11	14	21	12	10	17	13	9	18	9	18	27
18-Mar	12	16	11	7	10	18	9	8	12	26	29	65	41	28	20	28	18	13	6	9	19	11	10	83	83
19-Mar	29	15	38	13	12	27	82	18	16	15	16	20	18	15	22	22	14	13	12	11	12	12	12	11	82
20-Mar	10	14	12	14	13	11	11	12	21	15	14	18	24	19	18	15	13	13	11	10	11	19	13	12	24
21-Mar	13	13	10	10	10	11	9	10	11	14	15	20	15	18	18	13	15	13	14	11	13	10	10	17	20
22-Mar	14	15	13	14	14	14	15	14	17	22	36	51	71	37	38	38	34	23	15	13	14	13	12	12	71
23-Mar	12	12	30	12	25	29	43	10	15	14	14	15	16	14	15	13	14	14	14	12	12	12	10	9	43
24-Mar	15	7	7	9	12	12	8	14	13	34	57	45	68	74	27	24	14	12	12	8	8	10	13	30	74
25-Mar	19	22	49	27	14	15	20	14	19	22	43	47	81	34	54	16	73	21	57	13	45	34	11	52	81
26-Mar	10	8	6	8	9	19	11	15	30	100	33	74	63	38	58	40	47	17	15	12	13	30	32	31	100
27-Mar	29	17	13	19	18	11	13	14	16	18	17	20	17	16	21	20	16	14	11	12	11	10	9	16	29
28-Mar	13	9	16	7	12	8	12	11	18	21	17	19	26	22	16	13	18	13	9	8	10	11	12	6	26
29-Mar	12	9	19	17	18	22	19	13	17	16	28	42	17	28	47	20	16	36	51	10	11	9	11	57	57
30-Mar	16	86	39	28	18	47	20	10	16	12	17	17	18	16	15	14	13	17	16	16	15	14	15	17	86
31-Mar	16	13	14	15	13	10	15	21	28	31	82	72	39	35	66	23	24	16	15	23	19	10	75	62	82
	71	86	49	61	63	52	82	68	41	100	82	97	81	74	66	58	73	39	57	43	48	36	75	83	
	Diurnal Maximum																								

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Patricia McInnes - March 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	March 1, 2016	Last Calibration	February 1, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	13:40	End Time (MST)	16:16
Gas Cert Reference	EY0000355	Station temp.	21 Deg C
Cal Gas Concentration	49.8 ppm	Cal Gas Exp Date	18/09/2018
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
ZAG Make/Model	API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-677	-678
Analyzer IP address	192.168.1.43		Lamp voltage	767	766
Calculated slope	0.997954	1.001241	Chamber temp	45.1	45.1
Calculated intercept	1.061742	1.101378	Pressure	698.2	693.4
Analyzer Background	5.8	5.9	Flow	0.443	0.441
Analyzer Coefficient	1.112	1.122	Intensity	91	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	5500	0.0	0.0	-0.2	----
as found span	5500	86.8	785.9	776.3	1.012
calibrator zero	5500	0.0	0.0	0.0	----
high point	5500	86.8	785.9	784.1	1.002
second point	5500	43.4	393.0	391.7	1.003
third point	5500	21.7	196.5	193.5	1.015
as left zero	5500	0.0	0.0	0.3	----
as left span	5500	86.8	785.9	780.3	1.007
				Average Correction Factor	1.007

Corrected As found	776.4	Previous response	786.5	% change	1.3%

Notes:

Sample inlet filter replaced after as founds. Slightly adjusted span.

Calibration Performed By: Asad Hidayat

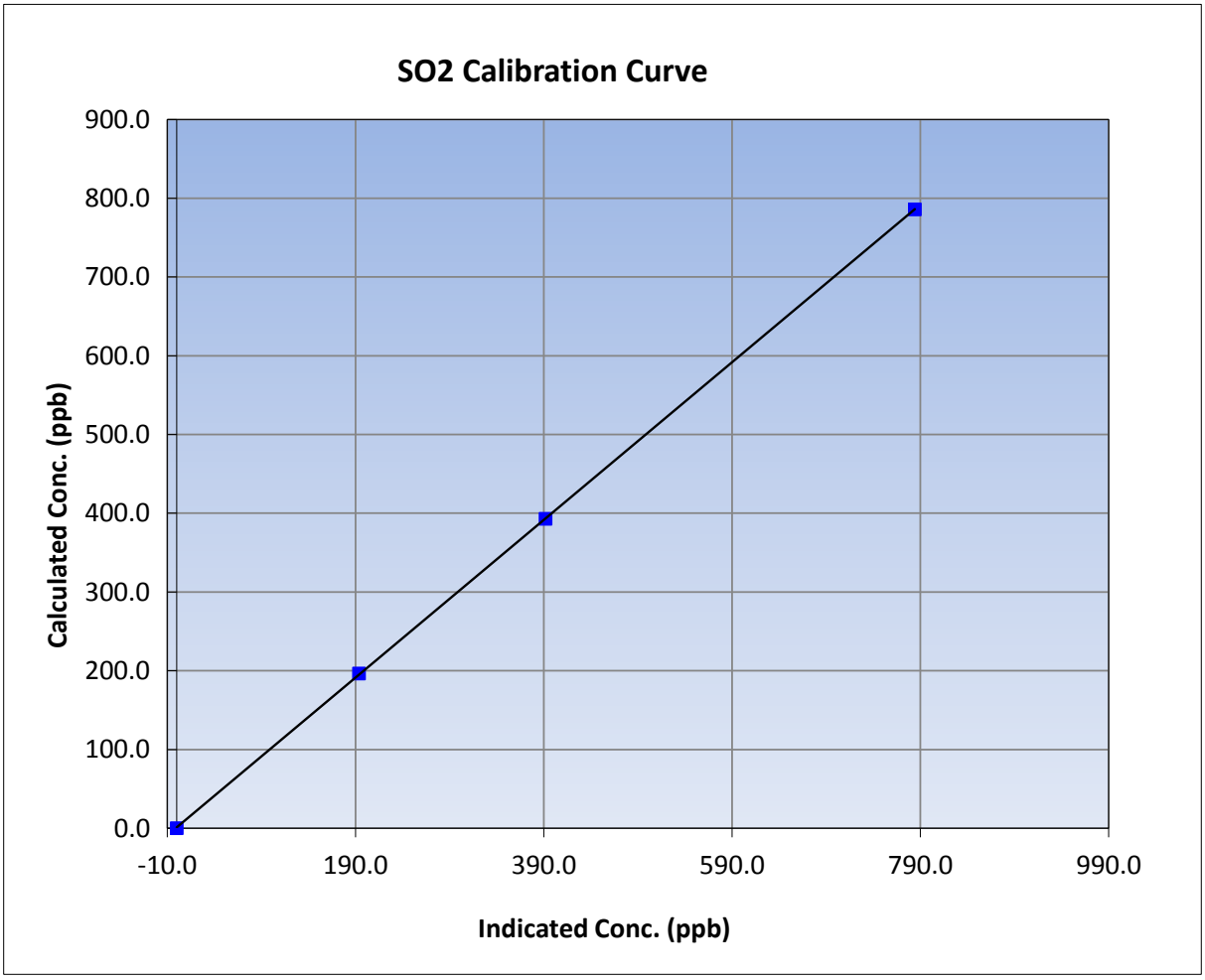
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

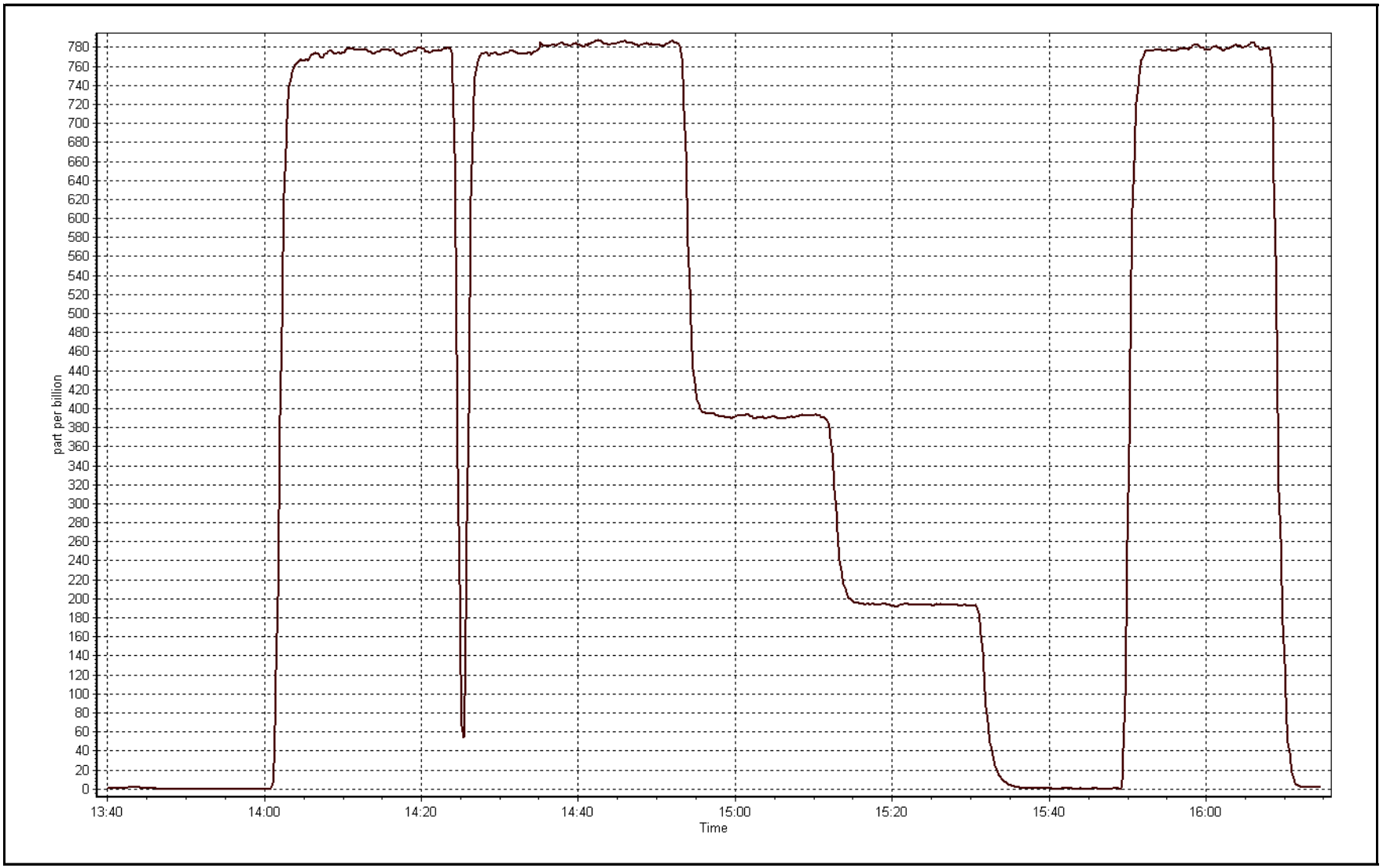
Calibration Date	March 1, 2016	Previous Calibration	February 1, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	13:40	End Time (MST)	16:16
Analyzer make	Thermo 43i	Analyzer serial #	1008841397

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999988
785.9	784.1	1.0023		
393.0	391.7	1.0033	Slope	1.001241
196.5	193.5	1.0153		
			Intercept	1.101378



SO2 Calibration Plot Date: March 1, 2016



Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

Calibration Date	March 9, 2016	Last Calibration	February 1, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	13:15	End Time (MST)	16:45
Gas Cert Reference	SA5551	Station temp.	22 Deg C
Cal Gas Concentration	5.28 ppm	Cal Gas Exp Date	13/02/2018
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
Dil air Make/Model	API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036
SO2 gas concentration	49.8 ppm	SO2 gas cert/exp	SA130110A 12/Dec/16

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-720	-720
Analyzer IP address	192.168.1.42		Lamp voltage	1008	1011
Calculated slope	0.995596	0.992653	Chamber temp	45	45
Calculated intercept	-0.097533	-0.234619	Pressure	689.1	684.2
Analyzer Background	1.99	2.05	Flow	0.434	0.431
Analyzer Coefficient	1.105	1.134	Intensity	91	91
			Converter temp.	800	800

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	6000	0.0	0.0	0.1	----
as found span	6000	79.5	70.0	66.7	1.049
SO2 scrubber check	5500	21.7	196.5	0.3	----
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	79.5	70.0	70.6	0.991
second point	6000	39.8	35.0	35.8	0.978
third point	6000	20.5	18.0	18.4	0.983
as left zero	6000	0.0	0.0	0.2	----
as left span	6000	79.5	70.0	70.7	0.990
				Average Correction Factor	0.984

Corrected As found	66.5	Previous response	70.4	% change	5.8%

Notes:

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

Calibration Performed By: Devin Russell

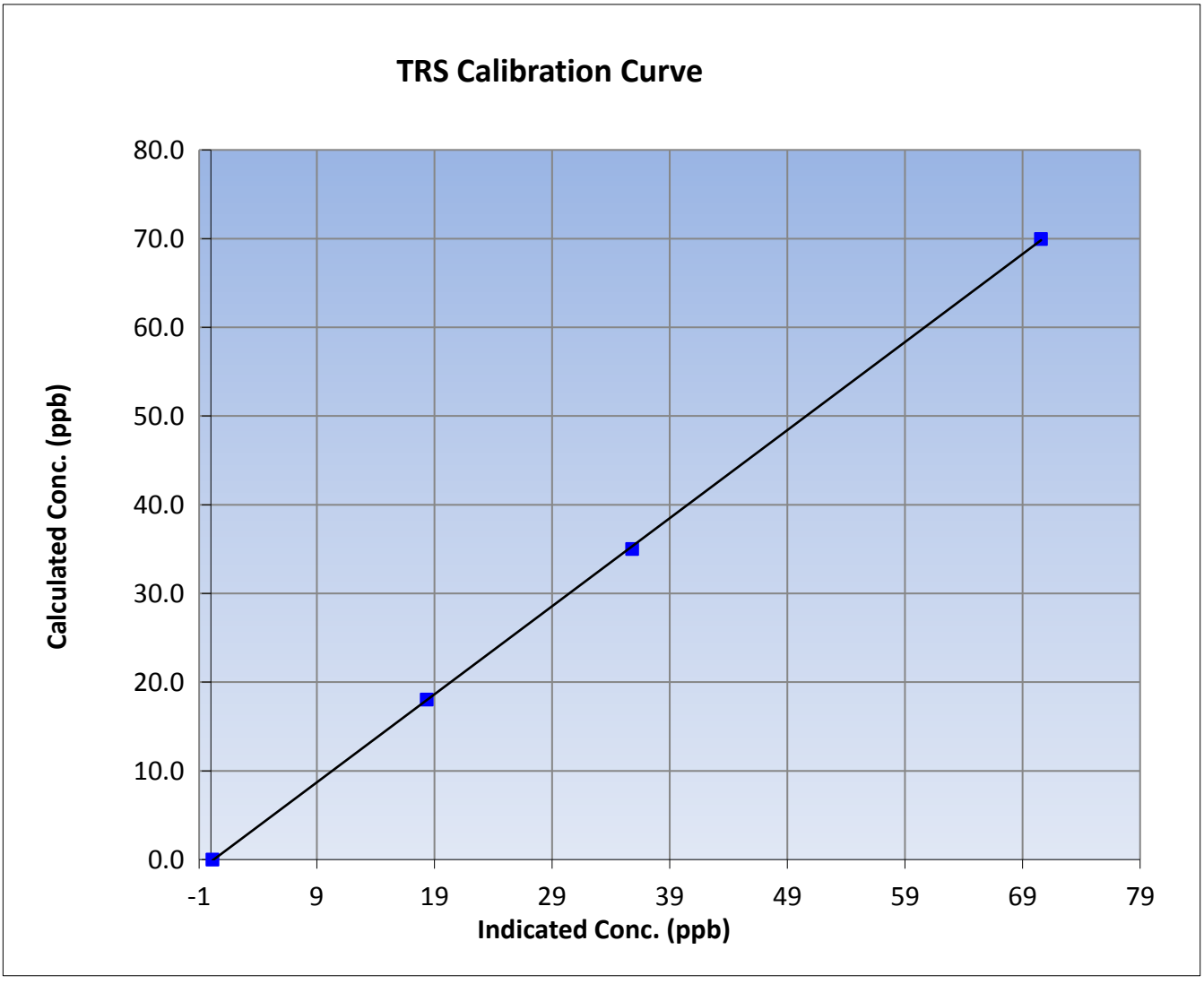
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

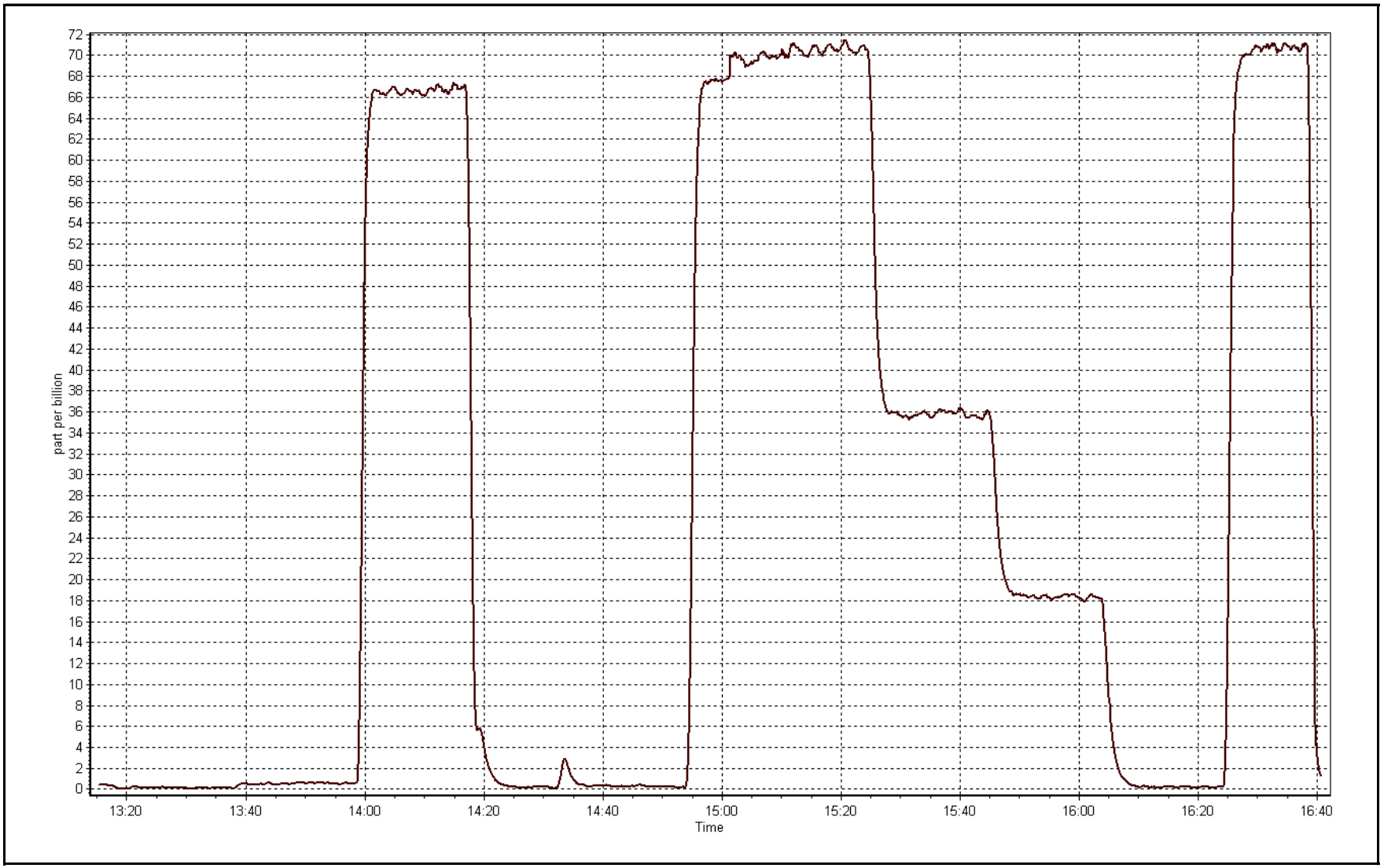
Calibration Date	March 9, 2016	Previous Calibration	February 1, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	13:15	End Time (MST)	16:45
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153358

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999957
70.0	70.6	0.9912		
35.0	35.8	0.9781	Slope	0.992653
18.0	18.4	0.9826		
			Intercept	-0.234619



TRS Calibration Plot Date: March 9, 2016



Wood Buffalo Environmental Association
THC / NMHC Calibration Report

W B E A

Station Information

Calibration Date	March-01-16	Last Calibration	February-01-16
Station Name	Patricia McInnes	Station Number	AMS 6

Reason: Routine

Start Time (MST)	13:40	End Time (MST)	16:15
Gas Cert Reference	EY0000355	Cal Gas Expiry Date	September-18-18
CH4 Cal Gas Conc.	518.0 ppm	CH4 Equiv Conc.	1068.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	14300410
ZAG make/model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	Serial Number	9036

Analyzer Information

	Before	*After*		*Before*	*After*
THC Range (ppm)	0 - 50 ppm		Column Temp	74.9	75.2
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	1.001528	0.999428	Carrier Pressure	34.5	34.5
THC Calc intercept	0.050382	0.048246	Fuel Pressure	42.3	42.3
NMHC Calc slope	1.003782	0.999570	Air Pressure	32.4	32.4
NMHC Calc intercept	0.028299	0.024125			

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	5500	0.0	0.00	0.00	----
as found span	5500	86.8	16.85	16.38	1.029
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	86.8	16.85	16.84	1.001
second point	5500	43.4	8.43	8.36	1.008
third point	5500	21.7	4.21	4.12	1.023
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	86.8	16.85	16.83	1.001
				Average Correction Factor	1.011

Corrected As found	16.38	Previous response	16.78	% change	2.4%

Notes:

Sample inlet filter replaced after as founds. 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	5500	0	0.00	0.00	----
as found span	5500	86.8	8.68	8.47	1.025
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	86.8	8.68	8.67	1.001
second point	5500	43.4	4.34	4.31	1.007
third point	5500	21.7	2.17	2.12	1.024
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	86.8	8.68	8.67	1.001
				Average Correction Factor	1.011

Corrected As found	8.47	Previous response	8.62	% 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	5500	0	0.00	0.00	----
as found span	5500	86.8	8.17	7.91	1.033
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	86.8	8.17	8.17	1.001
second point	5500	43.4	4.09	4.05	1.009
third point	5500	21.7	2.04	2.00	1.022
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	86.8	8.17	8.15	1.003
				Average Correction Factor	1.011

Corrected As found	7.91	Previous response	8.16	% change	3.2%

Wood Buffalo Environmental Association

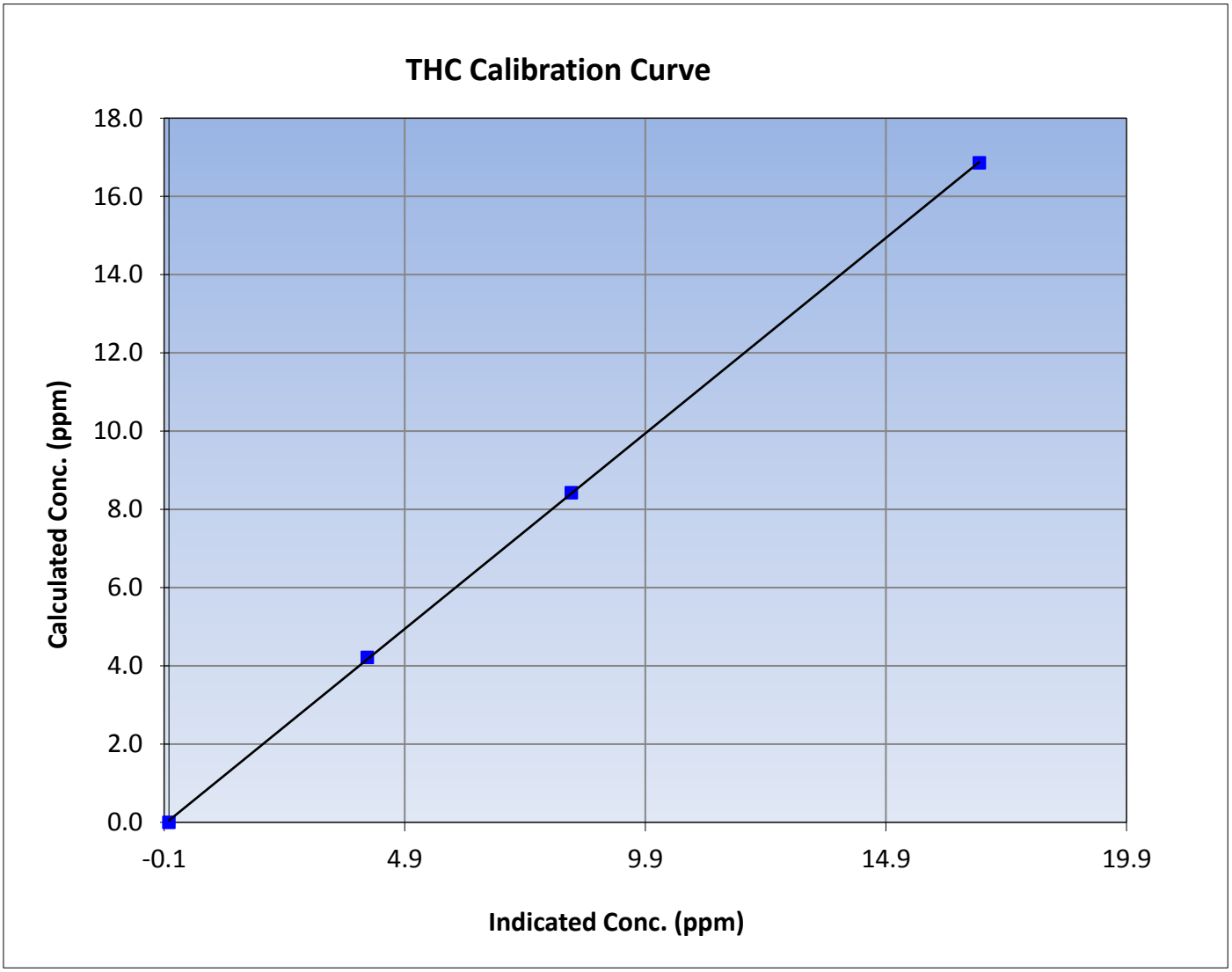
THC Calibration Summary

Station Information

Calibration Date	March 1, 2016	Previous Calibration	February 1, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	13:40	End Time (MST)	16:15
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
16.85	16.84	1.0009		
8.43	8.36	1.0081	Slope	0.999428
4.21	4.12	1.0228		
			Intercept	0.048246



Wood Buffalo Environmental Association

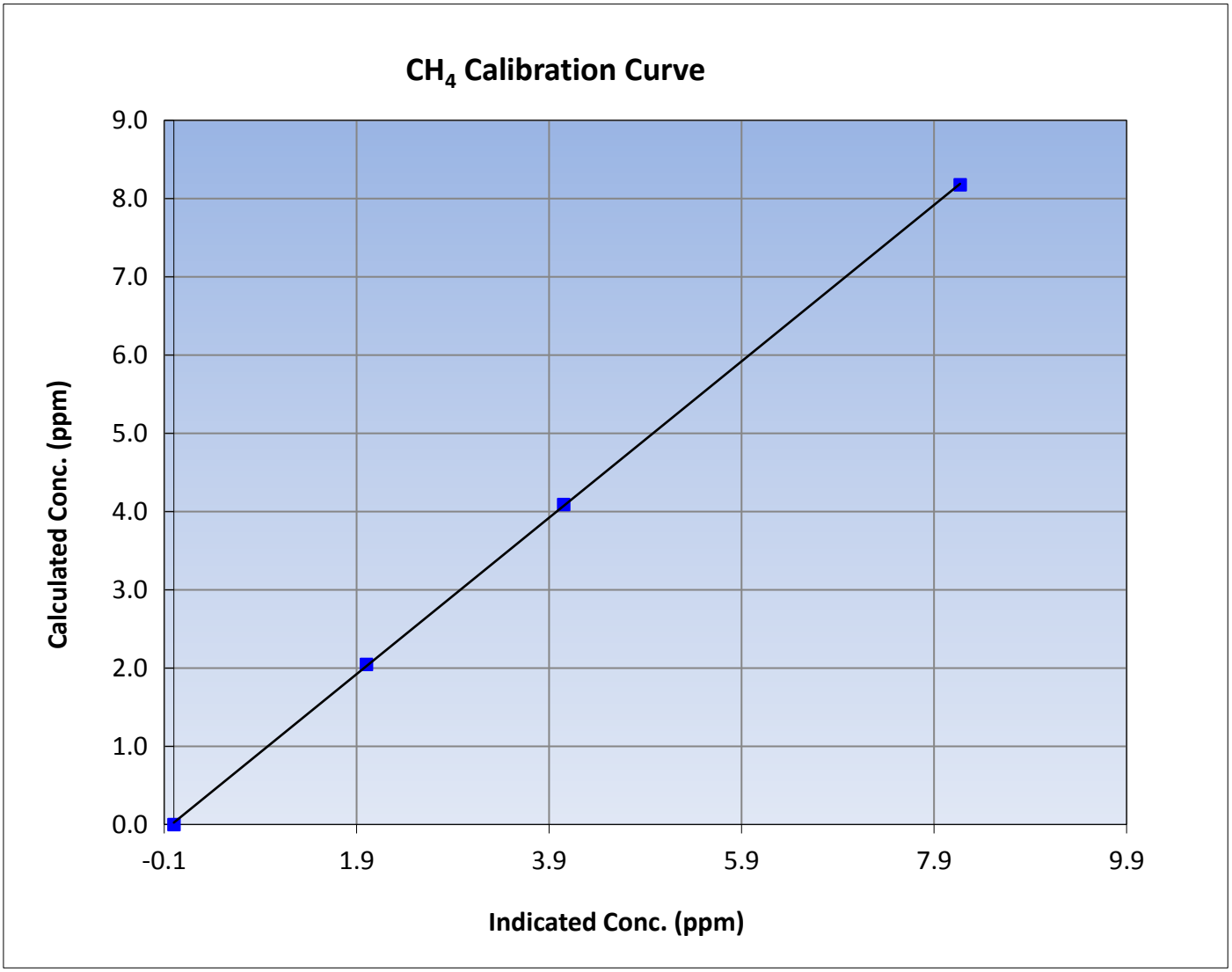
CH_4 Calibration Summary

Station Information

Calibration Date	March 1, 2016	Previous Calibration	February 1, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	13:40	End Time (MST)	16:15
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	0.999960
8.17	8.17	1.0006		
4.09	4.05	1.0093	Slope	0.999277
2.04	2.00	1.0219		
			Intercept	0.024126



Wood Buffalo Environmental Association

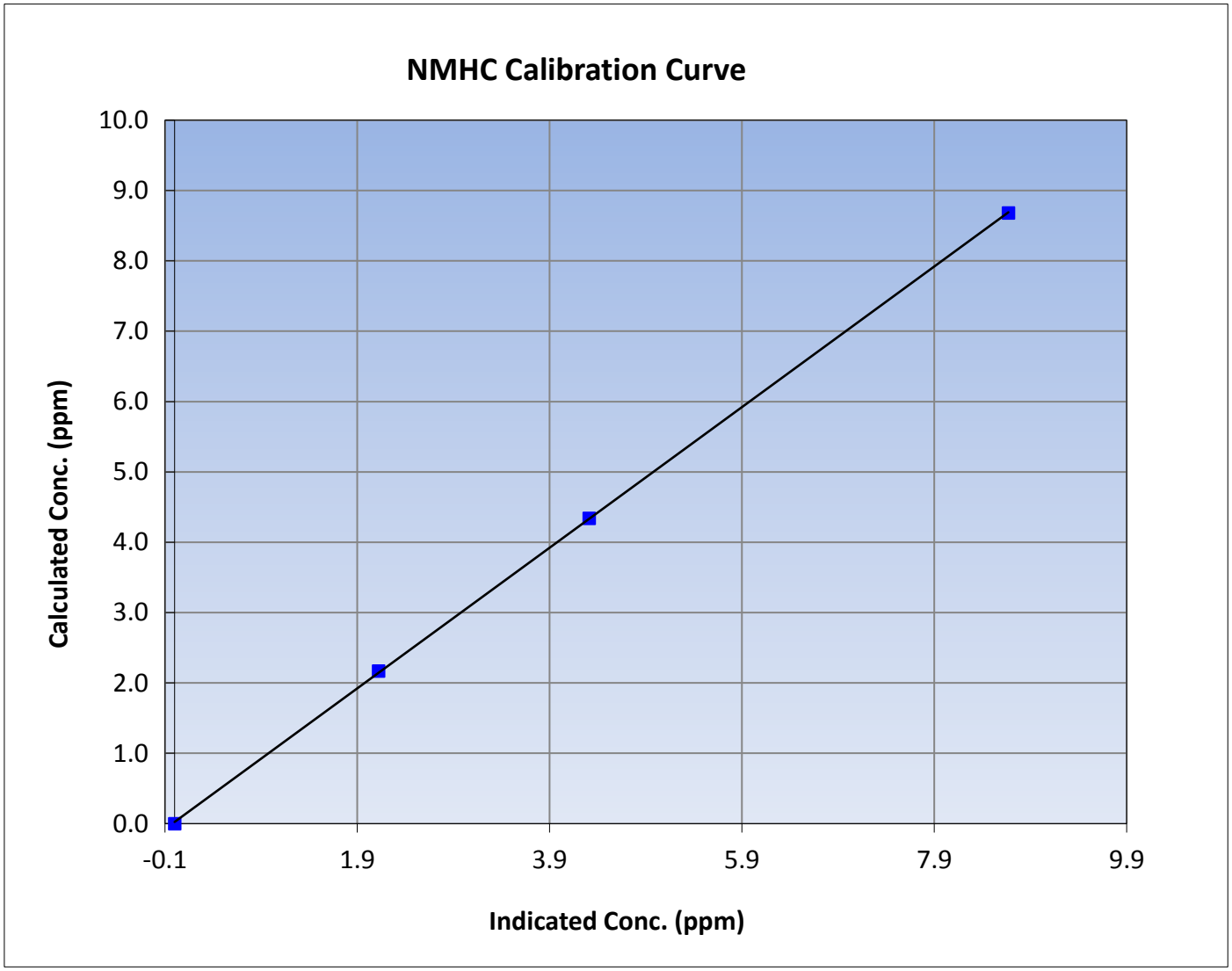
NMHC Calibration Summary

Station Information

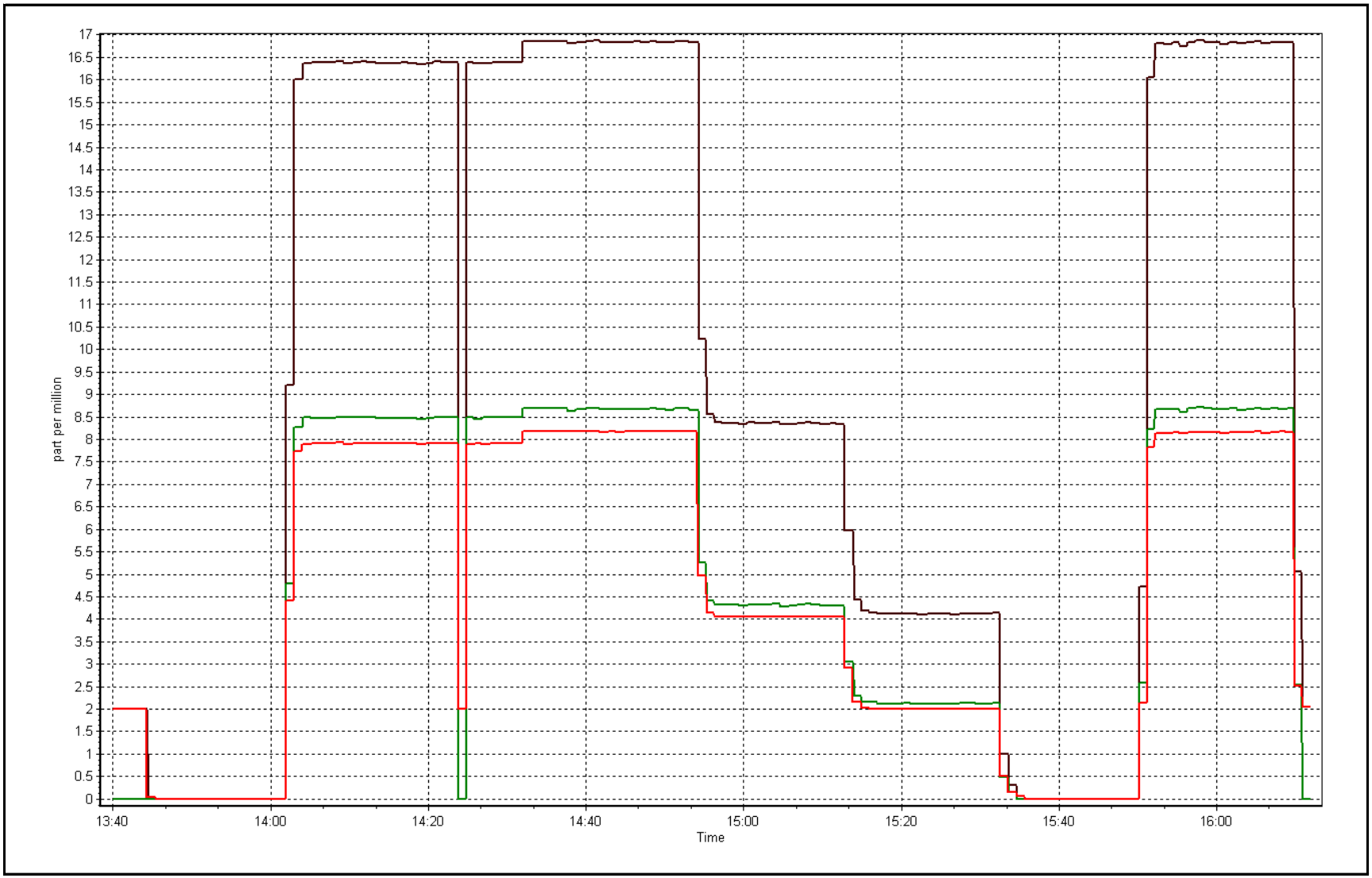
Calibration Date	March 1, 2016	Previous Calibration	February 1, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	13:40	End Time (MST)	16:15
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999964
8.68	8.67	1.0012		
4.34	4.31	1.0070	Slope	0.999570
2.17	2.12	1.0236		
			Intercept	0.024125



THC Calibration Plot Date: March 1, 2016



Wood Buffalo Environmental Association
O_3 Calibration Report

Station Information

Calibration Date	March 9, 2016	Previous Calibration	February 9, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:47	End Time (MST)	14:00
NO2 GPT Ref date	March-08-16	Transfer Standard	23
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
ZAG make/model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	Serial Number	9036

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 500 ppb		Bench temp.	28.1	27.4
Analyzer IP address	192.168.1.48		Lamp temp.	53.5	53.5
Calculated slope	1.003941	0.998433	Pressure	671.5	661.7
Calculated intercept	-0.678072	-1.054509	Flow cell A	0.709	0.701
Analyzer Background	-1.6	0.0	Flow cell B	0.732	0.724
Analyzer Coefficient	1.027	1.041	Cell A Intensity	75982	98406
			Cell B Intensity	71208	98682

Analyzer make	Thermo 49i	Analyzer serial #	1300156234

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	5500	0.00	0.0	1.8	----
as found span	5500	0.78	387.7	321.7	1.205
calibrator zero	5500	0.00	0.0	0.1	----
high point	5500	0.78	387.7	388.3	0.998
second point	5500	0.52	243.0	245.9	0.988
third point	5500	0.26	98.9	100.7	0.982
as left zero	5500	0.00	0.0	0.1	----
as left span	5500	0.78	387.7	386.5	1.003
				Average Correction Factor	0.990

Corrected As found	319.9	Previous response	386.9	% change	20.9%

Notes:

Completed as founds. Inlet filter changed. Span was 20.5% low. Diagnostics show sudden drop in intesity yesterday at 11:20 MST. Optical tubes cleaned. Lamp replaced. Lamp setting adjusted form 29.6 to 28.3%. Detector calibration completed. Ozone scrubber replaced. Pump changed for preventative maintenance. Zero and span adjusted.

Calibration Performed By: Devin Russell

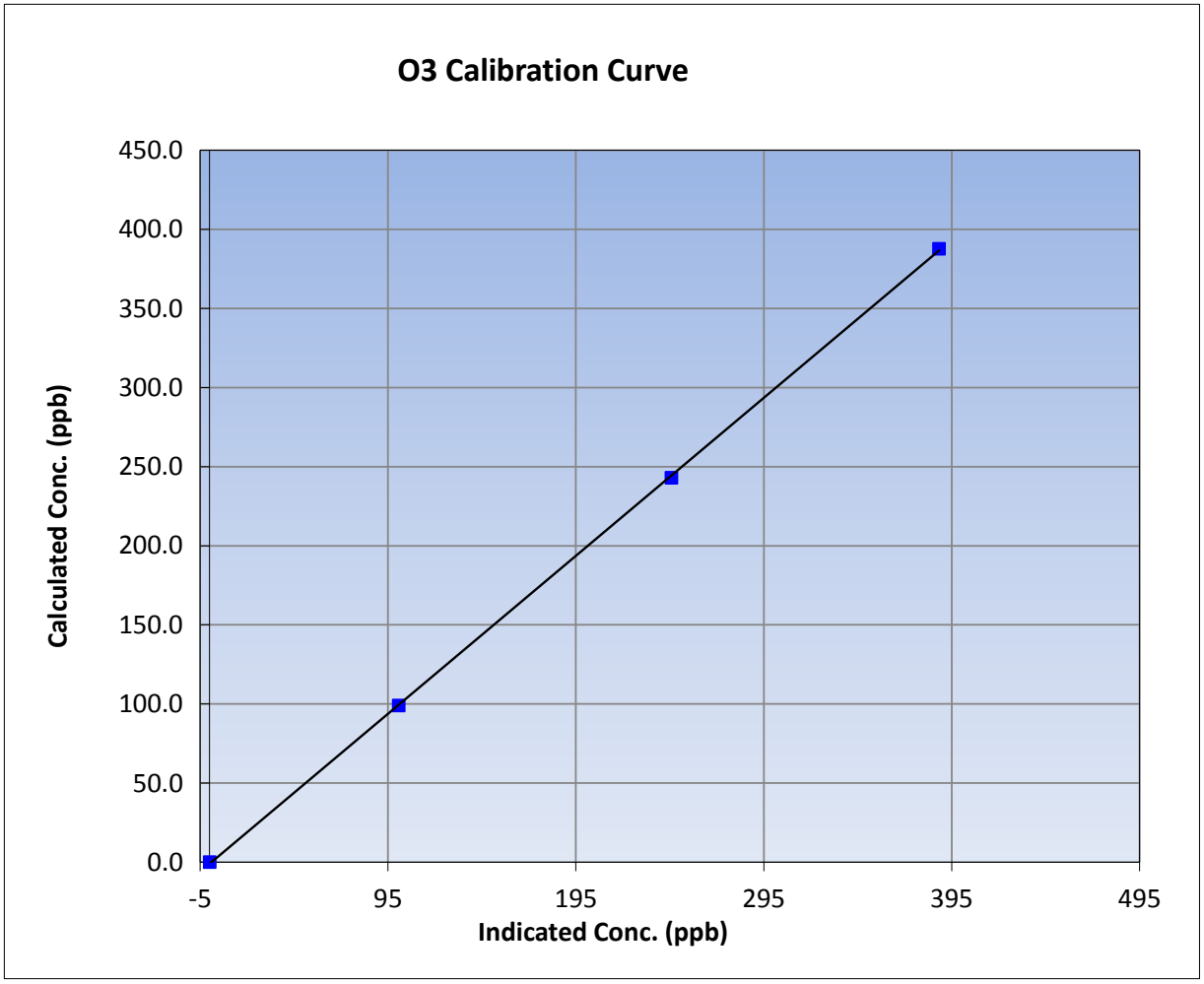
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

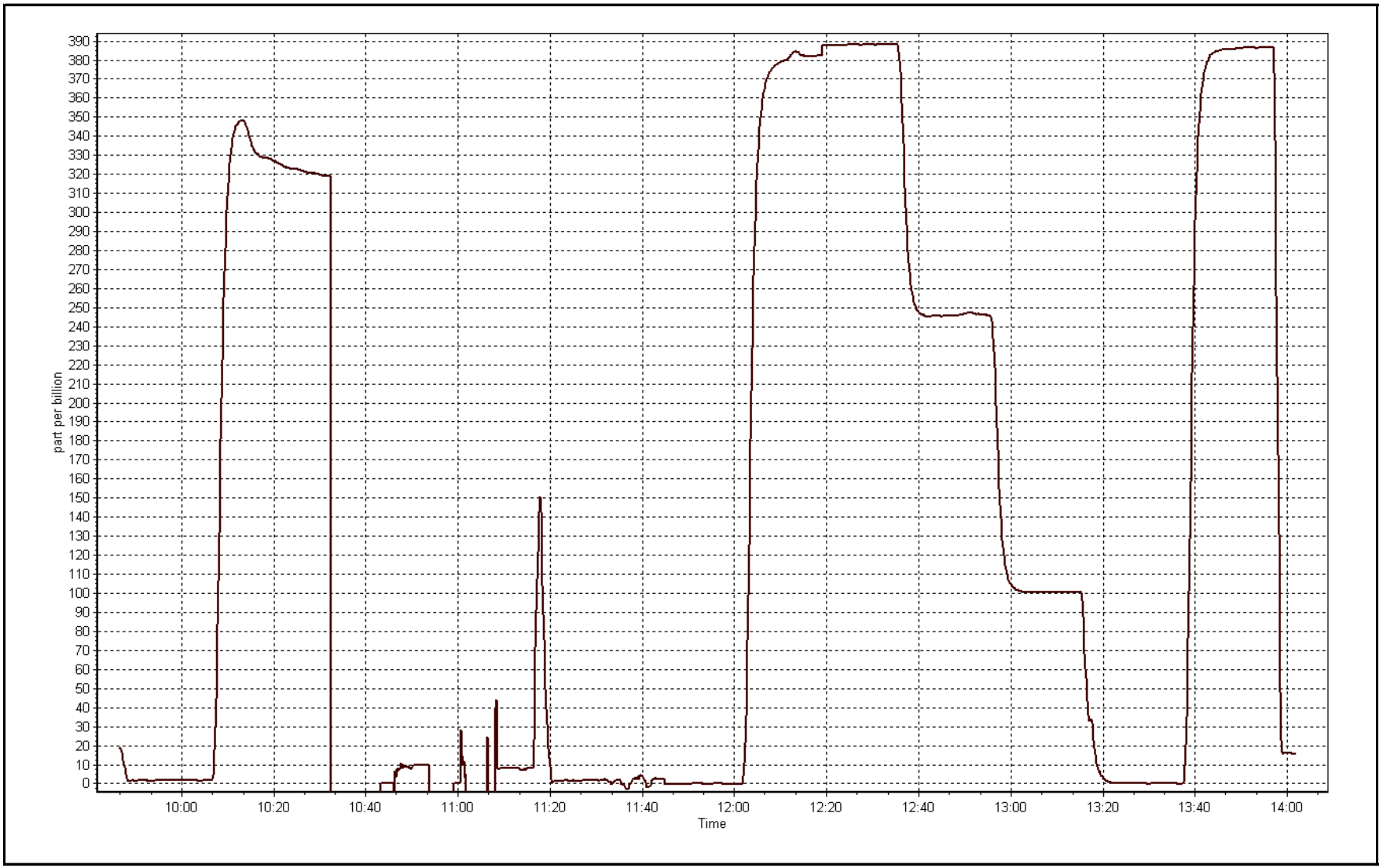
Calibration Date	March-09-16	Previous Calibration	February 9, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:47	End Time (MST)	14:00
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999947
387.7	388.3	0.9985		
243.0	245.9	0.9882	Slope	0.998433
98.9	100.7	0.9820		
			Intercept	-1.054509



O3 Calibration Plot Date: March 9, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 8, 2016	Previous Calibration	February 9, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	14:00
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	EY0000355
NOx Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	18/09/2018
Calibrator	Sabio 4010	Serial Number	14300410
Zero air Generator	Teledyne API T701	Serial Number	60

DACS Information

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

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999249	0.999035	1.002822
	Data Offset	0.737563	0.810200	0.113638
Current Calibration	Data Slope	0.999882	1.001481	0.993387
	Data Offset	0.775251	1.034173	-1.669127

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153460

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	1.186		1.214	
NOX coefficient	1.002		1.007	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.0		3.0	
NOX bkgrnd	3.3		3.4	
Chamber Temp	50.6	Deg C	50.7	Deg C
Moly Temp	327.1	Deg C	326	Deg C
PMT voltage	-760.7	V	-761.1	V
PMT Temp	-2.9	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	184.8	mmHg	183.3	mmHg
R Cell Press Nox	184.8	mmHg	183.3	mmHg
NO sample flow	0.760	lpm	0.755	lpm
Nox sample Flow	0.760	lpm	0.755	lpm

Notes:

Inlet filter changed after as founds. ZAG charcoal and purafil scrubbers changed after as founds. Span adjusted.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 8, 2016 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	0.2	0.1	0.0	----	----
as found span	5500	86.8	803.3	800.1	3.2	789.6	785.9	3.7	1.0174	1.0181
calibrator zero	5500	0.0	0.0	0.0	0.0	0.3	0.3	0.0	----	----
high point	5500	86.8	803.3	800.1	3.2	802.9	798.4	4.5	1.0005	1.0021
second point	5500	43.4	401.6	400.1	1.6	401.1	398.2	2.9	1.0014	1.0046
third point	5500	21.7	200.8	200.0	0.8	198.6	197.1	1.5	1.0112	1.0149
as left zero	5500	0.0	0.0	0.0	0.0	0.1	0.2	-0.2	----	----
as left span	5500	86.8	803.3	410.3	393.0	820.1	425.0	395.2	0.9795	0.9656
								Average Correction Factor	1.0044	1.0072

Corrcted As found NO_X= 789.4 NO= 785.8 Percent Change NO_X= 1.7% NO= 1.8%

Previous Response NO_X= 803.2 NO= 800.1

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 86.80 ccm NOX ref calc conc = 803.3 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		3.2	804.1	798.0	0.0	0.9990	1.0027	----	----
1st NO2 (300)	410.3	390.8	804.7	410.3	394.1	0.9982	----	0.9916	100.8%
2nd NO2 (200)	555.0	246.1	805.2	555.0	250.1	0.9977	----	0.9840	101.6%
3rd NO2 (100)	699.1	102.0	805.5	699.1	106.4	0.9972	----	0.9589	104.3%
2nd NO ref point	----	3.2	804.8	798.2	6.6	0.9981	1.0024	----	----
				Average Correction Factor		0.9978		0.9782	102.3%

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

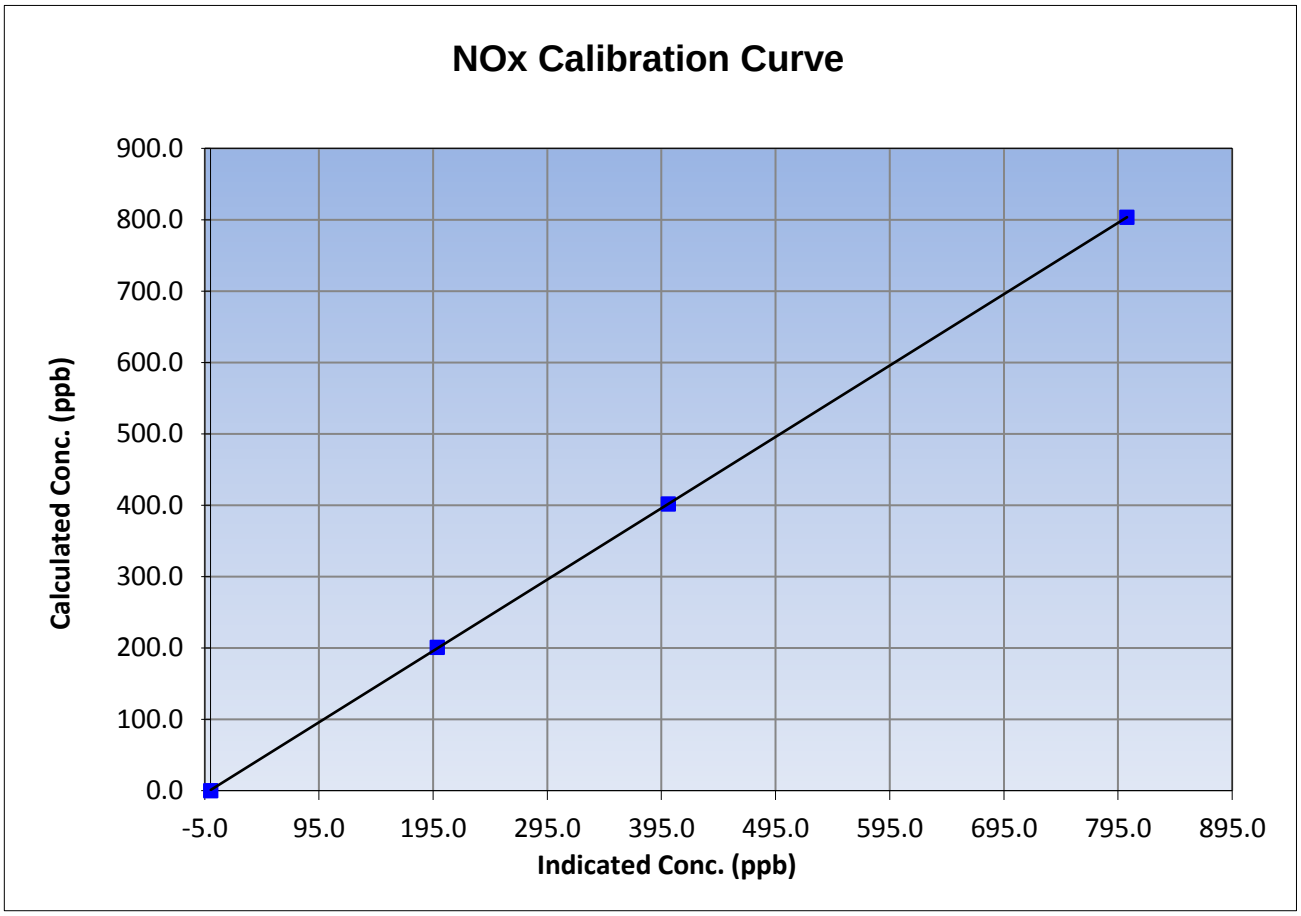
NO_X Calibration Summary

Station Information

Calibration Date	March 8, 2016	Previous Calibration	February 9, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	14:00
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	0.3	----	Correlation Coefficient	0.999990
803.3	802.9	1.0005		
401.6	401.1	1.0014	Slope	0.999882
200.8	198.6	1.0112		
			Intercept	0.775251



Wood Buffalo Environmental Association

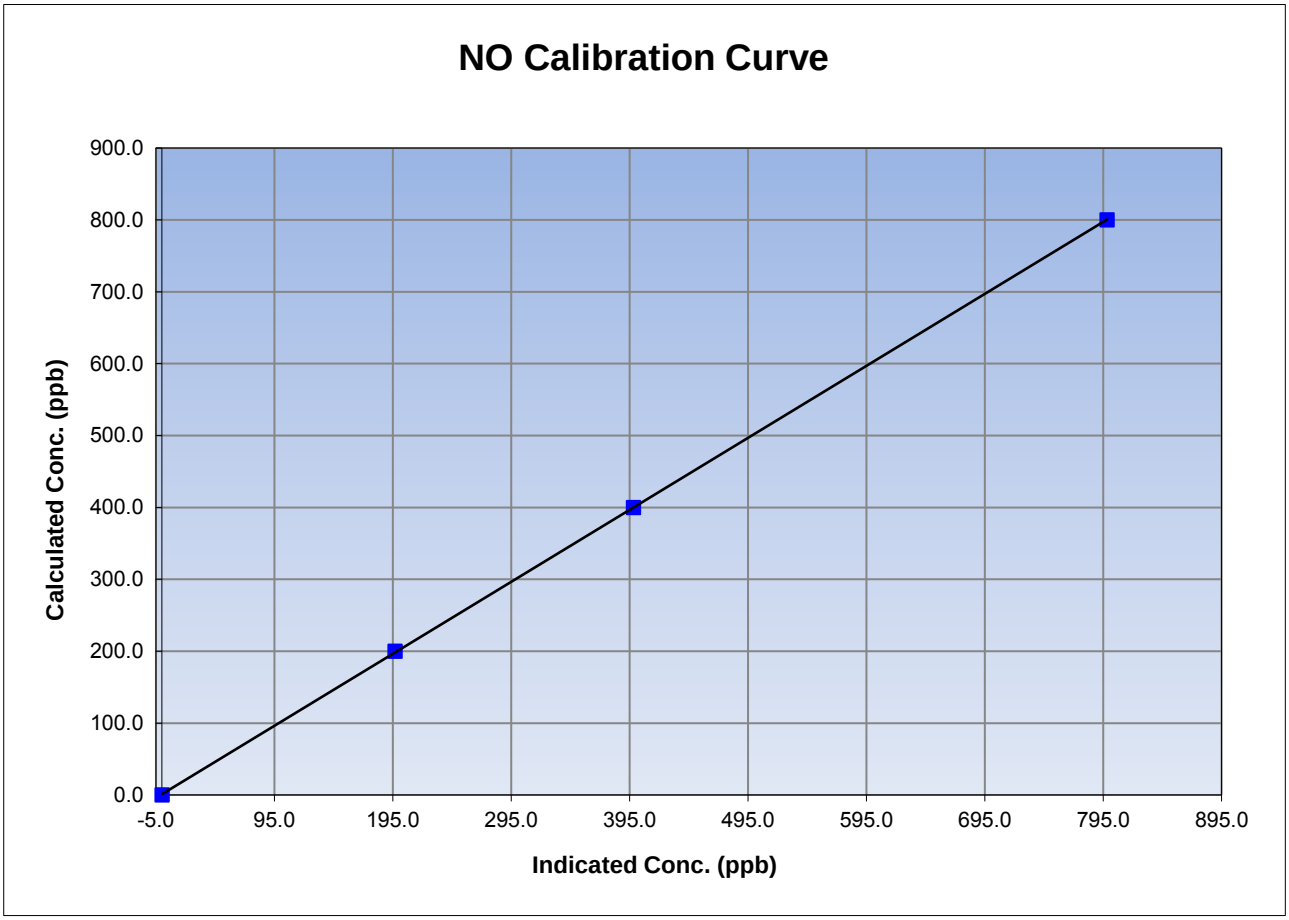
NO Calibration Summary

Station Information

Calibration Date	March 8, 2016	Previous Calibration	February 9, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	14:00
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	0.3	N/A	Correlation Coefficient	0.999987
800.1	798.4	1.0021		
400.1	398.2	1.0046	Slope	1.001481
200.0	197.1	1.0149		
			Intercept	1.034173



Wood Buffalo Environmental Association

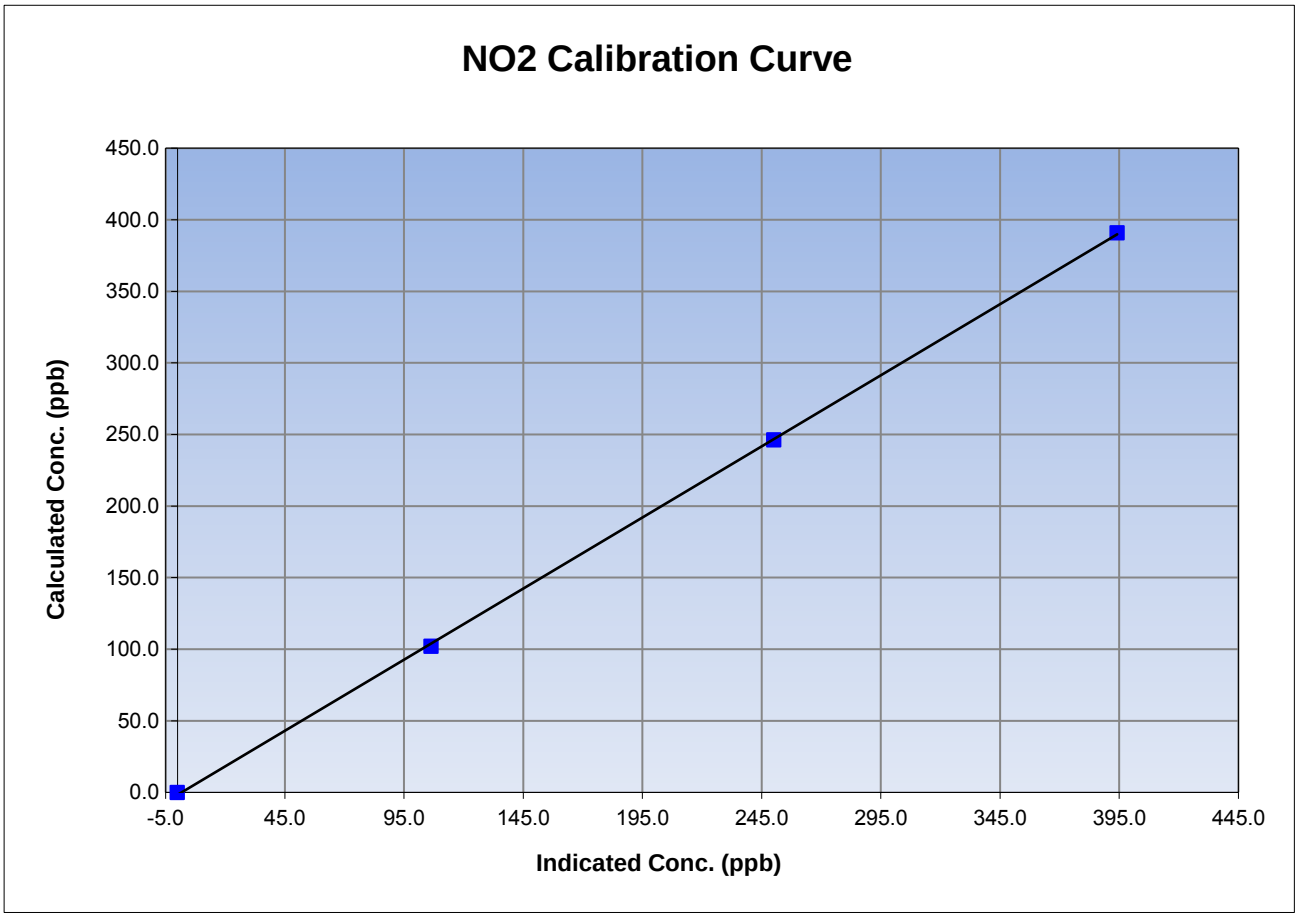
NO_2 Calibration Summary

Station Information

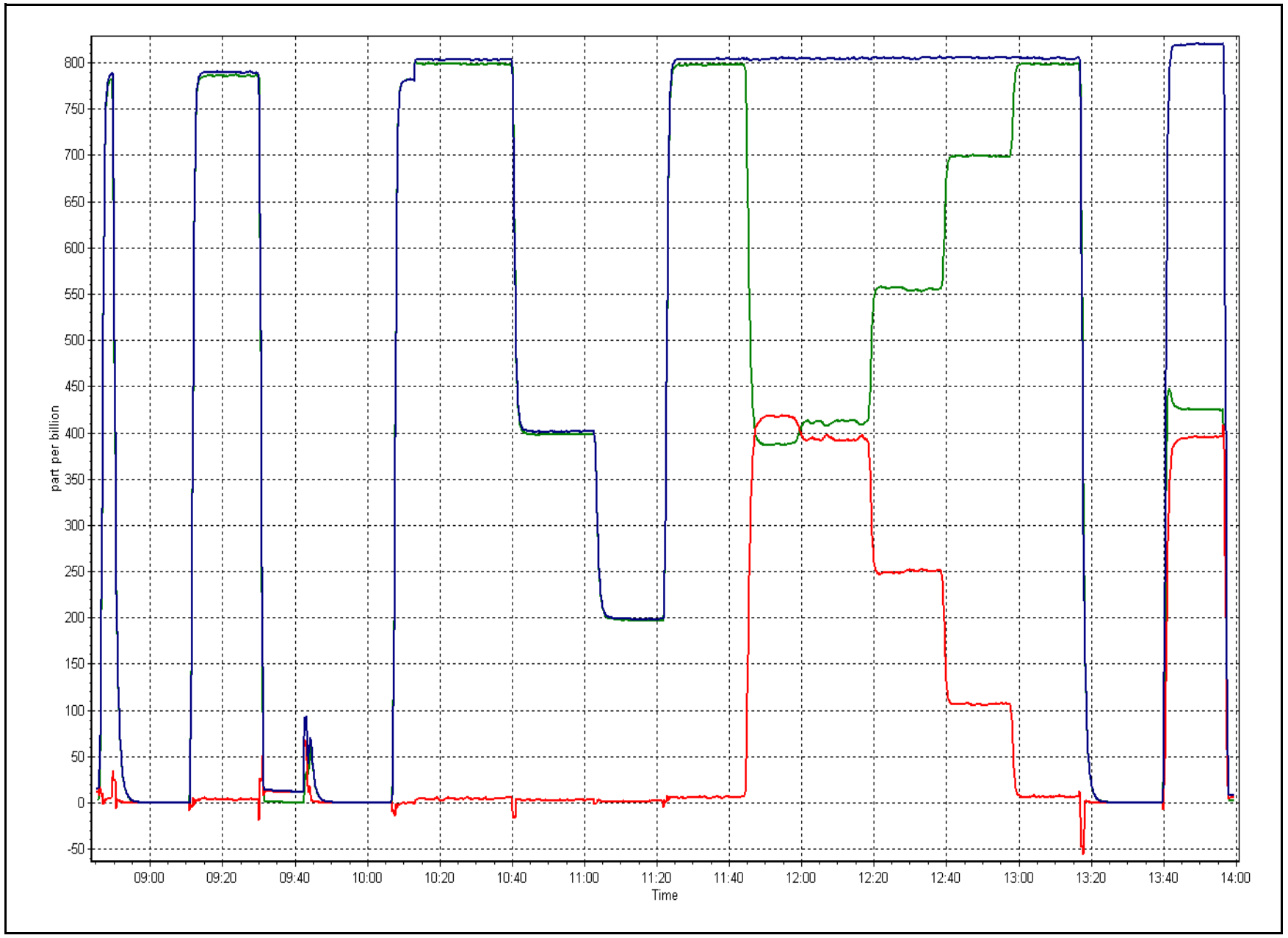
Calibration Date	March 8, 2016	Previous Calibration	February 9, 2016
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	14:00
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999904
390.8	394.1	0.9916		
246.1	250.1	0.9840	Slope	0.993387
102.0	106.4	0.9589		
			Intercept	-1.669127



NOX Calibration Plot Date: March 8, 2016



Wood Buffalo Environmental Association
N_t-NO_X-NH_3 Calibration Report

Station Information

Station Name	Patricia McInnis	Station Number	AMS 6
NOX Calibration Date	March 8, 2016	NOX Previous Cal Date	February 8, 2016
NH3 Calibration Date	March 8, 2016	NH3 Previous Cal Date	February 12, 2016
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	16:15
		Station Temperature	21.0 Deg C
Calibrator	Sabio 4010	Serial Number	14300410
NH3 Cal Gas Conc	75.1 ppm	NH3 Expiry Date / SN	4/Aug/2012 SGAL-3617
NOx Cal Gas Conc	50.9 ppm	NO Expiry Date / SN	18/Sep/2018 EY0000355
NO Cal Gas Conc	50.7 ppm		

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2582

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.998646	0.983286	0.999902	0.995789	0.993557
	Data Offset	-4.372688	-5.649164	3.138092	2.955928	2.449072
Cal Stats After	Data Slope	0.998516	0.982024	1.001191	0.999268	1.004934
	Data Offset	-6.609983	-8.297754	1.945705	2.232742	-0.763294
IP address		192.168.1.17				

Analyzer Information

Analyzer make/model — Analyzer serial #
Converter — Converter serial #

Test Point	before		after	
NH3 Conc range	2500	ppb	2500	ppb
NOX Conc range	1000	ppb	1000	ppb
NO BKG	-0.2	ppb	-0.2	ppb
NOx BKG	-0.2	ppb	-0.2	ppb
Nt BKG	-0.4		-0.4	
NO coefficient	1.002		1.023	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.012		1.046	
NH3 coefficient	0.976		0.968	
Nt coefficient	1.013		1.041	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.7	Deg C	316.3	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	86.0	ccm	85.0	ccm
R Cell Press	6.2	mmHg	6.1	mmHg
PMT Voltage	693.0	v	693.0	v
Sample Flow 1 NO	562.0	ccm	545.0	ccm
Sample Flow 2 Nox	562.0	ccm	545.0	ccm
Sample Flow 3 Nt	575.0	ccm	558.0	ccm

Notes:

Inlet filter changed after as founds. ZAG scrubber changed after as founds. Nox span adjusted, NH3 span adjusted.

Wood Buffalo Environmental Association

NH_3 Calibration Report

Station Information

Calibration Date: March 8, 2016 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 NH3 conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH3 conc (ppb)	Nt Correction factor	NH3 Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.0	-0.7	0.7	----	----
as found NO	5500	86.8	803.3	803.3	----	787.3	784.4	2.8	1.020	----
calibrator zero	5500	0.0	0.0	0.0	0.0	3.4	0.5	2.8	----	----
high NO point	5500	86.8	803.3	803.3	----	799.8	801.8	-2.0	1.004	----
NO/O3 point	5500	86.8	803.3	803.3	----	798.5	799.2	-0.7	1.006	----
as found NH3	3500	93.2	1999.8	NA	1999.8	2010.7	34.0	1976.5	0.995	1.012
first NH3	3500	93.2	1999.8	NA	1999.8	2040.1	34.2	2005.9	0.980	0.997
second NH3	3500	46.6	999.9	NA	999.9	1035.5	20.9	1014.6	0.966	0.986
third NH3	3500	23.3	500.0	NA	500.0	518.5	10.3	508.0	0.964	0.984
								Average Correction Factor	1.0052	0.9889

Nt Corrected As Found	Nt =	787.3	ppb	Previous Response	Nt =	822.6	ppb	Nt percent change	4.5%
NOx Corrected As Found	NOx =	785.1	ppb	Previous Response	NOx =	800.2	ppb	NOx percent change	1.9%
NH3 Previous Converter Efficiency =		97.6	%	NH3 Current Converter Efficiency =		96.8	%	NH3 percent change	-0.8%

Wood Buffalo Environmental Association

$NO_X(NH_3)$ Calibration Report

Station Information

Calibration Date: March 8, 2016 Station Number: AMS 6

NOX / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	-0.7	-0.9	0.0	----	----
as found span	5500	86.8	803.3	800.1	803.3	784.4	785.4	787.3	1.0241	1.0188
calibrator zero	5500	0.0	0.0	0.0	0.0	0.5	0.3	3.4	----	----
high point	5500	86.8	803.3	800.1	803.3	801.8	799.9	799.8	1.0019	1.0004
second point	5500	43.4	401.6	400.1	401.6	397.5	396.5	399.9	1.0105	1.0089
third point	5500	21.7	200.8	200.0	200.8	196.6	195.6	199.3	1.0217	1.0226
								Average Correction Factor	1.0114	1.0106

	Nt	NOX	NO	NO2
Corrected As found	787.3	785.1	786.3	----
Previous Response	822.6	800.2	800.6	----
Percent Change	4.5%	1.9%	1.8%	0.1%

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 86.8 ccm NOX ref calc conc = 803.3 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	----	3.2	799.2	795.2	4.0	1.0052	1.0063	----	----
1st NO2 (300)	398.3	400.0	796.4	398.3	398.1	1.0087	----	1.0048	99.5%
2nd NO2 (200)	551.0	247.3	798.9	551.0	247.9	1.0055	----	0.9975	100.2%
3rd NO2 (100)	692.6	105.7	798.8	692.6	106.2	1.0057	----	0.9957	100.4%
2nd NO ref point	----	3.2	797.5	793.0	4.6	1.0073	1.0091	----	----
				Average Correction Factor		1.0068	1.0077	0.9994	100.1%

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

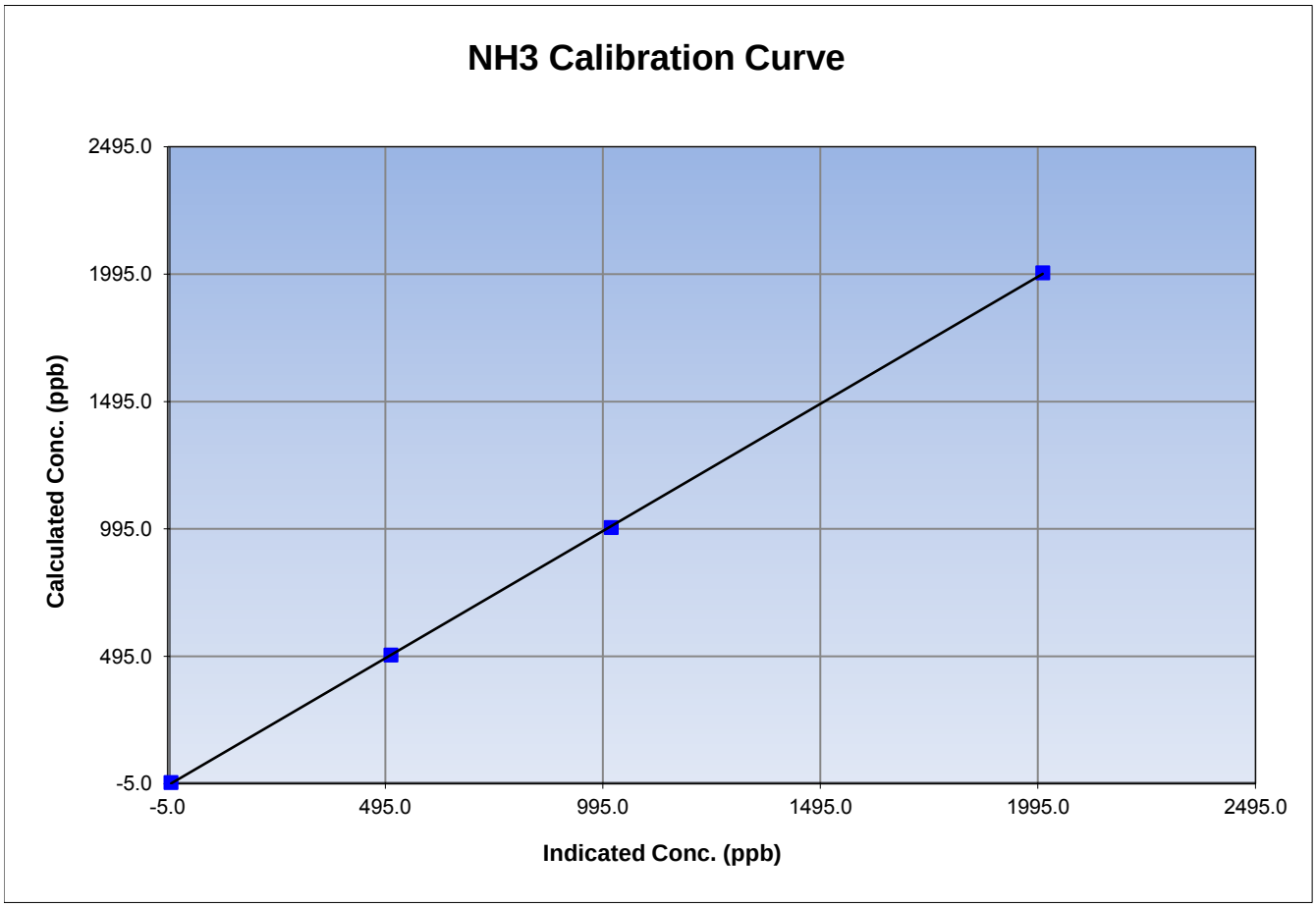
NH3 Calibration Summary

Station Information

Calibration Date	March 8, 2016	Previous Calibration	February 8, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	16:15
Analyzer make		Analyzer serial #	

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	2.8	----	Correlation Coefficient	0.999968
1999.8	2005.9	0.9970		
999.9	1014.6	0.9855	Slope	0.998516
500.0	508.0	0.9841		
			Intercept	-6.609983



Wood Buffalo Environmental Association

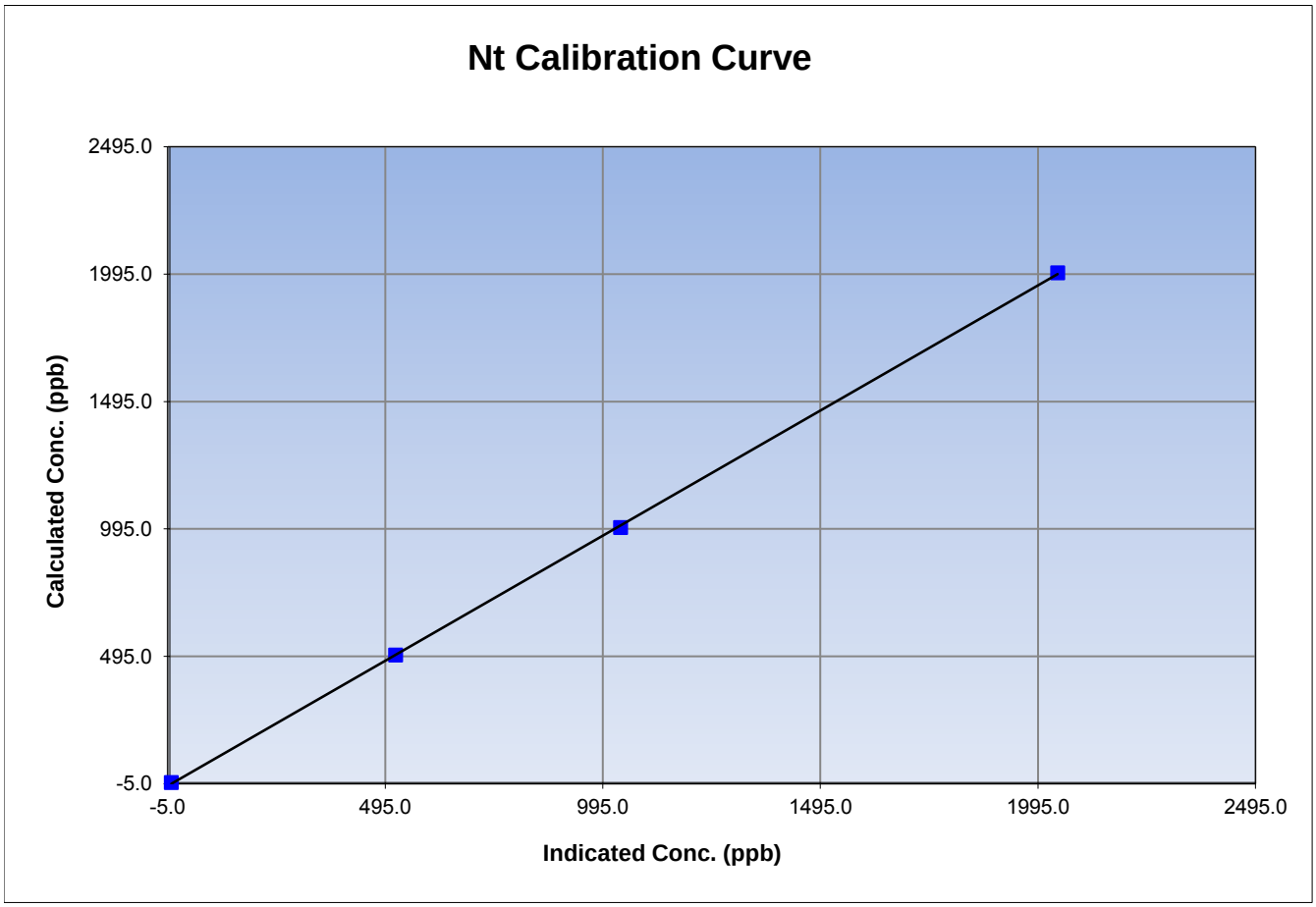
Nt Calibration Summary

Station Information

Calibration Date	March 8, 2016	Previous Calibration	February 8, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	16:15
Analyzer make		Analyzer serial #	

Nt (NH_3) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	3.4	----	Correlation Coefficient	0.999943
1999.8	2040.1	0.9802		
999.9	1035.5	0.9656	Slope	0.982024
500.0	518.5	0.9642		
			Intercept	-8.297754



Wood Buffalo Environmental Association

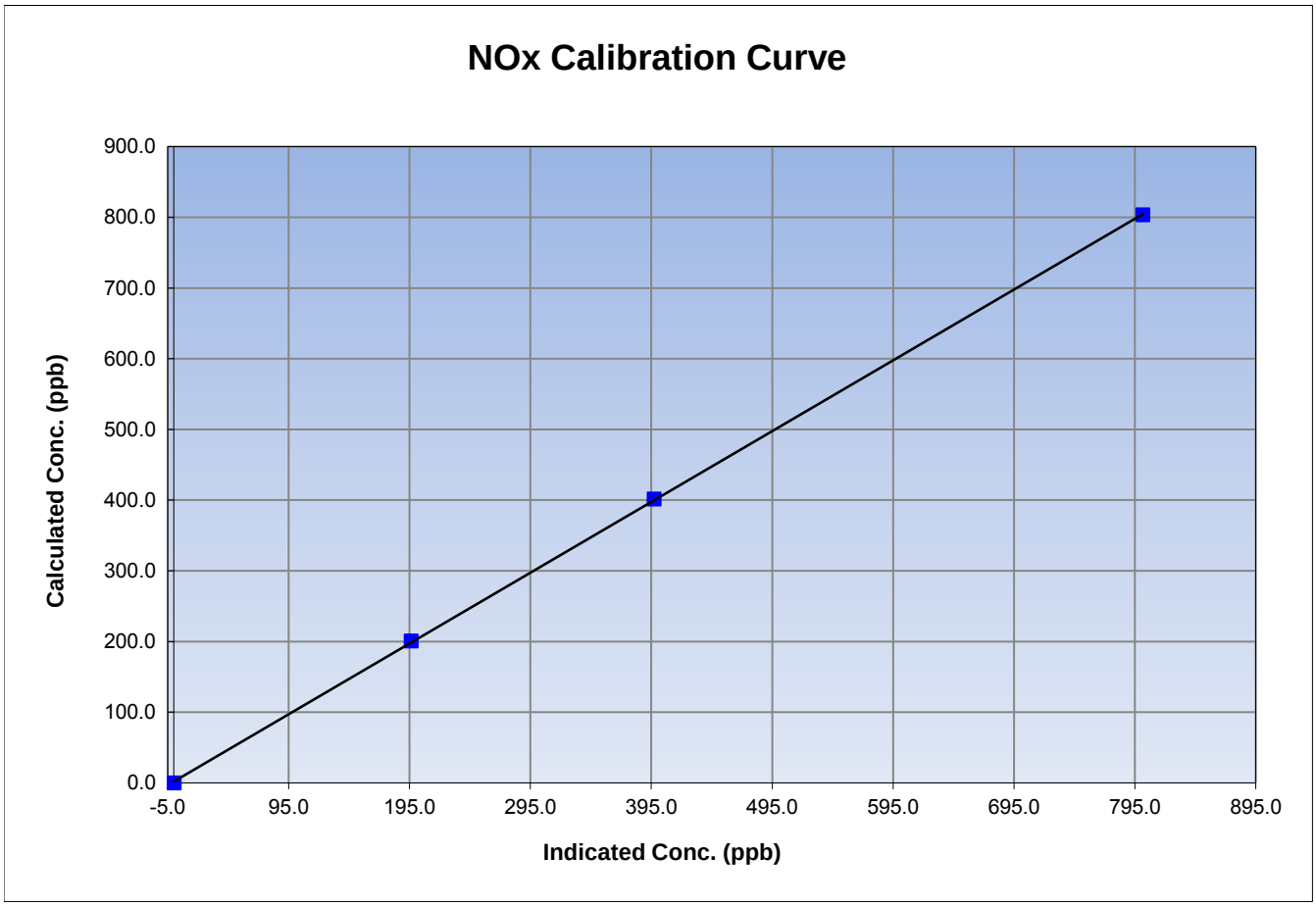
NOx Calibration Summary

Station Information

Calibration Date	March 8, 2016	Previous Calibration	February 8, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	16:15
Analyzer make		Analyzer serial #	

NO_X Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999956
803.3	801.8	1.0019		
401.6	397.5	1.0105	Slope	1.001191
200.8	196.6	1.0217		
			Intercept	1.945705



Wood Buffalo Environmental Association

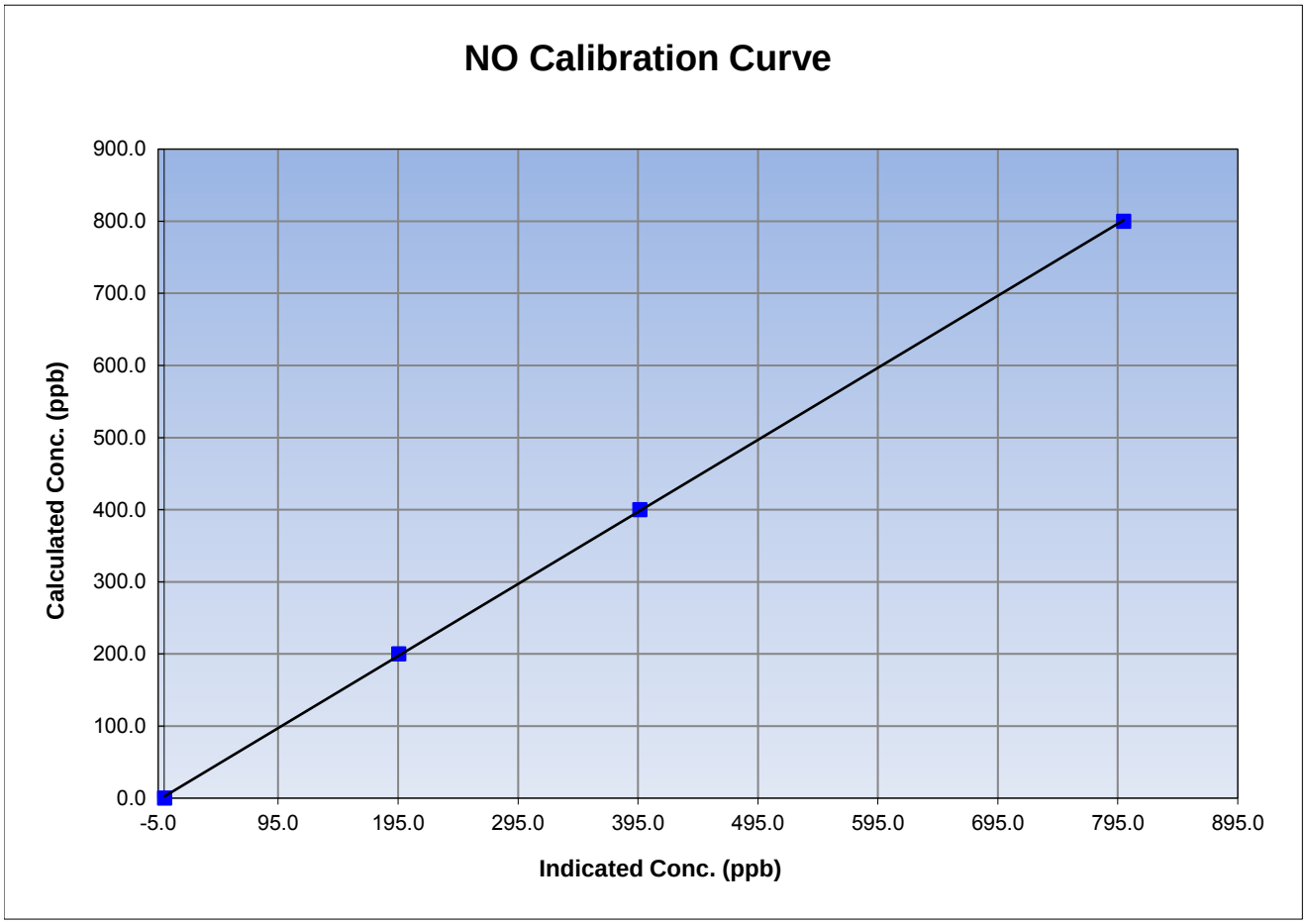
NO Calibration Summary

Station Information

Calibration Date	March 8, 2016	Previous Calibration	February 8, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	16:15
Analyzer make		Analyzer serial #	

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999953
800.1	799.9	1.0004		
400.1	396.5	1.0089	Slope	0.999268
200.0	195.6	1.0226		
			Intercept	2.232742



Wood Buffalo Environmental Association

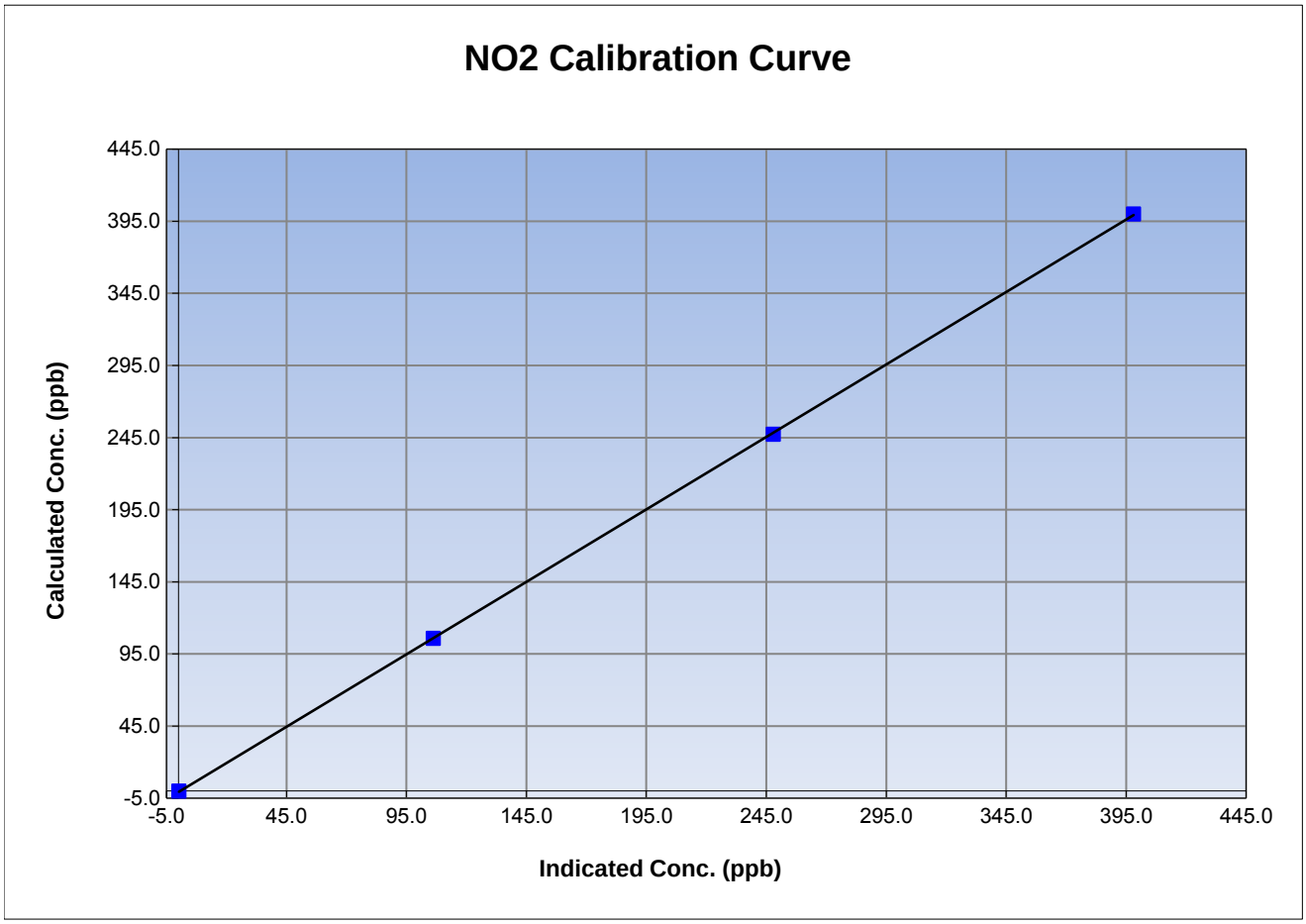
NO_2 Calibration Summary

Station Information

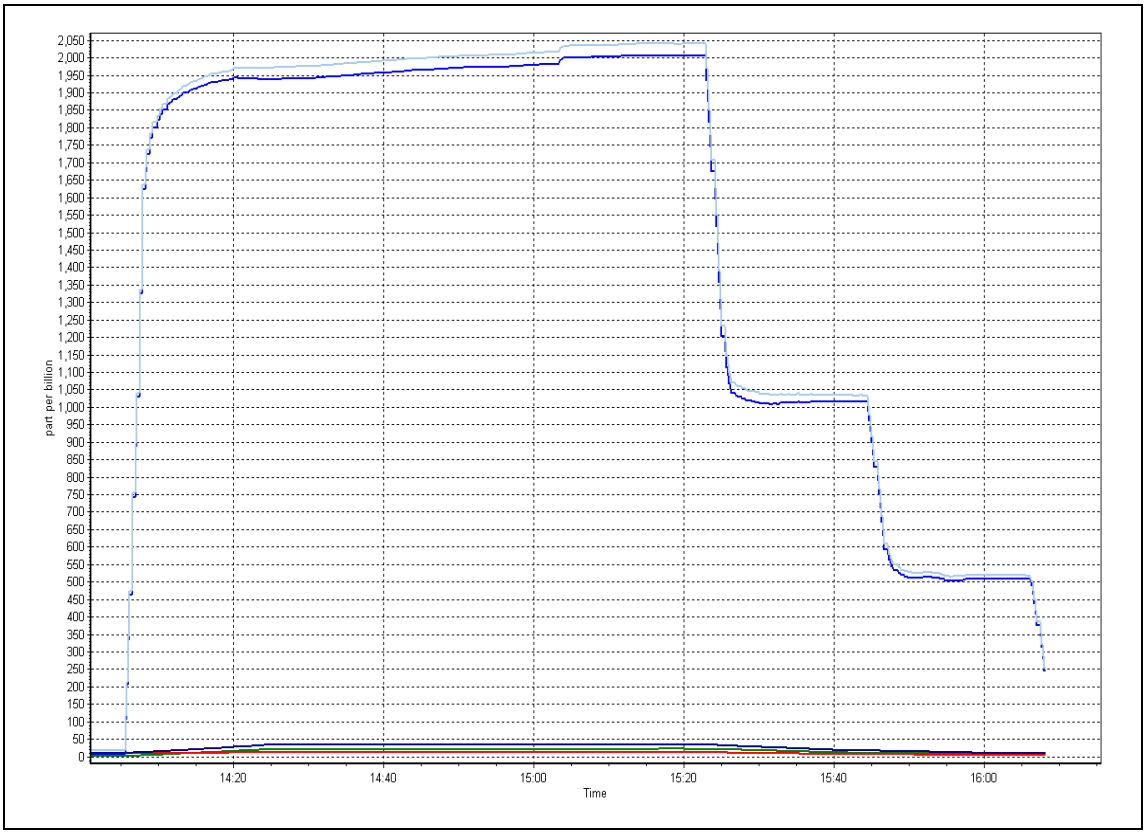
Calibration Date	March 8, 2016	Previous Calibration	February 8, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	16:15
Analyzer make		Analyzer serial #	

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999977
400.0	398.1	1.0048		
247.3	247.9	0.9975	Slope	1.004934
105.7	106.2	0.9957		
			Intercept	-0.763294



NH_3 Calibration Plot Date: March 8, 2016



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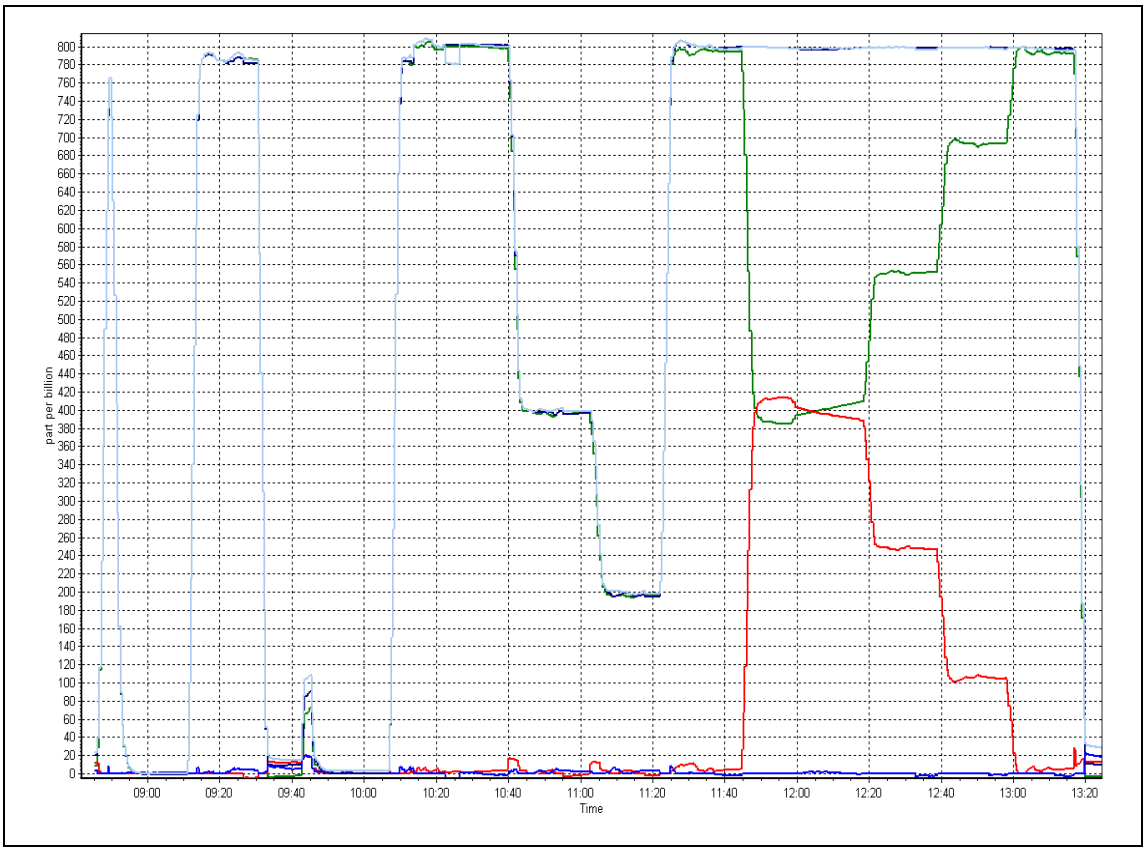


Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	March 9, 2016	Previous Calibration:	February 12, 2016
Station Name:	Patricia McInnis	Station Number:	AMS 6
Start Time (MST):	9:49	End Time (MST):	12:16
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	141228

SHARP INFORMATION

Particulate Fraction:	PM2.5										
Make/Model:	Thermo / SHARP 5030										
Serial Number											
C_{14} Source SN:											
Confirmation of Time settings:							Yes ☑		No ☐		
Paremeters Checked:	T1 ☑	T2 ☐	T3 ☐	T4 ☐	P3 ☑	Main Flow ☑	Beta ☐	Neph ☑			

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-6.0	-5.8	0.2	-6.0
T2	17.0	na	na	16.0
T3	20.0	na	na	20.0
T4	10.0	na	na	8.0
RH (%)	21.0	na	na	14.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	967	961.7	-5.4	967

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1004	4	1004	1000

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	206		206
Neph	1.3		0.1
C14	-1.7		-0.2
Indicated Concentration (ug/m3)	**0.6**	**yes**	**0**
Offset 1	204.1		205.3
Offset 2	32.5		32.7

Leak Check (Quarterly)

Leak Check Date:		Previous Leak Check Date:	February 12, 2016
	Measured	**Difference LPM (Limit +/- 0.42 LPM)**	
Flow without adaptor (LPM):		0.00	
*Flow with adaptor (LPM):			

**Note - do not attach adaptor without shutting off the pump first*

Mass Foil Calibration (Annualy)

Foil Calibration Date:		Previous Foil Calibration:	May 20, 2015
Zeroed?:			
Foil Mass:		**Mass foil set S/N:**	
Previous Correction Factor:			
New Correction Factor:			

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Cyclone head cleaned. Filter tape is good, just under half the roll remaining.

Calibration Performed By: **Devin Russell**

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 7
ATHABASCA VALLEY
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
MARCH 2016

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	700	36	44	98.92	35	0	8	0
TRS (ppb) Average	703	34	41	99.06	4	0	1	0
THC (ppm) Average	695	36	49	98.25	2.6	-	2.1	-
NMHC (ppm) Average	695	36	49	98.25	0.301	-	0.106	-
CH4(ppm) Average	695	36	49	98.25	2.4	-	2	-
O3 (ppb) Average	702	34	42	98.92	45	0	38	-
NO2 (ppb) Average	700	36	44	98.92	37	0	15	-
NO (ppb) Average	700	36	44	98.92	40	-	9	-
NOX (ppb) Average	700	36	44	98.92	72	-	24	-
PM2.5 (ug/m3) Average	730	1	14	98.25	22.6	-	10.9	0
CO(ppm) Average	705	34	39	99.33	0.4	0	0.1	-
Temperature 2 m (C) Average	744	0	0	100.00	13.5	-	4.8	-
Barometric Pressure (inHg) Average	744	0	0	100.00	29.4	-	29.4	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	87	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	28	-	17	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	700	1.5	3	-	0	0	0	0	1	4	35
TRS (ppb) Average	703	0.4	0	-	0	0	0	0	0	1	4
THC (ppm) Average	695	1.96	0.1	-	1.9	1.9	1.9	1.9	2	2.1	2.6
NMHC (ppm) Average	695	0.016	0.047	-	0	0	0	0	0	0.1	0.301
CH4(ppm) Average	695	1.95	0.1	-	1.9	1.9	1.9	1.9	2	2.1	2.4
O3 (ppb) Average	702	24.5	10	-	0	9	18	25	33	37	45
NO2 (ppb) Average	700	8.5	6	-	0	2	4	7	11	18	37
NO (ppb) Average	700	2.5	4	-	0	0	0	1	3	7	40
NOX (ppb) Average	700	10.9	10	-	0	2	5	8	13	23	72
PM2.5 (ug/m3) Average	730	4.23	3.4	-	0.1	1.1	1.7	3.3	5.8	9	22.6
CO(ppm) Average	705	0.09	0	-	0	0.1	0.1	0.1	0.1	0.1	0.4
Temperature 2 m (C) Average	744	-3.01	5.3	-	-18	-9.2	-6.8	-3.5	0.1	3.4	13.5
Barometric Pressure (inHg) Average	744	28.92	0.2	-	28.3	28.6	28.8	28.9	29.1	29.2	29.4
Relative Humidity (%) Average	744	70.8	17	-	27	44	60	74	85	90	97
Wind Speed 10 m (km/h) Average	744	8.4	5	-	0	2	4	8	12	16	28
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL AIR QUALITY ANALYZERS	02 Mar 2016 10:00	02 Mar 2016 11:00	2	Station power failure
ALL AIR QUALITY ANALYZERS	06 Mar 2016 13:00	06 Mar 2016 14:00	2	Station power failure
SO2, NO2, THC	06 Mar 2016 15:00	06 Mar 2016 15:00	1	Maintenance - verify daily QA response
TRS, O3	06 Mar 2016 16:00	06 Mar 2016 16:00	1	Maintenance - verify daily QA response
CO	06 Mar 2016 17:00	06 Mar 2016 17:00	1	Maintenance - verify daily QA response
SO2, NO2	09 Mar 2016 11:00	09 Mar 2016 13:00	3	Maintenance - verify daily QA response
TRS	09 Mar 2016 11:00	09 Mar 2016 11:00	1	Maintenance - verify daily QA response
TRS	09 Mar 2016 13:00	09 Mar 2016 13:00	1	Maintenance - verify daily QA response
THC	09 Mar 2016 07:00	09 Mar 2016 08:00	2	Maintenance - verify daily QA response
THC	09 Mar 2016 11:00	09 Mar 2016 14:00	4	Maintenance - verify daily QA response
O3	09 Mar 2016 11:00	09 Mar 2016 11:00	1	Maintenance - verify daily QA response
O3	09 Mar 2016 13:00	09 Mar 2016 14:00	2	Maintenance - verify daily QA response
THC	14 Mar 2016 12:00	14 Mar 2016 13:00	2	Maintenance - replaced carrier gas and fuel cylinders
PM2.5	27 Mar 2016 17:00	27 Mar 2016 18:00	2	Unstable operation - excessive baseline drift
PM2.5	28 Mar 2016 14:00	28 Mar 2016 18:00	5	Unstable operation - excessive baseline drift
PM2.5	29 Mar 2016 15:00	29 Mar 2016 15:00	1	Unstable operation - excessive baseline drift
PM2.5	30 Mar 2016 17:00	30 Mar 2016 17:00	1	Unstable operation - excessive baseline drift

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Athabasca Valley - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 35 ppb on Mar 15 17:00 Maximum Daily Average: 7.7 ppb on Mar 15

Minimum Value: 0 ppb on Mar 29 03:00 Minimum Daily Average: 0.1 ppb on Mar 21
Maximum Diurnal Average: 3.5 ppb at hour 12 Minimum Diurnal Average: 0.5 ppb at hour 8
Monthly Average: 1.5 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 4$ $P_{99} = 16$

Hours in Service:	744
Hours of Data:	700
Hours of Missing Data:	44
Hours of Calibration:	36
Percent Operational Time:	98.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	2	3	3	1	1	0	0	0.7	3
2-Mar	0	Z	0	0	0	0	0	0	0	PF	PF	1	1	1	3	4	7	5	4	5	5	3	4	2	2.2	7
3-Mar	2	3	Z	3	3	3	2	2	2	2	1	2	3	8	6	4	1	1	1	1	0	0	1	0	2.3	8
4-Mar	1	0	0	Z	0	0	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0.5	1
5-Mar	0	0	0	0	Z	0	0	0	0	0	0	1	3	6	3	1	1	1	1	1	0	0	0	0	0.9	6
6-Mar	0	0	1	0	0	Z	0	0	0	0	0	0	PF	PF	M	5	3	3	3	2	2	1	0	0	1.2	5
7-Mar	Z	0	0	0	0	0	1	1	2	C	C	C	C	C	0	0	0	0	0	0	0	0	1	3	0.6	3
8-Mar	4	Z	4	2	2	2	2	2	2	2	1	1	1	1	0	0	0	0	1	1	1	2	2	3	1.5	4
9-Mar	2	2	Z	3	4	3	2	1	1	1	M	M	M	3	2	1	1	1	1	0	0	0	0	0	1.4	4
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	0.1	0
11-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	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	Z	0	0	0	0	0	0	0	0	1	4	3	2	2	0	1	2	2	3	1	1	1	3	4	1.3	4
14-Mar	2	Z	3	0	0	1	2	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.6	3
15-Mar	1	2	Z	2	2	2	1	1	2	3	8	8	7	9	20	35	35	28	7	2	0	0	0	3	7.7	35
16-Mar	11	4	7	Z	8	6	7	1	0	5	10	11	2	1	5	1	1	0	3	1	1	1	0	0	3.7	11
17-Mar	0	1	1	1	Z	0	0	0	0	0	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0.5	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	0.2	0
19-Mar	Z	0	0	0	0	0	0	0	0	0	1	4	10	8	7	1	0	1	0	1	0	0	0	0	1.6	10
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	0	0	0	0	0	0	0.2	0
23-Mar	0	0	0	0	Z	0	0	0	1	8	13	6	15	19	5	0	0	0	0	0	0	0	0	0	2.9	19
24-Mar	0	0	0	0	0	Z	0	0	3	3	3	4	2	1	1	3	3	6	3	2	1	1	1	0	1.8	6
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	0.3	0
26-Mar	0	Z	1	0	0	0	0	0	1	1	5	17	9	7	7	7	7	6	4	2	1	1	1	0	3.3	17
27-Mar	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	0	1	1	0	0	0	0	0	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	0	0	0	0	0.2	0
29-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	7	11	8	7	3	1	1	1	0	1.8	11
30-Mar	0	0	0	0	0	Z	0	0	1	1	13	23	14	3	2	2	2	1	0	0	0	0	0	0	2.8	23
31-Mar	Z	0	0	0	0	0	0	0	4	6	9	13	13	12	8	6	4	2	1	1	1	1	1	1	3.8	13
	1.0	0.6	0.8	0.6	0.9	0.8	0.7	0.5	0.8	1.3	2.6	3.5	3.1	2.9	2.5	2.7	2.7	2.3	1.4	0.9	0.7	0.5	0.6	0.6	Diurnal Average	
	11	4	7	3	8	6	7	2	4	8	13	23	15	19	20	35	35	28	7	5	5	3	4	4	Diurnal Maximum	

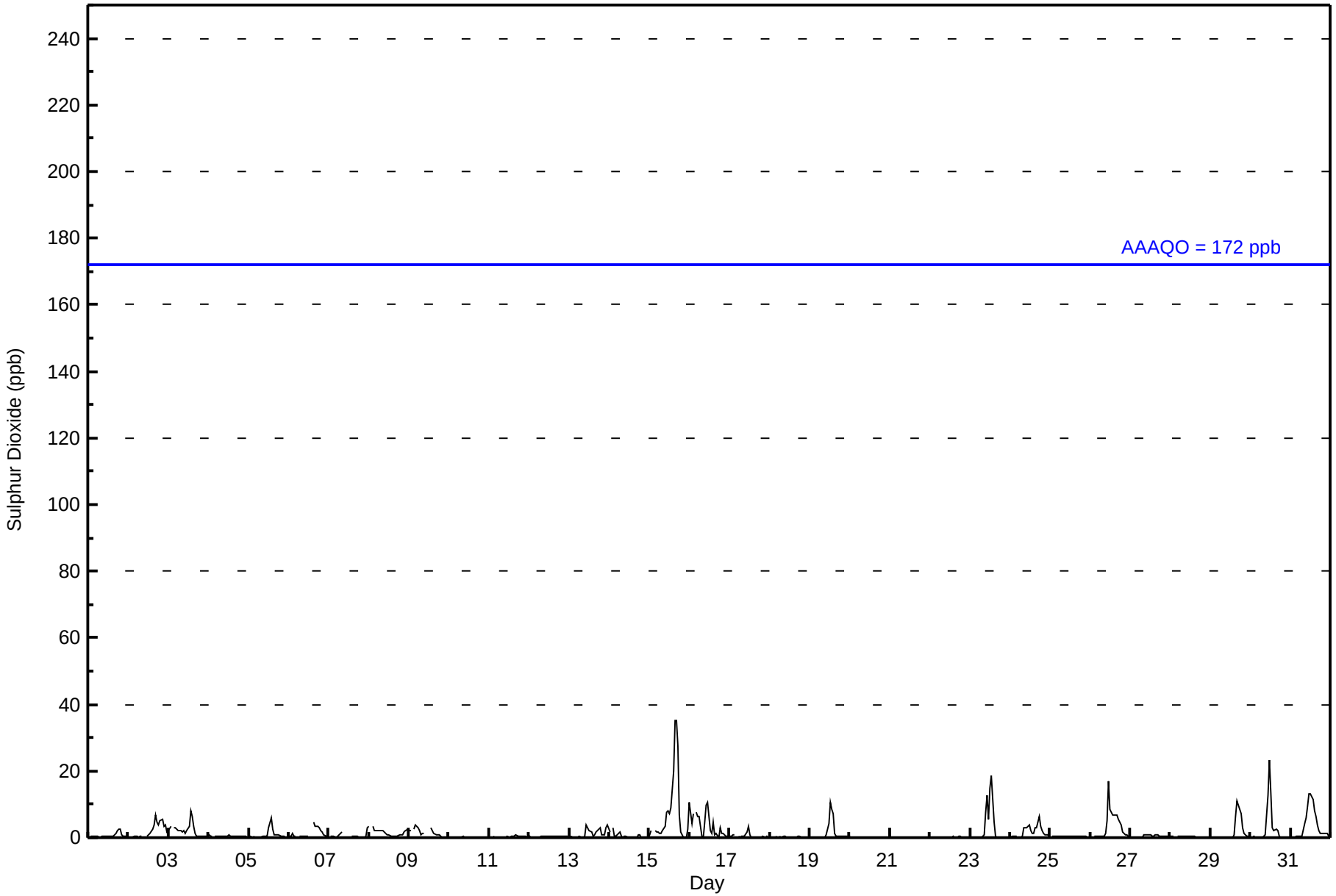
Z - zerospan C - Calibration M - Maintenance PF - Power Failure
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Athabasca Valley - March 2016



Sulphur Dioxide (SO_2) - ppb
Athabasca Valley - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	683	97.57	97.57
11 - 20	13	1.86	99.43
21 - 60	4	0.57	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: 700

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Athabasca Valley - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	95	24	7	20	39	30	118	42	9	11	26	35	16	18	29	164	683
11 - 20	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5	13
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	101	26	7	20	39	30	118	42	9	11	26	35	16	18	30	172	700

Total Number of Valid Hours: 700

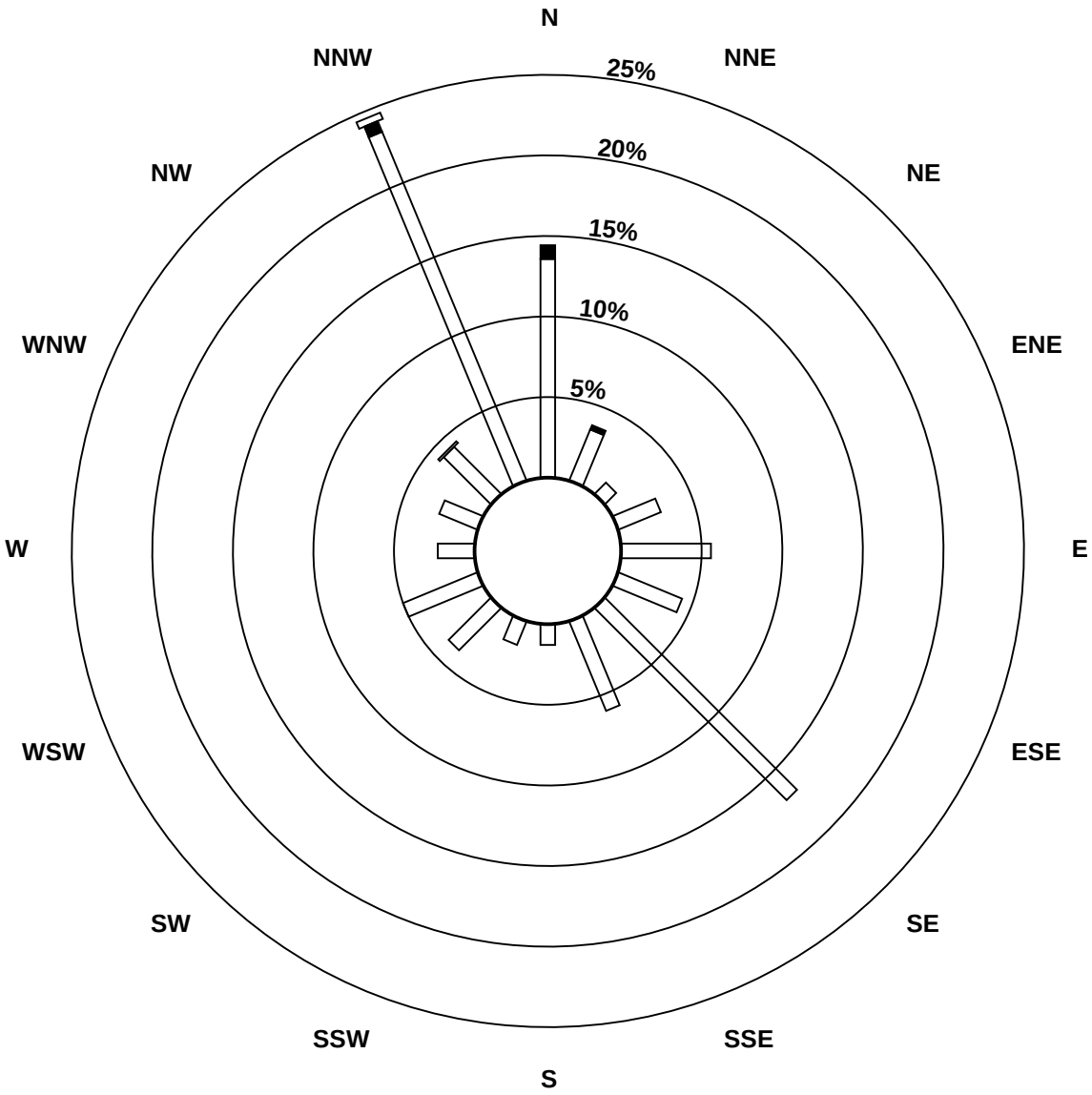
Total Number of Hours: 744

Wood Buffalo Environmental Association

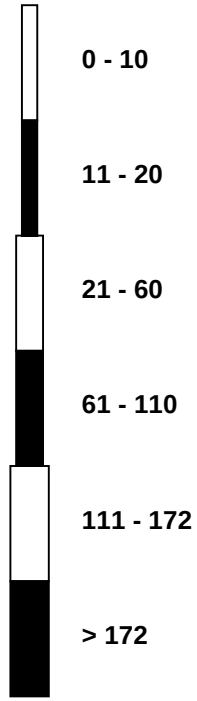
Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Athabasca Valley (AMS 7)



Classes (ppb)



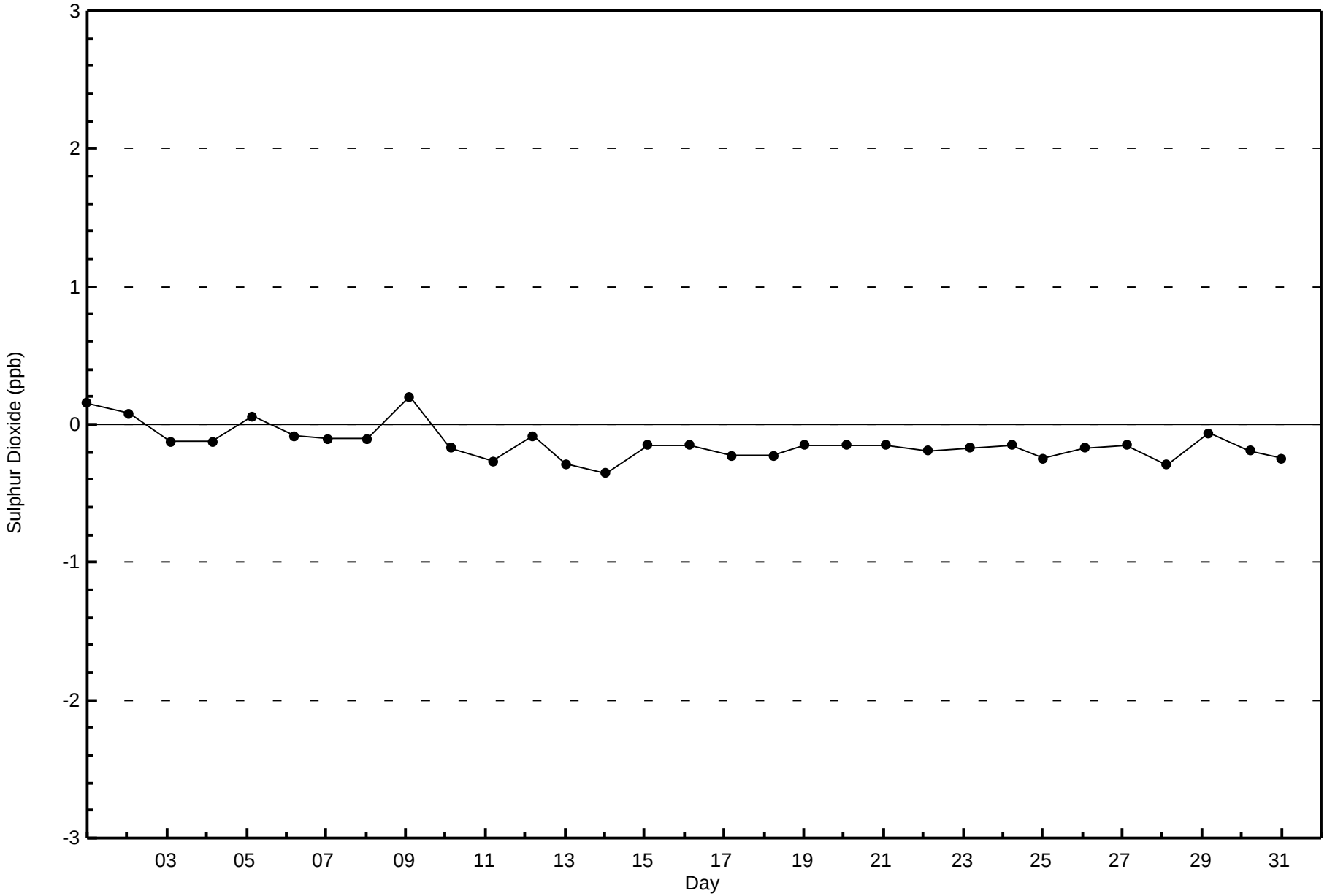
Total Number of Valid Hours: 700

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Athabasca Valley - March 2016

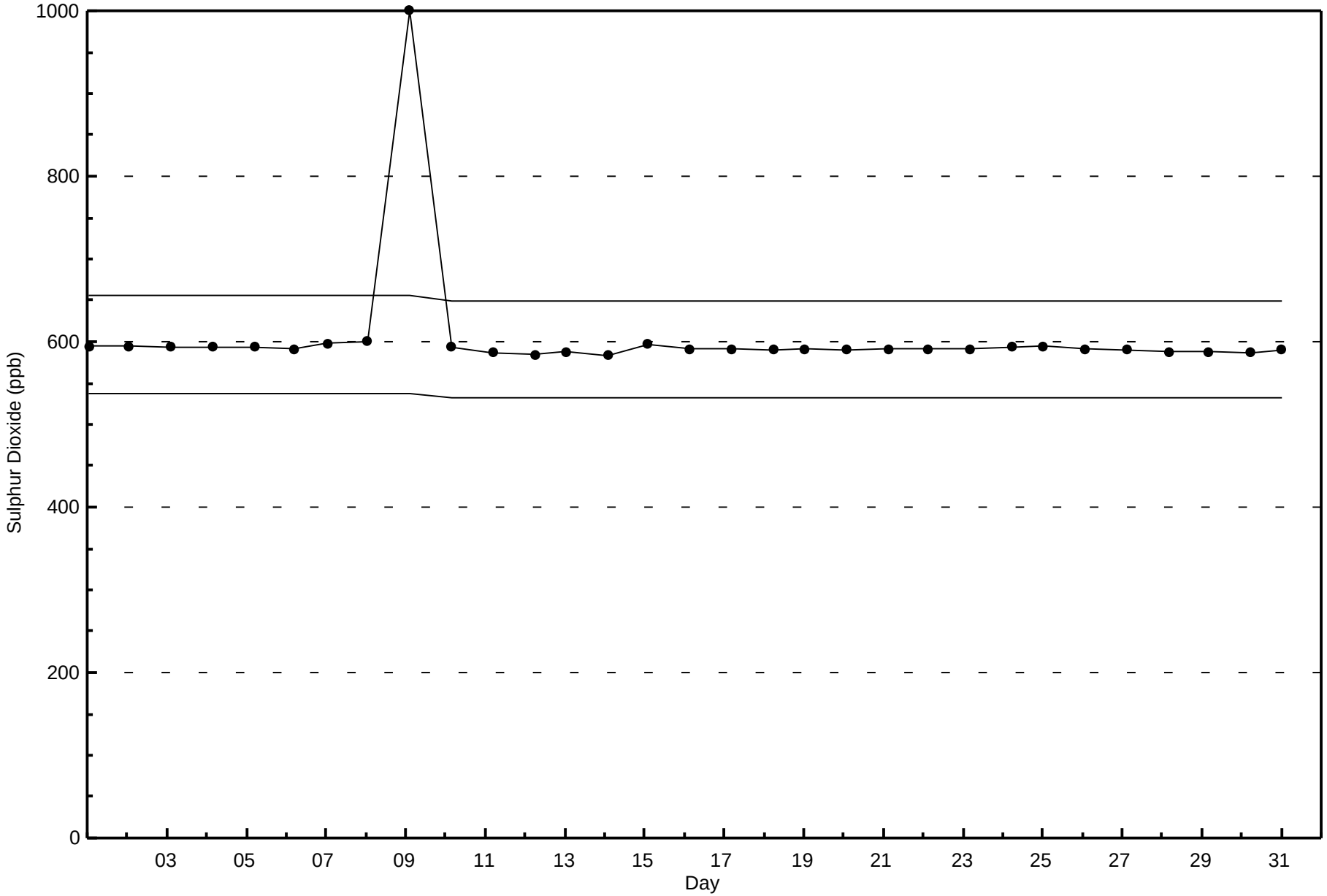


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Athabasca Valley - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Athabasca Valley - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 4 ppb on Mar 15 12:00 Maximum Daily Average: 1.0 ppb on Mar 15

Minimum Value: 0 ppb on Mar 29 12:00 Minimum Daily Average: 0.2 ppb on Mar 21
Maximum Diurnal Average: 0.5 ppb at hour 12 Minimum Diurnal Average: 0.3 ppb at hour 24
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 in Service:	744
Hours of Data:	703
Hours of Missing Data:	41
Hours of Calibration:	34
Percent Operational Time:	99.1

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

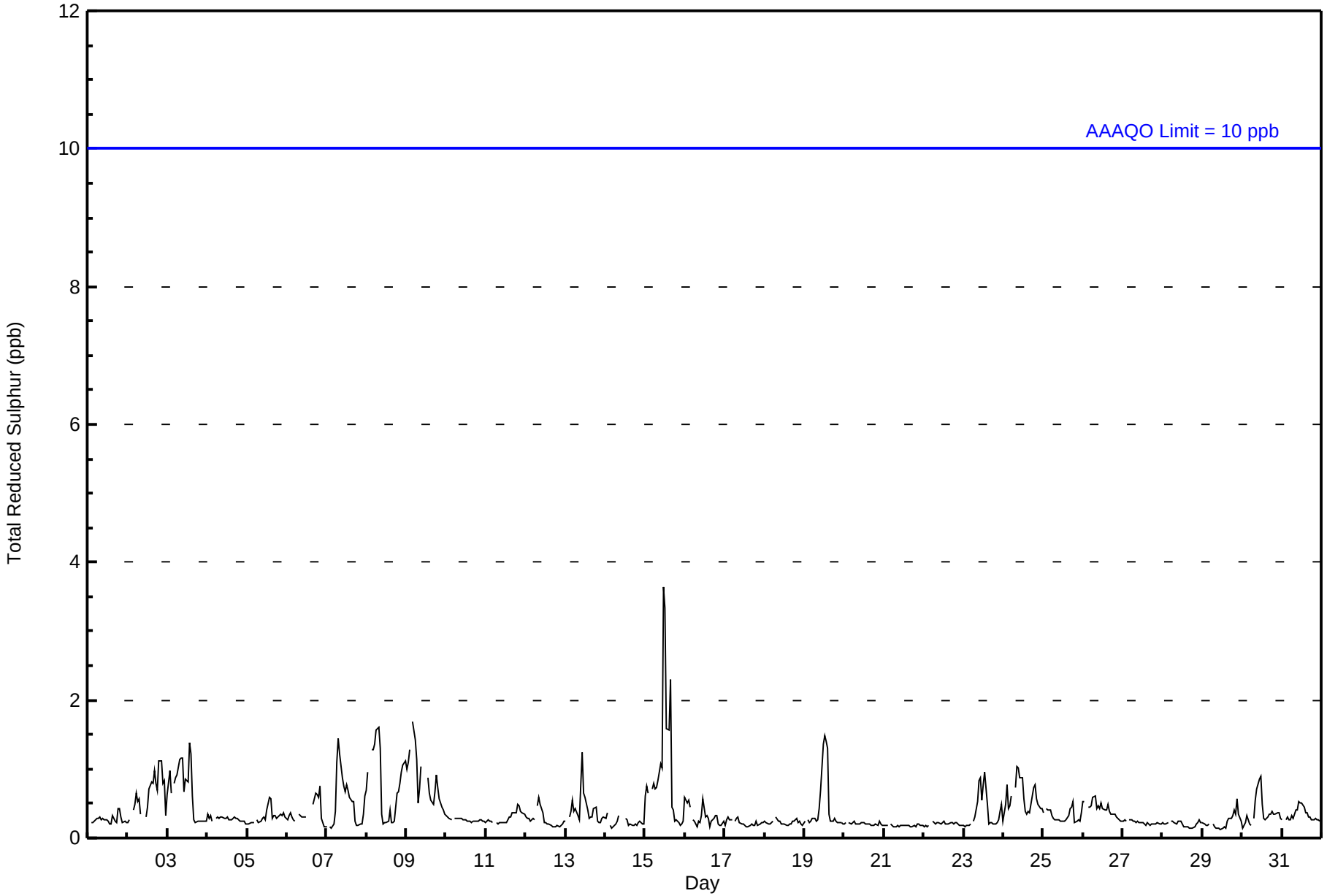
Z - zerospan C - Calibration M - Maintenance PF - Power Failure
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Total Reduced Sulphur (TRS) - ppb

Athabasca Valley - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Athabasca Valley - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	701	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: 703

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Athabasca Valley - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	107	25	7	21	38	30	118	42	9	11	25	34	18	20	29	167	701
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	107	25	7	21	38	30	118	42	9	11	25	34	18	20	29	169	703

Total Number of Valid Hours: 703

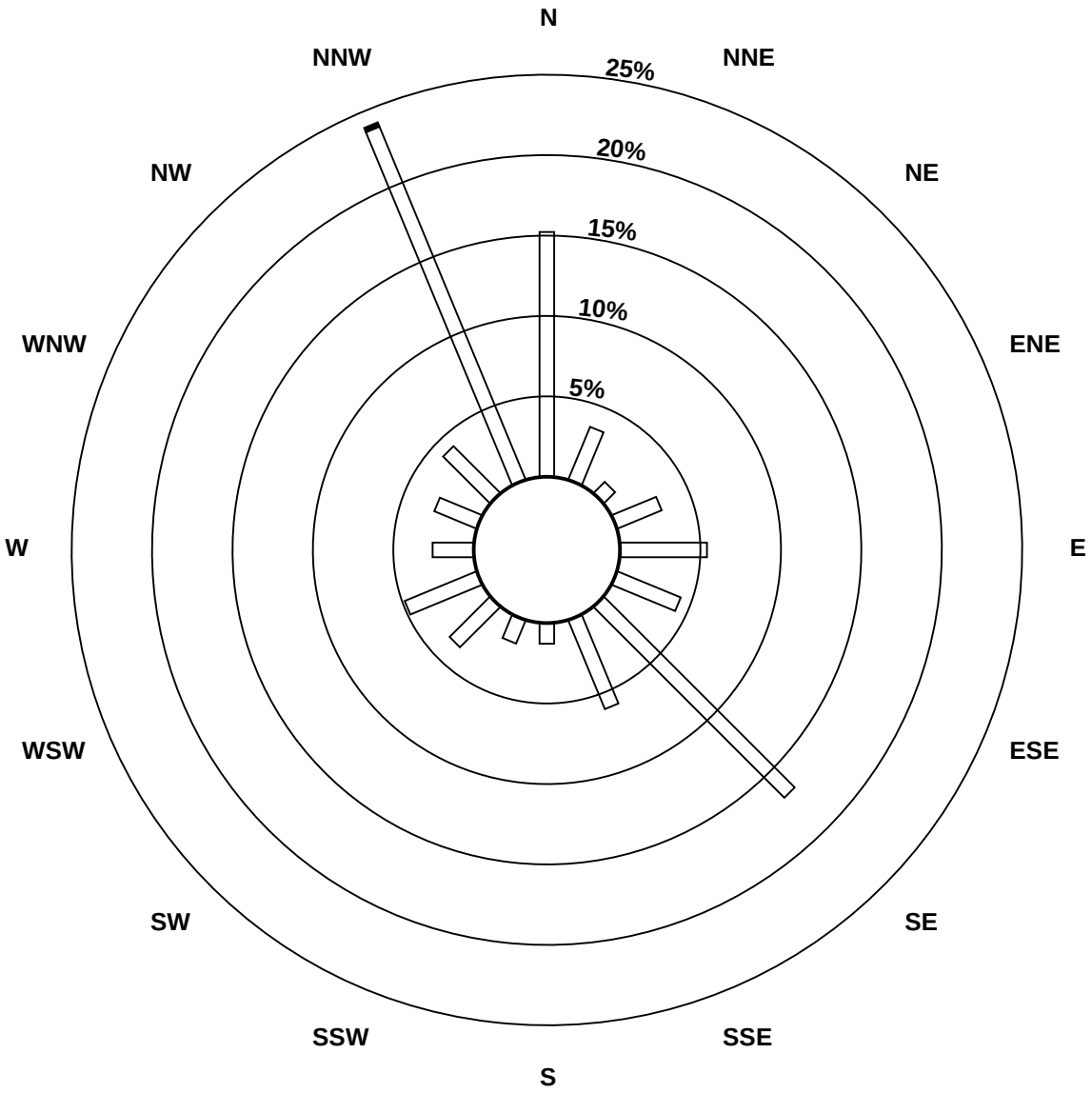
Total Number of Hours: 744

Wood Buffalo Environmental Association

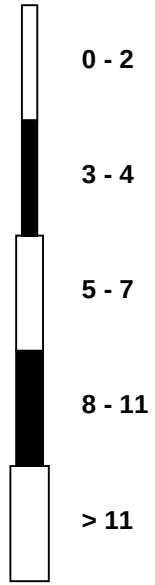
Wind Rose Mar 2016

Total Reduced Sulphur (TRS) - ppb

Athabasca Valley (AMS 7)



Classes (ppb)



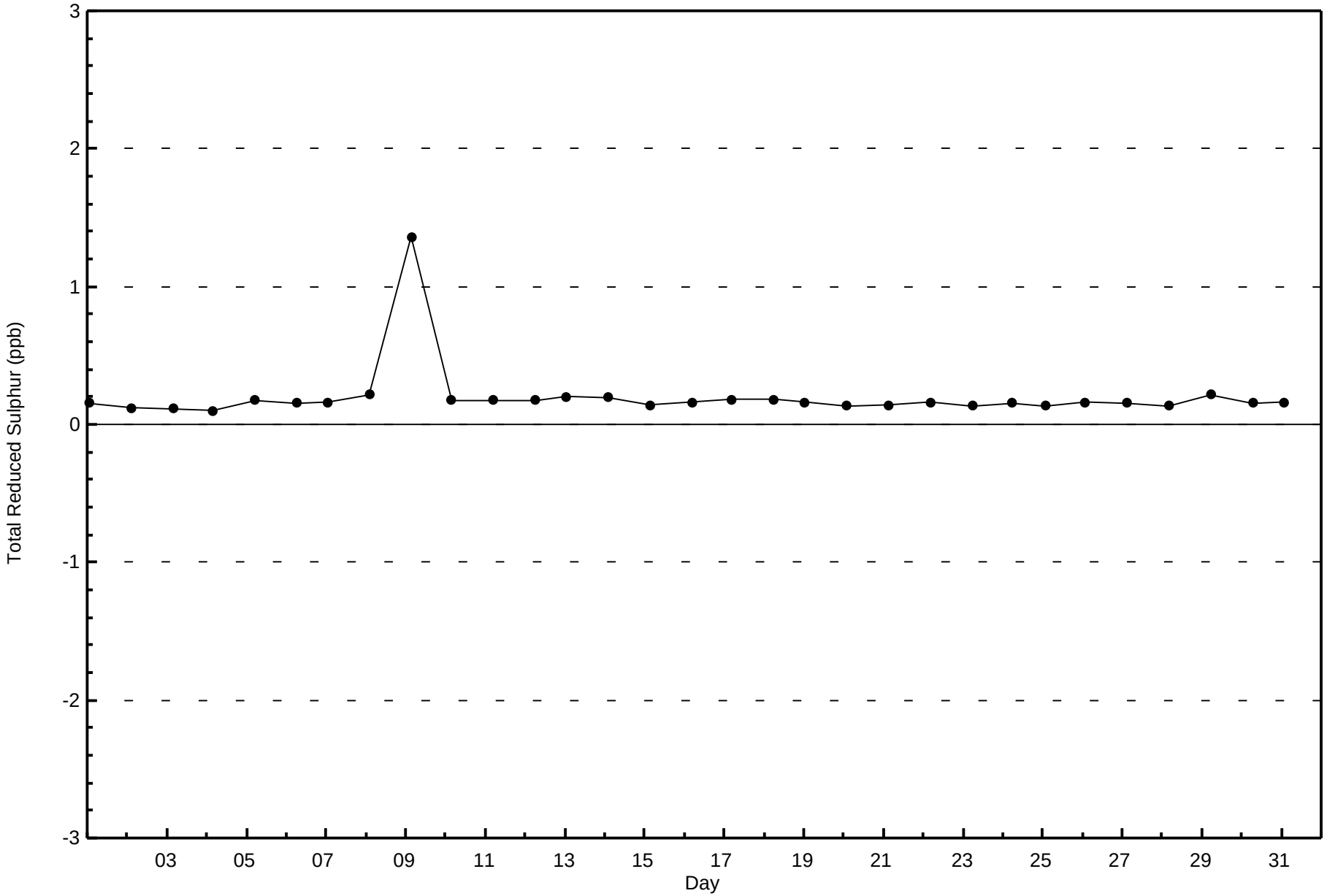
Total Number of Valid Hours: 703

Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

Athabasca Valley - March 2016

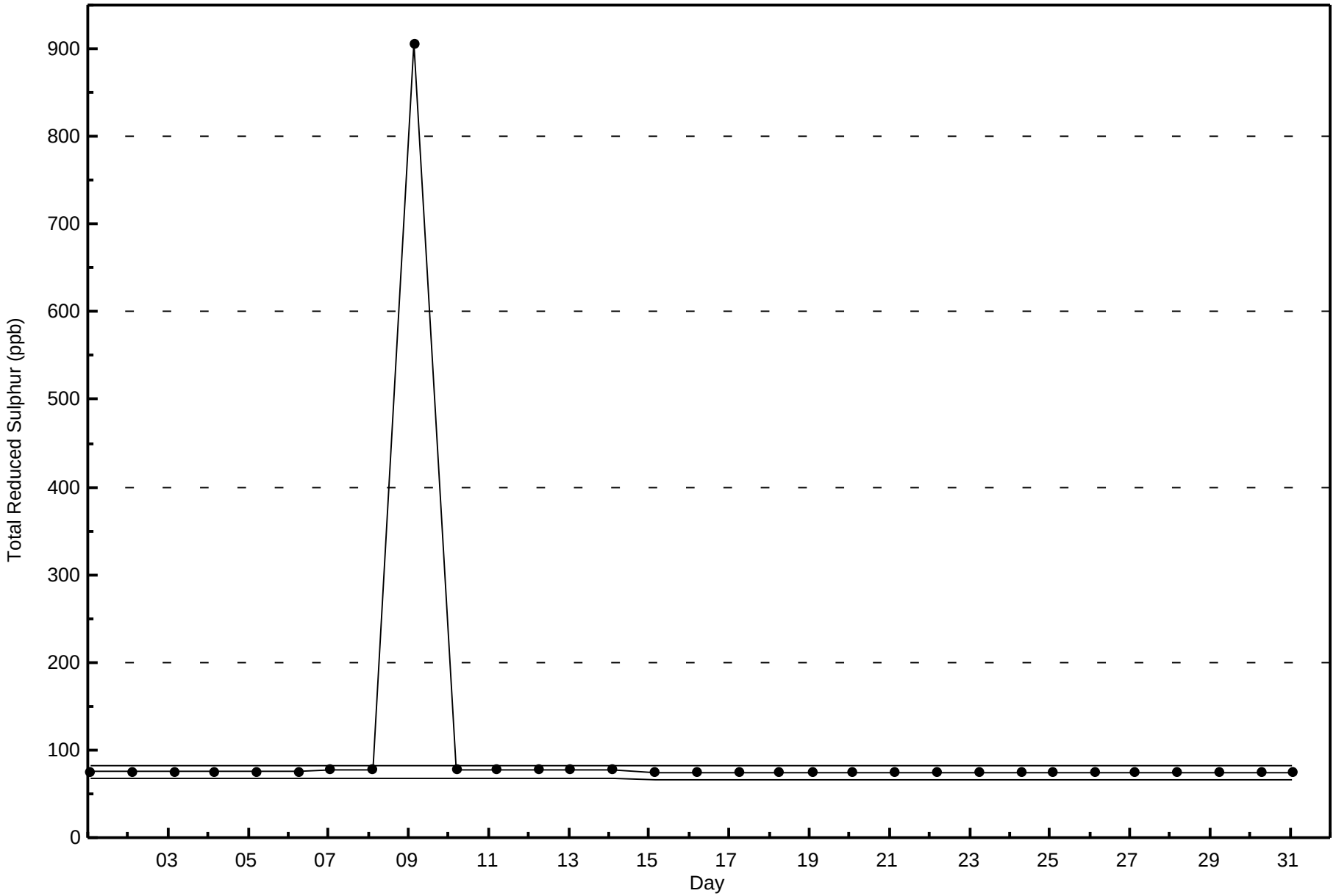


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

Athabasca Valley - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Athabasca Valley - March 2016

Maximum Value: 2.6 ppm on Mar 13 11:00

Maximum Daily Average: 2.1 ppm on Mar 8

Minimum Value: 1.9 ppm on Mar 28 17:00

Minimum Daily Average: 1.9 ppm on Mar 21

Maximum Diurnal Average: 2.0 ppm at hour 9

Minimum Diurnal Average: 1.9 ppm at hour 17

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} = 2.1 P_{99} = 2.4

Hours in Service:	744
Hours of Data:	695
Hours of Missing Data:	49
Hours of Calibration:	36
Percent Operational Time:	98.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	2.0	2.0	2.0	1.9	1.9	2.0	1.9	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	1.9	1.9	1.9	2.0	2.0
2-Mar	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	PF	PF	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.2
3-Mar	2.0	2.0	Z	2.0	2.1	2.2	2.3	2.3	2.4	2.4	2.1	2.3	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.4
4-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
5-Mar	1.9	1.9	2.1	1.9	Z	1.9	1.9	2.0	2.0	2.1	2.3	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	2.3
6-Mar	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	PF	PF	M	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0
7-Mar	Z	1.9	1.9	1.9	1.9	2.0	2.2	2.2	2.2	C	C	C	C	C	2.2	2.1	2.0	1.9	1.9	1.9	1.9	1.9	2.2	2.0	2.0	2.2
8-Mar	2.0	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.1	1.9	1.9	2.2	2.0	1.9	1.9	1.9	1.9	2.0	2.2	2.1	2.4	2.6	2.6	2.6	2.1	2.6
9-Mar	2.5	2.4	Z	2.2	2.2	2.2	M	M	2.0	2.1	M	M	M	M	2.0	2.0	2.0	2.1	2.2	2.1	2.0	2.0	2.0	2.0	--	2.5
10-Mar	2.1	2.1	2.1	Z	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1
11-Mar	1.9	1.9	1.9	2.0	Z	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.0	2.2
12-Mar	2.1	2.1	2.1	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1
13-Mar	Z	2.0	2.1	2.1	2.0	1.9	2.0	2.0	2.1	2.4	2.6	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.6
14-Mar	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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
15-Mar	1.9	2.0	Z	2.0	2.0	2.1	2.1	2.2	2.2	2.1	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.2
16-Mar	1.9	2.0	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
17-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
18-Mar	1.9	1.9	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	2.0	2.0	1.9	2.0	2.0	2.0	1.9	2.0
19-Mar	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.2	2.4	2.4	2.4	2.4	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.4
20-Mar	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
21-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
22-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
23-Mar	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	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	2.0	2.0	1.9	2.1
24-Mar	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.2	2.4	2.3	2.1	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.4
25-Mar	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	2.0	1.9	1.9	1.9	2.0
26-Mar	2.0	Z	2.1	2.1	2.2	2.3	2.3	2.3	2.3	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.3
27-Mar	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	1.9	2.0
28-Mar	1.9	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	2.0	1.9	2.0
29-Mar	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0
30-Mar	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
31-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	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	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	Diurnal Average	
	2.5	2.4	2.1	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.6	2.4	2.4	2.4	2.4	2.2	2.2	2.2	2.2	2.1	2.4	2.6	2.6	2.6	Diurnal Maximum	

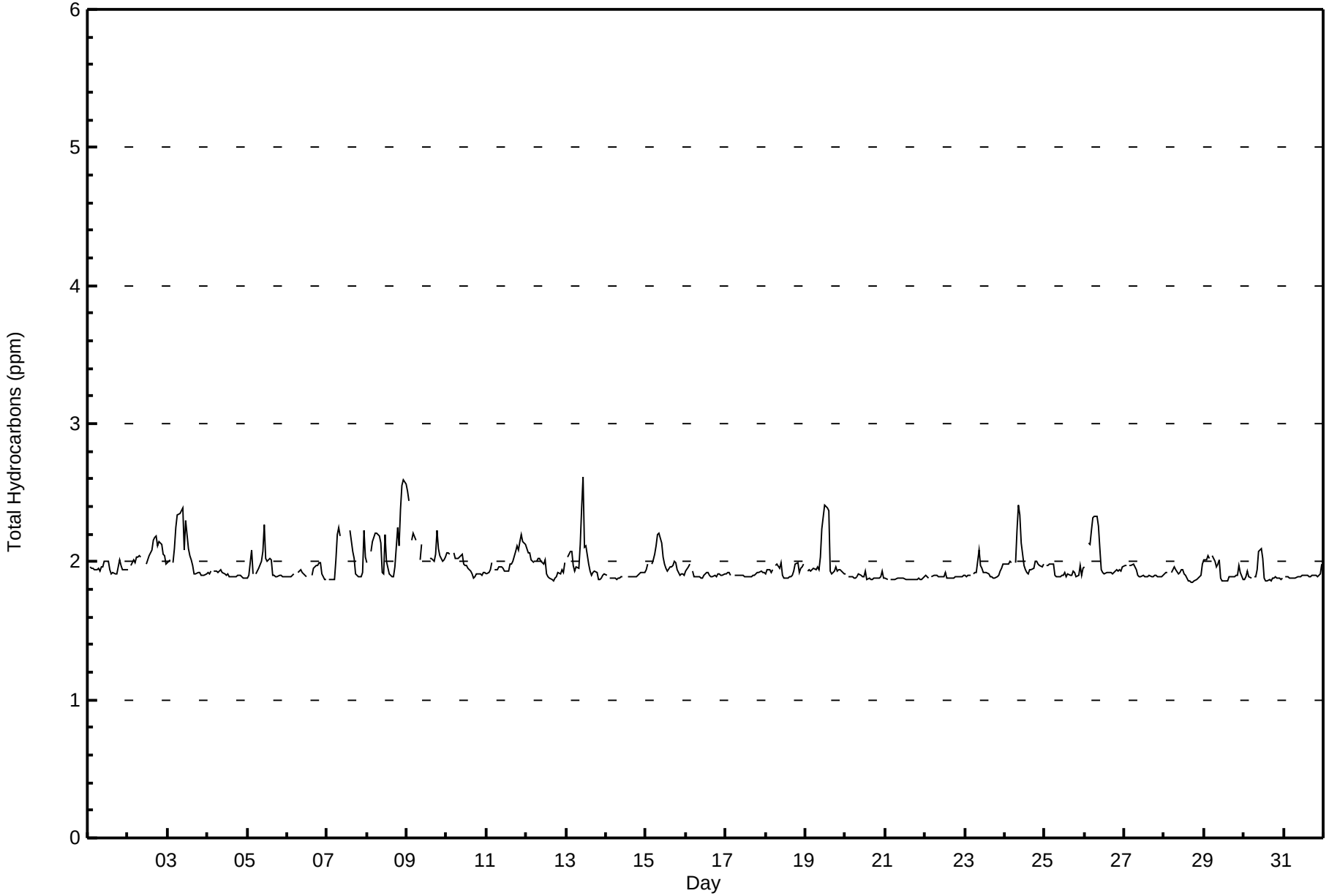
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Athabasca Valley - March 2016



Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	599	86.19	86.19
2.1 - 3.0	96	13.81	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 695

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Hydrocarbons (THC) - ppm

Athabasca Valley - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	73	20	4	18	38	29	113	37	9	10	22	31	14	17	24	140	599
2.1 - 3.0	26	6	3	2	1	1	5	5	0	1	4	4	2	1	6	29	96
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	99	26	7	20	39	30	118	42	9	11	26	35	16	18	30	169	695

Total Number of Valid Hours: 695

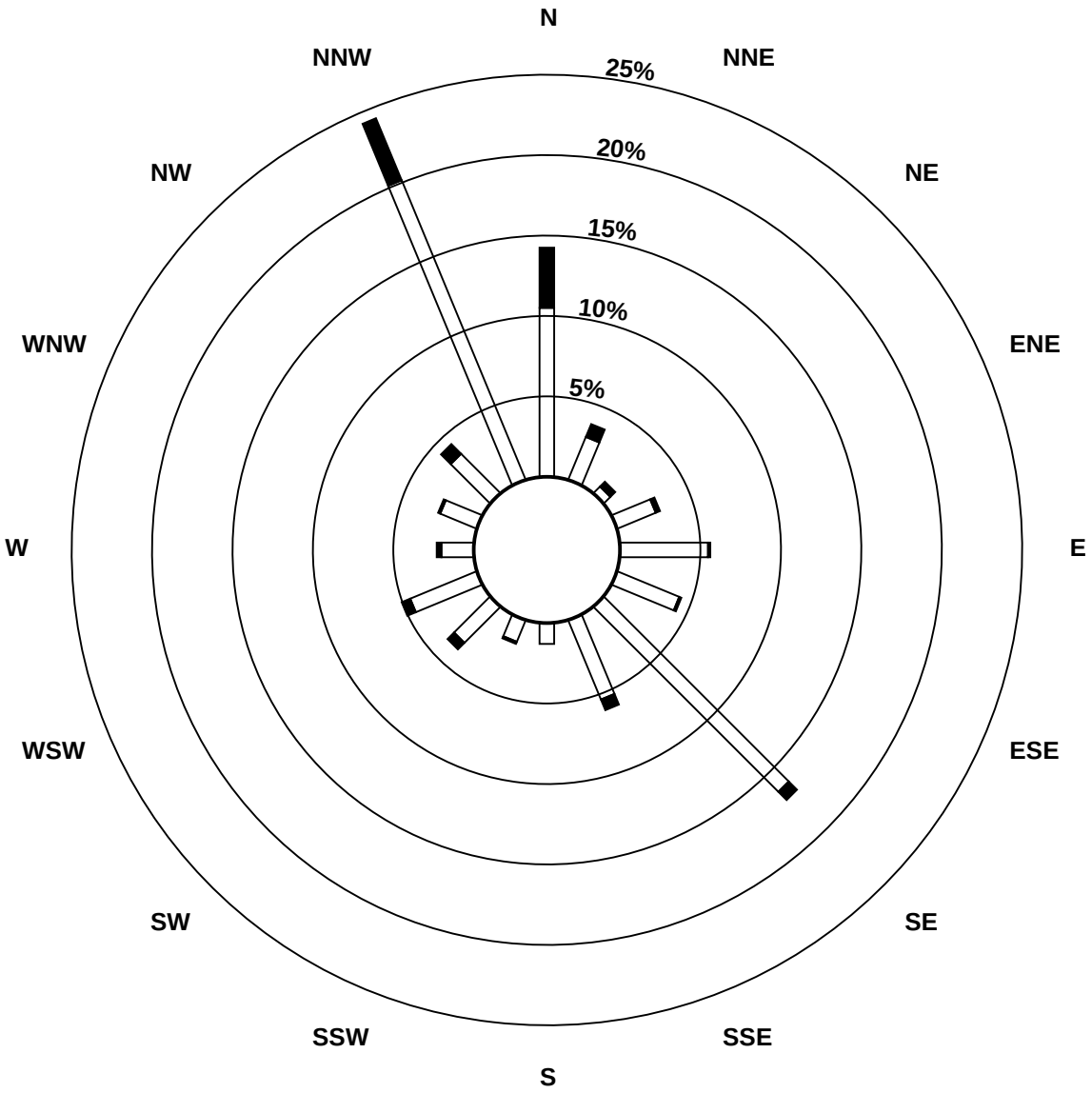
Total Number of Hours: 744

Wood Buffalo Environmental Association

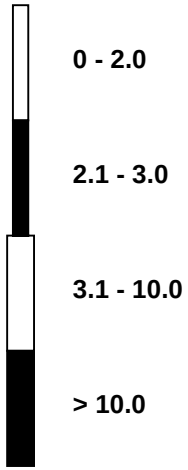
Wind Rose Mar 2016

Total Hydrocarbons (THC) - ppm

Athabasca Valley (AMS 7)



Classes (ppm)



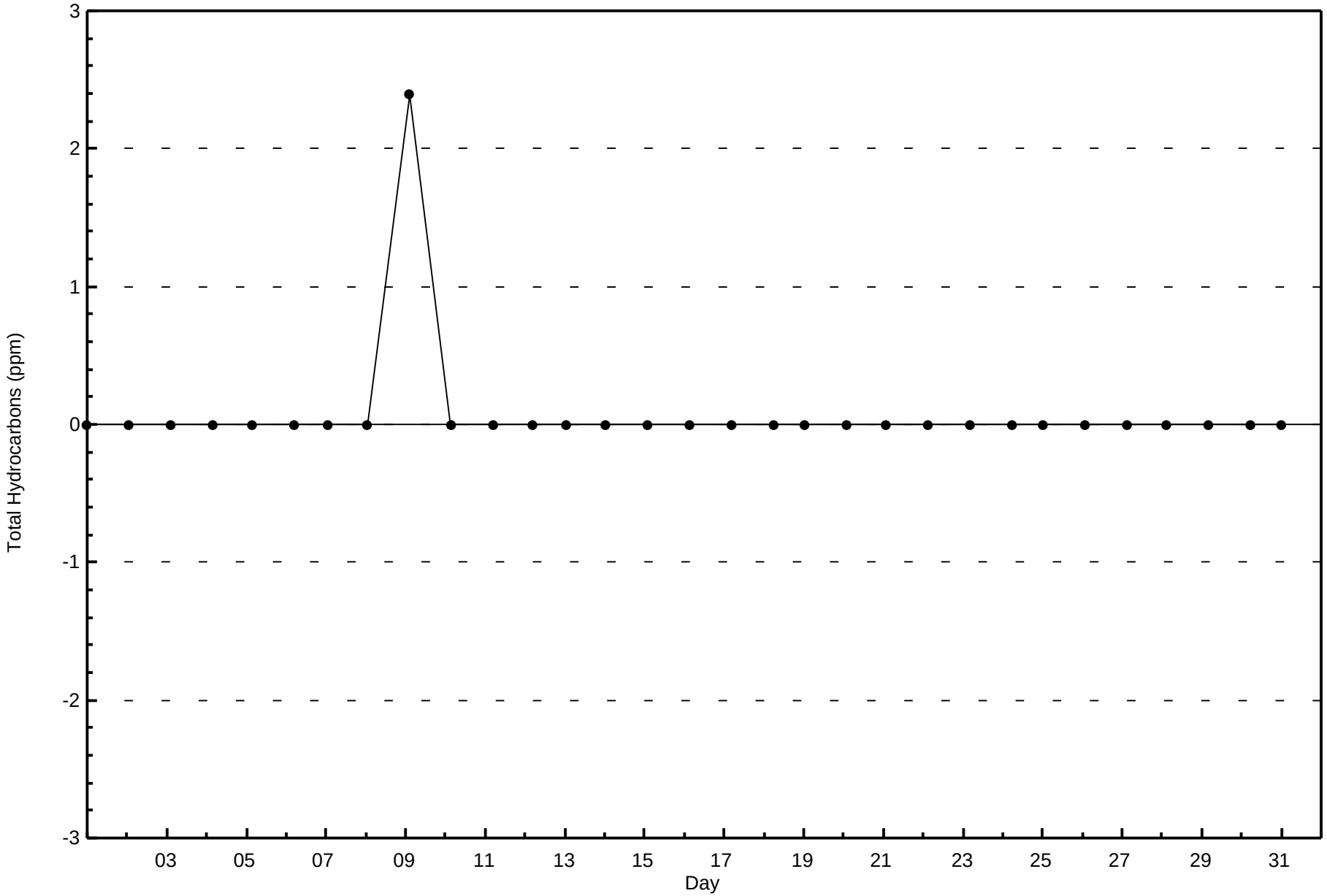
Total Number of Valid Hours: 695

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Athabasca Valley - March 2016

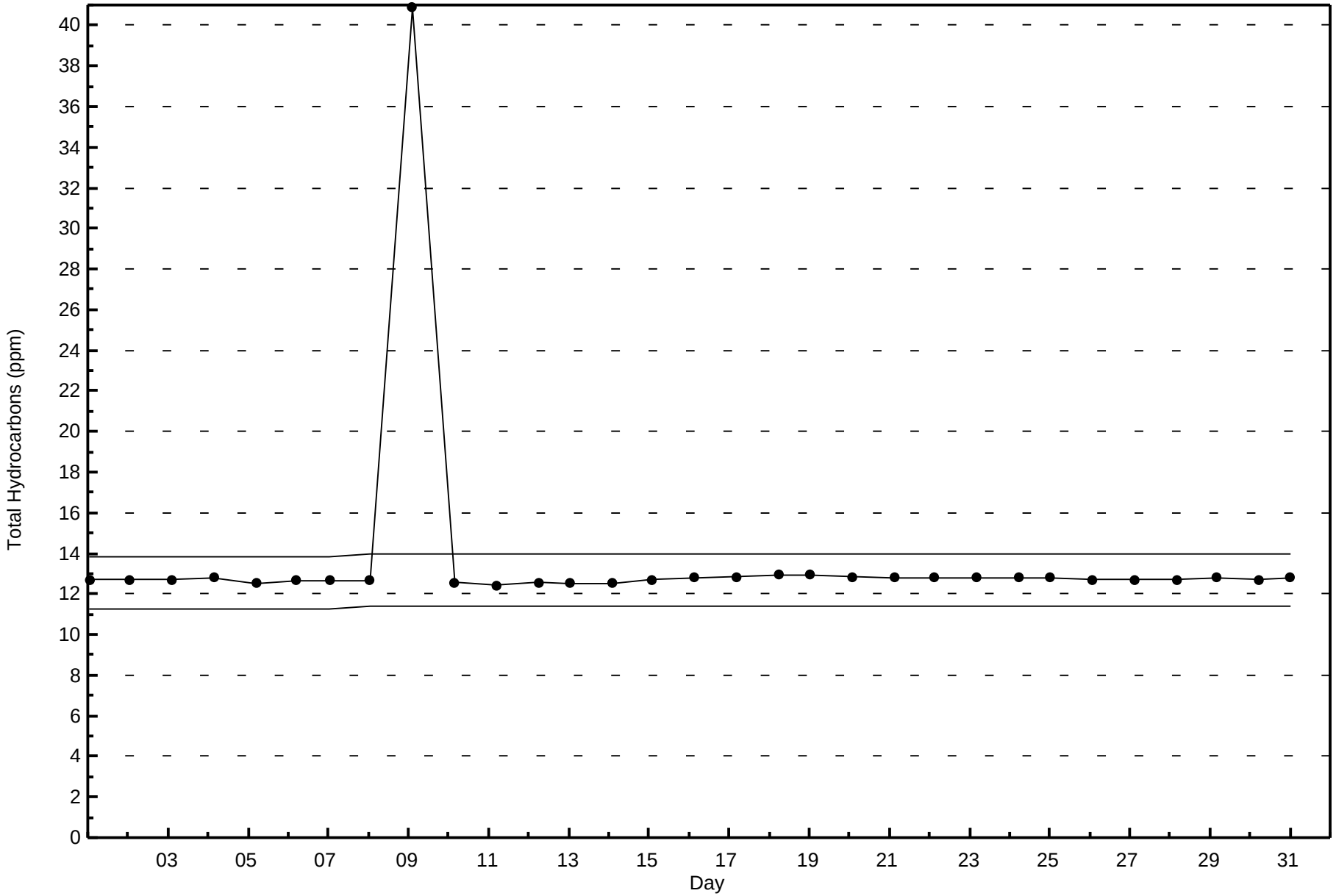


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Athabasca Valley - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley - March 2016

Maximum Value: 0.301 ppm on Mar 8 23:00

Maximum Daily Average: 0.106 ppm on Mar 8

Minimum Value: 0.000 ppm on Mar 1 02:00

Minimum Daily Average: 0.000 ppm on Mar 14

Maximum Diurnal Average: 0.034 ppm at hour 10

Minimum Diurnal Average: 0.004 ppm at hour 16

Monthly Average: 0.016 ppm

Percentiles: P_1 = 0.0 P_{10} = 0.0 Q_1 = 0.0 Median = 0.0 Q_3 = 0.0 P_{90} = 0.1 P_{99} = 0.2

Hours in Service:	744
Hours of Data:	695
Hours of Missing Data:	49
Hours of Calibration:	36
Percent Operational Time:	98.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.022	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.002	0.022
2-Mar	0.000	Z	0.000	0.000	0.000	0.000	0.002	0.000	0.000	PF	PF	0.000	0.000	0.000	0.039	0.076	0.060	0.126	0.087	0.084	0.050	0.001	0.008	0.006	0.026	0.126
3-Mar	0.004	0.000	Z	0.000	0.019	0.117	0.152	0.156	0.170	0.175	0.018	0.113	0.020	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.041	0.175
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	0.003	0.000	0.000	0.000	0.000	0.003
5-Mar	0.000	0.000	0.187	0.000	Z	0.000	0.000	0.000	0.000	0.032	0.272	0.000	0.003	0.002	0.016	0.000	0.000	0.000	0.000	0.000	0.003	0.002	0.000	0.000	0.023	0.272
6-Mar	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	PF	PF	M	0.000	0.004	0.000	0.001	0.000	0.000	0.002	0.000	0.000	0.000	0.004
7-Mar	Z	0.000	0.000	0.000	0.000	0.043	0.142	0.160	0.100	C	C	C	C	C	0.115	0.026	0.023	0.008	0.000	0.000	0.000	0.005	0.133	0.026	0.043	0.160
8-Mar	0.000	Z	0.063	0.113	0.123	0.132	0.133	0.123	0.080	0.000	0.000	0.284	0.087	0.000	0.000	0.000	0.000	0.001	0.126	0.065	0.235	0.293	0.301	0.278	0.106	0.301
9-Mar	0.246	0.233	Z	0.078	0.118	0.077	M	M	0.001	0.061	M	M	M	M	0.000	0.000	0.000	0.045	0.186	0.063	0.053	0.010	0.001	0.000	--	0.246
10-Mar	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
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	0.012	0.006	0.018	0.077	0.116	0.050	0.017	0.013	0.116
12-Mar	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.098	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.004	0.098
13-Mar	Z	0.001	0.008	0.004	0.000	0.000	0.002	0.000	0.000	0.069	0.241	0.059	0.071	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.241
14-Mar	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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
15-Mar	0.000	0.000	Z	0.000	0.000	0.009	0.047	0.109	0.122	0.073	0.002	0.000	0.000	0.000	0.016	0.005	0.034	0.070	0.048	0.000	0.000	0.000	0.000	0.000	0.023	0.122
16-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
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
18-Mar	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.007	0.000	0.065	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	0.004	0.065
19-Mar	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.114	0.175	0.189	0.198	0.217	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.039	0.217
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	0.043	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.043
21-Mar	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
22-Mar	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	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	0.026
23-Mar	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.072	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.072
24-Mar	0.000	0.000	0.000	0.000	0.001	Z	0.004	0.136	0.234	0.184	0.085	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	0.028	0.234
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	0.024	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.024
26-Mar	0.000	Z	0.077	0.070	0.132	0.188	0.197	0.201	0.171	0.085	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.049	0.201
27-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	0.009	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.010
28-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
29-Mar	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.007	0.044	0.114	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	0.007	0.114
30-Mar	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.013	0.104	0.120	0.093	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.120
31-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	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
	0.010	0.009	0.013	0.010	0.015	0.022	0.023	0.030	0.033	0.034	0.031	0.029	0.017	0.008	0.014	0.004	0.004	0.008	0.015	0.008	0.014	0.014	0.016	0.011	Diurnal Average	
	0.246	0.233	0.187	0.113	0.132	0.188	0.197	0.201	0.234	0.184	0.272	0.284	0.189	0.198	0.217	0.076	0.060	0.126	0.186	0.084	0.235	0.293	0.301	0.278	Diurnal Maximum	

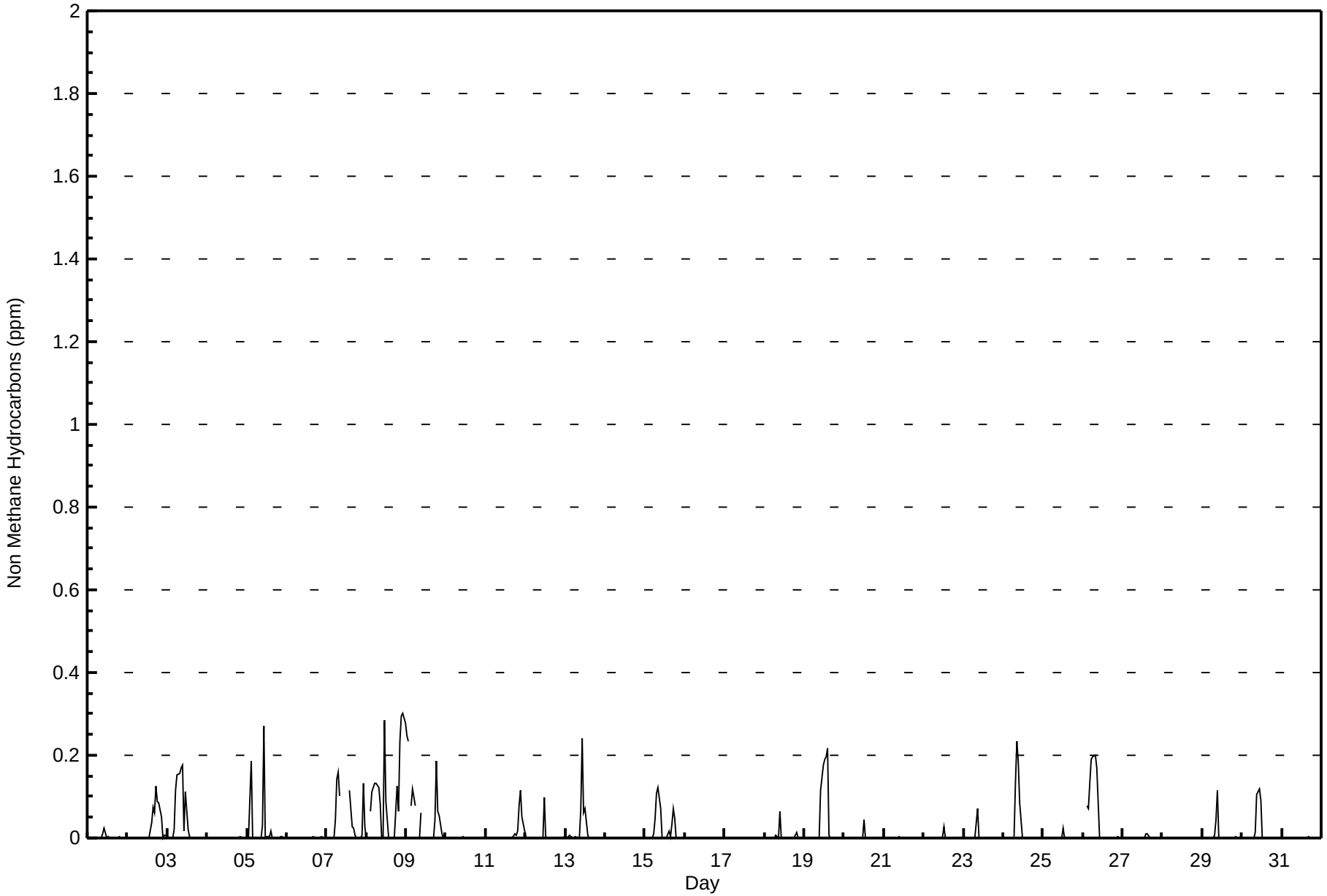
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	579	83.31	83.31
0.006 - 0.05	41	5.90	89.21
0.06 - 0.1	49	7.05	96.26
> 0.1	26	3.74	100.00

Total Number of Valid Hours: 695

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 0.005	71	20	4	17	37	26	107	38	8	10	23	33	14	16	21	134	579
0.006 - 0.05	5	1	1	1	1	4	7	2	0	1	1	0	1	1	2	13	41
0.06 - 0.1	14	3	1	1	0	0	2	1	1	0	2	1	1	1	4	17	49
> 0.1	9	2	1	1	1	0	2	1	0	0	0	1	0	0	3	5	26
Totals	99	26	7	20	39	30	118	42	9	11	26	35	16	18	30	169	695

Total Number of Valid Hours: 695

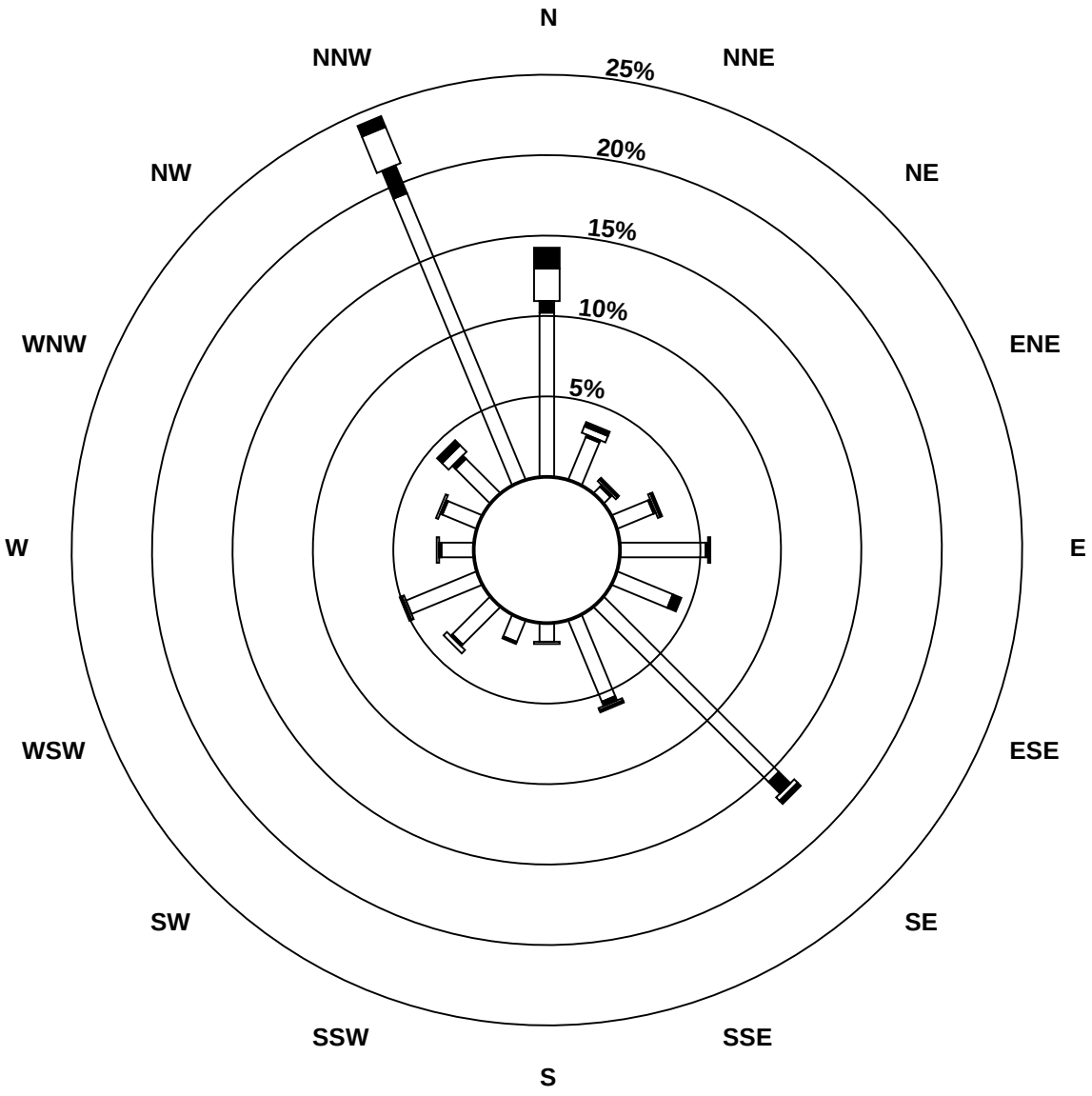
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Mar 2016

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley (AMS 7)



Classes (ppm)

0 - 0.005

0.006 - 0.05

0.06 - 0.1

> 0.1

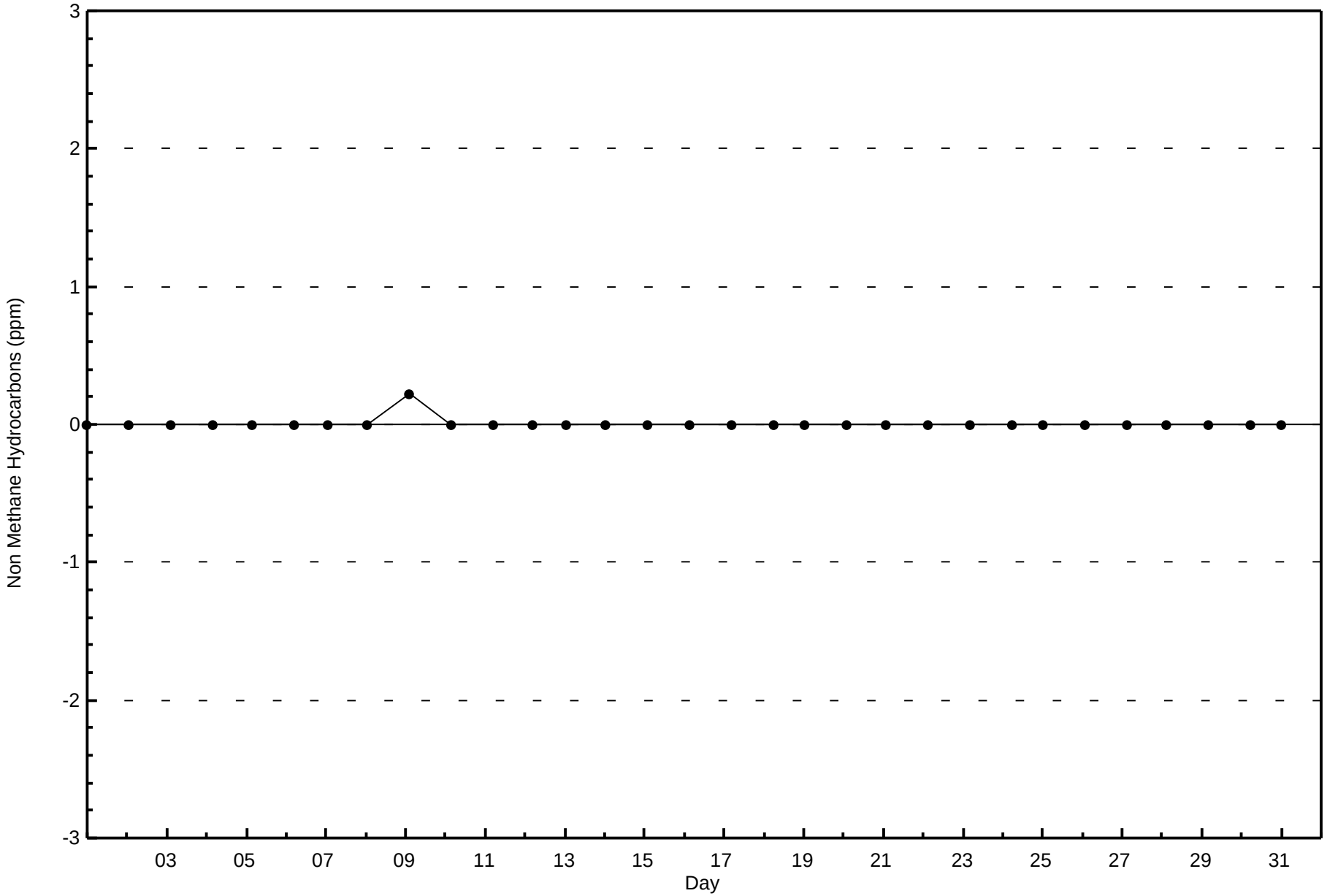
Total Number of Valid Hours: 695

Wood Buffalo Environmental Association

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley - March 2016

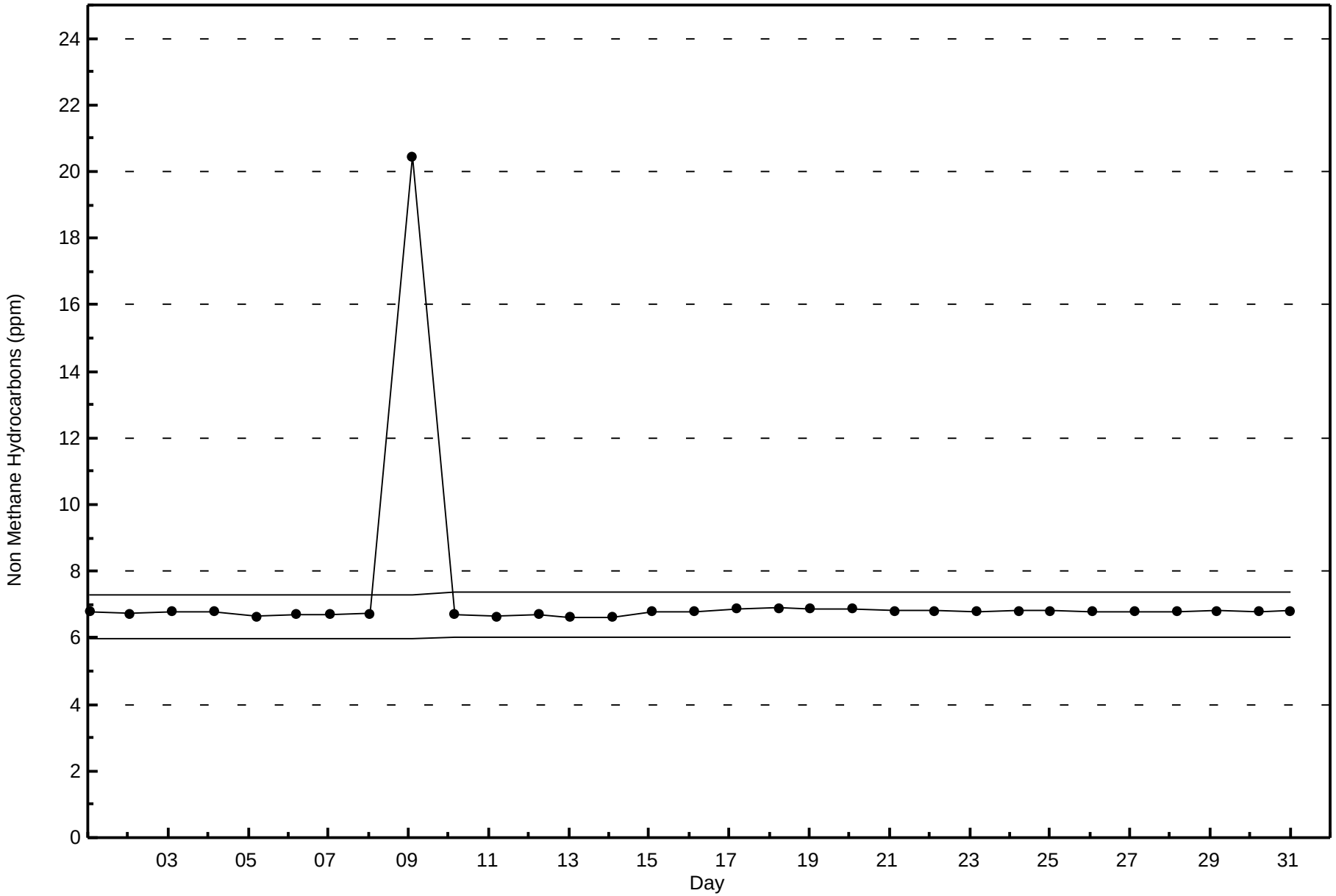


Wood Buffalo Environmental Association

Span Responses

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH_4) - ppm

Athabasca Valley - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 2.4 ppm on Mar 13 11:00

Maximum Daily Average: 2.0 ppm on Mar 8

Minimum Value: 1.9 ppm on Mar 28 17:00

Minimum Daily Average: 1.9 ppm on Mar 21

Maximum Diurnal Average: 2.0 ppm at hour 9

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} = 2.1 P_{99} = 2.2

Hours in Service:	744
Hours of Data:	695
Hours of Missing Data:	49
Hours of Calibration:	36
Percent Operational Time:	98.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	2.0	2.0	2.0	1.9	1.9	2.0	1.9	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	1.9	1.9	1.9	2.0	2.0
2-Mar	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	PF	PF	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.1
3-Mar	2.0	2.0	Z	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2
4-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
5-Mar	1.9	1.9	1.9	1.9	Z	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	1.9	1.9	1.9	1.9	1.9	2.0
6-Mar	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	PF	PF	M	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0
7-Mar	Z	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.1	C	C	C	C	C	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.1	2.0	2.0	2.1
8-Mar	2.0	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.1	2.3	2.3	2.3	2.0	2.3
9-Mar	2.3	2.2	Z	2.1	2.1	2.1	M	M	2.0	2.1	M	M	M	M	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	--	2.3
10-Mar	2.1	2.1	2.1	Z	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1
11-Mar	1.9	1.9	1.9	2.0	Z	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1
12-Mar	2.1	2.1	2.1	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	2.0	2.0	2.1
13-Mar	Z	2.0	2.1	2.1	2.0	1.9	2.0	2.0	2.1	2.3	2.4	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	2.4
14-Mar	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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
15-Mar	1.9	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	1.9	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.1
16-Mar	1.9	2.0	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
17-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
18-Mar	1.9	1.9	1.9	1.9	1.9	Z	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.0	1.9	2.0
19-Mar	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.1	2.2	2.2	2.2	2.2	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.2
20-Mar	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
21-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
22-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
23-Mar	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0
24-Mar	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.1	2.2	2.2	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	2.2
25-Mar	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	2.0	1.9	1.9	1.9	2.0
26-Mar	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1
27-Mar	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	1.9	2.0
28-Mar	1.9	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	2.0	1.9	2.0
29-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	2.0	1.9	1.9	1.9	2.0
30-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	1.9	1.9	1.9	2.0
31-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	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	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	Diurnal Average	
	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.4	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.3	2.3	Diurnal Maximum	

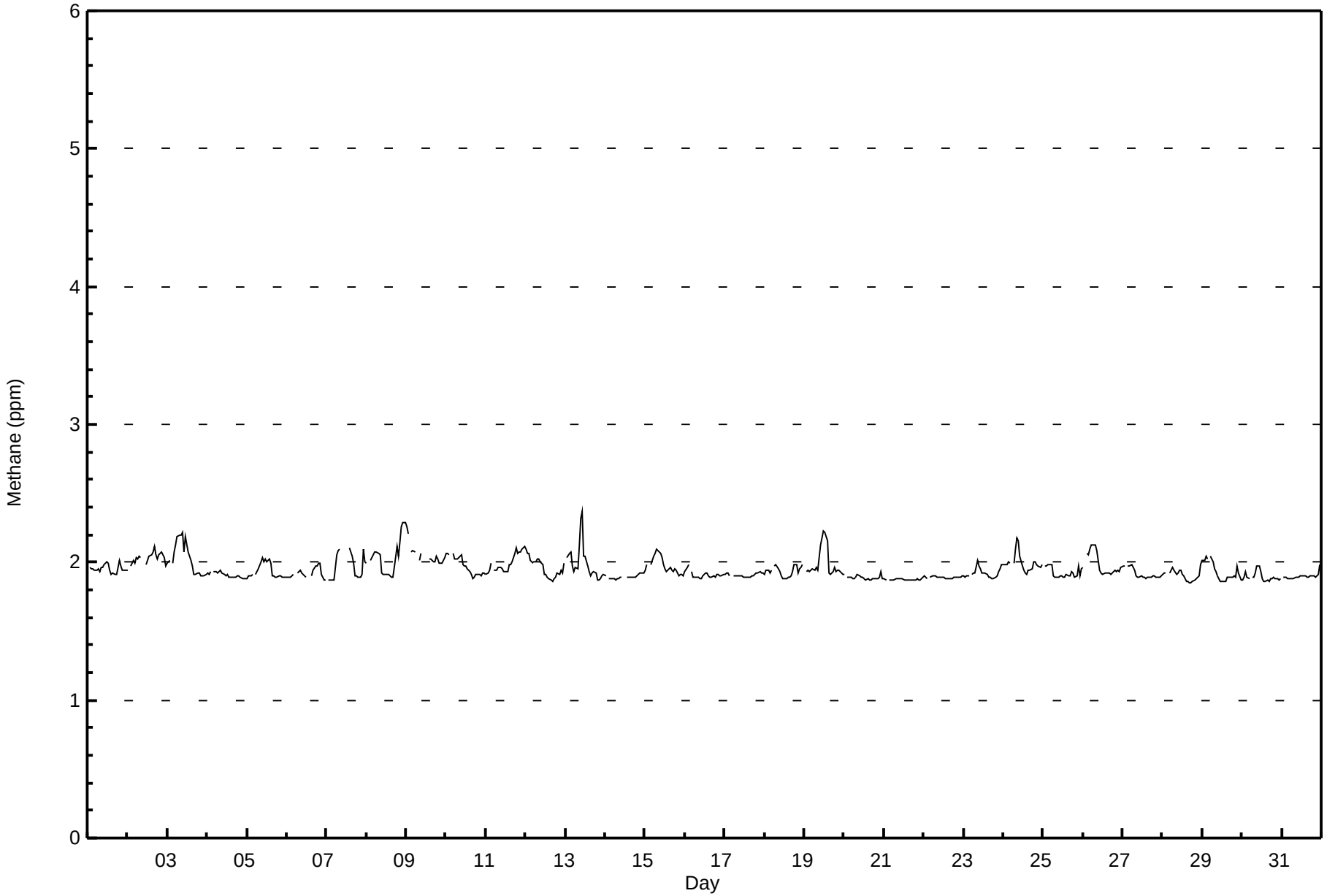
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Methane (CH_4) - ppm

Athabasca Valley - March 2016



Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	620	89.21	89.21
2.1 - 3.0	75	10.79	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 695

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Methane (CH_4) - ppm

Athabasca Valley - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	80	20	4	18	39	29	114	39	9	10	22	31	15	17	25	148	620
2.1 - 3.0	19	6	3	2	0	1	4	3	0	1	4	4	1	1	5	21	75
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	99	26	7	20	39	30	118	42	9	11	26	35	16	18	30	169	695

Total Number of Valid Hours: 695

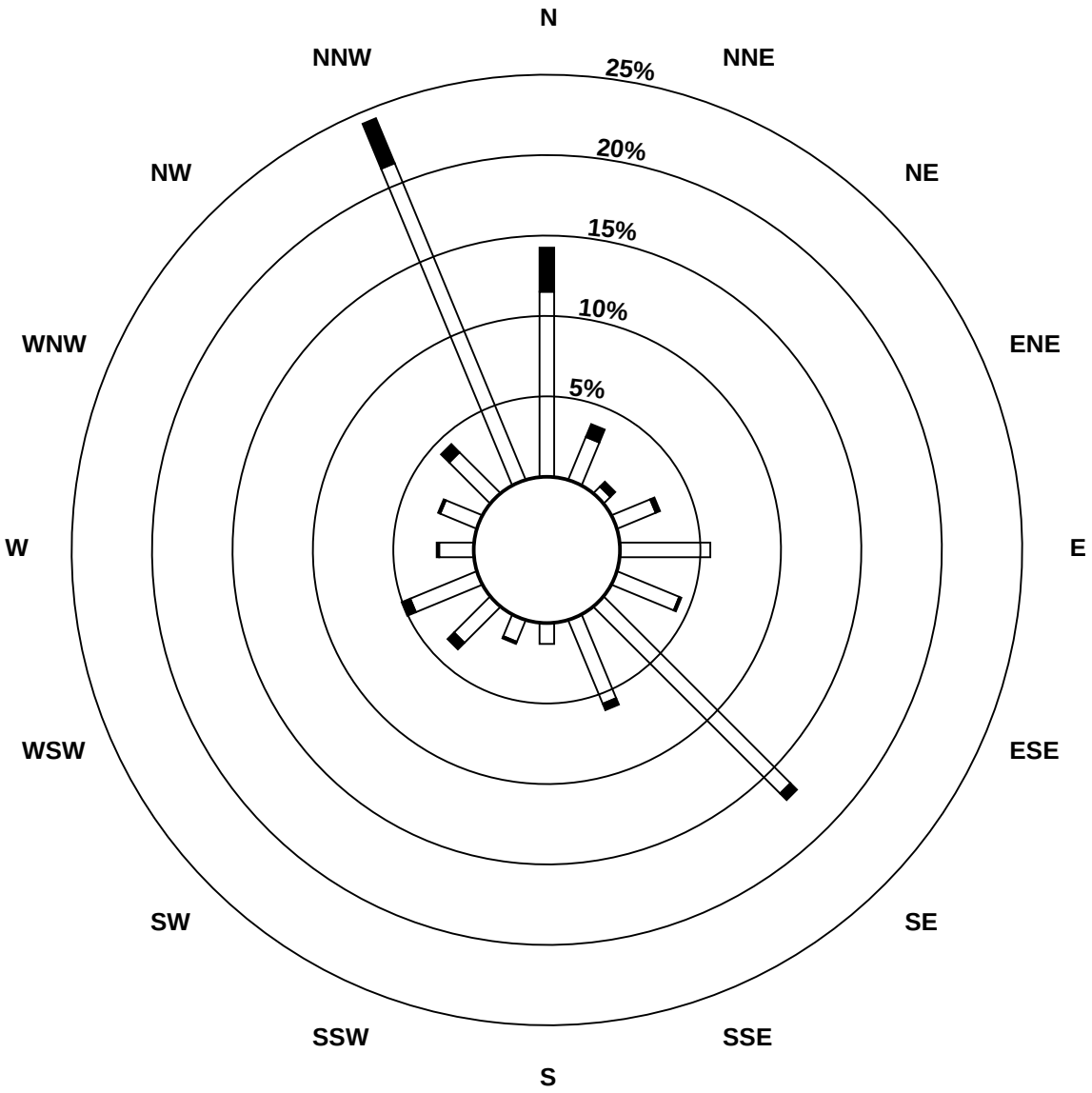
Total Number of Hours: 744

Wood Buffalo Environmental Association

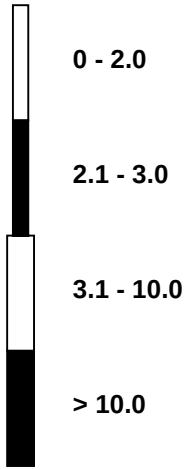
Wind Rose Mar 2016

Methane (CH_4) - ppm

Athabasca Valley (AMS 7)



Classes (ppm)



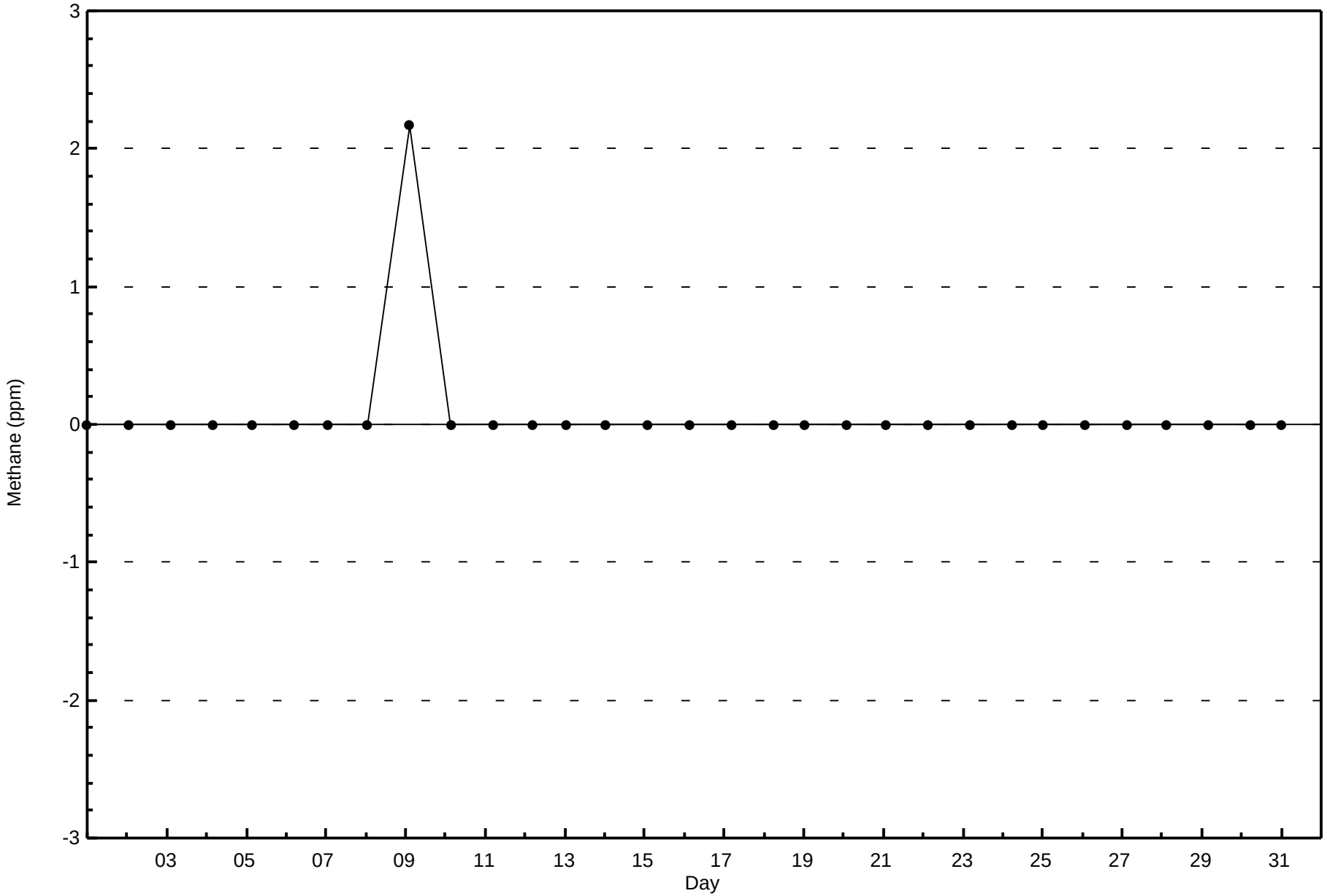
Total Number of Valid Hours: 695

Wood Buffalo Environmental Association

Zero Responses

Methane (CH_4) - ppm

Athabasca Valley - March 2016

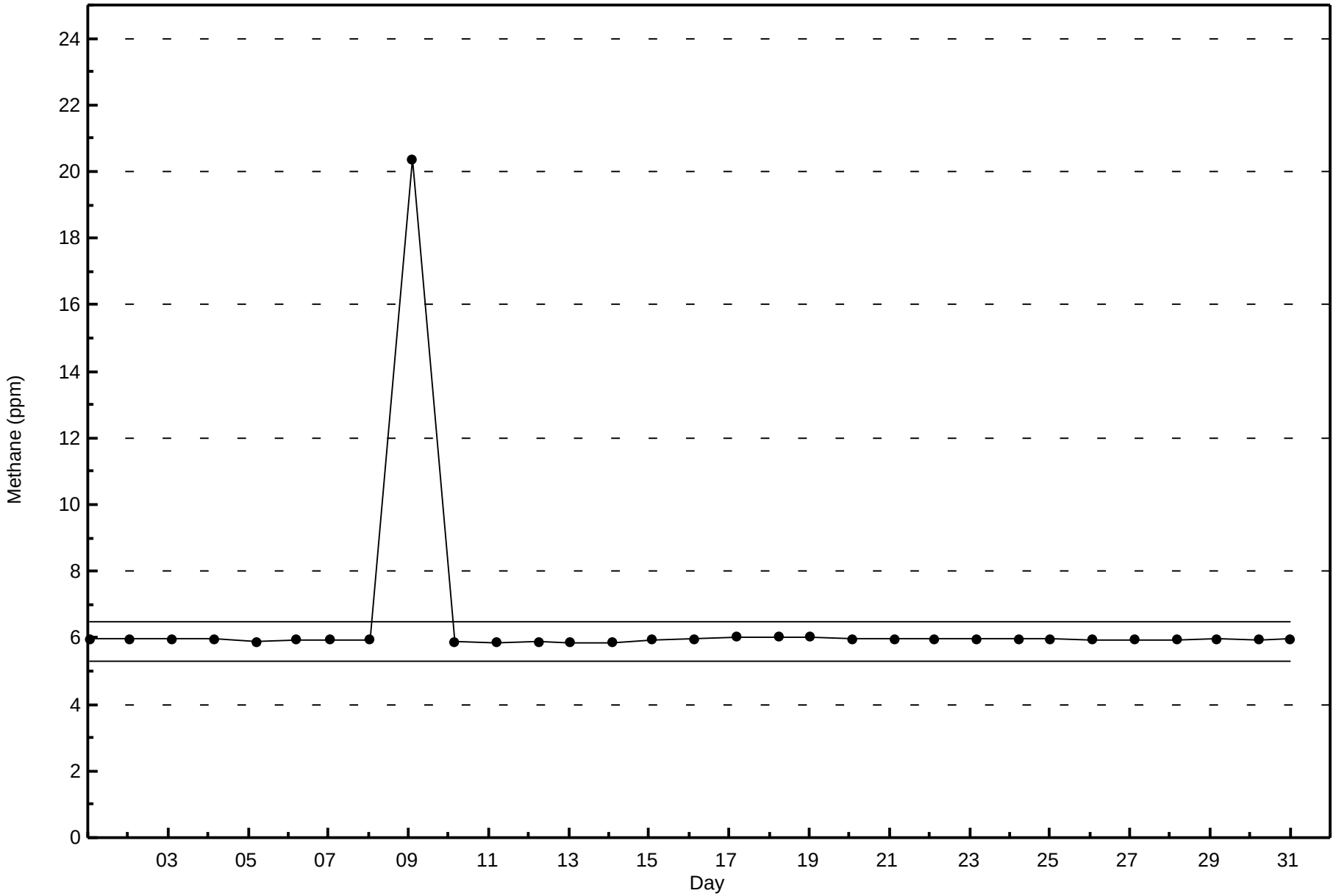


Wood Buffalo Environmental Association

Span Responses

Methane (CH_4) - ppm

Athabasca Valley - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O_3) - ppb

Athabasca Valley - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 45 ppb on Mar 28 15:00 Maximum Daily Average: 37.5 ppb on Mar 21

Minimum Value: 0 ppb on Mar 1 20:00 Minimum Daily Average: 9.2 ppb on Mar 9

Maximum Diurnal Average: 31.6 ppb at hour 16 Minimum Diurnal Average: 15.8 ppb at hour 7

Monthly Average: 24.5 ppb Percentiles: $P_1 = 1$ $P_{10} = 9$ $Q_1 = 18$ Median = 25 $Q_3 = 33$ $P_{90} = 37$ $P_{99} = 42$

Hours in Service:	744
Hours of Data:	702
Hours of Missing Data:	42
Hours of Calibration:	34
Percent Operational Time:	98.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	25	24	Z	23	23	20	11	14	15	19	20	21	22	26	28	26	23	22	2	0	13	16	11	11	18.0	28
2-Mar	13	11	11	Z	9	2	2	2	9	PF	PF	21	22	22	21	20	12	5	3	2	11	16	19	20	12.1	22
3-Mar	21	22	23	21	Z	7	4	2	5	9	14	16	19	22	23	26	29	31	31	31	32	32	33	33	21.3	33
4-Mar	30	26	21	21	20	Z	18	14	18	21	25	28	31	34	34	34	34	33	22	22	30	33	32	32	26.7	34
5-Mar	34	32	30	30	30	28	Z	20	20	22	26	22	24	21	26	31	30	30	32	31	29	30	30	30	27.7	34
6-Mar	31	31	31	30	28	27	17	Z	28	30	31	30	PF	PF	31	M	28	26	23	20	19	29	34	33	27.8	34
7-Mar	32	32	Z	30	29	18	4	10	16	18	19	20	19	19	17	16	13	24	24	27	28	24	11	18	20.4	32
8-Mar	17	17	16	Z	18	16	12	9	C	C	C	22	23	22	20	24	23	21	16	11	6	1	0	0	14.8	24
9-Mar	0	1	7	15	Z	14	17	20	17	16	M	16	M	M	16	15	15	8	1	0	1	2	2	2	9.2	20
10-Mar	2	2	2	3	3	Z	4	5	7	11	22	25	27	28	29	29	30	29	28	25	22	23	21	23	17.4	30
11-Mar	24	22	21	22	22	21	Z	17	17	18	19	23	24	24	19	20	17	10	10	5	3	1	2	2	15.7	24
12-Mar	3	4	9	10	10	8	7	Z	5	9	15	24	26	29	30	36	36	33	25	20	23	23	23	22	18.8	36
13-Mar	20	21	Z	18	13	10	9	13	15	11	10	20	20	22	24	24	21	20	22	25	25	26	23	23	19.0	26
14-Mar	28	28	30	Z	29	29	28	27	26	26	27	28	28	28	28	27	28	28	27	27	25	24	23	24	27.1	30
15-Mar	23	21	21	18	Z	15	14	13	16	18	20	23	25	25	24	19	16	14	20	23	26	24	25	28	20.5	28
16-Mar	23	21	21	21	24	Z	29	30	31	32	33	31	31	34	35	35	34	32	31	30	29	31	30	30	29.5	35
17-Mar	33	31	32	32	28	22	Z	22	21	24	27	32	34	35	35	35	33	32	30	27	25	23	26	25	29.0	35
18-Mar	24	16	14	19	15	5	6	Z	14	19	30	35	35	35	35	33	30	18	10	6	14	12	15	14	19.8	35
19-Mar	13	10	Z	8	5	4	2	9	17	16	17	16	16	14	16	34	35	29	11	25	32	32	31	31	18.5	35
20-Mar	32	32	36	Z	36	36	35	34	32	33	35	35	36	36	36	37	37	37	36	36	36	36	35	36	35.2	37
21-Mar	36	36	36	36	Z	37	37	36	37	37	37	37	38	38	38	38	39	39	39	39	38	39	39	39	37.5	39
22-Mar	39	39	39	37	35	Z	32	34	36	36	36	36	38	39	40	40	39	37	36	33	35	34	35	35	36.4	40
23-Mar	35	35	35	32	30	26	Z	22	18	24	28	34	33	35	38	40	39	40	39	38	37	32	27	21	32.0	40
24-Mar	16	17	17	13	12	5	11	Z	19	23	30	34	35	37	40	40	40	38	28	23	22	23	23	19	24.5	40
25-Mar	20	18	Z	17	17	22	32	33	34	34	33	34	35	37	34	35	32	30	21	31	25	22	21	19	27.6	37
26-Mar	14	9	9	Z	6	6	7	9	17	25	34	34	37	37	37	37	38	35	16	16	19	19	21	21	22.0	38
27-Mar	22	18	19	20	Z	16	18	22	29	31	32	33	38	40	40	40	40	38	33	29	32	34	34	32	30.0	40
28-Mar	30	29	29	26	20	Z	15	18	27	29	30	35	40	41	45	43	42	44	37	35	30	29	20	15	30.8	45
29-Mar	10	8	6	8	4	2	Z	14	22	29	35	40	43	44	44	42	41	40	32	29	24	18	20	26	25.2	44
30-Mar	26	21	19	16	15	13	12	Z	15	22	30	33	37	41	42	42	40	35	33	34	34	35	35	34	29.0	42
31-Mar	36	34	Z	33	31	27	28	30	31	32	31	31	31	32	33	33	31	30	31	29	28	28	26	22	30.4	36
	23.0	21.6	21.5	21.5	19.7	16.8	15.8	18.5	20.4	23.3	26.6	28.1	29.9	31.0	31.0	31.6	30.5	28.7	24.1	23.5	24.3	24.3	23.5	23.3	Diurnal Average	
	39	39	39	37	36	37	37	36	37	37	37	40	43	44	45	43	42	44	39	39	38	39	39	39	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance PF - Power Failure

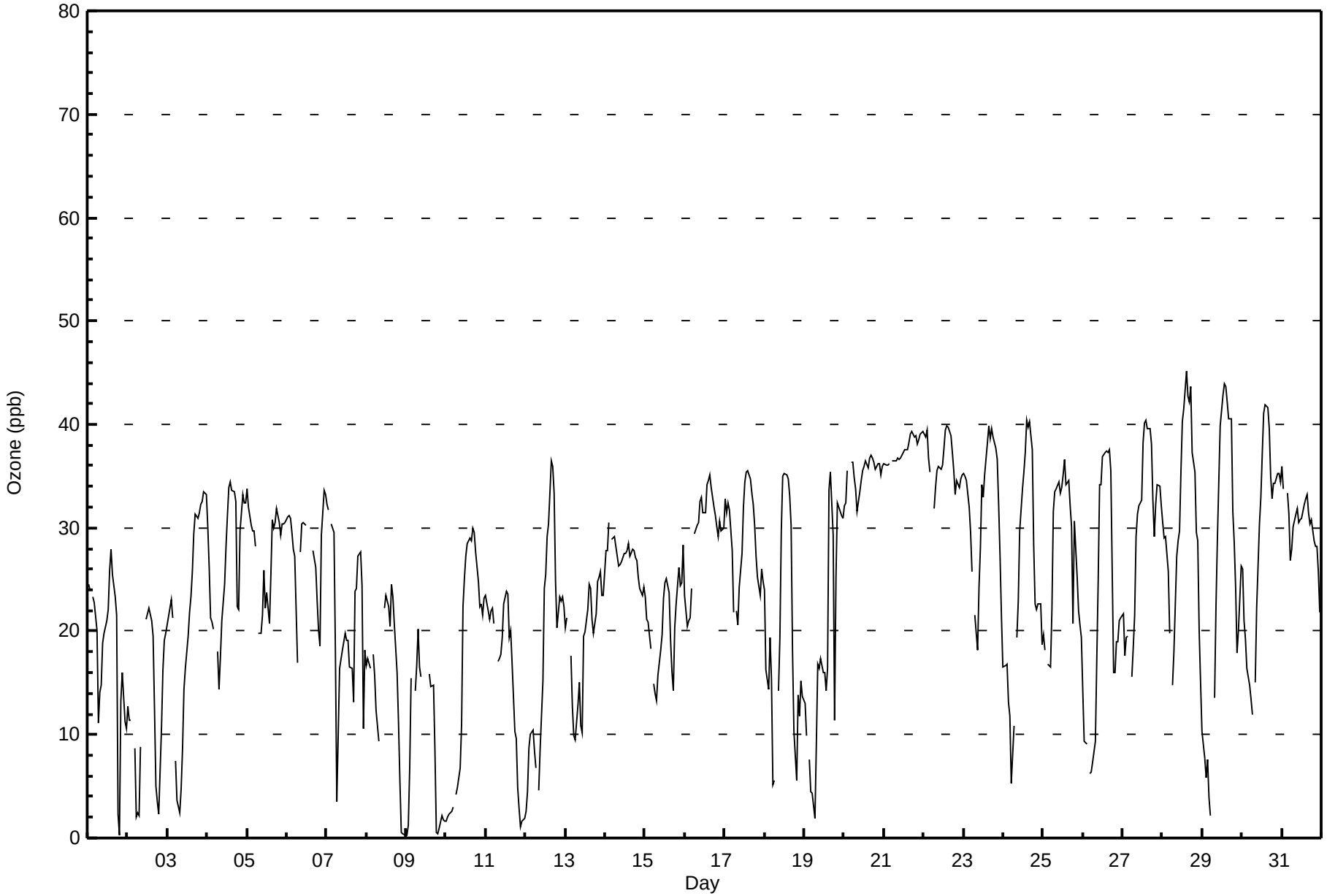
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ozone (O_3) - ppb

Athabasca Valley - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	233	33.19	33.19
21 - 50	469	66.81	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Ozone (O_3) - ppb

Athabasca Valley - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	40	11	5	3	2	6	25	17	7	4	13	18	10	10	14	48	233
21 - 50	59	15	2	17	35	23	95	25	2	6	12	14	8	11	16	129	469
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	26	7	20	37	29	120	42	9	10	25	32	18	21	30	177	702

Total Number of Valid Hours: 702

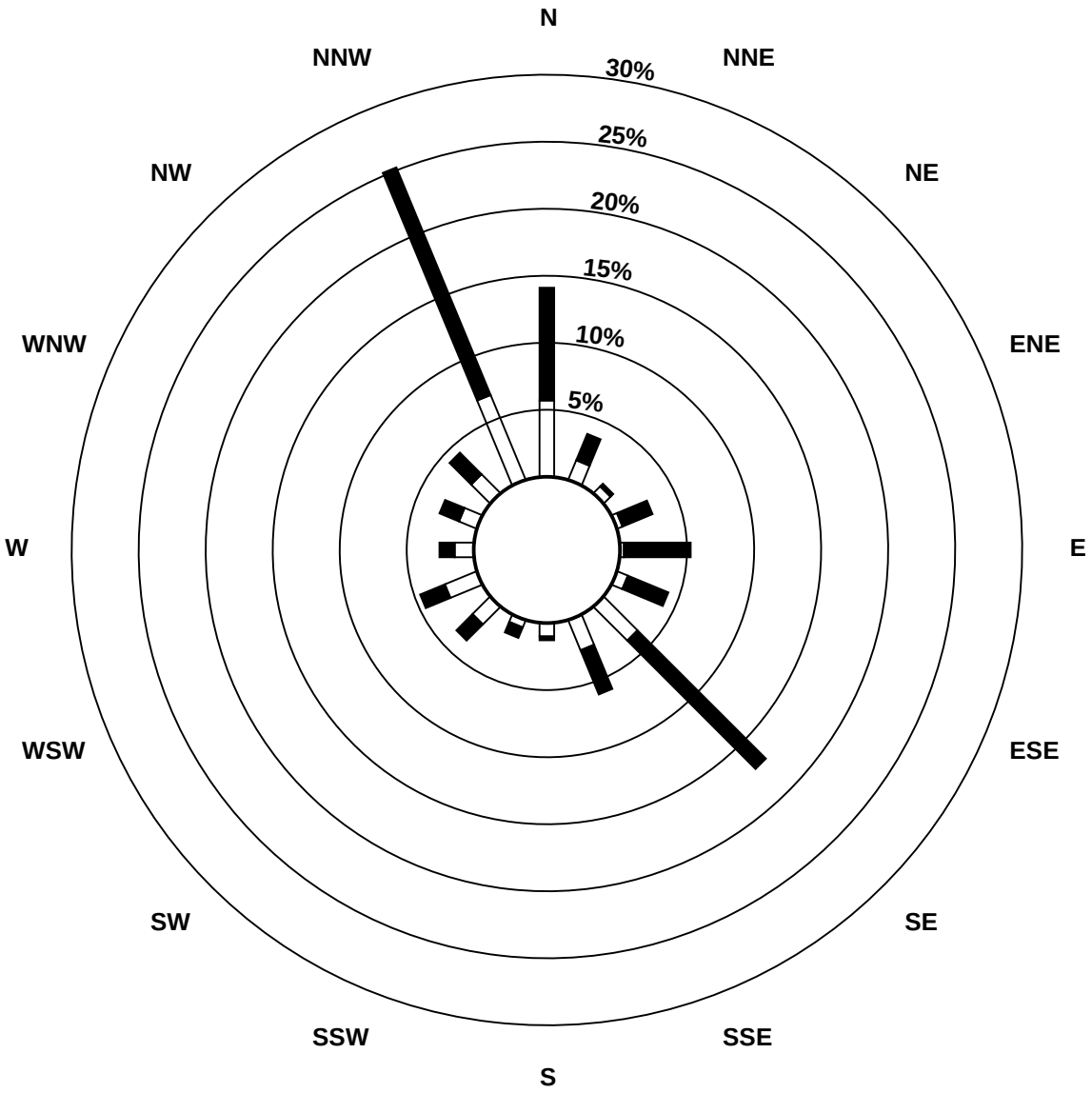
Total Number of Hours: 744

Wood Buffalo Environmental Association

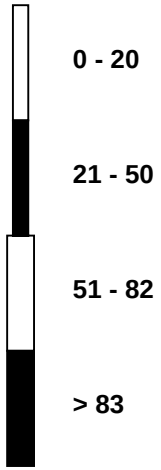
Wind Rose Mar 2016

Ozone (O_3) - ppb

Athabasca Valley (AMS 7)



Classes (ppb)



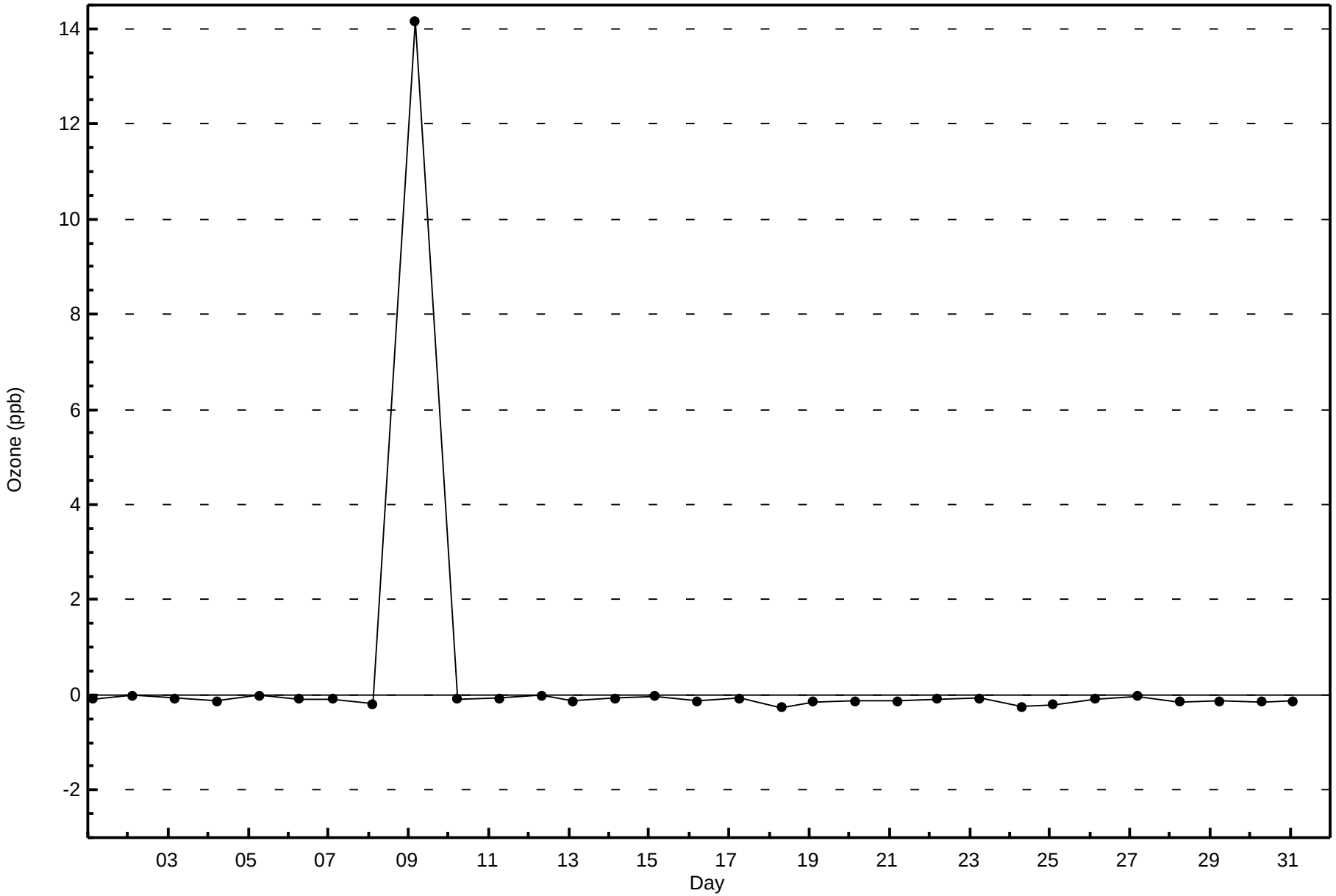
Total Number of Valid Hours: 702

Wood Buffalo Environmental Association

Zero Responses

Ozone (O_3) - ppb

Athabasca Valley - March 2016

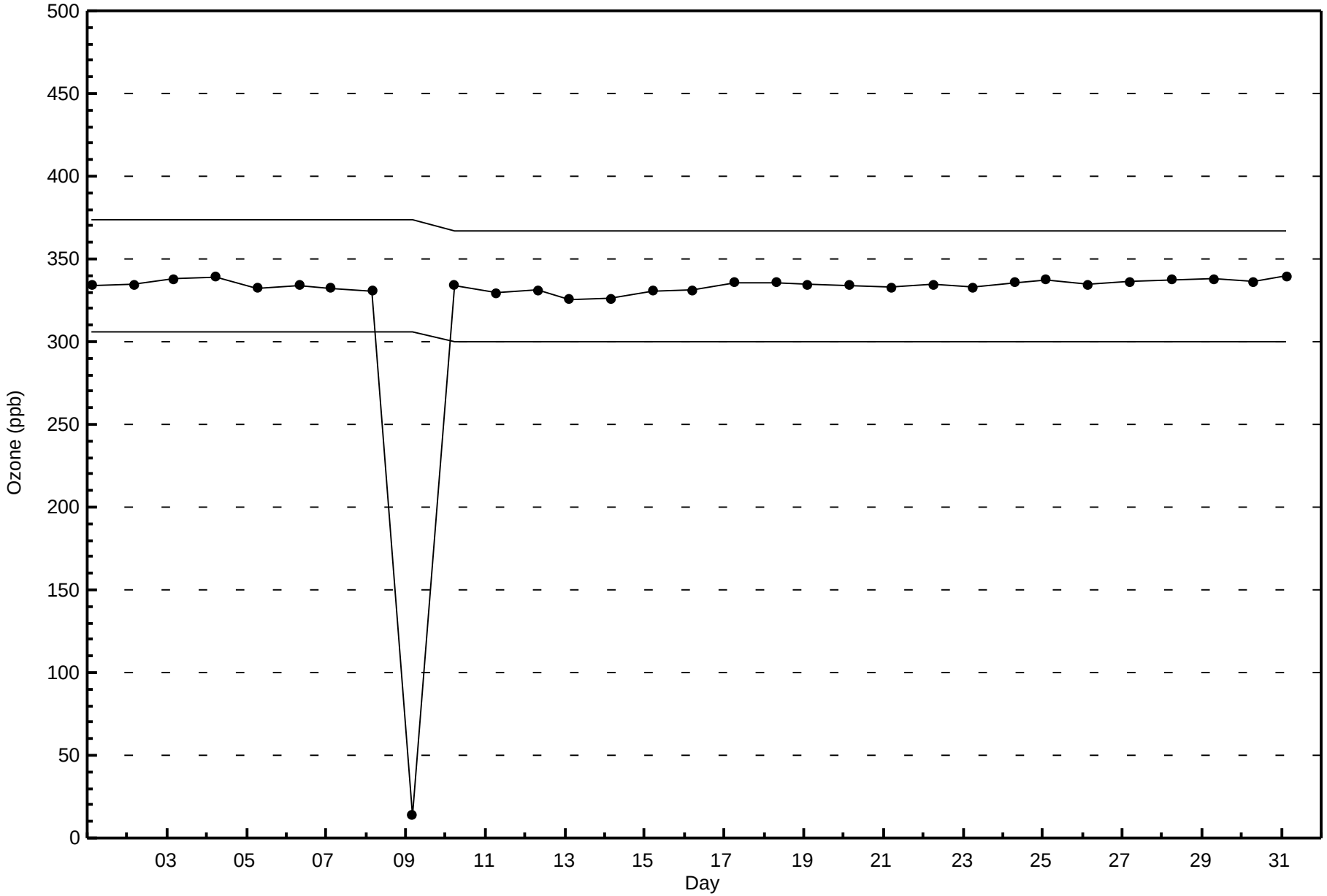


Wood Buffalo Environmental Association

Span Responses

Ozone (O_3) - ppb

Athabasca Valley - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Athabasca Valley - March 2016

Maximum Value: 40 ppb on Mar 19 14:00

Maximum Daily Average: 8.8 ppb on Mar 9

Minimum Value: 0 ppb on Mar 5 20:00

Minimum Daily Average: 0.3 ppb on Mar 21

Maximum Diurnal Average: 5.4 ppb at hour 9

Minimum Diurnal Average: 0.3 ppb at hour 4

Monthly Average: 2.5 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 3$ $P_{90} = 7$ $P_{99} = 20$

Hours in Service:	744
Hours of Data:	700
Hours of Missing Data:	44
Hours of Calibration:	36
Percent Operational Time:	98.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	1	1	1	1	2	4	4	6	7	9	7	7	4	1	2	1	1	8	35	10	1	1	1	5.0	35
2-Mar	0	Z	0	0	0	6	5	18	11	PF	PF	5	5	5	7	9	13	14	5	4	1	0	0	0	5.2	18
3-Mar	0	0	Z	0	0	0	1	8	12	10	6	8	7	4	3	1	0	0	0	0	0	0	0	0	2.6	12
4-Mar	0	0	0	Z	1	0	1	3	5	5	5	4	4	2	2	2	2	2	4	3	1	1	1	1	2.1	5
5-Mar	0	0	0	1	Z	1	1	2	4	6	4	4	3	7	3	1	1	0	0	0	0	0	0	0	1.6	7
6-Mar	0	0	0	0	0	Z	0	0	1	2	2	3	PF	PF	M	2	2	1	0	0	0	1	0	0	0.8	3
7-Mar	Z	0	0	0	0	0	6	2	3	C	C	C	C	C	7	6	6	0	0	0	0	0	0	0	1.8	7
8-Mar	0	Z	0	0	0	0	1	4	7	4	4	3	2	4	4	1	1	0	0	1	1	6	11	11	2.8	11
9-Mar	14	4	Z	0	0	0	0	0	3	6	M	M	M	12	12	12	8	13	31	18	12	15	11	7	8.8	31
10-Mar	6	5	2	Z	2	3	4	6	6	10	2	2	1	1	2	1	1	1	1	1	1	1	1	1	2.7	10
11-Mar	0	0	0	0	Z	0	1	1	1	2	1	1	0	1	2	2	2	4	2	2	8	12	6	6	2.3	12
12-Mar	4	1	1	1	1	Z	0	11	20	9	7	3	3	2	5	1	1	1	2	1	1	1	0	0	3.3	20
13-Mar	Z	0	0	0	0	1	1	2	2	7	12	3	3	2	1	1	1	0	0	0	0	0	0	0	1.6	12
14-Mar	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1
15-Mar	0	0	Z	0	0	0	0	2	4	6	8	6	4	4	8	11	9	5	0	0	0	0	0	0	3.0	11
16-Mar	0	0	0	Z	0	0	0	0	0	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0.4	2
17-Mar	0	0	0	0	Z	1	1	2	7	5	5	2	0	0	0	0	0	0	0	0	0	1	0	0	1.1	7
18-Mar	0	1	0	0	1	Z	8	5	8	8	2	1	1	1	2	3	4	10	8	15	3	3	1	2	3.8	15
19-Mar	Z	1	0	0	1	1	7	4	5	12	16	24	26	40	32	3	2	2	7	1	1	0	0	0	8.1	40
20-Mar	0	Z	0	0	0	0	1	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	2
21-Mar	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	1	1	0	0	0	0.3	1
22-Mar	0	0	0	Z	0	1	2	2	2	2	3	3	2	1	1	1	1	1	1	1	0	0	0	0	1.1	3
23-Mar	0	0	0	0	Z	1	3	3	7	4	5	3	4	3	1	1	1	0	0	0	0	0	0	0	1.6	7
24-Mar	0	0	0	0	0	Z	3	18	15	18	12	8	6	5	3	3	2	2	1	0	0	0	0	0	4.3	18
25-Mar	Z	0	0	0	1	1	1	1	2	2	3	3	2	1	2	1	0	1	1	0	0	1	0	0	1.0	3
26-Mar	0	Z	1	1	1	1	3	13	8	7	5	5	3	3	3	3	2	1	7	4	1	1	0	0	3.1	13
27-Mar	0	1	Z	0	1	1	1	1	2	2	2	3	2	2	1	1	1	1	1	1	0	0	0	0	1.1	3
28-Mar	0	0	0	Z	1	2	3	3	3	3	3	2	1	1	0	0	0	0	0	0	0	0	1	1	1.0	3
29-Mar	1	3	3	3	Z	11	21	8	7	4	3	1	0	0	0	1	1	1	0	0	1	1	0	1	3.1	21
30-Mar	0	0	0	0	0	Z	0	2	11	7	6	5	3	1	0	0	0	0	0	0	0	0	0	0	1.5	11
31-Mar	Z	0	0	0	0	0	0	1	1	2	3	4	4	3	2	1	1	1	1	1	0	0	0	0	1.1	4
	1.0	0.6	0.3	0.3	0.5	1.3	2.6	4.2	5.4	5.3	4.7	4.0	3.5	3.9	3.6	2.4	2.1	2.1	2.6	2.9	1.4	1.5	1.1	1.0	Diurnal Average	
	14	5	3	3	2	11	21	18	20	18	16	24	26	40	32	12	13	14	31	35	12	15	11	11	Diurnal Maximum	

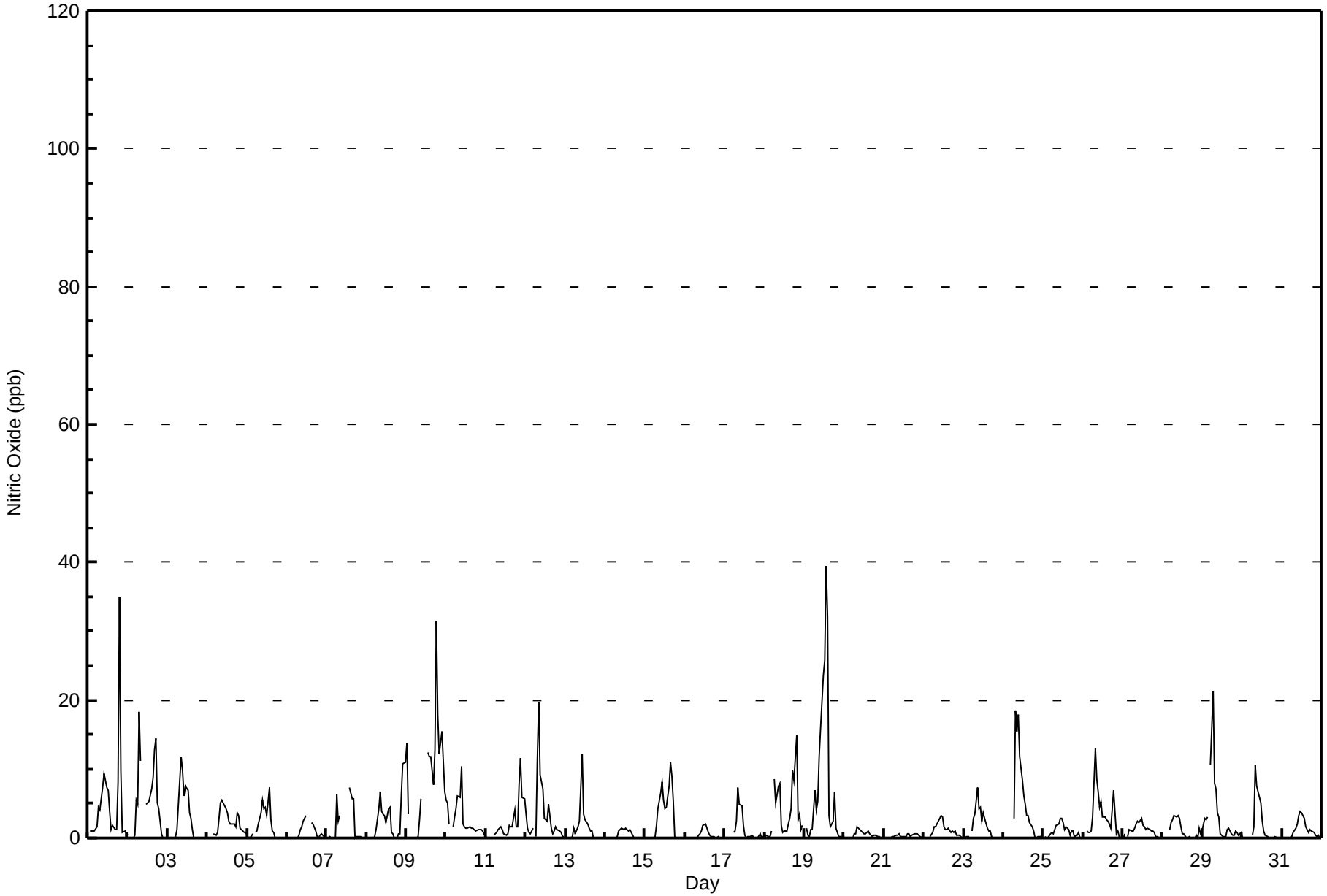
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Athabasca Valley - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	693	99.00	99.00
21 - 40	7	1.00	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: 700

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitric Oxide (NO) - ppb

Athabasca Valley - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	99	25	7	20	38	30	118	41	9	11	26	35	16	18	30	170	693
21 - 40	2	1	0	0	1	0	0	1	0	0	0	0	0	0	0	2	7
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	101	26	7	20	39	30	118	42	9	11	26	35	16	18	30	172	700

Total Number of Valid Hours: 700

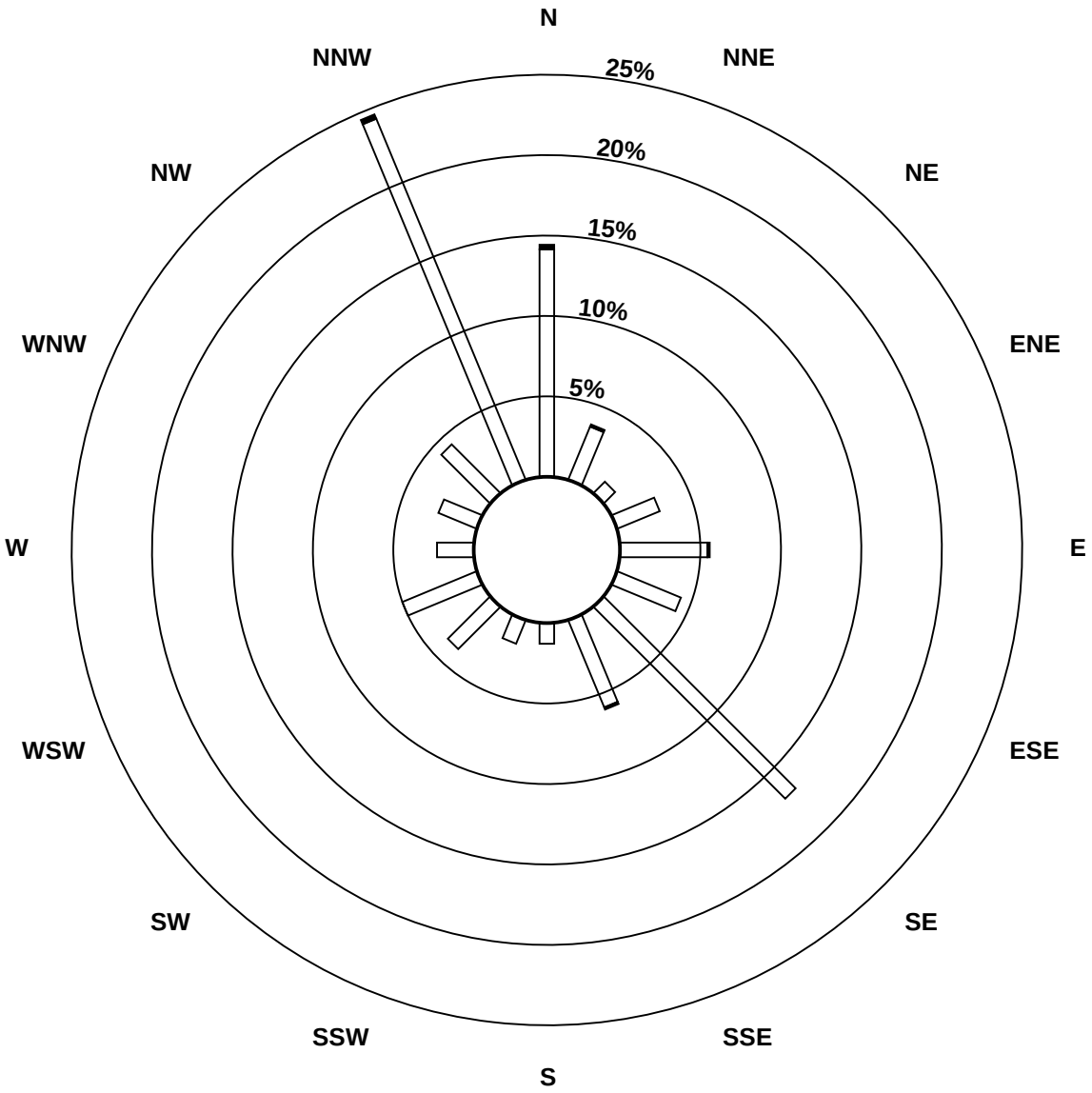
Total Number of Hours: 744

Wood Buffalo Environmental Association

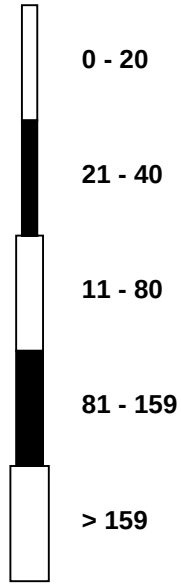
Wind Rose Mar 2016

Nitric Oxide (NO) - ppb

Athabasca Valley (AMS 7)



Classes (ppb)



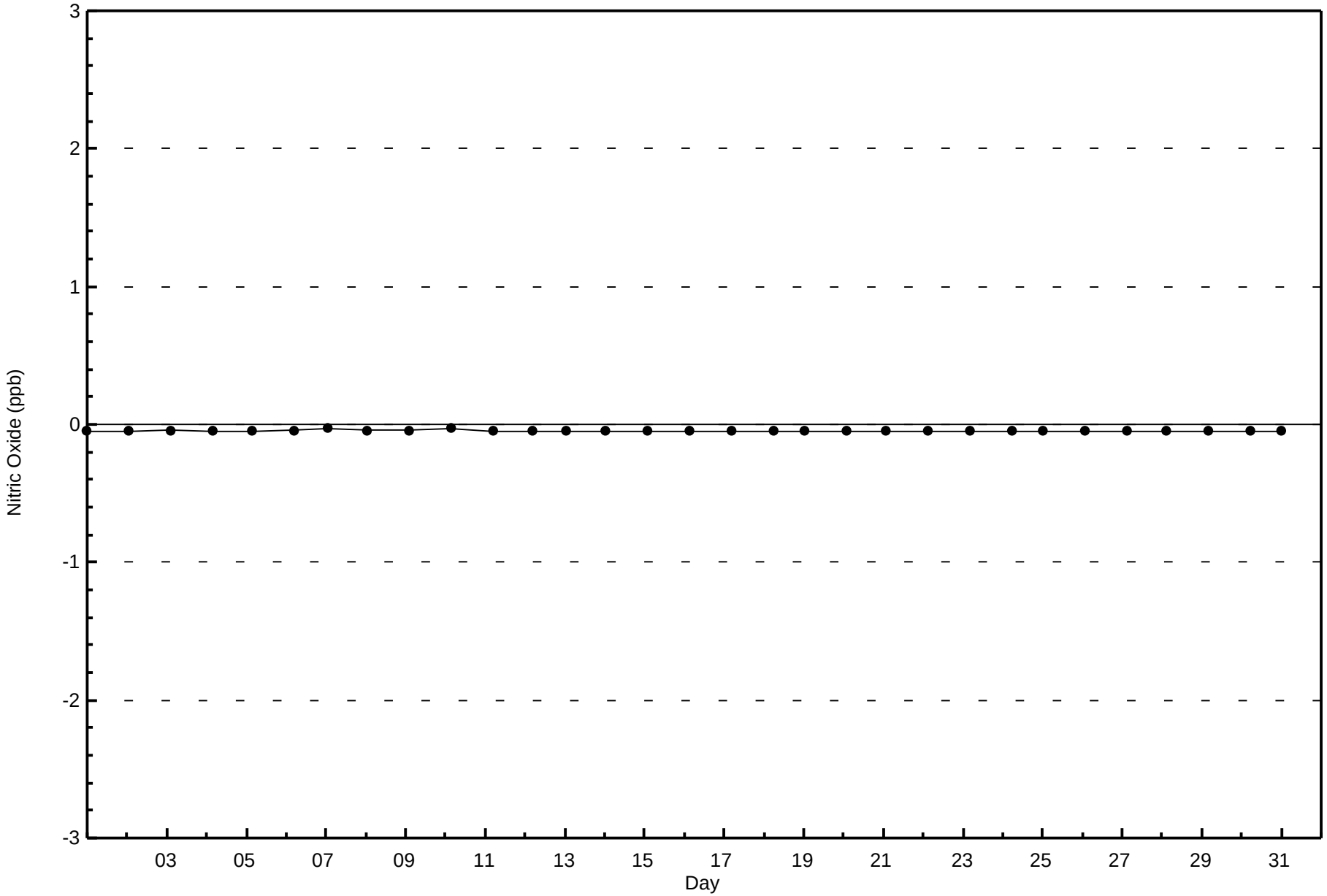
Total Number of Valid Hours: 700

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Athabasca Valley - March 2016

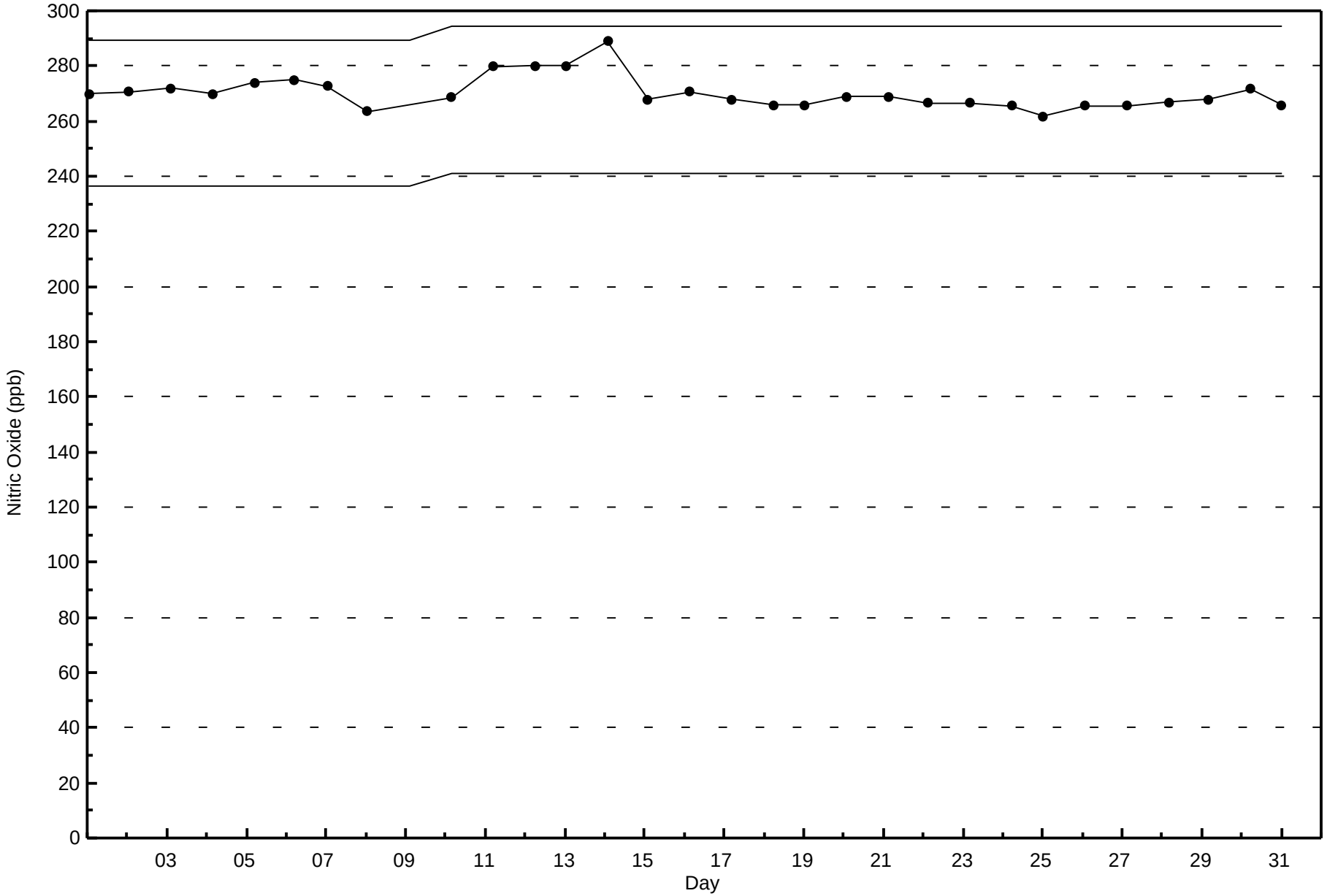


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Athabasca Valley - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Athabasca Valley - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 37 ppb on Mar 1 20:00

Maximum Daily Average: 15.4 ppb on Mar 9

Minimum Value: 0 ppb on Mar 7 00:00

Minimum Daily Average: 0.6 ppb on Mar 21

Maximum Diurnal Average: 12.8 ppb at hour 19

Minimum Diurnal Average: 5.4 ppb at hour 16

Monthly Average: 8.5 ppb

Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 4$ Median = 7 $Q_3 = 11$ $P_{90} = 18$ $P_{99} = 31$

Hours in Service:	744
Hours of Data:	700
Hours of Missing Data:	44
Hours of Calibration:	36
Percent Operational Time:	98.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	8	8	8	8	10	20	15	11	9	10	9	10	6	5	7	9	11	33	37	20	14	16	15	13.0	37
2-Mar	9	Z	9	9	13	23	22	24	14	PF	PF	7	8	7	10	12	20	27	28	29	18	12	10	10	15.2	29
3-Mar	9	7	Z	7	14	21	26	28	25	20	13	14	12	10	9	7	4	3	3	3	3	4	3	3	10.8	28
4-Mar	6	9	14	Z	12	12	12	15	17	13	9	6	5	4	4	5	6	9	20	20	10	6	6	6	9.7	20
5-Mar	4	6	7	7	Z	8	11	9	9	11	8	5	4	11	9	5	6	6	5	5	6	4	4	4	6.8	11
6-Mar	4	4	4	5	7	Z	19	12	8	6	5	6	PF	PF	M	7	9	11	13	15	16	5	0	0	7.8	19
7-Mar	Z	0	0	1	1	13	29	20	13	C	C	C	C	C	16	15	19	7	7	3	3	7	21	12	10.4	29
8-Mar	13	Z	12	12	10	11	14	18	16	9	8	8	6	7	9	3	5	8	13	18	23	31	31	31	13.7	31
9-Mar	31	28	Z	9	8	12	10	6	10	12	M	M	M	14	13	13	10	18	28	25	20	16	14	12	15.4	31
10-Mar	10	8	7	Z	6	6	7	8	7	9	5	4	3	4	3	4	3	4	5	7	9	8	9	7	6.2	10
11-Mar	6	5	3	2	Z	2	3	3	2	3	3	2	2	2	5	5	8	16	14	19	20	20	17	16	7.8	20
12-Mar	13	10	7	6	7	Z	6	11	12	7	6	5	5	5	8	3	3	5	14	18	12	10	9	9	8.2	18
13-Mar	Z	7	7	5	11	14	13	10	10	15	20	12	11	9	6	5	7	8	6	3	3	2	5	5	8.4	20
14-Mar	3	Z	2	2	1	1	2	3	4	4	4	3	3	3	2	4	3	3	4	3	5	5	6	5	3.2	6
15-Mar	5	7	Z	8	9	11	11	12	11	10	9	7	5	5	9	14	17	19	12	8	5	7	6	3	9.1	19
16-Mar	8	11	10	Z	9	3	3	2	3	3	3	6	6	4	4	3	4	6	7	8	8	5	5	7	5.5	11
17-Mar	5	5	3	3	Z	8	8	8	10	7	7	3	2	1	1	2	3	4	5	8	9	8	5	4	5.2	10
18-Mar	4	9	11	7	12	Z	22	15	13	11	3	1	1	2	3	5	9	22	30	34	17	16	7	7	11.3	34
19-Mar	Z	7	7	5	10	11	12	7	7	11	13	17	18	24	24	6	6	12	32	16	7	7	7	8	11.9	32
20-Mar	6	Z	2	2	1	0	1	2	5	3	2	1	1	1	2	1	1	1	1	1	1	1	1	0	1.6	6
21-Mar	0	0	Z	0	0	0	1	1	0	1	1	0	0	0	1	1	1	1	1	1	2	0	0	3	0.6	3
22-Mar	4	4	3	Z	7	11	10	8	6	5	5	5	3	2	3	3	4	5	7	8	7	7	6	6	5.4	11
23-Mar	6	6	6	7	Z	12	16	14	13	10	10	6	8	7	4	3	4	3	3	5	6	10	15	20	8.4	20
24-Mar	21	19	18	20	20	Z	16	23	19	19	14	10	8	7	6	7	7	10	19	24	19	12	9	12	14.7	24
25-Mar	Z	8	7	8	11	12	8	7	7	6	6	5	4	4	6	5	7	9	18	7	10	8	4	6	7.5	18
26-Mar	9	Z	14	14	17	18	17	15	10	10	8	8	6	5	6	6	7	9	29	24	17	14	12	8	12.3	29
27-Mar	7	9	Z	5	6	8	6	4	4	5	4	5	4	4	3	4	4	6	11	13	8	6	5	6	5.9	13
28-Mar	6	6	6	Z	10	10	10	7	7	6	5	4	2	2	1	1	2	2	7	5	6	4	8	14	5.7	14
29-Mar	20	23	23	18	Z	26	25	15	13	9	5	2	2	1	1	4	6	5	12	10	9	14	8	5	11.1	26
30-Mar	2	4	4	3	2	Z	3	4	14	13	12	12	7	3	2	2	2	4	4	2	3	2	1	2	4.6	14
31-Mar	Z	2	4	2	4	8	6	5	5	5	6	7	8	7	7	6	7	9	9	10	11	9	10	7	6.6	11
	8.3	8.2	7.6	6.7	8.3	10.4	11.9	10.7	9.9	8.6	7.3	6.2	5.5	5.6	6.0	5.4	6.5	8.5	12.8	12.5	10.0	8.8	8.4	8.1	Diurnal Average	
	31	28	23	20	20	26	29	28	25	20	20	17	18	24	24	15	20	27	33	37	23	31	31	31	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance PF - Power Failure

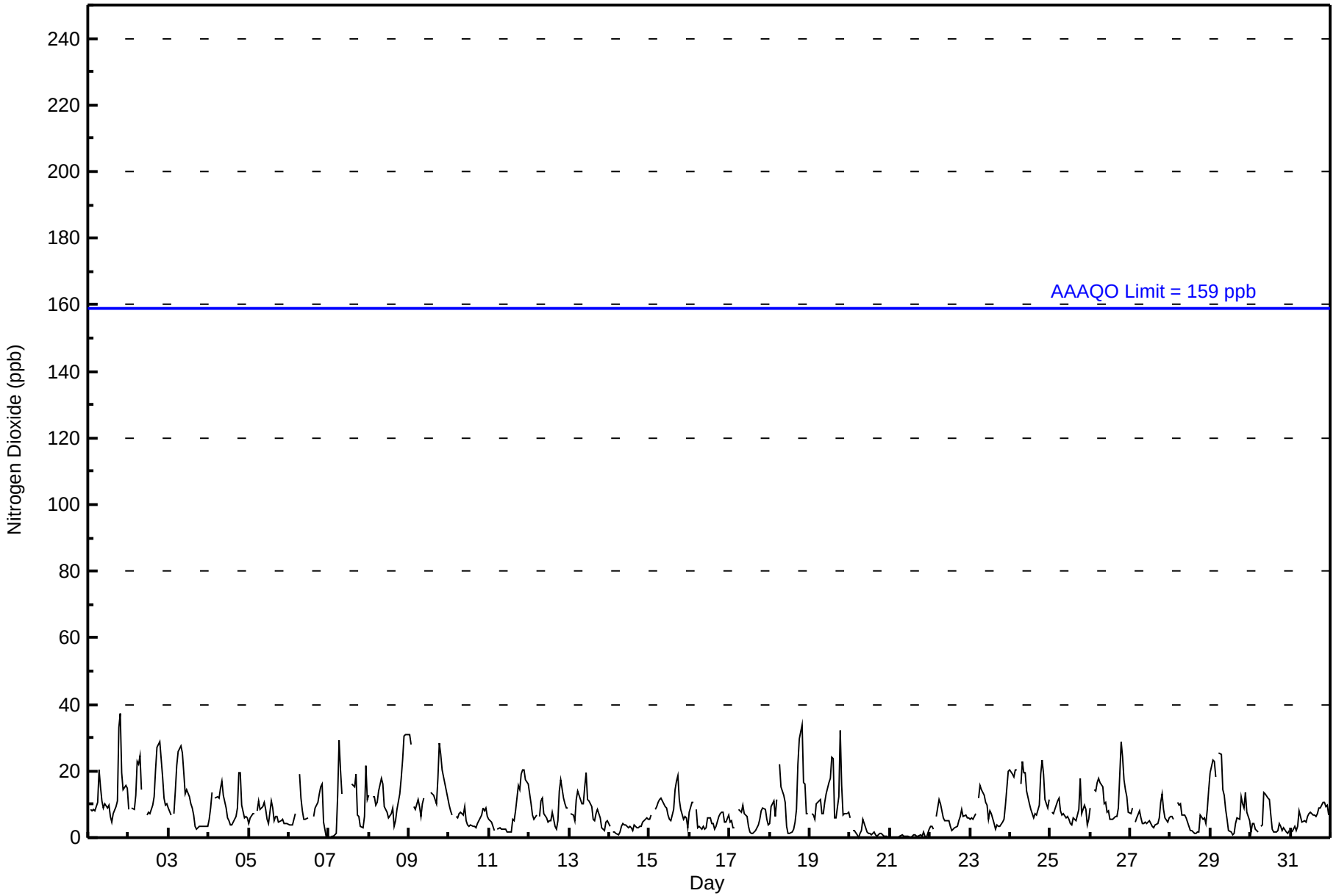
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Athabasca Valley - March 2016



Nitrogen Dioxide (NO_2) - ppb
Athabasca Valley - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	662	94.57	94.57
21 - 40	38	5.43	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: 700

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Athabasca Valley - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	90	25	5	20	38	30	113	37	8	11	26	33	16	18	25	167	662
21 - 40	11	1	2	0	1	0	5	5	1	0	0	2	0	0	5	5	38
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	101	26	7	20	39	30	118	42	9	11	26	35	16	18	30	172	700

Total Number of Valid Hours: 700

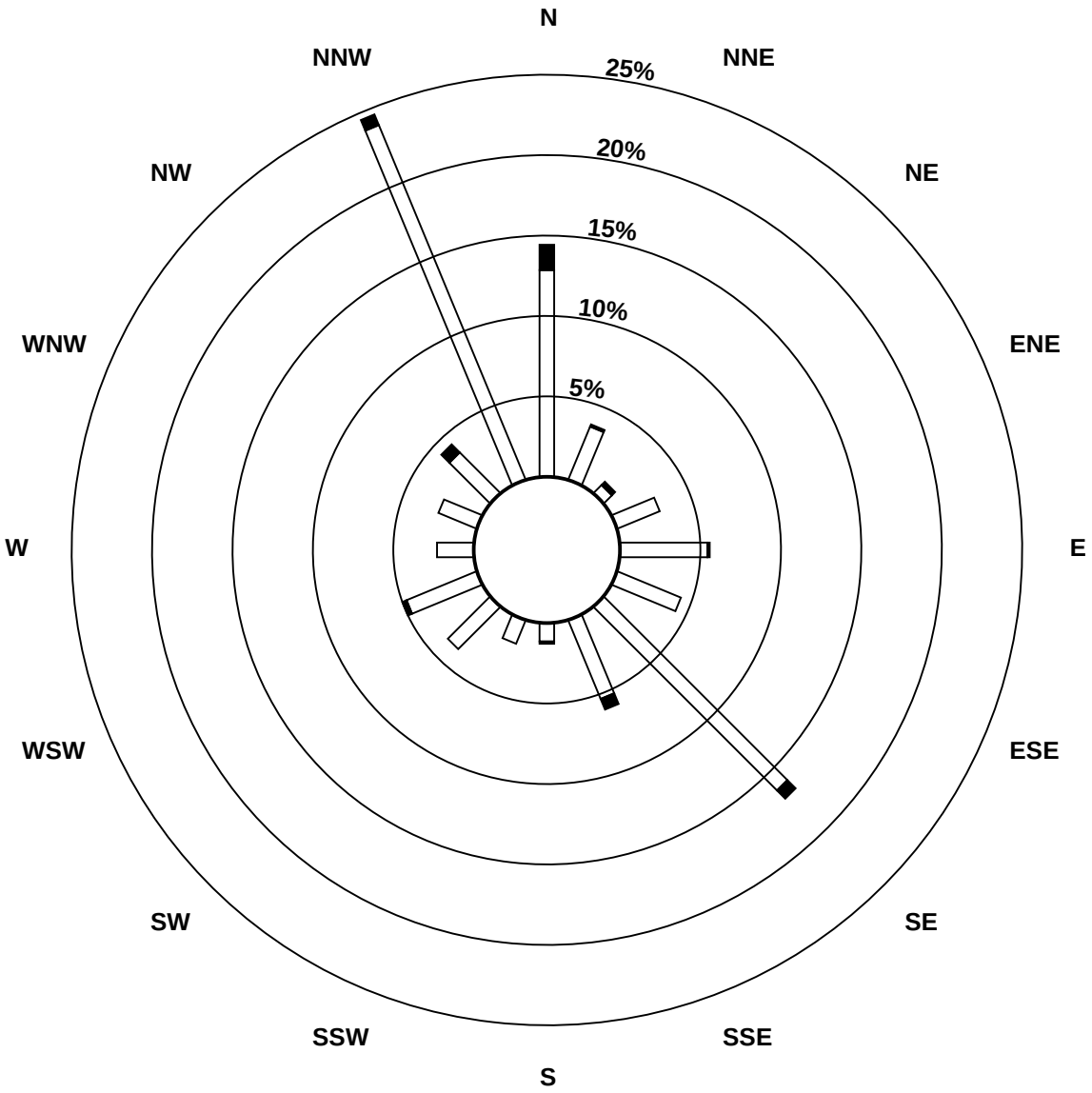
Total Number of Hours: 744

Wood Buffalo Environmental Association

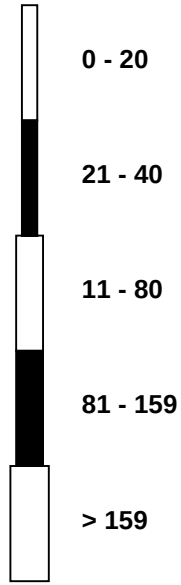
Wind Rose Mar 2016

Nitrogen Dioxide (NO_2) - ppb

Athabasca Valley (AMS 7)



Classes (ppb)



0 - 20

21 - 40

11 - 80

81 - 159

> 159

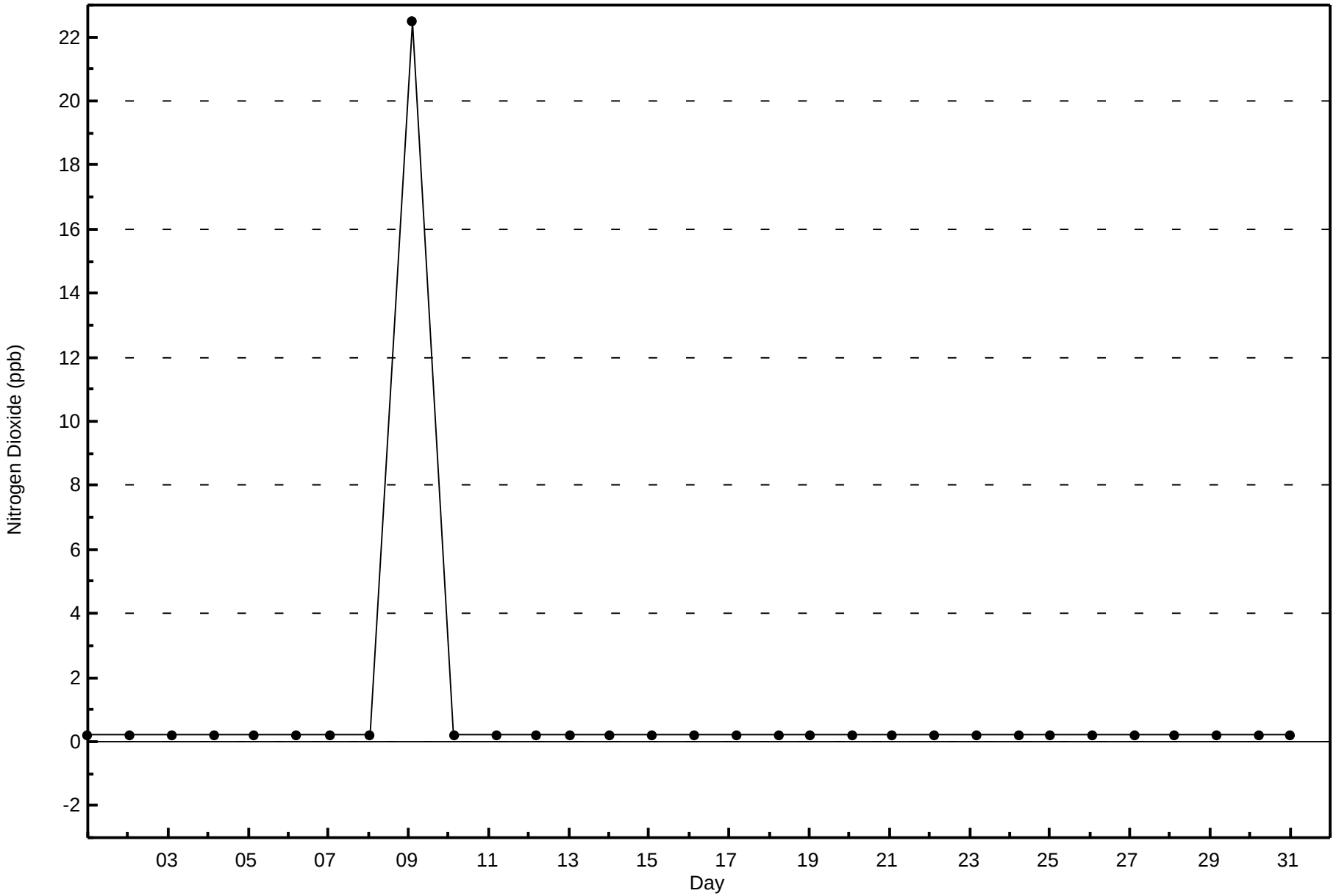
Total Number of Valid Hours: 700

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Athabasca Valley - March 2016

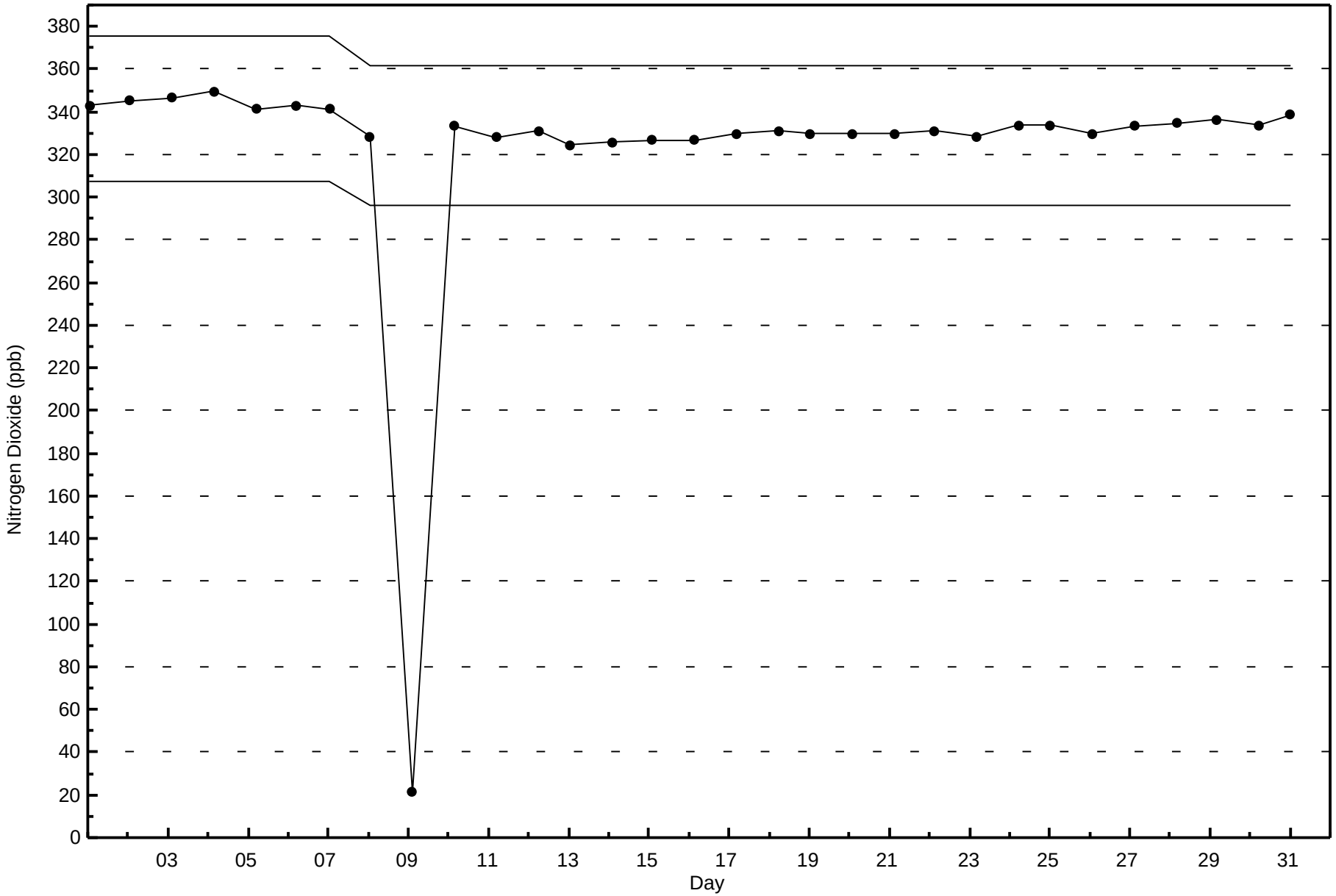


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Athabasca Valley - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Athabasca Valley - March 2016

Maximum Value: 72 ppb on Mar 1 20:00

Maximum Daily Average: 24.3 ppb on Mar 9

Minimum Value: 0 ppb on Mar 21 01:00

Minimum Daily Average: 0.9 ppb on Mar 21

Maximum Diurnal Average: 15.4 ppb at hour 19

Minimum Diurnal Average: 7.0 ppb at hour 4

Monthly Average: 10.9 ppb

Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 5$ Median = 8 $Q_3 = 13$ $P_{90} = 23$ $P_{99} = 44$

Hours in Service:	744
Hours of Data:	700
Hours of Missing Data:	44
Hours of Calibration:	36
Percent Operational Time:	98.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	9	9	9	9	12	25	19	17	16	20	16	16	10	6	9	11	12	41	72	30	15	17	15	18.1	72
2-Mar	9	Z	9	9	13	29	27	43	26	PF	PF	12	13	12	17	21	33	42	33	33	19	12	10	10	20.4	43
3-Mar	9	7	Z	7	14	22	27	36	37	29	19	22	19	14	12	8	4	3	3	3	3	4	3	3	13.4	37
4-Mar	5	9	14	Z	12	13	12	18	22	18	14	10	9	6	6	7	8	11	23	23	11	7	7	7	11.8	23
5-Mar	5	6	7	8	Z	9	12	11	13	16	13	10	7	18	12	6	7	6	5	5	5	4	4	4	8.5	18
6-Mar	4	4	4	5	7	Z	19	12	9	7	8	9	PF	PF	M	9	11	12	13	15	17	5	0	0	8.5	19
7-Mar	Z	0	0	1	1	13	35	23	16	C	C	C	C	C	23	21	25	7	7	3	3	7	21	12	12.2	35
8-Mar	13	Z	12	12	10	11	15	22	23	13	12	11	8	11	13	4	5	8	13	18	24	37	42	42	16.5	42
9-Mar	45	32	Z	9	8	11	9	7	13	18	M	M	M	26	25	24	18	31	60	43	33	32	25	18	24.3	60
10-Mar	15	13	9	Z	8	9	11	14	13	20	7	5	5	5	5	5	4	5	6	8	10	9	10	7	8.9	20
11-Mar	6	5	3	2	Z	3	4	4	4	4	4	3	2	3	7	7	10	20	16	20	28	32	23	21	10.0	32
12-Mar	17	12	7	6	8	Z	7	22	32	17	13	7	8	8	13	5	3	6	15	19	13	11	9	9	11.6	32
13-Mar	Z	7	7	5	12	16	13	12	13	23	32	15	14	11	7	6	8	8	6	3	3	2	5	5	10.1	32
14-Mar	3	Z	2	2	1	1	2	3	5	5	5	4	5	4	3	5	3	3	4	3	5	5	6	5	3.7	6
15-Mar	5	7	Z	8	9	11	11	14	15	16	17	12	10	10	16	25	26	24	12	8	5	6	6	3	12.1	26
16-Mar	8	10	10	Z	9	3	3	2	4	3	4	8	8	6	5	3	4	7	7	8	8	5	5	7	5.9	10
17-Mar	5	5	3	3	Z	9	9	10	17	12	11	5	2	1	2	2	3	4	5	8	9	9	6	4	6.3	17
18-Mar	4	10	11	7	13	Z	31	20	20	19	5	2	3	3	4	7	13	32	38	49	19	20	8	9	15.1	49
19-Mar	Z	9	7	6	11	12	18	11	12	22	29	40	44	64	56	9	8	15	39	17	8	7	7	8	20.0	64
20-Mar	6	Z	2	2	1	0	2	3	7	4	3	2	2	1	3	1	1	1	1	2	1	1	1	0	2.0	7
21-Mar	0	0	Z	0	0	0	1	1	1	1	1	1	0	1	2	2	1	1	1	1	2	1	0	3	0.9	3
22-Mar	4	4	3	Z	7	12	12	9	8	8	8	8	5	3	4	4	4	6	7	9	7	7	6	6	6.5	12
23-Mar	6	6	6	7	Z	13	19	18	20	15	14	8	12	10	6	4	5	4	3	5	6	10	15	20	9.9	20
24-Mar	20	19	18	20	20	Z	19	41	35	37	26	19	14	12	9	10	9	11	20	24	19	12	9	12	19.0	41
25-Mar	Z	8	7	8	12	13	9	8	9	8	9	8	6	5	8	6	7	10	19	7	10	9	4	6	8.5	19
26-Mar	9	Z	15	15	17	19	20	28	19	17	12	13	9	8	8	9	8	10	36	28	18	15	13	8	15.4	36
27-Mar	7	9	Z	5	7	9	7	6	6	7	7	8	6	5	4	5	5	7	11	14	9	6	5	6	7.0	14
28-Mar	6	6	6	Z	12	12	13	10	10	9	8	5	3	3	1	1	2	2	7	5	6	4	10	15	6.8	15
29-Mar	21	26	25	21	Z	36	46	22	20	12	8	3	2	1	1	6	7	6	13	10	10	14	8	6	14.2	46
30-Mar	2	5	4	2	2	Z	4	6	24	20	18	17	9	4	2	2	2	4	4	2	3	2	1	2	6.1	24
31-Mar	Z	2	4	2	4	8	6	5	6	7	10	11	11	10	8	7	8	10	10	11	11	10	10	7	7.8	11
	9.3	8.8	7.9	7.0	8.7	11.7	14.5	14.9	15.3	13.9	12.0	10.1	9.0	9.5	9.6	7.8	8.6	10.5	15.4	15.4	11.4	10.3	9.6	9.0	Diurnal Average	
	45	32	25	21	20	36	46	43	37	37	32	40	44	64	56	25	33	42	60	72	33	37	42	42	Diurnal Maximum	

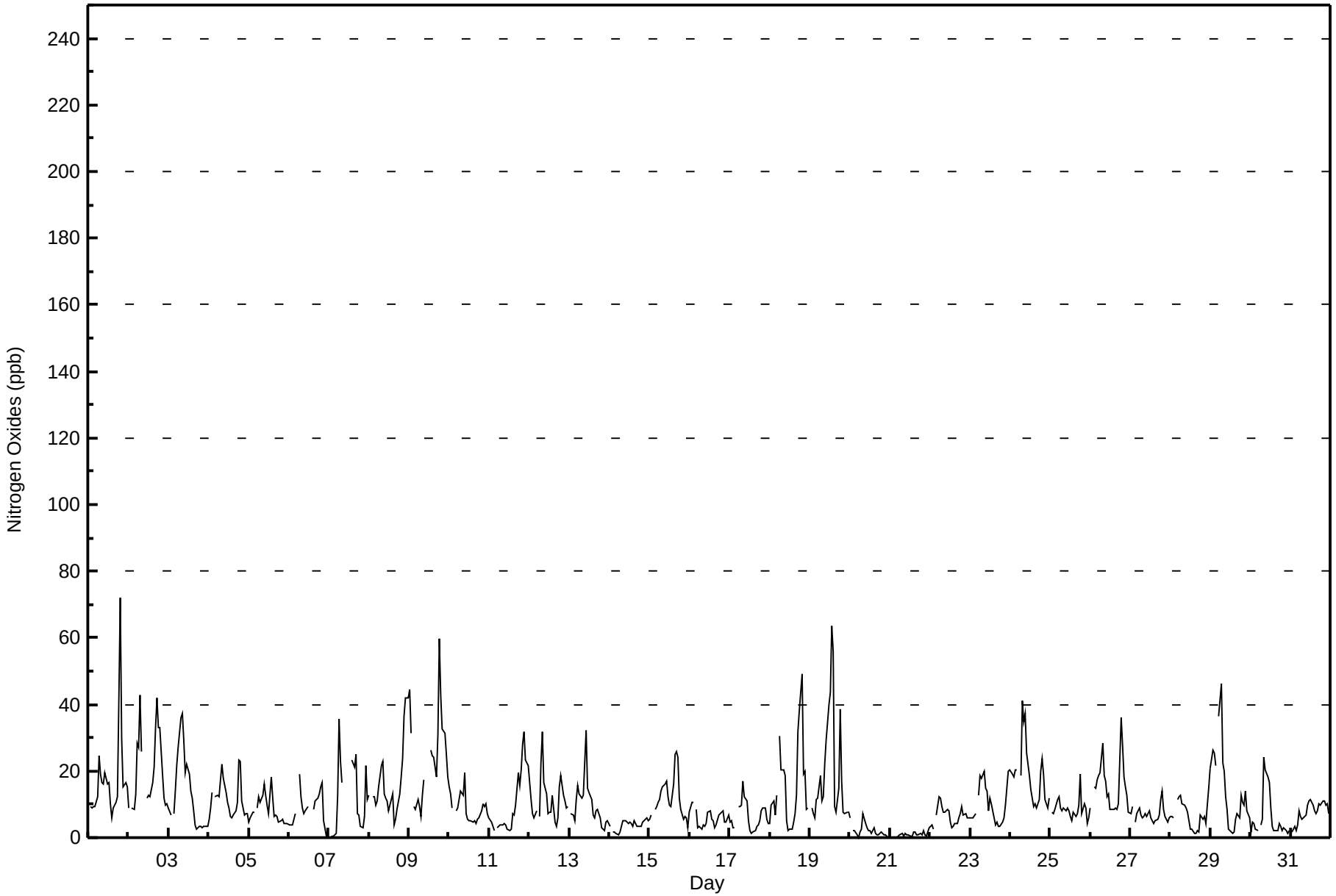
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Athabasca Valley - March 2016



Nitrogen Oxides (NO_X) - ppb
Athabasca Valley - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	617	88.14	88.14
21 - 40	68	9.71	97.86
11 - 80	15	2.14	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 700

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Athabasca Valley - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	85	20	5	18	37	29	109	32	8	10	23	33	15	17	21	155	617
21 - 40	12	5	2	2	1	1	8	9	1	1	3	1	1	1	6	14	68
11 - 80	4	1	0	0	1	0	1	1	0	0	0	1	0	0	3	3	15
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	101	26	7	20	39	30	118	42	9	11	26	35	16	18	30	172	700

Total Number of Valid Hours: 700

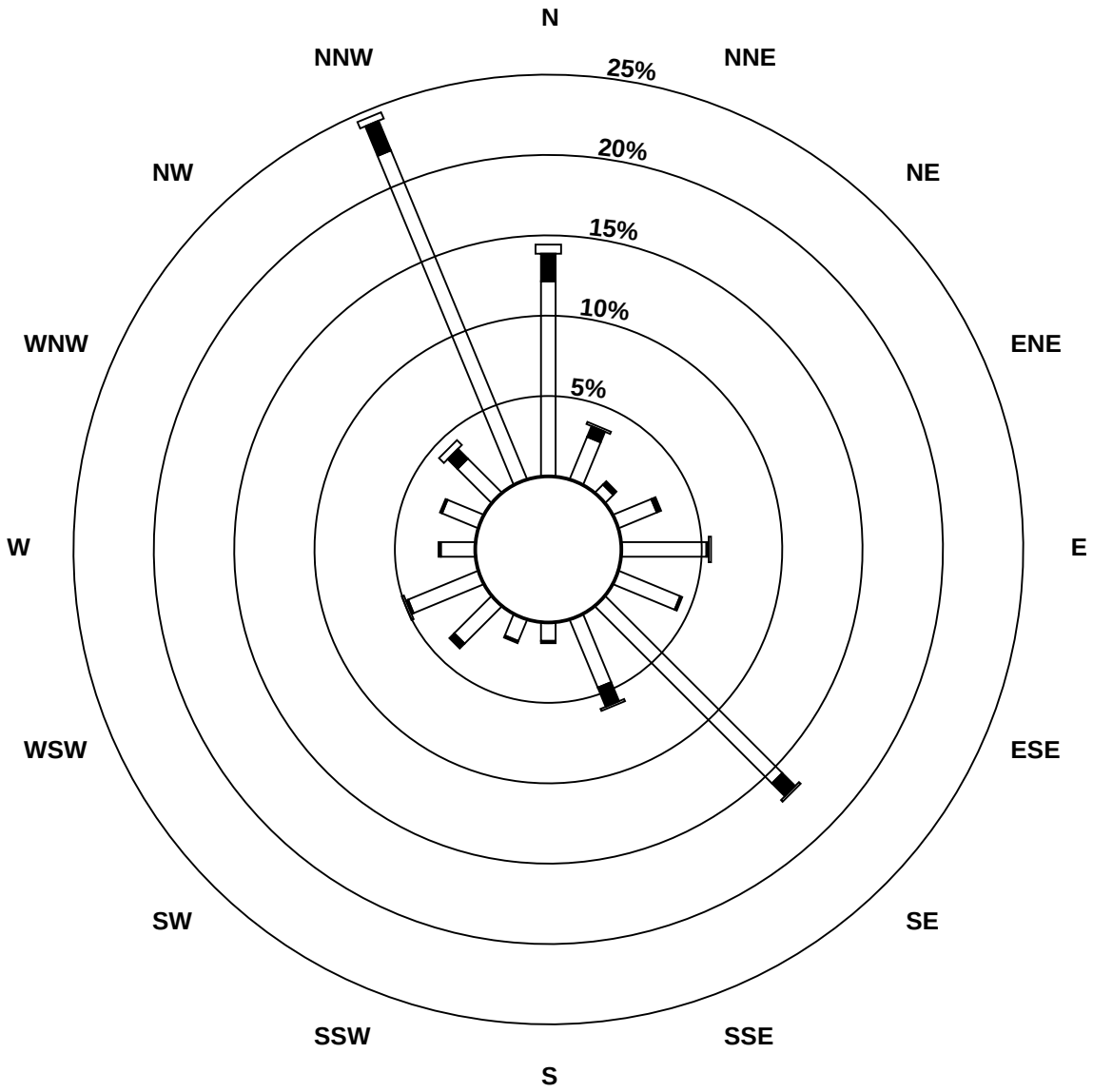
Total Number of Hours: 744

Wood Buffalo Environmental Association

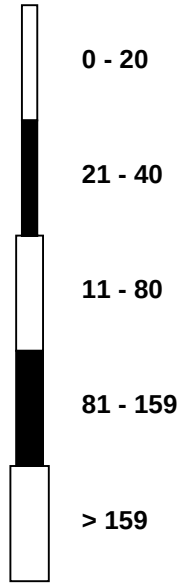
Wind Rose Mar 2016

Nitrogen Oxides (NO_X) - ppb

Athabasca Valley (AMS 7)



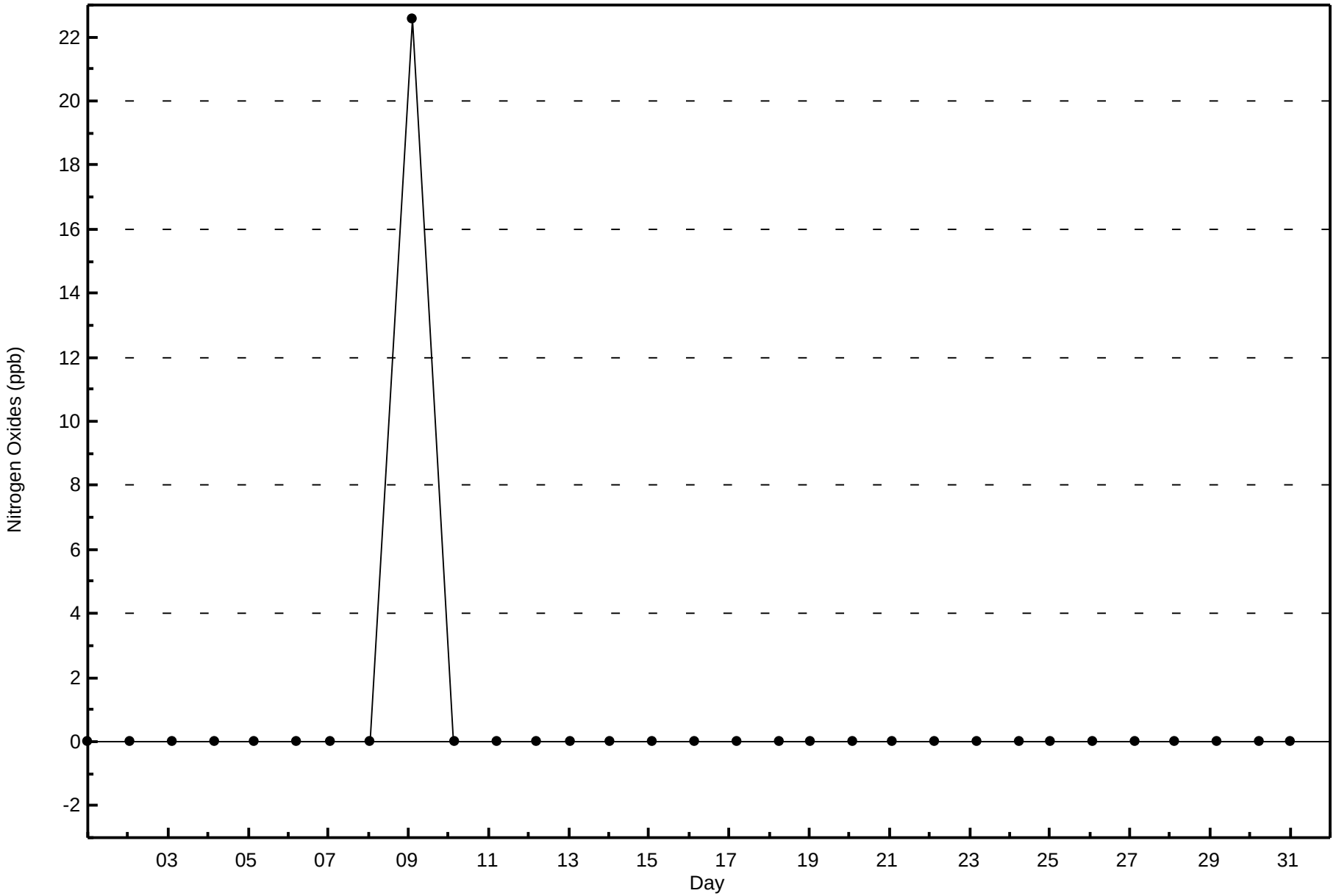
Classes (ppb)



Total Number of Valid Hours: 700

Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_X) - ppb
Athabasca Valley - March 2016

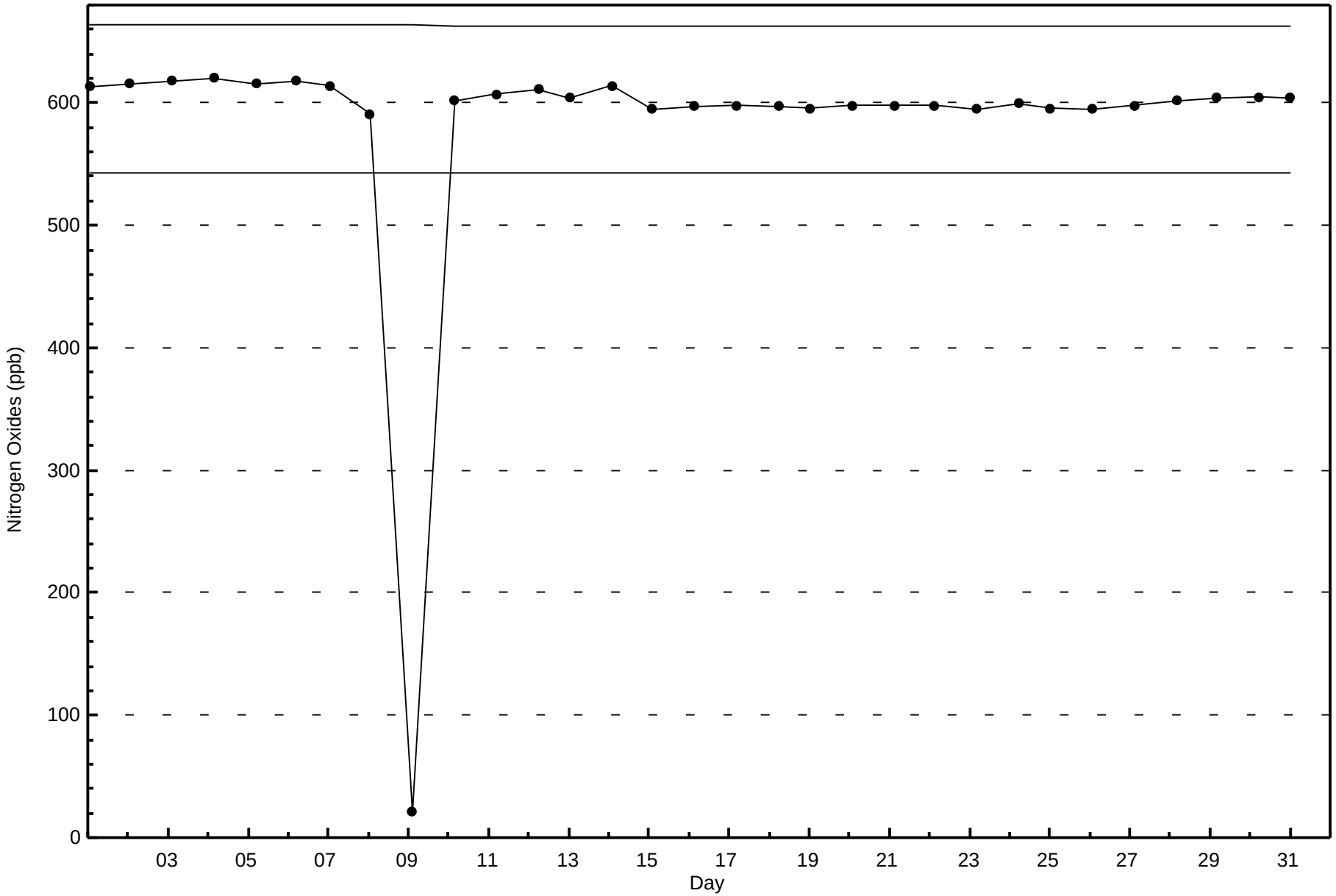


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Athabasca Valley - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Athabasca Valley - March 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 22.6 $\mu g/m^3$ on Mar 15 17:00

Maximum Daily Average: 10.9 $\mu g/m^3$ on Mar 8

Minimum Value: 0.1 $\mu g/m^3$ on Mar 13 20:00

Minimum Daily Average: 0.8 $\mu g/m^3$ on Mar 20

Maximum Diurnal Average: 5.3 $\mu g/m^3$ at hour 19

Minimum Diurnal Average: 3.2 $\mu g/m^3$ at hour 16

Monthly Average: 4.23 $\mu g/m^3$

Percentiles: P_1 = 0.3 P_{10} = 1.1 Q_1 = 1.7 Median = 3.3 Q_3 = 5.8 P_{90} = 9.0 P_{99} = 13.9

Hours in Service:	744
Hours of Data:	730
Hours of Missing Data:	14
Hours of Calibration:	1
Percent Operational Time:	98.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	9.0	6.4	4.3	3.9	3.7	3.6	3.6	3.5	5.1	4.5	6.0	5.0	4.4	3.3	2.7	3.4	3.4	3.7	6.8	9.0	5.3	3.8	4.7	5.4	4.8	9.0
2-Mar	4.8	4.2	4.4	4.7	5.3	6.0	6.3	6.0	4.8	PF	PF	4.8	5.6	5.7	6.0	6.3	8.6	8.5	8.8	13.8	15.3	7.6	6.1	5.5	6.8	15.3
3-Mar	5.8	5.8	5.0	4.9	6.3	7.4	7.9	7.8	7.8	7.4	5.0	4.2	3.3	3.4	4.2	3.3	2.8	3.4	3.6	4.1	3.2	2.5	2.1	1.9	4.7	7.9
4-Mar	2.5	2.6	2.9	2.9	2.9	2.9	2.8	3.2	3.3	3.2	2.6	2.2	1.9	1.3	1.1	1.2	1.5	1.4	4.2	3.6	2.7	1.6	1.6	1.4	2.4	4.2
5-Mar	0.8	0.8	1.0	1.1	1.2	1.6	1.8	2.0	2.4	3.5	8.0	13.9	12.9	9.6	4.9	2.7	2.4	2.3	1.7	1.4	1.6	1.8	1.8	1.5	3.5	13.9
6-Mar	1.9	1.9	1.9	1.9	2.3	2.3	2.5	2.5	2.4	2.2	2.0	1.5	PF	PF	1.6	1.6	1.9	2.2	2.2	2.6	2.8	1.6	1.2	1.2	2.0	2.8
7-Mar	1.2	1.5	1.4	1.4	1.7	2.7	4.6	5.2	4.3	3.4	3.7	3.2	4.3	4.3	5.3	5.3	5.0	4.4	4.8	4.2	3.8	3.9	7.4	12.3	4.1	12.3
8-Mar	7.1	8.8	10.2	10.1	10.3	10.3	10.5	10.7	11.0	5.9	4.5	C	9.9	10.5	10.0	7.5	8.3	9.2	12.9	13.5	18.4	20.3	17.1	13.8	10.9	20.3
9-Mar	12.8	12.5	12.2	10.7	11.3	11.3	9.7	7.9	9.9	10.5	10.9	11.3	9.7	8.7	9.0	10.7	10.2	11.4	14.2	11.5	8.2	6.3	6.5	5.8	10.1	14.2
10-Mar	5.8	6.2	5.5	6.2	7.4	7.5	10.7	11.3	13.2	10.9	5.8	4.8	3.3	2.7	2.3	1.3	1.0	1.3	2.2	3.5	4.5	3.8	4.1	2.8	5.3	13.2
11-Mar	2.2	1.6	1.2	1.1	0.9	1.1	1.4	1.5	1.7	2.4	3.3	4.1	3.7	3.9	4.8	4.4	5.6	7.5	7.6	8.0	9.3	8.9	9.1	8.9	4.4	9.3
12-Mar	7.9	6.5	5.5	5.3	2.4	3.0	4.3	6.9	6.4	5.2	3.8	1.8	1.8	1.3	1.4	0.4	0.1	0.5	1.4	2.2	2.0	1.9	1.9	1.5	3.1	7.9
13-Mar	1.6	1.5	1.6	1.5	1.7	2.0	1.7	1.8	1.9	4.2	5.4	4.0	4.3	4.3	1.5	0.8	1.0	0.7	0.5	0.1	0.3	0.5	5.1	4.8	2.2	5.4
14-Mar	1.9	2.1	1.9	1.8	1.6	1.1	1.1	1.1	1.3	1.8	1.9	1.9	1.9	1.9	1.4	1.2	1.0	1.0	1.0	1.0	1.7	1.8	2.2	2.6	1.6	2.6
15-Mar	3.9	4.8	6.2	5.5	5.9	6.3	6.5	7.2	6.5	5.6	4.4	4.6	4.3	3.5	5.4	11.3	22.6	17.3	4.0	1.8	1.0	1.1	1.1	0.9	5.9	22.6
16-Mar	1.7	1.5	1.8	1.8	2.1	1.9	1.8	1.6	1.7	1.7	1.7	1.9	1.6	1.7	1.7	1.6	1.6	1.9	1.9	2.5	2.5	1.5	1.5	1.5	1.8	2.5
17-Mar	1.4	1.7	1.6	1.6	1.7	1.6	1.6	1.7	1.9	2.2	1.8	1.6	0.7	1.1	1.2	1.2	1.3	1.3	1.4	1.6	1.5	1.6	1.7	1.3	1.5	2.2
18-Mar	1.4	1.9	2.3	2.0	2.6	3.1	3.0	4.3	2.9	1.3	0.6	0.6	0.5	0.5	0.5	0.7	1.3	5.0	8.3	11.0	4.1	4.5	1.6	1.8	2.7	11.0
19-Mar	1.8	2.3	1.8	1.6	2.8	2.9	2.3	1.8	2.2	2.8	5.7	8.3	9.5	11.7	13.3	2.1	1.9	4.0	7.9	4.0	1.6	2.0	2.3	2.2	4.1	13.3
20-Mar	1.8	1.2	0.6	0.6	0.6	0.7	0.8	0.9	1.8	2.2	1.9	1.6	1.0	0.6	0.7	0.2	0.1	0.2	0.3	0.4	0.4	0.4	0.6	0.6	0.8	2.2
21-Mar	0.6	0.6	0.7	1.0	1.9	2.0	2.0	2.2	1.8	2.3	1.4	1.2	0.9	0.8	0.8	0.8	0.9	1.0	1.5	1.5	1.5	1.5	1.6	1.4	1.3	2.3
22-Mar	1.1	1.3	2.3	2.7	3.4	4.9	5.1	4.7	3.7	3.5	3.2	2.8	1.5	1.1	1.1	1.0	1.3	1.6	2.1	2.0	1.5	1.5	1.7	2.2	2.4	5.1
23-Mar	3.4	4.0	3.9	3.8	4.0	3.9	4.1	5.5	6.7	6.1	5.6	4.2	4.7	4.3	3.6	3.0	3.3	3.1	3.0	3.4	3.6	4.7	6.2	7.3	4.4	7.3
24-Mar	6.7	10.1	8.1	8.3	7.9	8.8	7.0	10.5	9.3	10.6	7.8	6.4	6.1	4.8	4.9	6.3	7.3	8.1	11.7	12.8	12.8	13.8	10.2	9.4	8.7	13.8
25-Mar	7.9	7.8	7.8	7.3	7.3	6.7	6.3	6.3	6.6	5.8	5.4	5.9	6.1	5.2	5.9	5.0	5.4	6.2	9.3	4.7	4.9	5.8	3.7	4.4	6.2	9.3
26-Mar	6.4	8.2	7.8	7.2	7.6	9.8	9.4	10.1	8.7	9.8	6.8	6.0	4.9	4.7	5.4	5.8	6.2	7.8	17.7	15.0	12.0	8.8	7.6	5.5	8.3	17.7
27-Mar	5.3	5.9	5.3	5.3	5.4	5.5	4.9	4.4	4.4	5.3	4.5	4.6	2.5	2.4	0.9	0.4	UO	UO	1.1	2.5	2.9	2.6	2.6	2.5	3.7	5.9
28-Mar	2.4	2.9	2.1	2.3	2.5	2.8	2.9	3.4	4.4	4.1	3.3	2.3	1.2	UO	UO	UO	UO	UO	5.8	2.1	2.7	2.2	2.7	3.2	2.9	5.8
29-Mar	4.9	5.9	5.3	4.2	4.4	4.4	4.5	3.1	3.9	3.3	2.3	1.7	1.4	0.3	UO	1.0	2.5	2.4	8.0	6.3	4.8	6.2	4.5	3.0	3.8	8.0
30-Mar	1.7	2.5	2.0	1.4	1.2	1.2	1.3	1.8	5.0	4.2	9.0	9.2	4.8	3.0	0.9	0.3	UO	1.4	2.6	2.0	1.6	1.2	1.0	1.1	2.6	9.2
31-Mar	1.5	2.1	2.4	2.1	2.1	2.2	2.2	2.3	3.3	3.7	4.0	5.1	4.3	4.1	4.6	4.9	5.5	5.6	5.4	6.1	5.6	5.9	6.1	4.8	4.0	6.1
	3.8	4.1	3.9	3.8	3.9	4.2	4.3	4.6	4.9	4.7	4.4	4.4	4.1	3.8	3.7	3.2	4.1	4.3	5.3	5.1	4.7	4.2	4.1	3.9	Diurnal Average	
	12.8	12.5	12.2	10.7	11.3	11.3	10.7	11.3	13.2	10.9	10.9	13.9	12.9	11.7	13.3	11.3	22.6	17.3	17.7	15.0	18.4	20.3	17.1	13.8	Diurnal Maximum	

C - Calibration UO - Unstable Operation PF - Power Failure

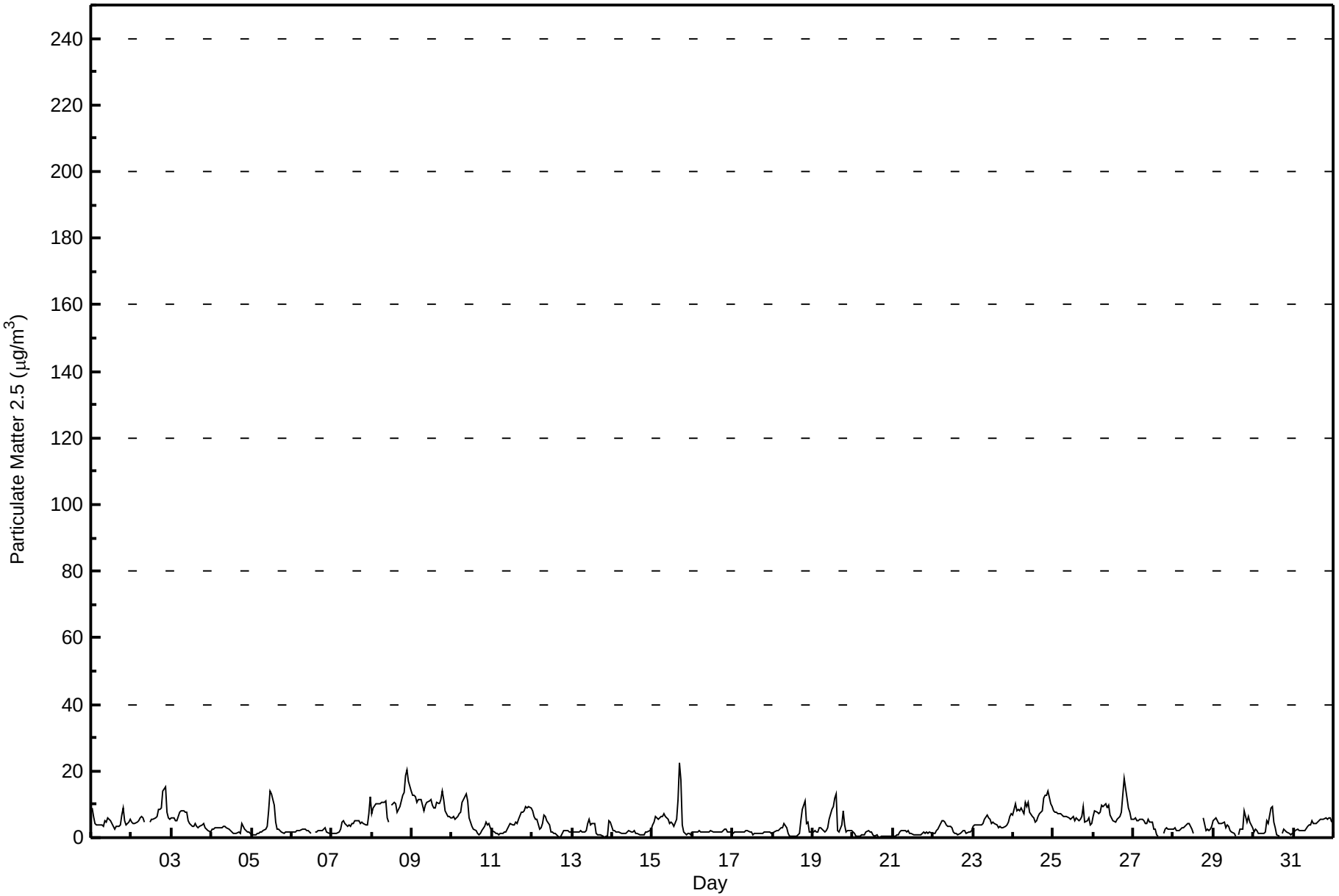
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Athabasca Valley - March 2016



Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Athabasca Valley - March 2016

Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	468	64.11	64.11
6 - 15	195	26.71	90.82
16 - 25	6	0.82	91.64
26 - 80	0	0.00	91.64
> 81.0	0	0.00	91.64

Total Number of Valid Hours: 730

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Athabasca Valley - March 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	60	16	2	8	20	18	98	33	5	8	22	17	14	15	18	114	468
6 - 15	42	10	4	5	2	6	18	9	4	3	4	18	5	4	9	52	195
16 - 25	0	1	0	0	0	0	0	1	0	0	0	0	0	0	3	1	6
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	27	6	13	22	24	116	43	9	11	26	35	19	19	30	167	669

Total Number of Valid Hours: 730

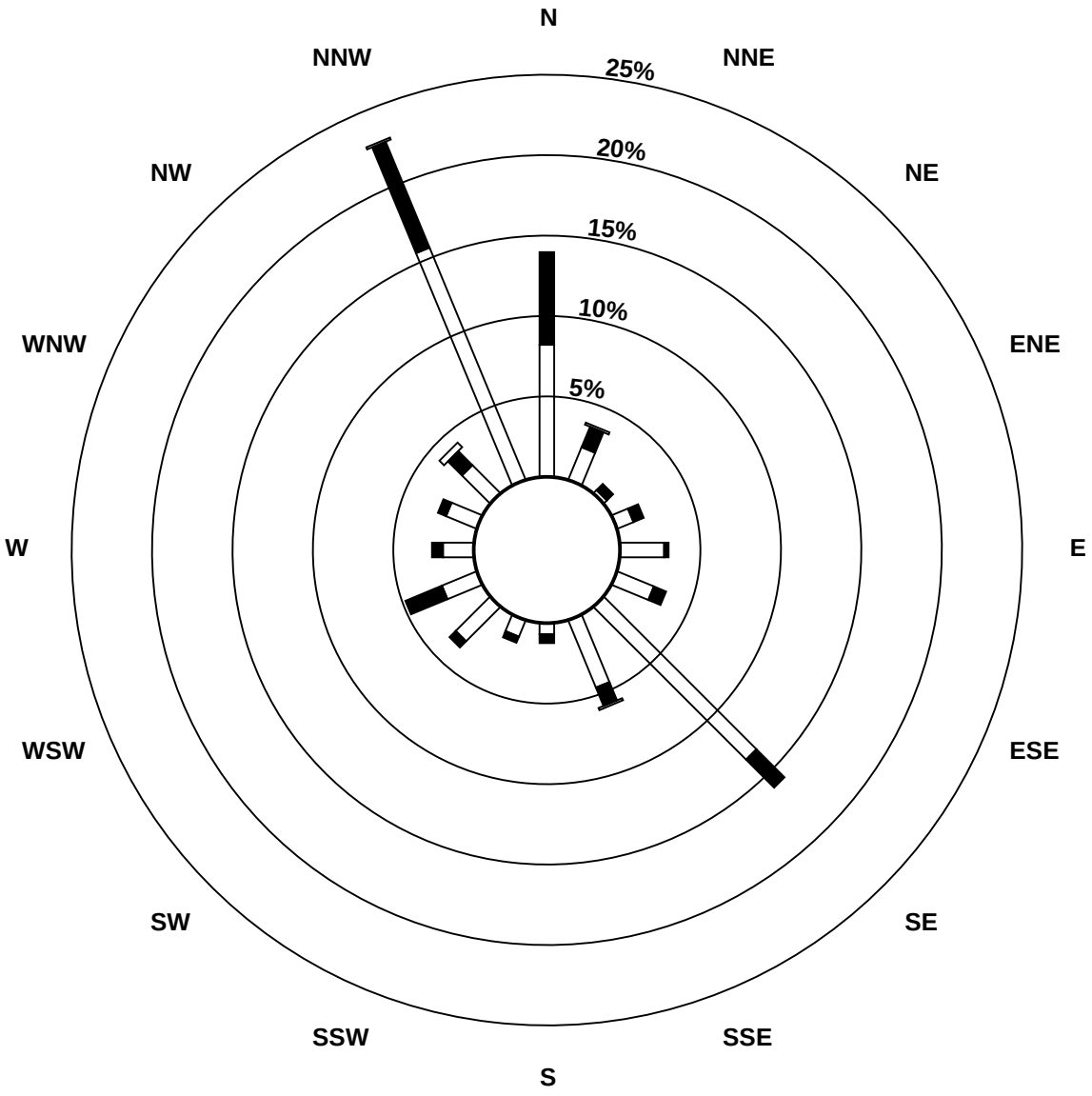
Total Number of Hours: 744

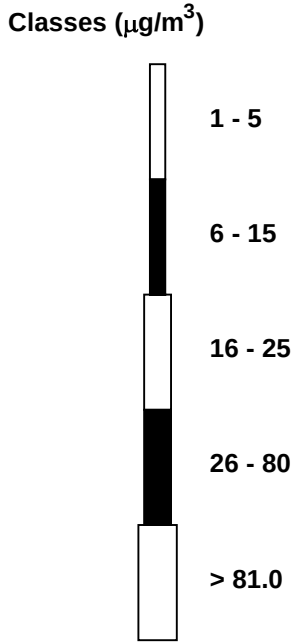
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Athabasca Valley (AMS 7)





Total Number of Valid Hours: 730

Wood Buffalo Environmental Association

Summary of Hour Averages

Carbon Monoxide (CO) - ppm

Athabasca Valley - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 0.4 ppm on Mar 18 20:00

Maximum Daily Average: 0.1 ppm on Mar 9

Minimum Value: 0.0 ppm on Mar 29 15:00

Minimum Daily Average: 0.1 ppm on Mar 16

Maximum Diurnal Average: 0.1 ppm at hour 20

Minimum Diurnal Average: 0.1 ppm at hour 4

Monthly Average: 0.09 ppm

Percentiles: P_1 = 0.0 P_{10} = 0.1 Q_1 = 0.1 Median = 0.1 Q_3 = 0.1 P_{90} = 0.1 P_{99} = 0.2

Hours in Service:	744
Hours of Data:	705
Hours of Missing Data:	39
Hours of Calibration:	34
Percent Operational Time:	99.3

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

Z - zerospan C - Calibration M - Maintenance PF - Power Failure

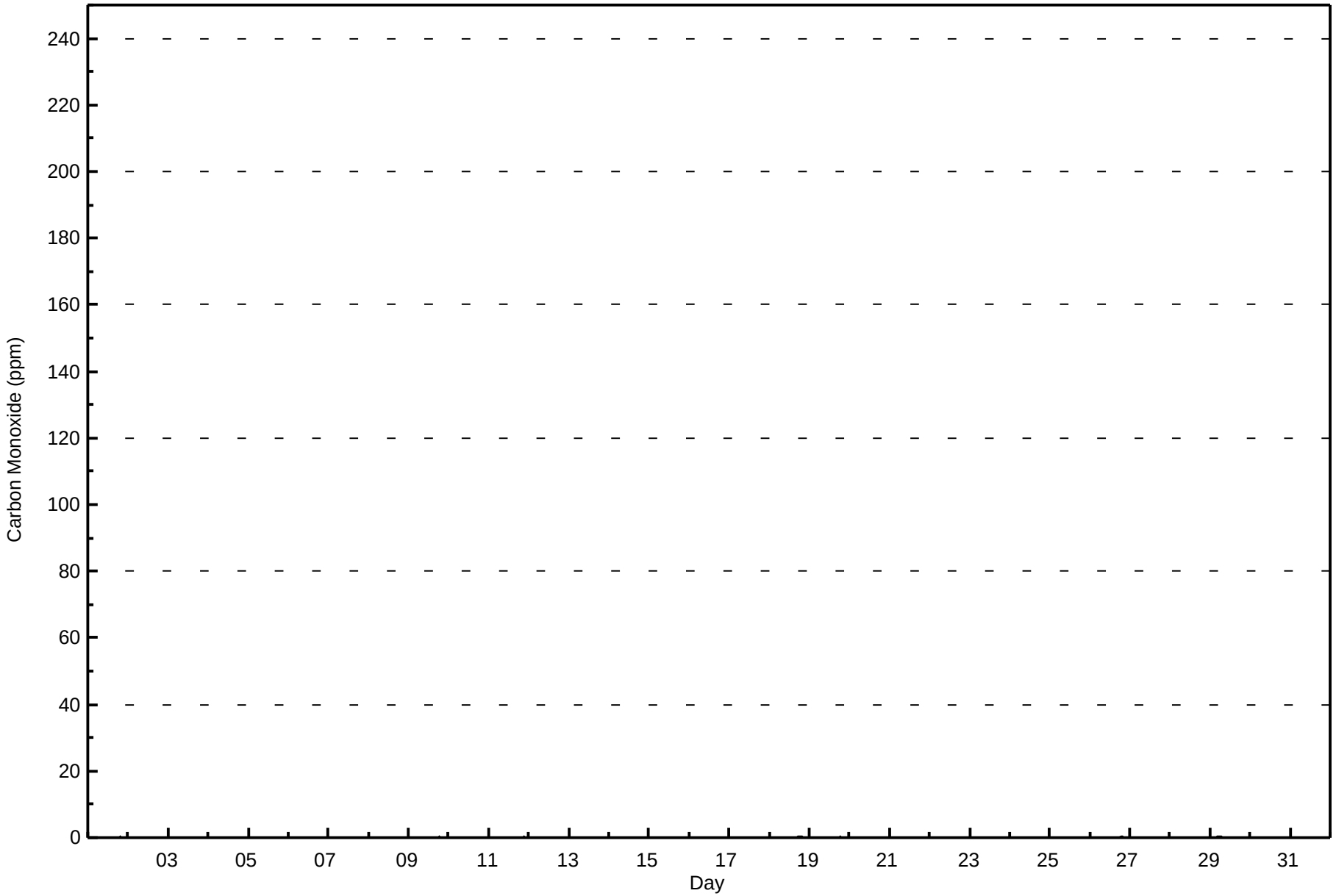
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 13 ppm

Wood Buffalo Environmental Association

Hourly Averages

Carbon Monoxide (CO) - ppm

Athabasca Valley - March 2016



Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	704	99.86	99.86
0.4 - 0.5	1	0.14	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: 705

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Carbon Monoxide (CO) - ppm

Athabasca Valley - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 0.3	98	25	6	21	38	29	119	45	8	8	28	34	18	22	32	173	704
0.4 - 0.5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
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	98	25	6	21	38	29	120	45	8	8	28	34	18	22	32	173	705

Total Number of Valid Hours: 705

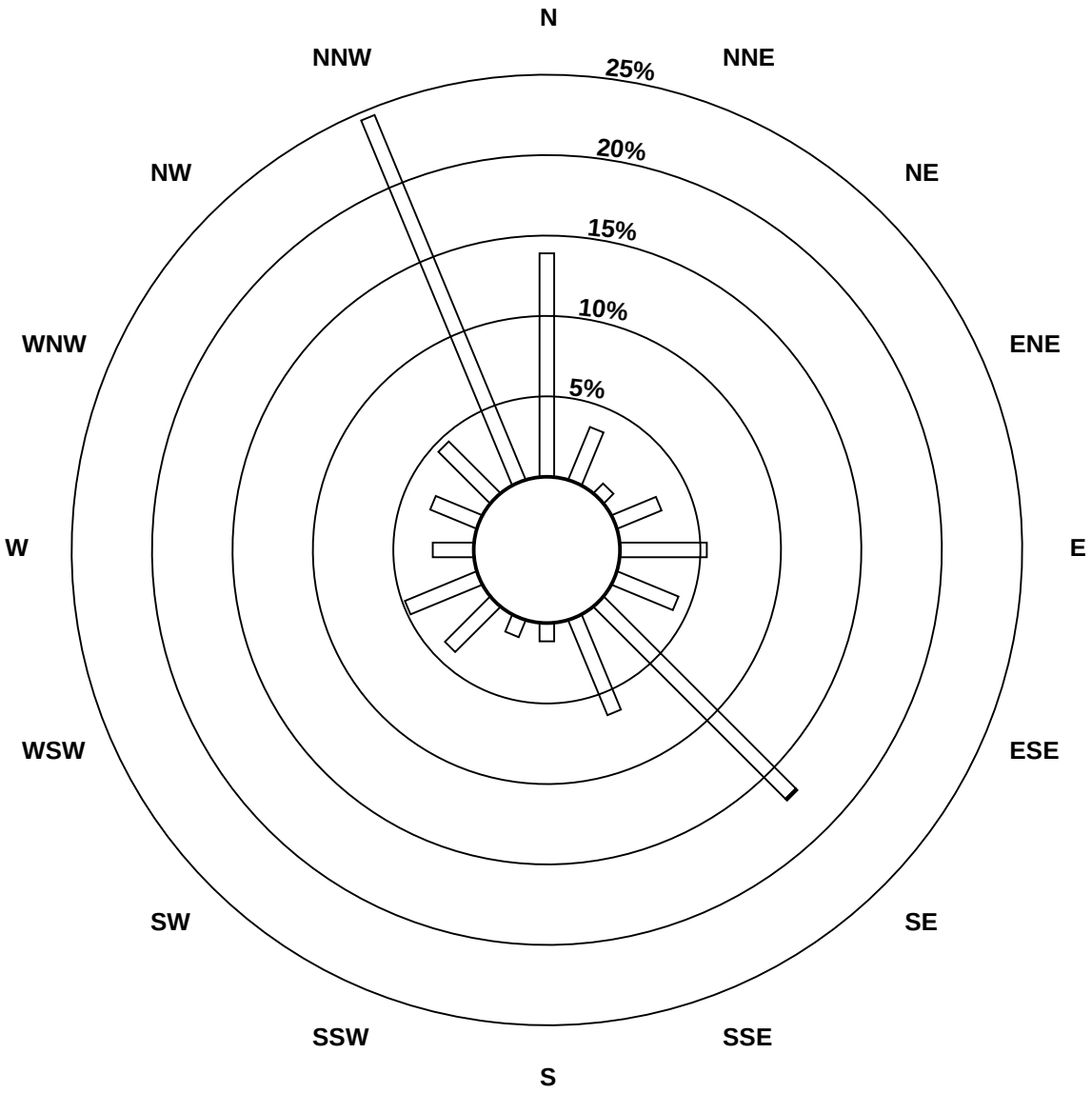
Total Number of Hours: 744

Wood Buffalo Environmental Association

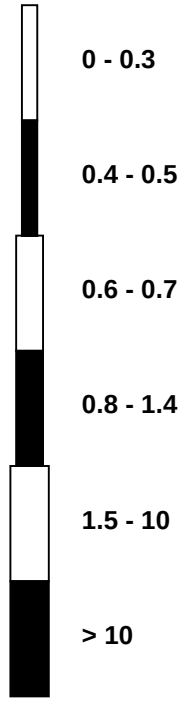
Wind Rose Mar 2016

Carbon Monoxide (CO) - ppm

Athabasca Valley (AMS 7)



Classes (ppm)



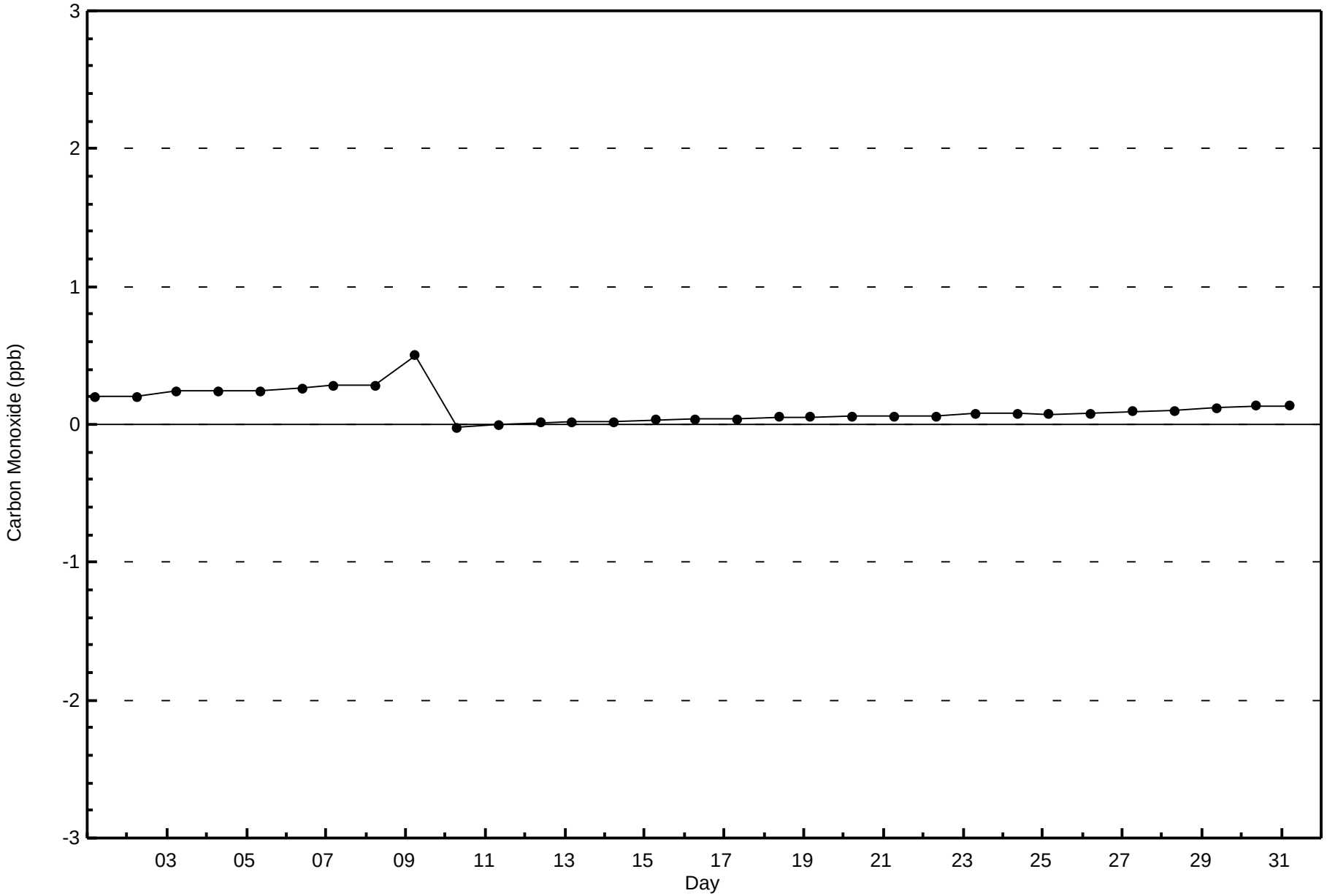
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Carbon Monoxide (CO) - ppb

Athabasca Valley - March 2016

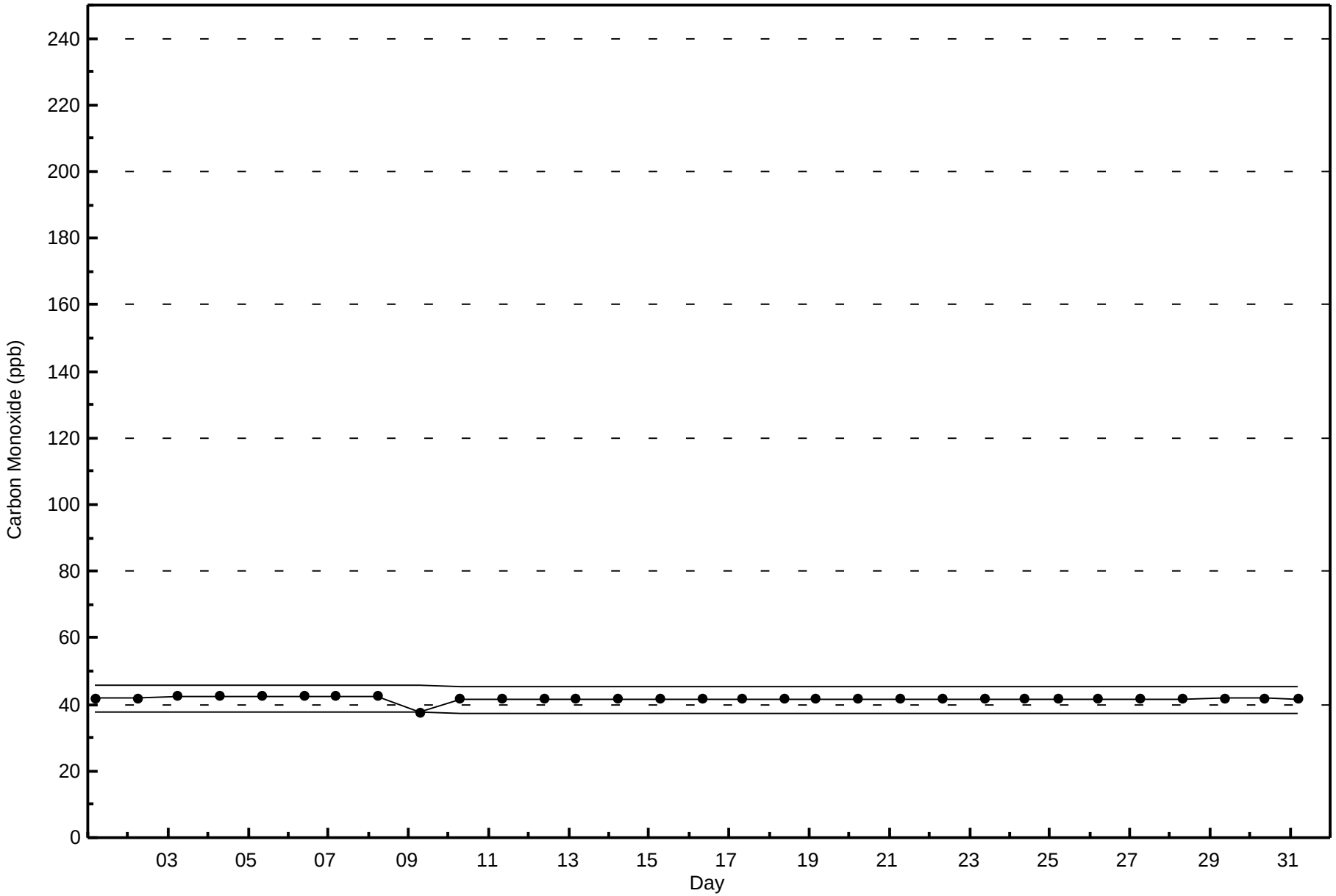


Wood Buffalo Environmental Association

Span Responses

Carbon Monoxide (CO) - ppb

Athabasca Valley - March 2016



Maximum Value: 13.5 C on Mar 29 17:00

Maximum Daily Average: 4.8 C on Mar 29

Minimum Value: -18.0 C on Mar 24 07:00

Minimum Daily Average: -8.9 C on Mar 24

Maximum Diurnal Average: 1.5 C at hour 16

Minimum Diurnal Average: -7.1 C at hour 7

Monthly Average: -3.01 C

Percentiles: P_1 = -14.4 P_{10} = -9.2 Q_1 = -6.8 Median = -3.5 Q_3 = 0.1 P_{90} = 3.4 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

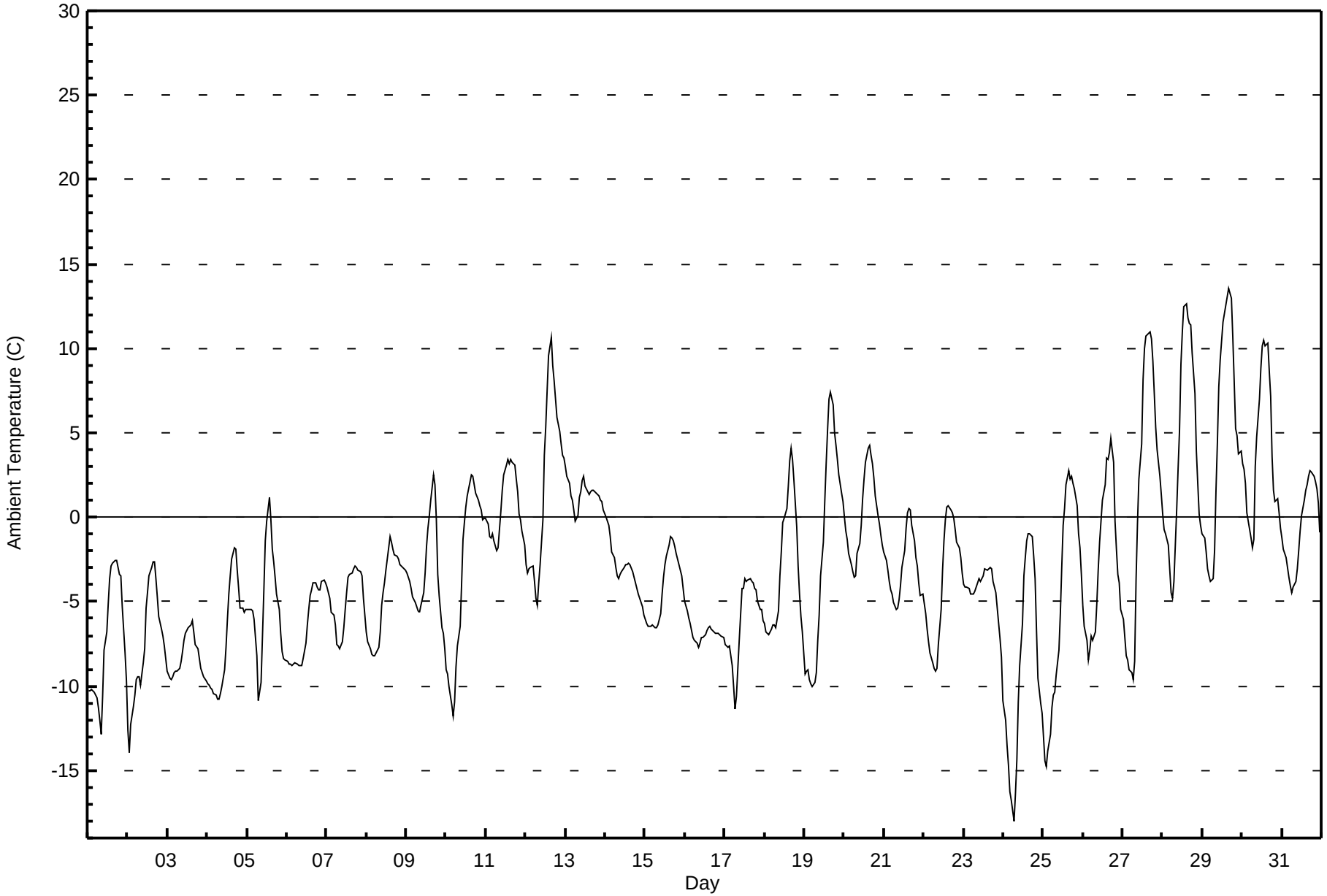
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.3	-10.3	-10.2	-10.3	-10.4	-10.7	-11.3	-12.1	-12.9	-10.6	-7.8	-6.8	-5.1	-3.7	-2.9	-2.8	-2.5	-2.5	-3.0	-3.4	-3.5	-5.3	-8.0	-9.7	-7.3	-2.5
2-Mar	-12.6	-13.9	-12.3	-11.2	-10.6	-9.6	-9.5	-9.5	-10.0	-8.6	-7.8	-5.4	-4.5	-3.5	-3.0	-2.6	-2.7	-3.6	-4.8	-5.9	-6.6	-7.0	-7.6	-8.4	-7.5	-2.6
3-Mar	-9.1	-9.6	-9.6	-9.5	-9.2	-9.1	-9.1	-8.9	-8.5	-7.9	-7.3	-6.9	-6.6	-6.5	-6.3	-6.1	-6.8	-7.6	-7.8	-8.3	-8.9	-9.2	-9.4	-9.7	-8.3	-6.1
4-Mar	-9.8	-10.0	-10.1	-10.2	-10.5	-10.6	-10.7	-10.8	-10.5	-10.0	-9.0	-7.7	-6.0	-4.5	-3.5	-2.5	-1.8	-1.9	-3.2	-4.2	-5.3	-5.4	-5.7	-5.5	-7.1	-1.8
5-Mar	-5.5	-5.5	-5.5	-5.5	-6.0	-7.1	-8.2	-10.8	-9.7	-7.1	-4.3	-1.4	-0.2	1.2	-0.1	-1.9	-2.6	-3.6	-4.5	-5.5	-6.9	-8.0	-8.4	-8.5	-5.2	1.2
6-Mar	-8.5	-8.7	-8.7	-8.8	-8.7	-8.6	-8.7	-8.7	-8.8	-8.8	-8.3	-7.4	-6.3	-5.4	-4.6	-4.3	-3.9	-3.9	-4.1	-4.3	-4.3	-3.8	-3.7	-3.9	-6.5	-3.7
7-Mar	-4.1	-4.5	-4.8	-5.7	-5.8	-6.4	-7.5	-7.6	-7.8	-7.3	-6.6	-5.4	-4.5	-3.6	-3.4	-3.3	-3.0	-2.9	-2.9	-3.2	-3.2	-3.5	-4.8	-5.8	-4.9	-2.9
8-Mar	-6.8	-7.3	-7.8	-8.1	-8.2	-8.2	-8.0	-7.7	-6.8	-5.2	-4.5	-3.9	-3.2	-1.8	-1.2	-1.4	-1.9	-2.2	-2.3	-2.5	-2.8	-2.9	-3.0	-3.2	-4.6	-1.2
9-Mar	-3.3	-3.5	-3.8	-4.3	-4.8	-5.0	-5.3	-5.6	-5.6	-5.3	-4.5	-3.3	-1.7	-0.7	0.1	1.0	2.5	2.0	-0.2	-3.4	-4.7	-6.5	-6.8	-7.8	-3.3	2.5
10-Mar	-9.0	-9.3	-10.0	-11.1	-11.8	-11.0	-8.9	-7.6	-6.5	-4.0	-1.3	-0.4	0.6	1.3	2.1	2.5	2.4	1.9	1.4	1.0	0.7	0.4	-0.1	-0.1	-3.2	2.5
11-Mar	-0.1	-0.4	-1.2	-1.3	-1.0	-1.4	-2.0	-1.8	-0.7	0.3	1.6	2.5	3.1	3.4	3.2	3.4	3.2	3.1	2.3	1.5	0.1	-0.2	-0.9	-1.6	0.6	3.4
12-Mar	-2.8	-3.3	-3.0	-2.9	-2.9	-3.8	-4.8	-5.2	-3.9	-2.8	-0.2	3.7	5.3	7.5	9.6	10.6	9.0	8.1	7.0	5.9	5.1	4.3	3.7	3.5	2.0	10.6
13-Mar	3.0	2.4	2.0	1.2	1.0	0.4	-0.2	0.1	1.2	1.5	2.2	2.4	1.8	1.5	1.3	1.5	1.6	1.6	1.5	1.3	1.2	1.0	0.9	0.4	1.4	3.0
14-Mar	0.0	-0.3	-0.5	-1.2	-2.0	-2.4	-3.0	-3.5	-3.6	-3.4	-3.2	-3.0	-2.8	-2.8	-2.8	-2.8	-3.2	-3.5	-3.9	-4.2	-4.5	-4.8	-5.3	-5.8	-3.0	0.0
15-Mar	-6.0	-6.3	-6.5	-6.5	-6.4	-6.5	-6.5	-6.5	-6.3	-5.7	-4.6	-3.5	-2.8	-2.3	-1.7	-1.2	-1.2	-1.4	-1.7	-2.1	-2.8	-3.1	-3.5	-4.2	-4.1	-1.2
16-Mar	-4.9	-5.6	-6.0	-6.3	-6.7	-7.1	-7.3	-7.5	-7.7	-7.5	-7.1	-7.1	-7.0	-6.7	-6.5	-6.5	-6.7	-6.8	-6.9	-6.9	-6.9	-7.0	-7.0	-7.2	-6.8	-4.9
17-Mar	-7.5	-7.6	-7.7	-7.7	-8.8	-10.0	-11.3	-10.6	-9.0	-7.3	-4.2	-4.2	-3.6	-3.8	-3.7	-3.6	-3.8	-3.9	-4.2	-4.3	-5.0	-5.4	-5.4	-6.1	-6.2	-3.6
18-Mar	-6.3	-6.8	-6.9	-6.8	-6.7	-6.4	-6.4	-6.5	-5.5	-3.5	-2.0	-0.3	-0.1	0.5	1.9	3.4	4.1	3.4	2.2	-0.6	-2.9	-4.5	-5.9	-6.8	-2.9	4.1
19-Mar	-9.3	-9.2	-9.1	-9.6	-9.8	-10.0	-9.8	-9.2	-7.3	-5.8	-3.5	-1.4	1.0	3.2	5.2	7.0	7.4	6.6	5.0	4.2	3.4	2.5	1.4	1.0	-1.9	7.4
20-Mar	0.0	-0.8	-1.3	-2.1	-2.8	-3.2	-3.5	-3.4	-2.2	-1.6	-0.5	1.1	2.3	3.3	4.1	4.2	3.7	3.2	2.3	1.2	0.1	-0.4	-1.0	-1.6	0.0	4.2
21-Mar	-2.1	-2.6	-3.2	-3.8	-4.3	-4.6	-5.1	-5.4	-5.4	-4.9	-4.0	-3.0	-2.0	-0.7	0.3	0.6	0.5	-0.5	-1.4	-2.4	-2.9	-3.9	-4.6	-4.6	-2.9	0.6
22-Mar	-5.2	-5.7	-6.6	-7.4	-8.1	-8.6	-8.9	-9.2	-9.0	-7.6	-5.4	-3.1	-1.4	-0.2	0.6	0.7	0.4	0.2	-0.1	-0.7	-1.5	-1.8	-2.4	-3.3	-3.9	0.7
23-Mar	-4.0	-4.1	-4.1	-4.2	-4.6	-4.6	-4.6	-4.4	-3.8	-3.6	-3.8	-3.6	-3.4	-3.1	-3.1	-3.1	-3.0	-3.1	-3.8	-4.5	-5.4	-6.3	-7.2	-8.3	-4.3	-3.0
24-Mar	-10.9	-12.0	-13.5	-14.6	-16.2	-16.8	-18.0	-16.3	-14.3	-10.9	-8.8	-6.3	-3.5	-2.4	-1.4	-1.0	-0.9	-1.2	-2.3	-3.6	-6.7	-9.5	-11.0	-11.6	-8.9	-0.9
25-Mar	-13.0	-14.4	-14.7	-13.8	-12.9	-11.2	-10.5	-10.3	-9.4	-7.9	-5.7	-2.9	-0.4	0.5	1.9	2.8	2.3	2.4	2.0	1.7	0.7	-1.0	-1.8	-3.4	-5.0	2.8
26-Mar	-5.2	-6.5	-7.3	-8.4	-7.9	-7.0	-7.3	-6.8	-5.2	-3.1	-1.5	-0.2	1.0	1.9	3.5	3.5	3.8	4.7	3.3	-0.2	-1.9	-3.4	-3.9	-5.5	-2.5	4.7
27-Mar	-6.0	-7.1	-8.2	-8.5	-9.0	-9.2	-9.6	-8.5	-3.7	-0.4	2.2	4.3	8.1	10.0	10.8	10.8	11.0	10.6	9.2	7.4	5.3	4.0	2.4	1.3	1.1	11.0
28-Mar	0.2	-0.8	-1.0	-1.7	-3.1	-4.5	-4.8	-3.8	0.5	2.9	5.2	9.1	11.0	12.5	12.6	11.8	11.5	11.4	9.7	7.3	3.9	2.0	0.2	-0.5	3.8	12.6
29-Mar	-0.9	-1.2	-2.1	-3.1	-3.4	-3.8	-3.7	-2.0	1.6	4.4	7.8	9.3	11.6	12.1	12.6	13.1	13.5	13.0	10.6	8.0	5.3	4.8	3.7	3.9	4.8	13.5
30-Mar	3.2	2.9	2.0	0.3	-0.7	-1.2	-1.8	-1.3	3.0	4.8	7.0	8.8	10.2	10.5	10.2	10.3	8.7	7.1	3.6	1.6	0.9	1.1	0.3	-0.6	3.8	10.5
31-Mar	-1.2	-1.9	-2.4	-3.0	-3.6	-4.1	-4.4	-4.1	-3.8	-3.1	-2.0	-0.8	0.1	1.0	1.6	2.0	2.4	2.8	2.7	2.4	2.1	1.7	0.9	-0.9	-0.7	2.8
	-5.1	-5.6	-5.9	-6.3	-6.6	-6.8	-7.1	-7.0	-5.9	-4.5	-3.0	-1.5	-0.3	0.6	1.2	1.5	1.4	1.1	0.2	-0.9	-1.9	-2.6	-3.4	-4.0	Diurnal Average	
	3.2	2.9	2.0	1.2	1.0	0.4	-0.2	0.1	3.0	4.8	7.8	9.3	11.6	12.5	12.6	13.1	13.5	13.0	10.6	8.0	5.3	4.8	3.7	3.9	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Athabasca Valley - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	554	74.46	74.46
0 - 10	167	22.45	96.91
10 - 20	23	3.09	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 29.4 % on Mar 17 20:00

Maximum Daily Average: 29.4 % on Mar 17

Minimum Value: 28.3 % on Mar 13 15:00

Minimum Daily Average: 28.3 % on Mar 13

Maximum Diurnal Average: 28.9 % at hour 9

Minimum Diurnal Average: 28.9 % at hour 17

Monthly Average: 28.92 %

Percentiles: P_1 = 28.3 P_{10} = 28.6 Q_1 = 28.8 Median = 28.9 Q_3 = 29.1 P_{90} = 29.2 P_{99} = 29.4

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

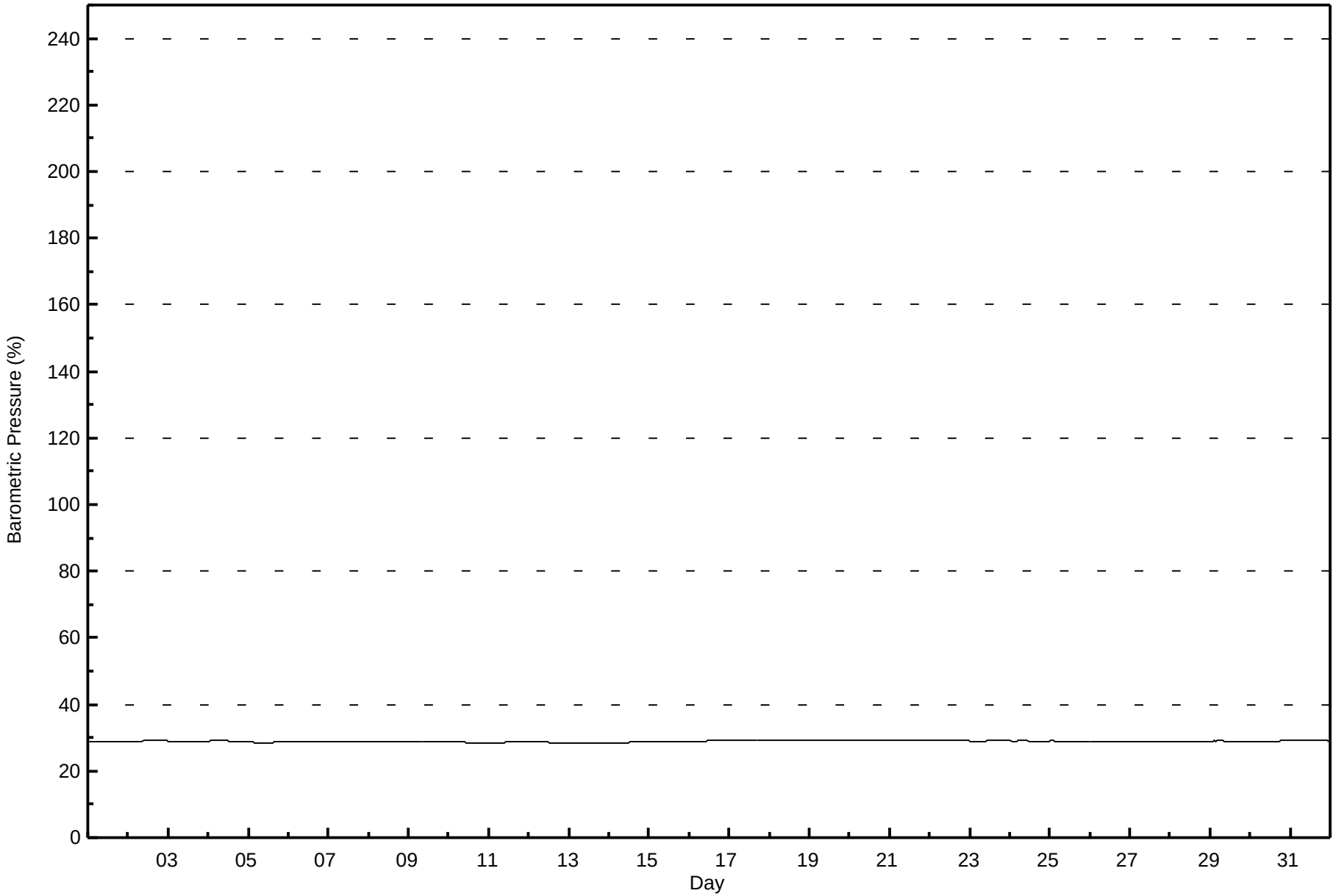
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0
2-Mar	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.1
3-Mar	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	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	28.9	29.0
4-Mar	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	28.9	28.9	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.9	29.1
5-Mar	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.6	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.6	28.7
6-Mar	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	28.7	28.7	28.7	28.7	28.8	28.8	28.7	28.7	28.7	28.7	28.8
7-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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.7	28.9
8-Mar	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	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9
9-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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9
10-Mar	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	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	28.4	28.6	28.8
11-Mar	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.6	28.8
12-Mar	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.6	28.8
13-Mar	28.4	28.4	28.4	28.4	28.4	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.4	28.4	28.4	28.4	28.4	28.4	28.3	28.4
14-Mar	28.4	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.6	28.8
15-Mar	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	28.9	28.9
16-Mar	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	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.1	29.2
17-Mar	29.2	29.2	29.2	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	29.4	29.4	29.4	29.4	29.4	29.4
18-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	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.4	29.4
19-Mar	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	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3
20-Mar	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2
21-Mar	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1
22-Mar	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.1	29.1
23-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	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
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	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
25-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	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
26-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	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0
27-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	28.9	28.9	28.9	28.9	28.9	28.9	28.9
28-Mar	28.9	28.9	28.9	28.9	28.9	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	29.0	29.0	29.0	29.0	29.0	28.9	29.0
29-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	29.0	29.0
30-Mar	28.9	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	29.1	29.1	29.2	29.2	29.2	29.2	29.0	29.2
31-Mar	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	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	29.2	29.3
	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	Diurnal Average	
	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	29.4	29.4	29.4	29.4	29.4	29.4	29.4	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Barometric Pressure (BP) - %

Athabasca Valley - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - inHg

Athabasca Valley - March 2016

Maximum Value: 97 inHg on Mar 12 04:00

Maximum Daily Average: 87.5 inHg on Mar 16

Minimum Value: 27 inHg on Mar 24 18:00

Minimum Daily Average: 51.3 inHg on Mar 22

Maximum Diurnal Average: 82.3 inHg at hour 7

Minimum Diurnal Average: 57.5 inHg at hour 16

Monthly Average: 70.8 inHg

Percentiles: P_1 = 30 P_{10} = 44 Q_1 = 60 Median = 74 Q_3 = 85 P_{90} = 90 P_{99} = 95

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

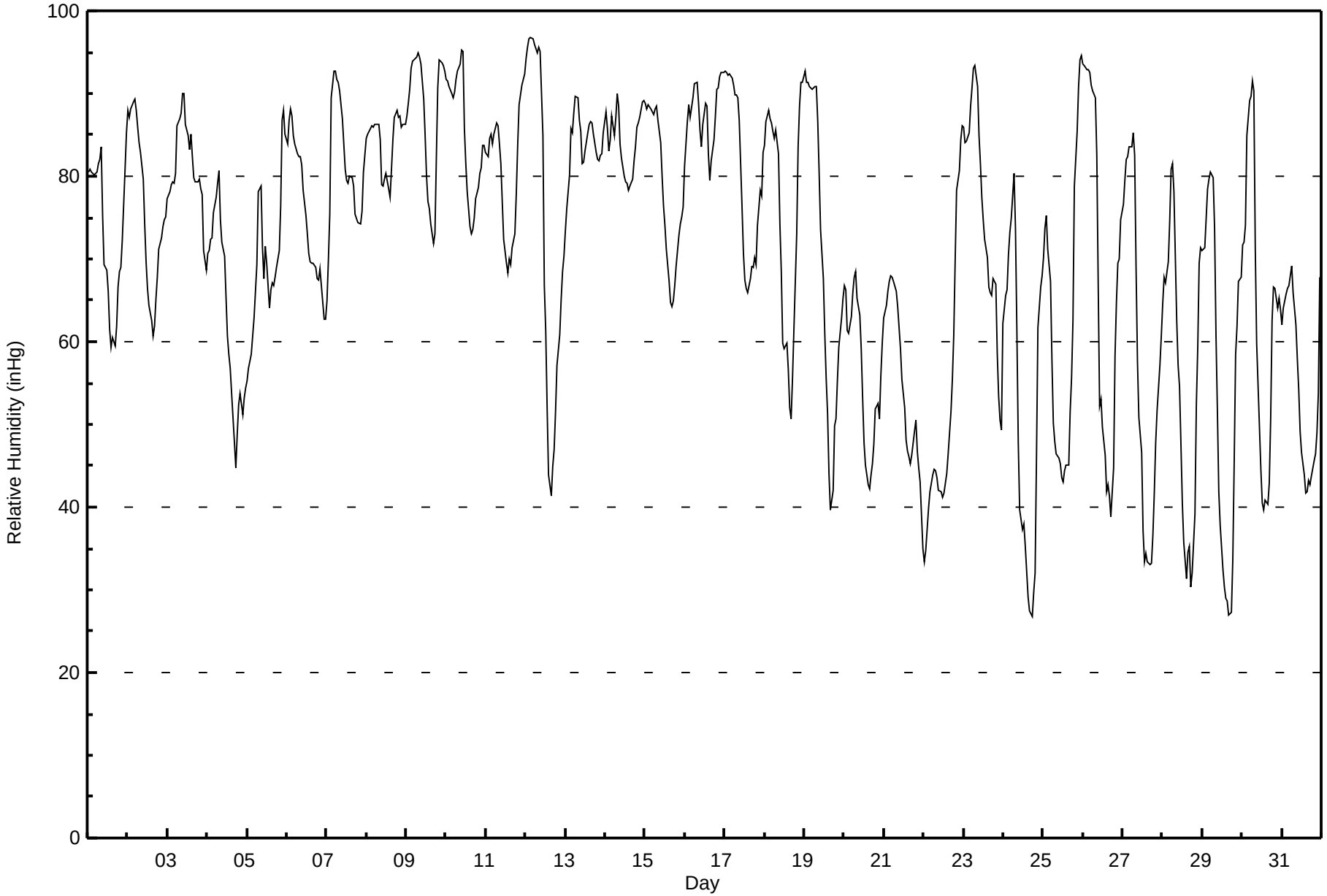
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	81	81	81	80	80	80	82	82	84	75	69	69	66	62	59	61	60	62	67	68	69	72	81	85	73.1	85
2-Mar	88	87	88	89	89	88	86	84	83	80	74	70	66	64	63	61	62	65	68	71	73	74	75	75	75.9	89
3-Mar	77	78	79	79	79	80	86	87	88	90	90	86	85	83	85	82	80	79	79	80	78	78	71	69	81.2	90
4-Mar	71	71	72	73	76	77	79	81	75	72	70	65	61	58	57	54	48	45	49	52	54	51	53	54	63.3	81
5-Mar	55	57	59	61	63	66	69	78	79	71	68	71	69	64	66	67	67	68	69	71	76	87	88	85	69.8	88
6-Mar	84	87	88	87	85	84	83	82	82	81	78	75	73	71	70	70	69	69	68	67	69	67	63	63	75.6	88
7-Mar	65	70	75	90	93	93	92	91	90	87	84	81	80	79	80	80	79	76	75	74	74	76	81	83	81.1	93
8-Mar	85	85	86	86	86	86	86	86	84	79	79	80	80	78	77	81	84	87	88	87	87	86	86	86	84.1	88
9-Mar	87	89	90	93	94	94	94	95	94	94	89	85	80	77	76	74	72	73	82	91	94	94	93	93	87.4	95
10-Mar	92	92	91	90	89	90	92	93	94	95	95	86	82	78	74	73	74	75	77	79	80	81	84	84	84.9	95
11-Mar	83	82	85	85	84	85	86	86	84	81	77	72	70	68	70	69	71	73	78	84	89	90	91	92	80.7	92
12-Mar	94	96	97	97	97	96	95	95	96	95	85	67	61	52	44	41	45	47	51	57	61	65	69	70	73.9	97
13-Mar	73	76	80	86	85	88	90	90	87	85	81	82	83	85	86	87	86	85	83	82	82	83	83	85	83.9	90
14-Mar	88	86	83	84	87	85	87	90	88	84	82	80	79	79	78	79	80	82	84	86	87	87	89	89	84.3	90
15-Mar	89	88	89	88	88	88	88	89	87	84	80	76	74	71	67	65	64	65	67	69	73	74	75	76	78.1	89
16-Mar	81	87	89	87	88	89	91	91	89	86	84	86	89	88	83	79	82	84	87	90	91	92	93	93	87.5	93
17-Mar	93	93	92	92	92	91	90	90	90	87	76	71	68	66	66	68	69	69	70	69	74	78	78	83	79.7	93
18-Mar	84	87	88	87	86	85	85	86	83	74	68	60	59	60	57	52	51	56	61	73	84	89	91	91	74.8	91
19-Mar	93	91	91	91	91	91	91	91	87	80	73	68	61	56	51	44	40	42	50	51	55	59	63	65	69.8	93
20-Mar	67	66	61	61	63	66	68	69	65	63	59	53	48	45	43	42	44	45	48	52	53	51	56	60	56.1	69
21-Mar	63	64	66	67	68	68	67	66	64	62	59	55	52	48	47	46	45	46	49	51	47	45	43	35	55.2	68
22-Mar	33	35	37	40	42	44	45	44	44	42	42	41	42	43	44	47	52	55	61	70	78	81	84	86	51.3	86
23-Mar	86	84	84	85	88	91	93	93	91	85	82	77	75	72	70	67	66	66	68	67	59	53	50	49	75.1	93
24-Mar	62	66	66	71	73	75	80	74	61	48	40	37	38	35	32	29	28	27	30	32	46	62	67	68	51.9	80
25-Mar	70	74	75	71	67	58	50	48	47	46	45	44	43	44	45	45	52	56	62	79	85	91	94	95	61.9	95
26-Mar	93	93	93	93	92	91	90	89	82	67	52	53	50	46	42	43	41	39	45	58	65	69	70	75	68.1	93
27-Mar	77	79	82	82	84	84	85	83	69	58	51	47	37	33	34	33	33	33	37	42	48	52	57	61	57.5	85
28-Mar	65	68	67	70	75	81	81	78	63	57	55	48	41	36	31	35	35	30	32	39	52	59	69	71	55.7	81
29-Mar	71	71	75	78	80	81	80	74	61	52	42	38	32	30	29	29	27	27	34	46	58	62	67	68	54.6	81
30-Mar	72	72	74	85	89	90	92	90	71	60	50	45	41	40	41	40	43	51	63	67	67	64	65	64	63.9	92
31-Mar	62	64	66	66	67	68	69	66	62	58	54	49	47	44	42	42	43	43	44	46	47	49	54	68	54.9	69
	76.9	78.0	79.0	80.5	81.3	81.7	82.3	81.9	78.1	73.5	68.9	65.0	62.3	60.0	58.4	57.5	57.7	58.7	62.1	66.1	69.5	71.6	73.6	74.9	Diurnal Average	
	94	96	97	97	97	96	95	95	96	95	95	86	89	88	86	87	86	87	88	91	94	94	94	95	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - inHg

Athabasca Valley - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Athabasca Valley - March 2016

Maximum Speed: 28 km/h on Mar 30 14:00

Maximum Daily Speed Average: 16.7 km/h on Mar 14

Minimum Speed Value: 0 km/h on Mar 10 01:00

Minimum Daily Speed Average: 1.0 km/h on Mar 29

Maximum Diurnal Speed Average: 6.1 km/h at hour 16

Minimum Diurnal Speed Average: 1.1 km/h at hour 6

Monthly Average Velocity: 2.8 km/h 9.8 deg

Percentiles: P_1 = 1 P_{10} = 2 Q_1 = 4 Median = 8 Q_3 = 12 P_{90} = 16 P_{99} = 20

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	SE11	SE11	SE9	SE9	SE10	SE9	SE7	SE6	S0	SE5	ESE5	NW3	NNW3	NW2	N2	NNW4	N5	N7	NW6	E1	E4	NE1	NNE2	WNW3	ESE2.4	SE11
2-Mar	WNW4	WNW4	WNW1	N2	NW4	NE0	WSW1	WSW4	SW6	SSW3	NW2	WNW2	N3	N7	NNW11	NNW8	NNW11	NNW9	N8	NNW5	NNW9	NNW8	NNW10	NNW12	NNW4.7	NNW12
3-Mar	NNW8	NNW8	N7	NNW8	N7	N7	N5	NE4	N10	NNW12	NNW14	NNW16	N14	NNW15	NNW17	NNW16	NNW21	N19	NNW16	N16	NNW16	NNW12	NNW13	NNW9	N11.9	NNW21
4-Mar	N6	NNW6	NW3	WNW2	SW1	WSW4	W2	ESE4	SE8	SE9	SE9	SE11	SE12	SE11	SE11	ESE12	SE16	SE13	SE6	SSE9	SE12	SE17	SSE15	SE16	SE7.1	SE17
5-Mar	SE17	SSE8	SSE8	SSE9	SSE10	SE9	SE5	WSW1	SSW1	SSE3	E4	ENE3	NNW9	NNW16	NNW22	NNW24	NNW18	NNW19	NNW20	NNW18	NNW21	NNW19	NNW17	NNW17	N6.4	NNW24
6-Mar	NNW15	NNW14	N12	NNW14	NNW12	N8	NNW12	N11	N12	N12	N13	NNW12	NW10	NNW8	NNW11	N11	N11	N9	N8	N11	N7	ENE9	E11	ENE10	N9.9	NNW15
7-Mar	ENE10	E11	E8	N6	N7	N10	N9	N4	N9	N10	N9	N9	N9	NNW8	NNW9	NNW8	NNW5	NW9	WSW9	WSW13	WSW13	WNW11	N11	NNW13	NNW6.0	WSW13
8-Mar	NNW10	NNW7	NNW7	N5	NNE3	N2	NE1	NE2	ENE3	ESE6	SSE8	SE5	N4	SSE2	N5	N10	N13	N11	NNW6	N6	NW4	NW4	NNE3	N5	N3.6	N13
9-Mar	N7	N7	N6	N8	N8	NNW8	N7	NNW7	NNW9	NNW7	NNW7	NNW8	NW4	N3	NW3	NW3	NNW3	N5	NNW3	NW2	W2	SW4	SSW2	S1	NNW4.4	NNW9
10-Mar	WSW0	SW3	SW3	WSW4	WSW4	WSW2	WSW3	WSW3	SW1	SE4	SE14	SE16	SE17	SE17	SE16	ESE12	ESE13	SE13	ESE10	SE12	SE11	SE9	SE9	SE8	SE7.2	SE17
11-Mar	SSE8	S6	SW3	SW8	SW11	SW8	SW8	SW10	WSW14	WSW13	WSW9	WNW11	NW11	NNW9	N7	N7	NNW7	NNE3	NE3	NNW3	SSE2	SW1	ESE2	SSE2	WSW3.5	WSW14
12-Mar	SSE2	SE4	SE6	SE7	SE5	SE5	NNE3	NNE3	NNE4	NNE4	ESE2	SE13	SE12	SE11	SE10	SE18	ESE12	ESE10	SE8	SE7	SE7	SE5	SE2	NNW1	SE5.7	SE18
13-Mar	SW1	SSE1	SSW2	NNW2	N5	WSW2	WNW4	W4	W4	NW4	NNW10	NNW17	NNW16	NNW17	NNW23	NNW21	NNW17	NNW18	NNW19	NNW20	NNW20	NNW19	NNW18	NNW17	NNW11.2	NNW23
14-Mar	NNW17	NNW16	NNW16	N16	NNW16	NNW18	NNW18	NNW18	NNW19	NNW16	NNW17	NNW18	NNW19	NNW19	NNW18	NNW19	NNW19	N17	NNW18	NNW15	NNW16	NNW14	NNW12	N11	NNW16.7	NNW19
15-Mar	NNW11	NNW11	NNW9	NNW7	N7	N7	N6	N6	N9	NNW9	NNW10	NNW9	NNW10	NW12	NNW12	NNW11	NNW12	NW13	NW12	NNW11	N12	N12	N13	NNW19	NNW10.3	NNW19
16-Mar	NNW17	NNW14	NNW15	NNW19	NNW19	NNW17	NNW17	NNW13	NNW17	NNW19	N15	N14	N11	NNW13	NNW15	N12	NNW14	NNW12	NNW9	WNW5	WSW6	WSW5	NW3	NNW4	NNW12.1	NNW19
17-Mar	NW3	NNW2	N1	WSW1	W1	WSW4	WSW3	SW3	ESE1	E1	N2	NNE5	NW12	NW16	NNW13	N8	NW10	NW10	NW7	NNW5	W2	WSW1	WSW3	SW2	NW3.7	NW16
18-Mar	SSW2	SE3	SSE1	SSE3	SSE4	SSE6	SE4	E3	SE3	S3	WSW3	SW2	E6	E8	ESE7	SSE5	SSE5	SSE6	SE7	SE3	ENE1	SE3	SW4	SW4	SSE3.0	E8
19-Mar	WNW2	NW2	WNW1	NNW1	NNE1	N0	W1	SE6	ENE2	N6	NNE6	NNE6	N8	N10	NNW9	ESE9	SE12	SE10	SE4	SE9	SE10	SE8	ESE6	SE9	E2.6	SE12
20-Mar	SE8	ESE6	ESE10	ESE10	E9	ENE7	ENE6	E3	SE9	SE12	ESE13	ESE11	ESE10	E12	E10	ENE13	E16	E14	E13	E9	E9	ENE7	NE8	ENE11	E9.2	E16
21-Mar	ENE13	ENE14	ENE13	ENE12	ENE11	ENE10	E12	E12	E14	E12	E11	E15	E17	E15	E14	E14	E15	E20	E13	E15	E8	E8	E9	SE13	E12.7	E20
22-Mar	SE10	ESE9	ESE9	SE9	SE8	SSE7	SE8	SE10	SSE12	SSE10	SSE10	SSE7	SE9	SE9	ESE8	ESE10	ESE11	SE12	SE10	SE10	SE10	SE9	SE10	SSE9	SE9.1	SE12
23-Mar	SSE10	SE9	SE11	SE10	SE10	SE9	SE6	N2	N7	NNW12	NNW13	NNW13	N10	N12	NNW15	NNW15	NNW13	NNW13	N11	N11	NNW10	N10	NNW9	N8	N5.3	NNW15
24-Mar	N5	N6	NNW5	N5	NNW4	NW3	NW3	NW2	NNW8	N6	NNW4	NNW5	N6	NW4	NNW8	NNW11	NNW13	NNW12	NNW7	NNW5	WNW3	W3	WSW5	WSW1	NNW5.0	NNW13
25-Mar	WSW3	WSW5	WSW3	WSW2	SSW2	SSE6	SE7	SE10	SE10	SE11	SE9	ESE7	ENE3	NNW5	NNE4	NNE2	NW2	N3	WNW2	SW4	SSW1	ENE1	SSW3	NNW3	SSE1.8	SE11
26-Mar	NNW4	WNW5	WNW5	WSW4	SW2	WSW5	SE1	ENE2	NW1	W3	NNW7	NNE6	NNE7	NNW4	WSW3	NNE5	N3	N1	SSE3	SE4	S2	SSE2	SE2	SSW2	NW1.2	NNE7
27-Mar	ENE1	S2	W2	SW4	SW4	SE3	W1	NNE2	SE8	SSE10	SE5	NNE2	ESE9	SE15	SE16	SE15	SE14	SE14	SE10	SE10	SE10	SE14	SE8	SE5	SE6.8	SE16
28-Mar	SE7	SE6	SSE7	SE7	SSE4	SW5	SW5	SSW5	SSE8	SE6	E4	E2	SW11	WSW11	WNW23	NW23	WNW16	WNW15	W10	W9	W4	WNW0	SE2	SSE5	WSW3.8	NW23
29-Mar	SSE6	S4	SSE3	SSE3	SSE3	SSE2	SSE2	SE4	SE7	SE7	SSW7	SW15	NW3	NNW9	NNW8	N8	N4	N4	W4	WSW4	E1	ESE2	SE2	SW3	SSW1.0	SW15
30-Mar	SW1	S2	S1	WNW3	W3	W3	W3	W3	WNW1	NNW6	N8	NNW8	NNW11	NNW28	NNW20	N16	N20	N16	N21	N17	N14	NNE16	N17	NNE18	N9.7	NNW28
31-Mar	NNE19	NNE14	N14	NNW17	NNW15	NNW13	NNW7	NNW9	NNW12	N9	NNE5	NNE6	N9	N6	NNE3	NE3	ESE5	SE9	SE12	SE8	SSE7	SSE7	SE4	SSW1	NNE4.8	NNE19
	NNE2.2	NNE1.8	NNE1.6	N1.6	N1.4	N1.1	N1.6	NNE1.2	N1.7	NNE2.0	NNE2.6	N3.2	N4.3	N5.3	N6.0	N6.1	N5.2	N4.5	N3.5	N2.6	N2.1	NNE2.0	NNE2.5	NNE2.5	Diurnal Average	
	NNE19	NNW16	NNW16	NNW19	NNW19	NNW18	NNW18	NNW18	NNW19	NNW19	NNW17	NNW18	NNW19	NNW28	NNW23	NNW24	NNW21	E20	N21	NNW20	NNW21	NNW19	NNW18	NNW19	Diurnal Maximum	

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 8 km/h on Mar 30 14:00

Minimum Value: 1 km/h on Mar 17 01:00

Percentiles: P_1 = 1 P_{10} = 1 Q_1 = 2 Median = 2 Q_3 = 3 P_{90} = 4 P_{99} = 5

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

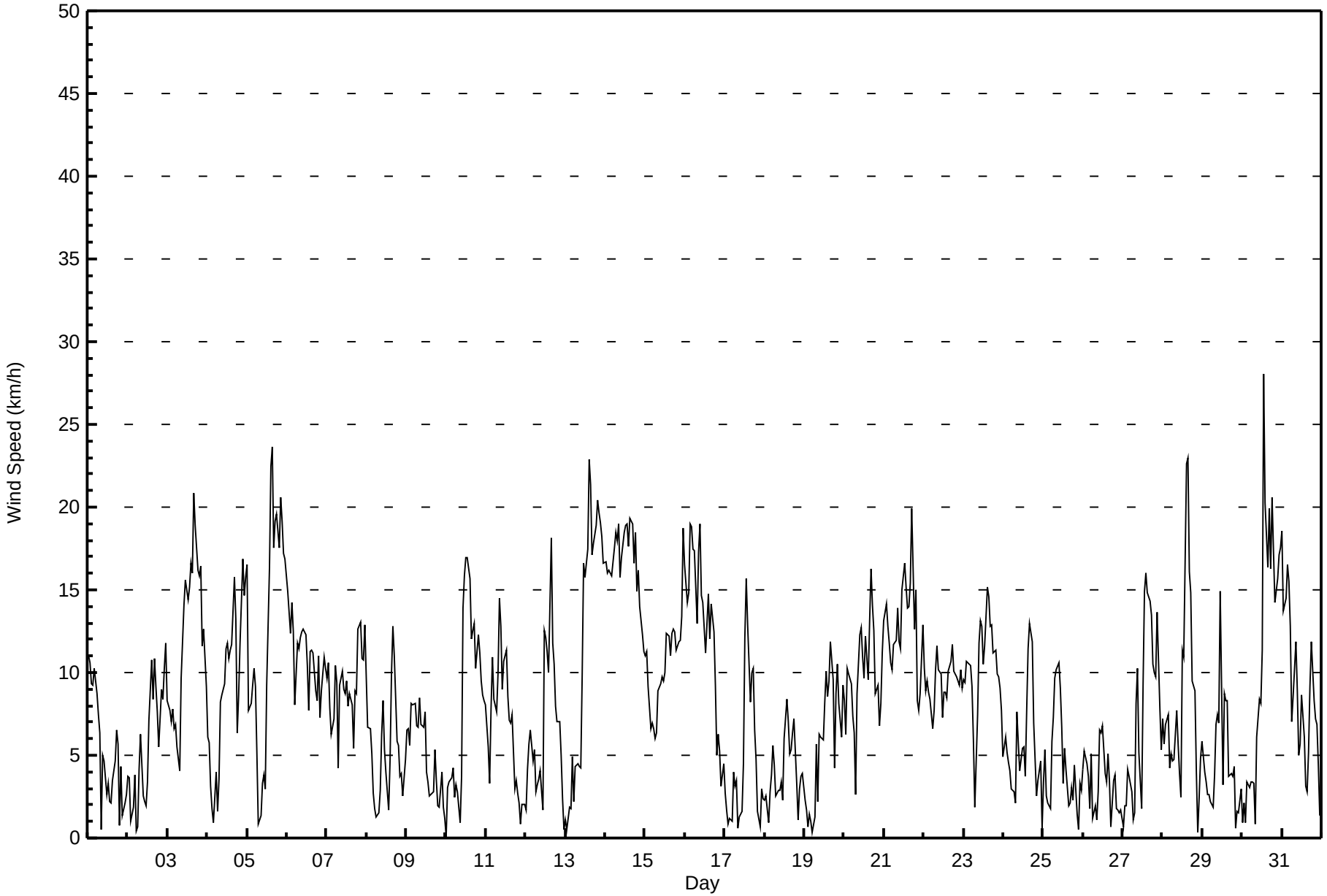
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	1	1	2	2	2	2	1	1	1	2
2-Mar	1	1	1	1	2	2	1	2	3	2	1	1	1	2	2	1	2	2	2	1	3	3	3	3	3
3-Mar	2	2	2	1	2	2	2	1	4	2	2	3	3	3	3	3	5	4	4	4	4	3	2	3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

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Athabasca Valley - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	264	35.48	35.48
6 - 11	283	38.04	73.52
12 - 19	181	24.33	97.85
20 - 28	16	2.15	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Athabasca Valley - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	25	18	6	8	9	7	25	20	8	11	20	29	17	17	22	22	264
6 - 11	58	5	1	9	13	19	70	23	1	1	7	4	2	2	6	62	283
12 - 19	23	4	0	5	16	5	28	2	0	0	1	4	0	2	5	86	181
20 - 28	2	0	0	0	1	0	0	0	0	0	0	0	0	1	1	11	16
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	108	27	7	22	39	31	123	45	9	12	28	37	19	22	34	181	744

Total Number of Valid Hours: 744

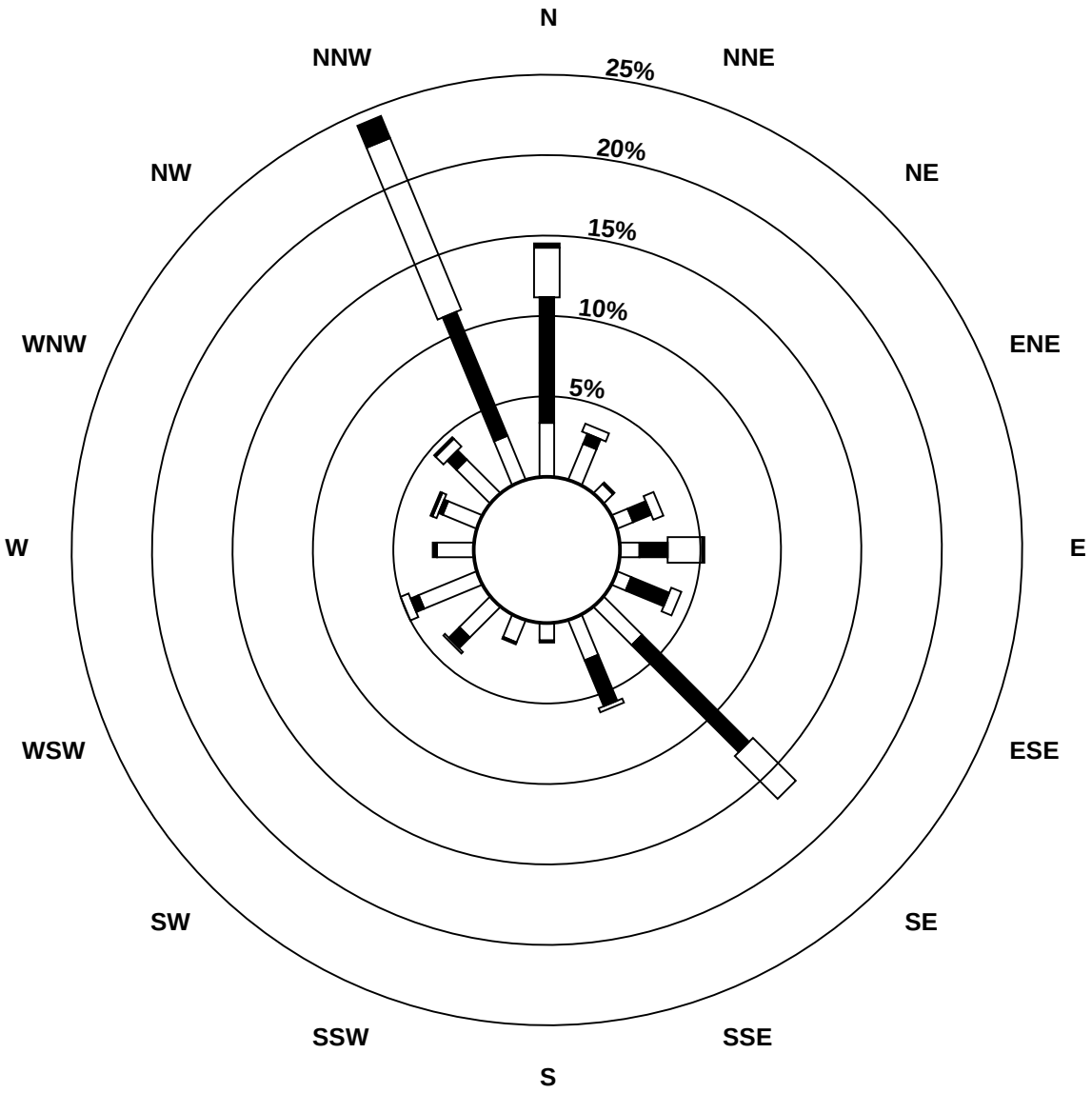
Total Number of Hours: 744

Wood Buffalo Environmental Association

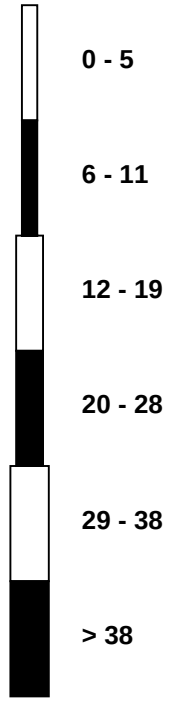
Wind Rose Mar 2016

Wind Speed (WS) - km/h

Athabasca Valley (AMS 7)



Classes (km/h)



Total Number of Valid Hours: 744

Direction of Maximum Speed: 339 deg on Mar 30 14:00
Direction of Maximum Daily Speed Average: 344.0 deg on Mar 14

Direction of Minimum Speed: 244 deg on Mar 10 01:00

Direction of Minimum Daily Speed Average: 1.0 deg on Mar 29

Monthly Average Direction: 334.3 deg

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	144	141	140	140	135	131	144	134	187	134	113	315	340	319	357	335	349	0	323	98	95	41	17	287	121.2
2-Mar	295	292	292	11	309	36	251	247	236	209	313	289	354	2	347	344	341	346	351	341	346	346	348	346	335.2
3-Mar	346	347	355	343	349	4	1	38	358	347	344	347	350	347	341	348	347	350	348	352	348	345	343	347	348.8
4-Mar	4	347	309	296	220	244	278	118	146	143	134	139	137	124	126	122	129	141	142	149	135	139	147	146	136.6
5-Mar	140	159	152	152	149	137	140	256	199	164	95	66	335	337	344	346	344	341	346	344	343	344	342	346	352.1
6-Mar	344	346	353	346	348	350	346	359	355	352	350	337	323	342	348	352	352	2	355	351	3	71	81	76	356.2
7-Mar	77	82	86	359	0	354	353	9	355	353	355	358	349	342	347	338	328	308	254	245	251	289	351	343	342.0
8-Mar	340	335	336	352	17	8	34	34	57	114	149	131	6	148	355	351	350	350	339	355	324	317	21	356	358.4
9-Mar	2	1	351	349	352	348	359	345	343	346	345	338	325	356	320	314	338	350	346	312	264	232	207	190	342.5
10-Mar	244	228	226	241	251	240	249	241	236	138	129	126	126	129	129	122	117	124	122	126	133	131	140	144	135.2
11-Mar	159	183	221	222	221	228	232	236	239	238	256	295	318	342	3	350	343	16	35	342	157	219	107	165	258.7
12-Mar	148	133	130	142	139	128	18	19	12	13	105	145	137	138	135	132	117	123	139	141	135	131	128	335	128.5
13-Mar	228	162	200	336	357	237	301	275	281	311	346	338	340	337	335	336	332	337	336	334	330	331	328	329	331.5
14-Mar	336	337	344	351	347	347	344	342	340	343	342	341	340	343	347	342	345	349	345	346	343	344	348	352	344.0
15-Mar	347	342	342	347	351	353	1	355	353	346	344	339	336	320	331	343	330	326	326	335	352	350	349	341	341.0
16-Mar	340	340	339	335	343	345	344	348	342	343	351	350	349	347	347	353	343	339	331	296	241	238	307	332	340.0
17-Mar	312	338	358	249	278	244	244	224	111	92	5	12	326	325	339	351	326	318	319	341	271	254	237	226	320.6
18-Mar	196	131	160	163	168	150	141	93	141	177	253	226	82	93	109	147	165	159	146	139	73	139	230	234	146.9
19-Mar	298	315	293	340	32	354	263	124	68	357	18	31	0	351	346	118	137	145	144	131	126	126	116	126	92.9
20-Mar	124	117	112	111	95	76	71	99	138	132	116	114	106	80	100	75	90	98	96	89	85	59	51	78	97.0
21-Mar	78	78	78	76	77	78	87	88	86	88	88	81	85	88	94	94	94	88	90	85	96	84	85	124	87.0
22-Mar	125	122	113	135	142	159	145	143	148	148	163	164	129	129	119	105	119	132	133	141	135	135	143	149	136.0
23-Mar	147	141	144	135	138	139	136	1	350	346	339	343	349	352	341	348	337	347	349	349	348	349	344	352	359.2
24-Mar	4	4	348	356	331	311	308	317	348	360	338	344	2	304	336	346	341	341	344	345	296	269	241	253	338.6
25-Mar	251	250	239	254	205	153	138	139	140	134	140	121	77	341	13	18	321	3	282	225	207	68	209	333	152.2
26-Mar	335	298	286	248	228	245	125	73	324	280	345	13	13	348	237	12	359	358	155	125	172	164	133	201	324.0
27-Mar	60	175	264	232	216	130	270	15	141	152	135	26	119	128	132	129	130	138	143	135	136	141	134	144	137.6
28-Mar	134	137	156	145	165	220	230	208	156	135	89	92	232	240	289	309	283	291	278	265	260	303	145	157	247.0
29-Mar	156	182	168	154	162	158	147	140	137	134	205	223	311	345	332	1	4	4	278	245	91	123	133	224	200.2
30-Mar	233	189	173	283	263	263	281	279	288	338	353	348	348	339	348	354	349	358	356	6	0	12	3	15	350.9
31-Mar	13	12	359	342	339	339	344	347	341	354	13	26	9	359	18	41	107	135	138	146	154	153	141	205	11.5
	33.1	24.4	30.8	6.5	7.3	5.2	360.0	14.9	8.9	24.1	19.8	9.5	7.3	1.0	356.9	8.6	6.4	9.8	0.4	5.3	10.2	22.4	18.4	16.9	
	Diurnal Average																								

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

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Athabasca Valley - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 105 deg on Mar 1 09:00

Minimum Value: 7 deg on Mar 14 09:00

Percentiles: $P_1 = 8$ $P_{10} = 11$ $Q_1 = 14$ Median = 18 $Q_3 = 36$ $P_{90} = 64$ $P_{99} = 95$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

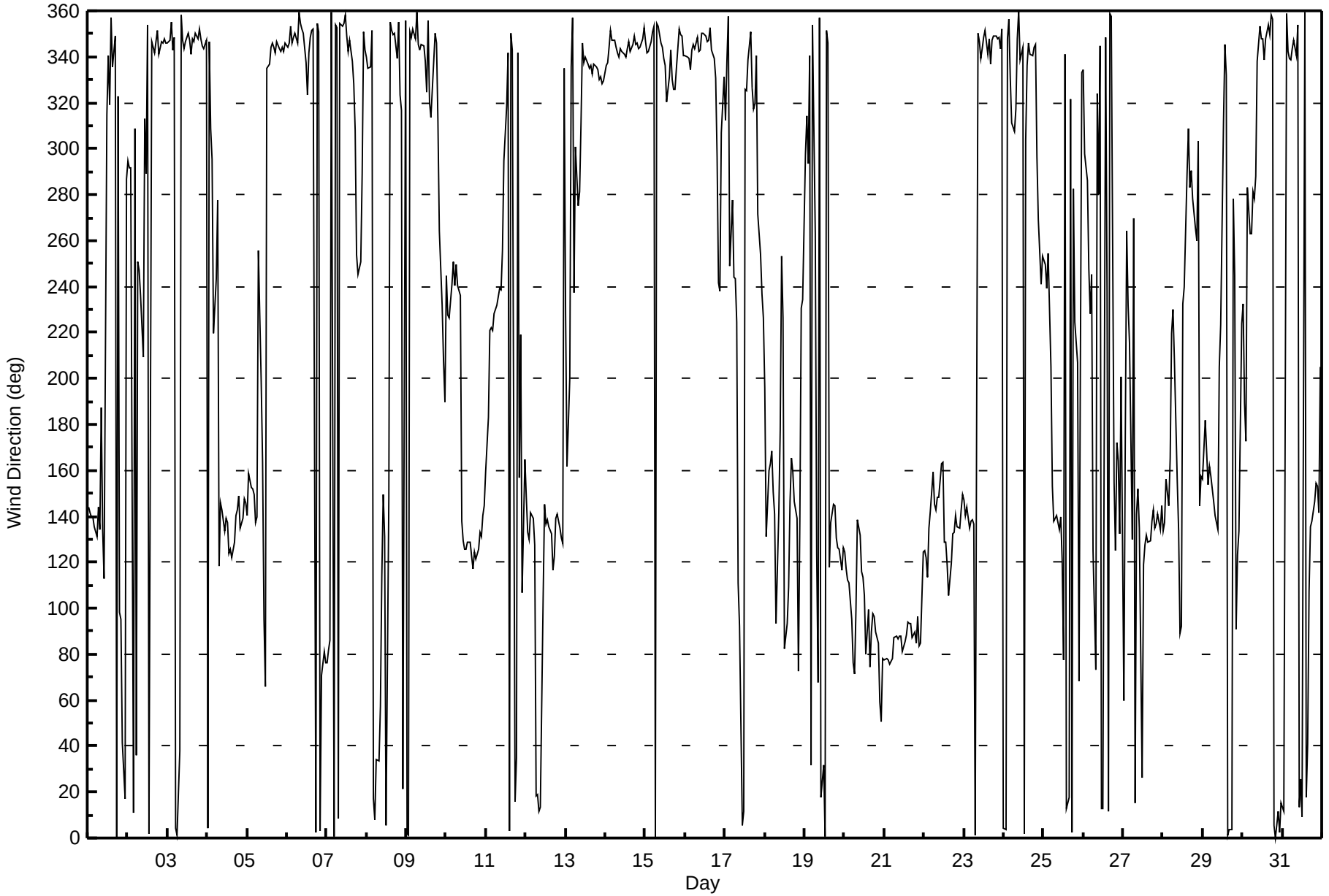
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	13	11	13	12	11	12	19	27	105	38	33	37	35	41	45	36	13	17	18	81	49	66	39	31	105
2-Mar	23	32	75	58	45	88	72	27	19	66	54	54	35	20	14	12	9	15	19	19	23	24	17	12	88
3-Mar	17	16	19	15	23	21	26	33	24	13	10	14	16	14	9	15	14	16	16	17	15	13	11	16	33
4-Mar	29	16	29	33	92	17	67	52	12	14	15	14	15	23	19	20	16	15	26	19	16	13	13	12	92
5-Mar	13	18	17	19	16	14	44	94	79	54	30	42	15	11	13	12	11	11	14	10	10	11	10	12	94
6-Mar	12	13	17	13	16	17	11	17	17	16	15	10	14	14	14	16	16	20	18	10	18	27	11	12	27
7-Mar	13	12	22	15	15	12	43	59	17	15	15	15	11	10	13	11	19	18	14	9	11	27	14	10	59
8-Mar	9	14	14	23	46	33	66	62	50	27	18	70	44	86	76	14	14	14	15	17	32	29	39	14	86
9-Mar	14	17	21	16	16	16	17	12	10	12	12	14	29	39	47	30	27	16	20	66	68	32	86	79	86
10-Mar	90	57	41	26	24	80	66	51	98	82	18	17	17	17	18	19	19	19	19	15	16	14	13	16	98
11-Mar	24	27	52	14	13	19	15	11	9	8	26	20	17	23	15	13	10	17	33	34	65	91	60	50	91
12-Mar	51	39	27	66	43	31	39	37	27	28	87	21	19	18	37	16	19	17	17	17	21	32	80	91	91
13-Mar	74	88	57	59	35	83	32	21	29	35	13	9	11	8	8	9	9	10	11	10	10	10	9	11	88
14-Mar	10	11	13	17	14	15	12	9	7	12	11	11	11	12	12	11	12	15	11	12	8	10	14	15	17
15-Mar	11	9	9	13	17	16	17	18	17	13	13	15	16	15	16	13	14	10	9	17	17	15	16	10	18
16-Mar	11	8	9	9	11	14	12	15	11	12	16	15	13	15	14	17	12	10	19	33	12	18	45	14	45
17-Mar	10	20	25	57	60	11	17	45	86	74	55	36	28	13	11	15	20	11	16	15	46	85	76	63	86
18-Mar	61	54	102	45	33	20	35	42	51	50	74	77	53	20	28	62	42	22	11	36	72	33	45	55	102
19-Mar	43	57	45	54	42	82	27	33	56	16	23	18	16	13	15	40	18	15	16	13	15	22	36	15	82
20-Mar	21	24	19	20	16	14	11	85	26	18	22	25	32	18	33	21	11	15	15	14	11	21	22	13	85
21-Mar	12	10	9	10	11	12	12	11	12	13	15	15	14	17	20	21	17	11	13	11	19	13	10	20	21
22-Mar	22	20	22	21	16	19	18	15	15	17	20	35	25	31	29	24	24	19	19	16	14	13	13	14	35
23-Mar	12	14	13	11	10	11	19	57	14	16	16	19	18	16	14	14	14	15	14	15	13	13	10	13	57
24-Mar	16	17	37	46	31	41	34	45	11	25	38	20	29	24	22	11	10	8	19	16	36	51	35	86	86
25-Mar	15	8	66	42	64	34	17	16	15	14	18	22	57	14	27	49	71	47	61	67	79	95	49	95	95
26-Mar	24	16	16	55	67	26	86	66	78	31	18	27	26	39	44	35	49	74	39	37	71	58	66	87	87
27-Mar	100	52	74	16	41	48	83	72	36	22	34	64	67	18	17	16	16	14	13	12	15	12	25	26	100
28-Mar	16	29	27	21	39	18	17	35	30	25	54	62	17	26	14	16	18	14	12	30	63	98	46	21	98
29-Mar	15	21	44	37	26	35	50	33	14	12	51	10	74	35	42	22	39	36	61	59	91	83	84	82	91
30-Mar	89	59	84	15	51	25	14	18	83	20	16	15	15	13	18	18	15	19	19	19	21	18	19	18	89
31-Mar	17	18	19	12	9	9	13	13	10	25	41	41	23	36	49	58	30	15	13	23	29	21	36	71	71
	100	88	102	66	92	88	86	94	105	82	87	77	74	86	76	62	71	74	61	81	91	98	86	95	
	Diurnal Maximum																								

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Athabasca Valley - March 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	March 7, 2015	Last Calibration	February 1, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	13:40
Gas Cert Reference	S970259A	Station temp.	18 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
ZAG Make/Model	API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564

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	803
Calculated slope	1.003014	0.998695	Chamber temp	44.0	44.0
Calculated intercept	1.418163	1.769867	Pressure	699.5	689.6
Analyzer Background	18.4	18.8	Flow	0.477	0.475
Analyzer Coefficient	1.084	1.084	Intensity	43372	43561

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	-0.1	----
as found span	5000	60.7	607.0	605.9	1.002
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	60.7	607.0	607.2	1.000
second point	5000	30.4	304.0	301.0	1.010
third point	5000	15.2	152.0	148.9	1.021
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	60.7	607.0	605.0	1.003
				Average Correction Factor	1.010

Corrected As found	606.0	Previous response	603.8	% change	-0.4%

Notes:

filter changed out, Pump changed out for preventative maintenance, Zero adjusted, After pump change out Pressure 689.6mmHg and Flow 0.475L/min

Calibration Performed By: Melissa Lemay

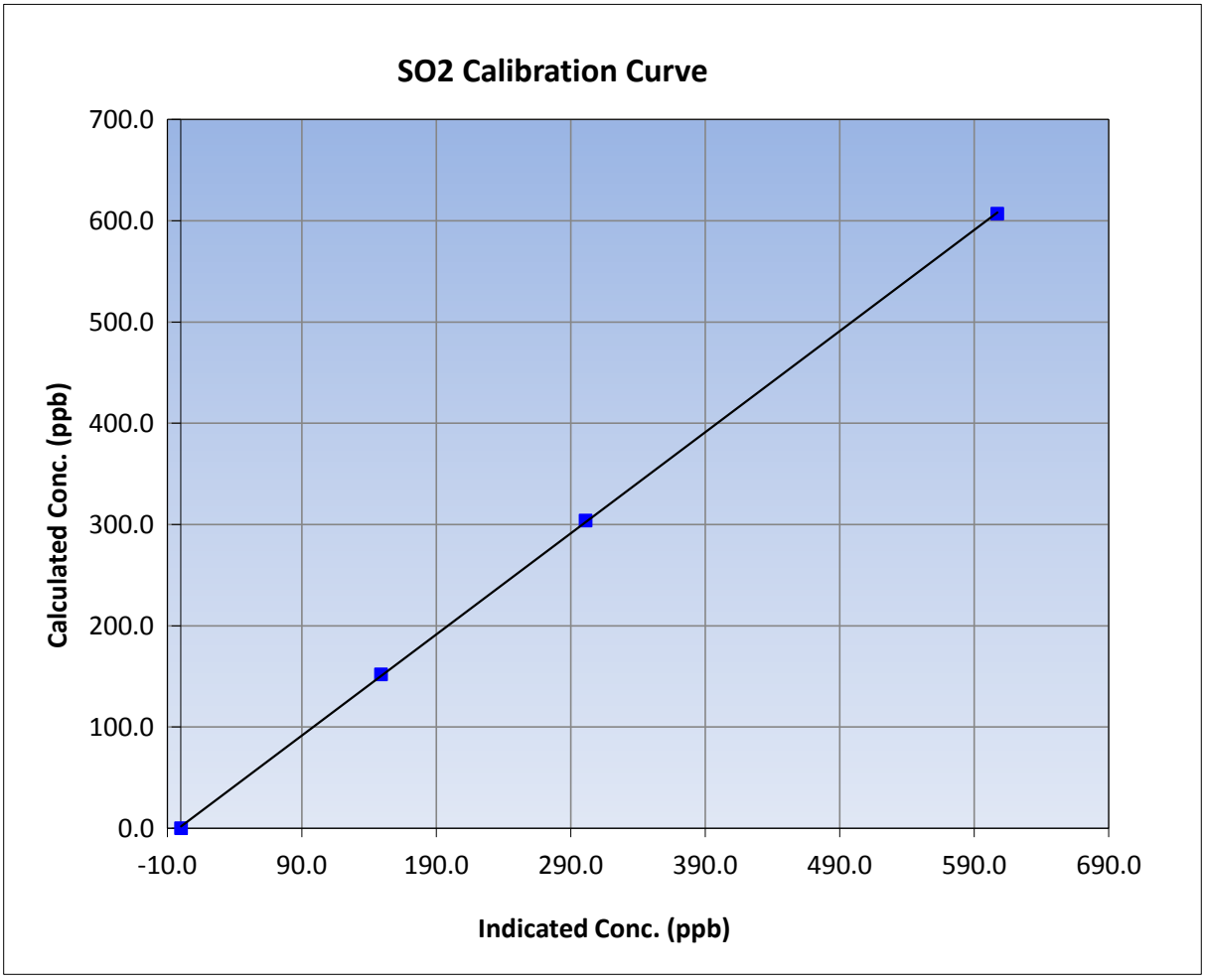
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

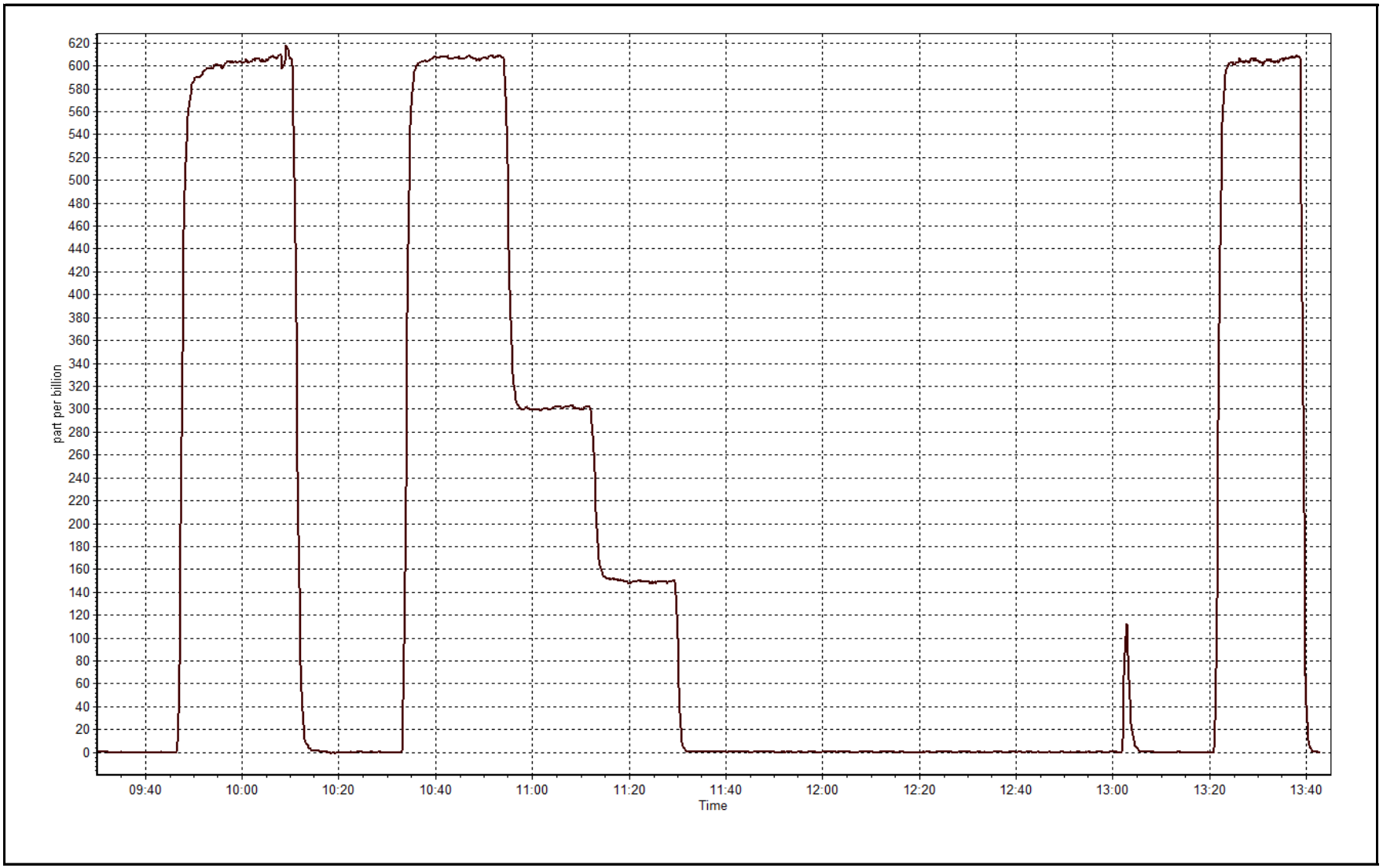
Calibration Date	March 7, 2015	Previous Calibration	February 1, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:25	End Time (MST)	13:40
Analyzer make	Thermo 45C	Analyzer serial #	630718530

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999949
607.0	607.2	0.9997		
304.0	301.0	1.0100	Slope	0.998695
152.0	148.9	1.0208		
			Intercept	1.769867



SO2 Calibration Plot Date: March 7, 2015



Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

Calibration Date	March 14, 2016	Last Calibration	February 3, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	11:18
Gas Cert Reference	ALM052589	Station temp.	22 Deg C
Cal Gas Concentration	5.02 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Dil air Make/Model	API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564
SO2 gas concentration	50.8 ppm	SO2 gas cert/exp	8400311 9/Sep/17

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	1105	1110
Calculated slope	0.997851	0.996396	Chamber temp	45	45
Calculated intercept	-0.182581	-0.175389	Pressure	707.4	693.1
Analyzer Background	2.42	2.39	Flow	0.438	0.430
Analyzer Coefficient	1.118	1.067	Intensity	71	71
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-LTE	Analyzer serial #	1507864683
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	6000	0.0	0.0	0.2	----
as found span	6000	89.6	75.0	77.7	0.965
SO2 scrubber check	5000	15.2	154.4	0.7	----
calibrator zero	6000	0.0	0.0	0.2	----
high point	6000	89.6	75.0	75.4	0.994
second point	6000	50.2	42.0	42.4	0.991
third point	6000	29.9	25.0	25.2	0.993
as left zero	6000	0.0	0.0	0.3	----
as left span	6000	89.6	75.0	74.8	1.002
				Average Correction Factor	0.993

Corrected As found	77.5	Previous response	75.3	% change	-2.8%

Notes:

no maintenance done, filter changed out, span adjusted

Calibration Performed By: Melissa Lemay

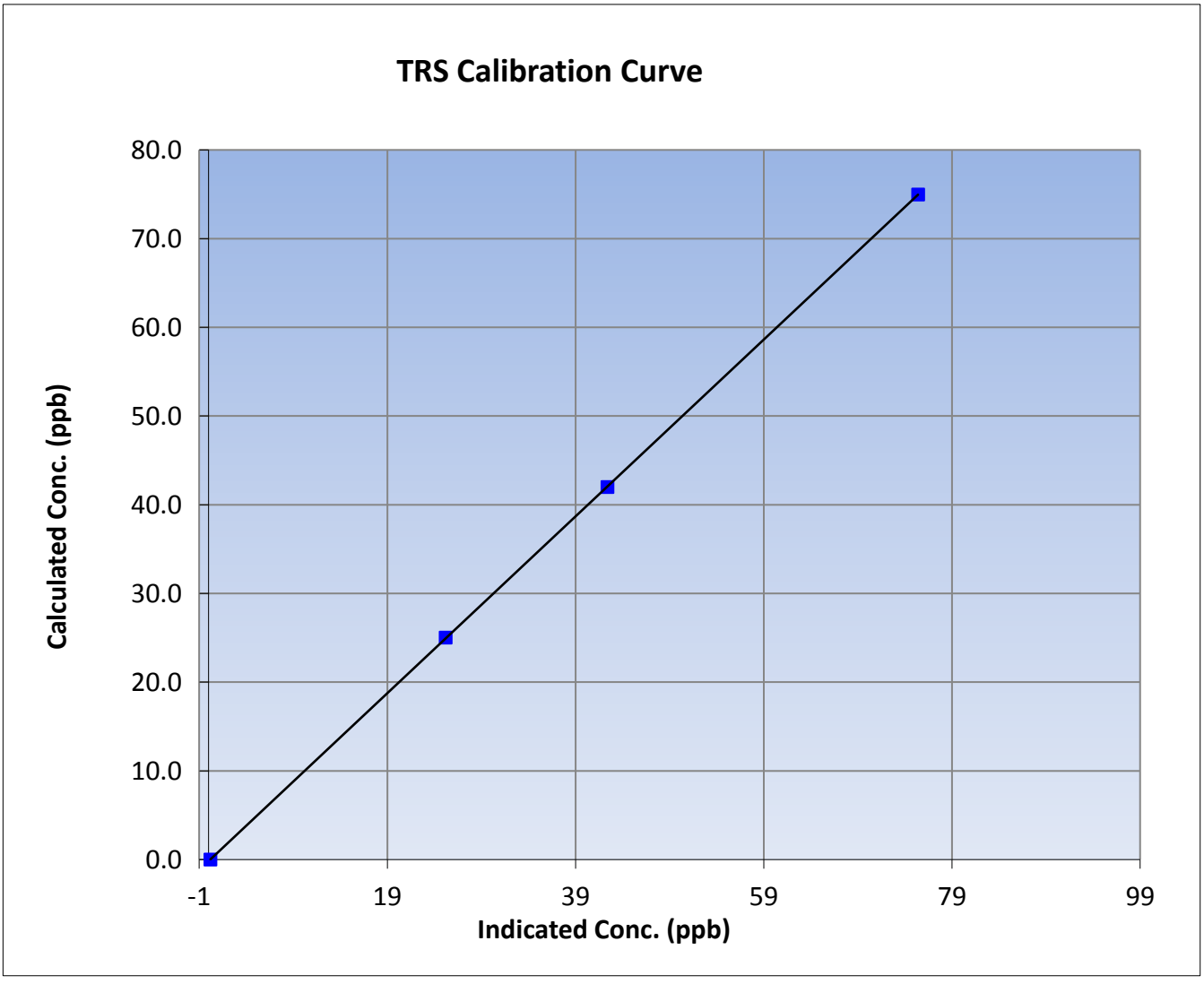
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

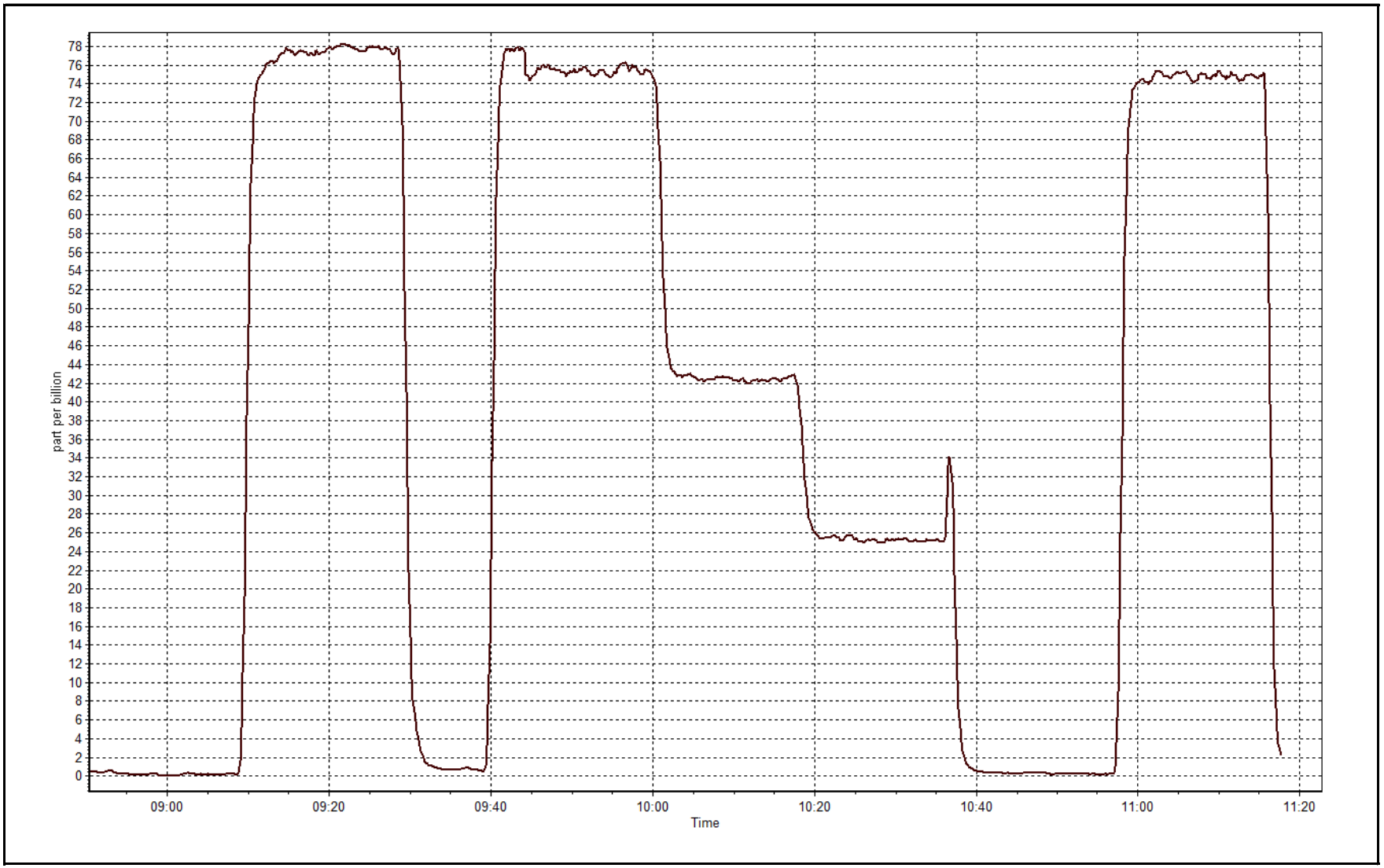
Calibration Date	March 14, 2016	Previous Calibration	February 3, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:50	End Time (MST)	11:18
Analyzer make	Thermo 43i-LTE	Analyzer serial #	1507864683

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999996
75.0	75.4	0.9942		
42.0	42.4	0.9906	Slope	0.996396
25.0	25.2	0.9927		
			Intercept	-0.175389



TRS Calibration Plot Date: March 14, 2016



Wood Buffalo Environmental Association
THC / NMHC Calibration Report

W B E A

Station Information

Calibration Date	March-07-15	Last Calibration	February-01-15
Station Name	Athabasca Valley	Station Number	AMS 7

Reason: Routine

Start Time (MST)	9:25	End Time (MST)	13:40
Gas Cert Reference	S970259A	Cal Gas Expiry Date	9/26/2017
CH4 Cal Gas Conc.	490.0 ppm	CH4 Equiv Conc.	1040.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm	Station temp.	22 Deg C
Calibrator Model	Sabio 4010	Serial Number	11021107
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	75.1
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	286.2	348.7
THC Calc slope	1.004944	0.998043	Carrier Pressure	36.8	36.8
THC Calc intercept	0.040606	0.038363	Fuel Pressure	42.1	42.1
NMHC Calc slope	1.001325	0.992860	Air Pressure	32.2	32.2
NMHC Calc intercept	0.024415	0.014170			

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	60.7	12.63	12.64	0.999
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	12.63	12.64	0.999
second point	5000	30.4	6.32	6.25	1.012
third point	5000	15.2	3.16	3.11	1.017
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	12.63	12.60	1.002
				Average Correction Factor	1.009

Corrected As found	12.64	Previous response	12.52	% change	-0.9%

Notes:

filter changed out, No adjustments or maintenance done

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	60.7	6.68	6.75	0.989
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	6.68	6.72	0.994
second point	5000	30.4	3.34	3.34	1.001
third point	5000	15.2	1.67	1.66	1.007
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	6.68	6.69	0.998
				Average Correction Factor	1.001

Corrected As found	6.75	Previous response	6.64	% change	-1.6%

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	60.7	5.95	5.93	1.003
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	5.95	5.92	1.005
second point	5000	30.4	2.98	2.92	1.020
third point	5000	15.2	1.49	1.45	1.027
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	5.95	5.91	1.007
				Average Correction Factor	1.017

Corrected As found	5.93	Previous response	5.88	% change	-0.9%

Wood Buffalo Environmental Association

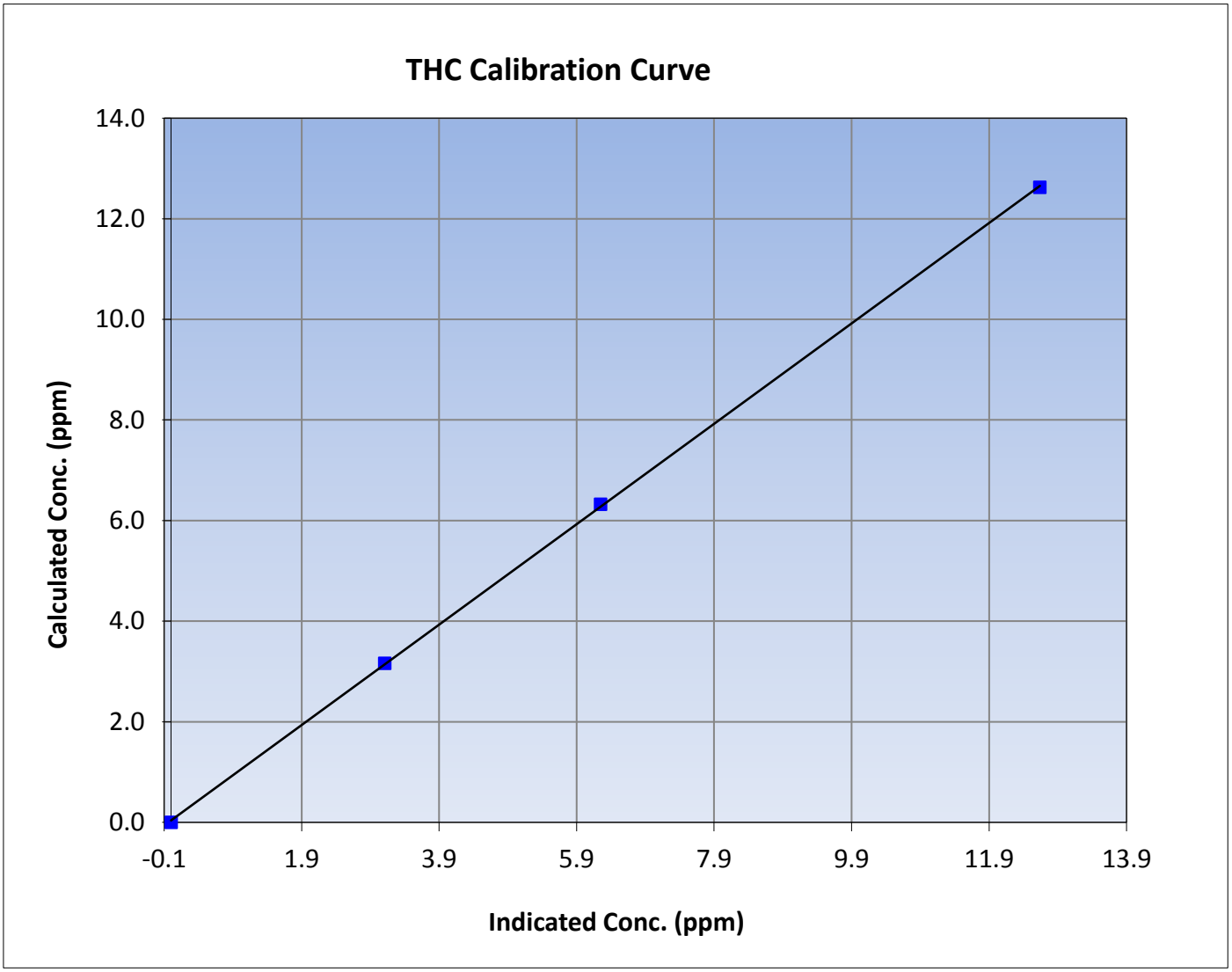
THC Calibration Summary

Station Information

Calibration Date	March 7, 2015	Previous Calibration	February 1, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:25	End Time (MST)	13:40
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	0.999944
12.63	12.64	0.9989		
6.32	6.25	1.0117	Slope	0.998043
3.16	3.11	1.0166		
			Intercept	0.038363



Wood Buffalo Environmental Association

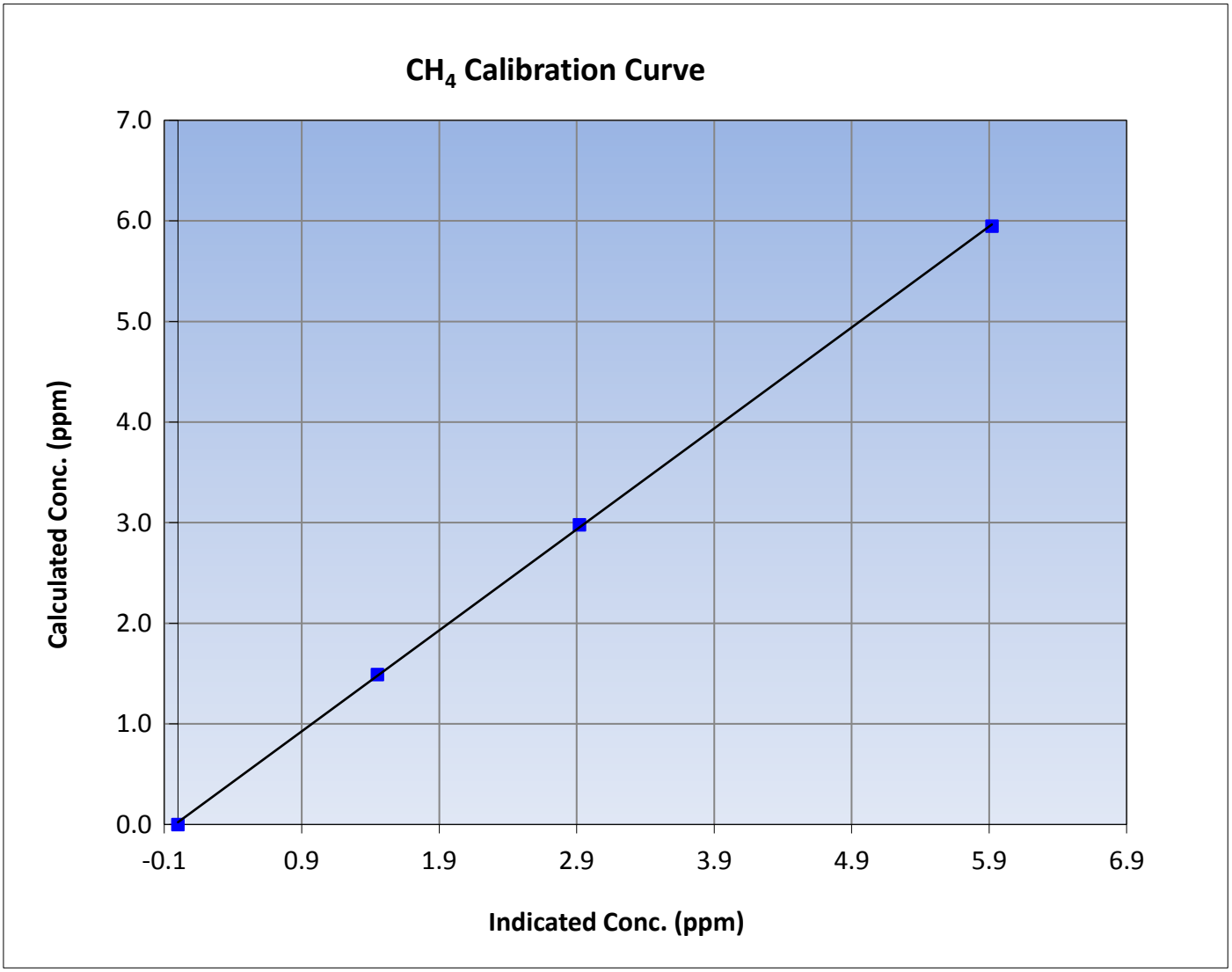
CH_4 Calibration Summary

Station Information

Calibration Date	March 7, 2015	Previous Calibration	February 1, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:25	End Time (MST)	13:40
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	0.999919
5.95	5.92	1.0048		
2.98	2.92	1.0203	Slope	1.003742
1.49	1.45	1.0273		
			Intercept	0.022224



Wood Buffalo Environmental Association

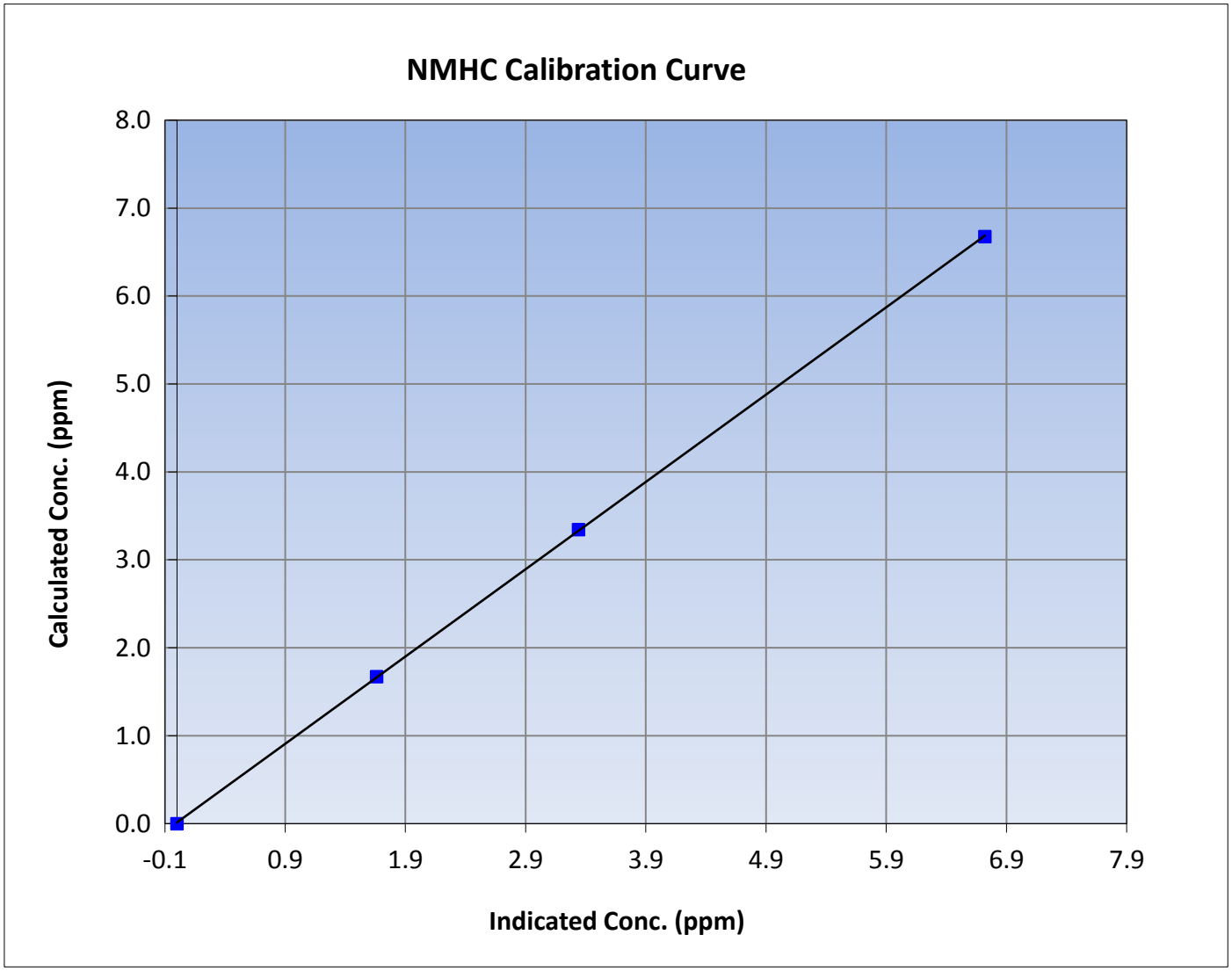
NMHC Calibration Summary

Station Information

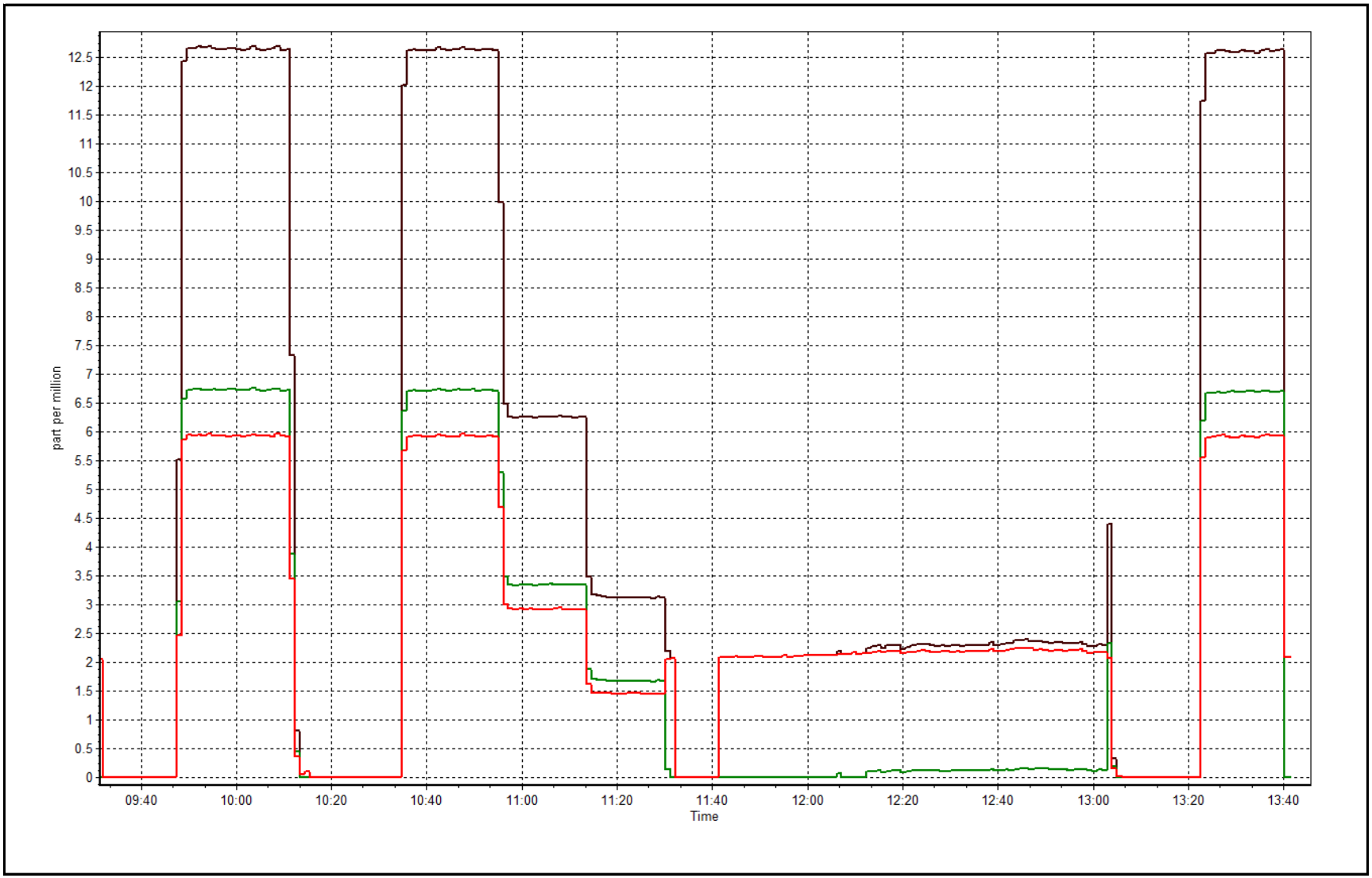
Calibration Date	March 7, 2015	Previous Calibration	February 1, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:25	End Time (MST)	13:40
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999977
6.68	6.72	0.9936		
3.34	3.34	1.0012	Slope	0.992860
1.67	1.66	1.0072		
			Intercept	0.014170



THC Calibration Plot Date: March 7, 2015



Wood Buffalo Environmental Association
O_3 Calibration Report

W B E A

Station Information

Calibration Date	March 8, 2016	Previous Calibration	February 3, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:10	End Time (MST)	10:30
NO2 GPT Ref date	March-07-16	Transfer Standard	GPT
		Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
ZAG make/model	Teledyne API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	Serial Number	5564

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 500 ppb		Bench temp.	28.7	27.7
Analyzer IP address	192.168.1.48		Lamp temp.	67.9	67.9
Calculated slope	1.001204	1.007192	Pressure	721.0	712.6
Calculated intercept	1.089850	0.275301	Flow cell A	0.743	0.737
Analyzer Background	0.2	0.2	Flow cell B	0.755	0.749
Analyzer Coefficient	0.943	0.943	Cell A Intensity	83229	80294
			Cell B Intensity	73279	70452

Analyzer make	TEI 49i	Analyzer serial #	1507964700

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	-0.1	----
as found span	5000	1.22	343.1	340.5	1.008
calibrator zero	5000	0.00	0.0	-0.1	----
high point	5000	1.22	343.1	340.5	1.008
second point	5000	0.70	172.7	171.0	1.010
third point	5000	0.43	87.3	86.3	1.012
as left zero	5000	0.00	0.0	-0.1	----
as left span	5000	1.22	343.1	328.5	1.044
				Average Correction Factor	1.010

Corrected As found	340.6	Previous response	341.6	% change	0.3%

Notes:

Filter changed out, No maintenance or adjustments done

Calibration Performed By: Melissa Lemay

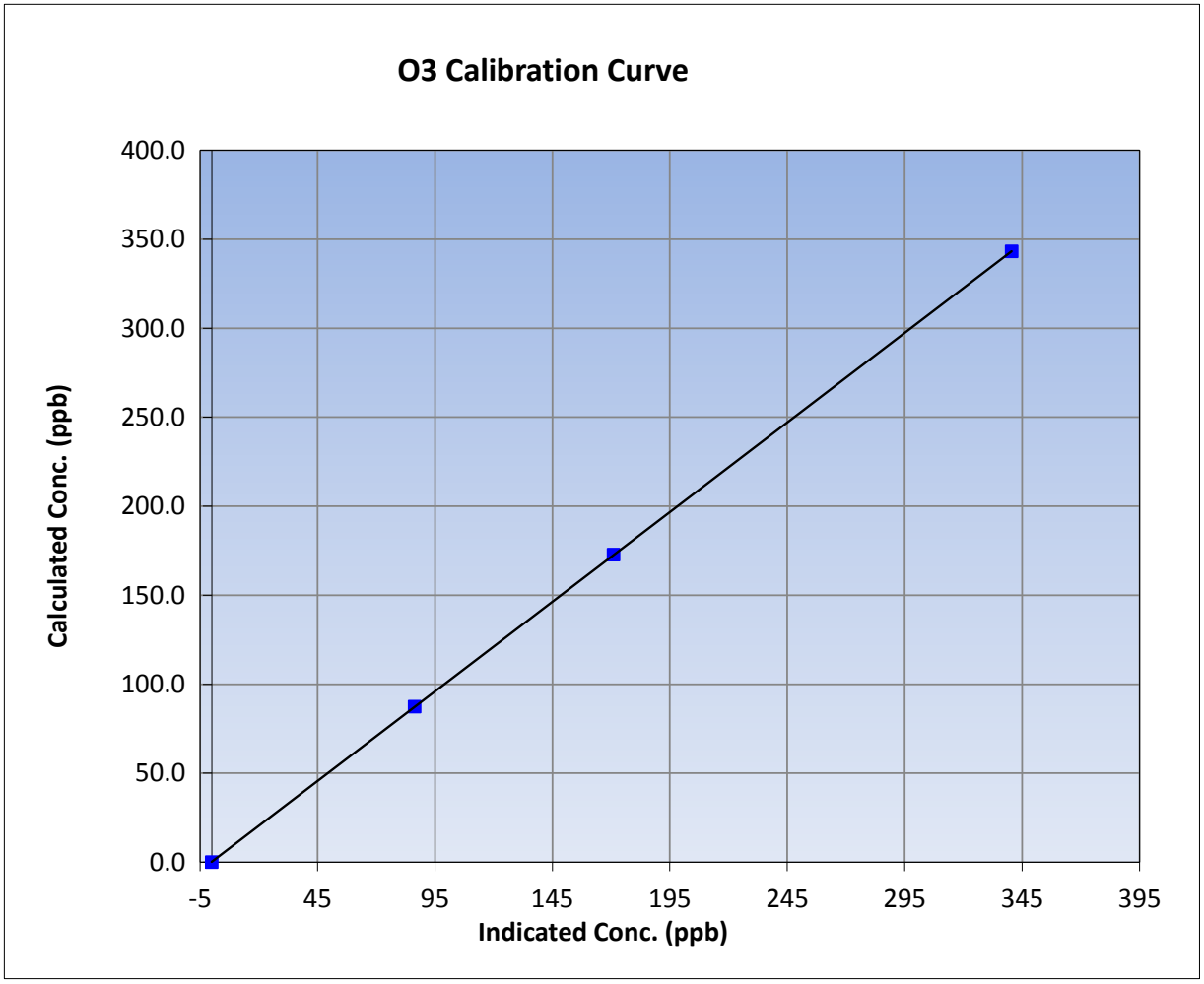
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

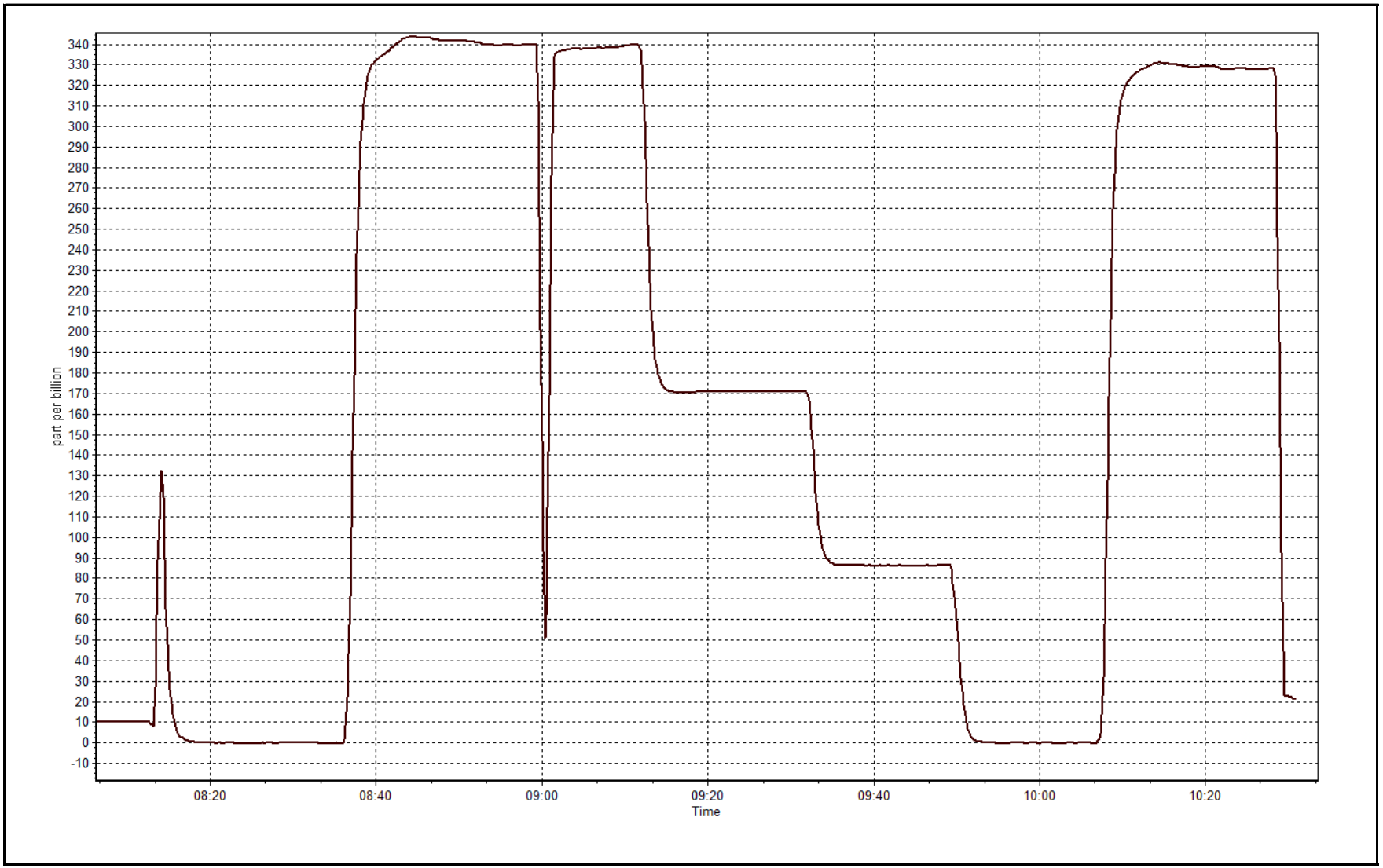
Calibration Date	March-08-16	Previous Calibration	February 3, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:10	End Time (MST)	10:30
Analyzer make	TEI 49i	Analyzer serial #	1507964700

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999999
343.1	340.5	1.0076		
172.7	171.0	1.0099	Slope	1.007192
87.3	86.3	1.0116		
			Intercept	0.275301



O3 Calibration Plot Date: March 8, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 7, 2016	Previous Calibration	February 1, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	13:40
NO Cal Gas Conc	49.4 ppm	Gas Cert Reference	S970259A
NOx Cal Gas Conc	49.4 ppm	Cal Gas Expiry Date	9/26/2017
Calibrator	Sabio 4010	Serial Number	11021107
Zero air Generator	Teledyne PAI T701	Serial Number	1864

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	5564

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.995917	0.998400	1.011229
	Data Offset	1.568616	1.846276	-1.129522
Current Calibration	Data Slope	0.997558	0.996930	1.003445
	Data Offset	1.824247	1.963622	-0.243397

Analyzer Information

Analyzer make/model	Thermo 42C	Analyzer serial #	601114773

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.103		192.168.1.103	
NO coefficient	1.009		0.988	
NOX coefficient	1.003		0.998	
NO2 coefficient	1.000		1.000	
NO bkgrnd	2.8		2.8	
NOX bkgrnd	2.9		2.9	
Chamber Temp	49.7	Deg C	49.7	Deg C
Moly Temp	324	Deg C	324	Deg C
PMT voltage	-784	V	-784	V
PMT Temp	-3.6	Deg C	-3.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	147.4	mmHg	142.3	mmHg
R Cell Press Nox	147.4	mmHg	142.3	mmHg
NO sample flow	0.881	lpm	0.889	lpm
Nox sample Flow	0.881	lpm	0.889	lpm

Notes:

Filter changed out, span adjusted, no maintenance done

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 7, 2016 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	0.0	-0.1	0.2	----	----
as found span	5000	60.7	599.7	599.7	0.0	618.2	614.7	3.8	0.9701	0.9756
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.2	----	----
high point	5000	60.7	599.7	599.7	0.0	600.5	600.8	-0.2	0.9987	0.9982
second point	5000	30.4	300.4	300.4	0.0	297.6	297.5	0.2	1.0092	1.0096
third point	5000	15.2	150.2	150.2	0.0	147.4	147.4	0.2	1.0188	1.0188
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.2	----	----
as left span	5000	60.7	599.7	257.1	342.6	593.3	266.7	326.6	1.0108	0.9640
								Average Correction Factor	1.0089	1.0089

Corrcted As found NO_X= 618.2 NO= 614.8 Percent Change NO_X= -2.8% NO= -2.6%

Previous Response NO_X= 600.6 NO= 598.8

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 60.70 ccm NOX ref calc conc = 599.7 ppb NO ref calc conc = 599.7 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	599.6	600.2	0.2	1.0002	0.9992	----	----
1st NO2 (300)	257.1	343.1	599.2	257.1	342.1	1.0009	----	1.0029	99.7%
2nd NO2 (200)	427.5	172.7	599.8	427.5	172.5	0.9999	----	1.0012	99.9%
3rd NO2 (100)	512.9	87.3	600.0	512.9	87.2	0.9995	----	1.0011	99.9%
2nd NO ref point		0.0	600.1	600.8	-0.5	0.9994	0.9982	----	----
				Average Correction Factor		0.9999		1.0017	99.8%

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

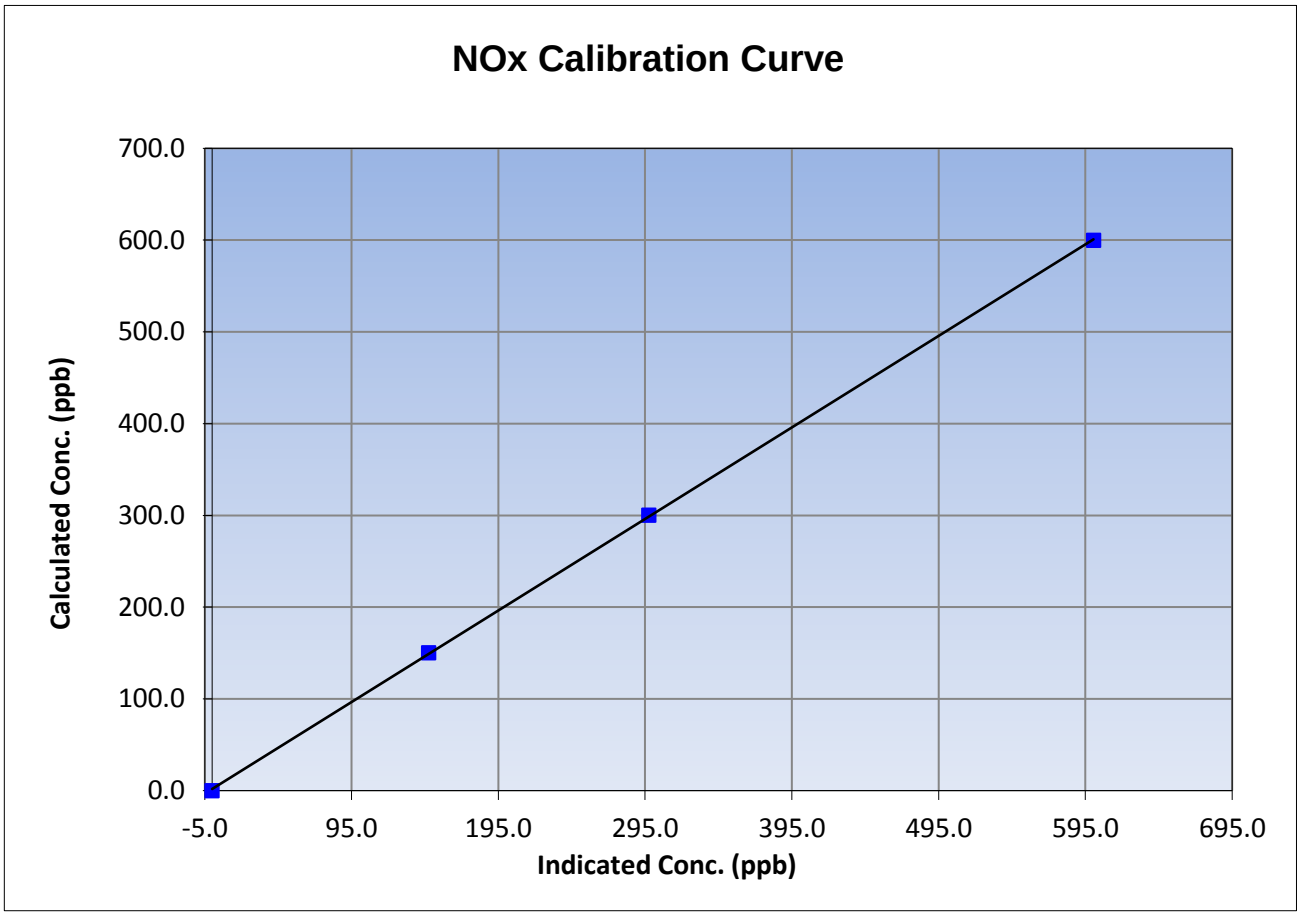
NO_X Calibration Summary

Station Information

Calibration Date	March 7, 2016	Previous Calibration	February 1, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:25	End Time (MST)	13:40
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	0.0	----	Correlation Coefficient	0.999954
599.7	600.5	0.9987		
300.4	297.6	1.0092	Slope	0.997558
150.2	147.4	1.0188		
			Intercept	1.824247



Wood Buffalo Environmental Association

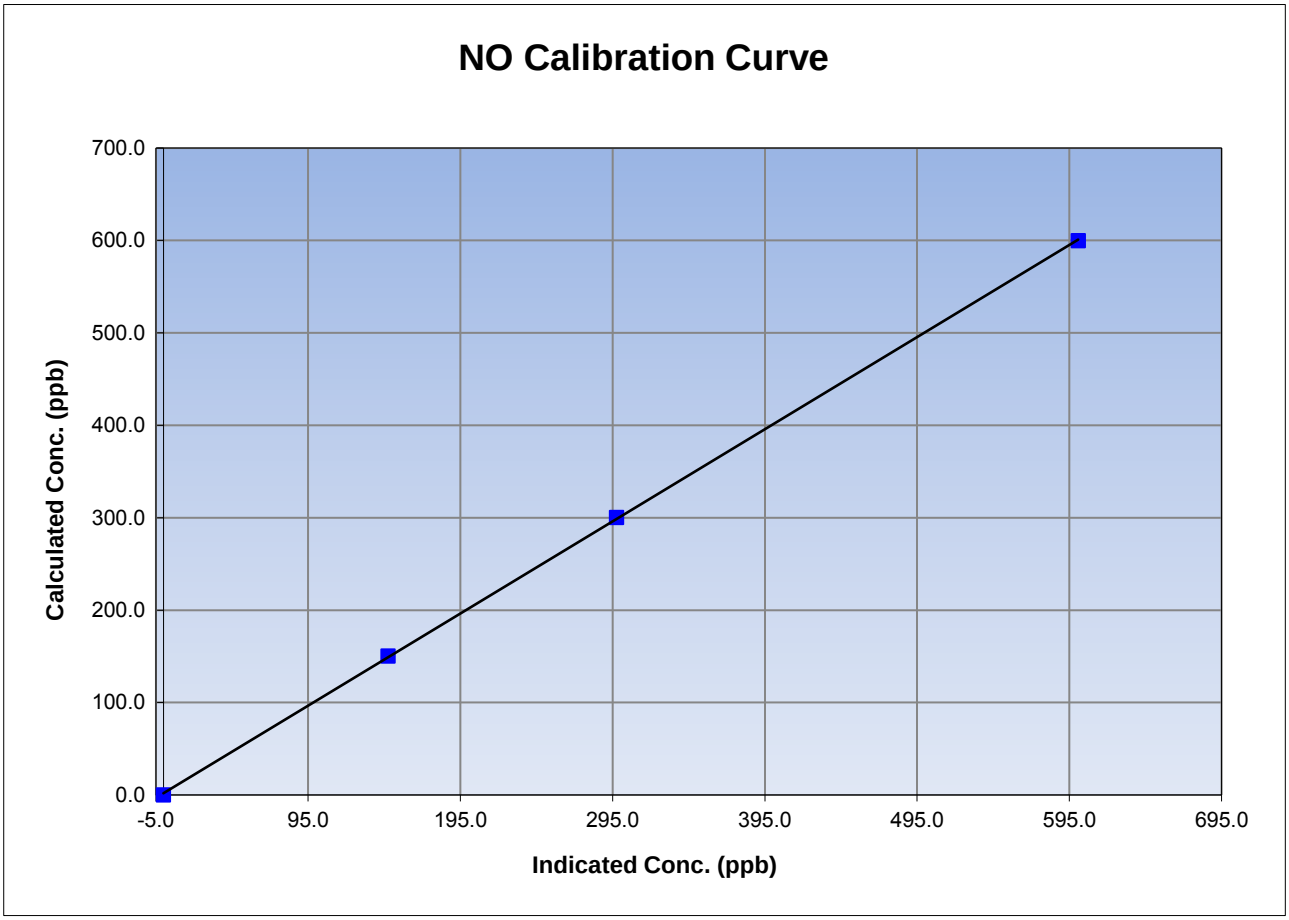
NO Calibration Summary

Station Information

Calibration Date	March 7, 2016	Previous Calibration	February 1, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:25	End Time (MST)	13:40
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	0.999950
599.7	600.8	0.9982		
300.4	297.5	1.0096	Slope	0.996930
150.2	147.4	1.0188		
			Intercept	1.963622



Wood Buffalo Environmental Association

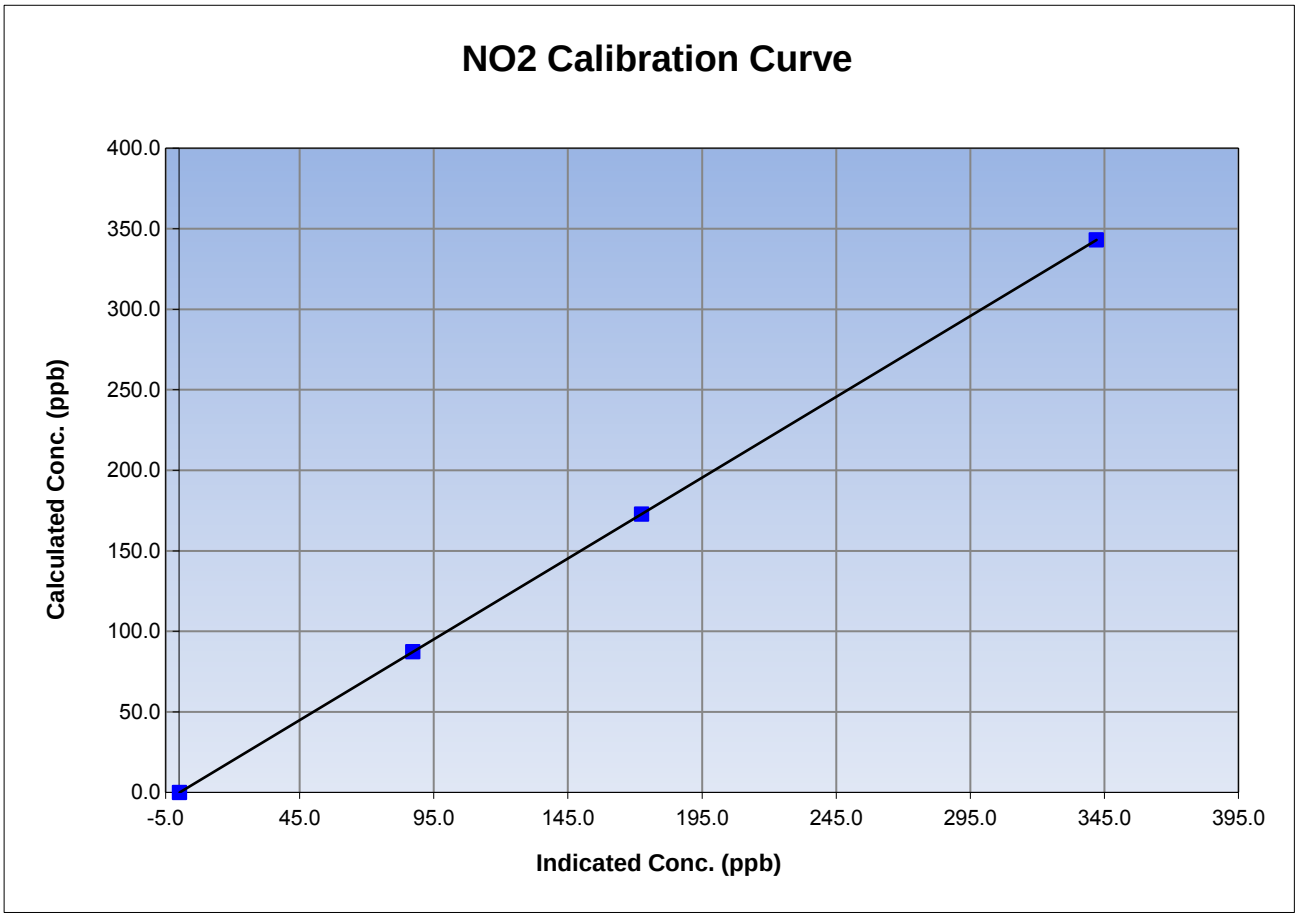
NO_2 Calibration Summary

Station Information

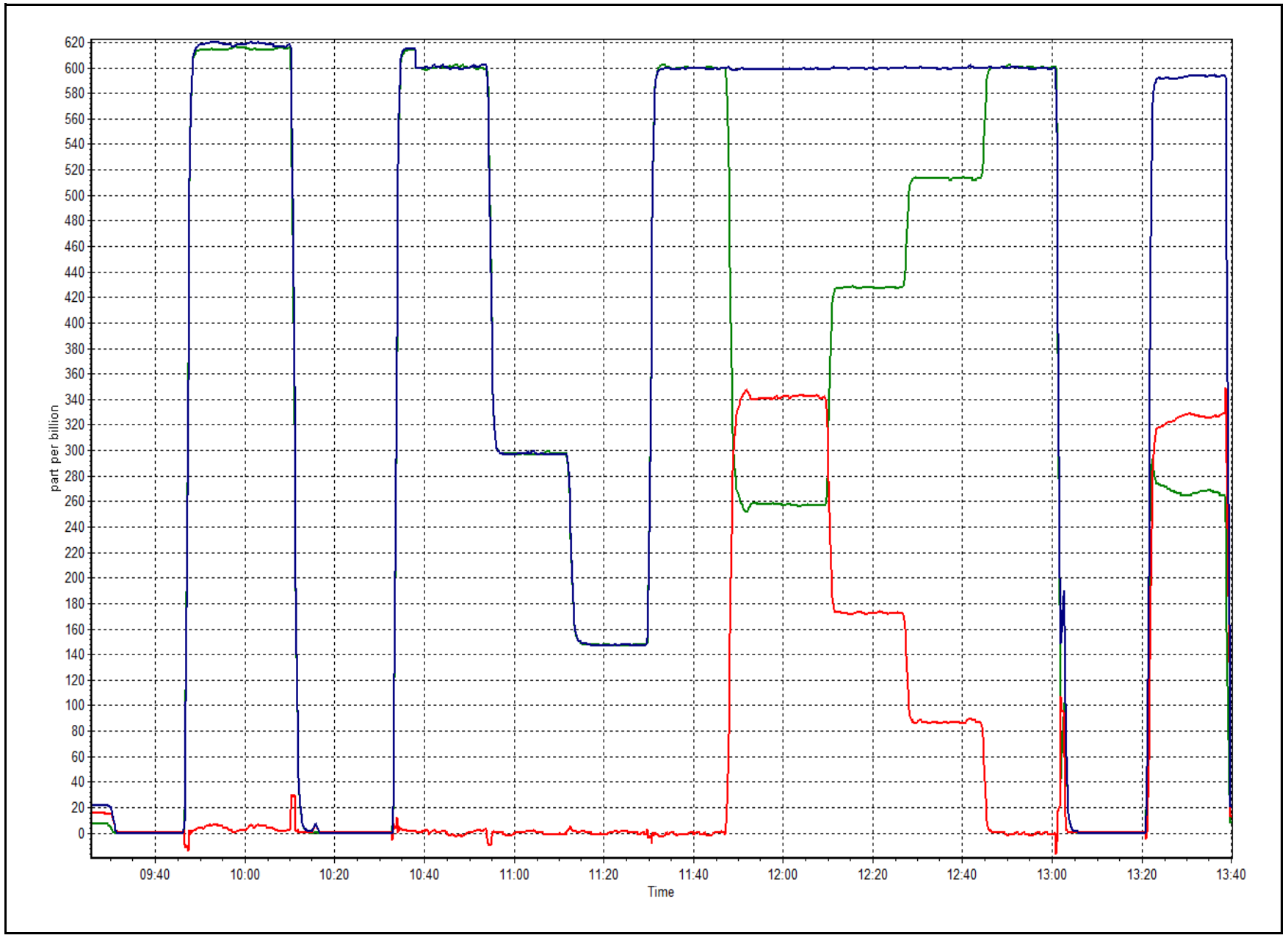
Calibration Date	March 7, 2016	Previous Calibration	February 1, 2016
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:25	End Time (MST)	13:40
Analyzer make	Thermo 42C	Analyzer serial #	601114773

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	1.000000
343.1	342.1	1.0029		
172.7	172.5	1.0012	Slope	1.003445
87.3	87.2	1.0011		
			Intercept	-0.243397



NOX Calibration Plot Date: March 7, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	March 8, 2016	Previous Calibration:	02/04/16
Station Name:	Athabasca Valley	Station Number:	AMS 7
Start Time (MST):	10:52	End Time (MST):	12:08
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION

Particulate Fraction:				PM2.5				
Make/Model:				Thermo / SHARP 5030				
Serial Number				E515				
C_{14} Source SN:				3256				
Confirmation of Time settings:				Yes ☑	No ☐			
Paremeters Checked:	T1 ☑	T2 ☐	T3 ☐	T4 ☐	P3 ☑	Main Flow ☑	Beta ☐	Neph ☑

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-5.0	-4.1	0.9	-5.0
T2	13.0	na	na	13.0
T3	17.0	na	na	17.0
T4	19.0	na	na	19.0
RH (%)	12.0	na	na	12.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	980	975.0	-5.0	980

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1002	1023	21	1002	1002

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	247		247
Neph	0.7		0.7
C14	215.5		215.5
Indicated Concentration (ug/m3)	**0.4**	**No**	**0.4**
Offset 1			
Offset 2			

Leak Check (Quarterly)

Leak Check Date:	March 8, 2016	Previous Leak Check Date:	December 1, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	17.10	0.20
*Flow with adaptor (LPM):	16.90	

**Note - do not attach adaptor without shutting off the pump first*

Mass Foil Calibration (Annualy)

Foil Calibration Date:		Previous Foil Calibration:	
Zeroed?:			
Foil Mass:		Mass foil set S/N:	
Previous Correction Factor:			
New Correction Factor:			

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

sample head cleaned. Flow adjusted

Calibration Performed By: **Melissa Lemay**

Wood Buffalo Environmental Association
CO Calibration Report

W B E A

Station Information

Calibration Date	March 9, 2016	Last Calibration	February 4, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	7:20	End Time (MST)	10:00
Gas Cert Reference	CC101396	Station temp.	22 Deg C
Cal Gas Concentration	2970 ppm	Cal Gas Exp Date	02/02/2023
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
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 - 1000 ppb		Chamber temp.	48.0	48.0
Analyzer IP address	192.168.1.48		Pressure	737.6	731.3
Calculated slope	1.005524	0.992456	Flow	0.491	0.490
Calculated intercept	0.027020	0.047560	Intensity	199664	199712
Analyzer Background	4.591	4.712	S/R ratio	1.174198	1.173620
Analyzer Coefficient	1.065	1.065			

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	0.3	----
as found span	5000	69.7	41.4	42.6	0.973
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	69.7	41.4	41.7	0.993
second point	5000	35.2	20.9	21.0	0.996
third point	5000	15.2	9.0	9.0	1.001
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	69.7	41.4	41.4	0.999
				Average Correction Factor	0.997

Corrected As found	42.3	Previous response	41.1	% change	-2.7%

Notes:

zero adjusted, Pump changed out for preventative maintenance, Flow and pressure after change out of pump same as before change out, Filter changed out

Calibration Performed By: Melissa Lemay

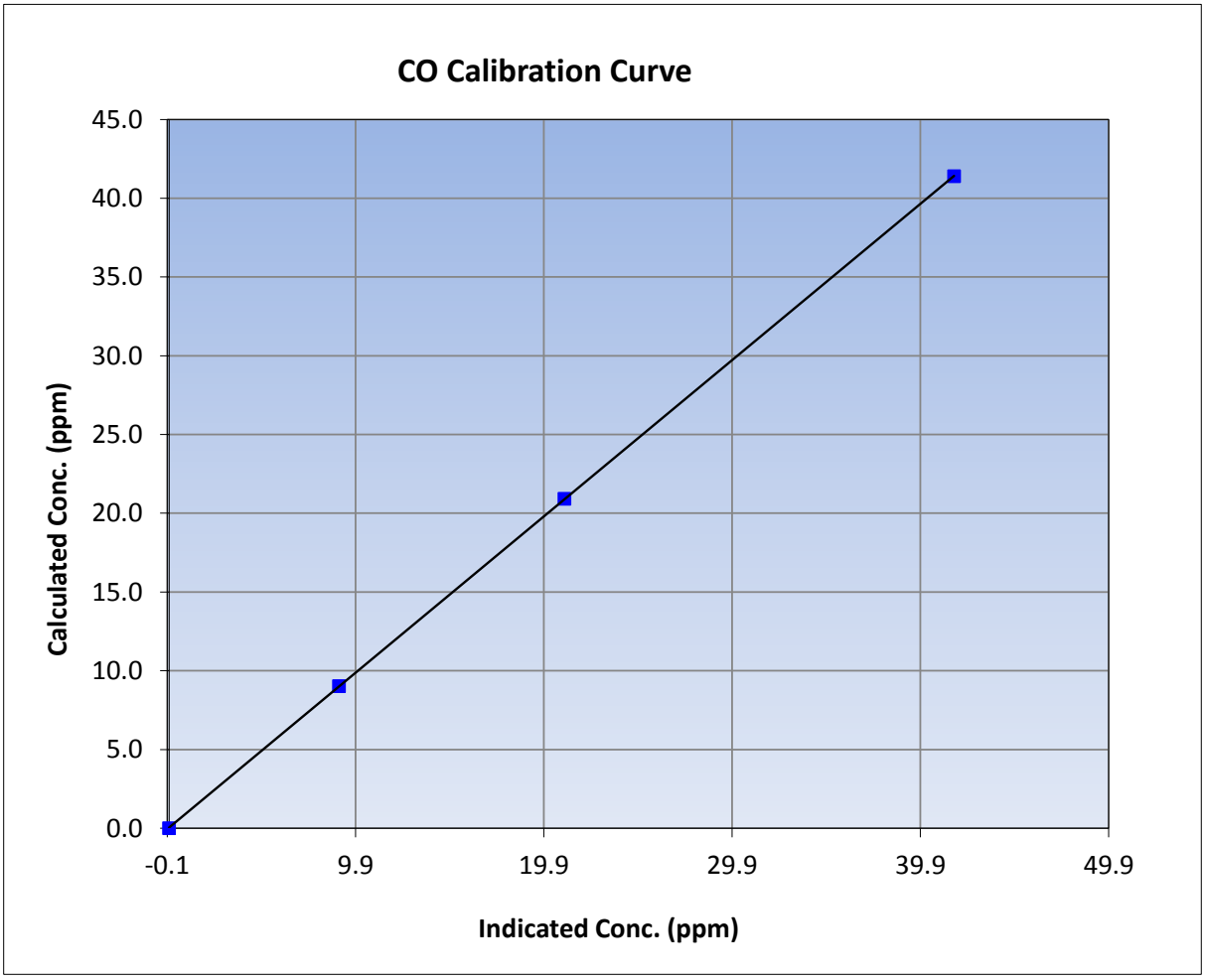
Wood Buffalo Environmental Association
CO Calibration Report

Station Information

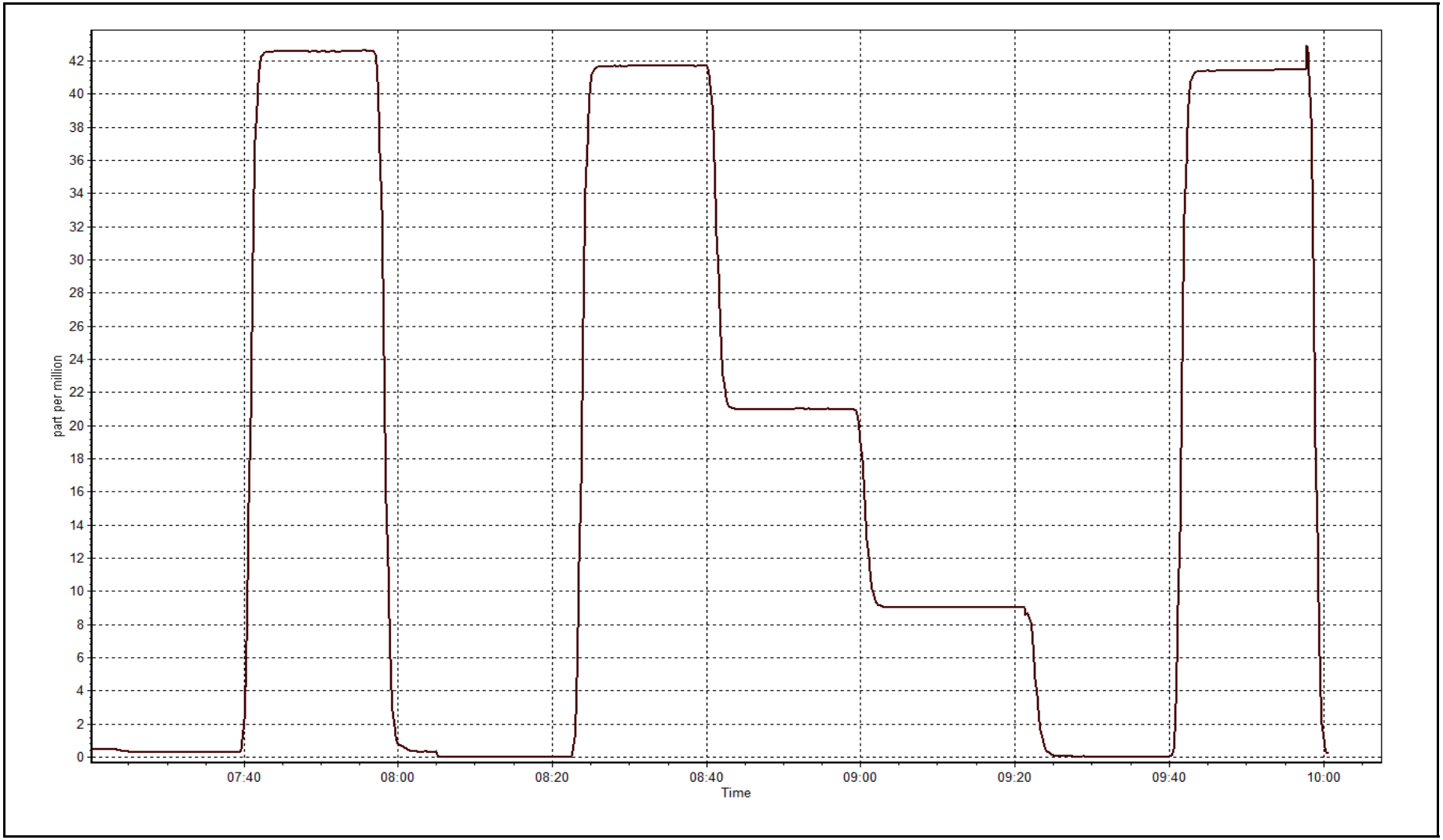
Calibration Date	March 9, 2016	Previous Calibration	February 4, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:20	End Time (MST)	10:00
Analyzer make	Thermo 48i-TLE	Analyzer serial #	1408761381

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999996
41.4	41.7	0.9931		
20.9	21.0	0.9961	Slope	0.992456
9.0	9.0	1.0010		
			Intercept	0.047560



CO Calibration Plot Date: March 9, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 8
FORT CHIPEWYAN
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
MARCH 2016

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	100.00	3	0	1	0
O3(ppb) Average	710	34	34	100.00	51	0	46	-
NO2(ppb) Average	706	36	38	99.73	9	0	2	-
NO(ppb) Average	706	36	38	99.73	6	-	1	-
NOX(ppb) Average	706	36	38	99.73	14	-	3	-
PM2.5(ug/m3) Average	736	2	8	99.19	17	-	4.8	0
Wind Speed 10 m (km/h) Average	743	0	1	99.87	37	-	30	-
Wind Direction 10 m (deg) Average	743	0	1	99.87	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	9.5	-	3.7	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	92	-
Precipitation (mm) Total	744	0	0	100.00	1	-	3.8	-
Leaf Wetness (% of range) Average	742	0	2	99.73	77	-	33	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	691	-	216	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	708	0.1	0	-	0	0	0	0	0	0	3
O3(ppb) Average	710	39.7	5	-	27	33	37	40	44	45	51
NO2(ppb) Average	706	0.7	1	-	0	0	0	1	1	1	9
NO(ppb) Average	706	0.1	0	-	0	0	0	0	0	0	6
NOX(ppb) Average	706	0.8	1	-	0	0	0	1	1	2	14
PM2.5(ug/m3) Average	736	2.39	1.7	-	0	0.8	1.3	2.1	2.9	4.3	17
Wind Speed 10 m (km/h) Average	743	14.7	8	-	1	5	8	13	20	27	37
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-8.47	6.6	-	-23.9	-16.9	-13.3	-9	-4.6	1.2	9.5
Relative Humidity (%) Average	744	72.5	14	-	28	52	65	74	83	89	98
Precipitation (mm) Total	744	-	-	7.37	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	742	1.7	8	-	-1	0	0	0	1	2	77
Global Solar Radiation (W/m2) Average	744	130	189	-	0	0	0	5	211	450	691

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NO2, NO, NOX	12 Mar 2016 17:00	12 Mar 2016 18:00	2	Power spike followed by stabilization period
PM2.5	18 Mar 2016 03:00	18 Mar 2016 04:00	2	Unstable operation - excessive baseline drift
PM2.5	18 Mar 2016 07:00	18 Mar 2016 08:00	2	Unstable operation - excessive baseline drift
PM2.5	18 Mar 2016 09:00	18 Mar 2016 09:00	1	Maintenance - remote tape change and zero
PM2.5	18 Mar 2016 10:00	18 Mar 2016 10:00	1	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	08 Mar 2016 07:00	08 Mar 2016 07:00	1	Flat line in sensor output signal - Sensor frozen
Surface Leaf Wetness	10 Mar 2016 17:00	10 Mar 2016 18:00	2	Maintenance - function check

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Fort Chipewyan - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 3 ppb on Mar 28 09:00 Maximum Daily Average: 0.6 ppb on Mar 28

Minimum Value: 0 ppb on Mar 7 21:00 Minimum Daily Average: 0.0 ppb on Mar 16
Maximum Diurnal Average: 0.2 ppb at hour 9 Minimum Diurnal Average: 0.0 ppb at hour 4
Monthly Average: 0.1 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 1$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
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	0	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	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	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	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
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	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	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	0
10-Mar	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0.2	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	0
12-Mar	0	0	0	0	0	Z	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1
13-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
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	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	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	0.0	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	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	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	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	0.1	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	0.1	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	0.1	0
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	0.2	0
27-Mar	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1
28-Mar	0	0	0	Z	0	1	2	3	3	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.6	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	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	0
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
	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Diurnal Average	
	0	0	1	0	0	1	2	3	3	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	Diurnal Maximum	

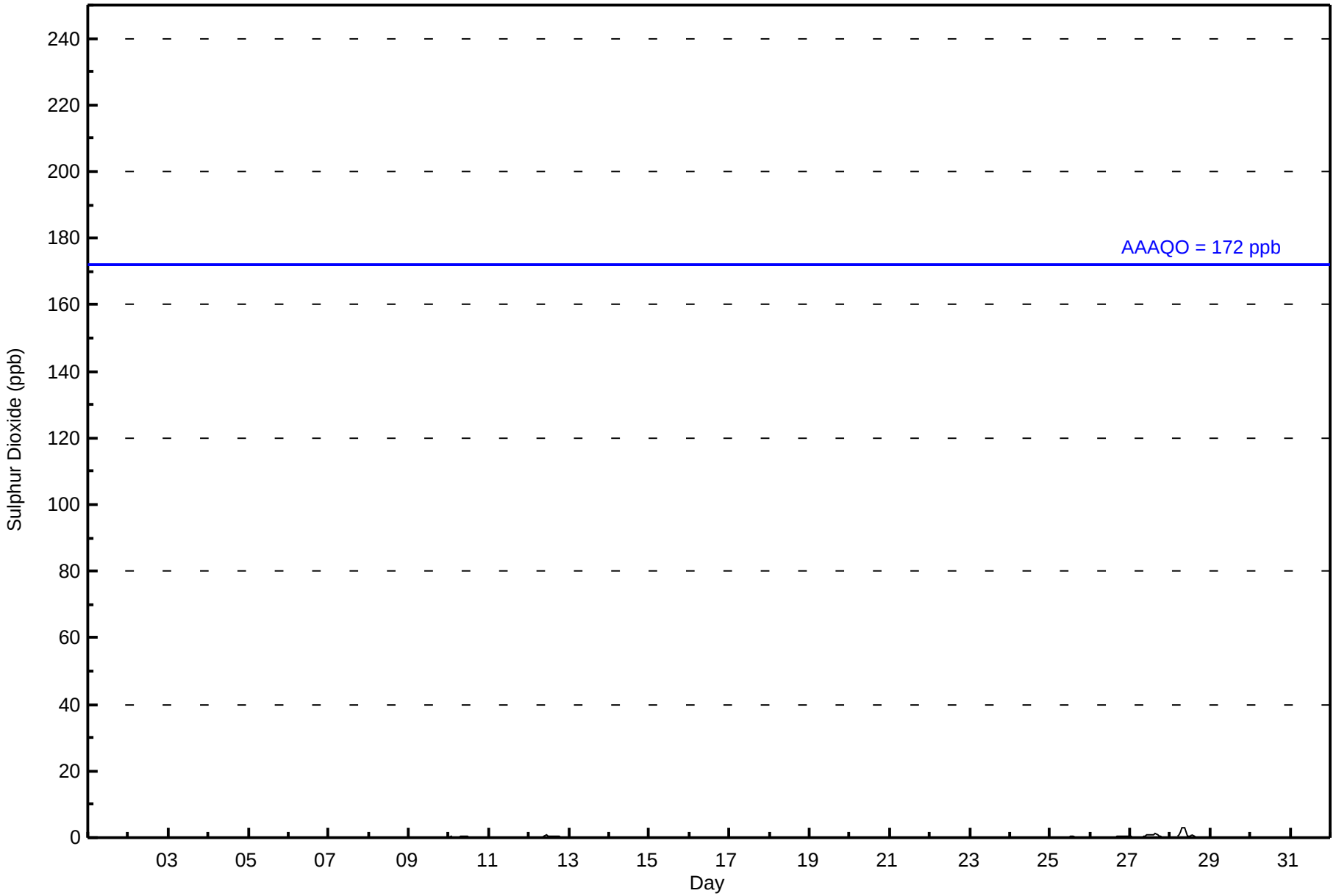
Z - zerospan C - Calibration
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Fort Chipewyan - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Fort Chipewyan - March 2016

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 (SO_2) - ppb

Fort Chipewyan - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	26	32	38	153	215	62	5	1	0	2	2	20	27	39	42	43	707
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	26	32	38	153	215	62	5	1	0	2	2	20	27	39	42	43	707

Total Number of Valid Hours: 707

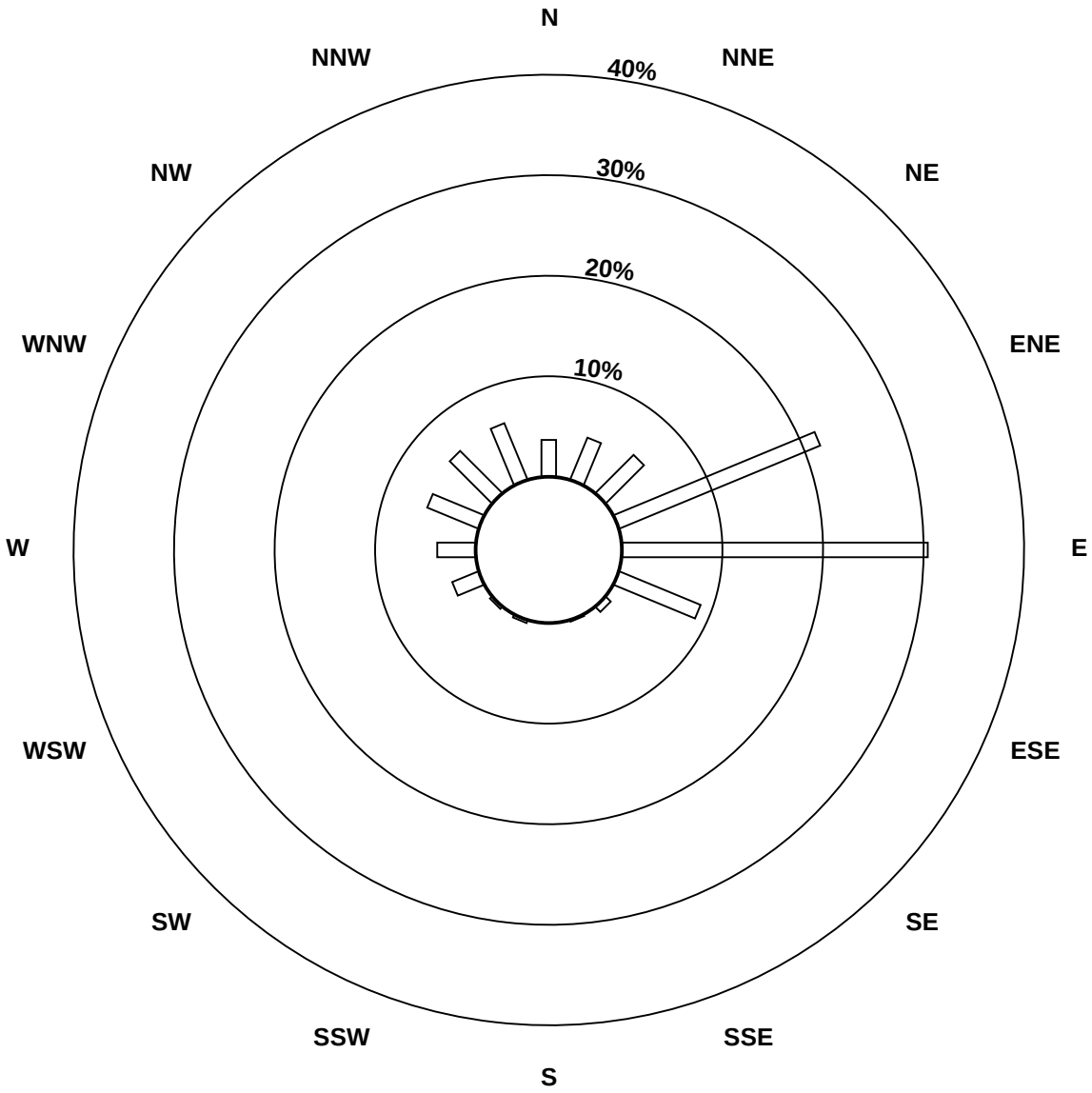
Total Number of Hours: 744

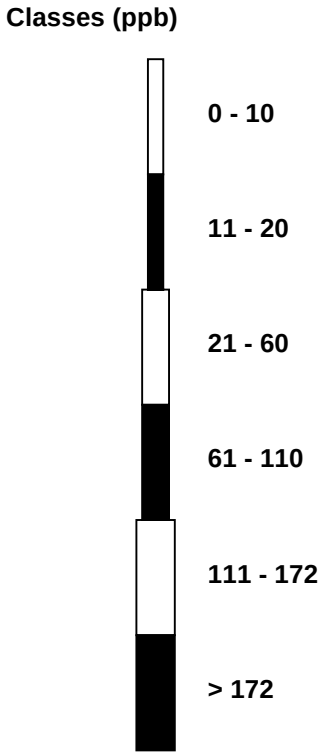
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Fort Chipewyan (AMS 8)





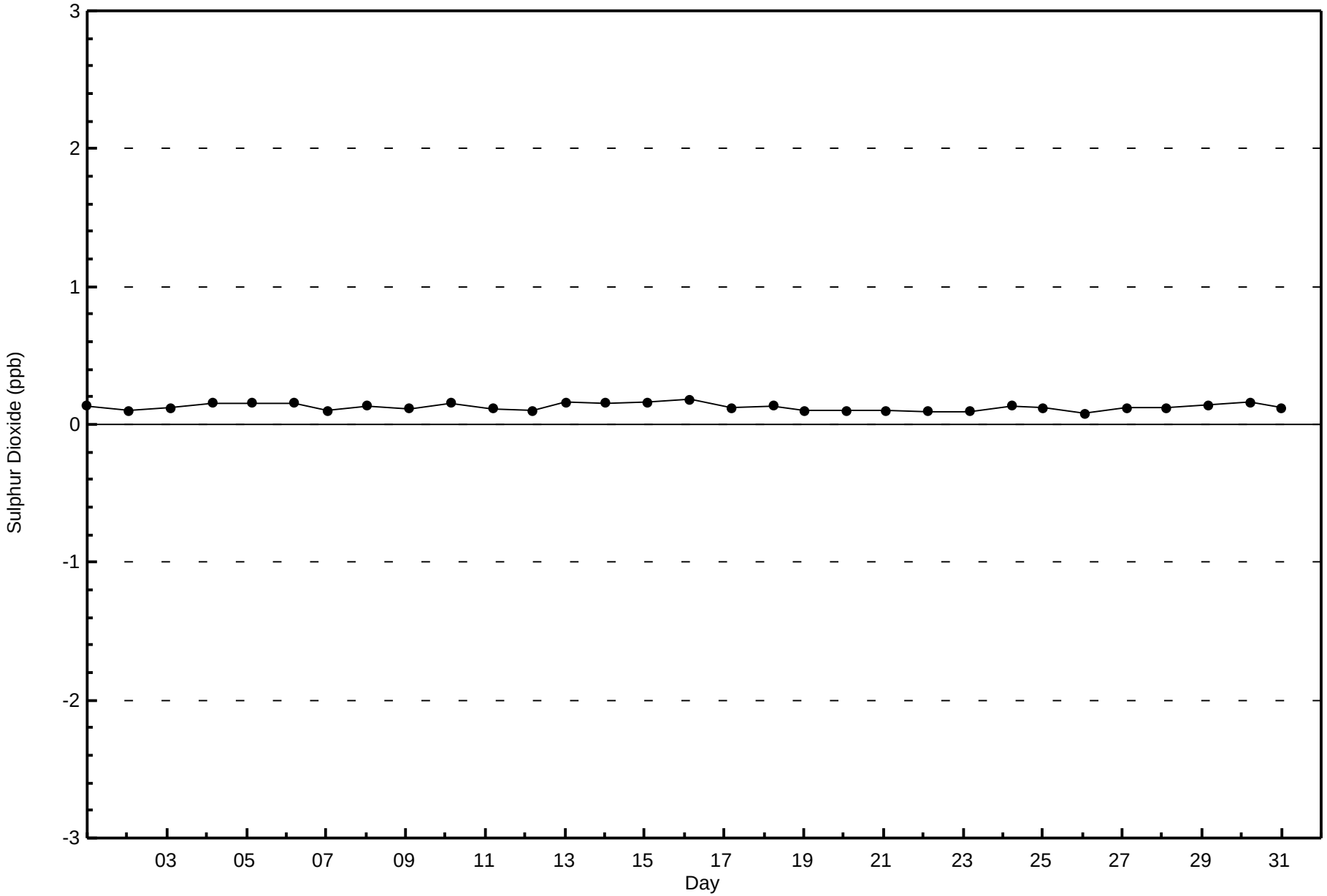
Total Number of Valid Hours: 707

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Fort Chipewyan - March 2016



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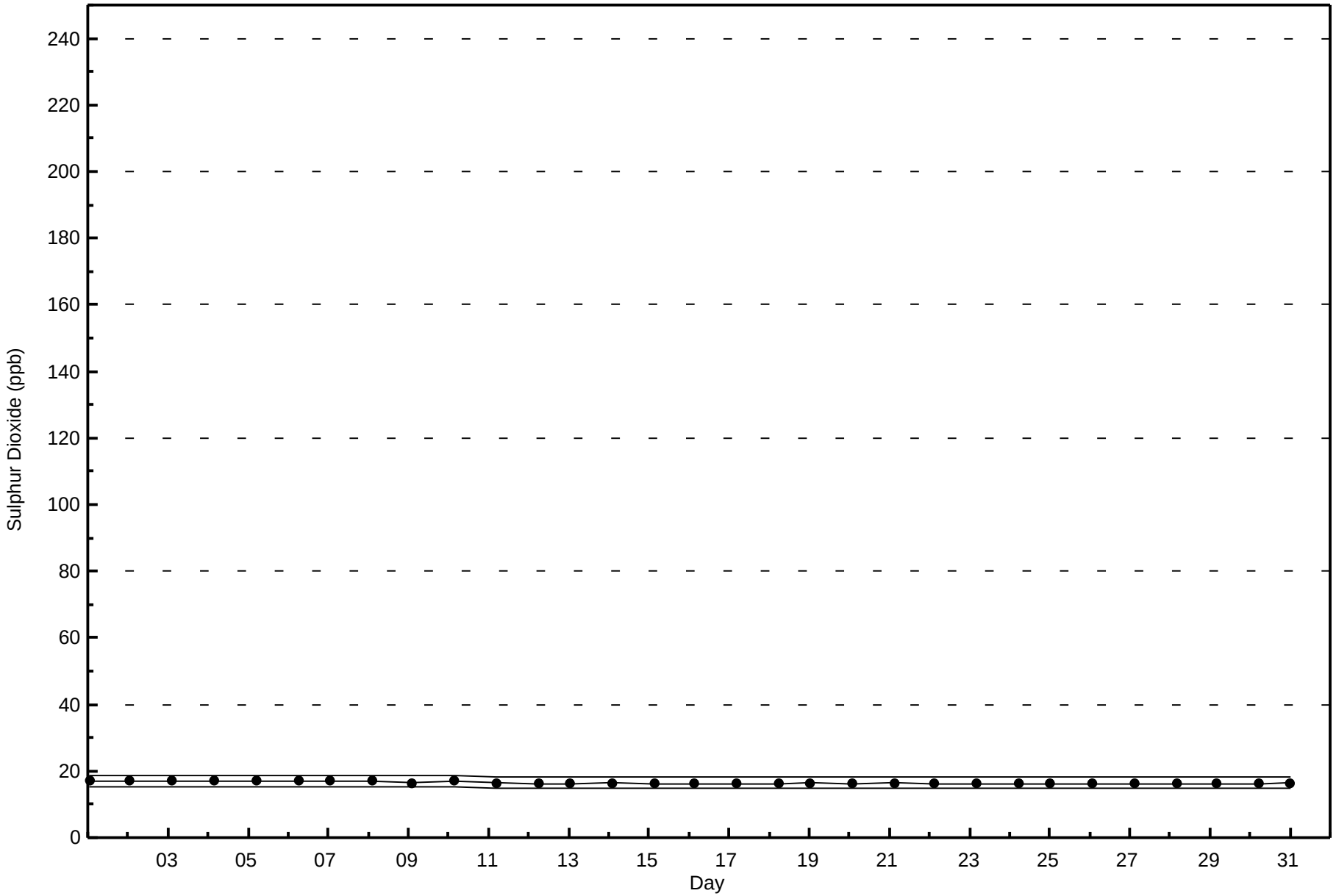
Span Responses

Sulphur Dioxide (SO_2) - ppb

Fort Chipewyan - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Fort Chipewyan - March 2016

Maximum Value: 6 ppb on Mar 28 09:00

Maximum Daily Average: 0.6 ppb on Mar 28

Minimum Value: 0 ppb on Mar 4 05:00

Minimum Daily Average: 0.0 ppb on Mar 24

Maximum Diurnal Average: 0.3 ppb at hour 9

Minimum Diurnal Average: 0.0 ppb at hour 1

Monthly Average: 0.1 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 1$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	36
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1	1
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	0.1	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	0.1	0
4-Mar	0	0	0	Z	0	0	0	0	1	1	4	2	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	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	0.1	0
7-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	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	0.1	0
9-Mar	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
10-Mar	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	C	C	C	C	C	0	0	0	0	0.2	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	0.1	0
12-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	PF	PF	0	0	0	0	0	0	0.1	0
13-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
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	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	0.1	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
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	0	0	0	0	0	0	0	0	0	0	0	0	0.1	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	0	0	0.1	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	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	0.1	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
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	0.0	0
26-Mar	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	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	0.1	0
28-Mar	0	0	0	Z	0	0	0	3	6	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	6
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
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	0
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	0.0	0
	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average	
	0	0	0	0	0	0	0	3	6	3	4	2	0	0	1	0	1	0	0	0	0	0	0	0	Diurnal Maximum	

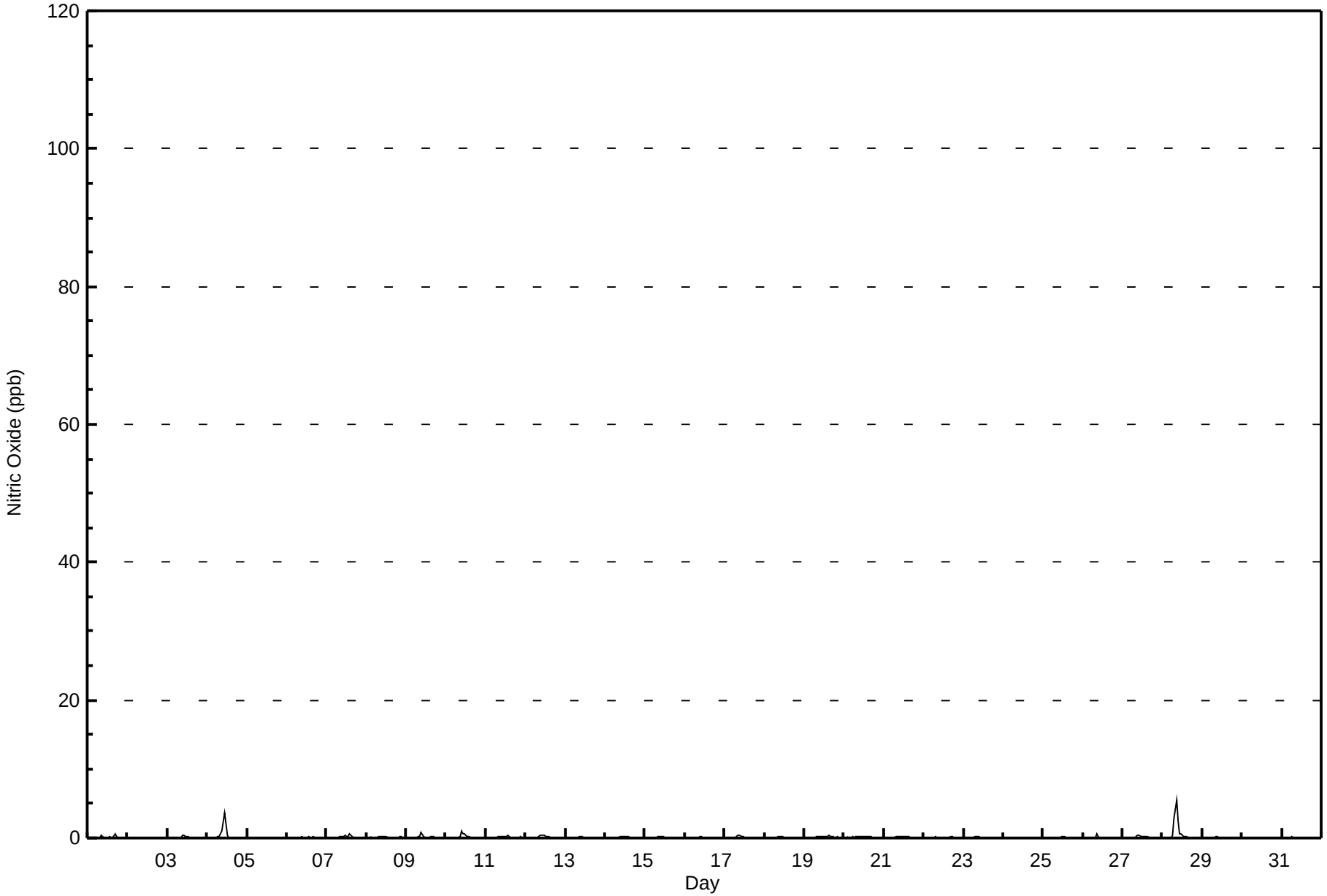
Z - zerospan C - Calibration PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Fort Chipewyan - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	100.00	100.00
21 - 40	0	0.00	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: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitric Oxide (NO) - ppb

Fort Chipewyan - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	26	32	38	151	215	62	5	1	0	2	2	20	27	39	42	43	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	26	32	38	151	215	62	5	1	0	2	2	20	27	39	42	43	705

Total Number of Valid Hours: 705

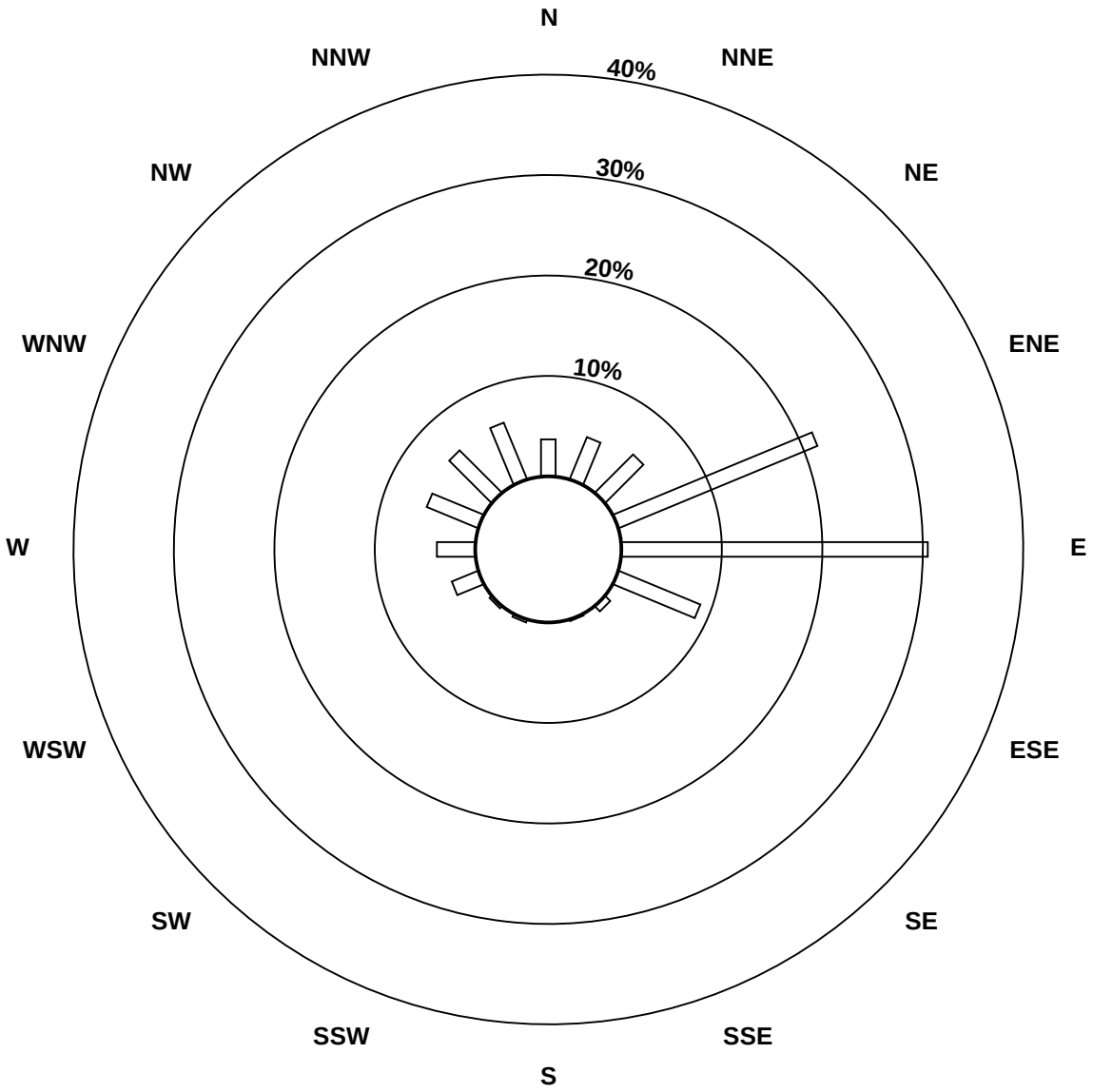
Total Number of Hours: 744

Wood Buffalo Environmental Association

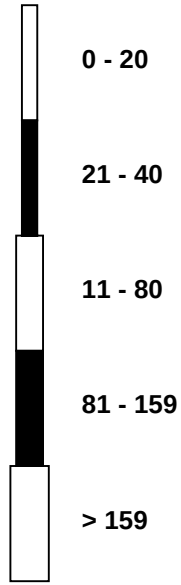
Wind Rose Mar 2016

Nitric Oxide (NO) - ppb

Fort Chipewyan (AMS 8)



Classes (ppb)



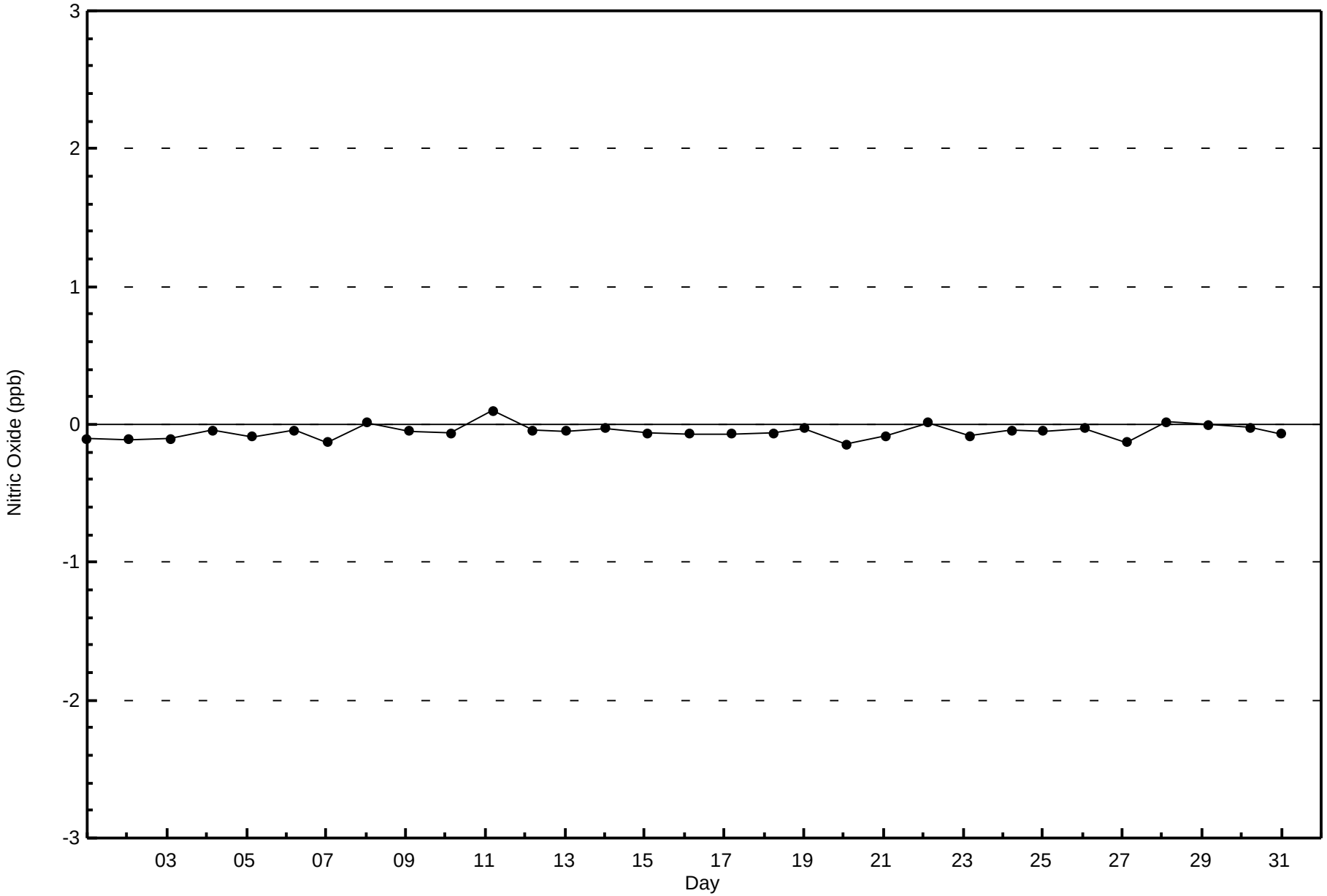
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Fort Chipewyan - March 2016

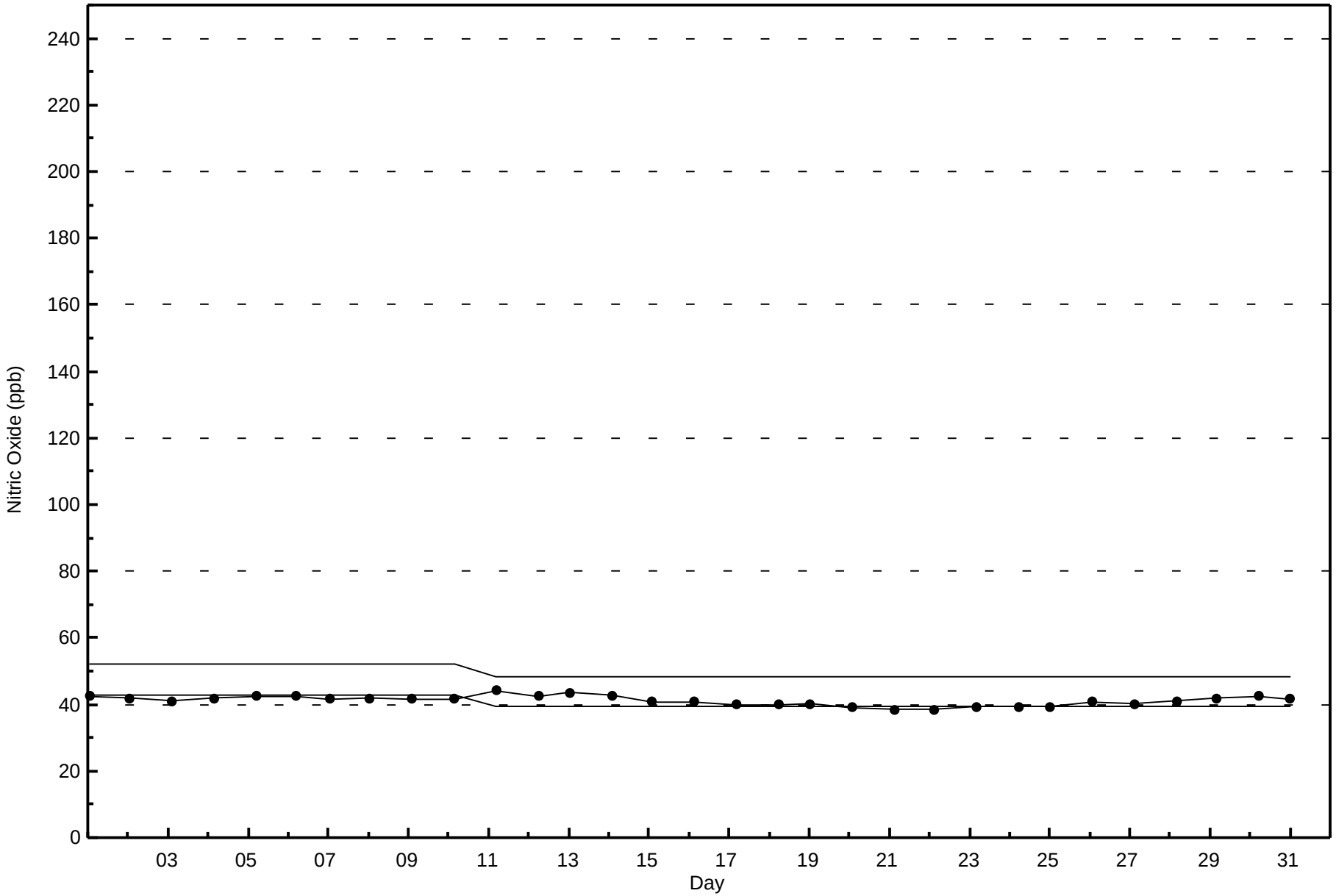


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Fort Chipewyan - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Fort Chipewyan - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 9 ppb on Mar 28 08:00 Maximum Daily Average: 2.1 ppb on Mar 28

Minimum Value: 0 ppb on Mar 2 10:00 Minimum Daily Average: 0.3 ppb on Mar 16
Maximum Diurnal Average: 1.1 ppb at hour 7 Minimum Diurnal Average: 0.4 ppb at hour 16
Monthly Average: 0.7 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 5$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	36
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	1	1	1	1	1	1	1	2	0	0	0	0	0	0	0	2	3	4	4	3	2	2	1	1.3	4
2-Mar	1	Z	1	2	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4
3-Mar	0	1	Z	2	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	0	1	0.5	2
4-Mar	0	0	1	Z	0	1	2	3	2	1	4	2	1	0	0	0	0	1	1	0	1	1	1	0	0.9	4
5-Mar	0	0	0	1	Z	1	1	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.4	2
6-Mar	0	0	0	0	1	Z	1	1	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	0.4	1
7-Mar	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	2	1	0	0	1	1	1	1	1	1	0.7	2
8-Mar	1	Z	5	1	0	1	7	3	1	1	1	1	1	1	0	0	1	0	0	0	2	3	1	0	1.3	7
9-Mar	0	0	Z	0	1	1	1	1	1	2	1	0	0	0	0	1	0	1	1	1	1	0	1	1	0.6	2
10-Mar	1	1	1	Z	1	1	1	1	1	2	1	1	1	1	1	C	C	C	C	C	1	1	1	0	0.9	2
11-Mar	1	1	1	2	Z	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0.7	2
12-Mar	1	0	0	0	0	Z	0	1	1	1	1	1	1	1	1	1	PF	PF	1	1	1	1	1	1	0.7	1
13-Mar	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0.6	1
14-Mar	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.4	1
15-Mar	0	0	Z	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	2	4	5	1	0	0	0.9	5
16-Mar	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.3	1
17-Mar	1	1	1	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	2	1	0.6	2
18-Mar	0	1	0	1	6	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0.8	6
19-Mar	Z	2	3	4	0	0	0	1	1	1	0	0	0	0	0	1	1	0	1	1	1	1	0	1	0.7	4
20-Mar	1	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1
21-Mar	0	0	Z	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.5	1
22-Mar	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.6	1
23-Mar	1	1	0	1	Z	4	1	1	1	1	0	0	0	0	0	0	0	1	0	2	3	1	1	3	1.1	4
24-Mar	1	4	5	7	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	7
25-Mar	Z	0	0	0	1	0	1	1	0	0	0	1	1	1	1	1	0	0	0	0	0	1	1	1	0.5	1
26-Mar	1	Z	1	0	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	2
27-Mar	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
28-Mar	0	0	1	Z	2	4	7	9	9	5	2	2	2	2	1	1	1	0	1	1	0	0	0	0	2.1	9
29-Mar	1	1	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0.5	2
30-Mar	2	1	1	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.5	2
31-Mar	Z	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	2
	0.6	0.7	1.0	1.0	0.9	0.8	1.1	1.1	1.0	0.8	0.6	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.7	0.9	0.9	0.8	0.7	0.6	Diurnal Average	
	2	4	5	7	6	4	7	9	9	5	4	2	2	2	2	1	2	3	4	4	5	3	2	3	Diurnal Maximum	

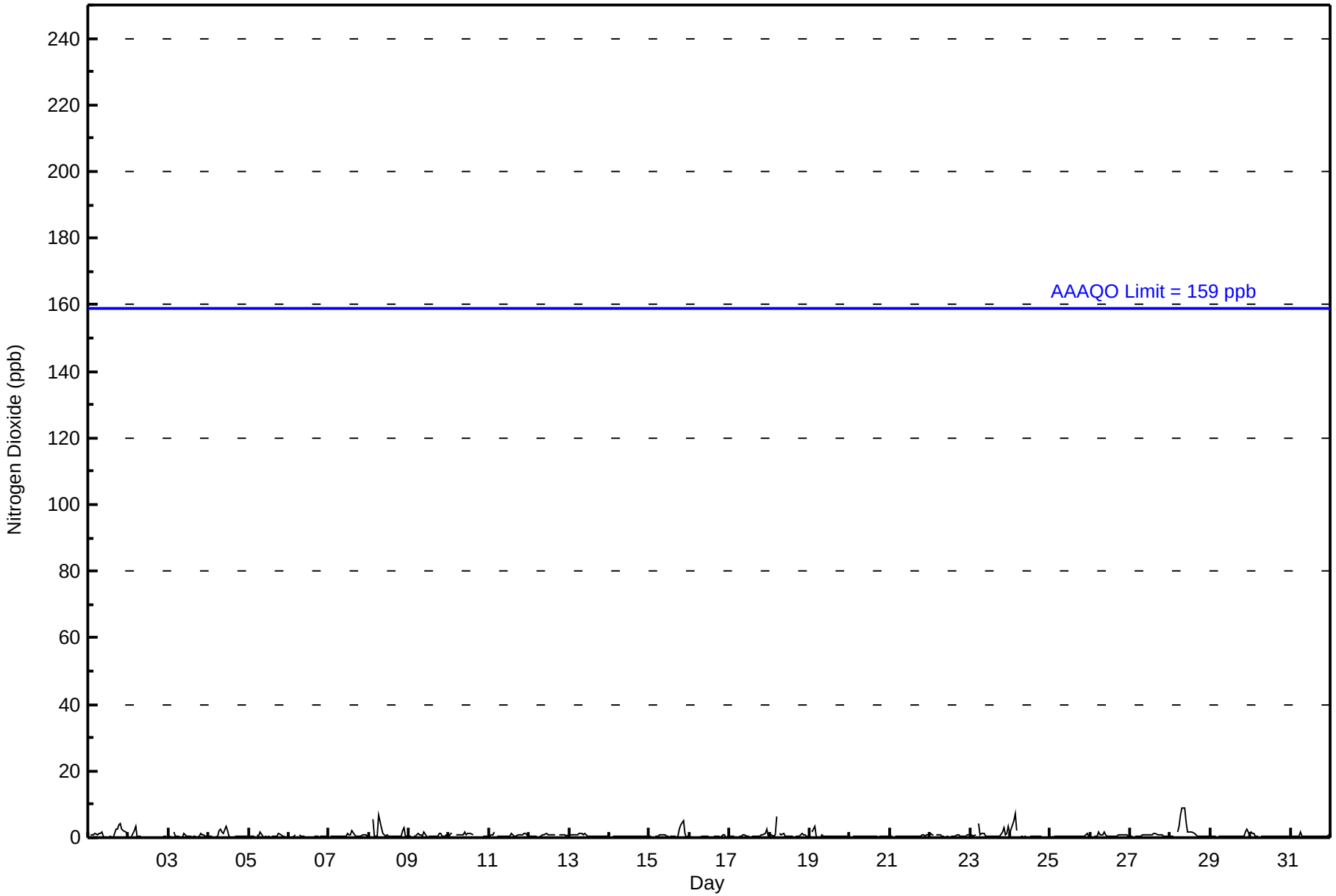
Z - zerospan C - Calibration PF - Power Failure
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Fort Chipewyan - March 2016



Nitrogen Dioxide (NO_2) - ppb
Fort Chipewyan - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	100.00	100.00
21 - 40	0	0.00	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: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Fort Chipewyan - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	26	32	38	151	215	62	5	1	0	2	2	20	27	39	42	43	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	26	32	38	151	215	62	5	1	0	2	2	20	27	39	42	43	705

Total Number of Valid Hours: 705

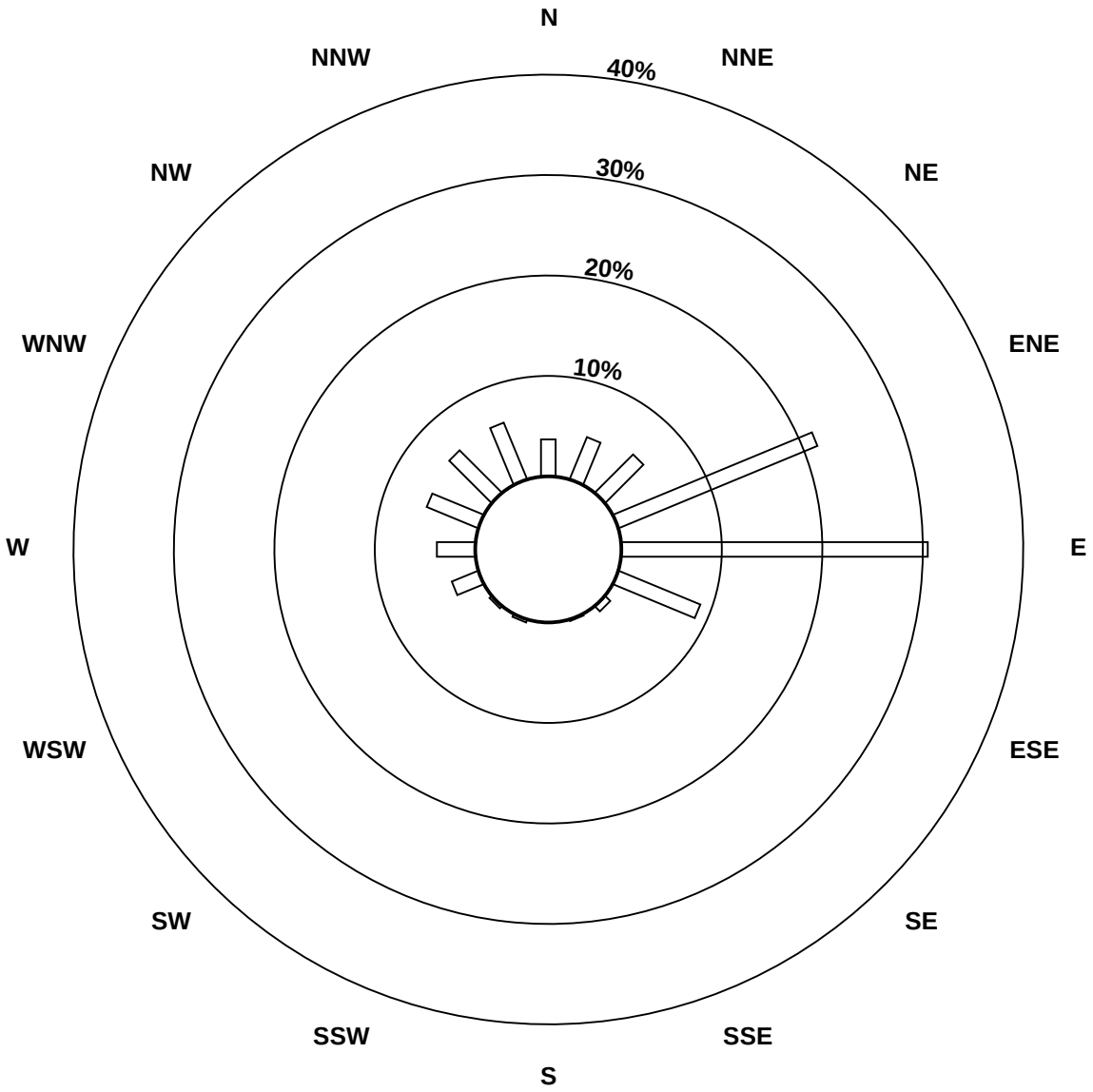
Total Number of Hours: 744

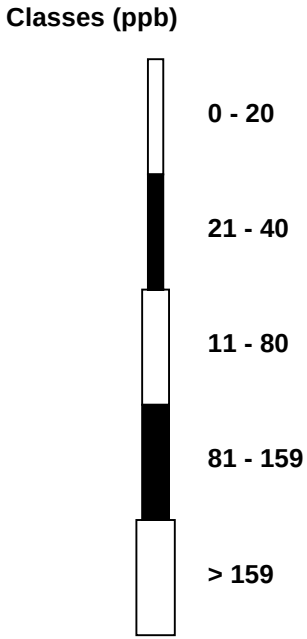
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Nitrogen Dioxide (NO_2) - ppb

Fort Chipewyan (AMS 8)





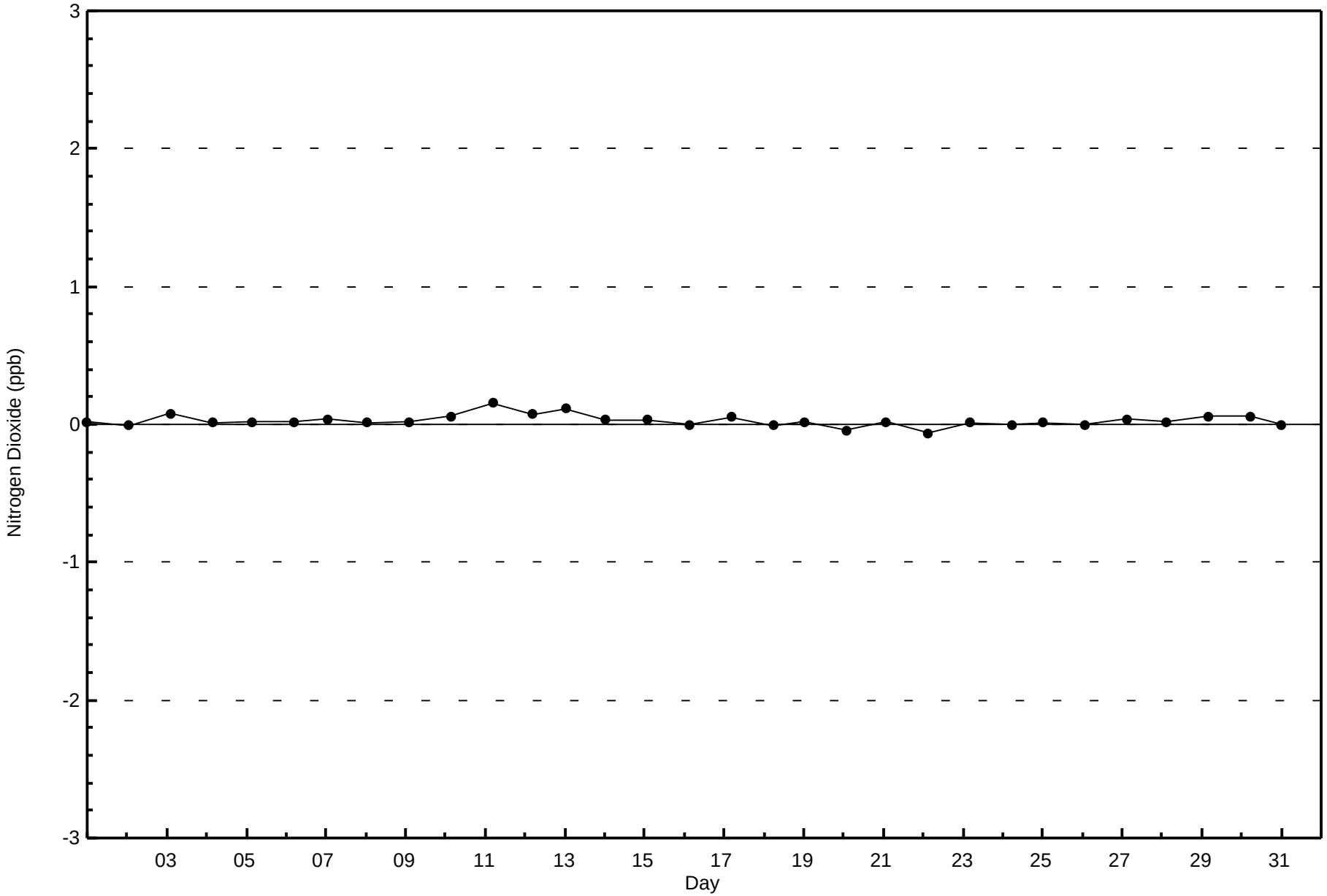
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Fort Chipewyan - March 2016

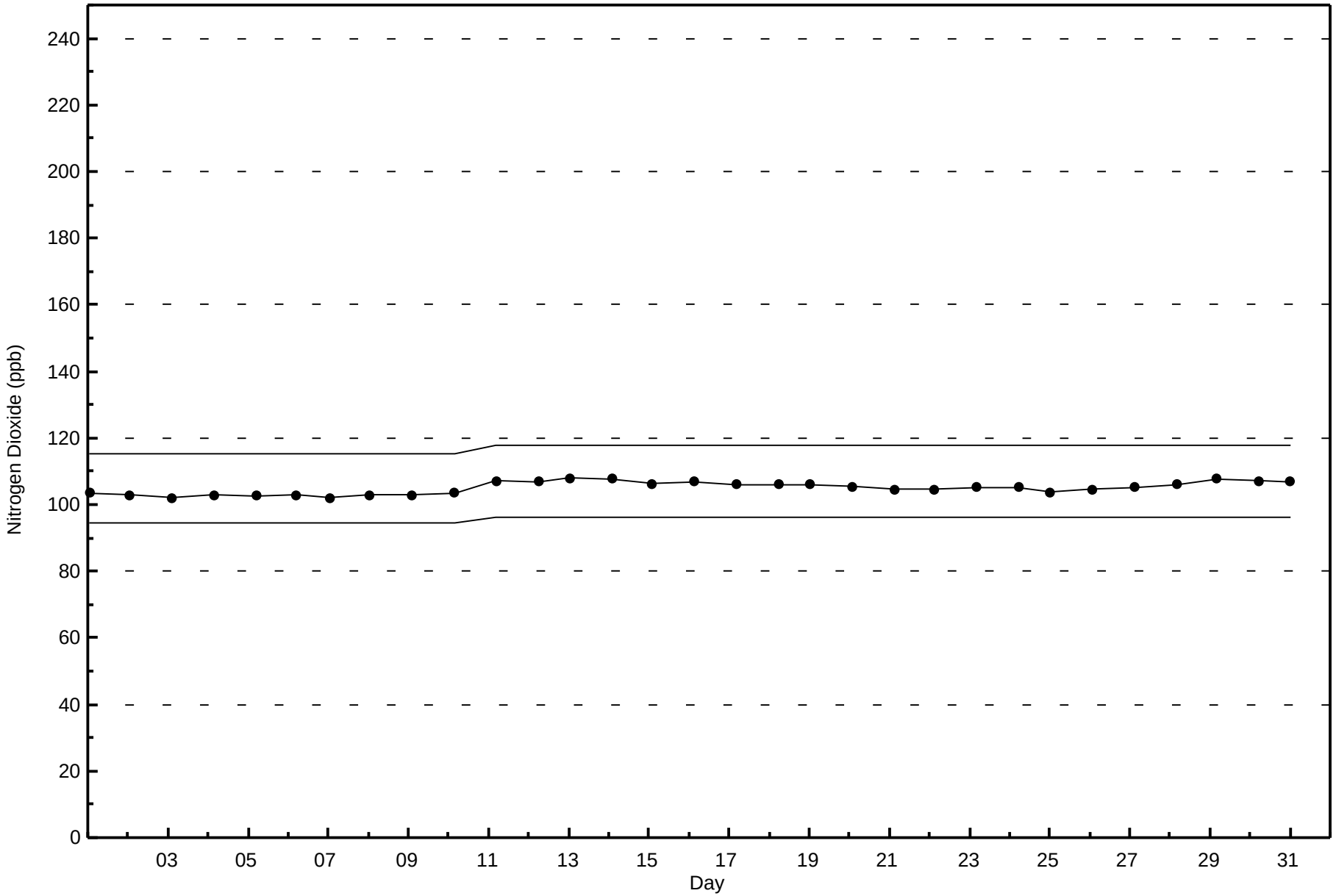


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Fort Chipewyan - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Fort Chipewyan - March 2016

Maximum Value: 14 ppb on Mar 28 09:00

Maximum Daily Average: 2.7 ppb on Mar 28

Minimum Value: 0 ppb on Mar 6 02:00

Minimum Daily Average: 0.4 ppb on Mar 16

Maximum Diurnal Average: 1.3 ppb at hour 9

Minimum Diurnal Average: 0.5 ppb at hour 16

Monthly Average: 0.8 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 7$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	36
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	1	1	1	1	1	1	1	2	0	0	0	0	0	0	0	3	3	4	4	3	2	2	1	1.5	4
2-Mar	1	Z	1	2	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4
3-Mar	0	1	Z	2	0	0	1	0	0	2	1	0	0	0	0	0	0	0	0	2	1	1	0	1	0.6	2
4-Mar	0	0	1	Z	0	1	3	3	3	3	7	4	1	0	0	0	0	1	0	0	0	0	0	0	1.3	7
5-Mar	0	0	0	1	Z	1	1	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.5	2
6-Mar	0	0	0	0	1	Z	1	0	0	1	0	0	0	0	0	0	1	0	0	1	1	1	1	1	0.4	1
7-Mar	Z	1	0	1	0	0	0	1	1	1	1	1	1	1	3	1	0	0	1	1	1	1	1	1	0.8	3
8-Mar	1	Z	6	1	0	1	7	3	2	1	1	1	1	1	1	0	0	0	0	0	2	3	1	0	1.4	7
9-Mar	0	0	Z	0	0	1	1	1	1	2	1	0	0	0	0	1	1	0	1	1	0	0	1	1	0.7	2
10-Mar	1	1	1	Z	1	1	1	1	1	3	2	2	2	1	1	C	C	C	C	C	1	1	0	0	1.1	3
11-Mar	0	1	1	2	Z	0	0	1	1	1	1	1	1	2	1	0	1	1	1	1	1	1	1	0	0.8	2
12-Mar	0	0	0	0	0	Z	0	0	1	1	2	1	1	1	1	1	PF	PF	1	1	1	1	1	1	0.8	2
13-Mar	Z	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0.6	2
14-Mar	1	Z	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
15-Mar	0	0	Z	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	2	4	5	1	0	0	1.0	5
16-Mar	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.4	1
17-Mar	1	1	1	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	2	0	0.7	2
18-Mar	0	1	0	1	6	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0.9	6
19-Mar	Z	2	3	4	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	4
20-Mar	1	Z	1	0	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.5	1
21-Mar	0	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0.6	1
22-Mar	2	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.7	2
23-Mar	1	1	0	1	Z	4	1	2	1	1	0	0	0	0	0	0	0	0	0	2	3	1	1	3	1.1	4
24-Mar	1	4	5	7	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	7
25-Mar	Z	0	0	0	1	0	1	0	0	0	1	1	1	1	1	0	0	0	0	0	0	1	1	1	0.5	1
26-Mar	1	Z	0	0	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	2
27-Mar	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.9	1
28-Mar	0	0	0	Z	2	4	7	12	14	7	2	2	2	2	2	1	1	0	0	0	0	0	0	0	2.7	14
29-Mar	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0.5	2
30-Mar	2	1	1	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.6	2
31-Mar	Z	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	2
	0.6	0.8	1.0	1.0	1.0	0.9	1.1	1.2	1.3	1.1	0.9	0.8	0.6	0.6	0.6	0.5	0.6	0.5	0.7	0.9	0.9	0.8	0.7	0.6	Diurnal Average	
	2	4	6	7	6	4	7	12	14	7	7	4	2	2	3	1	3	3	4	4	5	3	2	3	Diurnal Maximum	

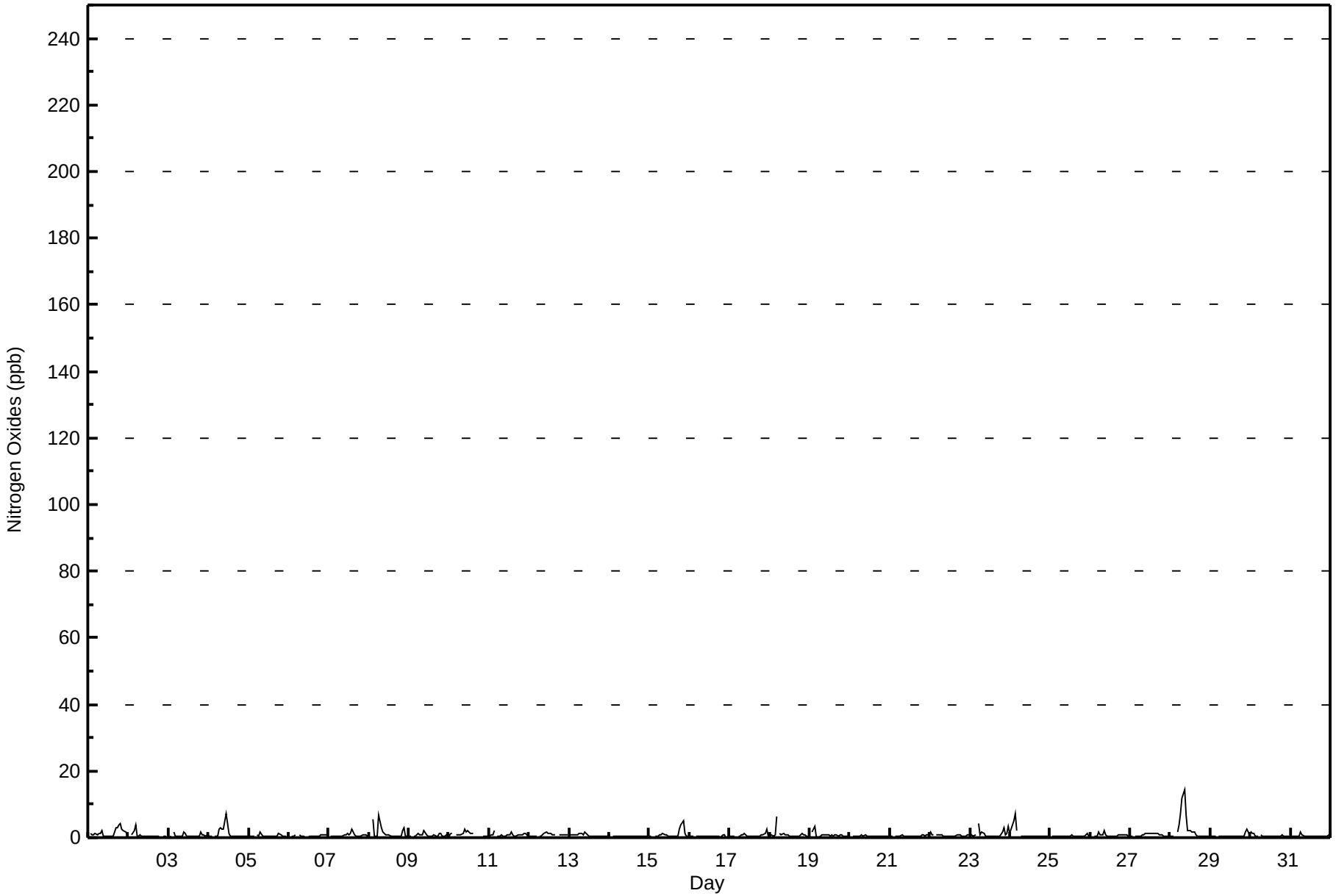
Z - zerospan C - Calibration PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Fort Chipewyan - March 2016



Nitrogen Oxides (NO_X) - ppb
Fort Chipewyan - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	100.00	100.00
21 - 40	0	0.00	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: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Fort Chipewyan - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	26	32	38	151	215	62	5	1	0	2	2	20	27	39	42	43	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	26	32	38	151	215	62	5	1	0	2	2	20	27	39	42	43	705

Total Number of Valid Hours: 705

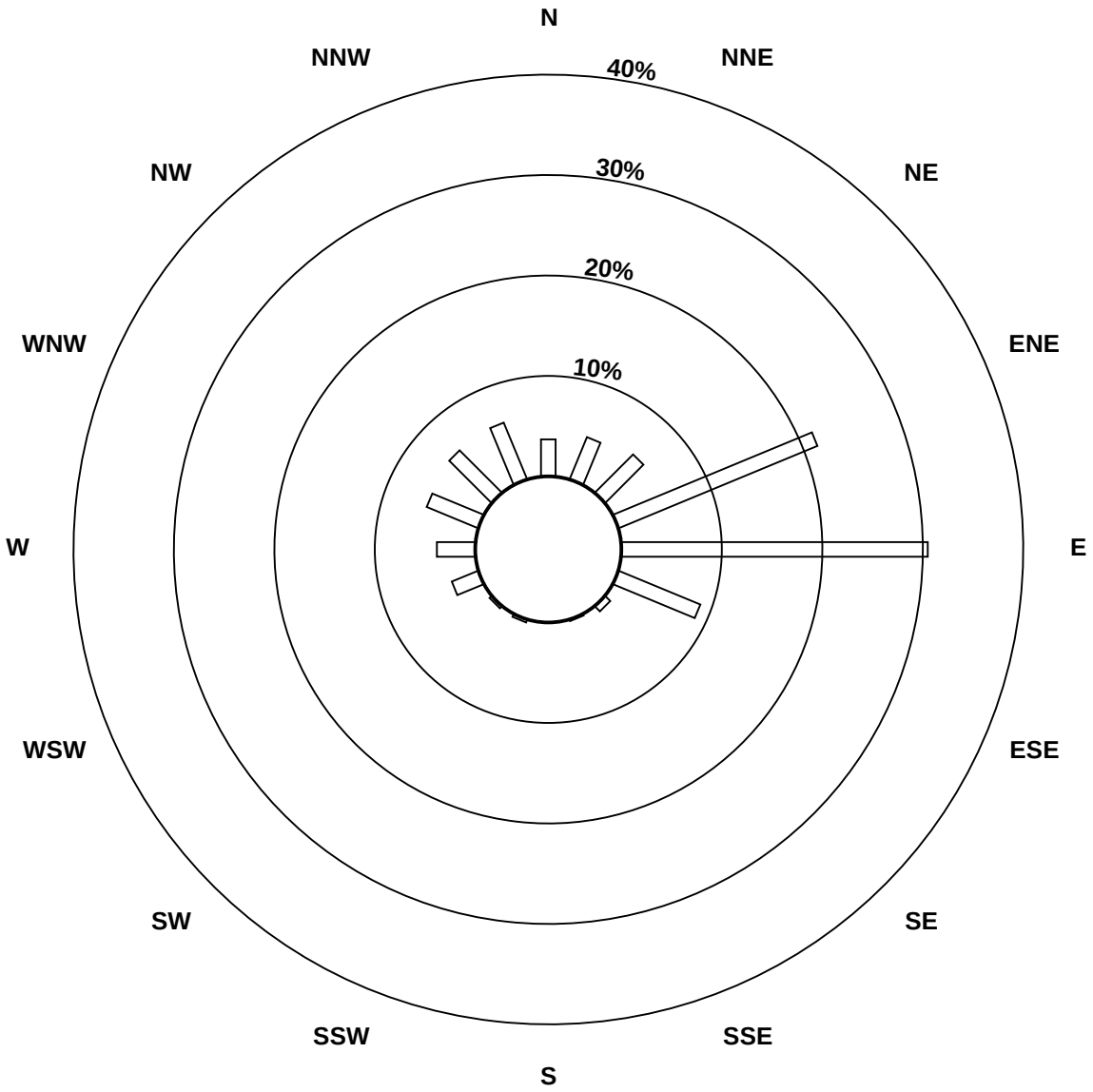
Total Number of Hours: 744

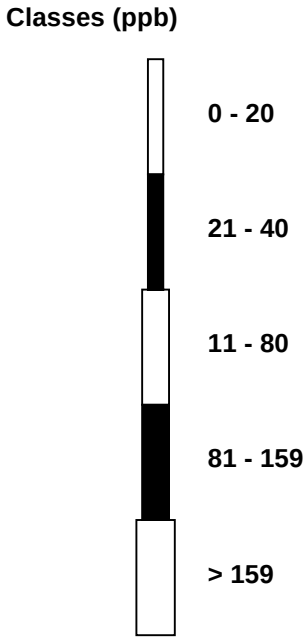
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Nitrogen Oxides (NO_X) - ppb

Fort Chipewyan (AMS 8)





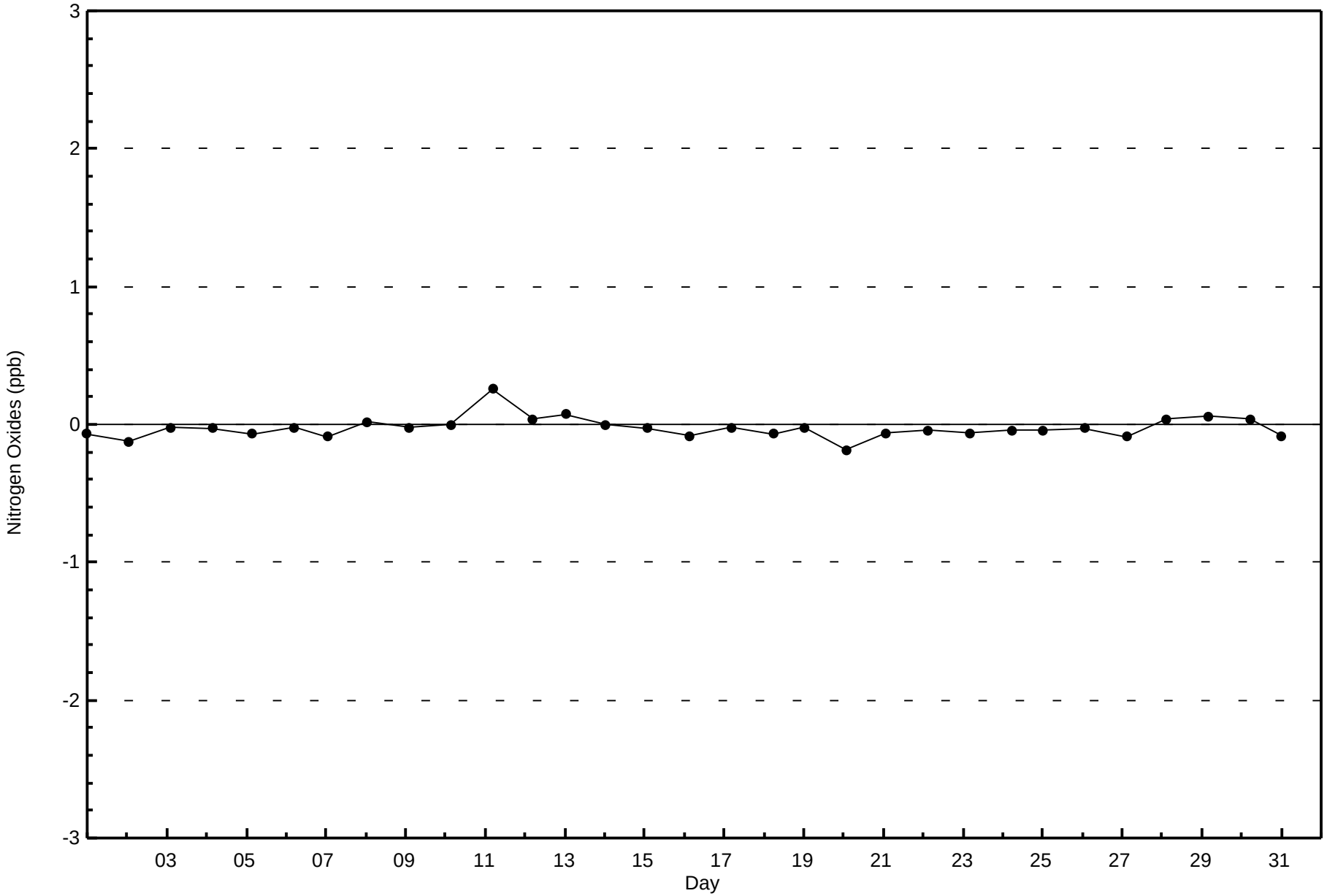
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Fort Chipewyan - March 2016

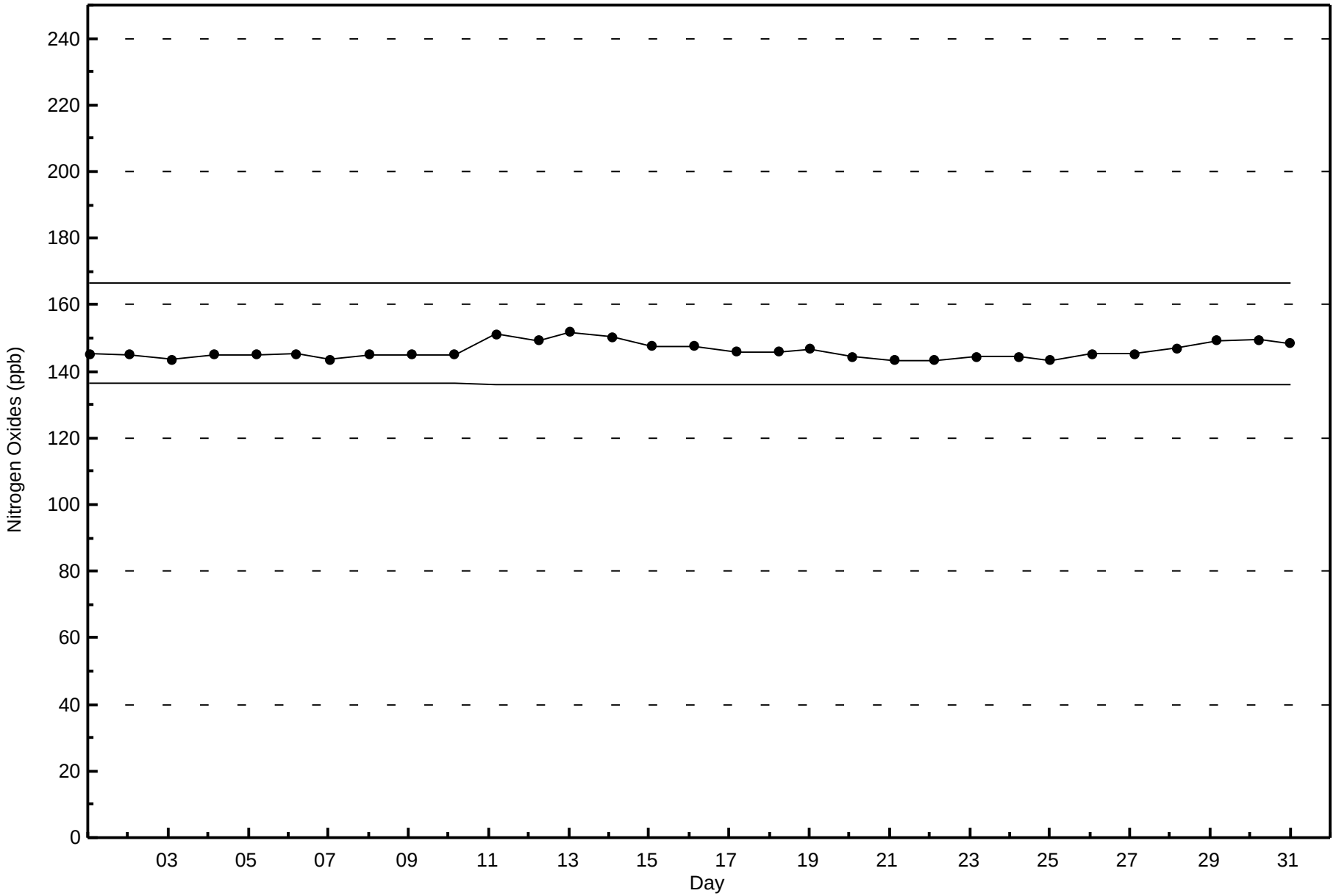


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Fort Chipewyan - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O_3) - ppb

Fort Chipewyan - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 51 ppb on Mar 28 15:00

Maximum Daily Average: 46.5 ppb on Mar 26

Minimum Value: 27 ppb on Mar 12 03:00

Minimum Daily Average: 32.0 ppb on Mar 11

Maximum Diurnal Average: 41.1 ppb at hour 17

Minimum Diurnal Average: 37.8 ppb at hour 8

Monthly Average: 39.7 ppb

Percentiles: P_1 = 29 P_{10} = 33 Q_1 = 37 Median = 40 Q_3 = 44 P_{90} = 45 P_{99} = 50

Hours in Service:	744
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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	30	31	32	Z	32	32	32	32	31	32	32	32	33	33	34	34	32	32	30	30	33	34	36	37	32.5	37
2-Mar	37	37	37	35	Z	38	37	37	38	38	38	39	39	39	39	39	39	39	39	39	39	39	39	39	38.2	39
3-Mar	39	38	38	38	40	Z	38	39	39	37	38	39	39	39	39	39	39	39	39	37	38	39	40	40	38.7	40
4-Mar	39	39	38	37	37	36	Z	34	34	35	33	35	37	38	39	39	40	40	40	40	40	40	40	41	37.9	41
5-Mar	41	41	41	41	41	40	41	Z	40	40	40	40	41	41	41	41	41	41	40	41	42	42	41	41	40.7	42
6-Mar	41	41	41	40	39	39	38	39	Z	38	38	38	39	40	40	41	45	45	43	42	42	42	41	41	40.5	45
7-Mar	41	40	40	Z	40	40	40	40	39	39	39	39	39	39	37	39	39	39	39	38	37	37	36	36	38.8	41
8-Mar	35	34	30	36	Z	37	31	32	34	35	36	36	36	38	38	39	39	40	40	39	36	35	37	38	36.0	40
9-Mar	38	37	38	36	34	Z	33	33	34	35	38	39	39	39	39	39	40	39	39	38	39	38	37	37	37.5	40
10-Mar	37	35	34	32	33	31	Z	30	30	29	31	32	34	36	37	38	38	37	37	38	37	37	37	38	34.7	38
11-Mar	37	36	35	33	27	27	29	Z	C	C	C	31	31	31	33	34	34	33	33	31	32	31	30	30	32.0	37
12-Mar	28	27	27	28	29	30	30	29	Z	29	28	30	32	33	34	35	35	35	36	37	37	37	37	37	32.2	37
13-Mar	37	36	36	Z	36	35	33	32	33	32	32	32	32	32	32	33	33	34	35	37	38	37	35	35	34.3	38
14-Mar	34	35	36	36	Z	37	37	37	37	37	37	38	38	38	39	39	40	41	41	41	41	40	40	40	38.2	41
15-Mar	40	40	40	39	39	Z	38	38	38	38	38	38	38	38	38	38	37	37	35	33	33	37	38	37	37.6	40
16-Mar	37	38	40	40	40	40	Z	42	43	44	44	44	44	45	45	45	45	45	45	44	43	43	44	42	42.7	45
17-Mar	41	40	40	37	37	36	35	Z	35	35	37	37	38	38	38	38	38	38	39	38	37	35	34	36	37.3	41
18-Mar	37	36	36	35	30	32	35	36	Z	37	38	40	40	39	39	40	40	40	39	38	38	37	37	38	37.3	40
19-Mar	38	37	37	Z	40	40	39	38	38	39	39	40	39	39	40	39	39	38	38	39	40	39	39	39	38.9	40
20-Mar	40	41	41	41	Z	40	39	38	39	39	39	40	40	40	40	41	41	42	43	42	43	43	43	43	40.7	43
21-Mar	43	43	44	44	44	Z	43	42	42	42	42	42	43	43	43	43	44	44	45	45	45	44	44	44	43.3	45
22-Mar	43	44	44	44	44	44	Z	44	44	44	44	44	45	45	45	45	45	46	46	46	46	45	45	45	44.6	46
23-Mar	45	45	45	45	42	42	45	Z	45	46	45	46	46	46	46	46	46	46	46	45	46	48	48	46	45.5	48
24-Mar	47	45	42	40	44	42	44	45	Z	44	44	44	44	44	44	44	44	44	43	43	43	44	43	43	43.7	47
25-Mar	44	44	44	Z	45	44	44	45	45	45	45	45	45	45	45	45	45	45	46	45	45	45	43	43	44.7	46
26-Mar	43	43	44	44	Z	43	44	44	43	46	46	47	47	47	48	48	49	50	49	50	50	50	49	48	46.5	50
27-Mar	47	47	46	45	44	Z	43	43	43	43	43	44	46	47	48	50	50	48	48	47	47	47	46	46	46.0	50
28-Mar	46	45	44	43	41	37	Z	30	30	40	45	46	47	50	51	50	49	47	46	47	47	47	47	45	44.3	51
29-Mar	44	44	42	41	41	41	41	Z	40	41	42	43	44	44	44	46	47	46	45	45	45	42	40	41	43.1	47
30-Mar	43	44	45	44	45	45	45	44	Z	45	44	43	42	41	41	40	40	40	39	40	39	39	40	38	42.0	45
31-Mar	38	39	38	Z	39	38	37	40	40	41	41	40	40	40	40	41	42	42	43	43	43	43	42	40	40.4	43
	39.6	39.4	39.2	39.0	38.6	37.9	38.1	37.8	38.2	38.9	39.3	39.5	39.9	40.2	40.6	40.9	41.1	41.0	40.9	40.6	40.7	40.5	40.3	40.1	Diurnal Average	
	47	47	46	45	45	45	45	45	45	46	46	47	47	50	51	50	50	50	49	50	50	50	49	48	Diurnal Maximum	

Z - zerospan C - Calibration

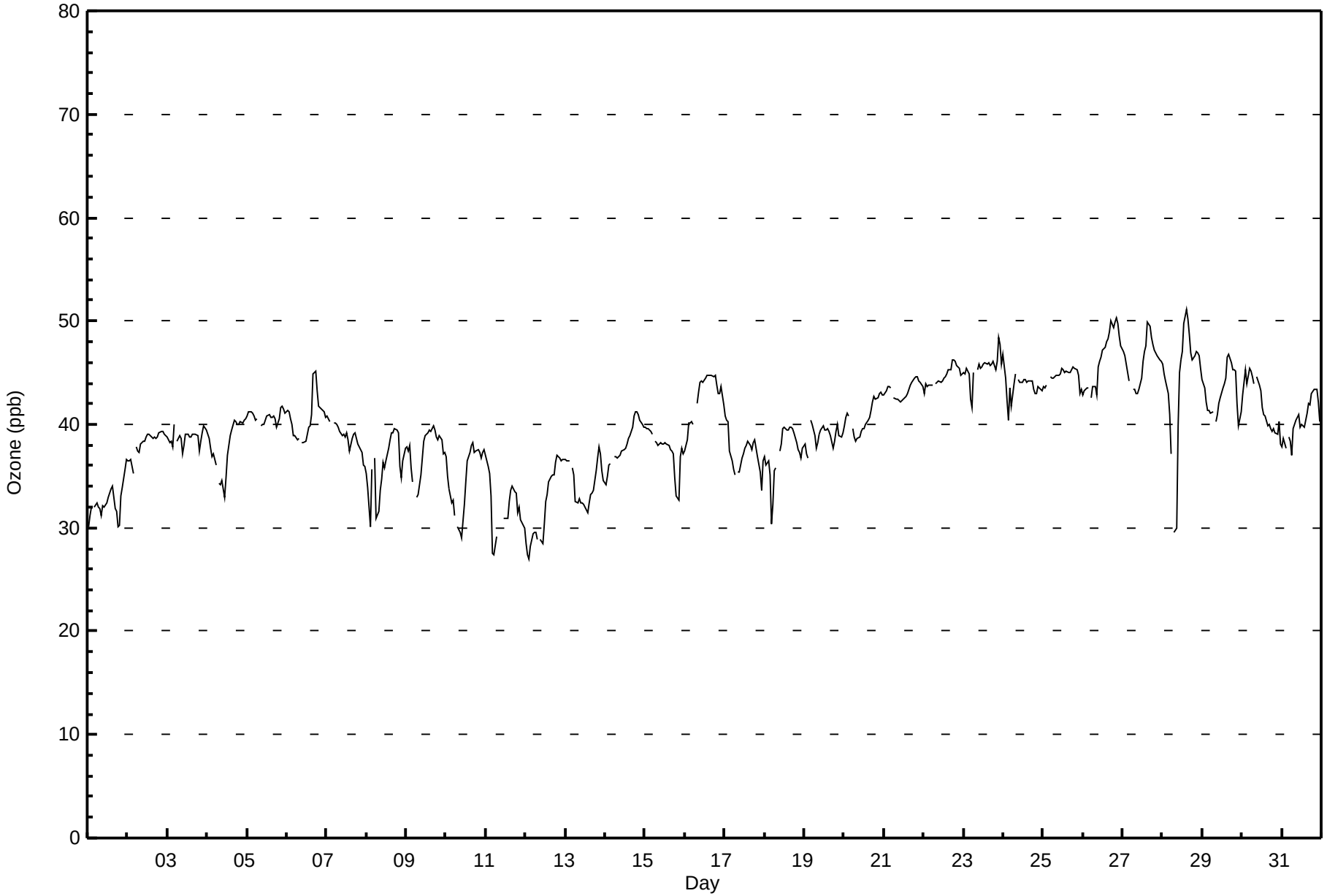
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ozone (O_3) - ppb

Fort Chipewyan - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
21 - 50	709	99.86	99.86
51 - 82	1	0.14	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 (O_3) - ppb

Fort Chipewyan - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 50	25	33	39	151	225	61	4	1	0	2	2	19	25	39	39	43	708
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	25	33	39	151	225	61	4	1	0	2	2	19	26	39	39	43	709

Total Number of Valid Hours: 709

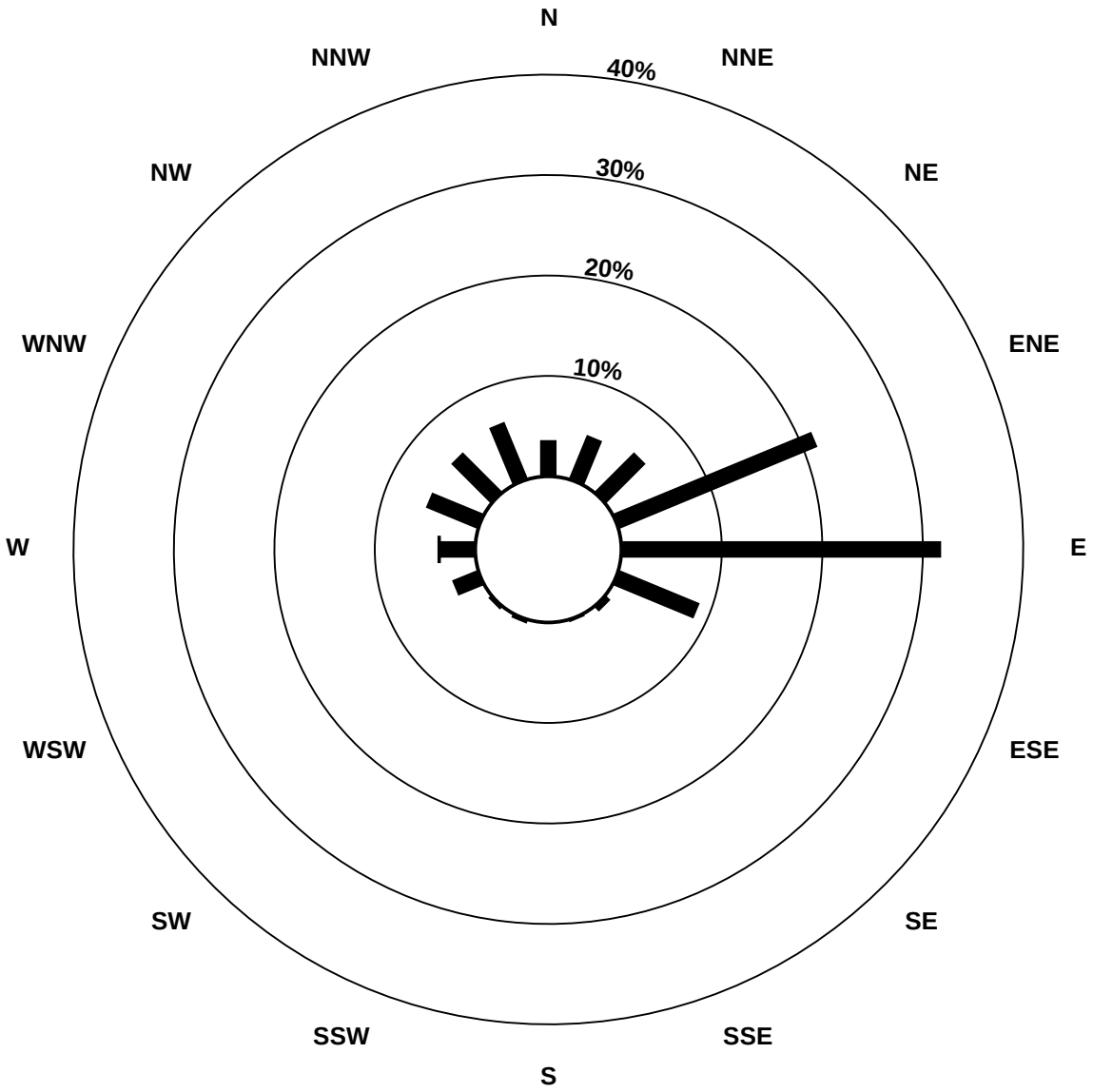
Total Number of Hours: 744

Wood Buffalo Environmental Association

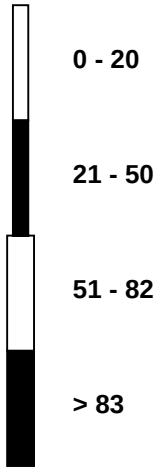
Wind Rose Mar 2016

Ozone (O_3) - ppb

Fort Chipewyan (AMS 8)



Classes (ppb)



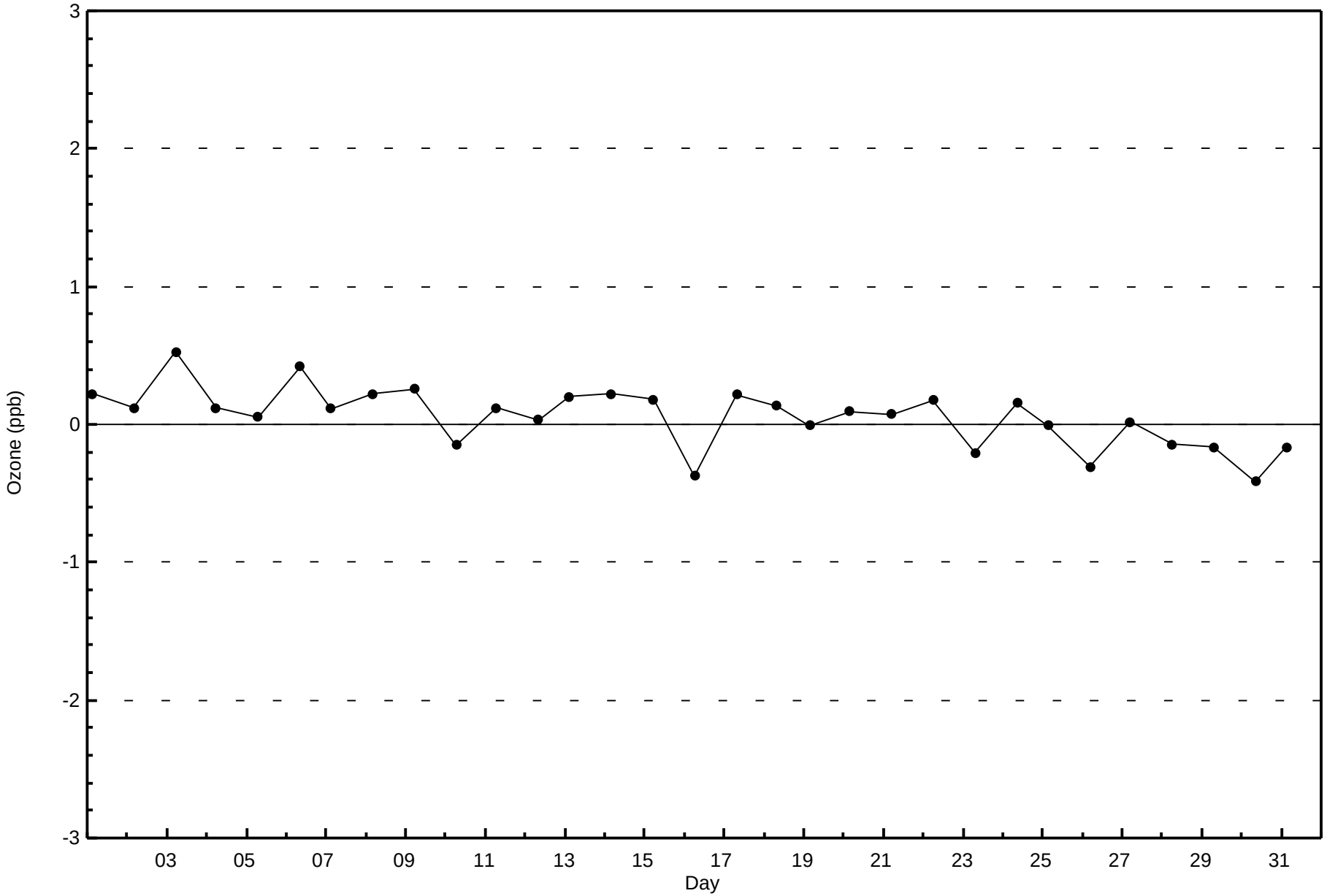
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Ozone (O_3) - ppb

Fort Chipewyan - March 2016

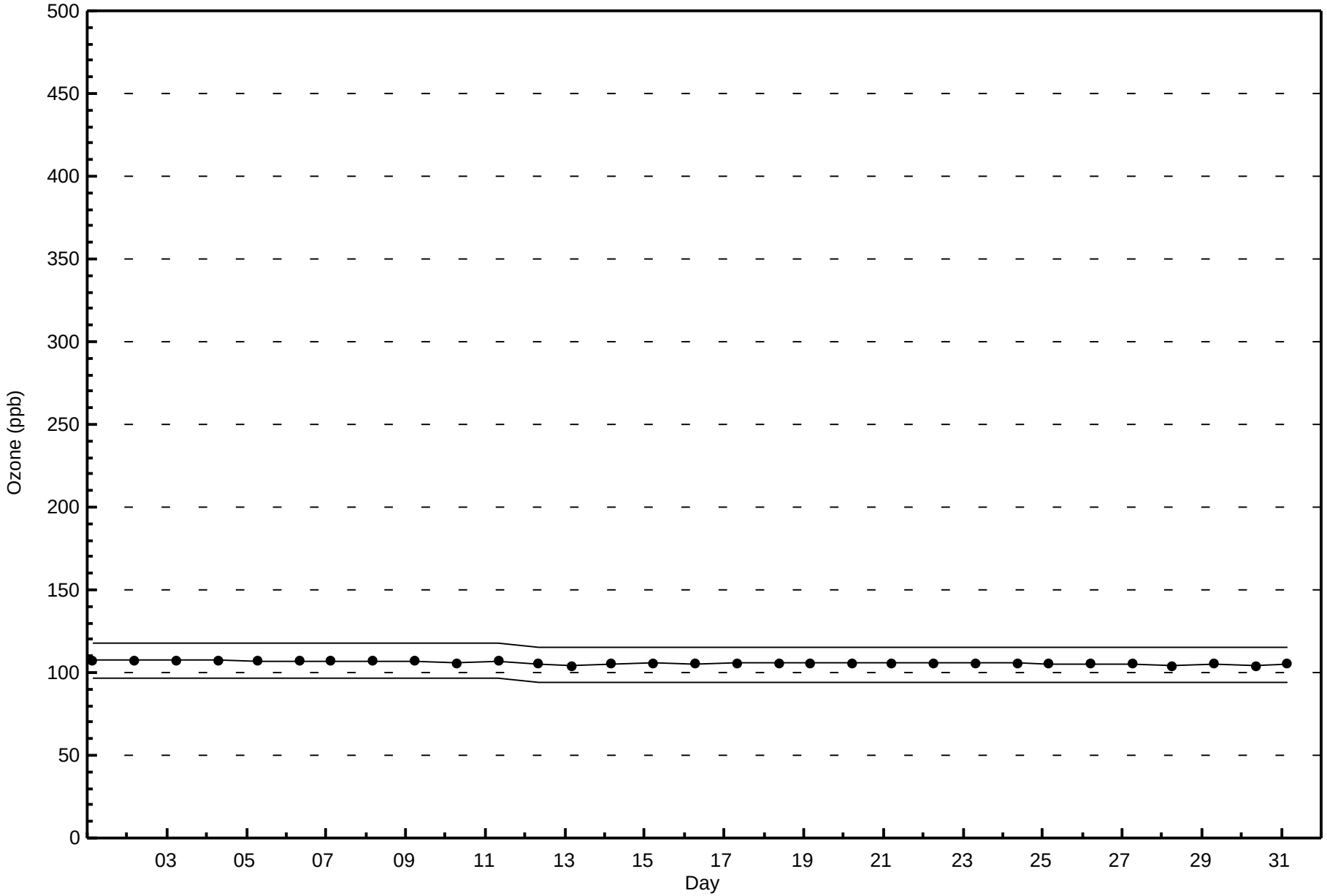


Wood Buffalo Environmental Association

Span Responses

Ozone (O_3) - ppb

Fort Chipewyan - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Fort Chipewyan - March 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 17.0 $\mu g/m^3$ on Mar 17 23:00

Maximum Daily Average: 4.8 $\mu g/m^3$ on Mar 12

Minimum Value: 0.0 $\mu g/m^3$ on Mar 14 01:00

Minimum Daily Average: 0.6 $\mu g/m^3$ on Mar 14

Maximum Diurnal Average: 3.2 $\mu g/m^3$ at hour 23

Minimum Diurnal Average: 2.0 $\mu g/m^3$ at hour 7

Monthly Average: 2.39 $\mu g/m^3$

Percentiles: P_1 = 0.3 P_{10} = 0.8 Q_1 = 1.3 Median = 2.1 Q_3 = 2.9 P_{90} = 4.3 P_{99} = 9.5

Hours in Service:	744
Hours of Data:	736
Hours of Missing Data:	8
Hours of Calibration:	2
Percent Operational Time:	99.2

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	3.0	3.2	3.3	3.4	3.8	3.4	3.2	3.0	3.2	2.9	2.7	2.8	2.9	3.0	3.1	3.1	3.3	2.9	2.7	2.9	2.9	3.2	3.2	2.9	3.1	3.8
2-Mar	2.6	2.5	2.2	2.1	2.0	1.8	1.8	1.3	1.1	1.0	1.3	1.6	1.5	1.6	1.7	1.7	1.6	1.5	0.9	0.9	0.9	1.0	1.4	1.5	1.6	2.6
3-Mar	0.9	1.2	1.0	1.0	1.0	1.1	1.0	0.9	1.1	2.1	2.3	2.9	2.9	2.7	2.8	2.8	2.5	2.4	2.7	3.7	3.5	2.7	4.3	6.8	2.3	6.8
4-Mar	2.2	2.0	1.7	1.5	1.5	1.5	1.5	1.6	1.8	2.4	1.8	1.9	2.2	2.1	2.2	2.1	2.1	2.3	2.2	2.4	2.2	2.2	2.3	2.4	2.0	2.4
5-Mar	2.3	2.2	2.1	2.3	2.2	2.3	2.5	2.9	2.8	2.8	2.7	2.7	2.7	2.7	2.7	2.9	2.6	5.7	7.0	2.2	2.2	2.2	1.9	1.7	2.8	7.0
6-Mar	1.7	1.6	1.6	1.4	2.4	2.0	1.9	1.7	1.9	1.9	1.9	2.0	2.1	2.4	2.4	2.3	2.2	1.8	1.6	2.0	1.9	1.8	2.0	2.1	1.9	2.4
7-Mar	1.9	1.8	1.8	1.8	1.9	1.9	2.0	2.1	2.2	2.2	2.4	2.5	2.6	2.7	2.6	2.7	2.6	2.4	2.3	2.8	3.6	5.2	4.2	2.3	2.5	5.2
8-Mar	6.7	7.8	5.8	4.7	2.2	2.0	2.7	2.9	2.8	3.8	2.8	2.8	2.9	2.8	2.7	2.6	3.1	3.6	3.0	3.1	5.5	10.6	4.4	2.6	3.9	10.6
9-Mar	2.3	2.2	2.3	2.1	2.3	2.3	2.3	2.6	2.3	2.8	5.2	2.2	2.4	2.4	2.3	2.4	2.5	2.8	2.5	2.9	2.4	2.3	2.8	2.6	2.5	5.2
10-Mar	2.8	3.8	5.6	5.7	5.0	5.4	4.2	5.0	6.6	6.9	5.7	4.9	3.9	4.0	4.2	C	C	1.4	1.2	1.7	1.9	1.5	1.5	1.6	3.8	6.9
11-Mar	1.5	1.5	1.7	1.6	1.5	1.5	1.5	1.5	1.6	2.4	2.4	2.2	2.8	2.9	3.2	3.1	3.6	4.0	3.9	3.8	3.6	4.0	4.4	4.3	2.7	4.4
12-Mar	9.5	11.8	11.8	10.1	9.4	5.1	2.8	3.1	4.0	4.1	5.0	4.4	4.2	4.5	3.8	3.0	3.0	3.4	3.2	2.5	2.2	2.1	1.7	1.7	4.8	11.8
13-Mar	1.8	1.5	1.5	1.5	1.6	1.6	1.7	1.7	1.7	1.8	1.9	1.8	1.9	2.1	2.4	2.6	2.6	2.2	2.4	2.4	2.0	1.8	1.4	0.5	1.8	2.6
14-Mar	0.0	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.5	1.0	1.5	1.5	0.9	1.1	1.1	1.0	0.7	0.5	0.5	0.4	0.4	0.2	0.2	0.3	0.6	1.5
15-Mar	0.5	0.5	0.5	0.6	0.5	0.5	0.6	0.6	0.6	0.7	0.5	0.5	0.7	1.0	0.8	0.8	0.8	2.0	2.0	1.8	0.9	0.8	0.8	0.9	0.8	2.0
16-Mar	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.6	0.5	0.5	0.5	0.5	0.4	0.3	0.6	0.6	0.8	0.4	2.5	0.7	2.5
17-Mar	0.5	0.4	0.4	0.6	0.7	0.8	0.7	0.7	0.8	1.2	1.5	1.6	1.4	1.2	1.0	0.9	1.2	2.7	2.3	4.2	1.4	1.4	17.0	3.5	2.0	17.0
18-Mar	0.9	5.4	UO	UO	2.1	1.5	UO	UO	M	UO	0.7	1.2	1.3	1.3	1.3	2.2	2.1	2.4	1.6	4.1	1.9	2.8	5.3	1.1	2.2	5.4
19-Mar	2.2	3.2	2.3	1.5	0.9	0.3	0.1	0.6	0.6	0.9	0.9	1.2	1.1	1.1	1.2	1.2	1.1	1.1	1.0	1.0	1.0	1.0	1.2	0.9	1.1	3.2
20-Mar	0.8	0.8	0.7	0.8	0.8	0.8	0.9	1.0	1.1	1.2	1.3	1.3	1.4	1.5	1.6	1.5	1.4	1.4	1.3	1.3	1.3	1.1	1.1	1.1	1.1	1.6
21-Mar	0.9	1.0	1.0	0.9	0.8	0.8	0.8	0.9	0.8	1.0	1.2	1.5	1.6	1.7	2.0	2.1	1.9	1.7	1.5	1.5	1.6	1.6	1.8	1.5	1.3	2.1
22-Mar	1.7	1.5	1.3	1.2	1.2	1.2	1.5	1.1	1.2	1.4	1.6	1.9	1.8	2.0	2.2	2.0	2.0	1.8	1.8	1.8	1.9	2.5	2.4	1.9	1.7	2.5
23-Mar	2.1	2.0	1.8	2.2	2.1	2.2	2.6	4.2	7.2	6.0	5.9	5.6	5.5	5.4	4.3	4.3	2.9	4.3	4.2	7.2	7.1	6.5	5.6	3.7	4.4	7.2
24-Mar	3.0	3.1	9.5	4.2	2.8	1.6	1.2	1.0	0.8	0.8	0.9	1.2	1.4	1.6	1.6	1.6	1.6	1.5	1.2	0.9	1.0	1.0	1.0	1.1	1.9	9.5
25-Mar	1.2	1.0	1.1	1.3	1.4	1.2	1.5	1.7	1.9	1.8	2.2	2.6	2.2	2.1	2.0	2.0	1.9	1.9	1.8	1.9	1.9	2.3	7.4	2.8	2.1	7.4
26-Mar	2.6	2.6	2.9	3.0	2.9	2.9	3.2	3.8	3.0	3.7	2.9	2.7	2.7	3.1	3.3	3.8	4.4	4.6	3.6	5.0	5.3	5.1	4.8	4.7	3.6	5.3
27-Mar	5.1	5.5	5.5	5.4	5.2	5.0	4.6	4.0	3.8	4.3	4.2	4.4	3.8	4.3	4.6	4.2	4.3	3.6	3.6	3.2	3.2	3.2	3.5	3.5	4.2	5.5
28-Mar	3.6	3.9	4.1	4.5	4.7	5.4	5.9	6.9	6.6	4.0	4.0	4.4	2.7	3.3	3.7	2.7	3.1	2.7	1.9	2.3	2.7	2.1	1.9	2.0	3.7	6.9
29-Mar	2.1	3.1	2.6	1.9	1.8	1.7	1.7	2.2	1.9	2.1	2.7	2.4	1.2	1.4	1.3	1.3	1.2	1.5	1.4	2.2	2.8	2.7	4.0	2.3	2.1	4.0
30-Mar	2.2	1.9	1.7	1.7	1.7	1.9	2.5	1.8	1.6	2.5	3.6	2.7	1.8	1.9	1.7	2.0	0.5	0.6	0.8	1.3	2.0	2.1	1.9	2.2	1.9	3.6
31-Mar	2.1	2.1	2.1	2.3	2.6	3.5	3.1	2.7	2.7	2.9	3.2	2.8	2.3	2.2	2.4	2.6	2.6	2.6	2.7	2.9	3.2	2.7	2.4	4.1	2.7	4.1
	2.3	2.7	2.7	2.4	2.3	2.1	2.0	2.1	2.3	2.4	2.5	2.4	2.2	2.3	2.3	2.3	2.2	2.4	2.2	2.5	2.4	2.6	3.2	2.4	Diurnal Average	
	9.5	11.8	11.8	10.1	9.4	5.4	5.9	6.9	7.2	6.9	5.9	5.6	5.5	5.4	4.6	4.3	4.4	5.7	7.0	7.2	7.1	10.6	17.0	6.8	Diurnal Maximum	

C - Calibration M - Maintenance UO - Unstable Operation

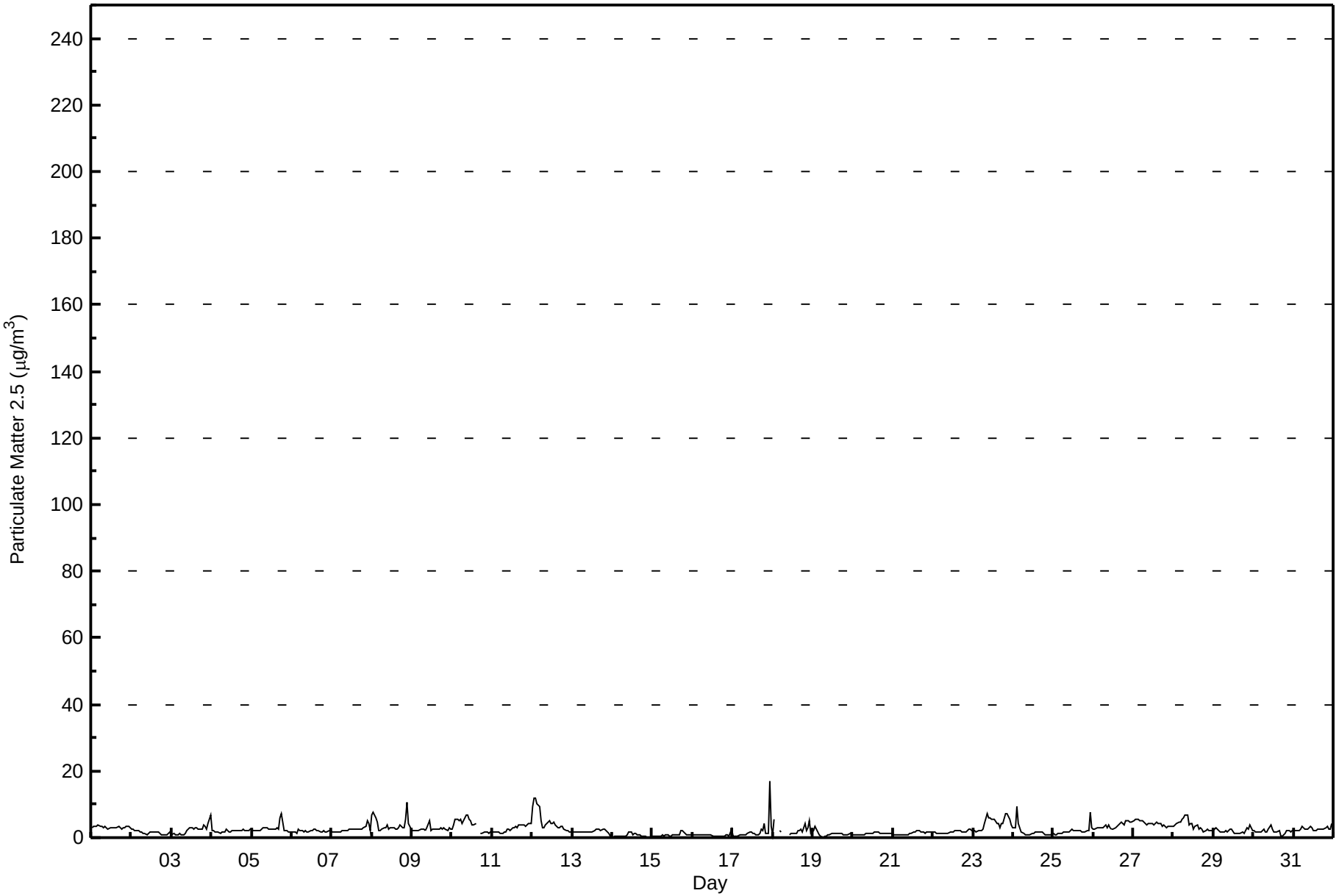
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Fort Chipewyan - March 2016



Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	584	79.35	79.35
6 - 15	32	4.35	83.70
16 - 25	1	0.14	83.83
26 - 80	0	0.00	83.83
> 81.0	0	0.00	83.83

Total Number of Valid Hours: 736

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Fort Chipewyan - March 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	19	28	25	112	196	51	2	1	0	0	2	20	23	30	34	40	583
6 - 15	0	1	3	3	8	5	2	0	0	2	0	0	1	2	3	2	32
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	19	29	28	115	204	56	4	1	0	2	2	20	24	33	37	42	616

Total Number of Valid Hours: 735

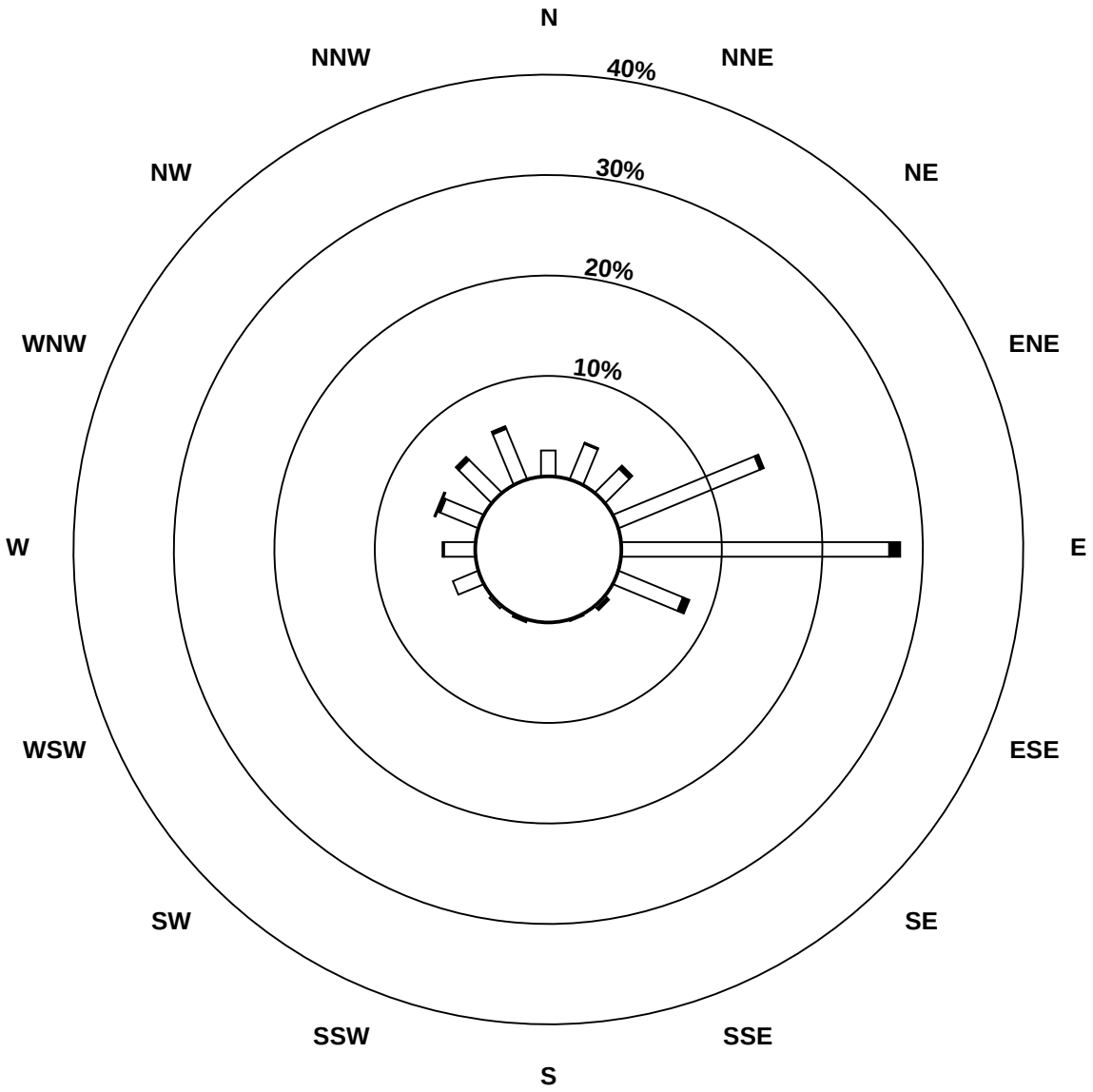
Total Number of Hours: 744

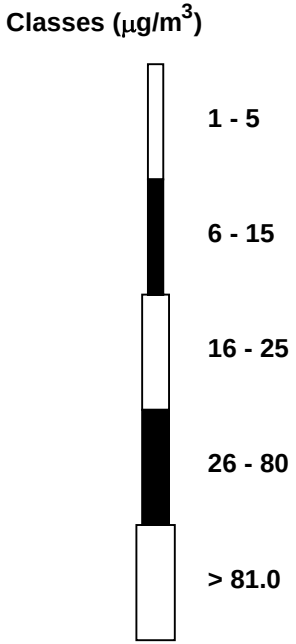
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Fort Chipewyan (AMS 8)





Total Number of Valid Hours: 735

Maximum Value: 9.5 C on Mar 29 16:00

Maximum Daily Average: 3.7 C on Mar 29

Minimum Value: -23.9 C on Mar 24 07:00

Minimum Daily Average: -18.0 C on Mar 24

Maximum Diurnal Average: -6.3 C at hour 17

Minimum Diurnal Average: -11.1 C at hour 7

Monthly Average: -8.47 C

Percentiles: P_1 = -20.5 P_{10} = -16.9 Q_1 = -13.3 Median = -9.0 Q_3 = -4.6 P_{90} = 1.2 P_{99} = 8.6

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

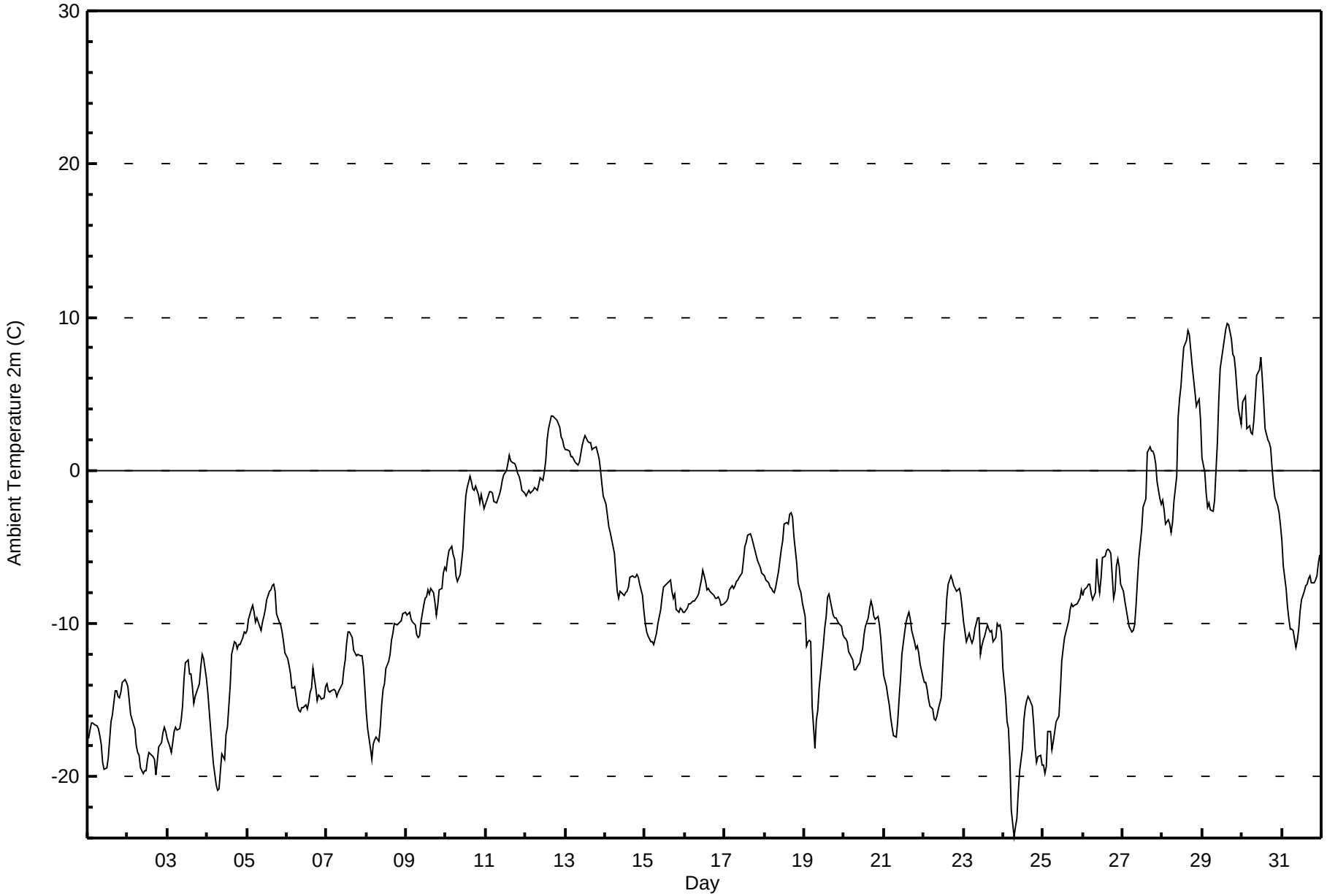
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-17.5	-17.0	-16.5	-16.5	-16.6	-16.7	-16.9	-17.3	-17.8	-19.0	-19.6	-19.5	-18.7	-17.6	-16.4	-16.0	-14.3	-14.3	-14.7	-14.9	-14.5	-13.9	-13.6	-13.9	-16.4	-13.6
2-Mar	-14.2	-15.0	-16.0	-16.6	-16.8	-18.0	-18.4	-18.6	-19.4	-19.8	-19.6	-19.6	-18.9	-18.4	-18.6	-18.7	-18.9	-19.9	-19.0	-18.0	-17.7	-17.1	-16.8	-17.0	-18.0	-14.2
3-Mar	-17.5	-18.0	-18.5	-17.8	-17.0	-16.8	-17.0	-16.8	-16.4	-15.4	-13.7	-12.5	-12.4	-13.2	-13.3	-14.1	-15.2	-14.8	-14.2	-14.0	-12.8	-12.0	-12.3	-13.6	-15.0	-12.0
4-Mar	-14.5	-15.7	-16.9	-18.1	-19.1	-20.5	-20.9	-20.8	-19.6	-18.5	-18.9	-17.3	-16.7	-15.4	-14.0	-12.0	-11.2	-11.3	-11.6	-11.4	-11.4	-11.0	-10.5	-10.7	-15.3	-10.5
5-Mar	-10.4	-9.7	-9.0	-8.8	-9.3	-9.9	-9.6	-9.9	-10.5	-9.9	-9.5	-9.1	-8.4	-7.9	-7.8	-7.6	-7.5	-7.9	-9.3	-9.9	-10.1	-10.6	-11.2	-11.9	-9.4	-7.5
6-Mar	-12.3	-12.8	-13.3	-14.2	-14.2	-14.1	-15.4	-15.7	-15.7	-15.5	-15.5	-15.3	-15.6	-15.2	-14.4	-14.2	-13.0	-14.2	-15.0	-14.6	-14.8	-14.9	-14.9	-14.1	-14.5	-12.3
7-Mar	-13.9	-14.4	-14.4	-14.4	-14.3	-14.4	-14.7	-14.5	-14.3	-14.0	-13.1	-12.3	-11.3	-10.6	-10.6	-10.9	-11.7	-11.9	-12.1	-12.0	-12.1	-12.1	-12.9	-14.2	-13.0	-10.6
8-Mar	-15.7	-16.9	-18.1	-18.8	-17.8	-17.6	-17.4	-17.7	-16.8	-15.3	-14.3	-13.9	-12.9	-12.5	-12.0	-11.1	-10.6	-10.0	-10.1	-10.0	-9.9	-9.9	-9.3	-9.3	-13.7	-9.3
9-Mar	-9.4	-9.4	-9.2	-9.7	-9.9	-10.1	-10.7	-10.9	-10.8	-9.9	-8.8	-8.4	-8.3	-7.8	-8.1	-7.7	-8.0	-8.7	-9.5	-8.8	-7.8	-7.7	-6.7	-6.4	-8.9	-6.4
10-Mar	-6.5	-5.8	-5.3	-5.0	-5.5	-5.8	-6.9	-7.3	-6.8	-6.0	-5.0	-3.1	-1.6	-1.1	-0.4	-0.7	-1.2	-1.3	-1.0	-1.6	-2.1	-1.6	-2.0	-2.5	-3.6	-0.4
11-Mar	-2.2	-1.6	-1.4	-1.4	-1.5	-2.0	-2.1	-1.8	-1.5	-1.2	-0.7	-0.3	0.0	0.5	1.0	0.6	0.5	0.4	0.1	-0.2	-0.4	-0.8	-1.3	-1.5	-0.8	1.0
12-Mar	-1.6	-1.5	-1.3	-1.5	-1.3	-1.2	-1.2	-1.3	-0.9	-0.5	-0.6	-0.1	0.6	2.0	2.8	3.6	3.5	3.5	3.4	3.3	2.8	2.1	2.0	1.6	0.8	3.6
13-Mar	1.4	1.3	1.2	0.9	0.9	0.7	0.5	0.3	0.6	1.1	1.6	2.0	2.3	1.9	1.8	1.8	1.3	1.5	1.6	1.2	0.8	0.1	-0.9	-1.7	1.0	2.3
14-Mar	-2.3	-3.0	-3.7	-4.0	-4.5	-5.5	-6.7	-7.9	-8.4	-7.9	-8.0	-8.1	-8.0	-7.9	-7.6	-7.0	-6.8	-7.0	-7.0	-6.8	-7.0	-7.5	-8.2	-9.2	-6.7	-2.3
15-Mar	-10.0	-10.6	-10.8	-11.2	-11.2	-11.3	-11.0	-10.6	-10.0	-9.1	-8.3	-7.6	-7.5	-7.4	-7.3	-7.2	-7.9	-8.4	-8.1	-9.1	-9.2	-9.0	-9.1	-9.3	-9.2	-7.2
16-Mar	-9.3	-9.0	-8.8	-8.7	-8.6	-8.6	-8.6	-8.3	-8.1	-7.6	-7.1	-6.5	-7.2	-7.8	-7.7	-7.9	-8.0	-8.2	-8.4	-8.4	-8.2	-8.4	-8.8	-8.7	-8.2	-6.5
17-Mar	-8.6	-8.5	-8.3	-7.8	-7.5	-7.7	-7.6	-7.3	-7.2	-7.0	-6.7	-5.9	-5.0	-4.7	-4.3	-4.2	-4.4	-4.8	-5.1	-5.6	-5.9	-6.3	-6.7	-6.8	-6.4	-4.2
18-Mar	-6.8	-7.1	-7.3	-7.6	-7.7	-7.9	-7.9	-7.7	-6.6	-5.9	-5.1	-4.6	-3.5	-3.4	-3.5	-2.8	-2.7	-3.0	-4.4	-6.1	-7.3	-7.7	-8.0	-8.6	-6.0	-2.7
19-Mar	-9.5	-11.4	-11.2	-11.1	-11.2	-15.4	-18.1	-16.3	-15.6	-14.2	-13.3	-11.4	-10.2	-9.5	-8.3	-8.1	-8.5	-9.4	-9.6	-9.6	-9.8	-10.0	-10.1	-10.7	-11.4	-8.1
20-Mar	-10.9	-11.0	-11.2	-11.8	-12.2	-12.4	-13.0	-13.0	-12.8	-12.6	-12.0	-11.6	-10.8	-10.2	-9.6	-9.0	-8.5	-8.9	-9.5	-9.7	-9.6	-10.1	-11.0	-12.2	-11.0	-8.5
21-Mar	-13.4	-14.1	-14.7	-15.3	-16.1	-16.7	-17.4	-17.4	-16.4	-14.9	-13.6	-12.0	-10.6	-9.9	-9.5	-9.3	-9.7	-10.4	-11.2	-11.6	-11.5	-11.9	-12.6	-13.4	-13.1	-9.3
22-Mar	-13.9	-13.9	-14.3	-15.0	-15.4	-15.6	-16.2	-16.3	-16.0	-15.6	-14.9	-13.1	-11.2	-10.1	-8.3	-7.5	-6.9	-7.2	-7.5	-7.8	-7.9	-7.7	-8.2	-9.0	-11.6	-6.9
23-Mar	-9.9	-10.5	-11.2	-10.7	-11.0	-11.3	-11.0	-10.4	-9.6	-9.6	-12.0	-11.5	-11.1	-10.8	-10.1	-10.4	-10.6	-10.5	-11.2	-10.9	-10.0	-10.2	-10.1	-10.6	-10.6	-9.6
24-Mar	-12.9	-14.8	-16.4	-16.8	-18.8	-22.1	-23.9	-23.3	-22.7	-21.0	-19.6	-18.2	-16.3	-15.5	-15.0	-14.7	-14.9	-15.4	-16.6	-18.2	-19.1	-18.7	-18.6	-19.2	-18.0	-12.9
25-Mar	-19.2	-19.8	-19.3	-17.1	-17.1	-18.2	-17.6	-17.1	-16.4	-16.1	-14.4	-12.5	-11.6	-11.0	-10.5	-9.8	-9.1	-8.8	-8.9	-8.8	-8.7	-8.5	-8.3	-7.8	-13.2	-7.8
26-Mar	-8.2	-7.8	-7.6	-7.5	-7.5	-8.0	-8.4	-8.0	-5.8	-7.3	-8.0	-7.1	-5.7	-5.6	-5.2	-5.1	-5.2	-5.4	-8.4	-7.9	-6.2	-5.8	-6.3	-7.4	-6.9	-5.1
27-Mar	-7.9	-8.5	-9.1	-9.6	-10.2	-10.6	-10.5	-10.1	-8.8	-7.2	-5.7	-3.9	-2.4	-2.2	-1.8	1.2	1.5	1.2	1.2	1.0	0.5	-0.7	-1.8	-2.2	-4.4	1.5
28-Mar	-1.9	-2.6	-3.5	-3.2	-3.5	-4.0	-3.4	-2.0	-0.4	3.4	4.6	5.5	6.8	8.0	8.5	9.2	8.9	7.9	6.8	5.1	4.2	4.5	4.7	3.2	2.8	9.2
29-Mar	0.8	-0.1	-1.5	-2.4	-2.1	-2.6	-2.7	-1.9	0.0	1.8	4.6	6.7	7.9	8.6	9.2	9.5	9.5	8.6	7.6	7.4	6.5	5.2	4.0	3.0	3.7	9.5
30-Mar	4.5	4.7	4.8	2.7	2.9	2.4	2.3	3.3	4.7	6.2	6.6	7.4	6.0	4.5	2.8	2.0	1.8	1.4	0.2	-1.0	-1.7	-2.3	-2.8	-3.6	2.5	7.4
31-Mar	-4.6	-6.2	-7.7	-8.9	-9.7	-10.4	-10.4	-10.5	-11.5	-11.1	-10.3	-9.2	-8.4	-7.9	-7.6	-7.4	-7.1	-6.9	-7.3	-7.3	-7.2	-6.9	-6.1	-5.5	-8.2	-4.6
	-9.0	-9.4	-9.7	-9.9	-10.1	-10.7	-11.1	-10.9	-10.4	-9.7	-9.1	-8.2	-7.4	-7.0	-6.6	-6.3	-6.3	-6.6	-7.1	-7.3	-7.4	-7.5	-7.7	-8.2	Diurnal Average	
	4.5	4.7	4.8	2.7	2.9	2.4	2.3	3.3	4.7	6.2	6.6	7.4	7.9	8.6	9.2	9.5	9.5	8.6	7.6	7.4	6.5	5.2	4.7	3.2	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 2m (AT 2m) - C

Fort Chipewyan - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	8	1.08	1.08
-20 - 0	639	85.89	86.96
0 - 10	97	13.04	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 2016

Maximum Value: 98 % on Mar 12 00:00

Maximum Daily Average: 92.4 % on Mar 11

Minimum Value: 28 % on Mar 23 23:00

Minimum Daily Average: 46.3 % on Mar 22

Maximum Diurnal Average: 77.7 % at hour 7

Minimum Diurnal Average: 68.0 % at hour 18

Monthly Average: 72.5 %

Percentiles: $P_1 = 36$ $P_{10} = 52$ $Q_1 = 65$ Median = 74 $Q_3 = 83$ $P_{90} = 89$ $P_{99} = 97$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

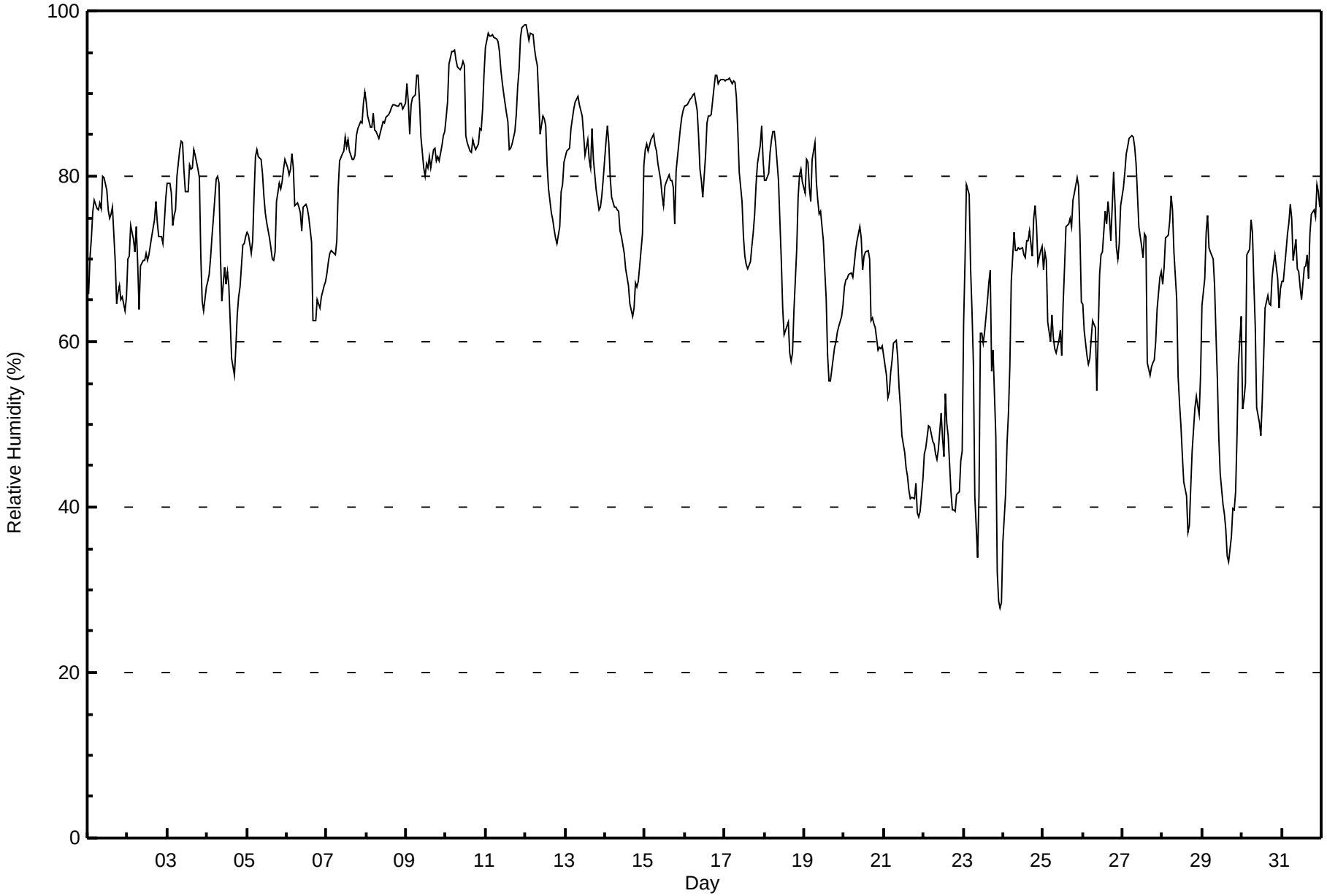
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	66	70	73	76	77	76	76	77	76	80	80	78	76	75	75	76	70	65	66	67	65	65	64	65	72.2	80
2-Mar	70	70	74	72	71	74	69	64	69	70	70	71	70	71	73	74	75	77	74	73	73	72	74	77	71.9	77
3-Mar	79	79	78	74	75	76	80	83	84	84	81	78	78	81	81	81	83	82	81	80	70	65	64	67	77.7	84
4-Mar	67	68	70	73	75	80	80	79	71	65	69	67	68	67	62	58	56	59	63	65	67	72	72	73	68.6	80
5-Mar	73	73	71	72	78	82	83	82	82	80	78	76	74	72	71	70	70	71	77	79	78	79	81	82	76.5	83
6-Mar	81	80	81	83	81	76	77	76	76	73	76	77	76	75	74	72	63	62	65	65	64	65	67	67	73.0	83
7-Mar	68	70	71	71	71	70	72	78	82	83	83	85	84	84	83	82	82	83	85	86	87	87	89	90	80.2	90
8-Mar	89	87	86	86	88	86	85	85	85	86	87	86	87	87	88	88	89	89	88	89	89	89	88	89	87.3	89
9-Mar	91	89	85	89	90	90	92	92	89	85	81	80	81	81	82	81	83	83	82	82	82	84	85	85	85.2	92
10-Mar	87	89	94	95	95	95	94	93	93	93	94	93	85	84	83	83	84	84	83	84	86	86	88	92	89.1	95
11-Mar	96	97	97	97	97	97	97	96	95	93	91	90	88	87	83	83	84	85	88	91	93	97	98	98	92.4	98
12-Mar	98	98	97	97	97	95	94	93	89	85	87	87	86	81	79	76	75	74	73	72	74	78	79	82	85.2	98
13-Mar	82	83	83	86	87	88	89	90	89	88	87	85	83	84	82	81	86	82	78	77	76	76	78	80	83.3	90
14-Mar	84	86	84	80	77	76	76	76	76	73	73	71	69	68	67	65	63	64	67	67	67	69	73	81	73.0	86
15-Mar	83	84	83	84	85	85	84	83	82	80	78	76	79	79	80	79	80	79	74	81	84	86	87	88	81.8	88
16-Mar	88	89	89	89	89	90	90	88	85	81	80	77	83	86	87	87	87	91	92	92	91	91	92	92	87.8	92
17-Mar	92	92	92	92	91	91	91	89	85	81	77	73	70	69	69	70	71	73	75	79	82	84	86	82	81.5	92
18-Mar	80	79	80	83	84	85	85	84	80	75	70	64	61	62	62	59	58	59	64	71	77	80	81	79	73.4	85
19-Mar	78	82	82	79	77	82	84	79	77	75	76	72	69	65	58	55	55	58	59	60	61	62	63	64	69.8	84
20-Mar	67	67	68	68	68	68	69	71	72	74	73	69	70	71	71	70	63	63	62	62	59	59	59	59	66.7	74
21-Mar	58	56	53	54	56	58	60	60	58	54	52	49	47	45	44	42	41	41	41	43	39	39	40	43	48.9	60
22-Mar	46	47	49	50	50	48	48	46	46	47	51	48	46	54	50	49	42	40	40	39	42	42	46	47	46.3	54
23-Mar	62	70	79	78	69	64	57	41	34	41	61	61	60	61	65	67	69	56	59	48	32	29	28	29	55.0	79
24-Mar	36	42	48	51	57	67	73	71	71	71	71	71	71	70	72	72	73	70	75	76	74	69	71	72	66.5	76
25-Mar	69	71	70	62	60	63	60	59	59	60	61	58	65	69	74	74	75	74	77	78	80	79	73	65	68.1	80
26-Mar	65	61	58	57	58	60	63	62	54	61	68	71	71	76	74	77	75	72	80	76	71	70	72	76	67.9	80
27-Mar	79	80	83	83	85	85	85	84	82	78	74	72	70	73	73	57	56	57	58	58	60	64	68	68	72.1	85
28-Mar	67	69	73	73	75	78	76	71	65	56	53	50	46	43	41	37	38	42	47	52	53	52	51	56	56.8	78
29-Mar	64	68	73	75	71	71	70	67	61	55	48	44	40	39	37	34	33	36	40	40	42	49	57	63	53.3	75
30-Mar	52	53	55	71	71	75	73	67	62	52	50	49	53	58	64	66	65	64	68	69	71	68	64	67	62.7	75
31-Mar	67	67	71	73	74	77	75	70	72	69	68	67	65	69	69	71	68	73	75	76	75	79	78	76	71.9	79
	73.7	74.7	75.7	76.6	76.8	77.7	77.7	76.1	74.2	72.5	72.5	70.8	70.0	70.6	70.2	68.9	68.1	68.0	69.6	70.2	69.8	70.5	71.4	72.8	Diurnal Average	
	98	98	97	97	97	97	97	96	95	93	94	93	88	87	88	88	89	91	92	92	93	97	98	98	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Fort Chipewyan - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	21	2.82	2.82
40 - 60	109	14.65	17.47
60 - 80	370	49.73	67.20
80 - 100	244	32.80	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

Fort Chipewyan - March 2016

Maximum Value: 1.0 mm on Mar 7 15:00

Maximum Daily Total: 3.8 mm on Mar 16

Minimum Value: 0.0 mm on Mar 1 01:00

Minimum Daily Total: 0.0 mm on Mar 1

Maximum Diurnal Total: 1.3 mm at hour 15

Minimum Diurnal Total: 0.0 mm at hour 1

Monthly Total: 7.37 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} = 0.0

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

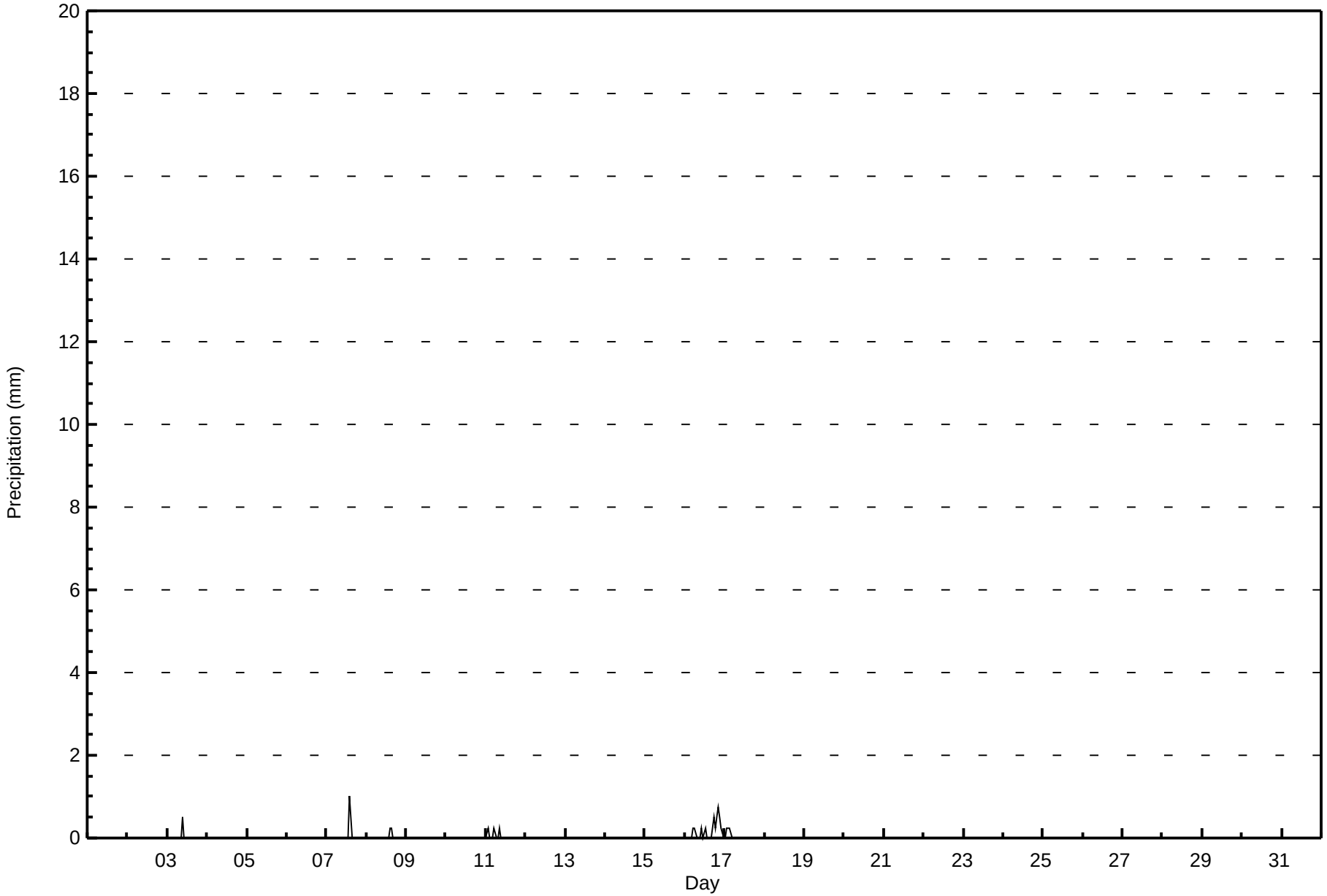
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
3-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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5
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
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
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
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	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0
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	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3
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
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
11-Mar	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.3
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
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
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
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
16-Mar	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.5	0.3	0.5	0.8	0.5	0.3	0.0	3.8	0.8
17-Mar	0.0	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	0.8	0.3
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
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
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
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
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
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
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
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
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
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
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
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
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
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	0.5	0.3	0.3	0.0	0.5	0.3	0.0	0.3	0.5	0.3	0.0	0.3	0.0	1.3	0.3	0.0	0.5	0.3	0.5	0.8	0.5	0.3	0.0	Diurnal Average	
	0.0	0.3	0.3	0.3	0.0	0.3	0.3	0.0	0.3	0.5	0.3	0.0	0.3	0.0	1.0	0.3	0.0	0.5	0.3	0.5	0.8	0.5	0.3	0.0	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Precipitation (PC) - mm

Fort Chipewyan - March 2016



Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	738	99.19	99.19
0.4 - 0.5	4	0.54	99.73
0.6 - 0.7	0	0.00	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 (SW) - %

Fort Chipewyan - March 2016

Maximum Value: 77 % on Mar 13 18:00

Maximum Daily Average: 33.1 % on Mar 13

Minimum Value: -1 % on Mar 29 12:00

Minimum Daily Average: -0.4 % on Mar 29

Maximum Diurnal Average: 3.7 % at hour 11

Minimum Diurnal Average: 0.6 % at hour 9

Monthly Average: 1.7 %

Percentiles: $P_1 = -1$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 60$

Hours in Service:	744
Hours of Data:	742
Hours of Missing Data:	2
Hours of Calibration:	0
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-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	1.4	1
2-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	1.4	1
3-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	1.4	1
4-Mar	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	2
5-Mar	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1.4	2
6-Mar	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	2
7-Mar	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	2	2	2	1.5	2
8-Mar	2	2	2	2	2	3	3	2	2	2	2	1	1	1	1	1	1	2	2	2	2	2	2	2	1.8	3
9-Mar	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1.5	2
10-Mar	2	2	2	2	2	2	3	3	3	2	1	1	1	1	1	1	M	M	0	0	0	0	0	0	1.3	3
11-Mar	0	0	0	1	1	1	1	1	1	2	43	16	11	7	4	2	2	2	1	2	3	15	13	4	5.4	43
12-Mar	2	2	2	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2
13-Mar	0	0	0	0	0	0	0	0	0	14	61	62	62	75	75	67	77	77	71	63	53	33	2	2	33.1	77
14-Mar	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
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	0.1	0
16-Mar	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.5	1
17-Mar	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
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
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	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	0	0	0	0	0	0	0	0	-0.2	0
23-Mar	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	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	-0.1	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
26-Mar	0	0	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-0.1	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	-0.1	0
28-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	-0.3	0
29-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
30-Mar	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	0	-0.3	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	-0.2	0
	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.9	3.7	2.8	2.6	3.0	2.9	2.6	3.0	3.0	2.7	2.5	2.2	2.0	0.9	0.6	Diurnal Average	
	2	2	2	2	2	3	3	3	3	14	61	62	62	75	75	67	77	77	71	63	53	33	13	4	Diurnal Maximum	

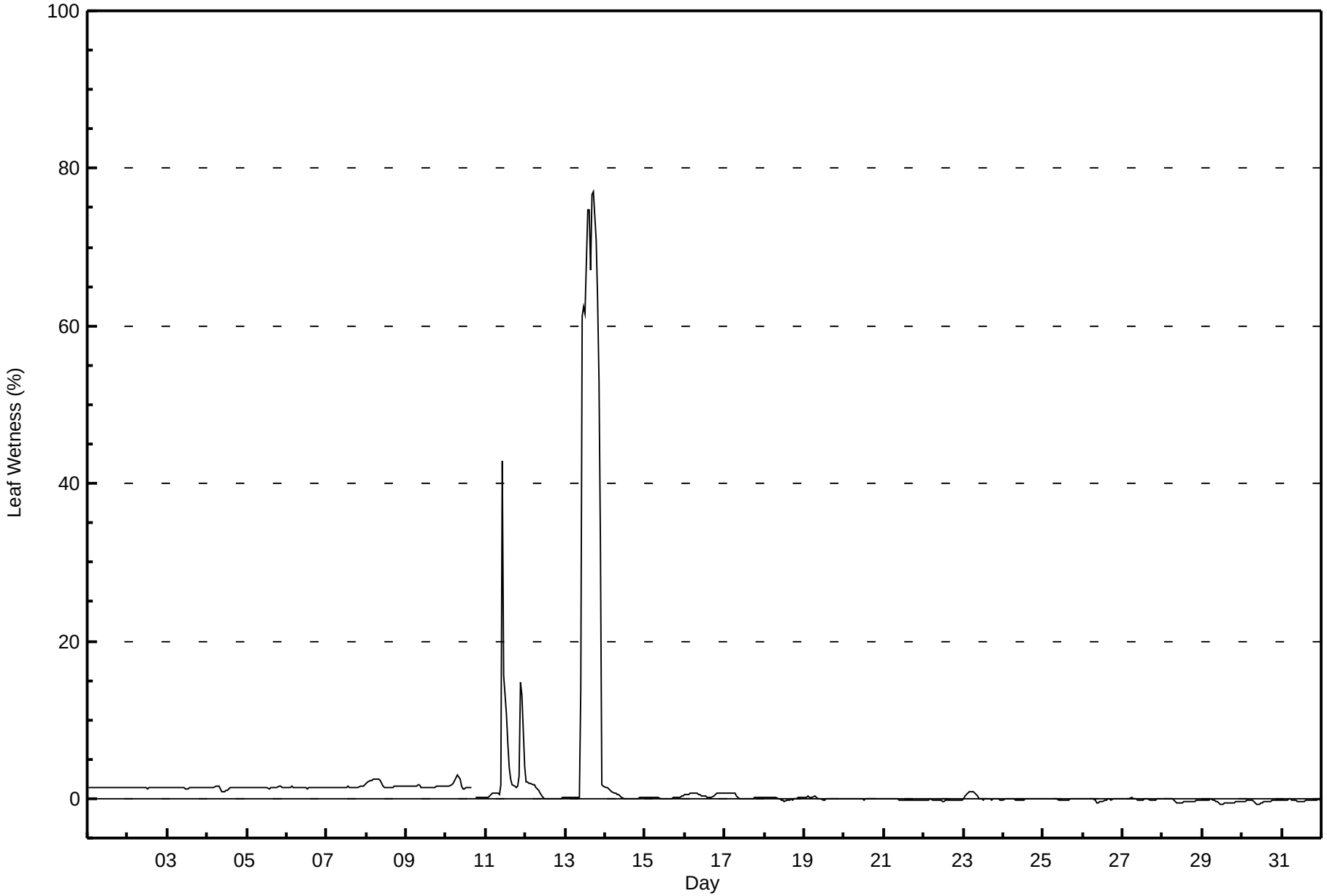
M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Leaf Wetness (SW) - %

Fort Chipewyan - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	138	29.87	29.87
0.4 - 0.5	14	3.03	32.90
0.6 - 0.7	29	6.28	39.18
0.8 - 1.4	149	32.25	71.43
1.5 - 10	70	15.15	86.58
> 10	18	3.90	90.48

Total Number of Valid Hours: 462

Total Number of Hours: 744

Maximum Value: 691 W/m2 on Mar 28 13:00

Maximum Daily Average: 215.8 W/m2 on Mar 28

Minimum Value: 0 W/m2 on Mar 1 01:00

Minimum Daily Average: 39.4 W/m2 on Mar 13

Maximum Diurnal Average: 454.9 W/m2 at hour 13

Minimum Diurnal Average: 0.0 W/m2 at hour 5

Monthly Average: 130.0 W/m2

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 5 $Q_3 = 211$ $P_{90} = 450$ $P_{99} = 665$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

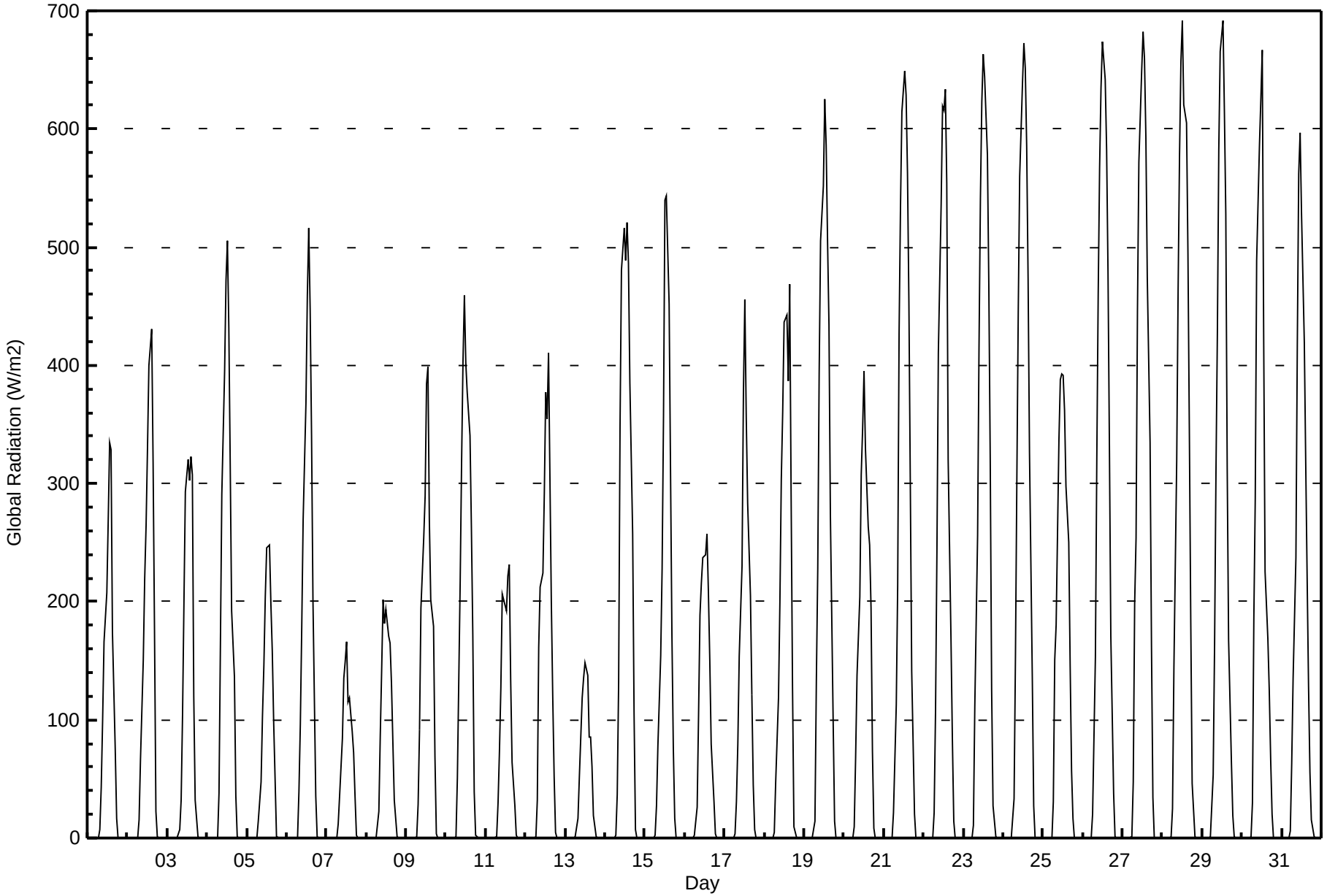
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0	0	0	0	0	0	0	7	42	99	167	208	270	334	329	175	74	17	0	0	0	0	0	0	71.7	334
2-Mar	0	0	0	0	0	0	0	16	66	150	220	265	330	400	431	316	175	22	1	0	0	0	0	0	99.7	431
3-Mar	0	0	0	0	0	0	0	8	32	105	199	293	321	303	323	308	120	32	1	0	0	0	0	0	85.2	323
4-Mar	0	0	0	0	0	0	0	38	163	290	395	472	505	432	316	193	137	35	1	0	0	0	0	0	124.1	505
5-Mar	0	0	0	0	0	0	0	14	48	103	146	204	245	248	198	158	98	50	2	0	0	0	0	0	63.1	248
6-Mar	0	0	0	0	0	0	1	39	96	177	269	368	459	516	448	341	202	35	1	0	0	0	0	0	123.1	516
7-Mar	0	0	0	0	0	0	0	12	36	84	135	150	166	115	118	90	72	35	2	0	0	0	0	0	42.3	166
8-Mar	0	0	0	0	0	0	1	22	87	143	201	182	193	171	164	131	81	32	1	0	0	0	0	0	58.7	201
9-Mar	0	0	0	0	0	0	1	29	92	195	254	290	384	399	269	202	179	69	4	0	0	0	0	0	98.6	399
10-Mar	0	0	0	0	0	0	2	51	217	318	404	459	402	377	341	263	172	40	3	0	0	0	0	0	127.0	459
11-Mar	0	0	0	0	0	0	1	30	73	128	207	202	192	222	232	134	64	27	2	0	0	0	0	0	63.1	232
12-Mar	0	0	0	0	0	0	2	32	162	212	225	292	378	355	411	199	119	52	5	0	0	0	0	0	101.8	411
13-Mar	0	0	0	0	0	0	1	16	52	85	119	136	148	137	85	85	61	19	2	0	0	0	0	0	39.4	148
14-Mar	0	0	0	0	0	0	3	36	131	349	481	516	489	521	486	386	258	106	7	0	0	0	0	0	157.1	521
15-Mar	0	0	0	0	0	0	2	28	79	155	228	358	540	544	452	311	172	75	17	0	0	0	0	0	123.4	544
16-Mar	0	0	0	0	0	0	3	26	105	189	216	238	240	257	208	150	80	31	4	0	0	0	0	0	72.8	257
17-Mar	0	0	0	0	0	0	4	31	79	155	230	377	456	356	284	205	121	45	7	0	0	0	0	0	97.9	456
18-Mar	0	0	0	0	0	0	5	47	118	200	304	360	437	443	387	469	290	128	10	0	0	0	0	0	133.2	469
19-Mar	0	0	0	0	0	0	15	133	228	393	505	552	625	586	505	434	275	98	14	0	0	0	0	0	181.7	625
20-Mar	0	0	0	0	0	0	9	68	138	204	308	346	395	330	264	248	194	74	9	0	0	0	0	0	107.8	395
21-Mar	0	0	0	0	0	0	21	113	214	427	534	614	649	629	563	453	300	141	20	0	0	0	0	0	195.0	649
22-Mar	0	0	0	0	0	0	22	108	244	411	536	619	616	634	554	320	170	84	15	0	0	0	0	0	180.6	634
23-Mar	0	0	0	0	0	0	10	111	257	416	541	622	663	644	577	467	321	125	27	1	0	0	0	0	199.3	663
24-Mar	0	0	0	0	0	0	34	155	306	447	559	638	673	651	585	474	327	136	27	0	0	0	0	0	208.9	673
25-Mar	0	0	0	0	0	0	31	151	180	337	387	392	391	361	297	251	146	56	17	0	0	0	0	0	125.0	392
26-Mar	0	0	0	0	0	0	20	153	320	461	567	635	674	641	582	478	331	171	38	1	0	0	0	0	211.4	674
27-Mar	0	0	0	0	0	1	48	198	254	446	572	649	682	659	593	475	334	163	35	1	0	0	0	0	212.9	682
28-Mar	0	0	0	0	0	1	24	144	320	465	578	657	691	621	605	495	346	185	46	1	0	0	0	0	215.8	691
29-Mar	0	0	0	0	0	1	53	164	311	428	582	666	691	615	528	313	167	64	19	1	0	0	0	0	191.8	691
30-Mar	0	0	0	0	0	1	29	187	287	489	586	625	667	427	225	169	125	66	20	1	0	0	0	0	162.6	667
31-Mar	0	0	0	0	0	5	62	135	237	417	562	596	528	419	317	221	130	56	16	1	0	0	0	0	154.3	596
	0.0	0.0	0.0	0.0	0.0	0.3	13.0	74.2	160.5	273.5	361.8	418.8	454.9	430.5	376.7	287.5	181.9	73.3	11.9	0.2	0.0	0.0	0.0	0.0	Diurnal Average	
	0	0	0	0	0	5	62	198	320	489	586	666	691	659	605	495	346	185	46	1	0	0	0	0	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Global Radiation (GR) - W/m2

Fort Chipewyan - March 2016



Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	397	53.36	53.36
21 - 100	73	9.81	63.17
101 - 300	130	17.47	80.65
301 - 600	116	15.59	96.24
601 - 900	28	3.76	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 2016

Maximum Speed: 37 km/h on Mar 21 00:00

Maximum Daily Speed Average: 29.7 km/h on Mar 21

Minimum Speed Value: 1 km/h on Mar 9 08:00

Minimum Daily Speed Average: 1.5 km/h on Mar 8

Maximum Diurnal Speed Average: 11.7 km/h at hour 16

Minimum Diurnal Speed Average: 8.6 km/h at hour 10

Monthly Average Velocity: 10.1 km/h 66.9 deg

Percentiles: $P_1 = 2$ $P_{10} = 5$ $Q_1 = 8$ Median = 13 $Q_3 = 20$ $P_{90} = 27$ $P_{99} = 34$

Hours in Service:	744
Hours of Data:	743
Hours of Missing Data:	1
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	E14	E15	E16	E16	E13	E12	E9	ENE11	ENE13	E11	E14	E16	E17	E15	E16	E13	NE7	NNE8	NNE6	NNE6	NNE6	NE7	ENE12	ENE9	E10.9	E17
2-Mar	NE7	E7	ENE5	NE4	ENE6	E9	E9	E7	E8	ESE9	ESE9	ESE9	ESE10	ESE12	ESE13	ESE11	E11	ESE9	ESE7	ESE10	E11	E8	ESE6	ESE10	E8.4	ESE13
3-Mar	E12	E11	E11	ENE10	E17	E15	E14	E13	E10	ENE5	NNE7	NE10	E7	ESE10	ESE9	ESE9	ESE7	E6	ESE2	W5	NW7	NW6	NNW8	NW7	E6.4	E17
4-Mar	NNW10	NNW9	NNW8	NNW7	NNW5	W3	WNW5	NW5	N4	ESE3	E7	E10	E12	E14	E19	E23	E27	E28	E31	E29	E29	E28	E29	E31	ENE12.4	E31
5-Mar	E31	E28	ENE24	ENE21	ENE17	ENE14	ENE7	NNW7	NNW12	NNW12	NNW12	NNW12	NNW12	NNW12	NNW11	NNW10	NNW9	NNW7	NNW7	N8	N9	N11	N14	N15	NNE9.4	E31
6-Mar	N12	N10	N7	NNW7	NE10	ENE19	ENE13	NE10	ENE12	ENE15	E16	E19	E20	E21	E19	E22	ENE21	NE14	NE21	ENE21	ENE23	ENE24	ENE22	ENE20	ENE15.0	ENE24
7-Mar	ENE24	ENE25	ENE27	ENE27	ENE24	ENE24	ENE24	ENE27	ENE29	ENE25	ENE20	ENE21	ENE17	NE8	N6	N5	NNW9	NNW9	NNW6	WNW5	WNW6	NW6	WNW5	W6	NE13.1	ENE29
8-Mar	WNW7	WNW6	W4	W4	W5	WNW2	AF	ENE2	ENE3	E3	E5	E6	E8	ESE9	E10	ESE10	ESE9	ESE6	E4	ESE1	WNW3	NW6	NNW7	NNW5	ENE1.5	E10
9-Mar	NNW5	NNW4	NNE2	W5	W4	WNW2	SW2	ENE1	SW4	ESE2	ESE7	E9	E15	E17	E20	E20	E21	E22	ENE19	ENE18	E22	E21	E17	E21	E9.7	E22
10-Mar	E23	E23	E25	E23	E26	E25	E21	E17	E16	E18	E24	E21	E23	E23	E25	E25	E24	E18	E19	E19	E16	E15	E17	E16	E20.9	E26
11-Mar	E14	E12	ENE9	ENE4	NW3	NNW8	NW9	NW10	NW12	NW12	NNW12	NNW9	NW10	NW10	NW11	NNW9	NNW6	NW5	WNW5	W3	WNW4	E2	E8	ESE10	NNW4.7	E14
12-Mar	ESE9	SE9	SE9	E14	E14	E13	ESE13	ESE13	SE14	SSE16	ESE13	E19	E25	E27	E32	ENE34	ENE34	ENE35	ENE33	ENE33	ENE34	ENE29	ENE26	ENE21	E20.1	ENE35
13-Mar	ENE21	ENE23	ENE20	ENE16	ENE15	ENE15	N8	NNE11	NNE17	NNE16	NE16	NNE14	NNE13	NNE15	NNE14	NNE17	NNE12	N11	NNE12	NNE13	NNE16	NNE16	NNE16	NE16	NE14.4	ENE23
14-Mar	NE15	NE18	NE22	NE24	NE25	NE28	NE27	NE27	ENE29	ENE30	ENE29	ENE27	ENE26	ENE29	ENE31	ENE28	ENE30	ENE31	ENE27	ENE28	ENE31	ENE33	ENE32	ENE26	ENE26.8	ENE33
15-Mar	ENE26	ENE24	NE20	NE17	ENE16	ENE14	ENE15	ENE12	ENE11	ENE12	ENE13	ENE13	E17	E18	E19	E19	E19	E10	NE9	NNE8	NNE8	N5	N7	NNW7	ENE12.7	ENE26
16-Mar	N10	N9	N7	N7	N7	NNW8	N7	NNE10	NNE13	NE15	NNE13	NNE13	ENE16	E20	E21	E18	ENE15	E7	ESE6	E4	NE4	E4	SE2	WNW3	NE7.9	E21
17-Mar	WNW5	WNW5	WNW6	WNW8	WNW9	WNW11	WNW11	WNW11	NW14	NW14	NW14	NW17	NW16	NW16	NW14	NW14	NW13	NW11	NW8	NW7	NW5	WNW1	WNW5	WNW6	NW9.9	NW17
18-Mar	W5	W5	W5	WNW7	WNW7	WNW7	WNW6	W6	NW5	NW8	NW6	WNW9	W7	WSW13	WSW12	WSW9	W7	W7	W8	W6	WNW7	NW8	NNW7	NNE10	WNW6.4	WSW13
19-Mar	NE9	NE8	NE14	NE15	ENE12	E12	E19	E23	ENE21	E20	E21	ENE20	ENE20	ENE22	ENE26	ENE25	ENE27	ENE27	ENE30	ENE33	ENE33	ENE32	ENE32	ENE32	ENE21.8	ENE33
20-Mar	ENE30	ENE31	ENE34	ENE32	ENE32	ENE31	ENE31	ENE30	ENE29	ENE28	ENE26	ENE26	ENE23	ENE24	NE21	NE21	NE25	NE27	NE27	ENE30	ENE31	ENE34	ENE34	ENE37	ENE28.7	ENE37
21-Mar	ENE36	ENE34	ENE35	ENE34	ENE32	ENE30	ENE31	ENE31	ENE31	ENE30	ENE29	ENE29	ENE32	ENE29	ENE29	ENE28	NE30	ENE29	ENE24	ENE27	ENE29	E30	E26	E22	ENE29.7	ENE36
22-Mar	E21	E22	E21	E20	E20	ENE17	ENE18	E20	E21	E20	E20	E20	E21	E18	E20	E18	ENE18	ENE15	ENE14	ENE12	ENE7	ENE6	ENE7	ENE10	E16.6	E22
23-Mar	ENE9	E6	E6	NE6	NNE7	NNE6	NNE7	NNE6	NNE7	ENE5	ESE8	ESE10	ESE11	E12	E9	E11	E8	E8	E5	ENE4	ENE6	NE6	NE6	N6	ENE6.1	E12
24-Mar	NE4	ENE1	NE3	E8	ESE8	E7	E6	E7	ESE11	ESE12	ESE13	ESE11	ESE12	ESE15	ESE15	ESE17	ESE17	E17	ESE15	E11	E11	E9	E10	E9	E10.3	ESE17
25-Mar	E11	E11	E16	E18	E16	E17	E18	E19	E20	E21	E19	E17	E16	ESE15	ESE16	ESE16	ESE14	E14	E12	E8	ESE4	E1	NW5	NW3	E12.8	E21
26-Mar	NNW4	NNW6	NNW4	N6	N4	NW6	N5	N5	E2	ESE6	E9	E10	E8	E14	E16	E17	E18	E17	ESE14	E14	E16	E17	E18	E19	E8.6	E19
27-Mar	E19	E19	E17	E17	E16	E17	E17	E17	E17	E18	E19	E19	E18	E21	E20	E21	E23	E25	E23	E25	E25	E23	E20	E16	E19.6	E25
28-Mar	ESE15	ESE14	ESE12	ESE9	ESE7	ESE7	ESE5	SSW6	SSW7	WSW13	WSW16	WSW16	WSW16	WSW20	W21	W22	W24	W22	W15	WNW12	WNW12	WNW13	WNW14	WNW11	WSW7.6	W24
29-Mar	WNW9	WNW8	WSW8	W10	WNW12	WNW10	WNW14	WNW14	WNW14	WNW13	W10	WSW11	WSW12	WSW11	WSW10	WSW9	W7	W7	WSW6	WSW5	WSW2	E3	E7	E5	W7.3	WNW14
30-Mar	ENE10	ENE14	ENE10	E13	E14	E7	SE3	WSW4	WSW8	WSW16	W16	NW22	NW27	NW26	NW25	NW22	NW19	NNW18	NNW18	NNW19	NW19	NNW17	NNW15	NW16	NNW10.5	NW27
31-Mar	NNW15	NNW10	NNW9	NNW8	N7	NE7	NNE7	E10	ESE12	ESE9	ESE10	ESE9	E11	E15	E18	E20	E18	E20	E21	E20	E20	E19	E15	NE4	E10.2	E21
	ENE10.5	ENE10.3	ENE10.3	ENE10.0	ENE9.9	ENE9.7	ENE9.0	ENE8.7	ENE9.0	ENE8.6	ENE9.1	ENE9.6	ENE10.2	ENE10.6	ENE11.3	ENE11.7	ENE11.6	ENE10.7	ENE10.4	ENE10.5	ENE10.6	ENE10.7	ENE10.6	ENE9.8	Diurnal Average	
	ENE36	ENE34	ENE35	ENE34	ENE32	ENE31	ENE31	ENE31	ENE31	ENE30	ENE29	ENE29	ENE32	ENE29	E32	ENE34	ENE34	ENE35	ENE33	ENE33	ENE34	ENE34	ENE34	ENE37	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 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 9 km/h on Mar 30 15:00

Minimum Value: 1 km/h on Mar 8 22:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 6$

Hours in Service:	744
Hours of Data:	743
Hours of Missing Data:	1
Hours of Calibration:	0
Percent Operational Time:	99.9

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

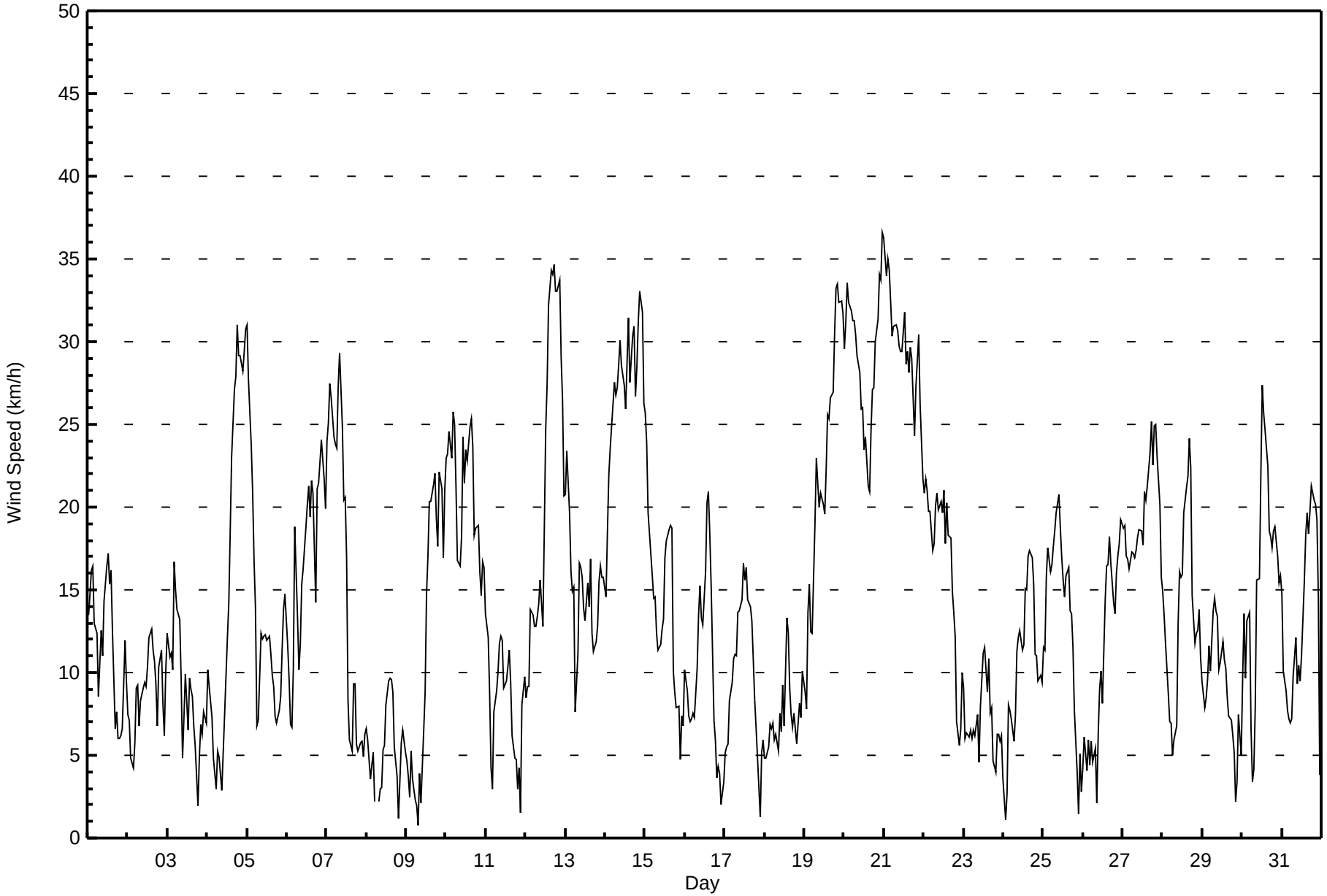
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Fort Chipewyan - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	82	11.04	11.04
6 - 11	234	31.49	42.53
12 - 19	225	30.28	72.81
20 - 28	138	18.57	91.39
29 - 38	64	8.61	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Fort Chipewyan - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	6	1	5	9	11	6	2	0	0	0	2	3	10	14	7	6	82
6 - 11	18	16	14	15	49	35	2	0	0	2	0	8	11	20	17	27	234
12 - 19	3	17	8	31	96	22	1	1	0	0	0	8	2	9	14	13	225
20 - 28	0	0	13	48	67	0	0	0	0	0	0	1	4	0	5	0	138
29 - 38	0	0	1	56	7	0	0	0	0	0	0	0	0	0	0	0	64
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	27	34	41	159	230	63	5	1	0	2	2	20	27	43	43	46	743

Total Number of Valid Hours: 743

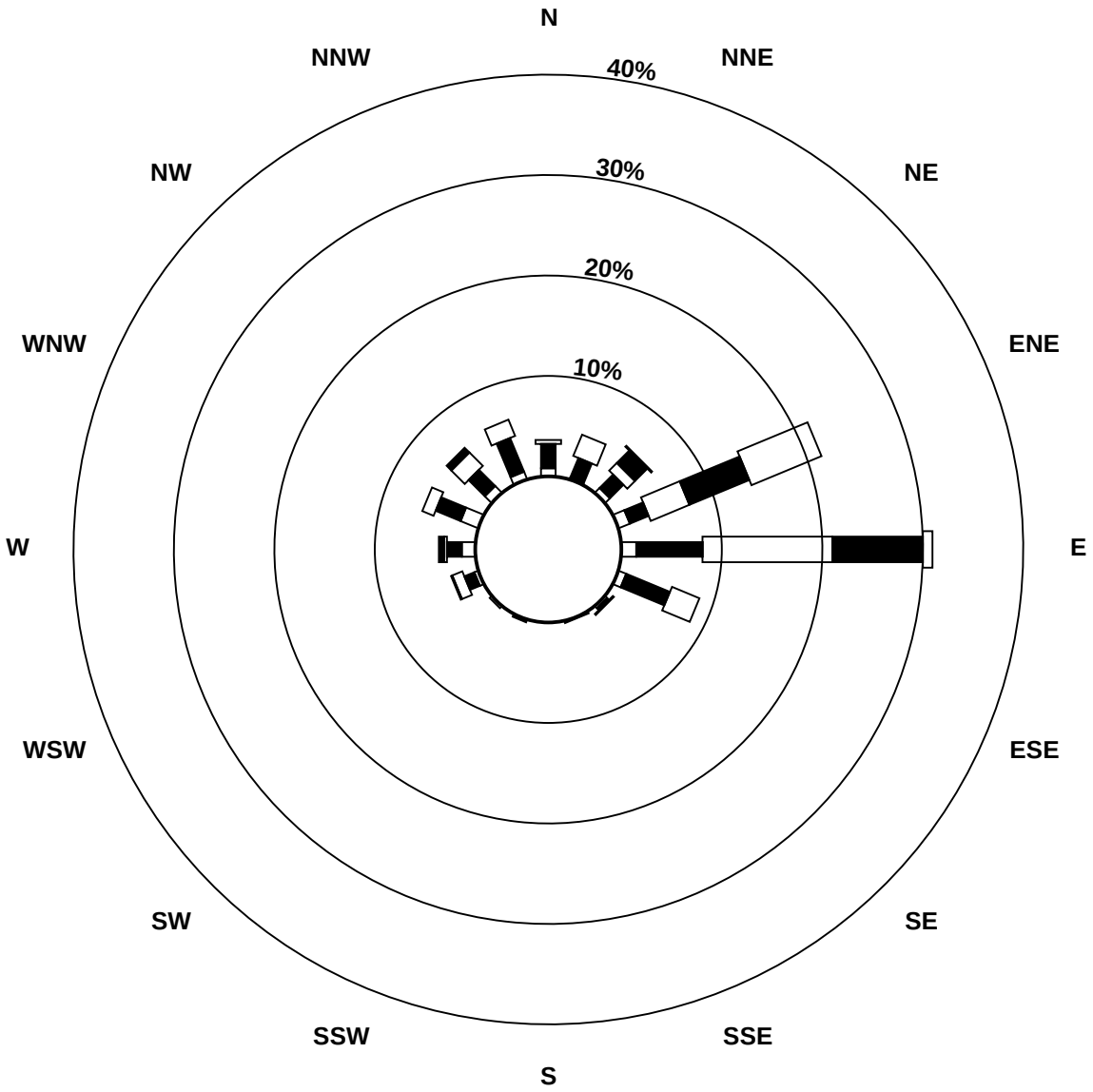
Total Number of Hours: 744

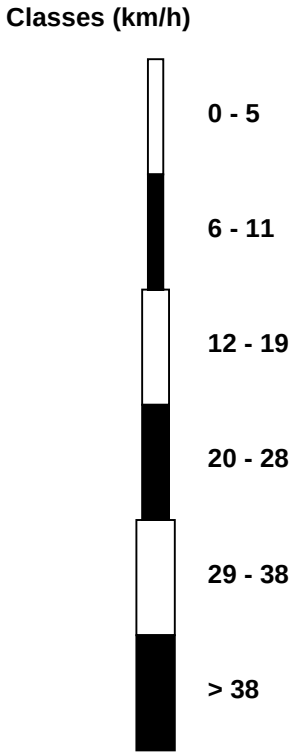
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Wind Speed (WS) - km/h

Fort Chipewyan (AMS 8)





Total Number of Valid Hours: 743

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Fort Chipewyan - March 2016

Direction of Maximum Speed: 72 deg on Mar 21 00:00
Direction of Maximum Daily Speed Average: 66.5 deg on Mar 21

Direction of Minimum Speed: 69 deg on Mar 9 08:00
Direction of Minimum Daily Speed Average: 1.5 deg on Mar 8

Monthly Average Direction: 358.8 deg

Hours in Service:	744
Hours of Data:	743
Hours of Missing Data:	1
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	89	85	81	86	83	88	79	71	69	96	98	98	95	97	99	96	49	25	18	15	31	53	65	60	79.9
2-Mar	56	83	74	50	60	99	86	95	100	104	117	115	111	112	103	104	101	116	111	105	95	85	114	116	99.6
3-Mar	96	88	86	74	95	89	83	94	89	78	30	44	95	112	111	110	104	93	119	272	313	325	333	322	80.3
4-Mar	327	328	331	335	341	270	287	324	359	104	88	85	96	95	89	85	85	82	85	85	81	85	79	79	75.6
5-Mar	81	81	78	67	60	65	60	343	347	343	331	335	335	345	330	334	343	336	336	350	358	351	351	358	21.0
6-Mar	1	6	5	338	43	72	65	53	72	68	98	97	99	94	95	86	67	53	51	63	68	67	67	70	68.4
7-Mar	67	63	66	63	61	63	59	66	66	58	61	62	58	43	2	7	331	334	327	294	289	307	287	279	52.4
8-Mar	287	291	276	262	269	285	AF	75	78	92	91	96	99	105	97	104	106	107	93	106	285	305	335	340	77.0
9-Mar	337	331	19	268	281	292	223	69	222	115	112	93	92	89	86	82	88	83	68	73	89	88	86	87	83.6
10-Mar	88	87	87	88	89	87	92	89	89	87	89	85	84	85	89	87	89	88	86	93	94	93	93	91	88.5
11-Mar	90	81	77	63	312	342	325	321	323	324	330	329	320	318	325	342	335	318	303	280	288	92	96	110	347.7
12-Mar	103	145	135	91	92	101	117	120	144	147	117	88	87	82	79	76	77	74	72	70	71	72	76	73	86.4
13-Mar	71	63	59	61	60	59	11	20	28	32	34	31	30	26	28	31	19	8	16	22	24	28	32	35	37.2
14-Mar	42	44	49	50	51	51	52	52	58	64	66	62	61	62	62	59	65	64	64	69	74	77	78	68	61.3
15-Mar	64	61	52	52	59	63	63	62	62	60	60	71	95	96	96	94	90	80	35	29	21	351	353	346	64.9
16-Mar	353	3	7	1	0	347	355	21	31	41	33	29	77	90	87	82	77	91	106	88	50	86	128	288	49.7
17-Mar	291	282	282	300	300	290	295	303	305	315	319	318	313	312	314	308	318	308	309	310	313	298	283	285	306.5
18-Mar	261	267	273	286	294	292	285	273	310	309	318	284	267	252	251	247	268	261	274	277	289	307	345	14	283.4
19-Mar	54	43	35	46	70	88	96	84	72	81	86	77	78	74	72	64	61	57	60	63	69	71	69	68	69.2
20-Mar	70	70	68	70	69	69	66	64	64	62	60	59	59	60	48	49	48	50	51	58	61	64	68	72	62.5
21-Mar	69	65	68	66	65	63	62	63	69	67	65	64	65	64	66	60	56	57	57	64	74	82	84	86	66.5
22-Mar	85	84	82	82	79	75	76	81	87	91	92	89	87	95	91	86	70	64	63	57	65	57	58	66	80.6
23-Mar	67	88	91	52	31	14	24	20	20	69	108	114	103	96	95	90	92	92	101	68	57	52	34	9	71.3
24-Mar	44	72	49	91	106	97	93	100	107	108	105	108	106	103	102	103	103	99	102	99	94	98	90	89	99.6
25-Mar	88	95	90	88	86	90	82	80	88	90	96	99	99	103	105	104	102	101	101	95	107	100	307	321	92.8
26-Mar	345	341	328	359	1	317	359	359	88	112	95	80	80	94	94	97	94	94	105	90	86	88	89	89	81.7
27-Mar	91	94	88	90	94	98	98	98	91	91	90	94	93	96	95	89	85	84	82	83	89	93	100	99	91.3
28-Mar	102	115	107	114	120	104	111	196	200	247	252	251	253	252	272	272	270	270	280	286	286	288	295	286	258.1
29-Mar	287	282	252	267	291	291	295	296	295	294	280	243	244	253	252	257	278	265	237	254	251	95	81	88	274.0
30-Mar	62	64	73	88	92	85	136	252	255	251	276	318	322	321	324	325	325	339	347	339	323	332	338	324	333.2
31-Mar	327	341	342	337	355	35	30	94	115	102	102	104	89	91	93	93	92	89	88	89	86	90	91	37	78.9
	64.7	66.0	66.1	63.3	64.6	66.7	64.2	62.7	65.3	68.3	70.8	68.2	73.4	76.4	74.4	72.1	67.3	64.5	63.0	63.1	64.2	66.1	64.5	62.9	
	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

Fort Chipewyan - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 93 deg on Mar 9 08:00

Minimum Value: 3 deg on Mar 15 14:00

Percentiles: P_1 = 3 P_{10} = 5 Q_1 = 7 Median = 10 Q_3 = 17 P_{90} = 24 P_{99} = 68

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	7	6	6	7	9	11	12	13	8	5	4	3	3	4	5	8	33	15	15	17	20	20	9	13	33
2-Mar	13	21	39	40	32	6	19	19	14	5	7	9	11	7	6	7	6	9	17	7	9	7	25	13	40
3-Mar	4	9	11	7	5	5	9	7	6	22	17	13	35	9	7	7	12	11	58	26	13	15	14	13	58
4-Mar	11	14	16	20	55	56	17	21	36	71	14	9	8	9	3	4	5	5	5	6	6	6	7	6	71
5-Mar	6	6	7	8	8	9	24	26	22	23	21	23	23	25	23	26	25	20	14	12	12	13	15	17	26
6-Mar	20	19	24	15	24	7	8	12	14	9	6	3	3	4	4	8	11	12	10	9	8	7	7	7	24
7-Mar	7	8	7	7	8	9	8	8	8	9	9	8	10	20	20	36	21	20	20	15	13	16	14	11	36
8-Mar	17	15	24	10	15	18	AF	14	11	12	15	9	10	9	5	5	3	6	15	65	15	6	18	17	65
9-Mar	21	36	72	21	15	28	43	93	21	69	20	12	6	5	4	5	4	5	6	8	6	5	5	6	93
10-Mar	5	6	5	5	4	5	4	4	4	4	4	5	5	5	6	5	5	5	7	4	6	5	5	5	7
11-Mar	7	6	11	11	30	18	16	15	15	15	18	22	18	17	21	23	21	17	17	39	29	71	7	9	71
12-Mar	19	22	28	10	8	14	6	5	13	15	11	5	5	6	7	7	6	6	7	7	6	6	7	6	28
13-Mar	11	8	7	7	8	9	26	18	15	14	13	15	17	16	16	15	18	19	18	19	17	17	16	14	26
14-Mar	15	14	12	11	11	12	11	11	9	9	10	10	10	9	9	11	9	8	8	8	7	7	6	8	15
15-Mar	7	9	9	9	10	8	8	9	10	9	9	11	4	3	3	3	4	23	17	15	15	41	58	26	58
16-Mar	19	19	20	20	18	18	18	16	14	17	17	18	36	4	6	7	7	19	8	32	16	25	39	8	39
17-Mar	9	15	17	14	15	13	14	15	16	18	17	18	20	19	20	18	18	16	14	14	18	77	19	19	77
18-Mar	15	23	18	8	8	11	15	13	31	23	37	24	46	20	20	27	27	18	11	15	5	16	19	22	46
19-Mar	17	16	9	11	12	8	7	5	8	7	5	10	10	11	8	8	9	8	8	8	7	7	7	7	17
20-Mar	7	8	7	7	7	7	8	7	8	8	9	9	10	9	12	11	10	10	10	9	8	8	8	7	12
21-Mar	7	8	8	8	8	8	8	7	7	8	7	8	8	8	7	9	8	7	8	7	8	5	5	6	9
22-Mar	5	6	5	5	5	8	7	5	5	4	3	4	5	5	4	8	6	9	9	12	19	31	16	8	31
23-Mar	8	20	13	20	14	19	24	31	23	53	9	6	8	7	6	3	13	11	16	13	8	9	8	12	53
24-Mar	39	84	44	10	8	12	12	11	6	8	7	5	9	6	5	4	4	4	5	6	7	7	7	6	84
25-Mar	4	5	7	5	7	8	6	8	7	5	5	5	5	8	5	5	5	5	5	8	13	69	37	67	69
26-Mar	36	30	47	20	33	17	36	25	53	10	13	7	9	5	4	4	7	7	7	7	5	6	6	4	53
27-Mar	5	5	5	5	5	6	5	5	7	6	6	5	6	4	5	5	5	5	5	5	5	5	7	9	9
28-Mar	10	9	6	12	11	9	23	31	45	17	17	14	16	15	14	14	14	14	13	11	11	11	13	14	45
29-Mar	10	12	17	25	12	11	7	10	11	12	18	17	17	20	17	19	16	13	10	8	20	48	28	43	48
30-Mar	6	7	10	6	11	26	44	62	18	16	19	18	18	18	21	20	22	23	23	23	17	22	22	20	62
31-Mar	19	25	22	23	20	20	17	24	10	8	8	11	7	6	6	5	5	5	5	6	6	5	7	55	55
	39	84	72	40	55	56	44	93	53	71	37	24	46	25	23	36	33	23	58	65	29	77	58	67	
	Diurnal Maximum																								

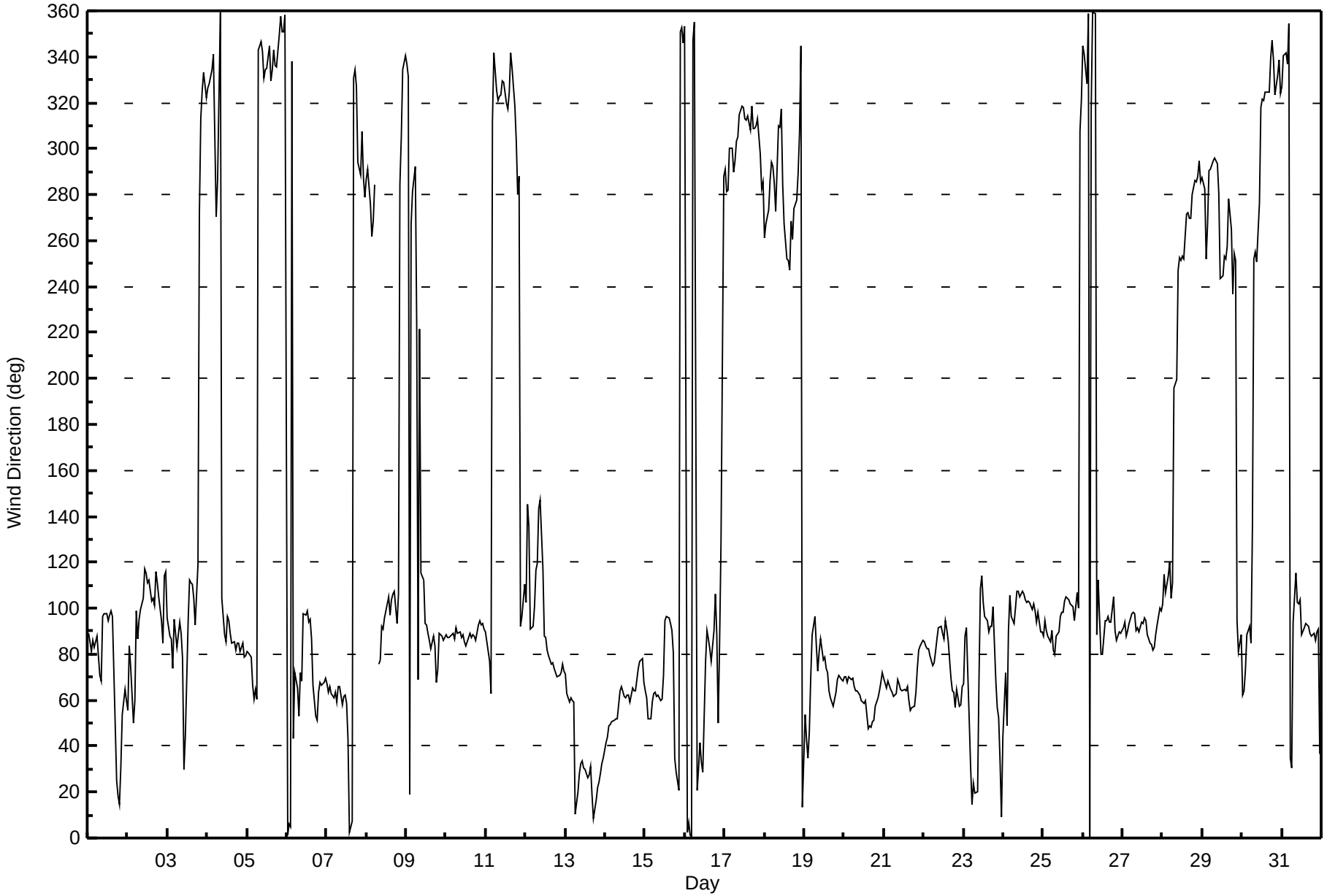
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Fort Chipewyan - March 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	March 10, 2016	Last Calibration	February 2, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	13:30	End Time (MST)	19:45
Gas Cert Reference	LL79696	Station temp.	22 Deg C
Cal Gas Concentration	2.35 ppm	Cal Gas Exp Date	2/13/16
Calibrator Make/Model	Teledyne API T700	Serial Number	747
ZAG Make/Model	Teledyne API T701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-826	-826
Analyzer IP address	192.168.1.43		Lamp voltage	1007	1016
Calculated slope	1.003678	1.008785	Chamber temp	45.0	45.0
Calculated intercept	-0.049767	-0.085182	Pressure	711.6	694.9
Analyzer Background	1.13	1.22	Flow	0.433	0.425
Analyzer Coefficient	1.025	1.083	Intensity	91	91

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	0.1	----
as found span	6000	44.8	17.5	18.0	0.976
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	44.8	17.5	17.5	1.004
second point	6000	23.9	9.4	9.4	0.994
third point	6000	12.0	4.7	4.7	1.009
as left zero	6000	0.0	0.0	0.1	----
as left span	6000	44.8	17.5	17.0	1.030
				Average Correction Factor	1.002

Corrected As found	17.8	Previous response	17.5	% change	-1.7%

Notes:

Inlet filter changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell

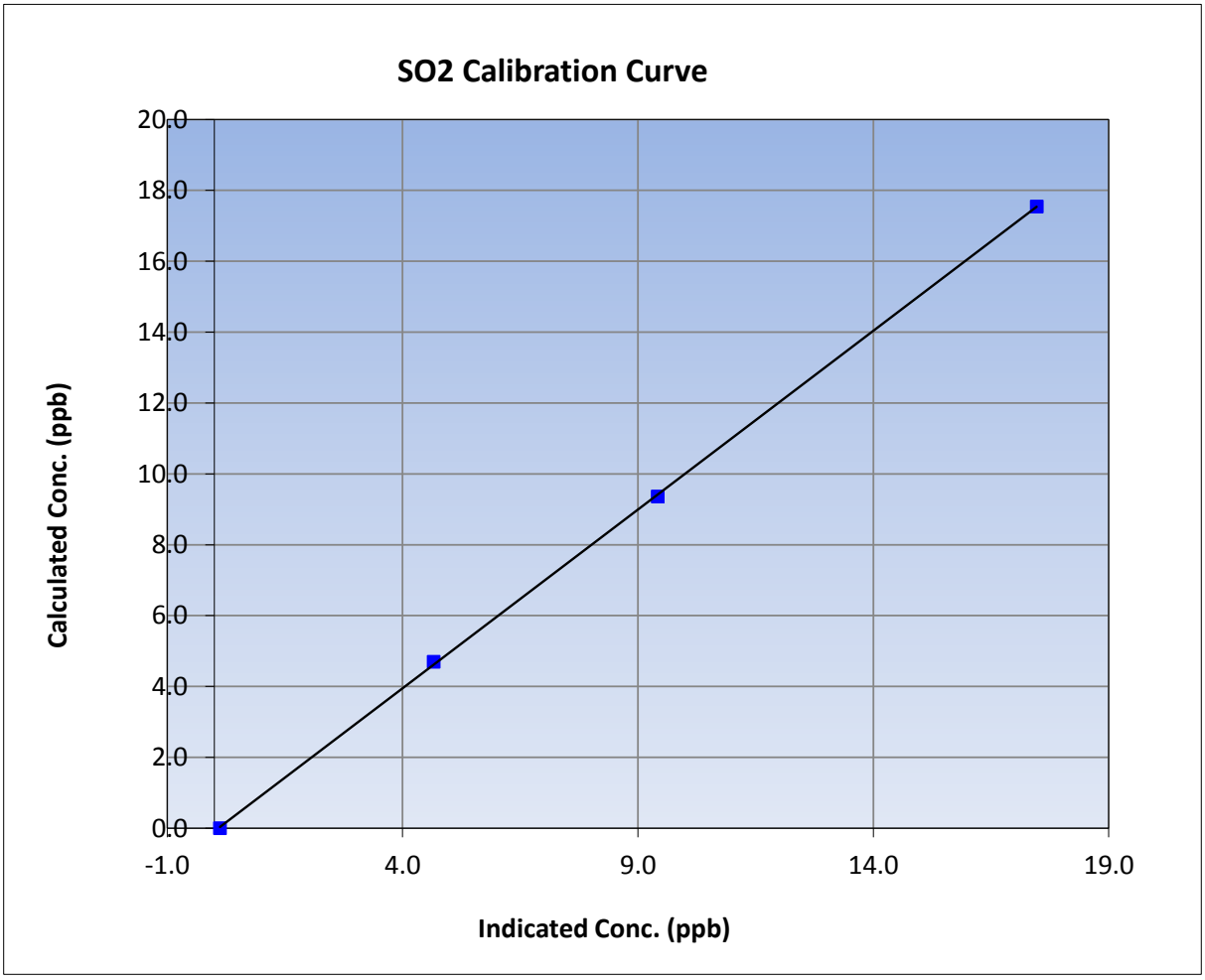
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

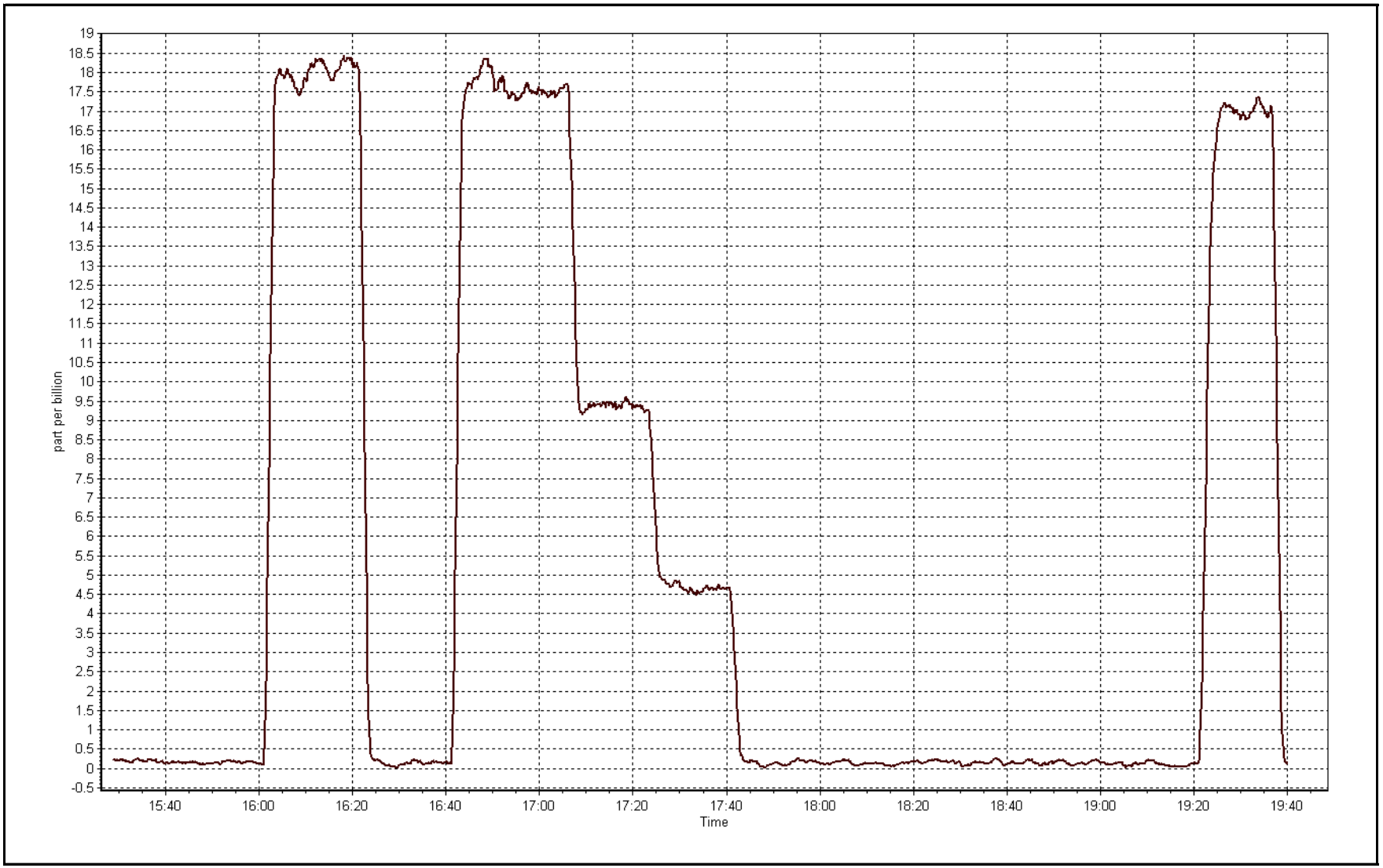
Calibration Date	March 10, 2016	Previous Calibration	February 2, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:30	End Time (MST)	19:45
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999930
17.5	17.5	1.0044		
9.4	9.4	0.9937	Slope	1.008785
4.7	4.7	1.0086		
			Intercept	-0.085182



SO2 Calibration Plot Date: March 10, 2016



Wood Buffalo Environmental Association
O_3 Calibration Report

Station Information

Calibration Date	March 11, 2016	Previous Calibration	February 15, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	7:55	End Time (MST)	10:35
NO2 GPT Ref date	February-02-16	Transfer Standard	NO2
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	735
ZAG make/model	Teledyne API 701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	Serial Number	8205

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 500 ppb		Bench temp.	34.6	38.4
Analyzer IP address	192.168.1.48		Lamp temp.	56.0	58.0
Calculated slope	0.993558	0.999623	Pressure	28.1	28.5
Calculated intercept	0.102657	-0.139581	Flow cell A	762	745
Analyzer Background	-0.3	-0.4	Flow cell B	762	745
Analyzer Coefficient	1.000	1.014	Cell A Intensity	NA	NA
			Cell B Intensity	NA	NA

Analyzer make	Teledyne API T400	Analyzer serial #	1107

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator O3 generator reference voltage - generator drive voltage (ppb of O3 called from from calibrator)	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	6000	237.0 - 830.8 (100ppb)	104.4	106.1	0.984
calibrator zero	6000	0.00	0.0	0.1	----
high point	6000	237.0 - 830.8 (100ppb)	104.4	104.4	1.000
second point	6000	188. - 797.0 (80ppb)	84.5	84.8	0.996
third point	6000	113.2 - 732.9 (50ppb)	53.4	53.6	0.997
as left zero	6000	0.00	0.0	0.4	----
as left span	6000	237.0 - 827.8 (100ppb)	104.4	105.1	0.993
				Average Correction Factor	0.997

Corrected As found	106.0	Previous response	105.0	% change	-1.0%

Notes:

Inlet filter changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell

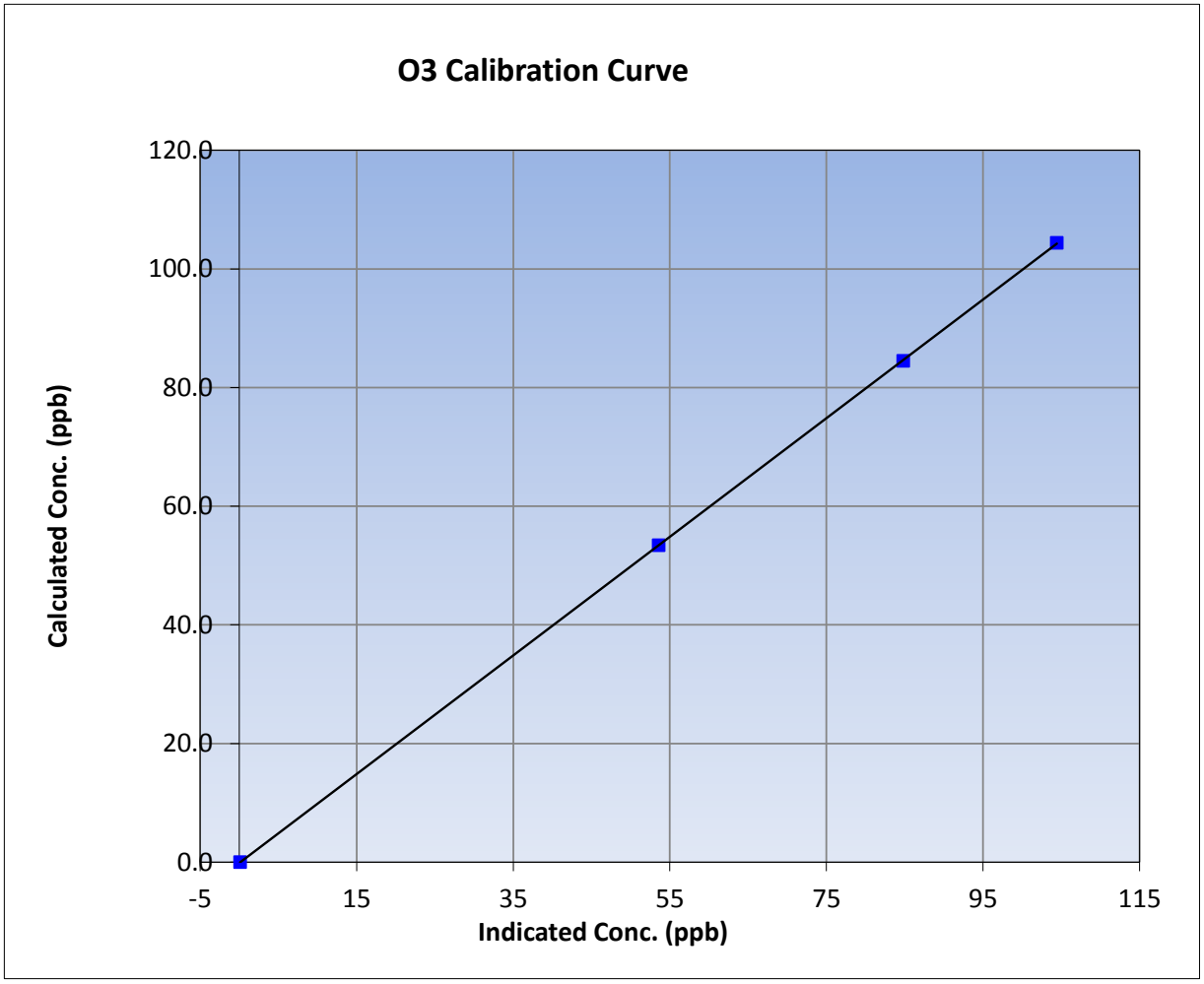
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

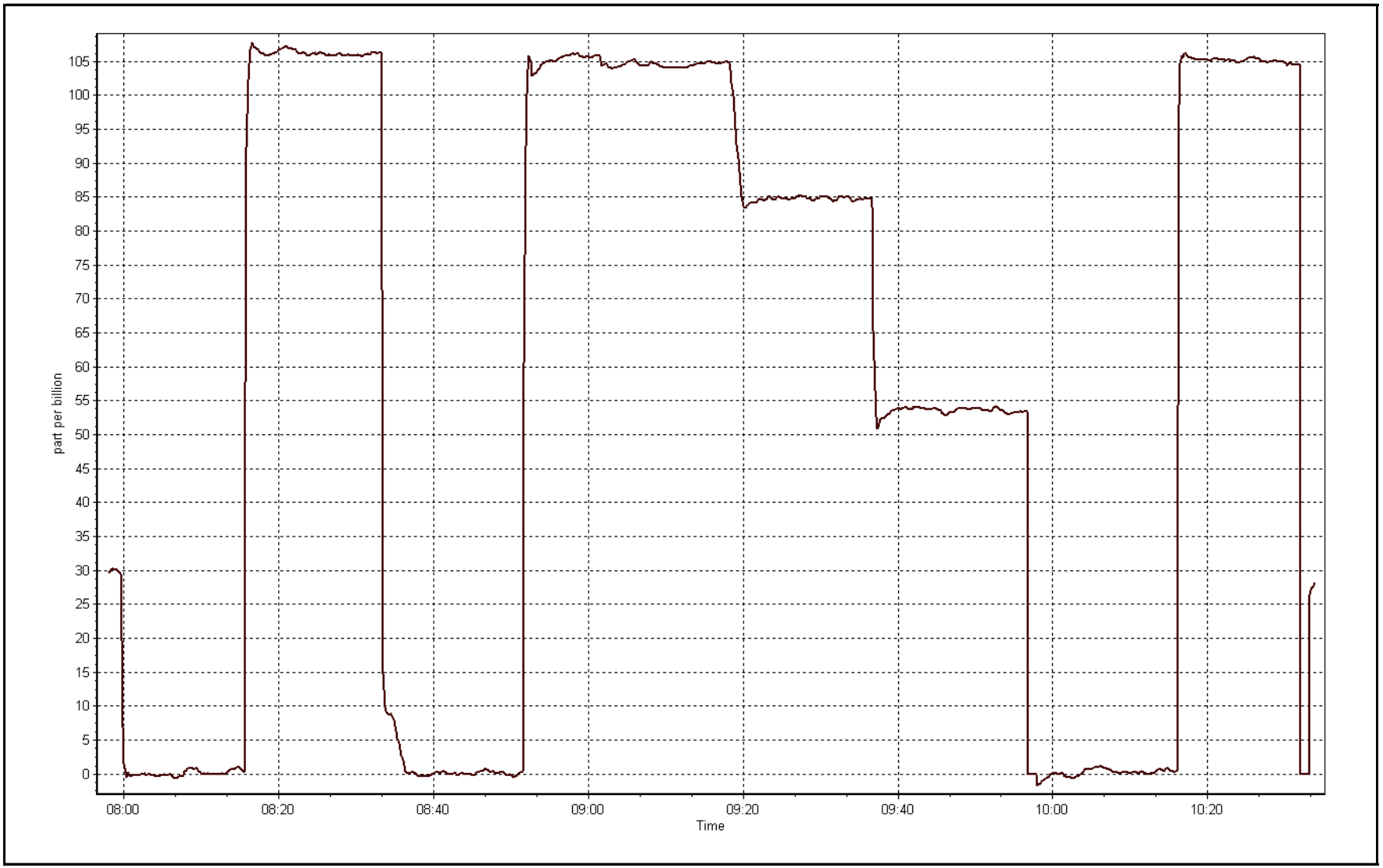
Calibration Date	March-11-16	Previous Calibration	February 15, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	7:55	End Time (MST)	10:35
Analyzer make	Teledyne API T400	Analyzer serial #	1107

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999993
104.4	104.4	0.9996		
84.5	84.8	0.9961	Slope	0.999623
53.4	53.6	0.9966		
			Intercept	-0.139581



O3 Calibration Plot Date: March 11, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 10, 2016	Previous Calibration	February 2, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	13:30	End Time (MST)	19:45
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	747
Zero air Generator	Teledyne API 701	Serial Number	4698

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8205

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.002768	1.005320	1.001167
	Data Offset	0.154094	0.208909	0.056382
Current Calibration	Data Slope	0.998961	0.997295	1.005121
	Data Offset	0.562138	0.601448	0.024172

Analyzer Information

Analyzer make/model	Teledyne API T200u	Analyzer serial #	172

Test Point	before		after	
Concentration range	0-200	ppb	0-200	ppb
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	1.181		1.234	
NOX coefficient	1.204		1.244	
NO2 coefficient	1.000		1.000	
NO bkgrnd	0.1		0.1	
NOX bkgrnd	0.2		0.2	
Chamber Temp	40.1	Deg C	40	Deg C
Moly Temp	316.5	Deg C	317.1	Deg C
PMT voltage	502	V	502	V
PMT Temp	5.1	Deg C	5	Deg C
O3 flow	89	ccm	87	ccm
R Cell press NO	4.0	mmHg	3.7	mmHg
R Cell Press Nox	4.0	mmHg	3.7	mmHg
NO sample flow	1097	lpm	1100	lpm
Nox sample Flow	1097	lpm	1100	lpm

Notes:

Inlet filter changed after as founds. Span adjusted.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 10, 2016 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	0.0	0.0	0.1	----	----
as found span	6000	44.8	150.1	150.1	0.0	146.9	145.2	1.6	1.0219	1.0335
calibrator zero	6000	0.0	0.0	0.0	0.0	0.0	0.0	0.1	----	----
high point	6000	44.8	150.1	150.1	0.0	150.0	150.2	-0.2	1.0003	0.9991
second point	6000	23.8	79.7	79.7	0.0	78.8	79.0	-0.2	1.0117	1.0096
third point	6000	12.0	40.2	40.2	0.0	39.2	39.2	0.0	1.0266	1.0263
as left zero	6000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as left span	6000	44.8	150.1	45.0	105.1	149.3	45.3	104.0	1.0052	0.9929
								Average Correction Factor	1.0128	1.0117

Corrcted As found NO_X= 146.8 NO= 145.3 Percent Change NO_X= 1.8% NO= 2.6%

Previous Response NO_X= 149.5 NO= 149.1

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	149.2	149.4	0.1	1.0059	1.0049	----	----
1st NO2 (300)	45.0	104.4	148.9	45.0	103.9	1.0083	----	1.0048	99.5%
2nd NO2 (200)	64.9	84.5	148.9	64.9	84.0	1.0077	----	1.0050	99.5%
3rd NO2 (100)	96.0	53.4	148.9	96.0	52.9	1.0080	----	1.0087	99.1%
2nd NO ref point	----	0.0	148.7	149.1	-0.4	1.0092	1.0065	----	----
				Average Correction Factor		1.0083		1.0062	99.4%

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

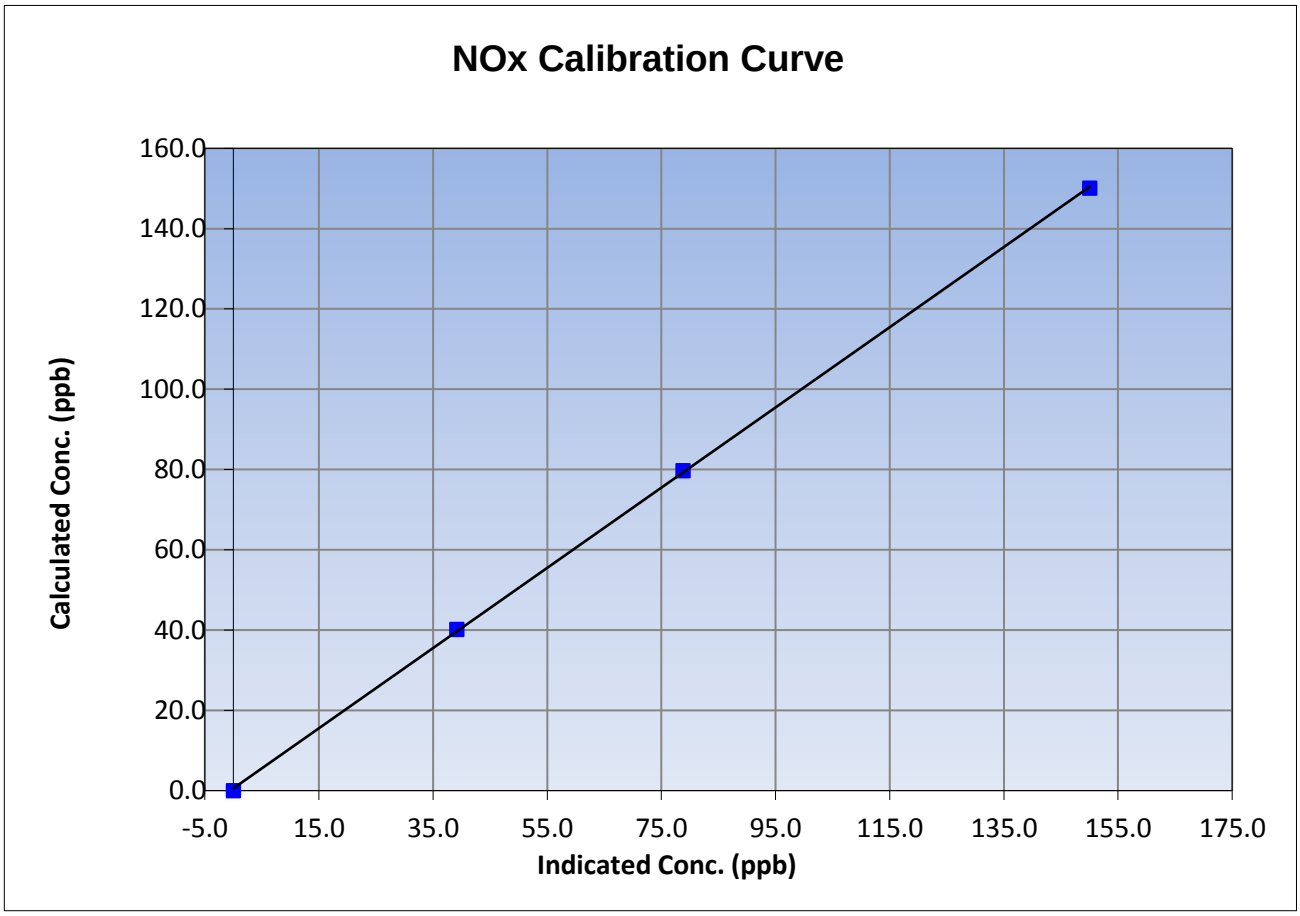
NO_X Calibration Summary

Station Information

Calibration Date	March 10, 2016	Previous Calibration	February 2, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:30	End Time (MST)	19:45
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	----	Correlation Coefficient	0.999923
150.1	150.0	1.0003		
79.7	78.8	1.0117	Slope	0.998961
40.2	39.2	1.0266		
			Intercept	0.562138



Wood Buffalo Environmental Association

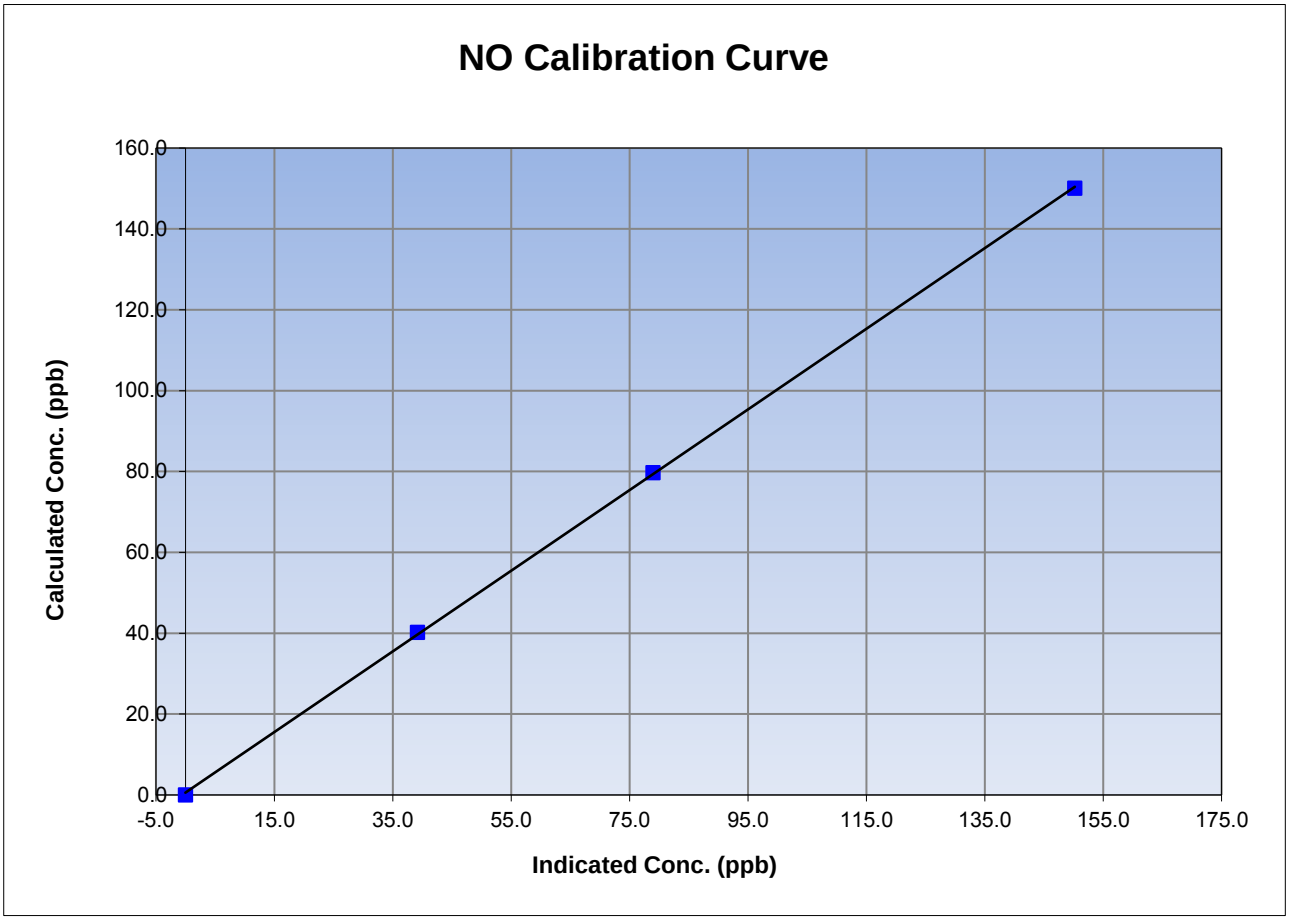
NO Calibration Summary

Station Information

Calibration Date	March 10, 2016	Previous Calibration	February 2, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:30	End Time (MST)	19:45
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	0.999930
150.1	150.2	0.9991		
79.7	79.0	1.0096	Slope	0.997295
40.2	39.2	1.0263		
			Intercept	0.601448



Wood Buffalo Environmental Association

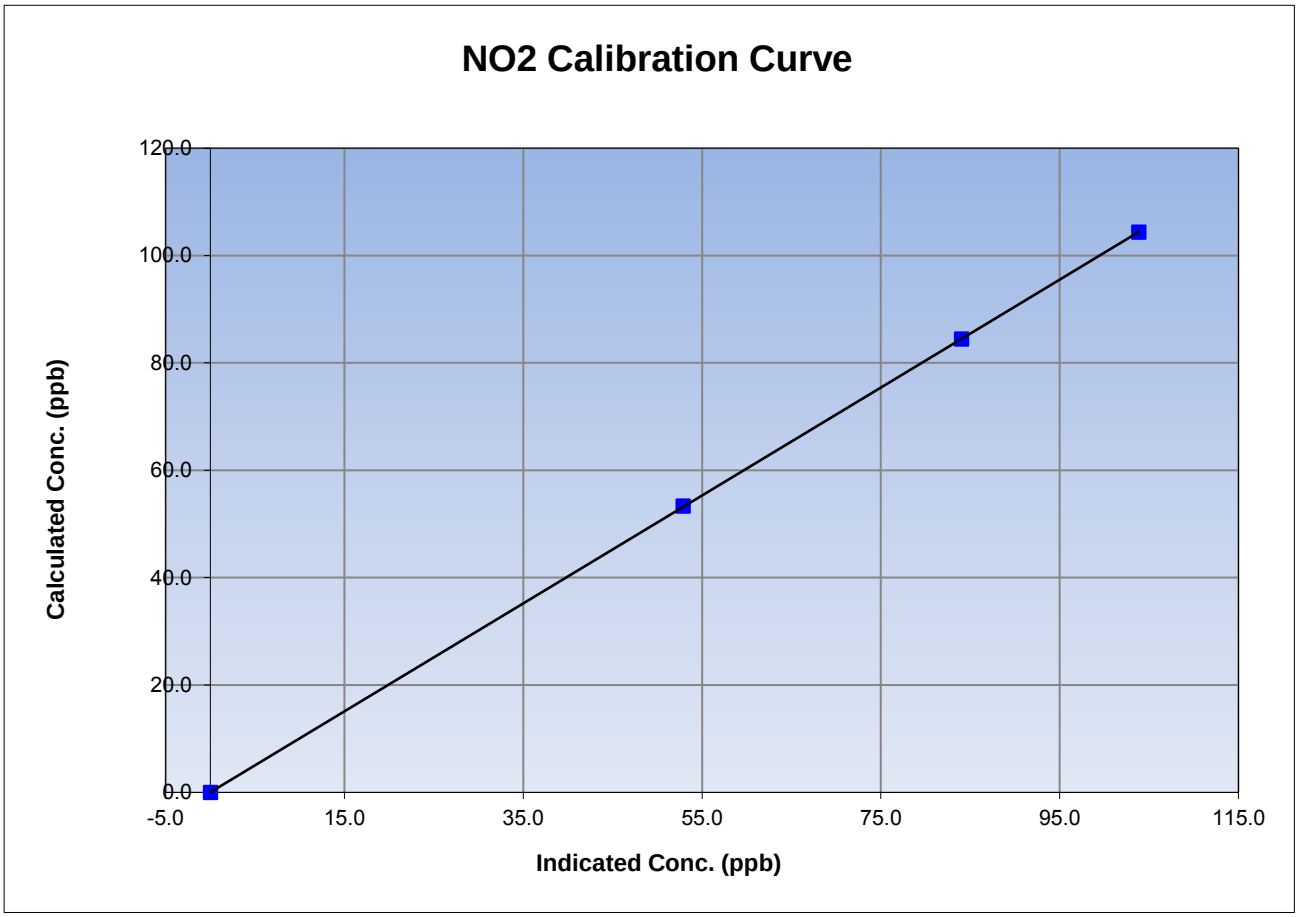
NO_2 Calibration Summary

Station Information

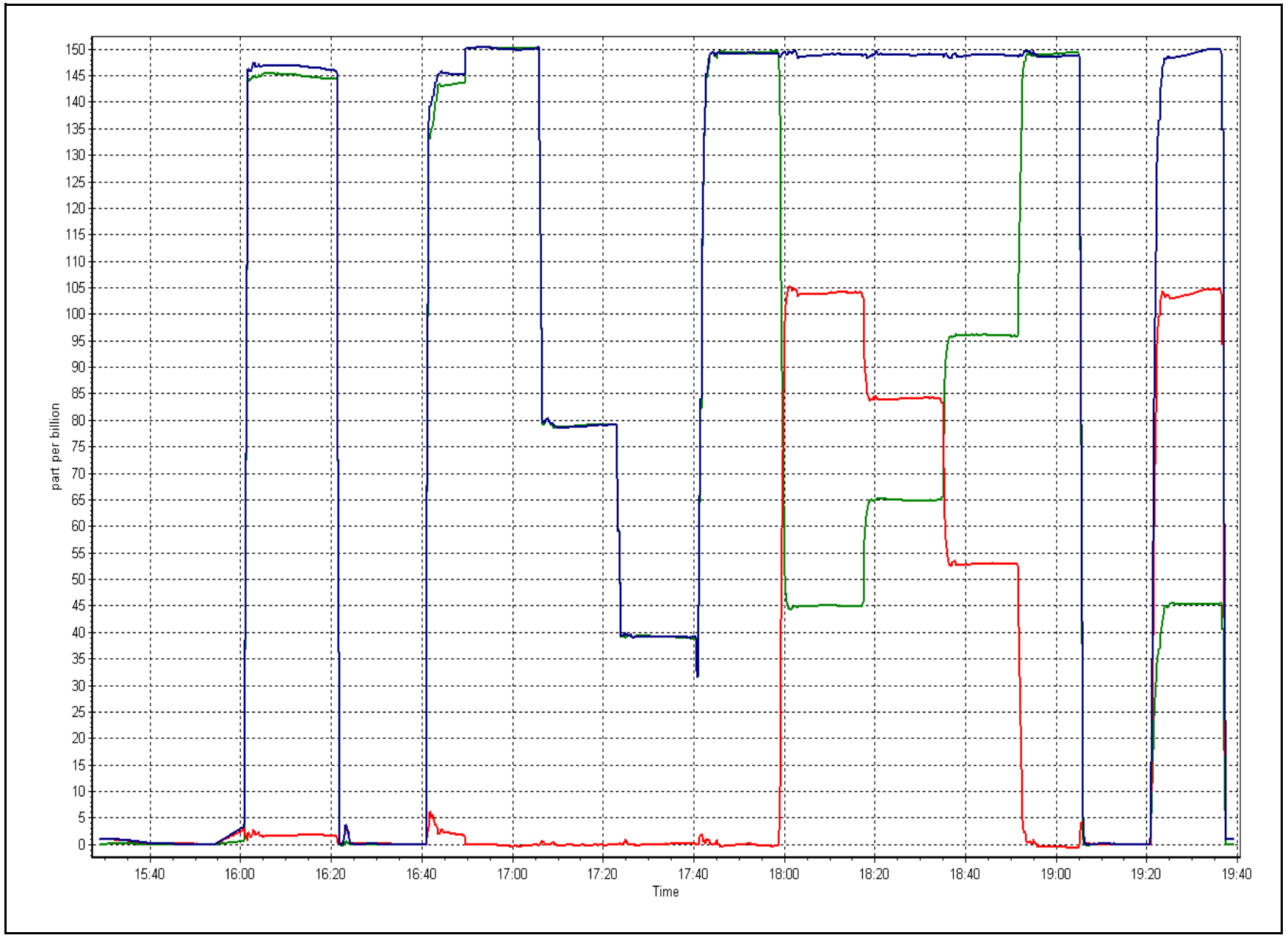
Calibration Date	March 10, 2016	Previous Calibration	February 2, 2016
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:30	End Time (MST)	19:45
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999994
104.4	103.9	1.0048		
84.5	84.0	1.0050	Slope	1.005121
53.4	52.9	1.0087		
			Intercept	0.024172



NOX Calibration Plot Date: March 10, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	March 10, 2016	Previous Calibration:	February 3, 2016
Station Name:	Fort Chipewyan	Station Number:	AMS 8
Start Time (MST):	15:35	End Time (MST):	17:00
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	141228

SHARP INFORMATION

Particulate Fraction:	PM2.5
Make/Model:	Thermo / SHARP 5030
Serial Number	E-2025
C_{14} Source SN:	7414
Confirmation of Time settings:	Yes ☑ No ☐

Paremeters Checked: T1 ☑ T2 ☐ T3 ☐ T4 ☐ P3 ☐ Main Flow ☑ Beta ☐ Neph ☑

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	0.0	-1.0	-1.0	0.0
T2	20.0	na	na	12.0
T3	21.0	na	na	16.0
T4	25.0	na	na	15.0
RH (%)	19.0	na	na	11.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	970	966.7	-3.3	970

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1003	3	1003	1000

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	191		191
Neph	2.3		0
C14	21.3		21.6
Indicated Concentration (ug/m3)	**1**	**yes**	**0**
Offset 1	191.2		191.2
Offset 2	32		32

Leak Check (Quarterly)

Leak Check Date:	March 10, 2016	Previous Leak Check Date:	October 7, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.71	0.09
*Flow with adaptor (LPM):	16.62	

**Note - do not attach adaptor without shutting off the pump first*

Mass Foil Calibration (Annualy)

Foil Calibration Date:	May 6, 2015	Previous Foil Calibration:	NA
Zeroed?:			
Foil Mass:	1324	Mass foil set S/N:	
Previous Correction Factor:	7081		
New Correction Factor:	7022		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	03/02/2016
Pump	Good	NA
Filter Tape	Good	NA
Mass Foil Cal Set	na	NA
HEPA filter	Good	NA

NOTES:

Cyclone head cleaned. Leak check completed. Nephalometer adjusted.

Calibration Performed By: **Devin Russell**

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 9
BARGE LANDING
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
MARCH 2016

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	706	35	38	99.60	2	0	1	0
THC(ppm) Average	700	33	44	98.52	4	-	2.8	-
Temperature (C) Average	744	0	0	100.00	13	-	5.8	-
Relative Humidity (%) Average	744	0	0	100.00	96	-	88	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	16	-	10	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
TRS(ppb) Average	706	0.4	0	-	0	0	0	0	0	1	2
THC(ppm) Average	700	2.38	0.3	-	2.1	2.1	2.2	2.3	2.5	2.7	4
Temperature (C) Average	744	-3.92	5.4	-	-19	-10	-7.7	-4.7	-0.6	2.7	13
Relative Humidity (%) Average	744	71.2	17	-	19	47	60	75	85	91	96
Wind Speed 10 m (km/h) Average	744	5.7	3	-	0	2	4	5	8	10	16
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	01 Mar 2016 01:00	01 Mar 2016 03:00	3	Station power failure
THC	01 Mar 2016 01:00	01 Mar 2016 03:00	3	Station power failure
THC	01 Mar 2016 04:00	01 Mar 2016 11:00	8	Stabilization following power failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Barge Landing - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 2 ppb on Mar 28 06:00 Maximum Daily Average: 1.2 ppb on Mar 25

Minimum Value: 0 ppb on Mar 5 00:00 Minimum Daily Average: 0.2 ppb on Mar 16

Maximum Diurnal Average: 0.5 ppb at hour 7 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 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 2$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	35
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	PF	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	0	0	0	1.0	2
2-Mar	0	0	Z	1	0	0	1	1	0	0	C	C	C	C	C	0	1	1	0	0	0	1	1	1	0.7	1
3-Mar	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
4-Mar	1	0	0	0	Z	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
5-Mar	0	0	1	2	2	Z	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.6	2
6-Mar	0	0	0	0	0	1	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0.3	1
7-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0.3	1
8-Mar	1	1	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
9-Mar	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.5	1
10-Mar	1	1	1	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	1
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	1	0.3	1
12-Mar	1	1	0	0	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	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	0.2	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	0	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
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	0.2	0
18-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	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	0.3	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	0.3	0
21-Mar	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
22-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	1	1	1	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	1	1	1	0	0.3	1
24-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1
25-Mar	0	Z	0	0	0	1	2	2	1	1	1	2	2	2	1	2	1	1	1	1	1	1	1	1	1.2	2
26-Mar	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.4	1
27-Mar	0	0	0	Z	0	0	0	0	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0.5	2
28-Mar	0	0	0	0	Z	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
29-Mar	0	0	0	0	0	Z	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
30-Mar	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
31-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0.4	1
	0.4	0.3	0.3	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	Diurnal Average	
	1	1	1	2	2	2	2	2	1	1	2	2	2	2	1	2	1	2	2	2	1	1	1	1	Diurnal Maximum	

Z - zerospan C - Calibration PF - Power Failure

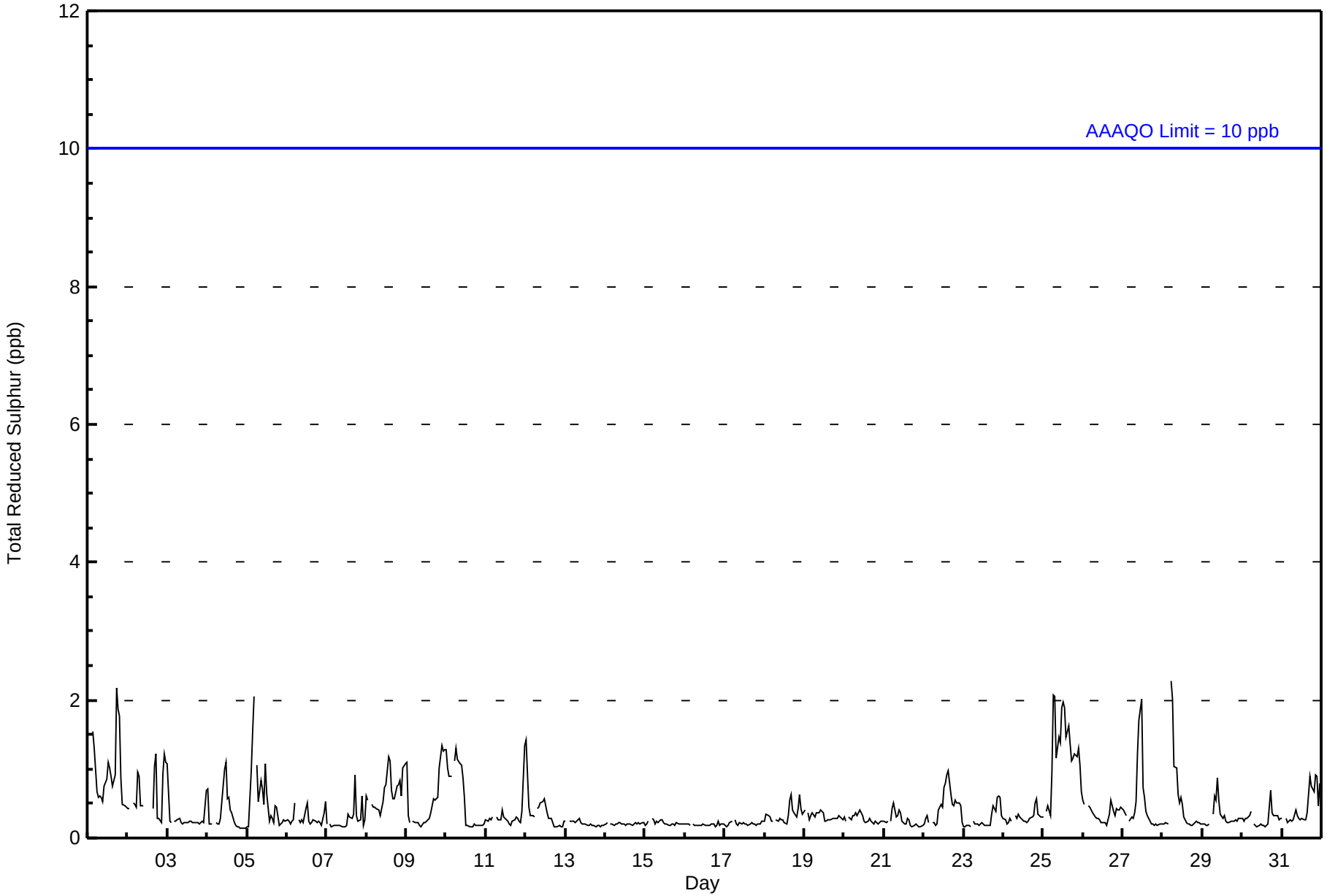
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Total Reduced Sulphur (TRS) - ppb

Barge Landing - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Barge Landing - March 2016

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

Barge Landing - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	155	132	37	23	17	14	46	34	50	19	16	16	10	15	23	99	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	155	132	37	23	17	14	46	34	50	19	16	16	10	15	23	99	706

Total Number of Valid Hours: 706

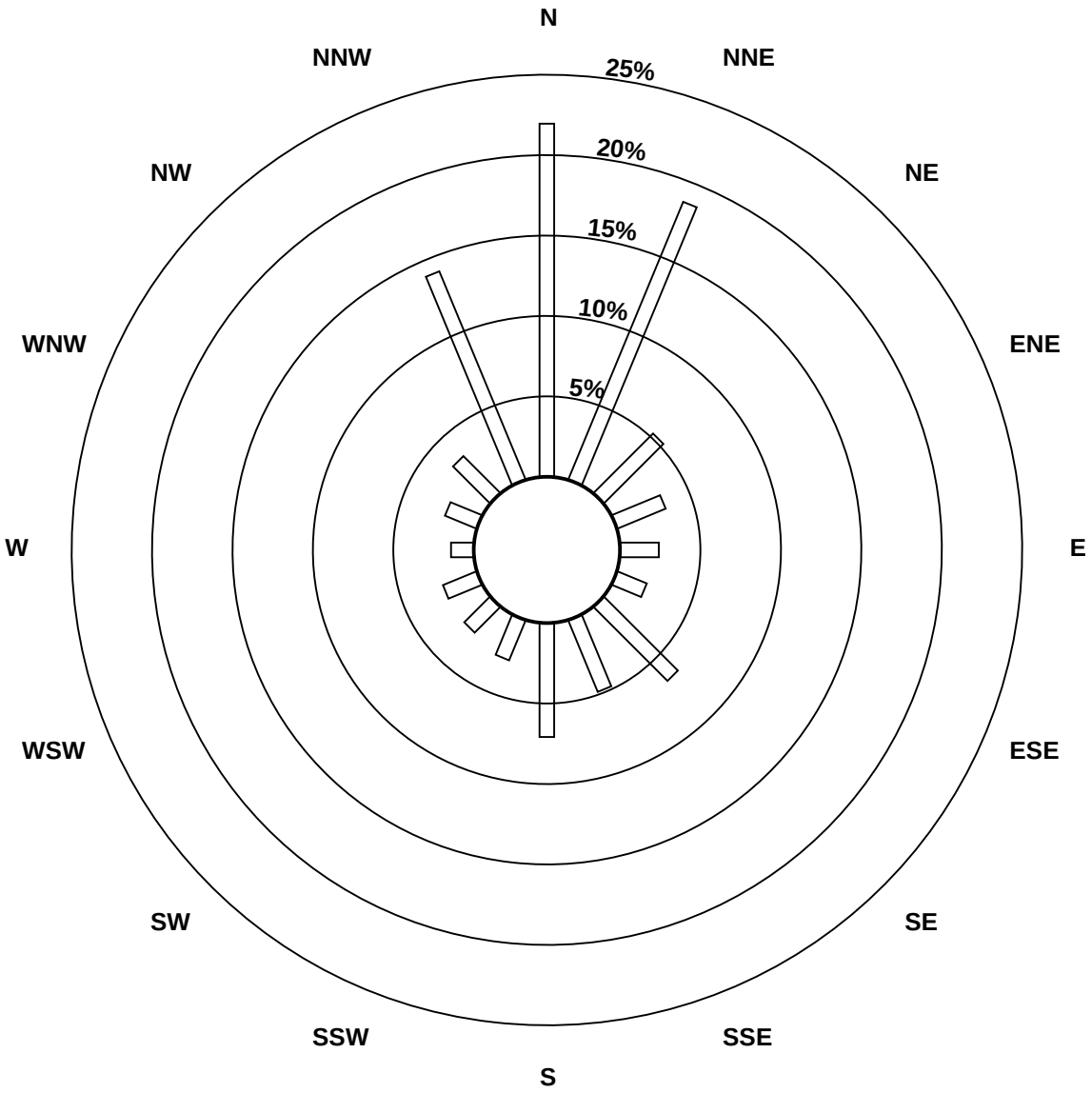
Total Number of Hours: 744

Wood Buffalo Environmental Association

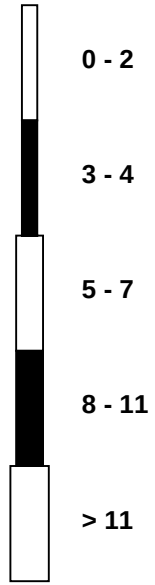
Wind Rose Mar 2016

Total Reduced Sulphur (TRS) - ppb

Barge Landing (AMS 9)



Classes (ppb)



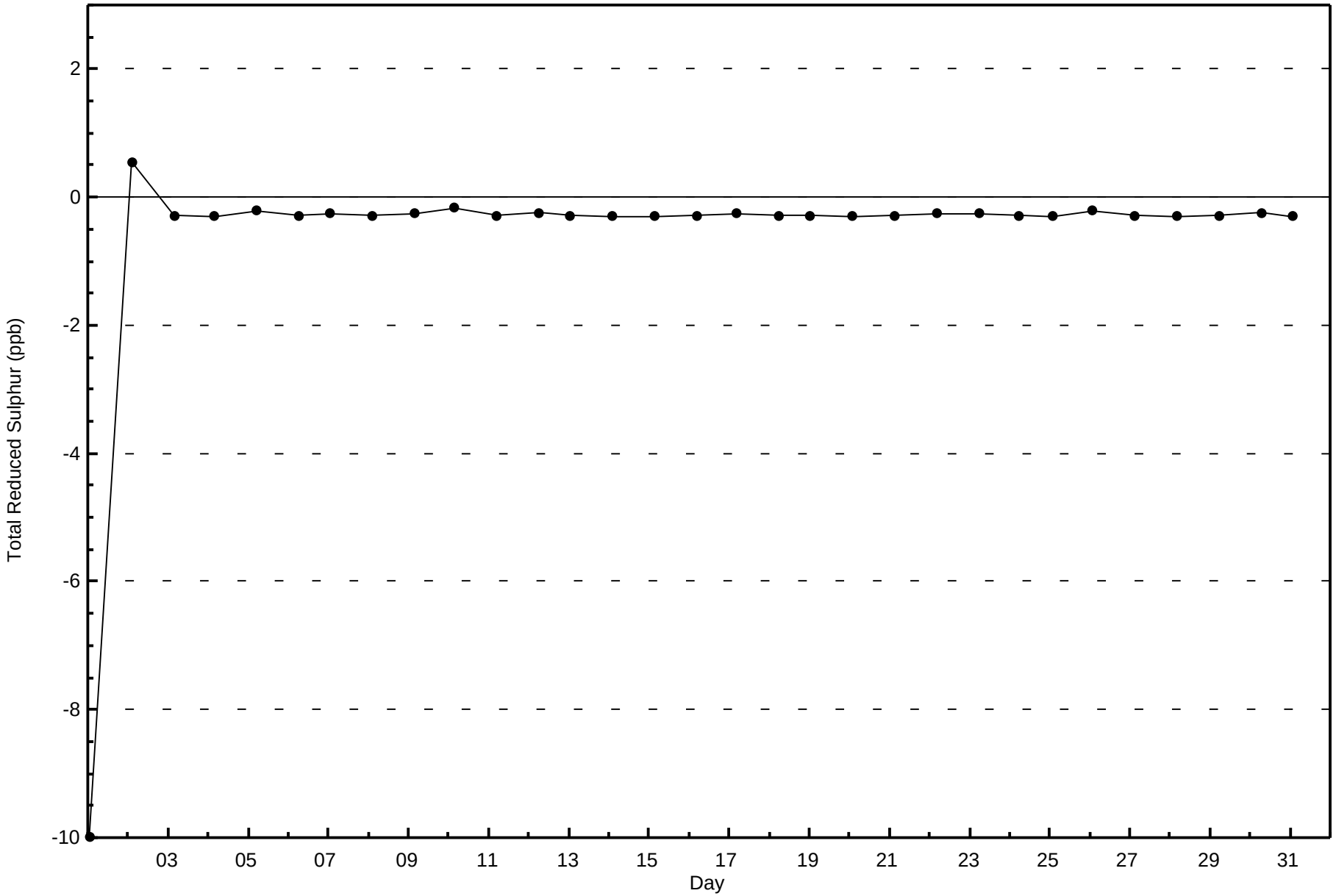
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

Barge Landing - March 2016

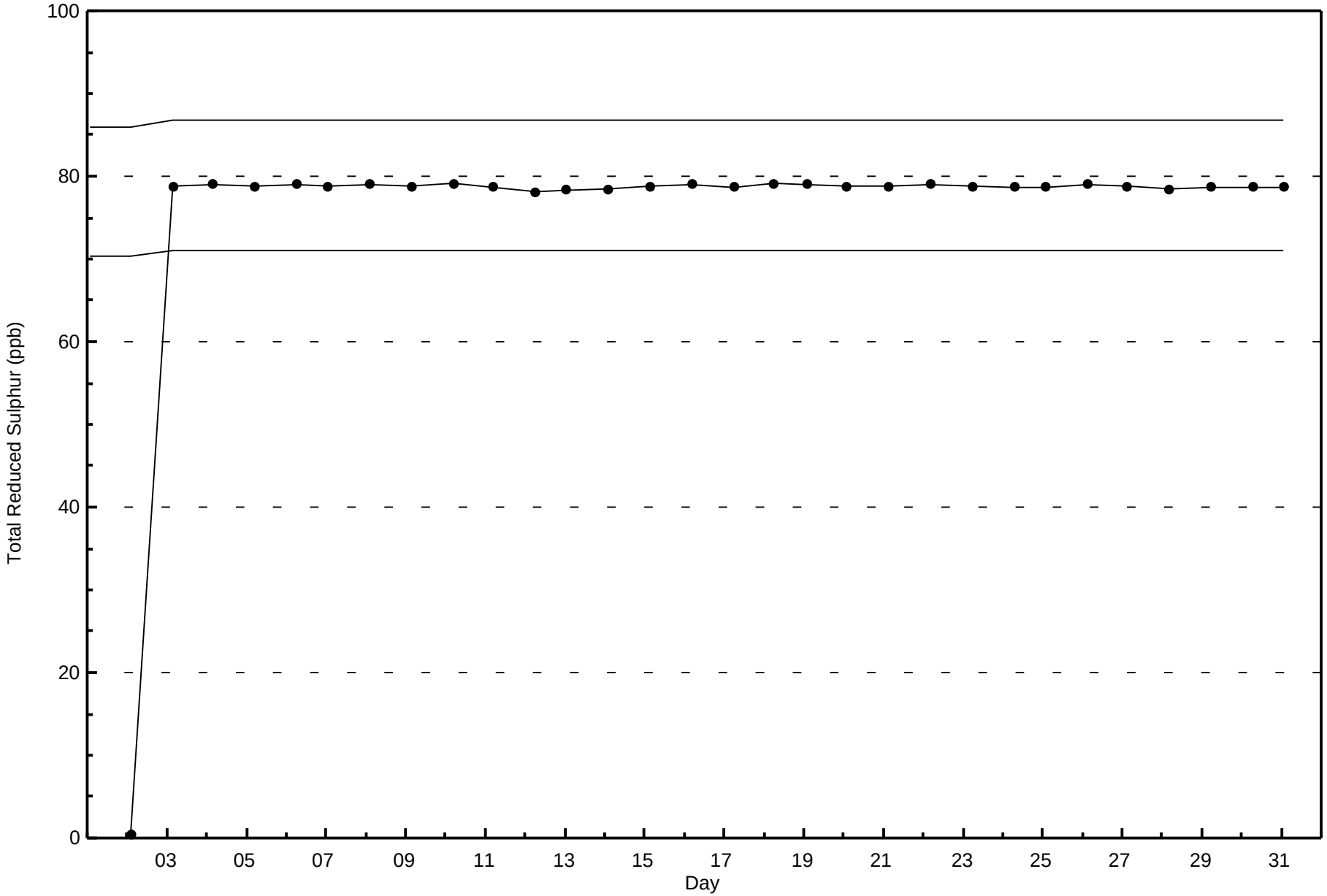


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

Barge Landing - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Barge Landing - March 2016

Maximum Value: 4.0 ppm on Mar 25 19:00

Maximum Daily Average: 2.8 ppm on Mar 25

Minimum Value: 2.1 ppm on Mar 12 18:00

Minimum Daily Average: 2.2 ppm on Mar 16

Maximum Diurnal Average: 2.5 ppm at hour 21

Minimum Diurnal Average: 2.3 ppm at hour 16

Monthly Average: 2.38 ppm

Percentiles: P_1 = 2.1 P_{10} = 2.1 Q_1 = 2.2 Median = 2.3 Q_3 = 2.5 P_{90} = 2.7 P_{99} = 3.7

Hours in Service:	744
Hours of Data:	700
Hours of Missing Data:	44
Hours of Calibration:	33
Percent Operational Time:	98.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	PF	AF	AF	AF	AF	AF	AF	AF	AF	2.7	2.5	3.2	3.0	2.5	3.0	2.9	2.9	2.8	2.4	2.3	2.3	2.3	--	3.2
2-Mar	2.1	Z	2.3	2.4	2.5	2.4	2.5	2.4	2.2	2.3	2.7	2.8	2.8	2.7	C	C	C	2.5	2.4	2.7	2.5	2.7	2.5	2.7	2.5	2.8
3-Mar	2.5	2.3	Z	2.1	2.2	2.1	2.2	2.3	2.2	2.1	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.5	2.2	2.5
4-Mar	2.5	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.5
5-Mar	2.2	2.3	2.4	2.3	Z	2.6	2.7	2.5	2.9	3.0	2.9	3.5	2.8	2.3	2.3	2.4	2.3	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.5	3.5
6-Mar	2.2	2.3	2.3	2.4	2.3	Z	2.4	2.3	2.5	2.4	2.3	2.5	2.3	2.2	2.3	2.3	2.2	2.3	2.4	2.4	2.4	2.3	2.4	2.5	2.3	2.5
7-Mar	Z	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.3	2.3	2.2	2.3	2.8	2.7	2.3	2.4	2.3	2.1	2.4	2.3	2.8
8-Mar	2.5	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.5	2.7	2.8	2.5	2.4	2.5	2.5	2.6	2.7	2.7	2.8	2.7	2.5	2.8
9-Mar	2.7	2.4	Z	2.5	2.4	2.5	2.5	2.5	2.3	2.2	2.5	2.6	2.6	2.9	2.4	2.4	2.4	2.4	2.7	2.9	2.6	2.6	2.9	2.9	2.6	2.9
10-Mar	3.0	2.7	2.7	Z	3.5	3.6	3.5	3.8	3.6	3.4	3.2	2.8	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.7	3.8
11-Mar	2.2	2.2	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.4	2.9	2.4	2.4	2.3	2.2	2.2	2.5	2.6	2.6	2.5	2.4	2.4	2.4	2.7	2.4	2.9
12-Mar	2.8	2.8	2.7	2.5	2.5	Z	2.7	2.9	3.0	3.3	3.4	3.7	3.0	2.7	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.6	3.7
13-Mar	Z	2.5	2.4	2.4	2.3	2.3	2.2	2.3	2.6	2.5	2.4	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.6
14-Mar	2.3	Z	2.2	2.1	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.3
15-Mar	2.2	2.2	Z	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.2	2.3	2.3	2.2	2.1	2.2	2.4
16-Mar	2.1	2.1	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.3	2.3	2.3	2.3	2.2	2.3
17-Mar	2.2	2.2	2.2	2.2	Z	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.3	2.4	2.3	2.3	2.2	2.5
18-Mar	2.3	2.7	2.5	2.3	2.2	Z	2.2	2.2	2.2	2.2	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	3.8	3.8	2.5	2.4	2.4	3.8
19-Mar	Z	2.3	2.2	2.4	2.8	2.8	2.3	2.3	2.6	2.5	2.7	2.5	2.3	2.3	2.3	2.4	2.3	2.4	2.2	2.3	2.4	2.7	2.4	2.2	2.4	2.8
20-Mar	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.4	2.5	2.3	2.3	2.2	2.4	2.6	2.3	2.6	2.8	2.4	2.5	2.4	2.5	2.5	2.4	2.8
21-Mar	2.4	2.3	Z	2.5	2.4	2.5	2.5	2.4	2.4	2.4	2.4	2.2	2.2	2.2	2.4	2.4	2.4	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5
22-Mar	2.3	2.3	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	2.5	2.2	2.3	2.3	2.3	2.2	2.3	2.6
23-Mar	2.1	2.1	2.2	2.2	Z	2.4	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.5	2.6	2.7	2.7	2.7	2.6	2.3	2.7
24-Mar	2.5	2.4	2.2	2.2	2.3	Z	2.3	2.2	2.2	2.5	2.4	2.3	2.2	2.2	2.3	2.4	2.6	2.3	2.4	3.0	3.6	2.7	2.5	2.4	2.4	3.6
25-Mar	Z	2.6	2.6	2.6	2.4	2.5	2.8	2.9	2.7	2.5	2.5	2.3	2.3	2.3	2.2	2.2	2.3	2.9	4.0	3.9	3.9	3.5	3.1	2.5	2.8	4.0
26-Mar	2.6	Z	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.4	2.5	2.4	2.4	2.5	2.4	2.6
27-Mar	2.5	2.5	Z	2.3	2.2	2.2	2.2	2.3	2.5	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.3	2.5
28-Mar	2.2	2.2	2.3	Z	2.4	2.5	2.4	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.5
29-Mar	2.1	2.1	2.1	2.1	Z	2.1	2.3	2.4	2.5	2.6	2.5	2.3	2.3	2.6	2.5	2.6	2.2	2.3	2.2	2.3	2.5	2.8	2.9	2.9	2.4	2.9
30-Mar	2.7	2.6	2.7	2.7	2.8	Z	3.0	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.4	3.0
31-Mar	Z	2.2	2.2	2.2	2.1	2.2	2.2	2.4	2.4	2.4	2.4	2.4	2.3	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.3	2.4
	2.4	2.4	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.4	2.4	2.4	Diurnal Average	
	3.0	2.8	2.7	2.7	3.5	3.6	3.5	3.8	3.6	3.4	3.4	3.7	3.0	3.2	3.0	2.6	3.0	2.9	4.0	3.9	3.9	3.8	3.1	2.9	Diurnal Maximum	

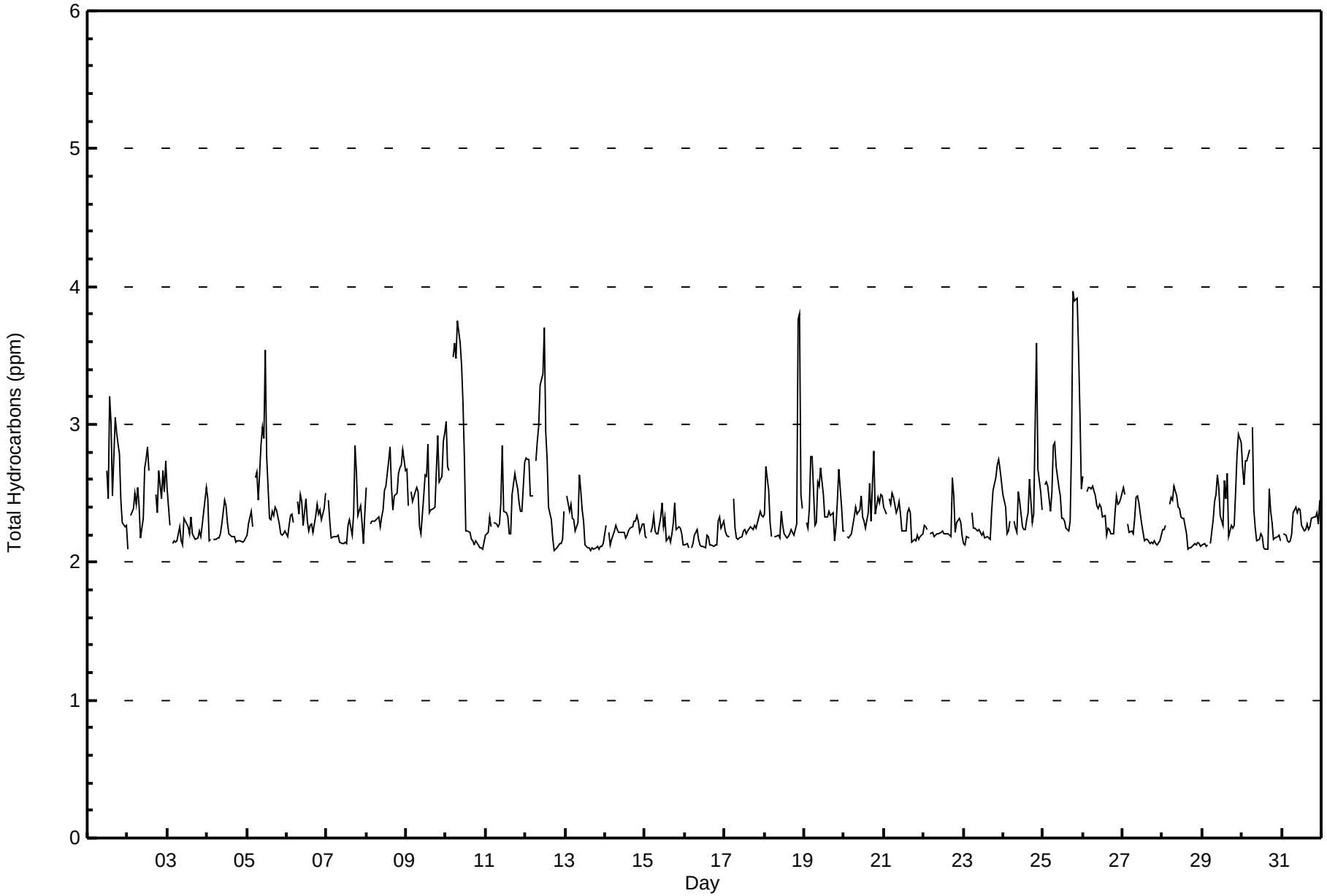
Z - zerospan C - Calibration AF - Analyzer Failure PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Barge Landing - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Barge Landing - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	680	97.14	97.14
3.1 - 10.0	20	2.86	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 700

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Hydrocarbons (THC) - ppm

Barge Landing - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	150	129	33	23	17	13	43	34	47	19	14	14	9	16	23	96	680
3.1 - 10.0	5	3	2	0	1	1	1	0	0	0	1	0	0	0	0	6	20
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	155	132	35	23	18	14	44	34	47	19	15	14	9	16	23	102	700

Total Number of Valid Hours: 700

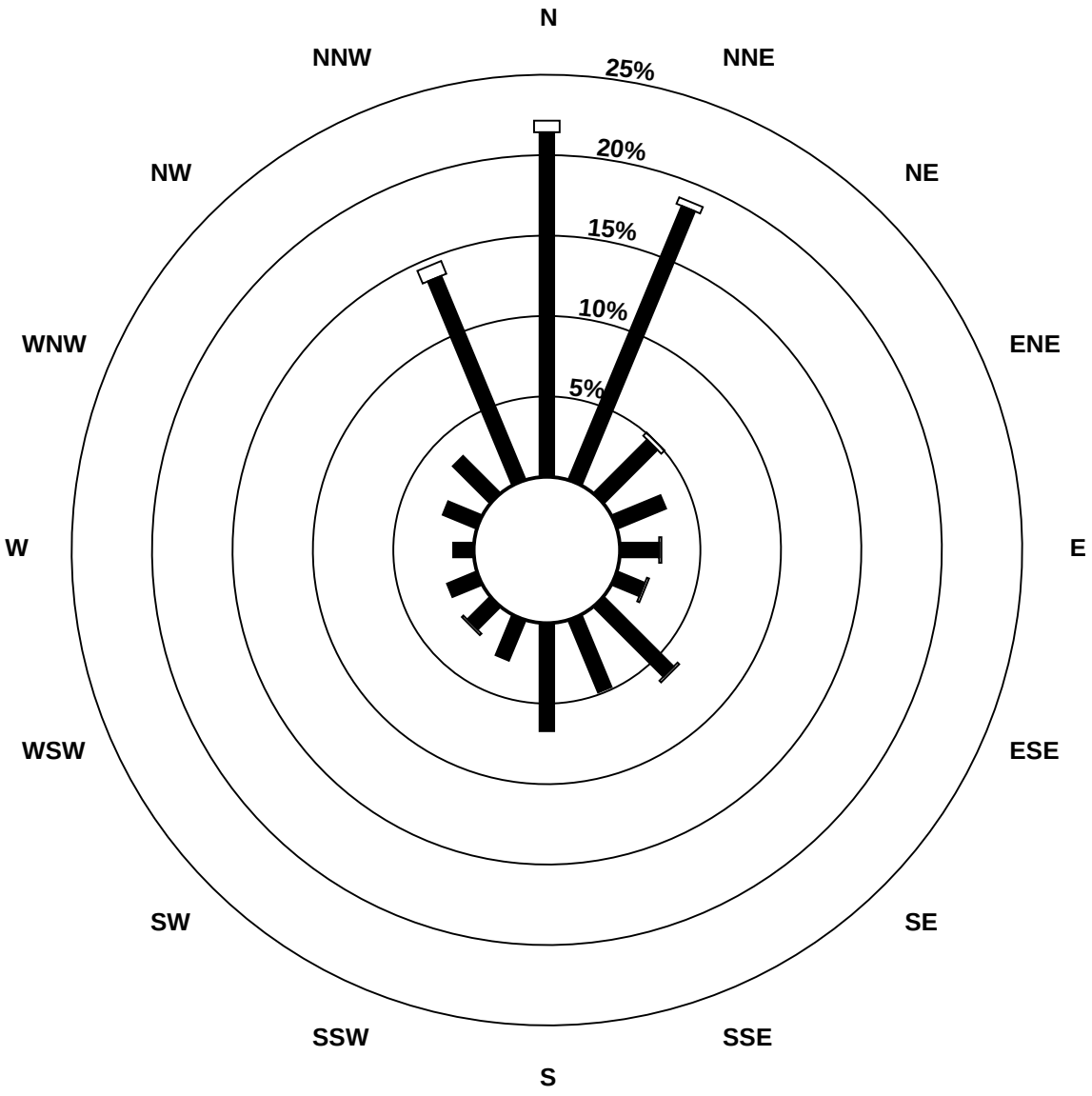
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Mar 2016

Total Hydrocarbons (THC) - ppm

Barge Landing (AMS 9)



Classes (ppm)

0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

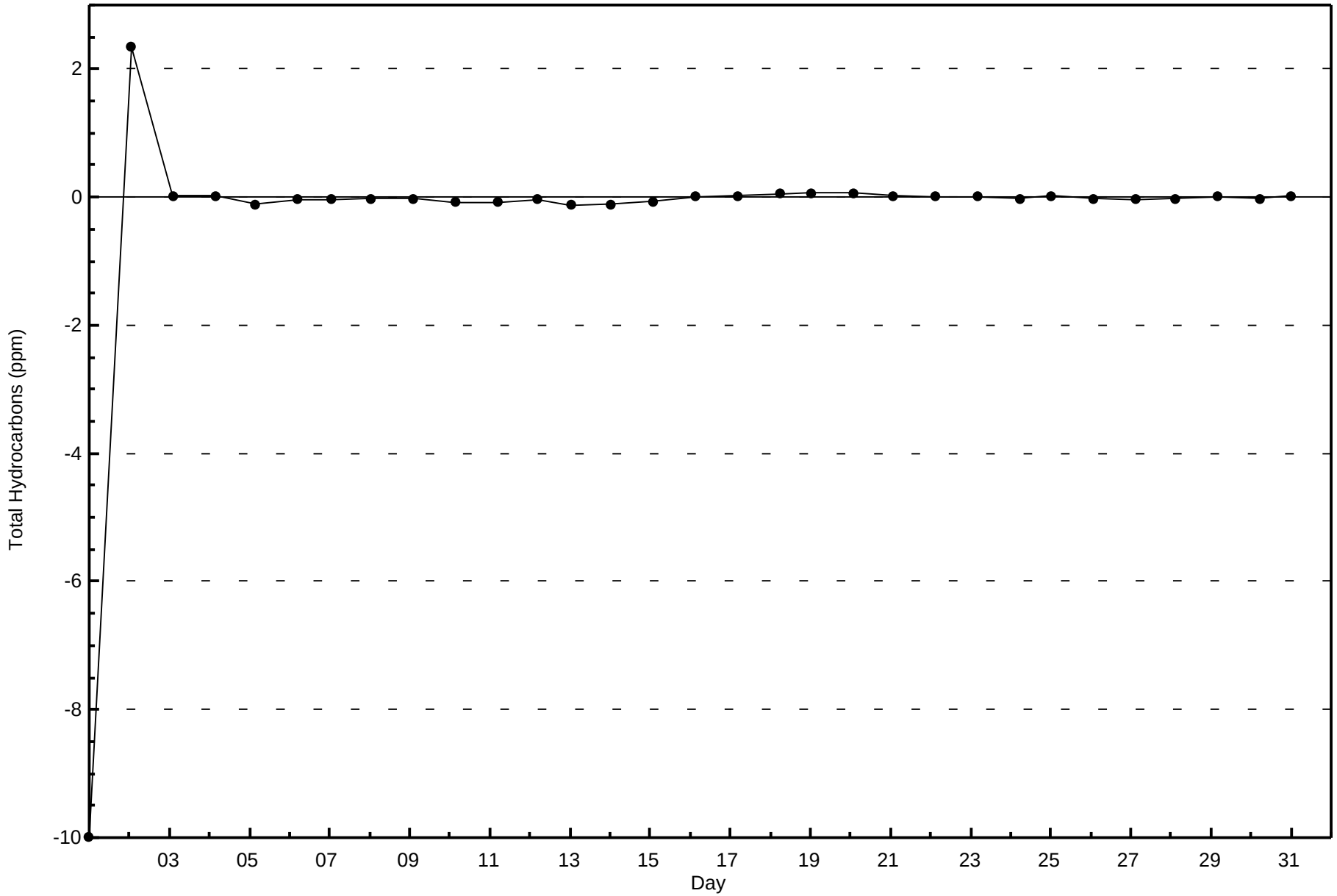
Total Number of Valid Hours: 700

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Barge Landing - March 2016

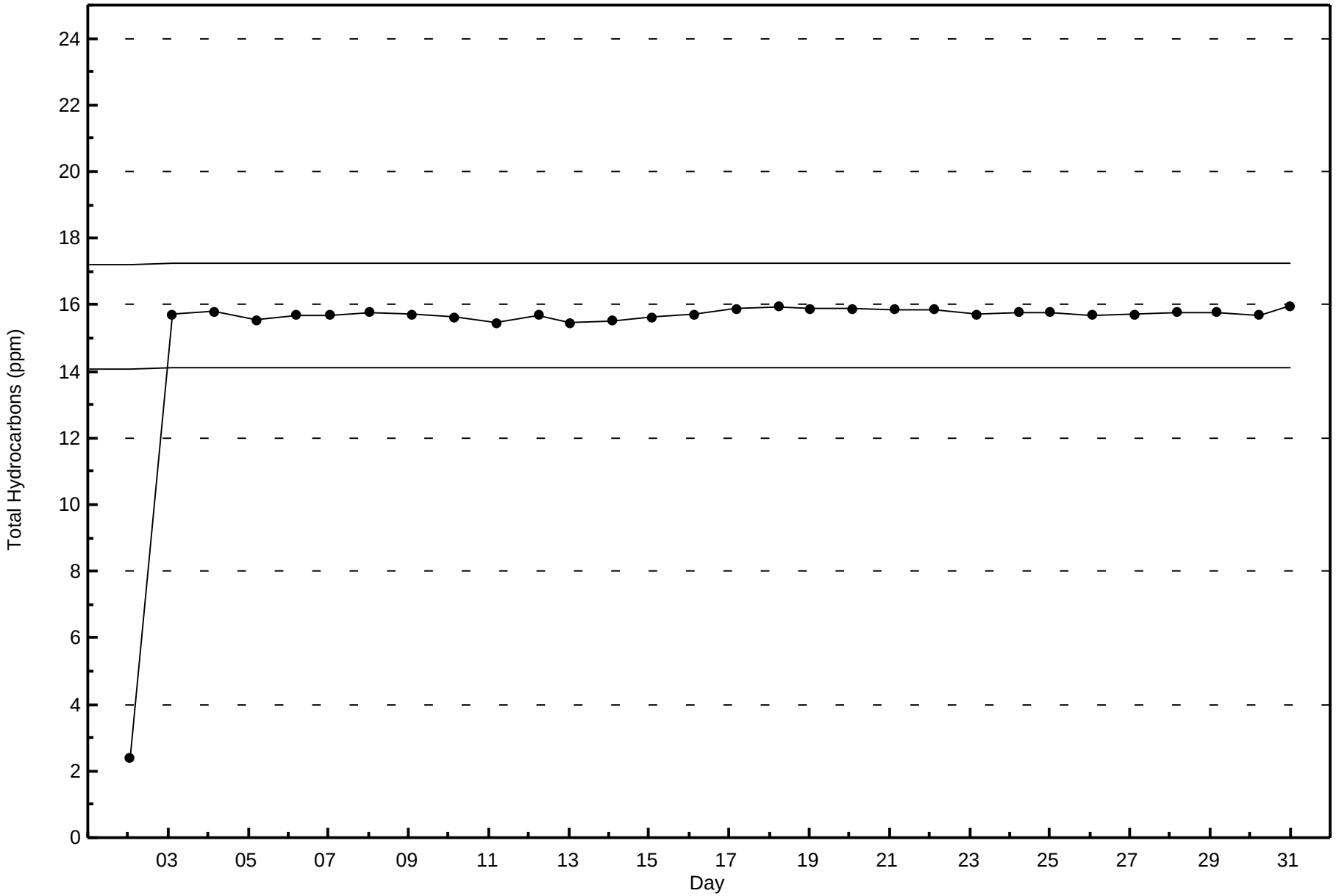


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Barge Landing - March 2016



Maximum Value: 13.0 C on Mar 28 14:00

Maximum Daily Average: 5.8 C on Mar 29

Minimum Value: -19.0 C on Mar 24 07:00

Minimum Daily Average: -9.8 C on Mar 24

Maximum Diurnal Average: 0.3 C at hour 16

Minimum Diurnal Average: -7.8 C at hour 7

Monthly Average: -3.92 C

Percentiles: P_1 = -15.0 P_{10} = -10.0 Q_1 = -7.7 Median = -4.7 Q_3 = -0.6 P_{90} = 2.7 P_{99} = 11.5

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

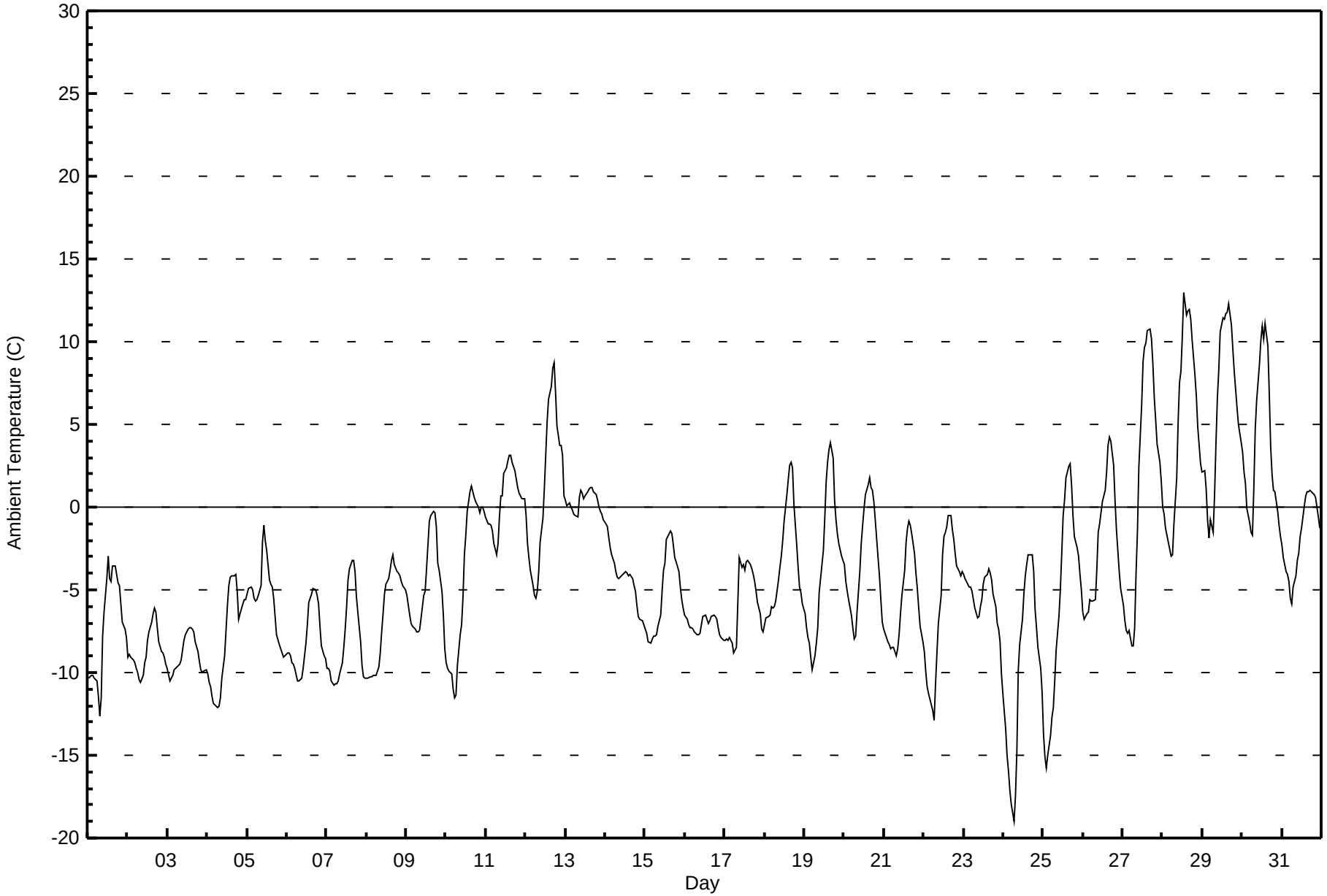
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.3	-10.2	-10.1	-10.1	-10.3	-10.5	-11.4	-12.6	-11.5	-7.8	-6.4	-4.4	-3.0	-4.4	-4.5	-3.5	-3.6	-4.1	-4.6	-4.7	-5.8	-6.9	-7.4	-7.9	-7.3	-3.0
2-Mar	-9.1	-8.9	-9.1	-9.2	-9.4	-9.7	-10.0	-10.4	-10.6	-10.2	-9.4	-9.1	-8.1	-7.6	-7.0	-6.5	-6.1	-6.4	-7.3	-8.1	-8.7	-8.8	-9.1	-9.5	-8.7	-6.1
3-Mar	-9.7	-10.5	-10.3	-10.2	-9.9	-9.7	-9.7	-9.5	-9.3	-8.6	-8.1	-7.7	-7.3	-7.2	-7.3	-7.4	-7.6	-8.1	-8.8	-9.3	-9.9	-10.0	-9.9	-9.8	-9.0	-7.2
4-Mar	-10.0	-10.6	-10.9	-11.4	-11.8	-12.0	-12.1	-12.0	-11.5	-10.3	-9.0	-7.5	-6.0	-4.7	-4.2	-4.2	-4.2	-4.1	-5.1	-6.7	-6.4	-5.9	-5.6	-5.6	-8.0	-4.1
5-Mar	-5.3	-4.9	-4.8	-5.0	-5.5	-5.7	-5.6	-5.4	-4.8	-2.1	-1.1	-2.0	-2.6	-4.4	-4.7	-4.8	-5.5	-6.6	-7.7	-8.3	-8.6	-8.8	-9.1	-9.0	-5.5	-1.1
6-Mar	-8.8	-8.8	-9.0	-9.4	-9.5	-9.8	-10.5	-10.5	-10.4	-10.4	-9.8	-8.3	-7.1	-5.8	-5.5	-5.2	-4.9	-5.0	-5.3	-5.8	-7.2	-8.4	-9.0	-9.2	-8.1	-4.9
7-Mar	-9.7	-9.8	-9.9	-10.6	-10.8	-10.7	-10.7	-10.5	-10.1	-9.4	-8.5	-7.3	-6.0	-4.4	-3.7	-3.2	-3.2	-3.9	-5.5	-6.4	-8.1	-9.6	-10.3	-10.3	-8.0	-3.2
8-Mar	-10.3	-10.4	-10.2	-10.2	-10.2	-10.1	-10.1	-9.7	-8.9	-7.5	-6.4	-5.3	-4.7	-4.3	-3.8	-3.3	-2.9	-3.5	-3.9	-4.0	-4.2	-4.5	-4.7	-5.0	-6.6	-2.9
9-Mar	-5.3	-5.9	-6.5	-7.0	-7.2	-7.4	-7.6	-7.6	-7.4	-6.8	-5.3	-5.1	-3.7	-2.3	-0.8	-0.5	-0.2	-0.3	-1.2	-3.4	-3.8	-5.1	-6.5	-8.6	-4.8	-0.2
10-Mar	-9.4	-9.7	-9.9	-10.1	-11.0	-11.5	-11.4	-9.5	-7.7	-7.1	-5.4	-2.9	-1.7	-0.3	0.9	1.3	0.9	0.6	0.4	0.0	-0.3	0.0	0.0	-0.3	-4.3	1.3
11-Mar	-0.6	-1.0	-1.0	-1.1	-1.5	-2.2	-2.9	-2.2	-0.6	0.7	0.7	2.0	2.4	2.8	3.2	3.2	2.7	2.2	1.7	1.2	0.8	0.7	0.5	0.5	0.5	3.2
12-Mar	-0.5	-2.2	-3.1	-3.8	-4.7	-5.3	-5.5	-5.1	-3.9	-2.1	-0.7	1.1	3.1	5.1	6.5	7.3	8.4	8.7	6.9	5.0	3.7	3.7	3.1	0.7	1.1	8.7
13-Mar	0.4	0.1	0.2	0.0	-0.2	-0.4	-0.5	-0.6	0.6	1.0	0.9	0.5	0.7	0.9	1.1	1.1	1.2	0.9	0.8	0.4	0.0	-0.3	-0.4	-0.7	0.3	1.2
14-Mar	-1.0	-1.2	-1.9	-2.5	-2.9	-3.4	-3.9	-4.3	-4.3	-4.2	-4.2	-4.0	-3.9	-4.0	-4.1	-4.1	-4.3	-4.7	-5.1	-5.9	-6.6	-6.8	-6.9	-7.2	-4.2	-1.0
15-Mar	-7.4	-7.6	-8.1	-8.2	-8.0	-7.8	-7.8	-7.7	-7.2	-6.5	-5.1	-3.8	-3.4	-2.0	-1.6	-1.4	-1.7	-2.3	-3.0	-3.3	-3.9	-4.8	-5.6	-6.1	-5.2	-1.4
16-Mar	-6.5	-6.8	-7.1	-7.3	-7.3	-7.3	-7.5	-7.7	-7.7	-7.6	-7.1	-6.6	-6.5	-6.8	-7.0	-6.8	-6.6	-6.5	-6.7	-6.7	-7.3	-7.7	-7.9	-8.0	-7.1	-6.5
17-Mar	-8.0	-7.9	-8.0	-7.9	-8.3	-8.8	-8.6	-8.5	-5.7	-3.0	-3.6	-3.4	-3.8	-3.3	-3.2	-3.4	-3.8	-4.1	-4.5	-5.1	-5.8	-6.4	-7.3	-7.5	-5.8	-3.0
18-Mar	-7.2	-6.7	-6.6	-6.5	-6.0	-6.1	-6.1	-5.7	-4.4	-3.6	-2.9	-2.1	-0.9	0.8	1.7	2.6	2.7	2.4	0.1	-2.3	-3.7	-4.9	-5.2	-5.9	-3.2	2.7
19-Mar	-6.4	-7.3	-7.9	-8.3	-9.0	-9.9	-9.0	-8.2	-7.3	-5.2	-4.4	-2.6	-0.6	1.6	2.7	3.5	3.9	3.0	0.5	-0.8	-1.6	-2.2	-3.0	-3.2	-3.4	3.9
20-Mar	-3.4	-4.5	-5.1	-5.6	-6.5	-7.3	-8.0	-7.8	-6.4	-3.9	-2.2	-1.1	-0.1	0.8	1.4	1.8	1.2	1.0	0.4	-0.8	-3.1	-4.2	-5.6	-6.9	-3.2	1.8
21-Mar	-7.4	-7.9	-8.1	-8.3	-8.6	-8.4	-8.5	-9.0	-8.6	-7.7	-6.4	-5.3	-3.8	-2.1	-1.2	-0.8	-1.1	-1.6	-2.8	-4.0	-4.9	-6.1	-7.2	-8.1	-5.7	-0.8
22-Mar	-8.8	-9.9	-10.8	-11.3	-11.6	-12.3	-12.9	-10.7	-8.8	-7.0	-5.4	-2.9	-1.8	-1.5	-1.2	-0.5	-0.5	-1.4	-1.9	-2.8	-3.5	-3.9	-4.2	-3.9	-5.8	-0.5
23-Mar	-4.0	-4.3	-4.5	-4.8	-4.9	-5.1	-5.6	-6.1	-6.7	-6.6	-6.0	-5.6	-4.7	-4.2	-4.1	-3.7	-4.0	-4.4	-5.3	-6.0	-7.0	-7.4	-8.1	-10.1	-5.5	-3.7
24-Mar	-11.3	-13.4	-15.0	-16.0	-17.2	-18.0	-19.0	-17.4	-14.8	-9.8	-8.3	-6.8	-5.3	-4.1	-3.5	-2.9	-2.9	-2.9	-3.9	-6.2	-7.3	-8.4	-9.8	-11.2	-9.8	-2.9
25-Mar	-13.8	-15.0	-15.8	-15.0	-13.8	-12.7	-12.1	-10.5	-8.7	-6.6	-5.0	-2.8	-0.5	0.4	1.8	2.4	2.6	1.4	-0.5	-1.8	-2.5	-2.9	-4.1	-5.0	-5.9	2.6
26-Mar	-6.3	-6.8	-6.5	-6.4	-5.6	-5.7	-5.7	-5.6	-3.8	-1.6	-1.0	-0.3	0.3	1.0	2.1	3.7	4.2	4.0	2.5	0.4	-1.4	-2.6	-3.9	-4.9	-2.1	4.2
27-Mar	-5.9	-6.9	-7.5	-7.7	-7.4	-8.4	-8.4	-7.3	-4.0	-1.4	2.4	6.2	8.8	9.6	9.9	10.7	10.7	10.2	8.7	6.6	5.3	3.8	2.7	1.5	1.3	10.7
28-Mar	0.0	-0.4	-1.3	-2.1	-2.5	-2.9	-2.8	-1.0	1.8	5.2	7.6	8.3	10.3	13.0	11.6	11.9	11.9	11.4	10.1	8.0	6.7	4.8	3.7	2.6	4.8	13.0
29-Mar	2.1	2.2	1.1	-0.8	-1.9	-0.7	-1.5	0.8	3.9	6.6	8.3	10.6	11.5	11.3	11.7	11.8	12.3	11.0	9.6	8.3	7.1	6.1	5.0	3.9	5.8	12.3
30-Mar	3.3	2.1	1.5	-0.1	-0.9	-1.5	-1.7	1.2	4.8	6.5	8.7	10.1	11.0	10.2	11.1	9.7	6.8	3.7	1.9	1.0	0.9	-0.2	-1.1	-1.7	3.6	11.1
31-Mar	-2.3	-3.1	-3.9	-4.1	-4.5	-5.5	-5.8	-4.8	-4.1	-3.2	-2.8	-1.8	-1.3	0.1	0.7	0.9	0.9	1.0	0.9	0.8	0.6	0.0	-0.6	-1.3	-1.8	1.0
	-5.9	-6.4	-6.8	-7.1	-7.4	-7.6	-7.8	-7.3	-6.1	-4.5	-3.4	-2.3	-1.2	-0.5	0.0	0.3	0.2	-0.3	-1.2	-2.3	-3.1	-3.8	-4.4	-5.1	Diurnal Average	
	3.3	2.2	1.5	0.0	-0.2	-0.4	-0.5	1.2	4.8	6.6	8.7	10.6	11.5	13.0	11.7	11.9	12.3	11.4	10.1	8.3	7.1	6.1	5.0	3.9	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Barge Landing - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	586	78.76	78.76
0 - 10	137	18.41	97.18
10 - 20	21	2.82	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 2016

Maximum Value: 96 % on Mar 12 05:00

Maximum Daily Average: 88.4 % on Mar 10

Minimum Value: 19 % on Mar 24 18:00

Minimum Daily Average: 42.8 % on Mar 24

Maximum Diurnal Average: 82.4 % at hour 7

Minimum Diurnal Average: 60.1 % at hour 16

Monthly Average: 71.2 %

Percentiles: $P_1 = 26$ $P_{10} = 47$ $Q_1 = 60$ Median = 75 $Q_3 = 85$ $P_{90} = 91$ $P_{99} = 95$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

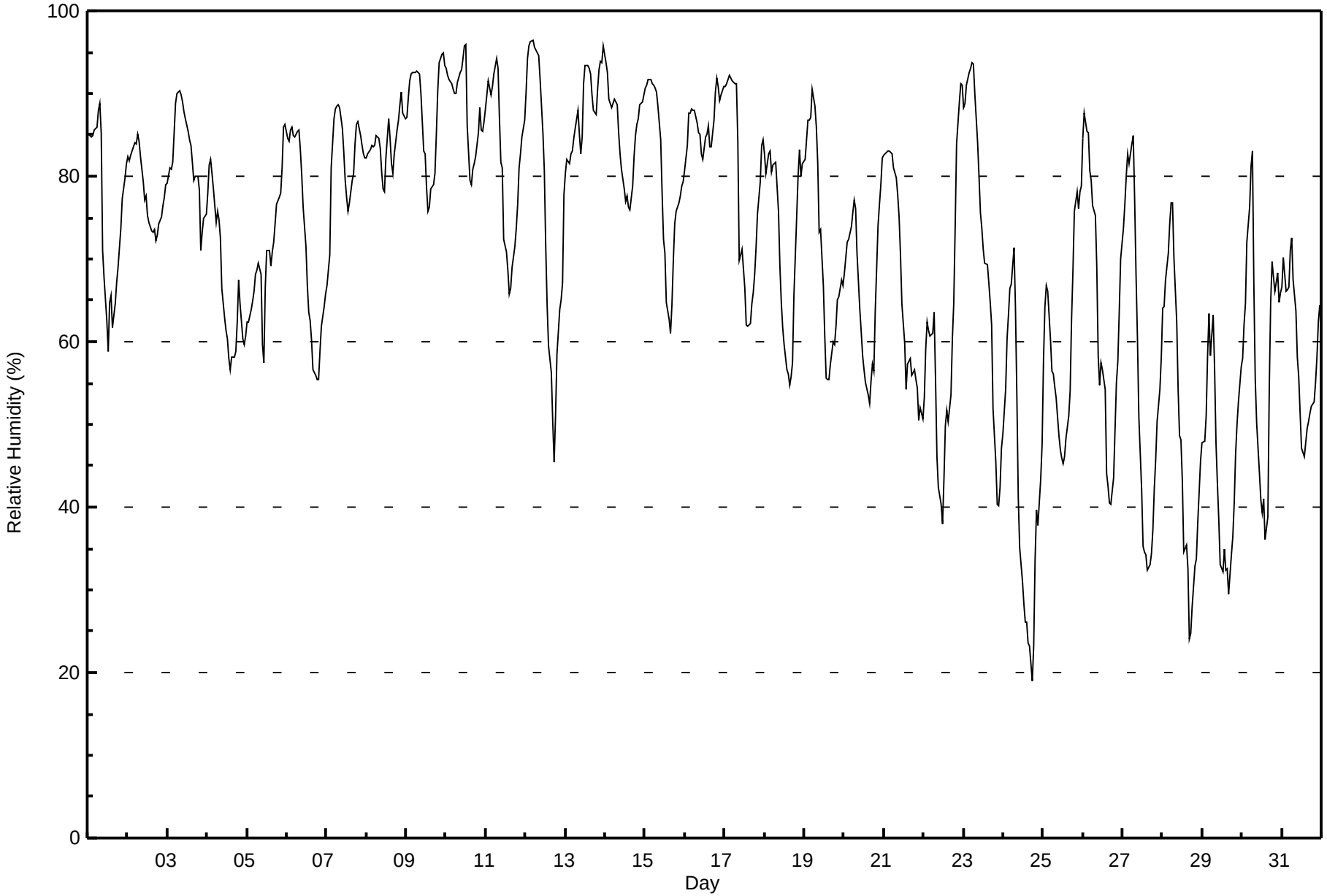
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	85	85	85	85	86	86	88	89	85	71	68	63	59	65	66	62	65	67	69	71	74	77	80	82	75.4	89
2-Mar	82	82	82	84	84	84	85	84	82	79	77	78	75	74	73	73	74	72	73	74	75	76	78	79	78.4	85
3-Mar	79	81	81	82	85	89	90	90	90	89	88	87	86	84	84	82	80	80	80	78	71	73	75	75	82.4	90
4-Mar	78	81	82	80	79	74	76	75	73	66	63	61	60	58	57	58	58	59	62	67	64	60	60	61	67.2	82
5-Mar	62	62	64	65	66	68	69	70	68	60	57	67	71	71	69	71	72	74	77	78	78	81	86	86	70.5	86
6-Mar	85	84	86	86	85	85	85	86	83	80	76	72	67	64	62	60	57	56	55	55	59	62	64	66	71.6	86
7-Mar	67	69	71	81	87	88	89	89	88	86	83	79	77	76	77	79	80	84	86	87	85	84	83	82	81.5	89
8-Mar	82	83	83	84	84	84	85	85	83	80	78	78	82	87	85	81	80	83	86	87	89	90	88	87	83.9	90
9-Mar	87	89	92	92	93	93	93	93	92	90	83	83	79	76	76	78	79	80	85	90	94	95	95	93	87.5	95
10-Mar	93	92	92	91	90	90	90	91	93	93	94	96	96	86	80	79	81	82	82	85	88	86	85	87	88.4	96
11-Mar	88	92	91	90	91	92	94	93	87	82	81	72	71	69	66	66	69	72	74	77	81	83	85	87	81.3	94
12-Mar	90	94	96	96	96	96	95	95	95	92	85	81	72	64	59	56	50	45	51	58	64	65	67	78	76.7	96
13-Mar	80	82	82	83	83	85	86	88	85	83	85	91	93	93	93	92	90	88	88	91	93	94	94	96	88.2	96
14-Mar	94	93	89	89	88	89	89	89	85	83	81	78	77	78	76	76	79	82	85	86	87	89	89	90	85.0	94
15-Mar	91	91	92	92	91	91	91	90	88	84	78	72	71	65	63	61	64	70	74	76	77	78	79	79	79.5	92
16-Mar	81	84	88	88	88	88	88	86	85	85	83	82	85	85	86	84	84	87	90	92	91	89	90	91	86.6	92
17-Mar	91	91	92	92	92	91	91	91	84	70	71	69	66	62	62	62	65	66	68	71	75	79	84	84	77.9	92
18-Mar	83	80	83	83	81	81	81	82	76	69	65	62	60	57	56	55	56	57	66	75	80	83	80	82	72.1	83
19-Mar	82	84	87	87	87	91	89	86	82	73	73	67	61	56	55	55	57	60	60	62	65	65	67	67	71.6	91
20-Mar	68	70	72	72	74	76	77	76	71	64	61	58	57	55	54	52	55	57	56	64	74	77	79	82	66.8	82
21-Mar	83	83	83	83	83	83	81	80	78	75	71	65	60	54	57	58	58	56	57	55	54	51	52	51	67.0	83
22-Mar	53	59	62	61	61	61	64	55	46	42	40	38	43	50	52	50	54	60	65	74	84	89	91	91	60.3	91
23-Mar	88	89	91	93	93	94	94	90	84	80	76	74	71	70	69	67	65	62	52	45	40	40	42	47	71.5	94
24-Mar	49	54	60	63	66	67	71	64	53	41	35	31	28	26	26	24	23	19	23	34	40	38	43	48	42.8	71
25-Mar	58	64	67	66	60	56	56	55	53	49	47	46	45	46	48	51	54	63	69	76	78	76	78	79	60.0	79
26-Mar	85	88	85	85	81	79	76	75	69	58	55	57	57	54	44	43	41	40	44	49	55	58	64	70	63.0	88
27-Mar	74	77	80	83	81	84	85	77	68	60	51	42	35	35	34	32	33	34	37	42	46	50	54	58	56.4	85
28-Mar	64	64	67	71	74	77	77	70	62	54	49	48	43	35	35	32	24	25	28	33	34	38	42	46	49.7	77
29-Mar	48	48	51	58	63	58	63	57	48	43	38	33	32	35	32	33	30	34	37	41	46	50	53	57	45.3	63
30-Mar	58	62	65	72	76	81	83	67	55	50	44	41	39	41	36	39	54	65	70	68	66	68	65	66	59.6	83
31-Mar	67	70	66	66	67	71	73	67	64	58	56	51	47	46	48	49	50	51	52	53	55	58	62	64	58.9	73
	76.6	78.3	79.5	80.7	81.1	81.7	82.4	80.1	76.0	70.7	67.5	65.2	63.4	61.8	60.7	60.1	60.6	62.3	64.5	67.6	69.8	71.0	72.7	74.5	Diurnal Average	
	94	94	96	96	96	96	95	95	95	93	94	96	96	93	93	92	90	88	90	92	94	95	95	96	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Barge Landing - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Barge Landing - March 2016

Maximum Speed: 16 km/h on Mar 30 20:00

Maximum Daily Speed Average: 9.6 km/h on Mar 14

Minimum Speed Value: 0 km/h on Mar 25 02:00

Minimum Daily Speed Average: 0.9 km/h on Mar 1

Maximum Diurnal Speed Average: 3.9 km/h at hour 19

Minimum Diurnal Speed Average: 1.8 km/h at hour 6

Monthly Average Velocity: 2.7 km/h 15.7 deg

Percentiles: $P_1 = 1$ $P_{10} = 2$ $Q_1 = 4$ Median = 5 $Q_3 = 8$ $P_{90} = 10$ $P_{99} = 13$

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	S5	SSE4	SSW4	SSW3	SSW3	SW3	S2	SSW2	S1	WSW4	W5	W4	W4	NE4	NNE4	NE4	NE4	NNE4	NNE5	NNE5	NNE5	NNW4	NNW3	NNW6	NNW0.9	NNW6
2-Mar	NNW5	N5	NNW4	N4	N4	N5	N5	N5	N5	N5	N5	NE5	NNE5	NNE5	NNE5	NNE5	NE5	NNE6	N5	N5	N5	NNE4	NNE4	NNE5	N4.7	NNE6
3-Mar	N4	NNW4	NNW5	NNW8	NNW5	NNW5	NNW5	NNW5	N7	N6	N6	N7	NNE7	NNE9	NNE9	NNE11	NNE10	NNE9	NNE8	NNE8	N6	NNE4	NNE4	NE4	N6.3	NNE11
4-Mar	NE4	ENE3	E3	ESE3	E3	ESE3	SSW2	S3	SE4	S4	S6	S6	S6	SSE9	S10	SSE10	SE9	SE9	ESE5	E5	SE5	SE6	SSE4	SSE3	SE4.3	SSE10
5-Mar	SSE5	S6	S7	S6	S5	S5	SW4	S5	S7	S3	NE2	NNE6	NNE11	NNE10	NNE8	NE9	NE10	NE10	NNE9	NNE11	NNE12	NNE11	NNE9	NNE8	NE3.4	NNE12
6-Mar	N7	N6	N7	NNE8	NNE8	NNE7	NNE6	N6	NNE7	NNE8	NNE10	NNE8	NNE9	NNE9	NNE8	NNE11	NNE11	N10	N9	N8	N6	NNW7	NNE5	NNE5	NNE7.6	NNE11
7-Mar	N5	N5	NNW5	NNW6	N6	N5	N5	NNW5	NNW5	NNW5	NW5	NW4	WNW2	SW3	WSW5	SSE3	SSE5	NE3	N6	N6	NNE6	ENE5	ENE5	NE3	N3.1	NNW6
8-Mar	N2	S1	WNW1	N1	NNW0	NNW1	E1	E1	SE2	WNW1	NNW2	NW1	NNW5	NNW6	N4	NNE3	N3	NNE4	NNE4	N4	N3	N4	NNE4	NNE4	N2.1	NNW6
9-Mar	NNE5	NNE6	N5	N5	N5	N5	N3	NNW4	NNW5	NNW4	NNE2	NNE4	NE4	ENE3	S6	S5	S2	NNW2	NNE2	ENE3	ENE4	NE2	ESE0	SE3	NNE2.1	NNE6
10-Mar	SE3	SE3	SE3	SE2	SW1	SE2	SE1	NNW1	N2	N3	NNW2	ESE2	SE9	SE9	SE10	SE11	ESE9	SE10	SE8	SE6	SE6	SSE6	SSW3	WSW1	SE4.0	SE11
11-Mar	NW2	WNW2	SSW4	SW5	WSW5	SSW2	WSW4	SW4	WSW2	N3	NNE3	WNW2	WNW3	WNW5	NW6	NW5	N3	SSW1	S2	SSW1	E1	SSW3	SSE5	SSE5	WSW1.5	NW6
12-Mar	SSE1	ESE4	E3	SE3	SE4	NE2	N3	N2	NE1	NNW3	NNW5	NNE6	NNE8	N8	NNW8	NNW6	ESE7	SE13	SE8	SE4	SE3	SE3	SSE3	NNW5	ENE1.9	SE13
13-Mar	NNW4	NNW5	NNW6	N3	NNW5	NNW5	NNW7	NNW7	N6	N6	NNE6	N6	N9	N10	N10	N10	N12	N11	N12	N10	NNW11	NNW9	NNW8	N8	N7.7	N12
14-Mar	N8	N8	N9	N10	N10	N10	N10	NNE11	NNE13	NNE12	NNE12	NNE12	NNE12	NNE12	NNE12	NNE11	NNE10	NNE9	N9	N8	N7	N6	N6	N5	N9.6	NNE13
15-Mar	NNW5	NNW5	N5	N4	N4	NNW4	NNW4	N5	N4	NNW5	NNW4	N4	NNE5	NNW5	NNE6	NNE6	NNE6	NNE7	NNE7	N6	N8	N8	N8	N8	N5.3	N8
16-Mar	N9	N9	N10	N10	N9	N10	N10	NNE10	N10	N9	N9	N8	N7	NNE8	NNE9	NNE10	N10	NNW7	NW4	WNW2	NE5	N3	NW3	WSW2	N7.2	NNE10
17-Mar	W3	SW2	WNW2	WNW2	WNW3	WNW2	W2	WSW3	SW3	WNW3	NW5	NNW7	NNW9	NW8	NNW7	NNW7	NNW6	NW5	NNW4	NNW2	W1	SW3	S3	S3	NW2.9	NNW9
18-Mar	SSW3	SSW3	SSW3	SW3	SW3	SW3	SSW3	SW1	NNW3	NNW6	ENE4	E5	ESE5	SSE7	SSE9	S10	S9	SSE6	ESE4	NE2	NNE3	N4	N5	N4	SSE1.4	S10
19-Mar	N4	N4	N5	N4	N4	NNE2	N5	N3	N4	NNE5	NNE6	NNE6	NNE7	NNE7	N8	N8	N8	N8	N10	N10	NNW6	N6	NW4	NNW4	N5.5	NNW10
20-Mar	N6	N6	NNW5	N6	N6	N5	N4	NNW4	NNW5	NNW5	N6	N8	NNE10	NNE10	NNE10	NNE11	NNE13	NNE10	NE8	NNE8	N10	N10	N7	NNW6	N7.1	NNE13
21-Mar	NNW7	NNW8	NNW7	NNW7	NNW6	N7	N7	N7	N7	NNE8	NNE9	NNE11	NNE11	N11	NNE13	NNE12	NE10	ENE10	ENE9	ENE6	ENE6	ENE5	NE4	NE3	NNE7.0	NNE13
22-Mar	NNE2	N3	NNW3	NNW3	N4	N3	NNE2	ESE4	SE5	E1	NW4	W5	SSW6	SSW7	WSW8	WSW6	SSW5	NE3	N4	NNW5	NNW4	N2	NNE2	E4	NW1.0	WSW8
23-Mar	SE5	SE4	ENE2	NNE1	NE3	NNW4	NNW5	N7	NNE7	NNE8	NNE8	NNE8	NE8	NNE10	NNE10	NNE9	NNE8	NNE7	NE7	NNE7	NNE6	NNE6	NNE6	N5	NNE5.6	NNE10
24-Mar	NNW5	NNW4	NNW3	NNW4	NNW3	N2	NNW2	NNW4	NNW5	N5	NNE6	NNE8	NNE8	NNE6	NE7	NE6	NE6	NNE5	N4	N3	N3	N4	N4	N3	N4.3	NNE8
25-Mar	N1	S0	SE3	SSE4	SSE3	SSE4	SSE3	SSE4	S7	S8	S7	S5	SW4	NNW3	NNW3	NW3	E1	E3	NE2	E1	N2	NNW5	NNW5	N4	S0.9	S8
26-Mar	N2	NW1	NW1	NNW4	NNW3	NNW2	NNW4	NNW4	NW5	NNW3	ENE6	ENE6	NE6	NE6	E4	S6	S8	SSE7	SE8	SE7	SE5	SE3	N2	N2	E1.2	S8
27-Mar	SE4	SE4	SE5	ESE4	SE5	SSE4	SE4	S2	WSW5	W6	WNW5	W4	S8	S10	SSE10	SE12	SE13	SSE12	SE10	SE11	SSE10	SSE8	SSE7	S5	SSE5.6	SE13
28-Mar	SSE6	SSE7	S5	S5	S6	S6	SSE6	S8	S9	SSW10	SSW9	S10	SSW9	WSW8	NW11	WNW10	WNW13	NW9	NW7	NW6	NW4	W5	WSW4	WSW6	SW3.9	WNW13
29-Mar	WSW4	SW6	SW5	SW3	S3	SSW4	S5	S5	S6	S7	SE8	SE6	E6	ENE7	ENE7	ENE6	E5	ENE5	ENE5	E4	E2	N2	SSW0	NNW3	SE2.1	SE8
30-Mar	NW2	WNW2	NNW2	WSW1	N1	NNE1	N4	NNW3	NW4	N5	NE4	NE5	NNW13	N11	NNW12	N13	NNE10	NE14	NNE15	NNE16	N12	NNE14	NNE15	N13	N7.3	NNE16
31-Mar	NNE11	NNE10	N10	N9	N6	NNW4	N4	NNE4	NE5	ENE5	NE6	ENE5	ENE6	ESE5	S7	SSE6	SE6	SSE6	S5	S4	S6	S5	SSE5	SSE5	ENE2.1	NNE11
	N2.2	N1.8	N1.9	N2.1	N2.0	N1.8	N2.2	N2.0	N1.9	N2.5	NNE3.1	NNE3.3	NNE3.5	NNE3.6	NNE3.5	NNE3.3	NE3.5	NE3.9	NE3.9	NNE3.6	NNE3.2	NNE2.8	N2.4	N2.5	Diurnal Average	
	NNE11	NNE10	N10	N10	N10	N10	N10	NNE11	NNE13	NNE12	NNE12	NNE12	NNW13	NNE12	NNE13	N13	WNW13	NE14	NNE15	NNE16	NNE12	NNE14	NNE15	N13	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

Barge Landing - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 6 km/h on Mar 30 13:00

Minimum Value: 0 km/h on Mar 10 04:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 2$ $P_{90} = 3$ $P_{99} = 4$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

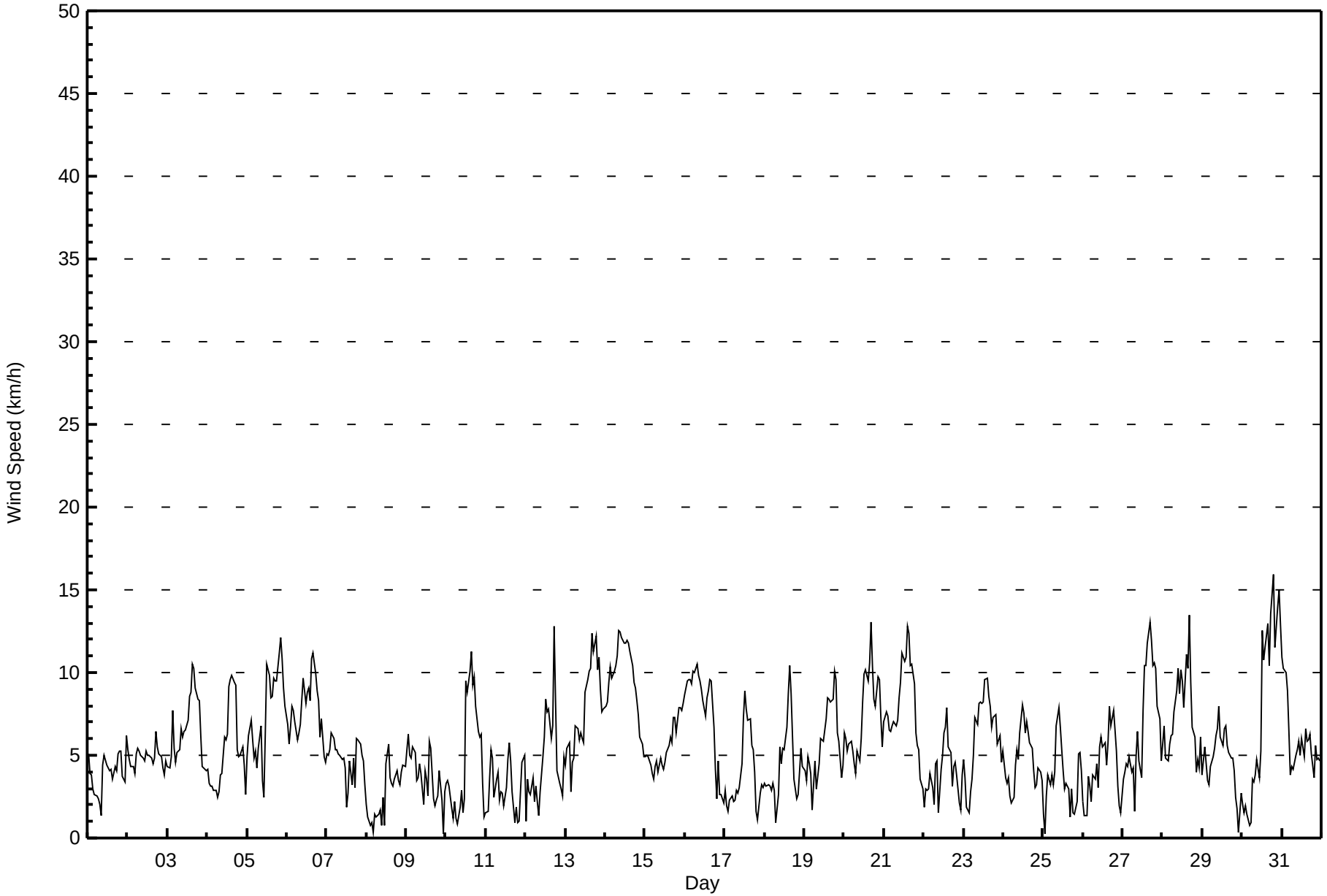
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2	1	2	1	2
2-Mar	1	1	1	1	1	2	1	2	1	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2
3-Mar	1	1	2	2	2	2	1	2	2	2	2	2	2	3	3	3	3	3	3	2	3	1	1	1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

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Barge Landing - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	417	56.05	56.05
6 - 11	299	40.19	96.24
12 - 19	28	3.76	100.00
20 - 28	0	0.00	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Barge Landing - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	81	38	24	13	17	13	24	18	27	18	16	12	9	15	18	74	417
6 - 11	79	84	13	10	1	2	19	16	27	5	1	4	1	1	6	30	299
12 - 19	5	15	1	0	0	0	3	1	0	0	0	0	0	1	0	2	28
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	165	137	38	23	18	15	46	35	54	23	17	16	10	17	24	106	744

Total Number of Valid Hours: 744

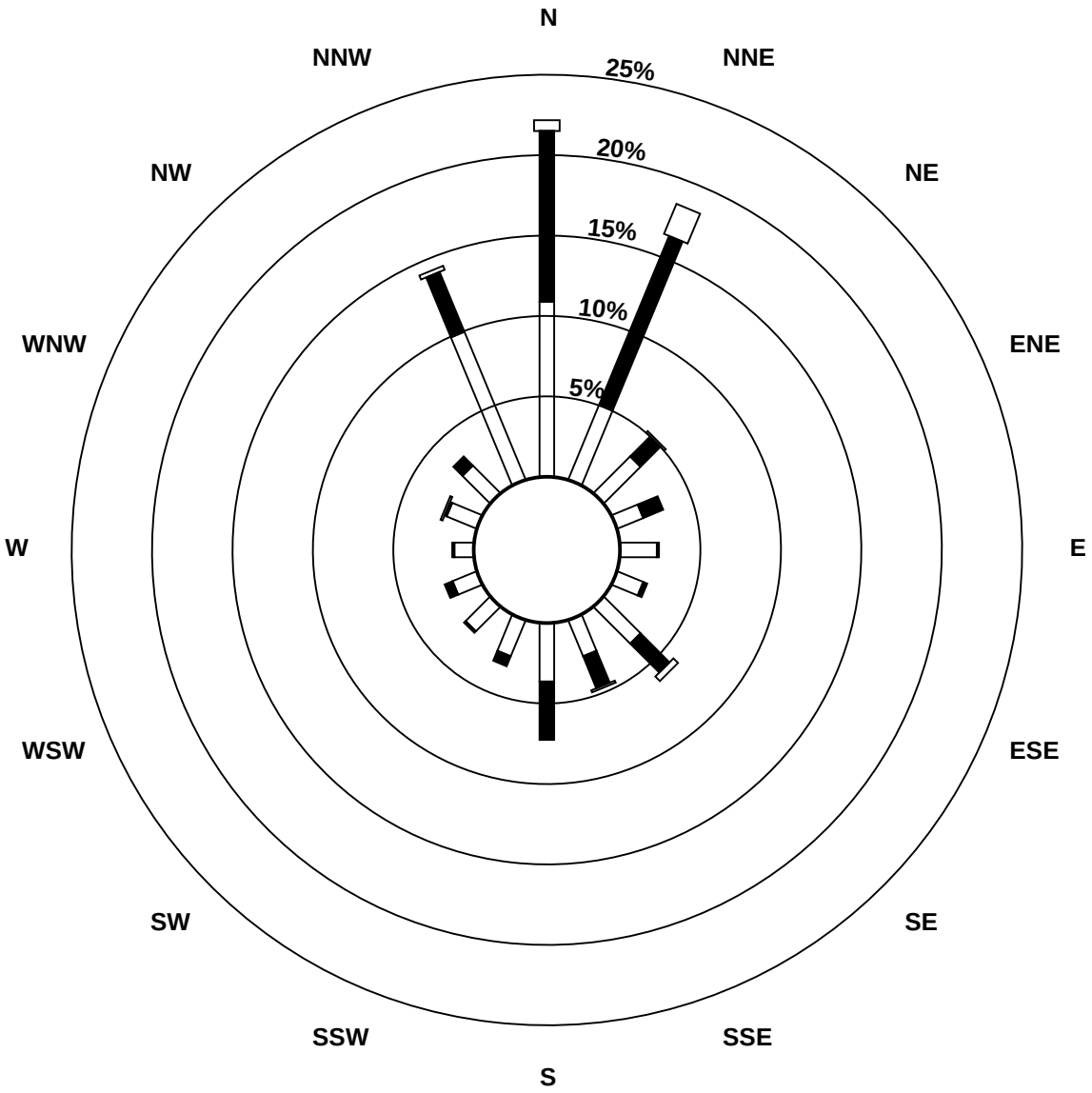
Total Number of Hours: 744

Wood Buffalo Environmental Association

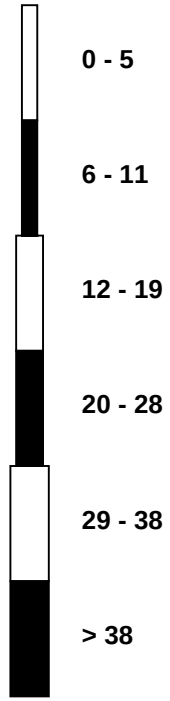
Wind Rose Mar 2016

Wind Speed (WS) - km/h

Barge Landing (AMS 9)



Classes (km/h)



Total Number of Valid Hours: 744

Direction of Maximum Speed: 22 deg on Mar 30 20:00
Direction of Maximum Daily Speed Average: 11.1 deg on Mar 14

Direction of Minimum Speed: 191 deg on Mar 25 02:00

Direction of Minimum Daily Speed Average: 0.9 deg on Mar 1

Monthly Average Direction: 336.4 deg

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	182	163	194	209	208	216	184	211	190	252	263	274	276	36	33	35	44	33	19	23	14	339	336	347	328.7
2-Mar	343	355	346	349	1	352	11	350	356	4	7	39	32	27	33	33	35	15	11	358	2	22	12	15	9.6
3-Mar	357	340	336	347	343	338	347	346	350	359	2	2	12	25	25	21	23	20	18	18	10	24	26	35	7.7
4-Mar	50	64	84	103	100	111	203	172	139	180	186	187	170	166	179	151	142	126	111	101	131	131	152	150	143.9
5-Mar	164	179	179	173	181	187	214	174	173	175	47	30	30	29	28	40	49	41	32	21	19	17	14	12	46.5
6-Mar	10	3	359	15	13	30	21	8	20	20	20	23	12	14	19	16	14	9	7	10	355	345	12	14	12.5
7-Mar	358	1	346	345	352	355	356	345	339	332	322	319	290	233	238	167	155	34	350	350	18	60	64	34	353.1
8-Mar	1	186	286	359	347	333	84	101	134	296	348	318	333	343	357	25	353	25	22	11	352	5	23	26	5.5
9-Mar	25	17	349	0	360	9	4	341	339	332	13	31	42	59	177	173	173	348	16	57	77	40	116	124	20.8
10-Mar	145	143	136	132	215	124	127	334	354	354	337	120	132	130	131	135	119	128	134	134	142	162	200	246	134.2
11-Mar	311	300	207	234	257	206	257	235	249	358	27	298	284	293	308	314	8	195	173	197	88	194	159	154	256.3
12-Mar	148	112	101	135	135	41	353	353	55	343	346	22	24	356	337	339	107	133	132	128	129	132	148	346	62.3
13-Mar	346	344	344	2	344	340	344	347	358	1	22	5	357	355	355	355	356	356	355	350	348	346	342	355	353.0
14-Mar	4	2	6	358	4	3	10	16	18	21	21	22	18	19	19	17	15	12	10	3	357	355	2	354	11.1
15-Mar	346	345	349	350	349	348	347	349	349	337	336	355	31	341	25	29	29	18	23	9	6	4	1	352	1.4
16-Mar	353	360	359	356	356	5	11	15	7	10	7	3	11	16	16	13	4	346	324	294	49	359	310	255	3.2
17-Mar	260	229	303	295	290	288	280	249	227	291	321	331	333	318	331	329	339	321	332	334	273	235	184	178	307.3
18-Mar	200	194	210	221	227	231	209	229	341	347	65	87	102	156	167	185	172	158	103	47	13	349	353	356	160.0
19-Mar	353	356	352	355	8	29	350	6	10	18	29	33	22	15	4	9	4	353	349	350	348	2	320	341	2.0
20-Mar	358	349	345	349	352	352	356	347	347	341	10	9	15	17	27	29	14	16	42	26	355	352	350	343	6.0
21-Mar	344	347	348	348	346	6	2	349	10	21	24	15	14	10	26	32	44	76	76	76	67	72	41	52	23.5
22-Mar	22	351	347	348	353	0	13	110	143	82	313	281	206	205	248	251	206	37	359	333	346	353	21	98	309.2
23-Mar	130	124	73	32	49	347	343	1	17	27	30	31	34	22	23	26	21	31	36	33	28	15	16	349	25.9
24-Mar	347	344	331	346	339	5	345	337	341	359	25	26	33	31	37	43	36	23	11	5	3	351	1	351	10.0
25-Mar	351	191	139	148	158	151	150	164	182	186	191	189	230	339	333	319	97	83	51	88	351	341	341	353	177.6
26-Mar	9	323	313	339	337	332	335	345	318	344	67	67	51	47	84	173	190	152	140	141	137	134	3	354	80.4
27-Mar	128	125	125	118	143	154	142	177	243	260	286	275	190	179	155	144	141	147	141	143	148	158	154	185	157.7
28-Mar	153	156	185	188	176	170	165	179	184	194	198	176	210	241	315	285	301	321	314	320	310	268	244	246	228.1
29-Mar	250	234	219	227	190	206	185	187	186	174	145	125	94	73	58	72	85	68	77	83	83	8	199	343	134.8
30-Mar	312	286	339	251	6	16	353	345	317	9	42	36	348	358	346	355	30	38	28	22	10	13	14	11	9.2
31-Mar	14	24	10	10	359	347	2	12	44	62	42	66	75	105	180	160	146	155	177	188	182	189	151	168	67.6
	3.5	5.2	353.2	352.1	353.6	359.3	355.7	354.4	357.3	357.8	14.1	21.7	21.2	19.2	17.2	28.0	41.6	44.2	34.9	26.4	22.5	12.0	10.8	3.6	
	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 (WD) - deg

Barge Landing - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 95 deg on Mar 12 01:00

Minimum Value: 7 deg on Mar 27 03:00

Percentiles: P_1 = 11 P_{10} = 16 Q_1 = 18 Median = 21 Q_3 = 28 P_{90} = 43 P_{99} = 86

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

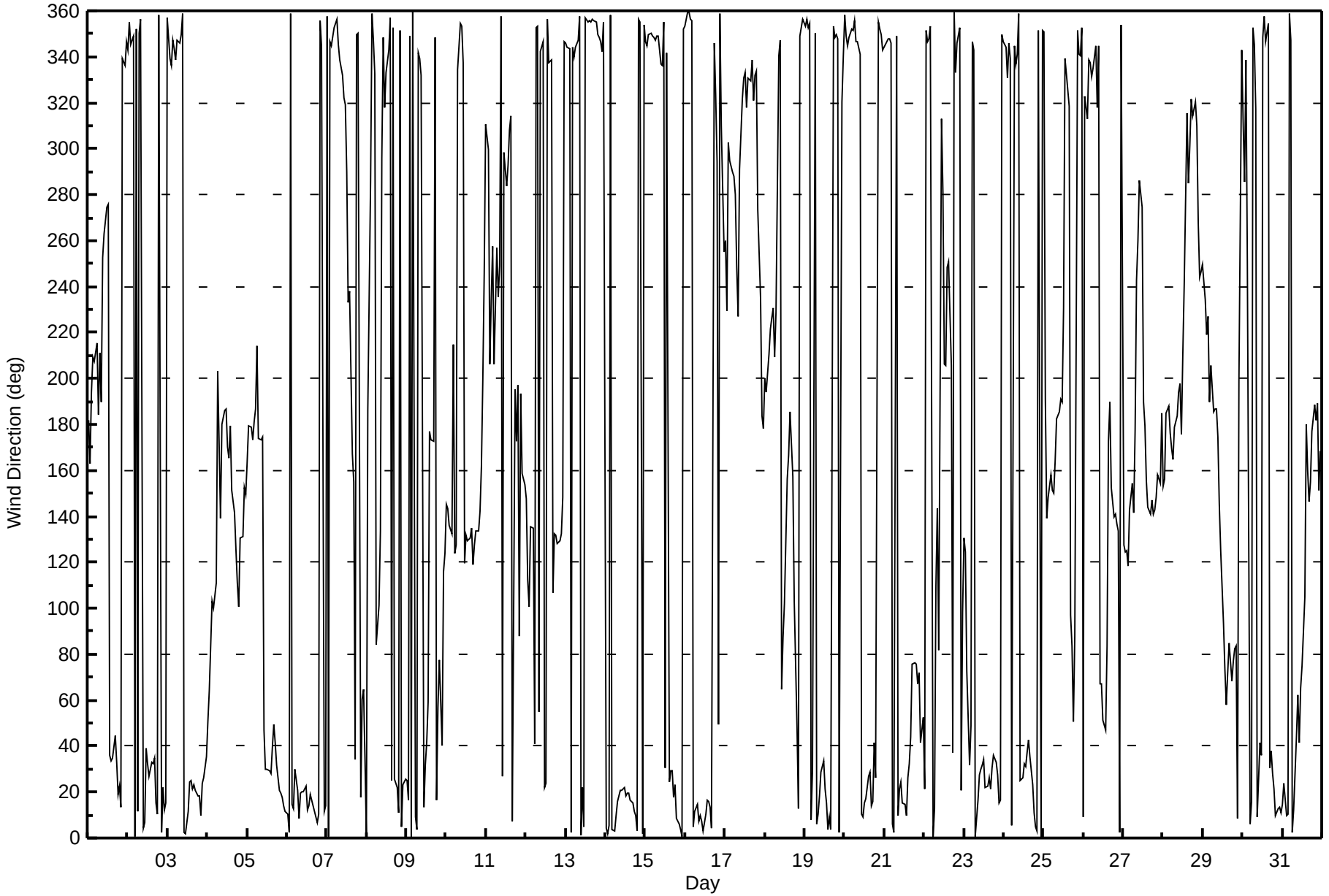
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	26	20	18	18	21	24	30	36	57	24	22	34	42	39	20	26	18	17	18	20	16	17	32	16	57
2-Mar	18	19	17	16	27	30	20	22	24	29	32	22	26	21	17	18	19	16	18	20	19	22	21	17	32
3-Mar	23	17	21	19	21	23	16	18	22	24	22	20	21	19	17	17	16	18	19	18	23	20	20	16	24
4-Mar	20	25	31	23	21	21	38	38	24	38	29	39	42	33	33	27	19	16	21	15	22	25	31	40	42
5-Mar	33	27	25	24	27	28	30	27	25	59	79	24	18	17	20	19	20	19	16	17	16	18	19	19	79
6-Mar	19	20	19	17	21	17	17	19	17	18	16	19	20	20	16	18	19	19	19	19	23	19	26	24	26
7-Mar	20	24	20	20	20	20	19	23	19	22	21	30	72	66	24	46	22	54	19	18	20	24	39	23	72
8-Mar	31	70	72	44	31	28	57	80	65	87	37	90	25	20	29	29	38	20	15	15	18	17	17	16	90
9-Mar	16	19	22	21	18	21	24	20	21	25	65	20	37	63	39	34	65	36	36	46	12	40	88	25	88
10-Mar	13	12	16	21	58	20	64	43	16	18	42	82	19	18	19	17	18	16	16	17	26	25	31	58	82
11-Mar	49	47	20	28	28	42	30	23	69	52	38	69	45	34	24	25	52	86	43	79	75	32	29	20	86
12-Mar	95	20	25	28	21	40	20	62	82	50	29	23	18	25	19	25	62	16	14	15	17	32	75	11	95
13-Mar	12	11	13	19	17	15	17	16	22	22	23	23	21	20	21	21	21	21	21	20	21	19	19	20	23
14-Mar	20	21	20	21	21	22	20	19	18	17	18	18	18	19	19	19	19	21	20	20	20	21	19	18	22
15-Mar	16	16	14	17	15	14	16	19	24	20	39	38	35	32	29	22	17	18	19	20	20	21	21	20	39
16-Mar	20	21	21	20	20	21	20	20	22	22	21	23	21	19	22	20	22	23	17	25	28	26	23	19	28
17-Mar	18	21	40	25	19	20	27	20	27	45	41	28	23	25	27	24	22	24	19	47	69	30	28	38	69
18-Mar	27	26	20	28	48	26	26	69	34	23	43	25	37	39	32	27	26	24	20	30	16	13	17	14	69
19-Mar	17	11	14	14	27	53	17	23	24	29	17	18	20	22	24	23	21	24	19	17	24	23	39	56	56
20-Mar	36	17	18	17	16	14	14	19	17	19	24	21	18	19	18	16	19	18	18	26	22	20	20	17	36
21-Mar	19	20	18	20	19	23	20	22	24	18	18	19	19	21	17	16	21	17	16	19	22	23	24	32	32
22-Mar	32	11	15	13	12	10	40	20	32	81	32	49	56	39	22	35	44	37	21	34	16	14	22	30	81
23-Mar	12	20	17	28	28	17	17	21	21	19	19	19	18	18	18	19	19	18	16	17	16	18	18	24	28
24-Mar	15	29	13	18	20	14	28	18	19	28	23	18	17	19	19	19	17	16	14	13	22	14	11	11	29
25-Mar	24	92	23	10	18	14	20	29	27	25	26	41	44	29	36	36	95	56	52	36	50	12	15	18	95
26-Mar	29	62	75	9	19	20	19	23	24	47	33	28	29	24	26	52	30	26	12	12	14	31	36	16	75
27-Mar	20	12	7	11	17	16	10	49	16	17	36	76	33	29	28	21	21	18	14	12	15	18	16	17	76
28-Mar	11	10	15	14	17	14	16	24	23	30	35	28	35	39	28	30	30	21	24	20	22	22	15	12	39
29-Mar	19	18	18	21	33	19	20	25	32	29	20	25	24	23	23	27	22	15	16	12	31	34	93	26	93
30-Mar	39	49	31	69	76	69	21	29	25	50	65	38	32	28	24	24	21	17	17	18	21	21	20	22	76
31-Mar	20	18	21	20	19	18	22	42	34	37	29	39	28	48	31	27	20	20	28	17	19	19	18	30	48
	95	92	75	69	76	69	64	80	82	87	79	90	72	66	39	52	95	86	52	79	75	40	93	58	
	Diurnal Maximum																								

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Barge Landing - March 2016



Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

Calibration Date	March 2, 2016	Last Calibration	February 3, 2016
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	10:20	End Time (MST)	14:20
Gas Cert Reference	CC62993	Station temp.	22 Deg C
Cal Gas Concentration	4.77 ppm	Cal Gas Exp Date	10/06/2014
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.	6466
SO2 gas concentration	47.8 ppm	SO2 gas cert/exp	LL104180 12/Feb/18

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-689	-690
Analyzer IP address	192.168.1.42		Lamp voltage	1021	1022
Calculated slope	1.006124	1.000317	Chamber temp	45	45
Calculated intercept	-0.191191	-0.050637	Pressure	691.5	694.3
Analyzer Background	1.98	2.27	Flow	0.437	0.436
Analyzer Coefficient	1.039	1.058	Intensity	91	91
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1218153461
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	83.8	79.9	78.3	1.021
SO2 scrubber check	5000	15.4	147.2	2.8	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	83.8	79.9	79.9	1.001
second point	5000	41.9	40.0	40.2	0.995
third point	5000	21.0	20.0	20.1	0.999
as left zero	6000	0.0	0.0	0.0	----
as left span	5000	83.8	79.9	79.6	1.004
				Average Correction Factor	0.998

Corrected As found	78.3	Previous response	79.6	% change	1.7%

Notes:

Changed inlet filter and scrubber check done after as founds. Changed pump after scrubber check for preventative maintenance. Allowed the pump time to warm up before proceeding with calibration. Adjusted zero and span.

Calibration Performed By: Evan Magill

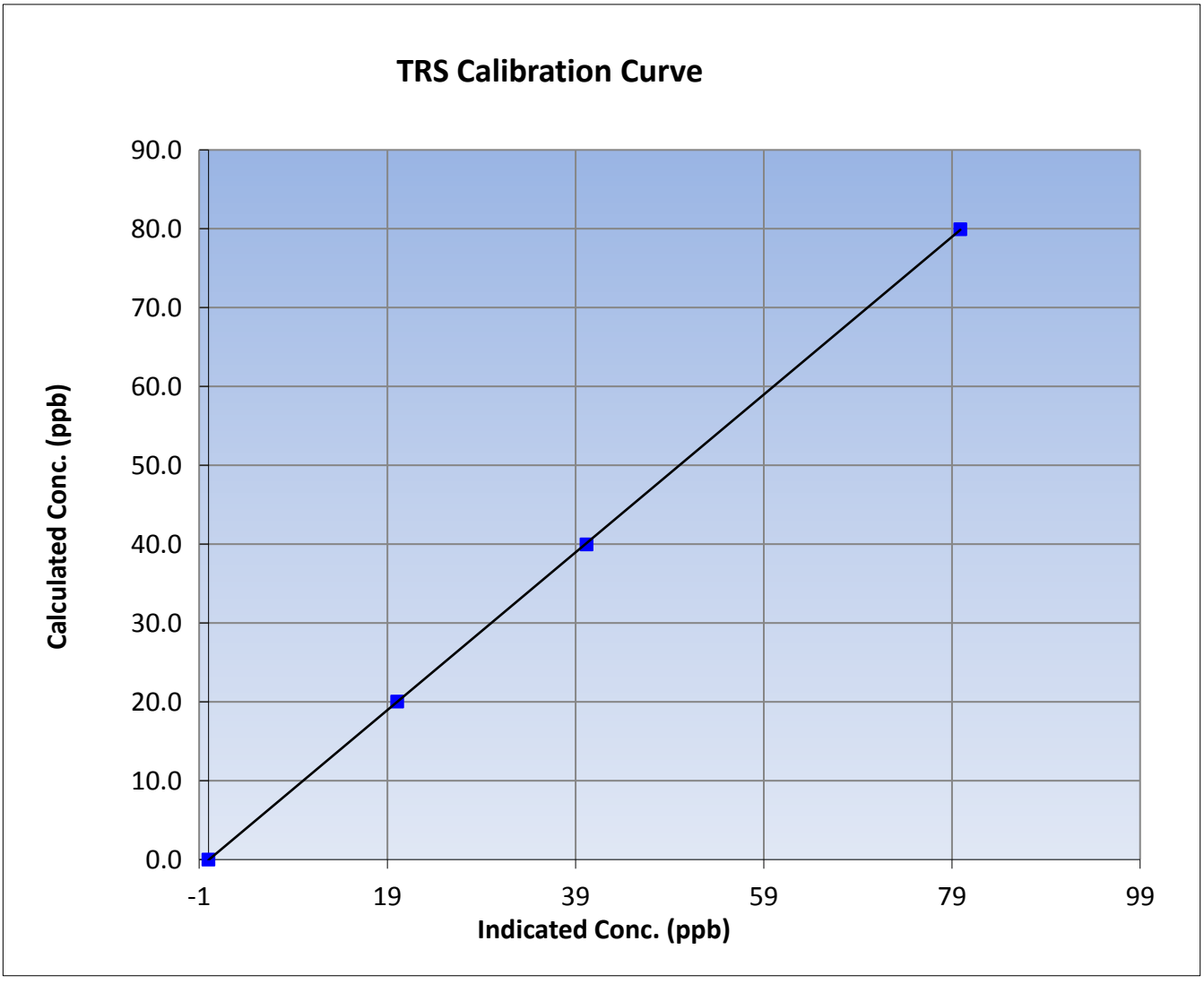
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

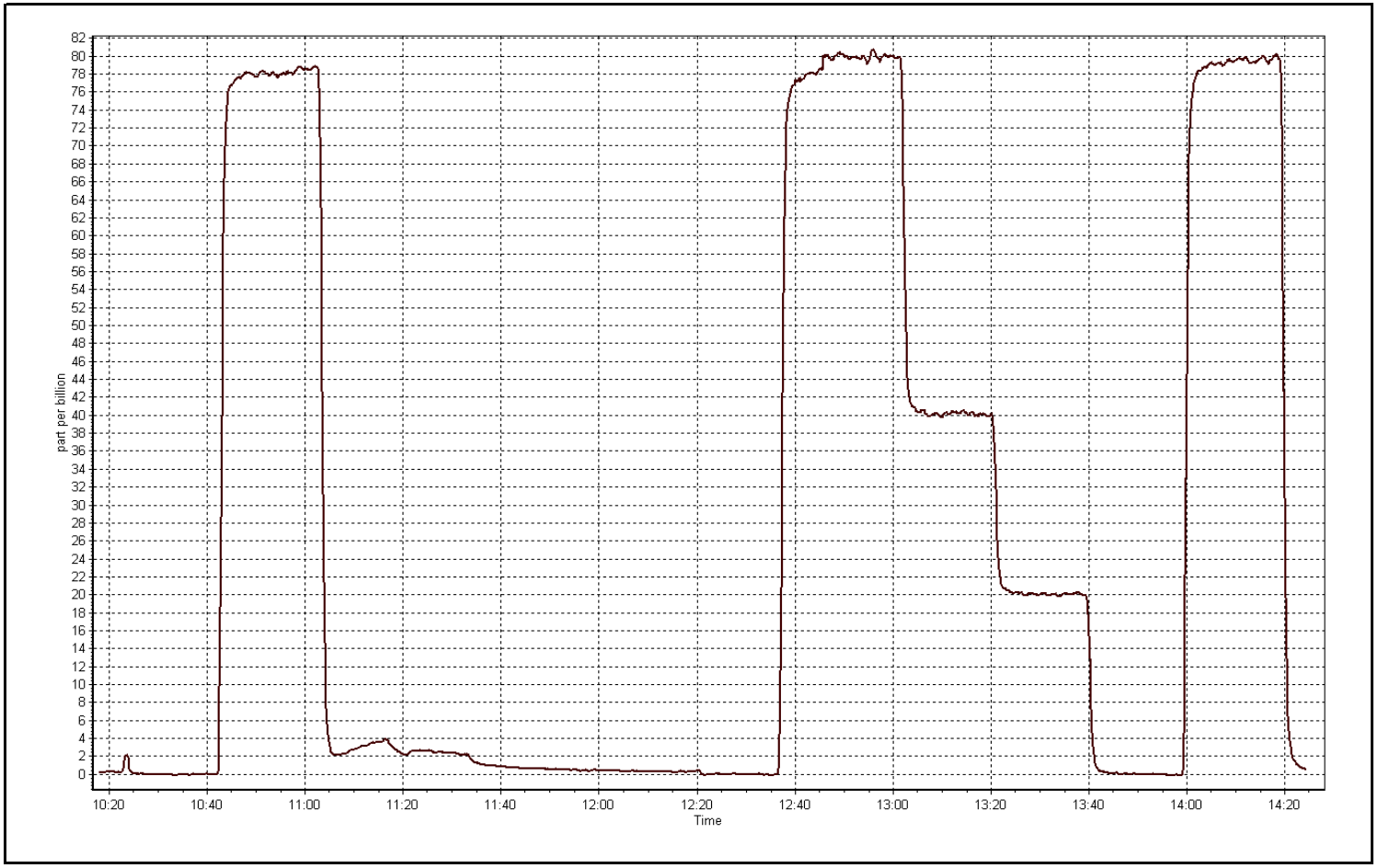
Calibration Date	March 2, 2016	Previous Calibration	February 3, 2016
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	10:20	End Time (MST)	14:20
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999991
79.9	79.9	1.0006		
40.0	40.2	0.9953	Slope	1.000317
20.0	20.1	0.9987		
			Intercept	-0.050637



TRS Calibration Plot Date: March 2, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	March-02-16	Last Calibration	February-03-16
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	14:25	End Time (MST)	17:10
Gas Cert Reference	LL104180	Cal Gas Expiry Date	12/02/2018
CH4 Cal Gas Conc.	490 ppm	CH4 Equiv Conc.	1023.5 ppm
C3H8 Cal Gas Conc.	194 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	6466

Analyzer Information

	Before	*After*		*Before*	*After*
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	1.001964	0.998071	Fuel Pressure	24.1	24.1
Calculated intercept	0.020582	0.024510	Analyzer Coeff	4.219	4.319
			Analyzer BKG	5.49	5.62

Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

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	76.7	15.70	15.33	1.024
calibrator zero	5000	0.0	0.00	-0.04	----
high point	5000	76.7	15.70	15.70	1.000
second point	5000	41.0	8.39	8.39	1.000
third point	5000	15.4	3.15	3.15	1.001
as left zero	5000	0.0	0.00	-0.02	----
as left span	5000	76.7	15.70	15.66	1.003
				Average Correction Factor	1.000

Corrected As found	15.33	Previous response	15.65	% change	2.1%

Notes:

Changed hydrogen cylinder after as founds, no change in span with new fuel. Changed inlet filter after hydrogen change. Adjusted span.

Calibration Performed By: Evan Magill

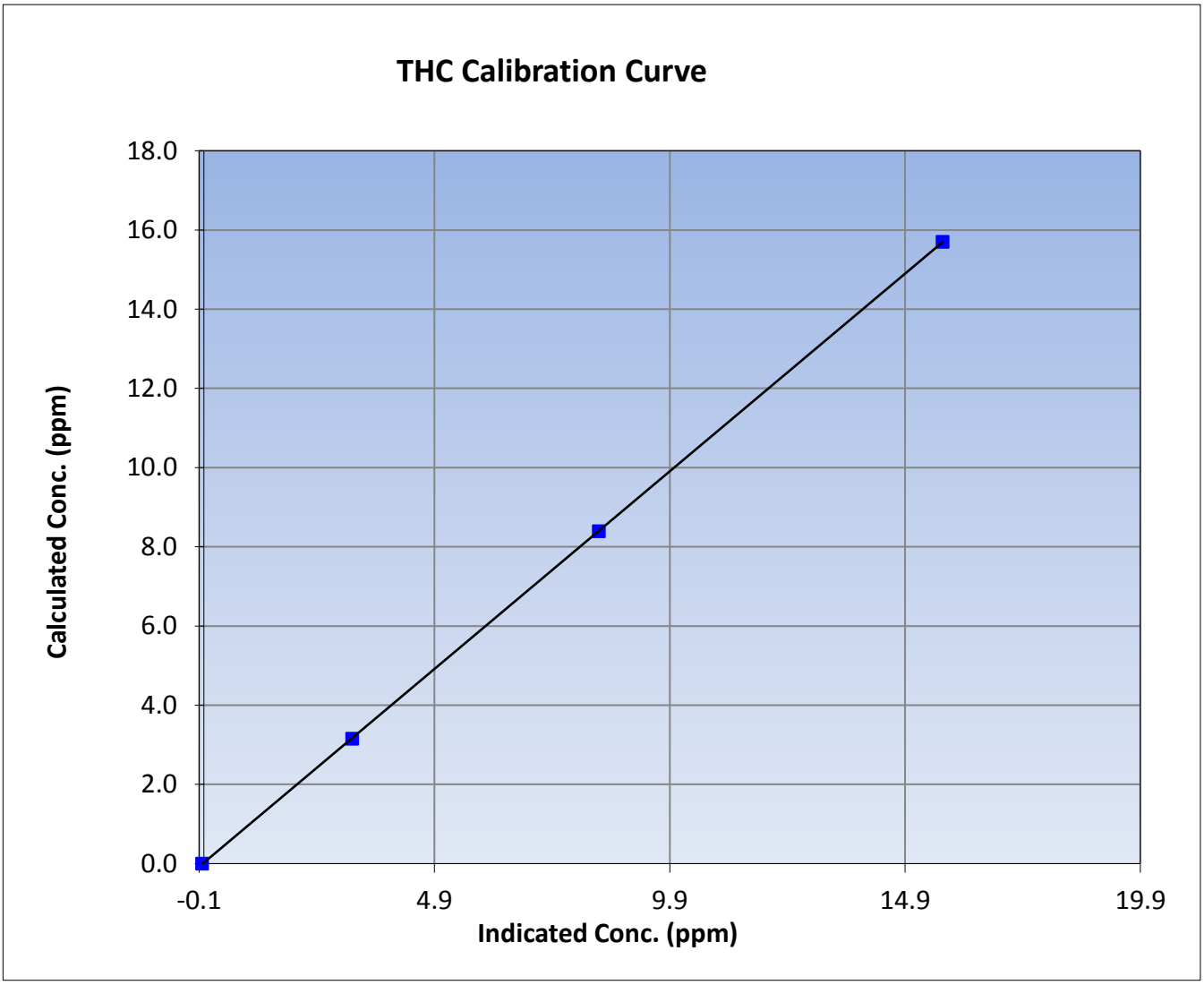
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

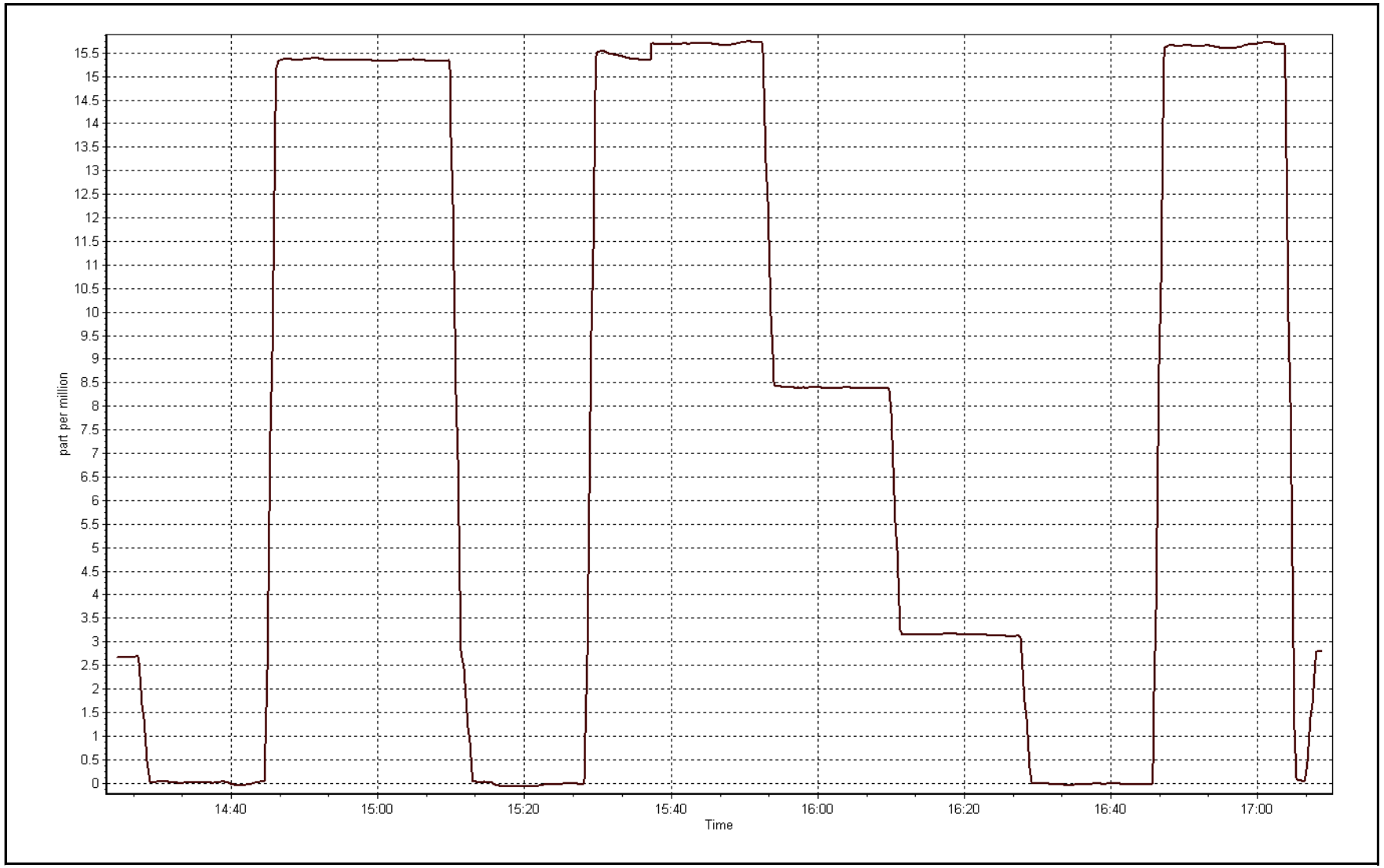
Calibration Date	March 2, 2016	Previous Calibration	February 3, 2016
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	14:25	End Time (MST)	17:10
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.04	----	Correlation Coefficient	0.999996
15.70	15.70	1.0000		
8.39	8.39	1.0003	Slope	0.998071
3.15	3.15	1.0008		
			Intercept	0.024510



THC Calibration Plot Date: March 2, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 11
LOWER CAMP
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
MARCH 2016

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	703	40	41	99.87	140	0	15	0
H2S (ppb) Average	709	34	35	99.87	8	0	2	0
THC (ppm) Average	700	43	44	99.87	4.5	-	2.8	-
Temperature (C) Average	744	0	0	100.00	13.4	-	4.8	-
Relative Humidity (%) Average	744	0	0	100.00	96	-	87	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	25	-	14	-
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 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	703	2.4	9	-	0	0	0	0	1	5	140
H2S (ppb) Average	709	0.6	1	-	0	0	0	0	1	1	8
THC (ppm) Average	700	2.35	0.3	-	1.8	2.1	2.1	2.3	2.5	2.7	4.5
Temperature 2 m (C) Average	744	-3.63	5.3	-	-21.2	-9.6	-7.2	-3.9	-0.2	2.8	13.4
Relative Humidity (%) Average	744	72.2	16	-	23	50	63	75	85	89	96
Wind Speed 10 m (km/h) Average	743	8.2	5	-	0	2	4	7	11	15	25
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, H2S, THC	10 Mar 2016 15:00	10 Mar 2016 15:00	1	Maintenance - sample manifold cleaned
Wind Speed, Wind Direction	17 Mar 2016 23:00	17 Mar 2016 23:00	1	Flat line in sensor output signal -sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Lower Camp - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 140 ppb on Mar 19 12:00 Maximum Daily Average: 14.6 ppb on Mar 19

Minimum Value: 0 ppb on Mar 16 19:00 Minimum Daily Average: 0.1 ppb on Mar 16
Maximum Diurnal Average: 6.9 ppb at hour 12 Minimum Diurnal Average: 0.4 ppb at hour 7
Monthly Average: 2.4 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 5$ $P_{99} = 40$

Hours in Service:	744
Hours of Data:	703
Hours of Missing Data:	41
Hours of Calibration:	40
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	1	1	0	0	0	0	0	0	0	1	1	11	50	48	19	22	21	3	1	2	8	3	2	8.4	50
2-Mar	6	Z	1	1	1	0	0	0	0	0	0	1	4	1	2	5	12	8	1	0	0	0	0	0	1.9	12
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	0.3	0
4-Mar	0	0	0	Z	0	0	0	0	0	1	5	1	0	1	1	0	0	0	0	0	2	1	0	0	0.6	5
5-Mar	1	6	2	5	Z	1	1	0	0	0	0	7	4	1	1	1	1	0	0	0	0	0	0	0	1.4	7
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	0.2	0
7-Mar	Z	0	0	0	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	C	1	0	0	0	--	1
8-Mar	0	Z	0	0	0	0	0	0	2	2	5	5	3	2	4	3	3	3	3	3	4	3	2	1	2.1	5
9-Mar	1	2	Z	1	0	0	0	0	0	0	0	17	40	39	22	6	4	5	3	3	5	4	10	5	7.3	40
10-Mar	3	8	4	Z	7	1	2	2	1	0	0	0	0	0	M	0	0	0	0	0	0	0	0	2	1.5	8
11-Mar	1	9	5	8	Z	1	2	2	3	1	0	0	0	3	5	0	0	3	35	3	3	13	2	1	4.5	35
12-Mar	1	1	1	1	0	Z	1	1	0	0	1	1	2	0	1	1	0	0	0	0	0	0	0	0	0.6	2
13-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
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	0.1	0
15-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	4	2	0	0	0	0	0	0	0	0.5	4
16-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.1	1
17-Mar	0	0	0	0	Z	0	0	0	5	2	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0.5	5
18-Mar	0	2	1	1	1	Z	1	1	3	2	0	4	10	5	1	0	0	0	0	0	0	1	1	1	1.6	10
19-Mar	Z	0	0	0	0	0	0	0	0	6	122	140	57	1	1	1	1	1	1	1	1	0	0	1	14.6	140
20-Mar	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	8	5	0	0	0	0	0	0	0	0	0.9	8
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	0.2	0
22-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	3	2	1	1	2	0	4	4	0	0	0	0	0.9	4
23-Mar	0	0	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
24-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	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	21	10	9	9	2	1	1	2	2.6	21
26-Mar	2	Z	1	1	0	0	0	1	1	4	4	2	14	26	36	38	41	23	11	9	5	4	3	2	9.9	41
27-Mar	3	2	Z	0	0	0	0	0	1	3	1	4	1	0	0	0	0	0	1	0	0	0	1	0	0.9	4
28-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	1	2	8	2	20	2	0	2	3	2	1	4	2.2	20
29-Mar	4	4	6	10	Z	2	0	0	0	0	1	9	5	3	1	1	0	1	9	13	12	16	4	4	4.7	16
30-Mar	2	2	1	1	0	Z	0	0	1	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0.6	3
31-Mar	Z	0	0	0	0	0	0	0	0	0	0	7	17	6	3	9	9	6	4	2	1	1	1	1	3.0	17
	1.0	1.5	1.0	1.2	0.6	0.4	0.4	0.4	0.7	0.9	4.7	6.9	5.8	4.9	5.0	3.3	4.7	2.9	2.9	1.8	1.4	1.9	1.0	0.9	Diurnal Average	
	6	9	6	10	7	2	2	2	5	6	122	140	57	50	48	38	41	23	35	13	12	16	10	5	Diurnal Maximum	

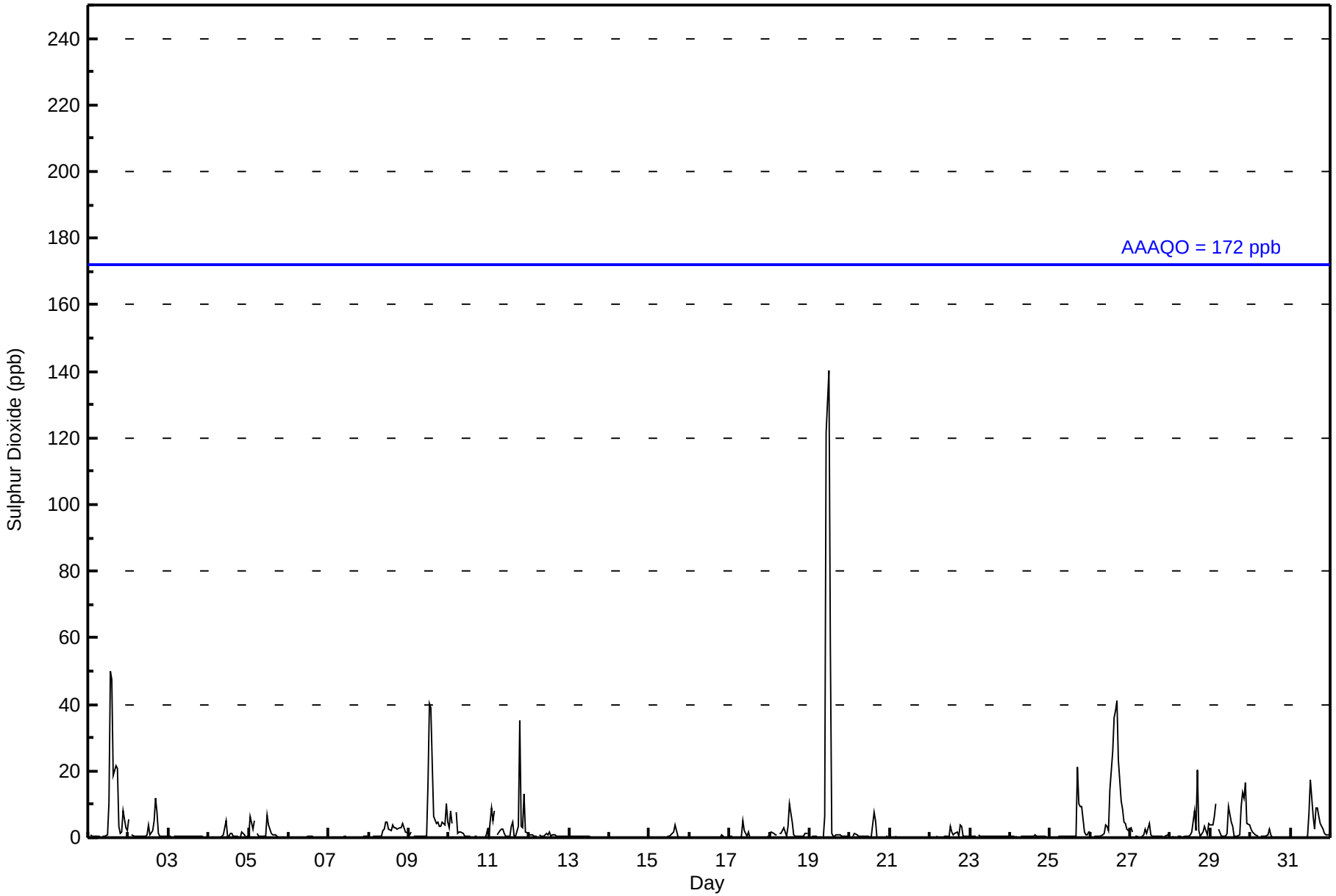
Z - zerospan C - Calibration M - Maintenance
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Lower Camp - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Lower Camp - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	674	95.87	95.87
11 - 20	12	1.71	97.58
21 - 60	15	2.13	99.72
61 - 110	0	0.00	99.72
111 - 172	2	0.28	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Lower Camp - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	76	12	3	9	14	74	114	10	4	1	3	14	20	72	127	120	673
11 - 20	1	0	0	0	0	0	3	1	0	0	1	3	3	0	0	0	12
21 - 60	0	0	0	0	0	0	3	0	1	0	0	4	4	1	2	0	15
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	2	0	0	0	0	2
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	77	12	3	9	14	74	120	11	5	1	4	23	27	73	129	120	702

Total Number of Valid Hours: 702

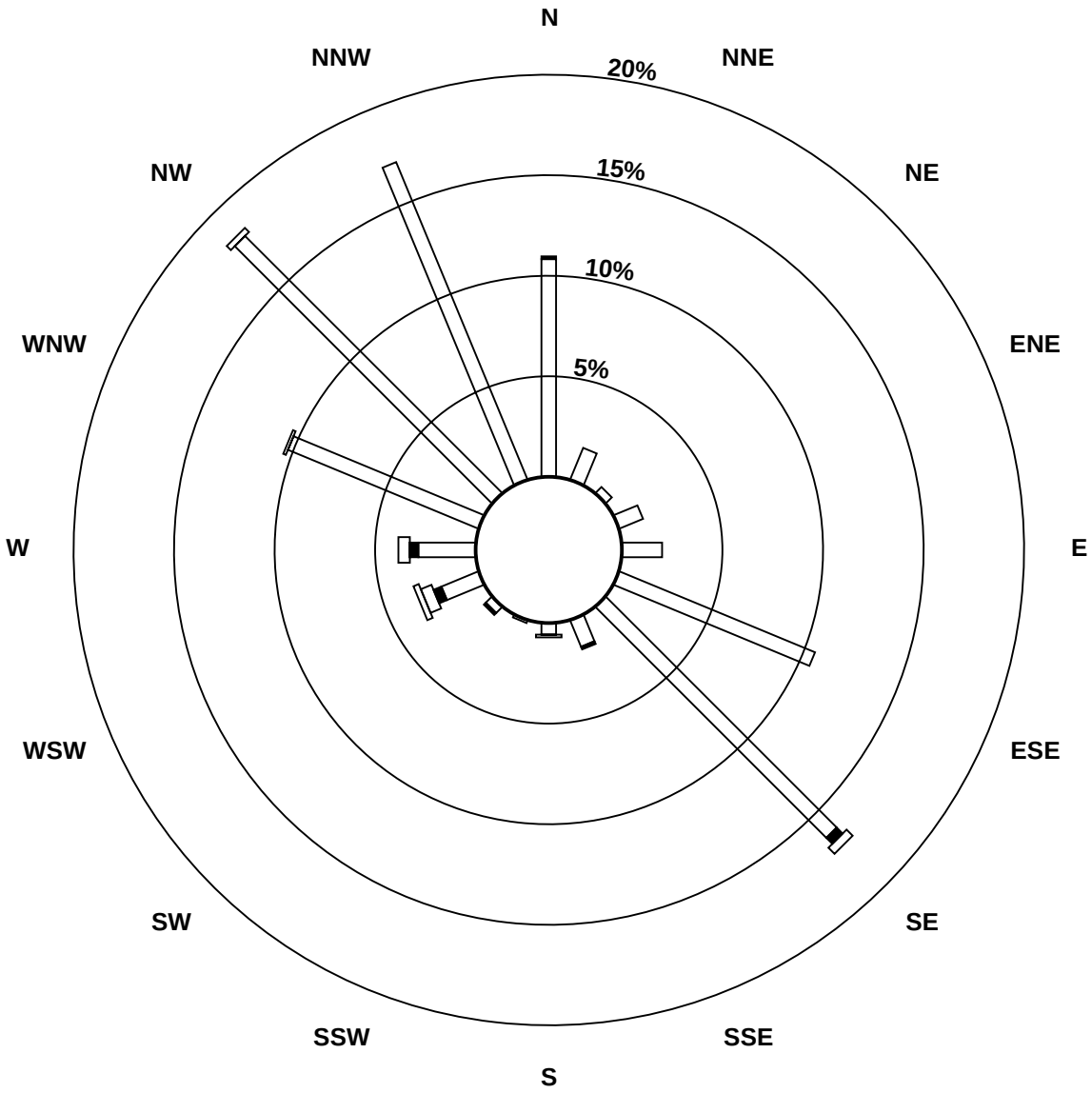
Total Number of Hours: 744

Wood Buffalo Environmental Association

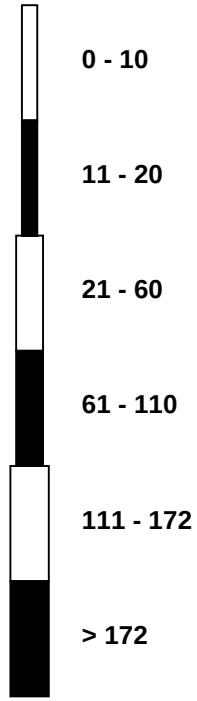
Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Lower Camp (AMS 11)



Classes (ppb)



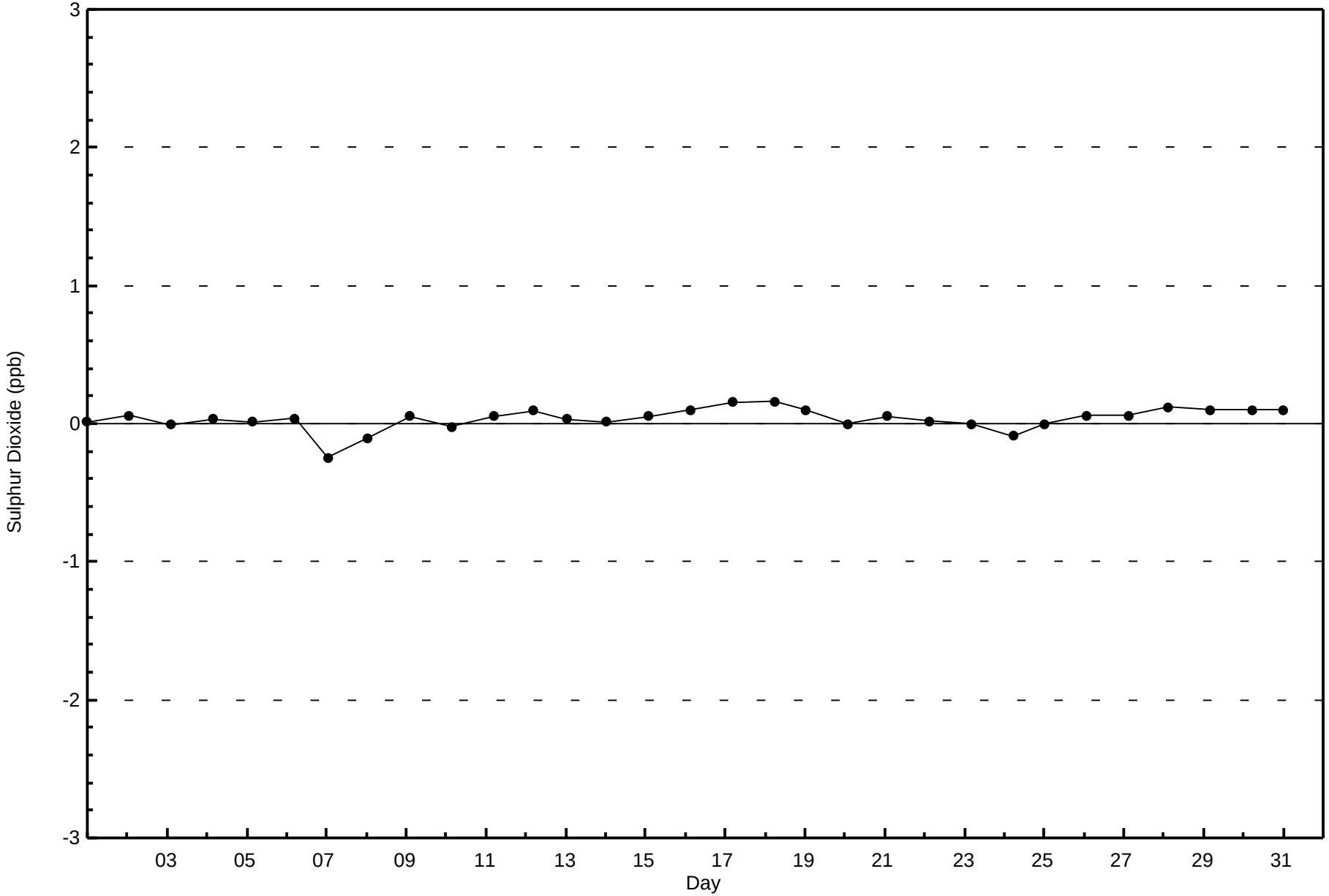
Total Number of Valid Hours: 702

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Lower Camp - March 2016

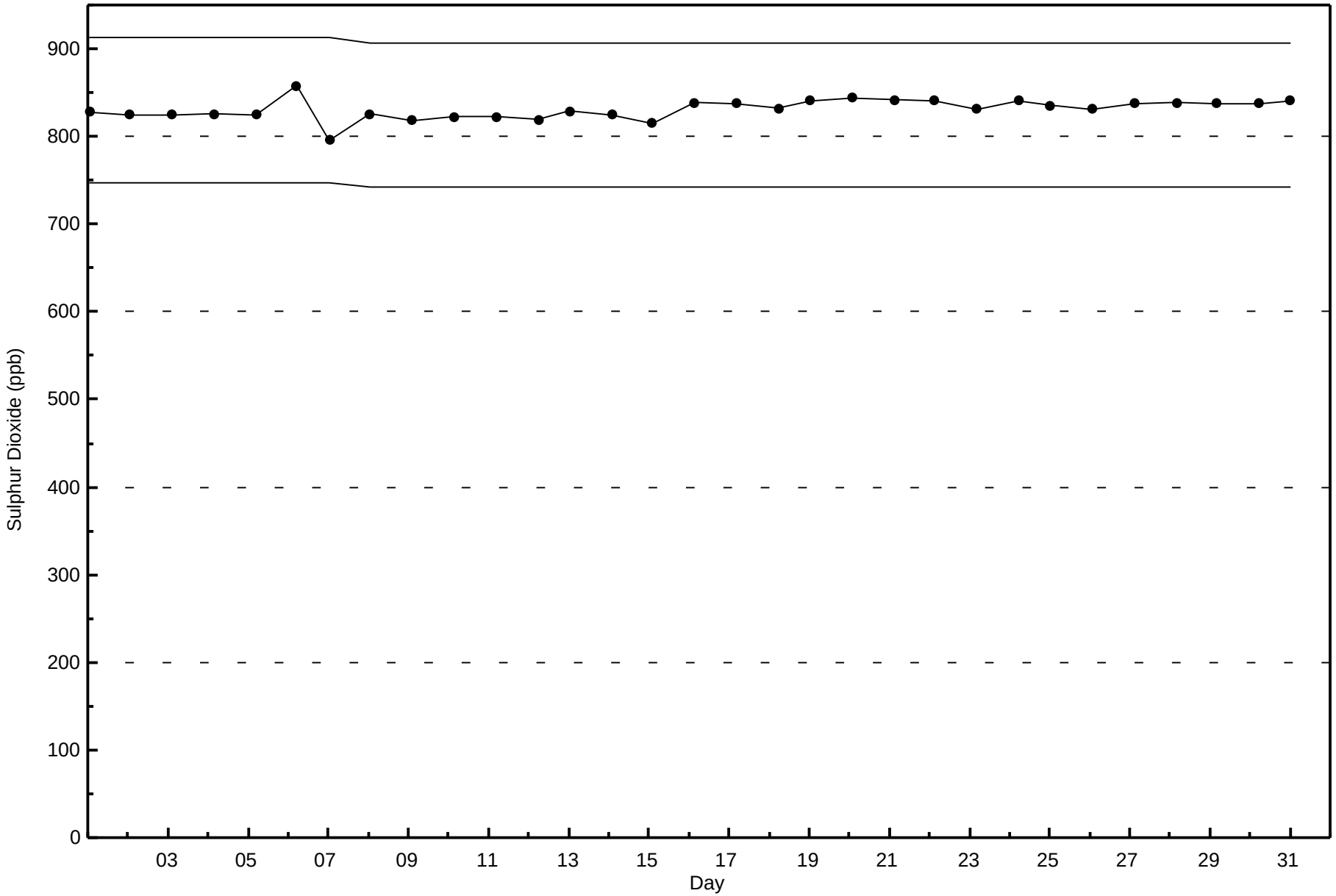


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Lower Camp - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Lower Camp - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 8 ppb on Mar 1 14:00

Maximum Daily Average: 1.6 ppb on Mar 9

Minimum Value: 0 ppb on Mar 14 11:00

Minimum Daily Average: 0.1 ppb on Mar 21

Maximum Diurnal Average: 0.7 ppb at hour 14

Minimum Diurnal Average: 0.3 ppb at hour 10

Monthly Average: 0.6 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 4$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	34
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	1	8	6	1	2	1	1	1	1	4	2	2	1.5	8
2-Mar	3	1	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.5	3
3-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0.2	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	0.3	0
5-Mar	0	1	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	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	0.2	0
7-Mar	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	3	5	3	0	0	0	0	0	0.8	5
8-Mar	0	0	Z	0	0	0	0	0	1	1	2	1	0	1	1	1	1	1	1	1	1	1	0	0	0.6	2
9-Mar	0	0	0	Z	0	0	0	0	0	0	0	3	7	6	4	1	1	1	1	1	2	2	4	3	1.6	7
10-Mar	2	3	2	2	Z	1	2	2	1	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0.9	3
11-Mar	0	1	1	2	0	Z	0	0	0	0	0	0	0	0	1	0	0	1	5	1	1	2	1	0	0.8	5
12-Mar	1	1	1	1	1	1	Z	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1
13-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
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	0.1	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	0	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
17-Mar	0	1	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	1
18-Mar	1	1	1	0	1	1	Z	1	1	1	0	1	2	0	0	0	0	0	0	0	0	2	2	2	0.7	2
19-Mar	2	Z	3	2	2	2	3	2	1	1	2	4	2	0	0	0	0	0	0	0	0	0	0	0	1.2	4
20-Mar	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.3	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	0.1	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	1	1	0.2	1
24-Mar	1	2	1	2	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.6	2
25-Mar	1	Z	1	0	0	0	1	1	0	0	0	0	1	0	0	0	2	2	2	3	3	3	1	1	1.0	3
26-Mar	1	1	Z	1	1	1	1	1	0	0	0	0	0	1	2	2	2	1	1	1	1	1	0	1	0.8	2
27-Mar	1	0	0	Z	1	1	1	1	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0.5	1
28-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	2	0.4	2
29-Mar	1	1	1	1	1	Z	0	0	0	0	0	1	0	0	0	0	0	0	1	2	1	4	2	2	0.9	4
30-Mar	1	1	1	1	1	1	Z	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
31-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0.4	4
	0.6	0.6	0.6	0.7	0.5	0.5	0.5	0.5	0.4	0.3	0.4	0.6	0.7	0.7	0.7	0.3	0.5	0.5	0.6	0.5	0.6	0.7	0.6	0.6	Diurnal Average	
	3	3	3	2	2	2	3	2	1	1	2	4	7	8	6	2	3	5	5	3	4	4	4	3	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

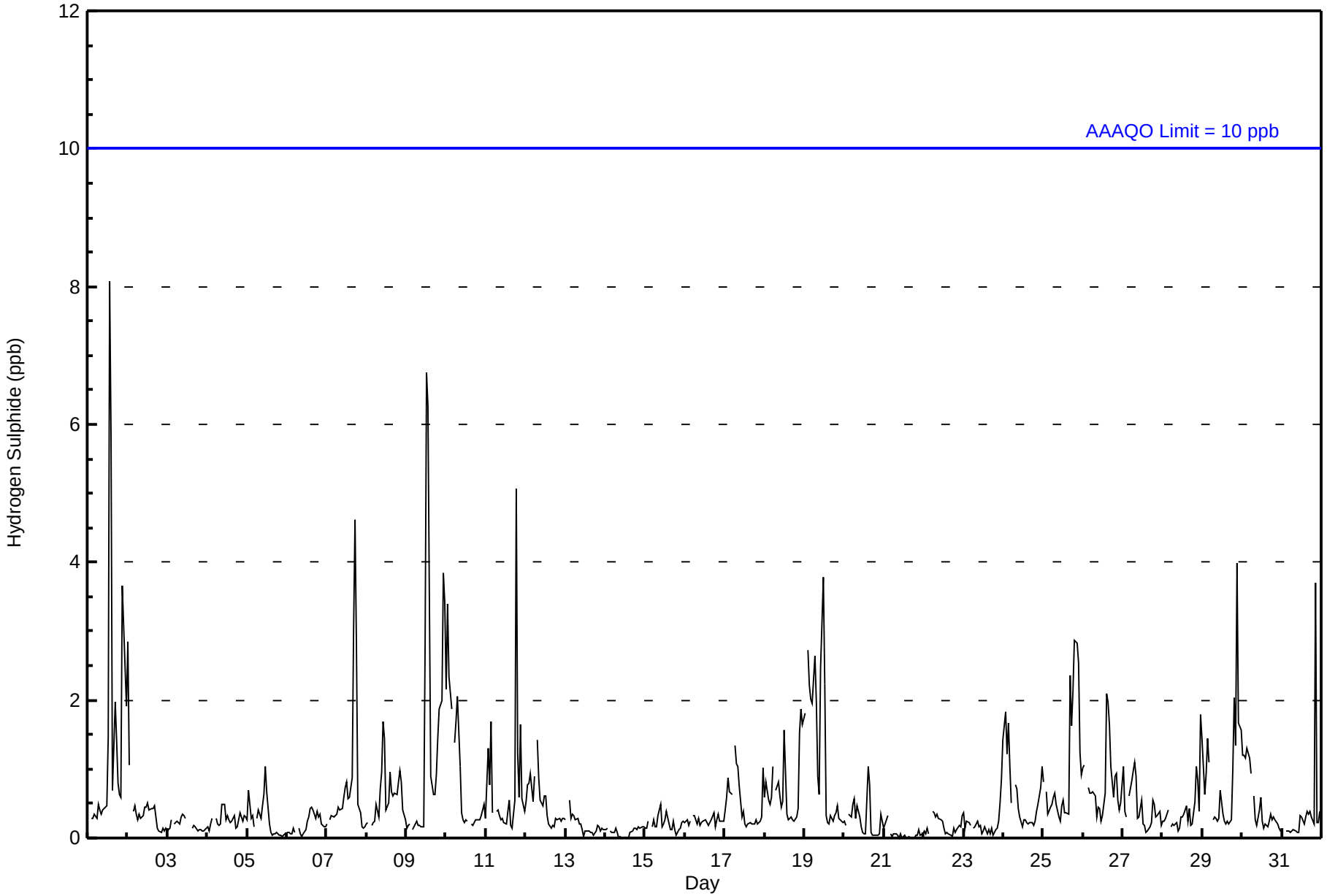
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Lower Camp - March 2016



Hydrogen Sulphide (H_2S) - ppb
Lower Camp - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	686	96.76	96.76
3 - 4	17	2.40	99.15
5 - 7	5	0.71	99.86
8 - 11	1	0.14	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 (H_2S) - ppb

Lower Camp - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	74	11	4	9	14	77	118	11	5	1	4	20	25	68	127	117	685
3 - 4	0	0	0	0	0	0	1	1	0	0	1	3	2	6	2	1	17
5 - 7	0	0	0	0	0	0	0	0	0	0	1	1	2	1	0	0	5
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	74	11	4	9	14	77	119	12	5	1	6	24	30	75	129	118	708

Total Number of Valid Hours: 708

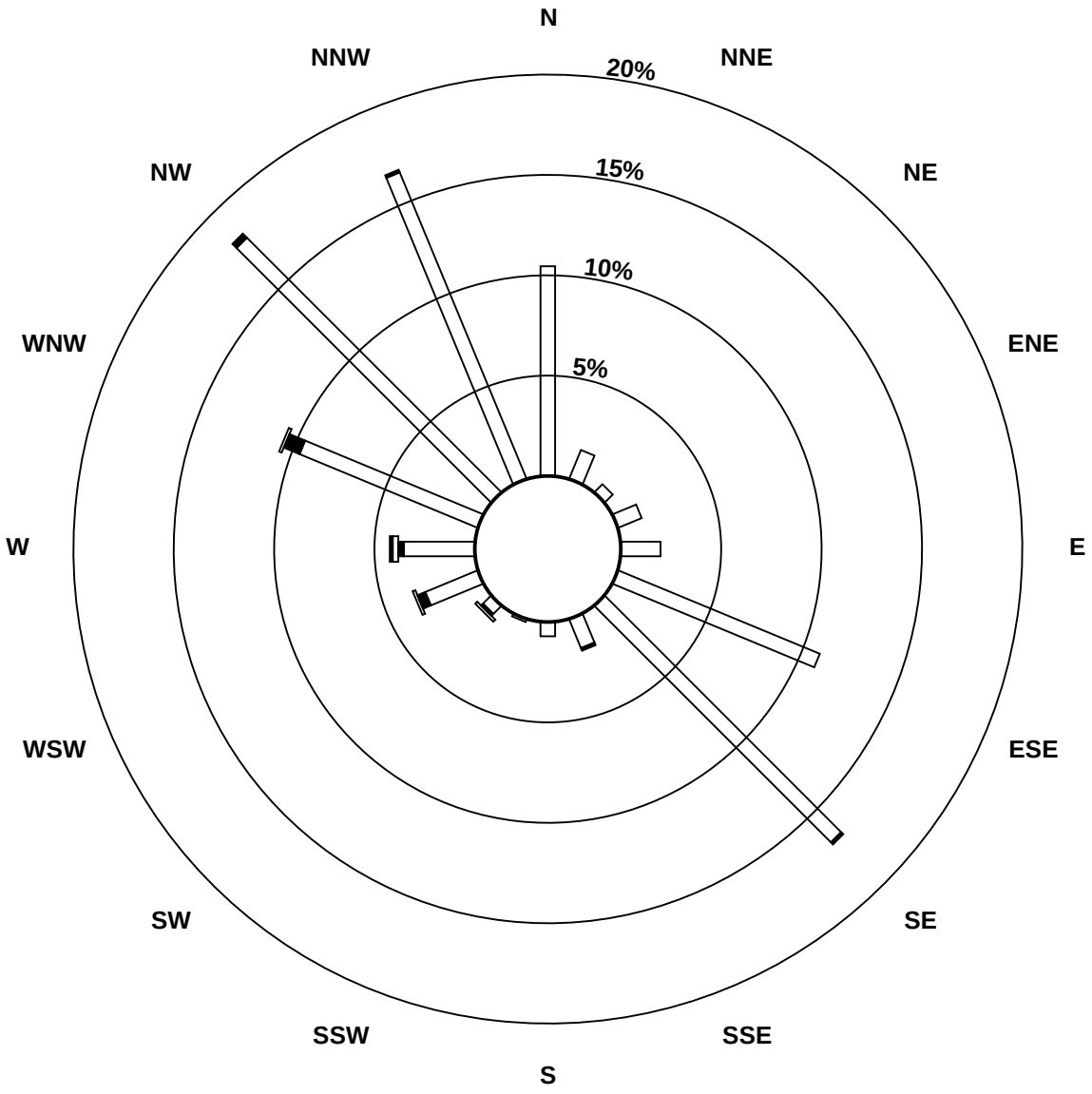
Total Number of Hours: 744

Wood Buffalo Environmental Association

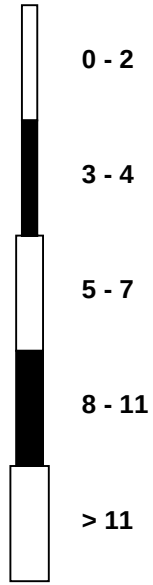
Wind Rose Mar 2016

Hydrogen Sulphide (H_2S) - ppb

Lower Camp (AMS 11)



Classes (ppb)



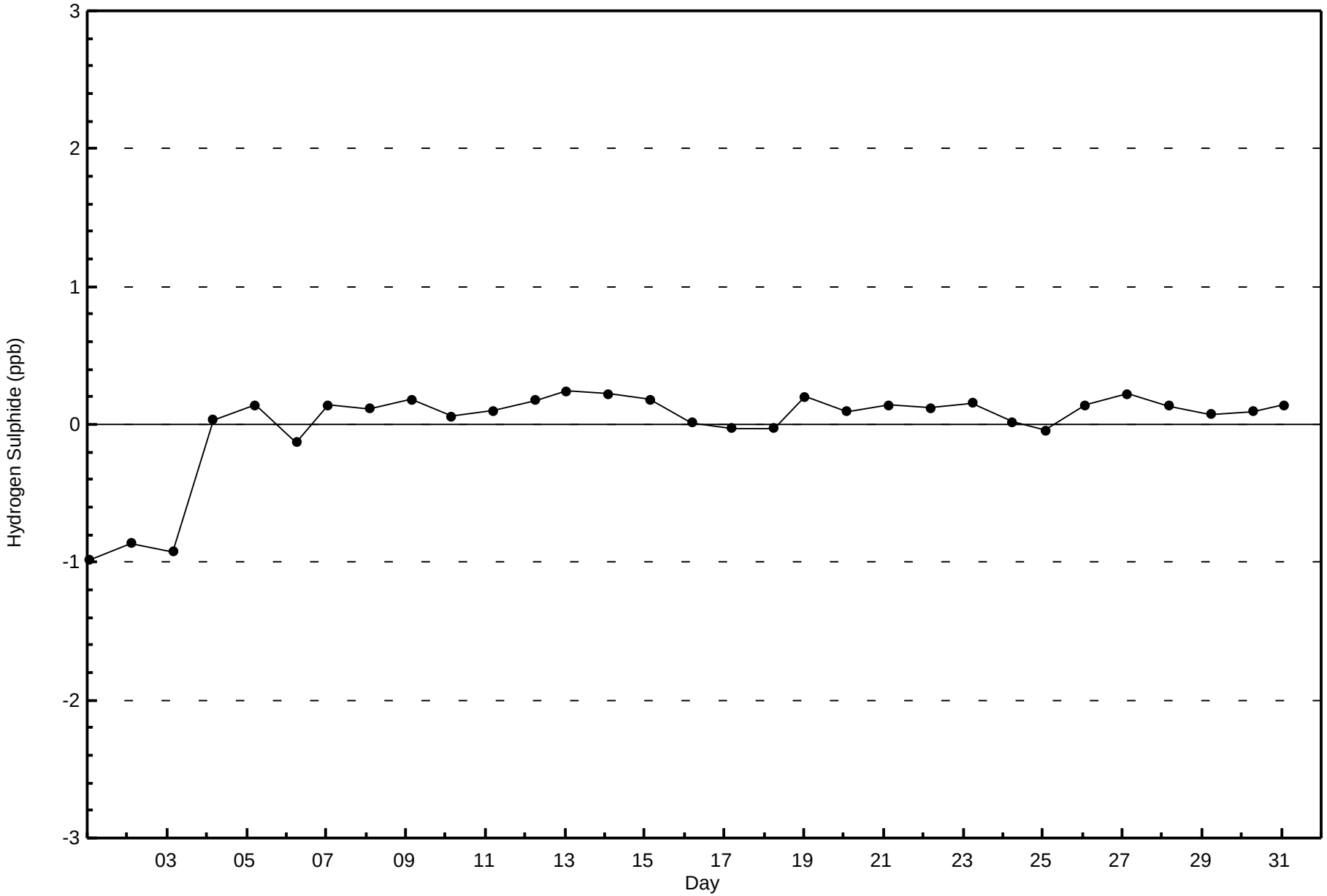
Total Number of Valid Hours: 708

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Lower Camp - March 2016

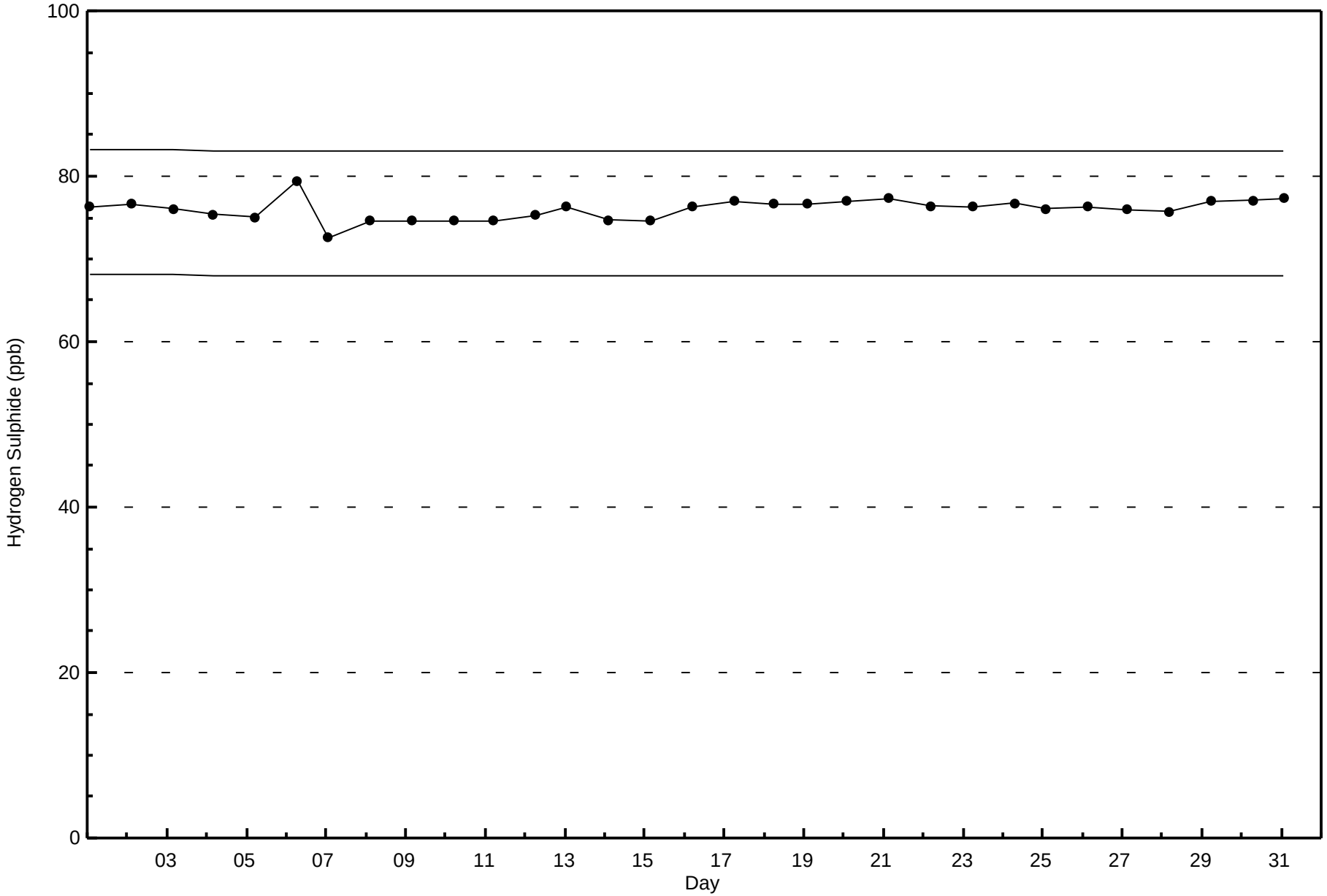


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Lower Camp - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Lower Camp - March 2016

Maximum Value: 4.5 ppm on Mar 10 02:00

Maximum Daily Average: 2.8 ppm on Mar 12

Minimum Value: 1.8 ppm on Mar 14 14:00

Minimum Daily Average: 2.1 ppm on Mar 14

Maximum Diurnal Average: 2.5 ppm at hour 2

Minimum Diurnal Average: 2.3 ppm at hour 18

Monthly Average: 2.35 ppm

Percentiles: P_1 = 2.0 P_{10} = 2.1 Q_1 = 2.1 Median = 2.3 Q_3 = 2.5 P_{90} = 2.7 P_{99} = 3.5

Hours in Service:	744
Hours of Data:	700
Hours of Missing Data:	44
Hours of Calibration:	43
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	2.7	2.6	2.6	2.6	2.4	2.6	2.7	2.8	2.4	2.5	2.7	2.5	3.5	2.7	2.4	2.4	2.5	2.5	2.4	2.3	2.4	2.4	2.3	2.6	3.5
2-Mar	2.5	Z	2.4	2.3	2.4	2.3	2.2	2.3	2.2	2.2	2.3	2.4	2.3	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.3	2.5
3-Mar	2.2	2.2	Z	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.4
4-Mar	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.6	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.4	2.6	2.4	2.1	2.3	2.1	2.3	2.6
5-Mar	2.3	2.2	2.2	2.1	Z	2.7	2.5	2.4	2.3	2.6	2.8	2.6	2.4	2.2	2.5	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.8
6-Mar	2.1	2.1	2.1	2.0	2.0	Z	2.1	2.1	2.0	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.1	2.2	2.2	2.3
7-Mar	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.3	C	C	C	C	C	C	C	C	C	2.3	2.3	2.0	2.2	--	2.4
8-Mar	2.3	Z	2.3	2.1	2.3	2.3	2.3	2.3	2.4	2.6	2.5	2.7	2.6	2.5	2.5	2.4	2.3	2.3	2.5	2.8	3.0	2.9	2.4	2.1	2.5	3.0
9-Mar	2.2	2.3	Z	2.4	2.1	2.3	2.4	2.3	2.3	2.4	C	C	C	3.5	2.5	2.2	2.4	2.3	2.3	2.7	2.7	2.7	3.3	3.5	2.5	3.5
10-Mar	3.4	4.5	3.6	Z	3.2	3.4	3.4	3.4	2.7	2.3	2.1	2.0	2.3	2.2	M	2.0	1.9	1.9	2.2	2.1	2.4	2.5	2.2	1.9	2.6	4.5
11-Mar	2.1	2.3	2.1	2.6	Z	2.6	2.4	2.2	2.1	2.6	2.3	2.1	2.1	2.1	2.4	2.1	1.9	2.1	2.5	2.2	2.4	3.2	2.6	2.5	2.3	3.2
12-Mar	2.7	3.3	3.3	3.3	3.1	Z	3.1	3.0	2.6	2.5	2.4	2.8	2.7	2.8	2.7	2.4	2.6	2.7	3.1	2.8	2.7	2.6	3.0	3.3	2.8	3.3
13-Mar	Z	2.7	2.4	2.6	2.5	2.5	2.7	2.7	2.7	2.5	2.3	2.2	2.1	2.1	2.2	2.3	2.2	2.1	2.2	2.3	2.3	2.3	2.1	2.0	2.3	2.7
14-Mar	2.1	Z	2.2	2.0	2.1	2.2	2.2	2.0	2.0	2.1	2.2	2.1	1.9	1.8	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2
15-Mar	2.2	2.3	Z	2.2	2.4	2.4	2.3	2.3	2.3	2.3	2.1	2.1	2.2	2.4	2.1	2.1	2.1	2.2	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.4
16-Mar	2.1	2.2	2.1	Z	2.2	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.0	2.3	2.3	2.1	2.0	2.0	2.1	2.3
17-Mar	2.1	2.5	2.2	2.2	Z	2.1	2.2	2.3	2.3	2.4	2.2	2.3	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.0	2.0	2.2	2.1	2.1	2.2	2.5
18-Mar	2.3	2.5	2.6	2.7	2.6	Z	2.7	2.6	2.5	2.2	2.2	2.1	2.2	2.4	2.4	2.6	2.3	2.3	2.4	2.9	2.5	2.6	2.7	2.6	2.5	2.9
19-Mar	Z	3.0	2.9	2.9	2.8	2.6	2.4	2.3	2.3	2.3	2.4	2.6	2.7	2.4	2.3	2.4	2.5	2.4	2.3	2.4	2.4	2.3	2.3	2.3	2.5	3.0
20-Mar	2.3	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.4	2.2	2.2	2.4
21-Mar	2.3	2.3	Z	2.2	2.1	2.1	2.0	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	2.2	2.2	2.2	2.1	2.3
22-Mar	2.2	2.2	2.3	Z	2.2	2.3	2.3	2.3	2.4	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.4	2.4	2.4	2.2	2.4
23-Mar	2.3	2.1	2.3	2.2	Z	2.3	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.3
24-Mar	2.3	2.3	2.3	2.2	2.4	Z	2.4	2.3	2.3	2.6	2.7	2.4	2.5	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.7
25-Mar	Z	2.3	2.2	2.1	2.1	2.2	2.4	2.4	2.3	2.1	2.2	2.4	2.6	2.5	2.4	2.3	2.7	2.8	3.9	3.7	3.0	3.3	2.8	2.9	2.6	3.9
26-Mar	2.8	Z	2.8	2.6	2.6	2.7	2.7	2.6	2.4	2.4	2.5	2.3	2.4	2.4	2.3	2.4	2.5	2.5	2.6	2.9	2.9	2.6	2.5	2.4	2.5	2.9
27-Mar	2.7	2.5	Z	2.7	2.6	2.6	2.6	2.6	2.5	2.4	2.4	2.5	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.6	2.5	2.4	2.3	2.3	2.5	2.7
28-Mar	2.4	2.6	2.3	Z	2.3	2.2	2.2	2.1	2.2	2.2	2.4	2.5	2.5	2.5	2.9	2.8	2.6	2.6	2.4	3.7	3.6	2.8	2.5	2.6	2.6	3.7
29-Mar	2.3	2.1	2.1	2.2	Z	2.1	2.0	2.0	2.0	2.1	2.3	2.4	2.3	2.3	2.4	2.4	2.5	2.6	2.9	3.1	3.1	2.9	2.7	2.6	2.4	3.1
30-Mar	2.8	2.9	3.3	3.3	3.2	Z	3.2	2.7	2.4	2.3	2.5	2.7	2.5	2.3	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.0	2.5	3.3
31-Mar	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.1	2.2	2.3	2.2	2.1	2.1	2.3	2.1	2.3	2.3	2.1	2.3
	2.4	2.5	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	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.3	Diurnal Average	
	3.4	4.5	3.6	3.3	3.2	3.4	3.4	3.4	2.8	2.6	2.8	2.8	2.7	3.5	2.9	2.8	2.7	2.8	3.9	3.7	3.6	3.3	3.3	3.5	Diurnal Maximum	

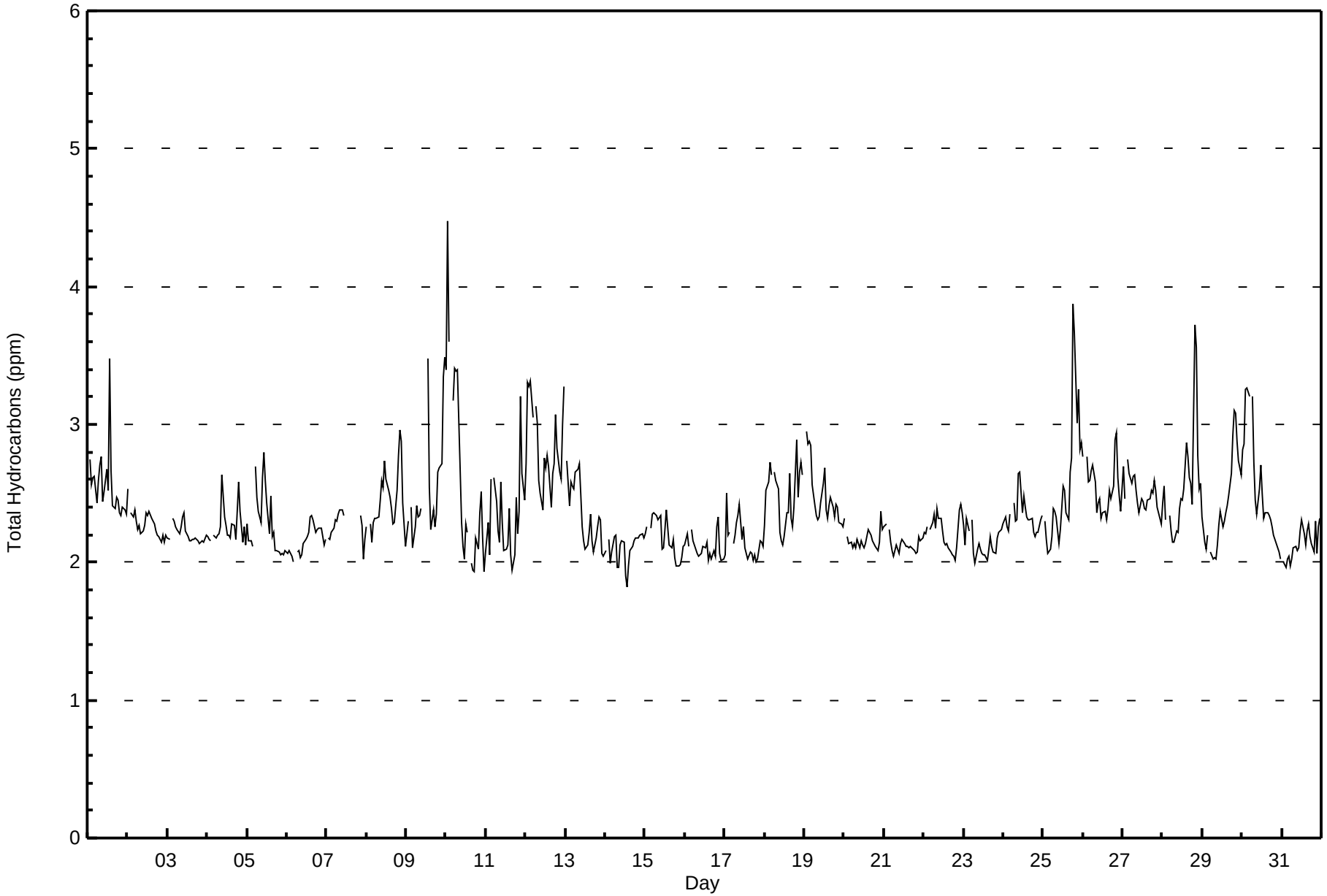
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Lower Camp - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Lower Camp - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	47	6.71	6.71
2.1 - 3.0	623	89.00	95.71
3.1 - 10.0	30	4.29	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 700

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Hydrocarbons (THC) - ppm

Lower Camp - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	18	1	1	0	0	4	6	0	0	0	0	0	0	4	4	9	47
2.1 - 3.0	58	11	2	9	13	67	112	10	4	1	3	21	22	61	119	109	622
3.1 - 10.0	1	0	0	0	1	3	2	1	1	0	1	1	4	8	5	2	30
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	77	12	3	9	14	74	120	11	5	1	4	22	26	73	128	120	699

Total Number of Valid Hours: 699

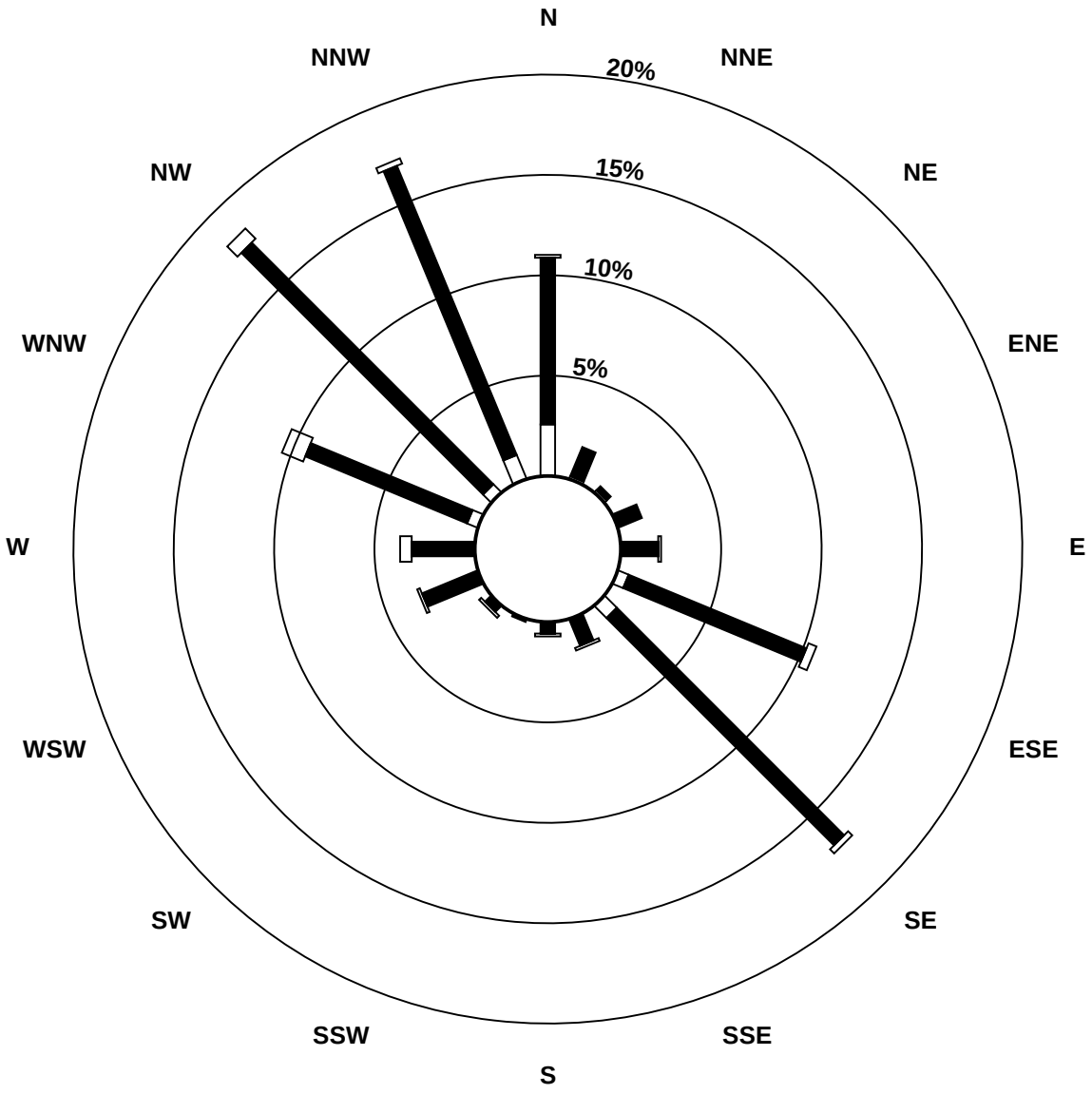
Total Number of Hours: 744

Wood Buffalo Environmental Association

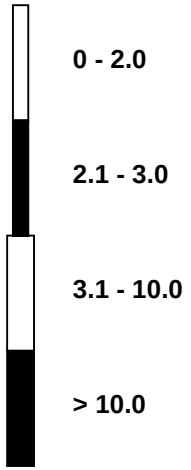
Wind Rose Mar 2016

Total Hydrocarbons (THC) - ppm

Lower Camp (AMS 11)



Classes (ppm)



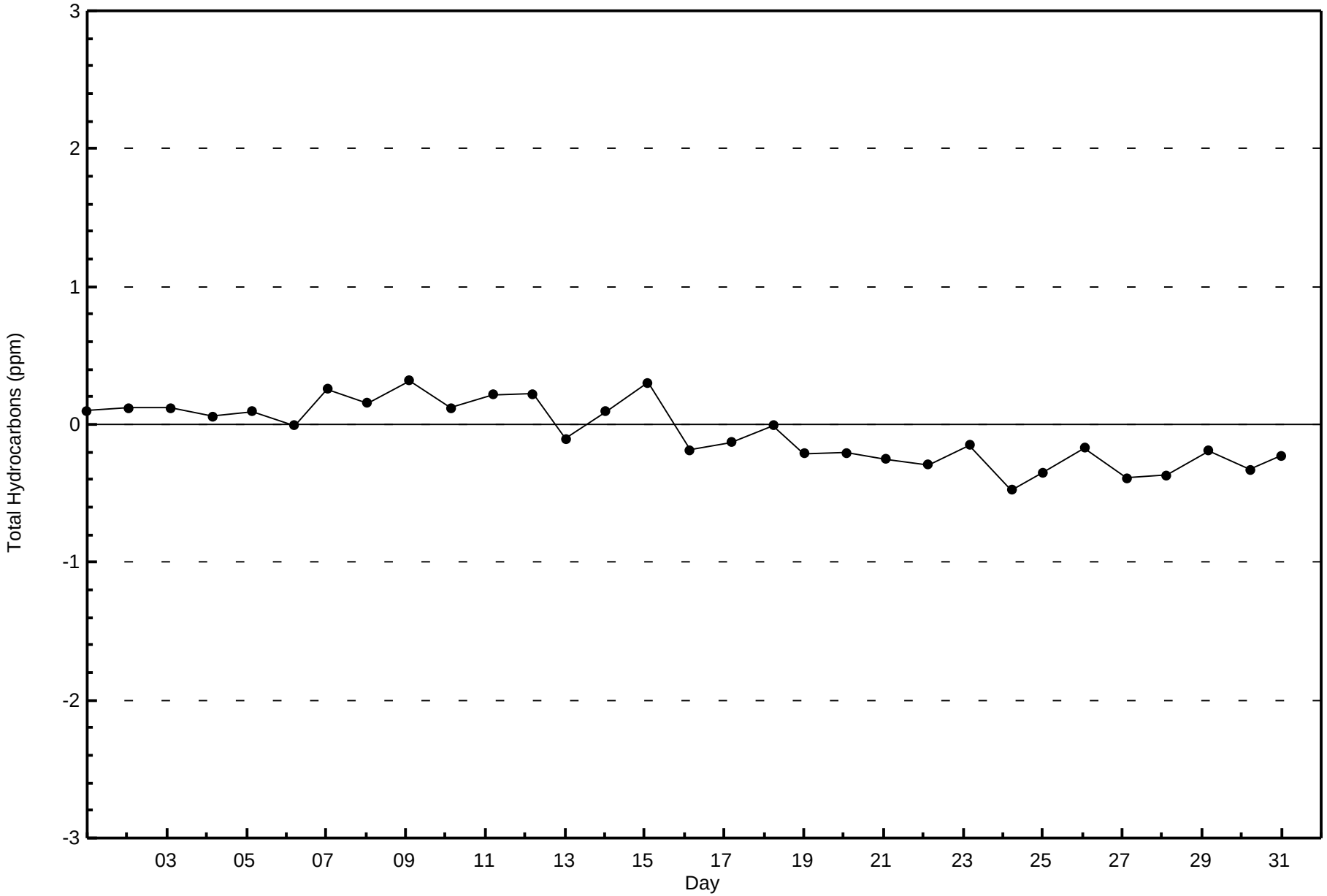
Total Number of Valid Hours: 699

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Lower Camp - March 2016

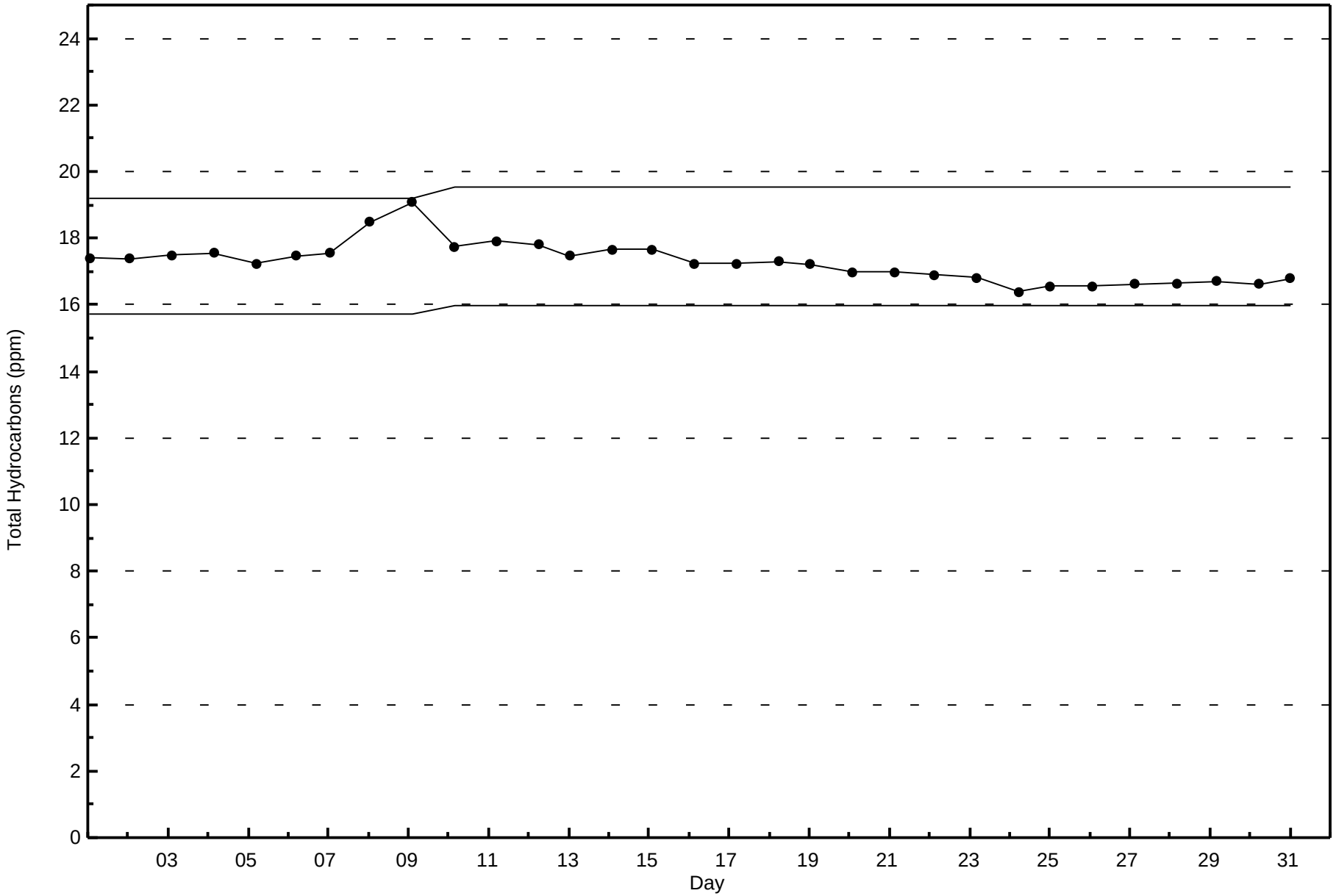


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Lower Camp - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Lower Camp - March 2016

Maximum Value: 13.4 C on Mar 29 17:00

Maximum Daily Average: 4.8 C on Mar 29

Minimum Value: -21.2 C on Mar 24 07:00

Minimum Daily Average: -10.7 C on Mar 24

Maximum Diurnal Average: 0.8 C at hour 17

Minimum Diurnal Average: -7.7 C at hour 7

Monthly Average: -3.63 C

Percentiles: P_1 = -16.9 P_{10} = -9.6 Q_1 = -7.2 Median = -3.9 Q_3 = -0.2 P_{90} = 2.8 P_{99} = 11.0

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

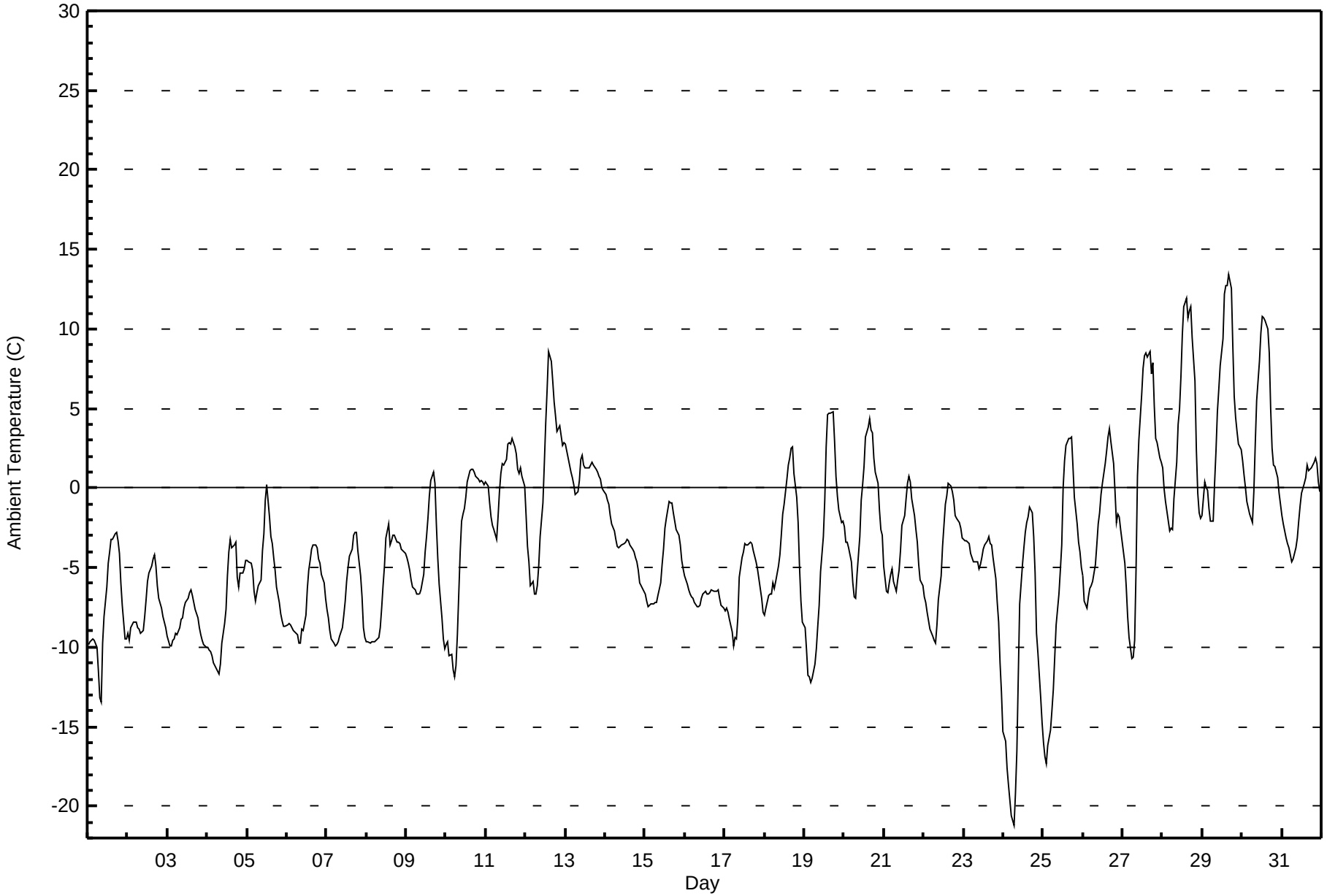
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-9.9	-9.7	-9.6	-9.5	-9.5	-10.0	-11.5	-13.2	-13.5	-9.8	-8.1	-6.2	-4.7	-4.0	-3.2	-3.3	-2.9	-2.8	-3.3	-4.1	-5.9	-7.4	-9.4	-9.5	-7.5	-2.8
2-Mar	-9.1	-9.6	-8.8	-8.4	-8.4	-8.4	-8.7	-8.9	-9.1	-8.9	-8.0	-7.0	-5.9	-5.4	-4.9	-4.5	-4.2	-4.9	-6.1	-6.9	-7.5	-8.1	-8.4	-8.8	-7.5	-4.2
3-Mar	-9.3	-9.9	-9.9	-9.6	-9.4	-9.2	-9.3	-8.8	-8.2	-8.2	-7.5	-7.2	-7.0	-6.6	-6.4	-6.8	-7.2	-7.6	-8.2	-8.8	-9.2	-9.6	-9.8	-10.0	-8.5	-6.4
4-Mar	-10.0	-10.2	-10.3	-10.5	-11.0	-11.3	-11.5	-11.7	-11.1	-9.8	-8.5	-7.6	-5.5	-4.1	-3.2	-3.8	-3.6	-3.4	-5.6	-6.2	-5.4	-5.3	-5.1	-4.6	-7.5	-3.2
5-Mar	-4.6	-4.7	-4.7	-5.2	-6.5	-7.1	-6.6	-6.1	-5.8	-3.9	-2.9	-0.7	0.2	-1.8	-3.1	-3.5	-4.4	-5.2	-6.2	-7.2	-7.9	-8.4	-8.7	-8.7	-5.2	0.2
6-Mar	-8.6	-8.5	-8.6	-8.7	-8.9	-9.0	-9.2	-9.7	-9.8	-8.9	-8.9	-8.0	-6.3	-5.1	-4.5	-3.9	-3.6	-3.6	-3.8	-4.5	-4.7	-5.4	-6.0	-7.0	-6.9	-3.6
7-Mar	-7.6	-8.2	-8.9	-9.5	-9.7	-9.9	-9.8	-9.7	-9.3	-8.8	-8.0	-7.1	-5.9	-5.0	-4.3	-3.8	-3.0	-2.8	-2.8	-3.9	-5.5	-6.9	-8.8	-9.4	-7.0	-2.8
8-Mar	-9.6	-9.7	-9.8	-9.7	-9.7	-9.6	-9.6	-9.4	-8.8	-7.5	-6.1	-4.9	-3.1	-2.2	-3.6	-3.3	-2.9	-2.9	-3.4	-3.4	-3.5	-3.8	-4.0	-4.1	-6.0	-2.2
9-Mar	-4.4	-4.7	-5.2	-5.7	-6.2	-6.4	-6.7	-6.7	-6.6	-6.4	-5.4	-4.0	-3.0	-1.9	-0.5	0.5	1.0	0.3	-2.2	-4.3	-6.0	-8.1	-9.5	-10.1	-4.7	1.0
10-Mar	-9.8	-9.7	-10.5	-10.4	-11.4	-11.9	-11.2	-9.2	-4.0	-2.0	-1.6	-1.3	-0.5	0.3	1.1	1.1	1.1	1.0	0.7	0.6	0.4	0.5	0.4	0.2	-3.6	1.1
11-Mar	0.4	0.1	-1.0	-1.8	-2.4	-2.6	-3.2	-1.8	-0.2	0.9	1.6	1.5	1.8	2.7	2.8	2.8	3.1	2.6	2.1	1.2	0.9	1.3	0.7	0.1	0.6	3.1
12-Mar	-1.7	-3.6	-4.7	-6.2	-5.9	-6.6	-6.7	-6.1	-4.9	-3.0	-0.9	1.5	4.1	6.2	8.6	8.0	6.7	5.4	4.5	3.5	3.9	3.3	2.7	2.8	0.5	8.6
13-Mar	2.8	2.3	1.5	1.0	0.6	0.2	-0.4	-0.2	0.5	1.8	2.1	1.5	1.2	1.2	1.3	1.5	1.6	1.4	1.2	1.0	0.7	0.5	0.1	-0.2	1.0	2.8
14-Mar	-0.4	-0.7	-1.1	-1.8	-2.2	-2.7	-3.2	-3.7	-3.7	-3.7	-3.6	-3.5	-3.4	-3.2	-3.3	-3.6	-3.8	-4.0	-4.4	-4.6	-5.2	-5.9	-6.3	-6.5	-3.5	-0.4
15-Mar	-6.7	-7.1	-7.4	-7.3	-7.2	-7.3	-7.2	-7.2	-6.8	-6.0	-4.9	-3.8	-2.6	-1.9	-0.9	-0.9	-0.9	-1.5	-2.1	-2.6	-3.0	-3.6	-4.5	-5.1	-4.5	-0.9
16-Mar	-5.5	-6.1	-6.4	-6.7	-6.8	-6.9	-7.2	-7.5	-7.4	-7.4	-6.9	-6.7	-6.5	-6.6	-6.7	-6.5	-6.4	-6.5	-6.5	-6.5	-6.4	-6.9	-7.4	-7.6	-6.8	-5.5
17-Mar	-7.7	-7.6	-7.8	-8.2	-9.0	-9.9	-9.4	-9.5	-8.1	-5.6	-4.3	-4.0	-3.5	-3.5	-3.6	-3.4	-3.5	-3.9	-4.3	-4.6	-5.1	-6.3	-6.9	-7.8	-6.2	-3.4
18-Mar	-8.0	-7.5	-6.7	-6.7	-6.6	-6.0	-6.3	-5.9	-4.9	-4.2	-3.0	-1.7	-1.0	0.6	1.4	1.9	2.5	2.5	0.9	-0.6	-2.2	-5.0	-7.1	-8.5	-3.4	2.5
19-Mar	-8.7	-10.2	-11.8	-11.9	-12.2	-11.9	-11.0	-10.1	-8.7	-7.4	-5.3	-3.0	-0.8	2.6	4.6	4.7	4.7	4.8	3.0	0.8	-0.5	-1.4	-2.2	-2.1	-3.9	4.8
20-Mar	-2.4	-3.4	-3.4	-3.8	-4.7	-6.0	-6.9	-6.9	-5.4	-3.1	-0.8	0.2	1.4	3.2	3.8	4.3	3.6	3.4	1.9	1.0	0.3	-1.4	-2.6	-3.0	-1.3	4.3
21-Mar	-4.9	-6.5	-6.6	-6.0	-5.4	-5.1	-5.9	-6.5	-5.8	-5.1	-3.9	-2.4	-1.7	-0.7	0.3	0.7	0.4	-0.7	-1.8	-2.6	-3.4	-4.8	-5.8	-6.1	-3.8	0.7
22-Mar	-6.8	-7.2	-7.8	-8.3	-8.9	-9.3	-9.6	-9.7	-8.6	-7.0	-5.5	-3.7	-2.4	-1.1	-0.5	0.3	0.1	-0.2	-0.8	-1.7	-1.9	-2.1	-2.5	-3.1	-4.5	0.3
23-Mar	-3.3	-3.3	-3.3	-3.5	-4.1	-4.3	-4.6	-4.6	-4.6	-5.1	-4.8	-4.3	-3.9	-3.6	-3.3	-3.1	-3.5	-3.6	-4.4	-5.7	-7.2	-8.4	-11.0	-12.8	-5.0	-3.1
24-Mar	-15.3	-15.9	-17.6	-18.7	-19.6	-20.6	-21.2	-19.2	-16.5	-11.9	-7.3	-4.8	-3.8	-2.8	-2.1	-1.8	-1.2	-1.5	-3.0	-5.4	-9.1	-10.3	-13.2	-14.8	-10.7	-1.2
25-Mar	-16.0	-16.9	-17.3	-16.2	-15.2	-14.0	-12.6	-10.7	-8.6	-6.7	-5.2	-3.6	0.1	1.7	2.7	3.1	3.1	3.2	1.3	-0.6	-2.2	-3.4	-4.0	-5.0	-5.9	3.2
26-Mar	-5.5	-7.1	-7.5	-6.8	-6.3	-6.1	-5.9	-4.8	-3.6	-2.3	-1.6	-0.4	0.3	1.5	2.3	3.2	3.7	3.0	1.6	-0.2	-2.1	-1.6	-1.8	-2.6	-2.1	3.7
27-Mar	-4.0	-4.7	-6.2	-8.1	-9.4	-10.7	-10.6	-9.6	-5.1	0.7	3.1	5.8	7.5	8.3	8.5	8.3	8.6	7.2	7.8	5.1	3.1	2.9	1.9	1.6	0.5	8.6
28-Mar	1.3	0.0	-0.9	-2.1	-2.7	-2.5	-2.6	-0.7	1.6	4.0	5.0	7.0	9.6	11.4	11.9	10.7	11.1	11.4	9.4	6.7	2.4	-0.3	-1.6	-1.9	3.7	11.9
29-Mar	-1.8	0.4	0.1	-0.1	-1.2	-2.1	-2.1	0.3	2.3	4.8	6.2	7.7	9.4	12.2	12.7	12.8	13.4	12.6	8.9	5.8	4.4	3.5	2.7	2.4	4.8	13.4
30-Mar	1.7	0.8	0.1	-0.9	-1.6	-1.9	-2.1	-0.2	2.8	5.5	8.0	9.8	10.8	10.7	10.6	10.0	8.5	5.0	2.5	1.4	1.3	0.6	-0.3	-1.1	3.4	10.8
31-Mar	-1.7	-2.3	-3.2	-3.5	-3.8	-4.2	-4.6	-4.5	-3.7	-3.1	-2.1	-1.1	-0.4	0.3	0.6	1.4	1.1	1.2	1.2	1.6	1.9	1.6	0.4	-0.2	-1.1	1.9
	-5.7	-6.2	-6.6	-6.9	-7.3	-7.5	-7.7	-7.2	-6.0	-4.4	-3.2	-2.0	-0.8	0.1	0.6	0.7	0.8	0.3	-0.7	-1.8	-2.7	-3.6	-4.5	-4.9	Diurnal Average	
	2.8	2.3	1.5	1.0	0.6	0.2	-0.4	0.3	2.8	5.5	8.0	9.8	10.8	12.2	12.7	12.8	13.4	12.6	9.4	6.7	4.4	3.5	2.7	2.8	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Lower Camp - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	2	0.27	0.27
-20 - 0	559	75.13	75.40
0 - 10	169	22.72	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) - %

Lower Camp - March 2016

Maximum Value: 96 % on Mar 10 10:00

Maximum Daily Average: 87.4 % on Mar 9

Minimum Value: 23 % on Mar 24 17:00

Minimum Daily Average: 52.5 % on Mar 24

Maximum Diurnal Average: 82.8 % at hour 7

Minimum Diurnal Average: 59.7 % at hour 16

Monthly Average: 72.2 %

Percentiles: $P_1 = 26$ $P_{10} = 50$ $Q_1 = 63$ Median = 75 $Q_3 = 85$ $P_{90} = 89$ $P_{99} = 95$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

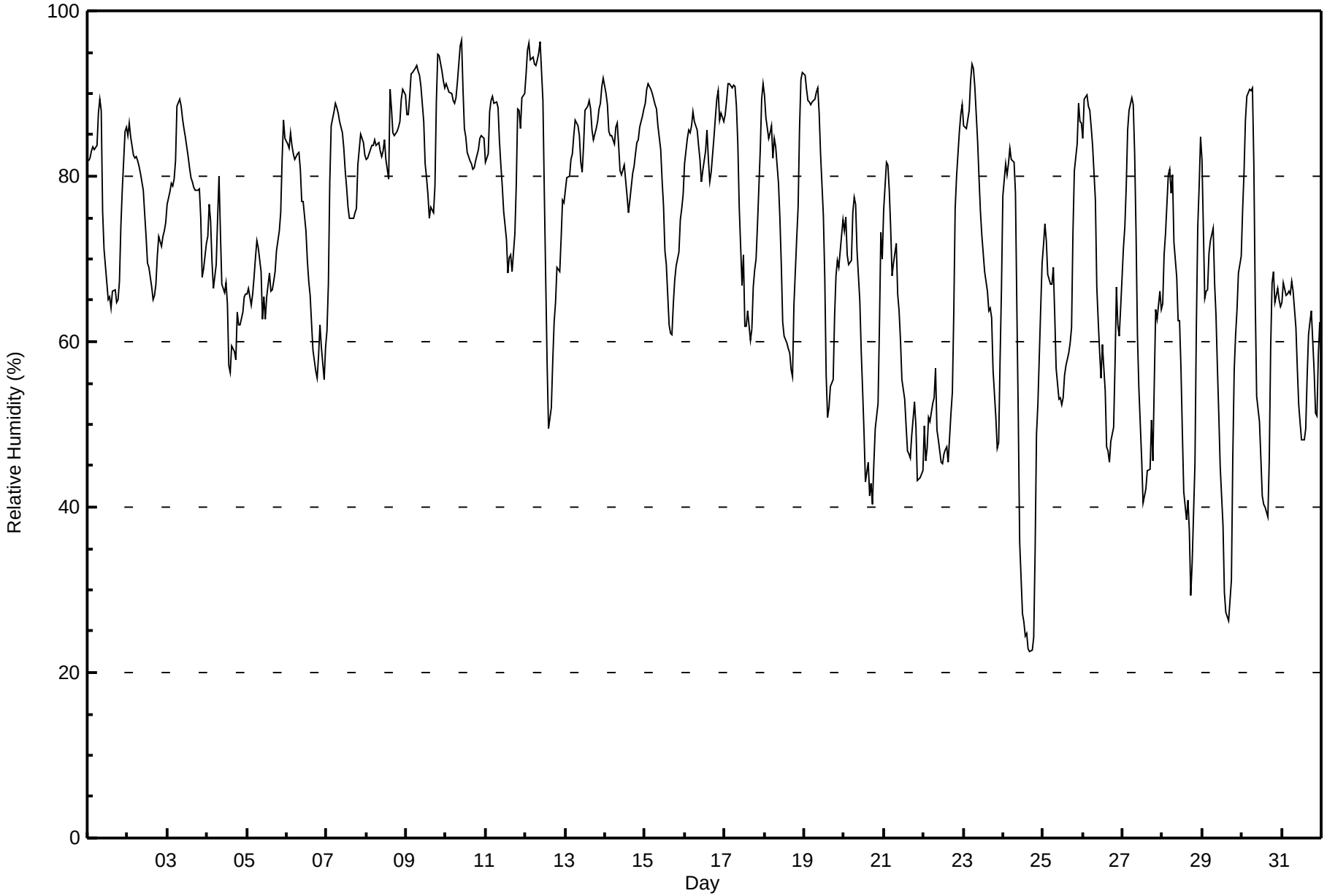
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	82	82	83	84	83	84	88	89	88	76	71	67	65	65	64	66	66	65	65	67	74	78	85	86	76.0	89
2-Mar	85	87	85	83	82	82	82	81	80	78	75	73	70	69	67	65	66	67	70	73	72	73	73	74	75.5	87
3-Mar	77	78	79	79	80	82	88	89	88	87	86	85	82	81	80	79	79	78	78	78	75	68	69	72	79.9	89
4-Mar	73	77	75	70	66	69	75	80	73	67	66	67	65	57	56	60	59	58	64	62	62	64	65	66	66.4	80
5-Mar	66	66	64	66	68	70	72	71	68	63	65	63	65	68	66	66	67	68	71	73	76	82	87	85	69.9	87
6-Mar	84	83	85	84	83	82	83	83	81	77	77	73	70	67	66	62	59	57	56	58	62	59	55	59	71.0	85
7-Mar	61	67	79	86	88	89	88	88	87	85	83	81	79	76	75	75	75	76	76	81	85	85	84	83	80.5	89
8-Mar	82	82	83	84	84	84	84	84	83	82	83	84	82	80	91	88	85	85	85	86	87	89	91	90	84.9	91
9-Mar	88	87	90	92	93	93	93	93	92	91	87	82	80	78	75	76	76	79	89	95	95	93	91	91	87.4	95
10-Mar	91	91	90	90	89	89	90	91	96	96	90	86	85	83	82	82	81	81	82	83	85	85	85	85	86.9	96
11-Mar	82	83	88	89	90	89	89	88	84	81	79	76	72	68	70	70	69	73	79	88	88	86	89	90	81.7	90
12-Mar	92	95	96	94	94	94	93	94	95	96	89	78	67	57	50	52	58	62	65	69	69	72	77	77	78.6	96
13-Mar	78	80	80	82	83	85	87	86	85	82	80	84	88	89	89	88	86	84	86	87	88	89	91	92	85.3	92
14-Mar	90	89	85	85	85	84	86	86	84	81	80	81	80	78	76	77	80	81	83	84	84	86	87	88	83.3	90
15-Mar	89	91	91	90	90	89	89	88	86	83	79	76	71	69	62	61	61	65	67	69	71	75	76	78	77.8	91
16-Mar	82	85	86	85	86	88	87	86	84	82	79	81	83	86	82	79	81	85	87	89	90	87	88	87	84.7	90
17-Mar	87	89	91	91	91	91	91	88	84	76	67	71	62	62	64	60	62	67	69	70	74	83	89	91	77.9	91
18-Mar	90	87	85	85	86	82	85	84	79	75	69	62	61	60	59	59	57	56	64	73	76	86	92	93	75.1	93
19-Mar	92	91	89	89	89	89	89	90	91	88	83	75	68	56	51	52	55	55	63	68	70	69	73	75	75.3	92
20-Mar	73	75	71	69	70	76	78	77	71	65	59	54	49	43	45	41	43	40	45	49	53	62	73	70	60.5	78
21-Mar	76	82	81	78	74	68	70	72	66	64	60	55	53	50	47	46	46	49	53	50	43	43	44	44	58.9	82
22-Mar	50	46	47	51	50	53	53	57	49	48	45	45	46	47	47	45	51	54	63	76	80	86	88	89	56.9	89
23-Mar	86	86	86	88	92	94	93	91	84	80	76	73	71	69	66	64	64	63	57	51	47	48	58	66	72.9	94
24-Mar	78	82	80	82	83	82	82	78	64	51	36	27	26	24	25	23	23	23	24	35	49	52	64	69	52.5	83
25-Mar	72	74	72	68	67	67	69	63	57	53	53	52	53	56	57	59	60	62	73	81	84	89	87	87	67.3	89
26-Mar	85	89	90	88	88	86	84	77	67	63	59	56	60	54	47	47	45	48	50	57	67	62	61	64	66.3	90
27-Mar	71	74	79	86	88	90	89	83	73	61	54	46	41	41	42	44	45	50	46	55	64	63	66	64	63.1	90
28-Mar	65	71	73	80	81	78	80	72	68	62	63	57	49	42	39	41	37	29	33	45	62	74	79	85	61.0	85
29-Mar	82	65	66	66	71	72	74	67	63	57	51	45	38	30	27	27	26	31	46	57	61	64	68	70	55.2	82
30-Mar	76	81	87	90	91	90	91	82	65	53	50	46	41	40	40	39	46	59	67	69	65	67	65	64	65.1	91
31-Mar	65	67	66	66	66	66	67	66	62	57	52	50	48	48	50	56	61	62	64	56	51	51	58	62	59.1	67
	79.0	80.0	80.7	81.3	81.6	81.8	82.8	81.4	77.3	72.9	69.3	66.1	63.5	61.1	59.8	59.7	60.2	61.7	65.2	68.9	71.2	73.2	76.1	77.2	Diurnal Average	
	92	95	96	94	94	94	93	94	96	96	90	86	88	89	91	88	86	85	89	95	95	93	92	93	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Lower Camp - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Lower Camp - March 2016

Maximum Speed: 25 km/h on Mar 10 12:00

Maximum Daily Speed Average: 13.7 km/h on Mar 14

Minimum Speed Value: 0 km/h on Mar 27 09:00

Minimum Daily Speed Average: 1.4 km/h on Mar 1

Maximum Diurnal Speed Average: 3.8 km/h at hour 16

Minimum Diurnal Speed Average: 1.0 km/h at hour 12

Monthly Average Velocity: 2.0 km/h 8.3 deg

Percentiles: P_1 = 1 P_{10} = 2 Q_1 = 4 Median = 7 Q_3 = 11 P_{90} = 15 P_{99} = 22

Hours in Service: 744

Hours of Data: 743

Hours of Missing Data: 1

Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	SE9	SE9	SE8	ESE4	SE4	SE3	SSE3	SE1	ESE1	SE8	SE7	SE6	SE4	W7	W6	W6	W4	NW5	NNW6	NNW6	WNW3	WNW3	W1	WNW4	S1.4	SE9
2-Mar	W5	WNW3	WNW3	NW5	NNW4	NW5	NW6	NW7	NNW8	NNW8	NW6	NNW7	NNW7	N10	NNW9	NNW9	N8	N7	NW7	NW7	NNW8	N9	NNW6	NW6	NNW6.2	N10
3-Mar	WNW7	NW6	NW5	NW6	NW5	NNW4	NNW5	NW5	NW8	NW8	NNW7	NNW9	NNW11	NNW12	N15	N18	N17	N15	N17	N16	N12	NNW7	NNW4	NW2	NNW8.7	N18
4-Mar	NW2	N4	NW5	NNW4	NNW5	NNW3	WSW1	ENE1	E2	SE6	SE11	SE14	SE17	SE13	SE14	ESE17	ESE19	ESE16	ESE15	ESE13	SE18	SE21	ESE21	ESE20	ESE9.0	ESE21
5-Mar	SE20	SE17	SSE9	SE11	SE8	SE6	SE5	SE9	SE12	SE11	SE11	WSW2	NNW10	N22	NNE19	NNE16	N18	N16	N16	N18	N16	N14	NNW10	NNW7	NE5.3	N22
6-Mar	NNW7	NNW8	NNW9	N10	N8	N7	N9	NNW9	N11	N12	N14	N10	NW10	NW9	NW8	NW9	NNW9	NNW7	NNW7	NW5	NW3	NNW10	NNW8	NNW8	NNW8.2	N14
7-Mar	NNW8	NNW9	NW7	NW6	NW6	NW6	WNW5	NW8	NW7	NW7	NNW5	W10	W7	W4	W4	E1	WSW6	SW9	SW11	WNW10	NNW11	NNE10	N10	NNW7	NW5.5	SW11
8-Mar	NW4	WNW4	N3	NNW2	WNW3	NW5	NNW3	NW2	NNW3	NNW2	WNW4	NNE1	SE9	ESE3	N10	NNW6	NW7	N5	NW4	NW5	WNW4	NW4	NW4	NNW7	NNW3.1	N10
9-Mar	NNW7	NNW7	NNW7	NNW7	NW7	NW6	NW7	NW5	NW6	NNW7	NW5	WSW5	W4	WNW2	NW1	ESE6	ESE3	NNW2	WNW1	WNW2	WNW2	W1	WNW3	WNW1	NW3.3	NNW7
10-Mar	WNW3	W2	WNW1	NNW2	NW2	N1	NW2	NNW3	ESE7	ESE17	ESE24	ESE25	ESE23	ESE20	ESE22	ESE22	ESE21	ESE18	ESE16	ESE15	ESE16	ESE19	SE14	SE9	ESE11.4	ESE25
11-Mar	SSE3	WSW2	WSW4	N2	NNW2	W8	W10	W14	WSW13	W9	NW9	NNW7	NW3	W2	WSW6	WNW7	NNW5	WSW6	WSW5	N2	SE3	SSE3	SE5	SE8	W3.4	W14
12-Mar	SE8	ESE7	SE1	E1	ESE5	WNW4	NW4	NW4	WNW3	WNW4	NW5	NW6	NW4	E5	SE9	ESE13	SE15	ESE16	SE9	E1	ESE8	SE12	ESE12	ESE10	ESE4.1	ESE16
13-Mar	ESE4	NW5	NW5	WNW4	W5	WNW4	W4	NW4	NW5	NW9	NW10	NNW12	NNW11	NNW12	NNW12	NNW13	NNW15	NNW15	NW15	NW18	NW17	NW17	NW15	NW13	NW9.6	NW18
14-Mar	NW12	NNW10	N17	N15	NNW12	NNW16	NNW15	N15	N15	N17	N17	N17	N16	N18	N16	N18	N15	NNW15	N13	N11	NNW10	NNW10	NNW7	NW7	N13.7	N18
15-Mar	NNW5	NNW5	NW3	NNW4	NW4	NW6	NW7	NW6	NNW7	NW7	NW8	NNW8	NW7	WSW14	WNW12	NW12	NNW10	NNW10	N13	N12	NNW11	NNW12	NNW10	NNW11	NW7.6	WSW14
16-Mar	NW12	NNW12	NW13	NNW13	NNW11	NNW9	NNW12	N12	NNW12	N16	NNW14	NNW13	NNW11	N12	NNW14	N14	NNW11	NW9	WNW8	WNW8	NNW6	NNW6	WNW6	NW3	NNW10.3	N16
17-Mar	WNW3	WNW4	N2	WNW3	NW3	NW1	NW4	W4	WSW7	W6	NW7	W8	NW13	WNW16	NW12	NNW10	NW11	NW10	NW7	WNW5	WNW2	ENE0	AF	ESE3	NW5.5	WNW16
18-Mar	SE1	ESE3	ESE4	SE3	ENE1	SSE4	SE3	SE3	E1	N4	NNE4	ENE4	ENE4	SE11	SE14	SE13	SE11	SE9	SE7	SE9	SE6	W3	WNW4	NW3	SE3.7	SE14
19-Mar	NW4	WNW3	NW4	NW2	NW4	WNW3	WNW3	WNW4	WNW3	NNW4	WSW7	WSW8	WSW10	NW8	WNW9	NNW7	NNW8	NNW9	WNW4	NW6	WNW4	WNW6	WNW7	NW9	WNW4.9	WSW10
20-Mar	WNW8	W4	W3	SSE2	ENE2	WNW5	WNW4	W5	NW5	ESE8	ESE9	E10	E9	SSW2	SW5	S6	ESE13	E14	E14	E11	E9	NNE7	NW4	ENE5	E2.8	E14
21-Mar	N9	NW10	NW9	N7	NE7	ENE11	NE9	ENE7	E13	ESE12	ESE9	SE11	ESE14	ESE14	E12	ESE14	ESE17	ESE18	E13	E13	ESE13	ESE11	ESE9	ESE10	E8.7	ESE18
22-Mar	ESE14	ESE17	ESE15	ESE15	ESE14	SE6	SE3	ESE7	SE9	SE12	SE11	SE10	SE10	SE9	ESE6	SE6	ESE10	ESE11	SE10	SE8	SSE5	SE5	SE9	SE11	SE9.5	ESE17
23-Mar	SE11	SE9	SSE4	SSE4	SE2	NNW4	NW6	NNW6	NNW11	NNW13	NNW13	NNW12	NNW12	NNW12	N14	N16	N14	N12	N11	NNW6	NNW6	NW4	NW3	NW4	N6.2	N16
24-Mar	WNW3	WNW3	WNW3	NW3	NW5	NW4	NW4	WNW5	NW4	NW6	NW8	NW10	NW11	NW11	NW10	NNW11	NNW9	N8	NNW7	WNW3	NW2	WNW5	WNW3	NW3	NW5.5	NW11
25-Mar	NW2	NNW1	N1	NW1	N1	NNE2	ESE3	ESE7	SE9	SE9	SE11	ESE11	SE9	SE10	SE8	SE8	S3	S1	W3	WNW1	NNW1	WNW3	WNW4	NW4	SE2.7	SE11
26-Mar	NW3	NW3	NW5	WNW5	WNW4	WNW4	WNW4	NW5	WNW6	WSW10	WSW10	W9	W12	WSW9	WSW6	SE7	SE10	SE11	SE8	SE9	SE8	SE10	SE12	SE12	SSW2.6	SE12
27-Mar	SE6	SE7	ESE7	E1	WNW2	NW2	WNW3	NW3	NW0	SE7	SE10	SE8	SE10	SE14	SE16	ESE22	SE17	SE14	SSE8	SE10	SE17	ESE17	ESE14	SE8	SE8.3	ESE22
28-Mar	SE13	SE11	SE9	ESE8	SE12	SE15	SE15	SE17	SE15	SE15	SE16	SE14	SE10	WNW5	WNW15	WNW17	W12	WNW9	WNW9	W9	S2	ESE1	ESE2	ESE4	SSE5.0	WNW17
29-Mar	ESE5	SW4	SE5	S4	SE7	SE10	SE9	SE12	SE14	SE13	SE12	ESE4	NNE3	N2	NE3	NNE3	NW3	WNW5	SW4	WSW1	SW1	SE3	NNW0	ESE1	SE3.6	SE14
30-Mar	NW2	NW1	NW2	WNW2	NNW1	NE1	NW4	WNW4	NNW4	NNW6	WSW9	WSW10	NW12	NNW21	NNW18	NNW22	N17	NNE23	N19	N19	N22	N22	N23	N22	NNW10.6	NNE23
31-Mar	N20	NNE15	N13	N12	NNW10	N9	N6	N8	NNW7	NNW7	WNW5	WSW10	WSW8	NW6	NNE2	SE10	SE14	SE11	SE8	SE7	SSE7	SSE7	SE7	SE4	NNE2.2	N20
	NNE1.3	N1.2	NNW1.8	N2.0	N1.8	NNW2.0	NNW2.4	NNW2.1	NNW1.7	NNE1.7	NE1.2	N1.0	N1.7	NNW2.8	N3.1	NNE3.8	NE3.4	NNE3.3	N2.4	N2.8	NNE2.3	NNE2.4	NNE1.8	NNE1.5	Diurnal Average	
	SE20	ESE17	N17	ESE15	ESE14	NNW16	SE15	SE17	N15	ESE17	ESE24	ESE25	ESE23	N22	ESE22	NNW22	ESE21	NNE23	N19	N19	N22	N22	N23	N22	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 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 7 km/h on Mar 30 22:00

Minimum Value: 1 km/h on Mar 19 10:00

Percentiles: P_1 = 1 P_{10} = 1 Q_1 = 1 Median = 2 Q_3 = 3 P_{90} = 3 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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	2	2	1	2	1	1	1	1	1	2	2	1	2	1	1	1	1	1	1	2	1	2	1	2	2
2-Mar	1	1	1	2	2	2	2	2	2	2	1	2	2	2	2	2	1	2	1	2	2	2	1	1	2
3-Mar	2	2	2	2	2	1	1	2	2	2	2	2	2	2	4	4	4	4	3	2	3	2	1	1	4
4-Mar	1	1	1	1	1	1	1	1	1	2	2	3	3	4	3	3	3	3	3	3	3	3	3	4	4
5-Mar	4	4	4	2	4	2	2	2	2	1	2	2	6	4	4	3	4	3	4	4	3	3	2	2	6
6-Mar	2	1	2	2	2	2	2	2	2	2	3	2	2	2	2	2	3	2	2	2	2	2	2	2	3
7-Mar	2	2	1	1	1	1	1	1	1	2	1	2	2	1	1	1	5	4	2	3	3	2	2	2	5
8-Mar	2	1	1	1	1	1	1	1	1	1	2	1	3	3	2	2	2	1	1	1	1	1	1	2	3
9-Mar	1	1	1	2	2	1	2	1	1	1	1	1	2	2	2	2	2	1	1	2	2	1	1	1	2
10-Mar	2	2	1	1	1	1	1	1	4	3	4	4	4	3	4	3	4	3	3	3	2	2	3	3	4
11-Mar	2	1	2	2	4	5	4	5	6	3	3	3	2	1	3	2	2	1	2	1	1	2	2	2	6
12-Mar	2	3	1	2	3	1	2	1	1	1	2	2	2	3	2	3	4	3	2	2	2	2	1	3	4
13-Mar	2	2	2	1	2	2	1	2	2	3	2	3	3	3	3	3	4	4	3	4	3	3	4	3	4
14-Mar	3	2	4	3	3	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3	2	3	2	1	4
15-Mar	2	1	1	1	1	1	1	2	2	1	2	1	2	2	3	3	2	2	2	2	3	3	3	3	3
16-Mar	2	3	3	3	3	2	3	3	3	4	3	3	3	3	3	4	4	2	1	1	2	2	1	2	4
17-Mar	1	1	1	2	2	1	2	2	1	2	3	2	4	4	3	2	3	2	1	1	2	1	AF	1	4
18-Mar	2	1	1	1	1	2	1	2	1	2	2	1	1	2	1	2	2	2	2	2	3	2	1	1	3
19-Mar	1	1	1	1	1	1	1	1	1	1	2	2	2	3	2	2	2	2	2	2	2	2	1	2	3
20-Mar	2	2	2	2	3	2	1	1	1	5	2	3	3	2	2	3	2	3	2	2	2	2	1	4	5
21-Mar	2	2	2	2	3	2	2	3	2	2	3	3	3	3	4	3	3	3	3	3	2	2	2	2	4
22-Mar	3	2	3	2	3	4	1	3	2	2	2	2	3	2	3	3	3	3	3	2	2	2	3	2	4
23-Mar	3	4	2	2	2	1	2	2	3	3	3	3	3	3	3	3	3	3	3	1	1	1	2	1	4
24-Mar	1	1	1	1	2	1	1	1	1	2	2	2	3	2	2	2	2	2	2	1	1	1	1	1	3
25-Mar	1	1	1	1	1	1	3	3	1	1	2	2	2	2	2	1	1	1	1	1	1	2	1	1	3
26-Mar	1	1	1	1	1	2	1	2	2	3	3	1	2	2	2	3	2	2	2	2	2	2	2	3	3
27-Mar	3	2	3	1	2	1	1	1	1	3	2	2	2	3	3	4	5	4	2	3	3	3	3	3	5
28-Mar	2	2	2	2	2	2	2	2	2	3	2	1	4	2	6	4	3	2	2	2	1	1	1	1	6
29-Mar	1	4	2	2	2	2	1	1	1	1	1	2	1	2	1	1	1	2	2	3	2	1	2	1	4
30-Mar	2	1	1	1	2	1	1	2	2	3	2	2	6	5	6	5	5	6	4	6	6	7	5	5	7
31-Mar	4	3	4	3	2	2	2	2	2	2	3	3	3	2	1	2	2	2	2	1	2	2	3	2	4
	4	4	4	3	4	5	4	5	6	5	4	4	6	5	6	5	5	6	4	6	6	7	5	5	
	Diurnal Maximum																								

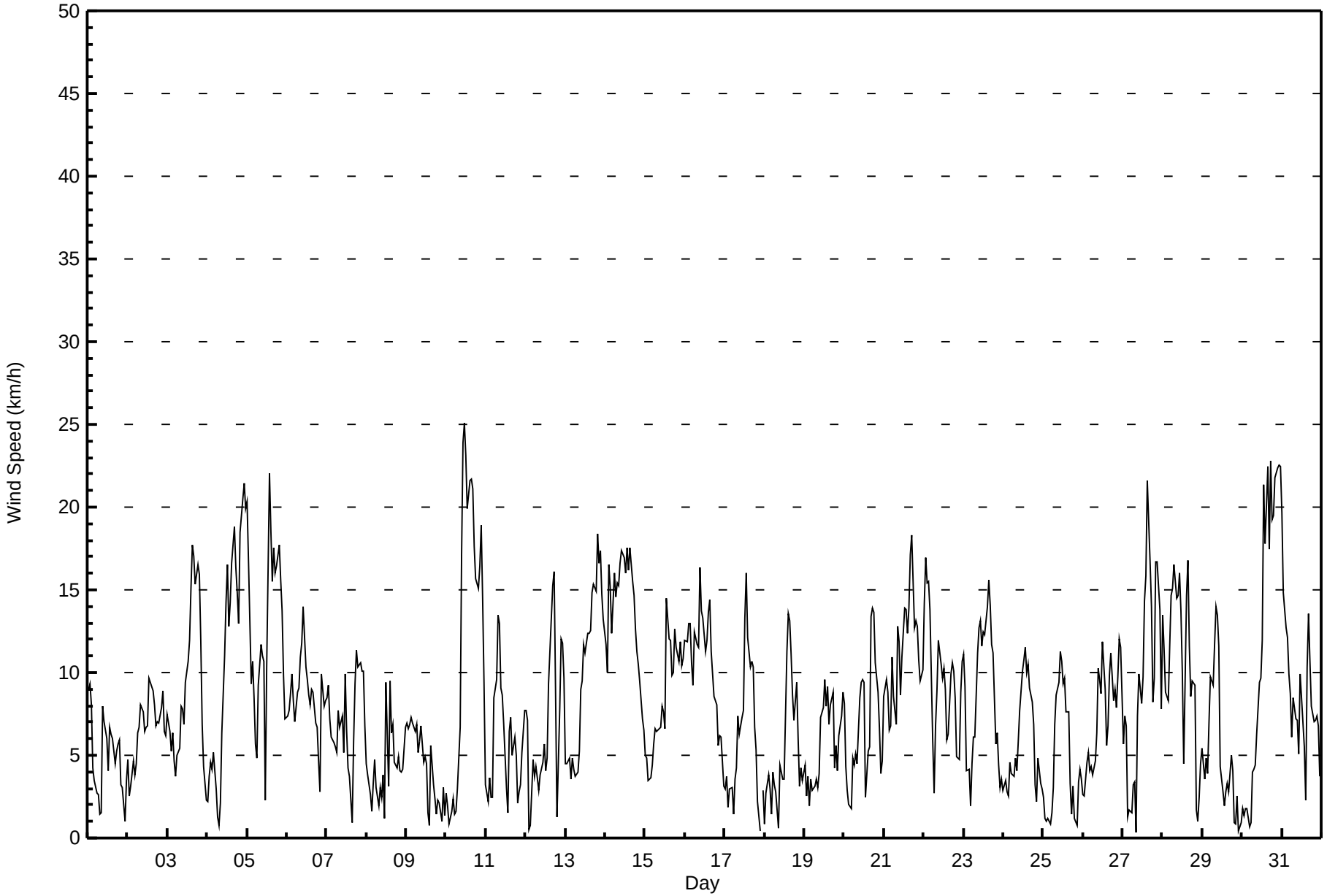
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Lower Camp - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	264	35.53	35.53
6 - 11	296	39.84	75.37
12 - 19	162	21.80	97.17
20 - 28	21	2.83	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

Lower Camp - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	11	6	2	7	7	17	17	8	4	1	4	7	17	59	70	27	264
6 - 11	19	2	2	2	4	19	73	4	1	0	2	15	12	14	54	73	296
12 - 19	43	3	0	0	4	33	32	0	0	0	0	2	3	4	13	25	162
20 - 28	6	1	0	0	0	10	2	0	0	0	0	0	0	0	0	2	21
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	79	12	4	9	15	79	124	12	5	1	6	24	32	77	137	127	743

Total Number of Valid Hours: 743

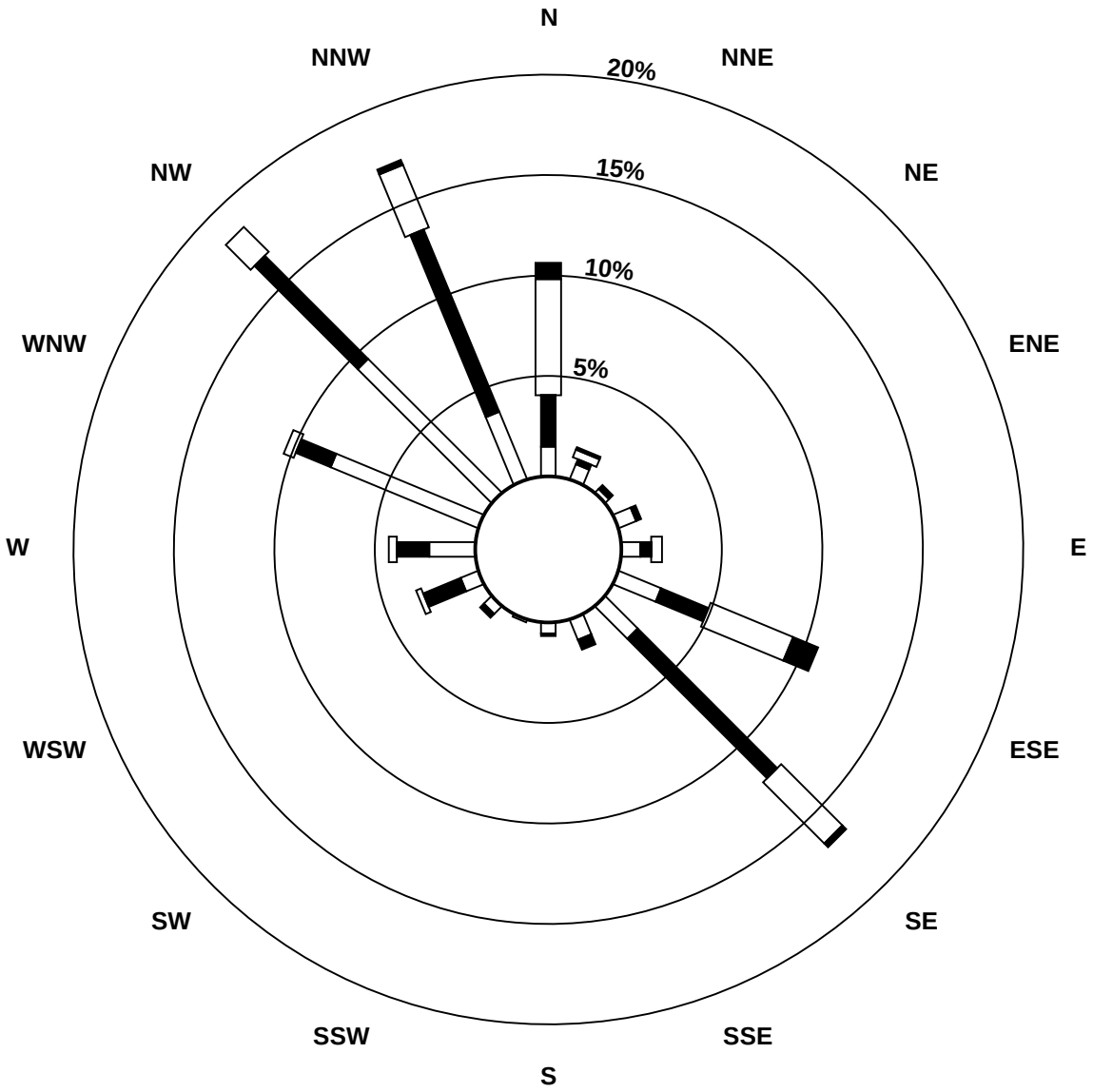
Total Number of Hours: 744

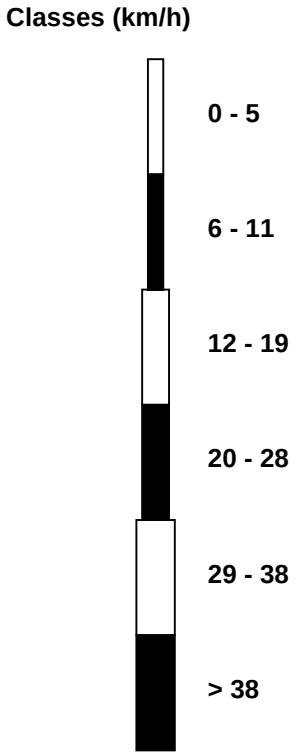
Wood Buffalo Environmental Association

Wind Rose Mar 2016

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 2016

Direction of Maximum Speed: 117 deg on Mar 10 12:00
Direction of Maximum Daily Speed Average: 349.8 deg on Mar 14

Direction of Minimum Speed: 308 deg on Mar 27 09:00

Direction of Minimum Daily Speed Average: 1.4 deg on Mar 1

Monthly Average Direction: 322.0 deg

Hours in Service:	744
Hours of Data:	743
Hours of Missing Data:	1
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	135	139	133	119	129	137	147	137	119	138	132	138	134	261	266	264	260	324	334	331	292	294	267	287	169.4
2-Mar	264	285	303	307	333	310	324	318	327	338	325	335	340	356	348	345	358	354	322	314	337	352	344	323	332.8
3-Mar	302	309	309	323	317	330	327	316	304	313	327	334	340	348	351	0	6	5	356	2	349	335	333	307	341.6
4-Mar	315	354	324	330	343	344	237	76	84	131	131	124	130	142	134	119	116	113	123	115	126	126	123	123	121.0
5-Mar	127	130	147	142	134	136	128	136	136	135	135	238	340	6	23	18	10	0	352	2	3	357	343	335	44.1
6-Mar	334	331	340	352	350	3	354	345	352	354	11	349	317	320	321	318	332	331	327	314	305	347	334	335	340.2
7-Mar	339	340	317	321	311	313	297	305	317	314	334	264	264	263	277	84	239	236	233	297	334	12	360	336	306.8
8-Mar	324	301	9	334	294	326	336	320	335	329	296	16	130	120	351	346	314	349	309	323	291	314	325	343	330.8
9-Mar	345	336	336	333	325	312	313	315	316	335	320	257	269	294	325	118	111	334	285	287	300	281	294	283	318.8
10-Mar	290	261	282	330	324	356	314	335	121	110	118	117	116	116	121	117	115	116	108	105	119	121	124	136	116.1
11-Mar	149	238	247	1	327	279	277	262	256	269	314	346	325	279	255	300	330	253	240	5	133	152	124	136	272.2
12-Mar	130	121	143	99	120	286	314	308	301	292	315	325	325	97	127	119	125	123	131	84	112	124	120	120	118.7
13-Mar	122	318	312	301	279	296	275	313	325	309	323	338	330	334	328	332	332	331	321	325	320	314	320	324	322.6
14-Mar	326	330	358	351	348	348	348	352	352	355	359	3	354	354	353	355	350	348	354	351	339	341	329	322	349.8
15-Mar	328	329	304	333	326	317	313	320	331	324	307	333	317	254	289	315	331	340	4	358	342	347	337	337	325.8
16-Mar	325	333	326	330	334	335	347	349	345	356	348	339	344	353	341	350	346	325	301	289	344	339	300	305	337.0
17-Mar	296	297	352	295	319	325	314	263	251	260	313	269	318	302	314	333	319	309	309	302	286	62	AF	123	303.8
18-Mar	128	122	113	129	75	155	132	140	81	7	14	63	75	135	133	132	142	146	145	142	127	277	285	307	129.7
19-Mar	314	299	319	317	305	284	295	289	297	348	252	258	253	317	296	345	344	334	302	319	293	297	292	304	302.1
20-Mar	303	277	278	163	64	291	291	280	313	104	111	93	93	195	230	173	111	99	93	93	84	28	321	68	92.8
21-Mar	351	325	323	353	52	74	53	59	94	110	122	124	117	115	98	108	103	103	101	101	105	115	102	111	94.0
22-Mar	122	116	114	118	117	138	136	108	128	130	132	134	130	129	120	127	121	121	137	138	153	134	131	130	125.6
23-Mar	124	125	158	147	130	331	325	327	338	347	345	347	346	344	5	11	6	1	0	340	332	313	309	318	354.9
24-Mar	303	297	295	314	304	311	314	292	322	326	311	305	319	307	316	341	340	349	348	289	306	287	301	313	317.0
25-Mar	311	340	9	323	355	14	113	121	135	137	130	123	134	135	124	126	185	174	267	298	339	294	298	325	131.3
26-Mar	312	319	311	301	293	297	303	321	283	246	252	263	260	253	254	128	134	135	142	135	132	138	140	141	203.8
27-Mar	124	130	108	96	297	324	303	305	308	130	135	138	139	138	134	122	126	131	157	138	125	120	121	133	129.7
28-Mar	137	137	133	123	133	142	133	136	133	127	132	132	128	291	284	291	264	287	285	264	172	116	109	120	151.4
29-Mar	115	222	141	174	145	142	135	133	133	134	133	106	28	358	50	31	309	292	230	255	215	125	340	111	135.3
30-Mar	311	308	304	297	329	39	306	290	330	331	256	256	326	337	344	348	360	16	7	356	356	1	3	359	347.9
31-Mar	3	12	352	349	348	349	357	2	328	337	293	247	258	322	13	131	128	132	135	143	160	155	141	145	14.1
	17.7	3.7	348.2	350.6	354.3	335.3	331.9	330.8	342.6	25.6	35.0	0.0	358.0	345.3	353.2	28.5	40.4	33.6	10.3	6.4	30.9	29.5	28.8	30.5	
	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

Lower Camp - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 102 deg on Mar 12 20:00

Minimum Value: 4 deg on Mar 29 10:00

Percentiles: $P_1 = 5$ $P_{10} = 10$ $Q_1 = 15$ Median = 18 $Q_3 = 33$ $P_{90} = 56$ $P_{99} = 96$

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	12	12	8	35	30	35	36	56	42	9	9	17	63	19	12	12	15	22	16	33	46	45	102	74	102
2-Mar	17	37	30	28	27	22	26	17	17	19	22	24	25	17	19	18	18	23	14	15	18	19	17	14	37
3-Mar	20	16	19	17	34	31	26	26	18	17	21	17	17	18	18	16	16	16	15	11	18	16	21	33	34
4-Mar	52	29	27	21	23	34	77	78	70	16	11	11	7	26	11	14	8	11	9	10	9	7	6	9	78
5-Mar	10	13	30	14	53	19	44	8	7	6	5	80	52	16	16	21	15	17	18	16	15	14	18	19	80
6-Mar	18	18	18	16	27	29	17	17	16	17	15	23	18	22	23	22	23	22	24	40	34	16	22	16	40
7-Mar	17	18	21	17	26	21	15	11	16	12	38	12	15	43	26	76	75	20	12	37	18	20	14	18	76
8-Mar	30	15	29	31	13	27	31	62	36	40	36	71	18	76	14	21	19	19	17	16	19	18	19	18	76
9-Mar	16	17	17	18	15	24	12	16	17	25	36	18	52	73	90	28	57	42	64	73	45	64	31	55	90
10-Mar	49	70	87	38	27	51	63	47	79	9	10	9	10	10	10	9	10	10	9	9	9	7	11	17	87
11-Mar	78	53	57	68	71	39	37	25	32	25	39	20	45	62	45	20	22	16	16	68	27	54	27	15	78
12-Mar	18	17	99	87	44	25	33	39	43	37	47	31	41	53	12	11	11	9	11	102	23	9	7	13	102
13-Mar	62	50	47	38	20	37	28	32	19	15	16	17	17	18	15	16	17	16	12	13	12	10	11	14	62
14-Mar	16	18	18	17	18	17	18	17	17	17	16	16	16	15	17	16	17	17	17	17	17	18	16	14	18
15-Mar	18	12	22	18	18	11	10	20	21	16	16	24	40	10	21	21	15	17	15	17	18	18	17	17	40
16-Mar	14	16	13	15	16	17	18	18	18	16	18	18	17	16	18	17	19	18	9	14	25	22	12	37	37
17-Mar	28	20	50	29	23	39	27	36	9	18	32	44	19	16	26	18	19	11	9	9	61	62	AF	27	62
18-Mar	79	62	29	38	77	42	38	65	76	12	34	27	27	7	5	7	15	16	12	11	46	45	32	26	79
19-Mar	12	30	23	49	23	26	25	16	21	25	16	12	12	24	18	24	18	16	41	26	49	31	20	14	49
20-Mar	14	37	66	72	97	28	25	18	21	46	22	23	27	75	37	49	15	13	12	14	15	41	41	81	97
21-Mar	29	14	16	40	46	13	33	44	14	16	16	17	16	15	21	16	14	10	11	12	13	14	13	12	46
22-Mar	10	7	10	8	11	36	54	42	15	11	11	13	14	14	40	42	17	18	15	16	25	26	14	10	54
23-Mar	11	25	33	26	78	21	15	17	18	17	18	17	17	19	25	15	16	19	18	18	16	24	65	31	78
24-Mar	48	27	55	38	23	20	19	11	30	35	24	15	20	14	23	21	18	15	33	41	50	17	25	32	55
25-Mar	39	55	54	49	56	66	57	26	8	8	9	10	13	9	13	10	48	88	44	81	92	22	24	28	92
26-Mar	32	35	34	11	19	21	21	31	33	13	16	14	12	16	64	34	8	8	14	12	17	14	10	10	64
27-Mar	43	16	19	66	78	43	17	28	95	28	8	11	13	11	13	9	18	17	18	17	7	12	15	20	95
28-Mar	10	10	12	8	8	8	7	6	8	11	5	4	39	67	19	13	12	21	14	20	73	68	38	22	73
29-Mar	31	92	44	61	29	18	8	5	4	4	4	47	44	89	44	38	46	37	49	96	97	63	97	79	97
30-Mar	63	55	37	66	78	79	31	31	35	32	12	13	36	20	19	20	28	17	18	19	17	18	17	18	79
31-Mar	16	17	20	17	18	17	20	17	26	29	59	22	22	36	54	9	7	11	12	14	18	17	60	73	73
	79	92	99	87	97	79	77	78	95	46	59	80	63	89	90	76	75	88	64	102	97	68	102	81	
	Diurnal Maximum																								

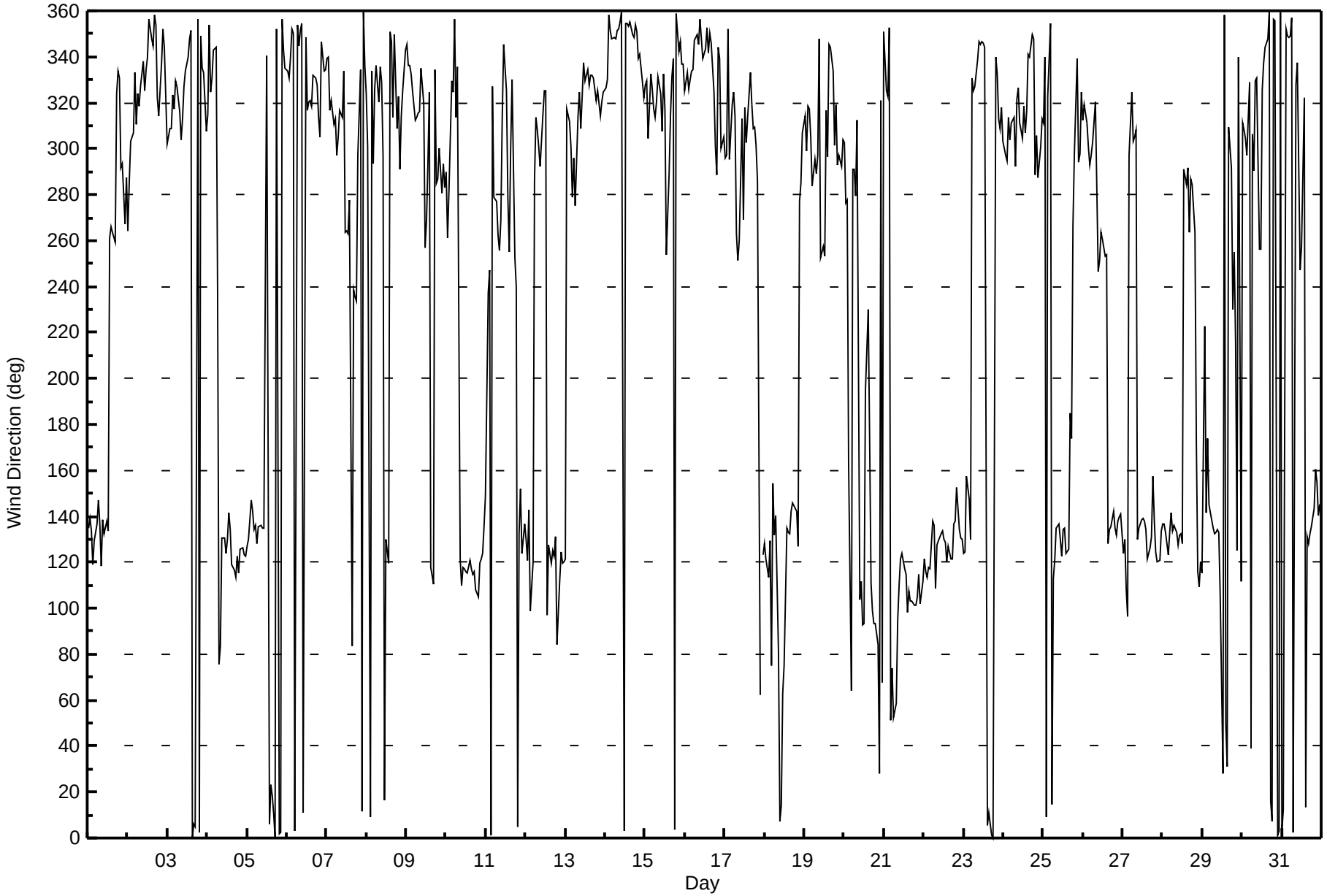
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Lower Camp - March 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	March 7, 2016	Last Calibration	February 22, 2016
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	11:10	End Time (MST)	19:15
Gas Cert Reference	LL110099	Station temp.	20 Deg C
Cal Gas Concentration	51.3 ppm	Cal Gas Exp Date	25/03/2016
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.	3492

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-675	-675
Analyzer IP address	192.168.1.43		Lamp voltage	802	802
Calculated slope	0.997403	0.999516	Chamber temp	45.0	44.8
Calculated intercept	1.147019	0.658396	Pressure	711.1	705.7
Analyzer Background	11.2	11.3	Flow	0.491	0.485
Analyzer Coefficient	1.025	1.025	Intensity	90	90

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	0.0	----
as found span	5000	80.9	830.0	819.0	1.014
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	80.9	830.0	830.1	1.000
second point	5000	40.9	419.6	418.8	1.002
third point	5000	20.5	210.3	209.1	1.006
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	80.9	830.0	831.1	0.999
				Average Correction Factor	1.003

Corrected As found	818.9	Previous response	831.0	% change	1.5%

Notes:

Changed inlet filter after as founds. No adjustments. The THC analyzer was changed out after the as founds and a change was made regarding the THC system between the 2nd and 3rd point.

Calibration Performed By: Evan Magill

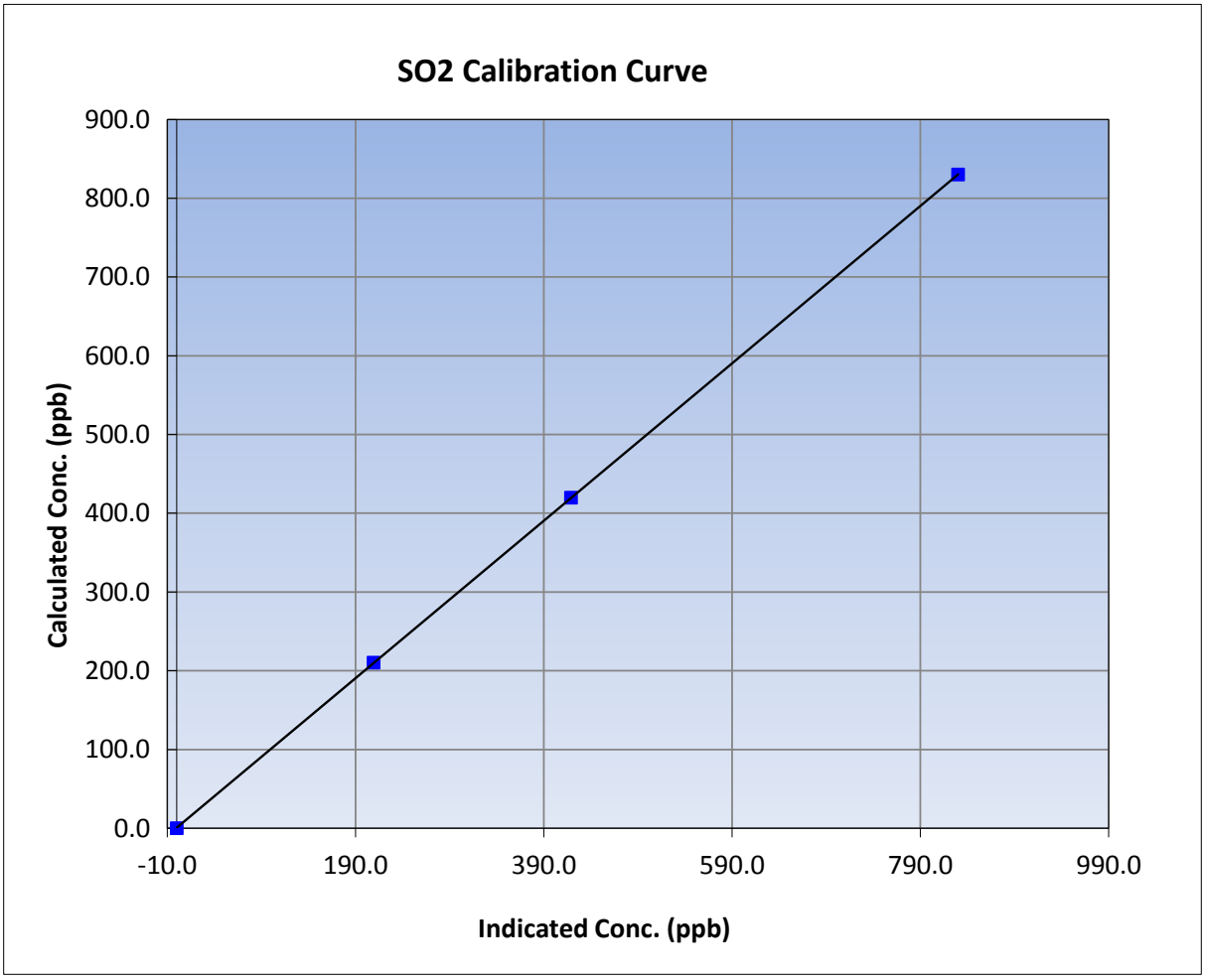
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

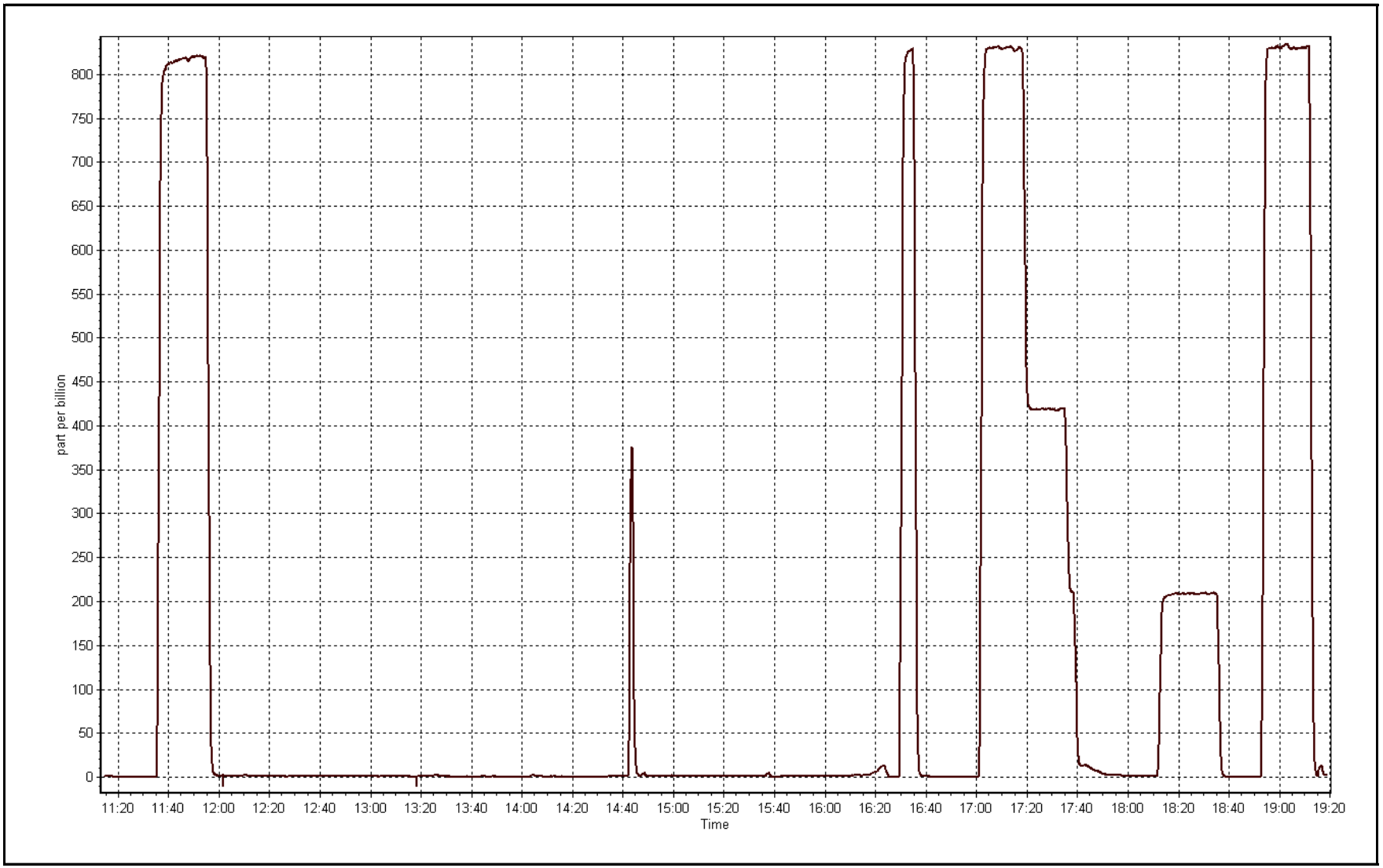
Calibration Date	March 7, 2016	Previous Calibration	February 22, 2016
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	11:10	End Time (MST)	19:15
Analyzer make	TEI 43i	Analyzer serial #	100841398

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999997
830.0	830.1	0.9999		
419.6	418.8	1.0019	Slope	0.999516
210.3	209.1	1.0060		
			Intercept	0.658396



SO2 Calibration Plot Date: March 7, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	March 3, 2016	Last Calibration	February 22, 2016
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	12:00	End Time (MST)	14:55
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	3492
SO2 gas concentration	51.4 ppm	SO2 gas cert/exp	LL110099 25/03/2016

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	808	807
Calculated slope	0.988410	0.996722	Chamber temp	45	45
Calculated intercept	0.311886	-0.086268	Pressure	589.0	592.3
Analyzer Background	12.2	10.8	Flow	1.056	1.063
Analyzer Coefficient	1.225	1.189	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	-1.0	----
as found span	5000	72.8	75.0	76.8	0.977
SO2 scrubber check	5000	20.5	210.7	0.7	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	72.8	75.0	75.2	0.997
second point	5000	38.8	40.0	40.4	0.989
third point	5000	19.4	20.0	20.1	0.995
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	72.8	75.0	75.6	0.992
				Average Correction Factor	0.994

Corrected As found	77.8	Previous response	75.6	% change	-2.9%

Notes:

Changed inlet filter and scrubber check done after as founds. Adjusted zero and span.

Calibration Performed By: Evan Magill

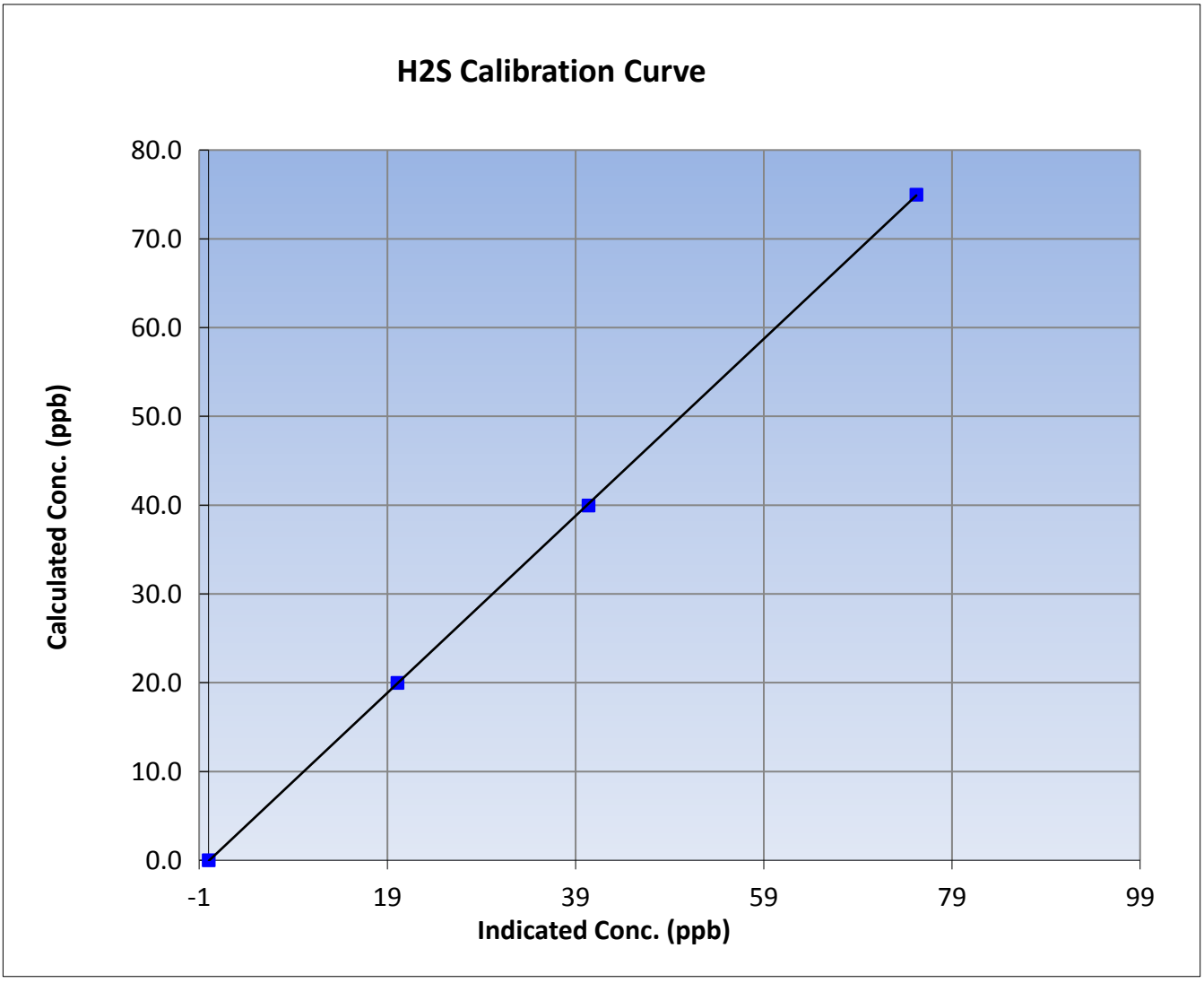
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

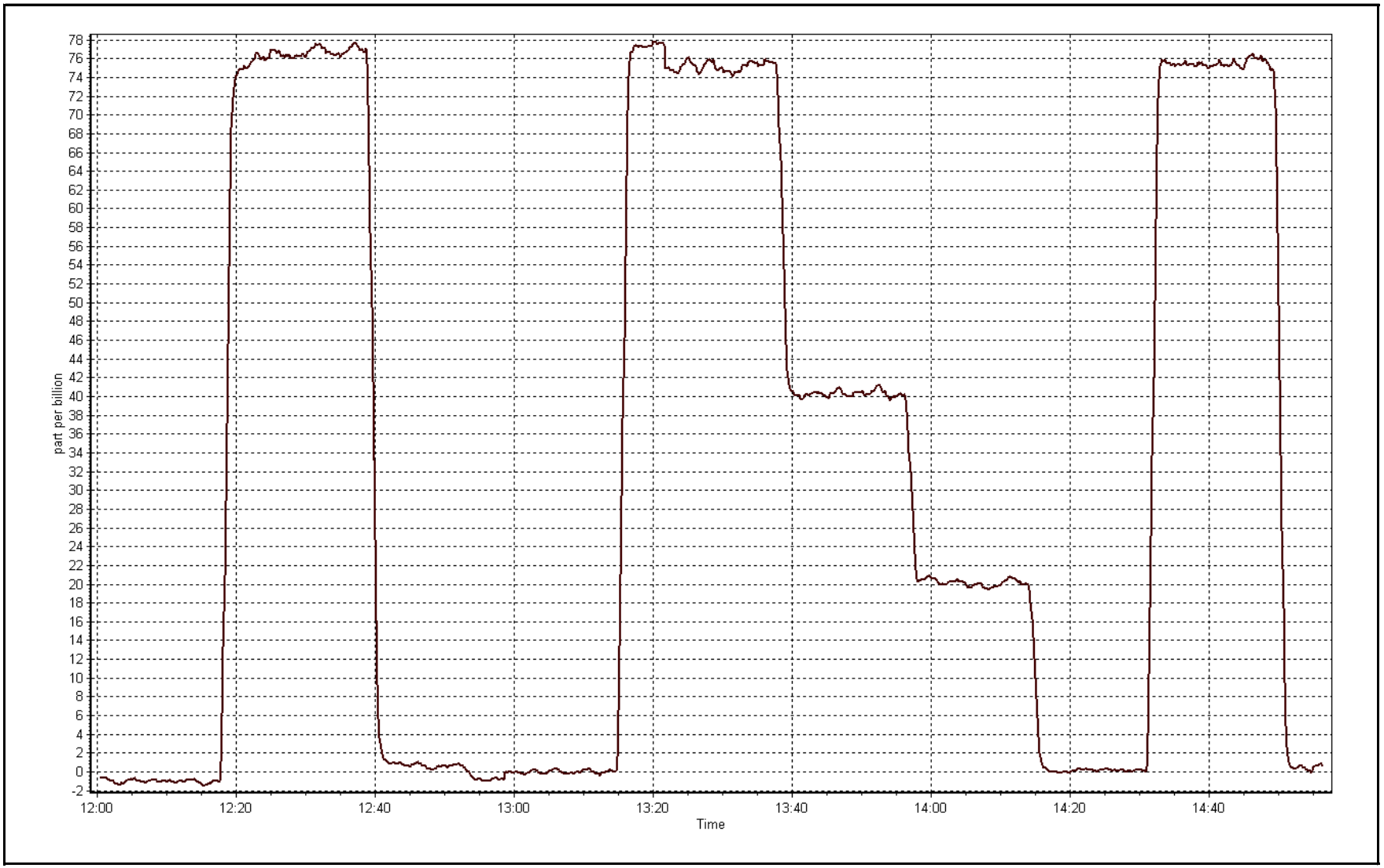
Calibration Date	March 3, 2016	Previous Calibration	February 22, 2016
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	12:00	End Time (MST)	14:55
Analyzer make	Thermo 450i	Analyzer serial #	1410661328

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999981
75.0	75.2	0.9969		
40.0	40.4	0.9895	Slope	0.996722
20.0	20.1	0.9951		
			Intercept	-0.086268



H2S Calibration Plot Date: March 3, 2016



Wood Buffalo Environmental Association
Removal THC Calibration Report

W B E A

Station Information

Calibration Date	March-07-16	Last Calibration	February-22-16
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Removal		
Start Time (MST)	11:10	End Time (MST)	13:10
Gas Cert Reference	LL110099	Cal Gas Expiry Date	25/03/2016
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1070.5 ppm
C3H8 Cal Gas Conc.	202 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	3492

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	37.3	37.3
Calculated slope	1.005948	1.013632	Fuel Pressure	24.0	24.0
Calculated intercept	-0.053747	-0.135142	Analyzer Coeff	4.127	4.127
			Analyzer BKG	5.89	5.89

Analyzer make	51i-LT	Analyzer serial #	1410661326

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	0.09	----
as found span	5000	80.9	17.32	17.20	1.007
calibrator zero	5000	0.0	0.00	0.09	----
high point	5000	80.9	17.32	17.20	1.007
second point	5000	40.9	8.76	8.79	0.996
third point	5000	20.5	4.39	4.51	0.973
as left zero					
as left span					
				Average Correction Factor	0.992

Corrected As found	17.11	Previous response	17.27	% change	0.9%

Notes:

Removal Calibration. Changing out analyzer for preventative maintenance, analyzer has been giving a noisy response. Will be investigating further back at the shop. Changed inlet filter after as founds. Switched off analzyer after span by accident, turned back on, did quick zero/span check, then proceeded with 2nd and 3rd point.

Calibration Performed By: Evan Magill

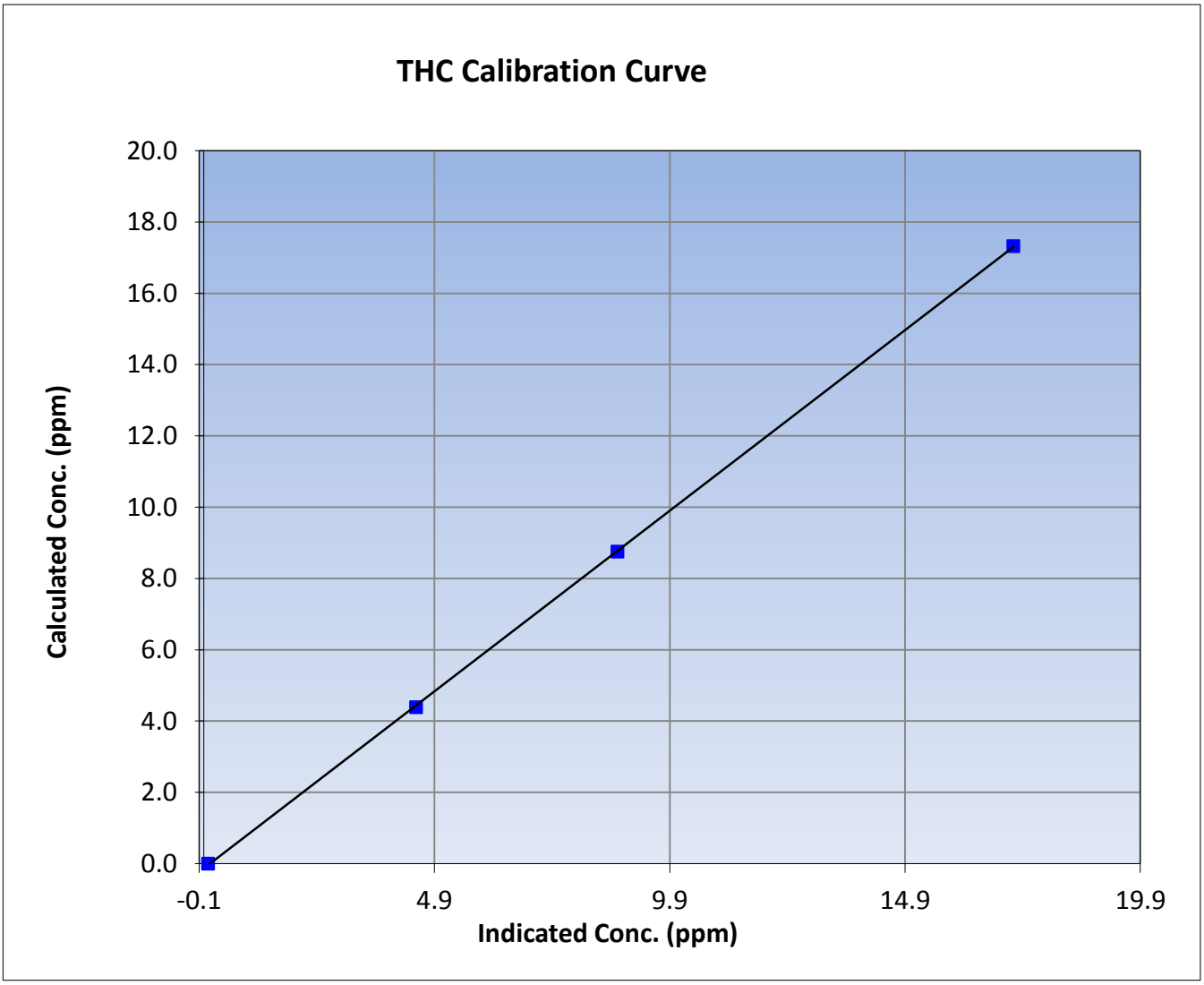
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

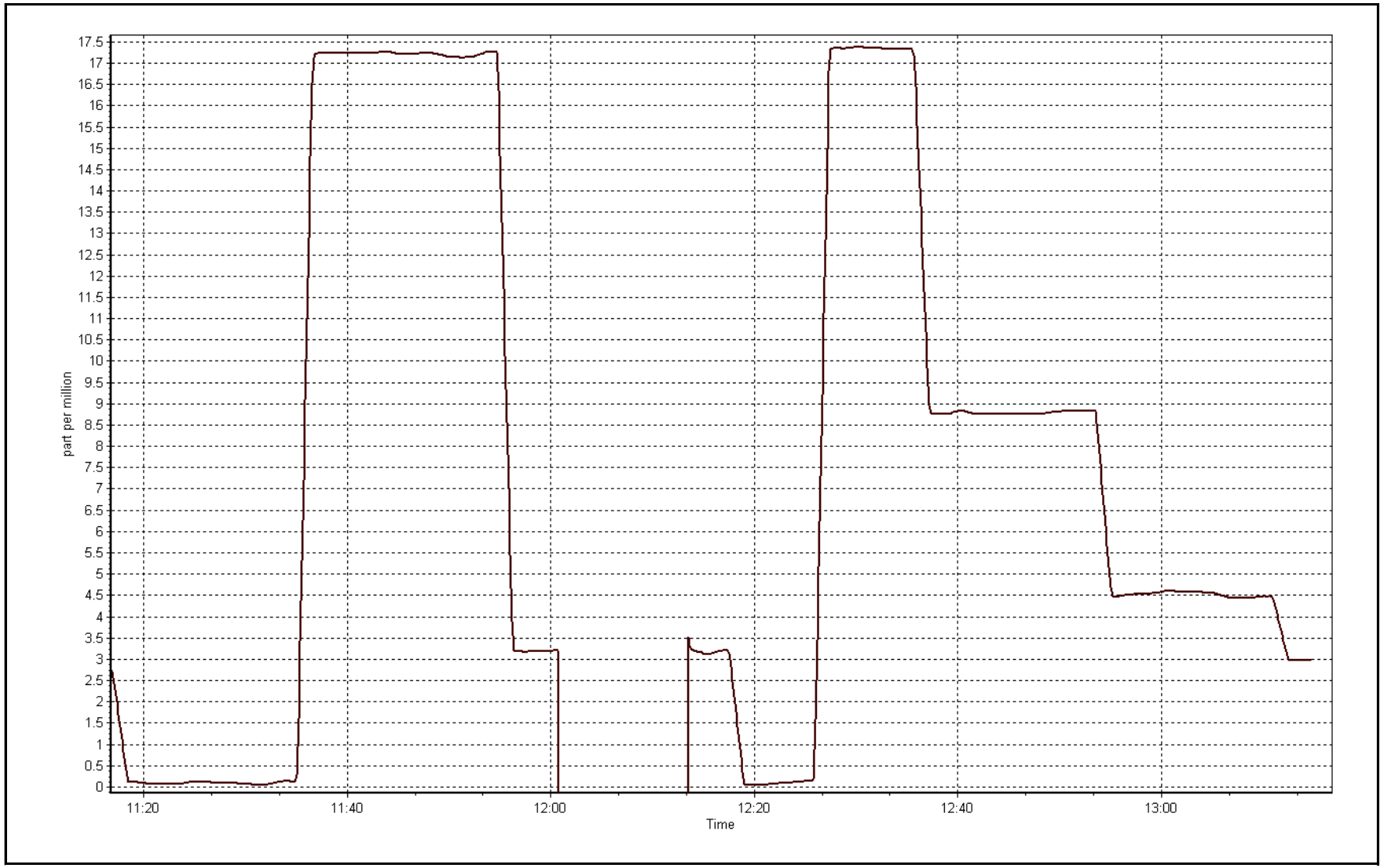
Calibration Date	March 7, 2016	Previous Calibration	February 22, 2016
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	11:10	End Time (MST)	13:10
Analyzer make	51i-LT	Analyzer serial #	1410661326

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.09	----	Correlation Coefficient	0.999970
17.32	17.20	1.0070		
8.76	8.79	0.9962	Slope	1.013632
4.39	4.51	0.9732		
			Intercept	-0.135142



THC Calibration Plot Date: March 7, 2016



Wood Buffalo Environmental Association
Install THC Calibration Report

W B E A

Station Information

Calibration Date	March-07-16	Last Calibration	March-07-16
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Install		
Start Time (MST)	16:40	End Time (MST)	19:20
Gas Cert Reference	LL110099	Cal Gas Expiry Date	25/03/2016
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1070.5 ppm
C3H8 Cal Gas Conc.	202 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	3492

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	7.8
Analyzer IP address	192.168.1.51		Air or Bypass Press	37.3	40.2
Calculated slope	1.013632	0.996344	Fuel Pressure	24.0	24.9
Calculated intercept	-0.135142	0.016995	Analyzer Coeff	4.127	4.798
			Analyzer BKG	5.89	2.49

Analyzer make	51i-LT	Analyzer serial #	1218153353

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					
as found span					
calibrator zero	5000	0.0	0.00	-0.02	----
high point	5000	80.9	17.32	17.36	0.998
second point	5000	40.9	8.76	8.79	0.996
third point	5000	20.5	4.39	4.38	1.002
as left zero	5000	0.0	0.00	-0.02	----
as left span	5000	80.9	17.32	17.58	0.985
				Average Correction Factor	0.999

Corrected As found	NA	Previous response	NA	% change	NA

Notes:

Installed new THC analyzer from the shop. Adjusted zero and span. The valve's power source was changed between the 2nd and 3rd point because the valve was not behaving as expected. Once the power source was changed, the valve operated as expected.

Calibration Performed By: Evan Magill

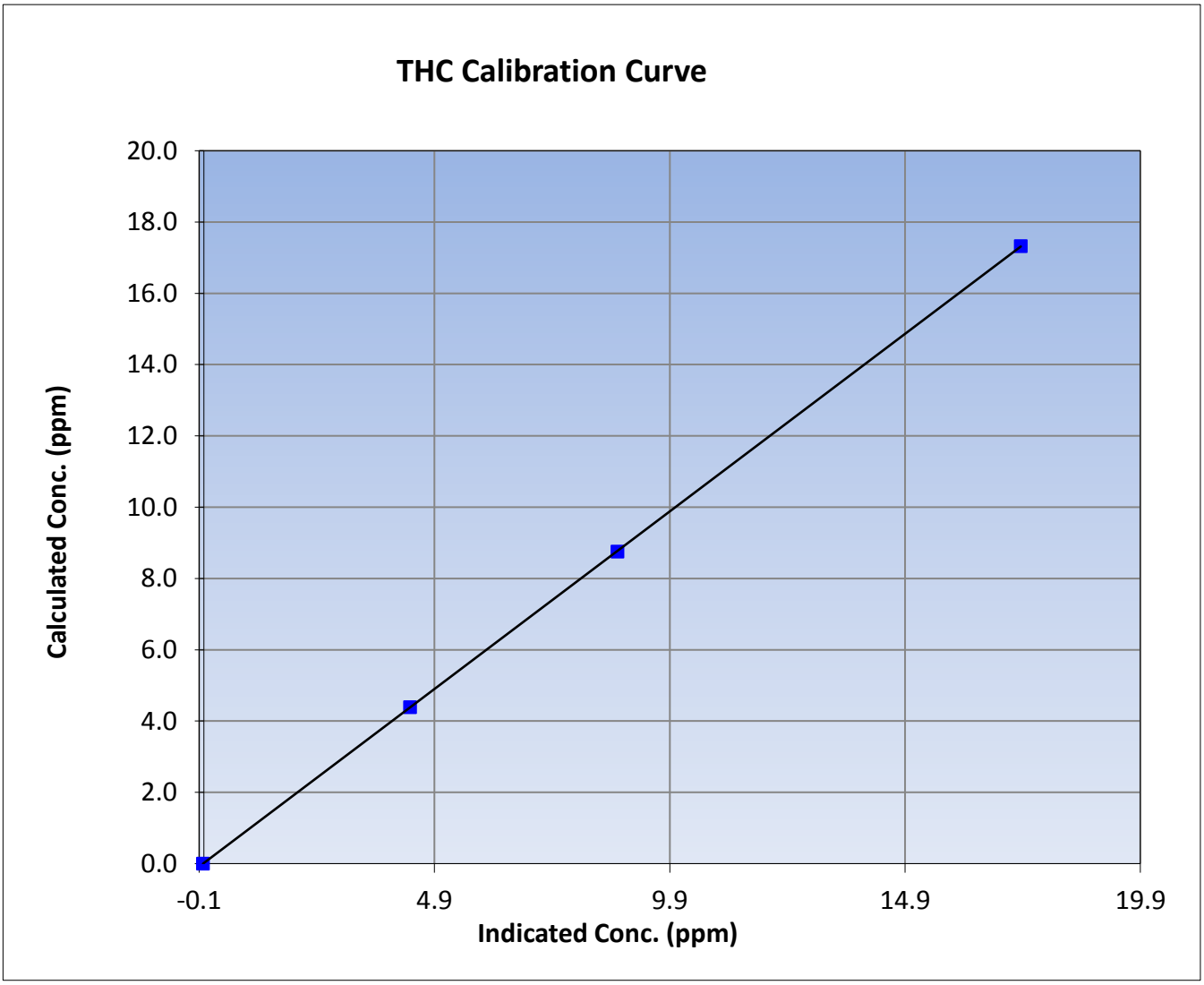
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

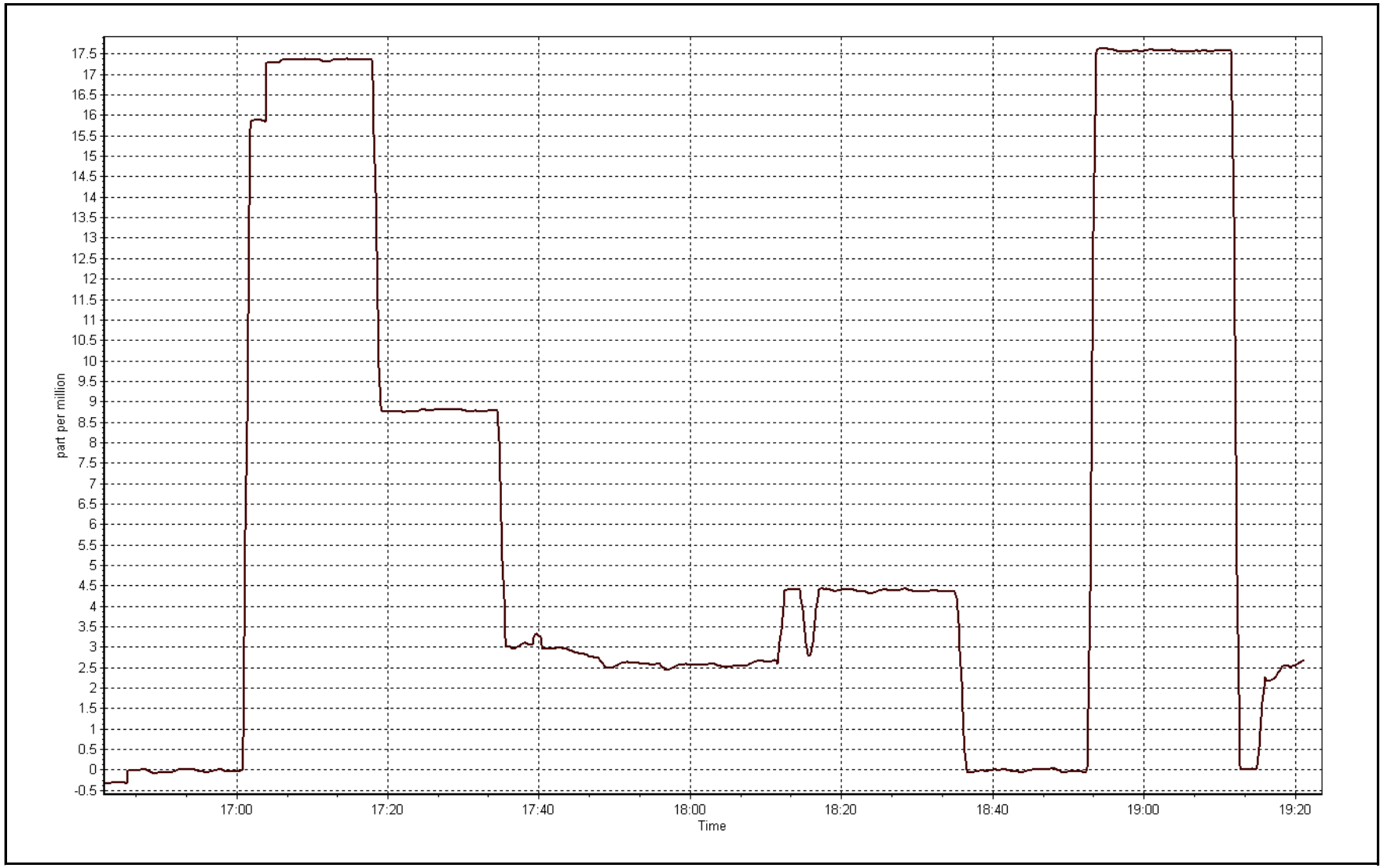
Calibration Date	March 7, 2016	Previous Calibration	March 7, 2016
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	16:40	End Time (MST)	19:20
Analyzer make	51i-LT	Analyzer serial #	1218153353

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.02	----	Correlation Coefficient	0.999997
17.32	17.36	0.9977		
8.76	8.79	0.9962	Slope	0.996344
4.39	4.38	1.0021		
			Intercept	0.016995



THC Calibration Plot Date: March 7, 2016



Wood Buffalo Environmental Association
Install THC Calibration Report

W B E A

Station Information

Calibration Date	March-09-16	Last Calibration	March-07-16
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	12:35
Gas Cert Reference	LL110099	Cal Gas Expiry Date	25/03/2016
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1070.5 ppm
C3H8 Cal Gas Conc.	202 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	3492

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	40.1
Calculated slope	0.996344	0.993062	Fuel Pressure	24.9	25.1
Calculated intercept	0.016995	0.027129	Analyzer Coeff	4.798	4.460
			Analyzer BKG	2.49	2.46

Analyzer make	51i-LT	Analyzer serial #	1218153353

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	0.23	----
as found span	5000	80.9	17.32	18.89	0.917
calibrator zero	5000	0.0	0.00	-0.05	----
high point	5000	80.9	17.32	17.40	0.995
second point	5000	40.9	8.76	8.81	0.994
third point	5000	20.5	4.39	4.41	0.995
as left zero	5000	0.0	0.00	0.03	----
as left span	5000	80.9	17.32	17.53	0.988
				Average Correction Factor	0.995

Corrected As found	18.66	Previous response	17.37	% change	-6.9%

Notes:

Recalibrating instrument since daily span response had drifted quite bit and daily zero had also elevated. Adjusted both zero and span after as founds.

Calibration Performed By: Asad Hidayat

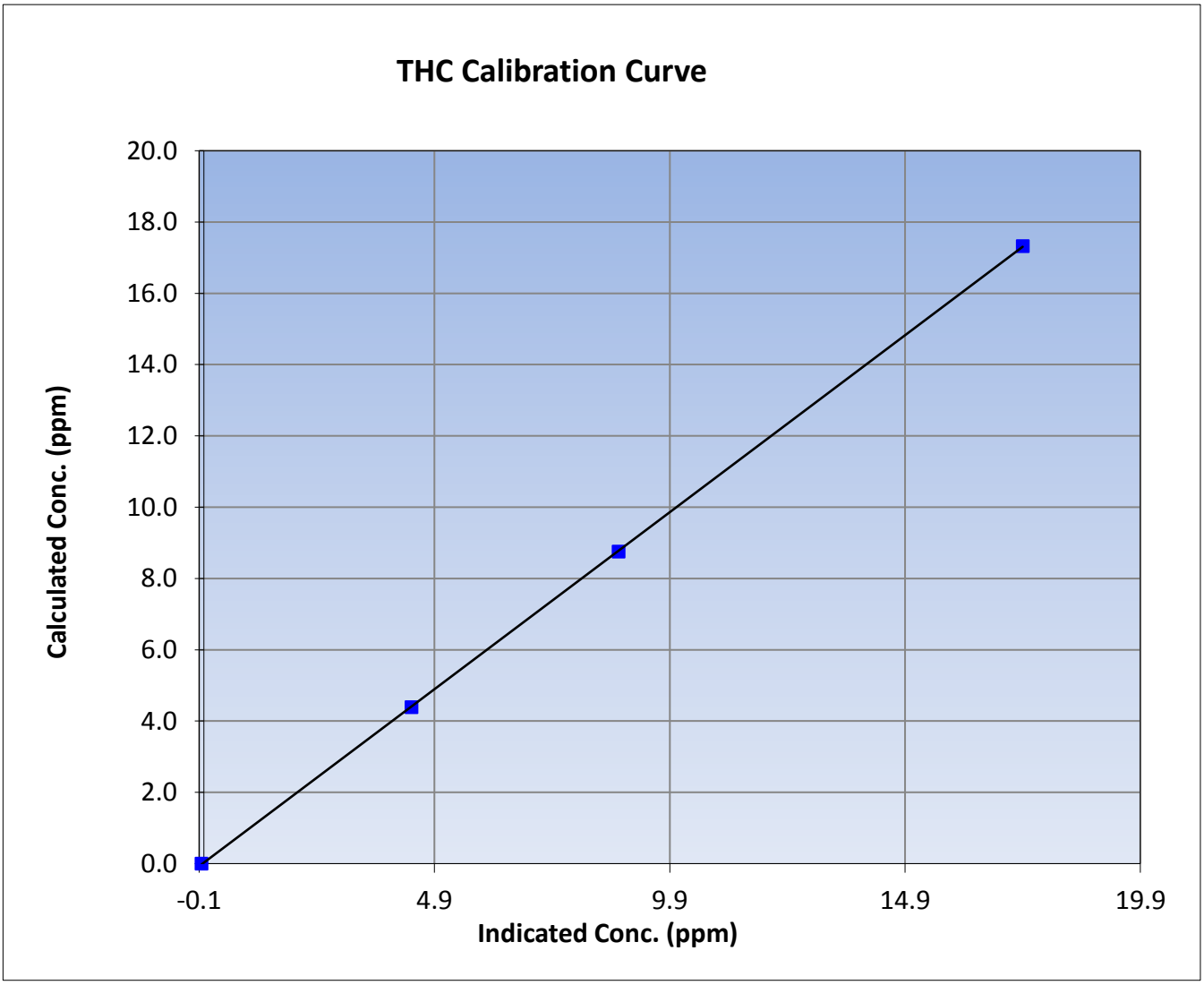
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

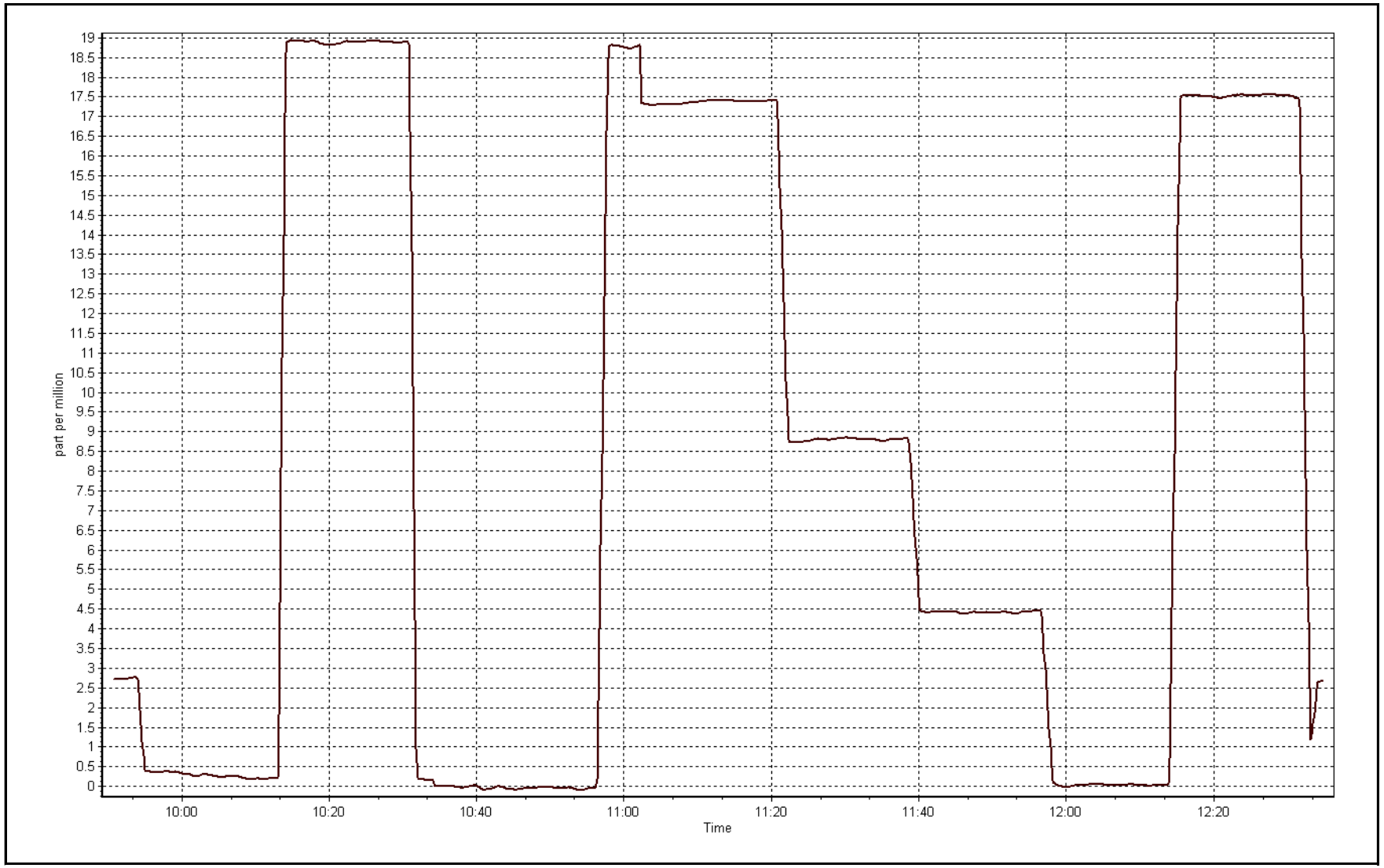
Calibration Date	March 9, 2016	Previous Calibration	March 7, 2016
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:50	End Time (MST)	12:35
Analyzer make	51i-LT	Analyzer serial #	1218153353

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.05	----	Correlation Coefficient	0.999992
17.32	17.40	0.9954		
8.76	8.81	0.9939	Slope	0.993062
4.39	4.41	0.9952		
			Intercept	0.027129



THC Calibration Plot Date: March 9, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 13
FORT MCKAY SOUTH
MARCH 2016

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

April 25, 2016

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT McKAY SOUTH (AMS 13)
MARCH 2016

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	35	38	99.60	52	0	10	0
TRS(ppb) Average	707	33	37	99.46	4	0	1	0
THC(ppm) Average	706	35	38	99.60	4	-	2.6	-
O3(ppb) Average	707	34	37	99.60	49	0	36	-
NO2(ppb) Average	706	35	38	99.60	36	0	20	-
NO(ppb) Average	706	35	38	99.60	50	-	9	-
NOX(ppb) Average	706	35	38	99.60	71	-	26	-
PM2.5(ug/m3) Average	740	2	4	99.73	51.1	-	14.6	0
ET(C) Average	744	0	0	100.00	14	-	5.2	-
RH(%) Average	744	0	0	100.00	95	-	89	-
WS(km/h) Average	740	0	4	99.46	15	-	10	-
WD(deg) Average	740	0	4	99.46	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT McKAY SOUTH (AMS 13)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	706	1.9	6	-	0	0	0	0	1	4	52
TRS(ppb) Average	707	0.3	0	-	0	0	0	0	0	1	4
THC(ppm) Average	706	2.36	0.2	-	2.1	2.2	2.2	2.3	2.4	2.6	4
O3(ppb) Average	707	24.8	11	-	0	8	17	26	33	39	49
NO2(ppb) Average	706	8.7	7	-	0	1	3	7	13	19	36
NO(ppb) Average	706	2.4	6	-	0	0	0	0	2	7	50
NOX(ppb) Average	706	11.1	11	-	0	1	4	8	15	26	71
PM2.5(ug/m3) Average	740	4.52	4.3	-	0.6	1.6	2	3.1	5.8	8.9	51.1
Temperature 2 m (C) Average	744	-4.3	5.7	-	-23.4	-10.3	-8.1	-4.7	-1	2.3	14
Relative Humidity (%) Average	744	72.5	17	-	16	49	61	77	86	90	95
Wind Speed 10 m (km/h) Average	740	5.2	3	-	0	1	2	5	8	10	15
Wind Direction 10 m (deg) Average	740	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	01 Mar 2016 01:00	01 Mar 2016 02:00	2	Station power failure
SO2, TRS, THC, NO2	01 Mar 2016 10:00	01 Mar 2016 10:00	1	Maintenance - verify daily QA response
TRS, O3	03 Mar 2016 11:00	03 Mar 2016 11:00	1	Maintenance - cleaned glass manifold
Wind Speed, Wind Direction	04 Mar 2016 06:00	04 Mar 2016 06:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	10 Mar 2016 05:00	10 Mar 2016 05:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	25 Mar 2016 05:00	25 Mar 2016 05:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	27 Mar 2016 08:00	27 Mar 2016 08:00	1	Flat line in sensor output signal -sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Fort McKay South - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 52 ppb on Mar 25 14:00 Maximum Daily Average: 10.1 ppb on Mar 22

Minimum Value: 0 ppb on Mar 3 17:00 Minimum Daily Average: 0.0 ppb on Mar 14
Maximum Diurnal Average: 5.5 ppb at hour 13 Minimum Diurnal Average: 0.3 ppb at hour 5
Monthly Average: 1.9 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 4$ $P_{99} = 33$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	35
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	2	2	1	1	1	1	1	M	4	10	33	18	25	24	15	4	1	1	1	1	1	1	7.1	33
2-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	0.3	1
3-Mar	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Mar	0	0	0	Z	0	0	0	0	0	1	4	8	28	8	2	4	2	0	0	0	0	0	7	10	3.3	28
5-Mar	11	3	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1.2	11
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	0.1	0
7-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1
8-Mar	0	Z	0	0	0	0	0	0	1	1	4	6	4	3	5	5	5	5	4	5	4	4	2	2	2.7	6
9-Mar	2	1	Z	0	0	0	0	0	0	0	0	2	5	5	6	6	6	4	2	1	0	0	0	0	1.8	6
10-Mar	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0.6	1
11-Mar	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Mar	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1
13-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
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	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	0.1	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	0.1	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	0	1	12	31	10	4	1	0	0	0	0	0	2.6	31
19-Mar	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0.4	1
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	0.2	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	0.1	0
22-Mar	0	0	0	Z	0	0	0	0	0	18	40	42	31	17	18	19	17	10	4	5	4	3	2	1	10.1	42
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	1	0	0	0	0	0	0	0	0	0	0.2	1
25-Mar	Z	0	0	0	0	0	0	0	1	2	2	6	22	52	36	19	13	5	2	1	1	1	0	1	7.1	52
26-Mar	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	8	10	16	14	2	2	1	1	0	2.7	16
27-Mar	0	0	Z	0	0	0	0	0	3	39	41	45	29	16	9	10	7	2	1	2	1	2	7	4	9.5	45
28-Mar	8	8	4	Z	1	1	1	1	2	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	1.5	8
29-Mar	0	0	0	0	Z	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
30-Mar	0	0	0	0	0	Z	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
31-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	15	13	22	14	6	3	1	1	1	3.4	22
	1.0	0.6	0.4	0.3	0.3	0.3	0.3	0.3	0.5	2.5	3.5	4.4	5.5	4.2	3.9	4.7	3.3	2.5	1.5	0.9	0.6	0.5	0.8	0.7	Diurnal Average	
	11	8	4	2	1	1	1	1	3	39	41	45	33	52	36	31	17	22	14	6	4	4	7	10	Diurnal Maximum	

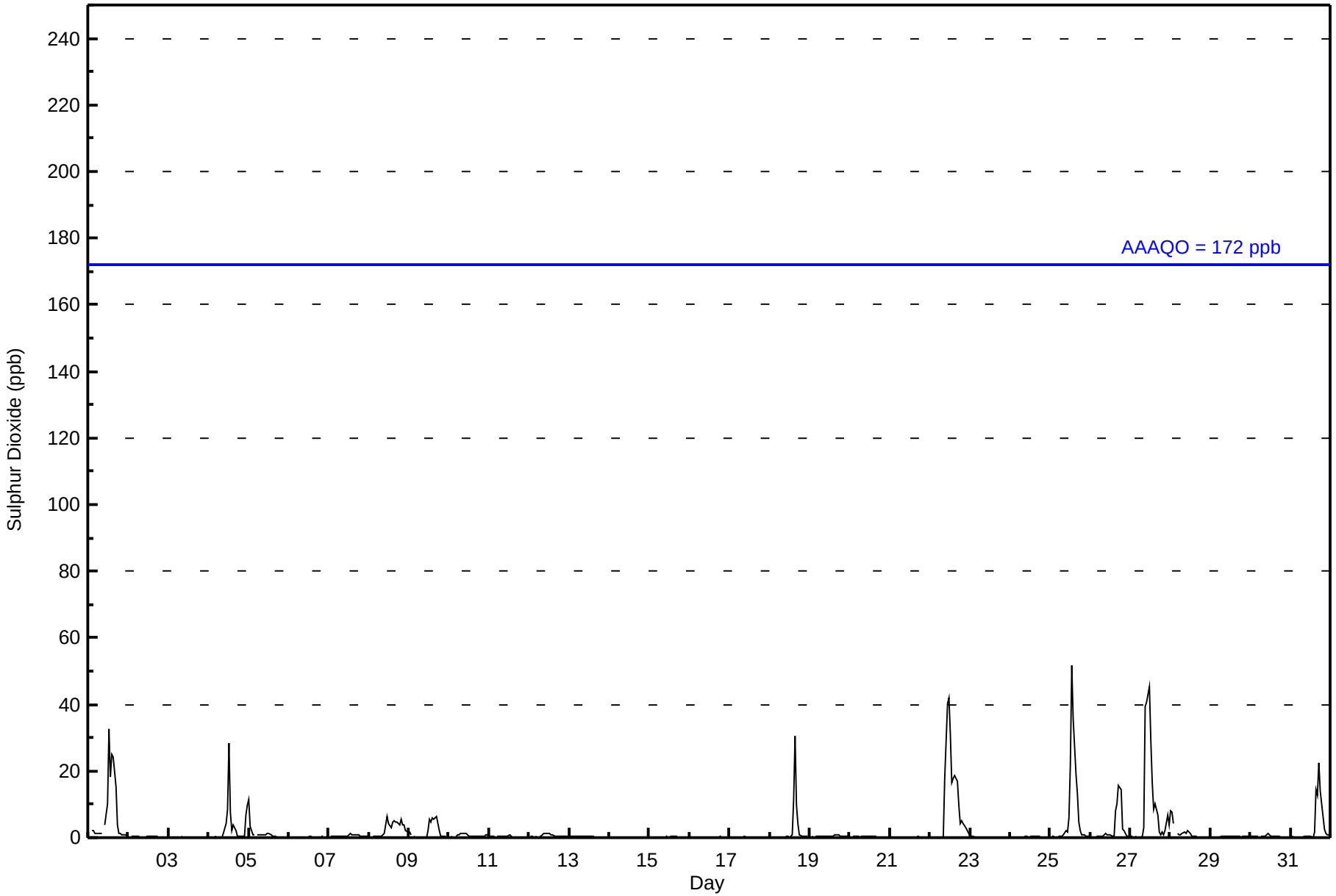
Z - zerospan C - Calibration M - Maintenance PF - Power Failure
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Fort McKay South - March 2016



Sulphur Dioxide (SO_2) - ppb
Fort McKay South - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	673	95.33	95.33
11 - 20	17	2.41	97.73
21 - 60	16	2.27	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 (SO_2) - ppb

Fort McKay South - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	200	141	30	6	6	13	21	24	43	26	19	46	19	20	21	34	669
11 - 20	0	1	0	0	0	2	6	5	2	1	0	0	0	0	0	0	17
21 - 60	0	0	1	0	0	2	7	3	3	0	0	0	0	0	0	0	16
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	200	142	31	6	6	17	34	32	48	27	19	46	19	20	21	34	702

Total Number of Valid Hours: 702

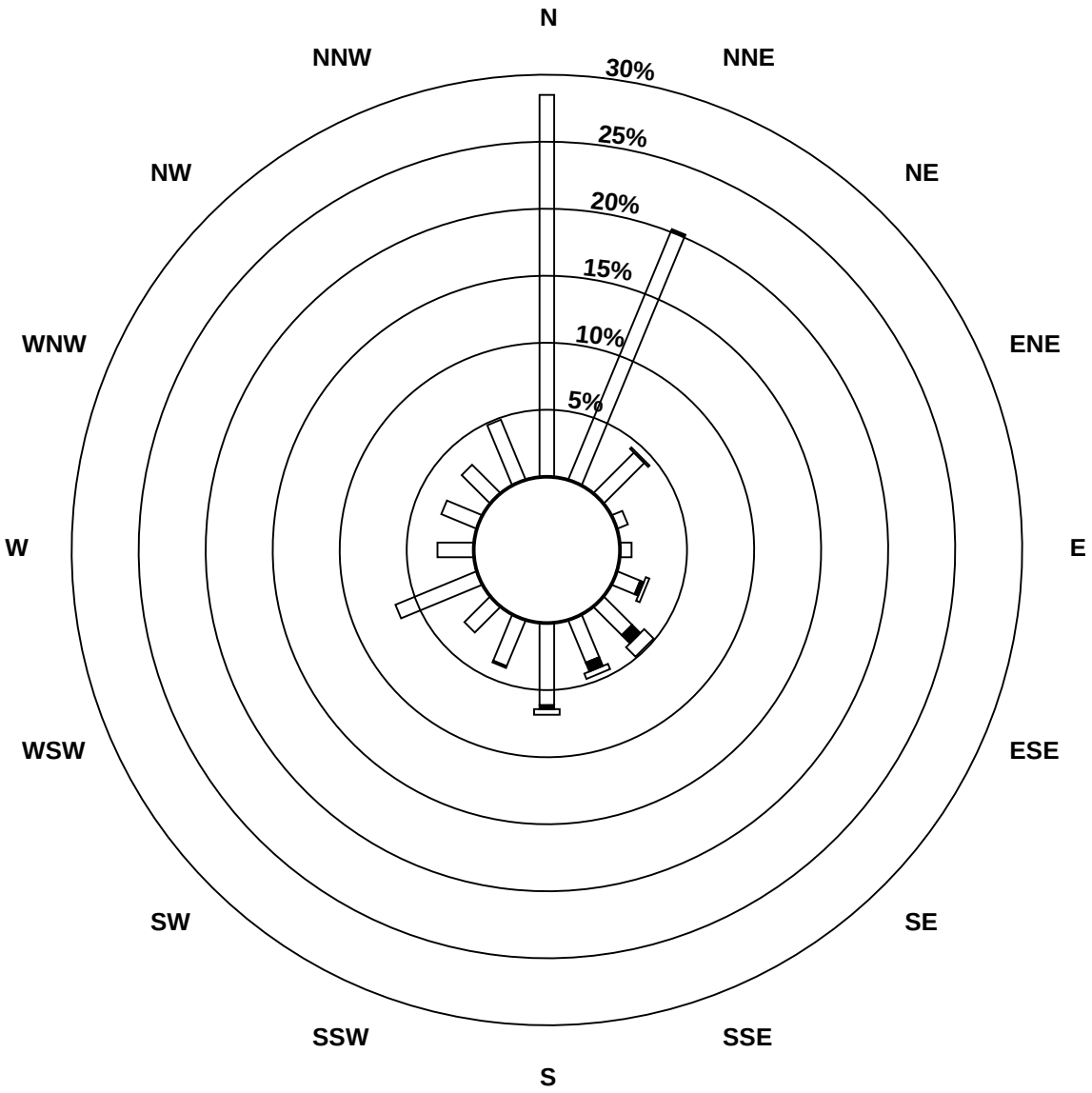
Total Number of Hours: 744

Wood Buffalo Environmental Association

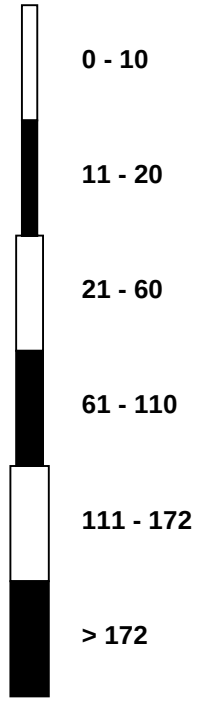
Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Fort McKay South (AMS 13)



Classes (ppb)



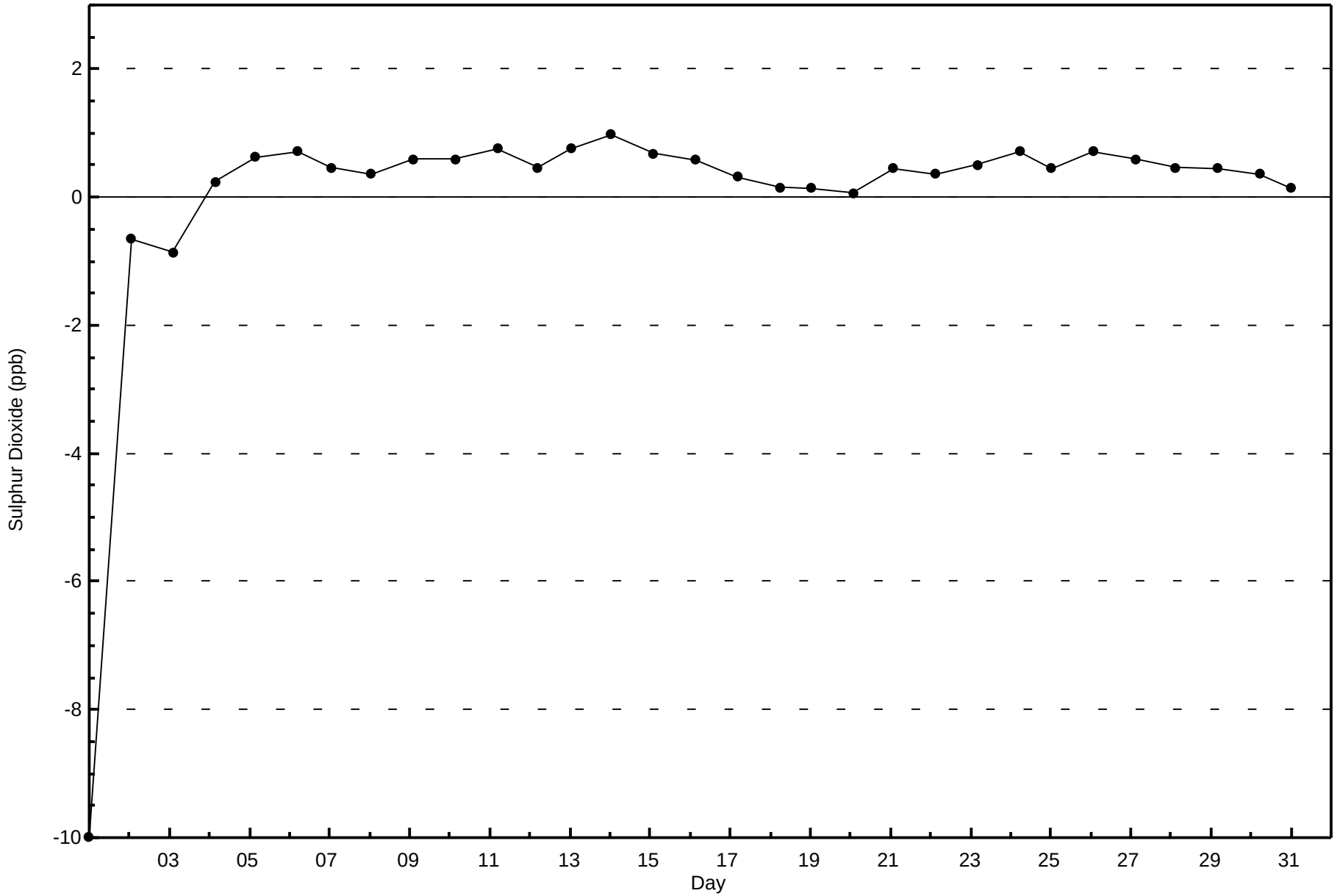
Total Number of Valid Hours: 702

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Fort McKay South - March 2016

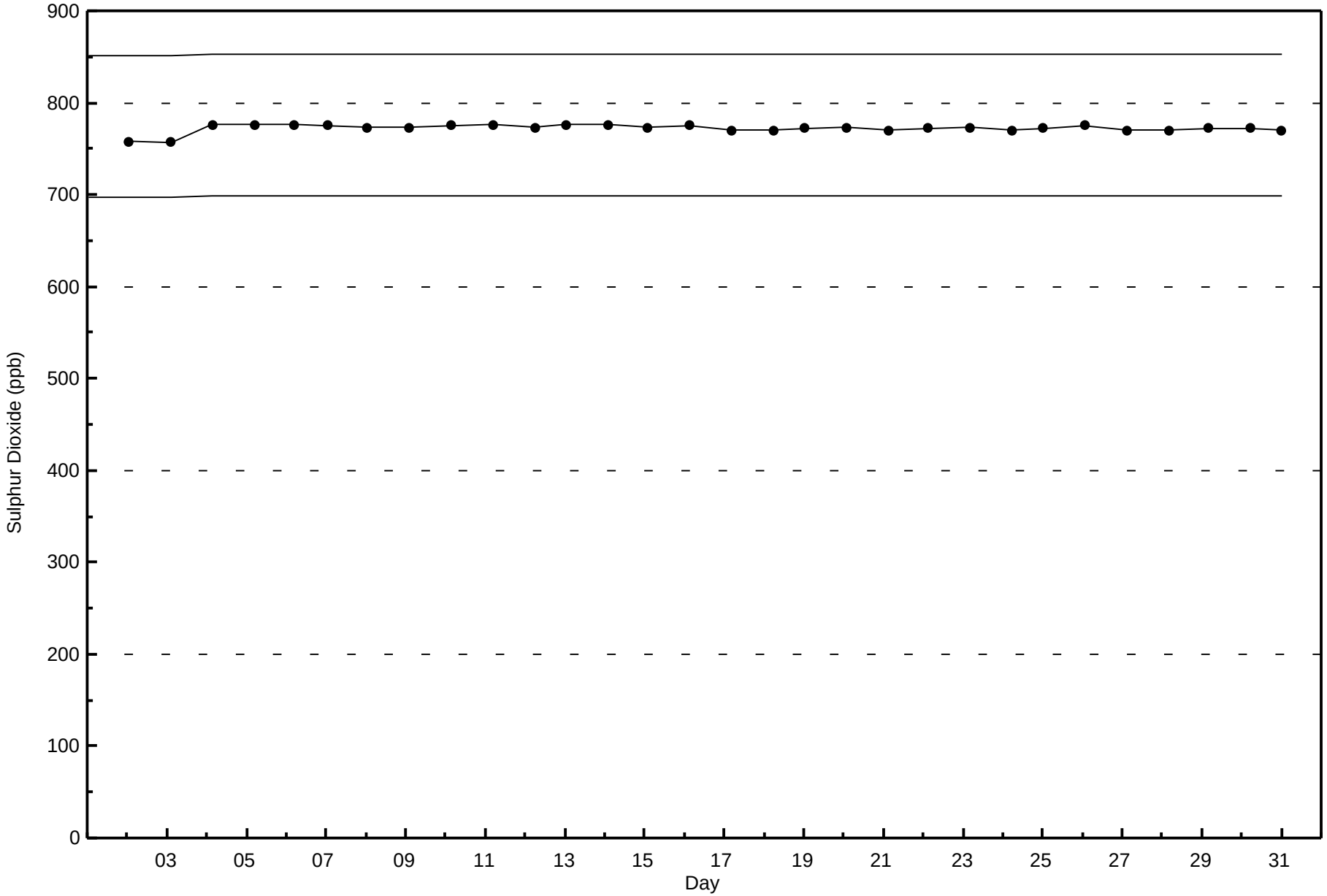


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Fort McKay South - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Fort McKay South - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 4 ppb on Mar 28 02:00

Maximum Daily Average: 1.0 ppb on Mar 27

Minimum Value: 0 ppb on Mar 4 20:00

Minimum Daily Average: 0.1 ppb on Mar 14

Maximum Diurnal Average: 0.4 ppb at hour 13

Minimum Diurnal Average: 0.2 ppb at hour 5

Monthly Average: 0.3 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 2$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	33
Percent Operational Time:	99.5

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

Z - zerospan C - Calibration M - Maintenance PF - Power Failure

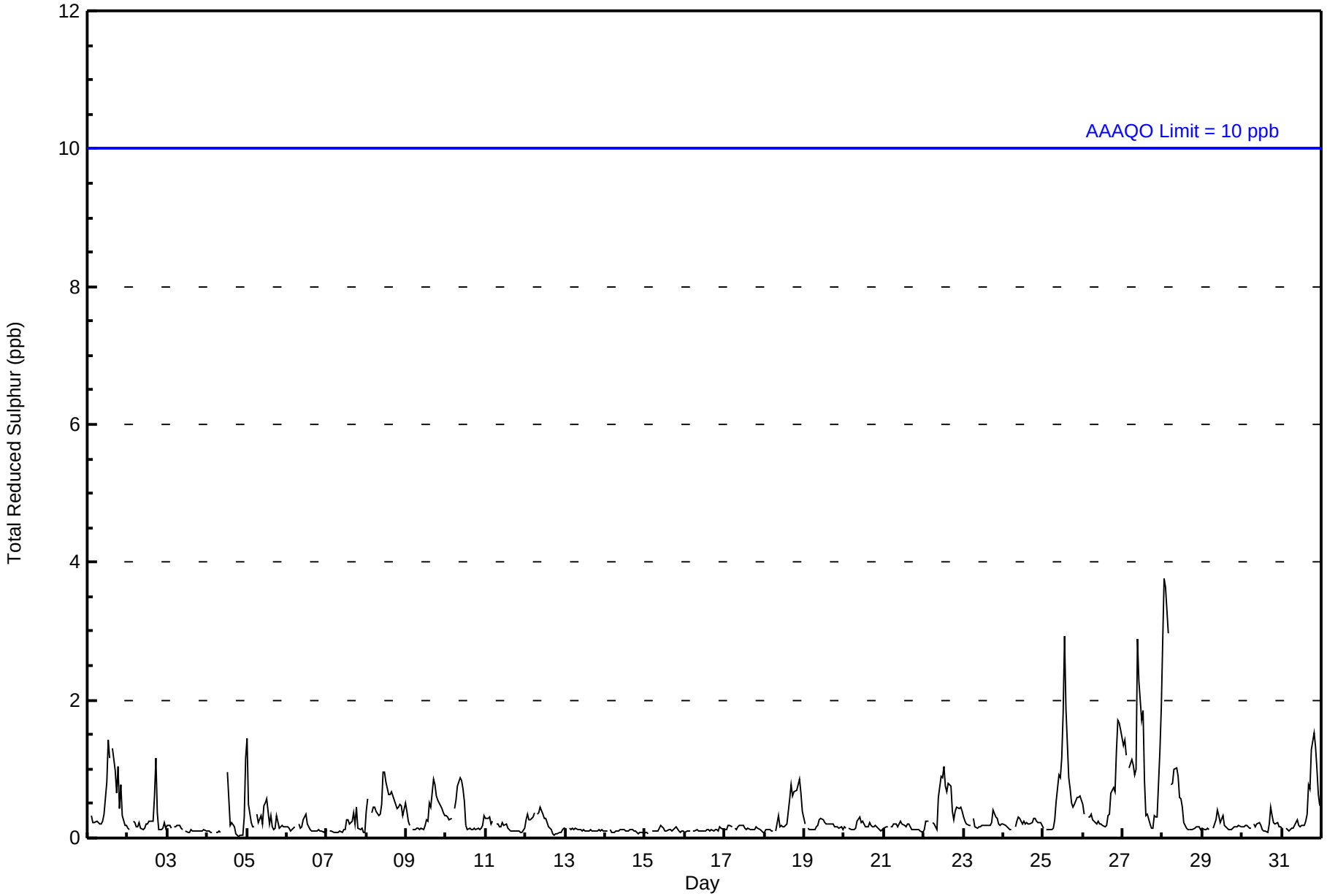
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Total Reduced Sulphur (TRS) - ppb

Fort McKay South - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Fort McKay South - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	701	99.15	99.15
3 - 4	6	0.85	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 South - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	203	143	31	6	6	17	33	29	45	26	17	49	19	19	22	33	698
3 - 4	0	0	0	0	0	0	1	0	2	2	1	0	0	0	0	0	6
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	203	143	31	6	6	17	34	29	47	28	18	49	19	19	22	33	704

Total Number of Valid Hours: 704

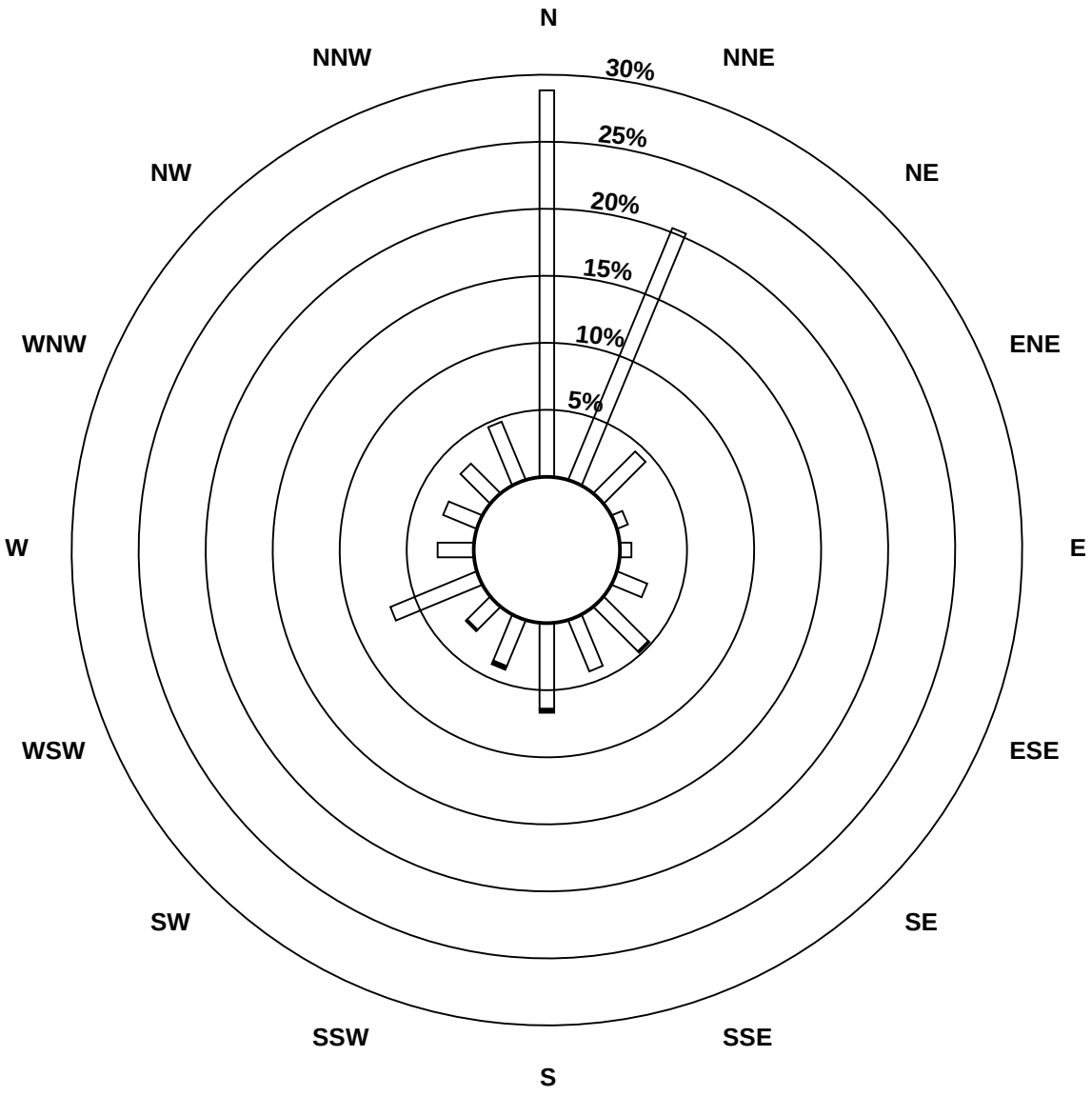
Total Number of Hours: 744

Wood Buffalo Environmental Association

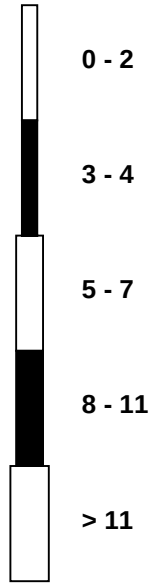
Wind Rose Mar 2016

Total Reduced Sulphur (TRS) - ppb

Fort McKay South (AMS 13)



Classes (ppb)



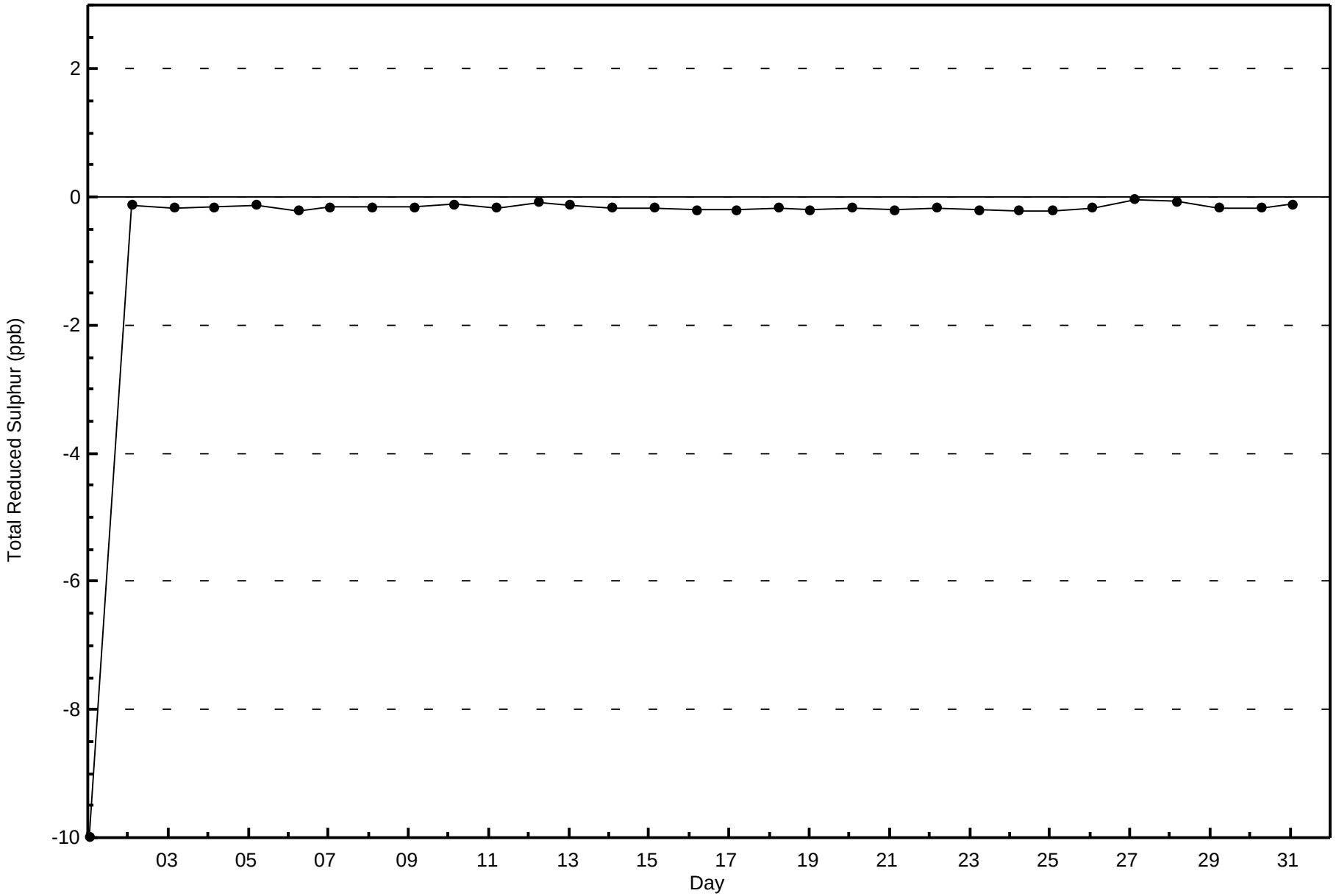
Total Number of Valid Hours: 704

Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

Fort McKay South - March 2016

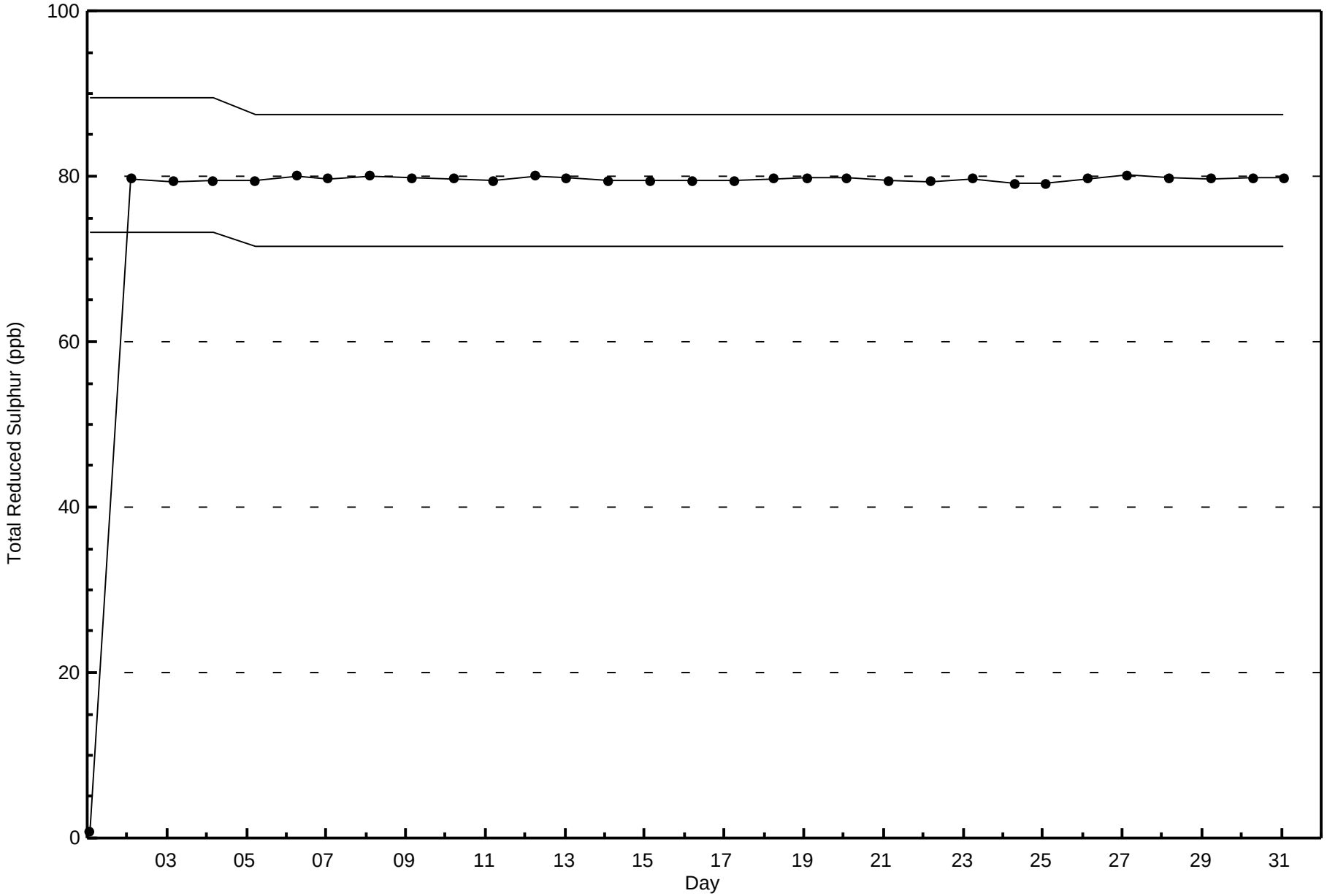


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

Fort McKay South - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Fort McKay South - March 2016

Maximum Value: 4.0 ppm on Mar 27 02:00

Maximum Daily Average: 2.6 ppm on Mar 27

Minimum Value: 2.1 ppm on Mar 12 18:00

Minimum Daily Average: 2.2 ppm on Mar 16

Maximum Diurnal Average: 2.5 ppm at hour 10

Minimum Diurnal Average: 2.3 ppm at hour 16

Monthly Average: 2.36 ppm

Percentiles: P_1 = 2.1 P_{10} = 2.2 Q_1 = 2.2 Median = 2.3 Q_3 = 2.4 P_{90} = 2.6 P_{99} = 3.3

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	35
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	2.5	2.4	2.4	2.4	2.5	2.5	2.5	M	2.7	2.7	2.5	2.5	2.5	2.4	2.5	2.6	2.7	2.6	2.6	2.5	2.3	2.4	2.5	2.7
2-Mar	2.2	Z	2.3	2.5	2.7	2.5	2.4	2.5	2.3	2.2	2.3	2.6	2.6	2.7	2.6	2.6	2.8	2.7	2.6	2.4	2.2	2.4	2.5	2.4	2.5	2.8
3-Mar	2.3	2.4	Z	2.3	2.3	2.3	2.2	2.3	2.2	C	C	C	C	C	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4
4-Mar	2.4	2.3	2.3	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.6	2.5	2.4	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.6
5-Mar	2.3	2.4	2.7	2.4	Z	2.3	2.5	2.8	2.7	2.7	2.9	2.8	2.8	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.3	2.4	2.4	2.5	2.9
6-Mar	2.3	2.3	2.2	2.3	2.4	Z	2.3	2.4	2.3	2.4	2.3	2.4	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.4	2.4	2.3	2.3	2.3	2.3	2.4
7-Mar	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.2	2.3	2.9	2.4	2.9	2.3	2.3	2.4	2.2	2.2	2.3	2.9
8-Mar	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.6	2.7	2.6	2.6	2.5	2.5	2.6	2.6	2.6	2.5	2.4	2.5	2.7	2.7	2.6	2.5	2.7
9-Mar	2.4	2.4	Z	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.6	2.5	2.5	2.4	2.5	2.4	2.4	2.5	2.5	2.5	2.4	2.6
10-Mar	2.5	2.5	2.5	Z	2.9	3.2	3.4	3.3	3.2	3.2	3.0	2.8	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.4	2.6	3.4
11-Mar	2.5	2.4	2.4	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.5	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.5
12-Mar	2.5	2.6	2.7	2.9	3.0	Z	2.8	2.7	2.8	3.5	3.1	2.7	2.8	2.5	2.4	2.3	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.4	2.5	3.5
13-Mar	Z	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4
14-Mar	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	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	2.3
15-Mar	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.3	2.3	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	2.5
16-Mar	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.3
17-Mar	2.3	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	2.3
18-Mar	2.3	2.4	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.6	2.3	2.6
19-Mar	Z	2.3	2.3	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	2.4	2.4	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.5
20-Mar	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.5	2.4	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.4	2.2	2.2	2.3	2.3	2.3	2.5
21-Mar	2.4	2.4	Z	2.4	2.4	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4
22-Mar	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.4
23-Mar	2.3	2.3	2.2	2.2	Z	2.4	2.4	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.3	2.4	2.3	2.4
24-Mar	2.4	2.4	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.5	2.5	2.3	2.5
25-Mar	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.6	2.6	3.3	3.2	2.6	2.4	2.3	2.3	2.3	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.8	2.5	3.3
26-Mar	2.8	Z	2.6	2.6	2.6	2.7	2.6	2.4	2.3	2.4	2.2	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.7	2.4	2.8
27-Mar	3.4	4.0	Z	3.3	3.1	3.1	3.0	3.0	2.8	2.5	2.4	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.3	2.6	4.0
28-Mar	2.4	2.4	2.4	Z	2.5	2.8	3.0	3.6	3.3	3.3	2.7	2.7	2.6	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.5	3.6
29-Mar	2.1	2.2	2.2	2.2	Z	2.2	2.2	2.6	2.8	2.4	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.8
30-Mar	2.3	2.4	2.6	2.7	2.5	Z	2.5	2.7	2.4	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.3	2.7
31-Mar	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.3	2.4	2.5	2.8	2.7	2.6	2.8	2.4	2.8
	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	Diurnal Average	
	3.4	4.0	2.7	3.3	3.1	3.2	3.4	3.6	3.3	3.5	3.2	2.8	2.8	2.7	2.6	2.6	2.9	2.7	2.9	2.6	2.8	2.8	2.9	2.8	Diurnal Maximum	

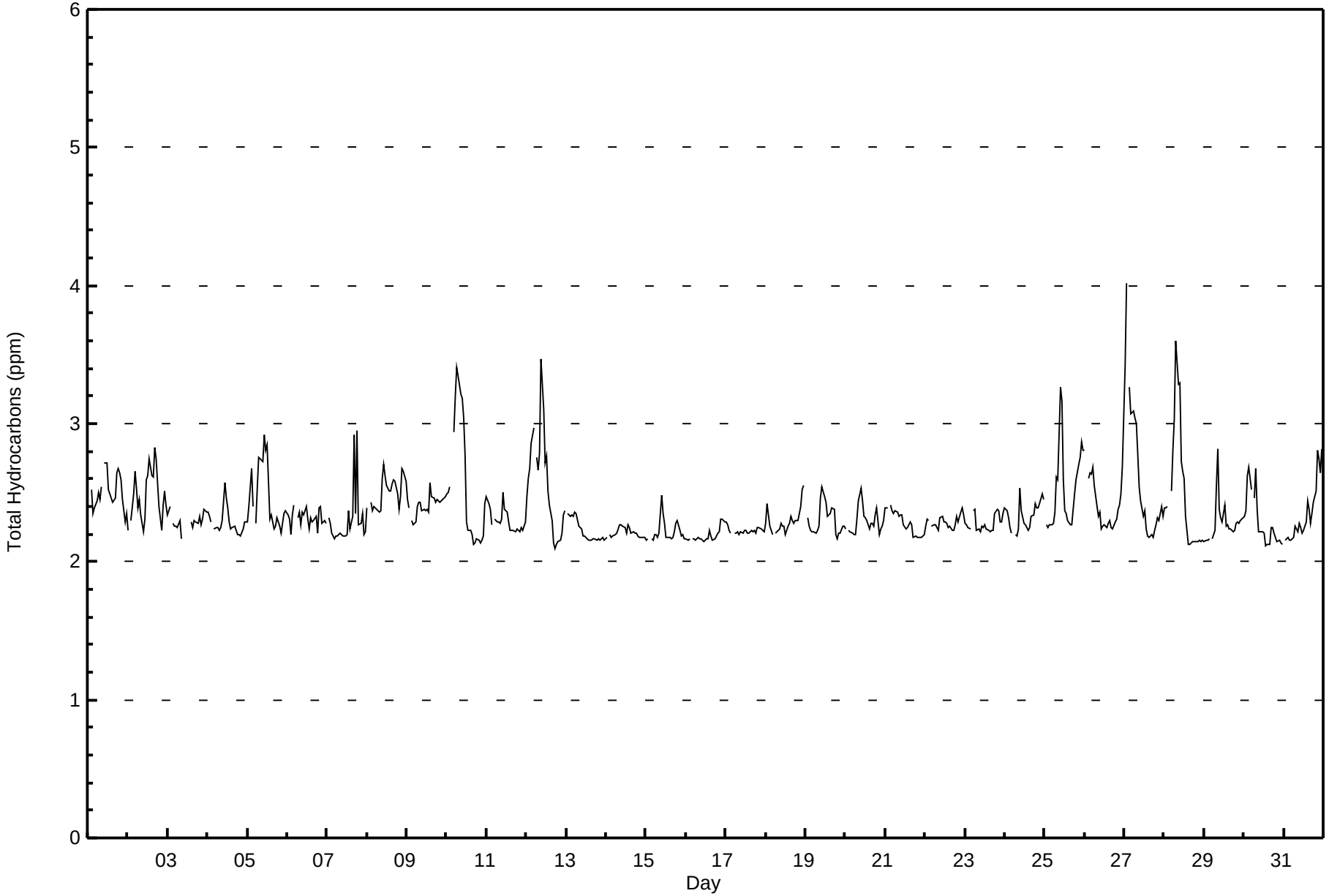
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Fort McKay South - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Fort McKay South - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	689	97.59	97.59
3.1 - 10.0	17	2.41	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

Fort McKay South - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	196	141	31	6	6	17	33	31	45	27	17	42	18	20	21	34	685
3.1 - 10.0	4	1	0	0	0	0	1	1	3	0	2	4	1	0	0	0	17
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	200	142	31	6	6	17	34	32	48	27	19	46	19	20	21	34	702

Total Number of Valid Hours: 702

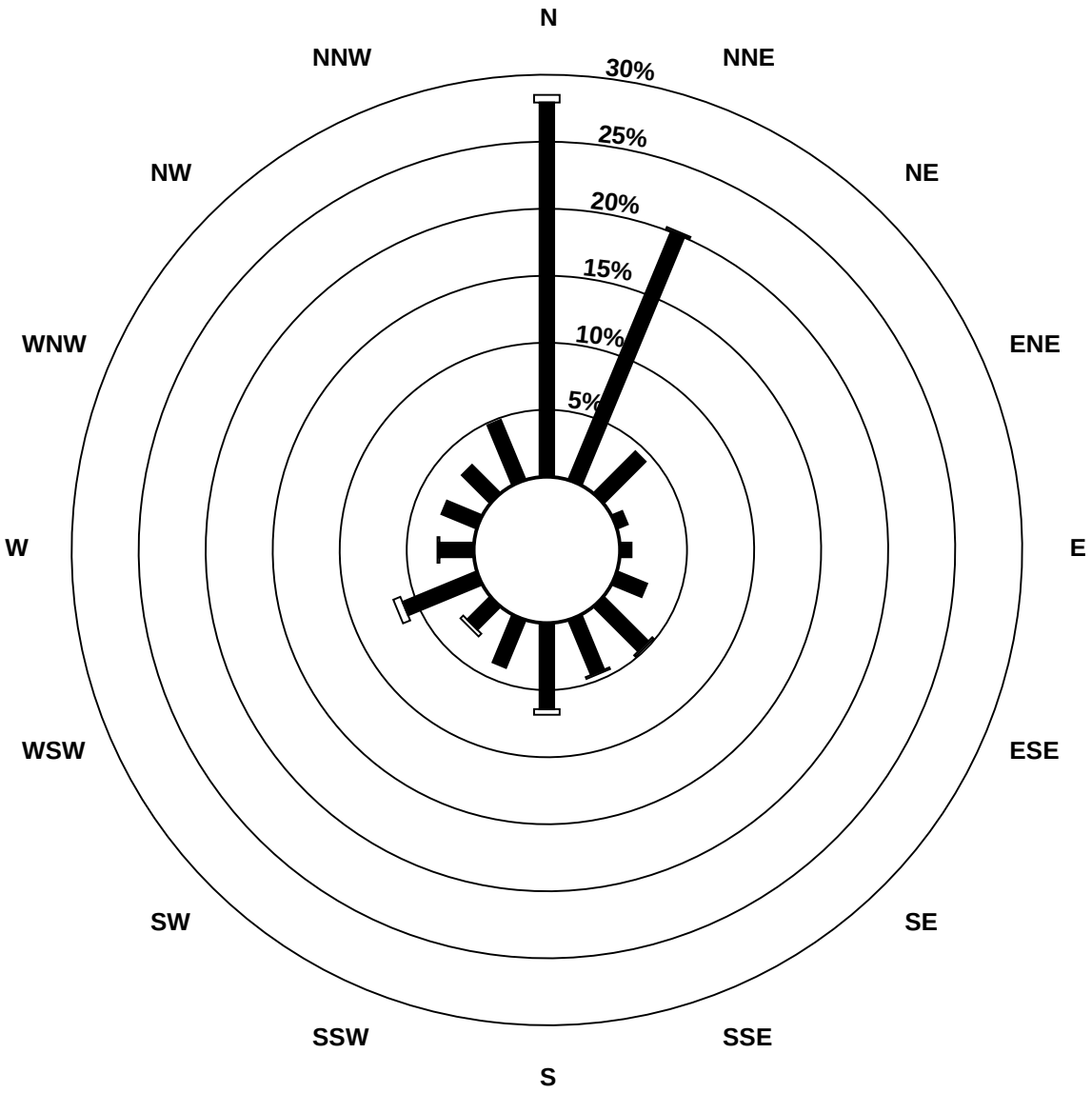
Total Number of Hours: 744

Wood Buffalo Environmental Association

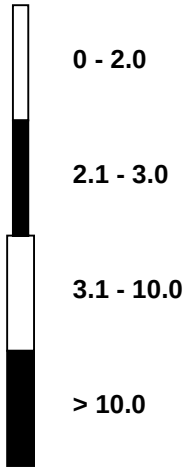
Wind Rose Mar 2016

Total Hydrocarbons (THC) - ppm

Fort McKay South (AMS 13)



Classes (ppm)



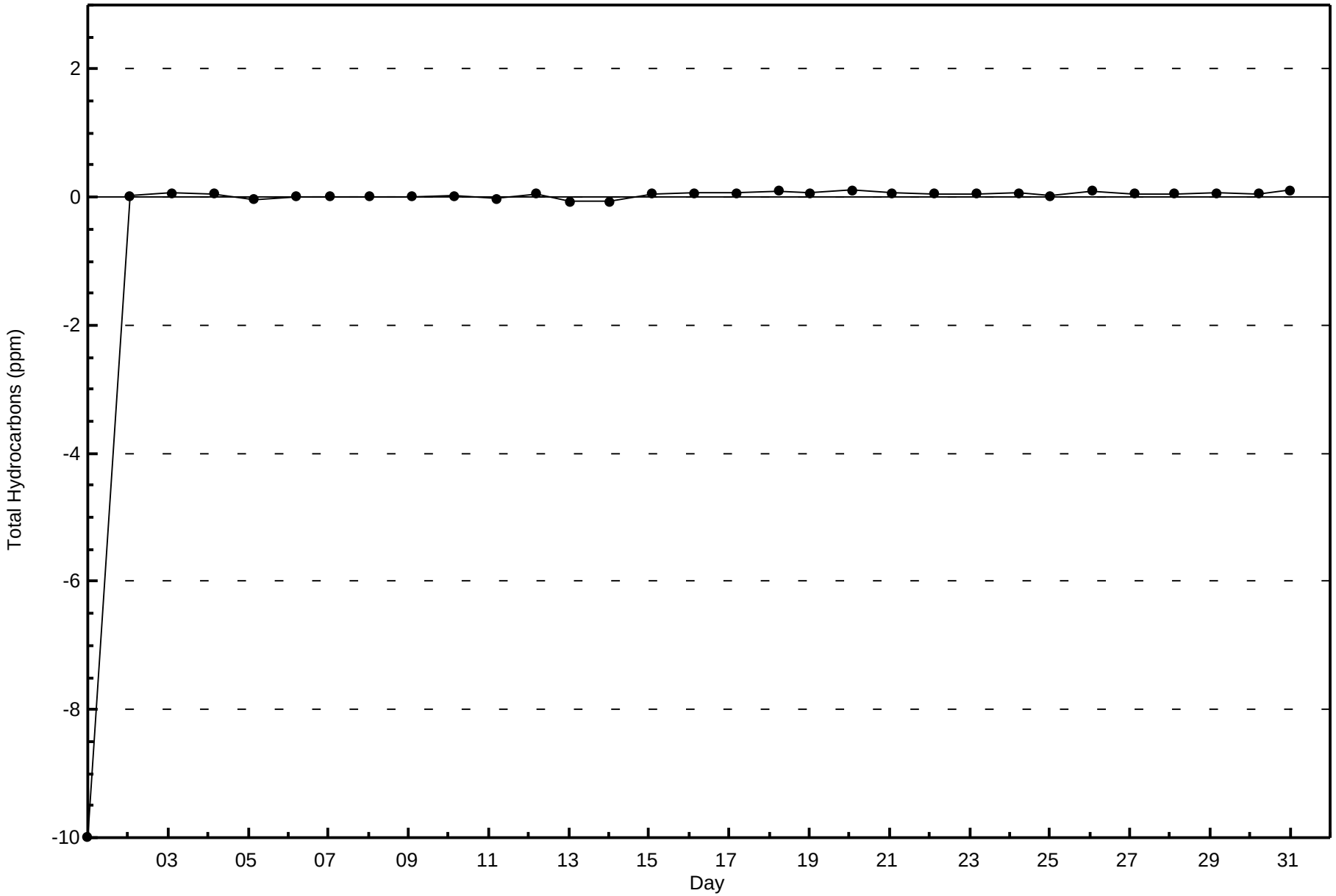
Total Number of Valid Hours: 702

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Fort McKay South - March 2016

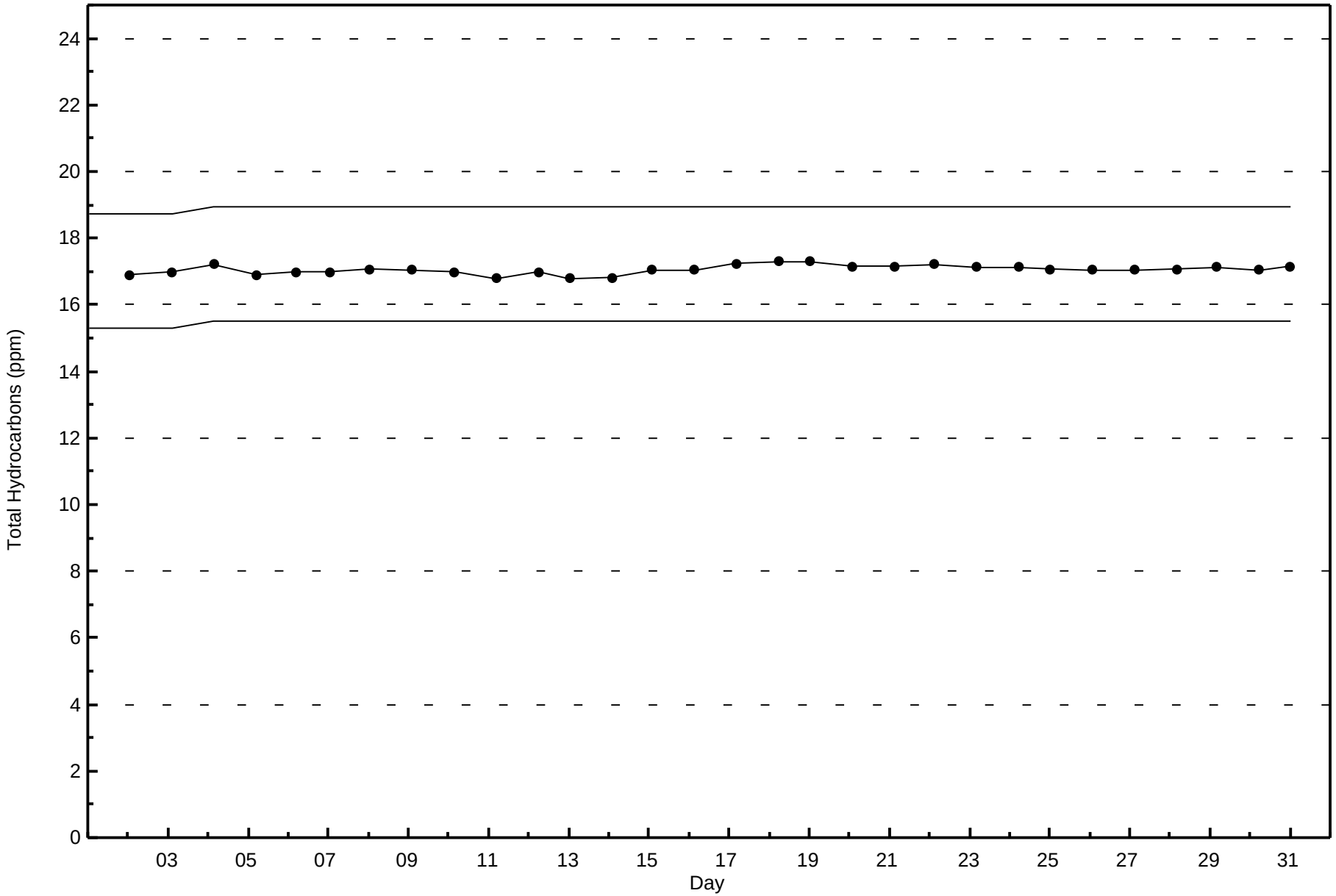


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Fort McKay South - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O_3) - ppb

Fort McKay South - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 49 ppb on Mar 28 17:00

Maximum Daily Average: 35.7 ppb on Mar 16

Minimum Value: 0 ppb on Mar 10 04:00

Minimum Daily Average: 10.9 ppb on Mar 1

Maximum Diurnal Average: 33.2 ppb at hour 15

Minimum Diurnal Average: 17.0 ppb at hour 7

Monthly Average: 24.8 ppb

Percentiles: $P_1 = 1$ $P_{10} = 8$ $Q_1 = 17$ Median = 26 $Q_3 = 33$ $P_{90} = 39$ $P_{99} = 47$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	34
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	8	Z	5	3	3	5	7	8	11	17	20	21	17	16	17	11	7	4	5	11	19	15	10.9	21
2-Mar	22	23	17	5	Z	6	10	9	18	23	18	13	14	12	14	15	9	7	11	18	28	20	12	13	14.7	28
3-Mar	14	11	14	20	21	Z	20	19	25	29	M	31	33	32	30	32	33	33	32	33	35	32	26	20	26.1	35
4-Mar	15	18	19	16	18	17	Z	C	C	C	28	27	23	33	38	36	32	36	34	26	22	24	24	21	25.3	38
5-Mar	20	23	34	34	31	25	24	Z	21	24	27	21	19	32	33	35	36	35	30	32	34	31	29	29	28.7	36
6-Mar	28	29	36	33	30	24	28	27	Z	31	31	34	36	35	34	35	34	33	37	29	28	30	28	28	31.2	37
7-Mar	25	23	26	Z	32	30	29	28	27	28	29	31	30	27	30	27	6	20	2	20	26	25	34	33	25.6	34
8-Mar	27	21	21	21	Z	20	17	15	13	11	10	9	11	13	14	12	9	6	3	3	2	1	1	2	11.4	27
9-Mar	13	16	15	21	24	Z	16	16	17	21	23	23	20	22	17	20	20	16	11	6	4	3	2	1	15.1	24
10-Mar	1	1	1	0	1	0	Z	1	2	2	5	8	25	30	31	32	33	33	32	29	28	25	22	21	15.7	33
11-Mar	17	10	6	20	19	17	18	Z	20	21	16	22	22	30	34	34	34	28	16	22	12	8	6	5	19.0	34
12-Mar	3	2	1	1	1	1	1	3	Z	4	4	8	13	17	21	24	38	39	32	21	17	11	10	8	12.2	39
13-Mar	6	4	6	Z	4	2	2	17	25	27	30	30	30	28	29	28	28	27	27	28	28	28	29	31	21.4	31
14-Mar	31	30	32	31	Z	32	31	30	31	31	31	31	32	31	32	32	32	32	32	32	33	32	31	30	31.4	33
15-Mar	29	27	27	23	23	Z	20	22	23	15	19	24	30	32	32	34	33	29	24	27	30	33	33	34	27.1	34
16-Mar	35	34	34	35	35	34	Z	34	35	37	38	39	41	40	38	40	41	40	39	33	33	33	27	26	35.7	41
17-Mar	24	26	30	30	22	25	31	Z	33	35	37	38	39	38	38	37	37	37	35	32	20	13	9	8	29.5	39
18-Mar	6	2	25	26	14	9	10	21	Z	30	35	35	37	39	34	25	31	31	17	11	10	7	3	5	20.3	39
19-Mar	13	10	13	Z	12	13	12	21	26	24	23	26	27	31	33	32	31	30	37	39	35	33	29	28	25.1	39
20-Mar	27	26	28	28	Z	19	15	18	20	20	28	32	33	35	37	36	35	36	33	30	35	32	29	26	28.6	37
21-Mar	22	21	22	18	21	Z	21	25	27	29	31	35	37	37	37	39	39	41	41	41	39	37	34	30	31.5	41
22-Mar	30	26	25	23	21	18	Z	17	32	29	23	25	27	32	33	34	33	34	33	27	25	19	14	16	25.9	34
23-Mar	18	20	15	19	23	15	9	Z	36	39	39	39	40	42	42	43	42	43	36	32	26	25	24	19	29.8	43
24-Mar	15	14	17	21	22	23	24	23	Z	24	32	40	43	45	47	48	47	44	31	24	22	20	15	17	28.6	48
25-Mar	23	25	21	Z	17	14	13	10	17	31	34	33	32	23	26	30	33	35	25	21	17	12	5	5	21.8	35
26-Mar	5	10	9	7	Z	5	18	25	33	33	42	42	42	43	43	40	39	36	29	20	17	14	12	13	25.1	43
27-Mar	11	9	9	12	12	Z	9	9	15	16	18	26	31	37	41	42	42	41	34	25	25	29	14	17	22.9	42
28-Mar	30	26	24	23	20	15	Z	24	32	42	42	40	43	44	47	49	49	48	47	40	34	31	24	35	35.2	49
29-Mar	37	42	43	39	35	30	22	Z	17	27	34	41	46	45	45	46	46	42	30	24	19	17	16	13	33.0	46
30-Mar	13	12	6	7	10	9	7	11	Z	38	41	43	45	46	46	45	39	37	35	37	40	39	40	39	29.8	46
31-Mar	38	36	37	Z	37	35	33	30	34	32	35	37	35	36	36	34	32	19	16	17	17	13	7	1	28.1	38
	20.0	19.3	20.0	20.6	19.7	17.0	17.0	18.4	23.4	25.5	27.1	29.0	30.8	32.5	33.2	33.2	32.6	31.7	27.3	25.3	24.0	22.3	19.6	19.0	Diurnal Average	
	38	42	43	39	37	35	33	34	36	42	42	43	46	46	47	49	49	48	47	41	40	39	40	39	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance PF - Power Failure

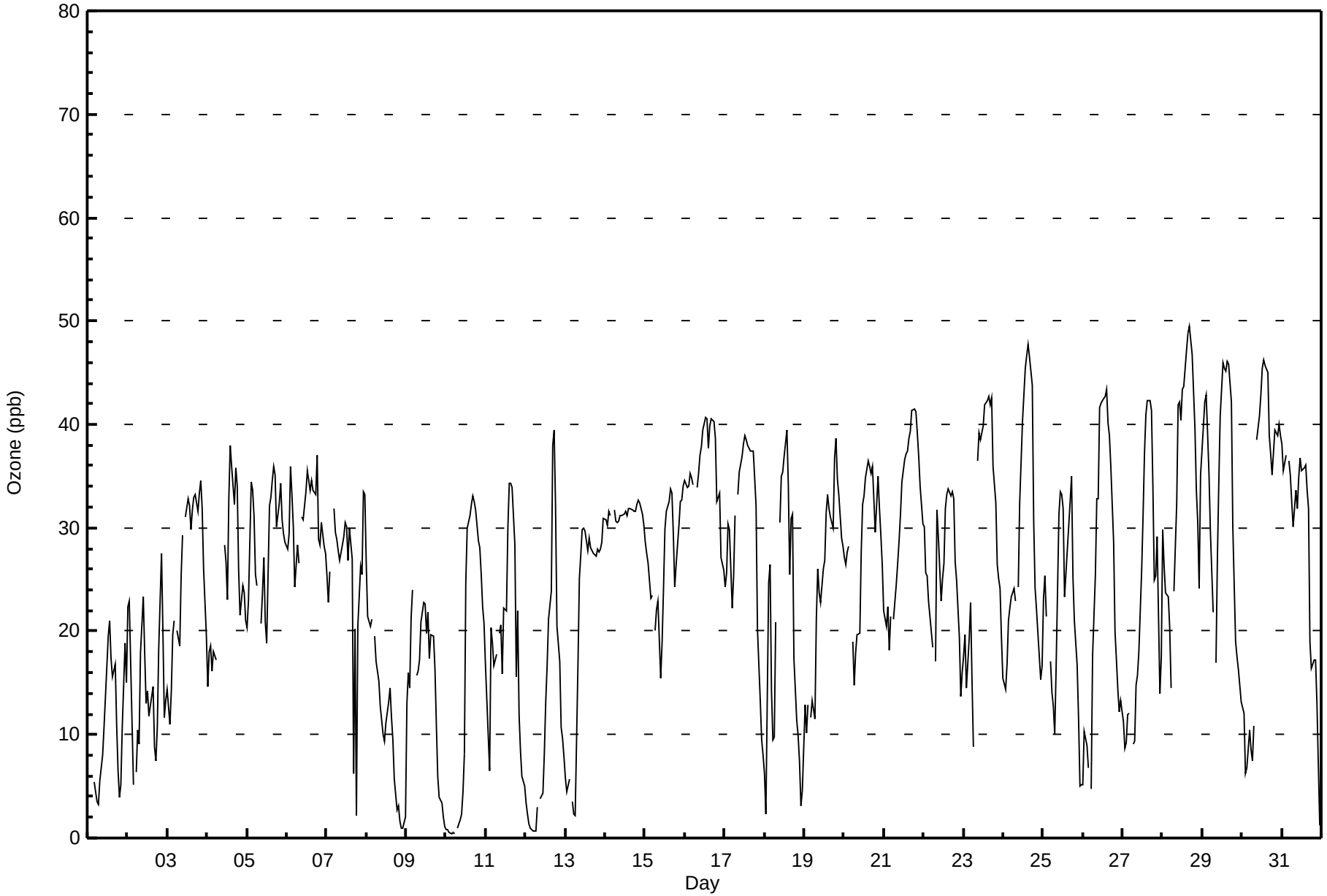
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ozone (O_3) - ppb

Fort McKay South - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	245	34.65	34.65
21 - 50	462	65.35	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Ozone (O_3) - ppb

Fort McKay South - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	62	35	6	1	3	3	5	5	20	20	14	29	10	6	7	15	241
21 - 50	139	110	21	5	4	14	29	24	28	8	5	18	11	14	15	17	462
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	201	145	27	6	7	17	34	29	48	28	19	47	21	20	22	32	703

Total Number of Valid Hours: 703

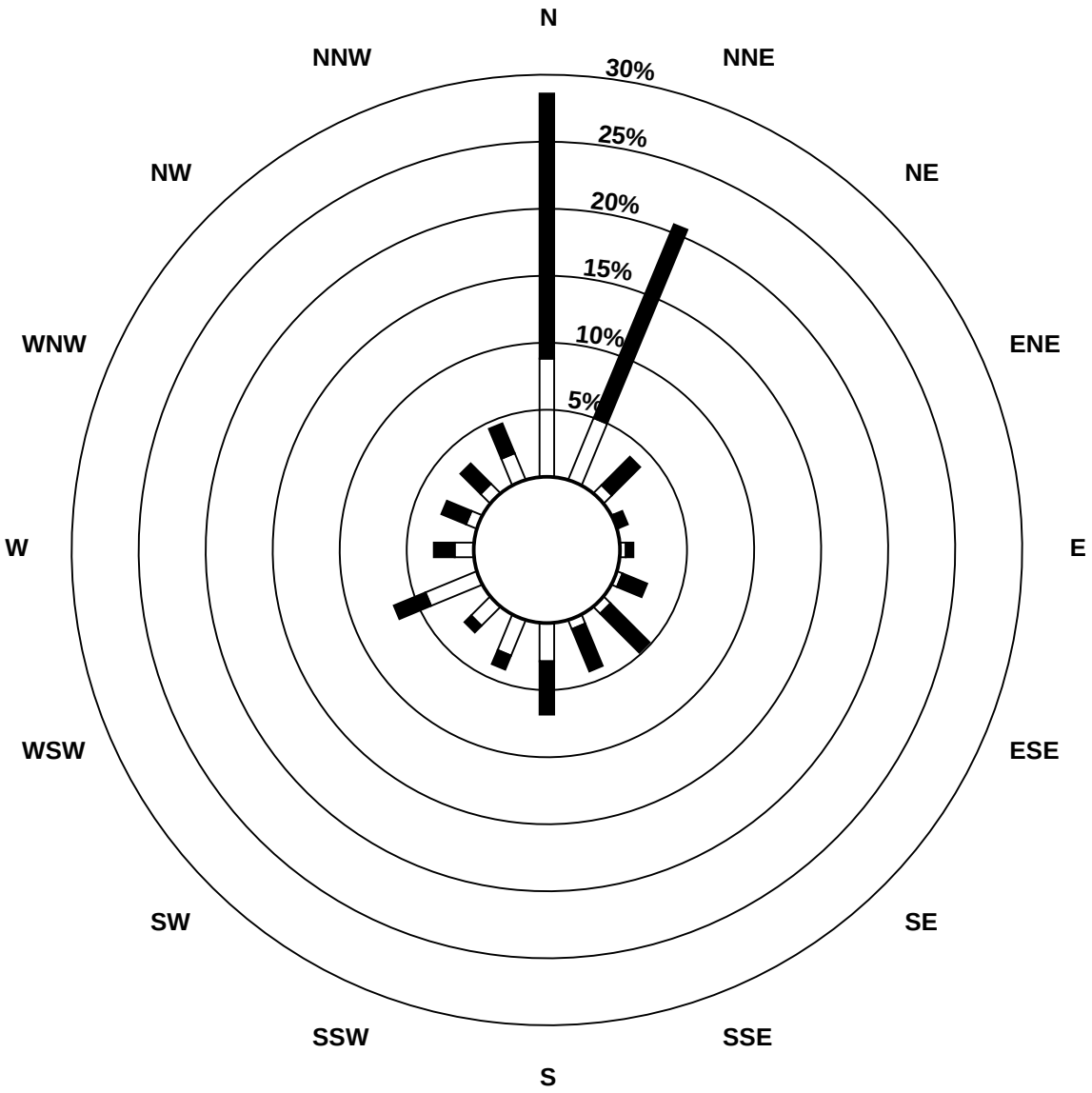
Total Number of Hours: 744

Wood Buffalo Environmental Association

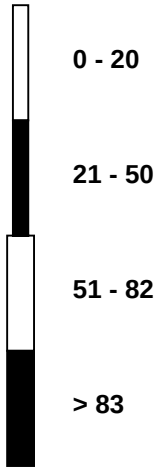
Wind Rose Mar 2016

Ozone (O_3) - ppb

Fort McKay South (AMS 13)



Classes (ppb)



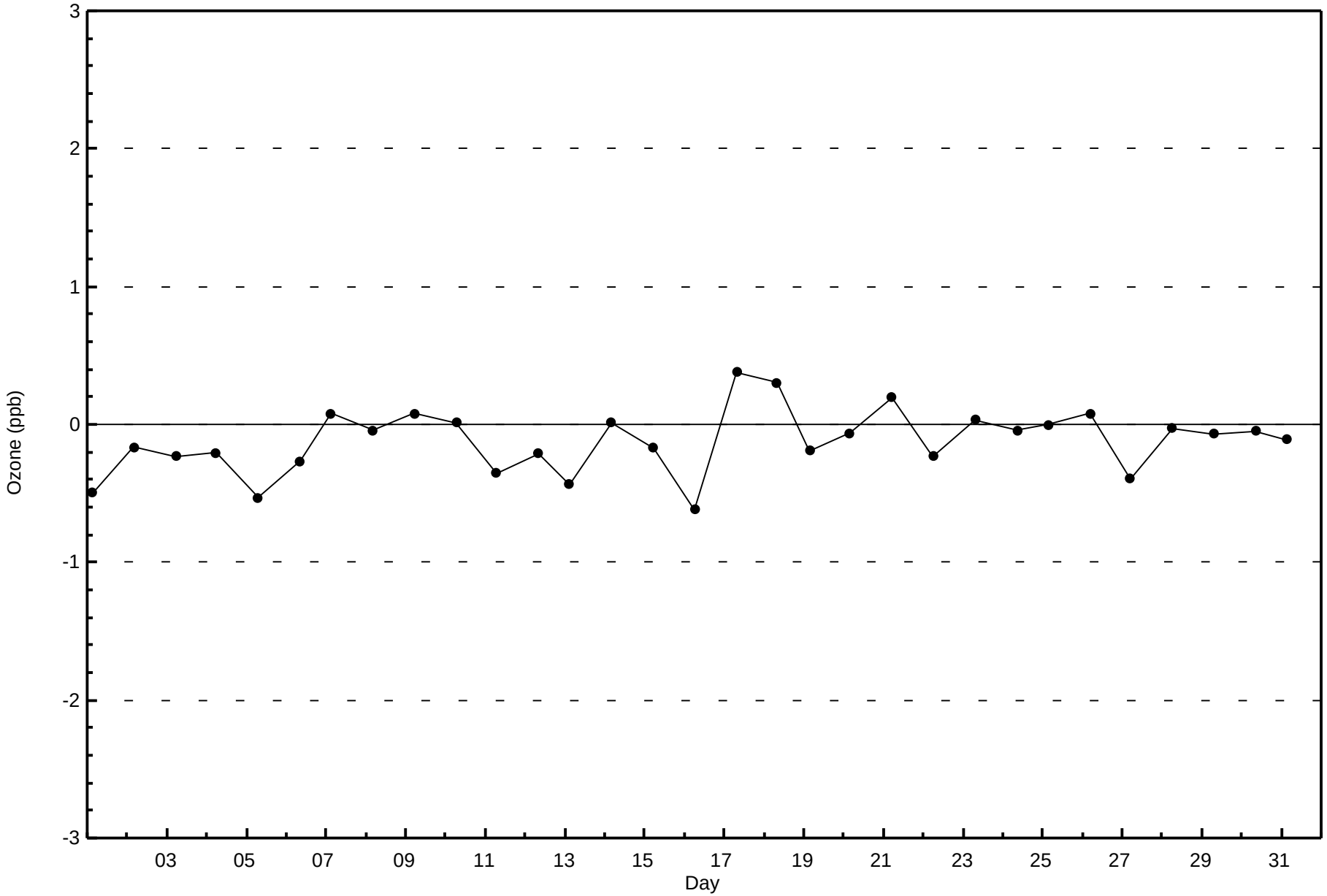
Total Number of Valid Hours: 703

Wood Buffalo Environmental Association

Zero Responses

Ozone (O_3) - ppb

Fort McKay South - March 2016

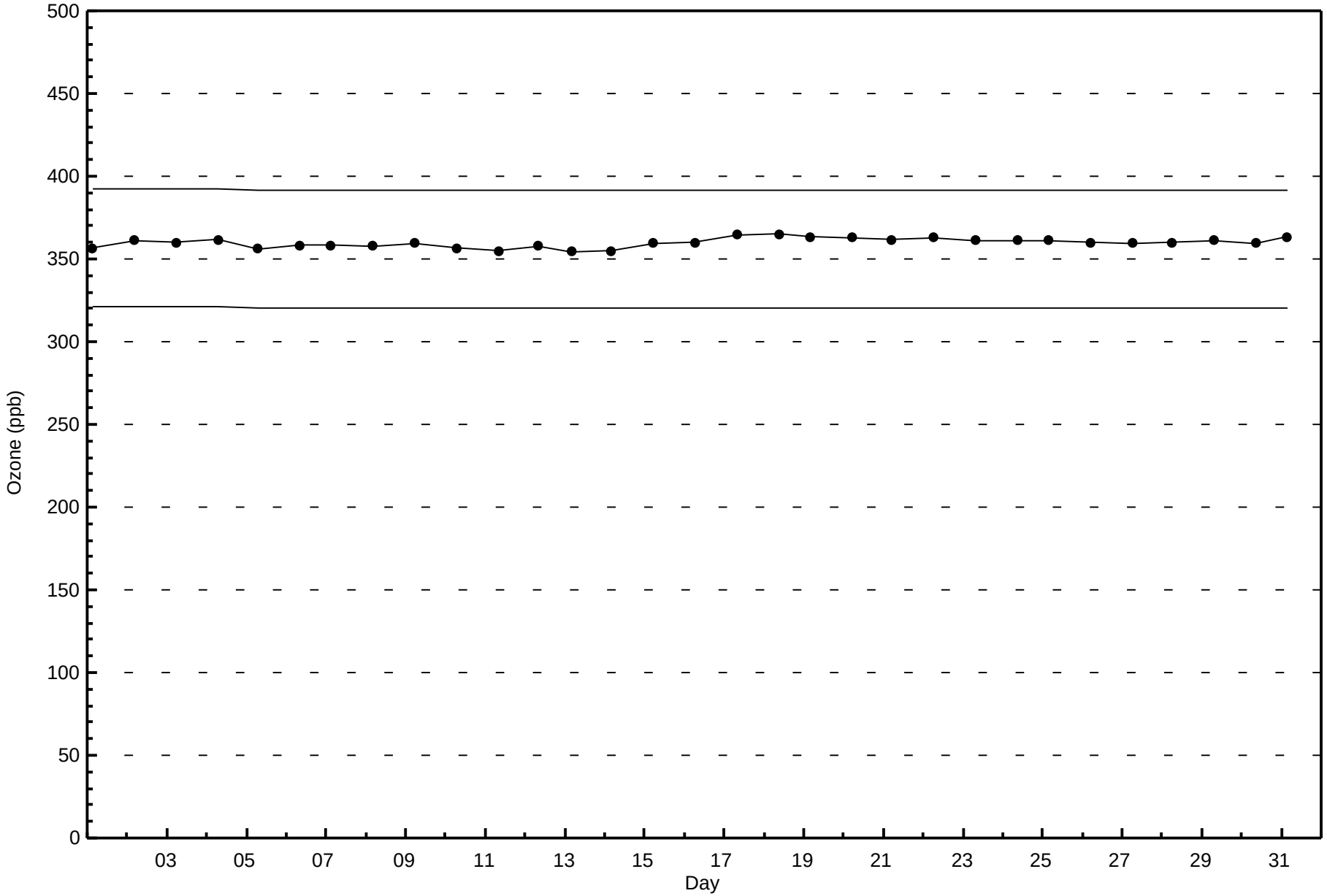


Wood Buffalo Environmental Association

Span Responses

Ozone (O_3) - ppb

Fort McKay South - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Fort McKay South - March 2016

Maximum Value: 50 ppb on Mar 12 11:00

Maximum Daily Average: 8.8 ppb on Mar 12

Minimum Value: 0 ppb on Mar 3 20:00

Minimum Daily Average: 0.1 ppb on Mar 17

Maximum Diurnal Average: 8.6 ppb at hour 11

Minimum Diurnal Average: 0.1 ppb at hour 3

Monthly Average: 2.4 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 2$ $P_{90} = 7$ $P_{99} = 30$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	35
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	0	0	0	0	0	1	14	M	34	22	20	11	12	10	5	6	1	2	1	0	0	0	6.6	34
2-Mar	0	Z	0	2	4	1	1	1	2	2	7	17	17	18	14	10	15	8	1	0	0	0	0	0	5.2	18
3-Mar	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	2	1	1	0	0	0	0	0	0	0	0.3	2
4-Mar	0	0	0	Z	0	0	0	0	1	2	3	7	12	4	1	1	1	0	0	0	0	0	0	0	1.4	12
5-Mar	0	0	0	0	Z	0	0	23	6	6	6	10	13	2	1	1	0	0	0	0	0	0	0	0	3.0	23
6-Mar	0	0	0	0	0	Z	0	1	1	3	5	5	3	2	2	1	1	0	0	0	0	0	0	0	1.1	5
7-Mar	Z	0	0	0	0	0	0	0	1	1	1	1	2	3	1	1	22	4	19	0	0	0	0	0	2.5	22
8-Mar	0	Z	0	0	0	0	0	1	4	9	15	16	16	13	11	13	14	12	4	1	2	6	3	2	6.0	16
9-Mar	0	0	Z	0	0	0	0	1	2	3	4	7	8	6	9	4	2	1	0	0	0	0	0	0	2.2	9
10-Mar	0	0	0	Z	9	18	31	40	31	30	23	15	1	0	0	0	0	0	0	0	0	0	0	0	8.7	40
11-Mar	0	0	0	0	Z	0	0	0	0	0	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0.4	3
12-Mar	0	0	0	0	1	Z	7	7	15	46	50	31	26	10	7	3	1	0	0	0	0	0	0	0	8.8	50
13-Mar	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
14-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	0.3	1
15-Mar	0	0	Z	0	0	0	0	0	1	8	10	6	2	2	1	1	0	1	0	0	0	0	0	0	1.5	10
16-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	0.1	1
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	2	0	0	0	Z	0	0	1	1	1	1	1	1	4	10	3	1	0	0	0	0	0	0	1.2	10
19-Mar	Z	0	0	0	0	0	0	1	3	9	12	9	8	4	3	4	3	1	0	0	0	0	0	0	2.5	12
20-Mar	0	Z	0	0	0	0	0	3	7	12	7	5	4	3	2	2	2	1	0	0	0	0	0	0	2.2	12
21-Mar	0	0	Z	0	0	0	0	1	3	4	3	3	2	2	2	2	1	0	0	0	0	0	0	0	1.1	4
22-Mar	0	0	0	Z	0	0	0	3	2	7	17	16	13	8	6	4	2	1	0	0	0	0	0	0	3.5	17
23-Mar	0	0	0	0	Z	0	1	1	2	1	3	3	3	2	1	1	1	0	0	0	0	0	0	0	0.9	3
24-Mar	0	0	0	0	0	Z	0	2	6	16	11	5	4	2	1	1	1	1	1	0	0	0	0	0	2.2	16
25-Mar	Z	0	0	0	0	0	0	7	8	3	3	4	6	10	8	3	2	1	0	0	0	0	0	1	2.5	10
26-Mar	1	Z	0	0	0	1	1	1	2	7	2	2	2	2	1	3	2	2	1	0	0	0	0	0	1.3	7
27-Mar	0	0	Z	0	0	0	1	4	12	24	24	14	9	4	2	2	1	1	0	0	0	0	0	0	4.3	24
28-Mar	0	0	0	Z	0	0	1	2	3	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0.5	3
29-Mar	0	0	0	0	Z	0	0	4	17	8	5	2	1	1	1	1	1	0	0	0	0	0	0	0	1.8	17
30-Mar	0	0	0	0	0	Z	1	6	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	6
31-Mar	Z	0	0	0	0	0	0	2	1	3	2	2	2	1	1	1	1	2	2	0	0	0	1	11	1.4	11
	0.1	0.1	0.1	0.1	0.6	0.8	1.4	3.6	4.8	7.2	8.6	6.9	6.0	3.8	3.1	2.6	2.7	1.5	1.0	0.1	0.1	0.2	0.2	0.5	Diurnal Average	
	1	2	0	2	9	18	31	40	31	46	50	31	26	18	14	13	22	12	19	2	2	6	3	11	Diurnal Maximum	

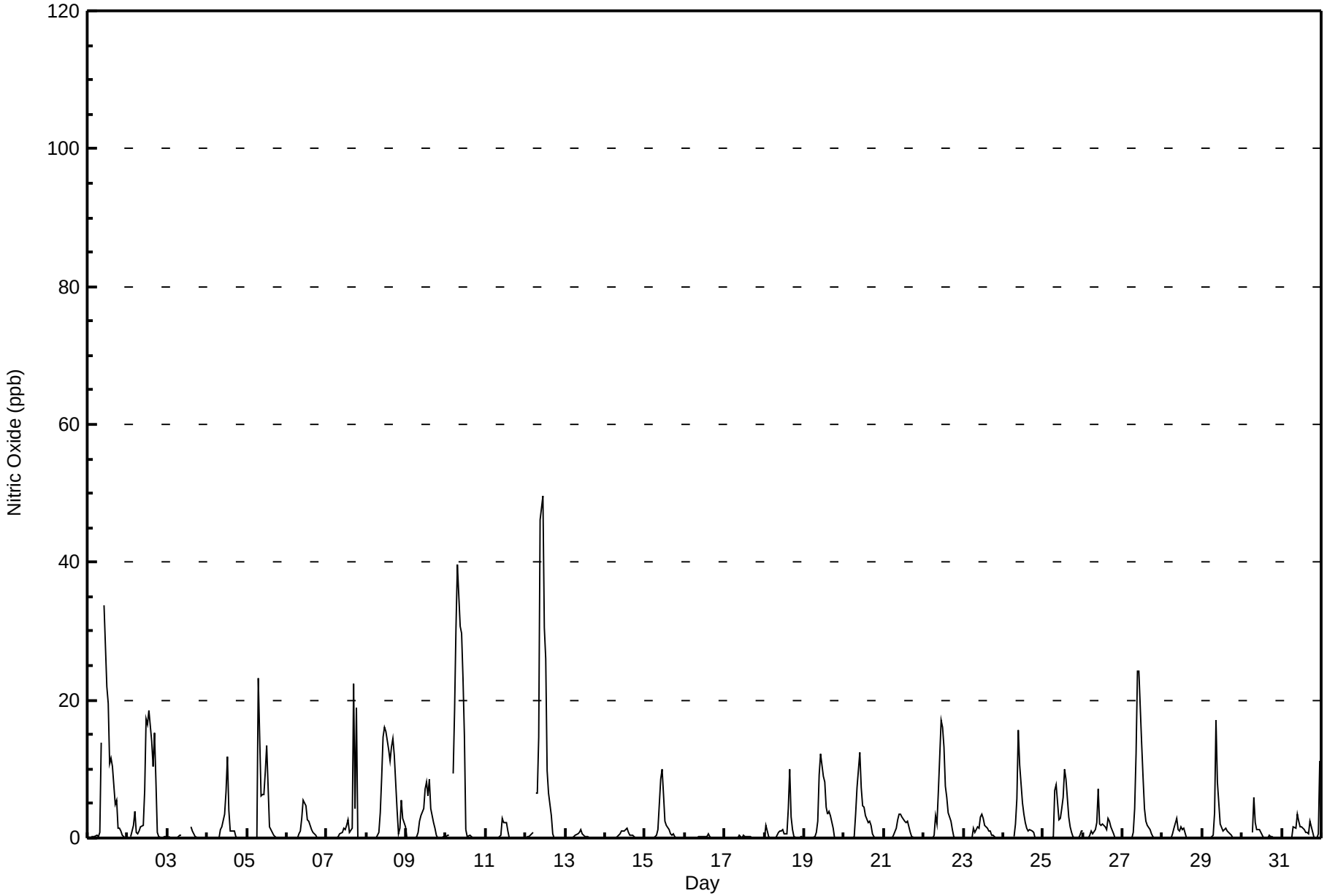
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Fort McKay South - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	691	97.88	97.88
21 - 40	13	1.84	99.72
11 - 80	2	0.28	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitric Oxide (NO) - ppb

Fort McKay South - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	194	140	31	6	6	17	33	31	44	27	19	45	19	20	21	34	687
21 - 40	5	1	0	0	0	0	1	1	4	0	0	1	0	0	0	0	13
11 - 80	1	1	0	0	0	0	0	0	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	200	142	31	6	6	17	34	32	48	27	19	46	19	20	21	34	702

Total Number of Valid Hours: 702

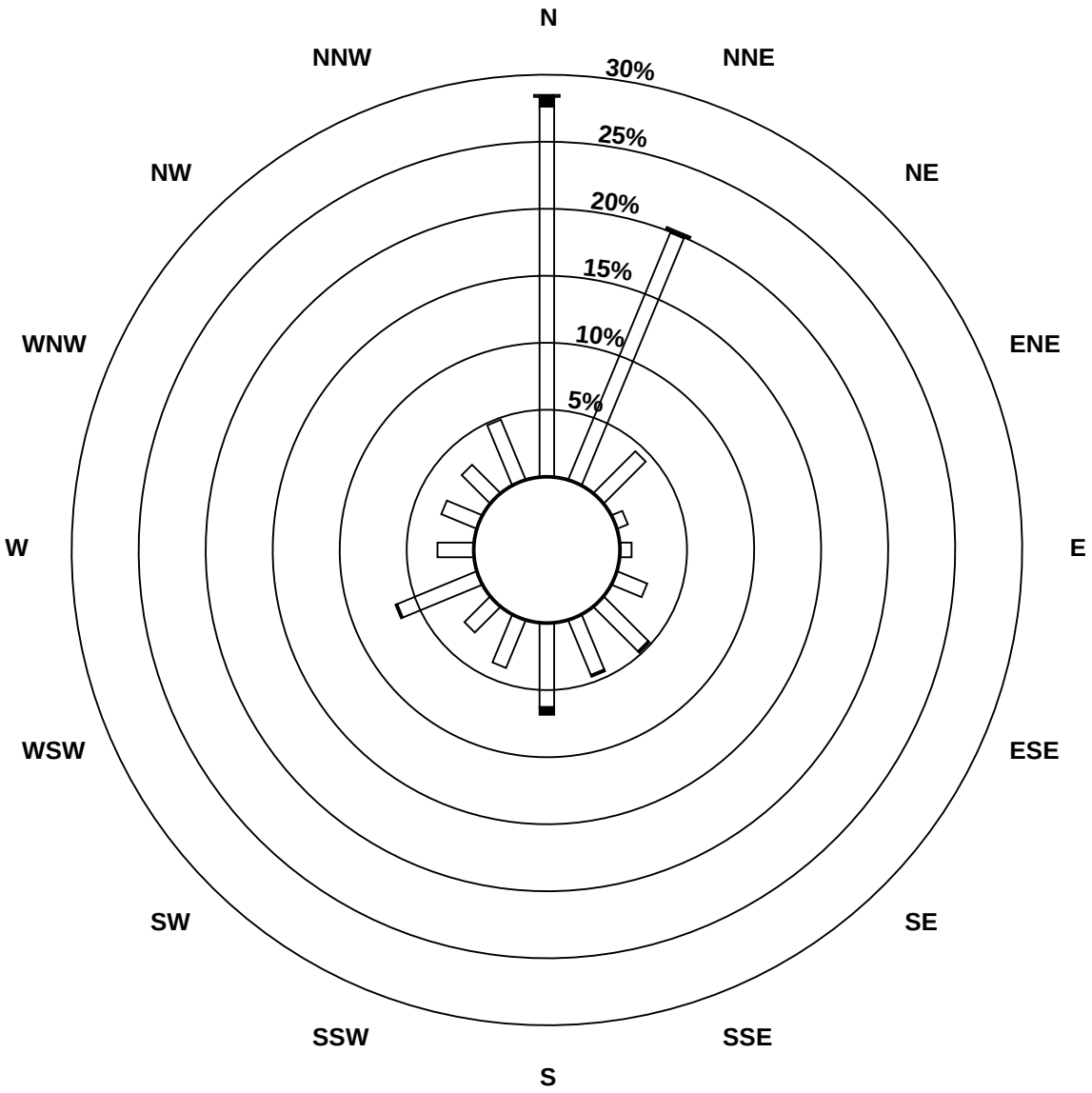
Total Number of Hours: 744

Wood Buffalo Environmental Association

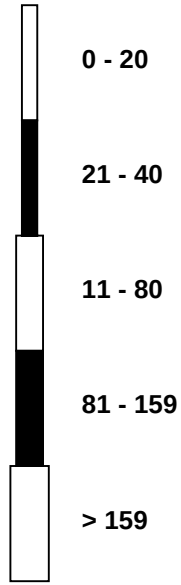
Wind Rose Mar 2016

Nitric Oxide (NO) - ppb

Fort McKay South (AMS 13)



Classes (ppb)



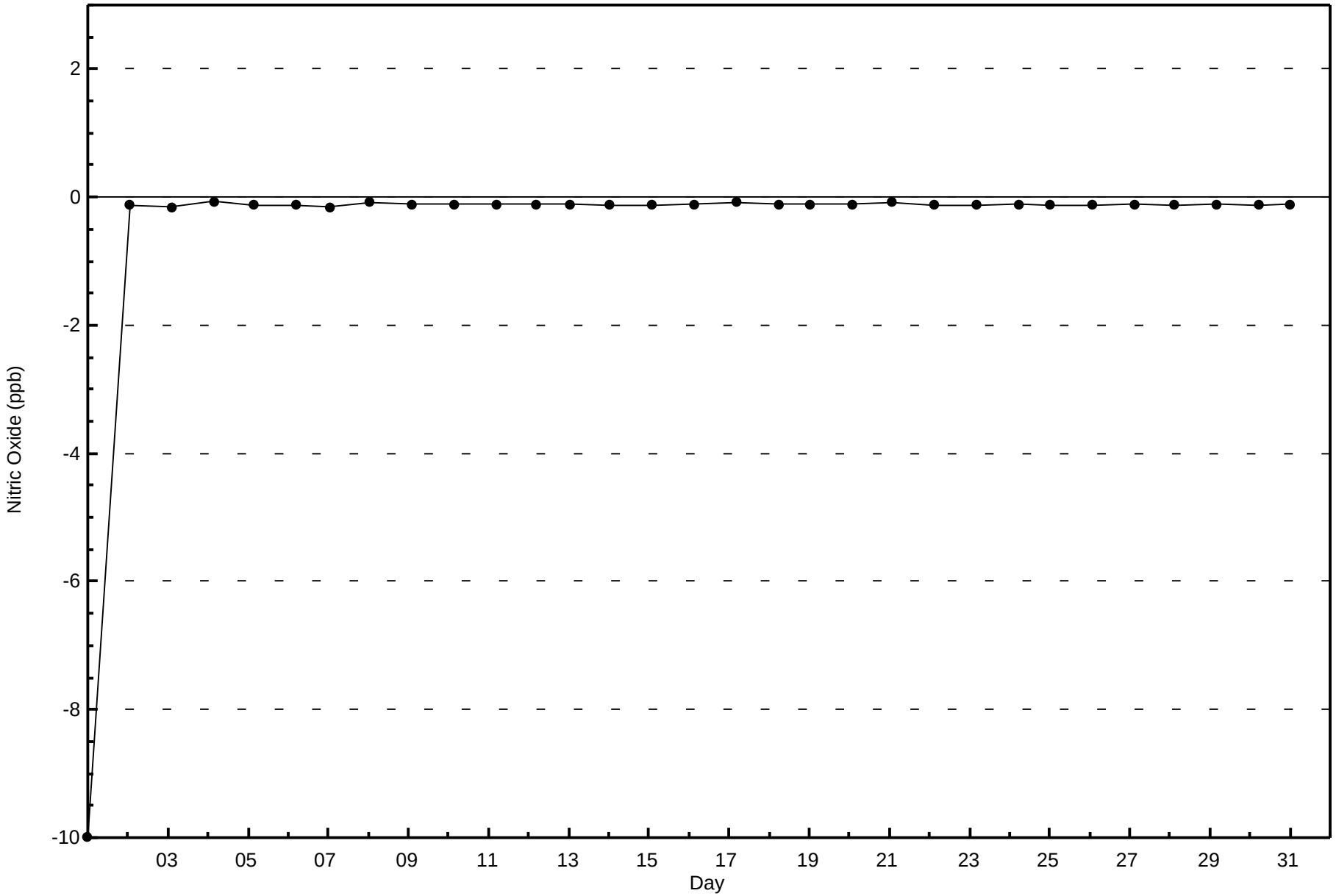
Total Number of Valid Hours: 702

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Fort McKay South - March 2016

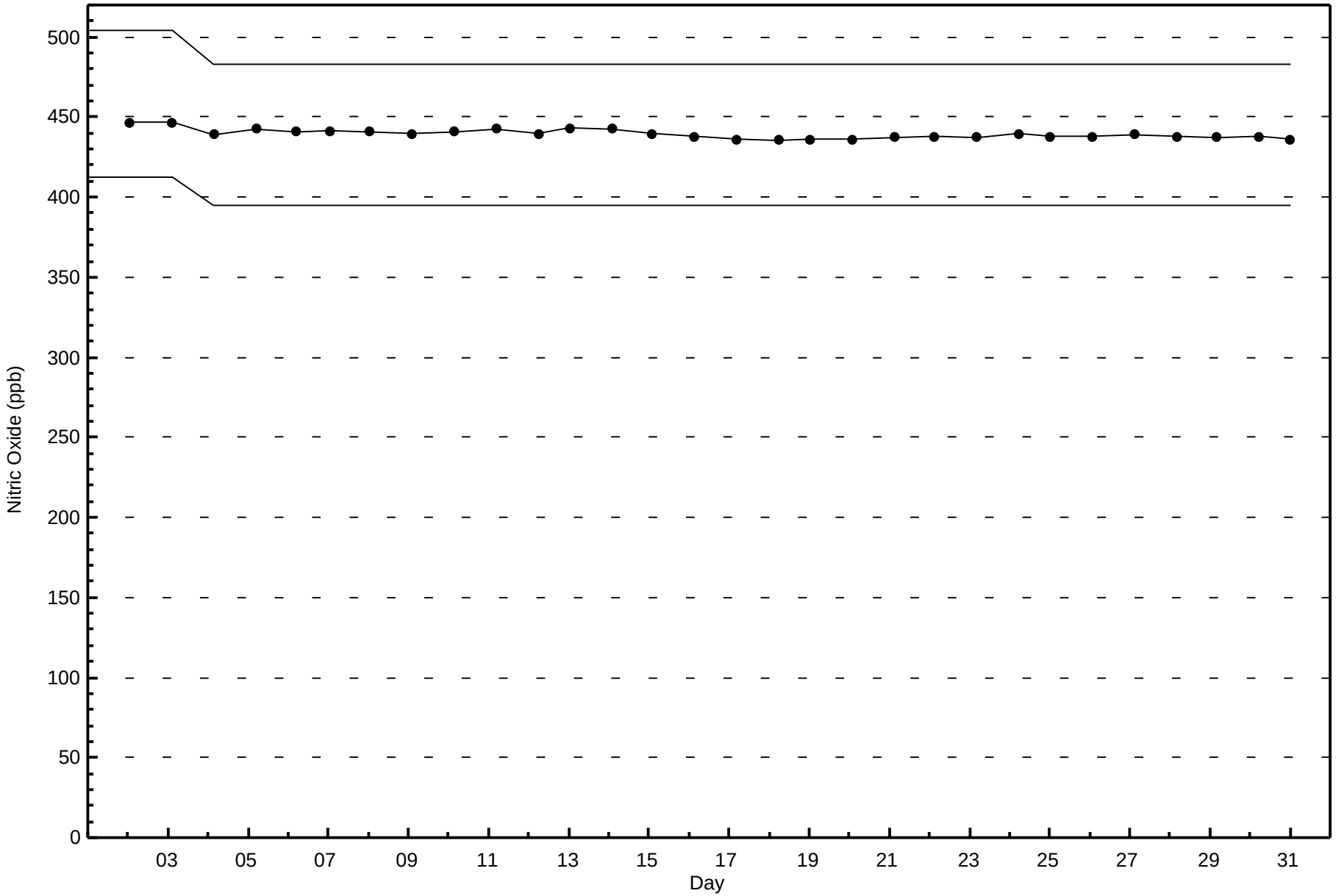


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Fort McKay South - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Fort McKay South - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 36 ppb on Mar 7 19:00

Maximum Daily Average: 20.3 ppb on Mar 8

Minimum Value: 0 ppb on Mar 17 07:00

Minimum Daily Average: 1.2 ppb on Mar 17

Maximum Diurnal Average: 11.3 ppb at hour 11

Minimum Diurnal Average: 6.0 ppb at hour 3

Monthly Average: 8.7 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 3$ Median = 7 $Q_3 = 13$ $P_{90} = 19$ $P_{99} = 31$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	35
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	10	9	7	10	12	11	12	M	24	19	19	17	21	23	21	28	30	31	28	19	11	13	17.8	31
2-Mar	7	Z	12	26	30	25	20	22	13	8	15	21	20	23	21	20	28	29	23	16	7	14	23	19	19.1	30
3-Mar	18	21	Z	13	12	12	12	14	8	C	C	C	C	C	6	5	4	5	7	6	6	7	10	9	9.8	21
4-Mar	8	6	4	Z	3	3	3	4	11	9	11	13	17	8	3	6	9	6	2	2	2	5	14	19	7.3	19
5-Mar	18	17	5	5	Z	8	9	35	17	13	11	17	21	8	8	6	6	6	10	7	5	8	10	10	11.2	35
6-Mar	11	9	3	6	10	Z	12	14	7	10	10	8	5	6	6	5	7	8	5	13	12	10	11	11	8.5	14
7-Mar	Z	15	12	7	5	7	7	8	9	7	6	5	5	8	4	6	31	12	36	13	7	10	2	3	9.7	36
8-Mar	8	Z	8	7	8	8	11	13	16	18	22	22	21	20	18	22	25	29	32	31	31	32	32	31	20.3	32
9-Mar	19	16	Z	11	8	9	17	17	17	13	11	11	14	12	18	14	13	14	14	11	9	8	8	7	12.6	19
10-Mar	7	6	5	Z	11	11	14	18	18	19	19	16	5	2	3	2	2	2	2	4	4	4	7	9	8.2	19
11-Mar	3	3	3	3	Z	3	2	2	1	2	9	7	7	3	1	1	1	1	1	1	1	1	1	3	2.6	9
12-Mar	6	7	5	4	4	Z	9	11	11	19	22	20	18	14	11	8	3	2	2	2	3	4	8	6	8.7	22
13-Mar	Z	4	4	4	4	5	6	6	6	6	4	3	2	2	1	1	1	1	1	1	1	0	1	1	2.7	6
14-Mar	1	Z	1	1	1	1	2	3	3	3	3	3	3	3	3	2	3	2	3	2	2	2	3	3	2.3	3
15-Mar	3	3	Z	5	6	7	10	8	9	19	16	10	5	3	3	2	2	6	11	8	4	2	2	1	6.2	19
16-Mar	1	2	2	Z	1	2	1	2	2	1	1	1	1	2	3	1	1	1	1	2	3	7	10	9	2.5	10
17-Mar	6	4	1	1	Z	0	0	1	1	1	0	1	1	1	1	1	1	0	0	2	2	1	1	1	1.2	6
18-Mar	4	12	3	0	0	Z	0	1	4	3	3	2	1	2	8	18	11	8	5	4	3	4	11	15	5.3	18
19-Mar	Z	6	4	3	3	3	3	6	7	13	15	11	11	7	7	9	11	12	4	3	6	7	10	11	7.5	15
20-Mar	12	Z	9	8	8	10	9	17	18	21	13	10	10	8	6	7	7	6	8	10	4	6	9	11	9.8	21
21-Mar	16	18	Z	20	17	15	18	15	13	11	9	7	5	5	6	5	4	2	1	1	1	1	2	2	8.4	20
22-Mar	5	12	12	Z	10	10	10	15	10	16	24	22	20	14	13	13	13	12	11	15	15	18	22	17	14.2	24
23-Mar	11	8	6	6	Z	13	24	9	7	5	6	6	6	5	5	4	6	5	11	13	13	9	9	13	8.7	24
24-Mar	15	16	13	9	6	Z	4	6	11	21	16	9	7	5	4	4	6	9	18	15	14	13	16	15	10.8	21
25-Mar	Z	5	4	4	4	4	5	19	21	14	13	12	13	23	20	13	11	7	5	5	7	10	18	24	11.2	24
26-Mar	23	Z	11	11	13	18	14	8	8	14	5	5	5	4	4	9	9	12	16	16	17	15	12	10	11.3	23
27-Mar	12	14	Z	8	6	7	8	8	15	26	25	19	17	11	8	6	6	6	9	13	13	10	21	14	12.2	26
28-Mar	5	6	6	Z	3	5	7	9	11	6	4	7	5	5	1	1	0	0	0	0	0	1	1	0	3.6	11
29-Mar	0	0	0	1	Z	2	5	15	26	16	10	5	4	4	5	5	4	5	4	4	4	4	4	3	5.6	26
30-Mar	3	6	10	11	6	Z	5	12	7	4	4	3	2	1	1	1	5	3	5	4	1	1	1	1	4.1	12
31-Mar	Z	3	2	1	2	2	3	8	5	7	5	4	5	5	5	9	9	24	25	16	10	8	16	25	8.5	25
	9.0	8.7	6.0	6.9	7.2	7.6	8.5	10.7	10.4	11.1	11.3	10.0	9.1	7.6	7.1	7.3	8.3	8.4	9.7	8.7	7.5	7.8	9.7	10.2	Diurnal Average	
	23	21	13	26	30	25	24	35	26	26	25	22	21	23	21	23	31	29	36	31	31	32	32	31	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance PF - Power Failure

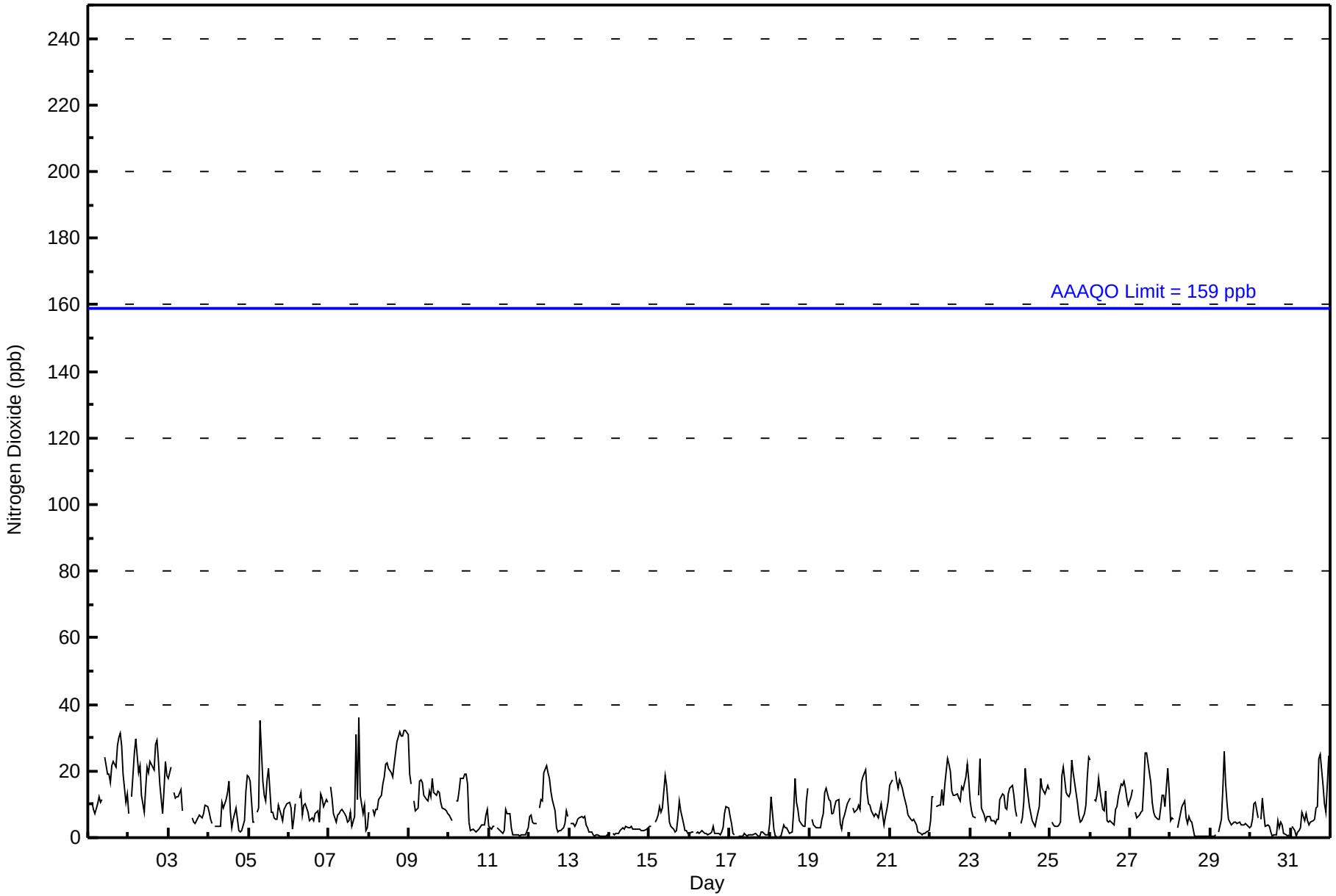
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Fort McKay South - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Fort McKay South - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	652	92.35	92.35
21 - 40	54	7.65	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: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Fort McKay South - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	182	126	29	6	6	17	30	29	40	26	19	46	19	20	21	32	648
21 - 40	18	16	2	0	0	0	4	3	8	1	0	0	0	0	0	2	54
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	200	142	31	6	6	17	34	32	48	27	19	46	19	20	21	34	702

Total Number of Valid Hours: 702

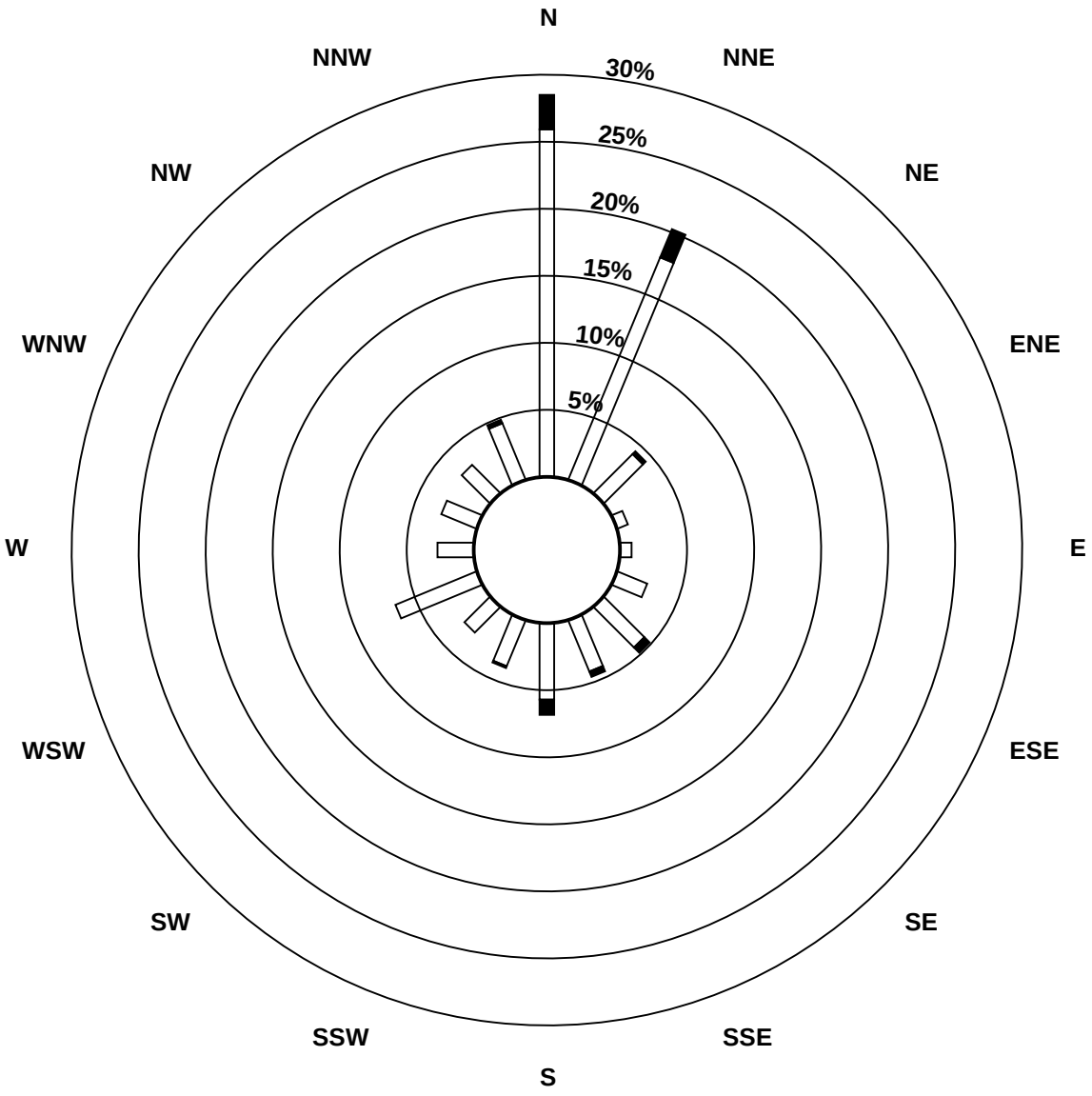
Total Number of Hours: 744

Wood Buffalo Environmental Association

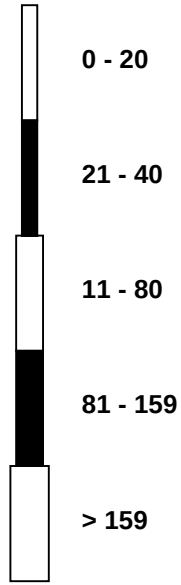
Wind Rose Mar 2016

Nitrogen Dioxide (NO_2) - ppb

Fort McKay South (AMS 13)



Classes (ppb)



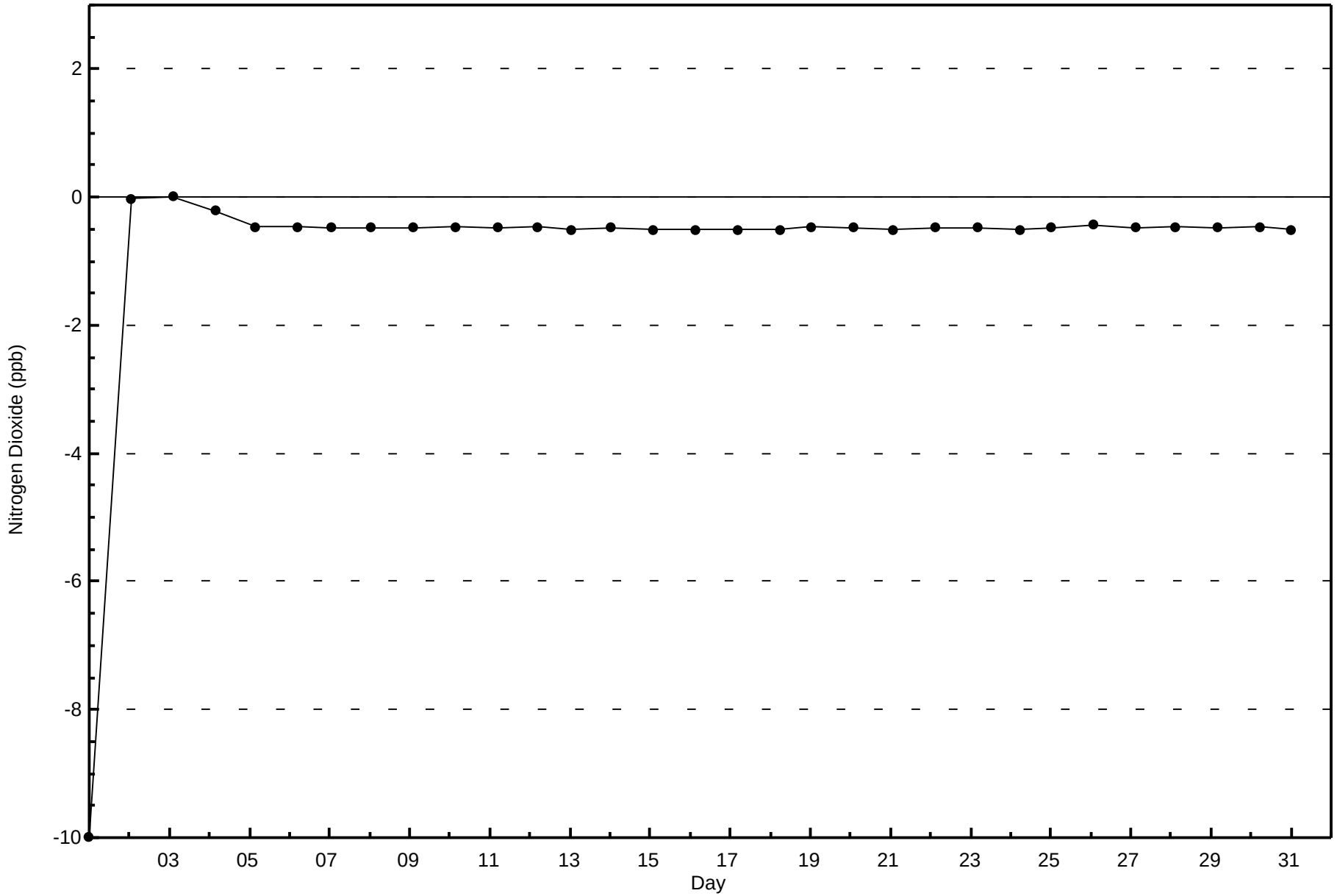
Total Number of Valid Hours: 702

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Fort McKay South - March 2016

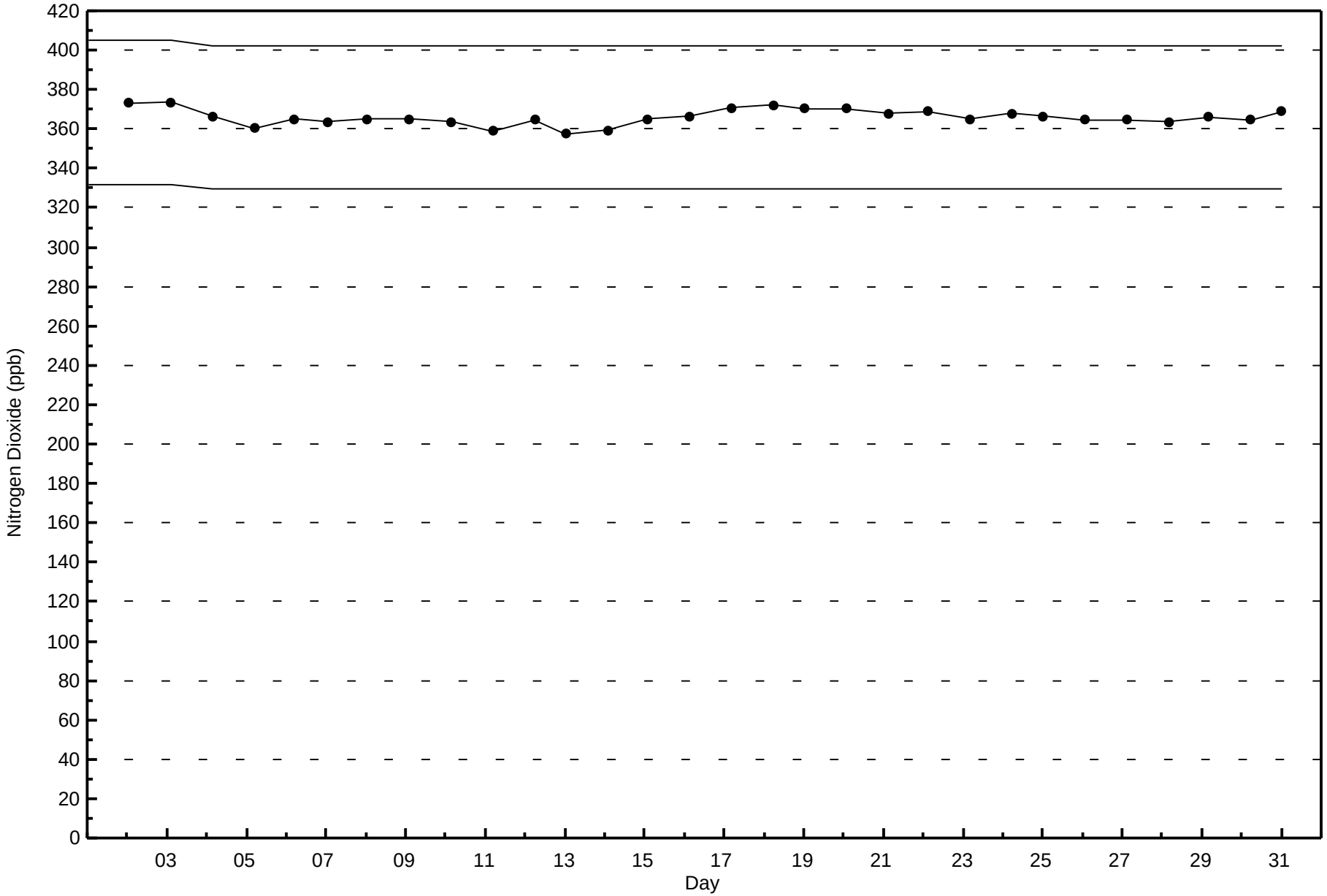


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Fort McKay South - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Fort McKay South - March 2016

Maximum Value: 71 ppb on Mar 12 11:00

Maximum Daily Average: 26.3 ppb on Mar 8

Minimum Value: 0 ppb on Mar 17 18:00

Minimum Daily Average: 1.3 ppb on Mar 17

Maximum Diurnal Average: 19.8 ppb at hour 11

Minimum Diurnal Average: 6.0 ppb at hour 3

Monthly Average: 11.1 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 4$ Median = 8 $Q_3 = 15$ $P_{90} = 26$ $P_{99} = 53$

Hours in Service:	744
Hours of Data:	706
Hours of Missing Data:	38
Hours of Calibration:	35
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	11	9	7	11	12	11	25	M	58	41	39	27	33	33	26	33	31	33	29	19	11	13	24.4	58
2-Mar	7	Z	12	27	34	25	20	23	14	9	22	38	36	41	35	31	43	37	24	16	7	15	23	19	24.3	43
3-Mar	18	21	Z	13	12	12	12	15	8	C	C	C	C	C	8	6	5	5	7	6	6	7	10	9	10.0	21
4-Mar	8	6	4	Z	3	3	3	4	12	10	15	20	29	12	4	6	10	6	2	2	2	5	14	19	8.7	29
5-Mar	18	17	5	5	Z	7	9	58	23	19	17	27	34	9	9	7	6	6	10	7	5	8	9	10	14.2	58
6-Mar	11	9	3	6	10	Z	12	14	8	12	16	12	8	8	8	6	8	8	5	13	12	9	11	11	9.6	16
7-Mar	Z	15	12	7	5	7	7	8	9	8	8	6	7	10	4	8	53	16	55	13	7	10	2	3	12.2	55
8-Mar	8	Z	8	7	8	8	11	14	20	27	37	38	36	32	29	35	40	41	36	31	32	38	35	33	26.3	41
9-Mar	19	16	Z	11	8	9	17	18	19	16	16	18	22	19	26	18	15	16	14	11	9	8	8	7	14.8	26
10-Mar	7	6	5	Z	20	30	44	57	49	49	42	31	6	2	3	2	2	2	2	4	4	4	7	9	16.9	57
11-Mar	3	3	3	3	Z	3	2	2	2	3	11	9	10	4	1	1	1	1	1	1	1	1	1	3	2.9	11
12-Mar	6	7	5	4	5	Z	16	18	26	66	71	50	44	24	18	11	4	2	2	2	3	4	8	6	17.5	71
13-Mar	Z	4	4	4	4	5	6	7	7	7	4	3	2	2	1	1	1	1	0	1	0	0	1	1	2.9	7
14-Mar	1	Z	1	1	1	1	2	3	3	3	4	4	4	5	3	3	3	3	3	2	2	2	3	3	2.6	5
15-Mar	3	3	Z	5	5	7	10	8	10	27	25	17	7	5	4	2	3	7	11	8	4	2	2	1	7.7	27
16-Mar	1	2	2	Z	1	2	1	2	2	1	2	1	1	2	4	2	1	1	1	2	3	7	9	9	2.6	9
17-Mar	6	4	1	1	Z	0	0	0	1	2	0	1	1	1	1	1	1	0	0	2	2	1	1	1	1.3	6
18-Mar	4	14	3	0	0	Z	0	0	5	4	4	3	2	2	12	28	14	10	5	4	3	3	11	15	6.5	28
19-Mar	Z	6	4	3	3	3	3	7	10	23	27	20	19	12	11	13	14	13	4	3	5	7	10	11	10.0	27
20-Mar	12	Z	9	8	8	10	9	20	26	33	21	15	14	11	8	10	9	7	8	10	4	6	9	11	12.0	33
21-Mar	16	18	Z	20	17	15	18	16	16	15	13	10	8	7	8	6	5	2	1	1	1	1	2	2	9.5	20
22-Mar	5	12	12	Z	10	10	10	18	12	22	41	38	33	22	19	16	15	13	11	15	15	18	22	17	17.7	41
23-Mar	11	8	6	6	Z	13	25	10	8	6	9	10	9	7	6	5	6	6	12	13	13	9	9	13	9.6	25
24-Mar	15	15	13	8	6	Z	4	8	16	36	26	14	11	7	6	5	7	10	18	15	14	13	16	15	13.0	36
25-Mar	Z	5	4	4	4	4	5	26	29	16	16	16	19	33	28	16	12	8	5	5	7	10	18	25	13.7	33
26-Mar	24	Z	12	11	14	19	15	10	10	21	7	6	7	6	5	11	12	14	17	16	17	15	12	10	12.6	24
27-Mar	12	14	Z	8	6	7	9	12	28	50	49	33	25	15	10	8	7	6	9	13	13	9	21	14	16.5	50
28-Mar	5	6	6	Z	3	5	8	11	14	7	5	8	6	6	1	0	0	0	0	0	0	0	1	0	4.1	14
29-Mar	0	0	0	1	Z	2	6	18	43	24	15	7	5	6	6	5	5	5	4	4	4	4	4	3	7.5	43
30-Mar	3	6	10	11	6	Z	6	18	10	5	5	4	2	1	1	1	6	3	5	4	1	1	1	1	4.7	18
31-Mar	Z	3	2	1	2	2	3	9	6	11	7	5	6	6	6	10	10	26	27	16	10	8	16	36	9.9	36
	9.0	8.8	6.0	7.1	7.8	8.4	9.9	14.3	15.1	18.4	19.8	17.0	15.1	11.5	10.2	10.0	11.1	9.9	10.7	8.7	7.6	8.0	9.9	10.6	Diurnal Average	
	24	21	13	27	34	30	44	58	49	66	71	50	44	41	35	35	53	41	55	33	32	38	35	36	Diurnal Maximum	

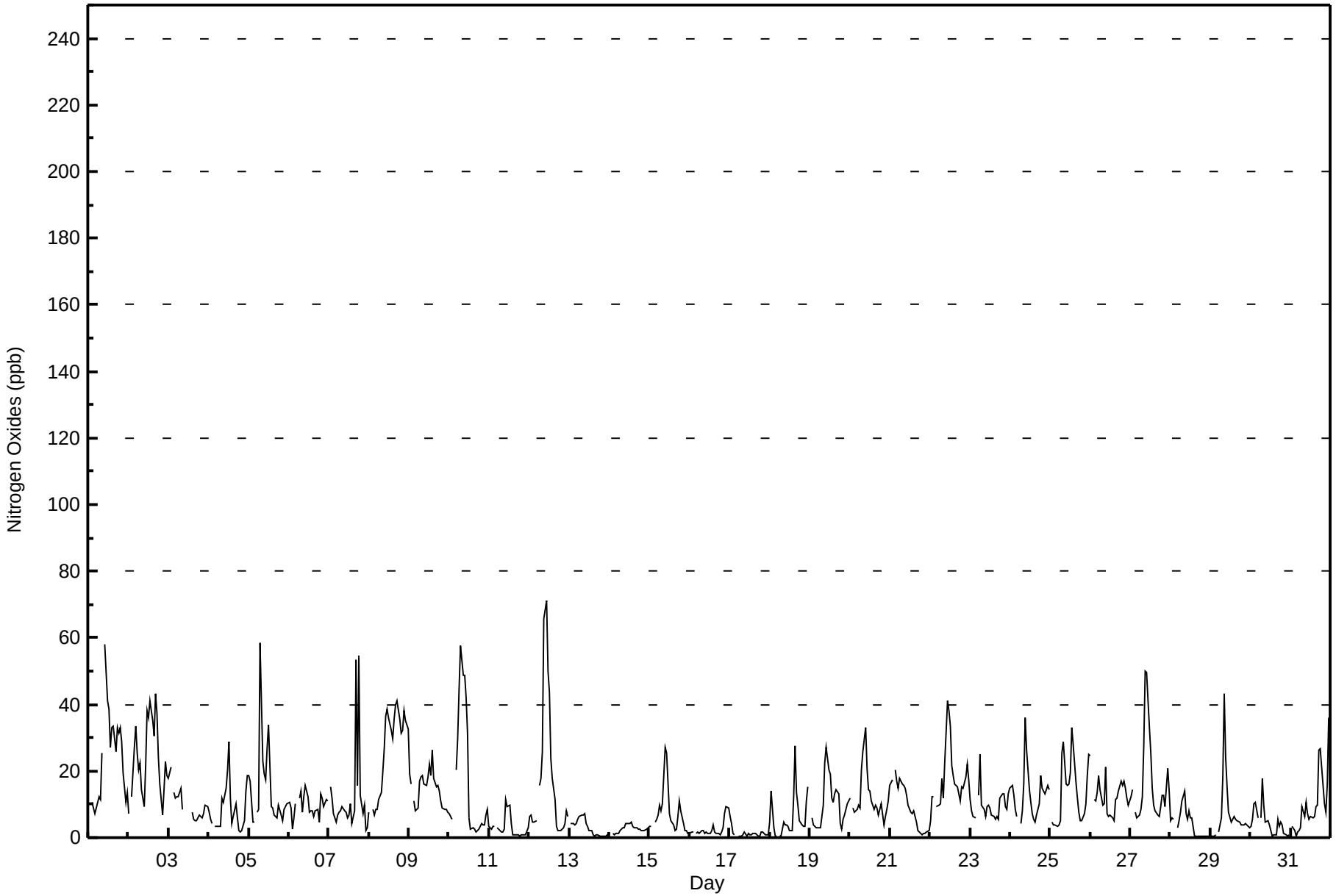
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Fort McKay South - March 2016



Nitrogen Oxides (NO_X) - ppb
Fort McKay South - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	607	85.98	85.98
21 - 40	78	11.05	97.03
11 - 80	21	2.97	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Fort McKay South - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	174	112	26	6	5	13	25	27	35	25	18	45	19	20	21	32	603
21 - 40	19	25	5	0	1	4	8	2	9	2	1	0	0	0	0	2	78
11 - 80	7	5	0	0	0	0	1	3	4	0	0	1	0	0	0	0	21
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	200	142	31	6	6	17	34	32	48	27	19	46	19	20	21	34	702

Total Number of Valid Hours: 702

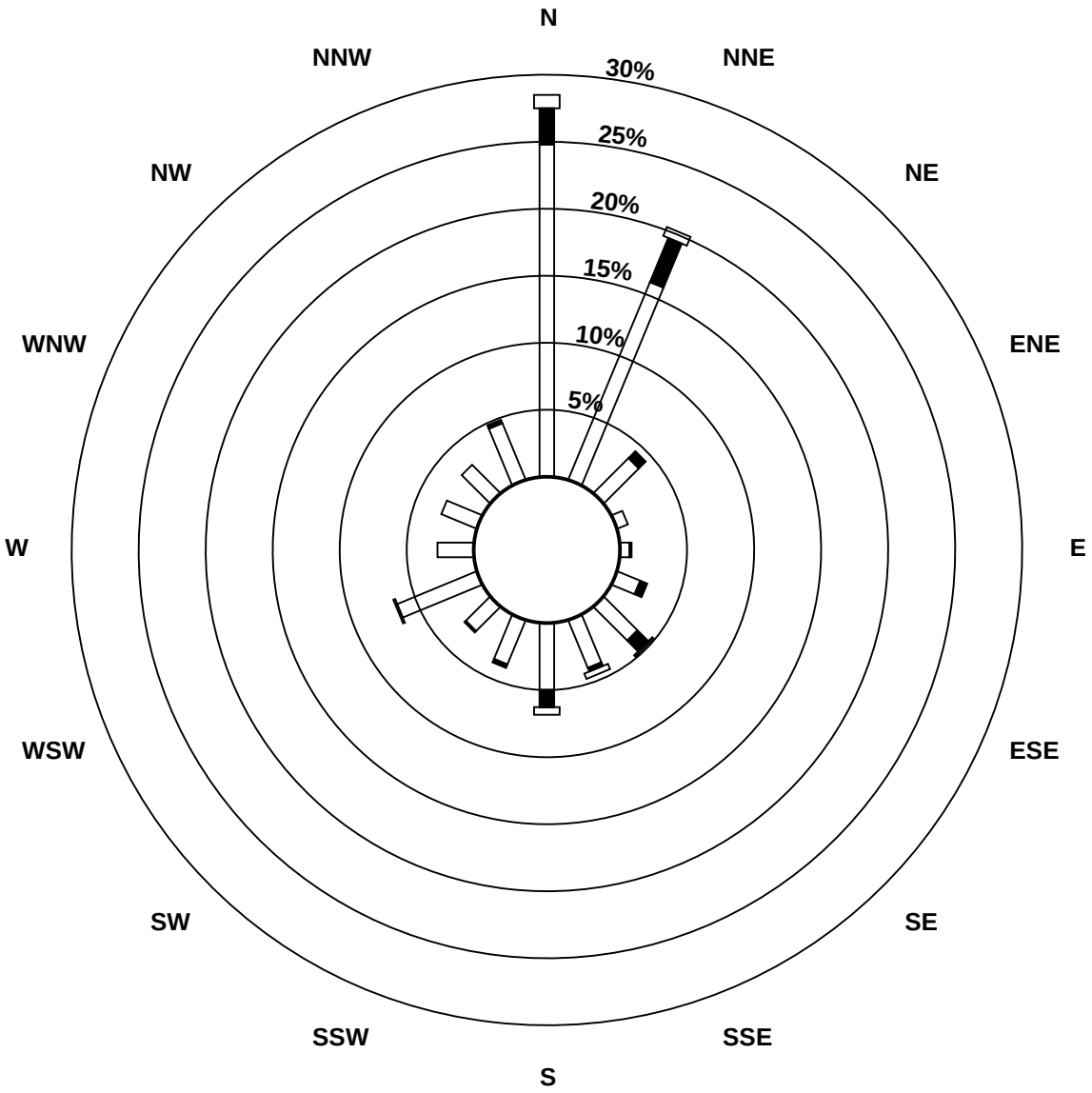
Total Number of Hours: 744

Wood Buffalo Environmental Association

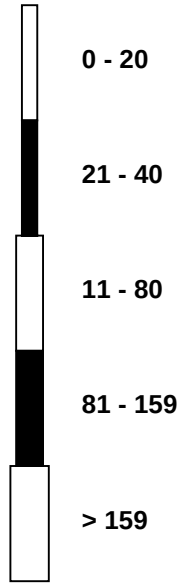
Wind Rose Mar 2016

Nitrogen Oxides (NO_X) - ppb

Fort McKay South (AMS 13)



Classes (ppb)



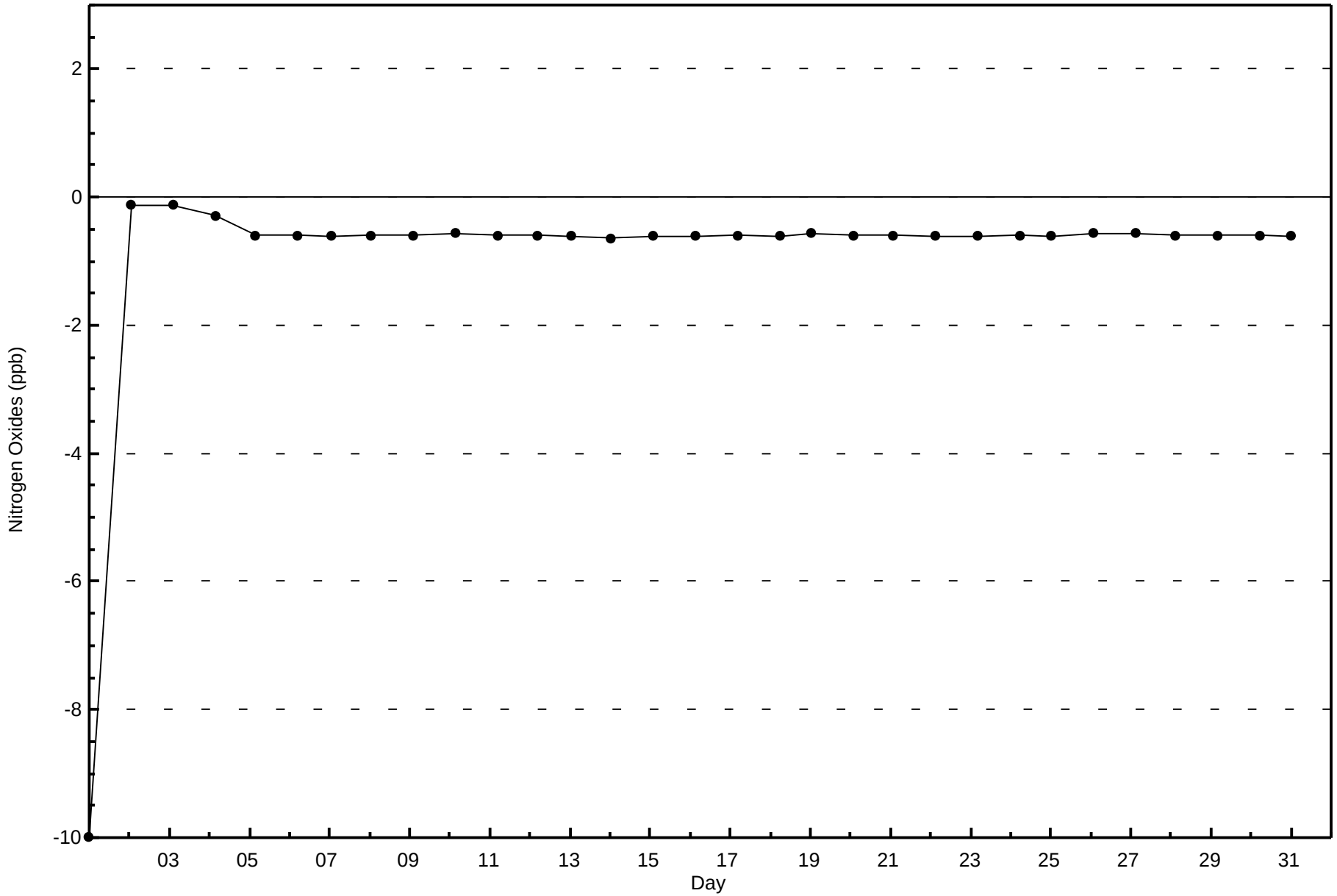
Total Number of Valid Hours: 702

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Fort McKay South - March 2016

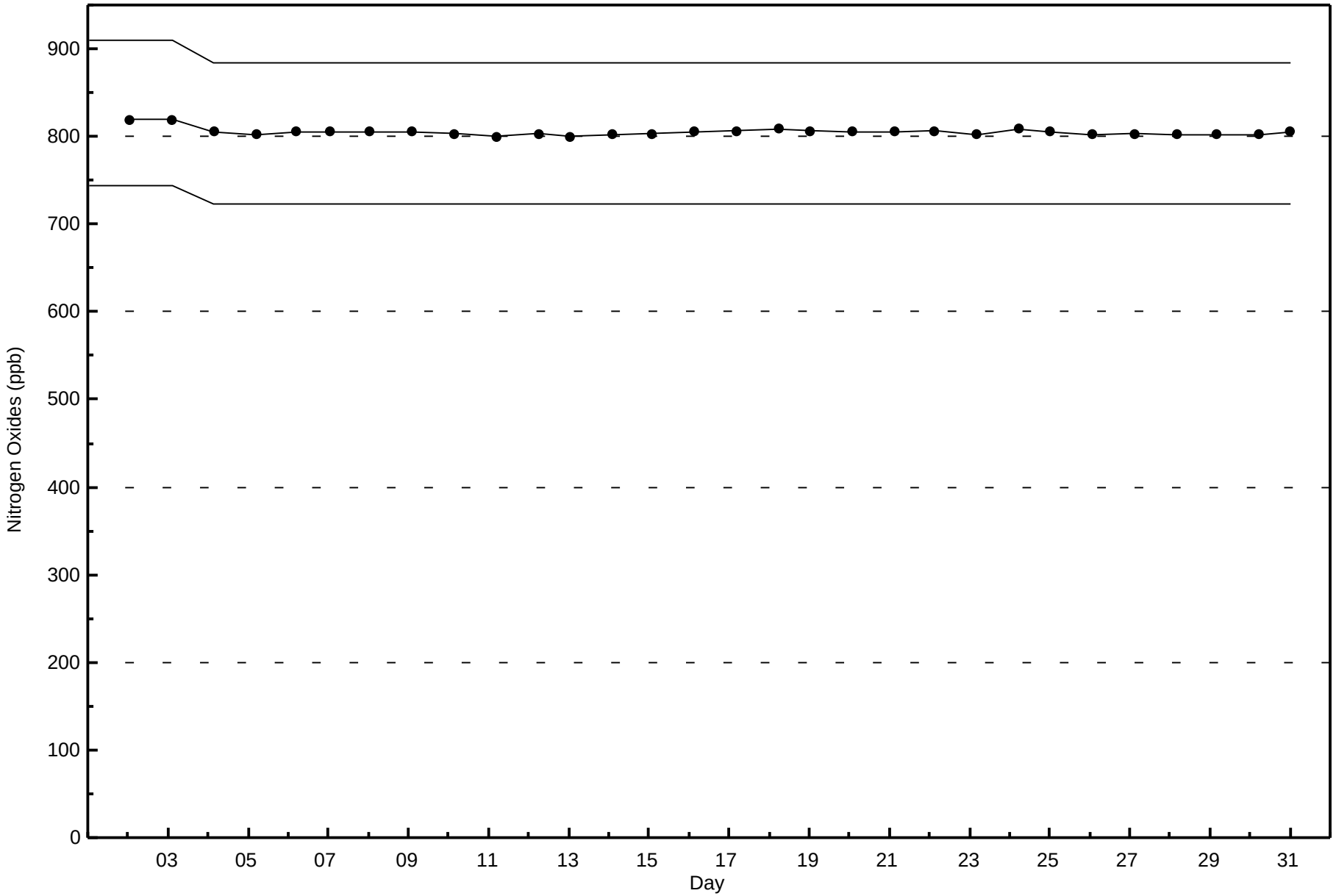


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Fort McKay South - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Fort McKay South - March 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 51.1 $\mu g/m^3$ on Mar 10 05:00

Maximum Daily Average: 14.6 $\mu g/m^3$ on Mar 10

Minimum Value: 0.6 $\mu g/m^3$ on Mar 6 13:00

Minimum Daily Average: 1.1 $\mu g/m^3$ on Mar 6

Maximum Diurnal Average: 5.7 $\mu g/m^3$ at hour 5

Minimum Diurnal Average: 3.3 $\mu g/m^3$ at hour 17

Monthly Average: 4.52 $\mu g/m^3$

Percentiles: P_1 = 1.0 P_{10} = 1.6 Q_1 = 2.0 Median = 3.1 Q_3 = 5.8 P_{90} = 8.9 P_{99} = 18.5

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	PF	PF	5.6	3.5	4.4	5.3	4.8	4.1	5.0	6.5	17.1	21.2	11.0	12.3	11.7	10.6	9.6	7.7	6.7	6.6	6.5	6.1	6.8	6.0	8.1	21.2
2-Mar	4.7	4.8	4.9	5.6	5.8	5.4	5.1	5.3	5.1	4.1	4.7	5.5	5.9	6.2	6.2	4.0	2.8	3.0	2.6	2.1	2.0	2.1	2.7	2.9	4.3	6.2
3-Mar	3.7	4.0	3.7	3.2	3.2	2.8	2.5	2.6	2.3	2.1	2.2	2.5	2.6	2.2	2.5	2.3	2.2	2.5	2.6	2.4	1.6	1.7	1.9	1.8	2.5	4.0
4-Mar	1.5	1.5	1.5	1.6	1.4	1.4	1.3	1.4	C	C	10.9	7.5	6.2	5.1	1.9	1.7	2.0	2.4	2.0	1.4	1.4	2.2	3.9	5.3	3.0	10.9
5-Mar	7.4	5.3	3.0	3.0	3.5	5.2	6.9	7.0	6.4	5.2	5.1	6.3	8.3	3.1	2.9	3.3	2.1	1.8	2.0	1.8	1.4	1.7	1.6	1.6	4.0	8.3
6-Mar	1.4	1.3	1.1	1.2	1.1	1.2	1.1	1.1	1.0	1.2	1.3	1.1	0.6	0.7	0.7	0.6	0.9	1.0	0.7	1.1	1.4	1.4	1.6	1.5	1.1	1.6
7-Mar	2.5	3.0	2.7	2.6	2.2	2.3	2.1	2.1	2.2	2.0	1.8	1.9	2.9	4.4	4.8	5.3	6.1	6.2	8.1	6.4	3.5	2.6	2.2	1.9	3.4	8.1
8-Mar	1.8	1.6	1.8	1.6	1.7	2.0	3.1	3.2	3.0	4.3	6.4	6.4	6.5	6.5	6.1	6.7	7.5	7.6	8.2	10.2	9.9	9.3	6.8	6.3	5.4	10.2
9-Mar	5.3	4.6	5.3	3.9	3.7	3.6	3.8	3.7	3.8	4.3	4.4	6.8	10.2	7.5	12.6	7.8	7.4	7.6	8.5	8.7	8.0	8.5	9.4	9.0	6.6	12.6
10-Mar	15.2	13.7	9.2	14.8	51.1	44.8	31.6	33.7	29.7	30.2	23.9	17.8	5.2	4.0	3.3	2.4	1.9	1.6	2.1	2.6	3.0	3.0	3.0	3.4	14.6	51.1
11-Mar	2.7	2.3	2.2	3.6	4.5	4.4	4.2	3.9	3.6	3.9	4.4	3.6	3.4	2.6	1.9	2.0	1.9	2.0	2.3	2.7	3.1	3.6	3.6	4.5	3.2	4.5
12-Mar	7.1	10.5	10.0	10.4	11.3	11.1	11.2	10.0	10.6	9.7	8.5	5.9	3.6	2.5	2.3	1.8	0.9	1.0	1.2	1.6	2.0	2.2	2.5	2.5	5.9	11.3
13-Mar	2.3	2.5	3.0	3.3	3.9	4.3	4.1	5.2	4.8	3.6	2.6	2.5	2.3	2.1	1.7	1.6	1.5	1.5	1.5	1.5	1.6	1.7	1.9	2.0	2.6	5.2
14-Mar	2.0	2.1	2.0	1.7	1.6	1.8	1.6	1.9	1.9	1.6	1.6	1.5	1.5	1.5	1.4	1.3	1.8	2.0	2.1	2.2	2.1	2.0	2.0	2.0	1.8	2.2
15-Mar	2.0	1.9	2.0	1.8	1.9	2.0	2.0	2.1	2.2	2.7	2.5	2.1	1.8	1.8	1.4	1.3	1.6	1.7	2.0	2.0	2.1	2.2	2.2	2.0	2.0	2.7
16-Mar	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2
17-Mar	2.0	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	2.4	2.3	2.0	1.9	1.6	1.5	1.5	1.5	1.4	1.5	1.8	1.9	1.9	1.8	1.7	1.8	2.4
18-Mar	1.9	2.5	2.7	2.5	2.5	2.1	2.1	2.2	2.4	2.1	2.0	2.0	1.8	2.2	6.1	7.9	5.1	4.2	4.7	5.8	5.6	5.4	6.3	6.4	3.7	7.9
19-Mar	4.6	4.0	3.2	3.1	2.5	2.6	2.4	2.2	2.2	2.4	2.1	1.8	1.7	1.4	1.5	1.7	1.9	1.9	2.0	1.7	1.7	1.7	2.0	1.9	2.3	4.6
20-Mar	2.2	2.7	2.8	2.8	3.0	3.5	3.7	4.4	3.6	3.1	2.2	1.9	1.8	1.4	1.3	1.4	1.3	1.6	2.1	2.6	2.7	2.5	2.6	2.7	2.5	4.4
21-Mar	4.1	5.0	4.9	4.8	4.3	4.2	4.5	4.5	4.3	3.5	2.9	2.2	1.6	1.7	1.7	1.4	1.6	1.7	2.3	2.8	2.8	2.4	2.8	3.1	3.1	5.0
22-Mar	4.0	4.5	4.2	4.3	4.0	4.2	4.3	5.0	4.4	5.3	6.8	6.9	8.5	9.0	6.6	5.8	5.7	5.4	5.7	7.7	8.3	8.4	8.5	8.5	6.1	9.0
23-Mar	6.6	6.0	5.9	6.4	5.9	5.4	5.5	5.4	4.5	3.7	3.1	2.5	2.1	2.6	2.8	2.5	2.8	3.1	3.5	4.1	4.5	4.7	5.7	6.2	4.4	6.6
24-Mar	5.6	5.3	5.5	4.9	6.0	4.8	4.3	4.4	4.6	6.4	5.7	4.7	3.4	2.9	2.6	2.6	3.5	5.2	7.6	8.3	8.9	9.1	8.9	8.1	5.6	9.1
25-Mar	6.5	5.6	4.4	4.3	4.0	3.9	4.7	7.4	9.6	8.2	8.0	8.5	8.5	7.4	8.7	8.9	7.5	7.5	7.2	8.1	9.7	9.3	10.1	11.5	7.5	11.5
26-Mar	10.3	7.7	7.4	7.2	8.0	9.1	7.7	6.8	6.3	5.2	3.4	2.9	2.7	2.2	2.8	7.7	5.7	7.7	7.3	8.2	10.3	10.4	10.2	9.6	7.0	10.4
27-Mar	10.5	12.5	12.9	11.3	11.0	11.0	10.6	10.3	10.9	11.8	9.9	6.5	6.2	5.0	3.8	4.0	4.5	4.2	6.2	7.0	8.2	8.0	10.2	10.6	8.6	12.9
28-Mar	12.3	15.3	14.5	13.3	8.7	9.2	8.6	12.3	8.6	8.3	5.7	5.6	4.8	2.5	1.5	2.0	1.3	1.1	1.5	1.9	2.6	2.9	3.1	2.8	6.3	15.3
29-Mar	2.2	2.0	1.9	2.1	2.6	3.0	3.6	3.4	3.1	2.3	1.8	1.7	1.7	1.6	1.6	1.5	1.6	1.7	2.8	3.7	4.2	4.3	4.1	4.1	2.6	4.3
30-Mar	4.3	5.3	6.3	6.8	5.7	5.4	5.4	5.9	3.0	1.6	1.5	1.4	1.3	1.1	1.2	1.3	2.0	3.3	4.2	4.3	3.6	2.7	2.3	2.1	3.4	6.8
31-Mar	3.1	3.5	4.2	4.0	3.7	3.9	3.7	3.4	2.2	2.2	2.1	1.9	1.9	2.2	2.7	4.8	5.0	6.4	9.7	9.2	8.2	8.1	8.7	10.6	4.8	10.6
	4.7	4.8	4.6	4.6	5.7	5.6	5.2	5.4	5.2	5.1	5.1	4.8	4.0	3.5	3.5	3.6	3.3	3.5	4.0	4.3	4.4	4.3	4.6	4.7	Diurnal Average	
	15.2	15.3	14.5	14.8	51.1	44.8	31.6	33.7	29.7	30.2	23.9	21.2	11.0	12.3	12.6	10.6	9.6	7.7	9.7	10.2	10.3	10.4	10.2	11.5	Diurnal Maximum	

C - Calibration PF - Power Failure

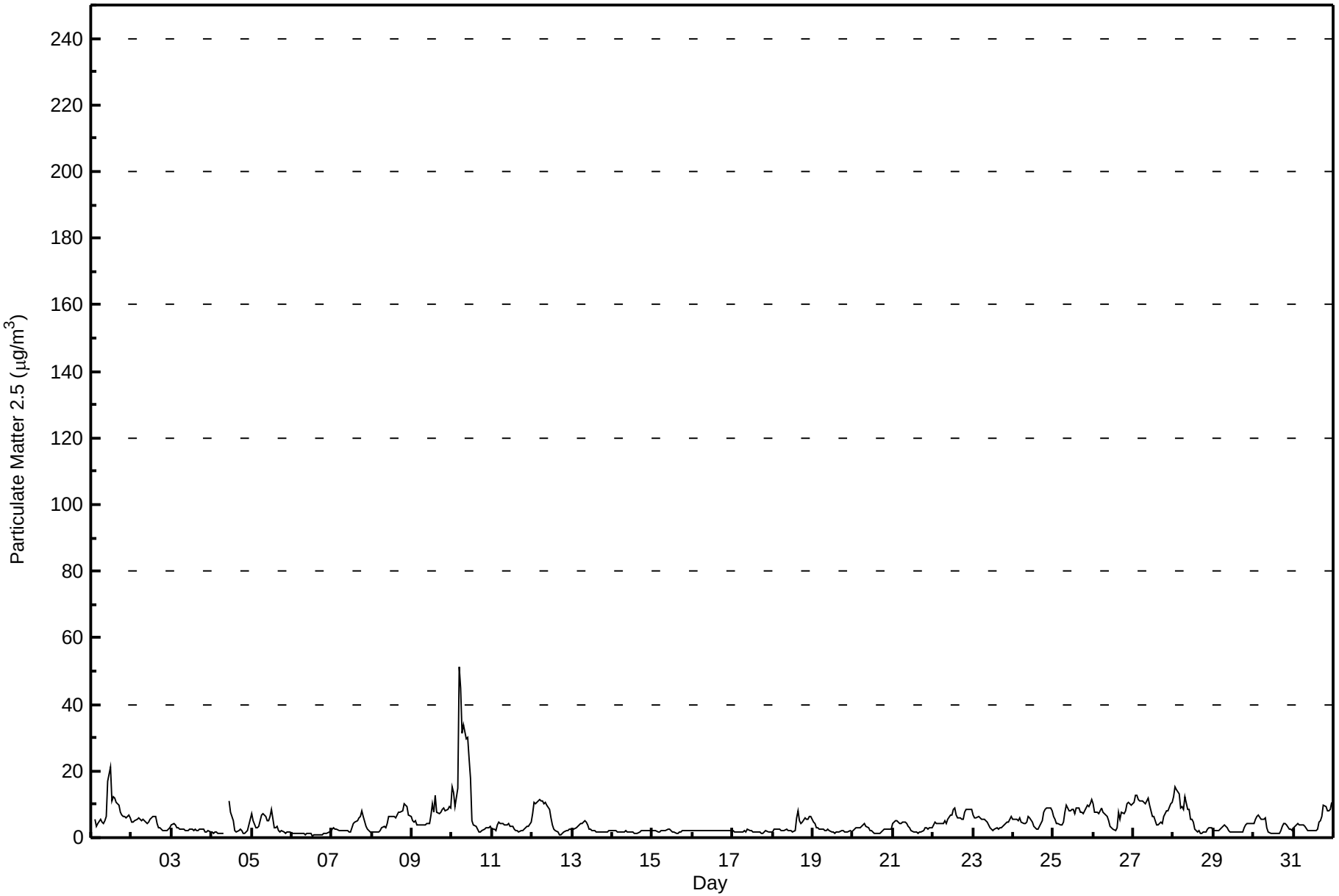
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Fort McKay South - March 2016



Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Fort McKay South - March 2016

Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	529	71.49	71.49
6 - 15	191	25.81	97.30
16 - 25	4	0.54	97.84
26 - 80	6	0.81	98.65
> 81.0	0	0.00	98.65

Total Number of Valid Hours: 740

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Fort McKay South - March 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	181	115	26	5	6	10	17	15	24	16	10	27	14	16	18	27	527
6 - 15	25	27	5	1	1	6	16	14	26	14	8	24	7	4	4	8	190
16 - 25	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	4
26 - 80	3	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	5
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	210	143	31	6	7	16	33	30	51	30	19	52	21	20	22	35	726

Total Number of Valid Hours: 736

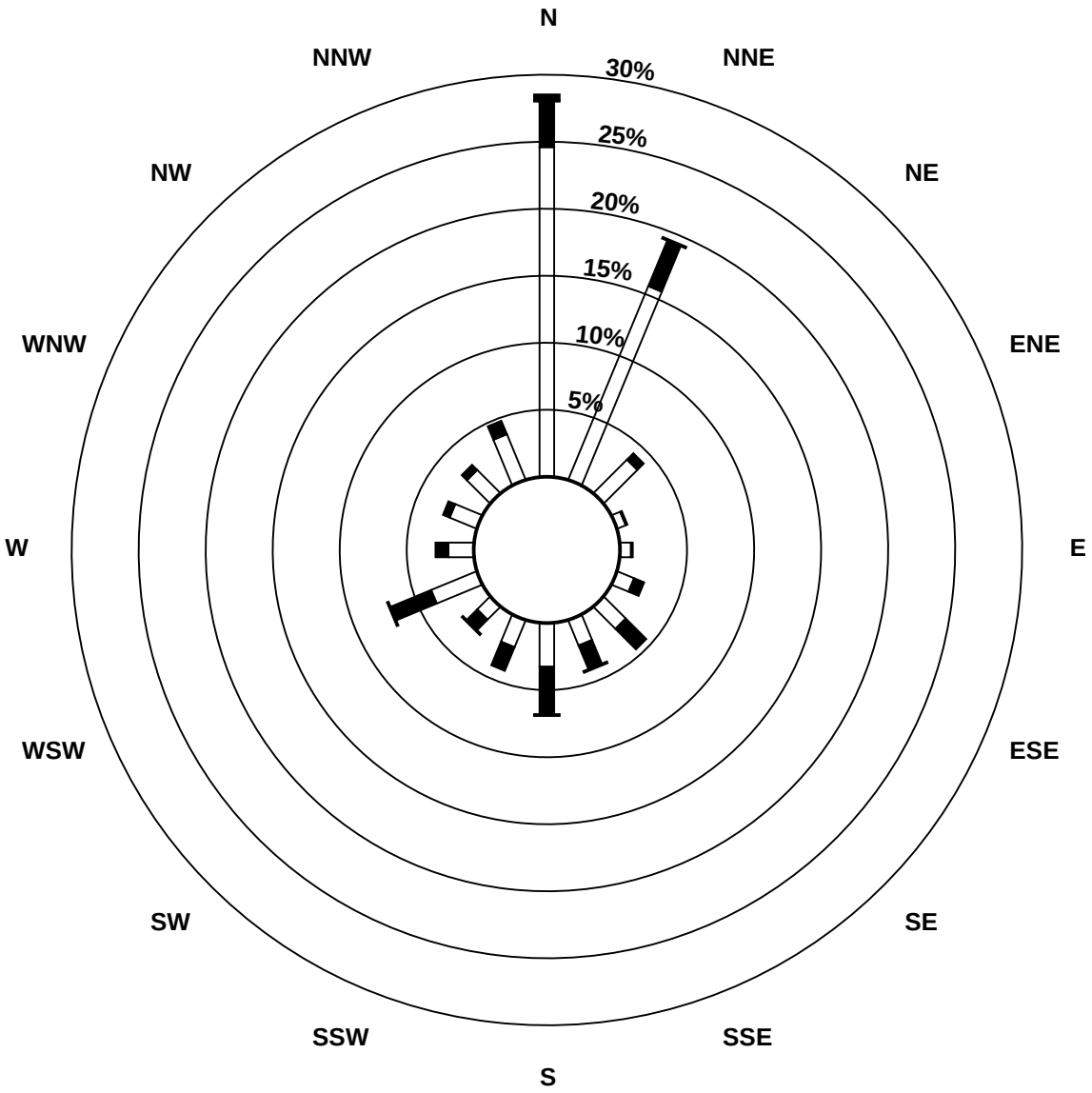
Total Number of Hours: 744

Wood Buffalo Environmental Association

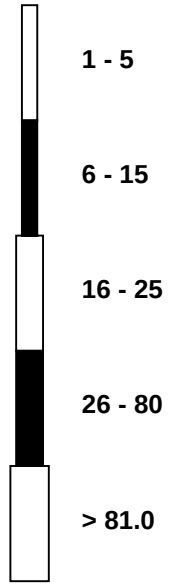
Wind Rose Mar 2016

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Fort McKay South (AMS 13)



Classes ($\mu g/m^3$)



1 - 5

6 - 15

16 - 25

26 - 80

> 81.0

Total Number of Valid Hours: 736

Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Fort McKay South - March 2016

Maximum Value: 14.0 C on Mar 28 14:00

Maximum Daily Average: 5.2 C on Mar 29

Minimum Value: -23.4 C on Mar 24 07:00

Minimum Daily Average: -12.1 C on Mar 24

Maximum Diurnal Average: 0.8 C at hour 16

Minimum Diurnal Average: -8.7 C at hour 7

Monthly Average: -4.30 C

Percentiles: P_1 = -18.3 P_{10} = -10.3 Q_1 = -8.1 Median = -4.7 Q_3 = -1.0 P_{90} = 2.3 P_{99} = 12.7

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

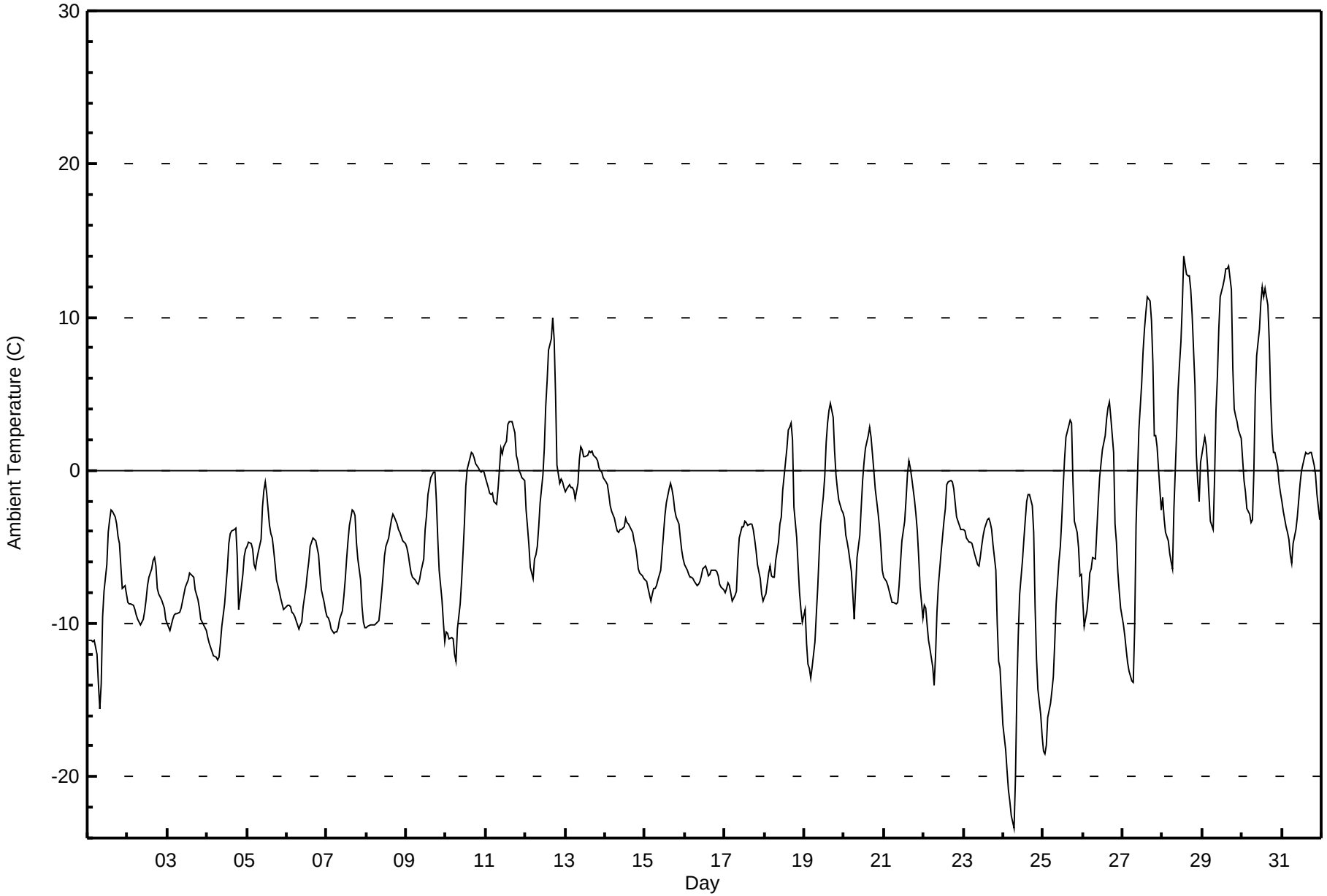
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-11.1	-11.1	-11.1	-11.1	-11.1	-12.0	-13.9	-15.6	-14.0	-9.6	-7.9	-6.1	-4.0	-3.3	-2.6	-2.7	-3.0	-3.5	-4.3	-4.7	-6.2	-7.7	-7.5	-8.1	-8.0	-2.6
2-Mar	-8.6	-8.8	-8.7	-8.8	-9.1	-9.4	-9.7	-9.9	-10.1	-9.7	-9.2	-8.5	-7.6	-7.0	-6.4	-5.9	-5.7	-6.2	-7.7	-8.1	-8.4	-8.7	-9.0	-9.7	-8.4	-5.7
3-Mar	-10.0	-10.5	-10.1	-9.7	-9.4	-9.4	-9.4	-9.3	-9.0	-8.5	-8.1	-7.6	-7.2	-6.7	-6.8	-6.9	-7.0	-7.8	-8.5	-9.0	-9.7	-9.9	-10.1	-10.5	-8.8	-6.7
4-Mar	-10.9	-11.2	-11.6	-11.8	-12.1	-12.2	-12.3	-12.1	-11.3	-10.2	-8.7	-7.6	-6.3	-4.8	-4.1	-4.0	-3.9	-3.8	-5.6	-9.0	-8.3	-6.8	-5.6	-5.1	-8.3	-3.8
5-Mar	-5.0	-4.7	-4.8	-5.2	-6.1	-6.4	-5.8	-5.3	-4.5	-2.4	-1.3	-0.8	-1.5	-3.6	-4.1	-4.4	-5.2	-6.1	-7.2	-7.9	-8.3	-8.7	-9.0	-9.0	-5.3	-0.8
6-Mar	-8.8	-8.8	-8.9	-9.3	-9.4	-9.6	-10.1	-10.3	-10.1	-9.9	-8.9	-7.6	-6.7	-5.9	-5.0	-4.7	-4.4	-4.6	-5.1	-5.5	-6.8	-7.8	-8.6	-9.2	-7.7	-4.4
7-Mar	-9.5	-9.7	-9.9	-10.3	-10.6	-10.5	-10.5	-10.3	-9.8	-9.1	-8.3	-7.1	-5.7	-4.6	-3.5	-2.6	-2.7	-2.9	-4.7	-5.8	-7.1	-8.9	-9.9	-10.2	-7.7	-2.6
8-Mar	-10.2	-10.2	-10.1	-10.1	-10.1	-10.1	-10.0	-9.8	-9.0	-7.9	-6.9	-5.6	-5.0	-4.4	-3.8	-3.2	-2.9	-3.0	-3.5	-3.9	-4.1	-4.3	-4.6	-4.8	-6.6	-2.9
9-Mar	-5.1	-5.5	-6.2	-6.7	-6.9	-7.1	-7.4	-7.5	-7.2	-6.7	-5.8	-3.8	-2.9	-1.6	-1.1	-0.5	-0.1	-0.1	-2.0	-4.4	-6.5	-8.4	-10.0	-11.2	-5.2	-0.1
10-Mar	-10.6	-10.7	-11.0	-10.9	-11.0	-12.0	-12.5	-10.4	-8.8	-7.3	-5.5	-3.5	-1.0	0.1	0.8	1.2	1.0	0.8	0.5	0.2	0.0	-0.1	-0.1	-0.1	-4.6	1.2
11-Mar	-0.5	-1.1	-1.5	-1.6	-1.5	-2.0	-2.2	-1.2	0.1	1.5	1.1	1.5	1.9	3.0	3.2	3.2	3.2	2.4	1.0	0.7	0.0	-0.2	-0.5	-0.7	0.4	3.2
12-Mar	-2.5	-3.7	-4.9	-6.3	-7.1	-5.8	-5.5	-5.0	-3.7	-2.1	-0.3	1.4	4.2	5.8	7.8	8.6	10.0	8.6	5.0	0.4	-0.9	-0.5	-0.8	-1.1	0.1	10.0
13-Mar	-1.4	-1.2	-1.0	-1.1	-1.1	-1.3	-1.9	-0.8	0.7	1.5	1.3	0.9	0.9	1.0	1.3	1.2	1.2	1.0	0.8	0.6	0.2	0.0	-0.2	-0.5	0.1	1.5
14-Mar	-0.7	-1.0	-1.6	-2.3	-2.7	-3.2	-3.6	-4.0	-4.0	-3.8	-3.8	-3.7	-3.1	-3.4	-3.5	-3.7	-4.0	-4.6	-5.0	-5.6	-6.4	-6.7	-6.9	-7.1	-3.9	-0.7
15-Mar	-7.2	-7.3	-7.7	-8.6	-8.1	-7.8	-7.7	-7.6	-7.1	-6.5	-5.3	-4.1	-3.0	-2.1	-1.2	-0.9	-1.2	-1.7	-2.5	-3.0	-3.5	-4.4	-5.2	-5.8	-5.0	-0.9
16-Mar	-6.1	-6.5	-6.8	-7.0	-7.0	-7.0	-7.2	-7.5	-7.4	-7.3	-6.9	-6.4	-6.2	-6.5	-6.9	-6.8	-6.5	-6.5	-6.6	-6.6	-6.9	-7.4	-7.6	-7.8	-6.9	-6.1
17-Mar	-8.0	-7.7	-7.3	-7.5	-8.5	-8.4	-8.1	-7.9	-5.8	-4.4	-3.6	-3.7	-3.3	-3.4	-3.5	-3.5	-3.5	-3.9	-4.5	-5.2	-6.2	-7.0	-8.1	-8.5	-5.9	-3.3
18-Mar	-8.2	-8.1	-6.7	-6.3	-6.8	-7.0	-6.9	-5.9	-4.7	-3.5	-3.0	-1.3	-0.4	1.4	2.7	2.8	3.1	2.0	-2.4	-4.4	-6.3	-8.0	-9.1	-9.9	-4.0	3.1
19-Mar	-9.0	-11.3	-12.6	-12.9	-13.6	-12.8	-11.2	-9.3	-7.6	-5.4	-3.5	-1.7	-0.4	1.9	3.1	3.9	4.4	3.5	1.2	-0.3	-1.2	-1.9	-2.6	-2.8	-4.3	4.4
20-Mar	-3.1	-4.2	-4.7	-5.2	-6.6	-8.0	-9.7	-7.8	-5.7	-4.2	-2.4	-0.7	0.5	1.5	2.3	2.8	2.1	1.1	-0.1	-1.2	-2.8	-3.7	-5.0	-6.6	-3.0	2.8
21-Mar	-7.0	-7.3	-7.6	-7.9	-8.2	-8.6	-8.6	-8.7	-8.6	-7.5	-6.1	-4.6	-3.3	-1.8	-0.2	0.6	0.2	-0.5	-1.9	-2.9	-3.9	-5.7	-7.6	-9.7	-5.3	0.6
22-Mar	-8.8	-9.0	-10.1	-11.1	-11.6	-12.8	-14.1	-12.1	-9.3	-7.5	-5.4	-4.3	-3.3	-2.5	-1.0	-0.7	-0.6	-0.8	-1.2	-2.2	-3.0	-3.6	-3.8	-3.9	-5.9	-0.6
23-Mar	-3.8	-4.0	-4.4	-4.7	-4.7	-4.8	-5.1	-5.5	-6.2	-6.3	-5.6	-4.9	-4.3	-3.8	-3.2	-3.1	-3.4	-3.8	-4.9	-6.5	-10.0	-12.5	-12.9	-14.7	-6.0	-3.1
24-Mar	-16.6	-18.2	-19.6	-20.9	-21.6	-22.5	-23.4	-20.0	-14.4	-10.8	-8.1	-5.9	-4.5	-3.2	-2.1	-1.5	-1.6	-2.3	-4.1	-8.9	-12.3	-14.3	-16.0	-17.3	-12.1	-1.5
25-Mar	-18.3	-18.5	-18.0	-16.1	-15.2	-14.4	-13.5	-11.3	-8.7	-6.0	-5.0	-3.2	-1.1	0.7	2.2	2.9	3.3	3.1	-0.7	-3.3	-4.0	-5.0	-6.9	-6.8	-6.8	3.3
26-Mar	-8.6	-10.1	-9.2	-8.2	-6.7	-6.4	-5.7	-5.8	-3.9	-2.1	-0.4	0.4	1.3	2.3	3.4	4.1	4.5	3.5	1.2	-3.5	-4.7	-6.6	-7.9	-9.0	-3.3	4.5
27-Mar	-10.1	-10.9	-11.7	-12.5	-13.1	-13.7	-13.9	-10.3	-3.5	-0.5	2.6	5.6	7.8	9.2	10.3	11.4	11.0	9.8	7.0	2.3	2.3	1.5	-1.3	-2.6	-1.0	11.4
28-Mar	-1.7	-3.1	-4.0	-4.6	-5.4	-6.0	-6.4	-2.5	2.6	5.3	7.0	8.4	10.9	14.0	12.8	12.7	12.7	11.8	10.2	5.5	1.0	-0.8	-2.1	0.5	3.3	14.0
29-Mar	1.1	2.2	1.6	0.2	-1.7	-3.3	-3.9	-0.5	3.9	6.1	9.2	11.4	12.1	12.5	13.1	13.2	13.3	11.8	6.6	4.0	3.6	3.2	2.7	2.1	5.2	13.3
30-Mar	0.7	-0.7	-1.4	-2.5	-2.9	-3.4	-3.2	-0.1	5.0	7.5	9.2	11.0	11.9	11.3	11.9	10.8	8.4	4.7	2.4	1.1	1.1	0.2	-0.8	-1.5	3.4	11.9
31-Mar	-2.0	-2.7	-3.7	-4.0	-4.5	-5.6	-6.1	-4.8	-3.8	-3.1	-2.0	-0.8	0.0	0.8	1.1	1.1	1.1	1.2	1.1	0.4	-0.3	-1.6	-2.4	-3.2	-1.8	1.2
	-6.8	-7.3	-7.6	-7.9	-8.2	-8.5	-8.7	-7.7	-6.0	-4.5	-3.3	-2.0	-0.9	-0.1	0.5	0.8	0.8	0.1	-1.5	-3.1	-4.2	-5.1	-5.8	-6.3	Diurnal Average	
	1.1	2.2	1.6	0.2	-1.1	-1.3	-1.9	-0.1	5.0	7.5	9.2	11.4	12.1	14.0	13.1	13.2	13.3	11.8	10.2	5.5	3.6	3.2	2.7	2.1	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Fort McKay South - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	5	0.67	0.67
-20 - 0	595	79.97	80.65
0 - 10	122	16.40	97.04
10 - 20	22	2.96	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 2016

Maximum Value: 95 % on Mar 12 02:00

Maximum Daily Average: 89.2 % on Mar 13

Minimum Value: 16 % on Mar 24 18:00

Minimum Daily Average: 46.1 % on Mar 29

Maximum Diurnal Average: 85.0 % at hour 7

Minimum Diurnal Average: 58.4 % at hour 16

Monthly Average: 72.5 %

Percentiles: P_1 = 23 P_{10} = 49 Q_1 = 61 Median = 77 Q_3 = 86 P_{90} = 90 P_{99} = 94

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

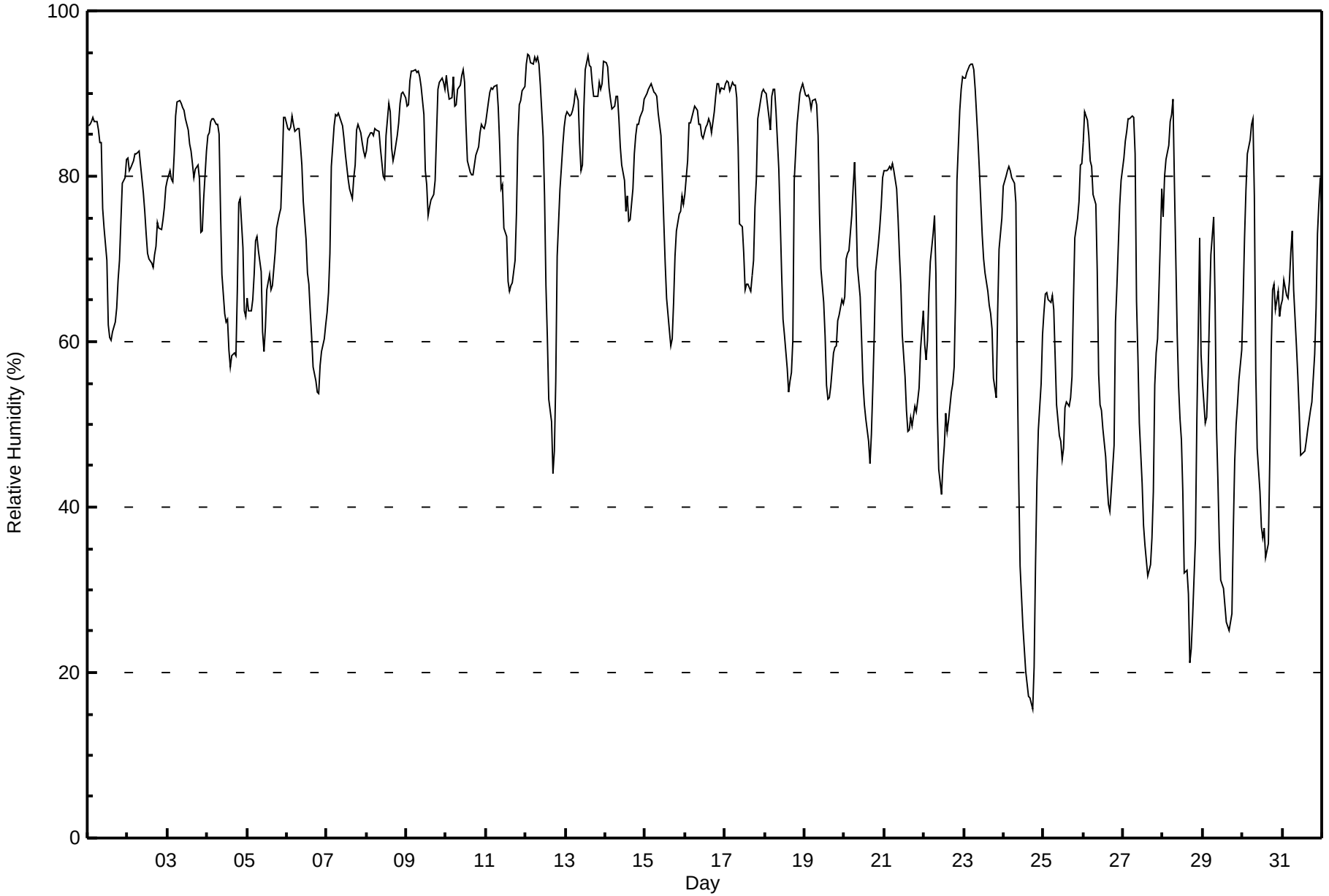
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	86	86	87	87	87	87	86	84	84	76	74	70	62	60	60	61	62	64	67	70	75	79	80	82	75.7	87
2-Mar	82	81	81	82	83	83	83	83	81	78	76	73	71	70	70	69	71	72	74	74	74	75	76	79	76.6	83
3-Mar	80	81	80	79	83	87	89	89	89	88	88	87	86	84	83	82	80	81	81	80	73	73	77	83	82.6	89
4-Mar	85	85	87	87	87	86	86	85	76	68	63	62	63	59	57	58	59	58	66	77	77	71	64	63	72.1	87
5-Mar	65	64	64	65	68	72	73	71	69	61	59	62	66	68	66	67	69	71	74	75	76	81	87	87	70.0	87
6-Mar	86	86	86	87	86	85	86	86	84	81	77	72	68	67	64	61	57	55	54	54	57	59	60	62	71.7	87
7-Mar	64	66	71	81	86	87	87	88	87	86	85	83	81	80	78	77	80	81	86	86	85	84	83	82	81.4	88
8-Mar	83	85	85	85	85	86	86	85	83	82	80	80	85	89	88	83	82	83	85	86	89	90	90	89	85.2	90
9-Mar	89	89	92	93	93	93	93	93	92	91	87	81	79	75	76	77	78	80	85	90	91	92	91	90	87.0	93
10-Mar	92	91	89	90	92	89	89	90	91	92	93	91	86	82	81	80	80	81	82	84	85	86	86	86	87.0	93
11-Mar	86	89	90	91	90	91	91	88	84	78	79	74	73	67	66	67	67	70	76	85	89	89	90	91	81.7	91
12-Mar	94	95	95	94	94	94	94	94	94	91	85	78	67	60	53	50	44	47	55	70	78	81	84	86	78.2	95
13-Mar	87	88	87	88	88	89	90	89	84	81	81	88	93	95	93	93	91	90	90	90	91	90	91	94	89.2	95
14-Mar	94	93	91	89	88	88	90	90	87	84	81	80	76	78	75	75	79	83	85	86	86	87	88	89	85.0	94
15-Mar	90	90	90	91	91	90	90	90	88	85	80	75	69	65	61	59	60	65	70	73	75	76	78	77	78.3	91
16-Mar	78	82	86	86	87	88	89	88	86	86	85	85	86	86	87	86	85	88	90	91	91	90	91	91	87.0	91
17-Mar	91	92	91	90	91	91	91	90	84	74	74	71	66	67	67	66	68	70	76	80	87	89	90	91	81.1	92
18-Mar	90	90	87	86	90	91	91	88	81	75	68	63	61	57	54	55	56	60	79	86	88	90	91	91	77.8	91
19-Mar	90	90	90	89	88	89	89	89	85	76	69	65	61	55	53	53	55	59	59	60	63	63	65	65	71.5	90
20-Mar	65	70	71	71	75	79	82	77	69	65	60	55	52	51	48	45	49	54	61	68	72	74	76	80	65.4	82
21-Mar	81	81	81	81	81	81	81	79	75	70	67	61	56	52	49	49	51	50	52	52	53	54	59	64	64.9	81
22-Mar	60	58	60	66	70	73	75	68	51	45	42	45	47	51	49	50	54	55	57	65	79	88	90	92	62.1	92
23-Mar	92	92	93	93	94	94	93	90	84	81	77	73	70	68	66	64	63	61	56	53	64	71	73	75	76.7	94
24-Mar	79	80	81	81	81	80	79	77	57	44	33	26	23	20	19	17	17	16	21	33	43	49	55	61	48.7	81
25-Mar	64	66	66	65	65	66	64	58	52	49	48	46	47	52	53	52	53	56	65	73	75	77	81	82	61.4	82
26-Mar	84	88	87	85	82	81	78	77	68	56	52	52	49	46	43	40	40	42	47	62	67	72	76	80	64.7	88
27-Mar	82	84	85	87	87	87	87	83	65	58	50	43	38	35	34	32	33	36	42	55	59	60	72	78	61.4	87
28-Mar	75	80	82	84	87	87	89	79	61	55	51	48	42	32	32	29	21	23	27	36	50	61	73	58	56.8	89
29-Mar	55	50	51	56	64	70	75	65	50	43	36	31	30	28	26	26	25	27	37	46	50	53	55	59	46.1	75
30-Mar	65	73	78	83	84	86	87	78	56	47	42	38	36	37	34	36	46	59	66	67	64	66	63	64	60.6	87
31-Mar	65	67	66	65	67	71	73	66	59	56	51	46	46	47	48	49	51	52	53	58	64	73	77	80	60.5	80
	79.9	80.9	81.6	82.5	83.6	84.6	85.0	82.4	76.0	71.0	67.5	64.5	62.4	60.8	59.1	58.4	58.8	60.9	65.1	69.8	73.2	75.7	77.9	79.0	Diurnal Average	
	94	95	95	94	94	94	94	94	94	92	93	91	93	95	93	93	91	90	90	91	91	92	91	94	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Fort McKay South - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Fort McKay South - March 2016

Maximum Speed: 15 km/h on Mar 30 13:00

Maximum Daily Speed Average: 10.1 km/h on Mar 14

Minimum Speed Value: 0 km/h on Mar 4 05:00

Minimum Daily Speed Average: 0.5 km/h on Mar 1

Maximum Diurnal Speed Average: 4.6 km/h at hour 13

Minimum Diurnal Speed Average: 1.8 km/h at hour 2

Monthly Average Velocity: 2.9 km/h 9.7 deg

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 2$ Median = 5 $Q_3 = 8$ $P_{90} = 10$ $P_{99} = 13$

Hours in Service: 744

Hours of Data: 740

Hours of Missing Data: 4

Percent Operational Time: 99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	S2	SSW0	WSW0	WSW1	SW2	SSW2	SSW1	WSW3	S1	S3	S2	SSE3	ESE4	SSW2	S3	NE2	NNE4	NE4	N5	N4	N4	NNW5	N5	N4	NNE0.5	N5
2-Mar	N5	N5	N4	N5	N5	N5	N6	N5	N6	NNE5	NNE6	NNE6	NNE6	NNE6	N6	N6	NNE6	N6	N5	N6	N7	N5	N4	N3	N5.2	N7
3-Mar	N4	NNW4	NNW4	N6	N6	N5	N6	N6	N6	N7	N7	N8	NNE9	NNE10	NNE10	NNE11	NNE12	NNE10	NNE9	NNE10	NNE8	N5	N3	N1	N6.8	NNE12
4-Mar	NE1	N2	NE1	E1	E0	AF	SSW2	S1	SSE1	SSE2	S5	SSE6	SE7	SSE8	SSE8	SE7	SE5	SE6	E2	N1	SE1	SSE3	SSE5	S4	SE2.9	SSE8
5-Mar	S4	S6	S6	S5	S3	S3	SW3	S4	S5	S3	ENE4	NNE9	NNE12	NNE12	NNE9	NNE10	NE10	NNE12	NNE9	NNE12	NNE12	NNE10	N8	N7	NNE4.0	NNE12
6-Mar	N7	N6	N7	N7	N7	NNE7	NNE7	N7	NNE8	NNE8	NNE9	N9	N10	N9	NNE9	NNE11	N10	N9	N8	NNE9	N8	N9	N7	N7	N8.1	NNE11
7-Mar	N7	N8	N6	N6	N7	N6	N7	N6	NNW4	NNW4	NNW4	NW3	N2	W3	SW3	S3	S3	SW4	N7	N5	NNE7	NNE6	NNE5	NNE4	N3.8	N8
8-Mar	N1	S0	SSE0	NE1	NE0	N1	ENE0	NNE1	S0	NE2	NNE2	S1	NE3	NNE4	NE4	NNE4	NNE3	NNE4	NNE3	N3	N3	N4	N4	NNE4	NNE2.0	NE4
9-Mar	NNE6	NNE5	N6	N6	N5	N6	N5	N4	N4	N3	NNE2	ENE3	E3	SSE4	SE5	SE4	SE2	NNE2	N3	WSW1	WSW1	WSW2	WSW2	SSW2	NNE1.8	N6
10-Mar	SSW1	S0	S1	SSW0	AF	SW0	WSW0	N1	N2	N3	N3	NNE2	ESE6	SE6	ESE7	SE7	ESE7	ESE5	SE6	SE5	SE4	SSE4	S4	S4	SE2.4	SE7
11-Mar	SSW2	SW1	SSW2	WSW4	WSW7	WSW8	W8	WSW8	WSW6	NW5	NNE6	ENE4	NE3	WNW3	NNW5	NW5	NW4	W2	SW2	NW2	WSW1	SSW2	SSW2	S1	W2.4	WSW8
12-Mar	SW1	WSW1	W1	WSW2	SSW1	N2	N2	NNE1	NE3	N4	NNE6	NNE8	N10	N8	N7	NNE6	ESE6	SE6	ESE3	SE2	SSE2	SSE2	SW2	NNW2	NNE1.8	N10
13-Mar	NW1	NNW1	NNE2	NE0	N2	NNW2	NNW2	NNW5	N7	N8	NNE8	N7	N9	N7	N9	N9	N12	N10	N10	N10	NNW10	NNW9	NNW8	N9	N6.4	N12
14-Mar	N8	N7	N12	N12	N11	N13	NNE10	N11	N12	NNE12	NNE12	NNE11	NNE12	N13	N12	NNE11	NNE12	N10	N9	N9	N8	N7	N7	N5	N10.1	N13
15-Mar	N5	N5	N4	NNW4	NNW3	N4	NNW3	NNW4	N4	NNE5	NNE5	NE5	NE6	NE6	NNE8	NNE7	NNE6	NNE7	N8	N7	N8	N9	N8	N9	N5.5	N9
16-Mar	N9	N8	N9	N10	N9	N10	N9	NNE10	N10	N9	NNE10	N9	NNE8	NNE10	NNE10	N9	N9	NNW6	WNW3	W1	NNE2	N2	WNW2	W2	N7.0	N10
17-Mar	WSW2	WSW2	WNW4	WNW3	W2	W4	W4	WSW4	W4	WNW4	WNW5	NW9	NW9	NW6	NNW8	NNW7	NW5	NW4	NW3	WNW2	SW1	SSW2	S2	S2	WNW3.1	NW9
18-Mar	SSW1	SSW1	WSW5	WSW4	SW3	WSW2	WSW3	W3	NNW2	NNE3	NE3	ESE4	ESE6	SSW6	SSE7	SSE8	S8	SSE5	W1	WNW1	WNW1	NW1	N2	N3	S1.3	SSE8
19-Mar	N3	WNW1	NW2	NNW1	WNW0	NNW2	NNE1	NNE4	NNE5	NNE7	NNE5	NNE7	NNE9	N10	NNE10	NNE10	NNE10	N9	N8	N9	N9	N9	N6	N5	N5.8	NNE10
20-Mar	N4	N4	N4	N3	N3	N3	N3	N5	NNE5	NNE8	NNE9	N9	NNE10	NNE12	NNE12	NNE14	N13	N13	N8	N8	N10	N8	N9	N7	N7.7	NNE14
21-Mar	N8	N7	N7	N6	N7	N5	N6	N8	N9	N9	N12	N12	N13	N12	N13	NNE13	NNE12	NE9	NE6	NE4	NE3	NNE4	NNE4	NNE2	N7.7	NNE13
22-Mar	NNE4	NNE4	NNE4	NNE2	NNE2	N1	N1	N1	ESE2	SE5	SSE6	SE6	SE6	ESE5	ESE5	SE4	SE3	E3	NE3	NNE4	NNE3	NNE4	NNE3	NNE3	E1.8	SE6
23-Mar	NNE1	ESE0	N2	N3	N3	N3	N4	N8	N9	NNE11	NNE10	NNE10	NNE11	NNE10	NNE10	NNE10	NNE10	NNE8	NNE6	N5	N3	NNW3	NNW3	NW3	NNE5.9	NNE11
24-Mar	WNW1	WSW1	WSW2	NW1	WSW2	WSW1	WSW2	NNE1	NE4	NNE7	NNE10	N10	NNE9	NNE8	NE7	NNE8	NNE7	NNE6	N3	W1	WSW2	W1	W1	WSW2	NNE3.0	NNE10
25-Mar	WSW2	SW2	SSW1	SSW1	AF	S1	S1	S2	SE3	S5	SE5	SE4	SE5	SE4	ESE3	SE2	SSE3	S3	WSW2	WSW2	W2	NNW1	NNW2	N3	SSE1.4	SE5
26-Mar	NNW1	WSW1	SSW1	NW2	NNW2	NNW1	NW3	NW3	N4	NNE6	NE6	NE6	NE6	E5	SE6	SSE6	SSE6	SE5	SSE4	SW1	WSW2	WSW2	WNW1	W1	ENE0.9	NE6
27-Mar	WSW2	SW1	WSW1	W1	WSW2	SW2	W1	AF	ESE2	S5	SE4	S6	SE7	SE8	SE9	SE9	SE9	SSE7	SSE4	SSE4	S5	S4	S3	SSW5	SSE3.8	SE9
28-Mar	S5	SSW4	SW3	SW3	SSW4	SSW3	S3	S4	SSE6	S8	S9	S8	SSW8	SW8	WNW11	W9	WNW11	WNW9	WNW6	NW4	WNW4	WNW4	WSW5	WSW7	SW3.9	WNW11
29-Mar	WSW7	WSW9	WSW7	WSW3	SSW2	S2	S3	SSE4	SSE5	S6	SSW5	S5	ESE5	NE7	NE6	ENE5	NE4	NNE3	NW2	WSW2	WSW2	W1	SW1	NW1	SSW1.1	WSW9
30-Mar	SW1	WSW1	WSW1	WSW2	NW0	W1	N1	NNE2	N5	NNE5	ENE5	N5	N15	N14	N12	N13	N11	NNE14	NNE14	NNE13	N9	NNE14	N15	NNE13	N7.1	N15
31-Mar	N11	NNE10	N11	N8	N5	NNW3	NNW3	NNE5	N7	NE6	NE6	E4	SE6	SSE5	SSE6	SE5	SSE4	SSE5	S4	SSW2	S3	SSW3	SW2	SSW2	NE1.8	NNE11
	NNW2.1	NNW1.8	NNW2.2	NNW2.2	NNW2.2	NNW2.2	NNW2.1	N2.5	N3.0	NNE3.2	NNE3.8	NNE3.7	NNE4.6	NNE4.0	NNE4.1	NNE4.1	NNE4.0	NNE3.7	N3.5	N3.5	N3.1	N3.0	N2.6	N2.4	Diurnal Average	
	N11	NNE10	N12	N12	N11	N13	NNE10	N11	N12	NNE12	NNE12	N12	N15	N14	N13	NNE14	N13	NNE14	NNE14	NNE13	NNE12	NNE14	NNE15	NNE13	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 McKay South - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 6 km/h on Mar 30 13:00

Minimum Value: 0 km/h on Mar 23 03:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 3$ $P_{99} = 5$

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Hours of Calibration:	0
Percent Operational Time:	99.5

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

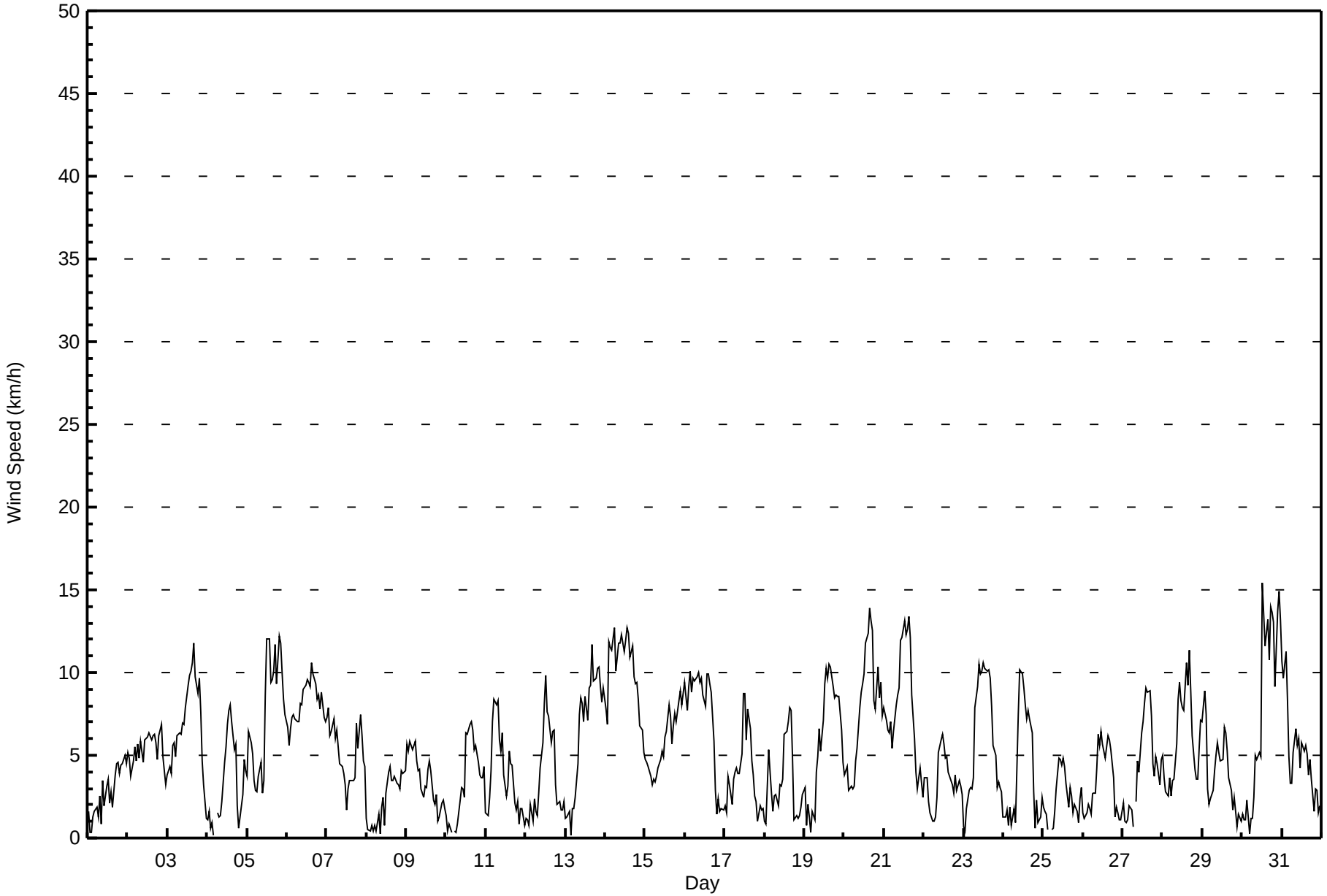
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Fort McKay South - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	429	57.97	57.97
6 - 11	272	36.76	94.73
12 - 19	39	5.27	100.00
20 - 28	0	0.00	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 740

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Fort McKay South - March 2016

Wind Speed	Wind Direction																
Ranges (km/h)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	80	49	18	6	7	11	19	21	44	29	18	44	19	16	19	29	429
6 - 11	118	75	13	0	0	6	15	11	8	2	1	8	2	4	3	6	272
12 - 19	17	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39
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	215	146	31	6	7	17	34	32	52	31	19	52	21	20	22	35	740

Total Number of Valid Hours: 740

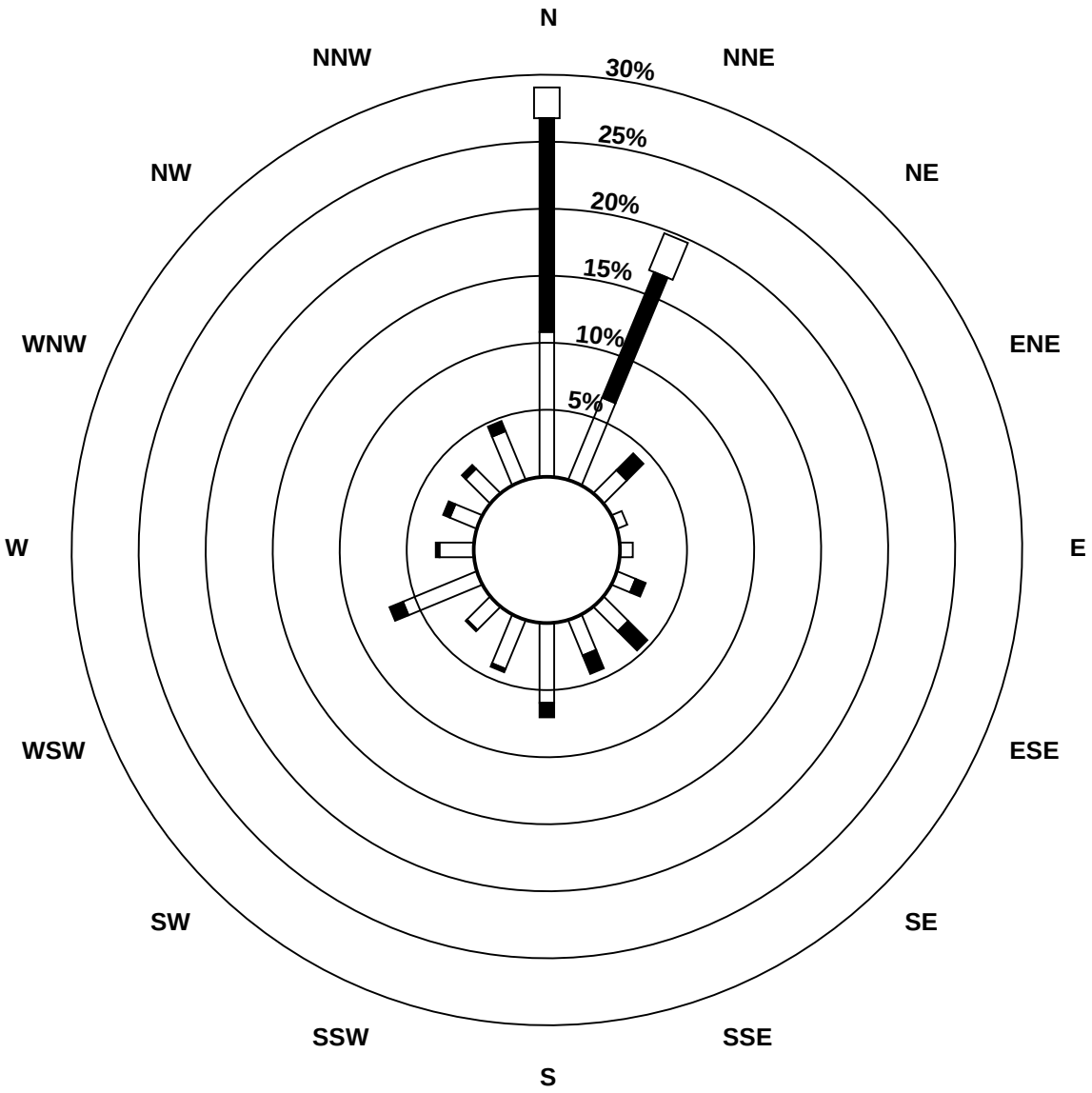
Total Number of Hours: 744

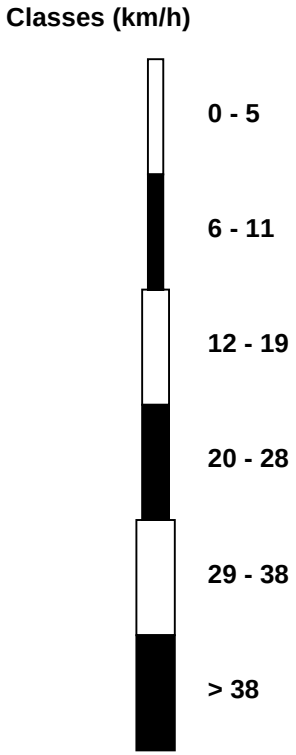
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Wind Speed (WS) - km/h

Fort McKay South (AMS 13)





Total Number of Valid Hours: 740

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Fort McKay South - March 2016

Direction of Maximum Speed: 355 deg on Mar 30 13:00
Direction of Maximum Daily Speed Average: 7.5 deg on Mar 14

Direction of Minimum Speed: 96 deg on Mar 4 05:00

Direction of Minimum Daily Speed Average: 0.5 deg on Mar 1

Monthly Average Direction: 304.5 deg

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	187	195	242	241	217	207	200	240	180	179	185	154	123	192	174	54	32	34	7	11	9	348	1	350	21.5
2-Mar	349	3	352	358	8	2	2	356	11	22	24	16	30	19	5	11	21	8	357	1	9	9	5	3	8.5
3-Mar	353	346	332	350	359	3	6	358	353	4	9	8	17	14	14	16	16	13	18	12	14	11	11	354	7.9
4-Mar	46	5	35	99	96	AF	210	177	148	151	170	147	136	148	147	142	139	124	93	358	130	150	168	183	145.3
5-Mar	177	179	176	173	186	186	215	180	174	189	71	12	19	22	26	31	38	28	23	16	18	15	11	10	30.8
6-Mar	5	360	3	9	11	15	12	4	15	17	16	7	2	6	13	13	9	6	6	12	357	7	5	4	8.3
7-Mar	6	4	357	356	5	1	2	358	346	342	334	306	353	278	227	182	178	221	359	351	12	30	28	25	356.2
8-Mar	353	173	164	46	43	357	67	16	190	34	24	184	47	15	43	16	22	18	19	8	358	1	4	14	18.7
9-Mar	18	12	357	3	2	5	4	1	358	9	27	59	84	153	135	133	144	27	349	248	255	258	239	206	18.5
10-Mar	205	190	187	209	AF	219	254	7	11	8	3	29	121	126	119	131	120	119	124	136	144	167	185	177	127.8
11-Mar	211	228	193	240	257	257	260	253	254	311	19	61	55	288	329	307	320	267	232	320	243	209	192	181	274.8
12-Mar	227	248	270	241	192	2	1	13	39	9	22	16	11	7	9	12	114	135	123	134	161	167	225	344	29.3
13-Mar	322	342	14	34	350	330	346	346	4	9	23	9	2	0	353	352	353	355	350	349	346	343	335	354	354.4
14-Mar	353	351	8	360	6	8	13	7	11	14	14	13	14	11	11	12	12	7	7	8	2	359	359	352	7.5
15-Mar	349	350	350	340	347	354	347	347	359	12	15	45	38	45	31	29	27	16	10	9	5	7	7	356	10.6
16-Mar	359	3	1	359	356	3	10	14	10	10	18	4	19	19	19	10	11	347	292	274	21	8	292	277	5.5
17-Mar	248	251	284	282	273	268	265	256	264	295	292	326	323	326	340	346	313	311	305	292	231	209	171	190	299.5
18-Mar	194	196	254	244	233	238	241	261	337	23	41	106	119	198	161	156	171	153	269	284	298	321	358	357	187.0
19-Mar	354	293	324	336	290	335	15	24	21	23	22	23	15	8	19	14	14	2	357	359	355	3	7	353	7.8
20-Mar	0	354	360	352	351	354	2	5	22	21	19	10	12	12	14	15	9	9	1	358	1	3	4	359	7.6
21-Mar	353	353	355	357	358	355	359	1	360	1	9	10	8	11	6	14	23	42	44	53	40	33	22	17	10.4
22-Mar	16	17	23	24	14	352	356	356	122	146	153	137	146	118	123	134	140	95	34	17	22	20	15	20	85.1
23-Mar	31	113	4	3	5	356	351	8	7	15	20	21	17	21	18	21	15	21	20	10	349	340	337	326	12.1
24-Mar	298	244	246	312	239	238	246	25	35	24	13	7	27	28	35	30	22	17	11	274	258	263	265	243	12.1
25-Mar	249	230	194	193	AF	191	175	177	134	171	143	129	134	137	121	127	157	181	254	253	259	327	334	353	160.2
26-Mar	340	240	200	324	343	339	318	322	357	24	54	55	46	81	135	157	147	146	161	224	241	252	297	261	75.5
27-Mar	244	228	250	260	238	236	260	AF	112	176	137	187	129	138	142	142	145	150	155	166	171	180	181	202	160.9
28-Mar	187	196	220	214	210	213	188	171	163	180	184	172	195	226	283	270	299	303	294	308	300	289	250	254	236.0
29-Mar	254	253	255	251	193	171	173	162	167	182	204	186	109	47	54	58	34	23	305	247	238	272	235	305	203.7
30-Mar	227	248	247	237	306	266	352	24	5	21	61	10	355	3	352	349	9	23	24	15	2	13	11	12	7.4
31-Mar	10	14	11	6	349	338	338	20	11	35	49	87	143	160	166	140	152	149	173	213	185	197	224	212	44.0
	345.7	342.0	340.7	342.1	344.4	343.5	344.4	354.0	10.1	17.2	27.5	26.9	32.5	25.8	26.3	26.4	26.6	24.8	10.3	2.3	0.2	1.3	355.7	349.1	
	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

Fort McKay South - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 105 deg on Mar 8 09:00

Minimum Value: 6 deg on Mar 1 04:00

Percentiles: P_1 = 10 P_{10} = 20 Q_1 = 24 Median = 28 Q_3 = 40 P_{90} = 57 P_{99} = 84

Hours in Service:	744
Hours of Data:	740
Hours of Missing Data:	4
Hours of Calibration:	0
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	19	73	59	6	18	44	58	8	67	31	74	60	57	76	52	82	33	24	24	30	22	19	19	19	82
2-Mar	22	22	24	22	24	25	26	27	26	45	29	28	33	27	28	29	26	21	21	22	23	24	22	18	45
3-Mar	22	24	29	27	23	24	20	24	26	25	24	25	22	24	25	25	24	23	23	23	23	26	23	16	29
4-Mar	71	48	47	37	84	AF	26	46	66	41	39	38	35	36	33	36	34	33	56	83	76	47	34	26	84
5-Mar	27	28	27	27	20	33	27	26	26	75	53	26	25	27	30	28	31	27	24	23	24	25	22	25	75
6-Mar	26	26	25	24	25	24	22	24	23	24	31	28	25	25	25	25	23	25	25	25	25	22	24	22	31
7-Mar	23	22	26	26	23	23	24	24	30	35	40	48	92	70	44	39	28	52	24	27	24	27	29	29	92
8-Mar	36	57	81	70	60	62	93	46	105	59	52	86	56	26	31	45	32	23	21	19	20	23	24	22	105
9-Mar	22	24	23	23	23	25	25	24	28	52	50	61	75	39	35	32	43	42	32	47	32	15	9	22	75
10-Mar	48	76	83	89	AF	86	76	53	22	26	44	54	36	37	32	38	33	40	32	34	48	28	25	29	89
11-Mar	45	47	14	28	23	18	19	17	30	38	25	41	51	73	40	43	39	25	48	49	61	39	44	69	73
12-Mar	60	37	48	9	77	33	61	62	55	27	25	26	24	25	28	30	36	33	33	44	29	24	38	27	77
13-Mar	32	16	21	73	24	27	22	24	23	27	23	27	24	26	29	27	28	30	27	28	28	32	31	28	73
14-Mar	27	26	25	26	24	24	24	26	25	27	25	26	27	26	27	26	24	26	26	25	26	24	24	24	27
15-Mar	24	26	22	20	26	23	24	29	29	34	38	34	39	35	31	33	29	28	26	26	25	25	27	25	39
16-Mar	25	24	25	26	28	26	26	25	25	26	25	27	25	26	27	26	25	32	35	41	63	36	28	29	63
17-Mar	20	55	30	30	21	22	24	21	32	56	58	40	40	44	34	32	46	33	35	39	73	26	26	56	73
18-Mar	69	78	16	21	16	58	19	31	58	58	59	83	42	40	38	34	28	32	53	29	43	29	51	27	83
19-Mar	18	77	38	38	71	29	65	18	21	30	37	31	25	27	25	24	25	25	26	23	22	19	21	25	77
20-Mar	35	22	21	32	18	16	17	24	22	22	24	26	26	25	25	24	24	22	23	24	25	25	25	25	35
21-Mar	24	25	24	25	26	26	25	25	27	26	24	26	25	26	27	30	27	32	31	31	30	17	13	37	37
22-Mar	21	24	23	34	19	15	31	25	56	34	40	37	43	49	41	57	49	48	38	29	23	20	18	33	57
23-Mar	72	62	14	16	20	20	24	25	25	25	25	25	24	30	28	30	27	24	26	19	19	10	15	15	72
24-Mar	44	40	43	35	13	60	19	58	17	26	23	27	28	32	36	30	28	22	33	36	17	33	39	7	60
25-Mar	8	36	31	40	AF	56	85	33	32	32	37	38	45	43	53	72	46	50	41	21	55	69	28	18	85
26-Mar	40	70	56	62	69	51	32	37	40	34	44	39	42	48	41	41	38	31	23	36	21	38	49	69	70
27-Mar	17	28	49	45	12	17	52	AF	57	44	54	36	34	31	33	34	31	33	26	21	23	23	13	18	57
28-Mar	15	15	15	14	17	14	12	20	26	31	30	31	36	47	39	43	47	34	35	24	15	20	10	15	47
29-Mar	16	18	26	67	52	32	18	19	29	32	48	52	55	46	42	48	76	49	48	33	39	77	62	74	77
30-Mar	70	52	48	30	79	50	65	39	39	48	41	63	34	35	38	34	33	27	29	26	28	27	26	27	79
31-Mar	24	25	25	26	28	30	29	29	32	42	42	76	41	47	35	32	28	31	29	29	15	11	26	40	76
	72	78	83	89	84	86	93	62	105	75	74	86	92	76	53	82	76	52	56	83	76	77	62	74	
	Diurnal Maximum																								

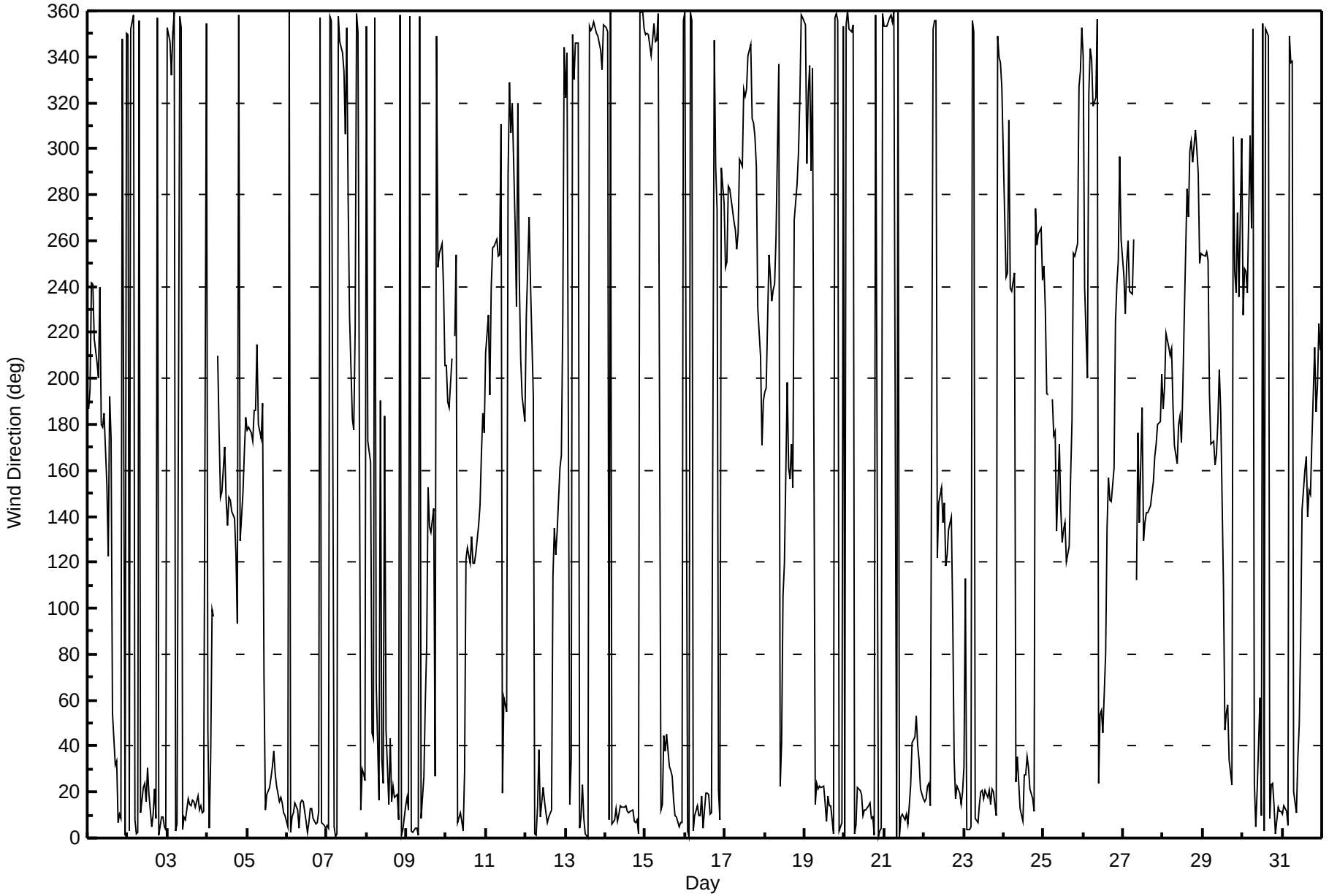
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Fort McKay South - March 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	March 3, 2016	Last Calibration	February 16, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	14:00
Gas Cert Reference	LL110515	Station temp.	22 Deg C
Cal Gas Concentration	49.8 ppm	Cal Gas Exp Date	08/09/2018
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.	1850

.

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		HVPS voltage	547	547
Analyzer IP address	192.168.1.44		Lamp voltage	1604	1590
Calculated slope	0.998095	0.993430	Box temp	30.8	30.8
Calculated intercept	1.947014	0.538802	Pressure	26.0	26.1
Analyzer Background	42.1	40.3	Flow	680	683
Analyzer Coefficient	0.965	0.985	Lamp Ratio	54	54

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	-0.9	----
as found span	5000	78.9	785.8	771.1	1.019
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	78.9	785.8	791.1	0.993
second point	5000	39.4	392.4	393.5	0.997
third point	5000	19.7	196.2	196.5	0.999
as left zero	5000	0.0	0.0	0.5	----
as left span	5000	78.9	785.8	784.4	1.002
				Average Correction Factor	0.996

Corrected As found	772.0	Previous response	785.4	% change	1.7%

Notes:

No maintenance done, filter changed out, zero and span adjusted

]

Calibration Performed By: Melissa Lemay

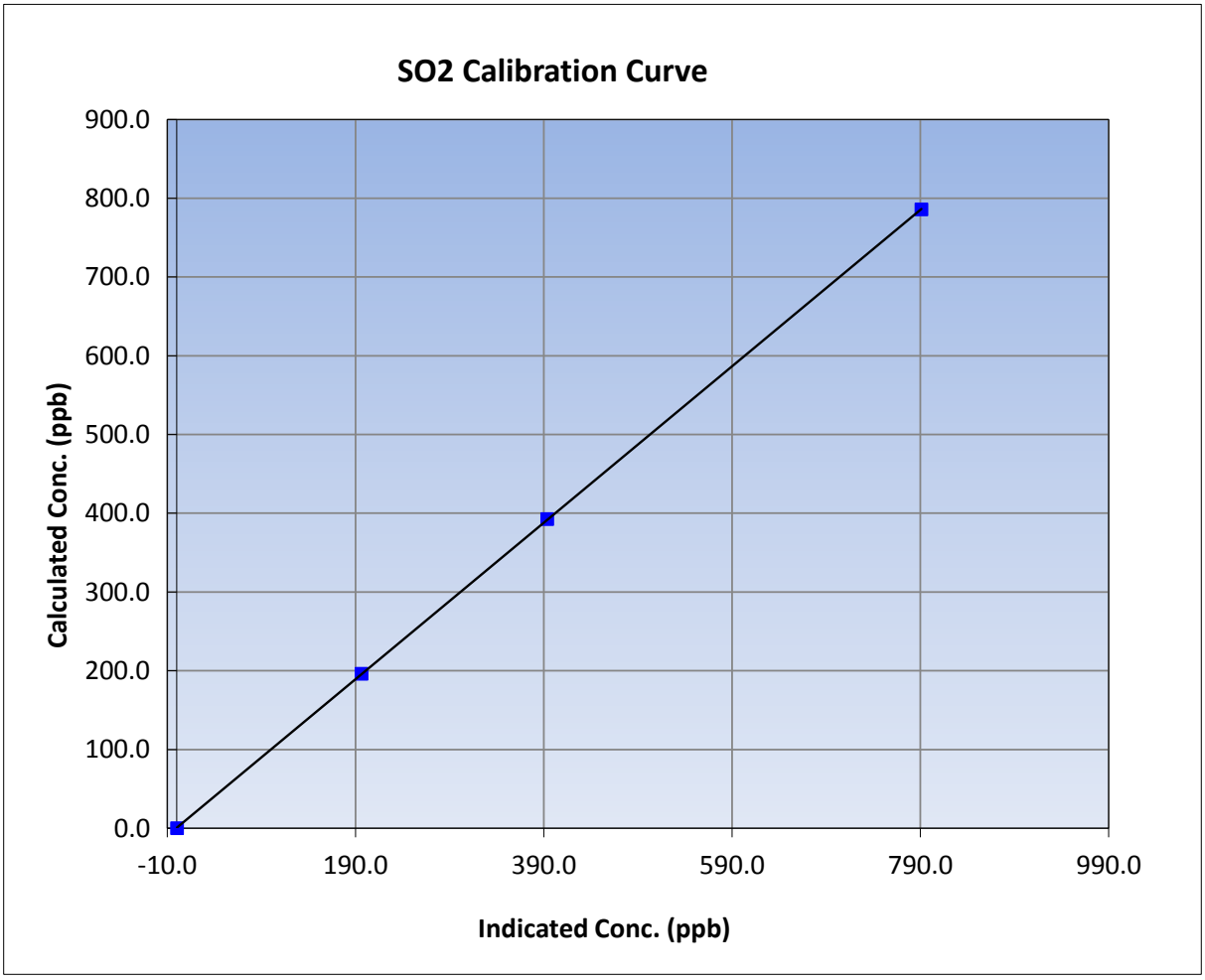
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

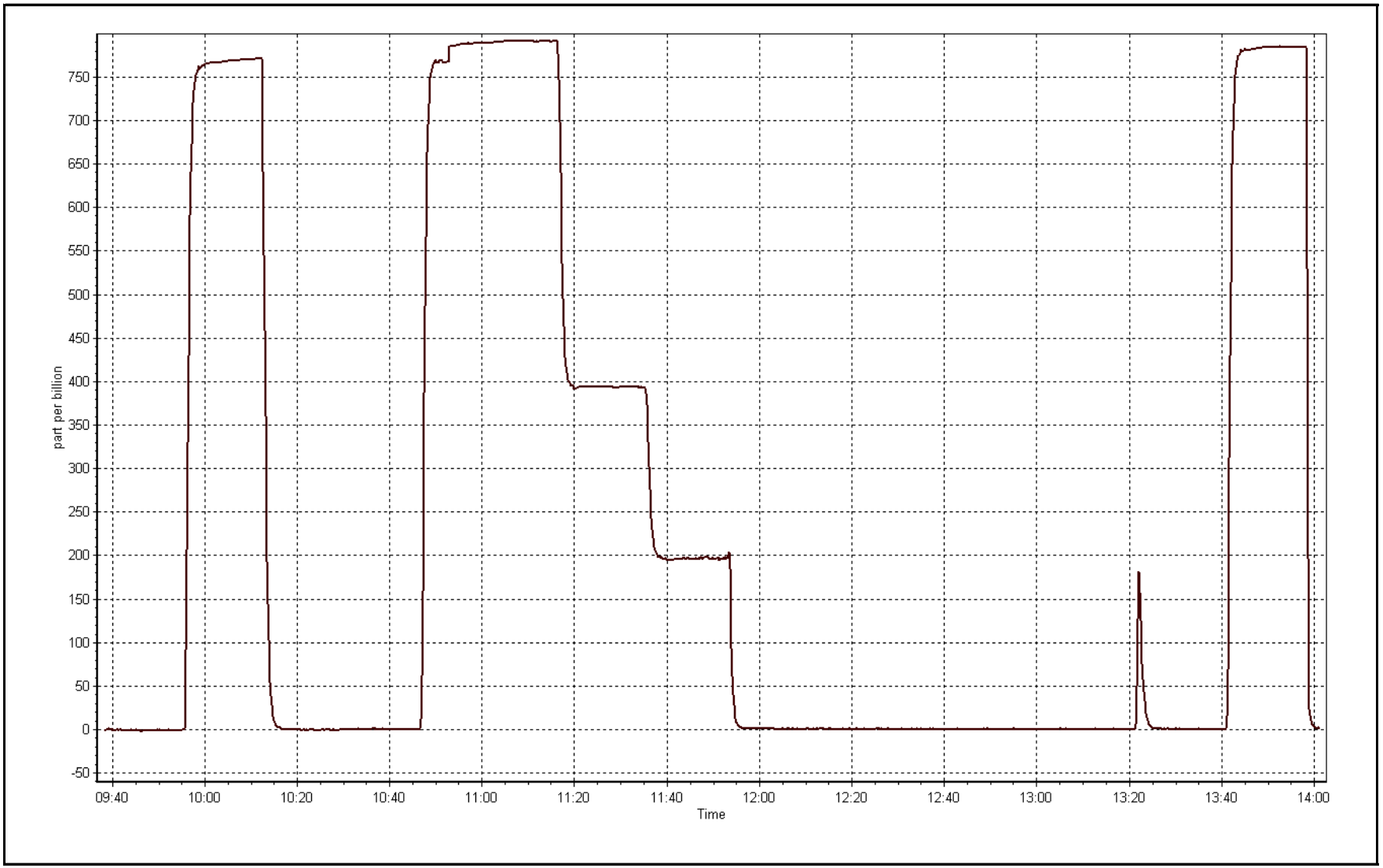
Calibration Date	March 3, 2016	Previous Calibration	February 16, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:40	End Time (MST)	14:00
Analyzer make	API T100	Analyzer serial #	599

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999993
785.8	791.1	0.9934		
392.4	393.5	0.9973	Slope	0.993430
196.2	196.5	0.9985		
			Intercept	0.538802



SO2 Calibration Plot Date: March 3, 2016



Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

Calibration Date	March 4, 2016	Last Calibration	February 8, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	11:30
Gas Cert Reference	CC178364	Station temp.	22 Deg C
Cal Gas Concentration	5.07 ppm	Cal Gas Exp Date	30/05/2013
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.	1850
SO2 gas concentration	51.1 ppm	SO2 gas cert/exp	S980455A 26/Sep/17

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	1009	1010
Calculated slope	0.981667	0.998198	Chamber temp	45	45
Calculated intercept	0.354708	0.420383	Pressure	697.1	692.3
Analyzer Background	2.13	2.13	Flow	0.453	0.450
Analyzer Coefficient	1.038	1.038	Intensity	90	90
			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	-0.2	----
as found span	5000	78.9	80.0	79.8	1.003
SO2 scrubber check	5000	17.6	179.9	0.1	----
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	78.9	80.0	79.8	1.003
second point	5000	39.4	40.0	39.6	1.009
third point	5000	19.7	20.0	19.3	1.035
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	78.9	80.0	79.8	1.003
				Average Correction Factor	1.015

Corrected As found	80.0	Previous response	81.1	% change	1.4%

Notes:

no adjustments or maintenance done, filter changed out

Calibration Performed By: Melissa Lemay

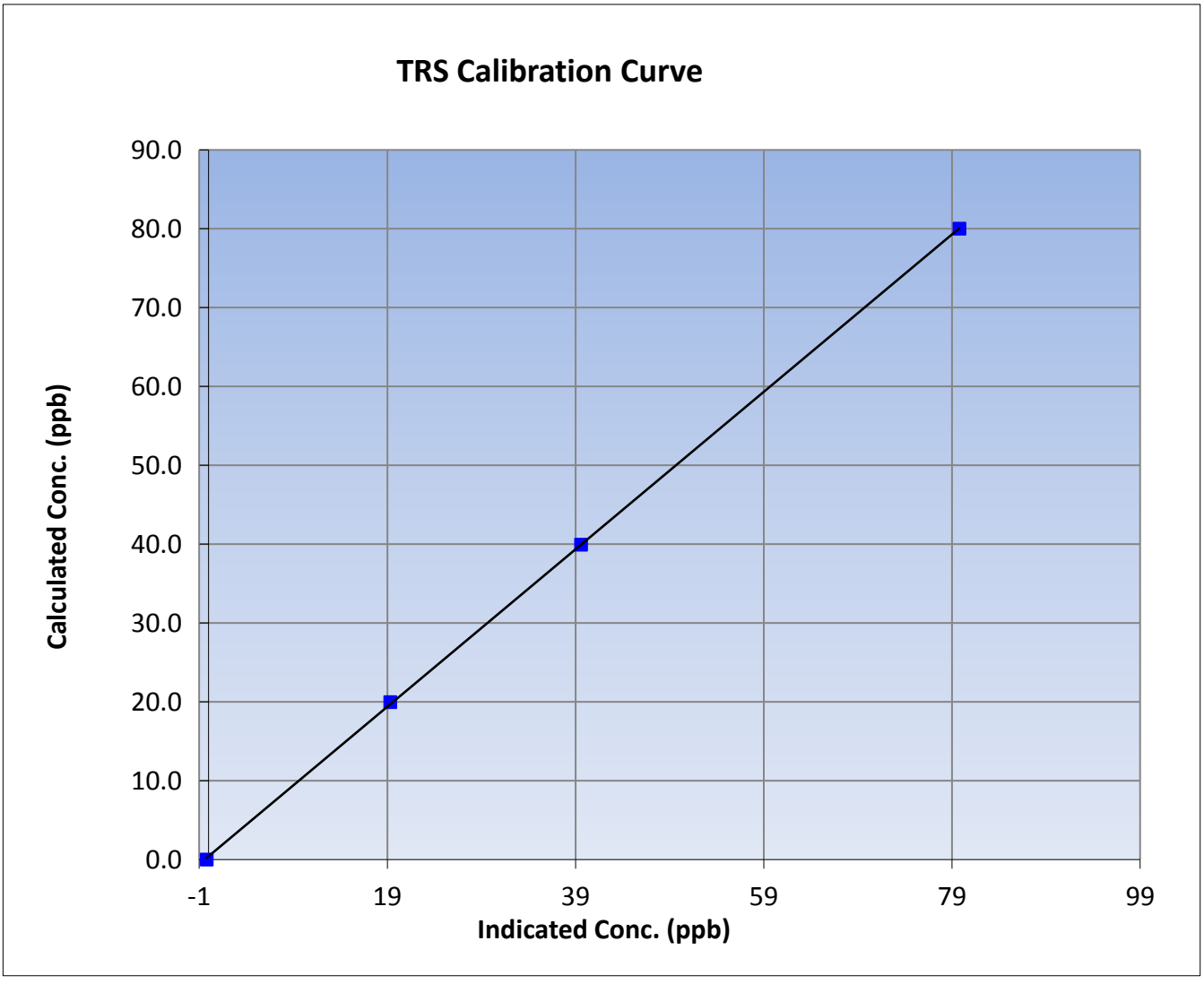
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

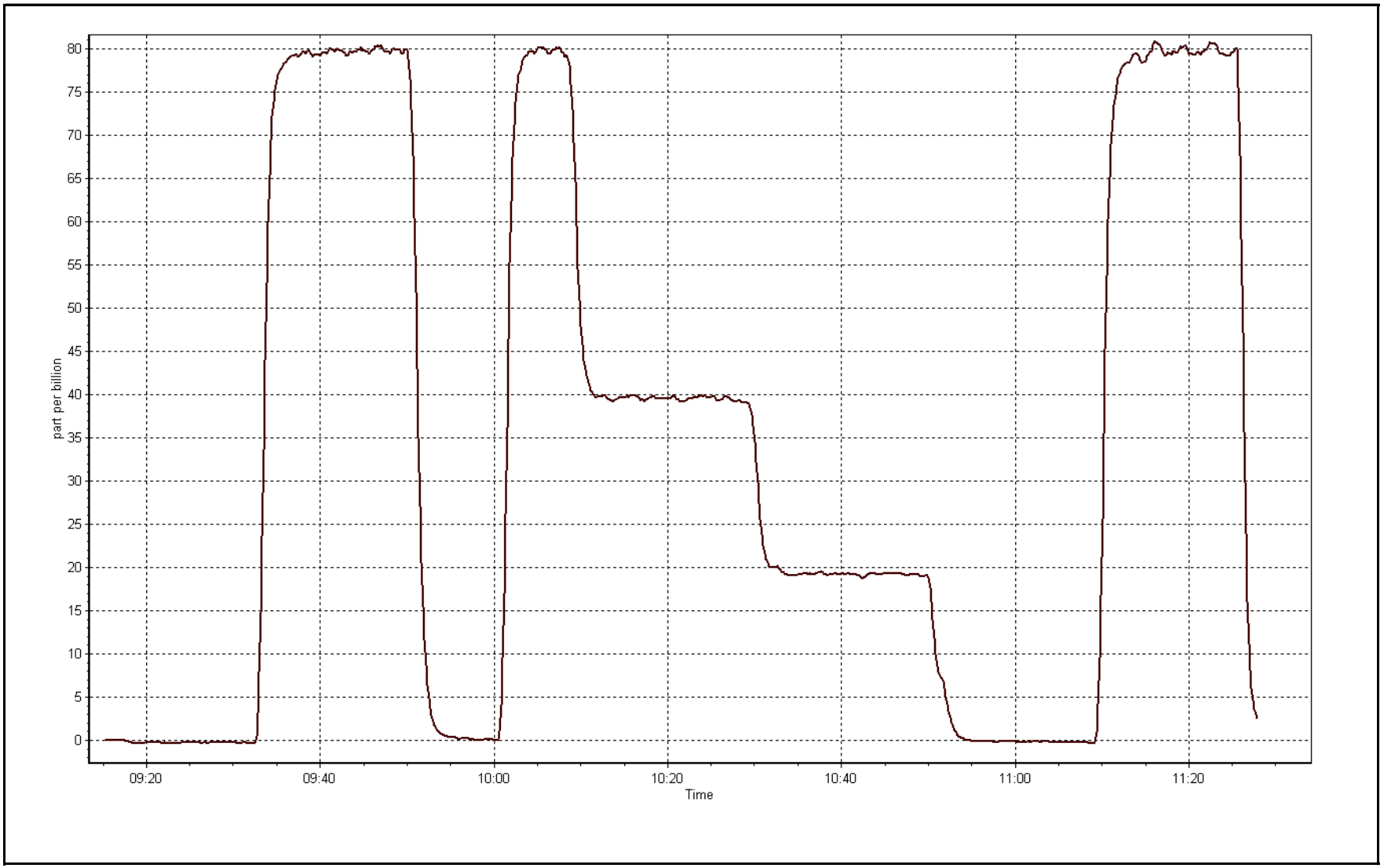
Calibration Date	March 4, 2016	Previous Calibration	February 8, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:15	End Time (MST)	11:30
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153359

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999961
80.0	79.8	1.0026		
40.0	39.6	1.0089	Slope	0.998198
20.0	19.3	1.0350		
			Intercept	0.420383



TRS Calibration Plot Date: March 4, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	March-03-16	Last Calibration	February-16-16
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	14:00
Gas Cert Reference	LL110515	Cal Gas Expiry Date	08/09/2018
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	1850

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 50 ppm		Sample Pressure	9.2	9.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.2	34.2
Calculated slope	0.996770	1.002320	Fuel Pressure	23.1	23.1
Calculated intercept	0.055973	-0.012266	Analyzer Coeff	3.104	3.137
			Analyzer BKG	1.300	1.310

Analyzer make	51i-LT	Analyzer serial #	1505164380

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	78.9	16.84	16.77	1.004
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.9	16.84	16.80	1.002
second point	5000	39.4	8.41	8.42	0.999
third point	5000	19.7	4.20	4.21	0.999
as left zero	5000	0.0	0.00	0.03	----
as left span	5000	78.9	16.84	16.95	0.993
				Average Correction Factor	1.000

Corrected As found	16.78	Previous response	16.84	% change	0.3%

Notes:

no maintenance done, filter changed out, span adjusted

Calibration Performed By: Melissa Lemay

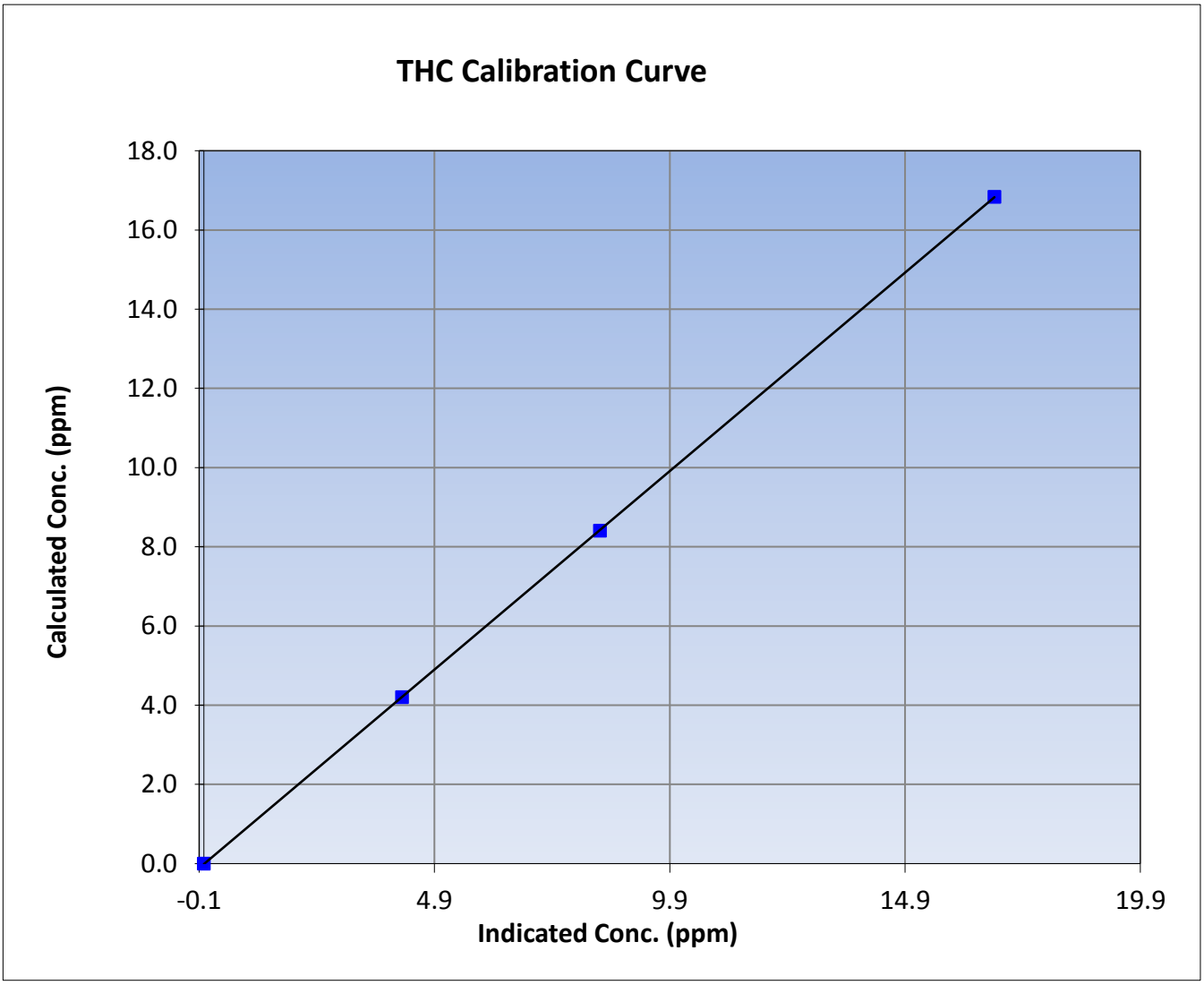
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

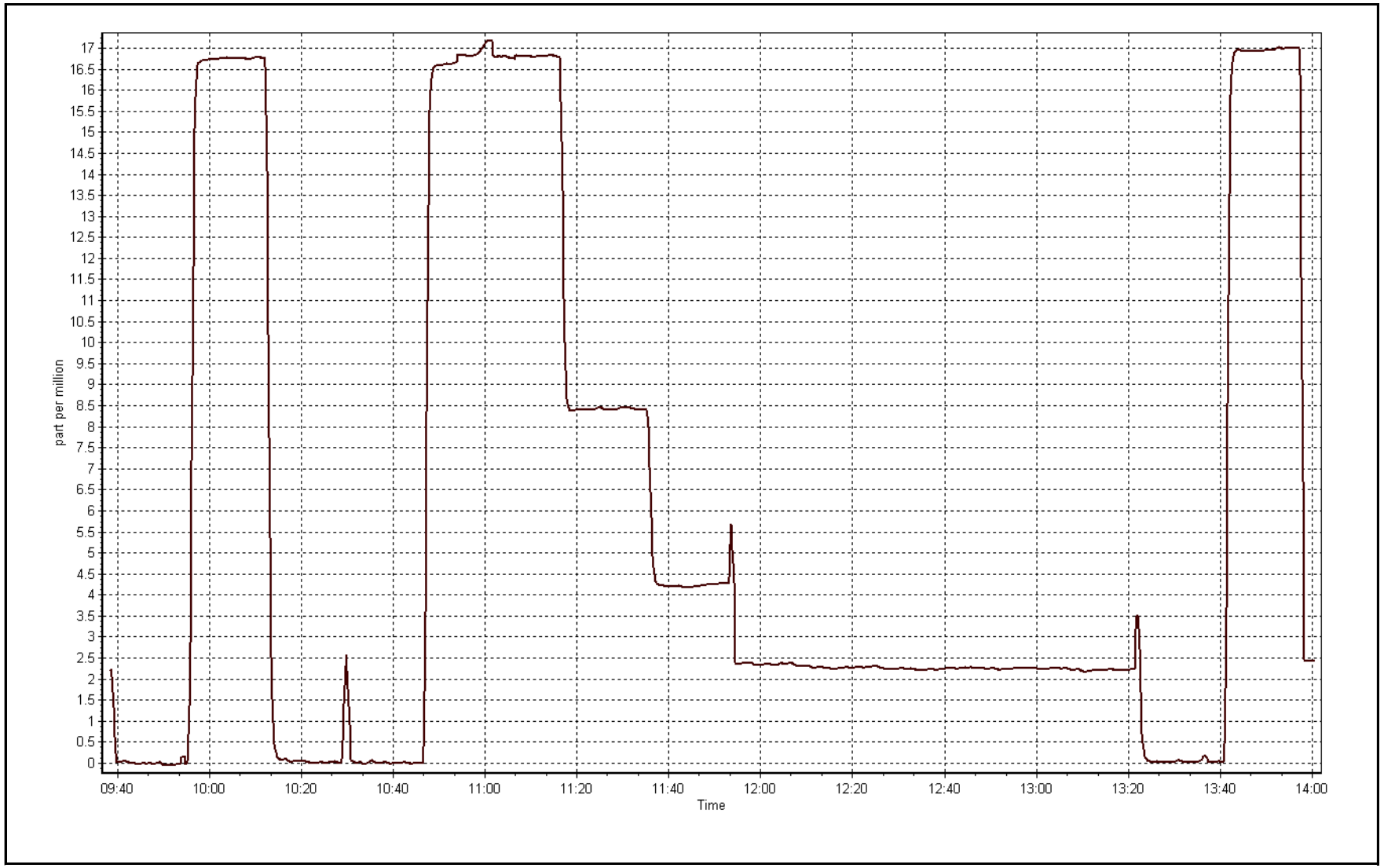
Calibration Date	March 3, 2016	Previous Calibration	February 16, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:40	End Time (MST)	14:00
Analyzer make	51i-LT	Analyzer serial #	1505164380

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999996
16.84	16.80	1.0022		
8.41	8.42	0.9986	Slope	1.002320
4.20	4.21	0.9986		
			Intercept	-0.012266



THC Calibration Plot Date: March 3, 2016



Wood Buffalo Environmental Association
O_3 Calibration Report

W B E A

Station Information

Calibration Date	March 4, 2016	Previous Calibration	February 17, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	7:15	End Time (MST)	9:16
NO2 GPT Ref date	March-03-15	Transfer Standard	Sabio 4010
		Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG make/model	Teledyne API 701	Serial Number	3410
DACS make/model	Campbell Scientific CR3000	Serial Number	1850

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 500 ppb		Box temp.	26.5	26.6
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	0.998026	1.005041	Pressure	26.5	26.6
Calculated intercept	-1.117429	0.624247	Flow	749.0	758.0
Analyzer Background	0.8	0.8	Intensity	2593.0	2579.0
Analyzer Coefficient	1.011	1.011			

Analyzer make	API T400	Analyzer serial #	825

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	0.1	----
as found span	5000	0.89	356.3	354.1	1.006
calibrator zero	5000	0.00	0.0	0.1	----
high point	5000	0.89	356.3	354.1	1.006
second point	5000	0.47	212.1	210.7	1.007
third point	5000	0.36	112.6	110.2	1.022
as left zero	5000	0.00	0.0	0.0	----
as left span	5000	0.89	356.3	360.9	0.987
				Average Correction Factor	1.012

Corrected As found	354.0	Previous response	358.1	% change	1.2%

Notes:

no maintenance or adjustments done, filter changed out

Calibration Performed By: Melissa Lemay

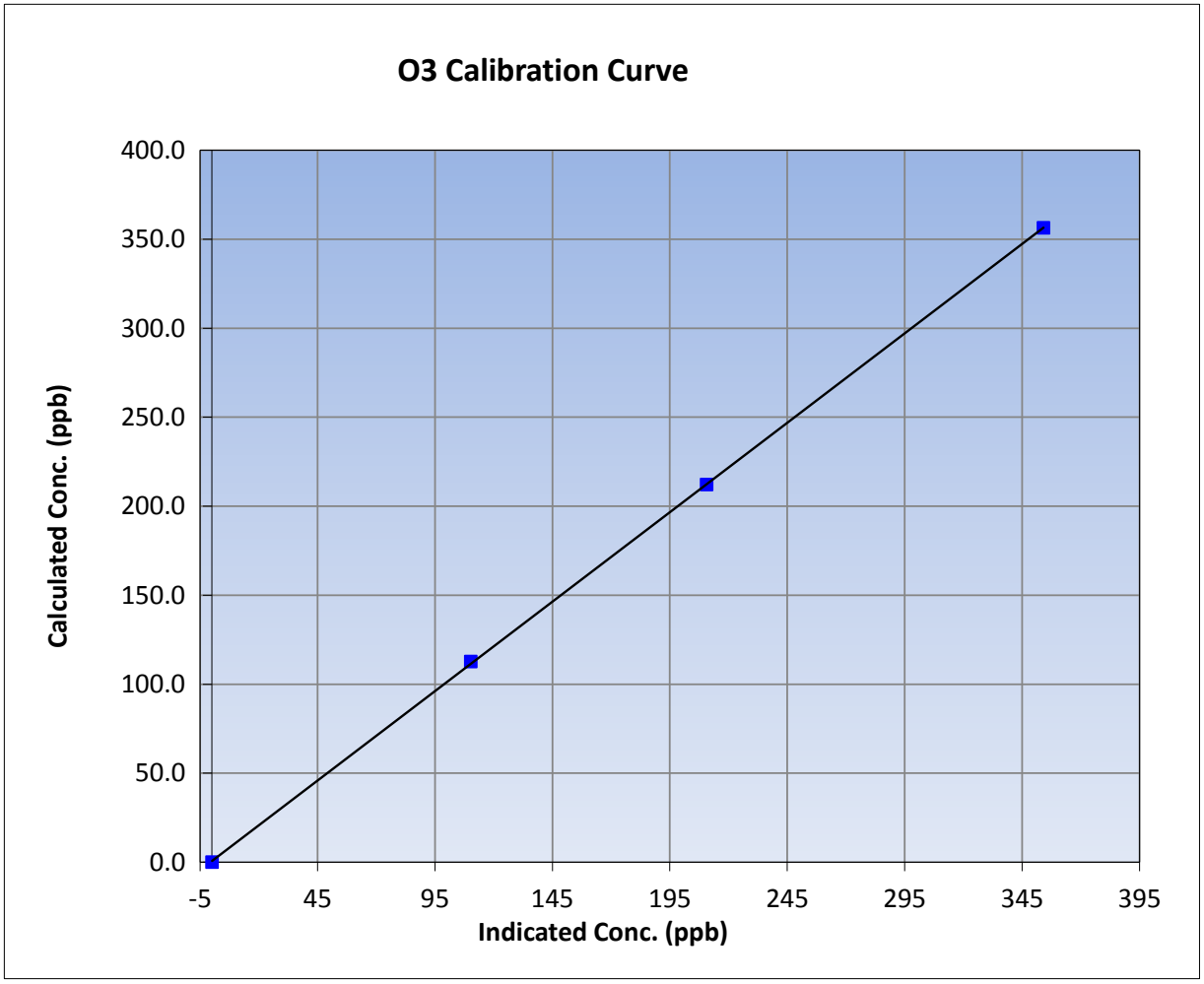
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

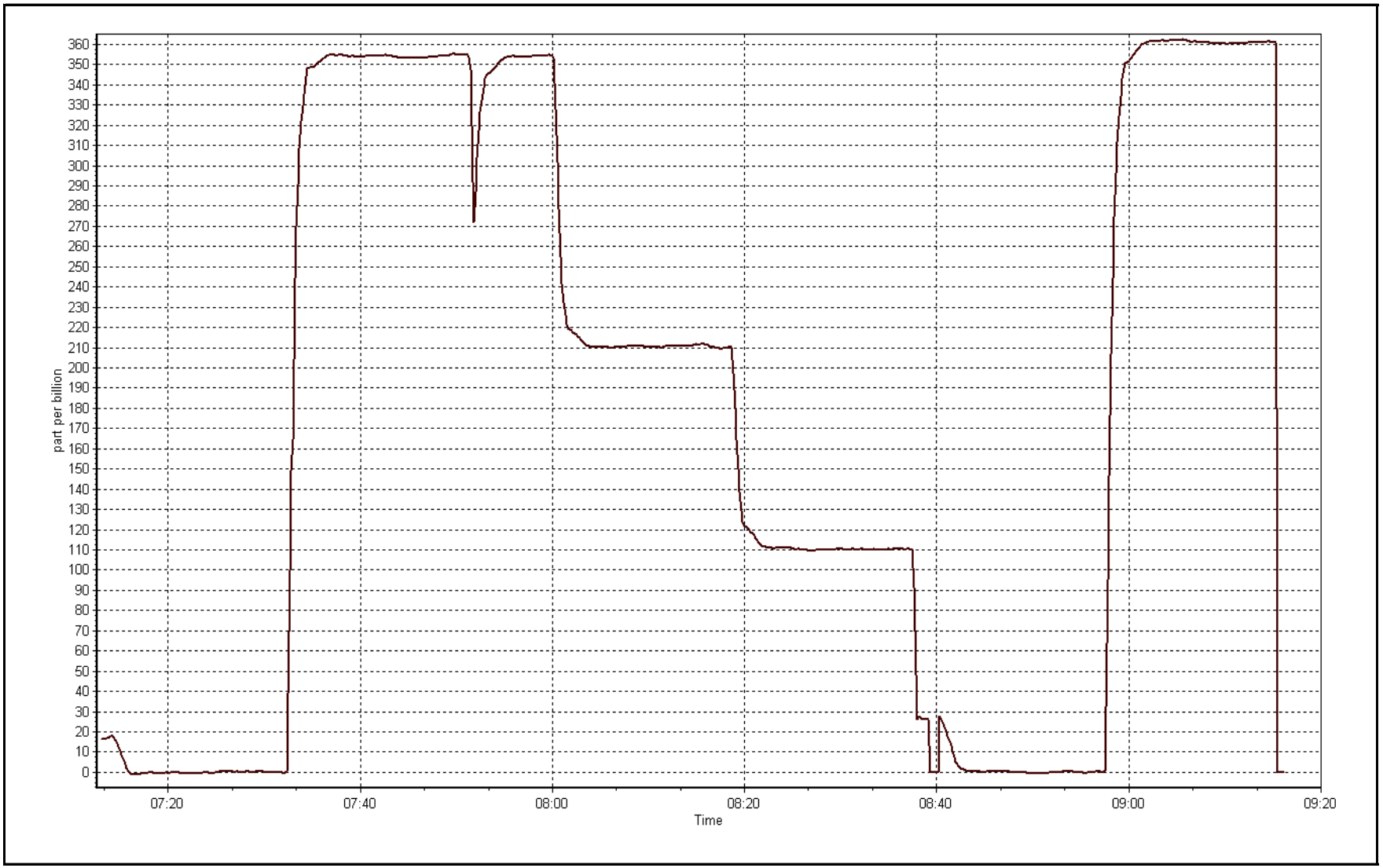
Calibration Date	March-04-16	Previous Calibration	February 17, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:15	End Time (MST)	9:16
Analyzer make	API T400	Analyzer serial #	825

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999969
356.3	354.1	1.0062		
212.1	210.7	1.0066	Slope	1.005041
112.6	110.2	1.0218		
			Intercept	0.624247



O3 Calibration Plot Date: March 4, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 3, 2016	Previous Calibration	February 16, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	14:00
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	LL110515
NOx Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	08/09/2018
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.	1850

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997669	0.996970	1.001444
	Data Offset	1.362468	1.396515	-1.103867
Current Calibration	Data Slope	1.003129	1.002680	1.003509
	Data Offset	0.641387	0.421145	0.916642

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661329

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.007		0.998	
NOX coefficient	1.002		1.002	
NO2 coefficient	1.000		1.000	
NO bkgrnd	7.6		7.5	
NOX bkgrnd	7.7		8.0	
Chamber Temp	50.6	Deg C	50.3	Deg C
Moly Temp	324.7	Deg C	327.4	Deg C
PMT voltage	-827.3	V	-827.3	V
PMT Temp	-2.7	Deg C	-2.9	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	177.9	mmHg	177.6	mmHg
R Cell Press Nox	177.9	mmHg	177.6	mmHg
NO sample flow	0.896	lpm	0.932	lpm
Nox sample Flow	0.896	lpm	0.932	lpm

Notes:

O rings replaced, pressure and flow after replacement of orings similar to before, zero and span adjusted, filter changed out

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 3, 2016 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	-0.1	-0.2	0.1	----	----
as found span	5000	78.9	803.2	800.0	3.2	821.0	817.0	4.0	0.9783	0.9792
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	----	----
high point	5000	78.9	803.2	800.0	3.2	800.6	798.0	2.7	1.0033	1.0026
second point	5000	39.4	401.1	399.5	1.6	398.1	396.9	1.2	1.0075	1.0066
third point	5000	19.7	200.5	199.8	0.8	199.3	199.0	0.3	1.0063	1.0038
as left zero	5000	0.0	0.0	0.0	0.0	-0.3	0.0	-0.4	----	----
as left span	5000	78.9	803.2	437.9	365.3	802.0	440.6	361.5	1.0015	0.9939
								Average Correction Factor	1.0057	1.0043

Corrcted As found NO_X= 821.1 NO= 817.2 Percent Change NO_X= -2.1% NO= -2.0%

Previous Response NO_X= 803.7 NO= 801.1

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	796.5	794.2	-0.1	1.0084	1.0074	----	----
1st NO2 (300)	437.9	359.5	795.6	437.9	357.7	1.0096	----	1.0049	99.5%
2nd NO2 (200)	582.1	215.3	795.6	582.1	213.5	1.0096	----	1.0082	99.2%
3rd NO2 (100)	681.6	115.8	794.9	681.6	113.3	1.0104	----	1.0217	97.9%
2nd NO ref point		3.2	795.8	793.2	2.6	1.0093	1.0086	----	----
				Average Correction Factor		1.0097		1.0116	98.9%

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

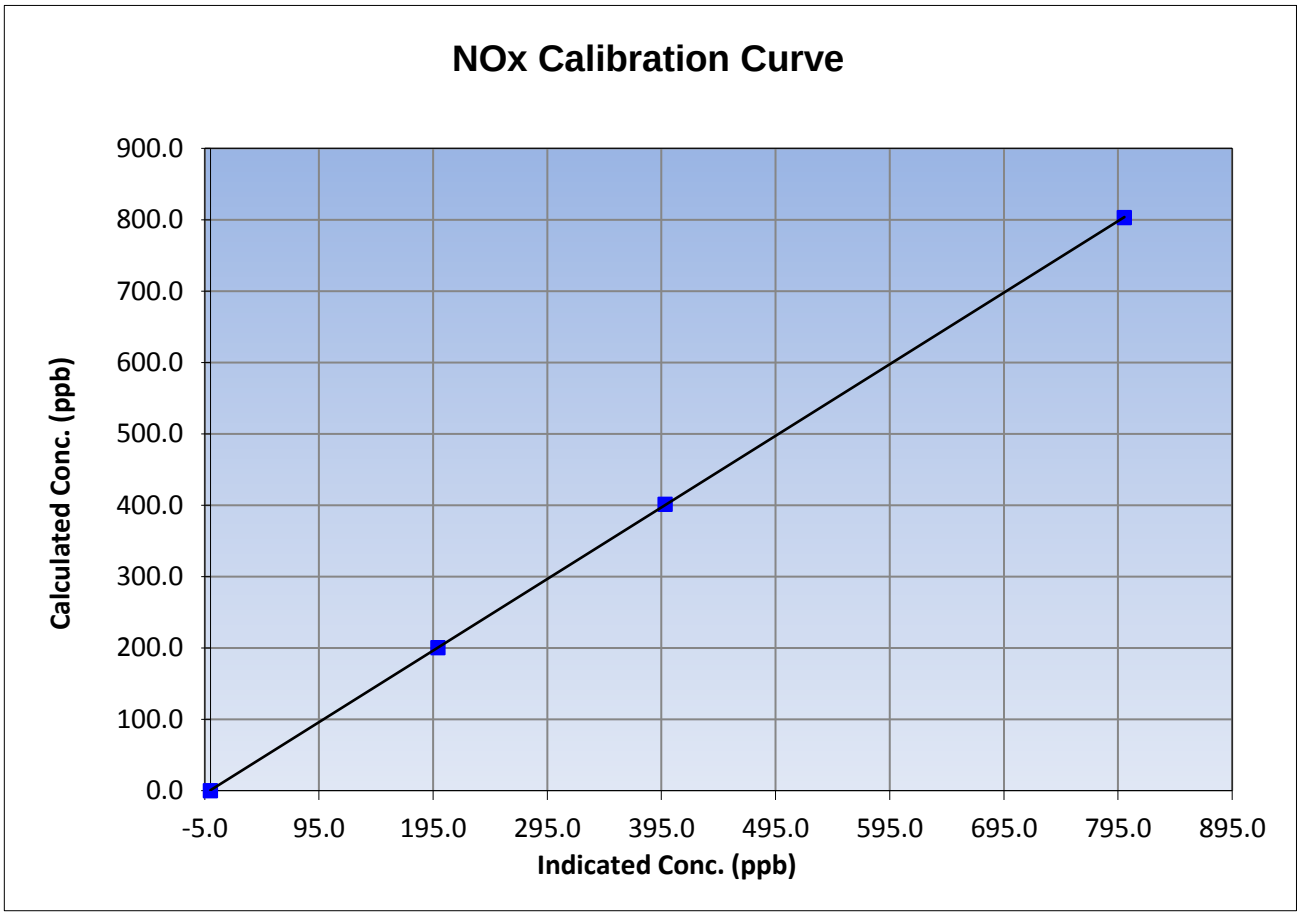
NO_X Calibration Summary

Station Information

Calibration Date	March 3, 2016	Previous Calibration	February 16, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:40	End Time (MST)	14:00
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	-0.1	----	Correlation Coefficient	0.999995
803.2	800.6	1.0033		
401.1	398.1	1.0075	Slope	1.003129
200.5	199.3	1.0063		
			Intercept	0.641387



Wood Buffalo Environmental Association

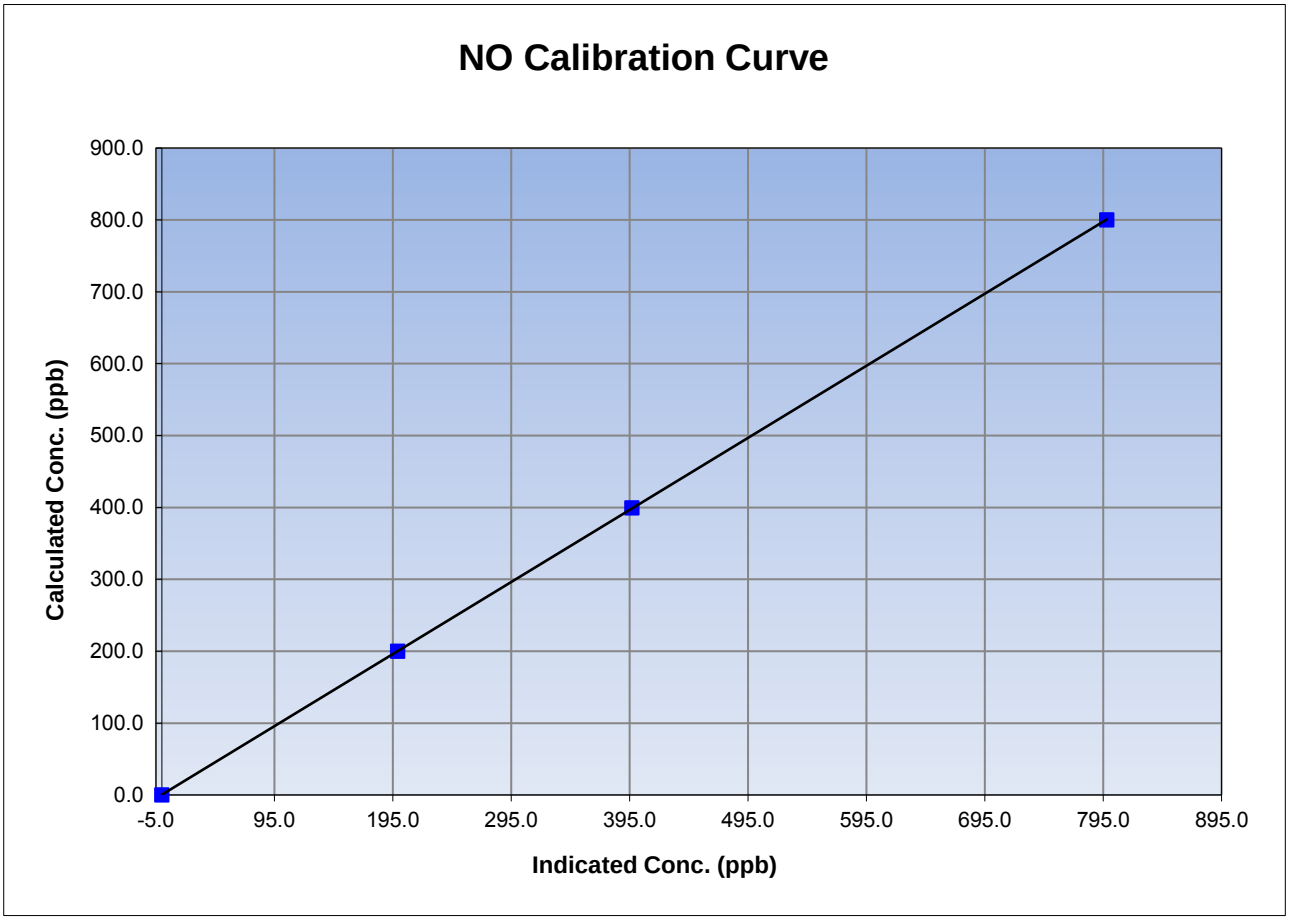
NO Calibration Summary

Station Information

Calibration Date	March 3, 2016	Previous Calibration	February 16, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:40	End Time (MST)	14:00
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	0.999995
800.0	798.0	1.0026		
399.5	396.9	1.0066	Slope	1.002680
199.8	199.0	1.0038		
			Intercept	0.421145



Wood Buffalo Environmental Association

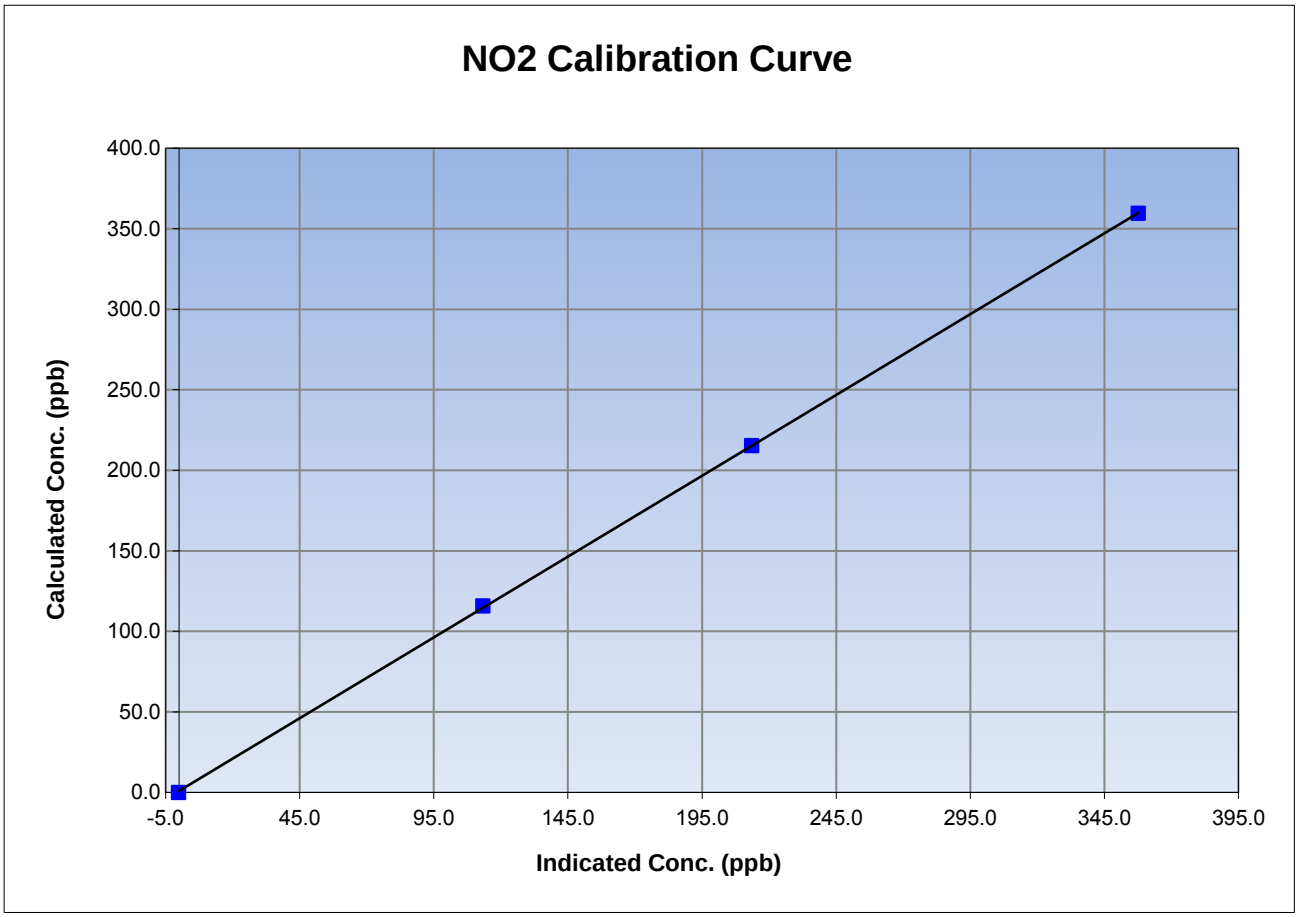
NO_2 Calibration Summary

Station Information

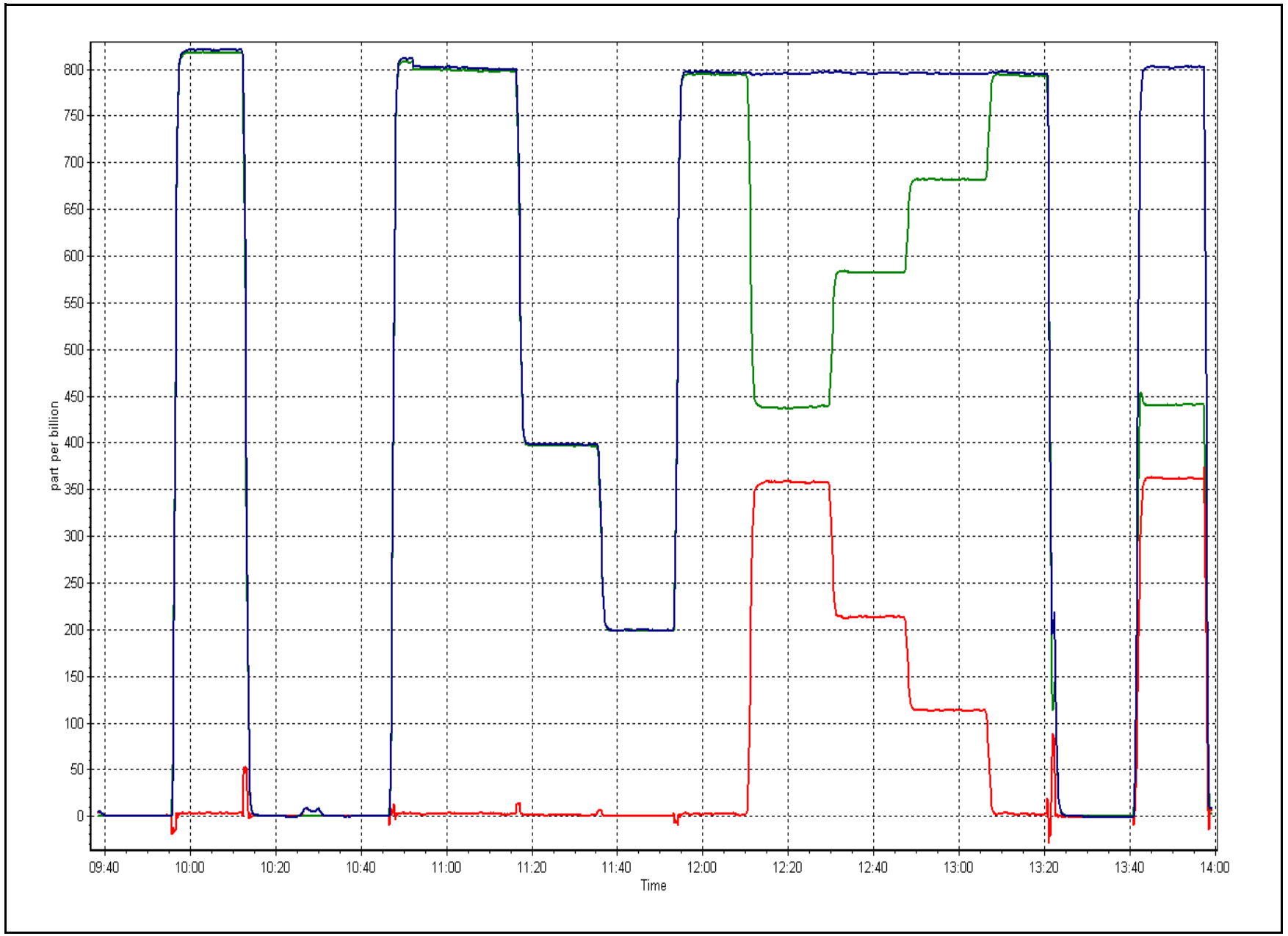
Calibration Date	March 3, 2016	Previous Calibration	February 16, 2016
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:40	End Time (MST)	14:00
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999969
359.5	357.7	1.0049		
215.3	213.5	1.0082	Slope	1.003509
115.8	113.3	1.0217		
			Intercept	0.916642



NOX Calibration Plot Date: March 3, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	March 4, 2016	Previous Calibration:	February 17, 2016
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	8:03	End Time (MST):	9:10
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION

Particulate Fraction:	PM2.5
Make/Model:	Thermo / SHARP 5030
Serial Number	E-803
C_{14} Source SN:	4066
Confirmation of Time settings:	Yes ☑ No ☐

Paremeters Checked: T1 ☑ T2 ☐ T3 ☐ T4 ☐ P3 ☑ Main Flow ☑ Beta ☐ Neph ☑

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-12.0	-11.8	0.2	-12.0
T2	19.0	na	na	19.0
T3	21.0	na	na	21.0
T4	18.0	na	na	18.0
RH (%)	15.0	na	na	15.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	982	983.0	1.0	982

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1015	15	1015	1000

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	397		398
Neph	1.2		0.1
C14	135.5		65.6
Indicated Concentration (ug/m3)	**0.9**	**Yes**	**0**
Offset 1	398		398.2
Offset 2	51.5		52.1

Leak Check (Quarterly)

Leak Check Date: March 4, 2015 Previous Leak Check Date: December 8, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.95	0.05
*Flow with adaptor (LPM):	16.90	

**Note - do not attach adaptor without shutting off the pump first*

Mass Foil Calibration (Annualy)

Foil Calibration Date:	July 14, 2015	Previous Foil Calibration:	
Zeroed?:	Yes		
Foil Mass:	1337	Mass foil set S/N:	
Previous Correction Factor:	6970		
New Correction Factor:	7080		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Nepholometer adjusted, Sample head cleaned

Calibration Performed By: Melissa Lemay

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 14
ANZAC
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
MARCH 2016

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	703	37	41	99.46	14	0	2	0
TRS(ppb) Average	705	34	39	99.33	2	0	0	0
THC(ppm) Average	701	37	43	99.19	2.6	-	2.1	-
NMHC(ppm) Average	701	37	43	99.19	0.151	-	0.015	-
CH4(ppm) Average	701	37	43	99.19	2.5	-	2.1	-
NO2(ppb) Average	703	37	41	99.46	22	0	8	-
NO(ppb) Average	703	37	41	99.46	6	-	1	-
NOX(ppb) Average	703	37	41	99.46	22	-	9	-
O3(ppb) Average	705	34	39	99.33	51	0	46	-
PM2.5(ug/m3) Average	737	5	7	99.73	26.8	-	7.5	0
AT 2m(C) Average	744	0	0	100.00	12.2	-	5	-
RH(%) Average	744	0	0	100.00	98	-	91	-
Leaf Wetness (% of range) Average	744	0	0	100.00	62	-	9	-
WS(km/h) Average	744	0	0	100.00	19	-	12	-
WD(deg) Average	744	0	0	100.00	-	-	-	-
PC(mm) Total	744	0	0	100.00	0.8	-	6.4	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	703	0.7	1	-	0	0	0	0	1	1	14
TRS(ppb) Average	705	0.3	0	-	0	0	0	0	0	0	2
THC(ppm) Average	701	2	0.1	-	1.9	1.9	2	2	2	2.1	2.6
NMHC (ppm) Average	701	0.003	0.012	-	0	0	0	0	0	0	0.151
CH4(ppm) Average	701	2	0.1	-	1.9	1.9	2	2	2	2.1	2.5
NO2(ppb) Average	703	2.6	3	-	0	0	1	2	3	6	22
NO(ppb) Average	703	0.4	1	-	0	0	0	0	0	1	6
NOX(ppb) Average	703	3	4	-	0	0	1	2	4	7	22
O3(ppb) Average	705	35.6	8	-	7	25	30	36	42	45	51
PM2.5(ug/m3) Average	737	2.91	2.3	-	0.6	1.2	1.5	2.2	3.5	5.3	26.8
Temperature 2 m (C) Average	744	-3.14	5.1	-	-19.5	-8.9	-6.2	-3.6	-0.3	3.2	12.2
Relative Humidity (%) Average	744	74.5	17	-	28	48	62	79	89	93	98
Leaf Wetness (% of range) Average	744	2.1	5	-	-1	0	0	1	3	4	62
Wind Speed 20 m (km/h) Average	744	7.9	3	-	0	3	5	8	10	12	19
Wind Direction 20 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	10.92	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	14 Mar 2016 08:00	14 Mar 2016 10:00	3	Station power failure
SO2, THC, NO2	08 Mar 2016 10:00	08 Mar 2016 10:00	1	Maintenance - reinitiated daily QA check
TRS, O3	08 Mar 2016 10:00	08 Mar 2016 11:00	2	Maintenance - reinitiated daily QA check
CH4, NMHC, THC	23 Mar 2016 09:00	23 Mar 2016 10:00	2	Maintenance - replaced carrier gas
PM2.5	14 Mar 2016 08:00	14 Mar 2016 09:00	2	Station power failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Anzac - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 14 ppb on Mar 15 18:00 Maximum Daily Average: 2.4 ppb on Mar 23

Minimum Value: 0 ppb on Mar 15 14:00
Maximum Diurnal Average: 1.2 ppb at hour 13
Monthly Average: 0.7 ppb

Minimum Daily Average: 0.1 ppb on Mar 21
Minimum Diurnal Average: 0.3 ppb at hour 24
Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 5$

Hours in Service:	744
Hours of Data:	703
Hours of Missing Data:	41
Hours of Calibration:	37
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0.4	1
2-Mar	0	Z	0	0	0	0	0	0	0	0	1	2	2	1	1	1	1	0	0	0	0	0	1	1	0.6	2
3-Mar	1	0	Z	0	0	0	0	1	1	1	1	0	0	0	1	5	3	1	0	0	0	0	0	0	0.8	5
4-Mar	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1
5-Mar	0	1	0	0	Z	0	0	1	0	1	0	0	1	2	3	4	2	1	1	1	1	1	0	0	0.9	4
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	0.1	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	0.3	0
8-Mar	0	Z	1	1	3	3	4	3	2	M	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.9	4
9-Mar	5	3	Z	3	2	2	2	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	1.1	5
10-Mar	0	0	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	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	0.2	0
12-Mar	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	1	1	1	1	1	1	1	0	0	0	0.5	1
13-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	2	1	1	2	1	1	0	0	1	1	1	1	0.6	2
14-Mar	2	Z	1	0	0	0	0	PF	PF	PF	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0.7	2
15-Mar	0	0	Z	0	0	0	0	C	C	C	C	C	C	0	0	1	3	14	14	14	3	0	0	0	--	14
16-Mar	0	0	0	Z	1	1	0	0	0	0	0	0	1	4	2	1	0	0	0	0	1	2	1	0	0.7	4
17-Mar	0	0	2	2	Z	0	0	0	0	1	3	3	5	2	0	0	0	0	0	0	0	0	0	0	1.0	5
18-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
19-Mar	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.5	1
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	0.2	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	0.1	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	0.2	0
23-Mar	0	0	0	0	Z	0	0	0	0	1	10	12	9	6	5	6	3	1	0	0	0	0	0	0	2.4	12
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	0.2	0
25-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
26-Mar	0	Z	1	1	2	2	2	1	1	1	1	2	1	1	1	1	1	1	1	0	1	1	0	0	1.0	2
27-Mar	1	1	Z	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	0	0	0	1	0	0.7	2
28-Mar	0	1	1	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	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	0	3	4	3	4	5	4	3	1	2	1	0	0	0	0	0	0	1.5	5
31-Mar	Z	0	0	0	0	0	0	0	2	4	5	4	4	3	2	0	0	0	0	0	0	0	0	0	1.1	5
	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.8	1.2	1.2	1.2	1.0	0.8	0.9	0.8	1.0	0.8	0.8	0.5	0.4	0.3	0.3	Diurnal Average	
	5	3	2	3	3	3	4	3	3	4	10	12	9	6	5	6	3	14	14	14	3	2	1	2	Diurnal Maximum	

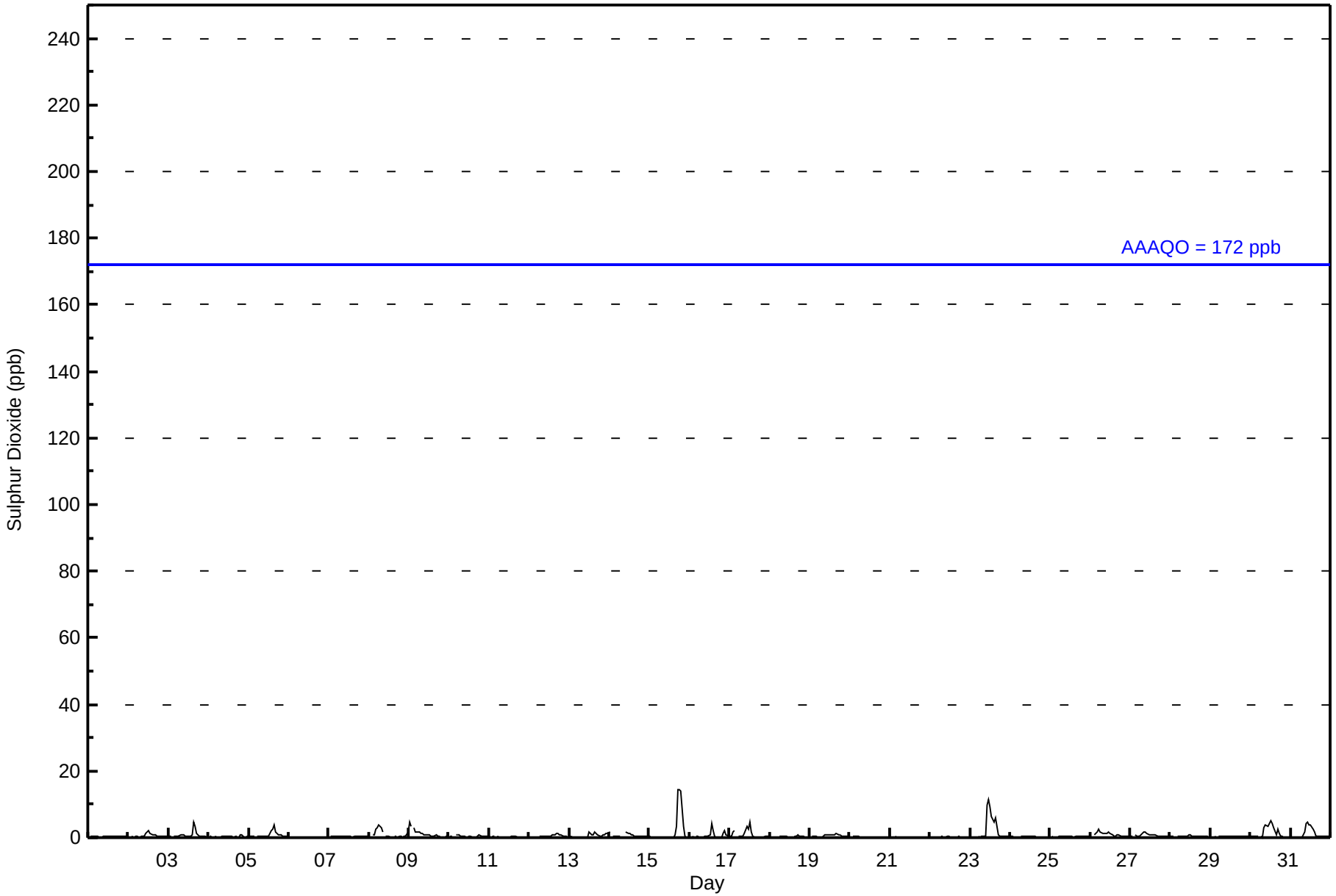
Z - zerospan C - Calibration M - Maintenance PF - Power Failure
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Anzac - March 2016



Sulphur Dioxide (SO_2) - ppb

Anzac - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	699	99.43	99.43
11 - 20	4	0.57	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: 703

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Anzac - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	44	20	15	16	38	67	101	98	27	13	13	16	26	59	47	99	699
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
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	44	20	15	16	38	67	101	98	27	13	13	16	26	59	47	103	703

Total Number of Valid Hours: 703

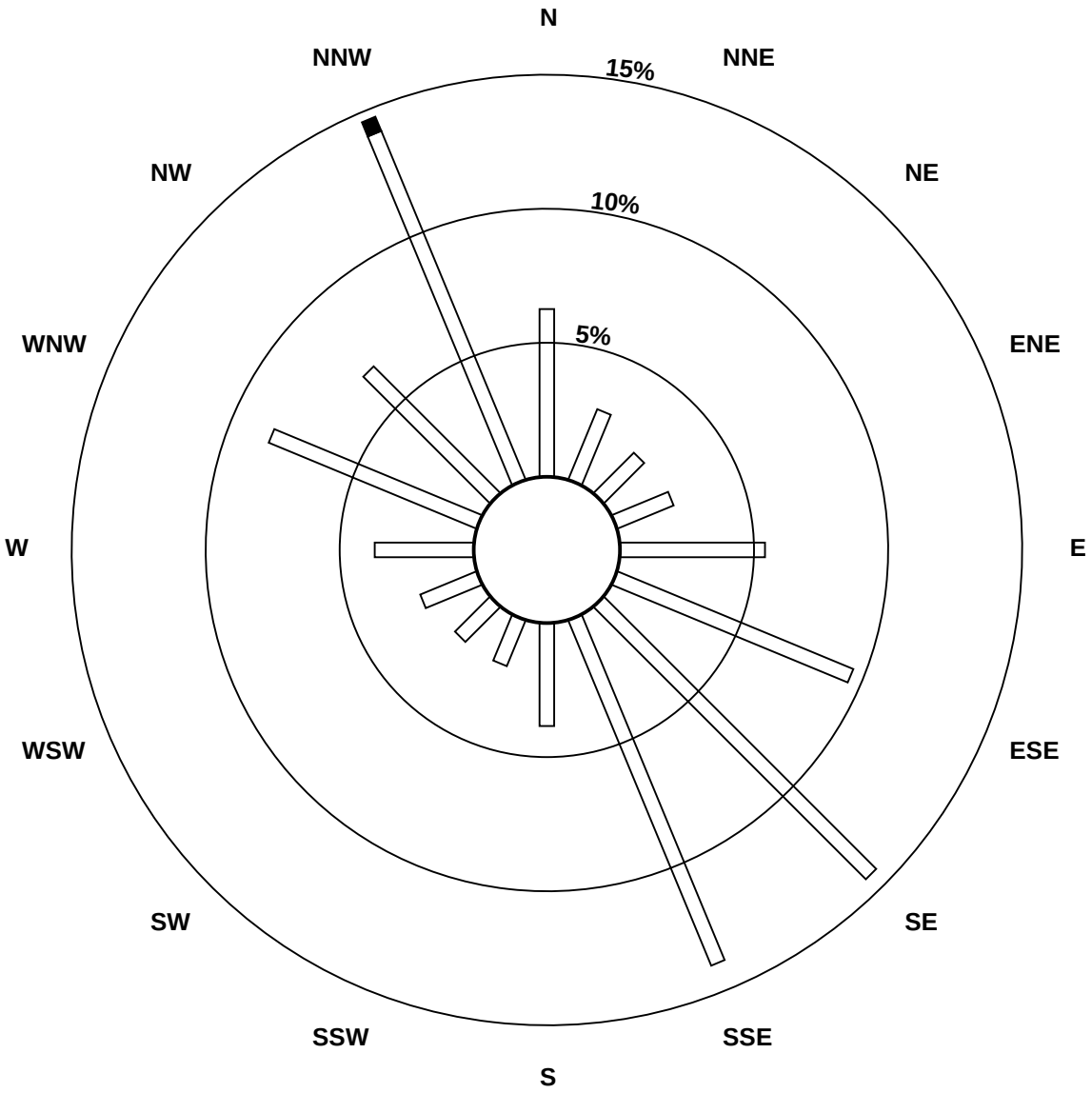
Total Number of Hours: 744

Wood Buffalo Environmental Association

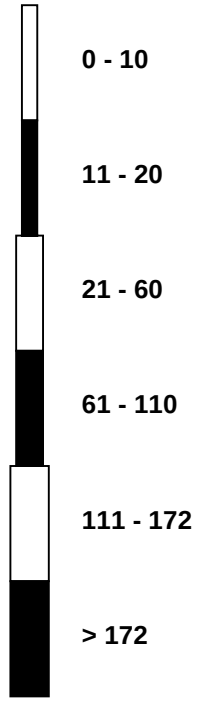
Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Anzac (AMS 14)



Classes (ppb)



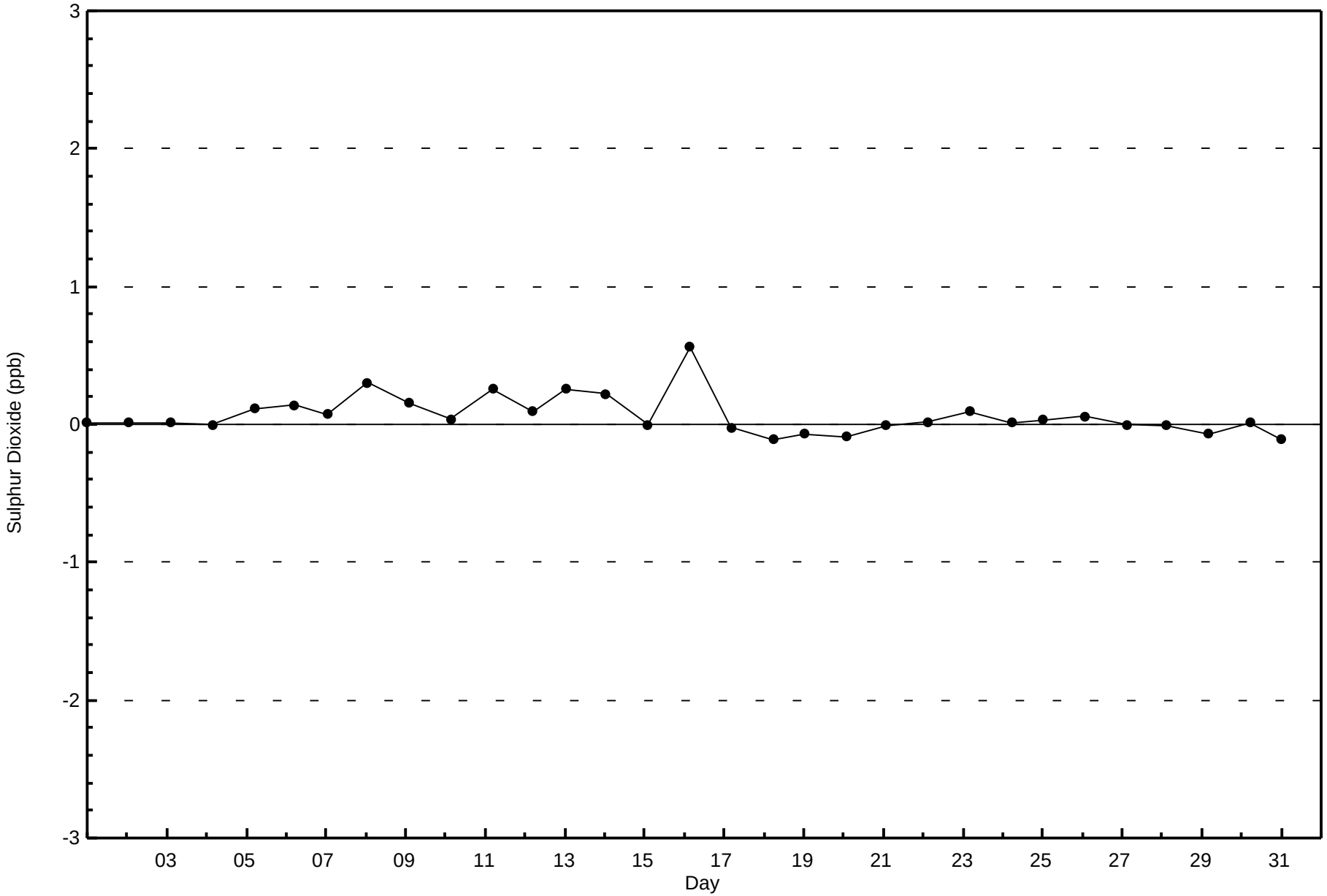
Total Number of Valid Hours: 703

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Anzac - March 2016

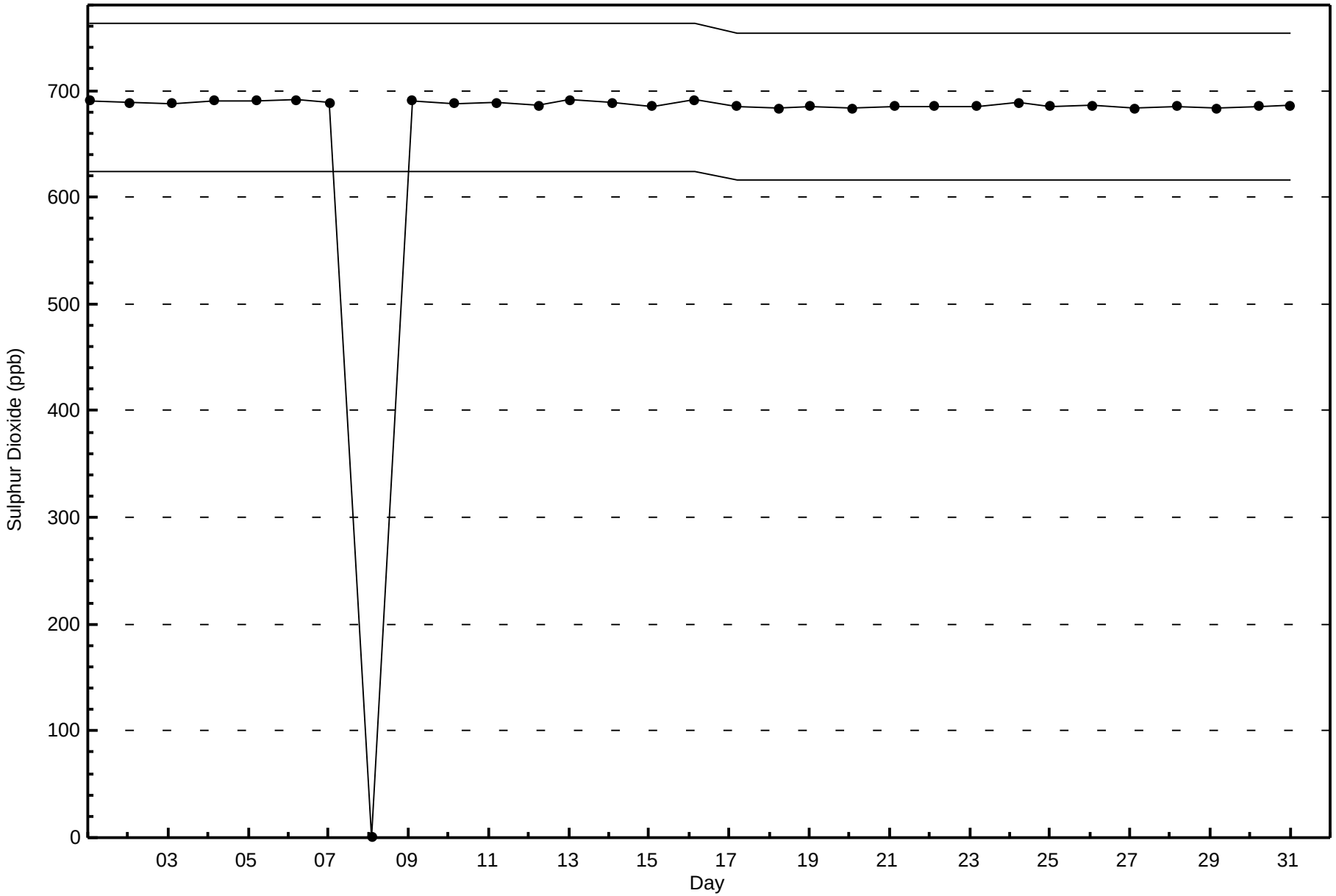


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Anzac - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Anzac - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 2 ppb on Mar 15 18:00

Maximum Daily Average: 0.4 ppb on Mar 9

Minimum Value: 0 ppb on Mar 12 01:00

Minimum Daily Average: 0.2 ppb on Mar 6

Maximum Diurnal Average: 0.3 ppb at hour 11

Minimum Diurnal Average: 0.2 ppb at hour 24

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 in Service:	744
Hours of Data:	705
Hours of Missing Data:	39
Hours of Calibration:	34
Percent Operational Time:	99.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
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	0.3	0
2-Mar	0	0	Z	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
3-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	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	1	0	0	0	0	0.2	1
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	0.3	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	0.2	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	0.2	0
8-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	0.3	0
9-Mar	1	1	1	Z	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	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	0.3	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	0.2	0
12-Mar	0	0	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
13-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	0.3	1
14-Mar	0	0	Z	0	0	0	0	PF	PF	PF	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	1	1	2	1	0	0	0	0	0	0.4	2
16-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	0.2	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	0.3	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	0.2	0
19-Mar	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1
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	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	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	0.2	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	0.3	0
26-Mar	0	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	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	0.2	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	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	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	0.3	0
	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.2	0.2	Diurnal Average	
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	2	1	1	1	0	0	0	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance PF - Power Failure

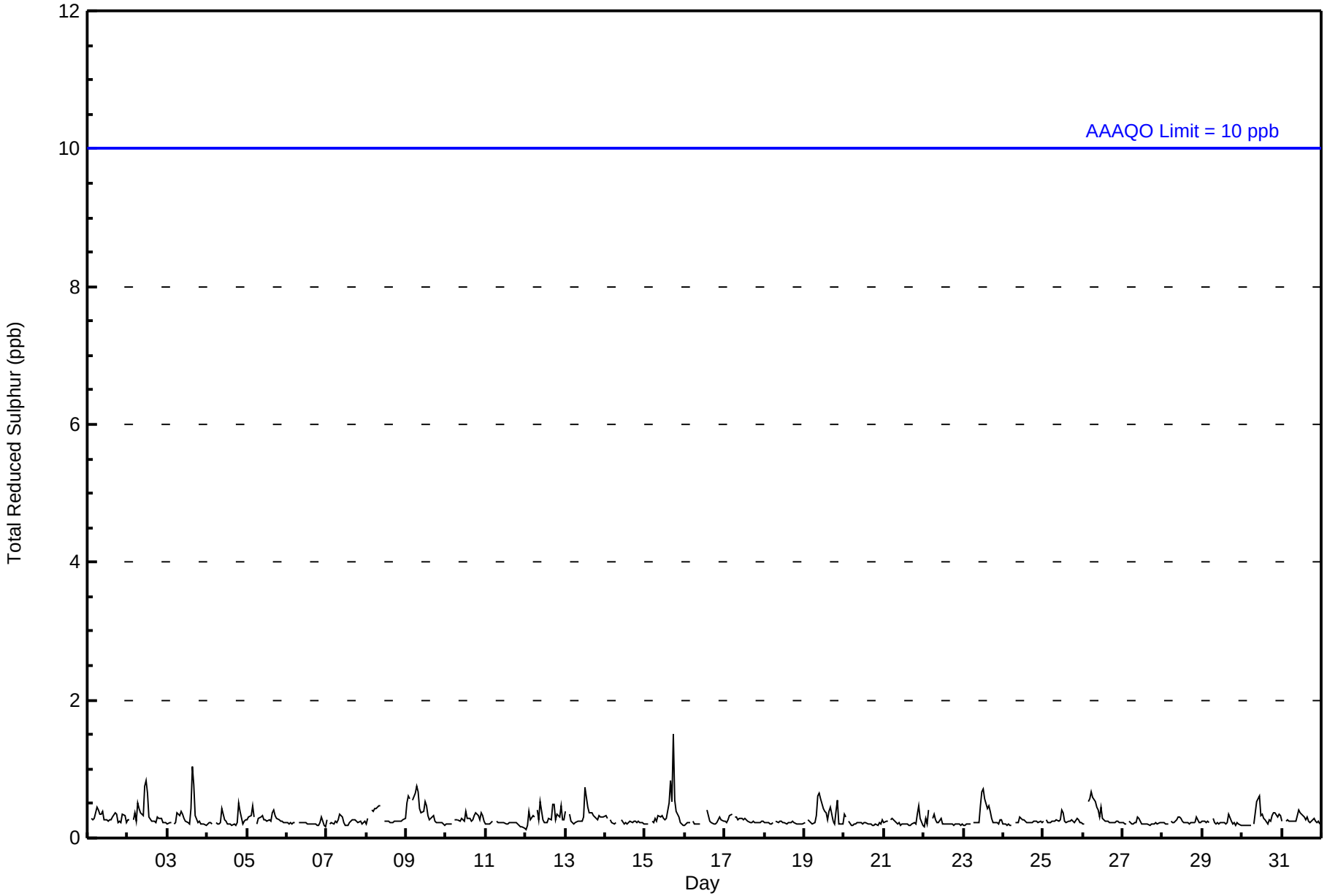
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Total Reduced Sulphur (TRS) - ppb

Anzac - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Anzac - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	705	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: 705

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Anzac - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	48	19	16	16	37	67	99	98	28	13	12	16	28	57	50	101	705
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	19	16	16	37	67	99	98	28	13	12	16	28	57	50	101	705

Total Number of Valid Hours: 705

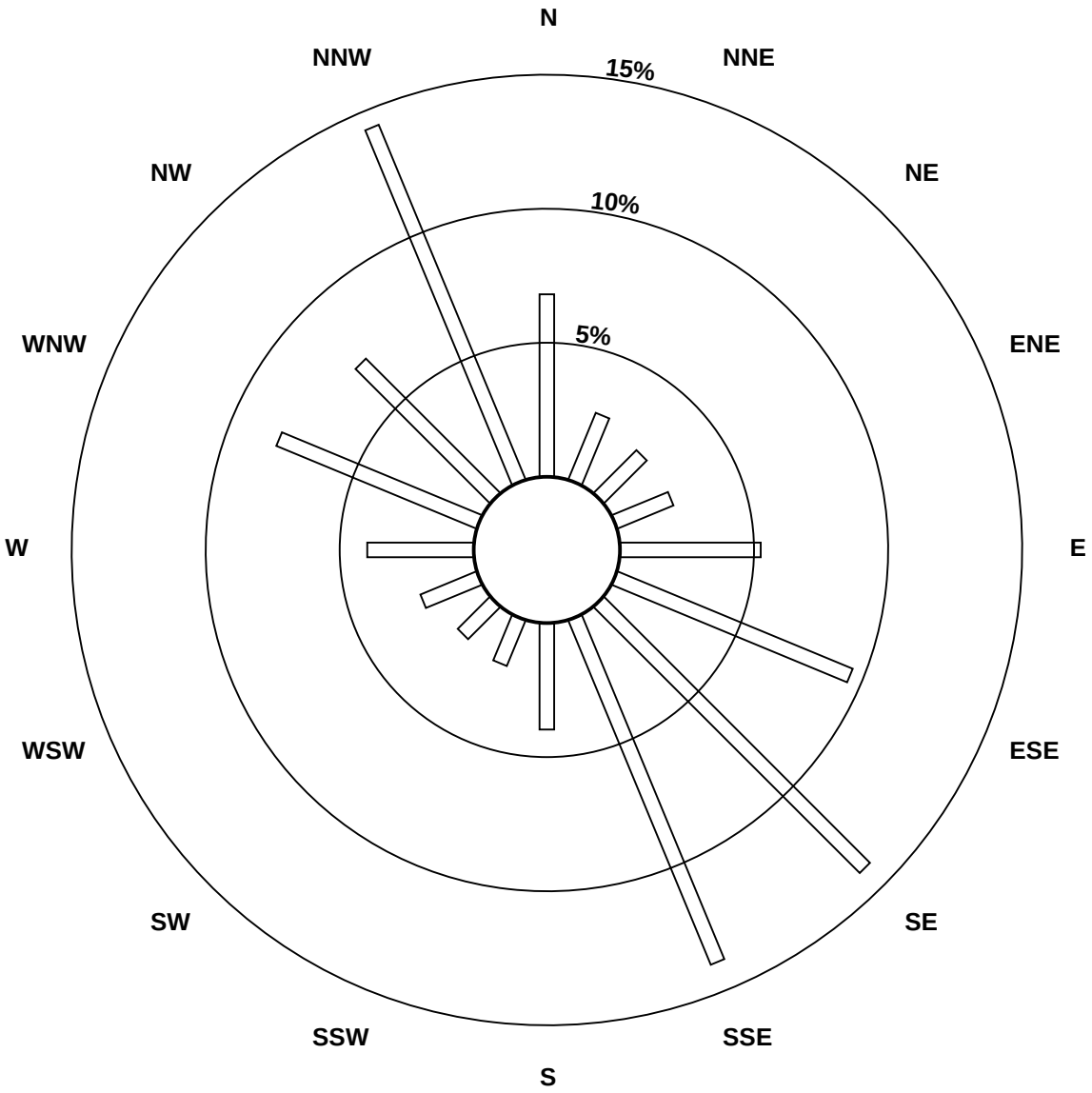
Total Number of Hours: 744

Wood Buffalo Environmental Association

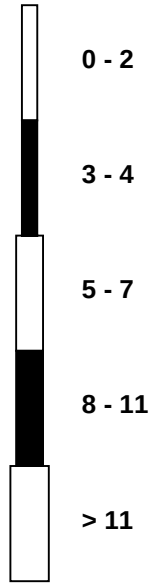
Wind Rose Mar 2016

Total Reduced Sulphur (TRS) - ppb

Anzac (AMS 14)



Classes (ppb)



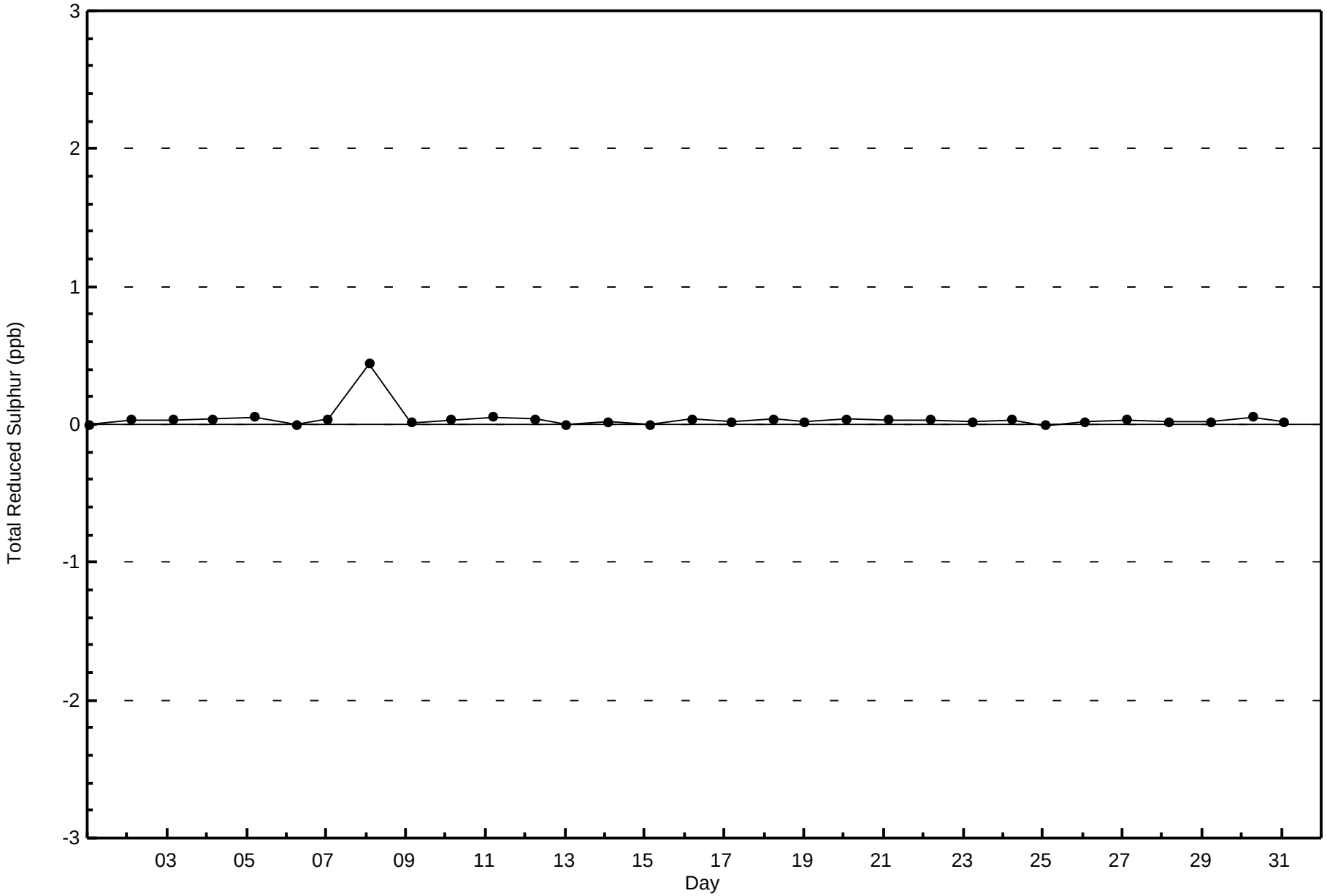
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

Anzac - March 2016

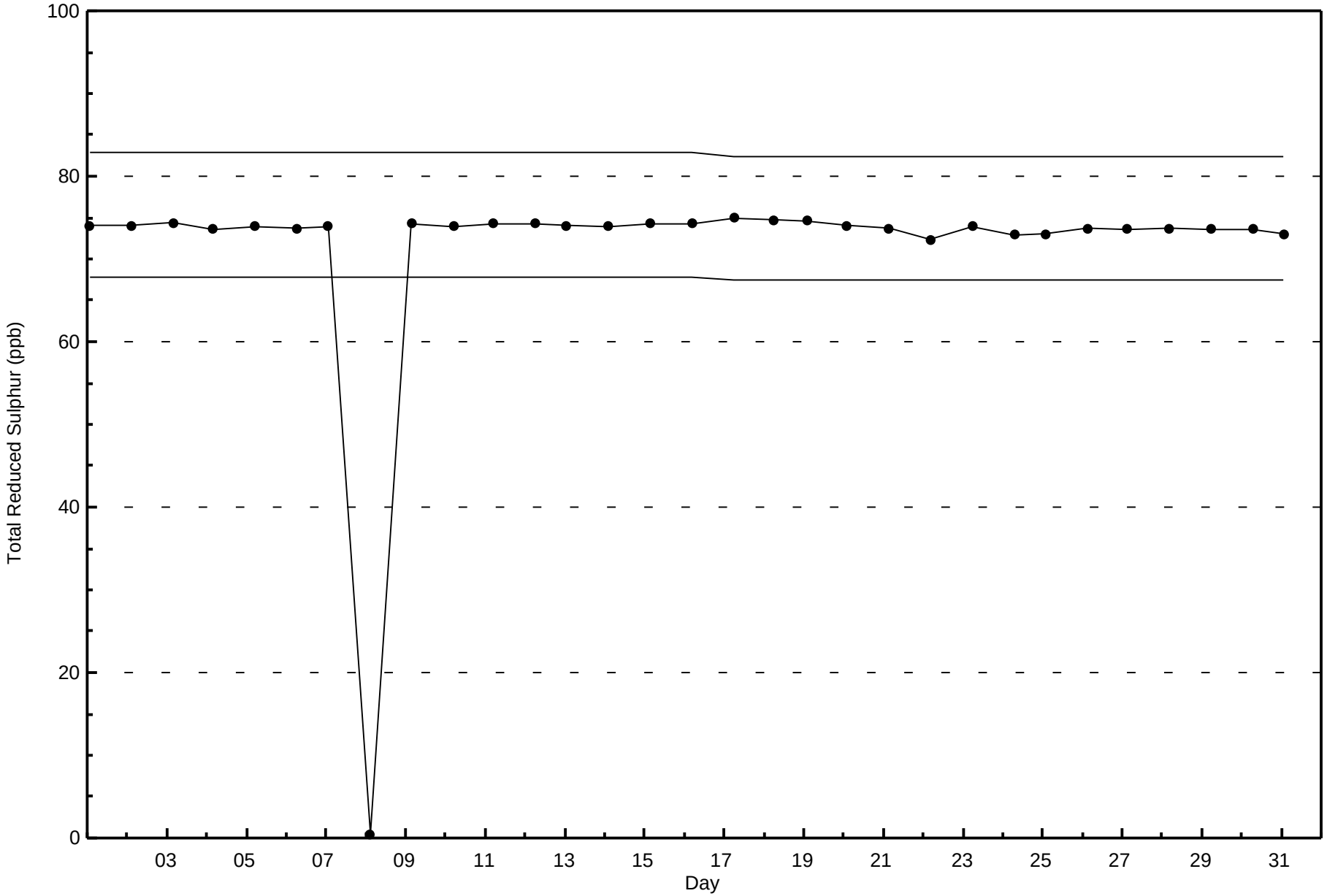


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

Anzac - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Anzac - March 2016

Maximum Value: 2.6 ppm on Mar 19 10:00

Maximum Daily Average: 2.1 ppm on Mar 19

Minimum Value: 1.9 ppm on Mar 30 07:00

Minimum Daily Average: 1.9 ppm on Mar 29

Maximum Diurnal Average: 2.0 ppm at hour 7

Minimum Diurnal Average: 2.0 ppm at hour 18

Monthly Average: 2.00 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} = 2.3

Hours in Service:	744
Hours of Data:	701
Hours of Missing Data:	43
Hours of Calibration:	37
Percent Operational Time:	99.2

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1
2-Mar	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.2
3-Mar	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.1	2.1	2.0	2.0	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
4-Mar	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	2.0	2.1
5-Mar	1.9	2.0	2.0	2.0	Z	2.0	2.0	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.2
6-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	2.0	2.1	2.0	2.0	1.9	2.1
7-Mar	Z	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	2.0	2.0	2.0	2.0
8-Mar	2.0	Z	2.1	2.0	2.0	2.0	2.0	2.1	2.1	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
9-Mar	2.0	2.0	Z	2.1	2.1	2.3	2.4	2.2	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.4
10-Mar	2.0	2.1	2.0	Z	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	2.0	1.9	2.1	2.0	2.0	2.0	2.1
11-Mar	2.0	2.1	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	2.0	2.0	2.0	2.0	2.0	2.0	2.1
12-Mar	2.0	2.0	2.2	2.1	2.1	Z	2.1	2.1	2.0	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.3	2.0	2.0	2.0	2.3
13-Mar	Z	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.3	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3
14-Mar	2.0	Z	2.0	2.0	2.0	2.0	2.0	PF	PF	PF	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	2.0	2.0
15-Mar	1.9	1.9	Z	1.9	1.9	1.9	1.9	C	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	--	2.0
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
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	2.0	2.0	2.0	2.0	2.0
18-Mar	2.0	2.0	2.0	2.0	2.0	Z	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
19-Mar	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.6	2.6	2.4	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.5	2.0	2.0	2.0	2.1	2.6
20-Mar	2.2	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	2.2
21-Mar	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	2.2	2.5	2.2	2.0	2.0	2.5
22-Mar	2.0	2.2	2.0	Z	2.2	2.0	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	2.2
23-Mar	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.0	M	M	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	2.1
24-Mar	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.1
25-Mar	Z	2.0	1.9	1.9	1.9	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	2.1	2.0	2.1
26-Mar	2.1	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
27-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	1.9	1.9	1.9	2.0	2.0
28-Mar	2.0	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	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1
29-Mar	1.9	2.0	1.9	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	2.0
30-Mar	1.9	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	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0
31-Mar	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	2.0	2.0	1.9	1.9	1.9	1.9	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	2.0	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	
	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.2	2.6	2.6	2.4	2.1	2.3	2.1	2.1	2.2	2.1	2.0	2.0	2.2	2.5	2.5	2.2	2.1	Diurnal Maximum	

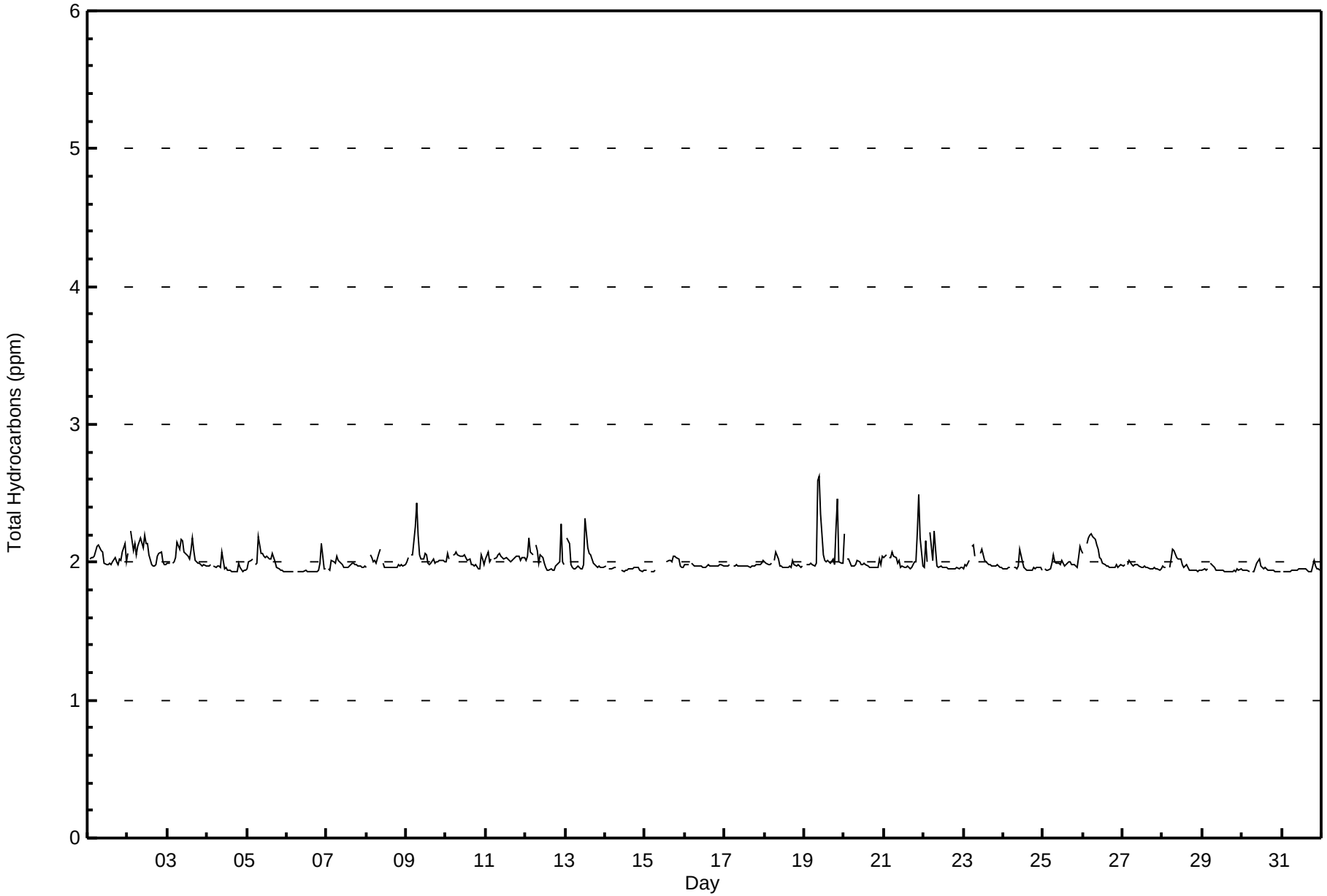
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Anzac - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Anzac - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	595	84.88	84.88
2.1 - 3.0	106	15.12	100.00
3.1 - 10.0	0	0.00	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

Anzac - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	42	18	14	16	29	44	80	83	24	10	9	12	23	54	43	94	595
2.1 - 3.0	2	2	1	0	9	23	21	15	3	3	4	4	3	5	3	8	106
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	44	20	15	16	38	67	101	98	27	13	13	16	26	59	46	102	701

Total Number of Valid Hours: 701

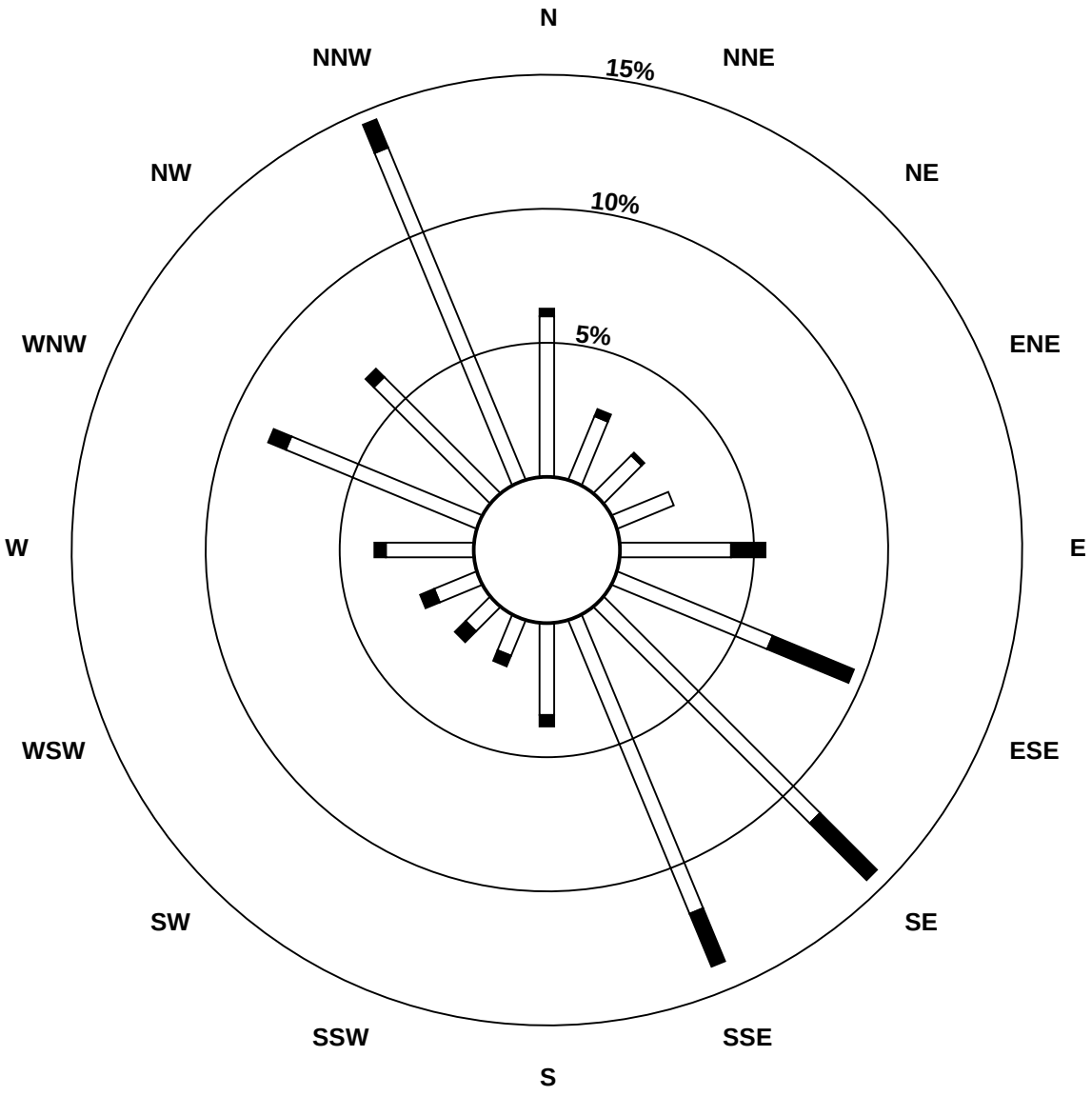
Total Number of Hours: 744

Wood Buffalo Environmental Association

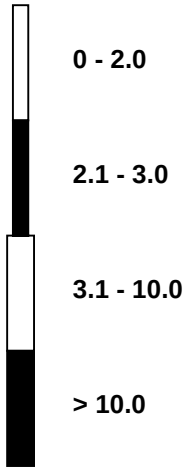
Wind Rose Mar 2016

Total Hydrocarbons (THC) - ppm

Anzac (AMS 14)



Classes (ppm)



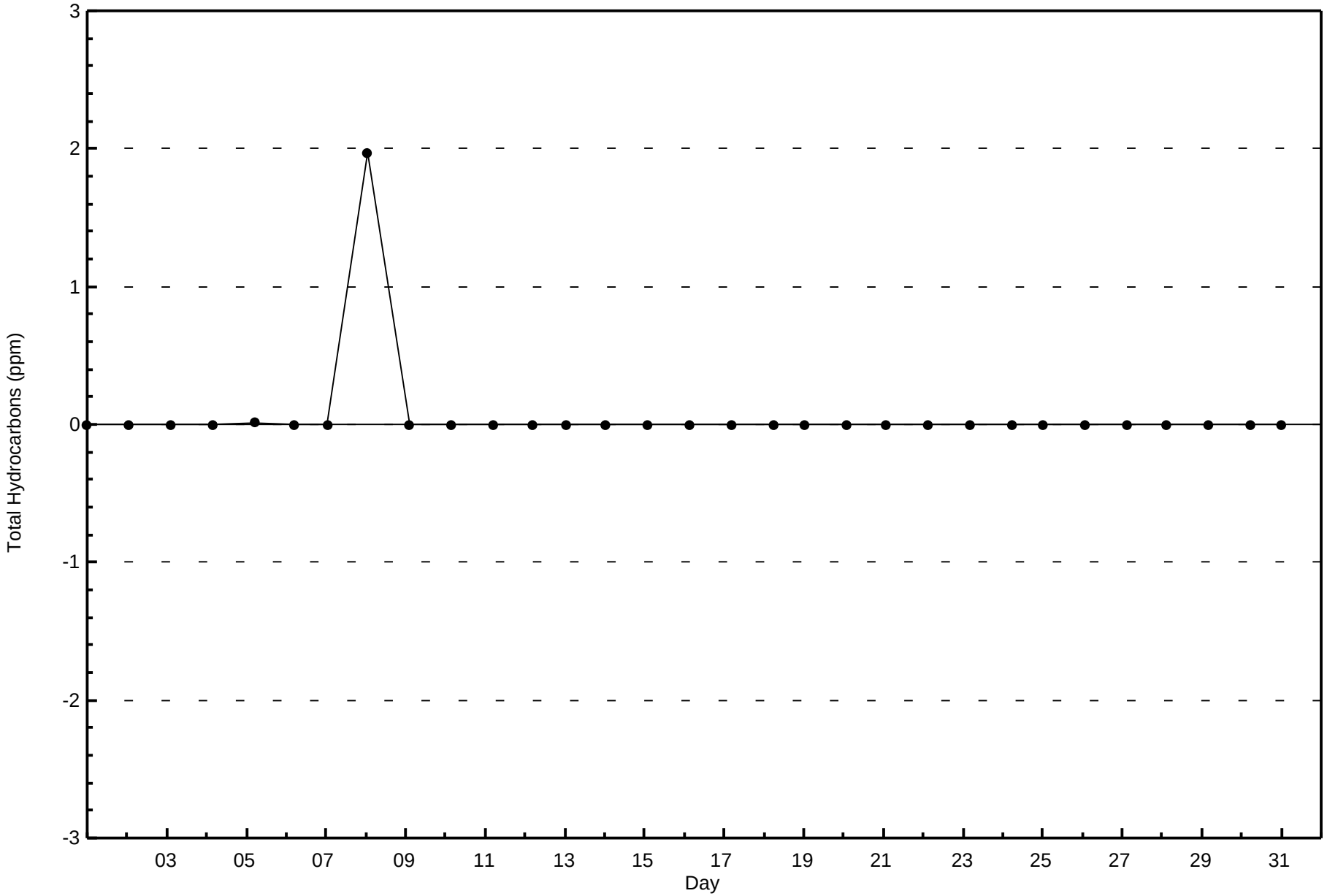
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Anzac - March 2016

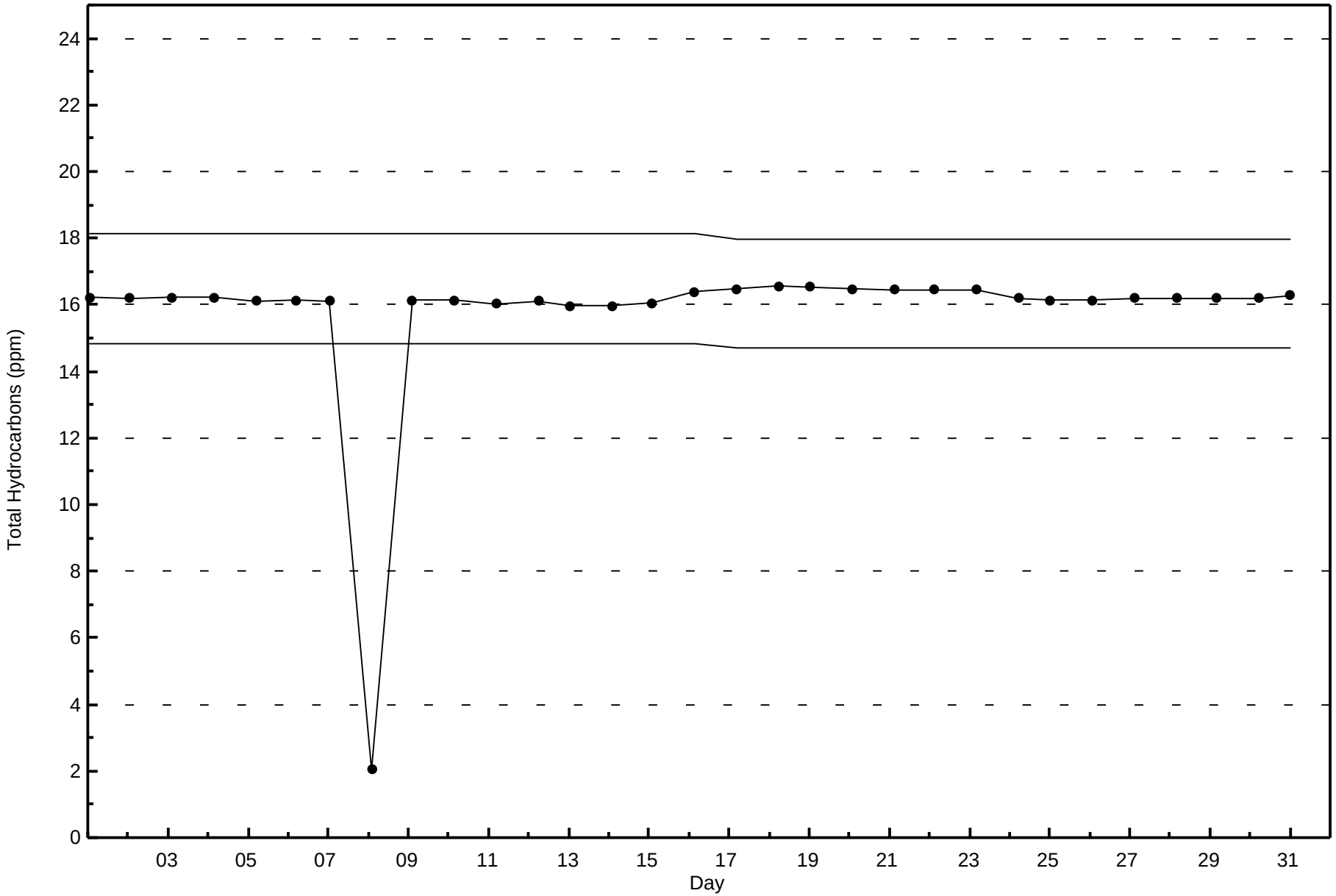


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Anzac - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Non Methane Hydrocarbons (NMHC) - ppm

Anzac - March 2016

Maximum Value: 0.151 ppm on Mar 5 08:00

Maximum Daily Average: 0.015 ppm on Mar 13

Minimum Value: 0.000 ppm on Mar 1 02:00

Minimum Daily Average: 0.000 ppm on Mar 24

Maximum Diurnal Average: 0.008 ppm at hour 8

Minimum Diurnal Average: 0.000 ppm at hour 24

Monthly Average: 0.003 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 in Service:	744
Hours of Data:	701
Hours of Missing Data:	43
Hours of Calibration:	37
Percent Operational Time:	99.2

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.001	0.013
2-Mar	0.005	Z	0.028	0.001	0.002	0.000	0.000	0.003	0.011	0.001	0.018	0.004	0.008	0.002	0.000	0.000	0.002	0.000	0.002	0.003	0.005	0.000	0.000	0.000	0.004	0.028
3-Mar	0.000	0.000	Z	0.000	0.000	0.000	0.011	0.000	0.008	0.006	0.001	0.000	0.000	0.000	0.019	0.037	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.037
4-Mar	0.000	0.000	0.000	Z	0.000	0.000	0.002	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.010
5-Mar	0.000	0.001	0.000	0.001	Z	0.000	0.000	0.151	0.011	0.001	0.002	0.006	0.004	0.004	0.001	0.005	0.006	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.151
6-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	0.004	0.020	0.000	0.000	0.001	0.020
7-Mar	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001
8-Mar	0.000	Z	0.001	0.001	0.000	0.000	0.000	0.000	0.000	M	0.000	0.000	0.000	0.000	0.001	0.000	0.002	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.002
9-Mar	0.001	0.001	Z	0.001	0.001	0.035	0.073	0.014	0.001	0.003	0.001	0.011	0.008	0.007	0.002	0.004	0.009	0.006	0.010	0.008	0.016	0.008	0.005	0.000	0.010	0.073
10-Mar	0.000	0.001	0.000	Z	0.004	0.004	0.004	0.011	0.003	0.004	0.002	0.003	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.002	0.000	0.002	0.011
11-Mar	0.000	0.000	0.000	0.001	Z	0.001	0.004	0.006	0.020	0.005	0.008	0.009	0.016	0.012	0.012	0.006	0.016	0.031	0.047	0.036	0.038	0.017	0.018	0.006	0.013	0.047
12-Mar	0.003	0.035	0.068	0.017	0.015	Z	0.034	0.015	0.000	0.011	0.002	0.000	0.000	0.002	0.000	0.000	0.001	0.000	0.000	0.000	0.007	0.049	0.007	0.001	0.012	0.068
13-Mar	Z	0.036	0.025	0.001	0.001	0.000	0.001	0.001	0.001	0.000	0.000	0.007	0.100	0.056	0.040	0.037	0.015	0.008	0.003	0.001	0.003	0.002	0.001	0.002	0.015	0.100
14-Mar	0.002	Z	0.001	0.000	0.000	0.000	0.000	PF	PF	PF	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
15-Mar	0.000	0.000	Z	0.000	0.000	0.000	0.000	C	C	C	C	C	C	0.000	0.000	0.000	0.000	0.007	0.008	0.009	0.002	0.001	0.000	0.000	--	0.009
16-Mar	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.005
17-Mar	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
18-Mar	0.000	0.000	0.000	0.000	0.003	Z	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.042	0.024	0.000	0.000	0.001	0.000	0.000	0.004	0.042
19-Mar	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.076	0.085	0.046	0.012	0.004	0.001	0.007	0.007	0.002	0.000	0.000	0.029	0.057	0.001	0.000	0.000	0.014	0.085
20-Mar	0.025	Z	0.003	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.025
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	0.025	0.066	0.019	0.000	0.005	0.066
22-Mar	0.000	0.023	0.000	Z	0.027	0.002	0.028	0.003	0.000	0.000	0.000	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	0.004	0.028
23-Mar	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.012	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	0.001	0.012
24-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
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
26-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
27-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
28-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
29-Mar	0.000	0.000	0.000	0.000	Z	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
30-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
31-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
	0.001	0.004	0.005	0.001	0.002	0.002	0.005	0.008	0.005	0.005	0.003	0.002	0.005	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.005	0.006	0.002	0.000	Diurnal Average	
	0.025	0.036	0.068	0.017	0.027	0.035	0.073	0.151	0.076	0.085	0.046	0.012	0.100	0.056	0.040	0.037	0.016	0.042	0.047	0.036	0.057	0.066	0.019	0.006	Diurnal Maximum	

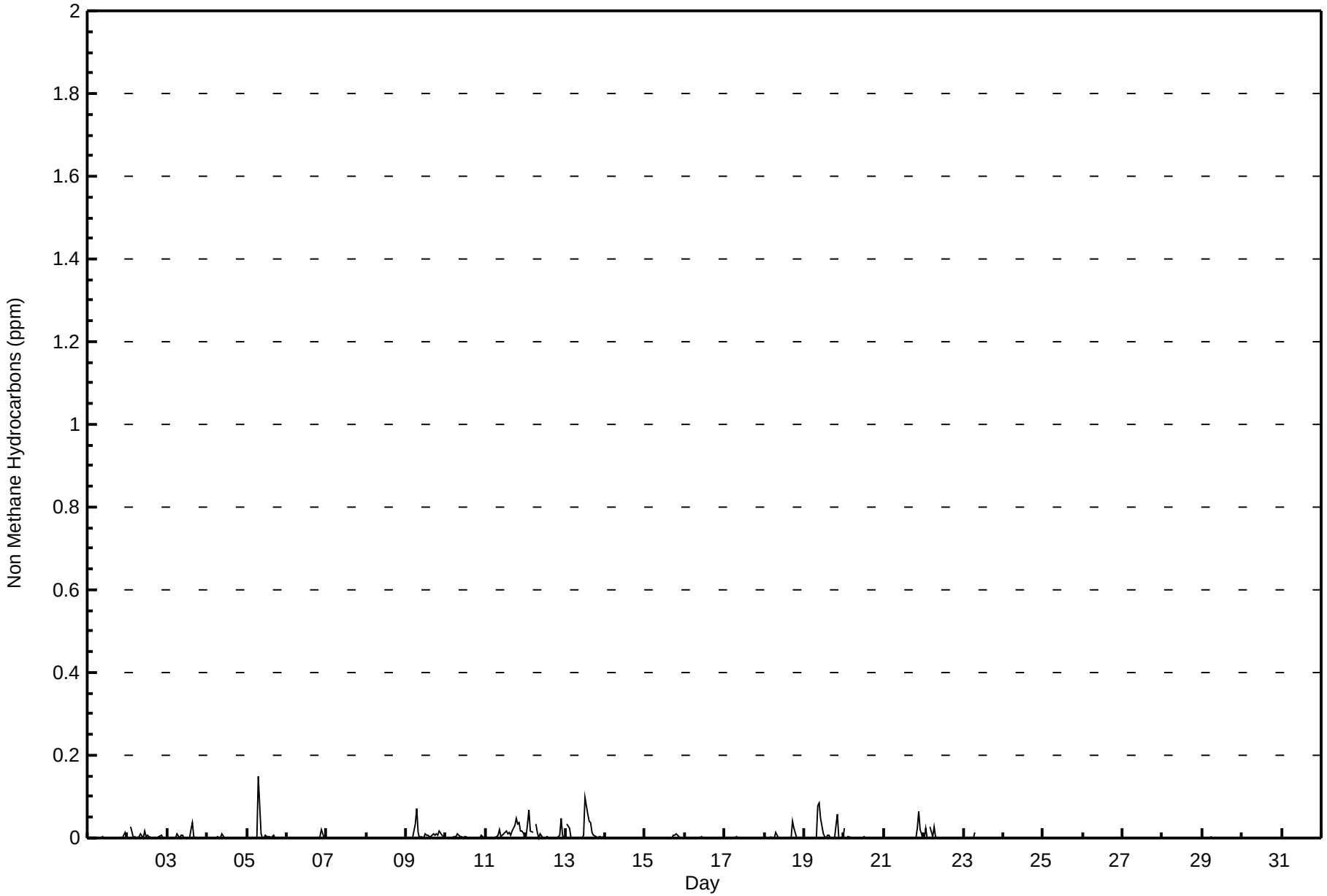
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm

Anzac - March 2016



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Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Anzac - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	614	87.59	87.59
0.006 - 0.05	78	11.13	98.72
0.06 - 0.1	8	1.14	99.86
> 0.1	1	0.14	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Anzac - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 0.005	42	20	15	16	32	50	83	86	21	13	12	15	26	54	39	90	614
0.006 - 0.05	2	0	0	0	4	15	17	11	5	0	1	1	0	5	7	10	78
0.06 - 0.1	0	0	0	0	2	2	1	1	0	0	0	0	0	0	0	2	8
> 0.1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Totals	44	20	15	16	38	67	101	98	27	13	13	16	26	59	46	102	701

Total Number of Valid Hours: 701

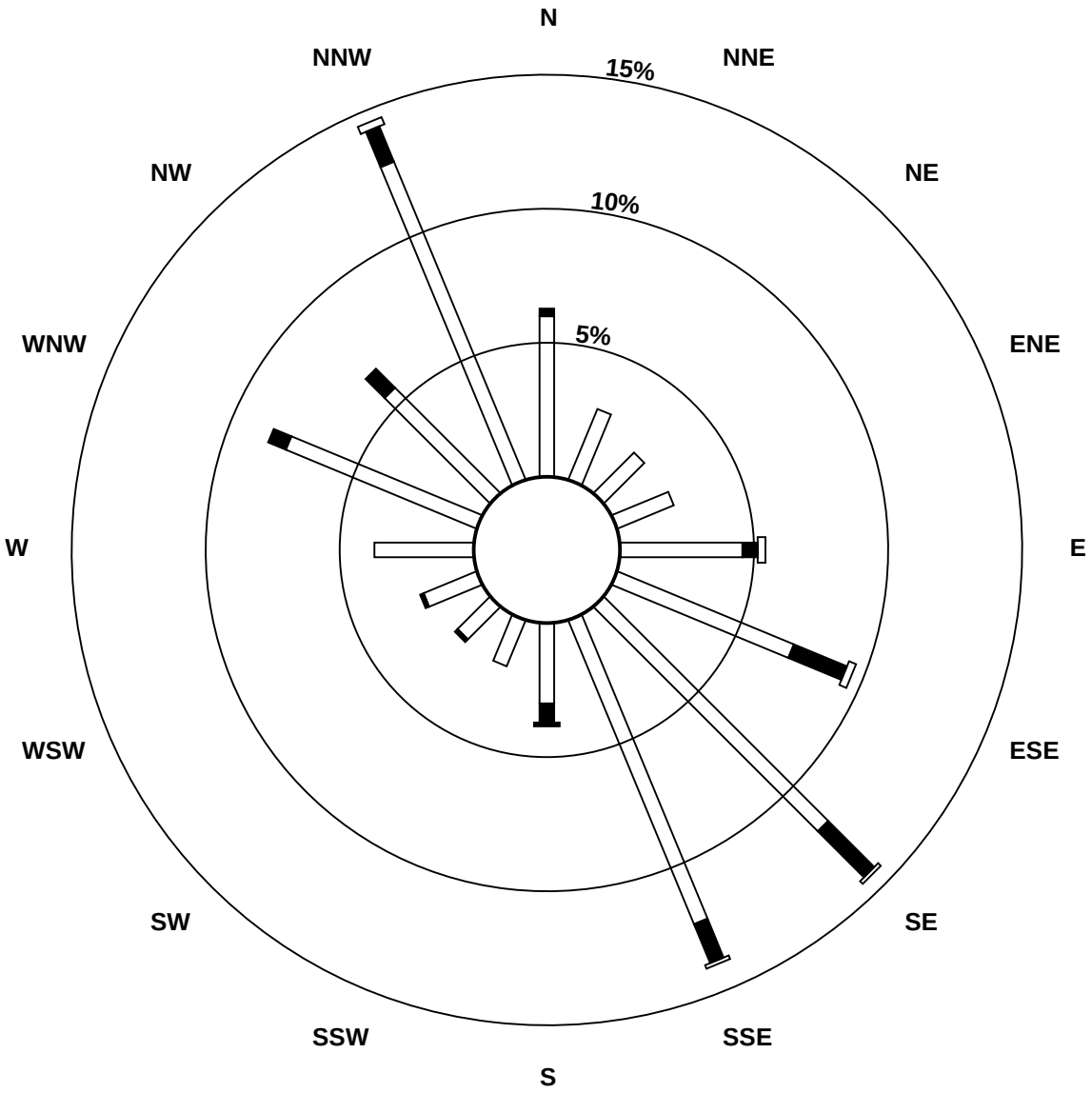
Total Number of Hours: 744

Wood Buffalo Environmental Association

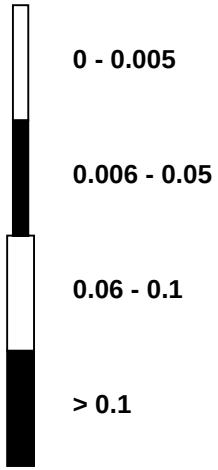
Wind Rose Mar 2016

Non Methane Hydrocarbons (NMHC) - ppm

Anzac (AMS 14)



Classes (ppm)



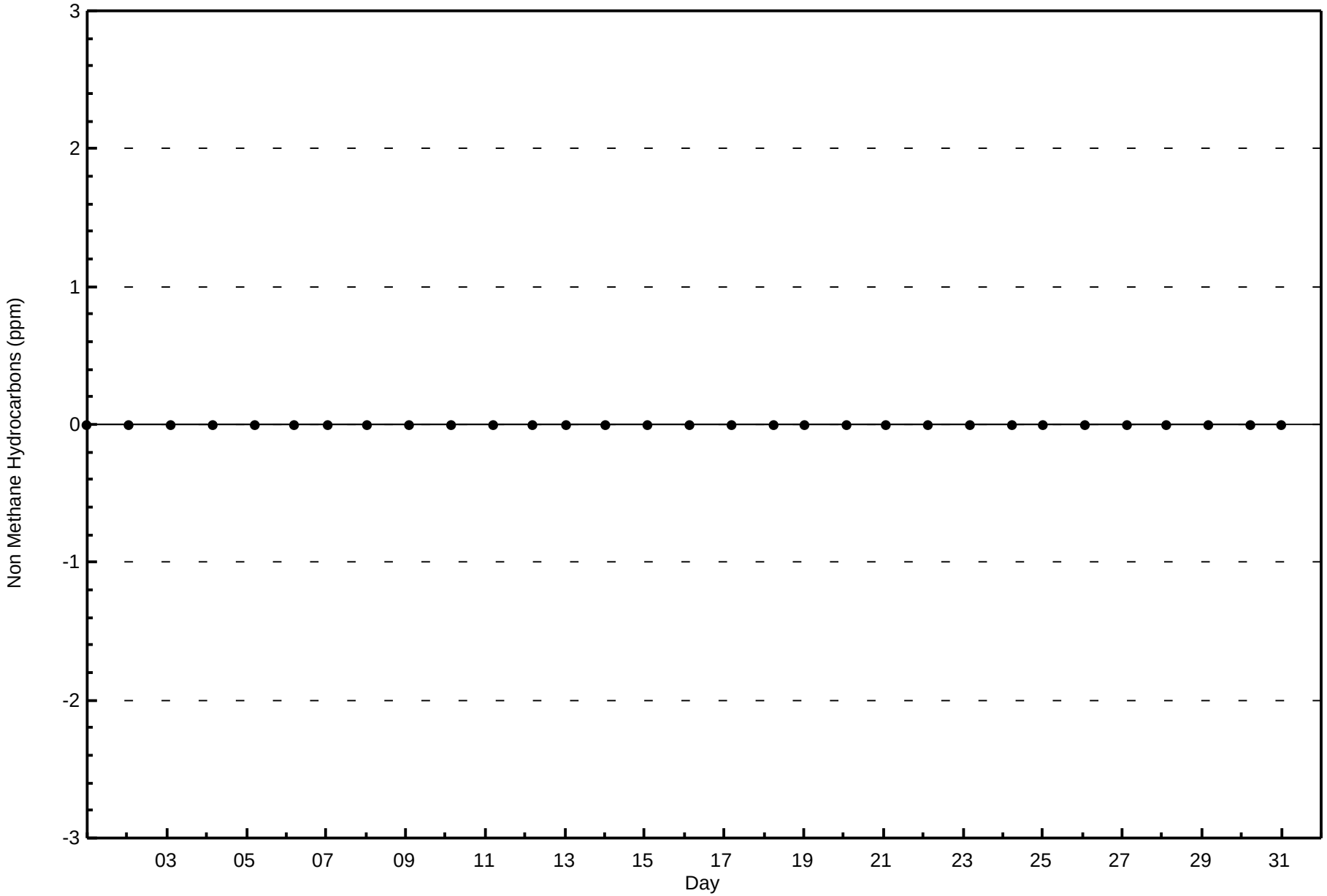
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

Anzac - March 2016



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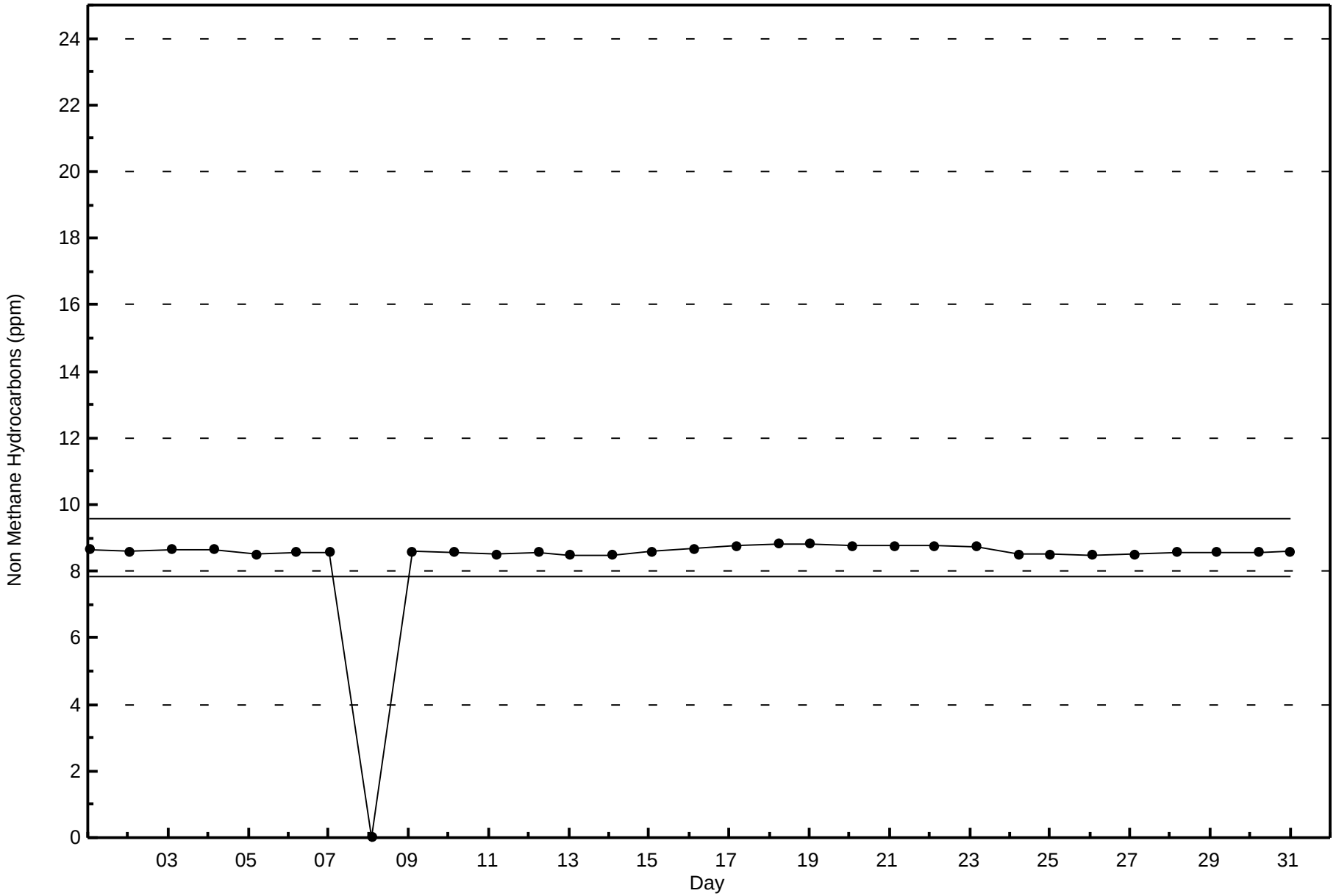
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm

Anzac - March 2016



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Summary of Hour Averages

Methane (CH_4) - ppm

Anzac - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 2.5 ppm on Mar 19 10:00

Maximum Daily Average: 2.1 ppm on Mar 19

Minimum Value: 1.9 ppm on Mar 30 07:00

Minimum Daily Average: 1.9 ppm on Mar 29

Maximum Diurnal Average: 2.0 ppm at hour 7

Minimum Diurnal Average: 2.0 ppm at hour 18

Monthly Average: 2.00 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} = 2.2

Hours in Service:	744
Hours of Data:	701
Hours of Missing Data:	43
Hours of Calibration:	37
Percent Operational Time:	99.2

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1
2-Mar	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.2
3-Mar	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.1	2.1	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	2.2
4-Mar	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	2.0	2.1
5-Mar	1.9	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.1
6-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	2.0	2.1	2.0	2.0	1.9	2.1
7-Mar	Z	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	2.0	2.0	2.0	2.0
8-Mar	2.0	Z	2.1	2.0	2.0	2.0	2.0	2.1	2.1	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
9-Mar	2.0	2.0	Z	2.1	2.1	2.2	2.4	2.2	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	2.4
10-Mar	2.0	2.1	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	2.0	1.9	2.0	2.0	2.0	2.0	2.1
11-Mar	2.0	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
12-Mar	2.0	2.0	2.1	2.1	2.0	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.2	2.0	2.0	2.0	2.2
13-Mar	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	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	2.2
14-Mar	2.0	Z	2.0	2.0	2.0	2.0	2.0	PF	PF	PF	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	2.0	2.0
15-Mar	1.9	1.9	Z	1.9	1.9	1.9	1.9	C	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	--	2.0
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
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	2.0	2.0	2.0	2.0	2.0
18-Mar	2.0	2.0	2.0	2.0	2.0	Z	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
19-Mar	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.3	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.4	2.0	2.0	2.0	2.1	2.5
20-Mar	2.2	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	2.2
21-Mar	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	2.2	2.4	2.2	2.0	2.0	2.4
22-Mar	2.0	2.1	2.0	Z	2.2	2.0	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	2.2
23-Mar	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.0	M	M	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	2.1
24-Mar	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.1
25-Mar	Z	2.0	1.9	1.9	1.9	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	2.1	2.0	2.1
26-Mar	2.1	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
27-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	1.9	1.9	1.9	2.0	2.0
28-Mar	2.0	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	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1
29-Mar	1.9	2.0	1.9	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	2.0
30-Mar	1.9	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	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0
31-Mar	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	2.0	2.0	1.9	1.9	1.9	1.9	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	2.0	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	
	2.2	2.1	2.2	2.2	2.2	2.2	2.4	2.2	2.5	2.5	2.3	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.2	2.4	2.4	2.2	2.1	Diurnal Maximum	

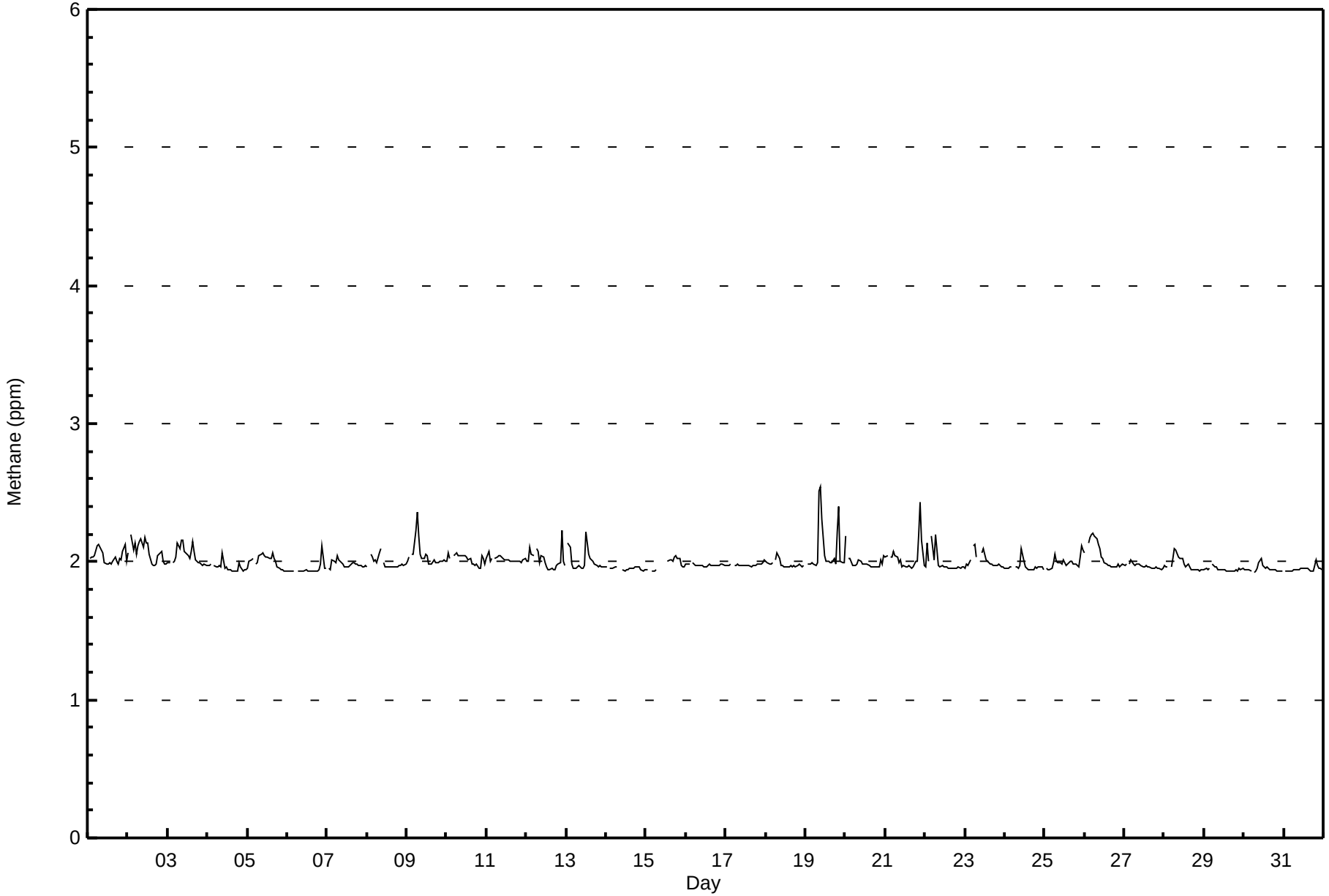
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Methane (CH_4) - ppm

Anzac - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Methane (CH_4) - ppm

Anzac - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	609	86.88	86.88
2.1 - 3.0	92	13.12	100.00
3.1 - 10.0	0	0.00	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

Methane (CH_4) - ppm

Anzac - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	42	18	15	16	29	47	82	87	25	10	9	12	23	54	43	97	609
2.1 - 3.0	2	2	0	0	9	20	19	11	2	3	4	4	3	5	3	5	92
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	44	20	15	16	38	67	101	98	27	13	13	16	26	59	46	102	701

Total Number of Valid Hours: 701

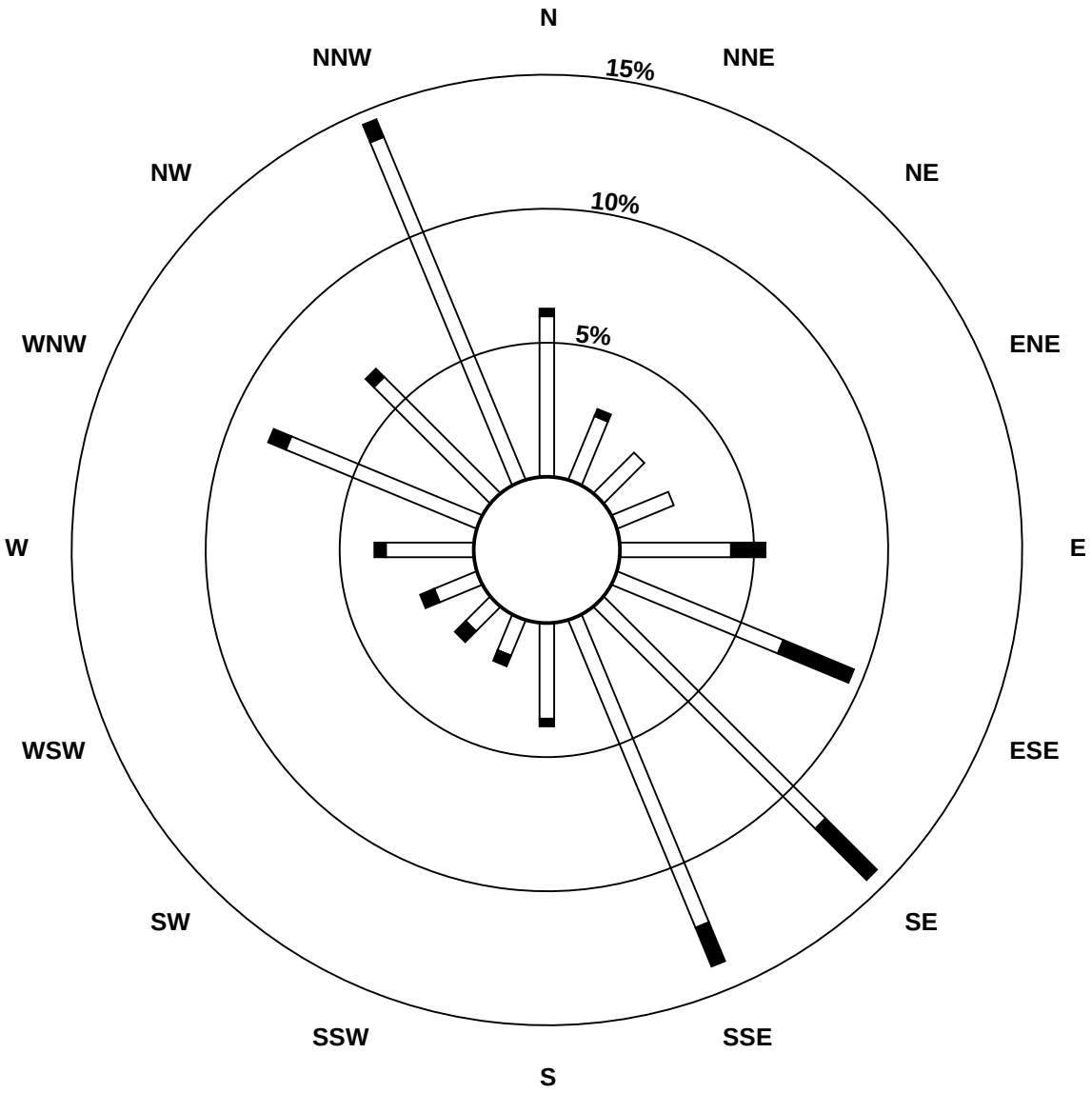
Total Number of Hours: 744

Wood Buffalo Environmental Association

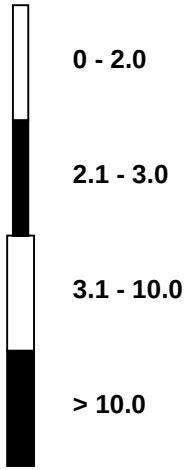
Wind Rose Mar 2016

Methane (CH_4) - ppm

Anzac (AMS 14)



Classes (ppm)



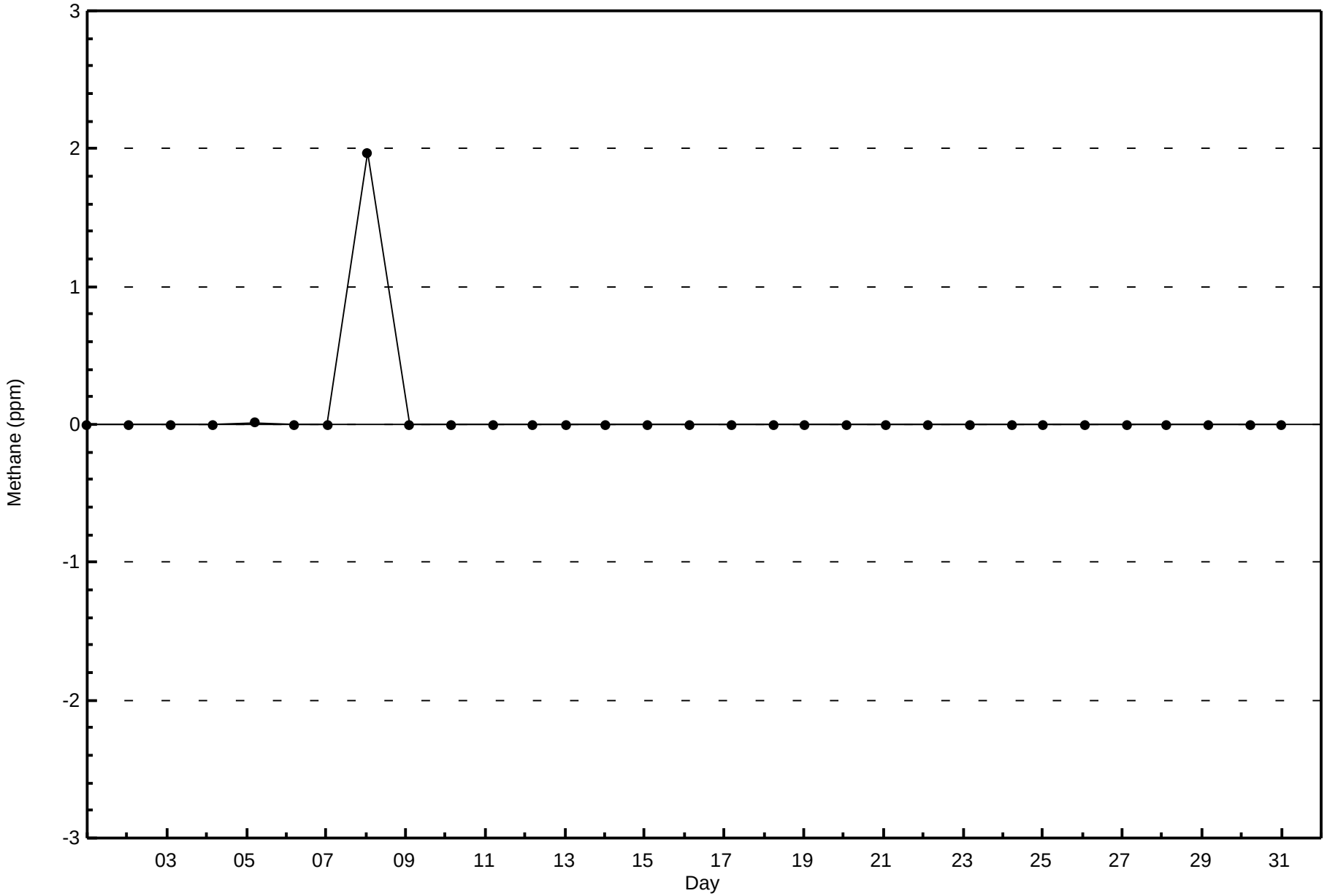
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Methane (CH_4) - ppm

Anzac - March 2016

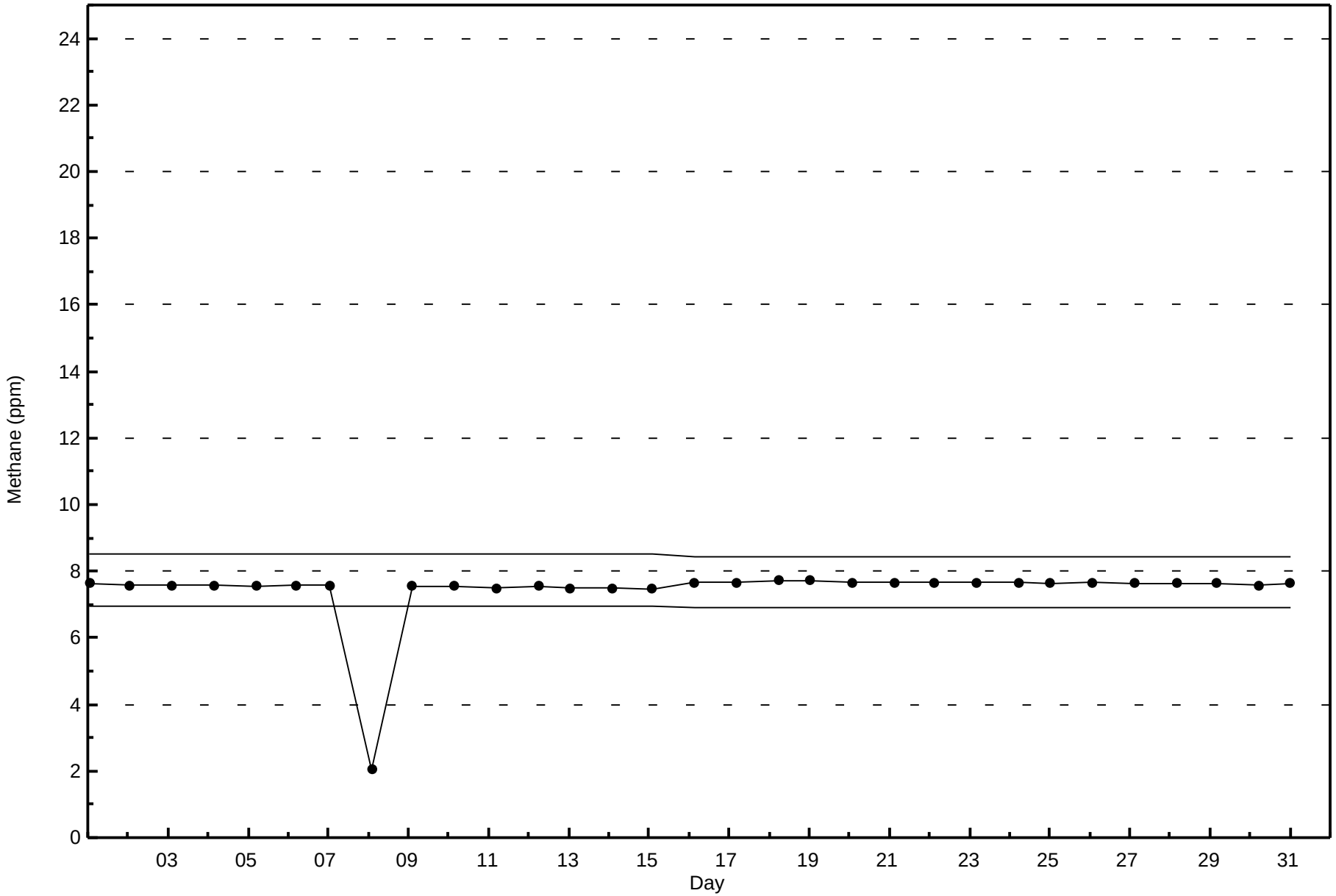


Wood Buffalo Environmental Association

Span Responses

Methane (CH_4) - ppm

Anzac - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Anzac - March 2016

Maximum Value: 6 ppb on Mar 9 23:00

Maximum Daily Average: 1.2 ppb on Mar 26

Minimum Value: 0 ppb on Mar 1 23:00

Minimum Daily Average: 0.0 ppb on Mar 20

Maximum Diurnal Average: 1.3 ppb at hour 11

Minimum Diurnal Average: 0.0 ppb at hour 24

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 in Service:	744
Hours of Data:	703
Hours of Missing Data:	41
Hours of Calibration:	37
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	0	0	0	0	0	0	0	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	2
2-Mar	0	Z	0	0	0	0	0	0	0	0	4	5	5	0	0	0	0	0	1	0	0	0	0	0	0.8	5
3-Mar	0	0	Z	0	0	0	0	1	0	2	2	0	0	0	1	3	1	0	0	0	0	0	0	0	0.5	3
4-Mar	0	0	0	Z	0	0	0	0	0	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	2
5-Mar	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	1	3	1	0	0	0	0	0	0	0	0.6	3
6-Mar	0	0	0	0	0	Z	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	4
7-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	0.3	1
8-Mar	0	Z	0	0	0	0	0	0	1	M	1	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	1	1	1	2	2	2	1	1	2	1	0	0	0	0	0	6	0	0.9	6
10-Mar	0	0	0	Z	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1
11-Mar	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0.4	3
12-Mar	0	0	0	0	0	Z	1	1	1	2	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0.4	2
13-Mar	Z	0	0	0	0	0	0	0	0	0	0	1	4	1	1	0	0	0	0	0	0	0	0	0	0.4	4
14-Mar	0	Z	0	0	0	0	0	PF	PF	PF	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.2	1
15-Mar	1	0	Z	0	0	0	0	C	C	C	C	C	C	1	2	2	1	2	1	0	0	0	0	0	--	2
16-Mar	0	0	0	Z	0	0	0	0	0	0	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	3
17-Mar	0	0	0	0	Z	0	0	3	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	3
18-Mar	0	0	0	0	0	Z	0	0	2	2	6	0	0	0	0	0	0	0	0	1	0	0	0	0	0.6	6
19-Mar	Z	0	0	0	0	0	0	0	0	1	1	1	2	1	1	1	0	0	0	0	0	0	0	0	0.3	2
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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	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	0.1	0
23-Mar	0	0	0	0	Z	0	0	1	0	1	4	6	5	2	1	1	0	0	0	0	0	0	0	0	1.0	6
24-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
25-Mar	Z	0	0	0	0	1	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
26-Mar	0	Z	1	1	1	1	2	2	3	3	2	3	2	1	1	1	1	1	0	0	2	0	0	0	1.2	3
27-Mar	0	0	Z	0	0	0	2	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
28-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0.2	2
29-Mar	0	0	0	0	Z	1	1	1	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	0	Z	0	0	1	3	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0.6	3
31-Mar	Z	0	0	0	0	0	0	0	1	1	3	2	2	1	1	0	0	0	0	0	0	0	2	0	0.6	3
	0.1	0.0	0.1	0.1	0.1	0.2	0.3	0.6	0.6	1.1	1.3	1.0	1.0	0.6	0.5	0.6	0.4	0.2	0.1	0.1	0.2	0.0	0.4	0.0	Diurnal Average	
	1	0	1	1	1	1	2	3	3	4	6	6	5	2	2	3	3	2	1	1	2	0	6	0	Diurnal Maximum	

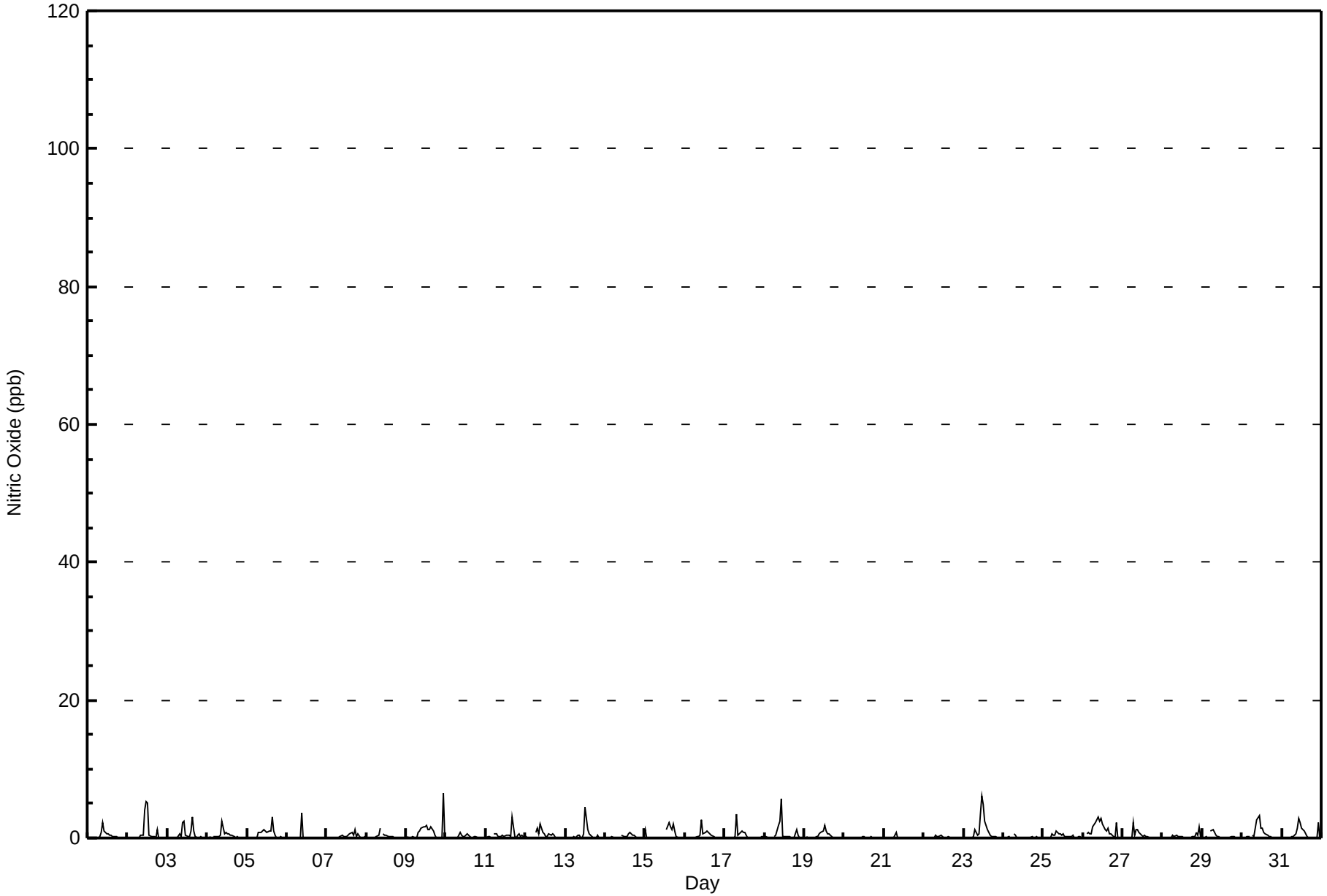
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Anzac - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	100.00	100.00
21 - 40	0	0.00	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: 703

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitric Oxide (NO) - ppb

Anzac - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	44	20	15	16	38	67	101	98	27	13	13	16	26	59	47	103	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	44	20	15	16	38	67	101	98	27	13	13	16	26	59	47	103	703

Total Number of Valid Hours: 703

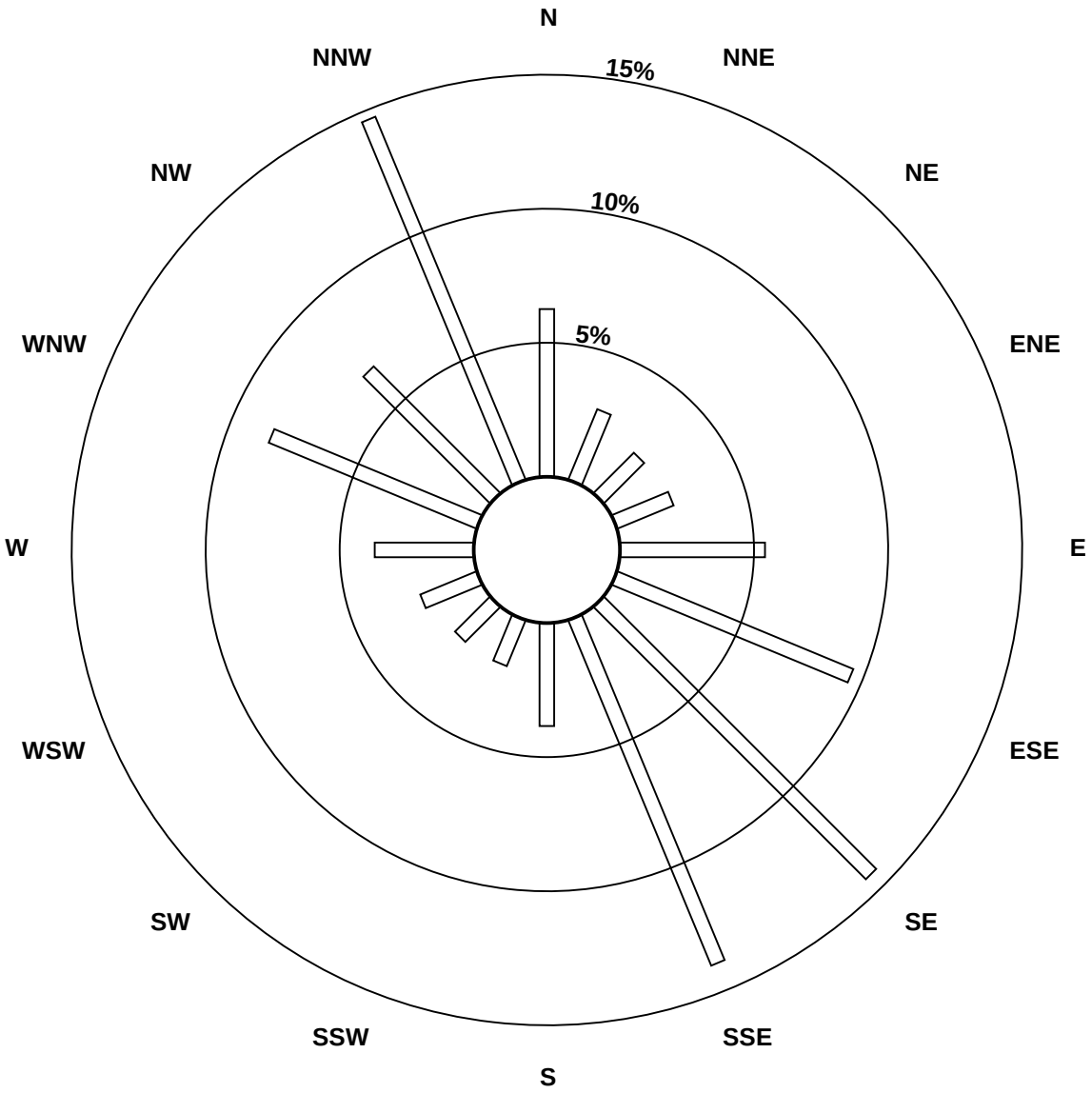
Total Number of Hours: 744

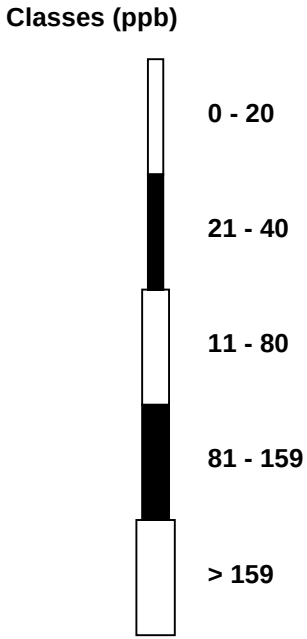
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Nitric Oxide (NO) - ppb

Anzac (AMS 14)





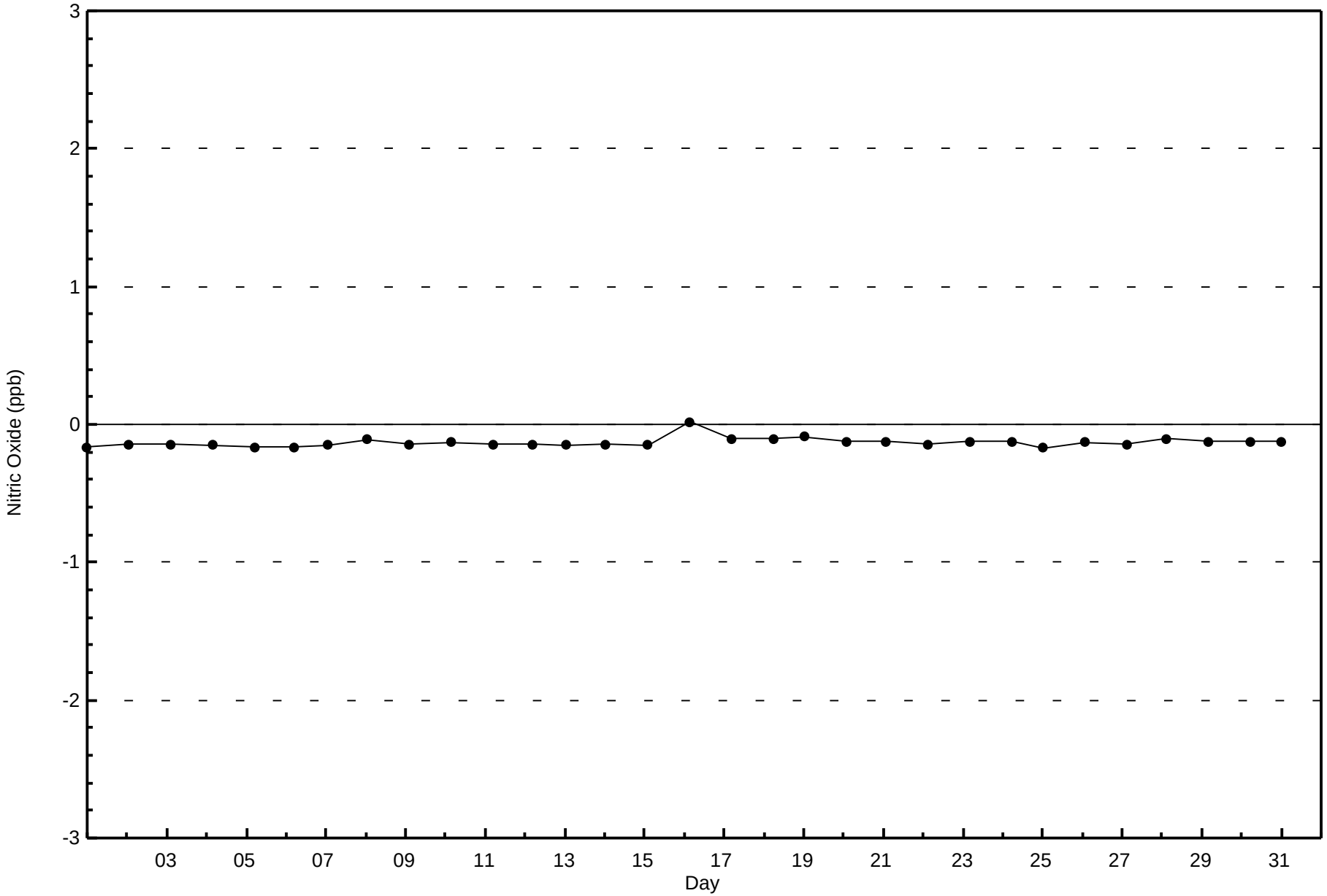
Total Number of Valid Hours: 703

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Anzac - March 2016

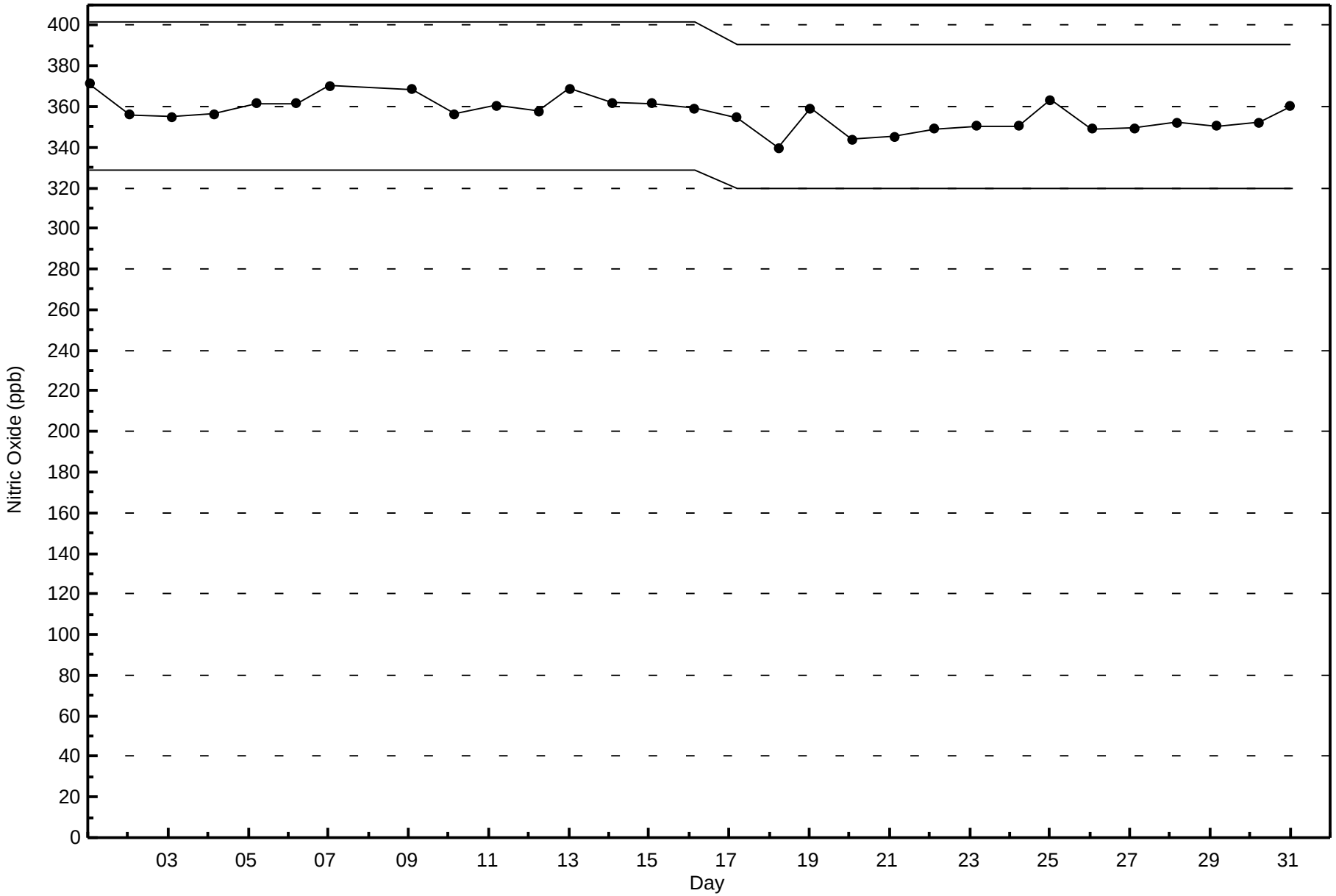


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Anzac - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Anzac - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 22 ppb on Mar 26 05:00

Maximum Daily Average: 8.0 ppb on Mar 26

Minimum Value: 0 ppb on Mar 6 10:00

Minimum Daily Average: 0.2 ppb on Mar 21

Maximum Diurnal Average: 3.8 ppb at hour 7

Minimum Diurnal Average: 1.4 ppb at hour 24

Monthly Average: 2.6 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 6$ $P_{99} = 16$

Hours in Service:	744
Hours of Data:	703
Hours of Missing Data:	41
Hours of Calibration:	37
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	3	3	3	3	3	3	2	2	4	2	1	2	2	2	2	3	3	2	1	1	2	1	1	2.2	4
2-Mar	1	Z	1	1	2	2	3	3	3	2	6	7	8	2	1	1	2	1	2	1	1	1	1	1	2.3	8
3-Mar	1	1	Z	1	1	2	4	5	5	7	5	2	2	1	6	14	10	6	4	4	5	4	4	4	4.3	14
4-Mar	5	5	6	Z	5	3	3	4	3	7	2	2	1	1	1	1	1	1	2	7	6	1	1	1	2.9	7
5-Mar	2	3	3	2	Z	2	2	5	3	3	3	3	2	3	4	11	8	6	2	2	2	1	1	0	3.1	11
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	0.2	0
7-Mar	Z	0	0	0	0	1	1	2	3	2	1	1	1	1	2	4	3	3	2	2	2	1	1	2	1.5	4
8-Mar	1	Z	9	8	9	10	11	9	7	M	2	1	1	1	1	1	1	1	2	5	3	3	3	4	4.4	11
9-Mar	11	11	Z	12	11	10	10	8	5	4	4	4	3	3	3	3	4	3	3	3	3	2	12	3	5.7	12
10-Mar	2	2	2	Z	4	4	4	3	3	2	2	1	2	2	1	1	1	2	4	2	1	2	2	1	2.2	4
11-Mar	1	2	2	2	Z	3	3	1	1	1	1	1	1	1	1	1	3	2	2	2	2	1	3	1	1.7	3
12-Mar	1	2	3	3	3	Z	14	10	2	6	2	1	1	1	3	2	6	6	3	4	1	0	0	0	3.2	14
13-Mar	Z	1	0	0	1	1	1	2	1	0	1	3	16	7	6	7	5	4	3	3	3	3	3	3	3.1	16
14-Mar	3	Z	2	2	4	4	3	PF	PF	PF	1	1	1	1	3	4	4	5	6	7	5	1	0	0	2.7	7
15-Mar	1	0	Z	0	0	0	0	C	C	C	C	C	C	3	6	6	6	17	20	18	8	1	1	1	--	20
16-Mar	4	6	5	Z	5	4	3	3	2	2	3	3	3	5	4	4	3	4	4	3	3	4	3	2	3.6	6
17-Mar	2	2	3	4	Z	1	1	7	1	2	3	2	3	2	1	1	1	1	2	3	3	3	4	3	2.3	7
18-Mar	3	2	2	2	3	Z	3	3	4	6	8	1	1	1	1	1	1	1	1	5	11	5	2	1	2.7	11
19-Mar	Z	1	1	1	1	1	1	1	1	1	2	2	3	2	2	2	3	1	1	1	1	1	1	1	1.3	3
20-Mar	0	Z	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-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	0.2	1
22-Mar	0	0	0	Z	0	1	2	3	1	1	1	0	0	0	0	1	1	1	1	1	1	1	0	0	0.7	3
23-Mar	0	1	1	1	Z	2	3	4	1	2	12	13	11	8	6	5	4	5	6	6	6	3	1	0	4.3	13
24-Mar	0	0	0	1	3	Z	4	3	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0.8	4
25-Mar	Z	1	1	1	2	3	2	2	4	2	2	1	2	1	1	1	1	2	3	1	1	4	2	2	1.8	4
26-Mar	2	Z	13	20	22	22	19	15	11	8	7	5	4	3	3	3	3	4	3	2	7	4	3	2	8.0	22
27-Mar	2	2	Z	2	2	2	4	3	3	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.6	4
28-Mar	1	1	1	Z	1	1	3	2	2	1	1	1	1	1	1	1	1	1	2	2	5	3	9	3	2.0	9
29-Mar	1	1	1	2	Z	9	8	4	1	1	1	1	1	0	0	0	1	1	1	2	1	2	1	1	1.9	9
30-Mar	1	1	1	2	1	Z	2	1	4	7	8	4	4	3	3	2	2	2	1	1	1	0	0	0	2.2	8
31-Mar	Z	0	0	0	0	2	4	2	2	3	5	4	3	3	2	1	1	1	0	1	1	2	7	3	2.0	7
	1.9	1.9	2.4	2.6	3.1	3.5	3.8	3.7	2.7	2.7	2.9	2.3	2.6	1.9	2.1	2.6	2.5	2.7	2.7	3.0	2.7	1.8	2.2	1.4	Diurnal Average	
	11	11	13	20	22	22	19	15	11	8	12	13	16	8	6	14	10	17	20	18	11	5	12	4	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance PF - Power Failure

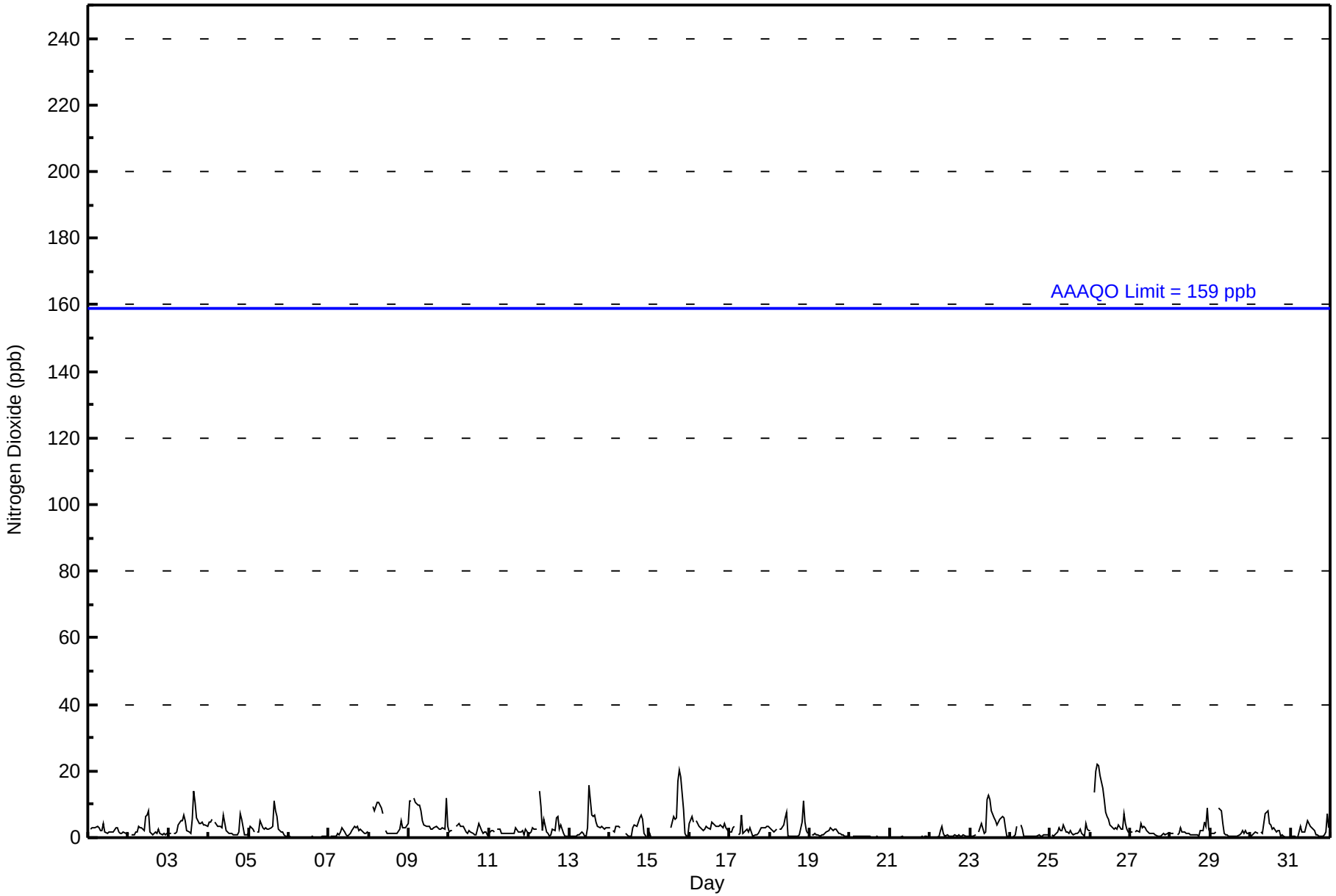
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Anzac - March 2016



Nitrogen Dioxide (NO_2) - ppb

Anzac - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	701	99.72	99.72
21 - 40	2	0.28	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: 703

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Anzac - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	44	20	15	16	38	67	101	98	27	13	13	16	26	57	47	103	701
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	2	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	44	20	15	16	38	67	101	98	27	13	13	16	26	59	47	103	703

Total Number of Valid Hours: 703

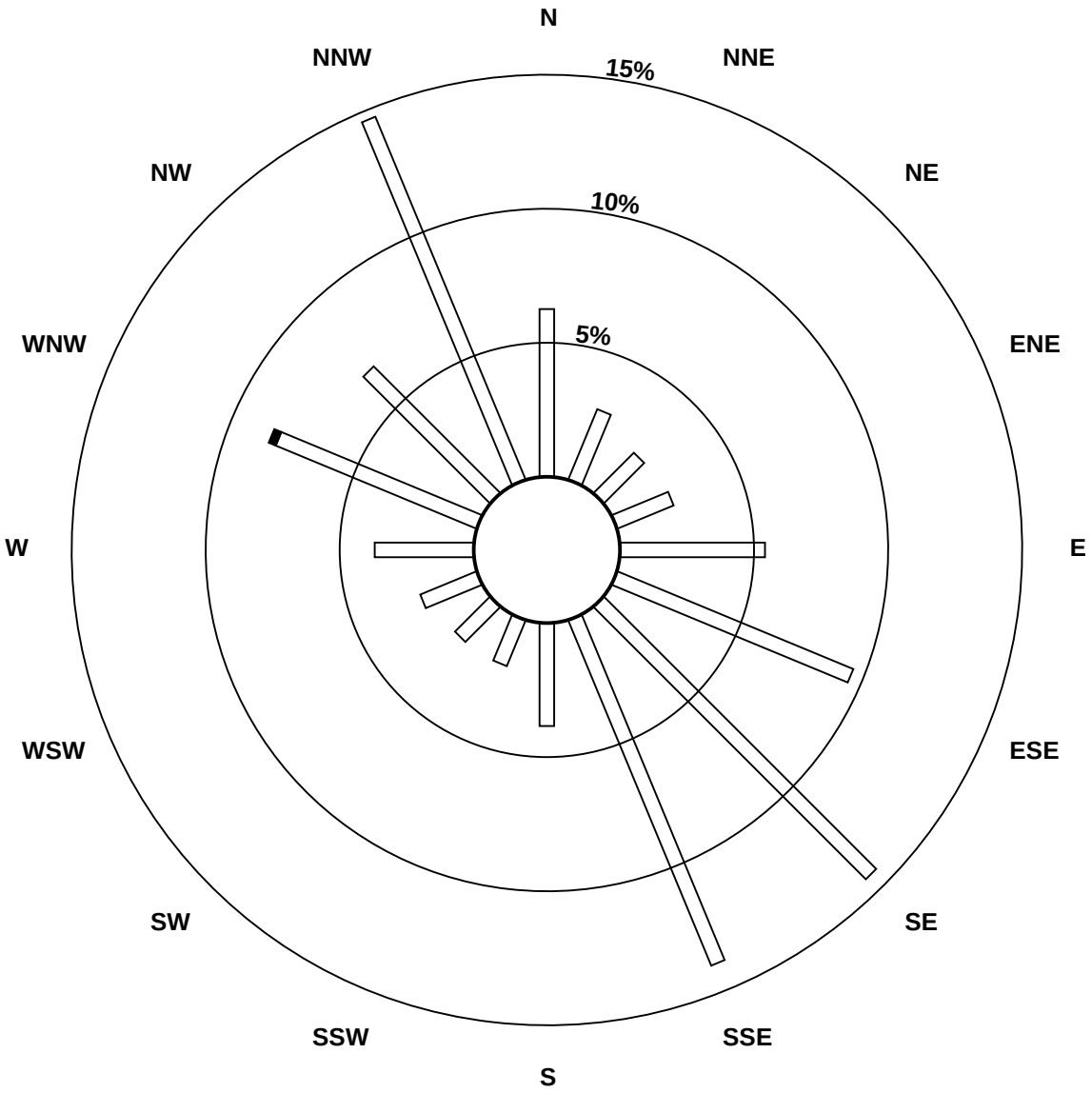
Total Number of Hours: 744

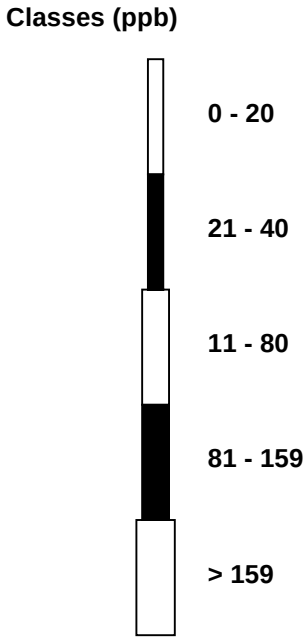
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Nitrogen Dioxide (NO_2) - ppb

Anzac (AMS 14)





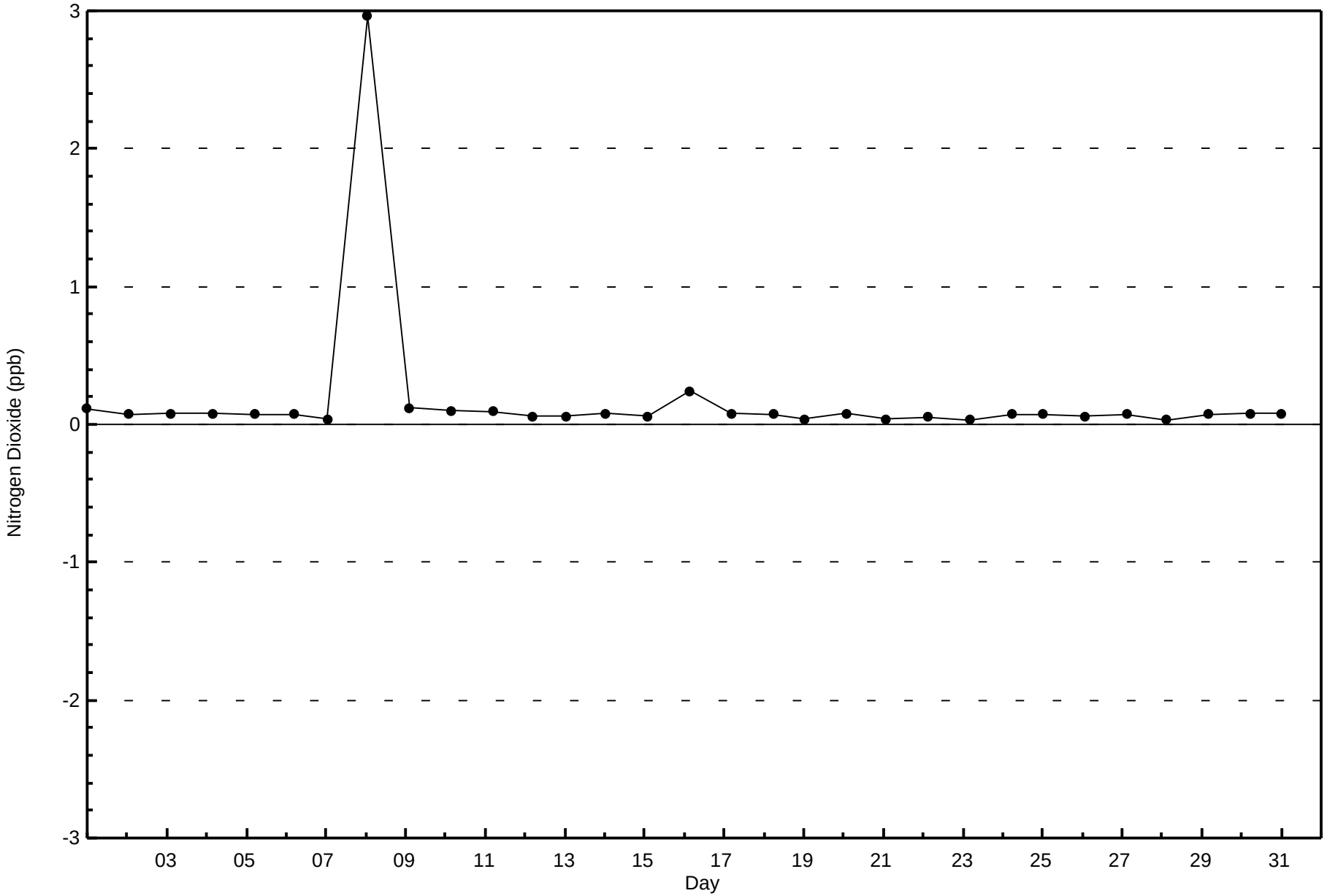
Total Number of Valid Hours: 703

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Anzac - March 2016

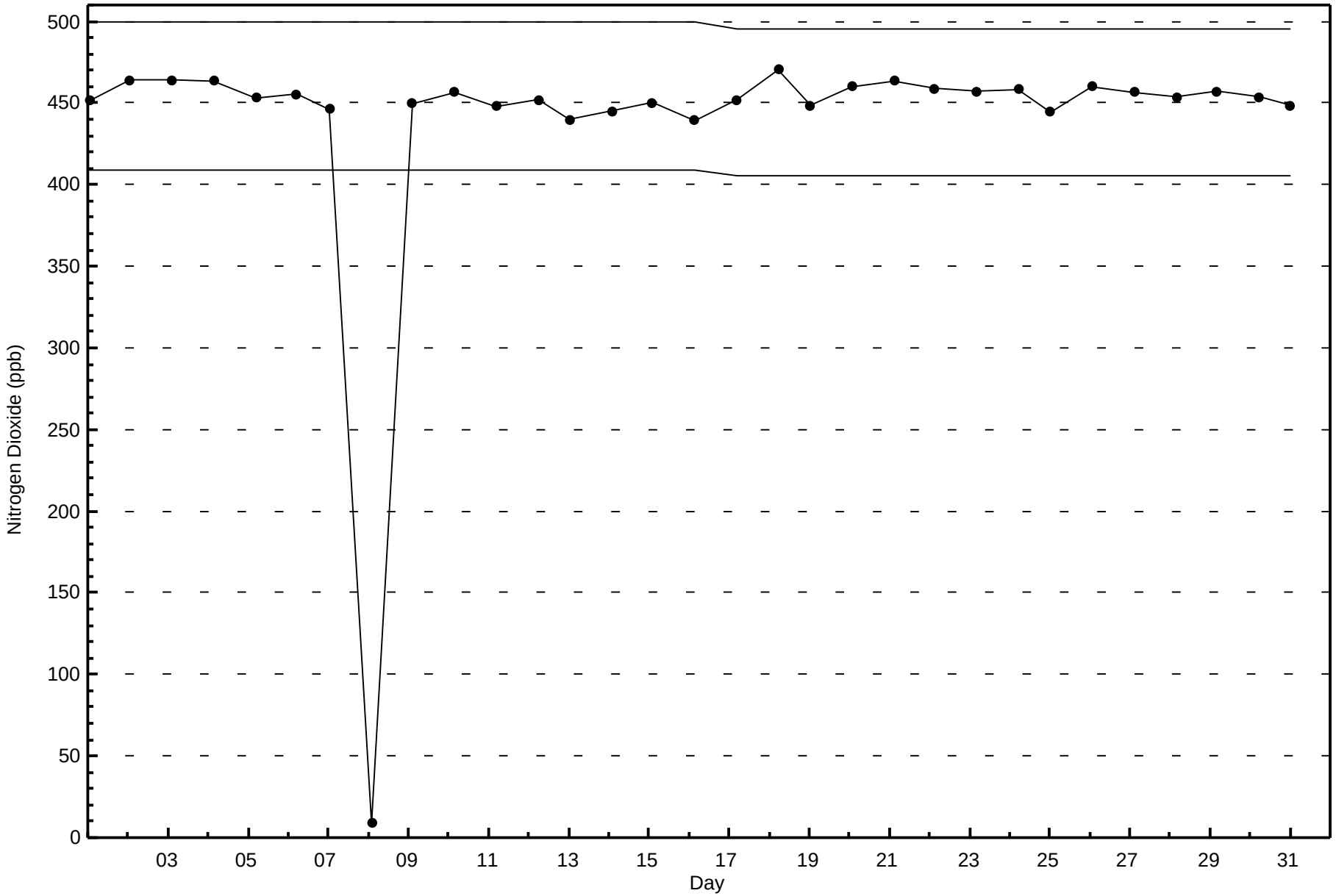


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Anzac - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Anzac - March 2016

Maximum Value: 22 ppb on Mar 26 05:00

Maximum Daily Average: 9.1 ppb on Mar 26

Minimum Value: 0 ppb on Mar 21 02:00

Minimum Daily Average: 0.2 ppb on Mar 21

Maximum Diurnal Average: 4.3 ppb at hour 8

Minimum Diurnal Average: 1.4 ppb at hour 24

Monthly Average: 3.0 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 1$ Median = 2 $Q_3 = 4$ $P_{90} = 7$ $P_{99} = 18$

Hours in Service:	744
Hours of Data:	703
Hours of Missing Data:	41
Hours of Calibration:	37
Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	2	3	3	3	3	3	2	3	7	3	2	2	2	2	2	3	3	2	1	1	2	1	1	2.5	7
2-Mar	1	Z	1	1	2	2	3	3	3	2	10	12	13	2	1	2	2	1	4	1	1	1	1	1	3.1	13
3-Mar	1	1	Z	1	1	2	4	6	5	9	7	3	2	2	7	17	11	6	4	4	5	4	4	4	4.8	17
4-Mar	5	5	6	Z	5	4	3	4	3	9	3	3	2	2	2	1	1	1	2	7	6	1	1	1	3.2	9
5-Mar	2	3	3	2	Z	2	2	6	4	4	4	4	3	4	5	14	9	7	2	2	2	1	1	0	3.7	14
6-Mar	0	0	0	0	0	Z	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4
7-Mar	Z	0	0	0	0	1	1	2	3	2	1	1	1	2	3	4	3	5	2	3	2	1	1	2	1.8	5
8-Mar	2	Z	9	8	9	10	11	9	9	M	3	2	2	1	1	1	1	1	2	5	3	3	3	4	4.6	11
9-Mar	11	11	Z	12	11	10	10	9	6	5	5	5	5	4	4	5	5	3	3	3	3	3	19	3	6.7	19
10-Mar	2	2	2	Z	4	4	4	3	4	3	2	1	3	2	1	1	1	2	4	2	1	2	1	1	2.3	4
11-Mar	2	2	2	2	Z	3	3	2	1	1	2	1	2	2	2	2	6	2	2	2	3	1	3	1	2.1	6
12-Mar	1	2	3	3	3	Z	15	11	3	8	3	2	1	1	3	2	7	7	2	4	1	0	0	0	3.5	15
13-Mar	Z	1	0	0	0	1	1	2	2	0	1	4	20	8	7	7	5	4	3	4	3	3	3	3	3.5	20
14-Mar	3	Z	2	2	4	4	3	PF	PF	PF	2	1	1	1	3	5	4	5	6	7	5	1	0	0	2.9	7
15-Mar	2	0	Z	0	0	0	0	C	C	C	C	C	C	4	9	7	7	19	21	18	8	1	1	0	--	21
16-Mar	4	6	5	Z	5	4	3	3	2	3	6	3	4	6	5	4	4	4	4	3	3	4	3	2	4.0	6
17-Mar	2	2	3	4	Z	1	2	10	2	2	4	3	4	2	1	1	1	1	2	3	3	3	4	3	2.6	10
18-Mar	3	3	2	2	3	Z	3	3	6	8	14	1	1	1	1	1	1	1	1	6	11	5	2	1	3.3	14
19-Mar	Z	1	1	1	1	1	1	1	1	2	3	3	5	4	3	3	3	1	1	1	1	1	1	1	1.7	5
20-Mar	0	Z	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-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	0.2	1
22-Mar	0	0	0	Z	0	1	2	4	1	1	1	1	0	0	0	1	1	1	1	1	1	0	0	0	0.7	4
23-Mar	0	1	1	1	Z	2	3	5	2	2	15	19	16	10	7	6	4	5	6	6	6	3	1	0	5.3	19
24-Mar	0	0	0	1	3	Z	4	3	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0.9	4
25-Mar	Z	1	1	1	2	3	3	3	5	2	2	2	3	1	1	1	1	2	3	1	1	5	3	2	2.1	5
26-Mar	2	Z	14	21	22	22	20	17	14	11	9	8	6	4	4	4	3	4	3	2	9	4	3	2	9.1	22
27-Mar	2	2	Z	2	2	2	6	3	5	4	3	1	1	2	1	1	1	1	1	1	1	1	1	1	1.9	6
28-Mar	1	1	1	Z	1	2	3	2	2	2	2	2	1	1	1	1	1	1	2	2	5	4	11	3	2.2	11
29-Mar	1	1	2	2	Z	10	9	5	1	1	1	1	1	0	1	0	0	1	1	2	1	2	1	1	2.1	10
30-Mar	1	1	1	2	2	Z	2	1	6	10	11	6	5	3	4	2	3	2	1	1	1	0	0	0	2.7	11
31-Mar	Z	0	0	0	0	2	4	2	2	5	8	7	5	3	3	1	1	0	0	1	1	2	9	3	2.6	9
	2.0	1.9	2.4	2.7	3.2	3.7	4.1	4.3	3.4	3.9	4.1	3.2	3.6	2.4	2.6	3.2	2.9	2.9	2.8	3.1	2.9	1.9	2.5	1.4	Diurnal Average	
	11	11	14	21	22	22	20	17	14	11	15	19	20	10	9	17	11	19	21	18	11	5	19	4	Diurnal Maximum	

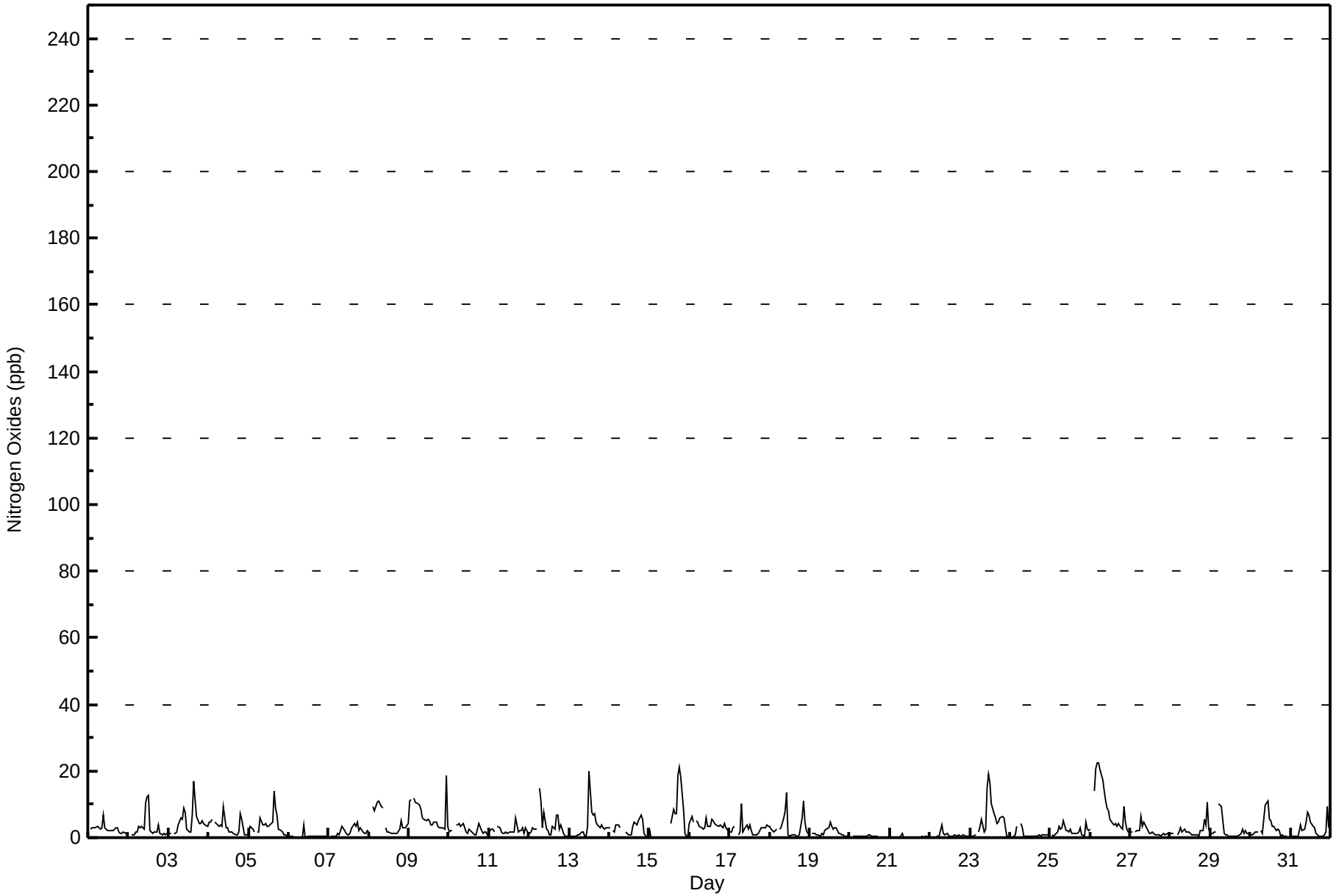
Z - zerospan C - Calibration M - Maintenance PF - Power Failure

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Anzac - March 2016



Nitrogen Oxides (NO_X) - ppb

Anzac - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	699	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: 703

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Anzac - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	44	20	15	16	38	67	101	98	27	13	13	16	25	57	47	102	699
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	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	44	20	15	16	38	67	101	98	27	13	13	16	26	59	47	103	703

Total Number of Valid Hours: 703

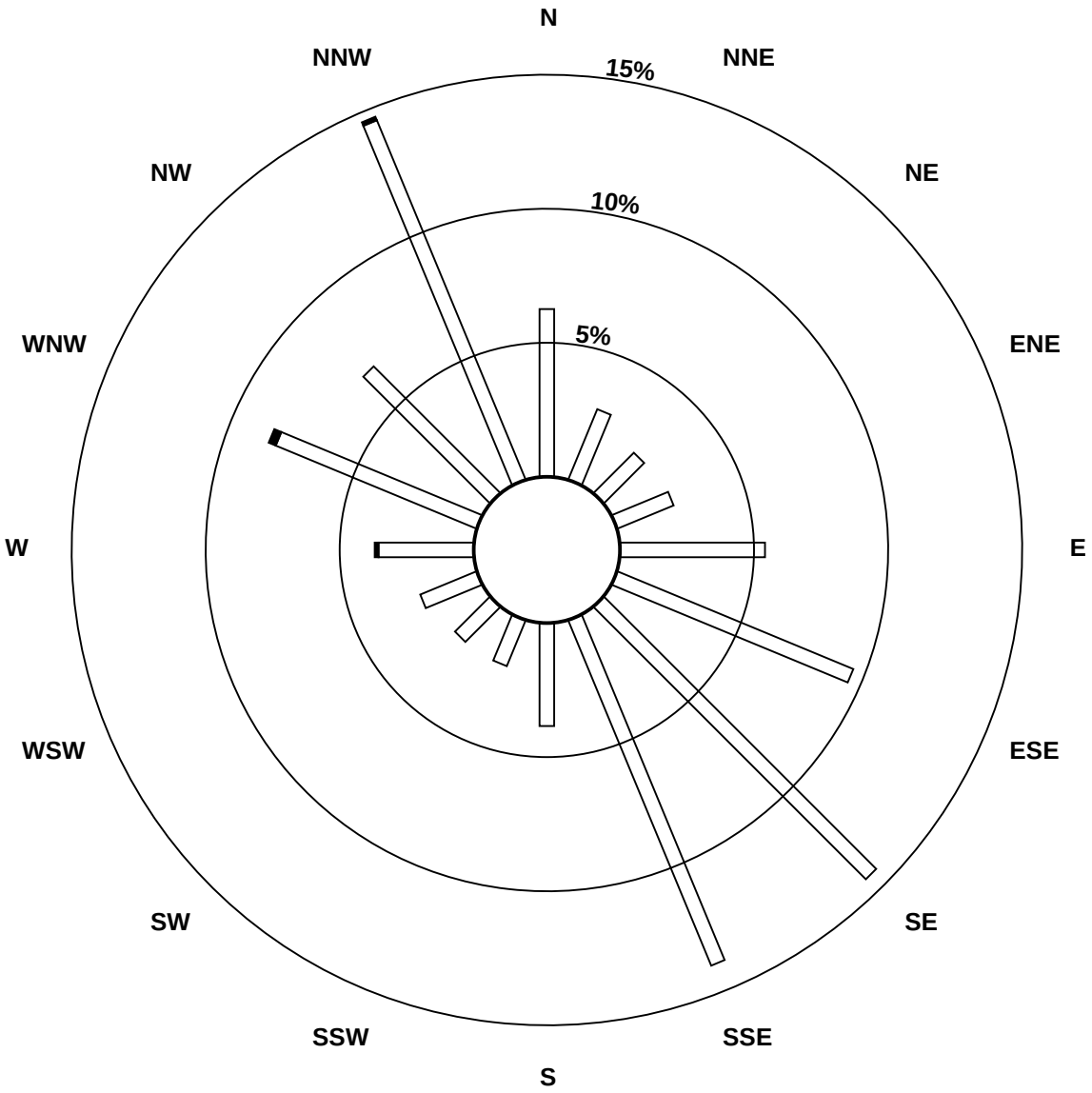
Total Number of Hours: 744

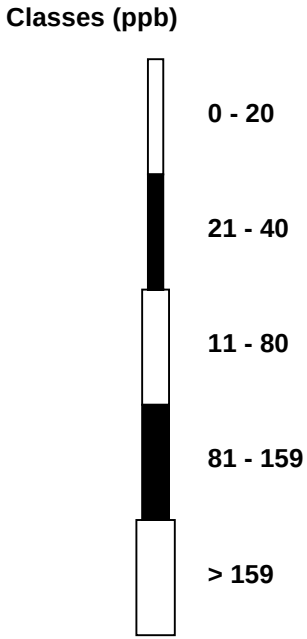
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Nitrogen Oxides (NO_X) - ppb

Anzac (AMS 14)





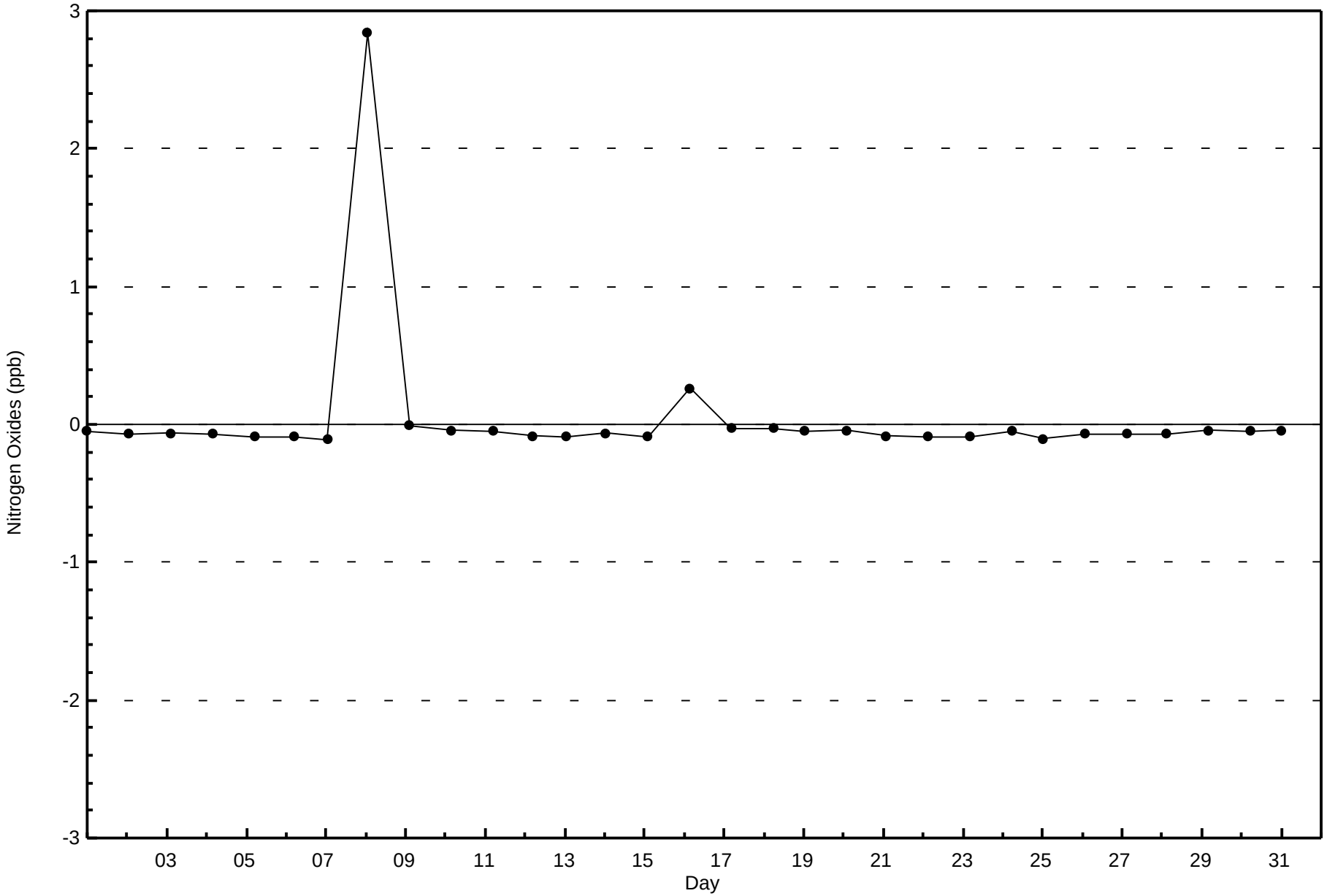
Total Number of Valid Hours: 703

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Anzac - March 2016

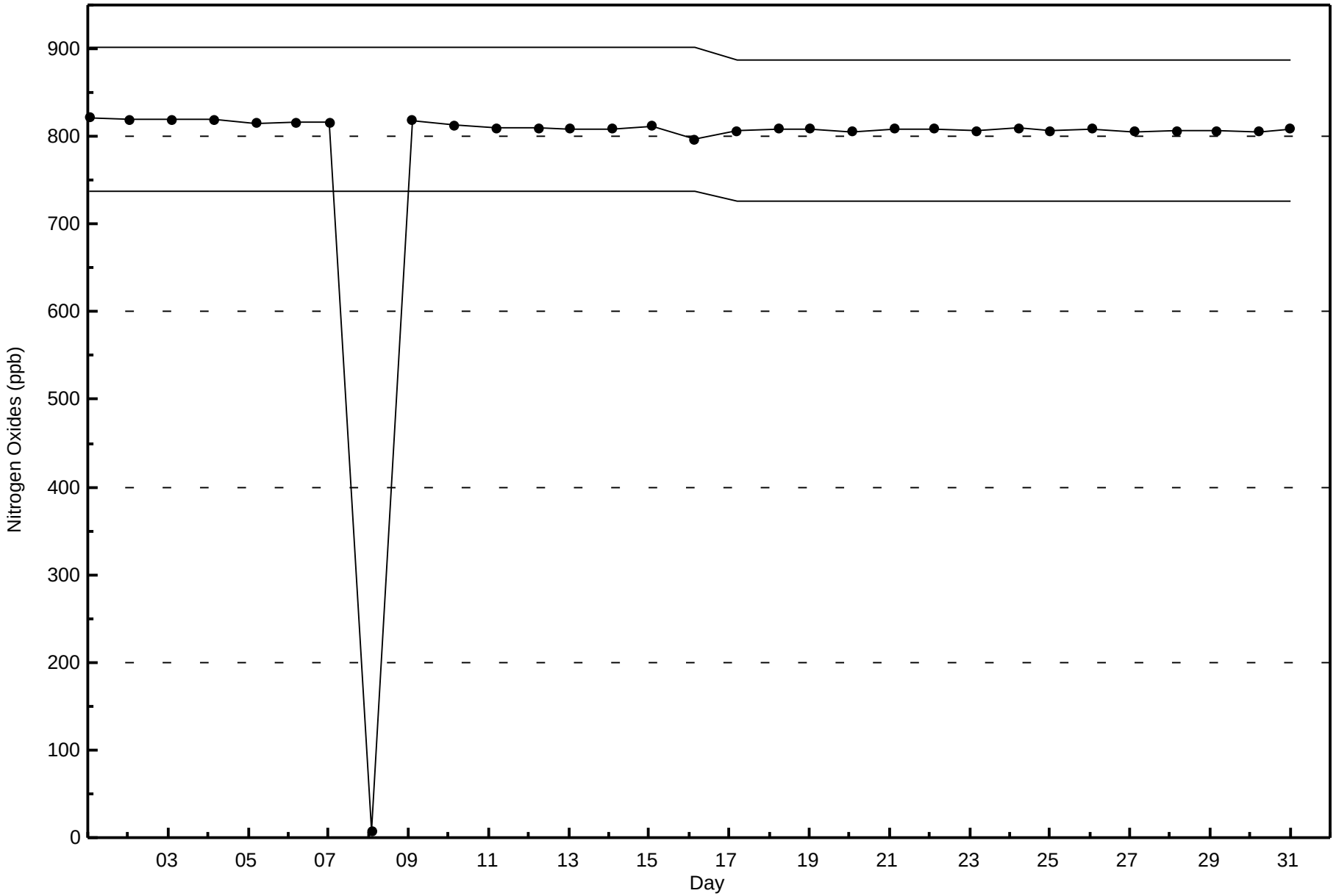


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Anzac - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O_3) - ppb

Anzac - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 51 ppb on Mar 24 16:00

Maximum Daily Average: 45.8 ppb on Mar 22

Minimum Value: 7 ppb on Mar 11 23:00

Minimum Daily Average: 21.7 ppb on Mar 9

Maximum Diurnal Average: 39.7 ppb at hour 15

Minimum Diurnal Average: 29.9 ppb at hour 7

Monthly Average: 35.6 ppb

Percentiles: $P_1 = 14$ $P_{10} = 25$ $Q_1 = 30$ Median = 36 $Q_3 = 42$ $P_{90} = 45$ $P_{99} = 50$

Hours in Service:	744
Hours of Data:	705
Hours of Missing Data:	39
Hours of Calibration:	34
Percent Operational Time:	99.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	32	32	31	Z	26	24	22	21	22	29	35	35	34	35	35	35	34	34	35	36	36	35	34	34	31.5	36
2-Mar	34	31	30	32	Z	33	31	31	32	32	29	29	30	37	38	39	38	31	31	35	35	36	36	36	33.2	39
3-Mar	35	34	34	34	34	Z	32	30	30	30	34	36	38	40	34	22	25	30	32	34	33	34	35	35	32.8	40
4-Mar	34	32	28	26	28	34	Z	32	36	36	38	40	41	42	43	45	45	44	43	38	39	43	43	43	37.9	45
5-Mar	41	39	38	37	36	34	28	Z	24	28	29	29	29	31	31	25	29	32	36	37	38	38	40	41	33.6	41
6-Mar	40	41	41	41	40	39	40	40	Z	40	40	40	40	40	40	41	40	40	39	39	38	38	37	37	39.6	41
7-Mar	37	36	36	Z	35	34	34	33	32	32	32	32	31	31	31	30	32	32	33	33	35	36	35	34	33.3	37
8-Mar	35	24	24	24	Z	21	21	23	24	M	M	31	32	33	35	34	31	29	27	26	31	29	29	27	28.1	35
9-Mar	20	18	18	17	15	Z	15	17	21	22	23	24	24	27	28	29	29	28	27	23	23	22	12	16	21.7	29
10-Mar	24	28	20	21	25	26	Z	29	30	32	32	34	35	36	36	38	38	36	33	34	34	33	31	28	31.1	38
11-Mar	26	25	29	33	32	31	30	Z	27	27	28	30	30	31	32	32	31	30	25	14	11	8	7	7	25.1	33
12-Mar	7	14	19	23	24	20	14	19	Z	25	30	32	35	43	45	45	40	40	43	42	42	38	39	38	31.1	45
13-Mar	35	34	27	Z	27	19	24	29	30	33	33	31	21	29	29	28	28	29	28	28	27	28	28	29	28.5	35
14-Mar	30	32	34	34	Z	30	30	PF	PF	PF	32	33	33	33	31	30	30	29	28	26	26	31	33	32	30.8	34
15-Mar	31	32	31	31	30	Z	28	24	25	28	26	28	29	29	27	27	29	20	17	18	26	33	35	35	27.8	35
16-Mar	30	29	31	31	31	32	Z	34	C	C	C	37	39	38	39	39	39	38	38	38	38	36	37	37	35.5	39
17-Mar	38	40	39	37	36	35	35	Z	35	36	37	39	38	39	40	40	40	39	38	36	34	31	30	28	36.6	40
18-Mar	30	31	28	25	26	25	26	28	Z	39	40	42	43	43	43	43	43	42	36	33	22	22	23	26	33.0	43
19-Mar	37	40	41	Z	31	27	20	24	28	35	37	39	39	42	43	44	45	45	43	42	43	44	43	43	38.1	45
20-Mar	42	41	41	41	Z	41	41	40	39	40	41	41	41	42	42	42	42	43	43	43	43	43	43	42	41.5	43
21-Mar	42	42	42	42	43	Z	43	42	43	43	43	43	43	44	44	45	45	45	45	45	46	46	45	46	43.8	46
22-Mar	47	47	47	46	46	45	Z	43	45	45	45	46	46	47	47	47	47	47	46	46	46	46	45	44	45.8	47
23-Mar	41	38	31	35	39	35	31	Z	37	36	27	27	30	36	40	42	43	42	41	39	38	40	43	38	36.9	43
24-Mar	37	35	32	29	27	26	26	34	Z	47	48	48	49	50	51	51	51	51	48	41	38	39	38	40	40.8	51
25-Mar	45	44	40	Z	35	39	43	43	40	40	41	43	42	45	46	45	42	40	37	35	41	32	29	25	39.7	46
26-Mar	18	23	22	15	Z	14	18	22	29	33	39	42	44	45	46	47	47	46	42	38	35	37	40	43	34.2	47
27-Mar	43	40	39	37	35	Z	38	40	40	42	45	47	48	47	49	50	49	48	47	46	44	44	45	42	43.7	50
28-Mar	41	40	41	37	35	37	Z	41	42	44	45	47	50	50	49	50	51	49	47	42	43	38	35	43	43.3	51
29-Mar	41	40	44	41	33	30	34	Z	48	48	48	50	50	50	50	50	50	49	48	43	39	39	44	43	44.0	50
30-Mar	43	43	39	41	40	40	39	40	Z	36	37	43	44	45	45	46	44	43	42	39	40	41	41	40	41.2	46
31-Mar	41	40	39	Z	39	37	33	36	37	37	36	37	39	41	40	42	43	43	43	42	41	39	31	27	38.4	43
	34.7	34.3	33.3	32.5	32.7	31.1	29.9	31.7	33.1	35.4	36.2	37.2	37.8	39.3	39.7	39.4	39.5	38.5	37.4	35.9	35.7	35.5	35.1	34.8	Diurnal Average	
	47	47	47	46	46	45	43	43	48	48	48	50	50	50	51	51	51	51	48	46	46	46	45	46	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance PF - Power Failure

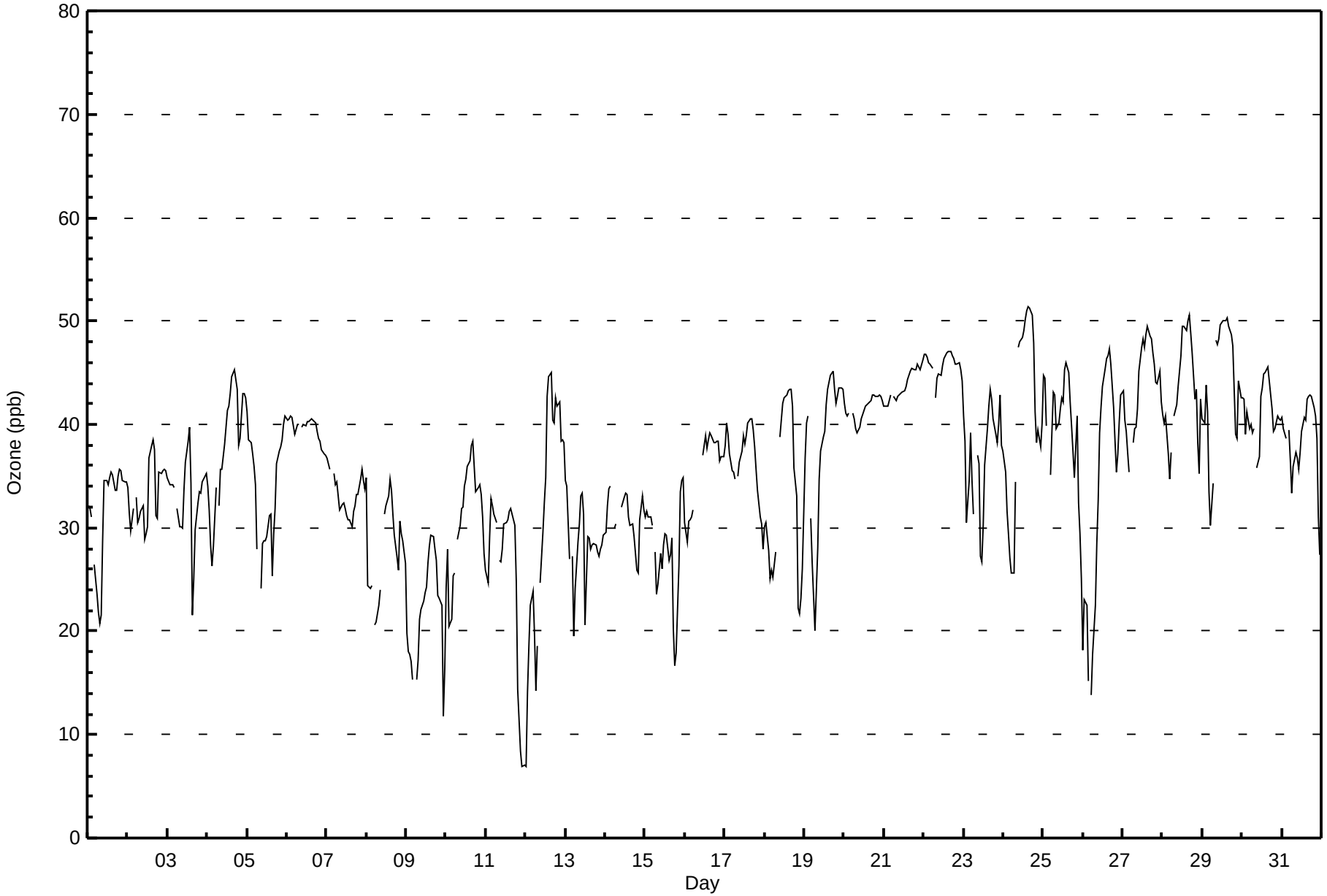
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ozone (O_3) - ppb

Anzac - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	30	4.26	4.26
21 - 50	670	95.04	99.29
51 - 82	5	0.71	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Ozone (O_3) - ppb

Anzac - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	0	1	1	2	1	0	5	7	3	2	0	0	2	2	1	3	30
21 - 50	48	18	14	12	36	70	91	90	26	9	14	15	26	55	48	98	670
51 - 82	0	1	1	0	1	0	1	0	0	0	0	0	1	0	0	0	5
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	48	20	16	14	38	70	97	97	29	11	14	15	29	57	49	101	705

Total Number of Valid Hours: 705

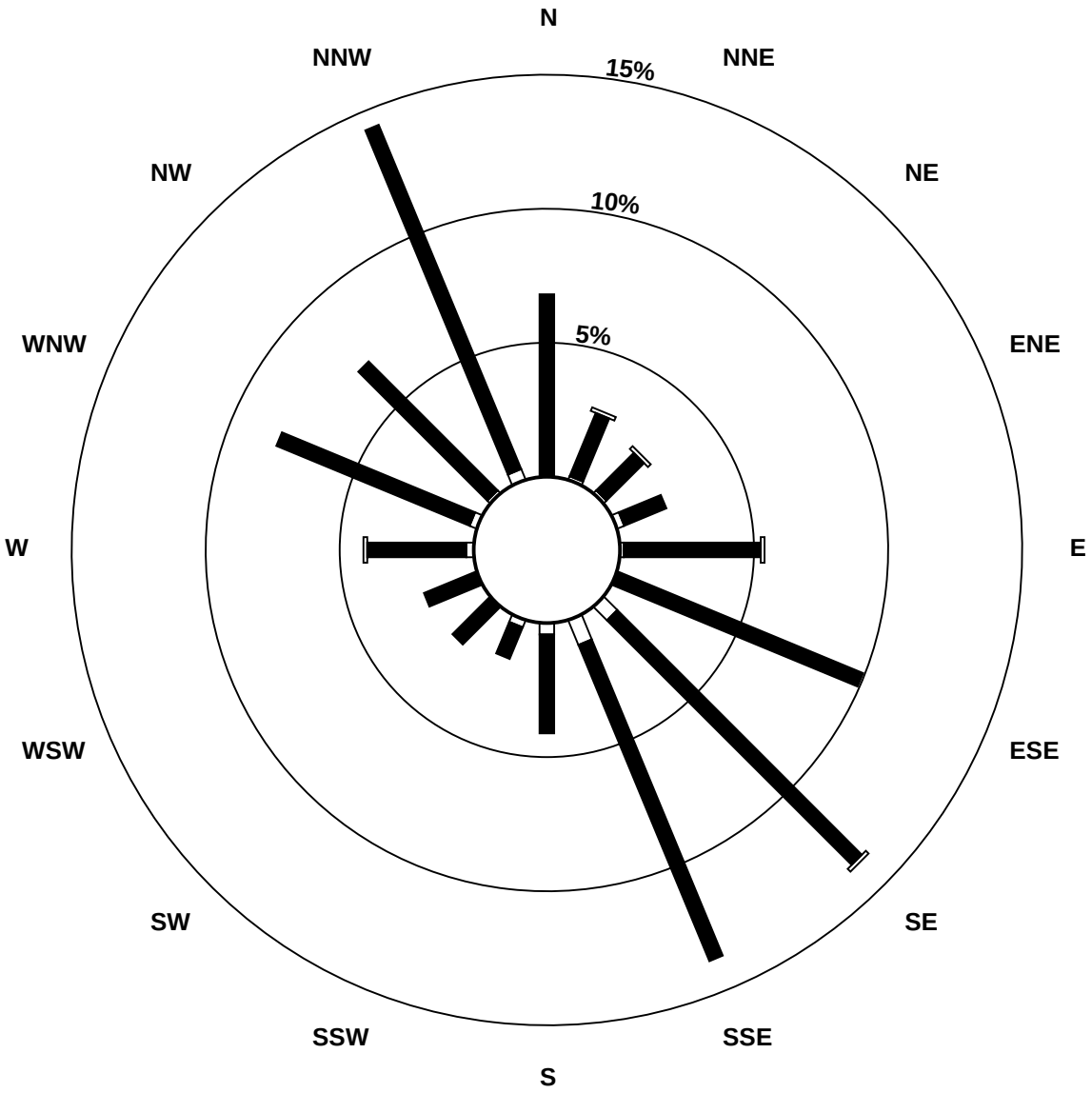
Total Number of Hours: 744

Wood Buffalo Environmental Association

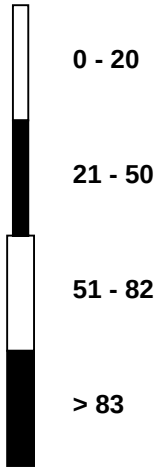
Wind Rose Mar 2016

Ozone (O_3) - ppb

Anzac (AMS 14)



Classes (ppb)



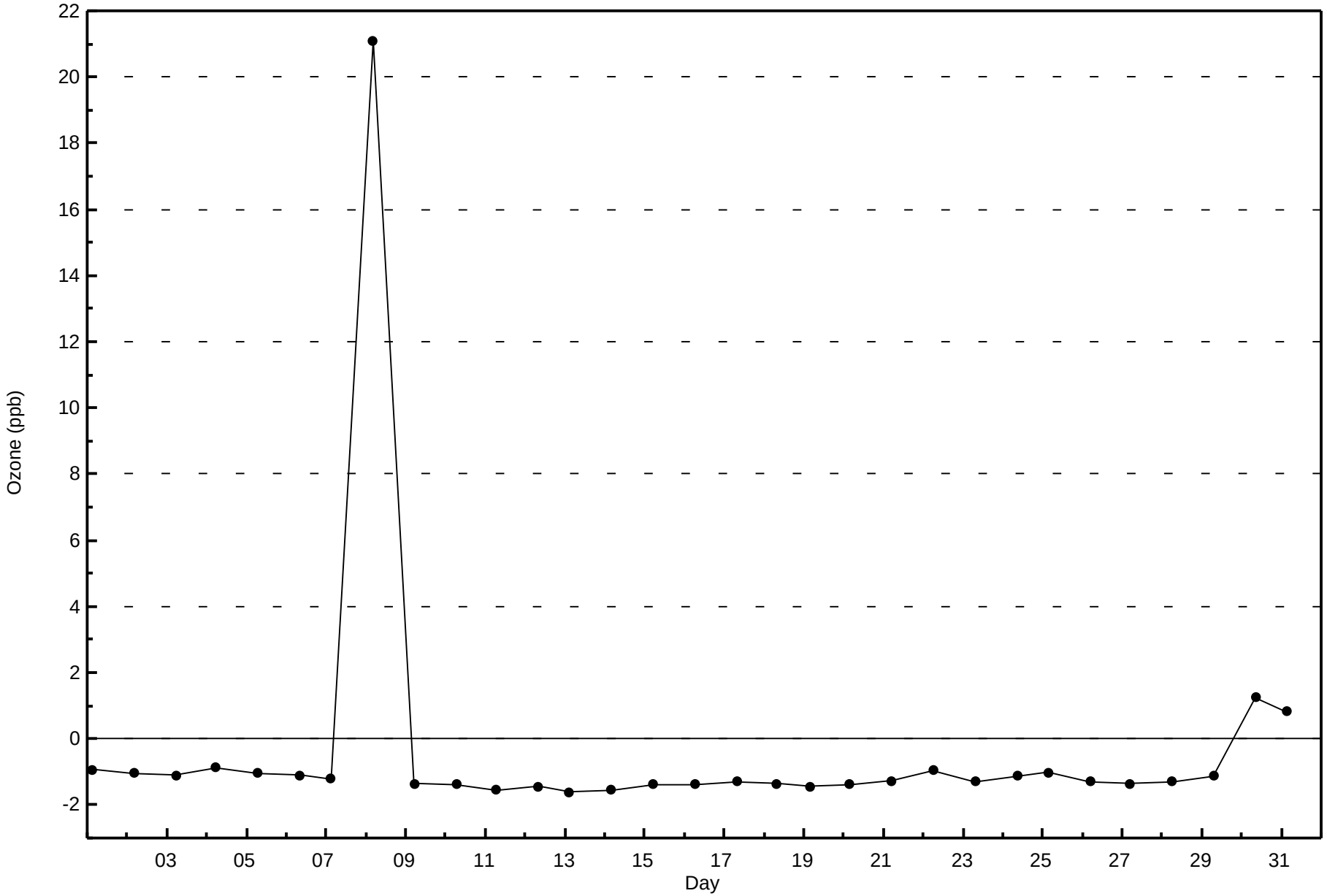
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Ozone (O_3) - ppb

Anzac - March 2016

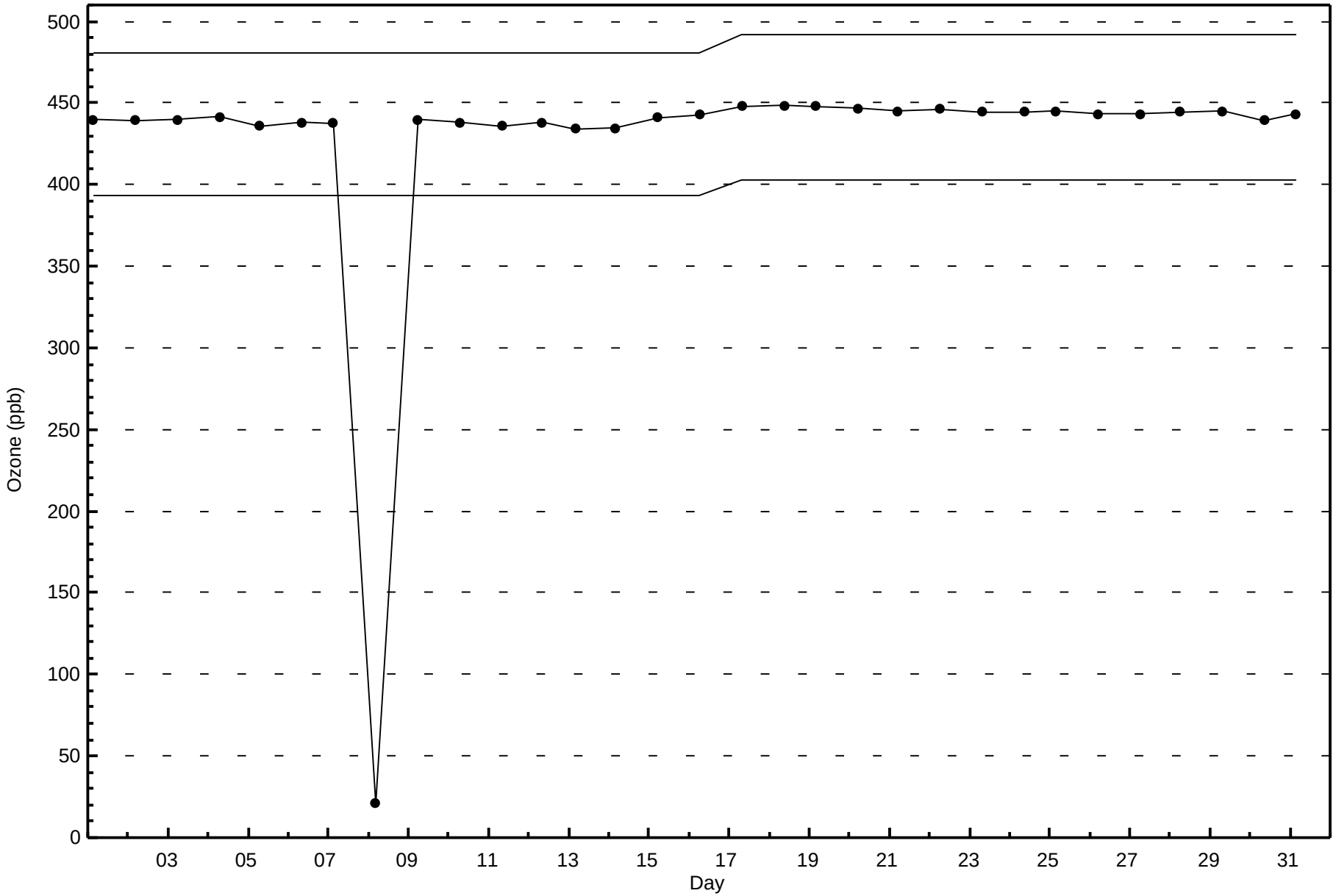


Wood Buffalo Environmental Association

Span Responses

Ozone (O_3) - ppb

Anzac - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Anzac - March 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 26.8 $\mu g/m^3$ on Mar 15 19:00

Maximum Daily Average: 7.5 $\mu g/m^3$ on Mar 9

Minimum Value: 0.6 $\mu g/m^3$ on Mar 17 16:00

Minimum Daily Average: 1.2 $\mu g/m^3$ on Mar 18

Maximum Diurnal Average: 3.5 $\mu g/m^3$ at hour 7

Minimum Diurnal Average: 2.2 $\mu g/m^3$ at hour 17

Monthly Average: 2.91 $\mu g/m^3$

Percentiles: $P_1 = 0.9$ $P_{10} = 1.2$ $Q_1 = 1.5$ Median = 2.2 $Q_3 = 3.5$ $P_{90} = 5.3$ $P_{99} = 12.0$

Hours in Service:	744
Hours of Data:	737
Hours of Missing Data:	7
Hours of Calibration:	5
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	2.9	3.1	3.2	3.0	3.0	3.1	2.8	2.7	2.9	3.8	2.7	2.5	2.3	C	C	1.9	1.9	1.9	2.1	2.5	2.8	3.0	2.9	2.9	2.7	3.8
2-Mar	3.7	4.8	4.9	4.5	3.8	3.5	4.8	4.4	4.6	4.1	3.6	2.4	2.2	2.1	1.9	1.7	1.8	2.1	2.6	3.2	3.0	3.0	3.1	3.0	3.3	4.9
3-Mar	3.6	4.6	4.7	4.3	4.0	4.4	5.0	5.5	7.4	7.8	6.3	4.4	3.0	2.2	2.7	6.1	6.1	5.2	4.5	4.5	4.6	4.3	3.8	2.7	4.6	7.8
4-Mar	2.0	1.7	2.2	1.9	2.4	1.5	1.4	1.4	1.4	1.5	1.4	1.4	1.4	1.4	1.3	1.2	1.2	1.3	1.3	1.2	1.3	1.3	1.4	1.7	1.5	2.4
5-Mar	2.6	3.5	4.3	4.5	4.2	4.8	5.0	7.0	7.0	8.5	7.9	8.0	8.4	7.2	6.3	7.1	5.0	4.4	4.8	3.2	3.1	2.4	1.7	1.3	5.1	8.5
6-Mar	1.2	1.1	1.0	0.9	0.9	0.9	1.0	1.0	1.1	1.1	1.0	1.1	1.1	1.1	1.3	1.5	1.6	1.6	1.5	1.5	1.5	1.4	1.5	1.6	1.2	1.6
7-Mar	1.7	1.9	2.0	2.0	1.7	1.6	1.5	1.5	1.6	1.6	1.7	1.9	2.4	2.5	2.5	2.8	2.9	3.5	4.3	4.4	4.3	3.9	3.3	3.2	2.5	4.4
8-Mar	3.4	6.4	8.0	8.0	10.9	10.8	9.4	8.2	6.8	4.5	3.5	3.0	2.7	2.4	2.0	1.4	1.6	2.2	3.0	6.4	5.1	4.8	5.1	6.6	5.3	10.9
9-Mar	10.5	12.2	10.1	10.0	9.4	9.0	8.8	7.8	8.2	9.3	9.5	10.2	10.6	7.3	6.4	3.4	2.2	1.9	2.9	5.3	6.7	6.8	6.2	6.3	7.5	12.2
10-Mar	10.2	13.3	12.4	12.1	10.2	9.5	9.1	7.7	5.8	5.1	4.7	3.2	2.5	2.0	1.4	1.3	1.6	1.5	1.5	2.2	1.9	1.6	1.4	1.3	5.2	13.3
11-Mar	1.4	1.6	2.5	2.9	2.6	2.4	2.7	2.9	2.7	2.8	2.8	2.8	2.6	2.5	3.4	3.4	2.4	2.1	2.7	2.8	3.5	3.0	2.9	2.4	2.7	3.5
12-Mar	1.8	2.1	4.1	1.6	1.9	1.8	2.3	2.5	2.4	2.7	2.5	2.4	2.5	1.2	1.0	1.0	1.1	1.0	0.9	0.9	1.0	1.3	1.5	1.9	1.8	4.1
13-Mar	2.1	2.0	1.9	1.9	1.8	1.8	2.3	2.8	3.1	2.5	2.4	2.5	6.1	4.5	3.7	3.5	2.3	2.2	1.3	1.0	1.2	1.4	1.5	2.0	2.4	6.1
14-Mar	4.1	2.7	2.1	2.3	2.7	2.4	1.9	PF	PF	1.6	1.6	1.6	1.7	1.8	2.5	2.9	2.6	2.2	2.4	2.8	2.3	1.8	1.8	1.7	2.3	4.1
15-Mar	1.6	1.5	1.6	1.6	1.6	1.5	1.6	2.3	3.3	2.7	3.9	2.5	2.5	2.7	3.5	3.9	3.7	15.1	26.8	16.4	4.7	1.7	1.4	1.5	4.6	26.8
16-Mar	2.2	2.9	2.5	2.1	2.1	1.8	1.6	1.7	C	C	C	1.6	4.1	1.7	1.3	1.1	1.2	1.1	1.2	1.0	1.2	2.0	1.4	1.1	1.8	4.1
17-Mar	1.4	1.0	1.2	1.8	1.2	0.8	0.8	0.9	0.9	1.2	2.1	1.7	2.5	1.6	0.7	0.6	0.6	1.1	1.5	1.6	1.3	1.9	2.1	1.5	1.3	2.5
18-Mar	3.1	1.5	1.7	1.5	1.5	1.4	1.2	1.4	1.7	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.1	0.9	0.9	1.0	1.0	0.9	0.9	1.2	3.1
19-Mar	1.0	1.1	1.1	2.3	2.1	1.7	1.3	1.1	1.6	2.5	2.9	2.2	1.8	1.2	1.4	1.9	1.8	1.7	1.4	1.2	1.3	1.4	1.5	1.5	1.6	2.9
20-Mar	1.5	1.5	1.6	1.6	1.6	1.7	1.7	1.7	1.6	1.7	1.6	1.5	1.5	1.4	1.3	1.3	1.2	1.2	1.3	1.3	1.2	1.2	1.2	1.3	1.4	1.7
21-Mar	1.3	1.3	1.4	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.7	1.7	1.7	1.9	2.1	2.1	2.0	2.0	2.0	1.8	1.6	2.1
22-Mar	2.0	2.7	2.8	3.2	3.1	4.2	6.6	4.0	2.7	1.9	1.8	1.6	1.4	1.5	1.3	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	2.1	6.6
23-Mar	1.1	1.2	1.4	1.8	2.4	2.3	2.6	3.1	2.7	2.3	9.9	5.1	5.4	4.6	4.8	3.4	3.2	3.1	3.6	3.8	3.6	3.1	2.6	2.5	3.3	9.9
24-Mar	2.6	3.3	3.4	3.3	4.4	3.9	4.4	3.3	1.8	1.7	1.8	1.9	2.0	2.0	2.2	2.9	3.0	2.8	3.5	4.1	4.9	8.0	4.6	3.6	3.3	8.0
25-Mar	3.8	4.2	3.9	4.2	3.7	4.0	3.7	3.5	3.3	2.5	2.0	2.1	2.2	2.1	2.5	4.0	4.0	3.5	4.5	3.7	2.7	3.2	3.2	3.9	3.4	4.5
26-Mar	4.3	4.2	7.0	8.0	8.3	8.2	8.1	7.6	7.0	5.7	5.3	5.3	3.7	3.2	3.1	2.9	2.9	3.3	3.7	4.3	5.6	5.0	4.5	4.6	5.2	8.3
27-Mar	4.0	3.3	3.4	3.1	3.2	3.1	3.4	3.2	2.9	2.4	2.0	1.5	1.2	1.3	1.3	1.2	1.2	1.5	2.0	2.7	3.4	3.9	3.9	3.5	2.6	4.0
28-Mar	3.5	3.5	3.4	3.6	4.0	5.3	5.0	4.5	3.4	2.6	2.3	1.9	1.2	1.0	1.3	1.5	1.6	1.5	2.3	2.1	1.8	1.7	1.7	1.8	2.6	5.3
29-Mar	1.0	1.4	1.7	1.0	1.0	1.6	1.6	1.5	1.3	1.2	1.3	1.3	1.2	1.4	1.9	1.5	1.9	2.1	2.4	3.7	2.4	3.5	1.9	1.5	1.7	3.7
30-Mar	1.1	1.1	1.4	1.5	1.3	2.4	1.4	1.2	1.9	3.2	3.4	2.3	2.6	2.0	3.5	2.1	2.0	1.9	1.4	1.8	1.3	1.0	0.9	1.0	1.8	3.5
31-Mar	1.2	1.6	1.9	2.0	2.0	2.6	3.0	2.3	2.2	2.8	4.5	3.9	3.1	2.5	2.5	2.9	2.2	1.5	1.6	1.7	1.8	1.8	1.9	1.6	2.3	4.5
	2.8	3.2	3.4	3.3	3.4	3.4	3.5	3.3	3.3	3.1	3.3	2.8	2.9	2.4	2.4	2.4	2.2	2.5	3.1	3.1	2.7	2.7	2.4	2.4	Diurnal Average	
	10.5	13.3	12.4	12.1	10.9	10.8	9.4	8.2	8.2	9.3	9.9	10.2	10.6	7.3	6.4	7.1	6.1	15.1	26.8	16.4	6.7	8.0	6.2	6.6	Diurnal Maximum	

C - Calibration PF - Power Failure

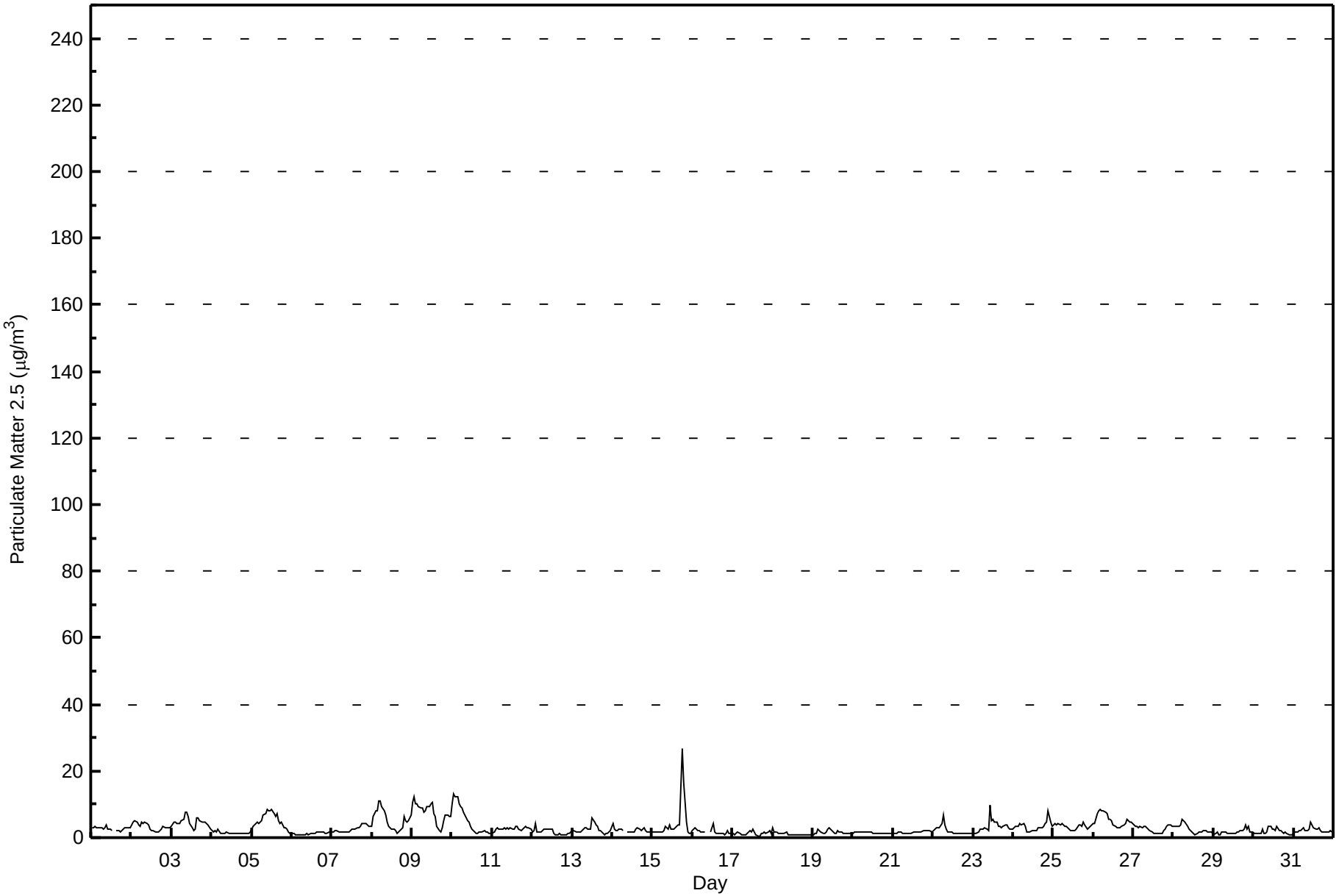
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Anzac - March 2016



Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Anzac - March 2016

Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	636	86.30	86.30
6 - 15	66	8.96	95.25
16 - 25	1	0.14	95.39
26 - 80	1	0.14	95.52
> 81.0	0	0.00	95.52

Total Number of Valid Hours: 737

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Anzac - March 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	42	15	15	14	36	69	88	88	24	10	11	15	24	52	41	92	636
6 - 15	6	3	1	2	2	3	12	12	5	2	0	0	2	5	5	6	66
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	48	18	16	16	38	72	100	100	29	12	11	15	26	57	46	100	704

Total Number of Valid Hours: 737

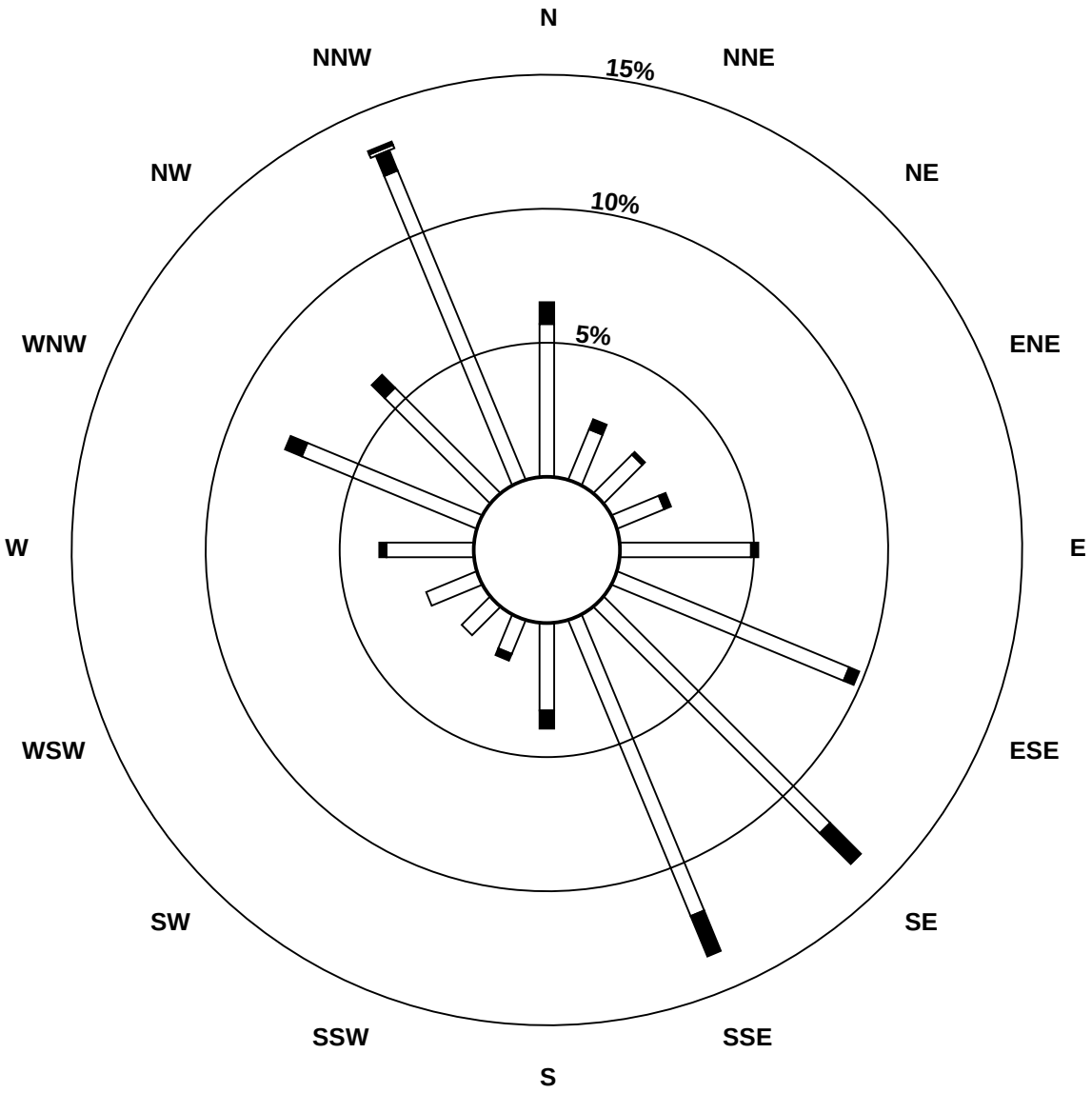
Total Number of Hours: 744

Wood Buffalo Environmental Association

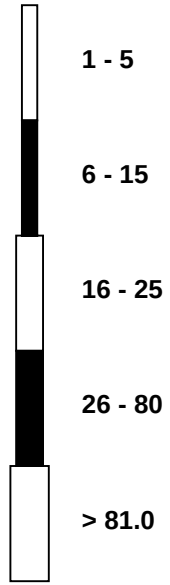
Wind Rose Mar 2016

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Anzac (AMS 14)



Classes ($\mu g/m^3$)



Total Number of Valid Hours: 737

Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 2m (AT 2m) - C

Anzac - March 2016

Maximum Value: 12.2 C on Mar 29 16:00

Maximum Daily Average: 5.0 C on Mar 29

Minimum Value: -19.5 C on Mar 24 07:00

Minimum Daily Average: -8.9 C on Mar 24

Maximum Diurnal Average: 1.3 C at hour 15

Minimum Diurnal Average: -6.8 C at hour 7

Monthly Average: -3.14 C

Percentiles: P_1 = -13.9 P_{10} = -8.9 Q_1 = -6.2 Median = -3.6 Q_3 = -0.3 P_{90} = 3.2 P_{99} = 10.7

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

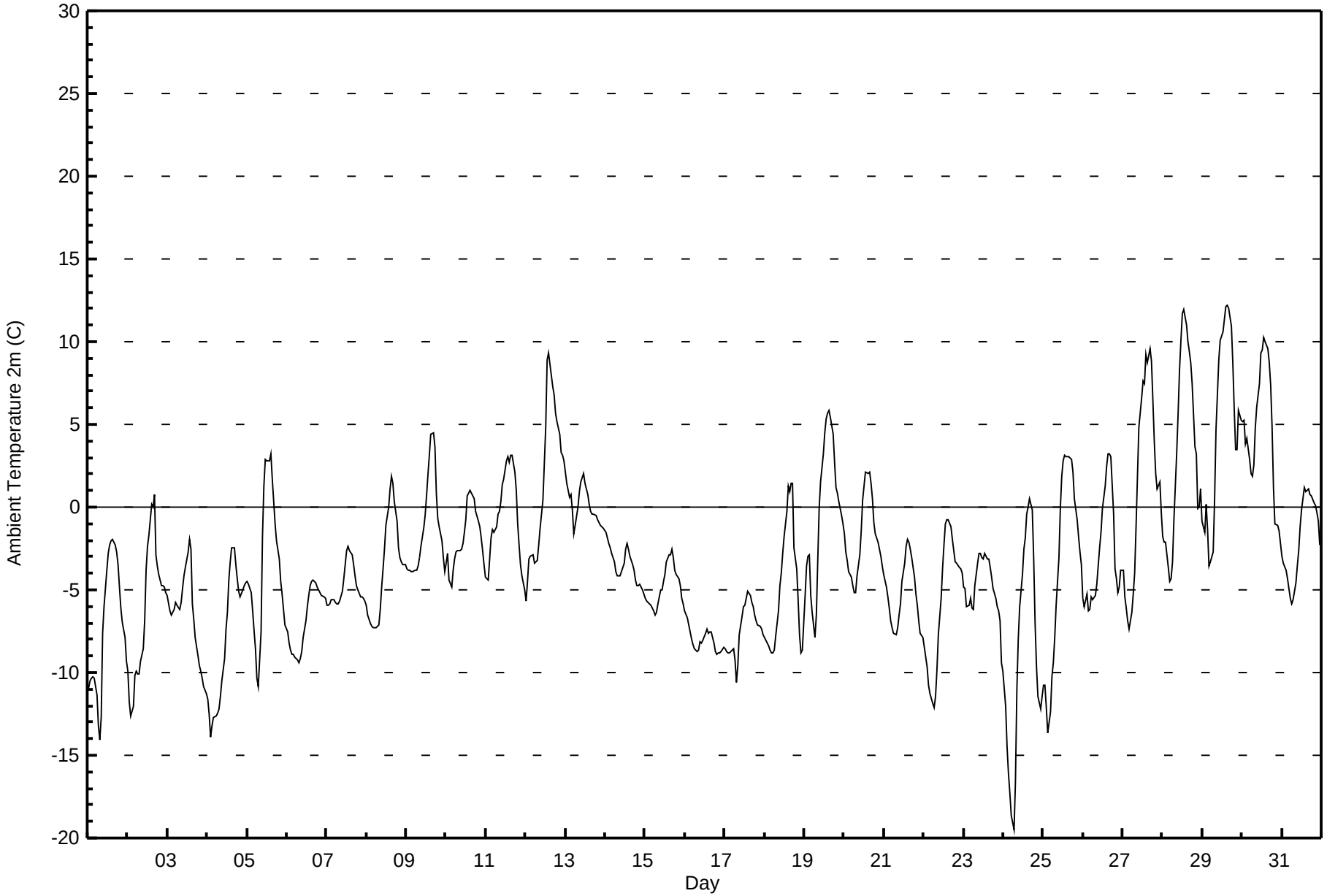
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.9	-10.5	-10.4	-10.3	-10.4	-11.4	-13.2	-14.1	-12.7	-7.6	-6.0	-3.8	-2.8	-2.3	-2.1	-2.0	-2.3	-2.8	-3.5	-4.9	-6.1	-7.0	-7.9	-9.3	-7.3	-2.0
2-Mar	-9.9	-11.8	-12.7	-12.0	-10.1	-10.0	-10.1	-10.1	-9.3	-8.5	-6.9	-3.8	-2.4	-1.7	0.2	0.0	0.8	-2.9	-3.5	-4.0	-4.7	-4.7	-4.9	-5.2	-6.2	0.8
3-Mar	-5.4	-6.3	-6.5	-6.4	-6.2	-5.7	-6.0	-6.2	-5.7	-4.9	-4.2	-3.7	-2.7	-1.9	-2.5	-5.9	-6.8	-7.9	-9.0	-9.6	-9.9	-10.3	-10.8	-11.3	-6.5	-1.9
4-Mar	-11.6	-12.5	-13.9	-13.3	-12.7	-12.6	-12.5	-12.2	-11.5	-10.5	-9.1	-7.4	-6.4	-4.4	-3.3	-2.5	-2.5	-3.4	-4.3	-5.1	-5.4	-5.0	-4.7	-4.5	-8.0	-2.5
5-Mar	-4.5	-4.7	-5.2	-6.3	-7.5	-8.5	-10.4	-10.9	-7.5	-1.7	1.3	2.9	2.8	2.8	3.2	1.7	0.3	-1.1	-2.0	-3.1	-4.5	-5.2	-6.2	-7.1	-3.4	3.2
6-Mar	-7.6	-8.2	-8.6	-8.9	-8.9	-9.1	-9.3	-9.4	-9.2	-8.7	-7.9	-6.8	-6.0	-5.3	-4.8	-4.5	-4.4	-4.6	-4.9	-5.0	-5.1	-5.4	-5.4	-5.5	-6.8	-4.4
7-Mar	-5.9	-5.9	-5.9	-5.6	-5.6	-5.7	-5.8	-5.9	-5.7	-5.1	-4.3	-3.5	-2.6	-2.4	-2.6	-2.9	-3.4	-4.1	-4.7	-5.0	-5.4	-5.4	-5.5	-5.7	-4.8	-2.4
8-Mar	-6.0	-6.5	-7.0	-7.2	-7.3	-7.3	-7.3	-7.1	-6.2	-4.9	-3.7	-2.5	-1.1	0.0	1.1	1.9	1.4	0.3	-0.8	-2.4	-3.1	-3.3	-3.5	-3.5	-3.6	1.9
9-Mar	-3.7	-3.8	-3.8	-3.9	-3.9	-3.8	-3.8	-3.5	-3.0	-2.4	-1.2	-0.5	0.7	2.0	3.1	4.4	4.5	3.6	0.9	-0.7	-1.2	-2.0	-3.1	-3.9	-1.2	4.5
10-Mar	-3.4	-2.8	-4.4	-4.8	-3.8	-3.1	-2.7	-2.6	-2.7	-2.5	-2.2	-1.5	-0.8	0.7	1.0	0.9	0.6	0.5	-0.3	-0.8	-1.2	-1.9	-2.6	-3.5	-1.8	1.0
11-Mar	-4.2	-4.4	-3.1	-1.9	-1.4	-1.5	-1.2	-0.4	-0.2	0.4	1.4	1.7	2.8	3.0	2.7	3.2	3.1	2.1	1.1	-1.1	-2.3	-3.5	-4.2	-5.0	-0.5	3.2
12-Mar	-5.7	-4.5	-3.1	-3.0	-2.9	-3.4	-3.3	-3.2	-2.3	-1.3	0.4	2.7	4.9	8.9	9.3	8.0	7.3	6.8	5.7	5.1	4.4	3.3	3.2	2.8	1.7	9.3
13-Mar	2.1	1.4	0.6	0.8	-0.2	-1.6	-1.1	0.0	0.9	1.5	1.8	2.1	1.5	0.8	0.1	-0.3	-0.5	-0.4	-0.5	-0.7	-1.0	-1.1	-1.1	-1.3	0.2	2.1
14-Mar	-1.5	-1.8	-2.2	-2.5	-2.8	-3.3	-3.9	-4.1	-4.2	-4.2	-3.9	-3.4	-2.5	-2.2	-2.5	-3.0	-3.5	-3.8	-4.4	-4.7	-4.7	-4.7	-5.0	-5.3	-3.5	-1.5
15-Mar	-5.5	-5.7	-5.7	-5.9	-6.1	-6.2	-6.5	-6.4	-5.8	-5.0	-5.0	-4.5	-4.1	-3.3	-2.9	-2.9	-2.6	-3.1	-3.8	-4.1	-4.3	-4.7	-5.5	-5.9	-4.8	-2.6
16-Mar	-6.3	-6.7	-7.1	-7.6	-8.0	-8.3	-8.6	-8.8	-8.6	-8.2	-8.2	-8.1	-7.7	-7.4	-7.6	-7.5	-7.5	-8.2	-8.8	-8.9	-8.8	-8.8	-8.8	-8.4	-8.0	-6.3
17-Mar	-8.5	-8.7	-8.8	-8.8	-8.6	-8.5	-9.2	-10.6	-9.6	-7.7	-6.6	-6.0	-5.9	-5.5	-5.1	-5.3	-5.8	-6.0	-6.5	-6.9	-7.1	-7.2	-7.4	-7.7	-7.4	-5.1
18-Mar	-7.9	-8.1	-8.4	-8.7	-8.8	-8.8	-8.7	-7.8	-6.3	-4.8	-4.0	-2.8	-1.8	-0.3	1.3	1.0	1.5	1.5	-2.4	-3.7	-5.6	-7.7	-8.8	-8.7	-4.9	1.5
19-Mar	-5.4	-3.6	-3.0	-2.8	-5.3	-6.3	-7.9	-6.5	-3.2	-0.1	1.5	3.2	4.5	5.3	5.7	5.9	5.4	4.4	2.7	1.2	0.8	0.3	-0.5	-1.0	-0.2	5.9
20-Mar	-1.6	-2.7	-3.2	-3.9	-4.2	-4.7	-5.2	-5.2	-4.2	-2.9	-1.5	0.4	1.3	2.1	2.0	2.1	1.5	0.5	-0.9	-1.6	-2.1	-2.5	-2.9	-3.5	-1.8	2.1
21-Mar	-4.1	-4.9	-5.5	-6.1	-6.8	-7.3	-7.6	-7.7	-7.3	-6.6	-5.9	-4.5	-3.4	-2.4	-1.9	-2.1	-2.5	-3.1	-4.2	-5.2	-5.9	-6.8	-7.6	-7.9	-5.3	-1.9
22-Mar	-8.5	-9.0	-9.6	-10.7	-11.3	-11.8	-12.1	-11.4	-9.8	-7.7	-5.5	-3.8	-2.3	-1.0	-0.7	-0.8	-1.2	-1.9	-2.7	-3.3	-3.4	-3.6	-3.7	-4.0	-5.8	-0.7
23-Mar	-4.8	-4.9	-6.0	-5.9	-5.5	-6.1	-6.2	-4.8	-3.4	-2.8	-2.8	-3.1	-3.2	-2.8	-3.1	-3.2	-3.6	-4.2	-4.9	-5.5	-6.0	-6.3	-6.9	-9.4	-4.8	-2.8
24-Mar	-9.9	-12.1	-14.5	-16.1	-17.3	-18.6	-19.5	-16.5	-11.0	-8.0	-6.0	-4.1	-2.5	-1.9	-0.5	0.0	0.5	-0.1	-3.2	-7.0	-9.7	-11.4	-12.2	-11.5	-8.9	0.5
25-Mar	-10.8	-10.8	-12.1	-13.6	-12.4	-10.2	-9.4	-7.8	-5.9	-3.0	-0.1	1.9	2.8	3.2	3.1	3.0	2.9	2.8	2.1	0.5	-0.7	-1.8	-2.7	-3.5	-3.4	3.2
26-Mar	-5.5	-6.0	-5.3	-6.2	-6.2	-5.4	-5.6	-5.4	-4.6	-3.5	-2.4	-1.5	-0.1	1.3	2.5	3.2	3.3	3.0	-0.4	-3.7	-4.3	-5.1	-4.9	-3.8	-2.8	3.3
27-Mar	-3.8	-5.4	-6.1	-6.8	-7.4	-6.4	-5.3	-4.0	-1.2	1.8	4.8	6.6	7.6	7.5	9.2	8.7	9.5	8.8	6.4	4.0	2.0	1.1	1.5	-0.4	1.4	9.5
28-Mar	-1.8	-2.2	-2.1	-3.6	-4.5	-4.3	-3.3	-0.8	3.3	5.7	8.3	10.0	11.7	12.0	11.1	10.0	9.4	8.7	7.4	3.6	3.2	-0.1	0.0	1.1	3.5	12.0
29-Mar	-0.9	-1.5	0.2	-1.4	-3.5	-3.3	-2.7	0.4	4.7	6.7	8.9	10.1	10.6	11.4	12.1	12.2	12.0	11.0	8.7	6.0	3.5	3.5	5.8	5.3	5.0	12.2
30-Mar	5.1	5.2	3.8	4.2	2.9	2.1	1.9	2.6	4.7	6.0	7.4	9.3	9.5	10.3	10.0	9.6	8.7	7.4	4.8	1.2	-1.0	-1.1	-1.4	-2.2	4.6	10.3
31-Mar	-2.9	-3.4	-3.8	-4.3	-4.9	-5.5	-5.9	-5.6	-4.5	-3.6	-2.6	-1.2	-0.1	1.2	1.0	1.0	1.1	0.7	0.7	0.3	0.1	-0.3	-0.8	-2.3	-1.9	1.2
	-5.2	-5.6	-5.9	-6.2	-6.5	-6.7	-6.8	-6.3	-4.9	-3.4	-2.1	-0.8	0.1	0.9	1.3	1.1	0.9	0.1	-1.1	-2.4	-3.2	-3.8	-4.1	-4.6	Diurnal Average	
	5.1	5.2	3.8	4.2	2.9	2.1	1.9	2.6	4.7	6.7	8.9	10.1	11.7	12.0	12.1	12.2	12.0	11.0	8.7	6.0	4.4	3.5	5.8	5.3	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 2m (AT 2m) - C

Anzac - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	568	76.34	76.34
0 - 10	163	21.91	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) - %

Anzac - March 2016

Maximum Value: 98 % on Mar 12 04:00

Maximum Daily Average: 90.5 % on Mar 14

Minimum Value: 28 % on Mar 29 16:00

Minimum Daily Average: 50.8 % on Mar 29

Maximum Diurnal Average: 84.3 % at hour 6

Minimum Diurnal Average: 61.4 % at hour 16

Monthly Average: 74.5 %

Percentiles: P_1 = 33 P_{10} = 48 Q_1 = 62 Median = 79 Q_3 = 89 P_{90} = 93 P_{99} = 97

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

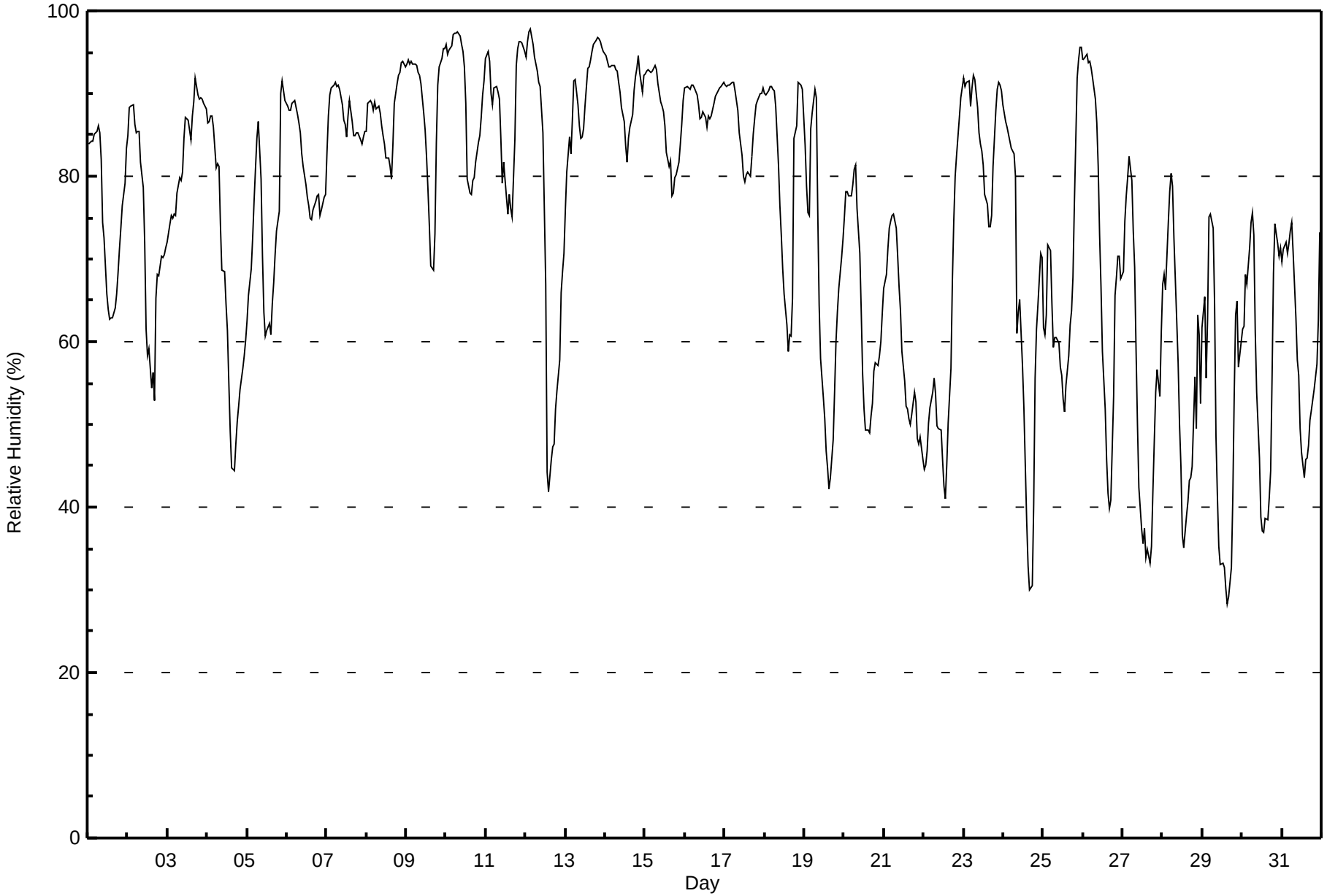
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	84	84	84	84	85	85	86	85	82	74	73	66	64	63	63	63	64	66	68	71	74	76	79	83	75.3	86
2-Mar	85	88	88	89	86	85	85	85	82	79	72	62	58	59	54	56	53	65	68	68	70	70	70	71	73.0	89
3-Mar	72	74	75	75	75	75	78	80	80	80	85	87	87	86	84	87	89	92	90	89	89	89	89	88	83.2	92
4-Mar	86	87	87	87	86	81	82	81	74	69	69	65	61	55	49	45	44	48	50	52	54	57	58	60	66.2	87
5-Mar	62	66	69	73	77	81	85	87	80	70	64	61	61	62	61	65	67	71	73	76	90	91	90	89	73.7	91
6-Mar	88	88	88	89	89	89	87	86	85	83	81	79	77	76	75	75	76	77	78	78	75	76	77	78	81.3	89
7-Mar	83	87	90	91	91	91	91	91	91	89	87	86	85	87	89	87	85	85	85	85	84	84	85	85	87.2	91
8-Mar	85	89	89	89	88	89	88	88	88	86	85	84	82	82	81	80	84	89	91	92	93	94	94	93	87.6	94
9-Mar	94	94	94	94	94	93	93	93	92	91	88	86	82	79	74	69	69	73	84	91	93	94	95	95	87.6	95
10-Mar	96	95	95	96	97	97	97	97	97	96	95	93	89	80	78	78	79	80	82	84	85	87	90	92	89.8	97
11-Mar	94	95	94	90	89	91	91	90	89	85	79	82	77	75	78	76	75	84	93	95	96	96	96	95	87.8	96
12-Mar	94	96	98	98	96	94	94	93	91	91	85	76	67	44	42	46	47	48	52	54	58	66	68	71	73.7	98
13-Mar	76	80	85	83	87	92	92	89	86	85	85	86	89	93	93	94	95	96	96	97	97	96	96	95	90.0	97
14-Mar	95	94	93	93	93	93	93	93	91	90	88	87	84	82	85	86	88	90	92	93	95	93	90	92	90.5	95
15-Mar	92	93	93	93	93	93	93	93	91	89	88	88	86	83	81	82	78	78	80	80	82	84	86	89	87.0	93
16-Mar	91	91	91	91	91	91	91	90	89	87	87	88	87	86	87	87	87	89	90	90	90	91	91	91	89.2	91
17-Mar	91	91	91	91	91	91	90	89	88	85	83	80	79	80	81	80	82	85	87	89	89	90	90	91	86.9	91
18-Mar	90	90	90	91	91	91	90	88	81	76	73	69	66	62	59	61	61	65	85	86	91	91	91	91	80.4	91
19-Mar	84	79	76	75	86	88	90	90	76	64	58	53	51	47	45	42	44	48	54	60	64	67	70	72	65.9	90
20-Mar	75	78	78	78	78	79	81	81	76	71	64	56	52	49	49	49	51	52	56	57	57	58	60	63	64.6	81
21-Mar	66	68	71	74	75	75	75	74	70	67	64	59	55	52	52	51	50	51	54	53	48	48	48	46	60.2	75
22-Mar	45	45	47	50	52	54	56	54	50	50	49	46	43	41	45	50	57	67	75	80	83	87	89	91	58.5	91
23-Mar	92	91	91	92	89	91	92	92	88	85	84	83	81	78	77	74	74	75	81	88	91	91	91	90	85.8	92
24-Mar	89	87	86	85	84	83	83	80	61	63	65	57	52	45	38	33	30	31	40	56	61	64	71	70	63.1	89
25-Mar	62	61	63	72	71	65	59	60	60	60	57	56	53	52	55	58	62	64	68	77	92	94	96	96	67.1	96
26-Mar	94	94	95	94	94	93	92	89	86	81	73	67	59	52	46	42	40	41	53	66	68	70	70	68	71.9	95
27-Mar	69	75	78	80	82	79	73	69	59	50	42	37	36	37	34	35	33	35	42	48	54	57	53	61	54.9	82
28-Mar	67	68	66	74	78	80	79	73	63	58	50	45	37	35	39	41	43	44	45	56	50	63	61	53	56.9	80
29-Mar	62	65	56	63	75	75	74	65	48	41	35	33	33	33	30	28	29	33	41	54	63	65	57	60	50.8	75
30-Mar	62	62	68	67	71	74	76	73	61	54	46	39	37	37	39	39	41	44	56	68	74	72	70	71	58.4	76
31-Mar	70	71	72	71	72	73	74	71	63	58	56	50	47	44	46	46	47	50	52	54	56	57	62	73	59.8	74
	80.4	81.5	82.0	82.8	84.0	84.3	84.2	82.9	78.1	74.4	71.2	67.8	65.1	62.4	61.6	61.4	62.1	65.0	69.7	73.8	76.3	78.0	78.6	79.5	Diurnal Average	
	96	96	98	98	97	97	97	97	97	96	95	93	89	93	93	94	95	96	96	97	97	96	96	96	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Anzac - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	28	3.76	3.76
40 - 60	136	18.28	22.04
60 - 80	223	29.97	52.02
80 - 100	357	47.98	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 62 % on Mar 9 12:00

Maximum Daily Average: 9.4 % on Mar 18

Minimum Value: -1 % on Mar 29 17:00

Minimum Daily Average: 0.0 % on Mar 31

Maximum Diurnal Average: 5.6 % at hour 14

Minimum Diurnal Average: 1.1 % at hour 21

Monthly Average: 2.1 %

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 28$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

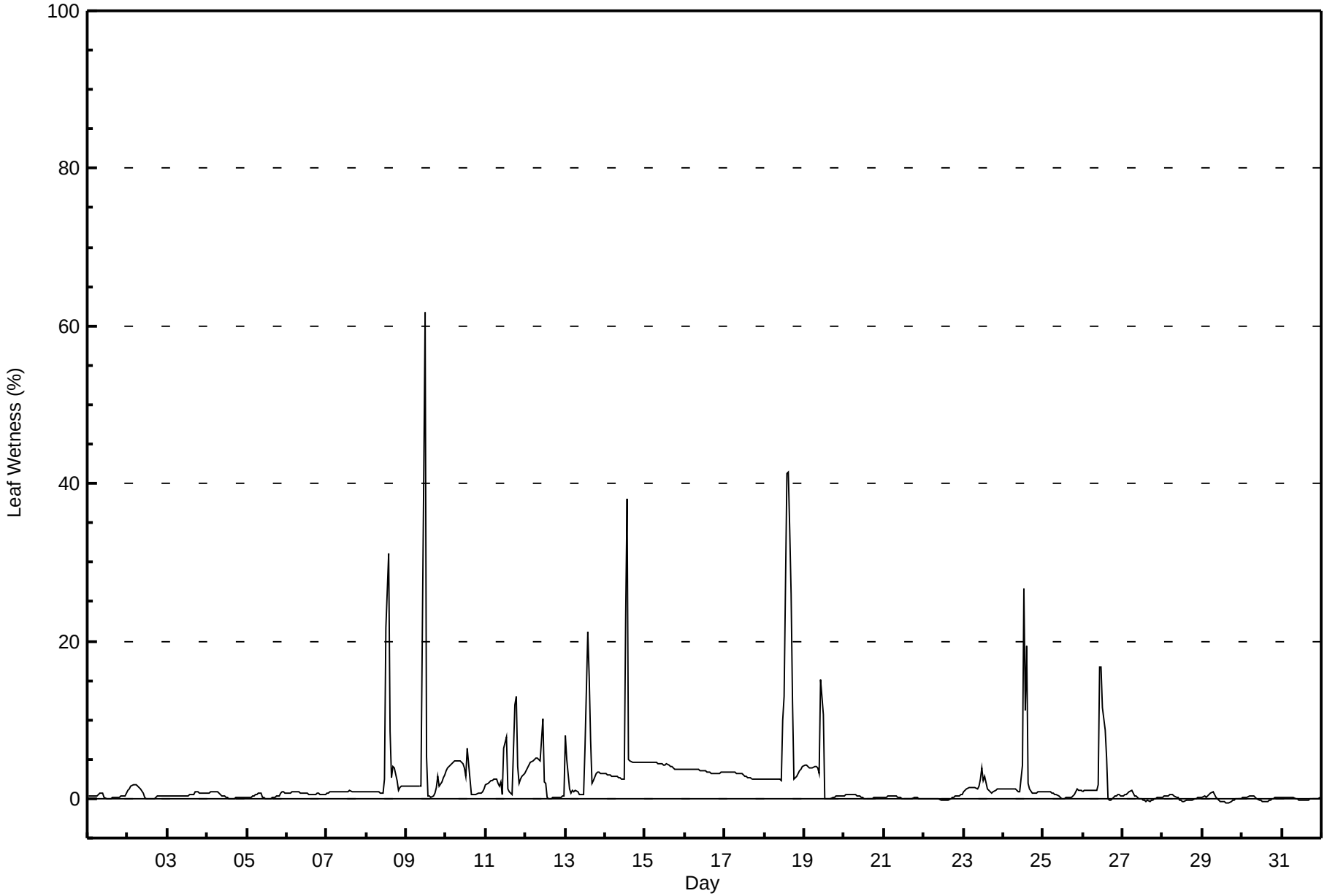
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
2-Mar	1	1	2	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2
3-Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.5	1
4-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
5-Mar	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1
6-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	0.7	1
7-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	0.8	1
8-Mar	1	1	1	1	1	1	1	1	1	1	1	2	22	31	9	3	4	4	2	1	1	2	2	2	3.8	31
9-Mar	2	2	2	2	2	2	2	2	2	2	40	62	5	0	0	0	0	1	1	3	2	2	3	3	5.8	62
10-Mar	3	4	4	4	5	5	5	5	5	5	4	4	3	6	2	1	1	1	1	1	1	1	1	1	2.9	6
11-Mar	2	2	2	2	2	2	2	2	2	2	1	6	8	1	1	1	1	12	13	4	2	2	3	3	3.3	13
12-Mar	4	4	4	5	5	5	5	5	5	5	10	2	2	0	0	0	0	0	0	0	0	0	0	0	2.6	10
13-Mar	8	5	1	1	1	1	1	1	1	1	1	1	6	21	15	8	2	2	3	3	3	3	3	3	3.9	21
14-Mar	3	3	3	3	3	3	3	3	3	3	2	3	23	38	5	5	5	5	5	5	5	5	5	5	5.9	38
15-Mar	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4.2	5
16-Mar	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3.5	4
17-Mar	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	3	2.9	3
18-Mar	3	3	3	3	3	3	3	3	2	2	2	10	13	41	41	34	26	12	3	3	3	4	4	4	9.4	41
19-Mar	4	4	4	4	4	4	4	4	4	3	15	11	0	0	0	0	0	0	0	0	0	0	0	0	2.8	15
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	0.2	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	1	0.1	1
23-Mar	1	1	1	1	1	1	1	1	1	2	2	4	2	3	1	1	1	1	1	1	1	1	1	1	1.5	4
24-Mar	1	1	1	1	1	1	1	1	1	1	1	4	27	11	19	2	1	1	1	1	1	1	1	1	3.4	27
25-Mar	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.6	1
26-Mar	1	1	1	1	1	1	1	1	1	2	17	17	12	9	5	0	0	0	0	0	0	0	0	0	3.0	17
27-Mar	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
28-Mar	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
29-Mar	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0.0	1
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
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
	1.6	1.6	1.5	1.5	1.6	1.6	1.6	1.6	1.4	1.4	3.6	4.4	4.3	5.6	3.6	2.1	1.6	1.6	1.4	1.1	1.1	1.2	1.2	1.3	Diurnal Average	
	8	5	5	5	5	5	5	5	5	5	40	62	27	41	41	34	26	12	13	5	5	5	5	5	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Leaf Wetness (SW) - %

Anzac - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	188	28.40	28.40
0.4 - 0.5	47	7.10	35.50
0.6 - 0.7	58	8.76	44.26
0.8 - 1.4	124	18.73	62.99
1.5 - 10	218	32.93	95.92
> 10	25	3.78	99.70

Total Number of Valid Hours: 662

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Anzac - March 2016

Maximum Speed: 19 km/h on Mar 12 15:00

Maximum Daily Speed Average: 11.6 km/h on Mar 21

Minimum Speed Value: 0 km/h on Mar 9 02:00

Minimum Daily Speed Average: 1.2 km/h on Mar 8

Maximum Diurnal Speed Average: 1.8 km/h at hour 24

Minimum Diurnal Speed Average: 0.7 km/h at hour 15

Monthly Average Velocity: 1.0 km/h 102.2 deg

Percentiles: P_1 = 1 P_{10} = 3 Q_1 = 5 Median = 8 Q_3 = 10 P_{90} = 12 P_{99} = 16

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	SSE4	SSE4	SSE4	SE3	E2	E1	E2	ESE2	SSW3	SW3	W5	SSW1	NW3	NW3	WSW1	ENE3	ENE6	E7	ESE7	ESE9	SE9	SE7	ESE7	ESE8	SE2.9	SE9
2-Mar	SE9	SE7	ESE5	ESE6	SSE7	SE7	SE4	ESE6	ESE5	ESE6	SE3	ESE3	SSE4	NE5	NNW2	WNW4	ENE2	E3	E6	SE8	SSE7	SSE9	SSE8	SSE10	SE4.7	SSE10
3-Mar	SSE12	SSE12	SSE12	SSE10	SSE9	SE10	SE10	SE9	SE11	SE10	SSE13	SSE11	S10	SSE8	WSW2	NW8	NW9	NNW11	NNW11	NNW11	NNW11	NNW10	NNW8	N9	SE2.3	SSE13
4-Mar	N9	NNE5	WNW5	NW4	N3	W1	SSW3	SE2	SSE4	SSE6	SSE8	SE9	SSE9	SSE10	SSE11	SSE12	SE13	SE13	SE12	SE11	SE12	SSE10	SE11	SE11	SE6.0	SE13
5-Mar	SE9	SE8	SSE8	SE6	SSE7	SE6	SE3	S2	N1	NNE3	NW7	NNW10	N9	N9	NNW10	N11	N10	NNE8	N8	N7	NNE8	NNE6	NNE8	NE8	NNE3.5	N11
6-Mar	NNE8	NNE8	NNE8	NNE5	NNE4	NE6	ENE7	NE6	NE6	ENE5	ENE5	E6	E6	ENE8	E11	E12	E11	E10	E9	E6	ESE8	ESE10	ESE11	ESE12	ENE6.8	ESE12
7-Mar	ESE11	SE13	ESE12	ESE11	SE11	SE11	SE10	SE9	SE9	SE9	SE10	SSE7	S2	NW5	NW8	NW9	NW9	NW8	NW8	NW8	NW8	NW7	NW5	WNW5	SE1.8	SE13
8-Mar	NW5	N4	NNE4	NE3	ENE4	E4	ESE3	ESE6	SE6	SE7	SE8	SE7	SE7	SSE6	S8	SSE3	N5	NNE4	NNW8	NNW8	NNW7	NW5	NNW5	N2	ENE1.2	NNW8
9-Mar	NNE2	NW0	ENE2	E2	SSE2	SE3	SE4	SE4	SSE5	SSE5	SE5	SE6	ESE5	SE6	SE7	SE7	ESE8	SE7	SSE9	SSE10	SSE10	S8	SSW6	SSW6	SSE4.8	SSE10
10-Mar	S7	S7	SSE6	SSE7	SSE13	SSE14	SSE12	SSE14	SSE13	SSE13	SSE14	SSE15	SSE17	SE15	SE15	SE16	SE15	SE13	SE13	SSE10	SE10	ESE8	SE6	SSE6	SSE11.2	SSE17
11-Mar	S7	WSW4	WNW8	WNW9	NW10	WNW9	WNW9	NW11	NNW11	NW10	NW9	NW10	NW13	WNW10	NW9	NW8	WNW8	WNW6	WNW2	SSE1	S3	SSE2	S5	S5	WNW5.8	NW13
12-Mar	SSE6	SSE8	SSE7	SSE9	SE8	SE9	SE10	SE10	SSE11	SE10	SE12	SE14	ESE10	ESE15	SE19	SE17	SE17	SE14	SE11	SE10	SE7	ESE8	ESE9	SE8	SE10.4	SE19
13-Mar	ESE5	ESE5	E4	ENE6	ENE2	NE3	ENE5	N3	N4	NNW6	NNW8	NNW10	NNW11	NNW13	NNW13	NNW12	NNW13	NNW11	NNW11	NNW10	NNW11	NNW10	NNW11	NNW11	NNW6.7	NNW13
14-Mar	NNW11	NNW12	NNW10	NNW9	NNW9	NNW11	NNW11	NNW9	NNW9	N10	N8	N9	N9	NNW8	NNW8	NNW10	NNW9	NNW8	NNW7	NNW5	NNW2	E4	E5	NE4	NNW7.7	NNW12
15-Mar	NE5	ENE4	NE3	NE3	NE3	NNE2	N3	N3	NNE4	N3	W4	N6	N7	N9	NNW10	NNW10	NNW11	NNW10	NNW9	NNW10	N9	N10	N11	NNW12	N6.0	NNW12
16-Mar	NNW12	NNW13	NNW13	NNW13	NNW11	NNW11	N9	NNW9	NNW10	NNW11	NNW11	NNW10	NNW11	NNW11	NNW12	NNW10	NNW10	NNW10	NNW11	NNW8	NW8	NW7	NW8	NW7	NNW10.1	NNW13
17-Mar	NNW9	NNW8	NNW7	NW5	NW7	NW8	NW7	NW7	WNW7	WNW8	NW11	NNW12	N10	NNW8	NNW10	NNW10	N8	NNW8	NNW6	NNW5	NNW4	NNW3	WNW1	WSW2	NNW6.8	NNW12
18-Mar	W3	WNW3	W2	W3	W3	W3	SW3	SW4	WSW3	WNW5	WNW6	NW6	W5	SW4	WSW3	W4	SW4	S7	SSE7	SSE6	S6	SSW5	SW6	SW9	WSW3.3	SW9
19-Mar	WSW10	WSW8	WSW10	WSW10	WSW5	NNE2	ENE3	E3	E5	E7	E9	ESE9	SE11	ESE11	SE11	SE13	SE11	SE10	ESE8	E7	ESE8	ESE9	ESE10	ESE9	SE5.4	SE13
20-Mar	E9	ESE8	ESE8	ESE8	SE10	ESE10	ESE11	SE12	SE13	SE13	SE13	SE13	ESE12	E12	E13	E12	E13	E13	E11	E12	ESE11	ESE12	ESE12	ESE12	ESE11.1	SE13
21-Mar	ESE12	ESE11	ESE12	ESE12	ESE12	ESE12	ESE12	ESE12	ESE13	ESE13	E13	ESE13	ESE14	E14	ESE14	E14	E12	E11	ESE10	ESE11	ESE10	ESE7	ESE8	ESE10	ESE11.6	ESE14
22-Mar	ESE10	ESE9	ESE8	ESE8	ESE9	SE8	SE8	SE9	SE10	SE10	SE11	SSE12	SSE10	SSE9	SE10	SSE9	SSE9	SSE9	SE7	SE6	SSE7	SSE8	SSE8	SSE8	SE8.5	SSE12
23-Mar	SSE6	SSW5	SSW4	SW6	SW7	SW5	WSW4	WNW6	NW7	NNW8	NNW9	NNW9	NNW9	NNW9	NNW9	NNW9	NNW8	NNW8	NNW6	NNW5	NNW5	N5	NNE4	N3	NW4.1	NNW9
24-Mar	N3	NE4	NE2	NE2	ENE2	NW2	NNE2	NE3	ENE4	E5	ESE7	SE4	SE4	NNW1	NNE4	NE5	E4	SE4	SSE5	SE5	W1	SE2	SE6	SSE8	E2.3	SSE8
25-Mar	S8	S9	SSE7	SSE6	SSE6	S5	S6	S6	S5	S4	SSE6	SE8	SE9	SSW10	SW12	WSW9	WNW8	WNW5	WNW4	NNW4	N4	SW4	SW5	WSW4	SSW4.1	SW12
26-Mar	W4	NNW4	W5	W5	WNW4	WNW5	WNW4	WNW5	NW6	WNW7	NNW7	WSW7	WSW7	W7	WSW5	W6	WNW4	NW3	S2	SSE5	S7	S8	S8	SSE10	WSW3.2	SSE10
27-Mar	SSE11	SSE8	S8	S7	SSE8	SSE10	SSE10	SSE10	SSE10	SE11	SE12	SSE15	SSE16	SSE14	SSE13	SSE12	SSE14	SSE13	SSE9	SE9	SSE8	SSE9	S11	SSE9	SSE10.6	SSE16
28-Mar	S8	S9	S8	S7	SSE4	S6	SSW8	SSW7	SSW8	SW5	W3	W4	WNW8	WNW11	WNW11	WNW12	W12	WNW9	WNW5	WNW6	WNW6	W6	WNW7	WNW6	WSW4.5	W12
29-Mar	WNW6	WNW6	WNW7	W6	W5	WNW6	W5	WNW7	WNW8	WNW7	WNW8	WNW10	WNW11	WNW11	WNW9	NW11	WNW9	WNW7	WNW7	WNW5	W4	W5	W6	WNW5	WNW7.1	WNW11
30-Mar	NW6	NW6	WNW5	NW7	NW7	WNW7	WNW7	NW8	NNW8	NW8	NW10	NNW13	NNW15	N17	NNW17	N18	N16	N16	N13	N14	N12	N13	NNE15	N14	NNW10.4	N18
31-Mar	N15	N13	N12	N11	N10	NNW10	NNW9	NNW9	N9	NNW7	W8	W9	W9	WNW10	WNW8	WNW8	NW5	N4	ESE4	SSE6	SSE5	S6	S5	S4	NW4.8	N15
	ESE1.5	ESE1.4	SE0.9	SE1.0	SE1.3	SE1.2	SE1.5	SE1.4	SE1.4	ESE1.3	ESE1.1	ESE1.2	E0.7	NE0.8	N0.7	N1.5	NNE1.5	NE1.6	ENE1.7	ENE1.7	E1.4	ESE1.7	SE1.7	SE1.8	Diurnal Average	
	N15	N13	NNW13	NNW13	SSE13	SSE14	SSE12	SSE14	SSE13	SSE13	SSE14	SSE15	SSE17	N17	SE19	N18	SE17	N16	N13	N14	SE12	N13	NNE15	N14	Diurnal Maximum	

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

Summary of Hour Standard Deviations

Anzac - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 6 km/h on Mar 30 15:00

Minimum Value: 0 km/h on Mar 9 05:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 2$ Median = 2 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 5$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

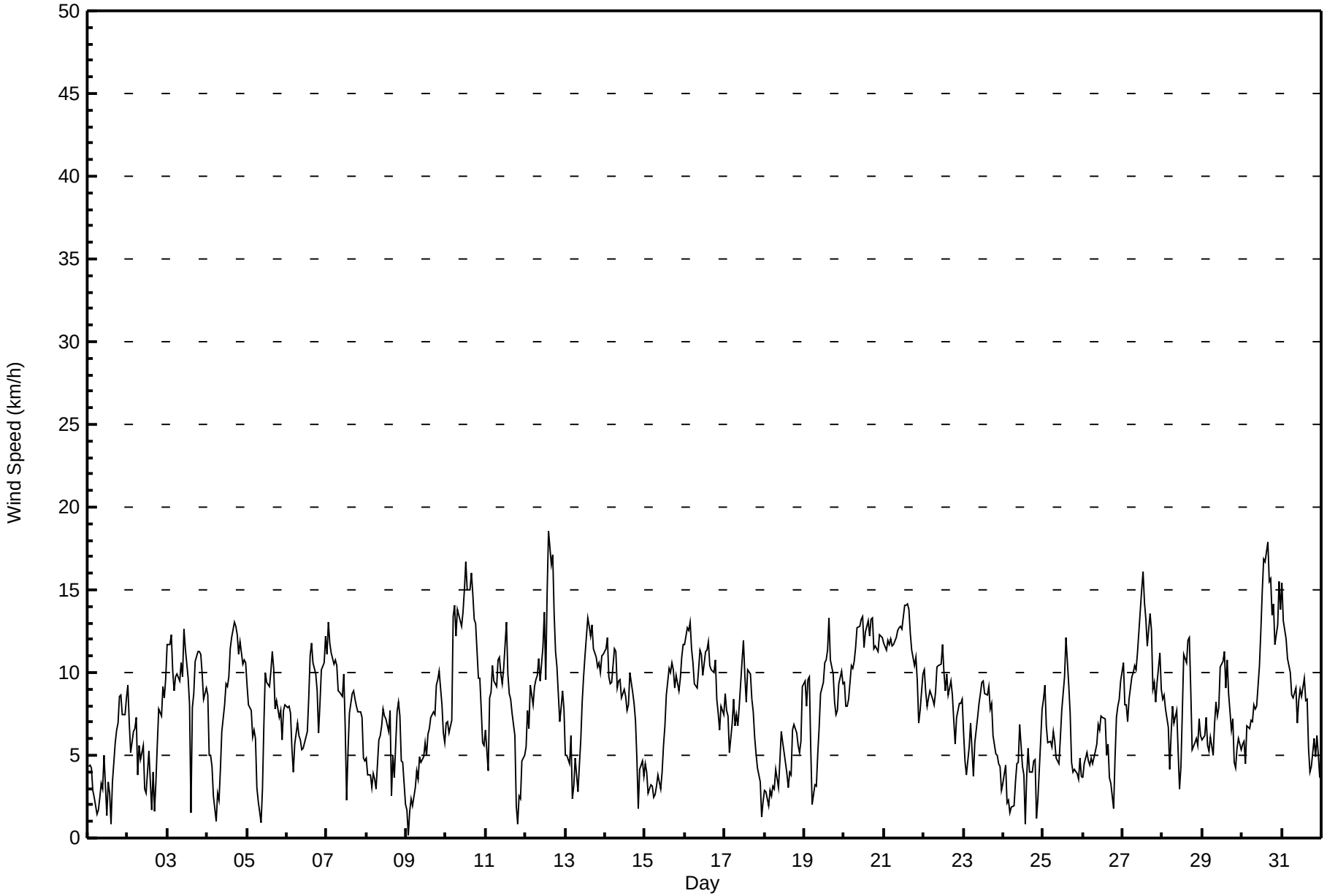
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	2	2	3	2	2	2	2	3
2-Mar	2	2	2	2	2	3	2	2	1	2	2	2	2	2	2	1	1	2	2	2	2	2	2	3	3
3-Mar	2	2	3	3	2	3	3	3	3	3	4	3	2	2	3	3	3	3	4	4	3	3	2	2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

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Anzac - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	202	27.15	27.15
6 - 11	434	58.33	85.48
12 - 19	108	14.52	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

Anzac - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	15	13	13	12	13	9	14	15	10	7	9	10	20	18	12	12	202
6 - 11	24	7	4	5	14	44	66	65	20	6	4	7	8	41	38	81	434
12 - 19	12	1	0	0	11	19	24	22	0	0	1	0	1	1	1	15	108
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	51	21	17	17	38	72	104	102	30	13	14	17	29	60	51	108	744

Total Number of Valid Hours: 744

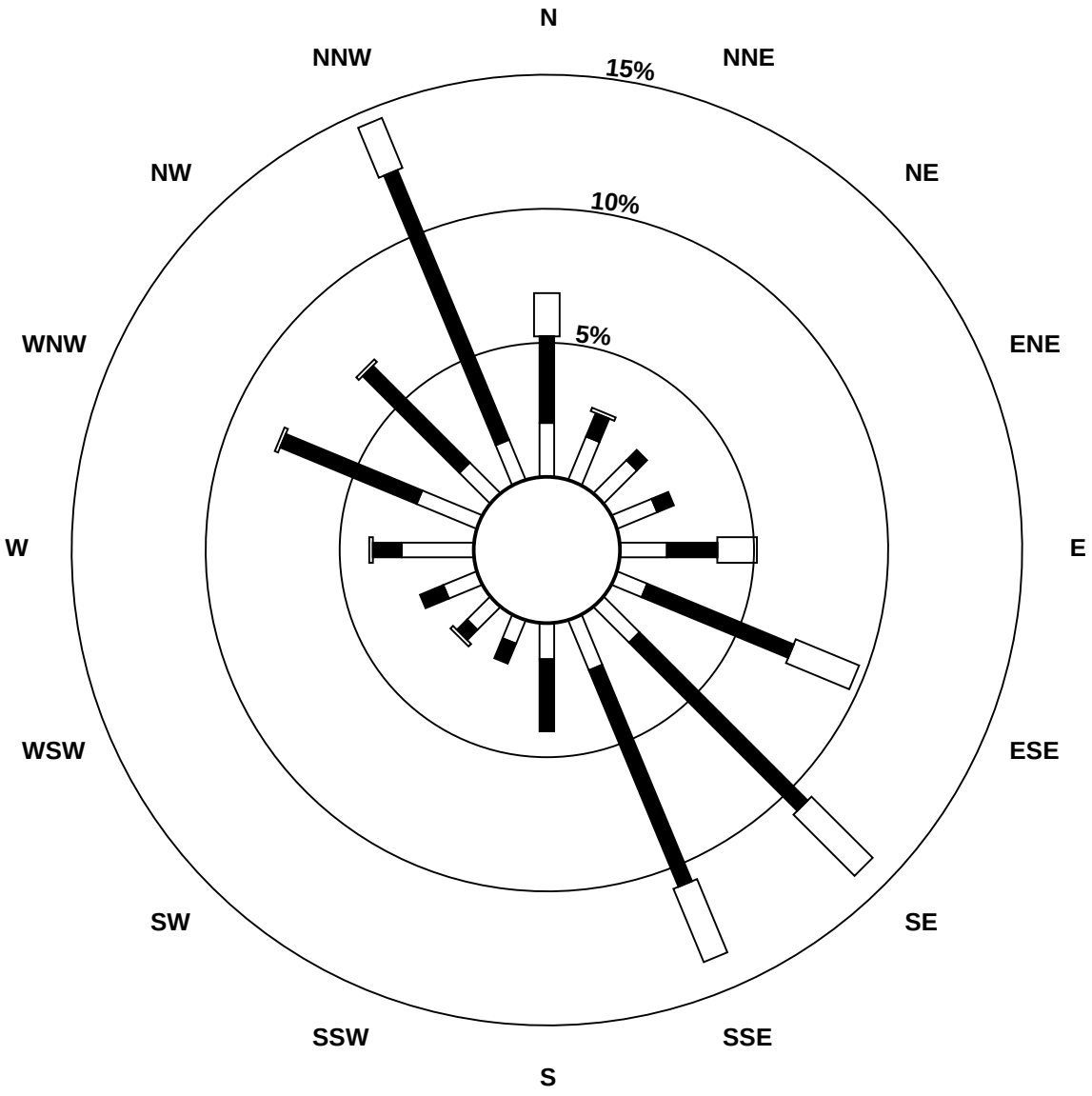
Total Number of Hours: 744

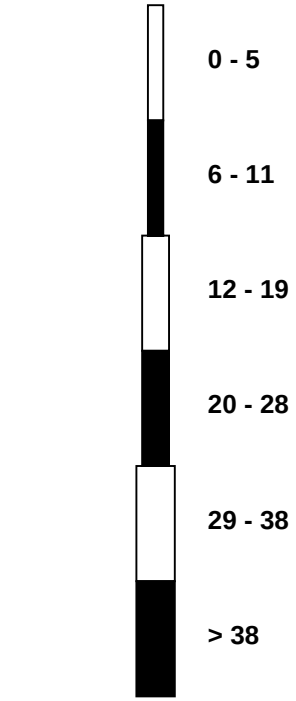
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Wind Speed (WS) - km/h

Anzac (AMS 14)





Total Number of Valid Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Anzac - March 2016

Direction of Maximum Speed: 136 deg on Mar 12 15:00
Direction of Maximum Daily Speed Average: 108.7 deg on Mar 21

Direction of Minimum Speed: 322 deg on Mar 9 02:00

Direction of Minimum Daily Speed Average: 1.2 deg on Mar 8

Monthly Average Direction: 310.9 deg

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	165	158	166	126	97	92	95	119	203	229	259	208	306	316	244	74	72	87	102	123	129	135	122	120	127.1
2-Mar	133	125	123	115	155	141	141	104	122	119	132	118	155	49	340	292	73	92	94	126	147	161	147	154	130.6
3-Mar	154	152	154	158	153	146	126	124	129	141	150	158	170	168	249	319	318	327	329	337	340	336	345	353	142.4
4-Mar	1	18	297	317	352	266	194	136	160	160	163	136	154	153	164	152	144	144	144	130	136	149	137	137	144.9
5-Mar	134	137	155	141	161	143	145	178	10	13	314	331	358	4	347	358	5	24	6	7	24	26	30	41	25.7
6-Mar	28	28	20	33	17	37	62	46	45	61	72	82	81	77	81	89	87	86	79	91	110	116	122	120	75.7
7-Mar	117	128	122	123	128	129	129	135	135	138	145	153	189	311	312	312	306	307	318	316	322	324	317	288	128.7
8-Mar	305	6	20	49	64	94	119	122	141	128	138	145	138	161	191	161	5	31	345	338	335	320	328	352	78.0
9-Mar	29	322	77	84	147	145	131	141	154	157	137	145	123	130	140	130	121	141	160	163	163	177	195	197	148.6
10-Mar	190	177	166	159	158	167	161	161	160	151	150	150	150	145	130	130	131	139	137	149	141	123	139	150	149.0
11-Mar	182	237	298	301	308	301	297	309	327	319	314	304	306	302	304	313	298	292	293	147	186	167	175	170	298.1
12-Mar	157	157	160	166	134	137	139	139	148	139	131	132	116	123	136	136	146	144	133	136	129	106	119	134	137.0
13-Mar	119	109	92	74	65	38	57	359	350	346	348	341	334	340	335	335	333	333	332	329	328	328	332	336	345.1
14-Mar	334	343	338	334	333	342	338	338	340	350	358	354	349	343	340	345	347	342	336	345	341	83	81	50	345.8
15-Mar	55	61	48	53	48	18	2	349	15	7	281	353	349	349	345	343	339	332	335	343	352	2	353	342	352.6
16-Mar	344	341	341	342	344	348	353	345	345	339	336	343	342	336	341	345	346	342	340	332	320	313	311	325	339.3
17-Mar	338	337	335	319	321	324	309	305	291	303	325	343	352	347	333	344	349	342	339	337	332	345	285	254	330.4
18-Mar	273	286	274	272	261	262	233	218	249	293	288	309	279	232	255	260	224	171	163	168	191	201	224	235	236.9
19-Mar	242	251	241	242	239	16	65	100	91	100	100	112	126	120	128	137	139	127	116	98	105	117	122	114	131.3
20-Mar	97	110	109	119	124	119	123	124	129	126	125	128	109	99	93	98	79	86	94	100	102	108	117	114	109.4
21-Mar	113	111	113	110	113	109	114	114	121	112	96	107	103	100	109	99	100	100	102	117	113	106	113	121	108.7
22-Mar	121	111	112	105	121	133	130	131	140	138	141	151	158	147	140	168	160	160	145	143	159	158	160	164	141.6
23-Mar	163	197	198	218	227	227	251	292	305	328	329	341	344	340	348	340	336	338	331	329	348	354	16	7	321.1
24-Mar	11	46	46	43	61	308	14	43	70	99	117	136	129	331	30	53	97	128	150	145	268	136	145	164	99.9
25-Mar	171	173	164	164	167	187	178	173	178	176	163	141	135	201	234	249	282	295	282	341	9	214	228	246	195.4
26-Mar	269	327	272	279	298	299	297	296	308	299	333	257	246	261	258	259	297	325	188	162	172	169	170	168	257.7
27-Mar	167	168	174	173	161	157	159	149	149	143	146	156	160	156	163	167	164	167	155	134	156	157	173	164	158.7
28-Mar	169	169	169	176	150	169	192	193	212	226	259	279	289	298	288	290	271	303	288	298	282	274	296	282	251.1
29-Mar	284	291	292	277	274	291	281	299	292	294	298	302	298	300	295	310	297	290	299	286	275	279	279	294	292.7
30-Mar	312	313	301	306	310	302	303	308	330	310	326	333	347	350	346	351	351	352	5	6	6	2	12	8	343.5
31-Mar	359	350	351	356	358	340	340	343	353	337	276	272	270	288	286	298	315	359	115	151	161	175	191	189	325.4
	123.1	114.3	134.7	126.7	133.4	131.8	130.3	125.5	126.7	117.2	123.0	121.7	95.1	35.0	4.8	6.4	23.7	43.2	59.6	77.7	97.8	118.4	124.6	132.2	
	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

Anzac - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 104 deg on Mar 24 14:00

Minimum Value: 10 deg on Mar 12 01:00

Percentiles: P_1 = 12 P_{10} = 16 Q_1 = 18 Median = 21 Q_3 = 26 P_{90} = 37 P_{99} = 77

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

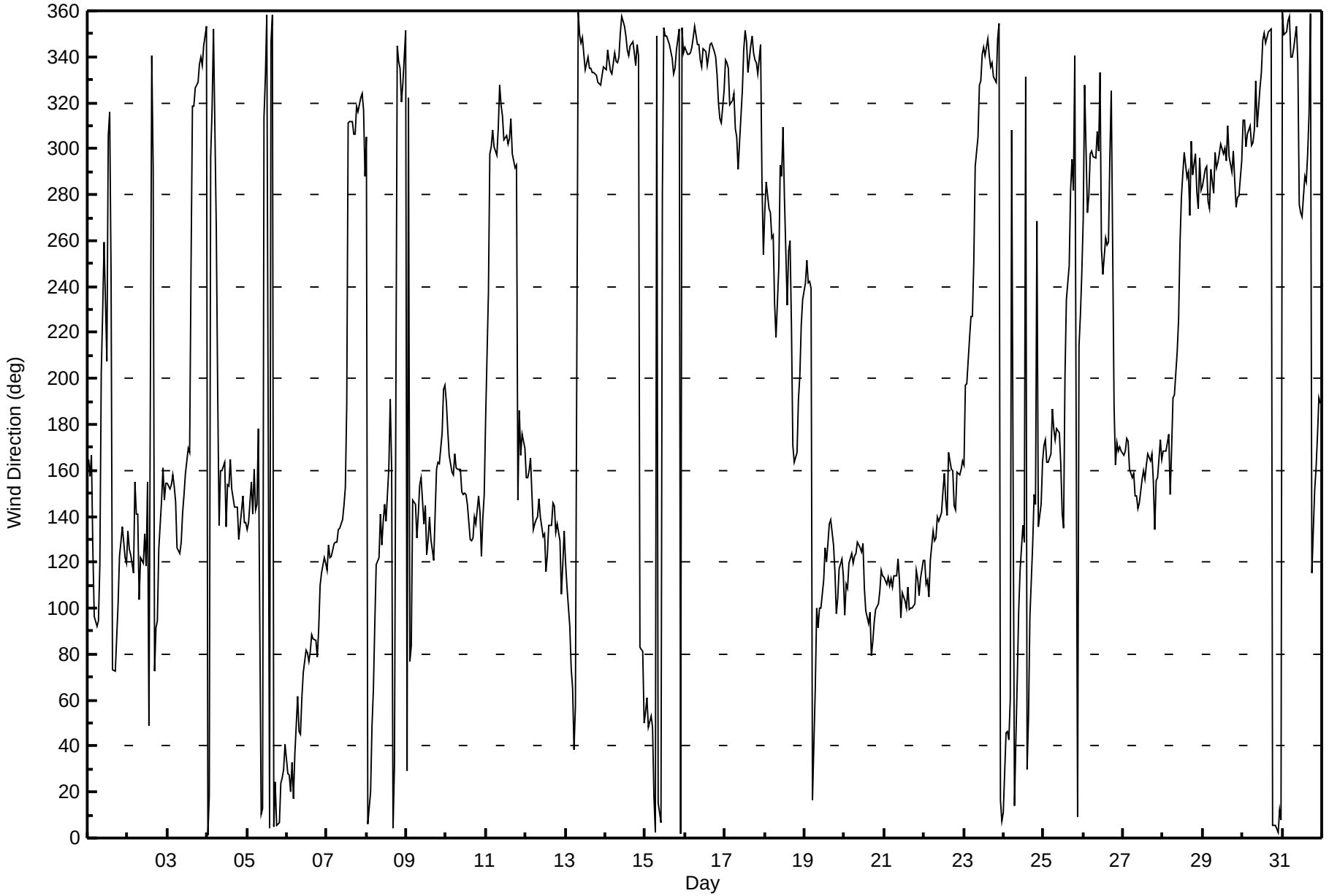
Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	22	18	18	26	22	33	42	31	15	35	37	88	51	52	94	59	20	21	22	19	17	14	17	16	94
2-Mar	13	15	20	25	22	26	54	23	33	35	63	71	51	47	93	47	74	23	21	19	17	17	19	18	93
3-Mar	15	15	15	14	16	18	18	20	20	21	20	20	19	18	76	25	21	18	17	17	17	16	17	16	76
4-Mar	16	19	18	23	31	66	27	68	31	22	25	25	29	29	25	24	22	20	20	19	19	22	25	20	68
5-Mar	20	17	21	20	19	16	46	53	87	66	37	23	24	22	22	19	18	27	17	18	20	21	22	22	87
6-Mar	20	19	19	23	28	28	22	23	24	30	37	33	36	24	24	23	19	19	18	25	26	22	21	20	37
7-Mar	24	20	20	24	22	20	19	17	17	20	19	26	60	30	25	25	23	24	23	23	21	19	24	24	60
8-Mar	27	21	18	29	26	29	42	23	20	26	22	29	22	27	26	70	36	38	17	18	16	19	19	54	70
9-Mar	30	83	33	24	33	27	23	23	28	33	26	29	37	28	26	22	22	15	12	12	12	16	24	22	83
10-Mar	21	19	18	19	16	19	20	20	20	22	22	22	21	21	19	20	23	22	22	24	23	21	22	18	24
11-Mar	17	39	21	22	20	22	24	22	22	25	26	25	25	27	26	28	26	31	64	71	15	14	10	15	71
12-Mar	10	17	20	18	21	20	20	19	20	20	18	19	25	23	22	20	20	22	20	22	30	20	22	20	30
13-Mar	23	23	24	16	40	14	34	41	23	20	19	17	17	17	16	18	17	18	18	17	17	19	17	17	41
14-Mar	16	16	19	20	17	16	17	17	16	18	18	19	20	21	19	16	16	16	16	18	69	31	20	22	69
15-Mar	19	19	25	19	25	26	18	18	28	35	36	23	20	18	18	18	18	17	16	16	17	17	16	16	36
16-Mar	17	17	17	16	16	17	15	16	17	16	17	18	17	16	17	19	17	16	17	17	18	21	19	19	21
17-Mar	16	16	15	21	22	19	21	21	24	22	23	19	19	18	19	18	17	16	15	14	16	16	62	68	68
18-Mar	29	54	36	25	42	18	32	12	38	37	32	41	44	51	71	40	38	16	13	21	18	20	14	14	71
19-Mar	18	20	16	19	28	46	15	15	24	21	24	26	25	28	23	20	20	21	22	19	26	23	21	24	46
20-Mar	21	25	23	24	21	23	23	24	21	22	23	23	32	28	26	27	21	19	23	24	23	25	25	23	32
21-Mar	24	23	23	27	24	25	24	26	23	25	24	25	26	27	29	25	26	25	25	24	26	24	24	22	29
22-Mar	23	25	24	21	18	17	16	18	21	19	23	28	32	32	31	36	24	24	21	19	18	18	18	15	36
23-Mar	16	25	19	20	14	10	25	23	23	24	20	18	19	19	20	18	20	17	19	20	16	17	18	17	25
24-Mar	16	15	30	63	69	44	23	38	26	51	37	71	73	104	76	57	67	59	13	44	74	47	12	13	104
25-Mar	12	12	15	11	16	16	12	14	18	27	35	27	33	37	22	31	28	29	27	27	19	59	13	21	59
26-Mar	10	27	23	19	24	21	24	23	25	35	36	41	21	31	51	44	54	51	42	15	13	12	13	13	54
27-Mar	13	15	16	17	12	13	15	16	17	20	21	22	24	22	30	24	22	21	17	18	19	17	14	14	30
28-Mar	15	15	17	23	40	32	14	17	23	44	80	55	51	31	31	31	30	23	23	21	16	16	20	18	80
29-Mar	18	18	19	14	17	19	13	21	26	31	32	27	30	33	33	32	31	28	23	22	18	19	23	24	33
30-Mar	22	19	24	21	21	22	22	20	28	27	25	21	21	22	21	20	18	19	19	18	20	19	18	18	28
31-Mar	18	18	17	18	18	17	17	18	25	44	41	34	41	36	36	29	28	33	25	20	18	17	19	23	44
	30	83	36	63	69	66	54	68	87	66	80	88	73	104	94	70	74	59	64	71	74	59	62	68	
	Diurnal Maximum																								

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Anzac - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

Anzac - March 2016

Maximum Value: 0.8 mm on Mar 5 21:00

Maximum Daily Total: 6.4 mm on Mar 16

Minimum Value: 0.0 mm on Mar 1 01:00

Minimum Daily Total: 0.0 mm on Mar 1

Maximum Diurnal Total: 1.5 mm at hour 5

Minimum Diurnal Total: 0.0 mm at hour 1

Monthly Total: 10.92 mm

Percentiles: P_1 = 0.0 P_{10} = 0.0 Q_1 = 0.0 Median = 0.0 Q_3 = 0.0 P_{90} = 0.0 P_{99} = 0.8

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

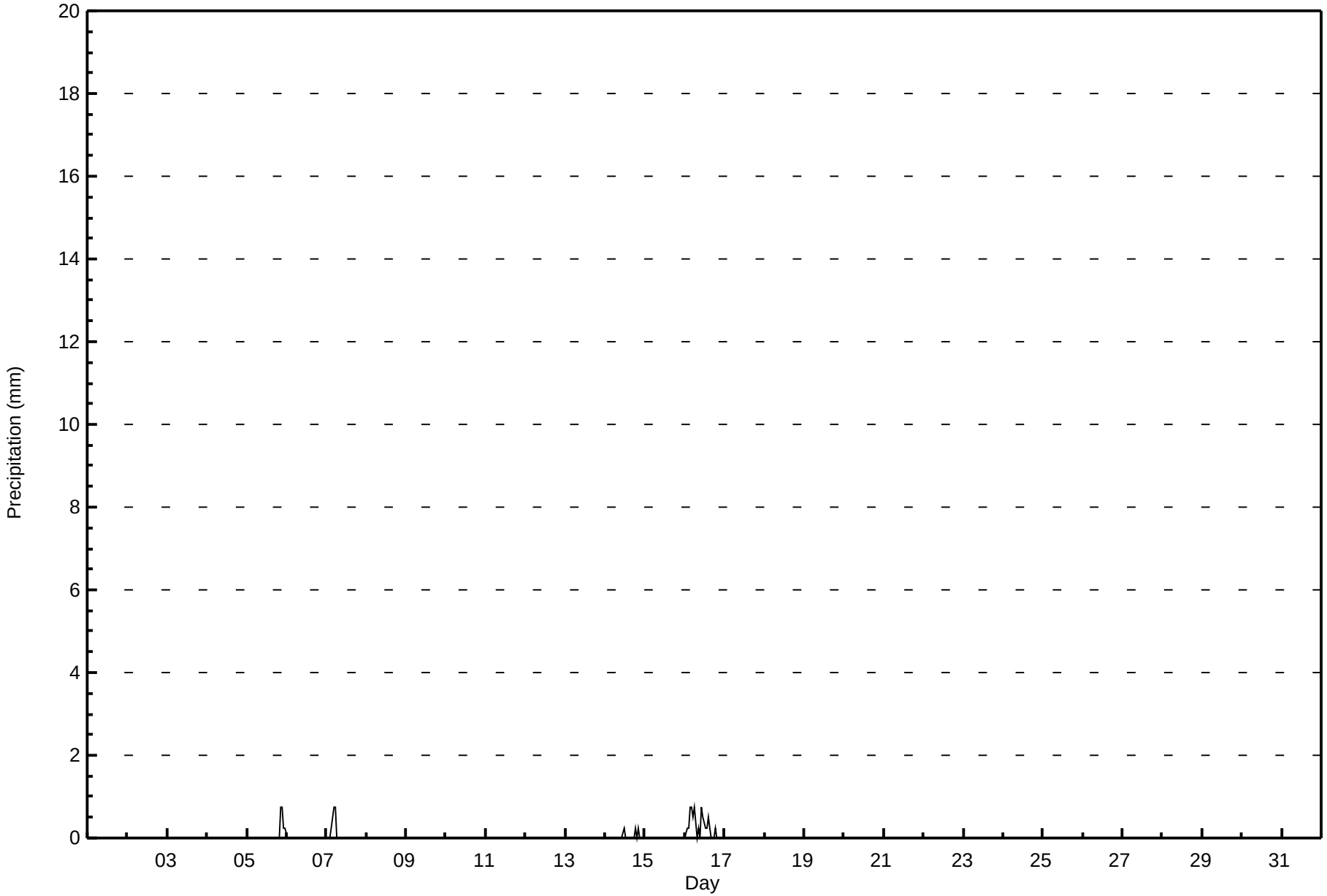
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
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
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
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	0.8	0.8	0.3	0.3	2.0	0.8
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
7-Mar	0.0	0.0	0.0	0.3	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.8
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
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
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
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
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
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
14-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.8	0.3
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
16-Mar	0.0	0.3	0.3	0.8	0.8	0.5	0.8	0.0	0.3	0.0	0.8	0.5	0.3	0.3	0.5	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	6.4	0.8
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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	0.3	0.3	1.0	1.5	1.3	0.8	0.0	0.3	0.0	0.8	0.8	0.3	0.3	0.5	0.3	0.0	0.0	0.5	0.0	1.0	0.8	0.3	0.3	Diurnal Average	
	0.0	0.3	0.3	0.8	0.8	0.8	0.8	0.0	0.3	0.0	0.8	0.5	0.3	0.3	0.5	0.3	0.0	0.0	0.3	0.0	0.8	0.8	0.3	0.3	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Precipitation (PC) - mm

Anzac - March 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	March 15, 2016	Last Calibration	February 11, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	7:30	End Time (MST)	13:00
Gas Cert Reference	SA130026A	Station temp.	22 Deg C
Cal Gas Concentration	47.2 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
ZAG Make/Model	API 701	Serial Number	764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	524	524
Analyzer IP address	192.168.1.43		Lamp voltage	2563	2524
Calculated slope	0.998132	1.007637	Chamber temp	50.0	50.0
Calculated intercept	-0.099689	-0.099807	Pressure	25.7	25.2
Analyzer Background	18.8	18.8	Flow	675	635
Analyzer Coefficient	1.063	1.063	Intensity	63	62

Analyzer make	API T100	Analyzer serial #	723

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	74.9	707.1	699.1	1.011
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	74.9	707.1	702.2	1.007
second point	5000	37.5	354.0	350.4	1.010
third point	5000	18.7	176.5	175.7	1.005
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	74.9	707.1	694.4	1.018
				Average Correction Factor	1.007

Corrected As found	699.3	Previous response	708.5	% change	1.3%

Notes:

filter changed out, no adjustments or maintenance done

Calibration Performed By: Melissa Lemay

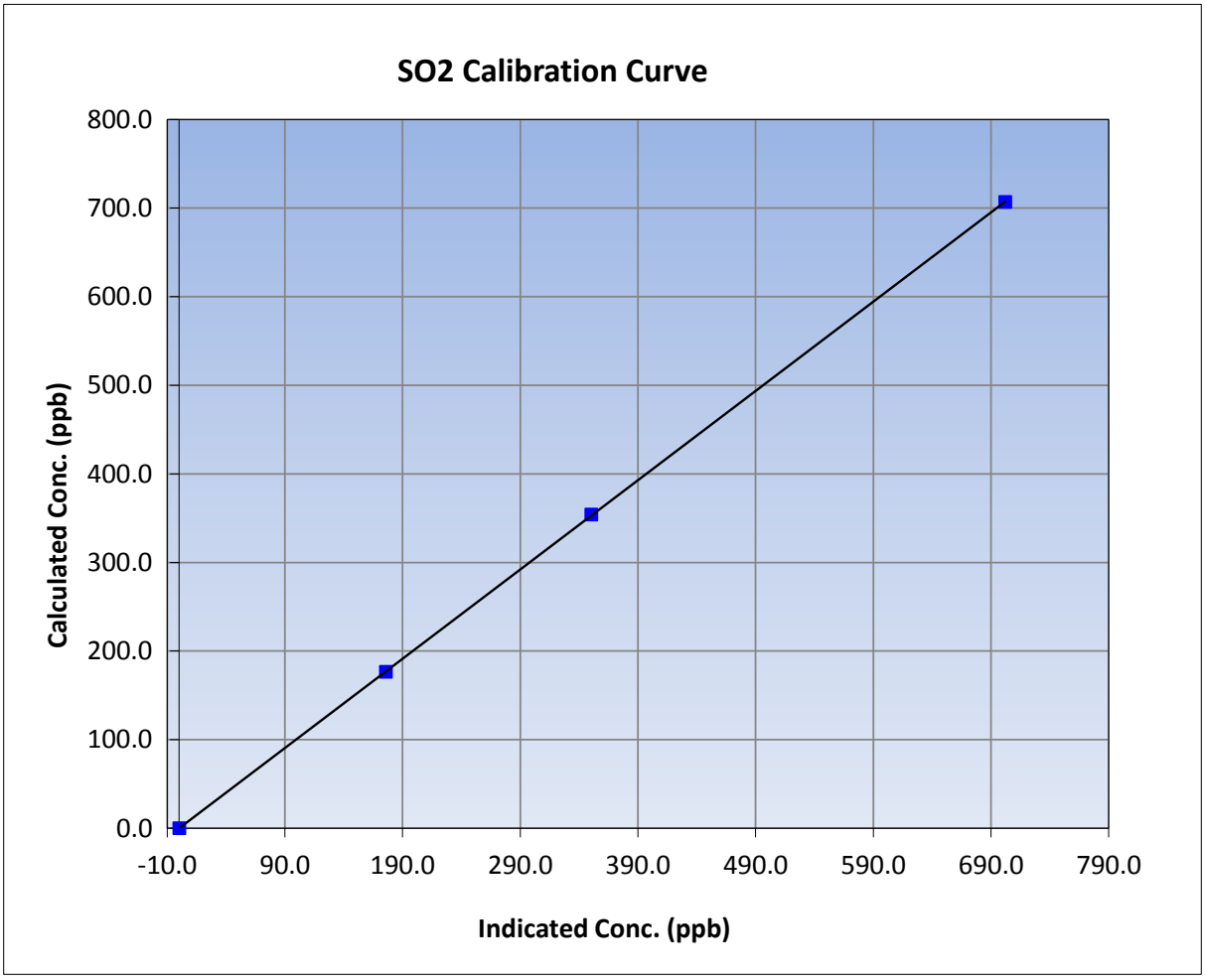
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

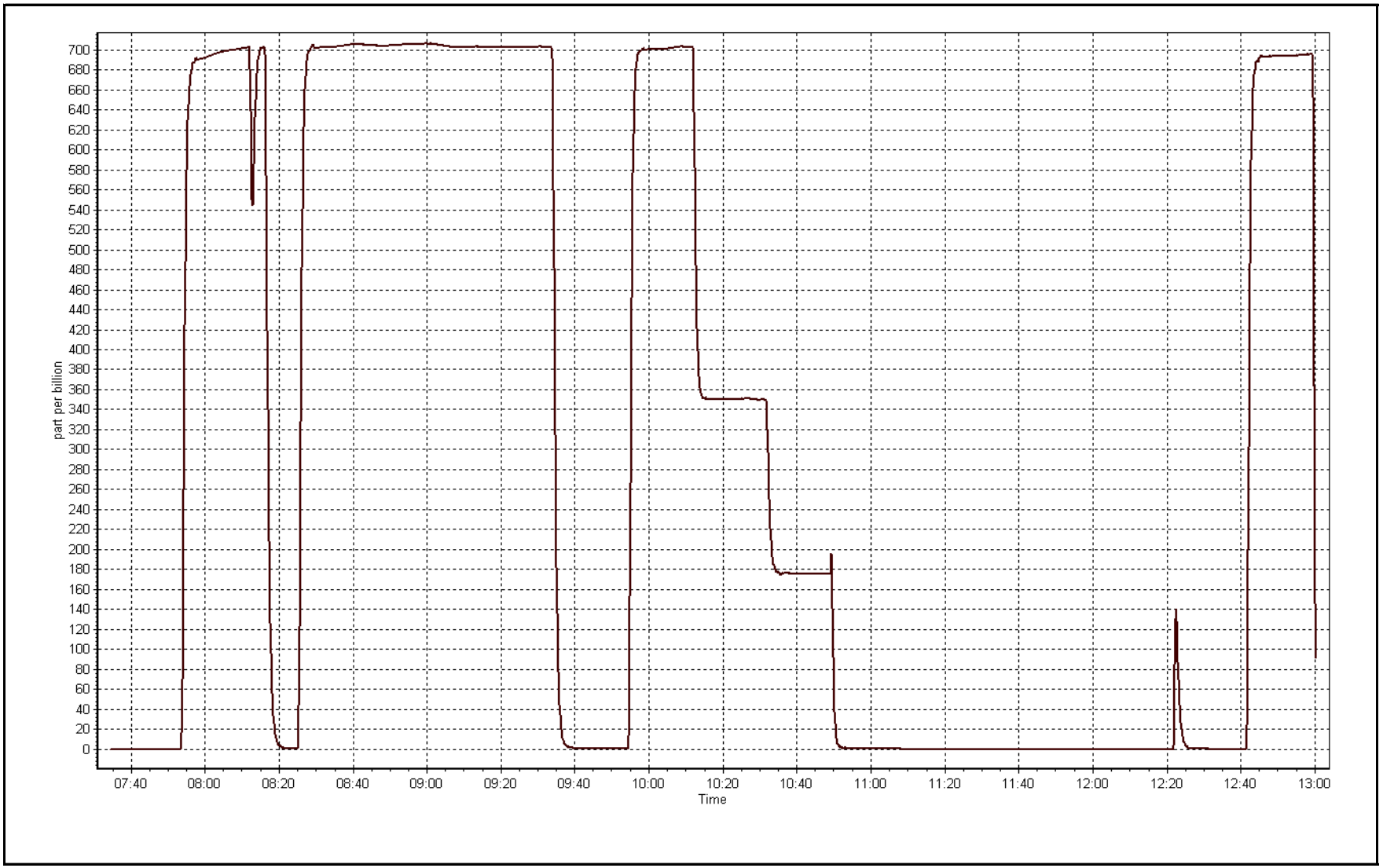
Calibration Date	March 15, 2016	Previous Calibration	February 11, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	7:30	End Time (MST)	13:00
Analyzer make	API T100	Analyzer serial #	723

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999995
707.1	702.2	1.0069		
354.0	350.4	1.0103	Slope	1.007637
176.5	175.7	1.0047		
			Intercept	-0.099807



SO2 Calibration Plot Date: March 15, 2016



Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

Calibration Date	March 16, 2016	Last Calibration	February 5, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	12:42
Gas Cert Reference	ALM033528	Station temp.	22 Deg C
Cal Gas Concentration	5.05 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Dil air Make/Model	API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790
SO2 gas concentration	47.2 ppm	SO2 gas cert/exp	SA130026A 12/Dec/16

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-731	-731
Analyzer IP address	192.168.1.42		Lamp voltage	997	997
Calculated slope	0.997497	1.010490	Chamber temp	45	45
Calculated intercept	-0.135682	-0.299311	Pressure	653.5	653.5
Analyzer Background	1.7	1.7	Flow	0.403	0.403
Analyzer Coefficient	1.192	1.192	Intensity	98	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	0.0	----
as found span	5000	74.3	75.0	74.3	1.010
SO2 scrubber check	5000	18.7	176.5	0.7	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	74.3	75.0	74.3	1.010
second point	5000	39.6	40.0	40.3	0.992
third point	5000	19.8	20.0	20.2	0.990
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	74.3	75.0	74.4	1.009
				Average Correction Factor	0.997

Corrected As found	74.3	Previous response	75.4	% change	1.5%

Notes:

No adjustments or maintenance done, filter changed out

Calibration Performed By: Melissa Lemay

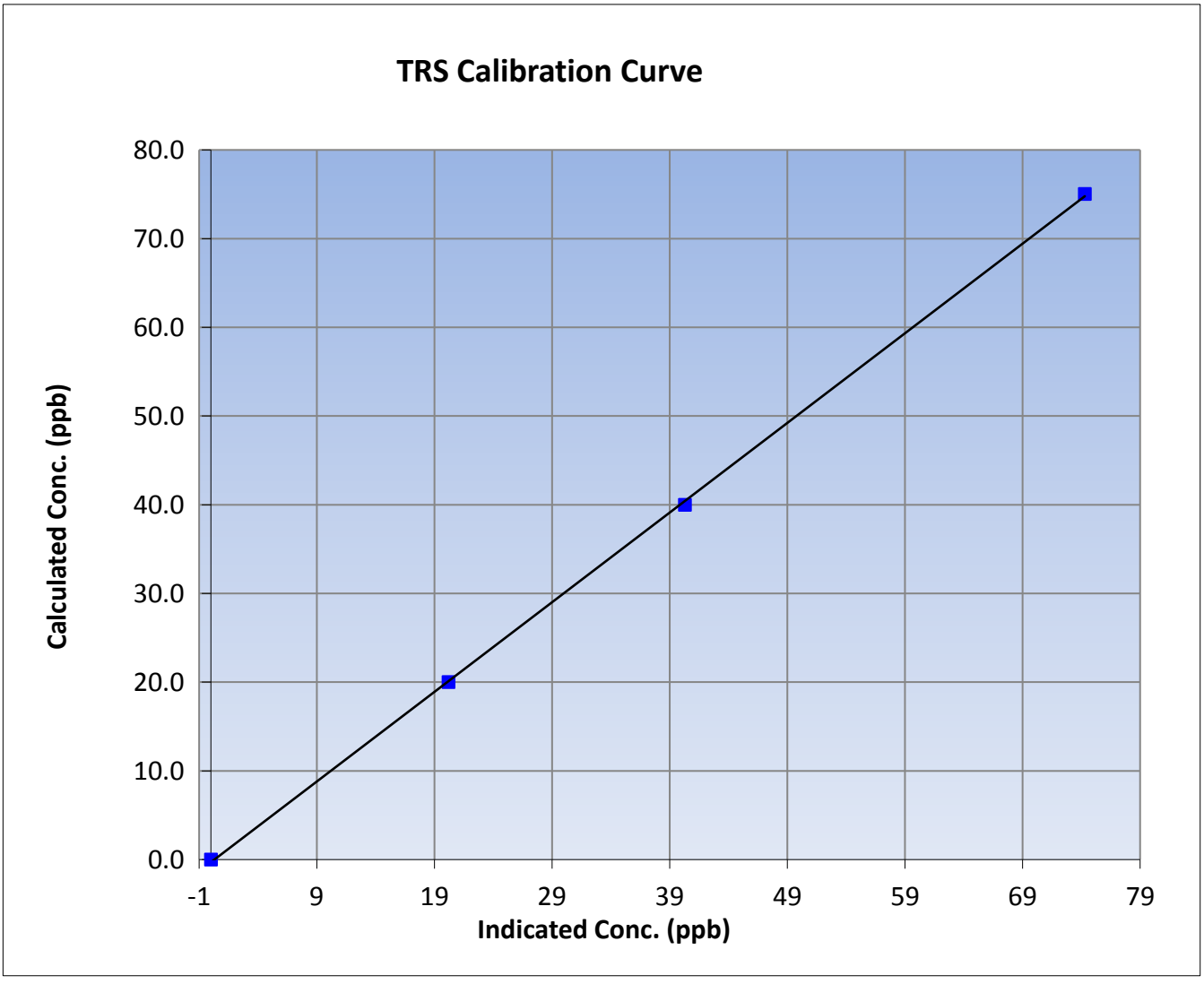
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

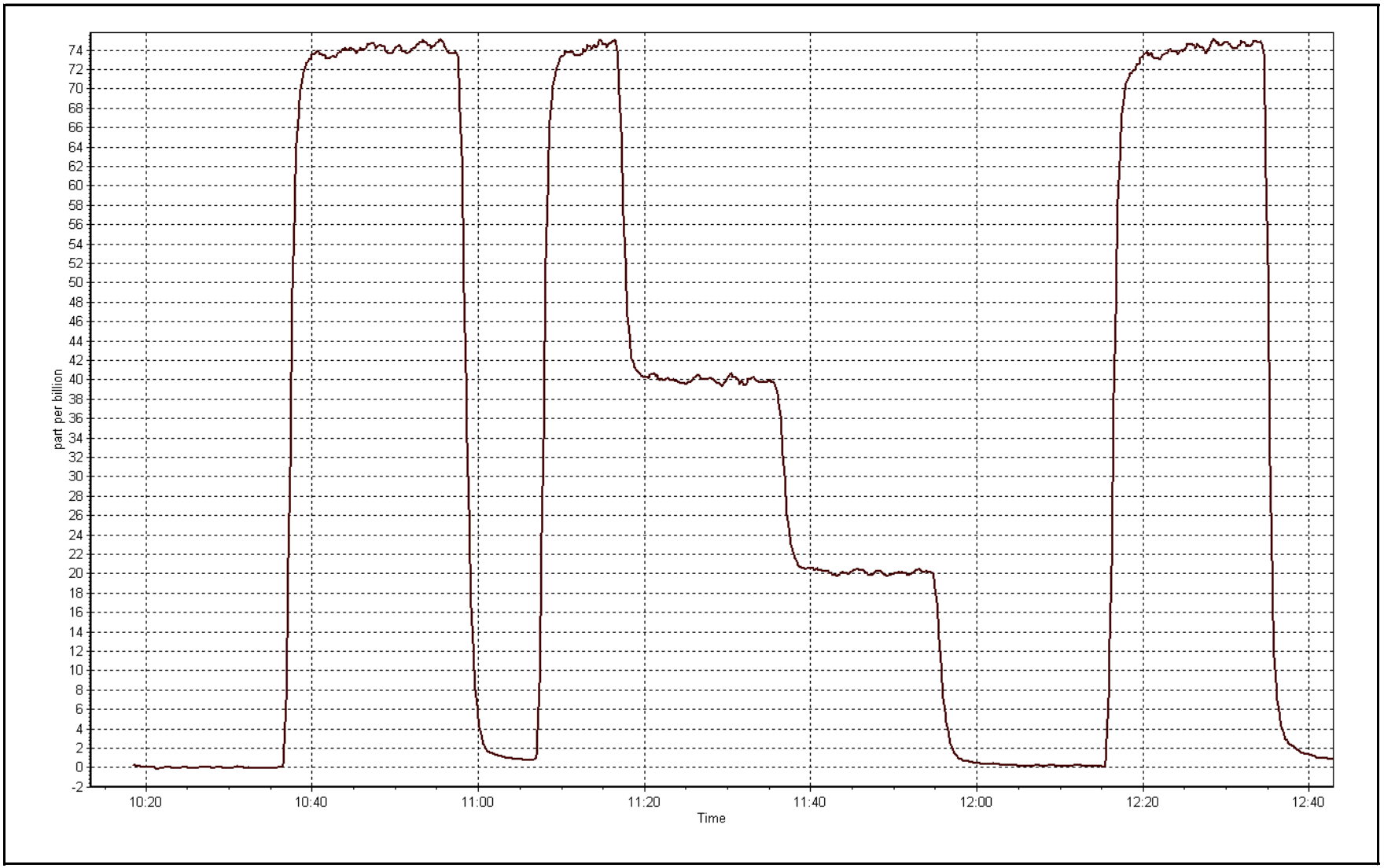
Calibration Date	March 16, 2016	Previous Calibration	February 5, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:15	End Time (MST)	12:42
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1300156232

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999888
75.0	74.3	1.0100		
40.0	40.3	0.9925	Slope	1.010490
20.0	20.2	0.9900		
			Intercept	-0.299311



TRS Calibration Plot Date: March 16, 2016



Wood Buffalo Environmental Association
THC / NMHC Calibration Report

Station Information

Calibration Date	March-15-16	Last Calibration	February-11-16
Station Name	Anzac	Station Number	AMS 14

Reason: Routine

Start Time (MST)	8:30	End Time (MST)	13:00
Gas Cert Reference	SA130026A	Cal Gas Expiry Date	December-12-16
CH4 Cal Gas Conc.	512.0 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211.0 ppm	Station temp.	22 Deg C
Calibrator Model	Sabio 4010	Serial Number	8400311
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	8790

Analyzer Information

	Before	*After*		*Before*	*After*
THC Range (ppm)	0 - 50 ppm		Column Temp	74.9	74.9
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	403.6	398.7
THC Calc slope	0.998416	1.002460	Carrier Pressure	31.8	31.8
THC Calc intercept	0.025768	0.012162	Fuel Pressure	41.4	41.4
NMHC Calc slope	1.001844	1.002501	Air Pressure	32.5	33.8
NMHC Calc intercept	0.004044	-0.005964			

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	74.9	16.36	16.04	1.020
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	16.36	16.33	1.002
second point	5000	37.5	8.19	8.11	1.010
third point	5000	18.7	4.09	4.08	1.001
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	16.36	16.34	1.001
				Average Correction Factor	1.004

Corrected As found	16.04	Previous response	16.36	% change	2.0%

Notes:

Span adjusted, filter changed out, carrier pressure increased from 32psi to 34psi

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	74.9	8.69	8.59	1.012
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	8.69	8.68	1.001
second point	5000	37.5	4.35	4.33	1.005
third point	5000	18.7	2.17	2.19	0.991
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	8.69	8.69	1.000
				Average Correction Factor	0.999

Corrected As found	8.59	Previous response	8.67	% change	1.0%

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	74.9	7.67	7.46	1.028
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	7.67	7.66	1.001
second point	5000	37.5	3.84	3.78	1.016
third point	5000	18.7	1.91	1.89	1.013
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	7.67	7.65	1.003
				Average Correction Factor	1.010

Corrected As found	7.46	Previous response	7.69	% change	3.1%

Wood Buffalo Environmental Association

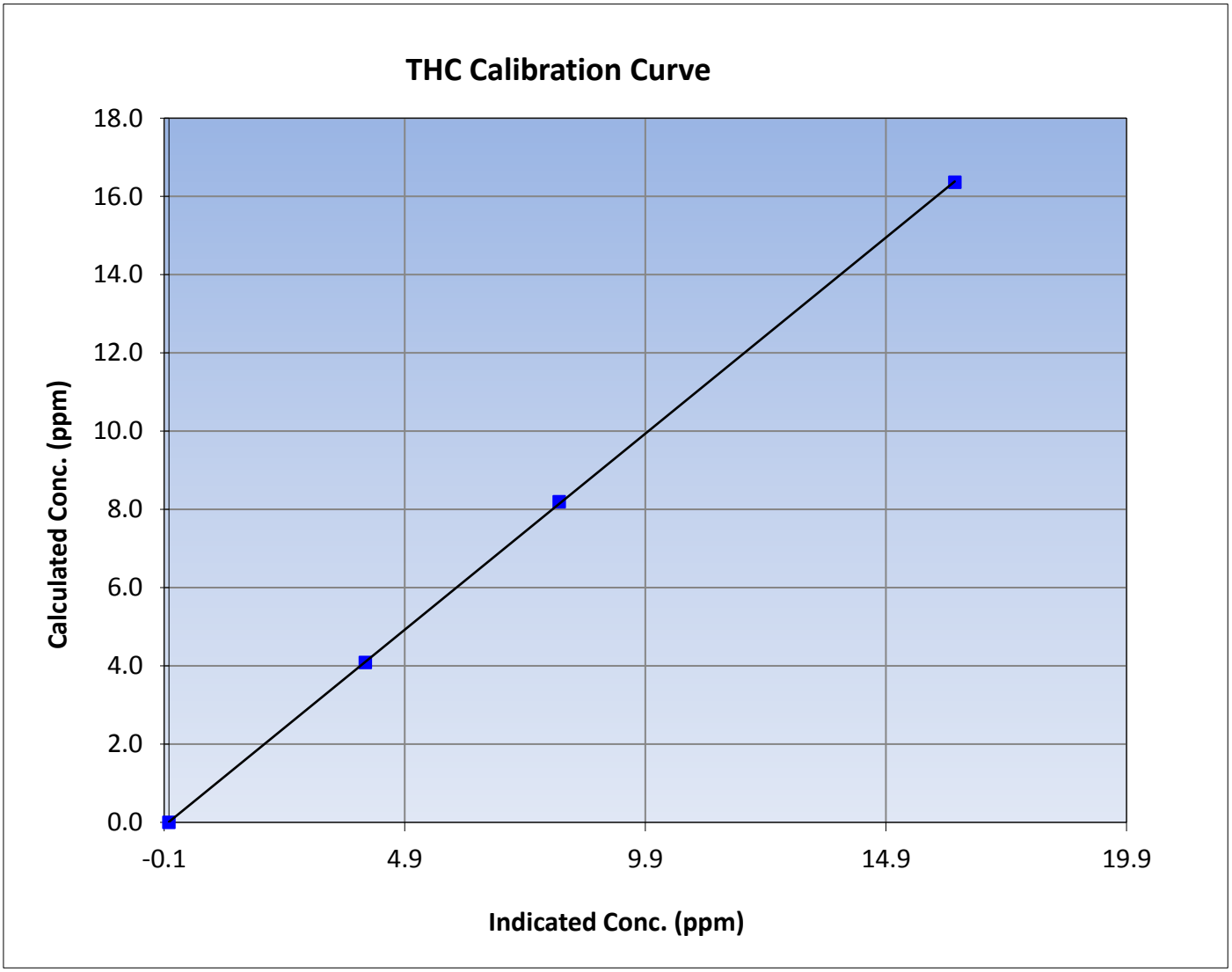
THC Calibration Summary

Station Information

Calibration Date	March 15, 2016	Previous Calibration	February 11, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:30	End Time (MST)	13:00
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	0.999977
16.36	16.33	1.0020		
8.19	8.11	1.0101	Slope	1.002460
4.09	4.08	1.0012		
			Intercept	0.012162



Wood Buffalo Environmental Association

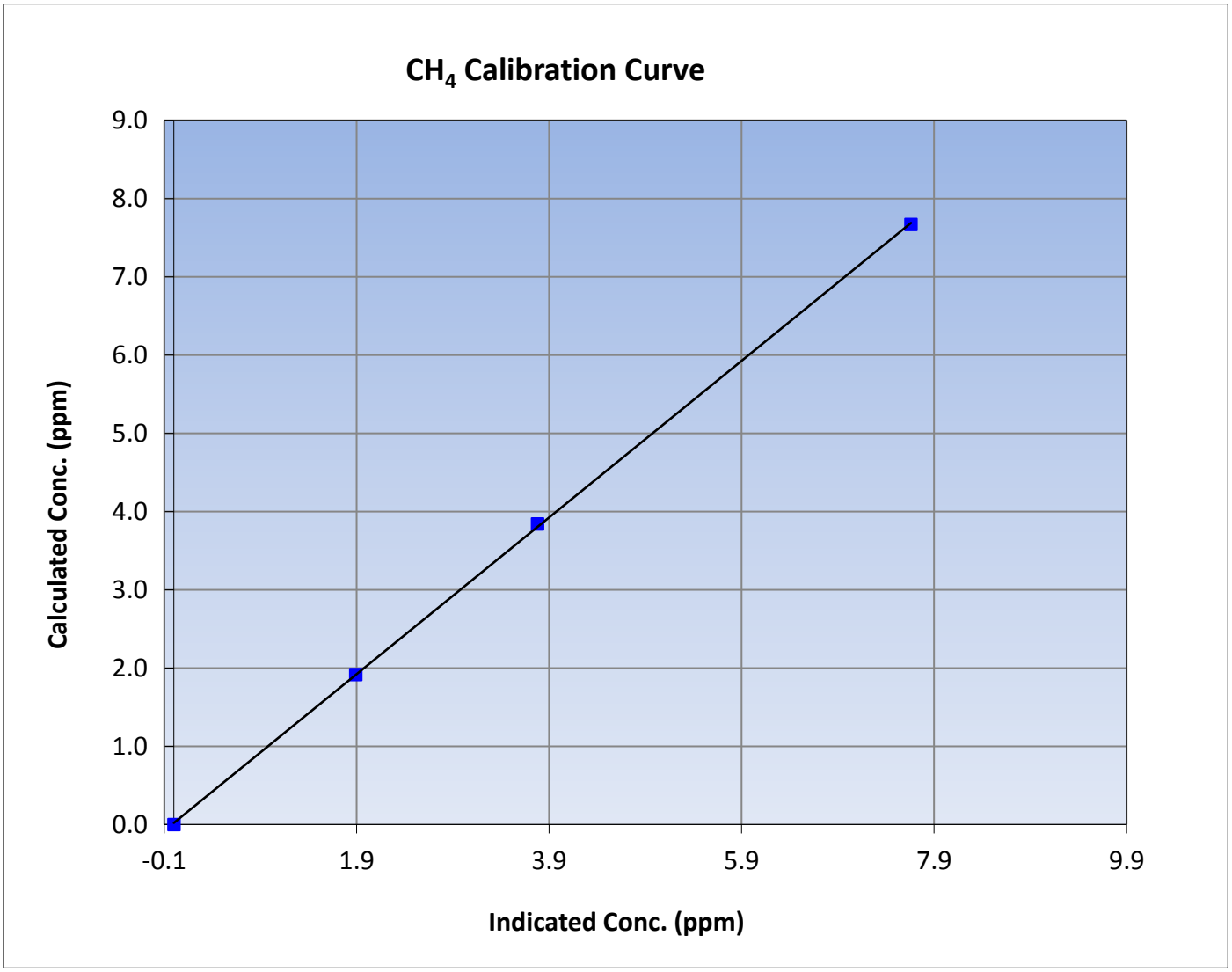
CH_4 Calibration Summary

Station Information

Calibration Date	March 15, 2016	Previous Calibration	February 11, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:30	End Time (MST)	13:00
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	0.999937
7.67	7.66	1.0013		
3.84	3.78	1.0159	Slope	1.001034
1.91	1.89	1.0132		
			Intercept	0.020215



Wood Buffalo Environmental Association

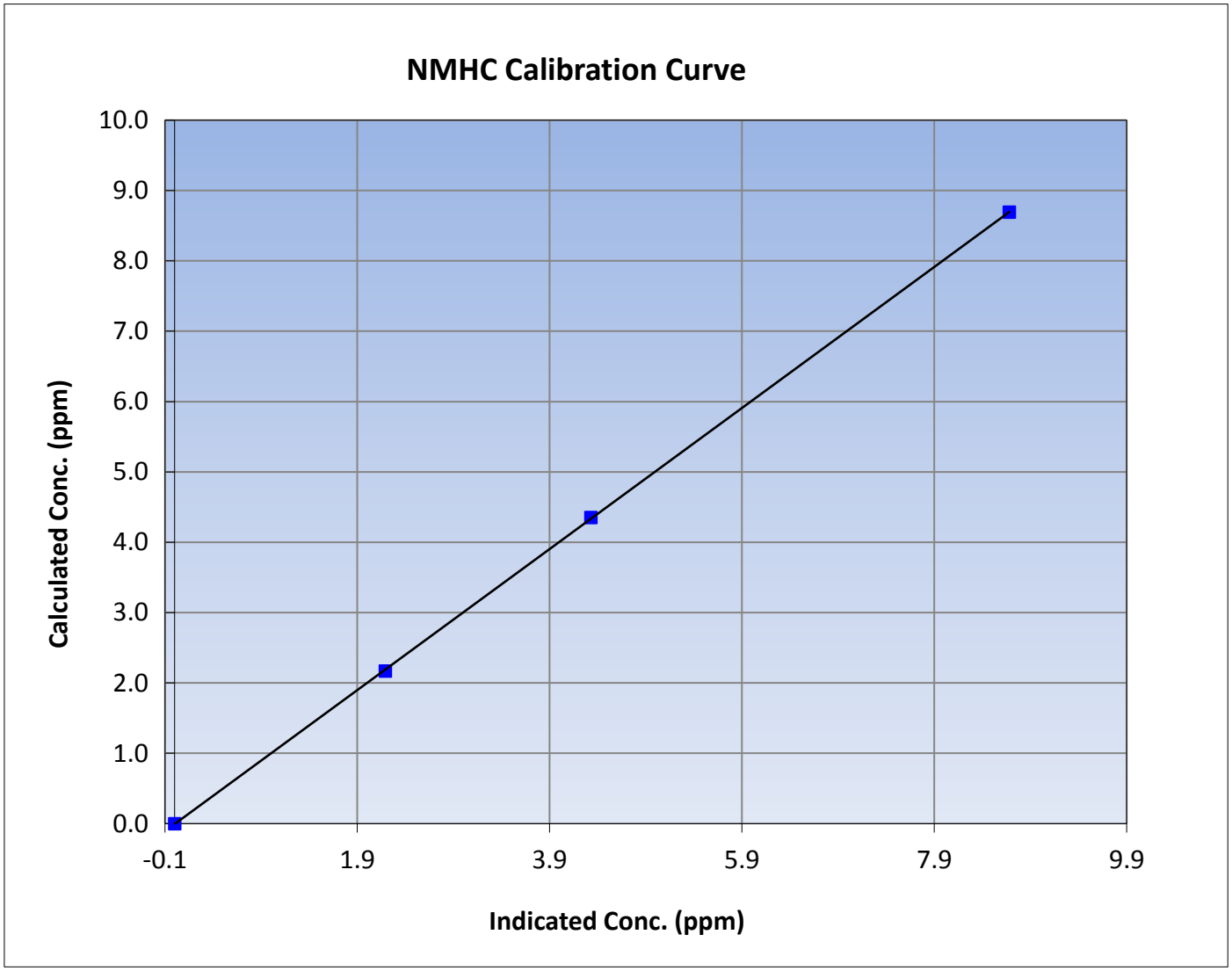
NMHC Calibration Summary

Station Information

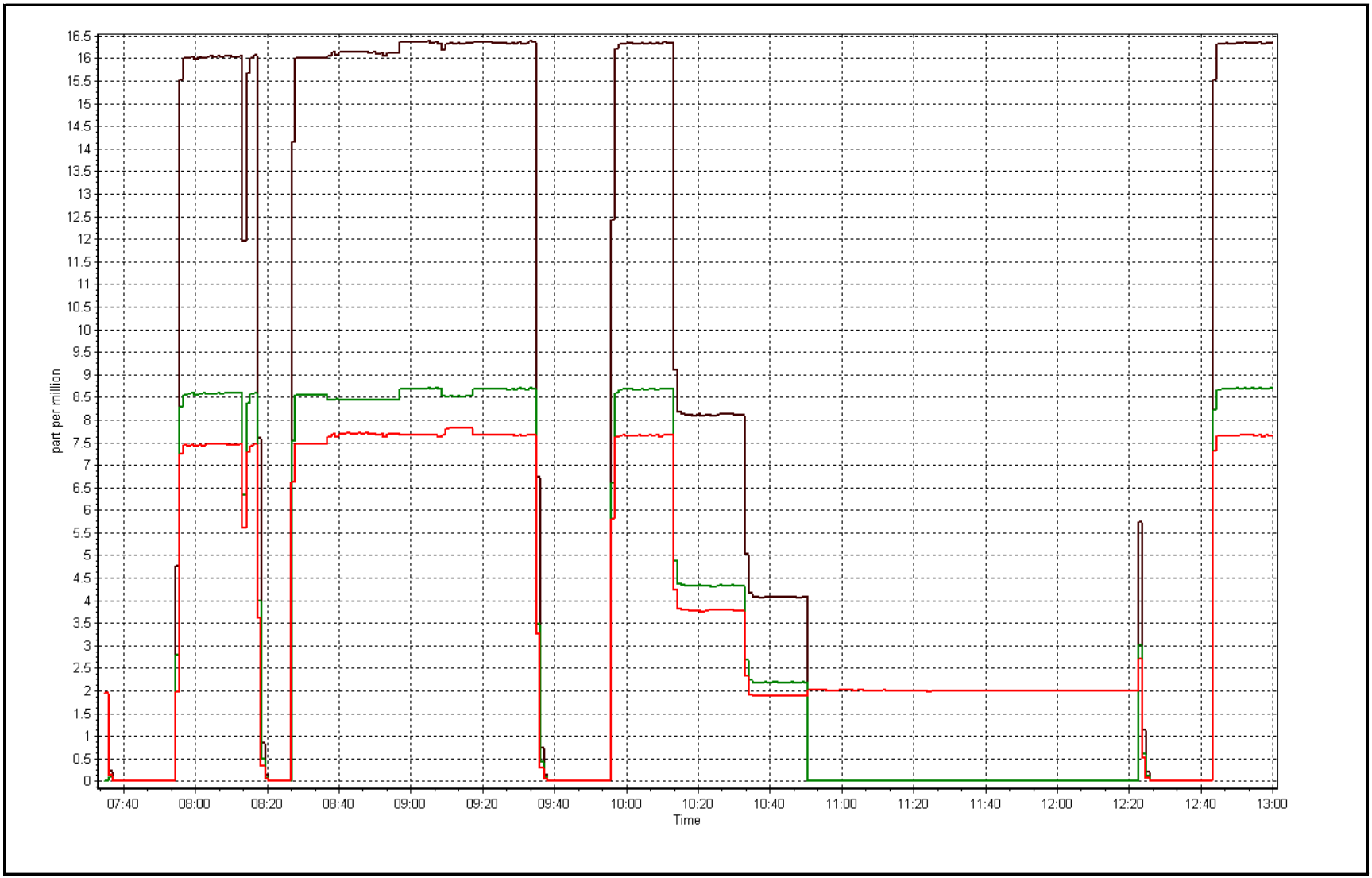
Calibration Date	March 15, 2016	Previous Calibration	February 11, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:30	End Time (MST)	13:00
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999983
8.69	8.68	1.0014		
4.35	4.33	1.0051	Slope	1.002501
2.17	2.19	0.9909		
			Intercept	-0.005964



THC Calibration Plot Date: March 15, 2016



Wood Buffalo Environmental Association
O_3 Calibration Report

Station Information

Calibration Date	March 16, 2016	Previous Calibration	February 12, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	8:05	End Time (MST)	10:22
NO2 GPT Ref date	March-15-16	Transfer Standard	NO2
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	8790

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 500 ppb		Bench temp.	26.3	27.7
Analyzer IP address	192.168.1.48		Lamp temp.	53.8	53.8
Calculated slope	0.998456	0.990769	Pressure	665.0	661.6
Calculated intercept	-1.447678	-1.729027	Flow cell A	0.710	0.707
Analyzer Background	-2.0	-2.0	Flow cell B	0.712	0.709
Analyzer Coefficient	1.006	1.006	Cell A Intensity	114407	111108
			Cell B Intensity	119823	116931

Analyzer make	Thermo 49i	Analyzer serial #	1426262596

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	1.19	439.1	444.2	0.989
calibrator zero	5000	0.00	0.0	0.3	----
high point	5000	1.19	439.1	444.2	0.989
second point	5000	0.85	299.9	304.3	0.986
third point	5000	0.51	153.9	159.4	0.965
as left zero	5000	0.00	0.0	0.8	----
as left span	5000	1.19	439.1	444.7	0.987
				Average Correction Factor	0.980

Corrected As found	443.9	Previous response	441.2	% change	-0.6%

Notes:

No maintenance or adjustments done, filter changed out,

Calibration Performed By: Melissa Lemay

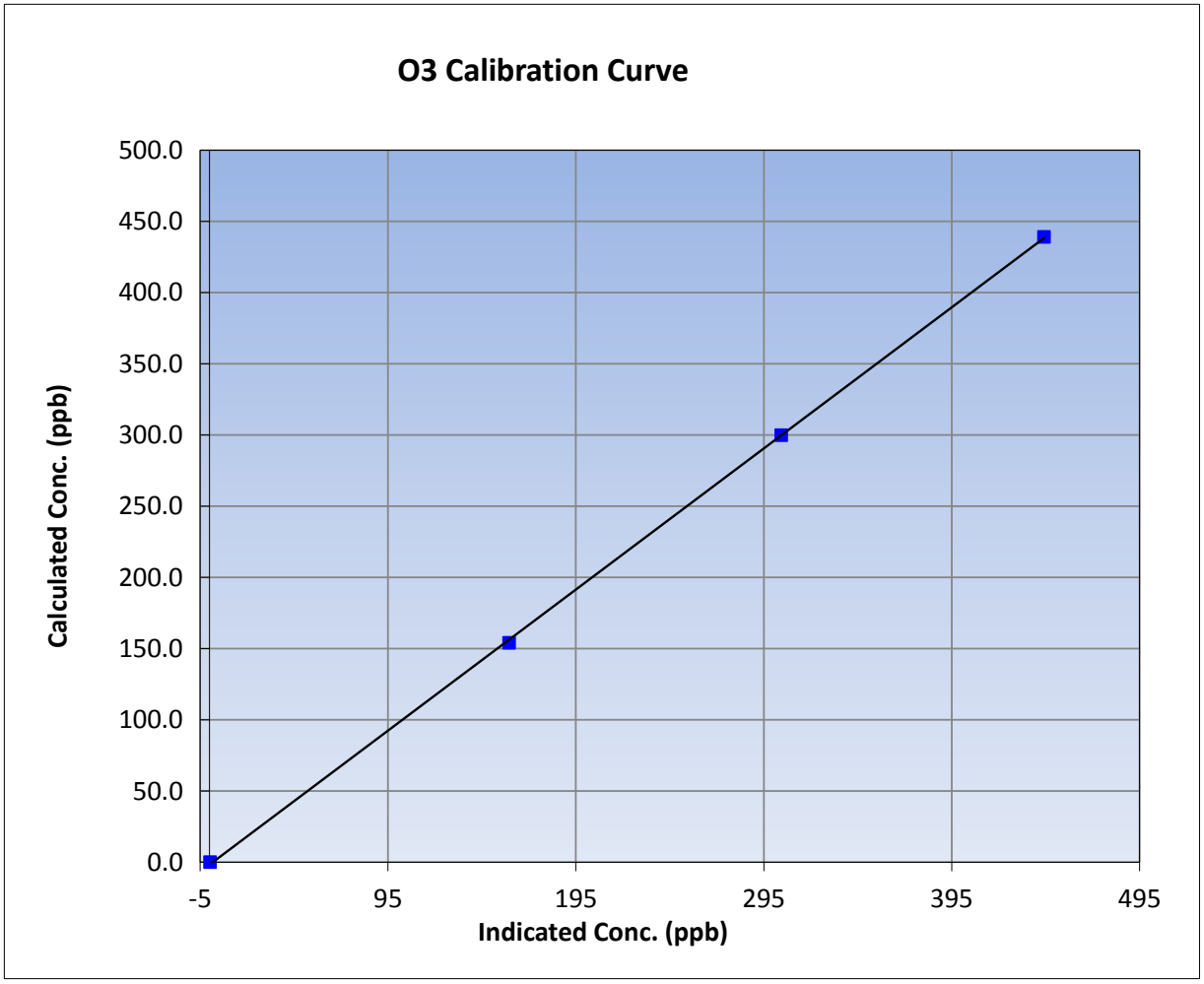
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

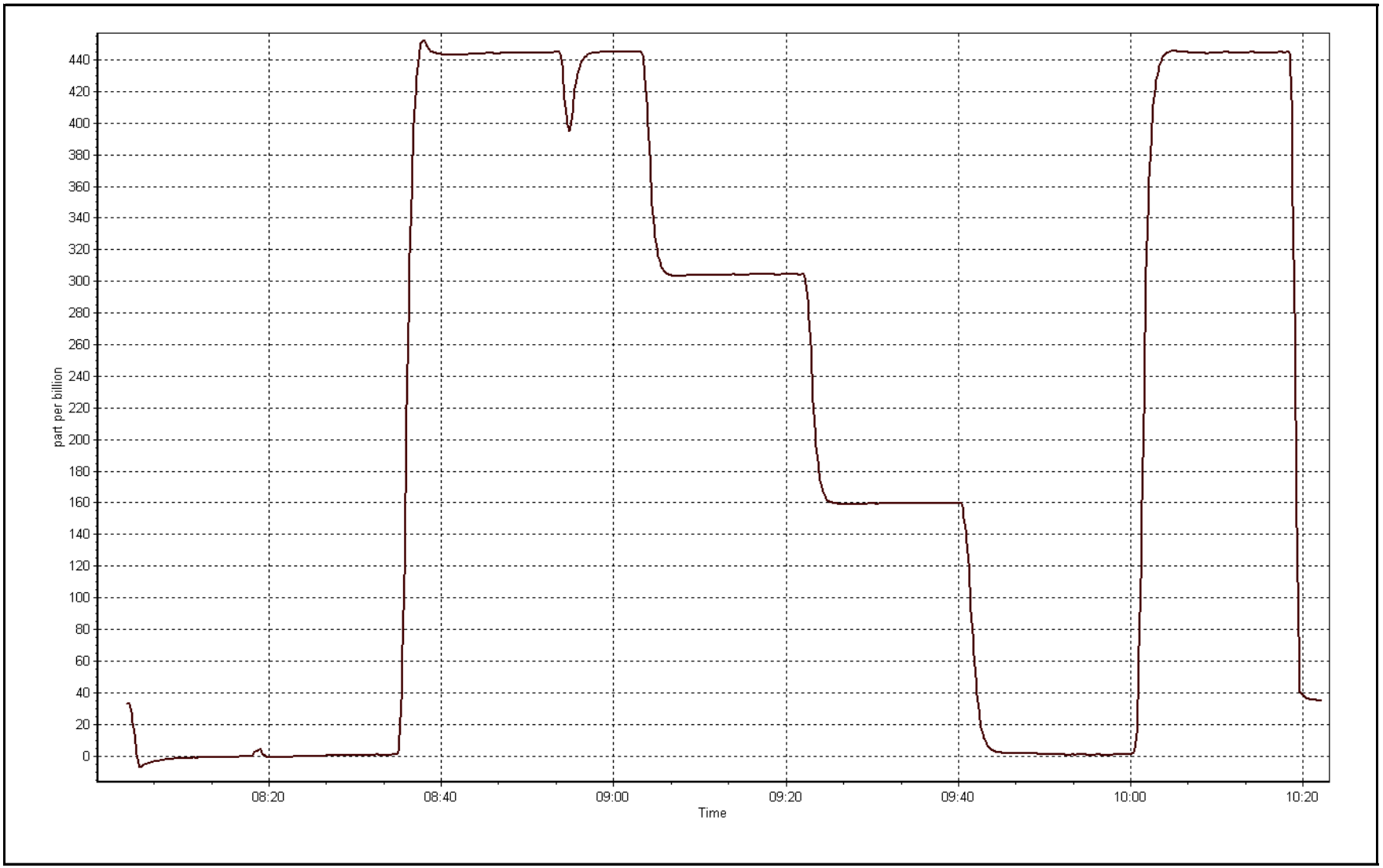
Calibration Date	March-16-16	Previous Calibration	February 12, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:05	End Time (MST)	10:22
Analyzer make	Thermo 49i	Analyzer serial #	1426262596

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999926
439.1	444.2	0.9885		
299.9	304.3	0.9855	Slope	0.990769
153.9	159.4	0.9655		
			Intercept	-1.729027



O3 Calibration Plot Date: March 16, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 15, 2016	Previous Calibration	February 11, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	8:30	End Time (MST)	13:00
NO Cal Gas Conc	53.4 ppm	Gas Cert Reference	SA130026A
NOx Cal Gas Conc	53.4 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	Sabio 4010	Serial Number	8400311
Zero air Generator	Teledyne PAI T701	Serial Number	4764

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8790

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.993969	0.995765	0.995997
	Data Offset	0.557513	0.498696	-1.284968
Current Calibration	Data Slope	1.001048	0.998991	1.004582
	Data Offset	0.220915	0.240300	-1.098146

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262592

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	1.000		0.985	
NOX coefficient	1.000		1.000	
NO2 coefficient	1.000		0.997	
NO bkgrnd	3.6		3.6	
NOX bkgrnd	3.7		3.6	
Chamber Temp	50.3	Deg C	50.3	Deg C
Moly Temp	325.3	Deg C	326.6	Deg C
PMT voltage	-808.1	V	-808.1	V
PMT Temp	-2.9	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	162.2	mmHg	156.1	mmHg
R Cell Press Nox	162.2	mmHg	156.1	mmHg
NO sample flow	0.792	lpm	0.808	lpm
Nox sample Flow	0.792	lpm	0.808	lpm

Notes:

Span adjusted, filter changed out, no maintenance done

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 15, 2016 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	-0.1	-0.1	0.0	----	----
as found span	5000	74.9	799.9	799.9	0.0	814.8	812.4	2.4	0.9818	0.9847
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
high point	5000	74.9	799.9	799.9	0.0	799.3	800.9	-1.7	1.0008	0.9988
second point	5000	37.5	400.5	400.5	0.0	398.9	399.8	-0.9	1.0040	1.0018
third point	5000	18.7	199.7	199.7	0.0	199.5	199.8	-0.3	1.0011	0.9996
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
as left span	5000	74.9	799.9	361.0	438.9	799.4	361.7	437.7	1.0007	0.9981
									1.0020	1.0000

Corrcted As found NO_X= 814.9 NO= 812.5 Percent Change NO_X= -1.3% NO= -1.2%

Previous Response NO_X= 804.2 NO= 802.8

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 74.90 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	799.2	800.1	0.0	1.0009	0.9998	----	----
1st NO2 (300)	361.0	439.1	798.8	361.0	437.8	1.0014	----	1.0030	99.7%
2nd NO2 (200)	500.2	299.9	799.5	500.2	299.2	1.0005	----	1.0023	99.8%
3rd NO2 (100)	646.2	153.9	802.5	646.2	156.2	0.9968	----	0.9853	101.5%
2nd NO ref point		0.0	800.4	801.6	-1.2	0.9994	0.9979	----	----
				Average Correction Factor		0.9995		0.9969	100.3%

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

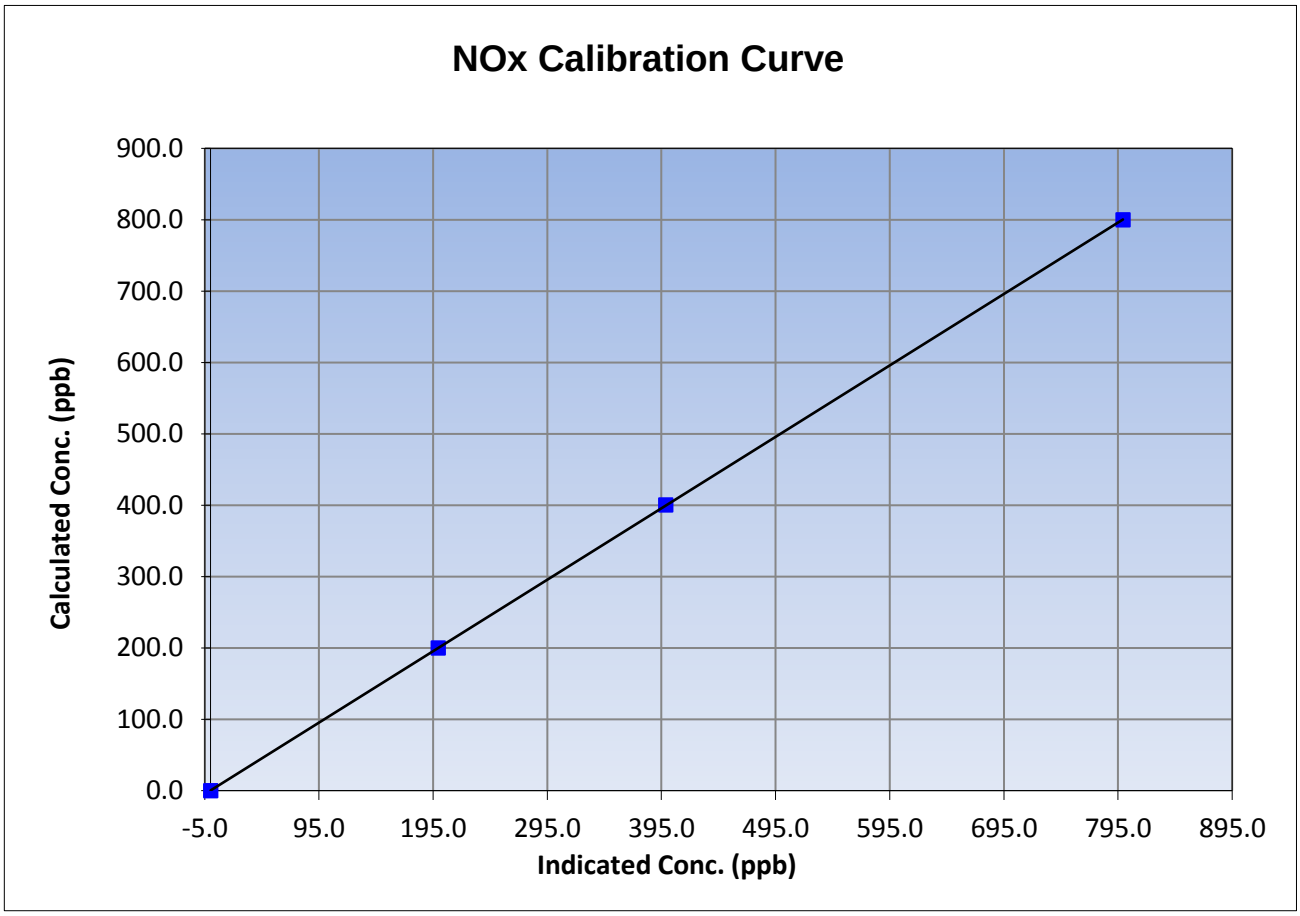
NO_X Calibration Summary

Station Information

Calibration Date	March 15, 2016	Previous Calibration	February 11, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:30	End Time (MST)	13:00
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	0.1	----	Correlation Coefficient	0.999996
799.9	799.3	1.0008		
400.5	398.9	1.0040	Slope	1.001048
199.7	199.5	1.0011		
			Intercept	0.220915



Wood Buffalo Environmental Association

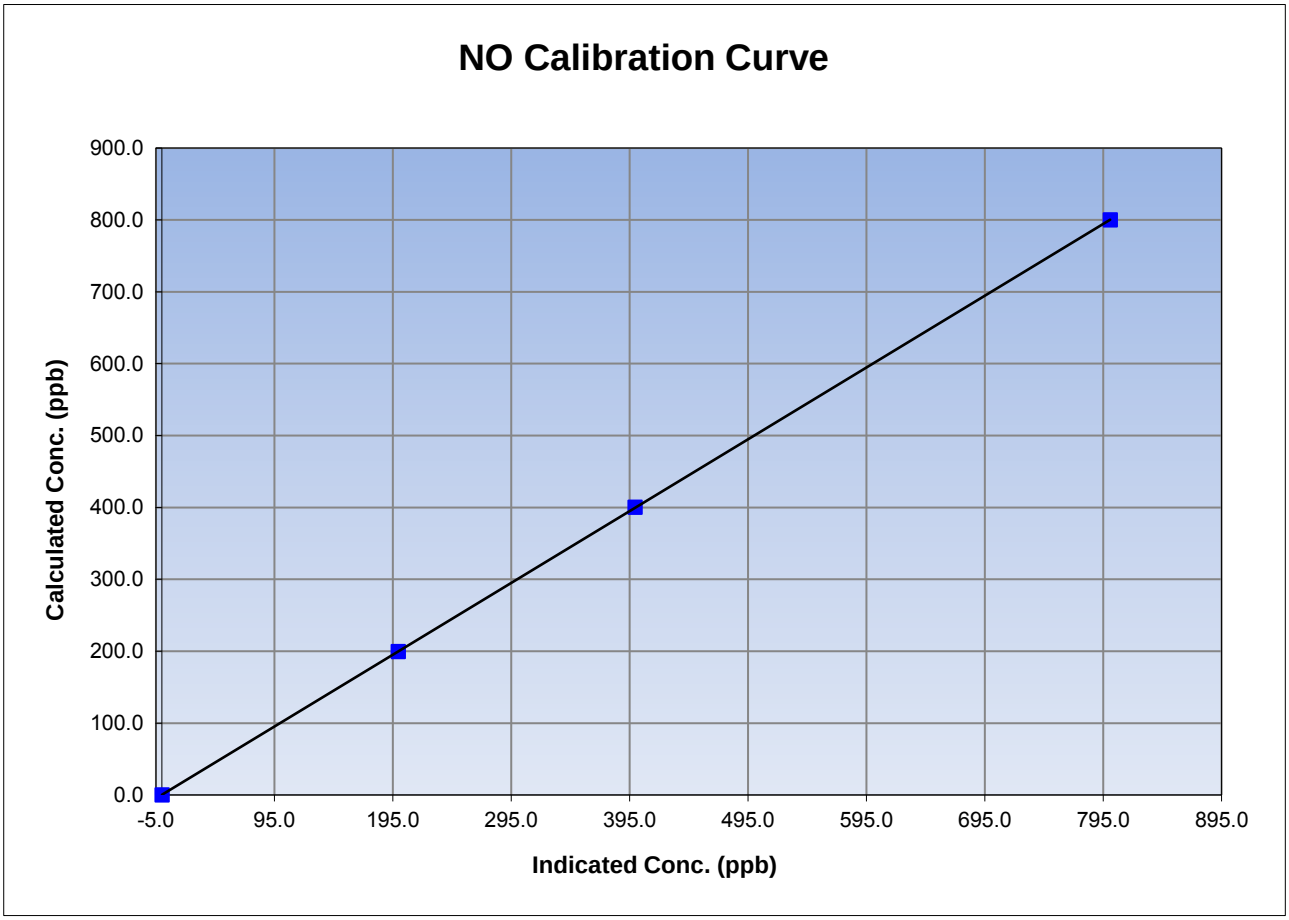
NO Calibration Summary

Station Information

Calibration Date	March 15, 2016	Previous Calibration	February 11, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:30	End Time (MST)	13:00
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	0.1	N/A	Correlation Coefficient	0.999997
799.9	800.9	0.9988		
400.5	399.8	1.0018	Slope	0.998991
199.7	199.8	0.9996		
			Intercept	0.240300



Wood Buffalo Environmental Association

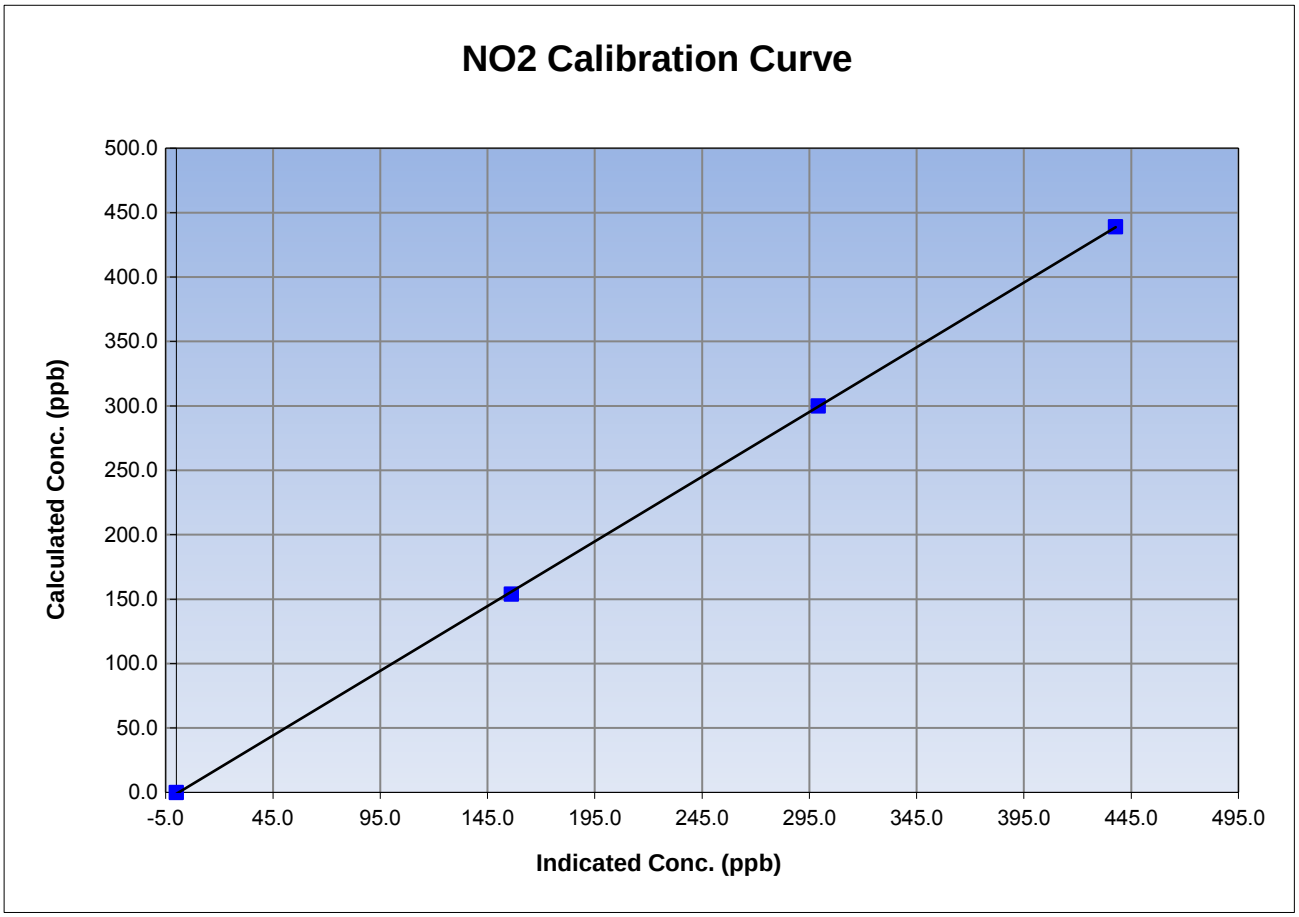
NO_2 Calibration Summary

Station Information

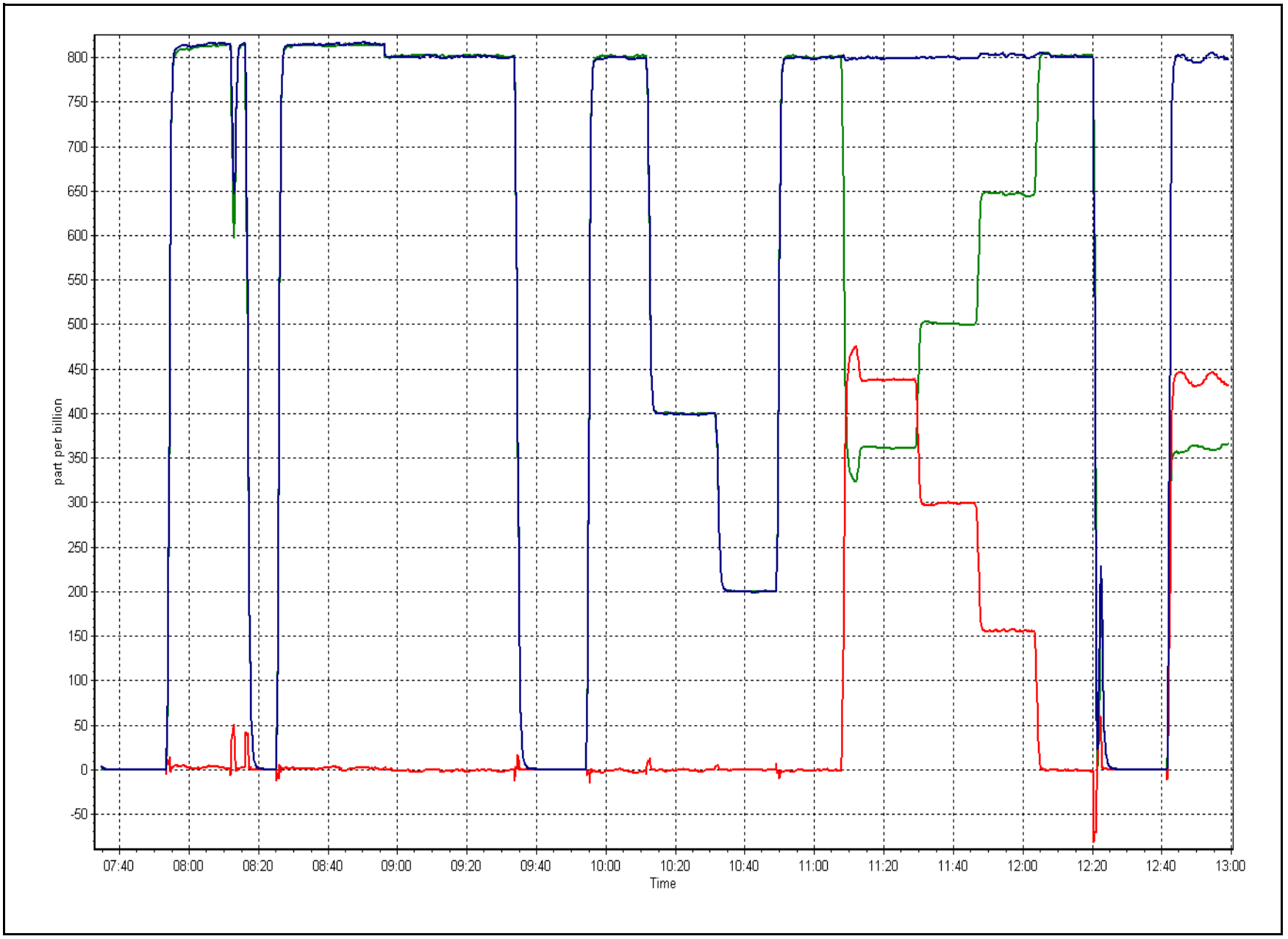
Calibration Date	March 15, 2016	Previous Calibration	February 11, 2016
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	8:30	End Time (MST)	13:00
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999951
439.1	437.8	1.0030		
299.9	299.2	1.0023	Slope	1.004582
153.9	156.2	0.9853		
			Intercept	-1.098146



NOX Calibration Plot Date: March 15, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	March 1, 2016	Previous Calibration:	February 12, 2016
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	13:39	End Time (MST):	14:35
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION

Particulate Fraction:	PM2.5
Make/Model:	Thermo / SHARP 5030
Serial Number	E1093
C_{14} Source SN:	4933
Confirmation of Time settings:	Yes ☑ No ☐

Paremeters Checked: T1 ☑ T2 ☐ T3 ☐ T4 ☐ P3 ☑ Main Flow ☑ Beta ☐ Neph ☑

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	0.0	0.0	0.0	0.0
T2	29.0	na	na	29.0
T3	23.0	na	na	23.0
T4	19.0	na	na	19.0
RH (%)	10.0	na	na	10.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	951	950.0	-1.0	951

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1005	5	1005	1000

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	191		190
Neph	-0.4		-0.2
C14	10.7		99.6
Indicated Concentration (ug/m3)	**-0.2**	**No**	**-0.2**
Offset 1			
Offset 2			

Leak Check (Quarterly)

Leak Check Date:	March 1, 2016	Previous Leak Check Date:	February 12, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.78	0.00
*Flow with adaptor (LPM):	16.78	

**Note - do not attach adaptor without shutting off the pump first*

Mass Foil Calibration (Annualy)

Foil Calibration Date:	June 17, 2015	Previous Foil Calibration:	
Zeroed?:			
Foil Mass:	1278	Mass foil set S/N:	2520
Previous Correction Factor:	7020		
New Correction Factor:	6936		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

No adjustments done, Tape changed out, Nepholometer and flow checked before and after tape change. Leak check done, cyclone head cleaned.

Melissa Lemay

Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	March 16, 2016	Previous Calibration:	March 1, 2016
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	8:06	End Time (MST):	10:19
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION

Particulate Fraction:	PM2.5							
Make/Model:	Thermo / SHARP 5030							
Serial Number	E1093							
C_{14} Source SN:	4933							
Confirmation of Time settings:	Yes ☑	No ☐						
Paremeters Checked:	T1 ☑	T2 ☐	T3 ☐	T4 ☐	P3 ☑	Main Flow ☑	Beta ☐	Neph ☑

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	25.0	25.6	0.6	25.0
T2	23.0	25.6	na	25.0
T3	23.0	25.6	na	25.0
T4	26.0	25.6	na	26.0
RH (%)	12.0	11.8	na	12.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	953	952.0	-1.0	953

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1005	5	1005	1000

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	191		191
Neph	0		0
C14	22.4		22.4
Indicated Concentration (ug/m3)	**0**	**No**	**0**
Offset 1			
Offset 2			

Leak Check (Quarterly)

Leak Check Date:	March 1, 2016	Previous Leak Check Date:	February 12, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.78	0.00
*Flow with adaptor (LPM):	16.78	

**Note - do not attach adaptor without shutting off the pump first*

Mass Foil Calibration (Annualy)

Foil Calibration Date:	March 16, 2016	Previous Foil Calibration:	June 17, 2015
Zeroed?:			
Foil Mass:	1337	Mass foil set S/N:	2520
Previous Correction Factor:	6935		
New Correction Factor:	7125		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

T2 and T3 were adjusted, Foil check done, No other parameters adjusted,cyclone head cleaning

Melissa Lemay

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 15
CNRL HORIZON
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
MARCH 2016

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	100.00	30	0	9	0
TRS (ppb) Average	707	36	37	99.87	2	0	1	0
THC (ppm) Average	708	36	36	100.00	7.4	-	3.2	-
NO2 (ppb) Average	708	36	36	100.00	43	0	19	-
NO (ppb) Average	708	36	36	100.00	88	-	18	-
NOX (ppb) Average	708	36	36	100.00	129	-	33	-
PM2.5 (ug/m3) Average	742	2	2	100.00	28.3	-	11.4	0
Temperature 2 m (C) Average	744	0	0	100.00	12.1	-	5.8	-
Wind Speed 10 m (km/h) Average	737	0	7	99.06	25	-	14	-
Wind Direction 10 m (deg) Average	737	0	7	99.06	-	-	-	-
Precipitation (mm) Total	744	0	0	100.00	2	-	5.1	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	91	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	658	-	211	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1.4	4	-	0	0	0	0	1	4	30
TRS (ppb) Average	707	0.3	0	-	0	0	0	0	0	0	2
THC (ppm) Average	708	2.29	0.5	-	2	2.1	2.1	2.1	2.3	2.6	7.4
NO2 (ppb) Average	708	10.6	9	-	0	1	4	8	15	23	43
NO (ppb) Average	708	4.3	8	-	0	0	0	1	5	10	88
NOX (ppb) Average	708	14.9	16	-	0	2	4	10	20	34	129
PM2.5 (ug/m3) Average	742	4.2	3.5	-	0.6	1.4	1.9	2.9	5.4	8.9	28.3
Temperature 2 m (C) Average	744	-4.37	5.3	-	-16.8	-10.4	-8	-5	-1.3	1.9	12.1
Wind Speed 10 m (km/h) Average	737	8	4	-	1	3	5	7	11	14	25
Wind Direction 10 m (deg) Average	737	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	20.07	-	-	-	-	-	-	-
Relative Humidity (%) Average	744	71.1	17	-	15	48	59	75	85	90	97
Global Solar Radiation (W/m2) Average	744	112.6	166	-	0	0	0	4	180	409	658

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	15 Mar 2016 12:00	15 Mar 2016 12:00	1	Maintenance - cleaned glass manifold
Wind Speed, Wind Direction	09 Mar 2016 19:00	09 Mar 2016 19:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	09 Mar 2016 22:00	09 Mar 2016 22:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	10 Mar 2016 00:00	10 Mar 2016 00:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	12 Mar 2016 02:00	12 Mar 2016 02:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	26 Mar 2016 21:00	26 Mar 2016 21:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	27 Mar 2016 00:00	27 Mar 2016 00:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	27 Mar 2016 07:00	27 Mar 2016 07:00	1	Flat line in sensor output signal -sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

CNRL Horizon - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 30 ppb on Mar 22 14:00 Maximum Daily Average: 8.7 ppb on Mar 22

Minimum Value: 0 ppb on Mar 5 20:00 Minimum Daily Average: 0.0 ppb on Mar 6

Maximum Diurnal Average: 3.1 ppb at hour 14 Minimum Diurnal Average: 0.2 ppb at hour 7

Monthly Average: 1.4 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 4$ $P_{99} = 19$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	1	1	1	1	0.4	1
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	0.1	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	0.2	0
4-Mar	0	0	0	0	Z	0	0	0	0	0	0	12	23	17	11	8	6	1	0	0	0	0	0	1	3.6	23
5-Mar	2	3	2	1	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	3
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	0.0	0
7-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.3	1
8-Mar	0	0	Z	0	0	0	0	0	1	3	2	4	7	14	17	13	11	9	11	12	6	5	3	2	5.2	17
9-Mar	1	0	0	Z	1	0	0	0	0	0	0	0	1	2	1	1	1	1	1	1	1	1	0	0	0.6	2
10-Mar	0	0	0	0	Z	1	1	0	4	4	4	3	1	1	0	0	0	0	0	0	0	0	0	0	1.0	4
11-Mar	0	0	1	1	1	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Mar	Z	0	0	0	0	0	0	1	3	7	5	3	2	1	0	0	0	0	0	0	0	0	0	0	1.1	7
13-Mar	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	2	1	6	8	0	1.2	8
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	0.1	0
15-Mar	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	0	1	0	0	0	0	0	0	0	0.2	1
16-Mar	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	1	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	0	0	0.1	0
18-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8	5	5	7	1	1	0	1	1.3	8
19-Mar	1	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0.3	1
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	0.1	0
22-Mar	0	0	0	0	Z	0	0	0	0	1	18	14	8	30	20	18	19	19	13	8	8	8	7	6	8.7	30
23-Mar	4	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	4
24-Mar	Z	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
25-Mar	0	Z	0	0	0	0	0	0	0	0	0	1	2	4	6	10	12	13	10	9	8	4	1	1	3.6	13
26-Mar	1	0	Z	0	1	1	0	1	1	1	5	4	1	1	0	0	3	4	3	9	10	8	7	3	2.8	10
27-Mar	2	4	2	Z	1	1	1	1	2	3	7	13	19	17	14	6	3	2	1	0	0	0	0	3	4.4	19
28-Mar	2	3	4	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4
29-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0.3	1
30-Mar	Z	1	1	1	1	1	0	0	1	1	3	0	1	2	0	0	0	0	0	1	2	0	0	0	0.7	3
31-Mar	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	15	26	20	11	7	4	2	3.9	26
	0.6	0.6	0.5	0.3	0.3	0.2	0.2	0.2	0.5	0.8	1.6	1.9	2.3	3.1	2.5	2.1	2.3	2.4	2.5	2.3	1.6	1.4	1.2	0.8	Diurnal Average	
	4	4	4	2	1	1	1	1	4	7	18	14	23	30	20	18	19	19	26	20	11	8	8	6	Diurnal Maximum	

Z - zerospan C - Calibration

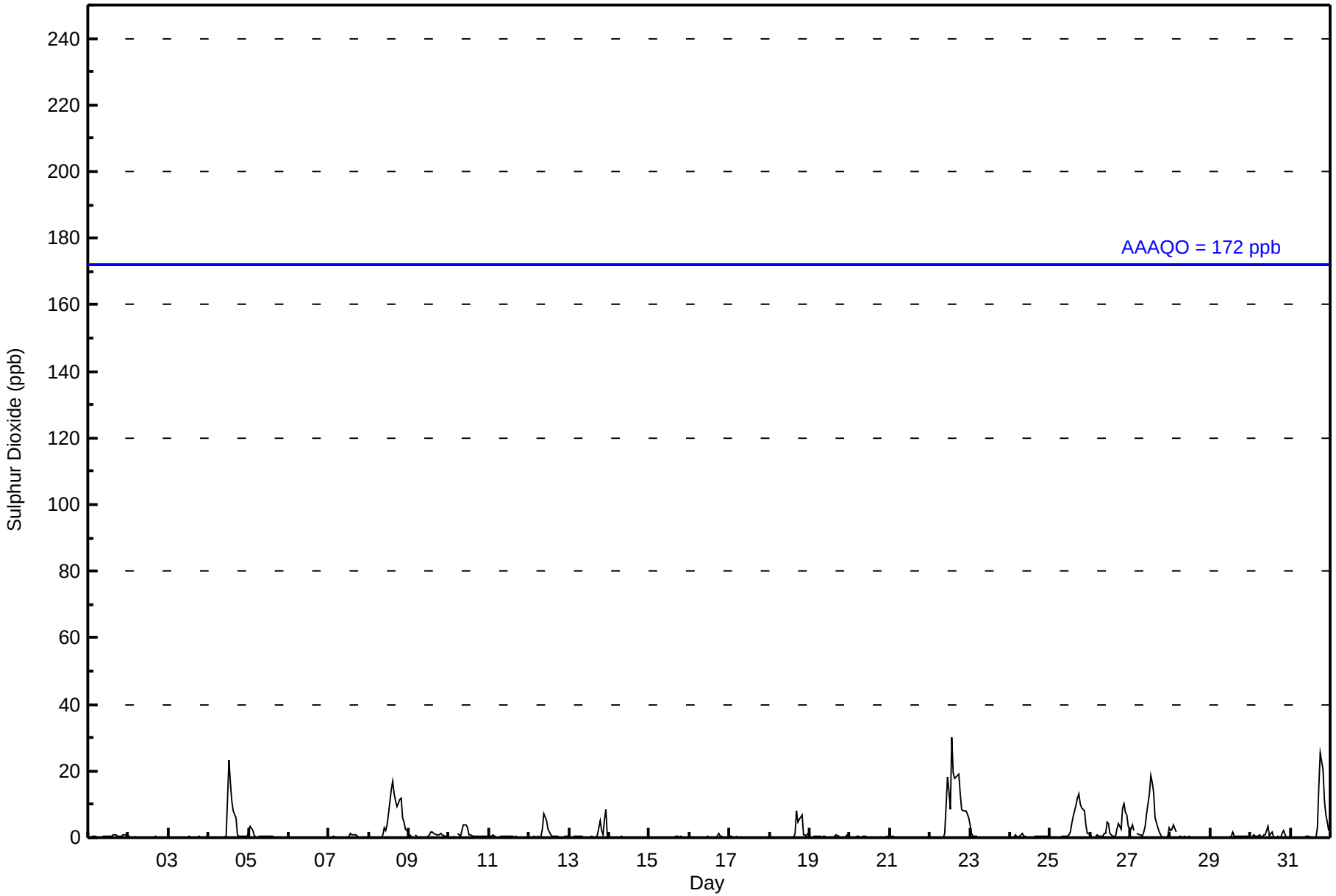
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

CNRL Horizon - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	680	96.05	96.05
11 - 20	25	3.53	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: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

CNRL Horizon - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	166	200	22	12	8	16	18	18	39	35	25	8	18	20	25	43	673
11 - 20	5	2	1	0	0	0	1	2	3	2	0	0	0	1	1	7	25
21 - 60	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	3
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	171	202	23	12	8	16	20	21	42	38	25	8	18	21	26	50	701

Total Number of Valid Hours: 701

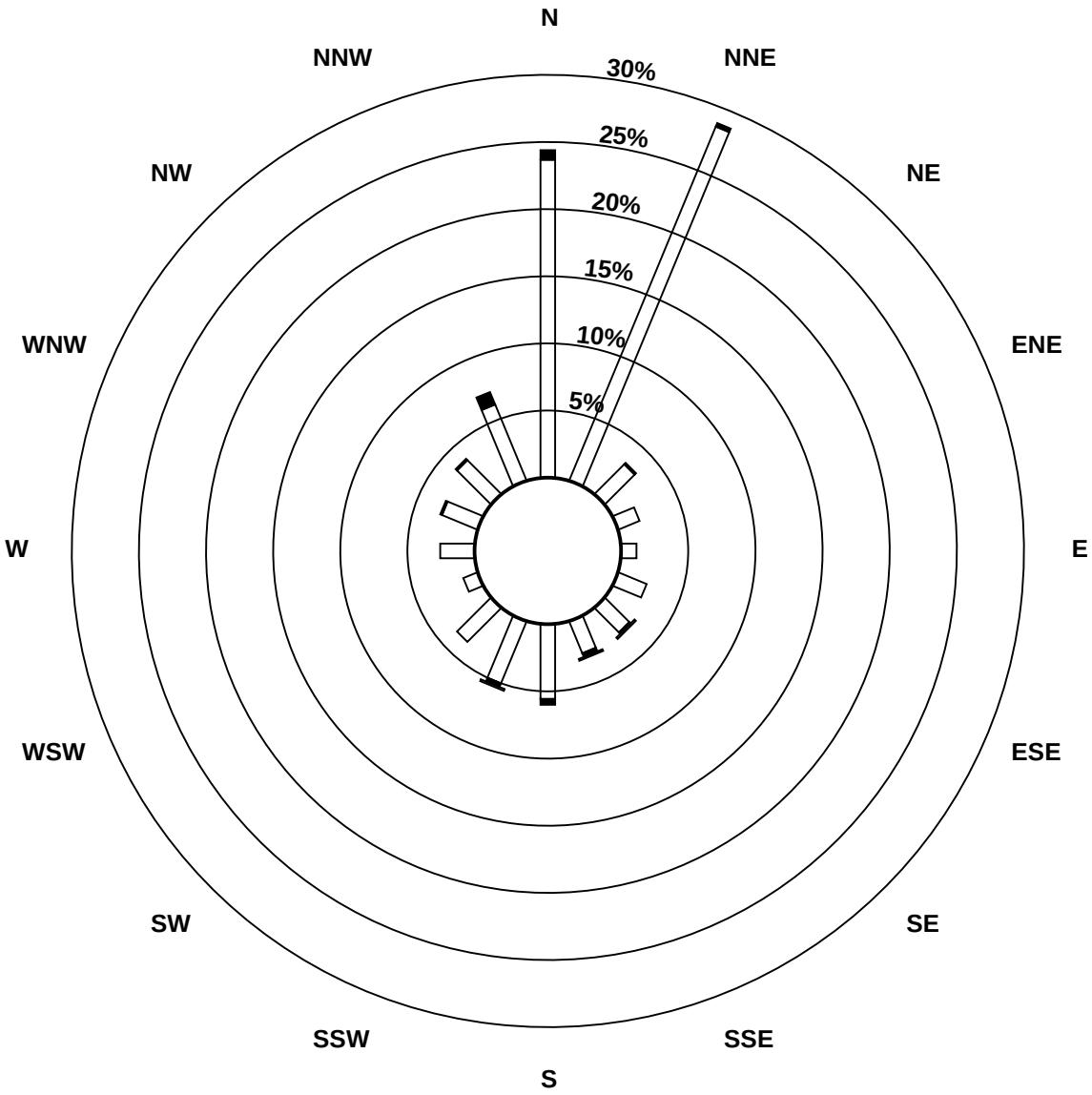
Total Number of Hours: 744

Wood Buffalo Environmental Association

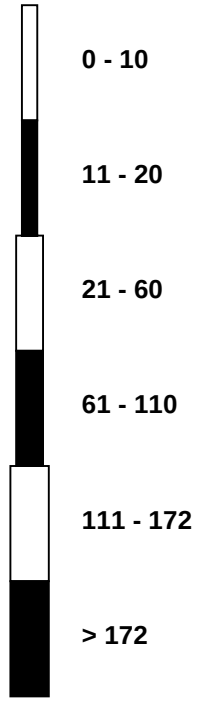
Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

CNRL Horizon (AMS 15)



Classes (ppb)



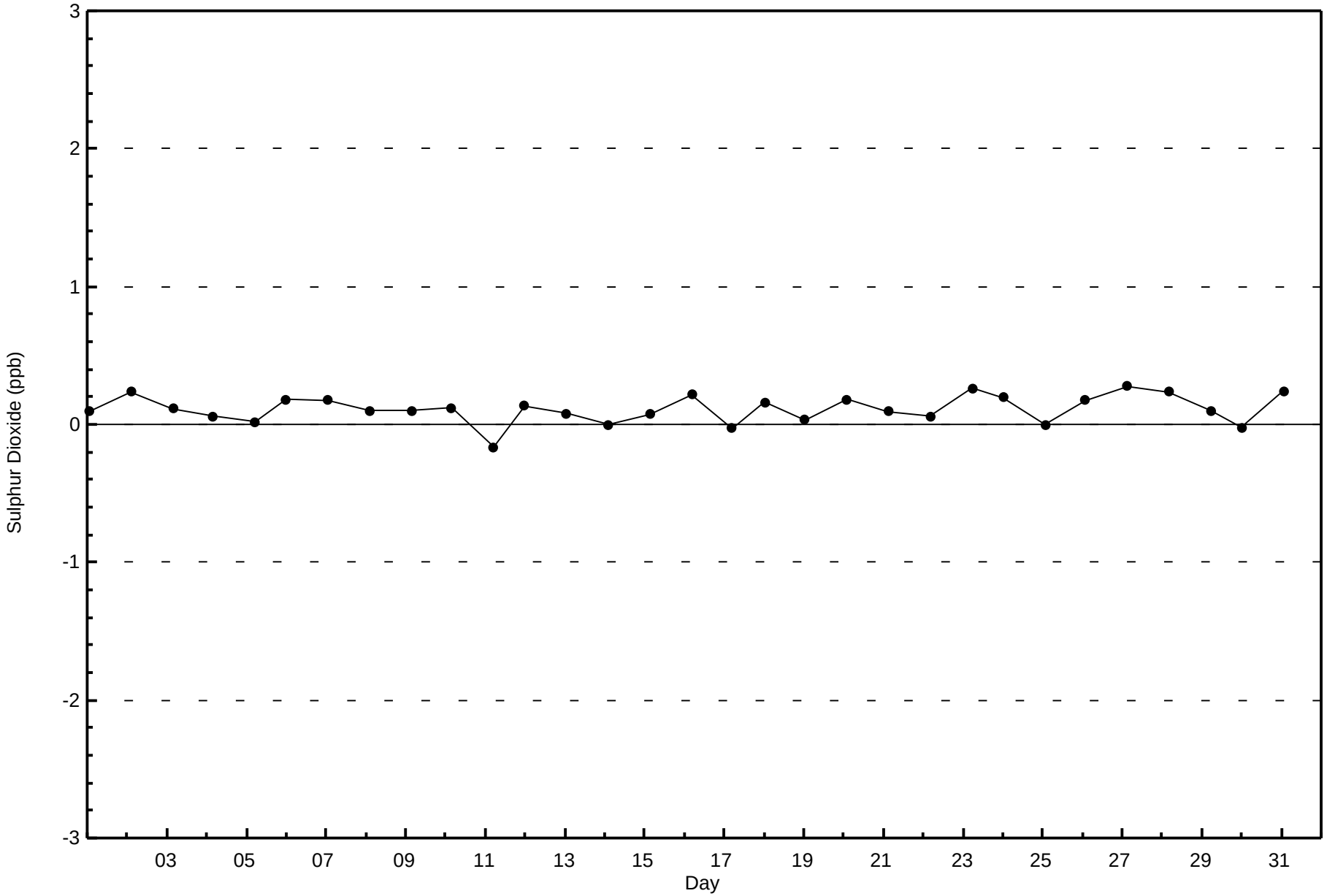
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

CNRL Horizon - March 2016

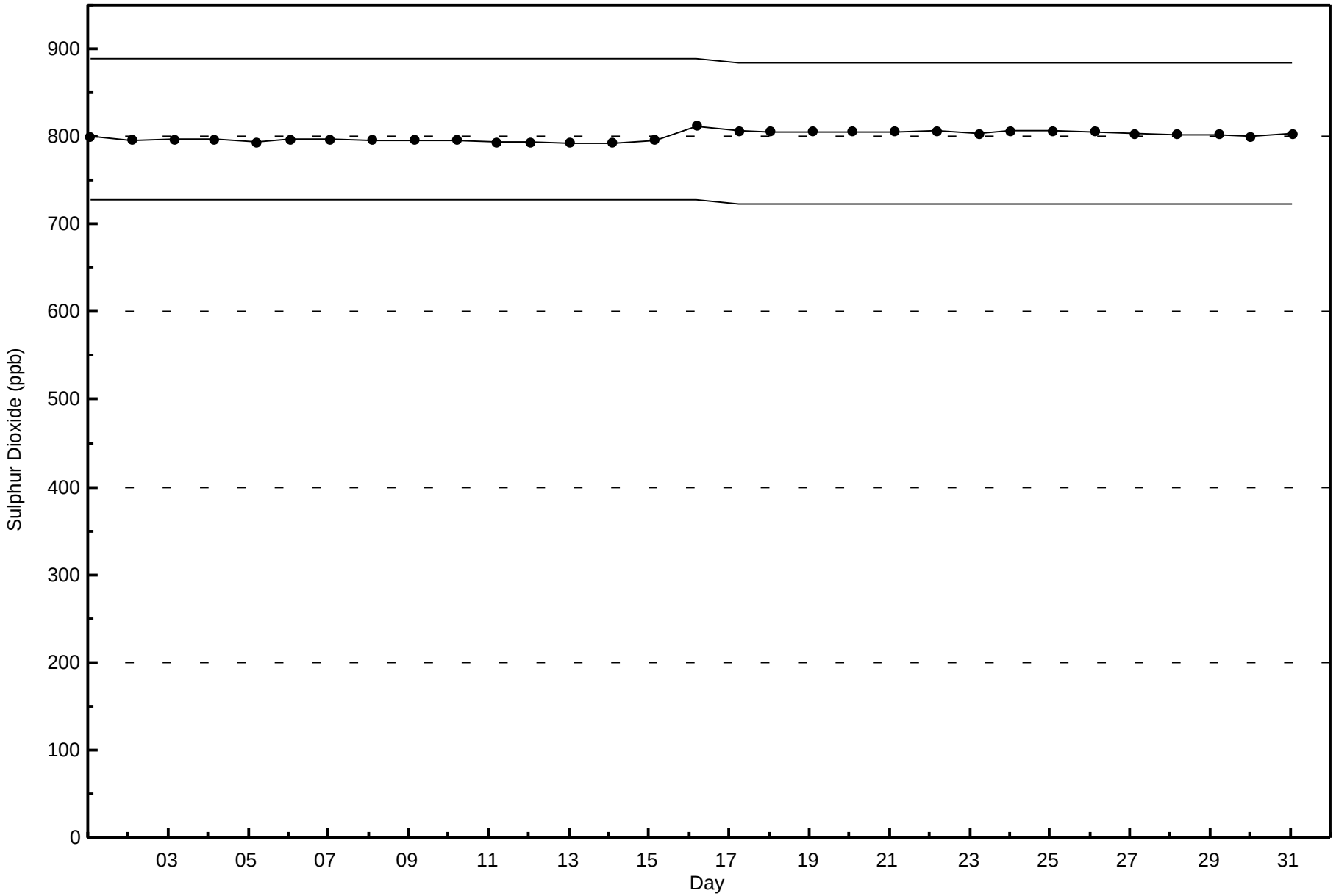


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

CNRL Horizon - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

CNRL Horizon - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 2 ppb on Mar 13 23:00

Maximum Daily Average: 0.6 ppb on Mar 25

Minimum Value: 0 ppb on Mar 29 06:00

Minimum Daily Average: 0.1 ppb on Mar 16

Maximum Diurnal Average: 0.3 ppb at hour 13

Minimum Diurnal Average: 0.2 ppb at hour 16

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 in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	36
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-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
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	0.2	0
3-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
4-Mar	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
5-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
6-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
7-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
8-Mar	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.5	1
9-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
10-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	0.3	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	0.2	0
12-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	0.3	1
13-Mar	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	2
14-Mar	0	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0.2	0
15-Mar	0	0	0	0	Z	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
16-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
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	0.2	0
18-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
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	0.2	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	0.2	0
22-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	0.4	1
23-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
24-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
25-Mar	1	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	1	0.6	1
26-Mar	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0.4	1
27-Mar	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
28-Mar	0	0	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
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	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
31-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0.4	1
	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	Diurnal Average	
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

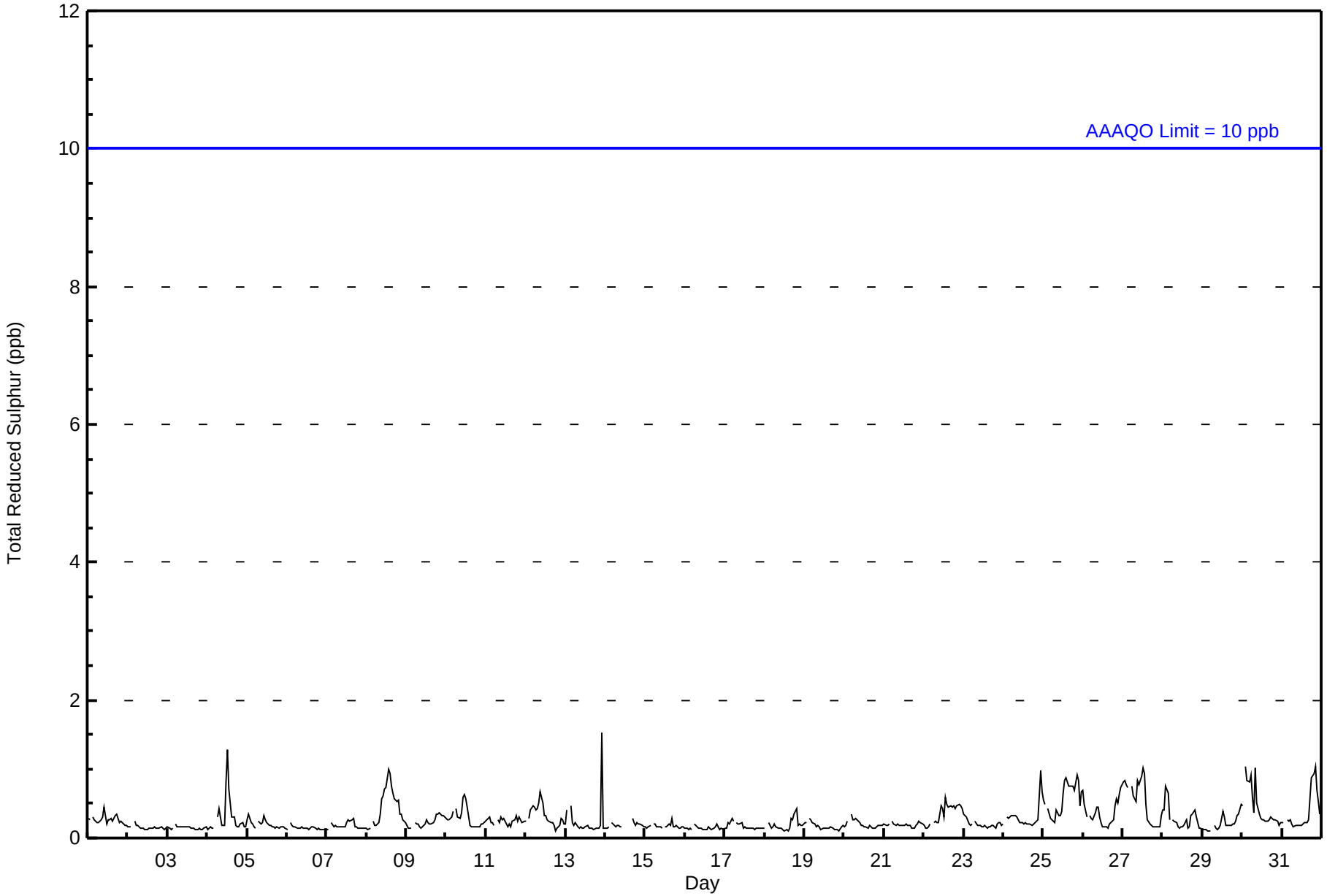
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Total Reduced Sulphur (TRS) - ppb

CNRL Horizon - March 2016



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

CNRL Horizon - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	169	201	23	12	9	16	20	20	41	41	25	7	18	20	28	51	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	169	201	23	12	9	16	20	20	41	41	25	7	18	20	28	51	701

Total Number of Valid Hours: 701

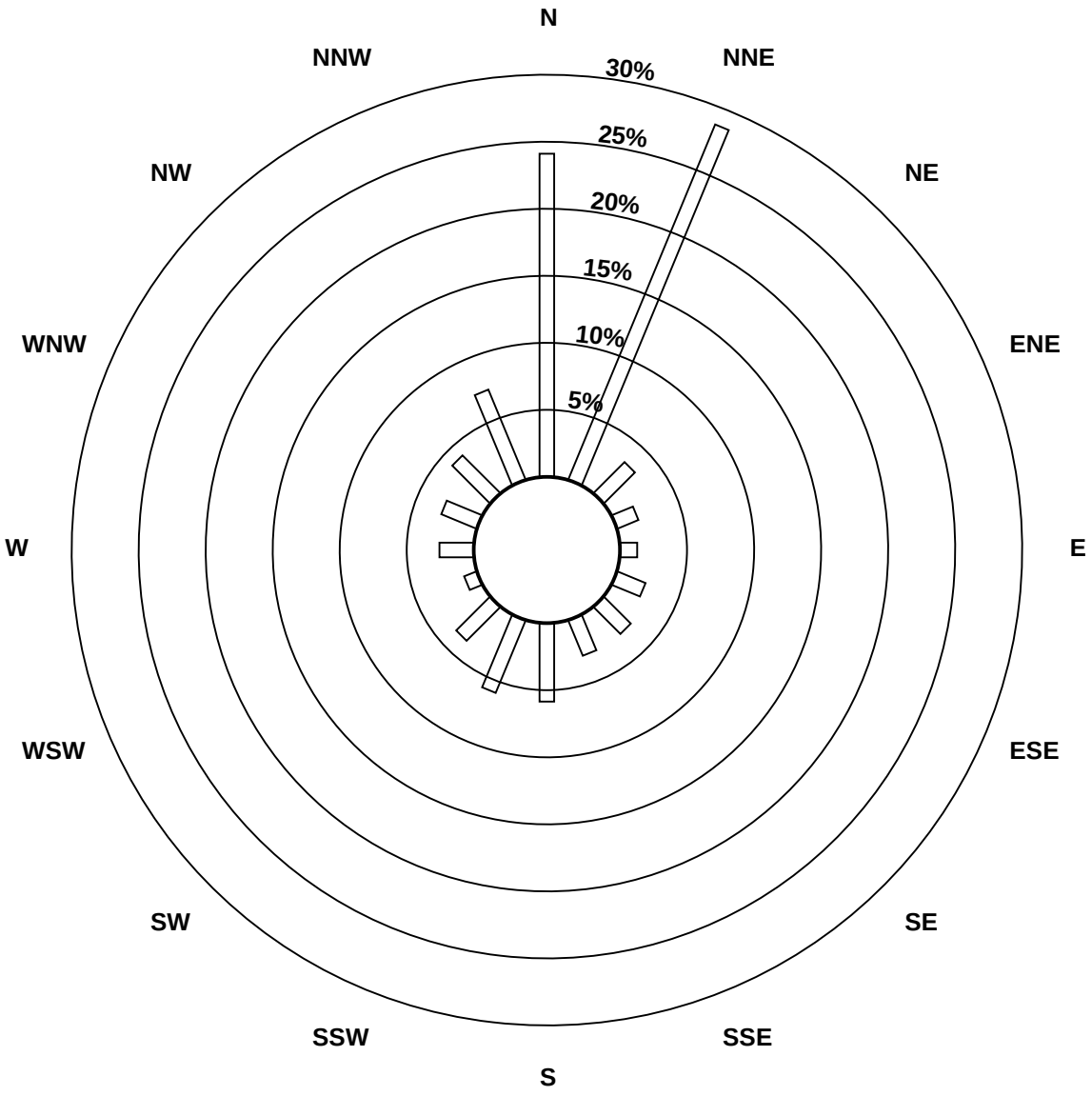
Total Number of Hours: 744

Wood Buffalo Environmental Association

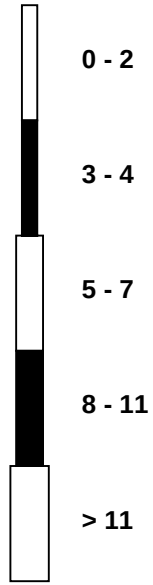
Wind Rose Mar 2016

Total Reduced Sulphur (TRS) - ppb

CNRL Horizon (AMS 15)



Classes (ppb)



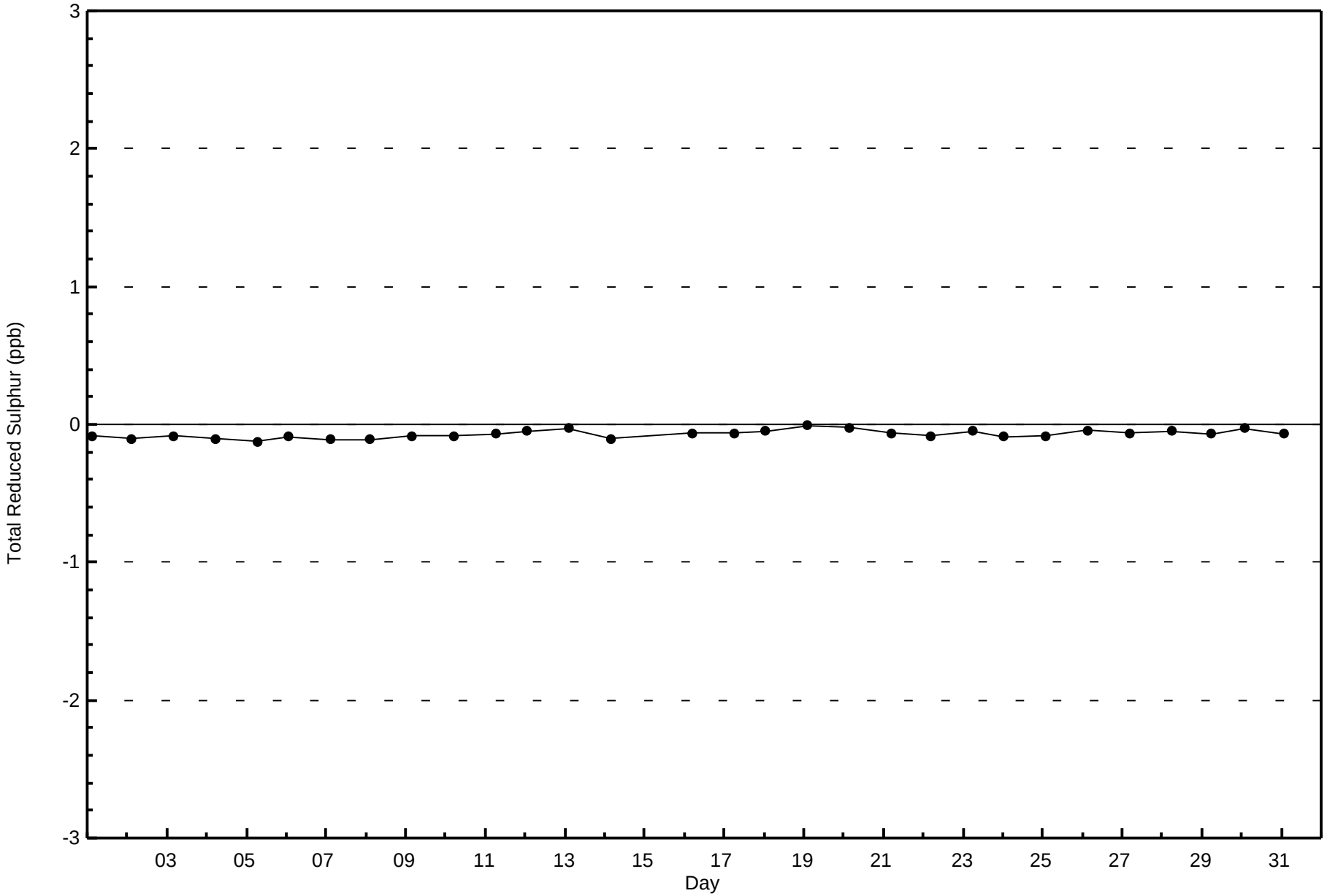
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

CNRL Horizon - March 2016

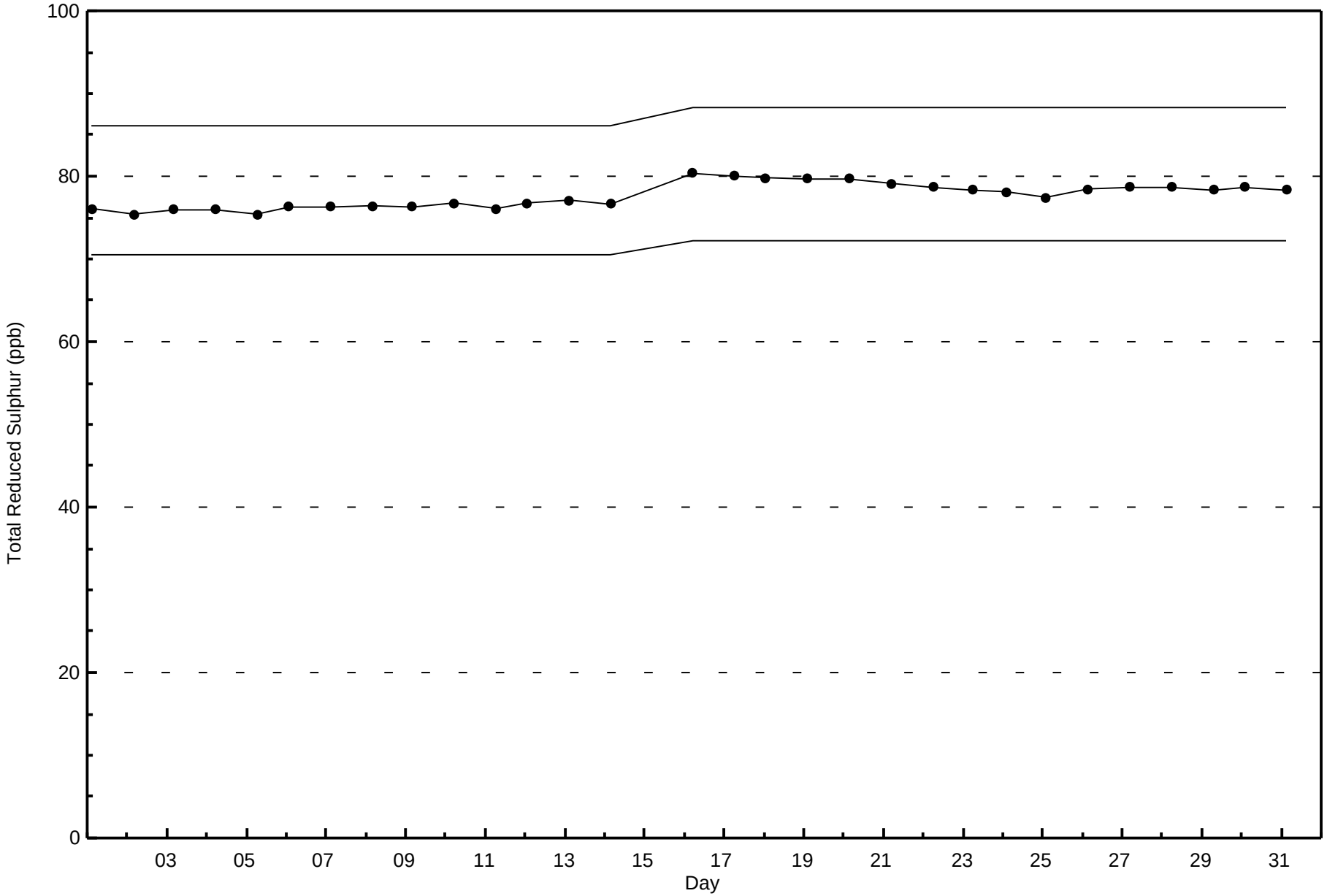


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

CNRL Horizon - March 2016



Maximum Value: 7.4 ppm on Mar 30 03:00

Maximum Daily Average: 3.2 ppm on Mar 30

Minimum Value: 2.0 ppm on Mar 29 02:00

Minimum Daily Average: 2.1 ppm on Mar 6

Maximum Diurnal Average: 2.5 ppm at hour 3

Minimum Diurnal Average: 2.2 ppm at hour 16

Monthly Average: 2.29 ppm

Percentiles: P_1 = 2.0 P_{10} = 2.1 Q_1 = 2.1 Median = 2.1 Q_3 = 2.3 P_{90} = 2.6 P_{99} = 4.5

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	2.4	Z	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.8	3.6	2.2	2.3	2.3	2.5	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.3	3.6
2-Mar	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	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
3-Mar	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	2.1
4-Mar	2.0	2.1	2.0	2.0	Z	2.1	2.2	2.2	2.2	2.1	2.1	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3
5-Mar	2.2	2.3	2.2	2.2	2.1	Z	2.1	2.1	2.1	2.1	2.3	2.3	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	2.3
6-Mar	Z	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	2.1	2.1	2.1	2.1	2.1	2.1
7-Mar	2.1	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.4	2.5	2.2	2.5	2.7	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.7
8-Mar	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.4	2.9	2.9	2.6	2.6	2.4	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.3	2.9
9-Mar	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.2	2.4
10-Mar	2.4	2.5	2.5	2.5	Z	2.6	2.5	2.4	2.4	2.7	2.7	2.5	2.9	2.8	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.3	2.3	2.2	2.4	2.9
11-Mar	2.7	3.0	2.8	2.2	2.1	Z	2.2	2.2	2.4	2.6	2.4	2.9	2.4	2.4	2.8	2.4	3.1	3.1	2.6	2.3	2.6	2.5	2.4	2.5	2.5	3.1
12-Mar	Z	2.3	2.2	3.1	2.8	2.7	2.7	2.8	2.8	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.3	2.4	2.5	2.4	2.3	2.4	3.1
13-Mar	2.2	Z	3.2	2.7	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	3.2
14-Mar	2.1	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
15-Mar	2.1	2.1	2.1	Z	2.1	2.0	2.1	2.0	2.1	2.1	C	C	C	C	C	2.2	2.7	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.7
16-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	2.6	2.6	2.4	2.1	2.1	2.1	2.1	2.6
17-Mar	2.1	2.1	2.6	2.7	4.0	Z	2.3	2.1	2.1	2.3	2.6	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.4	2.4	2.1	2.4	4.0
18-Mar	Z	2.1	2.1	2.1	2.1	2.2	2.7	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.3	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.7
19-Mar	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
20-Mar	2.1	2.1	Z	2.1	2.1	2.2	2.1	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	2.1	2.1	2.2
21-Mar	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	2.1
22-Mar	2.1	2.1	2.1	2.1	Z	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.5	2.5	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.5
23-Mar	2.2	2.4	2.3	2.2	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4
24-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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.8	2.1	2.8
25-Mar	3.2	Z	2.5	2.6	2.4	2.4	2.3	2.3	3.0	2.6	2.4	2.5	2.6	2.5	2.3	2.2	2.2	2.3	2.3	2.4	4.0	4.6	2.7	2.6	2.7	4.6
26-Mar	2.8	3.2	Z	3.4	2.8	2.5	2.4	3.4	4.0	3.7	2.7	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.4	2.6	2.6	4.0
27-Mar	3.1	2.7	2.6	Z	2.4	2.4	2.4	2.4	2.7	3.0	2.7	3.2	4.7	3.5	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.6	4.7
28-Mar	2.4	2.5	2.7	2.9	Z	2.5	2.3	2.4	2.3	2.1	2.1	2.2	2.2	2.5	3.1	2.2	2.4	3.3	4.4	3.4	2.7	2.2	2.1	2.0	2.6	4.4
29-Mar	2.0	2.0	2.0	2.1	2.0	Z	2.1	2.1	2.0	2.1	2.1	2.2	2.7	2.6	2.3	2.3	2.3	2.4	2.2	2.4	2.8	2.8	2.6	5.2	2.4	5.2
30-Mar	Z	5.6	7.4	6.1	6.7	7.0	3.2	2.2	2.5	4.0	2.2	2.5	2.1	2.1	2.2	2.3	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	3.2	7.4
31-Mar	2.0	Z	2.1	2.0	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.0	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.5	2.3	2.2	2.2	2.5
	2.3	2.4	2.5	2.5	2.4	2.4	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.2	2.3	Diurnal Average	
	3.2	5.6	7.4	6.1	6.7	7.0	3.2	3.4	4.0	4.0	3.6	3.2	4.7	3.5	3.1	2.5	3.1	3.3	4.4	3.4	4.0	4.6	2.7	5.2	Diurnal Maximum	

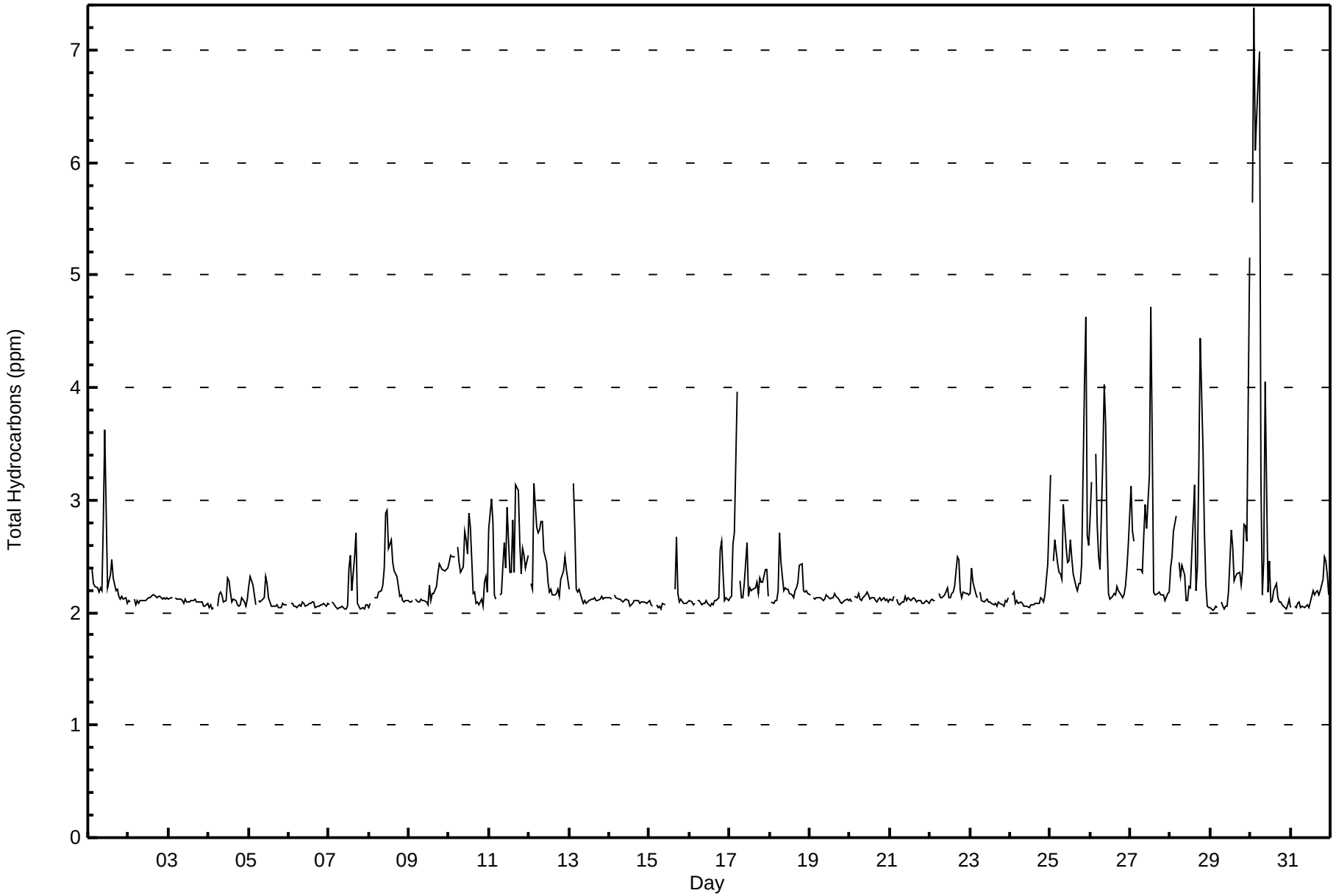
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

CNRL Horizon - March 2016



Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	28	3.95	3.95
2.1 - 3.0	650	91.81	95.76
3.1 - 10.0	30	4.24	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 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	6	10	4	0	1	1	0	0	1	0	4	1	0	0	0	0	28
2.1 - 3.0	163	192	19	12	7	15	20	20	41	38	21	7	15	12	19	42	643
3.1 - 10.0	2	0	0	0	0	0	0	1	0	0	0	0	3	9	7	8	30
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	171	202	23	12	8	16	20	21	42	38	25	8	18	21	26	50	701

Total Number of Valid Hours: 701

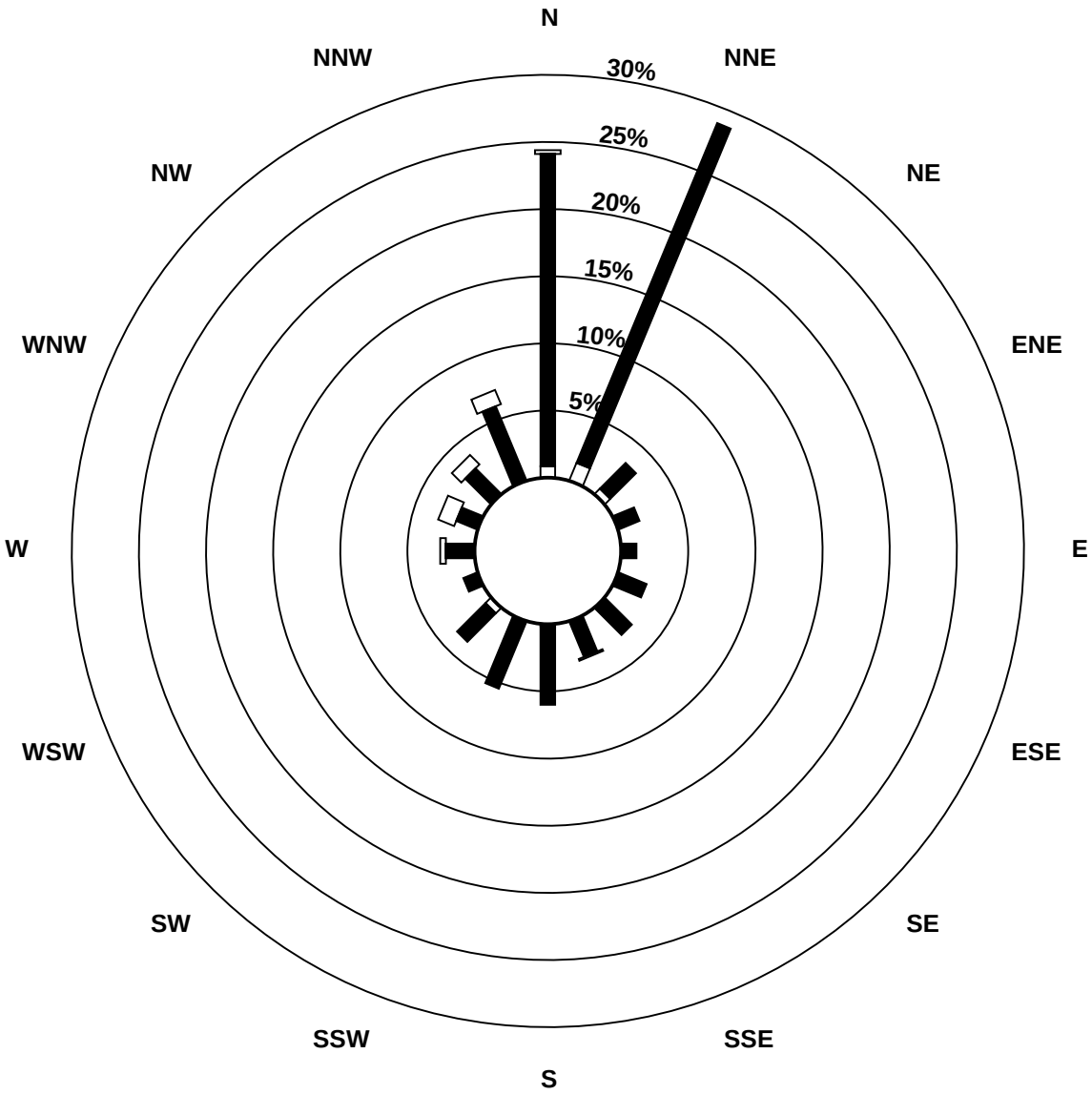
Total Number of Hours: 744

Wood Buffalo Environmental Association

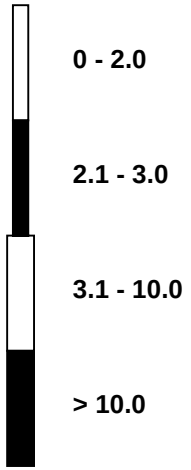
Wind Rose Mar 2016

Total Hydrocarbons (THC) - ppm

CNRL Horizon (AMS 15)



Classes (ppm)



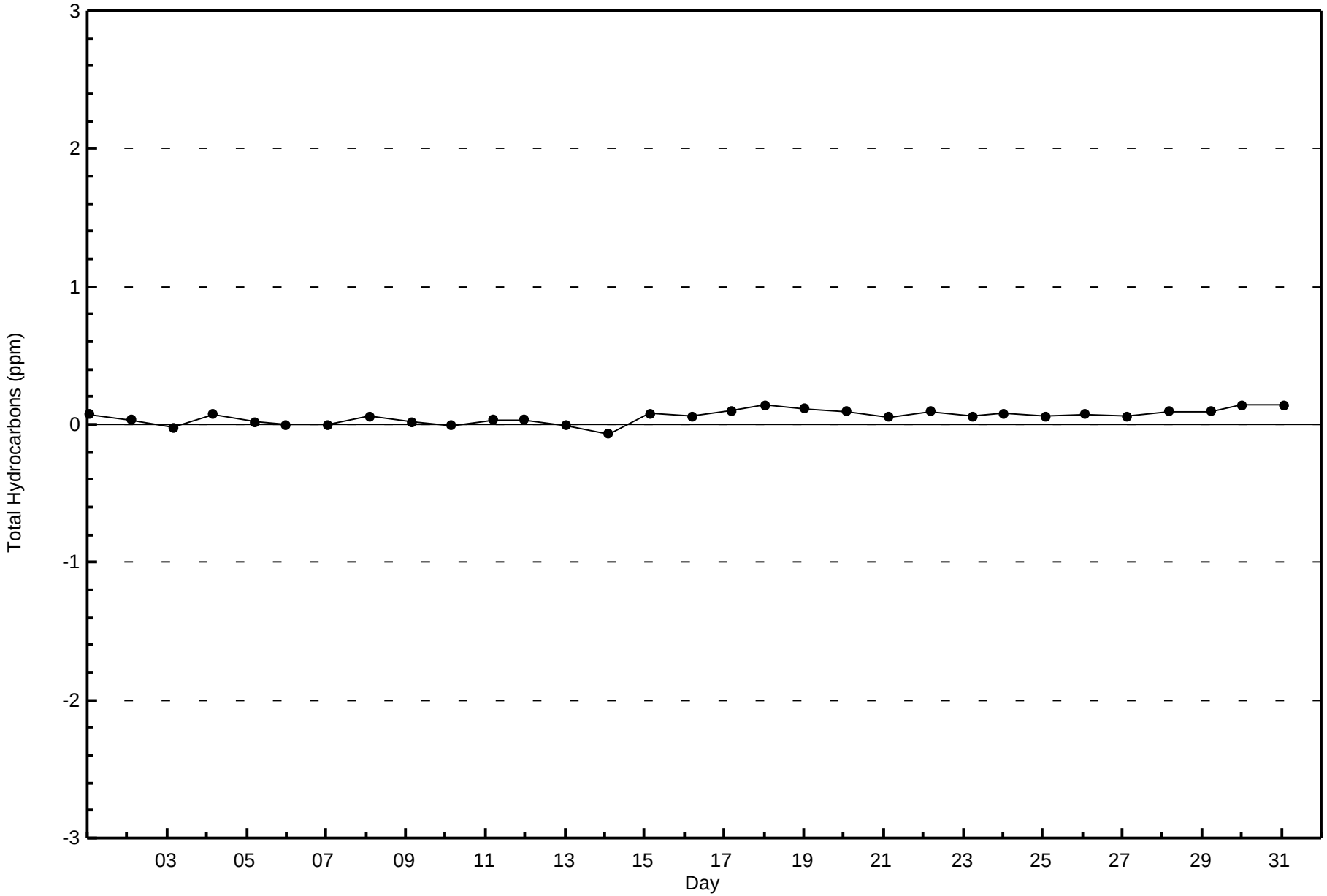
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

CNRL Horizon - March 2016

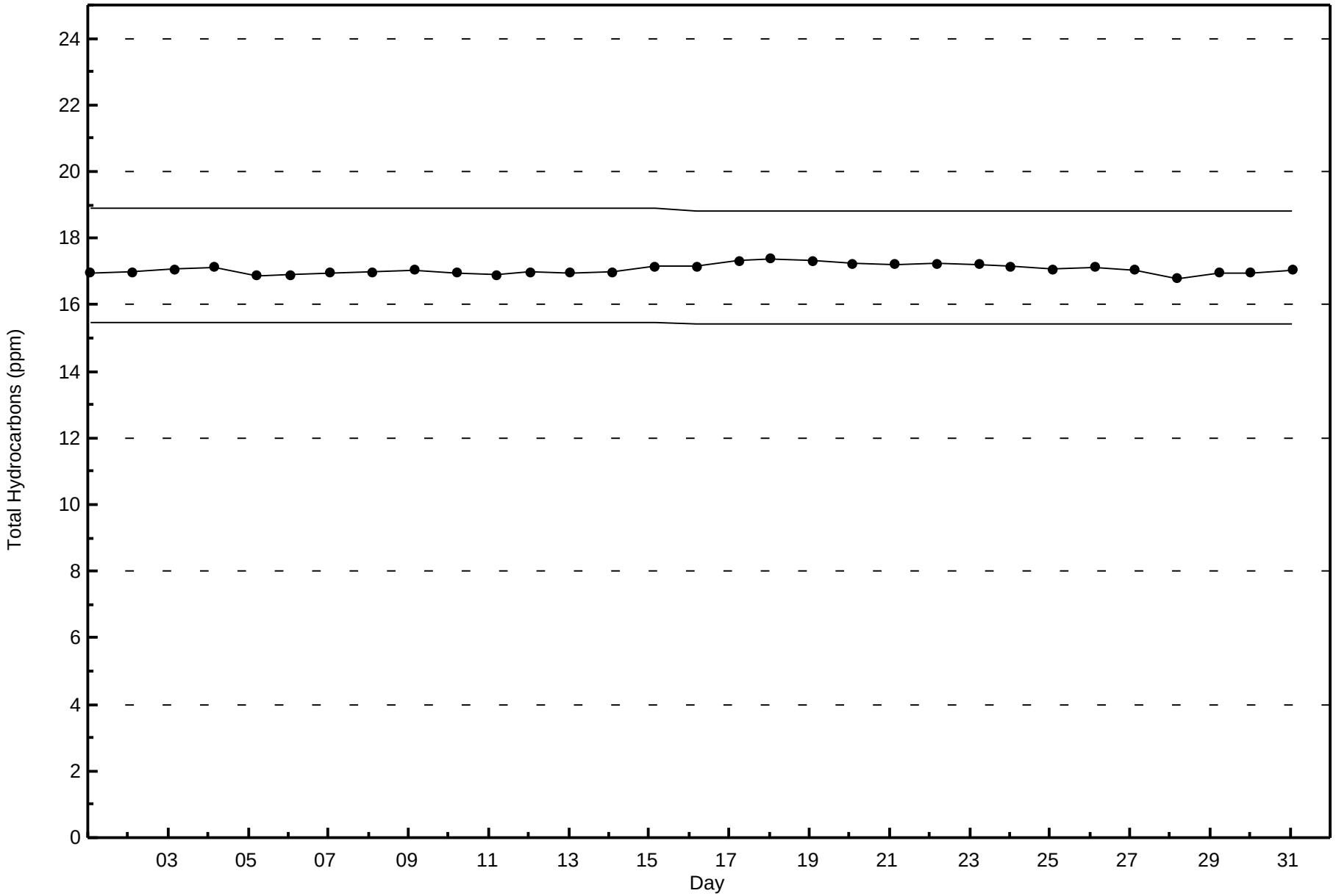


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

CNRL Horizon - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

CNRL Horizon - March 2016

Maximum Value: 88 ppb on Mar 30 06:00

Maximum Daily Average: 17.9 ppb on Mar 30

Minimum Value: 0 ppb on Mar 8 23:00

Minimum Daily Average: 0.3 ppb on Mar 3

Maximum Diurnal Average: 7.8 ppb at hour 10

Minimum Diurnal Average: 1.4 ppb at hour 19

Monthly Average: 4.3 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 5$ $P_{90} = 10$ $P_{99} = 40$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	1	Z	1	0	0	0	0	0	2	17	45	5	11	8	8	5	4	2	0	0	0	2	0	1	4.9	45
2-Mar	0	0	Z	0	0	0	0	1	1	2	1	0	1	1	1	1	1	0	0	0	0	0	0	1	0.5	2
3-Mar	0	0	0	Z	0	0	0	0	1	2	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.3	2
4-Mar	0	0	0	0	Z	0	0	0	1	1	1	4	10	12	4	2	1	0	0	0	0	0	0	0	1.6	12
5-Mar	0	0	0	0	0	Z	0	0	1	2	9	5	2	1	1	0	0	0	0	0	0	0	1	1	1.1	9
6-Mar	Z	1	1	1	2	1	0	2	3	4	0	1	1	2	2	5	3	1	1	2	1	1	0	1	1.5	5
7-Mar	1	Z	0	1	0	0	0	0	1	1	1	2	5	6	2	3	10	1	1	1	0	0	0	0	1.6	10
8-Mar	0	0	Z	0	0	0	0	1	2	9	28	36	24	37	26	19	18	8	0	0	0	1	0	0	9.1	37
9-Mar	1	0	1	Z	1	0	0	1	1	1	2	7	9	2	3	2	1	1	0	0	0	0	0	0	1.5	9
10-Mar	0	0	0	0	Z	2	0	1	3	24	25	14	26	16	1	0	0	0	0	0	0	2	0	0	5.0	26
11-Mar	4	15	12	0	0	Z	0	0	5	12	6	14	2	4	10	2	15	6	3	0	5	0	0	1	5.1	15
12-Mar	Z	0	0	9	5	4	10	29	31	25	21	8	11	4	6	8	5	3	0	0	5	14	8	12	9.5	31
13-Mar	4	Z	5	7	4	0	2	3	3	5	1	2	2	2	0	0	0	0	0	1	1	1	1	1	2.0	7
14-Mar	1	1	Z	1	1	1	1	2	4	4	4	3	3	4	4	3	3	0	2	11	7	8	4	3	3.4	11
15-Mar	1	0	2	Z	1	0	3	1	1	1	C	C	C	C	C	6	8	3	5	7	2	4	5	6	3.3	8
16-Mar	1	1	2	1	Z	0	0	1	2	3	1	2	2	3	6	5	2	0	1	0	0	0	0	0	1.4	6
17-Mar	0	0	1	1	10	Z	0	1	1	2	6	1	1	2	1	1	1	0	0	0	0	0	0	0	1.2	10
18-Mar	Z	0	0	0	0	0	0	2	1	1	1	1	1	1	1	1	2	2	2	5	0	1	1	1	1.0	5
19-Mar	3	Z	1	6	6	2	6	7	3	7	2	3	2	1	0	0	0	0	1	3	2	4	6	5	3.1	7
20-Mar	8	5	Z	4	30	18	21	32	21	9	5	4	4	2	2	8	5	0	3	4	14	13	19	17	10.7	32
21-Mar	19	14	12	Z	18	10	8	10	11	10	5	6	6	10	6	8	10	4	2	7	14	24	20	10	10.7	24
22-Mar	3	2	1	0	Z	0	1	5	4	4	9	7	5	8	5	5	6	4	2	2	4	3	5	6	4.0	9
23-Mar	3	3	2	1	1	Z	4	8	6	9	7	7	6	9	6	6	6	11	8	0	9	3	3	0	5.1	11
24-Mar	Z	0	1	2	2	6	1	3	7	6	2	2	3	1	1	2	2	1	1	0	2	0	0	0	2.1	7
25-Mar	0	Z	0	2	0	0	0	2	13	9	6	5	4	3	4	4	4	3	2	5	26	16	0	1	4.7	26
26-Mar	0	1	Z	4	1	0	1	23	29	30	10	5	1	1	3	1	1	1	0	0	0	0	9	8	5.6	30
27-Mar	26	8	6	Z	0	0	1	3	13	11	12	24	49	27	3	2	1	1	0	0	0	0	0	0	8.2	49
28-Mar	0	0	0	0	Z	0	1	7	6	1	0	2	2	2	5	1	2	6	5	6	2	0	0	0	2.2	7
29-Mar	0	0	0	0	0	Z	0	0	0	0	0	2	10	8	3	3	2	2	1	0	2	6	4	24	2.8	24
30-Mar	Z	42	83	52	72	88	7	6	9	29	5	3	2	2	1	1	2	0	2	1	1	1	1	1	17.9	88
31-Mar	0	Z	3	1	1	0	2	1	2	1	2	1	2	4	2	1	1	1	1	0	0	0	0	0	1.1	4
	3.0	3.8	5.2	3.6	5.9	5.1	2.3	4.9	6.0	7.8	7.4	5.9	6.9	6.2	3.8	3.4	3.7	2.0	1.4	1.9	3.2	3.3	2.9	3.3	Diurnal Average	
	26	42	83	52	72	88	21	32	31	30	45	36	49	37	26	19	18	11	8	11	26	24	20	24	Diurnal Maximum	

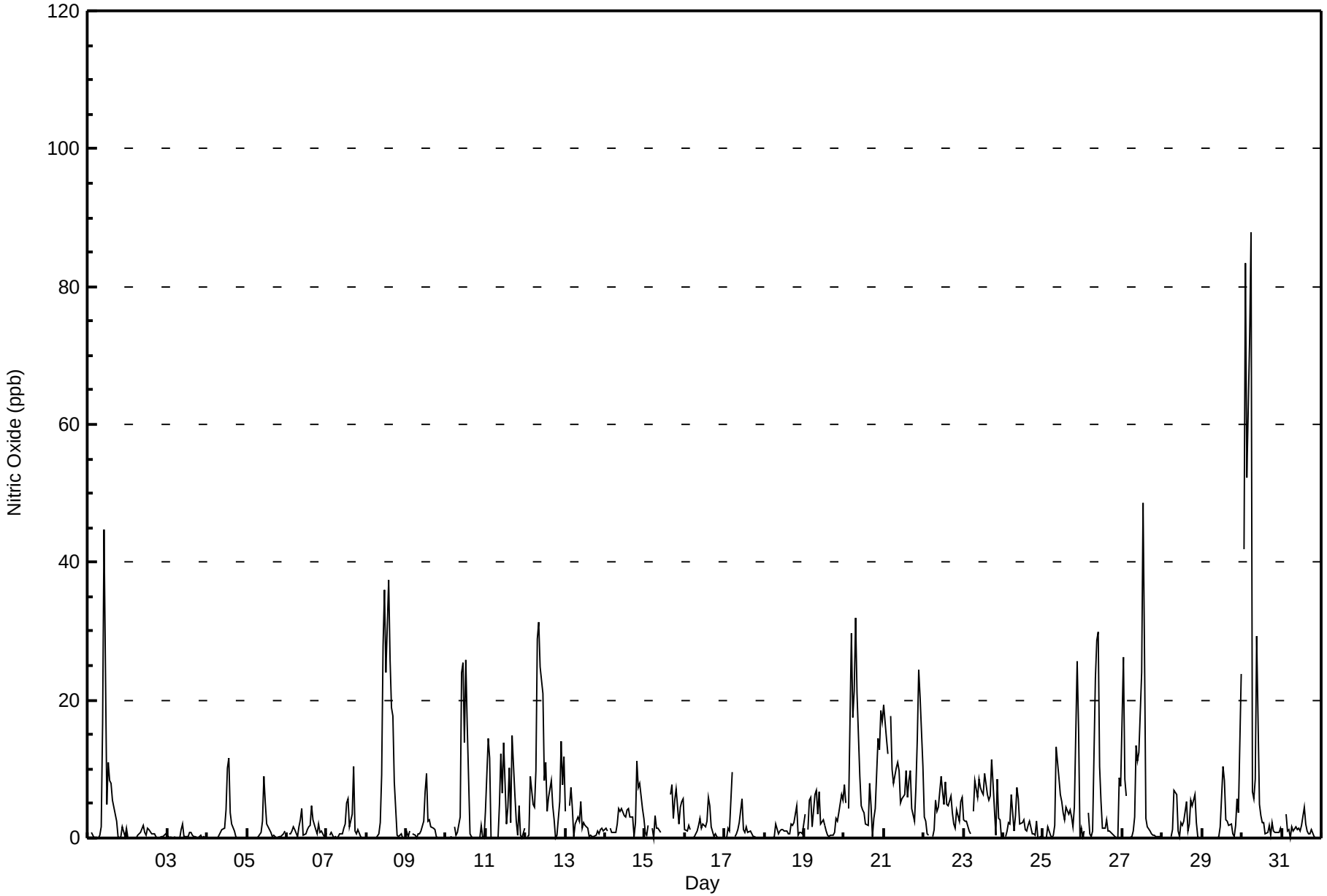
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

CNRL Horizon - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	675	95.34	95.34
21 - 40	26	3.67	99.01
11 - 80	5	0.71	99.72
81 - 159	2	0.28	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 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	166	196	23	11	8	16	20	20	42	38	25	8	17	17	21	40	668
21 - 40	5	6	0	1	0	0	0	1	0	0	0	0	0	2	4	7	26
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	5
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	171	202	23	12	8	16	20	21	42	38	25	8	18	21	26	50	701

Total Number of Valid Hours: 701

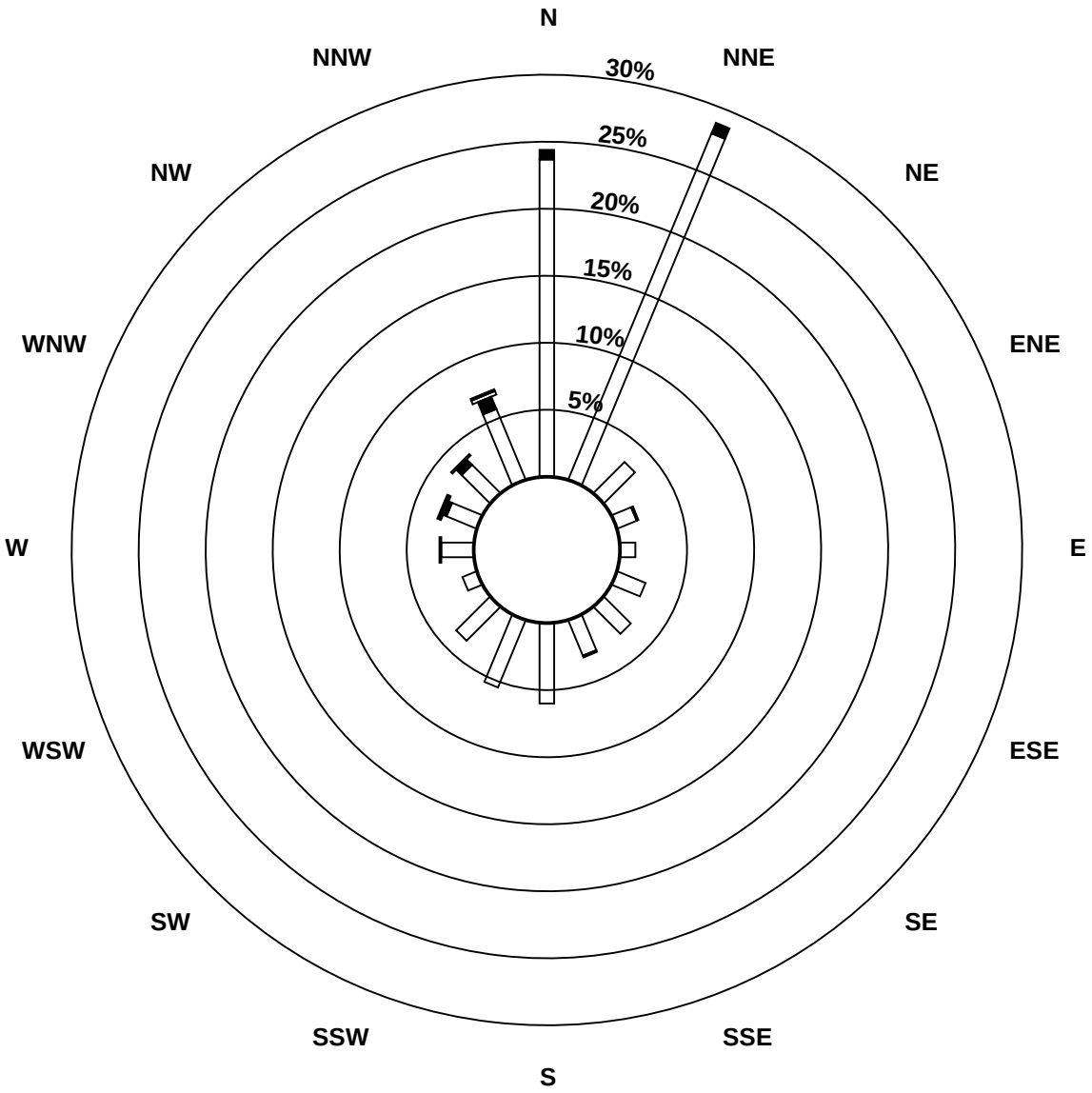
Total Number of Hours: 744

Wood Buffalo Environmental Association

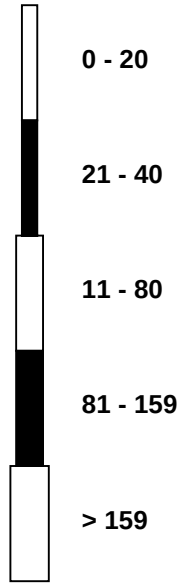
Wind Rose Mar 2016

Nitric Oxide (NO) - ppb

CNRL Horizon (AMS 15)



Classes (ppb)



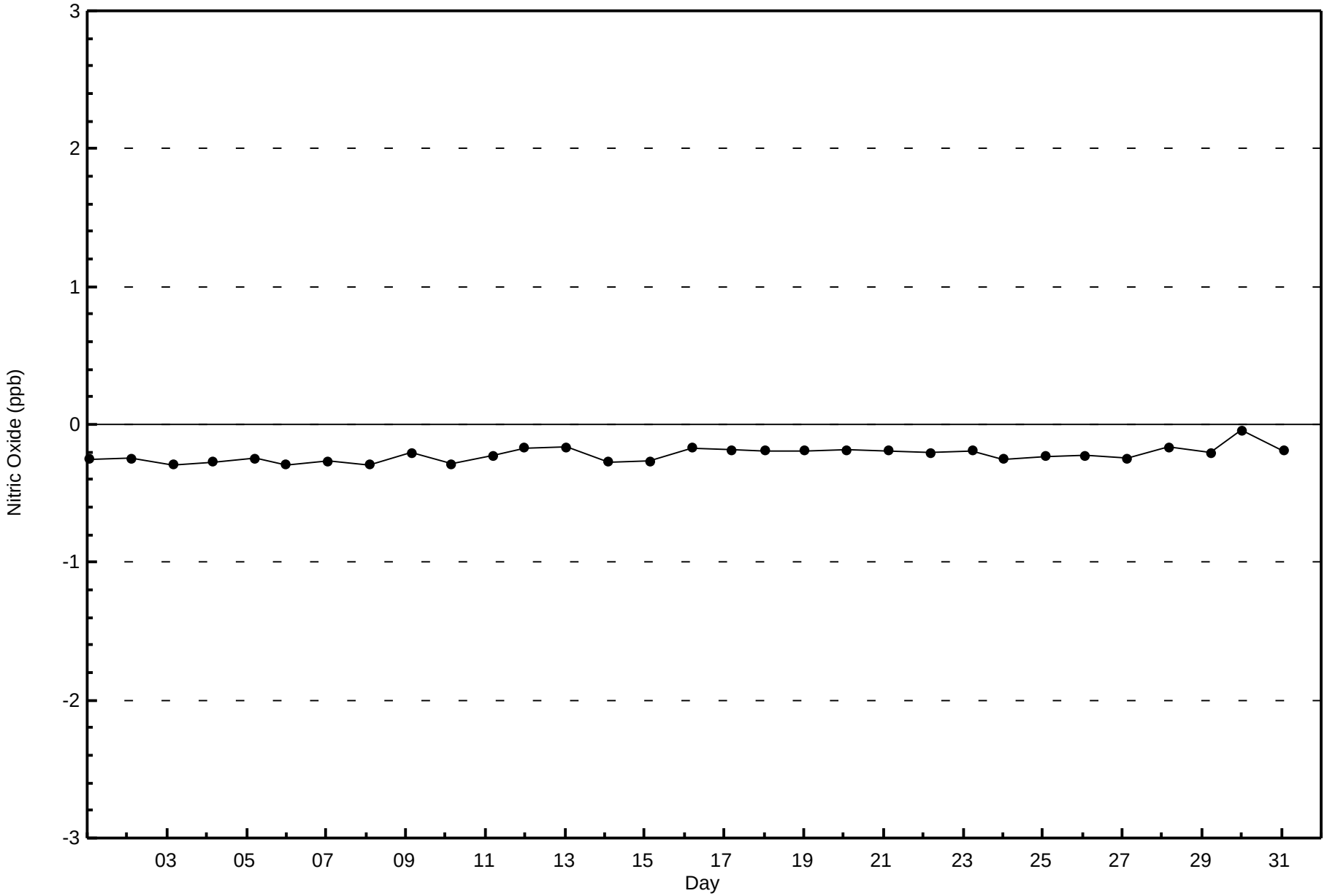
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

CNRL Horizon - March 2016

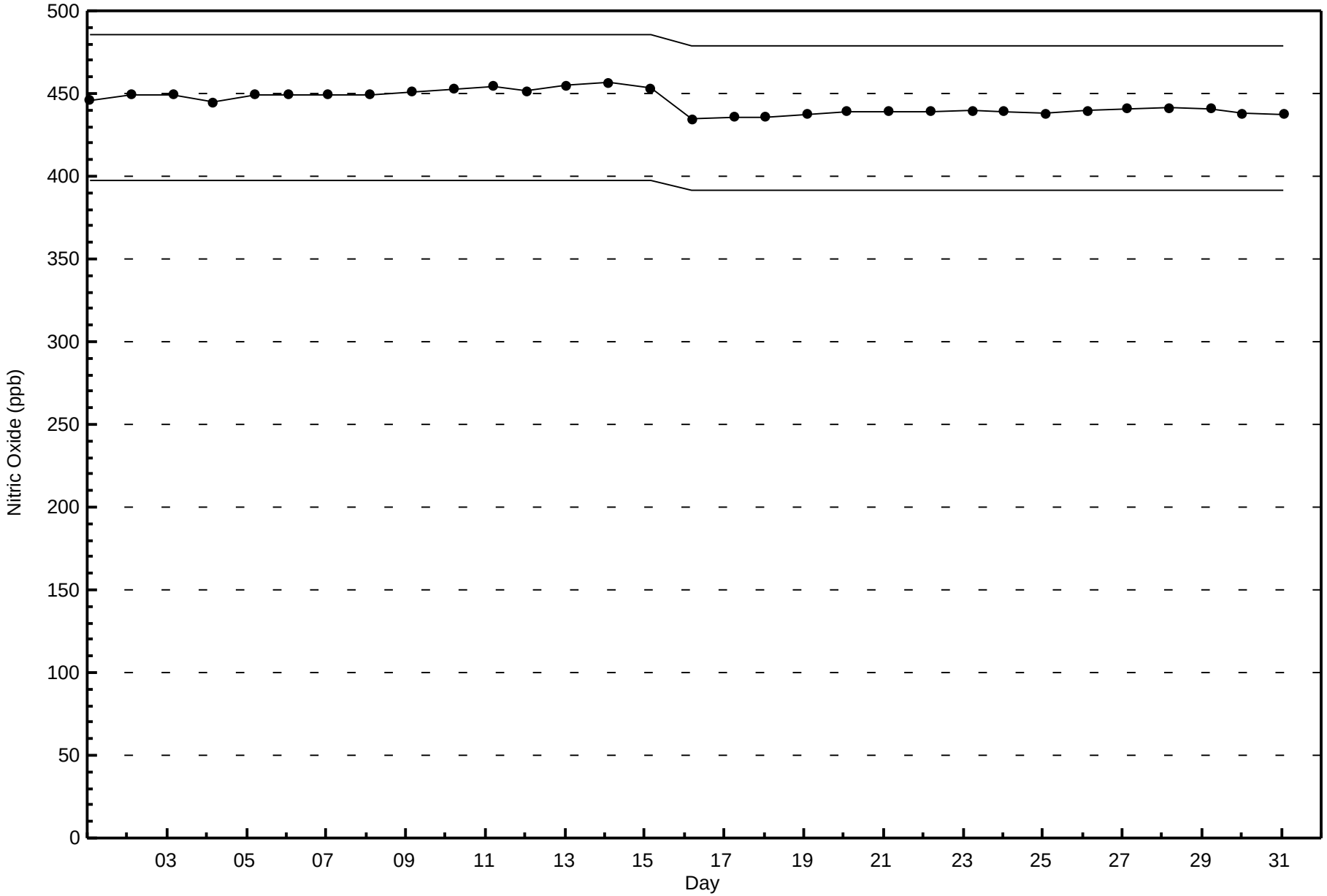


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

CNRL Horizon - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

CNRL Horizon - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 43 ppb on Mar 30 05:00 Maximum Daily Average: 18.9 ppb on Mar 25

Minimum Value: 0 ppb on Mar 18 04:00
Maximum Diurnal Average: 14.5 ppb at hour 21
Monthly Average: 10.6 ppb

Minimum Daily Average: 1.9 ppb on Mar 2
Minimum Diurnal Average: 6.7 ppb at hour 16
Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 4$ Median = 8 $Q_3 = 15$ $P_{90} = 23$ $P_{99} = 39$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	27	Z	28	18	13	9	7	7	6	9	22	5	10	10	14	13	15	20	12	4	5	10	3	6	11.8	28
2-Mar	2	1	Z	1	1	1	2	3	3	4	2	1	3	3	2	2	3	2	1	1	1	1	2	3	1.9	4
3-Mar	4	1	3	Z	3	1	1	1	4	4	1	1	1	2	2	1	1	1	1	2	2	1	7	3	2.0	7
4-Mar	1	1	1	1	Z	7	10	10	6	5	4	9	16	16	8	7	8	5	3	4	8	5	2	3	6.0	16
5-Mar	5	13	17	12	3	Z	1	4	5	4	13	9	5	3	2	1	1	1	1	1	1	2	4	6	4.9	17
6-Mar	Z	5	6	7	8	4	2	6	7	7	1	1	2	3	3	7	6	4	4	6	3	4	1	3	4.4	8
7-Mar	3	Z	2	4	1	2	2	2	4	3	4	5	9	10	4	9	24	5	5	6	1	1	10	11	5.5	24
8-Mar	8	6	Z	10	9	9	10	10	10	17	23	27	22	27	25	23	26	27	19	16	10	8	4	3	15.2	27
9-Mar	6	3	8	Z	7	3	1	4	4	4	6	10	12	5	7	5	8	12	15	16	14	14	13	12	8.0	16
10-Mar	13	12	12	14	Z	19	13	8	9	18	18	14	21	17	3	2	1	1	1	1	1	16	18	20	11.0	21
11-Mar	24	19	21	5	2	Z	2	1	6	12	11	15	5	10	19	8	25	24	22	14	29	23	14	21	14.4	29
12-Mar	Z	16	20	28	22	23	23	23	21	20	17	9	10	5	8	12	10	12	2	14	35	37	30	28	18.2	37
13-Mar	19	Z	28	28	14	7	14	11	7	8	3	6	5	4	1	1	2	2	2	3	3	5	6	6	8.0	28
14-Mar	9	5	Z	6	3	3	4	6	7	6	5	4	4	6	6	5	6	1	7	21	16	19	12	10	7.4	21
15-Mar	9	5	9	Z	7	1	13	9	5	3	C	C	C	C	C	10	13	6	9	14	5	12	14	15	8.8	15
16-Mar	10	6	9	9	Z	2	2	4	5	7	4	4	4	5	10	10	5	4	17	17	13	5	5	3	6.9	17
17-Mar	2	2	19	14	33	Z	9	4	4	4	8	2	2	4	2	3	3	2	4	5	4	7	10	2	6.5	33
18-Mar	Z	1	0	0	1	7	15	11	3	3	2	2	2	2	1	2	7	10	23	27	14	15	10	7	7.1	27
19-Mar	20	Z	15	22	19	13	19	13	6	8	3	3	3	2	1	1	1	1	3	13	12	14	18	16	9.8	22
20-Mar	19	23	Z	22	39	31	31	32	24	12	8	6	6	4	4	11	7	1	8	10	21	19	23	20	16.5	39
21-Mar	24	20	19	Z	23	16	13	15	13	10	7	7	8	11	7	10	13	7	8	15	19	30	29	27	15.2	30
22-Mar	23	19	10	13	Z	14	13	20	13	10	13	10	8	15	12	13	22	23	21	22	28	22	23	22	16.8	28
23-Mar	19	27	22	14	10	Z	12	15	11	12	9	8	7	10	8	8	10	17	15	4	28	20	19	9	13.6	28
24-Mar	Z	12	16	18	20	26	10	11	12	8	4	3	4	2	2	4	6	4	11	15	21	10	20	21	11.3	26
25-Mar	16	Z	14	22	20	11	13	12	27	19	16	13	10	9	12	12	15	15	20	34	40	37	21	27	18.9	40
26-Mar	25	27	Z	27	21	16	13	24	29	29	15	9	3	4	6	3	4	5	5	8	12	16	28	33	15.8	33
27-Mar	34	34	29	Z	12	12	13	8	18	18	17	24	36	27	8	5	4	3	3	5	3	3	7	10	14.5	36
28-Mar	11	13	11	11	Z	25	18	22	15	3	1	6	4	6	15	3	7	21	29	39	37	15	1	0	13.7	39
29-Mar	0	0	0	0	0	Z	0	0	0	0	1	4	15	14	6	7	7	13	11	16	36	35	33	40	10.5	40
30-Mar	Z	37	40	39	43	42	27	13	16	28	11	8	5	4	2	3	5	1	5	5	7	4	3	4	15.2	43
31-Mar	3	Z	11	7	6	3	7	3	4	3	3	2	4	11	8	6	5	8	21	28	22	23	19	11	9.4	28
	12.9	12.3	14.1	13.5	13.1	11.8	10.3	10.1	9.8	9.5	8.4	7.6	8.1	8.2	6.9	6.7	8.7	8.3	9.8	12.4	14.5	13.8	13.2	13.0	Diurnal Average	
	34	37	40	39	43	42	31	32	29	29	23	27	36	27	25	23	26	27	29	39	40	37	33	40	Diurnal Maximum	

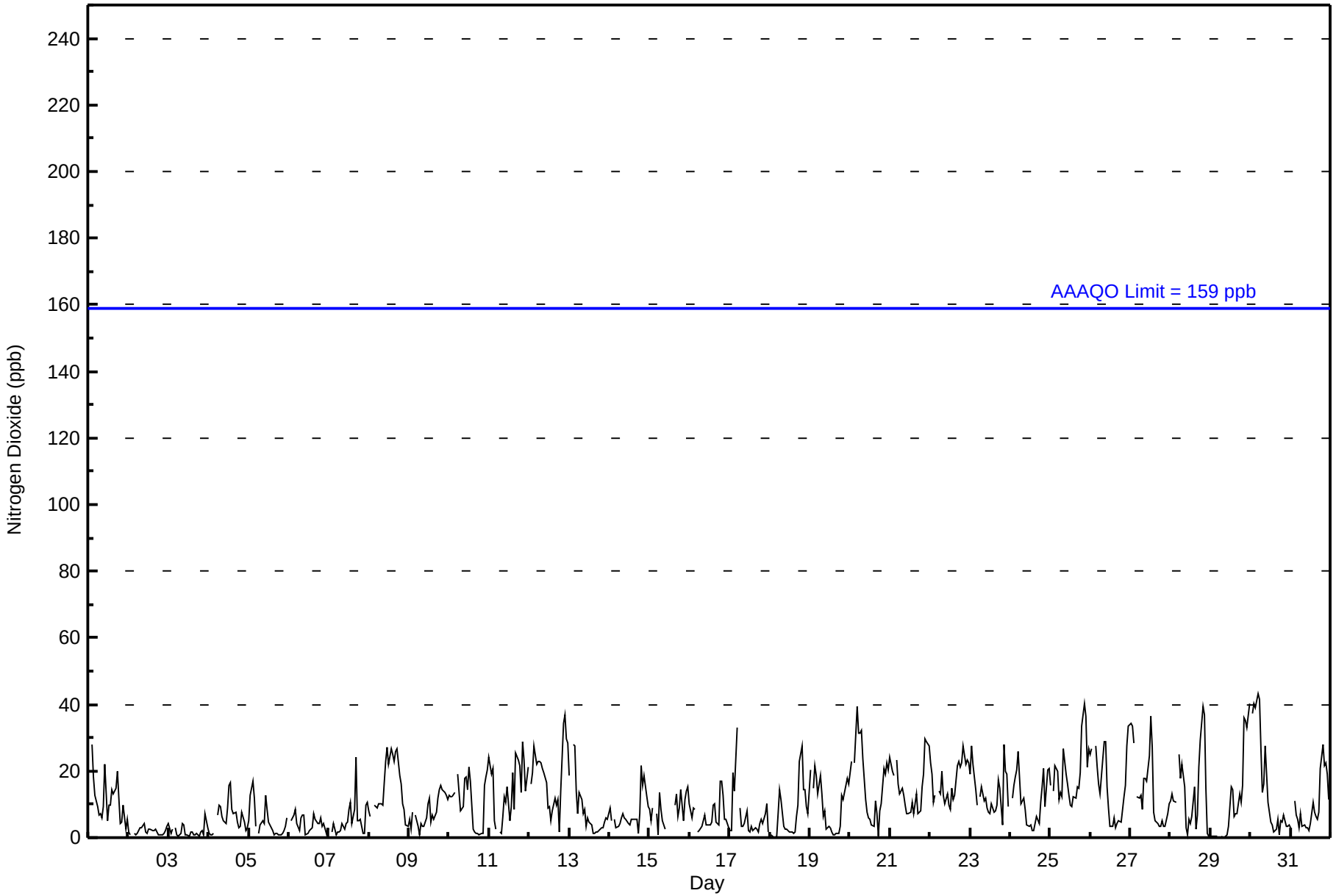
Z - zerospan C - Calibration
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

CNRL Horizon - March 2016



Nitrogen Dioxide (NO_2) - ppb

CNRL Horizon - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	598	84.46	84.46
21 - 40	108	15.25	99.72
11 - 80	2	0.28	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

CNRL Horizon - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	142	185	21	11	8	16	20	19	36	31	23	8	14	13	16	29	592
21 - 40	29	17	2	1	0	0	0	2	6	7	2	0	4	7	10	20	107
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	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	171	202	23	12	8	16	20	21	42	38	25	8	18	21	26	50	701

Total Number of Valid Hours: 701

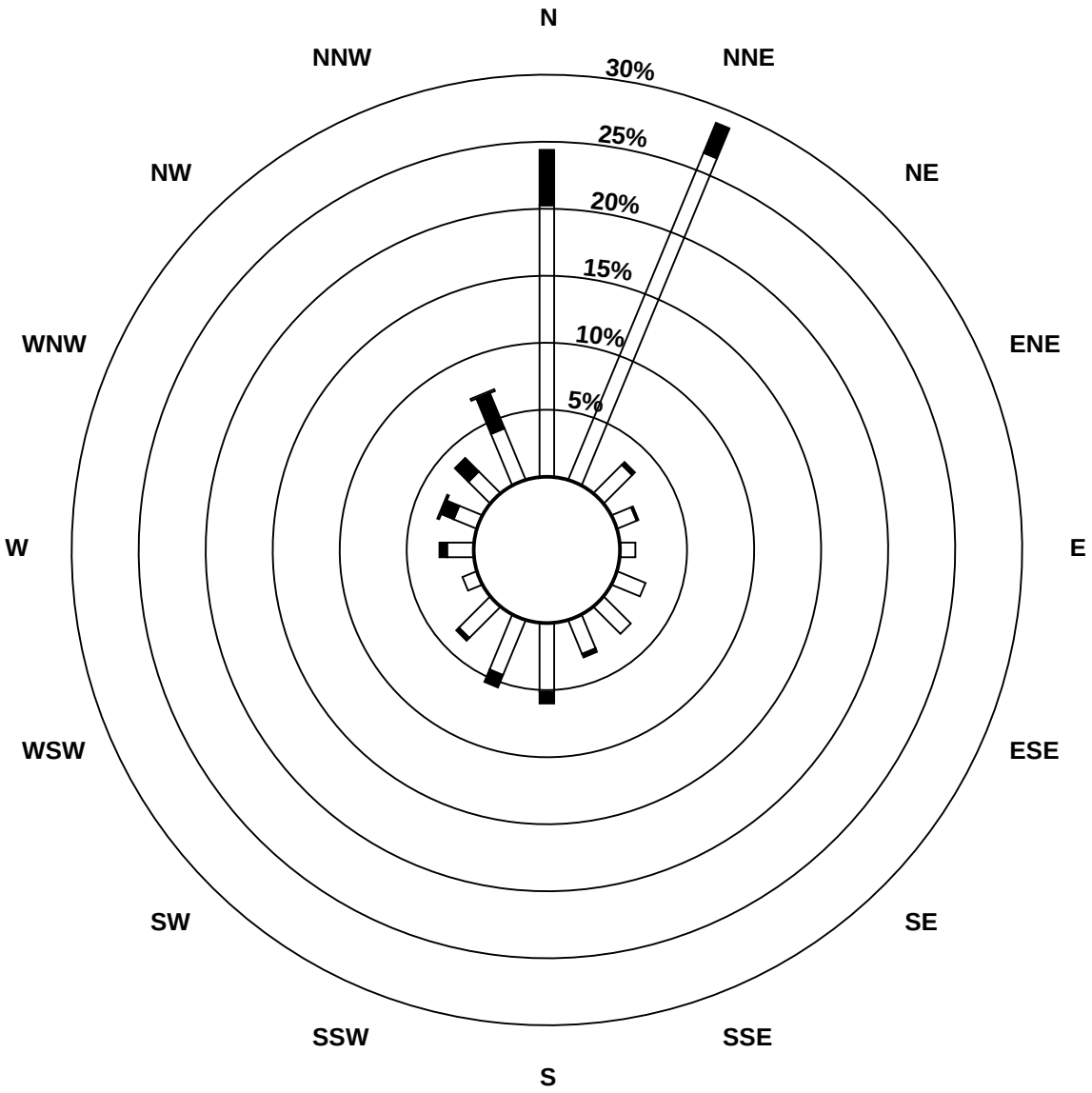
Total Number of Hours: 744

Wood Buffalo Environmental Association

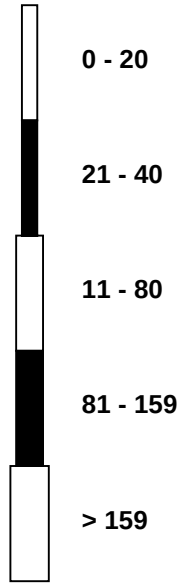
Wind Rose Mar 2016

Nitrogen Dioxide (NO_2) - ppb

CNRL Horizon (AMS 15)



Classes (ppb)



0 - 20

21 - 40

11 - 80

81 - 159

> 159

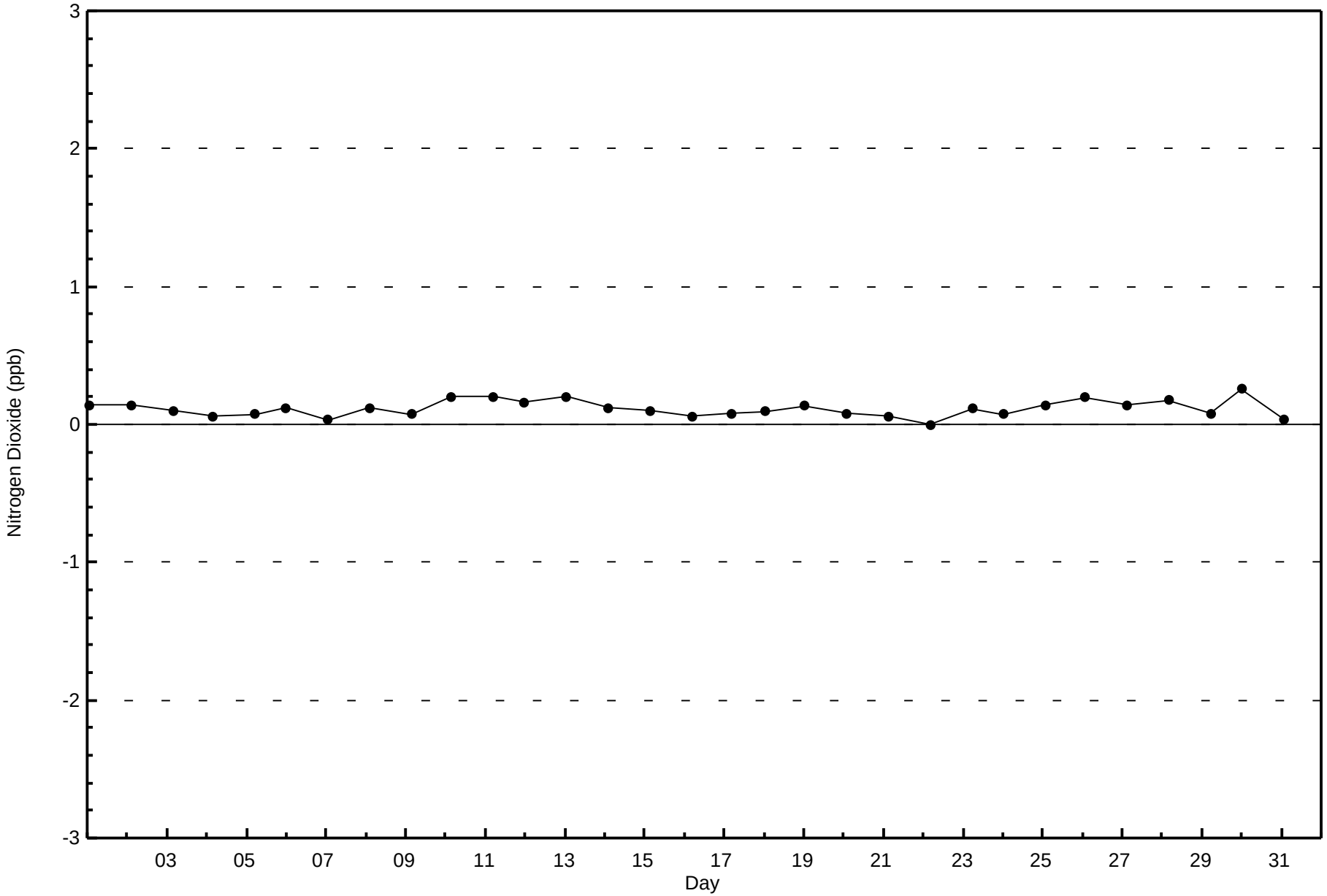
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

CNRL Horizon - March 2016

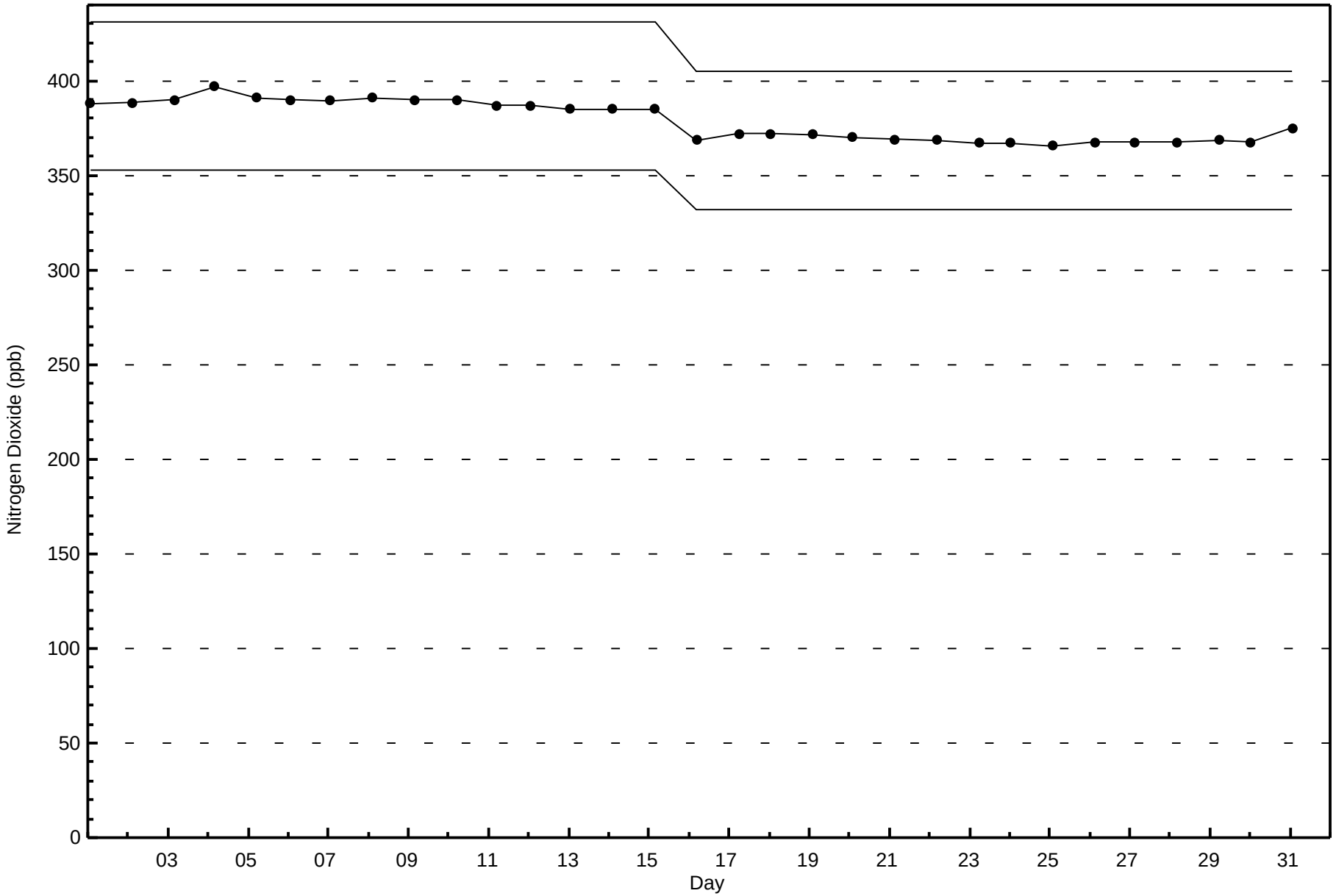


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

CNRL Horizon - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

CNRL Horizon - March 2016

Maximum Value: 129 ppb on Mar 30 06:00

Maximum Daily Average: 33.1 ppb on Mar 30

Minimum Value: 0 ppb on Mar 18 04:00

Minimum Daily Average: 2.3 ppb on Mar 3

Maximum Diurnal Average: 19.3 ppb at hour 3

Minimum Diurnal Average: 10.0 ppb at hour 16

Monthly Average: 14.9 ppb

Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 4$ Median = 10 $Q_3 = 20$ $P_{90} = 34$ $P_{99} = 63$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	28	Z	29	19	13	9	7	8	8	26	67	10	21	18	22	19	18	22	12	4	5	11	3	7	16.7	67
2-Mar	2	1	Z	1	1	1	2	3	4	6	3	2	4	4	3	3	3	2	1	1	1	1	3	4	2.4	6
3-Mar	5	1	3	Z	3	1	1	1	5	6	1	1	1	3	2	1	1	2	1	2	2	1	7	3	2.3	7
4-Mar	1	1	1	1	Z	7	10	10	7	6	5	13	26	28	12	9	9	5	3	4	8	5	2	3	7.6	28
5-Mar	5	13	17	12	3	Z	1	4	6	6	22	14	7	4	3	1	2	1	1	1	1	2	4	7	6.0	22
6-Mar	Z	6	6	8	10	6	2	8	10	11	1	2	3	4	5	12	8	6	5	8	4	5	2	3	5.8	12
7-Mar	3	Z	2	5	1	2	2	2	5	3	6	7	13	16	6	12	34	6	6	7	1	1	10	11	7.0	34
8-Mar	8	6	Z	10	10	9	10	11	12	26	51	63	46	64	51	42	43	35	19	16	11	9	4	3	24.3	64
9-Mar	6	3	9	Z	7	4	1	5	4	5	8	17	21	7	9	7	9	13	15	16	15	14	13	12	9.5	21
10-Mar	13	12	12	14	Z	21	14	9	13	42	44	28	47	33	3	2	2	1	1	1	1	17	19	20	16.0	47
11-Mar	28	34	32	5	2	Z	2	2	11	25	17	29	7	14	30	11	40	30	24	14	34	23	14	23	19.6	40
12-Mar	Z	16	20	37	27	27	33	51	52	44	37	17	20	9	14	20	15	14	2	14	40	51	37	40	27.7	52
13-Mar	23	Z	32	35	18	7	16	14	10	14	5	8	6	5	1	2	2	2	3	4	3	6	7	7	10.0	35
14-Mar	10	6	Z	7	4	4	5	8	12	10	10	7	7	10	10	8	9	2	9	33	23	26	17	12	10.8	33
15-Mar	9	6	10	Z	8	1	17	10	6	3	C	C	C	C	C	16	21	9	14	21	7	16	19	21	12.0	21
16-Mar	11	7	11	10	Z	2	2	5	7	10	5	6	5	7	15	15	6	4	18	17	13	5	5	3	8.3	18
17-Mar	2	2	21	15	43	Z	9	4	5	7	14	3	3	5	3	4	3	2	4	5	5	7	10	2	7.7	43
18-Mar	Z	1	0	0	1	7	15	13	4	4	4	3	3	3	2	3	9	11	25	32	15	15	10	8	8.1	32
19-Mar	24	Z	16	27	24	15	25	20	10	15	5	6	5	3	1	1	2	2	4	16	14	17	24	22	12.9	27
20-Mar	27	28	Z	27	69	49	53	64	45	20	12	10	9	6	6	19	12	1	11	15	35	32	41	37	27.2	69
21-Mar	43	34	31	Z	41	26	21	25	24	20	12	13	14	20	13	19	23	12	10	22	34	54	49	38	26.0	54
22-Mar	26	21	11	13	Z	14	14	25	16	14	22	17	13	23	16	17	27	26	23	24	32	25	29	28	20.8	32
23-Mar	22	30	24	15	11	Z	16	23	17	20	16	14	14	19	14	14	16	29	23	4	36	23	22	9	18.8	36
24-Mar	Z	12	17	20	23	32	11	14	19	14	6	6	7	3	3	6	9	5	11	16	23	10	20	21	13.4	32
25-Mar	16	Z	14	23	21	11	14	14	40	28	22	18	14	12	17	15	19	18	21	38	66	53	21	28	23.6	66
26-Mar	25	28	Z	31	22	16	14	47	57	59	26	14	5	5	9	4	5	6	5	9	12	16	36	41	21.4	59
27-Mar	61	42	35	Z	13	12	13	11	31	29	29	48	85	55	11	7	5	4	4	5	4	3	7	10	22.8	85
28-Mar	11	13	11	11	Z	25	19	29	21	4	1	8	6	9	20	4	9	27	34	46	39	15	1	0	15.8	46
29-Mar	0	0	0	0	0	Z	0	0	0	0	1	5	25	23	9	10	9	15	11	16	38	41	37	64	13.3	64
30-Mar	Z	79	124	91	116	129	34	19	25	57	15	11	7	6	3	4	7	1	7	6	7	4	4	5	33.1	129
31-Mar	3	Z	14	8	7	3	9	4	6	4	5	3	6	15	10	7	6	8	22	28	22	23	19	11	10.6	28
	15.9	16.1	19.3	17.1	19.1	16.9	12.7	15.0	15.8	17.4	15.7	13.5	15.0	14.4	10.8	10.0	12.4	10.3	11.3	14.3	17.7	17.2	16.1	16.3	Diurnal Average	
	61	79	124	91	116	129	53	64	57	59	67	63	85	64	51	42	43	35	34	46	66	54	49	64	Diurnal Maximum	

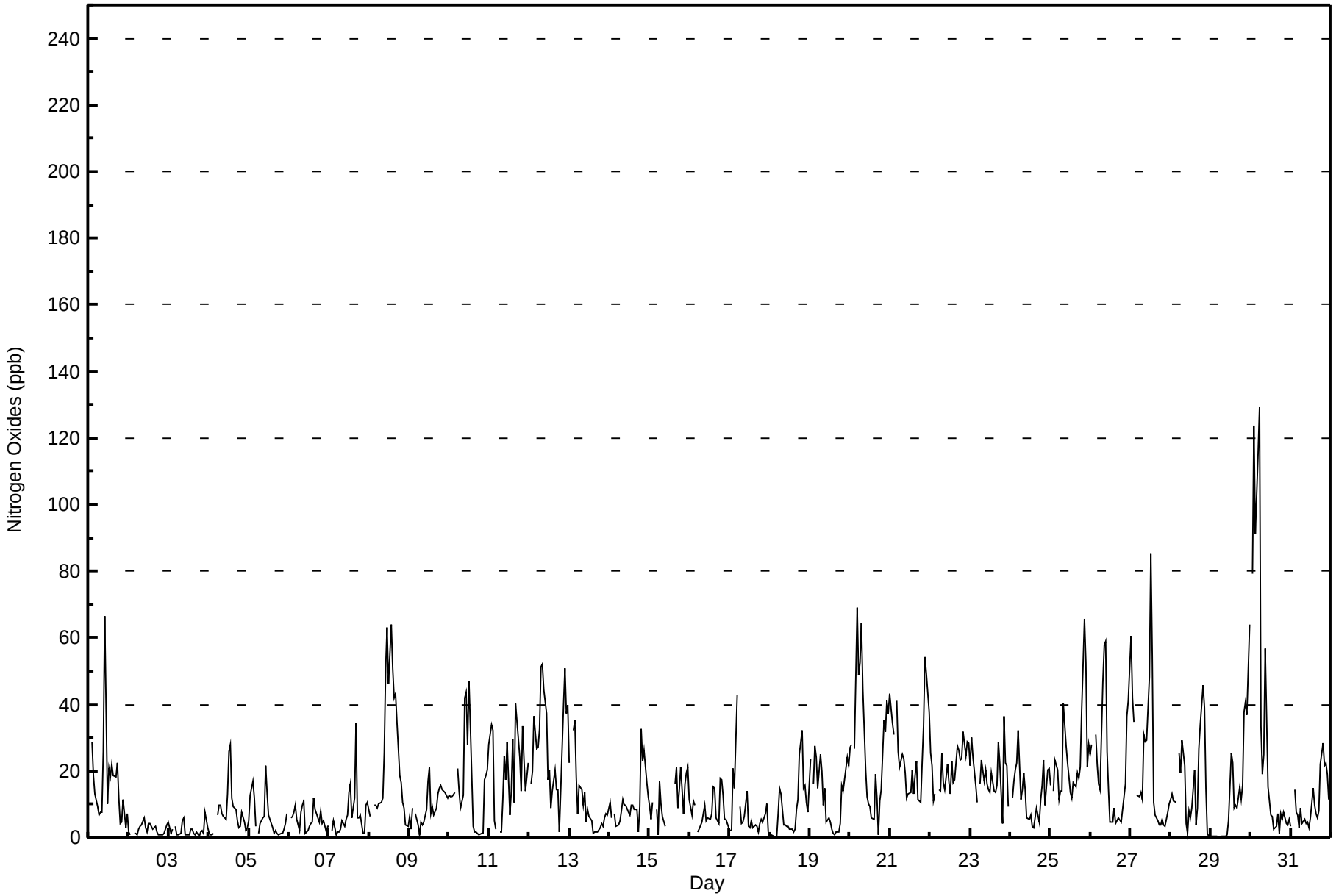
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

CNRL Horizon - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	531	75.00	75.00
21 - 40	131	18.50	93.50
11 - 80	41	5.79	99.29
81 - 159	5	0.71	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 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	124	162	19	9	8	16	18	18	32	25	23	7	13	11	13	27	525
21 - 40	39	30	4	2	0	0	2	2	10	12	2	1	3	5	6	13	131
11 - 80	8	10	0	1	0	0	0	1	0	1	0	0	1	3	7	8	40
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	2	5
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	171	202	23	12	8	16	20	21	42	38	25	8	18	21	26	50	701

Total Number of Valid Hours: 701

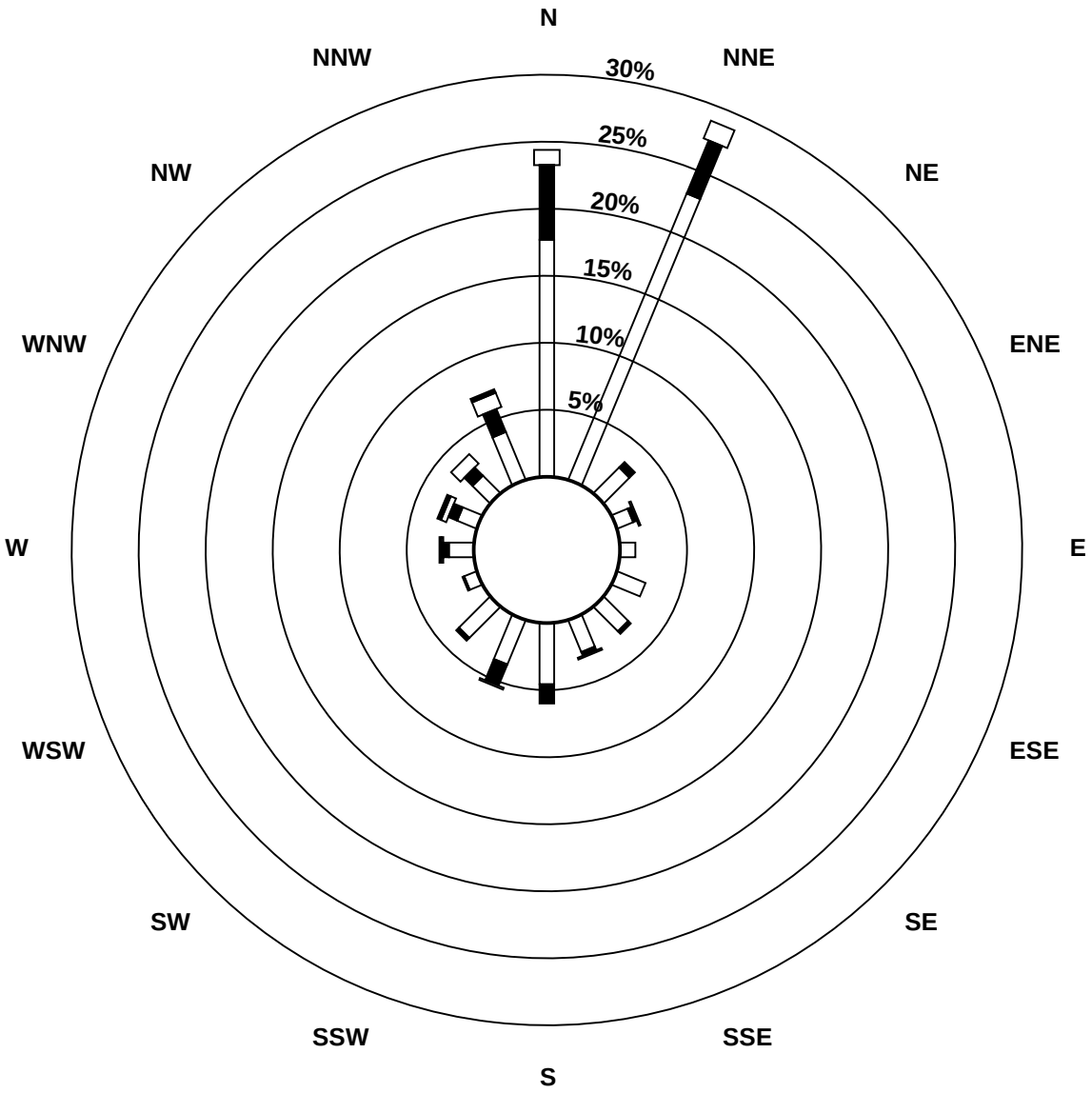
Total Number of Hours: 744

Wood Buffalo Environmental Association

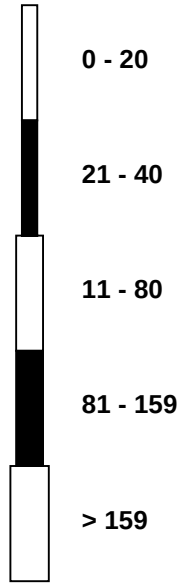
Wind Rose Mar 2016

Nitrogen Oxides (NO_X) - ppb

CNRL Horizon (AMS 15)



Classes (ppb)



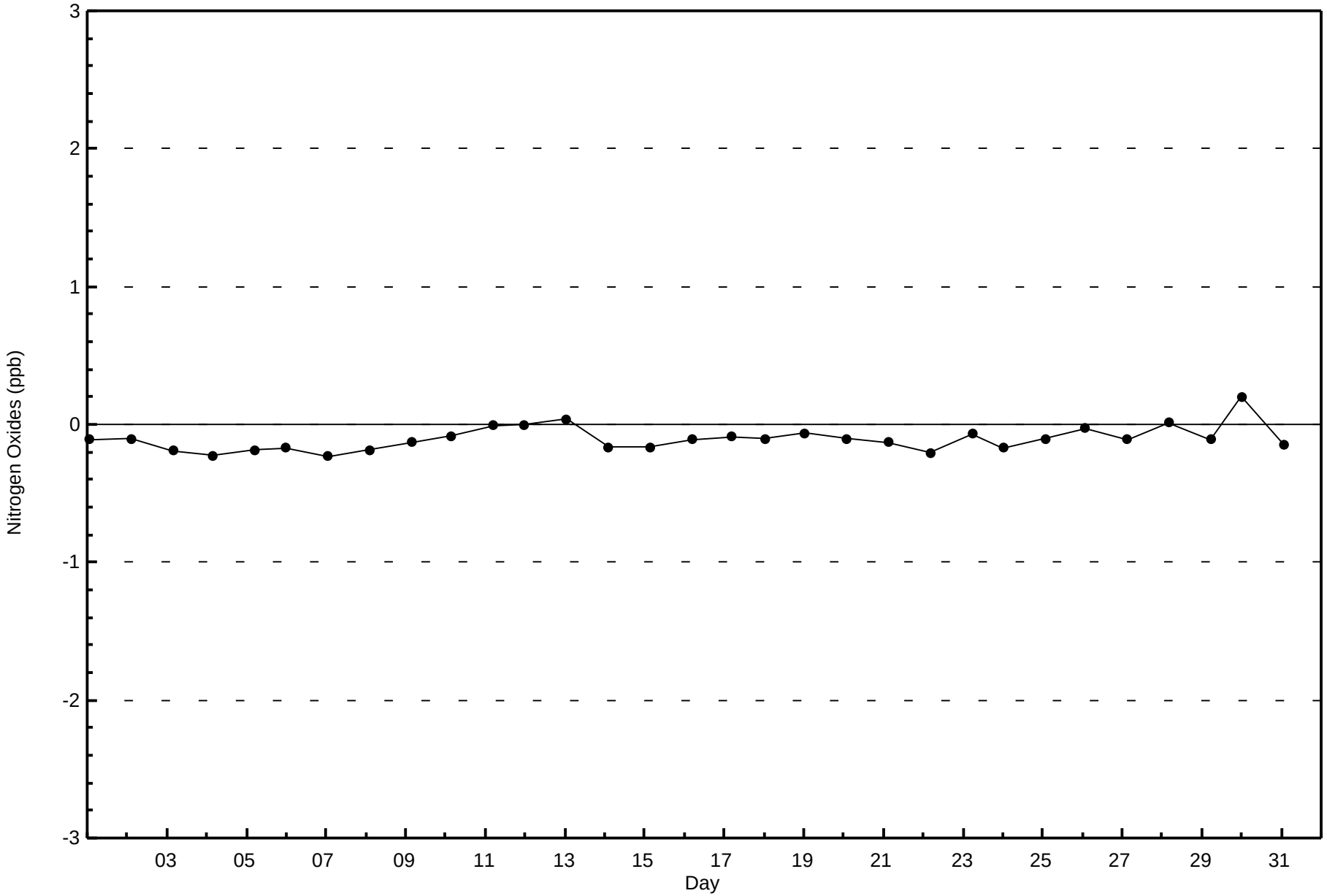
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

CNRL Horizon - March 2016

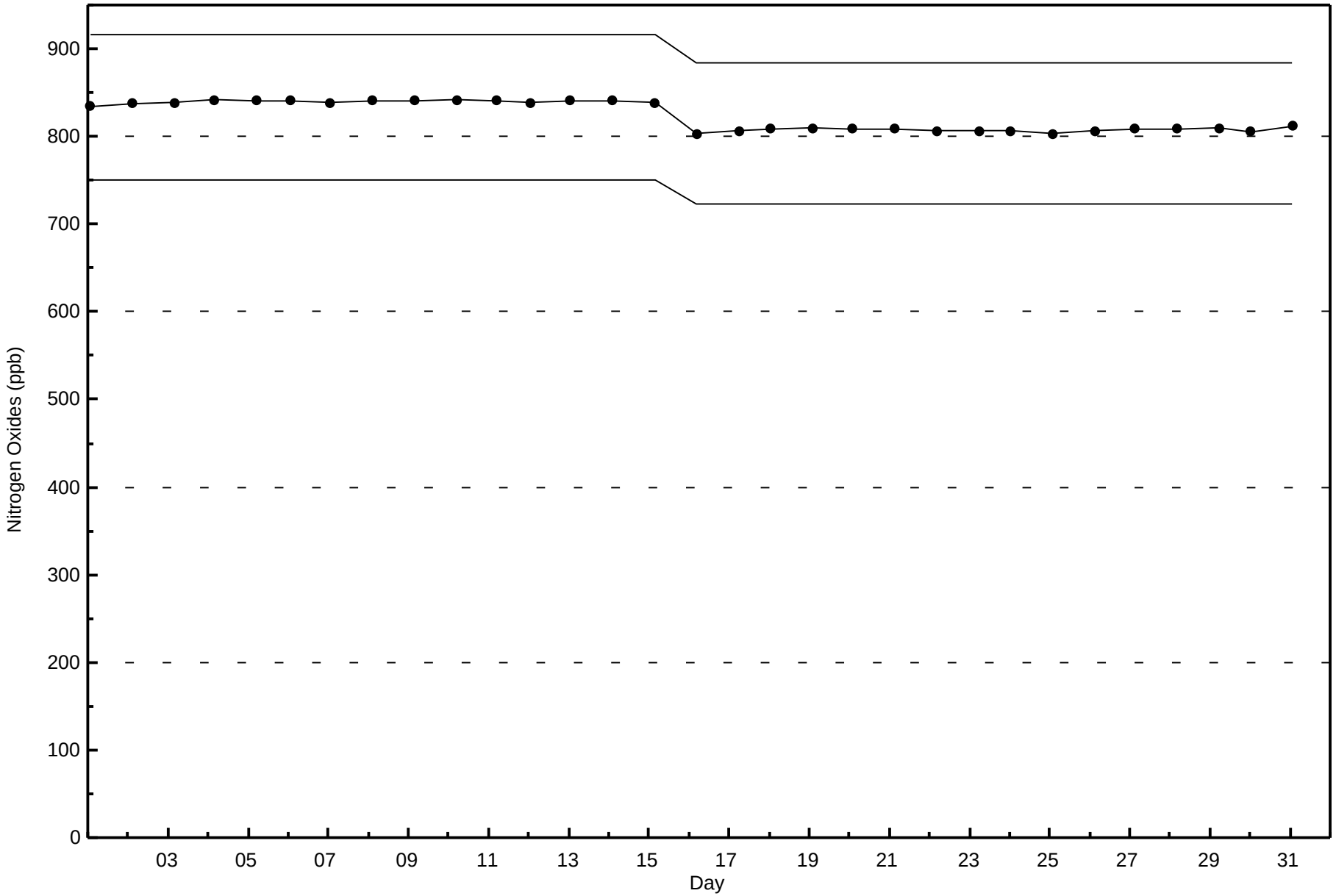


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

CNRL Horizon - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

CNRL Horizon - March 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 28.3 $\mu g/m^3$ on Mar 27 13:00

Maximum Daily Average: 11.4 $\mu g/m^3$ on Mar 27

Minimum Value: 0.6 $\mu g/m^3$ on Mar 13 17:00

Minimum Daily Average: 1.5 $\mu g/m^3$ on Mar 17

Maximum Diurnal Average: 5.2 $\mu g/m^3$ at hour 3

Minimum Diurnal Average: 3.1 $\mu g/m^3$ at hour 16

Monthly Average: 4.20 $\mu g/m^3$

Percentiles: P_1 = 0.8 P_{10} = 1.4 Q_1 = 1.9 Median = 2.9 Q_3 = 5.4 P_{90} = 8.9 P_{99} = 17.8

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	4.5	4.5	4.4	4.0	3.8	3.4	3.5	4.1	3.8	3.8	5.3	2.5	3.2	3.3	3.8	3.5	3.8	4.6	4.2	3.9	4.1	4.2	3.2	3.1	3.9	5.3
2-Mar	3.4	3.4	3.5	3.4	3.3	3.4	3.1	2.9	2.7	2.7	2.4	2.0	1.9	2.1	2.1	2.3	2.3	2.4	2.3	2.0	2.0	1.8	1.8	2.0	2.5	3.5
3-Mar	2.0	2.0	2.3	2.6	2.5	2.1	2.0	1.8	1.8	1.8	1.7	1.8	2.1	2.4	2.1	2.1	2.2	2.3	2.3	1.7	1.7	1.7	1.9	1.9	2.0	2.6
4-Mar	1.8	1.8	1.6	1.4	1.7	1.7	1.8	1.9	1.7	1.6	1.5	4.1	5.5	4.9	4.7	5.5	2.9	1.8	1.7	2.1	2.2	1.7	1.3	1.3	2.4	5.5
5-Mar	2.4	3.8	2.9	2.8	2.3	2.3	2.4	2.7	2.8	2.5	4.1	4.0	2.7	2.9	2.3	2.5	2.4	2.0	2.0	1.9	1.7	1.6	1.5	1.5	2.5	4.1
6-Mar	1.6	2.4	2.6	1.8	1.5	1.4	1.5	1.7	1.7	1.7	1.5	1.6	1.7	1.7	1.7	1.9	1.7	1.6	1.4	1.8	1.7	1.6	1.6	1.7	1.7	2.6
7-Mar	1.7	1.6	1.7	4.1	1.9	1.7	1.7	1.8	1.9	1.8	1.9	2.0	5.1	7.2	6.5	4.8	6.2	5.3	3.3	2.1	1.6	1.6	1.9	1.9	3.0	7.2
8-Mar	2.4	2.7	2.8	2.8	2.8	2.8	2.8	2.8	4.6	5.9	6.4	8.4	8.0	9.1	8.6	8.5	8.6	9.5	10.3	10.7	8.1	6.8	5.4	5.1	6.1	10.7
9-Mar	5.1	3.9	3.7	3.7	6.3	3.7	4.0	4.3	4.3	3.7	3.0	3.2	3.6	2.6	2.7	3.6	5.2	9.2	10.1	10.3	10.1	9.3	8.3	7.0	5.5	10.3
10-Mar	5.0	5.8	6.1	5.7	6.8	7.7	6.4	5.7	6.9	9.0	17.4	14.5	9.2	5.6	2.5	2.2	1.5	1.3	1.3	1.5	2.2	3.1	4.0	4.8	5.7	17.4
11-Mar	6.0	6.2	7.9	5.8	5.5	4.7	4.3	4.1	4.1	5.1	4.1	4.2	2.4	2.2	2.9	2.1	2.8	2.8	2.7	2.8	4.1	3.3	2.8	3.7	4.0	7.9
12-Mar	4.5	4.8	6.2	6.7	6.8	7.1	9.0	10.4	8.9	7.4	6.8	4.2	3.9	3.2	2.6	2.7	2.8	2.5	1.1	1.5	3.4	4.0	4.0	4.5	5.0	10.4
13-Mar	7.4	4.6	4.6	4.9	4.3	4.2	4.3	4.1	3.3	2.9	2.4	2.5	2.1	1.5	0.8	0.7	0.6	0.7	0.8	1.0	1.1	1.9	2.5	2.4	2.7	7.4
14-Mar	3.9	4.6	5.2	3.6	3.2	2.8	2.5	5.6	3.4	2.0	1.6	1.3	1.2	1.4	1.3	1.2	1.3	1.2	1.6	2.5	2.3	2.0	1.7	1.6	2.5	5.6
15-Mar	2.4	2.9	4.9	3.1	2.3	1.9	2.4	2.2	2.1	1.7	1.6	C	C	1.7	2.7	2.3	3.1	1.9	2.2	2.5	2.1	2.3	2.6	2.5	2.4	4.9
16-Mar	2.4	2.3	2.6	2.8	2.2	2.1	1.9	2.0	1.9	2.0	1.8	1.9	1.9	1.9	2.0	2.1	1.8	2.0	2.4	2.6	2.1	1.4	1.5	1.4	2.0	2.8
17-Mar	1.3	1.3	2.2	2.0	3.2	2.9	1.9	1.7	1.6	1.6	1.7	1.2	1.1	1.2	1.1	1.1	1.2	1.1	1.2	1.2	1.2	1.5	1.5	1.1	1.5	3.2
18-Mar	1.0	1.1	1.1	1.2	1.2	1.6	2.0	1.9	1.5	1.4	1.6	1.6	1.5	1.6	1.6	2.6	7.3	5.1	8.5	18.4	5.1	5.0	2.2	4.9	3.4	18.4
19-Mar	5.2	3.1	2.7	3.0	2.5	1.9	2.7	2.3	4.3	1.7	0.8	0.8	0.8	0.8	0.7	0.9	1.7	1.0	1.0	1.4	1.4	1.7	6.6	3.6	2.2	6.6
20-Mar	2.0	2.1	3.0	2.6	4.0	2.9	3.4	4.9	4.1	2.7	1.2	1.2	1.1	0.9	0.9	1.1	1.0	0.9	1.3	2.1	2.8	2.8	3.6	3.4	2.3	4.9
21-Mar	5.1	8.1	4.3	3.5	3.7	2.8	2.9	2.8	2.9	2.6	2.0	2.1	1.7	1.7	1.6	1.7	1.8	1.7	2.2	3.3	3.9	4.9	4.6	4.3	3.2	8.1
22-Mar	6.0	6.5	7.1	9.3	7.5	5.7	6.3	9.5	6.0	6.0	9.2	5.5	4.3	10.1	9.9	9.3	12.6	14.0	9.7	6.8	7.5	8.1	8.2	7.0	8.0	14.0
23-Mar	5.9	5.2	5.3	4.8	4.0	4.0	4.1	4.9	4.2	3.8	3.1	2.7	2.7	3.0	3.4	4.0	4.7	4.2	4.1	4.9	5.6	5.8	5.9	4.8	4.4	5.9
24-Mar	5.4	5.4	5.2	11.7	6.3	6.6	9.4	13.5	7.4	3.9	2.1	2.0	2.2	2.1	2.1	3.0	3.9	3.9	4.2	5.9	5.6	5.6	6.7	7.4	5.5	13.5
25-Mar	6.3	8.4	6.9	9.7	8.6	7.0	6.7	6.2	9.5	7.8	6.7	6.6	7.4	6.9	7.2	8.1	10.0	11.1	12.3	14.0	16.8	14.2	8.5	8.5	9.0	16.8
26-Mar	9.3	9.5	8.2	9.1	8.1	8.1	8.0	10.7	10.1	10.5	6.9	4.9	4.4	4.2	4.4	3.2	6.5	6.1	4.2	8.5	9.3	9.0	10.6	11.5	7.7	11.5
27-Mar	19.4	21.5	19.0	16.0	13.5	12.1	11.5	9.9	11.2	12.7	13.5	26.3	28.3	20.4	5.9	2.8	3.4	3.0	3.3	3.2	3.1	3.2	4.7	6.2	11.4	28.3
28-Mar	10.7	10.7	16.3	12.9	7.2	7.2	6.9	5.7	3.9	2.2	1.7	2.0	1.7	1.5	2.9	1.8	2.6	3.7	4.0	4.7	5.1	2.2	1.1	1.0	5.0	16.3
29-Mar	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.2	1.8	5.0	4.4	3.0	2.8	3.4	4.2	6.4	6.1	6.7	7.2	5.6	8.0	3.2	8.0
30-Mar	6.0	10.2	11.4	8.4	10.0	10.6	3.8	2.8	2.9	4.3	1.8	1.9	2.4	1.8	2.1	2.4	2.1	2.0	2.3	2.2	2.0	1.8	1.8	2.1	4.1	11.4
31-Mar	2.0	2.4	3.8	3.6	3.5	3.3	3.8	2.5	2.1	2.1	2.1	2.3	2.3	3.9	2.8	3.5	7.2	8.5	9.1	13.8	14.8	13.2	11.2	6.6	5.4	14.8
	4.6	5.0	5.2	5.1	4.5	4.2	4.1	4.5	4.2	3.9	3.8	4.0	4.0	3.8	3.2	3.1	3.8	3.9	4.0	4.8	4.6	4.3	4.2	4.1	Diurnal Average	
	19.4	21.5	19.0	16.0	13.5	12.1	11.5	13.5	11.2	12.7	17.4	26.3	28.3	20.4	9.9	9.3	12.6	14.0	12.3	18.4	16.8	14.2	11.2	11.5	Diurnal Maximum	

C - Calibration

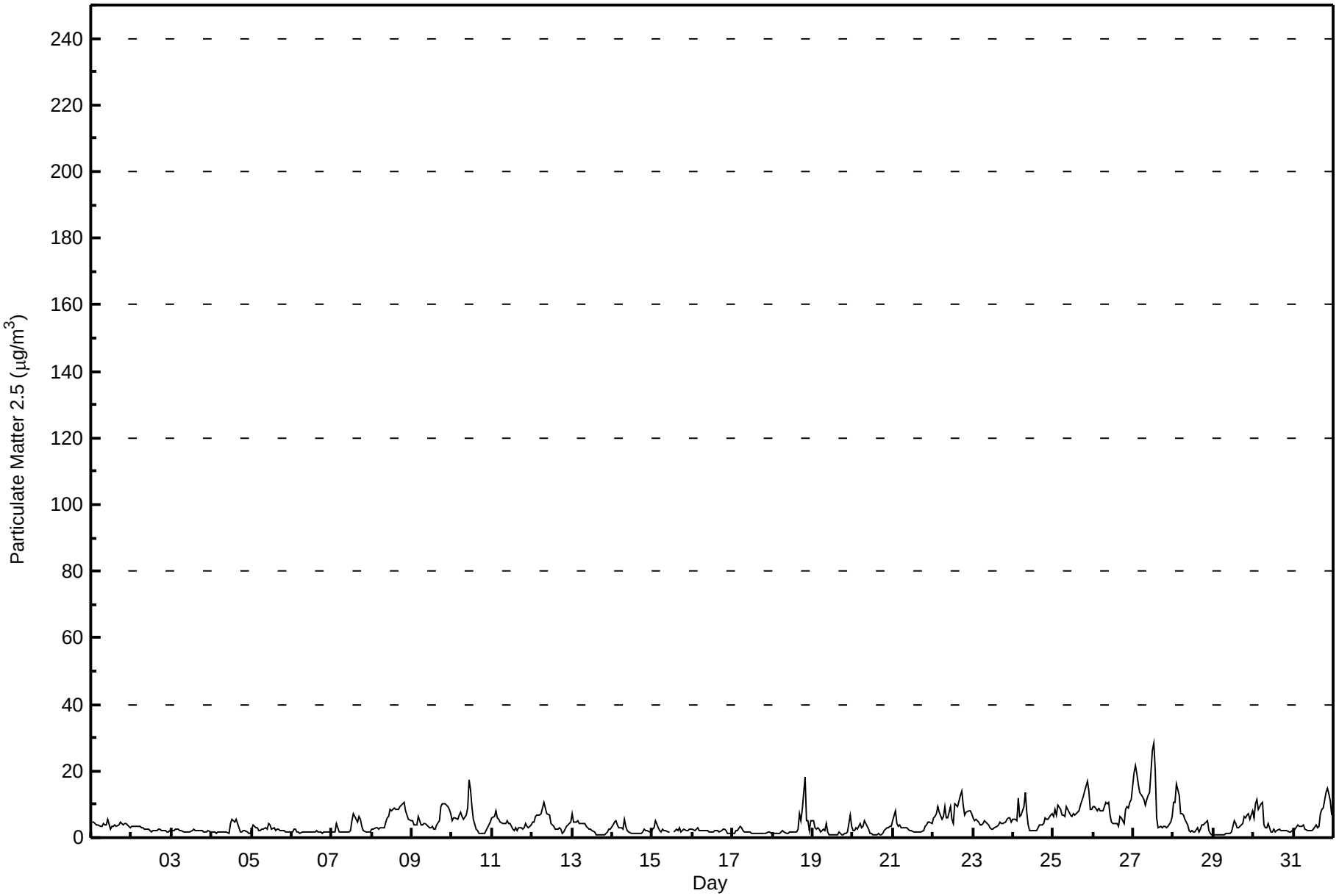
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

CNRL Horizon - March 2016



Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	538	72.51	72.51
6 - 15	171	23.05	95.55
16 - 25	9	1.21	96.77
26 - 80	2	0.27	97.03
> 81.0	0	0.00	97.03

Total Number of Valid Hours: 742

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

CNRL Horizon - March 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	127	187	19	10	9	12	14	12	25	22	20	5	16	15	18	26	537
6 - 15	38	19	4	2	0	4	6	8	17	19	4	3	3	5	10	23	165
16 - 25	1	1	0	0	0	0	0	1	1	3	0	0	0	1	1	0	9
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	166	207	23	12	9	16	20	21	43	44	24	8	19	21	29	51	713

Total Number of Valid Hours: 735

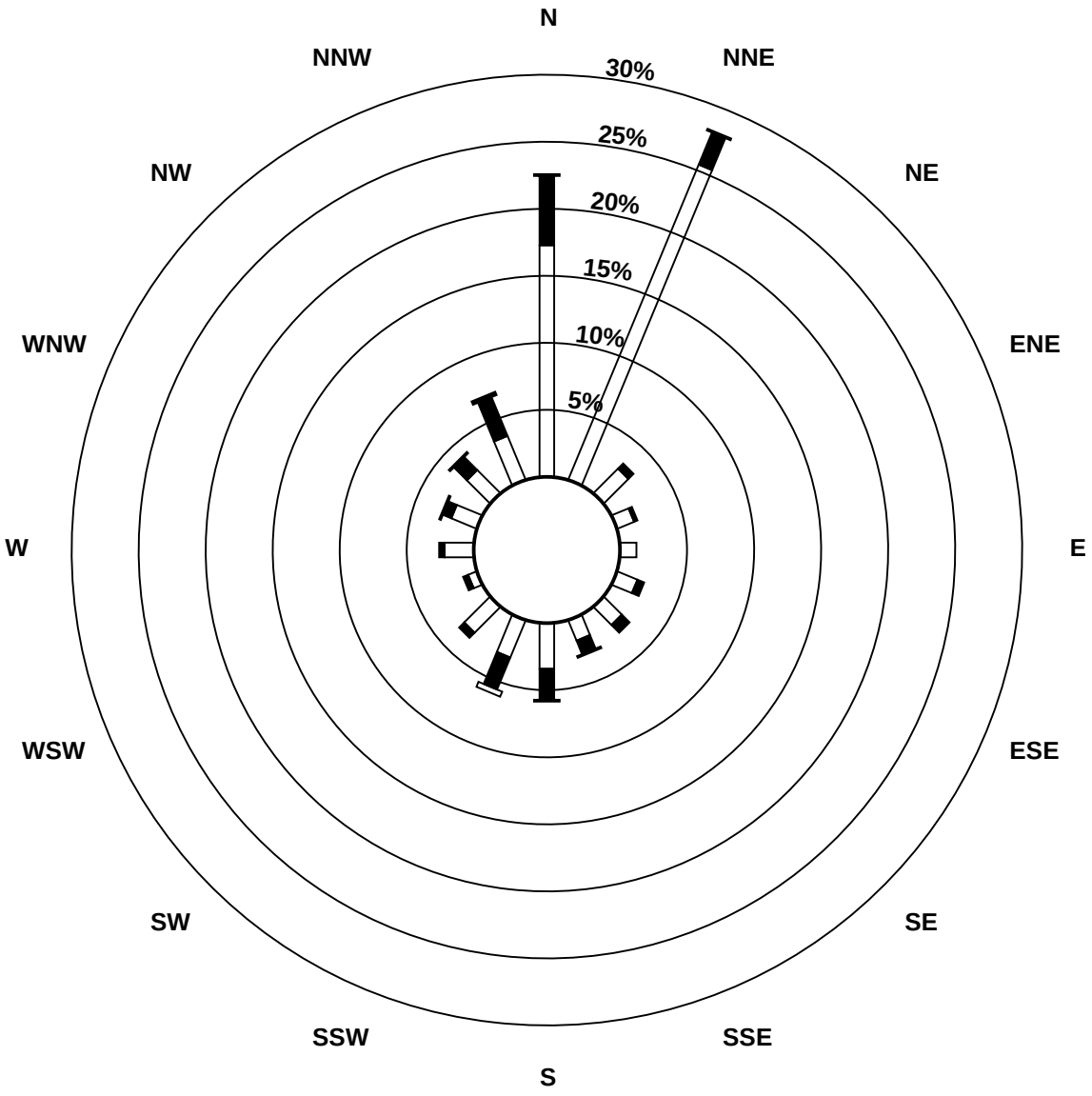
Total Number of Hours: 744

Wood Buffalo Environmental Association

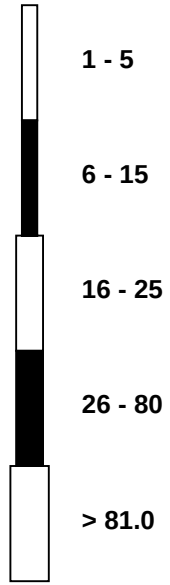
Wind Rose Mar 2016

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

CNRL Horizon (AMS 15)



Classes ($\mu g/m^3$)



1 - 5

6 - 15

16 - 25

26 - 80

> 81.0

Total Number of Valid Hours: 735

Maximum Value: 12.1 C on Mar 29 17:00

Maximum Daily Average: 5.8 C on Mar 29

Minimum Value: -16.8 C on Mar 24 07:00

Minimum Daily Average: -9.5 C on Mar 24

Maximum Diurnal Average: -0.2 C at hour 16

Minimum Diurnal Average: -7.9 C at hour 7

Monthly Average: -4.37 C

Percentiles: P_1 = -14.5 P_{10} = -10.4 Q_1 = -8.0 Median = -5.0 Q_3 = -1.3 P_{90} = 1.9 P_{99} = 10.9

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

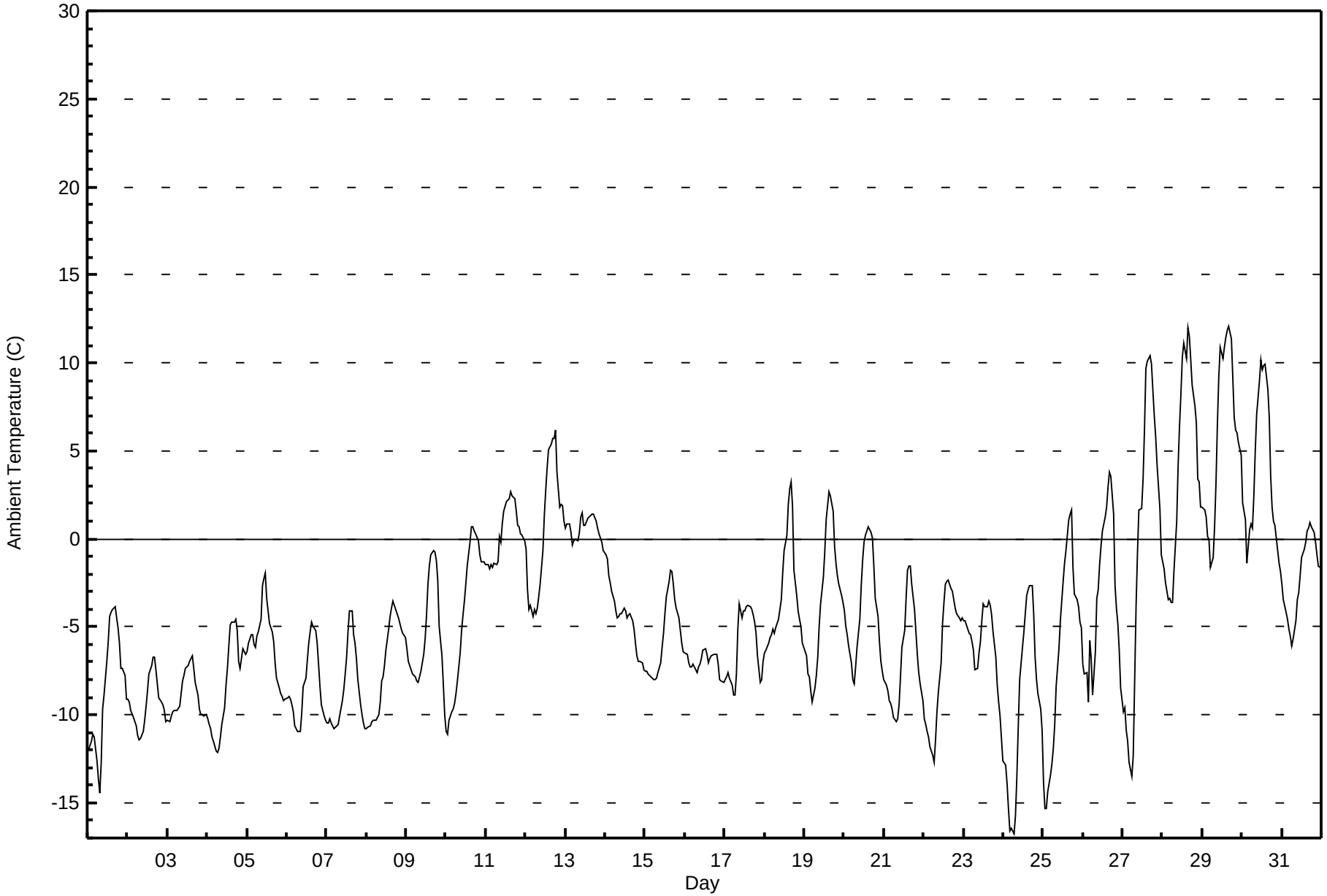
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-12.0	-11.8	-11.5	-11.1	-11.3	-12.6	-13.6	-14.5	-12.7	-9.6	-8.9	-6.9	-5.8	-4.4	-4.1	-4.0	-3.9	-4.5	-5.1	-5.9	-7.3	-7.4	-7.8	-9.1	-8.6	-3.9
2-Mar	-9.1	-9.3	-9.8	-10.2	-10.4	-10.6	-11.2	-11.5	-11.3	-11.0	-10.3	-9.5	-8.6	-7.7	-7.2	-6.7	-6.7	-7.4	-8.3	-9.1	-9.2	-9.5	-9.8	-10.4	-9.4	-6.7
3-Mar	-10.3	-10.4	-10.1	-9.8	-9.8	-9.7	-9.8	-9.5	-8.8	-8.1	-7.7	-7.4	-7.2	-7.0	-6.8	-6.7	-7.4	-8.1	-8.9	-9.7	-10.0	-10.0	-10.1	-10.0	-8.9	-6.7
4-Mar	-10.2	-10.6	-10.8	-11.2	-11.5	-12.1	-12.1	-11.9	-11.3	-10.6	-9.6	-8.3	-7.3	-6.1	-4.9	-4.8	-4.7	-4.6	-5.2	-7.0	-7.3	-6.3	-6.4	-6.6	-8.4	-4.6
5-Mar	-6.4	-5.9	-5.4	-5.4	-6.0	-6.1	-5.6	-5.3	-4.6	-2.7	-2.3	-1.9	-3.3	-4.8	-5.0	-5.3	-5.8	-7.0	-7.9	-8.5	-8.8	-9.0	-9.2	-9.1	-5.9	-1.9
6-Mar	-9.1	-9.0	-9.1	-9.5	-9.8	-10.7	-10.9	-10.9	-11.0	-9.9	-8.4	-7.9	-6.9	-5.9	-5.3	-4.7	-4.9	-5.2	-5.9	-7.2	-8.4	-9.4	-10.1	-10.3	-8.3	-4.7
7-Mar	-10.4	-10.5	-10.2	-10.4	-10.8	-10.7	-10.6	-10.5	-10.1	-9.2	-8.6	-7.7	-6.7	-5.3	-4.1	-4.1	-5.4	-6.0	-6.8	-8.0	-9.4	-10.0	-10.5	-10.8	-8.6	-4.1
8-Mar	-10.8	-10.7	-10.6	-10.4	-10.3	-10.3	-10.3	-10.0	-9.3	-8.1	-7.8	-7.2	-6.3	-5.1	-4.4	-4.0	-3.5	-3.8	-4.3	-4.5	-4.8	-5.1	-5.4	-5.6	-7.2	-3.5
9-Mar	-6.2	-6.9	-7.2	-7.5	-7.7	-7.9	-8.0	-8.1	-7.8	-7.5	-6.5	-5.7	-4.3	-2.6	-1.5	-0.9	-0.7	-0.7	-1.2	-2.3	-5.0	-6.7	-8.4	-10.1	-5.5	-0.7
10-Mar	-11.0	-11.1	-10.3	-9.8	-9.7	-9.4	-8.8	-8.1	-6.5	-5.2	-4.4	-3.5	-2.6	-1.6	-0.2	0.7	0.7	0.5	0.3	-0.1	-0.9	-1.3	-1.3	-1.3	-4.4	0.7
11-Mar	-1.4	-1.5	-1.7	-1.5	-1.6	-1.4	-1.4	-1.3	0.1	-0.2	0.9	1.6	2.1	2.2	2.3	2.7	2.4	2.3	1.6	0.7	0.6	0.3	0.2	-0.1	0.3	2.7
12-Mar	-0.6	-2.9	-4.0	-3.7	-4.4	-4.0	-4.2	-3.9	-3.3	-2.6	-0.7	1.3	2.8	4.0	5.1	5.4	5.7	5.7	6.2	3.8	1.8	2.0	1.8	1.0	0.5	6.2
13-Mar	0.6	0.8	0.8	0.4	-0.3	-0.1	0.0	-0.1	0.4	1.2	1.5	0.8	0.7	1.2	1.3	1.3	1.4	1.4	1.0	0.6	0.2	0.0	-0.2	-0.7	0.6	1.5
14-Mar	-0.9	-1.2	-2.1	-2.5	-3.0	-3.5	-4.1	-4.5	-4.4	-4.3	-4.2	-3.9	-4.1	-4.5	-4.3	-4.3	-4.7	-5.2	-5.9	-6.7	-7.0	-6.9	-7.0	-7.4	-4.4	-0.9
15-Mar	-7.5	-7.5	-7.7	-7.9	-7.9	-8.0	-8.0	-7.9	-7.6	-7.1	-6.1	-5.3	-4.3	-3.3	-2.5	-1.8	-1.8	-2.6	-3.4	-4.0	-4.5	-5.2	-5.9	-6.4	-5.6	-1.8
16-Mar	-6.5	-6.6	-7.0	-7.3	-7.2	-7.1	-7.3	-7.6	-7.3	-7.1	-6.8	-6.3	-6.2	-6.6	-7.0	-6.8	-6.6	-6.6	-6.5	-6.5	-7.1	-8.0	-8.1	-8.2	-7.0	-6.2
17-Mar	-8.0	-7.8	-7.6	-7.9	-8.3	-8.9	-8.9	-7.7	-5.1	-3.7	-4.5	-4.1	-4.1	-3.9	-3.8	-3.9	-4.0	-4.3	-4.7	-5.4	-6.7	-8.2	-8.0	-7.0	-6.1	-3.7
18-Mar	-6.5	-6.3	-5.9	-5.6	-5.4	-5.1	-5.4	-5.1	-4.5	-4.0	-3.5	-2.0	-0.7	0.2	1.9	2.8	3.2	1.9	-1.7	-3.2	-4.1	-4.6	-5.0	-5.9	-3.1	3.2
19-Mar	-6.4	-6.7	-7.7	-7.8	-8.6	-9.3	-8.5	-7.8	-6.8	-5.0	-3.7	-2.1	-0.7	1.1	1.9	2.7	2.5	1.6	-0.4	-1.4	-2.1	-2.6	-3.2	-3.6	-3.5	2.7
20-Mar	-4.1	-4.9	-5.4	-6.1	-7.0	-8.0	-8.3	-7.3	-6.1	-4.6	-2.6	-1.2	-0.2	0.2	0.7	0.5	0.3	0.0	-1.6	-3.4	-4.4	-5.8	-7.0	-7.5	-3.9	0.7
21-Mar	-8.0	-8.3	-8.6	-9.2	-9.3	-9.7	-10.1	-10.4	-10.3	-9.5	-7.9	-6.1	-5.2	-3.4	-1.8	-1.5	-1.6	-2.6	-4.1	-5.3	-6.5	-7.6	-8.2	-9.2	-6.8	-1.5
22-Mar	-10.2	-10.5	-10.9	-11.3	-11.8	-12.3	-12.7	-11.4	-9.8	-8.7	-7.0	-4.8	-3.7	-2.6	-2.4	-2.3	-2.9	-3.0	-3.5	-3.9	-4.2	-4.5	-4.7	-4.5	-6.8	-2.3
23-Mar	-4.7	-4.7	-4.9	-5.3	-5.5	-5.8	-6.3	-7.4	-7.4	-6.5	-5.9	-4.6	-3.7	-3.9	-3.9	-3.5	-3.8	-4.3	-5.3	-6.8	-8.3	-9.3	-10.1	-11.4	-6.0	-3.5
24-Mar	-12.6	-12.9	-13.9	-15.3	-16.6	-16.4	-16.8	-15.8	-13.5	-10.6	-8.0	-6.2	-5.3	-4.3	-3.3	-2.9	-2.7	-2.6	-4.2	-6.7	-8.0	-8.8	-9.7	-10.9	-9.5	-2.6
25-Mar	-13.8	-15.3	-15.3	-14.3	-13.4	-12.8	-11.9	-10.6	-8.4	-6.3	-4.6	-3.5	-2.4	-1.4	-0.7	1.1	1.4	1.6	-1.6	-3.1	-3.4	-3.9	-4.7	-5.1	-6.4	1.6
26-Mar	-7.1	-7.7	-7.6	-9.3	-5.8	-6.8	-8.8	-6.4	-3.4	-2.9	-1.4	-0.4	0.4	1.2	1.8	2.9	3.8	3.5	1.4	-2.6	-4.0	-4.9	-6.3	-8.5	-3.3	3.8
27-Mar	-9.8	-9.6	-10.8	-11.5	-12.7	-13.5	-12.3	-8.1	-3.8	-0.8	1.6	1.7	3.4	6.2	9.7	10.1	10.4	9.9	8.4	7.0	5.8	4.2	1.7	-0.9	-0.6	10.4
28-Mar	-1.3	-1.7	-2.5	-3.4	-3.4	-3.6	-3.6	-1.8	1.0	4.2	6.4	8.3	10.4	11.1	10.3	12.0	11.5	10.2	8.8	7.5	6.6	3.4	3.2	1.8	4.0	12.0
29-Mar	1.8	1.6	1.2	0.1	0.0	-1.6	-1.1	0.7	3.1	6.5	9.2	10.9	10.3	10.8	11.5	11.9	12.1	11.3	9.1	6.9	6.2	6.0	5.4	4.7	5.8	12.1
30-Mar	2.0	1.6	1.1	-1.4	0.6	0.8	0.6	2.5	5.0	7.0	9.0	10.2	9.6	9.8	9.9	8.5	6.9	3.5	1.8	1.0	0.8	-0.7	-1.3	-1.9	3.6	10.2
31-Mar	-2.6	-3.4	-4.2	-4.6	-5.2	-5.6	-6.1	-5.7	-4.7	-3.5	-3.1	-2.1	-1.0	-0.6	-0.2	0.4	0.6	0.9	0.7	0.3	-0.2	-0.9	-1.6	-1.6	-2.2	0.9
	-6.6	-6.8	-7.1	-7.4	-7.6	-7.8	-7.9	-7.3	-6.1	-4.8	-3.7	-2.7	-2.0	-1.2	-0.5	-0.2	-0.3	-0.8	-1.8	-3.0	-3.9	-4.5	-5.1	-5.7	Diurnal Average	
	2.0	1.6	1.2	0.4	0.6	0.8	0.6	2.5	5.0	7.0	9.2	10.9	10.4	11.1	11.5	12.0	12.1	11.3	9.1	7.5	6.6	6.0	5.4	4.7	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

CNRL Horizon - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	594	79.84	79.84
0 - 10	134	18.01	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

Maximum Value: 2.0 mm on Mar 11 16:00

Maximum Daily Total: 5.1 mm on Mar 11

Minimum Value: 0.0 mm on Mar 1 01:00

Minimum Daily Total: 0.0 mm on Mar 2

Maximum Diurnal Total: 4.3 mm at hour 15

Minimum Diurnal Total: 0.0 mm at hour 1

Monthly Total: 20.07 mm

Percentiles: P_1 = 0.0 P_{10} = 0.0 Q_1 = 0.0 Median = 0.0 Q_3 = 0.0 P_{90} = 0.0 P_{99} = 1.0

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

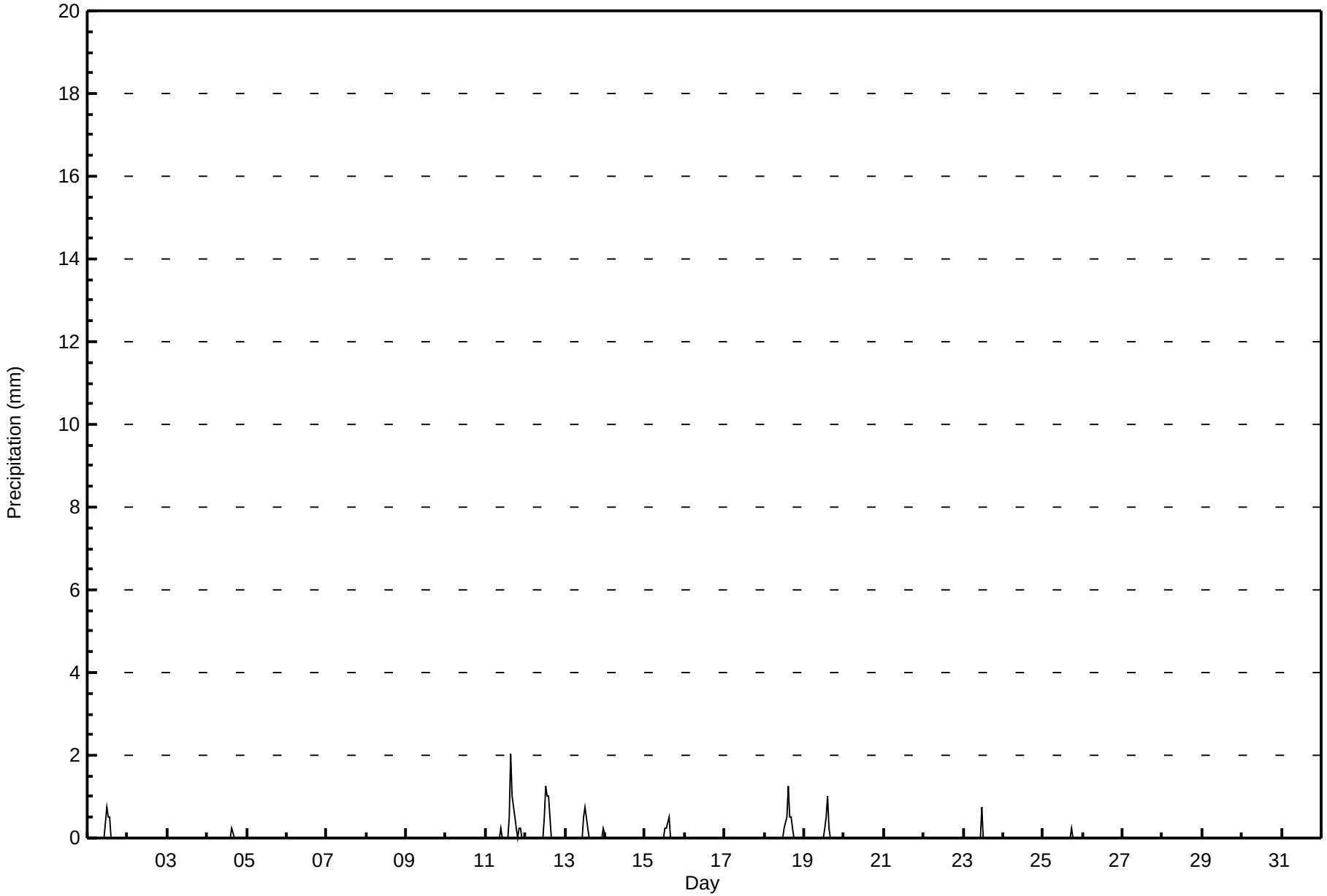
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.8
2-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
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
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	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
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
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
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
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
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
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
11-Mar	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	0.5	2.0	1.0	0.5	0.3	0.0	0.3	0.3	0.0	0.0	5.1	2.0
12-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.3	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	1.3
13-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.8	0.8
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
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	0.3	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5
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
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
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	0.3	0.5	1.3	0.5	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	3.3	1.3
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	0.3	0.5	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0
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
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
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
23-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8
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
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	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	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	0.0	0.0	0.0	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
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
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
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
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	0.0	0.0	0.0	0.0	0.3	0.0	2.5	3.3	3.0	4.3	3.0	1.5	1.0	0.3	0.0	0.3	0.3	0.0	0.3	Diurnal Average	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.8	1.3	1.0	1.3	2.0	1.0	0.5	0.3	0.0	0.3	0.3	0.0	0.3	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Precipitation (PC) - mm

CNRL Horizon - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

CNRL Horizon - March 2016

Maximum Value: 97 % on Mar 12 04:00

Maximum Daily Average: 91.0 % on Mar 10

Minimum Value: 15 % on Mar 24 17:00

Minimum Daily Average: 36.9 % on Mar 24

Maximum Diurnal Average: 81.2 % at hour 7

Minimum Diurnal Average: 59.6 % at hour 16

Monthly Average: 71.1 %

Percentiles: $P_1 = 25$ $P_{10} = 48$ $Q_1 = 59$ Median = 75 $Q_3 = 85$ $P_{90} = 90$ $P_{99} = 96$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

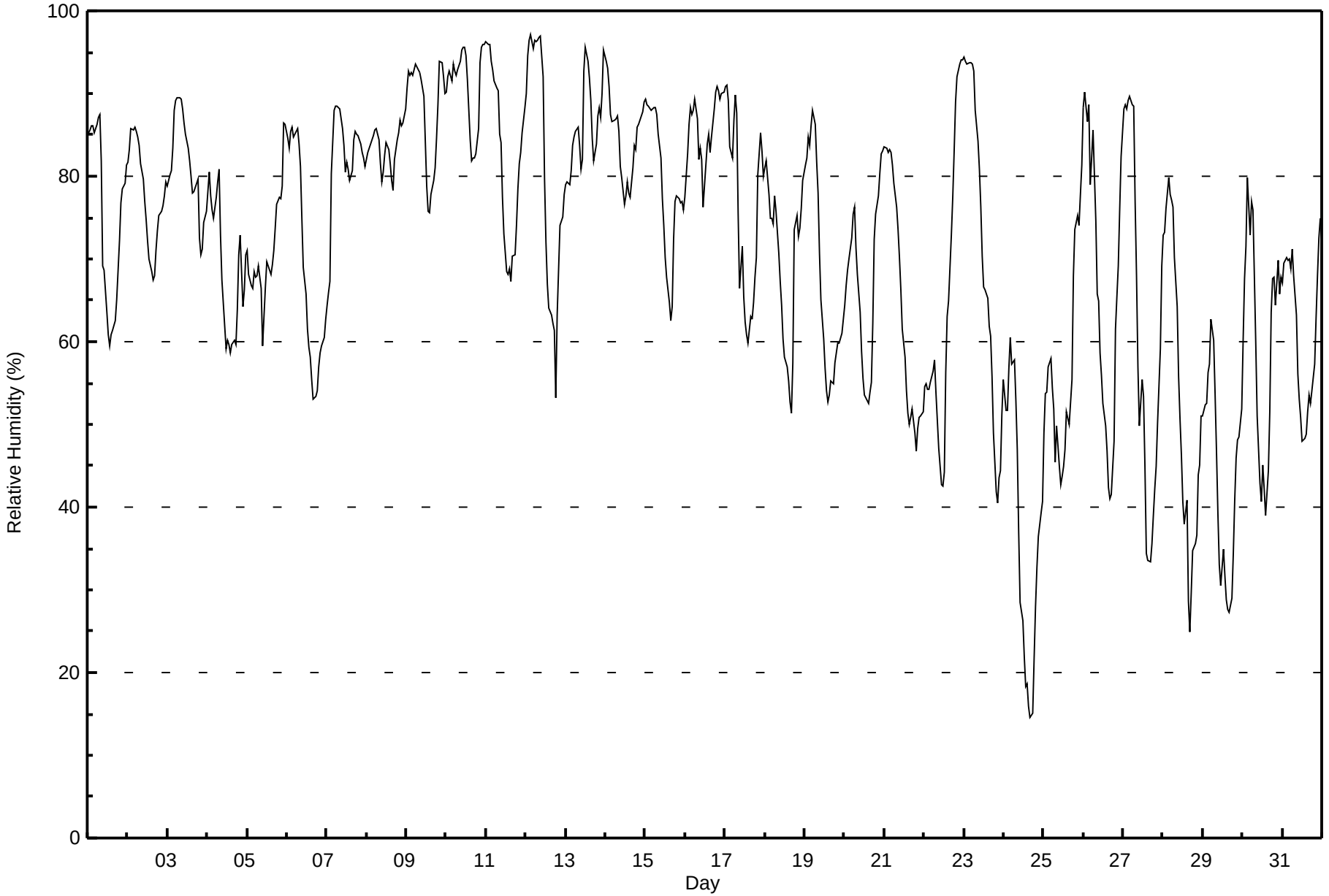
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	85	86	86	86	85	86	87	87	82	69	69	64	61	59	61	61	62	65	69	72	77	79	79	81	74.9	87
2-Mar	82	83	86	86	86	85	85	84	82	80	77	75	72	70	68	68	68	71	73	75	76	76	78	79	77.7	86
3-Mar	79	80	81	83	88	89	89	90	89	88	87	85	83	82	80	78	78	79	80	73	70	71	74	76	81.3	90
4-Mar	78	81	78	76	75	77	79	81	73	67	62	59	60	60	59	60	60	60	64	70	73	64	66	71	68.8	81
5-Mar	71	68	67	66	68	68	68	69	66	59	63	67	70	69	68	69	71	74	77	78	77	79	87	86	71.0	87
6-Mar	85	83	85	86	85	85	86	84	81	75	69	66	61	59	58	55	53	53	54	57	59	60	61	63	69.3	86
7-Mar	64	66	67	80	88	88	89	88	88	86	84	80	82	81	79	81	84	85	85	85	84	83	82	81	81.7	89
8-Mar	82	83	84	84	85	86	86	84	82	79	80	83	84	83	81	80	78	82	84	85	87	86	87	88	83.5	88
9-Mar	91	93	92	93	92	94	93	93	93	92	90	84	79	76	76	78	80	81	85	89	94	94	92	90	87.9	94
10-Mar	90	92	93	92	94	93	92	93	94	95	96	96	95	92	84	82	82	82	83	86	94	96	96	96	91.0	96
11-Mar	96	96	96	94	93	92	91	90	85	84	77	73	68	68	69	67	70	71	74	78	82	83	85	88	82.1	96
12-Mar	90	95	96	97	95	97	96	97	97	97	92	80	72	67	64	63	62	61	53	63	74	75	75	78	80.7	97
13-Mar	79	79	79	81	84	85	85	86	84	81	82	93	96	94	92	89	85	82	84	87	88	87	90	95	86.1	96
14-Mar	94	93	91	87	87	87	87	87	85	81	80	77	78	79	78	77	81	84	83	86	86	87	88	89	84.7	94
15-Mar	89	89	88	88	88	88	88	87	85	82	77	74	70	68	65	63	64	72	77	78	77	77	77	76	78.7	89
16-Mar	78	83	86	88	87	88	89	87	82	83	82	76	81	84	85	83	85	88	90	91	90	89	90	90	85.7	91
17-Mar	91	91	89	84	82	87	90	88	76	66	72	65	62	61	60	63	63	65	68	70	80	85	83	80	75.8	91
18-Mar	81	82	78	75	75	74	78	76	71	67	64	60	58	57	55	53	51	57	74	75	73	74	76	80	69.3	82
19-Mar	81	82	85	84	86	88	86	82	78	71	65	60	57	54	53	54	55	55	58	59	60	60	61	63	68.1	88
20-Mar	64	67	69	70	73	75	76	71	68	64	59	56	54	53	53	54	55	62	72	75	78	80	83	83	67.2	83
21-Mar	84	83	83	83	83	81	79	76	74	70	66	61	58	54	51	50	51	52	49	47	50	51	51	51	64.1	84
22-Mar	55	55	54	54	55	56	58	54	51	47	43	43	44	56	63	65	73	77	83	89	92	93	94	94	64.5	94
23-Mar	94	94	94	94	94	93	93	88	84	81	76	70	67	66	65	62	61	56	49	42	41	44	44	51	70.9	94
24-Mar	55	52	52	57	60	57	58	53	47	37	28	26	22	18	19	16	15	15	22	28	33	36	39	41	36.9	60
25-Mar	49	54	54	57	58	54	52	45	50	45	43	44	45	47	52	50	53	55	68	74	75	74	78	81	56.5	81
26-Mar	88	90	87	89	79	82	86	75	66	65	59	56	52	50	47	42	41	42	48	61	65	69	76	82	66.5	90
27-Mar	88	89	88	89	90	89	88	77	68	57	50	55	53	45	34	34	33	36	39	42	45	50	59	69	61.2	90
28-Mar	73	73	76	80	78	77	76	70	64	56	51	46	41	38	41	29	25	30	35	36	37	44	45	51	52.9	80
29-Mar	51	52	53	56	57	63	60	54	47	39	33	30	35	32	29	28	27	29	34	41	46	48	48	52	43.5	63
30-Mar	60	68	71	80	73	77	76	68	60	51	43	41	45	42	39	44	52	64	68	68	64	70	66	68	60.7	80
31-Mar	67	70	70	70	70	69	71	68	63	56	53	51	48	48	49	52	54	53	54	57	63	68	73	75	61.3	75
	77.9	79.0	79.3	80.3	80.4	81.0	81.2	78.5	74.6	70.1	66.8	64.4	63.0	61.7	60.6	59.6	60.4	62.5	65.6	68.3	70.6	72.0	73.6	75.8	Diurnal Average	
	96	96	96	97	95	97	96	97	97	97	96	96	96	94	92	89	85	88	90	91	94	96	96	96	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

CNRL Horizon - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	5	0.67	0.67
20 - 40	32	4.30	4.97
40 - 60	158	21.24	26.21
60 - 80	263	35.35	61.56
80 - 100	286	38.44	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 658 W/m2 on Mar 24 13:00

Maximum Daily Average: 210.7 W/m2 on Mar 29

Minimum Value: 0 W/m2 on Mar 1 01:00

Minimum Daily Average: 40.8 W/m2 on Mar 10

Maximum Diurnal Average: 390.4 W/m2 at hour 13

Minimum Diurnal Average: 0.0 W/m2 at hour 1

Monthly Average: 112.6 W/m2

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 4 $Q_3 = 180$ $P_{90} = 409$ $P_{99} = 632$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

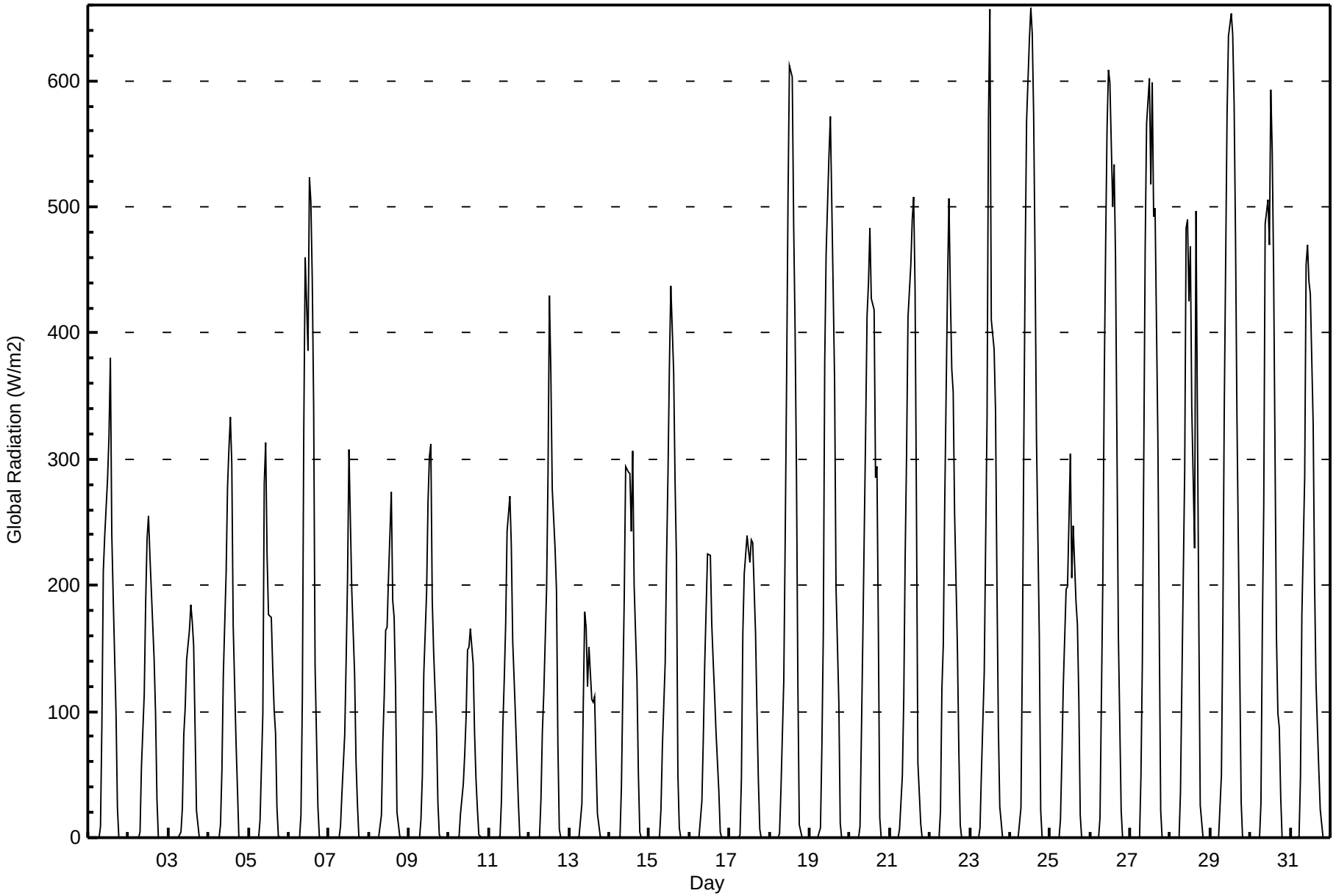
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0	0	0	0	0	0	0	9	91	212	239	284	317	380	241	190	99	24	0	0	0	0	0	0	86.9	380
2-Mar	0	0	0	0	0	0	0	4	56	114	187	237	255	224	169	141	98	30	0	0	0	0	0	0	63.2	255
3-Mar	0	0	0	0	0	0	0	5	24	82	102	141	164	184	171	153	86	22	0	0	0	0	0	0	47.2	184
4-Mar	0	0	0	0	0	0	0	10	53	128	210	279	309	333	296	168	76	39	1	0	0	0	0	0	79.3	333
5-Mar	0	0	0	0	0	0	0	14	99	281	313	224	177	174	135	102	83	24	1	0	0	0	0	0	67.7	313
6-Mar	0	0	0	0	0	0	0	18	111	324	460	386	523	504	443	342	136	25	1	0	0	0	0	0	136.4	523
7-Mar	0	0	0	0	0	0	0	8	34	81	140	206	308	251	196	130	61	26	1	0	0	0	0	0	60.1	308
8-Mar	0	0	0	0	0	0	0	17	76	113	165	166	206	274	187	175	119	20	1	0	0	0	0	0	63.3	274
9-Mar	0	0	0	0	0	0	0	15	50	130	194	266	302	312	188	147	86	28	2	0	0	0	0	0	71.6	312
10-Mar	0	0	0	0	0	0	1	20	43	66	97	149	152	165	137	82	45	22	2	0	0	0	0	0	40.8	165
11-Mar	0	0	0	0	0	0	1	29	89	125	169	243	270	231	155	125	94	28	1	0	0	0	0	0	65.1	270
12-Mar	0	0	0	0	0	0	1	30	84	115	197	288	430	369	276	229	196	74	7	0	0	0	0	0	95.6	430
13-Mar	0	0	0	0	0	0	1	27	108	179	166	119	151	110	107	111	62	19	2	0	0	0	0	0	48.5	179
14-Mar	0	0	0	0	0	0	1	40	117	190	294	290	288	243	306	200	125	51	5	0	0	0	0	0	89.6	306
15-Mar	0	0	0	0	0	0	1	22	71	138	222	290	375	437	369	282	219	50	7	0	0	0	0	0	103.5	437
16-Mar	0	0	0	0	0	0	2	29	79	138	182	224	224	169	140	113	84	37	4	0	0	0	0	0	59.3	224
17-Mar	0	0	0	0	0	0	2	46	162	210	240	228	218	237	234	162	101	46	6	0	0	0	0	0	78.8	240
18-Mar	0	0	0	0	0	0	3	38	124	236	363	506	612	603	487	404	288	120	10	0	0	0	0	0	158.1	612
19-Mar	0	0	0	0	0	0	7	73	161	376	463	541	572	503	434	361	199	108	11	0	0	0	0	0	158.7	572
20-Mar	0	0	0	0	0	0	8	83	158	323	414	440	484	427	418	285	294	165	16	0	0	0	0	0	146.5	484
21-Mar	0	0	0	0	0	0	6	49	110	223	305	413	454	490	508	435	259	60	12	0	0	0	0	0	138.5	508
22-Mar	0	0	0	0	0	0	21	118	154	264	439	506	432	371	353	257	150	70	11	0	0	0	0	0	131.1	506
23-Mar	0	0	0	0	0	0	7	52	131	234	334	570	656	410	387	338	201	88	25	0	0	0	0	0	143.1	656
24-Mar	0	0	0	0	0	0	24	146	307	458	569	633	658	637	573	458	317	159	21	0	0	0	0	0	206.7	658
25-Mar	0	0	0	0	0	0	14	63	121	197	200	251	304	206	247	187	169	110	18	0	0	0	0	0	87.0	304
26-Mar	0	0	0	0	0	0	16	204	361	471	563	608	599	500	533	458	312	161	22	0	0	0	0	0	200.4	608
27-Mar	0	0	0	0	0	0	48	139	300	467	566	602	518	599	493	499	315	161	21	1	0	0	0	0	197.0	602
28-Mar	0	0	0	0	0	0	36	124	292	484	489	425	468	341	230	497	335	171	26	0	0	0	0	0	163.3	497
29-Mar	0	0	0	0	0	1	49	167	336	456	573	636	653	636	581	475	334	132	28	0	0	0	0	0	210.7	653
30-Mar	0	0	0	0	0	0	27	166	264	487	505	469	592	544	446	159	98	88	33	0	0	0	0	0	161.6	592
31-Mar	0	0	0	0	0	1	48	177	286	455	470	440	430	328	201	123	87	54	23	1	0	0	0	0	130.2	470
	0.0	0.0	0.0	0.0	0.0	0.1	10.5	62.7	143.6	250.2	317.1	356.8	390.4	361.1	311.0	251.2	165.4	71.3	10.3	0.1	0.0	0.0	0.0	0.0	Diurnal Average	
	0	0	0	0	0	1	49	204	361	487	573	636	658	637	581	499	335	171	33	1	0	0	0	0	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Global Radiation (GR) - W/m2

CNRL Horizon - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

CNRL Horizon - March 2016

Maximum Speed: 25 km/h on Mar 30 13:00

Maximum Daily Speed Average: 14.4 km/h on Mar 14

Minimum Speed Value: 1 km/h on Mar 11 23:00

Minimum Daily Speed Average: 1.1 km/h on Mar 26

Maximum Diurnal Speed Average: 6.2 km/h at hour 21

Minimum Diurnal Speed Average: 3.0 km/h at hour 7

Monthly Average Velocity: 4.6 km/h 8.5 deg

Percentiles: P_1 = 1 P_{10} = 3 Q_1 = 5 Median = 7 Q_3 = 11 P_{90} = 14 P_{99} = 18

Hours in Service: 744

Hours of Data: 737

Hours of Missing Data: 7

Percent Operational Time: 99.1

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	SSW4	S4	SSW7	S8	S3	SSW5	SSW5	SSW6	SSW4	SSE1	NNW1	N3	NNW5	N7	NNE6	NNE5	NNE6	NE6	NNE7	NNE9	N9	N9	NNE10	N9	NNE1.8	NNE10
2-Mar	NNE7	NNE9	NNE8	NNE8	NNE7	NNE8	NNE9	NNE8	NNE7	NNE7	NNE7	NNE6	NNE5	NNE6	NNE6	NNE5	NNE8	NNE7	NNE9	NNE9	NNE8	NNE7	NNE6	NNE6	NNE7.2	NNE9
3-Mar	N8	NNE7	N8	N9	N9	NNE8	NNE9	NNE10	N11	N13	NNE12	NNE12	NNE14	NNE16	NNE14	NNE12	NNE13	NNE13	NNE11	NNE14	NNE11	NNE7	N3	N4	NNE10.3	NNE16
4-Mar	NE5	NNE7	NE5	E4	E4	SSE3	SSW5	S5	S5	S6	S6	S4	SE5	SE6	S10	SSE10	SE8	ESE7	E6	ENE4	ENE3	SE3	SSW1	W2	SE3.2	SSE10
5-Mar	SW3	SSW7	SSW4	SSW5	SSW5	SSW5	S8	SSE8	S5	SSE2	N7	NNE12	NNE15	NNE15	NNE13	NNE13	NNE14	NE16	NNE15	NNE15	NNE14	NNE13	NNE12	NNE10	NNE5.6	NE16
6-Mar	NNE9	NNE9	NNE8	NNE9	NNE13	NNE11	NNE9	N11	NNE9	NNE11	NNE11	NE13	NE11	NNE10	N12	N16	NNE15	NNE14	NNE16	NNE17	NNE14	NNE14	NNE13	NNE12	NNE11.8	NNE17
7-Mar	NNE12	NNE13	NNE12	NNE10	NNE10	NNE9	NNE9	NNE10	N7	N7	N6	N4	NNW3	SSE6	SSE5	ENE6	NE9	NNE9	NNE8	NNE10	NNE9	NE6	NE7	ENE5	NNE6.9	NNE13
8-Mar	ESE1	S3	SSW3	W1	SW1	SSW1	SE4	S3	NE2	SSW4	NNW4	NNW3	NNW5	NNW5	NNW4	NW5	N4	N4	NNE5	NNE6	NNE7	NNE7	NNE7	NNE7	N2.1	NNE7
9-Mar	NNE10	NNE8	N8	N8	NNE6	NNE7	NNE6	NNE6	N4	NNW4	NNW1	NW3	SSW1	S4	SSE6	S7	S7	S4	AF	ENE1	SE1	AF	WSW2	AF	NNE1.9	NNE10
10-Mar	SSW5	SSW5	S6	SSW5	SSW6	SSW5	SSW4	SSW3	W1	N3	NNE3	NNE3	ENE4	NNE3	E3	SE4	ESE10	ESE7	SE8	ESE5	E2	NNW3	NNW3	NW2	SE1.8	ESE10
11-Mar	NW1	WSW3	SSW6	SW8	SW9	SW10	WSW9	SW9	W5	NNE6	NW4	WNW7	WNW9	WNW9	WNW6	W7	WNW6	W4	SW4	WNW2	NE2	S1	NNW1	NNW2	W4.1	SW10
12-Mar	NE4	AF	NNW3	N3	SW1	NNE3	NNW3	N5	NNE5	N5	N8	NNE9	N11	N12	N9	N9	N7	NNE6	E6	NNE6	N5	N5	N6	N6	N5.6	N12
13-Mar	N6	NNW6	N5	N5	N6	N7	N7	NNE8	NNE10	NNE11	NNE9	NNE9	N10	N13	N16	N17	N17	N17	N18	N15	N13	N12	N15	N10	N10.8	N18
14-Mar	N11	N12	N13	N15	N17	N17	N16	N17	N18	NNE18	NNE18	NNE16	NNE16	N17	N16	N16	NNE14	N13	N14	N12	N11	N11	N10	N9	N14.4	N18
15-Mar	N8	N8	N8	NNE8	NNE7	NNE8	N7	N6	N6	N5	N5	NNW4	NNW4	NW6	NW4	NNW3	NW6	NNE11	NNE11	N11	NNE13	N13	N10	N10	N7.3	N13
16-Mar	N8	N11	NNE12	N9	N11	N11	NNE8	NNE10	NNE14	N13	N14	N14	NNE11	NNE13	NNE15	NNE14	N12	NNW5	W4	W5	NE4	NE3	WNW2	SW3	N8.5	NNE15
17-Mar	SW4	SW5	W5	WNW6	WNW4	W4	SW6	SW6	S4	WSW3	WNW11	NW10	WNW12	NW12	NW11	NW9	WNW10	NW10	NW9	NW3	SW2	SSW5	SSW6	SSW7	WNW5.2	WNW12
18-Mar	SSW7	WSW6	WSW6	SW7	SW7	W6	WSW4	W5	NNW9	NNW8	N5	SSE6	SSE8	SE9	SSE10	S8	S4	N2	N5	N7	N7	N8	N9	N7	W1.3	SSE10
19-Mar	NNE6	N6	N7	N8	N8	N8	N7	NNE11	NNE13	NNE9	NNE9	NNE8	NNE8	N8	N9	N11	N12	N14	N14	N14	NNE12	NNE12	NNE11	N11	N9.8	N14
20-Mar	NNE11	N9	N8	N7	NNE7	N6	N7	NNE9	NNE10	N9	N9	N10	N12	N15	N17	NNE17	N18	N18	N17	NNE19	NNE17	NNE15	NNE14	NNE16	NNE12.3	NNE19
21-Mar	NNE15	NNE15	NNE15	NNE15	NNE14	NNE15	NNE15	NNE15	NNE15	NNE14	N13	N13	N16	N14	NNE16	NNE17	NNE14	NNE14	NNE13	NNE13	NNE10	NNE8	NNE9	NNE8	NNE13.5	NNE17
22-Mar	N6	N6	N7	N6	N7	N7	N6	N4	NE1	NNE5	N5	NNW2	NNW3	SSW9	SSW6	N2	NNW5	NNW4	N4	N6	N5	N5	N6	NNE5	N3.7	SSW9
23-Mar	NNE4	NNE4	N5	N5	N7	N7	N8	NNE10	NNE11	NNE10	NNE10	NNE11	NNE13	NNE14	NNE13	NNE12	NNE11	NNE10	NNE8	NE8	NNE5	N5	N6	NNW6	NNE8.3	NNE14
24-Mar	N5	N7	N7	N7	N6	NNE7	N7	N7	N6	N8	N9	N9	NNE8	N6	NNW6	NNE5	NNE6	NE6	NNE5	N6	N6	NNW7	NNW7	NNW6	N6.4	N9
25-Mar	NNW3	N3	WNW2	SSW3	S6	S5	S6	S8	S9	S10	S7	SE5	ESE6	ESE4	NNE3	SE2	NE4	N2	NE3	N1	NW6	NW6	NNW6	NNW7	S1.1	S10
26-Mar	NW4	NNW5	NW4	NNW4	N5	NNW5	NW6	WNW2	NNW3	NW5	NNW4	N5	NE6	E7	E9	ESE9	SSE10	SE8	SE4	S4	AF	WNW2	NNE2	AF	NE1.1	SSE10
27-Mar	S5	SSW7	SSW7	SSW6	SSW6	SW5	AF	W2	NW3	SSW7	SSW5	NNW7	NNW7	WNW1	SSE10	ESE11	SE11	SE10	SE9	SE10	SSE11	SSE10	SSE6	SW5	SSE4.5	SSE11
28-Mar	SSW7	S9	S8	SSW8	SSW9	S10	S9	S10	S15	S13	S14	S11	S9	W7	WNW10	W11	W15	WNW12	WNW10	W9	W8	SW8	SW9	SW9	SW7.6	W15
29-Mar	SW9	WSW12	SW13	SW13	SW11	SW12	SW11	SSW9	S10	S9	SE6	SE1	ENE9	ENE9	ENE9	NE6	ENE6	E6	ESE4	ESE1	NNW4	N5	NNW5	NW5	SSW2.4	SW13
30-Mar	WSW3	NW5	WNW4	W4	WNW7	NNW6	NW6	N5	NW6	NW5	NW3	NW7	NNW25	NNW19	NNW19	NNW18	NNE16	NE17	NNE18	N14	NNW18	N19	N18	N15	NNW10.1	NNW25
31-Mar	N15	NNE12	NNE11	N9	NNW9	NNW9	NNE6	NE6	NE5	ENE4	ENE5	ESE5	ESE6	ESE9	ESE10	ESE9	SE7	SSE6	SSE8	S5	SSW5	S7	SSE6	S7	ENE2.6	N15
	N3.7	N3.5	N3.3	N3.1	NNW3.2	N3.2	N3.0	N3.1	N3.7	N3.9	N4.5	N5.0	NNE5.9	N5.6	NNE5.0	NNE5.2	NNE5.8	NNE6.1	NNE6.0	NNE6.1	N6.2	N5.5	N5.3	N4.9	Diurnal Average	
	NNE15	NNE15	NNE15	NNE15	N17	N17	N16	N17	N18	NNE18	NNE18	NNE16	NNW25	NNW19	NNW19	NNW18	N18	N18	N18	NNE19	NNW18	N19	N18	NNE16	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 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 7 km/h on Mar 30 12:00

Minimum Value: 1 km/h on Mar 17 22:00

Percentiles: P_1 = 1 P_{10} = 1 Q_1 = 1 Median = 2 Q_3 = 3 P_{90} = 4 P_{99} = 5

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2	2	2
2-Mar	1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	2	1	1	2
3-Mar	2	2	2	2	2	2	2	2	2	3	3	3	3	4	4	3	4	3	3	3	3	2	1	2	4
4-Mar	1	1	2	1	1	1	1	1	1	1	1	2	2	2	2	3	2	2	1	1	2	1	2	1	3
5-Mar	2	2	2	1	1	1	2	2	2	1	2	3	4	4	4	3	4	4	4	4	3	3	3	3	4
6-Mar	2	2	2	2	3	3	2	3	3	3	3	3	3	3	3	4	4	3	4	4	4	3	3	3	4
7-Mar	3	3	3	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	1	1	3
8-Mar	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	2	1	2	2	2
9-Mar	2	2	2	2	2	2	2	1	1	1	2	1	1	2	1	2	2	2	AF	2	1	AF	1	AF	2
10-Mar	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	3	3	3	2	2	1	1	1	3
11-Mar	1	1	2	2	2	2	2	2	2	2	1	2	2	2	1	2	2	1	1	1	2	1	2	2	2
12-Mar	1	AF	1	2	2	2	2	1	1	1	2	2	2	3	3	2	2	2	2	1	1	1	1	1	3
13-Mar	1	1	1	1	1	1	1	2	2	3	2	3	2	3	4	4	4	4	4	4	3	6	4	4	6
14-Mar	3	4	3	4	4	4	4	4	4	5	4	4	4	4	4	4	3	3	4	3	3	3	2	2	5
15-Mar	2	2	2	2	2	2	2	1	2	1	1	1	1	1	2	1	1	3	3	3	3	3	2	3	3
16-Mar	2	2	3	2	3	3	2	3	3	3	4	3	3	3	4	3	3	2	2	2	3	1	1	1	4
17-Mar	1	1	1	1	1	1	1	1	1	2	3	4	3	2	3	2	2	2	2	1	1	1	1	1	4
18-Mar	2	1	2	1	2	2	1	1	2	2	2	3	2	2	3	2	2	2	1	1	1	2	2	1	3
19-Mar	1	1	2	2	2	2	2	3	3	2	2	2	2	2	2	3	3	3	3	3	3	3	2	3	3
20-Mar	3	2	1	1	1	1	1	3	2	2	2	2	3	4	4	4	4	4	4	4	4	4	3	4	4
21-Mar	4	4	4	4	3	4	4	4	4	3	3	3	4	3	4	4	4	3	3	3	2	2	2	2	4
22-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
23-Mar	1	2	1	1	1	1	2	3	3	3	2	3	3	3	3	3	3	3	2	1	3	1	1	1	3
24-Mar	2	1	1	1	1	1	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	1	2
25-Mar	2	1	1	1	1	1	1	2	2	2	2	1	2	1	1	1	2	1	1	2	1	1	1	1	2
26-Mar	2	1	1	2	1	1	1	2	1	1	1	1	2	2	3	2	3	3	1	1	AF	1	1	AF	3
27-Mar	1	1	1	1	1	2	AF	1	1	3	2	1	1	4	3	3	3	3	3	2	3	3	1	1	4
28-Mar	1	1	1	1	2	2	2	2	3	3	3	3	2	4	3	4	4	3	2	2	2	1	1	2	4
29-Mar	1	3	3	2	2	2	3	2	2	2	2	2	3	2	2	1	2	1	1	1	1	1	1	1	3
30-Mar	1	1	2	1	1	1	1	1	1	2	1	7	6	6	6	6	6	4	5	4	5	5	5	4	7
31-Mar	4	3	3	2	3	2	2	2	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	4
	4	4	4	4	4	4	4	4	4	5	4	7	6	6	6	6	6	4	5	4	5	6	5	4	
	Diurnal Maximum																								

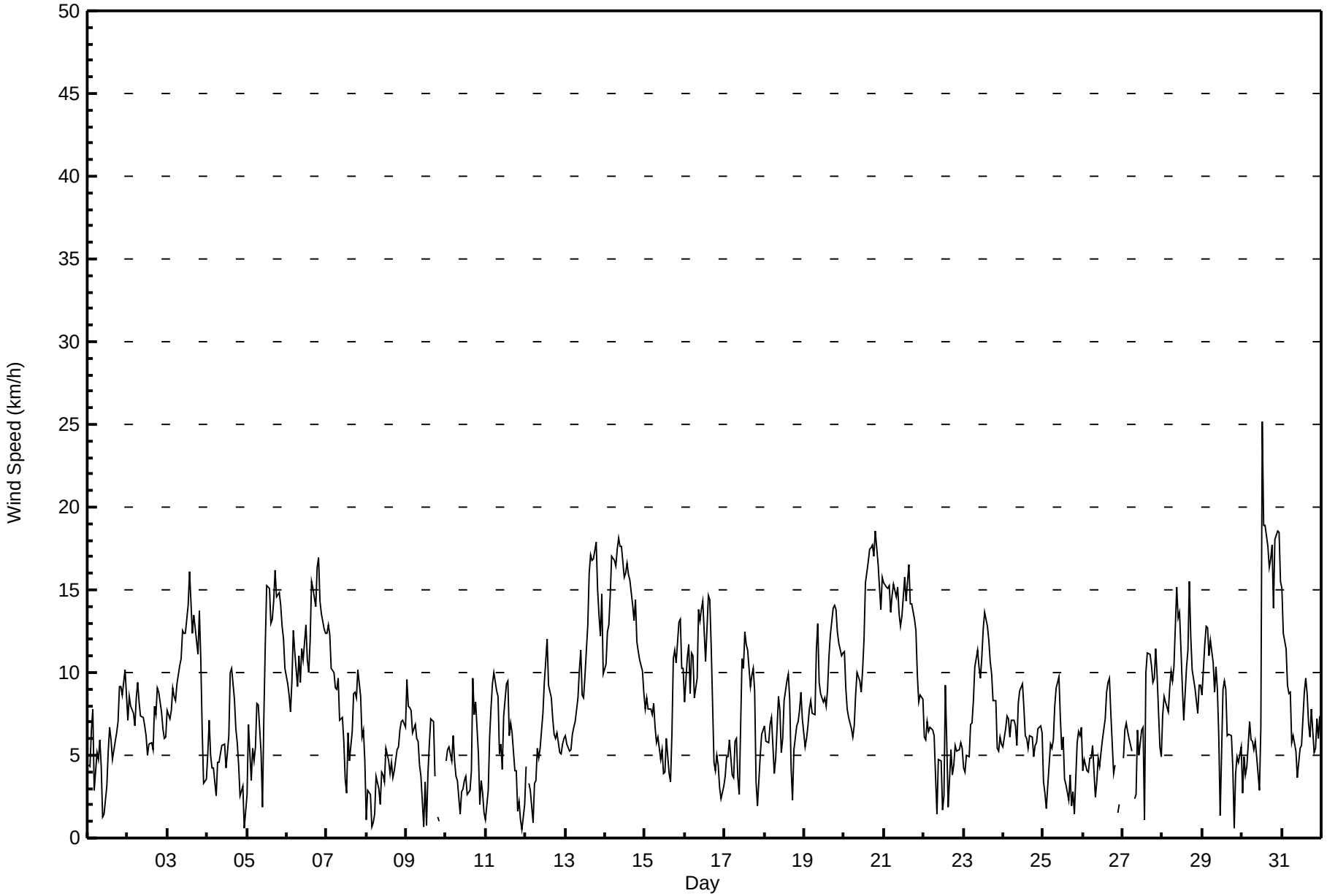
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

CNRL Horizon - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	219	29.72	29.72
6 - 11	372	50.47	80.19
12 - 19	145	19.67	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: 737

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

CNRL Horizon - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	36	19	10	7	4	6	9	6	15	24	10	5	12	8	15	33	219
6 - 11	94	115	10	5	5	10	11	15	25	20	14	3	6	11	13	15	372
12 - 19	51	76	3	0	0	0	0	0	3	0	3	1	1	2	1	4	145
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	181	210	23	12	9	16	20	21	43	44	27	9	19	21	29	53	737

Total Number of Valid Hours: 737

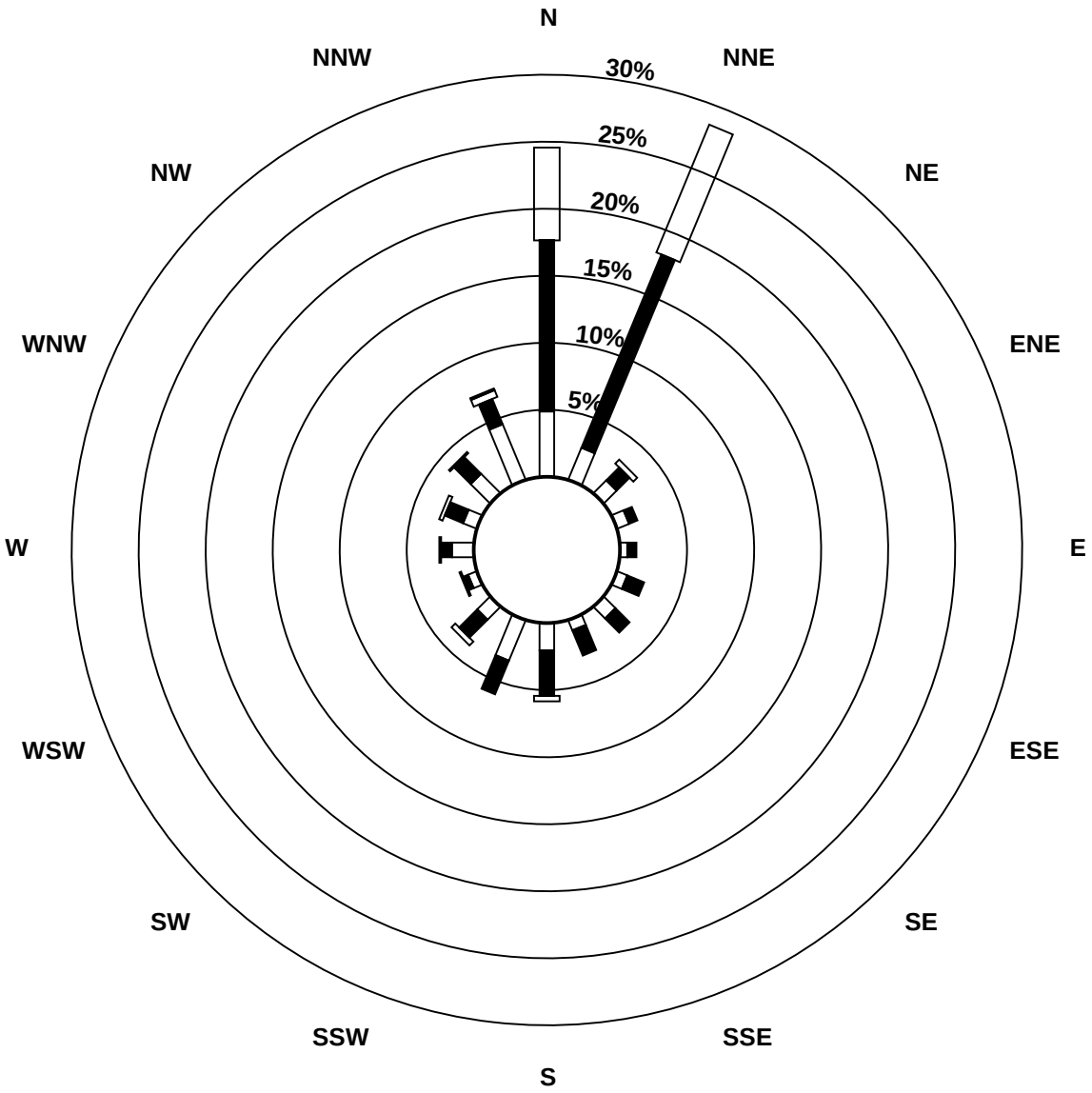
Total Number of Hours: 744

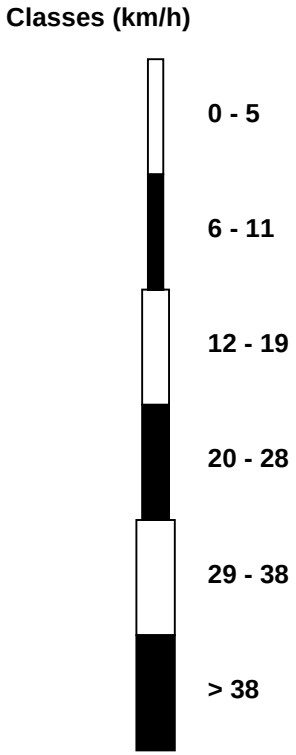
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Wind Speed (WS) - km/h

CNRL Horizon (AMS 15)





Total Number of Valid Hours: 737

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

CNRL Horizon - March 2016

Direction of Maximum Speed: 339 deg on Mar 30 13:00
Direction of Maximum Daily Speed Average: 8.8 deg on Mar 14

Direction of Minimum Speed: 334 deg on Mar 11 23:00

Direction of Minimum Daily Speed Average: 1.1 deg on Mar 26

Monthly Average Direction: 307.2 deg

Hours in Service:	744
Hours of Data:	737
Hours of Missing Data:	7
Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	208	189	203	188	178	193	193	192	205	159	345	10	335	2	18	21	29	39	17	15	9	7	16	10	12.0
2-Mar	16	17	19	18	15	19	17	14	17	30	20	23	26	15	29	17	32	15	16	22	18	21	13	12	19.1
3-Mar	5	14	4	2	6	26	20	15	7	8	12	12	15	15	21	25	30	18	21	15	19	20	349	1	14.9
4-Mar	36	26	42	81	83	160	207	188	170	190	191	188	139	144	170	150	128	115	94	77	78	128	201	267	134.5
5-Mar	222	199	192	197	212	205	183	168	178	163	2	22	22	17	21	31	28	37	32	24	19	18	15	17	27.3
6-Mar	16	16	18	17	14	22	14	11	15	16	28	45	48	17	1	11	15	16	15	15	16	12	18	17	17.8
7-Mar	17	17	16	17	18	17	18	17	8	357	8	1	344	165	154	71	43	17	15	15	30	51	46	58	23.8
8-Mar	114	183	206	264	218	193	133	169	54	203	328	340	340	342	341	317	0	360	25	27	24	19	21	26	6.6
9-Mar	18	22	8	11	18	25	19	14	6	341	338	305	200	169	161	174	178	191	AF	73	124	AF	253	AF	22.9
10-Mar	198	199	191	193	202	206	201	204	273	358	33	31	62	29	89	125	110	117	130	119	97	341	331	325	142.8
11-Mar	317	239	205	227	234	236	239	230	266	22	324	296	290	299	297	271	293	278	227	284	34	173	334	329	265.9
12-Mar	34	AF	328	350	224	32	345	8	13	1	9	20	8	4	360	2	5	27	99	31	7	357	6	10	10.8
13-Mar	1	330	350	356	4	357	4	18	17	18	24	17	3	358	357	358	358	357	353	356	357	353	352	1	0.4
14-Mar	3	8	9	5	0	7	7	8	11	13	13	18	22	10	9	4	13	6	6	8	6	7	8	2	8.8
15-Mar	360	1	11	17	22	12	11	0	3	358	359	346	333	315	319	343	312	16	17	11	17	6	7	6	3.4
16-Mar	5	8	12	6	356	355	15	20	15	9	3	4	16	19	13	12	7	347	263	262	48	36	288	223	6.3
17-Mar	215	230	277	293	302	260	218	235	186	255	297	325	300	311	307	311	298	310	308	304	218	212	210	205	282.7
18-Mar	208	239	237	226	231	268	253	281	328	337	4	160	151	137	164	175	185	360	350	1	2	354	354	5	270.9
19-Mar	14	7	6	3	9	2	8	17	16	20	29	22	26	360	359	3	10	9	7	11	12	14	12	9	11.0
20-Mar	15	11	11	8	13	6	11	17	14	11	3	6	8	5	7	14	11	8	10	13	17	16	17	19	11.6
21-Mar	18	19	17	18	21	19	18	16	18	19	9	6	8	8	13	18	21	18	16	19	27	19	21	14	16.4
22-Mar	2	358	357	350	355	5	11	357	54	25	11	335	340	195	195	358	329	344	354	1	6	8	10	19	358.6
23-Mar	25	12	11	2	5	7	11	26	17	19	28	20	20	31	33	28	30	28	31	37	19	4	4	348	20.8
24-Mar	3	349	357	4	5	19	1	358	358	11	357	7	19	4	348	22	31	51	26	6	358	343	341	335	4.3
25-Mar	331	6	285	206	179	171	179	187	186	186	170	137	119	116	15	127	50	2	50	9	305	324	335	342	175.8
26-Mar	315	332	311	330	356	335	307	284	328	319	346	353	54	90	96	122	159	140	145	173	AF	285	29	AF	34.2
27-Mar	169	200	200	196	199	217	AF	279	316	203	205	330	335	293	161	121	124	126	137	144	150	160	153	215	166.1
28-Mar	203	186	186	195	194	191	190	187	180	184	182	180	185	269	285	269	277	287	286	271	267	235	230	228	220.7
29-Mar	219	237	230	230	227	218	221	205	181	179	143	133	61	61	60	55	57	84	117	122	338	2	332	307	199.8
30-Mar	246	307	297	278	286	334	322	350	325	324	319	315	339	343	328	327	15	45	24	6	345	8	5	5	348.2
31-Mar	10	20	13	1	335	341	33	38	39	61	73	114	116	118	120	120	126	155	167	185	201	189	168	187	77.1
	3.9	356.2	352.7	349.2	348.4	353.2	358.3	5.6	9.3	9.9	9.1	10.0	12.1	10.9	11.3	17.7	20.5	22.1	18.8	14.1	11.0	8.1	4.5	0.9	
	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 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 102 deg on Mar 9 13:00

Minimum Value: 6 deg on Mar 24 23:00

Percentiles: P_1 = 8 P_{10} = 13 Q_1 = 17 Median = 19 Q_3 = 23 P_{90} = 37 P_{99} = 83

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	14	12	13	16	52	9	9	11	17	83	83	70	20	25	26	25	20	12	15	17	16	18	18	15	83
2-Mar	15	16	17	16	19	19	17	17	18	18	19	25	35	28	22	24	16	17	18	16	19	17	19	15	35
3-Mar	16	17	17	18	17	17	17	19	18	18	18	18	19	19	19	18	17	17	19	18	17	25	26	44	44
4-Mar	13	15	16	10	12	36	10	20	19	21	26	36	44	36	20	23	21	23	19	18	35	31	80	54	80
5-Mar	41	24	28	15	18	19	14	14	25	76	22	19	19	19	20	16	18	15	16	18	18	18	16	17	76
6-Mar	18	17	16	17	18	18	18	20	18	19	20	17	25	24	20	20	18	18	17	17	18	19	19	16	25
7-Mar	18	18	18	17	16	15	16	16	16	18	21	32	76	20	23	28	13	17	18	19	16	21	14	18	76
8-Mar	49	31	23	42	56	48	27	25	57	35	47	31	17	24	22	15	26	21	15	15	17	18	17	17	57
9-Mar	16	23	18	18	19	18	17	18	24	25	91	58	102	48	30	26	18	18	AF	61	76	AF	29	AF	102
10-Mar	12	11	12	14	16	17	18	22	37	23	26	24	24	36	44	27	20	20	20	23	78	21	11	17	78
11-Mar	50	14	18	19	13	14	14	16	40	23	25	22	21	15	27	25	17	26	13	57	61	78	96	72	96
12-Mar	18	AF	17	31	79	49	35	18	20	23	19	20	17	18	20	19	21	31	25	16	13	10	14	11	79
13-Mar	14	9	17	22	17	16	17	17	19	18	22	19	18	19	21	20	19	21	19	19	20	18	18	20	22
14-Mar	19	21	19	19	20	19	19	19	17	20	19	19	20	19	20	20	19	20	20	18	18	18	18	17	21
15-Mar	18	17	19	17	18	18	19	19	20	27	24	37	31	17	33	33	18	18	19	19	18	19	18	18	37
16-Mar	19	19	17	18	19	19	20	18	18	19	19	19	19	19	18	17	18	26	22	54	54	20	45	10	54
17-Mar	17	16	18	16	41	34	15	15	32	68	33	22	17	20	17	19	15	13	15	34	52	14	13	13	68
18-Mar	15	14	25	14	16	19	27	24	17	19	27	47	28	24	22	24	62	58	18	12	12	15	14	13	62
19-Mar	13	14	12	16	15	16	17	16	19	21	19	21	22	22	22	19	20	18	19	19	17	19	17	19	22
20-Mar	17	15	15	13	13	14	17	18	17	17	19	21	21	19	19	19	19	20	19	19	20	17	18	19	21
21-Mar	17	18	18	17	18	18	18	18	18	18	19	20	20	19	19	19	19	17	17	18	18	16	17	15	20
22-Mar	14	14	14	12	10	9	9	21	65	29	40	93	83	28	45	89	20	21	19	17	20	17	15	19	93
23-Mar	17	19	18	16	17	13	19	19	19	20	21	20	21	18	18	19	21	18	18	10	21	18	12	10	21
24-Mar	28	8	11	12	12	8	12	19	25	21	20	22	27	31	28	28	20	17	26	13	16	12	6	14	31
25-Mar	42	29	28	25	10	9	10	14	14	13	19	27	25	39	60	51	40	72	29	59	12	20	14	18	72
26-Mar	21	17	31	23	19	8	19	47	28	24	39	34	44	38	31	24	19	20	20	8	AF	28	45	AF	47
27-Mar	20	11	8	11	7	15	AF	25	35	32	71	23	19	84	23	22	22	19	16	14	16	14	14	34	84
28-Mar	10	9	8	8	11	11	13	15	13	17	15	17	21	61	20	25	20	18	15	15	14	13	10	12	61
29-Mar	13	20	15	14	14	13	15	18	14	17	29	97	36	17	19	28	25	21	28	86	20	17	31	12	97
30-Mar	40	30	24	25	10	22	21	21	22	31	50	81	22	23	19	16	34	14	18	24	21	20	21	21	81
31-Mar	19	19	20	20	21	22	26	22	31	70	54	44	45	26	18	20	22	27	16	23	11	12	15	11	70
	50	31	31	42	79	49	35	47	65	83	91	97	102	84	60	89	62	72	29	86	78	78	96	72	
	Diurnal Maximum																								

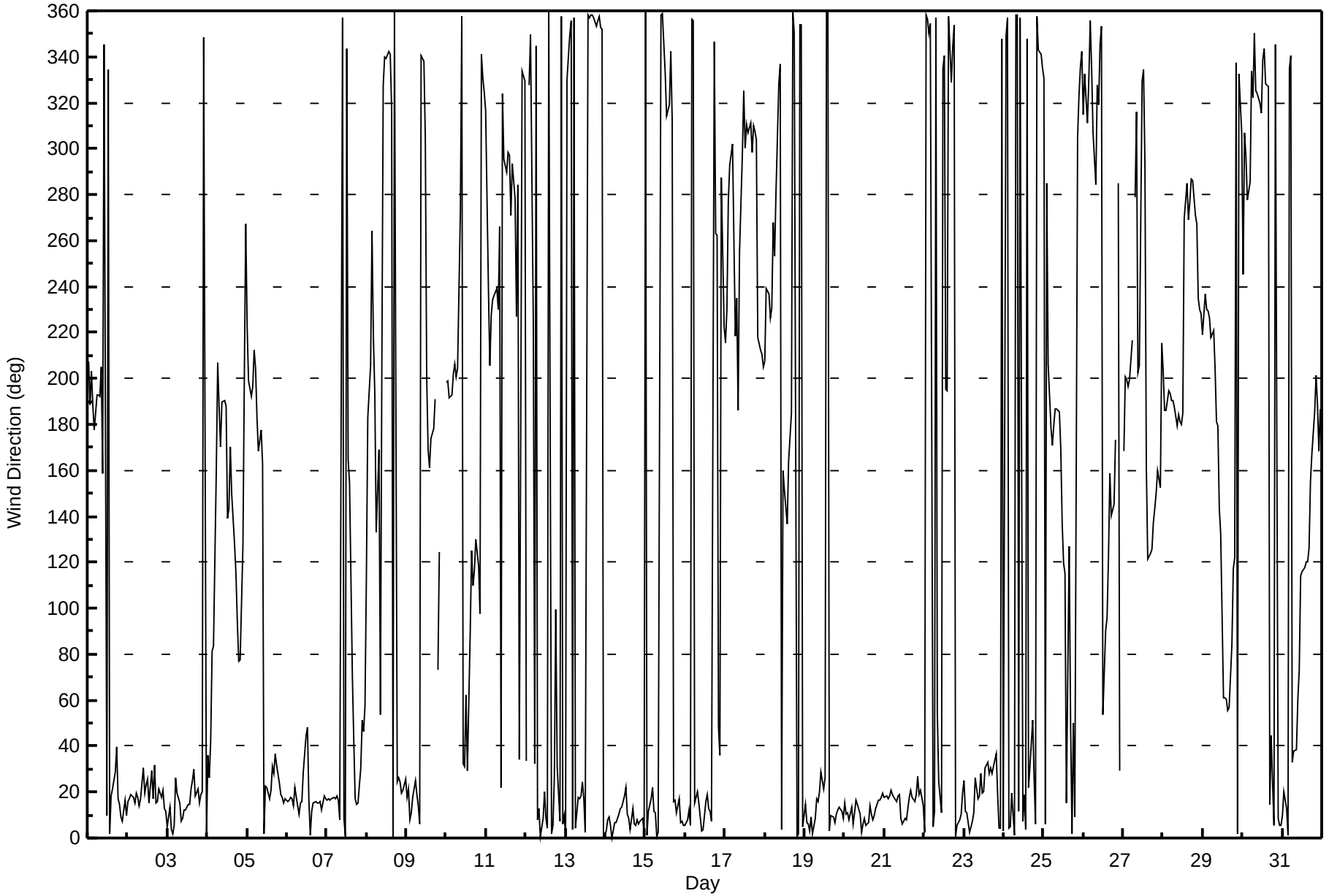
AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

CNRL Horizon - March 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	March 15, 2016	Last Calibration	February 10, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:10	End Time (MST)	14:20
Gas Cert Reference	S0002486	Station temp.	21 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
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.	2580

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-622	-622
Analyzer IP address	192.168.1.43		Lamp voltage	855	855
Calculated slope	1.001651	0.997015	Chamber temp	45.0	45.0
Calculated intercept	0.023638	-0.388728	Pressure	716.7	708.1
Analyzer Background	18.3	18.6	Flow	0.432	0.431
Analyzer Coefficient	0.990	1.003	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	0.0	----
as found span	5000	81.5	815.0	802.6	1.015
calibrator zero	5000	0.0	0.0	0.5	----
high point	5000	81.5	815.0	817.4	0.997
second point	5000	40.6	406.0	409.1	0.992
third point	5000	20.2	202.0	201.9	1.000
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	81.5	815.0	817.1	0.997
				Average Correction Factor	0.997

Corrected As found	802.6	Previous response	813.6	% change	1.4%

Notes:

Sample inlet filter replaced after as founds. Slightly adjusted span.

Calibration Performed By: Asad Hidayat

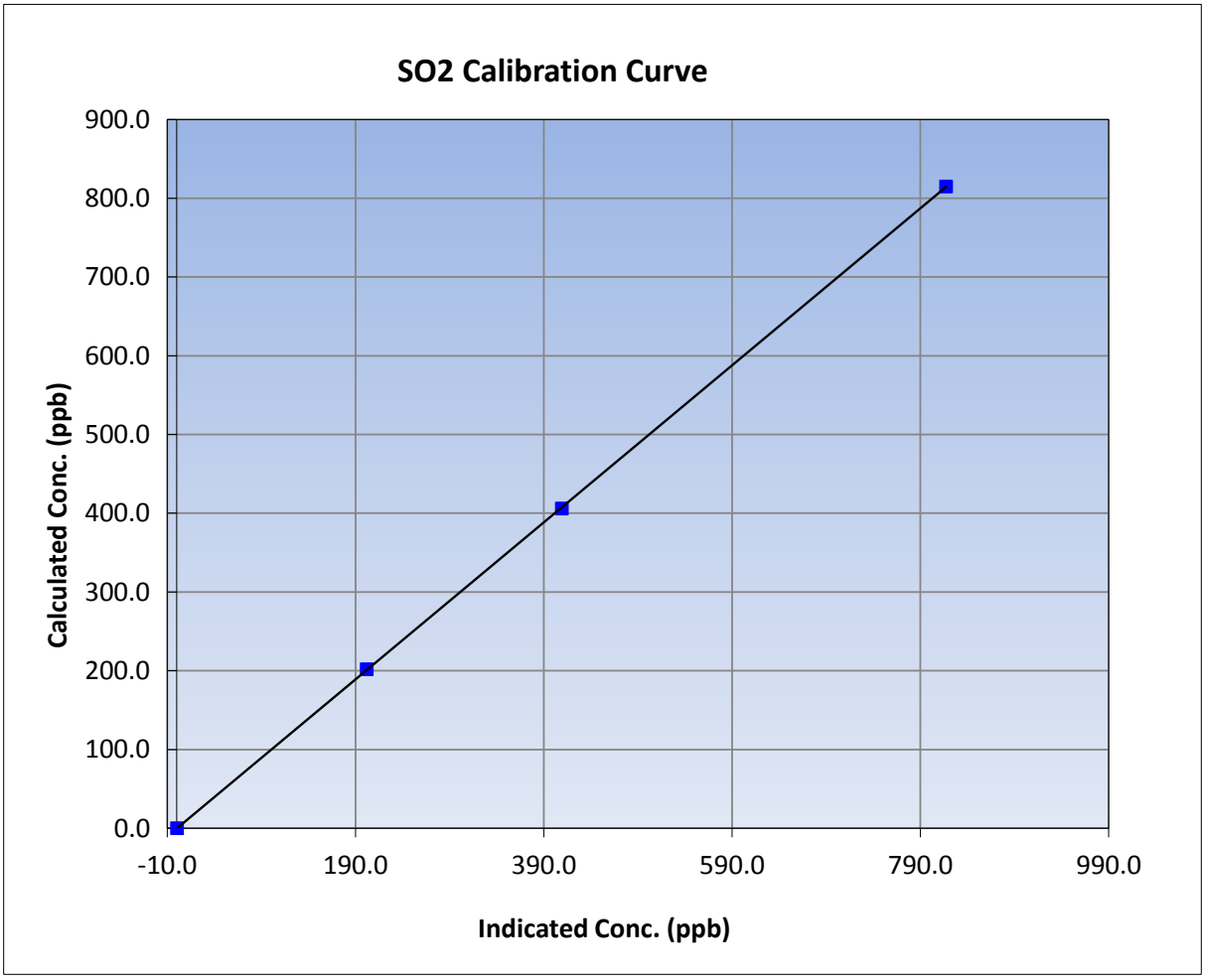
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

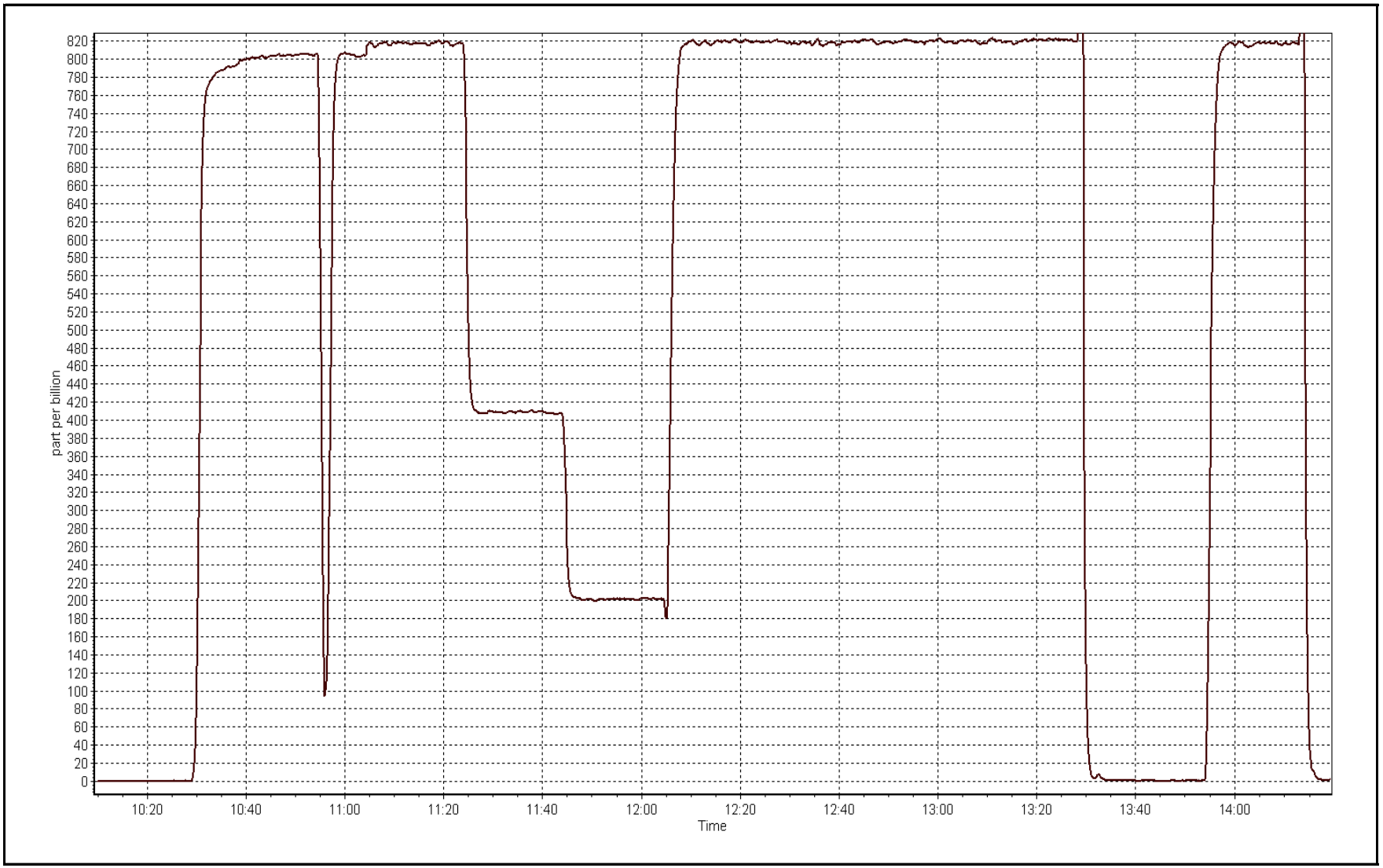
Calibration Date	March 15, 2016	Previous Calibration	February 10, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:10	End Time (MST)	14:20
Analyzer make	Thermo 43i	Analyzer serial #	710321322

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999990
815.0	817.4	0.9971		
406.0	409.1	0.9925	Slope	0.997015
202.0	201.9	1.0003		
			Intercept	-0.388728



SO2 Calibration Plot Date: March 15, 2016



Wood Buffalo Environmental Association
Repair TRS Calibration Report

Station Information

Calibration Date	March 14, 2016	Last Calibration	February 8, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	11:35	End Time (MST)	15:15
Gas Cert Reference	LL82745	Station temp.	22 Deg C
Cal Gas Concentration	9.6 ppm	Cal Gas Exp Date	2/22/16
Calibrator Make/Model	API T700	Serial Number	1223
Dil air Make/Model	API 701	Serial Number	1005
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S0002486 26/Sep/17

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-694	-694
Analyzer IP address	192.168.1.44		Lamp voltage	988	986
Calculated slope	0.993795	0.985537	Chamber temp	45	45
Calculated intercept	0.084340	0.014363	Pressure	690.5	676.7
Analyzer Background	1.47	1.47	Flow	0.437	0.427
Analyzer Coefficient	1.076	1.06	Intensity	91	91
			Converter temp.	809	809

Analyzer make/model	Thermo 43i TLE	Analyzer serial #	1150840012
Converter make/model	CDN-101	Converter serial #	461

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	41.4	79.5	78.4	1.014
SO2 scrubber check	5000	19.8	198.0	0.9	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	41.4	79.5	80.7	0.985
second point	5000	20.6	39.6	40.1	0.986
third point	5000	10.2	19.6	19.8	0.991
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	41.4	79.5	81.0	0.982
				Average Correction Factor	0.987

Corrected As found	78.5	Previous response	79.9	% change	1.8%

Notes:

Sample inlet filter replaced after as founds. Performed as scrubber check after as founds with existing beads; test results were 0.98 ppb. Replaced Sox scrubber beads and scrubber test was around 0.88 ppb. Adjust span.

Calibration Performed By: Asad Hidayat

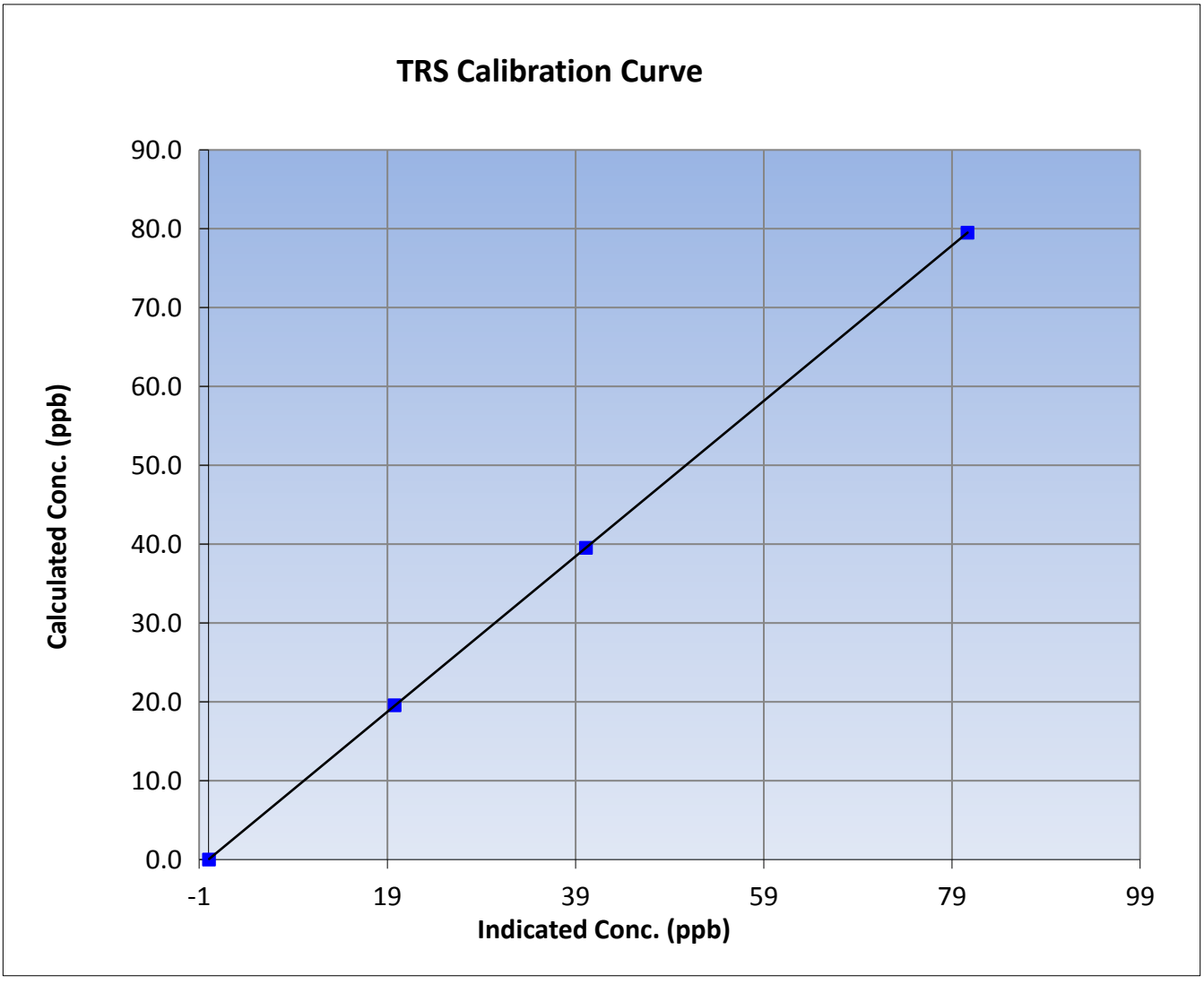
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

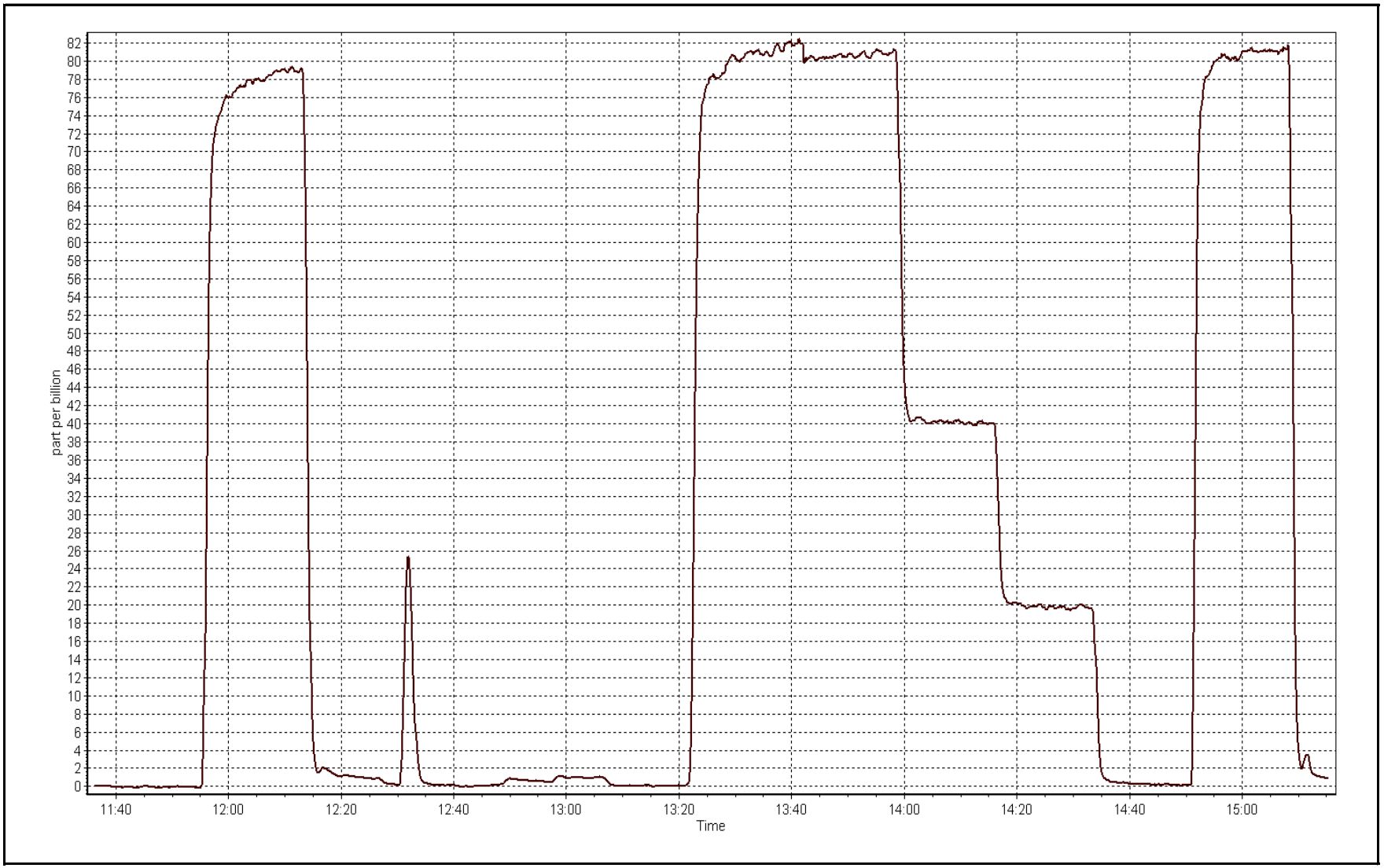
Calibration Date	March 14, 2016	Previous Calibration	February 8, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	11:35	End Time (MST)	15:15
Analyzer make	Thermo 43i TLE	Analyzer serial #	1150840012

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999996
79.5	80.7	0.9853		
39.6	40.1	0.9863	Slope	0.985537
19.6	19.8	0.9906		
			Intercept	0.014363



TRS Calibration Plot Date: March 14, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	March-15-16	Last Calibration	February-10-16
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:10	End Time (MST)	14:18
Gas Cert Reference	S0002486	Cal Gas Expiry Date	26-Sep-17
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	2580

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 50 ppm		Sample Pressure	8.7	8.7
Analyzer IP address	192.168.1.51		Air or Bypass Press	38.0	38.0
Calculated slope	1.001544	1.006812	Fuel Pressure	26.3	26.3
Calculated intercept	-0.058949	-0.043058	Analyzer Coeff	3.1	3.1
			Analyzer BKG	1.850	1.850

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	0.05	----
as found span	5000	81.5	17.06	17.09	0.998
calibrator zero	5000	0.0	0.00	0.05	----
high point	5000	81.5	17.06	16.99	1.004
second point	5000	40.6	8.50	8.49	1.001
third point	5000	20.2	4.23	4.23	1.000
as left zero	5000	0.0	0.00	0.05	----
as left span	5000	81.5	17.06	17.14	0.995
				Average Correction Factor	1.002

Corrected As found	17.04	Previous response	17.09	% change	0.3%

Notes:

Sample inlet filter replaced after as founds. No adjustments.

Calibration Performed By: Asad Hidayat

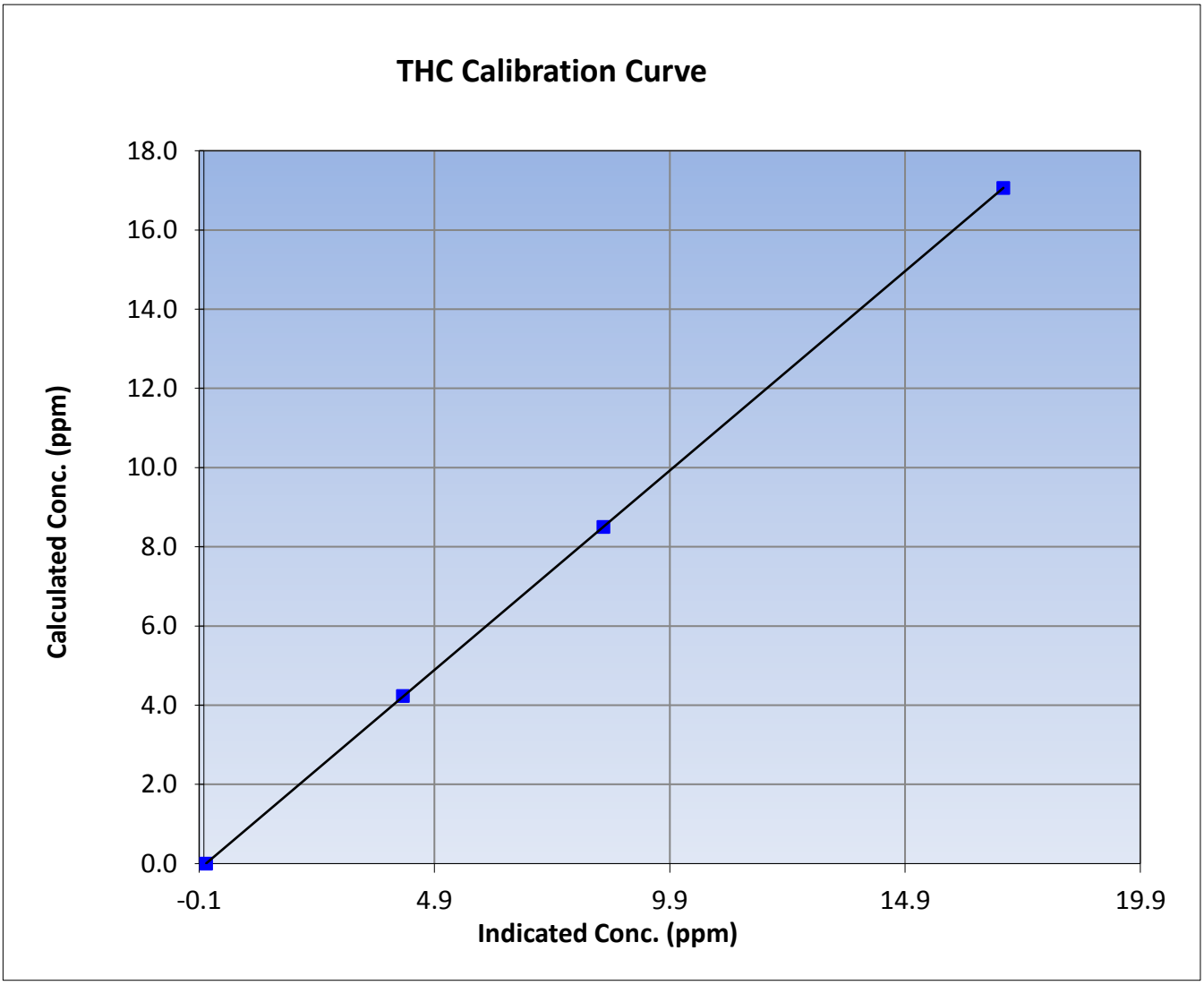
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

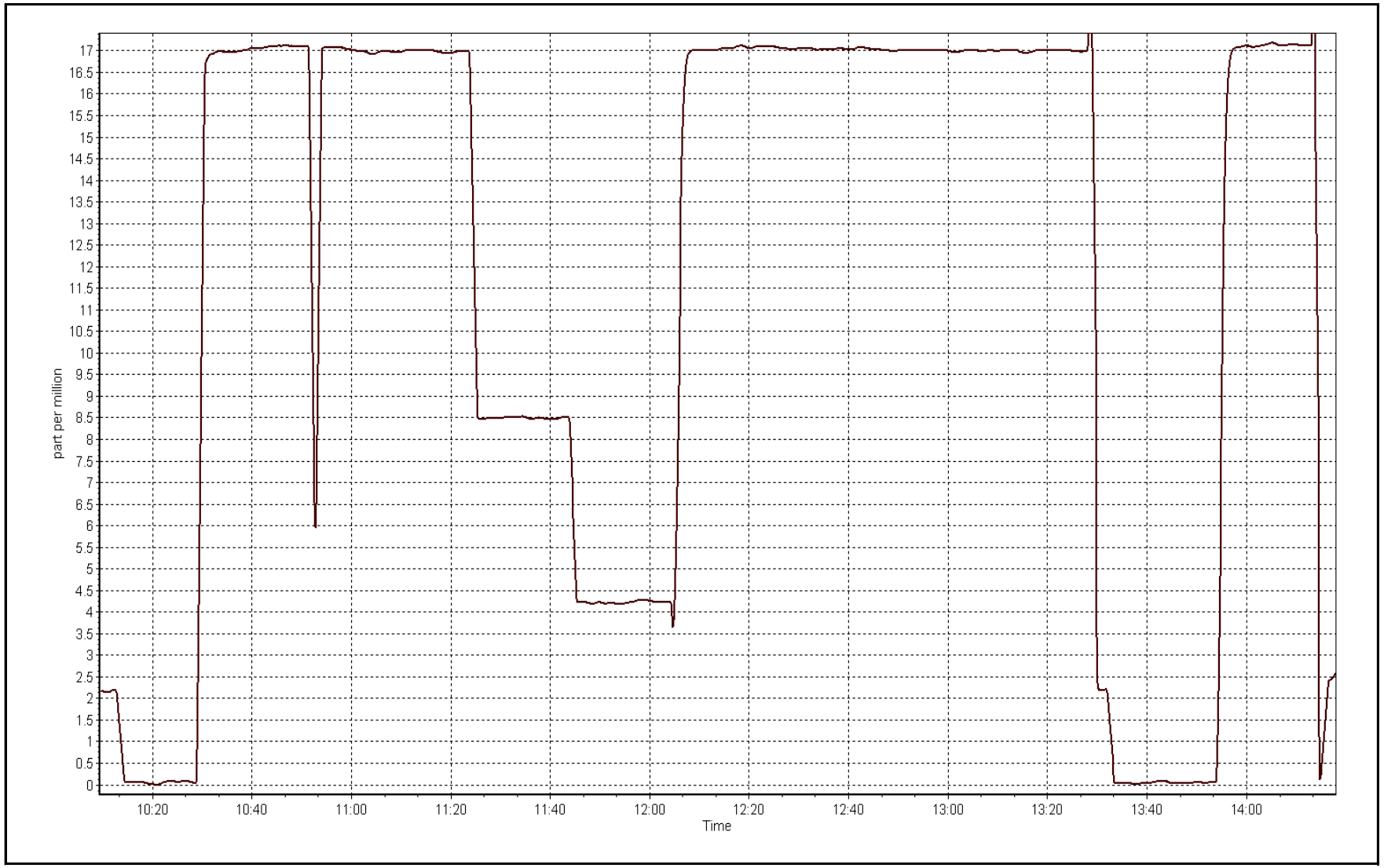
Calibration Date	March 15, 2016	Previous Calibration	February 10, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:10	End Time (MST)	14:18
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.05	----	Correlation Coefficient	0.999998
17.06	16.99	1.0042		
8.50	8.49	1.0011	Slope	1.006812
4.23	4.23	0.9997		
			Intercept	-0.043058



THC Calibration Plot Date: March 15, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 15, 2016	Previous Calibration	February 10, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:10	End Time (MST)	14:20
NO Cal Gas Conc	48.9 ppm	Gas Cert Reference	S0002486
NOx Cal Gas Conc	48.9 ppm	Cal Gas Expiry Date	26/09/2017
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.	2580

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.995237	0.995420	1.001867
	Data Offset	-0.237748	-0.060559	-1.288427
Current Calibration	Data Slope	0.995441	0.994933	0.996958
	Data Offset	-0.351542	-0.041879	-0.369293

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	710321429

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.010		0.982	
NOX coefficient	1.005		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	11.4		11.3	
NOX bkgrnd	11.5		11.3	
Chamber Temp	50	Deg C	49.9	Deg C
Moly Temp	325.3	Deg C	325.3	Deg C
PMT voltage	-778.9	V	-779.2	V
PMT Temp	-2.7	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	178.5	mmHg	174.3	mmHg
R Cell Press Nox	179.1	mmHg	174	mmHg
NO sample flow	0.630	lpm	0.630	lpm
Nox sample Flow	0.632	lpm	0.628	lpm

Notes:

Sample inlet filter replaced after as founds. Adjusted span.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 15, 2016 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	-0.2	-0.2	0.0	----	----
as found span	5000	81.5	797.1	797.1	0.0	834.2	829.1	5.0	0.9555	0.9614
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
high point	5000	81.5	797.1	797.1	0.0	800.2	800.5	-0.3	0.9961	0.9957
second point	5000	40.6	397.1	397.1	0.0	401.2	400.8	0.4	0.9897	0.9906
third point	5000	20.2	197.6	197.6	0.0	198.2	197.8	0.4	0.9966	0.9988
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
as left span	5000	81.5	797.1	439.3	357.8	799.3	437.6	361.7	0.9972	1.0038
								Average Correction Factor	0.9941	0.9950

Corrcted As found NO_X= 834.4 NO= 829.3 Percent Change NO_X= -4.0% NO= -3.4%

Previous Response NO_X= 801.1 NO= 800.8

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 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	801.7	799.9	0.0	0.9943	0.9965	----	----
1st NO2 (300)	439.3	360.6	801.2	439.3	362.0	0.9948	----	0.9961	100.4%
2nd NO2 (200)	554.7	245.2	800.8	554.7	246.0	0.9954	----	0.9965	100.4%
3rd NO2 (100)	672.0	127.9	801.4	672.0	129.3	0.9946	----	0.9888	101.1%
2nd NO ref point		0.0	800.1	797.6	2.6	0.9962	0.9994	----	----
				Average Correction Factor		0.9952		0.9938	100.6%

Calibration Performed By: Asad Hidayat

Wood Buffalo Environmental Association

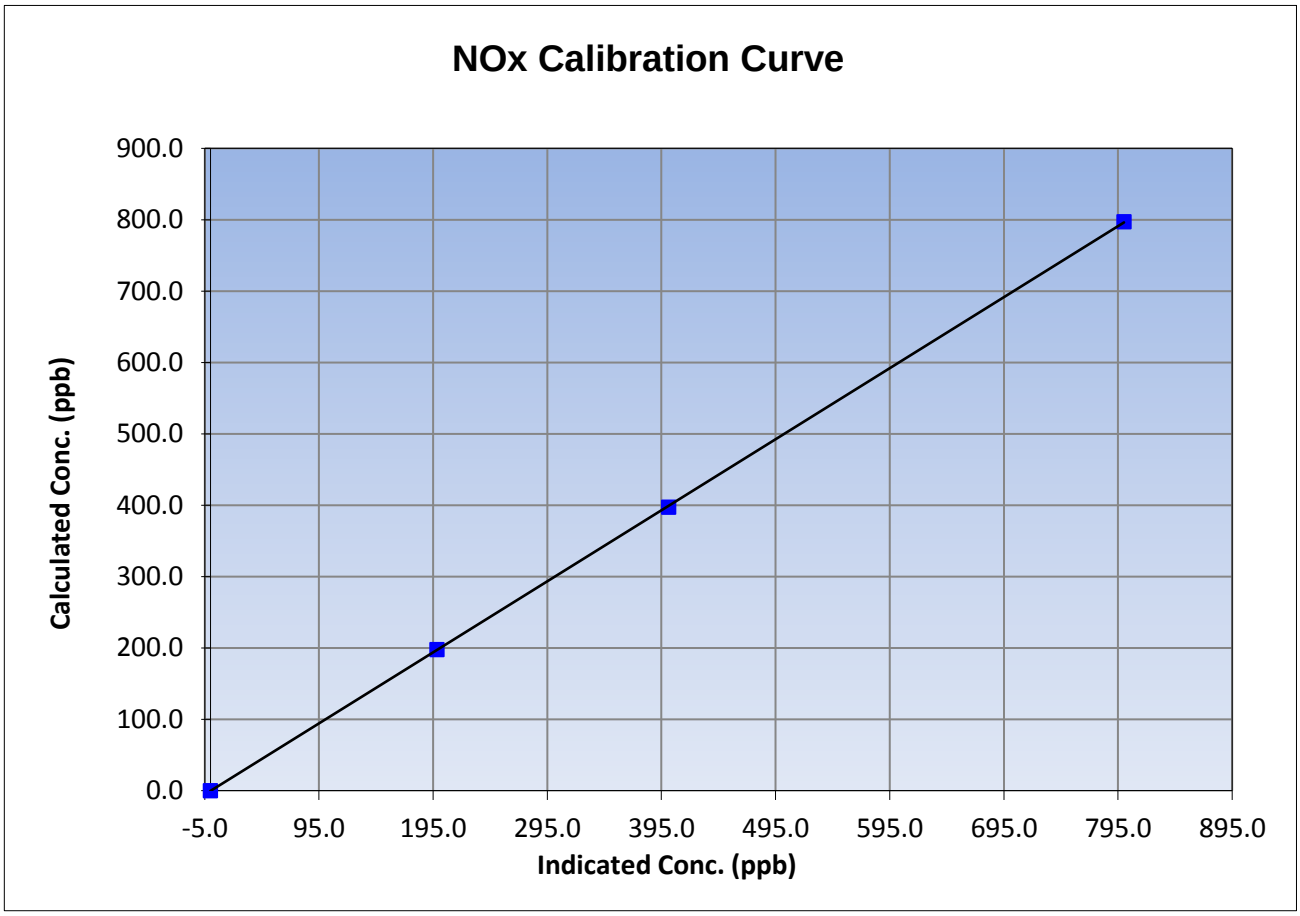
NO_X Calibration Summary

Station Information

Calibration Date	March 15, 2016	Previous Calibration	February 10, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:10	End Time (MST)	14:20
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	----	Correlation Coefficient	0.999985
797.1	800.2	0.9961		
397.1	401.2	0.9897	Slope	0.995441
197.6	198.2	0.9966		
			Intercept	-0.351542



Wood Buffalo Environmental Association

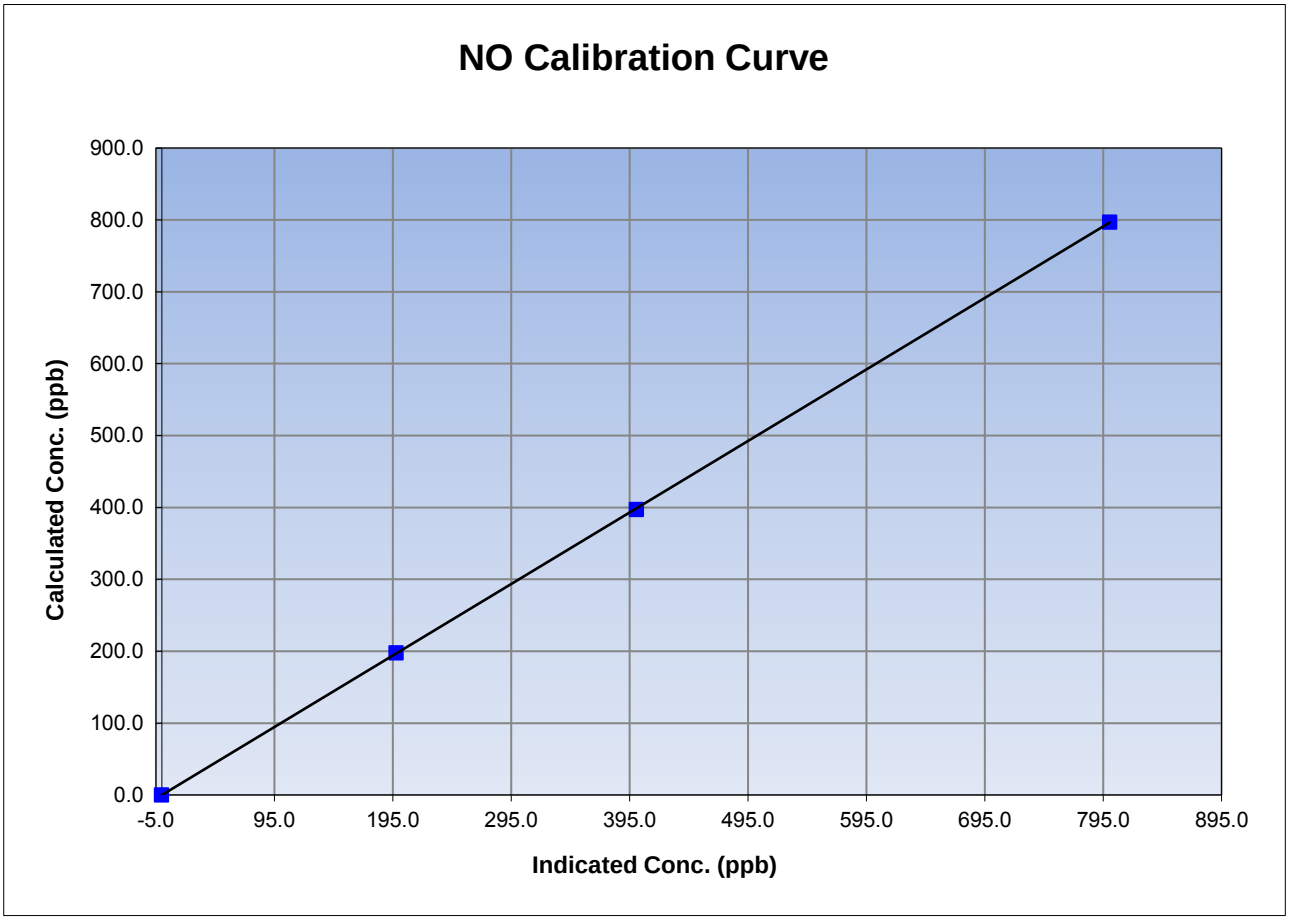
NO Calibration Summary

Station Information

Calibration Date	March 15, 2016	Previous Calibration	February 10, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:10	End Time (MST)	14:20
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	0.999989
797.1	800.5	0.9957		
397.1	400.8	0.9906	Slope	0.994933
197.6	197.8	0.9988		
			Intercept	-0.041879



Wood Buffalo Environmental Association

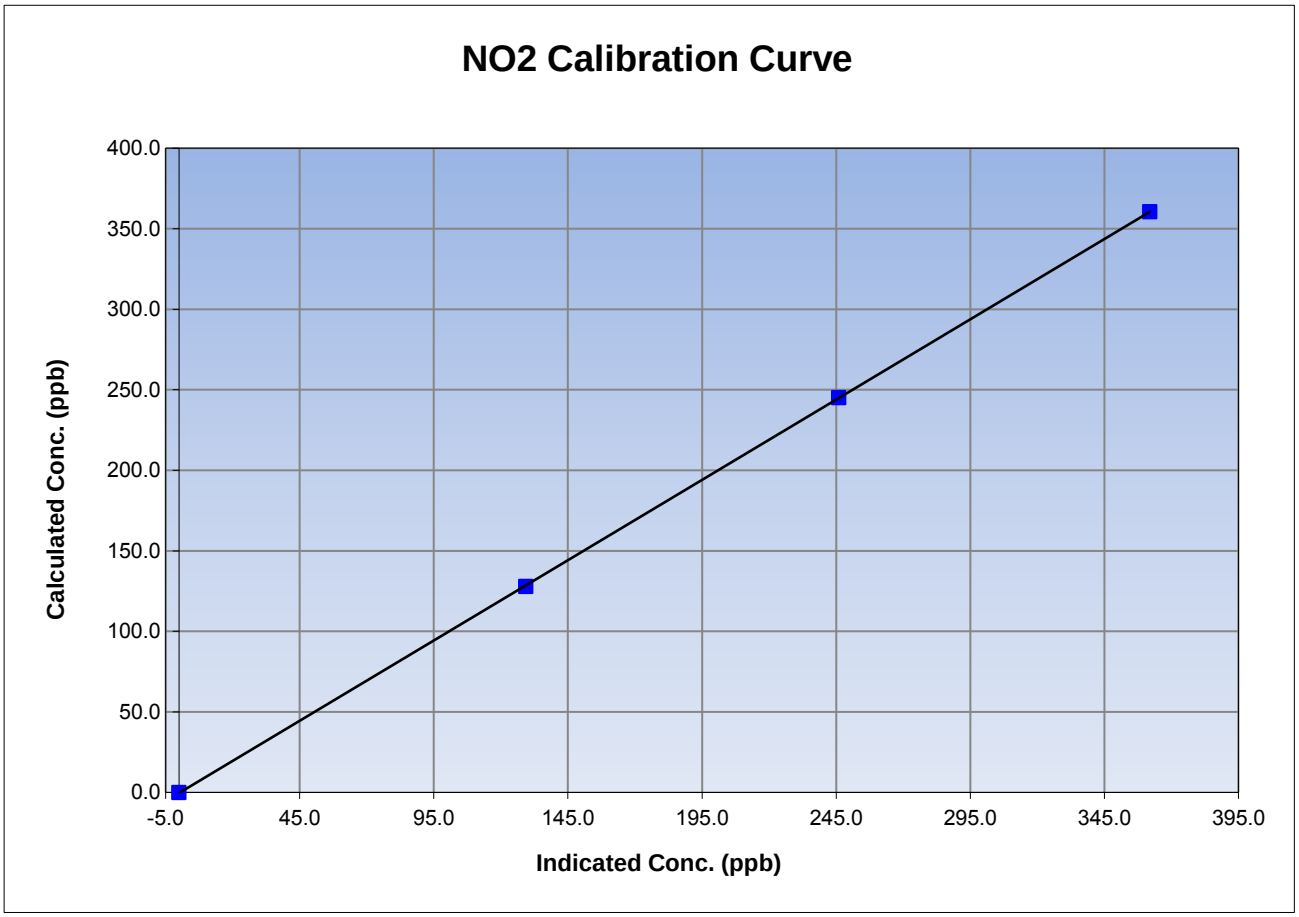
NO_2 Calibration Summary

Station Information

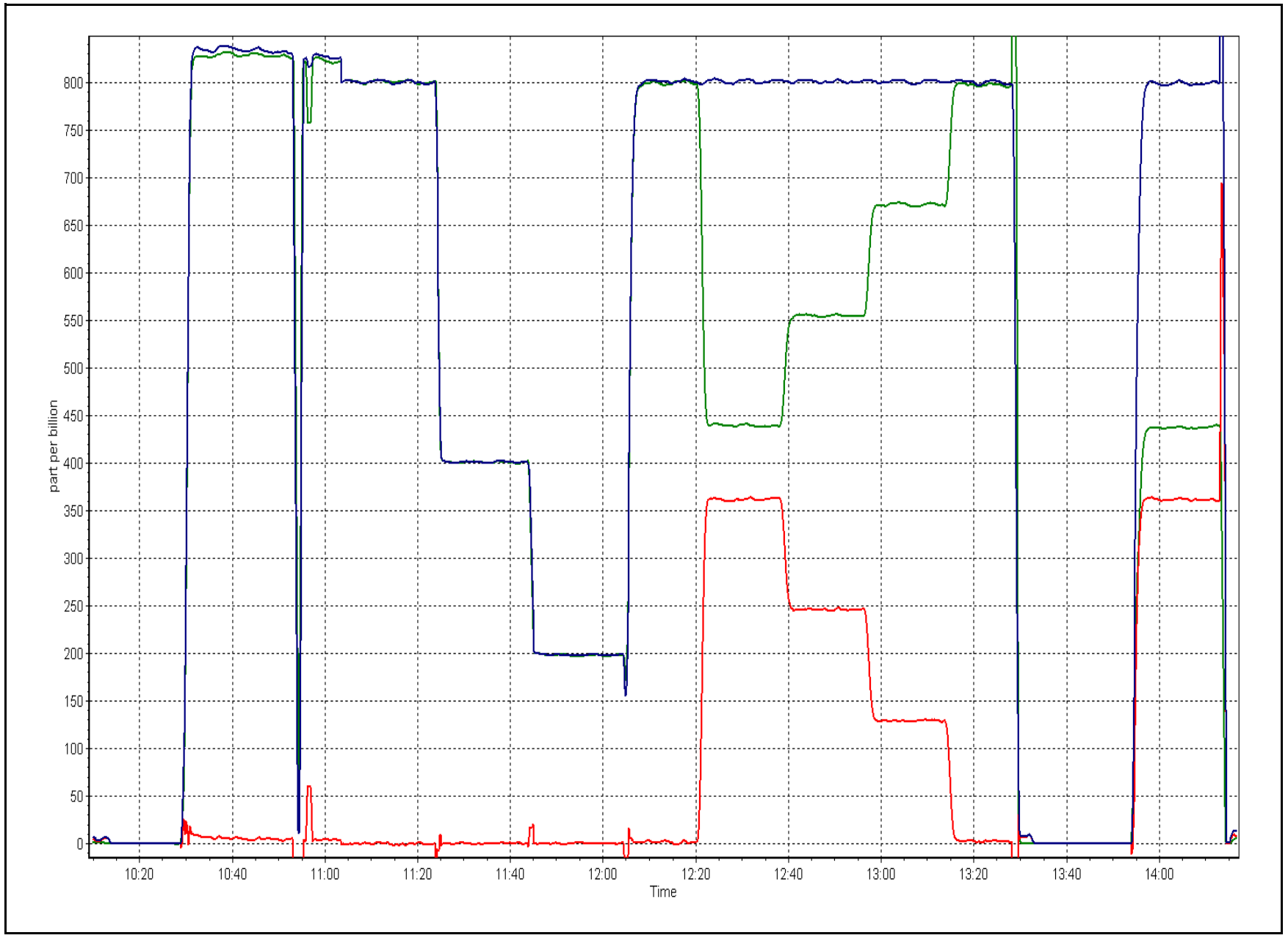
Calibration Date	March 15, 2016	Previous Calibration	February 10, 2016
Station Number	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:10	End Time (MST)	14:20
Analyzer make	Thermo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999991
360.6	362.0	0.9961		
245.2	246.0	0.9965	Slope	0.996958
127.9	129.3	0.9888		
			Intercept	-0.369293



NOX Calibration Plot Date: March 15, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	March 15, 2016	Previous Calibration:	February 10, 2016
Station Name:	CNRL Horizon	Station Number:	AMS 15
Start Time (MST):	11:05	End Time (MST):	12:30
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1451

SHARP INFORMATION

Particulate Fraction:	PM2.5
Make/Model:	Thermo / SHARP 5030
Serial Number	E-2020
C_{14} Source SN:	7409
Confirmation of Time settings:	Yes ☑ No ☐
Paremeters Checked:	T1 ☑ T2 ☑ T3 ☑ T4 ☑ P3 ☑ Main Flow ☑ Beta ☑ Neph ☑

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-5.0	-4.7	0.3	-5.0
T2	19.0	na	na	19.0
T3	20.0	na	na	20.0
T4	16.0	na	na	16.0
RH (%)	16.0	na	na	16.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	973	973.3	0.3	973

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
998	998	0	998	998

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	166		166
Neph	0.9		0.9
C14	8.9		8.9
Indicated Concentration (ug/m3)	**0.6**	**NO**	**0.6**
Offset 1			
Offset 2			

Leak Check (Quarterly)

Leak Check Date:	January 13, 2016	Previous Leak Check Date:	August 26, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.61	0.06
*Flow with adaptor (LPM):	16.55	

**Note - do not attach adaptor without shutting off the pump first*

Mass Foil Calibration (Annualy)

Foil Calibration Date:	June 22, 2015	Previous Foil Calibration:	NA
Zeroed?:	Yes		
Foil Mass:	1507	Mass foil set S/N:	2022
Previous Correction Factor:	7091		
New Correction Factor:	7029		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	15/03/2016
Pump	Good	09/06/2014
Filter Tape	Good	09/06/2014
Mass Foil Cal Set	Good	06/22/2015
HEPA filter	Good	15/03/2016

NOTES:

No adjustments. Cleaned cyclone head.

Calibration Performed By: **Asad Hidayat**

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 16
SHELL MUSKEG RIVER
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
MARCH 2016

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	701	37	43	99.19	29	0	10	0
THC (ppm) Average	683	37	61	96.77	11.8	-	3.9	-
NO2 (ppb) Average	701	37	43	99.19	43	0	30	-
NO (ppb) Average	701	37	43	99.19	132	-	28	-
NOX (ppb) Average	701	37	43	99.19	175	-	54	-
PM2.5 (ug/m3) Average	741	2	3	99.87	34.5	-	18.3	0
Temperature 2 m (C) Average	742	0	2	99.73	11.5	-	4.4	-
Relative Humidity (%) Average	742	0	2	99.73	97	-	89	-
Barometric Pressure (inHg) Average	743	0	1	99.87	29.3	-	29.3	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	30	-	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 - SHELL MUSKEG RIVER (AMS 16)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	701	1.4	3	-	0	0	0	0	1	3	29
THC (ppm) Average	683	2.67	0.8	-	2	2.1	2.3	2.5	2.7	3.3	11.8
NO2 (ppb) Average	701	13.4	9	-	0	2	7	12	19	27	43
NO (ppb) Average	701	9.9	16	-	0	0	0	5	12	24	132
NOX (ppb) Average	701	23.3	23	-	0	3	8	17	29	50	175
PM2.5 (ug/m3) Average	741	5.14	4.6	-	0.1	1.6	2.3	3.4	6.4	10.7	34.5
Temperature 2 m (C) Average	742	-4.25	5.3	-	-20.9	-10.3	-7.8	-4.7	-0.9	2.1	11.5
Relative Humidity (%) Average	742	72.3	16	-	23	49	62	75	85	90	97
Barometric Pressure (inHg) Average	743	28.83	0.2	-	28.2	28.5	28.7	28.8	29	29.1	29.3
Wind Speed 10 m (km/h) Average	743	10.4	6	-	0	4	5	9	15	19	30
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, NO2	16 Mar 2016 10:00	16 Mar 2016 15:00	6	Maintenance - station wiring cleanup
THC	16 Mar 2016 11:00	16 Mar 2016 15:00	5	Maintenance - station wiring cleanup
THC	16 Mar 2016 16:00	17 Mar 2016 10:00	19	Analyzer Failure - sample solenoid functioning incorrectly
PM2.5	16 Mar 2016 13:00	16 Mar 2016 13:00	1	Maintenance - station wiring cleanup
Temperature/ Relative Humidity	16 Mar 2016 13:00	16 Mar 2016 14:00	2	Maintenance - station wiring cleanup
Barometric Pressure	16 Mar 2016 13:00	16 Mar 2016 13:00	1	Maintenance - station wiring cleanup
Wind Speed, Wind Direction	16 Mar 2016 13:00	16 Mar 2016 13:00	1	Maintenance - station wiring cleanup

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Shell Muskeg River - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 29 ppb on Mar 25 13:00 Maximum Daily Average: 10.0 ppb on Mar 25

Minimum Value: 0 ppb on Mar 25 01:00 Minimum Daily Average: 0.3 ppb on Mar 14
Maximum Diurnal Average: 3.3 ppb at hour 18 Minimum Diurnal Average: 0.5 ppb at hour 5
Monthly Average: 1.4 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 3$ $P_{99} = 19$

Hours in Service:	744
Hours of Data:	701
Hours of Missing Data:	43
Hours of Calibration:	37
Percent Operational Time:	99.2

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	2	Z	2	2	2	3	2	1	1	2	1	2	2	1	4	3	1	1	1	1	1	1	1	1	1.5	4
2-Mar	1	1	Z	1	1	1	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0.5	1
3-Mar	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0.4	1
4-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	1	2	5	3	0	0	0	0	0	0	0	0	0.8	5
5-Mar	0	0	0	0	0	Z	3	8	7	5	2	3	1	1	1	0	0	0	0	0	0	0	0	0	1.5	8
6-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
7-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0.3	1
8-Mar	0	0	Z	0	0	0	0	0	1	4	6	15	11	9	10	9	11	11	6	5	3	2	4	3	4.8	15
9-Mar	1	1	0	Z	0	0	0	0	0	0	0	1	1	1	1	9	15	16	10	4	6	4	3	2	3.4	16
10-Mar	3	2	2	3	Z	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.1	3
11-Mar	1	1	1	1	1	Z	1	1	0	1	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0.6	1
12-Mar	Z	1	1	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
13-Mar	0	Z	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
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	0.3	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	0.3	0
16-Mar	0	0	0	0	Z	0	0	0	0	M	M	M	M	M	M	0	0	0	0	0	0	0	0	0	--	0
17-Mar	0	0	0	0	0	Z	0	0	0	1	C	C	C	C	C	C	0	1	0	0	0	0	0	0	--	1
18-Mar	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	11	19	16	5	2	2	1	1	0	2.8	19
19-Mar	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	1	0.5	1
20-Mar	0	0	Z	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	0	1	1	0	0.4	1
21-Mar	1	1	1	Z	1	1	0	1	1	0	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0.6	1
22-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	5	9	7	5	2	1	1	1	0	0	1.6	9
23-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	0.5	1
24-Mar	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0.4	1
25-Mar	0	Z	0	0	0	0	1	1	1	24	27	22	29	24	21	19	17	17	11	5	3	3	3	2	10.0	29
26-Mar	1	1	Z	1	1	2	2	2	2	1	1	1	1	1	0	0	1	7	4	2	1	2	2	2	1.6	7
27-Mar	1	1	0	Z	0	0	0	0	0	1	1	1	3	4	6	1	1	0	0	0	0	0	0	0	1.0	6
28-Mar	0	0	0	0	Z	0	1	3	4	3	4	5	12	1	1	0	0	0	1	1	0	0	0	0	1.8	12
29-Mar	0	0	0	0	0	Z	0	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0.5	1
30-Mar	Z	0	0	1	0	0	1	0	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0.5	1
31-Mar	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	20	19	9	4	3	3	2	3.1	20
	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.8	0.8	1.6	1.8	2.1	2.4	1.9	2.2	2.5	2.9	3.3	2.2	1.2	1.0	0.8	0.8	0.7	Diurnal Average	
	3	2	2	3	2	3	3	8	7	24	27	22	29	24	21	19	19	20	19	9	6	4	4	3	Diurnal Maximum	

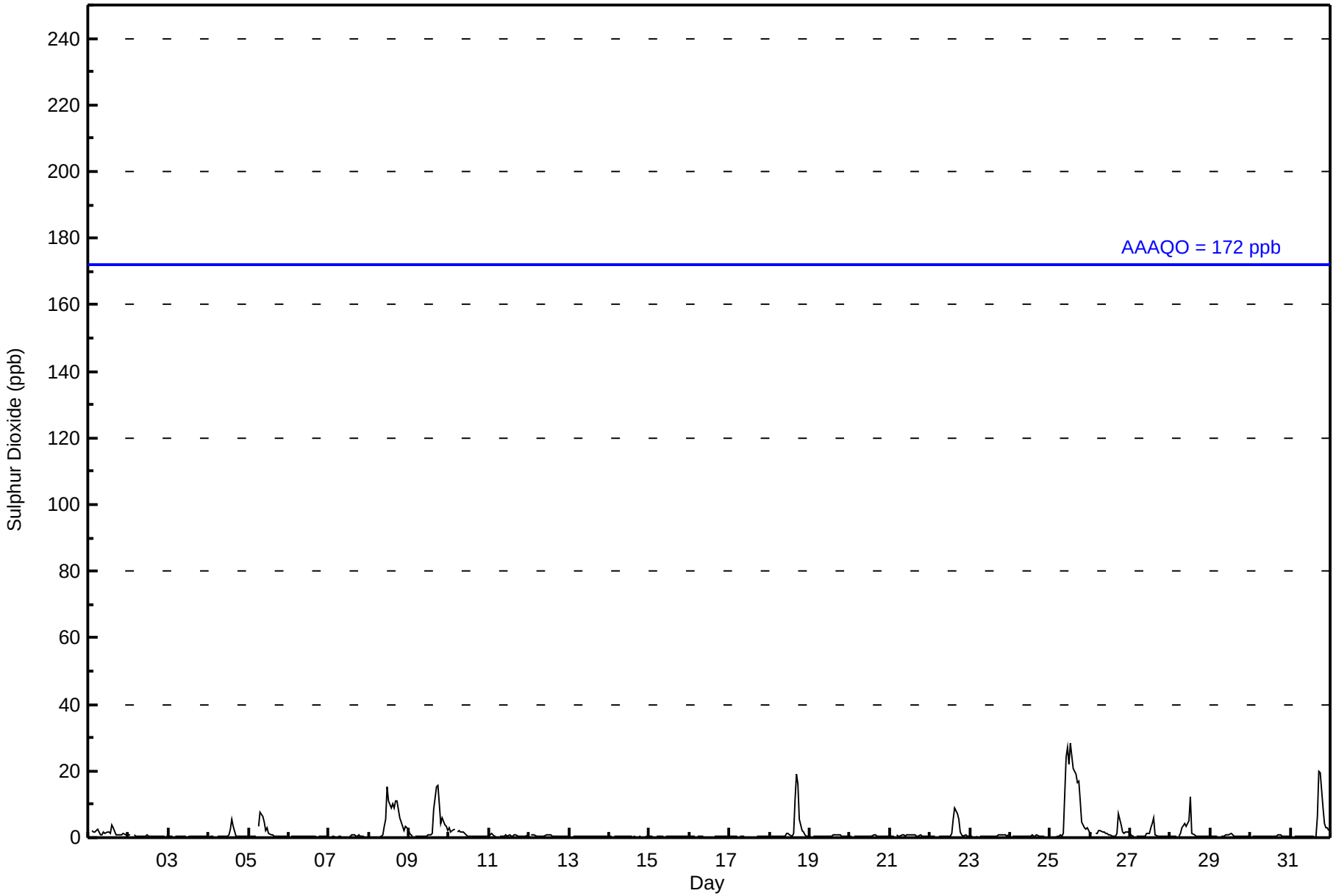
Z - zerospan C - Calibration M - Maintenance
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Shell Muskeg River - March 2016



Sulphur Dioxide (SO_2) - ppb
Shell Muskeg River - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	679	96.86	96.86
11 - 20	16	2.28	99.14
21 - 60	6	0.86	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: 701

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Shell Muskeg River - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	96	138	103	32	18	17	29	32	48	40	26	14	10	18	31	27	679
11 - 20	0	1	1	1	1	0	1	4	2	1	0	0	0	1	3	0	16
21 - 60	0	0	0	0	0	0	0	0	1	3	0	0	0	1	1	0	6
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	139	104	33	19	17	30	36	51	44	26	14	10	20	35	27	701

Total Number of Valid Hours: 701

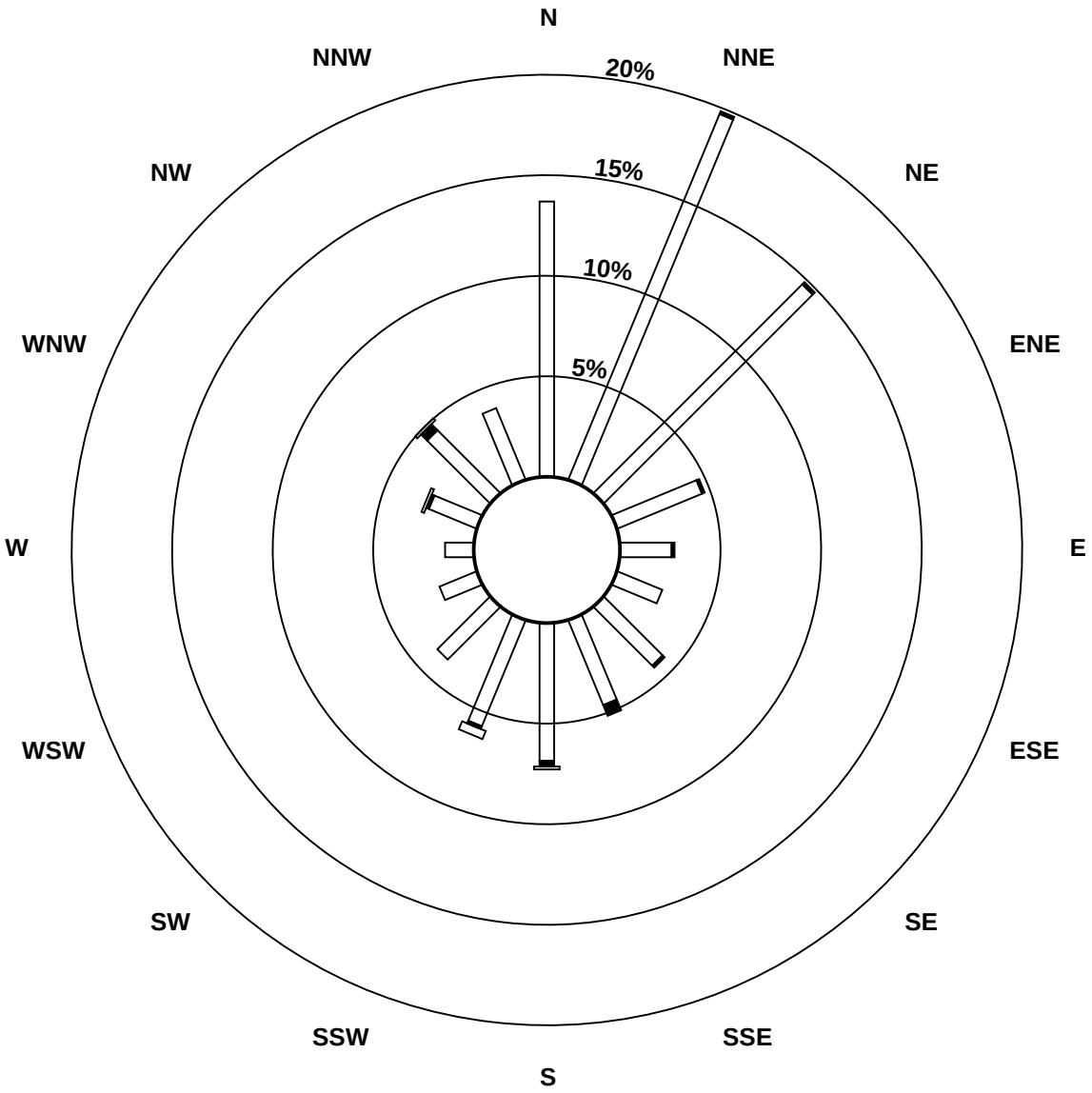
Total Number of Hours: 744

Wood Buffalo Environmental Association

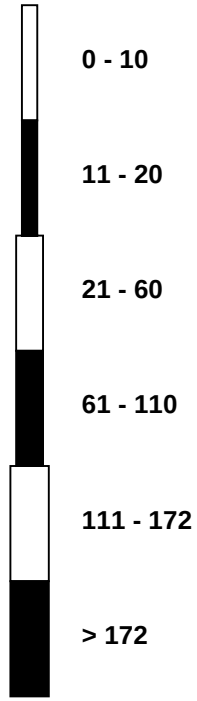
Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Shell Muskeg River (AMS 16)



Classes (ppb)



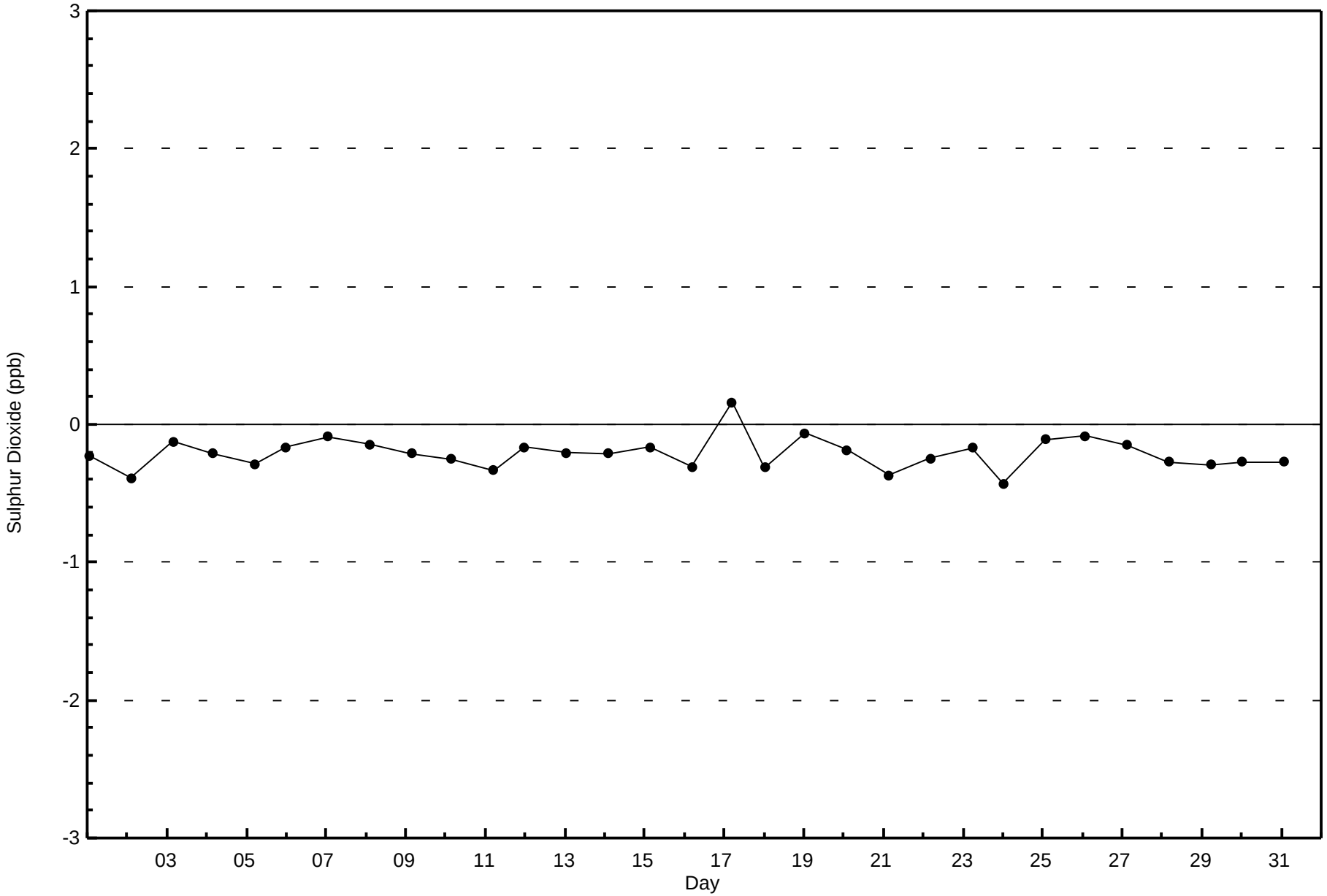
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Shell Muskeg River - March 2016

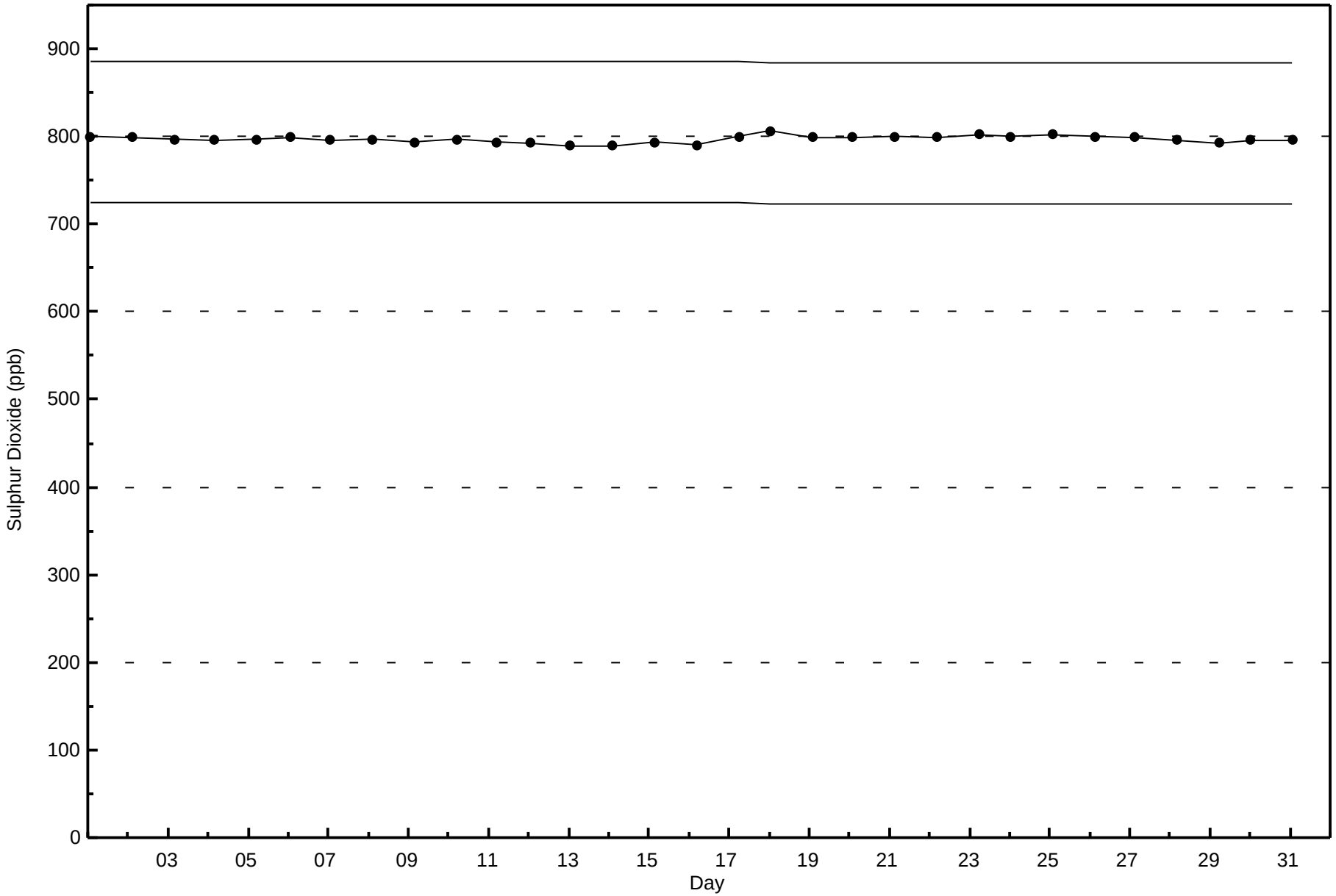


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Shell Muskeg River - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Shell Muskeg River - March 2016

Maximum Value: 11.8 ppm on Mar 24 09:00

Maximum Daily Average: 3.9 ppm on Mar 24

Minimum Value: 2.0 ppm on Mar 4 19:00

Minimum Daily Average: 2.1 ppm on Mar 4

Maximum Diurnal Average: 2.9 ppm at hour 20

Minimum Diurnal Average: 2.6 ppm at hour 5

Monthly Average: 2.67 ppm

Percentiles: P_1 = 2.0 P_{10} = 2.1 Q_1 = 2.3 Median = 2.5 Q_3 = 2.7 P_{90} = 3.3 P_{99} = 7.3

Hours in Service:	744
Hours of Data:	683
Hours of Missing Data:	61
Hours of Calibration:	37
Percent Operational Time:	96.8

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	2.2	Z	2.3	2.3	2.3	2.5	2.6	2.5	2.6	2.6	2.8	3.1	4.4	3.3	3.0	3.0	2.8	2.6	2.6	2.5	2.4	2.5	2.4	2.6	2.7	4.4
2-Mar	2.6	2.5	Z	2.3	2.5	2.4	2.3	2.4	2.5	2.4	2.5	2.4	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.4	2.3	2.2	2.2	2.3	2.4	2.6
3-Mar	2.4	2.4	2.3	Z	2.4	2.2	2.5	2.4	2.8	3.1	2.4	2.4	2.4	2.4	2.2	2.3	2.2	2.4	2.4	2.3	2.4	2.3	2.3	2.3	2.4	3.1
4-Mar	2.1	2.1	2.0	2.1	Z	2.2	2.1	2.2	2.2	2.2	2.1	2.4	2.3	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.1	2.4
5-Mar	2.0	2.0	2.1	2.1	2.2	Z	2.3	2.5	2.4	2.4	3.0	3.3	2.5	2.4	2.4	2.2	2.3	2.4	2.3	2.3	2.4	2.4	2.4	2.4	2.4	3.3
6-Mar	Z	2.6	2.5	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.3	2.4	2.3	2.7	2.7	2.7	2.7	3.0	2.8	2.7	2.7	2.5	2.4	2.6	2.5	3.0
7-Mar	2.5	Z	2.5	2.5	2.5	2.5	2.3	2.4	2.7	2.6	2.4	2.1	2.1	2.1	2.3	2.2	2.3	2.8	2.5	2.4	2.2	2.1	2.2	2.3	2.4	2.8
8-Mar	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.3	2.5	3.1	2.7	3.5	4.2	3.0	3.4	3.1	3.0	2.8	2.5	2.5	2.5	2.3	2.3	2.6	4.2
9-Mar	2.3	2.4	2.5	Z	2.5	2.5	2.4	2.3	2.5	2.6	2.9	3.1	3.6	3.5	2.9	2.4	2.4	2.4	2.6	2.7	2.7	2.7	3.3	3.4	2.7	3.6
10-Mar	3.7	3.4	2.9	3.3	Z	3.7	3.8	3.9	3.5	4.0	3.4	2.7	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.0	2.1	2.3	2.8	4.0
11-Mar	2.6	3.4	2.6	2.4	2.7	Z	2.6	2.3	2.3	2.7	3.1	2.8	2.4	2.5	3.2	2.9	2.9	2.8	2.6	2.6	2.6	2.6	2.5	2.4	2.7	3.4
12-Mar	Z	2.8	2.5	2.4	2.6	2.2	2.7	2.9	3.0	3.5	4.2	3.3	2.5	3.3	2.3	2.7	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.6	4.2
13-Mar	2.3	Z	4.0	3.9	3.3	4.8	4.5	3.3	2.6	2.7	2.7	2.7	2.7	2.6	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	3.0	4.8
14-Mar	2.5	2.5	Z	2.7	2.7	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.6	2.6	2.7	2.5	2.5	2.5	2.5	2.7
15-Mar	2.5	2.4	2.5	Z	2.4	2.4	2.5	2.6	2.5	2.6	2.9	2.8	2.9	2.8	2.6	2.7	2.7	2.8	2.6	2.5	2.8	2.7	2.7	2.7	2.6	2.9
16-Mar	2.9	2.9	2.7	2.9	Z	2.8	2.6	2.6	2.7	C	M	M	M	M	M	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	2.9
17-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	C	C	2.4	2.2	2.2	2.6	2.5	2.6	2.5	2.3	--	2.6
18-Mar	Z	2.4	2.5	2.5	2.4	2.4	2.2	2.4	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.6	2.7	2.7	3.6	3.4	2.5	3.6
19-Mar	3.8	Z	2.8	2.9	2.8	2.5	2.4	2.3	2.6	2.6	2.8	2.8	2.9	2.8	2.8	2.8	2.9	3.0	3.1	3.0	2.7	2.6	2.5	2.8	2.8	3.8
20-Mar	2.7	2.4	Z	2.3	2.6	3.5	3.4	2.3	2.3	2.3	2.6	2.5	2.6	7.4	2.9	3.0	2.3	3.7	2.3	2.2	2.8	2.7	3.1	3.4	2.9	7.4
21-Mar	2.9	4.0	2.6	Z	3.3	3.3	3.0	3.2	3.2	2.5	2.4	2.3	2.6	2.7	3.3	3.0	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.7	4.0
22-Mar	2.2	2.1	2.1	2.1	Z	2.3	2.5	2.3	2.1	2.1	2.0	2.2	2.6	2.4	2.3	2.8	2.9	2.8	2.6	2.4	2.3	2.4	2.4	2.3	2.4	2.9
23-Mar	2.2	2.2	2.2	2.2	2.2	Z	2.7	2.6	2.6	2.6	2.4	2.5	2.5	2.5	2.5	4.4	5.8	7.3	6.4	9.9	4.7	4.0	7.4	4.9	3.9	9.9
24-Mar	Z	4.2	3.5	2.5	2.4	2.8	2.5	2.8	11.8	5.8	3.0	2.5	2.7	2.5	2.7	2.4	5.1	5.7	2.4	7.3	7.5	3.3	2.7	2.6	3.9	11.8
25-Mar	2.6	Z	2.7	2.6	2.3	2.3	2.5	2.6	2.6	2.5	2.3	2.2	2.2	2.3	2.8	3.5	4.0	3.2	3.6	3.8	3.6	4.5	3.4	3.2	2.9	4.5
26-Mar	3.5	3.0	Z	3.0	2.7	2.7	2.6	3.1	2.7	2.9	2.9	2.9	2.8	2.5	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.5	2.3	2.3	2.6	3.5
27-Mar	2.2	2.1	2.0	Z	2.2	2.3	2.2	2.2	2.1	2.4	2.5	3.3	3.5	3.3	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.3	3.5
28-Mar	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	3.2	2.2	2.1	2.2	2.8	2.5	2.8	2.5	2.6	2.4	2.3	3.2
29-Mar	2.5	2.6	2.3	2.3	2.3	Z	2.2	2.3	2.3	2.4	2.3	2.2	3.0	2.2	2.1	2.1	2.2	2.1	2.1	2.2	2.6	2.4	2.4	2.4	2.3	3.0
30-Mar	Z	3.8	3.5	3.6	3.4	3.3	4.1	3.4	3.4	2.9	2.6	2.7	2.9	2.6	2.6	2.6	2.7	2.5	2.6	2.6	2.6	2.6	2.6	2.6	3.0	4.1
31-Mar	2.5	Z	2.6	2.6	2.5	2.5	2.5	2.4	2.1	2.3	2.4	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.4	2.4	2.6
	2.6	2.7	2.6	2.6	2.6	2.7	2.6	2.6	2.9	2.7	2.7	2.6	2.7	2.8	2.6	2.6	2.7	2.8	2.6	2.9	2.8	2.6	2.7	2.6	Diurnal Average	
	3.8	4.2	4.0	3.9	3.4	4.8	4.5	3.9	11.8	5.8	4.2	3.3	4.4	7.4	3.3	4.4	5.8	7.3	6.4	9.9	7.5	4.5	7.4	4.9	Diurnal Maximum	

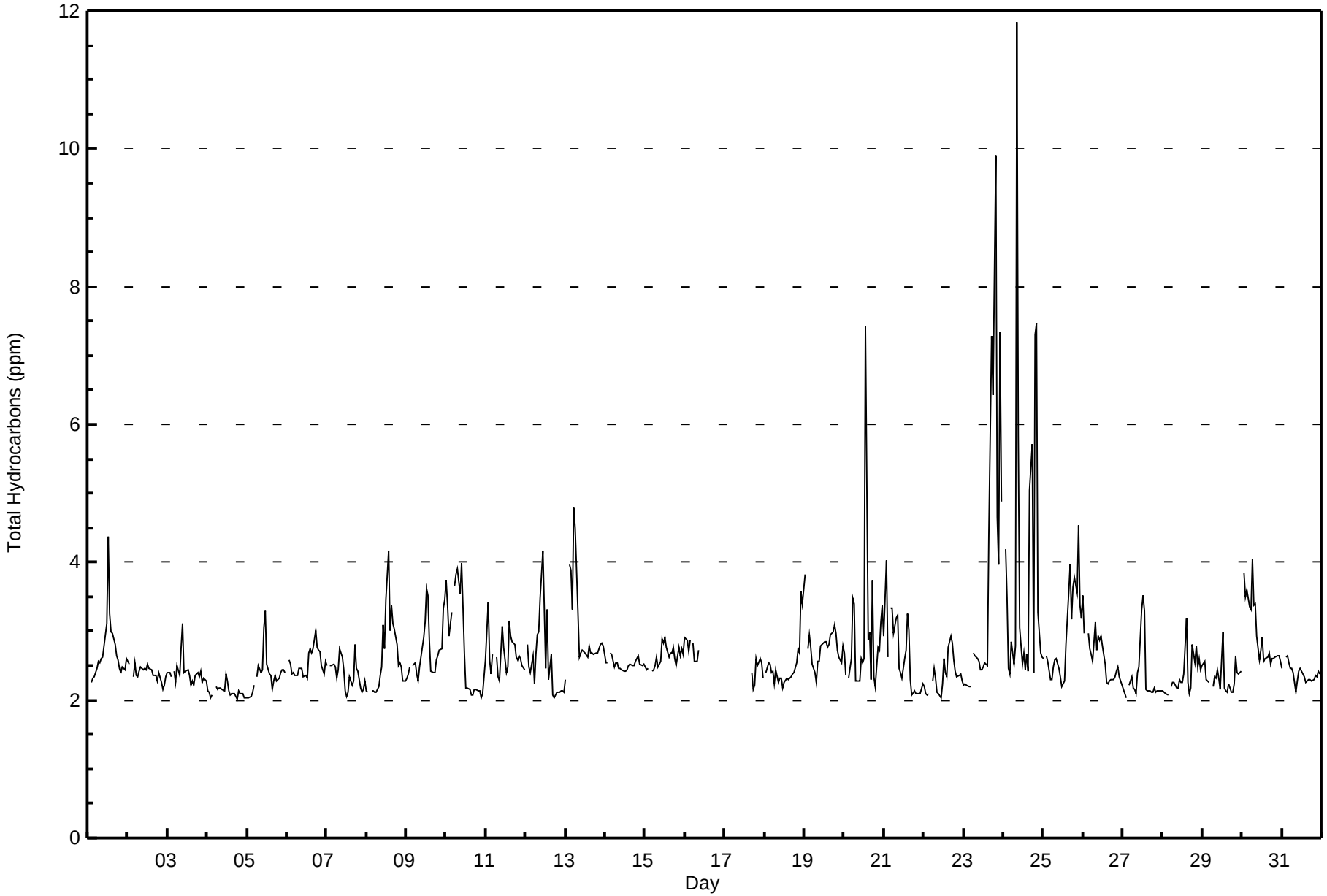
Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Shell Muskeg River - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Shell Muskeg River - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	10	1.46	1.46
2.1 - 3.0	579	84.77	86.24
3.1 - 10.0	93	13.62	99.85
> 10.0	1	0.15	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Hydrocarbons (THC) - ppm

Shell Muskeg River - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	0	0	0	0	1	1	1	3	4	0	0	0	0	0	0	0	10
2.1 - 3.0	83	115	79	29	17	15	28	32	46	38	22	11	8	16	20	20	579
3.1 - 10.0	11	21	24	4	1	1	1	1	1	4	2	2	0	2	13	5	93
> 10.0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	94	137	103	33	19	17	30	36	51	42	24	13	8	18	33	25	683

Total Number of Valid Hours: 683

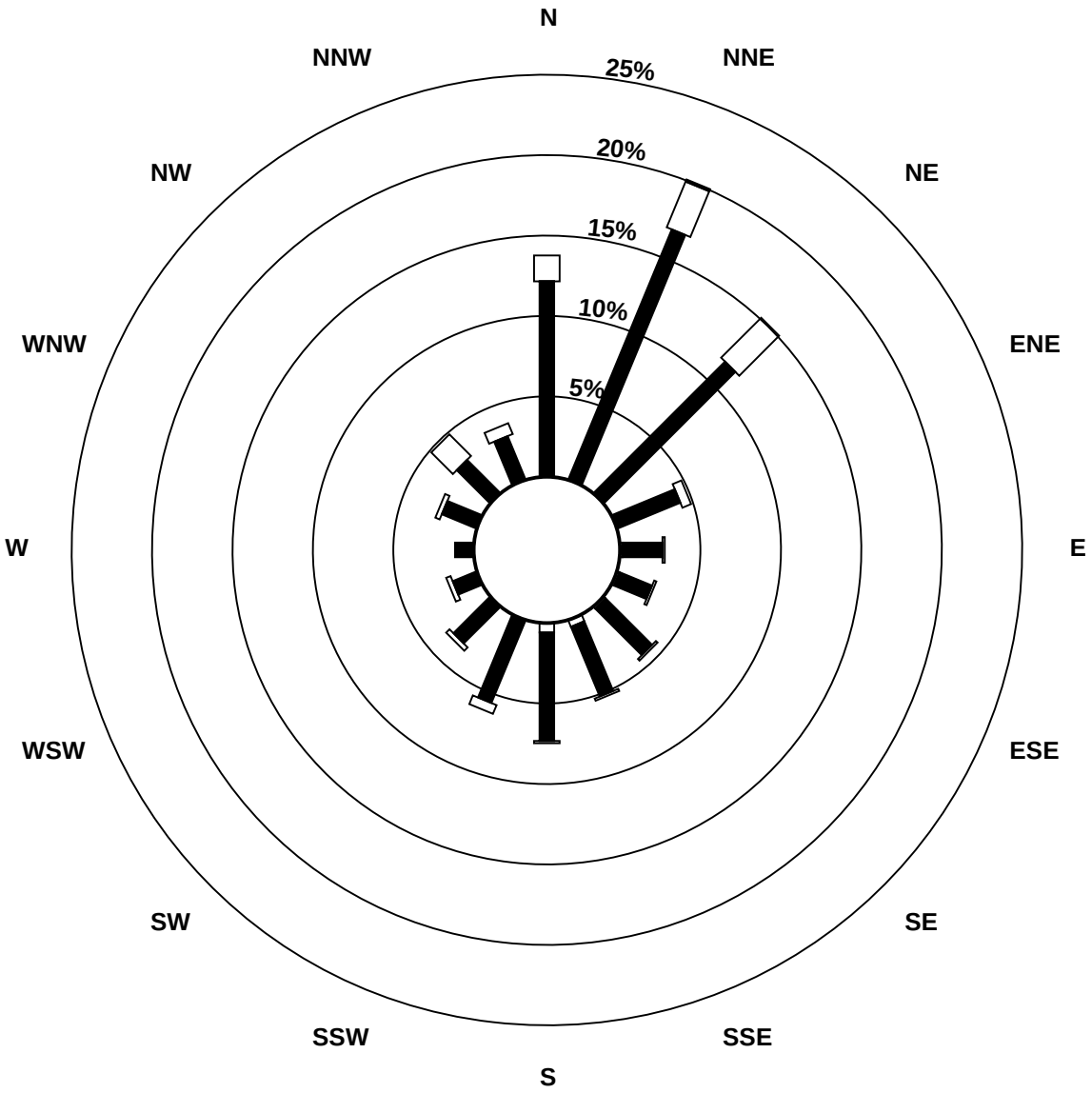
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Mar 2016

Total Hydrocarbons (THC) - ppm

Shell Muskeg River (AMS 16)



Classes (ppm)

0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

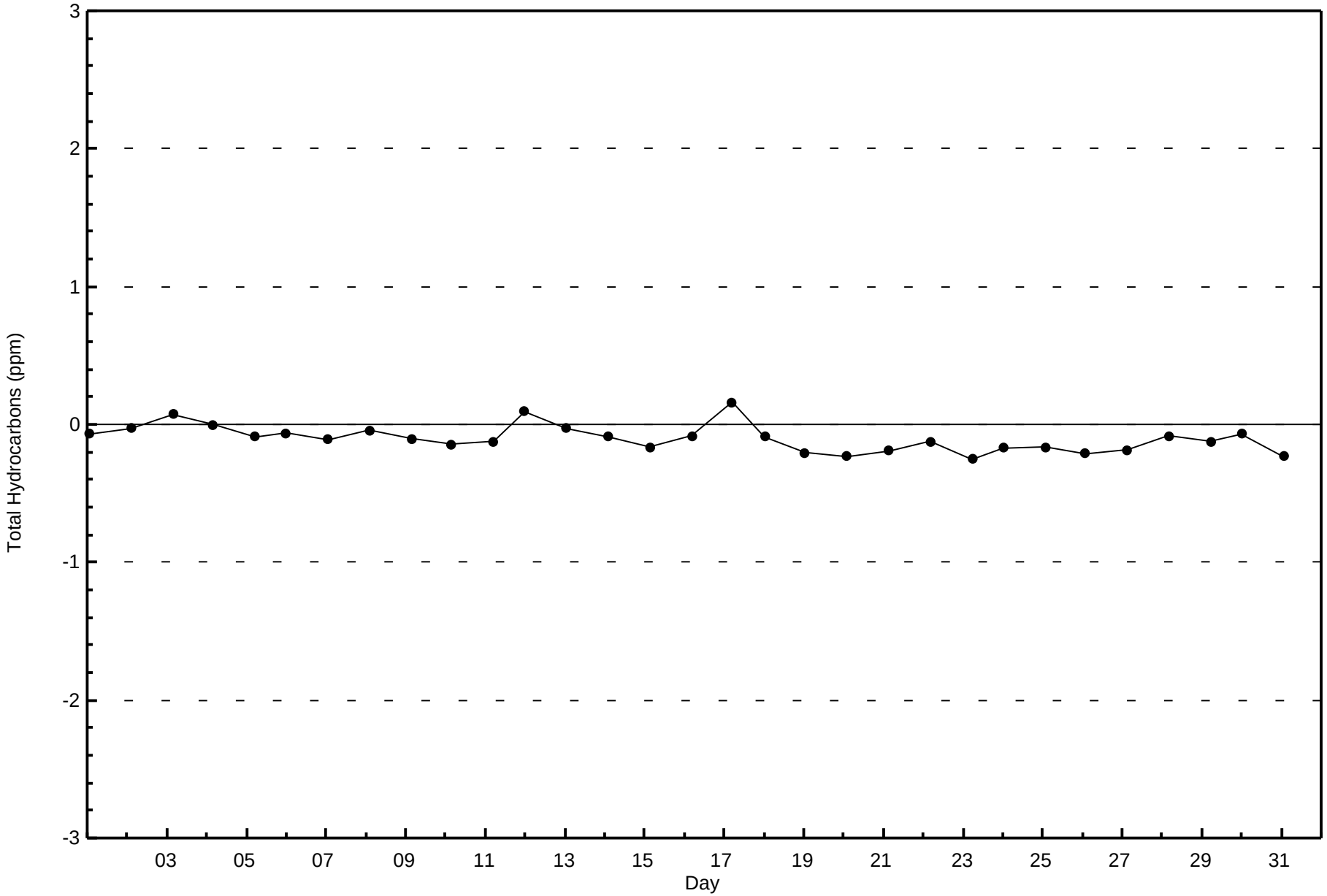
Total Number of Valid Hours: 683

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Shell Muskeg River - March 2016

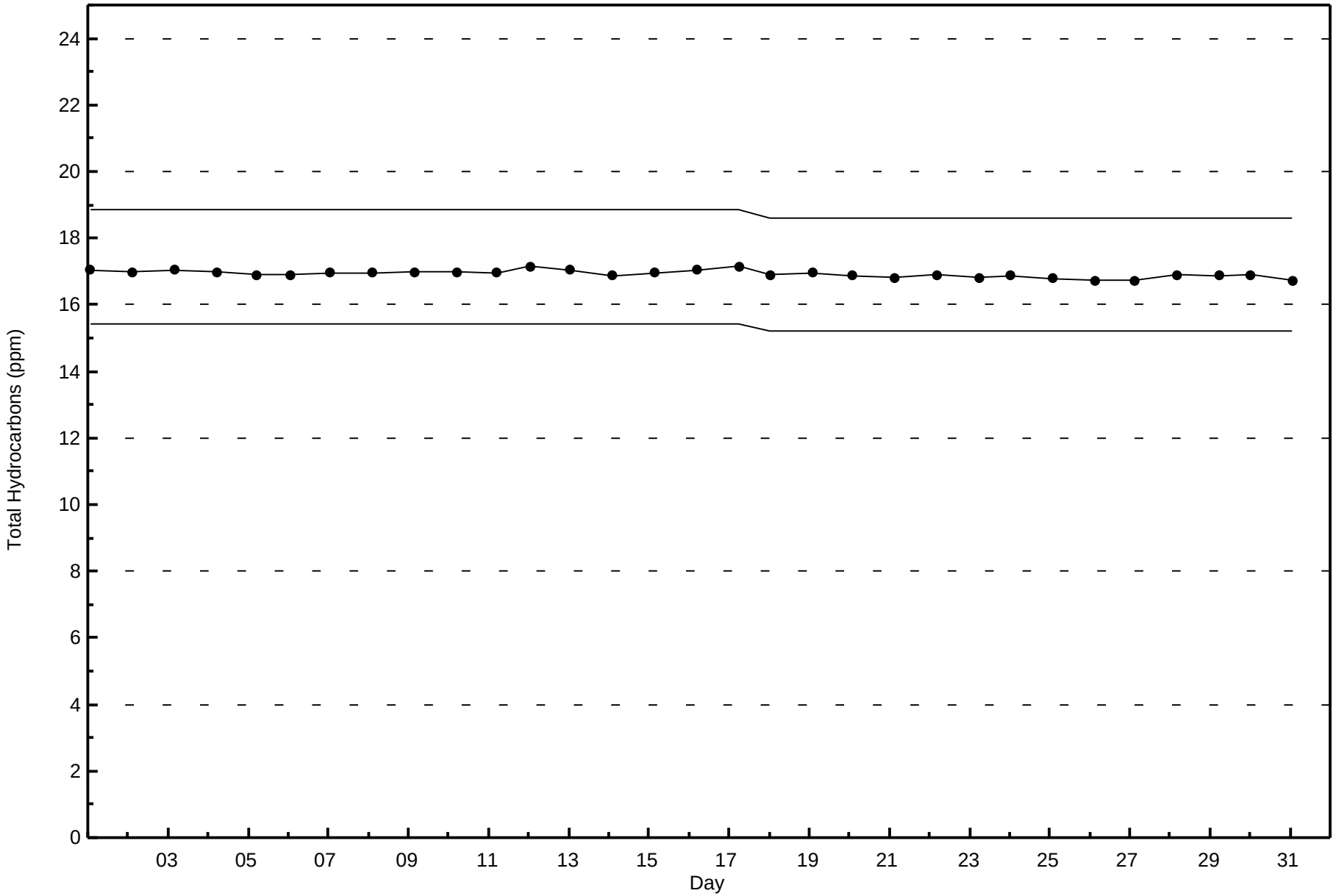


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Shell Muskeg River - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Shell Muskeg River - March 2016

Maximum Value: 132 ppb on Mar 8 14:00

Maximum Daily Average: 28.2 ppb on Mar 8

Minimum Value: 0 ppb on Mar 1 05:00

Minimum Daily Average: 1.9 ppb on Mar 29

Maximum Diurnal Average: 22.0 ppb at hour 13

Minimum Diurnal Average: 4.2 ppb at hour 5

Monthly Average: 9.9 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 5 $Q_3 = 12$ $P_{90} = 24$ $P_{99} = 84$

Hours in Service:	744
Hours of Data:	701
Hours of Missing Data:	43
Hours of Calibration:	37
Percent Operational Time:	99.2

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0	Z	0	0	0	0	0	1	14	10	14	27	87	28	36	25	8	1	2	5	8	9	1	3	12.2	87
2-Mar	3	2	Z	1	2	1	1	3	4	3	5	11	10	10	13	7	3	4	4	6	8	1	0	1	4.6	13
3-Mar	4	6	13	Z	11	1	5	5	5	17	8	7	7	9	15	14	11	8	6	8	6	10	8	4	8.0	17
4-Mar	0	0	0	0	Z	0	0	0	2	1	3	16	18	3	3	2	0	0	0	0	0	0	0	0	2.2	18
5-Mar	0	0	0	0	0	Z	6	1	5	8	28	30	16	7	2	0	6	7	14	13	13	11	8	13	8.2	30
6-Mar	Z	5	4	8	7	8	9	6	6	10	4	15	21	12	13	13	11	5	7	9	6	7	10	3	8.7	21
7-Mar	6	Z	10	12	8	6	11	9	29	25	21	10	7	4	3	3	2	3	5	3	3	0	0	1	7.8	29
8-Mar	0	0	Z	0	0	0	0	1	6	23	63	38	112	132	56	78	56	49	29	1	3	1	0	0	28.2	132
9-Mar	3	5	4	Z	5	5	1	0	10	15	41	60	92	101	44	5	6	6	13	11	22	20	44	49	24.5	101
10-Mar	74	58	29	23	Z	44	46	47	43	40	21	25	0	1	1	0	0	0	0	0	0	0	0	0	19.7	74
11-Mar	0	0	0	0	0	Z	0	5	3	15	45	21	6	8	22	12	17	13	1	0	0	0	0	0	7.4	45
12-Mar	Z	19	3	1	6	1	15	24	30	54	100	47	27	55	6	18	0	0	0	0	0	0	0	0	17.7	100
13-Mar	0	Z	73	5	10	26	71	38	8	13	7	12	19	14	29	24	16	14	16	19	13	15	9	7	19.9	73
14-Mar	9	7	Z	8	7	6	15	21	27	21	15	17	15	13	5	7	3	5	6	2	3	3	3	3	9.6	27
15-Mar	9	12	11	Z	9	6	5	10	3	5	34	49	22	16	11	12	11	8	7	9	2	4	5	7	11.6	49
16-Mar	12	6	8	7	Z	6	13	9	8	M	M	M	M	M	M	8	8	3	1	0	5	5	7	0	--	13
17-Mar	0	0	0	0	3	Z	3	2	5	4	C	C	C	C	C	C	6	0	1	9	15	1	0	0	--	15
18-Mar	Z	0	1	1	0	0	0	1	5	10	8	2	1	1	1	3	5	3	1	0	0	0	0	2	2.0	10
19-Mar	0	Z	1	0	4	0	0	0	3	3	7	36	30	22	9	11	8	6	22	6	3	2	1	4	7.8	36
20-Mar	1	0	Z	0	0	27	22	1	2	1	11	13	8	14	22	19	1	0	0	0	4	6	8	6	7.3	27
21-Mar	6	7	7	Z	6	5	3	9	12	4	17	18	14	16	23	17	2	0	0	0	0	0	0	0	7.3	23
22-Mar	0	0	0	0	Z	0	1	1	1	0	0	8	19	8	4	10	14	14	3	0	0	0	0	0	3.6	19
23-Mar	0	0	0	0	0	Z	2	4	4	5	7	8	8	6	4	6	8	8	11	11	3	2	3	3	4.5	11
24-Mar	Z	1	0	0	0	0	0	4	8	23	38	11	6	9	12	10	12	3	0	1	4	0	0	0	6.2	38
25-Mar	0	Z	0	0	0	0	7	17	16	22	17	15	18	18	47	59	62	36	12	27	37	94	20	14	23.4	94
26-Mar	62	18	Z	19	11	6	6	36	18	30	23	18	10	8	2	1	1	1	0	0	0	0	0	0	11.8	62
27-Mar	0	0	0	Z	0	3	0	1	2	4	7	39	38	33	1	0	0	0	0	0	0	0	0	0	5.6	39
28-Mar	0	0	0	0	Z	0	5	10	6	2	2	2	3	1	22	0	0	1	0	0	0	0	0	0	2.4	22
29-Mar	0	0	0	0	0	Z	1	2	2	3	2	1	4	1	0	1	1	1	0	0	5	5	10	6	1.9	10
30-Mar	Z	19	18	21	17	12	56	31	51	33	11	16	14	5	5	13	18	22	19	9	6	7	7	9	18.3	56
31-Mar	10	Z	5	5	3	2	2	4	2	7	8	9	5	2	1	0	0	1	1	0	0	0	0	0	2.9	10
	7.7	6.6	7.2	4.3	4.2	6.4	9.9	9.8	11.0	13.7	19.6	19.9	22.0	19.2	14.3	12.7	9.6	7.2	5.9	4.8	5.5	6.6	4.7	4.4	Diurnal Average	
	74	58	73	23	17	44	71	47	51	54	100	60	112	132	56	78	62	49	29	27	37	94	44	49	Diurnal Maximum	

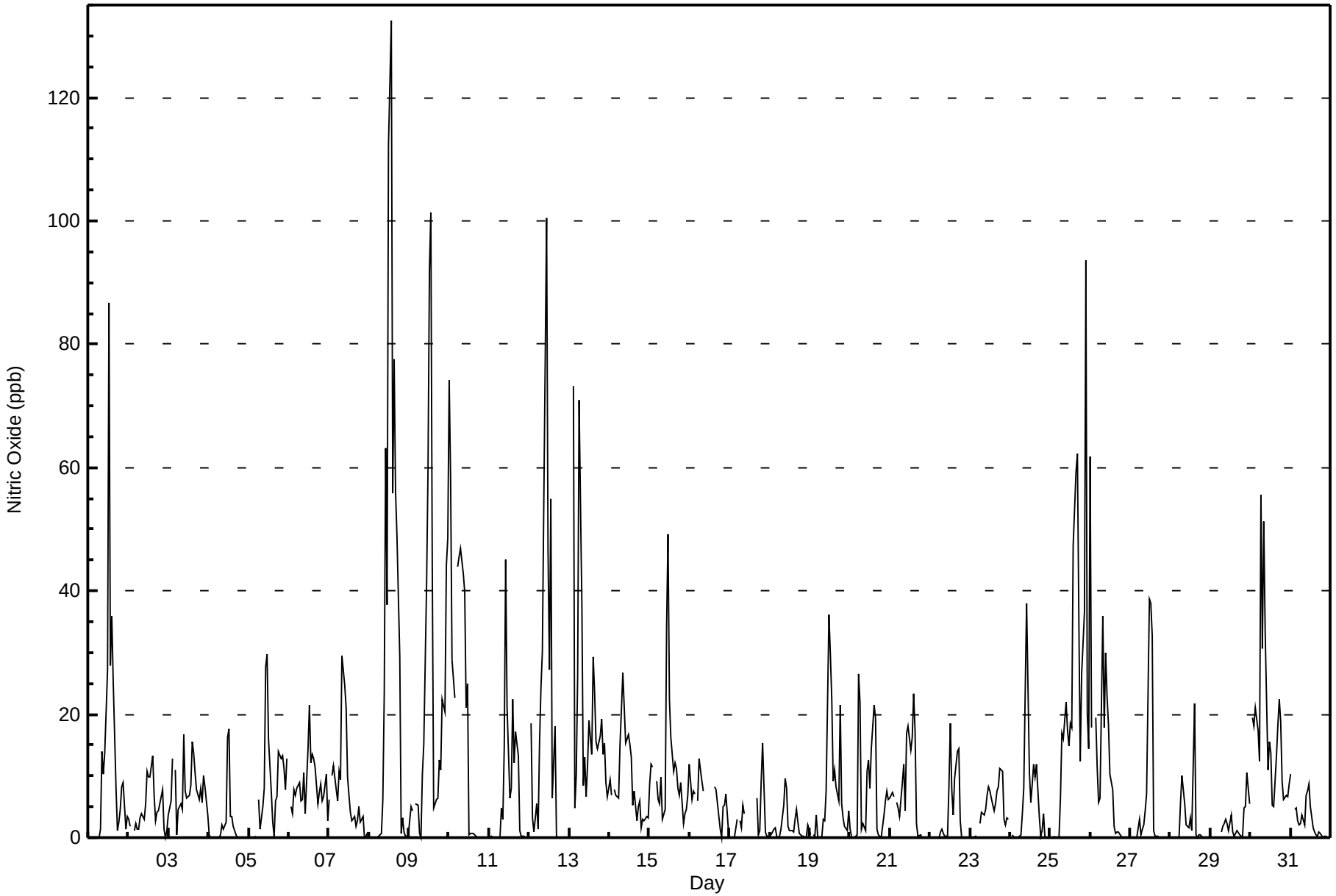
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Shell Muskeg River - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	607	86.59	86.59
21 - 40	58	8.27	94.86
11 - 80	29	4.14	99.00
81 - 159	7	1.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitric Oxide (NO) - ppb

Shell Muskeg River - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	83	123	99	30	16	16	29	34	50	38	24	13	10	16	13	13	607
21 - 40	8	13	4	3	3	1	0	1	0	4	0	0	0	2	8	11	58
11 - 80	3	3	1	0	0	0	1	1	1	2	2	1	0	2	10	2	29
81 - 159	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	7
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	139	104	33	19	17	30	36	51	44	26	14	10	20	35	27	701

Total Number of Valid Hours: 701

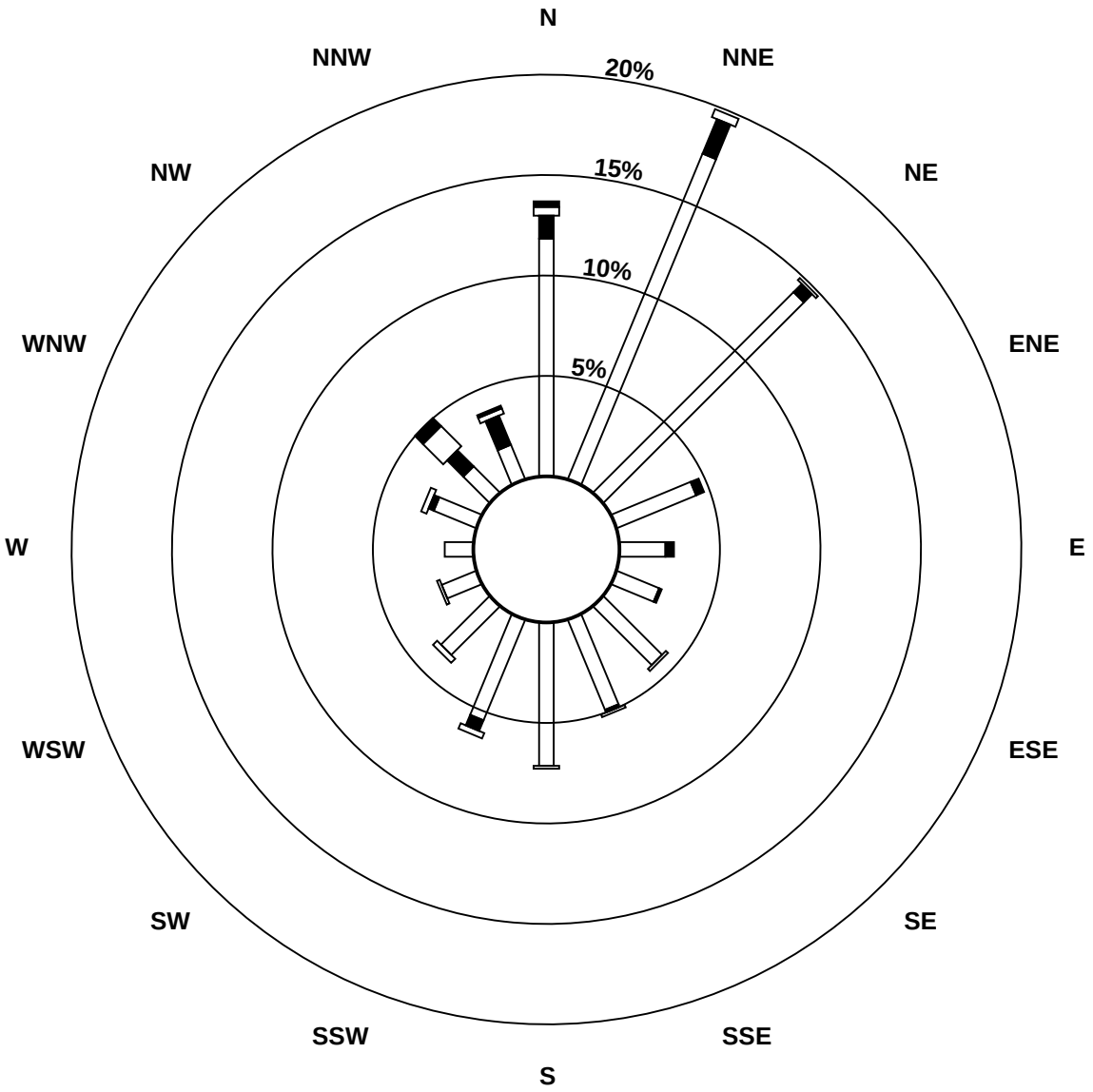
Total Number of Hours: 744

Wood Buffalo Environmental Association

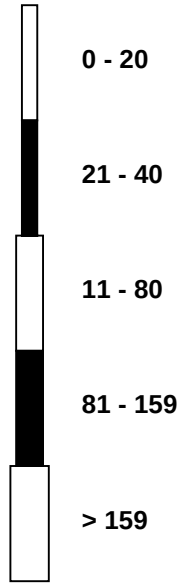
Wind Rose Mar 2016

Nitric Oxide (NO) - ppb

Shell Muskeg River (AMS 16)



Classes (ppb)



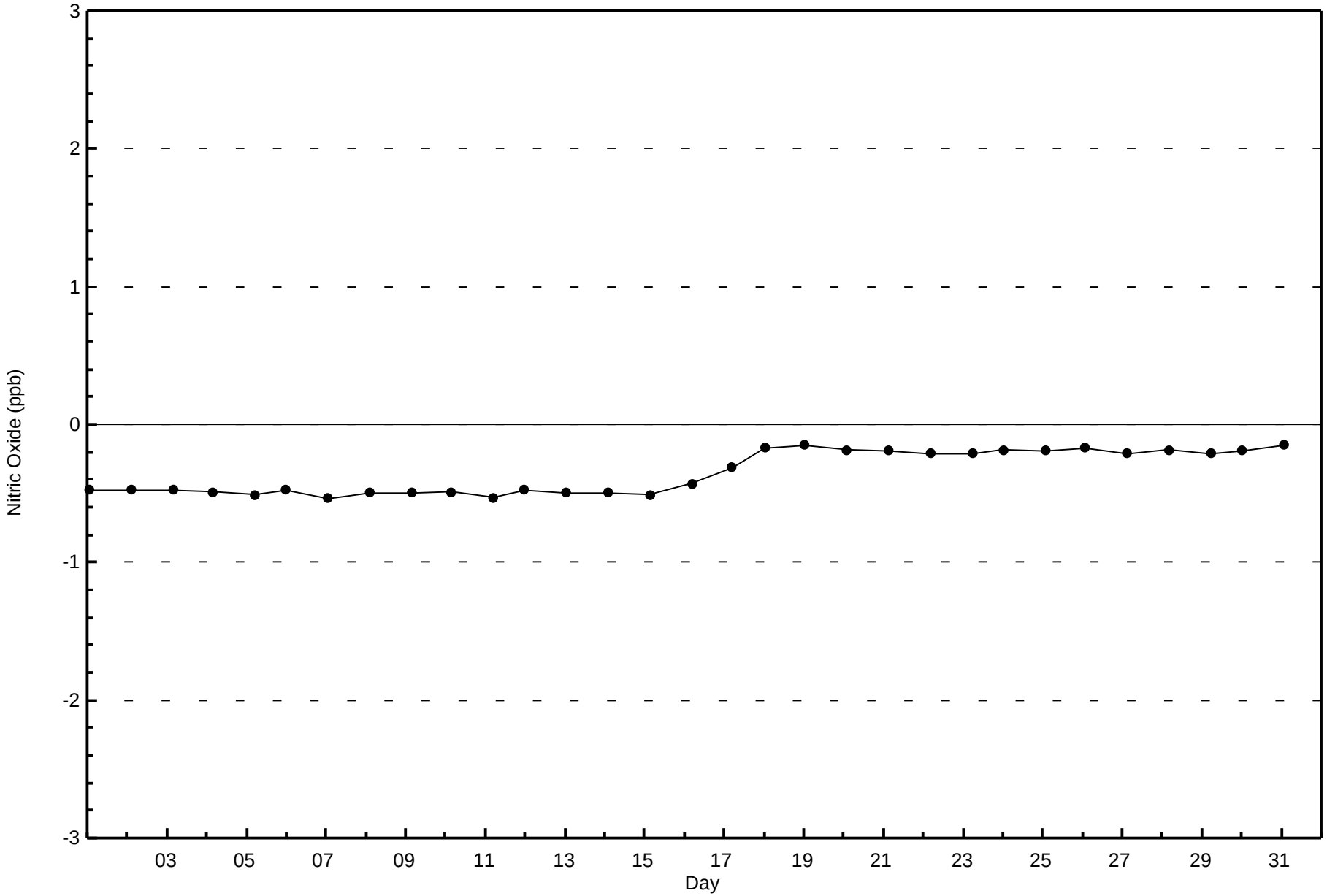
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Shell Muskeg River - March 2016

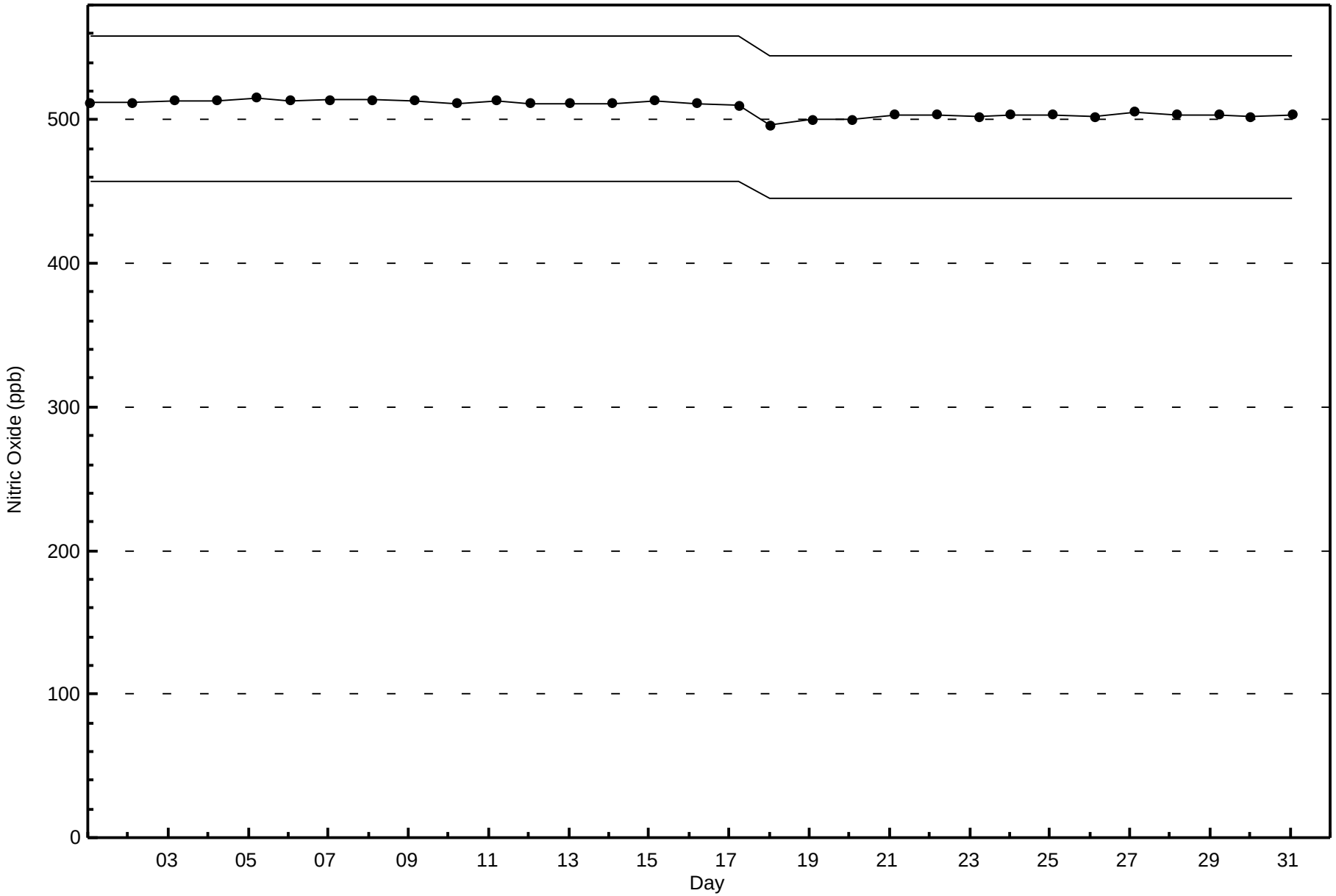


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Shell Muskeg River - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Shell Muskeg River - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 43 ppb on Mar 25 17:00 Maximum Daily Average: 30.5 ppb on Mar 25

Minimum Value: 0 ppb on Mar 2 23:00
Minimum Daily Average: 4.1 ppb on Mar 4
Maximum Diurnal Average: 15.7 ppb at hour 12
Minimum Diurnal Average: 10.8 ppb at hour 1
Monthly Average: 13.4 ppb
Percentiles: $P_1 = 0$ $P_{10} = 2$ $Q_1 = 7$ Median = 12 $Q_3 = 19$ $P_{90} = 27$ $P_{99} = 39$

Hours in Service:	744
Hours of Data:	701
Hours of Missing Data:	43
Hours of Calibration:	37
Percent Operational Time:	99.2

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	9	Z	8	9	12	12	10	14	15	11	12	18	34	19	27	26	17	11	12	10	14	15	7	11	14.5	34
2-Mar	14	12	Z	4	9	8	3	10	10	6	6	10	9	10	14	11	3	6	7	12	12	2	0	7	8.1	14
3-Mar	13	14	21	Z	16	2	10	10	10	20	7	8	8	7	12	12	11	10	9	12	10	14	12	6	10.9	21
4-Mar	0	0	0	0	Z	1	13	8	10	4	4	17	18	5	5	5	2	0	0	1	1	2	0	0	4.1	18
5-Mar	0	0	1	11	23	Z	31	16	15	12	19	24	13	7	2	0	5	7	13	14	13	14	11	15	11.5	31
6-Mar	Z	12	12	10	10	12	12	11	9	9	2	8	12	10	12	11	14	13	13	14	10	14	12	8	10.8	14
7-Mar	13	Z	14	24	15	14	11	15	34	28	24	13	9	5	5	8	7	18	12	6	4	0	0	1	12.2	34
8-Mar	2	2	Z	9	10	14	16	10	14	20	27	24	38	42	32	37	35	35	29	9	10	5	3	2	18.5	42
9-Mar	5	8	10	Z	13	8	1	0	21	19	29	32	39	40	28	10	15	21	26	26	29	26	28	25	19.9	40
10-Mar	29	24	21	24	Z	25	25	22	22	23	16	14	1	1	2	1	1	0	1	3	2	0	0	3	11.2	29
11-Mar	7	17	11	13	6	Z	5	12	6	12	24	21	11	11	22	21	25	31	26	22	21	18	13	12	15.9	31
12-Mar	Z	26	18	8	15	11	13	13	13	20	27	20	13	26	6	12	0	0	0	0	0	0	1	1	10.6	27
13-Mar	1	Z	30	18	16	25	36	24	13	18	12	16	18	16	27	21	20	23	25	27	25	27	26	20	21.1	36
14-Mar	12	9	Z	19	21	12	15	17	18	14	11	11	9	8	4	5	3	6	9	8	10	9	10	12	11.0	21
15-Mar	12	12	12	Z	12	10	14	21	7	8	23	25	16	12	10	14	16	13	11	12	10	12	21	25	14.2	25
16-Mar	31	24	26	24	Z	18	16	11	15	M	M	M	M	M	M	16	20	20	14	1	10	21	41	20	--	41
17-Mar	7	6	15	13	22	Z	19	8	9	5	C	C	C	C	C	C	18	4	13	32	38	33	29	23	--	38
18-Mar	Z	21	28	25	14	5	6	8	14	17	12	3	2	2	2	6	12	13	14	17	12	9	14	13	11.7	28
19-Mar	10	Z	7	6	10	7	6	2	5	4	9	22	22	19	10	11	12	11	33	16	10	7	9	14	11.4	33
20-Mar	10	5	Z	10	10	32	29	7	7	3	11	13	10	15	20	19	4	2	2	4	12	15	15	14	11.7	32
21-Mar	13	14	14	Z	11	10	8	13	15	7	16	14	13	14	19	14	3	3	12	9	9	8	3	6	10.7	19
22-Mar	10	7	5	9	Z	9	16	9	3	1	1	9	21	12	8	19	28	34	15	7	7	10	7	1	10.6	34
23-Mar	0	1	1	4	3	Z	11	12	7	7	8	10	10	7	8	10	11	16	21	23	10	7	10	9	8.9	23
24-Mar	Z	13	6	11	8	6	10	11	17	23	29	12	8	13	17	18	22	11	4	12	19	7	8	10	12.7	29
25-Mar	14	Z	20	17	24	26	34	32	28	28	27	24	24	25	36	39	43	38	37	39	37	41	33	35	30.5	43
26-Mar	42	32	Z	35	22	18	24	37	24	29	28	21	16	14	5	2	4	7	7	7	14	21	12	7	18.5	42
27-Mar	5	2	2	Z	5	22	11	6	5	7	9	25	28	29	4	1	1	1	1	2	3	1	0	0	7.3	29
28-Mar	1	1	2	2	Z	20	27	24	14	5	4	4	8	4	26	2	0	3	9	7	17	9	10	5	8.9	27
29-Mar	5	2	3	4	6	Z	10	8	7	7	5	2	8	2	1	3	5	4	7	21	29	32	37	36	10.6	37
30-Mar	Z	28	26	23	20	17	23	20	34	28	19	22	20	12	13	21	19	20	21	19	17	14	16	16	20.3	34
31-Mar	17	Z	19	19	16	14	9	8	3	10	12	14	10	5	5	4	5	15	17	17	25	23	15	7	12.5	25
	10.8	11.6	12.7	13.6	13.4	13.7	15.3	13.5	13.6	13.5	15.0	15.7	15.4	13.5	13.1	12.6	12.3	12.7	13.4	13.1	14.2	13.4	12.9	11.7	Diurnal Average	
	42	32	30	35	24	32	36	37	34	29	29	32	39	42	36	39	43	38	37	39	38	41	41	36	Diurnal Maximum	

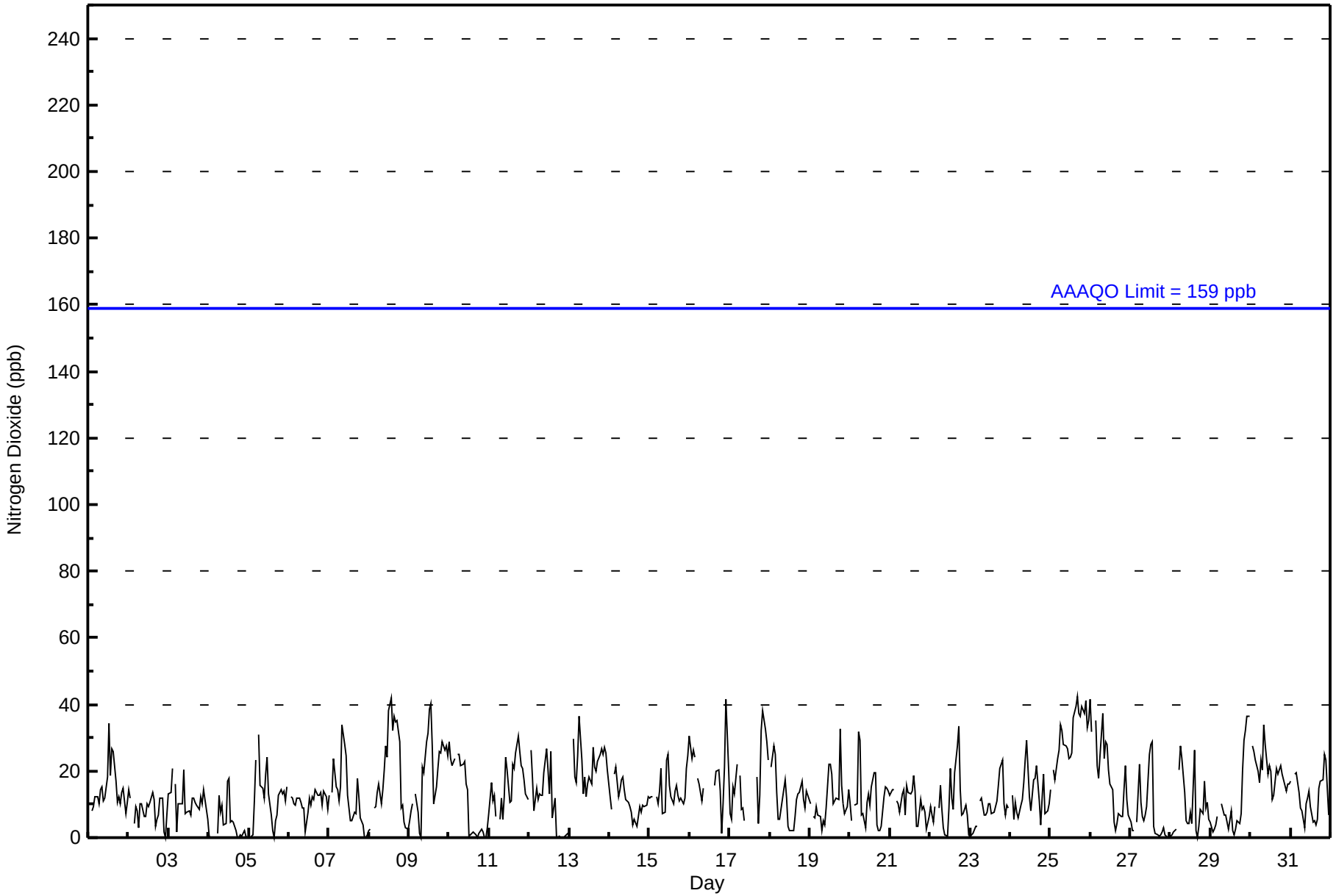
Z - zerospan C - Calibration M - Maintenance
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Shell Muskeg River - March 2016



Nitrogen Dioxide (NO_2) - ppb
Shell Muskeg River - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	548	78.17	78.17
21 - 40	148	21.11	99.29
11 - 80	5	0.71	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Shell Muskeg River - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	68	122	94	31	13	15	27	34	42	25	19	13	10	13	11	11	548
21 - 40	26	16	10	2	6	2	3	2	9	19	7	1	0	7	23	15	148
11 - 80	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	5
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	139	104	33	19	17	30	36	51	44	26	14	10	20	35	27	701

Total Number of Valid Hours: 701

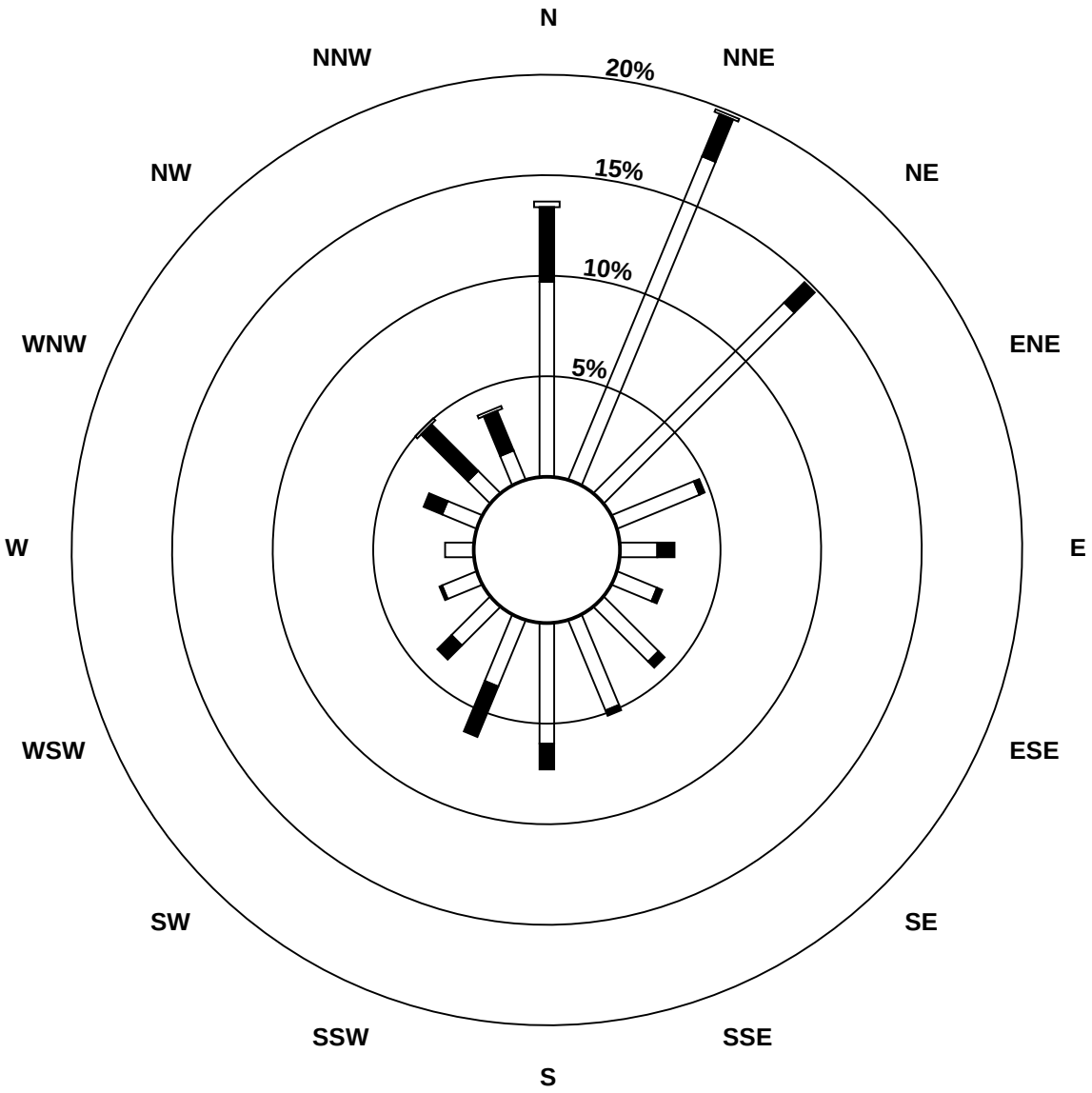
Total Number of Hours: 744

Wood Buffalo Environmental Association

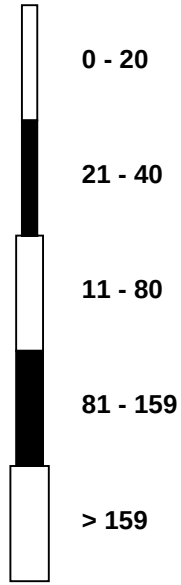
Wind Rose Mar 2016

Nitrogen Dioxide (NO_2) - ppb

Shell Muskeg River (AMS 16)



Classes (ppb)



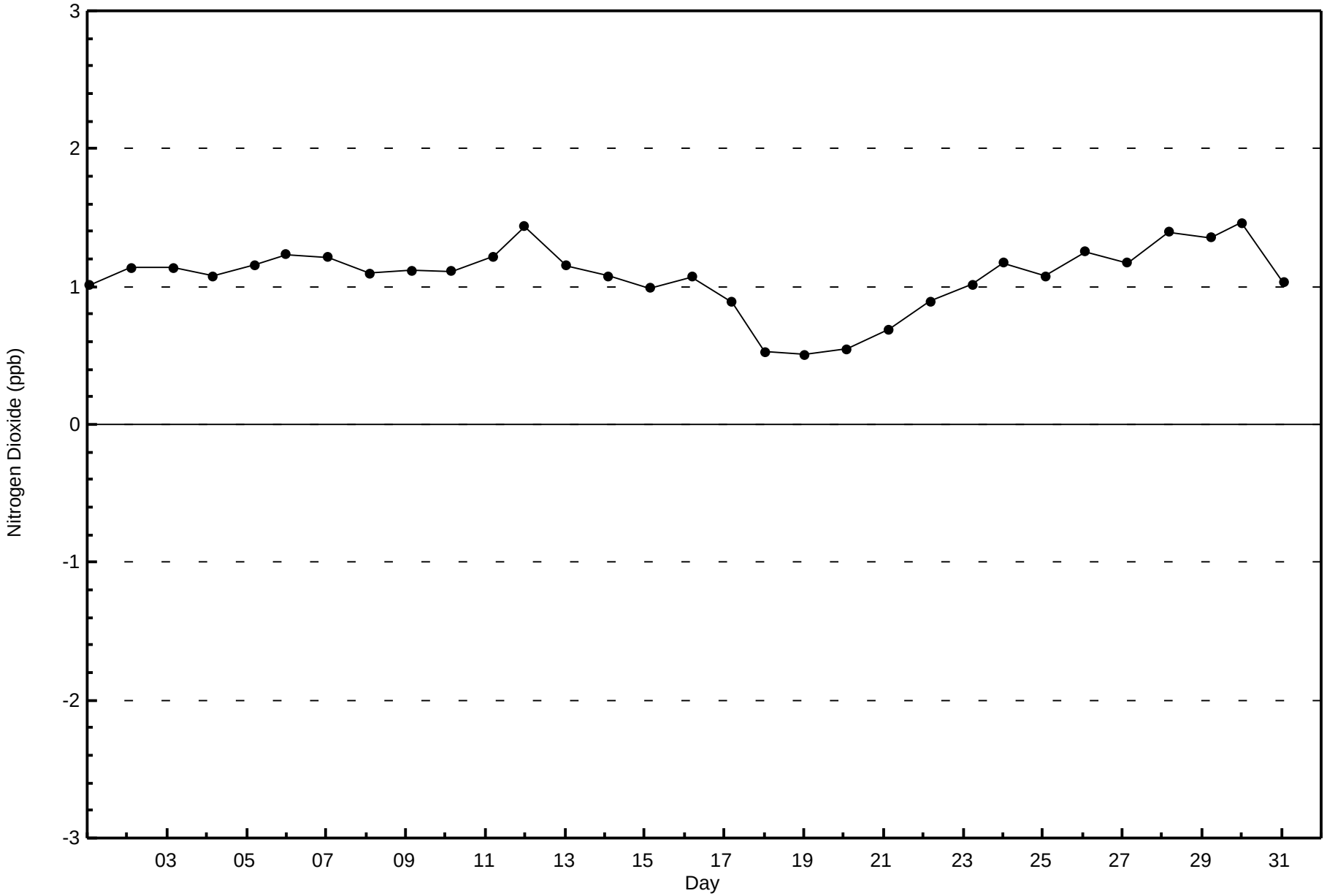
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Shell Muskeg River - March 2016

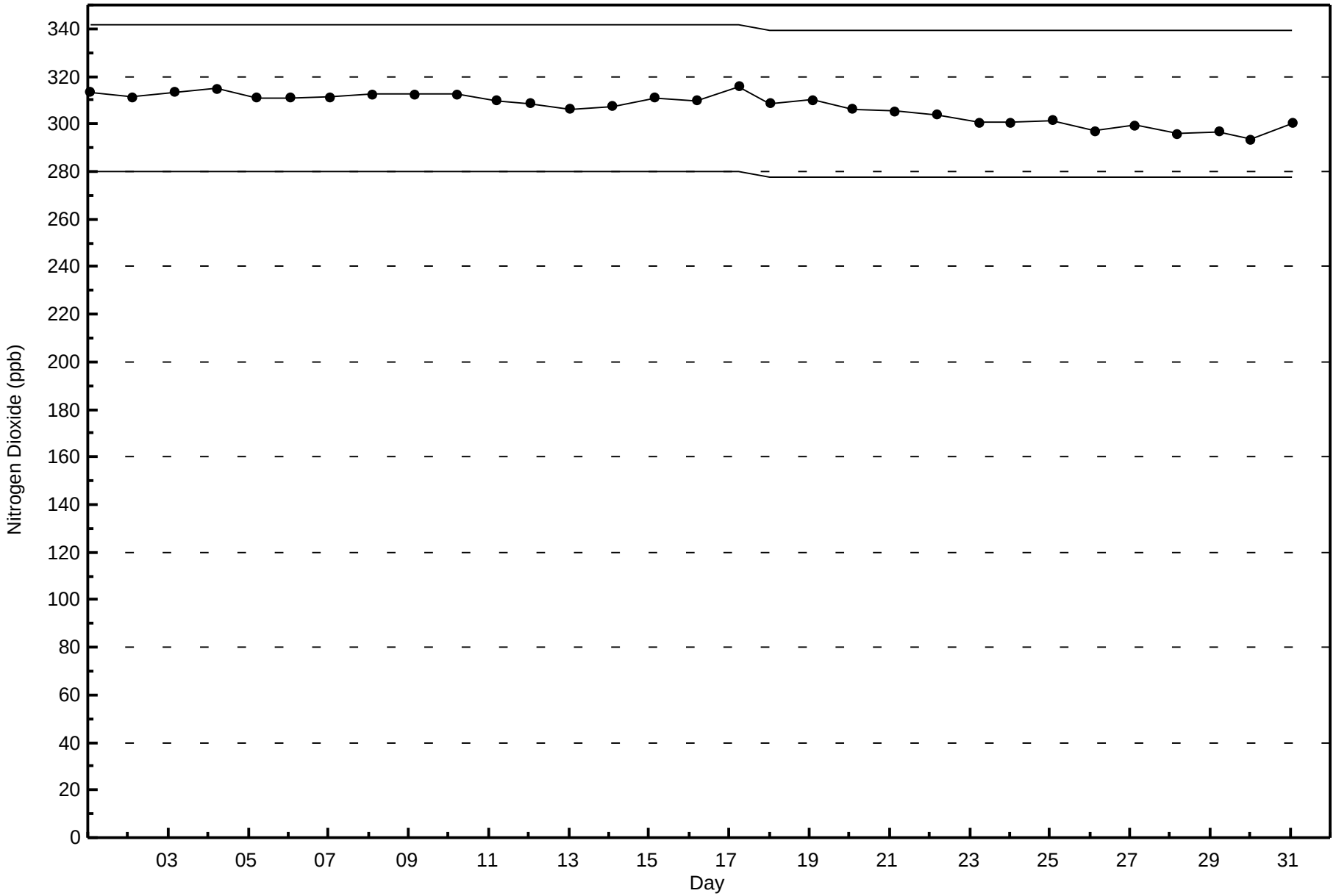


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Shell Muskeg River - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Shell Muskeg River - March 2016

Maximum Value: 175 ppb on Mar 8 14:00

Maximum Daily Average: 53.9 ppb on Mar 25

Minimum Value: 0 ppb on Mar 4 03:00

Minimum Daily Average: 6.3 ppb on Mar 4

Maximum Diurnal Average: 37.4 ppb at hour 13

Minimum Diurnal Average: 16.1 ppb at hour 24

Monthly Average: 23.3 ppb

Percentiles: $P_1 = 0$ $P_{10} = 3$ $Q_1 = 8$ Median = 17 $Q_3 = 29$ $P_{90} = 50$ $P_{99} = 118$

Hours in Service:	744
Hours of Data:	701
Hours of Missing Data:	43
Hours of Calibration:	37
Percent Operational Time:	99.2

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	9	Z	8	9	12	12	10	16	29	21	26	46	121	46	63	51	25	12	15	15	22	24	9	14	26.7	121
2-Mar	17	14	Z	6	12	10	4	13	14	9	12	21	19	20	27	18	6	10	11	17	20	3	0	8	12.7	27
3-Mar	17	19	33	Z	27	2	15	16	15	37	15	14	15	15	27	26	21	17	15	20	16	24	20	9	18.9	37
4-Mar	1	0	0	0	Z	1	13	8	11	5	7	33	35	8	8	7	3	0	0	1	1	2	0	0	6.3	35
5-Mar	0	0	1	11	23	Z	37	17	20	20	47	54	29	14	5	0	11	13	27	27	26	25	19	28	19.7	54
6-Mar	Z	17	15	18	17	20	21	17	15	19	6	22	33	22	26	24	26	18	20	22	16	21	22	11	19.5	33
7-Mar	19	Z	24	35	23	20	22	25	63	53	45	23	16	9	8	11	9	21	17	8	7	0	0	2	20.0	63
8-Mar	2	2	Z	9	10	13	16	11	21	44	91	62	151	175	88	114	91	84	58	10	13	5	3	3	46.7	175
9-Mar	7	13	15	Z	19	13	2	0	31	34	70	91	131	141	72	15	21	27	38	37	51	46	72	73	44.4	141
10-Mar	103	82	50	47	Z	69	71	69	65	63	37	39	1	1	2	2	1	0	1	3	2	0	0	3	30.9	103
11-Mar	7	17	11	13	6	Z	6	17	9	27	69	41	17	19	45	33	43	44	27	22	21	18	13	12	23.3	69
12-Mar	Z	45	21	9	20	13	29	37	43	74	127	67	40	81	12	30	1	0	0	0	0	0	1	1	28.3	127
13-Mar	1	Z	103	23	27	51	107	61	22	31	19	28	37	30	56	45	36	37	42	46	38	43	35	27	41.0	107
14-Mar	22	15	Z	27	28	18	30	38	45	35	27	27	24	21	9	13	6	11	15	9	13	12	13	15	20.6	45
15-Mar	20	24	24	Z	21	16	20	31	10	12	57	74	38	29	21	26	27	21	18	21	12	16	26	31	25.8	74
16-Mar	43	30	34	31	Z	24	29	20	23	M	M	M	M	M	M	24	28	24	15	1	15	26	48	20	--	48
17-Mar	7	6	15	13	25	Z	21	10	14	9	C	C	C	C	C	C	25	5	14	41	53	34	29	24	--	53
18-Mar	Z	22	29	27	14	5	6	10	20	27	20	5	4	4	3	9	16	16	14	17	12	9	14	15	13.7	29
19-Mar	11	Z	7	6	13	7	6	3	8	7	16	58	52	42	20	22	20	17	54	21	13	9	10	19	19.2	58
20-Mar	11	5	Z	10	11	58	51	8	10	4	21	26	18	30	41	39	5	3	2	4	16	21	22	20	18.9	58
21-Mar	19	21	21	Z	17	15	11	22	26	11	33	32	27	30	42	32	6	4	12	9	9	8	3	6	18.0	42
22-Mar	10	7	5	9	Z	9	17	10	4	1	1	17	39	20	12	29	41	48	17	7	7	10	7	1	14.2	48
23-Mar	0	1	1	4	3	Z	13	16	10	11	15	18	18	14	12	15	19	24	32	34	13	9	13	12	13.4	34
24-Mar	Z	13	5	11	8	6	10	15	24	47	67	23	14	21	29	28	33	14	4	13	23	7	8	10	18.9	67
25-Mar	14	Z	21	17	24	26	40	49	44	49	44	38	43	43	83	99	105	73	49	66	74	135	53	50	53.9	135
26-Mar	103	50	Z	55	33	24	31	73	42	59	51	39	26	22	7	3	5	8	7	7	14	21	12	7	30.2	103
27-Mar	5	2	2	Z	5	25	11	8	7	11	16	64	66	62	5	1	1	1	1	2	3	1	0	0	12.9	66
28-Mar	1	1	2	2	Z	20	33	34	19	7	6	6	11	5	48	3	0	4	9	7	17	9	10	5	11.3	48
29-Mar	4	2	2	4	6	Z	11	10	9	10	7	3	12	3	1	3	6	5	8	21	34	37	47	42	12.5	47
30-Mar	Z	47	44	44	37	29	79	51	85	61	30	37	34	17	18	34	37	43	40	28	23	21	23	25	38.6	85
31-Mar	27	Z	23	24	19	16	11	12	5	17	20	23	15	6	6	4	6	16	17	17	25	23	15	7	15.4	27
	18.5	18.2	19.9	17.9	17.7	20.1	25.2	23.4	24.6	27.2	34.5	35.6	37.4	32.7	27.5	25.3	21.9	20.0	19.3	17.8	19.7	19.9	17.7	16.1	Diurnal Average	
	103	82	103	55	37	69	107	73	85	74	127	91	151	175	88	114	105	84	58	66	74	135	72	73	Diurnal Maximum	

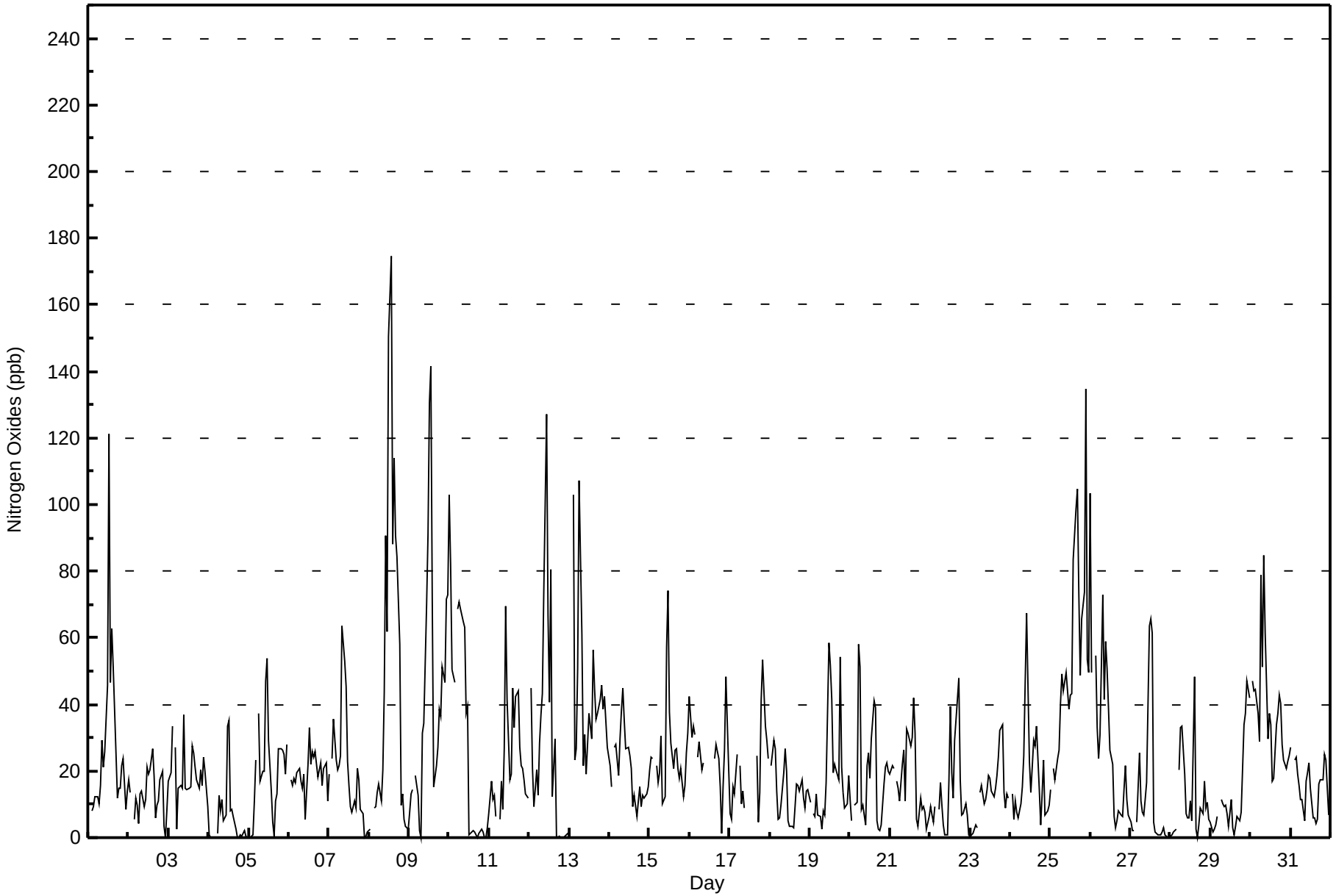
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Shell Muskeg River - March 2016



Nitrogen Oxides (NO_X) - ppb
Shell Muskeg River - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	405	57.77	57.77
21 - 40	182	25.96	83.74
11 - 80	91	12.98	96.72
81 - 159	21	3.00	99.71
> 159	1	0.14	99.86

Total Number of Valid Hours: 701

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Shell Muskeg River - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	36	59	85	27	12	13	25	30	40	25	18	13	8	9	3	2	405
21 - 40	44	64	12	4	2	3	4	3	8	11	4	0	2	5	8	8	182
11 - 80	12	14	7	2	5	1	1	2	3	7	4	1	0	5	13	14	91
81 - 159	3	2	0	0	0	0	0	1	0	1	0	0	0	1	10	3	21
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Totals	95	139	104	33	19	17	30	36	51	44	26	14	10	20	35	27	700

Total Number of Valid Hours: 701

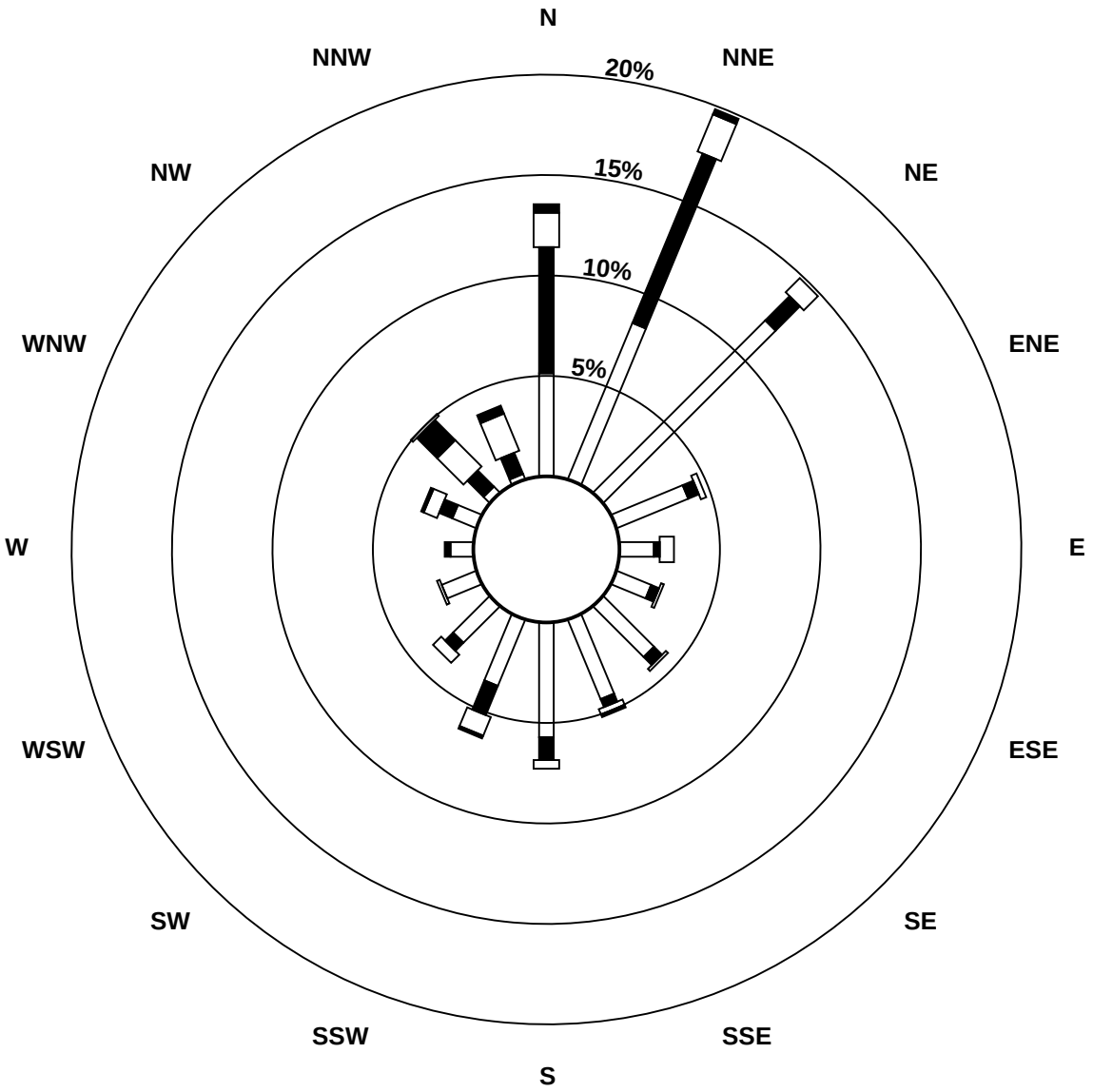
Total Number of Hours: 744

Wood Buffalo Environmental Association

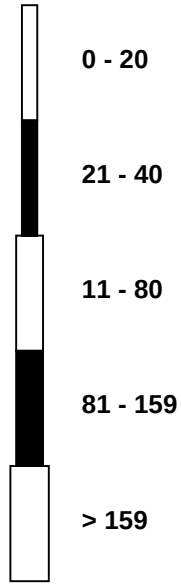
Wind Rose Mar 2016

Nitrogen Oxides (NO_X) - ppb

Shell Muskeg River (AMS 16)



Classes (ppb)



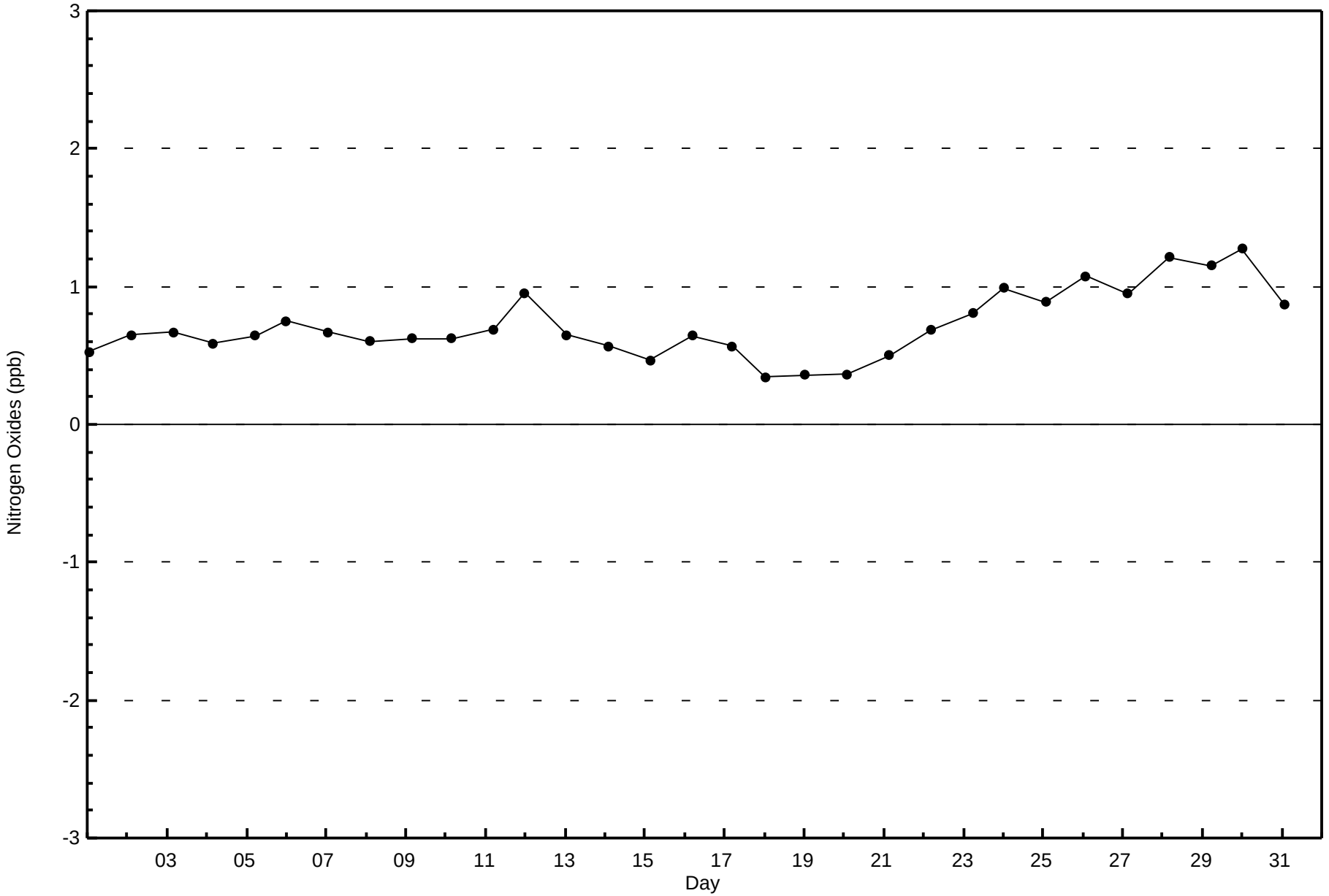
Total Number of Valid Hours: 701

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Shell Muskeg River - March 2016



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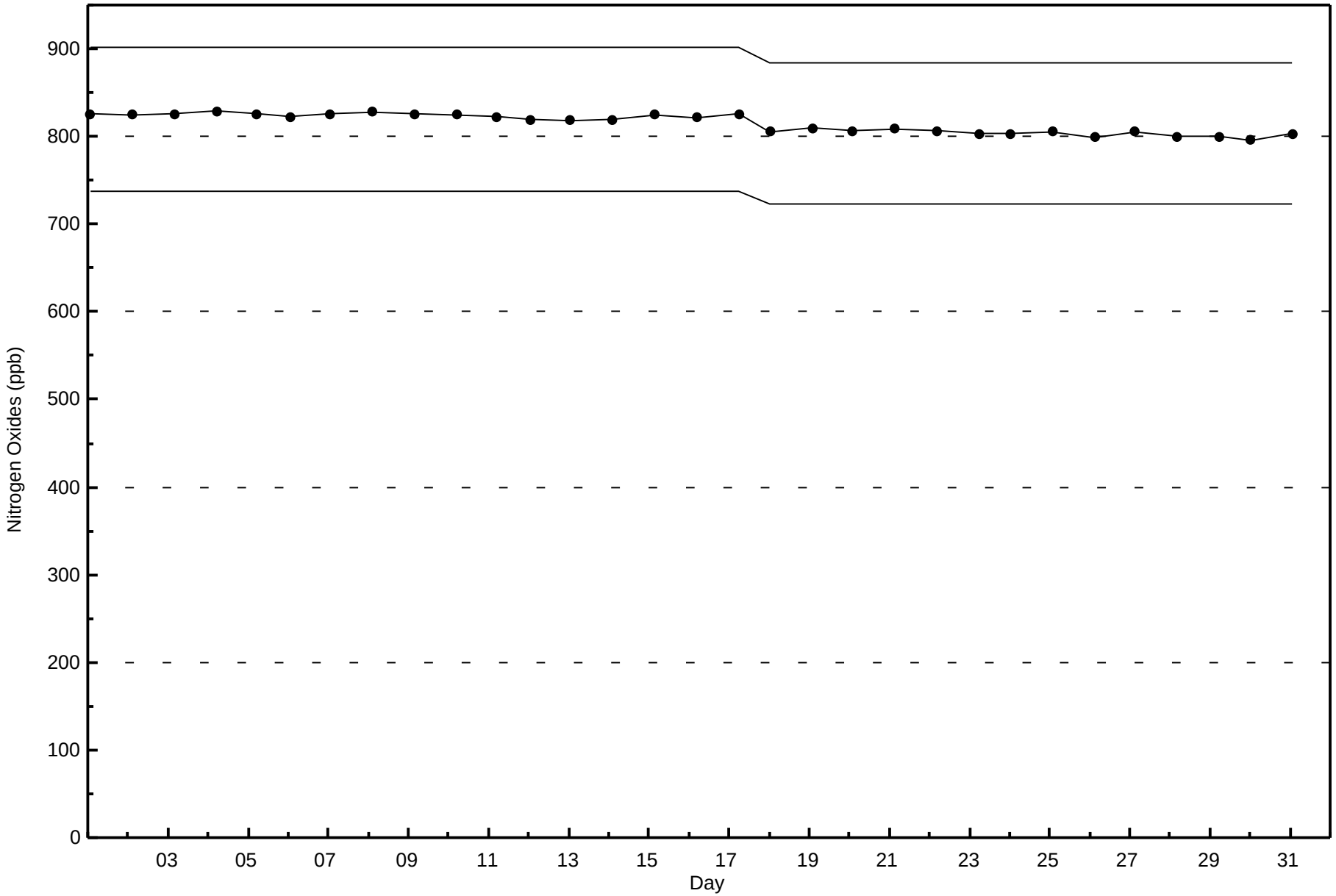
Span Responses

Nitrogen Oxides (NO_X) - ppb

Shell Muskeg River - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Shell Muskeg River - March 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 34.5 $\mu g/m^3$ on Mar 25 01:00

Maximum Daily Average: 18.3 $\mu g/m^3$ on Mar 25

Minimum Value: 0.1 $\mu g/m^3$ on Mar 29 15:00

Minimum Daily Average: 1.9 $\mu g/m^3$ on Mar 4

Maximum Diurnal Average: 6.6 $\mu g/m^3$ at hour 7

Minimum Diurnal Average: 3.9 $\mu g/m^3$ at hour 14

Monthly Average: 5.14 $\mu g/m^3$

Percentiles: P_1 = 0.4 P_{10} = 1.6 Q_1 = 2.3 Median = 3.4 Q_3 = 6.4 P_{90} = 10.7 P_{99} = 24.5

Hours in Service:	744
Hours of Data:	741
Hours of Missing Data:	3
Hours of Calibration:	2
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	4.5	4.8	4.8	5.0	5.8	8.2	8.4	8.3	10.3	8.0	5.7	8.1	14.2	7.0	6.1	6.0	5.4	4.6	5.4	5.0	5.7	5.4	4.6	5.1	6.5	14.2
2-Mar	7.0	5.6	4.5	4.1	5.3	4.8	3.8	5.2	4.7	4.0	3.5	2.6	2.8	2.5	3.0	3.7	2.8	2.5	2.8	4.8	2.8	2.4	2.4	2.8	3.8	7.0
3-Mar	3.2	3.7	3.9	5.8	4.8	3.2	3.6	3.0	4.6	3.9	3.4	3.3	3.3	2.5	1.8	2.3	2.4	3.5	4.4	3.0	3.3	2.0	1.6	1.6	3.2	5.8
4-Mar	2.1	2.5	2.3	1.8	1.6	1.6	2.2	2.2	2.3	1.8	1.7	3.2	3.3	2.1	2.2	1.8	1.2	1.3	1.4	1.8	1.6	1.3	1.2	1.3	1.9	3.3
5-Mar	1.4	1.5	2.0	3.9	6.7	6.9	7.6	8.6	8.1	6.7	5.2	7.9	3.1	2.2	2.6	2.2	1.9	1.6	1.9	2.5	3.2	2.7	3.7	2.4	4.0	8.6
6-Mar	1.9	3.4	3.0	1.6	2.4	1.3	1.4	3.3	2.4	2.1	1.0	1.1	1.3	2.4	2.1	2.0	2.1	2.8	1.7	1.7	3.4	2.4	1.4	1.5	2.1	3.4
7-Mar	1.8	1.6	2.2	4.3	4.1	4.0	2.6	2.2	4.1	4.6	2.8	2.2	2.1	3.0	3.1	3.4	4.3	5.5	6.9	4.6	2.5	1.6	1.6	1.8	3.2	6.9
8-Mar	1.9	1.8	2.0	2.3	2.2	2.6	2.8	3.0	3.7	5.1	7.9	6.4	10.1	11.9	10.2	11.3	12.7	13.5	10.4	7.9	6.8	5.3	5.9	5.1	6.4	13.5
9-Mar	4.9	6.0	5.3	5.1	4.6	3.7	3.1	3.0	4.6	4.4	4.7	5.0	6.7	7.6	6.5	12.6	16.1	13.0	11.2	11.1	14.6	14.2	11.3	17.0	8.2	17.0
10-Mar	21.4	25.1	17.2	15.2	16.9	17.0	22.4	32.5	26.6	19.7	12.6	7.4	2.6	2.5	2.4	1.8	1.7	1.3	2.2	2.7	2.9	2.5	2.6	3.0	10.9	32.5
11-Mar	4.1	6.8	6.6	6.7	6.6	6.4	6.5	7.4	5.5	5.2	5.3	3.1	2.4	2.3	3.2	2.7	2.8	3.2	3.4	3.7	3.8	3.6	3.5	6.7	4.6	7.4
12-Mar	11.4	12.0	8.9	8.3	8.7	7.3	8.5	8.5	8.4	10.1	9.6	5.9	2.7	2.7	0.6	0.7	0.2	0.1	0.2	0.3	0.4	0.5	0.5	0.6	4.9	12.0
13-Mar	0.7	1.6	4.5	2.5	2.7	4.9	6.3	5.8	4.5	4.0	3.6	3.8	3.2	2.2	2.4	2.0	1.8	2.0	2.2	2.6	2.7	3.1	3.9	3.7	3.2	6.3
14-Mar	3.6	3.5	2.9	3.0	3.1	2.7	3.4	2.9	2.2	1.8	2.1	1.6	1.6	1.3	1.2	1.4	1.5	2.6	2.6	2.7	2.7	2.5	2.6	2.3	2.4	3.6
15-Mar	3.0	2.8	2.8	2.4	2.8	2.6	2.9	3.2	2.2	1.9	3.8	4.1	2.8	2.0	1.3	1.2	1.3	2.2	3.3	3.0	3.6	4.3	4.3	4.8	2.9	4.8
16-Mar	6.3	5.7	5.6	5.7	5.9	4.8	4.5	3.6	3.4	3.7	3.4	1.9	M	1.7	1.8	1.9	2.2	2.2	2.1	1.7	1.6	2.1	3.2	2.0	3.4	6.3
17-Mar	2.1	2.8	3.5	3.2	3.7	3.1	3.3	2.8	4.1	2.5	1.9	7.1	3.2	1.2	C	C	3.8	1.0	1.3	2.3	2.9	2.5	3.0	3.3	2.9	7.1
18-Mar	2.3	3.0	3.1	3.1	2.5	1.6	1.5	1.5	1.8	2.4	3.2	2.0	1.7	1.2	1.9	3.2	2.3	2.4	2.7	5.3	9.7	6.4	7.4	4.5	3.2	9.7
19-Mar	4.8	3.4	4.6	9.8	4.5	3.6	3.4	2.8	2.6	1.8	2.2	3.6	3.1	2.5	1.6	1.9	1.5	1.7	4.4	2.9	2.7	2.8	3.4	4.6	3.3	9.8
20-Mar	3.3	2.5	2.5	2.6	3.0	6.1	6.7	3.3	2.7	2.0	2.4	2.4	2.2	1.5	1.3	1.2	0.7	0.7	0.9	1.8	3.2	3.7	3.2	3.1	2.6	6.7
21-Mar	3.2	3.9	4.1	3.1	2.8	2.7	2.3	2.4	2.3	2.1	2.7	2.9	3.0	3.1	2.3	1.9	1.6	1.5	2.0	2.4	3.1	3.4	4.0	6.4	2.9	6.4
22-Mar	9.9	11.1	9.8	11.9	5.9	12.0	19.8	9.8	2.9	2.2	1.4	4.3	10.2	6.0	5.1	8.6	9.8	10.7	5.4	3.5	3.7	5.0	4.5	3.4	7.4	19.8
23-Mar	4.0	4.2	4.4	4.9	4.8	5.2	6.4	5.5	4.6	3.8	2.3	2.4	2.6	2.7	3.0	3.0	3.1	3.4	4.2	5.1	5.2	5.0	4.9	4.7	4.1	6.4
24-Mar	8.9	10.2	8.5	11.7	10.1	9.9	11.8	12.9	6.4	8.1	14.7	6.1	5.6	6.5	7.4	8.6	9.2	7.6	7.2	6.8	7.4	7.4	10.9	19.6	9.3	19.6
25-Mar	34.5	28.6	31.7	16.2	10.5	10.7	13.7	16.0	17.3	17.0	12.4	12.1	16.2	14.9	24.8	21.9	21.7	16.7	14.3	18.7	19.5	23.2	14.5	12.6	18.3	34.5
26-Mar	14.5	11.2	8.6	10.8	9.5	9.1	9.7	14.3	10.5	11.6	10.1	8.7	7.1	5.9	2.6	1.9	3.6	5.6	4.4	5.8	9.3	10.3	7.6	6.7	8.3	14.5
27-Mar	6.8	6.6	7.1	7.1	7.5	10.4	8.4	7.1	4.5	2.6	2.8	7.7	9.0	9.4	1.8	1.4	1.1	1.1	1.0	1.7	3.1	3.7	4.2	4.4	5.0	10.4
28-Mar	4.3	4.0	4.2	4.3	4.8	6.4	8.8	8.2	4.7	3.0	3.0	2.5	5.3	2.3	11.5	2.9	1.7	2.2	3.3	2.5	3.7	3.4	2.5	1.4	4.2	11.5
29-Mar	1.4	1.1	1.3	1.4	2.6	1.8	2.3	3.8	2.6	1.9	1.4	1.0	1.1	0.4	0.1	0.3	1.1	1.1	3.4	11.3	20.1	14.9	11.5	8.1	4.0	20.1
30-Mar	12.7	14.9	15.4	12.8	11.5	8.6	12.5	7.7	6.1	4.0	3.4	3.1	4.5	4.5	5.7	4.4	2.0	2.4	4.1	6.9	5.5	6.6	4.8	5.7	7.1	15.4
31-Mar	5.9	4.8	6.1	5.6	5.4	5.2	4.8	3.7	1.9	2.0	2.5	2.4	1.5	1.4	1.2	1.7	5.6	9.4	7.1	6.5	9.0	8.2	7.5	5.1	4.8	9.4
	6.4	6.5	6.2	6.0	5.6	5.8	6.6	6.6	5.6	5.0	4.6	4.4	4.6	3.9	4.0	4.0	4.2	4.2	4.1	4.6	5.5	5.2	4.8	5.0	Diurnal Average	
	34.5	28.6	31.7	16.2	16.9	17.0	22.4	32.5	26.6	19.7	14.7	12.1	16.2	14.9	24.8	21.9	21.7	16.7	14.3	18.7	20.1	23.2	14.5	19.6	Diurnal Maximum	

C - Calibration M - Maintenance

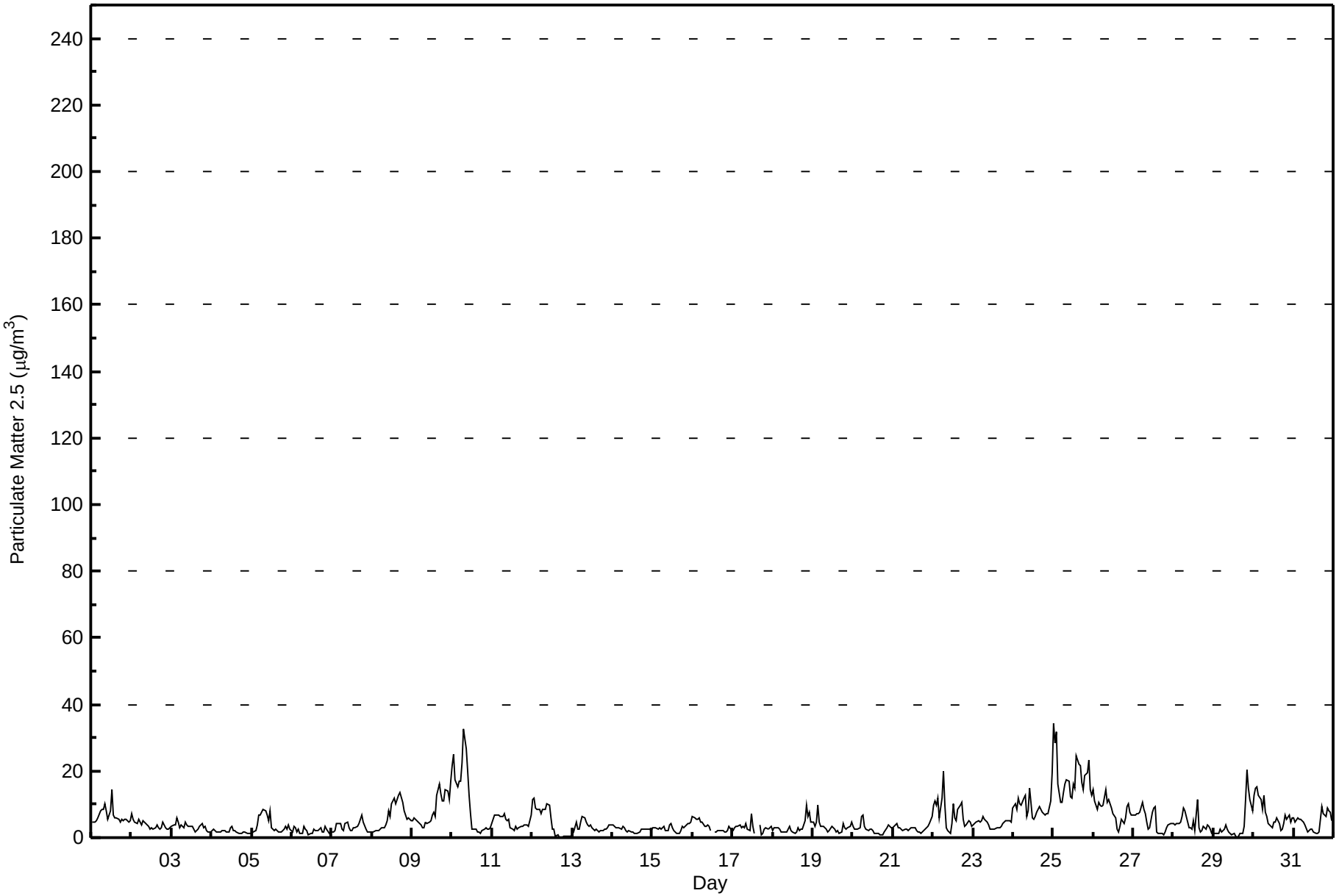
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Shell Muskeg River - March 2016



Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Shell Muskeg River - March 2016

Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	498	67.21	67.21
6 - 15	194	26.18	93.39
16 - 25	24	3.24	96.63
26 - 80	5	0.67	97.30
> 81.0	0	0.00	97.30

Total Number of Valid Hours: 741

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Shell Muskeg River - March 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	75	126	71	22	10	12	19	24	31	21	17	11	8	15	22	14	498
6 - 15	26	21	25	11	6	4	4	7	22	20	10	1	2	6	15	14	194
16 - 25	1	2	2	2	2	0	1	2	3	7	0	0	0	0	2	0	24
26 - 80	0	0	0	2	0	0	0	1	0	0	1	1	0	0	0	0	5
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	102	149	98	37	18	16	24	34	56	48	28	13	10	21	39	28	721

Total Number of Valid Hours: 741

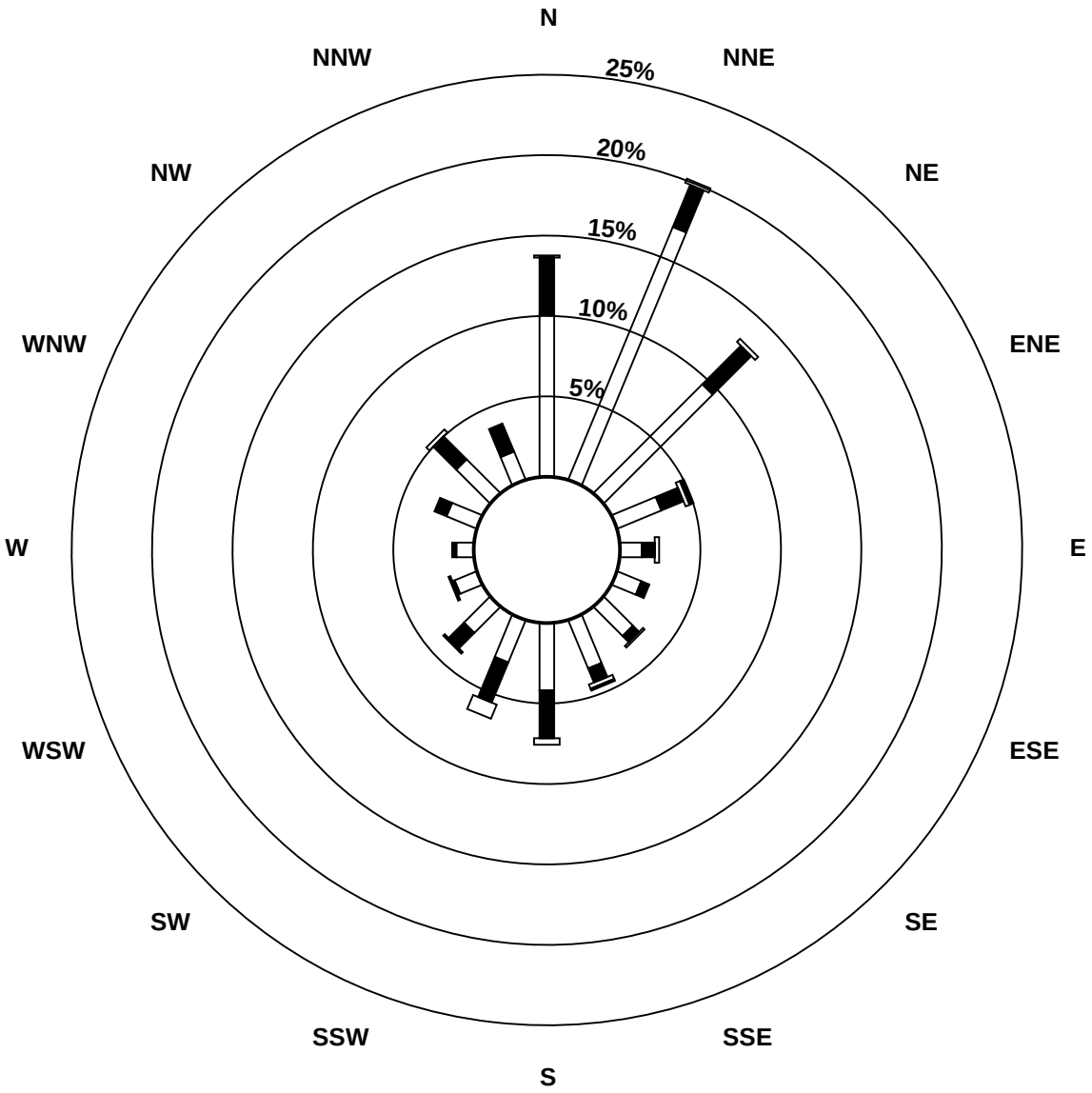
Total Number of Hours: 744

Wood Buffalo Environmental Association

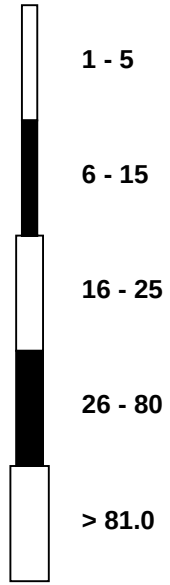
Wind Rose Mar 2016

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Shell Muskeg River (AMS 16)



Classes ($\mu g/m^3$)



Total Number of Valid Hours: 741

Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Shell Muskeg River - March 2016

Maximum Value: 97 % on Mar 12 06:00

Maximum Daily Average: 88.8 % on Mar 13

Minimum Value: 23 % on Mar 24 17:00

Minimum Daily Average: 45.3 % on Mar 24

Maximum Diurnal Average: 83.1 % at hour 7

Minimum Diurnal Average: 61.5 % at hour 16

Monthly Average: 72.3 %

Percentiles: P_1 = 28 P_{10} = 49 Q_1 = 62 Median = 75 Q_3 = 85 P_{90} = 90 P_{99} = 95

Hours in Service:	744
Hours of Data:	742
Hours of Missing Data:	2
Hours of Calibration:	0
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	85	84	85	86	86	87	89	90	90	80	74	70	72	68	62	63	66	66	70	72	75	79	81	82	77.5	90
2-Mar	84	84	84	85	86	86	86	86	86	85	84	83	78	76	76	74	72	73	74	76	77	77	77	78	80.3	86
3-Mar	79	78	80	82	85	88	91	91	90	89	88	86	86	84	84	83	81	82	81	78	70	73	76	77	82.5	91
4-Mar	79	82	81	74	71	73	74	77	72	65	60	62	60	58	57	58	59	62	65	68	66	64	60	60	67.0	82
5-Mar	61	62	64	66	68	71	72	72	71	66	66	71	75	73	72	73	75	77	79	80	81	81	86	87	72.9	87
6-Mar	84	84	85	85	85	86	87	87	85	83	79	75	72	68	63	61	58	58	55	56	62	62	64	67	73.0	87
7-Mar	69	70	71	81	88	89	89	90	90	86	82	80	79	78	79	78	81	85	86	86	85	82	82	80	81.9	90
8-Mar	81	83	84	84	84	85	85	85	84	81	78	79	84	86	85	83	81	83	85	84	87	88	86	87	83.9	88
9-Mar	88	91	92	93	93	93	93	93	92	91	86	82	82	80	77	80	81	82	86	91	96	95	94	93	88.5	96
10-Mar	92	91	91	92	90	89	90	91	93	95	95	90	81	78	78	79	80	82	84	86	92	88	87	89	87.7	95
11-Mar	89	91	93	92	92	93	96	96	91	86	80	73	71	69	71	70	69	70	77	80	81	84	85	87	82.7	96
12-Mar	89	94	97	97	95	97	95	94	95	92	87	82	71	62	45	48	45	49	55	60	66	66	68	71	75.9	97
13-Mar	79	82	81	84	82	85	88	87	86	86	89	94	94	92	92	91	90	90	92	93	94	94	94	93	88.8	94
14-Mar	90	88	87	88	89	90	90	90	88	86	84	82	80	81	80	79	81	84	87	88	88	89	89	89	86.0	90
15-Mar	90	90	91	90	90	90	89	89	88	87	82	75	68	66	63	64	66	71	74	76	79	80	81	82	80.1	91
16-Mar	85	85	88	87	87	88	87	87	86	85	84	83	M	M	84	83	82	83	90	90	87	84	86	89	85.9	90
17-Mar	90	90	91	92	91	87	87	89	84	74	68	72	70	63	63	60	60	65	72	72	70	79	87	86	77.6	92
18-Mar	84	81	81	84	83	77	79	79	72	67	64	61	56	55	54	53	55	57	69	73	73	77	85	80	70.8	85
19-Mar	82	86	90	89	86	90	91	88	85	79	75	68	61	59	61	60	60	60	65	64	65	66	68	71	73.7	91
20-Mar	70	71	71	71	73	81	85	77	70	66	65	62	58	56	54	52	48	50	55	63	72	79	80	81	67.1	85
21-Mar	83	83	84	83	83	83	82	82	81	75	72	67	62	59	60	58	56	53	53	50	45	44	50	51	66.6	84
22-Mar	54	50	51	56	57	69	70	59	46	43	38	39	46	48	54	59	63	62	63	63	72	84	89	87	59.3	89
23-Mar	87	88	91	93	93	93	92	89	86	82	79	76	74	73	72	69	67	57	47	41	40	40	40	40	71.2	93
24-Mar	48	56	60	68	67	66	72	66	53	49	42	34	28	25	26	23	23	24	25	34	35	46	56	60	45.3	72
25-Mar	64	65	67	70	61	62	58	55	50	49	49	48	47	49	56	59	62	59	65	77	80	85	77	76	62.1	85
26-Mar	84	79	75	70	67	65	62	65	65	63	59	62	59	54	45	42	43	43	49	61	70	67	68	66	61.7	84
27-Mar	68	73	80	84	88	89	90	84	71	64	59	59	52	46	38	37	36	38	42	50	52	54	58	63	61.5	90
28-Mar	65	68	69	69	70	76	80	74	65	58	55	51	48	44	47	37	28	31	38	40	43	49	62	58	55.2	80
29-Mar	64	57	61	62	70	72	71	64	55	48	40	34	43	37	34	31	31	32	34	42	51	48	51	56	49.6	72
30-Mar	69	73	74	80	84	89	87	74	57	54	50	44	45	45	43	47	58	66	70	68	68	68	67	67	64.4	89
31-Mar	70	70	68	67	68	70	71	71	68	63	59	56	53	49	48	51	55	56	57	58	62	63	68	67	62.0	71
	77.6	78.4	79.6	80.7	81.0	82.5	83.1	81.3	77.2	73.4	70.0	67.8	65.2	62.7	62.1	61.5	61.7	63.0	65.9	68.4	70.4	72.1	74.3	74.9	Diurnal Average	
	92	94	97	97	95	97	96	96	95	95	95	94	94	92	92	91	90	90	92	93	96	95	94	93	Diurnal Maximum	

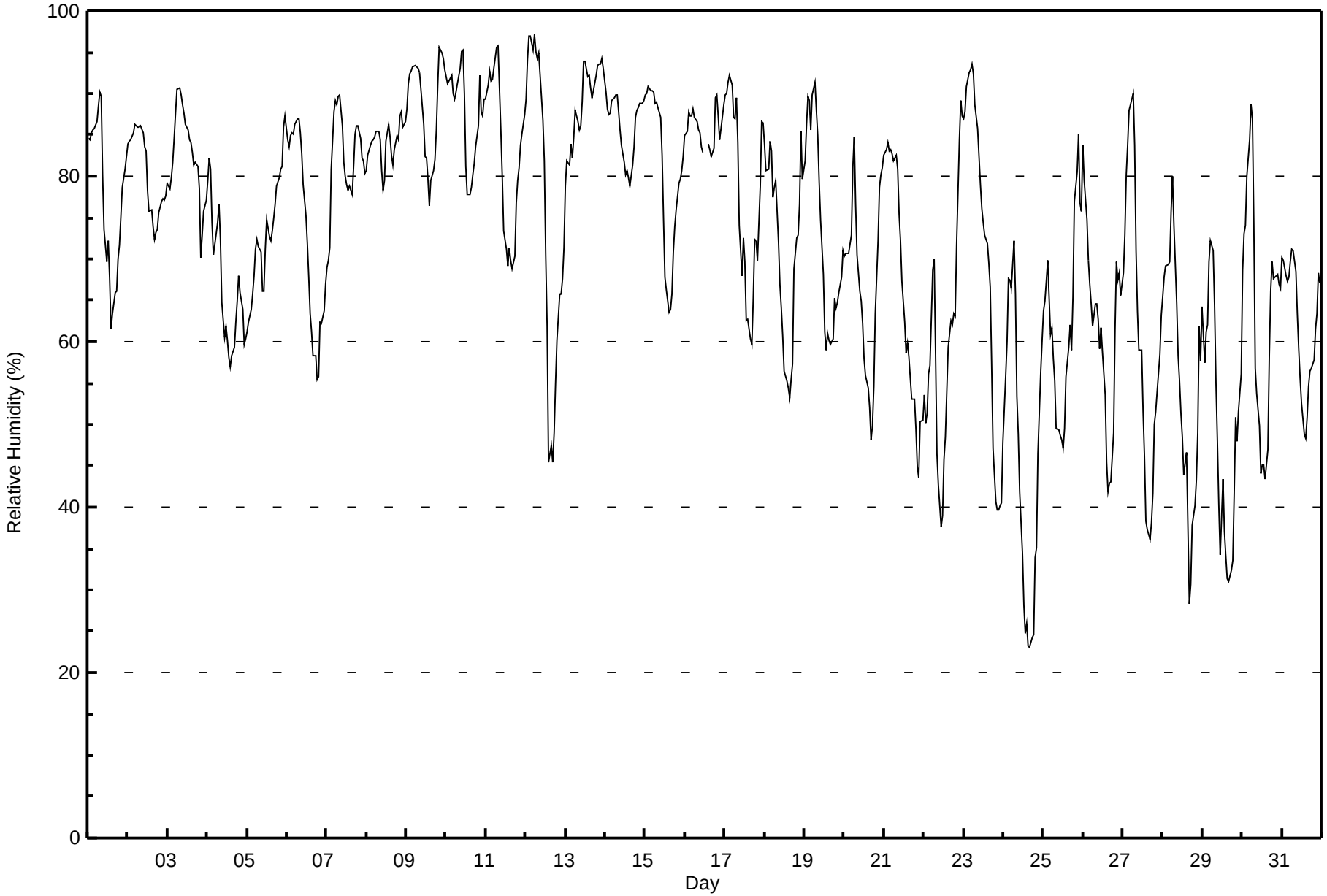
M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Shell Muskeg River - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	29	3.91	3.91
40 - 60	132	17.79	21.70
60 - 80	273	36.79	58.49
80 - 100	308	41.51	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Shell Muskeg River - March 2016

Maximum Value: 11.5 C on Mar 28 17:00

Maximum Daily Average: 4.4 C on Mar 29

Minimum Value: -20.9 C on Mar 24 07:00

Minimum Daily Average: -10.6 C on Mar 24

Maximum Diurnal Average: -0.1 C at hour 16

Minimum Diurnal Average: -8.2 C at hour 7

Monthly Average: -4.25 C

Percentiles: P_1 = -17.5 P_{10} = -10.3 Q_1 = -7.8 Median = -4.7 Q_3 = -0.9 P_{90} = 2.1 P_{99} = 10.2

Hours in Service:	744
Hours of Data:	742
Hours of Missing Data:	2
Hours of Calibration:	0
Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.3	-10.4	-10.4	-10.4	-10.4	-10.6	-11.3	-12.8	-12.9	-9.7	-8.1	-6.7	-6.3	-5.2	-3.5	-3.8	-4.3	-4.4	-4.6	-5.0	-5.5	-6.0	-6.6	-7.2	-7.8	-3.5
2-Mar	-7.8	-8.2	-8.9	-9.6	-9.6	-9.8	-10.6	-10.8	-10.9	-10.8	-10.5	-9.9	-8.6	-7.7	-7.3	-6.7	-6.6	-6.9	-7.6	-8.5	-9.0	-9.2	-9.5	-9.5	-8.9	-6.6
3-Mar	-9.6	-9.3	-9.0	-7.8	-7.9	-8.3	-8.4	-8.6	-9.0	-8.6	-8.5	-8.1	-7.9	-7.6	-7.7	-7.7	-7.9	-8.3	-8.9	-9.5	-9.9	-9.9	-9.9	-10.0	-8.7	-7.6
4-Mar	-10.3	-10.8	-11.4	-11.9	-12.1	-12.6	-12.7	-12.7	-11.9	-10.7	-9.4	-7.9	-6.4	-5.2	-4.6	-4.5	-4.3	-4.7	-5.7	-7.0	-6.8	-6.3	-5.6	-5.3	-8.4	-4.3
5-Mar	-5.0	-5.0	-5.0	-5.2	-5.4	-5.8	-5.6	-5.5	-4.9	-3.3	-2.8	-2.4	-3.7	-5.1	-5.4	-5.8	-6.4	-7.3	-8.2	-8.4	-8.6	-8.7	-8.9	-8.9	-5.9	-2.4
6-Mar	-8.7	-8.7	-8.9	-9.2	-9.4	-10.0	-10.5	-10.8	-10.8	-10.2	-9.9	-9.0	-7.6	-6.2	-5.1	-4.9	-4.6	-4.7	-4.7	-5.7	-7.7	-8.6	-9.2	-9.3	-8.1	-4.6
7-Mar	-9.5	-9.5	-9.3	-9.6	-9.9	-10.0	-9.9	-9.6	-9.3	-8.5	-8.4	-8.0	-7.1	-6.0	-5.3	-4.2	-4.2	-5.0	-5.8	-7.2	-9.3	-10.5	-10.7	-10.6	-8.2	-4.2
8-Mar	-10.7	-10.8	-10.7	-10.6	-10.5	-10.4	-10.3	-10.0	-9.0	-7.2	-6.2	-4.8	-4.7	-4.6	-3.8	-3.5	-3.3	-3.6	-3.8	-4.0	-4.3	-4.7	-5.0	-5.3	-6.7	-3.3
9-Mar	-5.6	-6.3	-6.7	-7.0	-7.3	-7.6	-7.8	-7.8	-7.5	-7.2	-6.3	-5.3	-4.6	-3.4	-1.9	-0.9	-0.6	-0.5	-1.1	-3.4	-5.1	-7.7	-9.4	-11.2	-5.5	-0.5
10-Mar	-12.3	-13.3	-13.6	-12.2	-13.0	-14.1	-13.6	-12.2	-8.9	-5.5	-4.0	-2.5	-0.7	0.4	1.1	1.2	0.7	0.4	-0.1	-0.4	-0.9	-0.4	-0.5	-0.8	-5.2	1.2
11-Mar	-0.8	-1.0	-1.5	-1.5	-1.9	-2.5	-4.3	-3.8	-1.7	-0.5	0.5	1.3	1.7	2.3	1.9	2.0	2.4	2.1	1.1	0.6	0.5	0.2	0.0	0.0	-0.1	2.4
12-Mar	-0.3	-2.2	-3.5	-4.5	-6.9	-6.1	-7.1	-6.8	-4.7	-1.7	-0.3	0.9	3.6	6.1	8.9	8.9	9.3	7.7	5.9	4.6	3.3	3.5	3.7	3.0	1.1	9.3
13-Mar	1.4	0.6	0.9	0.4	1.3	1.4	0.4	0.6	0.5	0.5	0.3	0.2	0.3	0.7	0.9	1.0	0.9	0.7	0.4	0.1	0.0	-0.2	-0.4	-0.7	0.5	1.4
14-Mar	-0.9	-1.3	-2.1	-2.6	-3.1	-3.6	-4.1	-4.3	-4.4	-4.4	-4.3	-4.2	-4.2	-4.3	-4.2	-4.1	-4.5	-4.7	-5.1	-6.0	-6.6	-6.6	-6.6	-6.7	-4.3	-0.9
15-Mar	-6.5	-6.6	-7.1	-7.3	-7.4	-7.3	-7.4	-7.4	-7.3	-6.9	-5.9	-4.3	-2.6	-2.0	-1.3	-1.3	-1.6	-2.5	-3.1	-3.3	-4.3	-5.1	-5.7	-6.2	-5.0	-1.3
16-Mar	-6.5	-6.7	-7.2	-7.3	-7.2	-7.4	-7.6	-7.8	-7.9	-7.9	-7.5	-7.1	M	M	-7.0	-6.9	-6.6	-6.5	-6.8	-7.2	-7.6	-7.6	-7.9	-8.3	-7.3	-6.5
17-Mar	-8.3	-8.3	-8.4	-8.8	-9.2	-9.2	-8.5	-8.9	-7.2	-5.3	-4.7	-4.5	-4.1	-3.6	-3.7	-3.7	-3.6	-4.1	-4.7	-4.9	-5.1	-7.1	-8.6	-8.5	-6.4	-3.6
18-Mar	-7.8	-6.9	-6.7	-7.1	-6.7	-5.6	-5.7	-5.5	-4.5	-4.0	-3.5	-2.6	-1.1	0.0	1.4	2.4	2.5	2.1	-0.8	-2.0	-3.2	-4.1	-6.4	-4.4	-3.3	2.5
19-Mar	-5.4	-6.9	-8.2	-9.0	-6.9	-10.6	-10.3	-8.9	-7.4	-6.0	-4.5	-2.4	0.0	1.6	2.3	3.3	3.4	3.1	1.5	0.6	-0.5	-1.7	-1.9	-1.5	-3.2	3.4
20-Mar	-1.3	-2.4	-3.2	-3.9	-5.1	-7.2	-7.9	-6.9	-5.3	-3.9	-2.9	-1.5	0.0	0.6	1.1	1.6	1.7	1.4	0.4	-0.9	-2.3	-3.8	-4.7	-5.4	-2.6	1.7
21-Mar	-6.5	-6.6	-7.6	-7.8	-8.1	-8.4	-8.7	-8.7	-8.6	-7.9	-6.6	-5.4	-4.1	-2.4	-1.4	-1.0	-1.2	-1.5	-2.6	-3.8	-4.7	-5.8	-7.4	-8.2	-5.6	-1.0
22-Mar	-9.1	-9.3	-10.3	-11.3	-11.4	-13.3	-13.8	-11.3	-9.2	-8.2	-5.9	-4.4	-3.7	-2.1	-1.5	-2.0	-1.9	-1.7	-2.0	-2.3	-2.8	-3.6	-3.9	-4.3	-6.2	-1.5
23-Mar	-4.6	-4.7	-4.9	-5.1	-5.3	-5.3	-5.3	-6.6	-7.5	-7.3	-6.6	-6.0	-5.2	-4.6	-4.3	-4.1	-4.2	-4.5	-4.8	-5.6	-6.8	-7.2	-7.7	-8.9	-5.7	-4.1
24-Mar	-10.7	-13.8	-16.4	-18.6	-19.1	-19.2	-20.9	-18.6	-12.9	-11.2	-8.7	-7.0	-5.6	-4.1	-3.5	-2.5	-3.1	-3.4	-4.1	-5.0	-5.7	-10.9	-13.9	-15.9	-10.6	-2.5
25-Mar	-17.5	-18.0	-17.8	-17.1	-14.4	-13.7	-12.0	-10.0	-8.3	-6.3	-4.3	-2.8	-0.7	0.2	0.5	1.1	0.8	1.4	0.0	-2.4	-3.7	-4.3	-2.4	-2.9	-6.4	1.4
26-Mar	-5.4	-3.2	-3.1	-3.3	-3.6	-4.1	-4.6	-4.5	-3.9	-3.2	-2.1	-1.8	-0.4	0.9	2.0	3.3	3.8	3.8	1.7	-2.0	-3.7	-4.0	-4.7	-4.7	-2.0	3.8
27-Mar	-5.1	-6.0	-7.8	-8.7	-10.1	-10.6	-9.0	-7.0	-4.3	-1.5	0.2	1.5	4.1	6.5	9.1	9.6	10.0	9.4	7.7	4.7	4.2	3.1	1.5	0.2	0.1	10.0
28-Mar	-0.6	-1.5	-2.1	-2.3	-2.4	-3.6	-4.4	-2.0	1.8	4.3	5.7	7.3	8.6	10.3	10.2	10.5	11.5	10.2	8.0	6.5	5.3	3.3	0.0	1.4	3.6	11.5
29-Mar	-0.7	0.6	-0.6	-1.2	-3.1	-3.7	-3.1	-0.9	2.1	5.0	7.2	9.4	8.0	9.1	10.0	10.8	11.1	10.7	9.7	7.0	5.2	5.2	4.3	3.4	4.4	11.1
30-Mar	2.0	1.1	0.3	-0.7	-1.8	-2.7	-2.3	0.4	3.6	5.4	7.3	9.1	9.9	9.9	10.4	9.1	6.2	3.5	1.9	1.2	0.7	-0.4	-1.1	-1.9	3.0	10.4
31-Mar	-2.4	-3.3	-3.7	-4.0	-4.6	-5.1	-5.7	-5.6	-5.2	-4.6	-3.9	-3.3	-2.5	-1.1	-0.2	0.2	0.6	0.5	0.5	0.1	-0.2	-0.8	-1.2	-1.5	-2.4	0.6
	-6.0	-6.4	-6.9	-7.3	-7.5	-8.0	-8.2	-7.6	-6.4	-5.1	-4.0	-3.0	-1.9	-0.9	-0.4	-0.1	-0.1	-0.6	-1.5	-2.6	-3.4	-4.2	-4.8	-5.2	Diurnal Average	
	2.0	1.1	0.9	0.4	1.3	1.4	0.4	0.6	3.6	5.4	7.3	9.4	9.9	10.3	10.4	10.8	11.5	10.7	9.7	7.0	5.3	5.2	4.3	3.4	Diurnal Maximum	

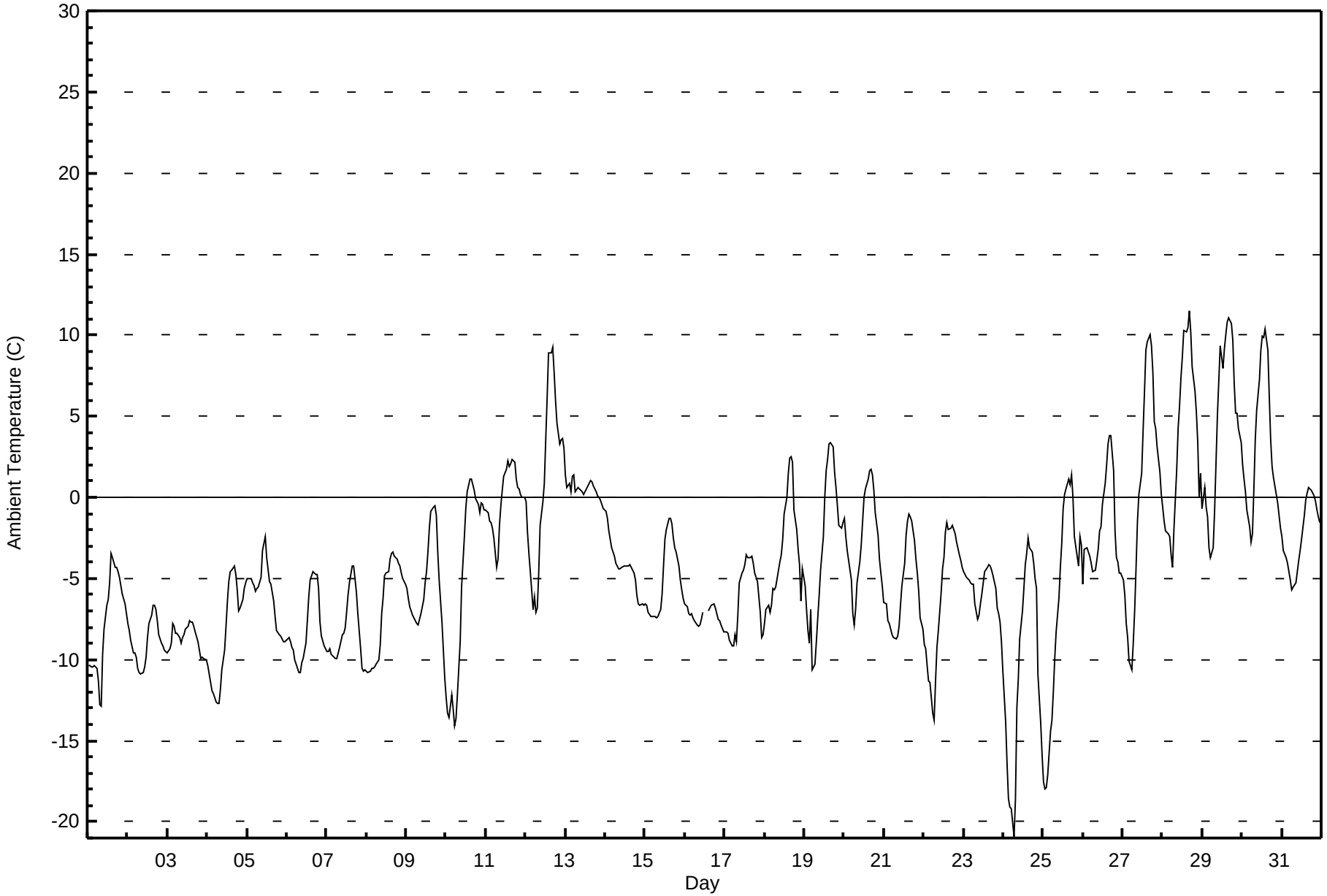
M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Shell Muskeg River - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	1	0.13	0.13
-20 - 0	589	79.38	79.51
0 - 10	141	19.00	98.52
10 - 20	11	1.48	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Barometric Pressure (BP) - inHg

Shell Muskeg River - March 2016

Maximum Value: 29.3 inHg on Mar 17 20:00

Maximum Daily Average: 29.3 inHg on Mar 17

Minimum Value: 28.2 inHg on Mar 13 14:00

Minimum Daily Average: 28.3 inHg on Mar 13

Maximum Diurnal Average: 28.8 inHg at hour 10

Minimum Diurnal Average: 28.8 inHg at hour 17

Monthly Average: 28.83 inHg

Percentiles: P_1 = 28.2 P_{10} = 28.5 Q_1 = 28.7 Median = 28.8 Q_3 = 29.0 P_{90} = 29.1 P_{99} = 29.3

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-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
2-Mar	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	29.0	29.0	29.0	29.0	29.0	29.0	28.9	29.0
3-Mar	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	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.9
4-Mar	28.9	28.9	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	28.8	28.8	28.8	28.7	28.7	28.7	28.6	28.6	28.6	28.9	29.0
5-Mar	28.5	28.5	28.5	28.5	28.5	28.4	28.5	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.6
6-Mar	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7
7-Mar	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.7	28.8
8-Mar	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	28.7	28.7	28.7	28.7	28.7	28.8
9-Mar	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	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8
10-Mar	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.3	28.4	28.3	28.3	28.3	28.3	28.3	28.5	28.7
11-Mar	28.3	28.3	28.3	28.4	28.4	28.4	28.4	28.4	28.5	28.5	28.5	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	28.5	28.7
12-Mar	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.3	28.3	28.3	28.5	28.7
13-Mar	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.2	28.2	28.2	28.3	28.2	28.2	28.2	28.2	28.2	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3
14-Mar	28.3	28.3	28.4	28.4	28.4	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.5	28.7
15-Mar	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	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.9
16-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	M	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.0	29.1
17-Mar	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	29.3	29.3	29.3	29.3	29.3
18-Mar	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	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3
19-Mar	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2
20-Mar	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.0	29.0	29.1	29.1
21-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	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
22-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	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
23-Mar	28.9	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	29.0	29.0	28.9	29.0
24-Mar	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0
25-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	28.8	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
26-Mar	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9
27-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	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8
28-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	28.9	28.9	28.9	28.9	28.9	28.8	28.9
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	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9
30-Mar	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	29.0	29.0	29.1	29.1	29.1	29.1	29.1	28.9	29.1
31-Mar	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	29.1	29.2
	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	Diurnal Average	
	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	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	Diurnal Maximum	

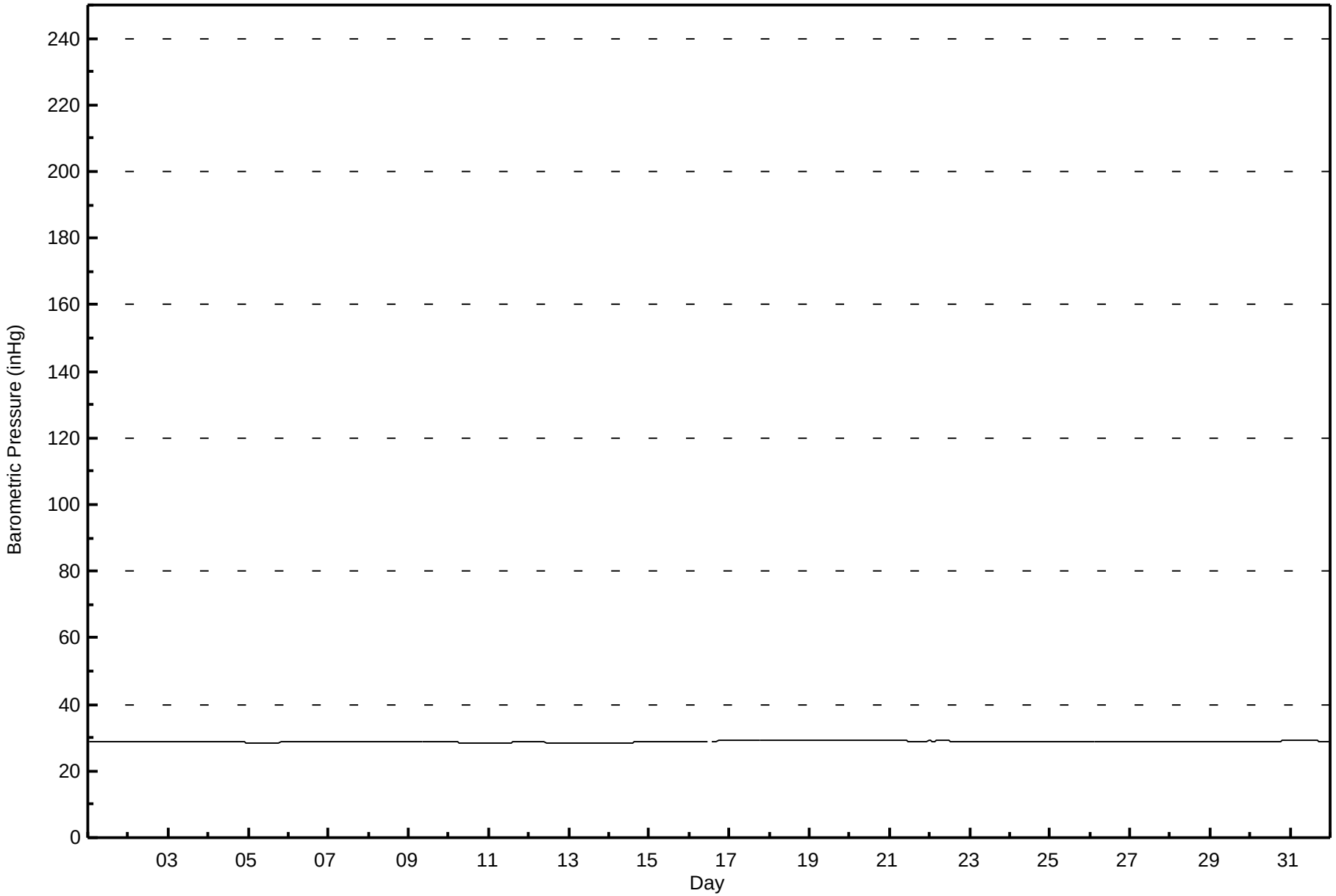
M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Barometric Pressure (BP) - inHg

Shell Muskeg River - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Shell Muskeg River - March 2016

Maximum Speed: 30 km/h on Mar 30 22:00

Maximum Daily Speed Average: 18.8 km/h on Mar 14

Minimum Speed Value: 0 km/h on Mar 12 06:00

Minimum Daily Speed Average: 1.0 km/h on Mar 25

Maximum Diurnal Speed Average: 8.4 km/h at hour 20

Minimum Diurnal Speed Average: 3.9 km/h at hour 4

Monthly Average Velocity: 5.6 km/h 23.7 deg

Percentiles: $P_1 = 2$ $P_{10} = 4$ $Q_1 = 5$ Median = 9 $Q_3 = 15$ $P_{90} = 19$ $P_{99} = 25$

Hours in Service: 744

Hours of Data: 743

Hours of Missing Data: 1

Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	S7	S5	SSW5	SSW5	SSW4	SSW5	SSW5	SSW5	S5	SW5	W5	NW6	NNW7	NNE5	NW7	N4	ENE11	NE11	NE14	NE15	NNE15	NNE13	NE13	NE10	NE2.6	NNE15
2-Mar	NNE8	NE10	NE11	NE9	NE7	NE10	NE12	NNE8	NNE8	NNE7	NNE8	NNE7	N6	NNE8	NNE7	N5	NE12	NE14	NNE16	NNE15	NNE17	NE11	NE13	NE13	NNE10.0	NNE17
3-Mar	NE14	NE16	NE15	NNE16	NNE14	NE14	NNE12	NNE14	N16	N11	NNE14	N13	N14	NNE16	NNE21	NNE22	NNE22	NNE18	N18	NNE19	NNE16	NNE14	NE12	NE12	NNE15.2	NNE22
4-Mar	NE12	ENE10	E6	ESE3	E6	SE3	SSW4	S5	SSE6	S6	S7	S7	SSE7	S11	S13	SSE13	SE9	SE11	ESE7	ESE7	SE6	SSE8	SSE10	SSE11	SE6.2	SSE13
5-Mar	S10	S10	S10	S10	S9	S9	SW9	S7	S6	SW7	NNW4	NE13	NNE23	NE20	NE20	NE22	NE25	NE21	NNE27	NNE23	NNE22	NNE21	NNE18	NNE19	NE8.3	NNE27
6-Mar	NNE17	N13	N15	NNE21	NNE19	NNE18	NNE17	NNE15	NNE15	NNE16	NE16	NE15	NNE17	N14	N15	NNE19	NNE18	N18	NNE16	NNE18	NNE19	NNE22	NNE20	NE15	NNE16.6	NNE22
7-Mar	NNE14	NNE18	NNE17	N12	NNE13	NNE11	NNE15	NNE11	N8	NNW6	NW8	WNW9	WNW5	SW5	SW5	SE4	E4	NE9	NNE15	NNE15	NE14	NE12	ENE11	NE14	NNE8.4	NNE18
8-Mar	ENE6	SSE3	SW4	SW3	S3	SW2	SSE3	SE3	E3	SSE2	NW3	E3	NW6	NW8	NW7	NW5	WNW6	NW7	NNW7	NE7	NE9	NE12	NE15	NE15	NNE2.6	NE15
9-Mar	NE15	NE15	NNE12	NNE12	NNE10	NNE14	NE10	ENE5	N3	NNW3	WNW5	NW5	NW5	NW4	SW3	S9	SSE6	SE3	N2	ESE4	E3	NE3	NE4	SE2	NE4.0	NE15
10-Mar	SSE3	SSW6	SSW6	SSW5	SSW3	S4	SSW2	SW3	WSW2	NE3	ENE4	ESE5	SE11	SE10	SE12	SE13	SE12	ESE9	SE9	SSE7	SE8	S10	SW5	WSW5	SSE5.2	SE13
11-Mar	WSW5	WSW7	SSW6	SW9	SW6	SW5	SSW5	S5	S3	ESE2	NW6	NW5	SW4	WNW7	N5	N4	NW4	SW4	SSW4	SSW2	SE2	S5	S5	SSE7	SW2.9	SW9
12-Mar	S4	SSE4	SE5	S3	S7	ENE0	NNW4	N2	ENE2	N4	N9	NNE11	NNE14	N6	E6	SE9	SE16	SE15	SE10	SE7	SE6	SE8	SSE9	ESE1	ESE3.6	SE16
13-Mar	E5	NNE4	NNE3	ENE4	NE7	NNE5	NNW5	N15	NNE16	N15	N16	N12	N17	N17	NNW15	N21	N22	N22	N20	NNW20	N20	NNW15	N18	N18	N13.2	N22
14-Mar	N21	N21	N21	N20	N19	N23	N19	NNE18	NNE20	NNE20	NNE18	NNE19	NNE19	NNE19	N20	N19	N21	N18	NNE19	N19	N17	N15	NNE15	NNE14	N18.8	N23
15-Mar	NNE14	NNE15	NNE15	NNE17	NNE14	NE10	NNE11	NNE10	NE7	NNE6	NNW6	NW8	NW9	NW10	NW11	NW10	N11	NNE16	NNE16	NNE17	N17	N20	N17	N19	N11.5	N20
16-Mar	N18	N19	N20	N19	N20	N20	N21	N19	N19	N17	N18	NNW17	M	N17	N17	N16	N17	NNW11	NW9	NNE8	NE13	NNE9	NW3	W4	N14.6	N21
17-Mar	SW4	SW5	SSW3	WNW5	NW8	NW8	WNW8	WSW7	SSW3	W7	NW5	WNW3	NW7	NW10	NW10	NNW9	NW8	WNW8	NW8	NW7	WNW3	SW5	SSW4	SSW6	WNW4.7	NW10
18-Mar	SSW6	SSW7	SW6	S5	WSW7	WSW10	WSW7	W8	NW8	NNW9	NNW5	WSW2	SSW4	SE7	S9	S11	S11	SSE7	ESE6	ENE7	NE11	NE10	NE6	NNE14	SSW1.2	NNE14
19-Mar	NE8	ENE4	NNE4	NE5	NNE16	NE7	ENE4	ENE4	NE10	NE10	NNE7	NNW8	NW8	NNW10	NNE16	NNE17	NNE24	NNE24	N17	NNE21	NNE20	NNE22	NNE18	NE14	NNE11.7	NNE24
20-Mar	NE12	NE12	ENE8	ENE7	NE8	NE5	NE6	NE6	NE7	NE11	NE13	NNE14	N15	NNE20	NNE19	NE20	NE21	NE21	NE20	NE19	NNE18	NNE19	NNE21	NNE22	NE13.9	NNE22
21-Mar	NNE21	NNE18	NNE22	NNE22	NE19	NE19	NE20	NE18	NNE18	NE20	NNE20	NNE21	NNE20	NNE21	NNE22	NE23	NE21	E12	E11	ENE11	ENE10	ENE9	NE11	NE9	NE16.7	NE23
22-Mar	ENE6	NE7	ENE8	E8	SE7	ESE6	E6	SE6	SSE7	E3	SSE3	WNW5	NNW5	SW5	SW8	NNW3	N4	NW3	ENE4	E3	SSW4	SE2	E5	ESE6	ESE2.2	SW8
23-Mar	ESE5	ESE4	E4	ENE4	ENE5	ENE5	NNE11	N17	N16	N15	N13	N14	N13	NNE15	N16	NNE14	NE18	NE18	NNE20	NE18	NE13	NE13	NE14	NE14	NNE11.3	NNE20
24-Mar	NNE10	NE4	ENE4	ENE4	ENE5	ENE6	NE5	NE4	NNE9	NNE8	NNW9	N13	N12	NNW9	NNW8	NW7	NE9	NE10	NE13	NE12	NNE13	NE4	ENE5	ENE4	NNE6.7	NNE13
25-Mar	ENE5	ENE5	SSE4	SSW7	SSW7	SSW8	SSW8	SSW7	S8	SSW8	SSW7	SSW4	S5	WNW3	NW5	NW5	NNE3	ENE3	NE5	E2	NNE2	N4	NNE14	NNE8	S1.0	NNE14
26-Mar	N5	NNE13	NNE10	N11	NNE10	NNE11	NNE8	NNE4	NNE7	NNW5	WNW5	N4	WNW4	W5	SSE5	SSE6	SSE7	S9	SE8	SSE7	SSE7	S6	SSW4	S6	NE1.6	NNE13
27-Mar	S10	S7	S6	SSW6	SSW6	SSW6	SSW6	SW6	WSW5	W5	W5	NNW6	NNW5	WNW2	SSE14	SSE15	SSE15	SSE15	SSE12	SE11	SSE14	SSE10	S10	S10	S6.6	SSE15
28-Mar	S11	S9	S8	SSW8	S9	S10	SSW9	S8	S10	SSW12	SSW13	S14	SSW13	SW12	NW9	W15	W17	WNW16	WNW15	WNW13	WNW13	W11	WSW10	WSW12	SW8.1	W17
29-Mar	SW7	WSW11	SSW8	SSW7	SW7	S7	SSE6	SSE7	S9	SSW8	SW6	WSW3	NE10	NE8	NE11	NE7	ENE6	ENE8	ESE5	E5	NE4	ENE6	E4	E4	SE2.1	NE11
30-Mar	SSW1	SW1	ESE3	SSW4	NW4	N2	NW4	N7	NNW5	NW6	WNW5	WNW5	N13	N18	NNW17	N19	NNE21	NNE26	NNE29	N26	N26	N30	N26	N26	N12.0	N30
31-Mar	NNE21	NNE21	N17	N19	N15	N13	N14	NNE14	NE10	NNE8	N6	NE6	NE7	ESE5	SE8	SE6	SSE8	SSE10	SSE7	S6	S8	S7	S7	S7	NNE4.6	NNE21
	NE5.2	NNE4.8	NNE4.3	NNE3.9	NNE4.2	NNE4.1	NNE4.0	NNE4.0	NNE4.3	N4.3	N5.0	N5.7	N6.5	N6.2	N5.8	NNE6.0	NE7.3	NE7.2	NNE8.1	NNE8.4	NNE8.1	NNE7.0	NNE6.9	NNE6.3	Diurnal Average	
	N21	NNE21	NNE22	NNE22	N20	N23	N21	N19	NNE20	NE20	NNE20	NNE21	NNE23	NNE21	NNE22	NE23	NE25	NNE26	NNE29	N26	N26	N30	N26	N26	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

Shell Muskeg River - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 8 km/h on Mar 30 13:00

Minimum Value: 0 km/h on Mar 22 22:00

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	1	1	1	1	1	1	1	1	1	2	1	1	2	1	2	2	1	2	2	2	3	2	2	2	3
2-Mar	2	1	1	2	1	3	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	2	2	2	3
3-Mar	2	2	3	3	2	3	2	3	4	3	3	3	3	4	4	5	4	4	4	4	3	3	2	3	5
4-Mar	3	2	3	2	2	1	1	1	1	2	2	2	3	3	4	3	3	3	2	2	2	2	2	2	4
5-Mar	2	2	2	2	2	3	2	2	2	2	2	4	4	3	3	4	4	4	4	5	4	4	4	3	5
6-Mar	4	3	4	4	5	4	3	3	3	3	3	2	3	3	3	4	4	4	3	4	4	3	3	2	5
7-Mar	2	2	3	2	2	3	2	2	2	2	2	2	2	1	1	1	1	4	2	3	3	4	4	2	4
8-Mar	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	2	2	2	2	2	3
9-Mar	2	2	3	2	2	2	2	4	1	2	2	1	1	1	3	2	2	1	2	1	1	1	2	1	4
10-Mar	1	1	1	1	1	1	1	1	1	2	1	2	3	2	3	4	3	3	2	2	3	3	1	1	4
11-Mar	1	1	2	2	4	2	2	1	2	1	2	2	1	2	2	1	1	1	1	1	1	1	2	1	4
12-Mar	2	1	1	2	2	2	2	2	1	2	3	3	3	3	2	6	5	4	3	1	2	2	3	2	6
13-Mar	1	1	1	1	2	2	4	4	3	3	3	3	4	4	4	5	5	5	5	5	5	5	4	5	5
14-Mar	5	4	5	4	5	4	4	4	4	4	4	4	4	4	4	4	4	4	5	4	3	4	3	2	5
15-Mar	2	2	2	2	2	2	2	2	2	1	2	2	3	2	3	2	4	4	3	4	4	4	4	5	5
16-Mar	4	5	5	4	4	5	4	4	4	4	4	4	M	4	5	4	5	3	2	4	3	3	2	1	5
17-Mar	1	2	1	1	1	1	2	2	1	1	2	2	2	3	3	3	2	2	2	2	2	1	1	2	3
18-Mar	1	1	2	1	2	1	2	2	2	3	2	2	2	2	3	3	3	2	1	1	3	3	3	3	3
19-Mar	3	2	4	5	2	3	2	2	2	1	2	3	3	4	3	4	2	2	5	3	2	2	1	2	5
20-Mar	2	2	2	1	2	2	4	2	2	3	2	3	4	3	3	3	3	3	3	2	4	4	4	3	4
21-Mar	3	2	2	2	3	3	3	3	3	3	3	3	3	4	4	4	5	4	3	2	2	2	1	2	5
22-Mar	2	1	1	2	1	1	1	1	2	1	2	1	2	3	3	2	2	1	1	1	1	0	1	2	3
23-Mar	1	1	1	1	1	2	4	4	3	3	3	3	4	3	3	3	3	3	3	3	2	2	2	3	4
24-Mar	3	3	1	2	2	1	2	3	2	2	3	3	3	2	3	2	3	2	1	2	3	3	2	2	3
25-Mar	2	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	2	1	1	1	2	1	4	4	4
26-Mar	3	3	5	3	3	2	4	2	3	2	2	1	1	2	2	2	2	2	1	1	1	1	1	2	5
27-Mar	2	1	1	1	1	1	1	1	1	1	1	2	1	4	3	3	3	3	3	2	3	3	2	2	4
28-Mar	2	1	1	1	2	1	2	2	3	4	4	4	4	2	3	4	5	4	3	2	1	2	2	3	5
29-Mar	1	2	2	2	2	2	2	1	3	2	1	1	1	1	2	2	2	2	1	2	2	2	2	1	3
30-Mar	2	1	1	1	1	1	2	3	2	2	1	2	8	7	6	5	4	5	6	6	6	7	6	6	8
31-Mar	5	5	5	4	4	3	3	3	2	3	3	2	2	2	2	2	1	2	2	2	1	2	1	1	5
	5	5	5	5	5	5	4	4	4	4	4	4	8	7	6	6	5	5	6	6	6	7	6	6	
	Diurnal Maximum																								

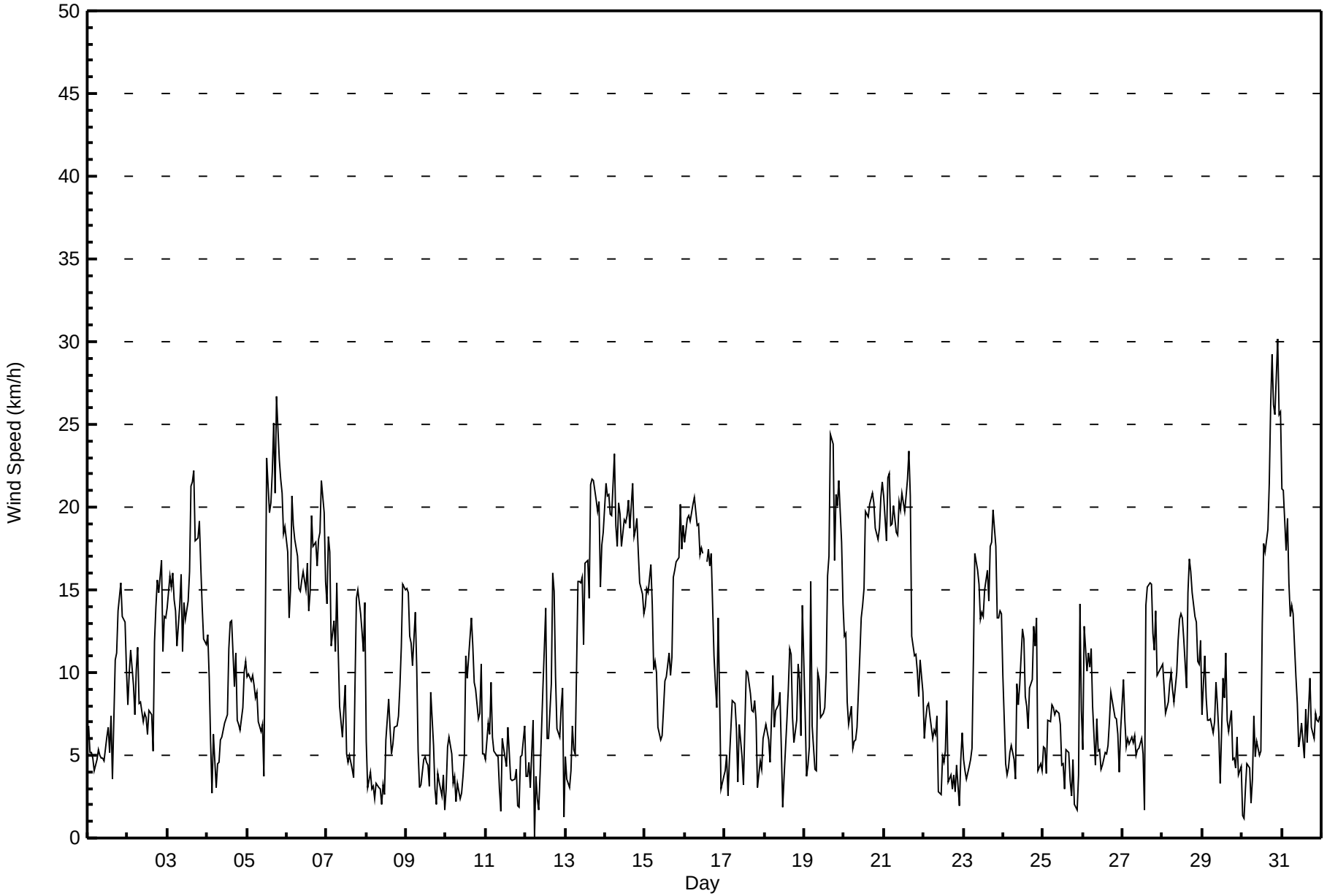
M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Shell Muskeg River - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	190	25.57	25.57
6 - 11	274	36.88	62.45
12 - 19	208	27.99	90.44
20 - 28	69	9.29	99.73
29 - 38	2	0.27	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Shell Muskeg River - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	13	8	11	20	13	10	8	8	13	22	17	6	5	12	13	11	190
6 - 11	9	30	37	17	6	7	18	21	41	23	10	7	3	5	27	13	274
12 - 19	58	76	44	0	1	0	5	7	2	3	1	1	2	4	0	4	208
20 - 28	21	34	13	0	0	0	0	0	0	0	0	0	0	0	0	1	69
29 - 38	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	102	149	105	37	20	17	31	36	56	48	28	14	10	21	40	29	743

Total Number of Valid Hours: 743

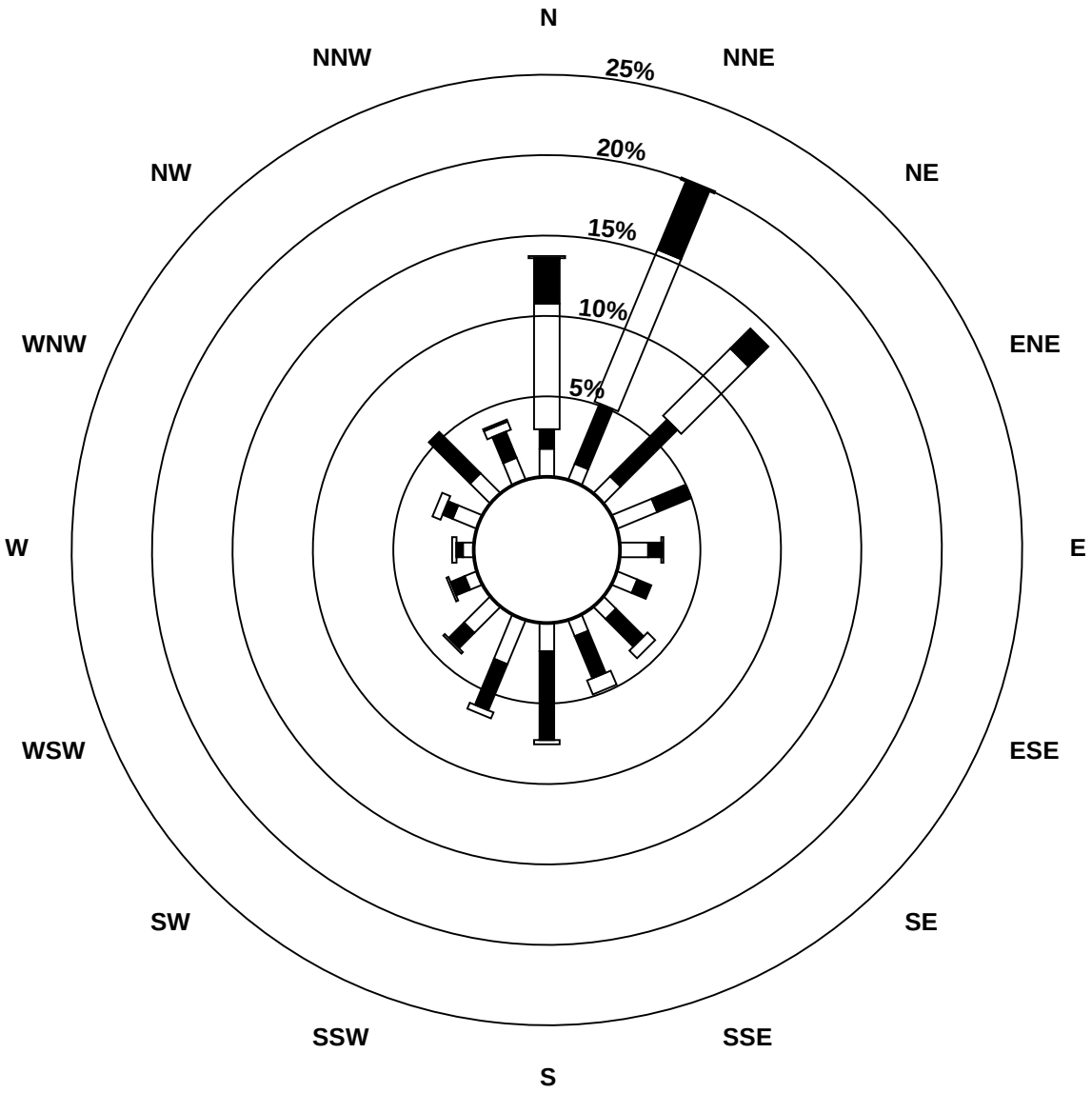
Total Number of Hours: 744

Wood Buffalo Environmental Association

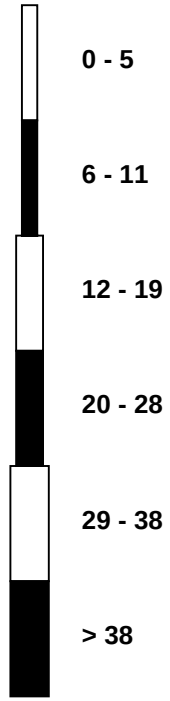
Wind Rose Mar 2016

Wind Speed (WS) - km/h

Shell Muskeg River (AMS 16)



Classes (km/h)



Total Number of Valid Hours: 743

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Shell Muskeg River - March 2016

Direction of Maximum Speed: 6 deg on Mar 30 22:00
Direction of Maximum Daily Speed Average: 7.3 deg on Mar 14

Direction of Minimum Speed: 61 deg on Mar 12 06:00

Direction of Minimum Daily Speed Average: 1.0 deg on Mar 25

Monthly Average Direction: 296.3 deg

Hours in Service:	744
Hours of Data:	743
Hours of Missing Data:	1
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	189	175	195	195	205	210	205	196	179	221	261	314	332	25	306	11	58	56	42	44	31	31	45	37	38.2
2-Mar	22	37	42	44	41	37	42	19	29	30	30	32	11	26	26	9	41	40	27	18	30	50	47	41	33.4
3-Mar	39	37	35	21	32	46	32	26	3	1	15	359	4	16	30	24	26	16	10	18	13	22	39	49	22.7
4-Mar	56	62	92	106	81	135	201	182	161	175	191	169	158	174	174	159	143	124	116	109	133	148	153	166	142.6
5-Mar	170	174	183	180	184	185	222	189	175	218	342	36	31	44	47	46	44	38	27	25	22	24	20	26	42.6
6-Mar	23	11	10	26	22	29	27	15	21	25	50	35	26	4	352	12	18	1	24	29	16	27	30	35	21.5
7-Mar	30	25	24	2	22	14	23	24	352	338	307	302	298	236	230	146	96	47	25	29	43	54	57	44	22.1
8-Mar	66	162	225	218	188	234	147	130	81	148	310	101	319	313	310	323	301	318	343	51	39	46	45	47	18.3
9-Mar	41	36	20	20	29	31	55	62	10	330	292	304	315	323	223	170	162	136	354	103	81	38	53	124	33.8
10-Mar	158	196	195	197	193	175	210	226	247	46	73	110	135	137	137	135	130	123	139	147	142	170	217	248	152.4
11-Mar	247	252	209	223	235	223	209	184	187	120	312	310	233	289	0	354	323	226	209	210	131	188	177	159	231.1
12-Mar	170	164	126	182	174	61	344	7	72	4	7	20	21	9	96	137	132	132	131	130	130	136	148	112	108.6
13-Mar	82	32	16	66	49	31	332	4	14	355	357	352	354	360	348	352	353	354	351	348	353	345	357	3	358.4
14-Mar	2	1	0	358	358	2	3	12	18	18	14	22	17	12	3	5	0	6	12	2	2	8	12	15	7.3
15-Mar	24	29	29	28	26	34	20	21	34	32	327	314	316	317	318	325	349	12	20	26	360	3	360	353	6.5
16-Mar	353	0	351	360	5	3	8	7	360	4	2	347	M	6	358	354	350	336	309	14	39	12	326	262	358.6
17-Mar	227	227	196	282	312	315	286	255	199	263	312	288	324	323	326	337	316	288	308	324	293	233	196	192	291.7
18-Mar	209	206	221	171	240	250	253	267	311	333	330	248	200	141	174	180	170	152	110	59	42	45	39	26	197.8
19-Mar	39	65	24	46	30	53	73	71	50	53	14	344	324	348	23	22	23	20	4	23	25	27	26	40	24.9
20-Mar	40	47	57	58	46	49	52	55	44	47	46	26	9	26	29	35	42	42	47	47	15	16	22	22	34.8
21-Mar	23	28	24	22	36	39	41	35	31	39	29	28	25	24	33	37	47	81	80	66	77	75	48	51	38.0
22-Mar	57	53	61	99	140	105	94	126	156	89	162	298	334	232	229	345	350	321	69	91	197	130	101	114	101.9
23-Mar	114	120	83	78	73	59	12	1	5	11	1	350	357	22	4	27	40	34	27	34	44	47	34	39	25.7
24-Mar	24	46	62	64	68	60	47	44	32	17	346	8	3	338	332	314	38	47	51	43	33	40	68	64	27.3
25-Mar	73	75	150	199	195	195	204	196	191	204	199	203	184	288	323	323	32	67	55	97	26	353	14	16	182.8
26-Mar	358	21	28	357	31	30	18	14	23	334	296	10	298	264	148	152	164	170	143	159	158	177	199	189	46.0
27-Mar	181	183	187	192	196	198	212	222	237	260	272	340	328	289	167	149	153	154	152	139	147	162	170	179	174.2
28-Mar	182	181	190	192	189	191	193	187	190	202	193	189	210	221	306	272	274	301	301	295	290	268	254	253	234.5
29-Mar	226	237	208	209	214	180	162	165	187	195	235	240	47	47	51	45	59	69	102	88	42	69	93	79	139.3
30-Mar	202	218	123	202	308	349	317	352	340	304	300	303	4	352	345	9	31	28	21	8	2	6	5	8	4.3
31-Mar	17	17	359	0	357	10	6	23	44	33	0	45	51	110	128	135	153	160	168	188	181	190	175	191	33.7
	34.6	32.4	29.2	23.1	26.7	28.9	20.5	20.2	23.0	9.4	355.9	1.3	4.3	4.7	11.1	24.6	35.6	35.5	29.9	31.9	28.1	30.6	33.2	32.7	
	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

Shell Muskeg River - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 91 deg on Mar 16 23:00

Minimum Value: 5 deg on Mar 28 23:00

Percentiles: P_1 = 6 P_{10} = 10 Q_1 = 13 Median = 17 Q_3 = 26 P_{90} = 44 P_{99} = 73

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	16	14	14	14	12	10	12	15	14	32	24	19	27	35	20	60	7	9	11	11	11	11	10	15	60
2-Mar	19	11	9	14	17	19	10	25	17	25	18	20	44	37	28	37	9	10	10	15	11	17	6	9	44
3-Mar	9	11	12	11	13	10	14	12	17	24	17	19	16	17	10	13	9	17	18	16	16	15	15	13	24
4-Mar	19	20	48	69	23	59	19	29	18	23	29	30	29	23	21	16	21	16	20	18	19	13	14	10	69
5-Mar	15	15	17	14	17	20	17	19	20	26	63	15	13	11	8	8	9	12	8	10	13	11	14	11	63
6-Mar	12	16	18	9	14	9	10	16	16	14	7	14	10	17	16	18	15	14	18	13	14	9	8	12	18
7-Mar	10	6	7	19	11	17	7	11	15	28	15	14	39	28	20	28	40	10	12	14	22	18	21	8	40
8-Mar	25	43	17	27	17	43	34	27	53	64	53	78	31	20	21	33	26	30	29	28	17	11	7	7	78
9-Mar	14	14	24	14	17	13	14	44	53	54	37	27	35	37	61	20	26	41	57	44	23	41	49	47	61
10-Mar	21	11	12	13	18	14	31	18	21	45	26	34	19	19	15	16	16	18	15	13	19	17	19	9	45
11-Mar	14	10	14	14	48	34	34	26	65	72	34	25	24	33	30	31	30	26	14	68	70	30	20	16	72
12-Mar	62	30	18	48	21	88	52	62	84	54	27	22	13	41	41	57	16	15	14	12	16	16	13	78	88
13-Mar	10	45	33	21	32	35	62	15	15	14	14	16	16	15	15	15	17	15	15	15	16	19	16	13	62
14-Mar	15	15	16	17	17	15	18	17	15	15	16	15	15	18	15	16	14	16	16	14	13	15	14	14	18
15-Mar	11	7	9	7	10	16	15	23	34	28	26	23	21	20	17	19	24	22	16	14	15	13	15	15	34
16-Mar	15	15	15	17	14	14	16	17	17	18	15	15	M	16	17	17	15	17	13	57	14	22	91	45	91
17-Mar	31	20	43	18	9	10	22	23	32	24	51	64	29	25	21	23	25	17	12	19	76	23	13	20	76
18-Mar	15	12	24	26	25	11	19	18	16	21	44	83	65	32	35	24	15	19	25	14	8	10	20	9	83
19-Mar	21	66	86	50	8	30	39	38	9	8	32	35	29	32	13	13	6	6	17	10	7	6	7	8	86
20-Mar	8	8	14	12	10	23	24	17	17	8	11	16	19	10	11	11	7	8	9	8	21	14	9	8	24
21-Mar	8	11	6	6	11	9	8	11	11	10	10	10	11	14	12	11	14	18	15	12	14	16	6	9	18
22-Mar	11	7	12	28	9	11	11	17	20	54	85	39	49	60	33	61	39	34	43	37	24	33	17	16	85
23-Mar	15	15	17	16	15	23	30	17	17	16	19	19	20	22	20	23	11	11	10	11	11	12	13	14	30
24-Mar	13	45	38	40	22	23	28	62	19	34	25	19	22	32	34	37	32	16	6	12	10	55	22	31	62
25-Mar	11	12	35	12	14	13	15	16	19	21	22	33	37	46	21	22	46	55	16	58	66	42	18	54	66
26-Mar	56	20	54	19	23	17	65	55	42	47	44	45	55	30	40	33	24	16	11	9	10	12	30	21	65
27-Mar	15	12	12	15	13	13	14	13	12	23	34	33	39	73	20	17	15	12	11	9	11	14	11	12	73
28-Mar	13	11	15	14	12	11	17	18	20	23	23	19	24	12	32	12	13	15	10	8	6	11	5	7	32
29-Mar	12	12	23	26	24	20	31	14	20	25	14	56	9	8	7	41	25	20	19	35	26	19	27	30	56
30-Mar	77	66	24	16	34	60	48	36	44	25	28	36	42	25	23	26	12	11	13	17	19	16	16	18	77
31-Mar	17	16	17	17	16	19	17	19	20	37	58	53	19	52	20	32	16	10	14	14	14	15	12	15	58
	77	66	86	69	48	88	65	62	84	72	85	83	65	73	61	61	46	55	57	68	76	55	91	78	
	Diurnal Maximum																								

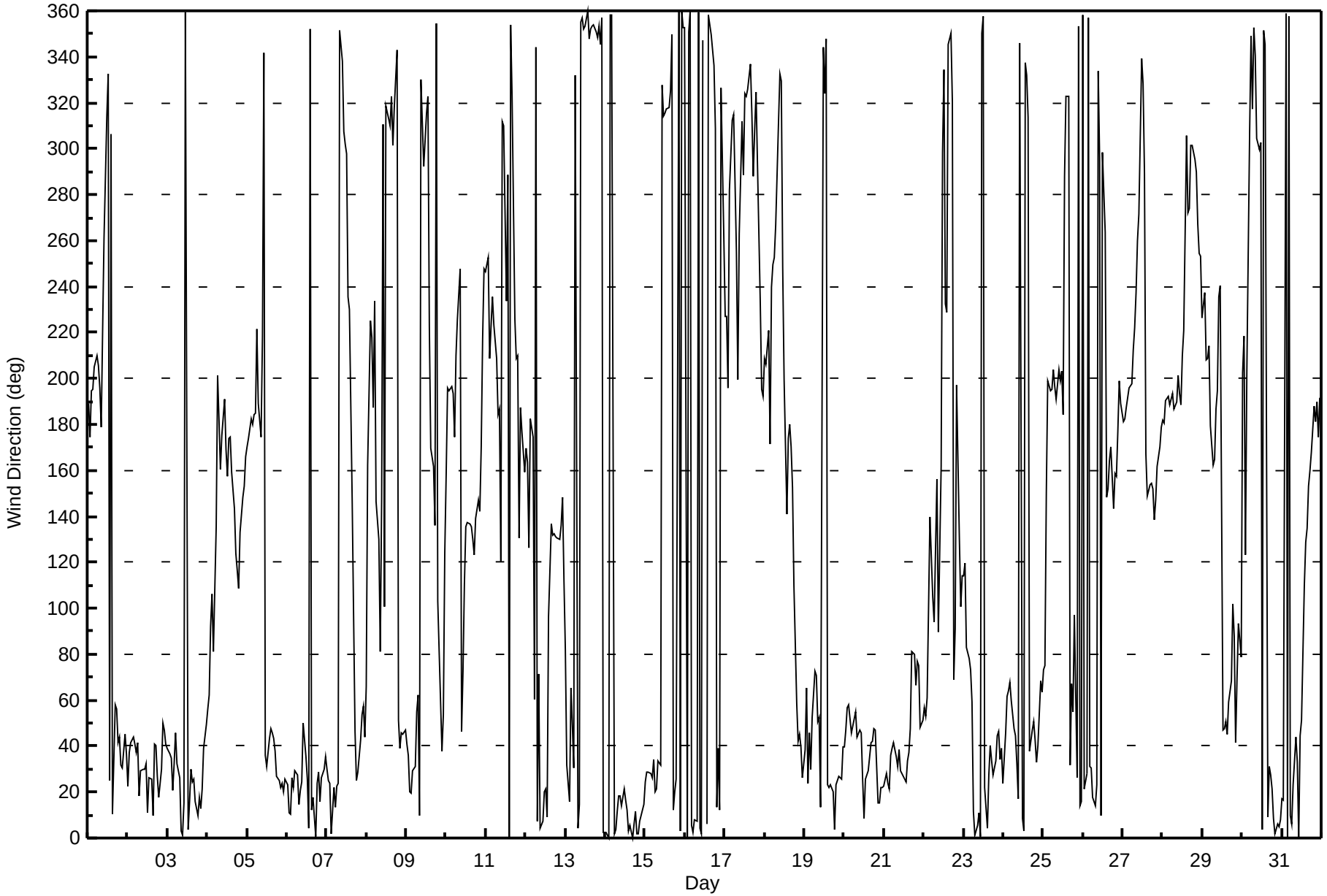
M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Shell Muskeg River - March 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	March 16, 2016	Last Calibration	February 11, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Other:	Zero/Spans before and after station upgrades	
Start Time (MST)	9:00	End Time (MST)	14:30
Gas Cert Reference	LL104193	Station temp.	22 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	12-Feb-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.	2632

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-710	-710
Analyzer IP address	192.168.1.43		Lamp voltage	779	775
Calculated slope	0.997511	1.003973	Chamber temp	45.1	45.1
Calculated intercept	2.306207	0.230914	Pressure	726.4	709.0
Analyzer Background	8.6	8.7	Flow	0.461	0.451
Analyzer Coefficient	1.215	1.215	Intensity	91	91

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	-0.2	----
as found span	5000	83.6	807.6	804.2	1.004
	5000	0.0	0.0	-0.2	----
	5000	83.6	807.6	804.2	1.004
as left zero	6000	0.0	0.0	-0.2	----
as left span	5000	83.6	807.6	802.6	1.006
				Average Correction Factor	1.004

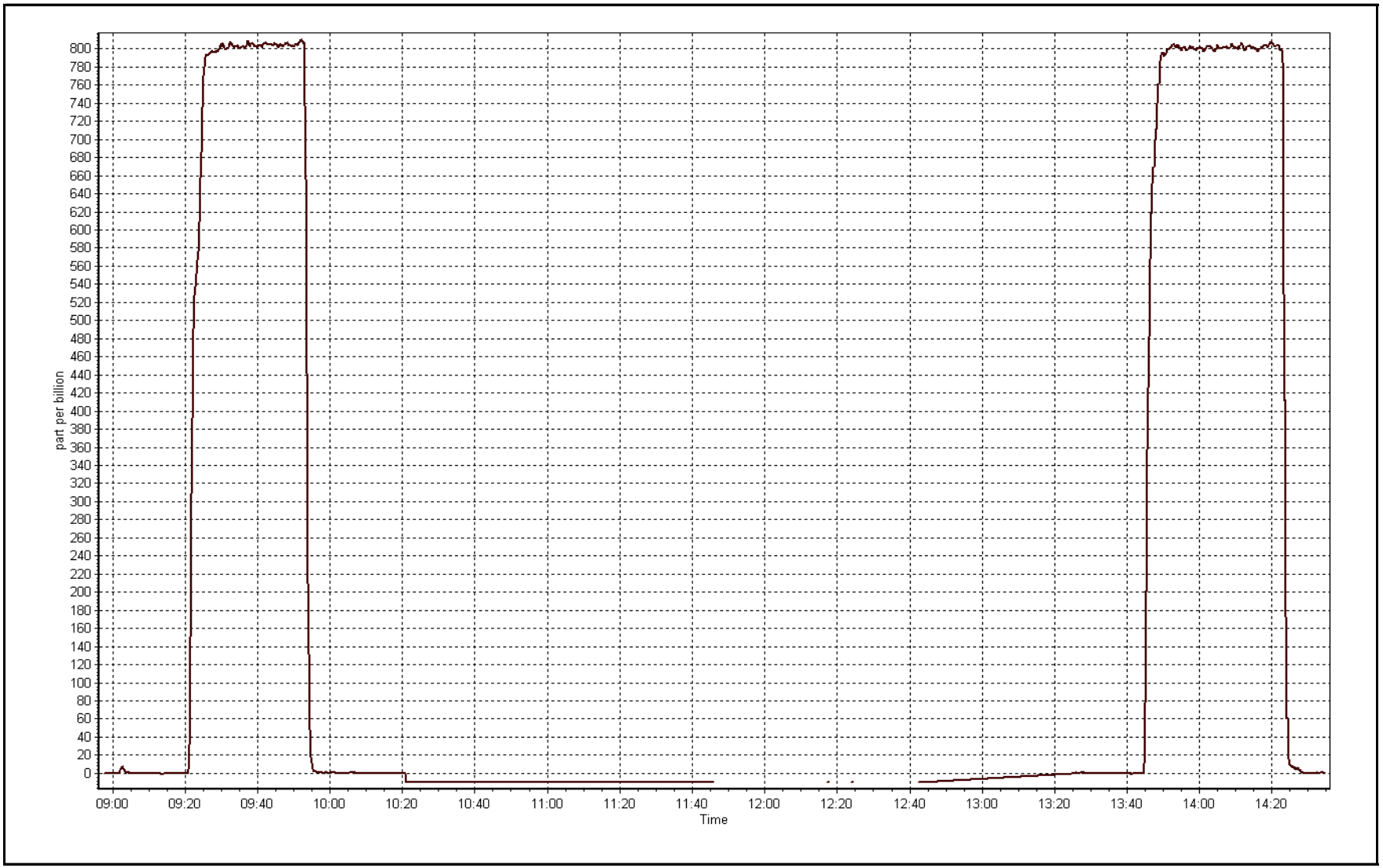
Corrected As found	804.4	Previous response	807.3	% change	0.4%

Notes:

Captured Zero/Spans before and after some station upgrades. Moved around tubing, ethernet cables, and upgraded station card.

Calibration Performed By: Evan Magill

SO2 Calibration Plot Date: March 16, 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	March 17, 2016	Last Calibration	February 11, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	16:00
Gas Cert Reference	LL104193	Station temp.	22 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	12-Feb-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.	2632

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-710	-710
Analyzer IP address	192.168.1.43		Lamp voltage	779	773
Calculated slope	1.003973	0.998447	Chamber temp	45.1	45.0
Calculated intercept	0.230914	2.195503	Pressure	726.4	716.5
Analyzer Background	8.6	8.6	Flow	0.461	0.456
Analyzer Coefficient	1.215	1.215	Intensity	91	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	-0.2	----
as found span	5000	83.6	807.6	805.1	1.003
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	83.6	807.6	808.0	0.999
second point	5000	42.0	405.7	402.1	1.009
third point	5000	21.1	203.8	200.5	1.017
as left zero	6000	0.0	0.0	0.1	----
as left span	5000	83.6	807.6	804.9	1.003
				Average Correction Factor	1.008

Corrected As found	805.2	Previous response	804.1	% change	-0.1%

Notes:

Changed inlet filter after as founds. No adjustments.

Calibration Performed By: Evan Magill

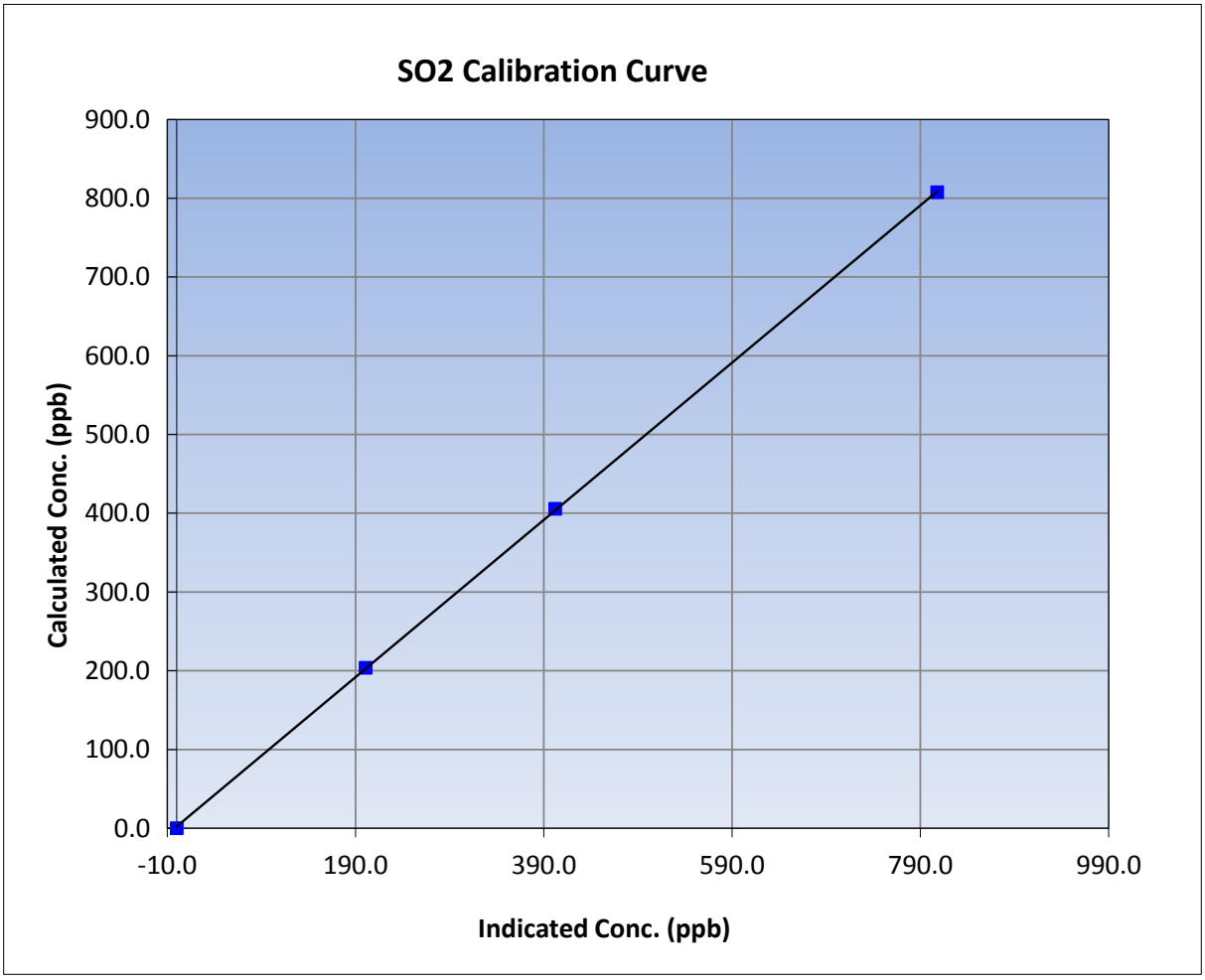
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

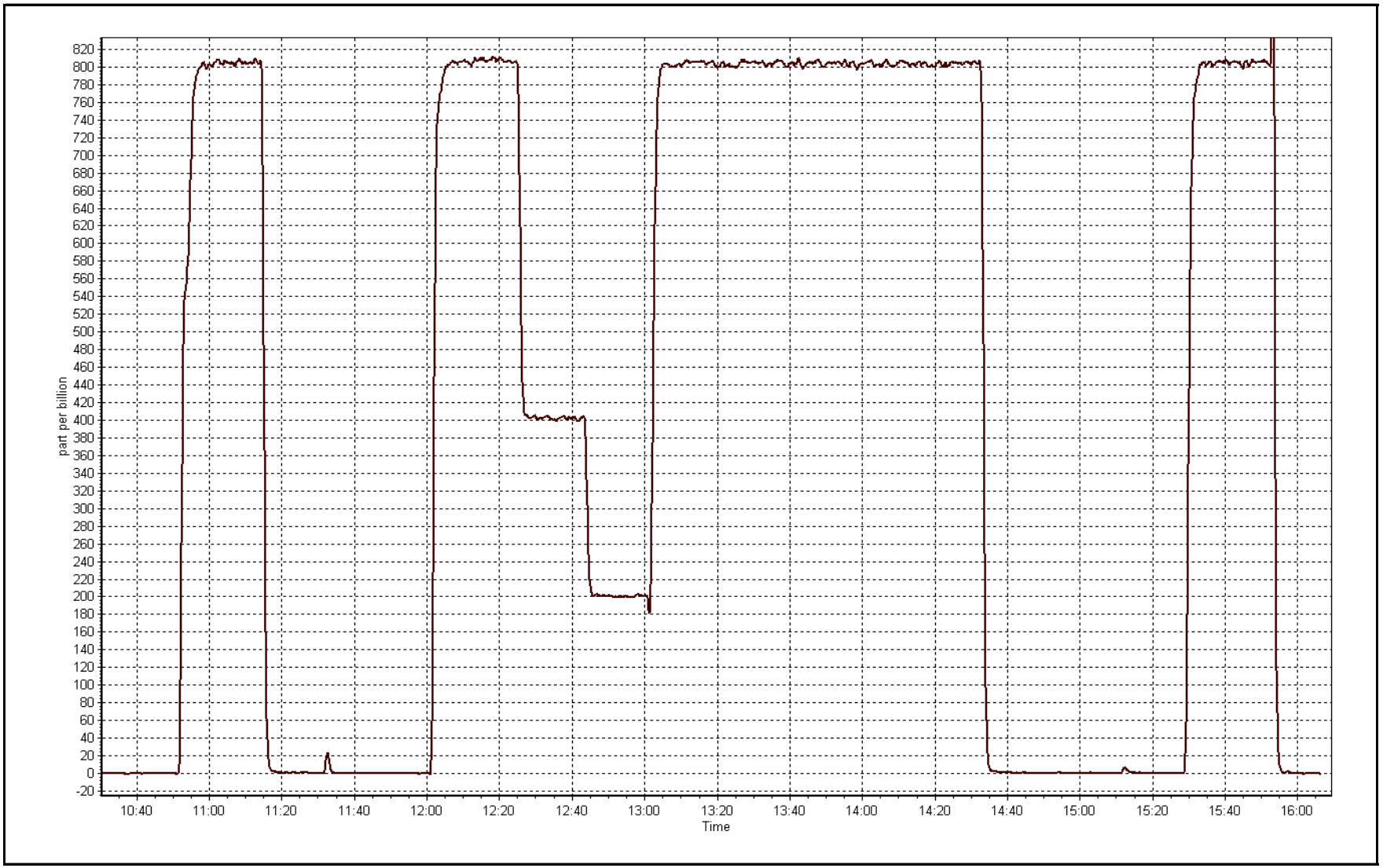
Calibration Date	March 17, 2016	Previous Calibration	February 11, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:30	End Time (MST)	16:00
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999964
807.6	808.0	0.9995		
405.7	402.1	1.0091	Slope	0.998447
203.8	200.5	1.0165		
			Intercept	2.195503



SO2 Calibration Plot Date: March 17, 2016



Wood Buffalo Environmental Association
THC Calibration Report

Station Information

Calibration Date	March-16-16	Last Calibration	February-11-16
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Other:	Zero/Spans before and after station upgrades. Also changed out H2 cylinder.	
Start Time (MST)	9:00	End Time (MST)	14:30
Gas Cert Reference	LL104193	Cal Gas Expiry Date	12-Feb-18
CH4 Cal Gas Conc.	487 ppm	CH4 Equiv Conc.	1017.8 ppm
C3H8 Cal Gas Conc.	193 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	2632

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.8	34.4
Calculated slope	0.992161	0.999224	Fuel Pressure	24.2	24.2
Calculated intercept	0.016547	0.019984	Analyzer Coeff	4.586	4.586
			Analyzer BKG	2.29	2.29

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

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	-0.02	----
as found span	5000	83.6	17.02	17.01	1.000
calibrator zero	5000	0.0	0.00	-0.02	----
high point	5000	83.6	17.02	17.01	1.000
second point					
third point					
as left zero	6000	0.0	0.00	-0.03	----
as left span	5000	83.6	17.02	16.96	1.003
				Average Correction Factor	1.000

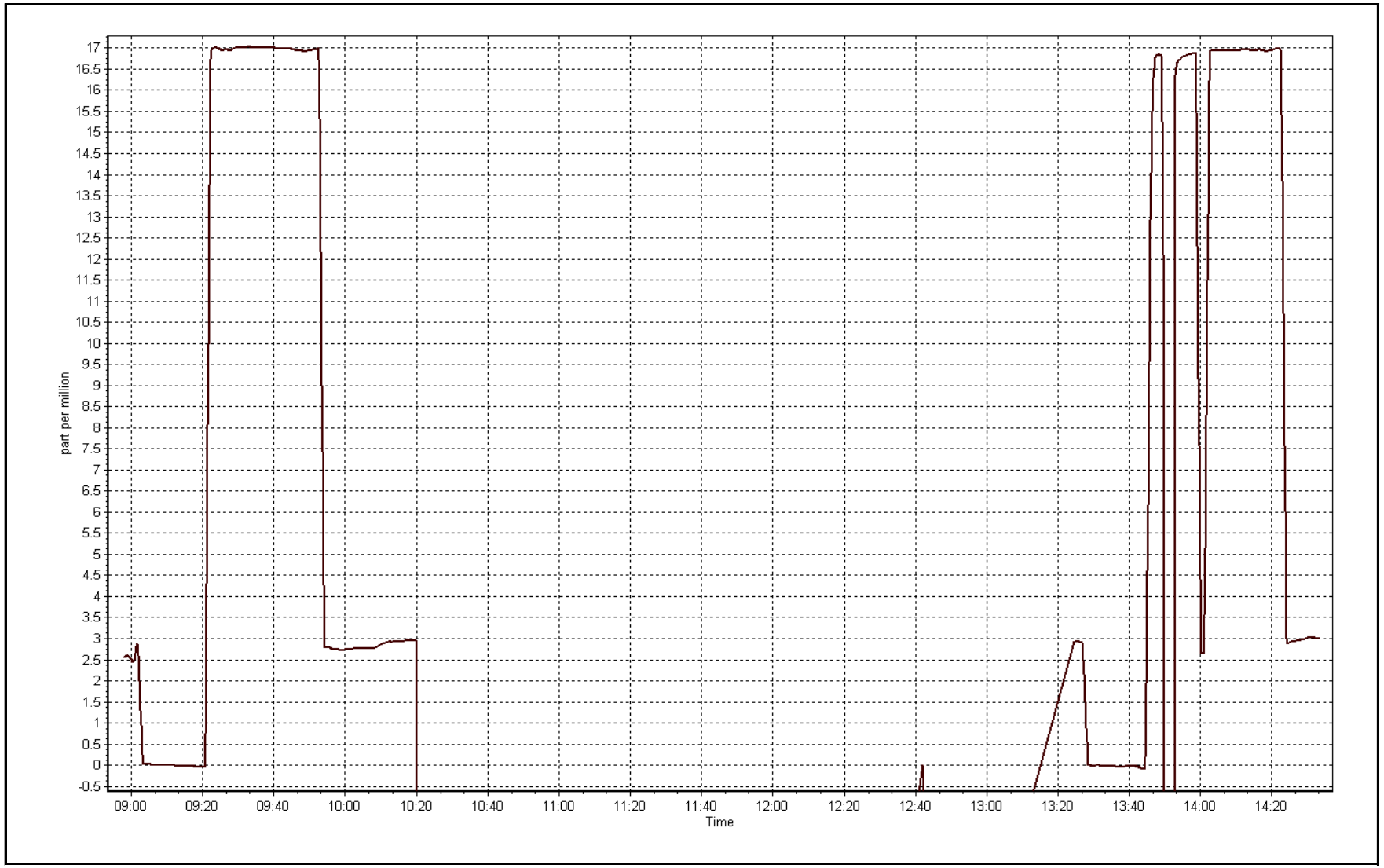
Corrected As found	17.03	Previous response	17.13	% change	0.6%

Notes:

Captured Zero/spans before and after some station upgrades. Moved around tubing, ethernet cables, and upgraded station card. Also changed out hydrogen cylinder after as founds, no change in span response and flame did not go out.

Calibration Performed By: Evan Magill

THC Calibration Plot Date: March 16, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	March-17-16	Last Calibration	February-11-16
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	16:00
Gas Cert Reference	LL104193	Cal Gas Expiry Date	12-Feb-18
CH4 Cal Gas Conc.	487 ppm	CH4 Equiv Conc.	1017.8 ppm
C3H8 Cal Gas Conc.	193 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	2632

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.8	34.7
Calculated slope	0.999224	0.997741	Fuel Pressure	24.2	24.2
Calculated intercept	0.019984	0.044495	Analyzer Coeff	4.586	4.568
			Analyzer BKG	2.29	2.47

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

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					
as found span					
calibrator zero	5000	0.0	0.00	-0.01	----
high point	5000	83.6	17.02	17.04	0.999
second point	5000	42.0	8.55	8.47	1.009
third point	5000	21.1	4.29	4.25	1.011
as left zero	6000	0.0	0.00	-0.04	----
as left span	5000	83.6	17.02	16.97	1.003
				Average Correction Factor	1.006

Corrected As found	NA	Previous response	NA	% change	NA

Notes:

Could not capture As Founds, solenoid valve was activated since the station upgrades the day before and had been sampling room air. Switched the power supply to the solenoid valve, which fixed the problem. Inlet filter changed, adjusted zero and span.

Calibration Performed By: Evan Magill

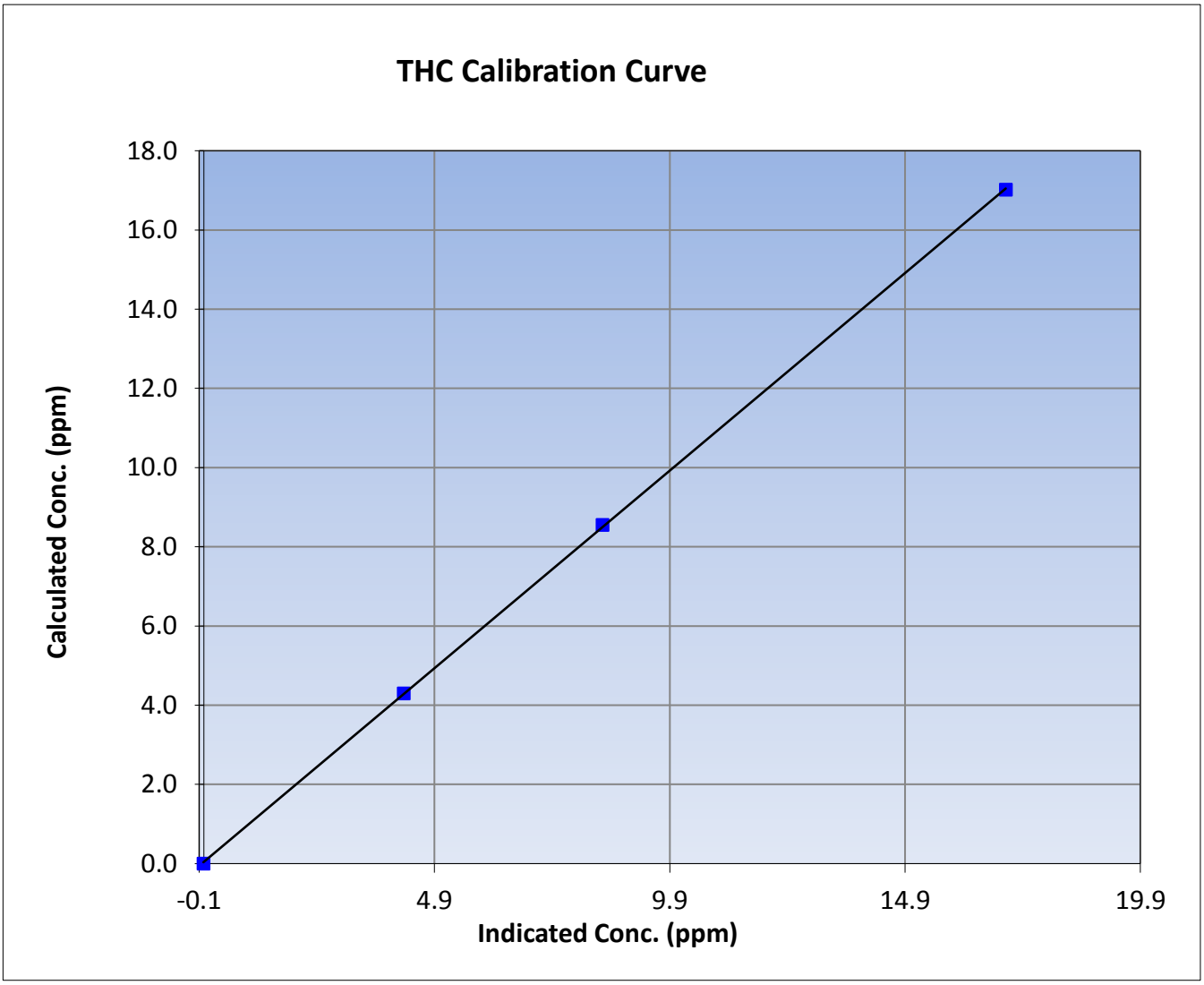
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

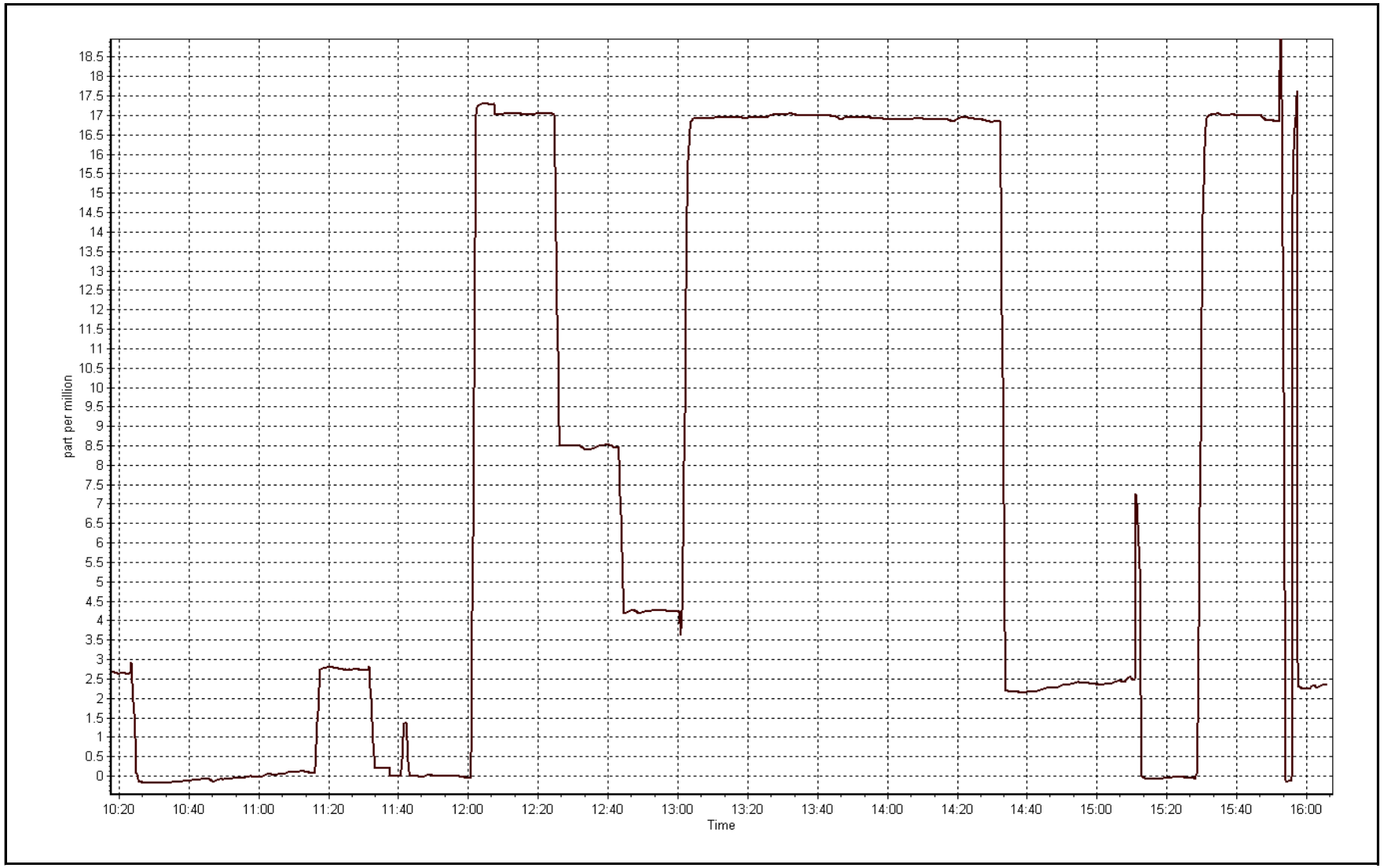
Calibration Date	March 17, 2016	Previous Calibration	February 11, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:30	End Time (MST)	16:00
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	----	Correlation Coefficient	0.999968
17.02	17.04	0.9986		
8.55	8.47	1.0093	Slope	0.997741
4.29	4.25	1.0106		
			Intercept	0.044495



THC Calibration Plot Date: March 17, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 16, 2016	Previous Calibration	February 16, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Other: Zero/Spans before and after station upgrades		
Start Time (MST)	9:00	End Time (MST)	14:30
NO Cal Gas Conc	48 ppm	Gas Cert Reference	LL104193
NOx Cal Gas Conc	48 ppm	Cal Gas Expiry Date	February 12, 2018
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

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000617	1.000095	0.993246
	Data Offset	0.493340	1.349049	0.175134
Current Calibration	Data Slope	0.979174	0.981653	1.015001
	Data Offset	0.528754	0.471193	0.060900

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262593

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	1.016		1.016	
NOX coefficient	0.998		0.998	
NO2 coefficient	1.000		1.000	
NO bkgrnd	8.7		8.7	
NOX bkgrnd	9.0		9.0	
Chamber Temp	50.5	Deg C	50.3	Deg C
Moly Temp	324.5	Deg C	323.9	Deg C
PMT voltage	-744.4	V	-744.8	V
PMT Temp	-3	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	164.3	mmHg	164.6	mmHg
R Cell Press Nox	164	mmHg	164.3	mmHg
NO sample flow	0.901	lpm	0.923	lpm
Nox sample Flow	0.904	lpm	0.925	lpm

Notes:

Captured zero/spans before and after some station upgrades. Moved around tubing, ethernet cables, and upgraded station card.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 16, 2016 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	-0.5	-0.5	-0.1	----	----
as found span	5000	83.6	802.6	802.6	0.0	819.1	817.1	2.0	0.9798	0.9822
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.5	-0.1	----	----
high point	5000	83.6	802.6	802.6	0.0	819.1	817.1	2.0	0.9798	0.9822
second point										
third point										
as left zero	6000	0.0	0.0	0.0	0.0	0.6	-0.4	1.0	----	----
as left span	5000	83.6	802.6	506.5	296.0	812.4	506.5	305.9	0.9879	1.0000
								Average Correction Factor	0.9798	0.9822

Corrcted As found NO_X= 819.6 NO= 817.6 Percent Change NO_X= -2.2% NO= -2.0%

Previous Response NO_X= 801.6 NO= 801.1

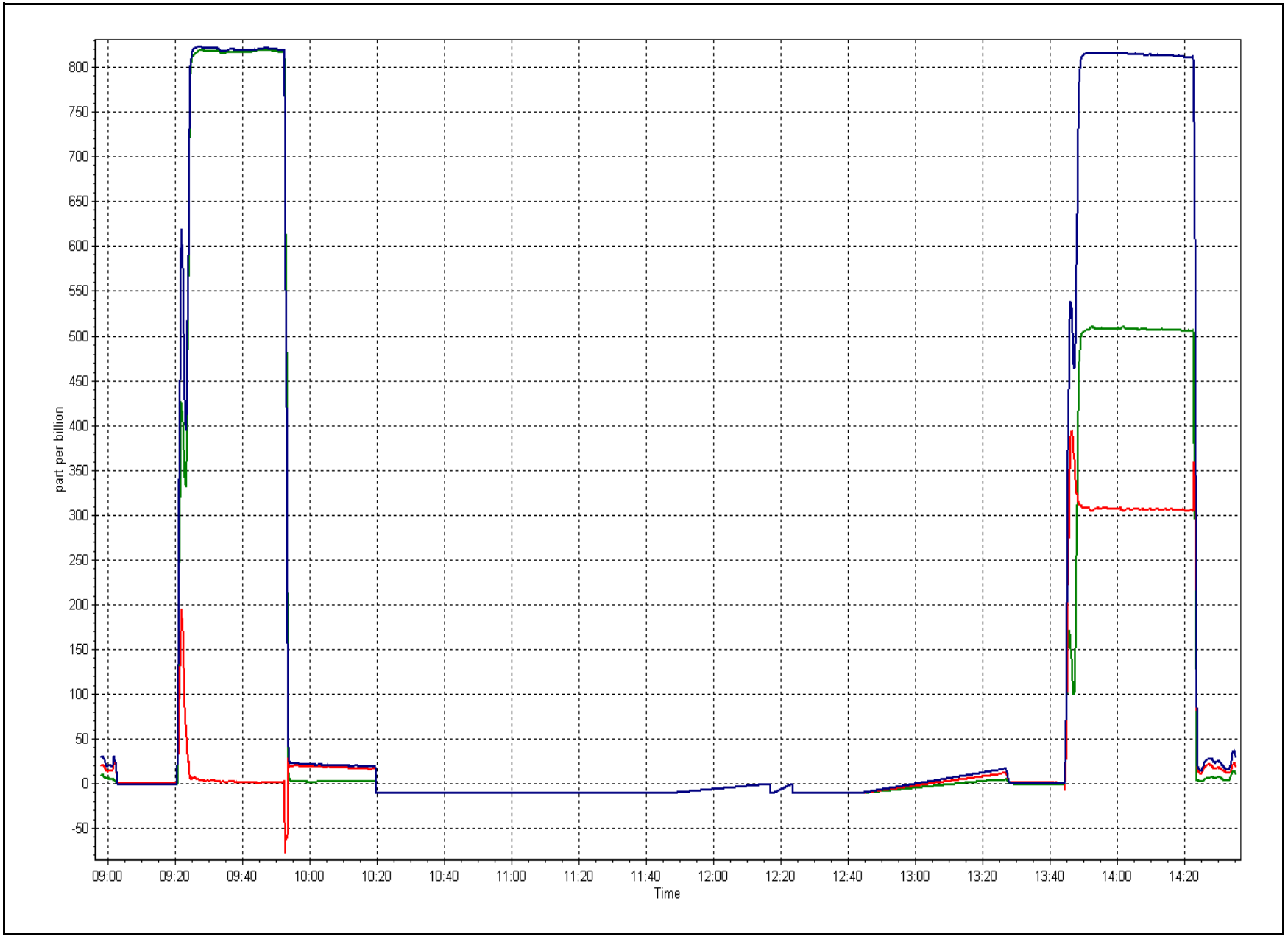
GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 83.60 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			-0.1			N/A	
1st NO2 (300)	----	506.5	310.6	812.4	506.5	305.9	0.9716	1.0000	1.0152	98.5%
2nd NO2 (200)										
3rd NO2 (100)										
4th NO2 (0)	817.1	----	2.0	819.1	817.1	2.0	0.9637	1.0000	N/A	----
					Average Correction Factor		0.9677	1.0000	1.0152	98.5%

Calibration Performed By: Evan Magill

NOX Calibration Plot Date: March 16, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 17, 2016	Previous Calibration	February 16, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	16:00
NO Cal Gas Conc	48 ppm	Gas Cert Reference	LL104193
NOx Cal Gas Conc	48 ppm	Cal Gas Expiry Date	February 12, 2018
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

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.979174	0.981653	1.015001
	Data Offset	0.528754	0.471193	0.060900
Current Calibration	Data Slope	0.998117	0.996253	0.998385
	Data Offset	1.499037	2.041585	0.077432

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262593

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.016		0.996	
NOX coefficient	0.998		0.996	
NO2 coefficient	1.000		1.000	
NO bkgrnd	8.7		8.2	
NOX bkgrnd	9.0		8.3	
Chamber Temp	50.5	Deg C	50.6	Deg C
Moly Temp	324.5	Deg C	325	Deg C
PMT voltage	-744.4	V	-744.4	V
PMT Temp	-3	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	164.3	mmHg	165.5	mmHg
R Cell Press Nox	164	mmHg	165.2	mmHg
NO sample flow	0.901	lpm	0.932	lpm
Nox sample Flow	0.904	lpm	0.935	lpm

Notes:

Changed inlet filter after as founds, adjusted zero and span.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 17, 2016 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	-0.6	-0.4	-0.1	----	----
as found span	5000	83.6	802.6	802.6	0.0	823.0	821.6	1.5	0.9751	0.9769
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	----	----
high point	5000	83.6	802.6	802.6	0.0	803.6	804.8	-1.2	0.9987	0.9972
second point	5000	42.0	403.2	403.2	0.0	400.8	400.8	0.1	1.0059	1.0061
third point	5000	21.1	202.6	202.6	0.0	200.6	199.9	0.7	1.0097	1.0134
as left zero	6000	0.0	0.0	0.0	0.0	0.9	0.1	0.8	----	----
as left span	5000	83.6	802.6	501.3	301.3	804.4	497.7	306.7	0.9977	1.0071
								Average Correction Factor	1.0048	1.0056

Corrcted As found NO_X= 823.6 NO= 822.0 Percent Change NO_X= -0.5% NO= -0.6%

Previous Response NO_X= 819.1 NO= 817.1

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 83.60 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)	----	501.3	298.1	799.8	501.3	298.5	0.9869	1.0000	0.9987	100.1%
2nd NO2 (200)	----	596.4	203.0	799.8	596.4	203.4	0.9870	1.0000	0.9983	100.2%
3rd NO2 (100)	----	694.6	104.8	799.4	694.6	104.8	0.9874	1.0000	1.0003	100.0%
4th NO2 (0)	799.4	----	0.9	800.3	799.4	0.9	0.9863	1.0000	N/A	----
					Average Correction Factor		0.9869	1.0000	0.9991	100.1%

Calibration Performed By: Evan Magill

Wood Buffalo Environmental Association

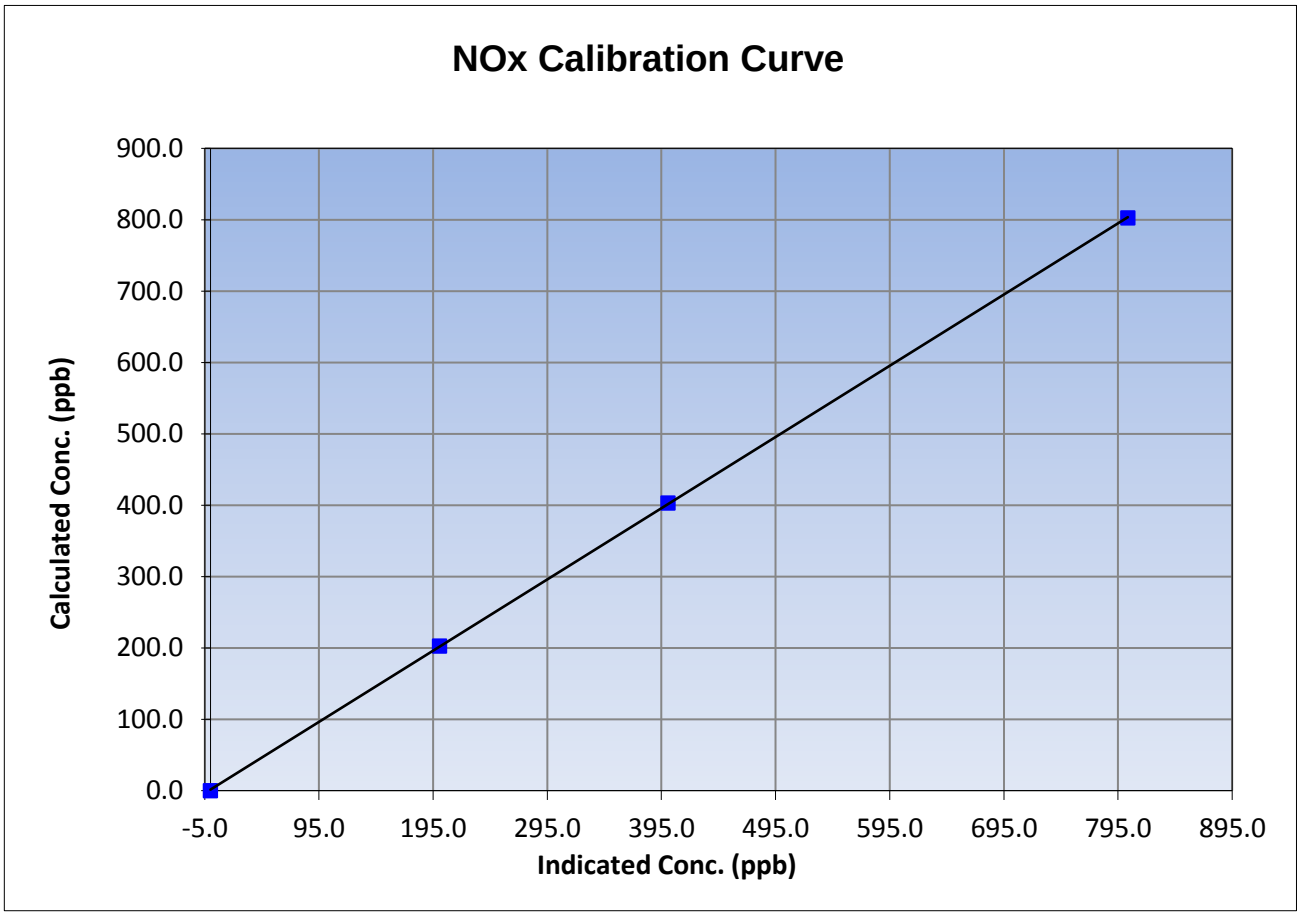
NO_X Calibration Summary

Station Information

Calibration Date	March 17, 2016	Previous Calibration	February 16, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:30	End Time (MST)	16:00
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	0.999982
802.6	803.6	0.9987		
403.2	400.8	1.0059	Slope	0.998117
202.6	200.6	1.0097		
			Intercept	1.499037



Wood Buffalo Environmental Association

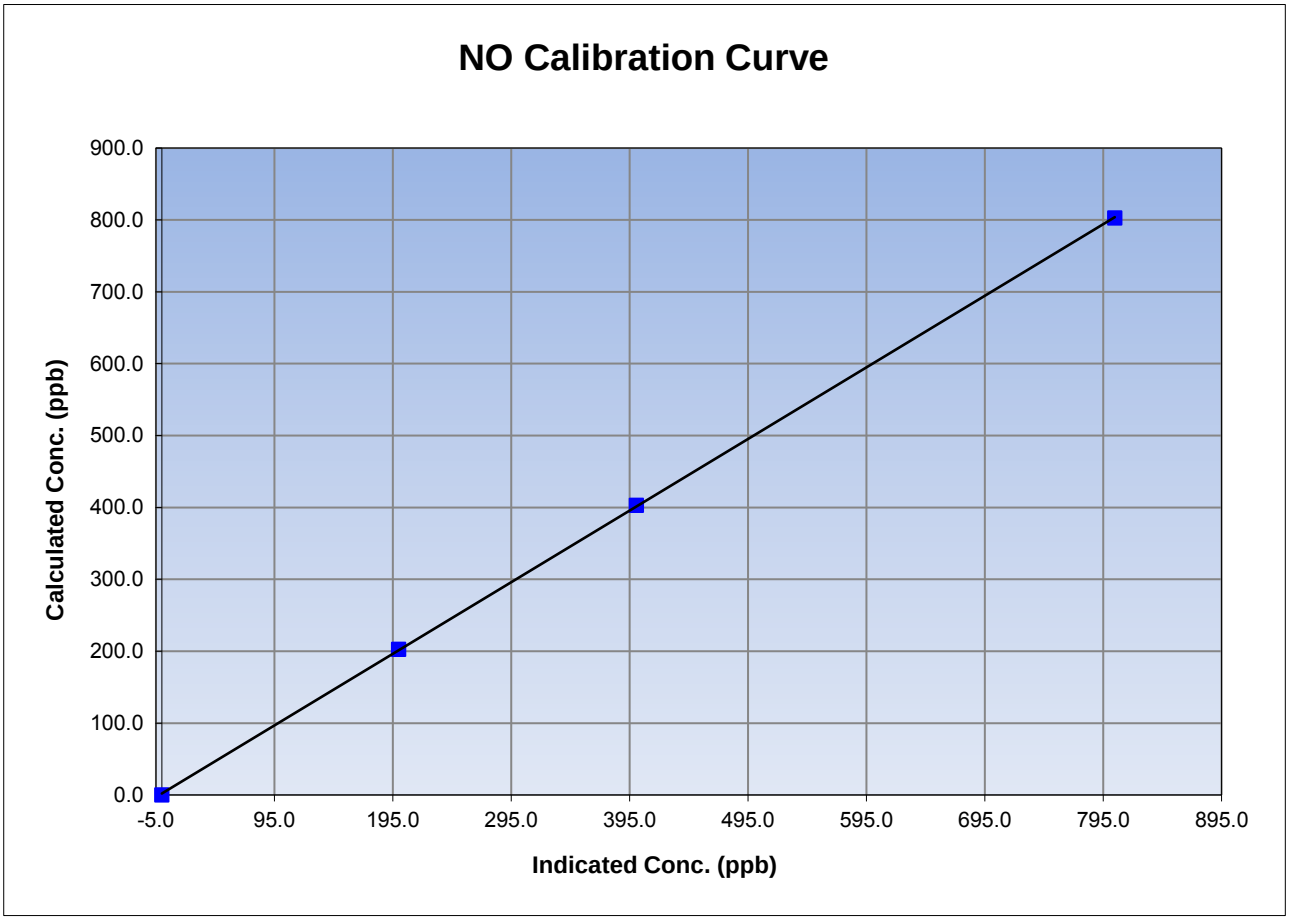
NO Calibration Summary

Station Information

Calibration Date	March 17, 2016	Previous Calibration	February 16, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:30	End Time (MST)	16:00
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	0.999968
802.6	804.8	0.9972		
403.2	400.8	1.0061	Slope	0.996253
202.6	199.9	1.0134		
			Intercept	2.041585



Wood Buffalo Environmental Association

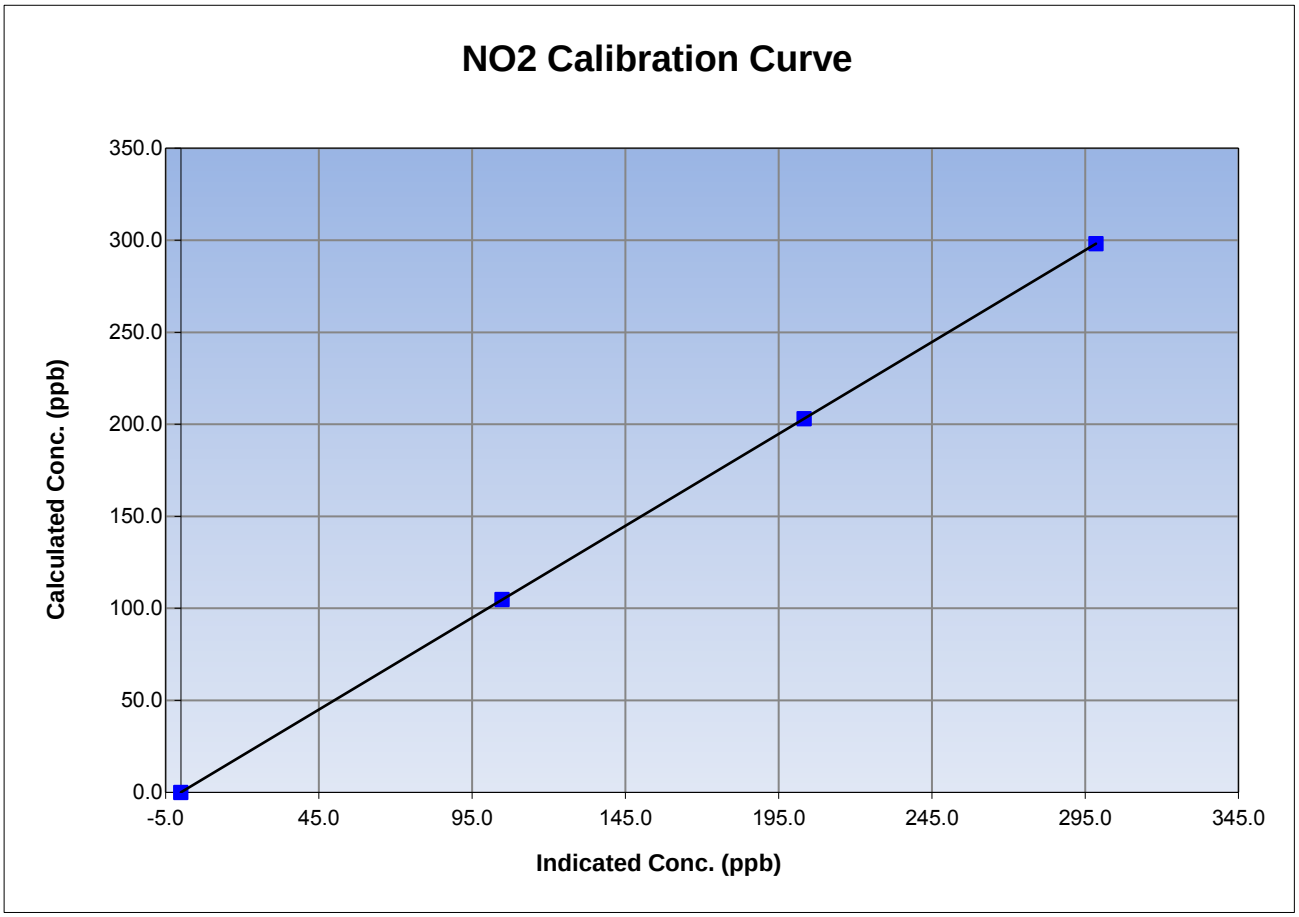
NO_2 Calibration Summary

Station Information

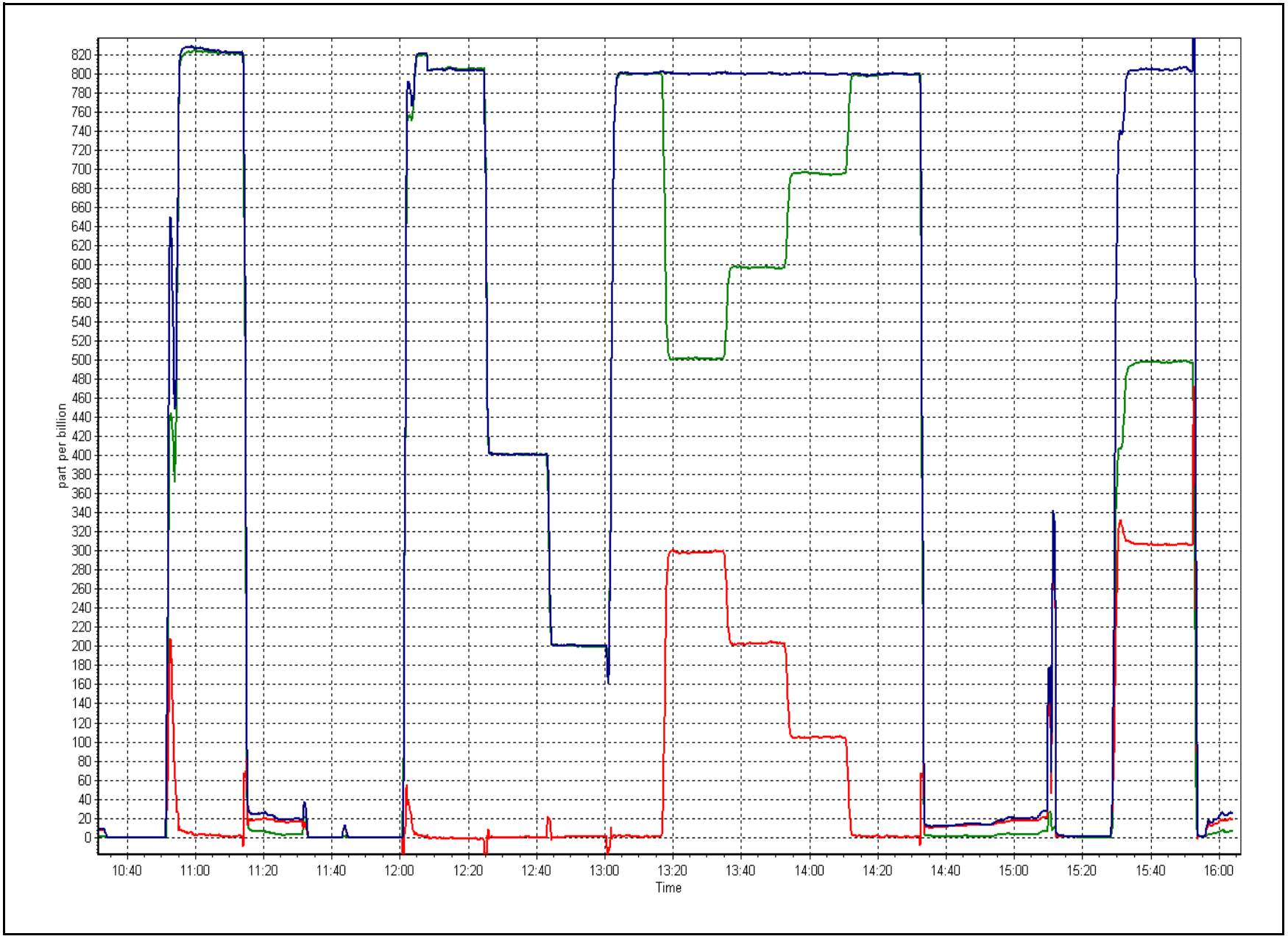
Calibration Date	March 17, 2016	Previous Calibration	February 16, 2016
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:30	End Time (MST)	16:00
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999999
298.1	298.5	0.9987		
203.0	203.4	0.9983	Slope	0.998385
104.8	104.8	1.0003		
			Intercept	0.077432



NOX Calibration Plot Date: March 17, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	March 17, 2016	Previous Calibration:	February 16, 2016
Station Name:	Shell Muskeg River	Station Number:	AMS 16
Start Time (MST):	14:30	End Time (MST):	15:45
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1102

SHARP INFORMATION

Particulate Fraction:	PM2.5							
Make/Model:	Thermo / SHARP 5030							
Serial Number	E-798							
C_{14} Source SN:	4142							
Confirmation of Time settings:	Yes ☑	No ☐						
Paremeters Checked:	T1 ☑	T2 ☐	T3 ☐	T4 ☐	P3 ☑	Main Flow ☑	Beta ☐	Neph ☑

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-1.8	-1.5	0.3	-1.8
T2		na	na	
T3		na	na	
T4		na	na	
RH (%)		na	na	

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	993	993.5	0.5	993

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1001	1018	17	1018	1001

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	546		546
Neph	0.1		0.1
C14	21.4		21.4
Indicated Concentration (ug/m3)	**0.0**	**no**	**0.0**
Offset 1			
Offset 2			

Leak Check (Quarterly)

Leak Check Date:	January 25, 2016	Previous Leak Check Date:	October 29, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.70	0.09
*Flow with adaptor (LPM):	16.61	

**Note - do not attach adaptor without shutting off the pump first*

Mass Foil Calibration (Annualy)

Foil Calibration Date:	May 25, 2015	Previous Foil Calibration:	na
Zeroed?:	yes		
Foil Mass:	1337	Mass foil set S/N:	2518
Previous Correction Factor:	7029		
New Correction Factor:	7067		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

No adjustments, cleaned the cyclone head at the station.

Calibration Performed By: **Evan Magill**

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 17
WAPASU
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
MARCH 2016

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	100.00	24	0	2	0
H2S (ppb) Average	709	35	35	100.00	1	0	0	0
THC (ppm) Average	709	35	35	100.00	2.5	-	2.3	-
O3 (ppb) Average	710	34	34	100.00	48	0	45	-
NO2 (ppb) Average	707	37	37	100.00	25	0	8	-
NO (ppb) Average	707	37	37	100.00	19	-	3	-
NOX (ppb) Average	707	37	37	100.00	40	-	11	-
PM2.5 (ug/m3) Average	737	2	7	99.33	12.9	-	6.1	0
Temperature 2 m (C) Average	744	0	0	100.00	10.6	-	4.3	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	94	-
Precipitation (mm) Total	744	0	0	100.00	1.1	-	9.2	-
Wind Speed 10 m (km/h) Average	741	0	3	99.60	23	-	14	-
Wind Direction 10 m (deg) Average	741	0	3	99.60	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	0.6	1	-	0	0	0	0	0	1	24
H2S (ppb) Average	709	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	709	2.18	0.1	-	2.1	2.1	2.1	2.2	2.2	2.3	2.5
O3 (ppb) Average	710	35	8	-	7	24	30	36	41	45	48
NO2 (ppb) Average	707	2.4	3	-	0	0	1	1	3	6	25
NO (ppb) Average	707	0.5	1	-	0	0	0	0	0	1	19
NOX (ppb) Average	707	2.9	4	-	0	0	1	1	4	7	40
PM2.5 (ug/m3) Average	737	2.64	2	-	0	0.6	1.1	2.1	3.6	5.4	12.9
Temperature 2 m (C) Average	744	-4.33	5.3	-	-22	-10.2	-7.7	-5.2	-1.3	2.8	10.6
Relative Humidity (%) Average	744	72.3	20	-	18	42	57	78	89	93	98
Precipitation (mm) Total	744	-	-	35.05	-	-	-	-	-	-	-
Wind Speed 10 m (km/h) Average	741	8	4	-	1	3	5	7	10	13	23
Wind Direction 10 m (deg) Average	741	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	21 Mar 2016 06:00	21 Mar 2016 10:00	5	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	02 Mar 2016 03:00	02 Mar 2016 03:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	11 Mar 2016 19:00	11 Mar 2016 19:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	13 Mar 2016 11:00	13 Mar 2016 11:00	1	Flat line in sensor output signal -sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Wapasu - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 24 ppb on Mar 9 13:00

Maximum Daily Average: 2.4 ppb on Mar 9

Minimum Value: 0 ppb on Mar 25 20:00

Minimum Daily Average: 0.1 ppb on Mar 13

Maximum Diurnal Average: 1.3 ppb at hour 13

Minimum Diurnal Average: 0.4 ppb at hour 24

Monthly Average: 0.6 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 6$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	1	1	2	1	2	1	1	1	2	2	2	2	1	1	0	0	1	1	1	1	0	0	0	1.1	2
2-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1
3-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	0.3	1
4-Mar	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
5-Mar	0	0	0	0	Z	0	0	1	4	4	3	2	2	1	1	1	0	0	0	0	0	0	0	0	1.0	4
6-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0.4	1
7-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	1	1	1	0	0	0	0	0.6	3
8-Mar	0	Z	1	1	1	0	0	0	1	6	2	1	1	1	0	1	0	0	0	0	0	0	0	0	0.8	6
9-Mar	1	1	Z	0	0	0	0	0	1	0	1	5	24	12	3	1	1	1	3	1	0	0	0	0	2.4	24
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	0.2	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	0.2	0
12-Mar	0	2	2	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
13-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
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	0.1	0
15-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	0.2	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	0.3	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	0.3	0
18-Mar	0	0	0	1	1	Z	0	0	0	0	0	0	1	1	1	5	4	2	1	0	0	0	0	0	0.9	5
19-Mar	Z	0	0	0	0	0	1	2	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.7	2
20-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	1	0.4	1
21-Mar	1	2	Z	1	0	1	0	0	0	1	1	C	C	C	C	1	0	1	0	0	2	1	0	0	0.7	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	0.4	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	0.2	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	0.3	0
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	0.2	0
26-Mar	1	Z	2	1	1	1	1	2	1	1	1	1	1	1	1	0	0	1	1	0	2	2	1	0	1.0	2
27-Mar	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
28-Mar	0	0	0	Z	0	0	0	1	3	5	6	1	1	7	5	0	0	0	0	0	0	0	0	0	1.5	7
29-Mar	0	1	0	1	Z	2	2	5	8	6	2	1	1	0	0	0	0	0	0	0	0	0	0	0	1.4	8
30-Mar	0	0	0	0	0	Z	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
31-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	6	6	4	3	2	2	1.4	6
	0.4	0.5	0.4	0.5	0.4	0.5	0.5	0.6	0.9	1.1	0.8	0.7	1.3	1.0	0.6	0.6	0.5	0.5	0.6	0.5	0.6	0.5	0.4	0.4	Diurnal Average	
	1	2	2	2	1	2	2	5	8	6	6	5	24	12	5	5	4	2	6	6	4	3	2	2	Diurnal Maximum	

Z - zerospan C - Calibration

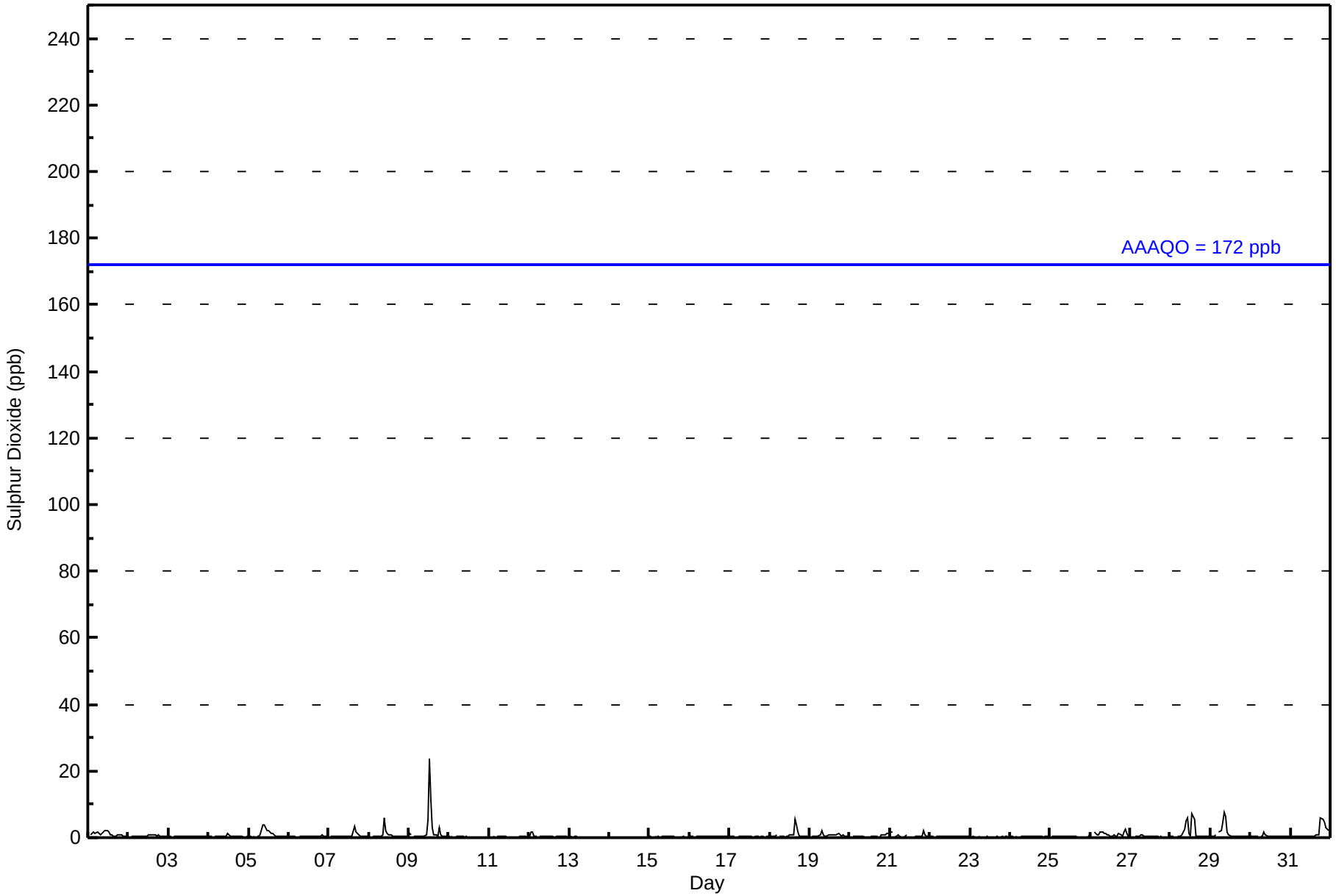
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Wapasu - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Wapasu - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	99.72	99.72
11 - 20	1	0.14	99.86
21 - 60	1	0.14	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Wapasu - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	48	35	20	28	50	75	104	72	34	17	12	14	15	24	49	107	704
11 - 20	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	48	35	20	28	50	75	104	72	34	17	14	14	15	24	49	107	706

Total Number of Valid Hours: 706

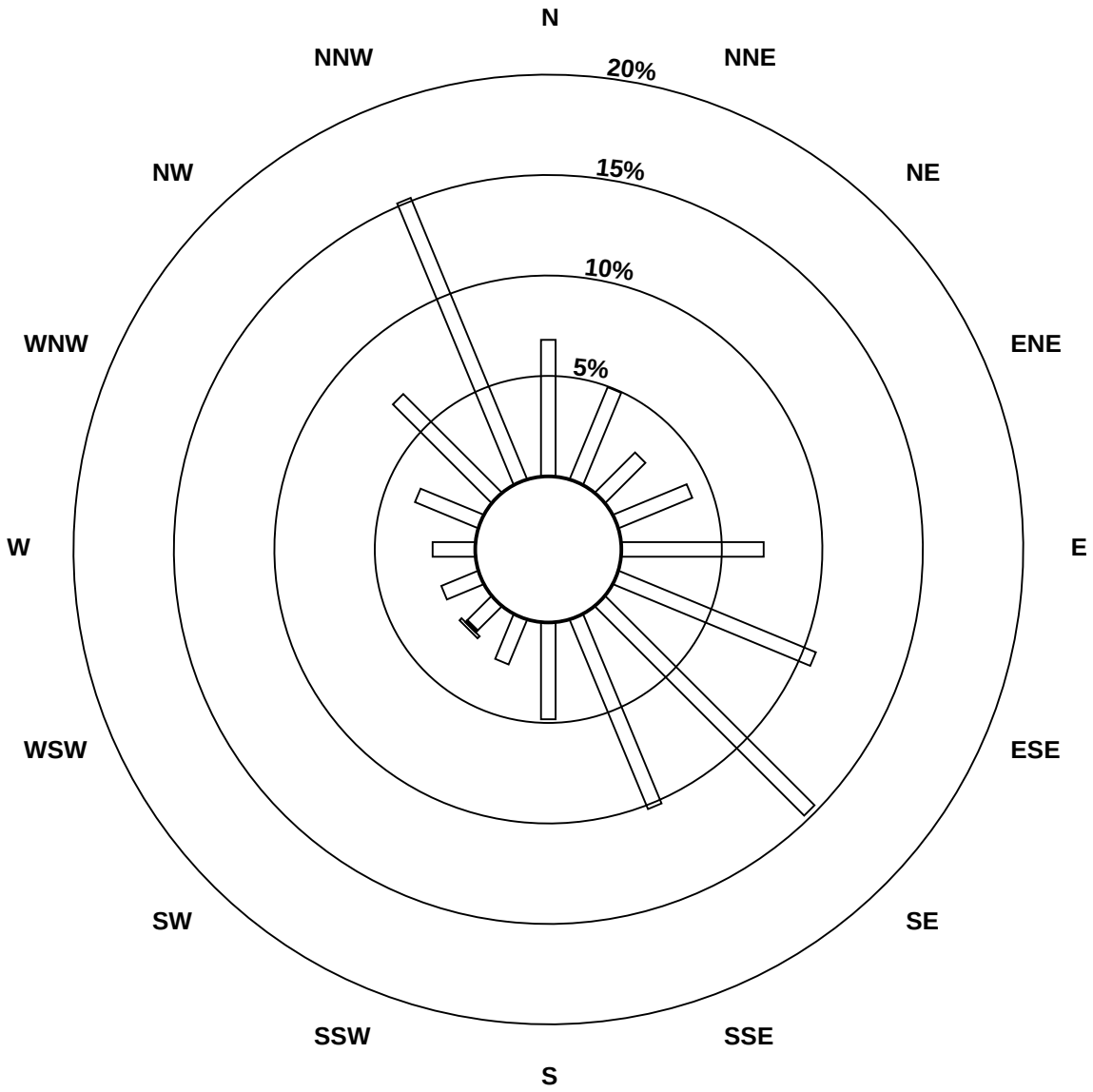
Total Number of Hours: 744

Wood Buffalo Environmental Association

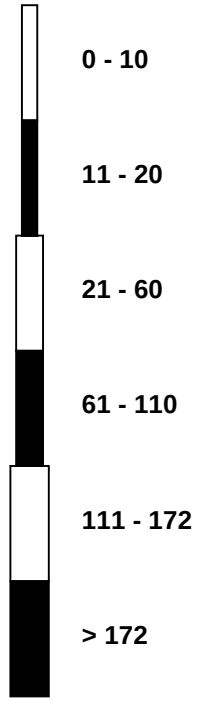
Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Wapasu (AMS 17)



Classes (ppb)



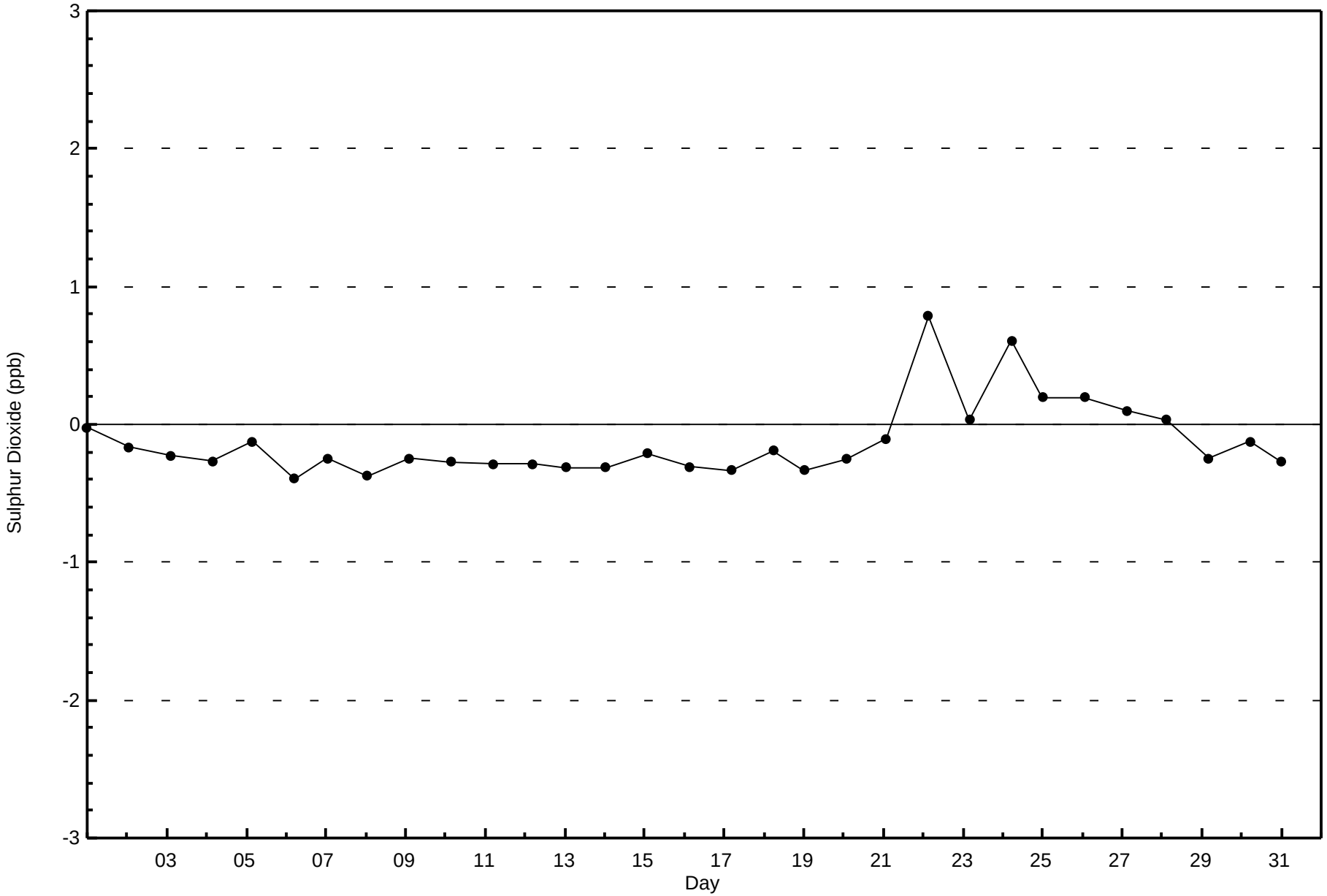
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Wapasu - March 2016

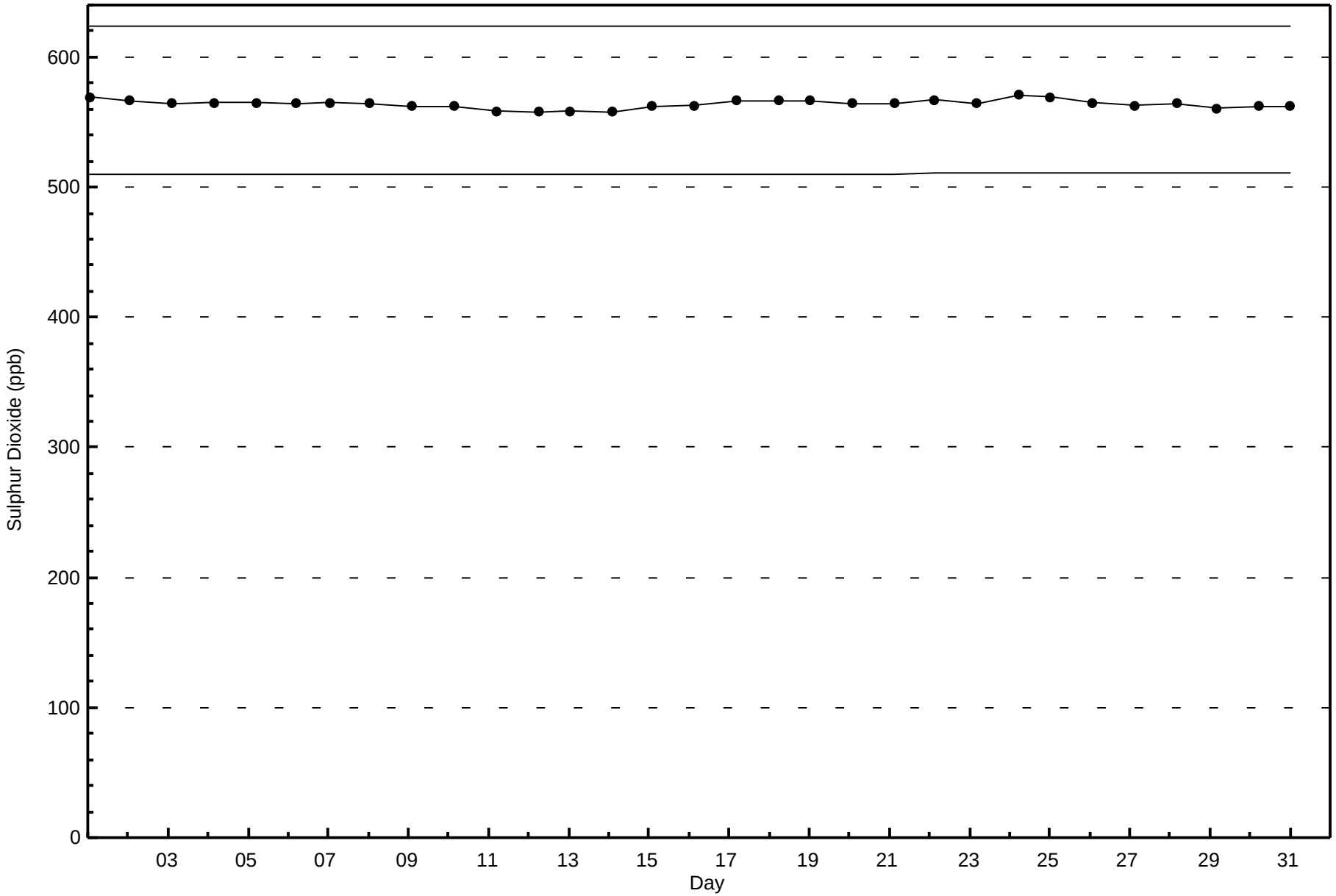


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Wapasu - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Wapasu - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 1 ppb on Mar 2 09:00 Maximum Daily Average: 0.5 ppb on Mar 2

Minimum Value: 0 ppb on Mar 30 01:00 Minimum Daily Average: 0.1 ppb on Mar 30
Maximum Diurnal Average: 0.3 ppb at hour 10 Minimum Diurnal Average: 0.2 ppb at hour 24
Monthly Average: 0.2 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 1$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
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	0.2	0
2-Mar	0	0	Z	0	0	0	0	0	1	1	1	0	1	1	1	1	1	0	0	1	1	0	0	0	0.5	1
3-Mar	0	0	0	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	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	0.1	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	0.2	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	0.2	0
7-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0.2	1
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	0.2	0
9-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	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	0.1	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	0.2	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	0.2	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	0.2	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	0	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
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	0.2	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	0.2	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	0.2	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	0.1	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	0.1	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	0.1	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	0.3	0
24-Mar	0	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
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	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	0.3	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	0.2	0
29-Mar	0	0	0	0	0	Z	1	1	1	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	1
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	0.3	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	Diurnal Average	
	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	Diurnal Maximum	

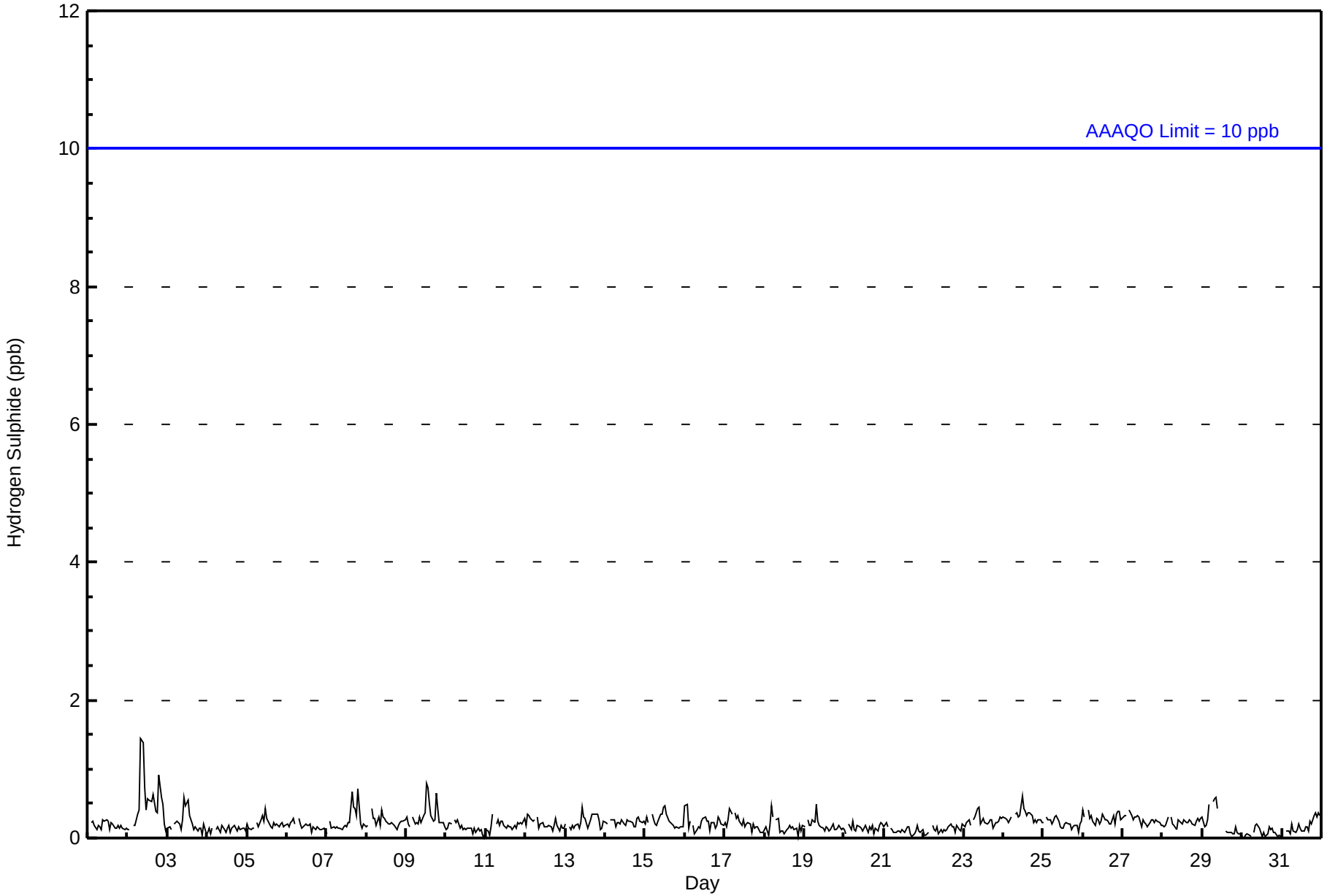
Z - zerospan C - Calibration
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Wapasu - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Wapasu - March 2016

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 (H_2S) - ppb

Wapasu - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	47	35	20	27	55	77	104	71	34	18	12	16	15	24	45	107	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	47	35	20	27	55	77	104	71	34	18	12	16	15	24	45	107	707

Total Number of Valid Hours: 707

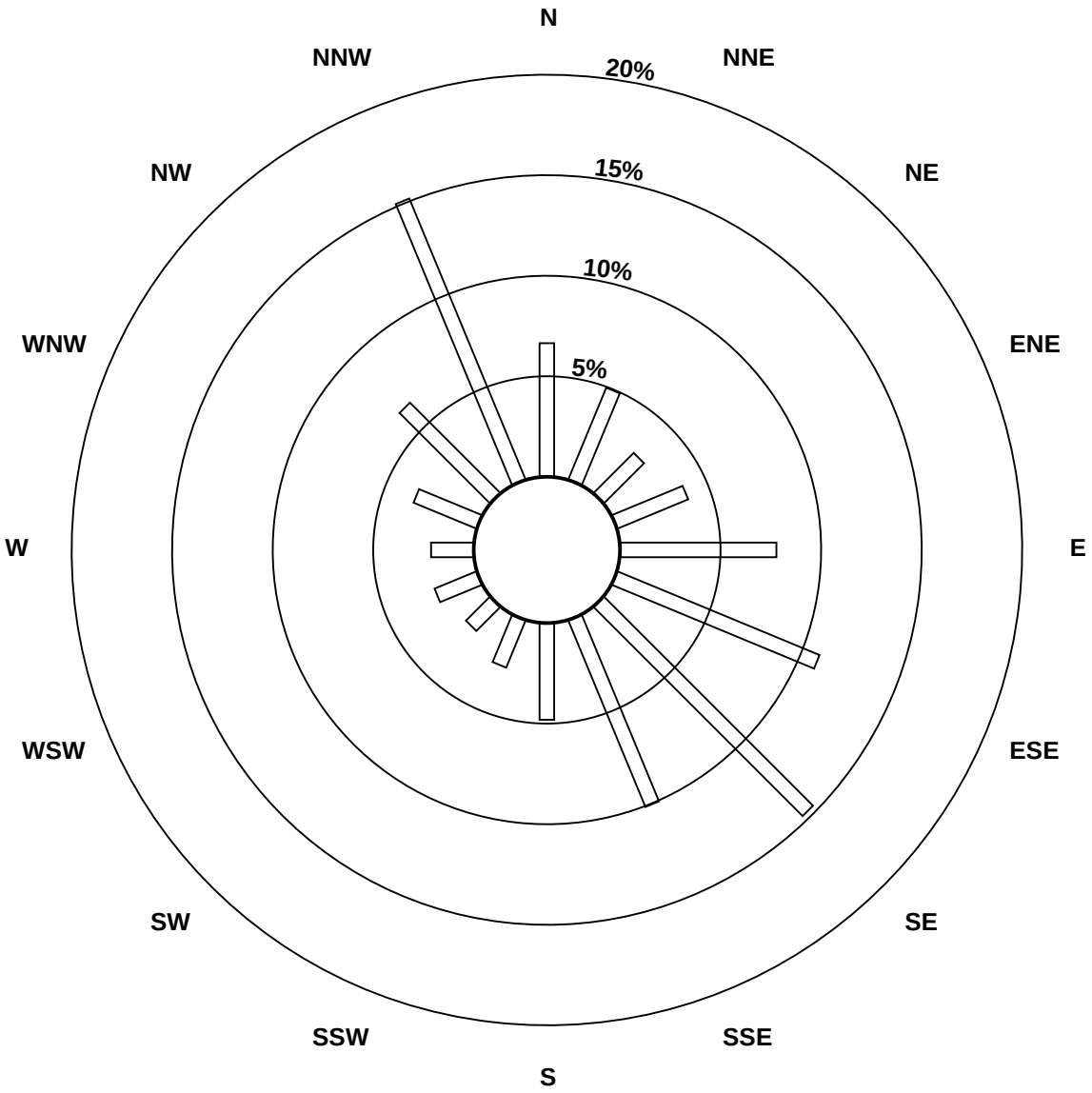
Total Number of Hours: 744

Wood Buffalo Environmental Association

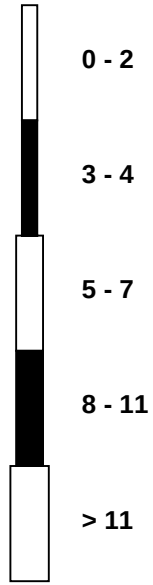
Wind Rose Mar 2016

Hydrogen Sulphide (H_2S) - ppb

Wapasu (AMS 17)



Classes (ppb)



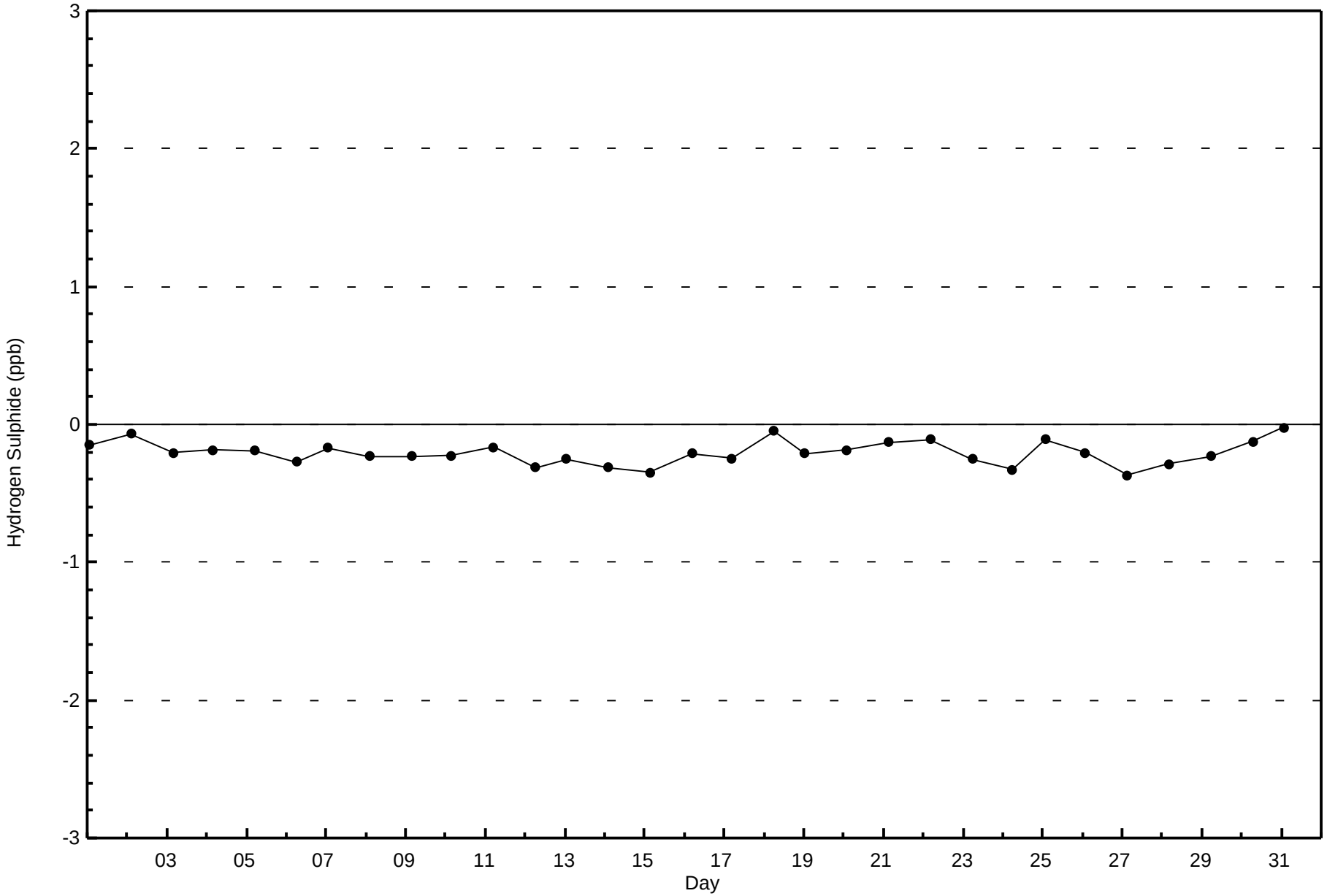
Total Number of Valid Hours: 707

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Wapasu - March 2016

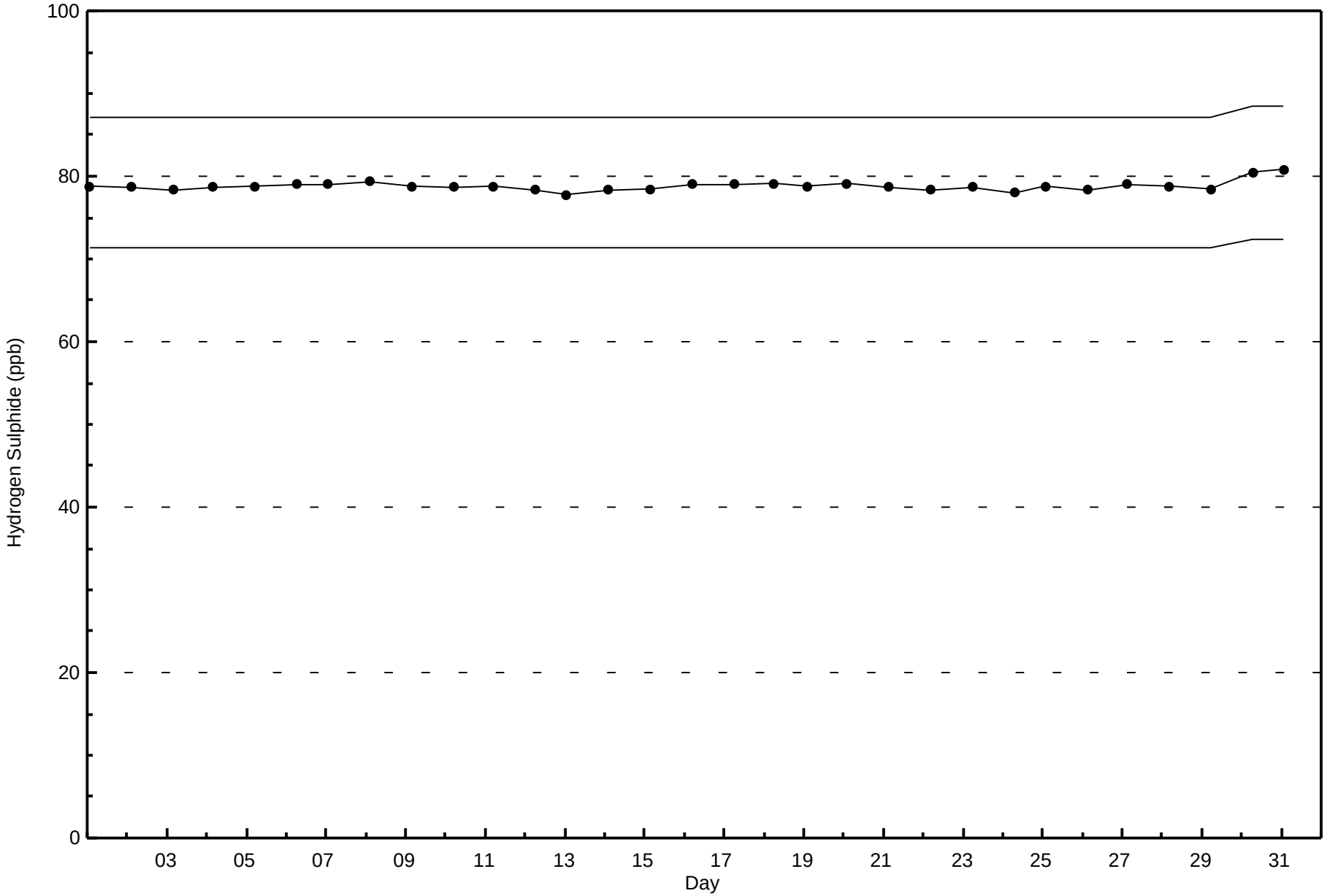


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Wapasu - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Wapasu - March 2016

Maximum Value: 2.5 ppm on Mar 2 09:00

Maximum Daily Average: 2.3 ppm on Mar 2

Minimum Value: 2.1 ppm on Mar 13 07:00

Minimum Daily Average: 2.1 ppm on Mar 22

Maximum Diurnal Average: 2.2 ppm at hour 9

Minimum Diurnal Average: 2.2 ppm at hour 17

Monthly Average: 2.18 ppm

Percentiles: P_1 = 2.1 P_{10} = 2.1 Q_1 = 2.1 Median = 2.2 Q_3 = 2.2 P_{90} = 2.3 P_{99} = 2.4

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
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	2.2	2.2	2.2	2.2
2-Mar	2.2	Z	2.2	2.2	2.3	2.3	2.3	2.3	2.5	2.5	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.3	2.5
3-Mar	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	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	2.3
4-Mar	2.2	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
5-Mar	2.1	2.1	2.1	2.2	Z	2.2	2.2	2.3	2.3	2.5	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.5
6-Mar	2.1	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.2
7-Mar	Z	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.4
8-Mar	2.2	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	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2
9-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	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3
10-Mar	2.2	2.2	2.2	Z	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	2.1	2.2	2.2	2.2	2.2	2.3
11-Mar	2.1	2.1	2.2	2.2	Z	2.3	2.3	2.4	2.4	2.4	2.3	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	2.4
12-Mar	2.3	2.3	2.3	2.3	2.3	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3
13-Mar	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2
14-Mar	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
15-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
16-Mar	2.3	2.3	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
17-Mar	2.2	2.2	2.2	2.4	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	2.3	2.2	2.4
18-Mar	2.3	2.3	2.2	2.3	2.4	Z	2.3	2.3	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.4
19-Mar	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	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.2
20-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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2
21-Mar	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	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
22-Mar	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
23-Mar	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3
24-Mar	2.2	2.2	2.2	2.2	2.1	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
25-Mar	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.1	2.3
26-Mar	2.3	Z	2.4	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.4
27-Mar	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2
28-Mar	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.1	2.1	2.2	2.3	2.3	2.2	2.3
29-Mar	2.3	2.3	2.2	2.3	Z	2.3	2.3	2.4	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	2.1	2.1	2.1	2.2	2.4
30-Mar	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.3
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	2.1	2.1	2.1	2.1	2.1	2.1	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	Diurnal Average	
	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.4	2.5	2.5	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	Diurnal Maximum	

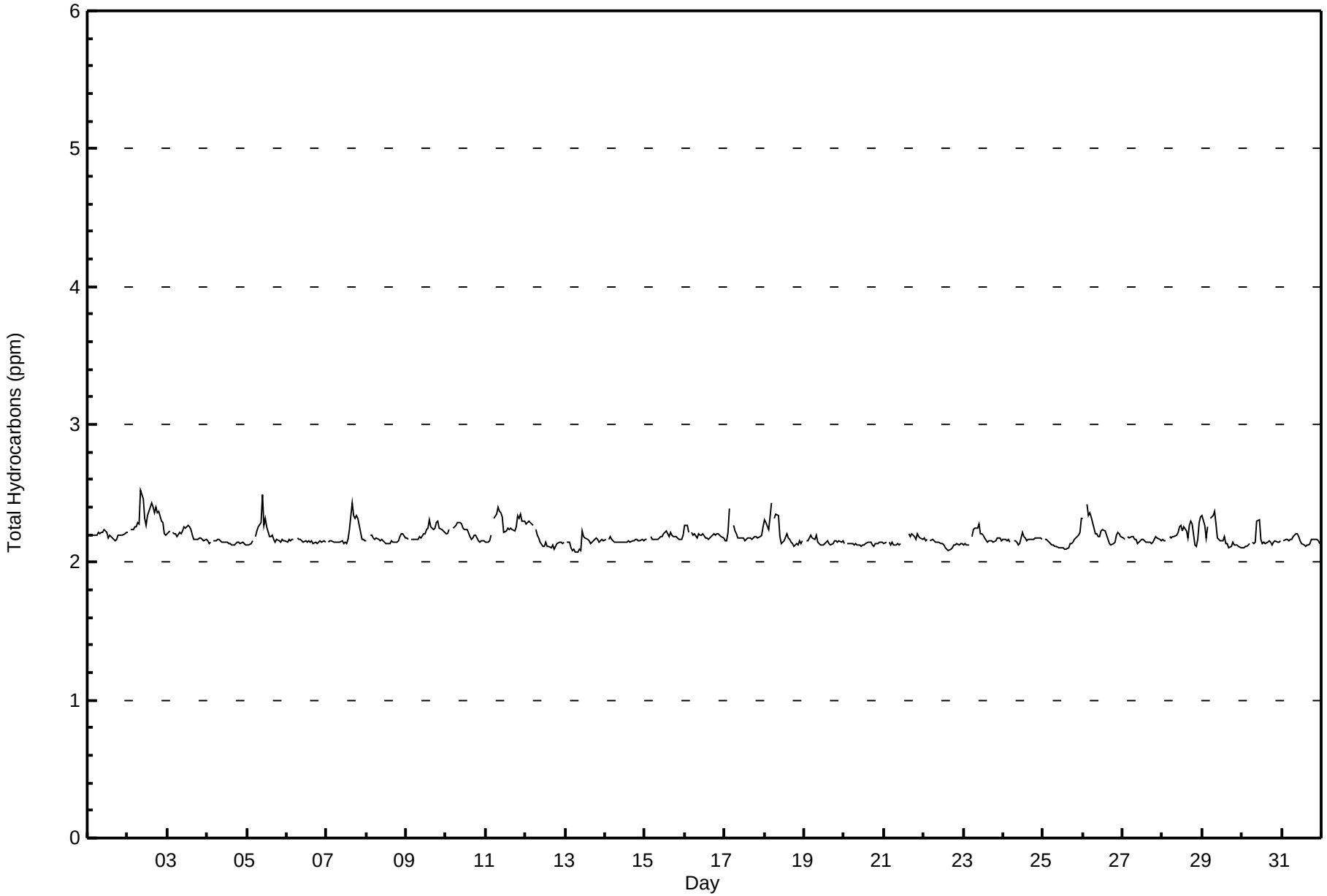
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Wapasu - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Wapasu - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	709	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: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Total Hydrocarbons (THC) - ppm

Wapasu - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	48	35	20	28	50	75	104	72	34	17	14	14	15	24	49	107	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	48	35	20	28	50	75	104	72	34	17	14	14	15	24	49	107	706

Total Number of Valid Hours: 706

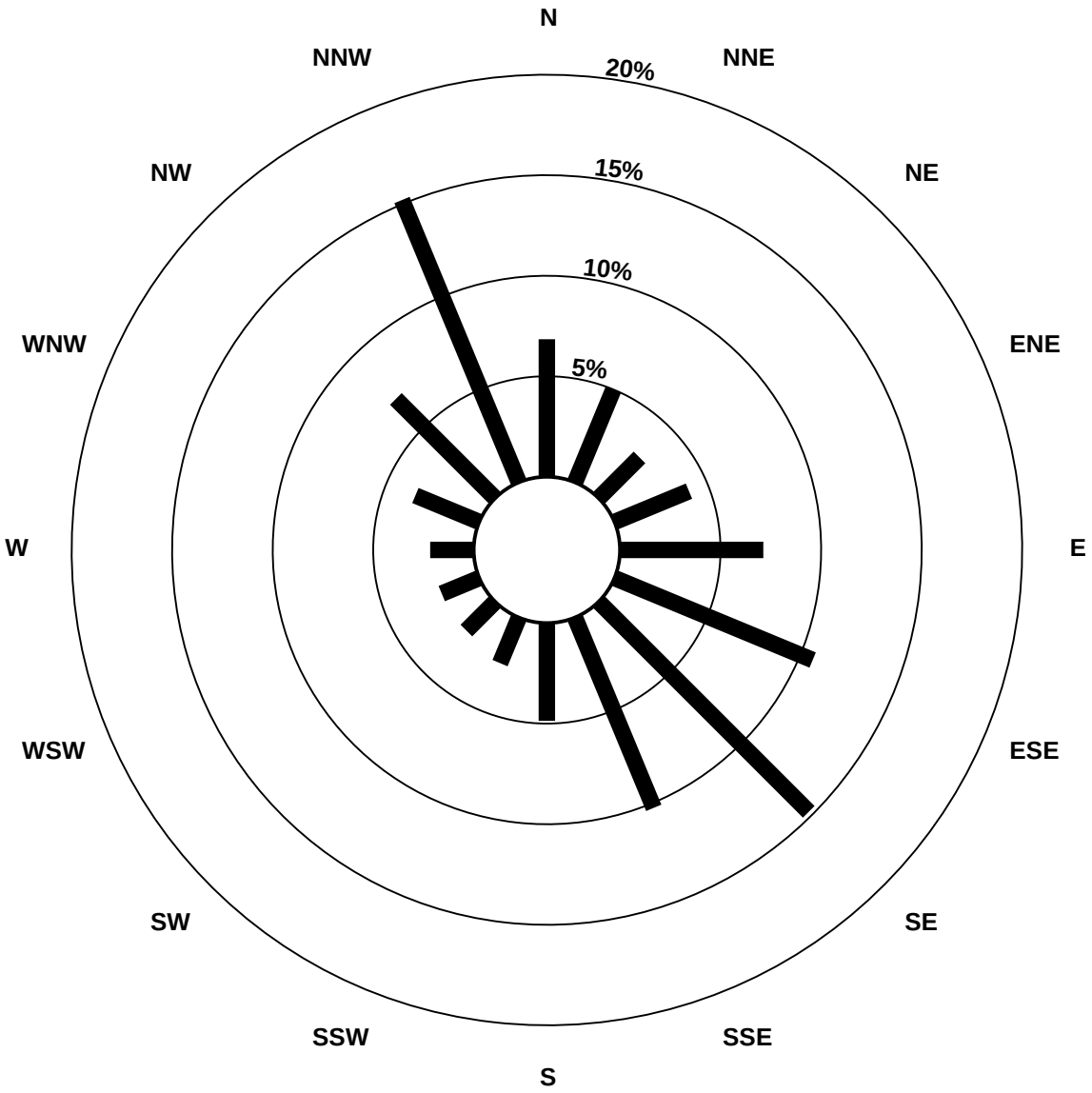
Total Number of Hours: 744

Wood Buffalo Environmental Association

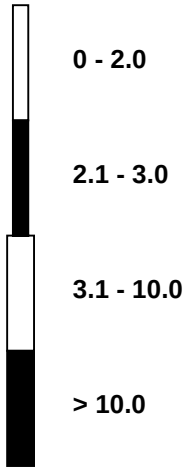
Wind Rose Mar 2016

Total Hydrocarbons (THC) - ppm

Wapasu (AMS 17)



Classes (ppm)



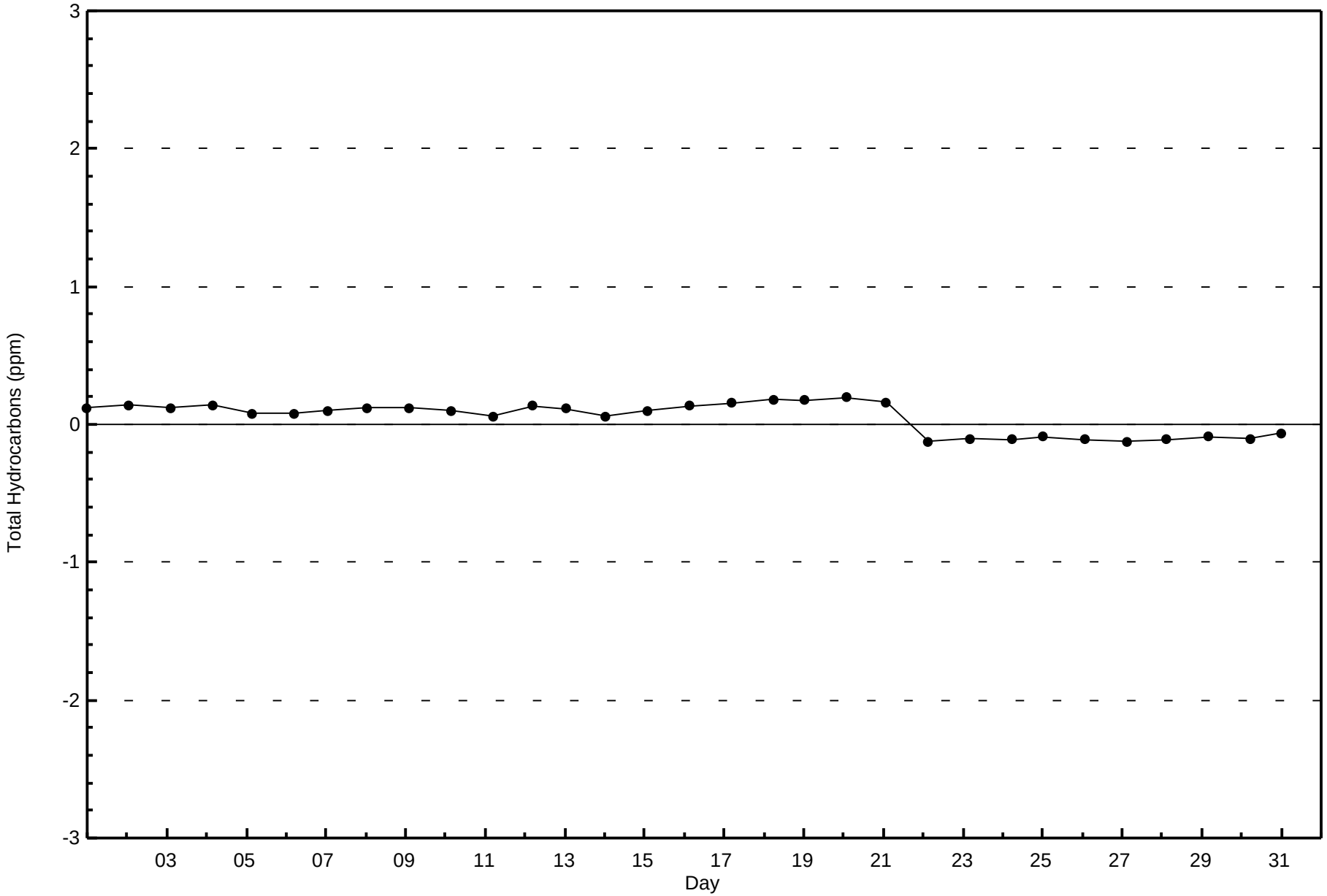
Total Number of Valid Hours: 706

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Wapasu - March 2016

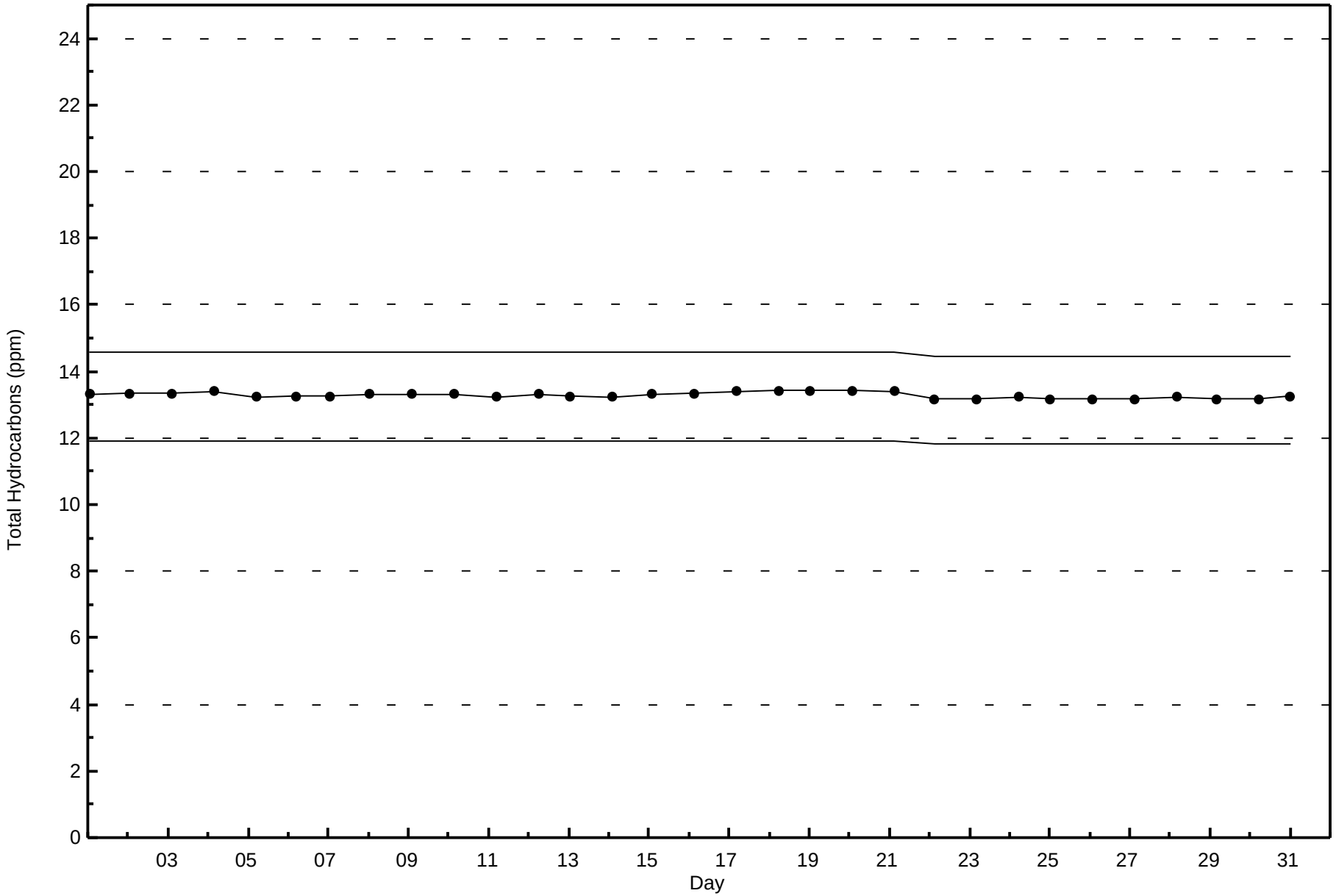


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Wapasu - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O_3) - ppb

Wapasu - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 48 ppb on Mar 25 01:00

Maximum Daily Average: 44.6 ppb on Mar 22

Minimum Value: 7 ppb on Mar 2 09:00

Minimum Daily Average: 21.9 ppb on Mar 2

Maximum Diurnal Average: 37.7 ppb at hour 17

Minimum Diurnal Average: 31.4 ppb at hour 7

Monthly Average: 35.0 ppb

Percentiles: $P_1 = 13$ $P_{10} = 24$ $Q_1 = 30$ Median = 36 $Q_3 = 41$ $P_{90} = 45$ $P_{99} = 47$

Hours in Service:	744
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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	32	31	30	Z	29	27	24	24	26	28	28	31	32	30	29	32	34	31	28	30	31	31	31	31	29.6	34
2-Mar	31	30	26	25	Z	24	24	23	7	9	19	26	21	20	21	21	19	18	20	12	19	23	31	32	21.9	32
3-Mar	31	29	29	28	28	Z	32	32	35	27	23	26	26	27	30	33	36	37	38	37	38	38	37	36	31.9	38
4-Mar	37	38	38	37	36	33	Z	31	33	37	41	40	40	41	41	41	41	42	42	42	41	42	42	41	39.0	42
5-Mar	41	40	39	36	35	36	35	Z	28	26	28	26	31	36	37	37	38	39	38	39	39	39	39	38	35.6	41
6-Mar	38	38	38	38	38	38	37	37	Z	37	38	38	39	40	40	41	41	42	41	40	39	39	38	36	38.7	42
7-Mar	36	36	36	Z	35	34	34	34	34	33	32	32	32	27	23	18	21	21	19	13	31	34	35	35	29.9	36
8-Mar	33	31	28	26	Z	28	29	32	36	31	32	33	33	32	31	29	30	31	32	31	28	26	26	29	30.3	36
9-Mar	30	30	31	31	29	Z	27	26	26	24	24	23	16	20	26	26	26	25	13	9	16	24	25	23	23.9	31
10-Mar	25	25	25	25	26	25	Z	25	27	29	31	32	34	35	36	36	36	35	34	35	33	32	32	30	30.6	36
11-Mar	31	29	27	22	22	19	17	Z	15	18	24	35	35	32	33	34	33	34	28	21	17	18	22	25	25.6	35
12-Mar	26	22	18	20	21	23	24	27	Z	34	39	40	41	43	43	44	41	42	41	40	40	41	41	41	34.4	44
13-Mar	40	38	38	Z	32	30	33	35	31	29	23	27	27	28	27	27	26	26	24	25	27	29	32	34	29.9	40
14-Mar	33	33	32	31	Z	32	32	32	32	32	32	33	32	32	32	32	32	33	32	31	30	29	28	26	31.5	33
15-Mar	27	28	26	21	18	Z	16	21	24	28	29	26	26	28	31	31	32	32	32	33	33	33	33	31	27.6	33
16-Mar	24	25	31	28	33	35	Z	35	36	36	34	33	37	37	38	42	41	39	41	41	36	37	39	40	35.5	42
17-Mar	40	39	29	14	21	28	31	Z	36	36	38	37	38	37	36	38	39	36	31	30	35	32	26	21	32.5	40
18-Mar	23	28	26	13	11	14	18	22	Z	34	39	40	40	39	38	35	38	38	32	30	34	36	33	24	29.8	40
19-Mar	22	18	14	Z	16	25	34	30	37	38	39	39	40	40	41	41	41	41	41	40	41	41	41	41	34.8	41
20-Mar	41	41	41	41	Z	40	40	40	41	41	41	42	42	42	40	39	40	40	39	36	37	34	35	35	39.6	42
21-Mar	40	39	40	40	40	Z	40	40	40	40	41	41	42	41	41	41	41	41	43	43	42	45	45	46	41.4	46
22-Mar	46	45	45	45	45	45	Z	44	45	45	44	44	45	45	45	45	45	45	44	44	44	44	45	44	44.6	46
23-Mar	43	42	42	41	35	29	32	Z	34	36	41	42	42	43	45	45	46	47	46	46	46	46	43	42	41.4	47
24-Mar	44	43	44	44	44	43	36	41	Z	C	C	C	43	44	46	46	47	47	46	42	37	38	43	47	43.2	47
25-Mar	48	48	48	Z	47	47	46	46	43	44	44	44	45	45	44	44	43	42	41	35	33	28	25	21	41.2	48
26-Mar	24	28	27	33	Z	31	38	41	43	44	45	43	43	44	45	47	47	46	43	40	40	38	41	44	39.7	47
27-Mar	43	43	42	42	42	Z	41	41	43	46	47	46	47	47	47	47	47	46	46	44	44	44	44	44	44.5	47
28-Mar	43	42	41	41	41	42	Z	42	41	41	41	43	44	40	44	45	42	42	42	45	43	38	25	17	40.3	45
29-Mar	19	27	37	32	26	26	27	Z	32	37	44	45	46	46	45	47	47	47	44	40	41	44	44	45	38.6	47
30-Mar	45	45	44	44	43	37	36	39	Z	37	38	45	45	45	44	43	40	39	40	40	39	40	39	38	41.1	45
31-Mar	39	38	37	Z	37	35	32	33	33	34	36	38	40	40	40	39	40	39	35	35	36	37	38	37	36.8	40
	34.6	34.5	33.9	31.9	31.9	31.8	31.4	33.7	33.0	33.7	35.1	36.4	36.8	37.0	37.4	37.6	37.7	37.5	36.0	34.5	35.1	35.4	35.3	34.7	Diurnal Average	
	48	48	48	45	47	47	46	46	45	46	47	46	47	47	47	47	47	47	46	46	46	46	45	47	Diurnal Maximum	

Z - zerospan C - Calibration

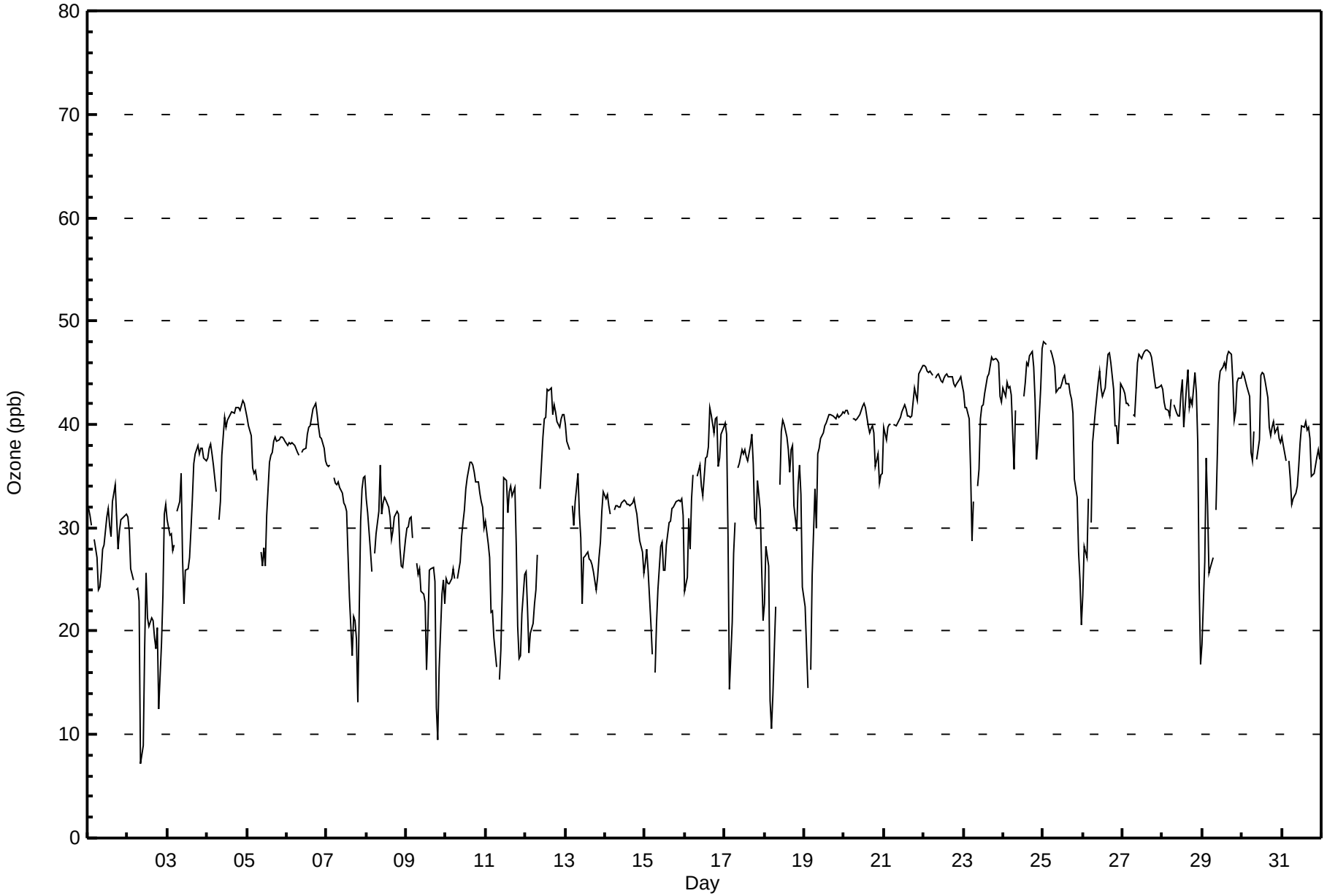
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ozone (O_3) - ppb

Wapasu - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Ozone (O_3) - ppb

Wapasu - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	37	5.21	5.21
21 - 50	673	94.79	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 (O_3) - ppb

Wapasu - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	3	2	2	1	2	4	2	2	0	3	4	2	1	3	3	3	37
21 - 50	45	34	18	27	53	73	99	69	34	15	8	14	13	23	41	104	670
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	48	36	20	28	55	77	101	71	34	18	12	16	14	26	44	107	707

Total Number of Valid Hours: 707

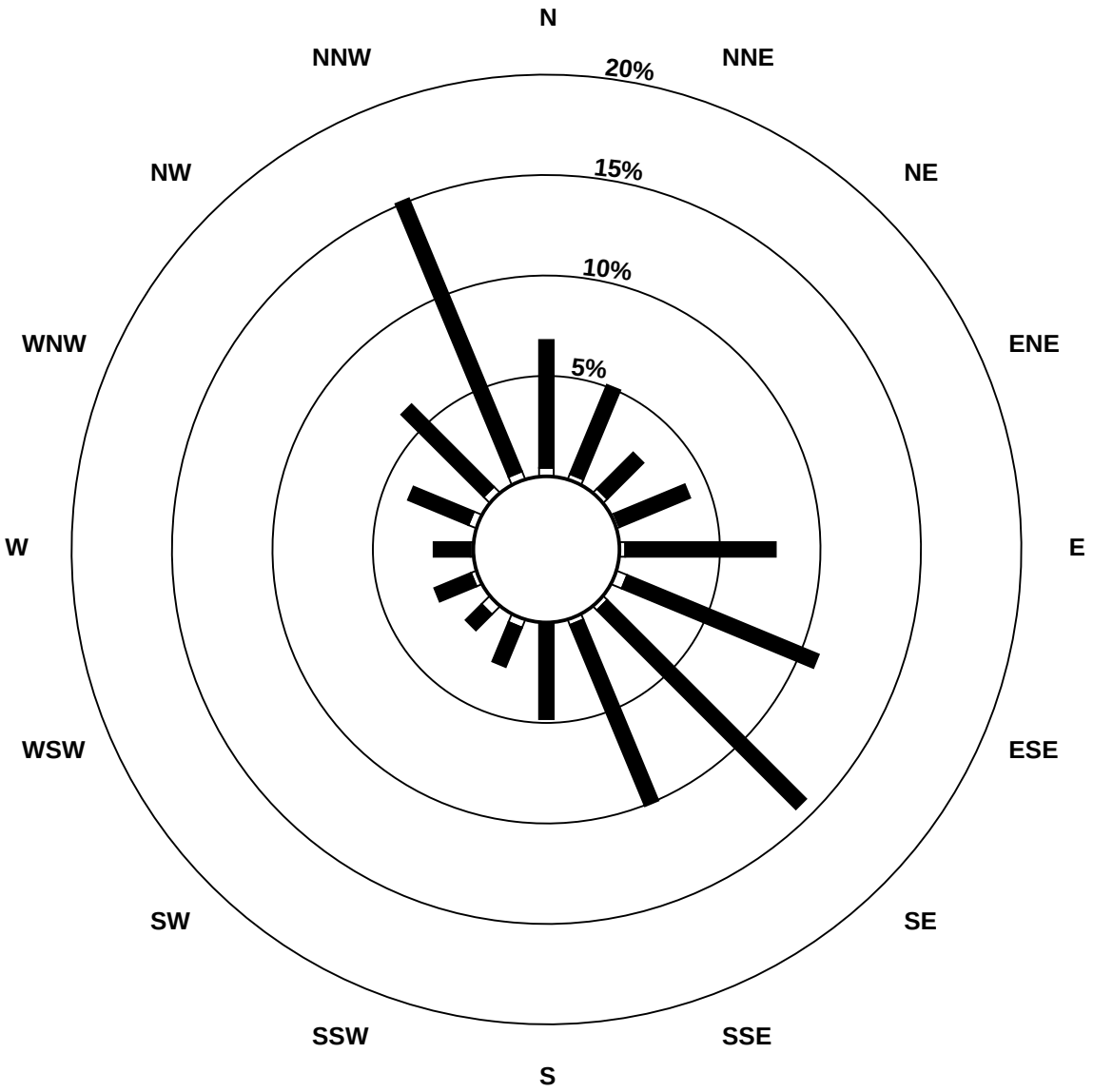
Total Number of Hours: 744

Wood Buffalo Environmental Association

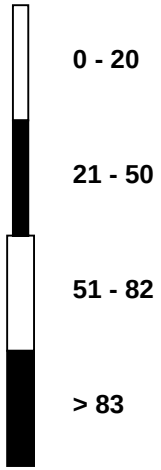
Wind Rose Mar 2016

Ozone (O_3) - ppb

Wapasu (AMS 17)



Classes (ppb)



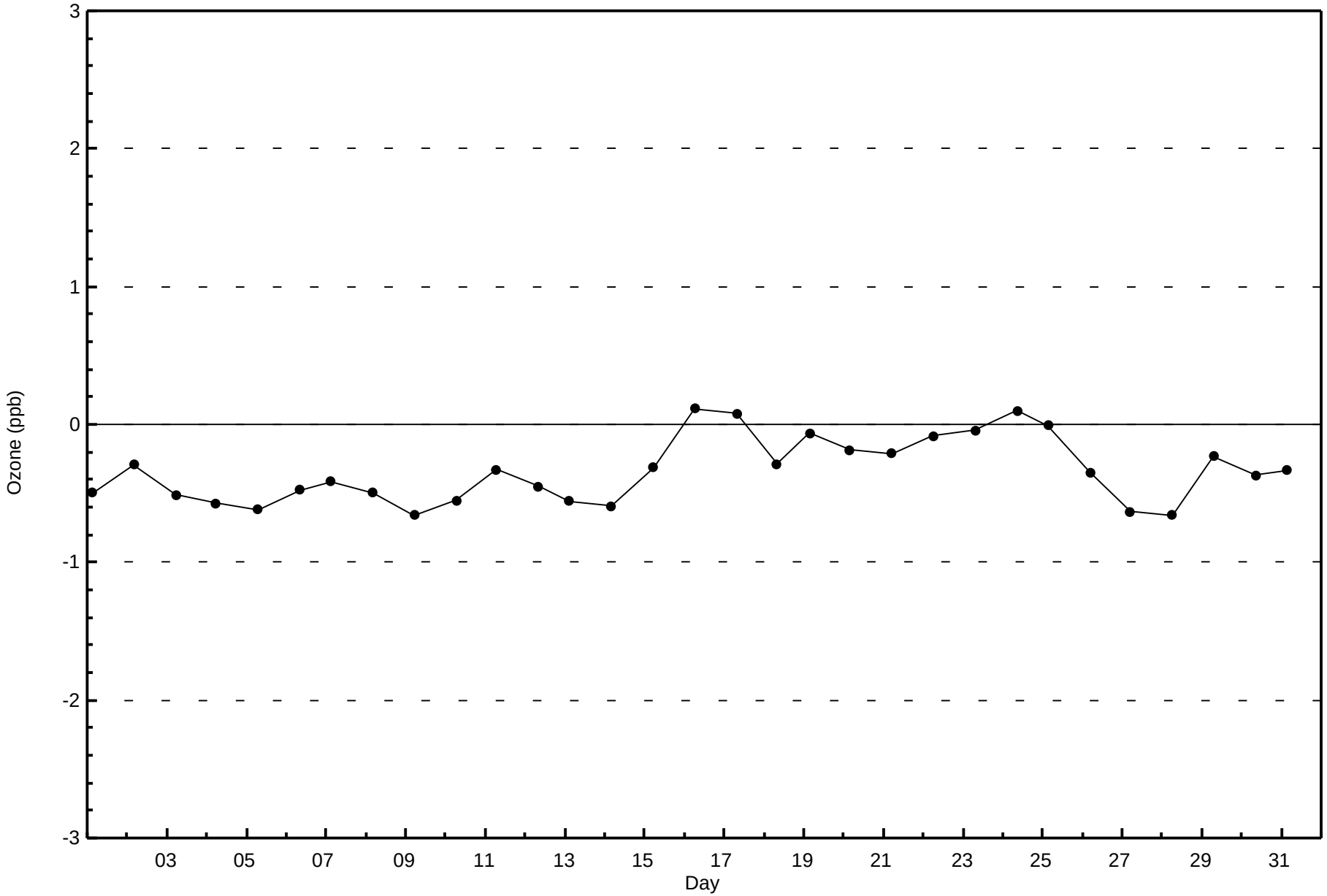
Total Number of Valid Hours: 707

Wood Buffalo Environmental Association

Zero Responses

Ozone (O_3) - ppb

Wapasu - March 2016

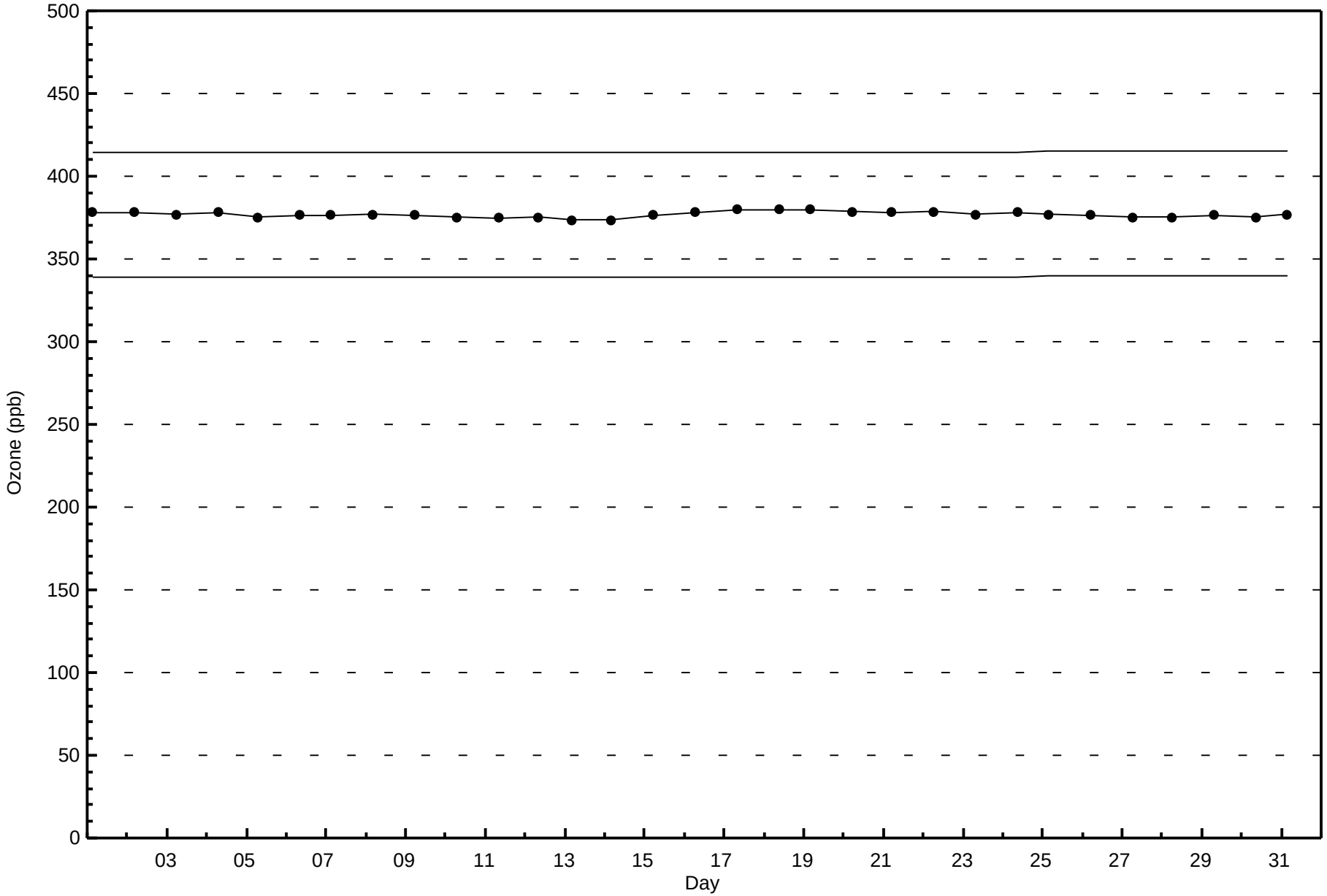


Wood Buffalo Environmental Association

Span Responses

Ozone (O_3) - ppb

Wapasu - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Wapasu - March 2016

Maximum Value: 19 ppb on Mar 2 10:00

Maximum Daily Average: 3.0 ppb on Mar 2

Minimum Value: 0 ppb on Mar 1 21:00

Minimum Daily Average: 0.0 ppb on Mar 14

Maximum Diurnal Average: 1.3 ppb at hour 10

Minimum Diurnal Average: 0.1 ppb at hour 6

Monthly Average: 0.5 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 4$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	37
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	0	0	0	0	0	0	0	1	1	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0.6	2
2-Mar	0	Z	0	0	0	0	0	0	16	19	6	3	9	7	4	3	2	1	0	0	0	0	0	0	3.0	19
3-Mar	0	0	Z	0	0	0	0	0	0	1	3	2	2	2	1	1	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	0.2	0
5-Mar	0	0	0	0	Z	0	0	0	0	1	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0.5	3
6-Mar	0	0	0	0	1	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1
7-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4	2	1	0	0	0	0	0	1	0.7	4
8-Mar	1	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1
9-Mar	0	0	Z	0	0	0	0	0	0	0	1	2	10	5	1	1	1	0	0	0	0	0	0	0	1.0	10
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	0.1	0
11-Mar	0	0	0	0	Z	0	0	1	1	2	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0.4	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	0.1	0
13-Mar	Z	0	0	0	0	0	0	0	0	0	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	2
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	0
15-Mar	0	0	Z	0	0	0	0	0	0	1	1	3	3	1	0	1	0	0	0	0	0	0	0	0	0.5	3
16-Mar	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
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
18-Mar	0	0	0	0	0	Z	0	1	2	1	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0.5	2
19-Mar	Z	0	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
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	0.1	1
21-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0.3	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	1	1	C	C	C	C	C	C	0	0	0	0	0	0	1	0	0	--	1
24-Mar	1	0	0	0	0	Z	0	0	0	0	1	5	2	2	1	1	1	0	0	0	0	0	0	0	0.8	5
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	1	1	2	2	2	1	0	0	0	1	0	0	0	0	0	0.5	2
27-Mar	0	1	Z	1	1	0	0	1	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	1	0.5	1
28-Mar	0	0	0	Z	0	0	0	0	1	1	2	1	1	2	1	1	1	1	0	0	0	0	0	0	0.7	2
29-Mar	0	0	0	0	Z	0	1	3	5	4	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.8	5
30-Mar	0	0	0	0	0	Z	0	0	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	3
31-Mar	Z	1	0	0	1	1	1	1	1	2	2	2	1	0	0	1	1	1	1	1	1	0	1	0	0.8	2
	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.4	1.0	1.3	1.1	1.1	1.3	1.0	0.8	0.7	0.5	0.3	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average	
	1	1	0	1	1	1	1	3	16	19	6	5	10	7	4	4	2	1	1	1	1	1	1	1	Diurnal Maximum	

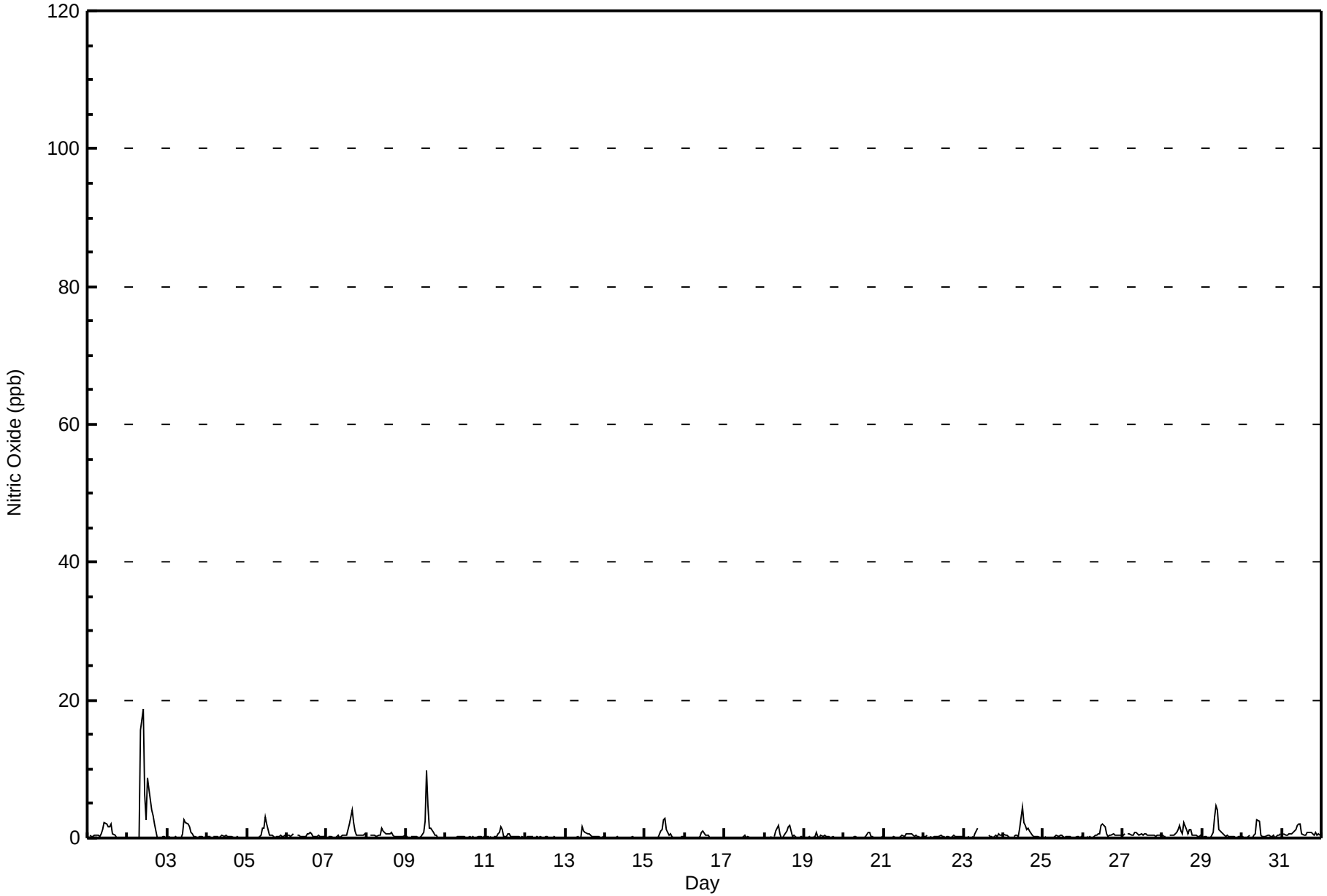
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Wapasu - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	100.00	100.00
21 - 40	0	0.00	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

Wapasu - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	48	35	20	28	54	75	104	72	34	17	14	14	15	24	49	101	704
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	35	20	28	54	75	104	72	34	17	14	14	15	24	49	101	704

Total Number of Valid Hours: 704

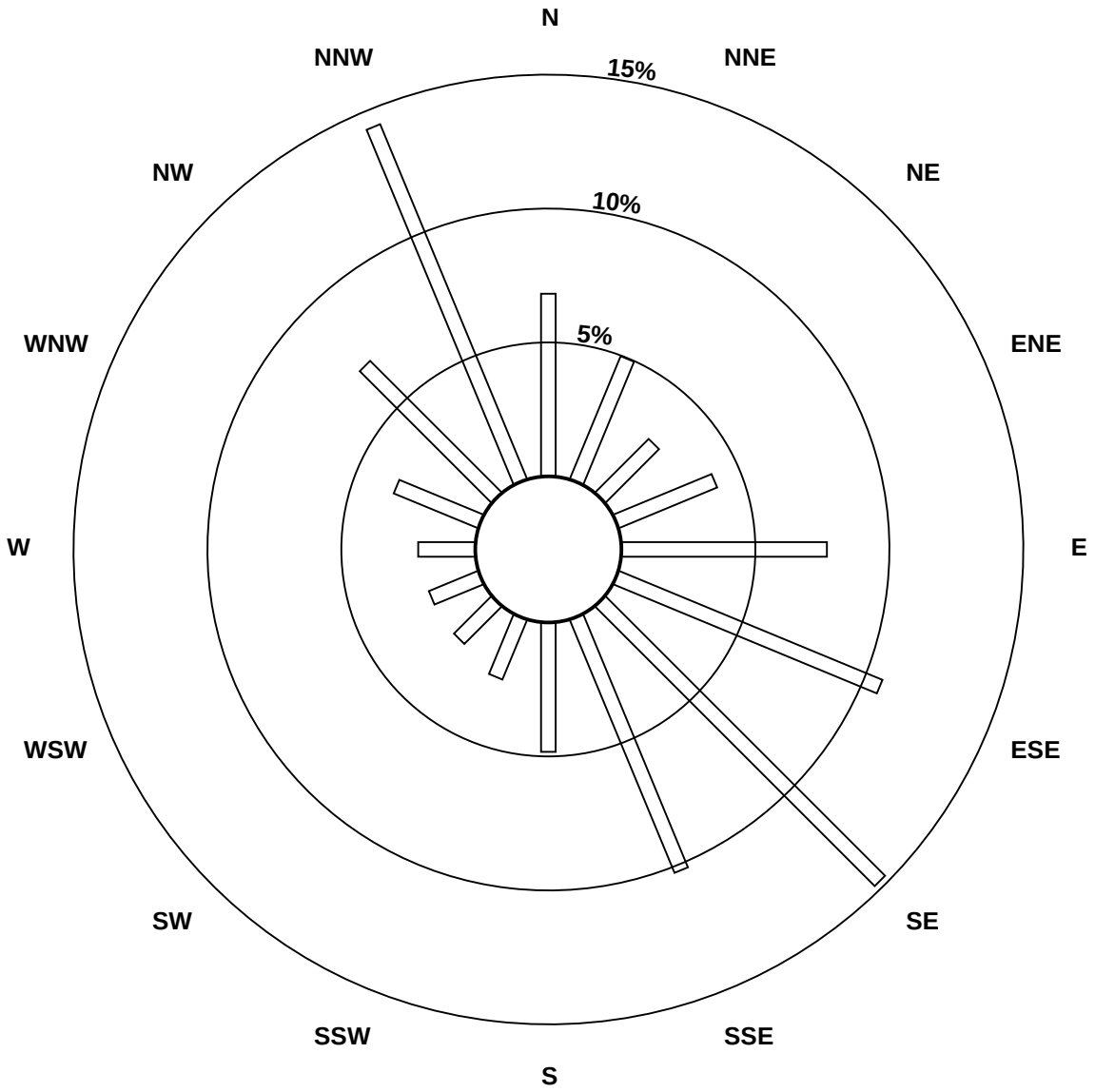
Total Number of Hours: 744

Wood Buffalo Environmental Association

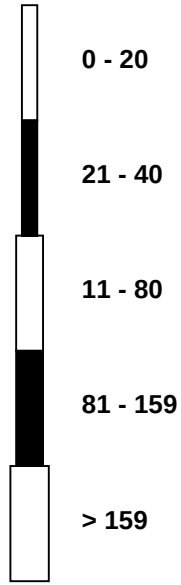
Wind Rose Mar 2016

Nitric Oxide (NO) - ppb

Wapasu (AMS 17)



Classes (ppb)



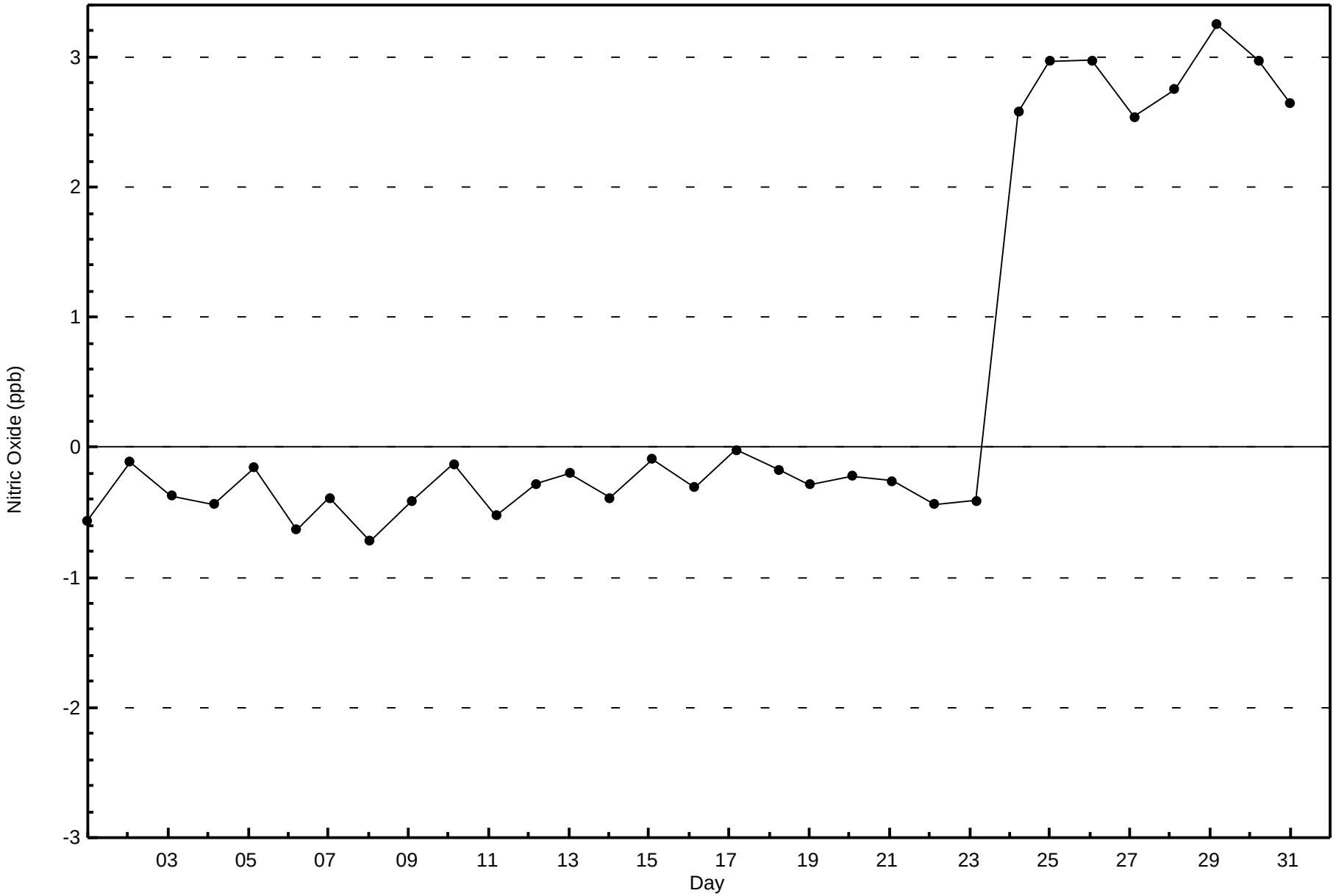
Total Number of Valid Hours: 704

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Wapasu - March 2016

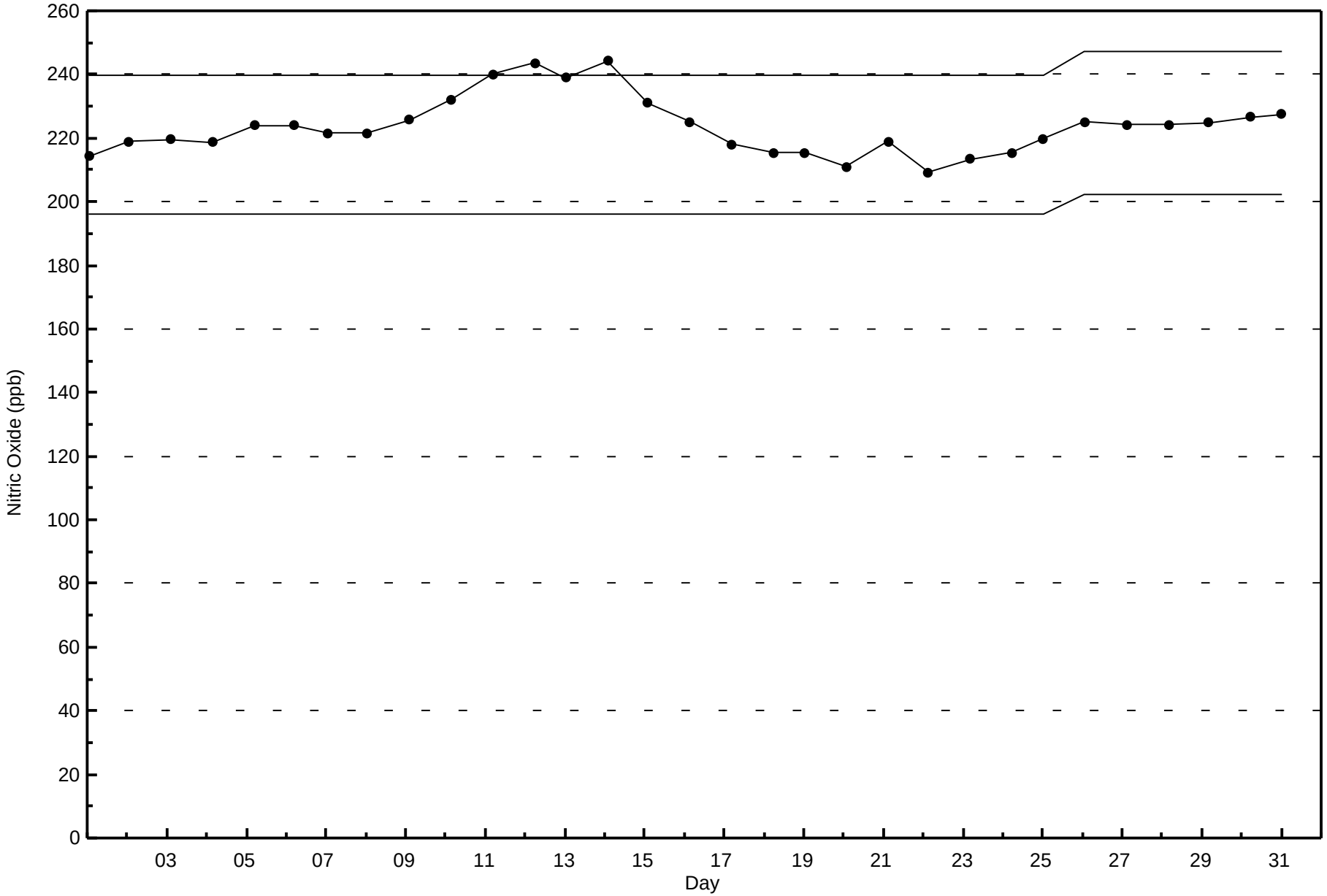


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Wapasu - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Wapasu - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 25 ppb on Mar 18 05:00 Maximum Daily Average: 8.2 ppb on Mar 2

Minimum Value: 0 ppb on Mar 3 00:00
Maximum Diurnal Average: 3.3 ppb at hour 4
Monthly Average: 2.4 ppb

Minimum Daily Average: 0.4 ppb on Mar 6
Minimum Diurnal Average: 1.6 ppb at hour 2
Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 1$ Median = 1 $Q_3 = 3$ $P_{90} = 6$ $P_{99} = 18$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	37
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	2	2	3	3	4	6	5	5	3	4	4	3	4	6	4	2	2	4	3	2	1	1	1	3.1	6
2-Mar	1	Z	2	1	1	2	1	2	20	21	11	5	11	12	11	12	13	14	10	19	12	9	0	0	8.2	21
3-Mar	0	1	Z	1	1	0	0	1	1	3	8	7	7	7	4	2	0	0	0	1	1	1	2	1	2.2	8
4-Mar	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0.4	1
5-Mar	0	1	1	3	Z	1	1	2	5	6	5	8	6	2	2	2	1	1	0	0	0	0	0	0	2.1	8
6-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0.4	1
7-Mar	Z	0	0	0	0	1	0	0	0	0	1	1	1	4	9	16	13	11	13	20	3	1	1	1	4.2	20
8-Mar	1	Z	2	3	2	2	2	2	1	5	3	2	1	1	2	4	3	1	1	1	3	3	4	2	2.2	5
9-Mar	2	2	Z	1	1	1	1	1	2	1	3	7	15	11	5	7	5	5	14	11	4	2	2	4	4.6	15
10-Mar	2	1	1	Z	1	2	2	2	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	2	1.0	2
11-Mar	1	1	1	5	Z	5	6	7	5	6	5	1	1	3	2	1	3	2	4	8	8	7	6	5	4.0	8
12-Mar	3	4	5	3	2	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	5
13-Mar	Z	1	1	1	1	1	1	1	1	1	7	4	4	3	3	4	4	4	6	5	3	3	2	2	2.5	7
14-Mar	3	Z	1	1	1	1	0	0	0	1	0	1	1	1	1	1	1	1	0	0	0	0	0	1	0.6	3
15-Mar	1	1	Z	0	1	1	0	1	1	3	4	6	6	4	2	2	1	1	0	1	0	0	1	3	1.6	6
16-Mar	10	9	3	Z	2	1	1	1	1	1	4	5	3	3	2	1	2	4	2	1	4	4	2	1	2.9	10
17-Mar	1	1	9	24	Z	8	4	2	1	1	1	2	1	2	2	2	1	3	4	3	1	2	2	3	3.5	24
18-Mar	4	6	8	22	25	Z	17	13	11	4	1	1	1	3	3	5	4	3	3	1	1	1	2	4	6.1	25
19-Mar	Z	1	1	2	2	2	2	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1.4	8
20-Mar	0	Z	0	0	0	0	0	1	0	0	0	0	0	1	2	3	2	2	1	4	3	5	5	5	1.6	5
21-Mar	1	2	Z	0	0	1	0	1	0	0	1	1	0	1	2	2	3	3	0	1	2	0	0	1	1.1	3
22-Mar	0	0	0	Z	0	1	0	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0.5	1
23-Mar	1	2	1	1	Z	6	5	5	6	C	C	C	C	C	C	0	0	0	0	0	0	0	1	1	--	6
24-Mar	0	0	0	0	0	Z	0	0	0	0	2	8	4	3	3	4	4	4	4	3	2	1	1	1	1.9	8
25-Mar	Z	1	0	1	1	1	1	1	3	2	1	1	1	1	1	1	1	1	2	2	1	1	1	10	1.3	10
26-Mar	10	Z	10	6	9	9	4	2	2	2	1	3	5	3	2	1	1	1	2	1	3	4	2	0	3.7	10
27-Mar	0	0	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
28-Mar	0	1	2	Z	3	1	1	1	2	3	4	3	2	6	4	2	6	6	6	1	1	2	9	12	3.3	12
29-Mar	8	5	1	5	Z	10	10	12	12	8	3	2	1	1	1	1	1	1	1	1	1	0	0	0	3.7	12
30-Mar	0	0	1	0	1	Z	2	1	2	8	7	1	1	1	1	1	1	1	1	1	1	1	2	1	1.6	8
31-Mar	Z	2	2	1	1	2	4	3	3	3	3	3	1	0	0	1	2	2	6	5	4	3	2	3	2.5	6
	2.0	1.6	2.1	3.3	2.3	2.3	2.5	2.5	2.9	2.9	2.7	2.6	2.6	2.7	2.5	2.7	2.5	2.4	2.7	3.0	2.0	1.8	1.6	2.0	Diurnal Average	
	10	9	10	24	25	10	17	13	20	21	11	8	15	12	11	16	13	14	14	20	12	9	9	12	Diurnal Maximum	

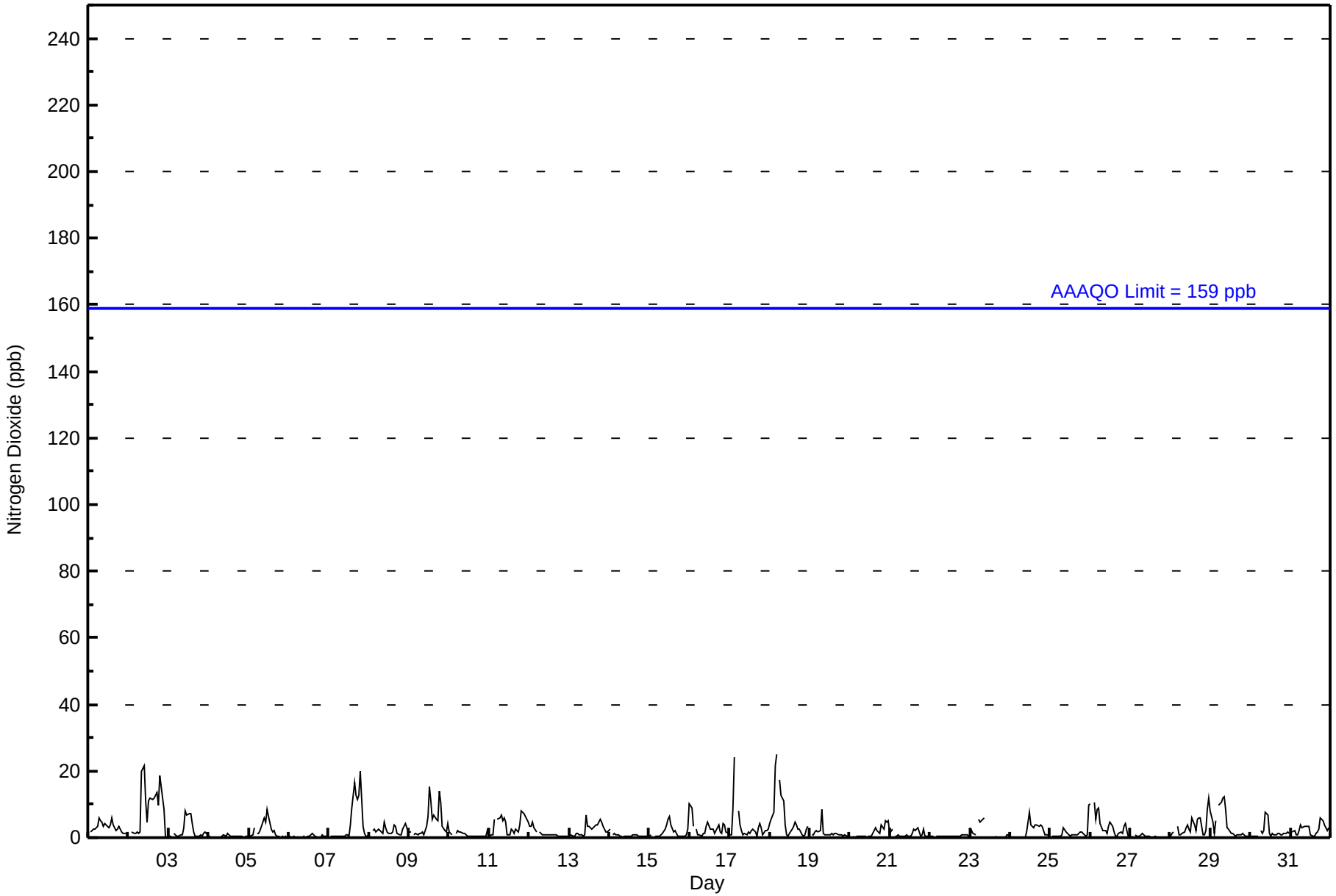
Z - zerospan C - Calibration
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Wapasu - March 2016



Nitrogen Dioxide (NO_2) - ppb
Wapasu - March 2016

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

Nitrogen Dioxide (NO_2) - ppb

Wapasu - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	48	35	20	28	54	75	104	72	34	15	14	14	15	23	48	101	700
21 - 40	0	0	0	0	0	0	0	0	0	2	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	48	35	20	28	54	75	104	72	34	17	14	14	15	24	49	101	704

Total Number of Valid Hours: 704

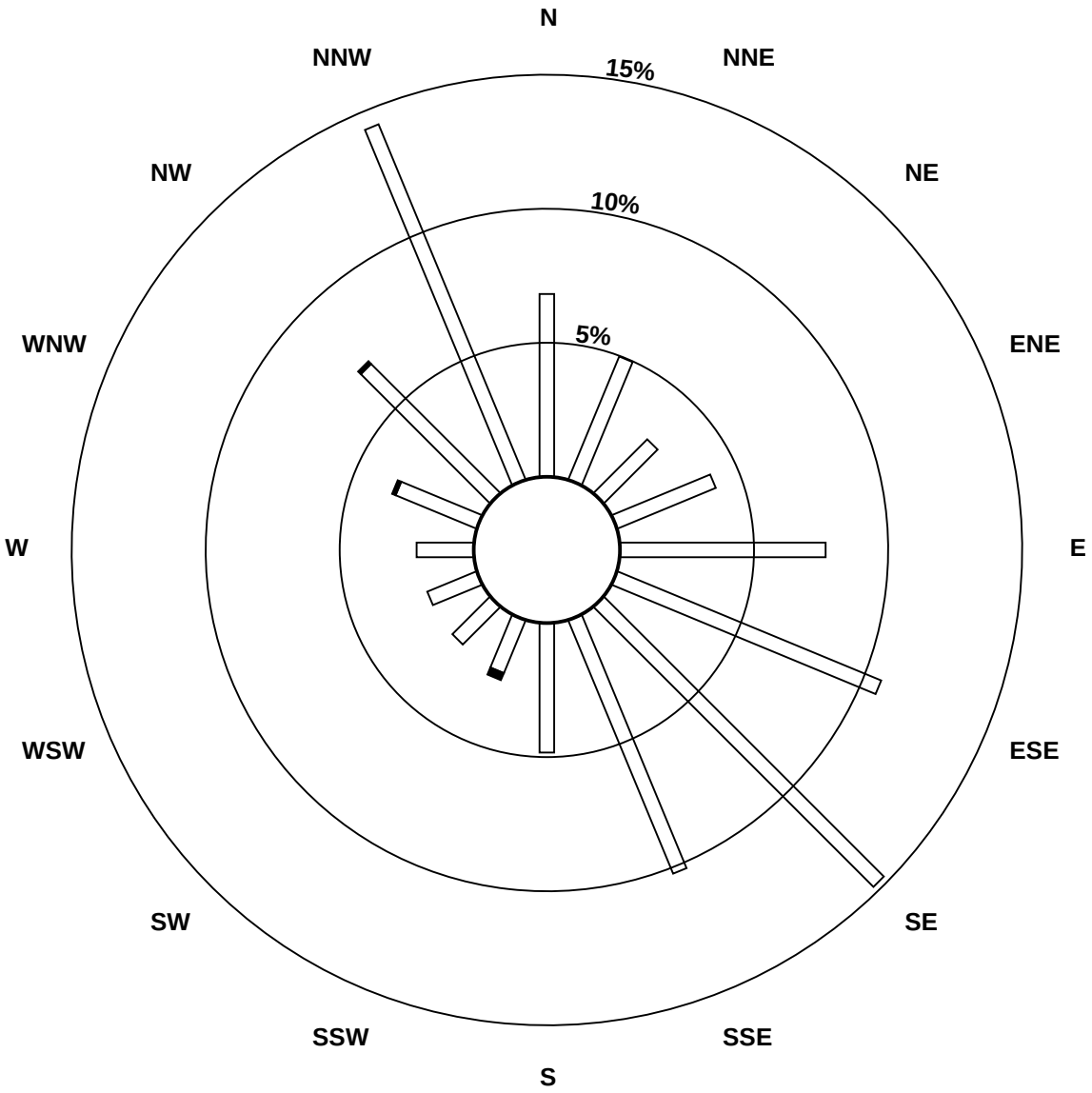
Total Number of Hours: 744

Wood Buffalo Environmental Association

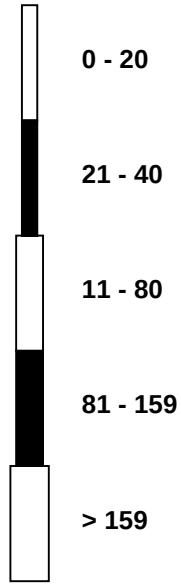
Wind Rose Mar 2016

Nitrogen Dioxide (NO_2) - ppb

Wapasu (AMS 17)



Classes (ppb)



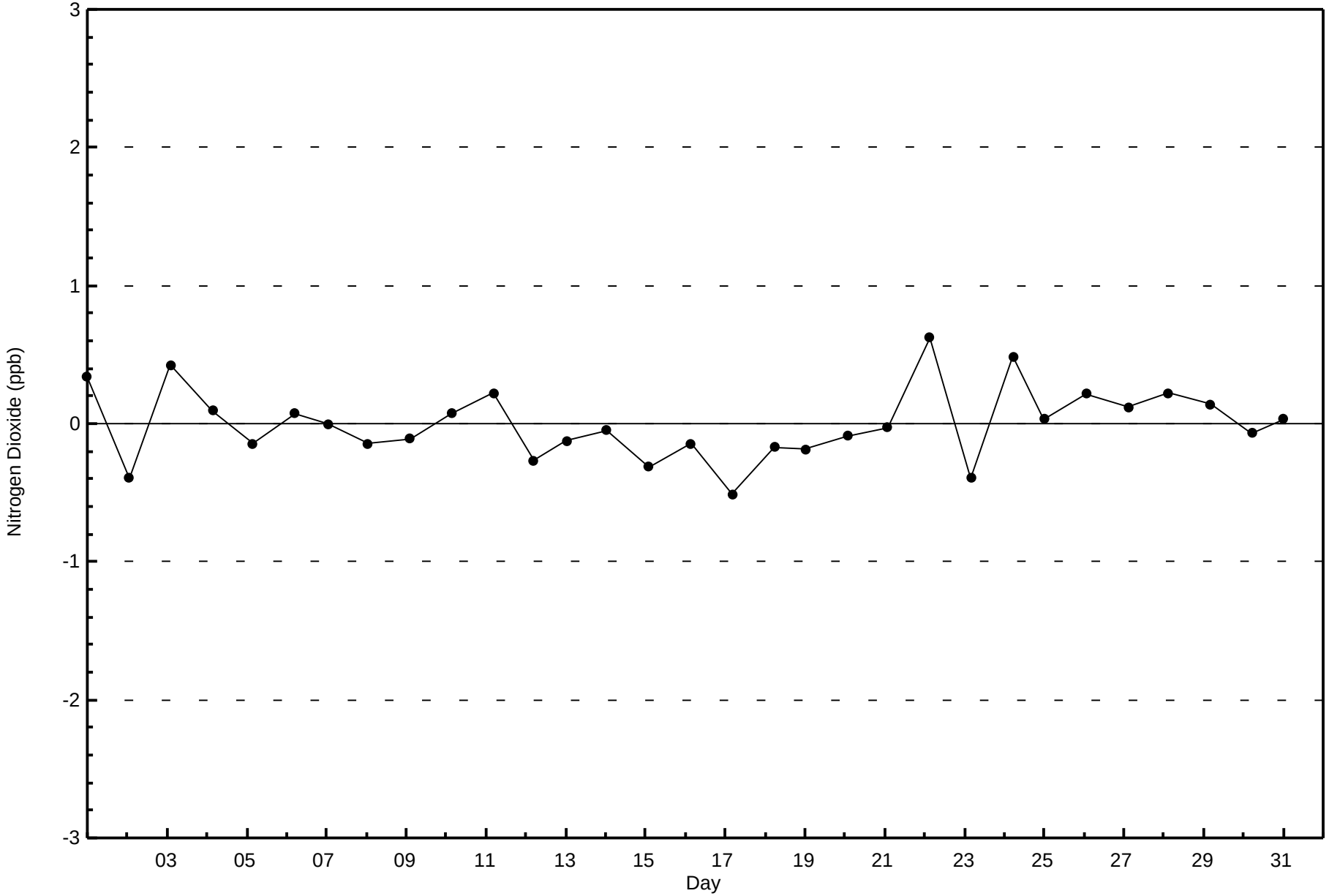
Total Number of Valid Hours: 704

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Wapasu - March 2016

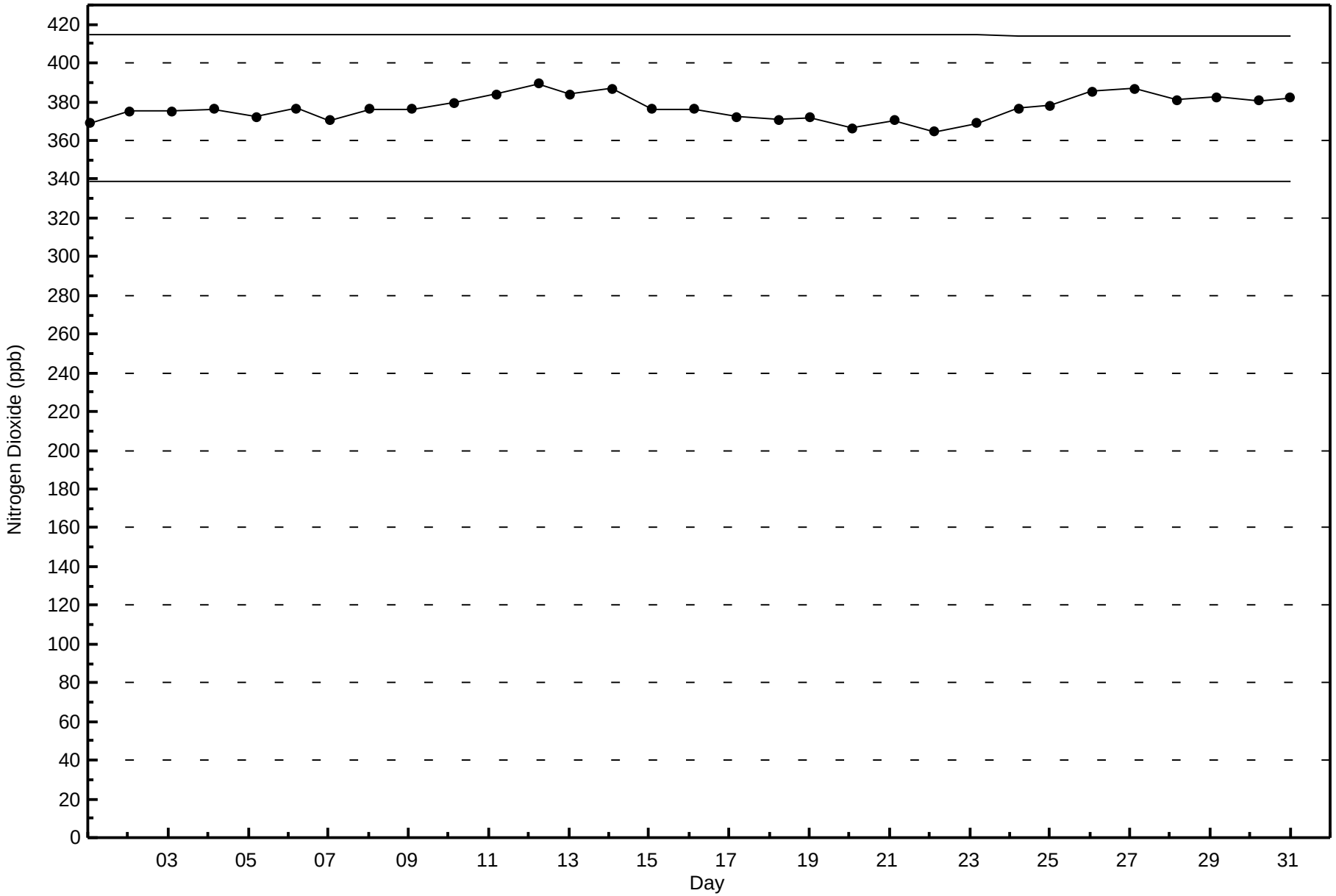


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Wapasu - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Wapasu - March 2016

Maximum Value: 40 ppb on Mar 2 10:00

Maximum Daily Average: 11.3 ppb on Mar 2

Minimum Value: 0 ppb on Mar 24 05:00

Minimum Daily Average: 0.6 ppb on Mar 4

Maximum Diurnal Average: 4.3 ppb at hour 10

Minimum Diurnal Average: 1.8 ppb at hour 2

Monthly Average: 2.9 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 1$ Median = 1 $Q_3 = 4$ $P_{90} = 7$ $P_{99} = 20$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	37
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	2	2	3	3	4	6	5	5	4	6	6	5	6	8	4	3	3	4	3	2	1	1	1	3.8	8
2-Mar	1	Z	2	1	1	2	1	2	36	40	17	7	20	19	16	15	15	15	10	19	12	9	0	0	11.3	40
3-Mar	0	1	Z	2	1	1	0	1	1	4	11	9	10	9	5	2	0	0	0	1	1	1	2	1	2.7	11
4-Mar	0	0	0	Z	0	0	0	0	1	1	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0.6	2
5-Mar	1	1	1	3	Z	1	1	2	5	7	6	11	8	3	2	2	1	1	0	0	1	0	0	1	2.6	11
6-Mar	1	1	0	1	1	Z	1	1	0	1	0	0	1	1	2	1	0	0	0	0	1	1	1	1	0.7	2
7-Mar	Z	0	1	1	0	0	1	1	0	1	1	1	1	5	11	21	15	12	13	21	4	2	1	1	4.9	21
8-Mar	1	Z	2	3	2	2	3	2	1	6	4	2	2	2	2	4	4	2	1	1	3	4	4	2	2.6	6
9-Mar	2	2	Z	1	1	1	1	1	2	1	4	9	25	16	7	8	6	6	14	11	4	2	2	4	5.6	25
10-Mar	2	1	1	Z	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1.1	2
11-Mar	1	1	1	6	Z	6	6	7	6	7	6	1	1	3	3	2	3	2	4	8	8	7	6	5	4.3	8
12-Mar	3	4	5	3	2	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	5
13-Mar	Z	1	1	1	1	1	1	1	1	1	8	4	4	3	3	4	4	4	6	5	4	2	2	2	2.7	8
14-Mar	3	Z	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	0	0	1	0	0	0	1	0.7	3
15-Mar	1	1	Z	0	0	1	0	1	1	4	5	8	9	5	2	3	1	1	0	0	0	0	1	3	2.1	9
16-Mar	10	9	3	Z	2	1	1	1	1	1	4	6	3	3	3	1	2	4	2	1	4	4	2	1	3.0	10
17-Mar	1	1	9	24	Z	8	4	2	1	1	1	2	2	2	3	2	1	3	4	3	1	2	2	2	3.5	24
18-Mar	4	6	8	22	25	Z	17	14	13	5	1	1	2	4	5	7	5	3	3	1	1	1	2	4	6.6	25
19-Mar	Z	1	1	2	2	2	3	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1.6	9
20-Mar	0	Z	0	0	0	0	1	1	0	0	0	0	0	1	3	4	2	2	1	4	3	5	5	5	1.7	5
21-Mar	1	3	Z	0	0	1	1	1	0	0	1	1	1	2	3	3	3	4	1	1	3	1	1	1	1.3	4
22-Mar	1	1	1	Z	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
23-Mar	1	2	1	1	Z	6	5	6	7	C	C	C	C	C	C	1	0	0	0	0	0	1	1	1	--	7
24-Mar	1	0	0	0	0	Z	0	1	0	0	3	12	6	5	4	5	5	4	4	4	2	1	1	1	2.6	12
25-Mar	Z	1	0	1	0	0	1	1	3	2	2	1	1	1	1	1	1	1	1	2	1	1	1	10	1.5	10
26-Mar	10	Z	10	6	9	9	4	3	3	3	2	5	7	5	2	1	1	2	2	2	4	5	3	1	4.2	10
27-Mar	1	1	Z	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2
28-Mar	1	1	2	Z	4	1	2	2	3	4	6	4	2	8	5	3	7	7	6	1	1	2	9	12	4.0	12
29-Mar	8	5	1	5	Z	10	11	15	17	13	4	3	2	2	1	1	1	1	1	1	1	0	1	1	4.5	17
30-Mar	0	0	1	0	1	Z	2	2	3	10	9	2	1	1	1	1	1	1	1	1	1	1	2	2	2.0	10
31-Mar	Z	2	2	1	1	3	5	4	4	5	5	5	2	1	1	2	2	3	7	6	5	4	3	3	3.3	7
	2.2	1.8	2.2	3.4	2.4	2.5	2.7	2.9	3.9	4.3	3.8	3.6	3.9	3.7	3.3	3.4	2.9	2.7	3.0	3.2	2.2	2.0	1.8	2.2	Diurnal Average	
	10	9	10	24	25	10	17	15	36	40	17	12	25	19	16	21	15	15	14	21	12	9	9	12	Diurnal Maximum	

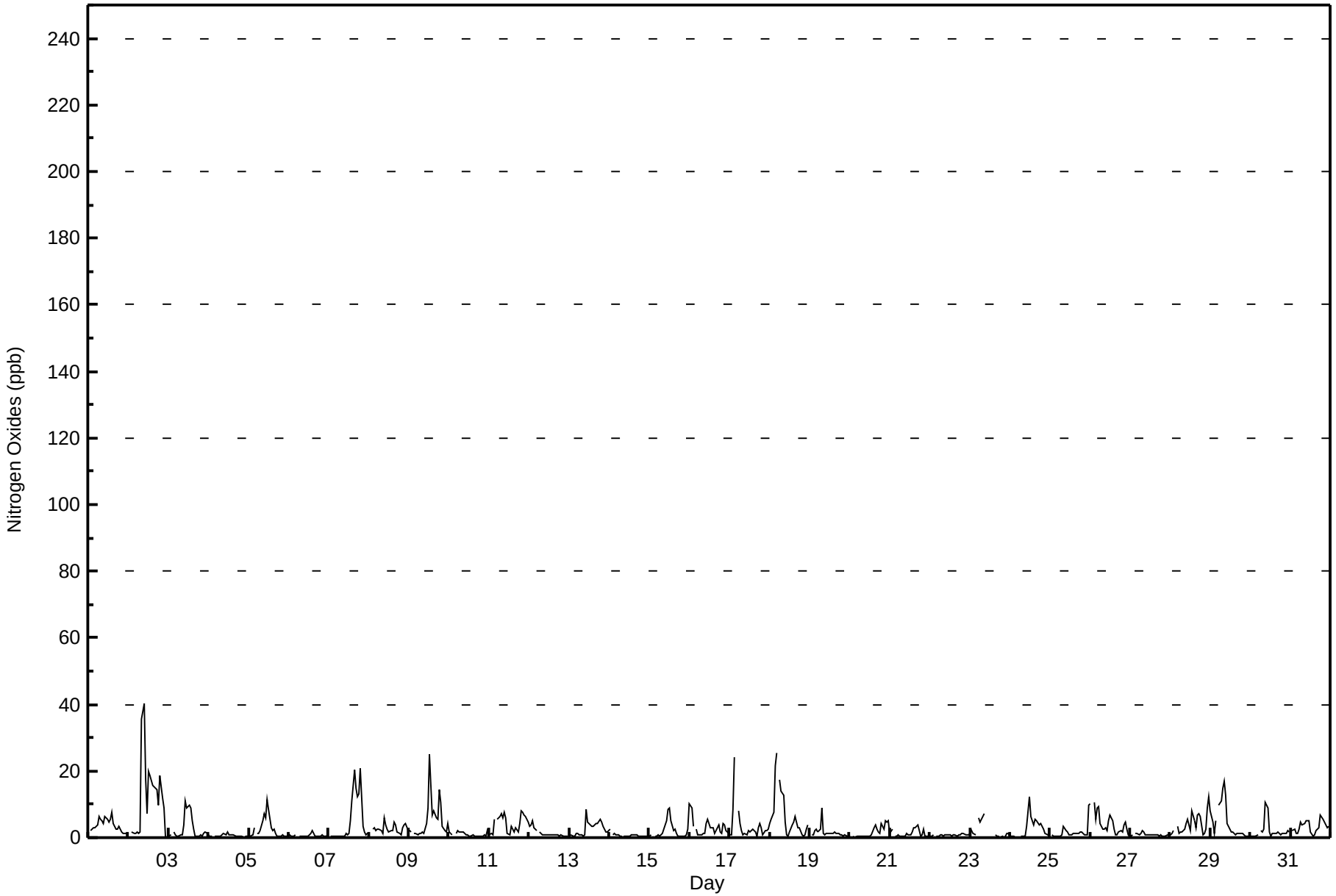
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Wapasu - March 2016



Nitrogen Oxides (NO_X) - ppb

Wapasu - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	699	98.87	98.87
21 - 40	8	1.13	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

Nitrogen Oxides (NO_X) - ppb

Wapasu - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	48	35	20	28	54	75	104	72	34	15	13	13	15	23	47	100	696
21 - 40	0	0	0	0	0	0	0	0	0	2	1	1	0	1	2	1	8
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	48	35	20	28	54	75	104	72	34	17	14	14	15	24	49	101	704

Total Number of Valid Hours: 704

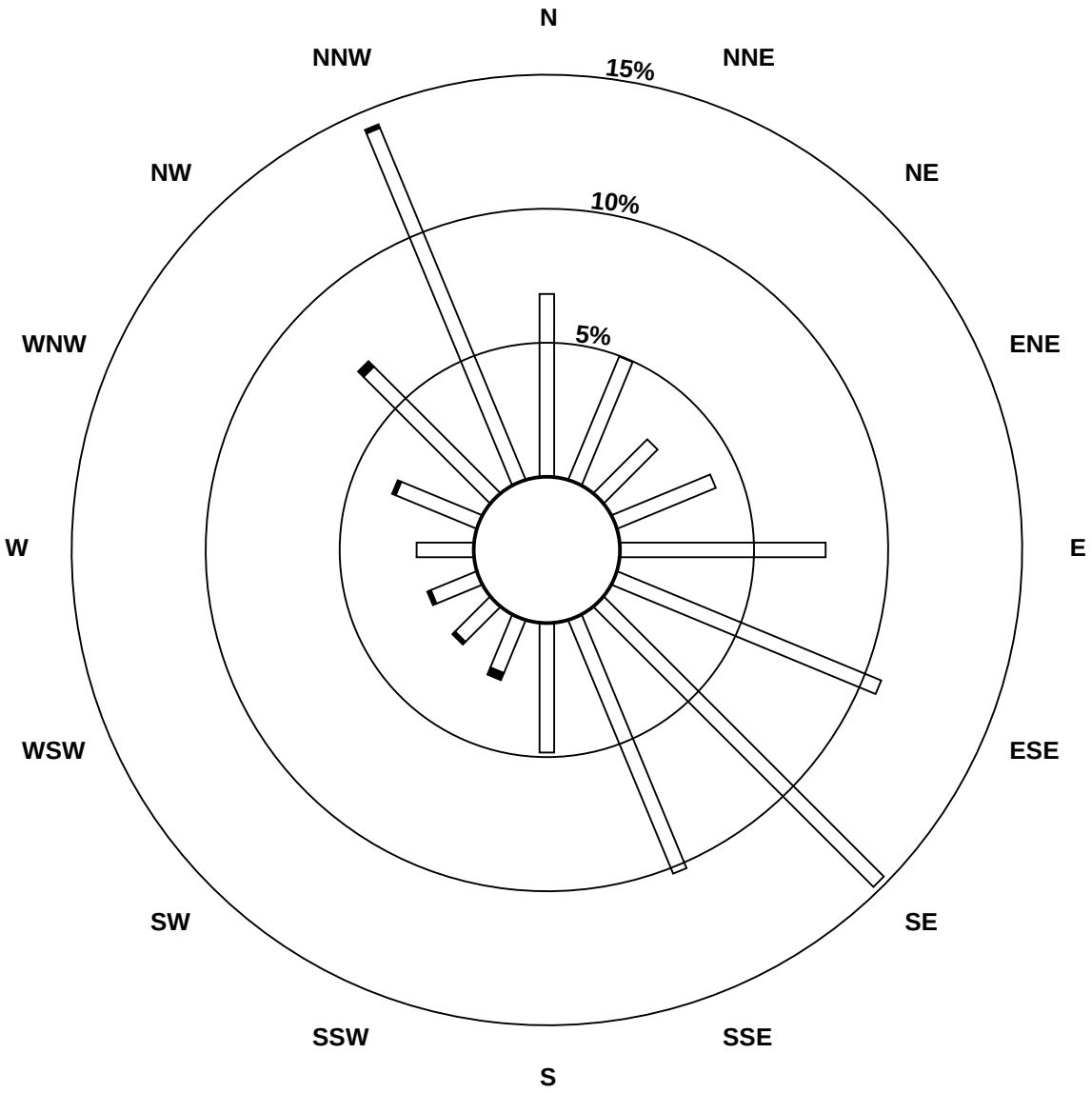
Total Number of Hours: 744

Wood Buffalo Environmental Association

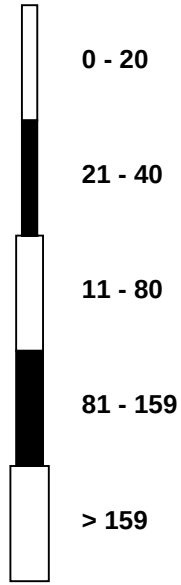
Wind Rose Mar 2016

Nitrogen Oxides (NO_X) - ppb

Wapasu (AMS 17)



Classes (ppb)



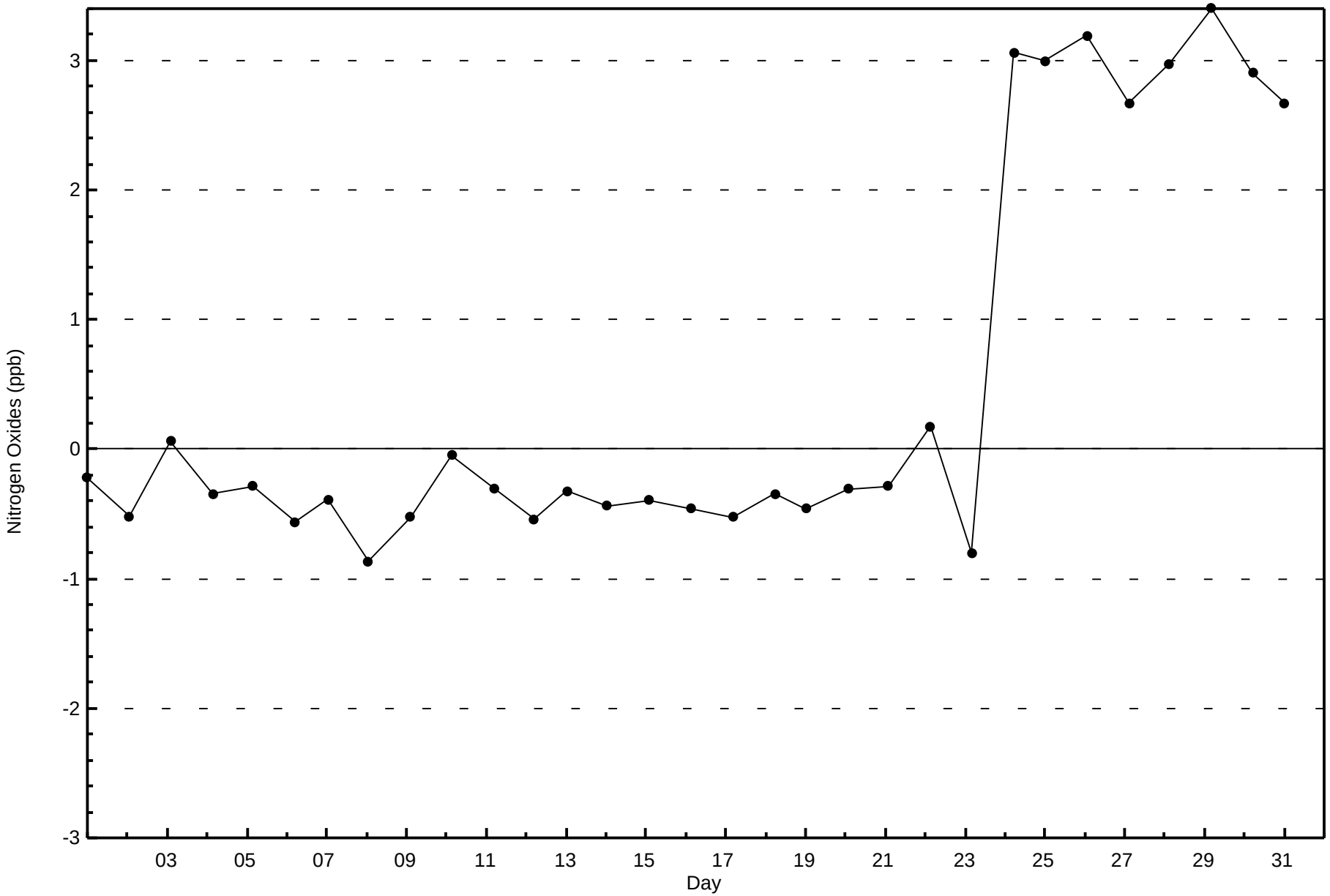
Total Number of Valid Hours: 704

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Wapasu - March 2016



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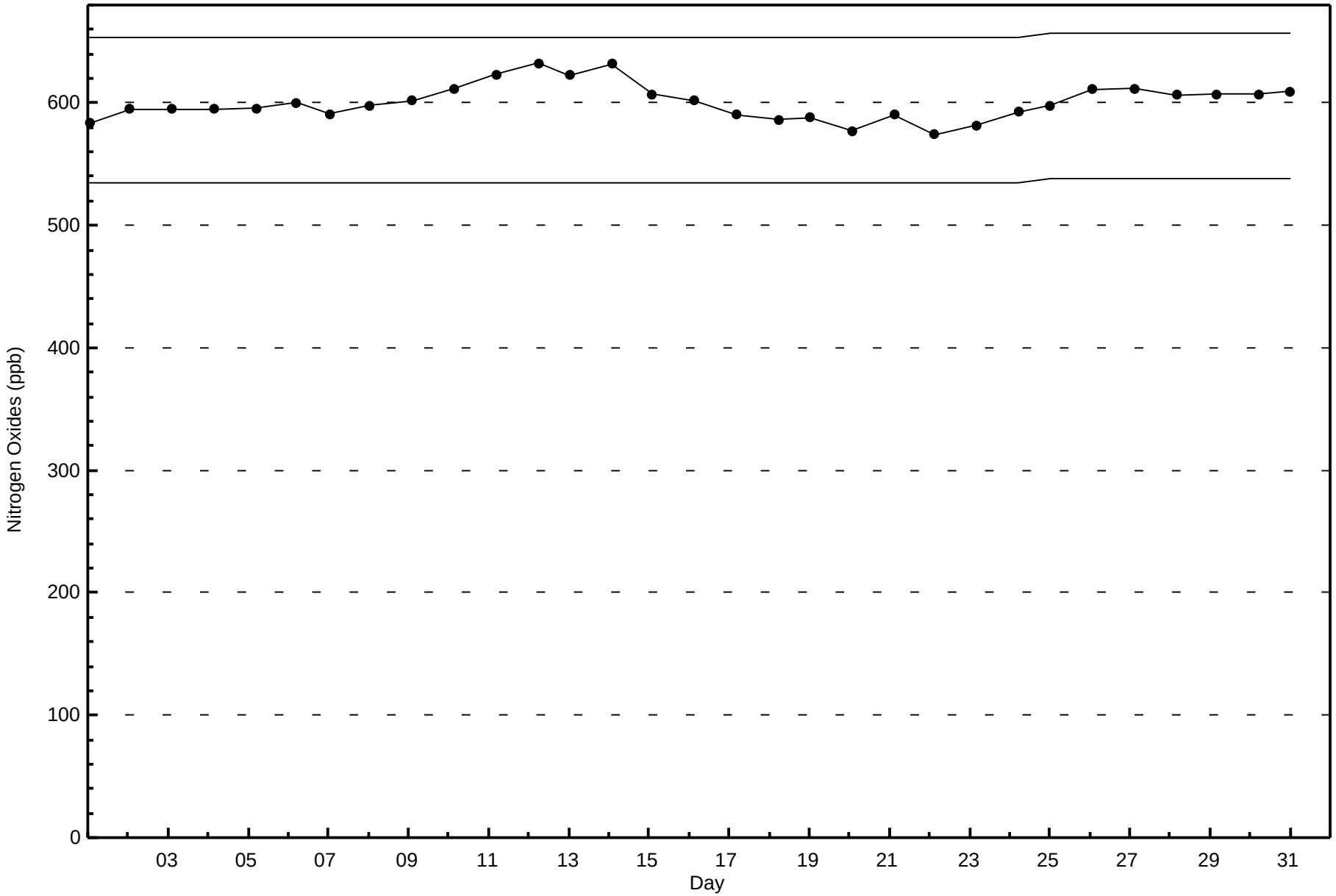
Span Responses

Nitrogen Oxides (NO_X) - ppb

Wapasu - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Wapasu - March 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 12.9 $\mu g/m^3$ on Mar 26 06:00

Maximum Daily Average: 6.1 $\mu g/m^3$ on Mar 26

Minimum Value: 0.0 $\mu g/m^3$ on Mar 15 07:00

Minimum Daily Average: 0.6 $\mu g/m^3$ on Mar 15

Maximum Diurnal Average: 3.4 $\mu g/m^3$ at hour 6

Minimum Diurnal Average: 2.1 $\mu g/m^3$ at hour 23

Monthly Average: 2.64 $\mu g/m^3$

Percentiles: P_1 = 0.1 P_{10} = 0.6 Q_1 = 1.1 Median = 2.1 Q_3 = 3.6 P_{90} = 5.4 P_{99} = 9.4

Hours in Service:	744
Hours of Data:	737
Hours of Missing Data:	7
Hours of Calibration:	2
Percent Operational Time:	99.3

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	3.8	3.9	4.3	5.3	4.5	4.6	4.3	4.1	4.4	4.0	3.5	2.8	2.4	3.3	4.1	3.6	3.2	3.5	4.3	4.1	3.6	3.3	4.4	5.5	3.9	5.5
2-Mar	5.8	5.8	5.3	4.9	4.6	4.2	4.0	3.8	4.7	4.5	4.2	3.5	3.8	4.7	5.4	5.1	4.9	4.9	4.3	4.6	3.1	2.6	1.5	1.4	4.2	5.8
3-Mar	1.8	2.5	2.7	2.3	2.8	3.4	3.2	3.5	2.8	2.7	3.1	2.7	2.8	3.0	2.9	2.3	2.0	2.1	1.9	1.6	1.3	1.1	1.1	1.1	2.4	3.5
4-Mar	1.1	0.8	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.6	0.7	1.9	1.9	1.8	1.5	1.3	1.6	1.5	0.9	0.4	0.5	0.8	1.4	1.5	1.0	1.9
5-Mar	1.5	1.7	2.3	3.2	4.5	6.0	7.2	9.3	10.8	11.1	8.5	6.3	3.3	1.8	1.6	1.2	1.0	0.9	0.7	0.4	0.4	0.4	0.4	0.3	3.5	11.1
6-Mar	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.9	0.9	1.1	1.0	1.0	1.0	0.6	1.1
7-Mar	1.3	1.7	2.0	1.9	2.0	2.1	2.2	1.9	1.7	1.5	1.5	2.2	3.1	2.2	4.1	6.0	7.5	6.3	5.9	8.5	6.4	4.7	2.9	5.4	3.6	8.5
8-Mar	6.1	8.1	8.1	6.7	4.7	3.1	2.0	1.9	2.6	5.8	4.7	3.7	3.1	2.7	2.8	3.4	4.6	4.9	4.7	4.5	4.4	4.2	3.7	3.1	4.3	8.1
9-Mar	2.8	2.2	2.4	2.5	2.9	3.1	3.3	3.3	3.7	3.1	4.7	4.5	6.7	5.3	3.8	3.5	4.0	4.1	6.4	6.5	6.1	4.3	4.3	4.5	4.1	6.7
10-Mar	4.9	5.3	6.0	6.9	6.2	5.0	5.5	5.1	4.2	3.1	1.9	1.3	1.7	1.7	1.2	1.9	1.5	1.2	1.7	1.8	1.6	1.8	1.8	1.5	3.1	6.9
11-Mar	1.3	1.4	1.6	3.0	5.6	6.3	6.2	6.3	5.7	5.1	3.8	2.4	2.3	2.3	1.9	1.5	1.7	1.6	1.8	2.4	2.2	2.4	2.5	2.7	3.1	6.3
12-Mar	4.2	7.4	9.5	7.3	5.7	6.1	4.8	3.7	3.3	1.9	1.2	1.0	0.9	0.7	0.6	0.7	1.1	0.8	0.9	0.9	0.8	0.8	0.8	0.8	2.7	9.5
13-Mar	0.8	1.0	1.2	1.2	1.5	1.2	0.9	0.9	1.0	0.8	2.1	1.6	1.3	0.9	0.9	0.9	0.8	1.1	1.1	0.9	1.0	1.1	1.2	1.4	1.1	2.1
14-Mar	1.4	1.4	1.2	1.1	1.0	1.0	1.0	1.0	1.1	1.1	1.1	0.9	0.8	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.1	0.1	0.8	1.4
15-Mar	0.1	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.4	1.0	1.1	1.4	1.6	1.4	1.0	1.0	1.0	0.8	0.9	0.8	0.2	0.2	0.2	0.4	0.6	1.6
16-Mar	1.9	2.3	1.9	1.5	2.1	1.9	1.7	1.7	1.9	1.9	2.2	2.3	2.1	1.9	1.8	1.5	1.5	1.7	1.4	0.9	0.5	0.4	0.2	0.1	1.5	2.3
17-Mar	0.1	0.1	0.8	1.7	1.2	1.2	1.3	0.5	1.3	1.4	1.3	1.4	1.2	1.1	1.2	1.1	1.1	1.2	1.4	1.3	1.2	1.3	0.9	0.2	1.1	1.7
18-Mar	0.5	0.7	1.3	3.4	5.0	5.4	4.4	3.4	3.4	1.4	1.0	0.9	1.0	1.3	1.8	7.9	1.8	1.0	1.0	1.0	1.1	1.0	1.2	1.3	2.2	7.9
19-Mar	1.1	1.1	0.7	0.4	0.7	0.8	0.6	1.4	1.3	1.2	1.4	1.8	2.1	2.2	2.3	2.2	2.1	2.3	2.8	2.8	3.1	2.8	2.0	1.8	1.7	3.1
20-Mar	1.8	1.9	1.9	1.8	1.9	1.9	2.0	2.1	2.1	2.1	2.0	1.7	1.4	1.2	1.1	1.1	1.1	1.3	1.5	1.8	2.0	2.1	2.3	2.5	1.8	2.5
21-Mar	2.6	2.7	2.5	2.5	2.5	UO	UO	UO	UO	UO	2.5	2.3	2.1	2.0	1.9	2.1	2.3	2.3	2.4	2.6	1.8	1.1	1.5	2.6	2.2	2.7
22-Mar	5.6	6.7	6.0	5.8	5.5	5.2	4.8	4.6	3.5	2.8	1.9	1.6	1.6	1.6	1.6	2.0	2.1	2.0	2.4	2.5	2.3	3.0	3.9	3.7	3.4	6.7
23-Mar	3.1	2.9	2.8	2.9	3.0	3.7	4.4	4.9	4.3	3.6	2.4	2.2	2.6	2.7	2.2	2.2	2.7	2.6	2.6	3.1	3.6	3.8	3.6	3.3	3.1	4.9
24-Mar	3.5	3.8	3.2	2.9	2.8	2.8	2.4	2.9	2.6	3.7	3.5	9.4	10.3	8.3	6.4	6.5	6.4	6.8	8.4	8.8	6.0	4.5	4.5	4.9	5.2	10.3
25-Mar	5.7	5.2	4.5	4.5	4.5	4.2	3.8	3.5	3.6	3.3	4.1	2.8	2.6	2.8	2.7	3.0	3.6	4.0	4.3	4.5	4.8	4.6	4.4	7.2	4.1	7.2
26-Mar	7.5	8.2	9.4	7.6	11.5	12.9	7.0	5.4	5.0	5.4	5.7	7.8	9.3	7.3	4.4	2.7	2.0	2.0	2.4	3.0	5.2	5.4	4.8	4.6	6.1	12.9
27-Mar	3.3	3.5	3.8	3.8	3.6	3.7	3.7	3.1	1.9	1.3	1.0	1.1	1.1	1.1	1.3	1.4	1.6	1.7	2.1	3.2	3.9	3.9	3.6	3.4	2.6	3.9
28-Mar	3.1	2.9	3.1	3.1	2.9	3.1	3.6	3.5	3.8	3.3	2.3	1.7	2.1	4.2	4.0	1.6	2.0	2.2	1.4	0.8	0.6	0.9	1.8	1.8	2.5	4.2
29-Mar	1.6	1.1	1.0	1.9	3.1	3.2	3.3	3.2	3.1	C	C	0.9	0.6	0.4	0.4	0.5	0.6	0.7	0.8	0.6	0.5	0.4	0.5	0.5	1.3	3.3
30-Mar	0.5	0.5	0.5	0.5	0.5	0.7	0.7	0.6	0.8	1.7	2.2	0.8	0.5	0.5	0.8	1.0	1.5	1.7	1.2	0.9	0.9	0.9	1.2	1.7	0.9	2.2
31-Mar	1.6	2.6	2.7	2.5	2.7	3.2	3.1	2.8	3.2	3.1	2.5	2.2	1.5	1.3	1.5	1.8	2.0	2.2	3.5	3.3	3.3	3.2	2.8	4.0	2.6	4.0
	2.6	2.9	3.0	3.0	3.2	3.4	3.1	3.0	3.0	2.9	2.6	2.5	2.5	2.4	2.2	2.3	2.3	2.3	2.5	2.6	2.4	2.2	2.1	2.4	Diurnal Average	
	7.5	8.2	9.5	7.6	11.5	12.9	7.2	9.3	10.8	11.1	8.5	9.4	10.3	8.3	6.4	7.9	7.5	6.8	8.4	8.8	6.4	5.4	4.8	7.2	Diurnal Maximum	

C - Calibration UO - Unstable Operation

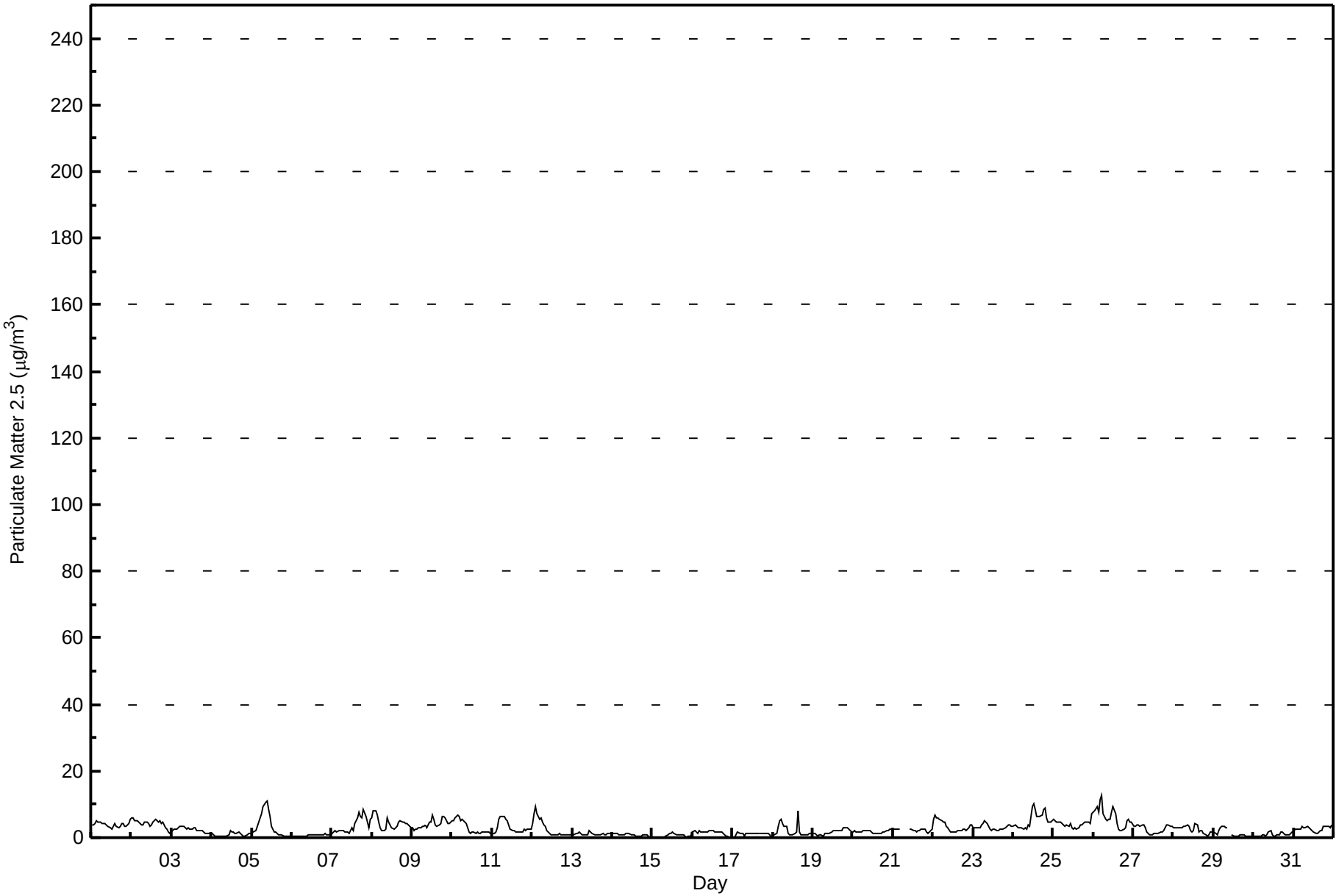
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Wapasu - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Wapasu - March 2016

Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	525	71.23	71.23
6 - 15	66	8.96	80.19
16 - 25	0	0.00	80.19
26 - 80	0	0.00	80.19
> 81.0	0	0.00	80.19

Total Number of Valid Hours: 737

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Wapasu - March 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	24	12	15	17	44	54	83	69	29	18	8	8	9	20	34	78	522
6 - 15	5	0	1	1	1	9	11	3	3	0	4	5	3	2	5	13	66
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	29	12	16	18	45	63	94	72	32	18	12	13	12	22	39	91	588

Total Number of Valid Hours: 734

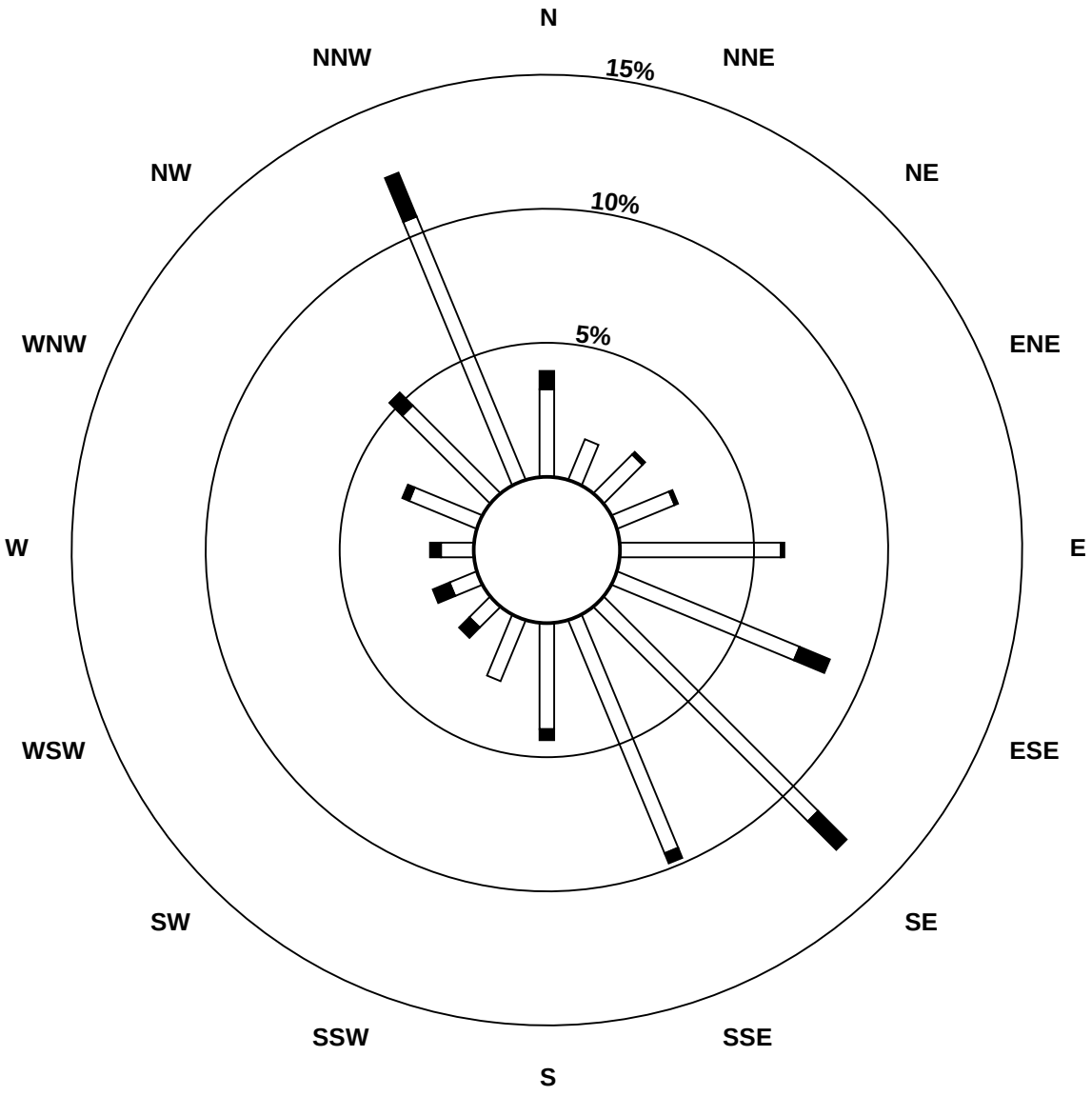
Total Number of Hours: 744

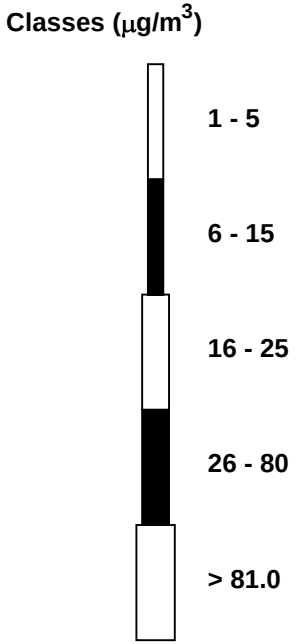
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Wapasu (AMS 17)





Total Number of Valid Hours: 734

Maximum Value: 10.6 C on Mar 29 16:00

Maximum Daily Average: 4.3 C on Mar 29

Minimum Value: -22.0 C on Mar 24 07:00

Minimum Daily Average: -10.2 C on Mar 24

Maximum Diurnal Average: -1.0 C at hour 15

Minimum Diurnal Average: -7.3 C at hour 6

Monthly Average: -4.33 C

Percentiles: P_1 = -14.6 P_{10} = -10.2 Q_1 = -7.7 Median = -5.2 Q_3 = -1.3 P_{90} = 2.8 P_{99} = 9.9

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

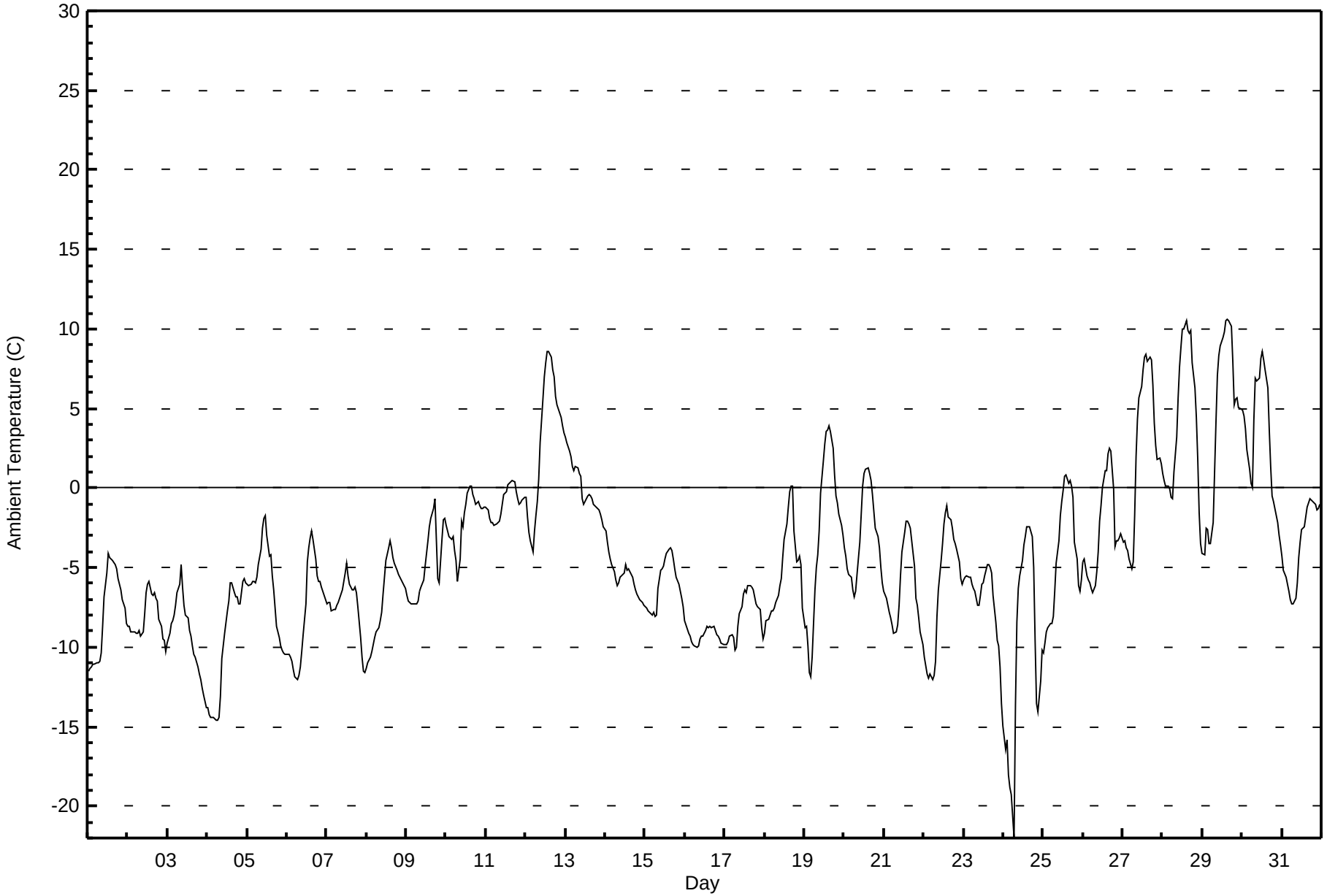
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-11.5	-11.4	-11.2	-11.1	-11.1	-11.0	-11.0	-10.9	-10.3	-8.7	-6.9	-5.4	-4.1	-4.4	-4.5	-4.6	-4.8	-5.1	-5.7	-6.1	-6.4	-7.0	-7.5	-8.5	-7.9	-4.1
2-Mar	-8.7	-8.7	-9.0	-9.1	-9.0	-9.1	-9.2	-9.0	-9.3	-9.0	-7.9	-6.6	-6.0	-5.9	-6.6	-6.8	-6.5	-6.9	-7.1	-8.3	-8.7	-9.4	-9.6	-10.3	-8.2	-5.9
3-Mar	-9.8	-9.1	-8.5	-8.3	-8.0	-7.4	-6.6	-6.1	-4.8	-6.2	-7.4	-8.0	-8.2	-9.0	-9.3	-9.9	-10.4	-10.6	-11.3	-11.7	-12.1	-12.5	-13.0	-13.8	-9.3	-4.8
4-Mar	-13.8	-14.2	-14.4	-14.4	-14.4	-14.6	-14.6	-14.4	-13.1	-10.7	-9.1	-8.4	-7.7	-7.1	-5.9	-5.9	-6.5	-6.8	-6.8	-7.3	-7.3	-5.9	-5.7	-5.9	-9.8	-5.7
5-Mar	-6.1	-6.1	-6.1	-5.8	-5.9	-6.0	-5.6	-4.8	-3.8	-2.5	-1.9	-1.8	-3.0	-4.3	-4.2	-5.5	-6.4	-7.6	-8.7	-9.4	-9.9	-10.2	-10.4	-10.5	-6.1	-1.8
6-Mar	-10.5	-10.5	-10.6	-10.9	-11.4	-11.8	-12.0	-11.8	-11.3	-10.3	-9.2	-7.3	-4.6	-3.7	-3.1	-2.7	-3.2	-4.4	-5.5	-5.8	-5.9	-6.2	-6.7	-7.0	-7.8	-2.7
7-Mar	-7.2	-7.2	-7.2	-7.7	-7.6	-7.6	-7.3	-7.2	-7.0	-6.4	-5.9	-5.3	-4.7	-5.5	-6.1	-6.4	-6.4	-6.3	-6.6	-7.5	-9.4	-10.7	-11.5	-11.6	-7.3	-4.7
8-Mar	-11.3	-11.0	-10.7	-10.3	-9.9	-9.4	-9.1	-8.8	-8.3	-7.8	-6.7	-5.6	-4.6	-3.7	-3.3	-3.7	-4.4	-4.7	-5.1	-5.4	-5.6	-5.8	-6.0	-6.3	-7.0	-3.3
9-Mar	-6.8	-7.1	-7.2	-7.2	-7.3	-7.3	-7.3	-7.1	-6.5	-6.2	-5.8	-4.9	-4.1	-3.3	-2.5	-1.9	-1.3	-0.7	-3.3	-5.7	-6.0	-3.2	-2.0	-1.9	-4.9	-0.7
10-Mar	-2.4	-2.7	-3.1	-3.2	-3.1	-4.0	-4.5	-5.8	-4.4	-2.1	-2.4	-1.5	-1.0	-0.3	0.1	0.2	-0.4	-0.7	-1.0	-0.8	-1.1	-1.3	-1.3	-1.2	-2.0	0.2
11-Mar	-1.2	-1.4	-1.9	-2.2	-2.1	-2.3	-2.3	-2.1	-2.1	-1.7	-1.0	-0.4	-0.2	0.2	0.3	0.4	0.5	0.4	-0.2	-0.7	-1.0	-0.9	-0.7	-0.5	-1.0	0.5
12-Mar	-0.5	-1.8	-2.8	-3.3	-4.0	-2.7	-1.7	-0.8	0.5	2.8	5.6	7.0	7.9	8.6	8.6	8.2	7.5	7.0	5.8	5.2	4.7	4.4	3.9	3.5	3.1	8.6
13-Mar	3.2	2.8	2.3	2.0	1.3	1.1	1.3	1.3	0.9	0.7	-0.7	-1.0	-0.9	-0.5	-0.4	-0.5	-0.7	-1.0	-1.2	-1.3	-1.4	-1.6	-2.0	-2.5	0.1	3.2
14-Mar	-2.7	-3.4	-4.0	-4.4	-4.8	-5.2	-5.8	-6.1	-6.0	-5.7	-5.5	-5.3	-4.8	-5.2	-5.1	-5.3	-5.6	-6.1	-6.4	-6.7	-6.8	-7.0	-7.2	-7.4	-5.5	-2.7
15-Mar	-7.4	-7.6	-7.7	-7.9	-7.9	-7.8	-8.1	-8.0	-6.3	-5.2	-5.1	-4.9	-4.5	-4.1	-3.8	-3.8	-3.9	-4.4	-5.1	-5.6	-6.0	-6.5	-6.9	-7.5	-6.1	-3.8
16-Mar	-8.3	-8.9	-9.1	-9.3	-9.6	-9.9	-10.0	-10.0	-9.9	-9.4	-9.3	-9.3	-9.0	-8.7	-8.8	-8.7	-8.8	-8.7	-9.0	-9.2	-9.3	-9.5	-9.8	-9.9	-9.3	-8.3
17-Mar	-9.9	-9.8	-9.6	-9.3	-9.2	-9.4	-10.2	-10.0	-8.7	-7.9	-7.5	-6.7	-6.4	-6.6	-6.2	-6.1	-6.2	-6.4	-6.9	-7.3	-7.4	-7.7	-8.8	-9.5	-8.1	-6.1
18-Mar	-9.2	-8.4	-8.2	-8.0	-7.8	-7.7	-7.6	-7.2	-6.8	-6.1	-5.7	-4.4	-3.2	-2.3	-1.2	-0.3	0.1	0.1	-2.7	-4.6	-4.5	-4.3	-4.9	-7.6	-5.1	0.1
19-Mar	-8.8	-8.7	-9.9	-11.6	-11.9	-10.6	-6.4	-5.0	-4.2	-2.7	-0.3	1.7	2.8	3.6	3.6	3.9	3.6	2.5	0.9	-0.5	-0.9	-1.6	-2.3	-3.0	-2.7	3.9
20-Mar	-3.7	-4.3	-5.1	-5.4	-5.6	-6.4	-6.8	-6.5	-5.4	-3.4	-1.7	0.1	1.0	1.2	1.2	0.9	0.5	-0.4	-1.5	-2.5	-3.1	-3.8	-5.0	-5.9	-3.0	1.2
21-Mar	-6.5	-7.0	-7.3	-7.8	-8.1	-8.6	-9.1	-9.1	-8.6	-7.4	-5.5	-4.0	-2.8	-2.1	-2.1	-2.2	-2.5	-3.3	-4.9	-7.0	-7.3	-8.2	-9.1	-9.9	-6.3	-2.1
22-Mar	-10.6	-11.2	-11.7	-11.9	-11.7	-12.0	-11.8	-10.9	-8.1	-6.4	-4.6	-3.5	-2.3	-1.6	-1.1	-1.8	-2.0	-2.5	-3.2	-3.5	-3.9	-4.7	-5.7	-6.1	-6.4	-1.1
23-Mar	-5.8	-5.6	-5.6	-5.6	-5.6	-6.1	-6.3	-6.5	-7.4	-7.3	-6.7	-6.1	-5.9	-5.5	-4.8	-4.9	-5.0	-5.3	-6.7	-8.4	-9.6	-9.9	-11.2	-13.6	-6.9	-4.8
24-Mar	-15.0	-16.4	-15.8	-18.0	-18.8	-19.2	-22.0	-13.6	-8.5	-6.3	-5.5	-4.6	-3.6	-3.0	-2.4	-2.5	-2.5	-3.1	-5.0	-9.5	-13.5	-14.0	-12.2	-10.2	-10.2	-2.4
25-Mar	-10.3	-9.8	-9.1	-8.8	-8.5	-8.5	-8.0	-6.5	-4.7	-3.3	-1.7	-0.8	-0.1	0.7	0.8	0.3	0.5	0.1	-0.6	-3.4	-4.4	-6.1	-6.5	-5.8	-4.4	0.8
26-Mar	-4.7	-4.5	-5.5	-5.8	-6.0	-6.3	-6.5	-6.1	-5.3	-4.0	-2.1	-1.1	0.1	1.1	1.1	2.2	2.5	2.4	0.0	-3.7	-3.3	-3.3	-3.1	-2.9	-2.7	2.5
27-Mar	-3.4	-3.3	-3.8	-4.0	-4.4	-5.1	-4.6	-1.8	2.0	4.4	5.7	6.4	7.4	8.2	8.4	7.9	8.3	8.0	6.4	4.1	2.6	1.8	1.9	1.6	2.3	8.4
28-Mar	1.0	0.5	0.1	0.1	0.0	-0.5	-0.7	1.0	3.2	5.6	7.6	8.9	10.0	10.0	10.5	9.9	9.7	9.9	7.8	6.3	4.4	1.8	-1.6	-3.5	4.2	10.5
29-Mar	-4.2	-4.2	-2.5	-2.6	-3.5	-3.5	-2.2	1.0	4.2	7.1	8.3	8.9	9.5	9.8	10.5	10.6	10.5	10.2	8.0	5.2	5.6	5.7	5.1	4.9	4.3	10.6
30-Mar	4.9	4.5	3.7	2.4	1.2	0.3	0.0	4.3	6.9	6.7	6.9	8.2	8.6	8.1	7.4	6.3	3.6	1.3	-0.5	-0.8	-1.3	-2.2	-3.0	-3.6	3.1	8.6
31-Mar	-4.3	-5.1	-5.6	-6.0	-6.5	-7.0	-7.3	-7.3	-6.9	-6.0	-4.4	-3.4	-2.6	-2.4	-1.8	-1.2	-0.9	-0.7	-0.7	-0.9	-1.0	-1.4	-1.3	-1.0	-3.6	-0.7
	-6.3	-6.5	-6.7	-6.9	-7.1	-7.3	-7.2	-6.3	-5.2	-4.0	-3.1	-2.2	-1.5	-1.2	-1.0	-1.1	-1.3	-1.7	-2.8	-4.0	-4.5	-4.9	-5.3	-5.7	Diurnal Average	
	4.9	4.5	3.7	2.4	1.3	1.1	1.3	4.3	6.9	7.1	8.3	8.9	10.0	10.0	10.5	10.6	10.5	10.2	8.0	6.3	5.6	5.7	5.1	4.9	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Wapasu - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	1	0.13	0.13
-20 - 0	613	82.39	82.53
0 - 10	125	16.80	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 2016

Maximum Value: 98 % on Mar 13 21:00

Maximum Daily Average: 93.9 % on Mar 13

Minimum Value: 18 % on Mar 24 18:00

Minimum Daily Average: 37.6 % on Mar 24

Maximum Diurnal Average: 80.9 % at hour 7

Minimum Diurnal Average: 62.9 % at hour 14

Monthly Average: 72.3 %

Percentiles: $P_1 = 28$ $P_{10} = 42$ $Q_1 = 57$ Median = 78 $Q_3 = 89$ $P_{90} = 93$ $P_{99} = 98$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

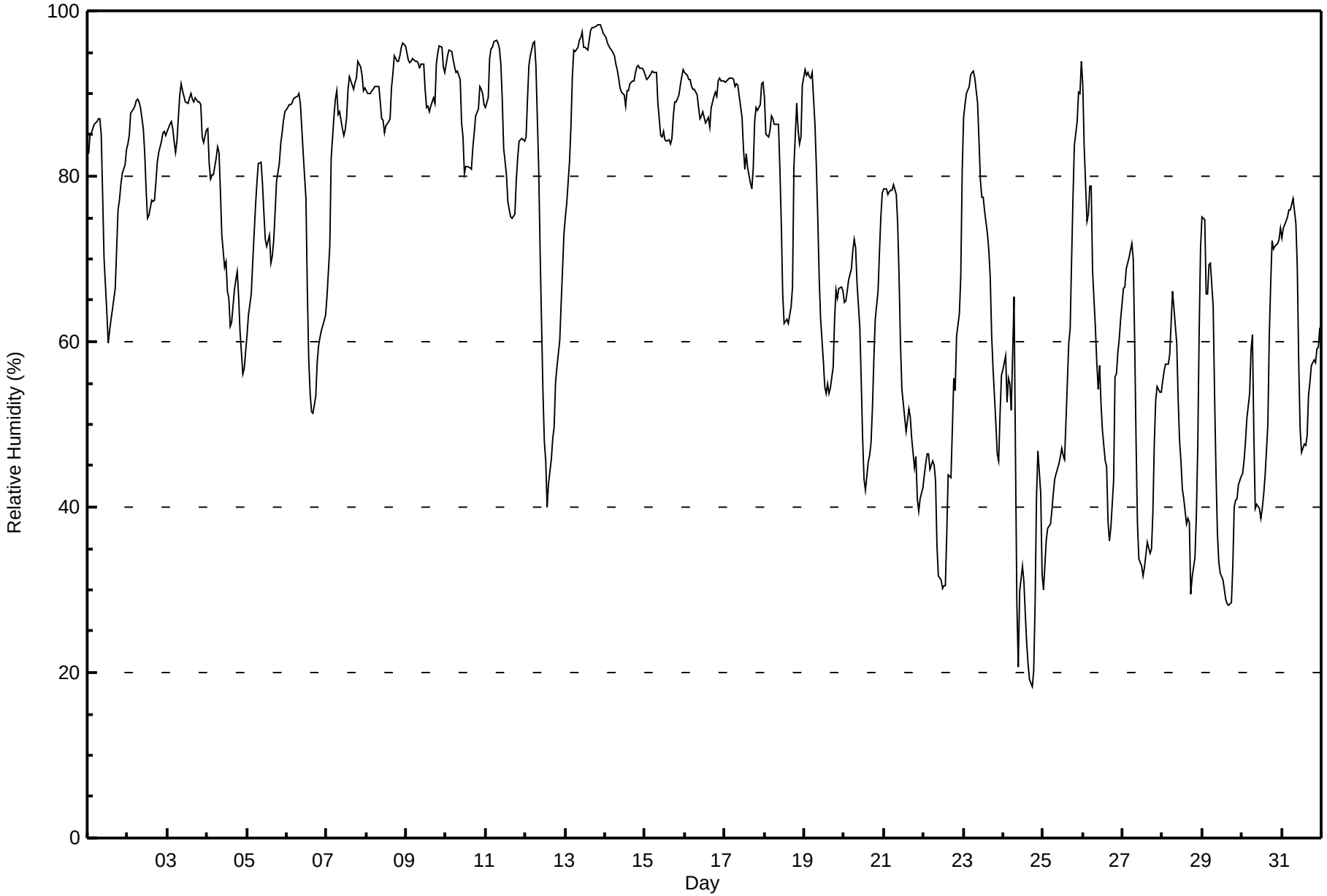
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	83	85	85	86	86	87	87	87	85	78	70	64	60	61	63	64	66	71	76	77	79	80	81	83	76.9	87
2-Mar	84	85	88	88	88	89	89	89	88	86	83	78	75	75	77	77	77	79	82	83	84	85	86	85	83.4	89
3-Mar	85	86	87	86	84	83	84	90	91	90	90	89	89	90	90	89	89	90	89	89	89	85	84	86	87.6	91
4-Mar	86	82	80	80	80	82	84	83	78	73	69	70	66	65	62	62	66	67	69	65	61	56	57	59	70.9	86
5-Mar	61	63	66	69	73	76	79	82	82	79	76	72	71	73	70	70	72	76	79	82	84	85	87	88	75.6	88
6-Mar	88	89	89	89	89	89	90	90	89	86	83	77	66	58	54	52	51	53	57	60	60	61	63	63	72.8	90
7-Mar	65	68	72	82	87	89	90	87	88	86	85	86	87	90	92	91	90	91	92	94	93	92	90	91	86.7	94
8-Mar	90	90	90	90	91	91	91	91	89	87	87	85	86	87	87	91	92	95	94	94	95	96	96	96	90.8	96
9-Mar	95	94	94	94	94	94	94	94	93	94	93	91	88	88	88	89	89	89	94	95	96	96	93	93	92.5	96
10-Mar	94	95	95	95	94	93	92	93	92	86	85	80	81	81	81	81	83	85	87	88	91	91	90	89	88.5	95
11-Mar	88	90	94	95	96	96	96	96	95	93	89	83	80	77	76	75	75	75	79	82	84	84	85	84	86.3	96
12-Mar	85	89	93	95	96	96	93	87	81	71	54	48	46	40	43	46	48	50	55	57	60	65	69	73	68.3	96
13-Mar	75	77	82	86	92	95	95	96	96	97	97	96	96	95	96	98	98	98	98	98	98	98	98	97	93.9	98
14-Mar	97	96	96	95	95	95	94	93	92	91	90	90	89	90	90	91	92	91	93	93	93	93	93	93	92.7	97
15-Mar	92	92	92	92	93	92	92	92	89	85	85	85	84	84	84	84	85	87	89	89	90	91	92	93	89.0	93
16-Mar	93	92	92	92	91	91	91	90	88	87	87	88	86	87	87	86	88	90	90	90	92	92	92	91	89.6	93
17-Mar	91	92	92	92	92	92	91	91	91	90	87	83	81	83	81	79	78	81	87	88	88	89	91	91	87.5	92
18-Mar	90	85	85	86	87	87	86	86	86	81	74	66	62	63	62	63	64	67	81	89	86	84	85	91	79.0	91
19-Mar	93	92	93	92	92	93	86	81	75	68	63	58	55	54	55	54	54	57	63	66	65	67	67	66	71.1	93
20-Mar	65	65	66	67	69	71	72	71	67	62	55	48	43	42	45	46	48	52	58	63	66	71	75	78	61.1	78
21-Mar	79	78	78	78	78	78	79	78	74	68	60	54	51	49	51	52	51	48	45	46	41	39	41	42	59.9	79
22-Mar	44	45	46	46	45	46	45	43	35	32	31	30	31	31	37	44	44	49	56	54	61	63	68	80	46.1	80
23-Mar	87	89	90	91	92	92	93	92	89	84	79	77	77	76	73	71	68	61	57	50	46	46	51	56	74.5	93
24-Mar	57	58	53	56	55	52	65	47	28	21	30	33	31	27	24	21	19	18	20	28	41	47	42	32	37.6	65
25-Mar	30	33	36	37	38	40	42	43	44	45	46	47	46	46	50	60	62	70	77	84	87	90	90	94	55.7	94
26-Mar	91	84	75	75	79	79	68	62	57	54	57	53	49	46	45	38	36	37	43	56	56	59	60	63	59.3	91
27-Mar	66	67	69	69	70	72	70	60	48	38	34	33	32	33	34	36	34	35	39	48	53	55	54	54	50.1	72
28-Mar	55	56	57	57	59	62	66	64	60	53	48	46	42	41	38	39	38	30	31	34	39	47	61	71	49.8	71
29-Mar	75	75	66	66	69	69	64	54	44	37	33	32	31	30	29	28	28	29	33	40	41	41	43	44	45.9	75
30-Mar	44	46	48	51	54	59	61	49	40	40	40	39	40	42	44	50	61	67	72	71	72	72	72	74	54.4	74
31-Mar	73	74	75	75	76	76	77	77	74	69	57	49	47	48	48	49	53	55	57	58	57	59	59	62	62.6	77
	77.4	77.7	78.1	79.2	80.1	80.9	80.9	78.6	75.2	71.3	68.3	65.5	63.5	62.9	63.1	63.7	64.6	65.9	69.1	71.3	72.5	73.5	74.6	76.2	Diurnal Average	
	97	96	96	95	96	96	96	96	96	97	97	96	96	95	96	98	98	98	98	98	98	98	98	97	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Wapasu - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	2	0.27	0.27
20 - 40	60	8.06	8.33
40 - 60	148	19.89	28.23
60 - 80	178	23.92	52.15
80 - 100	356	47.85	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

Maximum Value: 1.1 mm on Mar 7 06:00

Maximum Daily Total: 9.2 mm on Mar 16

Minimum Value: 0.0 mm on Mar 1 03:00

Minimum Daily Total: 0.0 mm on Mar 4

Maximum Diurnal Total: 3.0 mm at hour 6

Minimum Diurnal Total: 0.4 mm at hour 22

Monthly Total: 35.05 mm

Percentiles: P_1 = 0.0 P_{10} = 0.0 Q_1 = 0.0 Median = 0.0 Q_3 = 0.0 P_{90} = 0.2 P_{99} = 0.8

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

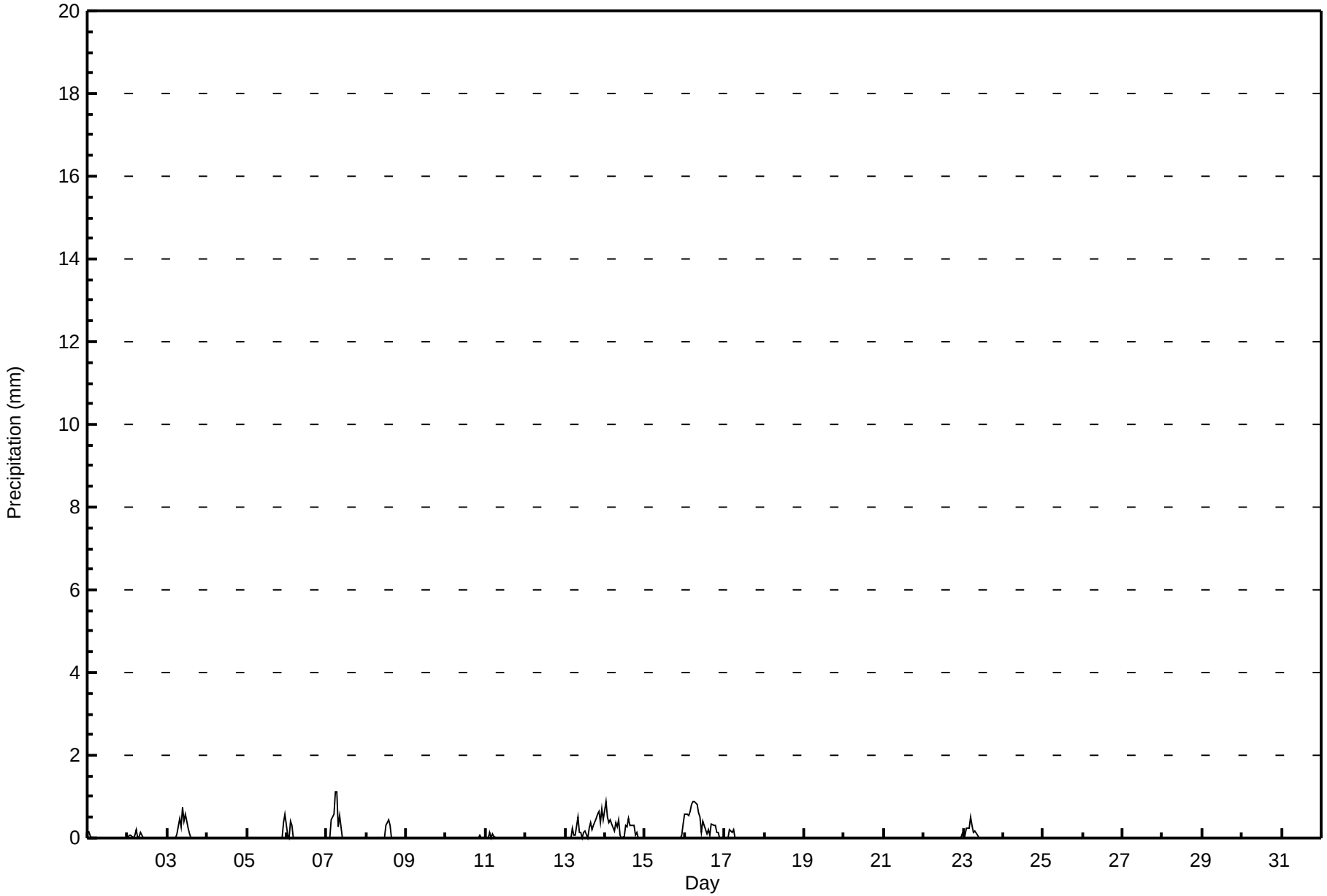
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2
2-Mar	0.0	0.1	0.1	0.0	0.1	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2
3-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.3	0.8	0.4	0.6	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.8
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
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	0.4	0.6	0.9	0.6
6-Mar	0.1	0.0	0.4	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	0.8	0.4
7-Mar	0.0	0.0	0.0	0.4	0.6	1.1	1.1	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	4.1	1.1
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	0.3	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.5
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
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	0.1	0.0	0.0	0.0	0.1	0.1
11-Mar	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	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
13-Mar	0.0	0.0	0.0	0.0	0.3	0.1	0.1	0.5	0.2	0.1	0.0	0.2	0.2	0.0	0.3	0.4	0.2	0.3	0.5	0.6	0.7	0.4	0.7	0.5	5.9	0.7
14-Mar	0.9	0.5	0.4	0.4	0.4	0.2	0.4	0.3	0.4	0.1	0.0	0.1	0.3	0.3	0.5	0.3	0.3	0.3	0.1	0.1	0.0	0.0	0.0	0.0	6.0	0.9
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	0.1	0.3	0.4	0.3
16-Mar	0.6	0.6	0.5	0.7	0.8	0.9	0.9	0.8	0.6	0.5	0.1	0.4	0.2	0.1	0.2	0.1	0.4	0.3	0.3	0.1	0.1	0.0	0.0	0.1	9.2	0.9
17-Mar	0.0	0.0	0.0	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2
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
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
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
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
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	0.1	0.1	0.1
23-Mar	0.2	0.1	0.2	0.3	0.5	0.3	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.5
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
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
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
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
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
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
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
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
	1.8	1.3	1.7	2.3	2.8	3.0	2.7	2.6	2.2	1.5	0.6	1.2	1.3	0.9	1.2	0.7	0.9	0.9	0.9	0.8	0.9	0.4	1.2	1.5	Diurnal Average	
	0.9	0.6	0.5	0.7	0.8	1.1	1.1	0.8	0.6	0.8	0.4	0.6	0.3	0.5	0.5	0.4	0.4	0.3	0.5	0.6	0.7	0.4	0.7	0.6	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Precipitation (PC) - mm

Wapasu - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Wapasu - March 2016

Maximum Speed: 23 km/h on Mar 30 14:00

Maximum Daily Speed Average: 13.6 km/h on Mar 12

Minimum Speed Value: 1 km/h on Mar 25 23:00

Minimum Daily Speed Average: 0.8 km/h on Mar 26

Maximum Diurnal Speed Average: 4.4 km/h at hour 24

Minimum Diurnal Speed Average: 0.4 km/h at hour 11

Monthly Average Velocity: 2.0 km/h 94.0 deg

Percentiles: $P_1 = 1$ $P_{10} = 3$ $Q_1 = 5$ Median = 7 $Q_3 = 10$ $P_{90} = 13$ $P_{99} = 18$

Hours in Service:	744
Hours of Data:	741
Hours of Missing Data:	3
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	S7	S6	S6	SSE5	SSE5	SSE4	SSE4	SSE4	SSE4	SSE3	WSW3	ESE4	WNW4	NNW5	NNW5	NNW6	NNE3	ENE5	ENE4	ESE5	ESE7	ESE8	ESE8	ESE8	SE2.6	ESE8
2-Mar	SE6	WSW1	AF	ENE3	E2	ENE3	NE2	ENE1	NW3	NW4	WNW3	NW5	NNW6	NW5	NW8	NNW4	NNE4	NE5	NE3	N4	N4	N4	NE5	NE7	N2.6	NW8
3-Mar	NE7	NE7	ENE8	NE3	ESE2	ESE4	SE4	ESE8	SE10	WNW5	NW5	NNW7	NNW7	NNW8	NNW9	NNW10	N10	N10	N11	NNW9	N8	NNW7	NNW6	N5	N4.5	N11
4-Mar	NNE6	NNE5	NNE3	NNE2	NNE2	ENE2	SE3	SE4	SE4	SE4	SSE5	SSE7	SSE8	SSE9	SSE9	SSE10	SE12	SE11	SE9	SE12	SE16	SE17	SE17	SE15	SE6.7	SE17
5-Mar	SE13	SE14	SE12	SSE10	SSE9	SSE8	SSE8	S6	S6	SW6	NW7	NNW9	N12	N11	N9	NNW9	N10	NNE8	N9	N8	NNE9	NNE10	NNE9	NNE8	NE2.3	SE14
6-Mar	NNE7	N6	N6	NNE7	NNE7	NNE6	NNE5	NNE5	NNE6	NNE7	NNE7	NE9	NE9	ENE8	E8	ENE10	ENE11	ENE11	ENE7	ENE5	E6	E7	E7	E6	NE6.2	ENE11
7-Mar	ESE13	E12	ESE9	ESE7	ESE5	ESE5	SE6	SE9	SE10	SSE8	SSE8	S8	S6	W6	W5	WSW6	W4	W3	NNW4	NNW5	NNW7	NNE6	NE7	NE4	ESE2.7	ESE13
8-Mar	ENE4	SE4	SE4	SE4	SE4	S1	SSW2	SSE3	SSE6	SE7	SSE6	SSE7	SSE7	SSE4	SSW3	NW4	NNW5	NNW4	NNW5	NNW4	NNW4	NNW4	NNW4	N4	SE1.1	SSE7
9-Mar	NNE5	NNE5	NE5	NNE5	NNE3	NNE3	NNE2	ENE3	NNW1	WNW2	SW4	SSW5	SW7	SW6	SSW7	S7	S7	SSW4	NNW1	ESE3	ESE5	SE9	SSE10	SSE10	SSE1.9	SSE10
10-Mar	SSE7	SSE7	SSE6	SE7	SE8	SE10	SE12	ESE16	SE13	SE8	SE13	SE13	SE17	ESE15	SE14	SE14	SE13	ESE14	SE9	SE12	SE14	SE12	SE11	SSE9	SE11.3	SE17
11-Mar	S5	SSW5	WSW5	SW7	WSW6	SW4	WSW5	SW4	W5	WNW6	NW8	NW10	WNW9	W9	WNW8	WNW7	WNW7	W5	AF	SE2	E2	SE4	SE4	SE6	W3.4	NW10
12-Mar	SE7	SE9	SE8	ESE8	SE10	ESE11	ESE13	ESE14	SE15	SE13	SE10	ESE10	ESE15	ESE17	ESE19	ESE20	ESE13	SE17	SE19	SE19	SE17	SE17	ESE14	ESE14	ESE13.6	ESE20
13-Mar	ESE14	ESE12	SE9	SE5	E4	NE6	NE5	NE6	NNE7	N8	AF	NW1	NNW4	NNW10	NNW9	NNW9	NNW13	NNW14	NNW12	NNW12	NNW11	NNW11	NNW10	NNW10	N5.0	ESE14
14-Mar	NNW11	NNW11	NNW10	NNW10	NNW9	NNW10	N10	N10	N9	N8	N9	N8	N8	NNW10	NNW11	NNW9	N9	N8	NNE6	NNE5	NNE4	N4	NNE3	NE3	N7.9	NNW11
15-Mar	E2	ENE2	E1	NNW1	NNE2	N2	N2	NNE3	NNE2	NNW5	NNW4	NNW3	N5	N6	NNW7	NNW9	NNW8	N7	N7	N7	N8	N8	NNW8	NNW9	N4.5	NNW9
16-Mar	NW10	NNW8	NNW9	NNW9	NNW11	NNW12	NNW10	NNW9	NNW11	NNW11	NW11	NW12	NNW12	NW12	NNW12	NNW12	NNW9	NNW8	NNW6	NNW6	NW5	NW6	NW5	WNW4	NNW9.1	NW12
17-Mar	W4	WSW3	W4	WNW5	WNW6	NW6	NW4	NW6	NW8	NW10	NW12	NNW9	NNW9	NW7	NW6	NW7	NW7	NNW5	WNW2	WSW2	WSW5	SW1	S1	SE3	NW4.7	NW12
18-Mar	S3	S4	S4	SSW5	SSW5	SSW5	SW4	WSW5	W6	NW8	WNW8	WSW6	SSW4	SSW4	SSW6	S7	SW7	SW6	SE3	SE5	SE7	SSE7	SSE3	ESE2	SSW3.4	NW8
19-Mar	E3	E3	ENE3	E5	E3	ENE7	E8	ESE10	ESE11	ESE11	ESE10	ESE8	ESE8	E9	E11	E12	E12	E11	E11	ESE13	ESE16	ESE17	ESE18	ESE19	ESE9.7	ESE19
20-Mar	ESE18	ESE17	ESE16	ESE15	ESE15	ESE7	ESE10	ESE15	ESE13	SE9	ESE11	E11	ESE11	E10	ENE11	ENE10	ENE11	ENE10	E9	E11	E11	E11	E11	E12	ESE11.5	ESE18
21-Mar	E10	E10	E7	E7	E8	E10	E7	E6	E10	E10	E12	E12	E14	E12	E12	ENE12	E13	E11	E10	E9	ESE15	ESE16	ESE16	ESE14	E10.8	ESE16
22-Mar	ESE14	ESE15	ESE14	ESE13	SE12	SE10	SE9	SE10	SE9	SSE9	S10	SE9	SSE9	SSE8	S7	SSW7	S6	S7	SSE6	SSE7	SSE7	SE8	SE9	SE10	SE8.7	ESE15
23-Mar	SSE9	SSE8	SSE7	S4	WNW1	N3	N3	NNW7	NNW9	NNW10	NNW9	NNW8	NNW10	NNW10	NNW10	NNW10	NNW8	NNW8	N7	N6	NNE6	NE6	ENE4	ENE4	N4.2	NNW10
24-Mar	ENE4	E5	E6	E5	E6	E4	ENE4	NE5	NE7	ENE6	NW7	NW10	NNW11	NW11	NW11	NNW11	NNW8	NNW8	N5	NE3	E6	ESE5	ESE7	ESE9	NNE3.4	NW11
25-Mar	SE9	SE9	SE9	SE9	SE8	SE7	SE7	SE6	SSE7	SSE7	S7	S8	SSE10	S9	S9	SSE9	S7	SSE6	SSE5	ESE3	E3	E3	S1	N5	SSE6.0	SSE10
26-Mar	N5	N7	N6	NNW5	NW6	NNW5	NNW6	N6	N5	N5	WNW5	NNW7	NW6	WSW3	W8	SW5	S3	SE4	SSE3	ESE6	SE8	SE9	SE11	SE13	N0.8	SE13
27-Mar	SE13	SE13	SE11	SE11	SE9	SE9	SE10	SE10	SE12	SE15	SSE15	SSE14	SE14	SSE11	SSE11	SSE10	SE14	SE13	SE12	ESE13	SE15	SE15	SE15	SE13	SE12.3	SE15
28-Mar	SSE11	SSE10	SSE11	SSE10	SSE11	SSE10	SSE10	S10	S10	SSW10	SSW11	SSW11	SSW10	WSW12	W12	WNW11	W10	W11	WNW7	WNW8	W6	WSW4	S3	SSE4	SSW6.0	WSW12
29-Mar	SSE4	SSE5	SSE5	SSE5	SE5	SSE6	SSE6	SSE6	S7	SW5	WNW8	WNW9	NW10	NW10	NNW8	NW6	NNW5	N4	E2	E6	ESE7	ESE9	ESE8	ESE8	SSE1.1	NW10
30-Mar	ESE8	ESE7	ESE7	SE7	ESE4	NNE3	ENE4	ESE3	SW4	WNW8	WNW9	NW14	NW17	NW23	NNW19	NNW14	NNW16	NNW17	NNW18	NNW18	NNW18	NNW19	NNW17	NNW15	NNW8.4	NW23
31-Mar	NNW14	NW14	NW12	NW13	NW12	NW12	NW9	NW7	NW6	NW7	NW6	WNW7	WNW8	WSW5	WSW5	SSW3	S5	SSE7	SSE7	S6	S7	S7	S7	S7	WNW3.8	NNW14
	ESE4.4	ESE3.9	ESE3.7	ESE2.8	ESE2.4	E2.3	ESE2.6	ESE3.1	ESE2.5	ESE0.6	W0.4	NNE0.6	N0.7	NNW1.3	NNW1.5	N1.6	NNE2.0	ENE2.2	ENE2.7	ENE2.9	E3.5	ESE4.1	ESE4.3	ESE4.4	Diurnal Average	
	ESE18	ESE17	ESE16	ESE15	ESE15	NW12	ESE13	ESE16	SE15	SE15	SSE15	SSE14	SE17	NW23	ESE19	ESE20	NNW16	SE17	SE19	SE19	NNW18	NNW19	ESE18	ESE19	Diurnal Maximum	

AF - Analyzer Failure

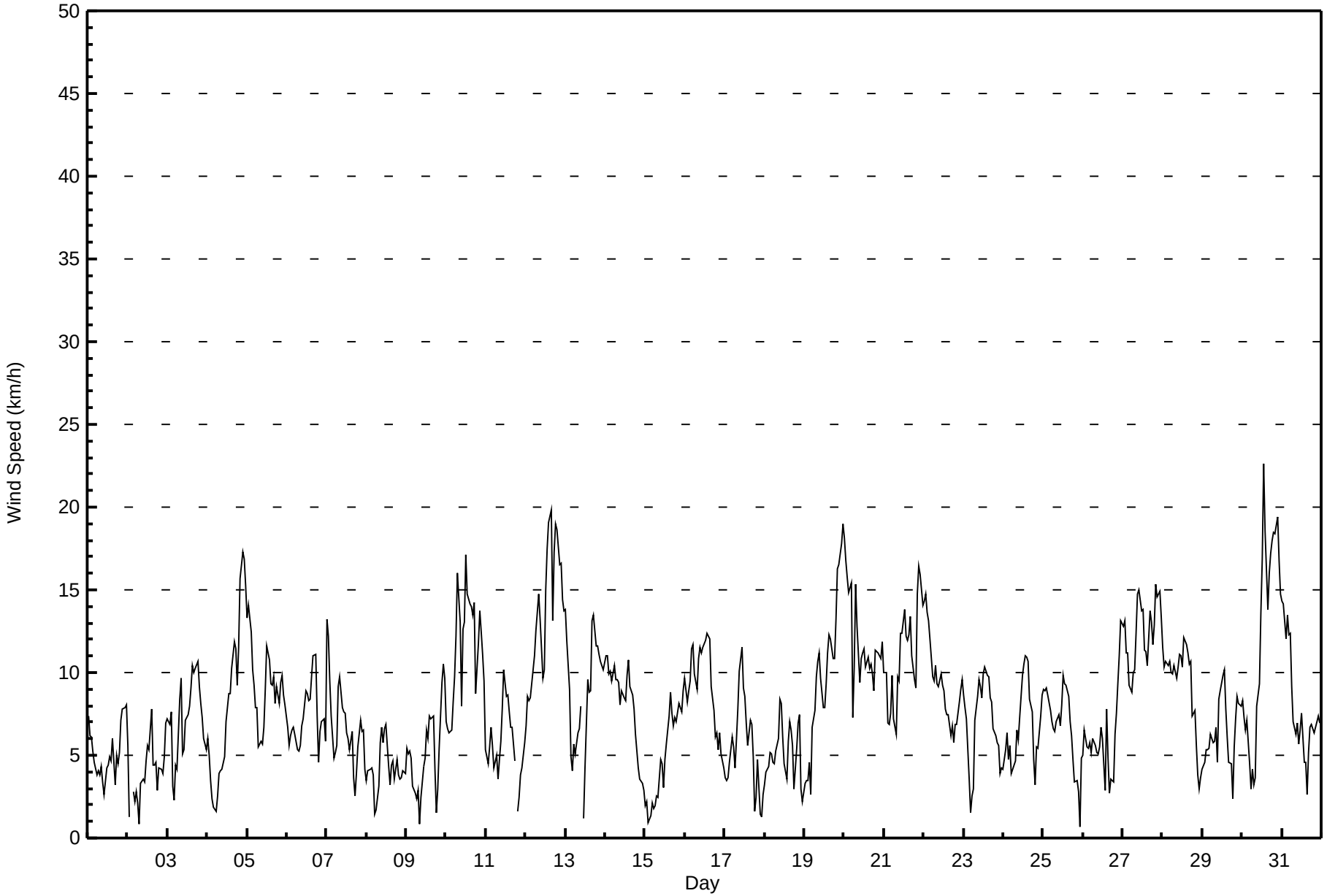
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Wapasu - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	220	29.69	29.69
6 - 11	398	53.71	83.40
12 - 19	121	16.33	99.73
20 - 28	2	0.27	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 741

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Wapasu - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	17	21	11	16	14	14	18	18	11	11	8	12	7	9	10	23	220
6 - 11	31	17	10	12	34	30	50	54	24	7	6	3	7	17	28	68	398
12 - 19	1	0	0	1	10	35	41	2	0	0	0	1	1	0	10	19	121
20 - 28	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	2
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	49	38	21	29	58	80	109	74	35	18	14	16	15	26	49	110	741

Total Number of Valid Hours: 741

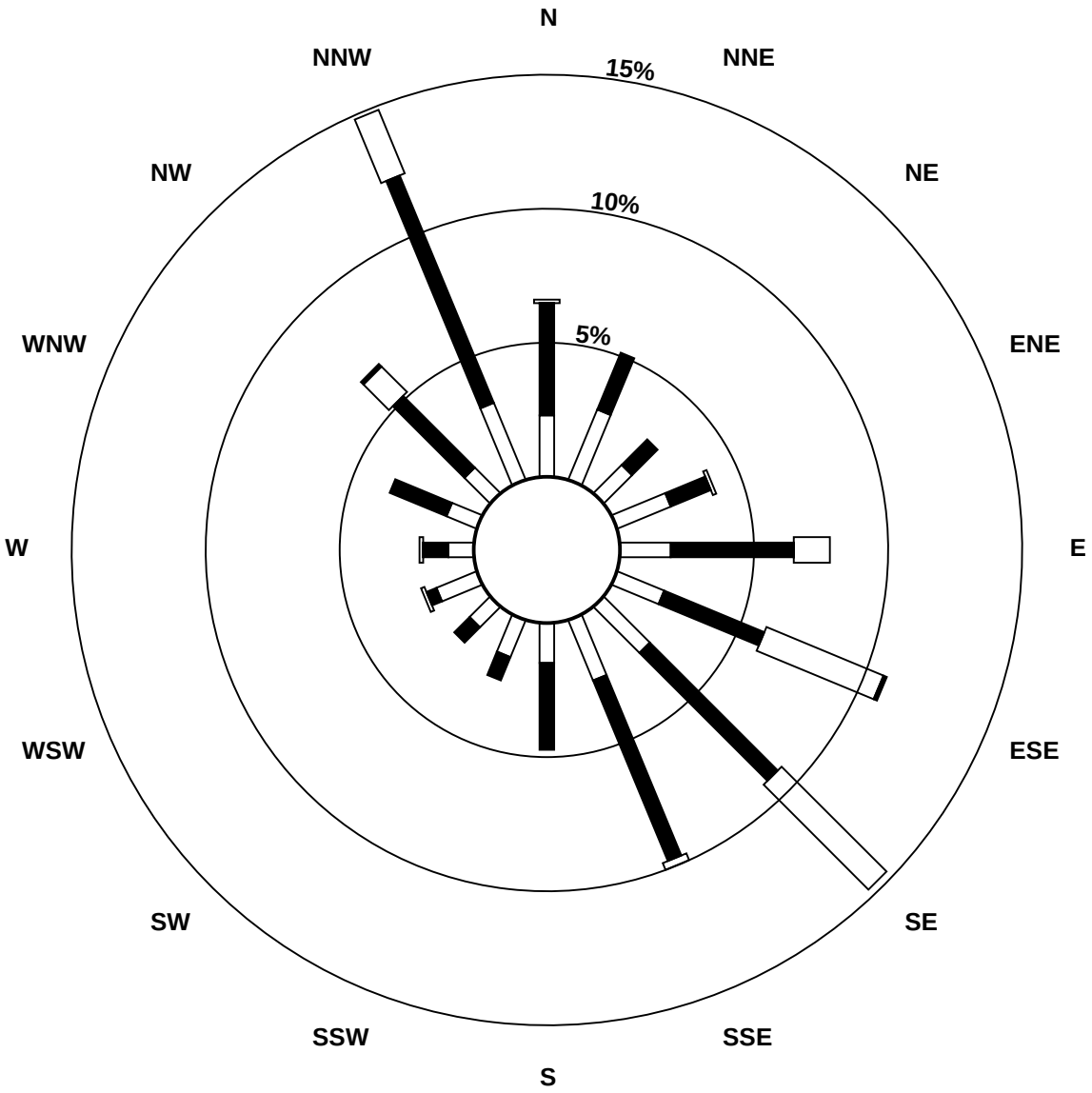
Total Number of Hours: 744

Wood Buffalo Environmental Association

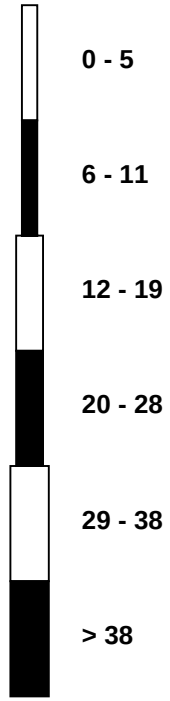
Wind Rose Mar 2016

Wind Speed (WS) - km/h

Wapasu (AMS 17)



Classes (km/h)



Total Number of Valid Hours: 741

Summary of Hour Standard Deviations

Wapasu - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 7 km/h on Mar 30 14:00

Minimum Value: 0 km/h on Mar 25 22:00

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:	741
Hours of Missing Data:	3
Hours of Calibration:	0
Percent Operational Time:	99.6

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

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Wapasu - March 2016

Direction of Maximum Speed: 322 deg on Mar 30 14:00
Direction of Maximum Daily Speed Average: 123.5 deg on Mar 12

Direction of Minimum Speed: 184 deg on Mar 25 23:00

Direction of Minimum Daily Speed Average: 0.8 deg on Mar 26

Monthly Average Direction: 330.9 deg

Hours in Service:	744
Hours of Data:	741
Hours of Missing Data:	3
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	172	176	172	165	164	160	162	153	167	157	245	105	300	328	329	328	22	74	77	102	118	118	119	118	135.2
2-Mar	129	244	AF	76	82	64	51	60	315	321	302	307	335	326	305	336	13	38	46	2	354	2	37	39	1.2
3-Mar	55	50	71	52	106	110	133	123	125	285	317	330	336	341	333	337	352	349	351	348	351	343	346	357	3.9
4-Mar	20	23	24	21	25	75	133	137	137	126	156	151	156	159	167	156	134	136	136	130	132	140	141	144	136.0
5-Mar	138	141	146	154	159	167	168	169	176	236	315	338	350	350	6	343	357	21	11	11	21	22	17	20	41.0
6-Mar	19	4	357	14	19	28	26	15	19	12	24	38	50	72	95	71	59	72	68	67	92	86	97	99	50.3
7-Mar	109	99	104	117	104	104	125	135	139	149	154	172	191	261	269	250	269	274	347	329	327	26	47	50	122.1
8-Mar	71	130	136	133	138	189	192	165	156	138	155	149	158	153	202	324	341	337	334	344	334	344	340	3	132.3
9-Mar	33	31	44	31	26	14	33	58	345	291	235	210	230	217	194	181	180	194	347	121	115	136	149	151	152.4
10-Mar	149	148	148	136	125	125	125	121	129	131	125	127	129	120	124	128	127	122	136	141	141	141	142	155	131.4
11-Mar	181	203	237	222	241	230	240	235	280	298	307	321	300	274	286	288	295	260	AF	138	89	144	138	146	260.8
12-Mar	138	129	124	122	126	123	120	122	128	131	137	115	115	121	115	113	119	125	127	128	127	128	123	123	123.5
13-Mar	123	120	128	132	81	53	50	37	13	0	AF	325	338	338	339	328	330	329	327	329	335	336	336	341	357.3
14-Mar	342	343	338	337	341	347	357	354	355	6	9	9	357	341	338	339	352	7	20	17	22	11	19	53	353.7
15-Mar	95	68	95	348	22	356	356	31	28	348	333	343	354	349	335	331	348	5	6	2	354	351	344	332	352.8
16-Mar	326	331	341	335	342	343	343	344	347	336	323	319	331	326	333	345	337	334	331	333	307	306	311	295	332.3
17-Mar	280	258	260	289	299	304	305	312	308	314	326	330	330	324	325	317	317	328	288	255	247	231	184	146	307.4
18-Mar	172	187	169	206	212	209	224	248	266	307	292	250	213	198	206	185	218	214	134	133	143	148	158	106	206.4
19-Mar	95	84	76	95	101	71	85	103	106	112	112	102	110	98	87	89	92	97	99	105	110	109	112	113	101.4
20-Mar	113	113	116	117	116	119	117	114	115	125	112	93	109	96	77	70	78	77	81	89	91	86	91	95	102.1
21-Mar	91	97	100	89	88	91	90	86	98	99	91	99	96	86	81	77	84	92	79	85	106	111	112	116	94.8
22-Mar	121	117	121	123	125	130	132	132	145	162	169	142	156	158	186	207	171	171	163	153	150	143	134	134	142.8
23-Mar	150	158	156	181	285	10	9	339	334	331	342	345	333	330	336	341	343	344	1	7	28	37	62	57	352.0
24-Mar	65	83	85	81	83	90	69	54	56	62	323	322	334	319	320	327	338	335	357	48	92	108	119	123	23.9
25-Mar	124	137	142	143	145	140	138	142	160	161	183	174	167	173	178	161	173	167	148	120	97	101	184	354	152.3
26-Mar	357	351	352	346	325	338	348	7	11	358	297	328	304	238	266	225	174	141	152	123	129	132	136	138	9.3
27-Mar	139	141	142	140	134	125	126	137	140	145	153	152	141	155	162	157	139	136	130	120	124	131	135	142	139.4
28-Mar	148	153	154	155	158	163	165	170	180	194	198	201	193	240	268	288	270	275	299	285	263	246	186	149	203.1
29-Mar	151	155	156	162	144	149	155	158	189	222	288	289	318	307	347	305	347	360	79	100	103	113	119	119	150.9
30-Mar	122	115	120	126	122	30	77	103	214	287	290	315	314	322	336	346	345	348	341	339	332	332	329	339	336.9
31-Mar	332	325	321	318	317	324	322	317	308	309	325	299	288	248	248	199	187	151	149	169	169	171	172	189	293.7
	110.3	112.5	117.5	119.2	111.4	96.2	106.0	109.5	120.5	112.5	272.3	13.6	9.7	332.9	338.7	0.1	31.4	56.4	56.8	74.9	93.2	101.3	107.9	108.1	
	Diurnal Average																								

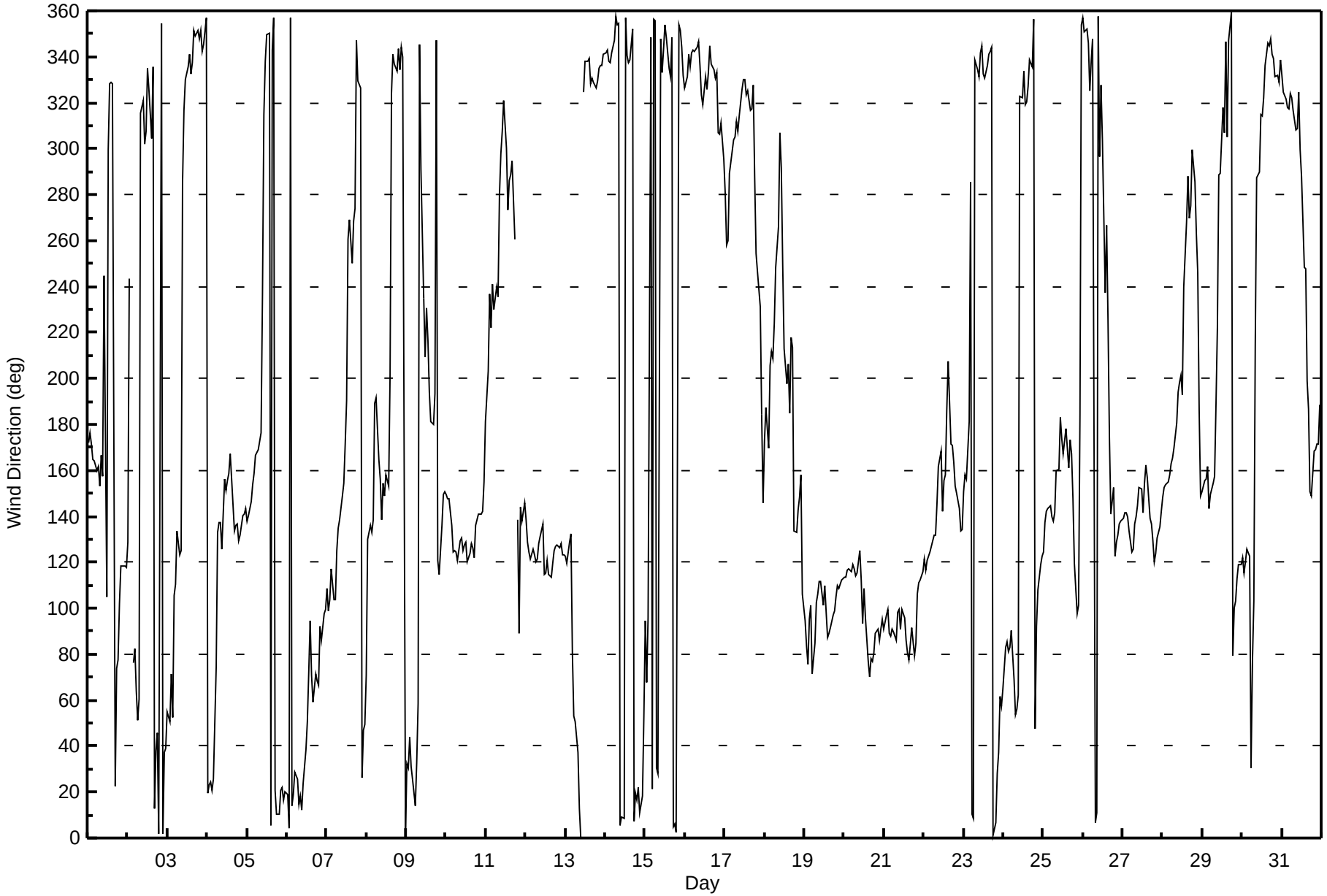
AF - Analyzer Failure
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Wapasu - March 2016



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Wapasu - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 92 deg on Mar 26 14:00

Minimum Value: 7 deg on Mar 24 04:00

Percentiles: P_1 = 10 P_{10} = 17 Q_1 = 22 Median = 28 Q_3 = 34 P_{90} = 41 P_{99} = 76

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	29	31	27	24	22	23	23	21	27	39	69	50	74	48	51	37	57	19	19	24	20	19	19	19	74
2-Mar	60	81	AF	21	33	14	45	72	34	32	39	38	38	40	24	44	34	27	58	37	37	41	32	29	81
3-Mar	18	17	21	35	72	41	31	19	23	63	29	26	26	32	29	32	38	33	33	36	33	33	32	28	72
4-Mar	28	28	31	36	38	27	19	15	20	30	32	31	35	33	37	31	21	22	21	19	19	20	21	21	38
5-Mar	20	21	23	24	28	29	30	28	32	33	41	34	36	35	37	30	37	35	35	37	30	31	36	31	41
6-Mar	35	38	35	38	33	29	30	35	39	35	33	32	38	39	36	30	26	23	22	22	27	29	61	76	76
7-Mar	21	23	24	22	24	24	23	23	22	26	27	33	41	29	29	26	29	30	27	28	28	33	25	30	41
8-Mar	35	17	17	19	15	71	51	33	29	25	35	33	34	37	46	29	32	26	23	26	24	30	23	38	71
9-Mar	29	28	25	34	40	48	43	31	80	30	30	39	31	36	35	35	33	47	70	22	22	16	25	23	80
10-Mar	19	16	16	16	13	15	16	17	30	37	23	22	22	23	21	24	22	19	25	27	20	21	21	27	37
11-Mar	44	32	26	23	26	32	27	32	38	27	24	25	26	26	26	25	24	36	AF	55	19	14	23	25	55
12-Mar	19	16	14	16	15	17	17	18	19	20	22	26	22	22	21	21	24	19	18	18	17	19	17	17	26
13-Mar	16	20	70	56	46	24	24	32	36	37	AF	13	26	29	28	25	28	26	26	27	29	31	32	32	70
14-Mar	32	32	32	31	32	35	34	35	33	38	35	36	39	33	30	30	37	34	35	35	31	30	31	20	39
15-Mar	39	32	80	39	24	26	39	27	53	33	46	69	49	38	34	28	34	33	33	38	35	32	34	24	80
16-Mar	23	27	33	28	34	34	36	34	31	27	26	21	29	26	27	36	31	28	25	27	18	18	21	21	36
17-Mar	24	35	27	27	20	18	18	18	21	23	29	32	29	29	27	24	25	23	29	26	23	91	40	31	91
18-Mar	26	25	28	31	32	29	28	24	29	24	30	49	61	74	52	38	32	29	35	10	15	19	77	74	77
19-Mar	16	15	22	25	27	18	18	20	20	21	24	31	30	26	23	22	21	19	18	18	19	19	20	20	31
20-Mar	19	19	20	19	18	43	28	21	25	29	24	25	26	31	26	28	26	22	23	22	23	22	21	24	43
21-Mar	32	26	35	24	21	23	30	27	24	27	25	28	27	29	28	28	24	25	23	23	20	19	20	20	35
22-Mar	19	18	17	17	17	16	18	18	24	34	33	34	37	37	51	41	37	32	30	28	23	23	19	17	51
23-Mar	28	30	25	38	60	27	36	32	30	27	33	36	31	33	35	35	36	34	33	30	27	19	16	15	60
24-Mar	12	12	10	7	10	21	27	17	26	44	48	34	35	29	32	33	37	37	28	25	8	13	10	10	48
25-Mar	12	17	20	22	21	16	15	18	27	27	37	37	31	38	36	29	35	30	22	19	30	24	75	23	75
26-Mar	26	31	29	31	23	29	33	38	39	48	61	50	58	92	35	66	78	31	20	10	11	13	16	18	92
27-Mar	19	20	21	19	17	13	15	19	20	23	27	29	29	32	31	31	22	21	17	17	18	16	18	20	32
28-Mar	22	23	24	25	26	28	29	32	37	35	35	33	34	30	33	24	27	27	21	27	26	31	39	22	39
29-Mar	16	12	10	16	9	8	14	23	34	54	33	30	32	33	47	67	52	37	49	10	14	18	16	16	67
30-Mar	16	18	13	10	24	42	18	41	58	26	25	28	24	25	31	34	34	35	33	36	30	29	28	32	58
31-Mar	31	23	23	22	21	22	25	26	38	43	57	53	46	60	71	70	41	25	29	30	30	30	32	33	71
	60	81	80	56	72	71	51	72	80	63	69	69	74	92	71	70	78	47	70	55	37	91	77	76	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	March 21, 2016	Last Calibration	February 16, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	11:10	End Time (MST)	15:00
Gas Cert Reference	SA130010A	Station temp.	Deg C
Cal Gas Concentration	47.8 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	493
ZAG Make/Model	API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-702	-702
Analyzer IP address	192.168.1.43		Lamp voltage	884	879
Calculated slope	0.996022	0.996525	Chamber temp	45.1	44.9
Calculated intercept	1.929258	1.533392	Pressure	685.9	694.6
Analyzer Background	9.0	8.6	Flow	0.449	0.455
Analyzer Coefficient	0.855	0.850	Intensity	82	82

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	-0.2	----
as found span	5000	60.4	577.4	577.9	0.999
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	60.4	577.4	578.6	0.998
second point	5000	30.2	288.7	287.7	1.003
third point	5000	15.2	145.3	142.4	1.020
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	60.4	577.4	578.6	0.998
				Average Correction Factor	1.007

Corrected As found	578.1	Previous response	577.8	% change	0.0%

Notes:

Pump changed after as founds for preventative maintenance. Zero and span adjusted slightly.

Calibration Performed By: Devin Russell

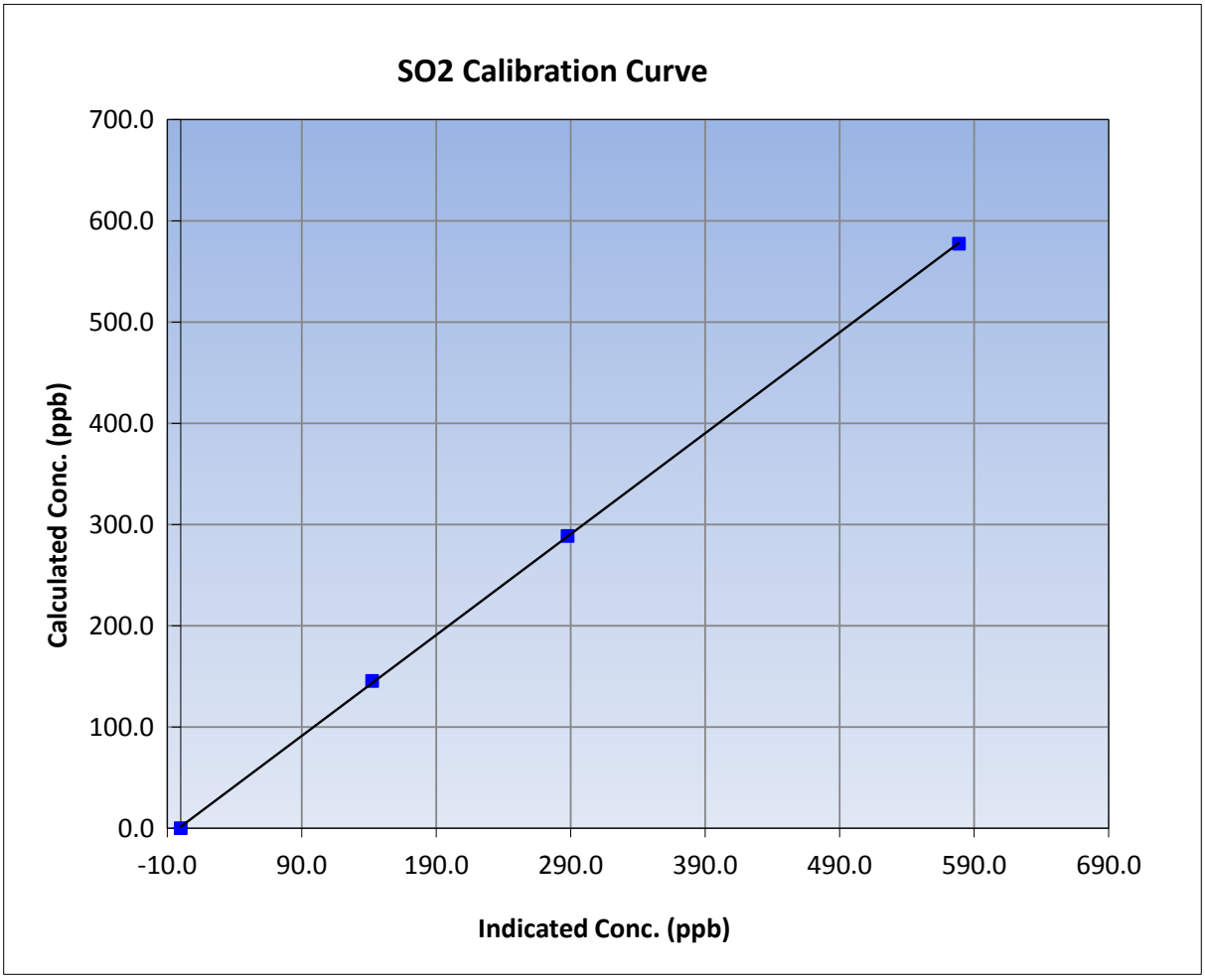
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

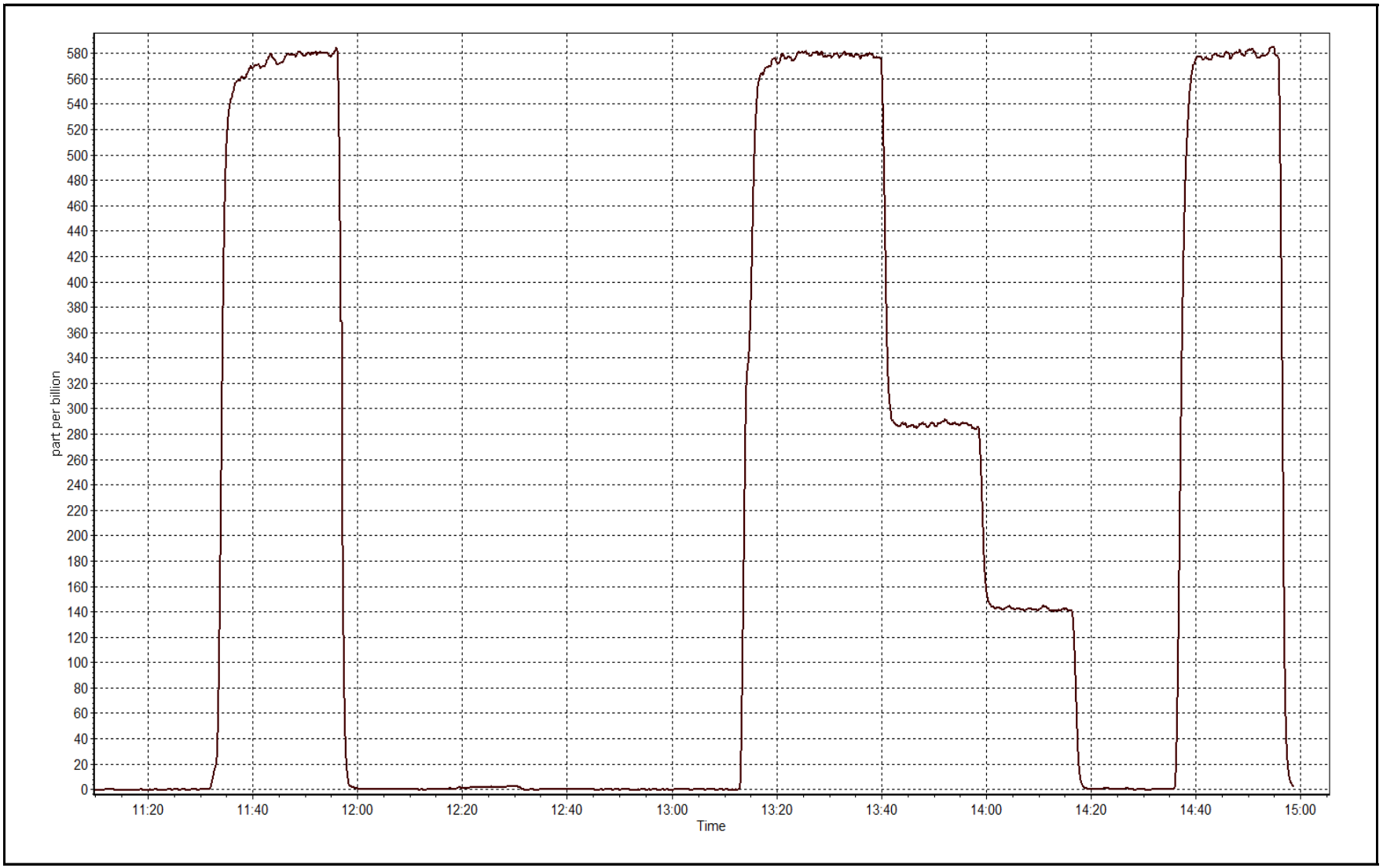
Calibration Date	March 21, 2016	Previous Calibration	February 16, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	11:10	End Time (MST)	15:00
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999963
577.4	578.6	0.9980		
288.7	287.7	1.0034	Slope	0.996525
145.3	142.4	1.0204		
			Intercept	1.533392



SO2 Calibration Plot Date: March 21, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	March 29, 2016	Last Calibration	February 11, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	13:05
Gas Cert Reference	CC107167	Station temp.	21 Deg C
Cal Gas Concentration	5.1 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	API T700	Serial Number	997
ZAG air Make/Model	API 701	Serial Number	4227
DACS make/model	Campbell Scientific CR3000	Serial Number	6894
SO2 gas concentration	47.8 ppm	SO2 gas cert/exp	SA130010A 12-Dec-16

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-651	-651
Analyzer IP address	192.168.1.45		Lamp voltage	800	798
Calculated slope	1.000275	0.987594	Chamber temp	45	45
Calculated intercept	0.117383	0.073698	Pressure	566.0	549.5
Analyzer Background	14.4	14.9	Flow	1.001	0.974
Analyzer Coefficient	1.222	1.246	Intensity	112	112
			Converter temp.	341	342

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	-0.3	----
as found span	5000	78.4	80.0	79.0	1.012
SO2 scrubber check	5000	20.9	199.8	1.5	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	78.4	80.0	80.9	0.989
second point	5000	39.3	40.1	40.7	0.986
third point	5000	19.7	20.1	20.1	1.001
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	78.5	80.1	81.0	0.988
				Average Correction Factor	0.992

Corrected As found	79.3	Previous response	79.8	% change	0.6%

Notes:

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

Calibration Performed By: Devin Russell

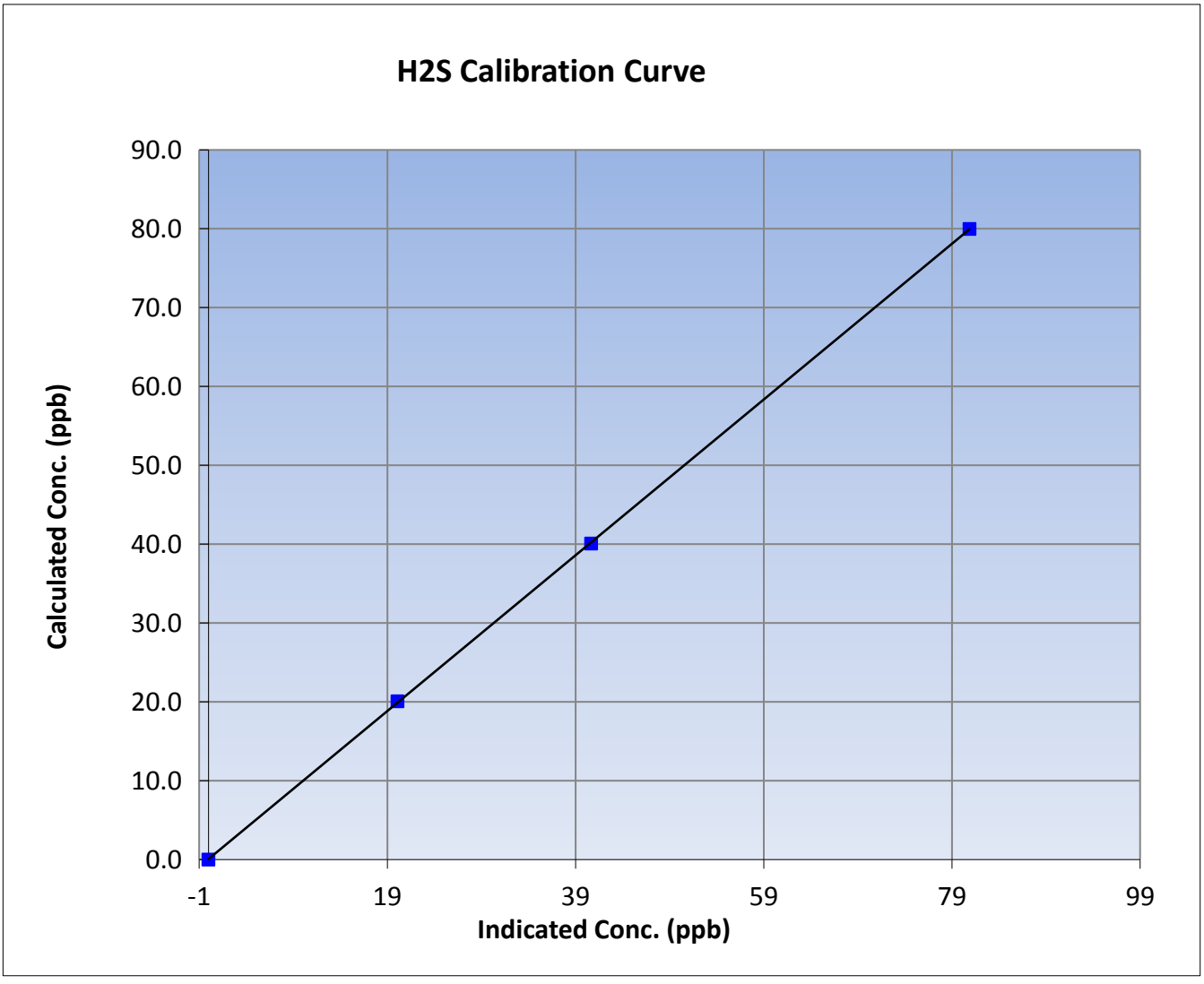
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

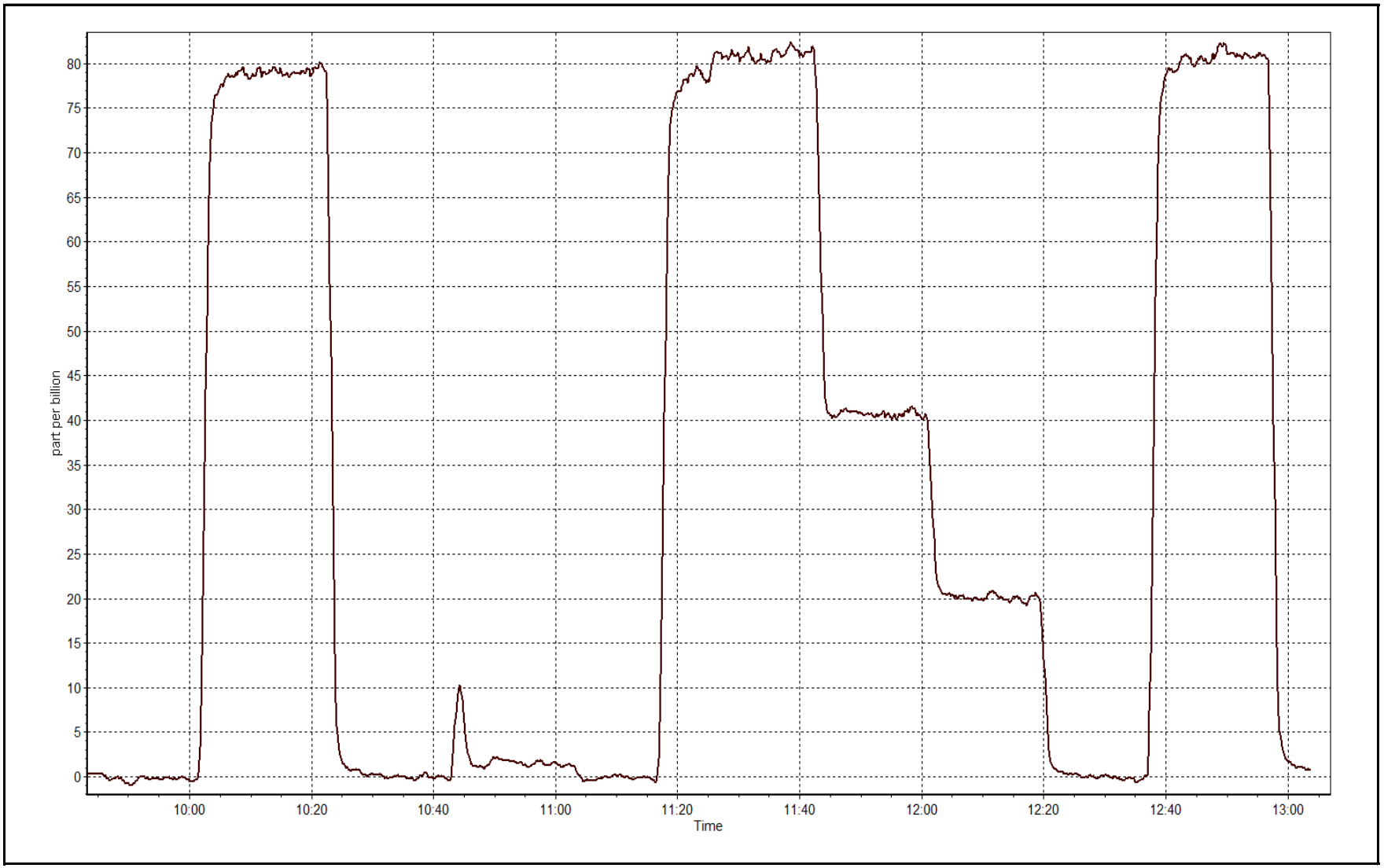
Calibration Date	March 29, 2016	Previous Calibration	February 11, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:45	End Time (MST)	13:05
Analyzer make	Thermo 450i	Analyzer serial #	1218153583

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999980
80.0	80.9	0.9888		
40.1	40.7	0.9856	Slope	0.987594
20.1	20.1	1.0012		
			Intercept	0.073698



H2S Calibration Plot Date: March 29, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	March 21, 2016	Last Calibration	February 16, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	11:10	End Time (MST)	15:00
Gas Cert Reference	SA130010A	Cal Gas Expiry Date	12/12/2016
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	493
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	6894

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	41.0	41.0
Calculated slope	1.005271	0.998894	Fuel Pressure	24.8	24.8
Calculated intercept	-0.037492	0.026873	Analyzer Coeff	4.3	4.4
			Analyzer BKG	2.720	3.000

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	0.09	----
as found span	5000	60.4	13.19	13.31	0.991
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	60.4	13.19	13.20	1.000
second point	5000	30.2	6.60	6.56	1.006
third point	5000	15.2	3.32	3.26	1.019
as left zero	5000	0.0	0.00	-0.05	----
as left span	5000	60.4	13.19	13.19	1.000
				Average Correction Factor	1.008

Corrected As found	13.22	Previous response	13.16	% change	-0.4%

Notes:

Pump changed after as founds. Zero and span adjusted.

Calibration Performed By: Devin Russell

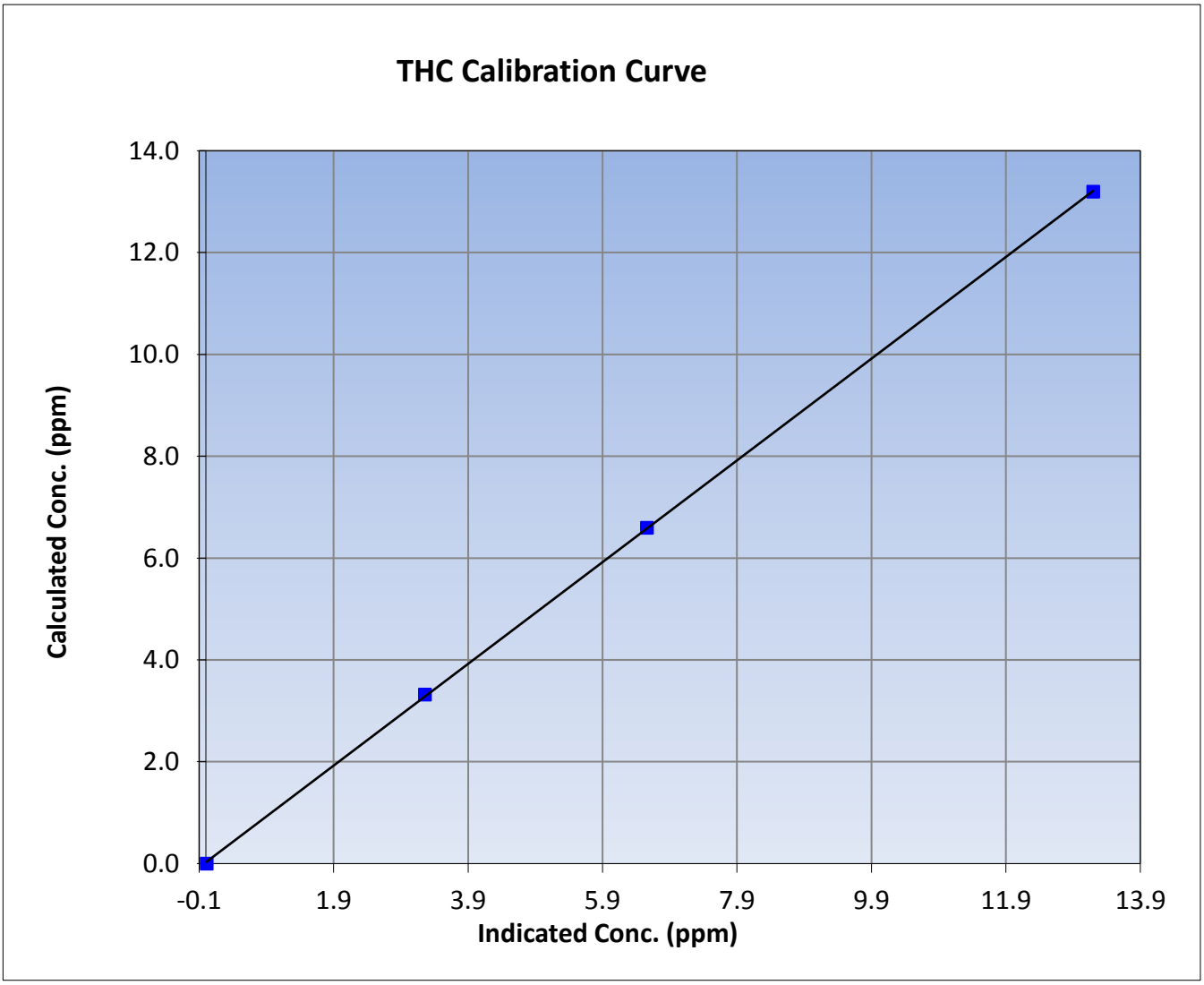
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

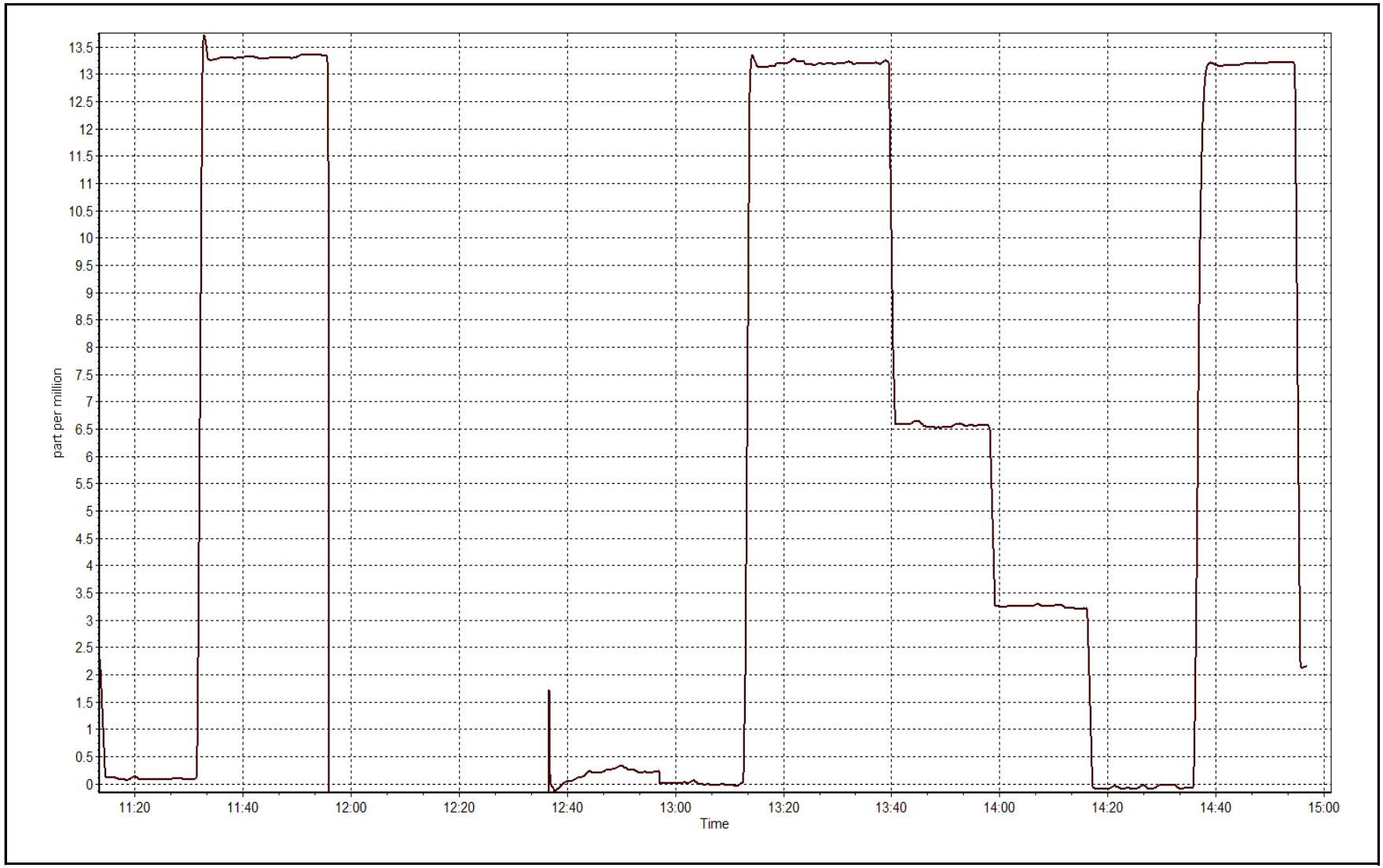
Calibration Date	March 21, 2016	Previous Calibration	February 16, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	11:10	End Time (MST)	15:00
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999965
13.19	13.20	0.9996		
6.60	6.56	1.0057	Slope	0.998894
3.32	3.26	1.0185		
			Intercept	0.026873



THC Calibration Plot Date: March 21, 2016



Wood Buffalo Environmental Association
O_3 Calibration Report

Station Information

Calibration Date	March 24, 2016	Previous Calibration	February 17, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	11:22
NO2 GPT Ref date	March 23, 2016	Transfer Standard	23
		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	6894

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 500 ppb		Bench temp.	27.7	28.1
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	58.0
Calculated slope	0.997619	0.998737	Pressure	25.8	25.8
Calculated intercept	0.093749	-0.696834	Flow cell A	738	713
Analyzer Background	6.5	6.2	Flow cell B	723	713
Analyzer Coefficient	0.979	0.986	O3 measure	4527.3	4536.7
			O3 reference	4544.3	4537.1

Analyzer make	Teledyne API T400	Analyzer serial #	824

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		0.0	0.4	----
as found span	5000	713.6/1082.0	375.8	378.1	0.994
calibrator zero	5000		0.0	0.4	----
high point	5000	713.6/1082.0	375.8	376.4	0.998
second point	5000	496.5/973.6	252.8	254.6	0.993
third point	5000	260.3/849.3	129.8	130.8	0.993
as left zero	5000		0.0	0.5	----
as left span	5000	713.6/1082.0	375.8	377.2	0.996
				Average Correction Factor	0.995

Corrected As found	377.7	Previous response	376.6	% change	-0.3%

Notes:

Inlet filter changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell

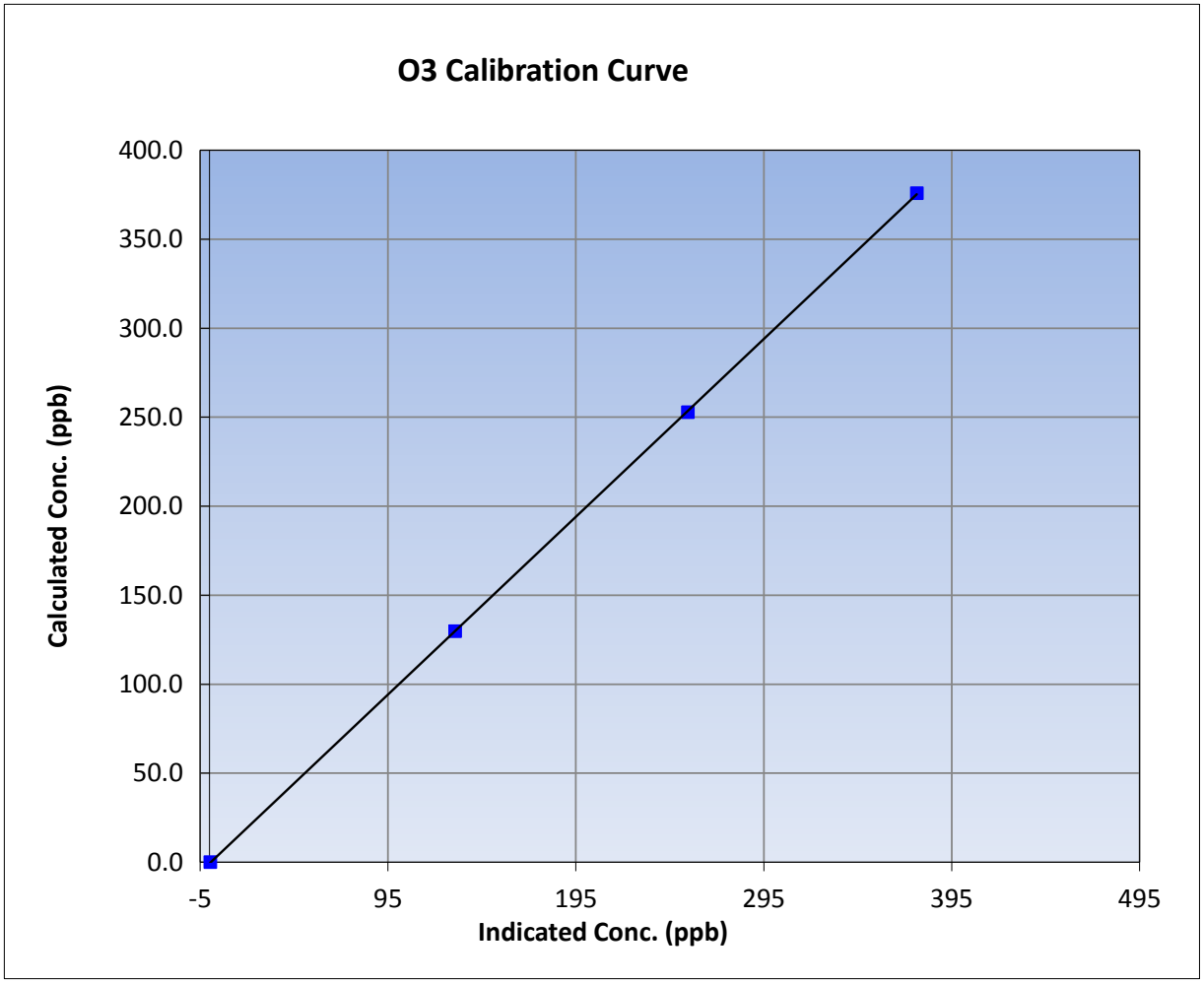
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

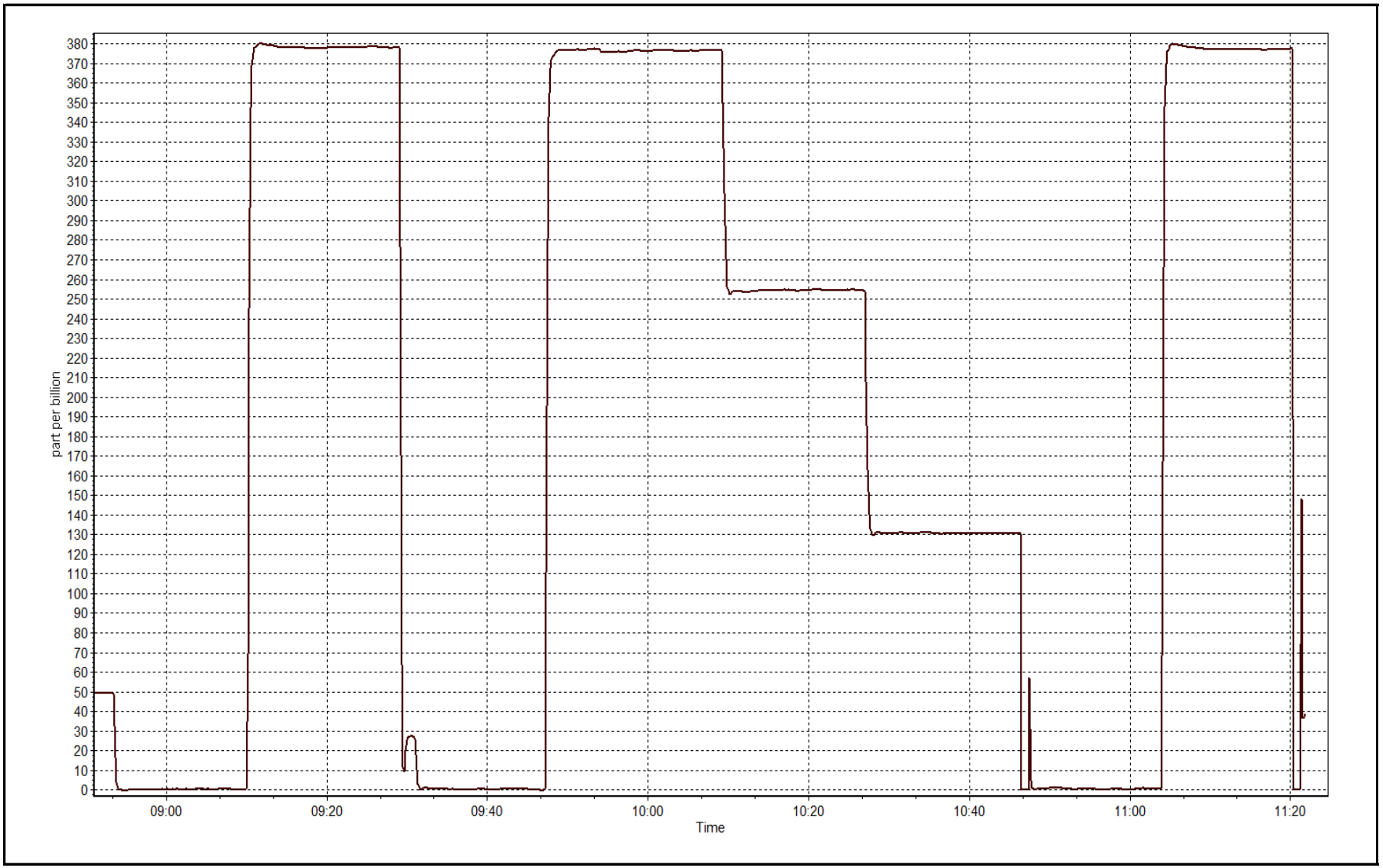
Calibration Date	March-24-16	Previous Calibration	February 17, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	8:50	End Time (MST)	11:22
Analyzer make	Teledyne API T400	Analyzer serial #	824

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999987
375.8	376.4	0.9984		
252.8	254.6	0.9930	Slope	0.998737
129.8	130.8	0.9926		
			Intercept	-0.696834



O3 Calibration Plot Date: March 24, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 23, 2016	Previous Calibration	February 16, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	8:53	End Time (MST)	14:20
NO Cal Gas Conc	49.7 ppm	Gas Cert Reference	SA130010A
NOx Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	12/1216
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.	6894

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999477	0.996700	1.010320
	Data Offset	2.376955	2.634685	-0.143885
Current Calibration	Data Slope	0.996567	0.999993	0.994240
	Data Offset	-0.469569	-0.197634	-1.129949

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	833

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	0.976		980.000	
NOX coefficient	0.966		0.985	
NO2 coefficient	1.000		1.000	
NO bkgrnd	0.6		-6.2	
NOX bkgrnd	1.1		-5.8	
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	71	ccm	72	ccm
R Cell press NO	5.1	mmHg	5.8	mmHg
R Cell Press Nox	5.1	mmHg	5.8	mmHg
NO sample flow	0.441	lpm	0.445	lpm
Nox sample Flow	0.436	lpm	0.445	lpm

Notes:

Critical flow paths serviced after as founds; o-rings and sintered filters replaced. Zero and span adjusted.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 23, 2016 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	-0.8	-0.6	-0.2	----	----
as found span	5000	60.4	600.4	600.4	0.0	582.6	582.8	-0.2	1.0306	1.0302
calibrator zero	5000	0.0	0.0	0.0	0.0	1.2	1.3	-0.1	----	----
high point	5000	60.4	600.4	600.4	0.0	602.9	600.9	2.0	0.9957	0.9991
second point	5000	30.2	300.2	300.2	0.0	302.3	300.4	1.9	0.9929	0.9992
third point	5000	15.2	151.1	151.1	0.0	150.7	149.8	0.9	1.0024	1.0086
as left zero	5000	0.0	0.0	0.0	0.0	2.5	2.6	-0.2	----	----
as left span	5000	60.4	600.4	222.6	377.8	597.7	221.5	376.2	1.0045	1.0050
								Average Correction Factor	0.9970	1.0023

Corrcted As found NO_X= 583.4 NO= 583.4 Percent Change NO_X= 2.6% NO= 2.8%

Previous Response NO_X= 598.3 NO= 599.7

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 60.40 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	602.0	598.4	-0.1	0.9973	1.0034	----	----
1st NO2 (300)	222.6	375.8	601.0	222.6	378.4	0.9990	----	0.9931	100.7%
2nd NO2 (200)	345.6	252.8	601.0	345.6	255.5	0.9990	----	0.9896	101.0%
3rd NO2 (100)	468.6	129.8	602.1	468.6	133.6	0.9971	----	0.9718	102.9%
2nd NO ref point	----	0.0	601.1	597.4	3.7	0.9988	1.0050	----	----
				Average Correction Factor		0.9985		0.9849	101.5%

Calibration Performed By: Devin Russell

Wood Buffalo Environmental Association

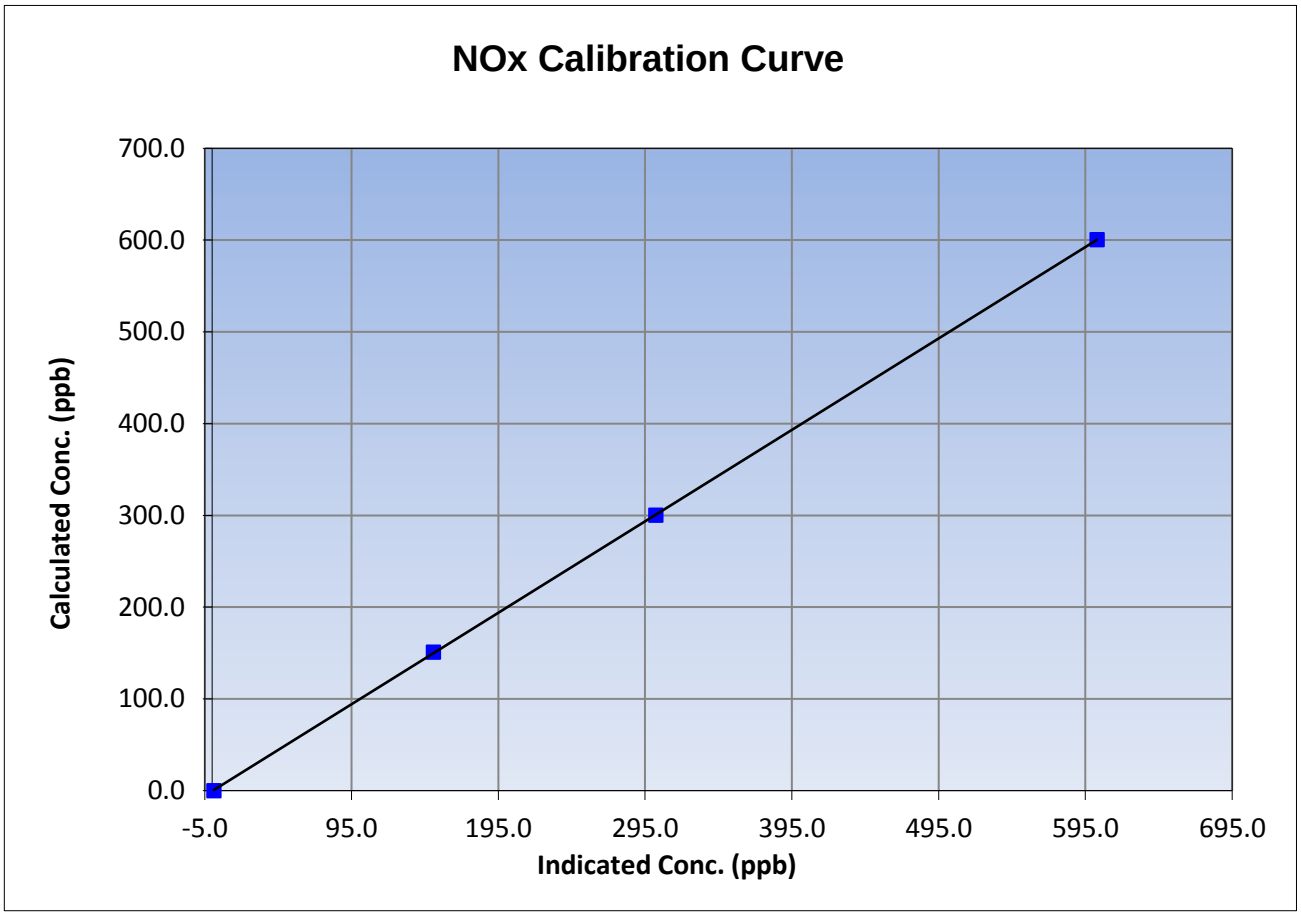
NO_X Calibration Summary

Station Information

Calibration Date	March 23, 2016	Previous Calibration	February 16, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	8:53	End Time (MST)	14:20
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.2	----	Correlation Coefficient	0.999986
600.4	602.9	0.9957		
300.2	302.3	0.9929	Slope	0.996567
151.1	150.7	1.0024		
			Intercept	-0.469569



Wood Buffalo Environmental Association

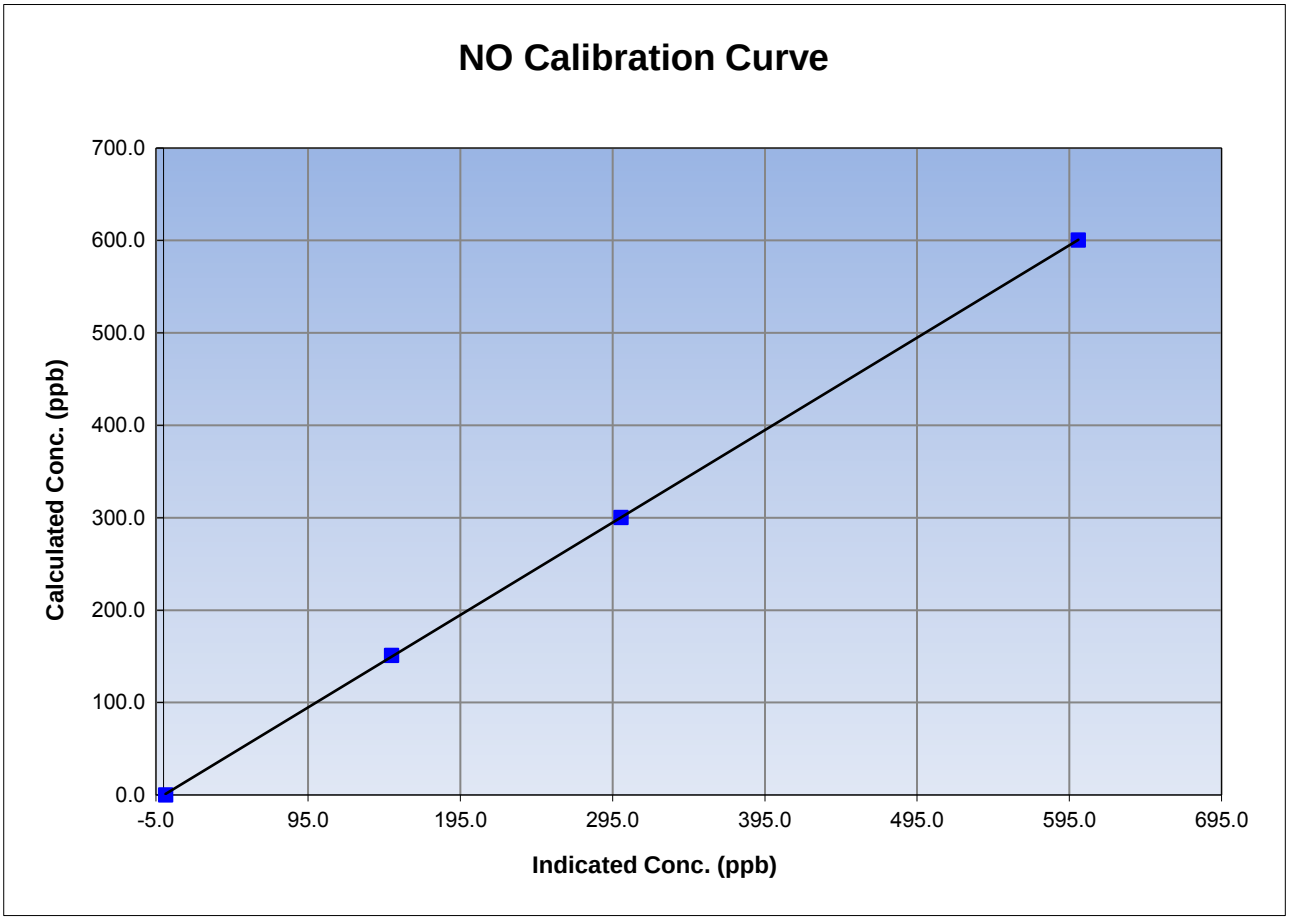
NO Calibration Summary

Station Information

Calibration Date	March 23, 2016	Previous Calibration	February 16, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	8:53	End Time (MST)	14:20
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.3	N/A	Correlation Coefficient	0.999982
600.4	600.9	0.9991		
300.2	300.4	0.9992	Slope	0.999993
151.1	149.8	1.0086		
			Intercept	-0.197634



Wood Buffalo Environmental Association

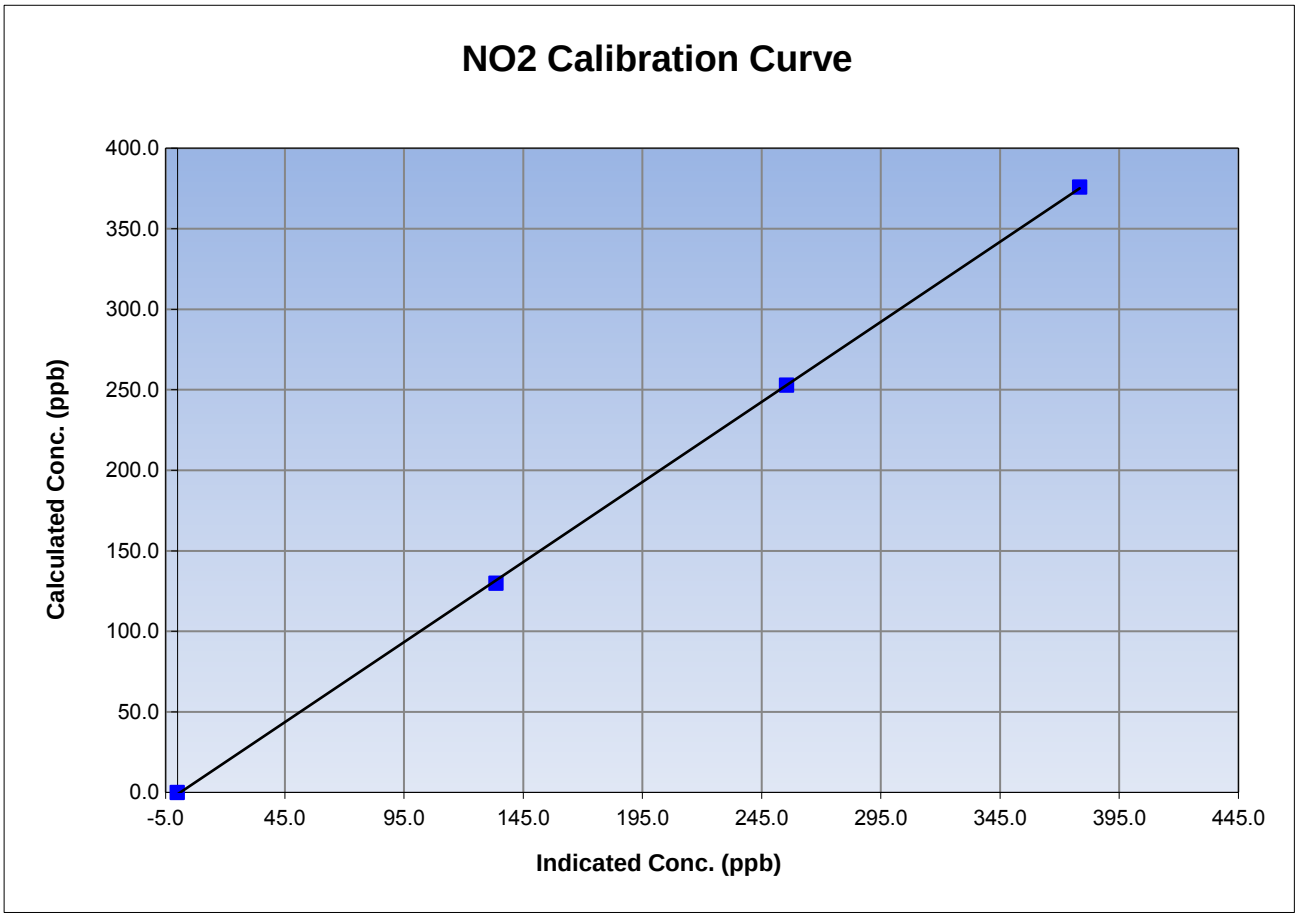
NO_2 Calibration Summary

Station Information

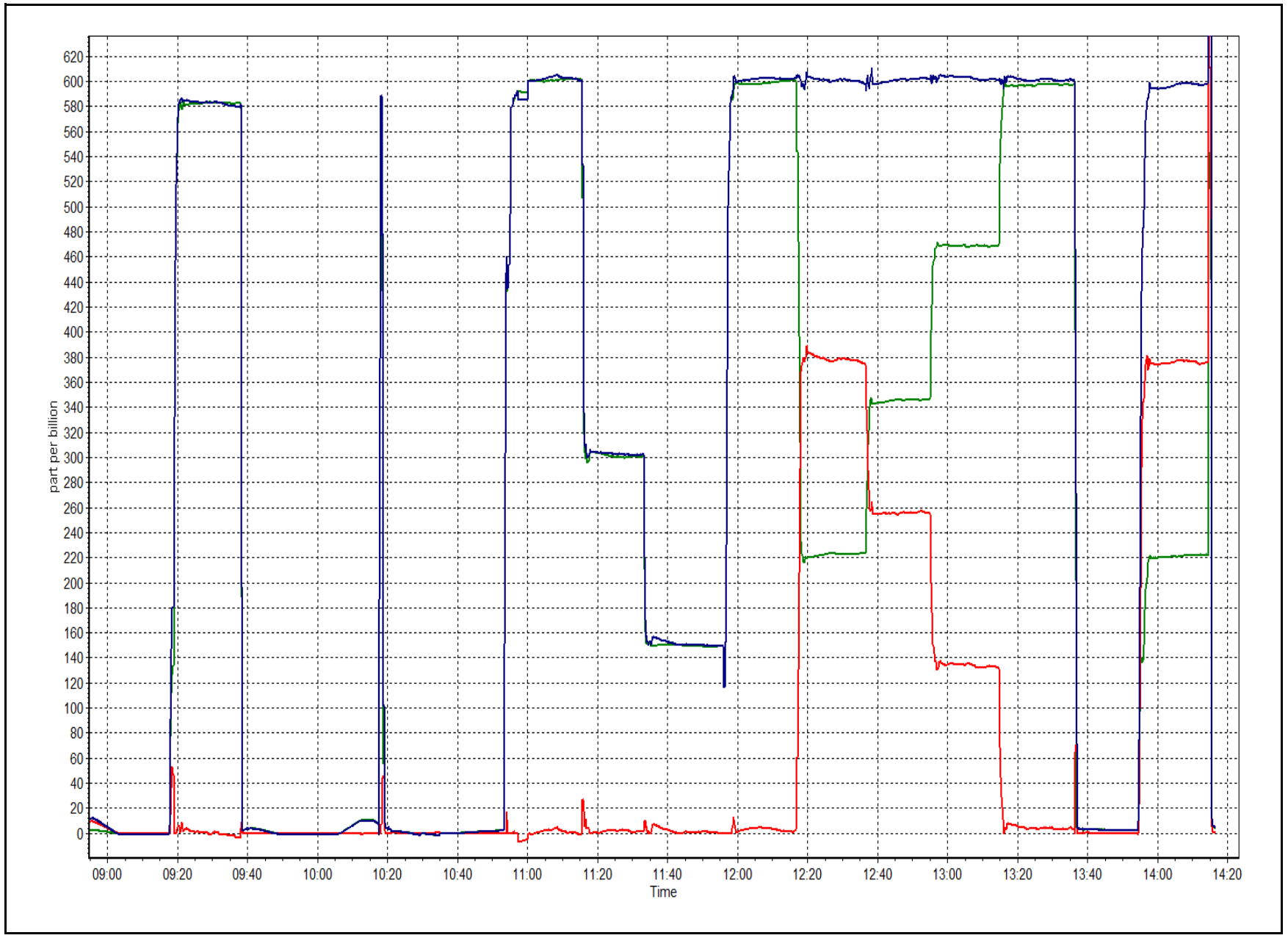
Calibration Date	March 23, 2016	Previous Calibration	February 16, 2016
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	8:53	End Time (MST)	14:20
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999931
375.8	378.4	0.9931		
252.8	255.5	0.9896	Slope	0.994240
129.8	133.6	0.9718		
			Intercept	-1.129949



NOX Calibration Plot Date: March 23, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	March 29, 2016	Previous Calibration:	February 17, 2016
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	9:45	End Time (MST):	11:10
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	141228

SHARP INFORMATION

Particulate Fraction:	PM2.5
Make/Model:	Thermo / SHARP 5030
Serial Number	E-1107
C_{14} Source SN:	2518
Confirmation of Time settings:	Yes ☑ No ☐
Paremeters Checked:	T1 ☑ T2 ☐ T3 ☐ T4 ☐ P3 ☑ Main Flow ☑ Beta ☐ Neph ☑

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	8.0	7.0	-1.0	8.0
T2	20.0	na	na	
T3	21.0	na	na	
T4	22.0	na	na	
RH (%)	14.0	na	na	

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	953	951.9	-1.1	953

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1003	2	1003	1000

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	200		200
Neph	0		0
C14	7.2		7.2
Indicated Concentration (ug/m3)	**0**	**no**	**0**
Offset 1	199.8		199.8
Offset 2	32		32

Leak Check (Quarterly)

Leak Check Date:	March 29, 2016	Previous Leak Check Date:	February 17, 2016

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.71	0.03
*Flow with adaptor (LPM):	16.68	

**Note - do not attach adaptor without shutting off the pump first*

Mass Foil Calibration (Annualy)

Foil Calibration Date:		Previous Foil Calibration:	
Zeroed?:			
Foil Mass:		Mass foil set S/N:	
Previous Correction Factor:			
New Correction Factor:			

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	29/03/2016
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Cyclone head cleaned. Leak check completed. Filter tape has about 25% of the roll left.

Calibration Performed By: **Devin Russell**

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 18
CONKLIN LOOKOUT
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)
MARCH 2016

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	100.00	4	0	2	0
TRS(ppb) Average	710	34	34	100.00	1	0	0	0
THC(ppm) Average	708	36	36	100.00	2.2	-	2.1	-
NMHC(ppm) Average	708	36	36	100.00	0.061	-	0.009	-
CH4(ppm) Average	708	36	36	100.00	2.2	-	2.1	-
O3 (ppb) Average	711	33	33	100.00	55	0	52	-
NO2 (ppb) Average	708	36	36	100.00	12	0	6	-
NO (ppb) Average	708	36	36	100.00	2	-	1	-
NOX (ppb) Average	708	36	36	100.00	12	-	7	-
PM2.5 (ug/m3) Average	690	2	54	93.01	13.5	-	6.4	0
Wind Speed 10 m (km/h) Average	722	0	22	97.04	20	-	12	-
Wind Direction 10 m (deg) Average	722	0	22	97.04	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	11.2	-	6.3	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	93.0	-
Precipitation (mm) Total	744	0	0	100.00	2.7	-	12.5	-
Leaf Wetness (% of range) Average	744	0	0	100.00	71	-	11.0	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	796	-	217.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.5	1	-	0	0	0	0	1	1	4
TRS (ppb) Average	710	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	708	1.97	0	-	1.9	1.9	1.9	2	2	2	2.2
NMHC(ppm) Average	708	0.002	0.006	-	0	0	0	0	0	0	0.061
CH4(ppm) Average	708	1.96	0	-	1.9	1.9	1.9	2	2	2	2.2
O3 (ppb) Average	711	40.5	6	-	24	31	35	41	45	49	55
NO2 (ppb) Average	708	2.2	2	-	0	1	1	1	3	5	12
NO (ppb) Average	708	0.3	0	-	0	0	0	0	0	1	2
NOX (ppb) Average	708	2.5	2	-	0	1	1	2	3	6	12
PM2.5 (ug/m3) Average	690	2.53	2.2	-	0	0.6	1.1	1.9	3.2	5.4	13.5
Wind Speed 10 m (km/h) Average	722	8.4	3	-	0	4	6	8	11	13	20
Wind Direction 10 m (deg) Average	722	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-2.21	4.9	-	-13.1	-8.2	-5.6	-2.6	0.4	5	11.2
Relative Humidity (%) Average	744	74.1	18	-	29	48	60	78	90	94	98
Precipitation (mm) Total	744	-	-	35.55	-	-	-	-	-	-	-
Surface Wetness (% of range) Average	744	3.3	5	-	0	1	1	2	3	6	71
Global Solar Radiation (W/m2) Average	744	112.3	182	-	0	0	0	4	150	425	796

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	13 Mar 2016 10:00	13 Mar 2016 11:00	2	Maintenance - Flow and zero check
PM2.5	17 Mar 2016 06:00	17 Mar 2016 10:00	5	Unstable operation - excessive baseline drift
PM2.5	17 Mar 2016 13:00	18 Mar 2016 11:00	23	Unstable operation - excessive baseline drift
PM2.5	20 Mar 2016 13:00	20 Mar 2016 18:00	6	Unstable operation - excessive baseline drift
PM2.5	29 Mar 2016 10:00	29 Mar 2016 17:00	8	Unstable operation - excessive baseline drift
PM2.5	30 Mar 2016 11:00	30 Mar 2016 11:00	1	Unstable operation - excessive baseline drift
PM2.5	30 Mar 2016 13:00	30 Mar 2016 19:00	7	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	15 Mar 2016 02:00	15 Mar 2016 23:00	22	Flat line in sensor output signal - Sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Conklin Lookout - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 4 ppb on Mar 15 21:00

Maximum Daily Average: 2.1 ppb on Mar 16

Minimum Value: 0 ppb on Mar 8 13:00

Minimum Daily Average: 0.1 ppb on Mar 8

Maximum Diurnal Average: 0.6 ppb at hour 12

Minimum Diurnal Average: 0.3 ppb at hour 5

Monthly Average: 0.5 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 3$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
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	0.3	0
2-Mar	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0.3	1
3-Mar	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	4	2	1	1	0.6	4
4-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	0	0	0.3	1
5-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1	1	0.5	2
6-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
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	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
10-Mar	0	0	0	0	Z	0	0	0	C	C	C	C	C	1	1	1	0	0	0	0	0	0	0	0	0.3	1
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	1	0.2	1
12-Mar	Z	2	0	0	0	1	1	0	1	1	0	1	1	0	1	1	1	1	1	0	1	1	1	1	0.6	2
13-Mar	1	Z	1	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	0	0	0	0	0	0	0.4	1
14-Mar	0	0	Z	0	1	1	1	0	1	2	2	3	2	1	1	1	0	0	0	0	0	0	0	0	0.7	3
15-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	3	2	3	0.7	4
16-Mar	3	1	2	2	Z	2	3	2	2	3	2	2	2	2	2	2	3	3	3	2	1	1	2	3	2.1	3
17-Mar	2	1	1	1	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
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	0.2	0
19-Mar	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0.7	1
20-Mar	0	0	Z	1	0	0	0	1	2	1	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0.6	2
21-Mar	0	0	1	Z	0	0	0	0	1	1	1	1	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	1	1	1	0	0	0	1	1	0	0	0	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	1	1	1	1	0.3	1
24-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1
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	2	2	3	3	3	3	2	1	1	0	1	0	0	0	0	0	1	1	1	1.1	3
27-Mar	1	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0	0	1	3	1	1	0.8	3
28-Mar	1	1	0	0	Z	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
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	Z	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	1	1	0	0	0	0	0.4	2
31-Mar	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1
	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.5	0.5	0.5	Diurnal Average	
	3	2	2	2	1	2	3	3	3	3	3	3	2	2	2	2	3	3	3	2	4	3	2	3	Diurnal Maximum	

Z - zerospan C - Calibration

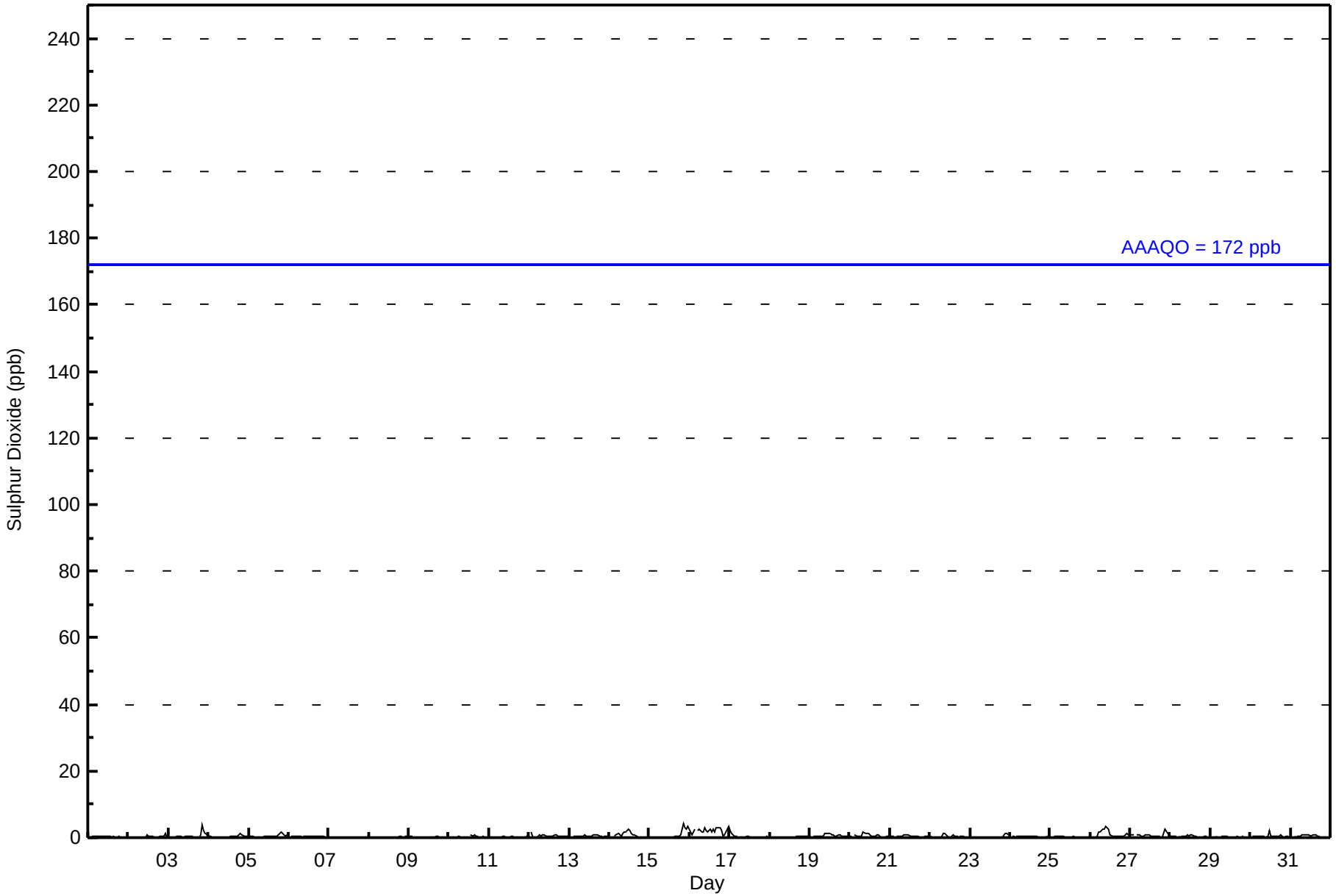
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Conklin Lookout - March 2016



Sulphur Dioxide (SO_2) - ppb
Conklin Lookout - March 2016

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 (SO_2) - ppb

Conklin Lookout - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	30	14	40	34	35	26	38	54	52	62	53	25	39	59	47	79	687
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	30	14	40	34	35	26	38	54	52	62	53	25	39	59	47	79	687

Total Number of Valid Hours: 687

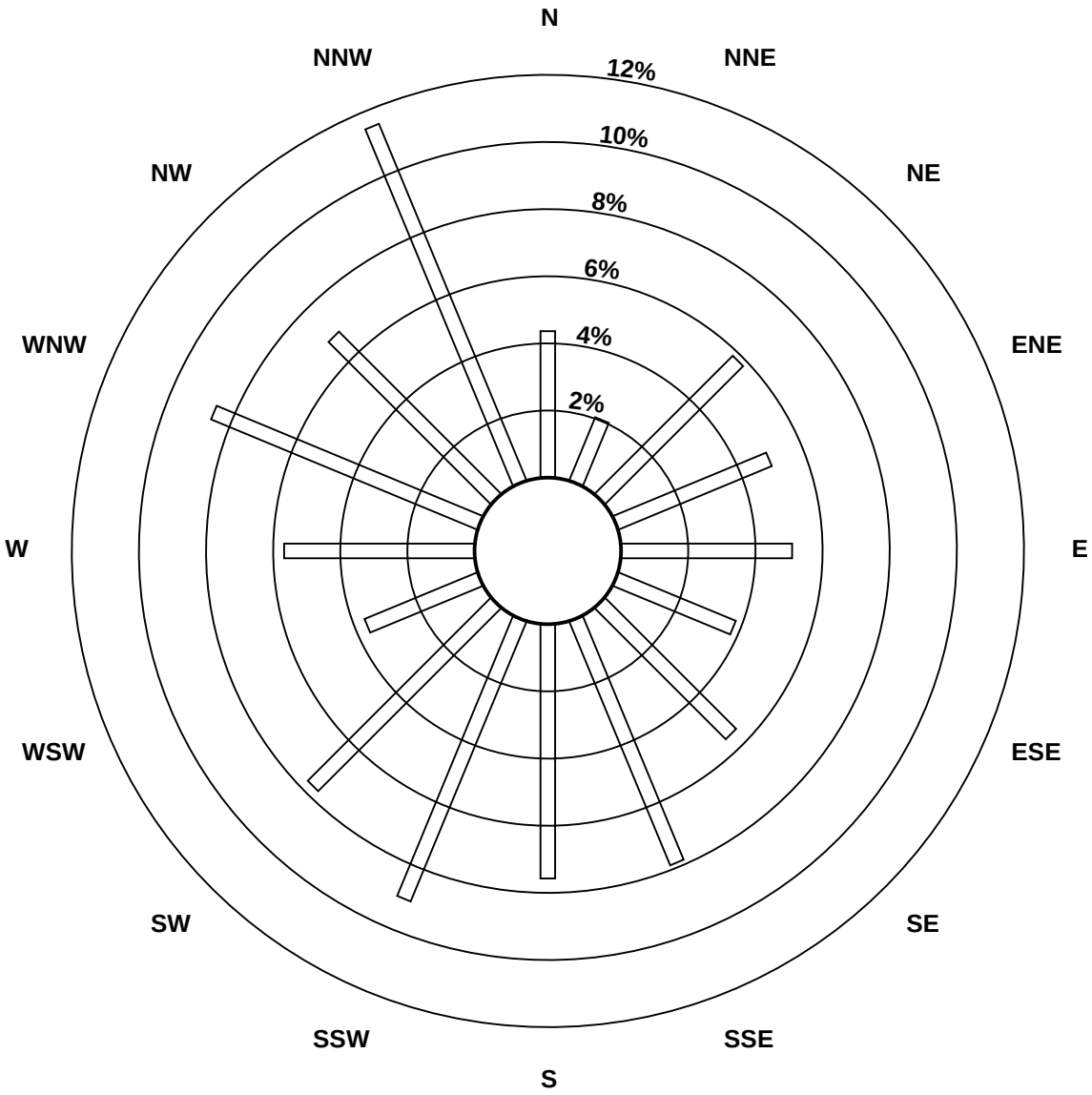
Total Number of Hours: 744

Wood Buffalo Environmental Association

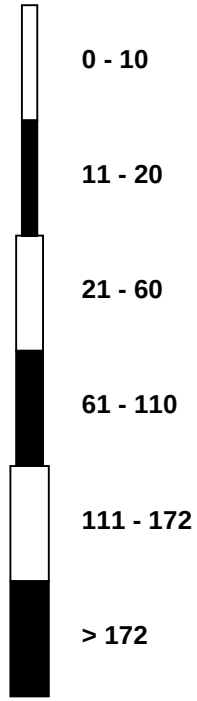
Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Conklin Lookout (AMS 18)



Classes (ppb)



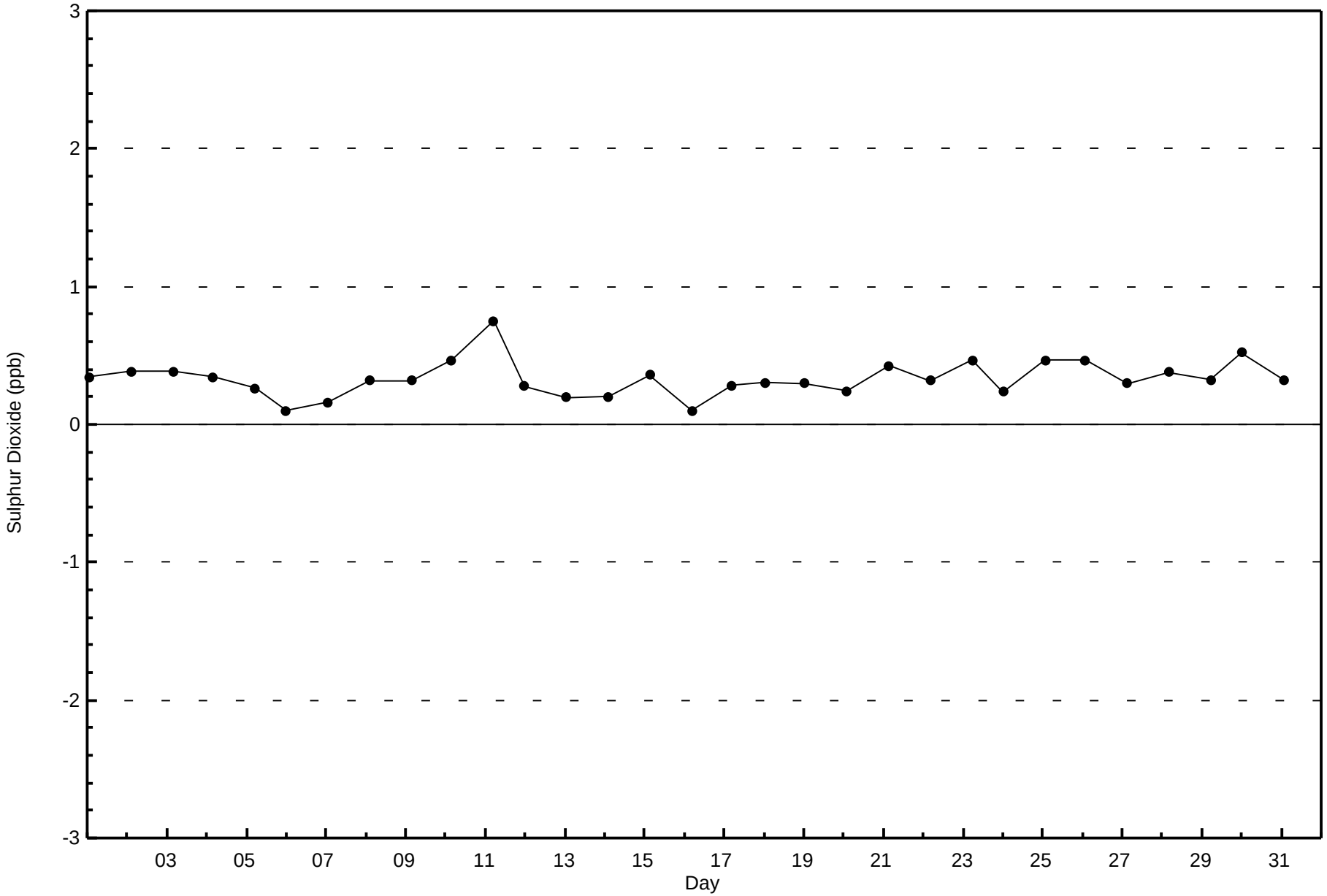
Total Number of Valid Hours: 687

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Conklin Lookout - March 2016

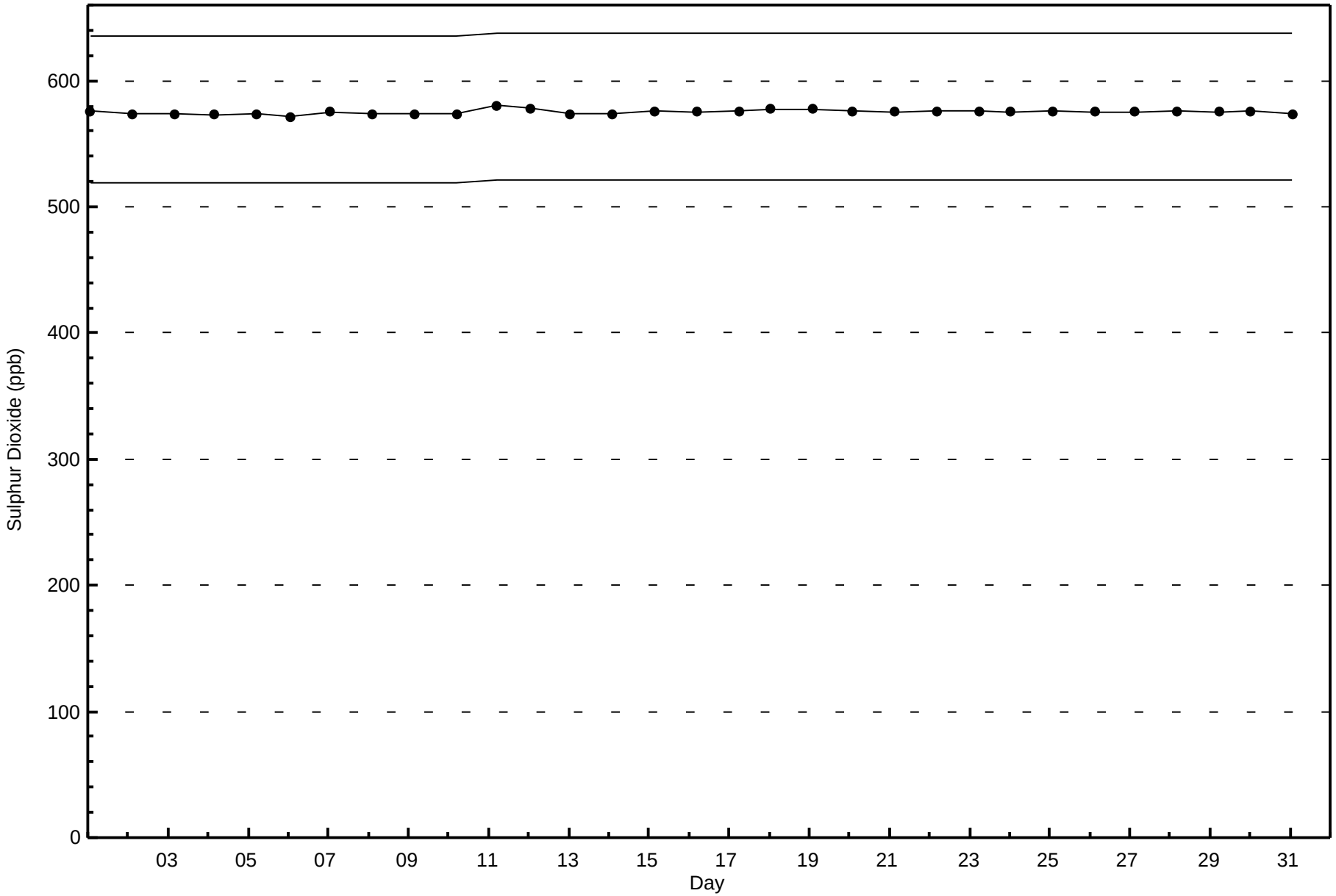


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Conklin Lookout - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Conklin Lookout - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 1 ppb on Mar 15 21:00 Maximum Daily Average: 0.4 ppb on Mar 31

Minimum Value: 0 ppb on Mar 14 01:00 Minimum Daily Average: 0.3 ppb on Mar 14

Maximum Diurnal Average: 0.3 ppb at hour 12 Minimum Diurnal Average: 0.3 ppb at hour 18

Monthly Average: 0.3 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 0$

Hours in Service:	744
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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-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	0.4	0
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	0.4	0
3-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	0.4	0
4-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
5-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	0.4	0
6-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
7-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
8-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	0.4	0
9-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	0.4	0
10-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
11-Mar	0	0	0	0	0	0	Z	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0.3	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	0.3	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	0.3	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	0.3	0
15-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1
16-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
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	0.4	0
18-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
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	0.3	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	0.3	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	0.3	0
22-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
23-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	0.4	1
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	0.3	0
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	0.3	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	0.3	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	0.3	0
28-Mar	0	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
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	0.3	0
30-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	0.4	0
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	0.4	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	0.3	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	1	1	0	0	0	0	0	0	0	0	1	0	1	0	Diurnal Maximum	

Z - zerospan C - Calibration

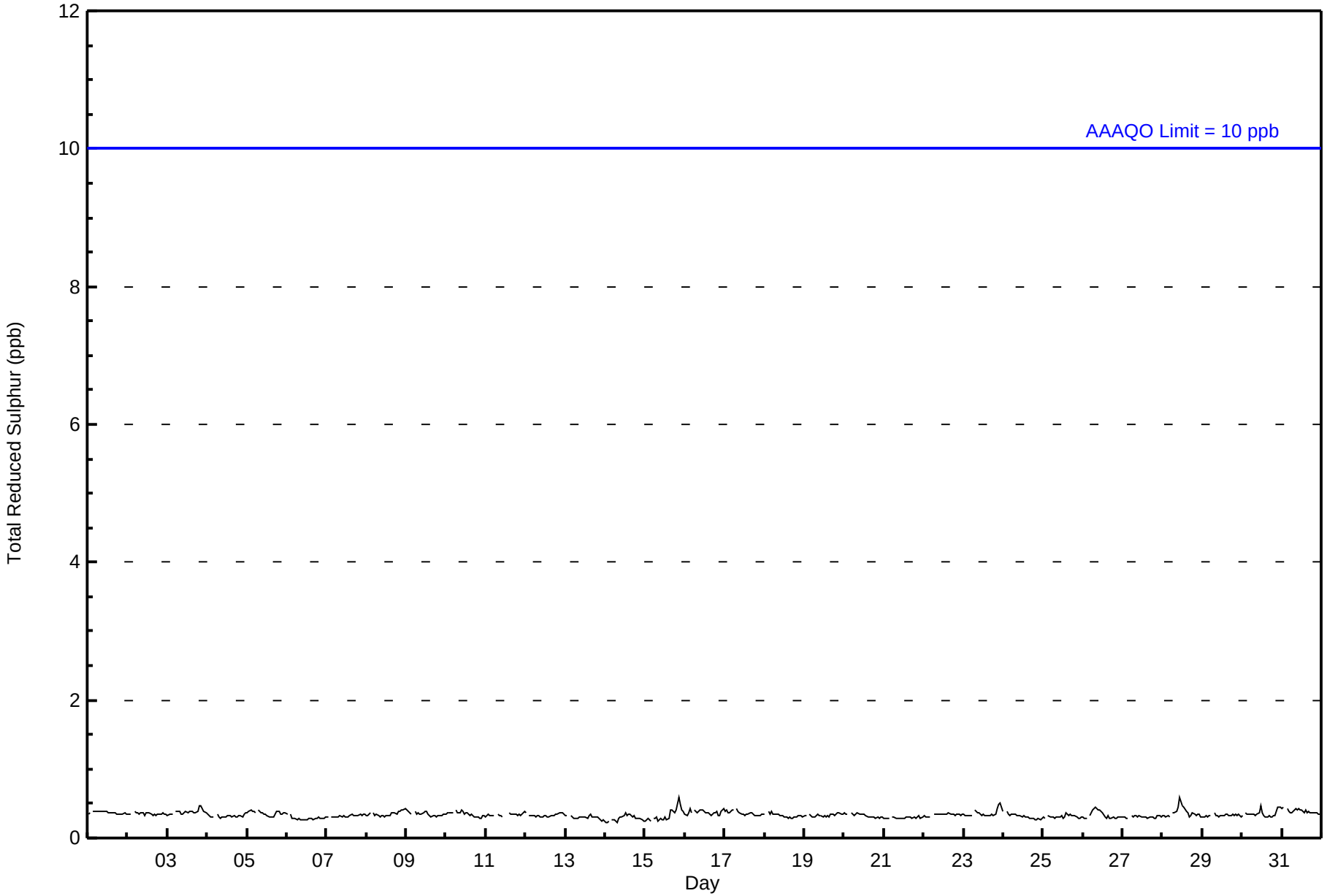
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Total Reduced Sulphur (TRS) - ppb

Conklin Lookout - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb

Conklin Lookout - March 2016

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

Conklin Lookout - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	30	13	40	34	37	23	45	53	52	64	52	24	39	57	48	78	689
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	30	13	40	34	37	23	45	53	52	64	52	24	39	57	48	78	689

Total Number of Valid Hours: 689

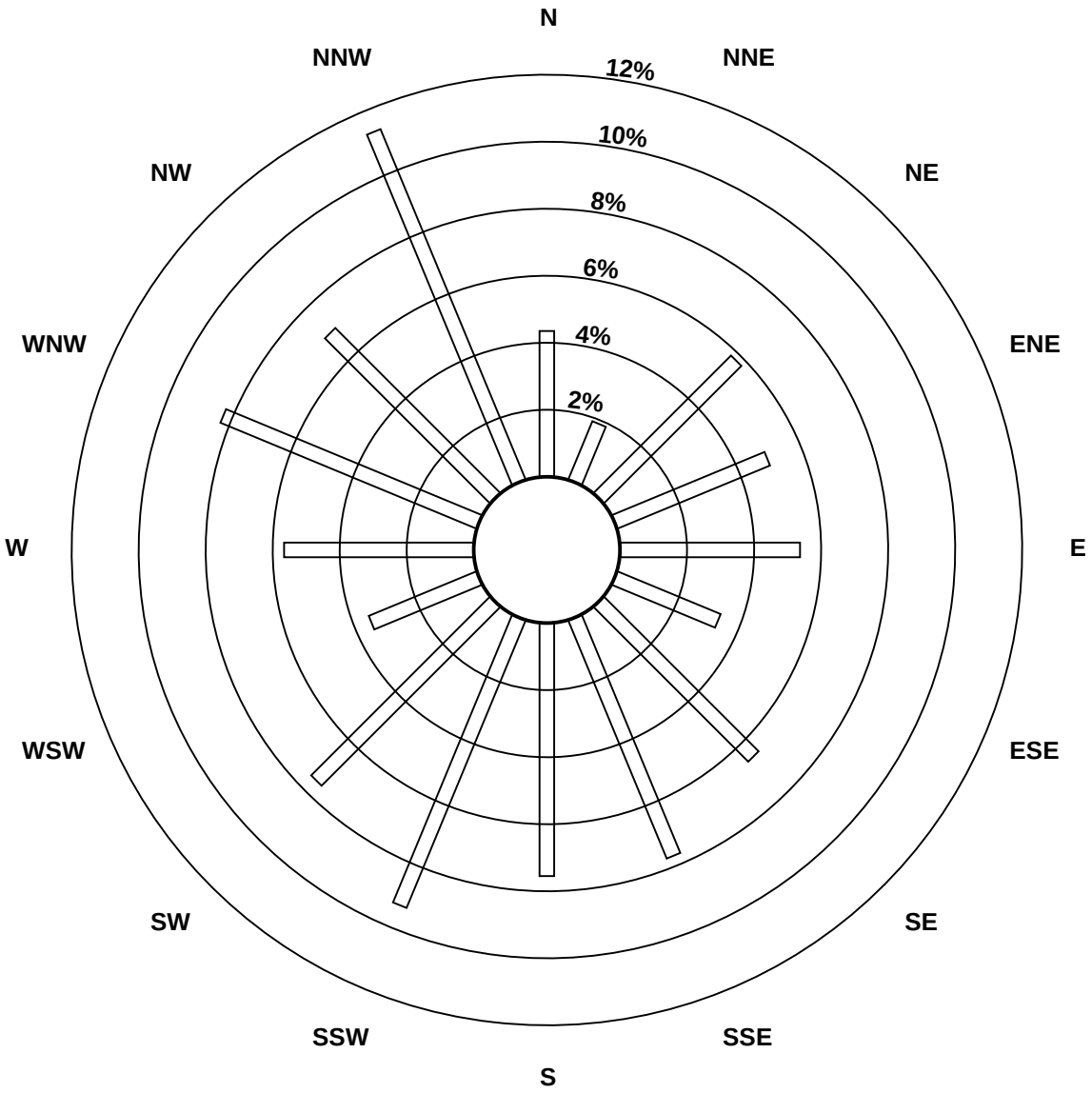
Total Number of Hours: 744

Wood Buffalo Environmental Association

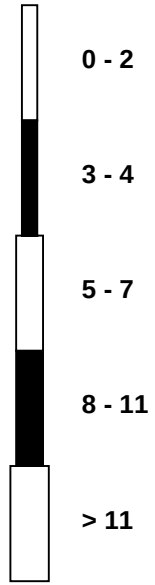
Wind Rose Mar 2016

Total Reduced Sulphur (TRS) - ppb

Conklin Lookout (AMS 18)



Classes (ppb)



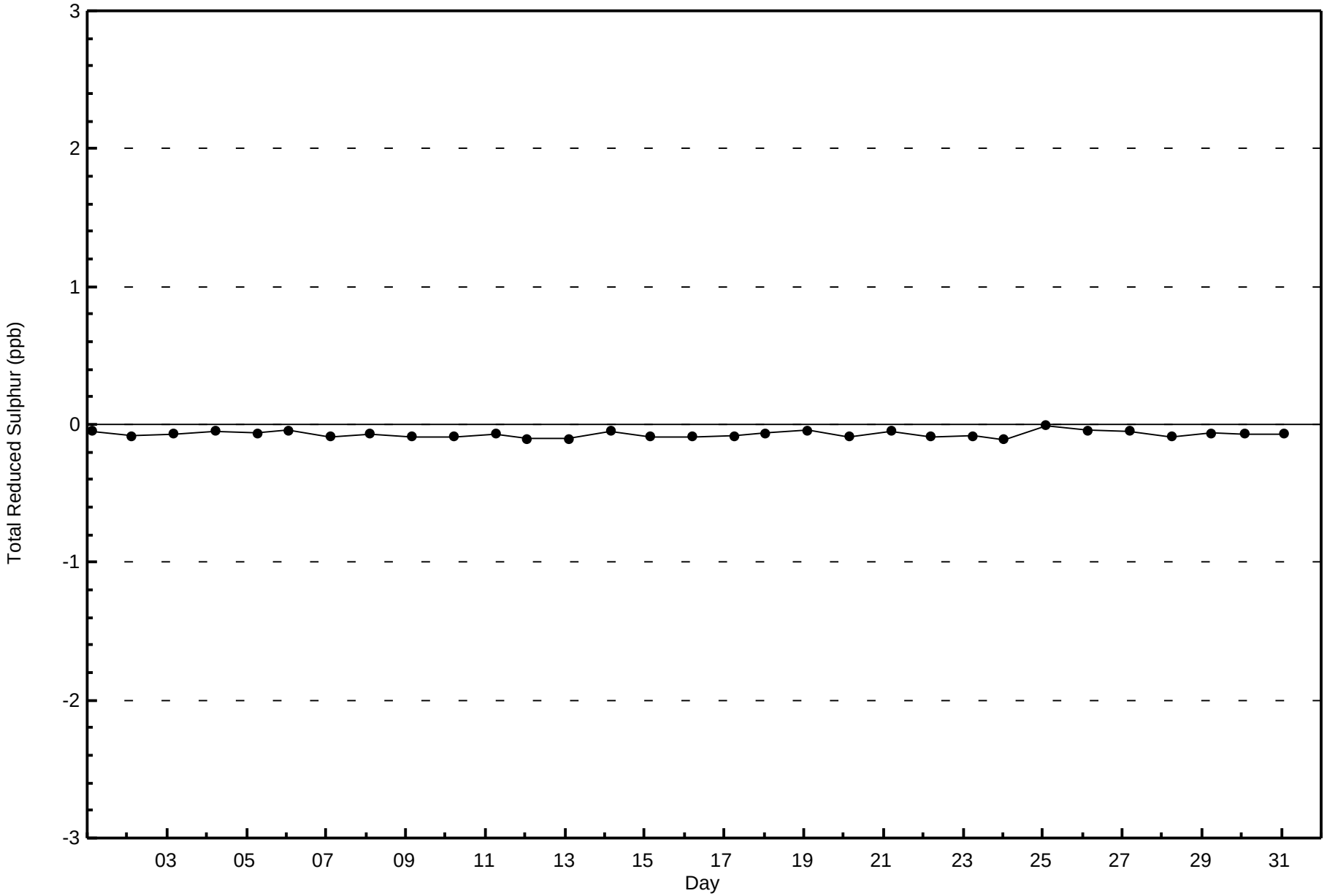
Total Number of Valid Hours: 689

Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

Conklin Lookout - March 2016

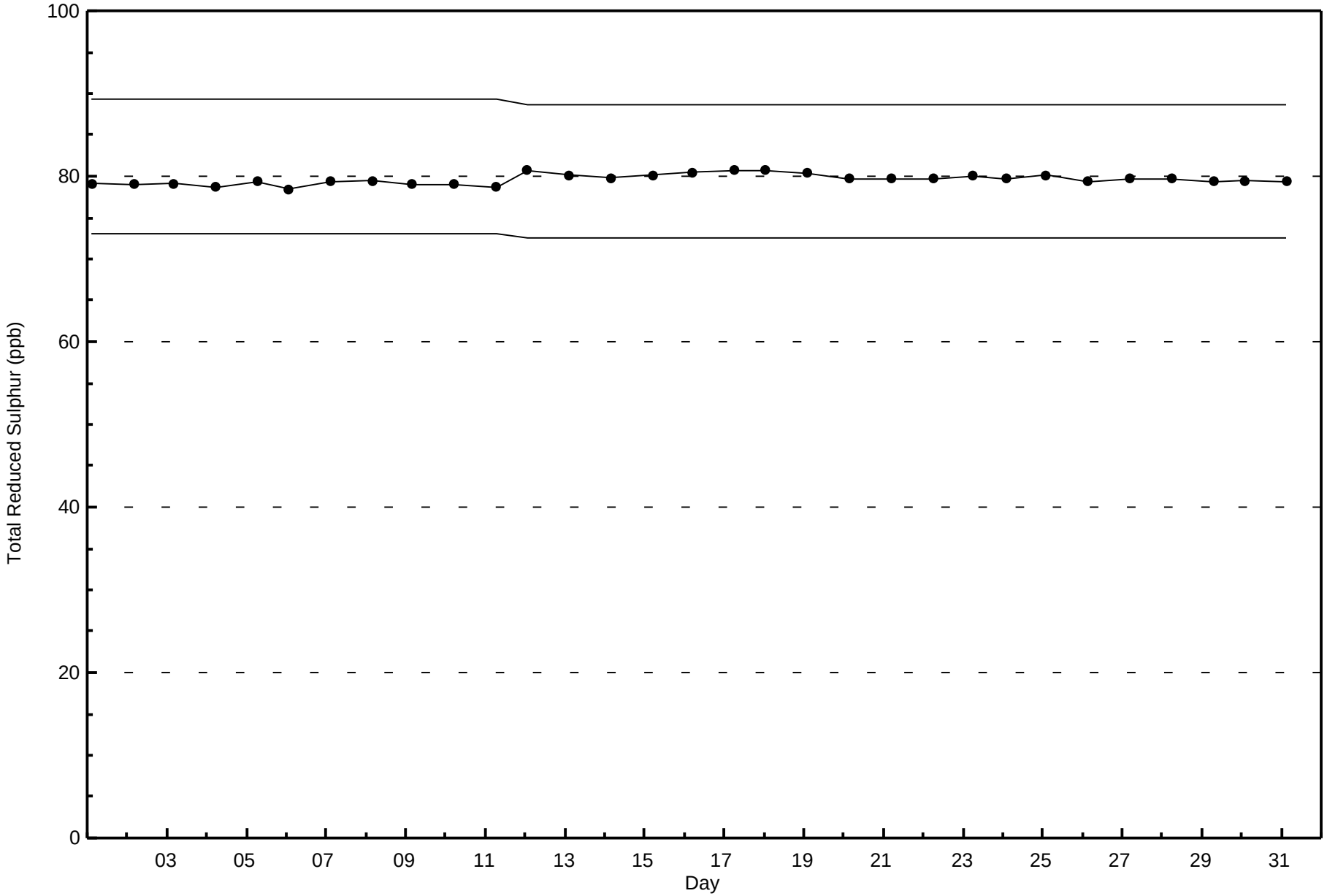


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

Conklin Lookout - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Conklin Lookout - March 2016

Maximum Value: 2.2 ppm on Mar 3 19:00

Maximum Daily Average: 2.1 ppm on Mar 3

Minimum Value: 1.9 ppm on Mar 12 15:00

Minimum Daily Average: 1.9 ppm on Mar 12

Maximum Diurnal Average: 2.0 ppm at hour 7

Minimum Diurnal Average: 2.0 ppm at hour 17

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} = 2.0 P_{99} = 2.1

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-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	2.0	2.0	2.0	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0
2-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
3-Mar	2.1	2.1	2.1	Z	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	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.1	2.2
4-Mar	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1
5-Mar	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1
6-Mar	Z	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	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
7-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
8-Mar	2.0	2.0	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
9-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	2.1	2.1	2.1	2.0	2.1
10-Mar	2.1	2.1	2.1	2.0	Z	2.1	2.1	2.0	C	C	C	C	C	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1
11-Mar	1.9	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	2.0	1.9	2.0
12-Mar	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
13-Mar	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0
14-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	1.9	2.0
15-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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
16-Mar	1.9	1.9	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
17-Mar	1.9	1.9	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	2.0	2.0	1.9	2.0
18-Mar	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	1.9	1.9	1.9	1.9	2.0
19-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
20-Mar	2.0	2.0	Z	2.1	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	1.9	2.0	2.1
21-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
22-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
23-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
24-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	1.9	1.9	1.9	1.9	1.9	1.9
25-Mar	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	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.1
26-Mar	1.9	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0
27-Mar	2.0	2.0	2.0	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0
28-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	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
29-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
30-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	1.9	1.9	1.9	1.9	1.9	1.9
31-Mar	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
	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	2.1	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	2.1	2.1	2.1	Diurnal Maximum	

Z - zerospan C - Calibration

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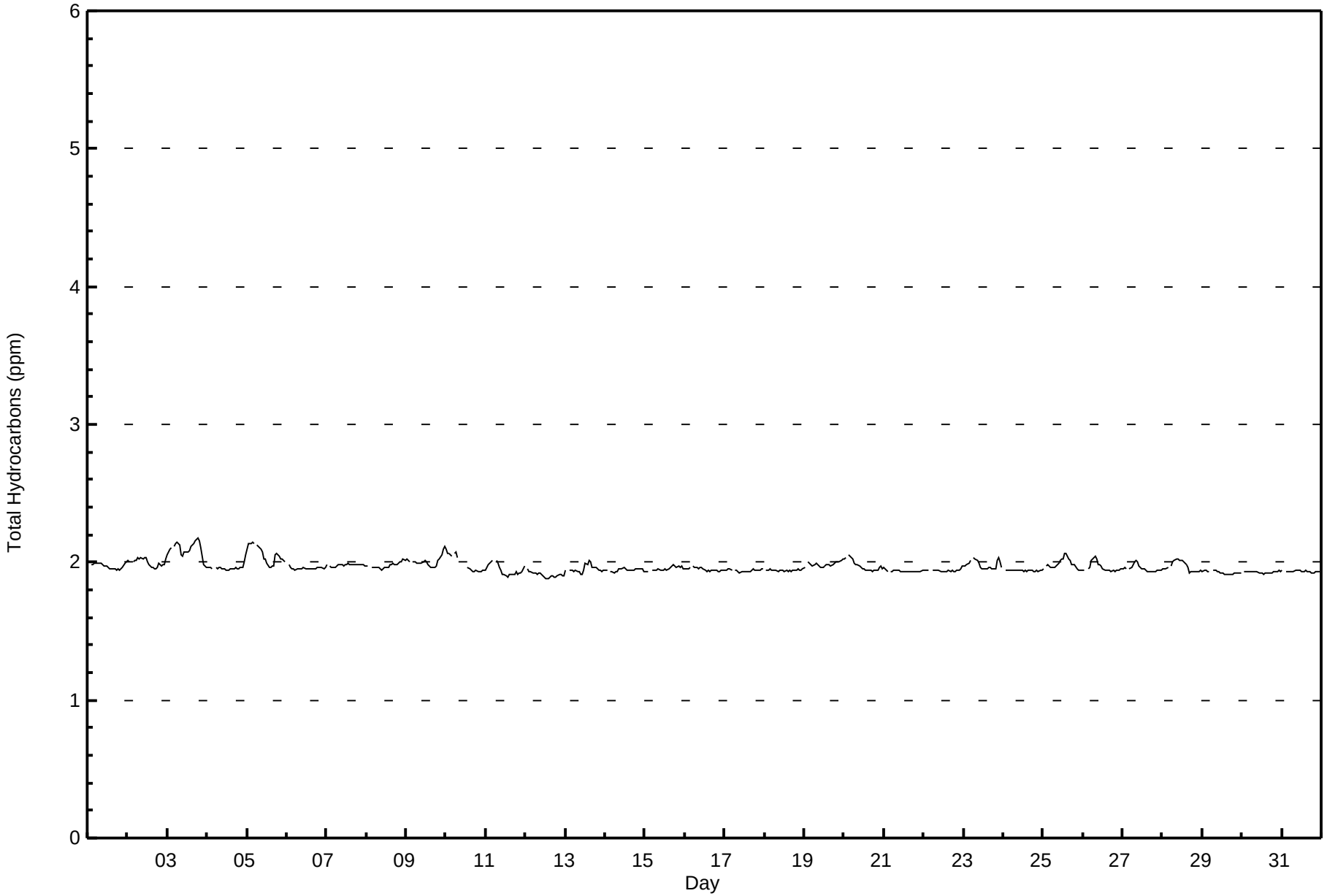
Hourly Averages

Total Hydrocarbons (THC) - ppm

Conklin Lookout - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Conklin Lookout - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	666	94.07	94.07
2.1 - 3.0	42	5.93	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

Conklin Lookout - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	30	14	38	34	35	25	38	48	40	54	45	25	37	58	46	78	645
2.1 - 3.0	0	0	2	0	0	1	0	6	12	8	8	0	2	1	1	1	42
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	30	14	40	34	35	26	38	54	52	62	53	25	39	59	47	79	687

Total Number of Valid Hours: 687

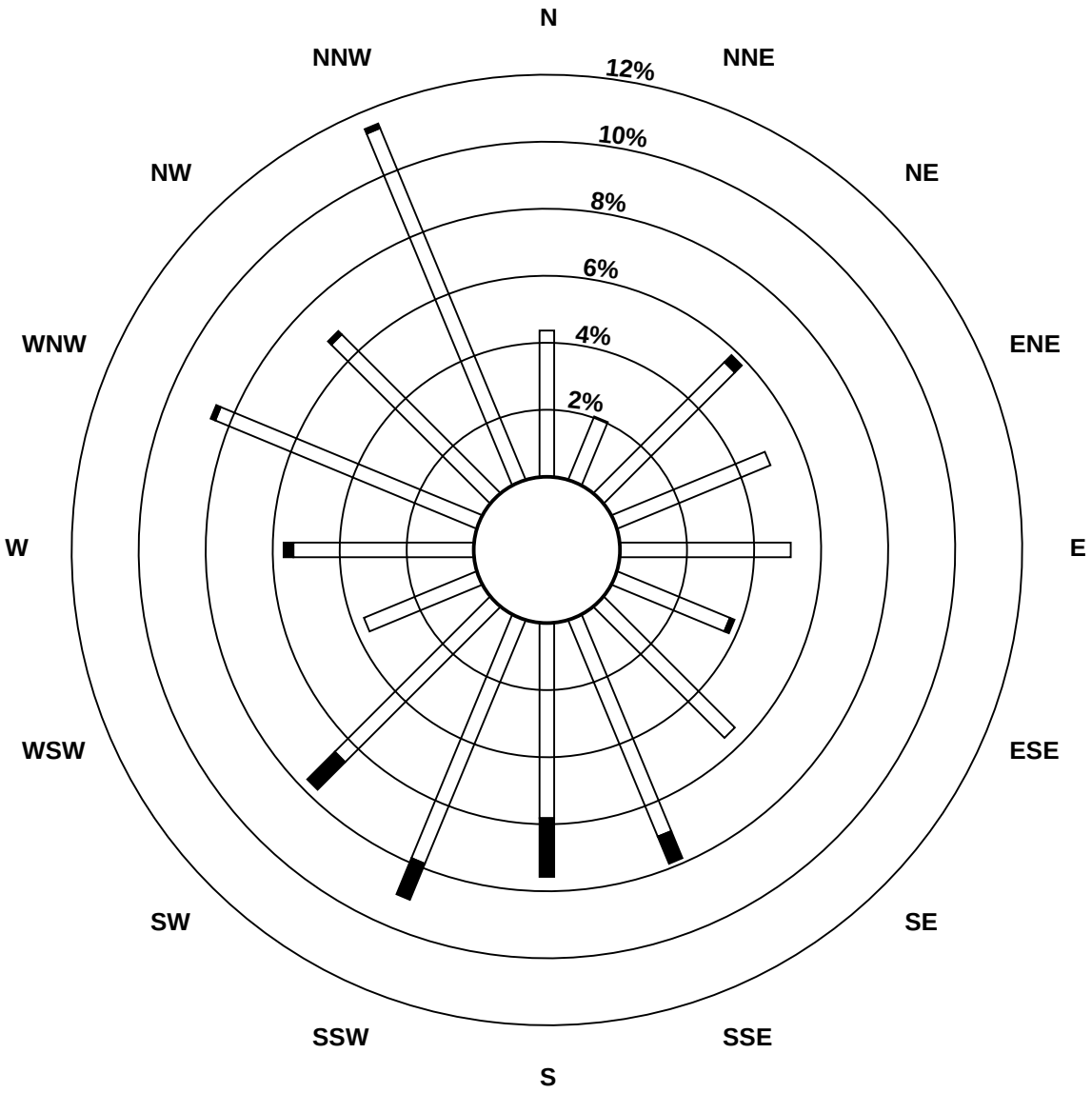
Total Number of Hours: 744

Wood Buffalo Environmental Association

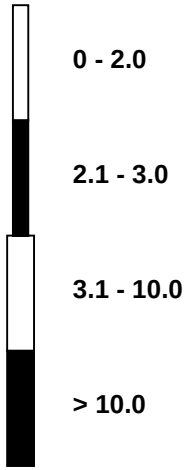
Wind Rose Mar 2016

Total Hydrocarbons (THC) - ppm

Conklin Lookout (AMS 18)



Classes (ppm)



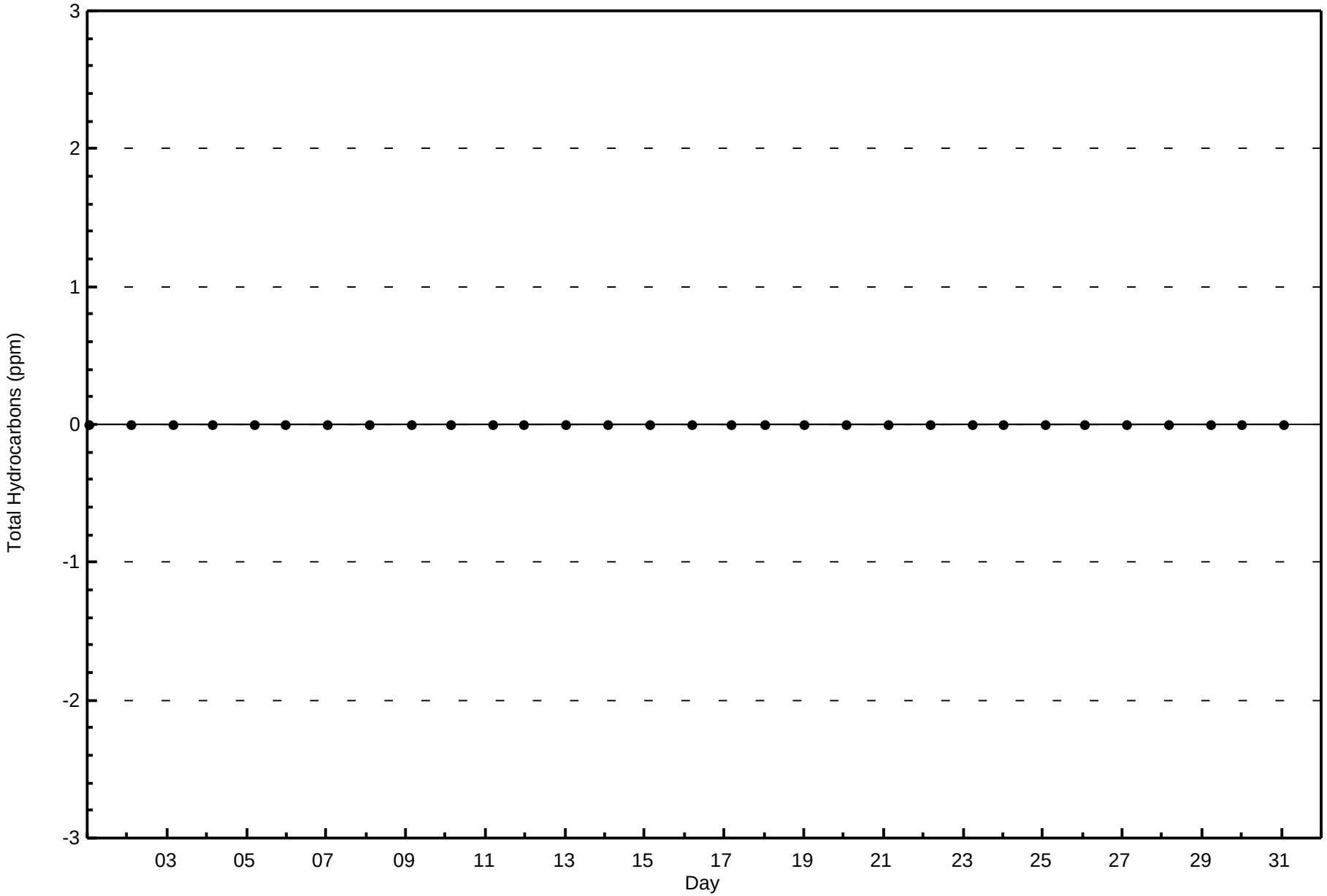
Total Number of Valid Hours: 687

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Conklin Lookout - March 2016

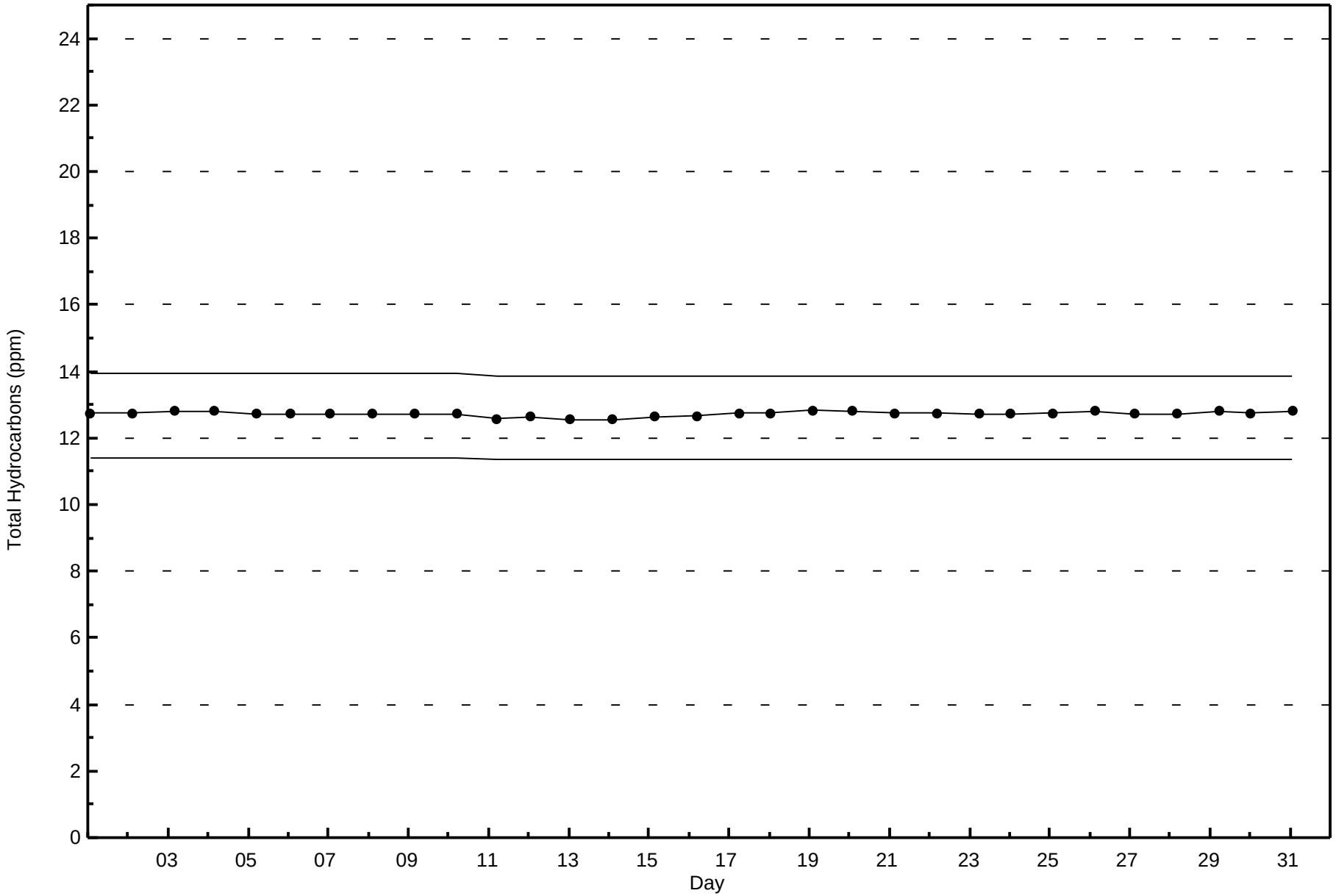


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Conklin Lookout - March 2016



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Summary of Hour Averages

Non Methane Hydrocarbons (NMHC) - ppm

Conklin Lookout - March 2016

Maximum Value: 0.061 ppm on Mar 23 22:00

Maximum Daily Average: 0.009 ppm on Mar 3

Minimum Value: 0.000 ppm on Mar 1 01:00

Minimum Daily Average: 0.000 ppm on Mar 24

Maximum Diurnal Average: 0.004 ppm at hour 21

Minimum Diurnal Average: 0.000 ppm at hour 13

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 in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0.000	Z	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.003	0.000	0.001	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	0.003
2-Mar	0.000	0.000	Z	0.000	0.000	0.000	0.010	0.000	0.000	0.002	0.002	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	0.001	0.010
3-Mar	0.000	0.000	0.000	Z	0.000	0.002	0.003	0.002	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.005	0.010	0.019	0.028	0.052	0.048	0.027	0.000	0.000	0.009	0.052
4-Mar	0.000	0.000	0.000	0.001	Z	0.003	0.000	0.007	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	0.007
5-Mar	0.002	0.007	0.007	0.010	0.011	Z	0.010	0.013	0.008	0.011	0.008	0.002	0.001	0.000	0.003	0.005	0.010	0.009	0.012	0.007	0.010	0.008	0.006	0.004	0.007	0.013
6-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
7-Mar	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.002	0.000	0.001	0.000	0.001	0.000	0.002	0.001	0.001	0.004	0.000	0.001	0.004
8-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	0.001	0.000	0.001	0.003	0.005	0.005	0.009	0.006	0.001	0.009
9-Mar	0.007	0.007	0.004	Z	0.003	0.001	0.002	0.001	0.001	0.001	0.002	0.005	0.007	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.001	0.002	0.007
10-Mar	0.000	0.002	0.002	0.002	Z	0.005	0.009	0.003	C	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.001	0.000	0.000	0.002	0.009
11-Mar	0.000	0.000	0.000	0.000	0.000	Z	0.007	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.020	0.000	0.000	0.000	0.002	0.026	0.003	0.026
12-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	0.006	0.000	0.000	0.003	0.000	0.006
13-Mar	0.009	Z	0.011	0.012	0.008	0.000	0.009	0.000	0.004	0.001	0.001	0.000	0.002	0.017	0.046	0.037	0.011	0.006	0.005	0.003	0.000	0.001	0.001	0.002	0.008	0.046
14-Mar	0.003	0.004	Z	0.002	0.000	0.001	0.005	0.000	0.003	0.006	0.003	0.007	0.001	0.001	0.004	0.003	0.001	0.001	0.001	0.002	0.001	0.000	0.000	0.000	0.002	0.007
15-Mar	0.000	0.000	0.001	Z	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.004	0.001	0.002	0.004	0.000	0.002	0.000	0.001	0.004
16-Mar	0.000	0.000	0.000	0.000	Z	0.009	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.009
17-Mar	0.001	0.001	0.002	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.002
18-Mar	Z	0.000	0.000	0.006	0.003	0.001	0.001	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	0.000	0.000	0.000	0.000	0.001	0.008
19-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
20-Mar	0.000	0.000	Z	0.007	0.005	0.001	0.000	0.000	0.005	0.000	0.001	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	0.001	0.007
21-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
22-Mar	0.000	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	0.001
23-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	0.001	0.000	0.000	0.001	0.001	0.000	0.000	0.034	0.061	0.034	0.002	0.006	0.061
24-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
25-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
26-Mar	0.000	0.000	Z	0.003	0.004	0.036	0.048	0.046	0.035	0.008	0.002	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.005	0.000	0.000	0.000	0.000	0.000	0.008	0.048
27-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
28-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
29-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
30-Mar	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
31-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
	0.001	0.001	0.001	0.002	0.001	0.002	0.004	0.003	0.002	0.001	0.001	0.001	0.000	0.001	0.002	0.002	0.001	0.001	0.002	0.002	0.004	0.003	0.002	0.001	Diurnal Average	
	0.009	0.007	0.011	0.012	0.011	0.036	0.048	0.046	0.035	0.011	0.008	0.007	0.007	0.017	0.046	0.037	0.011	0.019	0.028	0.052	0.048	0.061	0.034	0.026	Diurnal Maximum	

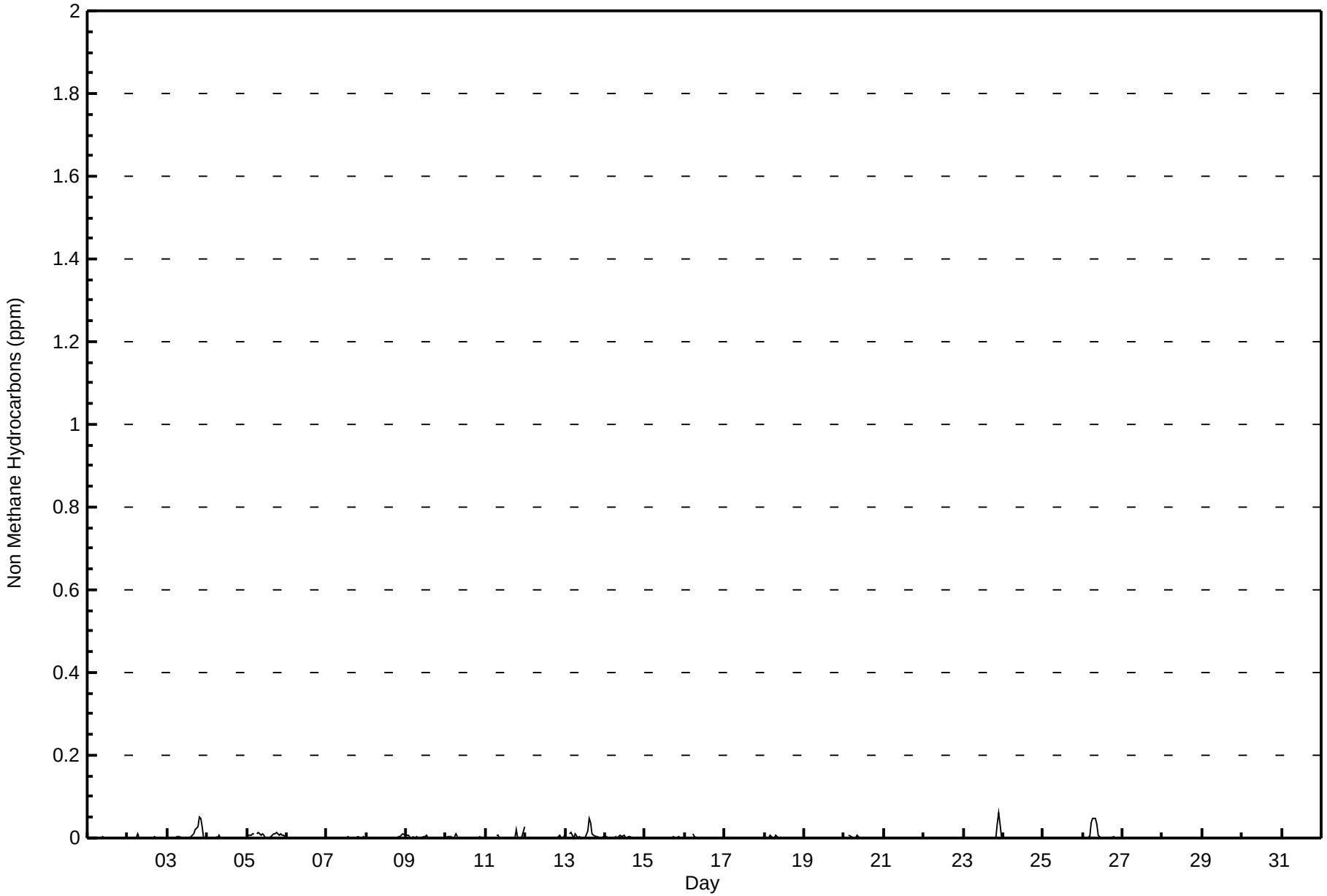
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm

Conklin Lookout - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Conklin Lookout - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	650	91.81	91.81
0.006 - 0.05	57	8.05	99.86
0.06 - 0.1	1	0.14	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm

Conklin Lookout - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 0.005	27	10	33	33	34	25	38	52	52	59	45	22	35	52	40	72	629
0.006 - 0.05	3	3	7	1	1	1	0	2	0	3	8	3	4	7	7	7	57
0.06 - 0.1	0	1	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	30	14	40	34	35	26	38	54	52	62	53	25	39	59	47	79	687

Total Number of Valid Hours: 687

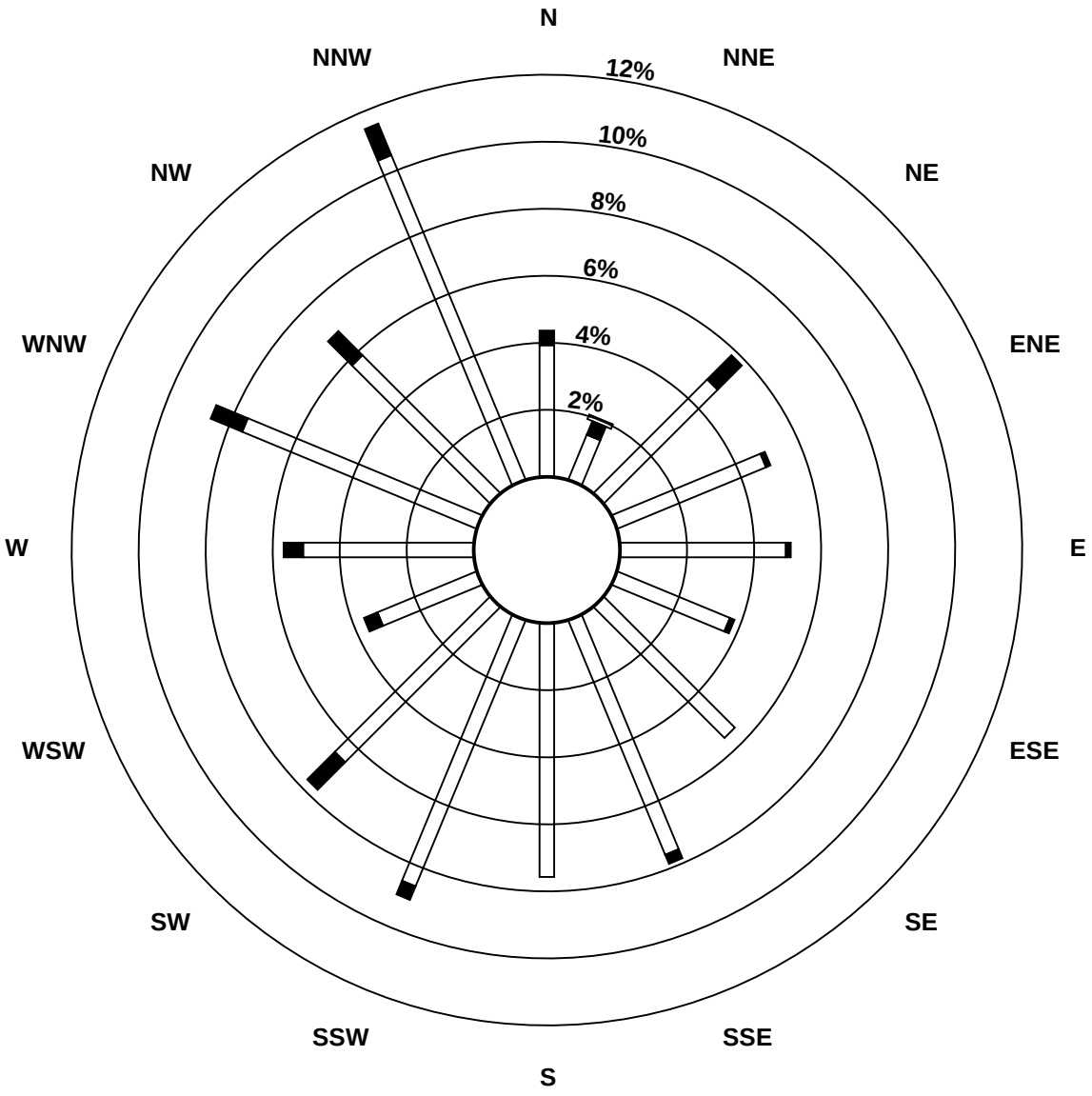
Total Number of Hours: 744

Wood Buffalo Environmental Association

Wind Rose Mar 2016

Non Methane Hydrocarbons (NMHC) - ppm

Conklin Lookout (AMS 18)



Classes (ppm)

0 - 0.005

0.006 - 0.05

0.06 - 0.1

> 0.1

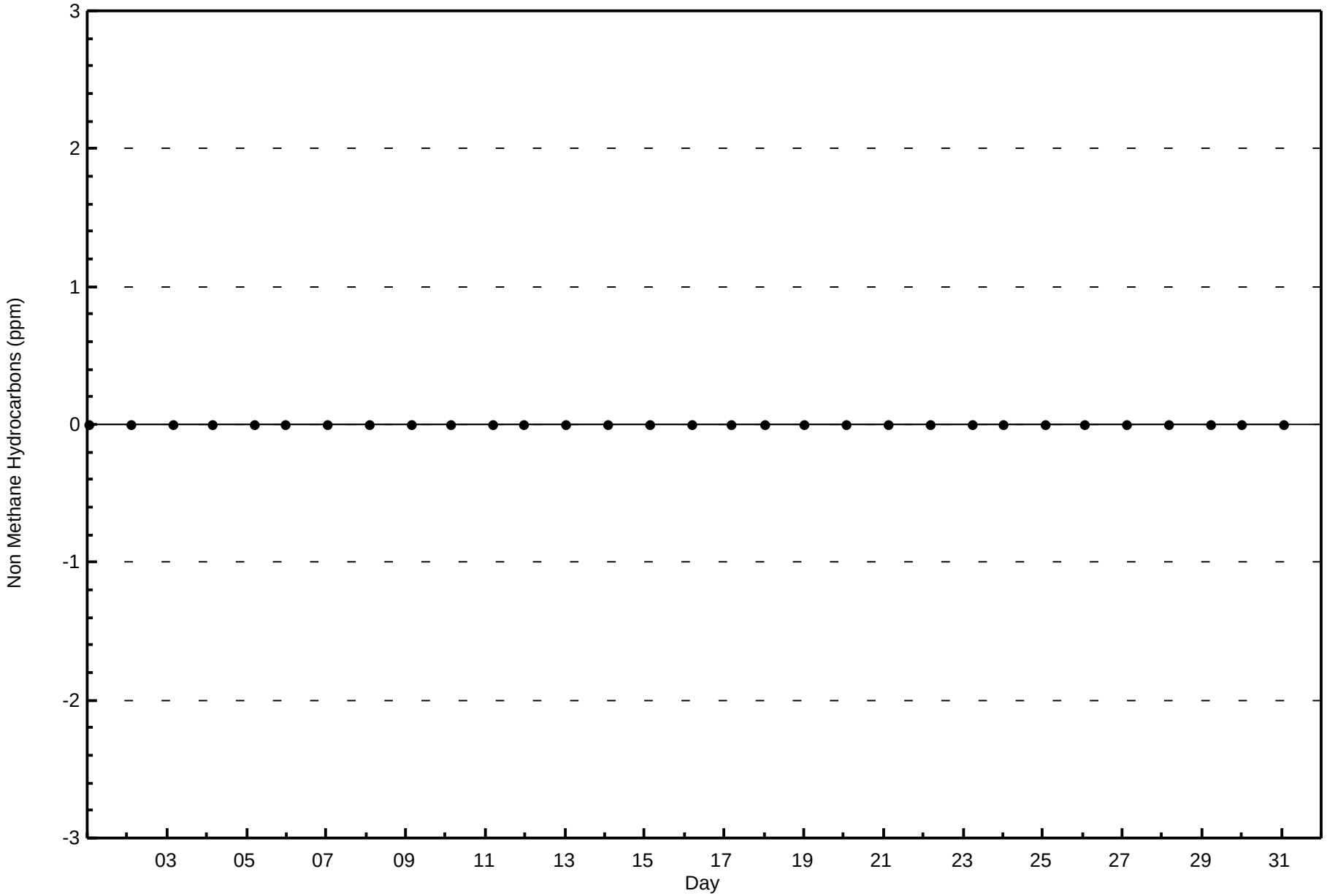
Total Number of Valid Hours: 687

Wood Buffalo Environmental Association

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

Conklin Lookout - March 2016

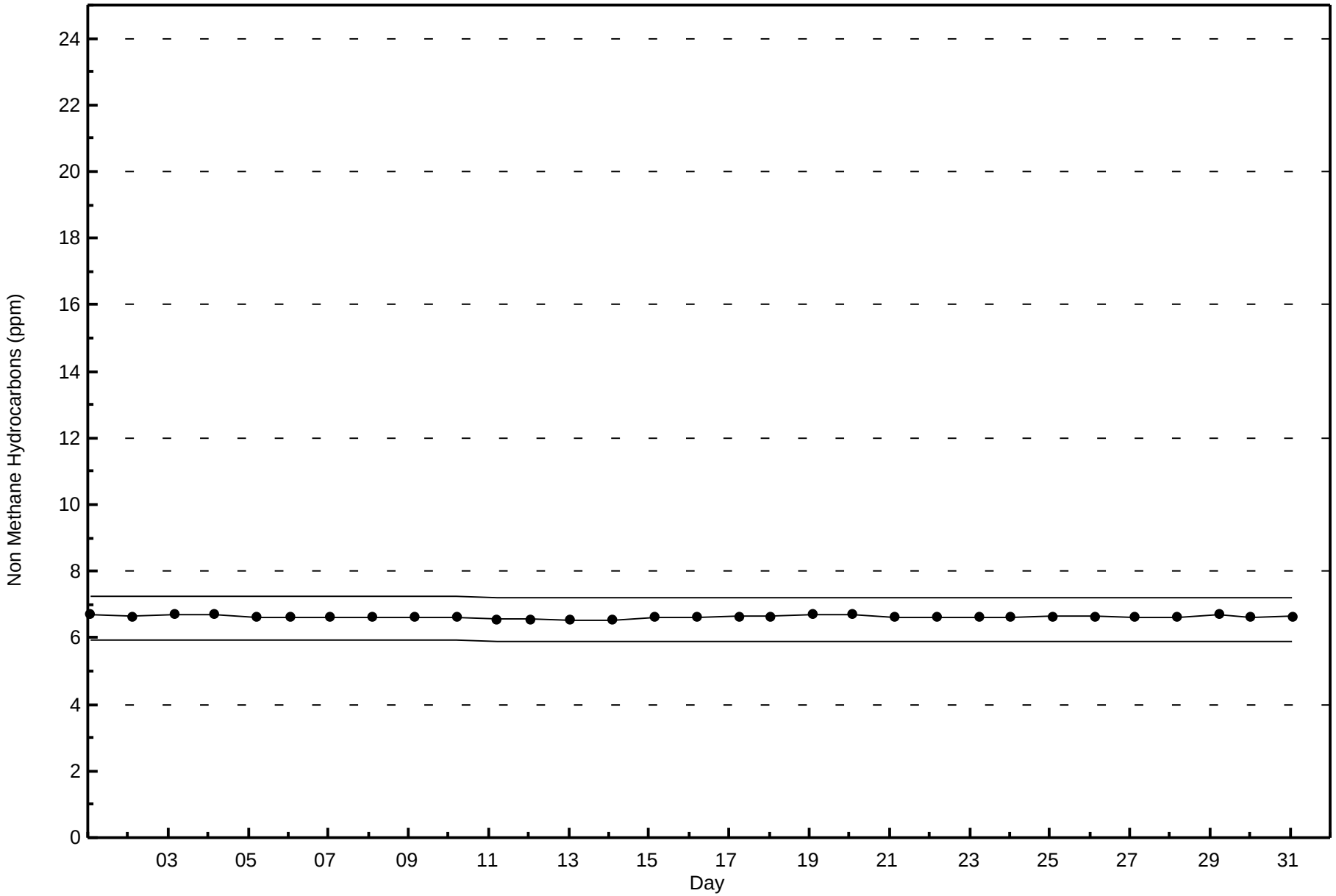


Wood Buffalo Environmental Association

Span Responses

Non Methane Hydrocarbons (NMHC) - ppm

Conklin Lookout - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH_4) - ppm

Conklin Lookout - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 2.2 ppm on Mar 3 19:00 Maximum Daily Average: 2.1 ppm on Mar 3

Minimum Value: 1.9 ppm on Mar 12 15:00 Minimum Daily Average: 1.9 ppm on Mar 12

Maximum Diurnal Average: 2.0 ppm at hour 7 Minimum Diurnal Average: 2.0 ppm at hour 17

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 in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-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	2.0	2.0	2.0	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0
2-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
3-Mar	2.1	2.1	2.1	Z	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	2.2	2.1	2.1	2.0	2.0	2.0	2.1	2.2
4-Mar	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1
5-Mar	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1
6-Mar	Z	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	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
7-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
8-Mar	2.0	2.0	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
9-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	2.1	2.1	2.1	2.0	2.1
10-Mar	2.1	2.1	2.1	2.0	Z	2.1	2.1	2.0	C	C	C	C	C	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1
11-Mar	1.9	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	2.0
12-Mar	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
13-Mar	1.9	Z	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	1.9	1.9	1.9	1.9	1.9	1.9	2.0
14-Mar	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	1.9	2.0
15-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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
16-Mar	1.9	1.9	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
17-Mar	1.9	1.9	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	2.0	2.0	1.9	2.0
18-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	1.9	1.9	1.9	1.9	1.9	1.9
19-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
20-Mar	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	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0
21-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
22-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
23-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
24-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	1.9	1.9	1.9	1.9	1.9	1.9
25-Mar	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	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.1
26-Mar	1.9	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0
27-Mar	2.0	2.0	2.0	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0
28-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	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
29-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
30-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	1.9	1.9	1.9	1.9	1.9	1.9
31-Mar	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
	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	2.1	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	2.1	2.1	Diurnal Maximum	

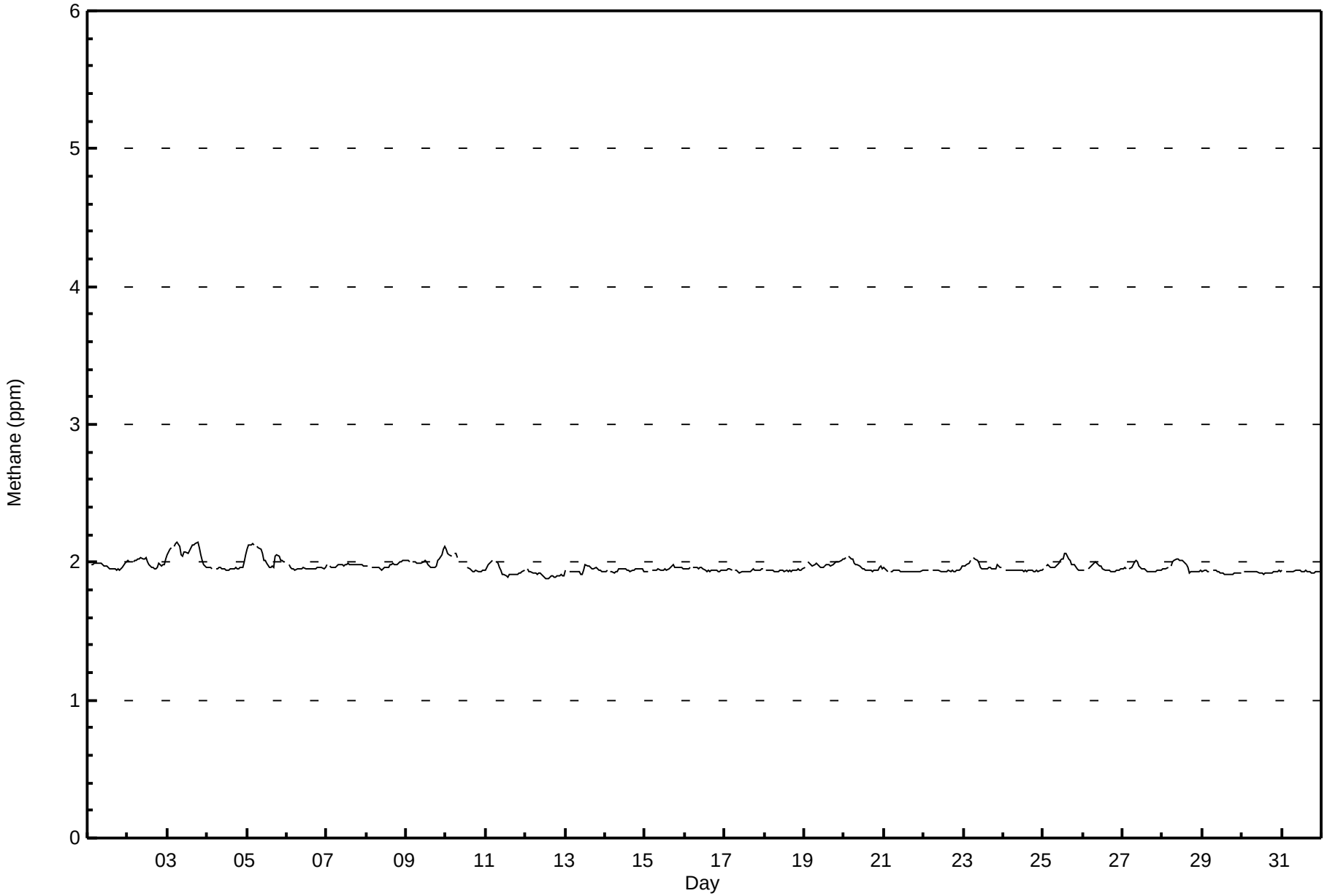
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Methane (CH_4) - ppm

Conklin Lookout - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Methane (CH_4) - ppm

Conklin Lookout - March 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	668	94.35	94.35
2.1 - 3.0	40	5.65	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Methane (CH_4) - ppm

Conklin Lookout - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	30	14	39	34	35	26	38	48	40	54	45	25	37	58	46	78	647
2.1 - 3.0	0	0	1	0	0	0	0	6	12	8	8	0	2	1	1	1	40
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	30	14	40	34	35	26	38	54	52	62	53	25	39	59	47	79	687

Total Number of Valid Hours: 687

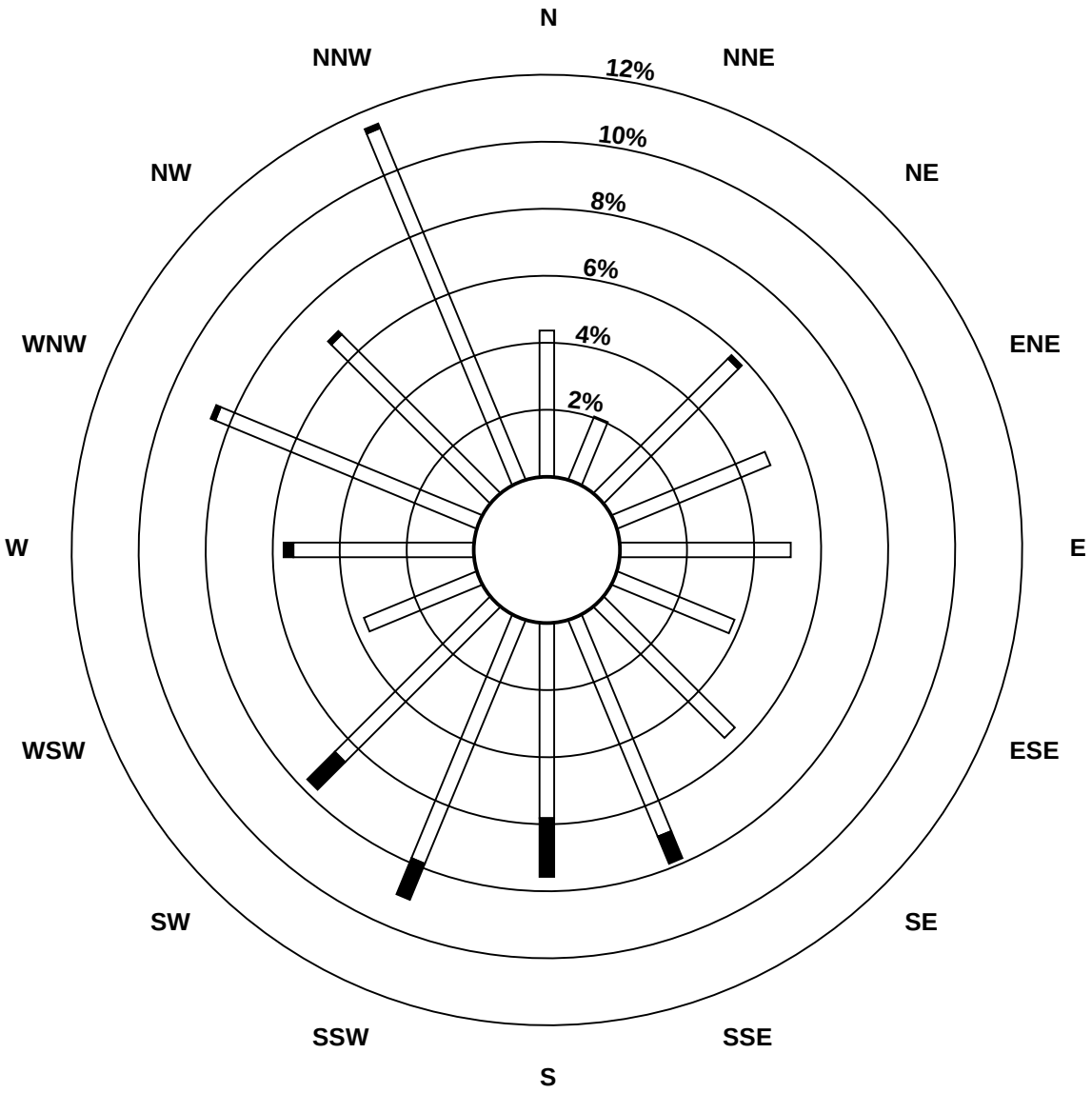
Total Number of Hours: 744

Wood Buffalo Environmental Association

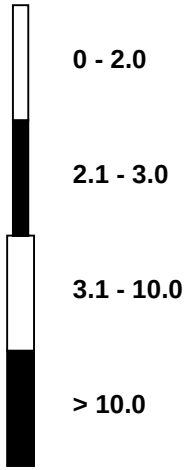
Wind Rose Mar 2016

Methane (CH_4) - ppm

Conklin Lookout (AMS 18)



Classes (ppm)



0 - 2.0

2.1 - 3.0

3.1 - 10.0

> 10.0

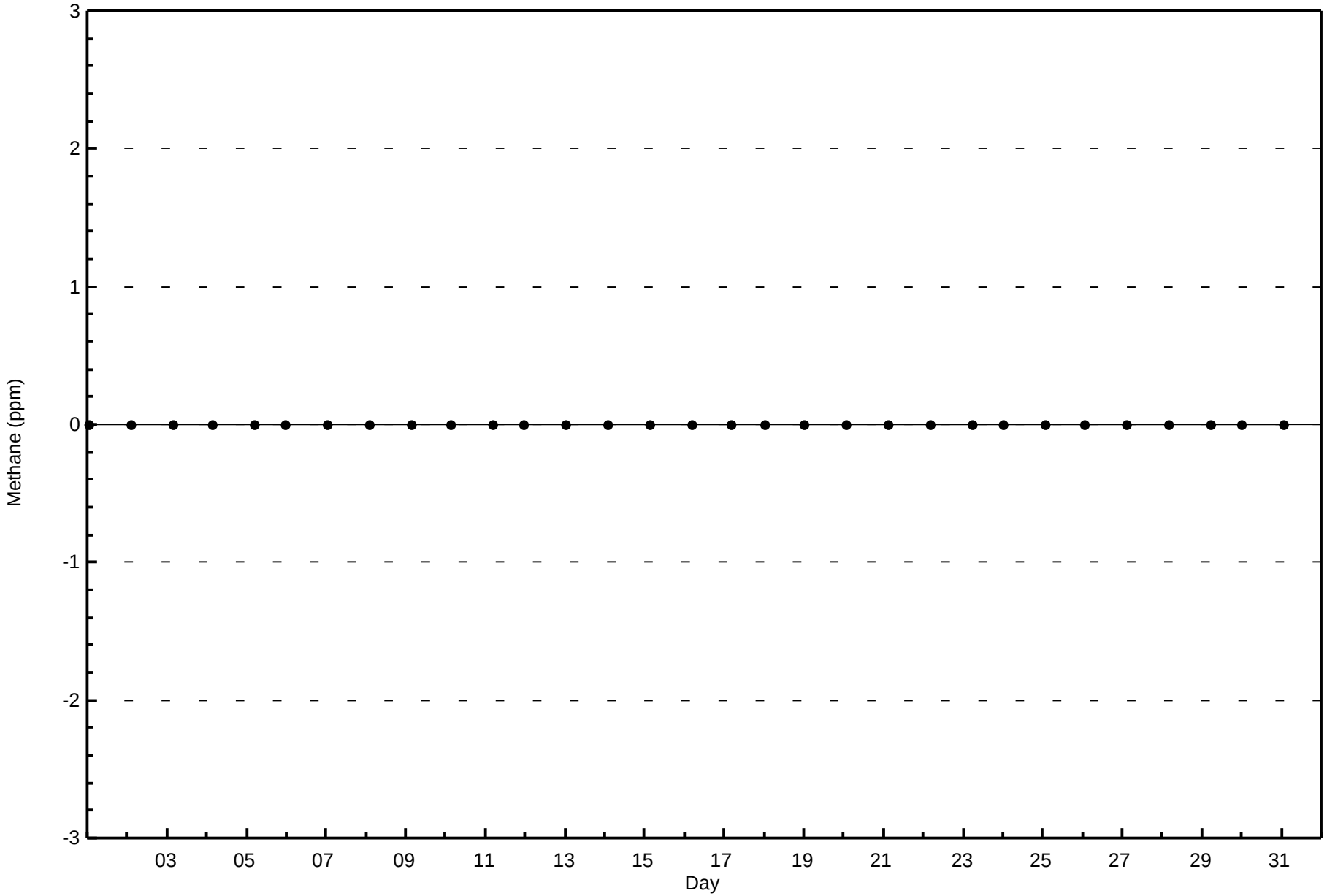
Total Number of Valid Hours: 687

Wood Buffalo Environmental Association

Zero Responses

Methane (CH_4) - ppm

Conklin Lookout - March 2016

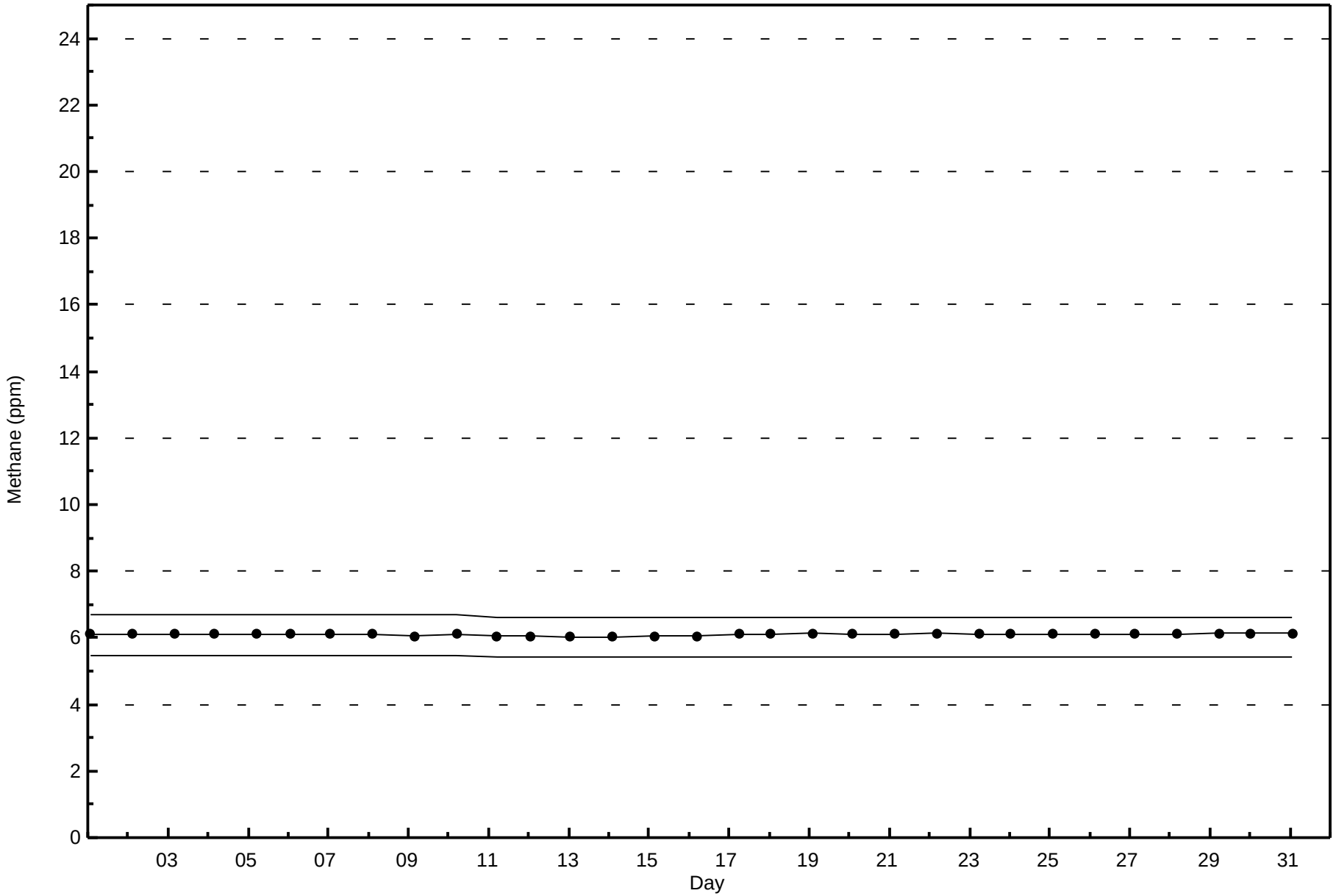


Wood Buffalo Environmental Association

Span Responses

Methane (CH_4) - ppm

Conklin Lookout - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Conklin Lookout - March 2016

Maximum Value: 2 ppb on Mar 11 10:00

Maximum Daily Average: 0.8 ppb on Mar 6

Minimum Value: 0 ppb on Mar 31 23:00

Minimum Daily Average: 0.1 ppb on Mar 17

Maximum Diurnal Average: 0.5 ppb at hour 10

Minimum Diurnal Average: 0.2 ppb at hour 1

Monthly Average: 0.3 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 1$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1
2-Mar	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
3-Mar	0	0	0	Z	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1	1	1	0	0	0	0.4	1
4-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	0.4	1
5-Mar	0	0	0	0	0	Z	0	1	1	1	1	1	0	0	0	0	0	0	1	1	1	2	2	2	0.6	2
6-Mar	Z	2	2	1	1	1	1	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	2
7-Mar	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.7	1
8-Mar	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	1
9-Mar	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0.6	1
10-Mar	0	0	1	1	Z	1	1	1	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.3	1
11-Mar	0	0	0	0	0	Z	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
12-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
13-Mar	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1
14-Mar	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0.3	1
15-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
16-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	0.3	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	0	0	0.1	0
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	0	Z	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
20-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
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	0.1	0
22-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	0.1	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	0.1	0
24-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
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	0.1	0
26-Mar	0	0	Z	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	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	0.1	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	0.1	0
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	0.1	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	0.1	0
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average	
	1	2	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	Diurnal Maximum	

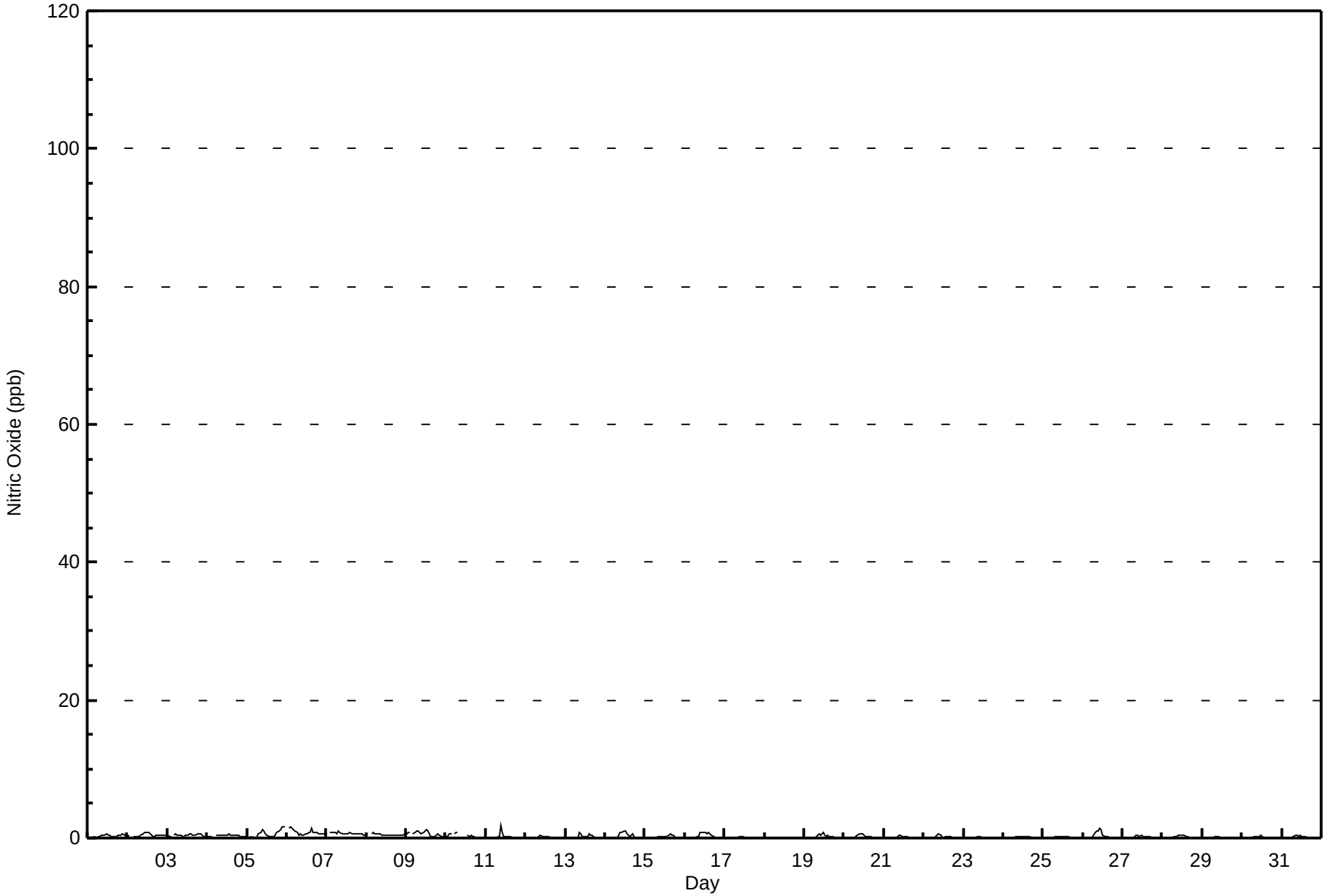
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Conklin Lookout - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	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: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitric Oxide (NO) - ppb

Conklin Lookout - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	30	14	40	34	35	26	38	54	52	62	53	25	39	59	47	79	687
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	30	14	40	34	35	26	38	54	52	62	53	25	39	59	47	79	687

Total Number of Valid Hours: 687

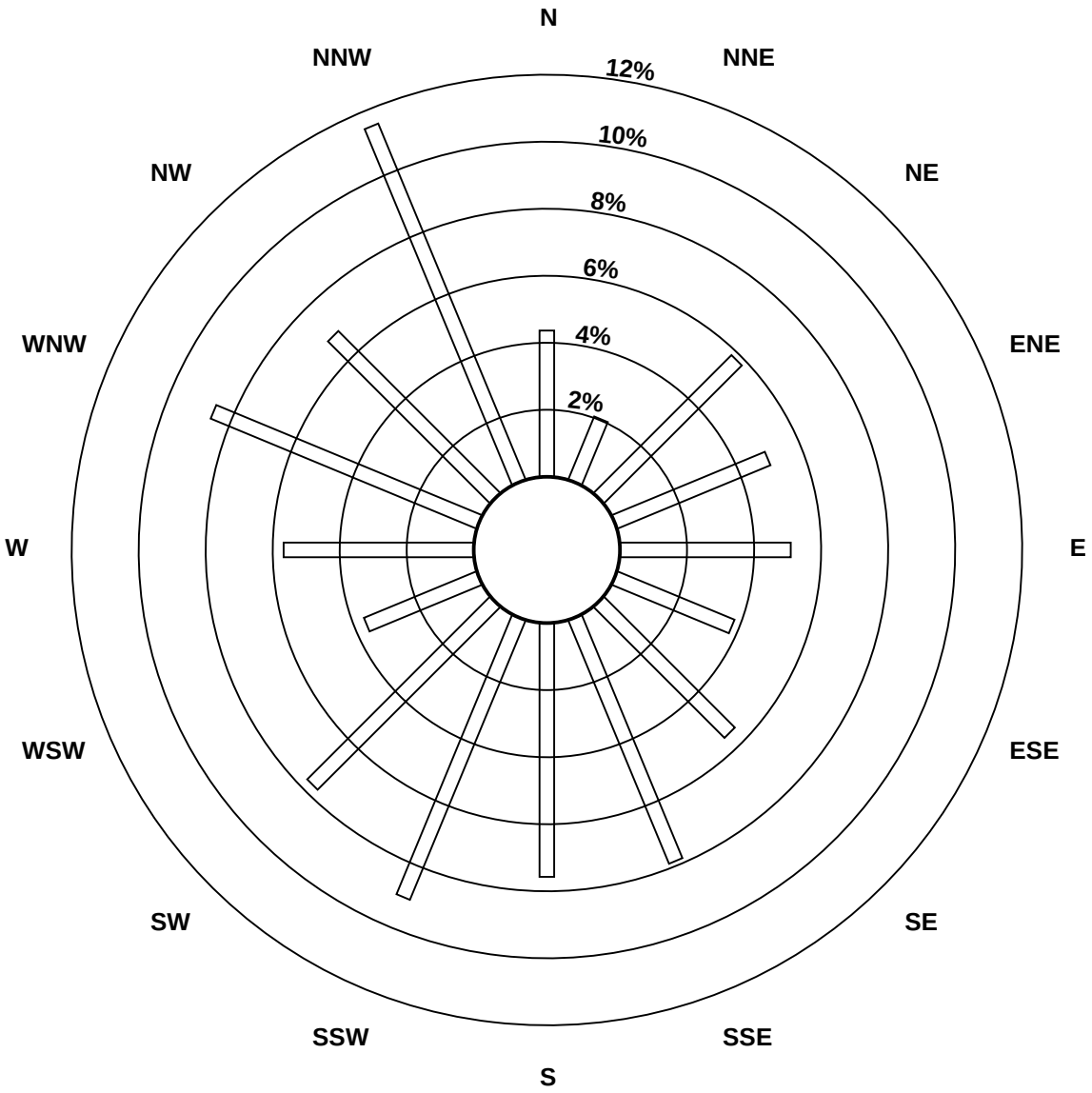
Total Number of Hours: 744

Wood Buffalo Environmental Association

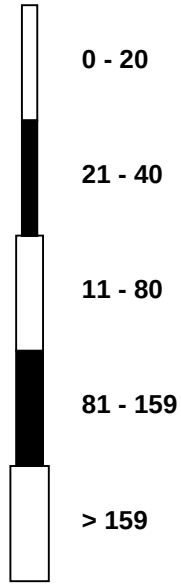
Wind Rose Mar 2016

Nitric Oxide (NO) - ppb

Conklin Lookout (AMS 18)



Classes (ppb)



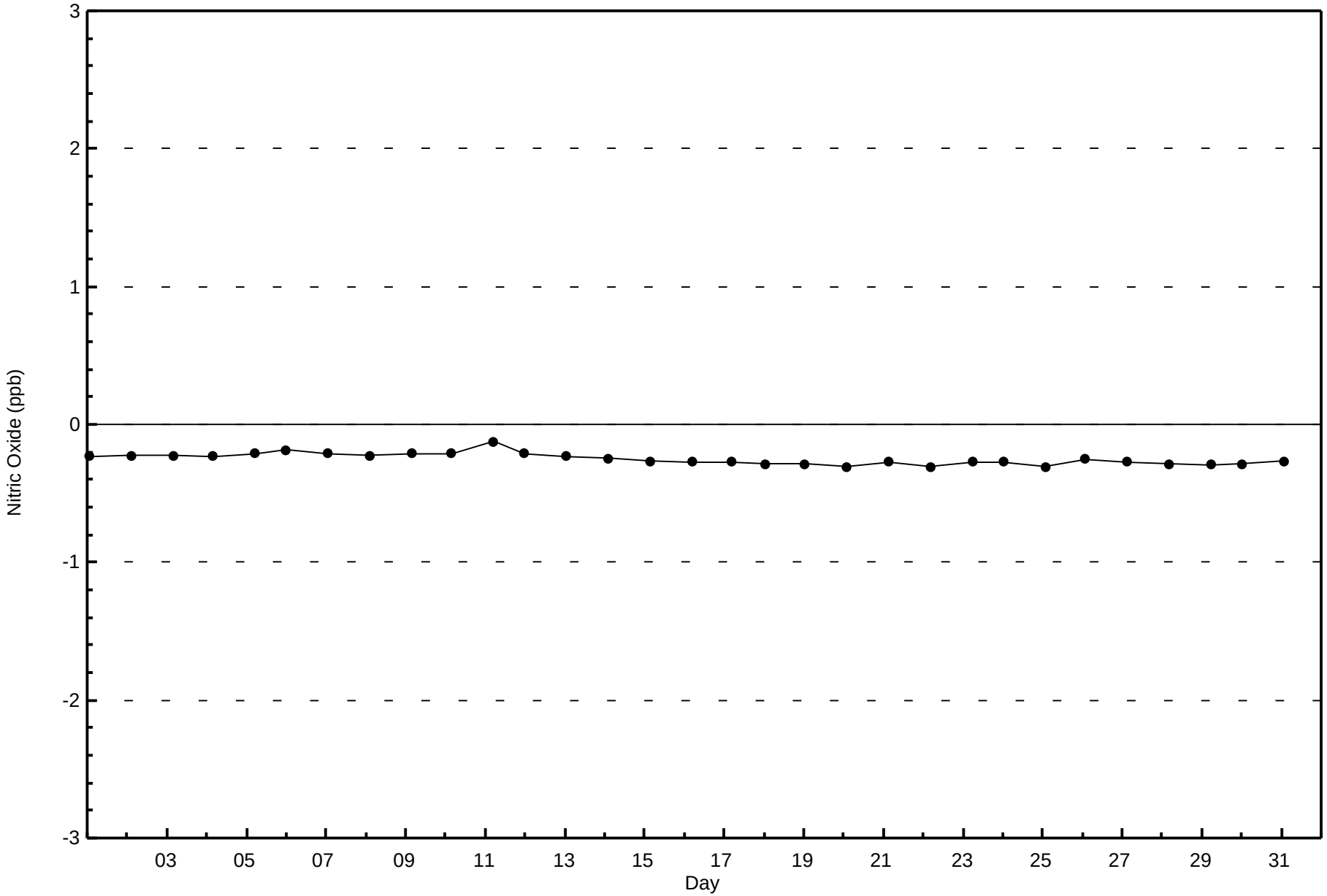
Total Number of Valid Hours: 687

Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Conklin Lookout - March 2016

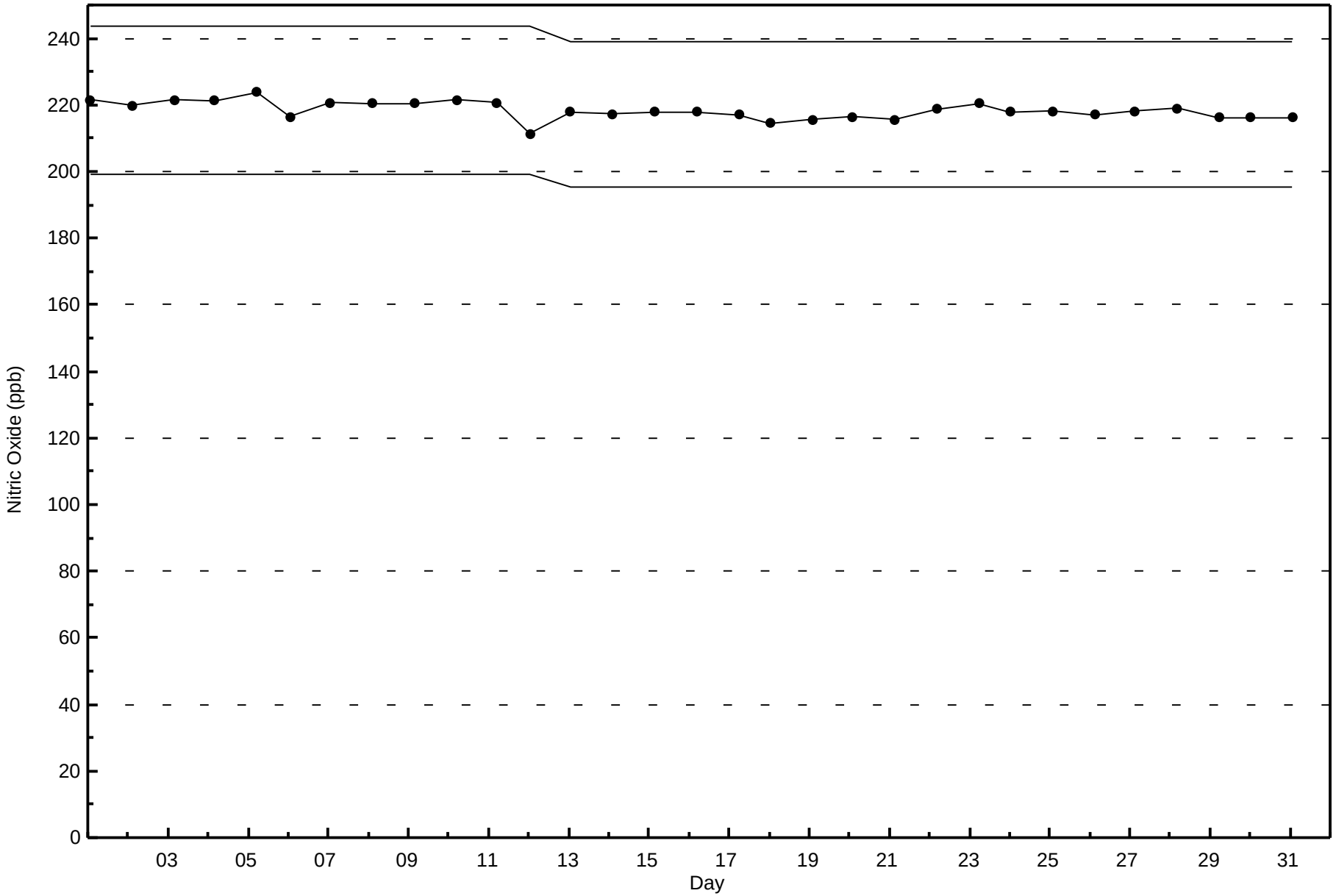


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Conklin Lookout - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Conklin Lookout - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 12 ppb on Mar 3 21:00

Maximum Daily Average: 5.9 ppb on Mar 6

Minimum Value: 0 ppb on Mar 18 10:00

Minimum Daily Average: 0.6 ppb on Mar 18

Maximum Diurnal Average: 2.8 ppb at hour 21

Minimum Diurnal Average: 1.8 ppb at hour 17

Monthly Average: 2.2 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 1 $Q_3 = 3$ $P_{90} = 5$ $P_{99} = 9$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	2	Z	2	2	2	2	2	2	3	3	4	5	4	3	2	2	3	3	5	6	6	7	6	4	3.5	7
2-Mar	3	2	Z	2	2	2	2	2	2	3	4	5	6	5	3	2	2	3	4	5	5	5	6	4	3.3	6
3-Mar	3	3	3	Z	4	5	6	6	4	3	2	2	3	5	5	5	4	5	6	10	12	9	4	3	4.8	12
4-Mar	2	2	3	2	Z	2	2	2	3	3	2	3	3	4	3	4	3	4	5	6	5	3	2	3	3.1	6
5-Mar	3	3	3	2	3	Z	3	4	4	5	6	4	3	2	1	1	2	4	7	8	8	9	9	9	4.4	9
6-Mar	Z	9	9	9	8	8	7	5	4	4	4	4	5	6	6	6	7	7	6	6	5	5	4	4	5.9	9
7-Mar	5	Z	6	6	6	6	6	7	7	6	6	5	6	6	6	6	6	6	6	6	6	6	5	5	5.8	7
8-Mar	5	4	Z	5	5	4	4	4	4	3	2	2	2	2	3	3	4	4	5	5	6	5	6	7	4.1	7
9-Mar	8	9	8	Z	7	7	7	7	6	5	5	6	6	6	4	2	2	2	3	5	5	4	3	3	5.2	9
10-Mar	3	3	4	5	Z	6	6	6	C	C	C	C	C	1	2	2	1	1	1	1	2	1	1	1	2.7	6
11-Mar	1	2	2	2	2	Z	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1.1	2
12-Mar	Z	4	1	1	1	1	2	1	2	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1.3	4
13-Mar	2	Z	1	2	2	1	2	1	3	2	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1.5	3
14-Mar	1	1	Z	1	1	2	1	1	2	2	2	3	3	2	2	2	3	3	3	3	3	3	3	1	1.9	3
15-Mar	1	1	1	Z	1	0	1	1	1	1	1	1	1	1	1	2	3	4	4	3	7	5	4	4	2.0	7
16-Mar	3	2	2	3	Z	3	4	3	3	4	3	3	3	2	3	2	3	4	5	3	2	1	2	3	2.9	5
17-Mar	2	2	2	1	1	Z	1	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1	1	1	0.8	2
18-Mar	Z	1	1	1	0	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
19-Mar	1	Z	2	2	2	1	1	1	2	2	2	2	2	1	2	1	1	2	3	2	1	1	1	1	1.6	3
20-Mar	1	1	Z	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1.1	2
21-Mar	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	1	1	0.7	1
22-Mar	1	1	1	0	Z	0	1	1	1	2	1	0	0	1	1	1	1	1	1	1	1	1	1	1	0.8	2
23-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	0	1	1	1	1	1	1	3	4	4	4	1.2	4
24-Mar	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	0.9	2
25-Mar	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1.0	2
26-Mar	1	1	Z	1	2	3	4	5	4	4	3	3	2	2	2	1	1	1	1	1	1	2	2	2	2.0	5
27-Mar	2	2	2	Z	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	4	2	2	1.7	4
28-Mar	1	1	1	1	Z	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1.2	2
29-Mar	1	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0.6	1
30-Mar	Z	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0	0	1	1	1	1	1	1	1	0.7	1
31-Mar	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	0.8	2
	2.2	2.3	2.3	2.1	2.2	2.5	2.5	2.3	2.2	2.2	2.0	2.1	2.0	1.9	1.9	1.8	1.8	2.0	2.4	2.6	2.8	2.7	2.5	2.3	Diurnal Average	
	8	9	9	9	8	8	7	7	7	6	6	6	6	6	6	6	7	7	7	10	12	9	9	9	Diurnal Maximum	

Z - zerospan C - Calibration

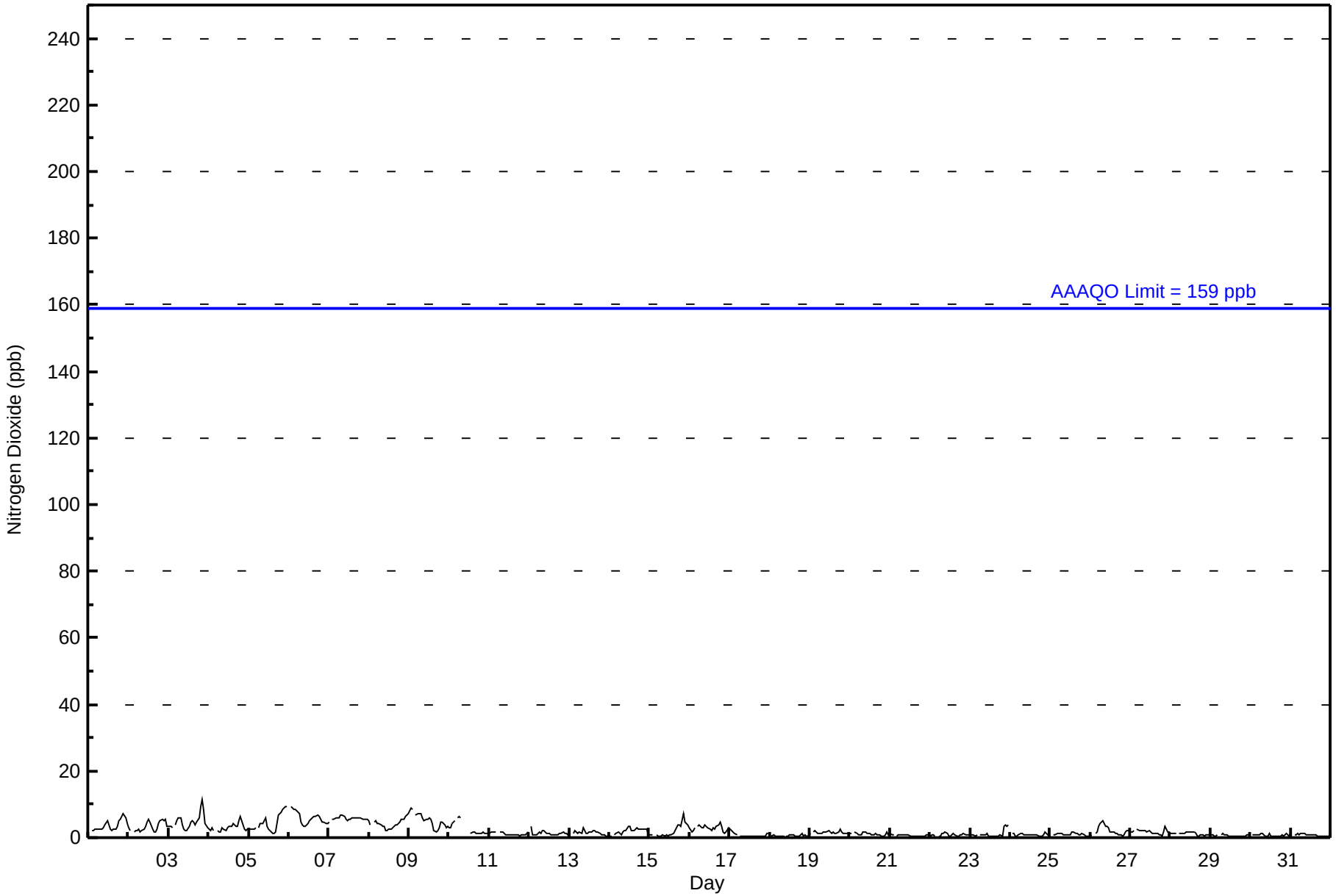
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Conklin Lookout - March 2016



Nitrogen Dioxide (NO_2) - ppb
Conklin Lookout - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	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: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Conklin Lookout - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	30	14	40	34	35	26	38	54	52	62	53	25	39	59	47	79	687
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	30	14	40	34	35	26	38	54	52	62	53	25	39	59	47	79	687

Total Number of Valid Hours: 687

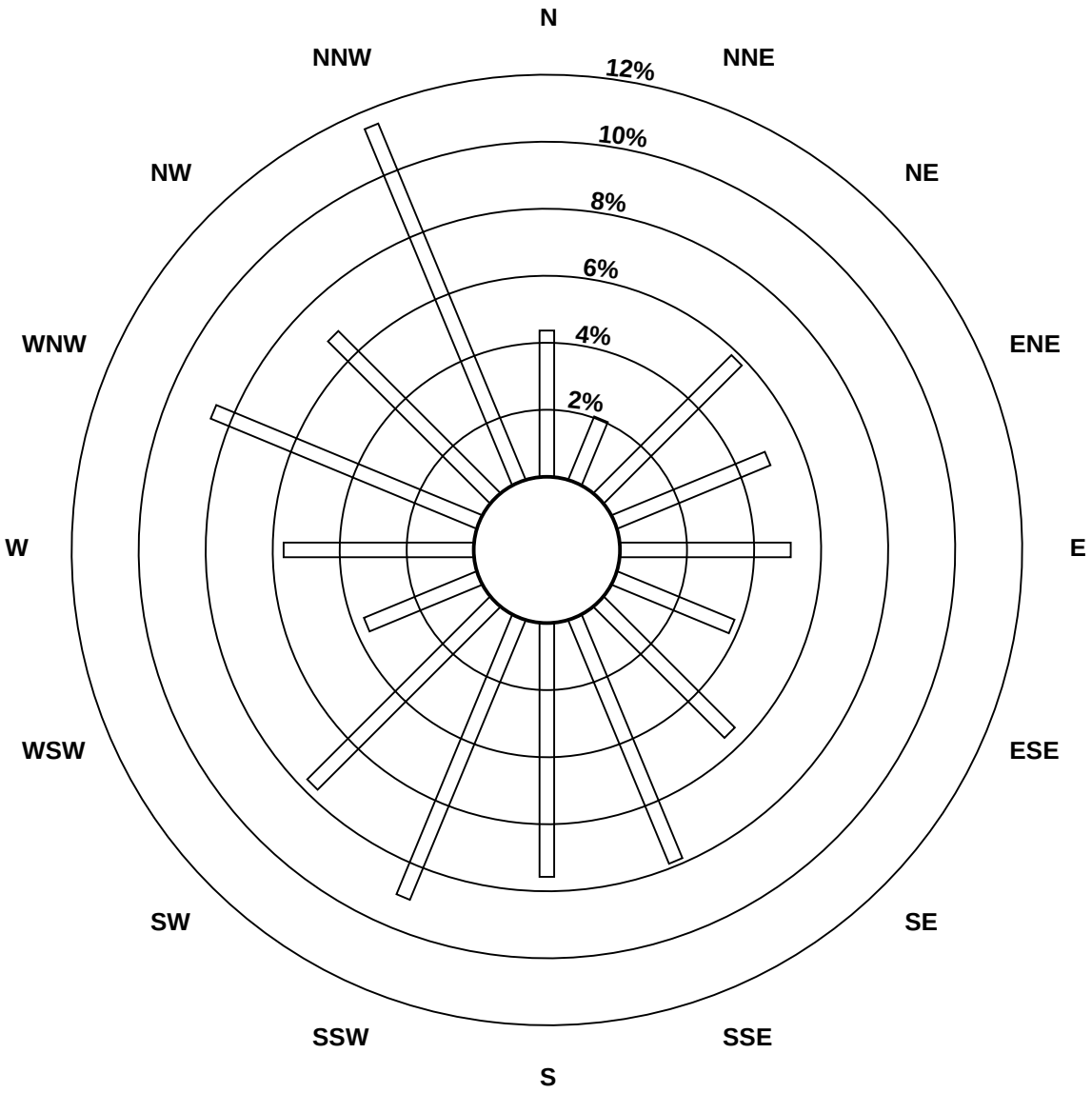
Total Number of Hours: 744

Wood Buffalo Environmental Association

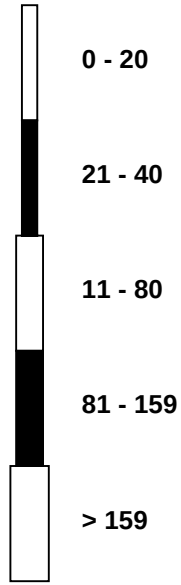
Wind Rose Mar 2016

Nitrogen Dioxide (NO_2) - ppb

Conklin Lookout (AMS 18)



Classes (ppb)



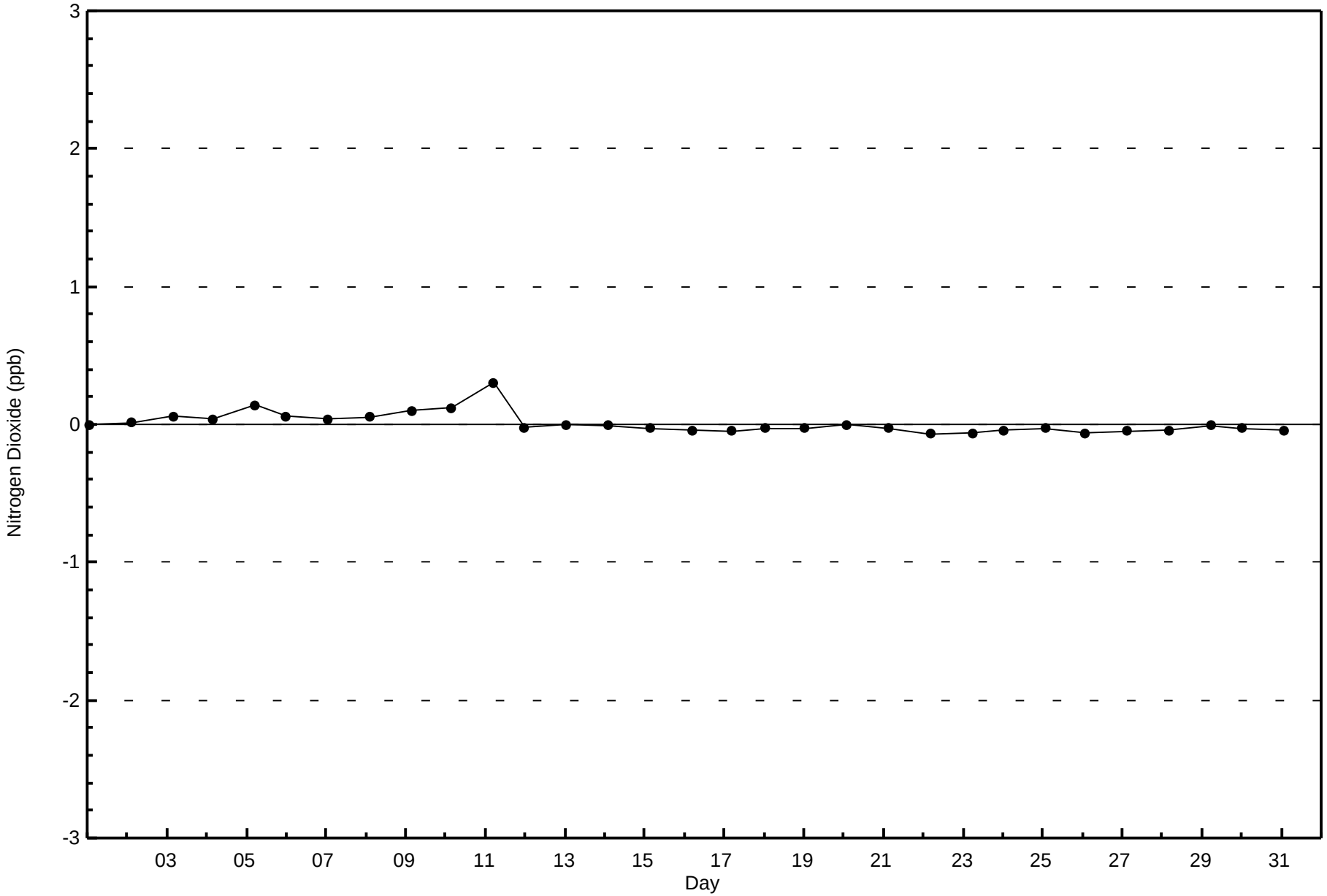
Total Number of Valid Hours: 687

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Conklin Lookout - March 2016

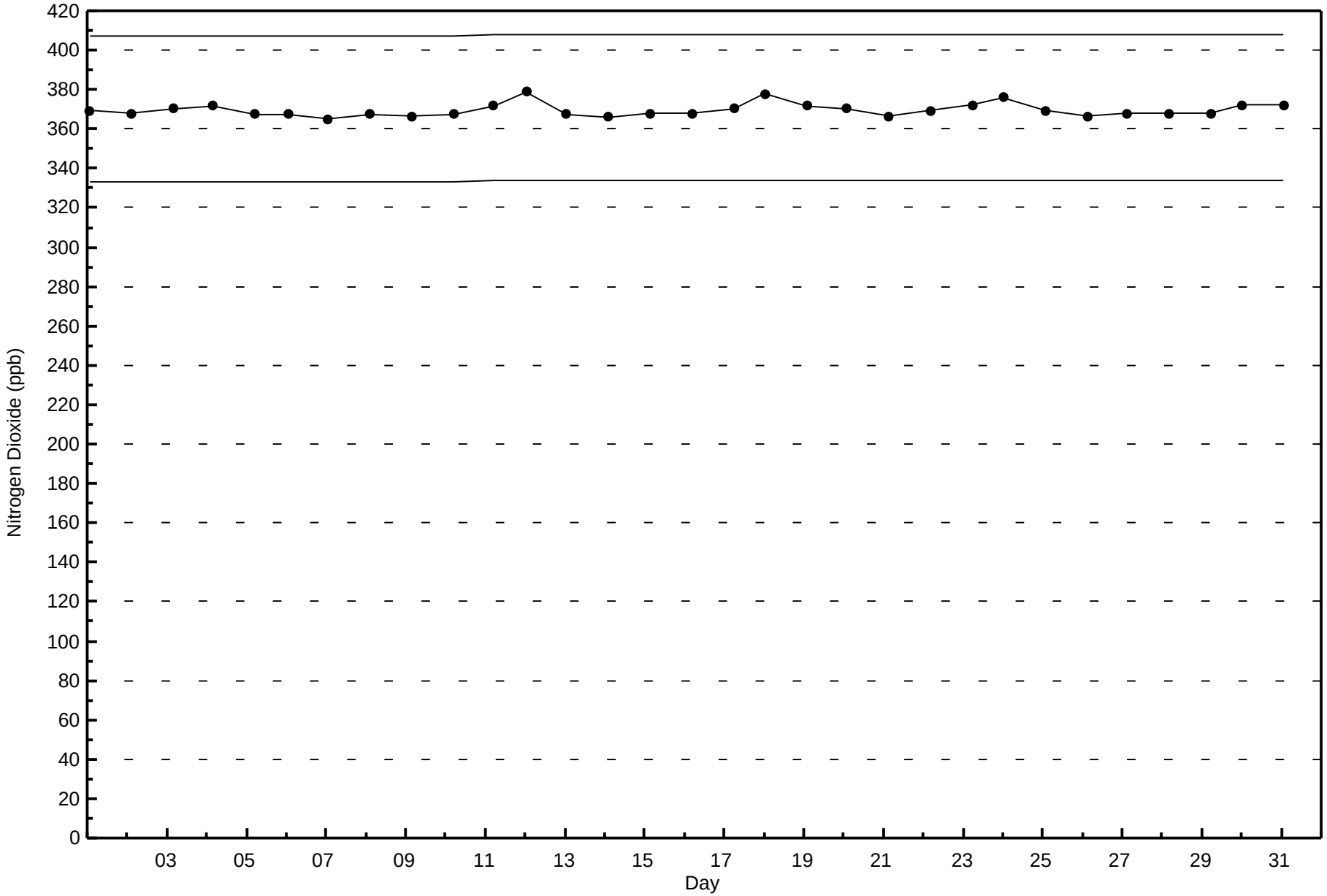


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Conklin Lookout - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Conklin Lookout - March 2016

Maximum Value: 12 ppb on Mar 3 21:00

Maximum Daily Average: 6.7 ppb on Mar 6

Minimum Value: 0 ppb on Mar 21 21:00

Minimum Daily Average: 0.7 ppb on Mar 18

Maximum Diurnal Average: 3.0 ppb at hour 21

Minimum Diurnal Average: 2.0 ppb at hour 17

Monthly Average: 2.5 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 6$ $P_{99} = 10$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	2	Z	2	2	3	3	2	3	3	4	4	5	5	3	2	3	3	4	5	6	7	8	6	5	3.8	8
2-Mar	3	2	Z	2	2	2	3	2	3	3	4	6	6	5	3	2	2	3	5	6	6	6	6	4	3.7	6
3-Mar	4	3	3	Z	4	6	6	7	4	3	3	3	4	5	6	5	4	5	7	10	12	9	5	3	5.2	12
4-Mar	3	2	3	3	Z	3	2	2	3	3	3	3	4	4	4	5	4	4	6	7	6	3	3	3	3.5	7
5-Mar	3	3	3	3	3	Z	3	5	5	6	7	4	3	2	1	2	2	5	8	9	10	10	11	11	5.1	11
6-Mar	Z	11	10	10	10	9	8	5	5	4	4	5	6	6	7	8	7	7	7	6	5	5	5	5	6.7	11
7-Mar	5	Z	6	7	7	7	7	8	7	7	6	6	6	6	6	7	7	7	6	6	6	6	6	6	6.4	8
8-Mar	6	5	Z	5	6	5	5	4	4	4	2	3	3	3	3	4	4	4	5	6	6	6	7	8	4.6	8
9-Mar	9	10	9	Z	7	8	8	8	7	6	6	7	7	6	5	2	2	2	3	5	5	4	3	3	5.8	10
10-Mar	3	3	5	5	Z	7	7	7	C	C	C	C	C	2	2	2	1	1	1	1	2	1	1	1	3.0	7
11-Mar	1	2	2	2	2	Z	2	2	2	3	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1.3	3
12-Mar	Z	4	1	1	1	1	2	1	2	3	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1.4	4
13-Mar	2	Z	2	2	2	1	2	1	4	3	2	1	2	2	3	3	2	2	1	1	1	1	1	1	1.7	4
14-Mar	1	1	Z	1	1	2	1	1	2	3	3	4	4	3	3	2	3	3	3	3	2	3	3	1	2.2	4
15-Mar	1	1	1	Z	1	0	1	1	1	1	1	1	1	1	1	3	3	4	4	3	7	5	4	4	2.2	7
16-Mar	3	2	2	3	Z	4	4	3	3	5	4	4	3	3	4	3	4	4	5	3	2	1	2	3	3.2	5
17-Mar	2	2	2	1	1	Z	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	1	1	1	0.8	2
18-Mar	Z	1	1	1	0	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
19-Mar	1	Z	2	2	2	1	1	1	2	2	2	3	2	2	2	1	2	2	3	2	2	1	1	1	1.8	3
20-Mar	1	1	Z	2	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	1	1.3	2
21-Mar	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0.8	1
22-Mar	1	1	1	0	Z	1	1	1	1	2	2	0	0	1	1	1	1	1	1	1	1	1	1	1	0.9	2
23-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	4	4	1.3	4
24-Mar	Z	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	0.9	2
25-Mar	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1.1	2
26-Mar	1	1	Z	1	2	3	4	6	5	5	5	4	2	2	2	1	1	1	1	1	1	2	2	2	2.3	6
27-Mar	2	2	2	Z	2	2	2	2	3	2	2	2	2	2	2	1	1	1	1	1	2	3	2	2	1.8	3
28-Mar	1	1	1	1	Z	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1.3	2
29-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	0.7	1
30-Mar	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	0	1	1	1	0.8	1
31-Mar	2	Z	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0.9	2
	2.3	2.4	2.5	2.3	2.4	2.7	2.7	2.6	2.6	2.7	2.5	2.5	2.4	2.3	2.2	2.1	2.0	2.2	2.5	2.8	3.0	2.8	2.6	2.4	Diurnal Average	
	9	11	10	10	10	9	8	8	7	7	7	7	7	6	7	8	7	7	8	10	12	10	11	11	Diurnal Maximum	

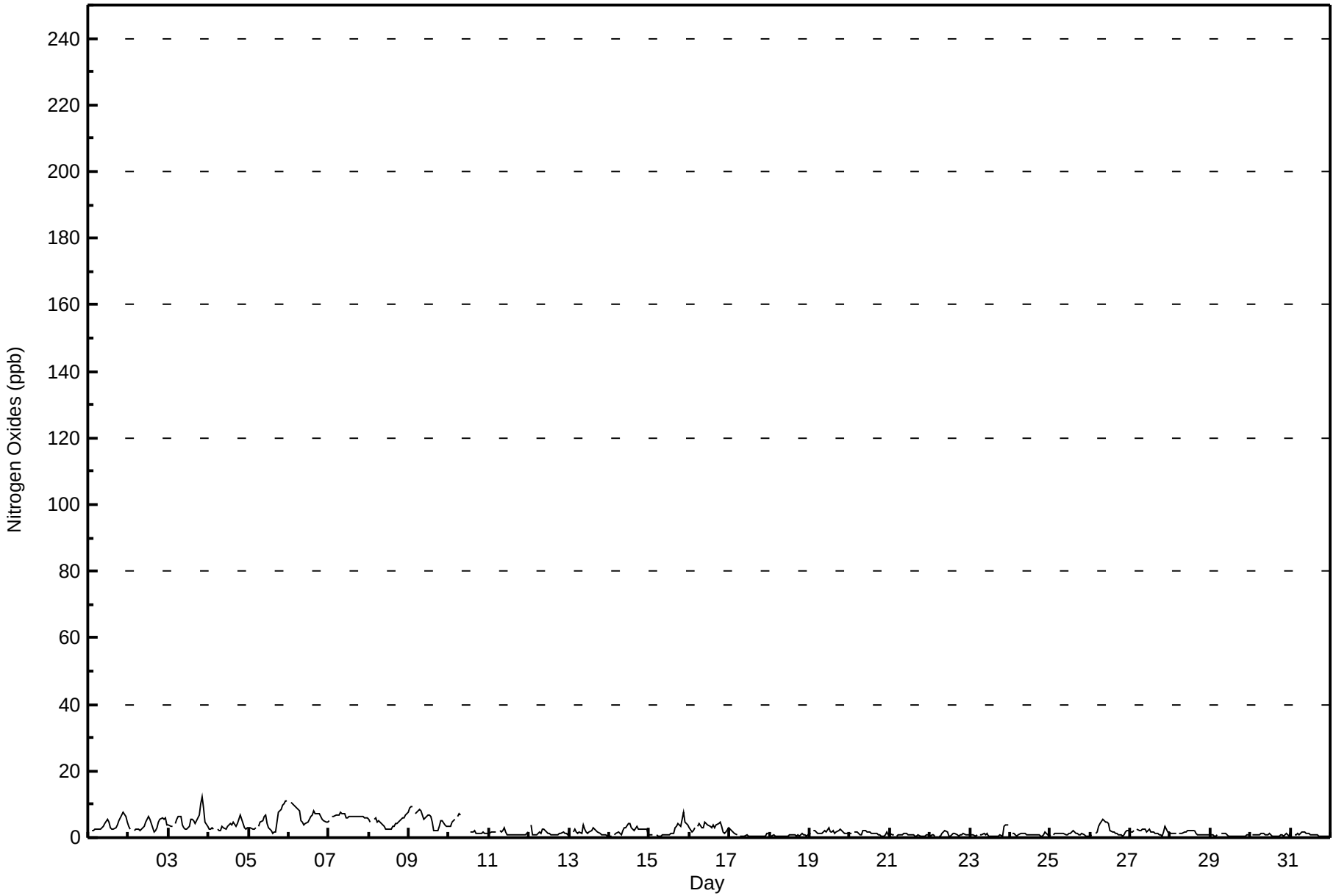
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Conklin Lookout - March 2016



Nitrogen Oxides (NO_X) - ppb
Conklin Lookout - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	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: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Conklin Lookout - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	30	14	40	34	35	26	38	54	52	62	53	25	39	59	47	79	687
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	30	14	40	34	35	26	38	54	52	62	53	25	39	59	47	79	687

Total Number of Valid Hours: 687

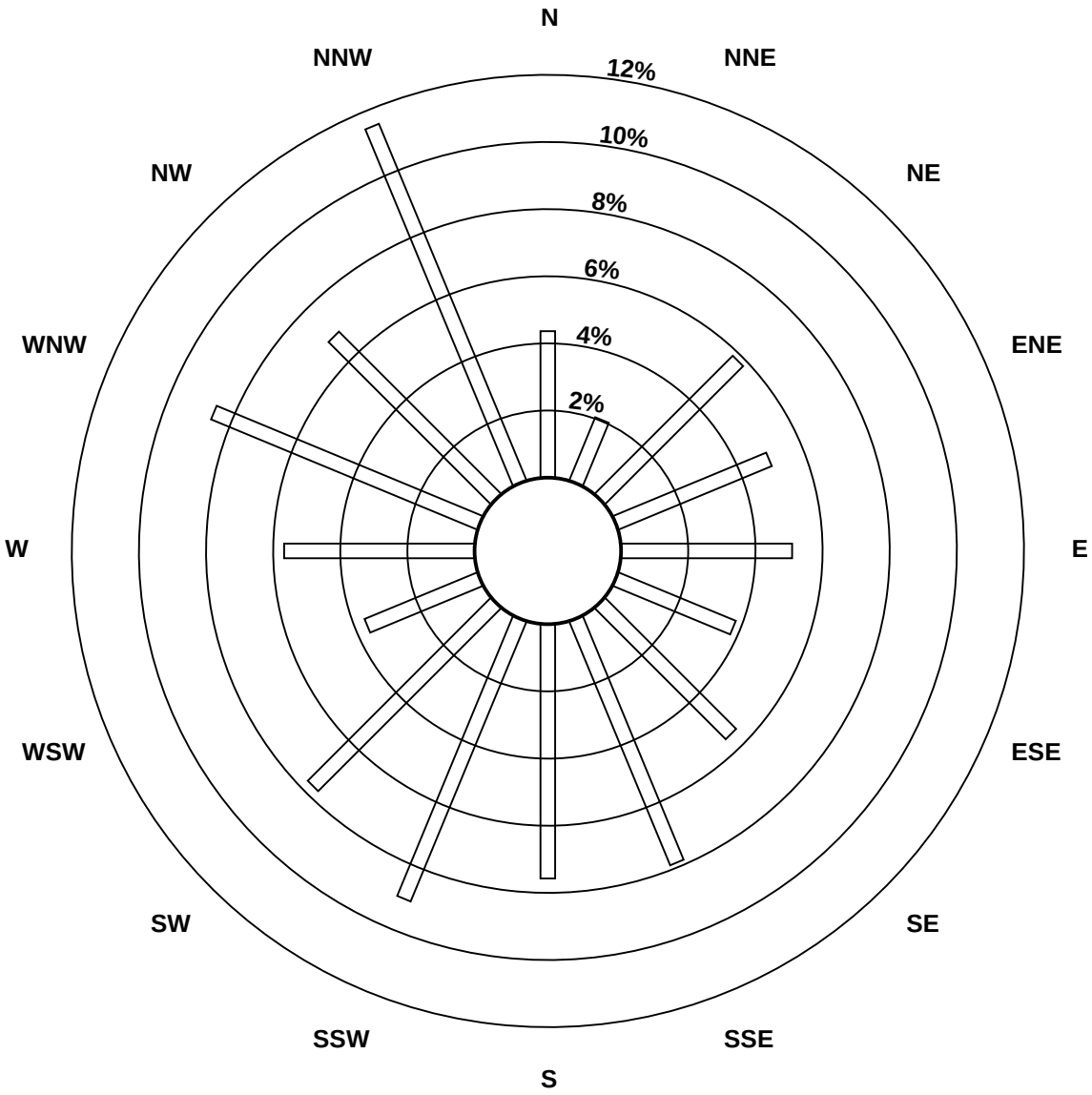
Total Number of Hours: 744

Wood Buffalo Environmental Association

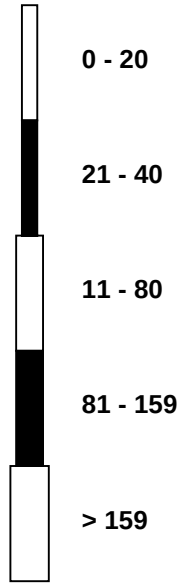
Wind Rose Mar 2016

Nitrogen Oxides (NO_X) - ppb

Conklin Lookout (AMS 18)



Classes (ppb)



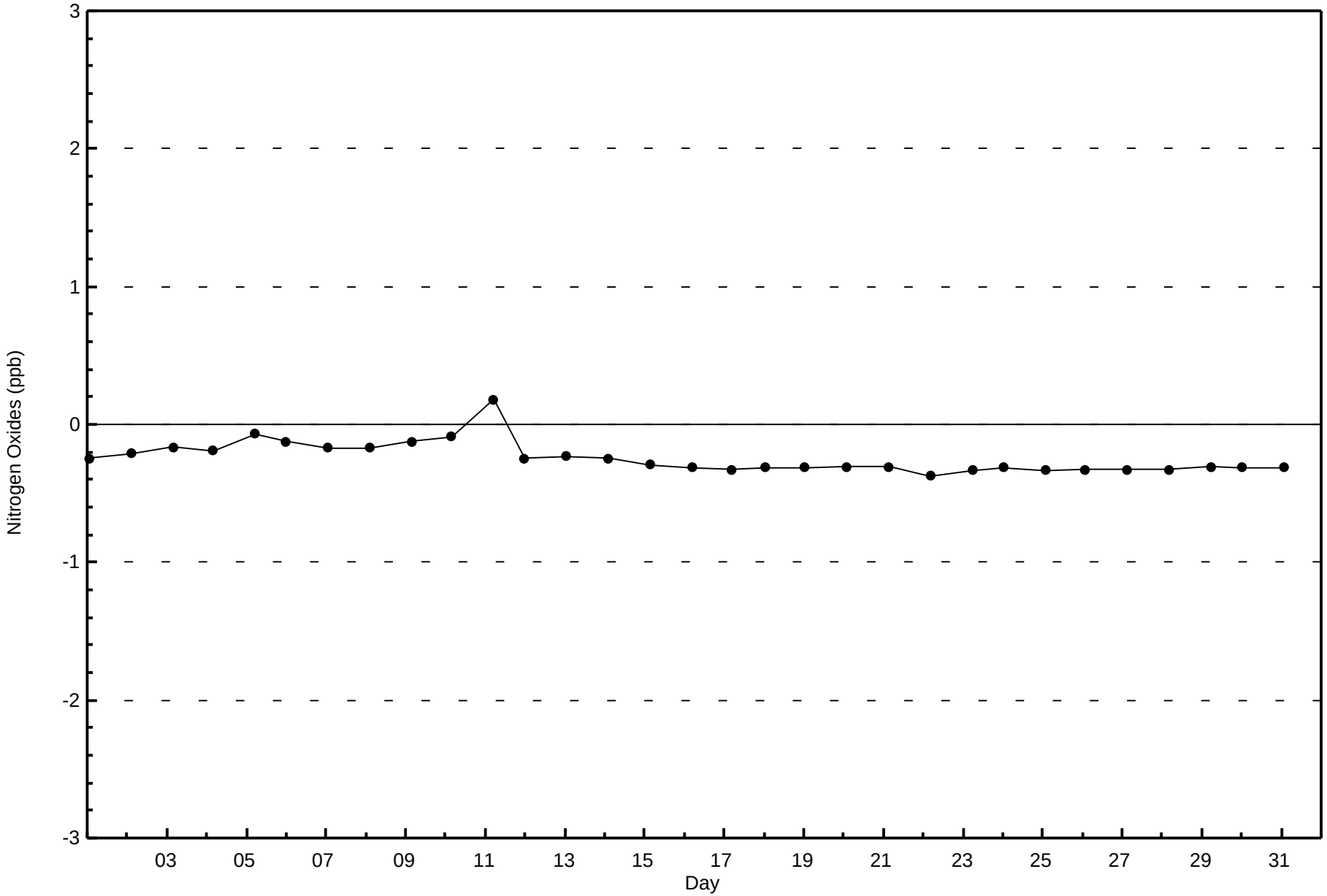
Total Number of Valid Hours: 687

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Conklin Lookout - March 2016

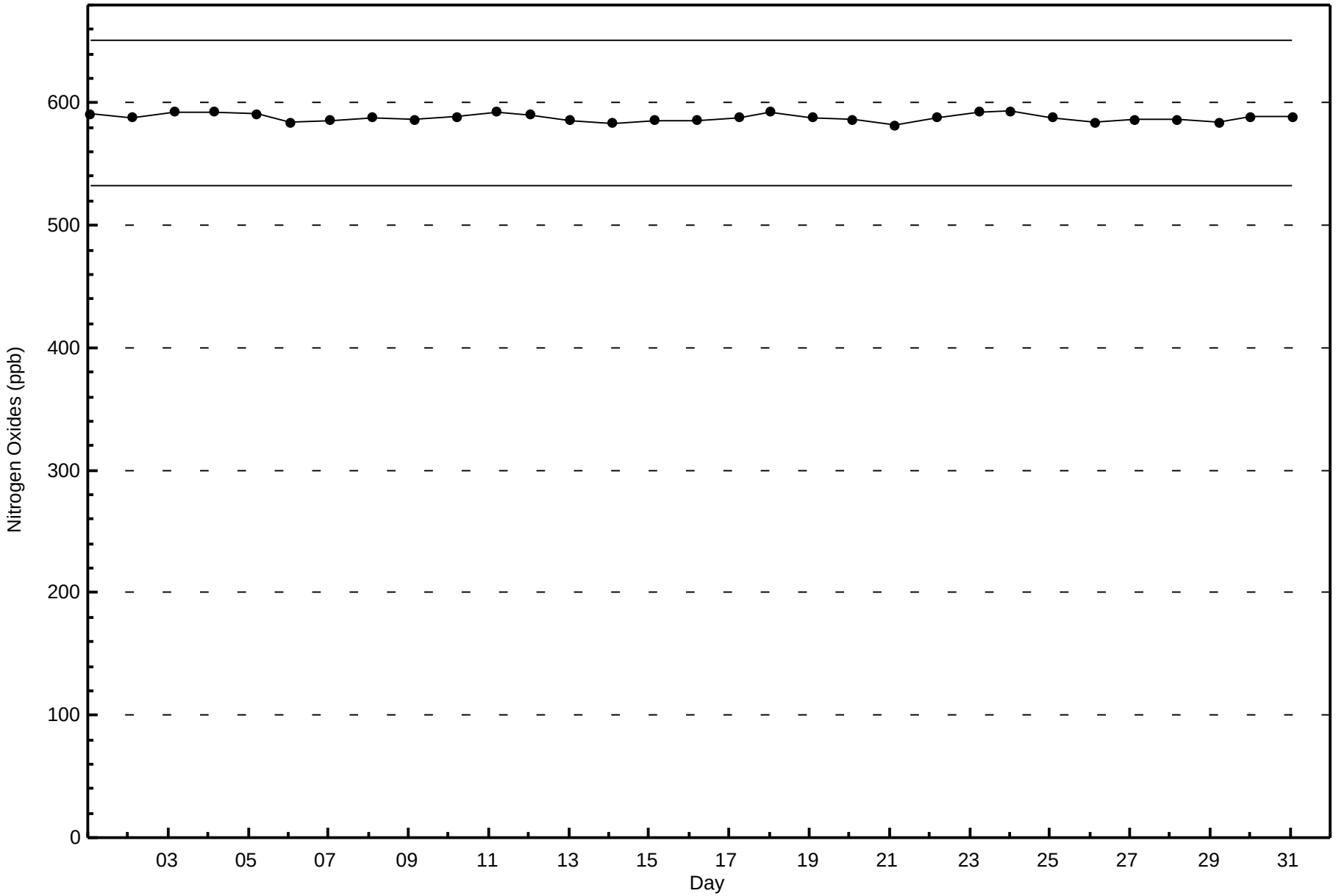


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Conklin Lookout - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O_3) - ppb

Conklin Lookout - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 55 ppb on Mar 28 17:00

Maximum Daily Average: 51.6 ppb on Mar 29

Minimum Value: 24 ppb on Mar 3 21:00

Minimum Daily Average: 31.2 ppb on Mar 9

Maximum Diurnal Average: 43.3 ppb at hour 17

Minimum Diurnal Average: 37.8 ppb at hour 8

Monthly Average: 40.5 ppb

Percentiles: P_1 = 27 P_{10} = 31 Q_1 = 35 Median = 41 Q_3 = 45 P_{90} = 49 P_{99} = 53

Hours in Service:	744
Hours of Data:	711
Hours of Missing Data:	33
Hours of Calibration:	33
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	38	37	36	35	Z	34	33	33	33	34	36	37	38	41	41	41	42	41	37	38	37	35	34	34	36.8	42
2-Mar	34	34	35	35	34	Z	32	33	33	32	31	35	37	39	42	43	43	43	41	40	39	39	38	39	37.1	43
3-Mar	39	40	40	39	40	37	Z	37	42	43	42	41	40	39	38	37	36	36	33	24	24	30	37	40	37.1	43
4-Mar	40	41	40	41	40	40	40	Z	38	41	44	44	45	45	44	45	46	44	43	41	41	42	40	38	41.9	46
5-Mar	36	34	34	32	30	29	28	26	Z	28	34	34	38	42	44	42	41	32	30	30	31	32	31	33	33.6	44
6-Mar	33	34	36	Z	39	40	40	39	39	39	39	39	39	39	39	39	39	39	38	37	37	36	36	36	37.9	40
7-Mar	35	34	34	33	Z	32	31	29	30	29	29	30	31	31	32	33	34	34	35	35	35	35	35	35	32.6	35
8-Mar	36	35	35	34	32	Z	30	30	33	35	36	36	36	38	38	37	37	36	35	33	32	31	28	26	33.8	38
9-Mar	24	24	27	30	30	28	Z	28	29	29	28	27	29	33	37	40	40	38	35	32	33	34	33	31	31.2	40
10-Mar	31	31	31	32	31	31	31	Z	36	35	36	37	38	39	39	37	38	38	38	38	38	38	37	37	35.5	39
11-Mar	36	38	36	35	35	34	33	34	Z	C	C	40	40	42	44	44	44	44	42	43	43	43	41	40	39.5	44
12-Mar	38	35	37	Z	38	39	40	43	41	41	48	50	50	51	51	50	50	49	48	47	46	47	46	45	44.9	51
13-Mar	42	43	42	40	Z	38	37	37	36	38	38	36	30	29	27	29	30	31	30	32	32	32	31	30	34.5	43
14-Mar	30	30	32	33	33	Z	32	31	33	34	34	32	32	33	33	33	32	31	31	30	29	31	30	33	31.9	34
15-Mar	33	33	33	33	32	32	Z	32	32	33	33	33	33	33	34	31	30	30	30	30	26	29	29	31	31.5	34
16-Mar	33	34	33	33	33	33	33	Z	35	34	36	38	40	41	40	41	41	40	40	42	44	43	42	40	37.7	44
17-Mar	40	38	38	37	37	38	38	39	Z	42	42	43	43	43	43	43	43	43	43	42	41	40	39	39	40.6	43
18-Mar	40	41	40	Z	42	41	42	42	43	41	42	43	44	45	46	46	46	45	44	43	43	43	42	42	42.8	46
19-Mar	41	40	40	40	Z	40	40	40	41	42	44	45	46	47	48	49	49	48	46	46	47	47	46	46	44.1	49
20-Mar	45	44	42	42	43	Z	44	44	42	42	43	44	45	46	47	47	46	46	44	42	42	41	41	43	43.7	47
21-Mar	41	41	42	42	42	42	Z	42	42	42	43	44	44	44	45	45	45	45	46	46	46	46	46	45	43.7	46
22-Mar	45	45	45	45	45	45	45	Z	45	46	49	50	50	50	50	49	49	49	48	47	47	46	46	45	47.1	50
23-Mar	44	44	44	44	44	44	44	43	Z	40	41	42	42	42	42	42	41	41	41	42	38	39	40	40	41.9	44
24-Mar	42	45	45	Z	48	47	45	45	46	47	48	49	49	50	50	50	49	49	49	48	48	47	49	49	47.6	50
25-Mar	49	47	44	43	Z	42	42	43	43	44	44	45	46	45	43	42	42	42	41	40	41	44	43	43	43.3	49
26-Mar	41	41	39	37	36	Z	34	33	36	38	39	41	47	49	51	51	52	51	50	50	49	46	45	44	43.5	52
27-Mar	45	45	44	44	44	44	Z	43	43	46	50	50	50	51	51	52	52	51	51	50	48	47	48	47	47.5	52
28-Mar	47	47	46	45	46	45	44	Z	43	42	42	43	44	46	50	51	55	52	52	51	50	49	49	49	47.4	55
29-Mar	49	50	50	51	51	51	51	51	Z	52	52	53	54	54	54	54	53	52	52	52	52	51	51	50	51.6	54
30-Mar	49	50	48	Z	47	46	45	45	46	48	50	50	51	50	50	49	49	49	48	47	47	43	42	43	47.5	51
31-Mar	41	42	43	42	Z	42	41	40	41	42	43	45	46	48	47	48	48	48	47	47	46	45	44	43	44.3	48
	39.2	39.2	39.0	38.3	38.9	39.0	38.3	37.8	38.5	39.4	40.5	41.2	41.9	42.8	43.2	43.3	43.3	42.5	41.6	40.8	40.3	40.3	40.0	39.9	Diurnal Average	
	49	50	50	51	51	51	51	51	46	52	52	53	54	54	54	54	55	52	52	52	52	51	51	50	Diurnal Maximum	

Z - zerospan C - Calibration

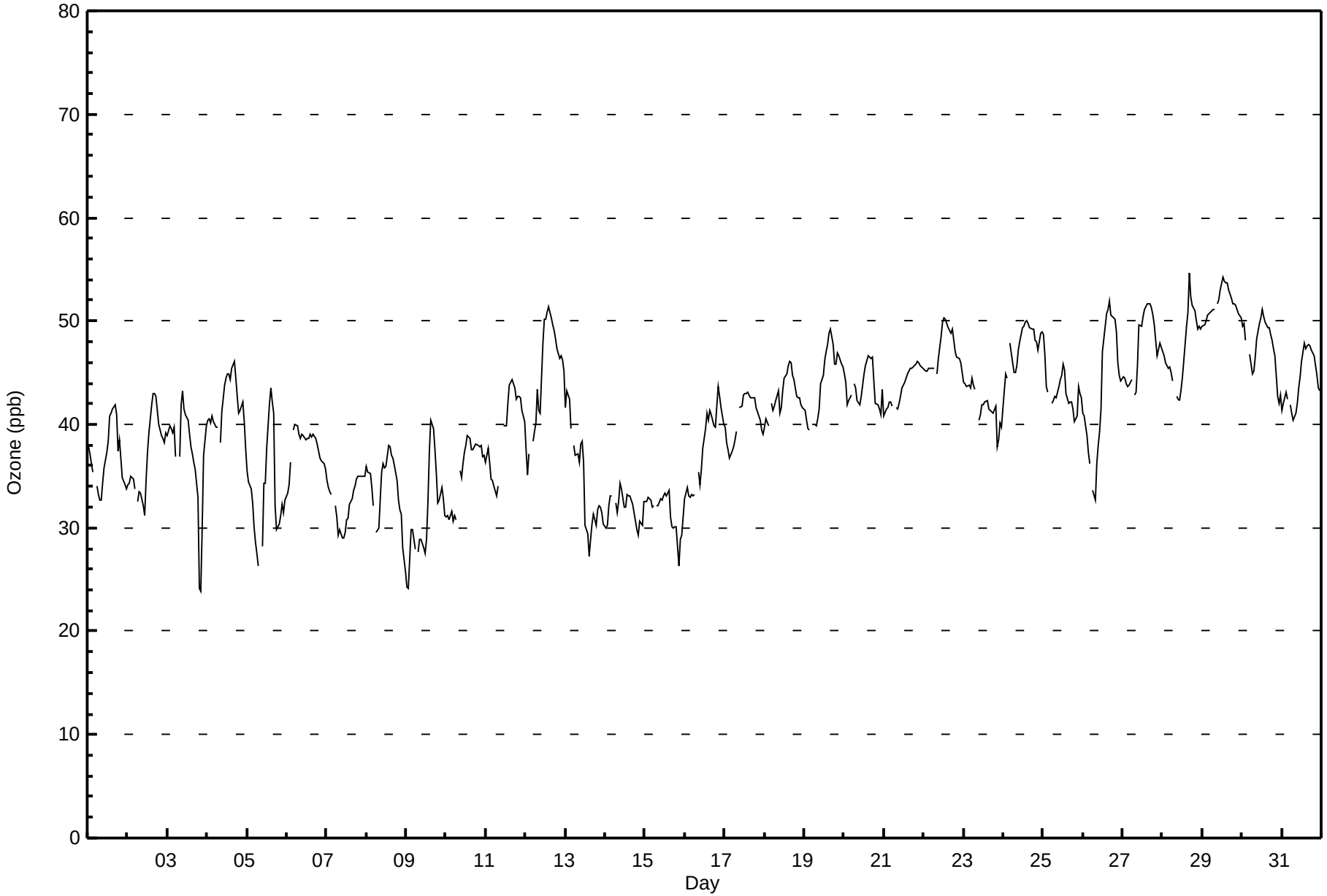
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb

Wood Buffalo Environmental Association

Hourly Averages

Ozone (O_3) - ppb

Conklin Lookout - March 2016



Ozone (O_3) - ppb
Conklin Lookout - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
21 - 50	674	94.80	94.80
51 - 82	37	5.20	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 711

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Ozone (O_3) - ppb

Conklin Lookout - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 50	28	13	41	34	37	25	44	44	53	64	53	19	27	49	47	75	653
51 - 82	1	0	0	0	0	0	2	6	0	0	0	6	11	8	1	2	37
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	29	13	41	34	37	25	46	50	53	64	53	25	38	57	48	77	690

Total Number of Valid Hours: 690

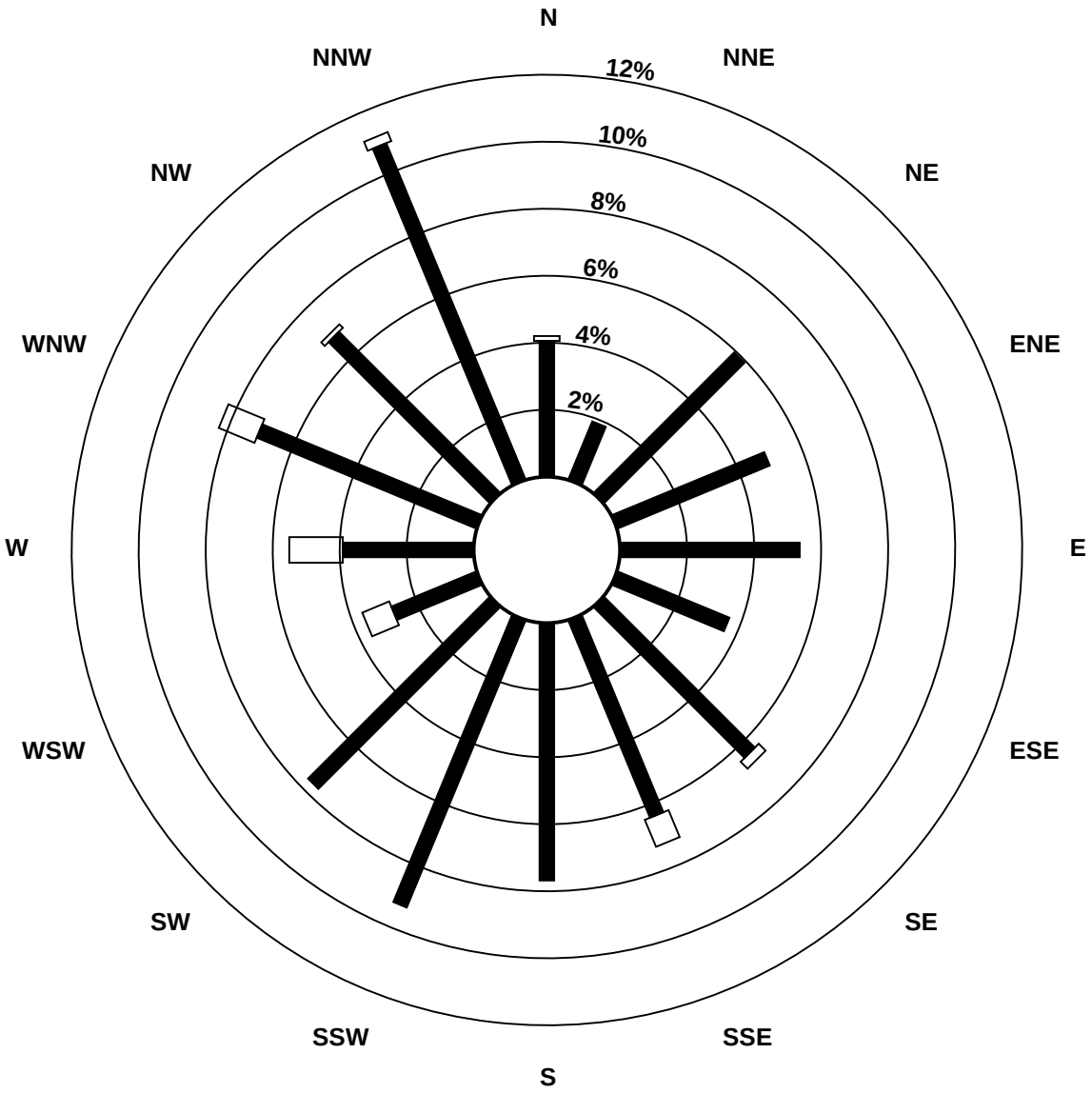
Total Number of Hours: 744

Wood Buffalo Environmental Association

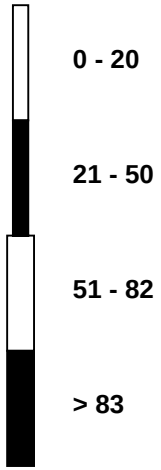
Wind Rose Mar 2016

Ozone (O_3) - ppb

Conklin Lookout (AMS 18)



Classes (ppb)



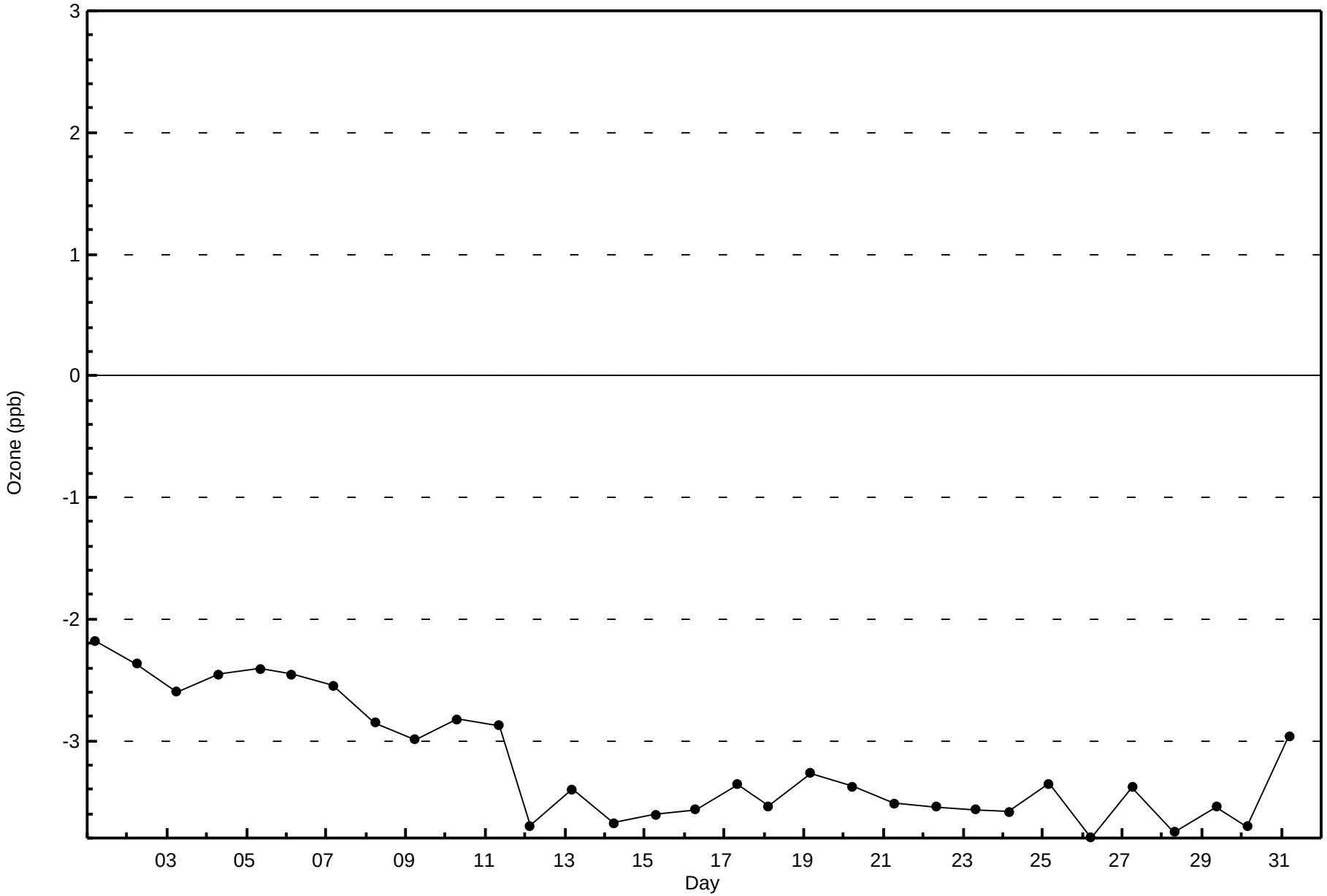
Total Number of Valid Hours: 690

Wood Buffalo Environmental Association

Zero Responses

Ozone (O_3) - ppb

Conklin Lookout - March 2016

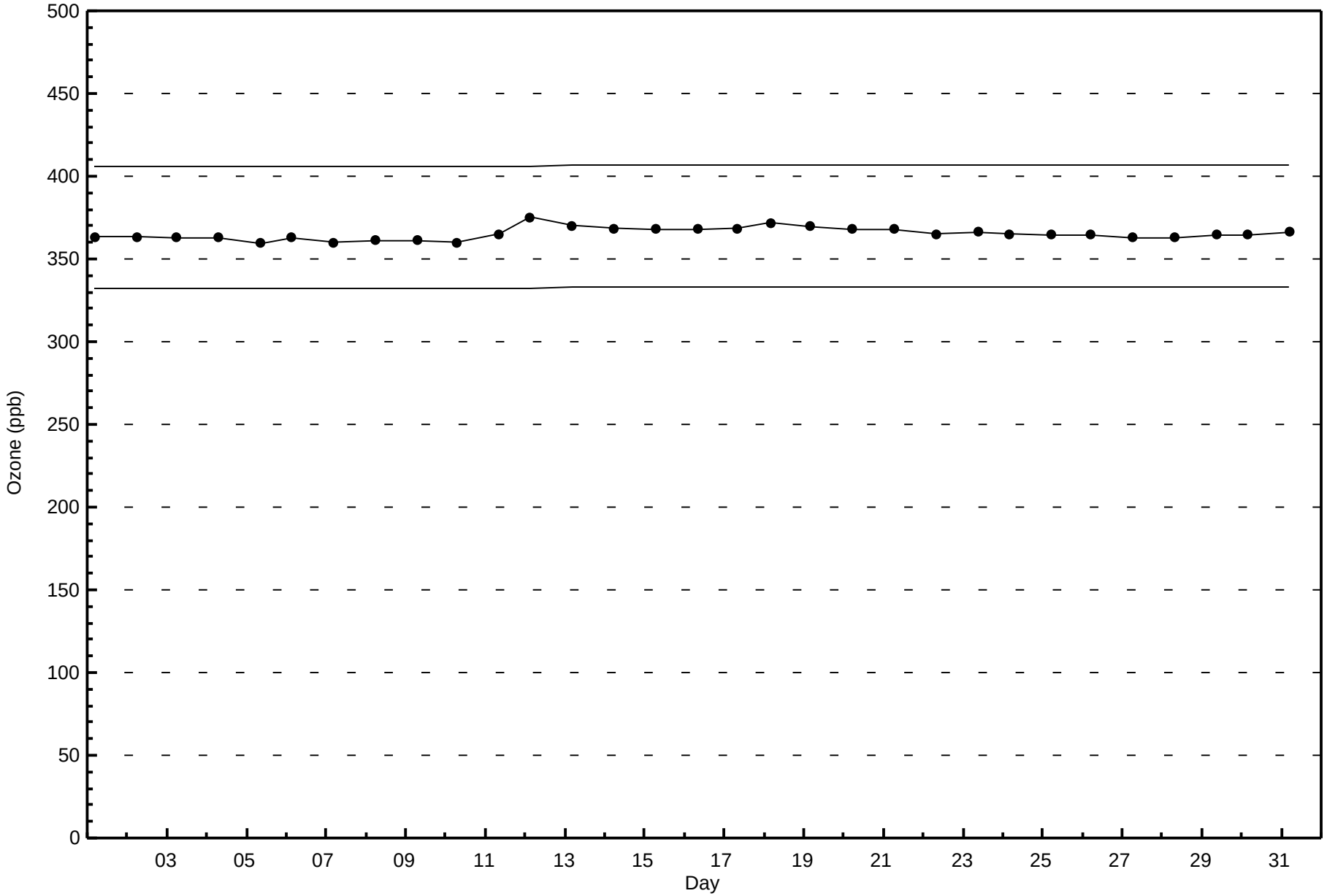


Wood Buffalo Environmental Association

Span Responses

Ozone (O_3) - ppb

Conklin Lookout - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Conklin Lookout - March 2016

Number of Exceedences (AAAQO): 24-hr: 0

Maximum Value: 13.5 $\mu g/m^3$ on Mar 5 05:00

Maximum Daily Average: 6.4 $\mu g/m^3$ on Mar 5

Minimum Value: 0.0 $\mu g/m^3$ on Mar 16 22:00

Minimum Daily Average: 0.6 $\mu g/m^3$ on Mar 22

Maximum Diurnal Average: 3.0 $\mu g/m^3$ at hour 7

Minimum Diurnal Average: 1.9 $\mu g/m^3$ at hour 13

Monthly Average: 2.53 $\mu g/m^3$

Percentiles: P_1 = 0.2 P_{10} = 0.6 Q_1 = 1.1 Median = 1.9 Q_3 = 3.2 P_{90} = 5.4 P_{99} = 11.1

Hours in Service:	744
Hours of Data:	690
Hours of Missing Data:	54
Hours of Calibration:	2
Percent Operational Time:	93.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	5.3	6.2	5.8	5.9	6.1	5.9	6.2	6.4	6.1	4.5	3.7	4.0	4.1	3.6	4.9	5.5	5.0	4.3	4.2	3.6	3.2	2.8	2.8	2.4	4.7	6.4
2-Mar	2.2	1.9	1.9	1.9	1.9	2.1	1.9	1.9	2.2	2.2	2.3	2.3	2.1	2.4	2.3	2.7	3.3	3.4	3.7	3.1	2.5	2.0	1.8	2.0	2.3	3.7
3-Mar	2.4	3.0	3.2	4.4	5.1	6.1	7.5	6.1	3.1	2.9	3.2	2.6	2.2	2.2	3.0	4.4	4.9	4.8	4.2	4.7	6.3	7.2	3.3	2.5	4.1	7.5
4-Mar	1.8	1.6	1.3	1.3	1.3	1.2	1.3	1.1	1.3	1.1	1.0	1.0	1.0	1.5	2.3	2.3	2.3	2.6	2.9	3.0	2.7	2.4	4.8	9.5	2.2	9.5
5-Mar	8.8	8.6	9.5	11.3	13.5	11.3	10.6	11.2	10.3	6.8	3.3	3.1	2.0	1.4	1.5	2.1	2.1	4.3	5.9	5.7	6.3	5.9	4.4	3.8	6.4	13.5
6-Mar	3.5	3.1	2.8	2.2	1.9	1.7	1.5	1.5	1.3	1.3	1.5	1.6	1.7	1.8	1.8	1.9	2.1	2.2	2.0	2.2	2.7	3.5	3.8	3.7	2.2	3.8
7-Mar	2.7	2.1	1.7	1.2	1.2	1.4	1.4	1.5	1.5	1.7	2.1	2.3	2.4	2.6	2.7	2.8	2.8	2.8	3.3	3.6	3.5	3.1	2.9	2.7	2.3	3.6
8-Mar	2.1	2.0	2.2	2.4	2.4	2.7	2.6	2.4	2.1	1.8	1.4	1.4	2.1	3.4	4.6	7.0	6.6	6.4	8.5	10.9	12.4	11.4	12.2	13.4	5.2	13.4
9-Mar	12.6	12.2	10.3	8.9	7.7	5.3	4.7	3.1	3.7	4.6	5.9	7.4	6.9	4.8	3.9	3.4	3.3	3.6	4.1	5.1	7.5	7.7	6.9	6.5	6.3	12.6
10-Mar	5.5	6.8	7.0	6.5	5.6	5.5	5.0	3.0	2.9	3.2	3.1	2.4	1.5	1.2	1.6	1.9	1.6	1.6	1.7	1.8	1.8	1.7	1.5	1.5	3.2	7.0
11-Mar	1.7	3.0	3.1	3.0	3.3	3.6	3.7	3.6	C	C	1.8	0.9	0.7	0.9	1.2	1.3	1.1	1.3	1.6	1.8	1.8	2.4	2.8	2.6	2.1	3.7
12-Mar	2.5	2.4	2.4	2.3	2.2	2.1	2.0	1.9	1.6	1.0	0.6	0.9	1.1	1.1	1.1	1.0	1.0	1.1	1.2	1.1	1.1	1.4	1.4	1.4	1.5	2.5
13-Mar	1.4	1.2	1.2	1.2	1.5	1.4	1.8	1.9	3.0	M	M	2.2	3.5	3.9	4.3	4.9	3.7	5.1	3.2	2.5	2.0	1.7	1.4	1.2	2.5	5.1
14-Mar	1.1	1.0	1.6	1.7	3.3	3.7	2.5	1.5	2.6	2.8	2.4	3.3	3.1	3.2	4.3	4.2	4.1	2.8	2.1	1.7	1.7	1.5	1.7	1.8	2.5	4.3
15-Mar	2.0	2.0	1.5	1.4	1.5	1.4	0.8	0.7	0.6	0.6	0.9	0.8	0.8	1.0	1.0	1.8	2.5	2.5	2.9	4.1	7.2	5.4	4.3	2.4	2.1	7.2
16-Mar	2.7	1.6	1.2	1.0	1.2	2.4	3.3	1.8	1.0	1.2	1.3	0.9	0.6	0.6	1.9	1.8	2.3	2.6	3.1	1.4	0.1	0.0	0.1	0.8	1.5	3.3
17-Mar	1.0	1.2	1.0	0.7	0.2	UO	UO	UO	UO	UO	0.6	0.4	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	1.2
18-Mar	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0.1	0.1	0.3	0.4	0.4	0.5	0.6	0.8	0.9	0.8	0.8	0.7	1.0	--	1.0
19-Mar	1.7	2.5	3.6	3.9	3.2	2.8	2.8	3.0	3.0	2.1	1.1	0.9	1.2	1.0	0.3	0.3	0.5	0.7	1.2	1.3	0.8	0.6	0.8	0.9	1.7	3.9
20-Mar	0.7	0.8	0.7	0.7	0.6	0.6	0.7	0.6	0.6	0.5	0.4	0.4	UO	UO	UO	UO	UO	UO	0.5	0.8	1.0	1.1	1.3	1.4	0.7	1.4
21-Mar	1.1	0.8	0.7	0.7	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.8	0.7	0.7	0.6	0.7	0.8	1.0	0.8	0.5	0.5	0.4	0.7	1.1
22-Mar	0.3	0.3	0.3	0.2	0.3	0.3	0.2	0.4	0.2	0.3	0.5	0.5	0.5	0.5	0.7	0.6	0.7	0.8	0.9	0.9	1.1	1.1	1.3	1.5	0.6	1.5
23-Mar	1.4	1.5	1.3	1.3	1.9	3.2	4.3	5.2	4.2	2.3	1.2	0.6	0.6	0.7	0.8	0.9	0.9	0.9	1.0	1.1	2.9	3.5	2.7	2.1	1.9	5.2
24-Mar	1.7	1.7	1.9	1.9	2.1	2.2	2.1	2.2	1.9	1.7	1.7	1.7	2.3	2.1	2.3	3.0	3.0	2.3	3.0	3.7	3.3	2.9	2.5	2.3	2.3	3.7
25-Mar	2.2	2.8	3.2	3.5	3.4	3.2	3.1	3.2	3.4	3.5	4.3	4.4	3.5	7.7	8.5	6.3	6.1	5.1	5.8	7.4	4.2	2.4	2.3	2.1	4.2	8.5
26-Mar	2.5	3.2	3.0	2.7	3.3	5.7	5.9	6.2	7.9	8.0	6.7	3.8	1.9	1.2	0.8	1.2	1.4	1.6	2.0	2.5	2.9	3.6	3.0	2.9	3.5	8.0
27-Mar	2.1	1.8	1.9	2.0	2.0	2.0	2.0	2.0	1.8	1.4	1.2	1.0	0.7	0.4	0.4	0.4	0.5	0.5	0.6	1.0	1.3	1.3	1.6	1.7	1.3	2.1
28-Mar	1.9	2.0	2.0	2.1	2.3	2.6	3.2	3.4	3.4	3.5	3.5	3.8	3.1	3.5	2.7	1.6	1.1	1.0	1.0	1.0	1.2	1.1	0.9	0.8	2.2	3.8
29-Mar	0.8	0.8	0.9	1.0	1.1	1.2	1.1	1.0	0.8	UO	UO	UO	UO	UO	UO	UO	UO	0.2	0.2	0.2	0.7	1.0	1.0	1.0	--	1.2
30-Mar	1.0	1.1	1.0	1.1	1.2	1.2	1.2	1.1	0.9	0.3	UO	0.7	UO	UO	UO	UO	UO	UO	UO	0.5	0.8	1.4	1.5	1.0	--	1.5
31-Mar	1.3	1.8	2.4	1.9	2.0	1.8	2.0	2.2	1.7	1.1	0.9	0.4	0.3	0.3	0.6	0.6	0.8	1.1	1.1	1.1	1.2	1.1	1.2	1.1	1.2	2.4
	2.6	2.7	2.7	2.7	2.8	2.9	3.0	2.8	2.6	2.3	2.1	1.9	1.9	2.0	2.2	2.4	2.4	2.4	2.5	2.7	2.9	2.8	2.6	2.6	Diurnal Average	
	12.6	12.2	10.3	11.3	13.5	11.3	10.6	11.2	10.3	8.0	6.7	7.4	6.9	7.7	8.5	7.0	6.6	6.4	8.5	10.9	12.4	11.4	12.2	13.4	Diurnal Maximum	

C - Calibration M - Maintenance UO - Unstable Operation

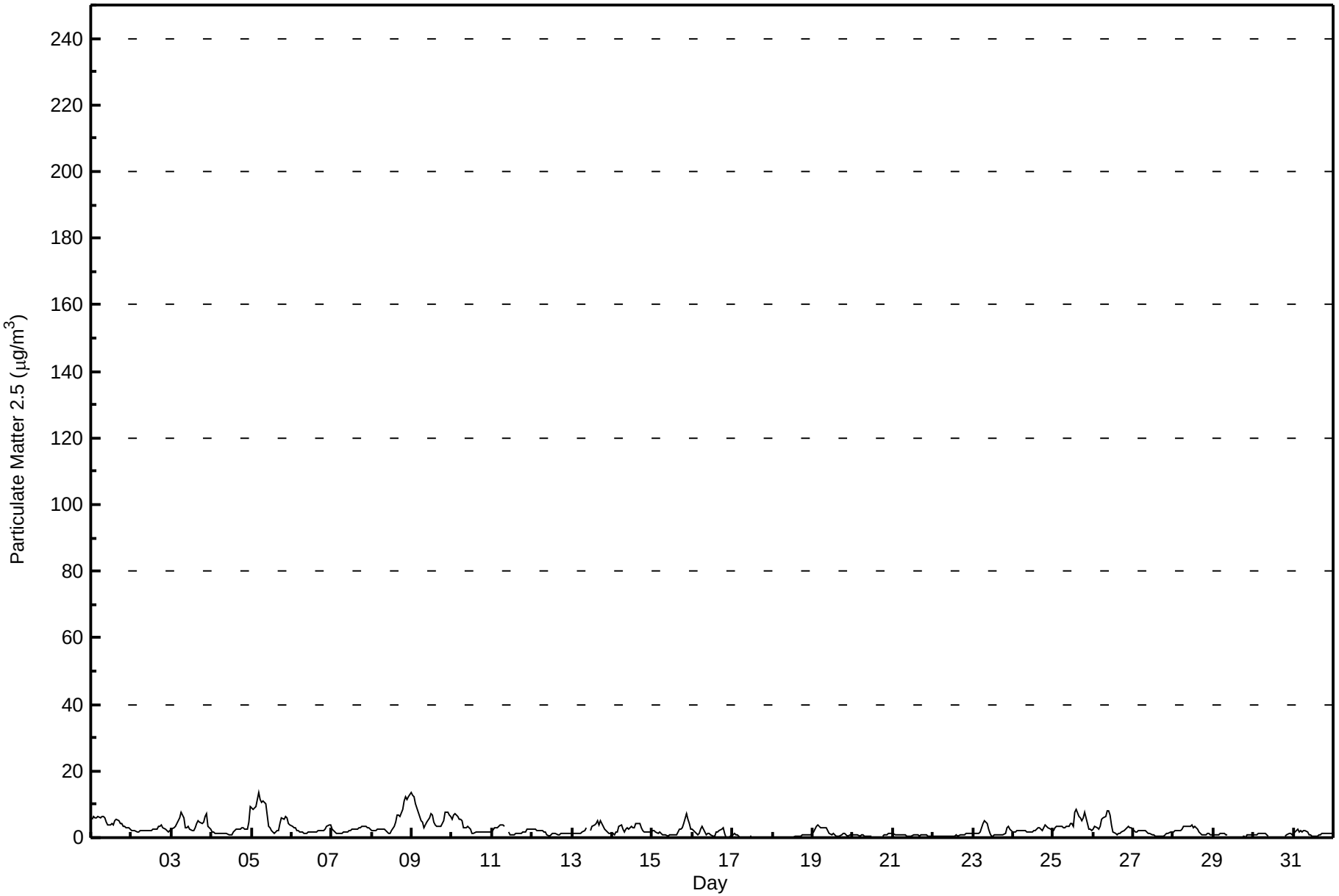
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 $\mu g/m^3$

Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Conklin Lookout - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Conklin Lookout - March 2016

Concentration Ranges ($\mu g/m^3$)	Number of Hours	%	Cumulative %
1 - 5	470	68.12	68.12
6 - 15	68	9.86	77.97
16 - 25	0	0.00	77.97
26 - 80	0	0.00	77.97
> 81.0	0	0.00	77.97

Total Number of Valid Hours: 690

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Conklin Lookout - March 2016

Concentration Ranges ($\mu g/m^3$)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
1 - 5	26	12	38	20	22	11	26	33	45	50	27	16	28	39	24	41	458
6 - 15	1	0	3	1	0	0	0	5	6	11	26	5	3	0	4	2	67
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	27	12	41	21	22	11	26	38	51	61	53	21	31	39	28	43	525

Total Number of Valid Hours: 668

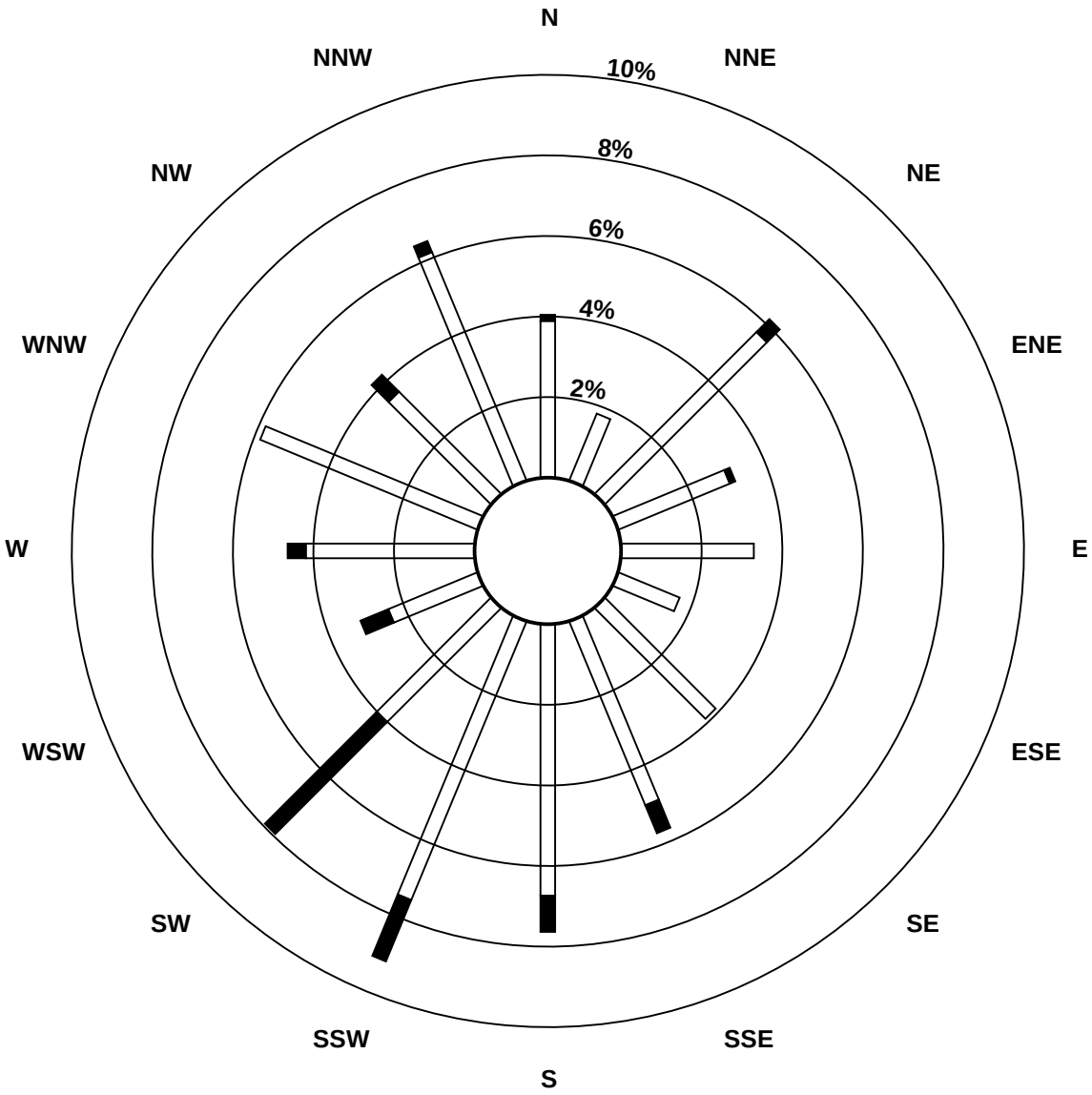
Total Number of Hours: 744

Wood Buffalo Environmental Association

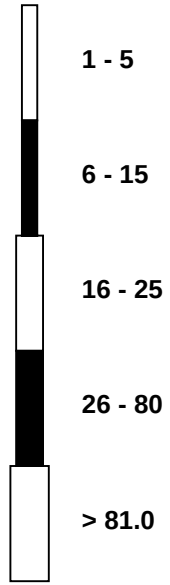
Wind Rose Mar 2016

Particulate Matter 2.5 ($PM_{2.5}$) - $\mu g/m^3$

Conklin Lookout (AMS 18)



Classes ($\mu g/m^3$)



Total Number of Valid Hours: 668

Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 2m (AT 2m) - C

Conklin Lookout - March 2016

Maximum Value: 11.2 C on Mar 29 14:00

Maximum Daily Average: 6.3 C on Mar 29

Minimum Value: -13.1 C on Mar 1 08:00

Minimum Daily Average: -8.3 C on Mar 16

Maximum Diurnal Average: 1.6 C at hour 15

Minimum Diurnal Average: -5.5 C at hour 7

Monthly Average: -2.21 C

Percentiles: P_1 = -12.0 P_{10} = -8.2 Q_1 = -5.6 Median = -2.6 Q_3 = 0.4 P_{90} = 5.0 P_{99} = 10.4

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

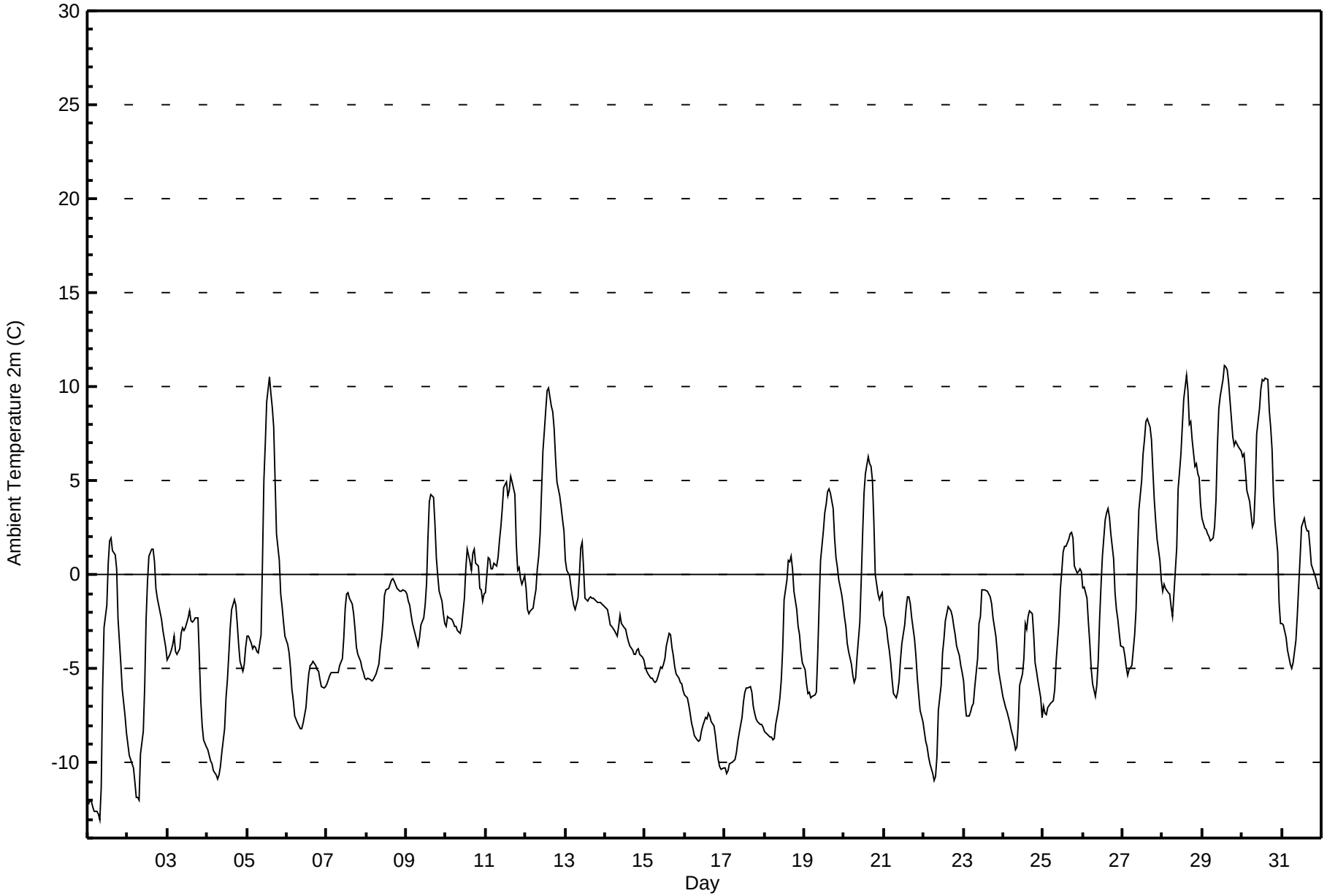
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-12.2	-12.0	-12.1	-12.4	-12.6	-12.6	-12.8	-13.1	-11.3	-6.1	-2.8	-1.6	0.6	1.8	2.0	1.3	1.1	0.3	-2.4	-3.5	-4.7	-6.1	-7.5	-8.4	-6.1	2.0
2-Mar	-9.0	-9.6	-9.9	-10.2	-11.1	-11.8	-11.8	-12.0	-9.6	-8.3	-5.9	-2.4	-0.4	1.0	1.4	1.3	0.7	-0.7	-1.3	-1.6	-2.4	-2.9	-3.4	-3.9	-5.2	1.4
3-Mar	-4.5	-4.2	-4.0	-3.7	-3.3	-4.1	-4.2	-3.9	-3.1	-2.8	-3.0	-2.8	-2.3	-1.9	-2.4	-2.5	-2.5	-2.3	-2.3	-4.4	-6.7	-8.1	-8.8	-9.1	-4.0	-1.9
4-Mar	-9.3	-9.6	-9.9	-10.0	-10.4	-10.6	-10.9	-10.6	-10.2	-9.4	-8.2	-6.5	-5.6	-4.3	-2.8	-1.8	-1.3	-1.6	-2.6	-3.7	-4.6	-5.1	-4.8	-3.8	-6.6	-1.3
5-Mar	-3.2	-3.3	-3.6	-3.9	-3.8	-3.9	-4.1	-4.1	-3.2	0.7	5.0	7.0	9.2	10.5	9.6	8.9	7.9	5.0	2.2	0.7	-1.0	-1.7	-2.5	-3.3	1.0	10.5
6-Mar	-3.7	-4.2	-5.0	-6.1	-6.7	-7.5	-7.9	-8.0	-8.2	-8.2	-7.9	-7.1	-6.1	-5.3	-4.8	-4.8	-4.6	-4.8	-5.1	-5.1	-5.6	-5.9	-6.0	-5.9	-6.0	-3.7
7-Mar	-5.8	-5.6	-5.3	-5.2	-5.2	-5.2	-5.2	-5.2	-4.8	-4.5	-3.3	-1.8	-1.0	-0.9	-1.2	-1.6	-2.1	-2.9	-3.8	-4.2	-4.6	-5.0	-5.2	-5.5	-4.0	-0.9
8-Mar	-5.5	-5.5	-5.6	-5.6	-5.6	-5.5	-5.2	-4.8	-4.0	-3.4	-2.4	-1.1	-0.8	-0.8	-0.5	-0.3	-0.2	-0.4	-0.8	-0.8	-0.9	-0.9	-0.8	-0.9	-2.6	-0.2
9-Mar	-1.1	-1.4	-1.6	-2.1	-2.6	-3.2	-3.5	-3.8	-3.4	-2.7	-2.3	-1.6	-0.5	2.0	3.9	4.3	4.1	2.7	0.9	0.0	-0.8	-1.4	-2.1	-2.6	-0.8	4.3
10-Mar	-2.7	-2.2	-2.3	-2.4	-2.5	-2.7	-2.8	-2.9	-3.1	-2.7	-2.0	-1.2	0.3	1.3	0.7	0.2	1.1	1.3	0.6	0.4	-0.7	-0.8	-1.4	-1.0	-1.1	1.3
11-Mar	-0.9	0.9	0.8	0.3	0.4	0.6	0.5	0.9	1.8	2.6	3.5	4.7	4.9	4.2	4.5	5.3	5.0	4.3	1.6	0.2	0.4	-0.2	-0.5	-0.1	1.9	5.3
12-Mar	-0.7	-1.8	-2.1	-1.9	-1.8	-1.2	-0.8	0.3	1.0	2.2	6.6	7.6	8.7	9.8	9.9	8.9	8.7	7.8	6.2	5.0	4.2	3.6	2.9	2.3	3.6	9.9
13-Mar	0.7	0.2	-0.1	-0.7	-1.2	-1.6	-1.8	-1.3	-0.1	1.4	1.7	0.3	-1.3	-1.4	-1.3	-1.2	-1.2	-1.2	-1.4	-1.5	-1.5	-1.4	-1.5	-1.6	-0.8	1.7
14-Mar	-1.8	-1.8	-2.3	-2.6	-2.8	-3.0	-3.1	-3.2	-2.7	-2.2	-2.6	-2.8	-2.9	-3.2	-3.6	-3.8	-4.0	-4.2	-4.2	-4.0	-3.9	-4.2	-4.4	-4.6	-3.2	-1.8
15-Mar	-4.9	-5.1	-5.3	-5.5	-5.5	-5.6	-5.7	-5.6	-5.4	-4.9	-5.0	-4.7	-4.4	-3.8	-3.1	-3.2	-3.9	-4.3	-4.9	-5.3	-5.5	-5.7	-5.8	-6.2	-5.0	-3.1
16-Mar	-6.4	-6.6	-6.9	-7.4	-7.9	-8.2	-8.6	-8.8	-8.9	-8.8	-8.4	-8.0	-7.6	-7.7	-7.4	-7.5	-7.8	-8.1	-8.5	-9.2	-9.8	-10.2	-10.3	-10.3	-8.3	-6.4
17-Mar	-10.3	-10.6	-10.4	-10.1	-9.9	-9.9	-9.8	-9.4	-8.8	-8.4	-7.5	-6.8	-6.3	-6.0	-6.0	-5.9	-6.2	-7.0	-7.3	-7.6	-7.8	-8.0	-8.0	-8.1	-8.2	-5.9
18-Mar	-8.3	-8.4	-8.5	-8.6	-8.7	-8.8	-8.7	-8.0	-7.2	-6.5	-5.6	-3.9	-1.3	-0.3	0.8	0.7	1.0	0.3	-0.9	-1.9	-2.8	-3.2	-4.1	-4.7	-4.5	1.0
19-Mar	-5.1	-5.8	-6.4	-6.3	-6.5	-6.5	-6.4	-6.3	-4.2	-1.5	0.8	2.3	3.3	3.7	4.4	4.5	4.3	3.6	2.0	0.9	0.4	-0.3	-1.0	-1.6	-1.1	4.5
20-Mar	-2.2	-2.8	-3.7	-4.1	-4.8	-5.4	-5.7	-5.5	-4.4	-2.5	-0.3	2.2	4.3	5.4	6.3	5.9	5.7	5.0	2.9	0.0	-1.0	-1.3	-1.1	-1.0	-0.3	6.3
21-Mar	-2.1	-2.8	-3.5	-4.0	-4.7	-5.6	-6.3	-6.5	-6.2	-5.6	-4.5	-3.6	-2.7	-1.7	-1.2	-1.2	-1.6	-2.3	-3.4	-4.3	-5.5	-6.4	-7.2	-7.8	-4.2	-1.2
22-Mar	-8.4	-8.8	-9.2	-9.7	-10.1	-10.6	-10.9	-10.7	-9.7	-7.2	-5.9	-4.2	-3.4	-2.4	-2.1	-1.7	-1.9	-2.2	-2.7	-3.2	-3.8	-4.3	-4.8	-5.2	-6.0	-1.7
23-Mar	-5.6	-6.7	-7.5	-7.5	-7.3	-7.0	-6.8	-5.9	-4.4	-2.6	-2.2	-0.8	-0.8	-0.8	-0.8	-1.0	-1.2	-1.5	-2.3	-3.3	-4.1	-5.1	-5.6	-6.0	-4.0	-0.8
24-Mar	-6.5	-7.1	-7.3	-7.6	-7.9	-8.2	-8.8	-9.3	-9.2	-7.9	-5.9	-5.3	-4.5	-2.6	-2.9	-2.2	-2.0	-2.1	-3.2	-4.7	-5.2	-5.7	-6.6	-7.6	-5.8	-2.0
25-Mar	-7.0	-7.3	-7.4	-7.1	-6.9	-6.8	-6.7	-6.1	-4.6	-2.5	-0.8	0.1	1.2	1.5	1.5	1.9	2.2	2.3	2.0	0.4	0.1	0.2	0.3	0.2	-2.0	2.3
26-Mar	-0.7	-0.6	-1.2	-2.5	-3.6	-5.0	-5.8	-6.5	-5.9	-4.6	-2.4	-0.6	1.0	3.0	3.3	3.5	3.1	2.2	0.9	-0.9	-1.8	-2.4	-3.1	-3.8	-1.4	3.5
27-Mar	-3.9	-4.3	-4.9	-5.4	-5.1	-4.8	-4.0	-3.2	-1.8	1.0	3.4	5.1	6.4	7.2	8.1	8.3	7.8	7.2	5.6	3.9	2.9	1.9	0.7	-0.3	1.3	8.3
28-Mar	-0.9	-0.5	-0.7	-0.9	-1.0	-1.7	-2.2	-1.0	1.4	4.6	5.5	6.4	8.0	9.3	10.6	9.8	8.0	8.1	7.2	5.8	5.9	5.4	5.2	3.7	4.0	10.6
29-Mar	3.0	2.5	2.4	2.2	2.0	1.8	1.9	2.5	4.0	6.8	8.8	9.5	10.4	11.2	11.1	10.9	10.3	8.3	7.4	6.9	7.1	7.0	6.8	6.6	6.3	11.2
30-Mar	6.3	6.4	5.6	4.5	3.9	3.2	2.5	2.7	4.5	7.5	8.8	9.9	10.4	10.3	10.5	10.4	8.7	7.9	6.7	4.2	2.8	1.2	-1.5	-2.6	5.6	10.5
31-Mar	-2.6	-2.6	-3.3	-4.0	-4.4	-4.8	-5.0	-4.7	-3.5	-2.1	-0.6	0.9	2.5	3.0	2.5	2.3	2.3	1.5	0.5	0.1	-0.1	-0.4	-0.7	-0.8	-1.0	3.0
	-4.0	-4.2	-4.6	-4.9	-5.1	-5.4	-5.5	-5.3	-4.4	-2.9	-1.5	-0.4	0.6	1.4	1.6	1.6	1.3	0.7	-0.3	-1.3	-2.0	-2.5	-3.0	-3.3	Diurnal Average	
	6.3	6.4	5.6	4.5	3.9	3.2	2.5	2.7	4.5	7.5	8.8	9.9	10.4	11.2	11.1	10.9	10.3	8.3	7.4	6.9	7.1	7.0	6.8	6.6	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature 2m (AT 2m) - C

Conklin Lookout - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	538	72.31	72.31
0 - 10	195	26.21	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) - %

Conklin Lookout - March 2016

Maximum Value: 98 % on Mar 9 07:00

Maximum Daily Average: 92.9 % on Mar 6

Minimum Value: 29 % on Mar 29 13:00

Minimum Daily Average: 45.0 % on Mar 29

Maximum Diurnal Average: 84.0 % at hour 7

Minimum Diurnal Average: 60.0 % at hour 15

Monthly Average: 74.1 %

Percentiles: $P_1 = 32$ $P_{10} = 48$ $Q_1 = 60$ Median = 78 $Q_3 = 90$ $P_{90} = 94$ $P_{99} = 98$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

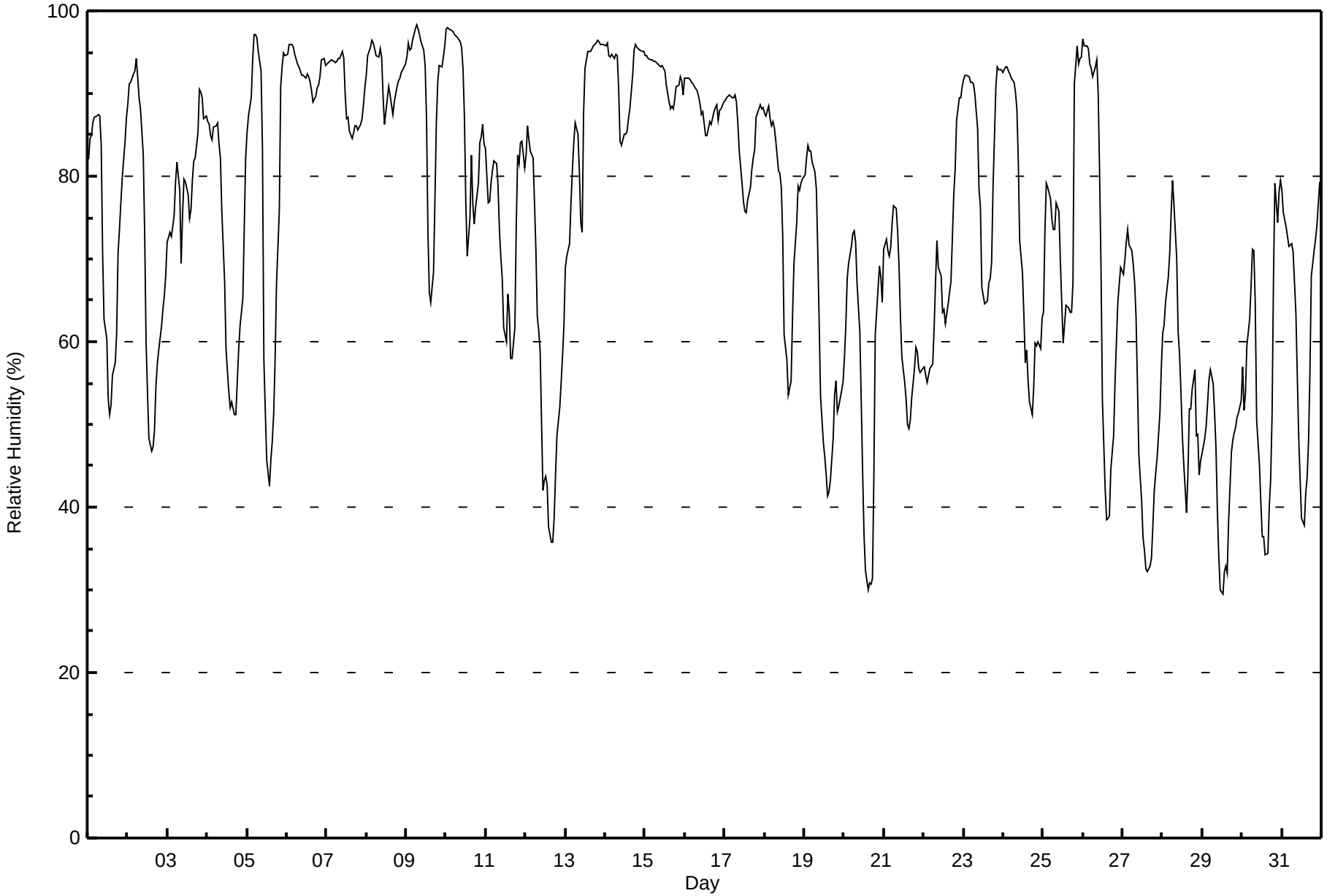
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	82	85	85	86	87	87	87	87	84	71	63	60	53	51	52	56	58	61	71	74	77	80	84	87	73.7	87
2-Mar	89	91	91	92	93	94	92	90	88	83	73	60	54	48	47	47	49	55	57	59	62	64	66	68	71.3	94
3-Mar	72	73	73	74	75	79	82	78	69	75	80	79	78	75	76	79	82	82	85	91	90	89	87	87	79.7	91
4-Mar	87	86	85	84	86	86	86	84	82	76	67	59	56	54	52	53	51	51	55	59	62	65	74	82	70.2	87
5-Mar	85	87	90	94	97	97	97	95	93	83	58	52	46	43	46	48	51	58	67	76	91	93	95	95	76.5	97
6-Mar	95	96	96	96	96	95	94	93	93	92	92	92	92	92	91	90	89	90	91	91	92	94	94	93	92.9	96
7-Mar	94	94	94	94	94	94	94	94	94	95	94	90	87	87	85	85	85	86	86	86	86	87	89	91	90.2	95
8-Mar	92	95	96	96	96	95	95	94	95	94	90	86	88	91	90	89	87	89	91	91	92	93	93	93	92.2	96
9-Mar	94	96	95	95	96	98	98	98	97	96	95	93	87	73	66	65	68	77	86	91	93	93	94	96	89.4	98
10-Mar	98	98	98	98	97	97	97	97	96	96	93	87	77	70	75	83	77	74	76	79	84	85	86	84	87.6	98
11-Mar	83	77	77	79	81	82	82	79	73	70	68	62	60	66	64	58	58	62	74	82	81	84	84	81	73.6	84
12-Mar	83	86	84	83	82	77	71	63	61	59	42	43	44	43	38	36	36	39	44	49	52	55	58	62	57.9	86
13-Mar	69	70	72	77	81	84	86	85	81	74	73	88	93	95	95	95	95	96	96	96	96	96	96	96	86.9	96
14-Mar	96	96	95	94	95	94	95	95	91	84	84	85	85	85	87	88	92	95	96	96	95	95	95	95	92.0	96
15-Mar	95	95	94	94	94	94	94	94	94	93	93	93	93	91	89	88	88	88	89	91	91	92	91	90	92.0	95
16-Mar	92	92	92	92	91	91	91	90	90	89	87	88	85	85	86	87	86	88	88	89	87	88	88	89	88.7	92
17-Mar	89	89	90	90	90	89	90	89	86	83	79	77	76	76	77	79	81	82	83	87	88	89	88	88	84.8	90
18-Mar	88	87	88	87	86	87	86	84	81	80	79	73	61	58	54	54	55	63	69	74	79	78	79	80	75.4	88
19-Mar	80	82	84	83	83	82	80	79	71	62	53	48	46	44	41	42	43	48	53	55	52	52	54	55	61.4	84
20-Mar	58	62	68	69	71	73	73	72	67	61	53	44	37	32	30	31	31	31	43	61	66	69	68	65	55.7	73
21-Mar	71	72	71	70	71	74	76	76	73	69	63	58	55	53	50	50	51	53	57	59	59	57	56	57	62.6	76
22-Mar	57	56	55	56	57	57	62	67	72	69	68	64	64	62	63	65	67	73	78	81	87	89	90	91	68.7	91
23-Mar	92	92	92	92	91	91	91	90	86	79	76	67	66	65	65	67	68	70	79	91	93	93	93	93	82.5	93
24-Mar	92	93	93	93	92	92	91	90	88	82	72	68	63	57	59	55	53	51	54	60	59	60	59	63	72.6	93
25-Mar	64	73	79	79	77	75	73	73	77	76	70	65	60	62	64	64	64	64	67	91	96	94	94	94	74.8	96
26-Mar	97	96	96	95	94	93	92	93	94	90	80	69	53	42	38	39	39	45	49	55	60	65	67	69	71.2	97
27-Mar	68	70	72	74	72	71	69	67	63	55	46	41	36	35	32	32	33	34	38	42	44	46	51	57	52.0	74
28-Mar	61	62	65	68	71	75	79	77	70	61	58	54	49	45	39	44	52	52	54	57	49	49	44	46	57.5	79
29-Mar	46	48	50	53	55	57	55	51	47	39	34	30	29	32	33	32	38	47	48	49	50	51	51	53	45.0	57
30-Mar	57	52	54	59	63	67	71	71	65	51	45	40	37	36	34	34	40	43	51	67	79	74	78	80	56.2	80
31-Mar	78	76	74	73	72	72	72	71	63	56	48	43	39	38	42	44	48	56	68	71	72	74	77	79	62.7	79
	80.8	81.5	82.1	82.9	83.4	83.9	84.0	82.8	80.2	75.6	70.3	66.4	62.8	60.9	60.0	60.6	61.8	64.6	69.2	74.2	76.3	77.2	78.2	79.3	Diurnal Average	
	98	98	98	98	97	98	98	98	97	96	95	93	93	95	95	95	95	96	96	96	96	96	96	96	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Conklin Lookout - March 2016



Maximum Value: 2.7 mm on Mar 13 15:00

Maximum Daily Total: 12.5 mm on Mar 16

Minimum Value: 0.0 mm on Mar 1 03:00

Minimum Daily Total: 0.0 mm on Mar 2

Maximum Diurnal Total: 3.2 mm at hour 15

Minimum Diurnal Total: 0.4 mm at hour 11

Monthly Total: 35.55 mm

Percentiles: P_1 = 0.0 P_{10} = 0.0 Q_1 = 0.0 Median = 0.0 Q_3 = 0.0 P_{90} = 0.0 P_{99} = 1.3

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

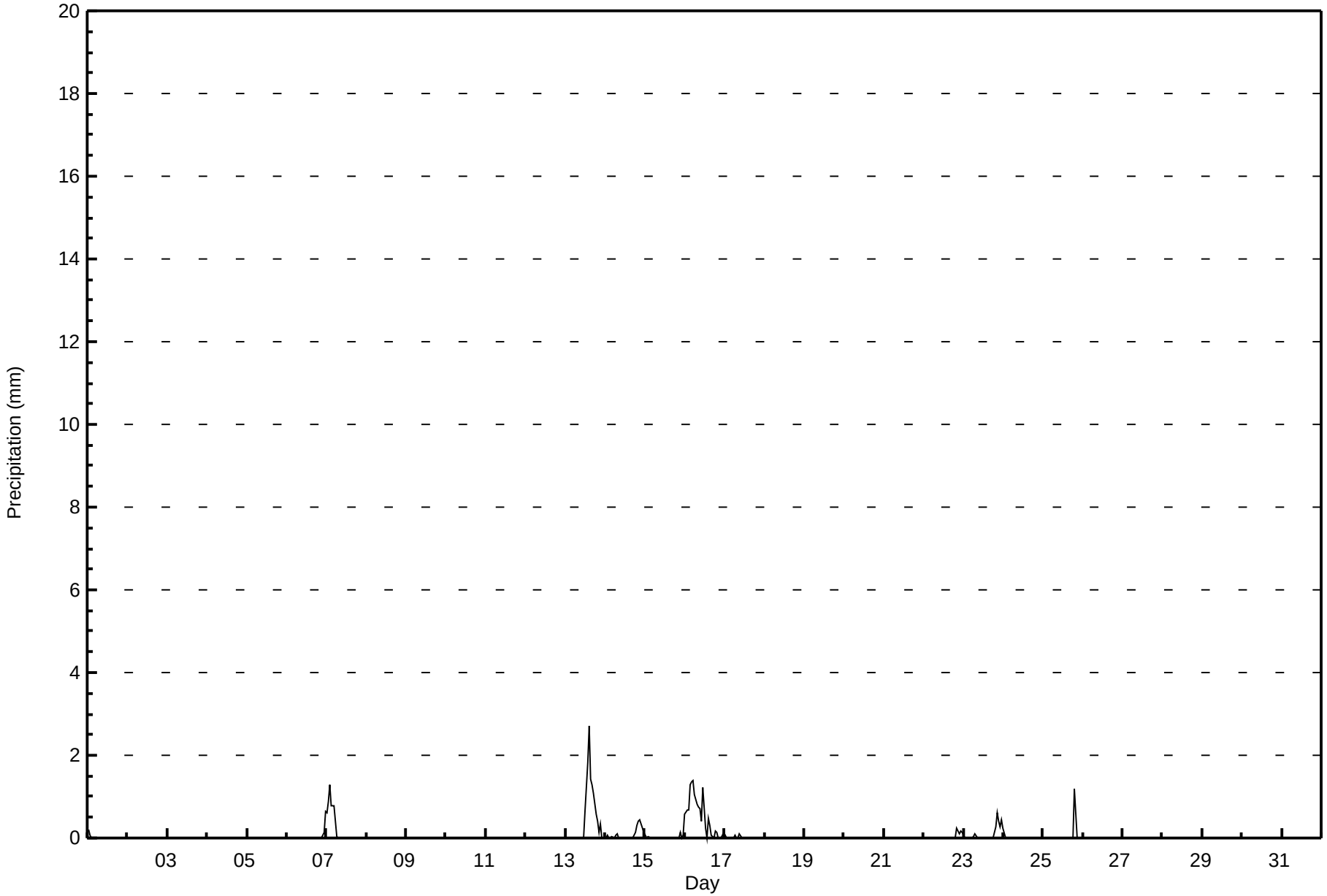
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2
2-Mar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
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
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
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
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	0.1	0.6	0.8	0.6
7-Mar	0.6	0.9	1.3	0.8	0.8	0.4	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	4.8	1.3
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
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
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
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
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
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	0.7	1.8	2.7	1.4	1.3	1.1	0.6	0.4	0.1	0.3	0.0	0.0	10.4	2.7
14-Mar	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.4	0.4	0.2	0.1	2.0	0.4
15-Mar	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	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.3	0.1
16-Mar	0.6	0.7	0.7	1.3	1.4	1.4	1.1	0.8	0.7	0.7	0.4	1.2	0.2	0.0	0.5	0.3	0.1	0.0	0.2	0.1	0.0	0.0	0.0	0.1	12.5	1.4
17-Mar	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1
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
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
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
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
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	0.2	0.1	0.2	0.2	0.7	0.2
23-Mar	0.1	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	0.0	0.0	0.0	0.3	0.6	0.4	0.3	0.5	2.2	0.6
24-Mar	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2
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	1.2	0.0	0.0	0.0	0.0	1.2	1.2
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
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
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
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
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
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
	1.8	1.7	2.0	2.1	2.2	1.8	1.3	1.0	0.7	0.8	0.4	1.2	0.9	1.8	3.2	1.7	1.4	1.2	0.9	2.3	1.4	1.4	0.8	1.6	Diurnal Average	
	0.6	0.9	1.3	1.3	1.4	1.4	1.1	0.8	0.7	0.7	0.4	1.2	0.7	1.8	2.7	1.4	1.3	1.1	0.6	1.2	0.6	0.4	0.3	0.6	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Precipitation (PC) - mm

Conklin Lookout - March 2016



Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	710	95.43	95.43
0.4 - 0.5	8	1.08	96.51
0.6 - 0.7	10	1.34	97.85
0.8 - 1.4	14	1.88	99.73
1.5 - 10	2	0.27	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) - %

Conklin Lookout - March 2016

Maximum Value: 71 % on Mar 26 12:00

Maximum Daily Average: 11.1 % on Mar 12

Minimum Value: 0 % on Mar 27 15:00

Minimum Daily Average: 1.2 % on Mar 29

Maximum Diurnal Average: 5.3 % at hour 12

Minimum Diurnal Average: 1.8 % at hour 16

Monthly Average: 3.3 %

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 6$ $P_{99} = 36$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

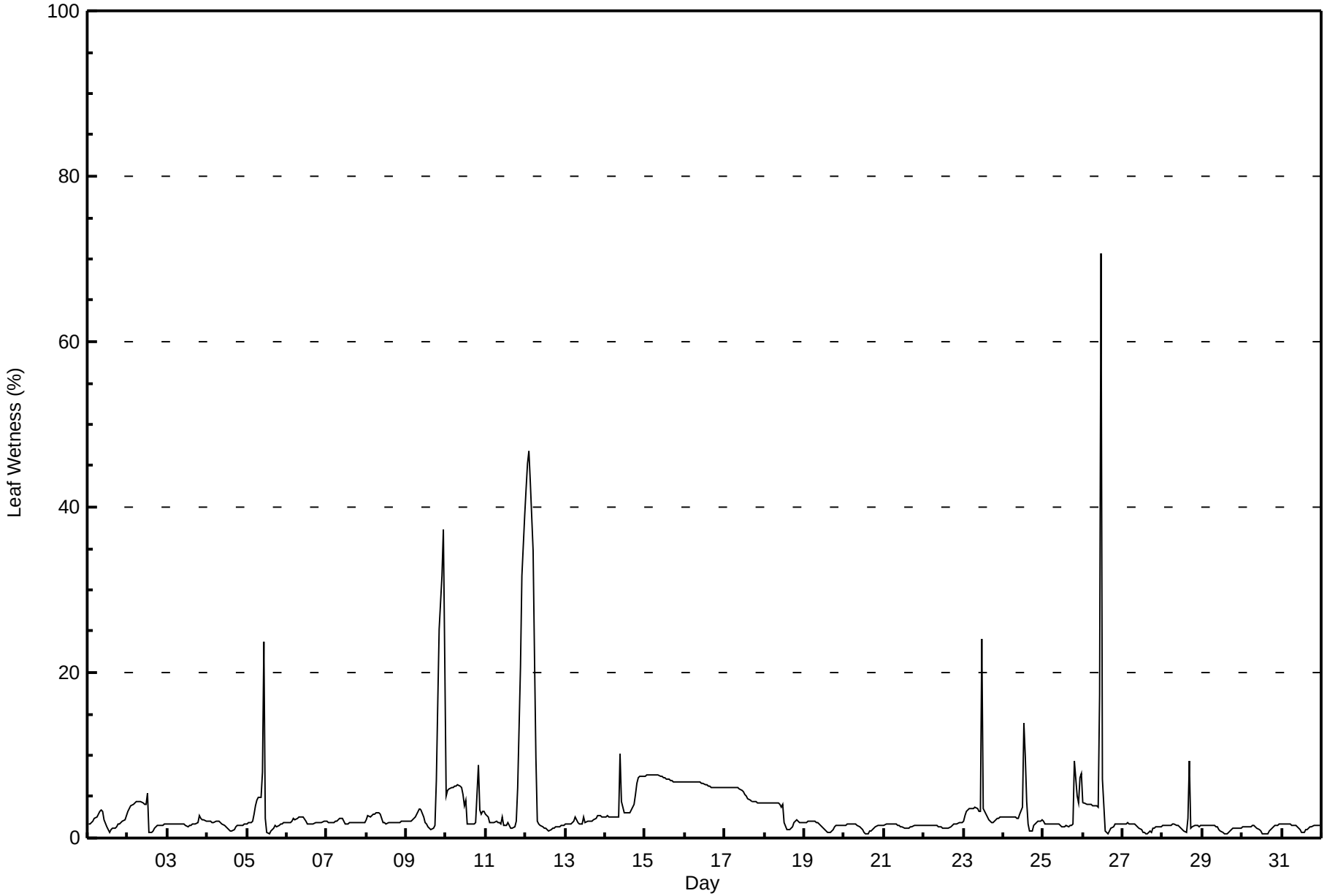
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	2	2	2	2	2	3	3	3	3	3	2	1	1	1	1	1	1	1	2	2	2	2	2	3	1.9	3
2-Mar	3	4	4	4	4	4	4	4	4	4	4	4	5	1	1	1	1	1	2	2	2	2	2	2	2.9	5
3-Mar	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	3	2	2	2	2	1.8	3
4-Mar	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2	2	2	2	1.6	2
5-Mar	2	2	2	2	3	4	5	5	5	8	24	2	1	1	1	1	1	1	1	2	2	2	2	2	3.3	24
6-Mar	2	2	2	2	2	2	2	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	3
7-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	1.9	2
8-Mar	2	3	2	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.2	3
9-Mar	2	2	2	2	2	3	3	3	4	3	3	2	2	1	1	1	1	2	7	16	25	32	37	22	7.4	37
10-Mar	5	6	6	6	6	6	6	6	6	6	5	4	5	2	2	2	2	2	2	9	3	3	3	3	4.4	9
11-Mar	3	3	2	2	2	2	2	2	2	2	3	2	2	2	1	1	1	1	2	6	13	21	32	39	6.1	39
12-Mar	42	45	47	43	35	22	10	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	11.1	47
13-Mar	2	2	2	2	2	2	3	2	2	2	2	3	2	2	2	2	2	2	2	3	3	3	3	3	2.1	3
14-Mar	3	3	3	3	3	3	3	3	3	10	4	3	3	3	3	3	4	4	5	7	7	7	7	8	4.3	10
15-Mar	8	8	8	8	8	8	8	8	8	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7.2	8
16-Mar	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6	6	6	6	6	6	6.5	7
17-Mar	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	4	4	4	4	4	4	4	4	5.3	6
18-Mar	4	4	4	4	4	4	4	4	4	4	4	4	2	1	1	1	1	1	2	2	2	2	2	2	2.9	4
19-Mar	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1.5	2
20-Mar	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1.3	2
21-Mar	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1.5	2
22-Mar	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1.5	2
23-Mar	2	3	3	3	4	4	4	4	3	3	3	24	4	3	2	2	2	2	2	2	2	2	2	3	3.7	24
24-Mar	3	3	3	3	3	3	3	3	2	2	3	4	14	10	4	2	1	1	1	2	2	2	2	2	3.1	14
25-Mar	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	9	5	4	7	8	2.7	9
26-Mar	4	4	4	4	4	4	4	4	4	4	17	71	7	1	1	1	1	1	1	2	2	2	2	2	6.2	71
27-Mar	2	2	2	2	2	2	2	2	2	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1.3	2
28-Mar	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	2	9	1	1	2	2	1	1	1	1.8	9
29-Mar	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1.2	2
30-Mar	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	2	2	2	1.2	2
31-Mar	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1.4	2
	4.0	4.1	4.2	4.1	3.9	3.6	3.2	3.0	2.9	3.2	3.8	5.3	2.7	2.0	1.8	1.8	2.0	1.9	2.3	3.3	3.6	4.0	4.7	4.5	Diurnal Average	
	42	45	47	43	35	22	10	8	8	10	24	71	14	10	7	7	9	7	7	16	25	32	37	39	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Leaf Wetness (LW) - %

Conklin Lookout - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	0	0.00	0.00
0.4 - 0.5	8	1.08	1.08
0.6 - 0.7	20	2.69	3.76
0.8 - 1.4	142	19.09	22.85
1.5 - 10	526	70.70	93.55
> 10	21	2.82	96.37

Total Number of Valid Hours: 744

Total Number of Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Averages

Global Radiation (GR) - W/m2

Conklin Lookout - March 2016

Maximum Value: 796 W/m2 on Mar 30 13:00

Maximum Daily Average: 217.0 W/m2 on Mar 29

Minimum Value: 0 W/m2 on Mar 1 01:00

Minimum Daily Average: 11.5 W/m2 on Mar 16

Maximum Diurnal Average: 401.2 W/m2 at hour 13

Minimum Diurnal Average: 0.0 W/m2 at hour 3

Monthly Average: 112.3 W/m2

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 4 $Q_3 = 150$ $P_{90} = 425$ $P_{99} = 704$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

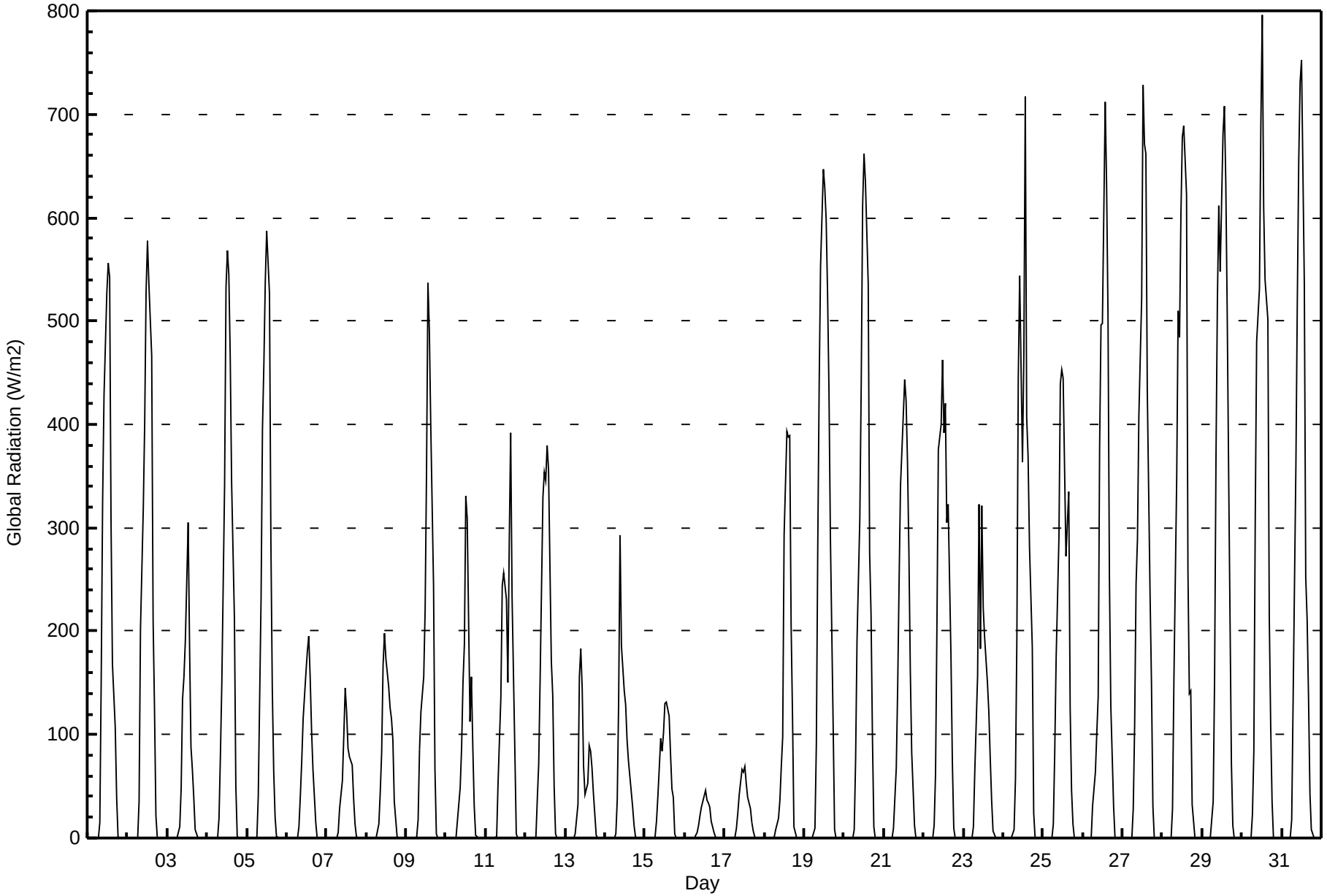
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0	0	0	0	0	0	0	15	154	326	429	527	556	542	305	168	107	40	1	0	0	0	0	0	132.1	556
2-Mar	0	0	0	0	0	0	0	36	201	319	401	529	578	536	466	212	125	22	1	0	0	0	0	0	142.8	578
3-Mar	0	0	0	0	0	0	0	11	48	135	156	191	305	186	88	67	39	8	0	0	0	0	0	0	51.4	305
4-Mar	0	0	0	0	0	0	0	19	81	150	342	533	569	545	466	343	211	51	1	0	0	0	0	0	138.0	569
5-Mar	0	0	0	0	0	0	0	40	232	396	459	538	587	526	287	146	65	21	1	0	0	0	0	0	137.4	587
6-Mar	0	0	0	0	0	0	0	11	41	75	115	161	180	195	156	104	66	15	1	0	0	0	0	0	46.6	195
7-Mar	0	0	0	0	0	0	0	6	28	56	99	146	122	87	78	70	39	14	1	0	0	0	0	0	31.1	146
8-Mar	0	0	0	0	0	0	0	13	45	83	167	198	173	146	126	116	95	35	1	0	0	0	0	0	50.0	198
9-Mar	0	0	0	0	0	0	1	18	85	123	156	221	355	536	491	400	244	66	4	0	0	0	0	0	112.5	536
10-Mar	0	0	0	0	0	0	1	17	48	86	150	187	331	309	113	156	89	31	2	0	0	0	0	0	63.3	331
11-Mar	0	0	0	0	0	0	2	53	95	136	244	256	231	151	288	392	234	83	5	0	0	0	0	0	90.3	392
12-Mar	0	0	0	0	0	0	2	38	72	154	330	354	346	379	357	171	139	51	4	0	0	0	0	0	99.9	379
13-Mar	0	0	0	0	0	0	4	32	156	183	146	70	42	53	89	85	68	43	3	0	0	0	0	0	40.6	183
14-Mar	0	0	0	0	0	0	4	36	132	293	186	143	129	95	74	60	29	12	1	0	0	0	0	0	49.7	293
15-Mar	0	0	0	0	0	0	1	16	41	96	84	102	130	132	118	82	48	40	4	0	0	0	0	0	37.2	132
16-Mar	0	0	0	0	0	0	1	5	12	22	30	35	47	36	35	30	17	5	1	0	0	0	0	0	11.5	47
17-Mar	0	0	0	0	0	0	1	9	24	43	66	63	70	53	39	29	15	7	1	0	0	0	0	0	17.5	70
18-Mar	0	0	0	0	0	0	1	8	19	37	70	98	293	393	388	390	205	118	11	0	0	0	0	0	84.6	393
19-Mar	0	0	0	0	0	0	9	91	281	437	553	647	629	598	526	433	293	107	8	0	0	0	0	0	192.2	647
20-Mar	0	0	0	0	0	0	8	76	191	309	440	612	662	635	535	275	217	98	11	0	0	0	0	0	169.5	662
21-Mar	0	0	0	0	0	0	10	68	146	246	340	374	443	423	363	277	162	82	12	0	0	0	0	0	122.9	443
22-Mar	0	0	0	0	0	0	12	62	206	376	400	462	391	421	304	323	176	73	10	0	0	0	0	0	134.1	462
23-Mar	0	0	0	0	0	0	11	66	157	323	183	321	222	194	150	122	77	37	7	0	0	0	0	0	77.9	323
24-Mar	0	0	0	0	0	0	8	58	194	444	544	364	470	717	407	369	283	184	24	0	0	0	0	0	169.3	717
25-Mar	0	0	0	0	0	0	13	83	173	290	439	453	444	359	273	335	127	47	14	0	0	0	0	0	127.1	453
26-Mar	0	0	0	0	0	0	31	63	102	137	376	496	498	712	630	505	252	127	30	0	0	0	0	0	165.0	712
27-Mar	0	0	0	0	0	0	29	110	246	289	408	522	728	671	662	433	235	150	31	0	0	0	0	0	188.2	728
28-Mar	0	0	0	0	0	0	28	153	349	510	484	603	678	688	623	258	140	142	33	0	0	0	0	0	195.5	688
29-Mar	0	0	0	0	0	1	35	155	367	519	612	548	680	708	633	508	357	72	12	0	0	0	0	0	217.0	708
30-Mar	0	0	0	0	0	1	22	84	309	481	532	691	796	610	540	502	214	110	35	1	0	0	0	0	205.3	796
31-Mar	0	0	0	0	0	1	18	132	363	519	653	731	752	536	252	211	136	43	8	0	0	0	0	0	181.5	752
	0.0	0.0	0.0	0.0	0.0	0.1	8.1	51.1	148.4	244.9	309.6	360.5	401.2	392.6	318.1	244.2	145.3	62.3	8.9	0.1	0.0	0.0	0.0	0.0	Diurnal Average	
	0	0	0	0	0	1	35	155	367	519	653	731	796	717	662	508	357	184	35	1	0	0	0	0	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Global Radiation (GR) - W/m2

Conklin Lookout - March 2016



Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	415	55.78	55.78
21 - 100	102	13.71	69.49
101 - 300	107	14.38	83.87
301 - 600	95	12.77	96.64
601 - 900	25	3.36	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

Conklin Lookout - March 2016

Maximum Speed: 20 km/h on Mar 5 04:00

Maximum Daily Speed Average: 12.0 km/h on Mar 21

Minimum Speed Value: 0 km/h on Mar 4 08:00

Minimum Daily Speed Average: 1.6 km/h on Mar 2

Maximum Diurnal Speed Average: 2.1 km/h at hour 2

Minimum Diurnal Speed Average: 0.2 km/h at hour 19

Monthly Average Velocity: 1.4 km/h 218.9 deg

Percentiles: $P_1 = 2$ $P_{10} = 4$ $Q_1 = 6$ Median = 8 $Q_3 = 11$ $P_{90} = 13$ $P_{99} = 16$

Hours in Service: 744

Hours of Data: 722

Hours of Missing Data: 22

Percent Operational Time: 97.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	SW12	SW12	SW14	SW13	SW10	SW11	SW10	SW10	SW8	WNW4	NW5	N4	NW4	N4	S4	SSE6	ESE4	ENE5	NE8	ENE8	NE8	NE8	NE8	NE7	SSW2.0	SW14
2-Mar	ENE6	E5	E5	E4	ESE2	N3	NE5	SE3	SSW3	NNW3	NNW4	NE2	NNE4	NE3	N3	NW3	ENE2	ESE3	SE4	SSE5	S7	S7	S5	S7	ESE1.6	S7
3-Mar	S6	S8	S9	S8	S8	SSE10	SSE11	SSE10	S12	S15	S12	S9	SSE9	SSW7	SSW8	SW7	SW8	W5	WNW7	NW9	NNW11	NNW10	NNW8	N6	SSW4.6	S15
4-Mar	NNW5	NNW5	N4	N3	NW2	NNW1	W2	W0	ESE4	SE5	SE5	SE7	SE9	SE9	SSE9	SE11	SE11	SE11	SSE11	SSE12	S12	S12	S13	S13	SSE5.2	S13
5-Mar	S15	SSW17	SSW19	SW20	SW16	SW14	SW13	SW7	SW9	W5	WNW7	WNW6	NW3	WNW3	NW6	NNW3	N4	NE11	NE10	NE12	NE14	ENE13	NE12	NE12	SW1.9	SW20
6-Mar	NE10	NE10	NNE9	NNE10	NE10	NE11	ENE9	NE8	NE8	NE8	NE8	ENE7	ENE8	ENE9	ENE10	ENE12	ENE13	ENE13	ENE13	ENE11	E13	E12	E12	E11	ENE9.7	E13
7-Mar	E9	E8	E8	E6	E6	ENE5	ENE3	NE3	E2	SSE4	WSW3	WNW4	WNW6	NW6	WNW10	WNW8	WNW9	WNW9	W10	WNW7	WNW6	WNW6	W4	W6	NW2.1	WNW10
8-Mar	W7	NNW2	SE1	ESE4	SE4	SSE3	S2	SSW3	S6	S10	SSW11	SSW11	SSW11	SSW12	SW11	SW11	SW12	SW10	SW10	SW10	SW9	SW8	SW10	SW8	SW6.8	SW12
9-Mar	WSW9	WSW9	WSW9	WSW7	WSW8	W7	WSW3	SSW4	SSW7	SSW6	SSW8	SSW9	SSW8	SSW8	SW9	SSW9	SSW9	SSW6	S5	S8	SSW11	SSW12	SSW12	SSW12	SSW7.5	SSW12
10-Mar	S13	S12	S9	SSE8	S9	SSE9	SSE9	SSE10	SE11	SE11	SE12	SE12	SE12	SE14	SE15	SE13	SE8	SSE8	SSE9	SSE9	SSE1	W5	SSW5	SW5	SSE8.5	SE15
11-Mar	SW9	W14	W15	WNW13	W13	W12	WSW10	W15	W16	W15	WNW16	WNW14	W13	WNW14	WNW15	WNW16	WNW14	WNW9	NW3	WSW2	SSW4	SSE3	SSE6	SSE8	W9.7	WNW16
12-Mar	SE8	SE8	SSE9	SSE9	SSE9	SSE9	SSE8	SE7	ESE7	ESE7	SE16	SE16	SE17	SE13	SSE16	SSE14	SE11	SE10	SE8	SE5	E4	E6	ESE6	E4	SE9.1	SE17
13-Mar	NNE5	E5	NNE4	NNW4	NNW4	NNW4	NNW4	NNW4	NNW5	NNW6	NW8	WNW11	WNW13	WNW14	WNW12	WNW12	WNW13	WNW13	WNW13	WNW11	WNW11	WNW10	NW9	WNW7	NW7.4	WNW14
14-Mar	NW6	NW5	NW6	NW6	NW7	NW6	NW6	NW5	NNW5	NNW7	NNW6	N5	NNW5	NNW5	NNW5	NNW5	NNW4	NW5	NNW4	NNW4	NNW3	NNE6	NNE5	NNE7	NNW5.1	NNW7
15-Mar	NNE6	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NNW8	----	NNW8
16-Mar	NNW8	NNW8	NNW7	NNW8	NNW8	NNW7	NNW7	NNW7	NNW6	NNW6	NNW6	NNW6	NNW8	NNW6	NNW7	N7	N6	N4	N7	N6	NNW6	NNW5	NW6	NW7	NNW6.6	NNW8
17-Mar	WNW8	NW7	NW8	NW8	NW8	NW9	NW8	NNW6	NNW7	NNW7	N7	NNW9	NNW9	NNW8	NNW7	NNW7	NNW7	NW9	NNW5	NNW3	NNW3	NNW3	N3	N3	NNW6.4	NNW9
18-Mar	NNW3	NNW3	NW3	NW3	NW2	NW2	NW1	NW3	WNW3	S3	SSW6	SW4	WSW5	WNW5	W6	WSW8	WSW7	S4	SSW5	SSW7	SSW9	SW11	SW13	SW14	SW3.9	SW14
19-Mar	SW14	SW14	SW14	SW14	SSW14	SSW14	SW14	SSW12	SSW13	SSW13	SSW12	S12	SSE10	SSE11	SSE11	SE11	SE12	SE10	SSE8	SSE7	SSE7	SSE9	SSE9	SSE8	S9.8	SW14
20-Mar	SSE7	SE7	SE7	ESE8	ESE7	ESE6	ESE8	ESE7	ESE8	ESE7	ESE8	ESE9	ESE10	SE11	SE10	SE9	ESE9	ESE9	ENE8	NNE9	NE9	NE7	ENE7	E8	ESE7.0	SE11
21-Mar	ENE8	ENE9	ENE11	ENE12	ENE13	ENE12	ENE12	ENE12	ENE13	ENE13	E13	E13	E14	E13	E12	E14	E14	ENE15	ENE14	ENE13	ENE12	E11	E9	E8	ENE12.0	ENE15
22-Mar	E7	E8	E9	E7	E7	E7	ESE6	E6	ESE6	SE8	SE9	SSE8	SE7	SE7	SSE7	SE7	SE7	S6	SSE6	SSE5	S7	S8	S9	S8	SE6.1	SE9
23-Mar	SSW6	SSW7	SSW8	SSW9	SW10	SW10	SW10	SW8	W9	WNW9	WNW9	NW10	WNW11	WNW9	WNW8	WNW7	NW7	NW4	NNE5	NE6	NE9	NNE9	NNE8	NE8	WNW3.2	WNW11
24-Mar	NE9	NE11	NE9	NE10	NE9	NE9	NE8	NE8	NE6	NE8	NE9	NE8	NE10	E8	ENE9	E5	NE4	E6	ESE3	ENE3	E3	ESE5	ESE5	SSE4	ENE6.2	NE11
25-Mar	SSW6	SSW9	SSW9	SSW10	SSW10	SW10	SW10	SSW10	SSW11	SSW11	SSW12	SSW12	SSW11	SSW13	SW15	SW14	SW12	SW11	SW8	W6	WSW7	WSW9	WSW9	W8	SW9.7	SW15
26-Mar	WSW8	W9	WNW8	WNW6	NW7	NW5	NW5	N6	NW5	NW4	W3	E4	NNE5	NNW6	N4	WSW4	NNW2	WSW6	W3	SSW2	SSE5	S7	S8	S8	W2.7	W9
27-Mar	SSW10	S10	S10	S10	S9	S9	S7	S6	S7	S9	S12	SSE12	SSE11	SSE12	SE11	SSE10	SSE11	SSE11	SSE9	SSE8	S9	S10	S10	S9	S9.4	SSE12
28-Mar	S6	SSW7	S8	SSW7	SSW11	SSW11	SSW15	SW16	SW15	SW12	SW14	SW15	SW14	SW16	WSW13	W14	WSW9	WSW9	WSW7	WSW6	WSW7	WSW9	W11	WNW11	SW9.8	SW16
29-Mar	WNW9	WNW10	WNW12	W11	W12	W12	W13	WNW13	WNW12	W10	W10	WNW11	WNW13	WNW14	WNW15	NW12	WNW15	WNW11	WNW6	W6	W9	W9	W9	W9	WNW10.8	WNW15
30-Mar	W8	W8	W10	WNW10	WNW10	NW10	NW8	NW8	NW8	NNW9	NNW9	NNW11	NNW13	NNW12	NNW11	NNW12	NNW12	NW11	NNW10	NNW10	NW8	N9	N9	N7	NW9.0	NNW13
31-Mar	N6	N9	N11	N10	N8	N8	N7	N6	N7	N6	NNW7	NNW8	NNW7	NNW8	NNW6	NW6	NW5	W6	W6	SSW4	S6	S5	SSW8	SW14	NNW4.0	SW14
	SW1.7	SW2.1	SW2.0	SW2.0	SW2.0	SW1.8	SW1.7	SW1.6	SW1.8	SW1.3	SW1.8	SSW1.4	SW1.3	SW1.5	SW1.8	SW1.8	WSW1.2	SW0.8	SE0.2	SSE0.5	S0.7	S0.8	SSW1.4	SSW1.5	Diurnal Average	
	S15	SSW17	SSW19	SW20	SW16	SW14	SSW15	SW16	W16	W15	WNW16	SE16	SE17	SW16	SSE16	WNW16	WNW15	ENE15	ENE14	ENE13	NE14	ENE13	SW13	SW14	Diurnal Maximum	

AF - Analyzer Failure

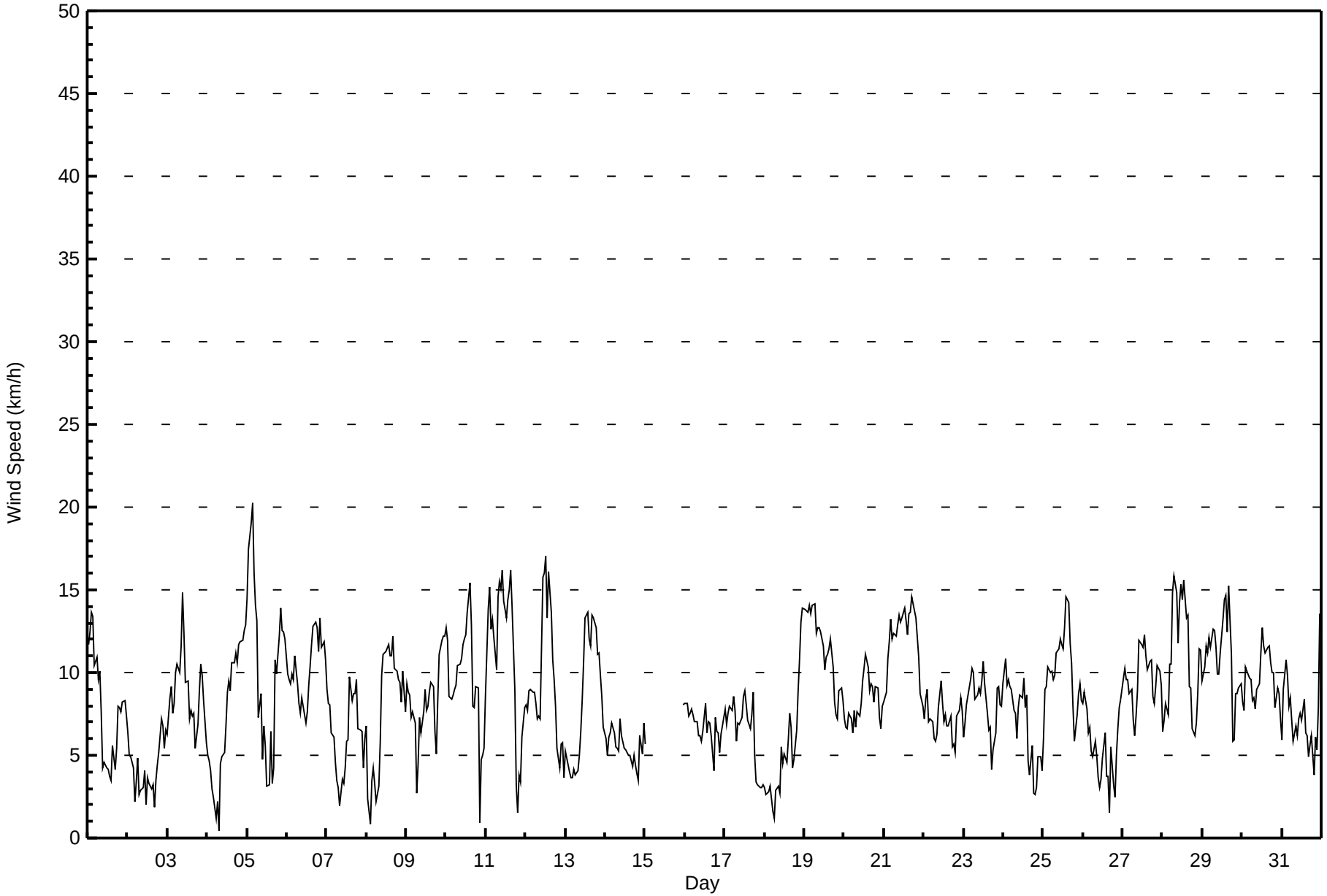
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Conklin Lookout - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	147	20.36	20.36
6 - 11	435	60.25	80.61
12 - 19	139	19.25	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: 722

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Conklin Lookout - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	12	6	5	5	9	9	7	8	6	9	2	5	8	5	19	32	147
6 - 11	19	8	33	14	20	17	28	41	36	40	28	19	23	34	30	45	435
12 - 19	0	0	4	16	10	0	11	5	12	17	25	2	11	21	1	4	139
20 - 28	0	0	0	0	0	0	0	0	0	0	1	0	0	0	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	31	14	42	35	39	26	46	54	54	66	56	26	42	60	50	81	722

Total Number of Valid Hours: 722

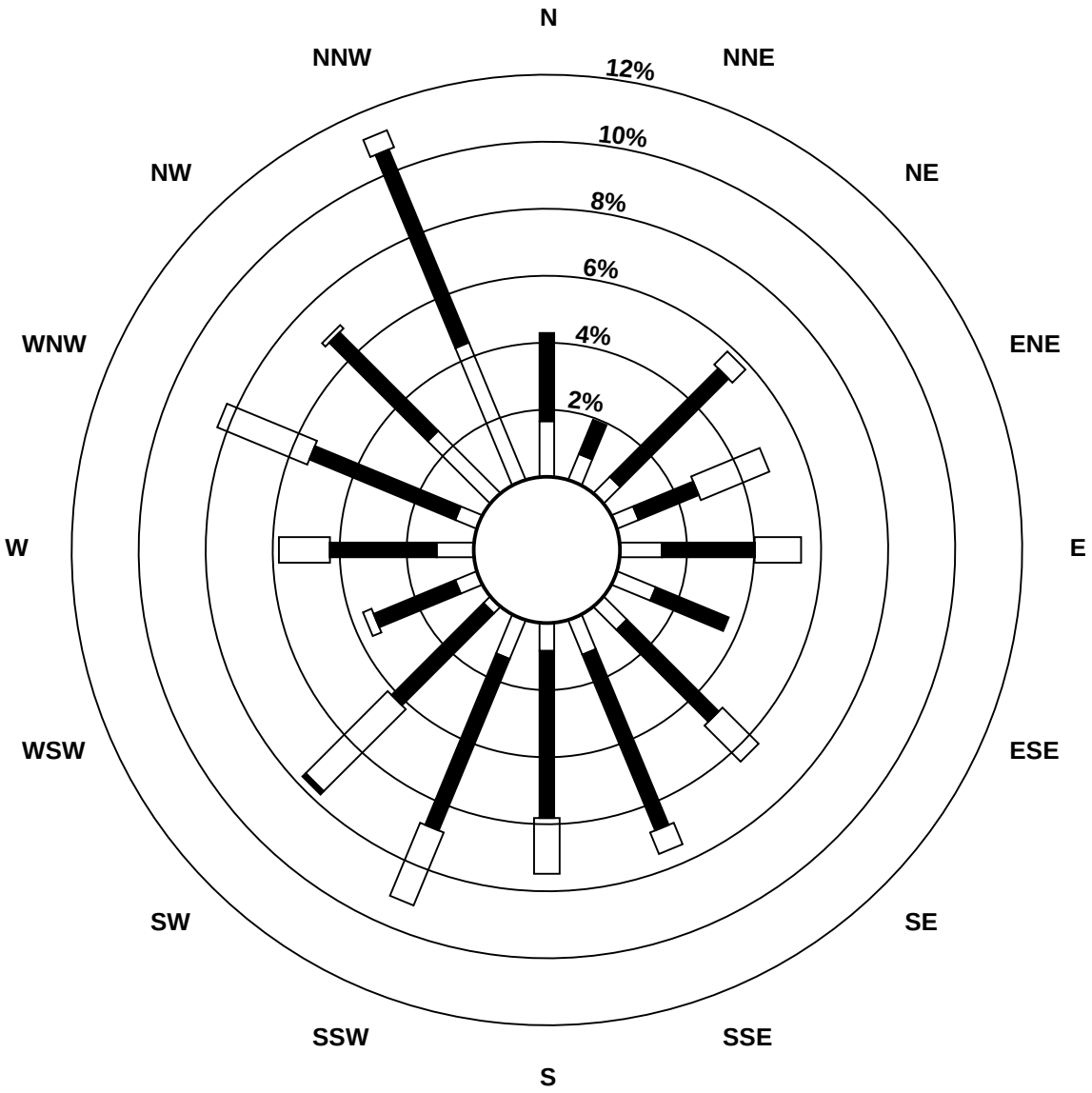
Total Number of Hours: 744

Wood Buffalo Environmental Association

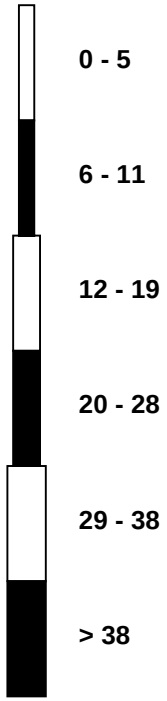
Wind Rose Mar 2016

Wind Speed (WS) - km/h

Conklin Lookout (AMS 18)



Classes (km/h)



Total Number of Valid Hours: 722

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Conklin Lookout - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 7 km/h on Mar 10 20:00

Minimum Value: 0 km/h on Mar 13 05:00

Percentiles: P_1 = 1 P_{10} = 1 Q_1 = 2 Median = 2 Q_3 = 3 P_{90} = 4 P_{99} = 5

Hours in Service:	744
Hours of Data:	722
Hours of Missing Data:	22
Hours of Calibration:	0
Percent Operational Time:	97.0

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

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Conklin Lookout - March 2016

Direction of Maximum Speed: 220 deg on Mar 5 04:00
Direction of Maximum Daily Speed Average: 77.0 deg on Mar 21

Direction of Minimum Speed: 260 deg on Mar 4 08:00
Direction of Minimum Daily Speed Average: 1.6 deg on Mar 2

Monthly Average Direction: 277.5 deg

Hours in Service:	744
Hours of Data:	722
Hours of Missing Data:	22
Percent Operational Time:	97.0

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	215	214	216	218	218	224	224	223	221	285	321	352	323	360	175	155	108	78	49	77	46	38	34	55	211.9
2-Mar	77	91	81	101	109	349	35	127	202	345	338	40	29	36	1	324	62	121	143	168	173	176	175	190	108.6
3-Mar	184	189	187	190	169	149	152	162	171	176	187	174	160	200	209	216	224	268	302	322	330	333	345	354	195.1
4-Mar	342	346	355	351	310	336	268	260	115	131	124	138	145	140	150	145	136	146	158	161	171	173	175	177	153.4
5-Mar	184	197	208	220	221	215	215	224	215	281	294	286	307	294	308	334	352	40	42	48	55	57	43	42	223.3
6-Mar	49	38	20	33	43	45	57	55	35	47	52	58	67	70	72	67	68	68	62	70	79	86	87	83	60.3
7-Mar	82	81	91	84	91	67	58	37	96	157	247	303	298	313	295	295	284	283	275	299	296	296	279	273	314.2
8-Mar	276	336	126	123	140	162	179	193	190	180	201	212	208	209	219	223	231	234	233	231	224	236	230	234	216.7
9-Mar	237	241	240	249	253	271	247	211	196	209	201	195	208	213	221	206	199	192	173	187	192	193	201	197	211.5
10-Mar	191	184	171	164	170	159	154	151	132	140	136	135	130	137	140	139	134	152	155	166	157	276	213	235	154.8
11-Mar	232	259	280	288	273	267	255	264	266	277	290	282	271	283	287	284	287	303	323	238	209	152	160	149	271.9
12-Mar	141	144	158	154	163	156	148	143	114	119	143	138	142	142	150	147	145	144	137	136	98	101	117	93	140.7
13-Mar	30	82	26	340	340	338	336	340	334	331	316	299	292	302	301	302	296	291	291	294	285	300	304	301	307.6
14-Mar	316	325	316	314	304	310	315	314	343	338	339	355	347	335	344	338	339	325	329	329	348	15	17	32	335.4
15-Mar	20	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	332	--
16-Mar	335	337	339	338	340	339	340	340	342	348	342	339	333	344	344	349	355	3	10	352	348	329	318	306	340.6
17-Mar	303	309	306	313	321	315	322	333	340	341	349	339	340	339	334	336	327	320	340	342	343	340	351	351	329.2
18-Mar	336	339	326	326	320	317	316	317	288	187	200	228	247	283	279	238	248	191	194	200	212	215	214	217	235.5
19-Mar	218	219	214	214	212	213	215	206	201	192	192	189	167	163	156	142	127	129	150	155	157	147	158	155	183.8
20-Mar	148	138	133	114	111	105	113	108	112	117	103	105	121	141	136	131	111	108	73	28	35	46	73	84	106.0
21-Mar	60	68	66	70	70	73	74	78	76	78	83	86	90	88	83	88	79	72	71	73	71	80	84	79	77.0
22-Mar	85	97	97	98	93	99	103	97	112	132	141	148	146	142	151	139	143	173	154	164	174	178	182	187	134.8
23-Mar	192	198	193	203	215	221	224	234	265	291	302	309	295	297	302	302	318	326	28	50	48	33	28	36	282.9
24-Mar	40	46	48	53	51	50	41	42	40	51	55	48	47	88	61	85	56	97	113	76	87	105	120	168	60.0
25-Mar	202	200	205	213	212	216	214	211	207	210	204	204	202	206	221	231	223	224	218	260	238	251	258	263	218.8
26-Mar	253	276	294	299	317	315	325	8	324	308	267	99	21	331	350	257	340	254	273	212	167	187	191	191	281.0
27-Mar	195	189	189	191	188	186	181	172	181	170	171	167	156	148	144	154	168	155	154	163	170	172	176	180	170.8
28-Mar	189	200	187	192	195	196	208	214	215	233	223	226	226	235	239	264	248	255	258	245	252	253	280	289	230.1
29-Mar	285	283	285	279	275	275	278	284	287	281	279	295	285	289	284	304	289	286	283	260	276	274	279	277	283.2
30-Mar	277	275	280	289	302	312	318	318	324	327	333	332	329	328	337	331	327	320	339	328	324	355	1	359	322.6
31-Mar	352	9	10	6	356	4	1	356	349	352	331	345	335	335	328	324	322	274	259	210	183	181	199	218	331.7
	219.5	215.0	226.5	230.4	229.3	231.9	220.3	222.5	216.2	215.7	216.2	211.0	217.5	228.4	232.9	231.0	239.9	219.1	129.9	153.1	171.3	179.4	195.4	211.2	
	Diurnal Average																								

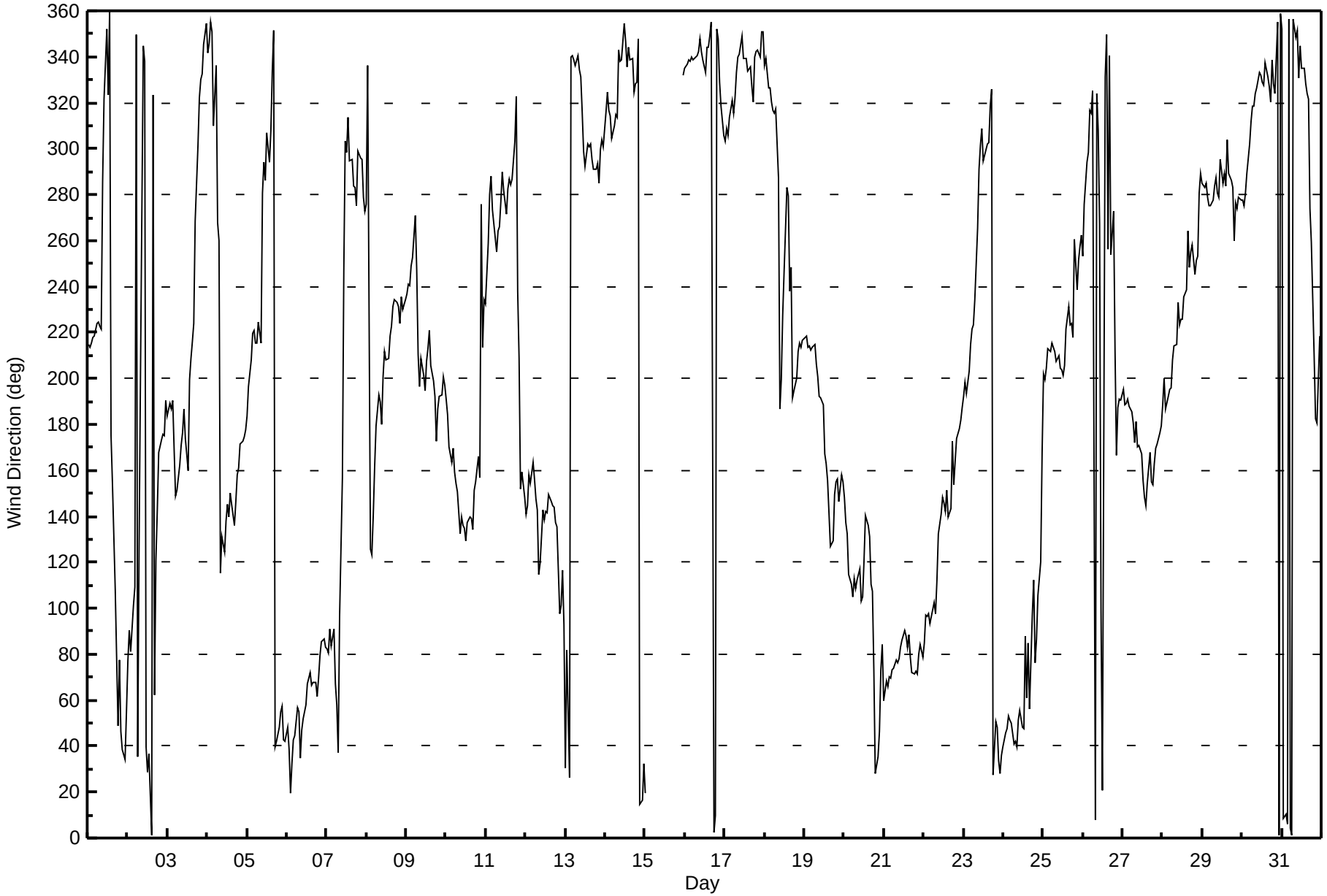
AF - Analyzer Failure
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Conklin Lookout - March 2016



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Conklin Lookout - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 97 deg on Mar 10 21:00

Minimum Value: 11 deg on Mar 18 19:00

Percentiles: P_1 = 13 P_{10} = 16 Q_1 = 18 Median = 22 Q_3 = 27 P_{90} = 34 P_{99} = 72

Hours in Service:	744
Hours of Data:	722
Hours of Missing Data:	22
Hours of Calibration:	0
Percent Operational Time:	97.0

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	17	16	15	15	16	16	14	14	18	40	36	42	44	66	71	27	25	31	18	17	16	17	17	21	71
2-Mar	16	17	16	16	62	16	18	48	59	24	20	70	55	64	72	53	60	16	17	16	20	19	20	14	72
3-Mar	14	15	16	19	26	19	18	21	22	23	24	28	21	33	27	21	24	23	27	23	19	20	22	23	33
4-Mar	23	23	25	28	39	49	28	86	26	37	38	43	32	33	32	26	21	19	18	18	19	20	20	20	86
5-Mar	20	18	19	18	19	18	20	19	17	36	29	38	57	62	24	33	24	24	18	17	17	19	17	18	62
6-Mar	18	20	25	21	20	17	16	17	20	17	18	23	21	21	20	19	19	18	17	18	18	18	17	17	25
7-Mar	19	19	17	18	18	22	19	25	37	32	40	36	29	33	23	25	24	23	21	27	27	27	36	26	40
8-Mar	24	40	69	21	22	24	30	26	26	23	23	24	24	24	22	25	24	24	22	25	23	26	21	23	69
9-Mar	20	23	24	29	29	29	59	37	29	29	29	27	34	34	31	28	24	18	13	16	16	17	16	18	59
10-Mar	18	22	24	22	24	21	24	23	21	24	20	24	21	23	21	22	32	27	19	72	97	29	22	22	97
11-Mar	23	22	23	21	21	23	23	24	22	25	25	25	24	23	24	24	24	23	13	56	25	26	13	16	56
12-Mar	14	17	17	18	16	17	18	25	20	19	23	23	23	25	24	22	22	20	17	22	19	14	15	54	54
13-Mar	23	22	32	12	12	12	14	16	26	27	22	24	20	20	20	21	20	20	22	21	20	22	20	22	32
14-Mar	22	25	21	21	20	20	20	21	32	29	28	29	32	30	25	25	22	19	21	23	24	21	24	21	32
15-Mar	21	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	23	23
16-Mar	26	27	28	27	27	27	26	28	27	29	32	29	27	29	31	28	26	22	21	27	25	22	18	19	32
17-Mar	20	19	19	18	18	18	21	23	26	28	29	29	29	28	28	27	28	21	25	24	25	22	22	22	29
18-Mar	25	23	18	22	25	30	71	24	36	56	29	48	53	58	48	43	29	22	11	13	15	16	15	17	71
19-Mar	16	16	16	17	16	16	17	17	16	20	22	24	26	27	26	28	22	18	19	20	18	14	15	16	28
20-Mar	16	16	15	17	17	15	17	20	20	27	27	28	30	26	30	28	22	20	31	18	16	19	22	17	31
21-Mar	15	19	17	18	16	18	17	17	18	21	21	22	22	24	26	22	20	19	17	18	18	20	17	16	26
22-Mar	17	16	17	17	15	17	17	18	22	27	27	41	44	37	42	30	26	32	22	21	21	20	20	21	44
23-Mar	19	17	15	18	17	17	17	19	26	24	25	26	25	24	31	30	26	35	28	18	16	19	19	17	35
24-Mar	18	17	17	18	16	17	19	18	23	24	24	31	23	41	27	61	57	29	18	29	48	20	15	15	61
25-Mar	13	15	15	16	17	17	18	18	19	20	25	29	27	27	24	25	24	22	24	27	20	23	22	23	29
26-Mar	22	20	20	19	18	15	18	27	28	47	69	58	69	50	78	78	86	28	17	58	18	14	14	14	86
27-Mar	14	15	13	12	13	15	17	20	27	24	22	26	31	29	34	30	26	22	20	18	18	18	17	17	34
28-Mar	21	20	18	18	18	18	17	18	21	25	23	22	24	25	27	29	36	23	23	15	16	20	20	20	36
29-Mar	19	19	20	19	19	17	18	19	23	25	29	27	29	28	25	29	25	20	18	26	21	19	19	20	29
30-Mar	20	17	19	19	20	18	17	17	20	26	31	29	29	29	34	31	27	24	30	26	19	26	25	26	34
31-Mar	26	26	22	25	28	26	26	30	34	41	40	38	41	33	29	34	35	32	21	39	18	17	16	18	41
	26	40	69	29	62	49	71	86	59	56	69	70	69	66	78	78	86	35	31	72	97	29	36	54	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	March 10, 2016	Last Calibration	February 18, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	8:35	End Time (MST)	12:47
Gas Cert Reference	EY0000368	Station temp.	22 Deg C
Cal Gas Concentration	49 ppm	Cal Gas Exp Date	10/06/2016
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.	9035

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-601	-601
Analyzer IP address	192.168.1.43		Lamp voltage	898	897
Calculated slope	0.985514	0.979446	Chamber temp	45.3	45.0
Calculated intercept	-0.649142	-0.764080	Pressure	644.7	647.3
Analyzer Background	21.6	21.6	Flow	0.414	0.413
Analyzer Coefficient	0.918	0.918	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	0.2	----
as found span	5000	58.6	574.3	583.5	0.984
calibrator zero	5000	0.0	0.0	0.6	----
high point	5000	58.6	574.3	587.1	0.978
second point	5000	29.3	287.1	293.8	0.977
third point	5000	14.6	143.1	147.2	0.972
as left zero	5000	0.0	0.0	0.5	----
as left span	5000	58.6	574.3	583.5	0.984
				Average Correction Factor	0.976

Corrected As found	583.3	Previous response	583.4	% change	0.0%

Notes:

no maintenance or adjustments done, filter changed out

Calibration Performed By: Melissa Lemay

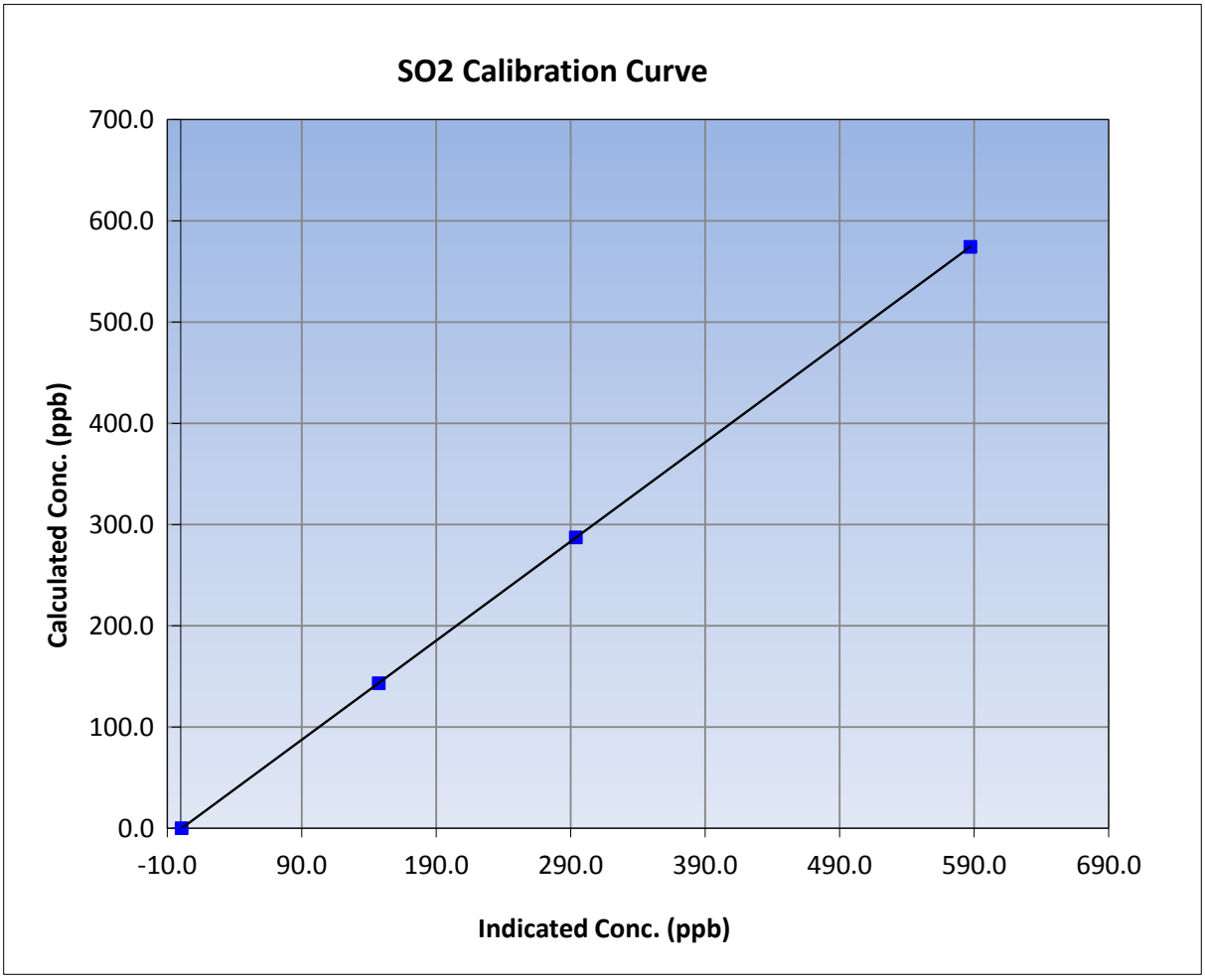
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

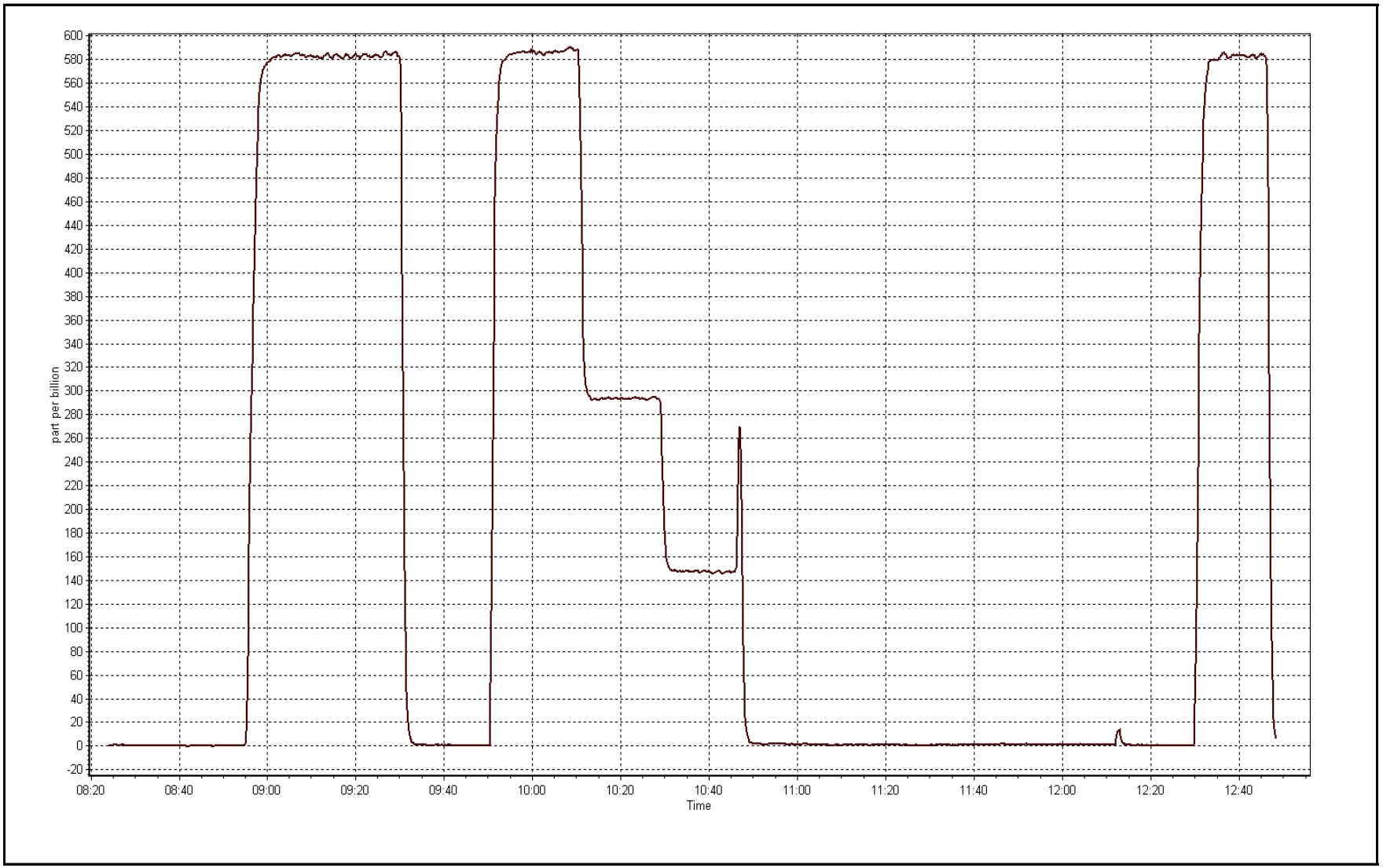
Calibration Date	March 10, 2016	Previous Calibration	February 18, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:35	End Time (MST)	12:47
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301453

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	----	Correlation Coefficient	0.999999
574.3	587.1	0.9782		
287.1	293.8	0.9773	Slope	0.979446
143.1	147.2	0.9720		
			Intercept	-0.764080



SO2 Calibration Plot Date: March 10, 2016



Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

Calibration Date	March 11, 2016	Last Calibration	February 10, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	10:49	End Time (MST)	12:52
Gas Cert Reference	CC233389	Station temp.	22 Deg C
Cal Gas Concentration	4.88 ppm	Cal Gas Exp Date	06/10/2014
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.	9035
SO2 gas concentration	49 ppm	SO2 gas cert/exp	EY0000368 10/Jun/15

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-700	-699
Analyzer IP address	192.168.1.42		Lamp voltage	1017	1014
Calculated slope	0.999644	1.009617	Chamber temp	45	45
Calculated intercept	-0.198473	-0.019709	Pressure	642.9	626.3
Analyzer Background	2.99	2.99	Flow	0.413	0.404
Analyzer Coefficient	1.121	1.121	Intensity	91	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	79.2	1.011
SO2 scrubber check	5000	19.5	191.1	0.8	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	82.0	80.0	79.2	1.011
second point	5000	41.0	40.0	39.8	1.005
third point	5000	20.5	20.0	19.9	1.005
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	82.0	80.0	80.2	0.998
				Average Correction Factor	1.007

Corrected As found	79.3	Previous response	80.3	% change	1.2%

Notes:

no maintenance or adjustments done, filter changed out,

Calibration Performed By: Melissa Lemay

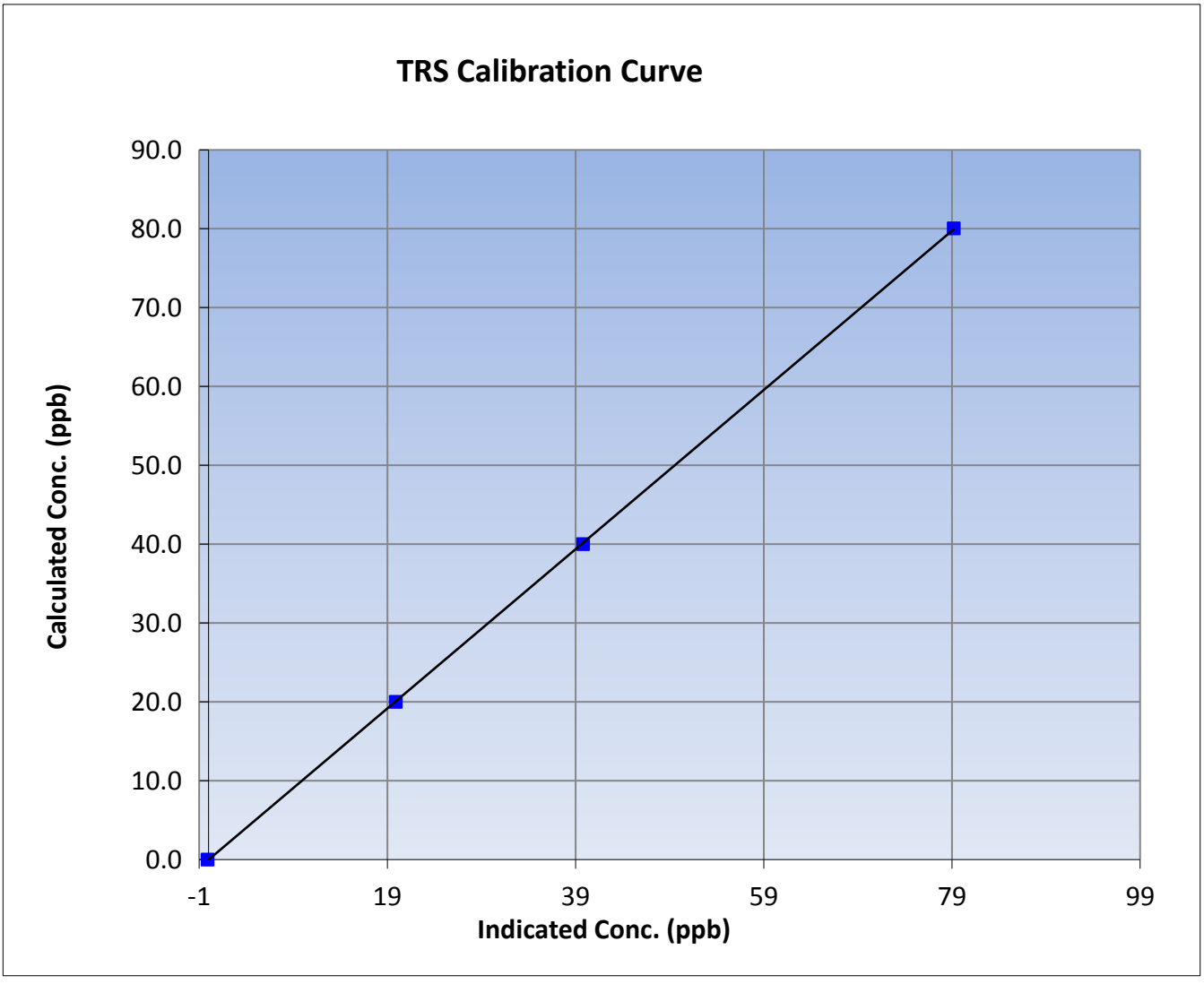
Wood Buffalo Environmental Association
TRS Calibration Report

Station Information

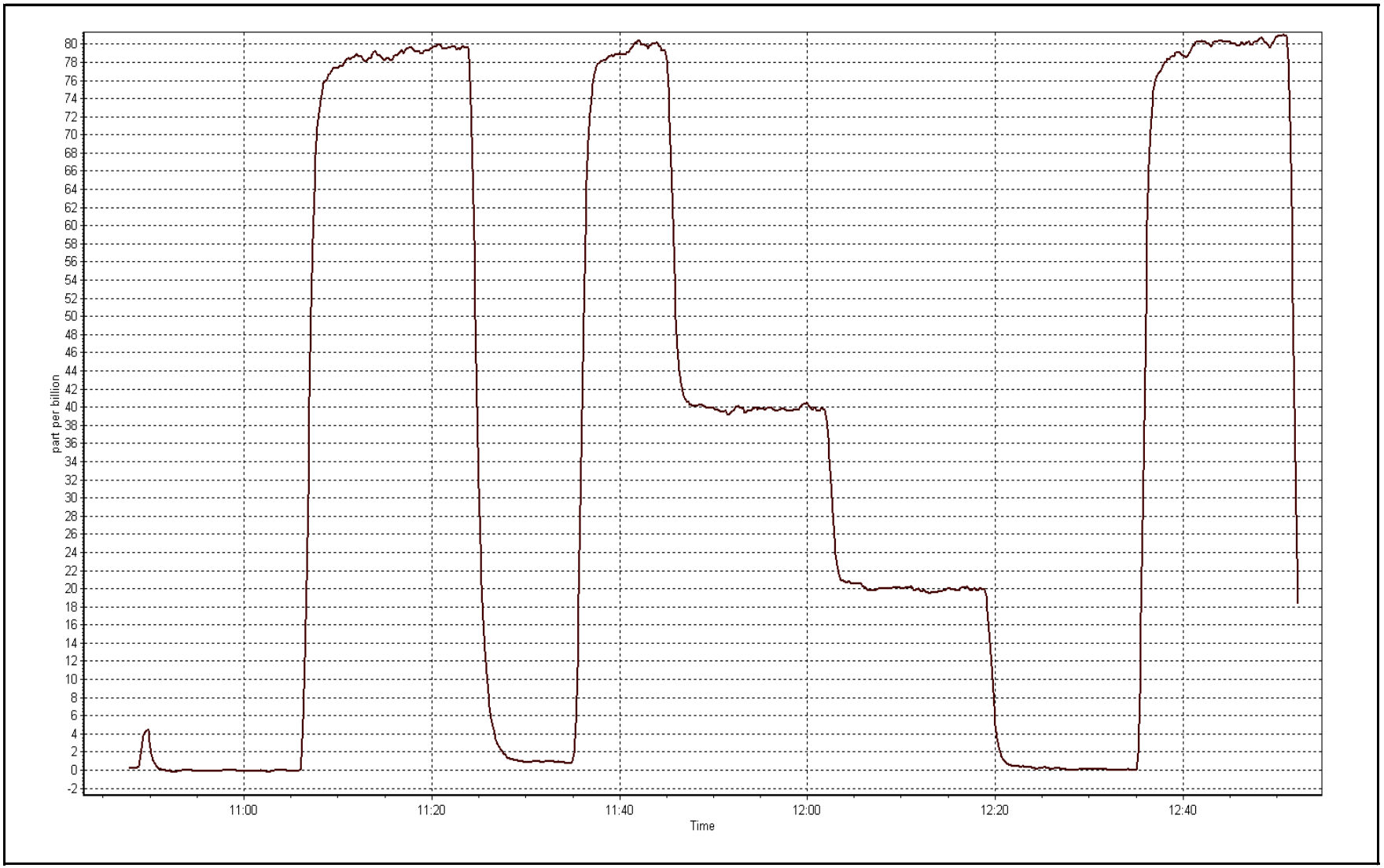
Calibration Date	March 11, 2016	Previous Calibration	February 10, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	10:49	End Time (MST)	12:52
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1336160090

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999986
80.0	79.2	1.0105		
40.0	39.8	1.0054	Slope	1.009617
20.0	19.9	1.0054		
			Intercept	-0.019709



TRS Calibration Plot Date: March 11, 2016



Wood Buffalo Environmental Association
THC / NMHC Calibration Report

W B E A

Station Information

Calibration Date	March 10, 2016	Last Calibration	February 18, 2016
Station Name	Conklin Lookout	Station Number	AMS 18

Reason: Routine

Start Time (MST)	8:35	End Time (MST)	12:48
Gas Cert Reference	EY0000368	Cal Gas Expiry Date	June 10, 2016
CH4 Cal Gas Conc.	518.0 ppm	CH4 Equiv Conc.	1076.3 ppm
C3H8 Cal Gas Conc.	203.0 ppm	Station temp.	22 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	9035

Analyzer Information

	Before	*After*		*Before*	*After*
THC Range (ppm)	0 - 50 ppm		Column Temp	75.4	75.3
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	174.8
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	1.000648	1.002461	Carrier Pressure	31.7	31.7
THC Calc intercept	-0.000291	-0.000258	Fuel Pressure	42.2	43.5
NMHC Calc slope	1.000965	0.999909	Air Pressure	32.5	32.5
NMHC Calc intercept	-0.004230	-0.006207			

Analyzer make	Thermo 55i	Analyzer serial #	1218153354

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	58.6	12.61	12.63	0.999
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.6	12.61	12.59	1.002
second point	5000	29.3	6.31	6.27	1.006
third point	5000	14.6	3.14	3.15	0.998
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	12.61	12.63	0.999
				Average Correction Factor	1.002

Corrected As found	12.63	Previous response	12.61	% change	-0.2%

Notes:

optimized the gas flows. Increased hydrogen from 42.5 to 43.5. Air stayed the same, span adjusted, filter changed out

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	58.6	6.54	6.56	0.997
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.6	6.54	6.55	0.999
second point	5000	29.3	3.27	3.27	1.000
third point	5000	14.6	1.63	1.65	0.988
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	6.54	6.58	0.994
				Average Correction Factor	0.996

Corrected As found	6.56	Previous response	6.54	% change	-0.3%

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	58.6	6.07	6.07	1.000
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.6	6.07	6.04	1.005
second point	5000	29.3	3.04	3.00	1.012
third point	5000	14.6	1.51	1.50	1.008
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	6.07	6.06	1.002
				Average Correction Factor	1.008

Corrected As found	6.07	Previous response	6.07	% change	-0.1%

Wood Buffalo Environmental Association

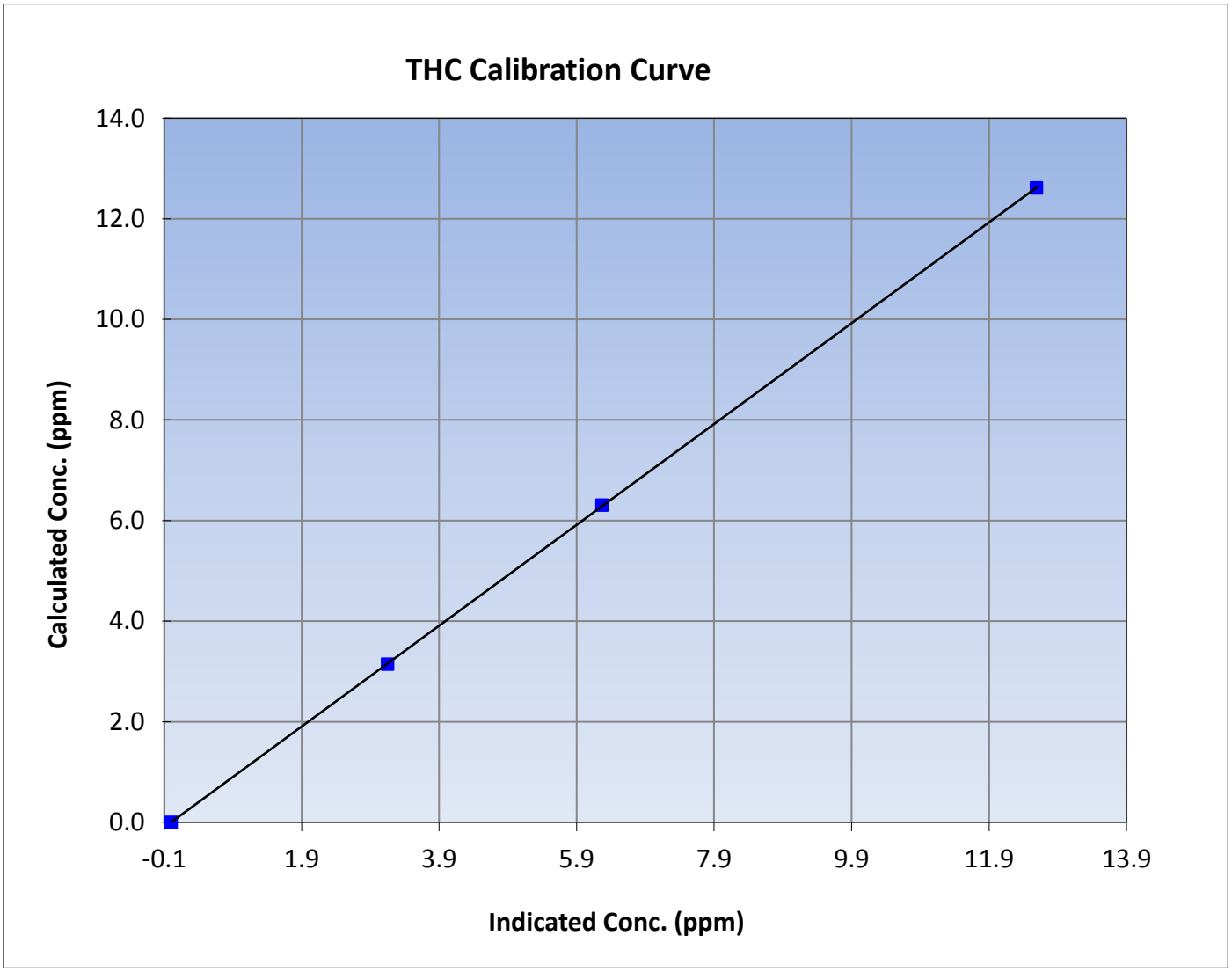
THC Calibration Summary

Station Information

Calibration Date	March 10, 2016	Previous Calibration	February 18, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:35	End Time (MST)	12:48
Analyzer make	Thermo 55i	Analyzer serial #	1218153354

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999992
12.61	12.59	1.0019		
6.31	6.27	1.0059	Slope	1.002461
3.14	3.15	0.9977		
			Intercept	-0.000258



Wood Buffalo Environmental Association

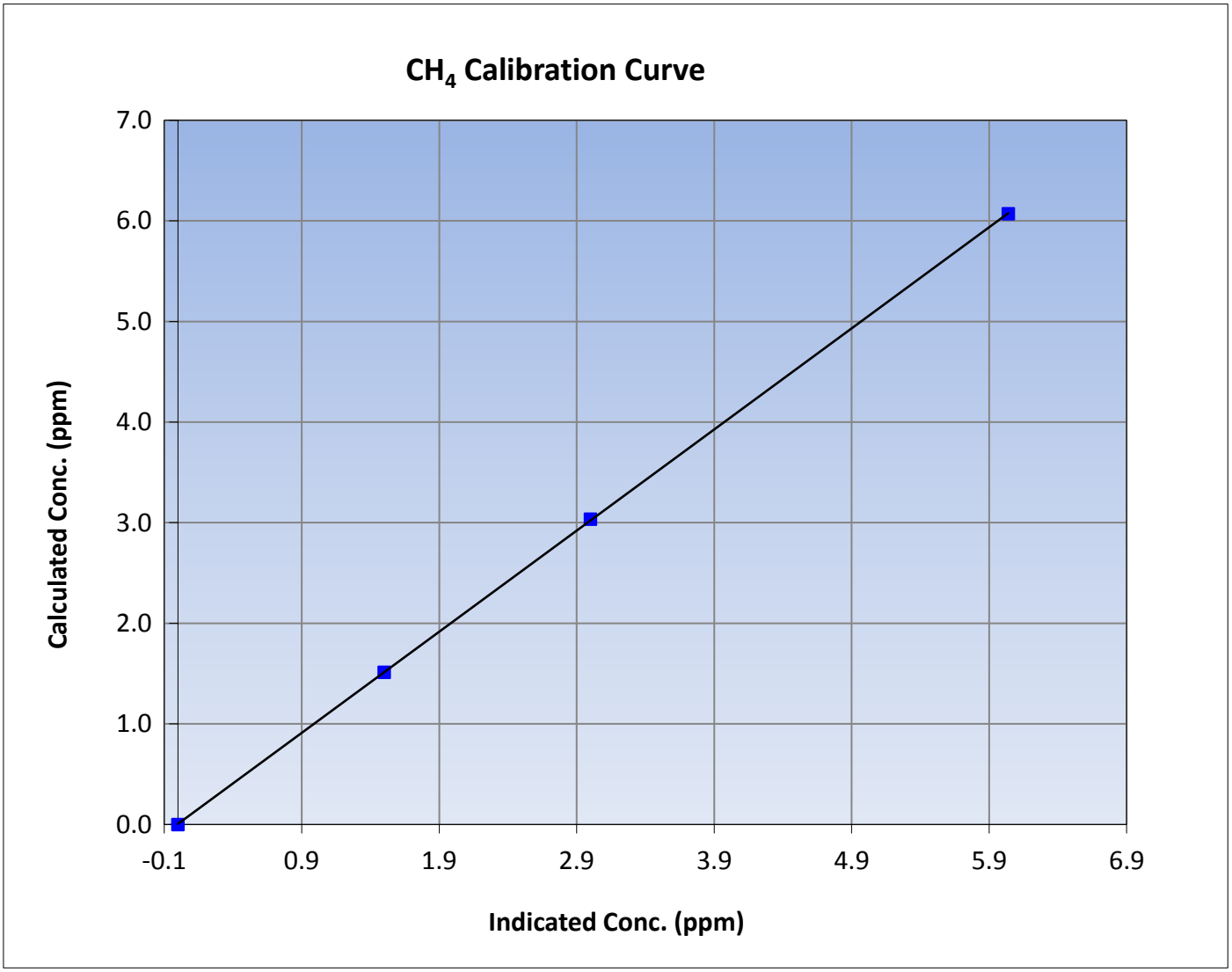
CH_4 Calibration Summary

Station Information

Calibration Date	March 10, 2016	Previous Calibration	February 18, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:35	End Time (MST)	12:48
Analyzer make	Thermo 55i	Analyzer serial #	1218153354

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999987
6.07	6.04	1.0051		
3.04	3.00	1.0118	Slope	1.005216
1.51	1.50	1.0084		
			Intercept	0.006005



Wood Buffalo Environmental Association

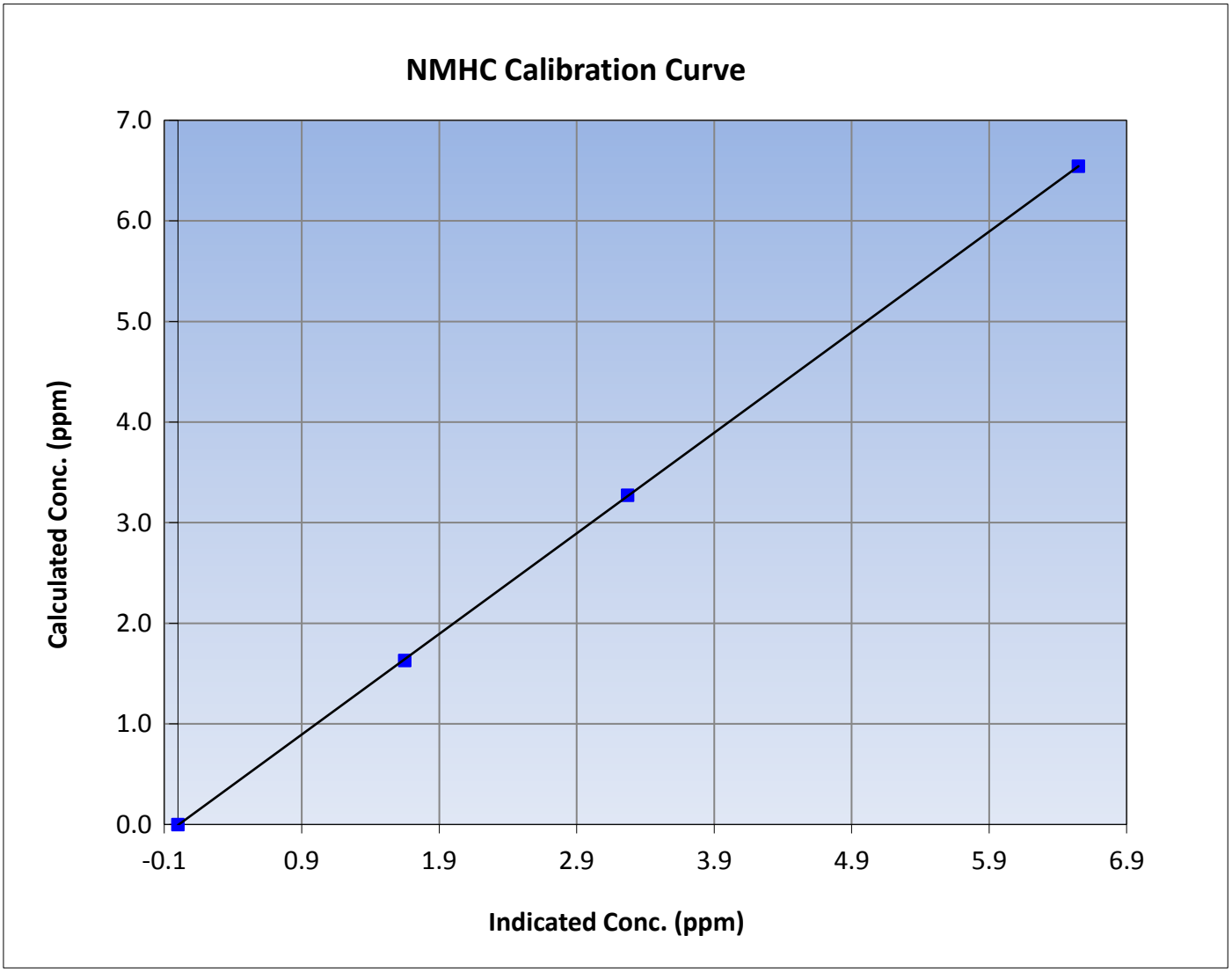
NMHC Calibration Summary

Station Information

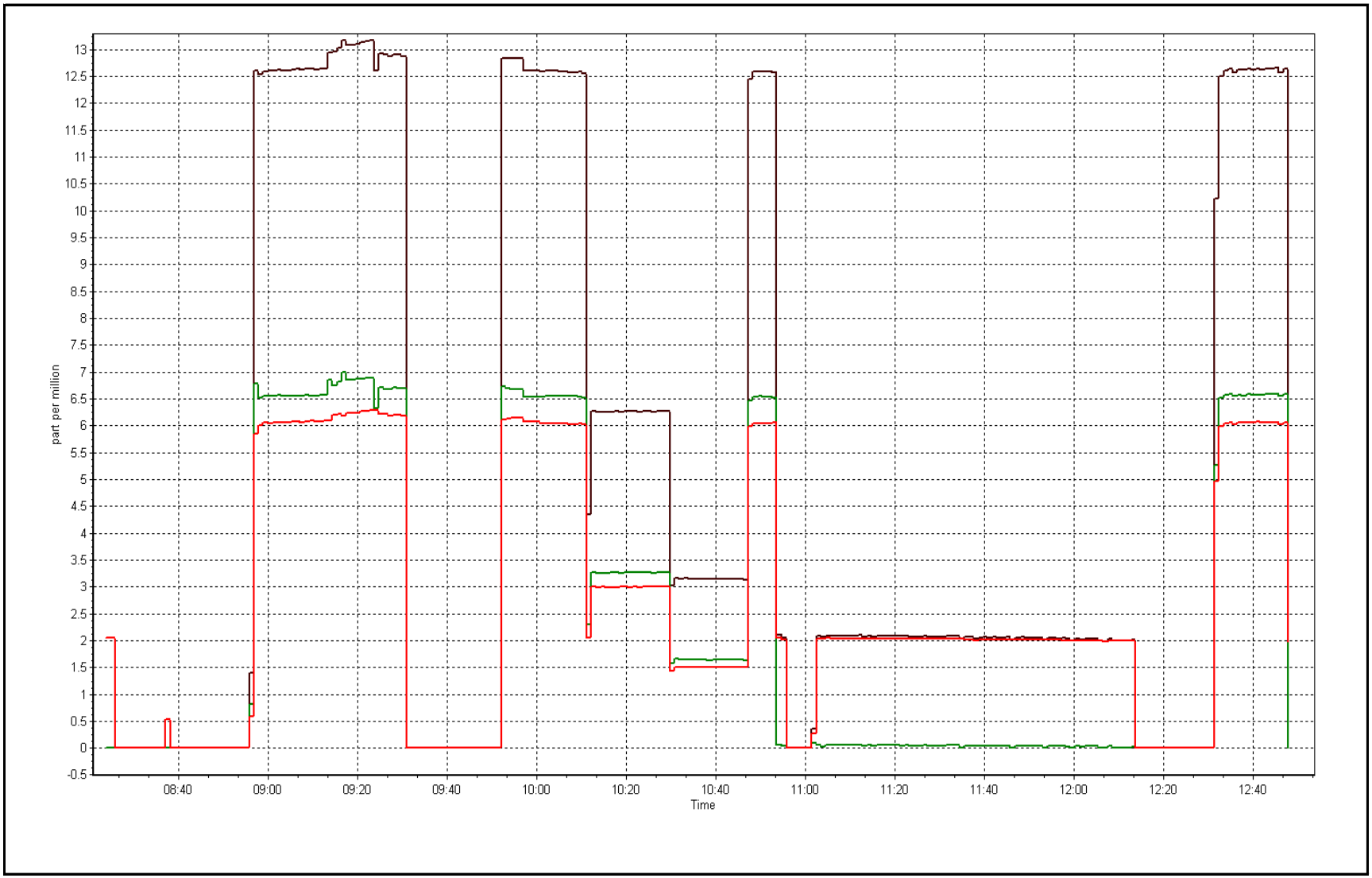
Calibration Date	March 10, 2016	Previous Calibration	February 18, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:35	End Time (MST)	12:48
Analyzer make	Thermo 55i	Analyzer serial #	1218153354

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999988
6.54	6.55	0.9989		
3.27	3.27	1.0004	Slope	0.999909
1.63	1.65	0.9879		
			Intercept	-0.006207



THC Calibration Plot Date: March 10, 2016



Wood Buffalo Environmental Association
O_3 Calibration Report

Station Information

Calibration Date	March 11, 2016	Previous Calibration	February 19, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	8:37	End Time (MST)	10:51
NO2 GPT Ref date	March-10-16	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	9305

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 500 ppb		Bench temp.	28.3	28.1
Analyzer IP address	192.168.1.48		Lamp temp.	53.3	53.3
Calculated slope	0.992035	0.997552	Pressure	607.7	605.9
Calculated intercept	0.453184	0.915894	Flow cell A	0.689	0.686
Analyzer Background	-1.7	-1.1	Flow cell B	0.688	0.686
Analyzer Coefficient	1.092	1.114	Cell A Intensity	74950	72876
			Cell B Intensity	71030	69207

Analyzer make	Thermo 49i	Analyzer serial #	1501663733

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	-0.1	----
as found span	5000	757.00	374.6	367.1	1.020
calibrator zero	5000	0.00	0.0	-0.1	----
high point	5000	757.00	374.6	375.3	0.998
second point	5000	520.00	255.1	254.3	1.003
third point	5000	270.00	133.5	131.9	1.012
as left zero	5000	0.00	0.0	0.7	----
as left span	5000	757.00	374.6	379.0	0.988
				Average Correction Factor	1.004

Corrected As found	367.2	Previous response	377.2	% change	2.7%

Notes:

No maintenance done, filter changed out, span adjusted

Calibration Performed By: Melissa Lemay

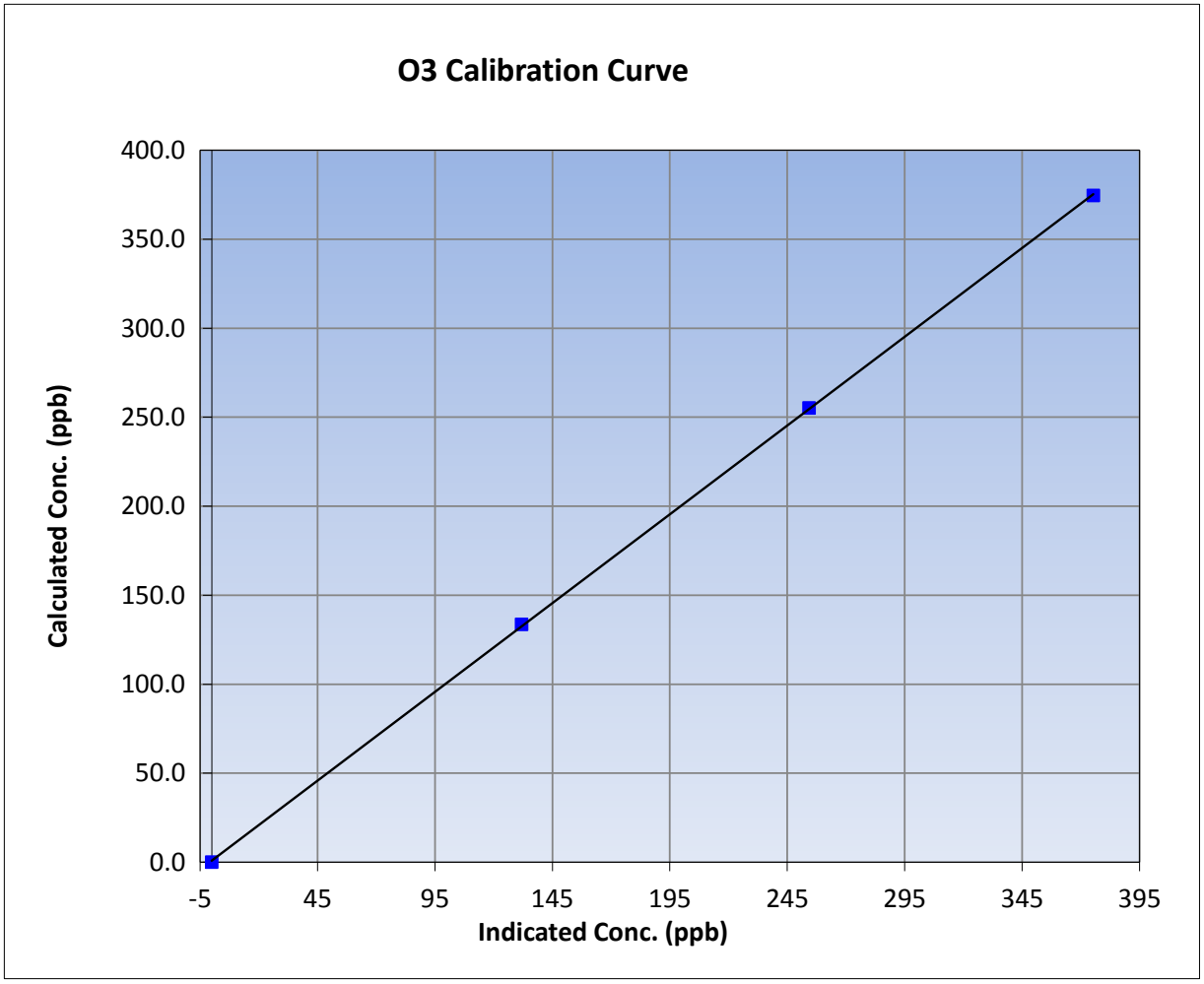
Wood Buffalo Environmental Association
O3 Calibration Report

Station Information

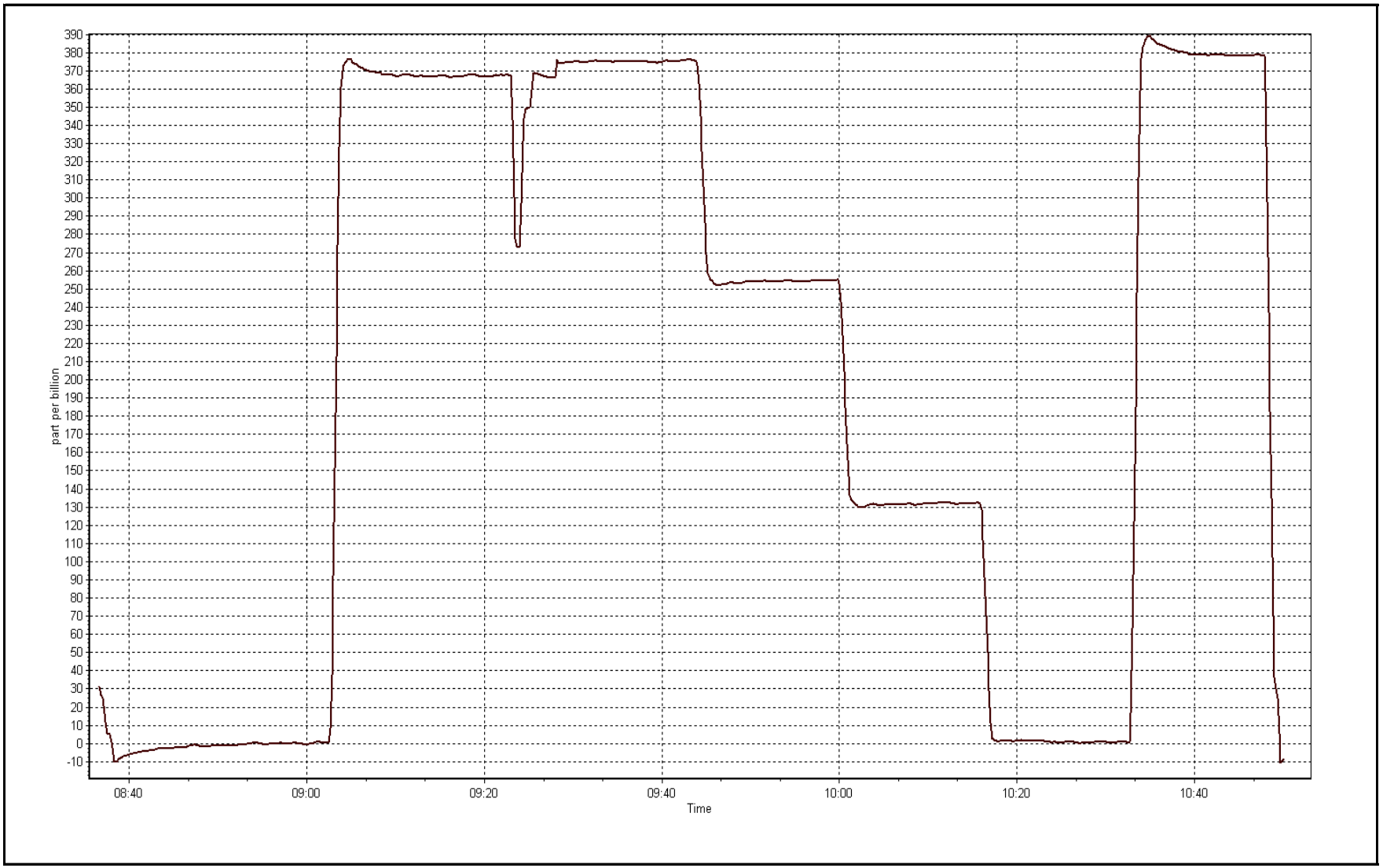
Calibration Date	March-11-16	Previous Calibration	February 19, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:37	End Time (MST)	10:51
Analyzer make	Thermo 49i	Analyzer serial #	1501663733

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999969
374.6	375.3	0.9981		
255.1	254.3	1.0031	Slope	0.997552
133.5	131.9	1.0121		
			Intercept	0.915894



O3 Calibration Plot Date: March 11, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 10, 2016	Previous Calibration	February 18, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:			
Start Time (MST)	8:35	End Time (MST)	12:47
NO Cal Gas Conc	51.2 ppm	Gas Cert Reference	EY0000368
NOx Cal Gas Conc	51.2 ppm	Cal Gas Expiry Date	10/06/2016
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.	9035

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.001387	1.000895	1.002846
	Data Offset	-0.463974	0.115591	0.569079
Current Calibration	Data Slope	1.000220	0.999865	1.001397
	Data Offset	-0.682761	-0.164611	0.835034

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1336160088

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.005		1.005	
NOX coefficient	0.997		0.997	
NO2 coefficient	0.999		0.999	
NO bkgrnd	1.8		1.8	
NOX bkgrnd	1.9		1.9	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	324.5	Deg C	326	Deg C
PMT voltage	-813.6	V	-814	V
PMT Temp	-3.1	Deg C	-3.1	Deg C
O3 flow	Ok	ccm	Ok	ccm
R Cell press NO	149.7	mmHg	150.9	mmHg
R Cell Press Nox	149.7	mmHg	150.6	mmHg
NO sample flow	0.945	lpm	0.96	lpm
Nox sample Flow	0.945	lpm	0.956	lpm

Notes:

No maintenance or adjustments done, filter changed out

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 10, 2016 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	-0.2	-0.2	0.1	----	----
as found span	5000	58.6	600.1	600.1	0.0	592.1	590.6	1.5	1.0135	1.0160
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
high point	5000	58.6	600.1	600.1	0.0	600.3	600.2	0.0	0.9996	0.9998
second point	5000	29.3	300.0	300.0	0.0	300.7	300.2	0.6	0.9978	0.9994
third point	5000	14.6	149.5	149.5	0.0	151.3	150.2	1.1	0.9881	0.9954
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as left span	5000	58.6	600.1	225.7	374.4	596.2	217.8	378.4	1.0065	1.0363
								Average Correction Factor	0.9952	0.9982

Corrcted As found NO_X= 592.3 NO= 590.8 Percent Change NO_X= 1.2% NO= 1.5%

Previous Response NO_X= 599.7 NO= 599.4

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 58.60 ccm NOX ref calc conc = 600.1 ppb NO ref calc conc = 600.1 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	600.0	600.3	0.0	1.0001	0.9996	----	----
1st NO2 (300)	225.7	374.6	599.4	225.7	373.7	1.0011	----	1.0024	99.8%
2nd NO2 (200)	345.2	255.1	599.0	345.2	253.9	1.0018	----	1.0047	99.5%
3rd NO2 (100)	466.8	133.5	598.1	466.8	131.2	1.0033	----	1.0175	98.3%
2nd NO ref point		0.0	596.3	596.6	-0.3	1.0063	1.0058	----	----
				Average Correction Factor		1.0031		1.0082	99.2%

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

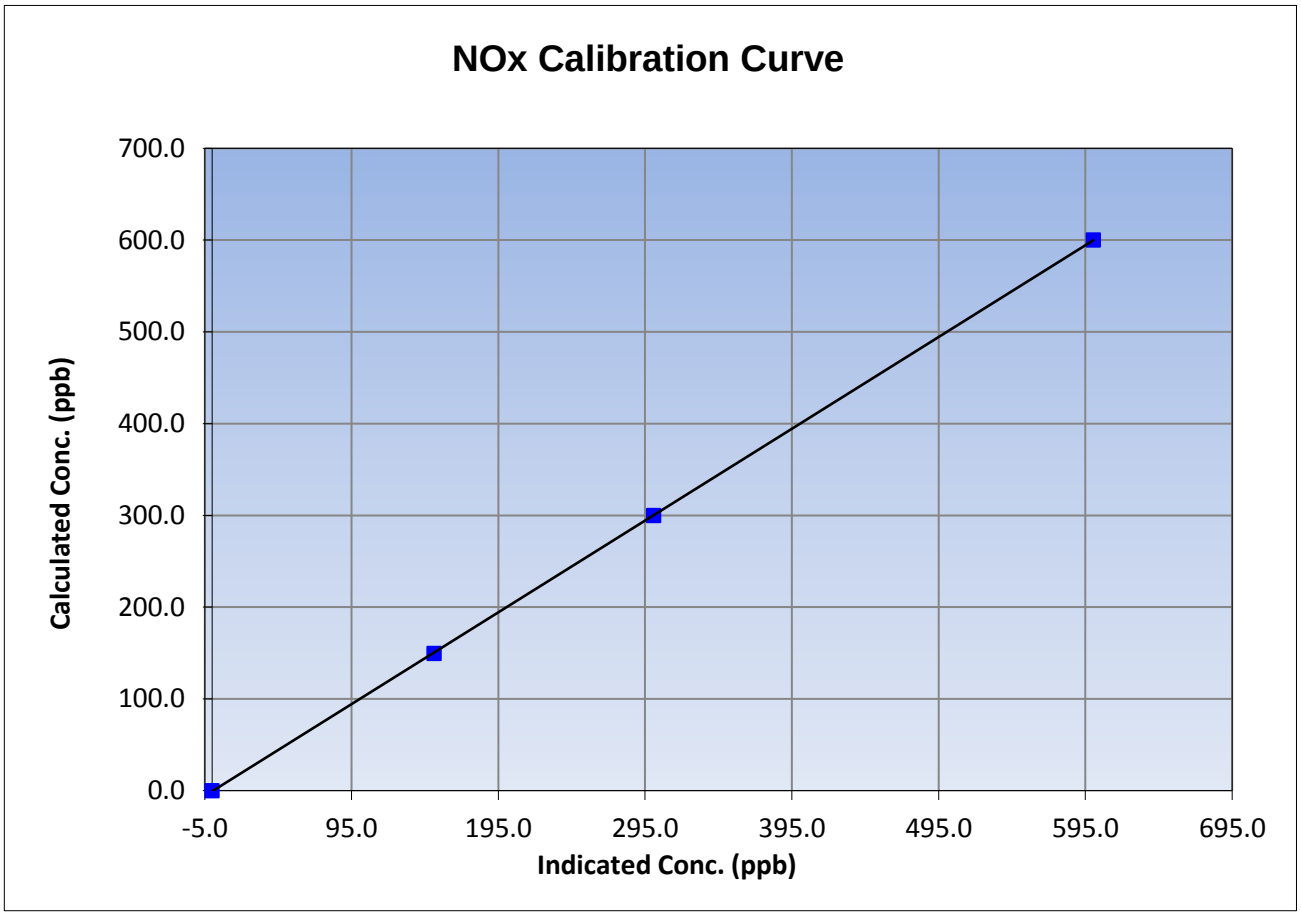
NO_X Calibration Summary

Station Information

Calibration Date	March 10, 2016	Previous Calibration	February 18, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:35	End Time (MST)	12:47
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	-0.2	----	Correlation Coefficient	0.999989
600.1	600.3	0.9996		
300.0	300.7	0.9978	Slope	1.000220
149.5	151.3	0.9881		
			Intercept	-0.682761



Wood Buffalo Environmental Association

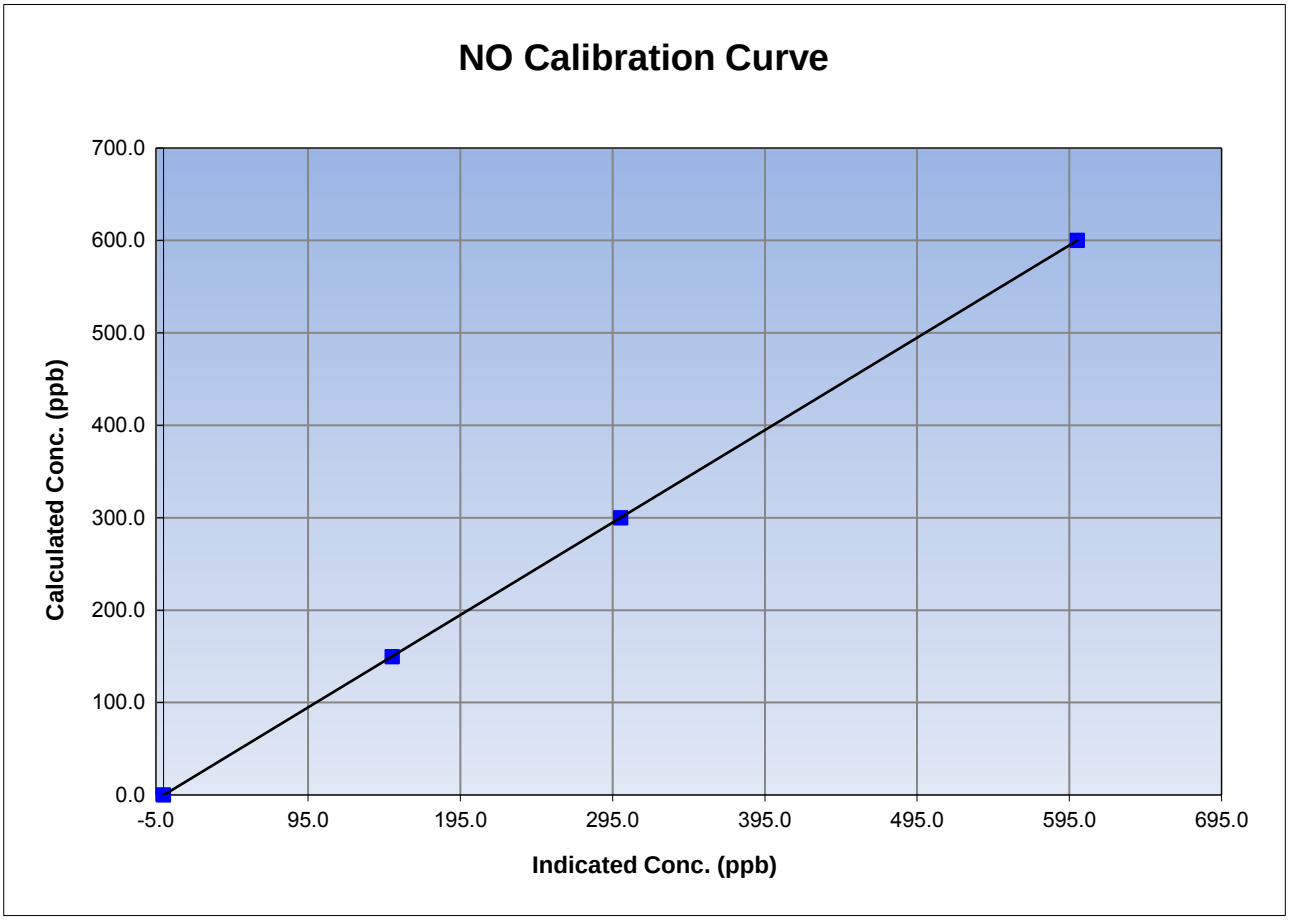
NO Calibration Summary

Station Information

Calibration Date	March 10, 2016	Previous Calibration	February 18, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:35	End Time (MST)	12:47
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	-0.2	N/A	Correlation Coefficient	0.999998
600.1	600.2	0.9998		
300.0	300.2	0.9994	Slope	0.999865
149.5	150.2	0.9954		
			Intercept	-0.164611



Wood Buffalo Environmental Association

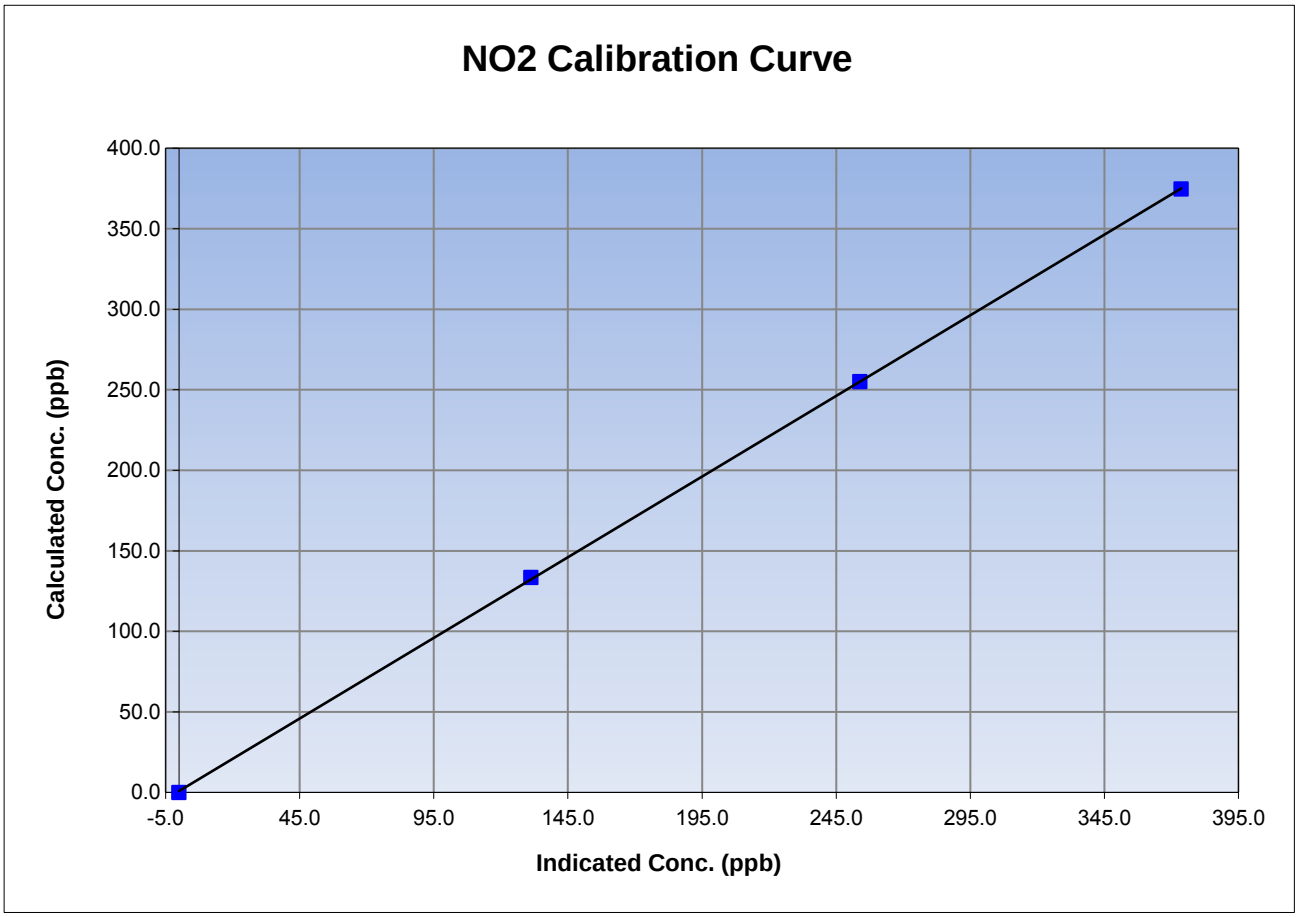
NO_2 Calibration Summary

Station Information

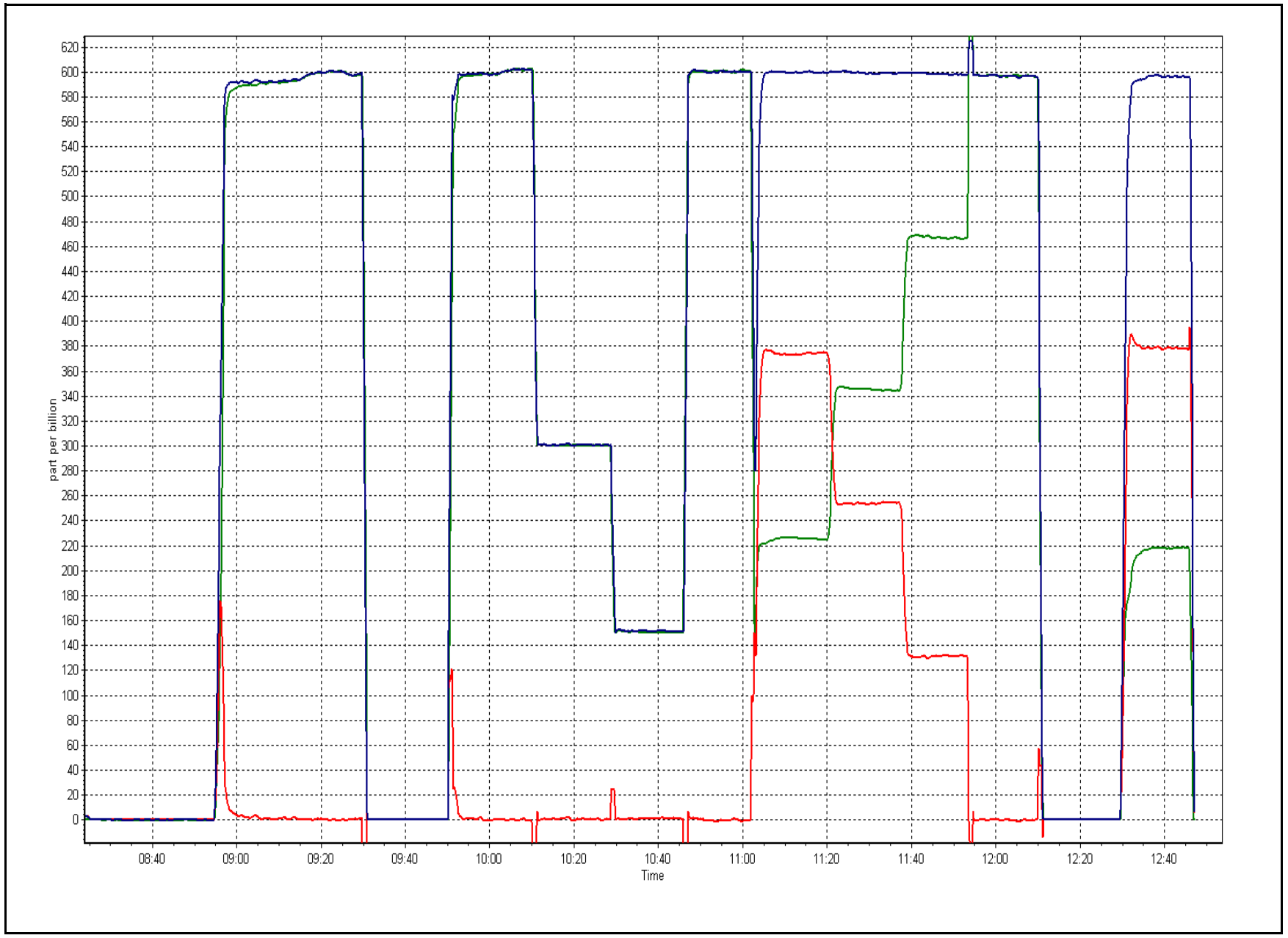
Calibration Date	March 10, 2016	Previous Calibration	February 18, 2016
Station Number	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:35	End Time (MST)	12:47
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999967
374.6	373.7	1.0024		
255.1	253.9	1.0047	Slope	1.001397
133.5	131.2	1.0175		
			Intercept	0.835034



NOX Calibration Plot Date: March 10, 2016



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	March 11, 2016	Previous Calibration:	February 18, 2016
Station Name:	Conklin Lookout	Station Number:	AMS 18
Start Time (MST):	8:17	End Time (MST):	9:24
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION

Particulate Fraction:	PM2.5							
Make/Model:	Thermo / SHARP 5030							
Serial Number	E-781							
C_{14} Source SN:								
Confirmation of Time settings:	Yes ☑	No ☐						
Paremeters Checked:	T1 ☑	T2 ☐	T3 ☐	T4 ☐	P3 ☑	Main Flow ☑	Beta ☐	Neph ☑

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	0.0	1.0	1.0	0.0
T2	20.0	na	na	20.0
T3	29.0	na	na	29.0
T4	18.0	na	na	18.0
RH (%)	19.0	na	na	19.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	924	919.0	-5.0	924

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1011	11	1011	1000

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	292		293
Neph	2.5		0.7
C14	5.2		5.7
Indicated Concentration (ug/m3)	**0.9**	**Yes**	**0.2**
Offset 1	292		292.6
Offset 2	42.1		42.3

Leak Check (Quarterly)

Leak Check Date:	February 18, 2016	Previous Leak Check Date:	November 29, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.89	0.05
*Flow with adaptor (LPM):	16.84	

**Note - do not attach adaptor without shutting off the pump first*

Mass Foil Calibration (Annualy)

Foil Calibration Date:	June 30, 2015	Previous Foil Calibration:	
Zeroed?:	Yes		
Foil Mass:	1337	Mass foil set S/N:	12111
Previous Correction Factor:	6983		
New Correction Factor:	7050		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

sample head cleaned, Nepholometer adjusted

Calibration Performed By: **Melissa Lemay**

Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	March 13, 2016	Previous Calibration:	March 11, 2016
Station Name:	Conklin Lookout	Station Number:	AMS 18
Start Time (MST):	9:33	End Time (MST):	11:11
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION

Particulate Fraction:	PM2.5										
Make/Model:	Thermo / SHARP 5030										
Serial Number	E-781										
C_{14} Source SN:											
Confirmation of Time settings:	Yes ☑	No ☐									
Paremeters Checked:	☑ T1	☐ T2	☐ T3	☐ T4	☑ P3	☑ Main Flow	☐ Beta	☑ Neph			

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1			0.0	
T2		na	na	
T3		na	na	
T4		na	na	
RH (%)		na	na	

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3			0.0	

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1005	5	1005	1000

Nephalometer Calibration

Parameter	As Founds	Zeroed (Limit +or- 2.0ug/m3)	As Left
Analog	297		297
Neph	0.4		0.4
C14	11901		11901
Indicated Concentration (ug/m3)	**0.4**	**No**	**0.4**
Offset 1			
Offset 2			

Leak Check (Quarterly)

Leak Check Date:	March 13, 2016	Previous Leak Check Date:	February 18, 2016

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.70	0.16
*Flow with adaptor (LPM):	16.54	

**Note - do not attach adaptor without shutting off the pump first*

Mass Foil Calibration (Annualy)

Foil Calibration Date:	June 30, 2015	Previous Foil Calibration:	June 30, 2015
Zeroed?:	Yes		
Foil Mass:	1337	Mass foil set S/N:	5872
Previous Correction Factor:	7050		
New Correction Factor:	7027		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Tape chamber cleaned out, foil check done, nepholometer checked, leak check done before and after chamber cleaning

Calibration Performed By: **Melissa Lemay**

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 19
SUNCOR FIREBAG
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
MARCH 2016
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	100.00	12	0	2	0
H2S (ppb) Average	710	34	34	100.00	1	0	0	0
THC (ppm) Average	708	36	36	100.00	2.4	-	2.3	-
NO2 (ppb) Average	708	36	36	100.00	19	0	6	-
NO (ppb) Average	708	36	36	100.00	9	-	2	-
NOX (ppb) Average	708	36	36	100.00	22	-	8	-
Temperature 2 m (C) Average	744	0	0	100.00	9.2	-	4.1	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	95	-
Wind Speed 10 m (km/h) Average	707	0	37	95.03	36	-	20	-
Wind Direction 10 m (deg) Average	707	0	37	95.03	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.7	1	-	0	0	0	0	1	2	12
H2S (ppb) Average	710	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	708	2.2	0.1	-	2.1	2.1	2.2	2.2	2.2	2.3	2.4
NO2 (ppb) Average	708	2.8	3	-	0	0	1	2	4	6	19
NO (ppb) Average	708	0.6	1	-	0	0	0	0	1	1	9
NOX (ppb) Average	708	3.4	3	-	0	0	1	2	4	8	22
Temperature 2 m (C) Average	744	-4.99	5	-	-16.5	-10.5	-8.3	-5.8	-1.9	1.6	9.2
Relative Humidity (%) Average	744	74.3	19	-	20	44	59	82	90	94	98
Wind Speed 10 m (km/h) Average	707	12.7	6	-	1	5	8	12	17	20	36
Wind Direction 10 m (deg) Average	707	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	13 Mar 2016 14:00	13 Mar 2016 16:00	3	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	14 Mar 2016 00:00	15 Mar 2016 09:00	34	Flat line in sensor output signal - sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Firebag - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 12 ppb on Mar 9 13:00

Maximum Daily Average: 2.1 ppb on Mar 21

Minimum Value: 0 ppb on Mar 10 18:00

Minimum Daily Average: 0.1 ppb on Mar 22

Maximum Diurnal Average: 1.0 ppb at hour 1

Minimum Diurnal Average: 0.4 ppb at hour 4

Monthly Average: 0.7 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 7$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	1	Z	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1.2	2
2-Mar	0	0	Z	1	0	0	1	0	0	1	1	2	3	4	6	1	1	2	1	2	3	3	2	1	1.6	6
3-Mar	0	0	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
4-Mar	0	0	0	0	Z	0	0	0	0	0	0	3	1	1	0	0	0	0	0	0	0	0	0	0	0.4	3
5-Mar	0	0	0	0	0	Z	0	1	4	3	3	2	2	1	1	1	1	0	0	0	0	0	0	0	0.9	4
6-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4	3	6	7	0	1.0	7
7-Mar	3	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1	1	1	1	0	0	0	0.6	3
8-Mar	0	0	Z	0	0	0	0	0	0	2	2	1	0	0	0	0	0	0	0	0	0	1	2	0	0.5	2
9-Mar	0	1	1	Z	0	0	1	0	1	1	2	4	12	6	4	1	0	0	0	0	0	0	0	0	1.6	12
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	0.1	0
11-Mar	0	0	0	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Mar	Z	2	2	1	0	1	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.6	2
13-Mar	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
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	7	0.4	7
15-Mar	8	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	8
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	0.1	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	0.1	0
18-Mar	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	0	0	0.6	4
19-Mar	0	Z	1	1	1	1	2	7	0	0	1	1	1	1	2	2	4	4	10	4	1	0	0	0	1.9	10
20-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	3	4	2	5	4	1.0	5
21-Mar	7	5	4	Z	2	5	2	0	1	5	2	1	1	0	0	0	0	0	0	0	5	4	0	0	2.1	7
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	0.1	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	0.1	0
24-Mar	Z	0	0	0	0	0	0	0	0	1	2	2	3	2	1	0	0	0	0	0	0	0	0	0	0.6	3
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	0.3	0
26-Mar	1	2	Z	2	1	1	2	2	2	1	1	1	1	1	1	1	0	0	0	1	2	2	1	0	1.1	2
27-Mar	0	0	0	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
28-Mar	0	0	0	0	Z	0	0	0	0	2	0	0	0	1	6	0	0	0	0	0	0	0	0	0	0.6	6
29-Mar	0	0	0	1	3	Z	3	5	6	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.1	6
30-Mar	Z	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	5	4	3	2	2	0.9	5
	1.0	0.6	0.5	0.4	0.6	0.6	0.6	0.8	0.7	0.9	0.6	0.7	0.9	0.7	0.8	0.6	0.6	0.5	0.7	0.8	0.8	0.8	0.7	0.6	Diurnal Average	
	8	5	4	2	3	5	3	7	6	5	3	4	12	6	6	4	4	4	10	5	5	6	7	7	Diurnal Maximum	

Z - zerospan C - Calibration

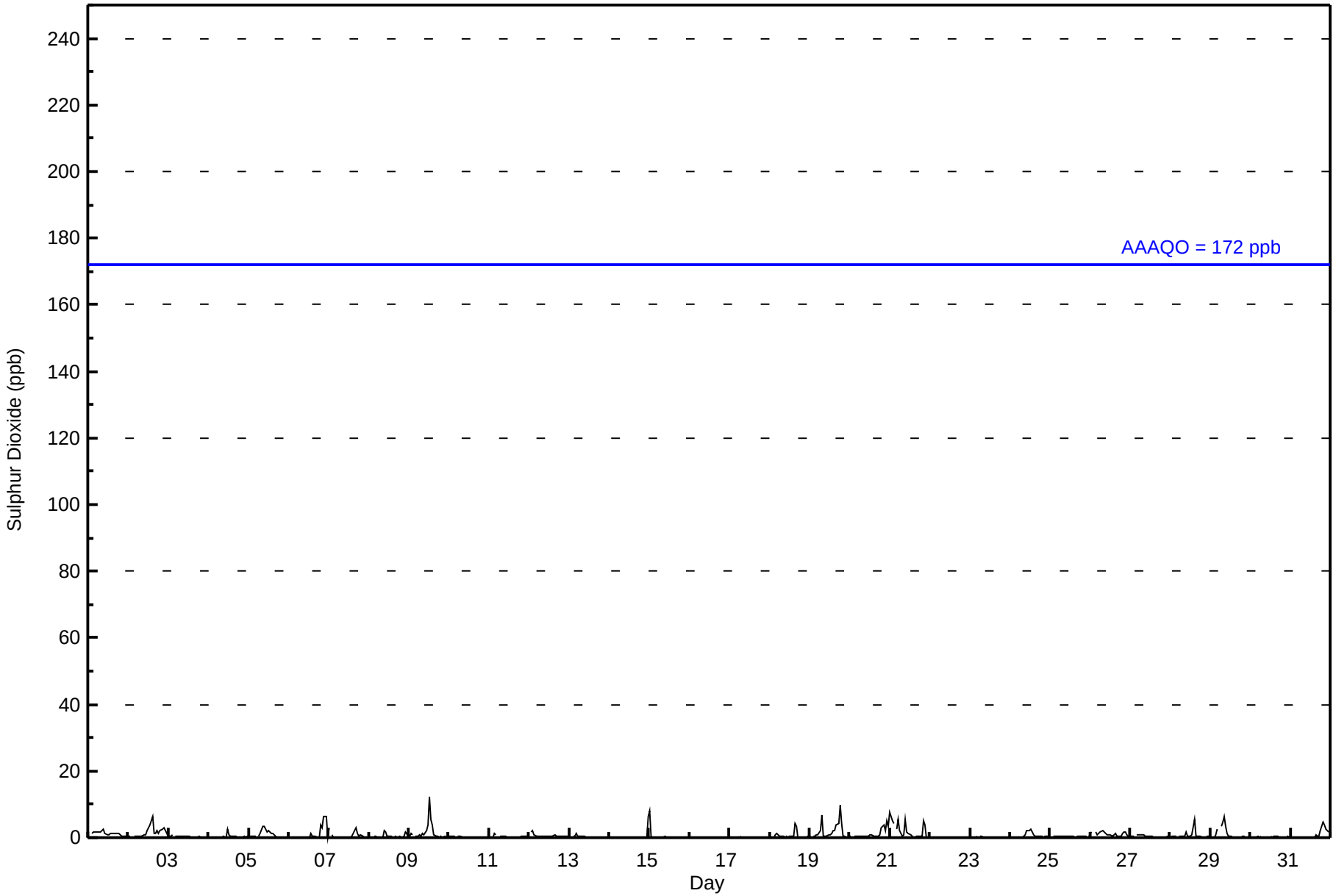
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Firebag - March 2016



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Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Firebag - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	99.86	99.86
11 - 20	1	0.14	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Firebag - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	91	34	20	19	26	65	82	57	84	29	38	18	22	19	26	42	672
11 - 20	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	34	20	19	26	65	82	57	84	29	38	19	22	19	26	42	673

Total Number of Valid Hours: 673

Total Number of Hours: 744

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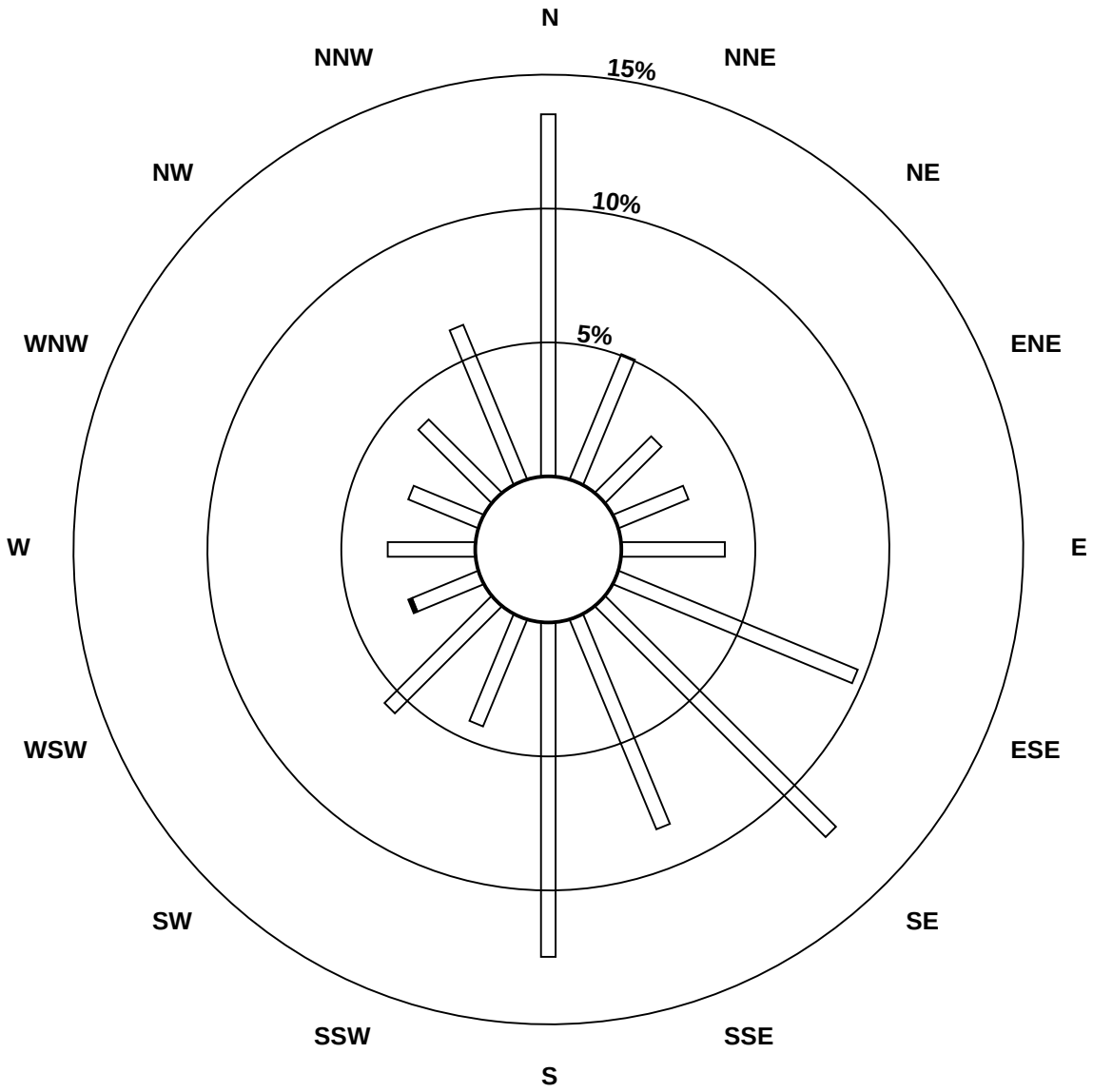
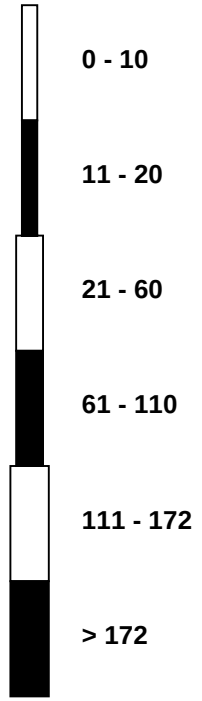
Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Firebag (AMS 19)



Classes (ppb)



Total Number of Valid Hours: 673

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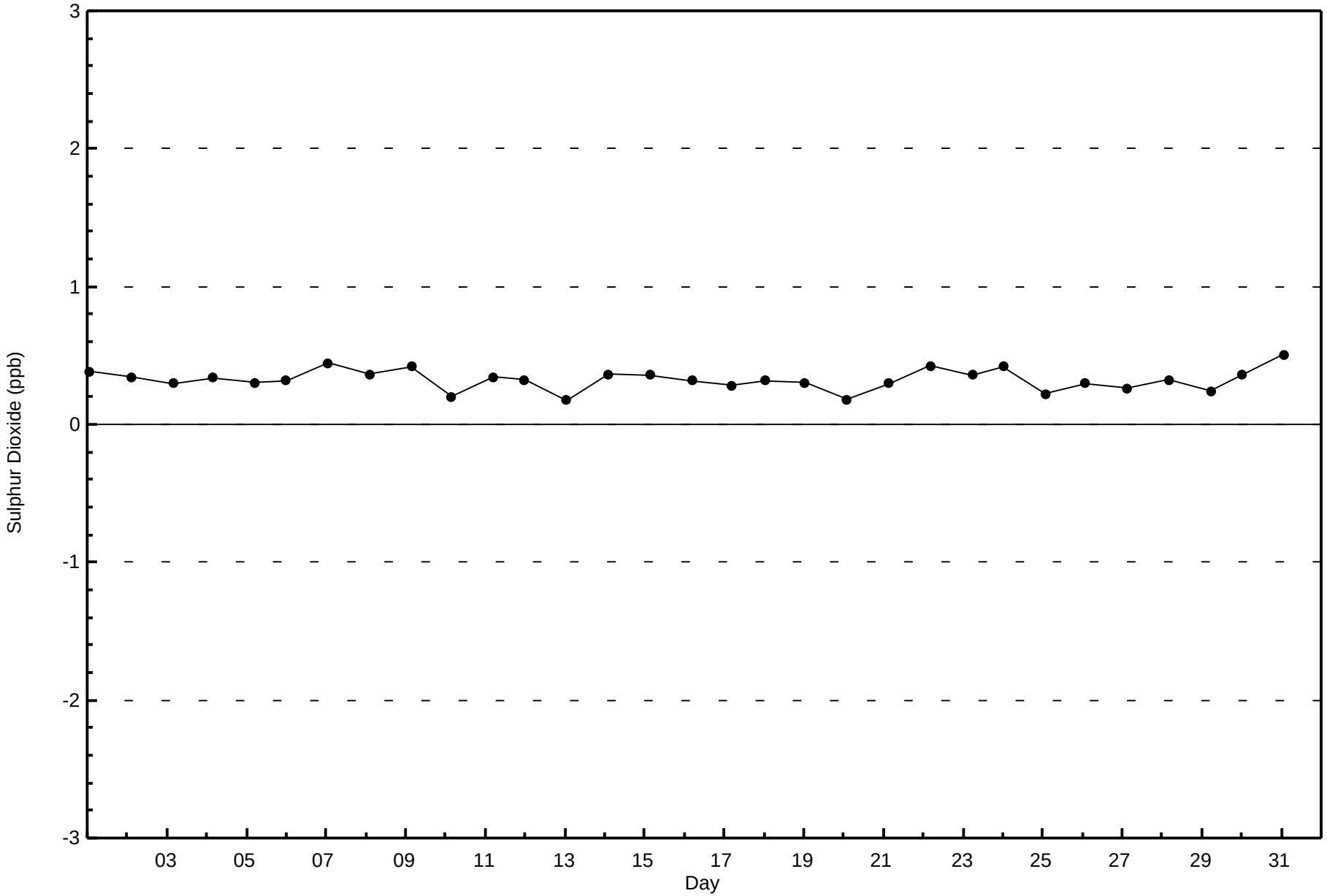
Zero Responses

Sulphur Dioxide (SO_2) - ppb

Firebag - March 2016



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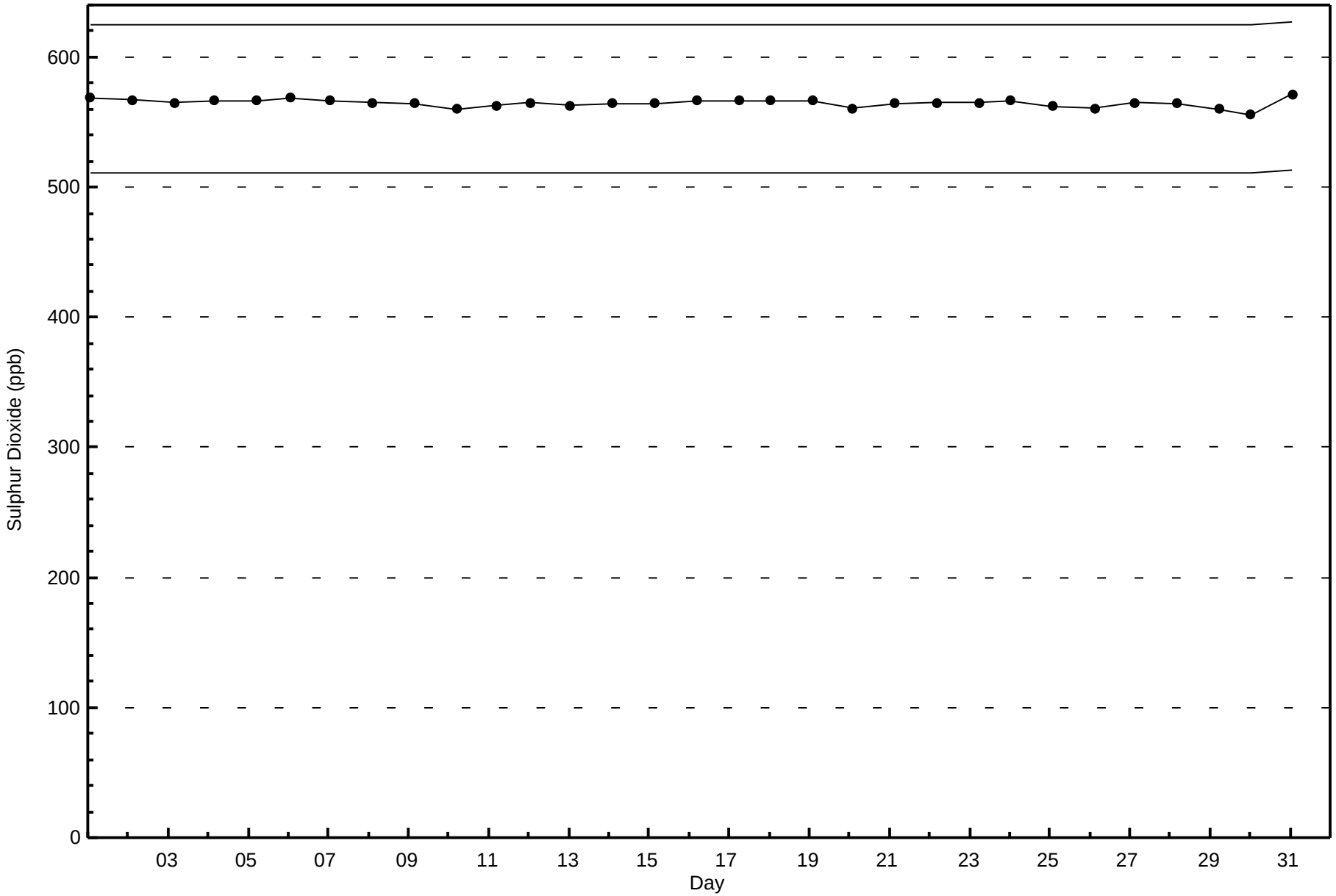
Span Responses

Sulphur Dioxide (SO_2) - ppb

Firebag - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Firebag - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 1 ppb on Mar 19 05:00

Maximum Daily Average: 0.4 ppb on Mar 19

Minimum Value: 0 ppb on Mar 14 09:00

Minimum Daily Average: 0.1 ppb on Mar 14

Maximum Diurnal Average: 0.3 ppb at hour 5

Minimum Diurnal Average: 0.2 ppb at hour 3

Monthly Average: 0.2 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 1$

Hours in Service:	744
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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-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
2-Mar	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1
3-Mar	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
4-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
5-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
6-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
7-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
8-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
9-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
10-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
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	0.1	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
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	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
17-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
18-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
19-Mar	0	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
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	0.2	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	0.2	0
22-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
23-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
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	0.2	0
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	0.2	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	0.2	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	1	1	Z	0	1	0	0	C	C	C	0	0	0	0	0	1	0	0	0	0	0.3	1
30-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
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	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average	
	0	0	0	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	Diurnal Maximum	

Z - zerospan C - Calibration

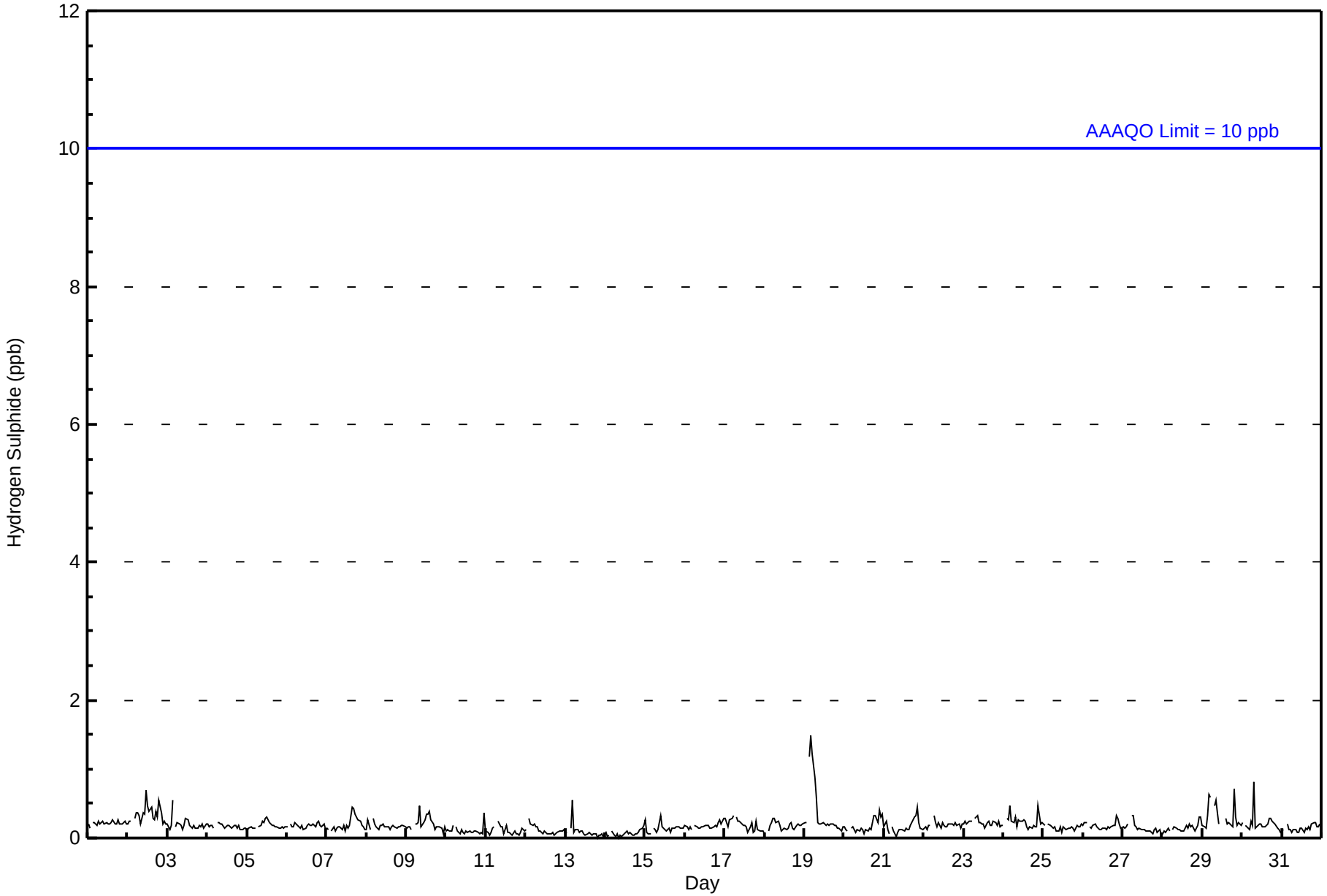
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Firebag - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Firebag - March 2016

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 (H_2S) - ppb

Firebag - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	91	32	21	20	24	66	82	59	85	30	36	19	22	19	27	42	675
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	91	32	21	20	24	66	82	59	85	30	36	19	22	19	27	42	675

Total Number of Valid Hours: 675

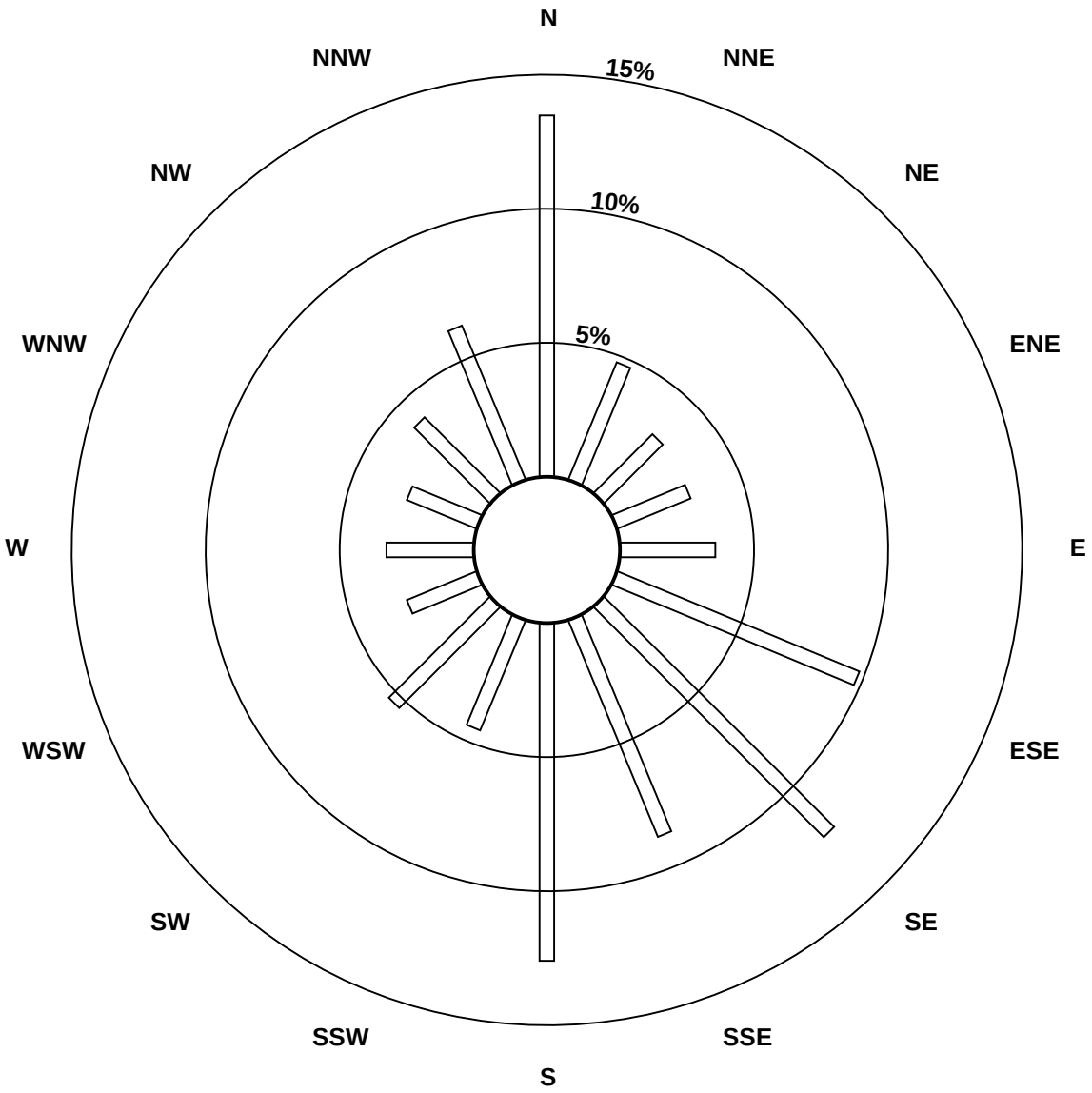
Total Number of Hours: 744

Wood Buffalo Environmental Association

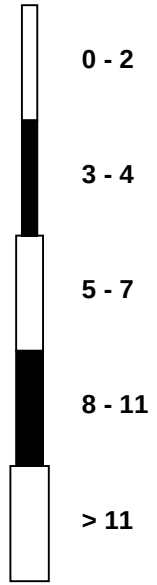
Wind Rose Mar 2016

Hydrogen Sulphide (H_2S) - ppb

Firebag (AMS 19)



Classes (ppb)



Total Number of Valid Hours: 675

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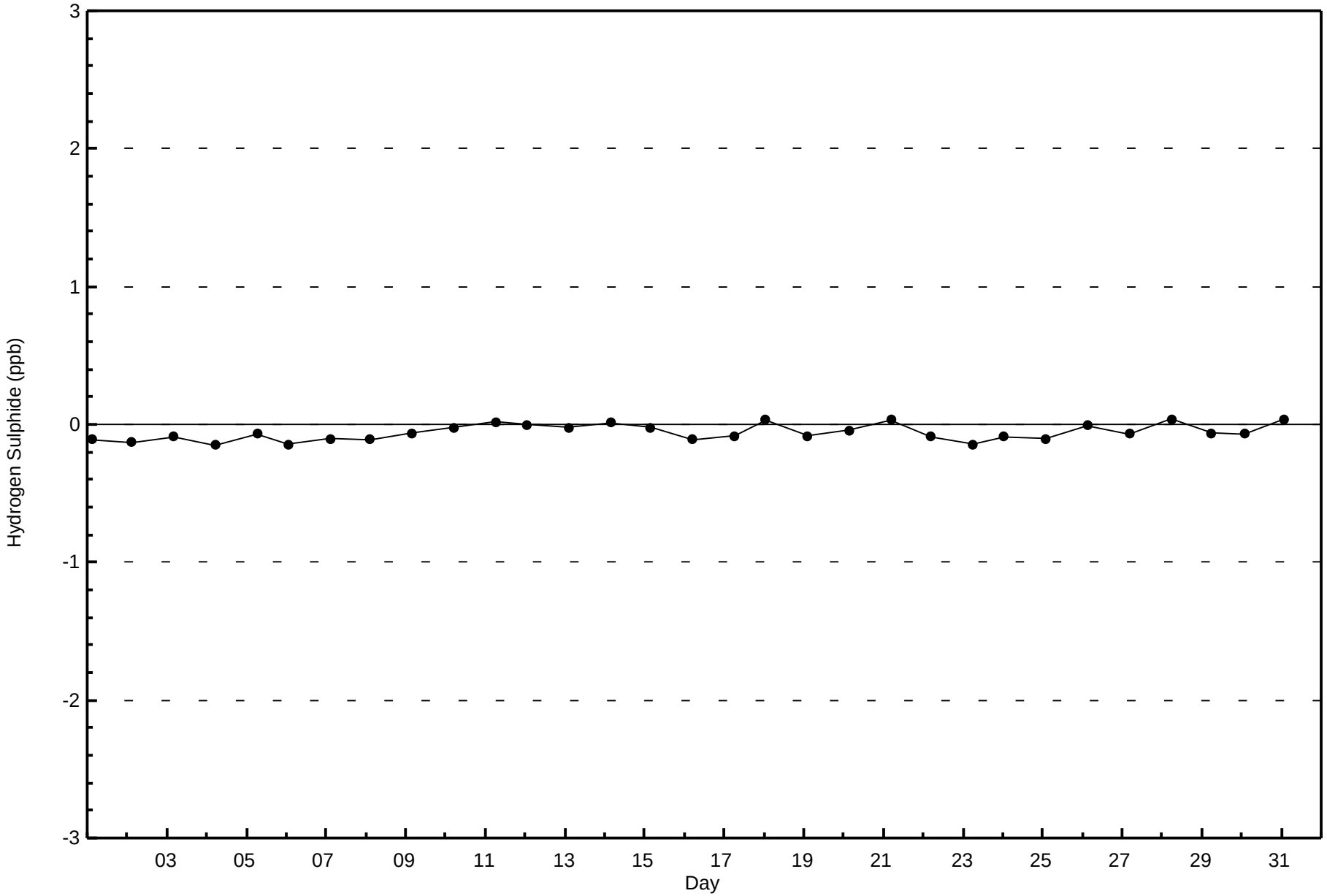
Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Firebag - March 2016

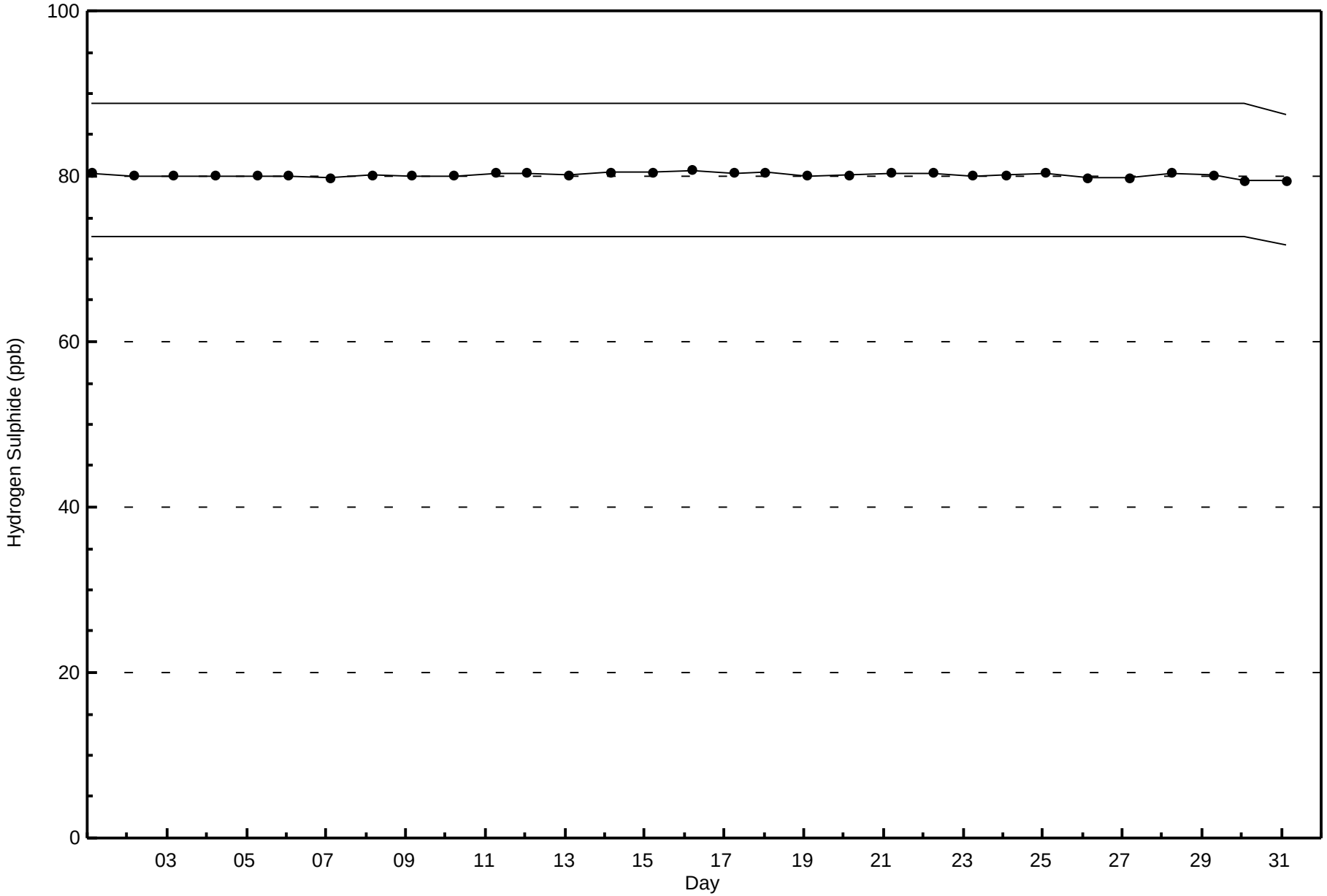


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Firebag - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Firebag - March 2016

Maximum Value: 2.4 ppm on Mar 29 00:00

Maximum Daily Average: 2.3 ppm on Mar 2

Minimum Value: 2.1 ppm on Mar 29 18:00

Minimum Daily Average: 2.1 ppm on Mar 23

Maximum Diurnal Average: 2.2 ppm at hour 5

Minimum Diurnal Average: 2.2 ppm at hour 11

Monthly Average: 2.20 ppm

Percentiles: P_1 = 2.1 P_{10} = 2.1 Q_1 = 2.2 Median = 2.2 Q_3 = 2.2 P_{90} = 2.3 P_{99} = 2.4

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3
2-Mar	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	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.4
3-Mar	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3
4-Mar	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.3
5-Mar	2.1	2.1	2.1	2.2	2.2	Z	2.3	2.3	2.3	2.3	2.4	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	2.2	2.4
6-Mar	Z	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
7-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	2.2	2.4	2.4	2.3	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.4
8-Mar	2.2	2.2	Z	2.3	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	2.3
9-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	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.3	2.2	2.3	2.2	2.3
10-Mar	2.2	2.2	2.2	2.2	Z	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	2.1	2.1	2.2	2.2	2.2	2.3
11-Mar	2.1	2.1	2.2	2.2	2.2	Z	2.3	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.3	2.3	2.4
12-Mar	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	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3
13-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	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2
14-Mar	2.2	2.1	Z	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.2
15-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	2.1	2.1	2.1	2.1	2.2	2.2
16-Mar	2.2	2.1	2.2	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	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	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
18-Mar	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	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	2.3
19-Mar	2.2	Z	2.2	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4
20-Mar	2.2	2.2	Z	2.2	2.2	2.1	2.1	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
21-Mar	2.2	2.2	2.2	Z	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	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.3
22-Mar	2.2	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.3
23-Mar	2.1	2.2	2.2	2.1	2.2	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2
24-Mar	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2
25-Mar	2.2	Z	2.1	2.1	2.1	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	2.3	2.3	2.3	2.4	2.3	2.2	2.4
26-Mar	2.2	2.3	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	2.3	2.3	2.2	2.2	2.2	2.3
27-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	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
28-Mar	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.3	2.1	2.1	2.1	2.3	2.4	2.2	2.4
29-Mar	2.2	2.2	2.2	2.3	2.4	Z	2.3	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.1	2.2	2.2	2.2	2.4
30-Mar	Z	2.2	2.2	2.2	2.2	2.2	2.2	C	C	C	C	C	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
31-Mar	2.2	Z	2.2	2.2	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	2.2	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	Diurnal Average	
	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.4	2.4	2.3	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.4	2.3	2.4	2.4	2.4	Diurnal Maximum	

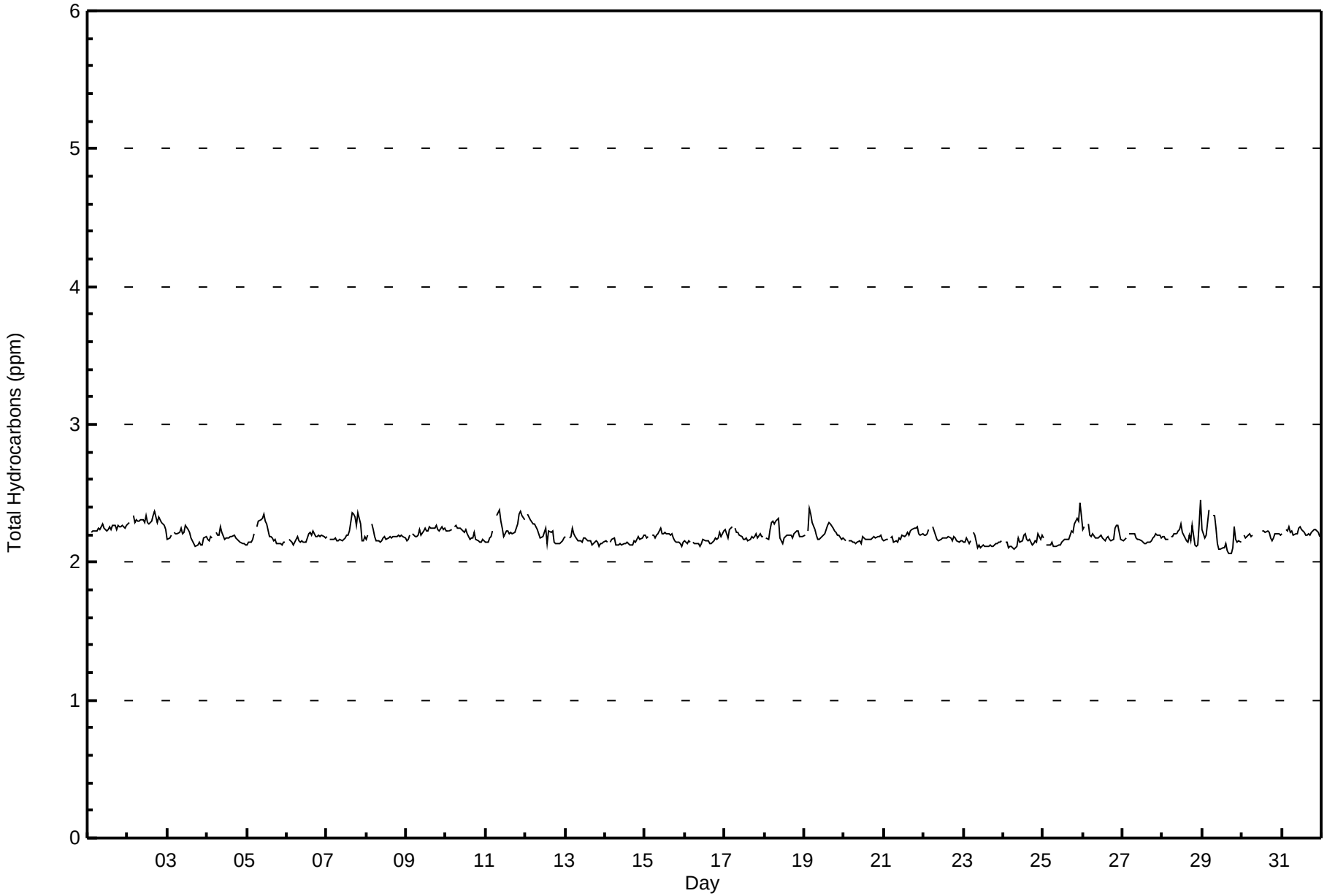
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Firebag - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Firebag - March 2016

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

Firebag - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	91	34	20	19	26	65	82	57	84	29	38	19	22	19	26	42	673
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	91	34	20	19	26	65	82	57	84	29	38	19	22	19	26	42	673

Total Number of Valid Hours: 673

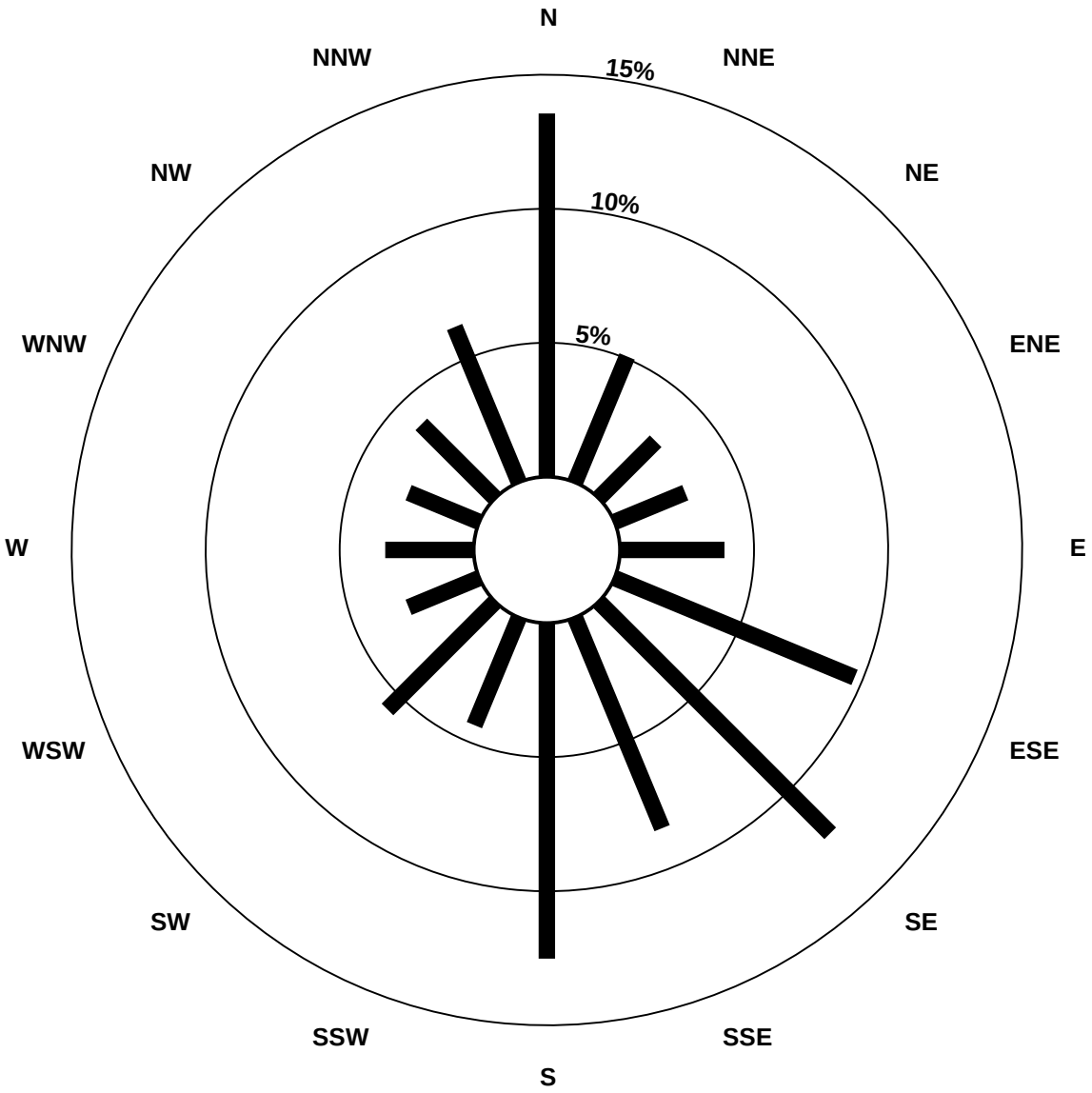
Total Number of Hours: 744

Wood Buffalo Environmental Association

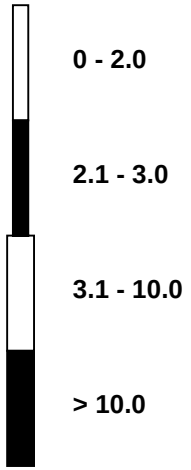
Wind Rose Mar 2016

Total Hydrocarbons (THC) - ppm

Firebag (AMS 19)



Classes (ppm)



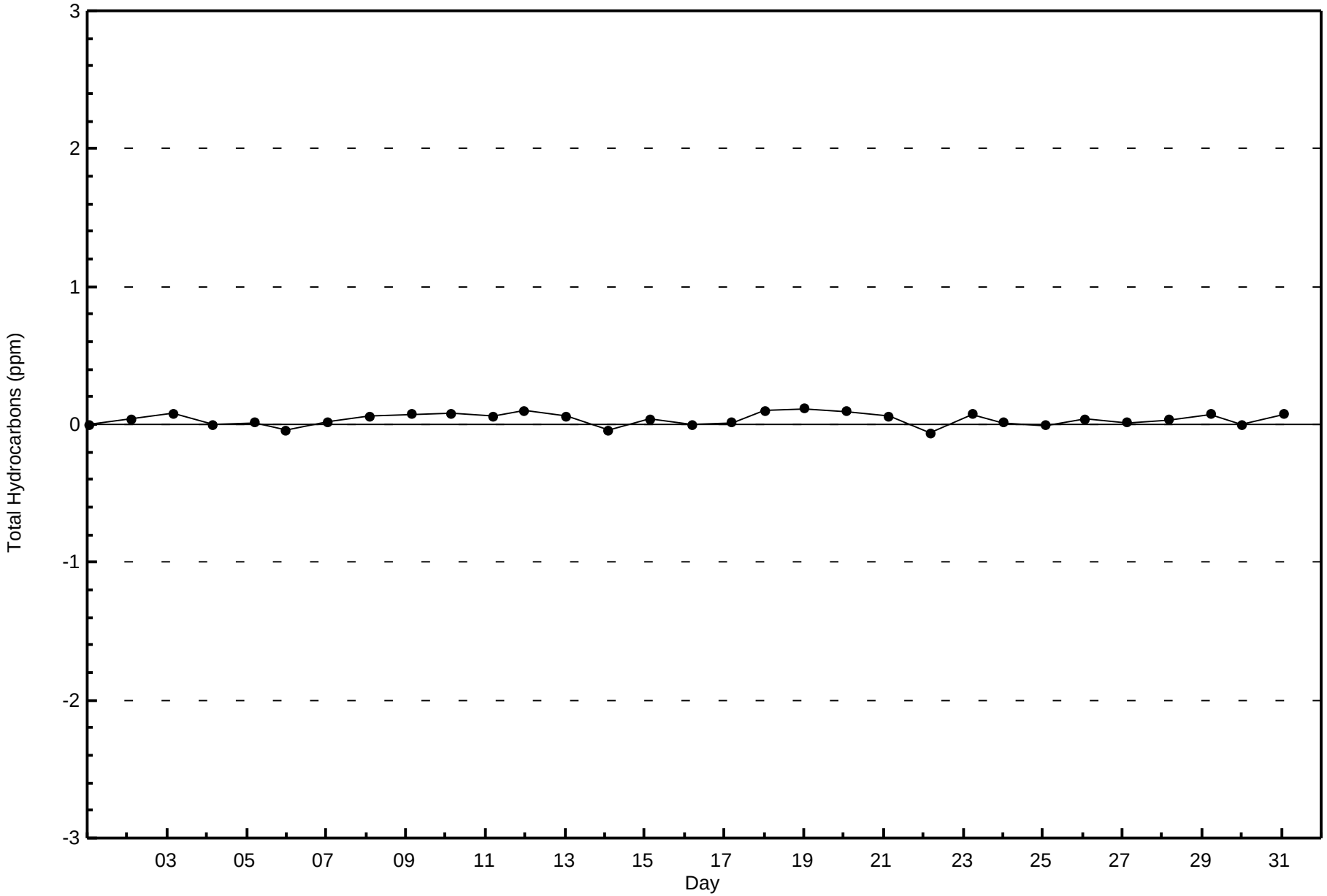
Total Number of Valid Hours: 673

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Firebag - March 2016

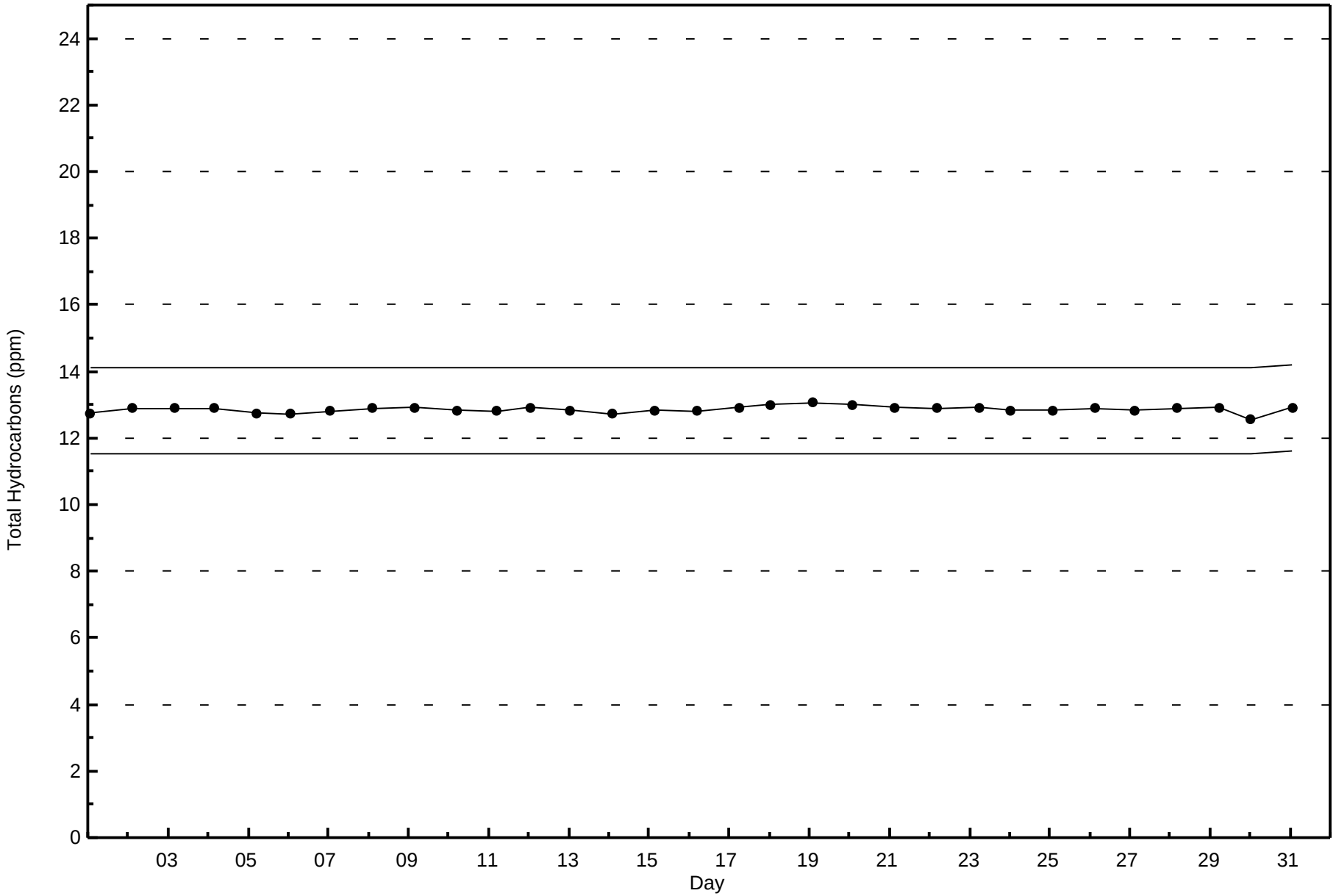


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Firebag - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

Firebag - March 2016

Maximum Value: 9 ppb on Mar 2 10:00

Maximum Daily Average: 1.9 ppb on Mar 2

Minimum Value: 0 ppb on Mar 3 18:00

Minimum Daily Average: 0.0 ppb on Mar 16

Maximum Diurnal Average: 1.2 ppb at hour 14

Minimum Diurnal Average: 0.2 ppb at hour 24

Monthly Average: 0.6 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 1$ $P_{99} = 5$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0	Z	0	0	0	0	0	0	1	2	2	1	1	1	1	1	1	0	1	1	1	0	0	1	0.7	2
2-Mar	0	1	Z	1	0	0	1	2	2	9	1	7	4	4	5	2	1	1	0	1	0	1	0	0	1.9	9
3-Mar	0	0	2	Z	1	1	2	2	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.6	2
4-Mar	0	0	0	0	Z	0	0	0	4	2	0	1	0	7	0	0	1	1	1	1	1	0	0	0	0.9	7
5-Mar	0	0	1	1	1	Z	0	0	1	1	2	2	3	1	0	0	0	0	0	0	0	0	0	0	0.6	3
6-Mar	Z	0	0	0	0	0	0	0	0	0	0	1	2	2	1	2	2	2	1	0	0	0	0	0	0.6	2
7-Mar	0	Z	0	1	1	1	1	1	1	1	0	0	0	0	2	4	3	1	0	0	0	0	0	0	0.7	4
8-Mar	0	0	Z	1	2	0	0	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0.4	2
9-Mar	0	0	0	Z	1	1	0	0	1	1	1	3	6	2	3	3	2	1	0	0	2	0	0	0	1.3	6
10-Mar	1	1	1	0	Z	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.9	2
11-Mar	0	0	0	0	0	Z	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Mar	Z	1	3	1	2	3	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	0	1.0	3
13-Mar	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
14-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.1	1
15-Mar	0	1	1	Z	1	0	0	1	1	1	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	0.0	0
17-Mar	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1
18-Mar	Z	0	0	0	0	0	0	1	2	1	0	0	0	1	2	2	1	0	0	1	0	0	0	0	0.6	2
19-Mar	0	Z	1	0	1	3	1	1	1	1	1	1	1	4	2	1	0	0	0	0	0	0	0	0	1.0	4
20-Mar	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	5	0	0	0	0	0.8	5
21-Mar	0	0	0	Z	0	0	0	0	0	1	1	1	1	2	1	1	1	1	0	0	0	0	0	0	0.5	2
22-Mar	0	0	1	1	Z	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
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	0
24-Mar	Z	1	2	3	3	1	2	4	1	1	1	1	4	5	2	0	0	0	0	0	1	1	0	0	1.5	5
25-Mar	2	Z	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
26-Mar	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0.3	1
27-Mar	0	0	0	Z	0	4	5	1	1	0	0	0	1	1	1	0	0	0	1	0	0	0	1	0	0.7	5
28-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	2	0	1	0	0	0	0	0	0	0	0.3	2
29-Mar	0	0	0	0	0	Z	1	3	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.6	3
30-Mar	Z	0	0	0	0	0	2	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
31-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
	0.2	0.3	0.5	0.4	0.6	0.9	0.7	0.8	0.9	1.1	0.6	0.8	1.1	1.2	0.9	0.7	0.6	0.4	0.2	0.4	0.3	0.2	0.2	0.2	Diurnal Average	
	2	1	3	3	3	4	5	4	4	9	2	7	6	7	5	4	3	2	1	5	2	1	1	1	Diurnal Maximum	

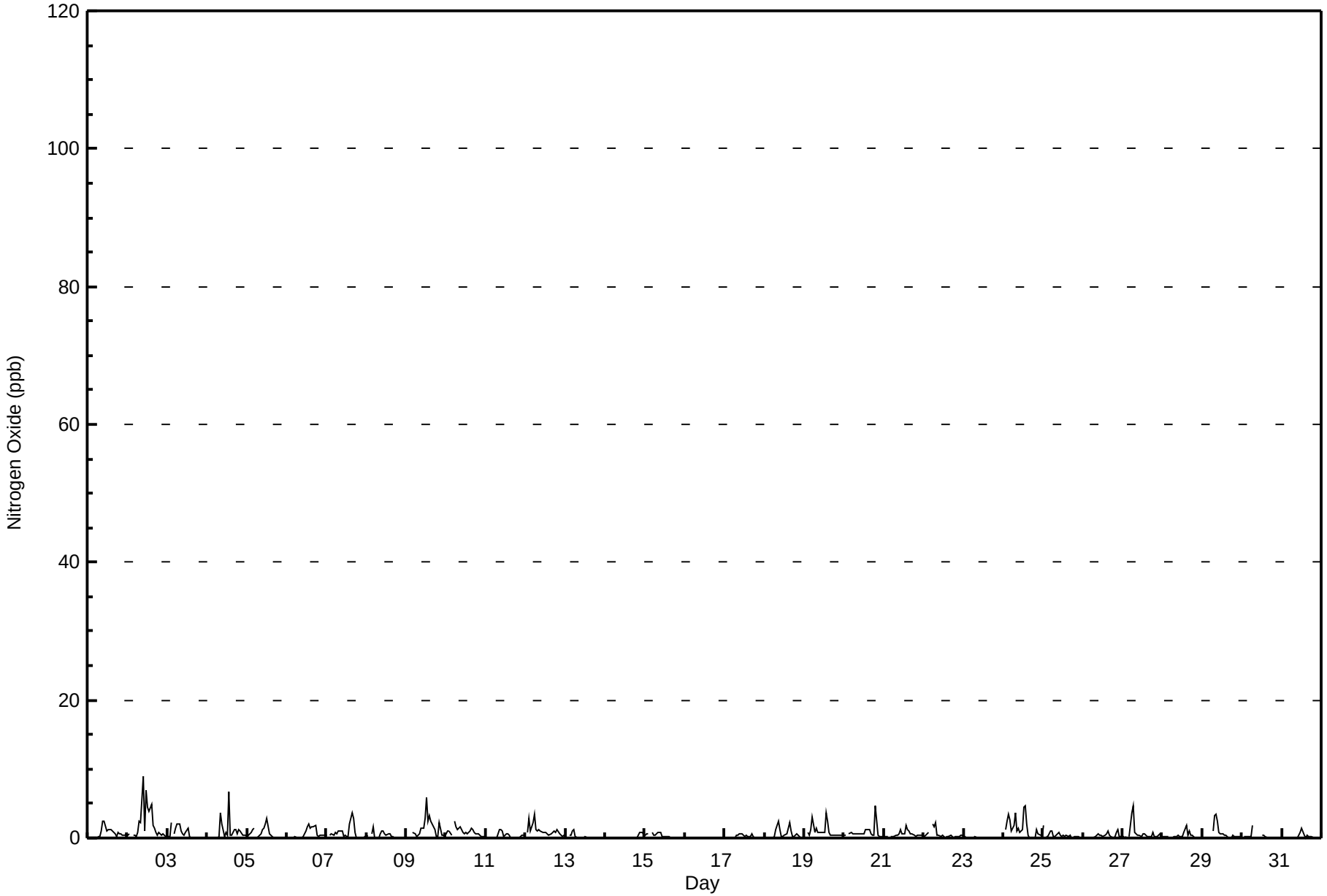
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxide (NO) - ppb

Firebag - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	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: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxide (NO) - ppb

Firebag - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	91	34	20	19	26	65	82	57	84	29	38	19	22	19	26	42	673
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	91	34	20	19	26	65	82	57	84	29	38	19	22	19	26	42	673

Total Number of Valid Hours: 673

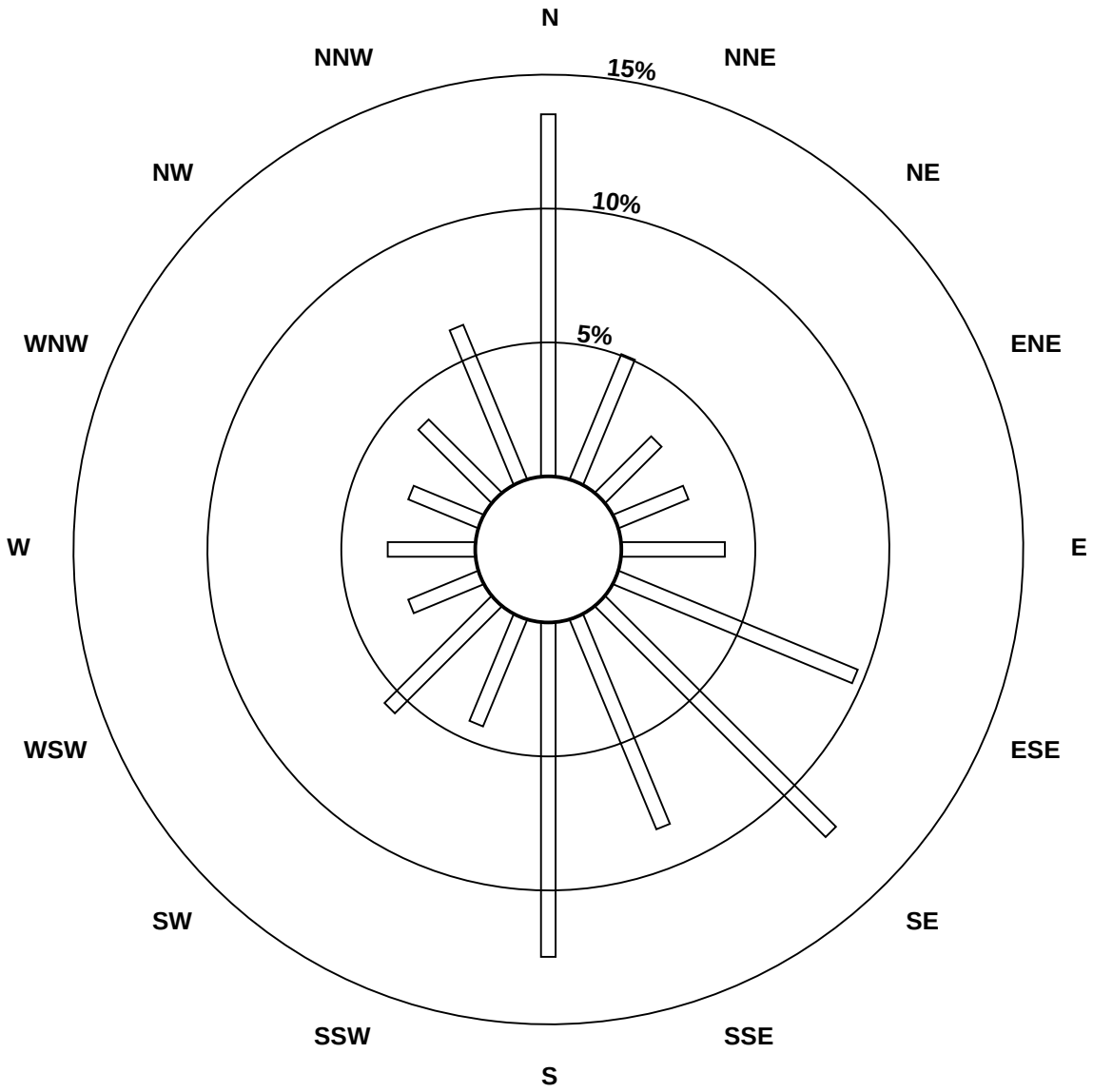
Total Number of Hours: 744

Wood Buffalo Environmental Association

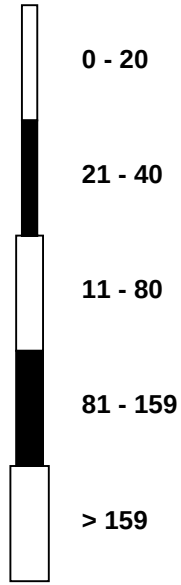
Wind Rose Mar 2016

Nitrogen Oxide (NO) - ppb

Firebag (AMS 19)



Classes (ppb)



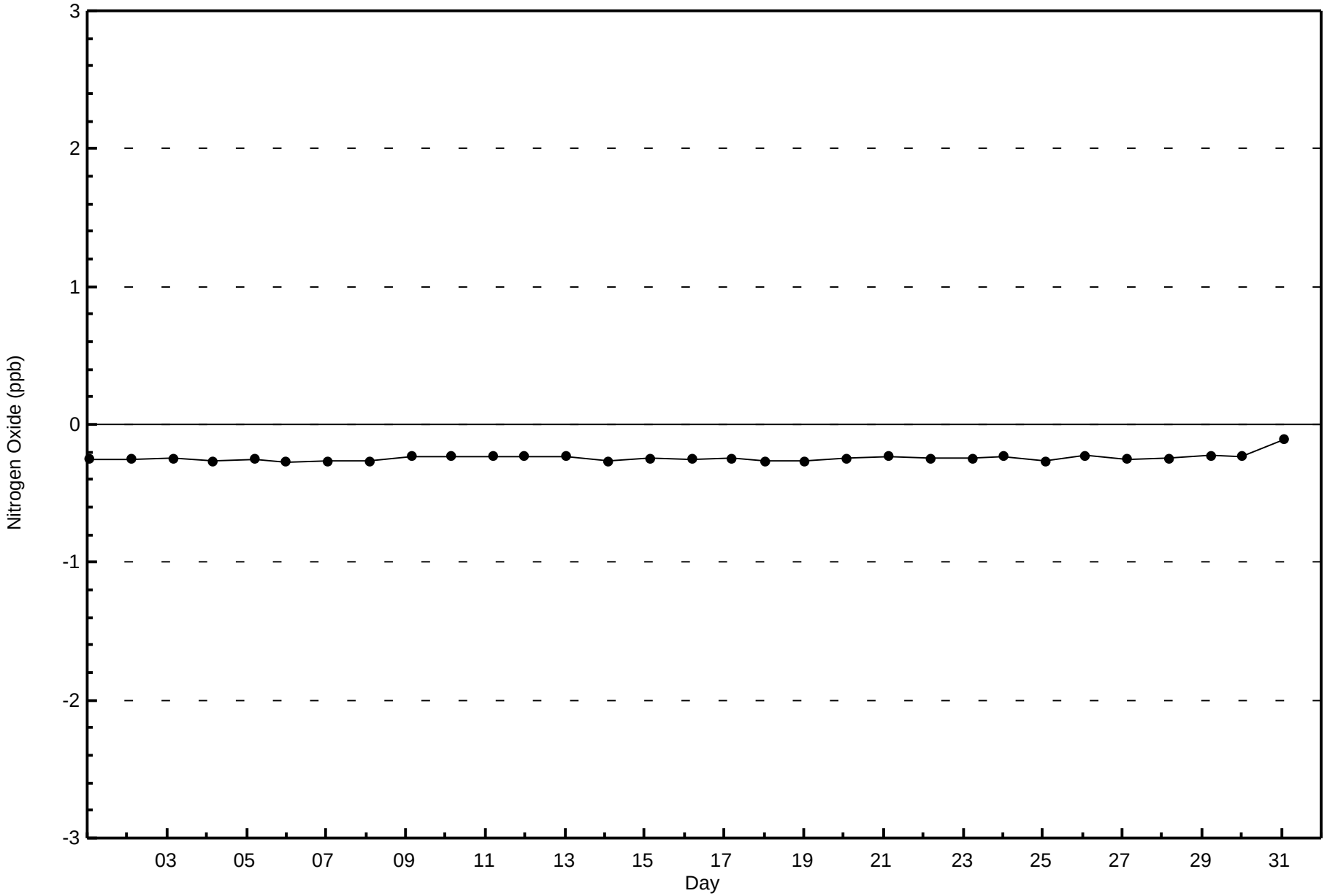
Total Number of Valid Hours: 673

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxide (NO) - ppb

Firebag - March 2016

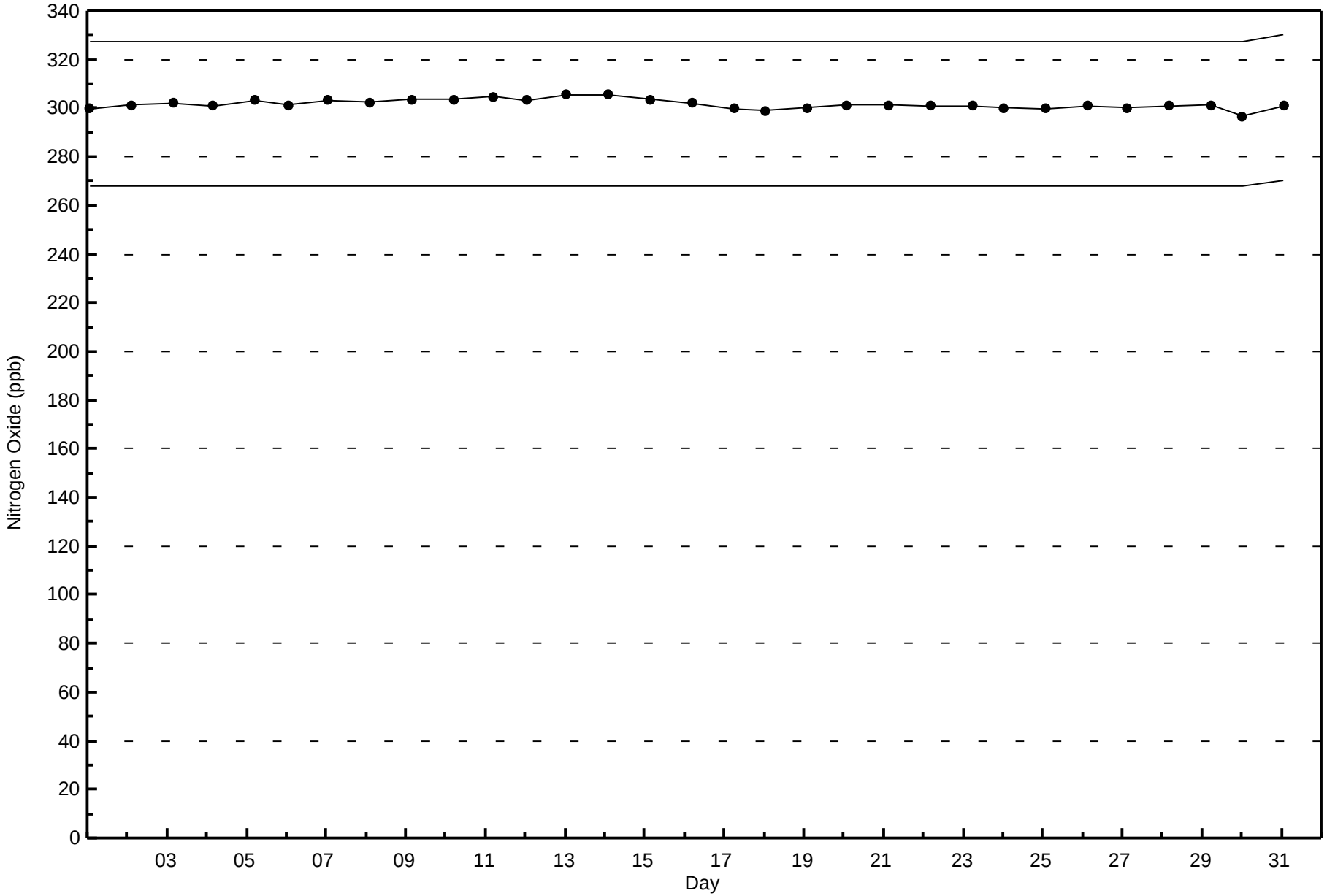


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxide (NO) - ppb

Firebag - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Firebag - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 19 ppb on Mar 18 05:00 Maximum Daily Average: 6.3 ppb on Mar 2

Minimum Value: 0 ppb on Mar 4 14:00 Minimum Daily Average: 0.5 ppb on Mar 14

Maximum Diurnal Average: 5.0 ppb at hour 5 Minimum Diurnal Average: 1.5 ppb at hour 11

Monthly Average: 2.8 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 1$ Median = 2 $Q_3 = 4$ $P_{90} = 6$ $P_{99} = 13$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	2	Z	2	3	3	3	5	5	5	5	4	2	2	3	3	3	3	3	6	4	3	3	4	3	3.4	6
2-Mar	4	6	Z	3	3	3	7	13	7	13	3	8	6	6	10	5	8	8	5	9	6	6	5	3	6.3	13
3-Mar	1	1	5	Z	3	7	8	7	4	3	2	3	4	1	1	1	0	0	0	0	0	0	0	0	2.2	8
4-Mar	0	0	0	0	Z	0	0	2	10	4	1	2	1	0	1	1	3	4	2	5	4	1	2	2	2.0	10
5-Mar	1	2	5	7	7	Z	2	3	4	4	4	5	6	2	2	1	1	1	0	0	0	0	0	0	2.5	7
6-Mar	Z	0	0	0	0	1	0	0	0	0	0	1	2	3	2	3	4	4	2	2	2	2	2	1	1.3	4
7-Mar	1	Z	1	1	2	3	2	3	3	2	1	1	1	1	5	11	12	10	6	11	8	1	1	1	3.7	12
8-Mar	1	5	Z	7	9	2	1	1	2	3	3	2	1	2	2	1	2	1	1	1	1	1	2	1	2.2	9
9-Mar	1	2	2	Z	3	3	3	3	4	4	3	5	8	5	6	6	6	6	4	3	8	3	3	3	4.0	8
10-Mar	4	5	6	3	Z	7	5	4	3	2	2	1	2	2	2	3	3	3	2	2	2	1	1	1	2.9	7
11-Mar	1	1	1	5	5	Z	6	6	6	5	3	1	3	2	2	1	1	1	2	5	10	9	8	6	3.9	10
12-Mar	Z	6	10	6	6	8	4	3	3	2	2	2	2	2	1	2	2	3	3	4	3	3	2	2	3.5	10
13-Mar	2	Z	2	2	6	4	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1.0	6
14-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	2	0.5	2
15-Mar	3	3	3	Z	5	3	4	3	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1.4	5
16-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	1	5	0.7	5
17-Mar	5	2	1	7	8	Z	4	3	2	2	2	1	1	1	1	1	3	1	1	5	2	2	1	3	2.5	8
18-Mar	Z	2	3	17	19	16	12	10	9	4	1	1	1	1	2	4	3	1	2	5	5	3	1	1	5.3	19
19-Mar	4	Z	11	8	10	10	11	8	2	2	1	2	2	3	3	2	2	3	3	3	2	2	2	2	4.2	11
20-Mar	1	1	Z	2	3	3	2	1	1	1	1	1	1	2	2	2	2	2	3	6	3	4	2	3	2.2	6
21-Mar	2	2	1	Z	1	2	1	1	1	1	1	1	1	2	2	2	1	2	2	2	4	2	2	2	1.6	4
22-Mar	2	2	3	6	Z	14	9	7	1	1	1	1	1	0	1	1	1	1	1	2	1	1	3	3	2.6	14
23-Mar	2	2	1	1	1	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.7	2
24-Mar	Z	7	12	11	11	5	7	9	2	3	2	2	6	7	4	1	1	0	0	2	6	6	5	6	4.9	12
25-Mar	12	Z	2	1	6	6	2	2	2	2	1	1	1	1	2	1	2	1	2	6	11	9	5	4	3.5	12
26-Mar	5	5	Z	4	2	2	2	3	3	2	2	2	1	2	2	3	2	1	2	5	11	12	4	2	3.4	12
27-Mar	1	1	1	Z	3	15	16	3	2	1	1	1	2	1	1	1	1	1	6	2	3	4	4	1	3.1	16
28-Mar	1	1	2	2	Z	1	1	1	1	2	1	1	1	2	4	2	5	3	6	1	1	2	13	16	3.1	16
29-Mar	4	1	1	5	9	Z	10	11	8	5	2	2	1	1	1	1	1	1	3	5	4	2	4	5	3.7	11
30-Mar	Z	4	4	2	6	6	7	C	C	C	C	C	1	1	0	0	0	0	0	0	0	0	0	0	1.9	7
31-Mar	0	Z	0	1	1	0	0	0	0	0	1	1	2	1	1	2	1	1	4	5	4	3	2	2	1.5	5
	2.3	2.4	3.1	4.1	5.0	4.7	4.4	3.7	2.9	2.5	1.5	1.7	2.0	1.8	2.0	2.0	2.3	2.1	2.3	3.1	3.4	2.9	2.6	2.6	Diurnal Average	
	12	7	12	17	19	16	16	13	10	13	4	8	8	7	10	11	12	10	6	11	11	12	13	16	Diurnal Maximum	

Z - zerospan C - Calibration

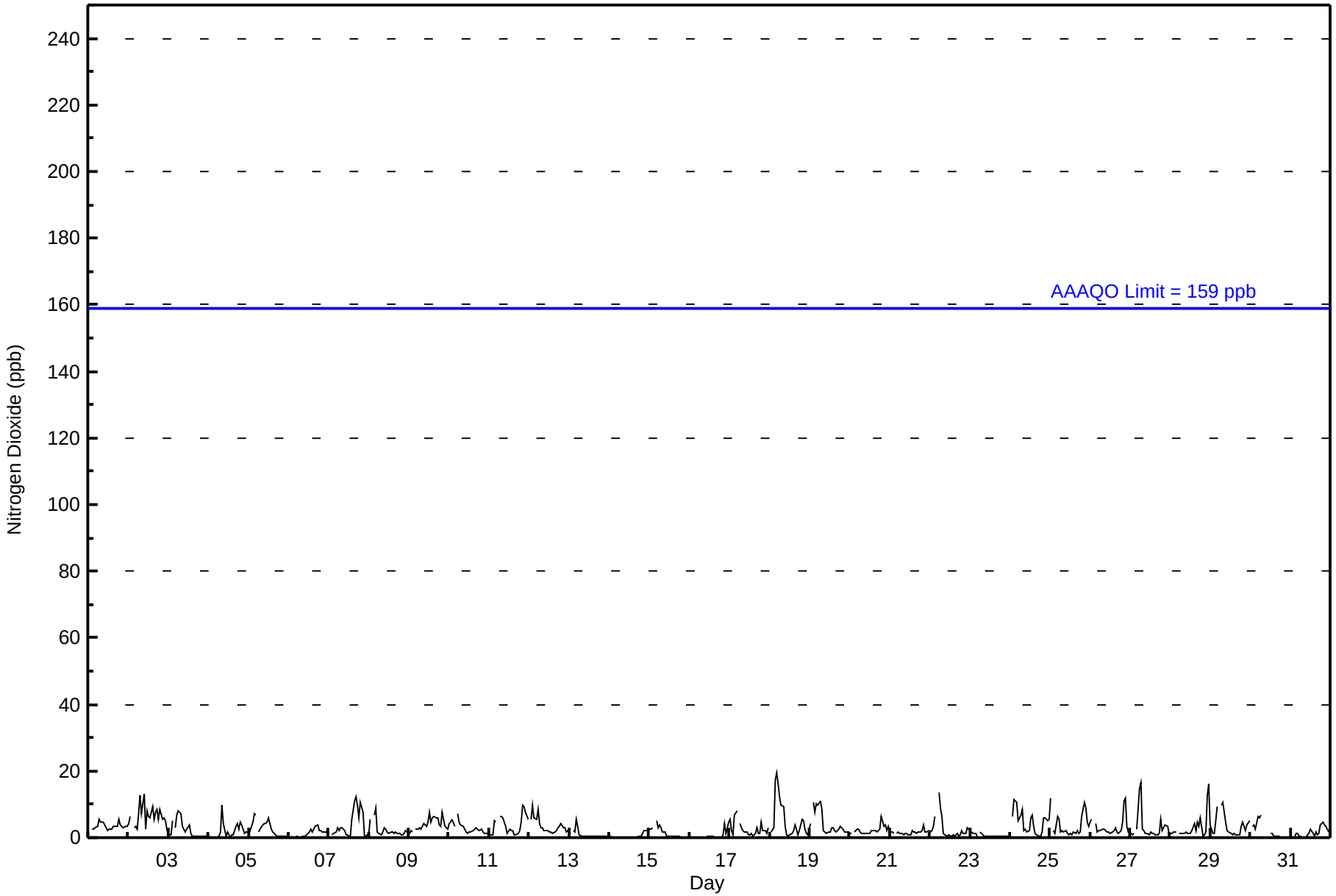
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Firebag - March 2016



Nitrogen Dioxide (NO_2) - ppb
Firebag - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	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: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Firebag - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	91	34	20	19	26	65	82	57	84	29	38	19	22	19	26	42	673
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	91	34	20	19	26	65	82	57	84	29	38	19	22	19	26	42	673

Total Number of Valid Hours: 673

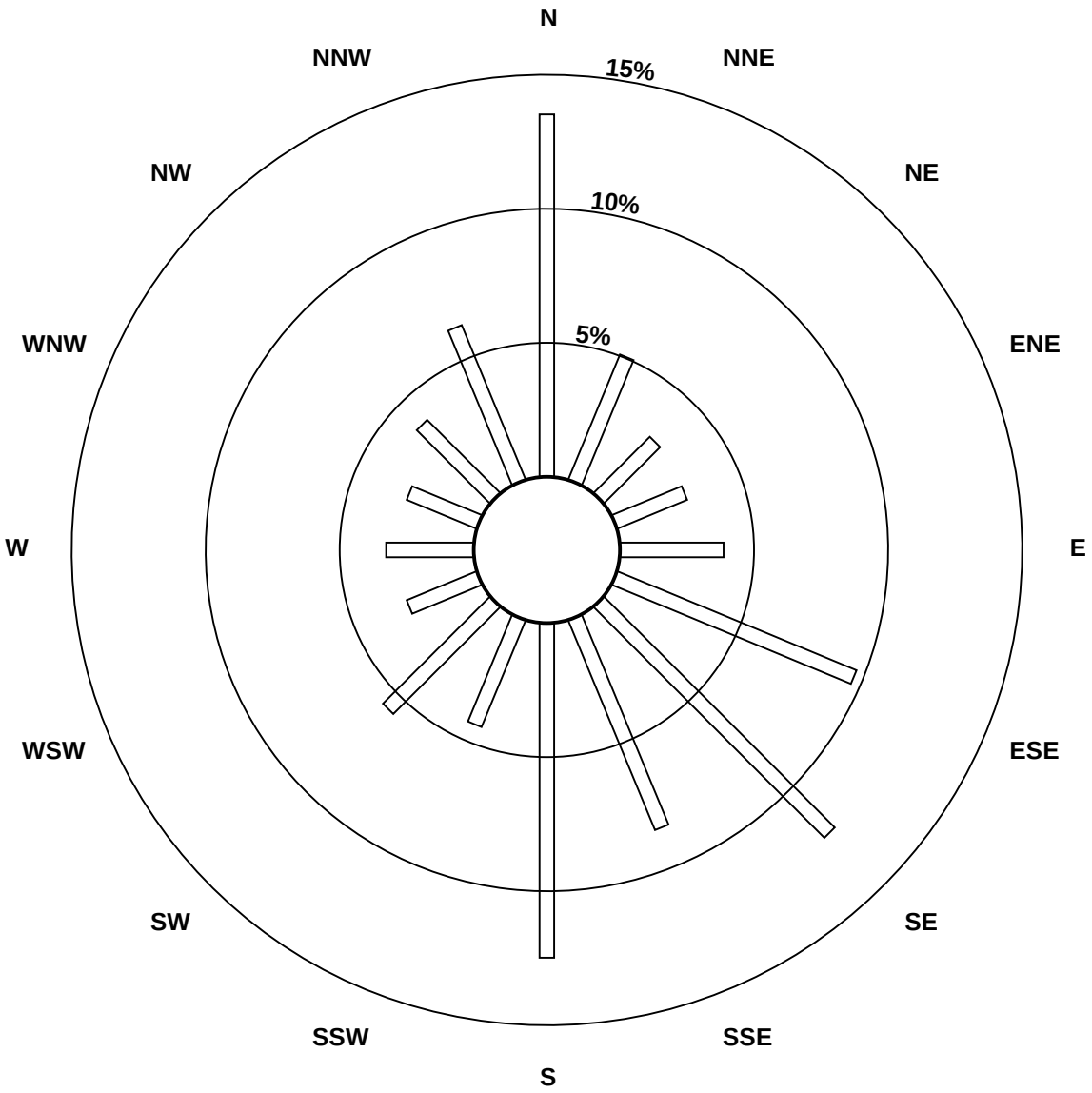
Total Number of Hours: 744

Wood Buffalo Environmental Association

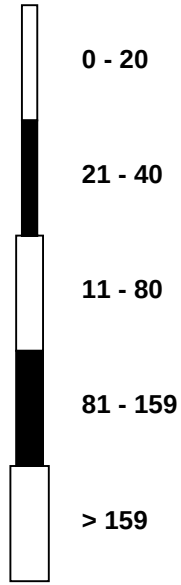
Wind Rose Mar 2016

Nitrogen Dioxide (NO_2) - ppb

Firebag (AMS 19)



Classes (ppb)



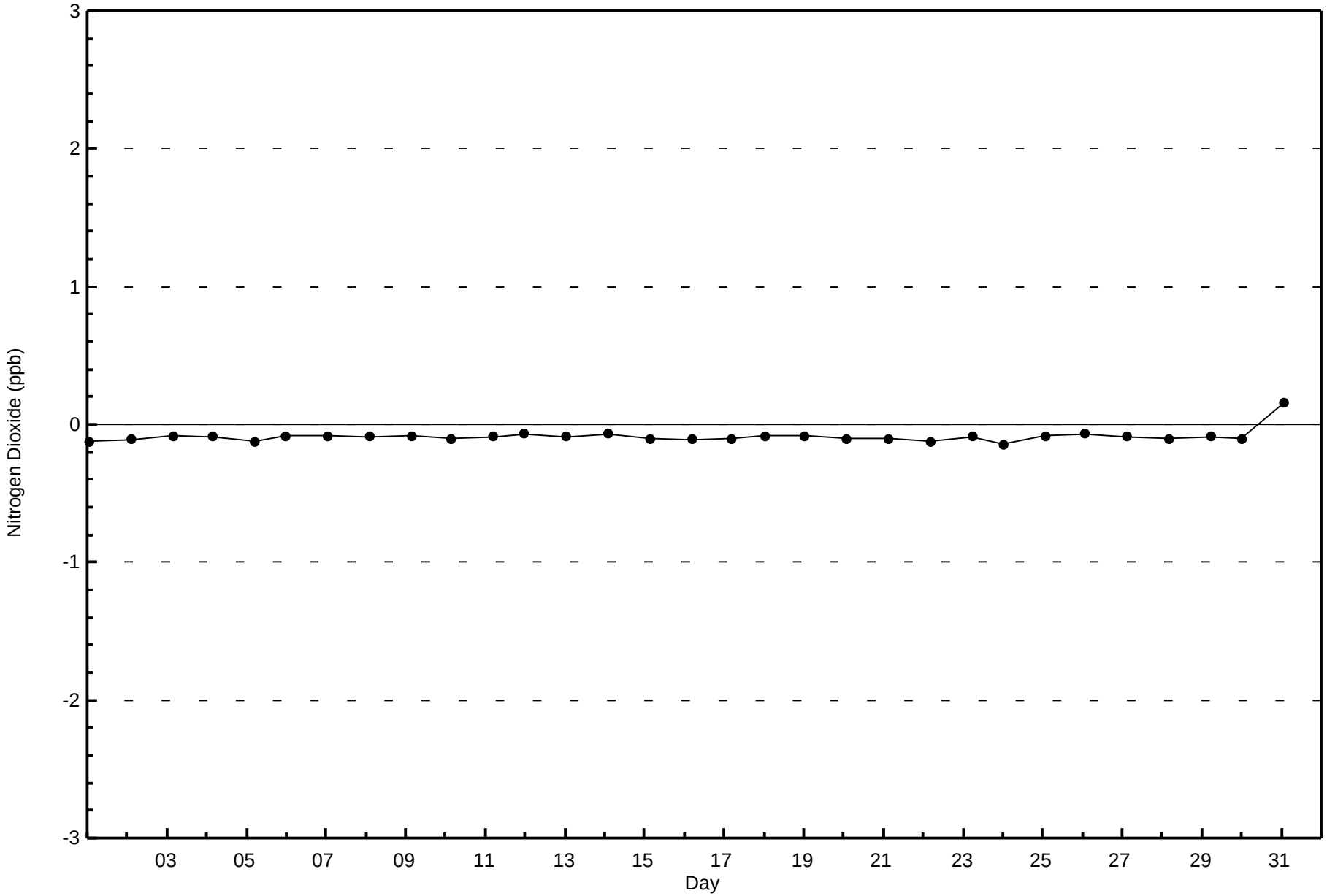
Total Number of Valid Hours: 673

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Firebag - March 2016

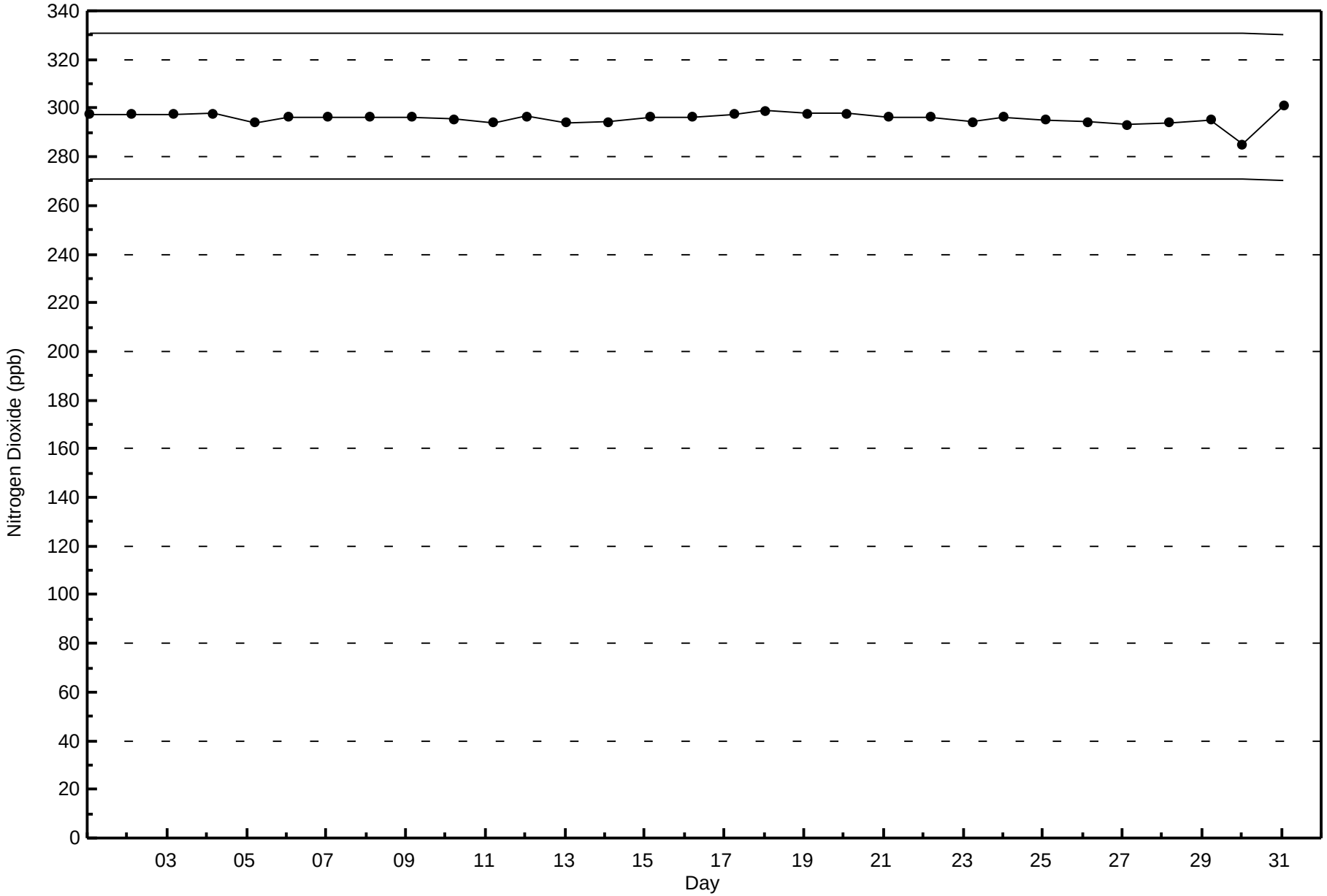


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Firebag - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Firebag - March 2016

Maximum Value: 22 ppb on Mar 2 10:00

Maximum Daily Average: 8.2 ppb on Mar 2

Minimum Value: 0 ppb on Mar 30 23:00

Minimum Daily Average: 0.6 ppb on Mar 14

Maximum Diurnal Average: 5.6 ppb at hour 5

Minimum Diurnal Average: 2.1 ppb at hour 11

Monthly Average: 3.4 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 1$ Median = 2 $Q_3 = 4$ $P_{90} = 8$ $P_{99} = 16$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	2	Z	2	3	3	3	6	5	6	7	6	3	4	4	4	4	4	4	6	5	4	3	4	4	4.1	7
2-Mar	5	7	Z	4	3	3	8	15	9	22	3	15	11	10	14	7	9	9	6	9	6	6	5	3	8.2	22
3-Mar	1	1	7	Z	3	8	10	9	4	3	2	4	5	1	1	1	0	0	0	0	0	0	0	0	2.8	10
4-Mar	0	0	0	0	Z	0	0	2	13	6	1	3	1	7	1	1	4	5	3	6	5	2	2	2	2.9	13
5-Mar	1	2	6	8	8	Z	2	3	5	5	6	7	9	3	2	2	1	1	0	0	0	0	0	0	3.1	9
6-Mar	Z	0	0	0	0	1	0	0	0	0	0	2	3	5	3	4	5	6	3	2	2	2	2	2	2.0	6
7-Mar	2	Z	1	2	2	4	3	4	4	3	1	1	1	1	7	15	15	11	6	11	8	0	0	1	4.5	15
8-Mar	1	6	Z	7	11	2	1	1	2	4	4	2	2	2	2	1	2	2	1	1	1	1	2	1	2.6	11
9-Mar	1	2	2	Z	3	3	3	3	4	5	4	7	14	7	9	9	8	7	4	3	10	4	3	3	5.2	14
10-Mar	5	6	7	4	Z	10	6	5	5	4	2	2	2	2	3	4	4	3	3	3	2	2	2	1	3.7	10
11-Mar	1	1	1	5	5	Z	7	7	7	6	4	1	3	3	3	1	1	1	2	5	10	10	8	6	4.2	10
12-Mar	Z	6	13	7	8	12	6	4	4	3	3	3	2	3	2	2	3	4	4	6	4	3	2	3	4.5	13
13-Mar	2	Z	3	2	7	5	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1.1	7
14-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	3	3	0.6	3
15-Mar	3	3	4	Z	6	3	4	3	3	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1.7	6
16-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	1	5	0.7	5
17-Mar	5	2	1	7	8	Z	4	3	2	2	2	1	1	2	1	1	4	1	1	5	2	2	1	3	2.7	8
18-Mar	Z	2	3	17	19	16	13	11	12	5	1	1	1	2	4	6	4	1	2	6	6	3	1	1	5.9	19
19-Mar	4	Z	11	8	11	13	12	10	3	2	2	2	2	7	5	3	2	3	4	3	3	2	2	2	5.1	13
20-Mar	2	2	Z	2	3	3	2	2	2	2	2	2	2	3	4	3	2	2	3	11	4	4	3	3	3.0	11
21-Mar	2	2	2	Z	2	2	1	2	1	2	3	2	2	4	3	3	2	2	2	2	4	2	2	2	2.2	4
22-Mar	2	3	4	7	Z	16	10	9	2	1	1	1	1	1	1	1	2	1	1	2	1	1	3	3	3.1	16
23-Mar	2	2	1	1	0	Z	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.7	2
24-Mar	Z	8	14	15	13	6	8	12	3	4	3	3	11	12	6	2	1	0	0	2	7	6	5	6	6.4	15
25-Mar	13	Z	2	1	7	7	2	2	2	3	1	1	2	1	2	2	2	1	1	7	11	9	5	4	3.9	13
26-Mar	5	5	Z	4	2	2	2	3	3	3	2	2	2	2	3	4	2	2	2	5	12	13	4	2	3.7	13
27-Mar	1	1	1	Z	3	18	21	3	3	2	2	1	2	2	2	1	1	2	6	2	3	4	4	1	3.8	21
28-Mar	2	1	2	2	Z	1	1	1	1	2	1	1	2	3	6	2	6	4	6	0	1	2	13	16	3.4	16
29-Mar	4	1	1	5	9	Z	11	14	11	7	3	2	2	1	2	1	1	1	4	5	4	2	4	5	4.4	14
30-Mar	Z	4	4	2	6	6	9	C	C	C	C	C	1	2	1	0	0	0	0	0	0	0	0	0	2.1	9
31-Mar	0	Z	0	1	1	0	0	0	0	0	1	2	4	2	1	2	1	2	4	5	4	3	2	2	1.7	5
	2.5	2.7	3.6	4.5	5.6	5.6	5.1	4.6	3.8	3.6	2.1	2.5	3.0	3.0	3.0	2.7	2.8	2.4	2.5	3.5	3.8	3.1	2.8	2.7	Diurnal Average	
	13	8	14	17	19	18	21	15	13	22	6	15	14	12	14	15	15	11	6	11	12	13	13	16	Diurnal Maximum	

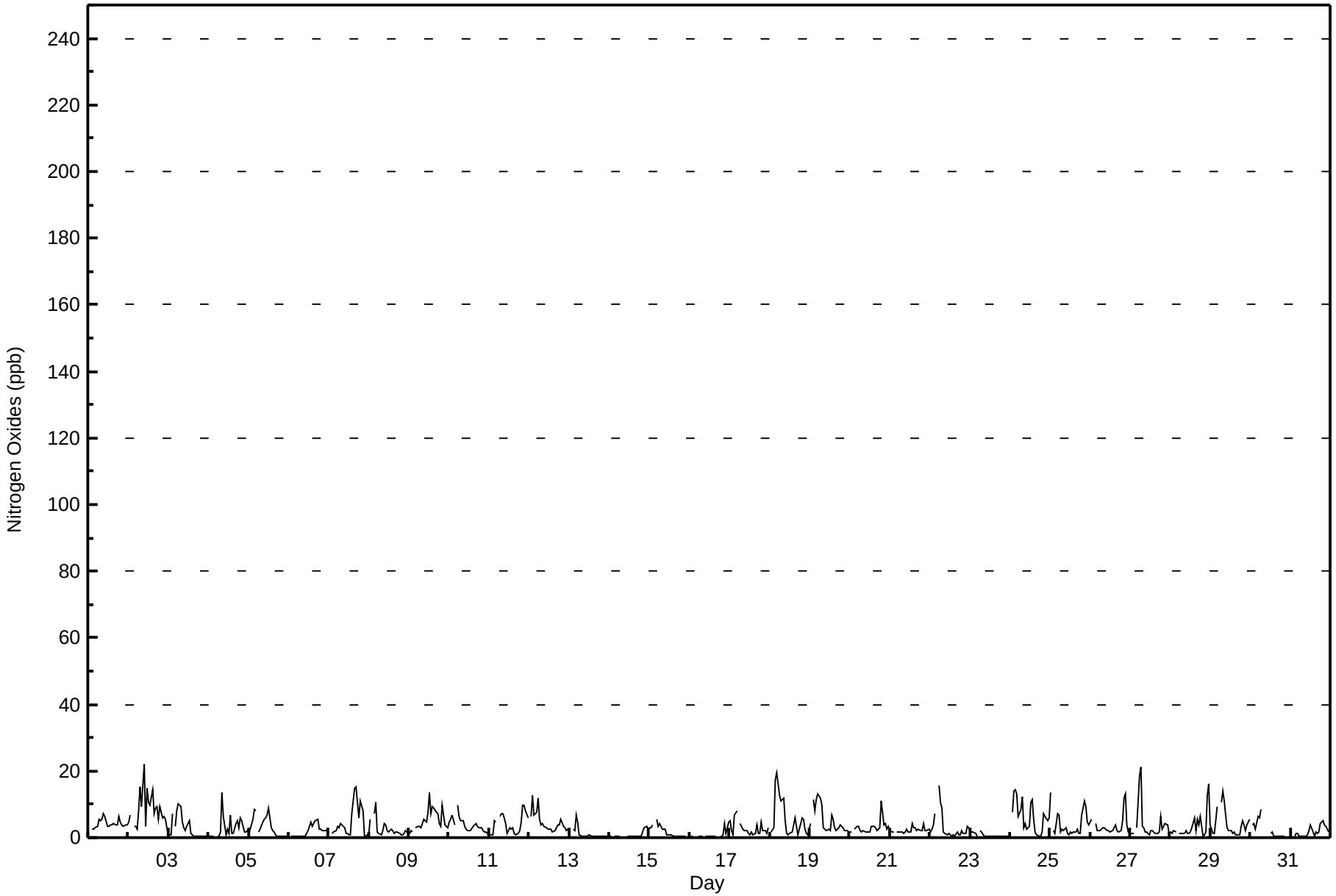
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Firebag - March 2016



Nitrogen Oxides (NO_X) - ppb
Firebag - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	99.72	99.72
21 - 40	2	0.28	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: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Firebag - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	91	34	20	19	26	65	82	56	84	29	38	18	22	19	26	42	671
21 - 40	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	34	20	19	26	65	82	57	84	29	38	19	22	19	26	42	673

Total Number of Valid Hours: 673

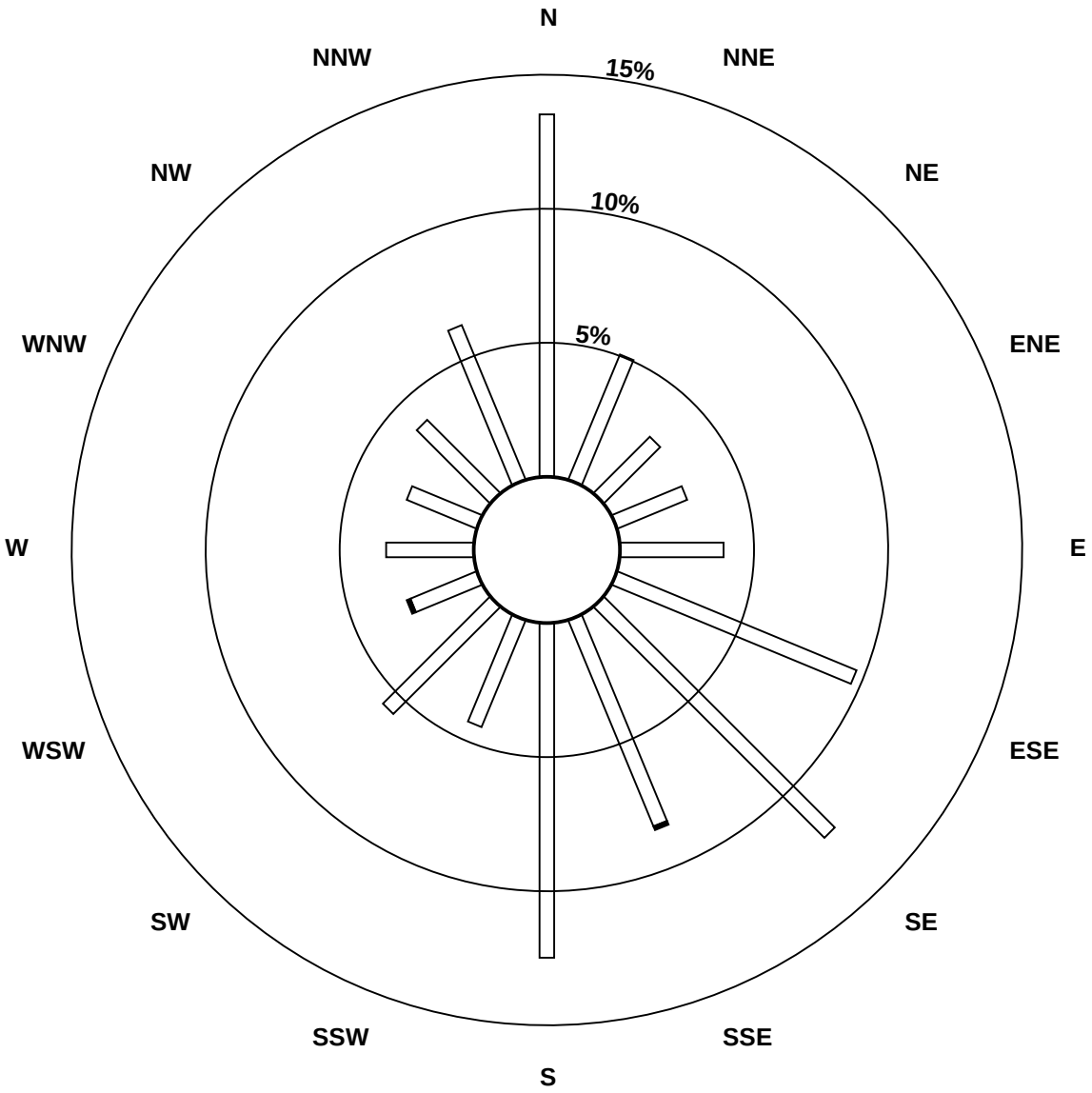
Total Number of Hours: 744

Wood Buffalo Environmental Association

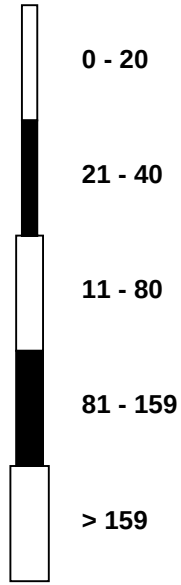
Wind Rose Mar 2016

Nitrogen Oxides (NO_X) - ppb

Firebag (AMS 19)



Classes (ppb)



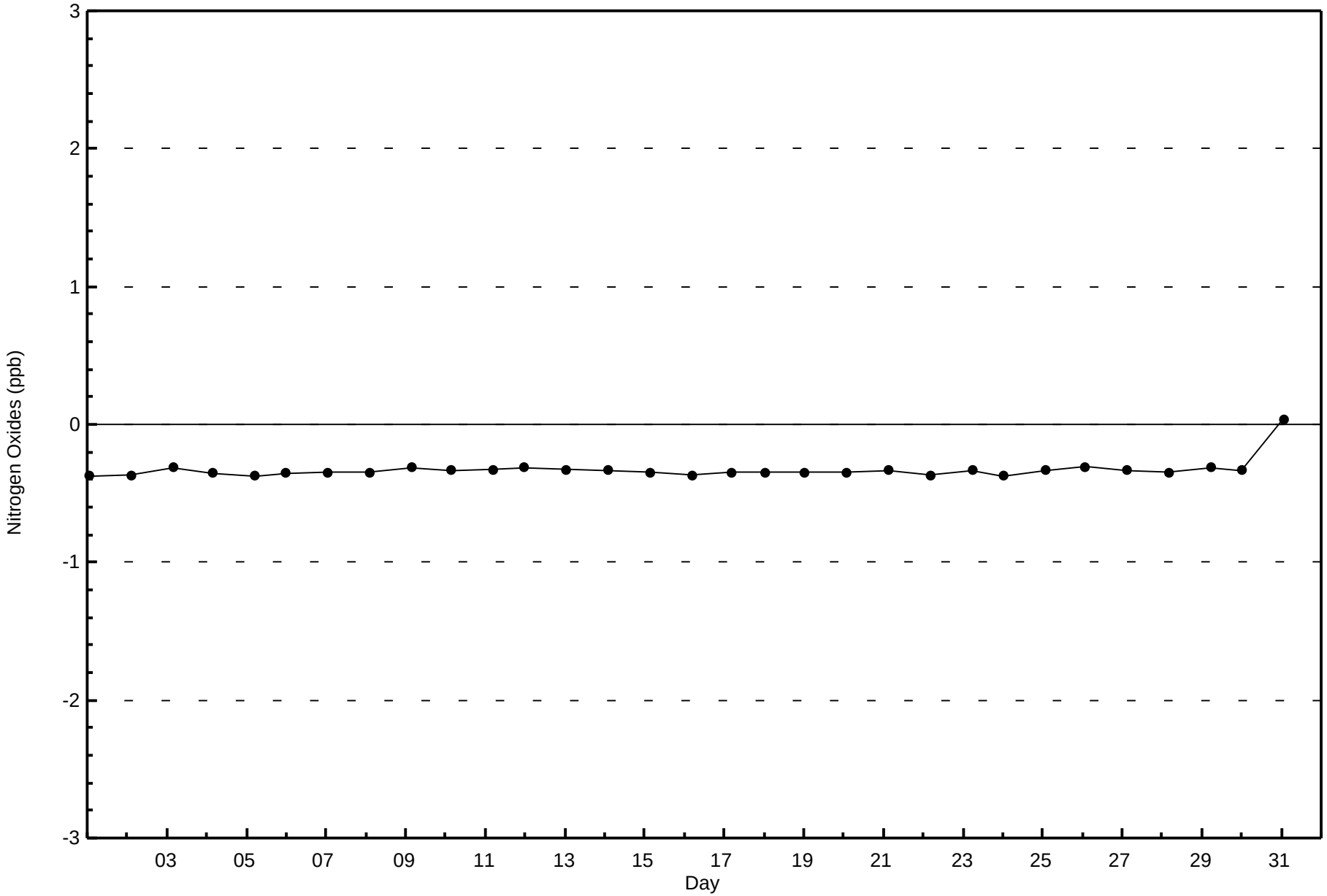
Total Number of Valid Hours: 673

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Firebag - March 2016

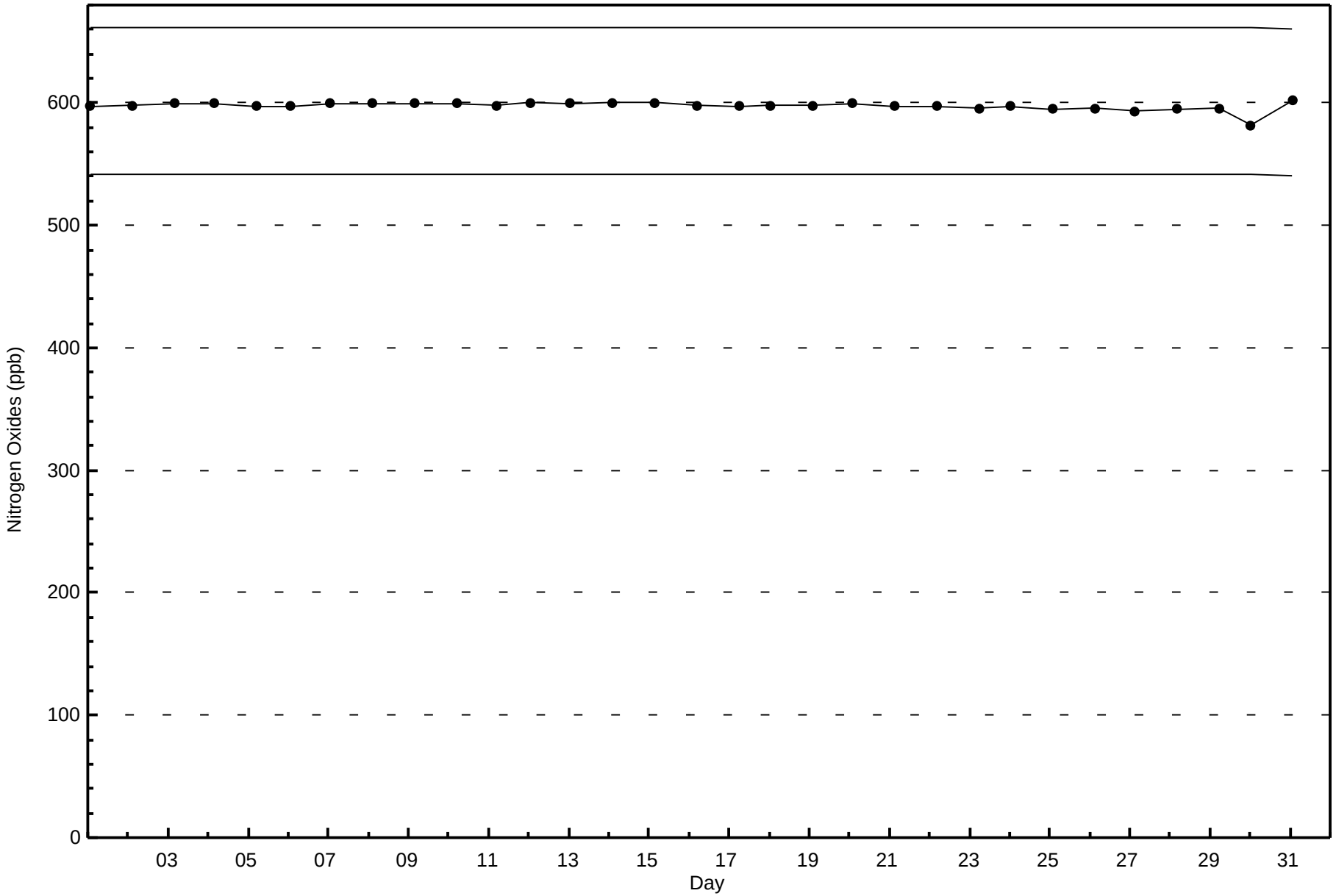


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Firebag - March 2016



Maximum Value: 9.2 C on Mar 29 17:00

Maximum Daily Average: 4.1 C on Mar 29

Minimum Value: -16.5 C on Mar 4 03:00

Minimum Daily Average: -10.9 C on Mar 4

Maximum Diurnal Average: -2.1 C at hour 15

Minimum Diurnal Average: -7.7 C at hour 7

Monthly Average: -4.99 C

Percentiles: P_1 = -15.3 P_{10} = -10.5 Q_1 = -8.3 Median = -5.8 Q_3 = -1.9 P_{90} = 1.6 P_{99} = 8.6

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

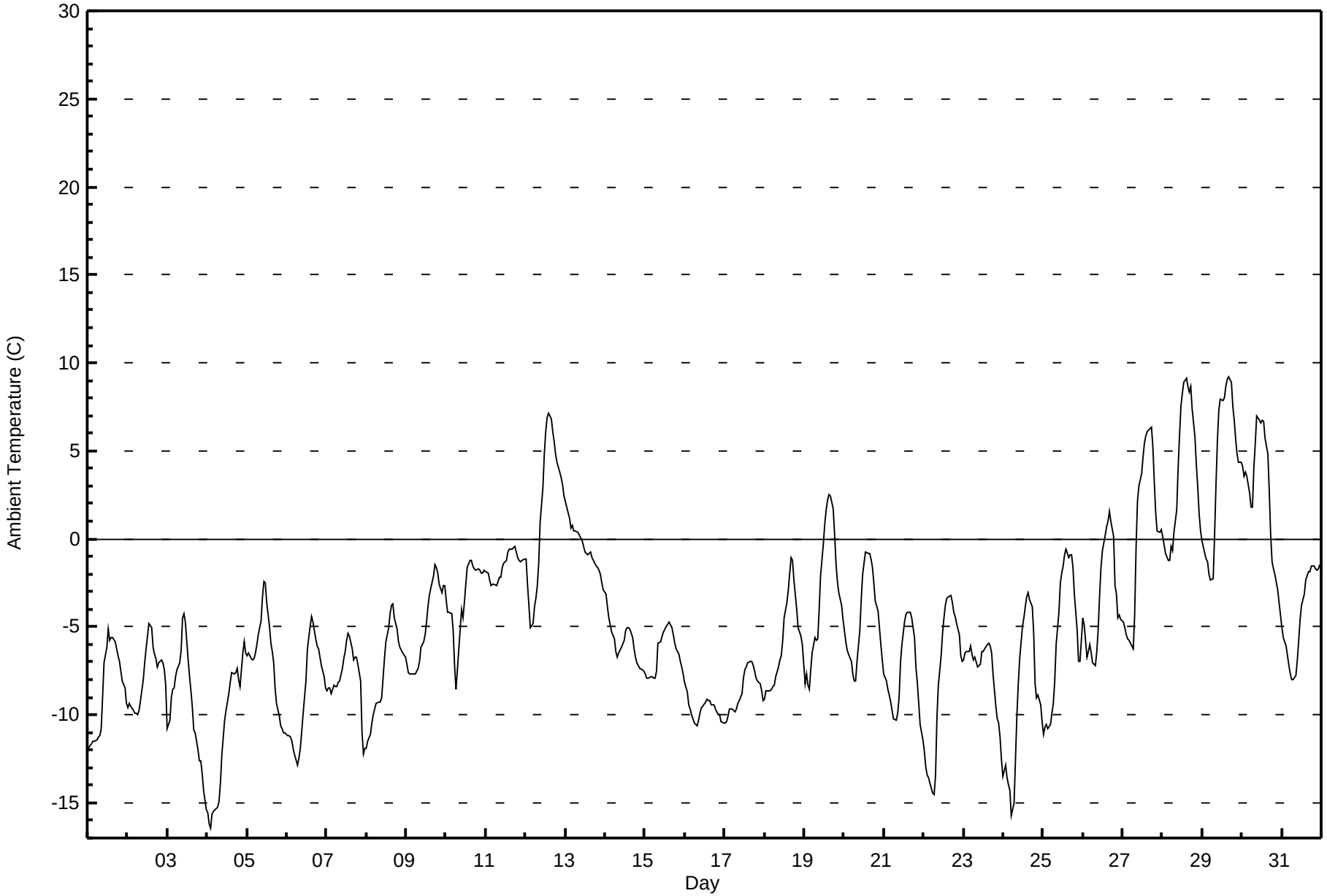
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-11.9	-11.8	-11.6	-11.5	-11.5	-11.4	-11.3	-11.2	-10.8	-8.9	-7.1	-6.1	-5.1	-5.7	-5.6	-5.6	-5.8	-6.2	-6.6	-6.9	-7.5	-8.1	-8.5	-9.3	-8.6	-5.1
2-Mar	-9.6	-9.4	-9.5	-9.8	-9.9	-9.9	-10.0	-9.8	-9.2	-8.0	-7.0	-6.2	-5.5	-4.8	-5.1	-6.2	-6.5	-6.8	-7.3	-7.0	-6.9	-7.0	-7.4	-8.3	-7.8	-4.8
3-Mar	-10.8	-10.3	-9.1	-8.6	-8.4	-7.8	-7.5	-7.0	-6.3	-4.5	-4.2	-4.8	-6.8	-7.8	-8.6	-9.6	-10.9	-11.0	-11.9	-12.6	-12.6	-13.3	-14.3	-15.4	-9.3	-4.2
4-Mar	-15.5	-16.2	-16.5	-15.6	-15.4	-15.3	-15.2	-14.9	-13.9	-12.3	-10.3	-9.7	-9.3	-8.8	-8.2	-7.6	-7.7	-7.6	-7.3	-8.0	-8.4	-6.5	-5.8	-6.5	-10.9	-5.8
5-Mar	-6.6	-6.5	-6.8	-6.8	-6.8	-6.5	-6.0	-5.5	-4.7	-3.3	-2.4	-2.5	-3.6	-5.0	-5.9	-6.4	-7.1	-8.4	-9.3	-10.1	-10.6	-10.8	-11.0	-11.0	-6.8	-2.4
6-Mar	-11.2	-11.2	-11.3	-11.5	-12.0	-12.3	-12.8	-12.4	-11.9	-10.9	-9.9	-8.1	-6.3	-5.6	-5.0	-4.4	-4.8	-5.7	-6.1	-6.3	-6.7	-7.2	-7.8	-8.5	-8.7	-4.4
7-Mar	-8.7	-8.5	-8.5	-8.8	-8.3	-8.4	-8.4	-8.2	-8.1	-7.3	-6.8	-6.4	-5.7	-5.4	-5.5	-6.3	-6.9	-6.8	-6.7	-7.1	-8.1	-11.0	-12.3	-11.9	-7.9	-5.4
8-Mar	-11.9	-11.5	-11.1	-10.5	-10.0	-9.7	-9.4	-9.3	-9.3	-9.0	-7.9	-6.8	-5.9	-5.0	-4.2	-3.8	-3.7	-4.5	-5.1	-5.8	-6.2	-6.3	-6.5	-6.7	-7.5	-3.7
9-Mar	-7.1	-7.6	-7.7	-7.7	-7.7	-7.7	-7.5	-7.4	-7.0	-6.2	-5.8	-5.5	-4.7	-3.9	-3.2	-2.9	-2.1	-1.4	-1.6	-1.9	-2.5	-3.0	-2.6	-2.6	-4.9	-1.4
10-Mar	-3.5	-4.2	-4.2	-4.2	-5.2	-7.2	-8.6	-7.4	-5.1	-4.0	-4.5	-3.6	-2.6	-1.6	-1.2	-1.3	-1.5	-1.7	-1.8	-1.7	-1.8	-2.0	-1.9	-1.8	-3.4	-1.2
11-Mar	-1.9	-1.9	-2.3	-2.6	-2.6	-2.6	-2.7	-2.4	-2.2	-2.2	-1.6	-1.4	-1.2	-0.8	-0.6	-0.6	-0.6	-0.4	-0.8	-1.0	-1.2	-1.3	-1.2	-1.2	-1.6	-0.4
12-Mar	-1.2	-2.6	-3.7	-5.1	-4.8	-3.8	-3.4	-2.7	-1.4	1.0	2.9	4.8	6.1	6.9	7.2	6.8	6.1	5.5	4.8	4.3	3.8	3.4	3.1	2.4	1.7	7.2
13-Mar	2.1	1.8	1.2	0.6	0.7	0.5	0.4	0.3	0.2	0.0	-0.1	-0.4	-0.8	-0.9	-0.8	-0.8	-1.1	-1.2	-1.5	-1.7	-1.8	-2.0	-2.5	-2.9	-0.4	2.1
14-Mar	-3.2	-3.9	-4.5	-4.9	-5.3	-5.7	-6.4	-6.7	-6.5	-6.3	-6.2	-5.8	-5.2	-5.1	-5.0	-5.1	-5.6	-6.2	-6.7	-7.0	-7.2	-7.3	-7.4	-7.5	-5.9	-3.2
15-Mar	-7.6	-7.9	-7.9	-7.8	-7.8	-7.9	-7.9	-7.6	-5.9	-5.8	-5.6	-5.3	-5.1	-4.9	-4.8	-4.9	-5.1	-5.4	-5.9	-6.2	-6.6	-6.9	-7.3	-7.7	-6.5	-4.8
16-Mar	-8.2	-8.7	-9.4	-9.6	-10.0	-10.2	-10.5	-10.6	-10.3	-9.9	-9.6	-9.5	-9.3	-9.1	-9.2	-9.2	-9.4	-9.4	-9.7	-9.8	-10.0	-10.0	-10.4	-10.4	-9.7	-8.2
17-Mar	-10.5	-10.4	-10.0	-9.7	-9.6	-9.8	-9.8	-9.7	-9.3	-9.2	-8.8	-7.9	-7.4	-7.3	-7.0	-6.9	-6.9	-7.2	-7.5	-8.0	-8.1	-8.2	-8.7	-9.2	-8.6	-6.9
18-Mar	-9.1	-8.7	-8.6	-8.6	-8.5	-8.4	-8.3	-7.8	-7.3	-6.9	-6.6	-5.7	-4.5	-3.6	-2.9	-1.9	-1.0	-1.2	-2.4	-4.0	-5.1	-5.3	-5.5	-6.0	-5.8	-1.0
19-Mar	-8.2	-7.7	-8.3	-8.5	-7.4	-6.5	-5.6	-5.8	-5.7	-4.0	-2.1	-0.3	0.9	1.6	2.2	2.5	2.5	1.7	0.3	-1.4	-2.4	-3.1	-3.8	-4.6	-3.1	2.5
20-Mar	-5.2	-5.8	-6.3	-6.6	-7.0	-7.6	-8.1	-8.1	-6.9	-5.2	-3.4	-2.0	-1.4	-0.7	-0.8	-0.8	-1.1	-1.7	-2.5	-3.5	-4.1	-5.0	-6.0	-6.9	-4.4	-0.7
21-Mar	-7.7	-8.1	-8.5	-8.9	-9.3	-9.7	-10.2	-10.3	-9.9	-9.0	-7.1	-6.0	-4.7	-4.2	-4.2	-4.2	-4.2	-4.5	-5.6	-7.3	-8.1	-9.4	-10.5	-11.4	-7.6	-4.2
22-Mar	-12.1	-12.9	-13.4	-13.6	-13.9	-14.4	-14.5	-13.4	-10.1	-8.3	-6.7	-5.4	-4.5	-3.8	-3.3	-3.3	-3.2	-3.7	-4.1	-4.4	-4.8	-5.5	-6.7	-7.0	-8.0	-3.2
23-Mar	-6.9	-6.5	-6.4	-6.4	-6.1	-6.5	-6.9	-6.7	-7.3	-7.2	-7.1	-6.4	-6.4	-6.2	-6.0	-5.9	-6.1	-6.5	-7.7	-9.5	-10.2	-10.4	-11.3	-12.6	-7.5	-5.9
24-Mar	-13.5	-12.9	-13.6	-13.9	-14.3	-15.7	-15.0	-12.5	-10.1	-8.2	-6.8	-5.0	-4.5	-3.8	-3.3	-3.1	-3.4	-3.8	-5.4	-8.2	-9.0	-8.9	-9.4	-10.4	-9.0	-3.1
25-Mar	-11.1	-10.7	-10.6	-10.8	-10.5	-9.9	-9.4	-8.1	-6.0	-4.2	-2.5	-1.9	-1.6	-0.9	-0.6	-1.1	-0.9	-0.9	-1.7	-3.2	-5.2	-7.0	-6.9	-5.8	-5.5	-0.6
26-Mar	-4.5	-4.9	-6.7	-6.4	-6.0	-6.5	-7.0	-7.2	-6.4	-5.1	-3.2	-1.6	-0.6	0.2	0.7	1.0	1.5	1.0	0.1	-2.6	-3.1	-4.5	-4.4	-4.6	-3.4	1.5
27-Mar	-4.7	-5.1	-5.5	-5.7	-5.8	-6.1	-6.2	-4.3	-0.5	2.1	3.0	3.7	4.6	5.5	5.9	6.1	6.2	6.4	5.2	3.3	1.5	0.4	0.3	0.6	0.5	6.4
28-Mar	0.1	-0.3	-0.9	-1.2	-1.2	-0.5	-0.6	0.4	1.6	4.0	5.8	7.5	8.2	8.9	9.2	8.7	8.4	8.7	7.4	5.8	4.2	2.9	1.4	0.4	3.7	9.2
29-Mar	-0.1	-0.8	-1.2	-1.3	-2.1	-2.3	-2.2	0.2	3.1	5.6	7.3	7.9	7.9	8.0	8.6	9.1	9.2	8.9	7.6	6.7	5.7	4.9	4.3	4.4	4.1	9.2
30-Mar	4.1	3.6	3.8	3.6	2.6	1.8	1.8	4.0	5.4	7.0	6.7	6.6	6.8	6.7	5.7	4.8	2.7	0.2	-1.3	-1.7	-2.0	-2.9	-3.6	-4.4	2.6	7.0
31-Mar	-5.0	-5.6	-6.1	-6.6	-7.2	-7.7	-8.0	-8.0	-7.8	-6.9	-5.8	-4.6	-3.8	-3.1	-2.3	-2.1	-1.9	-1.9	-1.6	-1.6	-1.7	-1.8	-1.7	-1.5	-4.3	-1.5
	-6.8	-7.0	-7.3	-7.4	-7.5	-7.6	-7.7	-7.1	-6.1	-4.9	-4.0	-3.2	-2.6	-2.3	-2.1	-2.1	-2.3	-2.6	-3.3	-4.1	-4.7	-5.3	-5.7	-6.1	Diurnal Average	
	4.1	3.6	3.8	3.6	2.6	1.8	1.8	4.0	5.4	7.0	7.3	7.9	8.2	8.9	9.2	9.1	9.2	8.9	7.6	6.7	5.7	4.9	4.3	4.4	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Firebag - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	638	85.75	85.75
0 - 10	106	14.25	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 2016

Maximum Value: 98 % on Mar 13 09:00

Maximum Daily Average: 95.1 % on Mar 13

Minimum Value: 20 % on Mar 24 16:00

Minimum Daily Average: 34.1 % on Mar 24

Maximum Diurnal Average: 82.0 % at hour 6

Minimum Diurnal Average: 65.9 % at hour 14

Monthly Average: 74.3 %

Percentiles: $P_1 = 30$ $P_{10} = 44$ $Q_1 = 59$ Median = 82 $Q_3 = 90$ $P_{90} = 94$ $P_{99} = 98$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

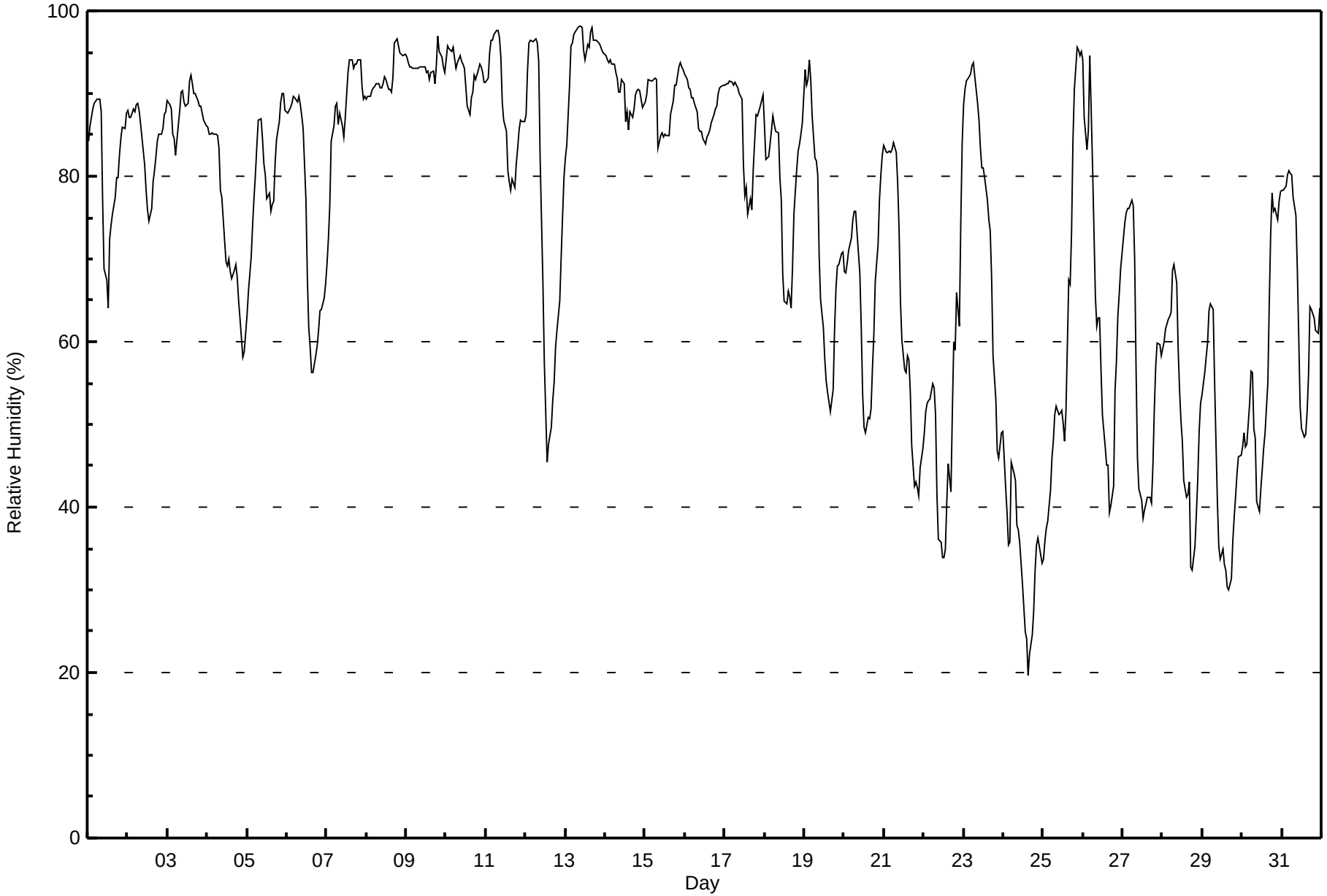
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	84	86	87	88	89	89	89	89	88	77	69	67	64	72	74	76	78	80	80	83	85	86	86	88	81.4	89
2-Mar	88	87	87	88	88	89	89	88	86	83	81	78	76	75	76	79	81	82	84	85	85	86	88	88	84.1	89
3-Mar	89	89	88	85	85	83	84	88	90	90	89	88	89	91	92	91	90	90	89	89	88	88	87	86	88.3	92
4-Mar	86	85	85	85	85	85	85	83	78	77	72	70	69	70	69	68	69	69	68	65	63	58	59	61	73.5	86
5-Mar	63	66	70	74	77	80	84	87	87	84	81	80	77	78	76	77	77	81	84	87	89	90	90	88	80.4	90
6-Mar	88	88	88	89	90	89	89	90	89	87	86	77	68	62	59	56	56	58	59	61	64	64	65	67	74.6	90
7-Mar	69	72	76	84	86	89	89	86	88	86	85	87	90	93	94	94	93	94	94	94	94	91	89	90	87.7	94
8-Mar	89	90	90	90	91	91	91	91	91	91	91	92	92	91	90	90	92	96	97	96	95	95	95	95	92.1	97
9-Mar	94	94	93	93	93	93	93	93	93	93	93	93	93	93	92	93	93	91	93	97	95	94	93	93	93.3	97
10-Mar	94	96	95	95	96	94	93	94	95	94	94	93	91	89	87	89	90	92	92	93	94	93	93	91	92.8	96
11-Mar	91	92	95	96	96	97	98	98	97	94	89	87	85	81	79	78	80	79	81	83	86	87	87	87	88.4	98
12-Mar	88	93	96	96	96	96	97	96	94	82	67	57	52	45	48	50	53	55	59	61	65	70	75	80	73.8	97
13-Mar	82	84	91	96	96	97	98	98	98	98	98	95	94	96	96	98	98	97	96	96	96	96	95	95	95.1	98
14-Mar	95	94	94	94	94	94	92	92	90	90	92	91	87	88	86	88	87	88	90	90	90	90	88	89	90.5	95
15-Mar	89	90	92	91	92	92	92	92	83	85	85	85	85	85	85	87	88	89	91	91	93	94	93	93	89.3	94
16-Mar	92	92	91	90	89	89	89	88	86	86	85	85	84	85	85	86	86	87	88	88	90	91	91	91	88.1	92
17-Mar	91	91	91	92	91	91	91	91	91	90	89	81	78	79	76	77	76	81	84	88	87	88	89	90	86.4	92
18-Mar	86	82	82	84	86	87	86	85	85	80	77	68	65	64	66	65	64	69	75	81	83	84	85	86	78.3	87
19-Mar	93	91	92	94	92	87	82	82	80	70	65	62	58	55	54	53	51	54	62	66	69	69	71	71	71.8	94
20-Mar	68	68	70	71	73	75	76	76	73	68	62	54	50	49	51	51	52	57	61	67	72	77	80	83	65.9	83
21-Mar	84	83	83	83	83	83	84	83	79	74	65	60	57	56	58	58	54	47	43	43	42	41	45	47	64.0	84
22-Mar	49	52	53	53	53	55	54	51	42	36	36	34	34	35	41	45	42	52	60	59	66	62	74	84	50.9	84
23-Mar	89	91	91	92	92	93	94	92	89	87	83	81	81	80	77	75	73	68	58	53	47	46	48	49	76.2	94
24-Mar	49	42	39	35	36	45	44	43	38	37	36	31	28	25	24	20	22	25	27	32	35	36	34	33	34.1	49
25-Mar	34	36	38	38	42	46	48	51	52	51	51	52	50	48	51	67	67	73	84	90	96	95	95	95	60.5	96
26-Mar	94	87	83	86	95	88	81	65	62	63	63	57	51	47	45	45	39	40	43	54	58	63	66	69	64.3	95
27-Mar	73	74	76	76	76	77	76	70	57	46	42	41	39	40	40	41	41	41	45	52	57	60	60	58	56.5	77
28-Mar	59	60	62	63	63	64	69	69	67	59	54	50	48	43	41	41	43	33	32	35	39	43	49	53	51.7	69
29-Mar	54	56	58	60	64	65	64	55	48	41	35	34	35	33	32	30	30	31	36	39	41	44	46	46	44.9	65
30-Mar	47	49	47	48	53	56	56	49	48	41	39	42	45	47	49	55	65	73	78	76	76	75	77	78	57.1	78
31-Mar	78	78	79	80	81	80	80	78	75	69	61	52	49	49	49	52	56	64	64	63	61	61	61	64	66.0	81
	78.4	78.6	79.4	80.4	81.3	82.0	81.9	80.5	78.0	74.5	71.5	68.5	66.5	65.9	65.9	66.9	67.3	68.9	70.9	72.8	74.2	74.8	75.9	77.0	Diurnal Average	
	95	96	96	96	96	97	98	98	98	98	98	95	94	96	96	98	98	97	97	97	96	96	95	95	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Firebag - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	1	0.13	0.13
20 - 40	45	6.05	6.18
40 - 60	143	19.22	25.40
60 - 80	163	21.91	47.31
80 - 100	392	52.69	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 2016

Maximum Speed: 36 km/h on Mar 30 19:00

Maximum Daily Speed Average: 19.1 km/h on Mar 21

Minimum Speed Value: 1 km/h on Mar 11 21:00

Minimum Daily Speed Average: 1.4 km/h on Mar 26

Maximum Diurnal Speed Average: 5.3 km/h at hour 2

Minimum Diurnal Speed Average: 0.5 km/h at hour 13

Monthly Average Velocity: 2.8 km/h 122.7 deg

Percentiles: $P_1 = 2$ $P_{10} = 5$ $Q_1 = 8$ Median = 12 $Q_3 = 17$ $P_{90} = 20$ $P_{99} = 30$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Percent Operational Time:	95.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	SSW15	SSW13	SW12	SSW10	SW9	SSW6	SSW6	SW8	SW6	S3	SSE3	SSE1	S2	NNE8	NE5	NNE6	NNE6	NE7	ESE10	ESE10	SE11	SE10	SE9	SE11	S3.9	SSW15
2-Mar	SE8	SSE5	ESE4	E6	ESE5	ENE4	ESE3	SSE3	S2	WSW1	NW4	NW4	NNW3	WNW3	NW7	NNW8	N6	NE7	ENE6	ESE7	E5	ESE5	E5	ENE7	ENE1.9	NNW8
3-Mar	NE10	NE11	ENE12	ESE12	ESE9	SE11	SSE11	SSE13	SE15	S16	SSW18	WSW9	NNW11	N13	N14	N17	N21	N22	N22	N20	N16	N13	N10	N11	NNE5.6	N22
4-Mar	N13	N10	N9	N8	N7	NNE4	NW2	SW3	S4	S6	SSW8	SSW10	S11	S12	S15	SSE18	SSE17	SSE18	SSE19	SE17	SSE19	SSE22	S25	S23	SSE7.9	S25
5-Mar	SSE21	SSE20	S18	S14	S13	SSW13	SW13	SW11	SW10	W10	NNW11	N18	N20	NNE19	NNE19	N16	NNE18	NNE15	NNE18	NNE16	NNE18	NNE16	NNE16	NNE15	NNE4.2	SSE21
6-Mar	NE15	NNE13	NNE13	NNE13	NNE13	NE11	NE9	NNE10	NE10	NE11	NE13	ENE14	ENE13	ESE13	E12	E13	E14	ENE14	E15	ESE16	ESE20	ESE21	ESE20	ESE17	ENE11.4	ESE21
7-Mar	ESE18	ESE22	ESE24	ESE20	SE15	SE14	SE15	SE20	SSE17	SSE18	SSE20	S17	SSW13	SW12	W9	W11	W10	W8	W6	N4	N10	NNE11	NE7	ENE5	SE6.9	ESE24
8-Mar	NE4	SE4	S4	S3	S4	WSW4	SW6	SSW5	S9	S7	S7	SSE9	SSE14	S11	S8	SW9	W6	NNW5	NNW7	N7	N7	N6	N6	N8	SSW2.2	SSE14
9-Mar	N7	NE7	NE6	ENE6	ENE6	ENE5	ESE4	ESE5	ESE4	S2	SW8	WSW8	WSW11	SW11	SSW14	SSW15	SSW15	SSW13	S13	S15	SSE12	SSE14	S15	S14	S5.8	S15
10-Mar	S11	S11	S11	S11	SE14	SE12	SE12	SE13	SE15	SE16	SE17	SE22	SE26	SE25	SE26	SE23	SE22	SE20	SE21	SSE22	SSE21	S19	S17	S15	SSE16.8	SE26
11-Mar	SSW13	SW10	WSW11	WSW12	W11	W8	W8	WNW7	WNW10	NW14	NNW16	NNW15	NNW14	WNW13	WNW13	NW11	NW9	WNW6	W4	SW4	SE1	S5	S7	S11	W6.4	NNW16
12-Mar	SSE11	SSE12	SSE12	SE12	SSE12	SE11	SE13	SE15	SE14	SE18	SE16	SE19	ESE20	SE23	SE25	ESE25	SE24	SE21	SE22	SE22	SE20	SE19	SE18	SE15	SE17.1	SE25
13-Mar	SE15	SE16	SE15	ESE16	E9	ENE8	NE10	NE13	NNE14	NNE17	N18	N16	N18	AF	AF	AF	N2	N2	NNW4	N5	N6	N4	N2	AF	NE5.9	N18
14-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	----	----
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	ENE4	NNE5	N8	N9	NNE9	N11	N14	N15	N15	N17	N17	N18	N17	N16	N16	----	N18
16-Mar	N16	N16	N17	N16	N19	N18	N17	N17	N18	N18	N17	NNW17	N17	NNW18	N20	N20	N17	N16	NNW14	NNW13	NNW12	NW11	NNW10	NW7	N15.6	N20
17-Mar	WNW7	WNW7	WNW8	NW11	NW11	NNW14	NNW15	NNW13	NNW16	NNW19	NNW16	NNW18	NNW16	NNW14	NNW14	NW11	NNW11	NNW9	NW5	W6	W6	W4	W4	SW5	NW10.2	NNW19
18-Mar	WSW6	SW7	SW9	WSW9	SW10	SW8	SW8	W9	WNW10	NW12	NW12	WNW7	SSW4	SW7	WSW10	SW11	WSW12	SW9	SSW7	S9	S9	S10	SSW9	SW6	WSW7.2	NW12
19-Mar	WSW2	SSE3	ESE5	ESE6	ESE6	E11	ESE13	ESE14	ESE15	ESE14	ESE13	SE12	ESE12	ESE13	ESE15	ESE16	ESE19	ESE17	ESE16	ESE16	ESE15	ESE18	ESE20	SE20	ESE12.6	SE20
20-Mar	SE20	SE21	SE21	SE19	SE19	SE20	SE22	ESE24	SE22	SE23	SE21	SE16	SE16	ESE14	E17	E16	E17	E15	E16	ESE20	ESE17	ESE18	ESE21	ESE21	ESE18.4	ESE24
21-Mar	ESE23	ESE25	ESE23	ESE23	ESE16	ESE18	ESE19	ESE21	ESE20	ESE19	ESE21	ESE21	ESE19	E18	E19	E18	E18	E17	E17	E17	ESE17	ESE21	ESE18	SE17	ESE19.1	ESE25
22-Mar	SE17	SE14	SE13	SE11	SE11	SE11	SE12	SSE14	SSE18	SSE18	S17	SSE15	S16	S14	S12	S12	SSE12	S12	S12	S11	S12	S16	SSE12	SSE13	SSE13.1	SSE18
23-Mar	SSE13	S12	S11	SSW9	SW9	NW5	N5	N11	N15	N15	N15	N15	N16	N17	NNE15	N16	N14	NNE15	N13	N12	NNE12	NNE11	NE9	NE7	N7.4	N17
24-Mar	ENE7	E8	E8	ENE8	E9	ENE7	ENE8	E8	ENE10	ESE8	SE6	W1	SW5	SSE3	SSE3	NNE8	NNW13	N13	NNE11	NE6	ENE8	SE11	SE12	SE12	E5.1	NNW13
25-Mar	SE12	S14	S13	S14	S12	S11	S11	S10	S10	S11	S12	S15	S16	S16	S13	S14	S12	SSW11	S7	SSE4	SSE4	S3	WSW4	NNW8	S9.7	S16
26-Mar	N10	N11	N11	N10	N12	N11	N12	N12	N10	NNE7	NNW6	W3	SW4	SSW3	NE2	W4	SSW3	S4	SSW4	S10	SE11	SSE13	SSE14	SSE17	N1.4	SSE17
27-Mar	S17	S16	S15	SSE15	SSE14	SSE15	SSE13	SSE15	SSE17	S20	S21	S20	SSE21	SSE20	S20	S18	SSE19	SSE19	SE16	SE16	SE16	SE16	SSE17	S17	SSE16.9	S21
28-Mar	S18	S18	S16	S15	S16	SSW19	SSW19	SSW22	SSW19	SW19	SSW18	SW18	SW19	WSW19	W18	WNW17	WNW18	WNW18	NW13	NW12	WNW10	WNW9	WSW8	W8	SW12.0	SSW22
29-Mar	WSW11	WSW9	WSW11	SW9	SW7	SW8	SW9	SW10	SW10	WSW10	NW12	WNW12	NNW14	NW14	NW9	NW8	WNW8	N8	ENE6	E7	ESE9	SE10	SE7	SE9	W3.9	NNW14
30-Mar	SE11	SE10	SE10	SSE11	SSE9	NNE4	ENE8	ESE8	SSE5	WNW9	NW16	NW21	NW26	NW31	NNW30	N28	N30	N35	N36	N35	N30	N31	N27	N26	N14.4	N36
31-Mar	N23	NNW19	NNW18	NNW18	NNW18	NNW17	NNW14	NNW14	NNW10	NW10	NNW8	WNW7	NW10	NW9	W5	W4	SW7	S8	S11	S11	SSW12	SSW14	SW16	SW17	NW6.3	N23
	SE4.8	SE5.3	SE4.8	SE4.6	SE3.5	ESE3.1	SE3.3	SE3.7	SE3.5	SSE2.5	SSE1.3	SSW0.7	SE0.5	SE0.6	NE1.1	NE1.7	NE2.1	ENE2.7	ENE3.4	E4.0	ESE4.5	ESE4.8	SE5.1	SE4.7	Diurnal Average		
	N23	ESE25	ESE24	ESE23	SE19	SE20	SE22	ESE24	SE22	SE23	S21	SE22	SE26	NW31	NNW30	N28	N30	N35	N36	N35	N30	NNW31	N27	N26	Diurnal Maximum		

AF - Analyzer Failure

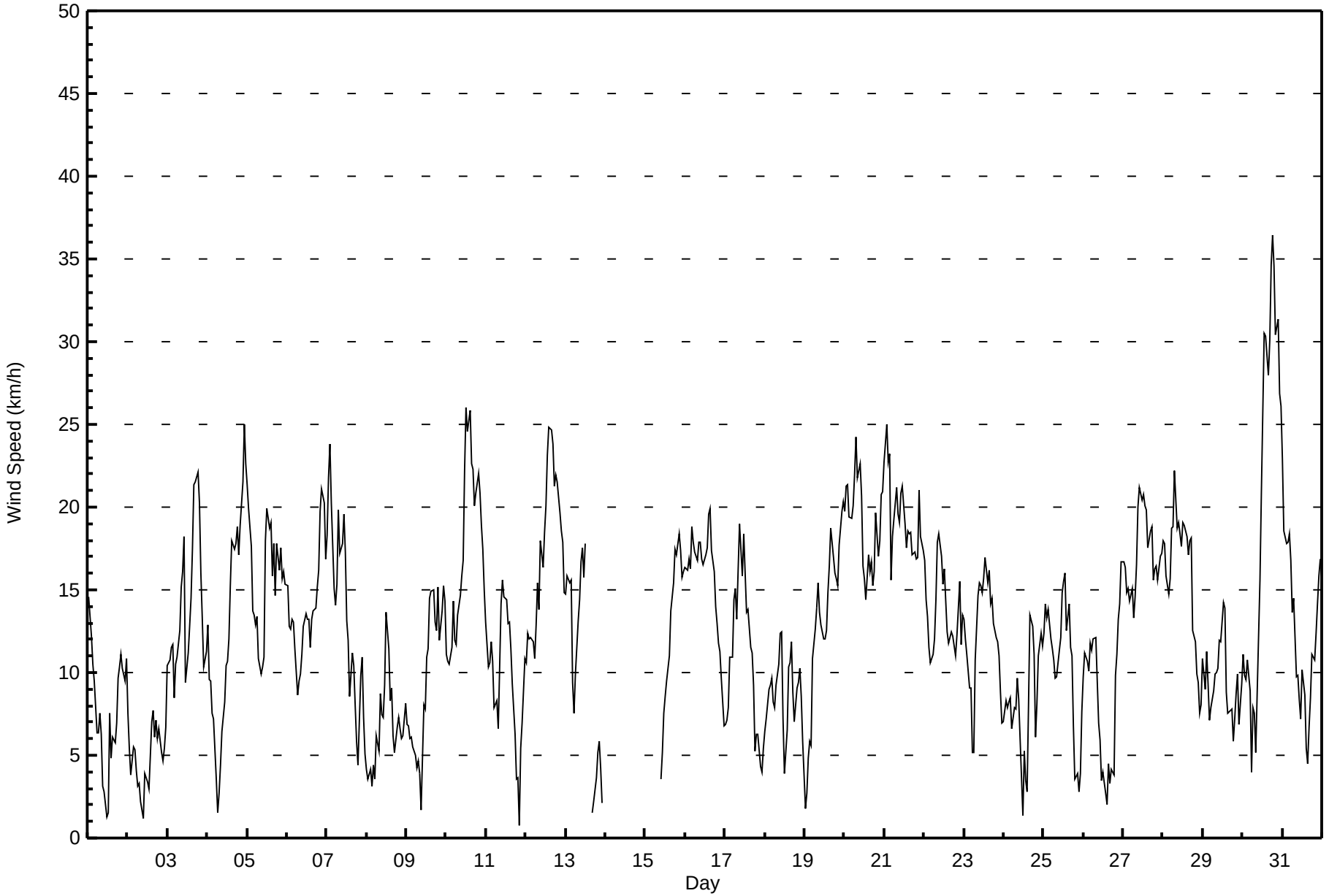
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Firebag - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	81	11.46	11.46
6 - 11	232	32.81	44.27
12 - 19	311	43.99	88.26
20 - 28	75	10.61	98.87
29 - 38	8	1.13	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Firebag - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	7	3	3	4	2	8	2	10	11	5	5	4	8	1	5	3	81
6 - 11	24	12	15	13	8	9	19	6	27	9	26	13	14	13	13	11	232
12 - 19	48	19	3	4	16	31	42	36	43	16	8	3	1	6	8	27	311
20 - 28	10	0	0	0	0	22	24	9	6	1	0	0	0	0	1	2	75
29 - 38	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	8
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	94	34	21	21	26	70	87	61	87	31	39	20	23	20	28	45	707

Total Number of Valid Hours: 707

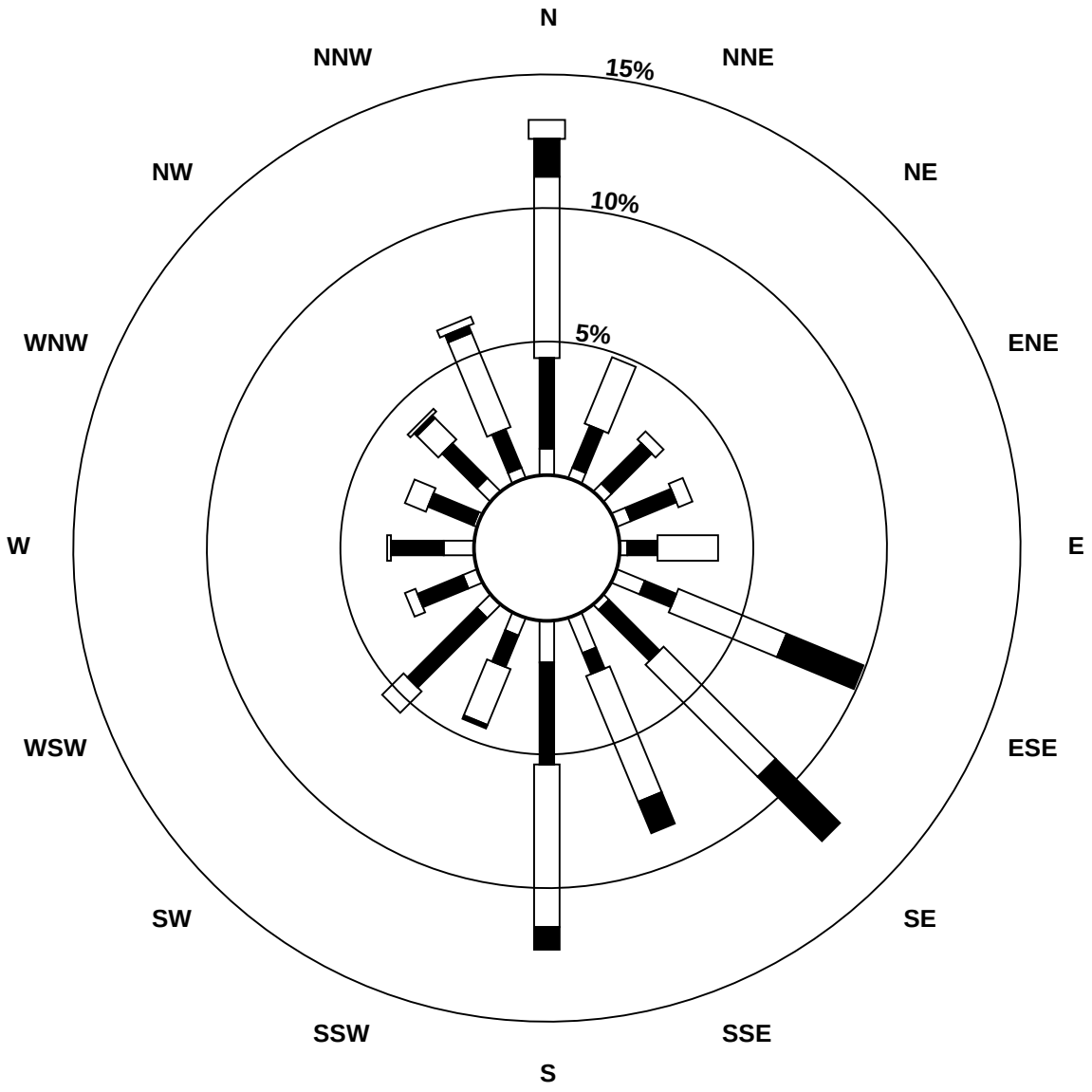
Total Number of Hours: 744

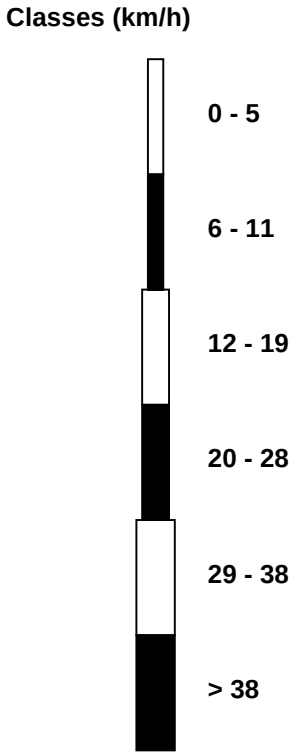
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Wind Speed (WS) - km/h

Firebag (AMS 19)





Total Number of Valid Hours: 707

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Firebag - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 7 km/h on Mar 30 18:00

Minimum Value: 0 km/h on Mar 28 23:00

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:	707
Hours of Missing Data:	37
Hours of Calibration:	0
Percent Operational Time:	95.0

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

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Firebag - March 2016

Direction of Maximum Speed: 354 deg on Mar 30 19:00
Direction of Maximum Daily Speed Average: 108.7 deg on Mar 21

Direction of Minimum Speed: 127 deg on Mar 11 21:00

Direction of Minimum Daily Speed Average: 1.4 deg on Mar 26

Monthly Average Direction: 248.0 deg

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Percent Operational Time:	95.0

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	212	213	217	212	223	213	202	218	221	186	163	149	175	23	46	28	21	55	120	123	131	134	137	130	169.7
2-Mar	139	157	103	88	121	70	111	164	178	245	315	310	337	295	308	328	352	40	67	116	101	108	101	59	75.4
3-Mar	52	52	77	119	123	141	154	148	137	174	204	248	348	354	357	360	1	6	3	2	1	360	352	350	24.9
4-Mar	3	11	10	2	358	16	323	218	170	178	209	205	185	172	176	167	153	152	154	146	147	163	169	169	161.3
5-Mar	165	168	173	174	182	195	217	226	230	266	327	354	4	12	14	9	14	20	15	20	29	28	30	30	17.9
6-Mar	34	30	16	23	26	47	40	25	43	43	51	61	76	104	92	83	84	76	93	109	115	114	115	115	72.9
7-Mar	112	113	114	120	128	124	132	143	149	155	163	173	200	230	277	269	278	265	274	355	360	18	36	58	141.9
8-Mar	53	144	182	186	189	249	235	212	177	175	171	168	168	169	188	224	259	330	347	350	1	355	352	1	199.8
9-Mar	11	38	55	61	66	74	104	102	110	188	227	242	243	220	205	199	204	195	186	173	154	162	177	185	181.3
10-Mar	183	179	178	170	144	134	130	131	143	140	129	136	139	132	146	136	140	135	146	152	157	170	170	182	147.7
11-Mar	193	216	246	250	269	274	269	283	303	324	330	328	327	294	300	309	325	290	265	224	127	177	170	175	281.2
12-Mar	164	159	148	141	155	140	126	127	138	140	134	124	122	135	125	123	124	135	142	146	142	141	136	130	135.7
13-Mar	132	132	138	119	91	66	40	34	21	17	6	349	349	AF	AF	AF	354	351	347	354	356	357	357	AF	42.7
14-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	--
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	72	16	359	4	29	4	358	358	6	8	8	3	5	7	359	--
16-Mar	358	0	359	2	1	4	3	1	4	360	353	342	349	345	349	351	358	349	348	339	336	324	344	318	352.6
17-Mar	299	282	297	316	321	334	336	334	337	337	333	338	331	334	341	321	332	331	306	277	278	279	278	235	323.5
18-Mar	245	236	223	238	234	229	236	266	288	306	306	289	211	214	246	221	249	233	200	187	190	190	207	232	238.4
19-Mar	250	158	117	107	110	88	102	111	122	121	123	126	118	114	115	113	111	115	113	119	121	120	122	124	116.5
20-Mar	126	124	125	127	127	127	124	123	126	127	127	136	132	102	87	86	90	94	97	110	112	105	112	108	115.9
21-Mar	112	111	113	113	111	112	112	118	112	112	115	114	115	90	90	90	95	94	94	99	113	117	118	128	108.7
22-Mar	136	132	133	145	141	146	144	152	162	165	172	165	174	183	171	174	161	191	186	178	172	169	156	159	161.1
23-Mar	168	181	185	196	220	319	357	357	6	358	2	2	358	5	12	8	11	12	11	11	25	29	40	54	9.5
24-Mar	68	90	89	78	85	75	66	80	70	105	137	279	223	166	167	31	344	9	18	45	75	125	139	142	79.2
25-Mar	144	172	174	173	178	176	172	172	178	170	177	189	170	181	187	191	175	192	190	160	158	172	250	329	178.0
26-Mar	355	351	351	1	351	355	354	1	355	18	343	269	215	206	39	264	208	183	195	169	146	150	168	168	0.0
27-Mar	169	170	171	168	163	151	153	163	166	172	173	170	162	166	172	169	166	163	146	138	141	142	157	171	162.4
28-Mar	180	184	183	185	190	198	203	208	213	214	213	223	219	251	281	295	283	286	312	304	284	284	257	261	231.1
29-Mar	253	241	237	235	226	224	221	233	233	254	308	302	327	319	319	326	302	354	57	98	122	134	130	143	262.8
30-Mar	141	134	133	159	161	21	66	117	151	295	306	326	326	325	345	354	353	357	354	354	350	349	349	354	349.9
31-Mar	356	347	343	334	335	343	347	348	345	313	340	298	309	307	273	280	226	188	178	190	194	209	217	229	307.3
	134.1	140.2	141.1	140.8	143.9	122.6	126.2	134.1	137.2	147.5	162.0	194.2	137.6	131.7	54.3	41.5	43.0	57.0	75.7	98.3	104.5	119.5	131.6	136.8	
	Diurnal Average																								

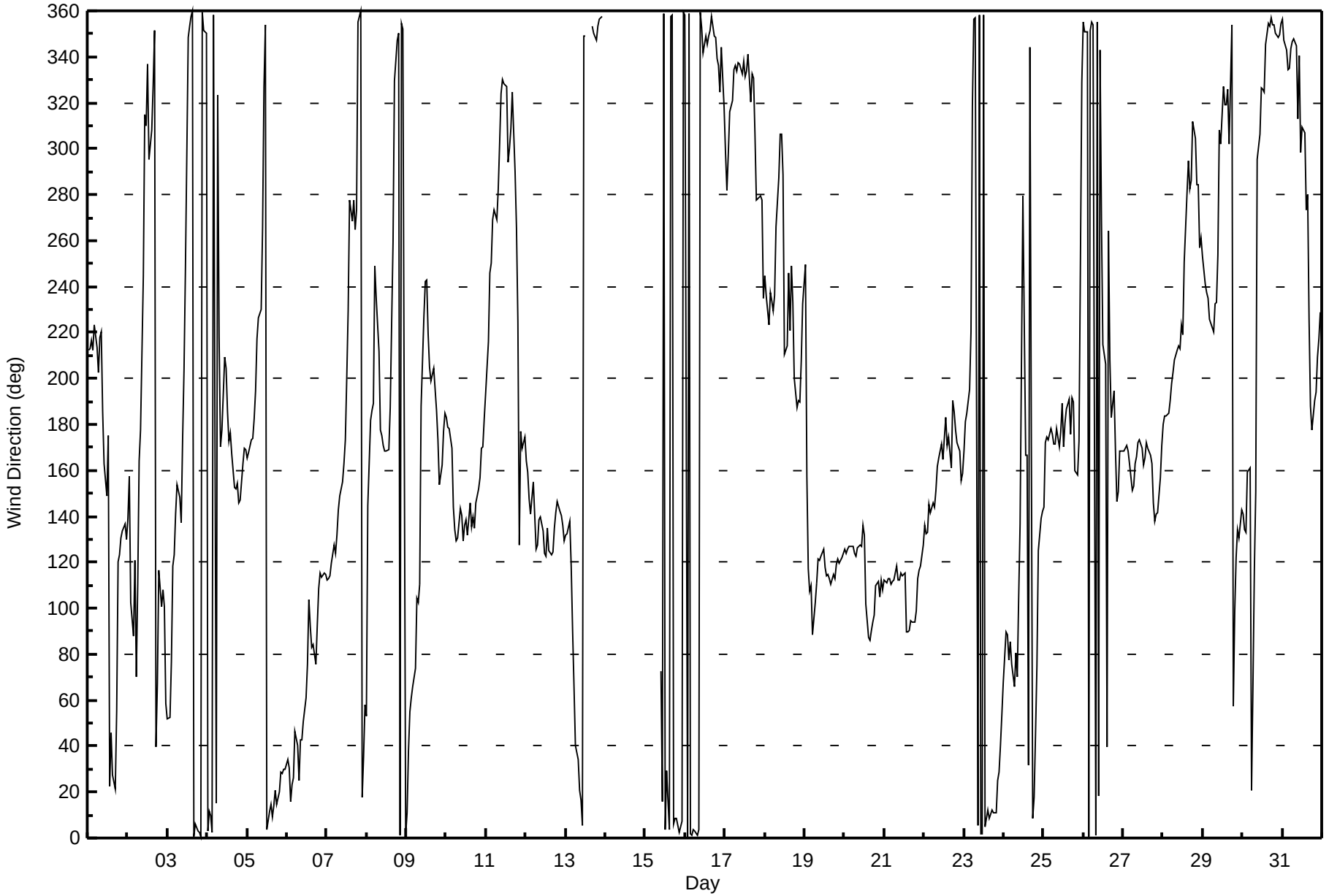
AF - Analyzer Failure
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Firebag - March 2016



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Firebag - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 87 deg on Mar 1 12:00

Minimum Value: 4 deg on Mar 18 21:00

Percentiles: $P_1 = 5$ $P_{10} = 8$ $Q_1 = 10$ Median = 12 $Q_3 = 15$ $P_{90} = 23$ $P_{99} = 68$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	0
Percent Operational Time:	95.0

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	8	9	9	19	9	10	10	9	9	23	24	87	82	31	23	28	16	21	12	14	12	12	14	14	87
2-Mar	17	19	48	22	21	27	29	28	24	58	56	43	39	61	21	15	19	9	21	16	20	45	31	32	61
3-Mar	11	8	18	14	16	12	10	10	10	25	10	51	11	12	11	13	13	13	14	13	12	13	10	7	51
4-Mar	11	6	8	14	14	19	48	21	15	17	25	18	15	16	12	11	11	11	12	10	10	9	9	8	48
5-Mar	8	8	8	8	8	12	11	14	12	16	23	13	14	13	14	12	12	13	11	11	10	11	10	10	23
6-Mar	11	14	10	12	10	13	14	13	13	11	11	13	20	19	22	19	14	13	10	12	10	9	10	10	22
7-Mar	10	10	10	11	13	12	13	10	11	10	9	11	14	13	33	13	11	9	15	25	11	12	15	12	33
8-Mar	22	26	17	20	12	29	21	21	22	17	17	11	10	9	21	11	42	14	11	11	11	14	15	10	42
9-Mar	11	15	9	11	12	20	18	21	19	54	16	17	12	12	13	12	12	9	7	12	9	8	8	5	54
10-Mar	6	7	7	7	8	11	11	12	11	11	12	12	11	12	11	13	12	12	14	13	9	9	8	10	14
11-Mar	8	10	13	10	12	14	15	17	23	13	13	15	12	18	13	14	17	30	20	15	53	16	17	9	53
12-Mar	10	8	9	9	10	14	11	11	11	10	11	12	12	15	13	13	14	11	11	10	10	11	11	11	15
13-Mar	11	12	13	12	14	11	20	9	10	11	14	13	12	AF	AF	AF	8	8	9	10	13	10	9	AF	20
14-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	--
15-Mar	AF	AF	AF	AF	AF	AF	AF	AF	AF	35	46	19	20	17	13	13	14	14	13	11	13	11	12	13	46
16-Mar	13	14	13	12	12	13	13	12	14	13	12	11	14	12	12	13	14	11	11	11	15	14	10	16	16
17-Mar	10	12	12	12	13	11	11	11	11	11	14	15	14	12	11	15	13	10	15	7	12	18	15	9	18
18-Mar	11	9	8	8	8	9	8	16	12	16	20	44	54	41	21	18	13	12	17	5	4	5	20	37	54
19-Mar	46	43	11	9	17	9	11	11	11	12	15	17	15	15	12	13	10	10	9	10	10	10	10	10	46
20-Mar	11	10	10	11	10	10	10	10	11	11	12	14	18	20	11	11	11	12	13	12	11	13	10	11	20
21-Mar	9	8	9	9	12	10	10	11	11	11	12	13	17	16	12	13	13	12	11	10	10	10	10	11	17
22-Mar	10	11	11	10	9	7	9	9	8	9	10	17	12	14	14	16	14	16	11	10	8	10	8	9	17
23-Mar	9	9	6	8	16	22	7	10	12	15	15	14	13	15	14	14	15	11	8	8	7	6	8	7	22
24-Mar	8	6	8	8	9	9	5	10	14	24	35	79	24	51	74	32	17	12	8	9	14	11	8	7	79
25-Mar	11	7	8	6	6	5	5	5	7	8	10	12	11	12	20	21	18	9	10	17	13	17	21	16	21
26-Mar	10	10	7	11	11	11	11	14	13	22	28	59	40	55	68	69	83	29	27	7	9	10	8	7	83
27-Mar	7	6	7	6	7	7	8	7	8	9	9	11	12	11	10	11	10	9	10	10	9	8	10	8	12
28-Mar	7	6	6	5	6	6	7	7	10	10	10	13	11	28	25	15	11	12	14	11	9	9	6	8	28
29-Mar	5	6	4	7	6	6	7	6	17	22	17	21	19	21	27	38	29	18	37	16	15	13	13	13	38
30-Mar	11	14	12	7	13	33	21	19	47	55	13	15	13	12	16	16	16	16	15	16	14	13	14	15	55
31-Mar	15	14	11	13	12	12	14	12	19	22	30	35	22	24	38	51	27	17	9	11	7	10	8	9	51
	46	43	48	22	21	33	48	28	47	58	56	87	82	61	74	69	83	30	37	25	53	45	31	37	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	March 30, 2016	Last Calibration	February 23, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	7:30	End Time (MST)	11:30
Gas Cert Reference	SA130123A	Station temp.	Deg C
Cal Gas Concentration	49.3 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	996
ZAG Make/Model	API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9037

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	-606	-606
Analyzer IP address	192.168.1.43		Lamp voltage	804	804
Calculated slope	1.005702	0.992613	Chamber temp	45.2	44.9
Calculated intercept	-0.882674	-0.797805	Pressure	689.5	681.6
Analyzer Background	7.3	7.6	Flow	0.450	0.452
Analyzer Coefficient	0.950	0.978	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	0.3	----
as found span	5000	58.3	574.8	559.6	1.027
calibrator zero	5000	0.0	0.0	0.4	----
high point	5000	58.3	574.8	579.8	0.991
second point	5000	29.3	288.9	291.8	0.990
third point	5000	14.7	144.9	147.4	0.983
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	58.3	574.8	581.2	0.989
				Average Correction Factor	0.988

Corrected As found	559.3	Previous response	572.5	% change	2.4%

Notes:

Inlet filter changed after as founds. Span adjusted

Calibration Performed By: Melissa Lemay

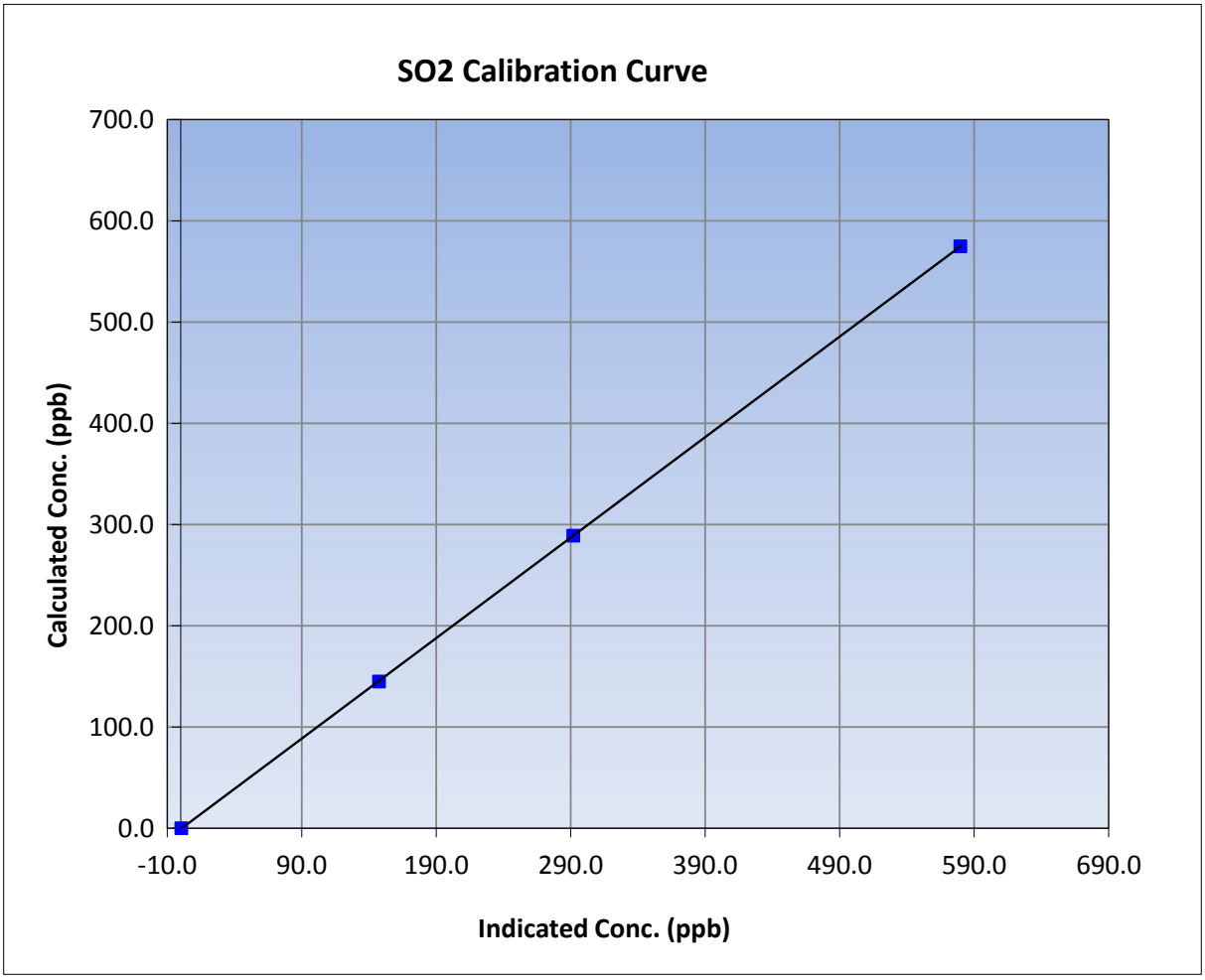
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

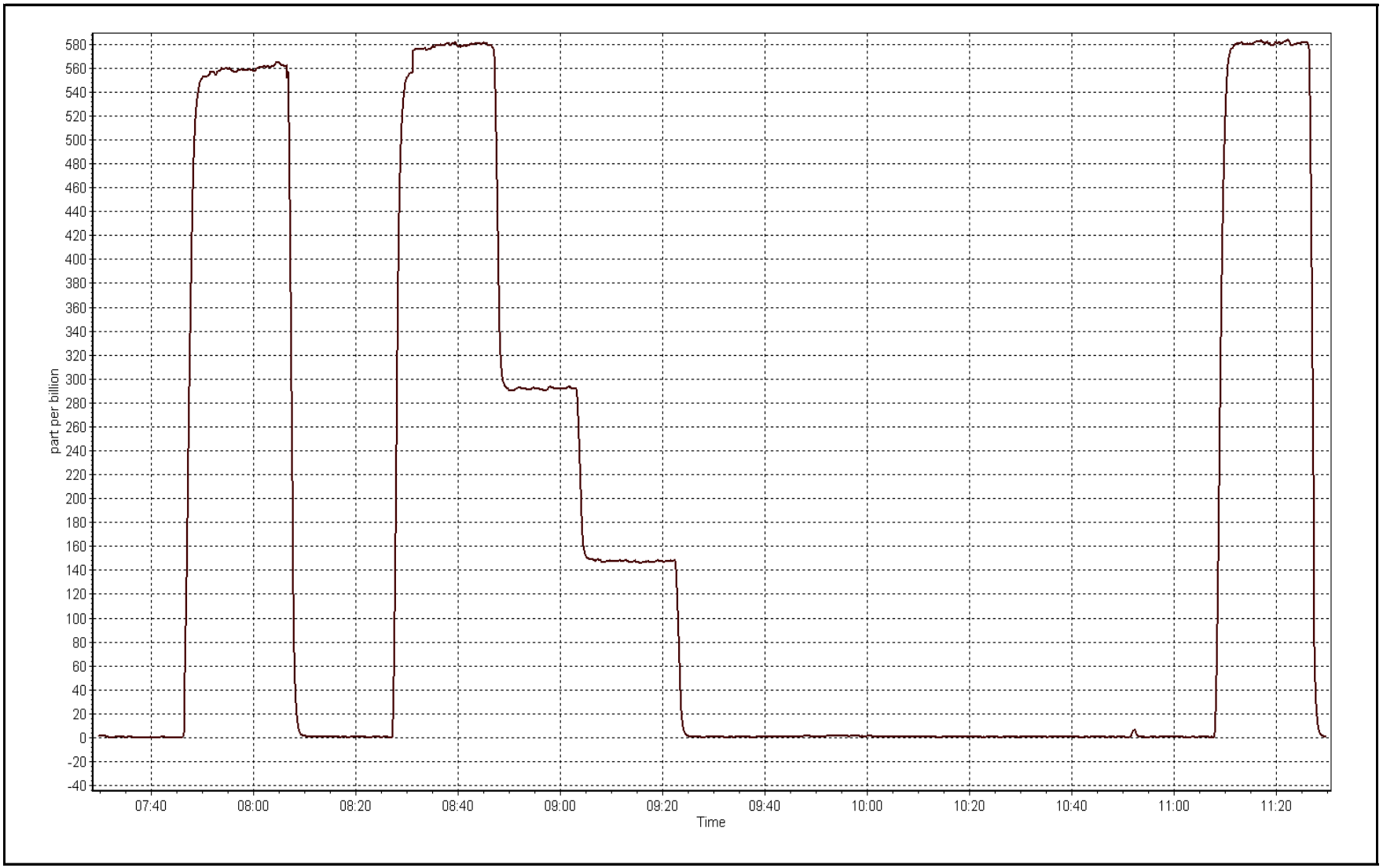
Calibration Date	March 30, 2016	Previous Calibration	February 23, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:30	End Time (MST)	11:30
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999997
574.8	579.8	0.9914		
288.9	291.8	0.9901	Slope	0.992613
144.9	147.4	0.9833		
			Intercept	-0.797805



SO2 Calibration Plot Date: March 30, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	March 29, 2016	Last Calibration	February 24, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:51	End Time (MST)	13:06
Gas Cert Reference	ALM066720	Station temp.	22 Deg C
Cal Gas Concentration	4.85 ppm	Cal Gas Exp Date	10/06/2014
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	9037
SO2 gas concentration	49.3 ppm	SO2 gas cert/exp	SA130123A December-12-16

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-574	-574
Analyzer IP address	192.168.1.45		Lamp voltage	931	936
Calculated slope	0.998275	1.000762	Chamber temp	45	45
Calculated intercept	-0.303998	-0.122803	Pressure	549.7	542.8
Analyzer Background	12.7	13	Flow	0.970	0.962
Analyzer Coefficient	1.146	1.164	Intensity	85	85
			Converter temp.	334	333

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	0.1	----
as found span	5000	83.3	80.8	79.1	1.022
SO2 scrubber check	5000	15.2	149.9	1.8	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	83.3	80.8	80.9	0.999
second point	5000	41.8	40.5	40.5	1.001
third point	5000	21.0	20.4	20.6	0.989
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	83.4	80.9	80.6	1.004
				Average Correction Factor	0.996

Corrected As found	79.0	Previous response	81.2	% change	2.8%

Notes:

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

Calibration Performed By: Melissa Lemay

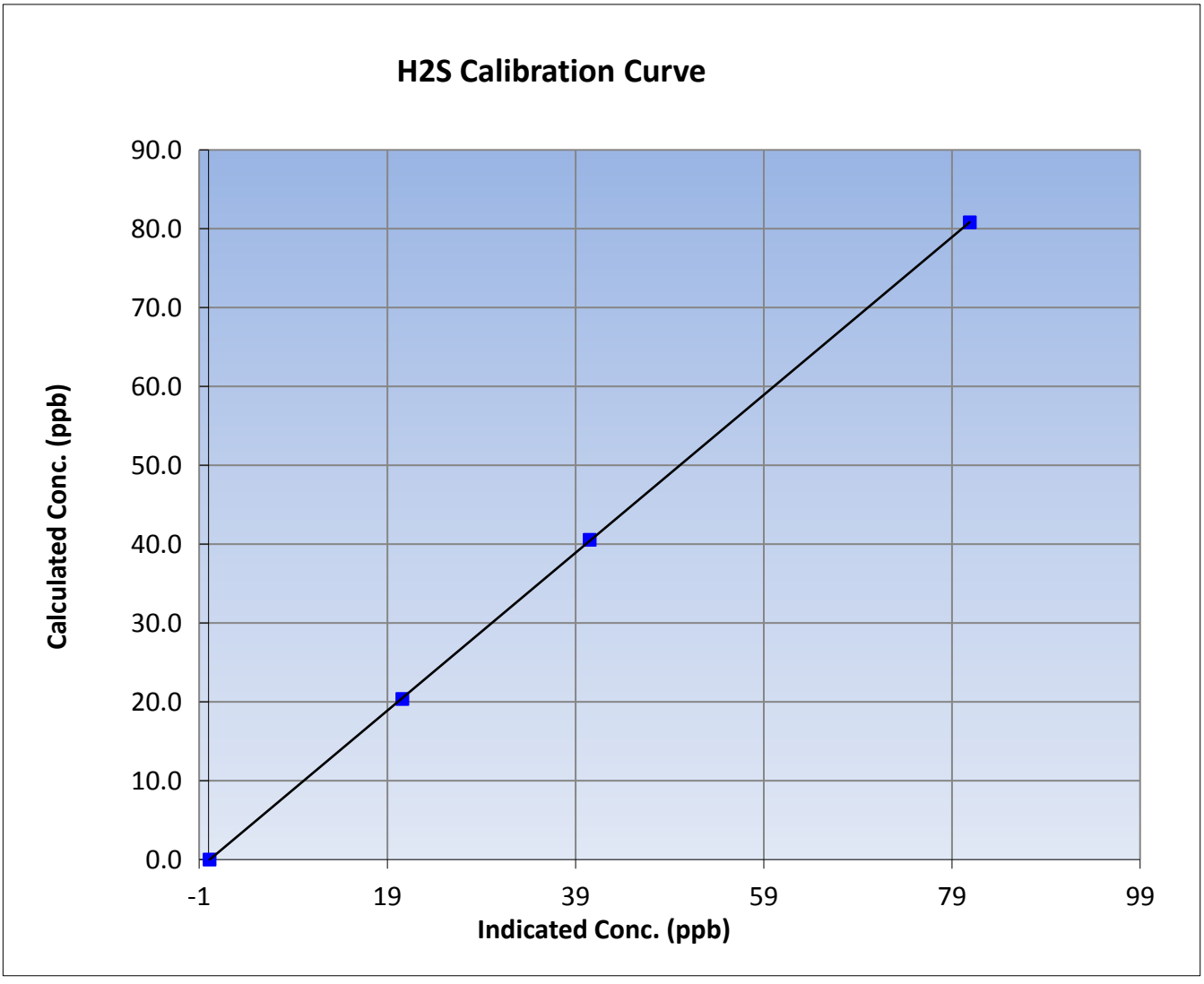
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

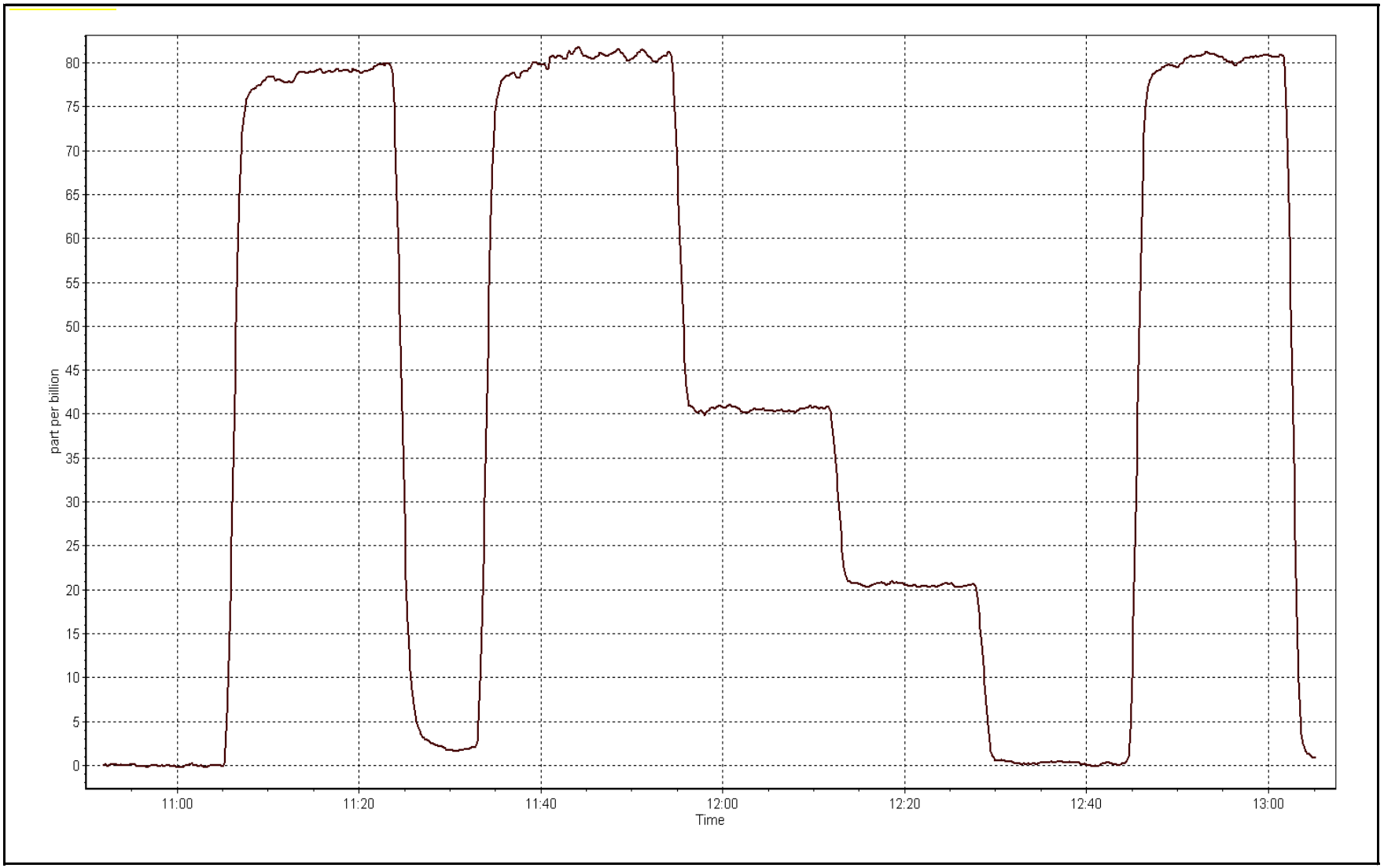
Calibration Date	March 29, 2016	Previous Calibration	February 24, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:51	End Time (MST)	13:06
Analyzer make	Thermo 450i	Analyzer serial #	815129098

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999990
80.8	80.9	0.9988		
40.5	40.5	1.0011	Slope	1.000762
20.4	20.6	0.9888		
			Intercept	-0.122803



H2S Calibration Plot Date: March 29, 2016



Wood Buffalo Environmental Association
THC Calibration Report

Station Information

Calibration Date	March 30, 2016	Last Calibration	February 20, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	7:30	End Time (MST)	11:30
Gas Cert Reference	SA130123A	Cal Gas Expiry Date	12/12/2016
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	996
ZAG make/model	Teledyne API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	Serial Number	9037

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	34.9	34.9
Calculated slope	0.998704	0.998664	Fuel Pressure	23.0	23.0
Calculated intercept	-0.048330	-0.068074	Analyzer Coeff	3.5	4.9
			Analyzer BKG	4.930	3.551

Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

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	58.3	12.74	12.53	1.016
calibrator zero	5000	0.0	0.00	0.04	----
high point	5000	58.3	12.74	12.82	0.993
second point	5000	29.3	6.40	6.45	0.992
third point	5000	14.7	3.21	3.34	0.961
as left zero	5000	0.0	0.00	0.03	----
as left span	5000	58.3	12.74	12.89	0.988
				Average Correction Factor	0.982

Corrected As found	12.63	Previous response	12.80	% change	1.3%

Notes:

filter changed out, no maintenance done, span adjusted

Calibration Performed By: Melissa Lemay

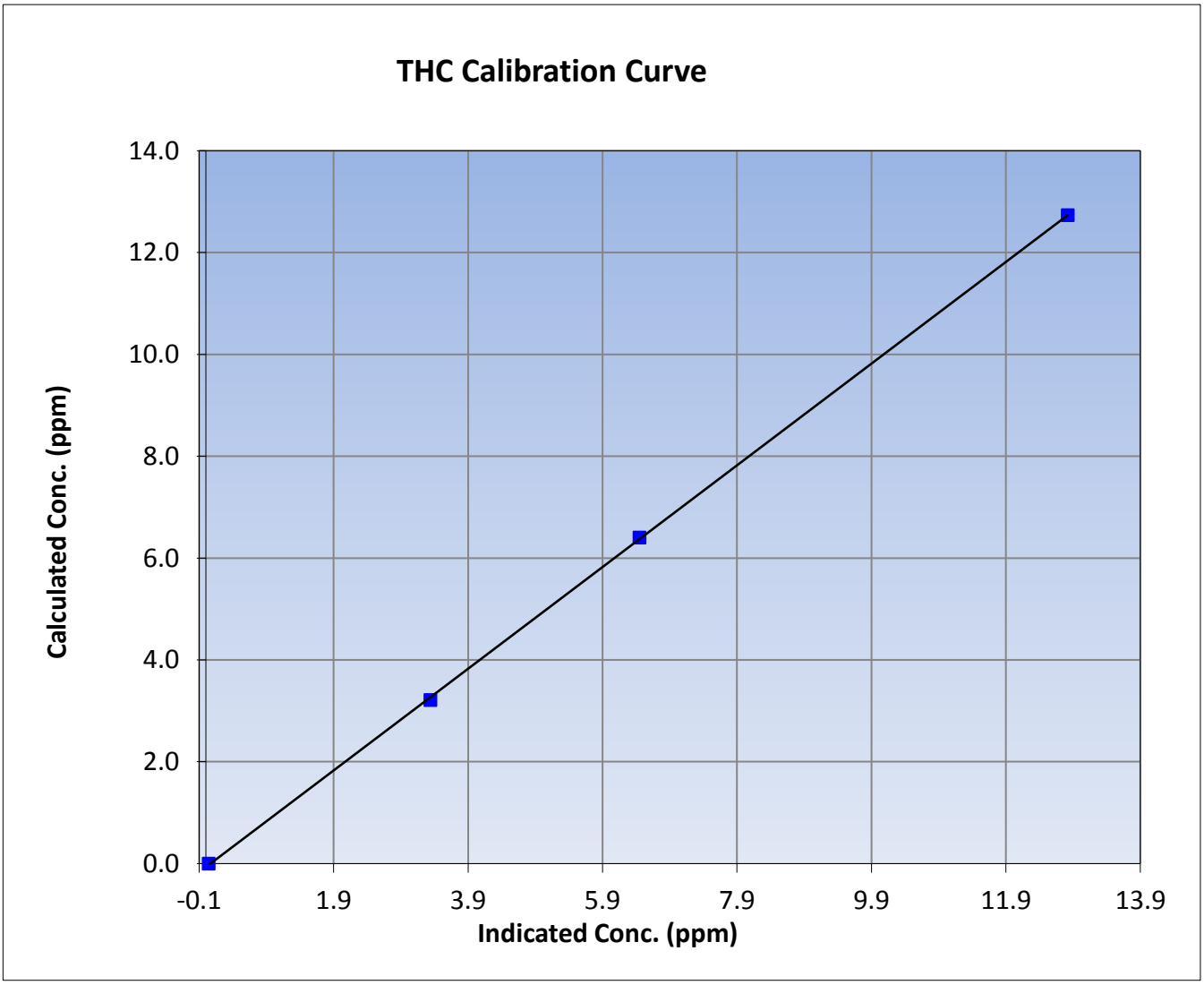
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

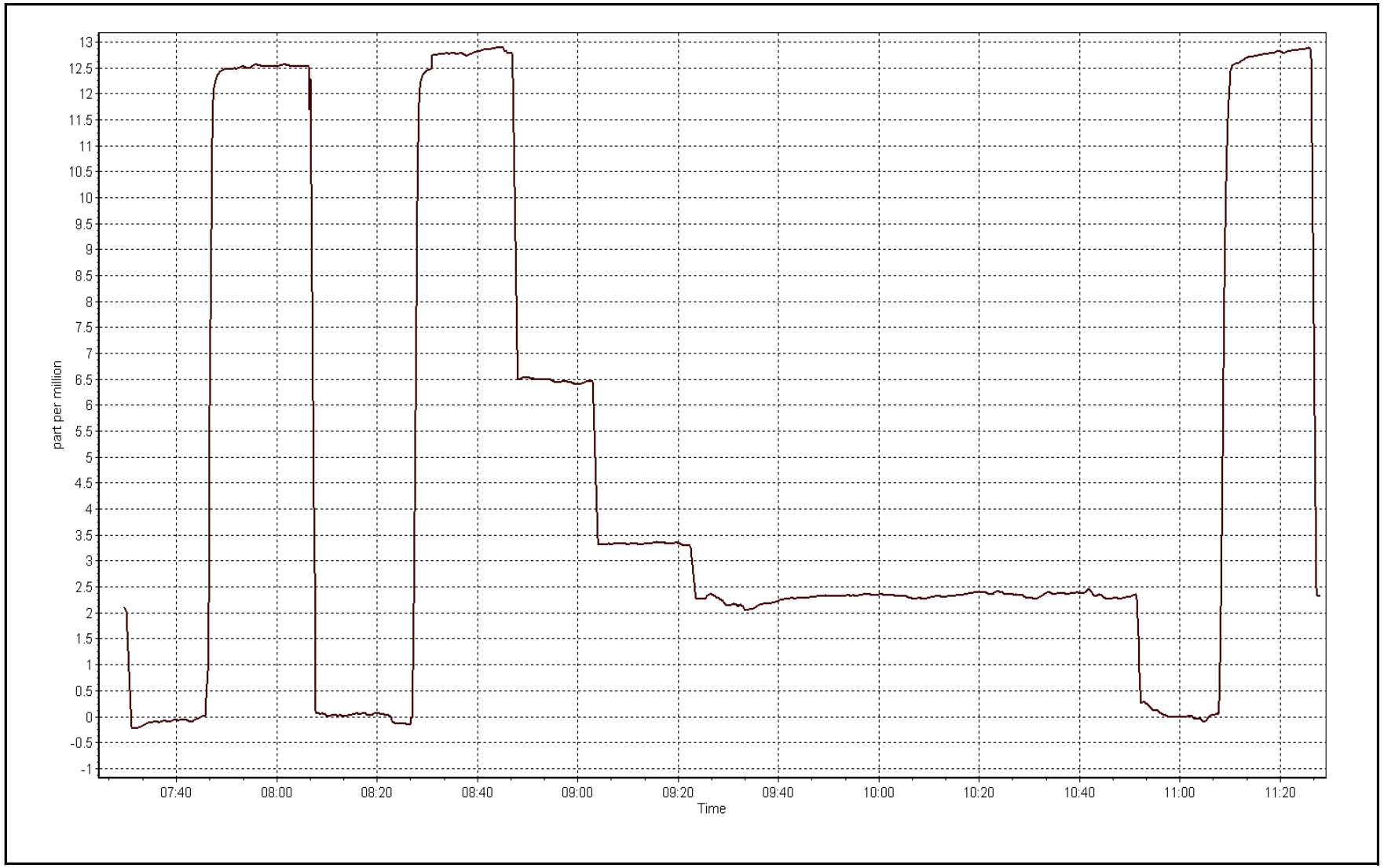
Calibration Date	March 30, 2016	Previous Calibration	February 20, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:30	End Time (MST)	11:30
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.04	----	Correlation Coefficient	0.999947
12.74	12.82	0.9934		
6.40	6.45	0.9923	Slope	0.998664
3.21	3.34	0.9614		
			Intercept	-0.068074



THC Calibration Plot Date: March 30, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 30, 2016	Previous Calibration	February 23, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	7:30	End Time (MST)	11:30
NO Cal Gas Conc	51.5 ppm	Gas Cert Reference	SA130123A
NOx Cal Gas Conc	51.5 ppm	Cal Gas Expiry Date	12/12/2016
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.	9037

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.994162	0.993412	0.997251
	Data Offset	-1.014624	-0.745613	-0.441121
Current Calibration	Data Slope	0.999026	0.997158	0.989179
	Data Offset	-0.570051	-0.350629	-0.389519

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661309

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.926		0.957	
NOX coefficient	0.999		0.998	
NO2 coefficient	1.000		1.000	
NO bkgrnd	4.2		4.3	
NOX bkgrnd	4.3		4.4	
Chamber Temp	50.3	Deg C	50.8	Deg C
Moly Temp	325.8	Deg C	325.5	Deg C
PMT voltage	-780	V	-780.3	V
PMT Temp	-2.8	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	167.3	mmHg	168.2	mmHg
R Cell Press Nox	167.3	mmHg	168.2	mmHg
NO sample flow	0.614	lpm	0.59	lpm
Nox sample Flow	0.614	lpm	0.590	lpm

Notes:

Inlet filter changed after as founds. Span adjusted

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 30, 2016 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	-0.3	-0.2	-0.1	----	----
as found span	5000	58.3	600.5	600.5	0.0	583.8	583.1	0.7	1.0286	1.0298
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	----	----
high point	5000	58.3	600.5	600.5	0.0	601.5	602.5	-0.9	0.9983	0.9967
second point	5000	29.3	301.8	301.8	0.0	302.3	302.7	-0.4	0.9983	0.9970
third point	5000	14.7	151.4	151.4	0.0	153.4	153.0	0.4	0.9870	0.9896
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	----	----
as left span	5000	58.3	600.5	309.2	291.3	596.6	301.0	295.7	1.0065	1.0272
								Average Correction Factor	0.9946	0.9944

Corrcted As found NO_X= 584.1 NO= 583.3 Percent Change NO_X= 3.6% NO= 3.8%

Previous Response NO_X= 605.0 NO= 605.2

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 58.30 ccm NOX ref calc conc = 600.5 ppb NO ref calc conc = 600.5 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	599.5	601.2	-0.1	1.0017	0.9988	----	----
1st NO2 (300)	309.2	292.0	604.5	309.2	295.3	0.9934	----	0.9888	101.1%
2nd NO2 (200)	405.0	196.2	603.8	405.0	198.8	0.9945	----	0.9869	101.3%
3rd NO2 (100)	502.1	99.1	603.4	502.1	101.3	0.9952	----	0.9783	102.2%
2nd NO ref point	----	0.0	604.2	605.6	-1.4	0.9939	0.9916	----	----
				Average Correction Factor		0.9942		0.9847	101.6%

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

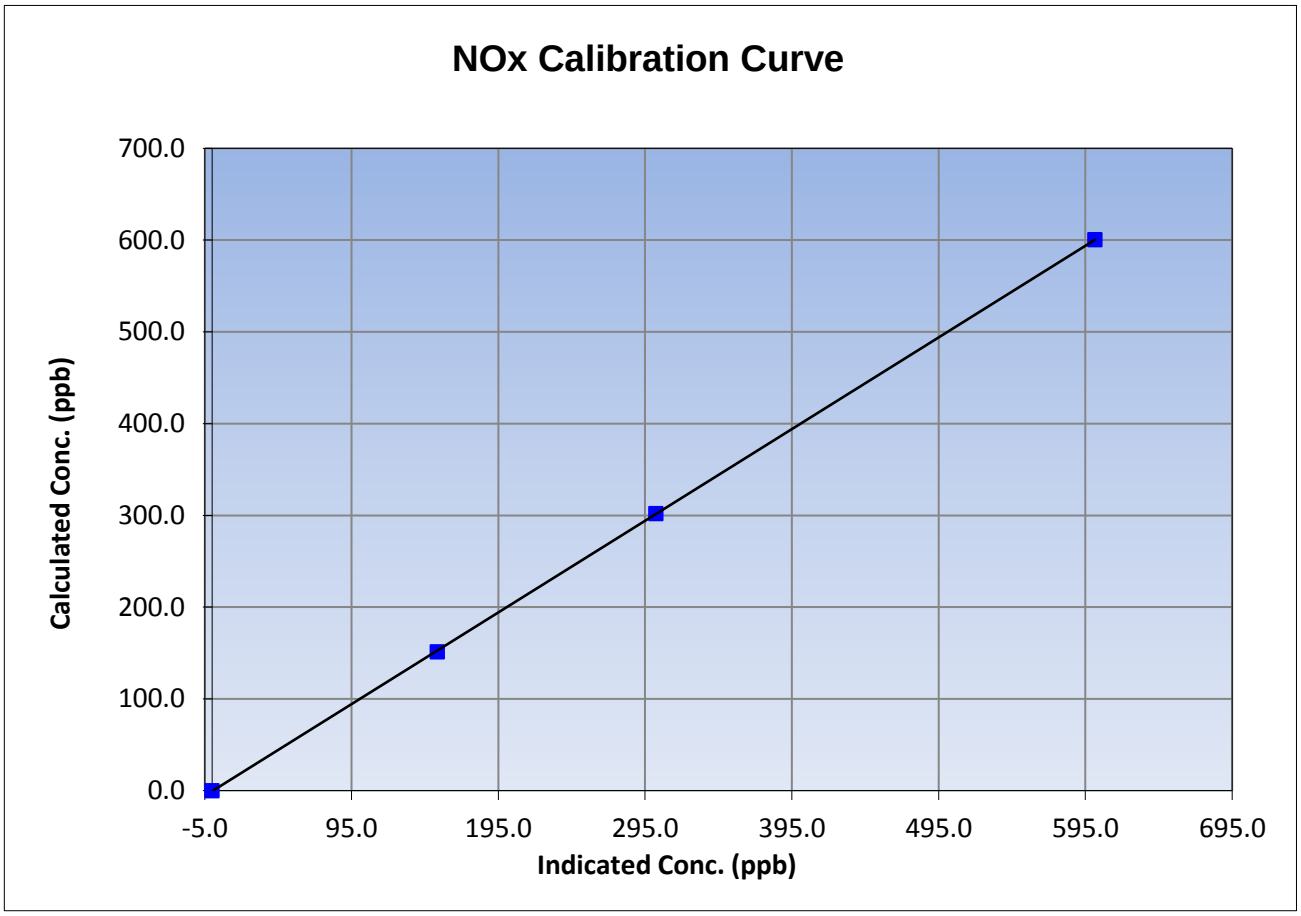
NO_X Calibration Summary

Station Information

Calibration Date	March 30, 2016	Previous Calibration	February 23, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:30	End Time (MST)	11:30
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	-0.2	----	Correlation Coefficient	0.999988
600.5	601.5	0.9983		
301.8	302.3	0.9983	Slope	0.999026
151.4	153.4	0.9870		
			Intercept	-0.570051



Wood Buffalo Environmental Association

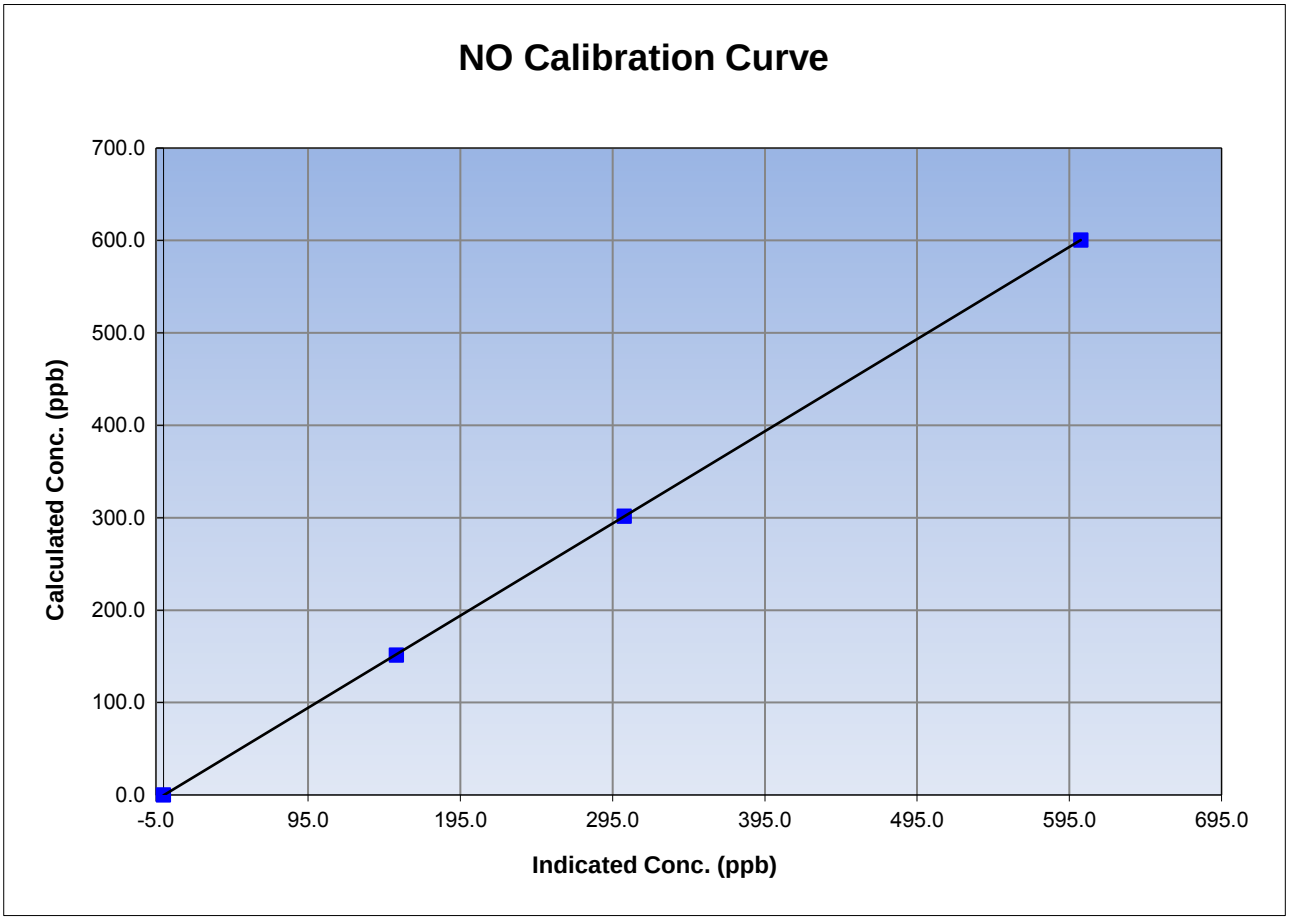
NO Calibration Summary

Station Information

Calibration Date	March 30, 2016	Previous Calibration	February 23, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	7:30	End Time (MST)	11:30
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	0.999995
600.5	602.5	0.9967		
301.8	302.7	0.9970	Slope	0.997158
151.4	153.0	0.9896		
			Intercept	-0.350629



Wood Buffalo Environmental Association

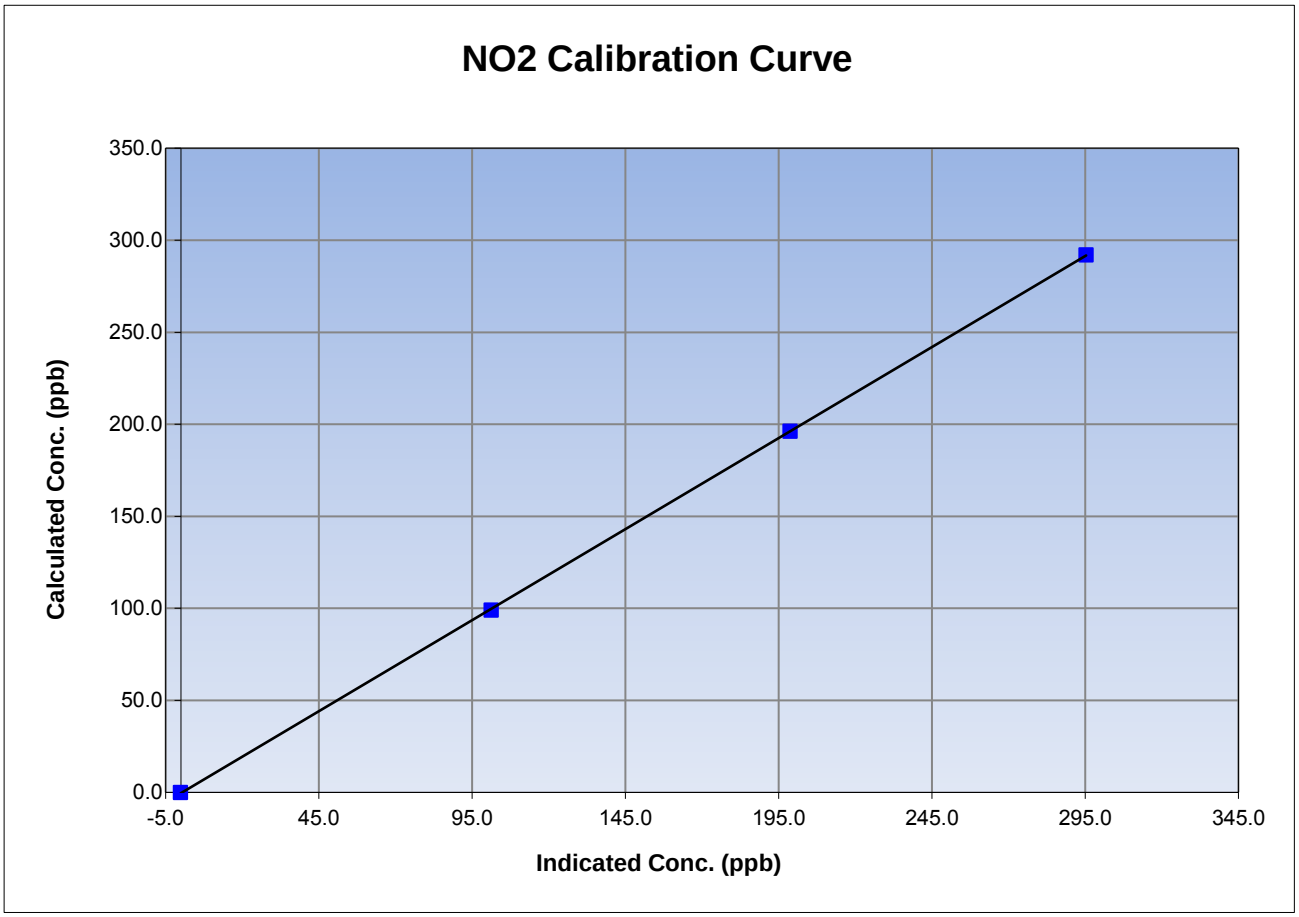
NO_2 Calibration Summary

Station Information

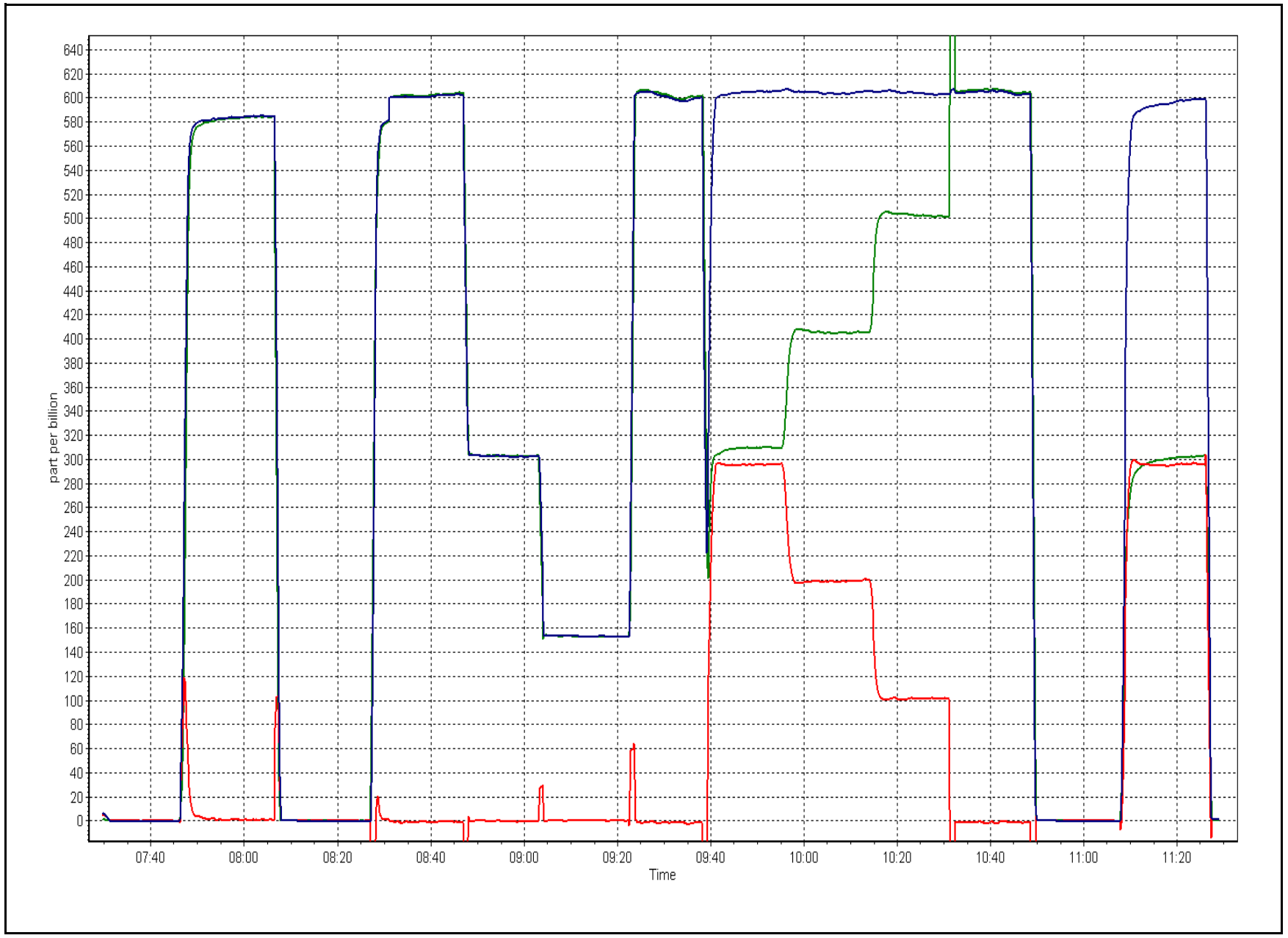
Calibration Date	March 30, 2016	Previous Calibration	February 23, 2016
Station Number	Firebag	Station Number	AMS 19
Start Time (MST)	7:30	End Time (MST)	11:30
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999982
292.0	295.3	0.9888		
196.2	198.8	0.9869	Slope	0.989179
99.1	101.3	0.9783		
			Intercept	-0.389519



NOX Calibration Plot Date: March 30, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 20
BRION MACKAY RIVER
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
MARCH 2016
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	100.00	23	0	7	0
H2S (ppb) Average	709	35	35	100.00	1	0	1	0
THC (ppm) Average	708	36	36	100.00	2.9	-	2.5	-
NO2 (ppb) Average	708	36	36	100.00	36	0	18	-
NO (ppb) Average	708	36	36	100.00	25	-	5	-
NOX (ppb) Average	708	36	36	100.00	44	-	23	-
Temperature 2 m (C) Average	744	0	0	100.00	12.1	-	4.7	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	90	-
Wind Speed 10 m (km/h) Average	741	0	3	99.60	18	-	9	-
Wind Direction 10 m (deg) Average	741	0	3	99.60	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1	3	-	0	0	0	0	1	2	23
H2S (ppb) Average	709	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	708	2.22	0.1	-	2.1	2.1	2.1	2.2	2.3	2.4	2.9
NO2 (ppb) Average	708	4.7	6	-	0	1	1	2	6	12	36
NO (ppb) Average	708	0.7	2	-	0	0	0	0	0	2	25
NOX (ppb) Average	708	5.4	7	-	0	1	1	2	7	15	44
Temperature 2 m (C) Average	744	-4	5.5	-	-19.7	-10.3	-7.6	-4.5	-1.1	2.9	12.1
Relative Humidity (%) Average	744	74.1	18	-	18	48	61	80	88	93	98
Wind Speed 10 m (km/h) Average	741	6.2	3	-	0	3	4	6	8	10	18
Wind Direction 10 m (deg) Average	741	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	17 Mar 2016 21:00	17 Mar 2016 21:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	25 Mar 2016 00:00	25 Mar 2016 00:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	26 Mar 2016 03:00	26 Mar 2016 03:00	1	Flat line in sensor output signal -sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Brion MacKay River - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 23 ppb on Mar 19 09:00

Maximum Daily Average: 6.6 ppb on Mar 24

Minimum Value: 0 ppb on Mar 6 04:00

Minimum Daily Average: 0.0 ppb on Mar 31

Maximum Diurnal Average: 1.9 ppb at hour 17

Minimum Diurnal Average: 0.4 ppb at hour 3

Monthly Average: 1.0 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 16$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	1	1	1	0	0.6	2
2-Mar	0	Z	0	0	0	0	0	0	0	0	1	1	2	2	5	6	10	13	16	17	5	2	3	6	3.9	17
3-Mar	4	2	Z	4	6	6	4	5	2	2	1	2	2	2	2	1	1	0	0	0	0	0	0	0	2.1	6
4-Mar	3	4	2	Z	1	3	5	6	2	1	1	C	C	C	C	C	0	0	0	0	0	0	0	0	1.6	6
5-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	11	16	18	9	1	0	0	0	0	1	2.7	18
6-Mar	0	0	0	0	0	Z	3	2	2	5	8	9	7	4	3	4	7	6	1	1	3	2	1	2	3.1	9
7-Mar	Z	1	1	2	1	1	2	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.8	2
8-Mar	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1
9-Mar	0	1	Z	1	1	1	1	0	1	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	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	0.2	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	0.1	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	0.1	0
13-Mar	Z	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
14-Mar	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
15-Mar	1	0	Z	1	3	1	1	0	1	2	3	4	3	2	3	4	2	1	1	0	1	0	0	0	1.5	4
16-Mar	7	12	3	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	12
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	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
19-Mar	Z	0	0	0	0	0	0	2	23	10	2	1	0	0	1	2	3	4	4	2	2	1	1	1	2.6	23
20-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	5	1	0	0	0	1	3	0.9	5
21-Mar	2	2	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	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	1	2	2	1	1	1	1	1	0	0	0	0	2	0	0	0	0	0	0.7	2
24-Mar	0	0	0	0	0	Z	0	0	3	5	11	15	12	10	10	7	7	12	22	19	10	5	2	1	6.6	22
25-Mar	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
26-Mar	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2	3	3	3	2	1	0.8	3
27-Mar	1	1	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	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	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
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	0.0	0
	0.9	1.0	0.4	0.5	0.7	0.7	0.7	0.8	1.4	1.1	1.2	1.3	1.1	0.9	1.3	1.5	1.9	1.8	1.8	1.5	0.9	0.6	0.5	0.6	Diurnal Average	
	7	12	3	4	6	6	5	6	23	10	11	15	12	10	11	16	18	13	22	19	10	5	3	6	Diurnal Maximum	

Z - zerospan C - Calibration

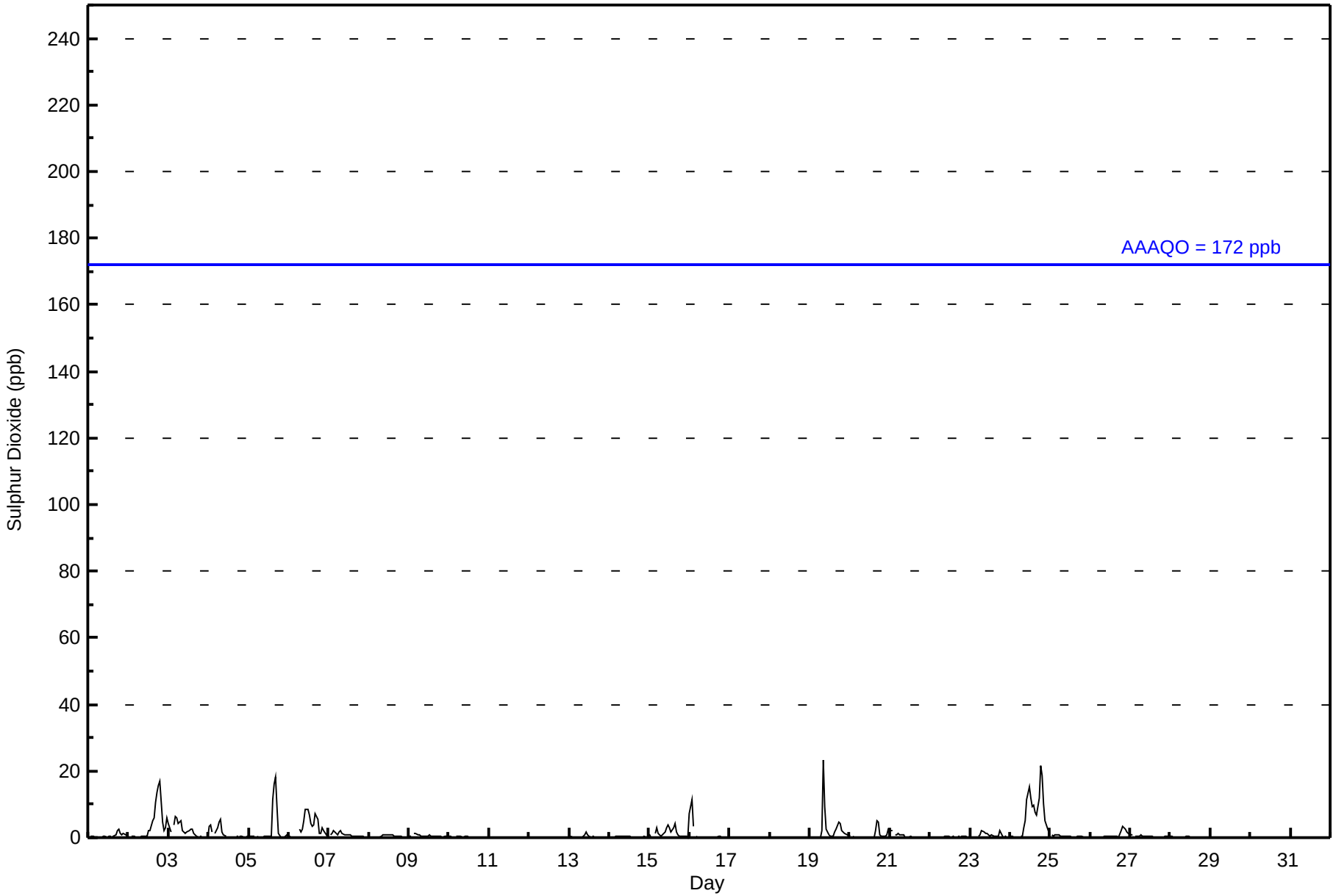
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Brion MacKay River - March 2016



Sulphur Dioxide (SO_2) - ppb
Brion MacKay River - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	694	98.02	98.02
11 - 20	12	1.69	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 (SO_2) - ppb

Brion MacKay River - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	48	94	78	20	33	49	69	45	34	19	21	26	20	36	44	55	691
11 - 20	3	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	12
21 - 60	0	0	2	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	51	96	87	20	33	49	69	45	34	19	21	26	20	36	44	55	705

Total Number of Valid Hours: 705

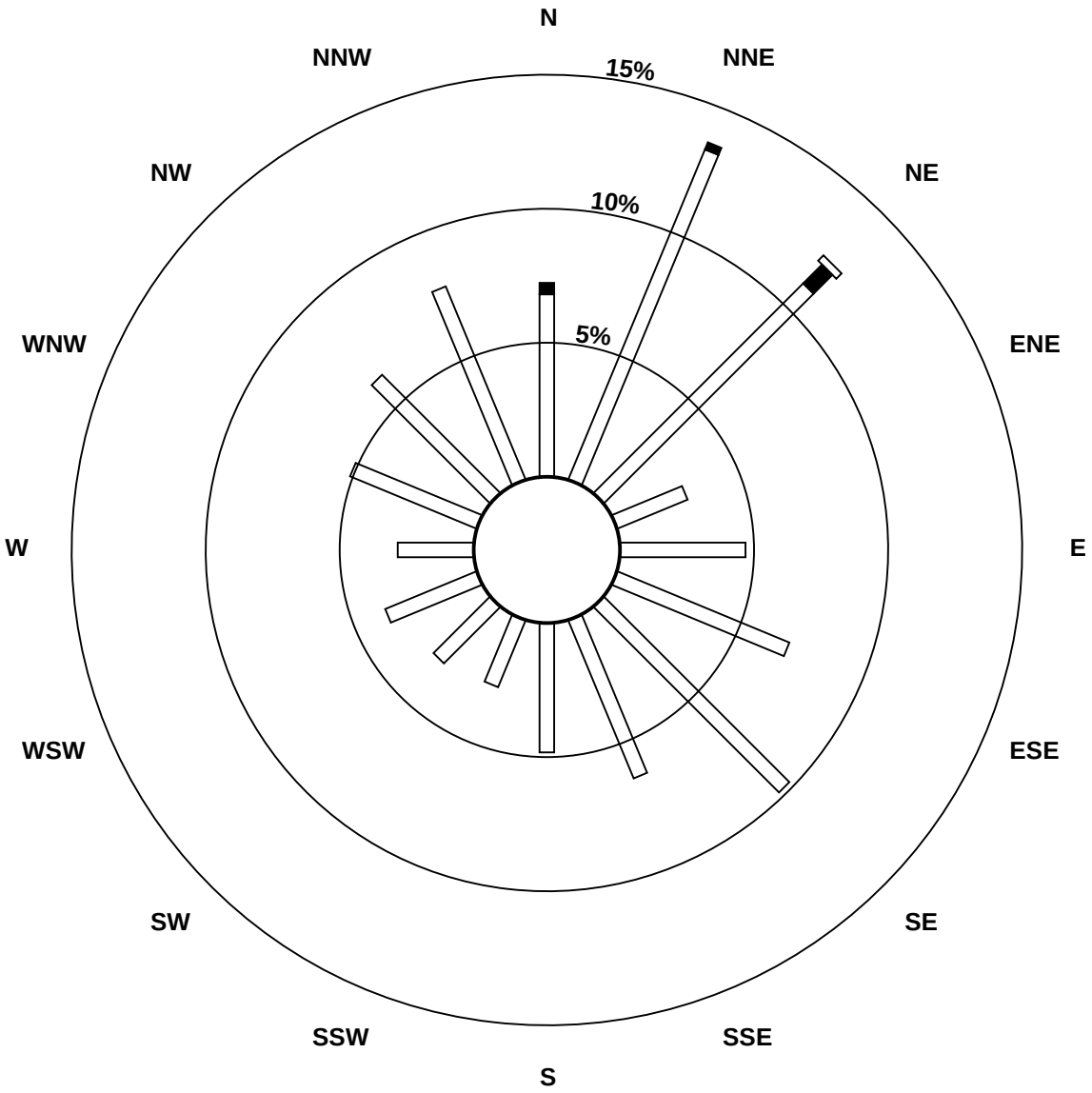
Total Number of Hours: 744

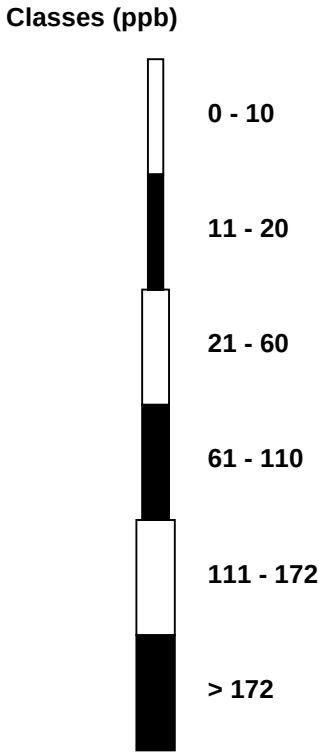
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Brion MacKay River (AMS 20)





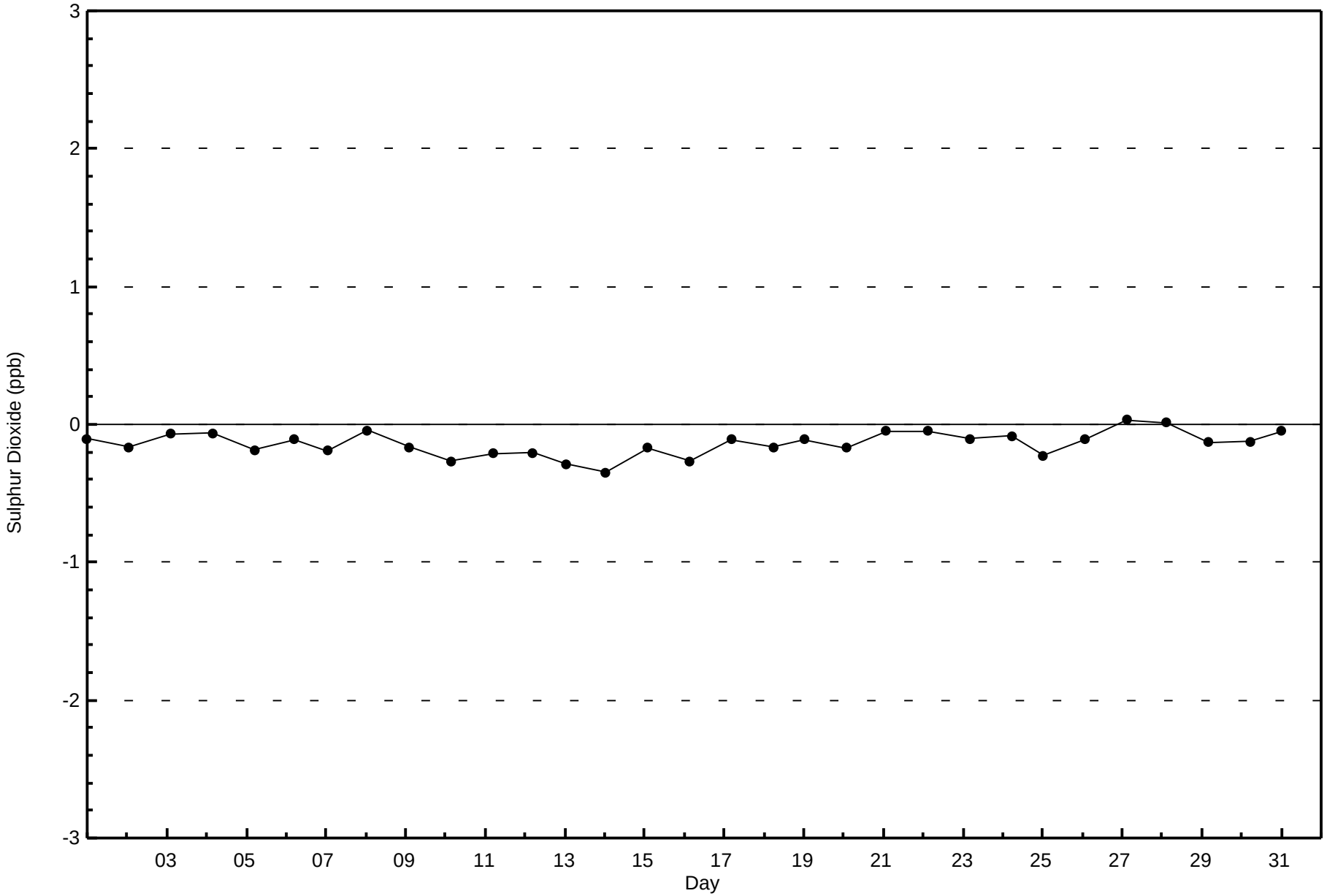
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Brion MacKay River - March 2016

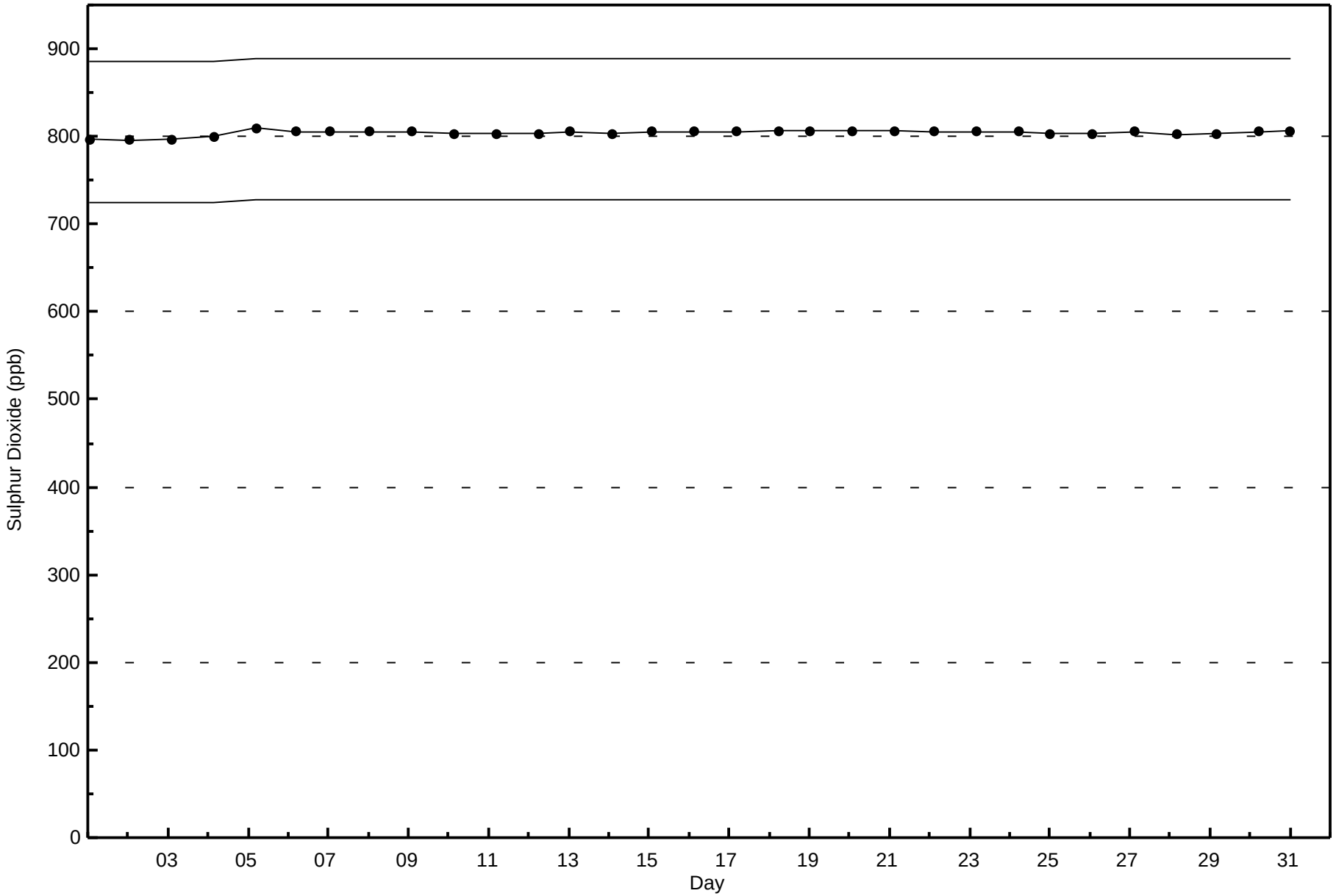


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Brion MacKay River - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Brion MacKay River - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 1 ppb on Mar 2 19:00 Maximum Daily Average: 0.6 ppb on Mar 2

Minimum Value: 0 ppb on Mar 28 02:00 Minimum Daily Average: 0.1 ppb on Mar 22
Maximum Diurnal Average: 0.4 ppb at hour 9 Minimum Diurnal Average: 0.2 ppb at hour 4
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 in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
2-Mar	1	1	Z	0	0	0	0	0	0	1	1	0	0	0	1	0	1	1	1	1	1	1	1	1	0.6	1
3-Mar	1	1	0	Z	1	1	1	1	1	1	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0.5	1
4-Mar	0	1	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
5-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.4	1
6-Mar	0	0	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Mar	1	Z	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-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	0.3	1
9-Mar	0	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	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	0.2	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	0.2	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	0.3	0
13-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	0.3	1
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	1	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	0.2	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	0.2	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	0.2	0
19-Mar	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.4	1
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	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
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	0.1	0
23-Mar	0	0	0	0	0	Z	1	1	1	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	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0.4	1
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	0	0	0	0	0	0	0	0	0	0.2	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	0.1	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	0.2	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	0.1	0
	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	Diurnal Average	
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum	

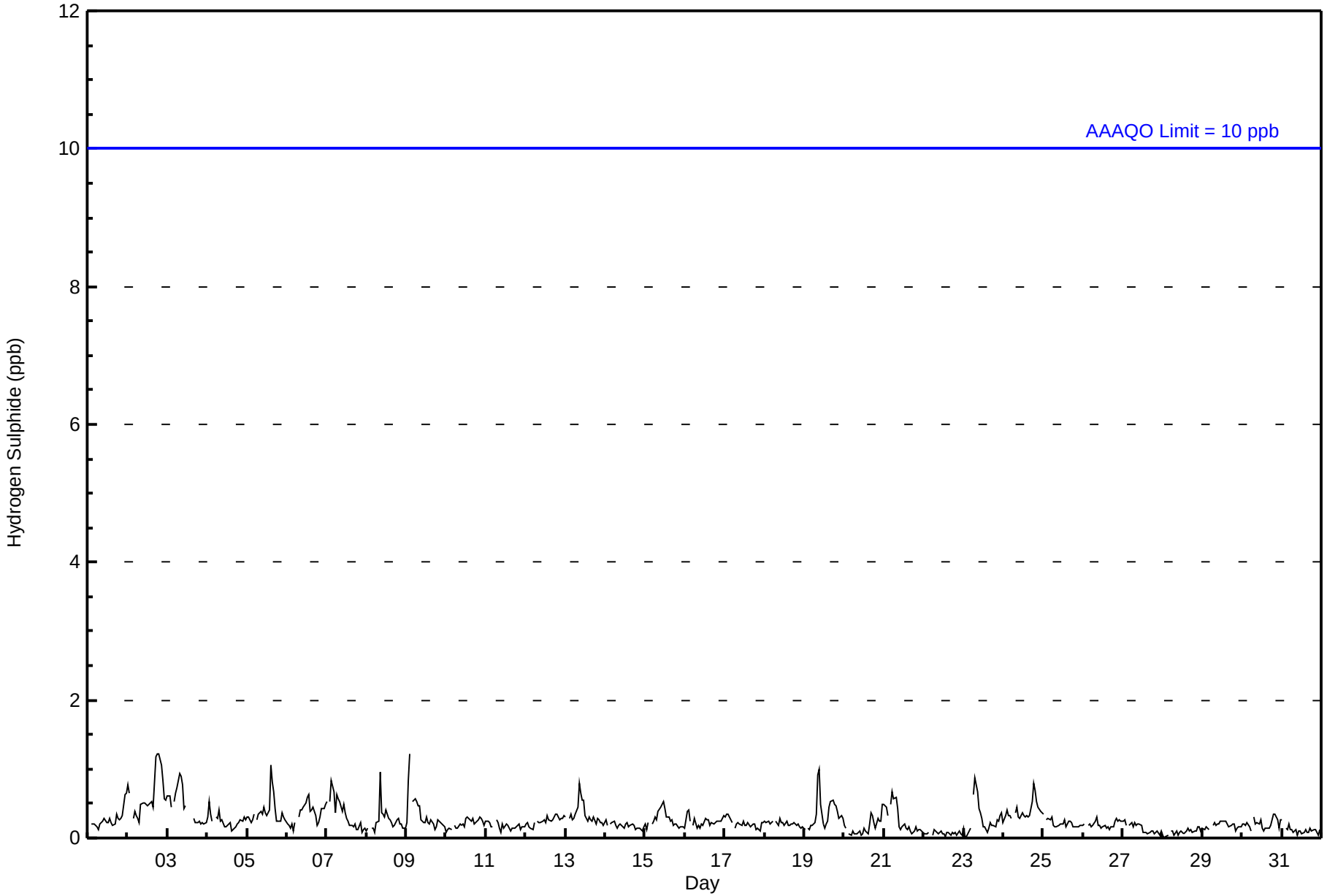
Z - zerospan C - Calibration
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Brion MacKay River - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Brion MacKay River - March 2016

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 (H_2S) - ppb

Brion MacKay River - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	53	91	86	22	32	48	70	49	35	18	21	26	20	36	45	55	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	53	91	86	22	32	48	70	49	35	18	21	26	20	36	45	55	707

Total Number of Valid Hours: 707

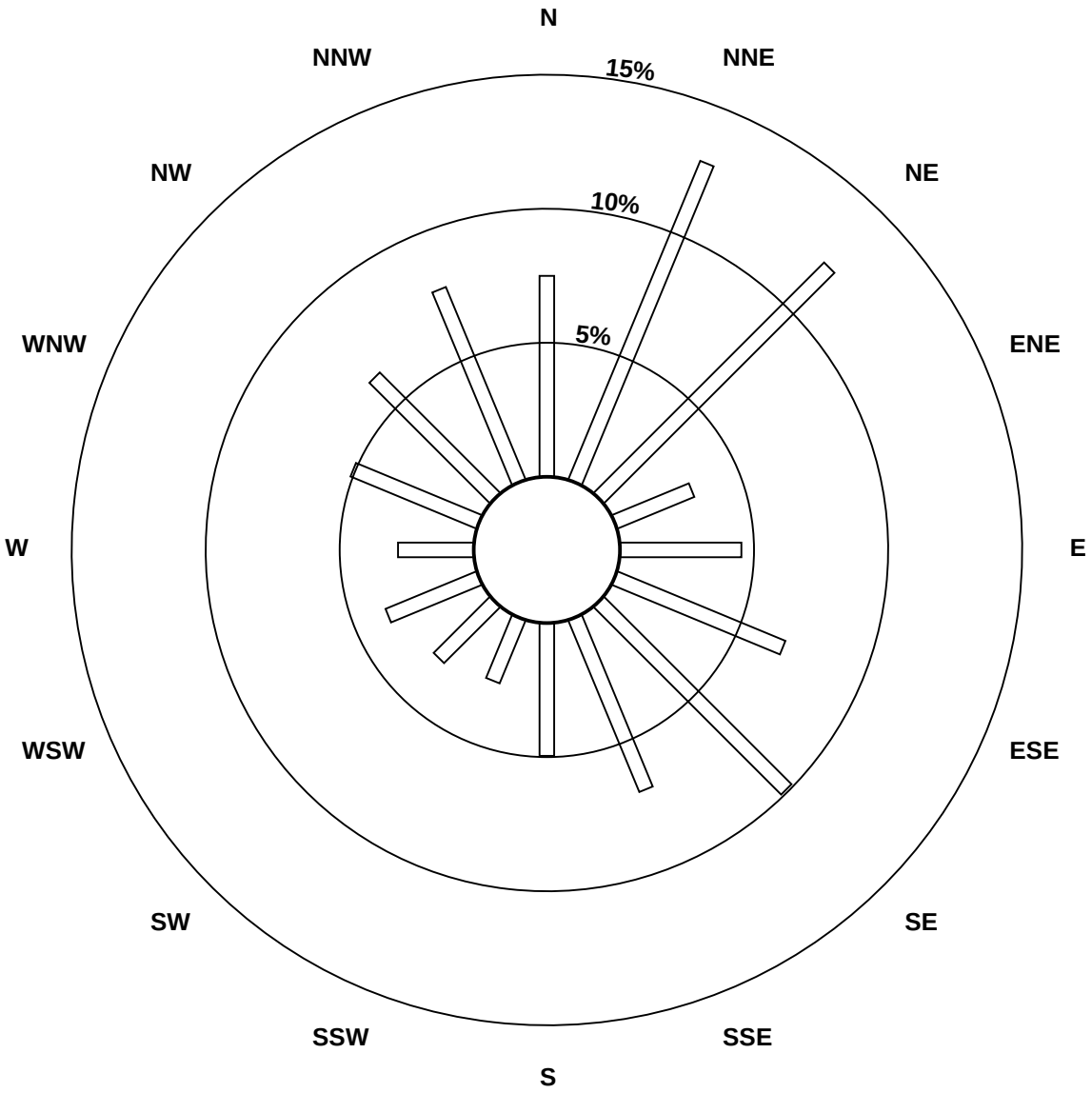
Total Number of Hours: 744

Wood Buffalo Environmental Association

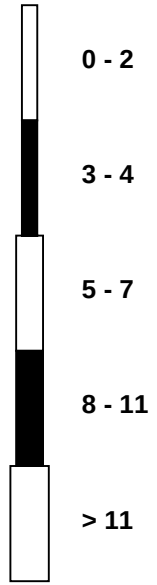
Wind Rose Mar 2016

Hydrogen Sulphide (H_2S) - ppb

Brion MacKay River (AMS 20)



Classes (ppb)



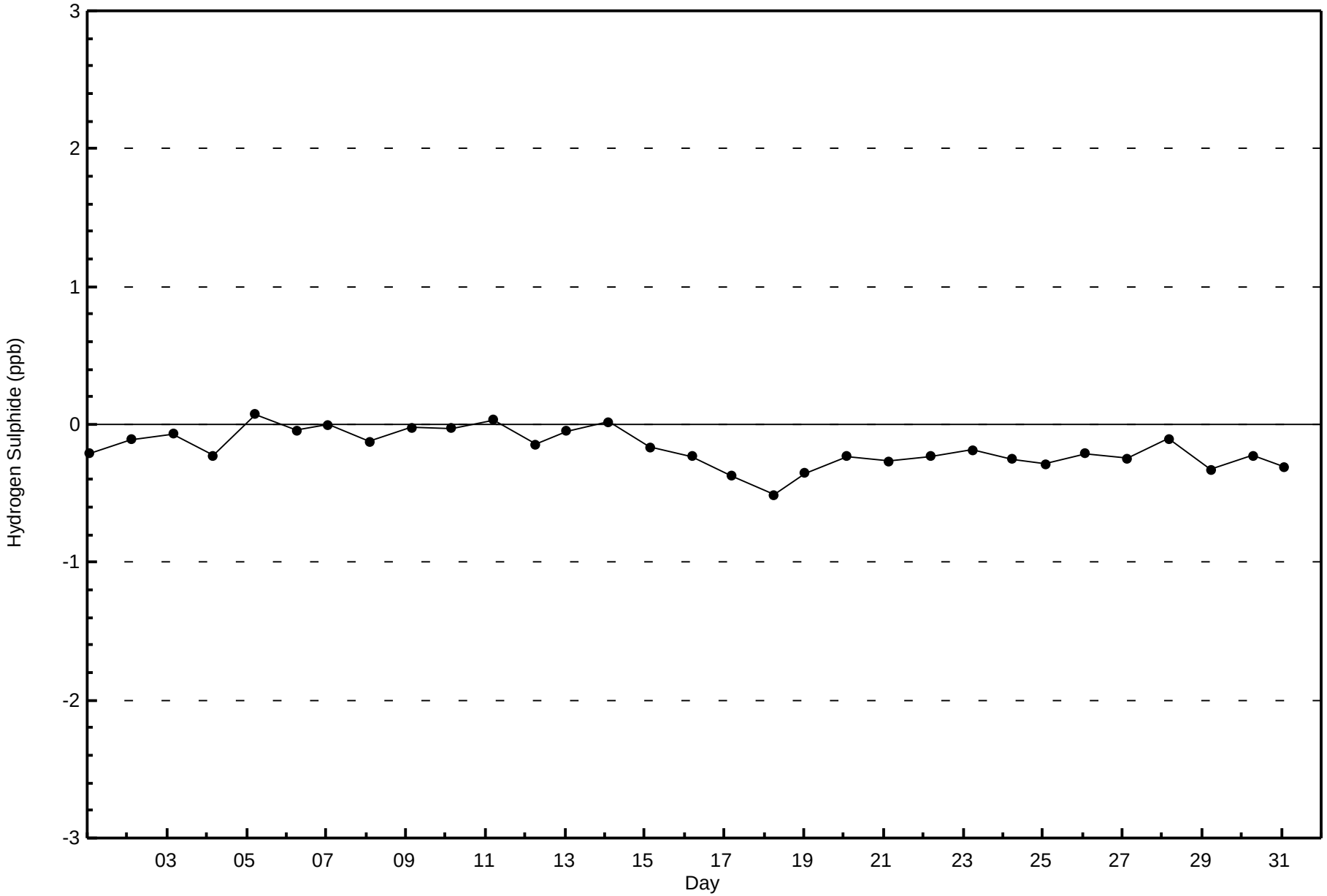
Total Number of Valid Hours: 707

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Brion MacKay River - March 2016

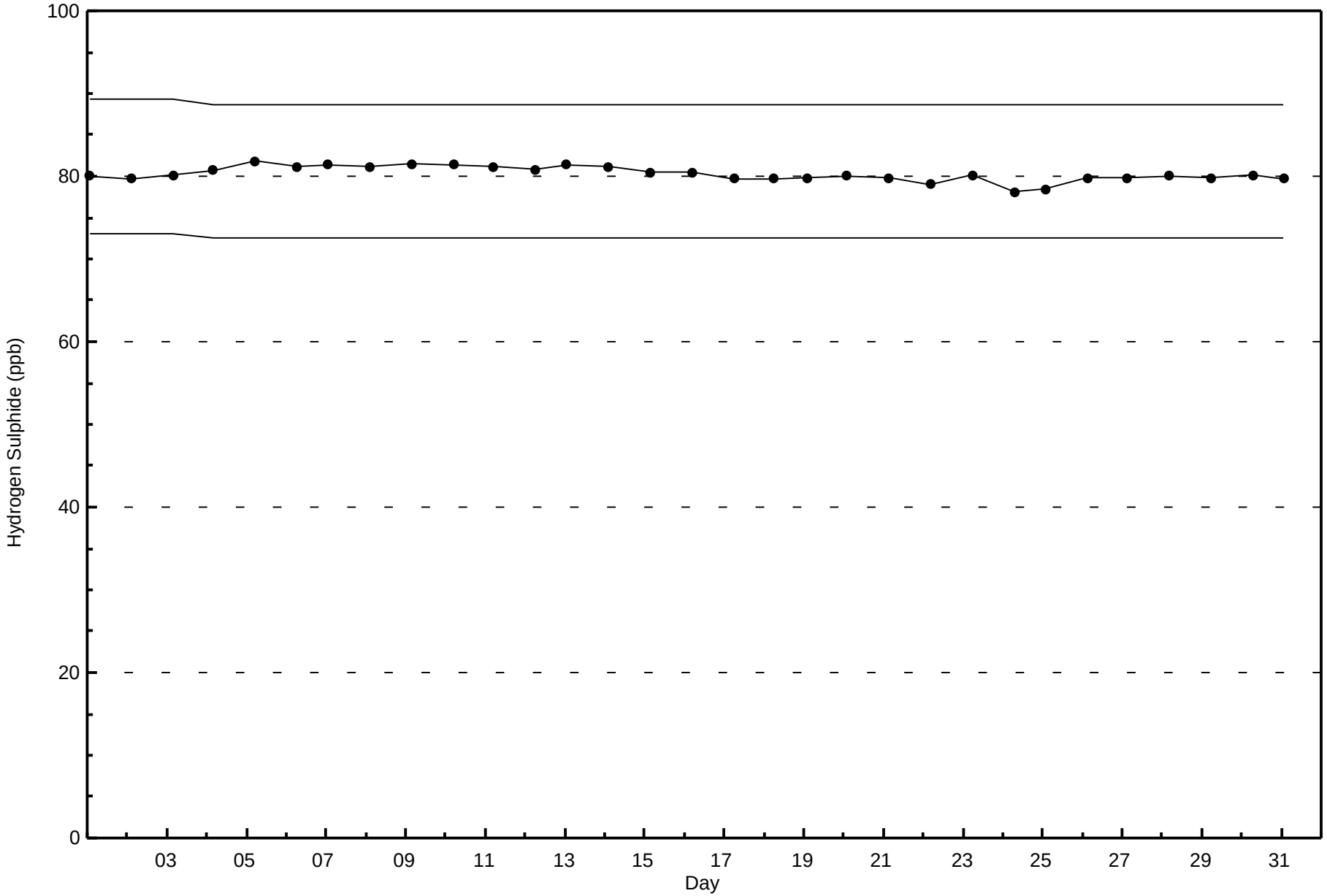


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Brion MacKay River - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Brion MacKay River - March 2016

Maximum Value: 2.9 ppm on Mar 23 08:00

Maximum Daily Average: 2.5 ppm on Mar 2

Minimum Value: 2.1 ppm on Mar 4 20:00

Minimum Daily Average: 2.1 ppm on Mar 31

Maximum Diurnal Average: 2.3 ppm at hour 9

Minimum Diurnal Average: 2.2 ppm at hour 19

Monthly Average: 2.22 ppm

Percentiles: P_1 = 2.1 P_{10} = 2.1 Q_1 = 2.1 Median = 2.2 Q_3 = 2.3 P_{90} = 2.4 P_{99} = 2.8

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	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	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.3	2.5
2-Mar	2.6	Z	2.5	2.4	2.4	2.4	2.5	2.4	2.5	2.5	2.5	2.5	2.4	2.5	2.4	2.4	2.5	2.6	2.7	2.8	2.8	2.6	2.5	2.4	2.5	2.8
3-Mar	2.5	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5
4-Mar	2.3	2.4	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	C	C	C	C	C	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4
5-Mar	2.1	2.1	2.1	2.2	Z	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.3	2.6	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6
6-Mar	2.2	2.2	2.2	2.2	2.1	Z	2.3	2.4	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.4	2.5	2.5	2.3	2.5
7-Mar	Z	2.4	2.5	2.6	2.4	2.3	2.3	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	2.1	2.2	2.2	2.2	2.3	2.6
8-Mar	2.2	Z	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	2.3	2.2	2.2	2.2	2.3
9-Mar	2.3	2.8	Z	2.9	2.6	2.5	2.4	2.4	2.4	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	2.9
10-Mar	2.2	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	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.3
11-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	2.2	2.2	2.2	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	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
13-Mar	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.6	2.5	2.4	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.6
14-Mar	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.2	2.1	2.2
15-Mar	2.2	2.2	Z	2.2	2.2	2.2	2.3	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	2.3
16-Mar	2.2	2.1	2.2	Z	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3
17-Mar	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2
18-Mar	2.1	2.2	2.1	2.2	2.1	Z	2.1	2.2	2.1	2.1	2.2	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	2.2
19-Mar	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.6	2.4	2.3	2.2	2.2	2.2	2.2	2.3	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.6
20-Mar	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.2	2.4
21-Mar	2.3	2.3	Z	2.4	2.4	2.5	2.5	2.5	2.4	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	2.3	2.5
22-Mar	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
23-Mar	2.1	2.1	2.1	2.1	Z	2.5	2.9	2.9	2.8	2.5	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.3	2.9
24-Mar	2.4	2.4	2.4	2.3	2.3	Z	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.5	2.5	2.3	2.5
25-Mar	Z	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4
26-Mar	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
27-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	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2
28-Mar	2.1	2.2	2.1	Z	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
29-Mar	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
30-Mar	2.1	2.1	2.1	2.1	2.2	Z	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	2.2	2.1	2.1	2.1	2.1	2.1	2.2
31-Mar	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	Diurnal Average	
	2.6	2.8	2.5	2.9	2.6	2.5	2.9	2.9	2.8	2.6	2.5	2.5	2.4	2.5	2.6	2.4	2.5	2.6	2.7	2.8	2.8	2.6	2.5	2.5	Diurnal Maximum	

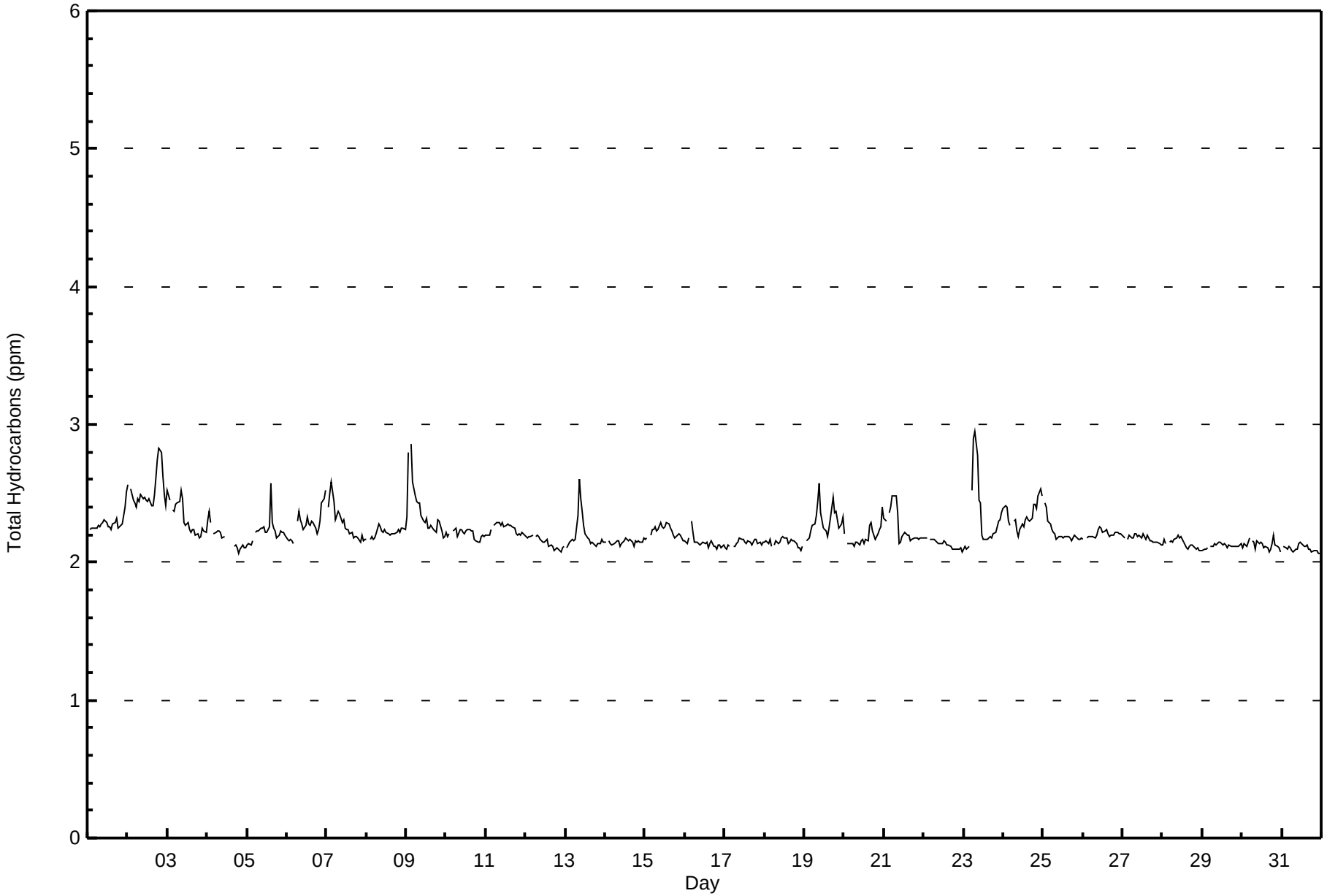
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Total Hydrocarbons (THC) - ppm

Brion MacKay River - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm

Brion MacKay River - March 2016

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

Brion MacKay River - March 2016

Concentration Ranges (ppm)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	51	96	87	20	33	49	69	45	34	19	21	26	20	36	44	55	705
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	51	96	87	20	33	49	69	45	34	19	21	26	20	36	44	55	705

Total Number of Valid Hours: 705

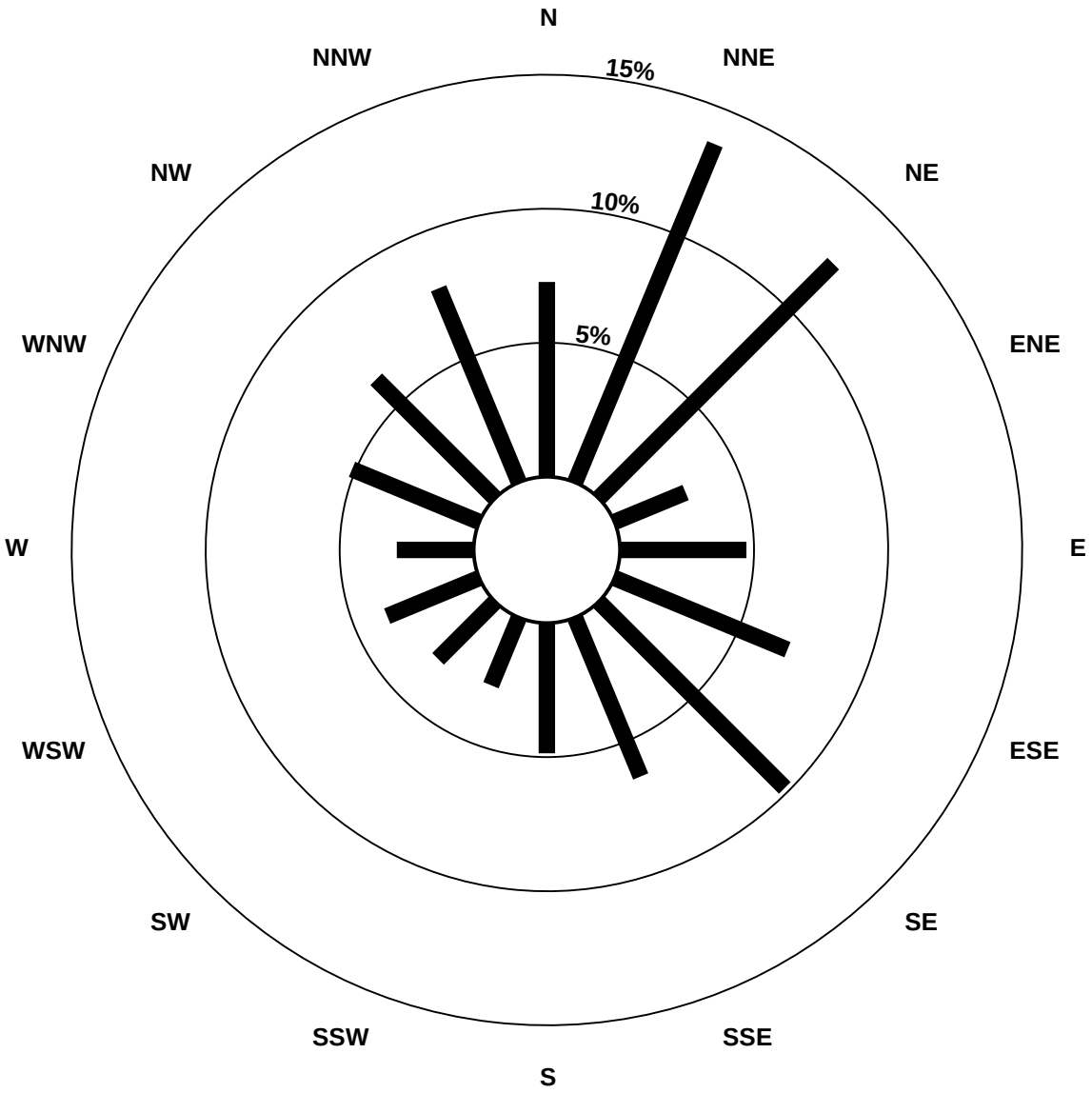
Total Number of Hours: 744

Wood Buffalo Environmental Association

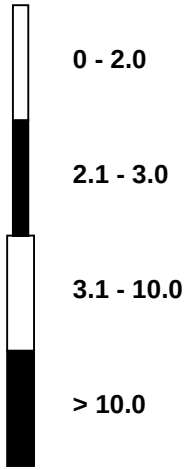
Wind Rose Mar 2016

Total Hydrocarbons (THC) - ppm

Brion MacKay River (AMS 20)



Classes (ppm)



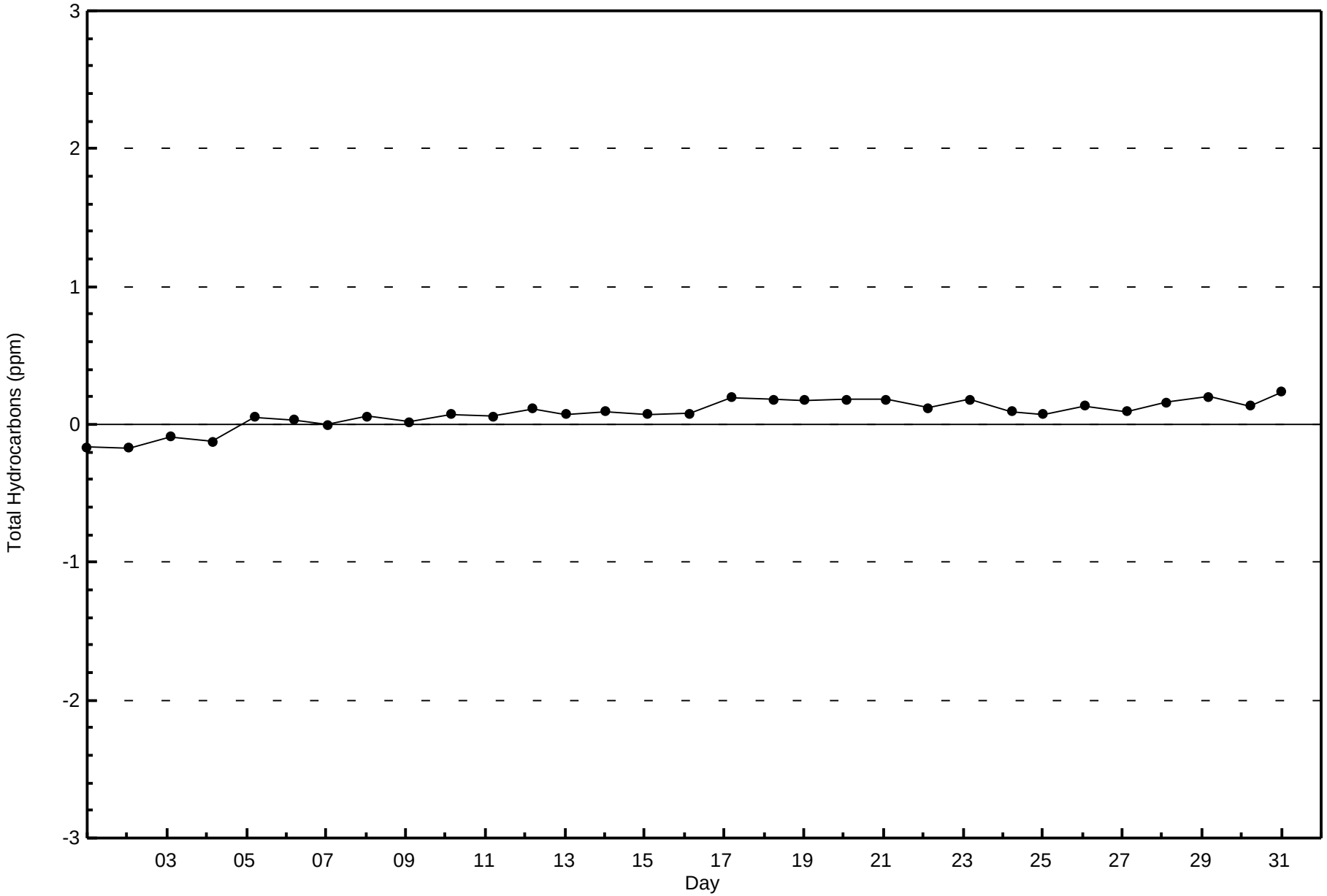
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Brion MacKay River - March 2016

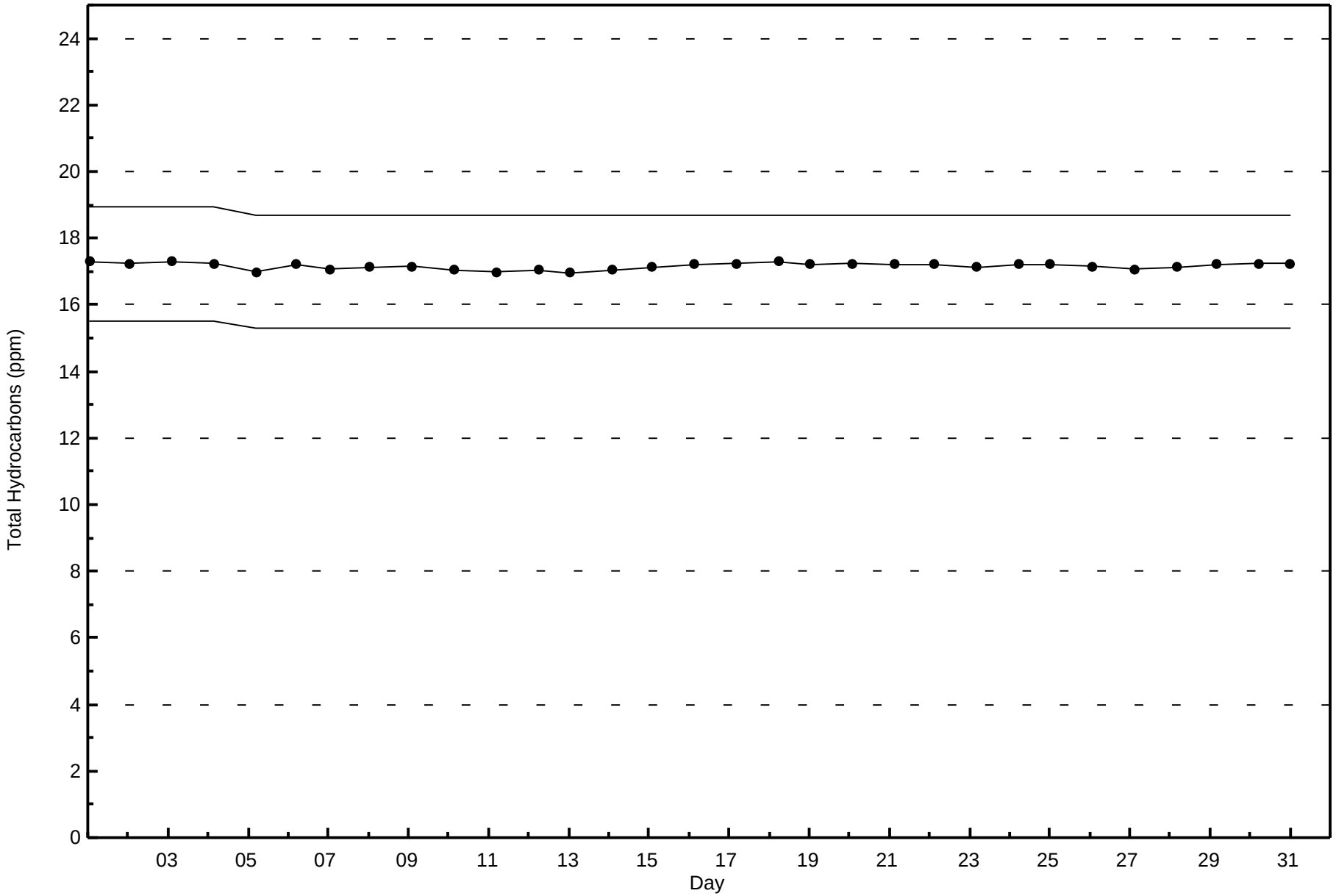


Wood Buffalo Environmental Association

Span Responses

Total Hydrocarbons (THC) - ppm

Brion MacKay River - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

Brion MacKay River - March 2016

Maximum Value: 25 ppb on Mar 8 09:00

Maximum Daily Average: 4.5 ppb on Mar 2

Minimum Value: 0 ppb on Mar 1 02:00

Minimum Daily Average: 0.0 ppb on Mar 22

Maximum Diurnal Average: 2.9 ppb at hour 9

Minimum Diurnal Average: 0.0 ppb at hour 3

Monthly Average: 0.7 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 2$ $P_{99} = 10$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	0	0	0	0	0	0	2	1	1	4	1	2	1	1	0	0	0	0	0	0	0	0	0	0.6	4
2-Mar	1	Z	0	0	0	0	0	1	6	7	9	8	9	9	8	4	10	12	9	8	2	1	0	0	4.5	12
3-Mar	0	0	Z	0	0	0	0	1	5	5	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.8	5
4-Mar	0	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0.1	0
5-Mar	0	0	0	0	Z	0	0	0	2	2	2	1	1	1	9	4	2	0	0	0	0	0	0	0	1.1	9
6-Mar	0	0	0	0	0	Z	0	0	2	3	4	6	6	3	2	2	2	1	1	0	0	0	0	0	1.4	6
7-Mar	Z	0	0	0	0	0	0	1	2	2	5	3	2	2	1	0	0	0	0	0	0	0	0	0	0.8	5
8-Mar	0	Z	0	0	0	0	0	0	25	4	3	1	9	1	1	1	1	0	0	0	0	0	0	0	2.0	25
9-Mar	0	6	Z	12	1	0	0	1	2	2	2	2	3	1	2	2	1	1	0	0	0	0	0	0	1.7	12
10-Mar	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
11-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	0.2	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	0.1	0
13-Mar	Z	0	0	0	0	0	0	3	8	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.9	8
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	0.1	0
15-Mar	0	0	Z	0	0	0	0	1	1	2	3	3	3	2	2	2	0	0	0	0	0	0	0	0	0.8	3
16-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1
17-Mar	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
18-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
19-Mar	Z	0	0	0	0	0	0	3	18	15	5	2	1	1	1	3	4	3	1	0	0	0	0	0	2.4	18
20-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0	0	0	0	0	0	0.3	2
21-Mar	0	0	Z	0	0	0	1	2	3	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0.4	3
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	0
23-Mar	0	0	0	0	Z	1	6	10	5	3	2	1	0	1	0	0	0	0	0	0	0	0	0	0	1.3	10
24-Mar	0	0	0	0	0	Z	1	2	3	3	4	5	4	4	4	3	2	2	1	0	0	0	0	0	1.6	5
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	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
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	0.1	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	0.1	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	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	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	0.0	0
	0.1	0.3	0.0	0.5	0.0	0.1	0.3	1.0	2.9	2.0	1.7	1.4	1.6	1.1	1.2	0.9	0.9	0.7	0.4	0.3	0.1	0.0	0.0	0.0	Diurnal Average	
	1	6	0	12	1	1	6	10	25	15	9	8	9	9	9	4	10	12	9	8	2	1	0	0	Diurnal Maximum	

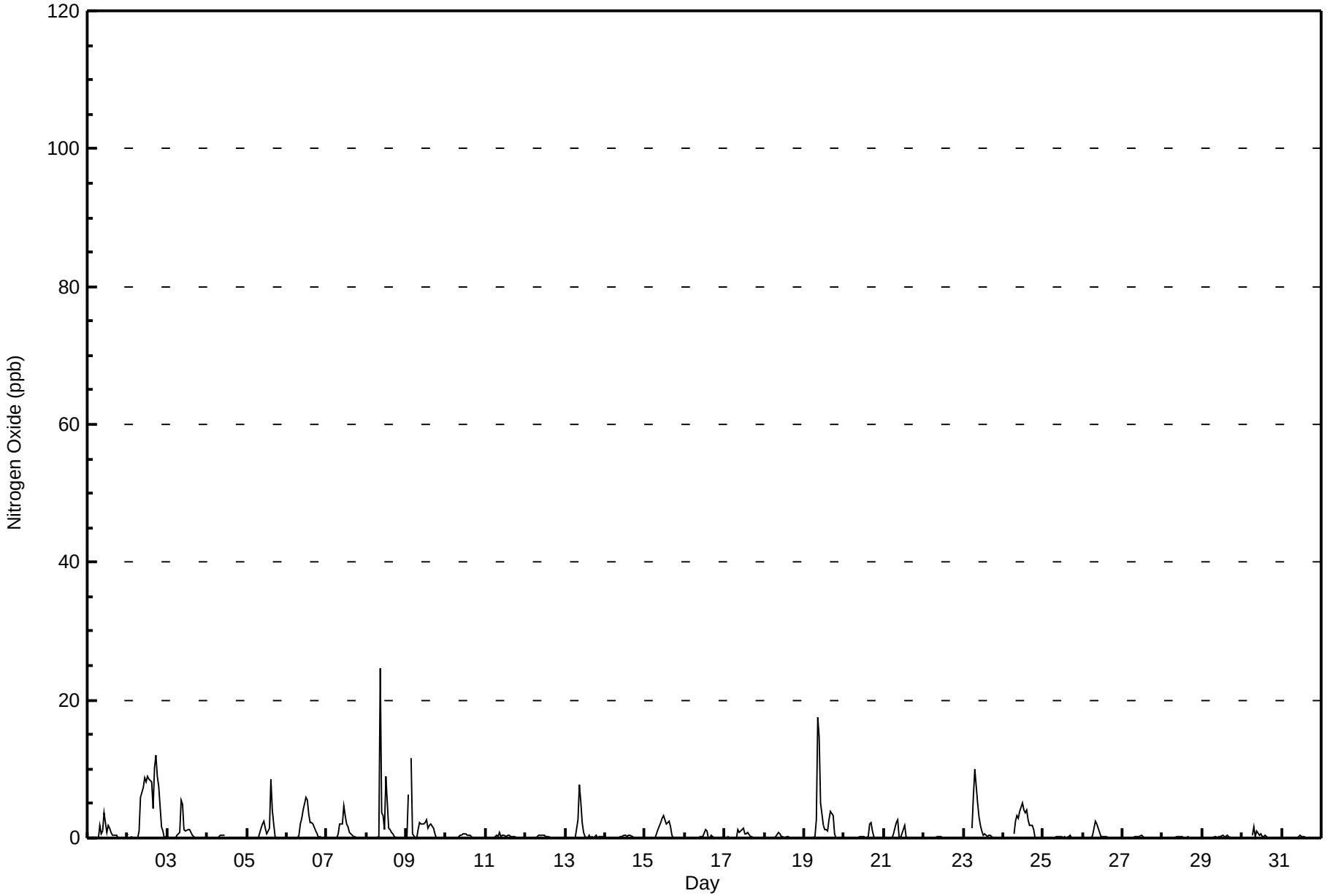
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxide (NO) - ppb

Brion MacKay River - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	99.86	99.86
21 - 40	1	0.14	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: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxide (NO) - ppb

Brion MacKay River - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	51	96	87	20	33	48	69	45	34	19	21	26	20	36	44	55	704
21 - 40	0	0	0	0	0	1	0	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	51	96	87	20	33	49	69	45	34	19	21	26	20	36	44	55	705

Total Number of Valid Hours: 705

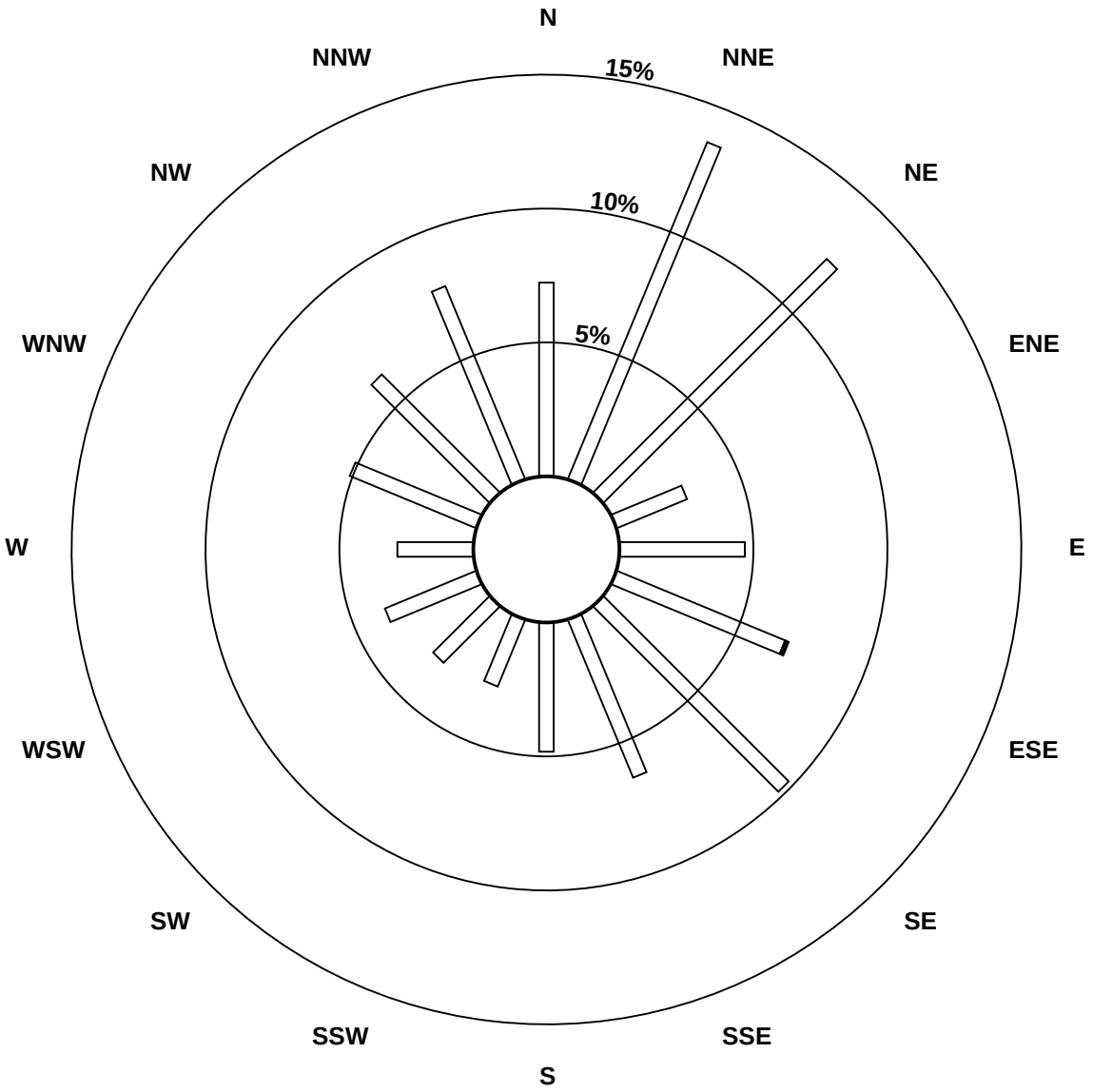
Total Number of Hours: 744

Wood Buffalo Environmental Association

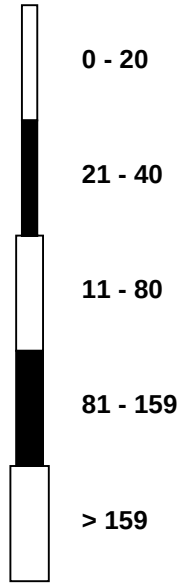
Wind Rose Mar 2016

Nitrogen Oxide (NO) - ppb

Brion MacKay River (AMS 20)



Classes (ppb)



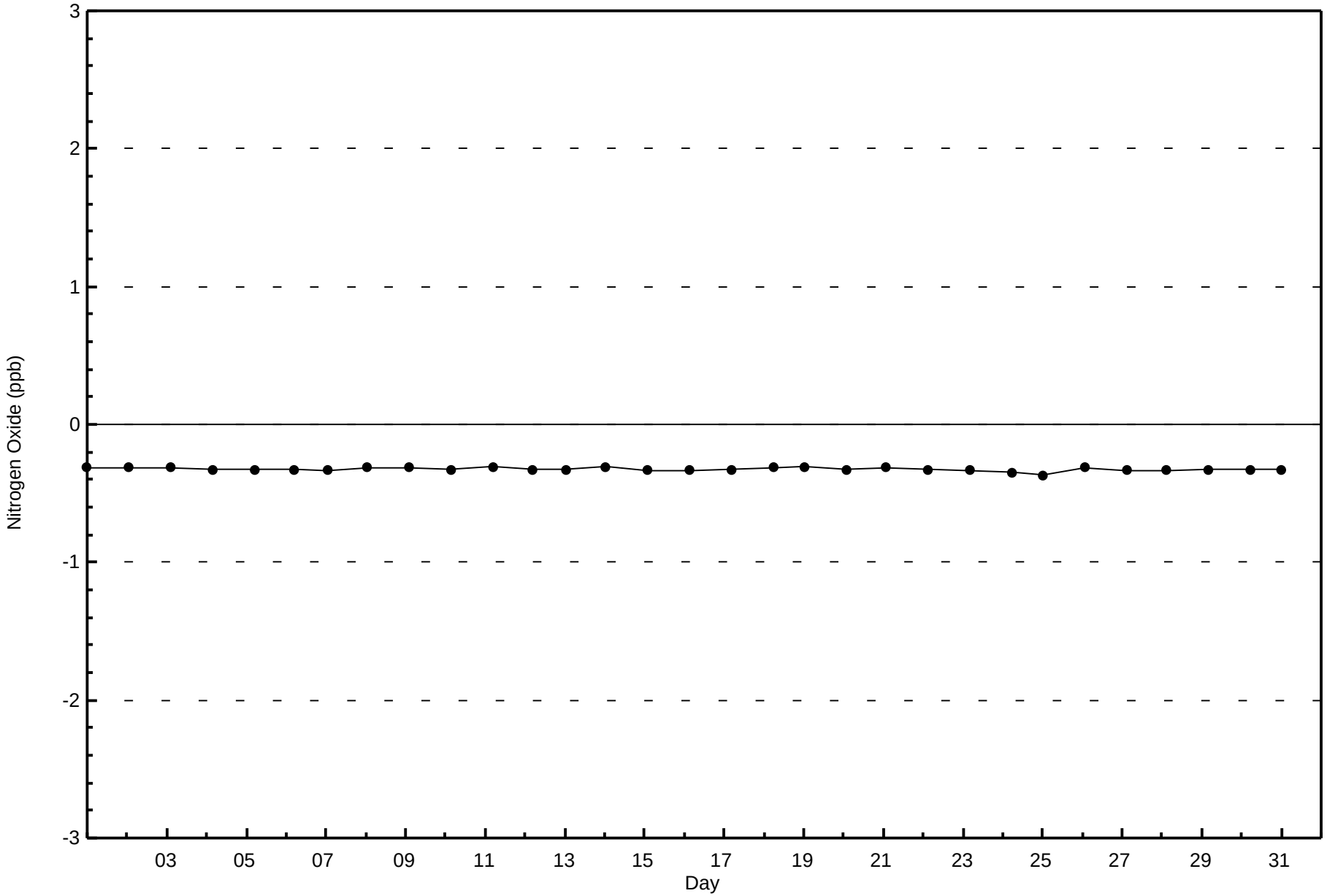
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxide (NO) - ppb

Brion MacKay River - March 2016

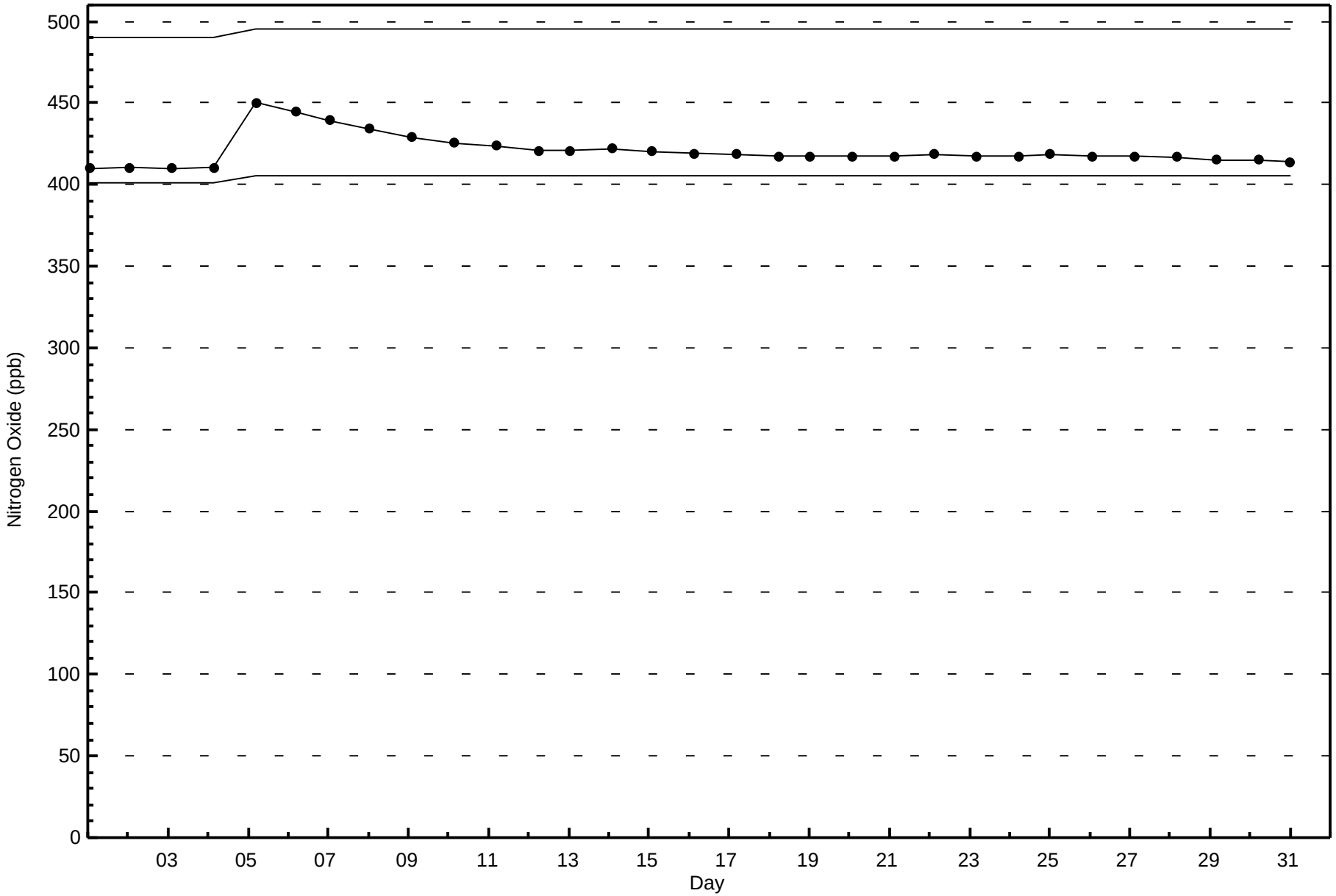


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxide (NO) - ppb

Brion MacKay River - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Brion MacKay River - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 36 ppb on Mar 2 20:00 Maximum Daily Average: 18.1 ppb on Mar 2

Minimum Value: 0 ppb on Mar 17 20:00
Minimum Daily Average: 0.6 ppb on Mar 31
Maximum Diurnal Average: 6.6 ppb at hour 9
Minimum Diurnal Average: 2.8 ppb at hour 14
Monthly Average: 4.7 ppb
Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 6$ $P_{90} = 12$ $P_{99} = 28$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	2	2	2	2	2	2	3	2	2	6	2	4	4	3	2	3	6	7	7	7	9	18	19	5.0	19
2-Mar	24	Z	18	14	13	12	13	11	13	10	9	8	9	10	12	11	19	29	35	36	34	30	22	24	18.1	36
3-Mar	26	23	Z	18	18	19	19	21	23	18	9	6	5	5	4	3	2	2	1	1	1	4	5	6	10.3	26
4-Mar	11	14	9	Z	3	4	4	6	4	3	2	C	C	C	C	C	1	1	2	2	1	1	1	1	3.8	14
5-Mar	1	1	1	1	Z	2	2	2	5	4	4	3	3	5	19	16	14	8	3	4	6	7	8	6	5.5	19
6-Mar	3	3	3	3	3	Z	13	12	15	12	11	13	12	8	6	8	12	12	7	8	10	17	18	18	9.9	18
7-Mar	Z	12	15	24	22	12	14	15	13	8	11	7	5	4	3	3	3	3	2	5	6	1	2	5	8.4	24
8-Mar	1	Z	1	1	1	1	2	4	18	6	6	5	5	5	5	4	5	5	5	4	5	6	4	2	4.3	18
9-Mar	9	29	Z	32	25	20	20	15	11	7	6	5	6	4	5	4	4	4	4	9	9	6	4	3	10.3	32
10-Mar	2	2	2	Z	2	3	3	3	3	3	3	3	2	2	2	1	1	1	1	1	1	1	1	1	2.0	3
11-Mar	1	1	2	1	Z	2	7	2	4	1	2	1	1	2	2	2	2	3	3	5	3	2	1	1	2.1	7
12-Mar	1	1	1	1	1	Z	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2
13-Mar	Z	1	1	1	1	2	3	11	15	10	8	5	2	1	4	1	1	2	7	1	3	5	5	4	4.0	15
14-Mar	8	Z	1	2	2	1	1	2	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1	2	1.6	8
15-Mar	3	2	Z	4	9	6	6	8	7	8	7	6	5	4	5	5	2	1	1	1	2	2	1	1	4.2	9
16-Mar	2	2	2	Z	5	3	1	1	1	1	1	1	3	3	0	0	4	1	1	4	5	4	3	6	2.4	6
17-Mar	4	4	5	3	Z	2	2	1	4	2	3	3	2	2	3	1	1	1	0	0	0	0	1	1	2.0	5
18-Mar	0	0	0	1	1	Z	0	1	3	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.7	3
19-Mar	Z	0	0	1	4	7	9	11	20	17	7	4	3	3	3	7	11	17	17	18	15	10	9	10	8.7	20
20-Mar	3	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	6	8	8	5	4	5	5	9	17	3.3	17
21-Mar	16	15	Z	13	19	23	22	17	10	1	1	1	3	1	0	0	0	0	0	1	0	1	0	1	6.3	23
22-Mar	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
23-Mar	1	1	1	1	Z	23	27	22	12	8	8	5	2	2	1	3	4	4	5	6	9	11	13	12	7.7	27
24-Mar	11	13	14	11	9	Z	11	11	9	6	7	9	7	7	8	7	7	12	22	22	17	12	8	6	10.8	22
25-Mar	Z	5	4	5	4	3	2	2	2	1	1	1	1	2	1	2	3	1	1	1	1	1	1	2	2.0	5
26-Mar	5	Z	6	6	5	4	4	5	5	3	2	1	1	1	1	1	1	1	3	5	5	4	3	2	3.2	6
27-Mar	2	1	Z	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	2
28-Mar	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	0	1	4	2	1	1.2	4
29-Mar	1	1	1	1	Z	1	2	2	1	1	1	1	1	1	1	2	1	1	4	1	1	2	1	0	1.2	4
30-Mar	0	3	3	2	2	Z	8	10	1	3	1	2	1	1	1	0	0	0	3	5	2	1	1	0	2.2	10
31-Mar	Z	1	2	1	2	1	1	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0.6	2
	5.4	5.2	3.7	5.7	5.9	6.0	6.4	6.5	6.6	4.6	4.0	3.3	3.0	2.8	3.2	3.2	3.7	4.2	4.7	5.0	4.9	4.8	4.6	5.0	Diurnal Average	
	26	29	18	32	25	23	27	22	23	18	11	13	12	10	19	16	19	29	35	36	34	30	22	24	Diurnal Maximum	

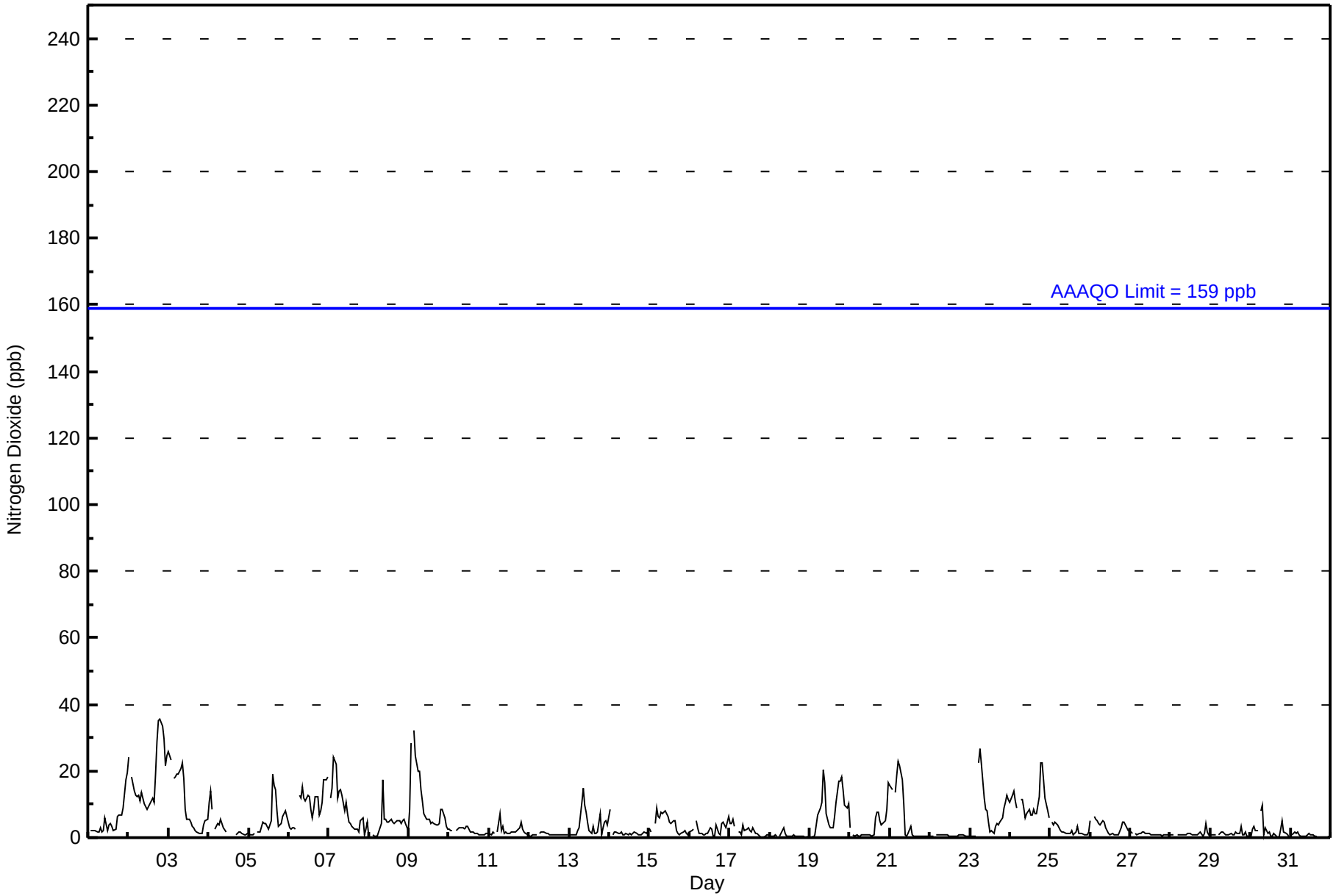
Z - zerospan C - Calibration
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Brion MacKay River - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Brion MacKay River - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	684	96.61	96.61
21 - 40	24	3.39	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: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Brion MacKay River - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	50	87	77	19	33	49	69	45	34	19	21	26	20	36	41	55	681
21 - 40	1	9	10	1	0	0	0	0	0	0	0	0	0	0	3	0	24
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	51	96	87	20	33	49	69	45	34	19	21	26	20	36	44	55	705

Total Number of Valid Hours: 705

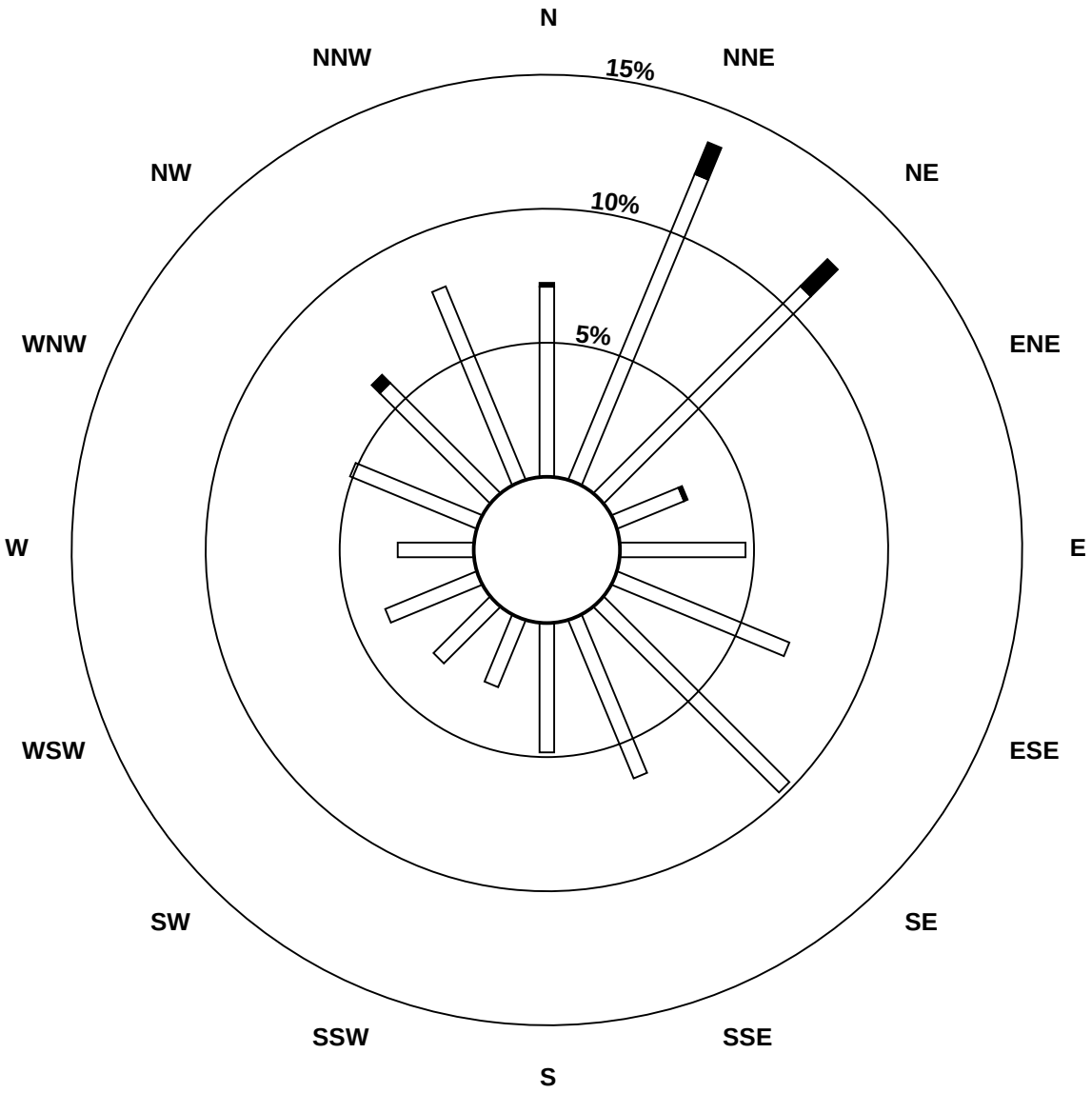
Total Number of Hours: 744

Wood Buffalo Environmental Association

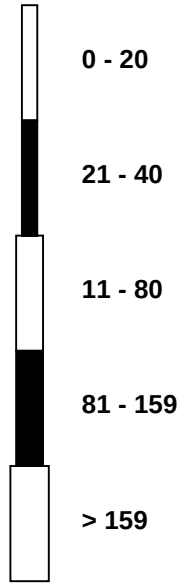
Wind Rose Mar 2016

Nitrogen Dioxide (NO_2) - ppb

Brion MacKay River (AMS 20)



Classes (ppb)



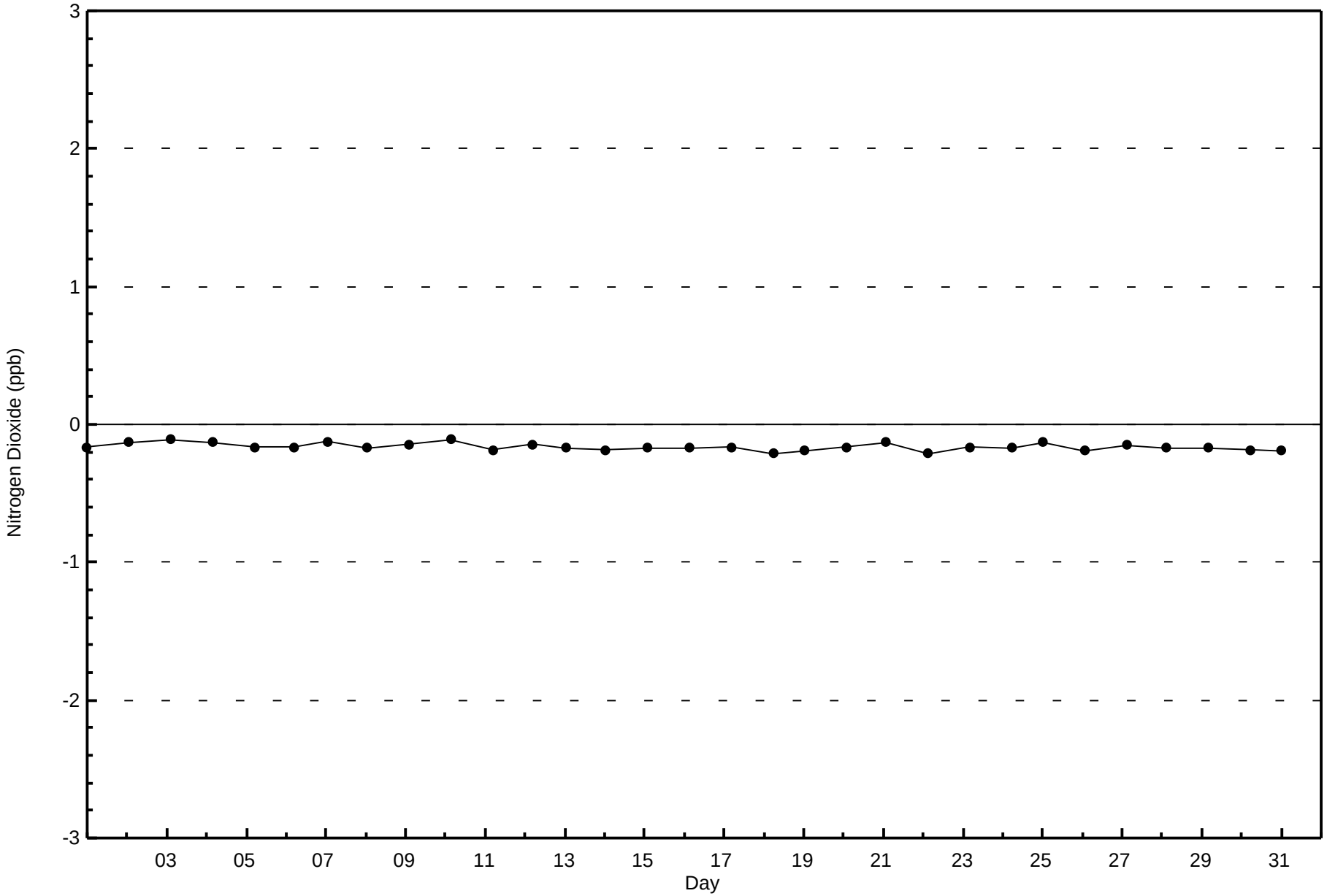
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Brion MacKay River - March 2016

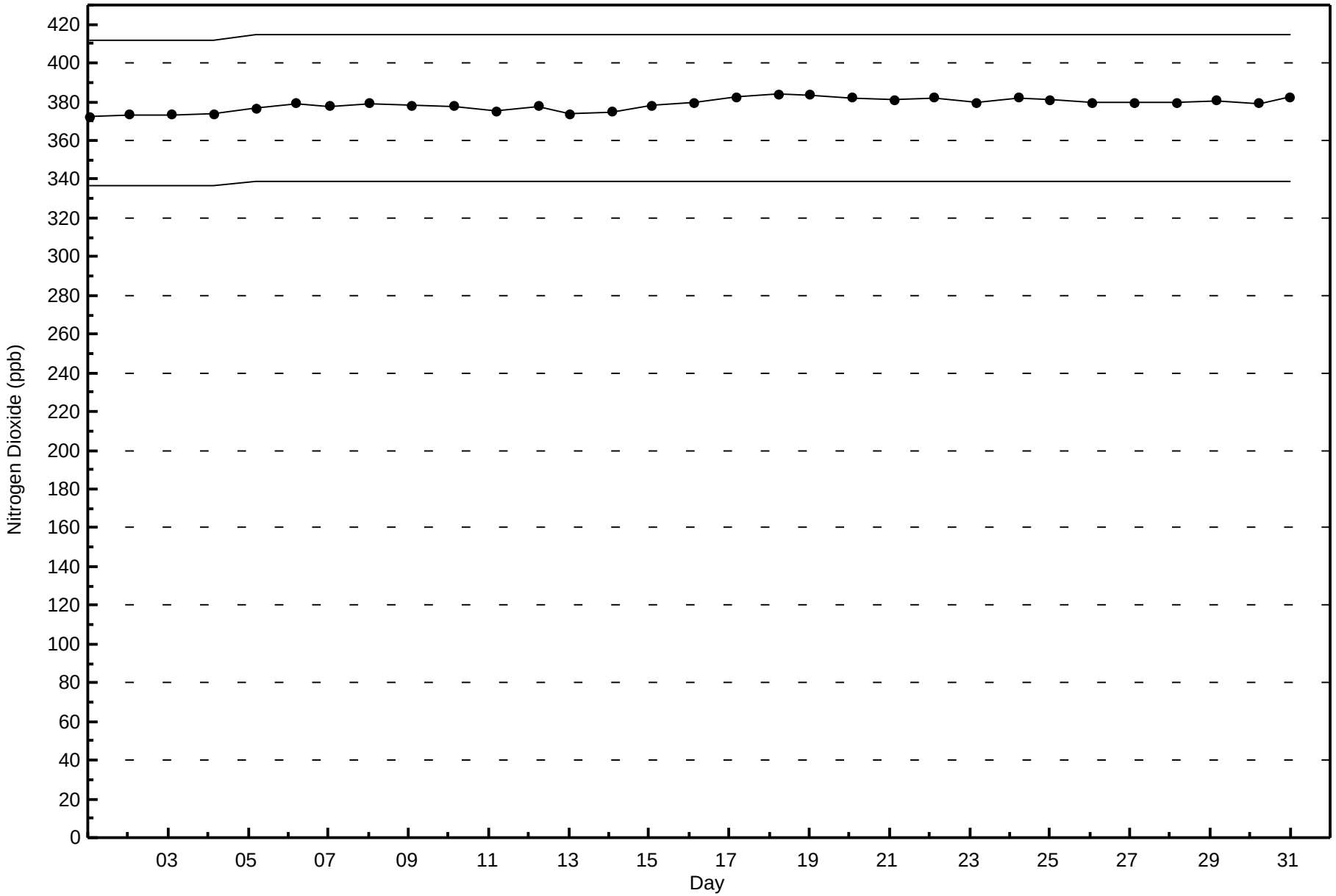


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Brion MacKay River - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Brion MacKay River - March 2016

Maximum Value: 44 ppb on Mar 2 19:00

Maximum Daily Average: 22.6 ppb on Mar 2

Minimum Value: 0 ppb on Mar 17 21:00

Minimum Daily Average: 0.7 ppb on Mar 31

Maximum Diurnal Average: 9.5 ppb at hour 9

Minimum Diurnal Average: 3.7 ppb at hour 3

Monthly Average: 5.4 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 7$ $P_{90} = 15$ $P_{99} = 33$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	2	2	2	2	2	2	5	2	3	10	3	6	6	4	2	3	7	7	7	7	9	18	19	5.6	19
2-Mar	25	Z	19	14	13	12	13	12	19	18	18	17	18	19	20	15	29	41	44	43	35	31	22	25	22.6	44
3-Mar	26	24	Z	18	18	19	19	21	28	22	10	6	7	6	4	3	2	2	1	1	1	4	5	6	11.1	28
4-Mar	11	14	9	Z	3	4	4	6	5	3	2	C	C	C	C	C	1	1	2	1	1	1	1	1	3.9	14
5-Mar	1	1	1	1	Z	2	2	2	6	6	7	5	3	6	28	20	16	8	3	4	6	7	8	6	6.5	28
6-Mar	3	2	3	3	2	Z	13	12	17	15	15	19	18	12	8	11	14	13	7	8	11	17	18	18	11.3	19
7-Mar	Z	12	15	24	22	12	14	15	15	10	15	10	7	6	4	3	3	3	2	5	6	1	2	5	9.2	24
8-Mar	1	Z	1	1	0	0	2	4	42	9	9	6	14	7	6	5	5	5	5	4	5	6	4	2	6.3	42
9-Mar	9	35	Z	44	25	20	20	16	14	10	8	7	8	5	6	6	5	5	4	9	8	6	3	3	12.0	44
10-Mar	2	2	2	Z	2	3	3	3	3	3	4	4	3	2	2	1	1	1	1	1	1	1	1	1	2.1	4
11-Mar	1	1	2	1	Z	2	8	2	4	1	2	2	1	2	2	2	2	3	3	5	3	2	1	1	2.3	8
12-Mar	1	1	1	1	1	Z	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	2
13-Mar	Z	1	1	1	1	2	3	13	23	15	10	5	3	1	4	1	2	2	8	1	3	5	5	4	4.9	23
14-Mar	9	Z	1	2	2	1	1	2	1	1	1	1	1	1	2	2	1	1	1	1	1	2	1	2	1.7	9
15-Mar	3	2	Z	4	9	6	6	8	8	10	10	10	7	6	8	7	2	1	1	1	2	2	1	1	5.0	10
16-Mar	1	2	2	Z	5	3	1	1	1	1	1	2	4	3	1	0	4	1	1	4	5	4	3	6	2.6	6
17-Mar	4	4	5	3	Z	2	2	1	5	3	4	4	3	2	4	2	1	1	0	0	0	0	1	1	2.3	5
18-Mar	0	0	0	1	0	Z	0	2	4	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.8	4
19-Mar	Z	0	0	1	4	7	9	13	38	31	12	6	4	4	4	9	14	20	18	18	15	10	9	10	11.2	38
20-Mar	3	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	8	10	9	5	4	5	5	8	17	3.6	17
21-Mar	16	14	Z	13	19	23	22	19	13	1	1	2	5	1	0	0	0	0	0	0	0	0	0	1	6.7	23
22-Mar	1	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
23-Mar	1	0	0	0	Z	24	33	32	17	11	10	5	2	3	2	4	5	4	5	6	9	11	13	11	9.0	33
24-Mar	11	13	14	11	9	Z	12	14	12	9	11	14	11	11	12	10	9	14	23	22	17	12	8	6	12.4	23
25-Mar	Z	5	4	5	4	3	2	2	2	2	2	1	1	2	1	2	4	1	1	1	1	1	1	2	2.1	5
26-Mar	5	Z	6	5	5	4	4	8	7	4	3	1	1	1	1	1	1	1	3	5	5	4	3	2	3.6	8
27-Mar	2	1	Z	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1.1	2
28-Mar	1	1	1	Z	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2	0	1	4	2	1	1.2	4
29-Mar	1	1	1	1	Z	1	2	2	1	1	1	1	1	1	1	2	2	1	4	1	1	2	0	0	1.2	4
30-Mar	0	3	3	2	2	Z	8	12	1	4	1	2	1	1	2	0	0	0	3	5	2	1	1	0	2.4	12
31-Mar	Z	1	2	1	2	1	1	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0.7	2
	5.5	5.5	3.7	6.2	5.9	6.0	6.8	7.6	9.5	6.6	5.7	4.7	4.6	3.9	4.4	4.1	4.6	4.9	5.0	5.2	4.9	4.8	4.6	5.0	Diurnal Average	
	26	35	19	44	25	24	33	32	42	31	18	19	18	19	28	20	29	41	44	43	35	31	22	25	Diurnal Maximum	

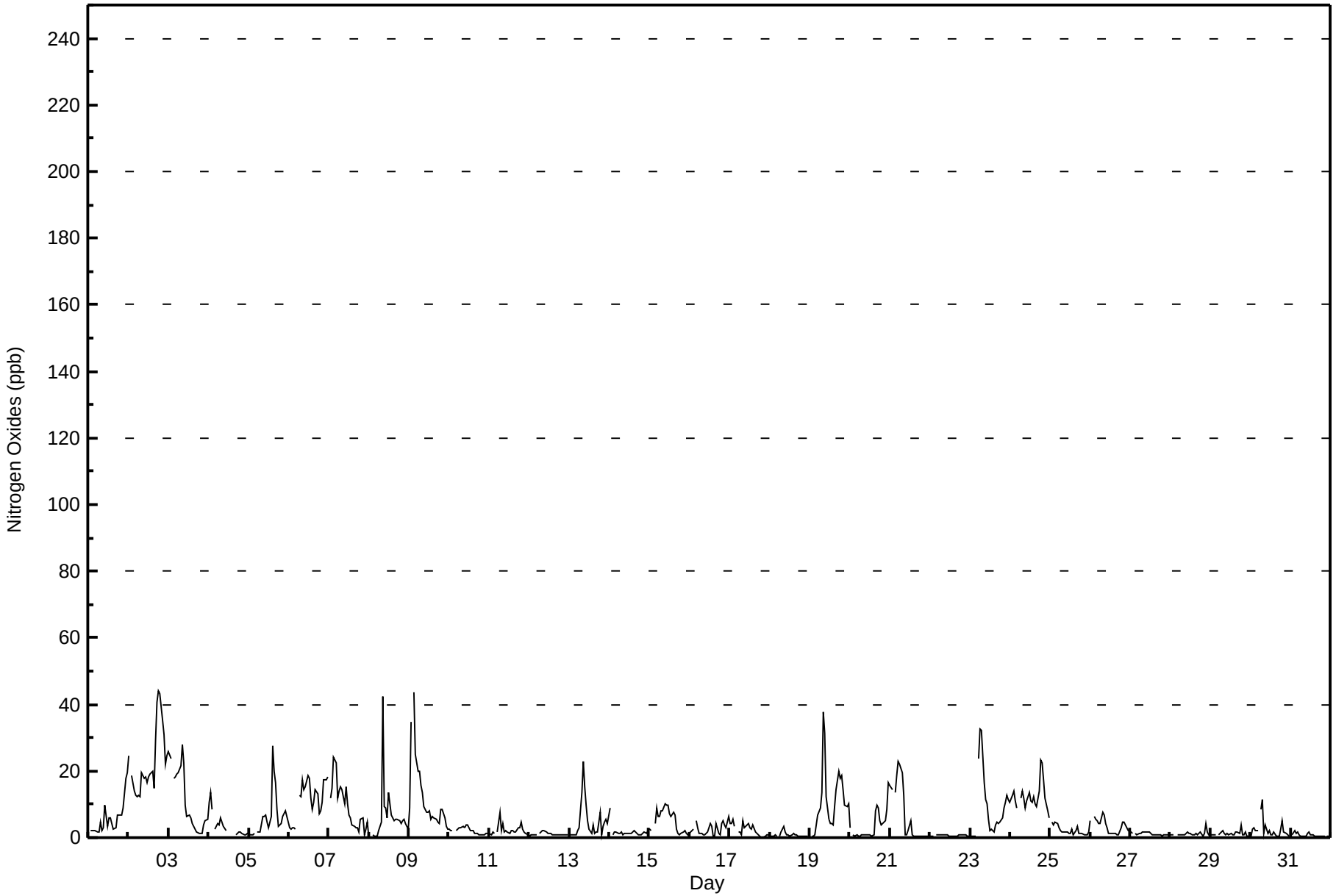
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Brion MacKay River - March 2016



Nitrogen Oxides (NO_X) - ppb
Brion MacKay River - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	677	95.62	95.62
21 - 40	26	3.67	99.29
11 - 80	5	0.71	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

Brion MacKay River - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	49	87	74	18	33	48	69	45	34	19	21	26	20	36	41	54	674
21 - 40	2	8	10	2	0	0	0	0	0	0	0	0	0	0	3	1	26
11 - 80	0	1	3	0	0	1	0	0	0	0	0	0	0	0	0	0	5
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	51	96	87	20	33	49	69	45	34	19	21	26	20	36	44	55	705

Total Number of Valid Hours: 705

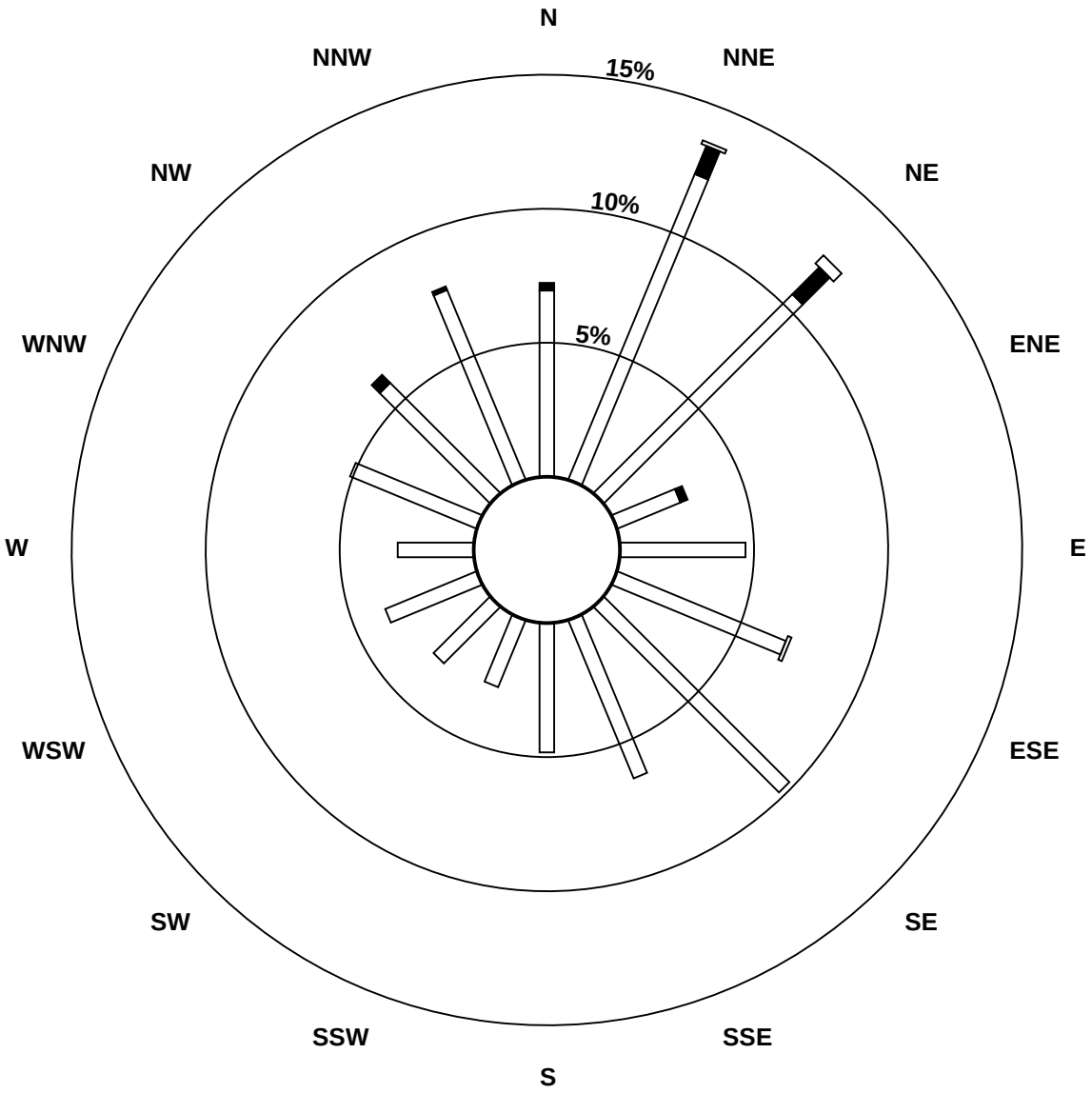
Total Number of Hours: 744

Wood Buffalo Environmental Association

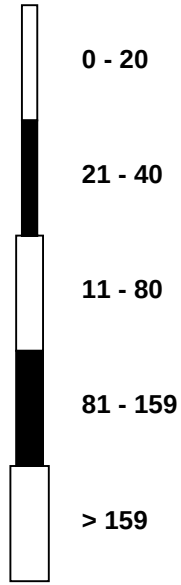
Wind Rose Mar 2016

Nitrogen Oxides (NO_X) - ppb

Brion MacKay River (AMS 20)



Classes (ppb)



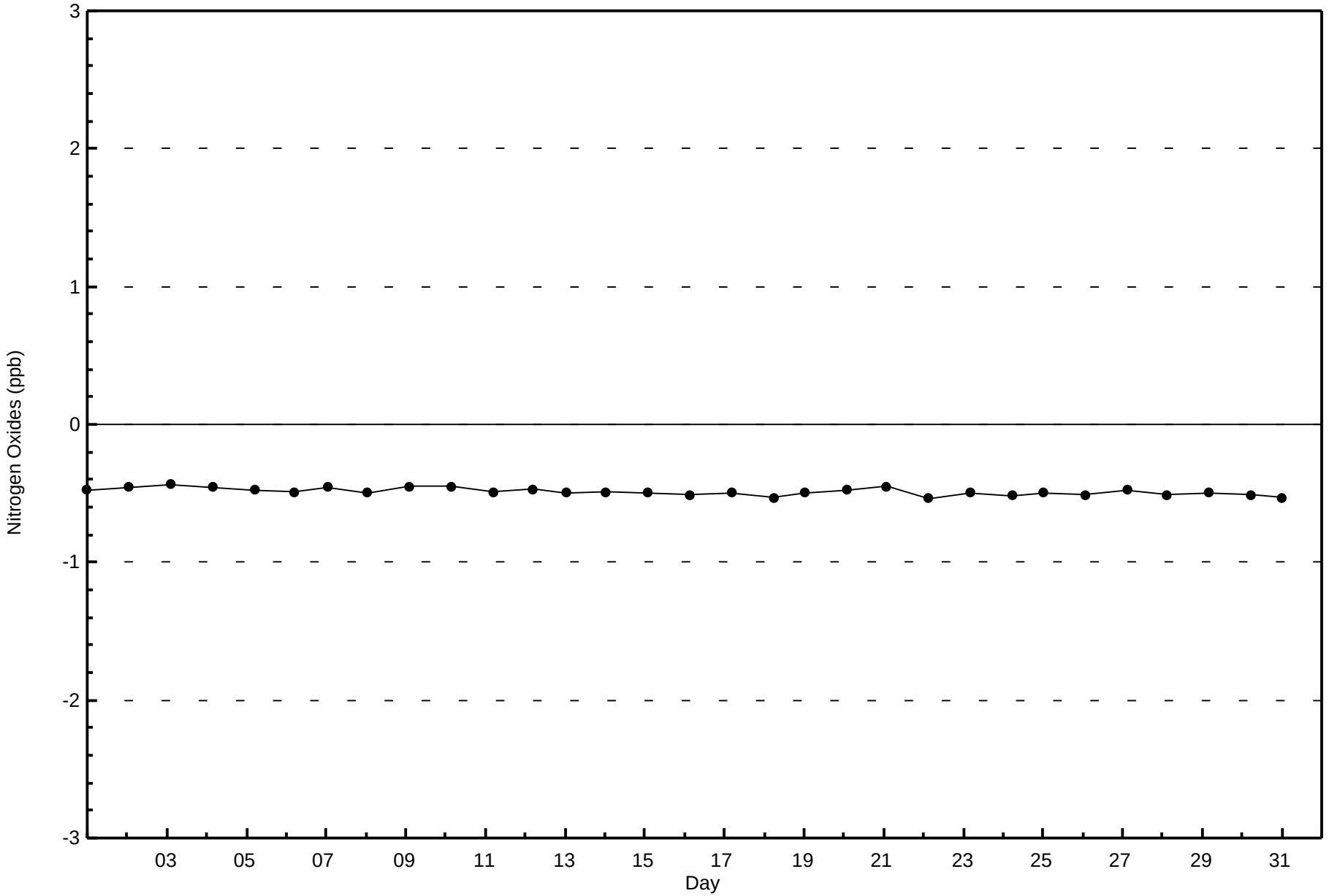
Total Number of Valid Hours: 705

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Brion MacKay River - March 2016

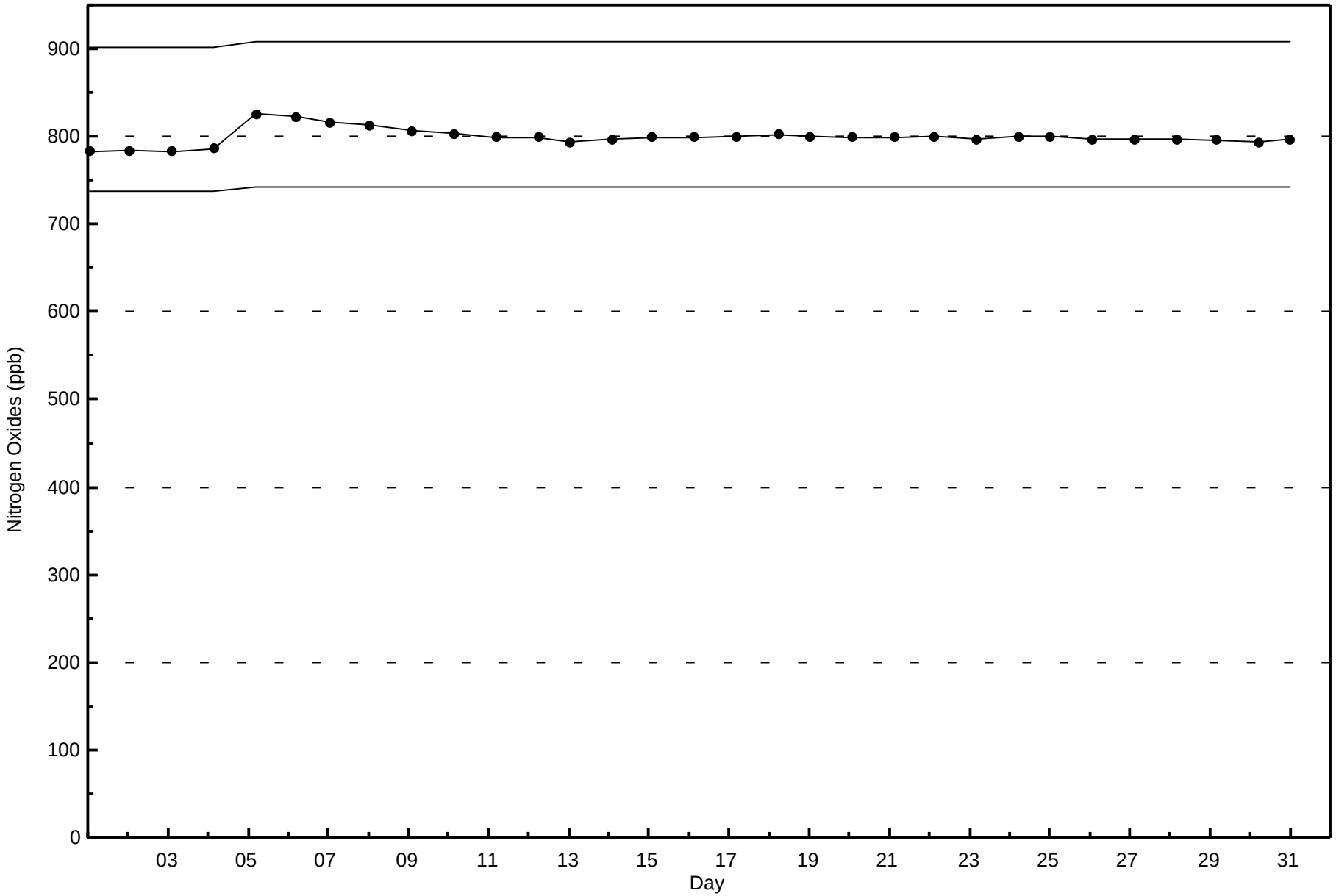


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Brion MacKay River - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Brion MacKay River - March 2016

Maximum Value: 12.1 C on Mar 29 15:00

Maximum Daily Average: 4.7 C on Mar 29

Minimum Value: -19.7 C on Mar 24 06:00

Minimum Daily Average: -10.3 C on Mar 24

Maximum Diurnal Average: 0.6 C at hour 15

Minimum Diurnal Average: -7.9 C at hour 7

Monthly Average: -4.00 C

Percentiles: P_1 = -17.1 P_{10} = -10.3 Q_1 = -7.6 Median = -4.5 Q_3 = -1.1 P_{90} = 2.9 P_{99} = 10.7

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

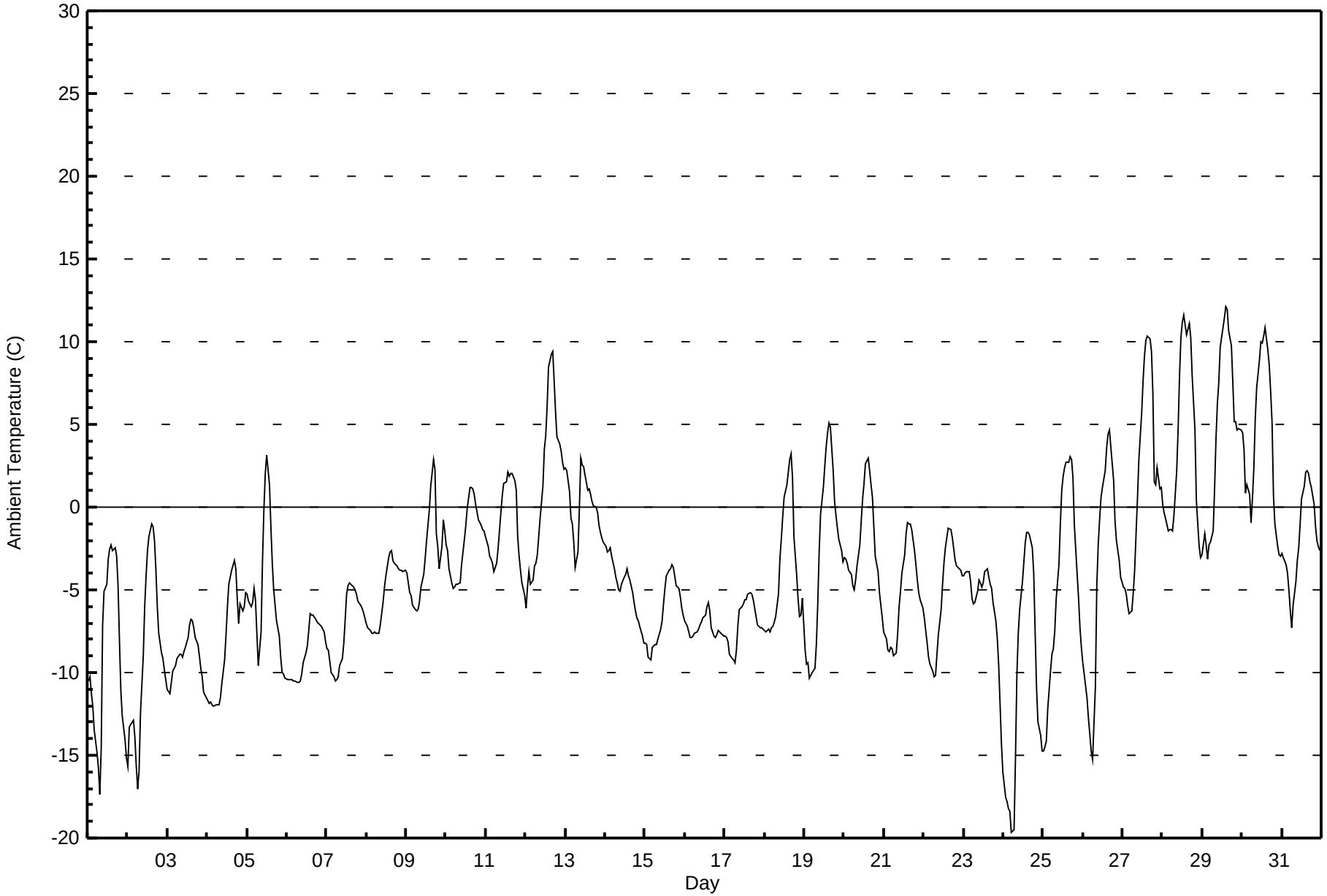
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.5	-10.2	-11.3	-12.1	-13.4	-14.8	-15.7	-17.4	-14.6	-7.1	-5.1	-4.7	-3.2	-2.5	-2.3	-2.7	-2.4	-2.9	-4.7	-8.1	-11.1	-12.6	-14.1	-15.2	-9.1	-2.3
2-Mar	-15.7	-13.3	-13.2	-12.9	-13.9	-15.7	-17.0	-16.0	-12.4	-9.0	-6.0	-4.2	-2.6	-1.8	-1.0	-1.2	-2.1	-3.8	-6.0	-7.6	-8.9	-9.1	-9.9	-10.4	-8.9	-1.0
3-Mar	-11.1	-11.3	-10.6	-9.9	-9.8	-9.6	-9.2	-8.9	-8.9	-9.1	-8.8	-8.5	-7.9	-7.2	-6.8	-6.9	-7.3	-7.9	-8.3	-9.0	-9.7	-10.3	-11.2	-11.6	-9.1	-6.8
4-Mar	-11.7	-11.8	-11.8	-12.0	-12.0	-12.0	-12.0	-11.9	-11.5	-10.7	-9.2	-7.7	-6.0	-4.7	-4.2	-3.8	-3.2	-3.7	-5.5	-7.0	-5.9	-6.3	-6.0	-5.2	-8.2	-3.2
5-Mar	-5.3	-5.7	-6.0	-5.8	-4.9	-5.6	-7.6	-9.6	-7.5	-3.3	-0.2	2.1	3.1	1.4	-1.2	-3.4	-5.0	-5.9	-6.9	-7.8	-9.1	-10.0	-10.1	-10.3	-5.2	3.1
6-Mar	-10.4	-10.4	-10.4	-10.4	-10.5	-10.5	-10.6	-10.6	-10.5	-10.1	-9.4	-8.8	-8.4	-7.5	-6.4	-6.5	-6.6	-6.8	-6.9	-7.1	-7.2	-7.2	-7.5	-8.1	-8.7	-6.4
7-Mar	-8.6	-8.7	-9.3	-10.0	-10.3	-10.5	-10.4	-10.2	-9.6	-9.2	-8.2	-6.8	-5.3	-4.7	-4.5	-4.8	-4.8	-5.0	-5.3	-5.6	-5.9	-6.1	-6.4	-6.7	-7.4	-4.5
8-Mar	-7.0	-7.3	-7.4	-7.6	-7.6	-7.6	-7.6	-7.6	-7.1	-6.4	-5.8	-4.8	-4.1	-3.0	-2.7	-2.6	-3.2	-3.4	-3.6	-3.7	-3.8	-3.8	-3.9	-3.9	-5.2	-2.6
9-Mar	-4.0	-4.5	-5.1	-5.4	-5.9	-6.2	-6.3	-6.2	-5.7	-4.8	-4.1	-3.1	-2.0	-1.1	-0.1	1.3	2.9	2.3	-1.6	-2.4	-3.7	-2.3	-0.8	-1.4	-2.9	2.9
10-Mar	-2.3	-2.7	-3.7	-4.6	-4.9	-4.8	-4.7	-4.6	-4.6	-3.5	-2.7	-2.0	-1.1	-0.1	1.2	1.2	1.1	0.8	0.2	-0.8	-0.9	-1.1	-1.3	-1.4	-2.0	1.2
11-Mar	-1.7	-2.3	-3.0	-3.2	-3.4	-3.9	-3.4	-2.6	-1.5	-0.3	0.7	1.4	1.6	2.1	1.8	2.0	2.0	1.6	1.0	-1.8	-3.0	-3.8	-4.6	-5.3	-1.2	2.1
12-Mar	-6.1	-4.8	-3.9	-4.7	-4.4	-3.5	-3.4	-2.9	-1.8	-0.7	1.3	3.5	4.4	6.1	8.5	9.2	9.4	7.6	5.8	4.3	3.8	3.4	2.7	2.3	1.5	9.4
13-Mar	2.4	2.2	0.9	-0.7	-1.1	-2.1	-3.6	-2.7	-0.1	3.0	2.5	2.5	2.0	1.0	1.1	0.7	0.4	0.1	0.0	-0.4	-1.1	-1.5	-1.8	-2.1	0.1	3.0
14-Mar	-2.4	-2.7	-2.6	-2.4	-3.0	-3.7	-4.2	-4.6	-5.0	-5.1	-4.7	-4.3	-4.1	-3.8	-4.1	-4.4	-5.2	-5.7	-6.3	-6.7	-6.9	-7.2	-7.8	-8.2	-4.8	-2.4
15-Mar	-8.2	-8.3	-9.1	-9.2	-8.5	-8.4	-8.3	-8.3	-7.9	-7.4	-6.8	-5.9	-4.9	-4.1	-3.8	-3.7	-3.5	-3.7	-4.1	-4.7	-4.9	-5.4	-6.1	-6.5	-6.3	-3.5
16-Mar	-6.8	-7.2	-7.6	-7.9	-7.9	-7.8	-7.6	-7.6	-7.4	-7.1	-6.9	-6.7	-6.5	-6.1	-5.8	-6.3	-7.3	-7.8	-7.9	-7.7	-7.5	-7.5	-7.6	-7.8	-7.3	-5.8
17-Mar	-7.8	-7.9	-8.2	-8.9	-9.1	-9.2	-9.4	-8.7	-7.2	-6.2	-6.0	-5.9	-5.6	-5.6	-5.3	-5.1	-5.3	-5.6	-6.1	-6.6	-7.1	-7.3	-7.3	-7.3	-7.0	-5.1
18-Mar	-7.5	-7.6	-7.4	-7.6	-7.3	-7.2	-7.0	-6.6	-5.3	-3.1	-1.9	-0.6	0.6	1.4	2.1	2.9	3.2	1.7	-1.8	-4.2	-5.6	-6.6	-6.5	-5.5	-3.6	3.2
19-Mar	-8.7	-9.5	-9.4	-10.4	-10.2	-10.0	-9.8	-8.3	-5.8	-2.8	-0.4	1.2	2.5	3.6	4.5	5.1	4.8	2.2	0.4	-0.5	-1.3	-2.0	-2.6	-3.3	-2.9	5.1
20-Mar	-3.1	-3.1	-3.4	-3.8	-4.1	-4.7	-5.0	-4.4	-3.6	-2.3	-0.8	0.5	1.4	2.6	3.0	2.2	1.3	0.6	-1.2	-3.0	-3.9	-5.2	-5.9	-6.7	-2.2	3.0
21-Mar	-7.6	-8.0	-8.6	-8.7	-8.5	-8.6	-9.0	-8.8	-7.6	-6.1	-5.1	-4.0	-2.8	-1.6	-0.9	-1.0	-1.1	-1.4	-2.6	-3.5	-4.4	-5.2	-5.6	-6.1	-5.3	-0.9
22-Mar	-6.7	-7.4	-8.2	-9.0	-9.5	-9.9	-10.3	-10.1	-8.9	-7.7	-6.2	-4.7	-3.4	-2.5	-1.9	-1.3	-1.4	-1.9	-2.6	-3.2	-3.6	-3.7	-3.8	-4.1	-5.5	-1.3
23-Mar	-4.1	-4.0	-3.9	-3.9	-4.5	-5.5	-5.9	-5.8	-5.1	-4.4	-4.6	-4.9	-4.6	-3.9	-3.7	-4.2	-4.7	-4.9	-5.7	-6.9	-7.9	-9.5	-11.9	-14.3	-5.8	-3.7
24-Mar	-16.0	-17.5	-17.8	-18.3	-18.3	-19.7	-19.5	-15.1	-10.1	-7.6	-6.2	-4.5	-3.3	-2.1	-1.5	-1.6	-1.7	-2.4	-4.0	-7.4	-10.9	-12.9	-13.8	-14.7	-10.3	-1.5
25-Mar	-14.8	-14.5	-14.2	-12.2	-9.9	-8.9	-8.6	-7.5	-5.6	-3.5	-1.0	1.0	1.9	2.3	2.7	2.7	3.0	2.8	1.7	-1.1	-4.0	-5.5	-7.3	-8.5	-4.5	3.0
26-Mar	-9.4	-10.1	-11.6	-12.7	-13.8	-14.8	-15.3	-10.8	-4.8	-2.3	-0.8	0.6	1.2	2.2	3.6	4.4	4.7	3.6	1.6	-0.8	-2.0	-2.7	-3.2	-4.3	-4.1	4.7
27-Mar	-4.8	-4.9	-5.3	-5.9	-6.4	-6.3	-5.2	-3.8	-1.6	0.5	2.9	5.7	7.7	9.1	10.1	10.4	10.2	9.4	6.9	1.5	1.3	2.4	1.1	1.2	1.5	10.4
28-Mar	0.2	-0.3	-0.7	-1.4	-1.4	-1.3	-1.4	-0.5	2.2	4.7	8.0	10.3	11.2	11.6	10.5	10.8	11.1	10.2	8.0	4.6	0.4	-1.0	-2.4	-3.1	3.8	11.6
29-Mar	-2.9	-1.6	-2.3	-3.1	-2.3	-2.1	-1.5	1.1	4.2	6.3	7.6	9.7	10.8	11.5	12.1	12.0	10.7	9.8	7.5	5.2	5.2	4.6	4.7	4.7	4.7	12.1
30-Mar	4.5	3.4	0.9	1.3	0.8	-0.9	0.5	2.4	5.3	7.2	8.9	10.0	9.9	10.3	10.9	9.5	8.6	6.9	5.1	0.7	-1.0	-2.3	-2.9	-3.0	4.0	10.9
31-Mar	-2.8	-3.0	-3.5	-4.0	-5.0	-6.3	-7.3	-5.9	-4.5	-3.2	-2.5	-1.0	0.5	1.3	2.1	2.2	2.0	1.5	1.2	0.1	-1.2	-2.0	-2.4	-2.6	-1.9	2.2
	-6.5	-6.6	-7.0	-7.3	-7.5	-7.8	-7.9	-7.2	-5.6	-3.9	-2.6	-1.4	-0.6	0.1	0.6	0.5	0.4	-0.4	-1.7	-3.3	-4.2	-4.8	-5.4	-5.8	Diurnal Average	
	4.5	3.4	0.9	1.3	0.8	-0.9	0.5	2.4	5.3	7.2	8.9	10.3	11.2	11.6	12.1	12.0	11.1	10.2	8.0	5.2	5.2	4.6	4.7	4.7	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Brion MacKay River - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	588	79.03	79.03
0 - 10	138	18.55	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

Maximum Value: 98 % on Mar 12 03:00

Maximum Daily Average: 90.0 % on Mar 9

Minimum Value: 18 % on Mar 24 12:00

Minimum Daily Average: 46.5 % on Mar 24

Maximum Diurnal Average: 84.2 % at hour 7

Minimum Diurnal Average: 61.3 % at hour 15

Monthly Average: 74.1 %

Percentiles: P_1 = 26 P_{10} = 48 Q_1 = 61 Median = 80 Q_3 = 88 P_{90} = 93 P_{99} = 97

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

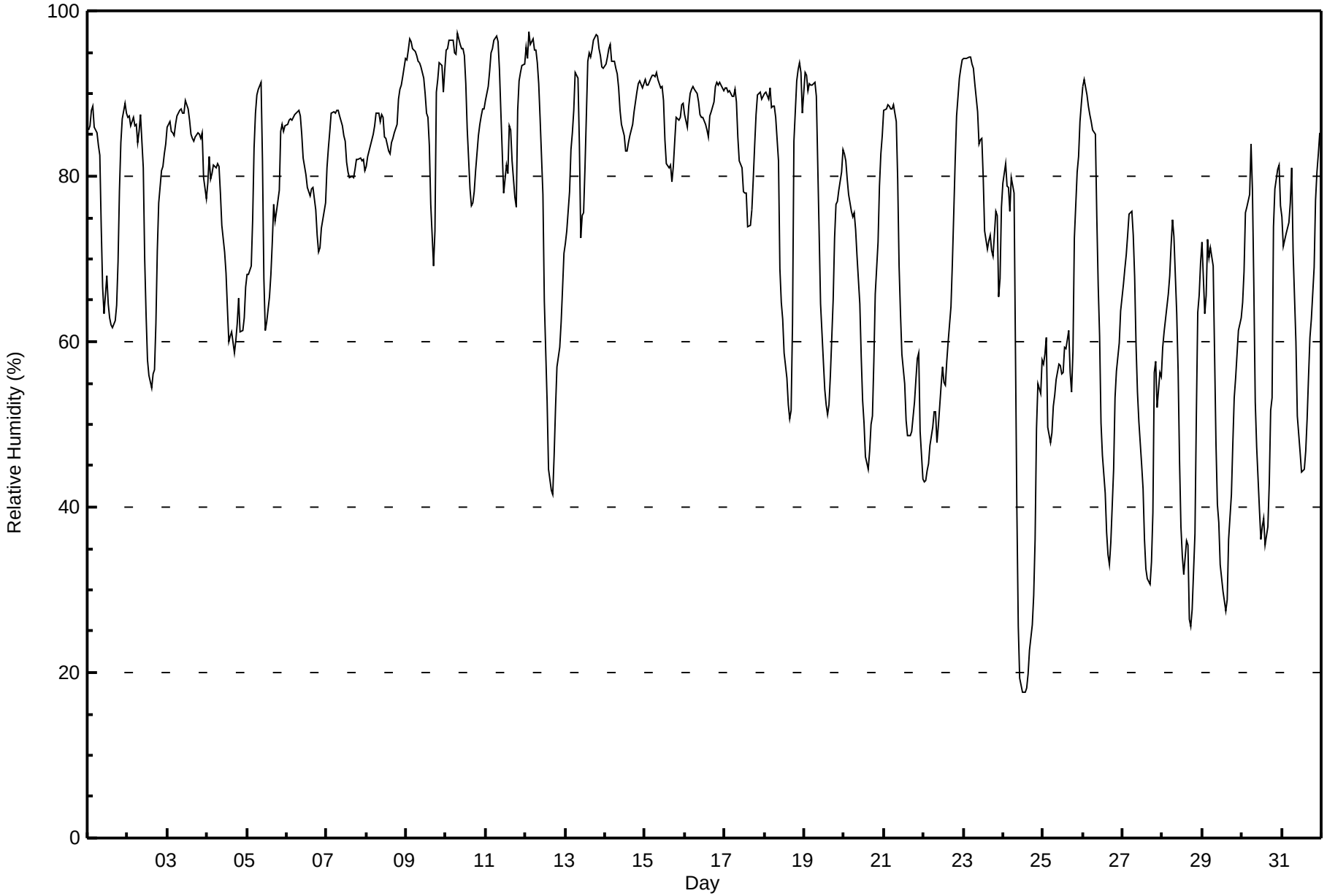
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	86	86	88	89	86	85	84	83	74	67	63	68	65	63	62	62	62	64	70	78	84	87	89	88	76.3	89
2-Mar	87	87	86	87	86	86	84	85	87	81	70	63	58	56	54	56	57	62	71	77	81	81	83	84	75.4	87
3-Mar	86	87	86	85	85	86	87	88	88	88	88	89	88	87	85	85	84	85	85	85	85	85	80	77	85.5	89
4-Mar	79	82	80	80	81	81	81	81	78	74	71	68	64	60	61	61	59	60	62	65	61	61	63	67	70.1	82
5-Mar	68	68	69	75	83	88	90	90	91	82	68	61	62	65	68	72	77	75	76	78	85	86	85	86	77.1	91
6-Mar	86	87	87	87	87	87	88	88	87	85	82	80	79	78	78	79	79	76	73	71	71	74	76	77	80.9	88
7-Mar	81	83	85	88	88	88	88	88	87	86	85	84	82	81	80	80	80	81	82	82	82	82	82	81	83.5	88
8-Mar	81	82	84	84	85	86	88	88	87	87	87	85	85	83	83	84	85	85	86	89	91	91	92	94	86.3	94
9-Mar	94	95	97	96	95	95	95	94	94	93	92	90	88	87	84	77	69	73	90	92	94	93	90	93	90.0	97
10-Mar	95	95	97	96	96	95	95	97	96	95	95	95	91	86	78	77	77	78	81	85	86	87	88	88	89.6	97
11-Mar	89	91	93	95	95	96	97	96	93	88	83	78	81	80	86	86	82	77	76	88	92	93	93	94	88.4	97
12-Mar	96	94	98	96	97	95	95	94	91	87	78	65	59	53	45	42	42	46	52	57	59	62	66	71	72.4	98
13-Mar	72	73	78	83	85	88	93	92	84	73	75	76	81	94	95	94	95	97	97	97	95	94	93	93	87.4	97
14-Mar	94	94	95	96	94	94	93	92	91	88	86	85	83	83	84	85	86	88	89	90	91	91	91	91	89.8	96
15-Mar	92	91	91	92	92	92	92	92	92	91	91	89	84	82	81	81	79	81	84	87	87	87	89	89	87.8	92
16-Mar	87	86	88	90	91	91	90	90	89	87	87	87	86	86	85	87	88	89	91	91	91	91	91	90	88.8	91
17-Mar	91	91	90	90	90	90	90	89	85	82	81	78	78	78	74	74	76	80	84	88	90	90	89	90	84.9	91
18-Mar	90	90	89	91	88	88	88	87	82	69	65	63	59	56	52	51	52	62	84	91	93	94	93	88	77.7	94
19-Mar	93	92	90	91	91	91	91	90	81	73	65	58	54	52	51	52	56	65	73	77	77	78	81	83	75.2	93
20-Mar	83	82	80	78	76	75	76	74	70	65	58	53	50	46	45	47	50	51	58	66	72	79	83	85	66.6	85
21-Mar	88	88	89	88	88	88	89	87	80	69	63	59	55	50	49	49	49	49	53	55	58	59	49	43	66.4	89
22-Mar	43	43	44	45	47	50	51	52	48	50	55	57	55	55	58	60	64	69	76	82	87	92	93	94	61.3	94
23-Mar	94	94	94	94	94	94	93	91	88	84	84	85	80	73	71	72	73	71	70	76	75	65	68	76	81.7	94
24-Mar	79	81	79	79	76	80	78	59	40	26	19	18	18	18	18	20	23	26	29	36	49	55	54	58	46.5	81
25-Mar	57	59	61	50	48	49	52	54	55	57	57	56	56	59	59	61	56	54	59	73	80	82	87	89	61.3	89
26-Mar	91	92	90	88	87	87	86	85	75	67	61	50	46	42	37	34	33	36	45	53	56	58	60	64	63.4	92
27-Mar	67	69	70	73	75	76	73	68	59	54	50	45	42	36	33	31	31	33	39	56	58	52	56	56	54.3	76
28-Mar	59	61	63	66	68	72	75	73	63	57	46	38	34	32	36	35	26	26	28	37	51	64	66	69	51.8	75
29-Mar	72	63	66	72	70	71	69	58	48	40	38	33	30	29	28	29	36	41	48	53	56	58	61	63	51.4	72
30-Mar	65	68	76	76	78	84	78	67	53	47	40	36	38	39	35	38	43	52	53	74	78	81	81	77	60.7	84
31-Mar	75	72	73	74	74	77	81	71	60	51	49	47	44	45	47	51	56	60	63	69	77	81	83	85	65.1	85
	81.3	81.6	82.4	83.1	83.2	84.0	84.2	82.0	77.3	72.3	68.8	65.7	63.7	62.3	61.3	61.6	62.0	64.3	68.6	74.2	77.2	78.6	79.1	80.0	Diurnal Average	
	96	95	98	96	97	96	97	97	96	95	95	95	91	94	95	94	95	97	97	97	95	94	93	94	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Brion MacKay River - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	6	0.81	0.81
20 - 40	38	5.11	5.91
40 - 60	130	17.47	23.39
60 - 80	196	26.34	49.73
80 - 100	374	50.27	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

Brion MacKay River - March 2016

Maximum Speed: 18 km/h on Mar 30 13:00

Maximum Daily Speed Average: 8.2 km/h on Mar 30

Minimum Speed Value: 0 km/h on Mar 8 20:00

Minimum Daily Speed Average: 1.0 km/h on Mar 1

Maximum Diurnal Speed Average: 3.5 km/h at hour 16

Minimum Diurnal Speed Average: 0.8 km/h at hour 2

Monthly Average Velocity: 1.8 km/h 37.2 deg

Percentiles: $P_1 = 1$ $P_{10} = 3$ $Q_1 = 4$ Median = 6 $Q_3 = 8$ $P_{90} = 10$ $P_{99} = 13$

Hours in Service: 744

Hours of Data: 741

Hours of Missing Data: 3

Percent Operational Time: 99.6

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	S6	S6	S5	SSW5	S3	SSE2	SSE2	SSE2	SSE3	SE1	N1	SSE4	NNE2	N3	N5	NNE6	NNE6	NE6	E3	E2	NE2	E1	NE1	ENE1	ESE1.0	NNE6
2-Mar	NNE3	NE2	NNE2	NE3	NNE1	N1	NE1	N1	N2	ENE3	WSW1	NW3	NNW5	NNW5	NNW6	N5	NE7	NE5	NE6	NE3	NE6	NE6	NE6	NE7	NNE3.2	NE7
3-Mar	NNE6	NNE6	NE6	NE5	NE5	NE5	NE5	ENE5	NNE4	N7	NNE7	N7	N9	NNE9	NNE8	NNE10	NNE10	NNE9	NNE7	NE9	NNE8	NE6	NNE5	NNE4	NNE6.6	NNE10
4-Mar	E2	SSW1	SE3	SE1	ESE2	ESE3	SSE3	SE5	SE6	SE8	SE8	SE9	SSE11	SSE11	SSE10	SE11	SE10	SE9	ESE5	ESE5	SE8	SE7	SE7	SE6	SE6.0	SE11
5-Mar	SE4	SSE5	SE4	SSE6	S6	S6	SSW3	SSE1	WSW3	W5	NW6	NNW10	NNW10	NE10	NE13	NE12	NE13	NE11	NE12	NNE13	NNE11	NNE12	NNE9	NNE10	NE4.6	NNE13
6-Mar	NNE9	NNE7	NNE9	NNE9	NE9	NE8	NE7	NNE8	NNE8	NE8	NE9	NE9	NE7	ENE8	NE10	NE9	NE9	NE9	NE7	NE7	NE8	NE8	NE7	NE7	NE8.0	NE10
7-Mar	NE8	NNE6	NNE6	NNE7	NNE5	NNE6	NNE5	NNE4	NNE4	NW5	NW5	WNW5	W6	WNW8	W8	WNW7	WSW6	WSW5	WSW6	W6	WNW5	WNW5	WNW5	NW5	NW3.4	W8
8-Mar	WNW4	NNW3	NE1	ESE2	ESE3	SE5	SE6	SE6	ESE6	ESE7	ESE6	SE7	SE6	NW2	N4	NNW6	N6	N5	NNE1	NW0	WNW2	SSE1	SSW3	S3	ESE1.6	ESE7
9-Mar	NNE2	N3	N4	NNE4	NNE5	NE3	NNE3	E3	ESE4	ENE4	NE5	ESE4	SSE6	S6	S6	SSE6	S6	SE4	SE4	ESE4	SE4	S6	S9	S7	SE2.3	S9
10-Mar	S7	SSE6	SSE5	SSE6	SSE7	SE7	SSE7	SSE8	SE6	SE8	SE8	ESE9	ESE10	ESE10	E10	ESE11	ESE12	ESE10	ESE8	ESE6	SE5	SE5	SE4	SE5	SE7.0	ESE12
11-Mar	S4	SW4	WSW4	WSW5	WSW7	WSW6	W6	W5	W5	WNW7	W6	WNW8	WNW7	WNW7	WNW6	WNW7	WNW7	W6	WNW4	SE1	SSE3	SSE4	SE3	SE4	W3.8	WNW8
12-Mar	SE5	SE5	SE5	SE5	ESE5	ESE5	ESE4	ENE3	E5	E6	ENE7	E9	E10	ESE10	ESE12	ESE13	ESE10	ESE9	ESE8	SE8	ESE9	ESE10	SE8	SE9	ESE7.2	ESE13
13-Mar	SE8	SE7	NNE1	NE2	NNW2	NNW2	NNW1	N2	NNW5	N8	N9	NNW9	NNW10	NNW6	NW7	NNW11	NNW11	NNW7	NW6	NNW7	NW8	NW8	NW9	NW8	NNW5.1	NNW11
14-Mar	NW7	NNW7	NNW6	NNW5	NNE9	N8	N10	NNE9	NNE9	NNE10	N10	N11	NNE10	NNE8	NNE8	NNE9	NNE10	NNE10	NNE10	NNE8	NNE8	NNE7	NNE7	NNE6	N8.0	N11
15-Mar	N6	NNE5	N4	N4	NNE4	NNE4	N4	NNE5	N5	N5	NNW5	NNW5	NNW5	NNW6	NNW6	NNW6	NNW6	N5	NNW4	N3	N4	NNE6	NNE7	N6	N4.8	NNE7
16-Mar	N7	N8	N7	N7	NNW7	NNW7	NNW9	NNW7	NNW8	NNW9	NNW10	NNW9	NW11	NW11	NNW12	NNW12	NNE7	NNE6	N3	NW6	NW9	NW7	NW8	NW9	NNW7.7	NNW12
17-Mar	NW8	NW8	NW9	NW7	WNW8	WNW7	WNW7	WNW7	NW9	NNW8	NW11	NW11	NW10	NW11	NW10	NNW8	NNW7	NNW5	NNE4	NE1	AF	SSW1	SW3	S2	NW6.3	NW11
18-Mar	SSW2	SSW2	SW3	S2	SSW4	S4	SSW4	SW3	WSW3	NW5	WNW5	SSW5	SW4	WSW5	W4	WSW4	SW5	SSW5	S4	S4	S4	SSE4	S5	S4	SSW3.1	S5
19-Mar	ENE1	SE2	ENE1	NE1	NE2	NE3	NE3	NE3	NE5	ENE6	ESE7	ESE8	E9	E9	E10	ENE9	ENE8	NE10	NE7	NE6	NE6	NE4	NNE4	NE4	ENE4.8	E10
20-Mar	E3	ENE4	E5	E6	E6	E5	E6	E6	E7	E8	ENE8	E8	ENE9	ENE9	NE11	NE13	NNE12	NE10	NNE8	NE7	NE6	NE6	NE7	NE7	ENE6.9	NE13
21-Mar	NNE6	NNE7	NNE7	NE8	NE8	NE9	NE8	NE8	NE8	ENE10	ENE12	NE13	ENE13	ENE13	E11	E10	E10	E9	E7	E7	E7	ESE7	ESE9	ESE9	ENE8.1	NE13
22-Mar	ESE9	ESE8	ESE6	ESE5	ESE5	ESE4	ESE4	ESE6	ESE6	SSE7	SE7	SE8	SE7	SE8	ESE7	ESE6	ESE8	ESE8	ESE6	ESE5	SE5	SE5	SE5	SSE3	ESE6.0	ESE9
23-Mar	SSE3	S2	SSW3	SW3	NW4	NW3	NW4	NW6	NNW7	N7	N6	NNE8	NNE7	NNE8	NNE8	NNE7	NE6	NE7	NE8	NE6	NE5	NE6	NE4	NE3	NNE3.8	NNE8
24-Mar	NE3	NNE4	NNE3	NNE3	NE3	NNE4	NE3	NNE5	NNE7	NE8	NNE9	NNE7	N5	N7	N9	NNW10	NNW9	N8	NE5	NE4	E1	SE1	SE2	AF	NNE4.7	NNW10
25-Mar	SSE1	SE2	SE2	SSE5	SSE5	SSE6	SSE5	SSE5	SSE6	S5	SSW5	S7	S9	SSW8	SW6	W5	NW5	NNW4	NNE2	E1	SSE2	SSE1	SW1	WSW3	S2.8	S9
26-Mar	NNW3	NW2	AF	SW1	W1	S1	SSW1	WNW2	NNW2	N3	N4	N3	NE5	N5	N5	ENE4	E4	SE6	SE7	SE8	SE8	SE7	SE7	SSE5	ESE1.5	SE8
27-Mar	SSE5	SSE5	SSE5	SSE5	SE5	SE5	SSE6	SSE6	SE7	SE8	SE9	SE11	SSE13	SSE12	SSE12	SSE12	S12	SSE9	SSE6	SE5	SE7	SE8	SSE6	S7	SSE7.7	SSE13
28-Mar	SSE6	S6	S7	S6	S8	S9	SSW8	S9	SSW9	SW9	SW7	W8	W11	WNW12	WNW13	WNW9	WNW10	WNW10	WNW7	WNW5	WSW3	WSW3	WSW3	SW4	WSW4.9	WNW13
29-Mar	SW5	SW6	SW5	WSW4	WSW5	WSW5	WSW6	WSW6	WSW6	W9	W8	W8	WNW11	NW11	NW10	NW11	WNW8	WNW7	SW3	SW3	WSW4	WSW4	WSW4	WSW4	W5.5	WNW11
30-Mar	W4	WNW3	W3	WNW5	WNW5	WNW3	WNW6	NW8	NW9	NW11	NNW11	NW13	NNW18	NNW15	NW16	NNW14	NNW14	NNW12	N13	NE11	NNE8	N5	NNE5	N9	NNW8.2	NNW18
31-Mar	N7	NNE7	NNE5	NNE7	NNE5	N4	NNE3	NNE5	N6	NNW5	N5	NNW4	NW3	WSW2	WSW4	W5	SW5	S6	SSW6	S3	SE1	SSW2	SW4	SW4	NNW1.5	NNE7
	ENE1.2	NE0.8	NE1.0	ENE1.0	NE1.0	ENE1.0	NE0.9	NE1.3	NNE1.6	NNE2.1	NNE2.4	NNE2.0	NNE2.4	N2.4	N2.9	NNE3.5	NNE3.2	NE2.9	NE2.8	ENE2.6	ENE2.3	ENE1.7	E1.2	ENE1.1	Diurnal Average	
	NNE9	NW8	NNE9	NNE9	NNE9	NE9	N10	NNE9	NNE9	NW11	ENE12	NE13	NNW18	NNW15	NW16	NNW14	NNW14	NNW12	N13	NNE13	NNE11	NNE12	NNE9	NNE10	Diurnal Maximum	

AF - Analyzer Failure

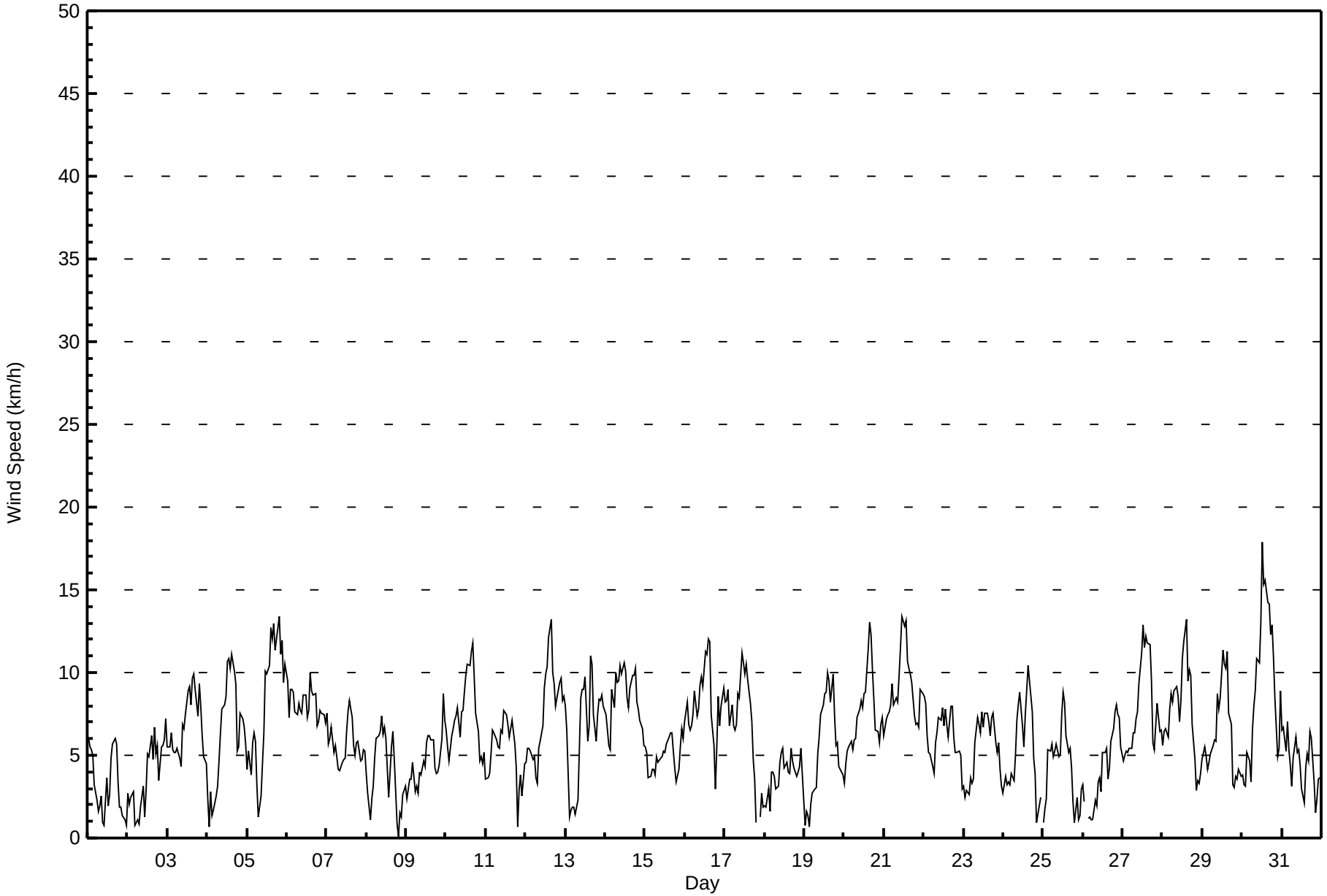
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Brion MacKay River - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	318	42.91	42.92
6 - 11	391	52.77	95.68
12 - 19	32	4.32	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: 741

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Brion MacKay River - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	30	34	32	10	12	17	33	27	16	15	17	21	9	14	13	18	318
6 - 11	24	61	53	9	21	31	40	20	21	4	4	7	11	22	31	32	391
12 - 19	1	3	6	3	0	3	0	4	1	0	0	0	0	2	2	7	32
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	55	98	91	22	33	51	73	51	38	19	21	28	20	38	46	57	741

Total Number of Valid Hours: 741

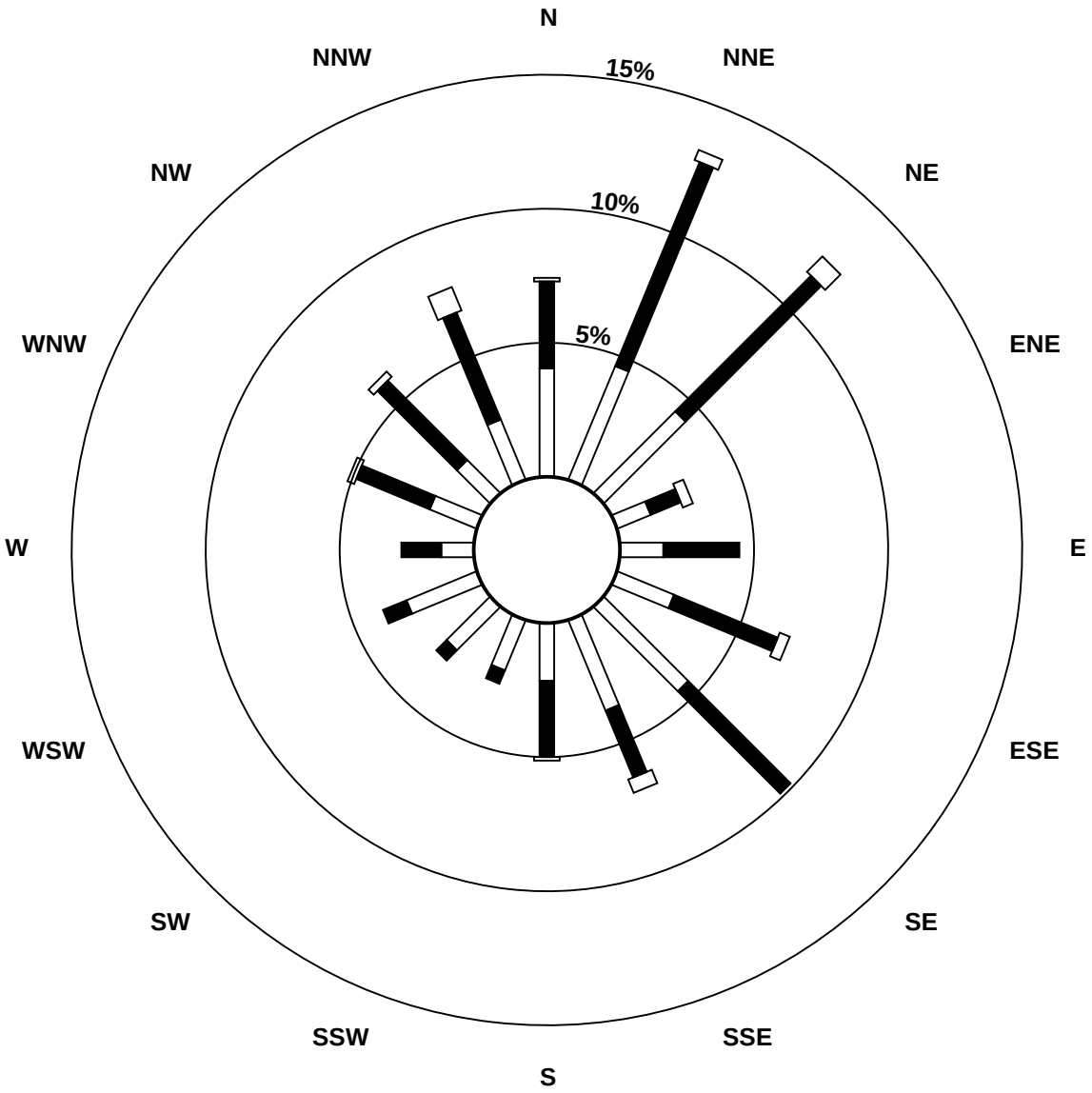
Total Number of Hours: 744

Wood Buffalo Environmental Association

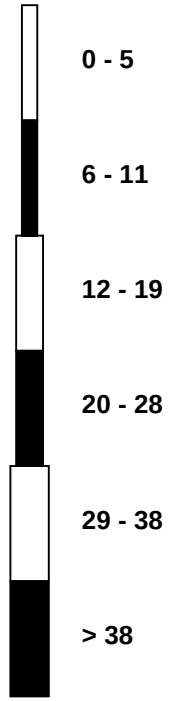
Wind Rose Mar 2016

Wind Speed (WS) - km/h

Brion MacKay River (AMS 20)



Classes (km/h)



Total Number of Valid Hours: 741

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Brion MacKay River - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 6 km/h on Mar 28 15:00

Minimum Value: 0 km/h on Mar 1 08:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 3$ $P_{99} = 5$

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	2	1	1	1	1	1	1	0	1	1	1	2	1	1	2	2	2	2	1	1	1	1	1	1	2
2-Mar	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	2	2	2	2	2
3-Mar	2	2	2	2	2	1	2	1	2	2	2	2	2	3	3	3	3	3	2	3	3	2	2	1	3
4-Mar	1	1	1	1	1	1	1	1	2	2	2	3	3	4	3	3	3	3	2	2	2	2	2	2	4
5-Mar	1	2	1	1	2	2	1	1	1	2	2	3	3	4	4	4	4	4	4	5	4	4	3	3	5
6-Mar	3	2	3	3	3	3	3	2	2	2	3	3	2	3	3	3	3	3	2	2	2	2	2	2	3
7-Mar	2	2	2	2	2	2	1	1	1	1	1	2	3	3	3	3	2	2	2	2	2	2	2	2	3
8-Mar	2	1	1	1	1	2	2	2	2	2	2	2	3	2	1	1	2	2	1	1	1	1	1	1	3
9-Mar	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	2	1	2	2	3	2	3
10-Mar	2	2	1	2	2	2	2	2	2	2	3	3	3	4	4	4	4	3	3	2	2	2	1	2	4
11-Mar	2	1	1	2	2	3	2	2	2	2	2	3	2	3	2	2	3	3	2	1	1	1	1	1	3
12-Mar	2	1	1	2	1	2	1	1	2	2	2	3	4	4	4	4	4	3	2	2	3	3	2	2	4
13-Mar	2	2	1	1	1	1	1	1	2	3	2	3	3	2	2	3	3	2	2	2	2	2	2	2	3
14-Mar	2	1	1	1	4	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	4
15-Mar	1	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	2	2	2	2
16-Mar	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	4	3	2	1	2	3	2	2	3	4
17-Mar	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	1	2	1	AF	1	1	1	3
18-Mar	1	2	1	1	1	1	1	1	1	3	2	2	2	3	2	2	2	1	1	1	1	1	1	2	3
19-Mar	1	1	1	1	1	1	1	2	2	2	3	3	3	3	4	3	3	3	2	2	2	1	1	1	4
20-Mar	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	3	2	2	2	2	2	4
21-Mar	2	2	2	3	3	3	3	3	3	4	4	4	4	5	4	4	4	4	3	3	3	2	3	3	5
22-Mar	3	3	2	2	2	1	1	2	2	2	3	3	3	3	3	2	2	3	2	1	1	1	2	1	3
23-Mar	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	2	1	2	1	1	3
24-Mar	1	1	1	1	1	1	1	1	2	3	3	3	3	4	3	3	2	3	2	1	1	1	1	AF	4
25-Mar	1	1	1	1	1	1	1	1	2	2	2	3	3	3	2	2	2	1	2	2	1	1	1	1	3
26-Mar	1	1	AF	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2
27-Mar	1	1	1	1	1	1	2	2	2	2	2	3	4	4	4	4	4	3	2	1	2	2	2	2	4
28-Mar	1	2	2	1	2	2	2	3	3	3	3	4	4	5	6	4	4	4	3	2	1	1	1	1	6
29-Mar	1	1	1	1	1	2	2	2	2	3	3	4	4	4	4	4	3	4	1	1	1	1	1	1	4
30-Mar	1	1	1	1	1	1	2	2	2	3	3	4	6	4	5	4	5	5	5	4	3	1	2	3	6
31-Mar	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2
	3	3	3	3	4	3	3	3	3	4	4	4	6	5	6	4	5	5	5	5	4	4	3	3	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Brion MacKay River - March 2016

Direction of Maximum Speed: 333 deg on Mar 30 13:00
Direction of Maximum Daily Speed Average: 334.8 deg on Mar 30

Direction of Minimum Speed: 312 deg on Mar 8 20:00

Direction of Minimum Daily Speed Average: 1.0 deg on Mar 1

Monthly Average Direction: 302.6 deg

Hours in Service:	744
Hours of Data:	741
Hours of Missing Data:	3
Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	180	187	188	196	178	158	147	164	158	132	1	160	13	3	358	30	33	48	86	90	48	79	49	73	113.8
2-Mar	33	47	30	34	23	358	45	353	4	68	247	320	344	346	334	349	47	52	40	44	35	34	34	34	22.3
3-Mar	33	21	39	38	40	42	49	57	15	4	12	4	8	16	12	14	19	18	24	39	28	39	32	22	24.3
4-Mar	83	201	140	145	113	114	150	124	139	140	139	142	154	154	160	133	131	125	116	117	131	134	140	138	137.3
5-Mar	133	150	141	167	179	188	194	162	258	266	310	332	332	40	39	40	45	41	39	33	32	33	33	28	34.9
6-Mar	28	20	27	24	40	45	42	33	32	36	47	49	53	57	42	41	40	46	49	42	44	52	50	44	40.7
7-Mar	49	33	20	30	25	29	32	22	13	323	304	282	279	282	281	284	258	248	250	274	283	294	301	304	317.4
8-Mar	302	329	46	107	113	134	135	124	115	115	116	124	146	324	351	348	10	3	29	312	285	159	192	186	102.6
9-Mar	19	11	9	22	21	37	30	80	122	62	49	114	158	184	177	165	173	145	126	123	141	178	191	181	135.0
10-Mar	172	168	154	150	147	145	161	153	125	127	130	116	112	110	98	114	116	120	113	116	125	128	128	143	128.6
11-Mar	174	214	242	253	248	255	273	280	279	289	280	291	303	291	282	286	292	281	301	140	160	160	145	142	268.4
12-Mar	138	134	131	138	114	118	107	74	100	80	69	91	90	103	115	116	111	121	114	124	123	123	129	128	112.7
13-Mar	128	134	29	53	345	338	341	350	327	1	355	345	344	339	320	332	329	327	320	328	325	321	323	320	337.4
14-Mar	322	327	331	328	12	4	10	16	20	16	9	3	15	25	20	26	25	20	22	26	19	13	15	19	11.0
15-Mar	9	14	356	4	29	18	10	15	360	359	346	339	342	337	343	345	340	351	339	351	360	13	18	5	357.8
16-Mar	4	356	357	354	343	335	335	336	335	332	328	331	321	326	335	344	26	17	356	316	321	314	306	314	336.2
17-Mar	306	306	311	306	301	297	290	296	317	328	320	321	316	308	320	336	338	339	21	48	AF	200	215	179	314.0
18-Mar	194	197	215	175	199	179	196	218	243	304	284	205	232	249	271	248	221	203	187	181	171	160	177	186	212.3
19-Mar	75	139	62	51	37	40	44	50	38	58	106	113	91	87	94	77	66	48	49	47	42	35	33	56	68.0
20-Mar	84	75	80	84	91	85	93	94	86	91	67	85	68	61	52	40	33	38	32	40	40	34	36	34	59.6
21-Mar	30	26	28	34	38	42	41	38	49	67	58	56	63	64	79	84	82	97	90	91	97	104	112	112	66.1
22-Mar	108	115	107	104	104	106	105	119	114	149	143	138	130	135	118	104	120	118	114	116	125	135	139	152	121.6
23-Mar	158	183	213	218	315	315	320	324	330	352	359	23	29	20	28	32	43	48	43	45	39	39	36	52	18.5
24-Mar	39	20	33	27	46	32	44	22	26	44	28	27	8	11	8	346	336	3	40	34	89	139	124	AF	20.1
25-Mar	161	142	143	155	159	156	151	154	168	186	206	189	179	209	216	273	305	343	14	87	150	163	235	249	186.8
26-Mar	343	316	AF	231	264	177	210	301	346	359	352	7	35	5	2	67	86	143	133	139	143	142	144	150	101.7
27-Mar	156	160	154	151	145	146	148	151	144	138	143	140	150	159	160	162	172	163	149	130	134	143	150	171	151.9
28-Mar	161	172	173	172	183	188	192	186	197	217	234	262	278	292	292	291	295	298	302	287	255	257	246	216	241.6
29-Mar	233	233	222	240	248	249	240	249	254	266	270	276	303	304	306	312	291	283	235	223	251	256	253	251	269.8
30-Mar	260	282	275	290	287	301	302	319	325	315	328	320	333	331	325	340	344	347	7	34	26	3	12	357	334.8
31-Mar	2	17	22	30	16	7	24	21	357	337	357	331	313	244	245	263	235	184	200	187	137	193	218	222	333.7
	62.0	54.9	49.9	58.8	53.3	64.0	54.1	43.1	28.9	21.4	13.3	20.6	12.0	9.9	8.3	16.9	27.4	42.2	50.0	59.0	61.9	74.6	79.8	68.1	
	Diurnal Average																								

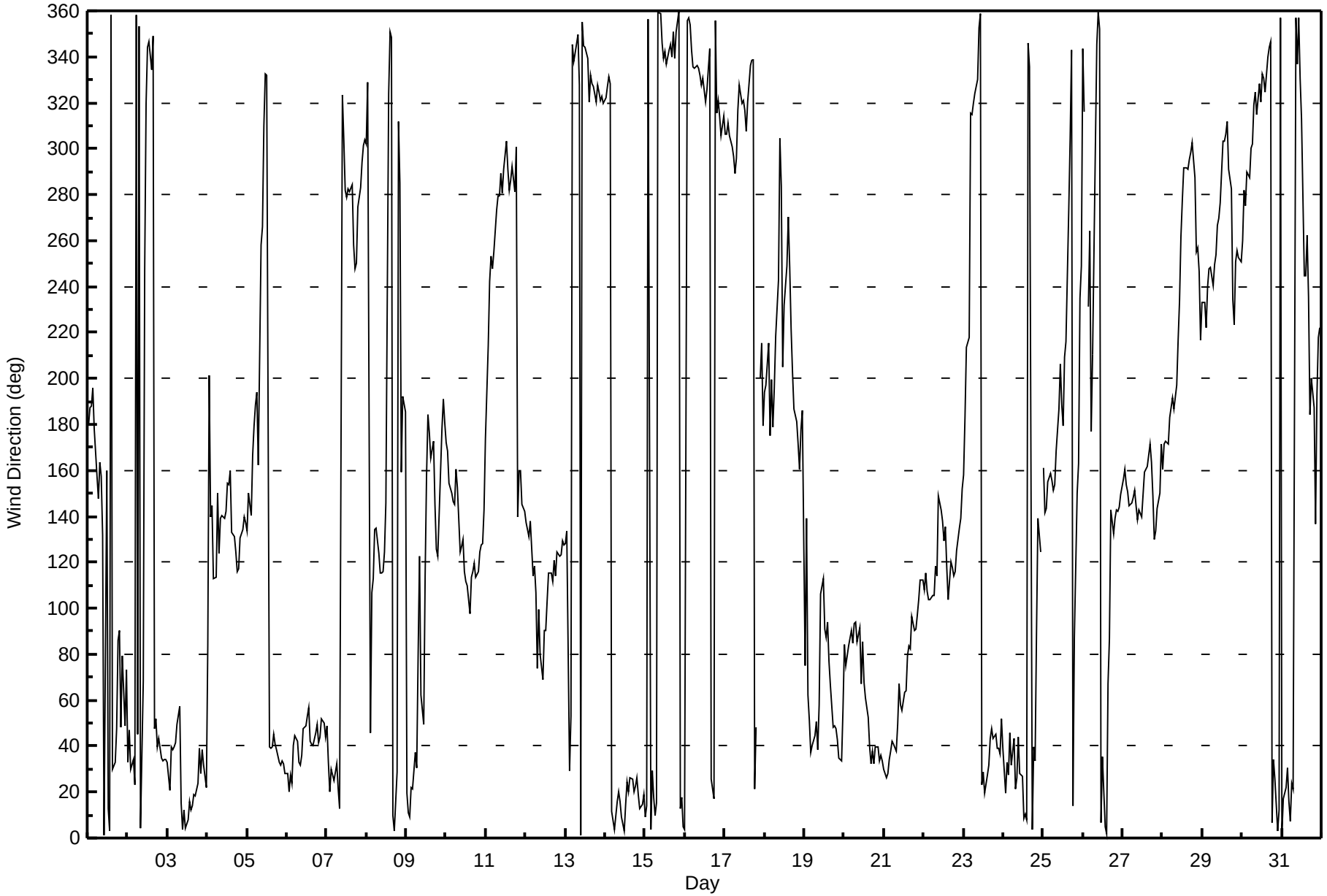
AF - Analyzer Failure
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Brion MacKay River - March 2016



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Brion MacKay River - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 106 deg on Mar 1 11:00

Minimum Value: 7 deg on Mar 11 21:00

Percentiles: P_1 = 12 P_{10} = 19 Q_1 = 22 Median = 25 Q_3 = 33 P_{90} = 46 P_{99} = 83

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	23	22	16	19	18	23	22	23	25	59	106	55	79	70	28	26	25	32	29	33	39	41	24	42	106
2-Mar	22	65	30	31	78	82	82	76	68	45	92	85	41	35	33	32	28	23	22	31	22	22	20	21	92
3-Mar	23	24	29	31	23	20	23	28	24	24	23	25	24	23	26	23	24	24	25	25	24	30	40	26	40
4-Mar	56	91	27	70	61	35	30	25	22	24	24	26	29	30	30	28	25	22	18	18	20	19	24	21	91
5-Mar	22	20	20	21	21	25	28	71	55	61	40	26	28	29	25	26	25	26	25	25	24	25	26	23	71
6-Mar	23	25	23	23	26	28	24	22	23	25	27	26	28	30	25	26	27	26	26	26	24	23	24	23	30
7-Mar	23	21	22	20	20	21	23	24	32	25	31	40	41	39	38	35	44	44	44	40	37	26	24	22	44
8-Mar	30	23	49	39	32	18	22	25	28	24	23	21	33	69	30	28	22	29	50	81	59	67	36	24	81
9-Mar	46	29	25	30	25	30	22	47	30	31	25	42	28	32	33	39	24	24	15	25	19	25	22	21	47
10-Mar	22	24	23	20	21	22	27	25	26	26	25	27	26	29	34	26	25	24	23	21	21	21	25	21	34
11-Mar	33	28	38	40	38	41	38	38	39	34	39	36	29	36	37	38	29	40	31	77	7	10	21	18	77
12-Mar	15	15	15	18	20	29	28	38	30	33	30	32	33	36	28	23	26	21	22	19	20	20	18	20	38
13-Mar	20	28	38	39	38	30	38	30	19	27	26	23	21	22	20	21	19	21	22	19	20	19	20	19	39
14-Mar	18	18	20	20	25	24	24	24	25	24	26	24	24	27	26	26	24	24	22	26	23	24	21	23	27
15-Mar	23	21	17	19	23	21	24	22	24	27	27	28	28	31	26	25	22	22	18	21	20	22	24	23	31
16-Mar	24	24	21	22	20	20	20	20	21	20	19	21	20	22	21	23	26	25	31	22	21	22	22	20	31
17-Mar	21	20	18	19	23	22	24	22	22	27	24	20	24	25	23	23	23	23	24	52	AF	60	32	45	60
18-Mar	38	55	23	54	21	20	25	34	43	53	50	67	59	57	70	63	41	28	11	12	14	12	13	74	74
19-Mar	55	48	49	62	46	22	20	38	24	29	35	30	33	34	33	34	36	23	25	30	24	20	17	16	62
20-Mar	30	29	31	31	32	35	30	32	32	34	33	41	35	38	30	28	26	22	23	23	21	20	20	24	41
21-Mar	22	21	22	25	24	22	23	24	26	29	30	24	31	31	35	33	35	31	32	33	32	27	24	24	35
22-Mar	27	24	26	29	26	26	21	23	24	30	35	35	43	36	45	41	29	24	23	21	21	23	19	24	45
23-Mar	21	30	21	27	30	18	17	18	22	28	30	24	28	30	28	28	29	27	24	21	19	19	19	28	30
24-Mar	37	14	19	23	27	14	18	18	23	32	31	56	72	56	32	26	23	29	21	18	38	17	13	AF	72
25-Mar	46	21	13	11	11	13	18	17	21	33	46	40	31	37	38	44	39	24	67	70	11	78	66	19	78
26-Mar	34	35	AF	65	75	51	52	31	58	74	76	93	53	61	51	67	58	33	17	18	17	19	19	22	93
27-Mar	24	22	19	20	18	20	22	24	23	24	23	26	24	27	28	29	27	25	20	10	14	19	24	24	29
28-Mar	23	24	22	19	19	20	23	22	27	32	49	47	41	34	33	38	35	34	20	21	16	20	19	24	49
29-Mar	20	22	22	27	30	36	43	39	44	43	47	47	39	36	36	26	31	32	34	20	30	25	38	32	47
30-Mar	27	30	19	19	21	24	20	20	22	22	25	24	23	24	24	23	26	27	31	24	23	31	36	24	36
31-Mar	25	25	26	24	23	22	18	26	36	51	39	69	89	87	74	50	45	26	27	21	44	21	20	27	89
	56	91	49	70	78	82	82	76	68	74	106	93	89	87	74	67	58	44	67	81	59	78	66	74	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	March 4, 2016	Last Calibration	February 2, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	11:14	End Time (MST)	15:30
Gas Cert Reference	EY0000372	Station temp.	22 Deg C
Cal Gas Concentration	50.7 ppm	Cal Gas Exp Date	10-Jun-16
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	-633	-633
Analyzer IP address	192.168.1.43		Lamp voltage	833	835
Calculated slope	0.998752	1.001837	Chamber temp	45	45.1
Calculated intercept	1.492947	0.381851	Pressure	667.9	666.5
Analyzer Background	12.6	12.6	Flow	0.485	0.484
Analyzer Coefficient	0.997	0.998	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	0.0	----
as found span	5000	79.8	809.2	807.0	1.003
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	79.8	809.2	807.0	1.003
second point	5000	40.0	405.6	405.9	0.999
third point	5000	20.1	203.8	201.6	1.011
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	79.8	809.2	815.1	0.993
				Average Correction Factor	1.004

Corrected As found	807.0	Previous response	808.7	% change	0.2%

Notes:

Sample inlet filter replaced after as founds. No adjustments. As left zero began at 14:47 MST.

Calibration Performed By: Asad Hidayat

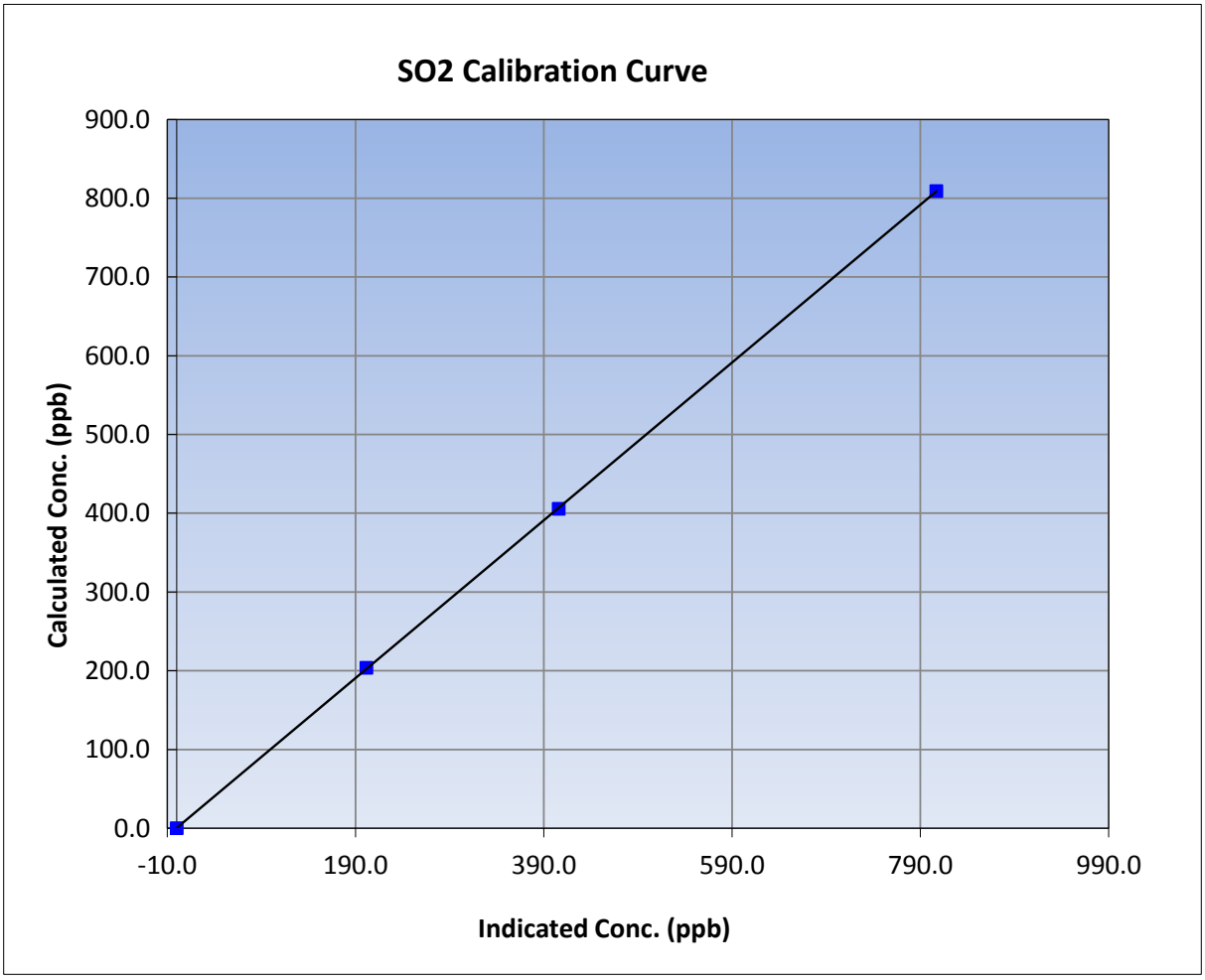
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

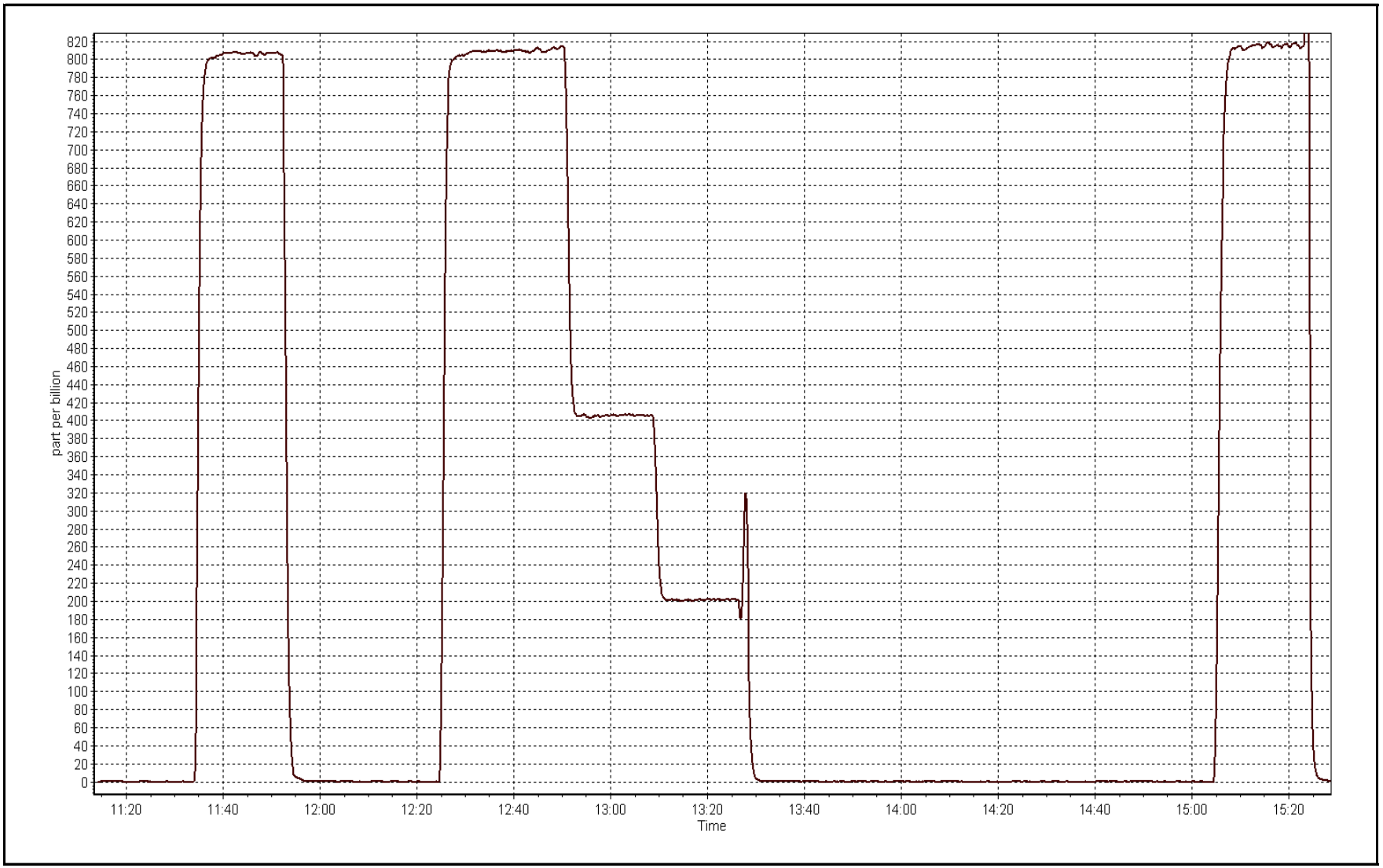
Calibration Date	March 4, 2016	Previous Calibration	February 2, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	11:14	End Time (MST)	15:30
Analyzer make	Thermo 43i	Analyzer serial #	1501301450

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999988
809.2	807.0	1.0027		
405.6	405.9	0.9994	Slope	1.001837
203.8	201.6	1.0110		
			Intercept	0.381851



SO2 Calibration Plot Date: March 4, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	March 3, 2016	Last Calibration	February 1, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	12:04	End Time (MST)	14:53
Gas Cert Reference	LL119508	Station temp.	22 Deg C
Cal Gas Concentration	5.35 ppm	Cal Gas Exp Date	13/02/2018
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	50.7 ppm	SO2 gas cert/exp	EY0000372 10-Jun-16

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	504	504
Analyzer IP address	192.168.1.75		Lamp voltage	3438	3292
Calculated slope	1.012157	1.012361	Chamber temp	50	50
Calculated intercept	0.046100	0.013656	Pressure	23.3	23.1
Analyzer Background	25.2	25.2	Flow	0.618	0.612
Analyzer Coefficient	1.039	1.039	Intensity	85	81
			Converter temp.	315	317

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	80.9	1.000
SO2 scrubber check	5000	19.8	200.8	3.6	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	75.6	80.9	79.9	1.013
second point	5000	37.9	40.6	40.1	1.012
third point	5000	19.0	20.3	20.0	1.018
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	75.6	80.9	79.5	1.018
				Average Correction Factor	1.014

Corrected As found	80.8	Previous response	79.9	% change	-1.2%

Notes:

Inlet filter replaced and scrubber check done after as founds. No adjustments.

Calibration Performed By: Asad Hidayat

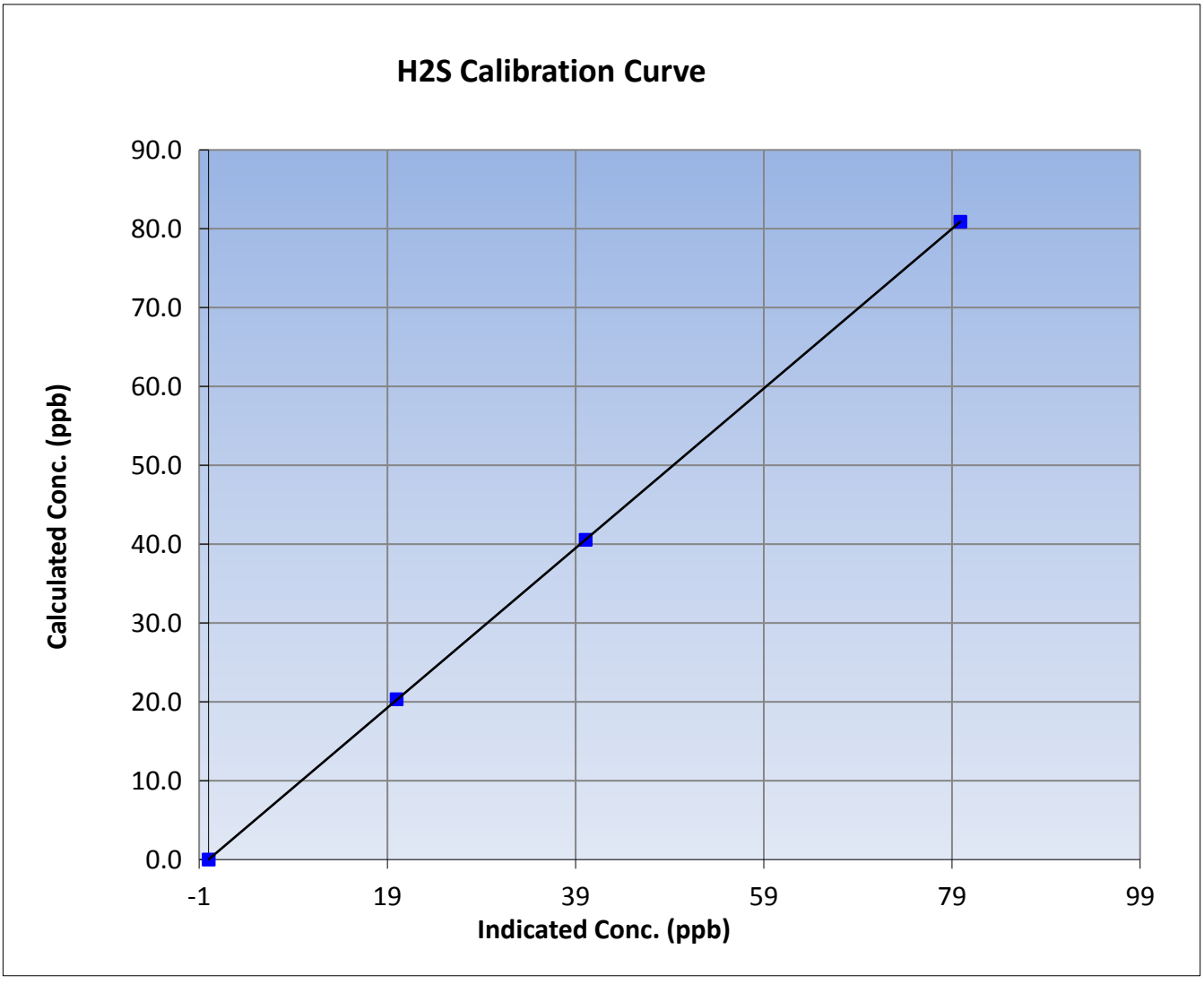
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

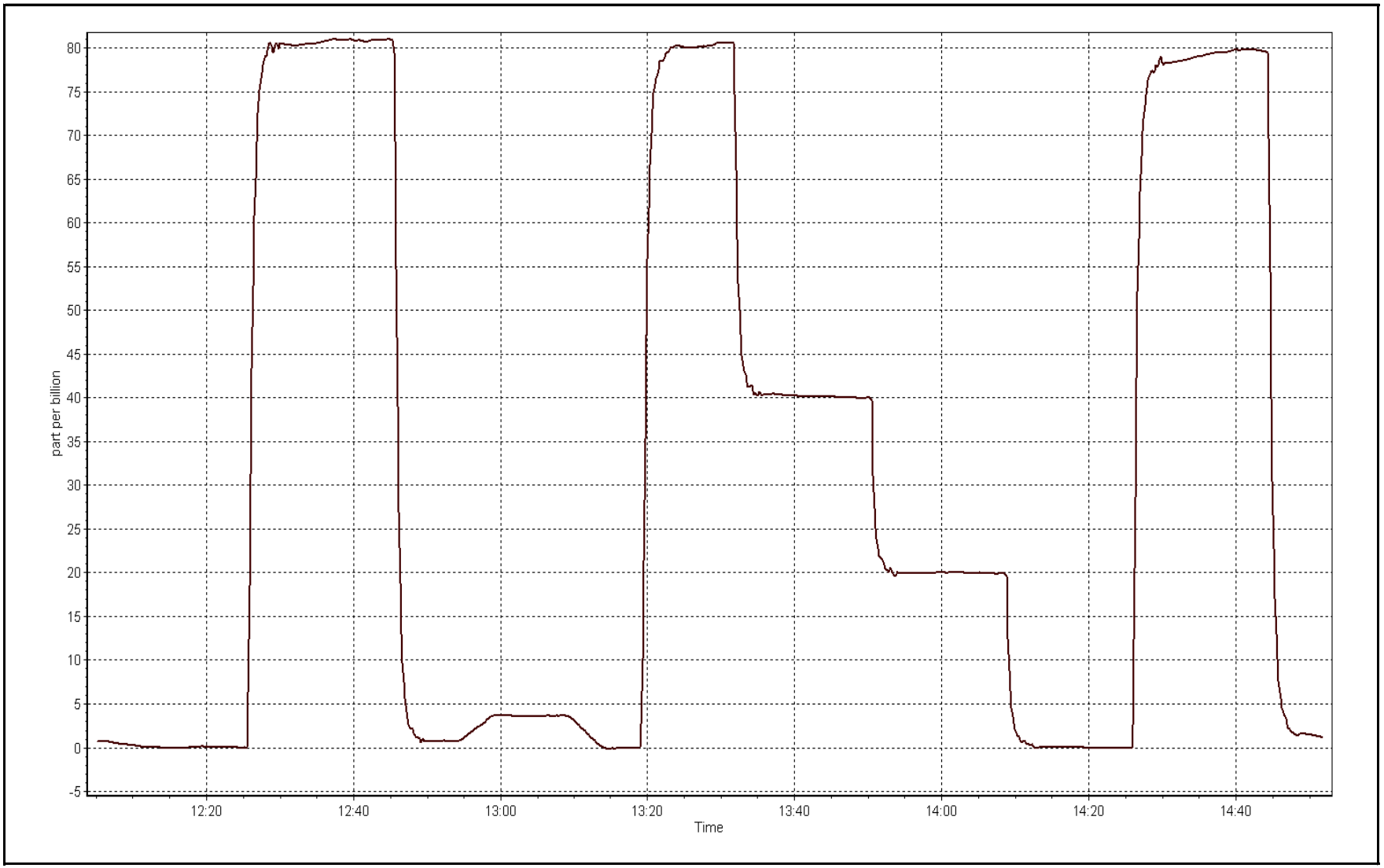
Calibration Date	March 3, 2016	Previous Calibration	February 1, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	12:04	End Time (MST)	14:53
Analyzer make	API T101	Analyzer serial #	196

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999997
80.9	79.9	1.0125		
40.6	40.1	1.0115	Slope	1.012361
20.3	20.0	1.0175		
			Intercept	0.013656



H2S Calibration Plot Date: March 3, 2016



Wood Buffalo Environmental Association
THC Calibration Report

W B E A

Station Information

Calibration Date	March-04-16	Last Calibration	February-02-16
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	11:14	End Time (MST)	15:31
Gas Cert Reference	EY0000372	Cal Gas Expiry Date	10/06/2016
CH4 Cal Gas Conc.	517 ppm	CH4 Equiv Conc.	1072.5 ppm
C3H8 Cal Gas Conc.	202 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	1.003054	1.002874	Fuel Pressure	23.9	23.9
Calculated intercept	0.009320	0.023202	Analyzer Coeff	4.4	4.3
			Analyzer BKG	2.000	1.800

Analyzer make	51i-LT	Analyzer serial #	1501663727

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	-0.14	----
as found span	5000	79.8	17.12	17.20	0.995
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	79.8	17.12	17.06	1.003
second point	5000	40.0	8.58	8.51	1.008
third point	5000	20.1	4.31	4.26	1.012
as left zero	5000	0.0	0.00	-0.02	----
as left span	5000	79.9	17.14	17.06	1.005
				Average Correction Factor	1.008

Corrected As found	17.34	Previous response	17.06	% change	-1.6%

Notes:

Sample inlet filter replaced after as founds. Adjusted both zero and span. H2 cylinder was swapped out during as left span point due to not realizing that existing H2 bottle is running pretty low during as founds.

Calibration Performed By: Asad Hidayat

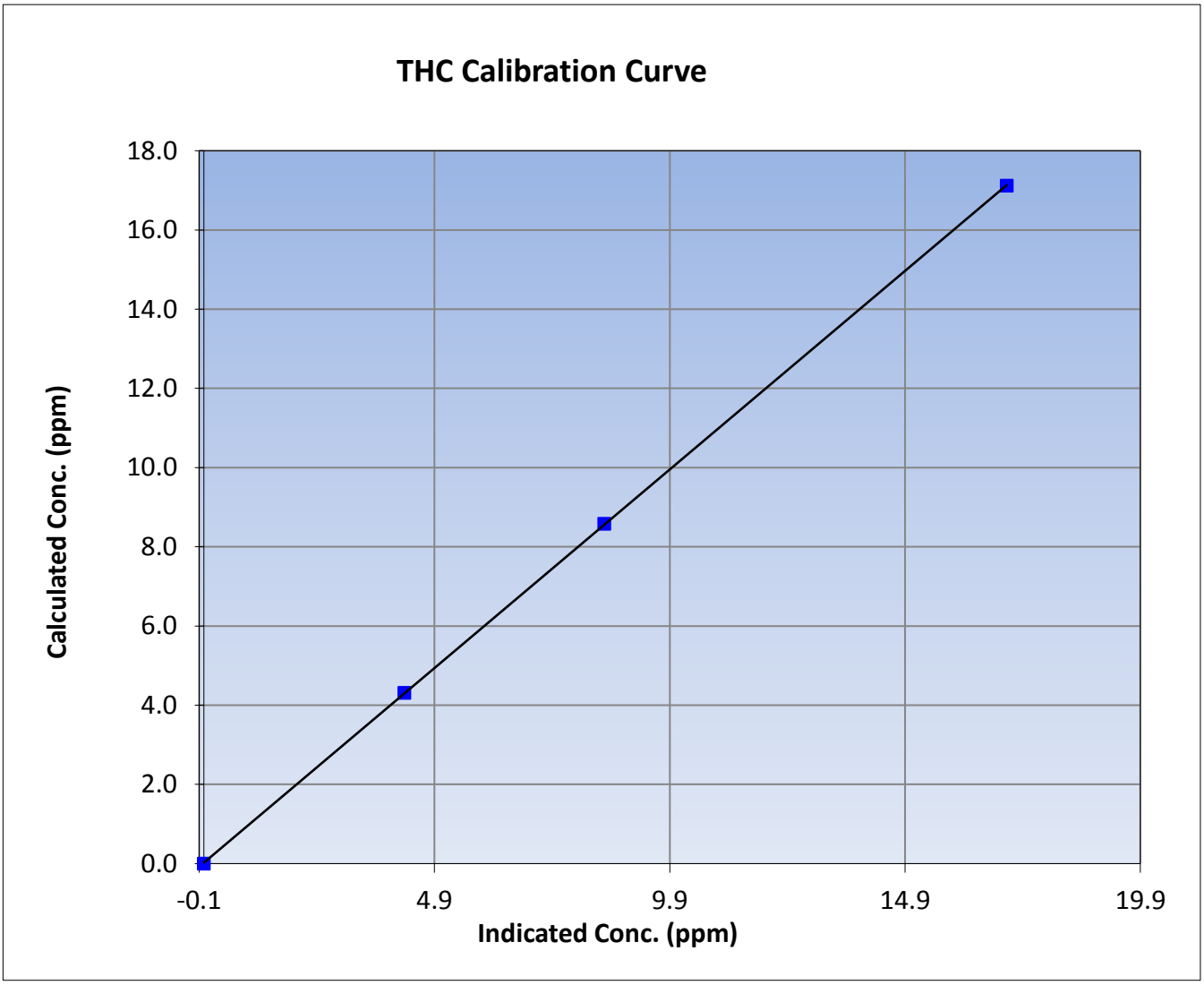
Wood Buffalo Environmental Association
THC Calibration Report

Station Information

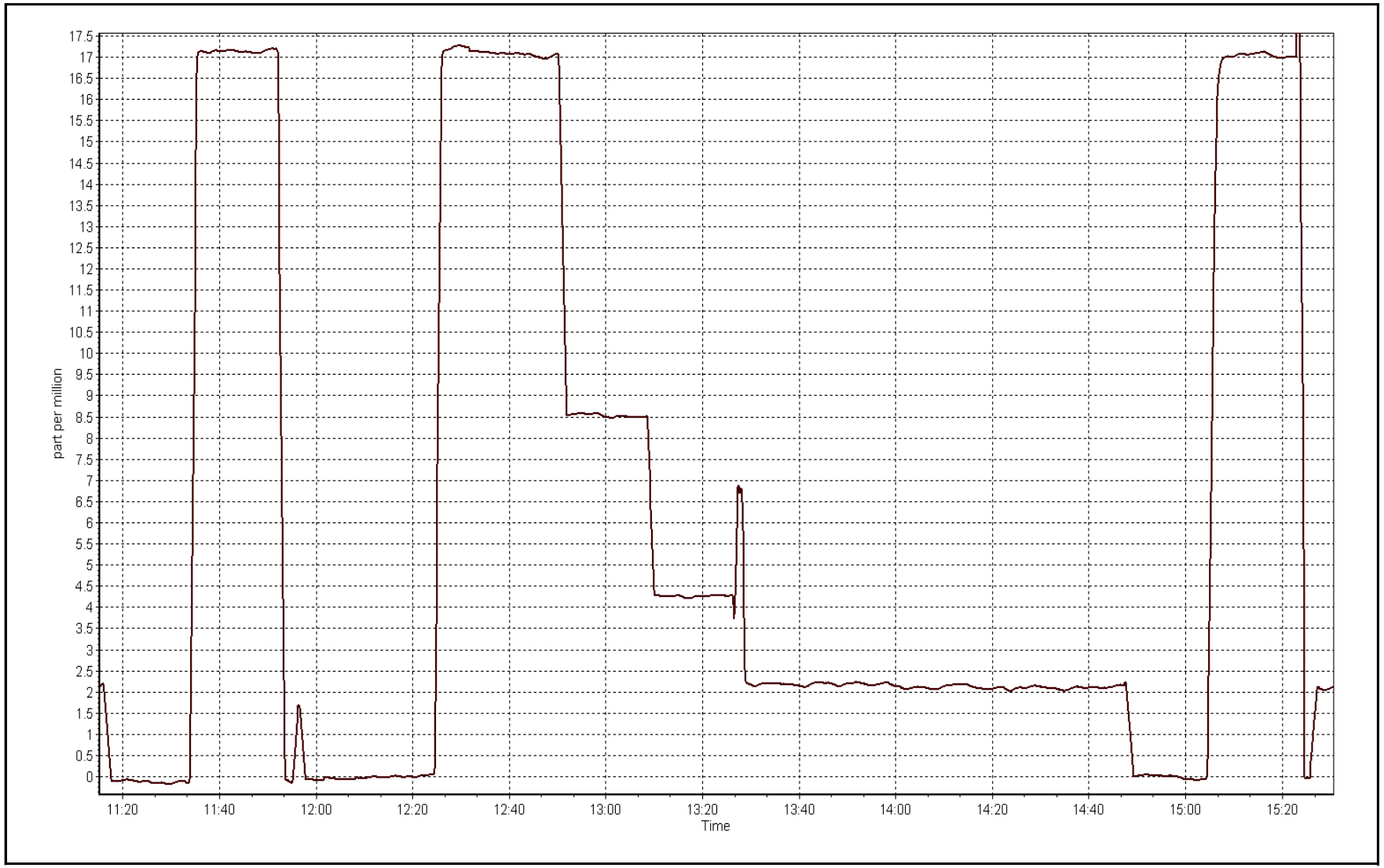
Calibration Date	March 4, 2016	Previous Calibration	February 2, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	11:14	End Time (MST)	15:31
Analyzer make	51i-LT	Analyzer serial #	1501663727

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999990
17.12	17.06	1.0033		
8.58	8.51	1.0082	Slope	1.002874
4.31	4.26	1.0121		
			Intercept	0.023202



THC Calibration Plot Date: March 4, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 4, 2016	Previous Calibration	February 2, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	11:14	End Time (MST)	15:30
NO Cal Gas Conc	50.1 ppm	Gas Cert Reference	EY0000372
NOx Cal Gas Conc	50.4 ppm	Cal Gas Expiry Date	June 10, 2016
Calibrator	Sabio 4010	Serial Number	1220
Zero air Generator	Teledyne API T701	Serial Number	4766

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9627

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.001929	1.001122	0.970000
	Data Offset	0.938524	0.977850	-3.382551
Current Calibration	Data Slope	1.001929	1.001122	0.970000
	Data Offset	0.938524	0.977850	-3.382551

Analyzer Information

Analyzer make/model	Thermo 42 i	Analyzer serial #	1505164379

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.085		1.107	
NOX coefficient	1.003		1.003	
NO2 coefficient	0.995		0.995	
NO bkgrnd	3.3		3.4	
NOX bkgrnd	3.5		3.6	
Chamber Temp	50.3	Deg C	50.5	Deg C
Moly Temp	322.9	Deg C	326	Deg C
PMT voltage	-767.4	V	-767	V
PMT Temp	-2.7	Deg C	-2.6	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	171.1	mmHg	171.1	mmHg
R Cell Press Nox	171.4	mmHg	171.1	mmHg
NO sample flow	0.809	lpm	0.81	lpm
Nox sample Flow	0.808	lpm	0.812	lpm

Notes:

Sample inlet filter replaced after as founds. Adjusted span. Used 2nd GPT point to determine converter efficiency test.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 4, 2016 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	-0.3	-0.2	-0.1	----	----
as found span	5000	79.8	804.4	799.6	4.8	787.0	782.8	4.2	1.0220	1.0215
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
high point	5000	79.8	804.4	799.6	4.8	807.8	803.3	4.5	0.9958	0.9954
second point	5000	40.0	403.2	400.8	2.4	406.8	404.6	2.2	0.9912	0.9906
third point	5000	20.1	202.6	201.4	1.2	202.9	201.3	1.6	0.9985	1.0003
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	----	----
as left span	5000	79.9	805.4	445.6	359.8	831.7	452.7	378.9	0.9684	0.9842
								Average Correction Factor	0.9952	0.9954

Corrcted As found NO_X= 787.3 NO= 783.0 Percent Change NO_X= 1.8% NO= 1.9%

Previous Response NO_X= 801.9 NO= 797.7

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 79.80 ccm NOX ref calc conc = 804.4 ppb NO ref calc conc = 799.6 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		4.8	827.0	821.2	-0.1	0.9726	0.9737	----	----
1st NO2 (300)	445.6	380.4	823.9	445.6	378.3	0.9763	----	1.0055	99.4%
2nd NO2 (200)	567.8	258.2	827.4	567.8	259.6	0.9722	----	0.9945	100.6%
3rd NO2 (100)	692.3	133.7	827.8	692.3	135.4	0.9717	----	0.9868	101.3%
2nd NO ref point		4.8	827.0	821.2	5.8	0.9726	0.9737	----	----
				Average Correction Factor		0.9732		0.9956	100.4%

Calibration Performed By: Asad Hidayat

Wood Buffalo Environmental Association

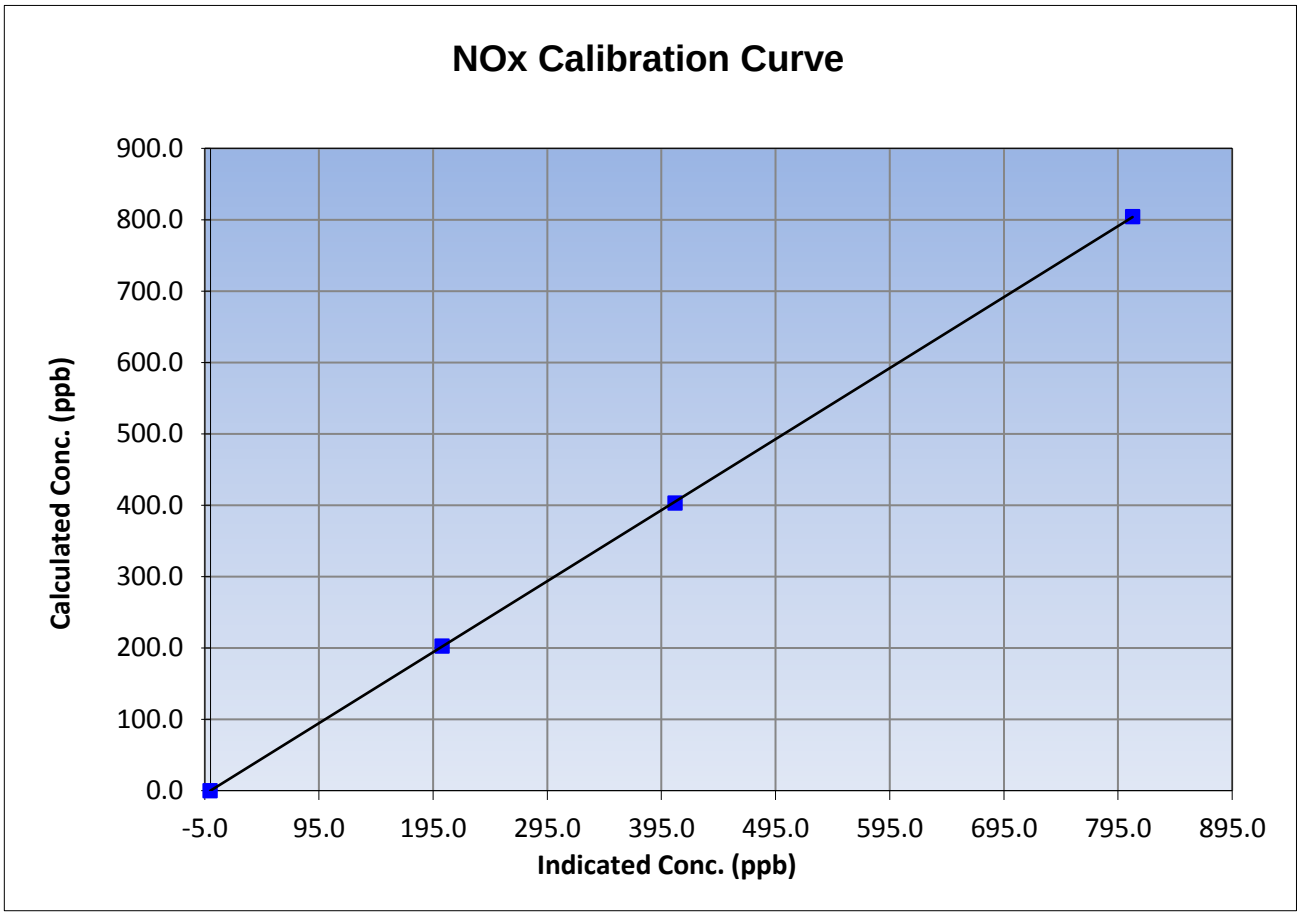
NO_X Calibration Summary

Station Information

Calibration Date	March 4, 2016	Previous Calibration	February 2, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	11:14	End Time (MST)	15:30
Analyzer make	Thermo 42 i	Analyzer serial #	1505164379

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999990
804.4	807.8	0.9958		
403.2	406.8	0.9912	Slope	0.995013
202.6	202.9	0.9985		
			Intercept	0.022380



Wood Buffalo Environmental Association

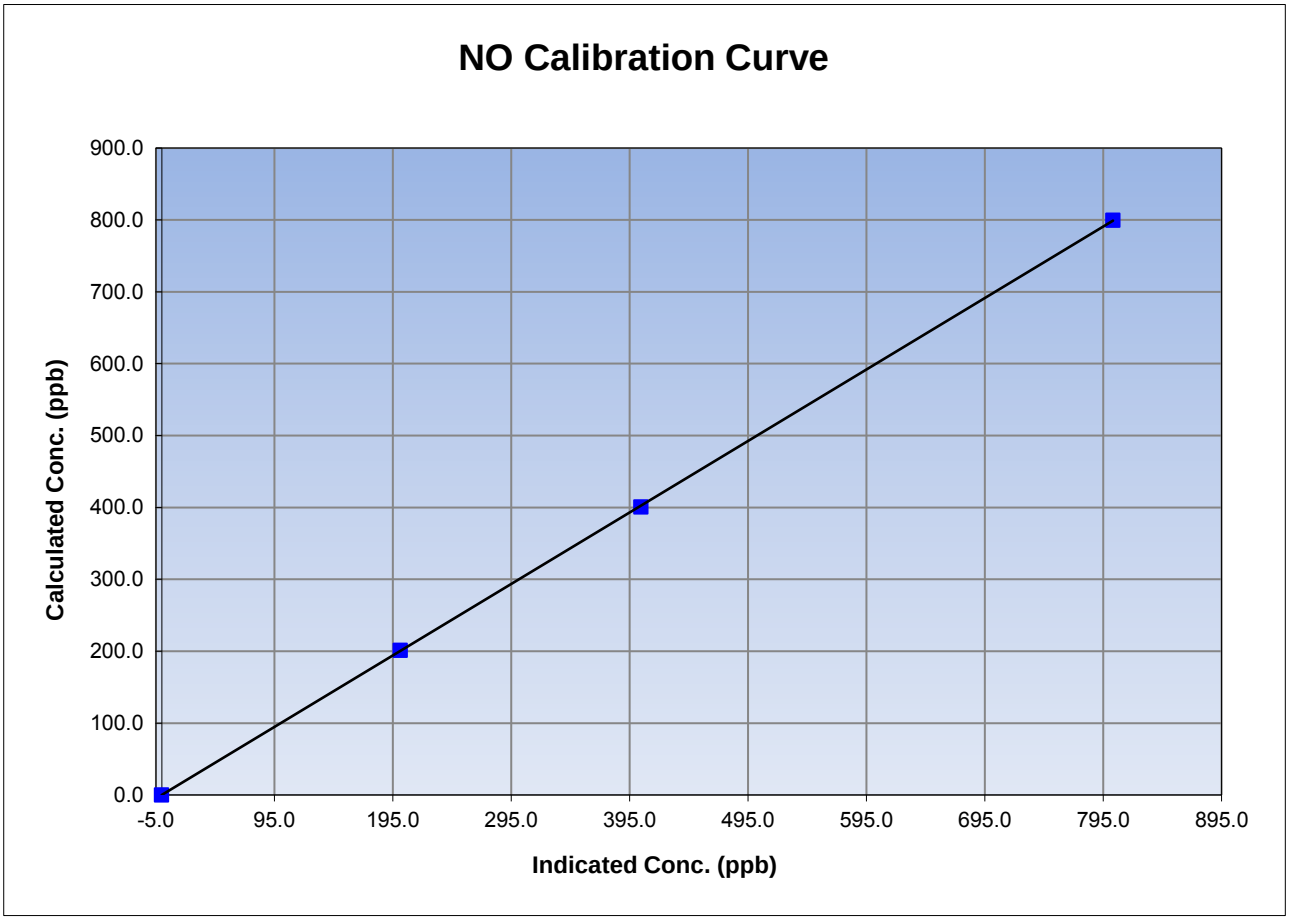
NO Calibration Summary

Station Information

Calibration Date	March 4, 2016	Previous Calibration	February 2, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	11:14	End Time (MST)	15:30
Analyzer make	Thermo 42 i	Analyzer serial #	1505164379

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999987
799.6	803.3	0.9954		
400.8	404.6	0.9906	Slope	0.994452
201.4	201.3	1.0003		
			Intercept	0.133870



Wood Buffalo Environmental Association

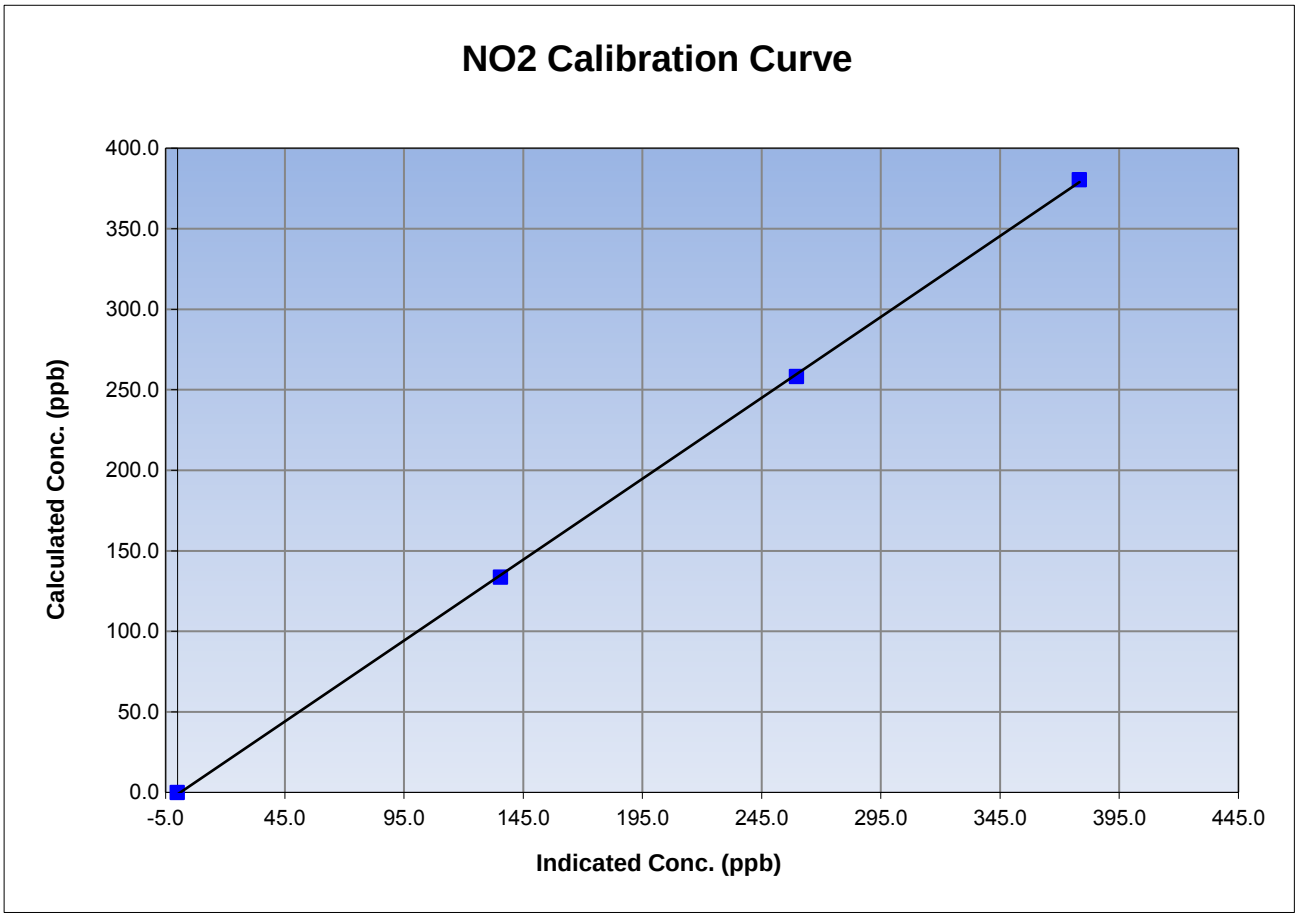
NO_2 Calibration Summary

Station Information

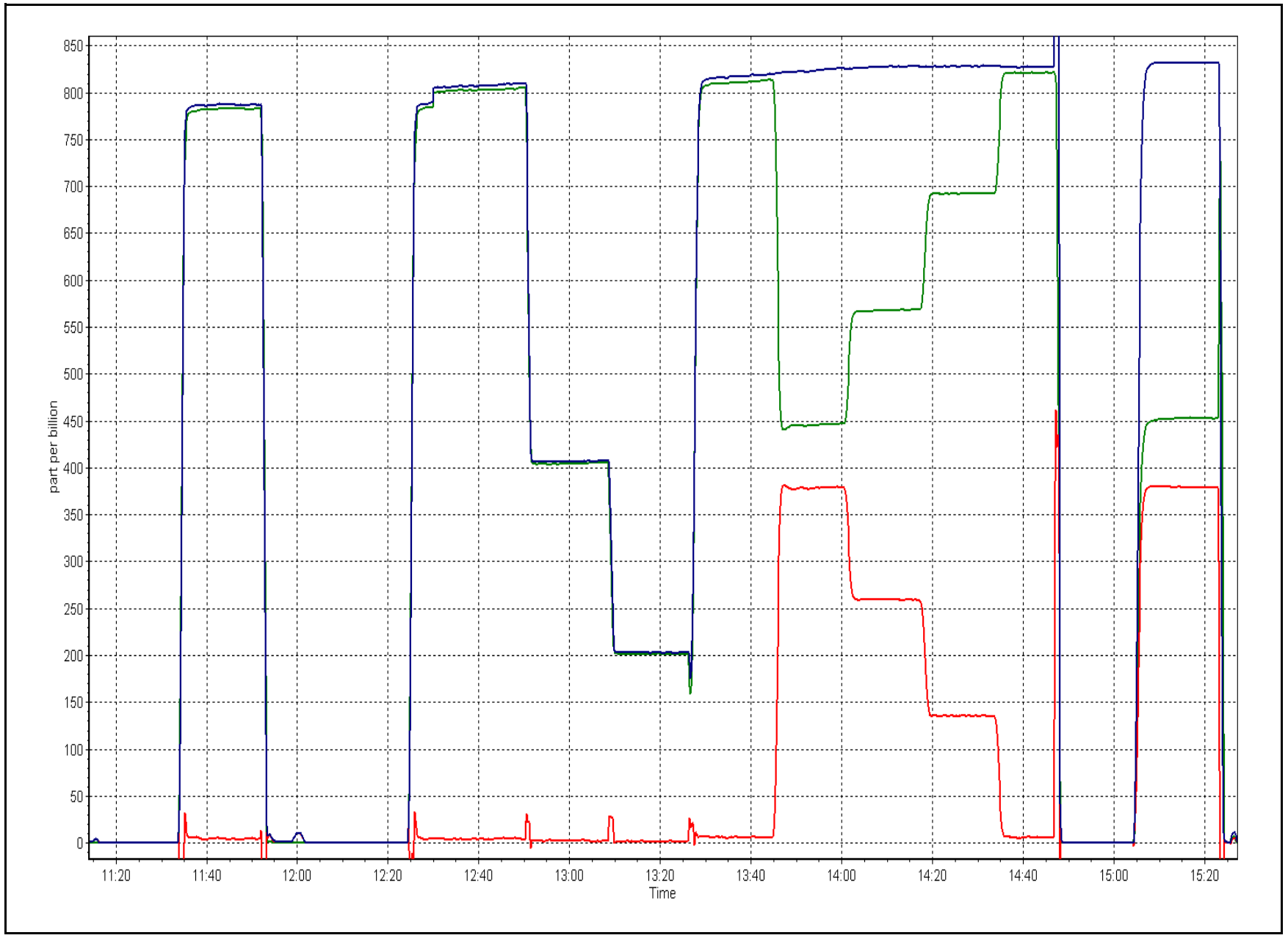
Calibration Date	March 4, 2016	Previous Calibration	February 2, 2016
Station Number	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	11:14	End Time (MST)	15:30
Analyzer make	Thermo 42 i	Analyzer serial #	1505164379

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999906
380.4	378.3	1.0055		
258.2	259.6	0.9945	Slope	1.004774
133.7	135.4	0.9868		
			Intercept	-1.179450



NOX Calibration Plot Date: March 4, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 500
CENOVUS
CHRISTINA LAKE
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
MARCH 2016

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	18	0	3	0
H2S (ppb) Average	710	34	34	100	1	0	0	0
NO2 (ppb) Average	707	36	37	99.87	15	0	7	-
NO (ppb) Average	707	36	37	99.87	23	-	5	-
NOX (ppb) Average	707	36	37	99.87	38	-	12	-
Temperature 2 m (C) Average	744	0	0	100	11.3	-	6.1	-
Relative Humidity (%) Average	744	0	0	100	98	-	91	-
Wind Speed 10 m (km/h) Average	733	0	11	98.52	25	-	16	-
Wind Direction 10 m (deg) Average	733	0	11	98.52	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	0.7	1	-	0	0	0	0	1	2	18
H2S (ppb) Average	710	0.1	0	-	0	0	0	0	0	0	1
NO2 (ppb) Average	707	2.5	3	-	0	0	1	2	3	6	15
NO (ppb) Average	707	1.1	2	-	0	0	0	1	1	2	23
NOX (ppb) Average	707	3.6	4	-	0	1	1	3	4	7	38
Temperature 2 m (C) Average	744	-2.04	5.1	-	-17.8	-8	-5.2	-2.3	0.6	5.2	11.3
Relative Humidity (%) Average	744	73	17	-	31	48	60	77	87	92	98
Wind Speed 10 m (km/h) Average	733	9.6	5	-	0	4	6	9	13	16	25
Wind Direction 10 m (deg) Average	733	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, NO2	24 Mar 2016 09:00	24 Mar 2016 09:00	1	Maintenance - sample manifold cleaned
Wind Speed, Wind Direction	25 Mar 2016 21:00	25 Mar 2016 21:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	26 Mar 2016 02:00	26 Mar 2016 11:00	10	Flat line in sensor output signal - Sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Cenovus - Christina Lake - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 18 ppb on Mar 17 02:00 Maximum Daily Average: 3.0 ppb on Mar 17

Minimum Value: 0 ppb on Mar 2 05:00
Maximum Diurnal Average: 1.1 ppb at hour 13
Monthly Average: 0.7 ppb

Minimum Daily Average: 0.1 ppb on Mar 20
Minimum Diurnal Average: 0.4 ppb at hour 1
Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 6$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	36
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	1	1	Z	1	1	1	1	0	1	1	2	1	2	2	0	0	0	0	0	0	0	0	0	0	0.6	2
2-Mar	0	0	0	Z	0	0	0	0	0	0	0	3	5	6	2	1	0	0	0	0	0	0	0	0	0.8	6
3-Mar	0	0	0	0	Z	0	1	0	0	0	1	0	0	1	1	1	0	0	0	1	3	5	3	2	0.9	5
4-Mar	1	1	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	1	1	0	0	0	1	2	1	0.6	2
5-Mar	Z	1	1	1	0	0	1	1	1	1	1	2	1	2	3	1	1	1	1	1	1	1	1	1	1.0	3
6-Mar	1	Z	1	1	1	0	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	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0.3	1
8-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0.3	1
9-Mar	0	0	0	0	Z	0	0	1	1	1	1	1	1	2	1	1	0	1	0	0	0	0	0	0	0.6	2
10-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
11-Mar	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	3	1	0	0	0	0	0	0	0.4	3
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	0.2	0
13-Mar	0	0	Z	0	0	0	0	0	0	0	1	0	2	1	2	2	3	1	0	0	0	0	1	0	0.6	3
14-Mar	2	1	1	Z	1	2	2	2	2	2	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0.9	2
15-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	6	5	3	0.9	6
16-Mar	1	0	0	0	0	Z	0	0	0	0	0	1	0	0	1	1	2	3	3	2	1	0	6	13	1.6	13
17-Mar	Z	18	16	13	6	4	4	1	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	3.0	18
18-Mar	0	Z	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
19-Mar	0	0	Z	1	0	0	1	4	2	1	1	4	3	1	1	1	1	1	1	0	0	0	0	0	1.0	4
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	0.2	0
22-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	3	3	1	0.6	3
23-Mar	Z	1	0	0	0	1	0	0	0	0	2	0	1	C	C	C	C	C	0	0	0	1	1	1	0.5	2
24-Mar	0	Z	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
25-Mar	0	0	Z	0	1	1	0	0	0	2	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0.5	2
26-Mar	0	0	0	Z	2	2	3	2	2	2	2	2	1	1	1	2	1	1	1	1	0	0	0	0	1.3	3
27-Mar	0	1	1	0	Z	0	0	1	1	3	2	1	0	1	1	0	0	0	0	0	0	0	0	0	0.7	3
28-Mar	0	0	1	2	1	Z	1	1	2	3	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0.8	3
29-Mar	Z	0	0	0	0	0	0	0	0	0	2	6	8	4	5	4	3	1	0	0	0	0	0	0	1.5	8
30-Mar	0	Z	0	0	1	11	5	1	0	0	1	1	1	1	0	0	0	1	0	1	1	0	0	0	1.2	11
31-Mar	0	0	Z	0	0	0	1	1	2	2	2	2	2	2	2	1	1	2	1	0	0	0	0	0	1.0	2
	0.4	1.0	1.0	0.8	0.7	1.0	0.7	0.6	0.6	0.8	0.9	1.1	1.1	1.0	0.9	0.6	0.7	0.6	0.4	0.4	0.5	0.7	0.8	0.9	Diurnal Average	
	2	18	16	13	6	11	5	4	2	3	2	6	8	6	5	4	3	3	3	2	3	6	6	13	Diurnal Maximum	

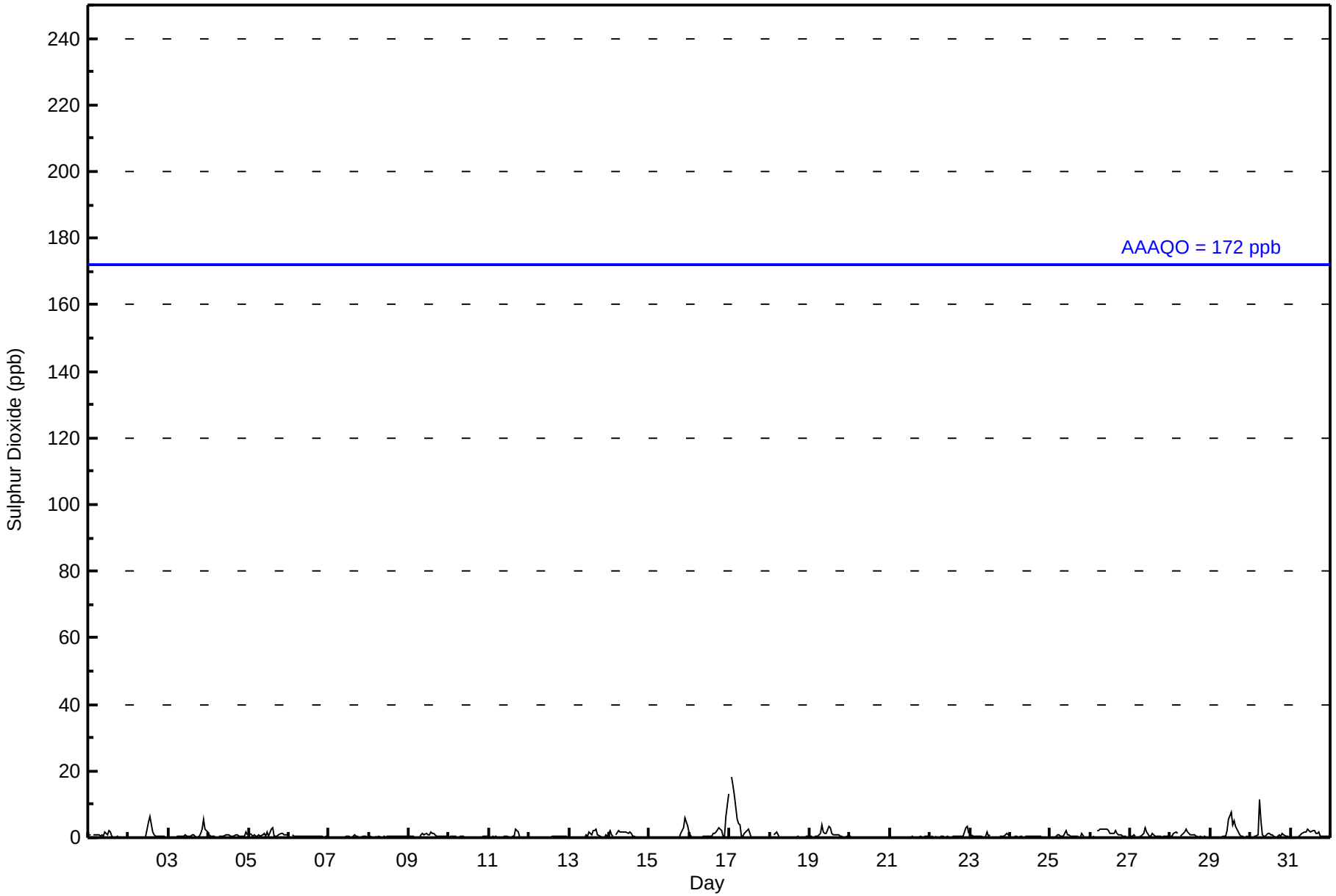
Z - zerospan C - Calibration M - Maintenance
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Cenovus - Christina Lake - March 2016



Sulphur Dioxide (SO_2) - ppb

Cenovus - Christina Lake - March 2016

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 (SO_2) - ppb

Cenovus - Christina Lake - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	29	33	29	53	37	51	69	50	58	32	47	42	22	17	67	56	692
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	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	33	29	53	37	51	69	50	58	32	47	42	22	17	72	56	697

Total Number of Valid Hours: 697

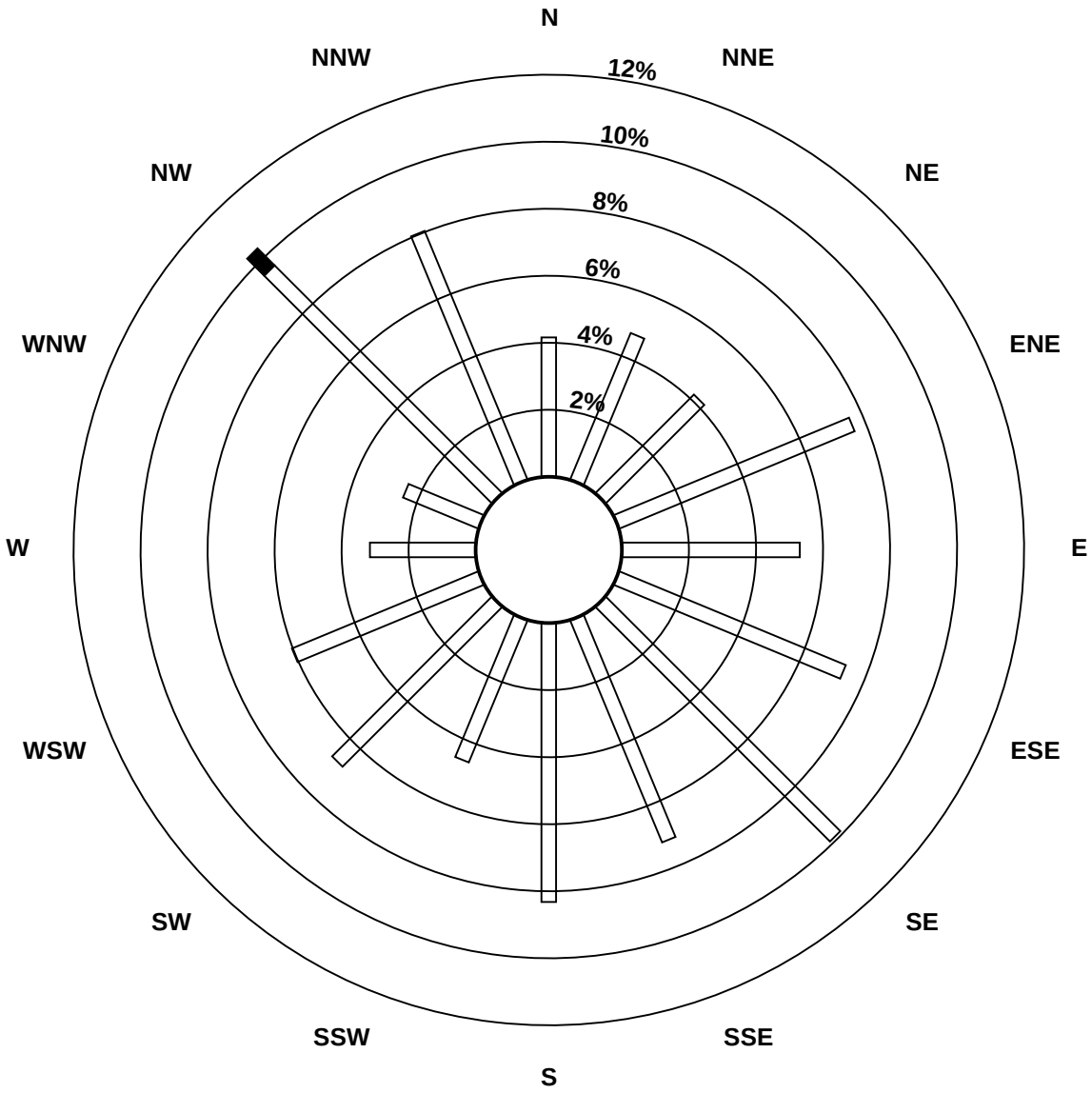
Total Number of Hours: 744

Wood Buffalo Environmental Association

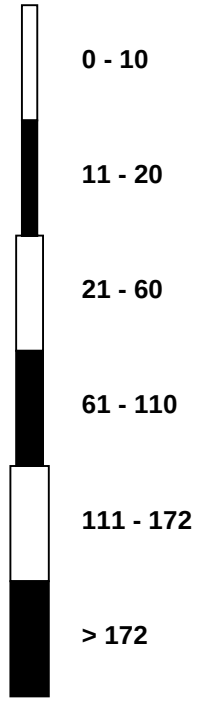
Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Cenovus - Christina Lake (AMS500)



Classes (ppb)



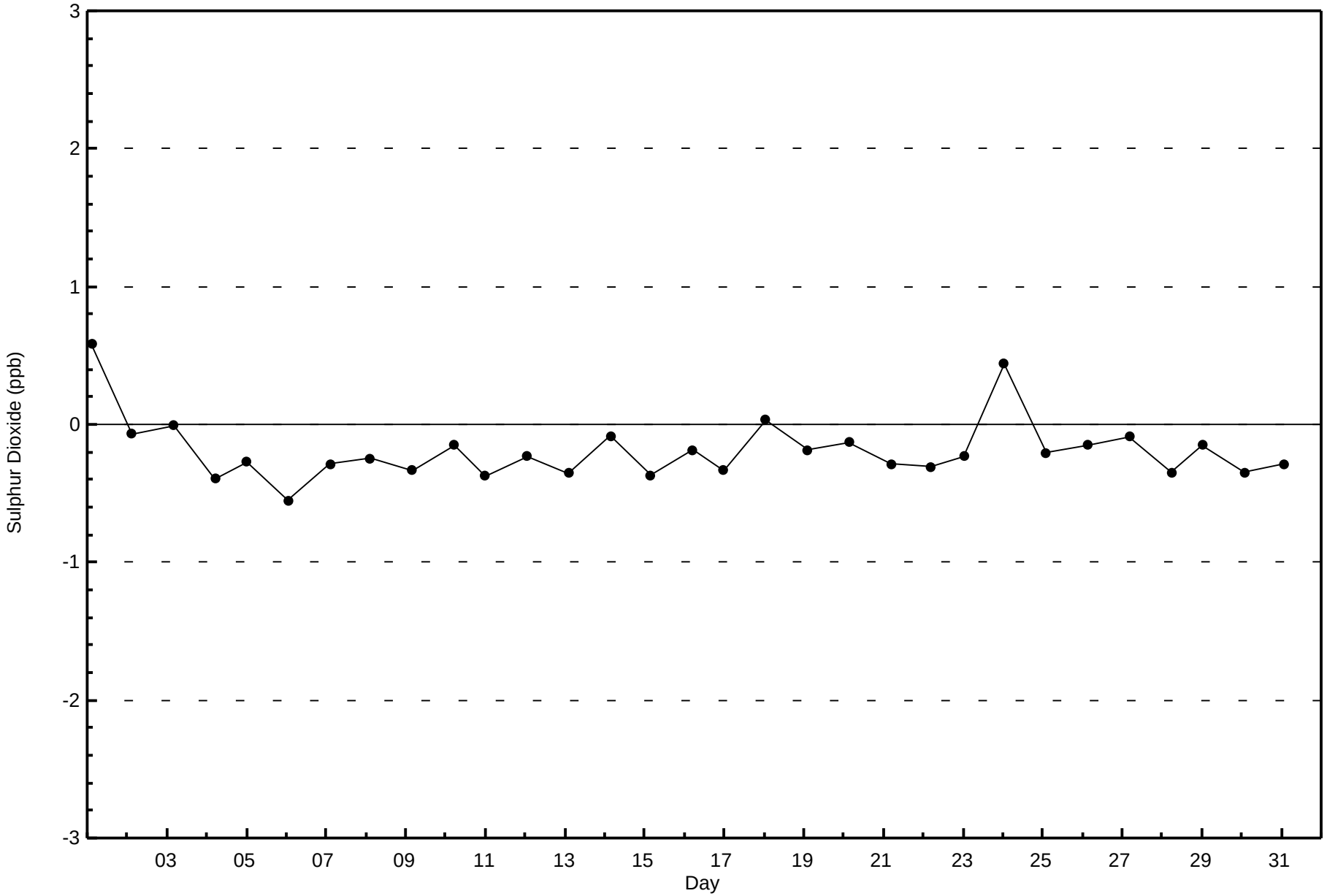
Total Number of Valid Hours: 697

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Cenovus - Christina Lake - March 2016

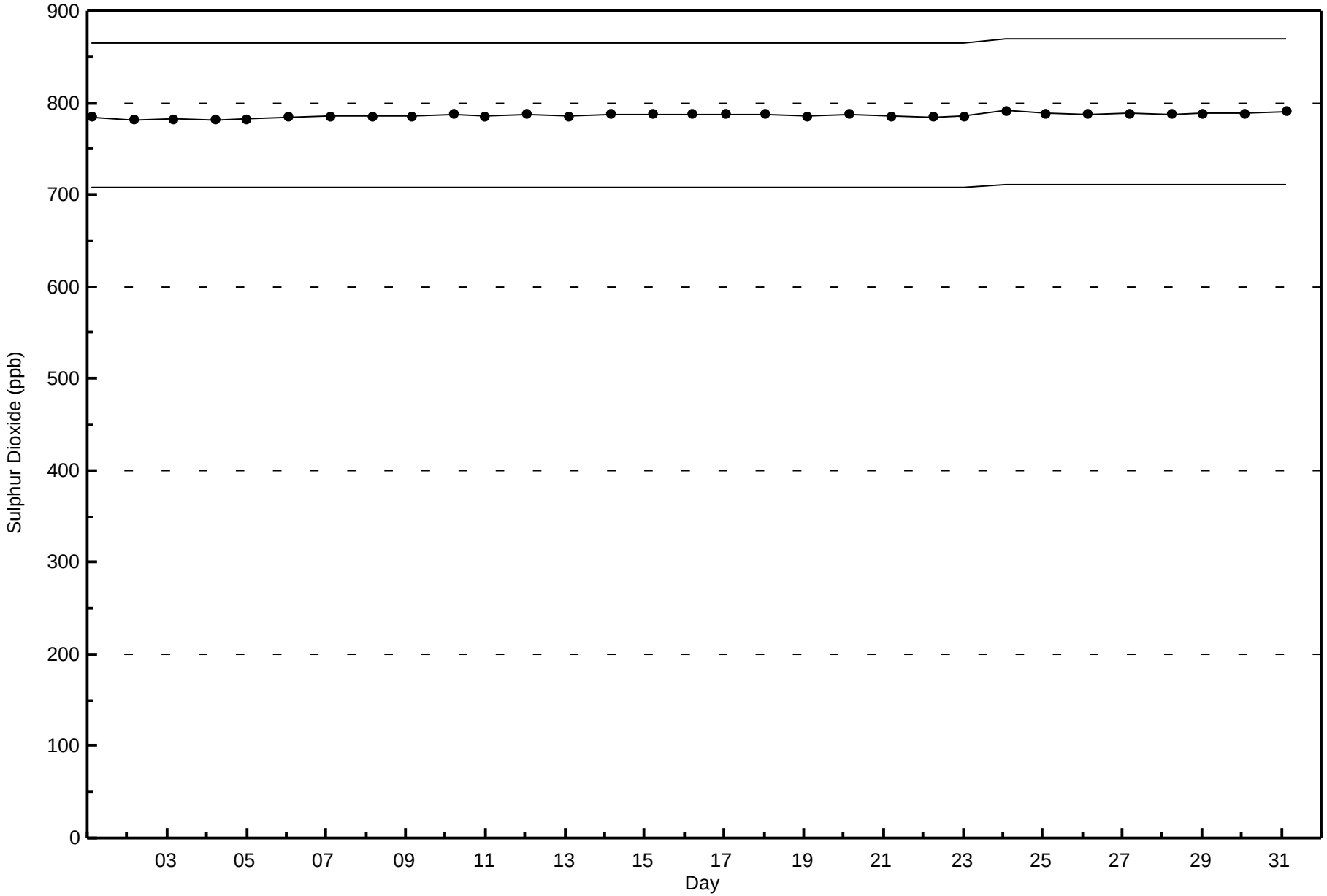


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Cenovus - Christina Lake - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Cenovus - Christina Lake - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 1 ppb on Mar 28 10:00

Maximum Daily Average: 0.3 ppb on Mar 13

Minimum Value: 0 ppb on Mar 26 01:00

Minimum Daily Average: 0.0 ppb on Mar 21

Maximum Diurnal Average: 0.1 ppb at hour 6

Minimum Diurnal Average: 0.1 ppb at hour 19

Monthly Average: 0.1 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 1$

Hours in Service:	744
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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
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	0.1	0
2-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
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	0.1	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	0.1	0
5-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
6-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
7-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.1	1
8-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
9-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
10-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	0.1	1
11-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
12-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
13-Mar	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
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	0.1	0
15-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.1	1
16-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
17-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
18-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
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	0.1	0
20-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
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	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	0
23-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
24-Mar	0	0	Z	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	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	0.1	0
26-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	0.1	1
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	0.1	0
28-Mar	0	0	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
29-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
30-Mar	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
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	0.1	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	Diurnal Average	
	0	0	0	0	1	1	0	1	0	1	1	0	0	0	0	0	0	1	0	1	1	1	0	0	Diurnal Maximum	

Z - zerospan C - Calibration

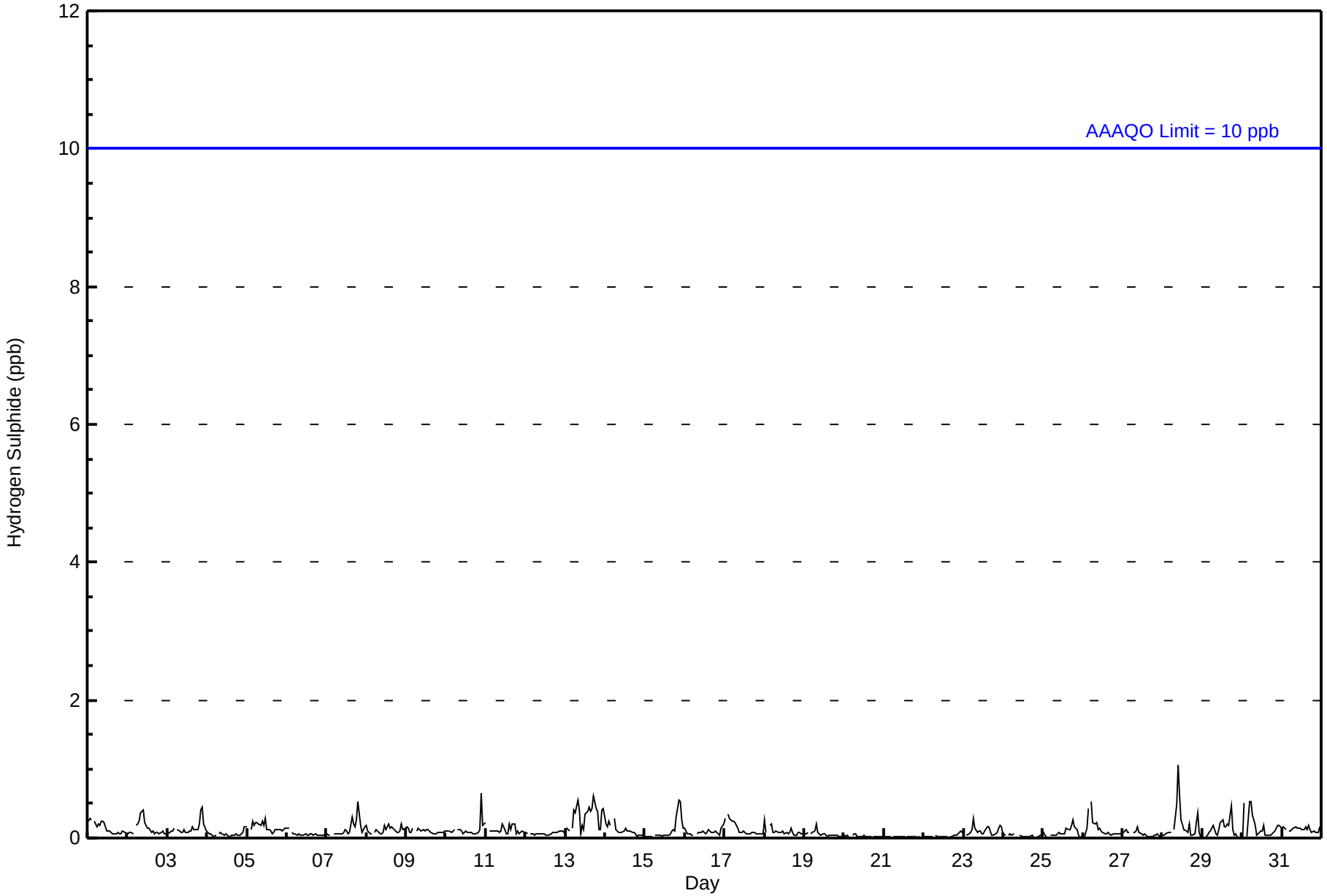
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Cenovus - Christina Lake - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Cenovus - Christina Lake - March 2016

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 (H_2S) - ppb

Cenovus - Christina Lake - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	29	32	29	53	38	48	69	54	57	32	45	42	22	19	75	56	700
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	32	29	53	38	48	69	54	57	32	45	42	22	19	75	56	700

Total Number of Valid Hours: 700

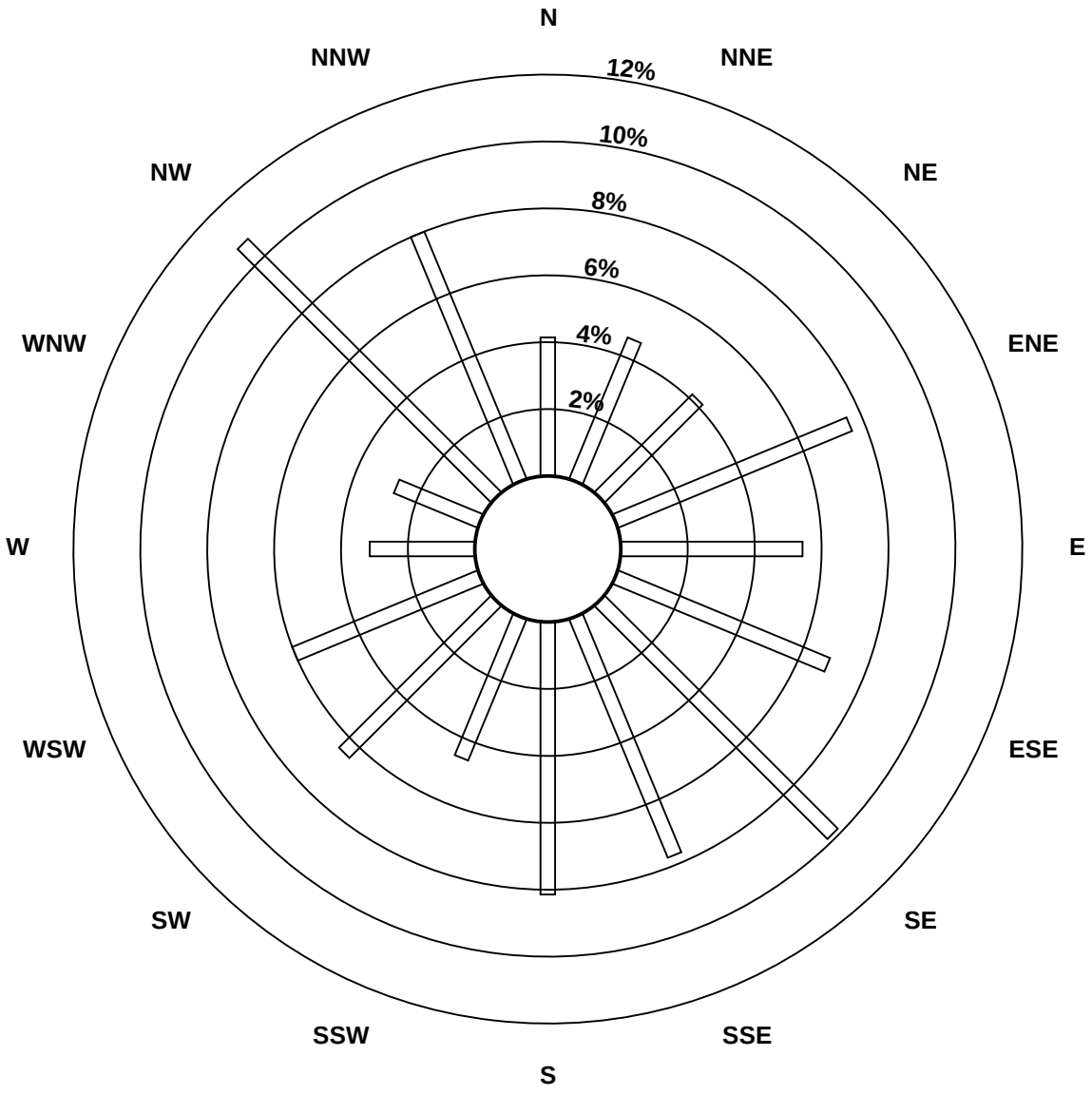
Total Number of Hours: 744

Wood Buffalo Environmental Association

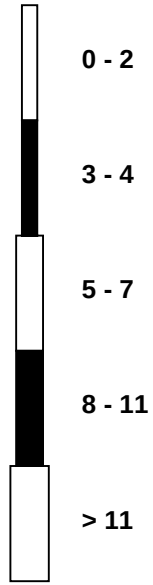
Wind Rose Mar 2016

Hydrogen Sulphide (H_2S) - ppb

Cenovus - Christina Lake (AMS500)



Classes (ppb)



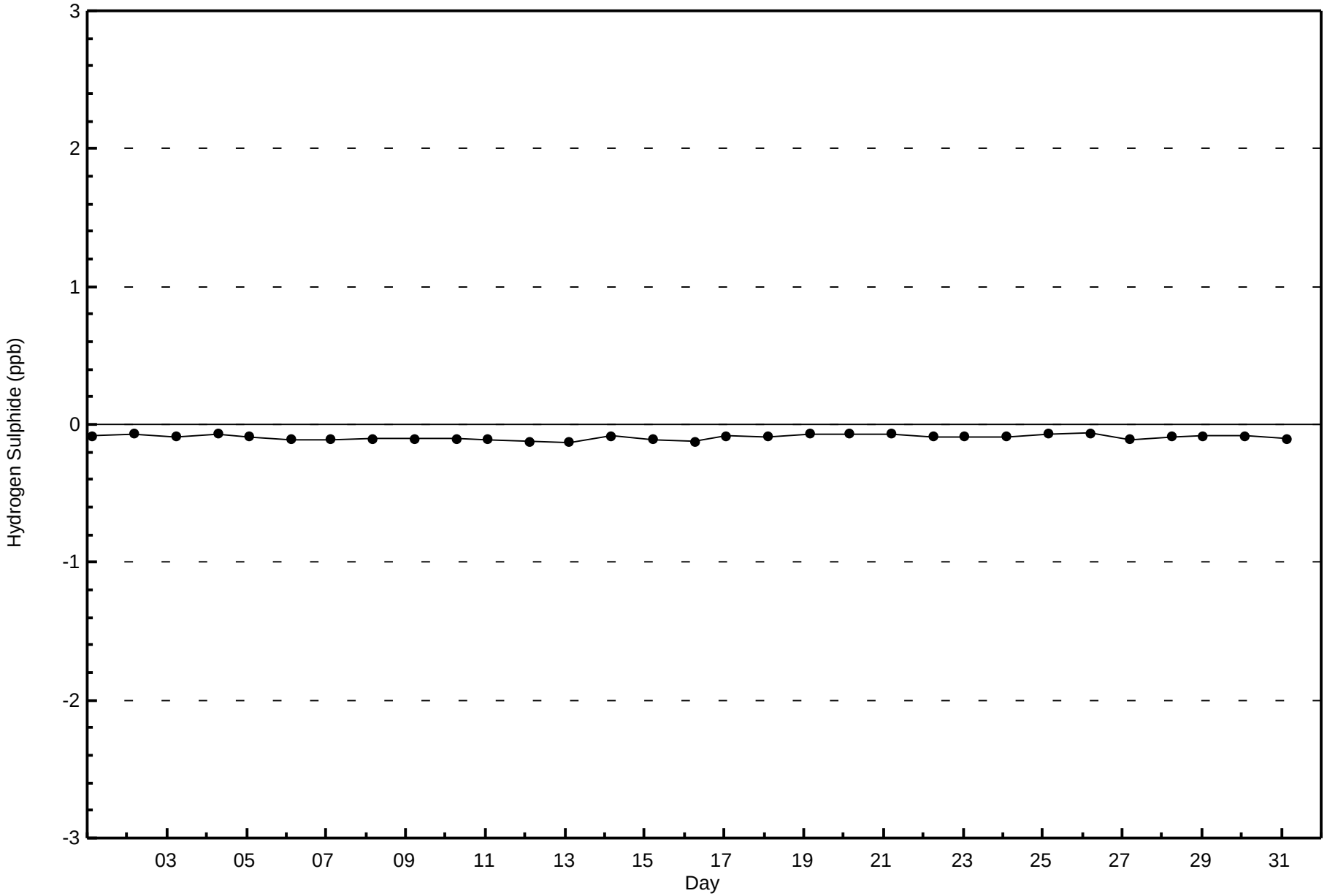
Total Number of Valid Hours: 700

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Cenovus - Christina Lake - March 2016

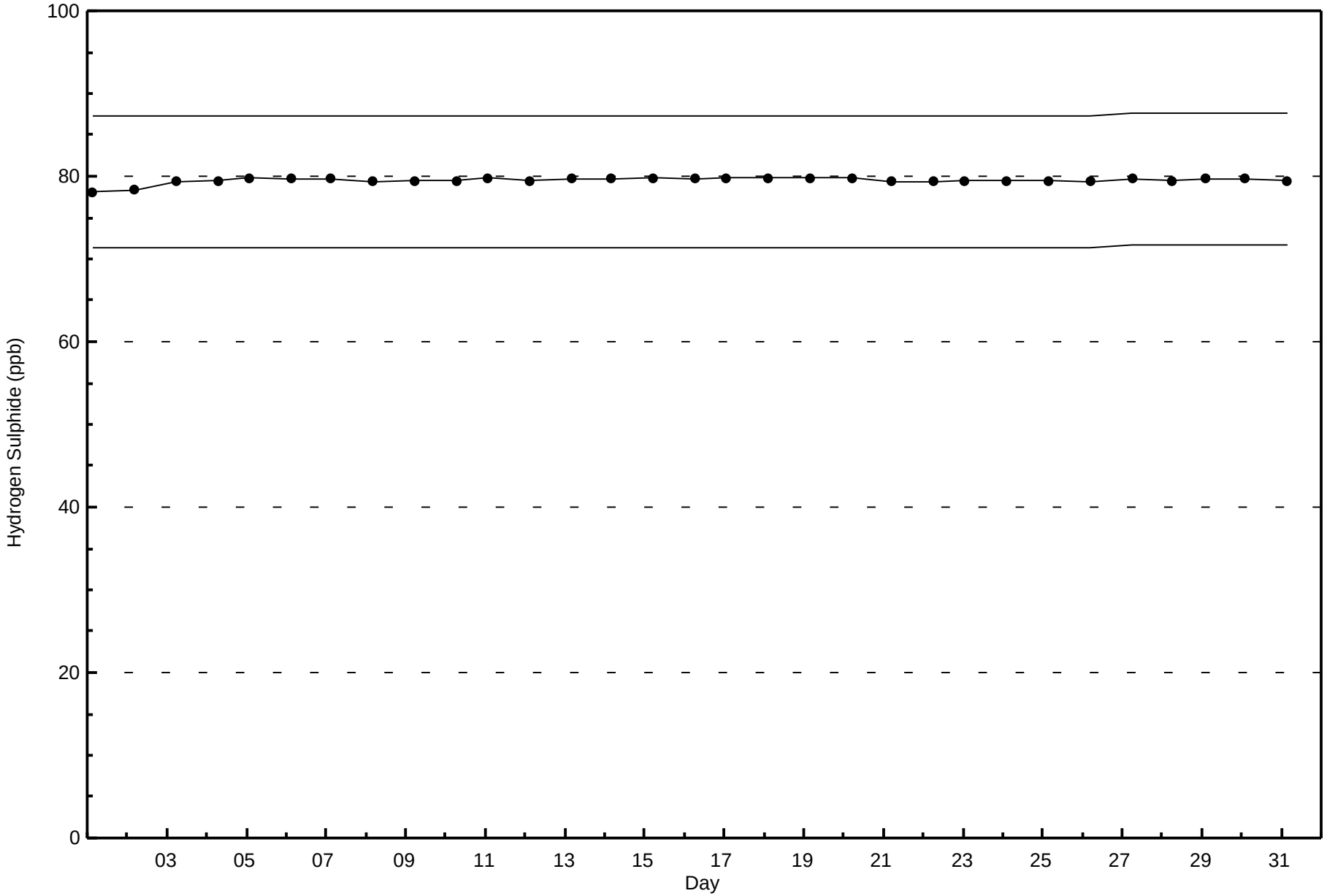


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Cenovus - Christina Lake - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

Cenovus - Christina Lake - March 2016

Maximum Value: 23 ppb on Mar 2 10:00

Maximum Daily Average: 4.9 ppb on Mar 2

Minimum Value: 0 ppb on Mar 1 02:00

Minimum Daily Average: 0.2 ppb on Mar 12

Maximum Diurnal Average: 2.1 ppb at hour 10

Minimum Diurnal Average: 0.5 ppb at hour 21

Monthly Average: 1.1 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 8$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	36
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	1	0	Z	0	1	3	6	4	11	7	7	2	3	3	1	1	1	1	1	0	1	2	2	0	2.5	11
2-Mar	1	1	4	Z	1	12	8	10	12	23	10	9	6	6	2	1	1	1	1	1	1	1	1	1	4.9	23
3-Mar	1	0	1	1	Z	1	1	1	1	1	1	2	1	1	2	1	1	0	1	2	1	1	1	2	1.1	2
4-Mar	2	2	2	1	0	Z	0	1	2	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0.9	2
5-Mar	Z	1	0	0	1	0	0	2	4	5	3	4	1	2	3	1	1	0	0	0	0	0	0	0	1.2	5
6-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	0.3	1
7-Mar	1	0	Z	0	1	1	1	1	2	1	2	1	2	1	1	1	1	1	0	0	0	0	0	1	0.9	2
8-Mar	0	0	0	Z	0	0	1	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
9-Mar	0	0	0	0	Z	0	0	0	1	1	2	2	2	2	1	1	0	1	0	1	1	1	0	1	0.7	2
10-Mar	0	0	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	1	0	0	0.7	1
11-Mar	Z	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	3	1	0	0	0	0	0	0	0.5	3
12-Mar	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1
13-Mar	0	0	Z	1	1	0	1	1	0	0	1	0	2	4	5	6	5	3	1	1	0	0	1	1	1.5	6
14-Mar	1	0	0	Z	0	1	0	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
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	0.2	0
16-Mar	0	0	0	0	0	Z	1	0	1	1	4	3	1	1	1	1	1	1	1	0	0	1	3	6	1.2	6
17-Mar	Z	8	6	6	3	2	2	1	1	2	2	1	1	1	1	1	0	1	1	0	0	0	1	0	1.9	8
18-Mar	0	Z	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	0	1	0	0	0	0	0	0.6	1
19-Mar	0	0	Z	0	0	0	1	4	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.6	4
20-Mar	0	0	0	Z	0	0	1	1	0	0	0	0	0	1	1	0	1	1	0	1	0	1	1	1	0.4	1
21-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
22-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1	0.9	1
23-Mar	Z	0	1	1	1	0	1	1	1	1	2	1	1	C	C	C	C	C	1	1	2	1	1	1	1.0	2
24-Mar	1	Z	1	1	1	1	1	1	M	2	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1.1	3
25-Mar	1	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	1
26-Mar	1	1	1	Z	2	1	2	2	2	2	2	2	1	1	1	1	1	0	1	1	1	1	1	1	1.2	2
27-Mar	1	1	1	1	Z	1	1	1	1	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	3
28-Mar	1	1	0	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
29-Mar	Z	0	1	1	1	1	2	2	1	1	2	6	8	4	5	3	3	1	1	1	1	1	1	0	2.0	8
30-Mar	1	Z	1	1	1	7	4	2	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2	2	1.6	7
31-Mar	2	2	Z	2	2	1	1	1	2	2	2	2	1	1	2	1	1	1	0	1	1	1	0	0	1.2	2
	0.6	0.8	0.9	0.8	0.7	1.4	1.3	1.4	1.8	2.1	1.8	1.6	1.5	1.4	1.2	1.1	1.1	0.8	0.5	0.6	0.5	0.7	0.7	0.8	Diurnal Average	
	2	8	6	6	3	12	8	10	12	23	10	9	8	6	5	6	5	3	1	2	2	2	3	6	Diurnal Maximum	

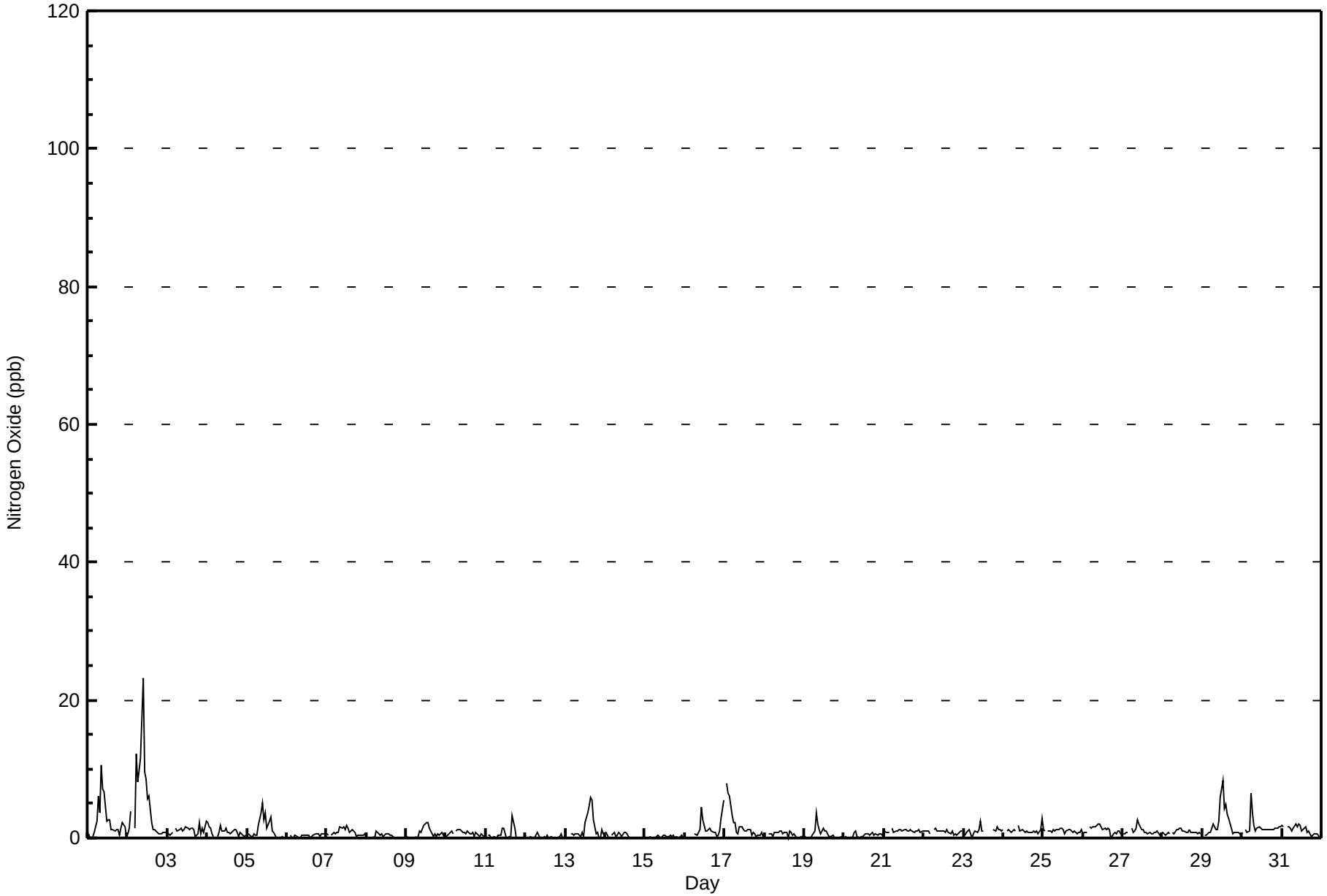
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxide (NO) - ppb

Cenovus - Christina Lake - March 2016



500-21

Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb

Cenovus - Christina Lake - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	99.86	99.86
21 - 40	1	0.14	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

Nitrogen Oxide (NO) - ppb

Cenovus - Christina Lake - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	29	33	28	53	37	51	69	50	58	32	47	42	22	17	72	56	696
21 - 40	0	0	1	0	0	0	0	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	29	33	29	53	37	51	69	50	58	32	47	42	22	17	72	56	697

Total Number of Valid Hours: 697

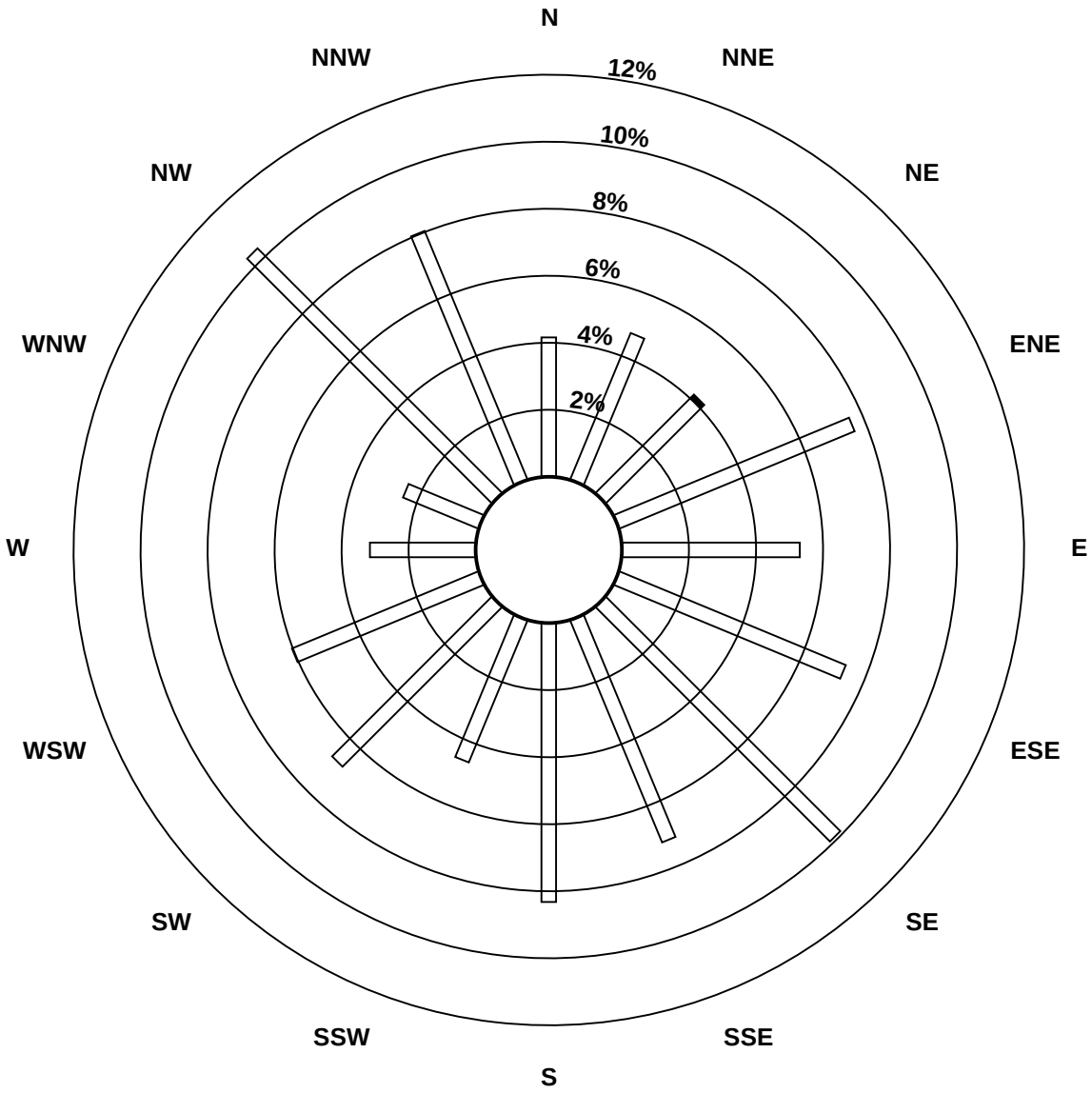
Total Number of Hours: 744

Wood Buffalo Environmental Association

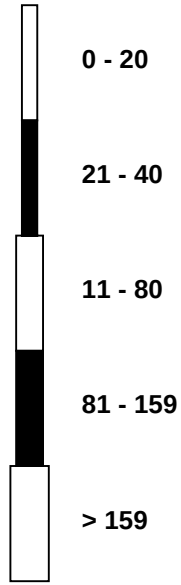
Wind Rose Mar 2016

Nitrogen Oxide (NO) - ppb

Cenovus - Christina Lake (AMS500)



Classes (ppb)



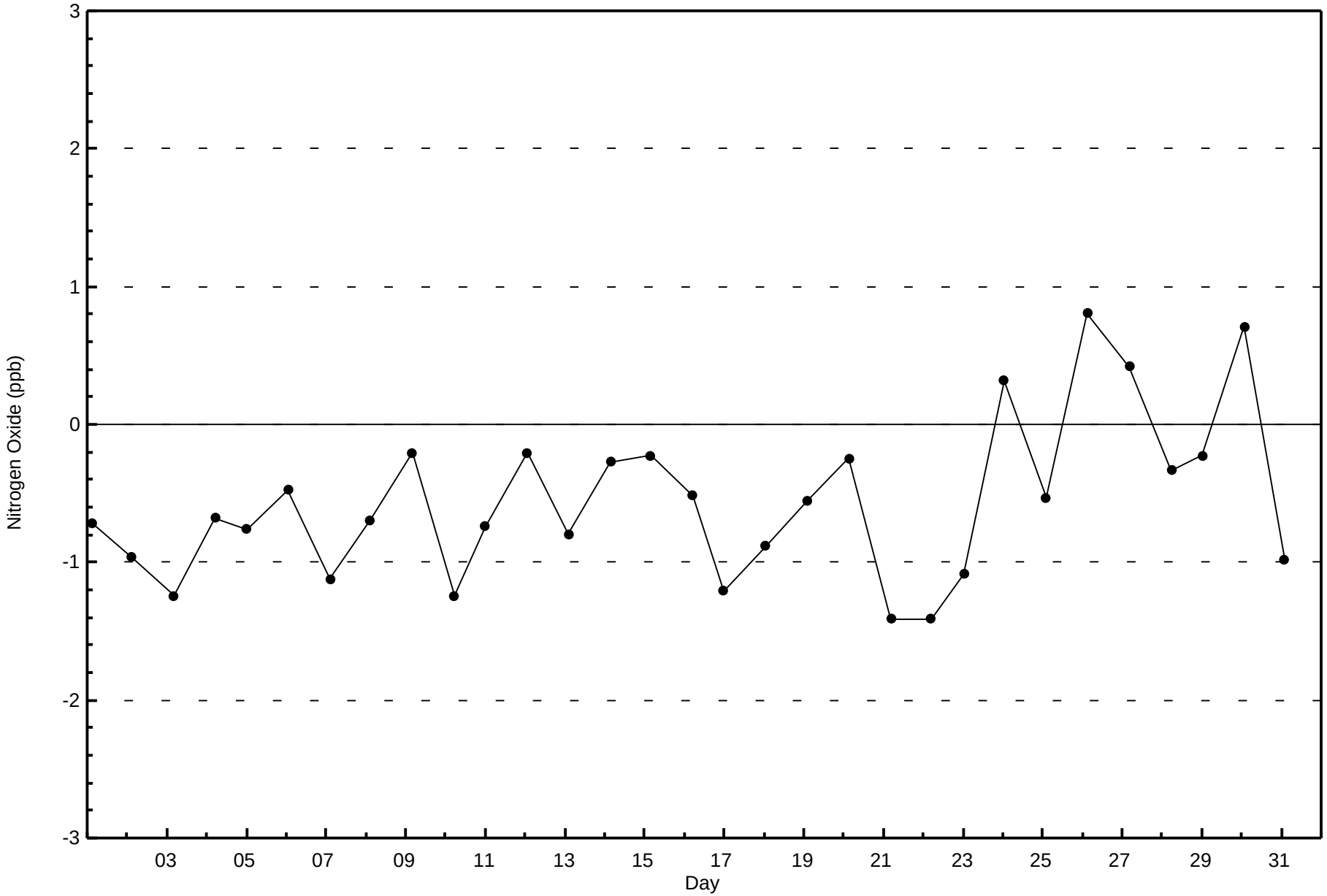
Total Number of Valid Hours: 697

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxide (NO) - ppb

Cenovus - Christina Lake - March 2016

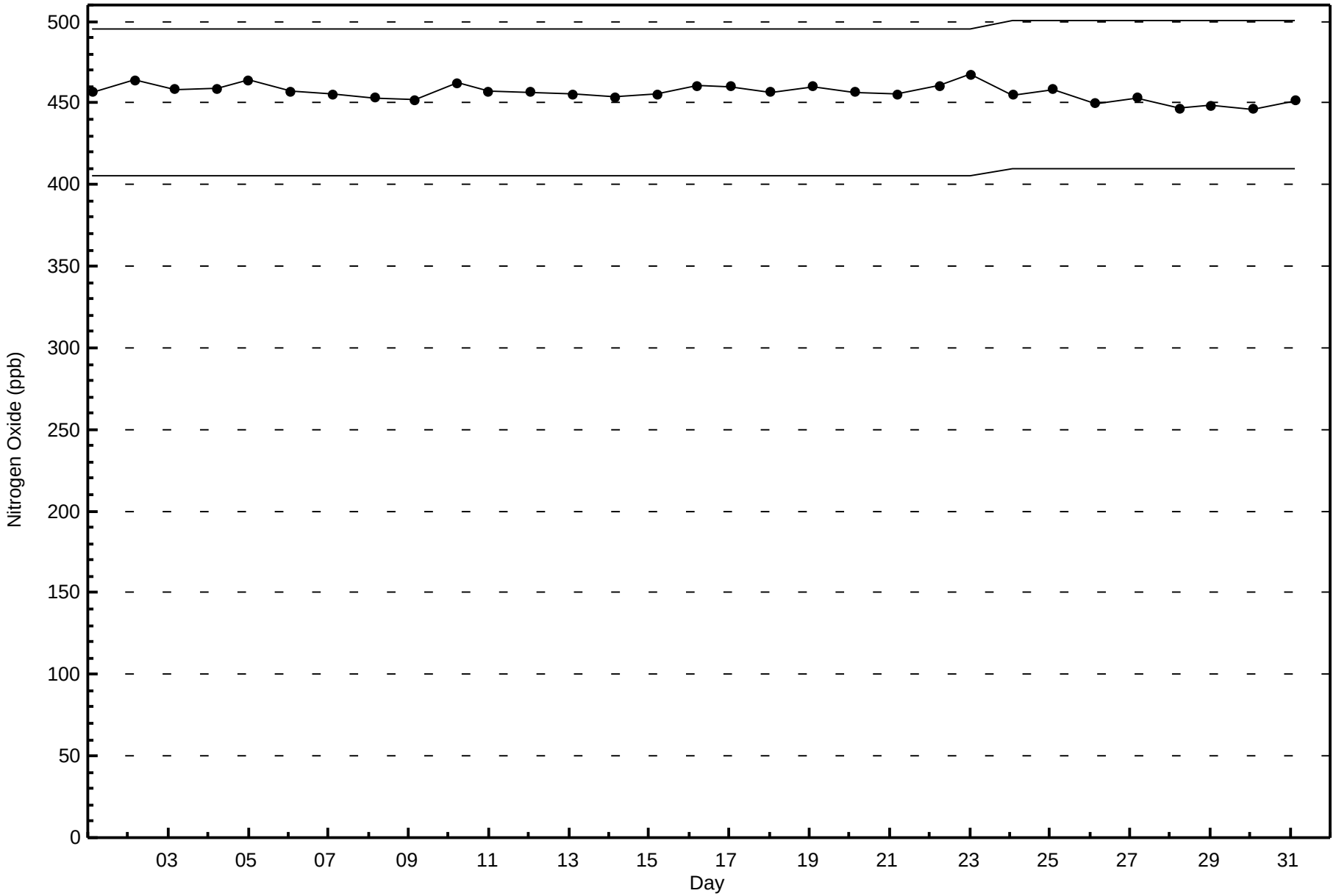


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxide (NO) - ppb

Cenovus - Christina Lake - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Cenovus - Christina Lake - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 15 ppb on Mar 17 02:00 Maximum Daily Average: 7.1 ppb on Mar 2

Minimum Value: 0 ppb on Mar 6 05:00 Minimum Daily Average: 0.0 ppb on Mar 21

Maximum Diurnal Average: 4.1 ppb at hour 7 Minimum Diurnal Average: 1.7 ppb at hour 16

Monthly Average: 2.5 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 6$ $P_{99} = 13$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	36
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	3	3	Z	4	6	9	15	11	13	8	8	3	3	4	2	2	3	5	8	4	6	13	9	9	6.4	15
2-Mar	8	9	9	Z	4	13	11	12	11	15	8	8	6	7	3	2	2	2	7	4	5	6	4	7	7.1	15
3-Mar	4	4	4	4	Z	5	6	5	3	3	4	3	3	3	3	4	4	4	4	6	13	14	6	9	5.1	14
4-Mar	10	8	8	3	1	Z	3	4	6	4	2	2	2	2	2	1	3	5	4	4	3	3	5	4	3.8	10
5-Mar	Z	5	3	4	5	6	6	11	7	7	4	5	3	5	6	4	5	4	3	4	2	1	2	3	4.5	11
6-Mar	2	Z	2	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0.4	2
7-Mar	0	0	Z	0	2	1	3	4	3	2	2	2	2	2	1	3	2	3	1	1	2	2	1	1	1.7	4
8-Mar	1	1	1	Z	1	2	5	5	1	1	1	2	1	2	1	2	2	2	2	2	2	3	3	4	2.0	5
9-Mar	4	4	4	3	Z	3	2	4	5	3	4	4	3	3	2	2	1	3	3	2	2	3	2	2	2.9	5
10-Mar	2	3	2	1	2	Z	2	3	2	1	1	1	0	1	1	1	1	1	4	2	2	2	2	2	1.6	4
11-Mar	Z	2	1	1	1	2	2	3	2	1	3	3	1	1	1	1	5	4	1	3	1	2	3	11	2.3	11
12-Mar	7	Z	4	3	3	1	3	4	4	2	1	1	1	1	1	1	1	1	1	1	0	1	1	1	2.0	7
13-Mar	3	4	Z	3	3	4	7	3	2	1	2	2	5	6	6	7	7	6	3	2	1	1	4	3	3.7	7
14-Mar	4	2	2	Z	4	5	3	3	3	3	2	2	3	2	2	2	2	2	2	1	1	0	1	0	2.3	5
15-Mar	1	0	1	1	Z	2	3	2	2	2	1	1	2	1	1	2	2	3	4	5	8	9	7	5	2.8	9
16-Mar	3	1	2	1	0	Z	2	4	4	3	4	3	2	2	2	3	4	4	5	3	2	1	6	11	3.0	11
17-Mar	Z	15	14	10	5	4	4	1	1	2	2	2	2	1	2	1	0	0	0	0	0	1	1	0	3.0	15
18-Mar	1	Z	1	1	3	2	6	4	3	2	2	1	1	1	1	2	2	2	2	2	1	1	2	2	1.9	6
19-Mar	2	2	Z	2	2	5	7	10	4	2	2	2	2	2	1	1	2	2	1	1	1	1	1	1	2.5	10
20-Mar	1	1	1	Z	0	3	6	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	6
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	0.0	0
22-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	2	4	5	3	0.9	5		
23-Mar	Z	2	2	1	2	3	3	4	2	2	4	2	2	C	C	C	C	C	0	0	0	3	3	3	2.1	4
24-Mar	2	Z	0	0	0	0	0	1	M	1	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0.3	3
25-Mar	2	2	Z	2	2	3	1	3	1	1	0	0	0	0	0	1	1	0	0	2	1	0	1	0	1.0	3
26-Mar	0	1	1	Z	2	3	4	4	3	2	2	2	1	1	1	2	1	1	1	2	1	2	2	2	1.7	4
27-Mar	2	3	3	2	Z	2	2	3	2	4	3	1	1	1	1	0	1	1	3	2	1	9	1	1	2.1	9
28-Mar	3	4	4	5	5	Z	2	2	2	2	2	2	1	1	1	1	2	1	1	1	2	4	2	1	2.2	5
29-Mar	Z	2	2	2	5	8	10	5	2	1	3	8	11	5	6	5	4	2	0	0	1	0	0	0	3.7	11
30-Mar	0	Z	1	1	2	12	7	2	0	0	1	1	0	0	1	0	1	1	0	1	1	2	2	3	1.7	12
31-Mar	2	2	Z	3	2	2	1	2	2	2	2	2	2	3	3	1	3	4	1	1	1	1	3	2	2.0	4
	2.6	3.0	2.8	2.2	2.3	3.8	4.1	4.0	3.1	2.5	2.3	2.1	1.9	1.9	1.8	1.7	2.1	2.2	2.0	1.8	1.9	2.8	2.5	2.9	Diurnal Average	
	10	15	14	10	6	13	15	12	13	15	8	8	11	7	6	7	7	6	8	6	13	14	9	11	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance

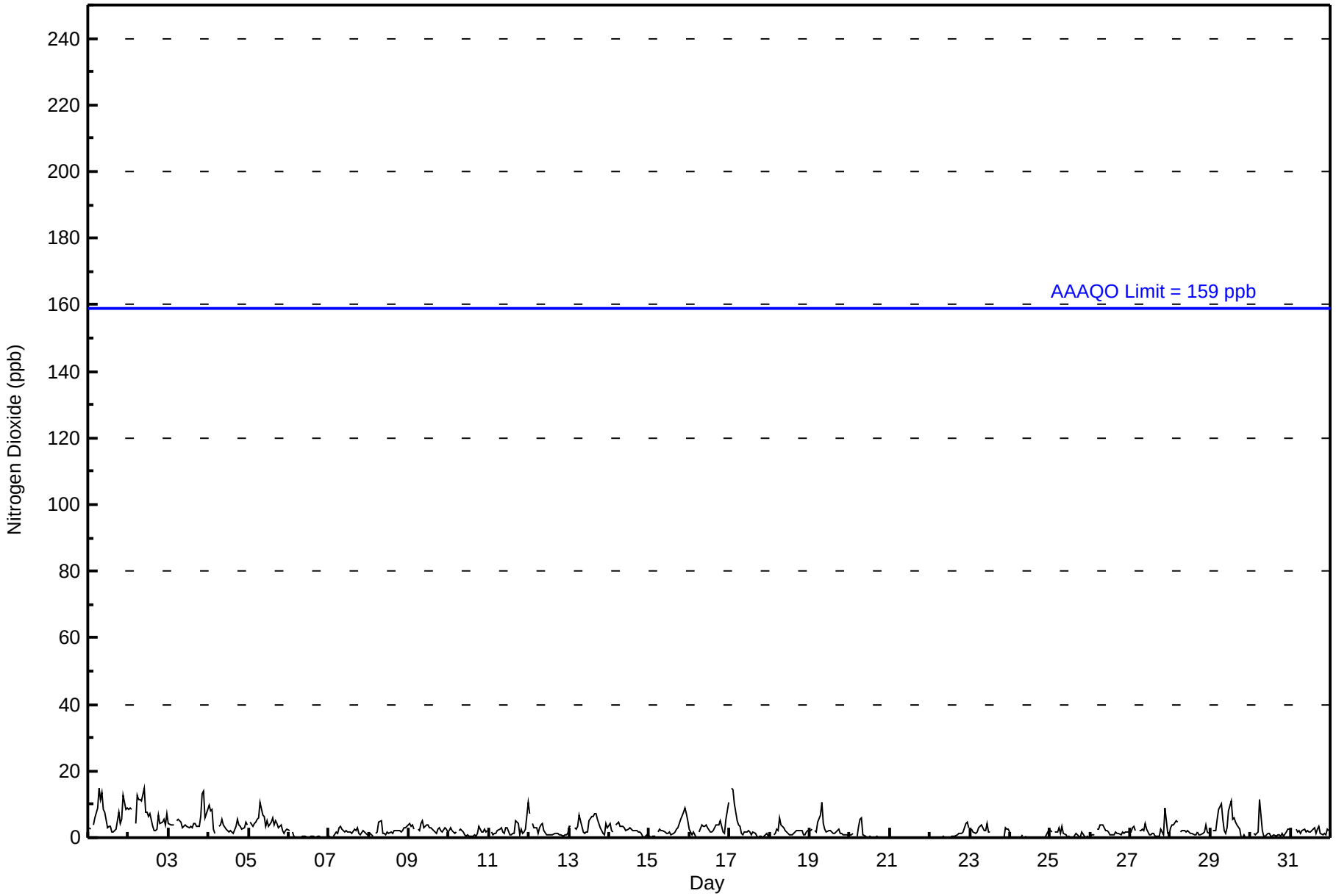
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Cenovus - Christina Lake - March 2016



Nitrogen Dioxide (NO_2) - ppb

Cenovus - Christina Lake - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	100.00	100.00
21 - 40	0	0.00	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

Nitrogen Dioxide (NO_2) - ppb

Cenovus - Christina Lake - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	29	33	29	53	37	51	69	50	58	32	47	42	22	17	72	56	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	33	29	53	37	51	69	50	58	32	47	42	22	17	72	56	697

Total Number of Valid Hours: 697

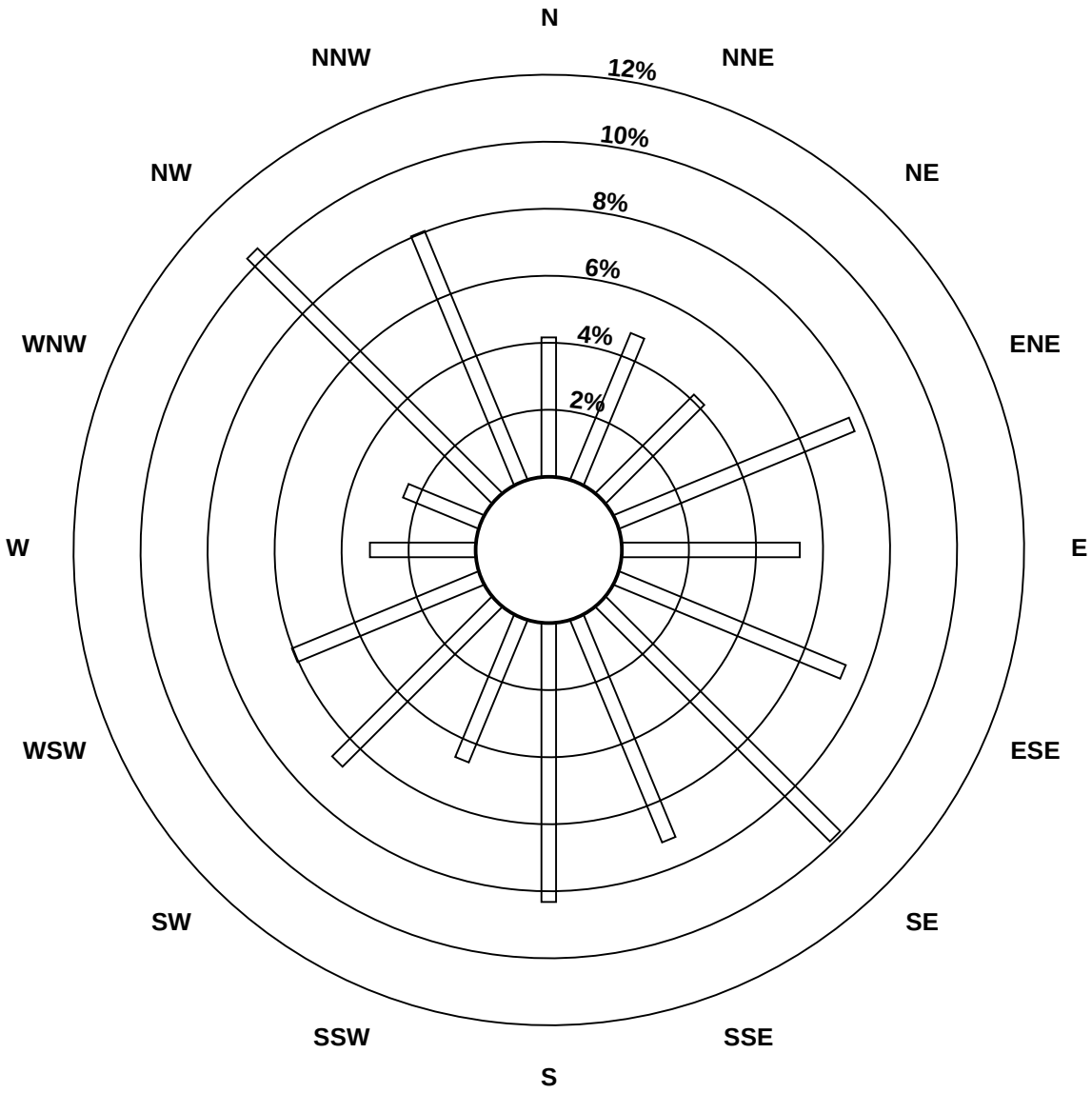
Total Number of Hours: 744

Wood Buffalo Environmental Association

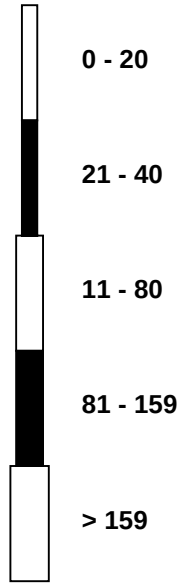
Wind Rose Mar 2016

Nitrogen Dioxide (NO_2) - ppb

Cenovus - Christina Lake (AMS500)



Classes (ppb)



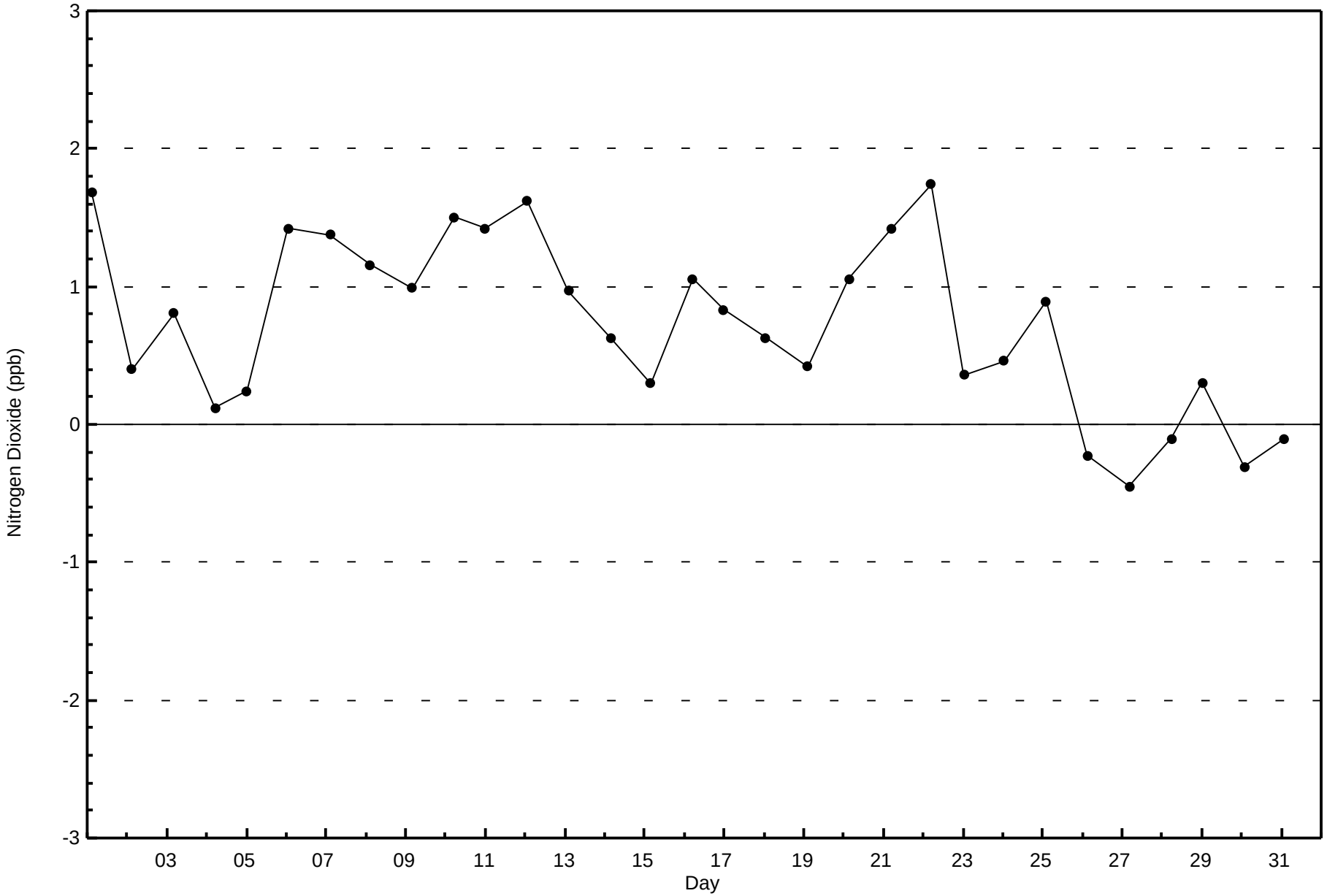
Total Number of Valid Hours: 697

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Cenovus - Christina Lake - March 2016

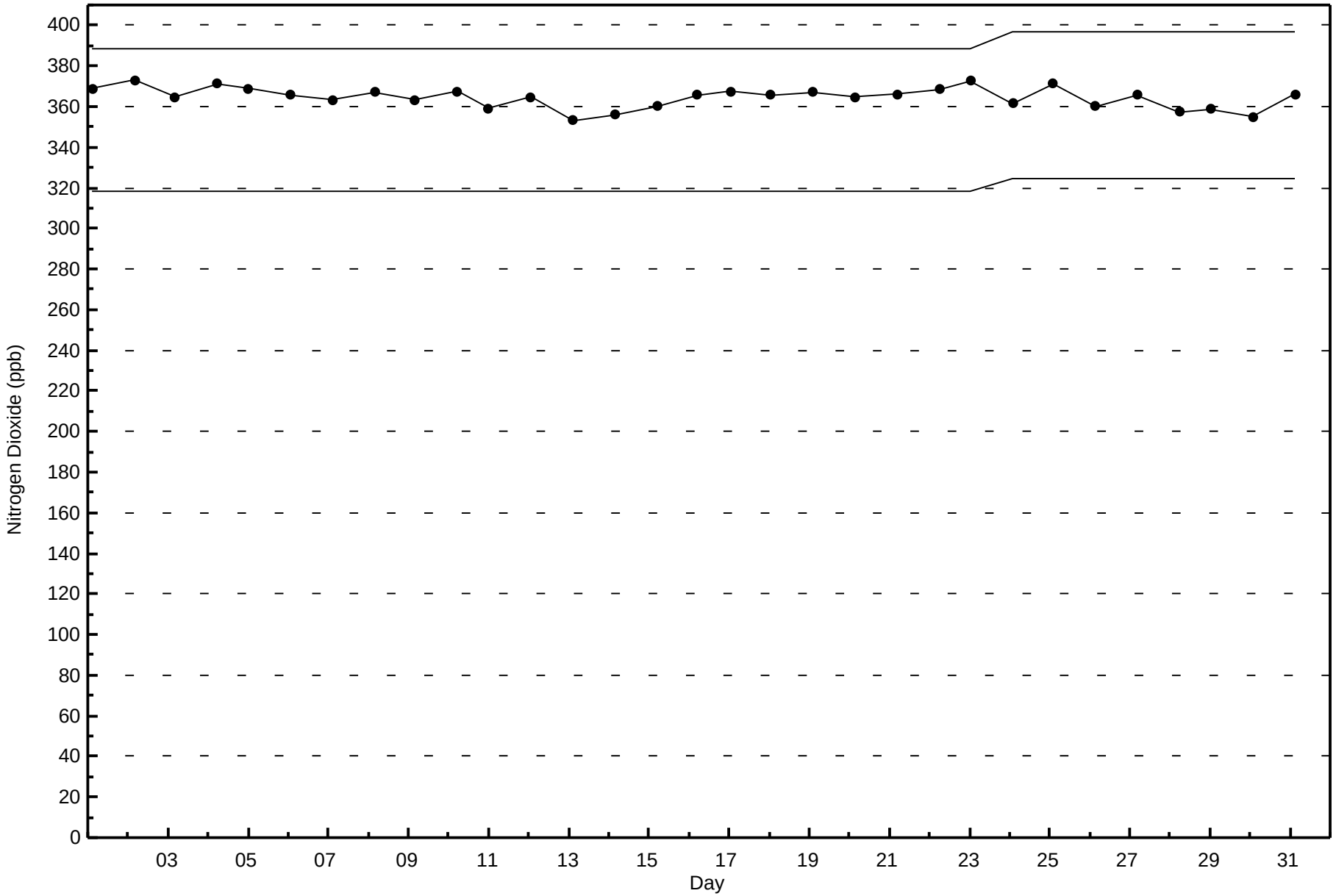


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Cenovus - Christina Lake - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Cenovus - Christina Lake - March 2016

Maximum Value: 38 ppb on Mar 2 10:00

Maximum Daily Average: 12.0 ppb on Mar 2

Minimum Value: 0 ppb on Mar 6 05:00

Minimum Daily Average: 0.7 ppb on Mar 6

Maximum Diurnal Average: 5.4 ppb at hour 8

Minimum Diurnal Average: 2.4 ppb at hour 20

Monthly Average: 3.6 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 3 $Q_3 = 4$ $P_{90} = 7$ $P_{99} = 21$

Hours in Service:	744
Hours of Data:	707
Hours of Missing Data:	37
Hours of Calibration:	36
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	4	3	Z	4	7	11	21	15	24	16	15	5	6	6	3	3	4	6	9	4	7	15	10	9	8.9	24
2-Mar	9	10	13	Z	6	25	20	21	23	38	17	16	12	13	5	3	3	4	8	5	5	7	5	8	12.0	38
3-Mar	5	4	4	4	Z	7	7	6	4	4	5	5	4	5	5	6	5	4	4	8	14	15	7	11	6.2	15
4-Mar	12	10	10	3	1	Z	4	5	7	5	3	4	3	3	2	2	5	7	5	4	3	3	5	4	4.7	12
5-Mar	Z	5	3	4	5	6	7	12	10	12	6	9	5	7	9	5	6	5	3	4	2	1	2	3	5.7	12
6-Mar	2	Z	2	1	0	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	0.7	2
7-Mar	1	0	Z	1	2	2	4	4	4	3	4	3	3	3	2	4	3	4	1	1	3	2	2	1	2.5	4
8-Mar	1	1	1	Z	1	2	6	6	1	2	1	2	2	2	2	2	3	2	2	2	2	3	3	4	2.3	6
9-Mar	4	4	4	3	Z	3	2	4	6	4	6	6	5	5	4	3	1	3	3	3	2	4	3	2	3.7	6
10-Mar	2	3	3	2	2	Z	3	4	3	2	1	2	1	2	1	1	1	1	4	2	2	3	2	2	2.2	4
11-Mar	Z	2	1	1	1	2	3	3	2	2	4	5	1	1	1	1	8	5	1	3	1	2	2	11	2.8	11
12-Mar	8	Z	4	3	3	1	3	5	5	2	1	1	1	1	1	1	1	1	1	1	0	1	1	2	2.2	8
13-Mar	4	4	Z	4	3	4	8	4	2	2	3	2	7	10	11	13	13	8	4	3	1	1	5	4	5.2	13
14-Mar	5	2	2	Z	4	5	3	4	4	4	2	3	4	3	2	2	2	2	2	1	1	0	1	0	2.6	5
15-Mar	1	0	0	1	Z	2	3	3	3	2	1	2	2	1	1	2	3	3	4	6	8	9	7	5	3.0	9
16-Mar	2	1	2	1	0	Z	2	4	5	5	8	6	3	2	3	4	5	4	6	4	2	2	8	16	4.2	16
17-Mar	Z	23	21	16	9	6	6	2	1	3	3	4	3	2	3	2	1	1	1	1	1	1	2	1	4.9	23
18-Mar	1	Z	2	2	3	3	7	5	4	3	3	2	2	2	2	3	3	3	3	2	1	1	2	2	2.5	7
19-Mar	2	2	Z	2	2	5	8	14	6	4	2	3	3	2	2	1	2	3	1	1	1	1	1	1	3.1	14
20-Mar	1	1	1	Z	0	3	7	7	1	0	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1.3	7
21-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
22-Mar	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	5	5	4	1.8	5
23-Mar	Z	3	2	2	3	3	4	5	3	3	7	3	3	C	C	C	C	C	1	1	2	4	4	4	3.1	7
24-Mar	3	Z	1	1	1	1	1	2	M	2	1	1	1	1	1	1	1	1	1	1	1	1	3	5	1.4	5
25-Mar	3	3	Z	3	3	4	3	4	2	2	1	2	1	1	1	2	2	1	1	3	1	1	1	1	2.0	4
26-Mar	1	2	2	Z	4	4	5	6	5	4	4	3	2	2	2	3	3	1	2	2	2	3	3	2	2.9	6
27-Mar	2	3	4	3	Z	3	3	4	4	7	5	2	2	2	2	1	1	1	3	2	2	10	2	1	3.1	10
28-Mar	4	4	4	6	5	Z	3	3	3	3	4	3	2	2	2	2	3	2	2	2	2	5	2	2	3.0	6
29-Mar	Z	2	3	3	6	9	12	7	3	2	6	14	19	9	11	8	7	4	1	1	2	1	1	0	5.7	19
30-Mar	1	Z	2	2	3	18	10	4	1	2	3	3	1	2	2	2	2	2	2	2	2	3	4	4	3.3	18
31-Mar	4	4	Z	4	3	4	2	3	4	3	4	4	3	4	5	2	4	4	1	1	2	1	3	2	3.2	5
	3.2	3.9	3.7	3.0	3.0	5.2	5.4	5.4	4.8	4.6	4.0	3.7	3.4	3.2	3.0	2.8	3.2	2.9	2.5	2.4	2.4	3.4	3.2	3.7	Diurnal Average	
	12	23	21	16	9	25	21	21	24	38	17	16	19	13	11	13	13	8	9	8	14	15	10	16	Diurnal Maximum	

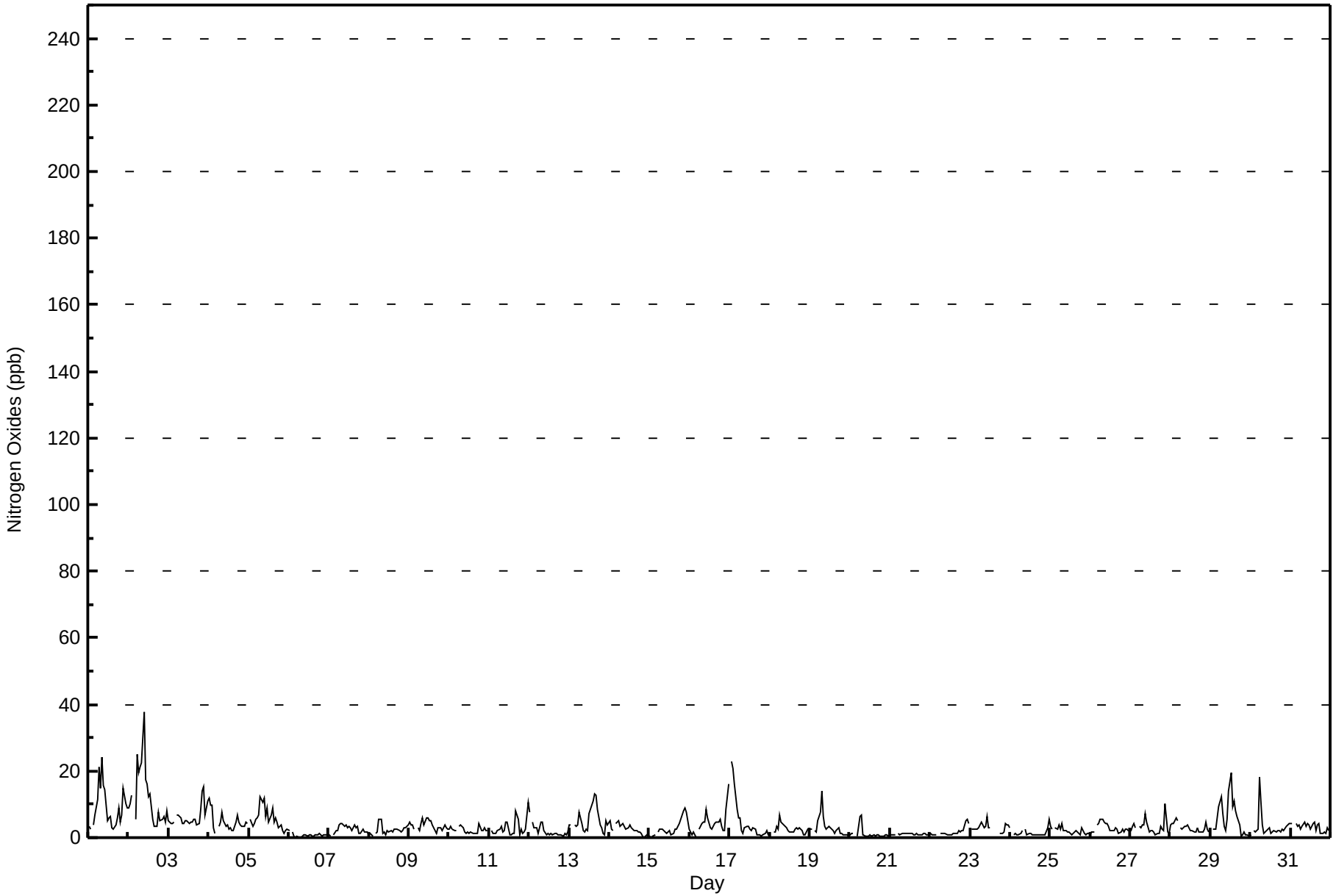
Z - zerospan C - Calibration M - Maintenance

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Cenovus - Christina Lake - March 2016



Nitrogen Oxides (NO_X) - ppb

Cenovus - Christina Lake - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	699	98.87	98.87
21 - 40	8	1.13	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

Nitrogen Oxides (NO_X) - ppb

Cenovus - Christina Lake - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	29	32	28	53	37	50	69	49	56	32	47	42	22	17	70	56	689
21 - 40	0	1	1	0	0	1	0	1	2	0	0	0	0	0	2	0	8
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	29	33	29	53	37	51	69	50	58	32	47	42	22	17	72	56	697

Total Number of Valid Hours: 697

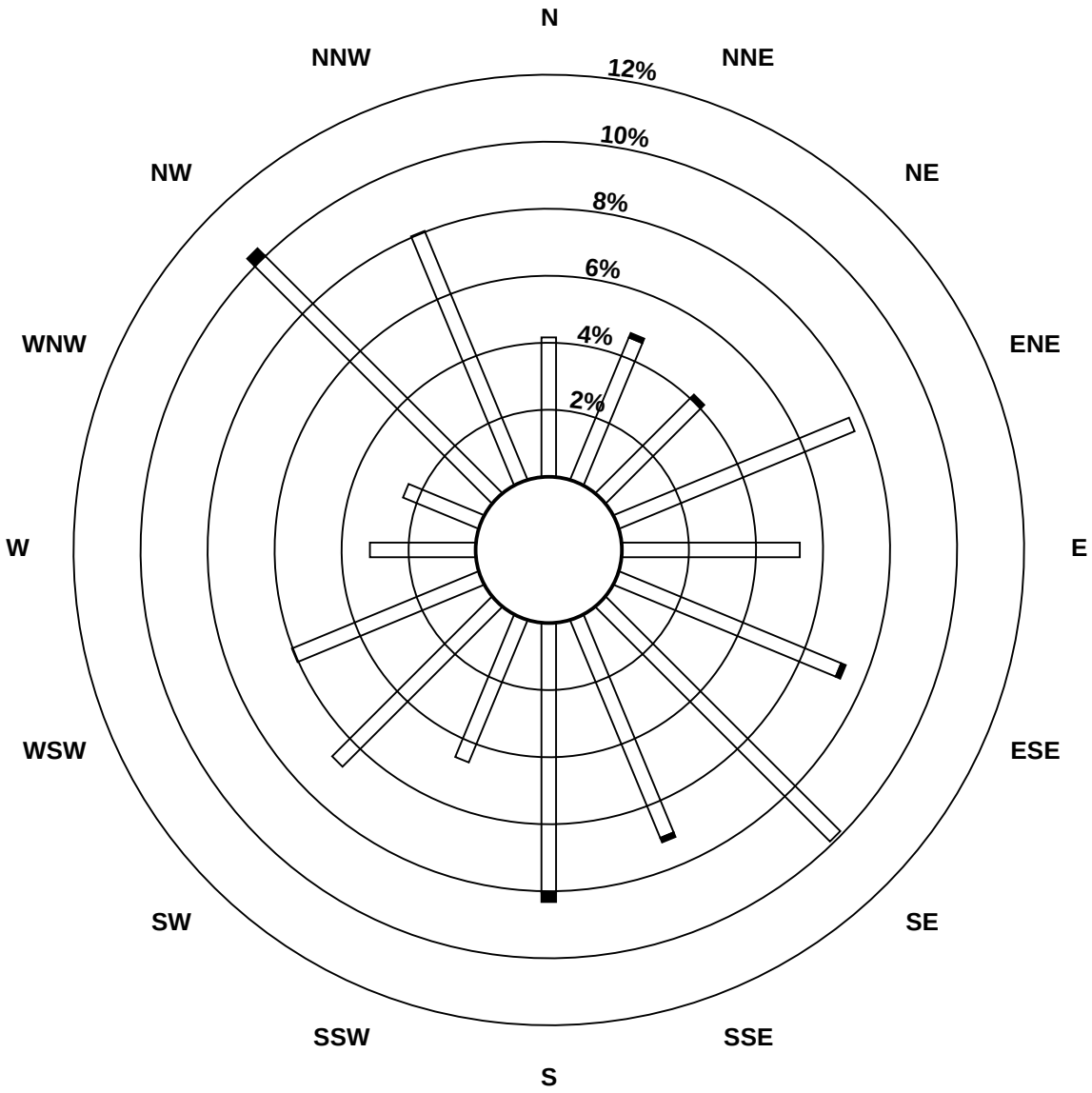
Total Number of Hours: 744

Wood Buffalo Environmental Association

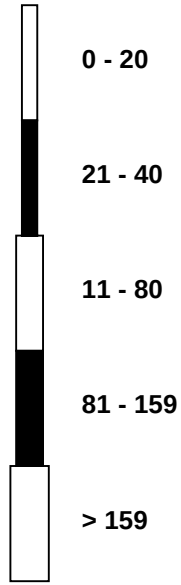
Wind Rose Mar 2016

Nitrogen Oxides (NO_X) - ppb

Cenovus - Christina Lake (AMS500)



Classes (ppb)



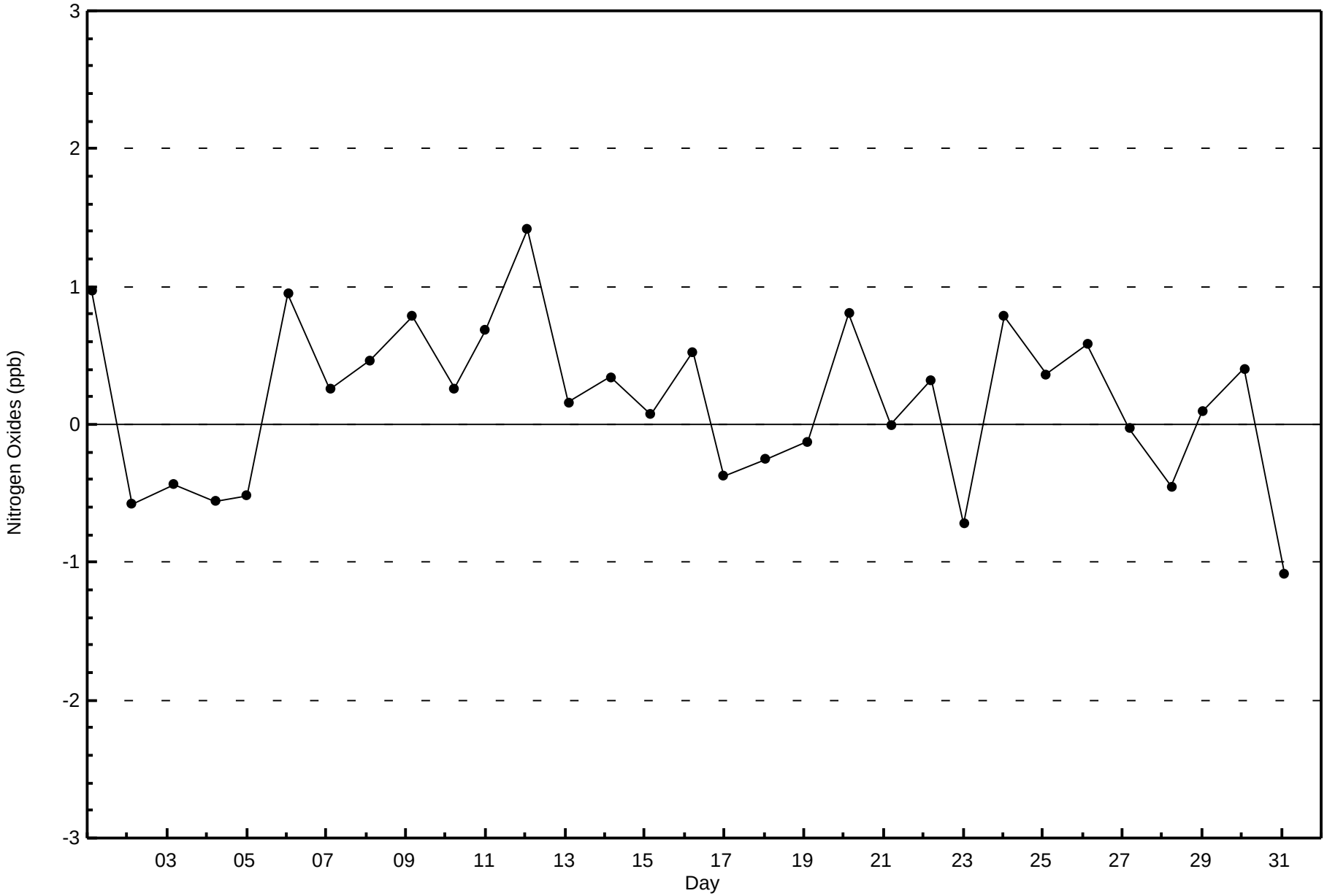
Total Number of Valid Hours: 697

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Cenovus - Christina Lake - March 2016

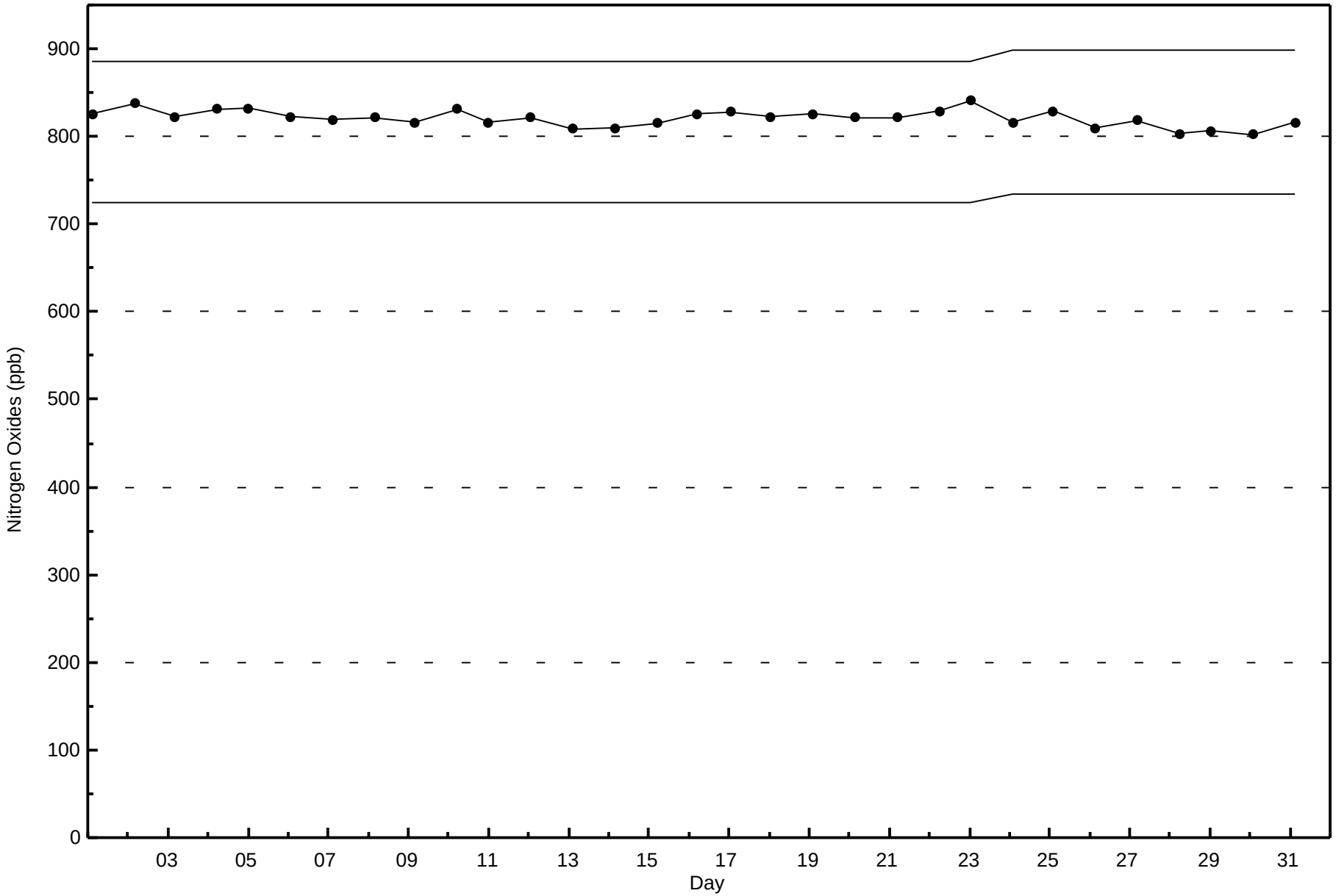


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Cenovus - Christina Lake - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Cenovus - Christina Lake - March 2016

Maximum Value: 11.3 C on Mar 28 16:00

Maximum Daily Average: 6.1 C on Mar 30

Minimum Value: -17.8 C on Mar 2 06:00

Minimum Daily Average: -7.6 C on Mar 16

Maximum Diurnal Average: 2.1 C at hour 16

Minimum Diurnal Average: -5.5 C at hour 7

Monthly Average: -2.04 C

Percentiles: P_1 = -13.8 P_{10} = -8.0 Q_1 = -5.2 Median = -2.3 Q_3 = 0.6 P_{90} = 5.2 P_{99} = 10.4

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

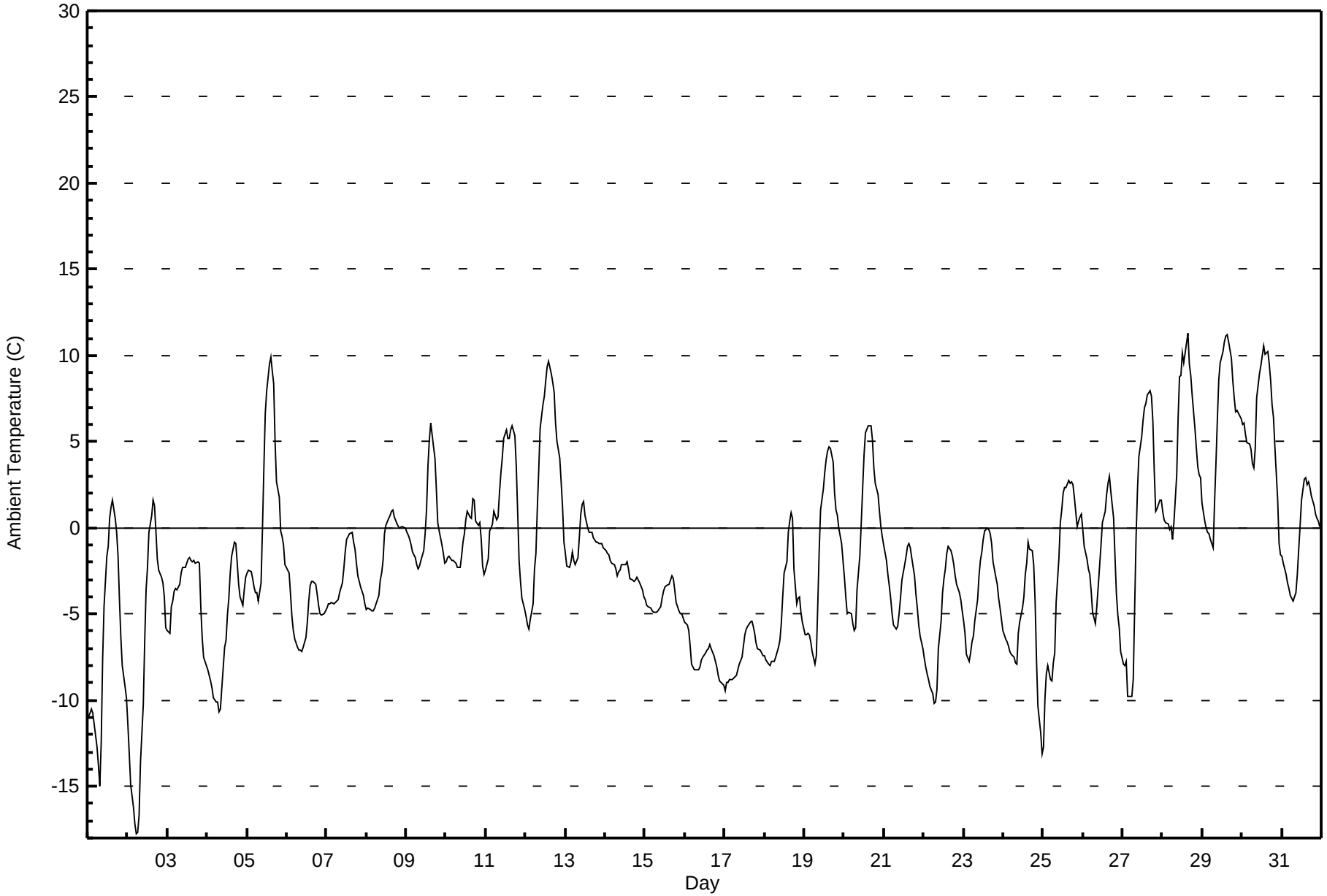
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.9	-10.8	-10.5	-10.7	-11.4	-12.7	-13.8	-15.0	-12.5	-7.6	-4.6	-1.7	-1.1	0.5	1.2	1.6	0.6	-0.3	-1.6	-4.1	-6.4	-8.0	-9.2	-9.9	-6.6	1.6
2-Mar	-11.4	-13.1	-14.9	-16.2	-17.2	-17.8	-17.7	-16.7	-13.6	-10.3	-6.6	-3.6	-2.3	-0.3	0.7	1.6	1.3	-0.2	-1.8	-2.4	-2.8	-3.2	-4.0	-5.8	-7.4	1.6
3-Mar	-6.0	-6.1	-4.6	-4.3	-3.7	-3.6	-3.6	-3.3	-2.6	-2.3	-2.3	-2.3	-1.8	-1.8	-1.9	-2.0	-1.9	-2.0	-2.0	-2.0	-4.6	-6.4	-7.5	-8.0	-3.6	-1.8
4-Mar	-8.2	-8.6	-8.9	-9.3	-9.9	-10.1	-10.1	-10.6	-10.5	-9.3	-7.0	-6.5	-5.1	-4.1	-2.6	-1.6	-0.9	-0.9	-2.1	-3.3	-4.0	-4.5	-3.6	-2.9	-6.0	-0.9
5-Mar	-2.6	-2.5	-2.5	-2.9	-3.4	-3.8	-3.8	-4.2	-3.2	0.0	3.5	6.7	7.9	9.5	9.9	9.1	8.4	5.0	2.7	1.7	-0.2	-0.5	-1.0	-2.1	1.3	9.9
6-Mar	-2.5	-2.7	-3.9	-5.2	-6.0	-6.5	-6.9	-7.1	-7.1	-7.2	-6.9	-6.3	-5.5	-4.2	-3.4	-3.1	-3.1	-3.2	-3.8	-4.5	-5.0	-5.1	-5.0	-4.8	-5.0	-2.5
7-Mar	-4.6	-4.4	-4.4	-4.4	-4.4	-4.3	-4.3	-4.1	-3.7	-3.2	-2.4	-1.4	-0.7	-0.5	-0.4	-0.3	-0.8	-1.2	-2.1	-2.8	-3.4	-3.7	-3.9	-4.4	-2.9	-0.3
8-Mar	-4.7	-4.6	-4.7	-4.8	-4.9	-4.7	-4.4	-3.9	-3.0	-2.6	-1.9	-0.4	0.2	0.6	0.7	1.0	1.0	0.6	0.2	0.0	0.0	0.0	0.1	0.0	-1.7	1.0
9-Mar	-0.3	-0.4	-0.7	-1.0	-1.4	-1.7	-2.2	-2.4	-2.2	-1.9	-1.3	-0.4	1.0	3.6	5.1	6.1	4.7	4.0	2.3	0.3	-0.2	-1.0	-1.5	-2.1	0.3	6.1
10-Mar	-2.0	-1.7	-1.7	-1.9	-1.9	-2.0	-2.0	-2.3	-2.3	-1.7	-0.8	-0.3	0.5	1.0	0.7	0.5	1.7	1.6	0.4	0.1	0.3	-0.7	-2.2	-2.7	-0.8	1.7
11-Mar	-2.5	-1.8	-0.2	0.0	0.2	0.9	0.4	0.6	2.0	3.1	4.1	5.2	5.6	5.2	5.2	5.6	5.9	5.4	3.6	0.9	-1.9	-3.1	-4.1	-4.7	1.5	5.9
12-Mar	-5.2	-5.6	-5.8	-5.3	-4.4	-2.3	-1.5	1.1	3.3	5.8	7.1	7.7	8.5	9.3	9.6	9.0	8.5	7.9	6.1	5.0	4.0	2.7	1.2	-0.8	2.7	9.6
13-Mar	-1.5	-2.2	-2.3	-2.0	-1.4	-1.9	-2.2	-1.8	-0.5	0.8	1.4	1.6	0.7	0.0	-0.3	-0.3	-0.3	-0.6	-0.8	-0.8	-0.9	-0.9	-0.9	-1.2	-0.8	1.6
14-Mar	-1.3	-1.5	-1.5	-1.9	-2.0	-2.1	-2.4	-2.8	-2.5	-2.5	-2.2	-2.1	-2.1	-2.0	-2.4	-2.9	-3.0	-3.1	-3.0	-2.9	-3.0	-3.2	-3.6	-4.0	-2.5	-1.3
15-Mar	-4.2	-4.5	-4.6	-4.7	-4.8	-4.9	-4.9	-4.9	-4.8	-4.6	-4.1	-3.6	-3.4	-3.4	-3.2	-3.0	-2.8	-3.0	-3.6	-4.3	-4.8	-5.0	-5.0	-5.2	-4.2	-2.8
16-Mar	-5.4	-5.7	-6.0	-6.9	-7.9	-8.0	-8.3	-8.2	-8.3	-8.1	-7.7	-7.5	-7.2	-7.1	-7.0	-6.8	-7.0	-7.5	-7.8	-8.0	-8.5	-8.9	-9.0	-9.2	-7.6	-5.4
17-Mar	-9.4	-9.0	-9.0	-8.8	-8.8	-8.7	-8.6	-8.6	-8.2	-7.9	-7.5	-6.8	-6.2	-5.8	-5.7	-5.5	-5.4	-5.7	-6.2	-6.7	-7.0	-7.1	-7.3	-7.4	-7.4	-5.4
18-Mar	-7.5	-7.7	-7.9	-8.0	-7.7	-7.7	-7.8	-7.5	-7.0	-6.5	-5.5	-4.0	-2.6	-2.0	-0.3	0.4	0.9	0.6	-2.4	-4.4	-4.1	-4.0	-4.9	-5.5	-4.7	0.9
19-Mar	-6.2	-6.2	-6.1	-6.2	-6.6	-7.2	-7.9	-7.4	-4.5	-1.4	1.0	2.3	3.2	4.0	4.4	4.7	4.6	3.8	2.0	1.0	0.7	0.0	-0.9	-1.9	-1.3	4.7
20-Mar	-2.8	-4.0	-5.0	-4.9	-5.0	-5.5	-5.9	-5.8	-3.6	-1.6	0.2	2.2	4.2	5.5	5.9	5.9	5.9	5.1	3.5	2.6	1.9	0.9	0.1	-0.5	0.0	5.9
21-Mar	-1.0	-1.9	-2.7	-3.3	-4.1	-4.9	-5.6	-5.9	-5.7	-5.0	-4.1	-3.1	-2.2	-1.6	-1.1	-0.9	-1.2	-1.7	-2.8	-3.8	-4.6	-5.6	-6.3	-7.0	-3.6	-0.9
22-Mar	-7.6	-8.1	-8.5	-8.8	-9.3	-9.6	-10.2	-10.1	-9.3	-7.0	-5.4	-3.8	-2.9	-2.4	-1.5	-1.1	-1.3	-1.6	-2.2	-2.8	-3.3	-3.8	-4.2	-4.8	-5.4	-1.1
23-Mar	-5.4	-6.2	-7.3	-7.7	-7.2	-6.6	-6.3	-5.4	-4.2	-2.8	-1.9	-1.4	-0.7	-0.2	0.0	-0.1	-0.4	-0.9	-2.0	-2.9	-3.3	-4.1	-4.7	-5.3	-3.6	0.0
24-Mar	-6.0	-6.4	-6.6	-6.9	-7.2	-7.4	-7.5	-7.9	-7.9	-6.1	-5.4	-4.6	-4.0	-2.7	-2.0	-0.8	-1.3	-1.3	-2.1	-4.3	-7.7	-10.4	-11.9	-13.1	-5.9	-0.8
25-Mar	-12.7	-10.0	-8.4	-8.0	-8.8	-8.9	-7.8	-7.3	-4.3	-1.7	0.3	1.1	2.0	2.4	2.4	2.7	2.6	2.7	2.5	1.7	0.1	0.4	0.6	0.8	-2.3	2.7
26-Mar	-0.1	-1.1	-1.8	-2.4	-2.7	-3.7	-4.9	-5.5	-4.6	-3.4	-2.2	-1.0	0.3	1.0	1.9	2.6	3.0	2.1	0.6	-1.7	-3.9	-5.0	-5.8	-7.2	-1.9	3.0
27-Mar	-7.9	-8.0	-7.7	-9.8	-9.8	-9.8	-8.8	-4.7	-0.6	2.2	4.2	5.3	6.3	7.0	7.2	7.7	7.9	7.6	6.2	3.2	1.0	1.1	1.6	1.6	0.1	7.9
28-Mar	1.0	0.5	0.3	0.2	-0.1	0.1	-0.7	0.3	3.1	6.4	8.7	8.9	10.2	9.6	10.7	11.3	9.5	8.8	7.7	5.8	4.6	3.6	3.1	2.9	4.8	11.3
29-Mar	1.5	0.4	0.0	-0.3	-0.3	-0.6	-1.1	1.5	3.8	6.3	8.6	9.6	10.2	10.8	11.2	11.2	10.8	9.8	8.5	7.5	6.8	6.8	6.6	6.3	5.7	11.2
30-Mar	6.0	6.1	5.4	5.0	4.9	4.5	3.7	3.4	4.6	7.5	8.9	9.4	10.0	10.5	10.1	10.2	9.5	8.5	7.2	6.4	4.7	1.6	-0.9	-1.6	6.1	10.5
31-Mar	-1.7	-2.0	-2.7	-3.2	-3.5	-3.9	-4.1	-4.3	-3.8	-2.7	-1.3	0.2	1.6	2.8	2.9	2.5	2.7	2.3	1.9	1.3	0.8	0.6	0.4	0.1	-0.6	2.9
	-4.3	-4.5	-4.7	-5.0	-5.2	-5.3	-5.5	-5.2	-4.0	-2.4	-1.1	0.0	0.8	1.5	1.9	2.1	1.9	1.4	0.3	-0.8	-1.8	-2.5	-3.0	-3.6	Diurnal Average	
	6.0	6.1	5.4	5.0	4.9	4.5	3.7	3.4	4.6	7.5	8.9	9.6	10.2	10.8	11.2	11.3	10.8	9.8	8.5	7.5	6.8	6.8	6.6	6.3	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Cenovus - Christina Lake - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	523	70.30	70.30
0 - 10	210	28.23	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 2016

Maximum Value: 98 % on Mar 13 20:00

Maximum Daily Average: 91.3 % on Mar 14

Minimum Value: 31 % on Mar 20 16:00

Minimum Daily Average: 49.6 % on Mar 29

Maximum Diurnal Average: 82.8 % at hour 7

Minimum Diurnal Average: 58.9 % at hour 16

Monthly Average: 73.0 %

Percentiles: $P_1 = 35$ $P_{10} = 48$ $Q_1 = 60$ Median = 77 $Q_3 = 87$ $P_{90} = 92$ $P_{99} = 98$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

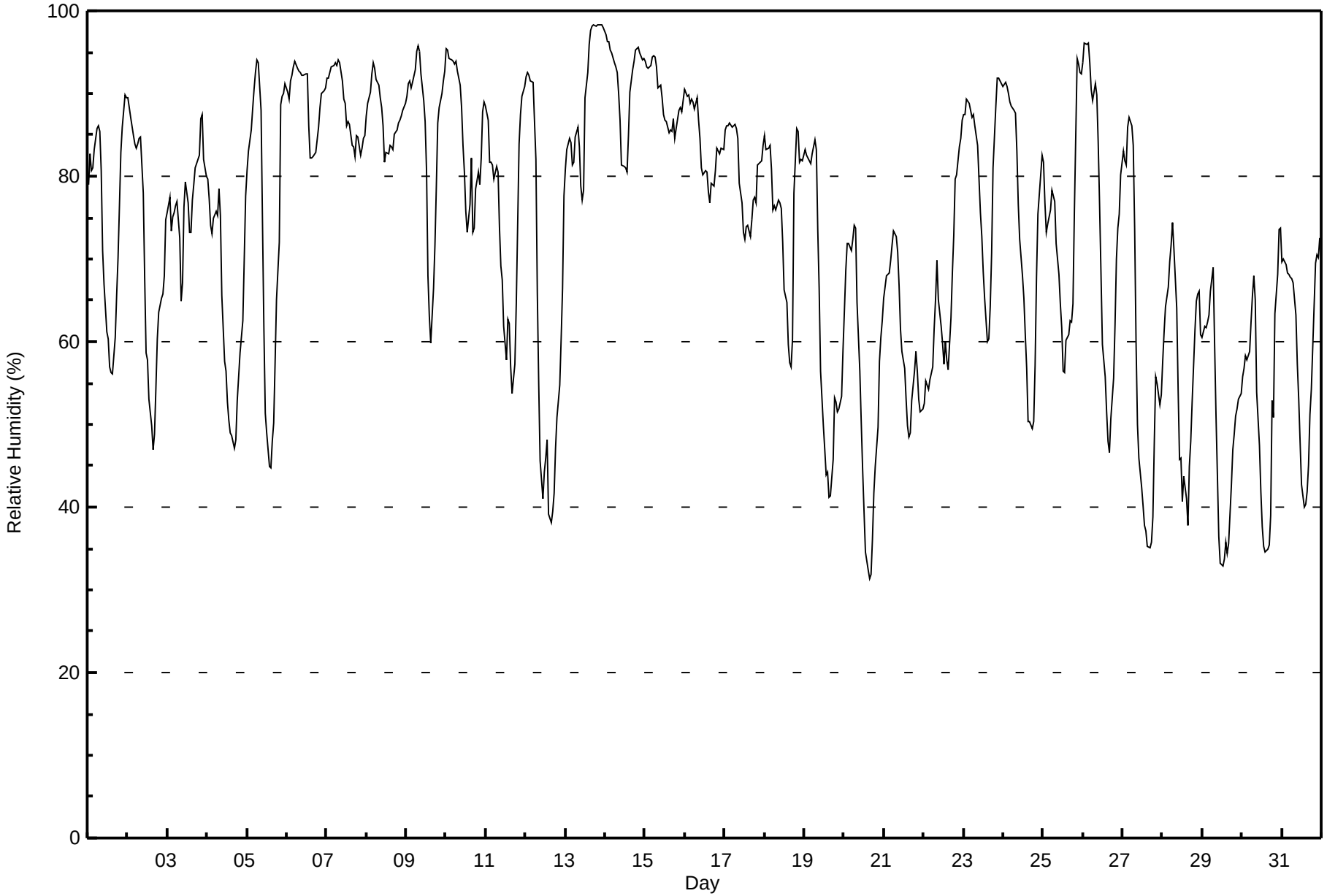
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	79	83	81	81	83	86	86	85	81	71	67	61	60	57	56	56	60	66	70	77	83	86	90	90	74.8	90
2-Mar	89	88	87	85	84	83	84	85	85	78	68	59	58	53	50	47	49	54	60	64	65	66	68	75	70.1	89
3-Mar	76	77	73	75	76	76	77	73	65	67	76	79	77	73	73	77	79	81	82	83	87	88	82	80	77.2	88
4-Mar	80	77	74	73	75	76	75	78	75	66	58	56	53	51	49	49	47	48	53	56	59	63	70	78	64.0	80
5-Mar	81	83	86	88	90	93	94	94	88	75	62	51	49	45	45	48	50	57	65	72	89	90	90	91	73.9	94
6-Mar	90	89	92	92	93	94	93	93	92	92	92	92	92	86	82	82	82	83	84	86	88	90	90	91	89.3	94
7-Mar	92	92	92	93	93	94	93	94	94	92	89	89	86	87	86	84	83	82	85	85	82	83	85	85	88.4	94
8-Mar	87	89	90	92	94	93	92	91	90	88	86	82	83	83	84	84	83	85	86	87	87	87	88	89	87.4	94
9-Mar	90	91	91	91	91	93	95	96	95	92	89	87	81	68	63	60	66	72	79	86	88	90	92	93	84.9	96
10-Mar	95	95	94	94	94	94	94	93	91	88	84	80	76	73	77	82	73	74	78	81	79	82	88	89	85.4	95
11-Mar	88	87	82	82	81	80	81	80	74	69	67	62	58	63	62	57	54	57	65	74	84	87	90	91	73.9	91
12-Mar	92	93	92	92	91	87	82	66	55	46	41	44	46	48	39	38	39	42	47	51	55	60	66	78	62.1	93
13-Mar	81	83	85	84	81	82	85	86	84	79	77	78	90	93	96	98	98	98	98	98	98	98	98	98	89.4	98
14-Mar	97	96	96	95	95	94	93	92	90	87	81	81	81	81	85	90	93	94	95	95	96	95	94	94	91.3	97
15-Mar	94	93	93	93	94	95	94	93	91	91	89	88	87	87	85	86	85	87	85	86	88	88	88	89	89.5	95
16-Mar	90	90	90	89	89	89	88	90	87	85	81	80	81	81	78	77	79	79	81	83	83	83	83	83	84.1	90
17-Mar	86	86	86	86	86	86	86	86	85	79	77	73	72	74	74	73	75	77	78	77	81	82	82	84	80.4	86
18-Mar	85	83	83	84	81	76	76	76	77	77	76	72	66	65	60	57	57	60	78	86	85	82	82	82	75.3	86
19-Mar	83	82	82	82	82	83	84	83	74	66	56	50	47	44	44	41	41	46	53	53	52	52	53	59	62.2	84
20-Mar	64	69	72	72	71	72	74	74	65	56	50	45	40	35	32	31	32	36	42	45	50	58	60	63	54.4	74
21-Mar	65	68	68	68	70	72	73	73	71	67	61	59	57	53	50	48	49	53	56	59	56	53	52	52	60.6	73
22-Mar	53	55	55	54	55	57	62	65	70	65	62	60	57	60	58	57	63	68	73	80	80	84	85	87	65.1	87
23-Mar	87	87	89	89	88	87	87	86	84	80	76	73	68	65	60	60	64	71	81	88	92	92	92	91	80.8	92
24-Mar	91	91	91	90	89	89	88	88	83	77	72	68	65	61	57	50	50	49	50	57	68	75	80	83	73.4	91
25-Mar	82	77	73	74	76	78	78	77	72	68	65	62	56	56	60	61	63	62	65	76	94	94	92	92	73.0	94
26-Mar	94	96	96	96	94	91	89	91	90	84	76	68	60	56	51	48	47	51	56	62	70	74	75	80	74.8	96
27-Mar	83	82	81	86	87	86	84	74	60	50	46	42	40	38	37	35	35	36	39	48	56	55	52	54	57.7	87
28-Mar	58	61	64	67	70	72	74	71	64	54	46	46	41	44	41	38	45	48	53	61	65	66	66	61	57.3	74
29-Mar	61	62	62	62	63	66	69	60	51	44	36	33	33	34	36	34	36	43	47	49	51	52	53	54	49.6	69
30-Mar	56	57	58	58	59	62	66	68	65	54	47	42	38	35	35	35	35	39	53	51	63	68	74	74	53.8	74
31-Mar	70	70	69	68	68	68	68	67	63	57	53	48	43	40	40	42	45	51	54	64	69	70	70	72	59.7	72
	81.2	81.7	81.6	81.8	82.1	82.3	82.8	81.5	77.7	72.4	68.0	64.8	62.5	60.8	59.5	58.9	60.0	62.9	67.4	71.5	75.6	77.1	78.4	80.0	Diurnal Average	
	97	96	96	96	95	95	95	96	95	92	92	92	92	93	96	98	98	98	98	98	98	98	98	98	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Cenovus - Christina Lake - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	30	4.03	4.03
40 - 60	155	20.83	24.87
60 - 80	220	29.57	54.44
80 - 100	339	45.56	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

Cenovus - Christina Lake - March 2016

Maximum Speed: 25 km/h on Mar 30 14:00

Maximum Daily Speed Average: 14.2 km/h on Mar 21

Minimum Speed Value: 0 km/h on Mar 13 01:00

Minimum Daily Speed Average: 2.1 km/h on Mar 7

Maximum Diurnal Speed Average: 1.4 km/h at hour 6

Minimum Diurnal Speed Average: 0.1 km/h at hour 20

Monthly Average Velocity: 0.4 km/h 320.9 deg

Percentiles: P_1 = 1 P_{10} = 4 Q_1 = 6 Median = 9 Q_3 = 13 P_{90} = 16 P_{99} = 21

Hours in Service: 744

Hours of Data: 733

Hours of Missing Data: 11

Percent Operational Time: 98.5

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	SSW6	SSW7	SW8	SW7	S4	SE4	SSE4	SSE3	ESE3	ESE1	ENE3	NE2	ESE3	E4	ESE6	E6	ESE7	E7	ENE5	NE6	NNE5	NE3	ENE2	E2	ESE2.2	SW8
2-Mar	SE3	SSW1	S3	S2	S3	S2	S4	S4	NNE1	NE2	ENE2	ENE2	ENE5	ENE4	ESE4	ESE1	NE5	ESE6	SE7	SSE6	SSE8	SE7	ESE4	ESE4	SE2.7	SSE8
3-Mar	E6	SE6	SE8	SE6	SSE8	SE10	SE10	SE10	SSE13	SSE15	S15	SSE12	SSE10	S10	S9	SW7	SW7	WSW8	WSW4	W11	NW21	NW21	NNW17	NNW12	S3.5	NW21
4-Mar	NNW11	N13	NNW13	N10	NNE8	NNE4	NNE4	NE7	ESE6	SE5	E3	ENE7	SE8	ESE10	SE10	SE12	SE13	SE12	SE12	SE11	SSE12	SSE8	SSE13	SSE14	ESE4.7	SSE14
5-Mar	SSE12	S11	S11	SSW6	SW5	SSW4	SSW7	WSW5	S4	SW1	SE2	E3	N4	E3	NE4	NNE8	N7	NNE17	NNE14	NNE13	NNE14	NE14	NNE14	NNE15	NNE2.7	NNE17
6-Mar	NNE13	NNE14	N14	N15	NNE14	NNE13	NNE11	NE12	NNE11	NNE11	NE11	NE10	NE9	NE15	NE17	NE18	ENE17	NE16	NE16	NE15	NE14	ENE14	ENE12	ENE11	NE12.7	NE18
7-Mar	ENE10	ENE9	ENE7	ENE7	ENE6	ENE6	NNE4	NNE3	E3	SE4	SSE4	SW5	NW8	NW8	NW7	WNW10	W10	W10	WSW11	WSW10	NW9	NW7	WSW7	WSW8	NW2.1	WSW11
8-Mar	WSW8	WNW4	E3	E4	ESE4	SSE4	SSE4	SSE4	S7	S13	S11	SSW9	SSW11	SW11	SSW11	SSW10	SW12	SW12	SW11	SW11	SW9	SSW6	SW6	SW6	SSW6.7	S13
9-Mar	SW5	SW8	WSW10	WSW10	WSW10	SW9	WSW6	SW6	SSW7	S6	SSW7	S9	S7	SW6	SW8	SSW8	S9	SSE7	SSE7	SSE7	S9	S7	S10	S10	SSW6.9	S10
10-Mar	S14	S14	SSE12	SSE13	SSE14	SSE12	SE13	SE12	SE14	SE14	SE17	ESE16	ESE15	ESE17	SE16	SE16	SE15	SE10	ESE7	ESE12	SSE1	W2	S6	S5	SE11.0	ESE17
11-Mar	SSW6	WSW6	WSW10	SW10	SW9	WSW10	SW8	SW12	WSW16	WSW16	W21	W19	WSW17	WSW17	W19	W20	W17	WNW12	NW7	S3	S5	SSE2	SSE2	ESE3	WSW9.9	W21
12-Mar	E3	SE4	ESE3	NNE3	ENE5	ENE5	ENE7	ESE10	ESE11	SE14	SE19	SE18	SE21	SE19	SE24	SE15	SE13	ESE11	E8	ESE7	E5	E6	E3	ESE2	ESE9.2	SE24
13-Mar	SSW0	S3	S1	SSW3	NW2	W3	WSW3	WNW4	WNW7	NW7	NW13	NW16	WNW16	W17	W15	W16	W16	W15	WSW14	WSW13	WSW12	WSW13	W12	W10	W8.6	W17
14-Mar	NW12	NW13	W8	NW13	W9	WNW11	NW13	NW12	NW11	NW11	NNW11	NNW10	NNW10	NNW8	NW12	NW11	NW9	NW8	NNW6	N7	N8	NE10	NNE10	N9	NW9.0	NW13
15-Mar	N7	N8	N7	N7	NNW7	NNW7	NNW7	NNW8	N9	NNW7	NNW9	N9	NNW10	NNW12	NNW13	NNW11	NNW11	NNW13	NW16	NW14	NW12	NW15	NW16	NW15	NNW10.0	NW16
16-Mar	NW15	NW15	NW15	N14	N13	N10	N10	N8	NNW13	NNW12	NNW12	NW14	NW14	NW16	NW16	NW14	NNW13	NNW11	NNW9	NW11	NNW14	NW10	NW17	NW18	NNW12.6	NW18
17-Mar	NW12	NW16	NW14	NW18	NW19	NW19	NW17	NW14	NW13	NNW16	NNW15	NNW13	NNW13	NNW14	NNW13	NNW13	NW14	NW13	NW13	NW11	NW9	NNW8	NNW7	NW6	NW13.2	NW19
18-Mar	NW8	NW7	NW7	NW6	NW7	NNW10	N5	NNW7	NNW7	NE2	S6	WSW7	WSW8	S7	SSW7	S5	SSW6	SSE5	SE8	SSE8	S7	S8	S10	S10	SW2.4	S10
19-Mar	S6	SSW7	SSW7	SSW8	S7	S6	SE4	SE5	S8	S11	S14	S15	SSE13	SSE13	SSE12	SE13	SE13	ESE10	SE8	SE8	SE9	SE8	ESE5	E5	SSE7.9	S15
20-Mar	ENE5	ENE7	ENE7	ENE6	E5	ENE4	ENE4	ENE4	ESE7	SE11	ESE10	ESE11	ESE10	SE14	SE13	SE13	ESE12	E15	ESE9	ESE8	E9	E15	ESE13	E9	ESE8.5	E15
21-Mar	ENE9	ENE11	ENE13	ENE15	ENE14	ENE13	ENE13	ENE15	ENE15	ENE14	ENE15	ENE17	E18	E19	E18	E14	E15	ENE18	ENE17	ENE15	ENE16	ENE13	ENE11	ENE9	ENE14.2	E19
22-Mar	ENE8	ENE7	ENE8	E6	ENE6	E6	E6	ESE6	ESE7	ESE5	ESE8	SSE10	SE8	SE9	ESE8	SE8	SSE10	SE9	SE7	SE6	SSE11	S12	SSE11	SSE11	SE6.8	S12
23-Mar	S9	S8	S8	S6	S5	S5	SSW6	SW7	WSW9	WSW9	WNW11	NNW10	NW10	NW15	WNW12	WNW8	NW9	NNW8	NNE9	NE9	NE8	NNE12	NNE10	NNE9	NW3.0	NW15
24-Mar	NNE10	NNE8	NNE10	NNE11	NE14	NE12	NE11	NNE10	N9	NNE9	NE13	ENE12	ENE9	NE6	NE6	NNE3	N3	N3	N6	E3	E3	E4	SSE2	S3	NE6.6	NE14
25-Mar	SSE3	SSE6	SE5	ESE4	E3	SSE4	SE3	ESE4	S6	S7	S10	S12	SSW11	SSW13	SSW13	SW13	SW11	SW11	SSW8	WSW7	AF	SW8	WSW9	WSW9	SSW6.5	SSW13
26-Mar	WSW9	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NNE8	NE7	E4	SSE7	ESE5	ENE7	ESE10	SE10	SSE6	SSE6	SE5	SE4	E3	----	ESE10
27-Mar	ESE4	SE5	SE4	E5	E3	ENE5	E6	ENE4	SSE9	S4	SSE11	SSE14	SSE13	SE14	SE12	ESE14	SE14	SSE14	SE10	ESE7	ESE5	SE7	SE7	SE8	SE7.5	SSE14
28-Mar	ESE4	E2	SSE4	SE6	SE6	SSE8	S9	S7	SSW10	SSW10	SW11	SW13	SW16	WSW16	SW15	WSW16	W16	WSW13	SW9	SW9	SSW8	SSW7	WSW5	WSW9	SW7.7	W16
29-Mar	SW6	SW6	SW8	SW9	SW7	SW6	SSW6	SW8	WSW10	SW9	W11	WNW16	WNW17	WNW18	WNW18	WNW19	WNW17	W18	WSW12	SW10	SW7	WSW11	WSW11	WSW10	WSW9.7	WNW19
30-Mar	WSW11	W5	SW7	SW11	W9	NW18	NW19	NW14	NW13	NNW12	NNW14	NNW16	NNW22	NW25	NNW22	NNW21	NNW22	NNW13	NW18	NNW17	NW16	N21	N18	NNW13	NW13.6	NW25
31-Mar	N17	N16	N16	N16	NNW15	NNW14	NNW14	NNW15	N13	N10	NW9	NW12	NW10	NW12	NW14	NW14	WNW9	WNW7	NW2	SW6	SSE5	SSE5	SSW5	SSW6	NNW8.5	N17
	NW0.6	NNW1.0	NW0.6	NNW1.2	N1.1	N1.4	N1.1	N0.8	W0.2	SSE0.4	SSW0.5	NNE0.2	W0.4	WSW1.0	SW1.1	W1.3	W1.1	WNW0.4	NNE0.7	SE0.1	N0.5	NE0.9	NNW0.3	W0.6	Diurnal Average	
	N17	NW16	N16	NW18	NW19	NW19	NW19	NNW15	WSW16	WSW16	W21	W19	NNW22	NW25	SE24	NNW21	NNW22	W18	NW18	NNW17	NW21	N21	N18	NW18	Diurnal Maximum	

AF - Analyzer Failure

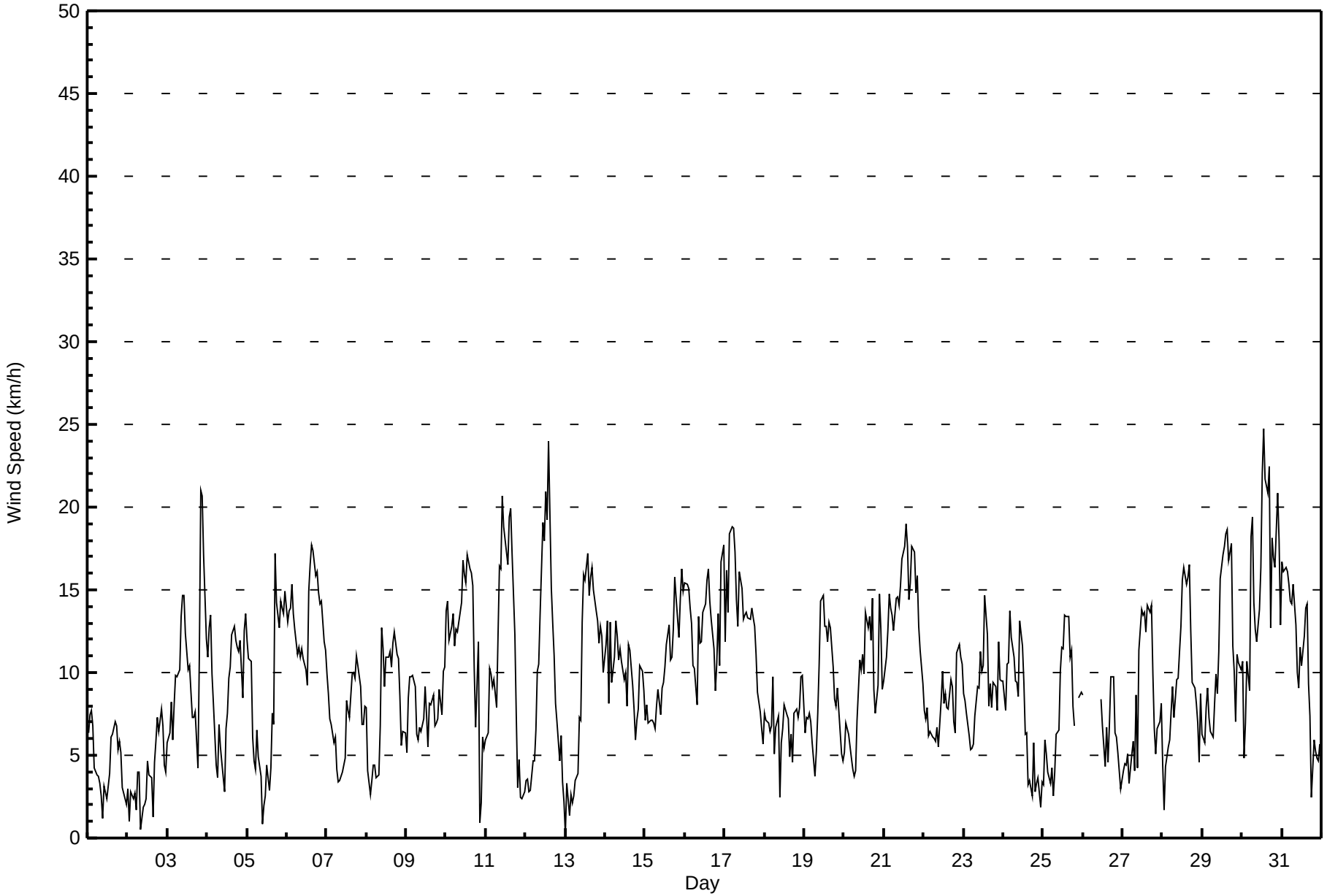
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Cenovus - Christina Lake - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	142	19.37	19.37
6 - 11	345	47.07	66.44
12 - 19	234	31.92	98.36
20 - 28	12	1.64	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 733

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

Cenovus - Christina Lake - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	4	8	6	15	22	19	14	16	18	5	4	4	3	2	2	0	142
6 - 11	17	17	11	22	11	24	30	21	35	27	38	27	7	8	25	25	345
12 - 19	10	11	12	19	7	8	25	17	8	2	7	12	11	9	47	29	234
20 - 28	1	0	0	0	0	0	2	0	0	0	0	0	2	0	3	4	12
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	32	36	29	56	40	51	71	54	61	34	49	43	23	19	77	58	733

Total Number of Valid Hours: 733

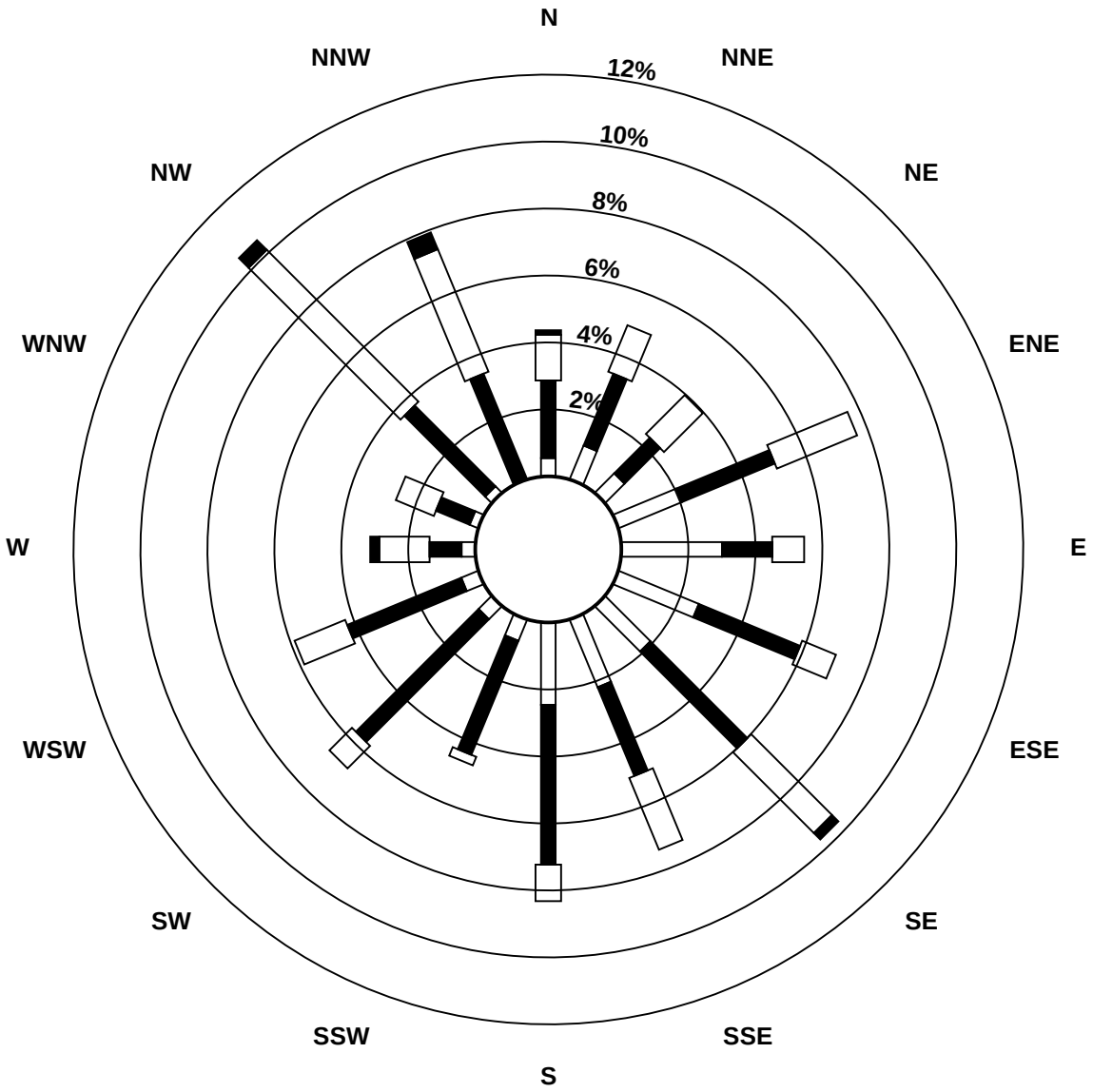
Total Number of Hours: 744

Wood Buffalo Environmental Association

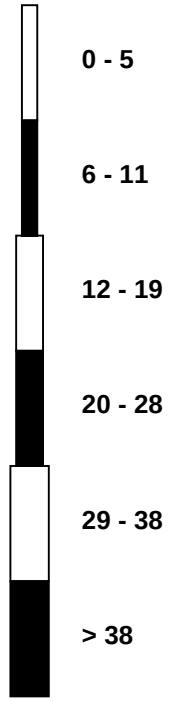
Wind Rose Mar 2016

Wind Speed (WS) - km/h

Cenovus - Christina Lake (AMS500)



Classes (km/h)



Total Number of Valid Hours: 733

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Cenovus - Christina Lake - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 8 km/h on Mar 12 11:00

Minimum Value: 0 km/h on Mar 1 07:00

Percentiles: P_1 = 1 P_{10} = 1 Q_1 = 1 Median = 2 Q_3 = 3 P_{90} = 4 P_{99} = 6

Hours in Service:	744
Hours of Data:	733
Hours of Missing Data:	11
Hours of Calibration:	0
Percent Operational Time:	98.5

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

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Cenovus - Christina Lake - March 2016

Direction of Maximum Speed: 317 deg on Mar 30 14:00
Direction of Maximum Daily Speed Average: 70.5 deg on Mar 21

Direction of Minimum Speed: 201 deg on Mar 13 01:00
Direction of Minimum Daily Speed Average: 2.1 deg on Mar 7

Monthly Average Direction: 270.7 deg

Hours in Service:	744
Hours of Data:	733
Hours of Missing Data:	11
Percent Operational Time:	98.5

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	208	211	216	220	190	131	154	163	118	112	60	49	113	84	103	96	111	84	63	38	26	39	68	96	118.8
2-Mar	133	194	186	191	191	188	177	187	33	46	77	67	71	73	112	106	50	106	132	163	163	139	105	105	129.3
3-Mar	92	125	144	143	154	125	133	143	152	160	169	158	153	180	182	219	226	244	255	276	311	313	327	338	186.4
4-Mar	348	349	346	7	26	14	21	51	104	136	88	75	126	122	138	127	130	136	144	137	148	149	158	163	110.2
5-Mar	168	176	189	213	230	207	212	244	188	221	140	84	2	91	48	19	359	13	18	15	29	43	28	21	33.2
6-Mar	31	30	3	7	21	14	12	45	21	25	38	52	52	45	53	55	57	51	51	49	52	65	69	66	40.9
7-Mar	66	74	71	62	64	64	14	17	92	133	151	216	311	319	322	286	269	273	250	253	315	318	242	238	307.5
8-Mar	247	286	94	100	105	160	167	166	173	175	185	201	198	215	203	209	220	221	233	225	223	213	223	225	205.2
9-Mar	229	226	237	239	254	236	240	218	195	189	194	175	181	214	222	211	185	160	149	168	178	170	182	179	201.6
10-Mar	177	177	160	154	159	149	145	143	133	127	126	120	117	117	124	124	135	130	112	110	151	267	184	189	138.8
11-Mar	198	239	249	225	226	240	231	235	245	258	268	265	252	252	260	263	270	286	324	172	179	158	164	111	251.4
12-Mar	96	127	111	26	77	73	72	116	112	129	141	126	125	130	141	132	131	116	97	102	91	96	95	119	119.9
13-Mar	201	184	175	213	320	271	242	295	303	325	316	322	291	273	278	276	275	263	258	254	253	252	266	261	275.5
14-Mar	310	311	277	309	268	303	318	314	319	326	332	328	334	334	323	316	319	317	335	351	2	34	32	8	325.3
15-Mar	360	0	359	357	340	341	345	340	351	340	337	354	348	328	337	339	339	329	324	321	315	308	310	314	333.5
16-Mar	313	325	324	354	5	1	360	3	338	346	344	318	322	320	319	322	334	333	341	321	327	317	314	313	330.8
17-Mar	306	307	305	313	313	310	315	313	315	328	329	334	327	329	327	330	325	326	320	326	318	332	337	321	320.0
18-Mar	314	321	325	317	307	328	353	333	343	40	174	242	240	187	192	176	201	163	129	161	185	185	190	190	231.6
19-Mar	189	196	198	197	186	180	143	132	179	177	183	170	161	164	147	146	134	118	130	140	139	127	105	86	157.3
20-Mar	75	69	67	71	86	69	69	77	102	124	108	104	118	133	132	141	118	100	116	117	89	98	106	95	105.7
21-Mar	70	69	62	66	63	66	66	70	65	64	65	70	91	81	85	93	82	58	60	62	61	73	74	73	70.5
22-Mar	74	67	73	85	74	84	96	105	119	109	121	154	137	129	119	140	149	139	143	136	163	170	167	164	127.7
23-Mar	173	173	178	181	174	188	210	230	241	258	293	333	320	319	295	290	313	346	30	46	41	21	17	13	309.5
24-Mar	19	12	24	26	43	41	47	14	1	19	38	60	66	36	44	19	356	349	5	88	88	86	155	178	35.0
25-Mar	157	158	129	111	90	155	126	110	171	187	191	184	196	194	206	226	220	216	213	245	AF	233	240	239	199.0
26-Mar	242	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	28	39	86	160	103	74	123	132	149	164	144	137	91	--
27-Mar	120	125	135	88	80	68	82	76	158	173	163	159	147	140	132	117	135	156	141	109	111	139	137	135	134.0
28-Mar	120	98	149	125	132	157	177	186	195	205	230	233	228	249	233	243	260	246	236	216	212	212	247	243	220.3
29-Mar	228	219	224	216	219	217	192	225	242	229	281	289	294	283	288	291	299	263	246	230	222	238	238	239	257.3
30-Mar	237	274	224	233	266	309	308	308	309	334	343	340	327	317	333	333	339	333	323	334	315	0	358	341	322.8
31-Mar	350	357	3	349	341	339	331	332	349	351	324	322	323	323	313	318	285	290	306	219	164	150	193	200	330.5
	312.9	337.2	324.3	348.7	6.3	355.5	358.6	356.2	271.5	154.8	204.6	24.4	263.9	255.8	233.8	264.2	277.2	301.7	30.5	127.2	3.8	48.2	332.1	267.1	
	Diurnal Average																								

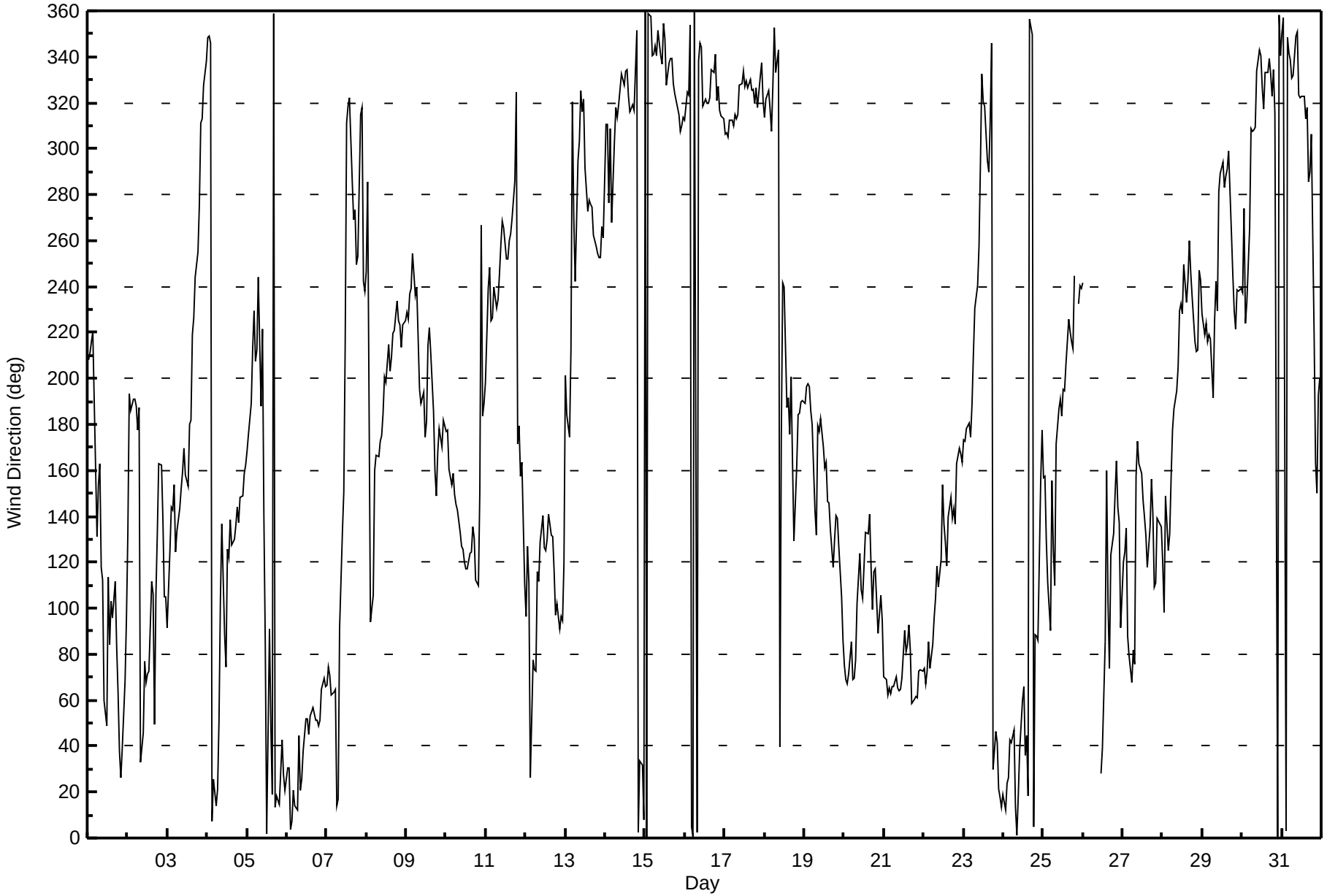
AF - Analyzer Failure
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Cenovus - Christina Lake - March 2016



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Cenovus - Christina Lake - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 99 deg on Mar 5 10:00

Minimum Value: 6 deg on Mar 20 04:00

Percentiles: P_1 = 8 P_{10} = 10 Q_1 = 13 Median = 16 Q_3 = 22 P_{90} = 34 P_{99} = 77

Hours in Service:	744
Hours of Data:	733
Hours of Missing Data:	11
Hours of Calibration:	0
Percent Operational Time:	98.5

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	21	18	17	21	28	17	13	27	44	81	29	44	36	35	27	34	13	17	28	7	13	45	44	37	81
2-Mar	39	15	17	16	26	29	12	13	86	28	36	50	26	29	51	78	39	10	17	12	8	26	13	22	86
3-Mar	9	19	11	16	16	12	13	14	15	13	17	17	13	19	21	20	19	18	41	37	9	9	14	15	41
4-Mar	16	16	16	15	11	19	18	19	21	27	67	34	35	24	25	14	15	11	11	13	13	16	14	13	67
5-Mar	16	20	16	25	24	30	18	16	42	99	80	63	61	47	34	14	19	14	13	15	11	11	15	12	99
6-Mar	12	17	17	17	13	15	14	13	19	15	15	14	15	13	12	11	11	10	10	9	11	10	10	9	19
7-Mar	9	10	9	8	8	9	23	14	22	19	18	37	26	17	21	24	23	24	16	19	24	27	22	17	37
8-Mar	20	65	33	24	20	16	18	14	17	14	21	24	23	20	19	19	19	21	20	18	18	19	17	18	65
9-Mar	23	18	17	20	16	21	28	22	26	22	26	18	39	44	27	28	14	14	10	10	10	12	13	12	44
10-Mar	11	13	14	15	12	15	17	17	18	16	16	14	16	15	12	17	17	17	17	14	96	81	18	21	96
11-Mar	12	28	15	12	14	17	15	16	16	17	17	17	18	17	17	17	18	28	19	38	25	35	21	48	48
12-Mar	34	31	49	37	21	18	17	12	11	15	19	14	12	14	15	13	13	14	10	9	15	7	22	26	49
13-Mar	87	37	95	43	55	55	30	53	18	19	12	11	25	16	15	15	16	15	15	15	15	14	20	20	95
14-Mar	15	11	35	20	25	27	11	10	13	15	18	14	11	16	11	11	10	11	21	17	21	12	12	14	35
15-Mar	15	14	16	16	15	18	15	13	15	17	18	22	22	17	15	14	14	15	11	13	11	10	10	11	22
16-Mar	10	11	11	26	17	16	14	17	15	17	19	13	13	13	13	13	15	11	14	13	13	12	9	9	26
17-Mar	15	10	12	9	9	9	10	11	13	14	14	18	16	16	16	12	13	14	12	12	11	12	12	11	18
18-Mar	9	11	10	12	26	16	24	14	19	65	31	40	30	22	31	40	22	29	11	8	8	11	11	11	65
19-Mar	12	12	13	13	12	12	32	14	18	13	15	14	15	14	17	17	16	12	17	11	11	14	20	22	32
20-Mar	12	7	9	6	8	12	11	12	19	12	19	25	21	20	18	16	14	13	11	16	24	12	13	14	25
21-Mar	13	12	8	9	10	10	9	9	10	12	13	14	18	14	15	17	16	11	10	9	9	13	9	8	18
22-Mar	8	7	8	11	8	18	12	15	15	37	26	21	27	26	31	26	16	13	19	17	9	11	11	9	37
23-Mar	11	9	8	11	15	13	20	22	18	27	30	25	21	18	28	29	23	21	16	9	12	9	12	13	30
24-Mar	12	12	11	12	10	10	10	22	13	32	13	18	26	40	46	68	54	61	11	31	14	17	39	19	68
25-Mar	27	9	20	15	21	35	44	13	23	21	20	20	21	19	20	20	18	17	17	32	AF	18	17	18	44
26-Mar	15	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	23	38	73	38	49	25	20	8	12	8	24	17	21	73
27-Mar	12	27	17	15	34	28	26	35	18	49	17	19	17	18	20	17	19	12	15	10	10	13	11	12	49
28-Mar	18	61	27	13	13	18	12	19	19	22	22	18	20	17	18	18	17	16	15	9	10	14	78	37	78
29-Mar	45	55	17	10	14	13	13	17	18	24	28	23	19	23	22	24	24	16	15	16	17	11	13	12	55
30-Mar	12	45	44	14	24	10	9	10	11	17	22	21	18	15	16	14	16	14	15	13	12	18	18	15	45
31-Mar	18	18	18	17	17	14	13	12	24	28	30	29	27	22	23	13	37	34	92	24	13	14	12	20	92
	87	65	95	43	55	55	44	53	86	99	80	63	61	73	51	78	54	61	92	38	96	81	78	48	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	March 23, 2016	Last Calibration	February 17, 2016
Station Name	Cenovus - Christina Lake	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	13:20	End Time (MST)	17:30
Gas Cert Reference	LL107928	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	Sep-8-2018
Calibrator Make/Model	API T700	Serial Number	451
ZAG Make/Model	API 701	Serial Number	404
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	841	839
Calculated slope	0.997571	0.995625	Chamber temp	45.1	45.1
Calculated intercept	0.621039	0.886051	Pressure	669.9	679.4
Analyzer Background	13.3	13.2	Flow	0.583	0.587
Analyzer Coefficient	1.027	1.027	Intensity	90	90

Analyzer make	Thermo 43i	Analyzer serial #	118148497

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	79.3	793.0	796.3	0.996
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	79.3	793.0	796.3	0.996
second point	5000	39.7	397.0	396.5	1.001
third point	5000	19.8	198.0	198.0	1.000
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	79.3	793.0	795.3	0.997
				Average Correction Factor	0.999

Corrected As found	796.5	Previous response	794.3	% change	-0.3%

Notes:

Changed inlet filter after as founds. No adjustments.

Calibration Performed By: Evan Magill

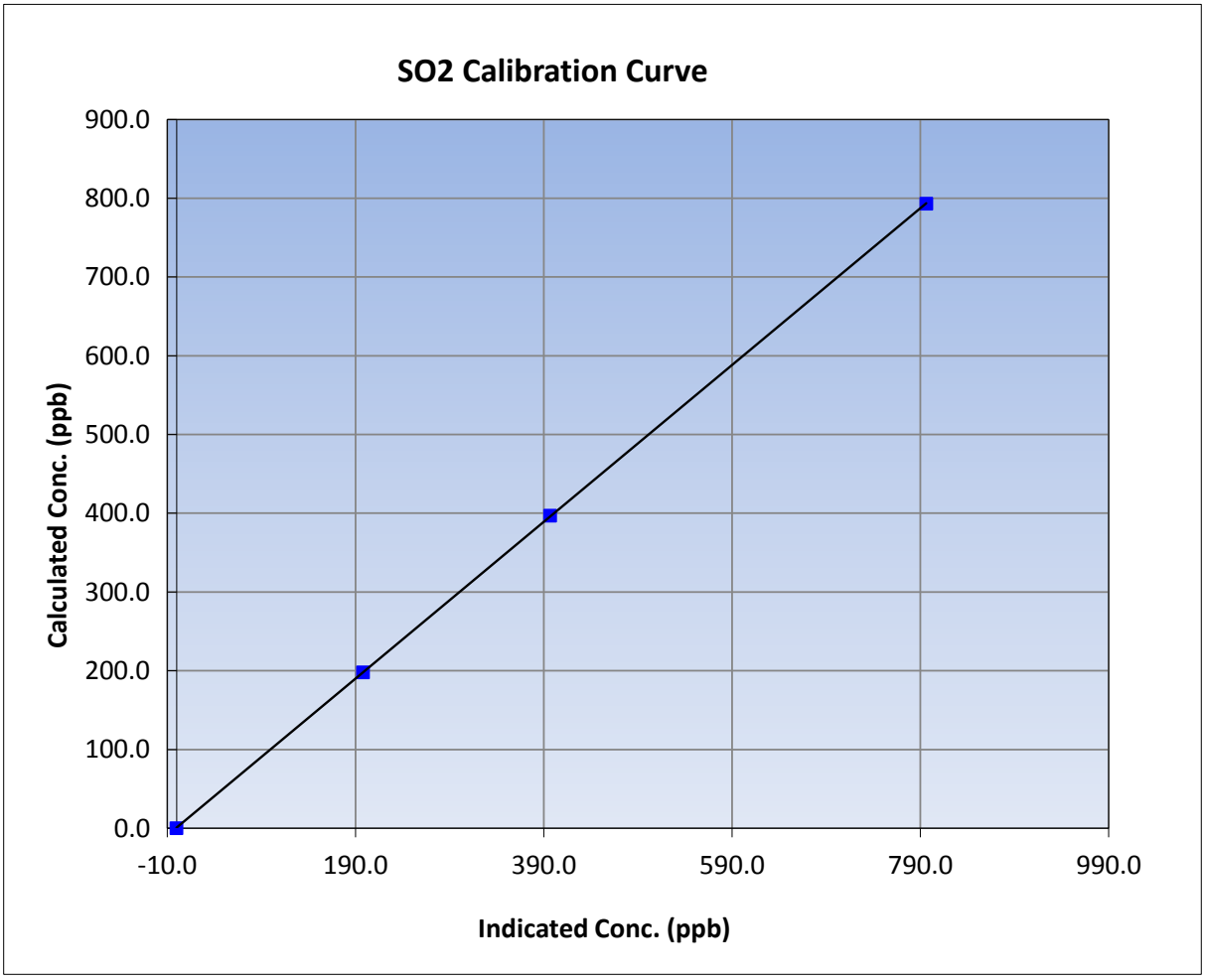
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

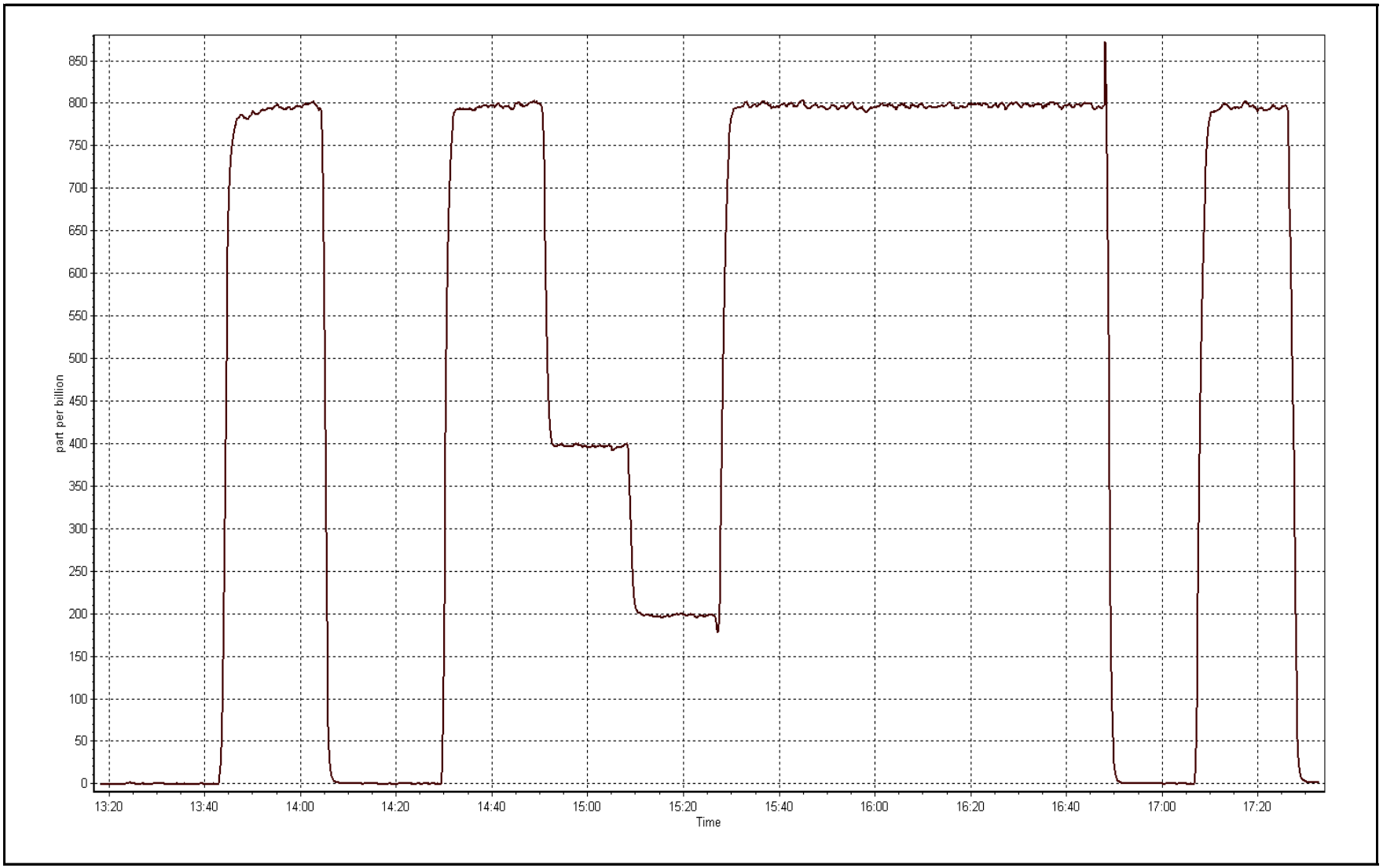
Calibration Date	March 23, 2016	Previous Calibration	February 17, 2016
Station Name	Cenovus - Christina Lake	Station Number	AMS 500
Start Time (MST)	13:20	End Time (MST)	17:30
Analyzer make	Thermo 43i	Analyzer serial #	118148497

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999992
793.0	796.3	0.9959		
397.0	396.5	1.0012	Slope	0.995625
198.0	198.0	1.0000		
			Intercept	0.886051



SO2 Calibration Plot Date: March 23, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	March 24, 2016	Last Calibration	February 18, 2016
Station Name	Cenovus	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	7:15	End Time (MST)	9:40
Gas Cert Reference	LL23598	Station temp.	22 Deg C
Cal Gas Concentration	10.2 ppm	Cal Gas Exp Date	5/30/2016
Calibrator Make/Model	API 700	Serial Number	451
ZAG air Make/Model	API 701	Serial Number	404
DACS make/model	Campbell Scientific CR3000	Serial Number	2575
SO2 gas concentration	50 ppm	SO2 gas cert/exp	LL107928 09-Aug-18

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-680	-680
Analyzer IP address	192.168.1.42		Lamp voltage	982	981
Calculated slope	0.995289	0.998541	Chamber temp	45	45
Calculated intercept	0.262628	0.121173	Pressure	639.1	659.3
Analyzer Background	1.76	1.72	Flow	0.424	0.433
Analyzer Coefficient	0.882	0.882	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	39.3	80.2	80.2	1.000
SO2 scrubber check	5000	20.0	200.0	1.6	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	39.3	80.2	80.2	1.000
second point	5000	19.7	40.2	40.2	1.000
third point	6000	11.9	20.2	20.1	1.008
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	39.3	80.2	80.9	0.991
				Average Correction Factor	1.003

Corrected As found	80.3	Previous response	80.3	% change	0.0%

Notes:

Changed inlet filter and scrubber check done after as founds. No adjustments.

Calibration Performed By: Evan Magill

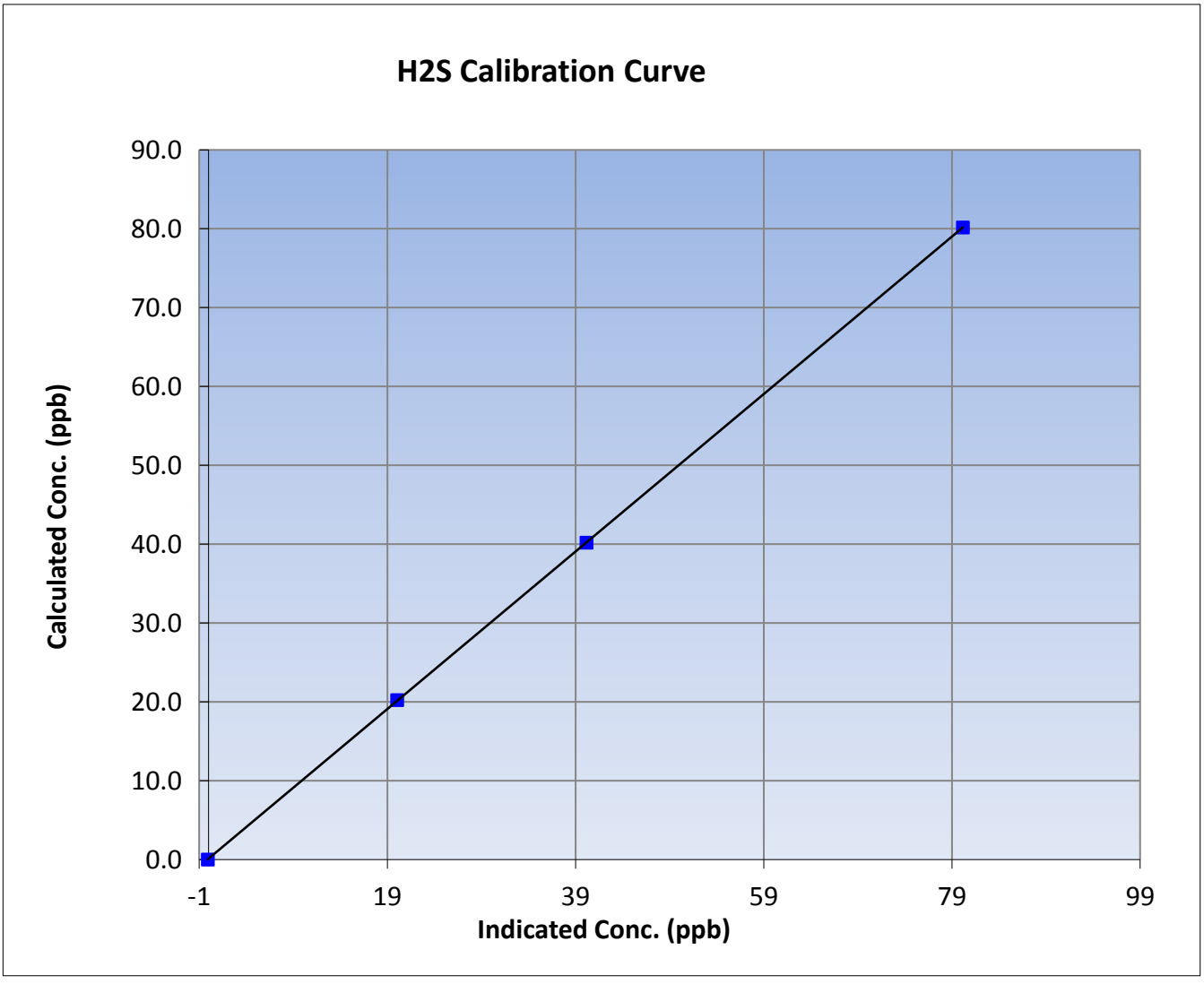
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

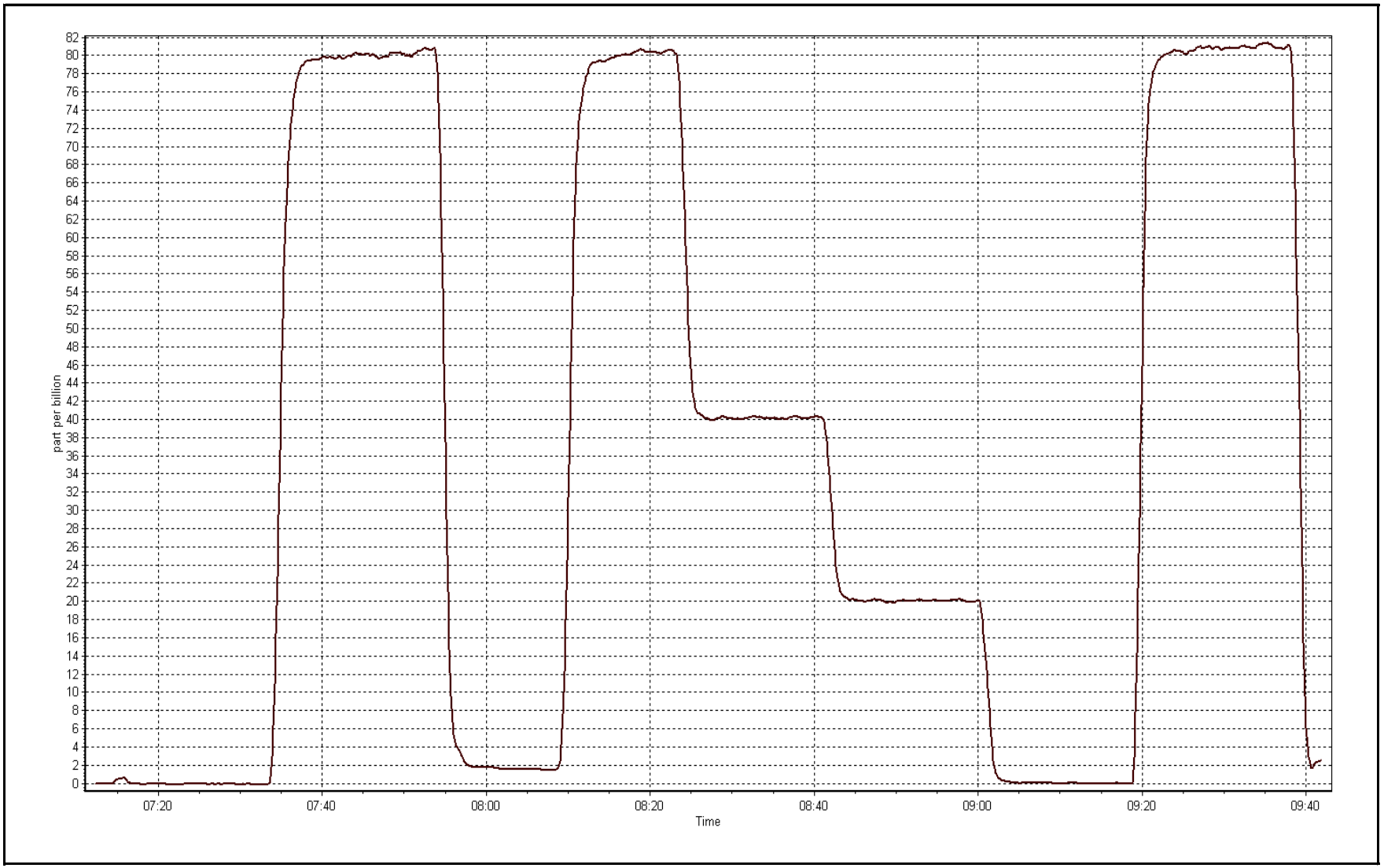
Calibration Date	March 24, 2016	Previous Calibration	February 18, 2016
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	7:15	End Time (MST)	9:40
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1008841400

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999997
80.2	80.2	1.0001		
40.2	40.2	1.0002	Slope	0.998541
20.2	20.1	1.0085		
			Intercept	0.121173



H2S Calibration Plot Date: March 24, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 23, 2016	Previous Calibration	February 17, 2016
Station Name	Cenovus	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	13:20	End Time (MST)	17:30
NO Cal Gas Conc	50.5 ppm	Gas Cert Reference	LL107928
NOx Cal Gas Conc	50.8 ppm	Cal Gas Expiry Date	Sep-8-2018
Calibrator	API T700	Serial Number	451
Zero air Generator	Teledyne API T701	Serial Number	4604

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2575

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000094	0.998815	1.013491
	Data Offset	-0.335236	0.480002	-0.871027
Current Calibration	Data Slope	0.996723	0.995802	0.995782
	Data Offset	1.199856	1.276187	-1.149607

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	723

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	1.065		1.045	
NOX coefficient	1.066		1.050	
NO2 coefficient	1.000		1.000	
NO bkgrnd	1.3		-0.3	
NOX bkgrnd	0.8		0.6	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	315.3	Deg C	316.3	Deg C
PMT voltage	826	V	826	V
PMT Temp	6.9	Deg C	6.9	Deg C
O3 flow	85	ccm	85	ccm
R Cell press NO	241.3	mmHg	264.16	mmHg
R Cell Press Nox	243.84	mmHg	266.7	mmHg
NO sample flow	0.482	lpm	0.488	lpm
Nox sample Flow	0.478	lpm	0.486	lpm

Notes:

Changed inlet filter after as founds. Small adjustment on zero and span.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 23, 2016 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	0.0	-0.5	0.5	----	----
as found span	5000	79.3	805.7	800.9	4.8	818.3	813.7	4.6	0.9846	0.9844
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.2	----	----
high point	5000	79.3	805.7	800.9	4.8	807.3	803.7	3.6	0.9980	0.9966
second point	5000	39.6	402.3	400.0	2.4	402.9	399.6	3.3	0.9986	1.0008
third point	5000	19.8	201.2	200.0	1.2	199.1	198.4	0.7	1.0105	1.0080
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.3	-0.4	----	----
as left span	5000	79.3	805.7	446.3	359.4	806.3	451.2	355.1	0.9992	0.9891
								Average Correction Factor	1.0024	1.0018

Corrcted As found NO_X= 818.3 NO= 814.1 Percent Change NO_X= -1.5% NO= -1.6%

Previous Response NO_X= 805.9 NO= 801.4

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	807.9	800.3	-0.2	0.9973	1.0008	----	----
1st NO2 (300)	446.3	358.7	806.8	446.3	360.4	0.9987	----	0.9951	100.5%
2nd NO2 (200)	582.5	222.5	807.6	582.5	225.1	0.9976	----	0.9884	101.2%
3rd NO2 (100)	687.8	117.2	808.4	687.8	120.6	0.9966	----	0.9717	102.9%
2nd NO ref point		4.8	808.5	801.0	7.6	0.9965	1.0000	----	----
				Average Correction Factor		0.9973		0.9851	101.5%

Calibration Performed By: Evan Magill

Wood Buffalo Environmental Association

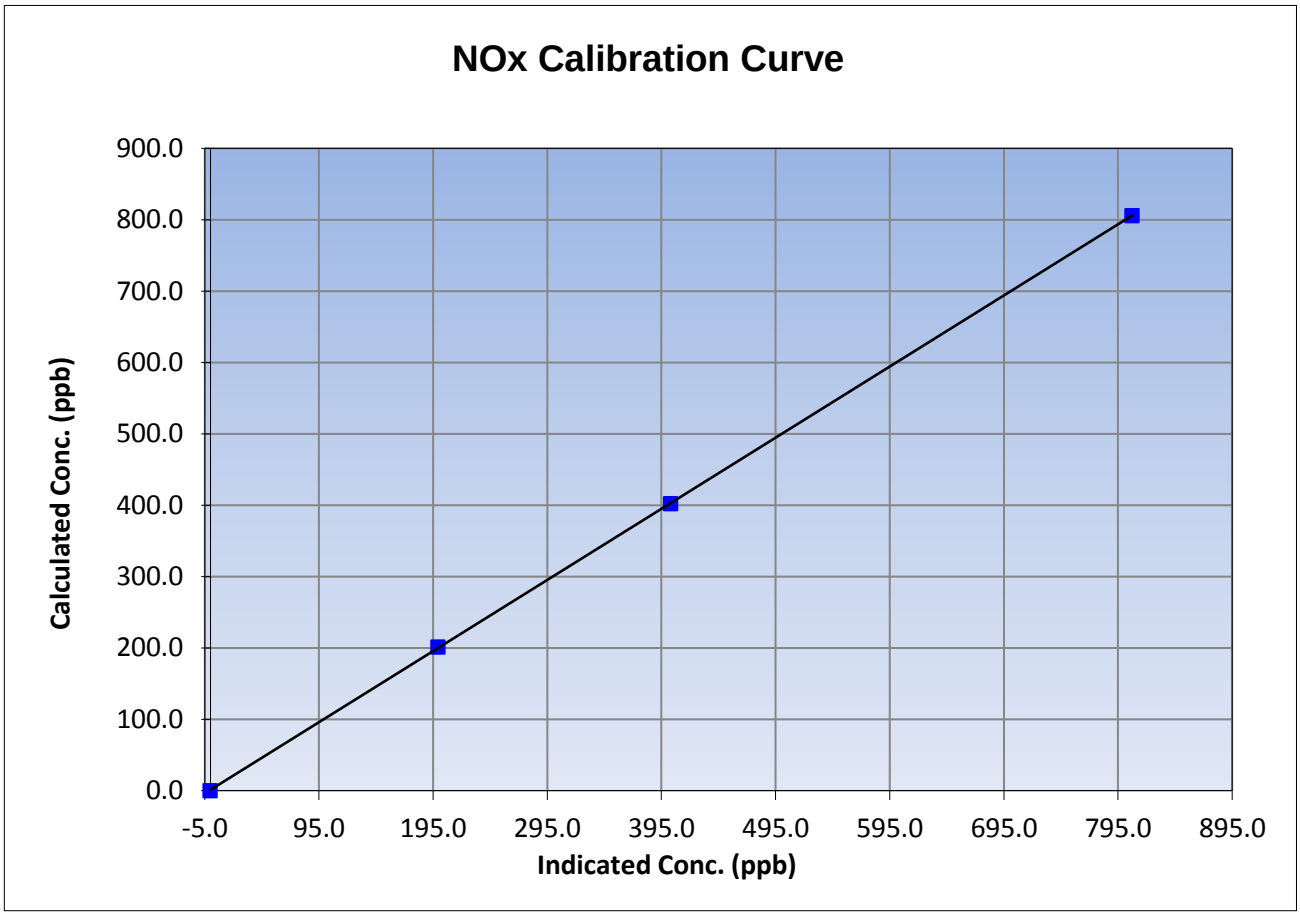
NO_X Calibration Summary

Station Information

Calibration Date	March 23, 2016	Previous Calibration	February 17, 2016
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	13:20	End Time (MST)	17:30
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	807.3	0.9980		
402.3	402.9	0.9986	Slope	0.996723
201.2	199.1	1.0105		
			Intercept	1.199856



Wood Buffalo Environmental Association

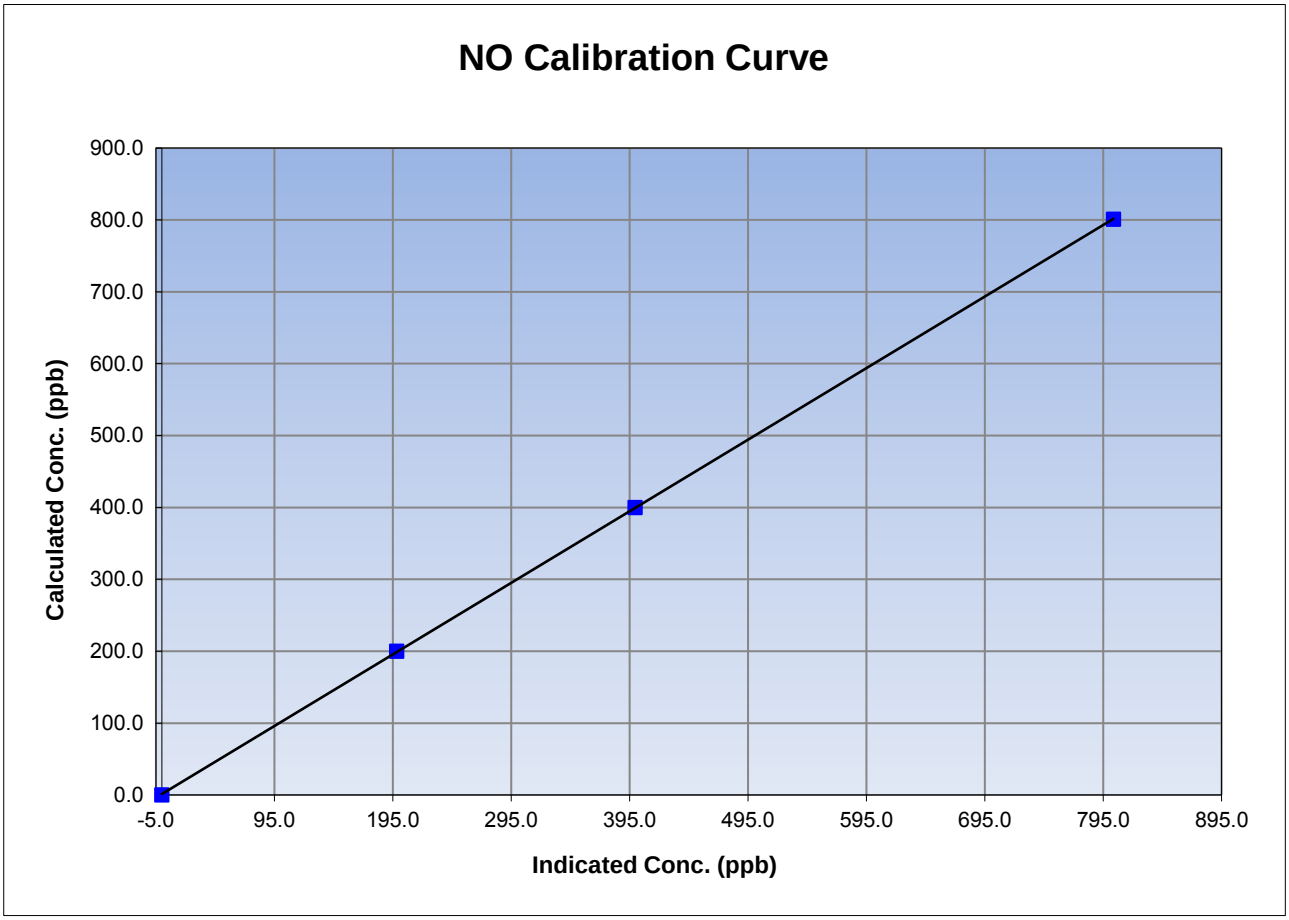
NO Calibration Summary

Station Information

Calibration Date	March 23, 2016	Previous Calibration	February 17, 2016
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	13:20	End Time (MST)	17:30
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	-0.1	N/A	Correlation Coefficient	0.999989
800.9	803.7	0.9966		
400.0	399.6	1.0008	Slope	0.995802
200.0	198.4	1.0080		
			Intercept	1.276187



Wood Buffalo Environmental Association

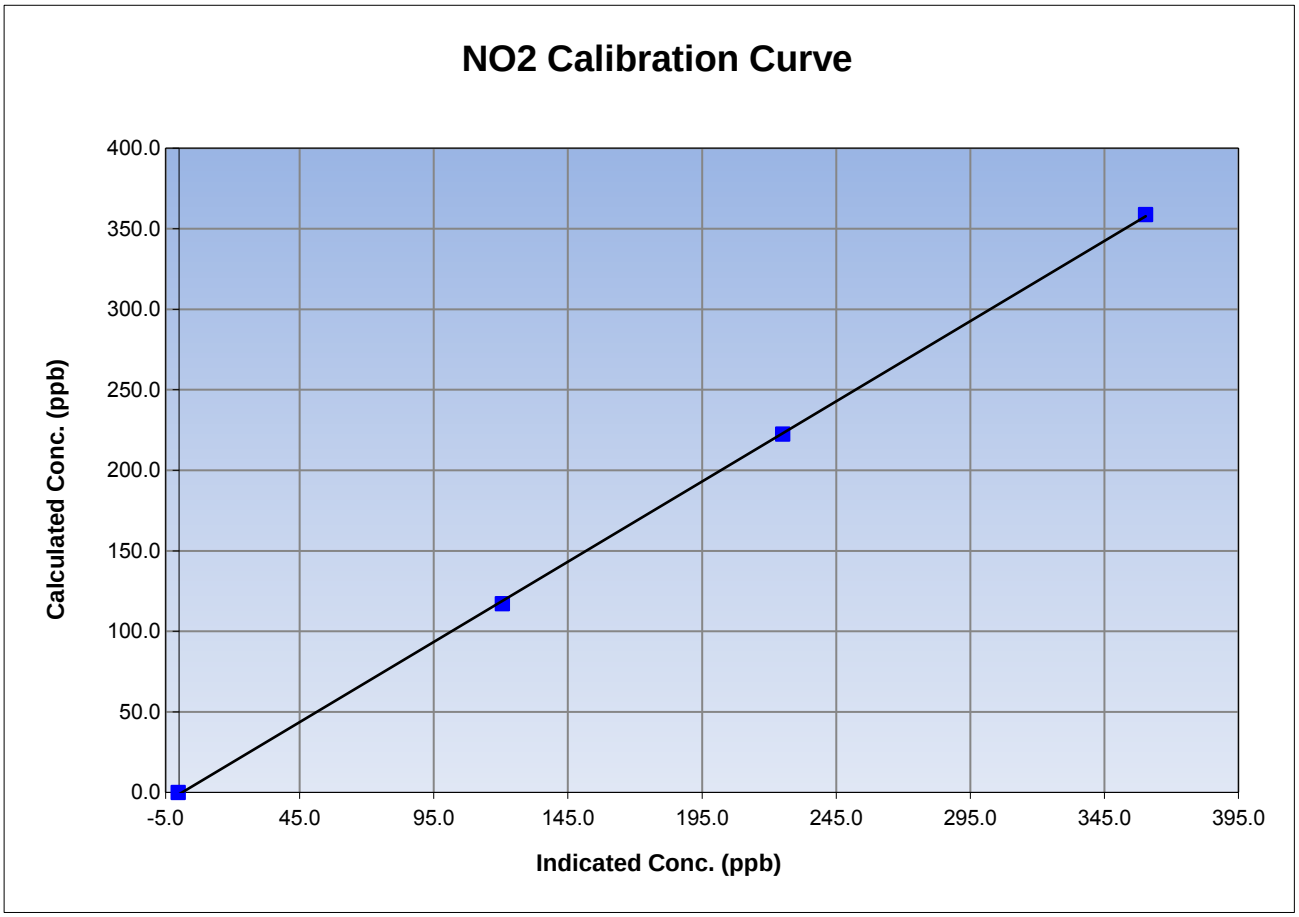
NO_2 Calibration Summary

Station Information

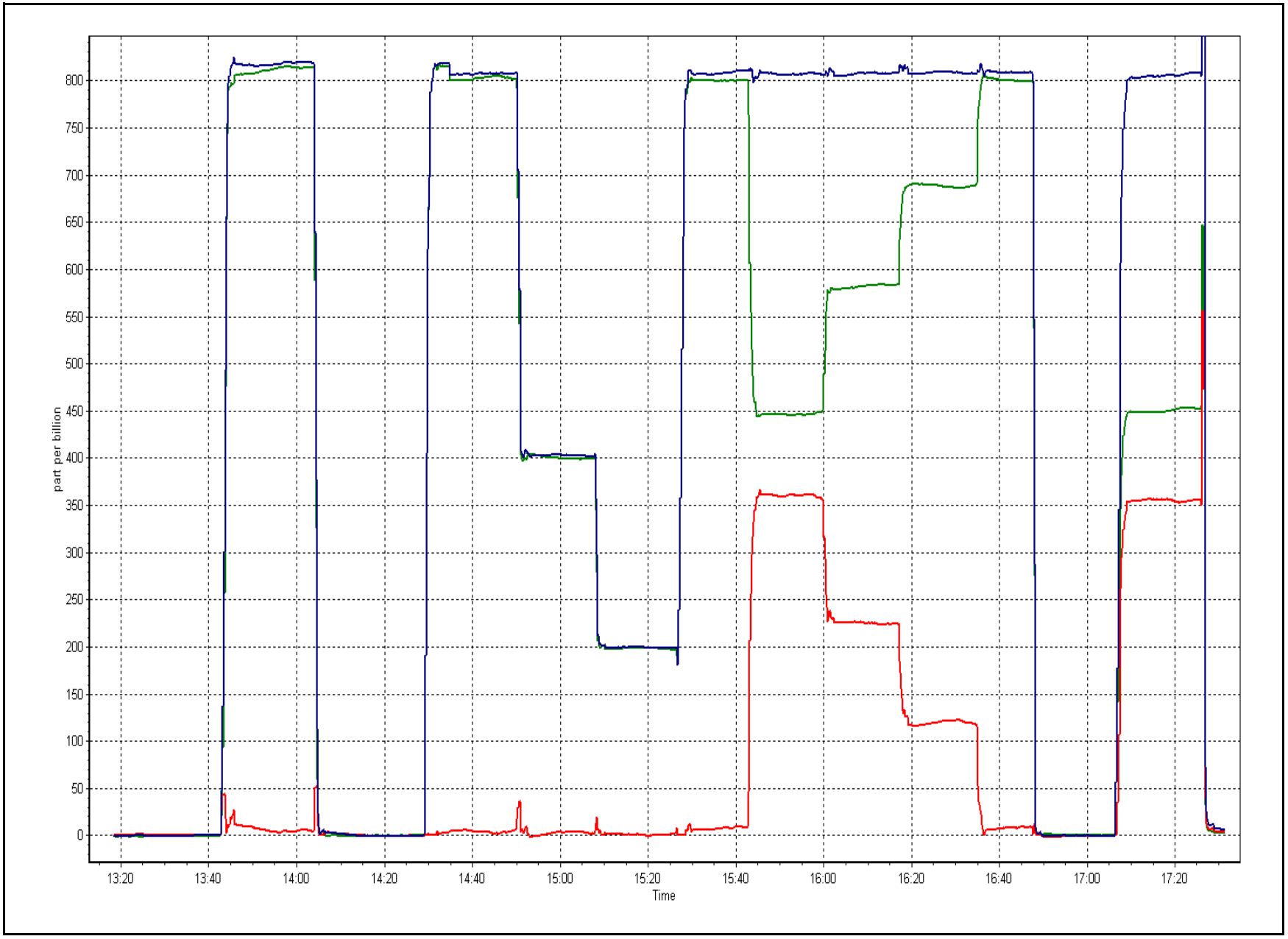
Calibration Date	March 23, 2016	Previous Calibration	February 17, 2016
Station Number	Cenovus	Station Number	AMS 500
Start Time (MST)	13:20	End Time (MST)	17:30
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999914
358.7	360.4	0.9951		
222.5	225.1	0.9884	Slope	0.995782
117.2	120.6	0.9717		
			Intercept	-1.149607



NOX Calibration Plot Date: March 23, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 501
STATOIL LEISMER
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
MARCH 2016

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	687	35	57	97.04	11	0	3	0
H2S (ppb) Average	708	35	36	99.87	0	0	0	0
NO2 (ppb) Average	709	35	35	100	12	0	4	-
NO (ppb) Average	709	35	35	100	18	-	3	-
NOX (ppb) Average	709	35	35	100	27	-	7	-
Temperature 2 m (C) Average	744	0	0	100	10.2	-	4.5	-
Relative Humidity (%) Average	744	0	0	100	98	-	93	-
Wind Speed 10 m (km/h) Average	744	0	0	100	31	-	18	-
Wind Direction 10 m (deg) Average	744	0	0	100	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	687	0.7	1	-	0	0	0	0	1	2	11
H2S (ppb) Average	708	0.2	0	-	0	0	0	0	0	0	0
NO2 (ppb) Average	709	1.8	2	-	0	1	1	1	2	4	12
NO (ppb) Average	709	0.5	1	-	0	0	0	0	0	1	18
NOX (ppb) Average	709	2.3	3	-	0	1	1	2	3	5	27
Temperature 2 m (C) Average	744	-2.73	4.8	-	-15.8	-8.4	-5.8	-2.9	-0.2	4.1	10.2
Relative Humidity (%) Average	744	75	17	-	33	50	62	79	89	94	98
Wind Speed 10 m (km/h) Average	744	9.8	5	-	0	4	6	9	13	17	31
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	01 Mar 2016 14:00	01 Mar 2016 18:00	5	Intermittent unstable operation - excessive baseline drift
SO2	04 Mar 2016 13:00	04 Mar 2016 15:00	3	Intermittent unstable operation - excessive baseline drift
SO2	07 Mar 2016 13:00	07 Mar 2016 13:00	1	Intermittent unstable operation - excessive baseline drift
SO2	18 Mar 2016 13:00	18 Mar 2016 18:00	6	Intermittent unstable operation - excessive baseline drift
SO2	24 Mar 2016 14:00	24 Mar 2016 18:00	5	Intermittent unstable operation - excessive baseline drift
SO2	26 Mar 2016 16:00	26 Mar 2016 16:00	1	Intermittent unstable operation - excessive baseline drift
SO2	30 Mar 2016 13:00	30 Mar 2016 13:00	1	Intermittent unstable operation - excessive baseline drift
H2S	21 Mar 2016 11:00	21 Mar 2016 11:00	1	Maintenance - cleaned glass manifold

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

Statoil - Leismer - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 11 ppb on Mar 13 14:00 Maximum Daily Average: 3.2 ppb on Mar 16

Minimum Value: 0 ppb on Mar 7 08:00
Maximum Diurnal Average: 1.1 ppb at hour 14
Monthly Average: 0.7 ppb

Minimum Daily Average: 0.2 ppb on Mar 25
Minimum Diurnal Average: 0.5 ppb at hour 4
Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 5$

Hours in Service:	744
Hours of Data:	687
Hours of Missing Data:	57
Hours of Calibration:	35
Percent Operational Time:	97.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	1	1	1	1	1	1	1	1	1	1	0	1	UO	UO	UO	UO	UO	0	0	0	0	0	0	0.5	1
2-Mar	0	Z	1	0	0	0	0	0	0	0	0	2	1	2	1	0	0	0	0	0	0	0	1	1	0.6	2
3-Mar	1	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	2	5	3	1	2	1	1.0	5
4-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	UO	UO	UO	0	0	1	0	1	1	1	1	1	0.5	1
5-Mar	1	1	1	0	Z	1	1	0	0	1	3	1	1	0	0	0	0	0	1	2	1	1	1	1	0.8	3
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	0.3	1
7-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	UO	1	1	0	1	0	0	0	0	0	0	0	0.3	1
8-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.3	1
9-Mar	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.5	1
10-Mar	0	0	0	Z	1	1	0	1	1	1	1	0	0	0	0	1	1	1	0	0	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	2	0	0	0	0	0	0.3	2
12-Mar	0	0	0	0	1	Z	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	1	0.5	1
13-Mar	Z	0	0	0	0	0	0	0	0	2	1	4	6	11	10	3	1	1	1	6	3	5	4	1	2.6	11
14-Mar	1	Z	1	2	2	1	1	1	1	4	4	3	1	1	1	0	0	0	0	1	0	0	0	0	1.2	4
15-Mar	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	2	1	2	2	5	0.8	5
16-Mar	2	3	3	Z	4	3	4	6	5	4	5	3	4	2	1	2	1	1	4	4	2	5	5	4	3.2	6
17-Mar	2	3	1	0	Z	0	0	0	0	0	0	0	1	2	1	1	2	0	0	0	0	0	0	0	0.7	3
18-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	UO	UO	UO	UO	UO	UO	0	0	0	0	0	0	--	0
19-Mar	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1	0.4	1
20-Mar	1	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
21-Mar	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.3	0
22-Mar	0	0	0	Z	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.6	1
23-Mar	0	0	0	0	Z	1	0	0	1	1	1	1	0	1	1	0	0	0	1	2	2	2	2	1	0.8	2
24-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	UO	UO	UO	UO	UO	0	0	0	0	0	0	0.3	0
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	0.2	0
26-Mar	0	Z	0	0	0	1	1	4	4	2	1	0	1	0	1	UO	1	0	0	0	0	0	0	0	0.9	4
27-Mar	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0.6	1
28-Mar	1	1	1	Z	1	0	0	0	1	1	0	0	0	0	0	0	4	3	2	0	0	0	1	5	1.0	5
29-Mar	1	0	0	0	Z	0	0	0	0	0	0	0	2	2	5	4	3	0	0	0	0	0	0	0	0.9	5
30-Mar	0	0	0	1	1	Z	0	0	1	0	0	0	UO	0	0	0	1	3	0	0	0	0	1	1	0.6	3
31-Mar	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	0	0	0	0	0	0	0	0	0.7	2
	0.5	0.6	0.5	0.5	0.7	0.6	0.6	0.8	0.7	0.7	0.8	0.7	0.9	1.1	1.0	0.6	0.7	0.6	0.6	1.0	0.7	0.8	0.8	0.8	Diurnal Average	
	2	3	3	2	4	3	4	6	5	4	5	4	6	11	10	4	4	3	4	6	3	5	5	5	Diurnal Maximum	

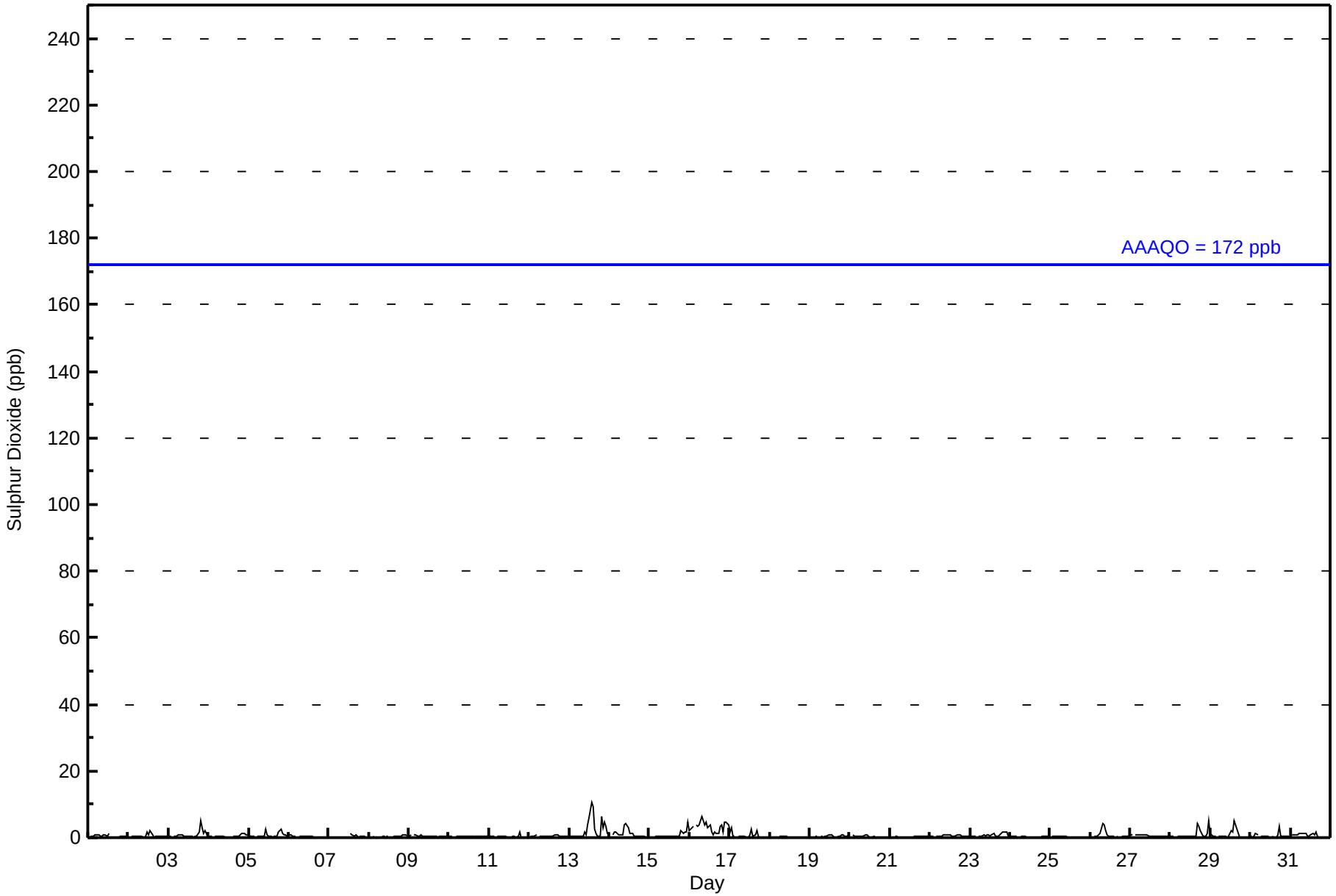
Z - zerospan C - Calibration UO - Unstable Operation
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

Statoil - Leismer - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Statoil - Leismer - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	686	99.85	99.85
11 - 20	1	0.15	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: 687

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

Statoil - Leismer - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	72	16	12	25	43	67	67	66	32	47	27	5	33	44	39	91	686
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	72	16	12	25	43	67	67	66	32	47	27	5	33	44	40	91	687

Total Number of Valid Hours: 687

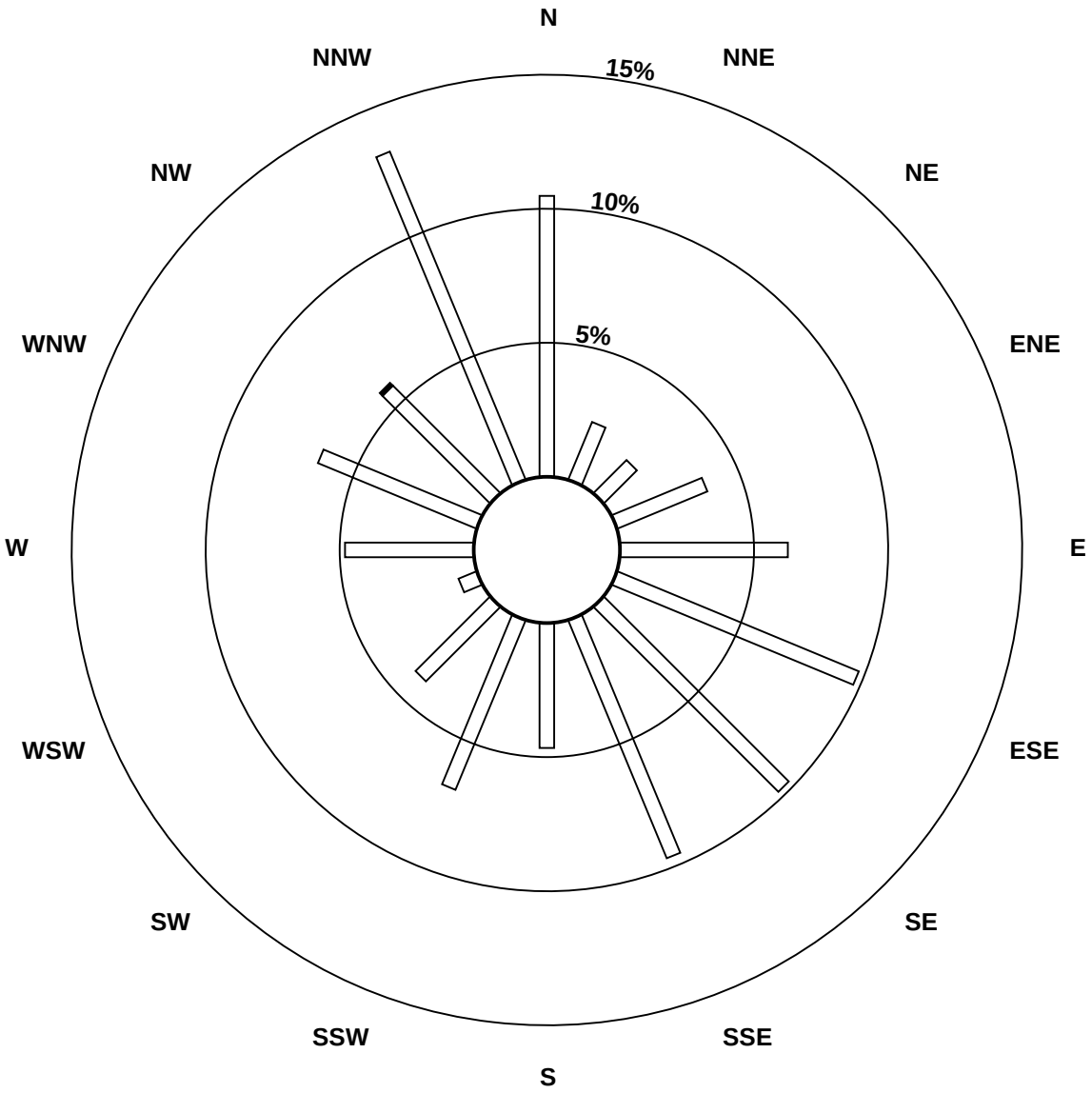
Total Number of Hours: 744

Wood Buffalo Environmental Association

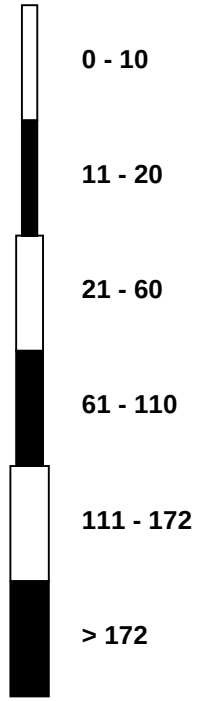
Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

Statoil - Leismer (AMS501)



Classes (ppb)



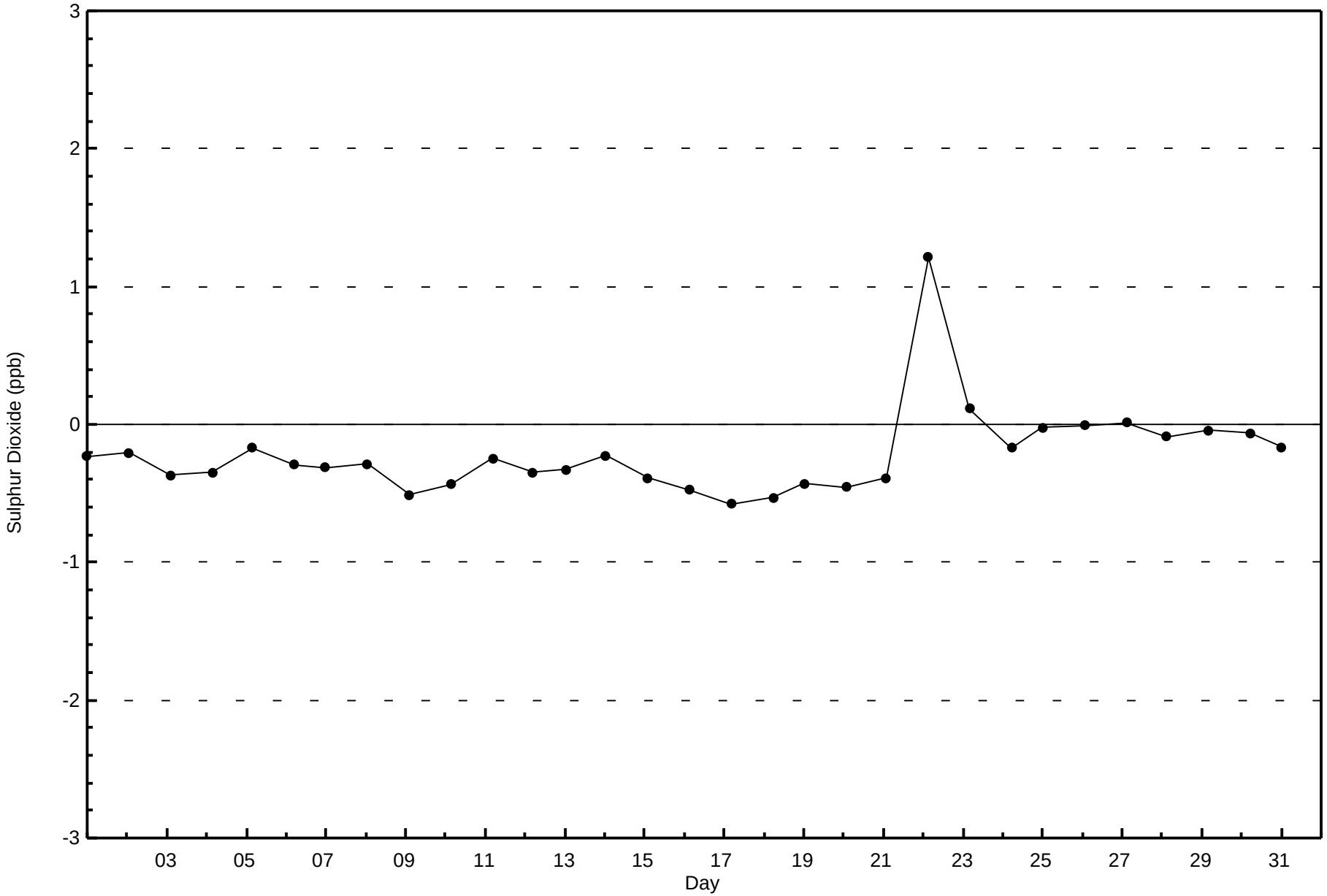
Total Number of Valid Hours: 687

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

Statoil - Leismer - March 2016



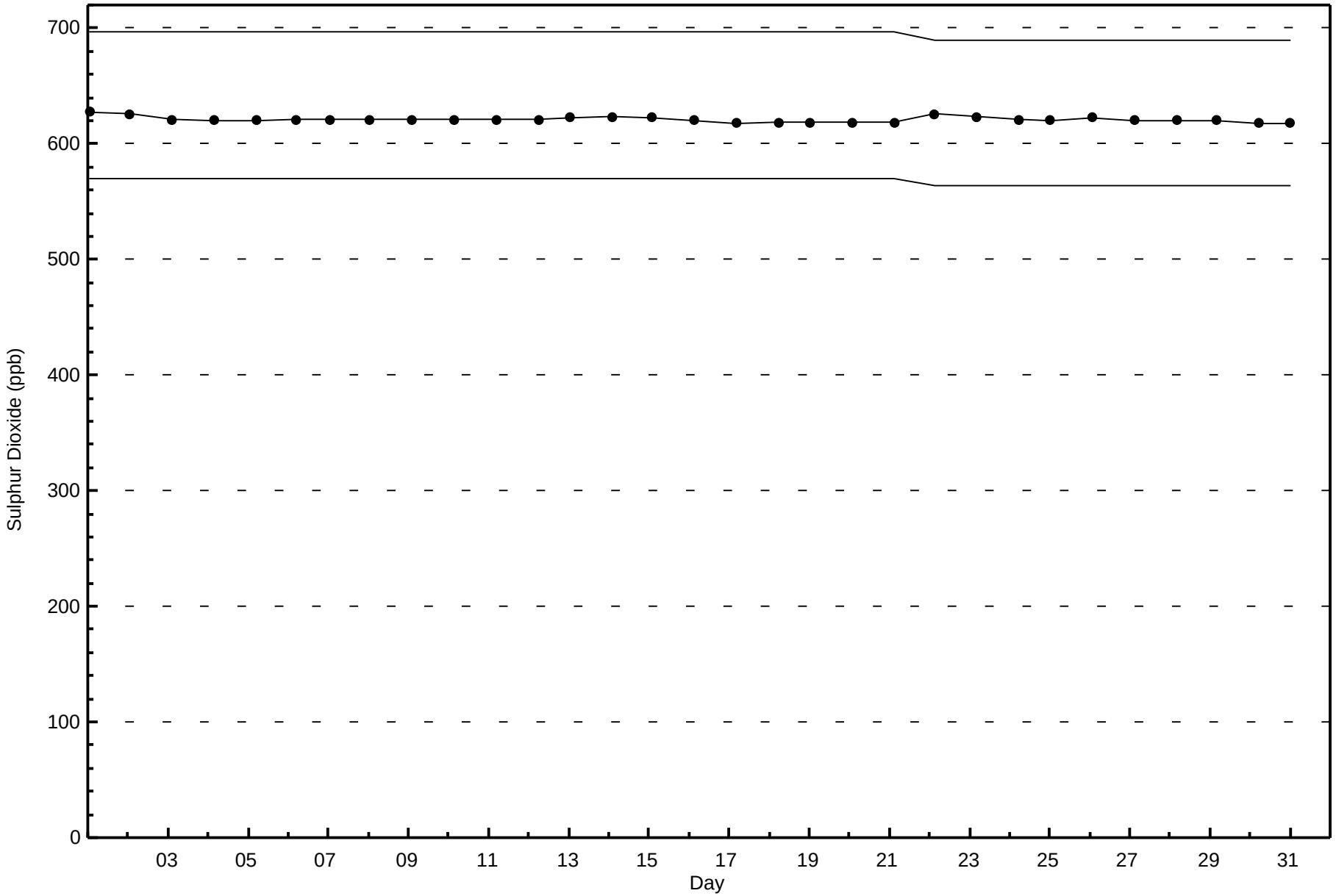
501-11

Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

Statoil - Leismer - March 2016



501-12

Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

Statoil - Leismer - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 0 ppb on Mar 26 04:00

Maximum Daily Average: 0.3 ppb on Mar 31

Minimum Value: 0 ppb on Mar 9 18:00

Minimum Daily Average: 0.0 ppb on Mar 27

Maximum Diurnal Average: 0.2 ppb at hour 8

Minimum Diurnal Average: 0.2 ppb at hour 15

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 in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	35
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
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	0.2	0
2-Mar	0	0	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	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	0.2	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	0.2	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	0.3	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	0.3	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	0.2	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	0.1	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	0.3	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	0.2	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	0.2	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	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-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
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	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	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	0.3	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	0.2	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	0.2	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	0.3	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	0.2	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	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	0.1	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	0.3	0
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average	
	0	0	0	0	0	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

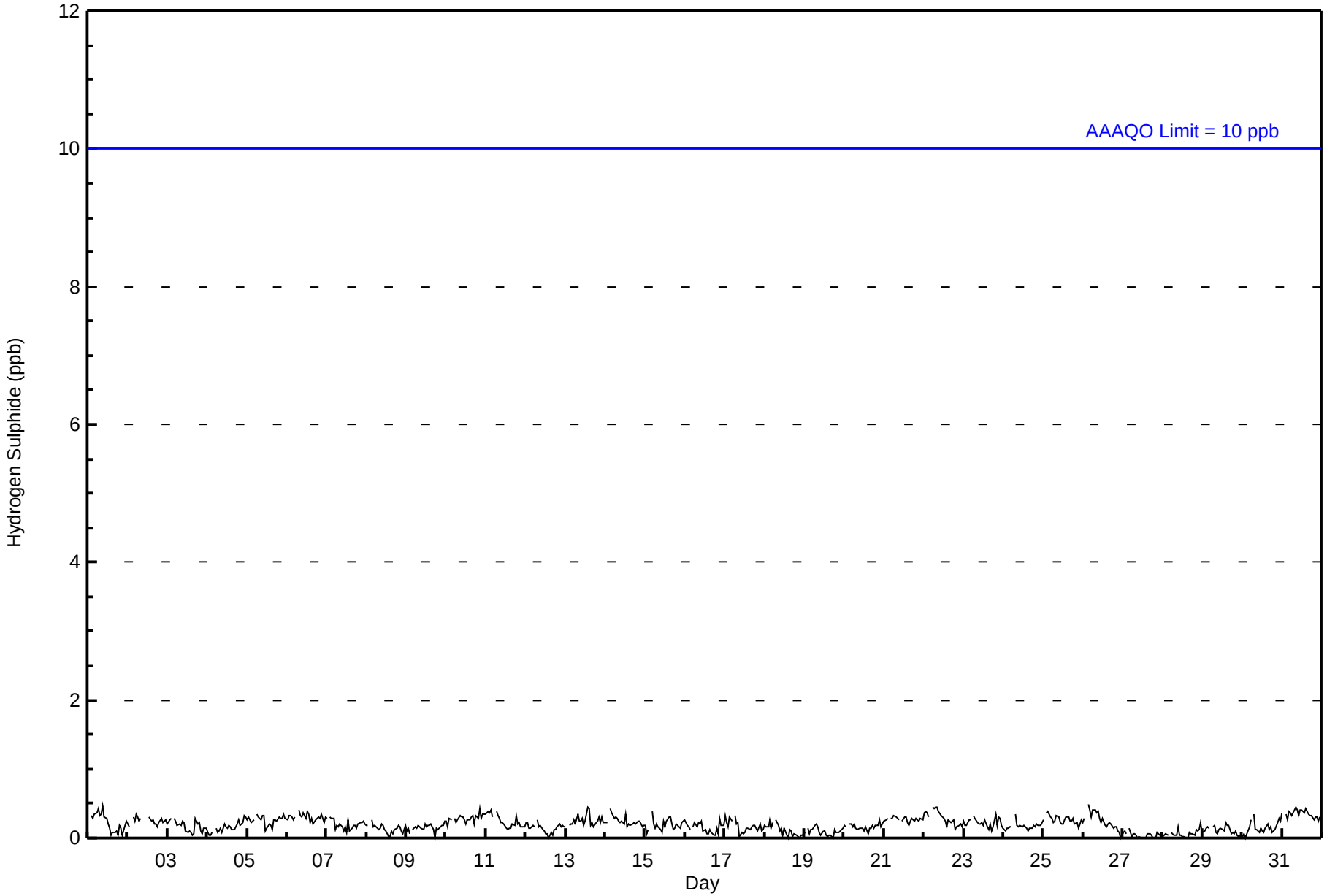
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

Statoil - Leismer - March 2016



501-14

Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Statoil - Leismer - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	708	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

Statoil - Leismer - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	72	16	13	25	42	72	72	68	33	47	27	5	38	45	38	95	708
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	72	16	13	25	42	72	72	68	33	47	27	5	38	45	38	95	708

Total Number of Valid Hours: 708

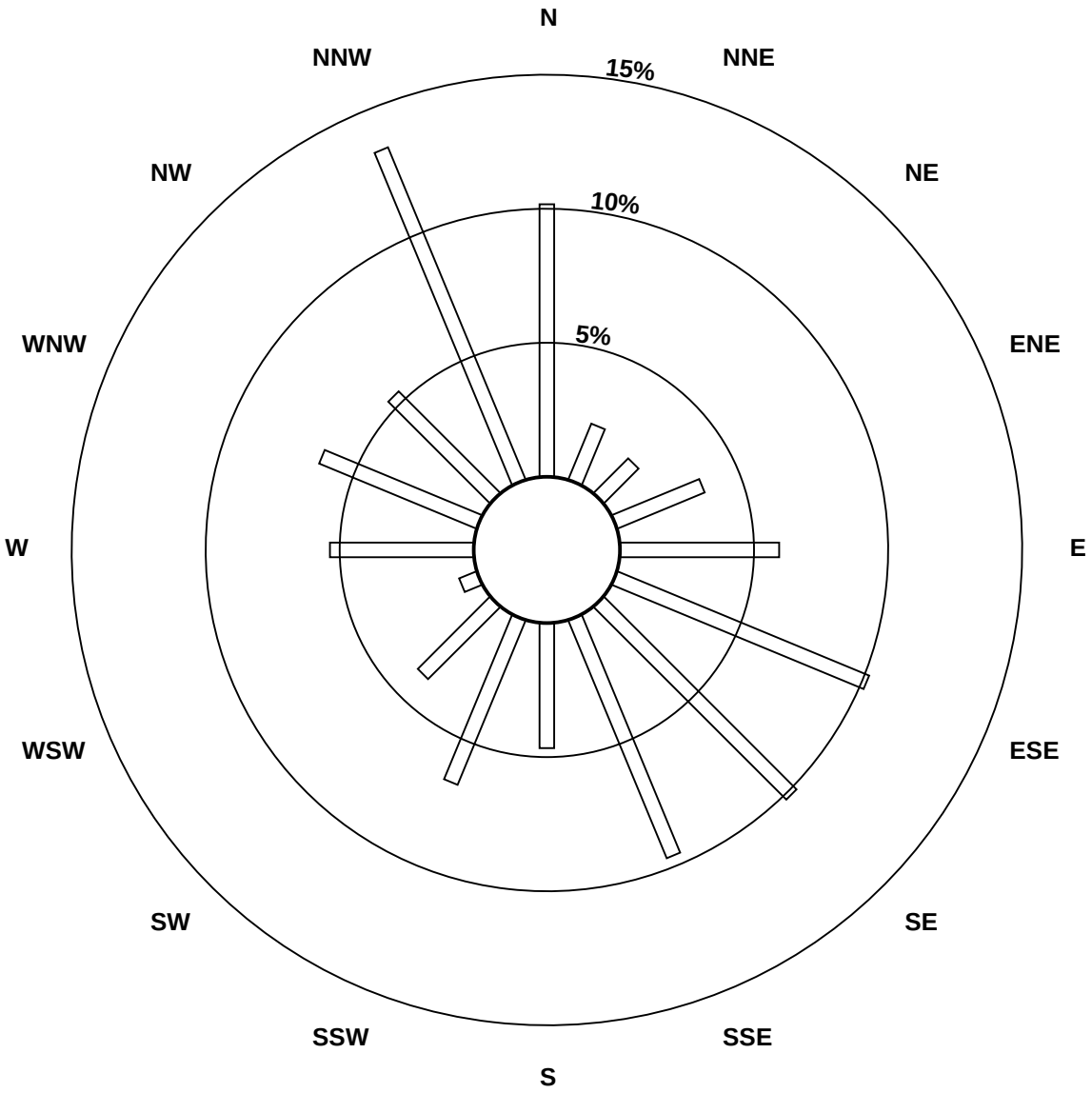
Total Number of Hours: 744

Wood Buffalo Environmental Association

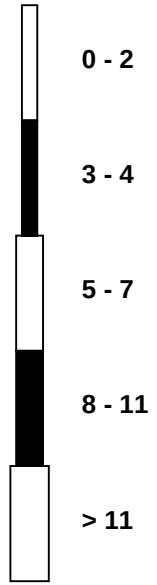
Wind Rose Mar 2016

Hydrogen Sulphide (H_2S) - ppb

Statoil - Leismer (AMS501)



Classes (ppb)



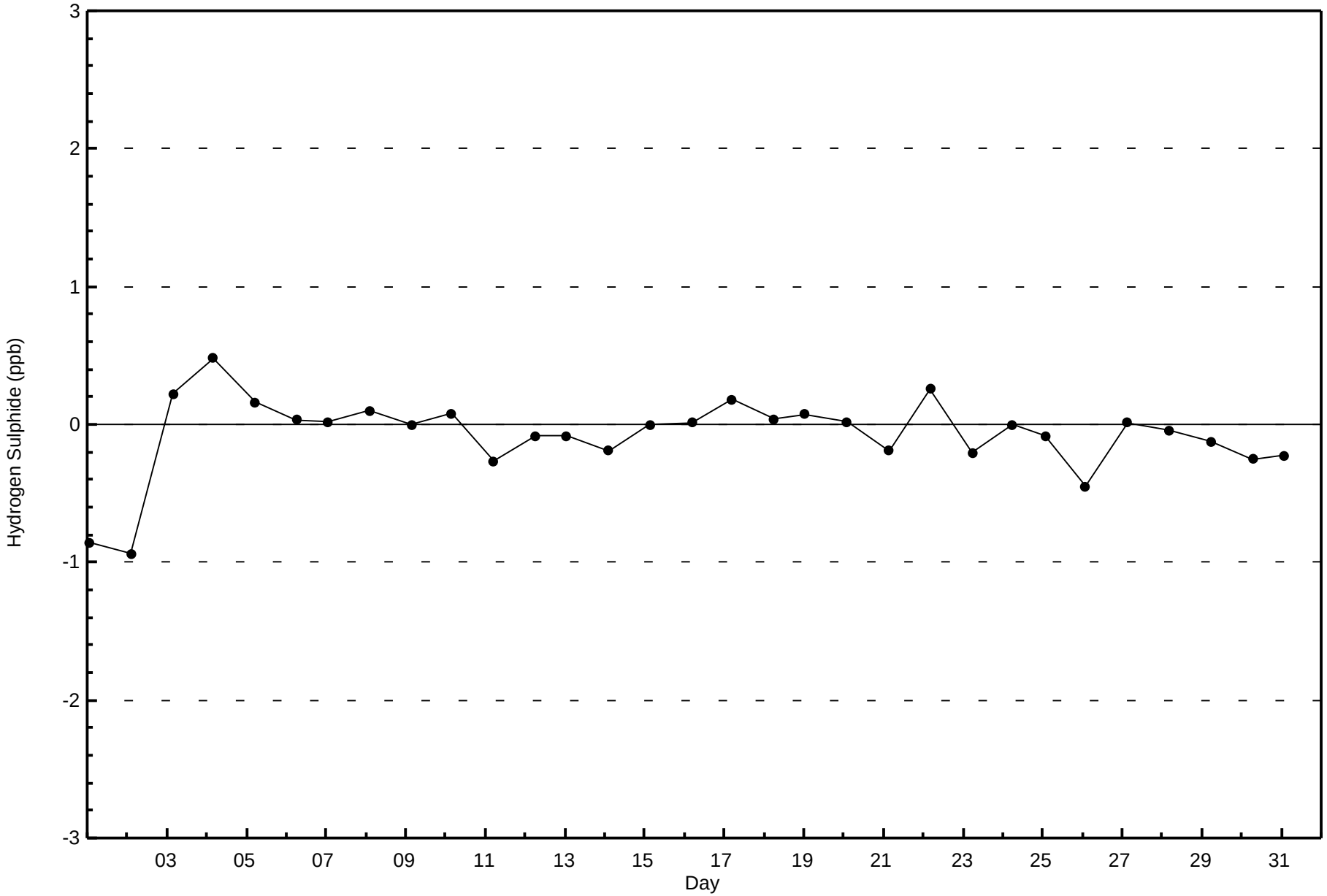
Total Number of Valid Hours: 708

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

Statoil - Leismer - March 2016



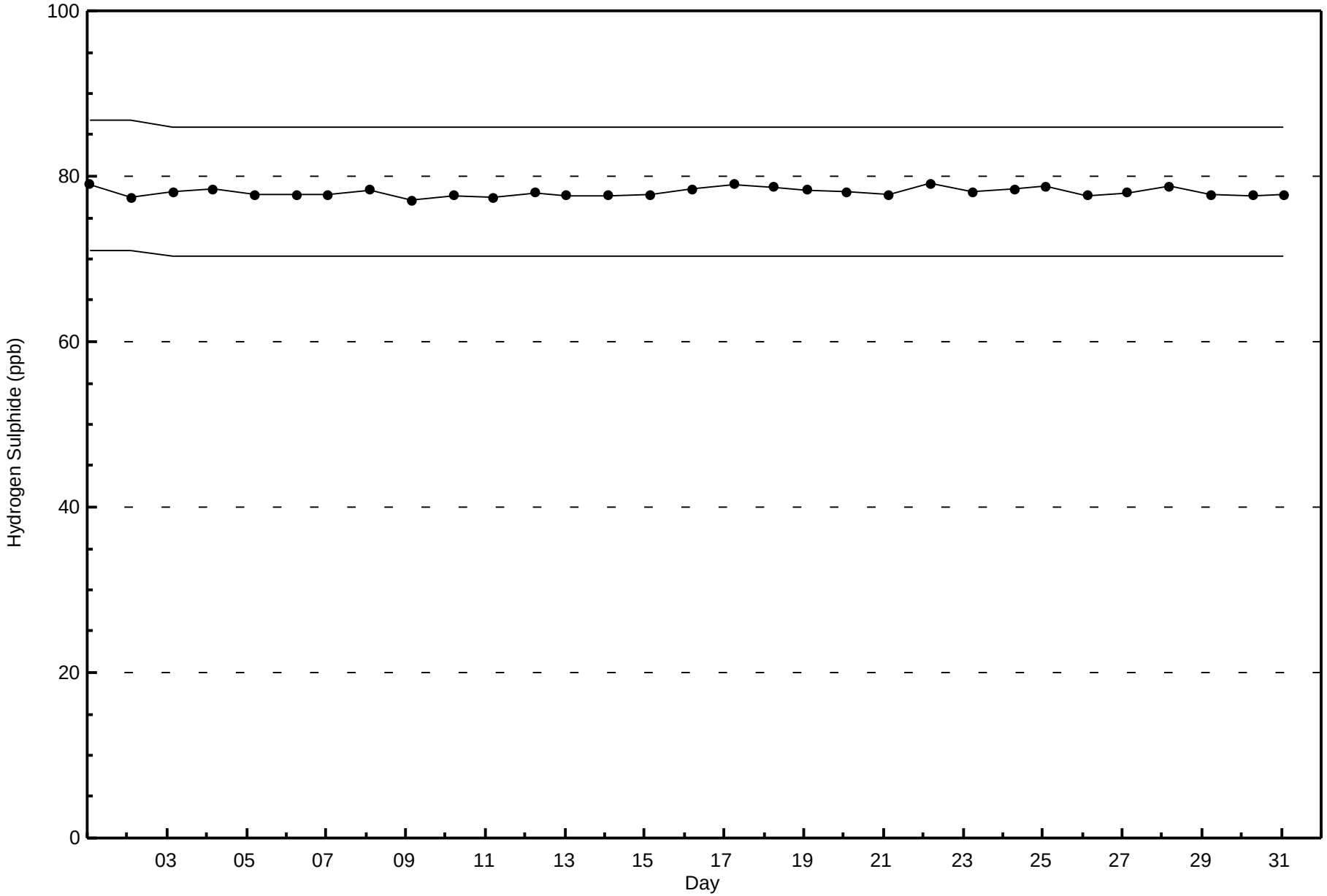
501-18

Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

Statoil - Leismer - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

Statoil - Leismer - March 2016

Maximum Value: 18 ppb on Mar 5 11:00

Maximum Daily Average: 3.0 ppb on Mar 13

Minimum Value: 0 ppb on Mar 1 23:00

Minimum Daily Average: 0.1 ppb on Mar 24

Maximum Diurnal Average: 1.4 ppb at hour 14

Minimum Diurnal Average: 0.0 ppb at hour 3

Monthly Average: 0.5 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 4$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	0	0	0	0	0	0	0	2	4	3	8	5	2	1	1	1	0	0	1	0	0	0	0	1.2	8
2-Mar	0	Z	0	0	0	0	1	3	1	1	2	3	1	2	1	0	1	0	0	0	0	0	0	0	0.7	3
3-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	0.2	1
4-Mar	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
5-Mar	0	0	0	0	Z	0	0	0	1	1	18	1	1	1	1	1	0	0	0	0	0	0	0	0	1.1	18
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	0.1	0
7-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	1	3	2	3	3	2	2	1	2	1	0	2	1.1	3
8-Mar	2	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	2
9-Mar	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1
10-Mar	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
11-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0.2	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	0.1	0
13-Mar	Z	0	0	0	0	0	0	0	1	1	1	5	9	15	13	2	1	1	1	7	2	4	3	1	3.0	15
14-Mar	0	Z	0	0	0	0	3	2	0	2	2	2	1	2	1	1	1	0	1	1	0	0	0	0	0.9	3
15-Mar	0	0	Z	0	0	0	1	2	1	1	1	2	2	3	2	2	2	1	1	0	0	0	0	0	0.9	3
16-Mar	0	0	0	Z	0	0	1	1	1	1	2	2	2	2	1	1	1	1	0	0	0	0	1	1	0.7	2
17-Mar	0	2	0	0	Z	1	5	0	0	0	0	1	1	3	1	1	3	0	0	0	0	0	0	0	0.8	5
18-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.1	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	0.1	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	C	C	C	C	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	0.1	0
23-Mar	0	0	0	0	Z	0	0	0	1	1	1	1	0	2	1	0	0	1	0	0	0	0	0	0	0.3	2
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	0.1	0
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	1	1	2	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.6	2
27-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
28-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	4	2	1	0	0	0	1	3	0.6	4
29-Mar	0	0	0	0	Z	0	0	0	0	0	0	0	2	2	5	3	2	0	0	0	0	0	0	0	0.7	5
30-Mar	0	0	0	1	1	Z	0	1	0	0	0	0	1	0	0	0	1	3	0	0	0	0	0	0	0.4	3
31-Mar	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0.4	2
	0.1	0.1	0.0	0.1	0.1	0.1	0.4	0.4	0.5	0.6	1.3	1.1	1.1	1.4	1.1	0.7	0.8	0.4	0.3	0.4	0.2	0.2	0.2	0.2	Diurnal Average	
	2	2	0	1	1	1	5	3	2	4	18	8	9	15	13	3	4	3	2	7	2	4	3	3	Diurnal Maximum	

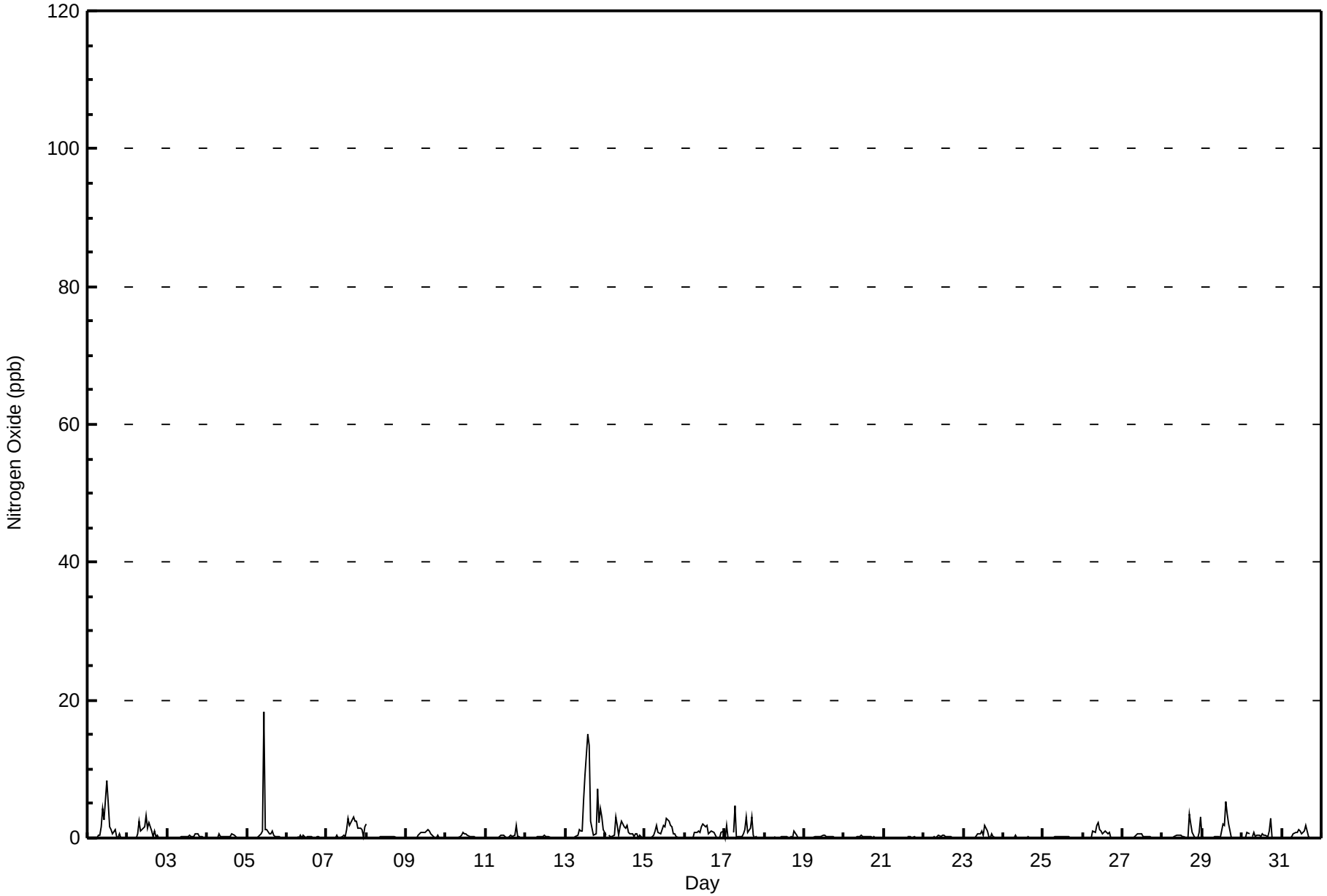
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxide (NO) - ppb

Statoil - Leismer - March 2016



501-21

Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb

Statoil - Leismer - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	709	100.00	100.00
21 - 40	0	0.00	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: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxide (NO) - ppb

Statoil - Leismer - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	73	16	13	25	43	67	72	68	33	47	27	5	40	44	41	95	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	73	16	13	25	43	67	72	68	33	47	27	5	40	44	41	95	709

Total Number of Valid Hours: 709

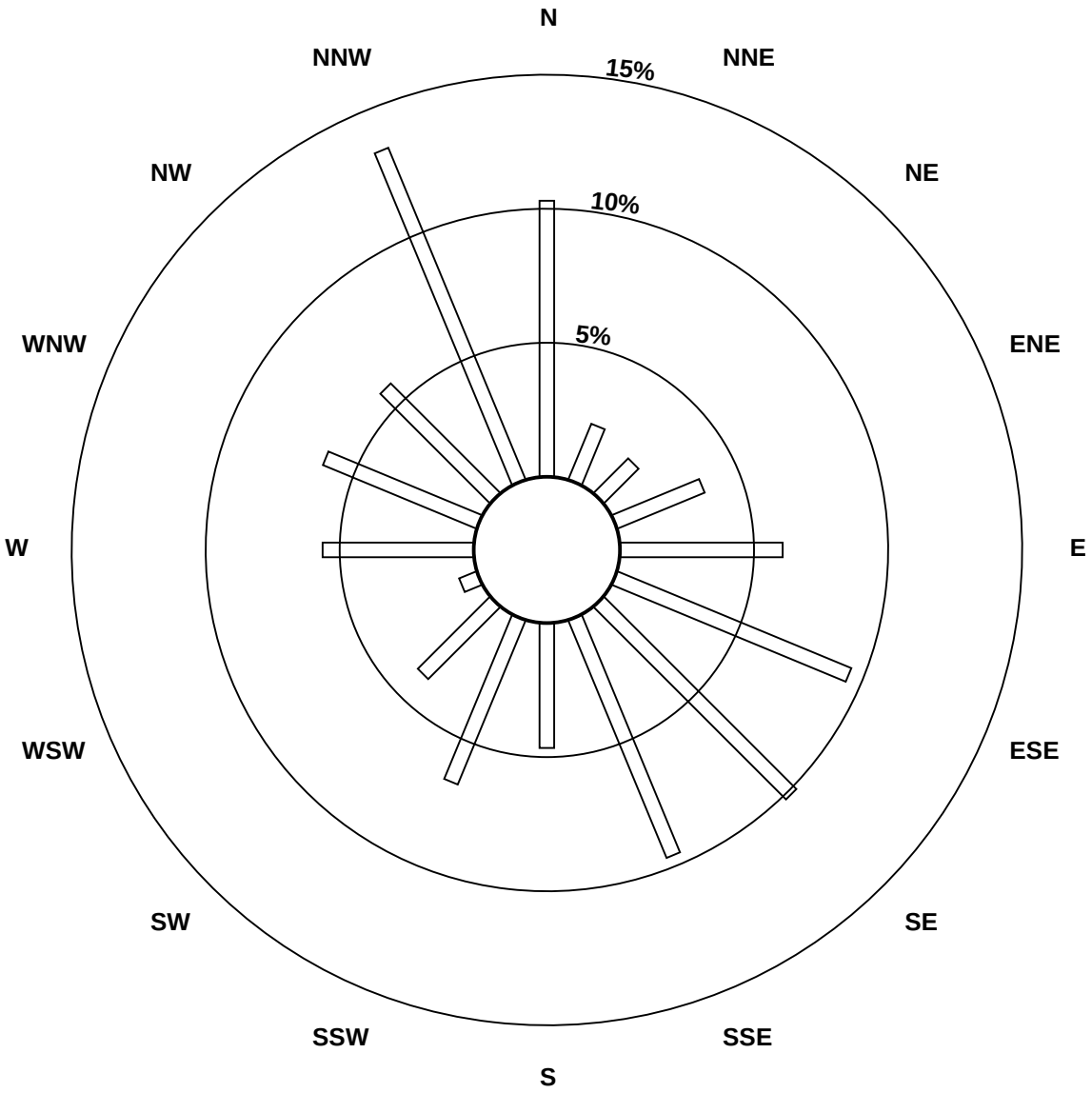
Total Number of Hours: 744

Wood Buffalo Environmental Association

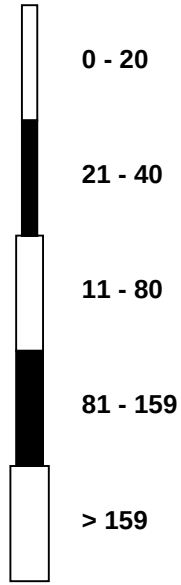
Wind Rose Mar 2016

Nitrogen Oxide (NO) - ppb

Statoil - Leismer (AMS501)



Classes (ppb)



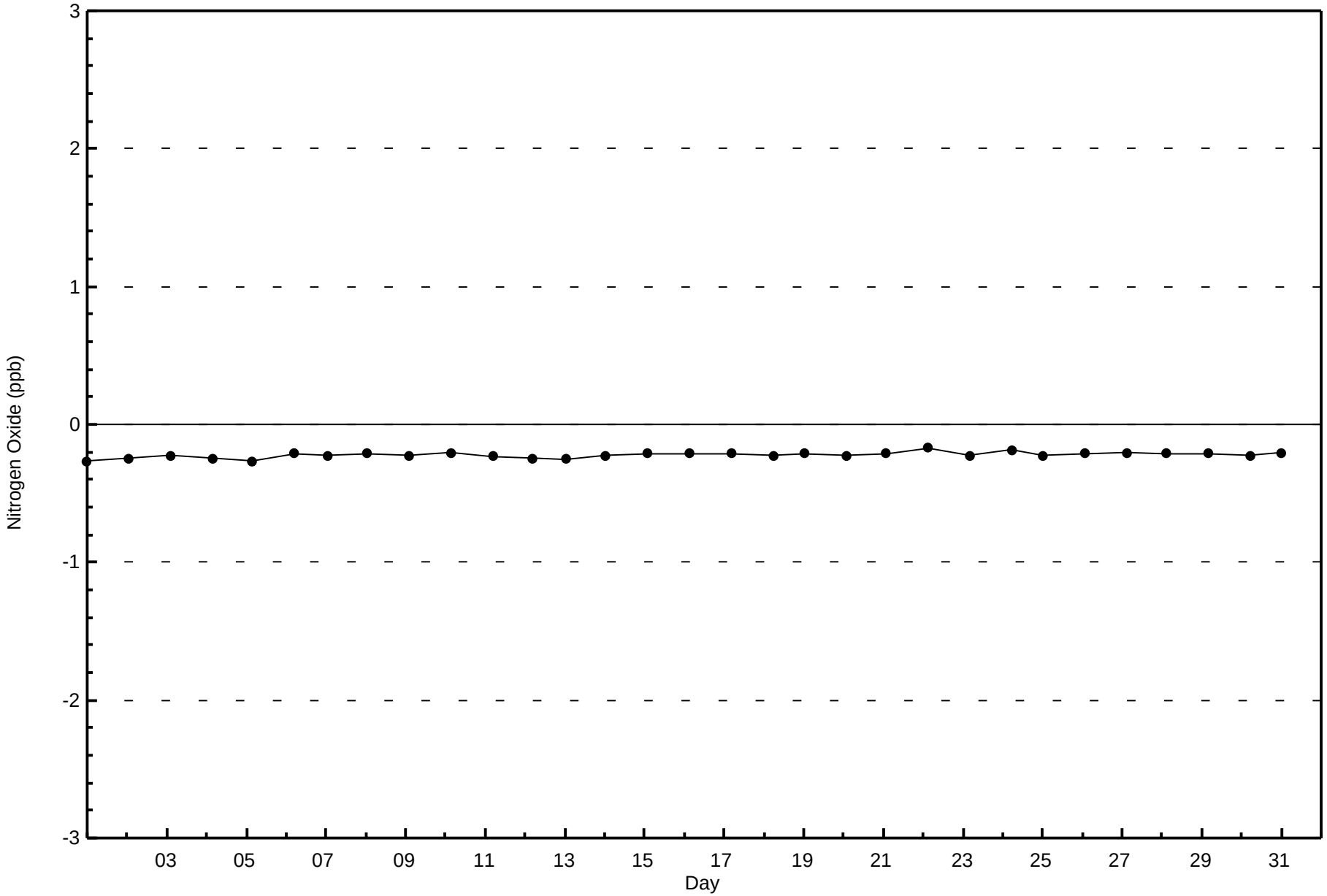
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxide (NO) - ppb

Statoil - Leismer - March 2016



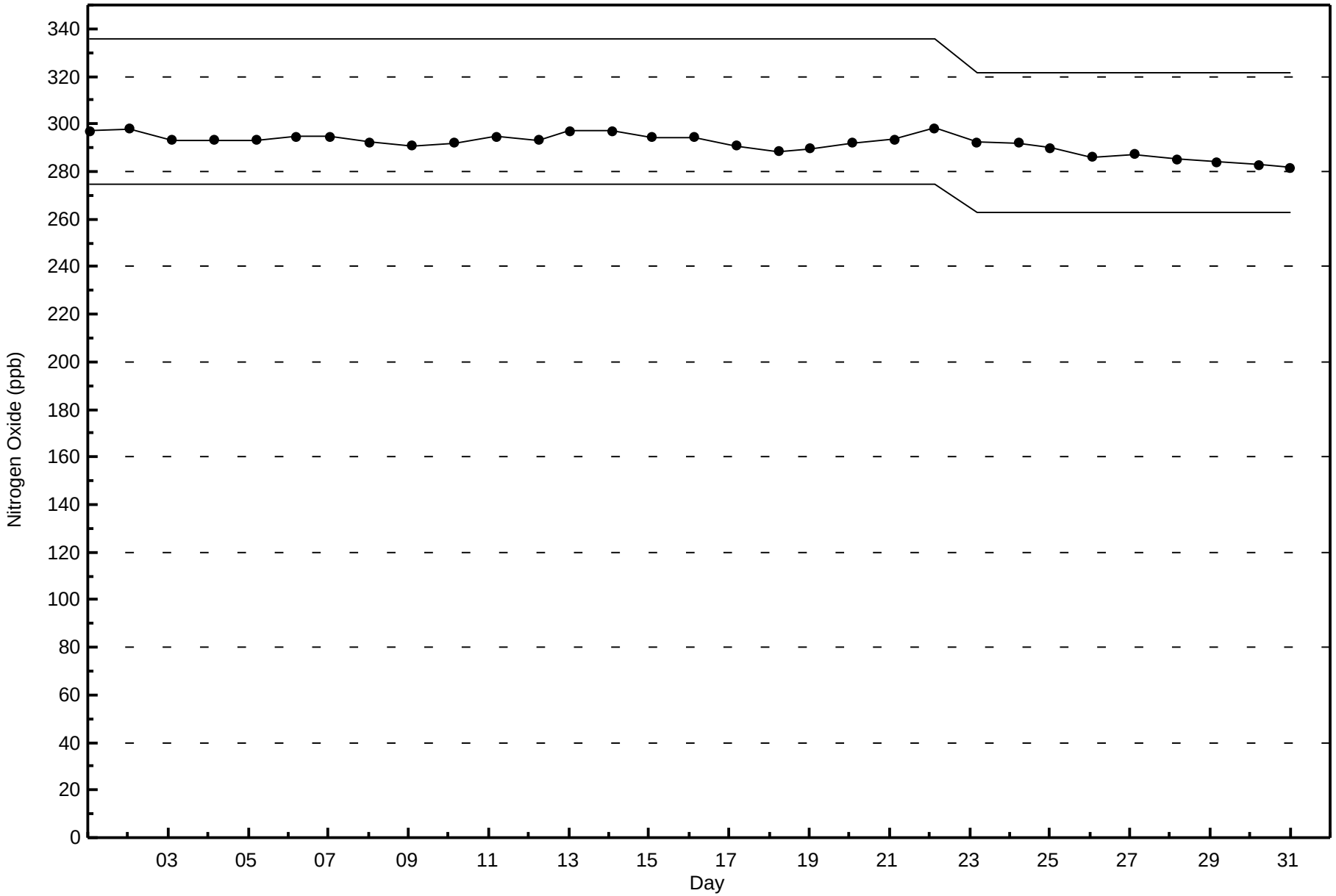
501-25

Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxide (NO) - ppb

Statoil - Leismer - March 2016



501-26

Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

Statoil - Leismer - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 12 ppb on Mar 1 12:00

Maximum Daily Average: 4.0 ppb on Mar 13

Minimum Value: 0 ppb on Mar 21 07:00

Minimum Daily Average: 0.3 ppb on Mar 21

Maximum Diurnal Average: 2.7 ppb at hour 20

Minimum Diurnal Average: 1.3 ppb at hour 3

Monthly Average: 1.8 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 1 $Q_3 = 2$ $P_{90} = 4$ $P_{99} = 8$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	2	2	3	3	3	3	4	3	6	4	12	5	1	2	2	2	1	2	2	2	1	1	1	2.9	12
2-Mar	1	Z	1	1	1	1	3	3	2	2	2	4	2	3	2	1	2	2	2	2	1	2	2	2	1.9	4
3-Mar	2	2	Z	2	2	2	3	4	4	3	2	2	2	2	2	2	3	6	12	11	7	2	2	2	3.3	12
4-Mar	2	2	1	Z	2	1	1	3	1	1	1	1	0	1	1	2	2	2	2	3	3	3	2	2	1.6	3
5-Mar	2	2	2	3	Z	4	4	3	3	3	8	3	3	2	2	1	2	3	4	9	7	5	4	2	3.5	9
6-Mar	2	2	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0.8	2
7-Mar	Z	0	0	0	0	1	1	1	1	1	1	1	2	3	3	4	5	5	5	5	4	3	2	4	2.3	5
8-Mar	4	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	4	5	5	4	4	5	2.2	5
9-Mar	5	6	Z	7	7	6	5	6	4	3	3	2	2	3	2	2	1	1	3	4	3	2	2	2	3.6	7
10-Mar	3	3	3	Z	3	2	2	3	3	2	3	2	2	2	2	2	1	2	2	2	2	1	1	2	2.0	3
11-Mar	1	2	2	2	Z	1	1	1	1	2	1	1	1	1	1	1	1	2	4	2	1	1	1	1	1.3	4
12-Mar	1	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	2
13-Mar	Z	1	1	1	1	2	4	3	4	3	3	7	8	11	10	4	3	2	1	8	3	6	4	2	4.0	11
14-Mar	1	Z	1	2	2	2	3	3	2	3	4	3	3	3	3	2	3	3	3	3	2	2	3	3	2.5	4
15-Mar	2	1	Z	3	3	3	4	2	2	2	1	2	2	3	3	3	4	3	3	4	3	3	3	4	2.7	4
16-Mar	2	2	3	Z	4	4	5	6	5	3	4	3	4	2	2	2	3	2	5	4	2	3	4	5	3.4	6
17-Mar	2	5	1	1	Z	1	4	0	1	1	1	1	1	3	1	1	4	1	1	1	0	1	1	1	1.4	5
18-Mar	1	1	1	0	1	Z	1	1	1	1	1	1	1	1	0	1	1	1	2	2	0	1	1	1	0.8	2
19-Mar	Z	1	1	1	2	2	3	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1.6	3
20-Mar	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.8	2
21-Mar	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	1	0	0	0	0	0	0	0	0.3	1
22-Mar	0	0	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
23-Mar	1	1	1	1	Z	1	1	1	2	1	1	2	1	2	2	1	1	1	6	8	4	4	3	2	2.0	8
24-Mar	2	3	1	0	0	Z	0	1	1	0	1	1	1	1	0	1	0	1	0	1	0	1	1	1	0.7	3
25-Mar	Z	1	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
26-Mar	1	Z	1	1	1	2	4	5	4	3	2	2	1	2	1	2	2	1	1	1	1	1	1	1	1.7	5
27-Mar	1	1	Z	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	2
28-Mar	1	1	1	Z	1	1	2	2	2	2	2	1	1	1	1	1	6	4	3	1	1	1	3	7	2.0	7
29-Mar	3	1	1	1	Z	1	1	1	1	1	1	1	3	3	6	5	4	1	1	0	1	0	1	1	1.5	6
30-Mar	1	1	1	2	2	Z	2	3	1	1	1	1	1	1	0	0	1	5	0	0	1	2	1	1	1.2	5
31-Mar	Z	2	1	1	1	1	1	2	1	1	2	1	1	2	2	3	1	1	0	0	0	0	0	1	1.2	3
	1.7	1.6	1.3	1.5	1.7	1.8	2.1	2.1	1.8	1.7	1.8	1.9	1.8	1.9	1.7	1.5	1.9	1.8	2.3	2.7	1.9	1.8	1.7	1.9	Diurnal Average	
	5	6	3	7	7	6	5	6	5	6	8	12	8	11	10	5	6	6	12	11	7	6	4	7	Diurnal Maximum	

Z - zerospan C - Calibration

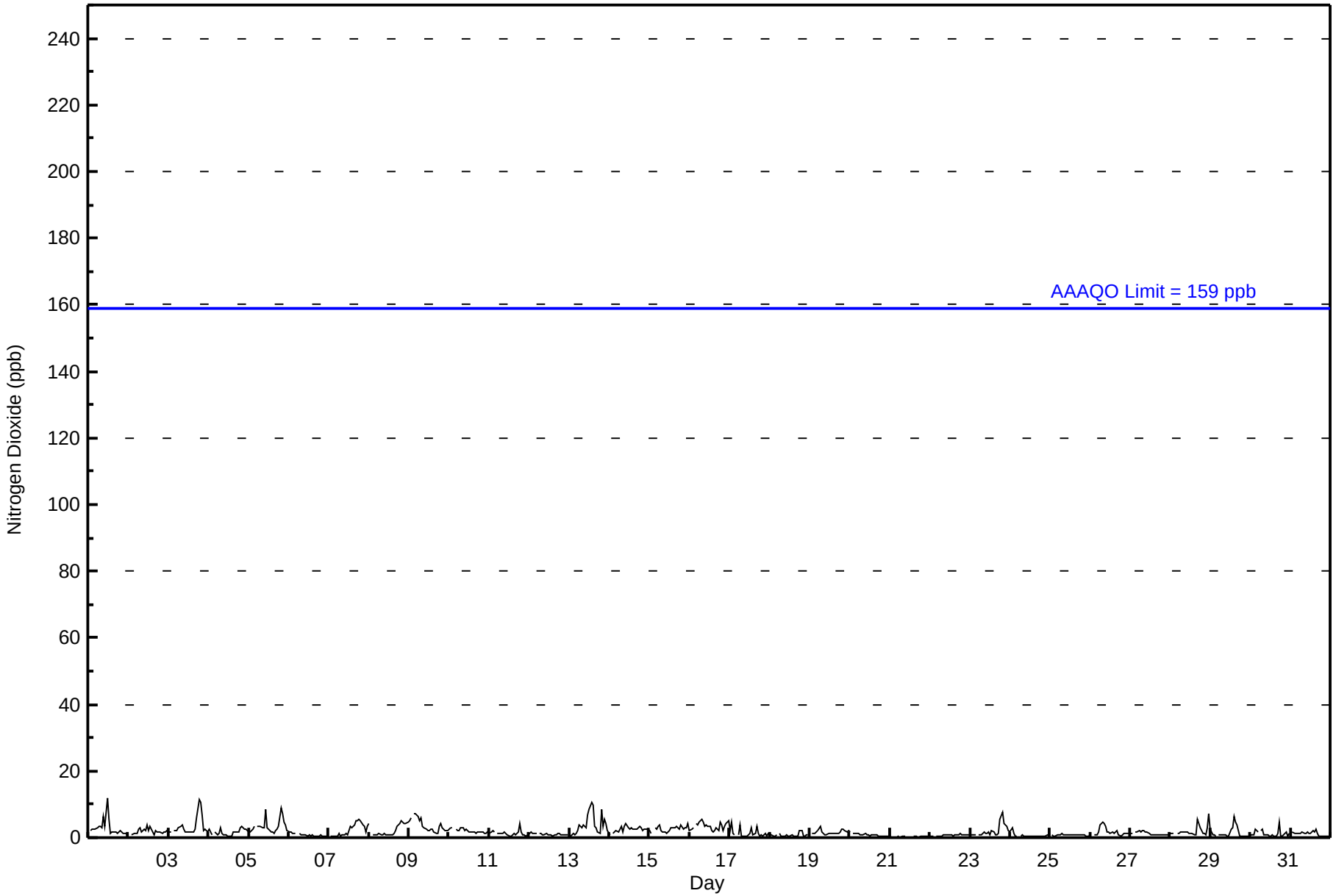
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

Statoil - Leismer - March 2016



501-28

Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Statoil - Leismer - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	709	100.00	100.00
21 - 40	0	0.00	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: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

Statoil - Leismer - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	73	16	13	25	43	67	72	68	33	47	27	5	40	44	41	95	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	73	16	13	25	43	67	72	68	33	47	27	5	40	44	41	95	709

Total Number of Valid Hours: 709

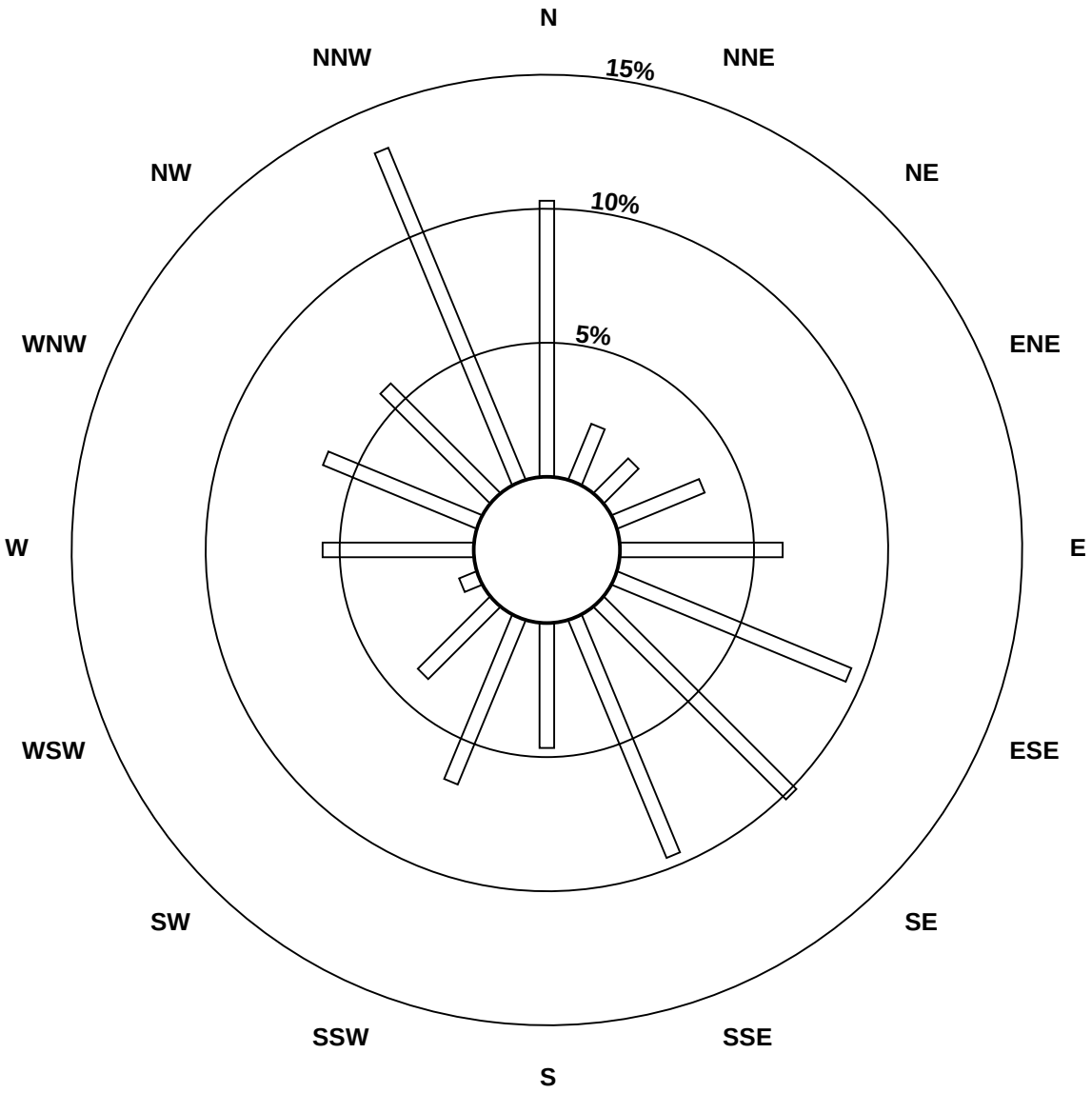
Total Number of Hours: 744

Wood Buffalo Environmental Association

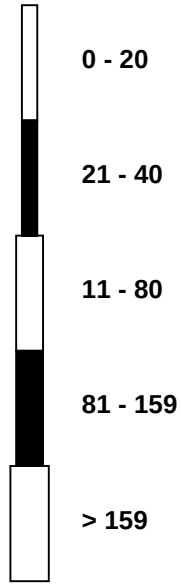
Wind Rose Mar 2016

Nitrogen Dioxide (NO_2) - ppb

Statoil - Leismer (AMS501)



Classes (ppb)



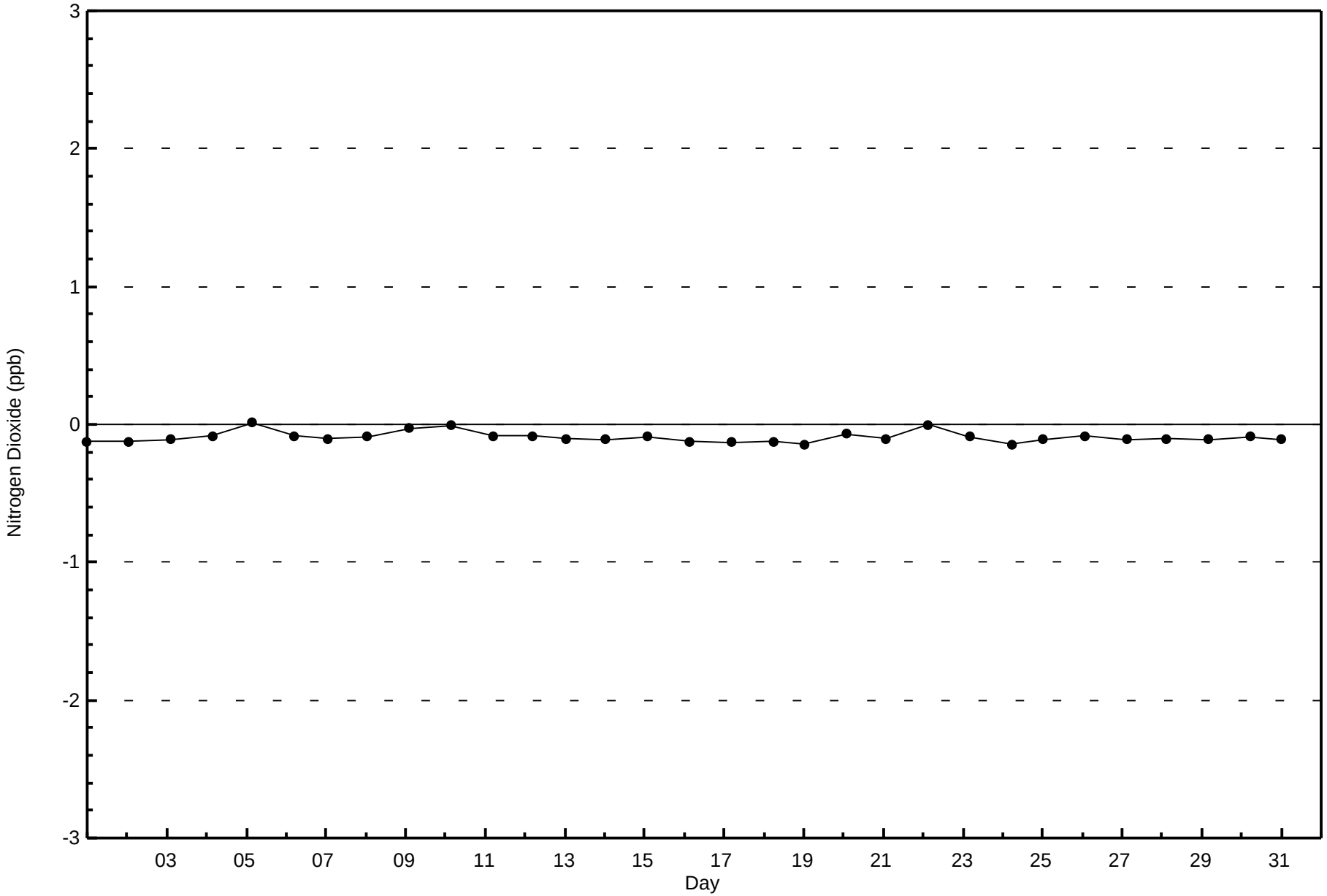
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

Statoil - Leismer - March 2016



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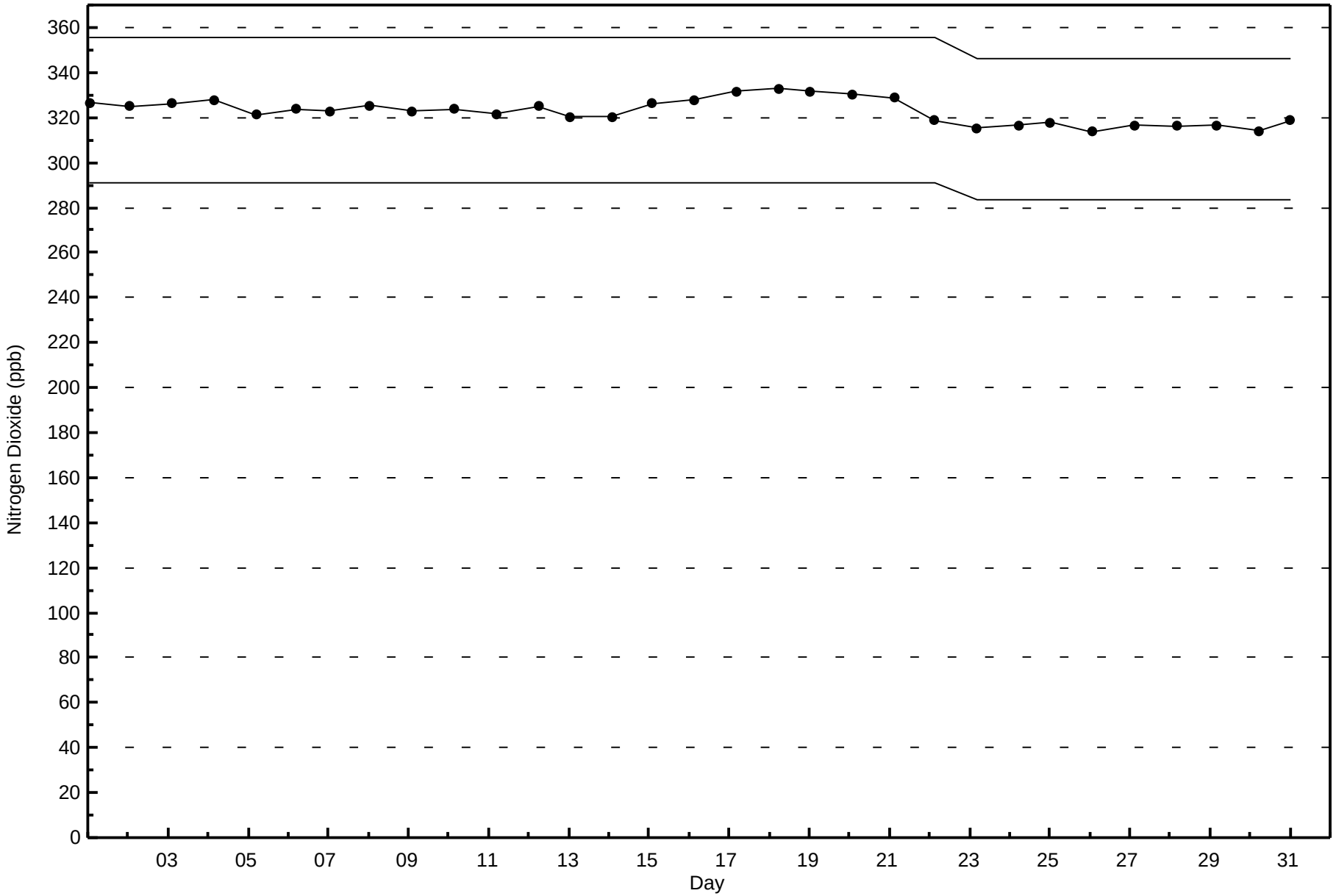
Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

Statoil - Leismer - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

Statoil - Leismer - March 2016

Maximum Value: 27 ppb on Mar 5 11:00

Maximum Daily Average: 7.0 ppb on Mar 13

Minimum Value: 0 ppb on Mar 21 05:00

Minimum Daily Average: 0.4 ppb on Mar 21

Maximum Diurnal Average: 3.3 ppb at hour 14

Minimum Diurnal Average: 1.3 ppb at hour 3

Monthly Average: 2.3 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 5$ $P_{99} = 10$

Hours in Service:	744
Hours of Data:	709
Hours of Missing Data:	35
Hours of Calibration:	35
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	2	2	3	3	3	4	4	4	11	6	20	11	3	3	2	3	1	2	3	2	1	1	1	4.1	20
2-Mar	1	Z	1	1	1	1	3	5	3	4	4	7	4	6	3	1	3	2	2	2	1	2	2	2	2.6	7
3-Mar	2	2	Z	2	2	2	3	4	4	3	2	2	2	2	2	2	3	7	12	11	7	2	2	2	3.5	12
4-Mar	2	2	1	Z	2	1	1	3	2	1	1	1	1	1	1	2	2	2	2	3	3	3	2	2	1.7	3
5-Mar	2	2	2	3	Z	4	4	3	4	4	27	4	4	2	3	2	2	3	4	9	7	5	4	2	4.6	27
6-Mar	2	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.9	2
7-Mar	Z	0	0	0	0	1	2	1	1	1	2	1	4	6	5	7	8	8	8	6	5	5	2	5	3.4	8
8-Mar	6	Z	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	3	4	5	5	4	4	5	2.4	6
9-Mar	5	6	Z	7	7	6	5	7	4	4	3	3	3	4	3	2	2	1	3	5	3	2	2	2	4.0	7
10-Mar	2	3	3	Z	2	2	2	3	3	3	3	2	2	2	2	2	2	2	2	2	2	1	1	2	2.2	3
11-Mar	1	1	2	2	Z	1	1	1	2	2	2	1	1	1	1	2	1	2	6	2	1	1	1	1	1.5	6
12-Mar	1	2	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	2
13-Mar	Z	1	1	1	1	2	4	3	5	4	4	12	18	26	23	6	4	2	2	15	5	10	7	4	7.0	26
14-Mar	1	Z	2	2	2	2	6	5	2	5	7	5	4	5	4	3	3	3	4	3	2	3	2	3	3.3	7
15-Mar	2	1	Z	3	3	4	5	4	2	2	2	4	4	6	5	5	5	4	3	4	3	3	3	4	3.5	6
16-Mar	2	2	3	Z	4	4	6	6	6	4	5	5	5	4	2	3	4	3	5	4	2	3	5	6	4.1	6
17-Mar	2	6	1	1	Z	2	9	0	1	1	1	1	3	6	2	3	7	2	0	1	0	1	1	1	2.2	9
18-Mar	1	1	1	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	3	3	0	0	1	1	0.9	3
19-Mar	Z	1	1	1	2	2	4	2	1	1	1	2	2	2	1	1	1	1	2	2	2	2	2	2	1.8	4
20-Mar	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.9	2
21-Mar	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	0	1	1	0	1	0	0	0	0	0	0.4	1
22-Mar	0	0	0	Z	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
23-Mar	1	1	1	1	Z	1	1	1	2	2	2	3	1	4	3	1	1	2	6	8	4	4	3	2	2.3	8
24-Mar	2	3	1	0	0	Z	0	1	1	0	1	1	1	1	0	1	0	0	0	1	0	0	1	1	0.7	3
25-Mar	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
26-Mar	1	Z	1	1	1	2	5	6	6	6	3	2	2	3	2	3	3	1	1	1	1	1	1	1	2.3	6
27-Mar	1	1	Z	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1.4	2
28-Mar	1	1	1	Z	1	1	2	2	2	2	2	2	2	1	1	1	9	6	4	1	1	1	4	10	2.6	10
29-Mar	3	1	1	1	Z	1	1	1	1	1	1	1	5	5	12	8	6	1	1	0	0	0	0	1	2.2	12
30-Mar	1	1	1	3	2	Z	2	3	1	1	1	1	1	1	1	1	2	7	0	0	1	2	1	1	1.5	7
31-Mar	Z	2	1	1	1	1	2	2	2	2	3	2	2	3	3	4	2	0	0	0	0	0	0	1	1.6	4
	1.9	1.7	1.3	1.5	1.7	1.9	2.5	2.5	2.2	2.4	3.1	3.0	2.9	3.3	2.9	2.2	2.7	2.3	2.7	3.1	2.1	2.0	1.8	2.1	Diurnal Average	
	6	6	3	7	7	6	9	7	6	11	27	20	18	26	23	8	9	8	12	15	7	10	7	10	Diurnal Maximum	

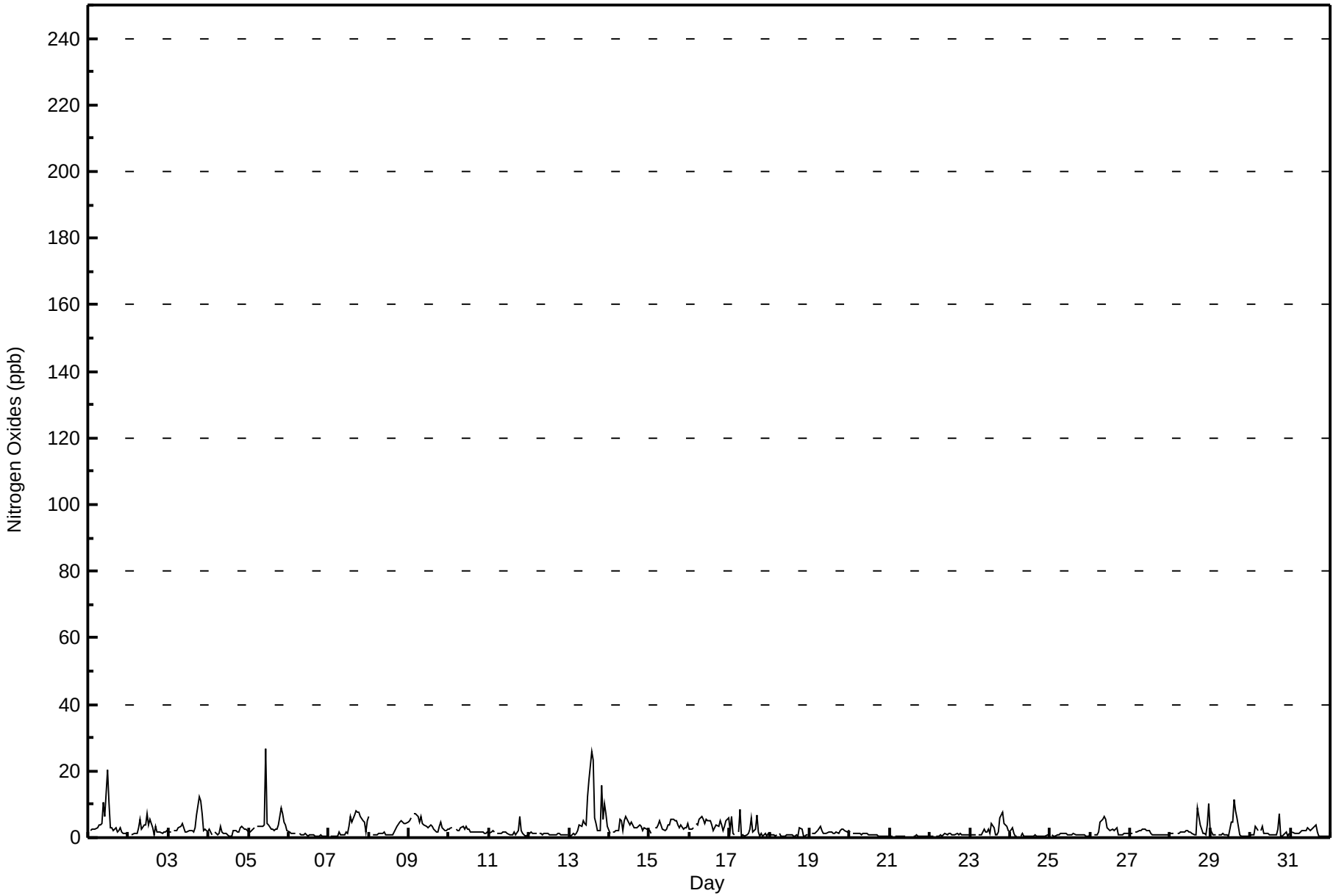
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

Statoil - Leismer - March 2016



501-35

Nitrogen Oxides (NO_X) - ppb

Statoil - Leismer - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	99.58	99.58
21 - 40	3	0.42	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: 709

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

Statoil - Leismer - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	73	16	13	25	43	67	72	68	33	47	27	5	40	44	38	95	706
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	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	73	16	13	25	43	67	72	68	33	47	27	5	40	44	41	95	709

Total Number of Valid Hours: 709

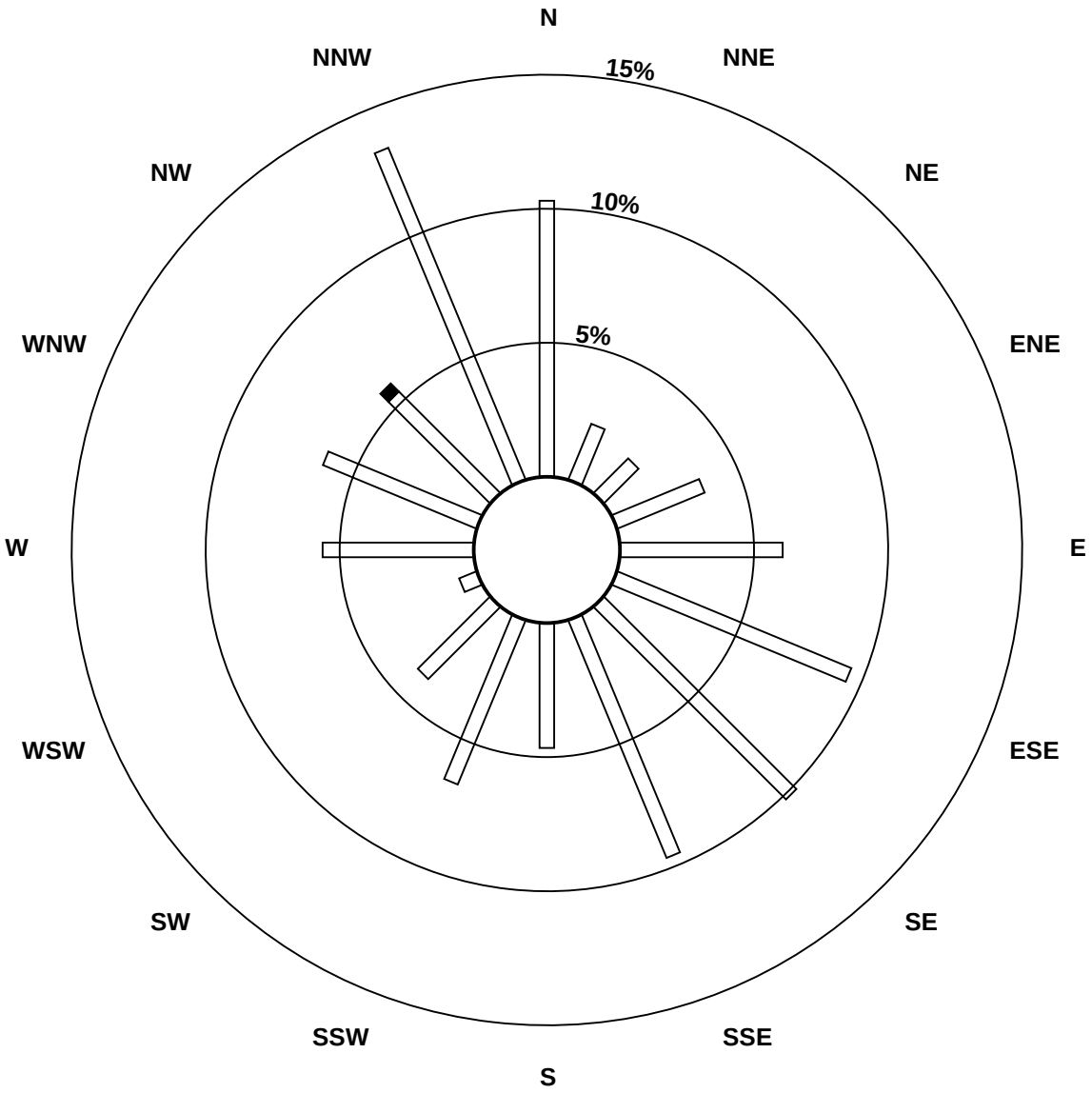
Total Number of Hours: 744

Wood Buffalo Environmental Association

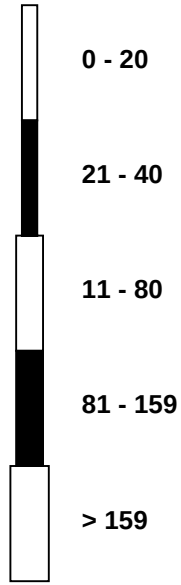
Wind Rose Mar 2016

Nitrogen Oxides (NO_X) - ppb

Statoil - Leismer (AMS501)



Classes (ppb)



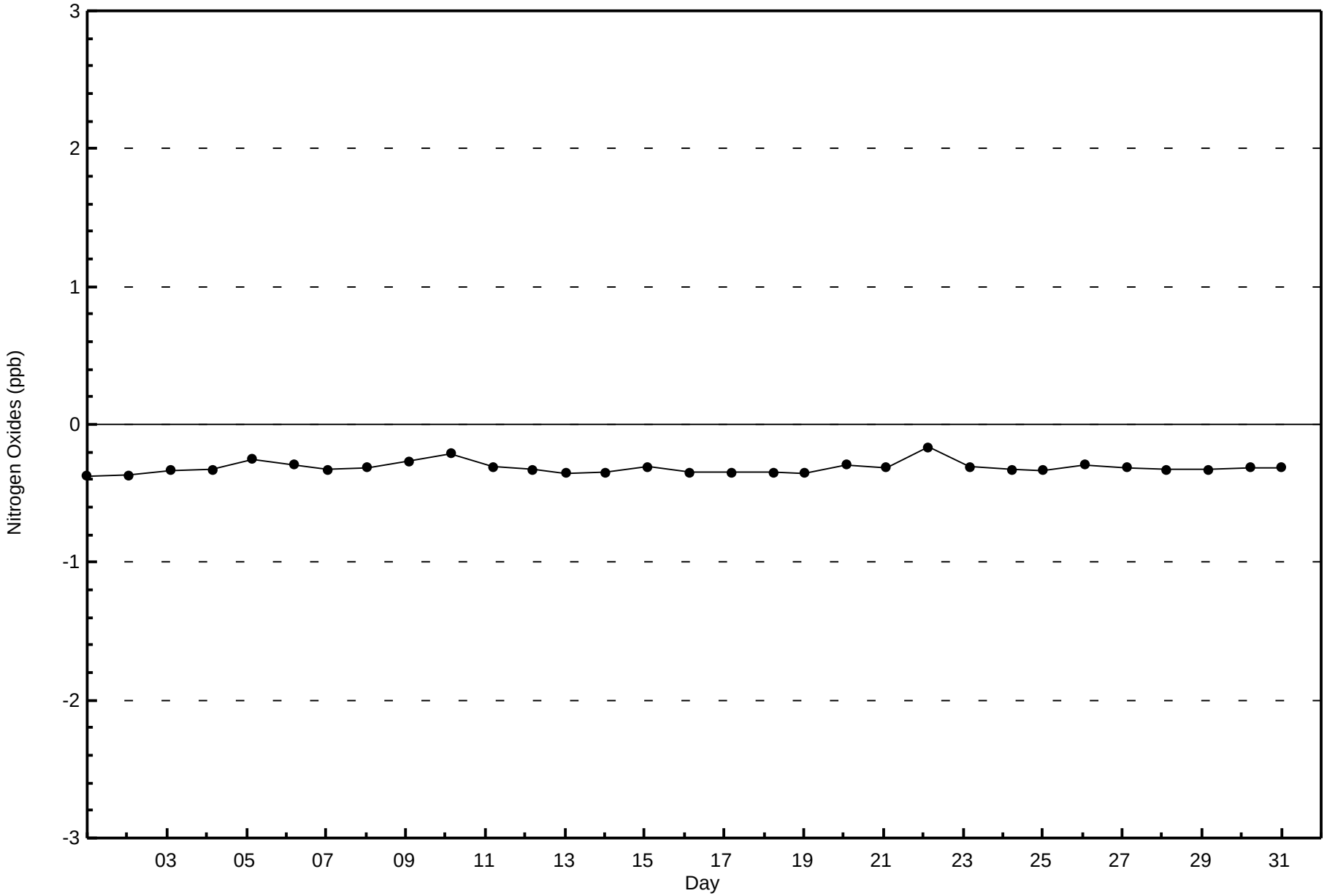
Total Number of Valid Hours: 709

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

Statoil - Leismer - March 2016



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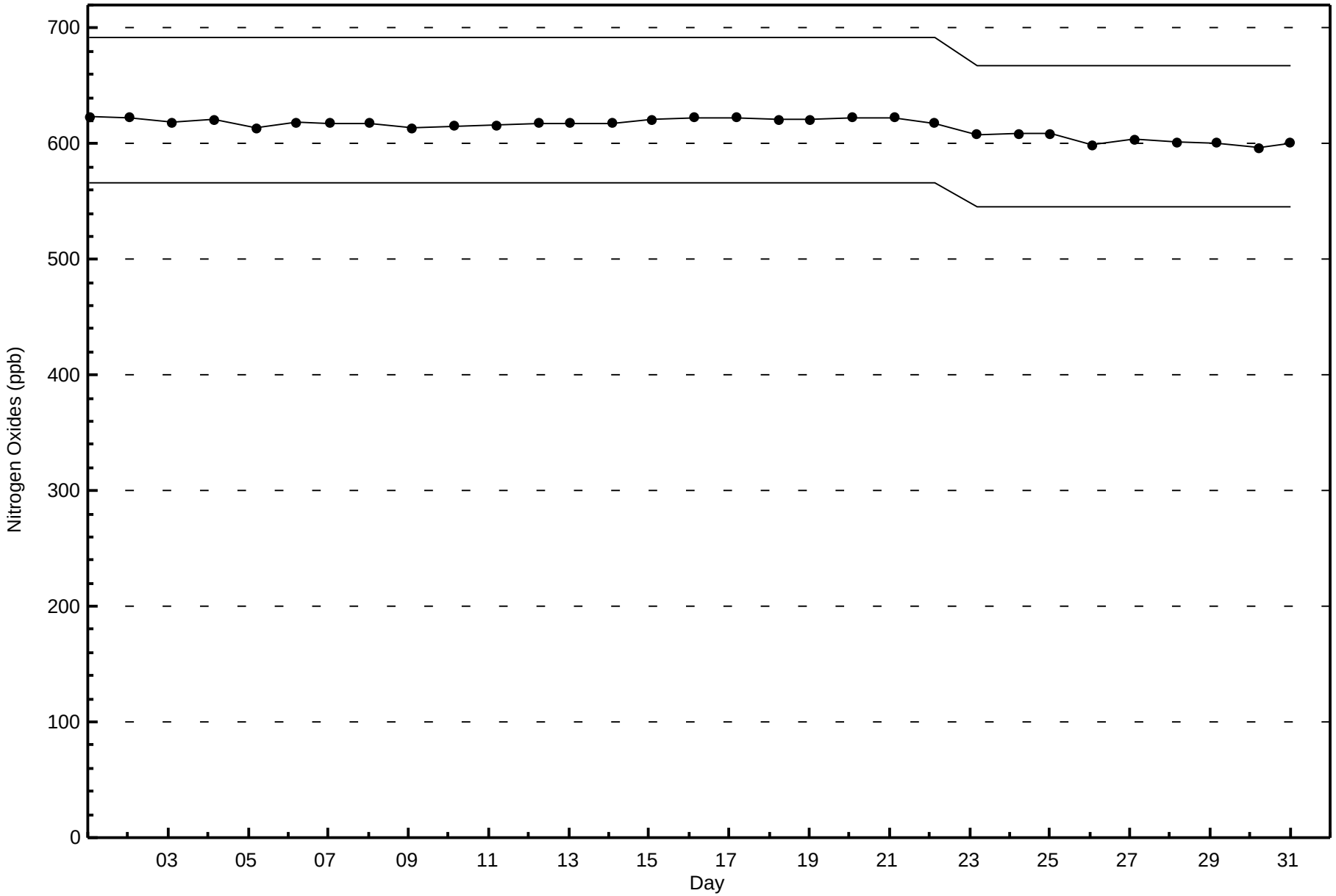
Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

Statoil - Leismer - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Statoil - Leismer - March 2016

Maximum Value: 10.2 C on Mar 12 15:00

Maximum Daily Average: 4.5 C on Mar 30

Minimum Value: -15.8 C on Mar 2 08:00

Minimum Daily Average: -8.4 C on Mar 16

Maximum Diurnal Average: 1.2 C at hour 16

Minimum Diurnal Average: -6.0 C at hour 7

Monthly Average: -2.73 C

Percentiles: P_1 = -13.2 P_{10} = -8.4 Q_1 = -5.8 Median = -2.9 Q_3 = -0.2 P_{90} = 4.1 P_{99} = 9.3

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

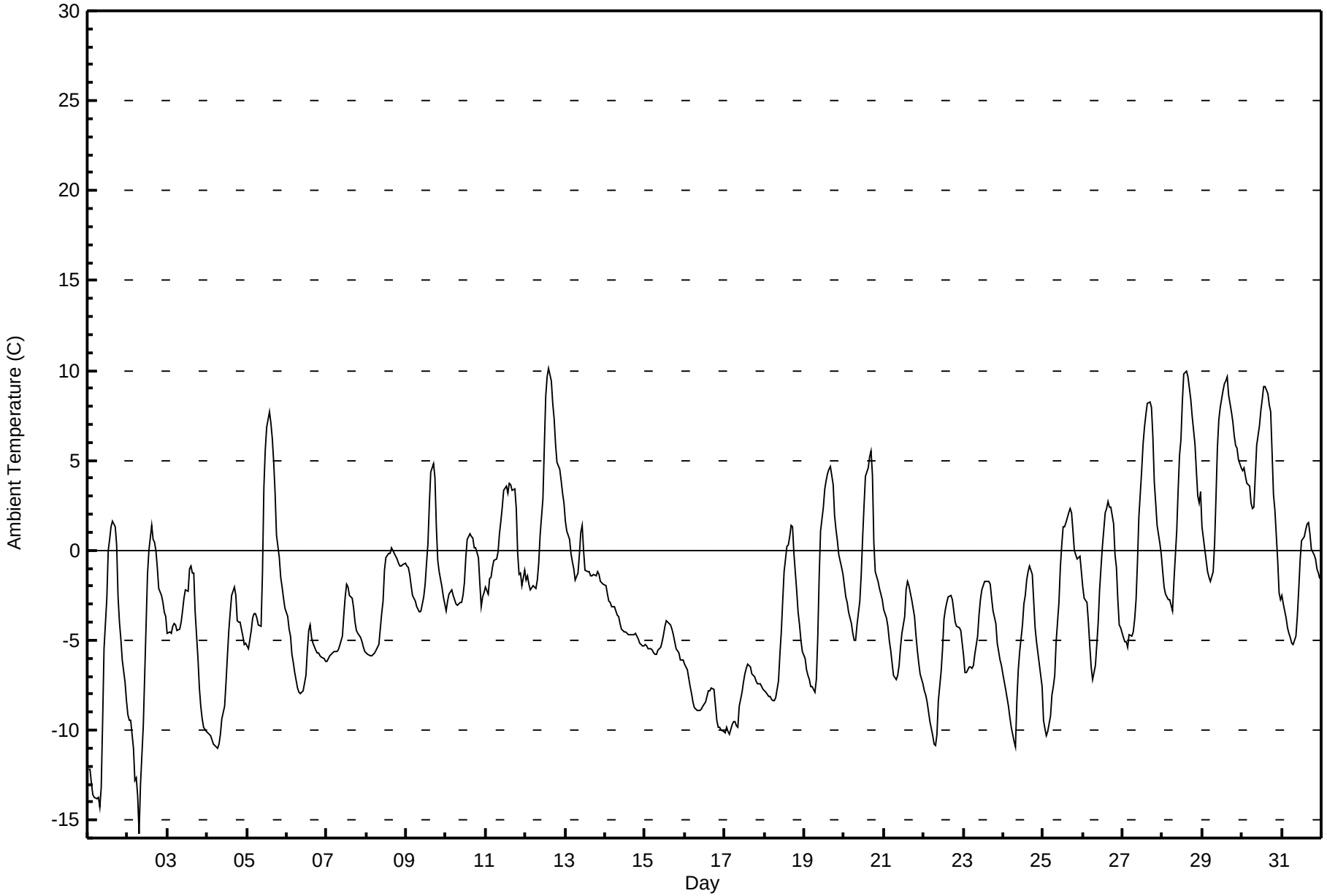
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-12.2	-12.2	-13.0	-13.6	-13.8	-13.8	-13.8	-14.3	-13.2	-9.6	-5.5	-2.7	0.0	0.6	1.3	1.6	1.3	0.3	-2.6	-4.0	-4.9	-6.1	-7.4	-8.4	-6.9	1.6
2-Mar	-9.1	-9.5	-9.4	-11.0	-12.8	-12.6	-13.6	-15.8	-13.0	-9.7	-6.9	-4.2	-1.4	0.0	1.4	0.6	0.4	0.0	-1.0	-2.1	-2.5	-2.9	-3.4	-3.7	-5.9	1.4
3-Mar	-4.6	-4.5	-4.6	-4.2	-4.1	-4.1	-4.4	-4.4	-4.0	-3.4	-2.6	-2.2	-2.3	-1.0	-0.9	-1.2	-1.2	-3.5	-6.0	-7.6	-8.6	-9.4	-9.8	-10.1	-4.5	-0.9
4-Mar	-10.1	-10.2	-10.3	-10.5	-10.8	-11.0	-11.0	-10.8	-10.3	-9.4	-8.7	-7.4	-5.9	-4.4	-3.4	-2.5	-2.1	-2.5	-3.9	-4.0	-4.0	-4.7	-5.2	-5.2	-7.0	-2.1
5-Mar	-5.4	-5.5	-4.4	-3.8	-3.5	-3.5	-3.8	-4.1	-4.2	-1.2	3.5	5.6	6.8	7.7	7.1	6.2	4.9	3.2	0.9	-0.4	-1.5	-2.0	-2.7	-3.2	-0.1	7.7
6-Mar	-3.7	-4.4	-4.8	-5.8	-6.3	-6.8	-7.7	-7.9	-8.0	-7.9	-7.8	-7.0	-5.6	-4.5	-4.1	-4.8	-5.2	-5.5	-5.7	-5.7	-5.8	-5.9	-6.0	-6.2	-6.0	-3.7
7-Mar	-6.2	-6.0	-5.9	-5.8	-5.6	-5.6	-5.6	-5.6	-5.3	-4.7	-3.6	-2.6	-1.9	-2.0	-2.5	-2.7	-3.2	-4.0	-4.5	-4.6	-4.8	-5.1	-5.4	-5.6	-4.5	-1.9
8-Mar	-5.7	-5.8	-5.9	-5.8	-5.8	-5.7	-5.6	-5.2	-4.3	-3.6	-2.8	-1.1	-0.4	-0.2	-0.2	0.1	0.0	-0.1	-0.5	-0.7	-0.9	-0.9	-0.8	-0.8	-2.6	0.1
9-Mar	-0.8	-0.9	-1.3	-1.9	-2.5	-2.8	-3.1	-3.3	-3.5	-3.4	-2.6	-1.9	-0.7	0.4	2.6	4.3	4.8	4.0	1.3	-0.6	-1.2	-2.1	-2.6	-3.0	-0.9	4.8
10-Mar	-3.3	-2.9	-2.4	-2.2	-2.5	-2.7	-3.0	-3.1	-2.9	-2.9	-2.5	-1.8	-0.4	0.6	0.9	0.8	0.7	0.1	0.1	-0.4	-1.8	-3.2	-2.6	-2.3	-1.7	0.9
11-Mar	-2.0	-2.5	-1.6	-1.5	-0.9	-0.6	-0.5	-0.1	0.9	1.6	2.4	3.4	3.6	3.2	3.7	3.6	3.3	3.4	2.3	-0.1	-1.3	-1.3	-1.9	-1.1	0.7	3.7
12-Mar	-1.7	-1.4	-1.9	-2.2	-2.0	-2.1	-2.2	-1.6	-0.7	0.8	2.9	5.7	8.6	9.6	10.2	9.4	8.2	7.3	5.9	4.9	4.5	3.9	3.2	2.6	3.0	10.2
13-Mar	1.6	1.1	0.6	-0.2	-0.7	-1.0	-1.7	-1.3	-0.3	1.0	1.4	0.0	-1.1	-1.2	-1.2	-1.4	-1.4	-1.3	-1.4	-1.2	-1.4	-1.7	-1.8	-1.9	-0.7	1.6
14-Mar	-2.0	-2.4	-2.8	-2.9	-3.1	-3.2	-3.3	-3.6	-3.7	-4.1	-4.4	-4.6	-4.6	-4.6	-4.7	-4.7	-4.7	-4.7	-4.7	-4.8	-4.9	-5.1	-5.3	-5.3	-4.1	-2.0
15-Mar	-5.3	-5.3	-5.5	-5.5	-5.6	-5.7	-5.8	-5.8	-5.6	-5.4	-5.1	-4.7	-4.2	-3.9	-4.1	-4.2	-4.4	-4.7	-5.1	-5.5	-5.7	-6.1	-6.1	-6.1	-5.2	-3.9
16-Mar	-6.4	-6.6	-7.1	-7.6	-8.0	-8.4	-8.7	-8.9	-8.9	-8.9	-8.9	-8.7	-8.5	-8.1	-7.8	-7.8	-7.7	-7.8	-8.6	-9.4	-9.8	-9.9	-10.0	-10.1	-8.4	-6.4
17-Mar	-10.2	-9.9	-10.1	-10.3	-9.7	-9.6	-9.5	-9.8	-9.9	-8.7	-7.9	-7.3	-6.9	-6.5	-6.3	-6.5	-6.9	-6.9	-7.1	-7.3	-7.4	-7.4	-7.6	-7.8	-8.2	-6.3
18-Mar	-7.8	-7.9	-8.1	-8.1	-8.2	-8.4	-8.3	-8.2	-7.3	-5.8	-4.6	-2.8	-1.2	0.2	0.3	0.7	1.4	1.3	-0.2	-2.3	-3.5	-4.1	-5.0	-5.6	-4.3	1.4
19-Mar	-6.0	-6.7	-6.9	-7.2	-7.6	-7.6	-7.9	-7.2	-4.9	-1.5	1.1	2.4	3.4	3.9	4.2	4.5	4.6	3.7	1.9	1.2	0.6	-0.3	-1.0	-1.4	-1.4	4.6
20-Mar	-1.9	-2.6	-2.9	-3.4	-4.1	-4.6	-5.0	-5.0	-4.1	-2.9	-1.3	0.7	2.5	4.1	4.6	5.2	5.5	4.2	0.5	-1.2	-1.7	-2.1	-2.5	-2.8	-0.9	5.5
21-Mar	-3.3	-3.7	-4.3	-5.0	-5.6	-6.2	-6.9	-7.2	-7.0	-6.4	-5.4	-4.6	-3.7	-2.2	-1.7	-1.9	-2.3	-2.8	-3.7	-4.7	-5.5	-6.3	-6.9	-7.4	-4.8	-1.7
22-Mar	-7.8	-8.0	-8.4	-8.9	-9.5	-10.3	-10.8	-10.8	-10.2	-8.4	-6.8	-5.5	-3.9	-3.3	-2.9	-2.6	-2.5	-2.8	-3.4	-4.0	-4.2	-4.3	-4.5	-5.2	-6.2	-2.5
23-Mar	-5.9	-6.8	-6.8	-6.5	-6.5	-6.6	-6.4	-5.8	-4.8	-3.6	-2.7	-2.2	-1.9	-1.7	-1.8	-1.7	-1.9	-2.7	-3.4	-4.0	-5.2	-5.7	-6.1	-6.4	-4.5	-1.7
24-Mar	-6.9	-7.7	-8.2	-8.6	-9.3	-9.8	-10.6	-10.9	-8.3	-6.6	-5.7	-4.1	-2.9	-2.5	-1.6	-1.2	-0.8	-1.3	-2.8	-4.3	-5.1	-5.7	-6.9	-7.5	-5.8	-0.8
25-Mar	-9.4	-9.9	-10.3	-10.0	-9.2	-8.1	-7.6	-7.0	-5.1	-2.9	-1.0	0.3	1.3	1.3	1.6	2.1	2.3	2.1	1.0	0.0	-0.5	-0.4	-0.3	-1.2	-3.0	2.3
26-Mar	-2.1	-2.7	-2.9	-4.0	-5.3	-6.5	-7.2	-6.4	-5.3	-4.0	-2.2	-1.0	0.2	2.1	2.3	2.7	2.4	2.4	1.5	-0.2	-1.0	-2.8	-4.1	-4.3	-2.0	2.7
27-Mar	-4.8	-5.1	-5.1	-5.4	-4.7	-4.8	-4.5	-3.8	-2.7	-0.6	1.8	4.4	5.9	6.8	7.6	8.2	8.3	7.9	6.3	3.8	2.7	1.4	0.3	-0.2	1.0	8.3
28-Mar	-1.2	-2.1	-2.5	-2.7	-2.8	-3.1	-3.3	-1.7	1.1	3.4	5.3	6.2	8.2	9.8	10.0	9.7	9.0	8.4	7.4	5.9	4.4	3.0	2.6	3.2	3.3	10.0
29-Mar	1.3	0.1	-0.6	-1.2	-1.5	-1.8	-1.2	0.4	2.9	5.7	7.3	7.9	8.8	9.3	9.4	9.7	8.7	7.7	7.2	6.3	5.8	5.7	5.1	4.6	4.5	9.7
30-Mar	4.4	4.6	4.1	3.7	3.6	2.6	2.3	2.4	4.1	5.8	6.9	7.8	8.4	9.1	9.1	8.7	8.1	7.7	5.4	3.1	2.3	-0.6	-2.3	-2.7	4.5	9.1
31-Mar	-2.5	-2.9	-3.8	-4.3	-4.6	-4.8	-5.1	-5.3	-4.7	-3.7	-2.2	-0.5	0.5	0.7	1.2	1.5	1.5	0.9	0.1	-0.2	-0.5	-1.0	-1.2	-1.6	-1.8	1.5
	-4.5	-4.9	-5.1	-5.4	-5.6	-5.8	-6.0	-5.9	-4.9	-3.6	-2.2	-1.0	0.0	0.7	1.1	1.2	1.0	0.5	-0.7	-1.7	-2.4	-3.0	-3.5	-3.8	Diurnal Average	
	4.4	4.6	4.1	3.7	3.6	2.6	2.3	2.4	4.1	5.8	7.3	7.9	8.8	9.8	10.2	9.7	9.0	8.4	7.4	6.3	5.8	5.7	5.1	4.6	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

Statoil - Leismer - March 2016



501-42

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	567	76.21	76.21
0 - 10	175	23.52	99.73
10 - 20	2	0.27	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) - %

Statoil - Leismer - March 2016

Maximum Value: 98 % on Mar 10 04:00

Maximum Daily Average: 93.0 % on Mar 14

Minimum Value: 33 % on Mar 27 17:00

Minimum Daily Average: 51.9 % on Mar 29

Maximum Diurnal Average: 85.0 % at hour 7

Minimum Diurnal Average: 61.7 % at hour 16

Monthly Average: 75.0 %

Percentiles: $P_1 = 36$ $P_{10} = 50$ $Q_1 = 62$ Median = 79 $Q_3 = 89$ $P_{90} = 94$ $P_{99} = 98$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

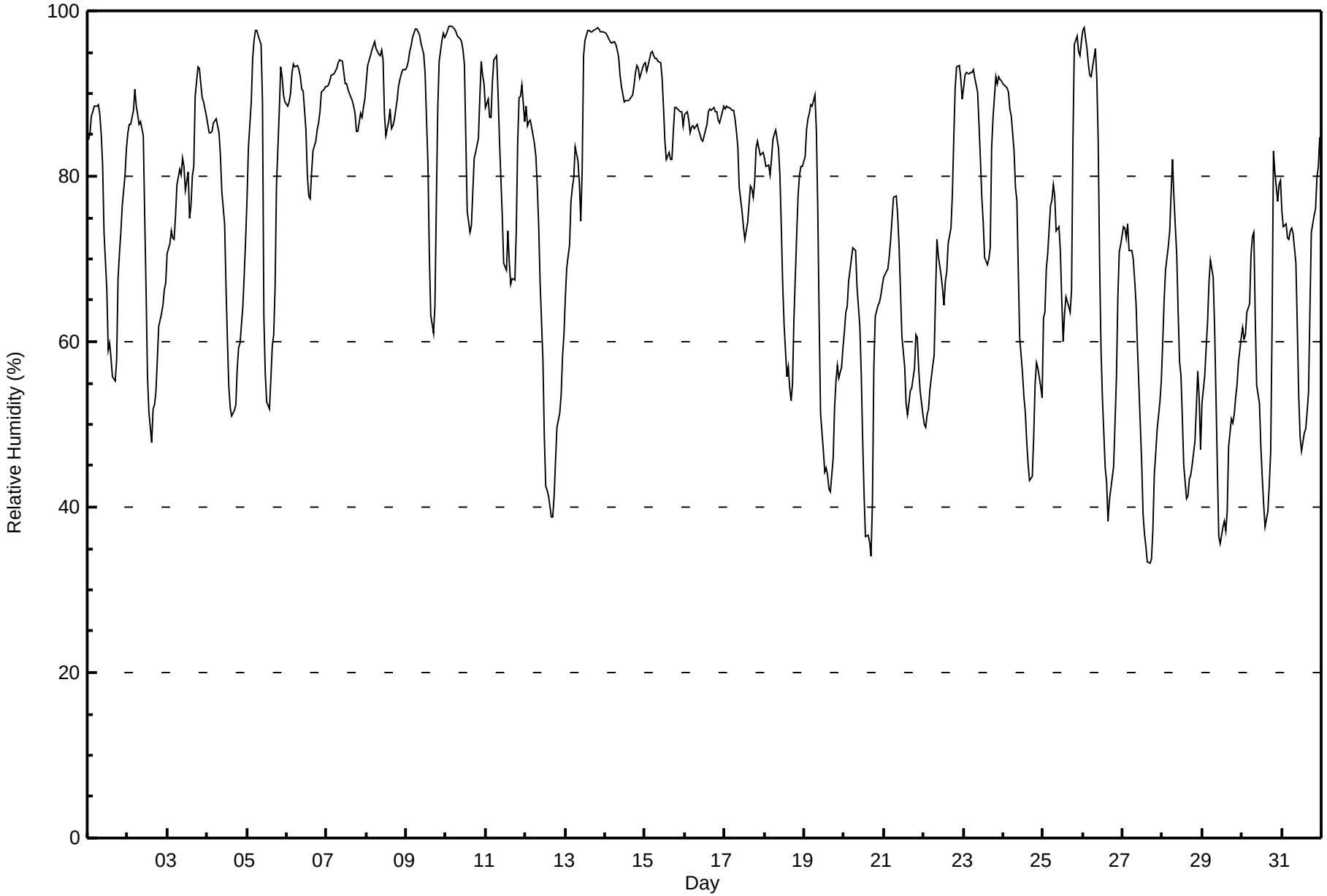
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	84	85	87	88	88	89	89	87	85	81	73	66	59	60	58	56	55	58	68	71	73	76	80	83	75.0	89
2-Mar	85	86	86	88	90	89	87	86	87	85	75	66	56	52	48	52	52	54	58	62	63	64	66	67	71.1	90
3-Mar	71	72	73	72	72	75	79	81	80	82	81	78	81	75	77	80	81	90	93	93	91	89	89	87	81.0	93
4-Mar	86	85	85	85	86	87	86	85	83	78	74	67	60	55	52	51	52	52	57	59	60	64	68	72	70.5	87
5-Mar	78	84	89	94	97	98	98	97	96	89	63	56	53	52	56	59	61	67	79	88	93	92	90	89	79.8	98
6-Mar	88	89	90	92	94	93	93	93	92	90	90	86	80	78	77	80	83	84	86	86	88	90	91	91	87.7	94
7-Mar	91	91	91	92	92	93	93	94	94	94	93	91	91	91	90	89	88	88	85	85	88	87	88	89	90.4	94
8-Mar	91	93	95	95	96	96	96	95	95	95	94	87	85	87	88	86	86	87	89	91	92	92	93	93	91.5	96
9-Mar	93	94	95	96	97	98	98	97	97	96	95	92	87	82	70	63	61	64	77	88	94	97	97	97	88.5	98
10-Mar	97	98	98	98	98	98	97	97	97	96	95	94	85	76	73	74	78	82	83	85	90	94	92	91	90.2	98
11-Mar	88	89	87	87	92	94	95	90	84	80	75	70	69	73	70	67	68	67	73	84	90	90	91	87	81.6	95
12-Mar	89	86	87	87	85	84	82	79	74	67	58	48	42	42	41	39	39	41	46	50	51	54	58	61	62.1	89
13-Mar	65	69	72	77	79	80	84	82	79	74	81	95	97	98	98	97	98	98	98	98	98	98	97	97	87.8	98
14-Mar	97	97	97	96	96	96	96	95	94	92	91	89	89	89	89	89	90	91	93	93	93	92	93	94	93.0	97
15-Mar	94	93	93	95	95	95	94	94	94	94	92	88	84	82	83	82	82	85	88	88	88	88	88	86	89.4	95
16-Mar	87	88	87	85	86	86	86	86	86	85	84	84	86	86	88	88	88	88	88	88	87	86	87	88	86.6	88
17-Mar	88	88	88	88	88	88	87	85	84	79	76	74	72	73	74	79	78	78	79	83	84	82	83	83	81.8	88
18-Mar	82	81	81	80	82	84	85	86	83	80	74	67	62	56	57	54	53	55	63	73	78	80	81	81	73.3	86
19-Mar	82	86	87	88	89	88	90	86	76	63	51	47	44	45	44	42	42	46	52	55	57	56	57	59	63.8	90
20-Mar	61	64	64	67	70	71	71	71	67	62	56	48	42	36	37	36	34	41	57	63	64	65	66	67	57.5	71
21-Mar	68	69	69	70	72	75	77	78	75	72	66	61	57	53	51	52	54	54	57	61	61	57	54	51	63.0	78
22-Mar	50	50	51	52	54	57	58	66	72	70	68	66	64	67	68	72	74	78	85	91	93	93	92	89	70.1	93
23-Mar	91	92	92	92	92	93	93	92	90	86	82	77	74	70	69	70	71	83	87	92	91	92	92	92	85.7	93
24-Mar	91	91	91	90	88	87	83	79	77	69	61	56	53	52	48	45	43	44	48	55	57	57	55	53	65.5	91
25-Mar	63	64	69	71	76	77	79	78	73	74	71	65	60	63	65	64	64	66	84	96	97	95	95	96	75.2	97
26-Mar	98	98	95	94	92	92	93	95	92	84	70	59	53	45	43	38	41	42	45	50	56	65	71	72	70.1	98
27-Mar	74	74	73	74	71	71	70	67	65	59	55	46	39	37	35	33	33	34	37	44	46	49	53	55	53.9	74
28-Mar	60	65	69	71	73	78	82	78	71	64	58	56	51	45	41	41	43	44	45	48	52	56	53	47	58.0	82
29-Mar	53	56	59	62	67	70	68	62	53	45	37	36	38	38	37	39	47	51	50	51	53	55	57	61	51.9	70
30-Mar	62	60	61	64	65	70	73	73	63	55	53	47	44	40	38	40	43	47	62	83	80	77	79	79	60.7	83
31-Mar	76	74	74	72	72	73	74	73	69	62	53	49	47	49	50	51	54	64	73	75	76	80	81	85	67.0	85
	80.1	80.9	81.8	82.8	83.7	84.7	85.0	84.1	81.5	77.5	72.4	68.1	64.6	62.7	61.8	61.7	62.5	65.2	70.5	75.2	76.9	77.8	78.6	78.8	Diurnal Average	
	98	98	98	98	98	98	98	97	97	96	95	95	97	98	98	97	98	98	98	98	98	98	97	97	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

Statoil - Leismer - March 2016



501-45

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	22	2.96	2.96
40 - 60	150	20.16	23.12
60 - 80	208	27.96	51.08
80 - 100	364	48.92	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

Statoil - Leismer - March 2016

Maximum Speed: 31 km/h on Mar 30 15:00

Maximum Daily Speed Average: 17.1 km/h on Mar 30

Minimum Speed Value: 0 km/h on Mar 2 09:00

Minimum Daily Speed Average: 1.3 km/h on Mar 7

Maximum Diurnal Speed Average: 3.0 km/h at hour 19

Minimum Diurnal Speed Average: 0.8 km/h at hour 10

Monthly Average Velocity: 1.4 km/h 22.1 deg

Percentiles: P_1 = 1 P_{10} = 4 Q_1 = 6 Median = 9 Q_3 = 13 P_{90} = 17 P_{99} = 23

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	SSW5	SSW5	SSW5	SSW4	S3	SSE4	SSE4	SSE3	ESE2	NW2	N4	N4	NNW4	NNW10	NNW13	NNW11	NNW12	NE6	ESE11	E10	E8	ENE7	ENE7	ENE4	NE2.1	NNW13
2-Mar	ENE6	E7	E7	ENE5	NE7	ENE2	ENE4	NE2	NE0	NW2	NW3	NW4	WNW4	NNW3	NW2	NNW3	N3	ENE3	ESE7	ESE7	ESE7	ESE7	ESE8	SE7	E2.8	ESE8
3-Mar	SE6	SE7	SE7	SE8	SE10	SE11	SE11	SSE11	SSE9	SSE9	SSE10	SSE11	SSE8	SE4	NW1	SW3	WNW3	NNW18	N20	NNW20	NNW19	N19	N13	N10	ENE2.0	NNW20
4-Mar	N9	NNE7	N4	N3	WSW2	W2	W1	SE3	SSE4	SSE8	SSE8	SSE10	S12	SSE12	SSE14	SE14	SSE16	SE12	SE9	SSE15	SSE13	S12	SSE10	SSE11	SSE6.6	SSE16
5-Mar	SSE9	SSW6	SW9	SW8	SW6	SW6	SW6	SW4	W4	W4	NW11	NNW4	N6	NW7	NNW11	N13	N12	NNE14	NE14	ENE8	E9	ENE9	NE10	ENE9	N2.5	NE14
6-Mar	ENE9	NE9	NNE9	NNE9	NE8	E8	E8	E7	ENE7	E9	ESE10	ESE10	ESE10	ESE12	E11	E14	E14	E14	E12	E11	E13	ESE14	ESE15	ESE14	E9.8	ESE15
7-Mar	ESE15	ESE14	ESE11	ESE10	ESE9	ESE9	ESE8	ESE6	SE5	SSE5	S3	SW3	W7	NW14	NW13	WNW12	WNW14	WNW13	WNW12	WNW8	WNW10	WNW10	W6	W7	WNW1.3	ESE15
8-Mar	W8	NNW8	N4	SSE2	SSE4	SSE6	SE5	SE5	SSE8	S10	S9	SSW9	SSW11	SSW11	SSW9	SSW10	SW8	WSW6	SW7	SW5	SW5	SW6	SW4	SW3	SSW5.0	SSW11
9-Mar	SSW2	SW3	WSW7	W9	WSW5	SW5	SSW4	S5	SSW6	S6	S7	SSW8	S8	SSW7	SSW8	SSW7	SSW7	SSW7	S4	SSE5	SSE8	SSE6	S6	S5	SSW5.1	W9
10-Mar	SSE6	S7	S7	SSE10	SSE11	SSE11	SSE12	SSE12	SE12	SE13	SE13	SE15	SE16	SE16	SE14	SE17	SE13	SE12	SE11	SE4	NNE4	SE5	SSW3	SW1	SE9.5	SE17
11-Mar	W3	WNW6	WNW12	WNW9	WNW13	W12	W11	W14	WNW19	WNW18	WNW21	WNW22	WNW21	W20	WNW22	WNW21	W17	WNW15	NW8	SE2	ESE3	ESE4	ESE4	ESE6	WNW10.9	WNW22
12-Mar	ESE8	ESE12	ESE9	ESE9	ESE11	ESE12	E12	E12	E13	ESE14	ESE15	ESE17	SE19	SE18	SE20	SSE18	SSE12	SE9	SE7	SE6	ESE9	E9	E8	ENE8	ESE11.3	SE20
13-Mar	ENE9	ENE8	NE7	N5	N5	N7	NNE1	NNW1	NNW6	NW10	NW11	NW16	NW18	NW16	NW17	WNW17	WNW18	WNW17	WNW17	NW16	NNW17	NW14	NNW14	NNW11	NW9.8	NW18
14-Mar	NNW13	NNW14	NNW13	NNW13	NNW11	NW8	NNW12	NNW13	N12	N14	N14	N13	NNW12	N10	N11	N11	N10	N10	N9	N9	N8	NNE8	NNE7	N5	N10.6	N14
15-Mar	N4	NNE5	N5	NNW5	NNW6	NNW7	N6	N7	N6	N6	N7	N10	NNW11	NNW14	NNW15	NNW17	NNW18	NNW17	N17	NNW19	NNW16	NNW15	NNW15	NNW17	NNW10.9	NNW19
16-Mar	NNW18	NNW19	NNW21	NNW21	N20	N20	N19	NNW18	NNW18	NNW19	NNW17	NNW18	N18	N16	N12	N12	N9	N9	N14	N12	N12	NNW9	NW9	NW9	N15.2	NNW21
17-Mar	NNW10	NNW10	NNW10	NNW10	NNW13	NNW16	NNW14	NNW16	NNW14	NNW21	NNW21	N19	NNW19	NNW17	NNW18	NNW17	NNW17	NNW14	N10	N6	N6	N8	N7	N6	NNW13.2	NNW21
18-Mar	N7	N7	N7	N6	NNW4	E1	N2	SSW2	SW4	SW5	W6	W5	W1	W2	W6	W7	W8	W4	S2	SE5	SSE7	S5	S4	S4	W1.8	W8
19-Mar	SSW4	SSW3	S3	S3	SSW3	SSW3	S2	S4	S6	S8	S10	S12	SSE14	SSE14	SSE14	SSE16	SE14	SE13	SE8	SE8	SE9	SE8	ESE7	ESE9	SSE7.4	SSE16
20-Mar	ESE9	ESE10	ESE9	ESE9	ESE9	ESE10	ESE11	ESE11	ESE12	SE11	SE13	SE15	SE16	SE15	SE12	ESE11	ESE12	E11	ENE12	ENE12	ENE12	E12	E12	E12	ESE10.6	SE16
21-Mar	E12	E11	E12	E12	E14	E14	E15	E15	E13	ESE14	ESE16	ESE17	ESE19	ESE16	E15	E13	E13	E14	E12	E12	E13	ESE13	ESE11	ESE11	E13.5	ESE19
22-Mar	ESE10	ESE11	ESE10	ESE10	ESE10	ESE10	ESE9	ESE9	ESE8	SE10	SSE12	SSE11	SSE11	SE11	SE10	SE9	SE9	SE8	SE6	SE6	SSE8	SSW9	SSW9	SE8.4	SSE12
23-Mar	SSW6	SSW5	S4	S4	SSW4	SSW4	SSW3	SW2	WNW8	WNW12	WNW13	WNW15	WNW15	NW13	NNW10	WNW8	WNW10	N10	NNE9	NNE8	NNE10	NNE8	NNE8	NE7	NW4.3	WNW15
24-Mar	NE7	NE7	ENE8	ENE8	ENE7	ENE8	ENE9	NE8	E9	E11	E11	E9	ESE10	SE11	SE10	SE9	SE7	SE6	ESE5	ESE5	ESE6	ESE7	ESE7	ESE5	E6.9	E11
25-Mar	ESE3	E5	E2	SE3	SE3	SSE4	SE4	SSE4	SSW5	SW6	SSW7	S11	SSW11	SW12	SSW13	SW11	SSW9	SSW7	W6	SSW2	SW3	W5	W8	W6	SSW4.6	SSW13
26-Mar	W5	WNW7	NNW9	NNW9	NNW9	NNW9	N12	N12	NNW10	NNW11	NNW12	NNW17	NW9	NW3	NW6	NW7	NNW8	NW6	NNE2	E5	E7	ESE5	SE6	SE6	NNW5.6	NNW17
27-Mar	SE6	SSE7	SE8	SE7	SE6	SE7	SE6	ESE7	SE7	SSE9	SSE12	SSE15	SSE17	SSE13	S13	SSE15	SSE15	SSE14	SSE11	SSE10	SSE12	SSE10	SSE9	SSE9	SSE9.9	SSE17
28-Mar	SSE8	SSE8	SSE7	SSE6	SSE6	S6	SSW5	SSW6	SW7	SW8	SSW9	SSW11	SSW10	SSW11	W12	W14	NW19	NW14	NW9	W5	W5	WNW7	WNW10	NW12	WSW5.1	NW19
29-Mar	WNW5	NW4	WNW5	W5	WNW7	WNW7	WNW10	WNW11	W9	W8	WNW11	W12	WNW18	NW18	NW23	NW23	WNW21	WNW13	W5	SW3	W6	W6	W6	WSW2	WNW9.5	NW23
30-Mar	SSW1	WSW3	WNW10	NW11	NNW14	NNW12	NNW12	NNW15	NNW16	NNW18	NNW22	NNW25	N26	NNW25	NNW31	NNW28	NNW24	NNW22	NNW28	NNW17	N19	N21	N18	N13	NNW17.1	NNW31
31-Mar	N15	N20	N16	N19	N19	N18	N17	NNW16	NNW12	NNW10	NNW13	NNW11	NW12	NW13	NNW10	NW9	NW4	W5	SSW3	S6	SSW3	SSE4	SSW4	SSW4	NNW8.4	N20
	ENE2.1	NE2.5	NNE2.0	NNE2.0	NNE2.1	NE1.7	NE1.9	NE1.6	NNE0.9	N0.8	NNW1.0	NNW0.8	W0.8	WNW1.3	NW2.6	NW2.4	NW2.6	NNW2.4	NNE3.0	NE2.5	NE2.6	ENE2.3	ENE1.9	ENE1.7	Diurnal Average	
	NNW18	N20	NNW21	NNW21	N20	N20	N19	NNW18	WNW19	NNW21	NNW22	NNW25	N26	NNW25	NNW31	NNW28	NNW24	NNW22	NNW28	NNW20	NNW19	N21	N18	NNW17	Diurnal Maximum	

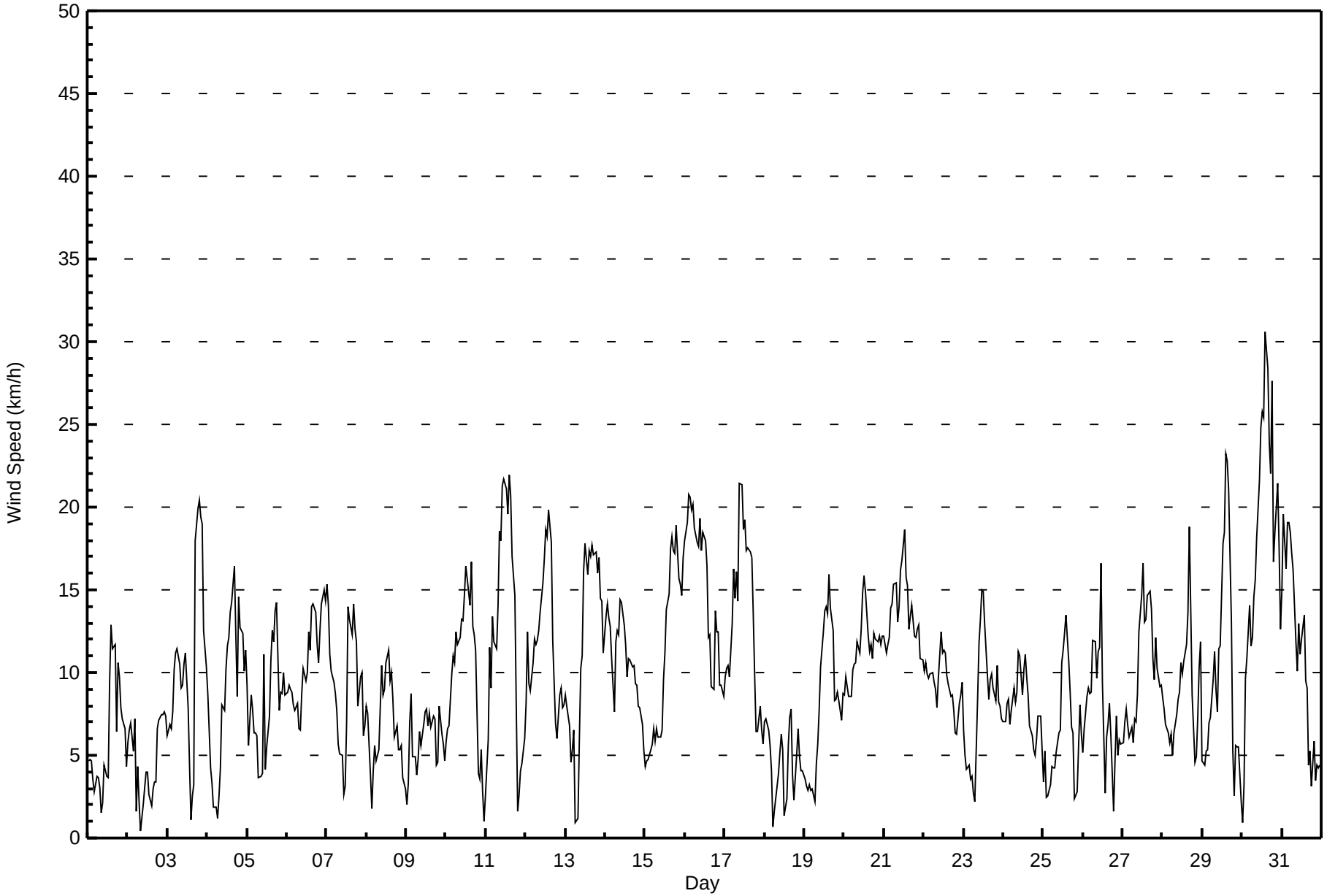
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

Statoil - Leismer - March 2016



501-48

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	153	20.56	20.56
6 - 11	341	45.83	66.40
12 - 19	221	29.70	96.10
20 - 28	28	3.76	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

Frequency Distribution

Wind Speed (WS) - km/h

Statoil - Leismer - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	11	5	2	5	4	9	12	11	15	24	15	4	16	4	9	7	153
6 - 11	31	10	10	19	17	48	41	36	14	25	12	2	18	17	15	26	341
12 - 19	29	1	1	3	26	19	20	23	4	1	1	0	5	20	15	53	221
20 - 28	5	0	0	0	0	0	1	0	0	0	0	0	1	6	2	13	28
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	76	16	13	27	47	76	74	70	33	50	28	6	40	47	41	100	744

Total Number of Valid Hours: 744

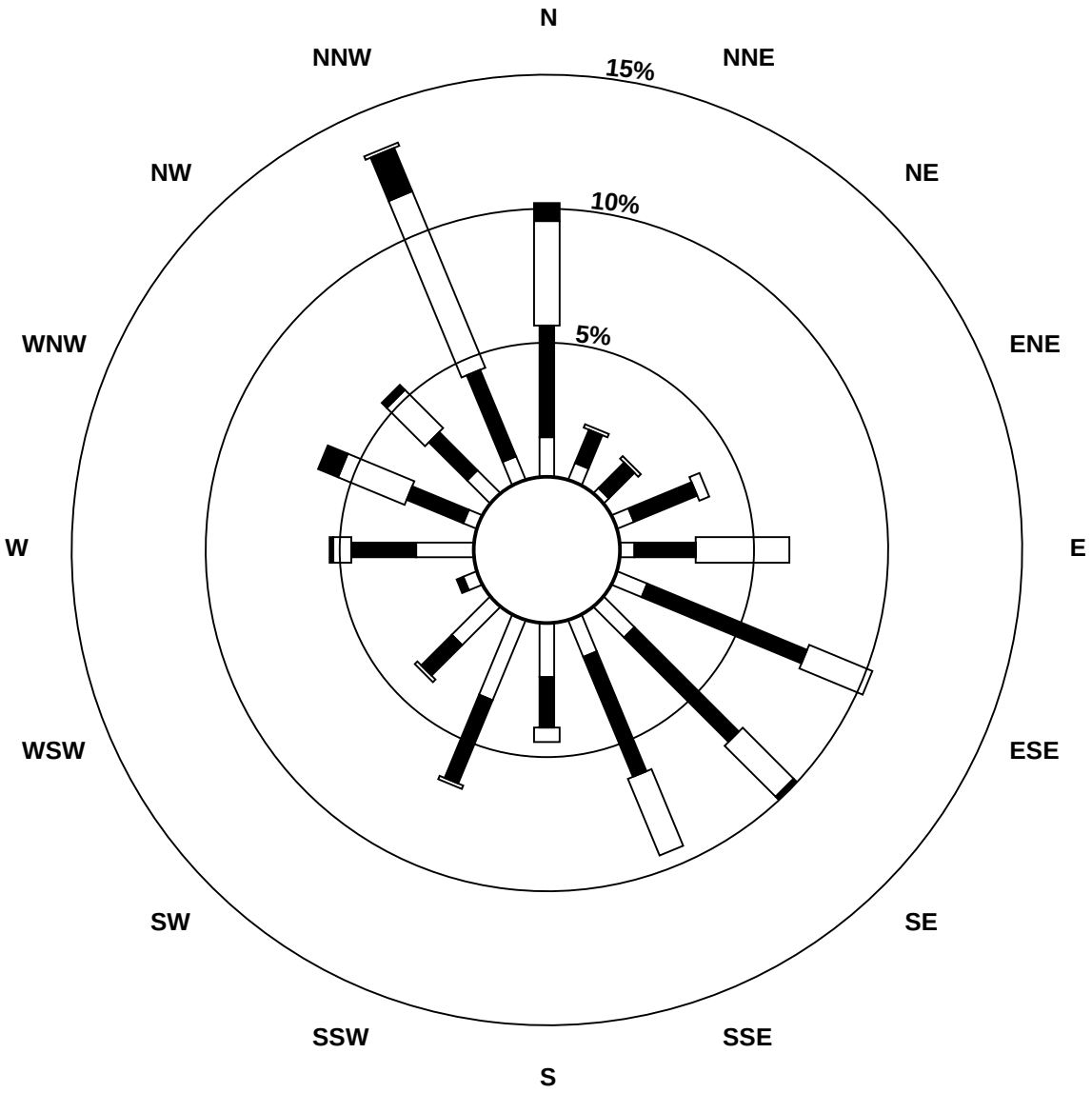
Total Number of Hours: 744

Wood Buffalo Environmental Association

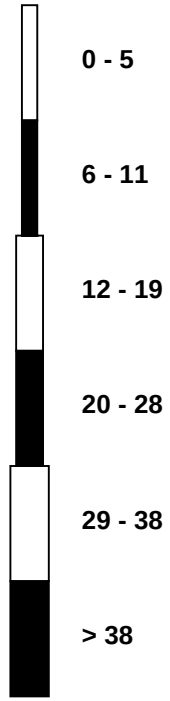
Wind Rose Mar 2016

Wind Speed (WS) - km/h

Statoil - Leismer (AMS501)



Classes (km/h)



Total Number of Valid Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Statoil - Leismer - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 8 km/h on Mar 30 19:00

Minimum Value: 0 km/h on Mar 1 06:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 2$ Median = 2 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 5$

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	1	1	1	1	1	0	1	1	1	1	2	2	2	3	4	3	2	3	2	2	2	2	2	2	4
2-Mar	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	2	1	1	2	2	1	1	1	1	2
3-Mar	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1	1	3	3	3	3	3	3	4	2	4
4-Mar	2	1	1	2	1	1	1	1	1	2	2	3	3	3	3	3	4	3	2	3	2	3	2	2	4
5-Mar	2	1	3	2	2	2	2	1	1	2	3	3	3	2	2	2	3	4	4	3	3	3	3	3	4
6-Mar	3	3	3	3	2	3	2	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4
7-Mar	4	3	3	3	2	2	2	2	1	1	1	1	5	3	3	3	3	3	2	2	2	3	2	2	5
8-Mar	2	2	1	1	1	1	1	1	2	2	3	3	3	3	2	2	3	2	2	2	1	1	1	1	3
9-Mar	1	1	3	3	2	1	2	1	2	2	2	2	2	2	2	3	2	2	2	1	1	1	1	1	3
10-Mar	1	2	2	2	2	3	3	3	3	3	3	4	4	4	5	4	3	3	3	2	1	2	1	1	5
11-Mar	1	3	2	3	3	3	2	3	4	4	5	5	5	5	6	5	4	4	2	1	1	1	1	1	6
12-Mar	3	2	2	2	2	2	2	3	3	3	3	4	5	5	5	5	3	2	2	1	2	2	2	2	5
13-Mar	2	2	3	1	1	2	2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	3	2	2	4
14-Mar	3	3	3	2	2	2	3	2	2	3	3	2	2	2	2	2	1	2	1	2	1	1	1	1	3
15-Mar	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	4	3	2	3	3	4
16-Mar	3	3	4	4	4	4	4	3	3	5	3	4	4	4	3	3	2	3	3	3	2	1	3	3	5
17-Mar	2	3	2	2	3	3	2	3	2	4	4	4	4	3	3	4	4	3	3	1	1	2	2	2	4
18-Mar	1	2	2	2	2	1	1	1	1	1	2	2	2	2	2	3	3	2	1	1	1	1	1	1	3
19-Mar	1	1	1	1	1	1	2	1	1	2	3	3	3	3	3	3	3	4	2	2	2	2	2	2	4
20-Mar	2	2	2	2	2	2	2	2	3	2	3	4	4	4	3	3	3	3	3	4	4	4	3	3	4
21-Mar	3	3	3	4	4	4	4	4	4	4	4	5	5	4	4	4	4	4	4	4	4	3	3	2	5
22-Mar	3	3	2	2	2	2	2	2	2	2	2	2	2	3	3	2	2	2	2	1	1	1	4	3	4
23-Mar	1	2	1	1	1	1	1	1	4	2	3	3	3	3	3	3	2	2	2	2	2	2	2	2	4
24-Mar	2	2	2	2	2	2	2	2	3	3	3	4	4	4	3	3	3	2	2	1	1	1	2	2	4
25-Mar	2	2	1	1	1	1	1	1	1	2	2	3	3	4	4	4	2	2	2	1	1	1	2	2	4
26-Mar	2	2	1	2	2	2	3	2	2	2	3	4	3	3	4	3	2	2	1	1	2	2	1	1	4
27-Mar	1	1	1	1	1	1	2	2	1	2	3	3	4	4	3	4	4	3	2	1	2	1	1	1	4
28-Mar	1	1	1	1	1	2	1	2	2	3	2	3	3	3	5	5	6	4	3	1	1	2	3	5	6
29-Mar	1	2	2	2	1	1	2	2	2	2	4	4	5	5	5	5	6	3	2	1	3	1	2	2	6
30-Mar	1	2	2	3	2	2	2	2	3	4	5	4	5	6	6	6	5	5	8	3	7	5	5	3	8
31-Mar	4	5	4	4	4	4	3	3	3	3	3	4	4	3	2	2	2	2	1	2	1	1	1	1	5
	4	5	4	4	4	4	4	4	4	5	5	5	5	6	6	6	6	5	8	4	7	5	5	5	
	Diurnal Maximum																								

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Statoil - Leismer - March 2016

Direction of Maximum Speed: 336 deg on Mar 30 15:00
Direction of Maximum Daily Speed Average: 339.9 deg on Mar 30

Direction of Minimum Speed: 46 deg on Mar 2 09:00

Direction of Minimum Daily Speed Average: 1.3 deg on Mar 7

Monthly Average Direction: 308.1 deg

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	205	200	204	192	169	161	161	150	109	320	5	7	346	348	343	340	348	35	104	96	83	70	70	76	43.7
2-Mar	74	99	97	77	40	75	66	35	46	321	311	318	296	341	321	345	11	76	105	116	106	118	123	129	80.7
3-Mar	133	130	131	125	124	137	140	147	148	164	163	156	153	140	317	226	303	336	349	344	343	350	9	1	64.1
4-Mar	356	25	9	356	256	275	279	130	156	158	167	158	170	168	162	146	147	135	136	153	162	171	156	162	153.6
5-Mar	163	200	217	227	233	221	224	235	280	281	318	348	360	323	345	354	2	18	34	74	79	63	52	66	1.2
6-Mar	73	44	26	29	36	88	86	86	70	79	102	103	105	103	97	100	98	96	80	85	91	107	107	109	87.7
7-Mar	107	107	109	106	112	106	118	121	140	153	186	218	275	312	320	298	297	289	286	292	289	283	267	274	283.4
8-Mar	277	343	3	154	151	161	140	146	162	174	188	204	207	205	211	212	220	238	222	227	215	217	230	233	205.3
9-Mar	204	227	257	276	242	221	207	181	192	185	177	194	183	197	200	208	198	193	188	153	157	154	170	177	196.4
10-Mar	167	189	174	161	161	153	155	147	138	136	134	132	125	133	135	135	143	128	128	129	28	135	196	230	141.7
11-Mar	276	290	291	282	285	277	279	279	282	284	288	288	283	279	288	293	279	293	326	131	118	117	116	108	285.2
12-Mar	114	106	123	113	111	110	98	101	90	103	117	119	130	135	133	149	147	137	136	127	108	93	90	74	117.5
13-Mar	65	76	56	0	0	10	13	347	346	323	316	325	318	318	316	296	296	292	294	313	330	324	328	328	323.0
14-Mar	342	346	335	335	334	323	335	338	352	349	356	351	345	359	354	351	350	359	4	11	7	19	12	11	349.9
15-Mar	7	22	0	340	340	347	5	3	5	5	360	351	348	340	346	339	344	348	354	346	343	346	346	343	348.6
16-Mar	340	346	348	348	355	354	352	348	348	348	340	346	349	357	350	9	2	7	5	358	356	342	323	312	349.6
17-Mar	336	327	328	338	340	343	337	342	340	342	348	350	332	329	337	335	329	338	349	355	358	3	8	1	340.7
18-Mar	357	356	0	3	338	85	357	196	230	219	271	280	267	263	280	272	278	265	175	144	152	190	191	188	270.8
19-Mar	201	202	178	176	198	206	178	176	185	185	189	173	165	162	156	147	141	141	128	127	141	134	123	111	156.0
20-Mar	109	103	110	105	107	105	113	111	117	137	131	139	135	133	125	116	111	88	63	65	73	83	87	91	107.6
21-Mar	87	92	85	89	92	96	100	100	101	103	108	104	106	110	98	91	90	87	91	90	98	103	109	107	97.9
22-Mar	104	107	104	108	105	104	103	115	119	135	153	155	153	138	143	142	132	145	128	134	143	163	194	204	133.7
23-Mar	198	195	184	190	192	201	211	227	287	291	288	303	292	308	327	291	288	358	20	20	31	32	32	43	313.0
24-Mar	45	47	58	77	77	71	58	52	79	82	79	89	118	137	136	138	139	124	122	116	111	104	109	104	94.2
25-Mar	116	95	90	132	134	147	145	156	200	215	210	179	199	216	213	215	208	208	266	209	215	276	280	281	205.5
26-Mar	275	294	340	344	340	348	4	360	337	340	340	343	326	320	322	315	339	313	13	82	96	106	132	135	345.3
27-Mar	141	151	144	140	130	130	131	123	141	149	154	163	156	164	175	165	165	164	155	147	156	164	157	161	154.7
28-Mar	153	150	152	152	162	181	193	211	226	221	209	207	208	210	264	272	305	314	314	275	279	289	296	314	244.2
29-Mar	302	307	290	281	293	287	282	286	280	279	285	281	297	307	310	315	297	288	275	225	272	264	266	254	292.4
30-Mar	199	248	285	312	330	338	333	336	339	346	346	343	354	343	336	338	330	329	336	336	352	358	7	360	339.9
31-Mar	6	10	8	3	358	357	359	345	338	342	348	348	317	309	327	317	316	264	205	172	193	165	193	212	345.0
	63.5	54.2	32.7	29.6	30.2	54.6	52.9	44.6	17.0	353.9	331.2	332.1	277.2	290.5	316.1	308.9	312.4	346.6	19.9	52.1	55.7	59.9	61.0	66.0	
	Diurnal Average																								

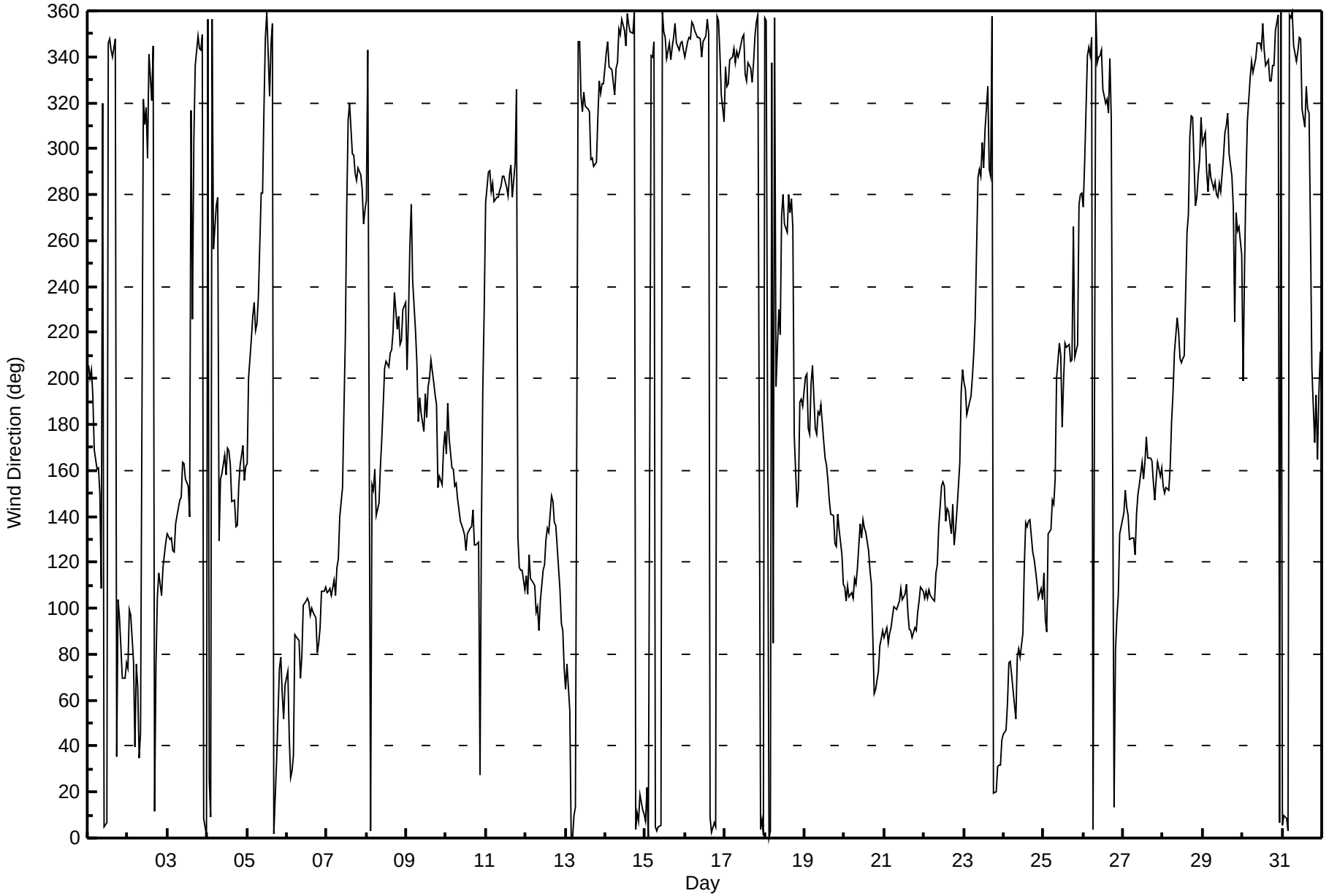
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

Statoil - Leismer - March 2016



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 100 deg on Mar 13 08:00

Minimum Value: 5 deg on Mar 28 01:00

Percentiles: P_1 = 7 P_{10} = 11 Q_1 = 13 Median = 17 Q_3 = 22 P_{90} = 32 P_{99} = 89

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	13	13	10	12	17	11	15	18	57	52	26	37	71	17	21	28	14	44	14	16	20	23	23	33	71
2-Mar	27	18	20	24	15	81	22	21	95	31	29	33	42	47	76	80	39	29	14	15	14	13	12	13	95
3-Mar	13	14	15	13	14	14	14	11	12	12	13	15	20	36	85	49	60	9	13	12	12	13	15	14	85
4-Mar	13	19	27	25	75	63	89	39	27	14	22	23	18	20	18	19	16	16	14	12	10	10	9	10	89
5-Mar	11	14	18	21	23	19	20	28	31	41	21	52	30	29	13	13	15	16	15	27	26	24	23	27	52
6-Mar	30	22	21	23	15	34	28	33	35	31	25	26	25	25	29	21	21	21	23	24	22	17	17	17	35
7-Mar	17	17	18	19	17	18	16	17	20	20	53	39	38	19	19	20	17	15	12	19	20	20	21	24	53
8-Mar	16	26	23	53	24	12	18	11	15	13	19	27	21	16	17	18	24	26	23	22	16	16	30	31	53
9-Mar	23	30	28	16	27	26	27	20	19	26	29	29	28	25	27	31	23	18	14	12	7	11	12	20	31
10-Mar	15	17	17	14	13	14	14	15	17	19	18	19	17	18	19	21	19	17	17	50	43	17	34	79	79
11-Mar	61	20	10	15	11	14	12	11	11	12	13	14	12	16	15	15	15	15	20	62	32	13	16	18	62
12-Mar	14	14	16	18	16	13	15	16	17	16	15	15	20	19	19	15	14	16	15	19	12	14	18	17	20
13-Mar	20	20	26	24	16	29	89	100	35	13	20	10	14	12	14	12	11	10	11	14	12	13	10	10	100
14-Mar	12	12	13	10	15	27	10	10	13	15	16	15	14	20	11	11	10	13	12	13	13	13	14	13	27
15-Mar	15	22	16	9	10	8	14	12	17	13	17	16	12	10	11	10	13	12	11	12	10	11	11	10	22
16-Mar	11	12	12	12	14	13	12	12	12	10	12	11	13	14	12	16	15	15	15	14	14	11	16	19	19
17-Mar	9	15	8	9	11	12	11	10	9	11	14	16	14	11	12	13	14	11	13	15	13	14	17	17	17
18-Mar	12	14	10	29	43	93	82	44	27	23	32	46	91	94	44	31	29	40	40	7	6	16	11	14	94
19-Mar	18	21	15	15	20	18	41	15	16	19	21	16	15	16	19	15	18	16	15	14	12	14	15	13	41
20-Mar	13	13	14	18	15	14	13	14	17	19	19	19	21	22	21	25	21	25	21	21	21	21	21	19	25
21-Mar	20	20	21	22	20	19	19	19	22	23	19	21	20	22	24	27	24	23	22	22	20	18	16	16	27
22-Mar	18	16	17	15	16	17	19	17	19	20	16	19	22	20	22	20	21	16	18	15	12	10	19	15	22
23-Mar	14	14	12	14	15	14	15	27	27	14	16	20	16	21	20	21	17	19	13	14	14	14	14	18	27
24-Mar	19	18	21	21	21	22	19	18	28	27	27	46	33	30	36	30	54	31	15	11	10	12	13	15	54
25-Mar	43	23	35	61	30	9	8	8	22	27	33	20	21	20	20	24	17	17	24	28	41	24	14	17	61
26-Mar	22	21	9	9	7	7	14	13	16	12	17	18	28	88	47	43	19	25	63	30	14	18	12	12	88
27-Mar	9	9	9	9	13	17	20	16	18	15	14	16	16	20	17	17	18	13	11	8	8	6	5	8	20
28-Mar	5	7	7	10	9	17	14	21	24	23	22	18	21	22	27	24	21	21	25	20	16	11	16	21	27
29-Mar	35	34	28	18	9	8	8	12	13	18	18	26	18	24	18	20	14	11	20	38	50	17	22	77	77
30-Mar	85	32	10	21	10	10	9	9	10	12	15	14	16	16	12	12	11	12	11	11	18	14	14	18	85
31-Mar	15	16	17	16	16	16	16	16	17	21	19	24	33	20	26	28	46	28	30	14	17	17	13	22	46
	85	34	35	61	75	93	89	100	95	52	53	52	91	94	85	80	60	44	63	62	50	24	34	79	
	Diurnal Maximum																								

Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

Calibration Date	February 9, 2016	Last Calibration	February 9, 2016
Station Name	Statoil - Leismer	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	10:05	End Time (MST)	13:50
Gas Cert Reference	S990374A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26-Sep-17
Calibrator Make/Model	Sabio 4010	Serial Number	11581008
ZAG Make/Model	API 701	Serial Number	4522
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2579

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	549	549
Analyzer IP address	192.168.1.72		Lamp voltage	2659	2630
Calculated slope	0.992262	0.991674	Chamber temp	50.0	50.1
Calculated intercept	0.996458	1.556221	Pressure	25.6	25.5
Analyzer Background	17.6	16.9	Flow	454	456
Analyzer Coefficient	1.074	1.073	Intensity	66	65

Analyzer make	API T100	Analyzer serial #	721

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	63.1	631.0	632.5	0.998
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	63.1	631.0	635.6	0.993
second point	5000	31.6	316.0	316.1	1.000
third point	5000	15.8	158.0	156.2	1.012
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	63.1	631.0	631.8	0.999
				Average Correction Factor	1.001

Corrected As found	633.0	Previous response	634.9	% change	0.3%

Notes:

no maintenance done, filter changed out, Zero adjusted

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Calibration Performed By: Melissa Lemay

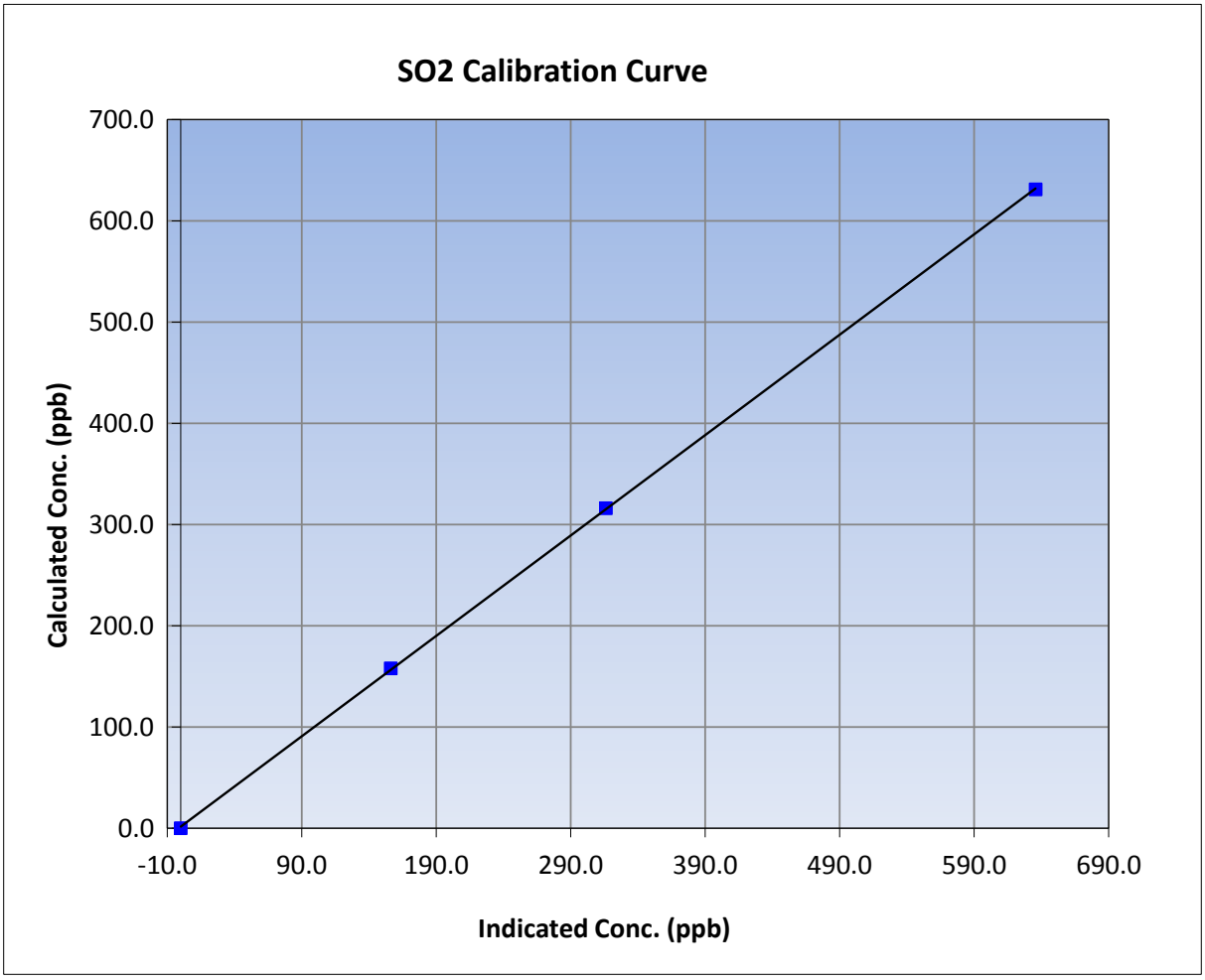
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

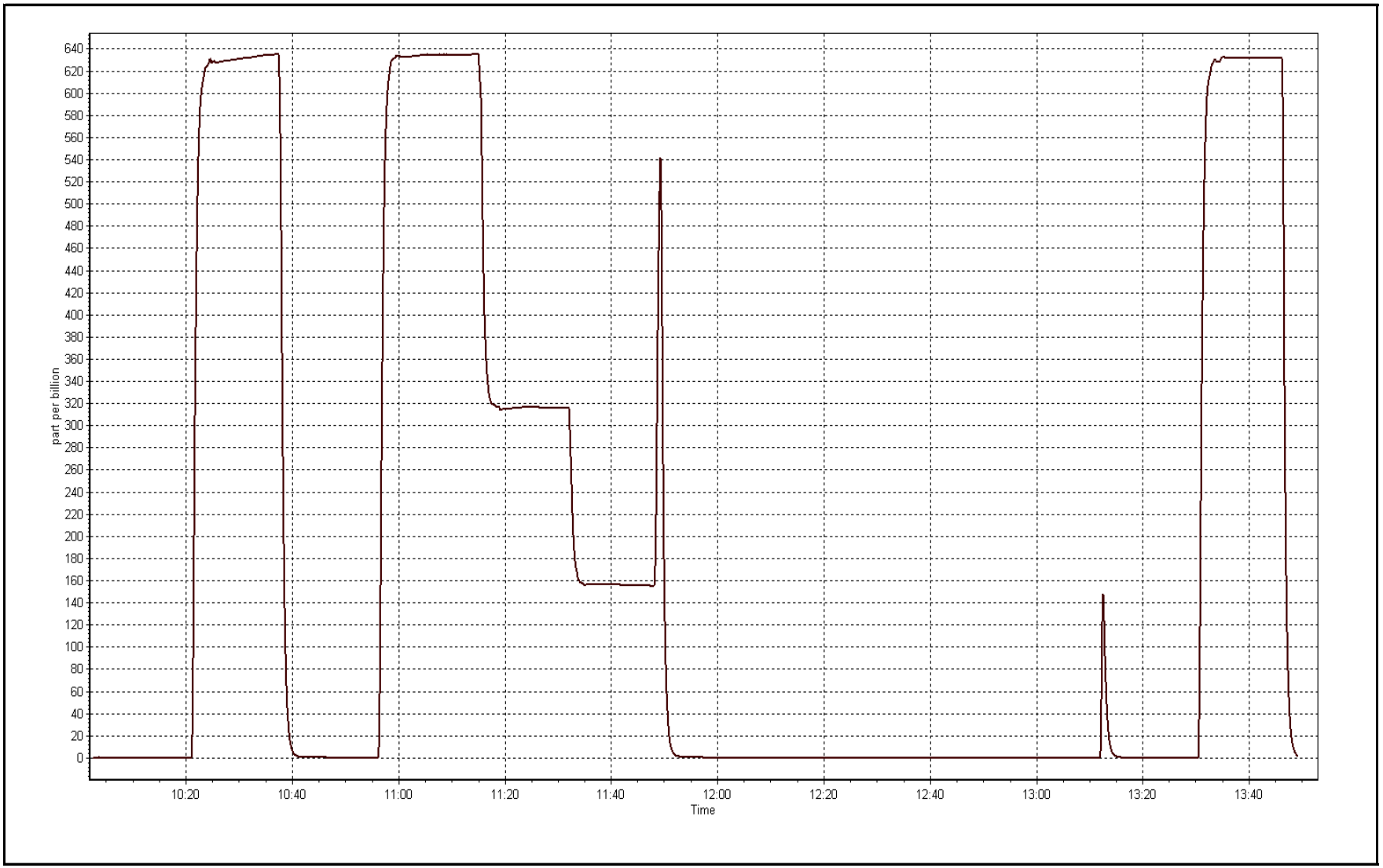
Calibration Date	February 9, 2016	Previous Calibration	February 9, 2016
Station Name	Statoil - Leismer	Station Number	AMS 501
Start Time (MST)	10:05	End Time (MST)	13:50
Analyzer make	API T100	Analyzer serial #	721

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999969
631.0	635.6	0.9928		
316.0	316.1	0.9997	Slope	0.991674
158.0	156.2	1.0115		
			Intercept	1.556221



SO2 Calibration Plot Date: February 9, 2016



Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	April 7, 2016	Last Calibration	March 21, 2016
Station Name	Statoil - Leismer	Station Number	AMS 501
Reason:	Removal		
Start Time (MST)	9:18	End Time (MST)	10:30
Gas Cert Reference	S990374A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26-Sep-17
Calibrator Make/Model	Sabio 4010	Serial Number	11581008
ZAG Make/Model	API 701	Serial Number	4522
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2579

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	549	549
Analyzer IP address	192.168.1.72		Lamp voltage	2630	2615
Calculated slope	0.991674	1.005321	Chamber temp	50.1	50.0
Calculated intercept	1.556221	1.169115	Pressure	25.5	25.8
Analyzer Background	16.9	16.9	Flow	456	461
Analyzer Coefficient	1.073	1.073	Intensity	65	65

Analyzer make	API T100	Analyzer serial #	721

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	63.1	631.0	626.7	1.007
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	63.1	631.0	626.7	1.007
second point	5000	31.6	316.0	313.5	1.008
third point	5000	15.8	158.0	154.5	1.023
as left zero					
as left span					
				Average Correction Factor	1.012

Corrected As found	626.9	Previous response	634.7	% change	1.3%

Notes:

Removal calibration done due to station is moving

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Calibration Performed By: Melissa Lemay

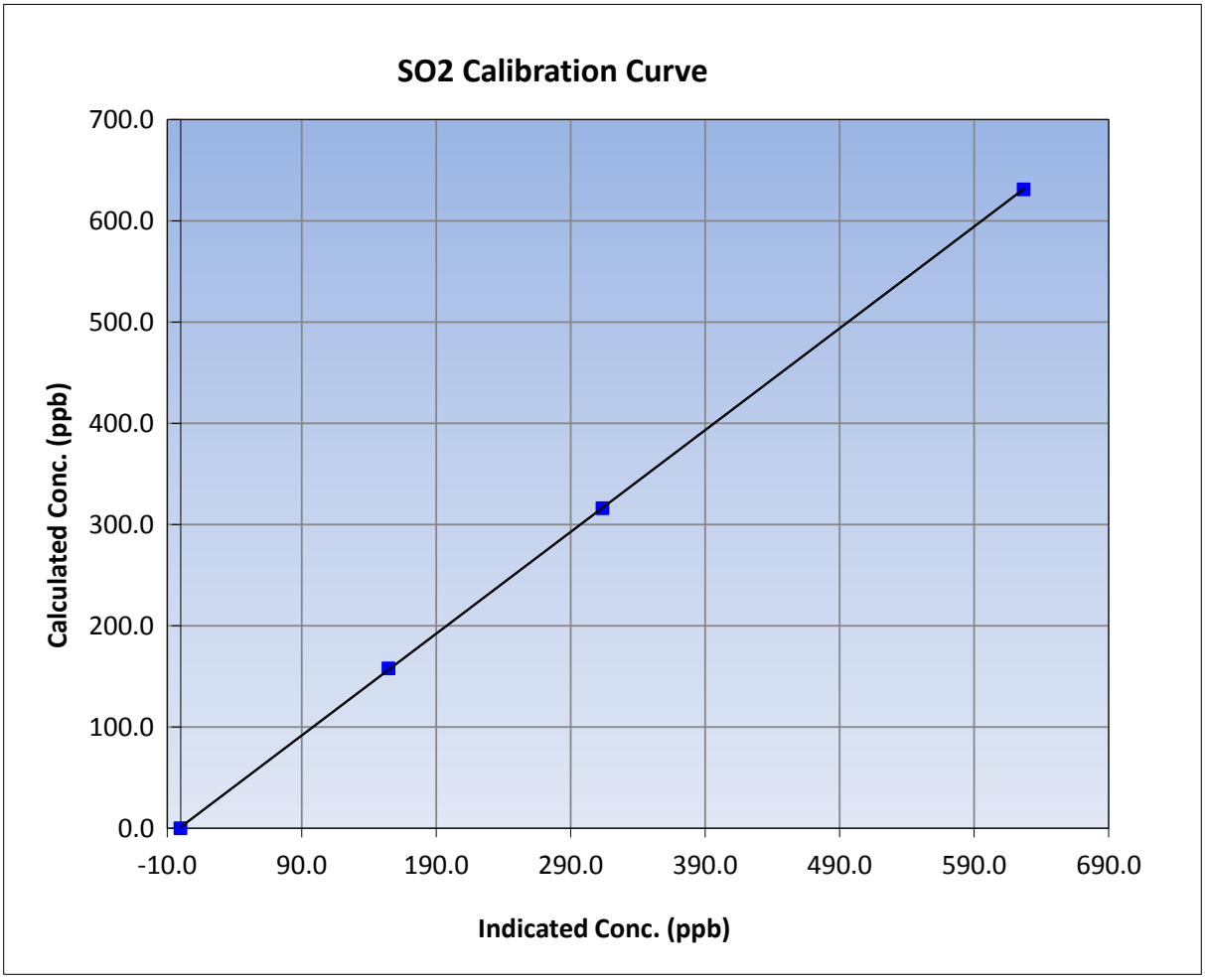
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

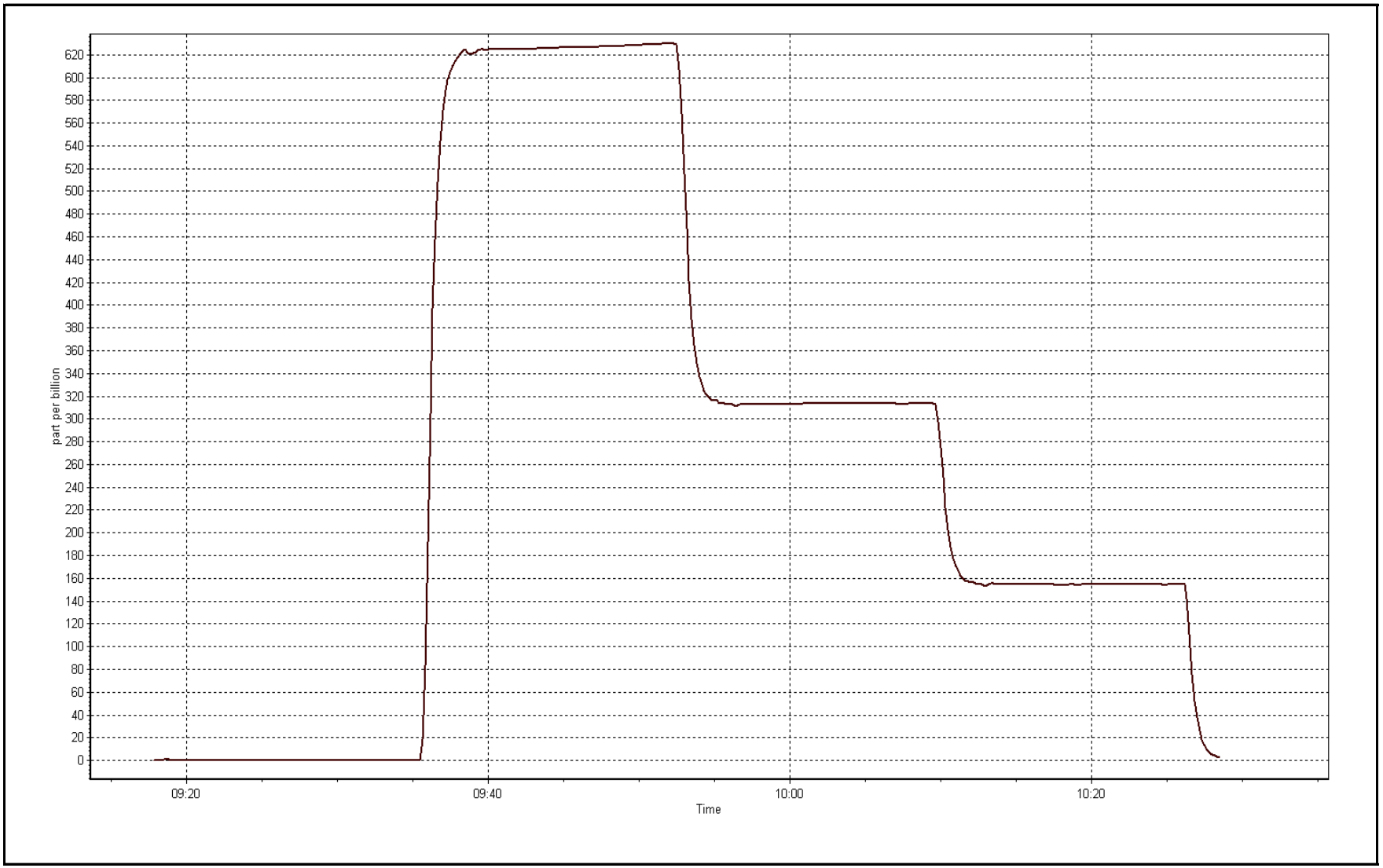
Calibration Date	April 7, 2016	Previous Calibration	March 21, 2016
Station Name	Statoil - Leismer	Station Number	AMS 501
Start Time (MST)	9:18	End Time (MST)	10:30
Analyzer make	API T100	Analyzer serial #	721

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999985
631.0	626.7	1.0069		
316.0	313.5	1.0080	Slope	1.005321
158.0	154.5	1.0227		
			Intercept	1.169115



SO2 Calibration Plot Date: April 7, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	March 2, 2016	Last Calibration	February 9, 2016
Station Name	Statoil	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	9:35	End Time (MST)	12:18
Gas Cert Reference	ALM066183	Station temp.	21 Deg C
Cal Gas Concentration	5.09 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11581008
ZAG air Make/Model	API 701	Serial Number	4522
DACS make/model	Campbell Scientific CR3000	Serial Number	2579
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S990374A 26-Sep-17

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-649	-649
Analyzer IP address	192.168.1.75		Lamp voltage	894	902
Calculated slope	1.004120	0.999092	Chamber temp	45	45
Calculated intercept	-0.283705	-0.500346	Pressure	543.2	542.9
Analyzer Background	20.3	19.3	Flow	1.090	1.089
Analyzer Coefficient	1.210	1.216	Intensity	89	91
			Converter temp.	340	340

Analyzer make/model	Thermo 450i	Analyzer serial #	1118148498
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	-1.1	----
as found span	5000	78.6	80.0	77.5	1.032
SO2 scrubber check	5000	15.8	158.0	1.0	----
calibrator zero	5000	0.0	0.0	0.5	----
high point	5000	78.6	80.0	80.6	0.993
second point	5000	39.3	40.0	40.5	0.988
third point	5000	24.6	25.0	25.6	0.978
as left zero	5000	0.0	0.0	0.6	----
as left span	5000	78.6	80.0	80.8	0.990
				Average Correction Factor	0.986

Corrected As found	78.6	Previous response	80.0	% change	1.7%

Notes:

Drifting zero, adjusted zero and span, filter changed out, No maintenance done

Calibration Performed By: Melissa Lemay

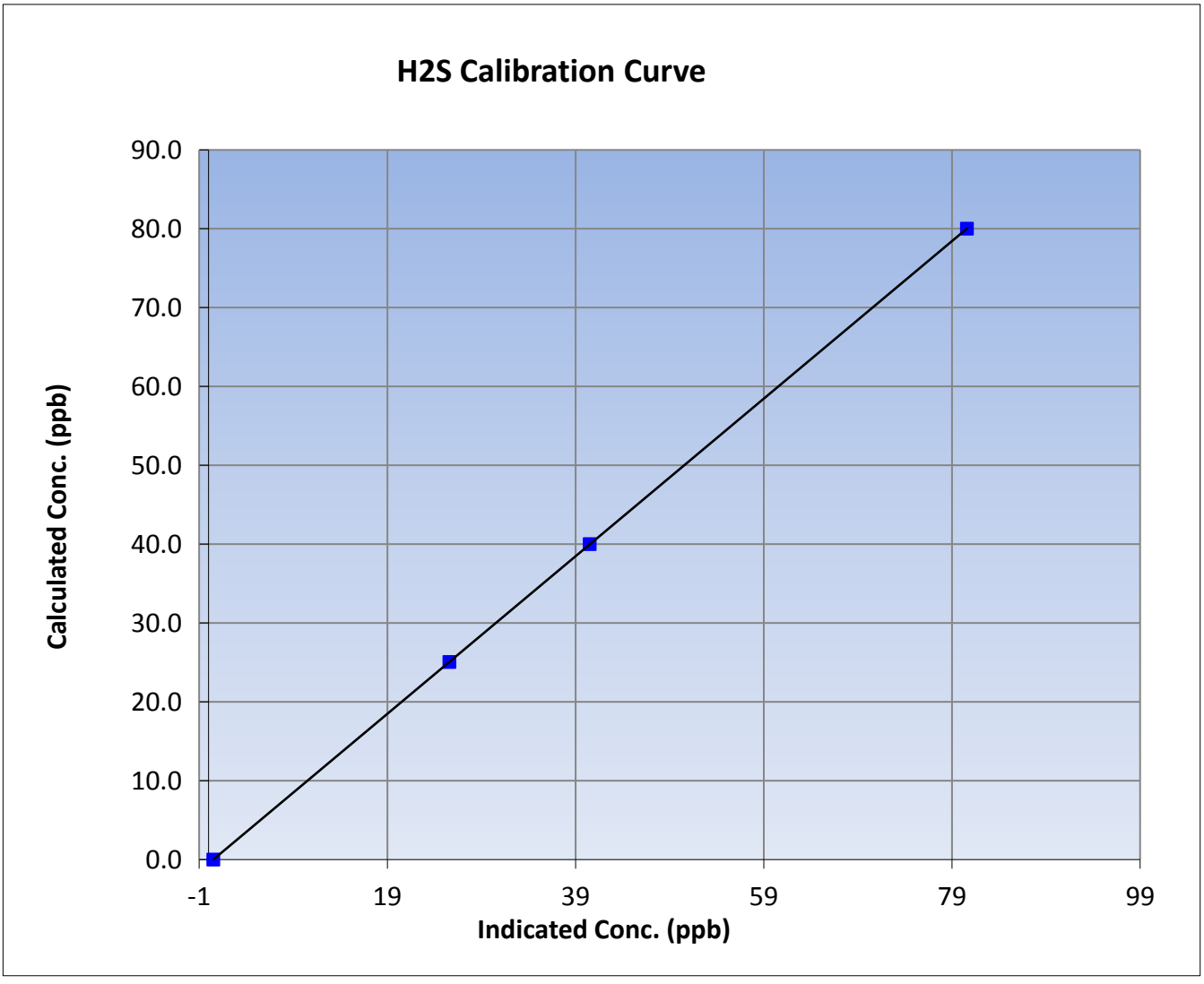
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

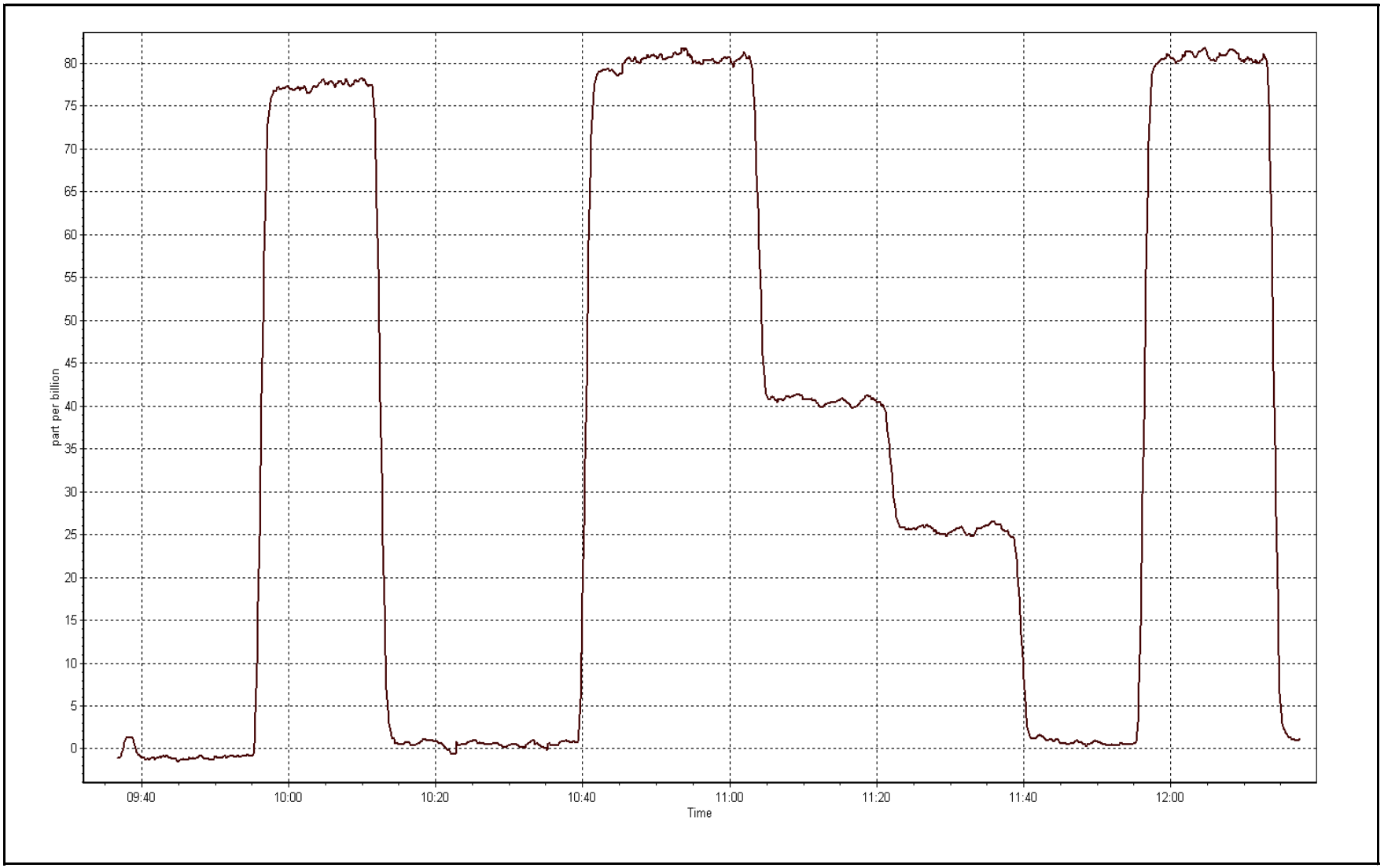
Calibration Date	March 2, 2016	Previous Calibration	February 9, 2016
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	9:35	End Time (MST)	12:18
Analyzer make	Thermo 450i	Analyzer serial #	1118148498

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999999
80.0	80.6	0.9927		
40.0	40.5	0.9878	Slope	0.999092
25.0	25.6	0.9782		
			Intercept	-0.500346



H2S Calibration Plot Date: March 2, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	April 7, 2016	Last Calibration	March 2, 2016
Station Name	Statoil	Station Number	AMS 501
Reason:	Removal		
Start Time (MST)	7:51	End Time (MST)	9:22
Gas Cert Reference	ALM066183	Station temp.	21 Deg C
Cal Gas Concentration	5.09 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11581008
ZAG air Make/Model	API 701	Serial Number	4522
DACS make/model	Campbell Scientific CR3000	Serial Number	2579
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S990374A 26-Sep-17

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-649	-650
Analyzer IP address	192.168.1.75		Lamp voltage	902	896
Calculated slope	0.999092	1.004323	Chamber temp	45	45
Calculated intercept	-0.500346	-0.391539	Pressure	542.9	549.0
Analyzer Background	19.3	19.3	Flow	1.089	1.096
Analyzer Coefficient	1.216	1.216	Intensity	91	91
			Converter temp.	340	340

Analyzer make/model	Thermo 450i	Analyzer serial #	1118148498
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	0.8	----
as found span	5000	78.6	80.0	80.3	0.996
SO2 scrubber check	5000	15.8	158.0	1.7	----
calibrator zero	5000	0.0	0.0	0.8	----
high point	5000	78.6	80.0	80.3	0.996
second point	5000	39.3	40.0	40.0	1.000
third point	5000	24.6	25.0	24.9	1.006
as left zero					
as left span					
				Average Correction Factor	1.001

Corrected As found	79.5	Previous response	80.6	% change	1.4%

Notes:

Scrubber checked before the zero, Removal Calibration due to station moving

Calibration Performed By: Melissa Lemay

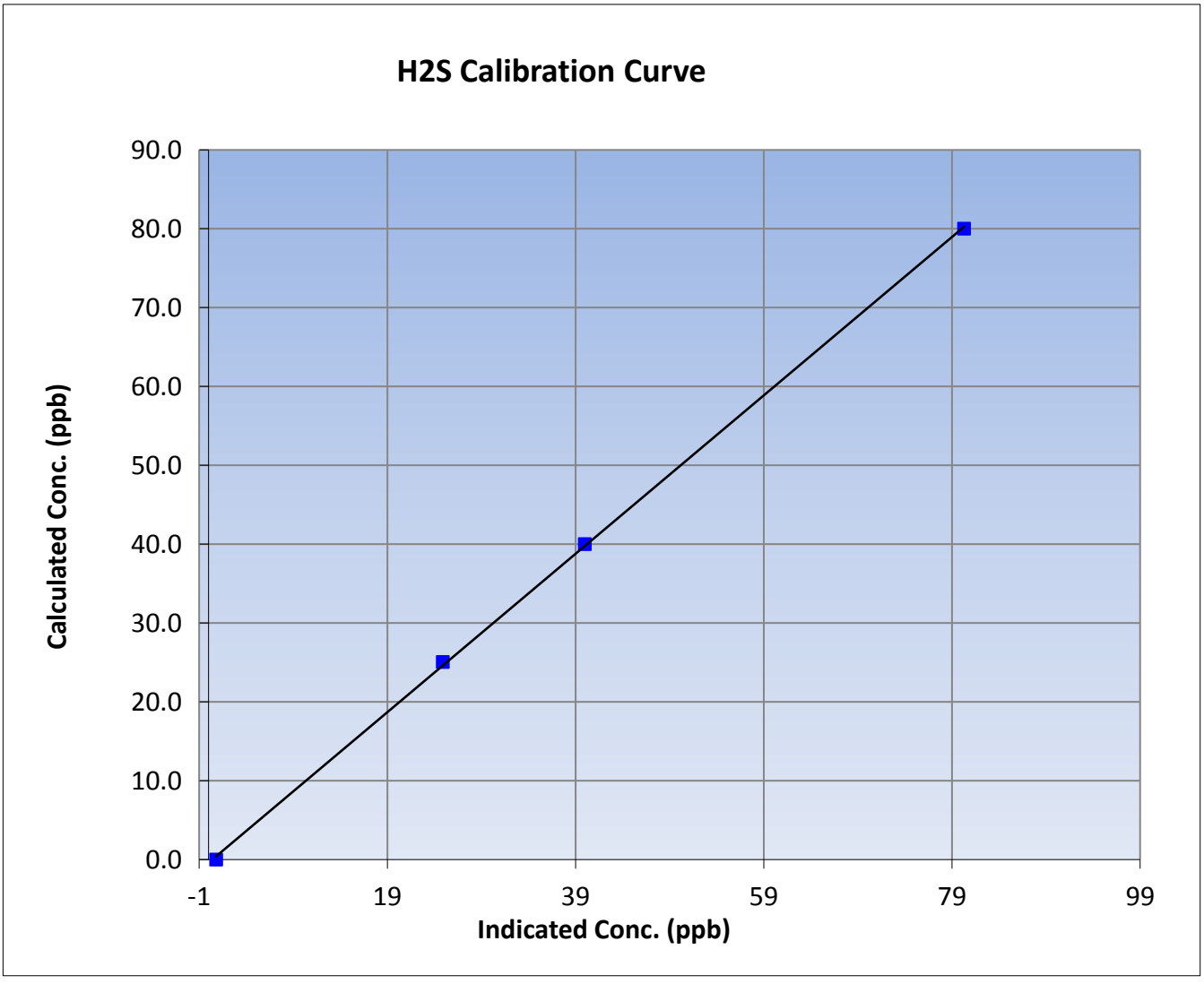
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

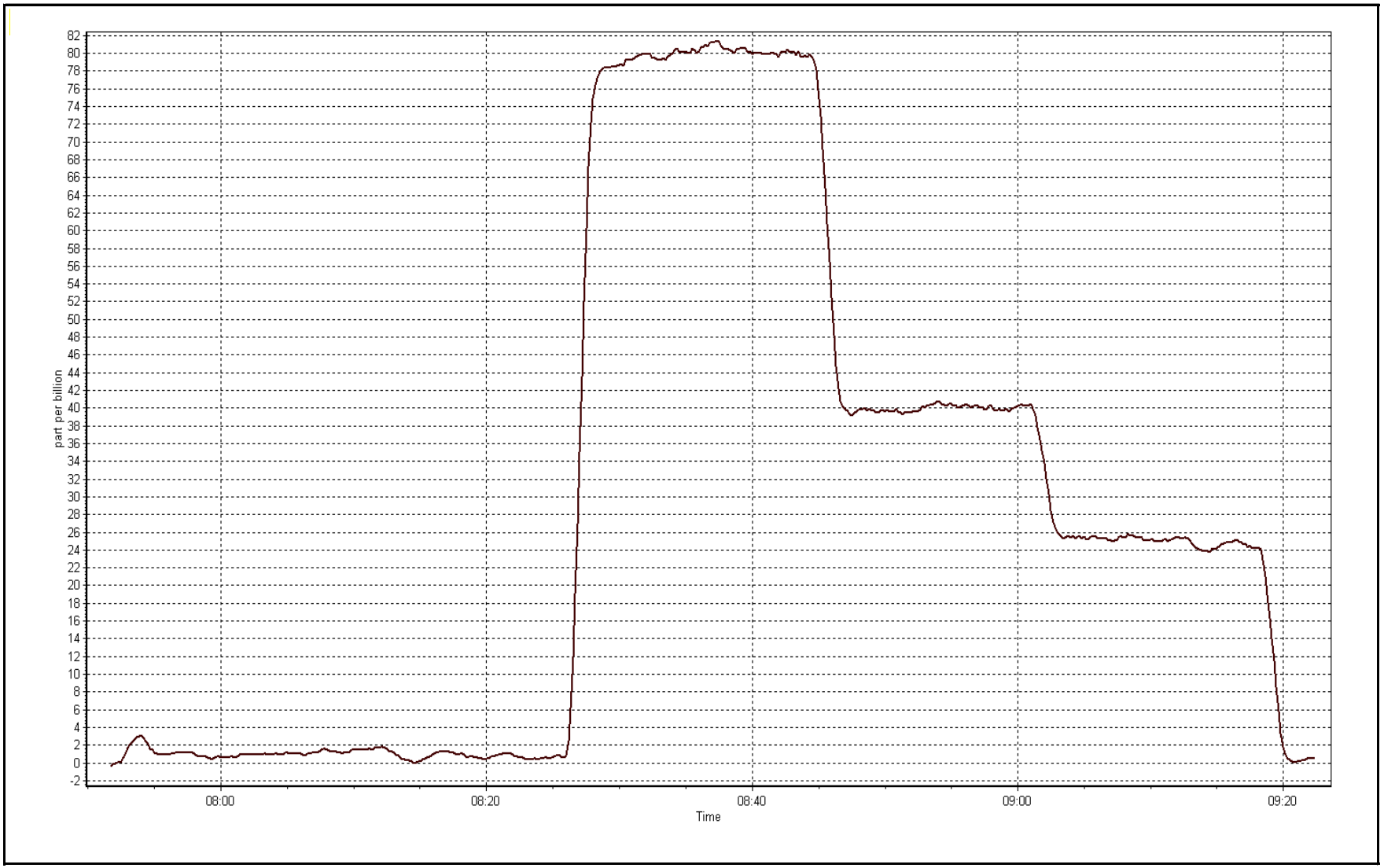
Calibration Date	April 7, 2016	Previous Calibration	March 2, 2016
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	7:51	End Time (MST)	9:22
Analyzer make	Thermo 450i	Analyzer serial #	1118148498

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.8	----	Correlation Coefficient	0.999863
80.0	80.3	0.9964		
40.0	40.0	1.0002	Slope	1.004323
25.0	24.9	1.0057		
			Intercept	-0.391539



H2S Calibration Plot Date: April 7, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 21, 2016	Previous Calibration	February 9, 2016
Station Name	Statoil	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	10:05	End Time (MST)	13:50
NO Cal Gas Conc	47.5 ppm	Gas Cert Reference	S990374A
NOx Cal Gas Conc	47.5 ppm	Cal Gas Expiry Date	26-Sep-17
Calibrator	Sabio 4010	Serial Number	11581008
Zero air Generator	Teledyne API T701	Serial Number	4522

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2579

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.996268	0.996021	1.024490
	Data Offset	0.070399	0.210032	-1.611241
Current Calibration	Data Slope	0.999674	0.999194	1.043792
	Data Offset	1.172685	1.273174	-0.519256

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1118148498

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.830		0.802	
NOX coefficient	1.000		1.000	
NO2 coefficient	1.000		0.999	
NO bkgrnd	4.4		4.2	
NOX bkgrnd	4.5		4.3	
Chamber Temp	49.8	Deg C	49.8	Deg C
Moly Temp	326.6	Deg C	325.5	Deg C
PMT voltage	-755.9	V	-756.3	V
PMT Temp	-3	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	181	mmHg	179.2	mmHg
R Cell Press Nox	181.9	mmHg	179.2	mmHg
NO sample flow	0.753	lpm	0.755	lpm
Nox sample Flow	0.755	lpm	0.755	lpm

Notes:

Span adjusted, Due to drift during the GPT, the second high GPT point used, filter changed out, No maintenance done

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 21, 2016 Station Number: AMS 501

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	63.1	599.5	599.5	0.0	622.7	620.4	2.3	0.9627	0.9662
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
high point	5000	63.1	599.5	599.5	0.0	598.7	599.0	-0.2	1.0013	1.0008
second point	5000	31.6	300.2	300.2	0.0	299.3	299.2	0.0	1.0030	1.0033
third point	5000	15.8	150.1	150.1	0.0	147.7	147.5	0.2	1.0162	1.0176
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	----	----
as left span	5000	63.1	599.5	289.3	310.2	608.2	298.7	309.5	0.9856	0.9685
								Average Correction Factor	1.0068	1.0072

Corrcted As found NO_X= 623.0 NO= 620.6 Percent Change NO_X= -3.4% NO= -3.1%

Previous Response NO_X= 601.6 NO= 601.6

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 63.10 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			-0.1			N/A	
1st NO2 (300)	----	289.3	323.4	599.2	289.3	309.8	0.9879	1.0000	1.0439	95.8%
2nd NO2 (200)	----	409.6	203.1	605.0	409.6	195.5	0.9785	1.0000	1.0389	96.3%
3rd NO2 (100)	----	493.5	119.2	608.8	493.5	115.4	0.9724	1.0000	1.0329	96.8%
4th NO2 (0)	612.7	----	-0.9	611.8	612.7	-1.0	0.9676	1.0000	N/A	----
					Average Correction Factor		0.9766	1.0000	1.0386	96.3%

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

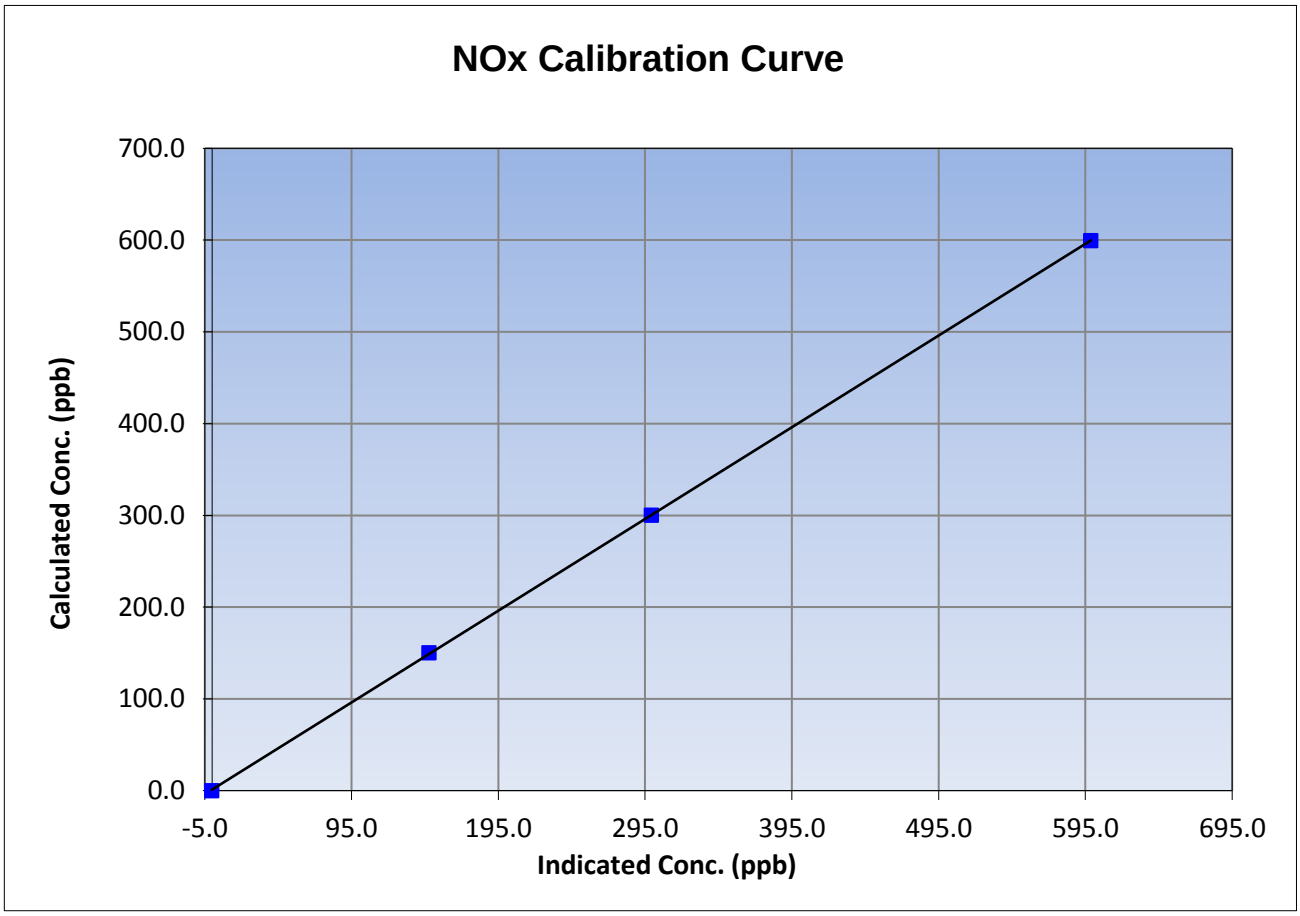
NO_X Calibration Summary

Station Information

Calibration Date	March 21, 2016	Previous Calibration	February 9, 2016
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	10:05	End Time (MST)	13:50
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999987
599.5	598.7	1.0013		
300.2	299.3	1.0030	Slope	0.999674
150.1	147.7	1.0162		
			Intercept	1.172685



Wood Buffalo Environmental Association

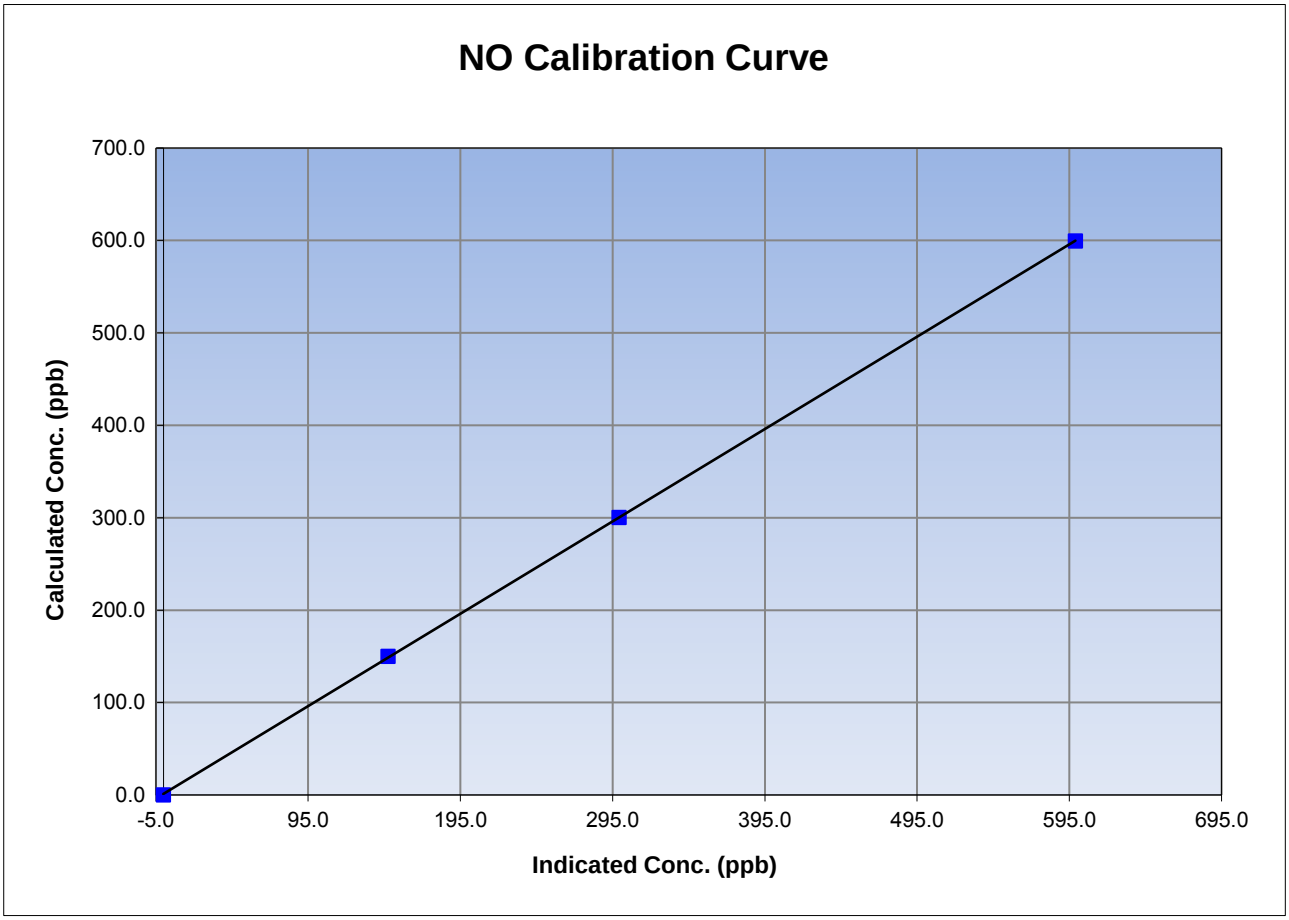
NO Calibration Summary

Station Information

Calibration Date	March 21, 2016	Previous Calibration	February 9, 2016
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	10:05	End Time (MST)	13:50
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999983
599.5	599.0	1.0008		
300.2	299.2	1.0033	Slope	0.999194
150.1	147.5	1.0176		
			Intercept	1.273174



Wood Buffalo Environmental Association

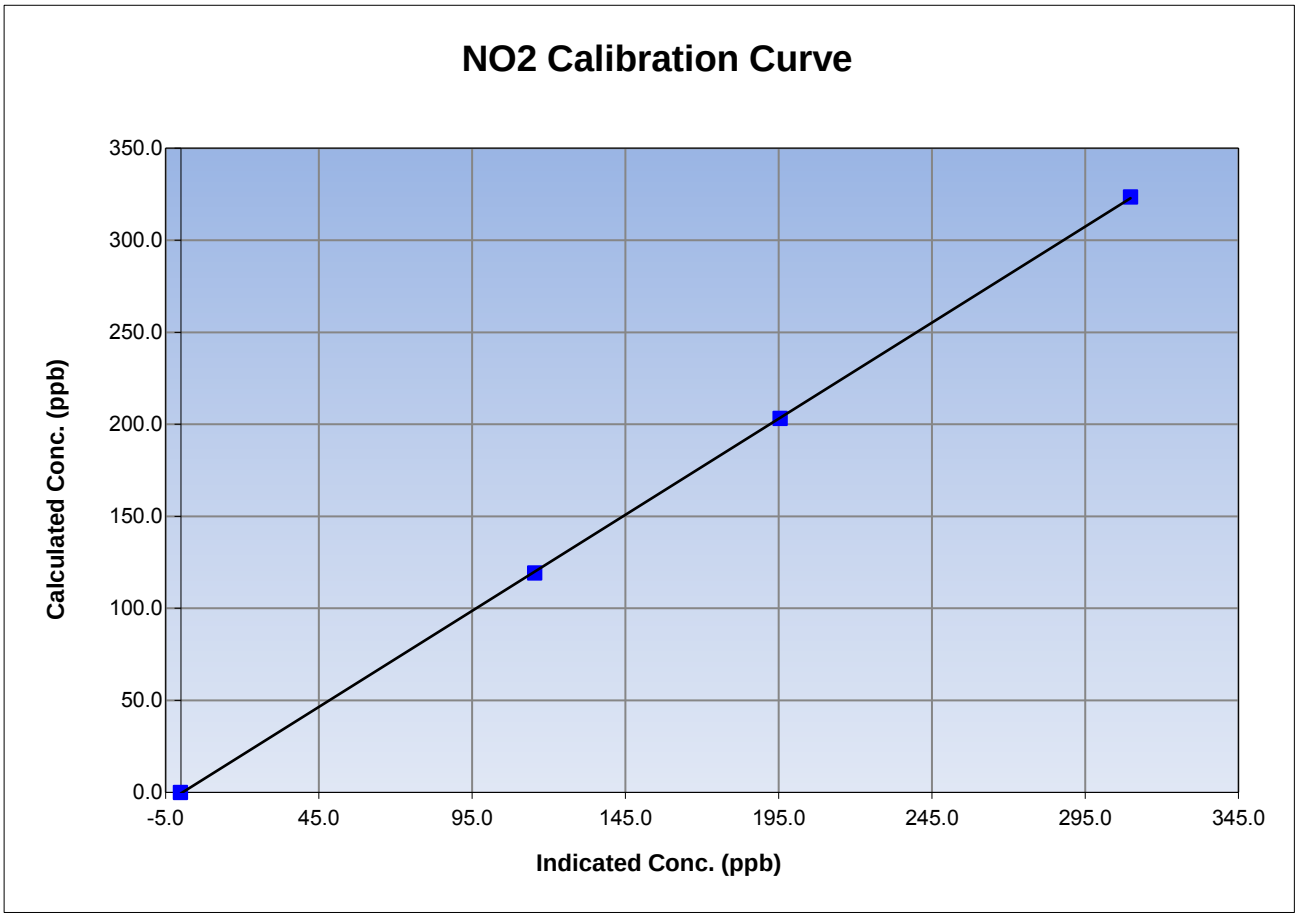
NO_2 Calibration Summary

Station Information

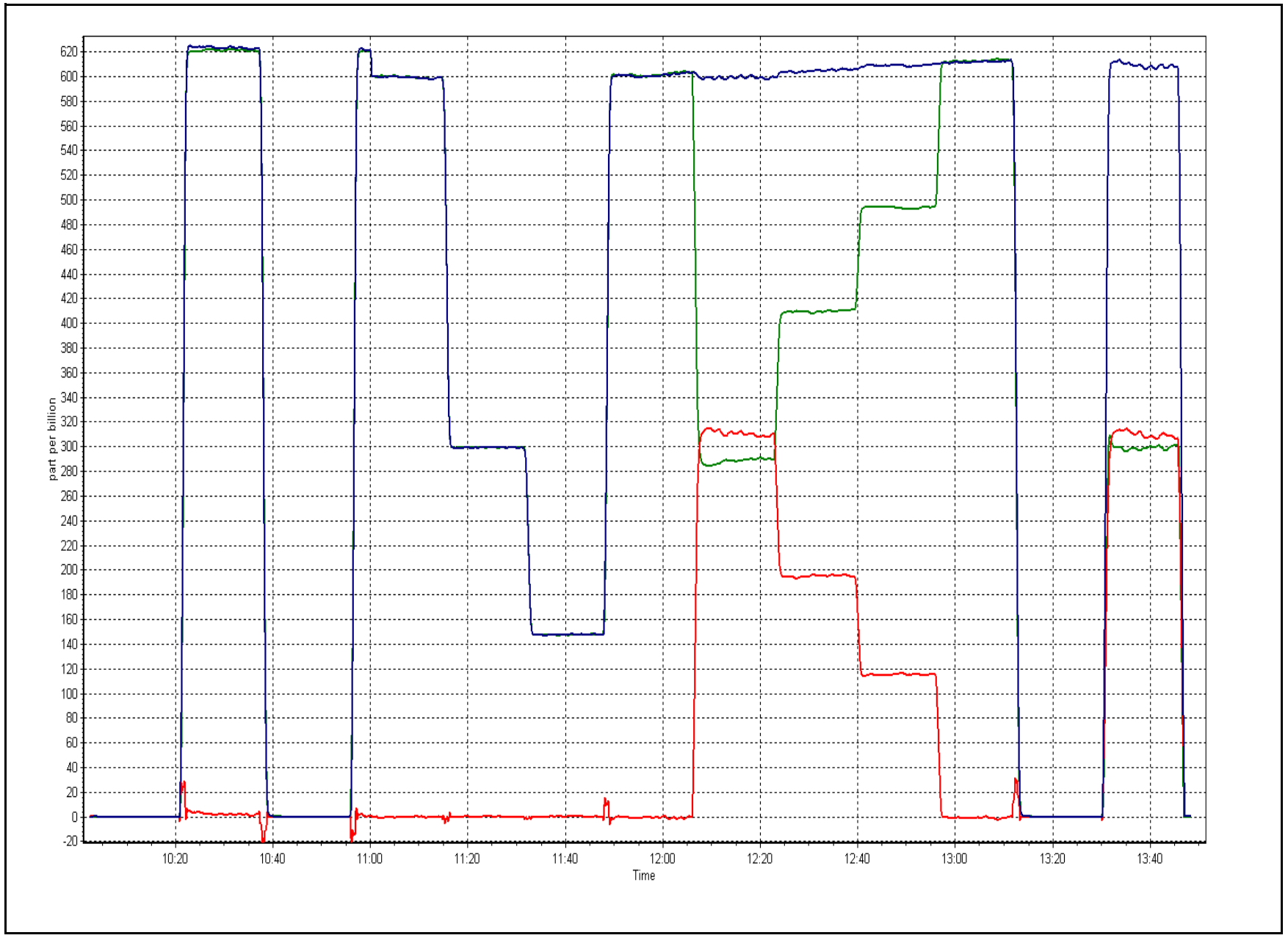
Calibration Date	March 21, 2016	Previous Calibration	February 9, 2016
Station Number	Statoil	Station Number	AMS 501
Start Time (MST)	10:05	End Time (MST)	13:50
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999974
323.4	309.8	1.0439		
203.1	195.5	1.0389	Slope	1.043792
119.2	115.4	1.0329		
			Intercept	-0.519256



NOX Calibration Plot Date: March 21, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	April 7, 2016	Previous Calibration	March 21, 2016
Station Name	Statoil	Station Number	AMS 501
Reason:	Removal		
Start Time (MST)	9:18	End Time (MST)	11:51
NO Cal Gas Conc	47.5 ppm	Gas Cert Reference	S990374A
NOx Cal Gas Conc	47.5 ppm	Cal Gas Expiry Date	26-Sep-17
Calibrator	Sabio 4010	Serial Number	11581008
Zero air Generator	Teledyne API T701	Serial Number	4522

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2579

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999674	0.999194	1.043792
	Data Offset	1.172685	1.273174	-0.519256
Current Calibration	Data Slope	1.001631	1.003525	1.013692
	Data Offset	1.637721	1.621238	-1.971152

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1118148498

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.802		0.802	
NOX coefficient	1.000		1.000	
NO2 coefficient	0.999		0.999	
NO bkgrnd	4.2		4.2	
NOX bkgrnd	4.3		4.3	
Chamber Temp	49.8	Deg C	49.8	Deg C
Moly Temp	325.5	Deg C	323.9	Deg C
PMT voltage	-756.3	V	-756.3	V
PMT Temp	-2.8	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	179.2	mmHg	181.3	mmHg
R Cell Press Nox	179.2	mmHg	181.3	mmHg
NO sample flow	0.755	lpm	0.764	lpm
Nox sample Flow	0.755	lpm	0.764	lpm

Notes:

Removal calibration due to station moving,

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: April 7, 2016 Station Number: AMS 501

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	-0.2	----	----
as found span	5000	63.1	599.5	599.5	0.0	597.4	596.3	1.1	1.0034	1.0053
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.2	----	----
high point	5000	63.1	599.5	599.5	0.0	597.4	596.3	1.1	1.0034	1.0053
second point	5000	31.6	300.2	300.2	0.0	297.7	297.2	0.5	1.0084	1.0101
third point	5000	15.8	150.1	150.1	0.0	146.7	146.3	0.4	1.0232	1.0260
as left zero										
as left span										
								Average Correction Factor	1.0117	1.0138

Corrcted As found NO_X= 597.7 NO= 596.5 Percent Change NO_X= 0.1% NO= 0.4%

Previous Response NO_X= 598.5 NO= 598.7

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 63.10 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			-0.2			N/A	
1st NO2 (300)	----	283.5	318.5	598.1	283.5	314.6	0.9898	1.0000	1.0124	98.8%
2nd NO2 (200)	----	405.3	196.7	602.0	405.3	196.7	0.9834	1.0000	1.0000	100.0%
3rd NO2 (100)	----	489.5	112.5	605.4	489.5	115.9	0.9778	1.0000	0.9707	103.0%
4th NO2 (0)	602.0	----	0.0	602.0	602.0	-0.2	0.9834	1.0000	N/A	----
					Average Correction Factor		0.9836	1.0000	0.9944	100.6%

Calibration Performed By: Melissa Lemay

Wood Buffalo Environmental Association

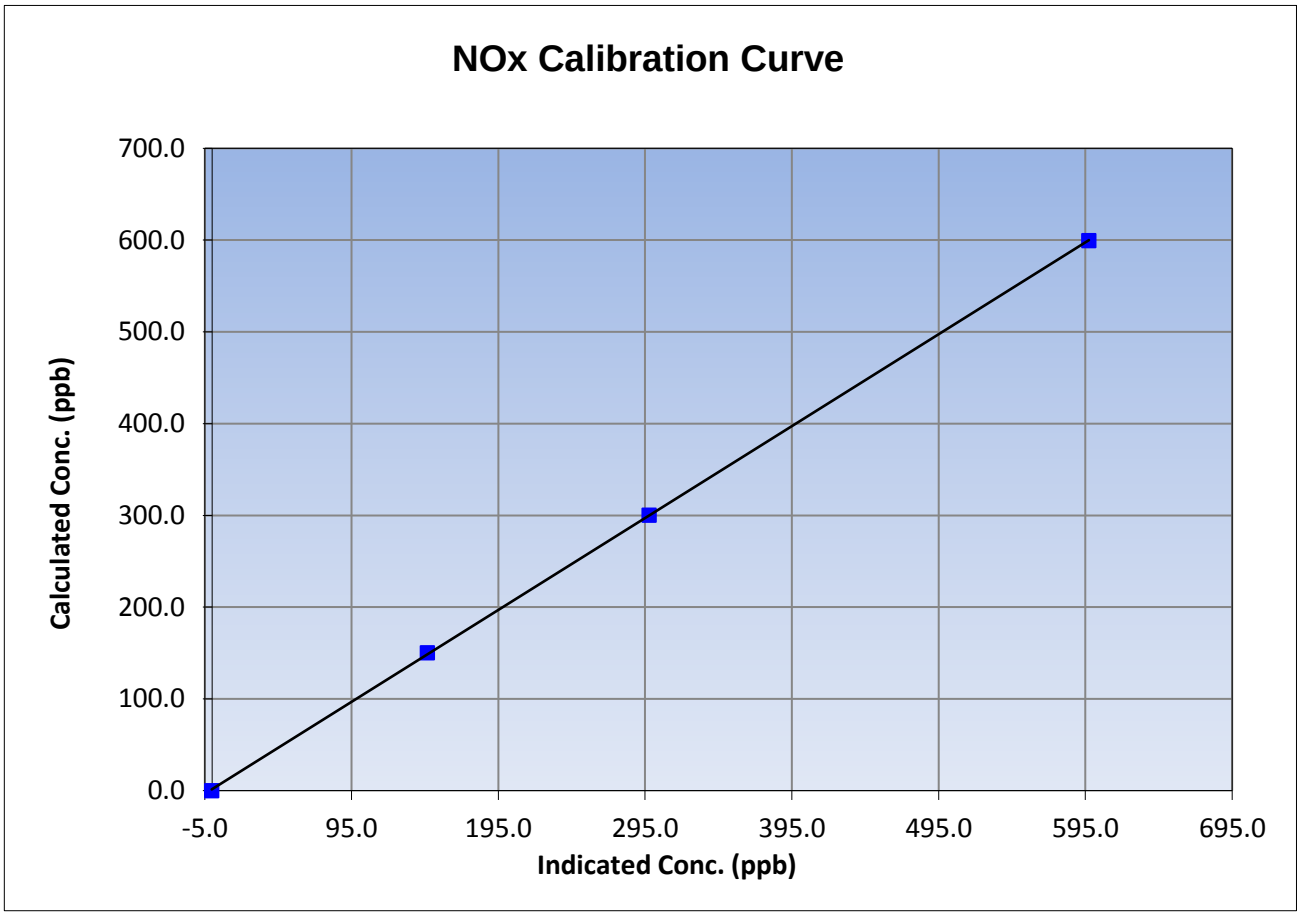
NO_X Calibration Summary

Station Information

Calibration Date	April 7, 2016	Previous Calibration	March 21, 2016
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	9:18	End Time (MST)	11:51
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999977
599.5	597.4	1.0034		
300.2	297.7	1.0084	Slope	1.001631
150.1	146.7	1.0232		
			Intercept	1.637721



Wood Buffalo Environmental Association

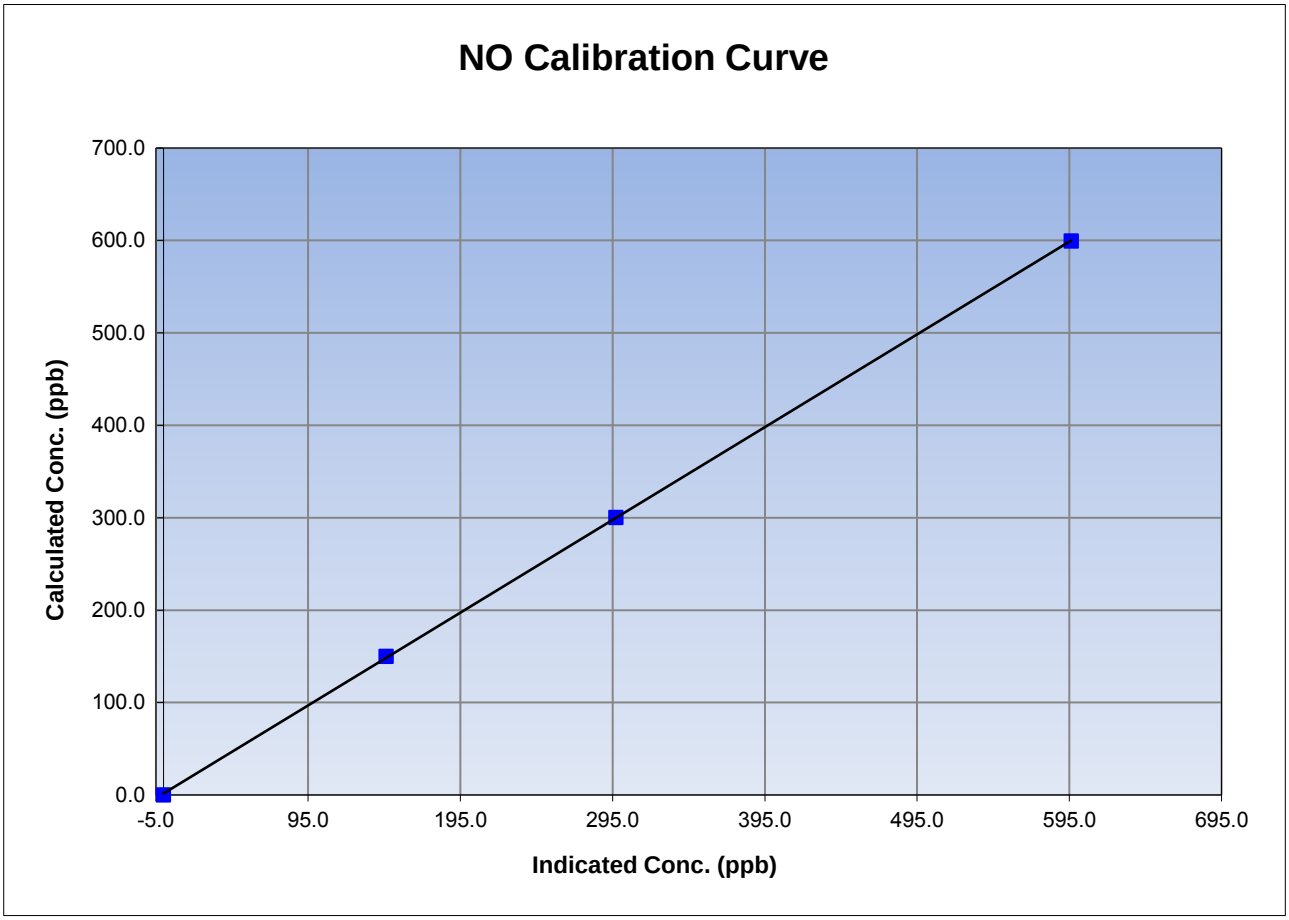
NO Calibration Summary

Station Information

Calibration Date	April 7, 2016	Previous Calibration	March 21, 2016
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	9:18	End Time (MST)	11:51
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999973
599.5	596.3	1.0053		
300.2	297.2	1.0101	Slope	1.003525
150.1	146.3	1.0260		
			Intercept	1.621238



Wood Buffalo Environmental Association

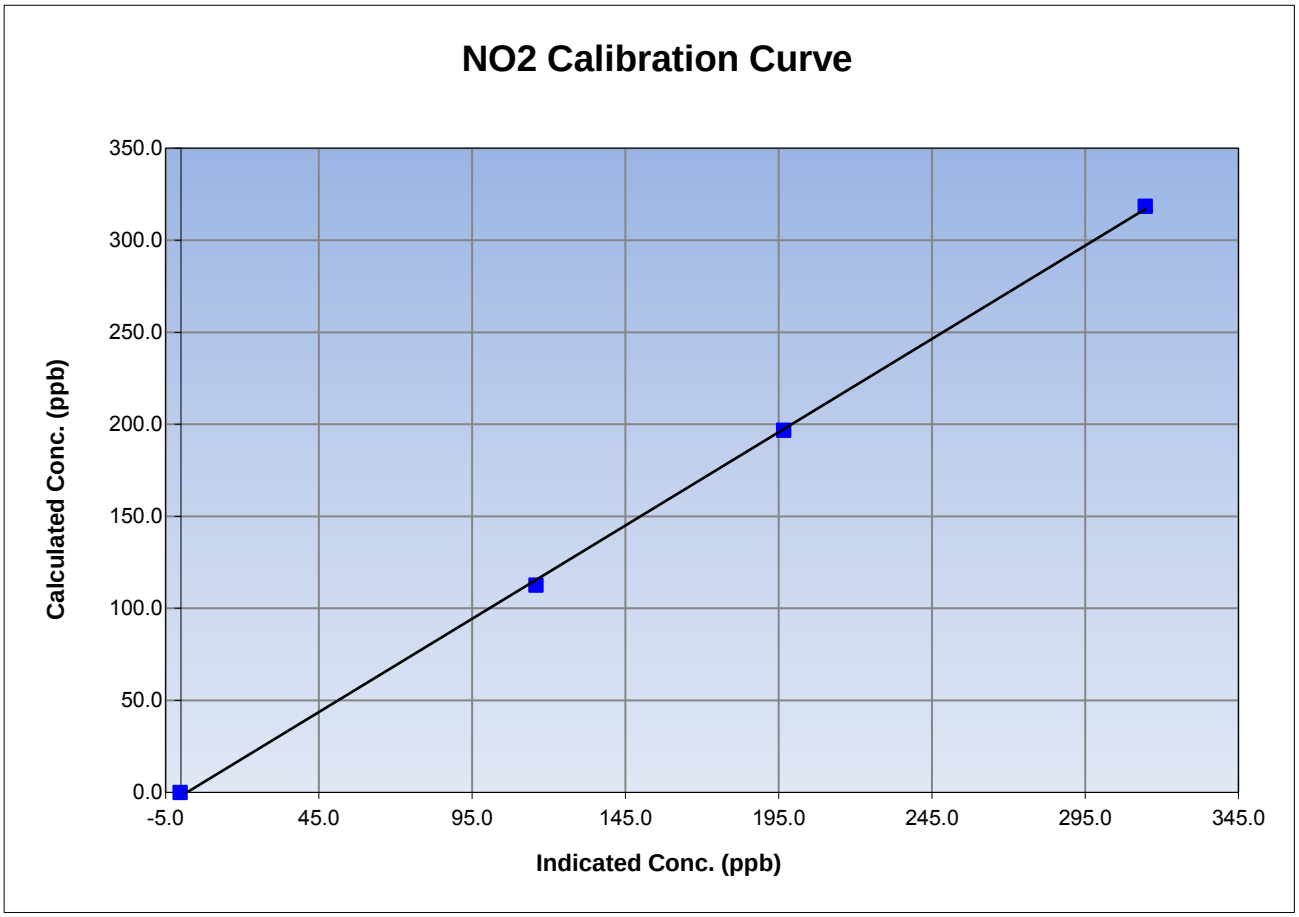
NO_2 Calibration Summary

Station Information

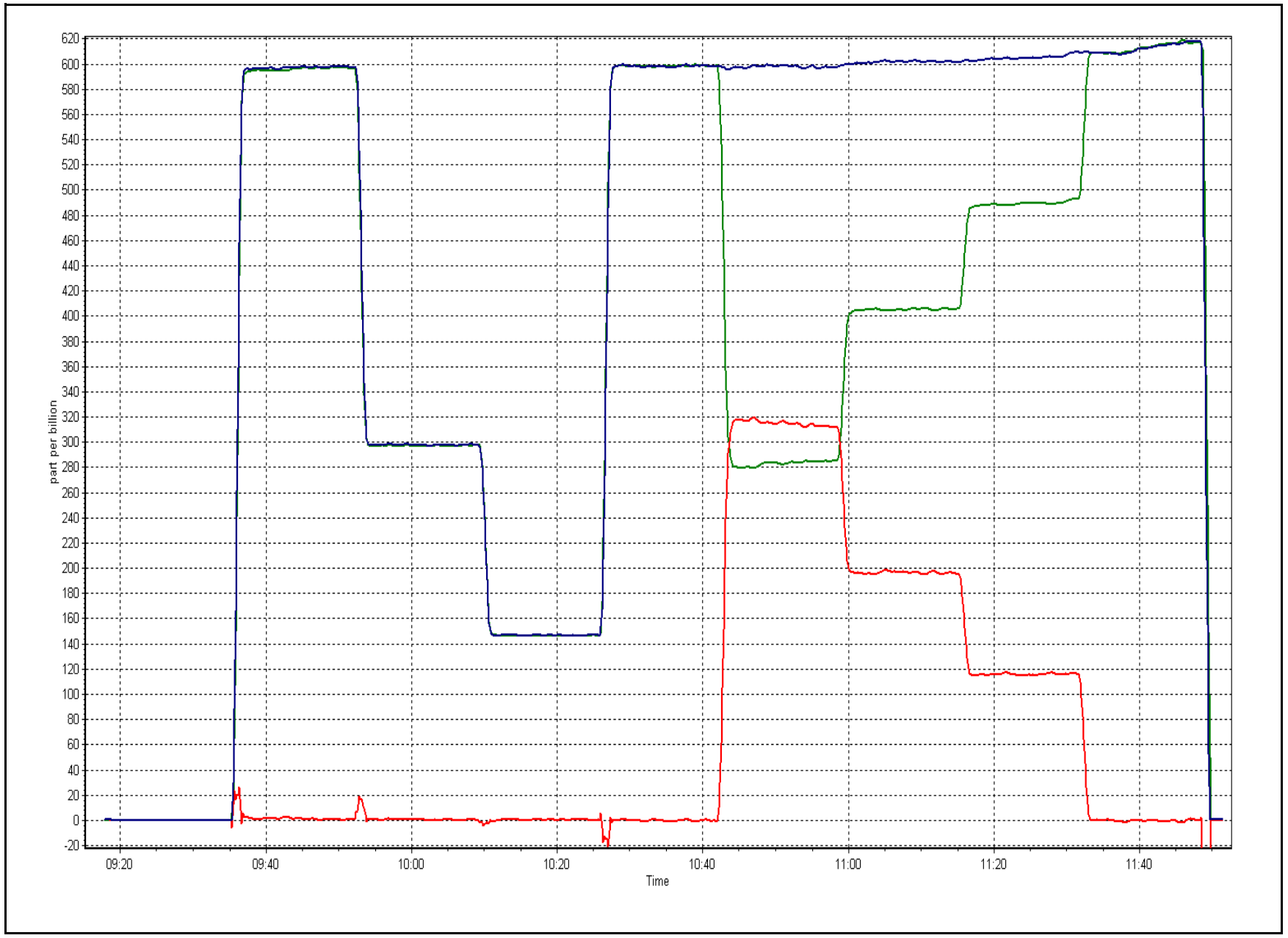
Calibration Date	April 7, 2016	Previous Calibration	March 21, 2016
Station Number	Statoil	Station Number	AMS 501
Start Time (MST)	9:18	End Time (MST)	11:51
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999691
318.5	314.6	1.0124		
196.7	196.7	1.0000	Slope	1.013692
112.5	115.9	0.9707		
			Intercept	-1.971152



NOX Calibration Plot Date: April 7, 2016



Wood Buffalo Environmental Association

WS/WD Calibration Report

W B E A

Station Information

Calibration Date	April-08-15	Previous Calibration	September-22-15
Station Name	Statoil	Station Number	AMS 501
Reason:	Routine / Installation / Removal		
Start Time (MST)	7:50	End Time (MST)	8:40
Barometric Press	n/a	Station Temp	22 Deg C
WS Calibrator	MetOne 053	Serial Number	P15103

WIND SPEED

Sensor make/model	Met One 010C-1	Sensor serial #	P22395
DACS make	Campbel Scientific CR3000	DACS serial No.	2579
DACS voltage range	5000	DACS channel #	na

	Before	After
Calculated slope	0.998908637	0.998446
Calculated intercept	0.030357419	0.046473

Wind Speed Calibration Data

Shaft RPM	Actual Speed (K/hr)	Indicated Speed (K/hr)	Correction factor
0	0.0	0.0	n/a
200	20.2	20.1	1.0031
400	39.4	39.4	0.9990
600	58.6	58.5	1.0009
800	77.8	77.9	0.9981
Average Correction Factor			1.0003

WIND DIRECTION

Sensor make/model	Met One 020C-1	Sensor serial #	R14656
DACS make	Campbel Scientific CR3000	DACS serial No.	2579
DACS voltage range	5000	DACS channel #	na

	Before	After
Calculated slope	0.275297733	0.277711
Calculated intercept	109.9974416	109.283528

As Found Declination (west of North): 14.0

As Left Declination (west of North): NA

Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	362.0	n/a
90	90.7	0.9923
180	180.4	0.9978
270	270.9	0.9967
357	358.4	0.9961
Average Correction Factor		0.9957

Notes:

Removal Calibration

Calibration Performed By: Melissa Lemay

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 502
CONOCOPHILLIPS
SURMONT
MARCH 2016

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

April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
MARCH 2016

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	100.00	22	0	5	0
H2S (ppb) Average	708	35	36	99.87	2	0	1	0
NO2 (ppb) Average	708	36	36	100.00	20	0	6	-
NO (ppb) Average	708	36	36	100.00	17	-	5	-
NOX (ppb) Average	708	36	36	100.00	32	-	11	-
Temperature 2 m (C) Average	744	0	0	100.00	10.6	-	6.1	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	93	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	28	-	20	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
MARCH 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1.1	2	-	0	0	0	0	1	2	22
H2S (ppb) Average	708	0.3	0	-	0	0	0	0	0	1	2
NO2 (ppb) Average	708	3	2	-	0	1	1	2	4	6	20
NO (ppb) Average	708	1.3	2	-	0	0	0	1	2	3	17
NOX (ppb) Average	708	4.3	4	-	1	1	2	3	5	8	32
Temperature 2 m (C) Average	744	-2.85	4.8	-	-13.1	-8.4	-6.1	-3.4	0	3.7	10.6
Relative Humidity (%) Average	744	75.2	17	-	33	48	61	80	91	94	98
Wind Speed 10 m (km/h) Average	744	12.4	5	-	1	6	9	12	15	19	28
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
MARCH 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	18 Mar 2016 04:00	18 Mar 2016 04:00	1	Unstable operation - excessive baseline drift

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 22 ppb on Mar 30 15:00 Maximum Daily Average: 5.3 ppb on Mar 30

Minimum Value: 0 ppb on Mar 22 08:00 Minimum Daily Average: 0.2 ppb on Mar 6

Maximum Diurnal Average: 2.0 ppb at hour 16 Minimum Diurnal Average: 0.6 ppb at hour 2

Monthly Average: 1.1 ppb Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 12$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1
2-Mar	0	Z	0	0	0	0	0	0	0	0	0	1	3	1	1	2	1	1	1	0	0	0	0	1	0.7	3
3-Mar	0	1	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	1	3	2	3	1	1	1	0	0.8	3
4-Mar	0	2	0	Z	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2	2	1	1	0.5	2
5-Mar	1	1	1	0	Z	0	0	0	1	4	4	1	1	2	1	2	2	1	1	1	1	1	0	0	1.1	4
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	0.2	0
7-Mar	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0.3	1
8-Mar	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0.4	1
9-Mar	0	0	Z	1	2	2	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0.8	2
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	0.3	0
11-Mar	0	0	0	0	Z	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.5	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	1	0	0	0	0	0	0	0	0	3	6	4	9	9	9	7	9	10	7	8	7	3.9	10
14-Mar	8	Z	2	1	1	2	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	8
15-Mar	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	8	17	15	4	1	1	0	2.3	17
16-Mar	0	0	1	Z	1	1	1	1	0	0	1	0	1	1	1	4	1	1	0	0	0	2	4	2	1.1	4
17-Mar	3	1	1	3	Z	3	4	5	4	2	2	3	2	1	2	3	1	0	0	0	0	0	0	0	1.9	5
18-Mar	1	1	3	1	1	Z	2	0	1	1	1	1	1	3	1	3	1	0	0	0	0	0	0	0	1.0	3
19-Mar	Z	0	0	0	1	2	1	1	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0.7	2
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	0.2	0
21-Mar	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	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	1	0	0	0	0	0.3	1
23-Mar	0	0	0	0	Z	0	0	0	0	2	1	2	4	3	1	2	4	3	2	1	0	0	0	0	1.2	4
24-Mar	0	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
25-Mar	Z	0	0	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	1	0	0	0.5	1
26-Mar	0	Z	1	2	2	1	2	1	1	0	0	0	0	0	1	2	2	1	0	0	0	1	1	1	0.9	2
27-Mar	1	2	Z	1	1	1	1	2	2	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	0.9	2
28-Mar	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	0	0	0	0	0	0.7	3
29-Mar	0	0	0	0	Z	0	0	0	0	1	1	5	1	4	3	7	13	4	1	0	0	0	1	0	2.0	13
30-Mar	0	1	0	1	1	Z	3	9	16	3	2	6	7	13	22	19	5	6	7	1	0	0	0	0	5.3	22
31-Mar	Z	1	1	2	2	1	4	3	4	3	5	3	2	2	1	1	0	3	0	0	0	1	1	1	1.8	5
	0.8	0.6	0.6	0.7	0.7	0.7	0.8	1.0	1.1	0.8	0.9	1.0	1.1	1.5	1.6	2.0	1.7	1.6	1.5	1.2	0.9	0.8	0.8	0.6	Diurnal Average	
	8	2	3	3	2	3	4	9	16	4	5	6	7	13	22	19	13	9	17	15	10	7	8	7	Diurnal Maximum	

Z - zerospan C - Calibration

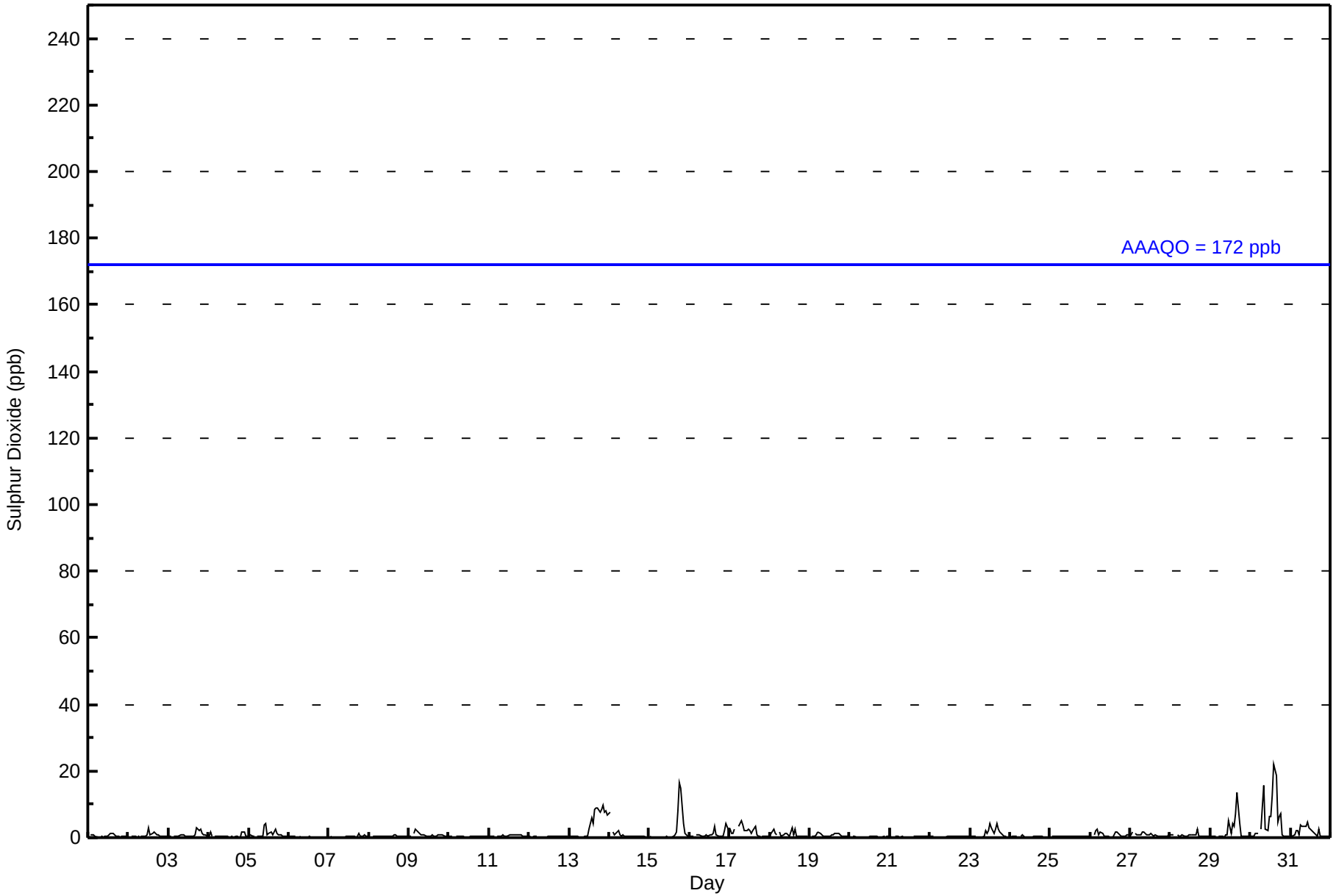
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - March 2016



Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	701	99.01	99.01
11 - 20	6	0.85	99.86
21 - 60	1	0.14	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	68	15	12	32	37	47	93	31	42	39	28	44	40	49	16	108	701
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	6
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	68	15	12	32	37	47	93	31	42	39	28	44	40	49	18	113	708

Total Number of Valid Hours: 708

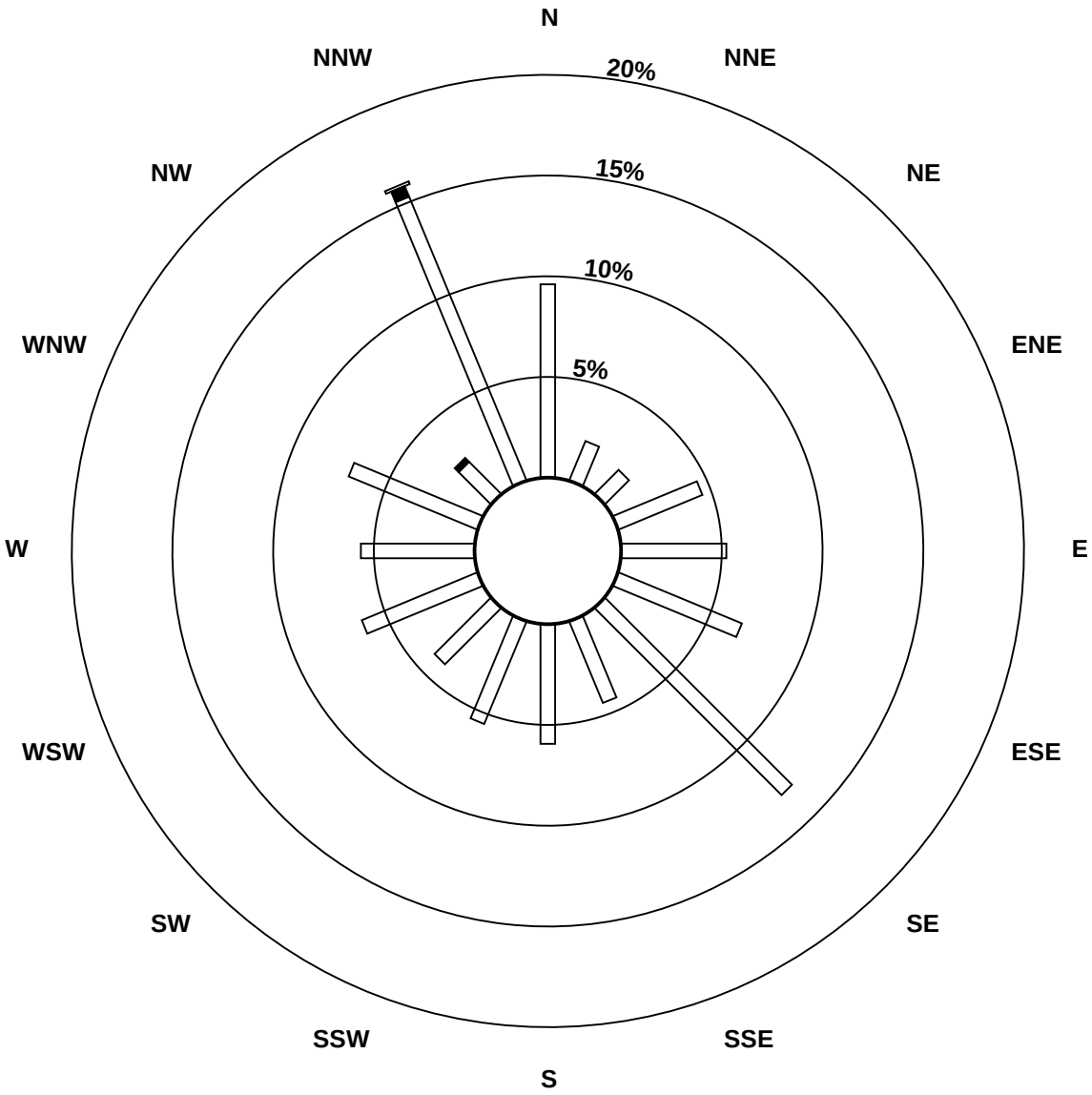
Total Number of Hours: 744

Wood Buffalo Environmental Association

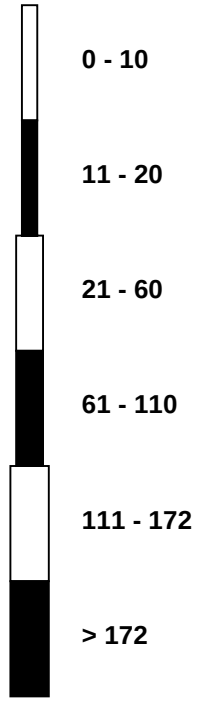
Wind Rose Mar 2016

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont (AMS502)



Classes (ppb)



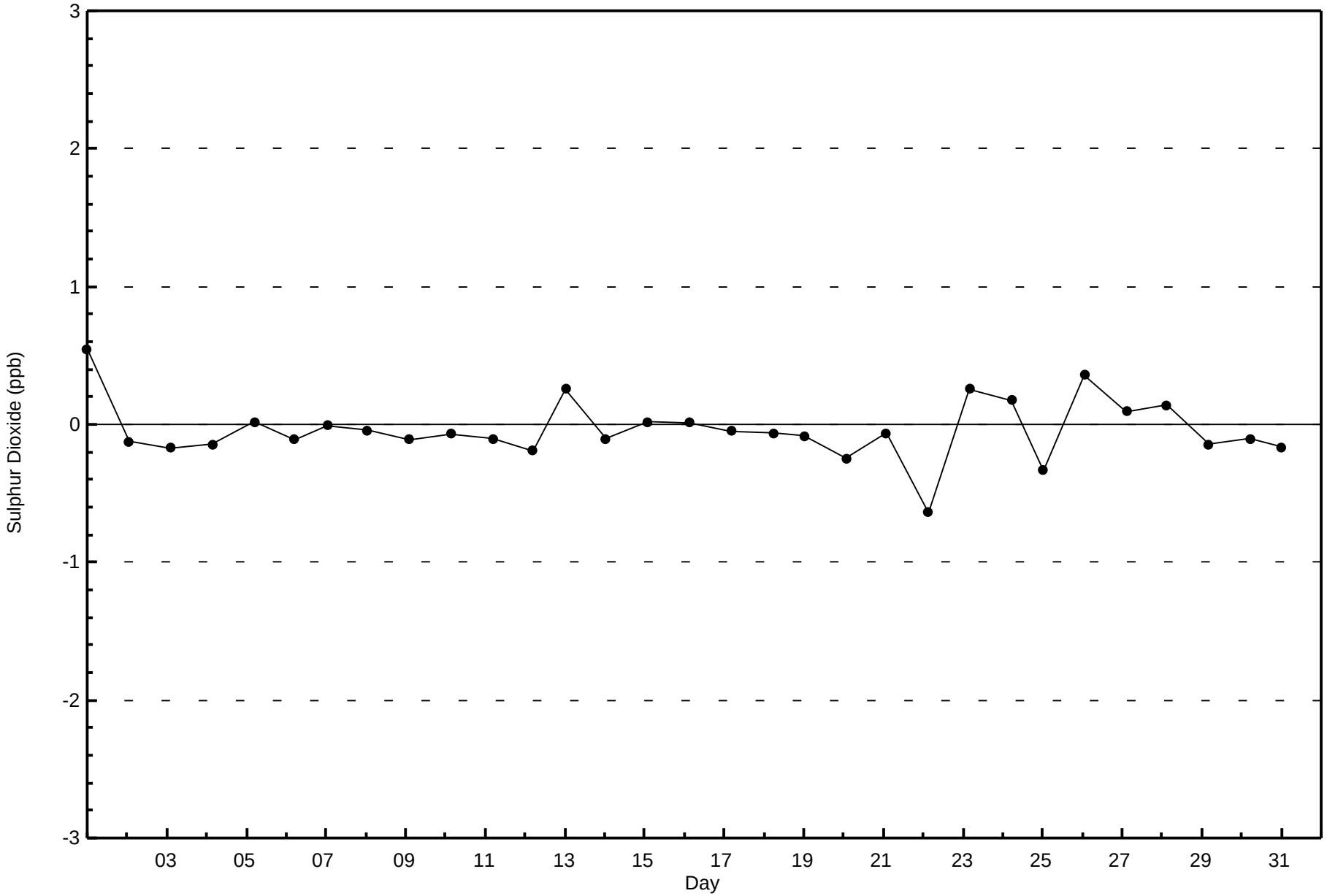
Total Number of Valid Hours: 708

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - March 2016

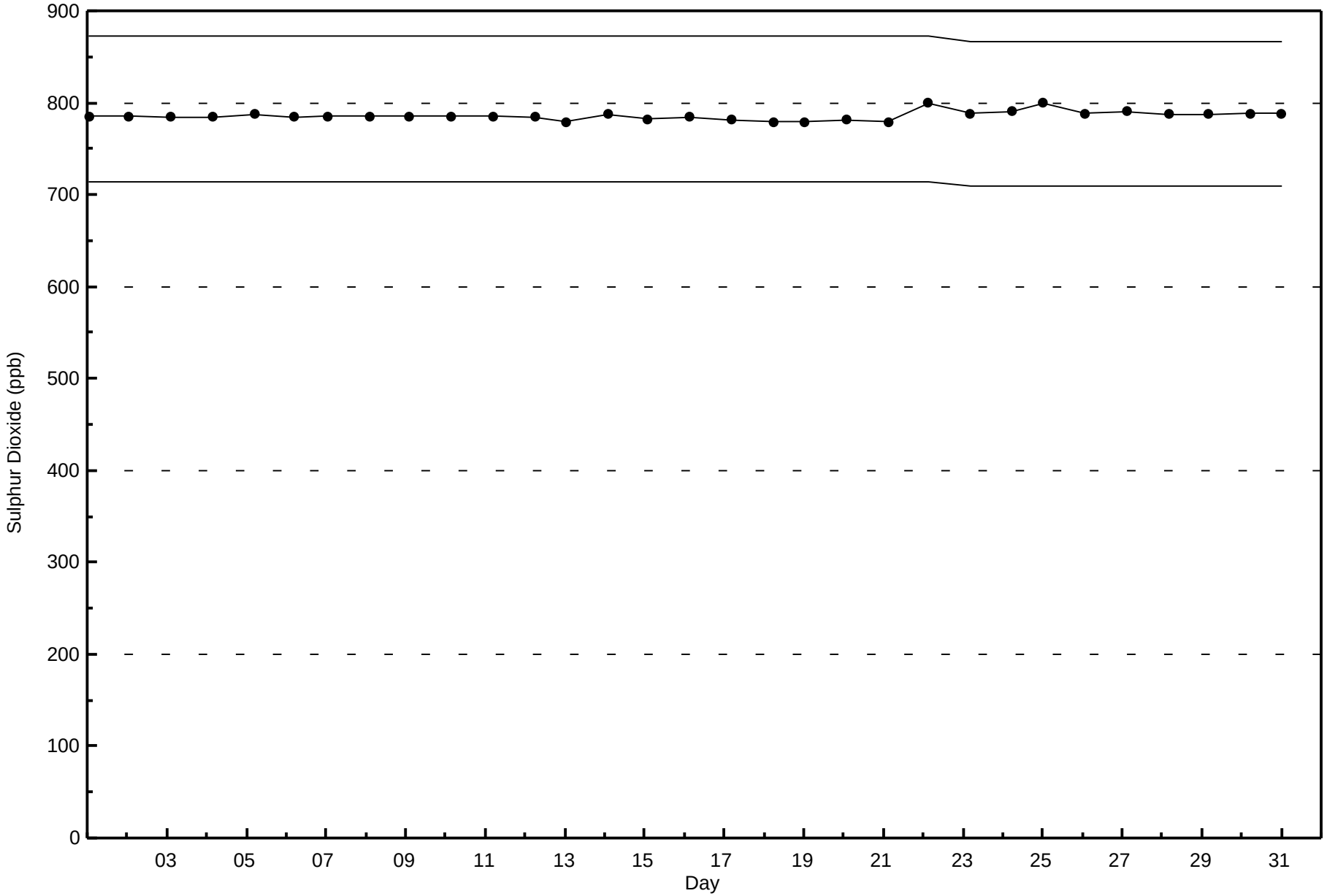


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 2 ppb on Mar 24 03:00

Maximum Daily Average: 0.8 ppb on Mar 13

Minimum Value: 0 ppb on Mar 2 20:00

Minimum Daily Average: 0.2 ppb on Mar 20

Maximum Diurnal Average: 0.4 ppb at hour 9

Minimum Diurnal Average: 0.2 ppb at hour 24

Monthly Average: 0.3 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 1$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	35
Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
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	0.2	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	0.2	0
3-Mar	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.4	1
4-Mar	1	1	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
5-Mar	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0.3	1
6-Mar	0	0	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	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	0	0	0	0	0	0	0	0	0	0	1	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
11-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
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	0.2	0
13-Mar	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0.8	1
14-Mar	1	1	Z	1	1	1	1	1	1	1	1	0	0	1	0	1	1	1	1	1	1	0	0	0	0.6	1
15-Mar	0	0	0	Z	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.5	1
16-Mar	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.7	1
17-Mar	1	1	1	1	1	Z	1	1	1	1	0	0	1	0	1	1	1	0	0	0	1	1	0	0	0.6	1
18-Mar	0	0	0	UO	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	0.2	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	1	1	1	1	1	1	1	1	1	0	0.5	1
24-Mar	0	2	2	1	1	0	Z	1	1	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.5	2
25-Mar	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
26-Mar	0	0	Z	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	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	0.2	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	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1
31-Mar	0	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	Diurnal Average	
	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum	

Z - zerospan C - Calibration UO - Unstable Operation

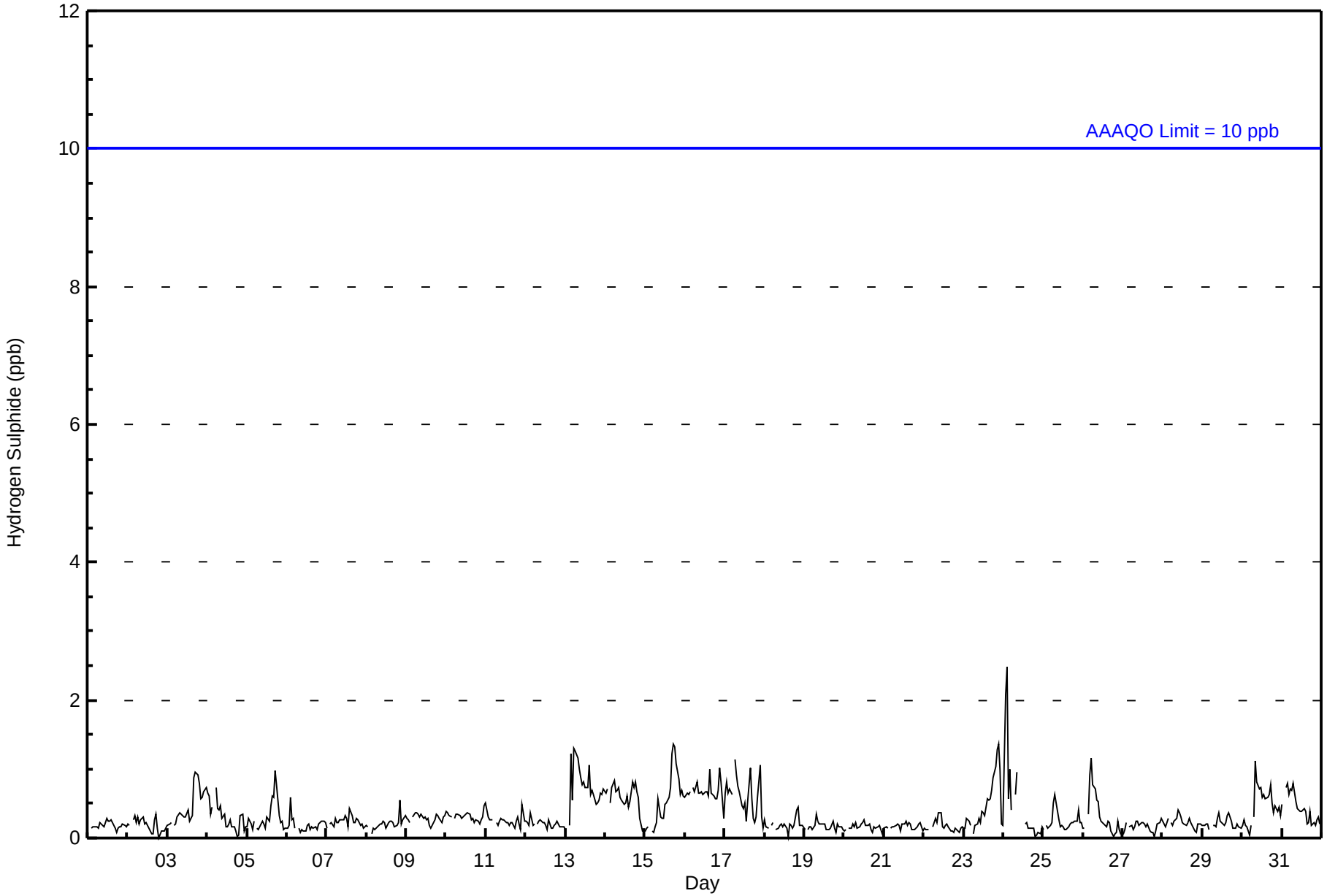
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - March 2016



Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	708	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	66	17	11	28	42	47	93	31	42	38	29	44	41	47	19	113	708
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	66	17	11	28	42	47	93	31	42	38	29	44	41	47	19	113	708

Total Number of Valid Hours: 708

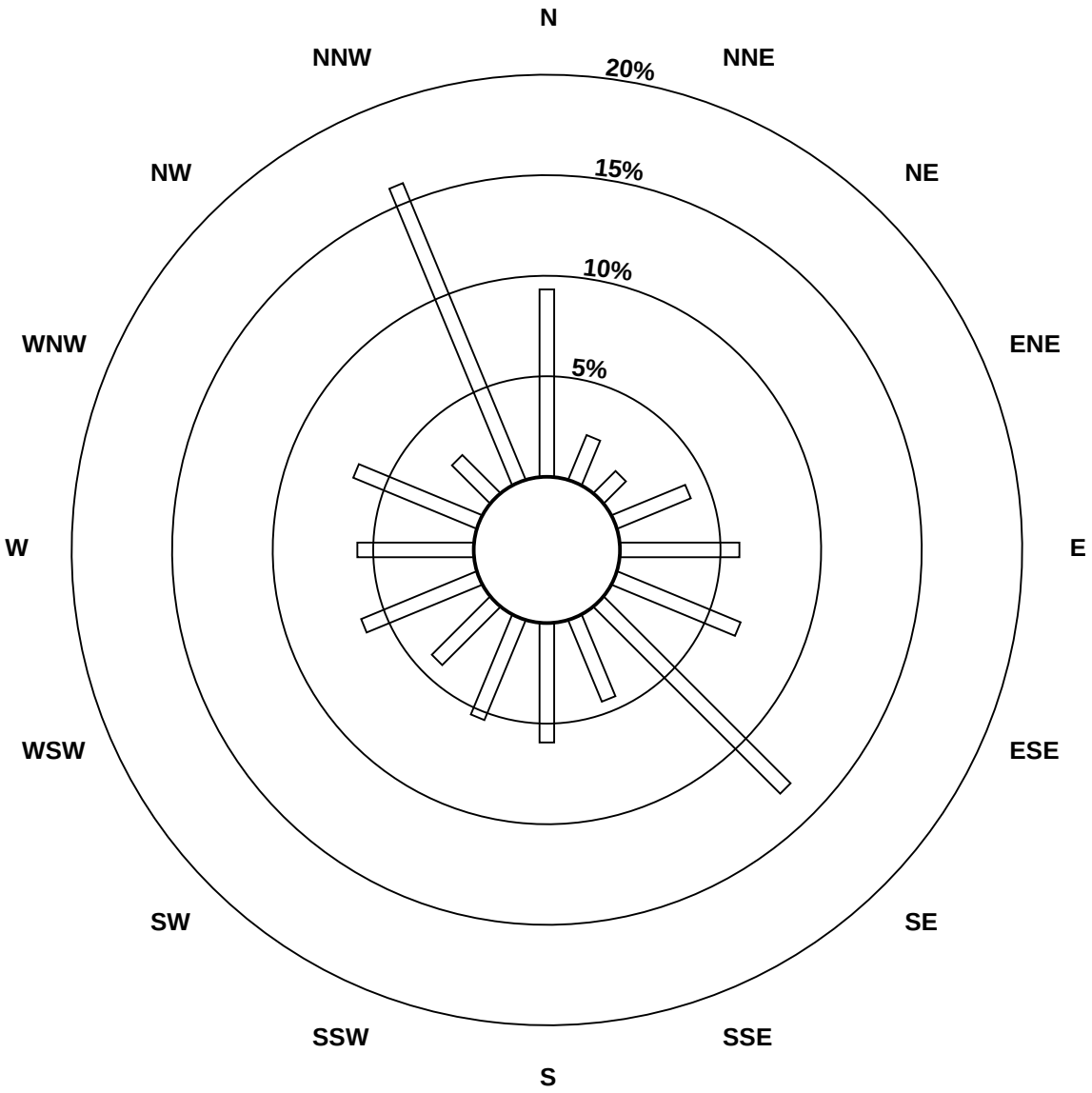
Total Number of Hours: 744

Wood Buffalo Environmental Association

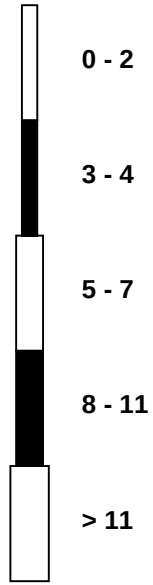
Wind Rose Mar 2016

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont (AMS502)



Classes (ppb)



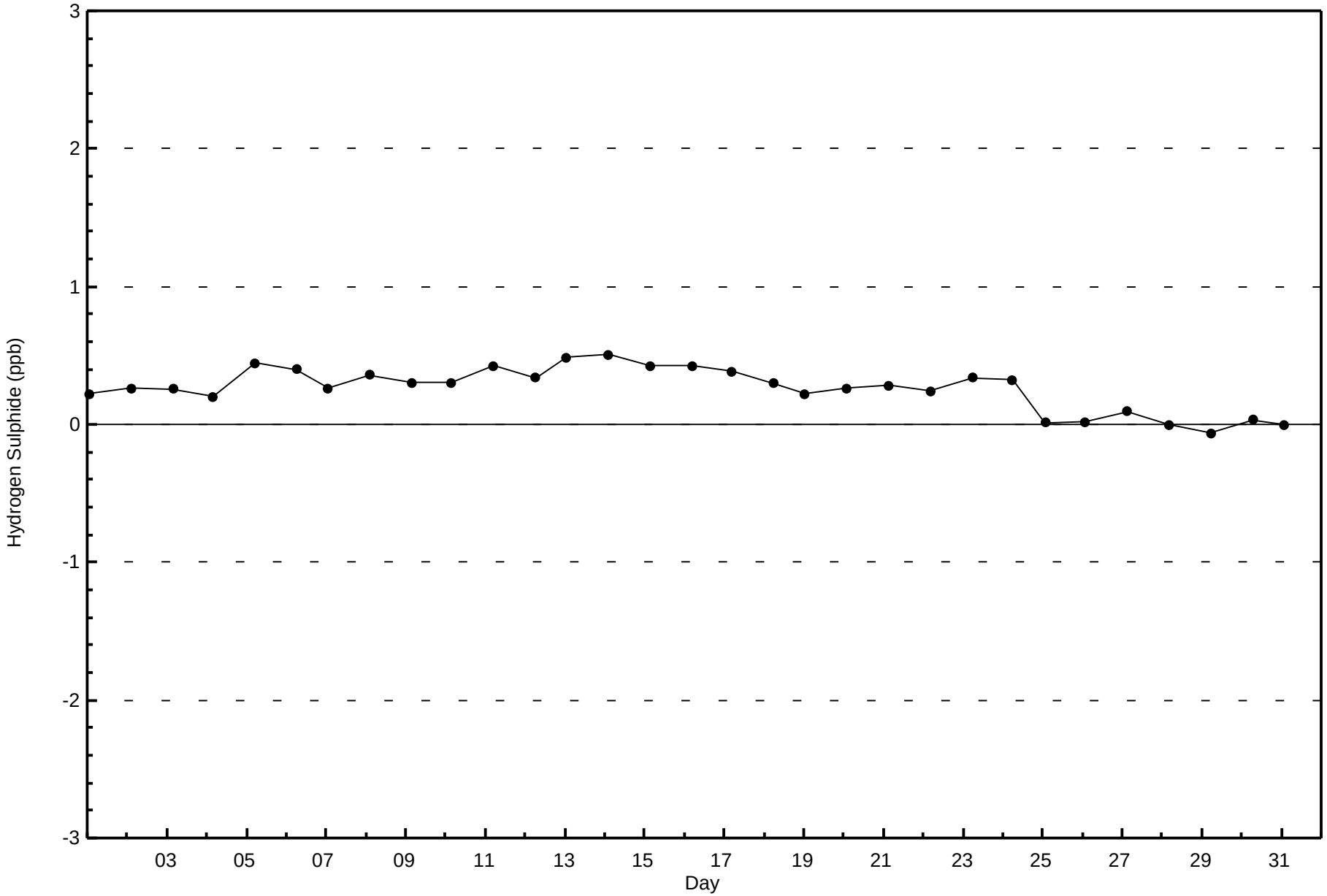
Total Number of Valid Hours: 708

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - March 2016

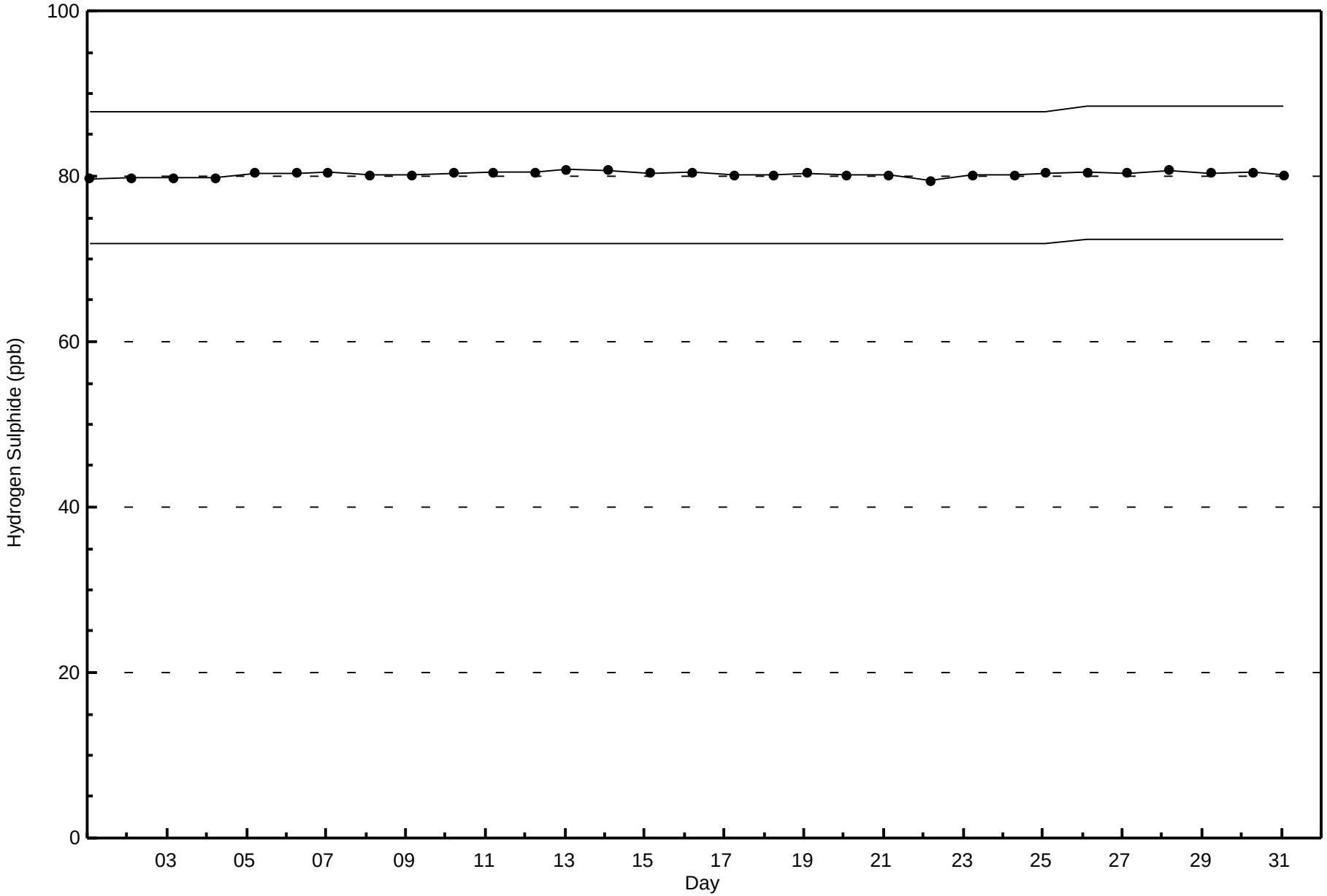


Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - March 2016

Maximum Value: 17 ppb on Mar 25 08:00

Maximum Daily Average: 5.0 ppb on Mar 13

Minimum Value: 0 ppb on Mar 2 04:00

Minimum Daily Average: 0.3 ppb on Mar 24

Maximum Diurnal Average: 2.0 ppb at hour 16

Minimum Diurnal Average: 0.4 ppb at hour 5

Monthly Average: 1.3 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 2$ $P_{90} = 3$ $P_{99} = 11$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	1	1	1	0	0	1	1	2	2	2	6	4	4	5	3	2	1	2	1	1	1	1	1	1.8	6
2-Mar	2	Z	2	0	0	1	4	1	2	4	1	2	3	1	1	2	5	1	4	1	2	1	1	2	1.9	5
3-Mar	0	2	Z	0	0	0	3	3	2	2	5	5	8	1	2	2	2	2	0	2	2	1	1	0	2.0	8
4-Mar	0	2	0	Z	0	0	0	3	4	3	7	1	1	5	6	2	1	3	3	1	6	7	1	1	2.5	7
5-Mar	0	3	0	1	Z	0	0	0	1	3	3	3	2	2	1	0	1	2	0	0	0	0	0	0	1.0	3
6-Mar	0	0	0	0	0	Z	1	1	1	1	1	0	0	1	1	1	1	2	1	1	0	0	0	0	0.6	2
7-Mar	Z	0	0	1	1	1	3	1	2	2	2	4	5	1	3	2	1	1	1	0	1	1	0	0	1.4	5
8-Mar	0	Z	0	0	1	0	0	2	3	1	1	2	1	1	1	0	0	0	0	0	0	0	0	1	0.6	3
9-Mar	0	0	Z	0	0	0	3	2	2	1	2	2	2	1	1	1	0	1	0	0	0	0	0	0	0.8	3
10-Mar	0	0	0	Z	0	0	1	2	2	1	1	1	1	1	1	0	0	0	1	0	1	0	0	1	0.8	2
11-Mar	3	0	0	0	Z	0	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	2	0.5	3
12-Mar	2	0	0	2	0	Z	2	1	3	3	2	2	1	2	2	1	2	2	3	1	1	1	0	1	1.4	3
13-Mar	Z	2	1	1	0	1	0	0	0	1	1	0	4	9	5	10	12	11	9	11	11	9	11	7	5.0	12
14-Mar	8	Z	2	1	2	3	1	1	2	1	2	1	1	1	1	1	1	0	0	1	0	0	1	1	1.4	8
15-Mar	1	2	Z	0	1	1	1	1	1	1	1	1	1	2	2	4	4	13	13	7	1	0	1	0	2.5	13
16-Mar	0	0	0	Z	0	0	0	1	1	1	1	1	1	0	1	3	0	0	0	0	0	2	2	1	0.7	3
17-Mar	2	0	1	2	Z	2	3	2	2	2	2	2	2	1	3	4	1	0	0	0	0	1	0	0	1.5	4
18-Mar	0	0	0	0	0	Z	0	1	0	1	2	1	2	1	0	1	0	0	0	0	0	0	0	0	0.4	2
19-Mar	Z	0	1	0	0	0	0	0	1	1	1	1	1	2	2	1	3	4	0	0	0	0	0	0	0.9	4
20-Mar	0	Z	0	1	1	2	1	2	2	2	1	2	1	2	2	0	1	1	1	0	0	0	0	0	1.0	2
21-Mar	0	1	Z	0	0	1	1	1	1	C	C	C	C	C	1	1	2	1	0	0	0	0	0	0	0.6	2
22-Mar	0	0	0	Z	0	1	2	2	1	3	3	1	2	1	1	1	1	1	0	0	0	0	0	0	0.8	3
23-Mar	0	0	0	0	Z	0	0	1	0	2	1	2	4	3	2	3	1	1	0	0	0	0	0	0	1.0	4
24-Mar	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0.3	2
25-Mar	Z	0	0	0	0	0	13	17	10	1	1	3	1	0	0	0	0	0	0	0	0	0	0	0	2.2	17
26-Mar	0	Z	1	1	1	0	1	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.4	1
27-Mar	0	0	Z	0	0	0	0	2	2	2	1	2	3	1	1	1	1	1	0	1	1	0	0	0	0.8	3
28-Mar	0	0	0	Z	0	1	1	1	1	2	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0.5	2
29-Mar	0	0	0	0	Z	0	0	0	1	0	0	3	1	3	2	4	8	2	0	1	0	0	0	0	1.2	8
30-Mar	0	0	0	1	0	Z	0	4	5	2	1	3	3	5	9	8	2	2	4	0	0	0	0	0	2.2	9
31-Mar	Z	1	1	1	1	0	3	2	3	2	3	2	1	1	0	0	0	1	0	0	0	0	0	0	1.0	3
	0.9	0.6	0.4	0.6	0.4	0.6	1.5	1.9	1.9	1.6	1.7	1.8	1.9	1.7	1.9	2.0	1.7	1.7	1.4	1.0	0.9	0.8	0.7	0.7	Diurnal Average	
	8	3	2	2	2	3	13	17	10	4	7	6	8	9	9	10	12	13	13	11	11	9	11	7	Diurnal Maximum	

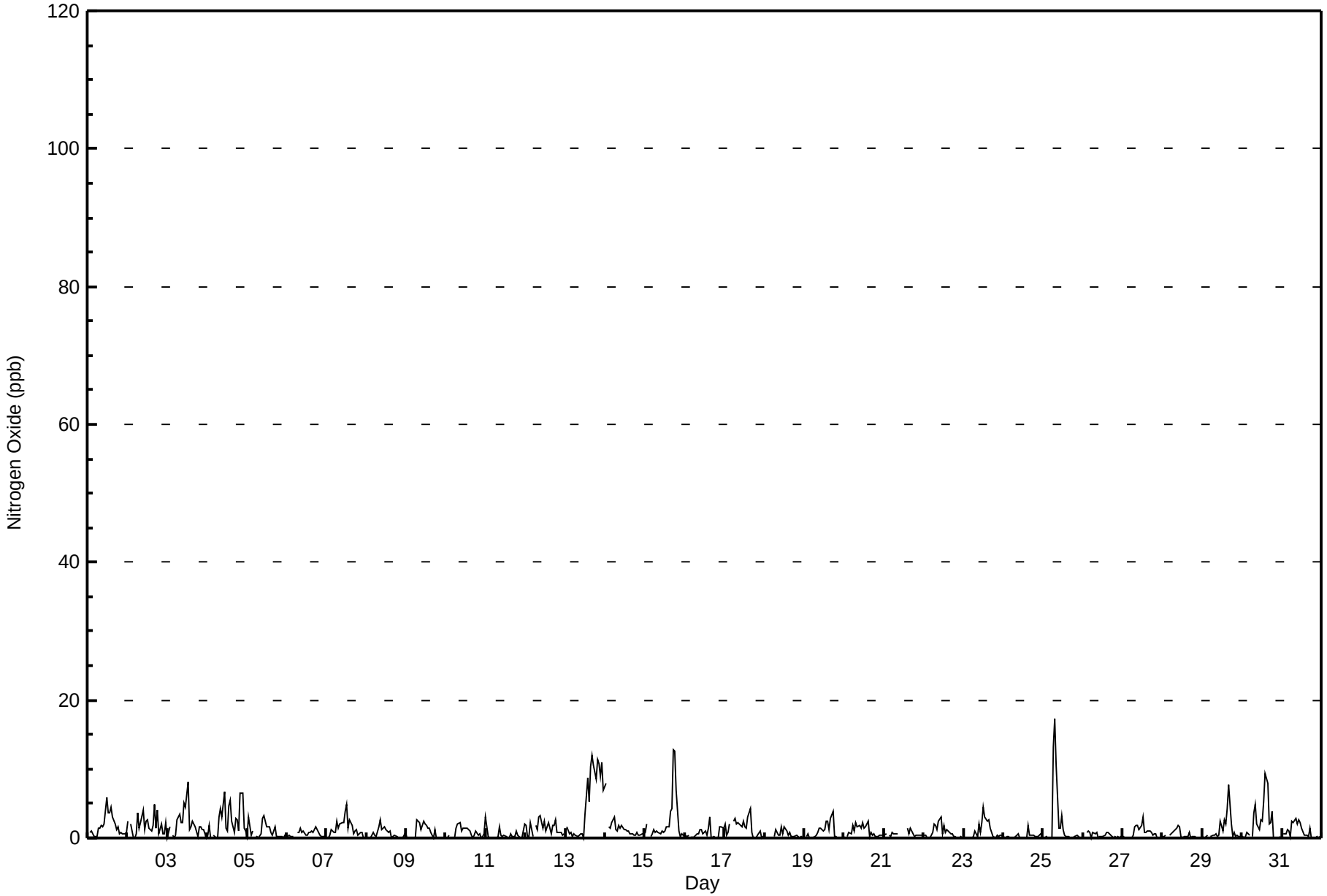
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - March 2016



Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	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: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	68	15	12	32	37	47	93	31	42	39	28	44	40	49	18	113	708
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	68	15	12	32	37	47	93	31	42	39	28	44	40	49	18	113	708

Total Number of Valid Hours: 708

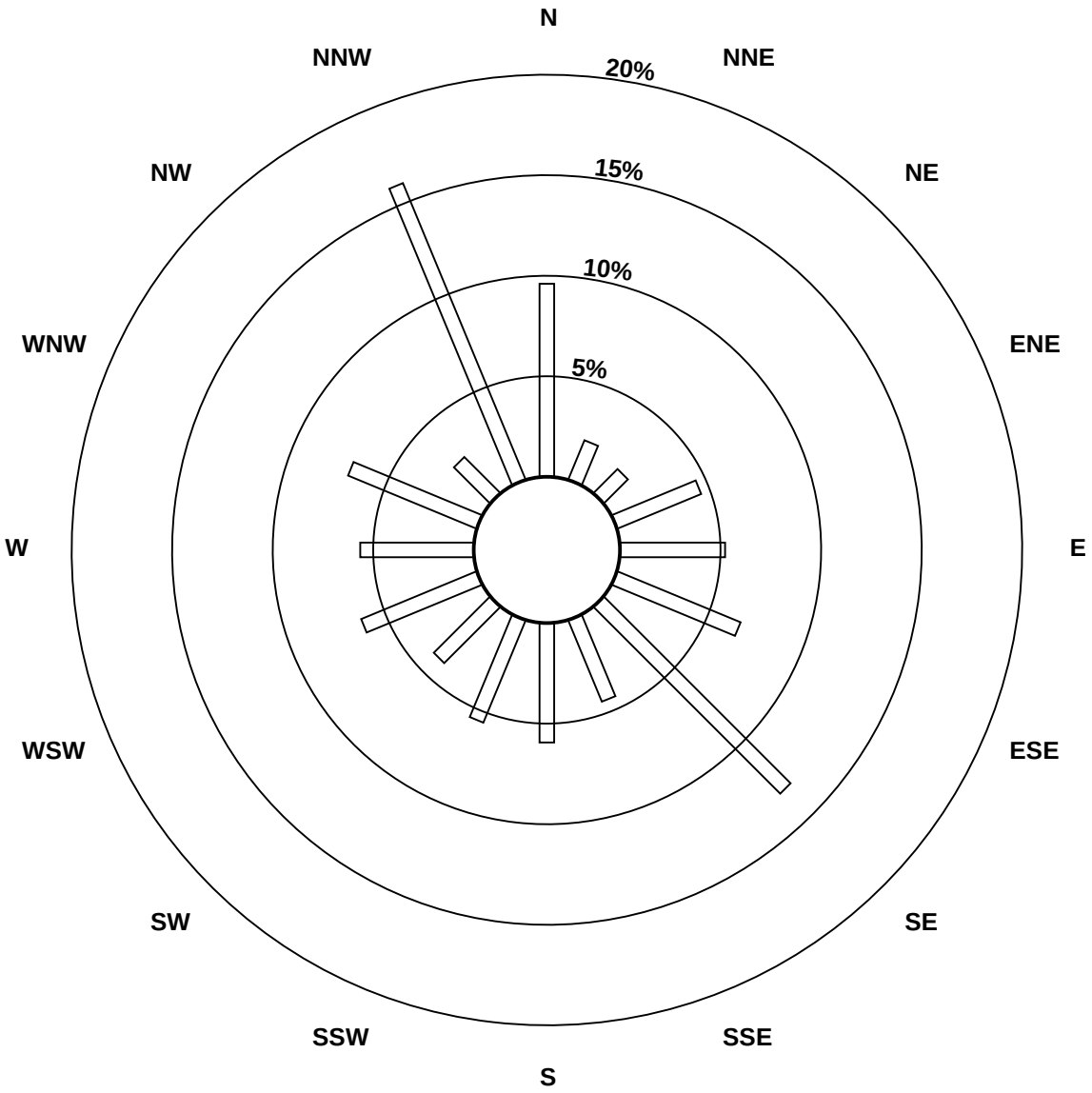
Total Number of Hours: 744

Wood Buffalo Environmental Association

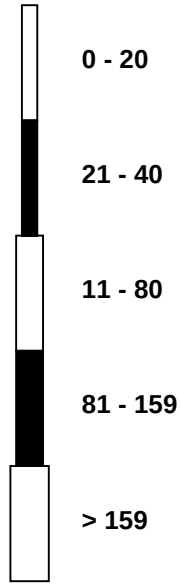
Wind Rose Mar 2016

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont (AMS502)



Classes (ppb)



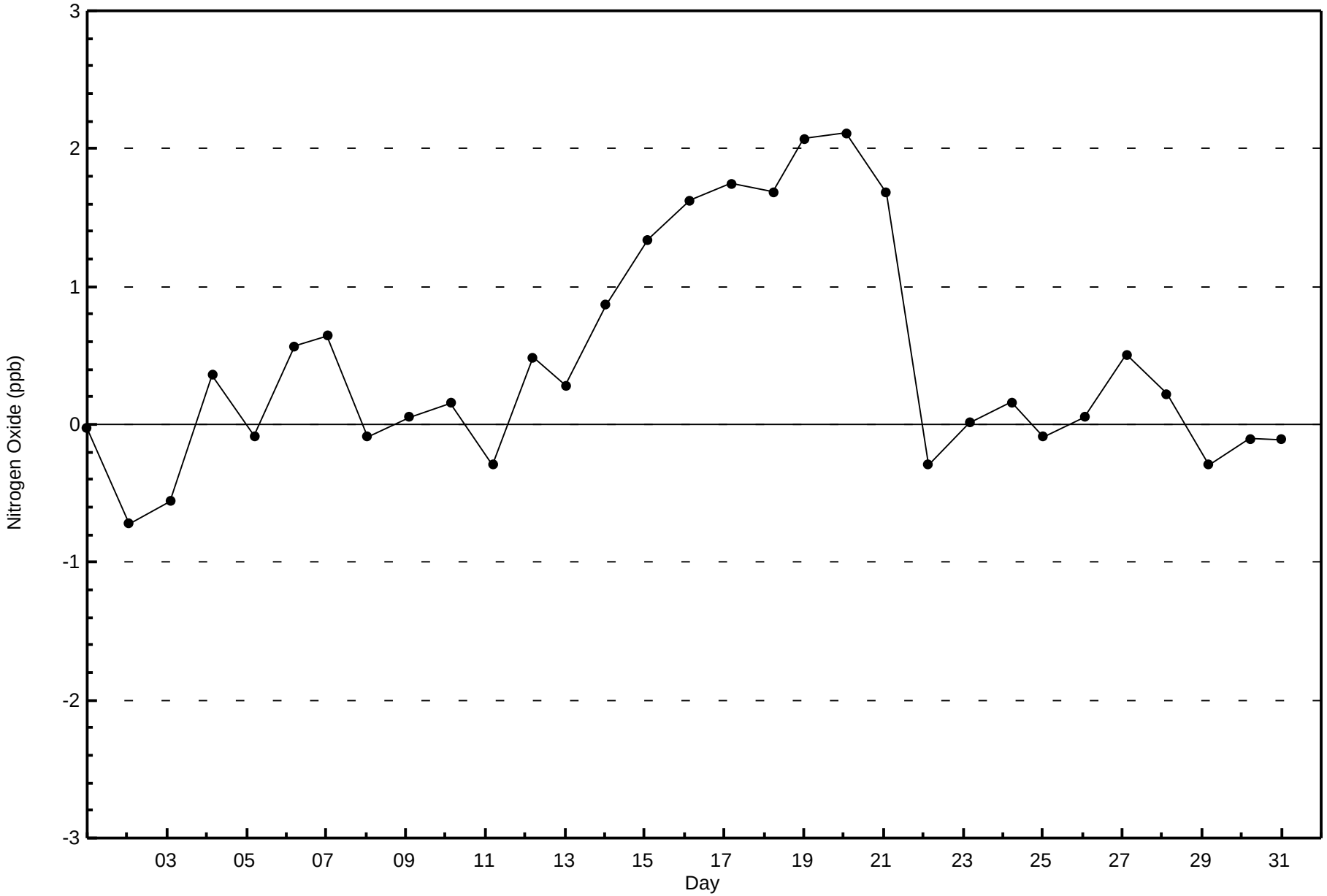
Total Number of Valid Hours: 708

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - March 2016

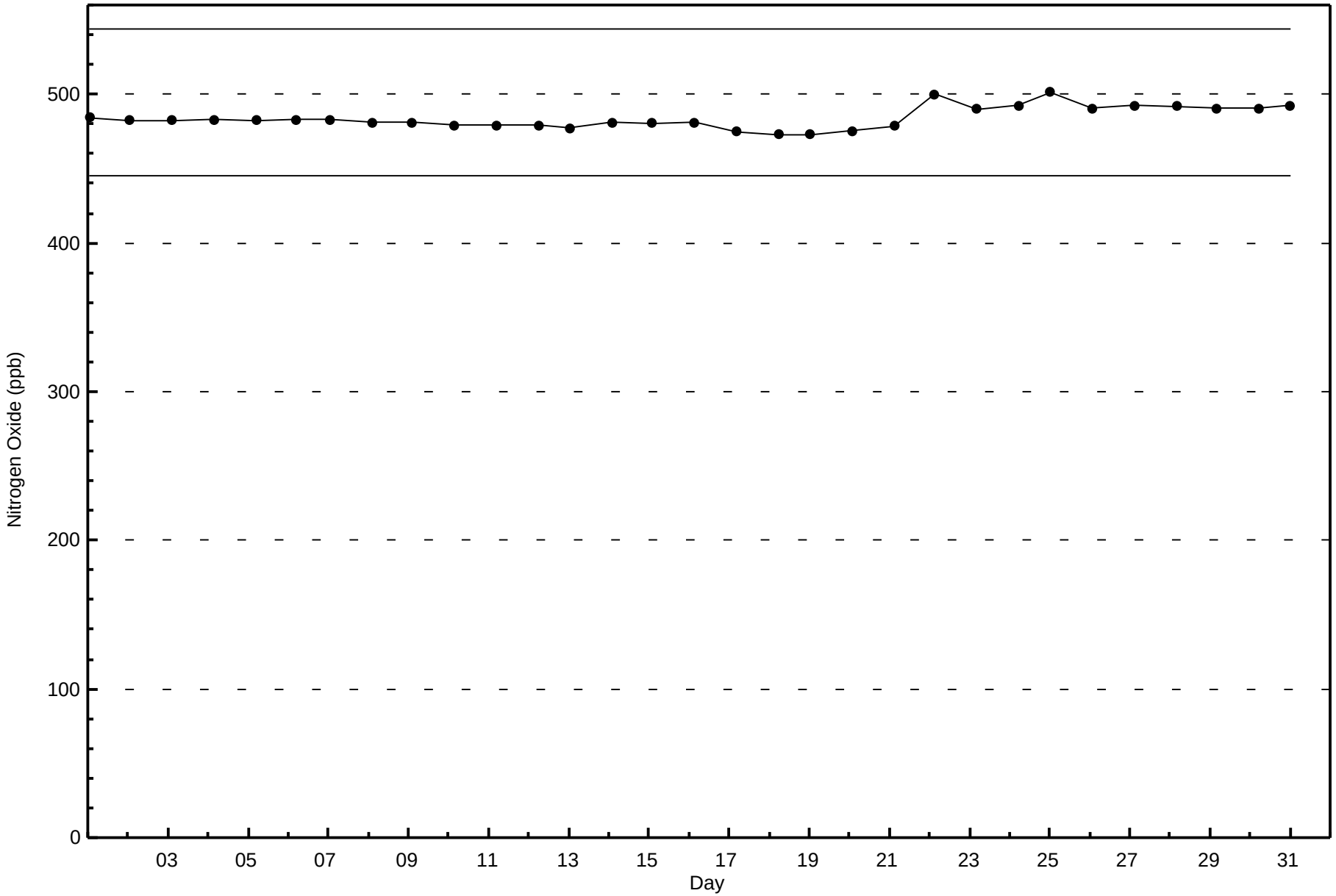


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 20 ppb on Mar 15 19:00 Maximum Daily Average: 6.0 ppb on Mar 3

Minimum Value: 0 ppb on Mar 21 17:00 Minimum Daily Average: 0.9 ppb on Mar 21

Maximum Diurnal Average: 4.1 ppb at hour 18 Minimum Diurnal Average: 2.1 ppb at hour 3

Monthly Average: 3.0 ppb Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 4$ $P_{90} = 6$ $P_{99} = 12$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	3	2	2	2	2	2	2	3	1	2	5	4	4	5	4	3	3	5	3	2	1	1	2	2.7	5
2-Mar	4	Z	4	3	13	5	8	3	6	8	3	3	4	2	3	3	6	7	8	3	3	3	3	5	4.7	13
3-Mar	5	5	Z	5	4	4	6	9	8	7	6	6	5	3	5	4	12	16	10	6	5	4	4	3	6.0	16
4-Mar	3	5	4	Z	4	4	6	10	11	8	4	2	2	3	5	2	2	3	5	2	12	12	4	4	5.2	12
5-Mar	3	9	5	4	Z	3	3	3	4	5	4	4	4	4	3	3	7	13	7	6	3	3	1	2	4.4	13
6-Mar	1	1	1	2	1	Z	2	2	2	2	2	1	1	1	1	1	2	3	3	1	1	1	1	1	1.5	3
7-Mar	Z	1	1	1	1	2	2	2	3	3	3	2	2	3	4	2	2	3	3	2	2	2	1	1	2.0	4
8-Mar	1	Z	1	2	1	1	2	3	2	2	2	2	2	2	3	2	2	2	2	3	3	3	3	3	2.1	3
9-Mar	2	2	Z	4	5	4	5	6	4	3	4	4	3	3	3	3	3	5	5	4	4	2	2	2	3.5	6
10-Mar	2	3	4	Z	3	4	5	5	5	3	2	2	1	2	2	2	2	2	2	2	2	2	3	2	2.6	5
11-Mar	7	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	2	6	1.8	7
12-Mar	4	4	2	7	3	Z	4	3	3	3	2	3	1	1	1	1	2	2	3	1	2	1	1	2	2.5	7
13-Mar	Z	1	2	5	3	2	2	2	2	2	3	1	4	10	9	12	12	10	10	9	8	7	8	7	5.7	12
14-Mar	8	Z	3	2	3	3	3	3	3	3	3	2	2	2	2	2	4	5	5	6	6	5	2	1	3.3	8
15-Mar	2	2	Z	1	2	2	2	2	2	1	2	1	2	3	3	6	8	12	20	19	10	6	4	2	5.0	20
16-Mar	2	4	3	Z	6	5	5	4	3	3	3	3	3	3	4	5	4	4	3	3	3	4	6	3	3.8	6
17-Mar	4	3	4	5	Z	5	6	6	5	3	3	4	3	3	4	5	2	1	2	2	4	6	3	3	3.6	6
18-Mar	4	3	2	2	2	Z	2	3	2	2	3	1	2	1	1	2	1	1	3	6	4	1	1	1	2.1	6
19-Mar	Z	1	1	1	2	2	2	3	2	3	2	2	2	2	3	3	4	5	3	2	1	1	1	1	2.1	5
20-Mar	1	Z	1	1	1	3	2	2	2	2	2	1	1	2	2	1	2	1	1	1	1	1	1	1	1.3	3
21-Mar	1	1	Z	1	1	2	2	2	1	C	C	C	C	C	0	0	0	0	0	1	1	0	0	1	0.9	2
22-Mar	1	1	1	Z	1	2	3	2	3	2	2	1	2	2	2	2	2	2	2	2	2	2	4	1	1.8	4
23-Mar	2	1	1	1	Z	1	1	2	1	3	1	3	5	3	7	11	11	8	6	4	5	5	5	3	3.8	11
24-Mar	2	2	2	1	1	Z	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	3	1	2	1.4	3
25-Mar	Z	2	1	2	1	1	10	12	6	2	2	4	2	1	1	1	1	1	1	2	2	4	3	1	2.8	12
26-Mar	1	Z	2	7	11	8	6	4	5	3	2	2	2	3	3	4	4	4	3	5	3	6	4	3	4.1	11
27-Mar	3	3	Z	3	3	4	5	6	5	4	3	3	6	3	3	4	3	2	2	3	3	2	3	3	3.5	6
28-Mar	3	3	3	Z	4	3	2	3	4	5	3	2	1	1	1	1	2	1	1	1	1	1	1	1	2.0	5
29-Mar	1	1	1	1	Z	1	1	1	1	1	1	3	1	2	2	4	9	3	0	1	1	0	0	1	1.5	9
30-Mar	0	1	0	2	2	Z	2	7	9	5	4	3	3	4	8	7	4	4	4	2	1	1	1	1	3.1	9
31-Mar	Z	1	1	2	2	2	5	4	4	4	4	4	3	3	2	2	2	4	1	1	2	3	2	1	2.4	5
	2.7	2.4	2.1	2.6	3.1	2.9	3.5	3.8	3.7	3.1	2.6	2.5	2.5	2.6	3.0	3.2	3.8	4.1	4.0	3.3	3.1	3.0	2.4	2.3	Diurnal Average	
	8	9	5	7	13	8	10	12	11	8	6	6	6	10	9	12	12	16	20	19	12	12	8	7	Diurnal Maximum	

Z - zerospan C - Calibration

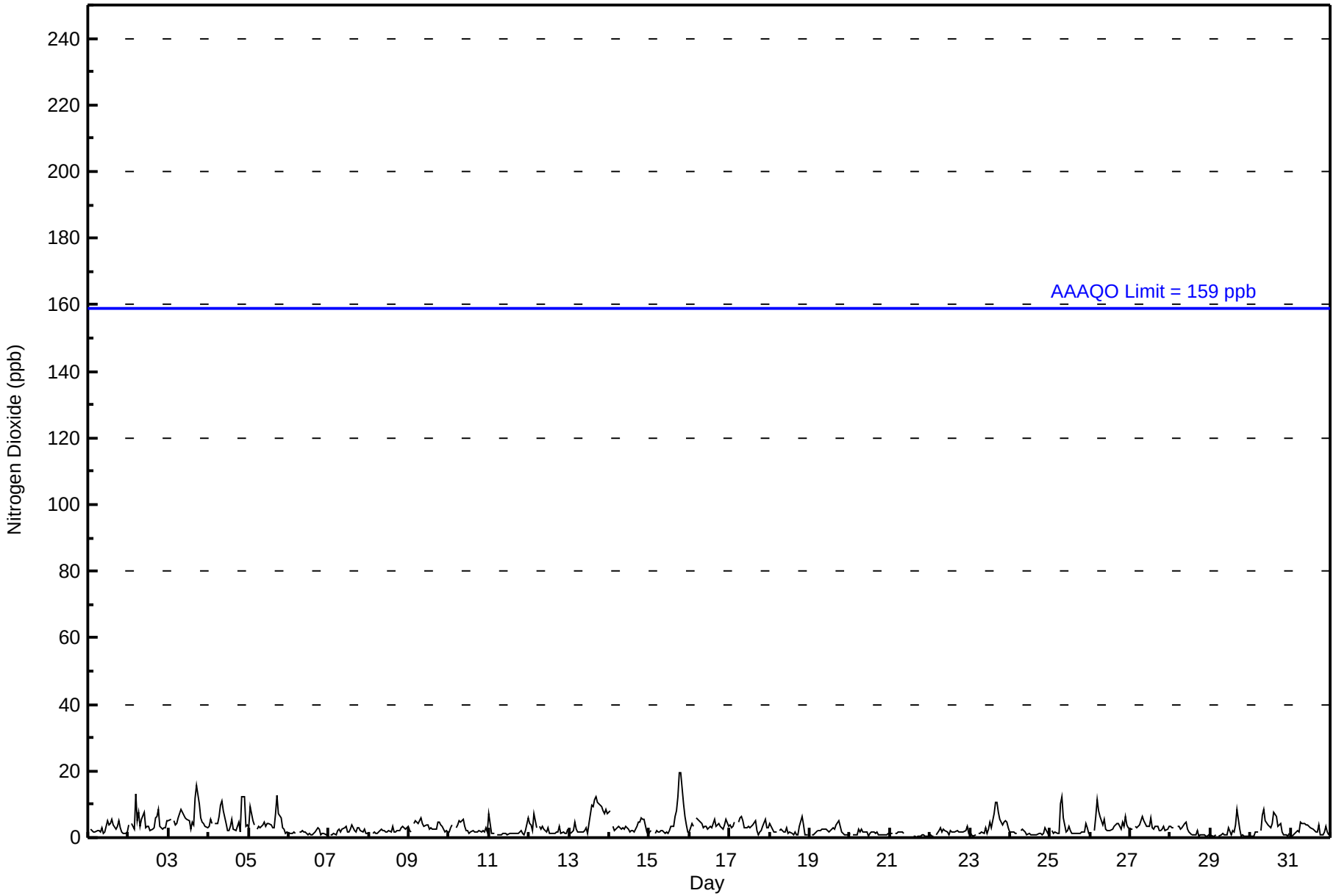
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - March 2016



502-28

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	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: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	68	15	12	32	37	47	93	31	42	39	28	44	40	49	18	113	708
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	68	15	12	32	37	47	93	31	42	39	28	44	40	49	18	113	708

Total Number of Valid Hours: 708

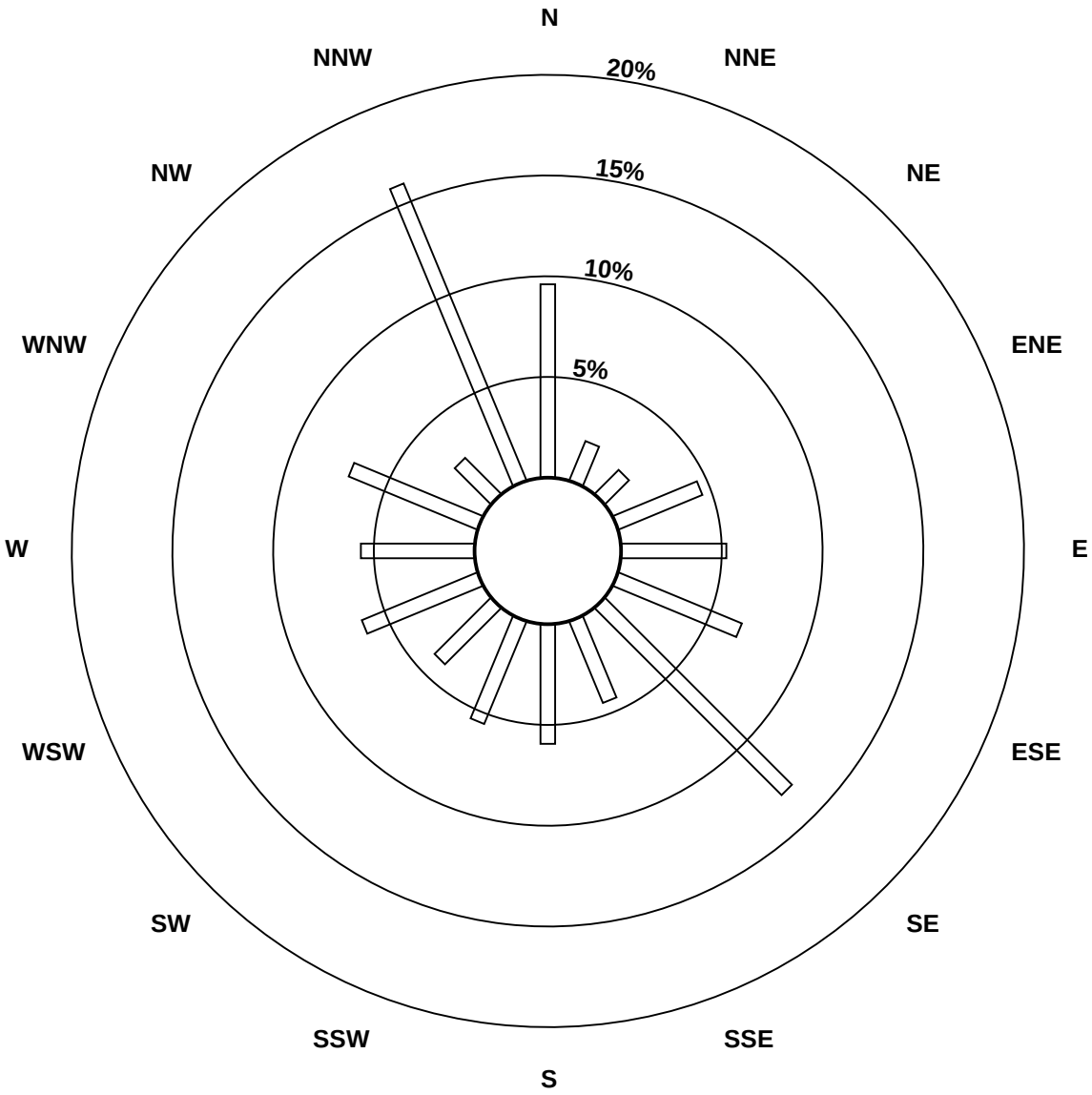
Total Number of Hours: 744

Wood Buffalo Environmental Association

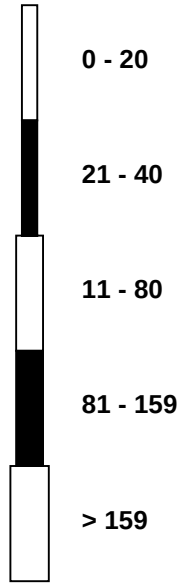
Wind Rose Mar 2016

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont (AMS502)



Classes (ppb)



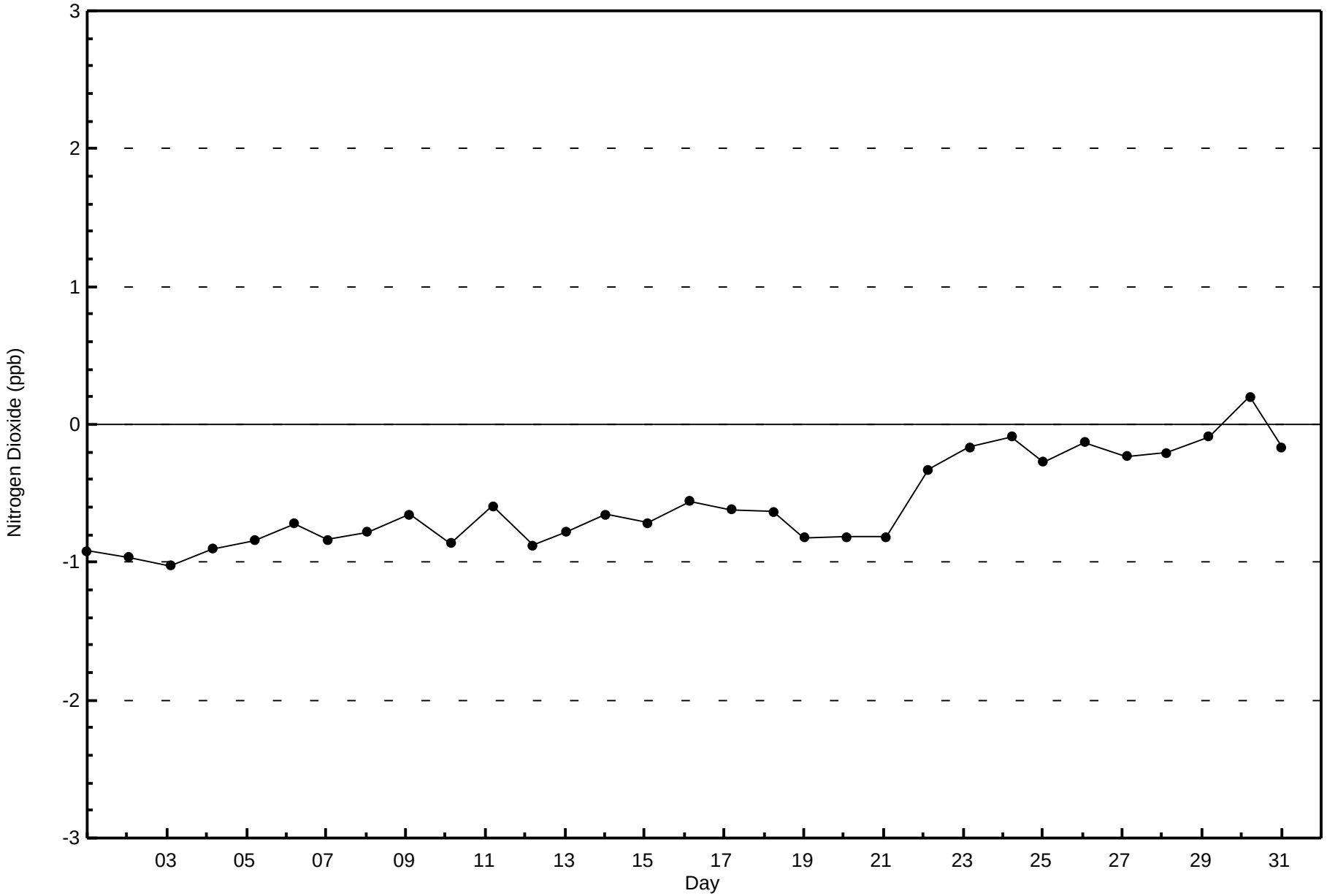
Total Number of Valid Hours: 708

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - March 2016

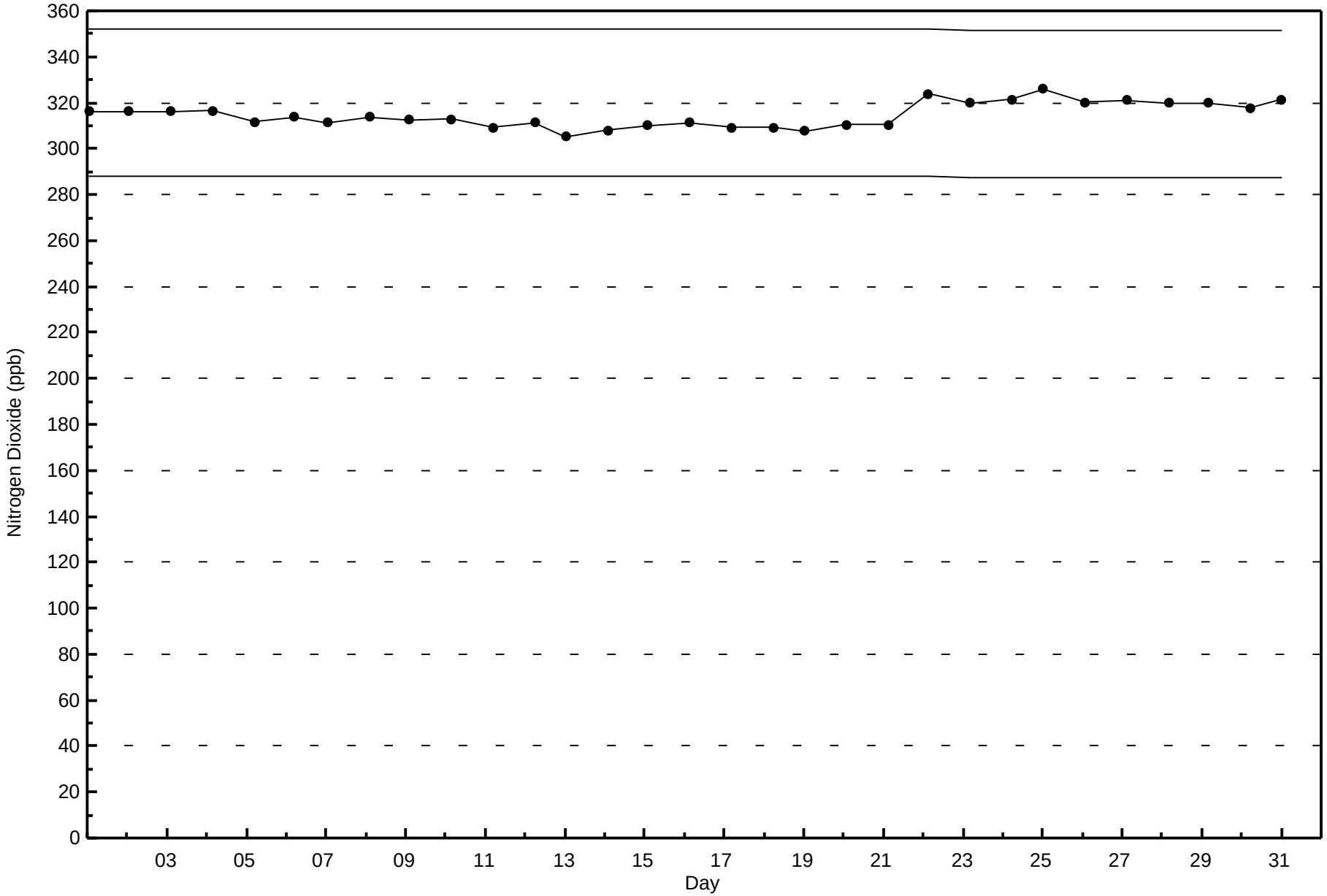


Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - March 2016

Maximum Value: 32 ppb on Mar 15 19:00

Maximum Daily Average: 10.7 ppb on Mar 13

Minimum Value: 1 ppb on Mar 29 02:00

Minimum Daily Average: 1.5 ppb on Mar 21

Maximum Diurnal Average: 5.8 ppb at hour 18

Minimum Diurnal Average: 2.5 ppb at hour 3

Monthly Average: 4.3 ppb

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 2$ Median = 3 $Q_3 = 5$ $P_{90} = 8$ $P_{99} = 21$

Hours in Service:	744
Hours of Data:	708
Hours of Missing Data:	36
Hours of Calibration:	36
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	Z	3	3	3	2	2	3	3	5	3	4	11	8	8	10	7	5	5	7	3	3	2	2	3	4.5	11
2-Mar	6	Z	6	3	13	5	11	5	8	11	4	6	6	4	4	5	11	8	12	4	5	3	3	7	6.6	13
3-Mar	5	7	Z	6	4	5	9	12	10	9	11	10	13	4	6	6	14	17	10	8	6	5	5	3	8.0	17
4-Mar	4	7	4	Z	5	4	6	13	15	11	11	4	3	8	11	5	3	6	7	3	19	19	5	5	7.7	19
5-Mar	3	12	5	5	Z	3	3	3	4	7	7	7	6	6	4	3	8	14	8	6	3	3	1	2	5.4	14
6-Mar	1	2	2	2	1	Z	2	3	4	3	2	1	2	2	2	2	2	5	4	2	2	2	1	2	2.1	5
7-Mar	Z	1	1	2	2	3	5	3	5	5	6	6	6	4	6	4	2	4	4	3	3	3	1	1	3.5	6
8-Mar	1	Z	1	2	2	2	2	4	5	3	3	3	3	2	4	2	2	2	2	3	3	3	3	4	2.7	5
9-Mar	2	2	Z	4	5	4	8	8	7	5	6	6	5	4	4	3	3	6	5	4	4	2	2	2	4.3	8
10-Mar	2	3	4	Z	3	4	7	7	7	4	3	3	3	3	3	2	2	2	3	2	3	2	3	2	3.4	7
11-Mar	10	2	1	1	Z	1	1	1	3	2	1	2	1	1	1	2	2	2	3	3	2	1	2	8	2.3	10
12-Mar	6	4	2	9	3	Z	5	4	6	6	3	5	2	3	4	2	4	4	6	2	2	2	2	3	3.9	9
13-Mar	Z	3	3	6	3	2	2	2	2	3	3	1	8	18	15	22	24	21	18	21	19	16	19	14	10.7	24
14-Mar	16	Z	5	3	5	6	4	4	5	4	5	4	3	3	3	3	4	5	5	7	6	6	2	1	4.8	16
15-Mar	3	4	Z	1	3	3	2	3	3	2	3	2	3	5	5	10	12	25	32	26	11	7	5	2	7.5	32
16-Mar	2	5	4	Z	6	5	5	5	3	5	4	3	4	3	6	8	3	4	3	3	3	6	7	4	4.5	8
17-Mar	6	3	4	7	Z	7	9	8	7	5	4	6	5	5	7	9	3	1	2	2	4	7	3	3	5.0	9
18-Mar	4	3	2	2	2	Z	2	4	2	2	4	2	3	2	1	2	1	1	4	7	4	1	1	1	2.5	7
19-Mar	Z	1	2	1	2	2	2	3	3	4	4	3	3	5	5	4	7	9	3	2	1	1	1	1	3.0	9
20-Mar	1	Z	1	1	2	4	3	5	3	4	3	3	3	4	4	2	2	1	1	1	1	1	1	1	2.3	5
21-Mar	2	2	Z	2	2	3	2	2	2	C	C	C	C	C	2	1	2	1	1	1	1	1	1	1	1.5	3
22-Mar	1	1	1	Z	1	3	5	4	4	5	5	1	4	3	3	3	3	2	2	2	2	2	4	1	2.6	5
23-Mar	2	1	1	1	Z	1	1	3	1	5	2	5	9	6	10	13	12	8	6	4	5	5	5	3	4.8	13
24-Mar	2	2	2	2	1	Z	2	3	2	2	1	1	1	1	1	3	1	2	2	1	1	3	2	2	1.7	3
25-Mar	Z	2	1	2	1	1	23	30	16	3	4	7	3	2	1	1	1	1	1	2	2	5	3	1	4.9	30
26-Mar	1	Z	3	8	12	8	7	5	6	3	2	2	2	3	4	5	5	5	3	5	3	7	4	3	4.5	12
27-Mar	3	3	Z	3	3	4	5	8	7	6	5	5	9	4	3	5	5	3	3	3	4	2	3	3	4.3	9
28-Mar	3	3	3	Z	4	4	3	4	6	6	4	2	1	1	1	1	3	1	1	1	1	1	1	1	2.4	6
29-Mar	1	1	1	1	Z	1	1	1	1	1	1	5	2	5	4	8	16	4	1	2	1	1	1	1	2.6	16
30-Mar	1	1	1	3	2	Z	2	10	14	7	5	6	5	10	17	14	6	6	8	2	1	1	1	1	5.3	17
31-Mar	Z	1	2	3	3	2	7	6	7	6	7	6	4	3	3	2	2	5	1	1	2	3	2	1	3.4	7
	3.5	3.0	2.5	3.2	3.5	3.5	4.9	5.6	5.6	4.7	4.3	4.2	4.4	4.4	4.9	5.1	5.5	5.8	5.4	4.3	4.0	3.9	3.0	2.9	Diurnal Average	
	16	12	6	9	13	8	23	30	16	11	11	11	13	18	17	22	24	25	32	26	19	19	19	14	Diurnal Maximum	

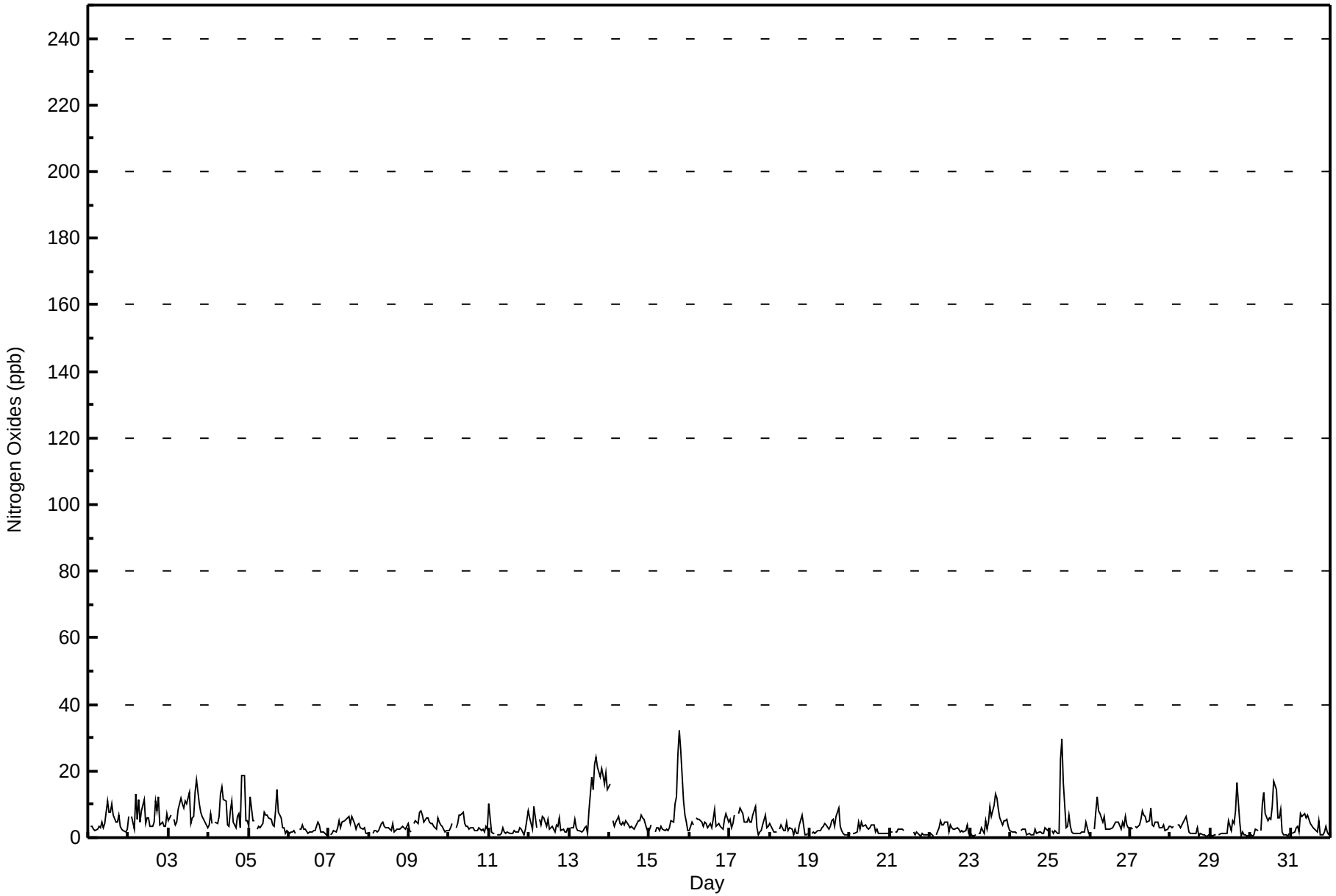
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - March 2016



Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - March 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	699	98.73	98.73
21 - 40	9	1.27	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: 708

Total Number of Hours: 744

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - March 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	68	15	12	32	37	47	93	31	42	39	28	42	40	49	12	112	699
21 - 40	0	0	0	0	0	0	0	0	0	0	0	2	0	0	6	1	9
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	68	15	12	32	37	47	93	31	42	39	28	44	40	49	18	113	708

Total Number of Valid Hours: 708

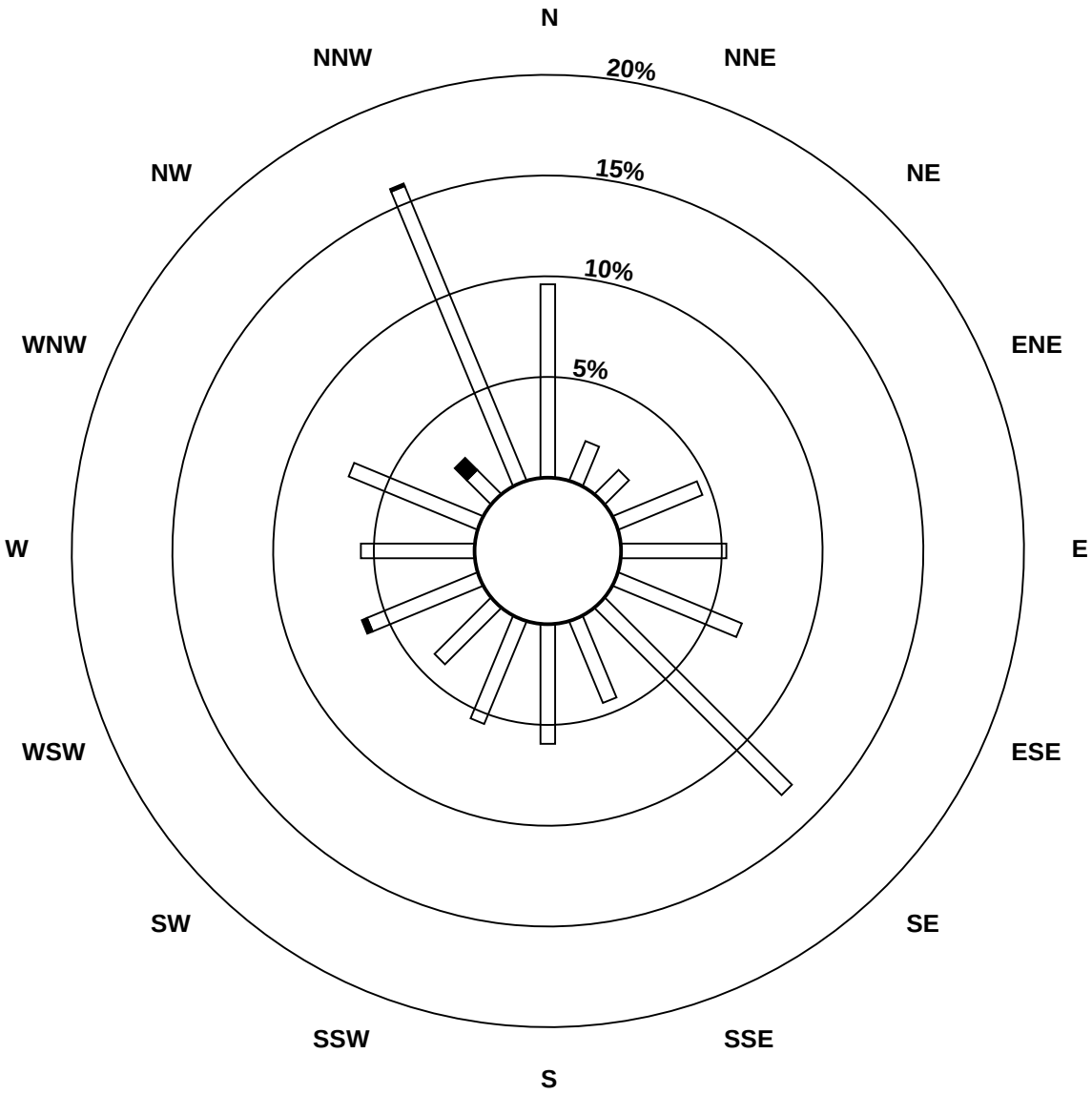
Total Number of Hours: 744

Wood Buffalo Environmental Association

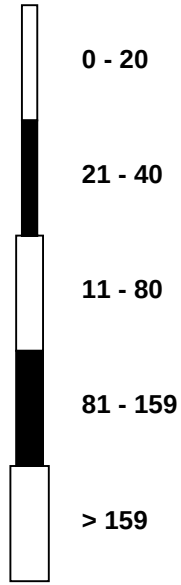
Wind Rose Mar 2016

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont (AMS502)



Classes (ppb)



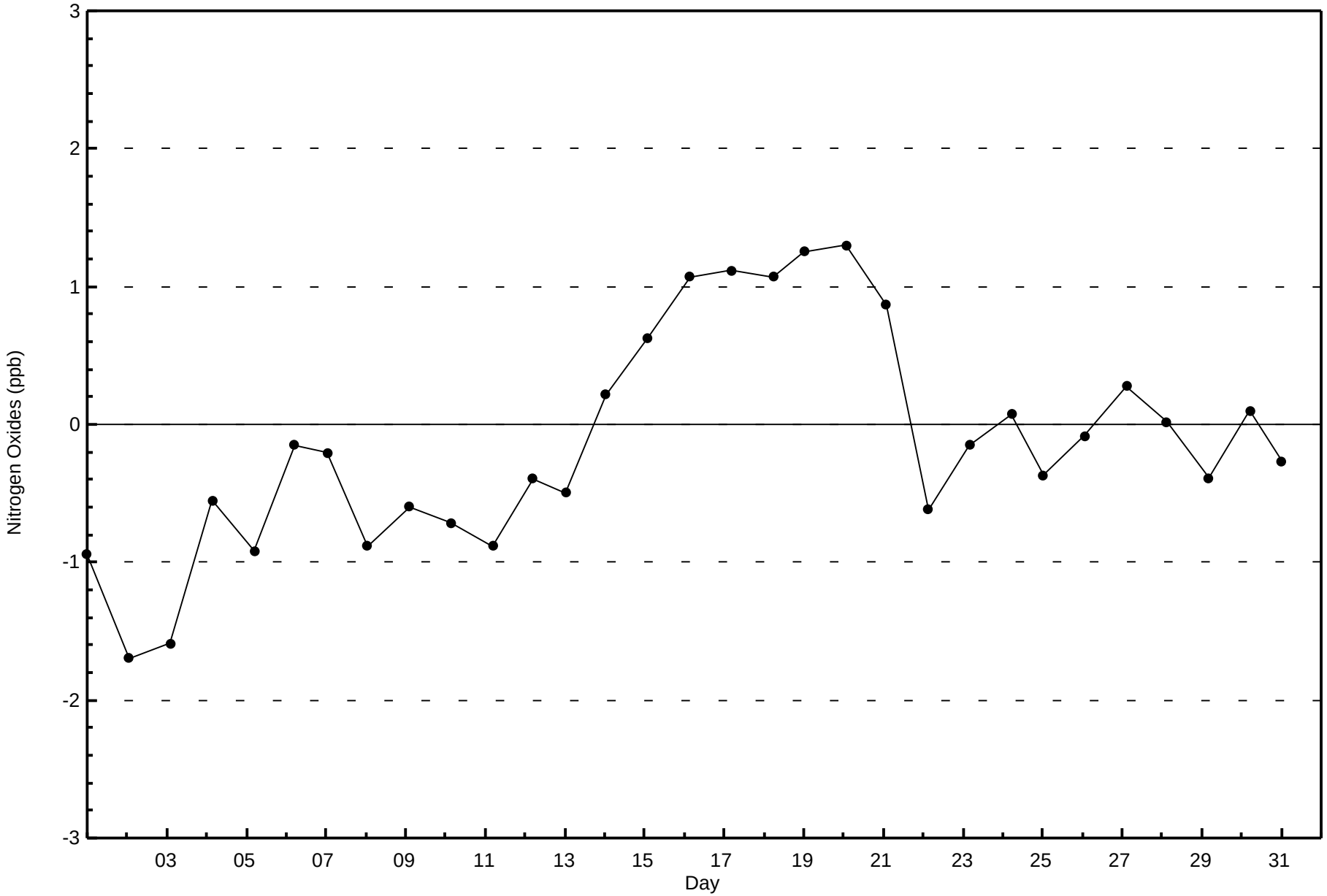
Total Number of Valid Hours: 708

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - March 2016

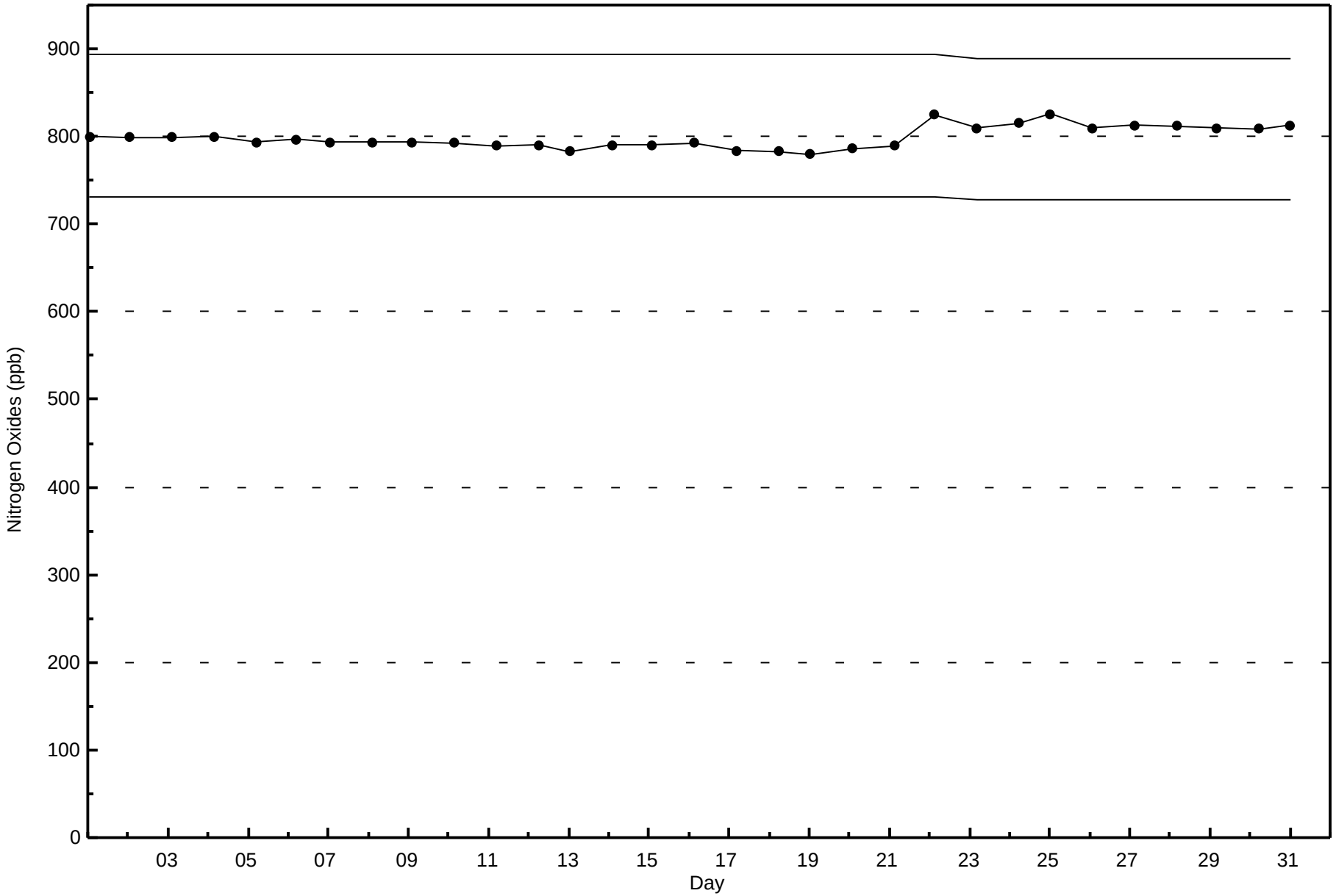


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - March 2016



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

ConocoPhillips - Surmont - March 2016

Maximum Value: 10.6 C on Mar 28 14:00

Maximum Daily Average: 6.1 C on Mar 29

Minimum Value: -13.1 C on Mar 4 07:00

Minimum Daily Average: -8.4 C on Mar 4

Maximum Diurnal Average: 0.5 C at hour 16

Minimum Diurnal Average: -5.6 C at hour 7

Monthly Average: -2.85 C

Percentiles: P_1 = -11.7 P_{10} = -8.4 Q_1 = -6.1 Median = -3.4 Q_3 = 0.0 P_{90} = 3.7 P_{99} = 9.9

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

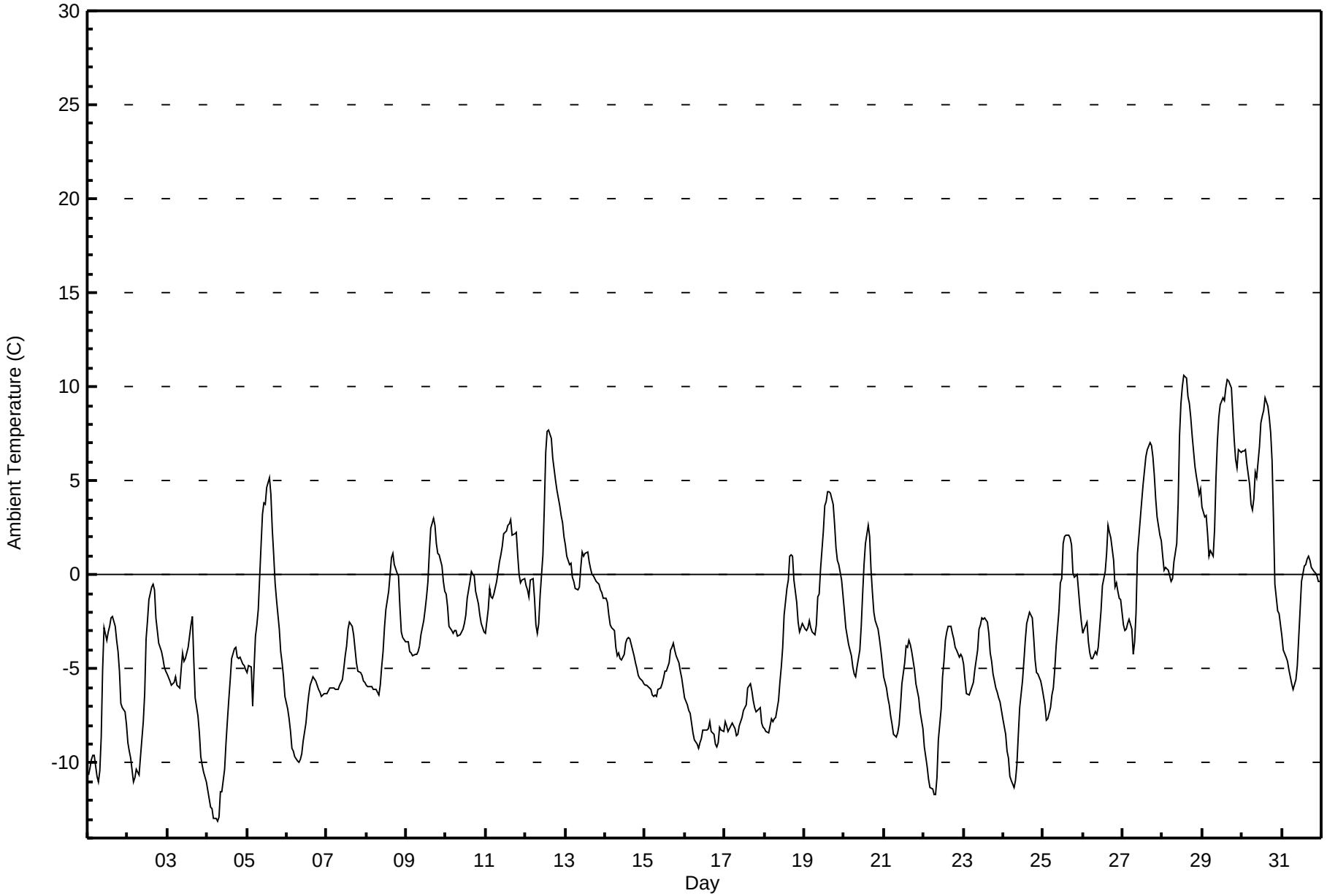
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	-10.6	-10.3	-9.9	-9.6	-9.6	-10.7	-11.0	-10.4	-8.7	-5.1	-2.8	-3.5	-3.1	-2.7	-2.3	-2.2	-2.7	-3.5	-4.1	-5.1	-6.9	-7.1	-7.3	-8.0	-6.5	-2.2
2-Mar	-8.9	-9.3	-9.8	-11.0	-10.8	-10.3	-10.5	-10.7	-9.7	-7.8	-6.3	-3.4	-2.4	-1.3	-0.7	-0.5	-0.8	-2.3	-3.0	-3.6	-4.1	-4.4	-4.9	-5.1	-5.9	-0.5
3-Mar	-5.3	-5.6	-5.9	-5.8	-5.7	-5.4	-5.9	-6.0	-5.0	-4.2	-4.6	-4.4	-3.8	-3.3	-2.6	-2.2	-4.5	-6.6	-7.5	-8.4	-9.7	-10.1	-10.5	-11.0	-6.0	-2.2
4-Mar	-11.5	-11.9	-12.4	-12.5	-13.0	-13.0	-13.1	-12.8	-11.6	-11.6	-10.4	-8.9	-7.7	-6.6	-5.5	-4.5	-3.9	-3.9	-4.4	-4.5	-4.4	-4.7	-4.9	-5.1	-8.4	-3.9
5-Mar	-5.2	-4.8	-4.9	-7.0	-4.9	-3.3	-2.6	-1.9	1.6	3.2	3.8	3.7	4.7	5.1	4.3	2.4	1.1	-0.4	-1.3	-2.9	-4.1	-4.6	-5.4	-6.5	-1.2	5.1
6-Mar	-7.1	-7.7	-8.3	-9.2	-9.4	-9.7	-9.9	-10.0	-9.8	-9.5	-8.8	-7.9	-7.0	-6.4	-5.9	-5.6	-5.4	-5.7	-5.9	-6.1	-6.3	-6.5	-6.3	-6.4	-7.5	-5.4
7-Mar	-6.4	-6.2	-6.0	-6.0	-6.0	-6.1	-6.1	-6.1	-5.9	-5.5	-4.9	-4.3	-3.8	-2.9	-2.5	-2.7	-3.2	-3.9	-4.7	-5.1	-5.2	-5.4	-5.6	-5.8	-5.0	-2.5
8-Mar	-5.9	-6.0	-6.0	-6.0	-6.1	-6.1	-6.1	-6.4	-5.9	-4.9	-4.1	-2.8	-1.8	-0.9	0.0	0.9	1.2	0.5	0.1	-0.1	-1.7	-3.0	-3.3	-3.6	-3.2	1.2
9-Mar	-3.6	-3.5	-4.1	-4.2	-4.3	-4.3	-4.2	-4.1	-3.8	-3.2	-2.4	-1.9	-1.2	-0.3	1.2	2.5	3.0	2.6	1.7	1.1	1.1	0.4	-0.3	-0.9	-1.4	3.0
10-Mar	-1.1	-1.7	-2.7	-2.9	-3.1	-2.9	-3.0	-3.3	-3.2	-3.0	-2.9	-2.6	-2.2	-1.3	-0.3	0.1	0.0	-0.1	-0.9	-1.6	-2.1	-2.6	-2.8	-3.1	-2.0	0.1
11-Mar	-3.1	-1.8	-0.7	-1.2	-1.3	-1.0	-0.4	0.2	0.7	1.1	1.5	2.2	2.3	2.7	2.7	2.9	2.1	2.2	2.3	1.1	0.0	-0.4	-0.3	-0.2	0.6	2.9
12-Mar	-0.5	-0.8	-1.2	-0.3	-0.2	-1.3	-2.6	-3.1	-2.6	-1.1	1.1	3.6	6.5	7.6	7.7	7.2	6.2	5.6	5.0	4.5	3.7	3.1	2.8	2.1	2.2	7.7
13-Mar	1.6	1.0	0.6	0.6	-0.1	-0.4	-0.7	-0.8	-0.6	0.4	1.2	1.0	1.1	1.2	0.7	0.3	0.0	0.0	-0.4	-0.5	-0.5	-0.8	-1.0	-1.2	0.1	1.6
14-Mar	-1.3	-1.5	-2.1	-2.7	-2.8	-2.9	-3.9	-4.3	-4.2	-4.5	-4.6	-4.2	-3.7	-3.4	-3.4	-3.4	-4.0	-4.3	-4.7	-5.0	-5.4	-5.5	-5.6	-5.8	-3.9	-1.3
15-Mar	-5.8	-5.8	-5.9	-6.1	-6.4	-6.4	-6.4	-6.5	-6.1	-6.0	-5.8	-5.5	-5.2	-5.1	-4.7	-4.0	-3.8	-3.6	-4.0	-4.3	-4.6	-5.1	-5.5	-6.1	-5.4	-3.6
16-Mar	-6.5	-6.9	-7.2	-7.4	-7.9	-8.4	-8.8	-9.0	-9.2	-8.9	-8.7	-8.3	-8.3	-8.3	-8.2	-7.8	-8.3	-8.5	-9.0	-9.1	-8.9	-8.1	-8.2	-8.4	-8.3	-6.5
17-Mar	-7.8	-8.0	-8.3	-8.2	-7.9	-8.0	-8.2	-8.6	-8.5	-8.0	-7.6	-7.2	-7.1	-6.9	-6.1	-5.8	-6.2	-6.7	-7.1	-7.3	-7.2	-7.0	-7.8	-8.1	-7.5	-5.8
18-Mar	-8.2	-8.3	-8.4	-8.0	-7.6	-7.8	-7.7	-7.6	-6.7	-5.7	-4.9	-3.8	-2.2	-0.7	-0.3	1.0	1.1	1.0	-0.3	-1.5	-2.5	-3.0	-2.8	-2.6	-4.1	1.1
19-Mar	-2.9	-2.9	-2.8	-2.4	-2.8	-3.0	-3.2	-2.6	-1.1	-1.0	0.3	2.4	3.7	3.9	4.4	4.4	4.3	3.7	2.7	1.4	0.8	0.5	-0.3	-1.1	0.3	4.4
20-Mar	-1.9	-2.8	-3.3	-3.7	-4.3	-4.9	-5.2	-5.4	-4.9	-4.0	-2.7	-1.0	0.5	1.6	2.6	2.1	0.2	-0.9	-2.0	-2.4	-2.9	-3.4	-4.0	-4.7	-2.4	2.6
21-Mar	-5.4	-6.0	-6.5	-6.9	-7.5	-8.0	-8.5	-8.6	-8.4	-7.9	-7.0	-5.8	-4.7	-3.8	-3.9	-3.5	-3.7	-4.1	-5.1	-5.8	-6.1	-6.6	-7.3	-8.2	-6.2	-3.5
22-Mar	-9.1	-9.6	-10.2	-10.9	-11.3	-11.4	-11.7	-11.7	-10.8	-8.8	-7.1	-5.4	-4.6	-3.5	-3.1	-2.7	-2.7	-3.1	-3.4	-3.8	-4.0	-4.3	-4.2	-4.4	-6.7	-2.7
23-Mar	-4.8	-5.5	-6.3	-6.4	-6.2	-5.9	-5.7	-5.0	-4.0	-2.9	-2.6	-2.3	-2.3	-2.3	-2.6	-3.1	-4.2	-4.6	-5.2	-6.0	-6.3	-6.5	-6.8	-7.2	-4.8	-2.3
24-Mar	-7.7	-8.5	-9.4	-9.8	-10.7	-11.0	-11.3	-10.9	-10.1	-8.5	-7.0	-5.6	-4.6	-3.5	-2.6	-2.3	-2.0	-2.3	-3.4	-4.5	-5.2	-5.3	-5.6	-6.0	-6.6	-2.0
25-Mar	-6.4	-6.9	-7.8	-7.7	-7.1	-6.4	-6.0	-5.0	-3.8	-1.9	-0.4	-0.2	1.6	2.1	2.1	2.1	2.0	1.6	0.1	-0.1	0.0	-0.8	-1.7	-2.5	-2.2	2.1
26-Mar	-3.1	-2.9	-2.5	-3.5	-4.2	-4.5	-4.5	-4.1	-4.3	-3.9	-2.9	-1.9	-0.5	0.2	1.2	2.7	2.3	2.0	0.8	-0.6	-0.4	-0.9	-1.2	-1.3	-1.6	2.7
27-Mar	-2.6	-3.0	-2.9	-2.6	-2.4	-2.9	-4.2	-3.5	-2.0	1.1	2.1	3.9	4.8	5.6	6.3	6.7	7.0	6.9	6.3	5.3	4.1	3.1	2.1	1.8	1.7	7.0
28-Mar	1.0	0.3	0.4	0.2	-0.1	-0.4	-0.2	0.7	1.7	3.7	7.4	9.1	10.0	10.6	10.5	9.5	9.1	8.4	7.4	5.7	5.2	4.8	4.3	4.6	4.7	10.6
29-Mar	3.6	3.1	3.2	2.2	1.0	1.3	1.0	2.4	5.1	7.1	8.4	9.0	9.4	9.3	10.0	10.4	10.3	9.9	8.5	7.2	6.2	5.7	6.6	6.5	6.1	10.4
30-Mar	6.6	6.6	6.6	5.9	4.8	3.7	3.4	4.0	5.5	5.2	6.8	8.1	8.5	8.8	9.4	9.0	8.4	7.6	6.1	3.0	-0.5	-1.9	-2.1	-2.7	5.0	9.4
31-Mar	-3.3	-4.0	-4.4	-4.6	-5.1	-5.4	-5.8	-6.1	-5.6	-4.8	-3.3	-1.8	-0.4	0.5	0.6	0.9	1.0	0.8	0.4	0.2	0.1	0.0	-0.3	-0.4	-2.1	1.0
	-4.3	-4.6	-4.8	-5.1	-5.3	-5.4	-5.6	-5.4	-4.6	-3.6	-2.6	-1.6	-0.8	-0.1	0.3	0.5	0.1	-0.4	-1.1	-1.9	-2.5	-2.9	-3.2	-3.6	Diurnal Average	
	6.6	6.6	6.6	5.9	4.8	3.7	3.4	4.0	5.5	7.1	8.4	9.1	10.0	10.6	10.5	10.4	10.3	9.9	8.5	7.2	6.2	5.7	6.6	6.5	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

ConocoPhillips - Surmont - March 2016



Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	560	75.27	75.27
0 - 10	179	24.06	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) - %

ConocoPhillips - Surmont - March 2016

Maximum Value: 98 % on Mar 13 18:00

Maximum Daily Average: 92.7 % on Mar 10

Minimum Value: 33 % on Mar 29 17:00

Minimum Daily Average: 45.3 % on Mar 29

Maximum Diurnal Average: 83.4 % at hour 7

Minimum Diurnal Average: 65.5 % at hour 16

Monthly Average: 75.2 %

Percentiles: $P_1 = 38$ $P_{10} = 48$ $Q_1 = 61$ Median = 80 $Q_3 = 91$ $P_{90} = 94$ $P_{99} = 97$

Hours in Service:	744
Hours of Data:	744
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

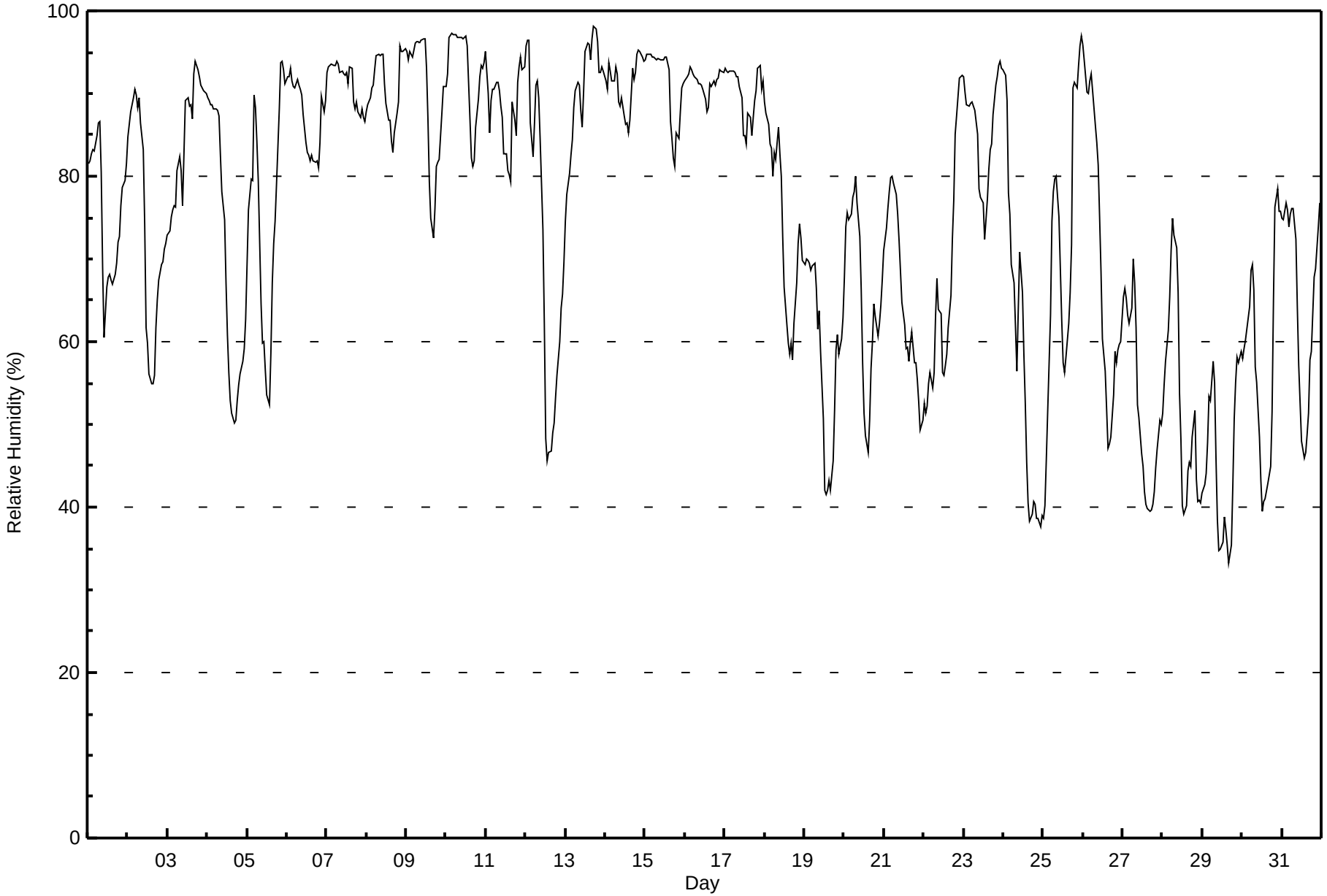
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	82	82	83	83	83	85	86	87	81	69	61	67	68	68	67	67	68	69	72	73	76	79	80	81	75.7	87
2-Mar	85	86	88	89	91	90	88	90	86	83	74	62	60	56	55	55	56	62	65	67	69	70	71	72	73.7	91
3-Mar	73	73	75	76	77	76	81	82	81	76	83	89	90	88	89	87	92	94	93	92	91	91	90	90	84.5	94
4-Mar	89	89	89	89	88	88	88	87	83	78	75	67	61	56	53	51	50	50	53	55	56	58	59	63	69.8	89
5-Mar	69	76	80	79	90	88	84	79	65	60	60	57	54	52	59	67	72	75	79	88	94	94	93	91	75.2	94
6-Mar	92	92	93	92	91	91	92	91	91	90	87	84	83	82	82	82	82	82	82	81	84	90	88	89	87.1	93
7-Mar	93	93	93	93	93	93	94	94	93	93	92	92	93	91	93	93	89	88	89	88	87	88	87	87	91.2	94
8-Mar	88	89	90	91	91	93	95	95	95	95	95	91	89	87	87	84	83	85	88	89	96	95	95	95	90.7	96
9-Mar	95	94	95	95	94	96	96	96	96	96	97	97	93	87	79	75	72	76	81	82	82	88	91	91	89.4	97
10-Mar	91	92	97	97	97	97	97	97	97	97	97	97	97	96	87	82	81	82	86	89	92	93	93	94	92.7	97
11-Mar	95	90	85	89	90	90	91	91	90	88	87	83	83	81	80	79	89	87	85	91	93	94	93	93	88.3	95
12-Mar	96	96	96	86	82	86	91	91	90	85	74	62	48	46	47	47	49	50	53	56	60	64	66	70	70.5	96
13-Mar	75	78	80	83	84	88	90	91	91	88	86	90	95	96	96	94	97	98	98	96	93	93	93	93	90.3	98
14-Mar	91	91	94	93	92	92	93	92	89	89	90	87	86	86	85	87	93	92	93	95	95	95	94	94	91.1	95
15-Mar	94	95	95	95	94	94	94	94	94	94	94	94	94	94	93	87	85	82	81	85	85	88	91	91	91.1	95
16-Mar	92	92	92	93	93	92	92	92	91	91	91	91	89	88	88	91	91	91	91	92	92	93	93	92	91.4	93
17-Mar	93	93	92	93	93	93	93	92	92	91	89	85	85	84	88	87	85	87	89	90	93	93	91	91	90.1	93
18-Mar	89	88	86	84	83	80	83	82	86	83	80	73	67	62	60	58	60	58	62	67	72	74	72	70	74.1	89
19-Mar	69	70	70	70	69	69	69	66	62	64	59	51	42	41	42	43	42	46	52	59	61	58	60	63	58.2	70
20-Mar	68	74	76	75	75	77	78	80	77	73	66	58	51	49	47	51	57	60	65	63	61	62	64	67	65.5	80
21-Mar	71	74	76	78	80	80	79	78	75	72	69	65	62	59	59	58	60	61	58	57	55	53	49	51	65.8	80
22-Mar	53	51	52	55	56	54	56	63	68	64	63	56	56	57	58	62	66	72	77	85	87	92	92	92	66.2	92
23-Mar	92	90	89	88	89	89	88	88	85	78	77	77	77	72	77	81	83	84	87	91	92	93	94	93	85.7	94
24-Mar	93	92	89	78	75	69	67	62	56	64	71	66	58	53	45	41	38	39	41	40	39	39	38	39	58.0	93
25-Mar	39	40	46	52	63	75	78	80	80	75	69	63	57	56	58	62	66	72	91	91	91	93	96	97	70.4	97
26-Mar	96	94	90	90	92	92	90	86	84	81	75	68	60	56	52	47	48	48	54	59	58	59	60	60	70.8	96
27-Mar	65	66	65	63	62	64	70	67	62	52	51	46	45	42	40	40	39	40	40	42	45	47	51	50	52.3	70
28-Mar	51	55	58	61	65	71	75	73	71	66	54	48	40	39	40	44	45	45	48	52	43	41	41	40	52.8	75
29-Mar	42	43	44	48	53	53	58	55	46	38	35	35	36	39	37	35	33	35	43	51	55	58	57	59	45.3	59
30-Mar	58	59	60	61	64	69	69	66	57	55	48	43	40	41	41	43	44	45	52	65	76	79	76	76	57.8	79
31-Mar	75	75	77	76	74	75	76	76	72	64	57	53	48	46	47	49	51	58	59	68	69	71	74	77	65.2	77
	79.1	79.7	80.5	80.5	81.5	82.3	83.4	82.7	80.1	77.2	74.3	70.8	67.9	66.2	65.5	65.5	66.7	68.2	71.1	74.2	75.5	76.9	77.1	77.8	Diurnal Average	
	96	96	97	97	97	97	97	97	97	97	97	97	97	96	96	94	97	98	98	96	96	95	96	97	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

ConocoPhillips - Surmont - March 2016



Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	21	2.82	2.82
40 - 60	158	21.24	24.06
60 - 80	190	25.54	49.60
80 - 100	375	50.40	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

ConocoPhillips - Surmont - March 2016

Maximum Speed: 28 km/h on Mar 30 21:00

Maximum Daily Speed Average: 19.9 km/h on Mar 16

Minimum Speed Value: 1 km/h on Mar 11 01:00

Minimum Daily Speed Average: 0.8 km/h on Mar 3

Maximum Diurnal Speed Average: 3.4 km/h at hour 6

Minimum Diurnal Speed Average: 0.6 km/h at hour 22

Monthly Average Velocity: 1.6 km/h 312.0 deg

Percentiles: $P_1 = 2$ $P_{10} = 6$ $Q_1 = 9$ Median = 12 $Q_3 = 15$ $P_{90} = 19$ $P_{99} = 24$

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	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Mar	SW9	SW10	WSW13	WSW17	WSW15	WSW10	SW9	WSW10	WSW9	W6	ENE2	ESE7	E7	ESE7	ESE6	E6	ENE8	ENE8	E8	E10	ESE8	ESE7	ESE7	ESE6	S2.4	WSW17
2-Mar	ESE6	SE8	SE6	NNW2	NE2	S5	SSE4	WSW4	SW3	E4	E5	ENE1	ENE6	ENE6	NE5	ENE6	E4	E5	ESE7	SE10	SE11	SE13	SE13	SE8	ESE4.7	SE13
3-Mar	SE9	S9	SSE9	SSE10	SSW14	S15	SSE12	SSE10	S11	SSE12	SE13	SE14	SE11	ESE7	E2	E3	N13	N16	NNW18	NNW21	NNW22	NNW19	NNW17	NNW16	E0.8	NNW22
4-Mar	NNW16	NNW12	WNW9	NW6	N8	NW7	WNW3	SW3	SE6	SE7	SSE8	SE10	SE13	SE13	SE15	SE14	SE17	SE17	SE14	SSE23	S17	S18	S20	S22	SSE7.1	SSE23
5-Mar	S18	SSE12	S8	SE5	WSW7	SW14	WSW19	W14	W8	WNW8	NW10	NE8	NE8	NNE10	N16	NNW18	N17	NNW17	N15	NNE13	N15	NNE13	N14	NNE14	NNW5.4	WSW19
6-Mar	N12	N12	NNW16	N15	N11	NNE10	N11	NNE10	NNE10	NNE8	ENE7	ENE7	ENE8	NE10	ENE12	ENE12	ENE13	E12	ENE10	ENE9	E10	E12	ESE12	ESE11	NE8.6	NNW16
7-Mar	ESE12	ESE11	ESE11	ESE11	ESE11	SE10	SE11	SE11	SE11	SE9	S7	S8	SE6	ESE3	N7	NW9	WNW14	WNW15	WNW13	WNW13	WNW10	WNW11	W9	W12	S1.4	WNW15
8-Mar	W11	W10	W7	WNW5	WSW3	SW4	SSW3	SE8	SSE9	S11	S12	SSW12	SSW13	SSW12	SSW12	SSW11	WSW12	WSW11	WSW10	WSW10	N12	N9	N8	N8	SW4.8	SSW13
9-Mar	N3	N6	NNE6	NNE5	E4	SE5	SE6	SSE7	SSE8	SSW9	S9	S9	S12	S11	S10	S10	S10	S11	SSW9	SSW12	SSW11	SSW10	SW13	SW14	S6.4	SW14
10-Mar	SW14	SSW11	SSW11	S13	S14	S15	SSE15	SSE17	SE17	SE15	SE17	SE15	SE15	SE15	SE16	SE16	SE16	SE16	SE14	SE11	ESE5	SE7	SSE4	SW5	SSE11.5	SSE17
11-Mar	SSE1	W11	W18	WNW15	WNW14	WNW15	W15	WNW17	WNW14	WNW16	WNW17	WNW21	WNW19	WNW20	WNW19	WNW18	W14	WSW11	NW9	NW2	SW7	WSW8	SW4	SSE5	W12.1	WNW21
12-Mar	SE11	SE9	SE12	S12	SE17	SE13	SE14	SE11	SE12	SE10	ESE10	SE12	SE15	ESE17	SE21	SE22	SE17	SE17	SE17	SE17	SE10	ESE8	ESE5	E5	SE12.8	SE22
13-Mar	E5	E4	NE3	NNW6	NNW7	NNW14	NNW15	NNW13	NNW13	N15	NNW15	NNW18	NNW15	NW17	NNW17	NW17	NW16	NW12	NW12	NW13	NW15	NNW13	NNW20	NNW20	NNW12.1	NNW20
14-Mar	NNW19	NNW17	NNW21	NNW22	NNW18	NNW16	NNW18	NNW17	NNW16	NNW18	N16	N14	N15	N14	N12	N12	NNW15	NNW15	N13	N12	NNW11	N7	ENE7	ENE7	NNW14.1	NNW22
15-Mar	NE7	NE7	NNE7	NE7	NE7	NNE7	NNE8	N8	N10	N9	N9	N11	N14	N15	NNW16	NNW18	NNW18	NW20	NW18	NNW18	NNW19	NNW21	NNW21	NNW24	N12.5	NNW24
16-Mar	NNW24	NNW25	NNW25	NNW24	NNW24	NNW23	NNW21	NNW20	NNW22	NNW21	NNW18	NNW22	NNW20	NNW19	NNW18	NNW19	NNW19	NNW19	NNW21	NNW22	NNW17	NNW15	WNW13	WNW16	NNW19.9	NNW25
17-Mar	WNW14	NNW13	NNW11	NNW12	NNW14	NNW15	NNW16	NNW16	NNW19	NNW21	NNW19	NNW20	NNW17	N13	NNW13	NW16	NNW14	N13	N12	N11	N11	NNW11	N10	N8	NNW13.6	NNW21
18-Mar	N3	SW2	W8	W9	WNW9	W9	WNW9	W9	W9	W9	WNW8	WSW6	WSW5	WSW6	WSW9	W11	W11	WSW7	SSW7	SSW8	SSW10	SW11	SW14	WSW19	WSW7.7	WSW19
19-Mar	WSW20	WSW21	WSW20	WSW19	WSW17	WSW20	SW16	SW11	S6	E8	ESE8	ESE11	SE14	SE12	SE13	SE15	SE17	SE15	SE10	SE11	SE11	SE12	SE11	SE9	S8.0	WSW21
20-Mar	ESE10	ESE9	ESE11	ESE11	ESE9	ESE10	SE10	ESE11	SE13	ESE12	ESE13	ESE14	ESE14	ESE13	ESE12	ENE14	ENE13	ENE12	ENE10	E11	E12	E12	E12	E13	ESE10.9	ESE14
21-Mar	E11	E11	E10	E11	E11	E11	E14	E14	E14	E13	E14	E14	E15	E15	E15	E16	E17	E16	ENE12	E12	E12	ESE13	ESE12	ESE10	E12.9	E17
22-Mar	ESE8	ESE10	ESE10	ESE10	ESE9	SE10	SE12	SE12	SSE9	SE10	SE14	SE12	SSE11	SSE11	SE11	SE12	SSE10	SE11	SE11	SE11	S10	SSE11	S12	S12	SE10.2	SE14
23-Mar	S11	SSW8	SSW9	SW9	SW10	WSW12	WSW15	W13	WNW15	WNW14	WNW14	NW15	NW15	WNW13	NNW10	NNE11	N14	N12	N12	N15	N15	NNW15	NNW12	NNE11	NW7.9	N15
24-Mar	NNE9	NNW10	NNW11	NNW11	NNW11	NNW11	NNW10	NNW8	N5	ENE6	ENE8	ENE8	ENE9	ENE7	NNE7	ENE6	ENE5	E5	ESE6	ESE8	SE8	SE13	SE15	S12	NE3.5	SE15
25-Mar	SSW15	SSW13	SSW11	SSW10	SSW11	SW12	WSW12	WSW12	SW11	SW8	SSW8	SSE11	S13	SSW13	SSW14	SW15	WSW15	WSW13	SW11	SW7	W4	N9	NNW3	WSW7	SW9.1	WSW15
26-Mar	WSW9	W10	WNW11	WNW10	NNW12	N14	NNW17	NNW13	N15	N15	N13	N12	NNE7	ENE7	NE5	ENE2	ENE4	NE5	ESE6	ESE6	SE13	S8	SSW12	S15	NNW3.5	NNW17
27-Mar	SSW12	SW13	SW12	SSW11	SSW11	S11	S10	S10	S11	S9	SE11	SSE15	SSE16	SSE16	SSE15	SSE15	SSE14	SE14	SE14	SE18	SSE15	S16	S13	SSW12	S11.9	SE18
28-Mar	SSW10	SSW11	SSW13	S14	S13	SSW14	SW14	SW11	S5	SSW7	SW7	SW14	WSW20	WSW20	W25	W21	WNW22	WNW19	W12	WSW13	W14	W13	W15	W15	WSW11.9	W25
29-Mar	W15	W14	W17	W15	WSW14	WSW15	WSW15	WSW15	W16	WNW16	WNW19	WNW21	W21	WNW23	W17	WNW19	NW18	WNW16	W14	W14	WSW13	WSW15	W16	W14	W15.7	WNW23
30-Mar	W16	WNW14	WNW13	WNW12	WNW12	WNW12	WNW13	WNW14	NNW15	NNW16	N17	NNW21	NNW22	NNW24	NNW25	NNW28	NNW24	NNW27	NNW27	N24	NNW28	N23	N23	N23	NNW17.9	NNW28
31-Mar	NNW25	NNW25	NNW21	NNW22	NNW23	NNW19	NNW21	NNW16	NNW13	N11	N9	N10	N10	N11	N11	W12	W11	NNW7	WNW2	SSW8	S9	SSW10	SSW11	WSW17	NNW9.6	NNW25
	W2.1	W2.5	WNW3.4	WNW3.3	WNW2.9	W3.4	W3.1	W2.4	NW1.9	NNW2.0	NNE1.5	NNE1.4	NE0.9	NNE1.0	N1.8	NNW2.2	NNW3.1	N2.8	N2.3	NE1.2	N1.3	N0.6	W1.0	W1.9	Diurnal Average	
	NNW25	NNW25	NNW25	NNW24	NNW24	NNW23	NNW21	NNW20	NNW22	NNW21	NNW19	NNW22	NNW22	NNW24	W25	NNW28	NNW24	NNW27	NNW27	N24	NNW28	N23	N23	NNW24	Diurnal Maximum	

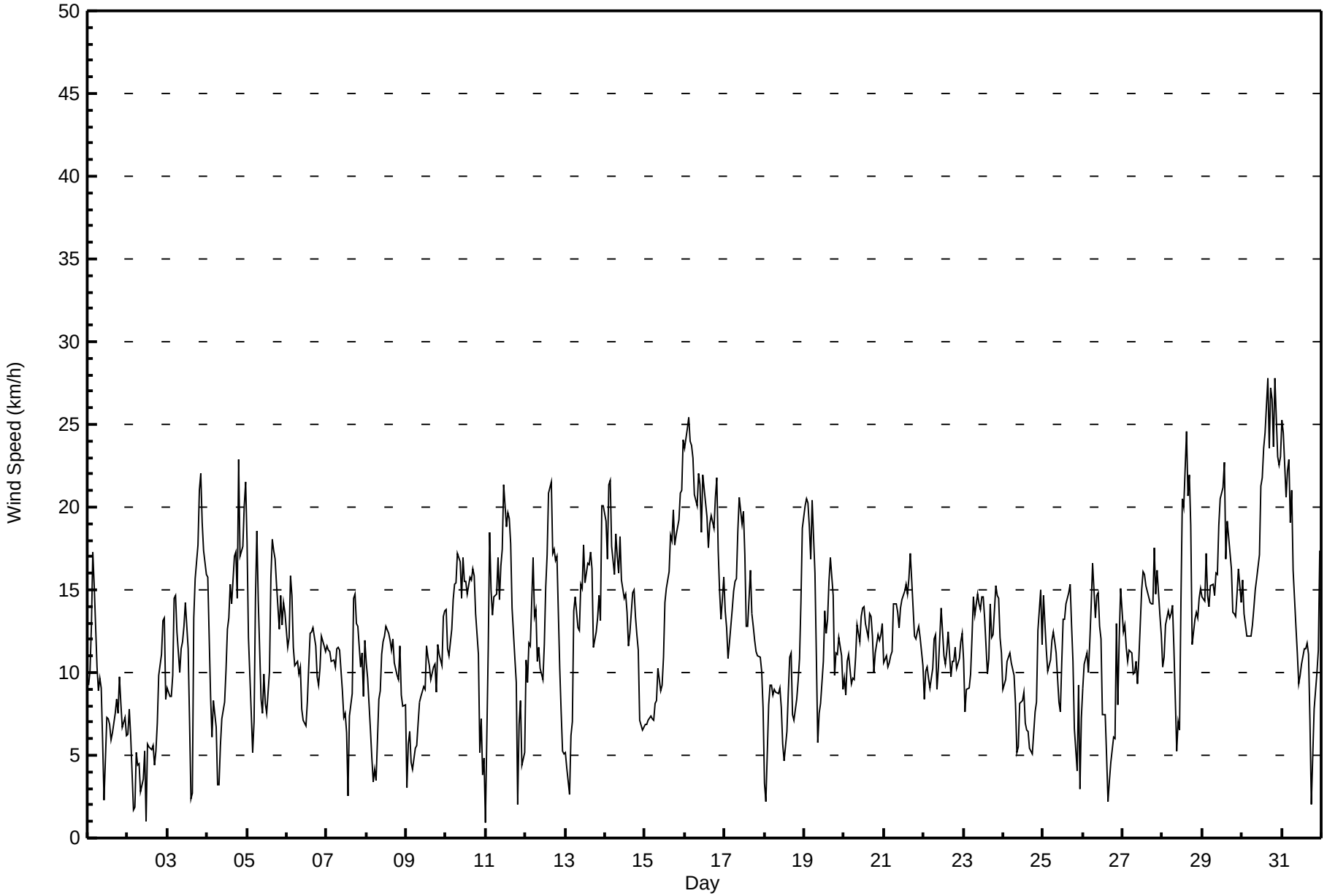
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

ConocoPhillips - Surmont - March 2016



Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	53	7.12	7.12
6 - 11	288	38.71	45.83
12 - 19	339	45.56	91.40
20 - 28	64	8.60	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

ConocoPhillips - Surmont - March 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	3	1	5	5	11	3	2	4	2	1	6	3	1	3	1	2	53
6 - 11	25	14	7	20	13	36	39	14	22	24	14	15	16	10	5	14	288
12 - 19	36	3	0	7	20	11	52	13	18	15	11	23	23	33	12	62	339
20 - 28	4	0	0	0	0	0	2	1	2	0	0	6	3	5	1	40	64
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	68	18	12	32	44	50	95	32	44	40	31	47	43	51	19	118	744

Total Number of Valid Hours: 744

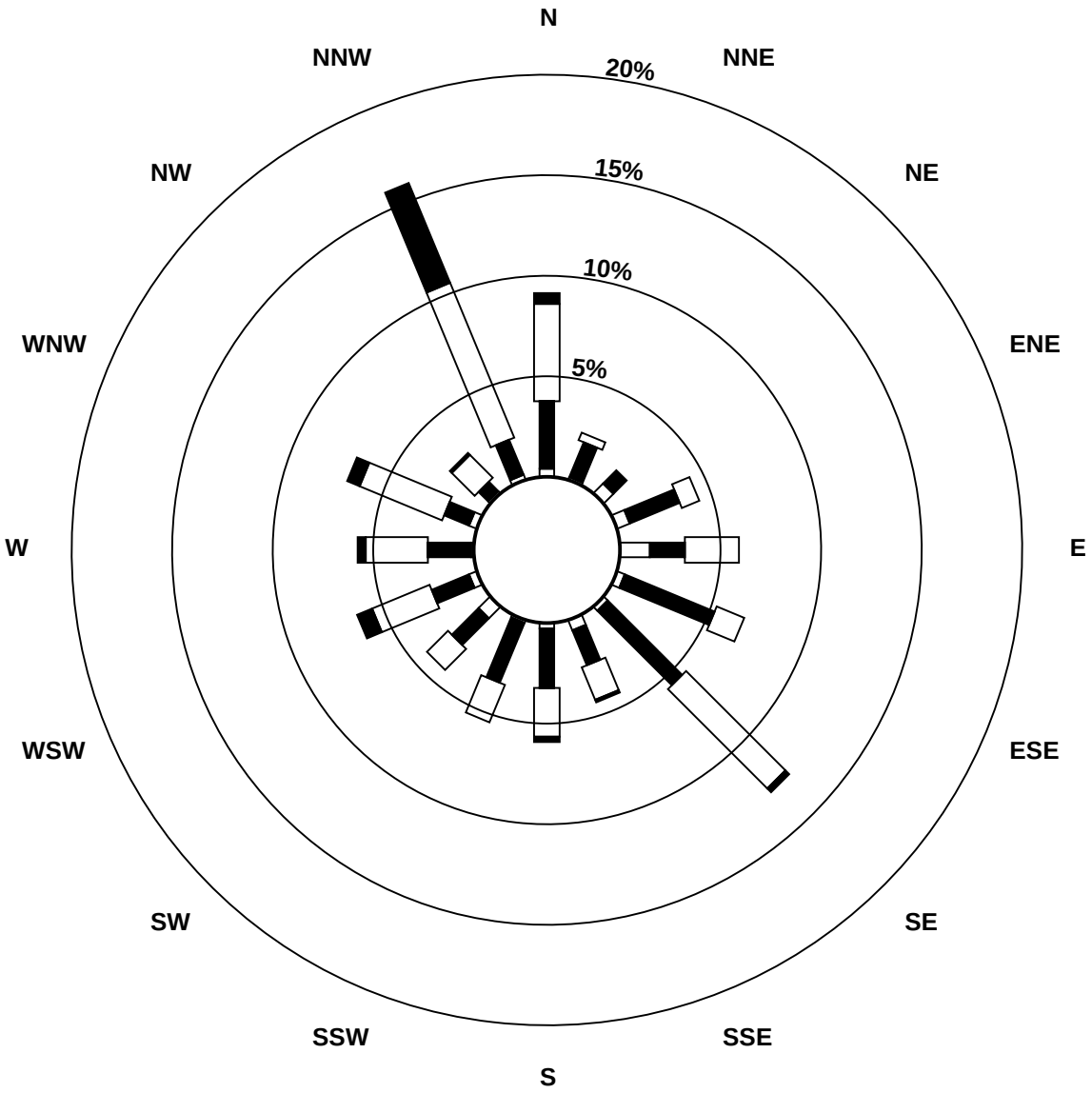
Total Number of Hours: 744

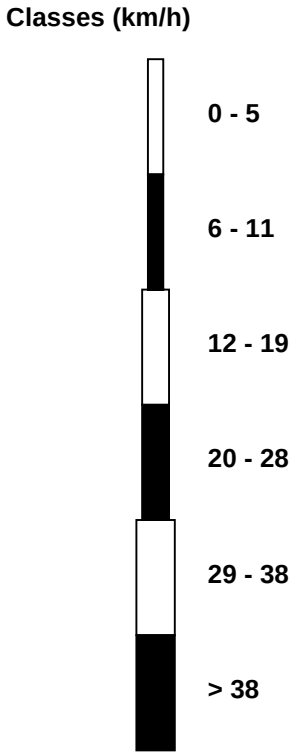
Wood Buffalo Environmental Association

Wind Rose Mar 2016

Wind Speed (WS) - km/h

ConocoPhillips - Surmont (AMS502)





Total Number of Valid Hours: 744

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

ConocoPhillips - Surmont - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 6 km/h on Mar 13 22:00

Minimum Value: 1 km/h on Mar 9 05:00

Percentiles: $P_1 = 1$ $P_{10} = 1$ $Q_1 = 2$ Median = 3 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 5$

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	3	3	3	3	3	2	1	1	1	2	1	2	1	1	1	2	2	2	1	2	2	1	1	1	3
2-Mar	1	1	3	1	1	2	2	2	2	1	1	1	2	2	2	2	2	1	1	2	2	2	2	3	3
3-Mar	2	2	2	3	3	3	2	2	4	3	3	2	2	2	1	1	4	3	3	4	4	4	3	3	4
4-Mar	3	3	2	2	1	2	2	2	2	2	2	3	3	4	3	3	3	4	2	5	4	4	4	4	5
5-Mar	4	3	3	1	2	4	3	2	5	3	3	2	2	2	3	3	4	3	3	3	3	2	3	3	5
6-Mar	2	2	4	3	2	2	2	2	2	2	2	2	2	2	3	3	3	3	2	2	2	3	2	2	4
7-Mar	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	2	3	2	3	2	2	3
8-Mar	2	2	1	2	2	1	2	1	2	3	3	3	3	4	3	3	3	3	2	2	2	2	1	2	4
9-Mar	1	2	2	1	1	2	2	1	2	2	2	2	3	3	2	2	3	2	2	2	2	2	3	2	3
10-Mar	3	2	3	4	3	3	6	4	4	3	4	3	3	3	3	3	3	3	3	4	2	5	1	2	6
11-Mar	1	5	3	2	2	2	3	3	3	4	3	4	4	4	4	4	4	2	2	2	1	1	2	2	5
12-Mar	2	2	3	3	3	2	3	2	2	2	2	4	4	4	5	5	4	4	3	3	2	2	1	1	5
13-Mar	1	1	1	2	2	2	2	2	2	3	3	4	3	3	4	4	4	4	3	3	5	6	4	4	6
14-Mar	4	4	5	4	4	3	4	3	3	3	3	3	3	3	2	3	2	3	3	2	2	1	1	1	5
15-Mar	1	1	1	1	1	1	1	1	2	1	2	2	3	3	4	4	4	4	3	3	4	4	4	4	4
16-Mar	4	4	4	4	4	4	4	3	4	4	4	4	4	4	3	4	4	4	4	4	3	3	2	2	4
17-Mar	2	2	2	2	3	3	3	3	4	4	4	4	3	2	4	4	3	3	2	2	2	2	2	2	4
18-Mar	2	2	1	1	2	1	2	2	2	2	3	2	3	2	3	3	3	3	1	1	1	2	3	3	3
19-Mar	3	3	3	3	3	4	4	3	3	1	2	2	3	3	3	3	3	4	2	2	2	2	2	1	4
20-Mar	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3
21-Mar	3	3	2	2	3	3	3	3	3	3	3	3	3	3	3	4	4	3	2	2	3	3	2	2	4
22-Mar	2	2	2	2	2	2	2	2	3	3	2	2	4	3	3	3	3	2	2	2	3	2	3	2	4
23-Mar	3	2	2	2	2	3	2	2	2	2	3	3	3	3	3	2	2	2	2	2	2	2	2	3	3
24-Mar	2	1	1	1	2	2	2	1	2	2	2	2	3	3	3	2	2	1	1	1	1	2	2	3	3
25-Mar	3	3	2	1	2	2	2	2	2	2	2	3	3	3	3	4	4	3	3	2	3	4	2	2	4
26-Mar	2	1	2	1	3	3	4	3	3	3	3	3	3	3	2	2	1	2	1	1	3	4	3	3	4
27-Mar	2	2	2	2	2	2	2	2	2	2	3	4	4	4	4	4	4	3	2	4	4	3	3	3	4
28-Mar	2	2	3	3	2	3	3	6	2	2	4	4	5	4	5	4	5	3	2	2	1	1	2	2	6
29-Mar	2	1	3	2	2	2	2	2	2	3	4	4	6	5	5	4	4	3	2	1	1	2	2	3	6
30-Mar	2	3	2	2	2	2	2	2	3	3	4	4	5	5	6	6	5	6	5	5	6	5	5	5	6
31-Mar	5	6	4	5	5	4	4	3	3	3	4	3	3	3	2	3	2	2	1	3	2	2	3	3	6
	5	6	5	5	5	4	6	6	5	4	4	4	6	5	6	6	5	6	5	5	6	6	5	5	
	Diurnal Maximum																								

Direction of Maximum Speed: 348 deg on Mar 30 21:00
Direction of Maximum Daily Speed Average: 340.4 deg on Mar 16

Direction of Minimum Speed: 155 deg on Mar 11 01:00

Direction of Minimum Daily Speed Average: 0.8 deg on Mar 3

Monthly Average Direction: 300.3 deg

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Mar	232	231	240	246	250	245	235	250	245	260	64	113	97	112	107	82	70	68	80	93	104	112	119	109	183.2
2-Mar	118	125	132	347	55	169	155	253	220	92	86	61	70	78	50	74	98	88	116	130	137	138	136	145	119.9
3-Mar	145	172	159	162	192	185	154	162	180	167	139	139	133	120	92	85	352	351	346	340	340	342	343	345	92.1
4-Mar	345	328	293	315	358	314	284	217	130	143	156	139	139	141	143	141	140	144	142	148	169	169	183	180	156.5
5-Mar	183	162	170	134	238	235	246	263	277	298	305	40	37	15	351	347	350	344	350	14	10	13	8	21	335.7
6-Mar	8	6	347	3	358	13	7	21	22	24	60	63	66	49	61	64	74	86	68	69	83	100	109	105	46.0
7-Mar	102	107	114	116	122	125	129	131	131	140	172	177	137	123	1	322	286	294	295	290	290	287	279	278	176.1
8-Mar	280	275	277	301	246	234	202	132	162	180	186	199	192	195	192	210	250	237	239	253	356	7	3	3	227.8
9-Mar	1	9	14	25	91	146	144	150	156	192	174	176	182	187	186	184	186	189	192	197	194	208	218	222	185.5
10-Mar	220	205	203	184	186	185	154	148	146	139	142	138	134	133	126	129	125	133	127	125	110	136	154	220	150.8
11-Mar	155	274	280	288	289	282	275	282	293	288	286	285	286	282	284	284	281	257	307	325	233	240	215	152	279.8
12-Mar	142	139	143	170	142	136	134	133	138	129	118	127	127	118	125	128	126	134	135	138	132	116	110	97	131.9
13-Mar	99	96	37	339	348	341	341	341	345	349	348	344	330	325	336	321	318	313	308	310	323	329	327	331	333.2
14-Mar	330	331	342	343	339	338	346	346	341	345	349	352	351	350	354	351	348	348	351	353	348	4	63	70	347.4
15-Mar	56	40	25	36	38	17	13	9	351	0	3	359	349	351	347	342	341	326	325	334	342	343	343	342	350.6
16-Mar	343	342	343	344	343	342	344	344	343	343	343	342	342	345	346	337	345	345	344	343	344	334	299	296	340.4
17-Mar	301	343	335	329	327	334	332	340	337	342	345	341	344	356	339	324	345	357	356	358	352	345	3	9	341.2
18-Mar	7	228	260	279	288	274	287	272	281	278	290	252	252	258	258	262	268	255	203	205	211	221	236	242	256.3
19-Mar	242	244	243	240	240	243	236	219	191	99	111	117	134	144	135	131	146	143	126	125	127	132	131	126	177.9
20-Mar	119	122	121	117	115	121	126	121	128	120	113	122	117	116	109	76	63	61	61	82	94	92	91	93	103.9
21-Mar	87	88	86	87	87	92	97	96	91	80	87	93	89	84	86	80	88	88	73	86	101	109	110	115	90.4
22-Mar	102	108	112	117	115	132	139	141	153	144	142	134	150	161	138	146	166	133	140	140	177	151	175	180	142.3
23-Mar	184	204	213	217	236	248	256	266	286	298	293	305	306	302	338	13	360	355	352	349	350	347	347	13	308.4
24-Mar	13	343	339	336	338	334	330	334	9	68	63	63	73	60	32	66	66	82	107	122	134	145	146	189	45.2
25-Mar	197	196	208	205	209	223	239	240	236	232	212	159	191	199	204	234	241	246	236	215	281	1	330	248	220.7
26-Mar	244	269	298	292	331	349	344	344	353	351	359	7	21	62	39	75	66	56	115	118	143	171	193	191	344.8
27-Mar	203	214	216	210	194	179	178	169	188	183	137	153	152	152	148	148	152	139	137	144	166	189	191	192	169.6
28-Mar	193	193	194	190	185	203	221	224	178	206	225	235	255	249	271	260	286	284	260	257	267	264	267	279	243.8
29-Mar	266	264	272	262	252	250	247	258	274	287	284	293	274	289	281	293	305	291	273	261	256	256	271	274	273.9
30-Mar	276	283	285	296	294	294	293	300	335	348	353	343	345	336	328	334	342	339	338	353	348	355	357	359	332.8
31-Mar	345	346	342	340	341	342	337	341	342	359	1	6	358	360	355	276	274	346	285	196	188	196	208	237	331.6
	266.4	276.6	282.1	287.4	283.6	270.6	275.6	280.5	304.4	337.3	13.9	30.4	46.3	12.1	1.3	339.4	339.0	350.3	356.1	36.4	1.1	354.5	265.3	268.2	
	Diurnal Average																								

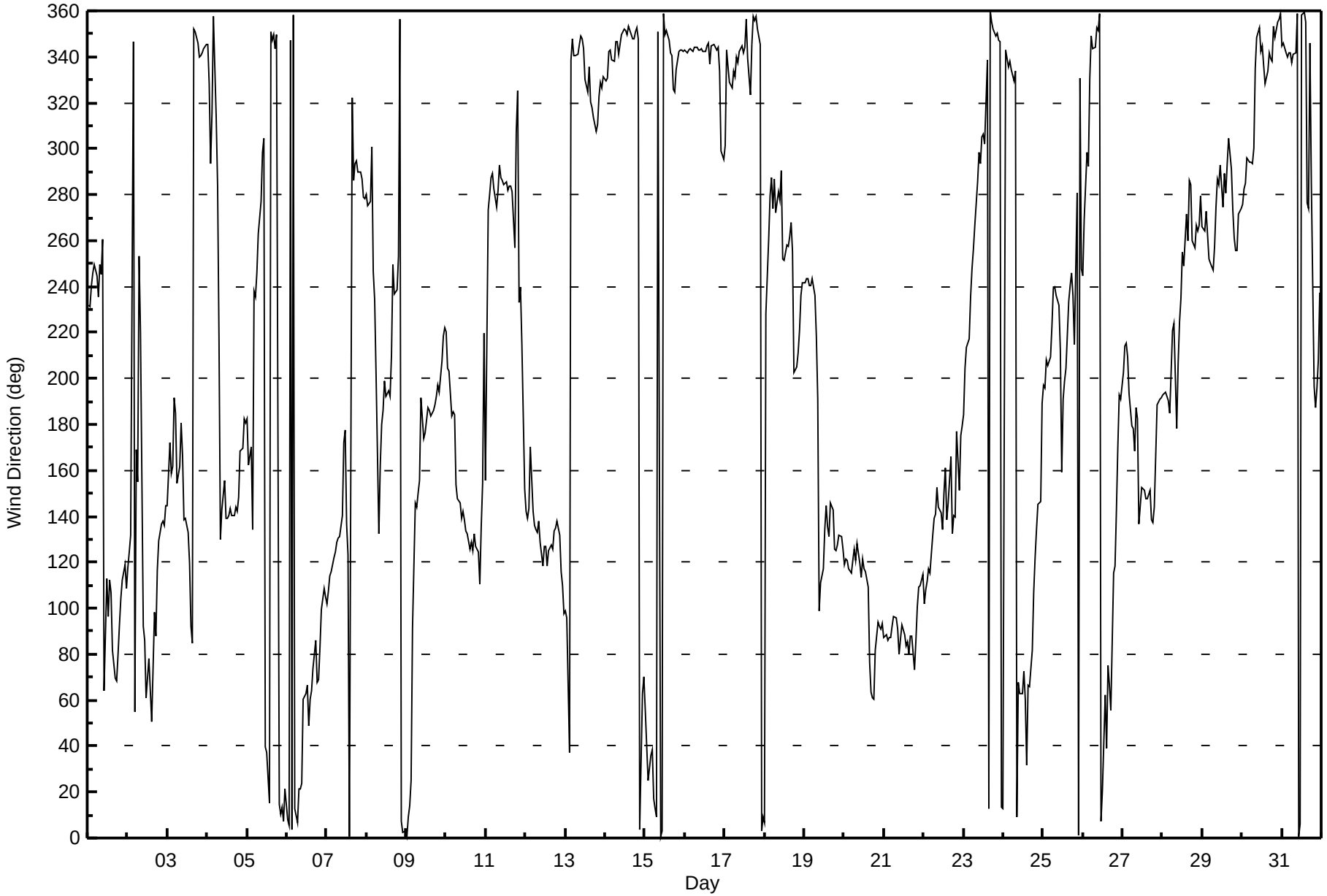
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

ConocoPhillips - Surmont - March 2016



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

ConocoPhillips - Surmont - March 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 89 deg on Mar 26 16:00

Minimum Value: 6 deg on Mar 1 08:00

Percentiles: $P_1 = 7$ $P_{10} = 10$ $Q_1 = 12$ Median = 14 $Q_3 = 18$ $P_{90} = 29$ $P_{99} = 71$

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
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Mar	19	18	15	9	11	11	11	6	8	18	70	20	22	23	25	24	19	13	14	13	10	16	13	16	70
2-Mar	17	8	43	72	63	31	67	72	67	45	26	83	31	32	36	34	29	16	11	12	10	9	8	12	83
3-Mar	11	17	19	23	13	13	24	20	22	26	13	11	12	15	57	39	21	14	11	12	12	11	11	10	57
4-Mar	10	21	17	30	16	29	55	54	21	19	19	26	15	17	13	14	14	10	10	10	18	17	13	12	55
5-Mar	14	21	33	20	23	14	8	10	56	38	39	16	17	17	17	14	16	9	15	12	12	15	15	17	56
6-Mar	15	14	13	15	16	14	14	12	14	20	28	23	21	18	15	15	14	12	16	15	14	12	12	12	28
7-Mar	12	11	11	10	11	11	11	11	10	14	24	26	17	64	24	38	11	9	11	11	9	11	14	12	64
8-Mar	11	13	14	44	59	35	37	13	24	17	19	22	18	18	17	23	17	18	15	31	16	14	15	15	59
9-Mar	48	16	16	29	25	22	22	18	25	20	19	21	16	19	20	23	18	15	13	11	12	12	13	10	48
10-Mar	12	13	16	16	15	15	18	12	13	13	12	12	14	13	13	13	14	12	12	15	38	38	35	41	41
11-Mar	64	11	10	9	8	10	11	10	12	10	11	13	13	12	12	12	11	12	37	71	12	7	41	28	71
12-Mar	9	9	12	21	9	12	10	11	10	11	13	15	15	12	13	12	12	12	11	10	12	11	13	21	21
13-Mar	18	24	60	29	31	7	9	8	11	13	12	12	17	15	16	15	15	13	12	13	14	16	15	16	60
14-Mar	16	16	11	12	16	15	12	11	16	12	13	14	13	14	14	15	11	12	12	13	12	15	17	11	17
15-Mar	12	13	18	13	13	15	12	16	14	18	17	16	13	14	13	15	16	13	12	14	11	11	11	10	18
16-Mar	11	10	10	12	10	11	12	11	11	11	13	10	12	12	15	16	12	12	10	10	11	16	12	8	16
17-Mar	12	17	21	18	17	16	16	14	15	14	15	17	15	16	24	22	19	15	16	15	17	19	14	13	24
18-Mar	59	85	14	19	14	14	23	14	20	20	33	40	58	31	22	28	23	27	15	10	10	12	11	8	85
19-Mar	8	7	8	9	9	8	13	13	53	16	14	15	18	17	19	16	12	11	11	11	11	11	10	10	53
20-Mar	9	10	10	11	11	11	10	10	12	14	15	17	18	17	21	17	18	16	14	13	13	13	12	12	21
21-Mar	14	13	13	13	14	13	12	12	14	17	16	18	16	18	15	16	14	14	12	13	11	12	11	10	18
22-Mar	11	10	10	10	10	11	10	10	20	17	14	17	23	28	21	20	28	12	10	11	20	17	18	13	28
23-Mar	16	14	12	16	14	12	8	10	13	15	15	18	17	23	35	22	15	15	14	11	11	10	13	17	35
24-Mar	16	12	8	8	8	9	20	21	33	28	21	33	36	51	42	37	42	30	14	7	9	9	9	19	51
25-Mar	13	13	10	9	9	14	10	10	12	14	30	19	29	23	17	20	14	13	13	26	76	17	57	18	76
26-Mar	15	15	10	9	23	11	14	15	14	15	17	18	31	31	61	89	56	30	14	12	8	24	18	12	89
27-Mar	13	10	9	12	13	17	22	23	18	20	20	19	19	21	16	19	20	11	9	11	24	14	14	15	24
28-Mar	14	13	13	13	12	14	15	39	50	23	49	20	16	18	14	12	15	10	12	8	8	9	9	8	50
29-Mar	7	7	8	11	7	6	9	8	12	12	13	15	16	13	19	21	15	11	10	8	7	6	8	11	21
30-Mar	10	9	8	17	8	8	8	9	22	14	17	17	17	17	18	15	16	14	17	17	15	17	17	17	22
31-Mar	15	16	12	12	13	12	14	16	24	20	35	25	29	21	19	23	17	36	67	22	16	13	19	11	67
	64	85	60	72	63	35	67	72	67	45	70	83	58	64	61	89	56	36	67	71	76	38	57	41	
	Diurnal Maximum																								

Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	March 21, 2016	Last Calibration	February 17, 2016
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	9:16	End Time (MST)	13:30
Gas Cert Reference	LL104215	Station temp.	21 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	12-Feb-18
Calibrator Make/Model	API T700	Serial Number	622
ZAG Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	DACS serial No.	7882

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	518	518
Analyzer IP address	192.168.1.43		Lamp voltage	1993	1937
Calculated slope	0.998556	0.995648	Chamber temp	50.0	50.0
Calculated intercept	0.177287	1.170679	Pressure	21.7	21.6
Analyzer Background	21.1	21.1	Flow	0.541	0.540
Analyzer Coefficient	1.011	1.020	Intensity	49	48

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	0.1	----
as found span	5000	83.2	803.7	792.3	1.014
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	83.2	803.7	806.6	0.996
second point	5000	41.6	401.9	402.0	1.000
third point	5000	20.8	200.9	199.3	1.008
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	83.2	803.7	801.2	1.003
				Average Correction Factor	1.001

Corrected As found	792.2	Previous response	804.7	% change	1.6%

Notes:

Inlet filter replaced after as founds. Sample pump replaced after as founds for preventative maintenance. Adjust span slightly.

Calibration Performed By: Asad Hidayat

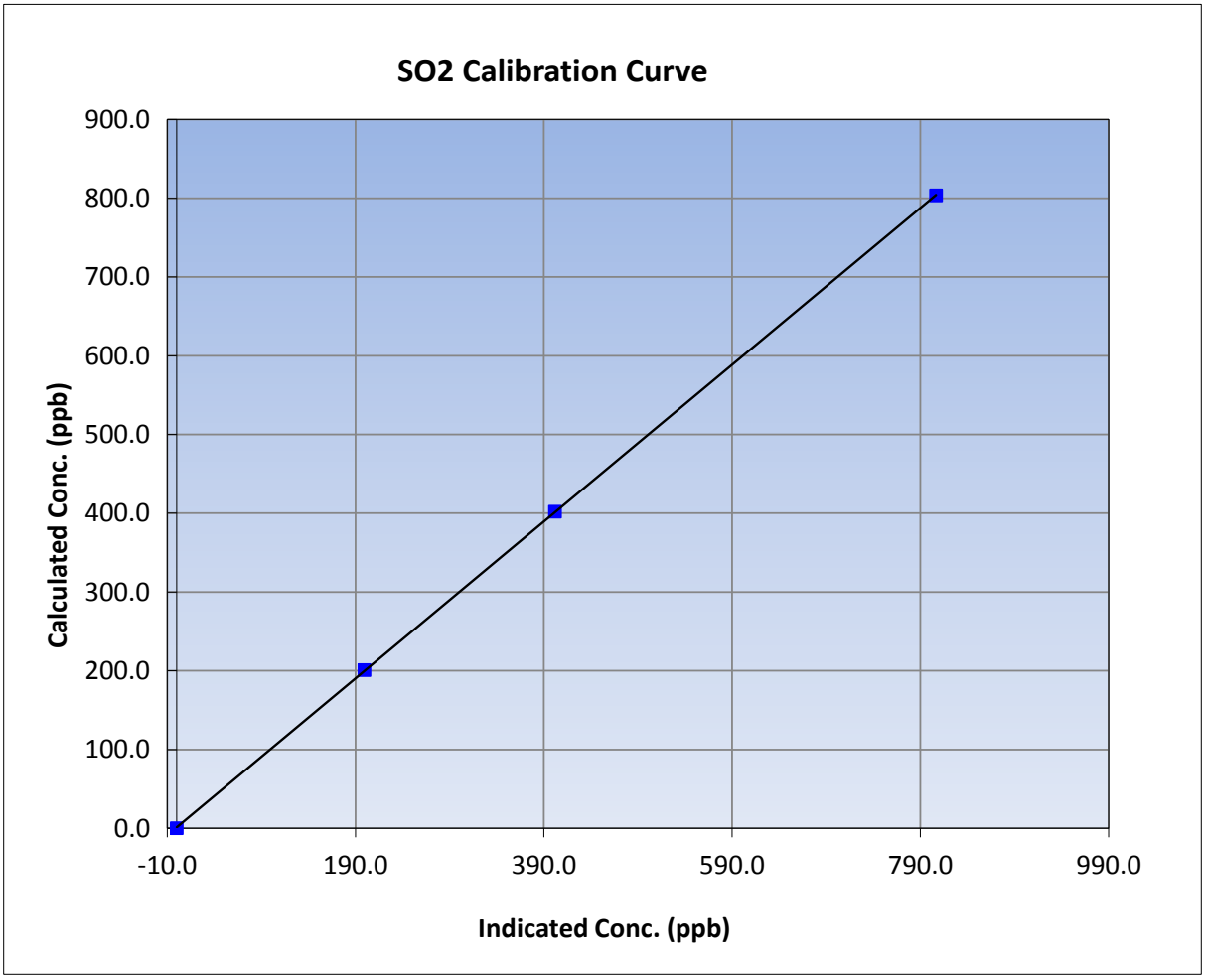
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

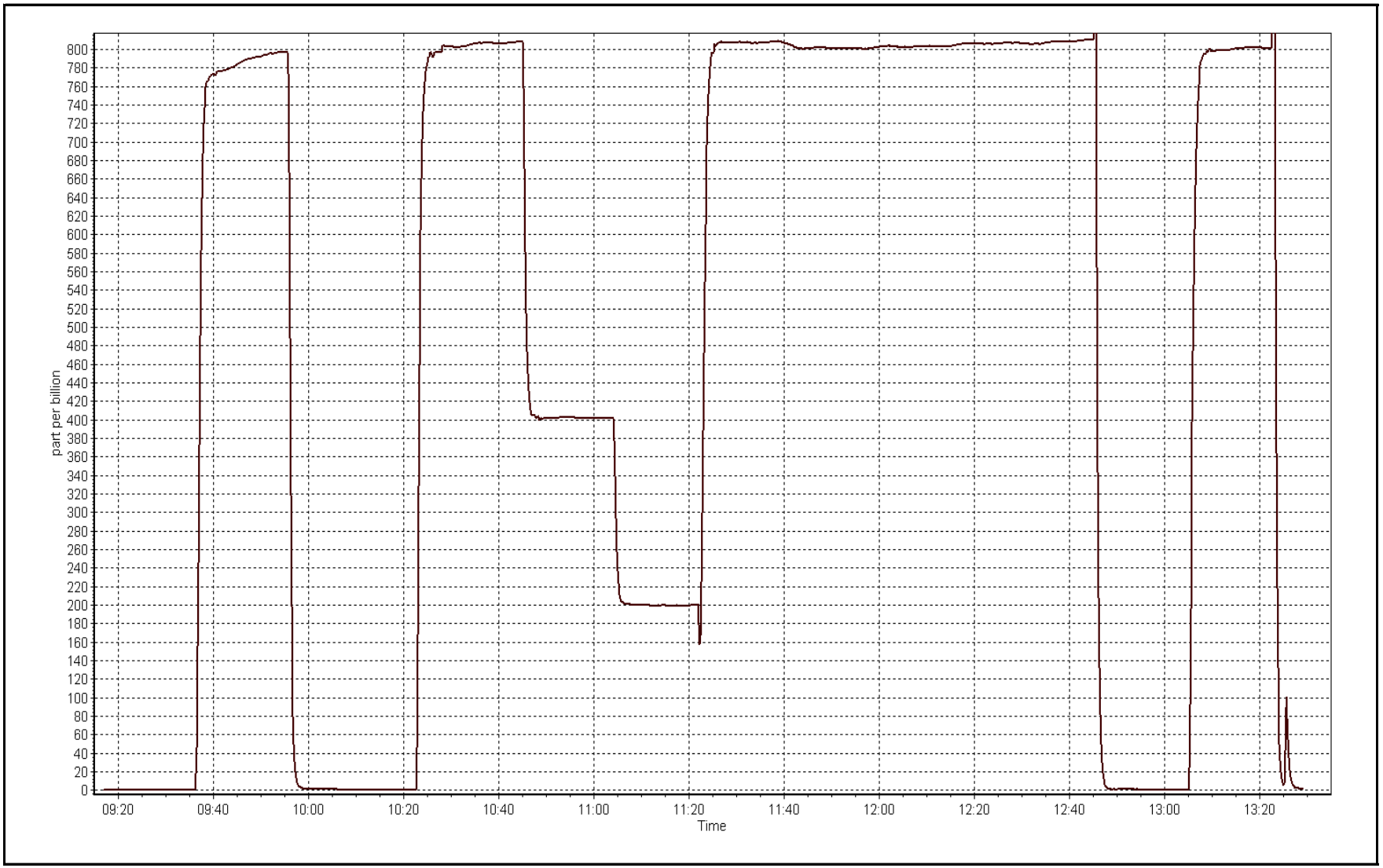
Calibration Date	March 21, 2016	Previous Calibration	February 17, 2016
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	9:16	End Time (MST)	13:30
Analyzer make	API T100	Analyzer serial #	598

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999989
803.7	806.6	0.9964		
401.9	402.0	0.9997	Slope	0.995648
200.9	199.3	1.0082		
			Intercept	1.170679



SO2 Calibration Plot Date: March 21, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	March 24, 2016	Last Calibration	February 16, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	12:20
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104215 12-Feb-18

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	496	497
Analyzer IP address	192.168.1.75		Lamp voltage	2568	2537
Calculated slope	0.995422	0.995783	Chamber temp	50	50
Calculated intercept	0.114634	0.123892	Pressure	23.1	23.4
Analyzer Background	17.4	18.1	Flow	0.611	0.631
Analyzer Coefficient	0.999	1.003	Intensity	57	56
			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	0.4	----
as found span	5000	38.5	80.1	80.4	0.996
SO2 scrubber check	5000	20.7	200.0	3.7	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	38.5	80.1	80.4	0.996
second point	5000	19.3	40.1	40.1	1.002
third point	5000	12.1	25.2	25.1	1.003
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	38.5	80.1	80.1	1.000
				Average Correction Factor	1.000

Corrected As found	80.0	Previous response	80.3	% change	0.4%

Notes:

Sample inlet filter replaced after as founds. Scrubber check done after as founds. Slightly adjusted zero.

Calibration Performed By: Asad Hidayat

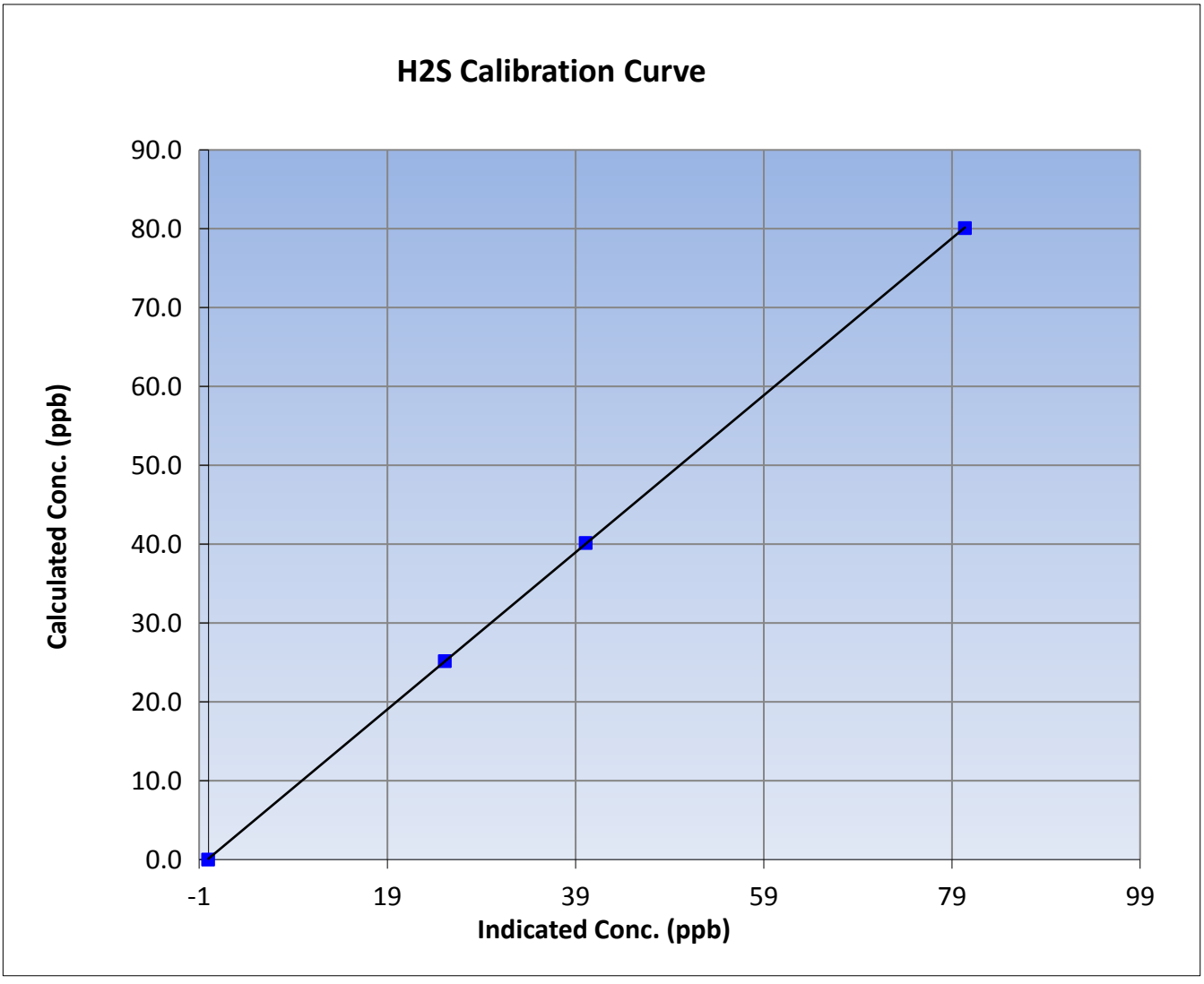
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

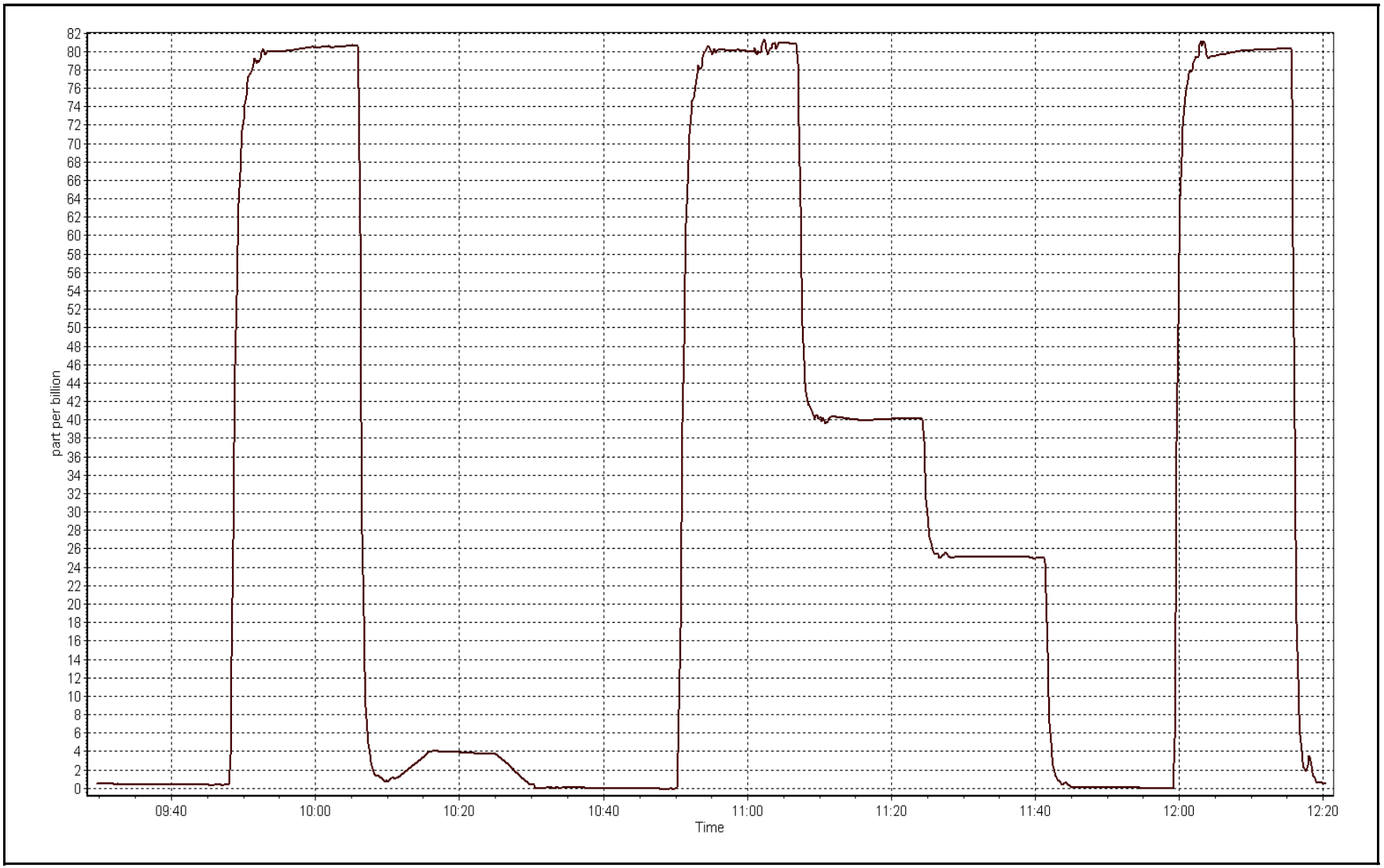
Calibration Date	March 24, 2016	Previous Calibration	February 16, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	9:30	End Time (MST)	12:20
Analyzer make	API T101	Analyzer serial #	197

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999991
80.1	80.4	0.9964		
40.1	40.1	1.0018	Slope	0.995783
25.2	25.1	1.0027		
			Intercept	0.123892



H2S Calibration Plot Date: March 24, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	March 21, 2016	Previous Calibration	February 17, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	9:16	End Time (MST)	13:28
NO Cal Gas Conc	48.1 ppm	Gas Cert Reference	LL104215
NOx Cal Gas Conc	48.1 ppm	Cal Gas Expiry Date	12-Feb-18
Calibrator	API T700	Serial Number	622
Zero air Generator	Teledyne API T701	Serial Number	4865

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	7882

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998717	0.999442	0.988063
	Data Offset	1.797897	1.487522	-0.251878
Current Calibration	Data Slope	0.998748	0.997961	0.998376
	Data Offset	1.287808	1.295706	-0.414179

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153356

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.955		0.970	
NOX coefficient	1.001		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	8.2		10.1	
NOX bkgrnd	9.1		10.4	
Chamber Temp	50.5	Deg C	50.4	Deg C
Moly Temp	322.1	Deg C	322.4	Deg C
PMT voltage	-866.5	V	-866.2	V
PMT Temp	-2.9	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	160.9	mmHg	160.6	mmHg
R Cell Press Nox	160.6	mmHg	160.9	mmHg
NO sample flow	0.662	lpm	0.657	lpm
Nox sample Flow	0.661	lpm	0.655	lpm

Notes:

Sample inlet filter replaced after as founds. Adjusted both zero and span.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: March 21, 2016 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	1.4	2.1	-0.7	----	----
as found span	5000	83.2	800.4	800.4	0.0	788.6	787.1	1.4	1.0150	1.0169
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.3	-0.1	----	----
high point	5000	83.2	800.4	800.4	0.0	800.8	801.5	-0.6	0.9994	0.9987
second point	5000	41.6	400.2	400.2	0.0	398.7	399.1	-0.4	1.0038	1.0028
third point	5000	20.8	200.1	200.1	0.0	197.6	197.5	0.1	1.0127	1.0130
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	0.2	-0.3	----	----
as left span	5000	83.2	800.4	488.1	312.3	804.1	489.8	314.3	0.9954	0.9967
								Average Correction Factor	1.0053	1.0048

Corrcted As found NO_X= 787.2 NO= 785.0 Percent Change NO_X= 1.6% NO= 1.8%

Previous Response NO_X= 799.6 NO= 799.3

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	801.5	799.8	-0.1	0.9986	1.0007	----	----
1st NO2 (300)	488.1	311.7	800.5	488.1	312.4	0.9998	----	0.9979	100.2%
2nd NO2 (200)	585.0	214.8	800.5	585.0	215.5	0.9998	----	0.9968	100.3%
3rd NO2 (100)	686.6	113.2	801.4	686.6	114.7	0.9988	----	0.9872	101.3%
2nd NO ref point		0.0	800.9	798.9	1.6	0.9993	1.0018	----	----
				Average Correction Factor		0.9994		0.9940	100.6%

Calibration Performed By: Asad Hidayat

Wood Buffalo Environmental Association

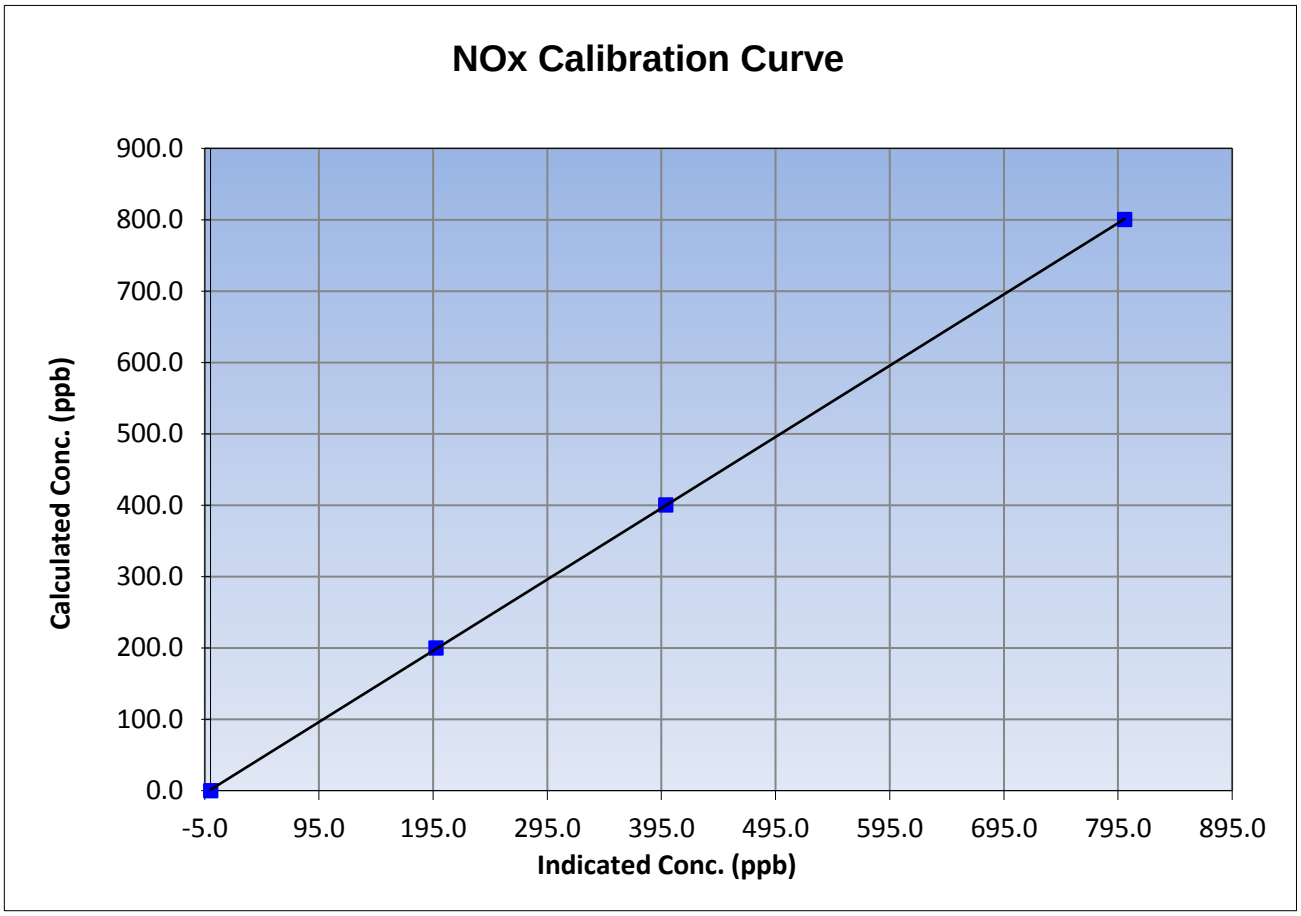
NO_X Calibration Summary

Station Information

Calibration Date	March 21, 2016	Previous Calibration	February 17, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	9:16	End Time (MST)	13:28
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	0.2	----	Correlation Coefficient	0.999985
800.4	800.8	0.9994		
400.2	398.7	1.0038	Slope	0.998748
200.1	197.6	1.0127		
			Intercept	1.287808



Wood Buffalo Environmental Association

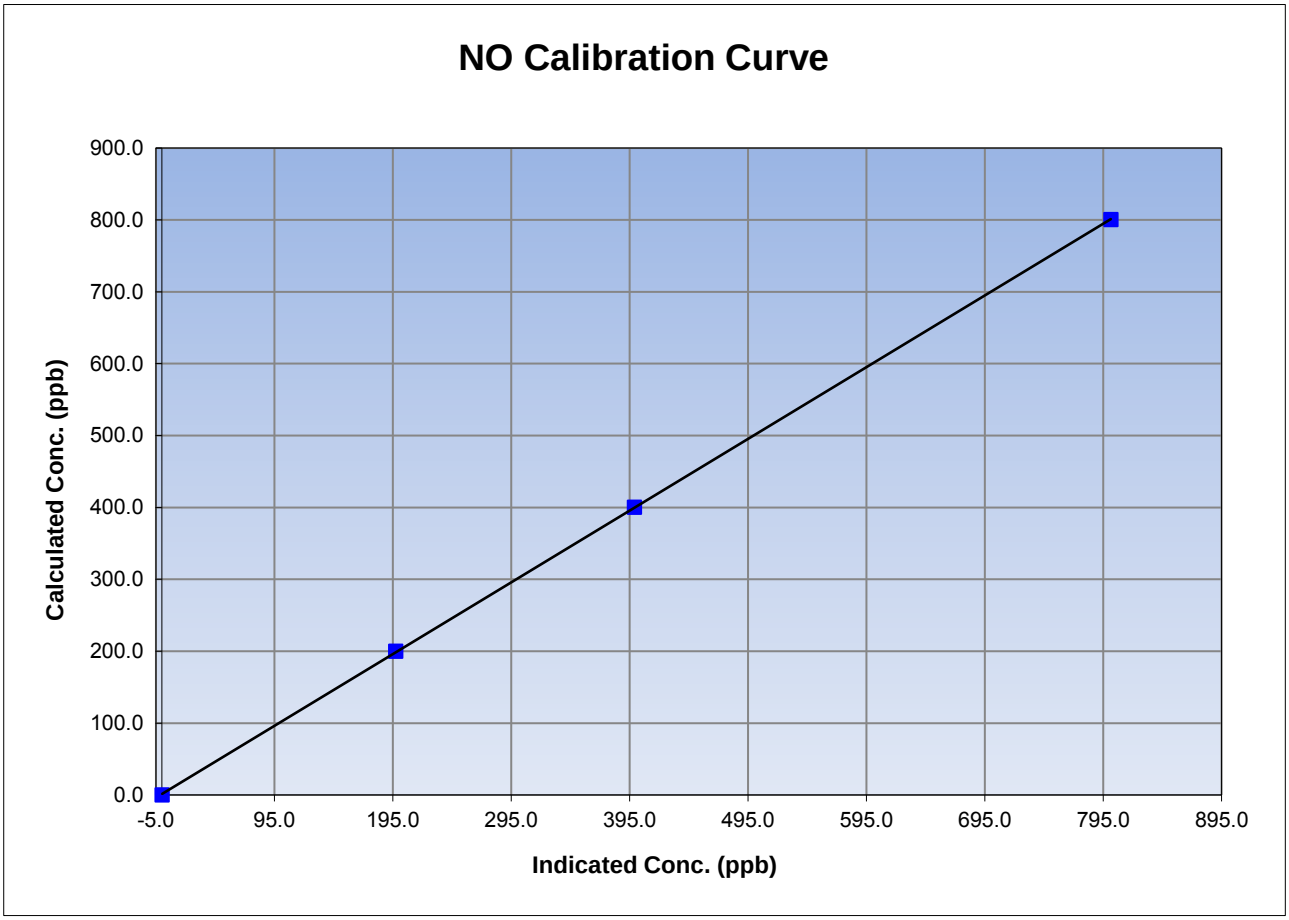
NO Calibration Summary

Station Information

Calibration Date	March 21, 2016	Previous Calibration	February 17, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	9:16	End Time (MST)	13:28
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	0.3	N/A	Correlation Coefficient	0.999982
800.4	801.5	0.9987		
400.2	399.1	1.0028	Slope	0.997961
200.1	197.5	1.0130		
			Intercept	1.295706



Wood Buffalo Environmental Association

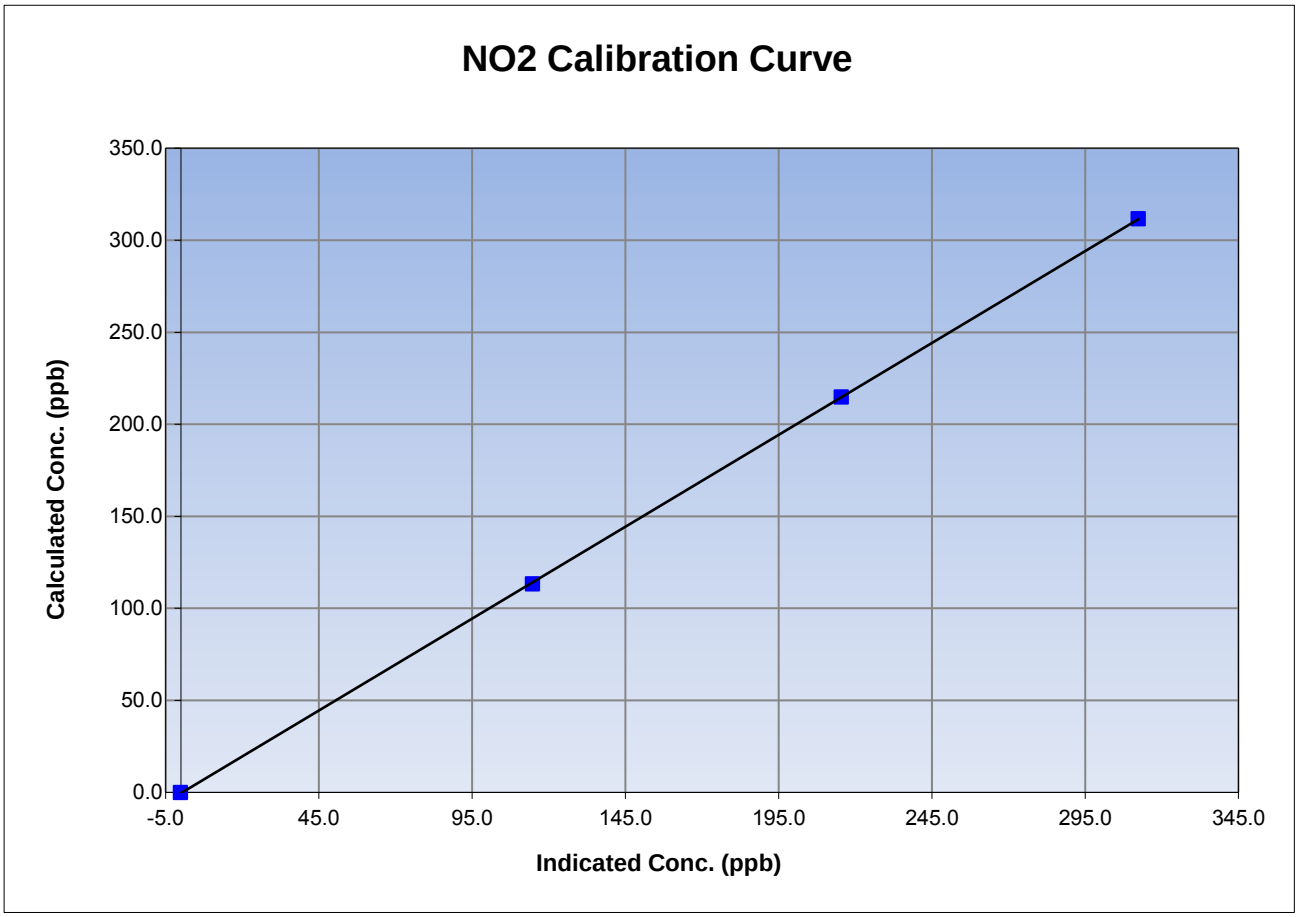
NO_2 Calibration Summary

Station Information

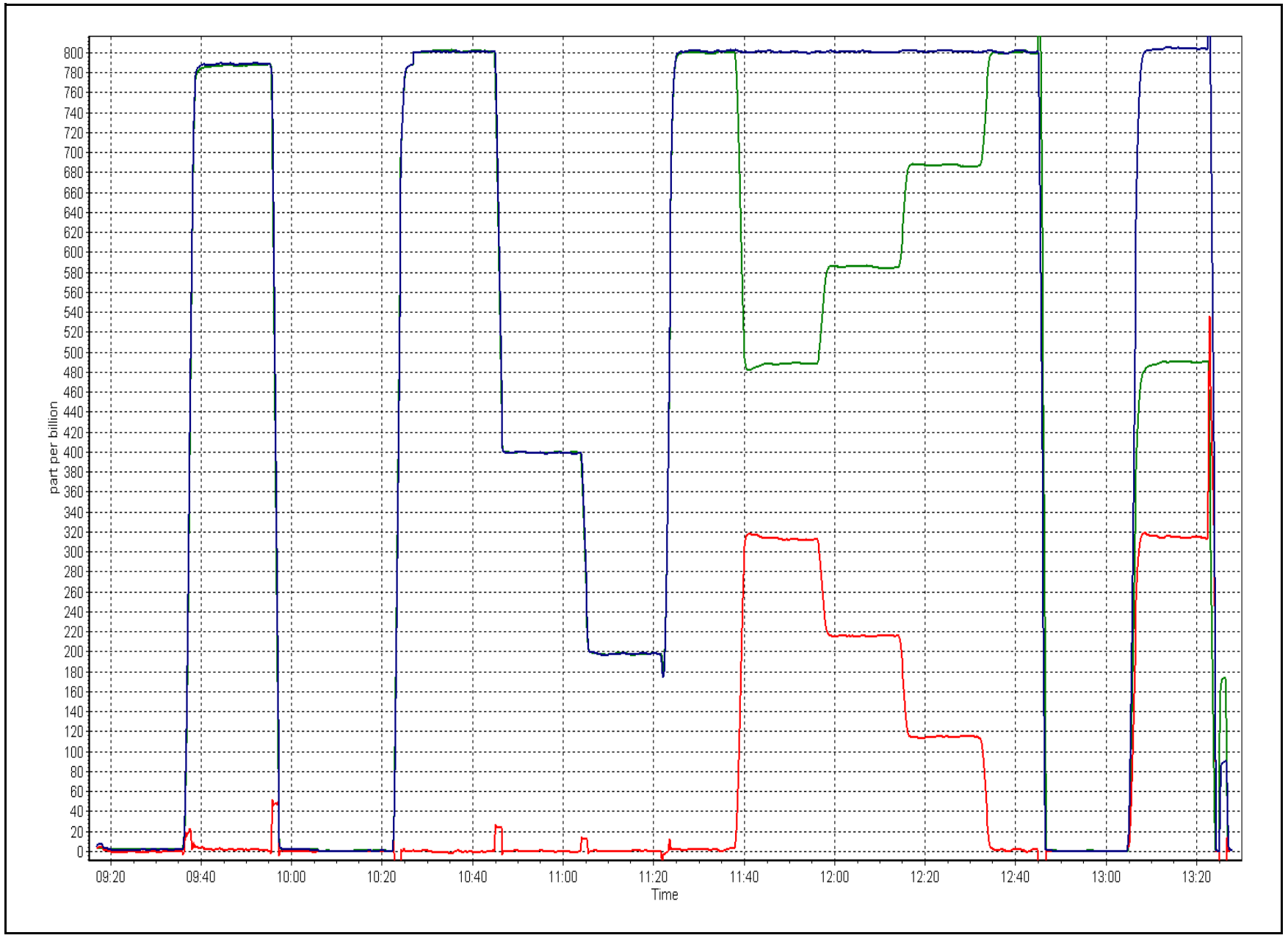
Calibration Date	March 21, 2016	Previous Calibration	February 17, 2016
Station Number	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	9:16	End Time (MST)	13:28
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999979
311.7	312.4	0.9979		
214.8	215.5	0.9968	Slope	0.998376
113.2	114.7	0.9872		
			Intercept	-0.414179



NOX Calibration Plot Date: March 21, 2016



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 502
CONOCOPHILLIPS
SURMONT
FEBRUARY 2016

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

March 24, 2016
Revised April 25, 2016

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
FEBRUARY 2016

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	649	33	47	97.99	25	0	7	0
H2S (ppb) Average	664	32	32	100.00	2	0	1	0
NO2 (ppb) Average	663	33	33	100.00	27	0	12	-
NO (ppb) Average	663	33	33	100.00	28	-	8	-
NOX (ppb) Average	663	33	33	100.00	46	-	16	-
Temperature 2 m (C) Average	696	0	0	100.00	8	-	3.1	-
Relative Humidity (%) Average	696	0	0	100.00	98	-	95	-
Wind Speed 10 m (km/h) Average	671	0	25	96.41	32	-	23	-
Wind Direction 10 m (deg) Average	671	0	25	96.41	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

					Percentile						
Parameter	Number	Mean	StnDev	Total	Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	649	1.1	2	-	0	0	0	0	1	2	25
H2S (ppb) Average	664	0.3	0	-	0	0	0	0	0	1	2
NO2 (ppb) Average	663	4.1	4	-	0	1	2	3	6	9	27
NO (ppb) Average	663	2	3	-	0	0	0	1	2	5	28
NOX (ppb) Average	663	6.1	6	-	0	2	2	4	8	12	46
Temperature 2 m (C) Average	696	-7.77	6.9	-	-25.2	-16.8	-12.9	-8.2	-2	1.2	8
Relative Humidity (%) Average	696	78.5	14	-	37	57	69	84	89	93	98
Wind Speed 10 m (km/h) Average	671	11.4	7	-	1	4	6	10	16	21	32
Wind Direction 10 m (deg) Average	671	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	11 Feb 2016 10:00	11 Feb 2016 11:00	2	Unstable operation - excessive baseline drift
SO2	28 Feb 2016 08:00	28 Feb 2016 11:00	4	Unstable operation - excessive baseline drift
SO2	28 Feb 2016 22:00	29 Feb 2016 05:00	8	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	06 Feb 2016 15:00	07 Feb 2016 13:00	23	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	15 Feb 2016 20:00	15 Feb 2016 21:00	2	Flat line in sensor output signal - sensor frozen

Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 25 ppb on Feb 6 18:00

Maximum Daily Average: 6.7 ppb on Feb 6

Minimum Value: 0 ppb on Feb 11 09:00

Minimum Daily Average: 0.2 ppb on Feb 11

Maximum Diurnal Average: 1.8 ppb at hour 22

Minimum Diurnal Average: 0.6 ppb at hour 2

Monthly Average: 1.1 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 1$ $P_{90} = 2$ $P_{99} = 17$

Hours in Service:	696
Hours of Data:	649
Hours of Missing Data:	47
Hours of Calibration:	33
Percent Operational Time:	98.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Feb	0	Z	1	1	1	1	2	3	2	2	2	2	2	1	2	1	1	1	1	1	1	1	1	0	1.3	3
2-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3	3	1	1	0.6	3
3-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	0.8	2
4-Feb	1	1	4	4	Z	3	3	2	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	4
5-Feb	1	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	1	0	0	1	1	1	1	1	1	0.5	1
6-Feb	Z	1	1	1	1	1	0	0	0	0	0	0	0	1	1	3	22	25	17	17	20	19	14	8	6.7	25
7-Feb	2	Z	4	1	0	0	0	0	0	1	2	3	2	2	1	0	0	0	1	1	2	3	2	2	1.3	4
8-Feb	1	0	Z	1	0	0	0	0	1	1	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0.5	3
9-Feb	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	1	1	3	5	6	4	2	1	1.2	6
10-Feb	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
11-Feb	0	0	0	0	0	Z	0	0	0	UO	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Feb	Z	1	1	0	0	2	2	1	0	0	0	3	1	1	2	1	0	0	0	1	1	8	4	2	1.5	8
13-Feb	0	Z	1	2	2	2	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.6	2
14-Feb	0	0	Z	0	0	0	0	0	0	2	2	1	4	1	1	1	1	1	1	1	0	0	1	1	0.8	4
15-Feb	1	0	0	Z	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.4	1
16-Feb	0	0	0	0	Z	0	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0	0.5	1
17-Feb	0	0	0	0	0	Z	2	1	1	2	1	C	C	C	C	0	0	0	0	0	0	0	0	0	0.7	2
18-Feb	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	3	6	0.8	6
19-Feb	13	Z	1	1	4	5	6	5	4	2	1	2	2	3	1	1	2	3	3	2	1	0	0	0	2.6	13
20-Feb	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
21-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.4	1
22-Feb	0	0	0	1	Z	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1
23-Feb	0	0	0	0	1	Z	0	1	3	0	1	6	2	7	10	5	11	2	2	1	2	2	1	1	2.6	11
24-Feb	Z	1	1	0	0	1	0	0	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0	0.5	2
25-Feb	0	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1
26-Feb	0	0	Z	0	0	0	0	0	0	3	2	5	5	2	10	12	2	4	5	2	1	1	1	0	2.5	12
27-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.3	3
28-Feb	6	4	3	0	Z	0	0	UO	UO	UO	UO	0	0	0	0	0	0	1	0	0	0	UO	UO	UO	--	6
29-Feb	UO	UO	UO	UO	UO	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
	1.2	0.6	0.8	0.7	0.7	0.9	0.8	0.7	0.7	0.7	0.7	1.0	1.1	1.0	1.5	1.2	1.7	1.6	1.5	1.4	1.6	1.8	1.3	1.1	Diurnal Average	
	13	4	4	4	4	5	6	5	4	3	2	6	5	7	10	12	22	25	17	17	20	19	14	8	Diurnal Maximum	

Z - zerospan C - Calibration UO - Unstable Operation

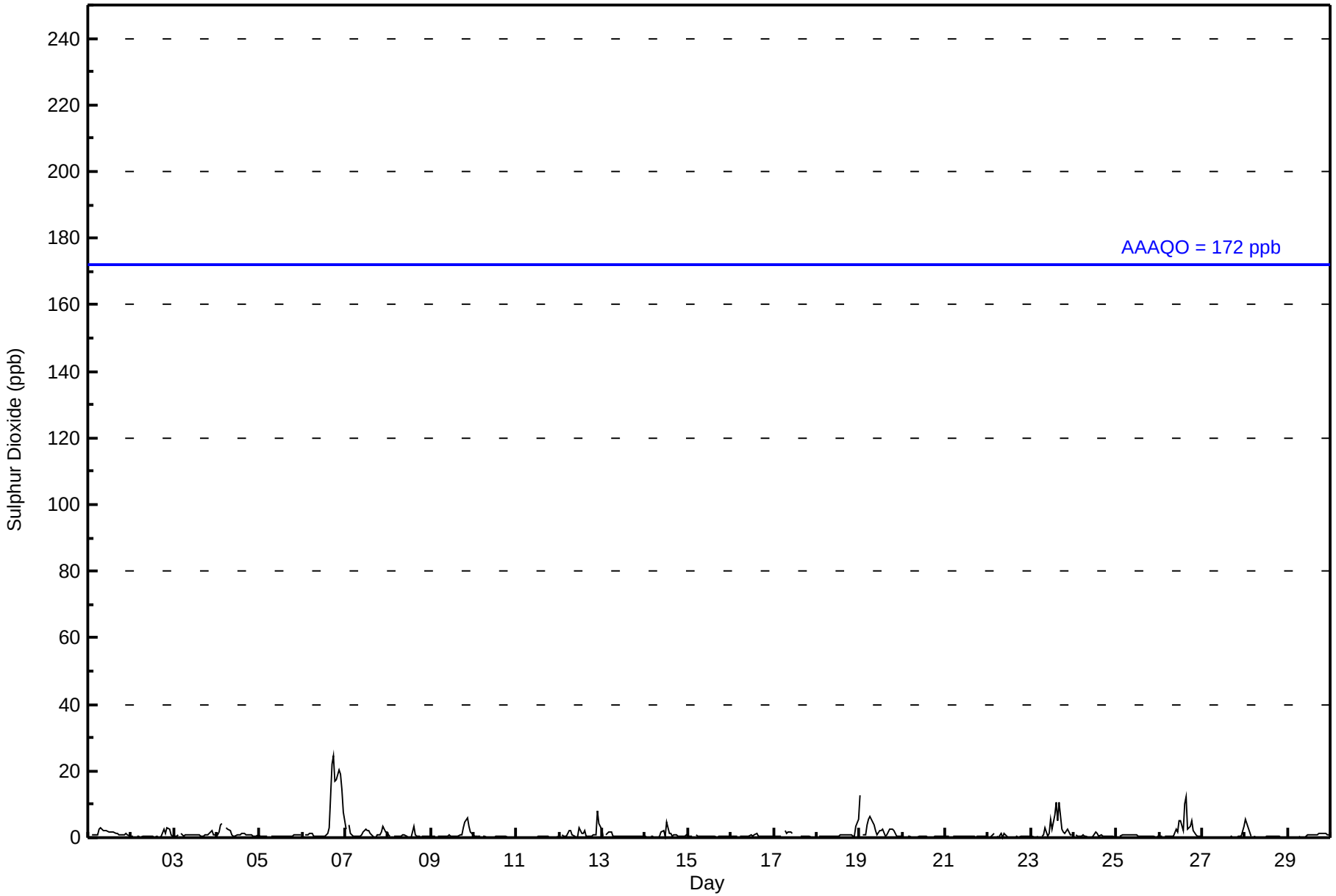
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb

Wood Buffalo Environmental Association

Hourly Averages

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - February 2016



0216 R502-7

Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	639	98.46	98.46
11 - 20	8	1.23	99.69
21 - 60	2	0.31	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: 649

Total Number of Hours: 696

Wood Buffalo Environmental Association

Frequency Distribution

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - February 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 10	42	26	22	21	11	24	29	27	61	43	35	54	76	88	22	41	622
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	42	26	22	21	11	24	29	27	61	43	35	54	76	88	24	42	625

Total Number of Valid Hours: 625

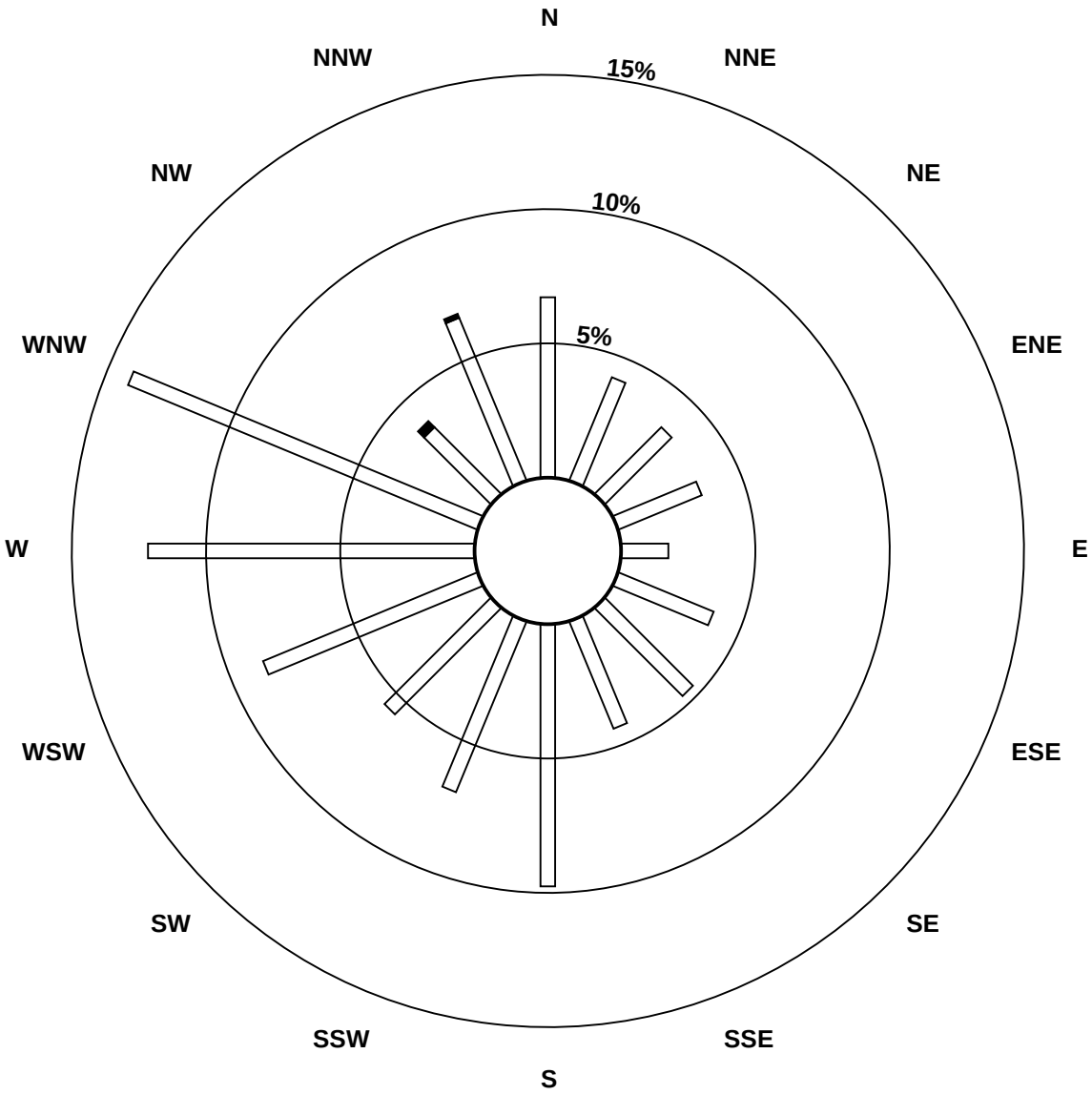
Total Number of Hours: 696

Wood Buffalo Environmental Association

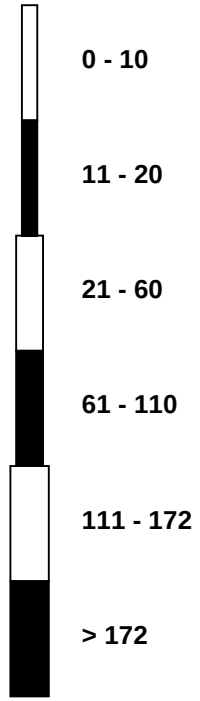
Wind Rose Feb 2016

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont (AMS502)



Classes (ppb)



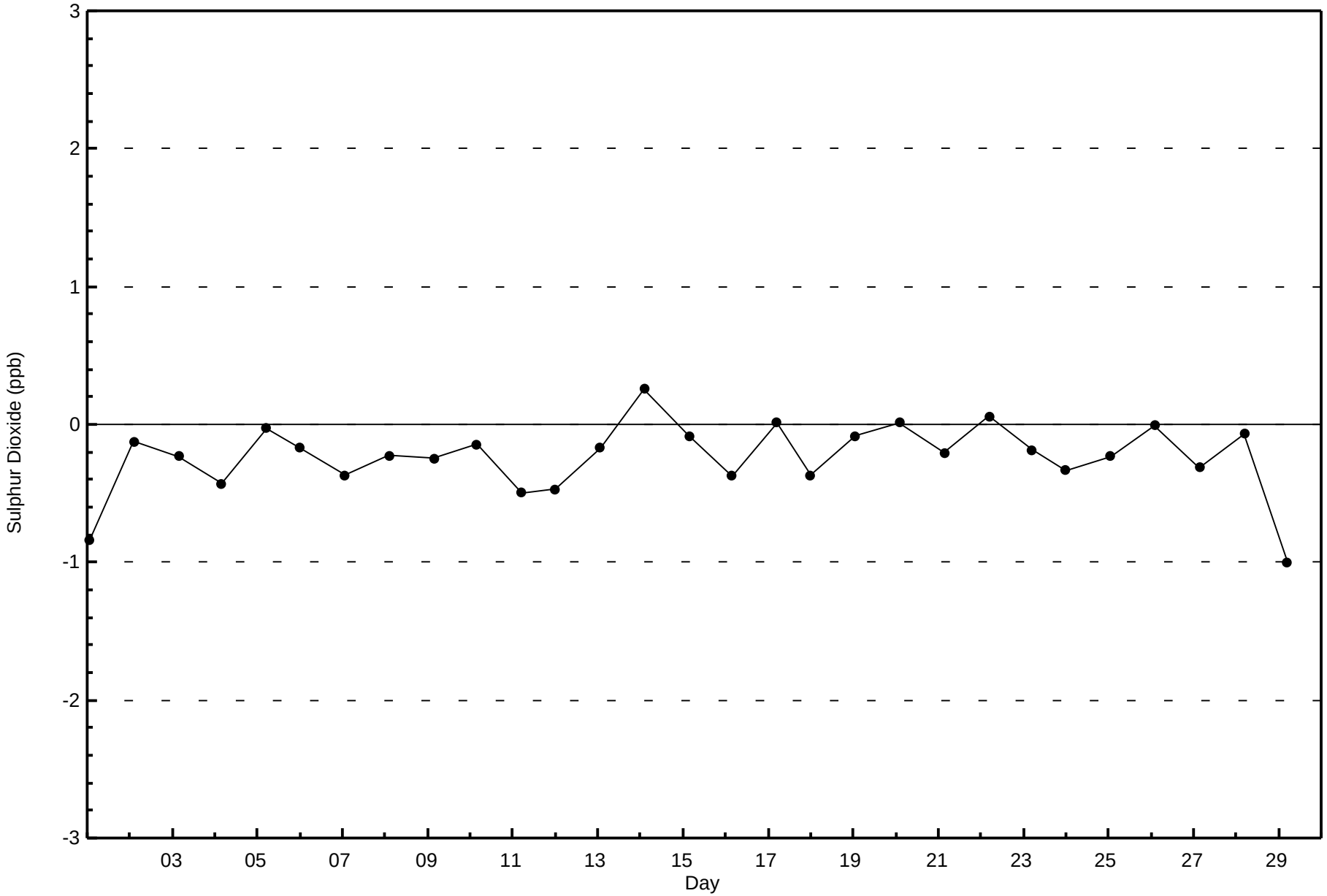
Total Number of Valid Hours: 625

Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - February 2016



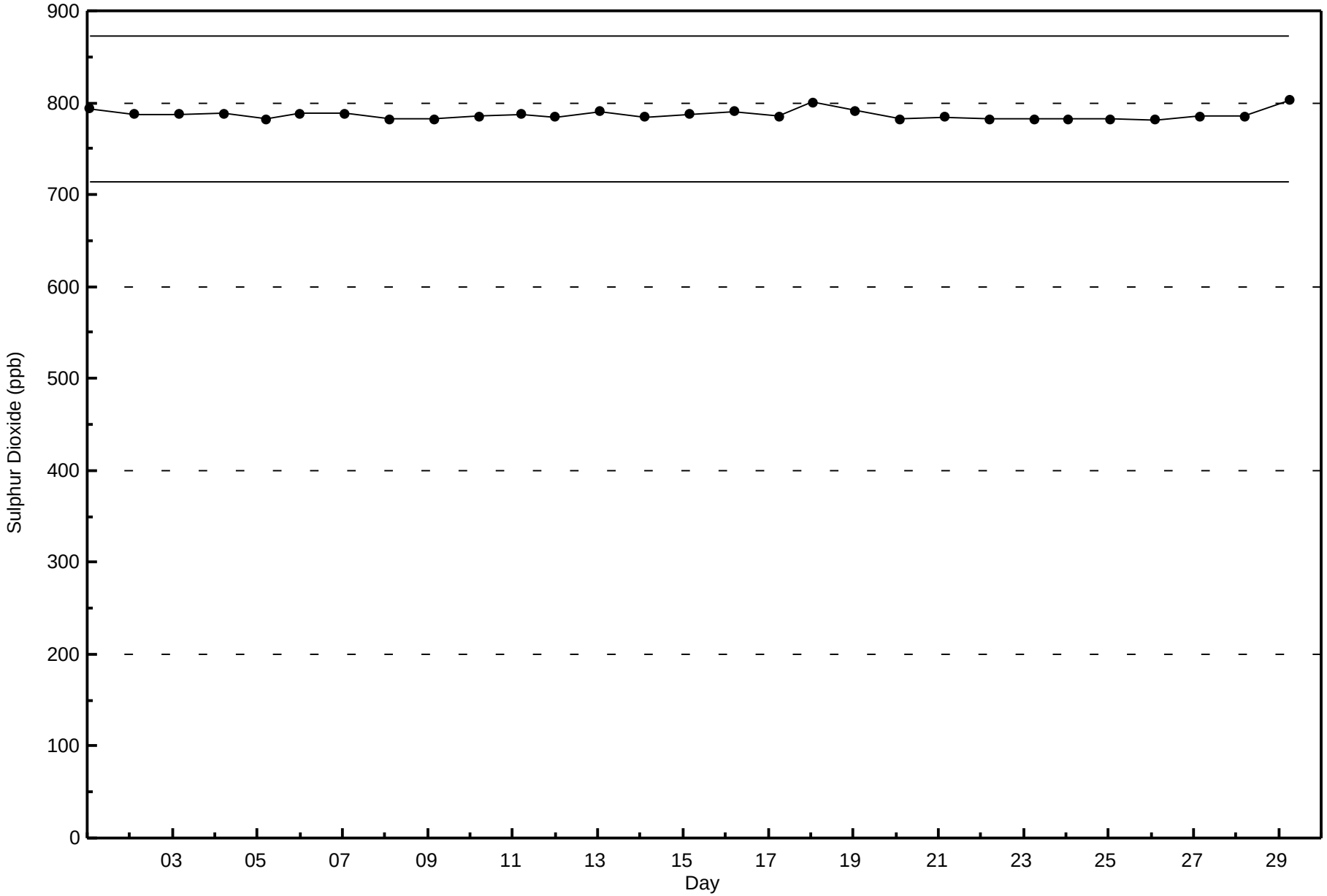
0216 R502-11

Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO_2) - ppb

ConocoPhillips - Surmont - February 2016



0216 R502-12

Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 2 ppb on Feb 20 05:00

Maximum Daily Average: 0.6 ppb on Feb 19

Minimum Value: 0 ppb on Feb 28 21:00

Minimum Daily Average: 0.1 ppb on Feb 22

Maximum Diurnal Average: 0.4 ppb at hour 7

Minimum Diurnal Average: 0.3 ppb at hour 17

Monthly Average: 0.3 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 1$ $P_{99} = 1$

Hours in Service:	696
Hours of Data:	664
Hours of Missing Data:	32
Hours of Calibration:	32
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Feb	0	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-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1
3-Feb	1	1	1	1	Z	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0.5	1
4-Feb	0	0	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
5-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0.3	1
6-Feb	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0.5	1
7-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.3	1
8-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Feb	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1
10-Feb	1	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
11-Feb	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
12-Feb	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
13-Feb	0	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
14-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
15-Feb	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0.2	0
17-Feb	0	0	0	0	0	1	Z	1	1	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0.5	1
18-Feb	0	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
19-Feb	1	1	Z	1	1	0	1	1	1	0	0	1	1	1	1	0	1	1	1	1	1	1	0	0	0.6	1
20-Feb	0	1	1	Z	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
21-Feb	0	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-Feb	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
23-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0.3	1
24-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.3	1
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
28-Feb	0	1	1	1	1	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
29-Feb	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	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	Diurnal Average	
	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum	

Z - zerospan C - Calibration

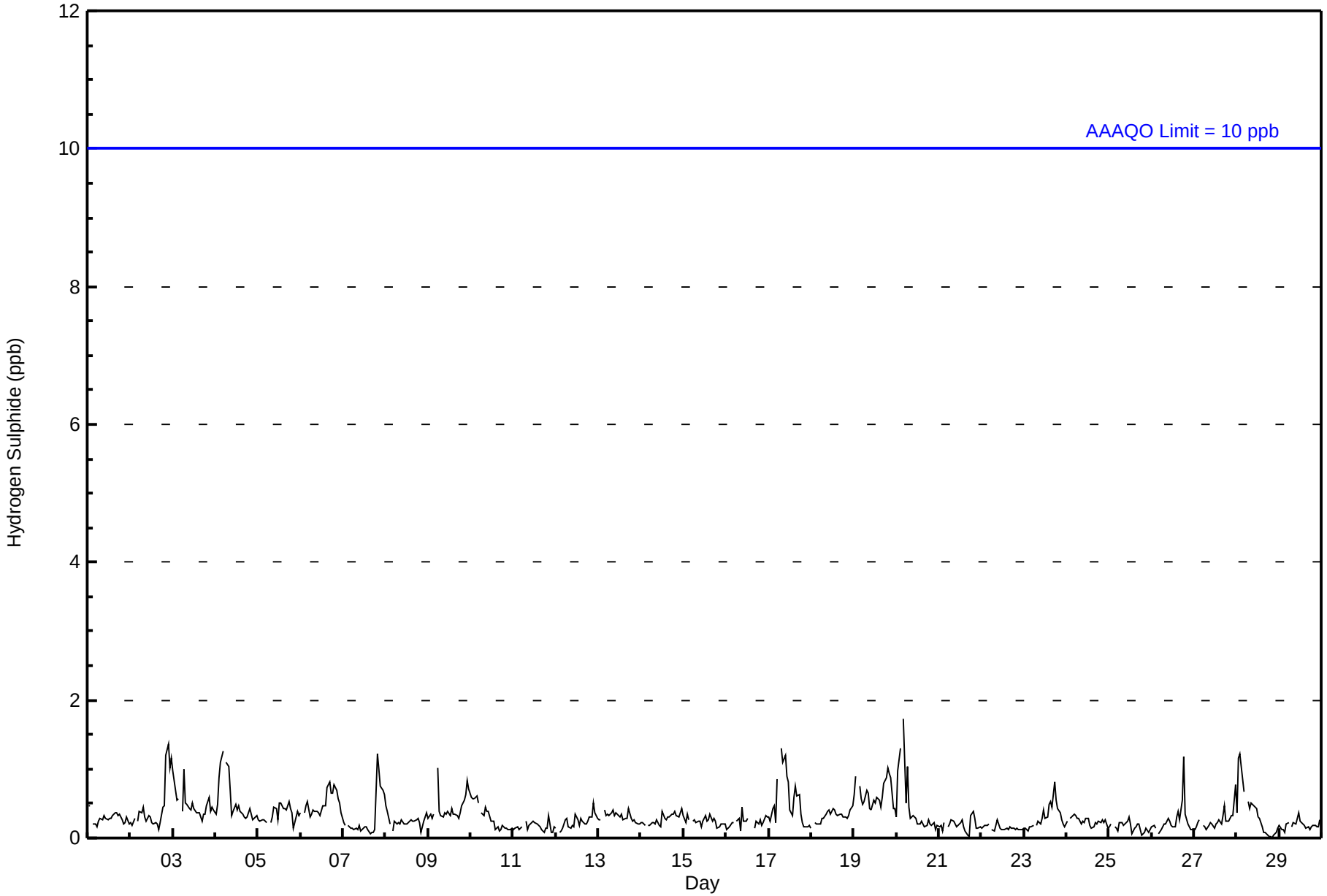
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb

Wood Buffalo Environmental Association

Hourly Averages

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - February 2016



0216 R502-14

Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	664	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: 664

Total Number of Hours: 696

Wood Buffalo Environmental Association

Frequency Distribution

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - February 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 2	49	27	22	21	13	24	34	26	61	44	37	54	74	87	23	44	640
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	49	27	22	21	13	24	34	26	61	44	37	54	74	87	23	44	640

Total Number of Valid Hours: 640

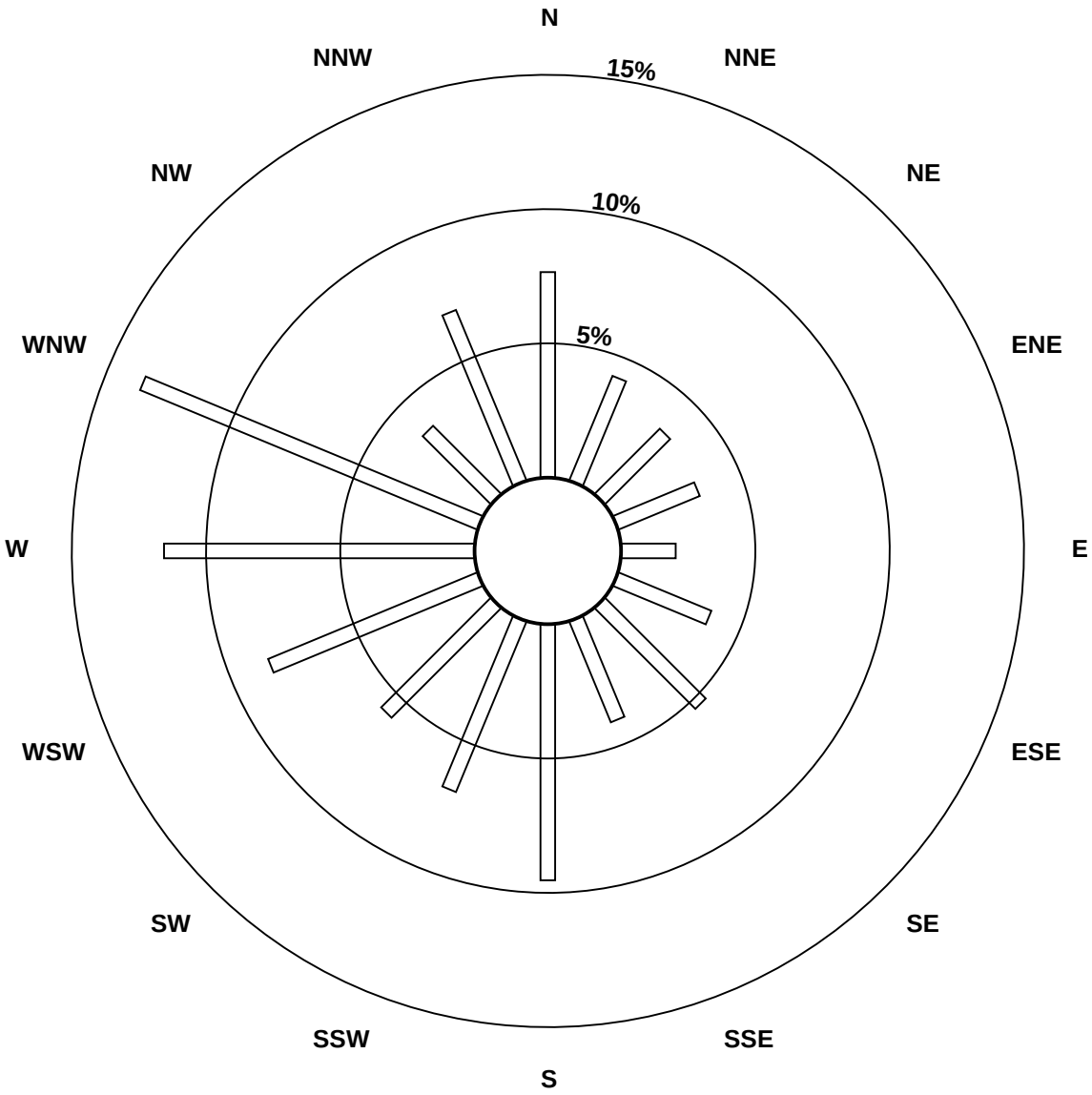
Total Number of Hours: 696

Wood Buffalo Environmental Association

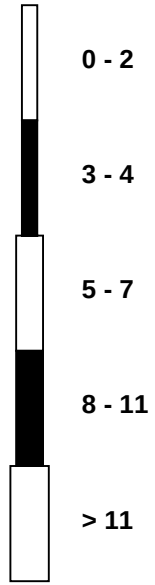
Wind Rose Feb 2016

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont (AMS502)



Classes (ppb)



Total Number of Valid Hours: 640

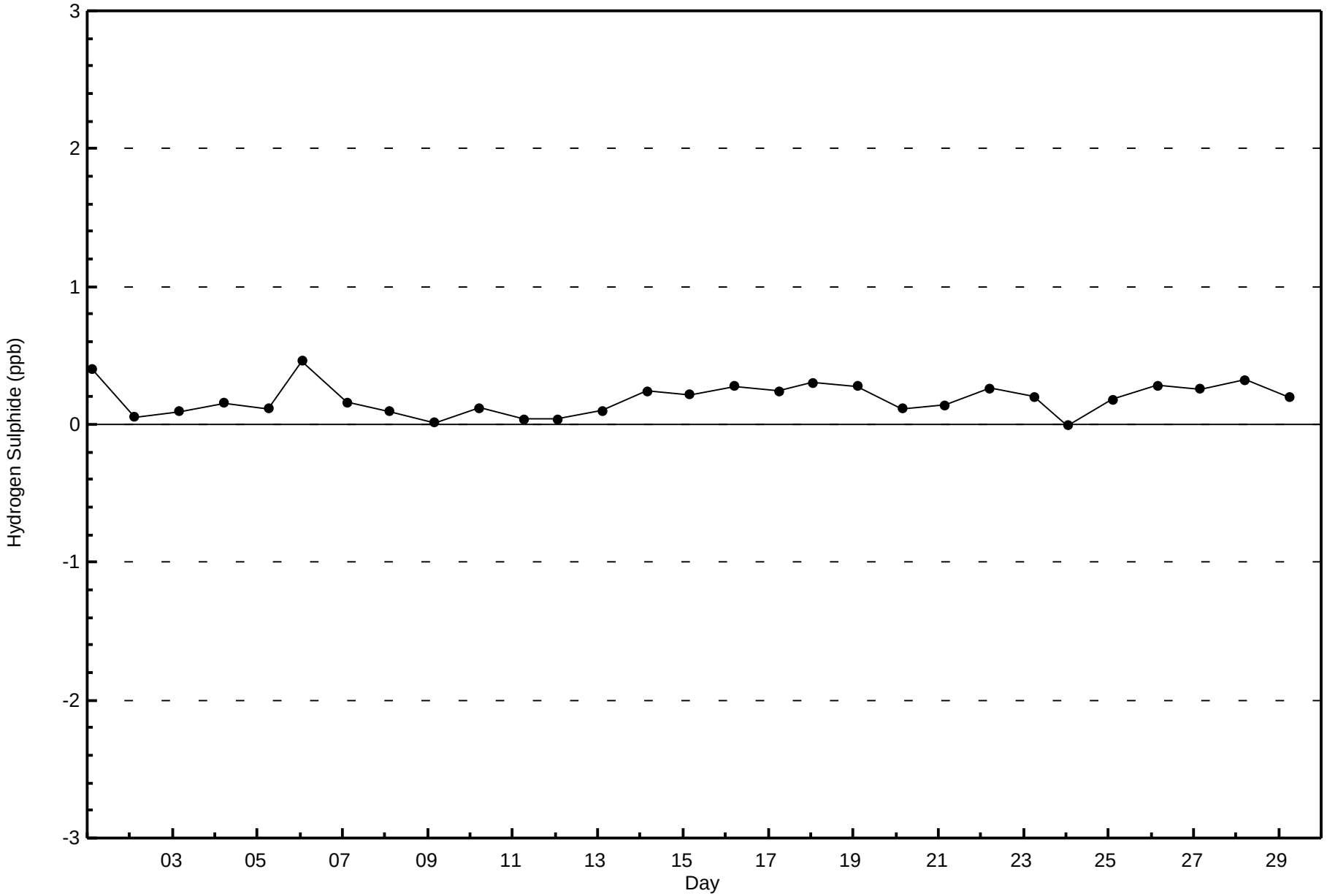
0216 R502-17

Wood Buffalo Environmental Association

Zero Responses

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - February 2016



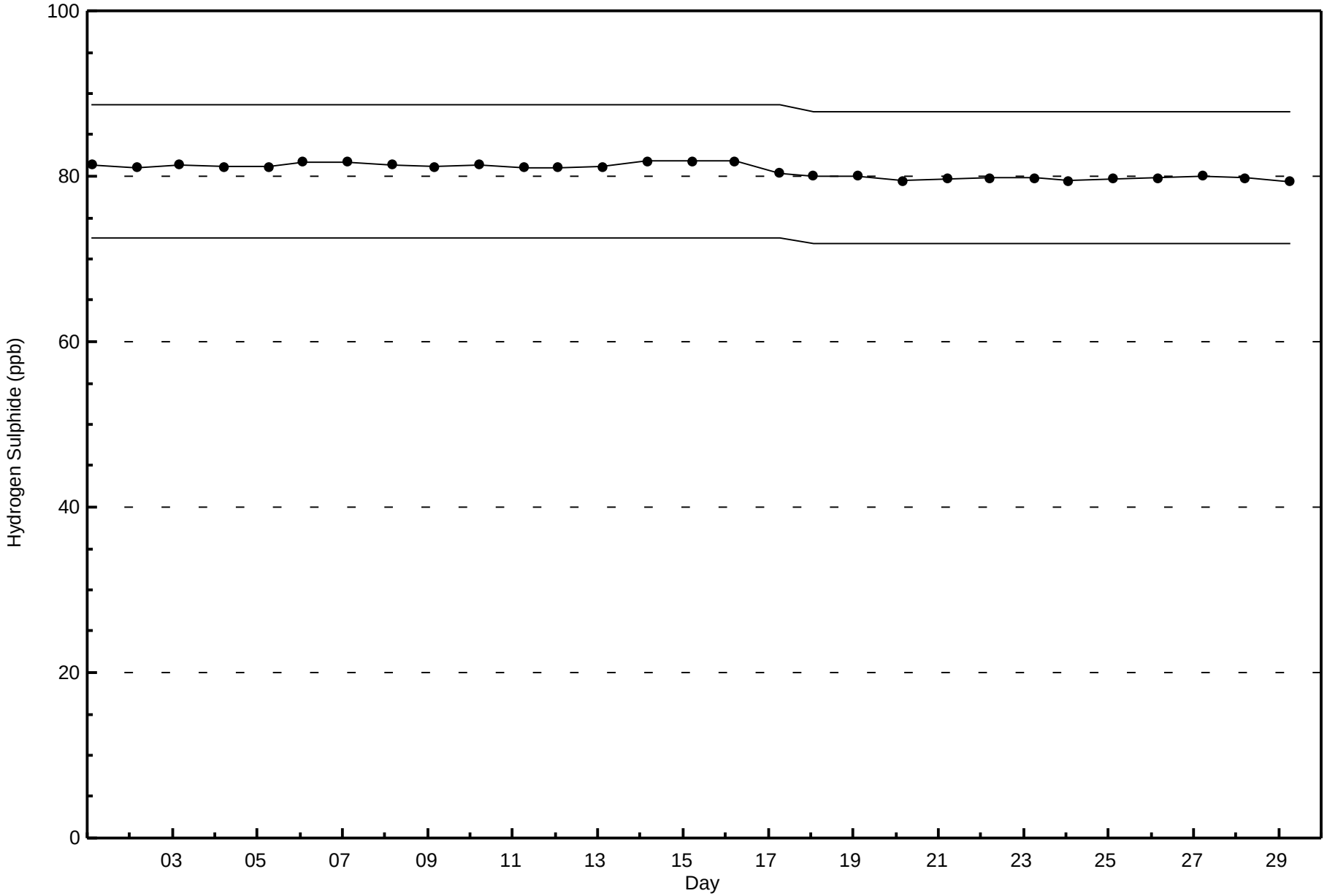
0216 R502-18

Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H_2S) - ppb

ConocoPhillips - Surmont - February 2016



0216 R502-19

Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - February 2016

Maximum Value: 28 ppb on Feb 6 18:00

Maximum Daily Average: 8.3 ppb on Feb 6

Minimum Value: 0 ppb on Feb 2 17:00

Minimum Daily Average: 0.5 ppb on Feb 10

Maximum Diurnal Average: 2.9 ppb at hour 15

Minimum Diurnal Average: 0.9 ppb at hour 2

Monthly Average: 2.0 ppb

Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 1 $Q_3 = 2$ $P_{90} = 5$ $P_{99} = 20$

Hours in Service:	696
Hours of Data:	663
Hours of Missing Data:	33
Hours of Calibration:	33
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Feb	0	Z	1	1	1	1	2	2	2	3	4	2	3	4	5	6	6	3	2	0	2	2	1	1	2.4	6
2-Feb	1	1	Z	2	1	2	6	4	2	0	1	2	1	1	2	0	0	1	5	0	0	3	0	0	1.5	6
3-Feb	0	0	0	Z	2	0	1	0	3	2	2	6	8	6	6	5	1	1	1	1	1	2	0	0	2.1	8
4-Feb	0	1	5	17	Z	21	13	12	5	3	4	3	5	6	4	3	3	3	2	1	0	0	0	1	4.8	21
5-Feb	0	0	0	0	0	Z	1	2	2	3	2	2	4	3	3	6	2	1	0	1	0	0	0	1	1.4	6
6-Feb	Z	2	1	2	2	1	0	1	1	1	1	1	1	1	4	6	28	28	21	22	23	20	15	8	8.3	28
7-Feb	2	Z	4	1	0	1	1	1	0	1	2	2	2	1	1	0	0	0	0	1	0	1	1	0	1.0	4
8-Feb	0	1	Z	1	2	2	2	1	1	1	1	2	1	0	3	1	0	2	3	0	2	1	0	1	1.2	3
9-Feb	0	2	1	Z	0	0	2	2	4	4	3	2	3	8	2	0	2	1	5	7	8	4	2	2	2.7	8
10-Feb	0	0	0	0	Z	1	0	0	0	0	0	1	1	1	1	0	0	0	1	1	0	1	0	0	0.5	1
11-Feb	0	0	0	0	1	Z	2	2	1	1	1	1	1	1	1	1	1	3	3	0	4	2	1	1	1.2	4
12-Feb	Z	6	1	1	0	5	6	4	1	1	2	9	5	5	8	3	1	3	3	3	3	11	5	2	3.7	11
13-Feb	2	Z	1	3	2	3	0	1	1	0	0	0	1	1	1	1	1	10	5	1	1	1	0	0	1.6	10
14-Feb	0	0	Z	1	0	1	1	1	1	2	2	1	4	1	1	2	1	3	2	2	1	0	1	1	1.3	4
15-Feb	1	0	0	Z	0	0	1	0	1	1	0	1	0	1	1	0	0	1	0	0	1	1	0	2	0.5	2
16-Feb	1	2	1	1	Z	0	3	5	2	15	4	2	2	3	7	3	4	2	1	0	1	1	5	2	3.0	15
17-Feb	2	0	1	0	0	Z	7	3	7	4	3	C	C	C	C	1	1	0	1	0	1	0	0	0	1.7	7
18-Feb	Z	1	0	0	1	3	3	5	4	7	5	3	5	4	6	3	3	2	2	1	0	0	4	7	3.0	7
19-Feb	12	Z	0	0	6	6	6	5	4	3	2	3	3	2	1	2	2	2	1	0	0	0	0	0	2.5	12
20-Feb	0	0	Z	0	0	0	0	6	2	2	3	3	1	2	3	2	0	1	4	1	0	1	0	0	1.4	6
21-Feb	0	0	0	Z	1	2	1	3	1	2	1	1	2	2	1	1	1	0	1	2	2	1	0	0	1.1	3
22-Feb	1	1	1	2	Z	1	0	2	1	1	1	1	1	2	1	0	0	1	1	0	0	0	0	0	0.7	2
23-Feb	0	1	0	0	1	Z	0	1	3	1	2	5	2	5	8	4	7	1	1	0	2	1	1	1	2.1	8
24-Feb	Z	1	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	3	1	1	0	1	1	1	0.7	3
25-Feb	1	Z	1	1	1	0	0	1	0	1	2	1	1	1	1	1	1	1	1	0	0	0	0	1	0.7	2
26-Feb	0	1	Z	1	1	1	1	1	1	3	2	4	4	2	7	8	2	3	1	1	0	0	0	0	1.8	8
27-Feb	0	0	1	Z	1	1	2	1	3	1	2	2	1	1	1	1	2	1	1	1	0	1	1	5	1.3	5
28-Feb	7	3	1	1	Z	1	1	1	1	1	1	2	2	1	1	1	0	1	2	0	0	0	3	3	1.5	7
29-Feb	2	1	1	0	0	Z	0	1	1	2	2	2	3	3	2	1	1	1	4	1	1	1	1	1	1.4	4
	1.3	0.9	1.0	1.4	1.0	2.2	2.2	2.3	1.9	2.3	1.9	2.2	2.4	2.5	2.9	2.2	2.5	2.7	2.5	1.8	1.9	2.0	1.5	1.4	Diurnal Average	
	12	6	5	17	6	21	13	12	7	15	5	9	8	8	8	8	28	28	21	22	23	20	15	8	Diurnal Maximum	

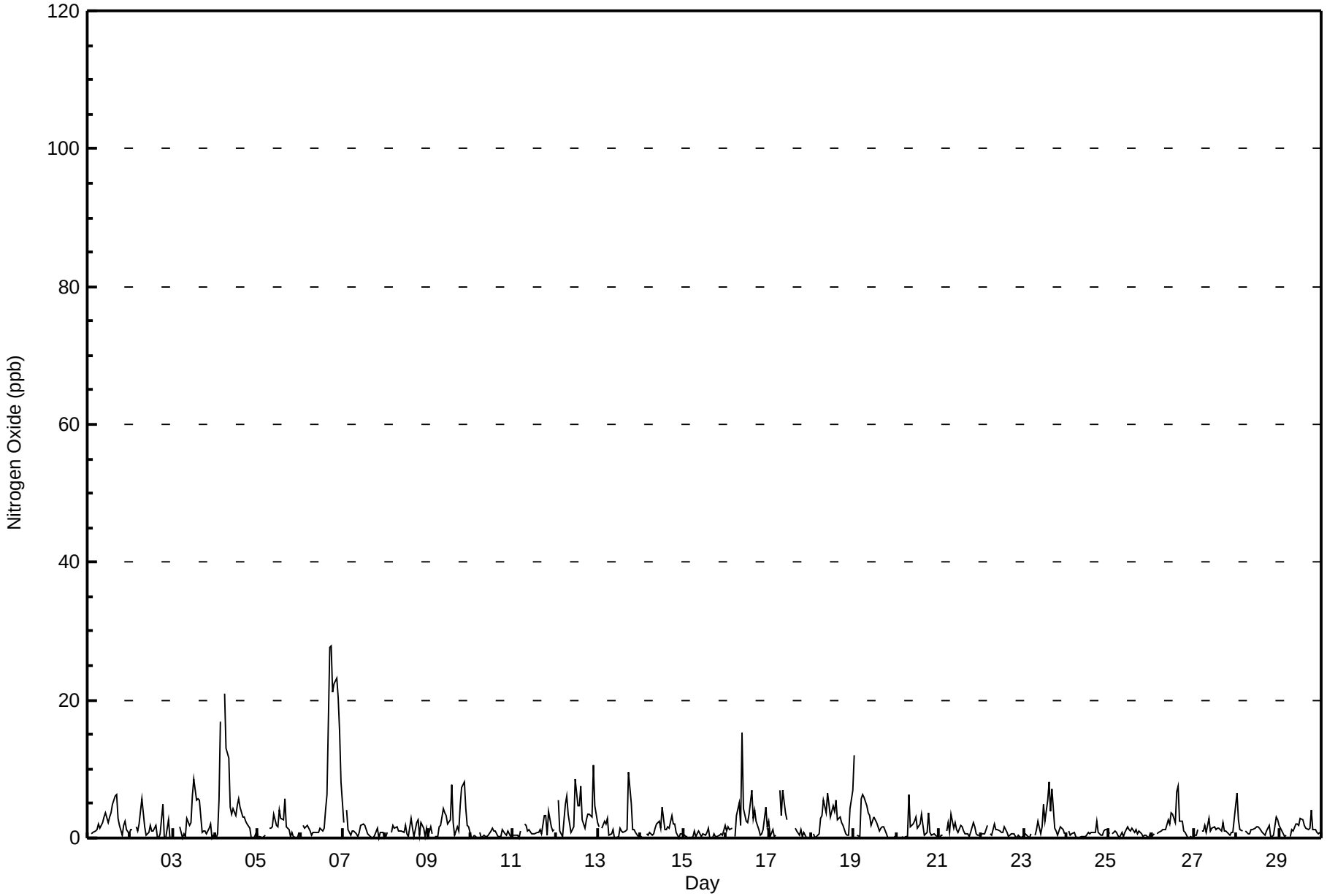
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - February 2016



0216 R502-21

Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	657	99.10	99.10
21 - 40	6	0.90	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: 663

Total Number of Hours: 696

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - February 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	42	26	22	22	11	25	32	28	63	44	35	54	76	88	24	46	638
21 - 40	0	0	0	1	0	0	0	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	42	26	22	23	11	25	32	28	63	44	35	54	76	88	24	46	639

Total Number of Valid Hours: 639

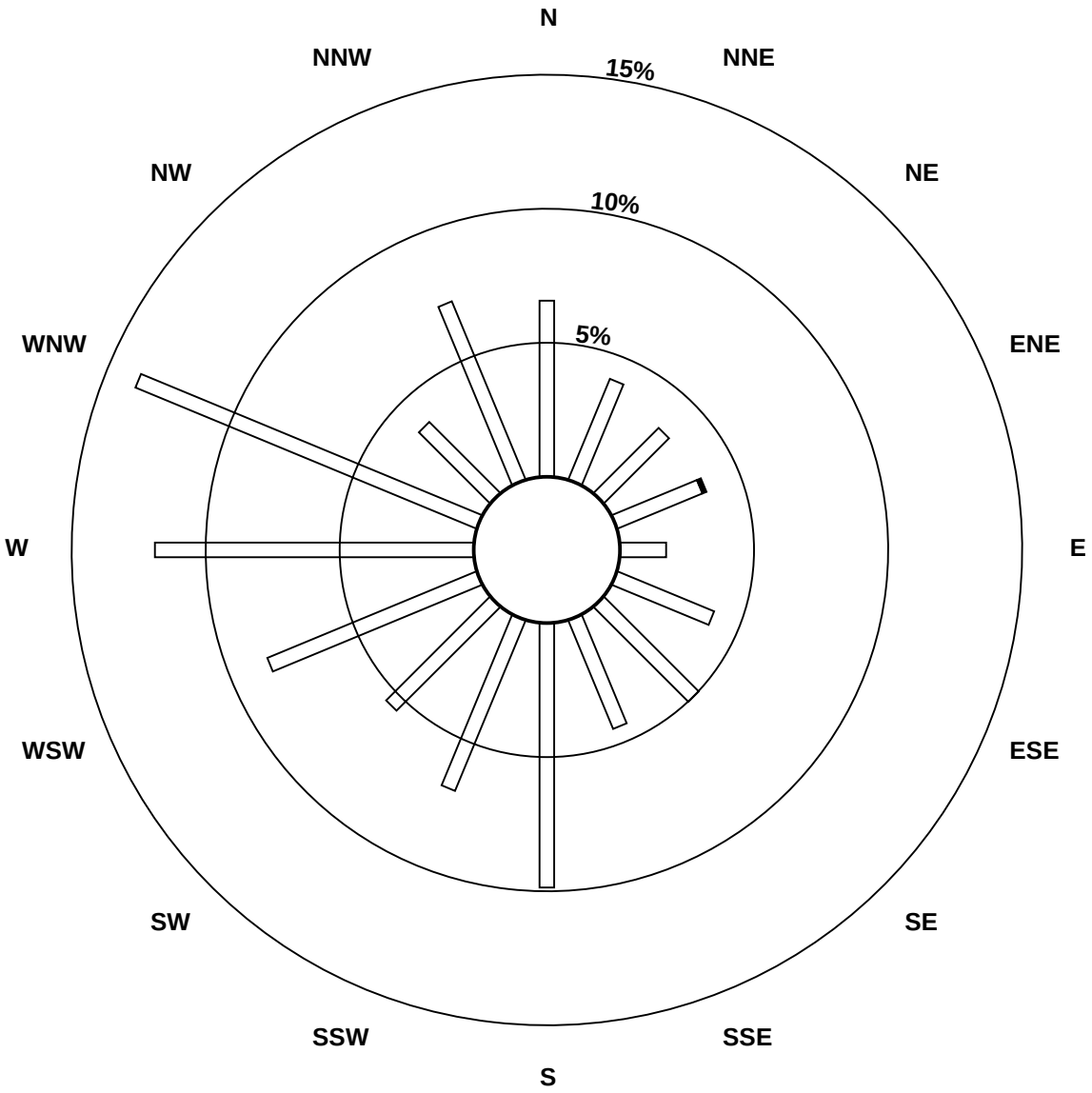
Total Number of Hours: 696

Wood Buffalo Environmental Association

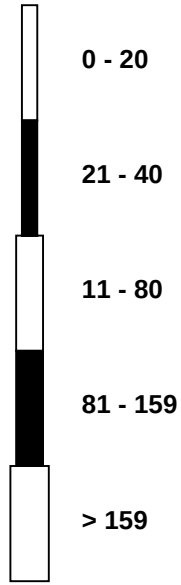
Wind Rose Feb 2016

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont (AMS502)



Classes (ppb)



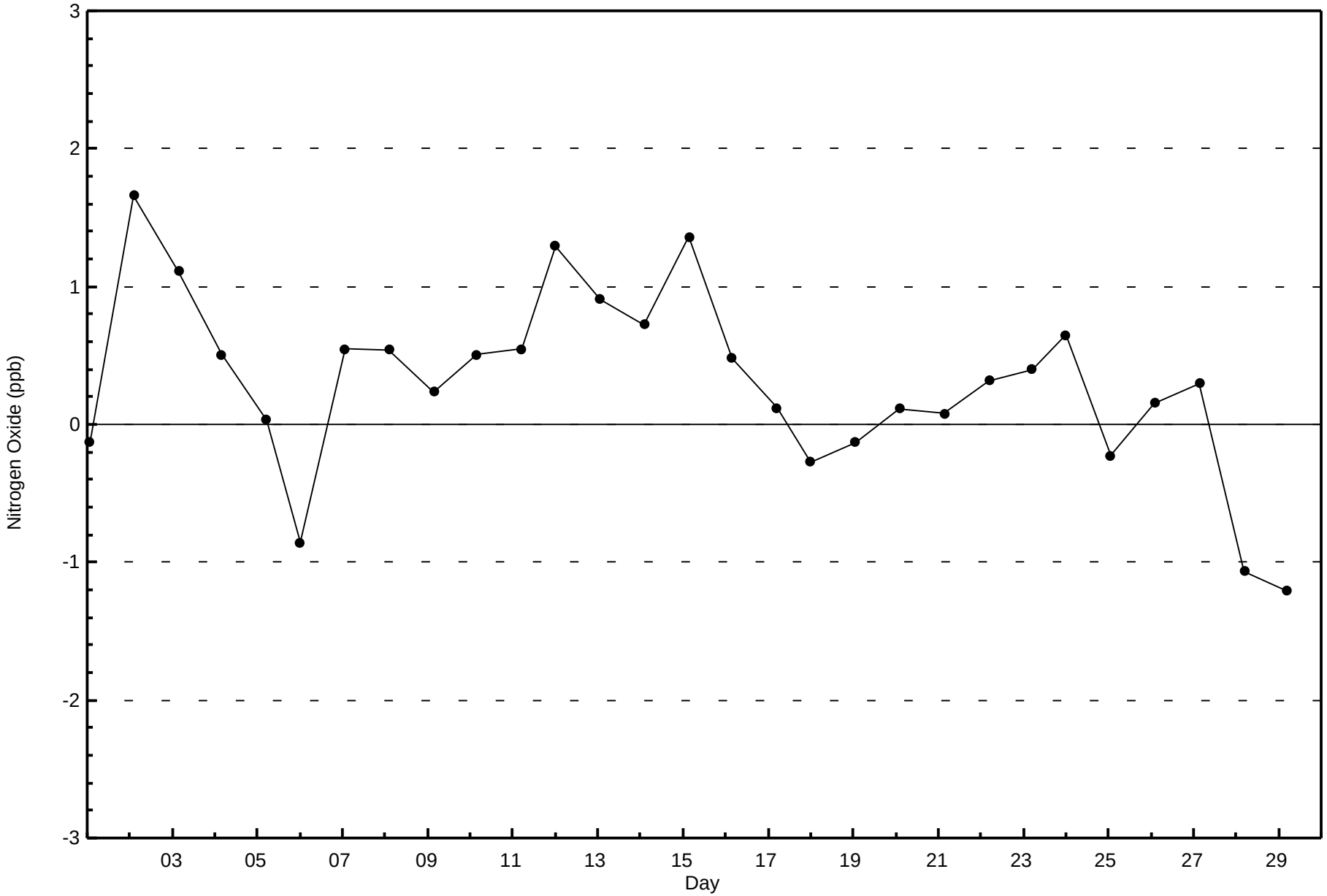
Total Number of Valid Hours: 639

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - February 2016



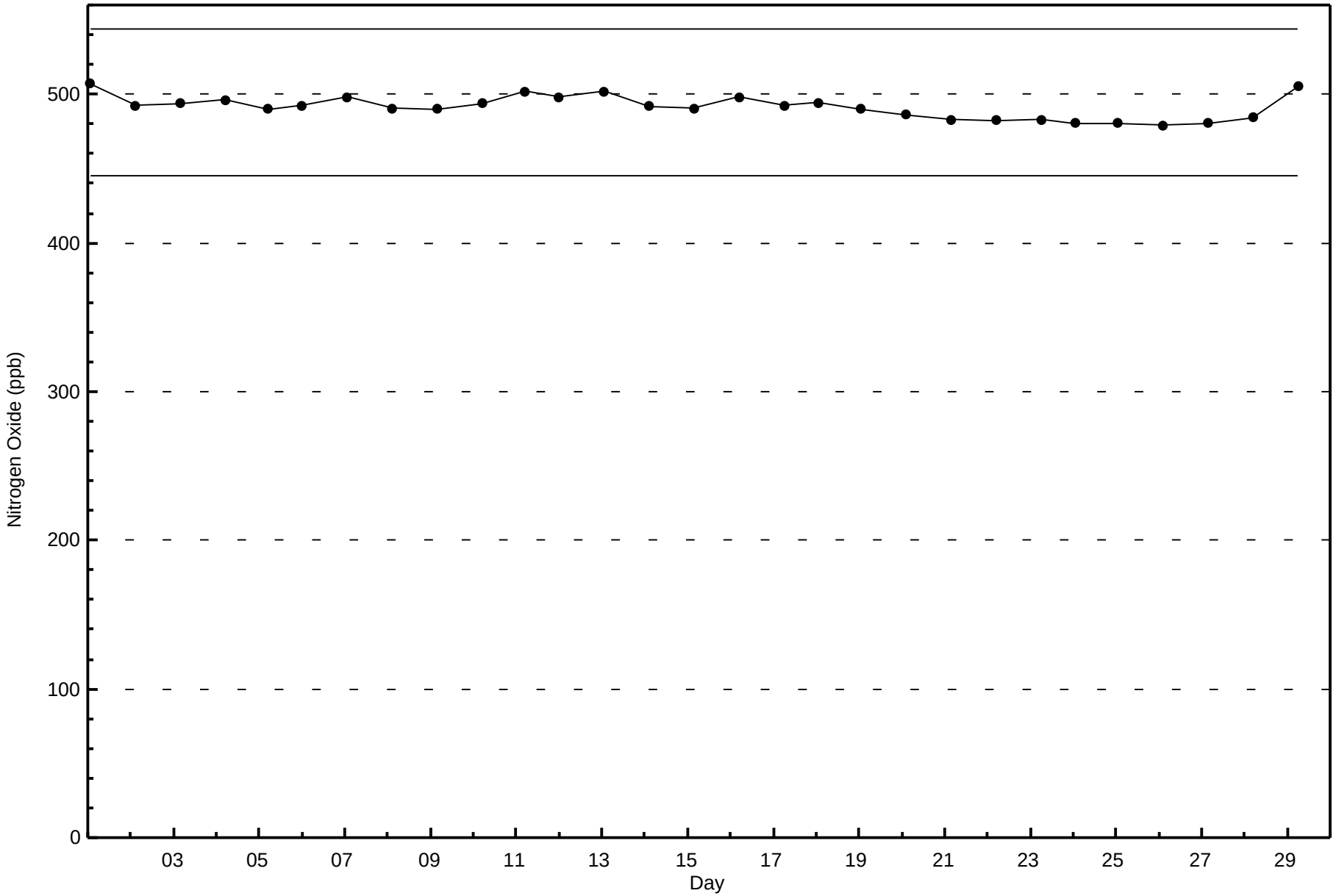
0216 R502-25

Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - February 2016



0216 R502-26

Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0

Maximum Value: 27 ppb on Feb 4 04:00

Maximum Daily Average: 11.5 ppb on Feb 4

Minimum Value: 0 ppb on Feb 27 01:00

Minimum Daily Average: 1.3 ppb on Feb 24

Maximum Diurnal Average: 5.3 ppb at hour 19

Minimum Diurnal Average: 2.9 ppb at hour 13

Monthly Average: 4.1 ppb

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 2$ Median = 3 $Q_3 = 6$ $P_{90} = 9$ $P_{99} = 23$

Hours in Service:	696
Hours of Data:	663
Hours of Missing Data:	33
Hours of Calibration:	33
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Feb	1	Z	3	2	3	3	6	5	4	5	4	3	3	5	6	7	7	9	6	1	0	2	6	0	3.9	9
2-Feb	3	2	Z	2	3	9	10	11	5	2	1	1	1	1	1	1	1	2	6	6	17	12	15	13	5.3	17
3-Feb	10	9	10	Z	7	6	8	9	13	9	8	8	8	7	8	9	9	10	9	8	6	4	4	5	7.9	13
4-Feb	8	15	25	27	Z	25	25	24	17	7	7	6	7	9	8	8	7	6	6	9	5	4	4	6	11.5	27
5-Feb	4	4	3	2	2	Z	3	4	5	7	5	4	8	7	6	9	9	7	6	6	7	7	7	6	5.4	9
6-Feb	Z	5	5	6	9	6	3	2	2	2	1	1	1	1	4	7	10	12	9	10	9	9	9	6	5.7	12
7-Feb	3	Z	4	1	1	2	1	1	1	2	2	2	2	2	2	1	1	1	3	23	20	23	21	18	5.9	23
8-Feb	11	5	Z	6	6	8	1	1	5	6	3	4	1	1	4	2	2	9	13	2	3	3	5	6	4.7	13
9-Feb	3	3	2	Z	4	3	9	6	6	7	5	2	3	5	4	2	2	1	3	6	6	6	13	4	4.5	13
10-Feb	3	3	3	3	Z	5	4	4	3	4	3	4	4	3	2	1	1	3	3	2	1	1	1	1	2.7	5
11-Feb	1	1	2	1	1	Z	4	3	2	2	2	3	2	1	2	3	2	4	6	5	6	2	4	4	2.8	6
12-Feb	Z	5	6	3	2	9	8	5	4	3	4	9	6	5	8	5	3	4	4	5	5	16	10	7	5.9	16
13-Feb	4	Z	5	7	8	7	4	3	5	3	2	2	3	3	3	3	3	8	4	3	3	3	2	1	3.9	8
14-Feb	2	1	Z	3	2	2	1	1	2	2	2	1	4	2	2	2	5	10	8	9	12	7	5	9	4.1	12
15-Feb	9	5	4	Z	4	3	4	3	3	2	2	2	2	4	5	3	2	3	4	4	3	3	3	4	3.4	9
16-Feb	4	3	4	4	Z	3	4	6	4	4	5	3	3	5	5	1	5	5	5	3	4	5	10	8	4.4	10
17-Feb	7	5	4	3	2	Z	20	19	18	10	7	C	C	C	C	7	8	9	8	8	7	6	5	1	8.1	20
18-Feb	Z	1	1	1	1	2	3	2	4	2	4	2	2	2	2	2	3	4	5	5	3	2	4	6	2.7	6
19-Feb	9	Z	5	5	4	4	5	6	5	3	2	3	3	3	2	3	5	8	9	9	7	4	6	6	5.0	9
20-Feb	4	4	Z	7	6	8	7	9	7	5	6	4	3	3	3	2	2	4	4	3	2	1	2	2	4.2	9
21-Feb	2	2	2	Z	2	3	2	3	3	3	2	1	2	2	1	1	2	2	5	6	5	1	1	1	2.3	6
22-Feb	1	1	1	3	Z	1	2	3	3	2	1	1	1	2	1	1	1	1	2	1	1	1	1	2	1.5	3
23-Feb	2	2	2	1	1	Z	1	2	3	1	2	3	2	4	6	5	6	3	6	7	6	2	1	1	3.0	7
24-Feb	Z	1	1	1	1	2	2	1	1	1	1	1	2	2	1	1	1	2	1	2	2	1	2	1	1.3	2
25-Feb	1	Z	2	2	2	2	2	3	3	3	3	2	2	1	1	1	1	1	1	1	1	1	0	0	1.5	3
26-Feb	0	0	Z	0	1	1	1	1	0	2	1	2	2	1	4	7	4	6	7	3	1	0	0	0	1.9	7
27-Feb	0	0	0	Z	0	0	0	0	1	1	1	1	0	1	1	1	6	6	4	3	3	2	2	5	1.6	6
28-Feb	5	16	14	6	Z	4	4	5	2	2	2	2	2	2	1	1	1	3	4	3	1	1	1	2	3.7	16
29-Feb	5	2	3	1	4	Z	2	1	1	0	1	1	2	2	2	2	2	1	2	1	2	1	1	2	1.8	5
	4.1	3.9	4.5	4.0	3.2	4.8	5.0	4.9	4.5	3.5	3.0	2.9	2.9	3.0	3.4	3.3	3.8	4.9	5.3	5.3	5.0	4.6	5.0	4.3	Diurnal Average	
	11	16	25	27	9	25	25	24	18	10	8	9	8	9	8	9	10	12	13	23	20	23	21	18	Diurnal Maximum	

Z - zerospan C - Calibration

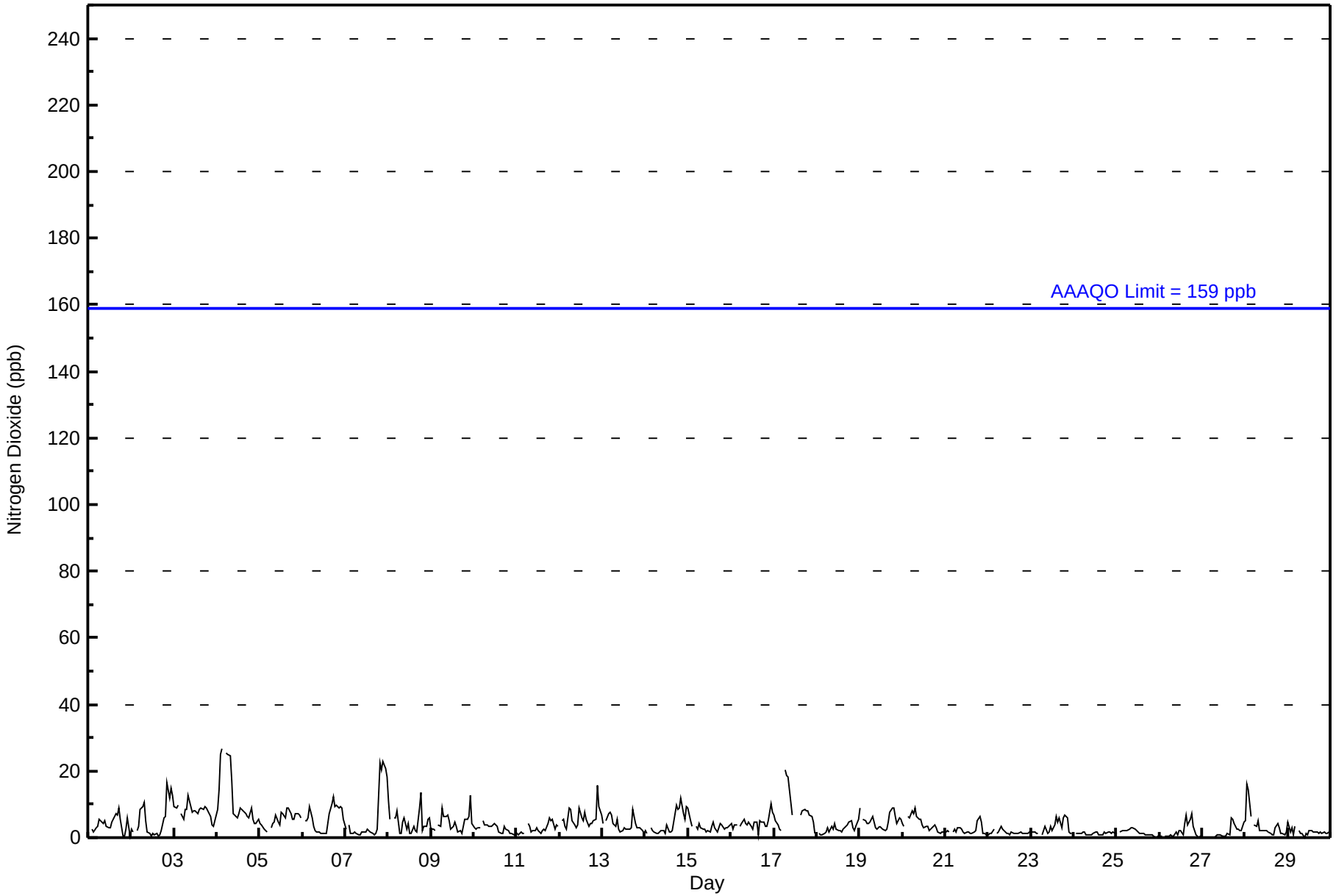
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - February 2016



0216 R502-28

Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	655	98.79	98.79
21 - 40	8	1.21	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: 663

Total Number of Hours: 696

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - February 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	41	24	22	21	11	23	32	27	63	44	35	54	76	88	24	46	631
21 - 40	1	2	0	2	0	2	0	1	0	0	0	0	0	0	0	0	8
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	42	26	22	23	11	25	32	28	63	44	35	54	76	88	24	46	639

Total Number of Valid Hours: 639

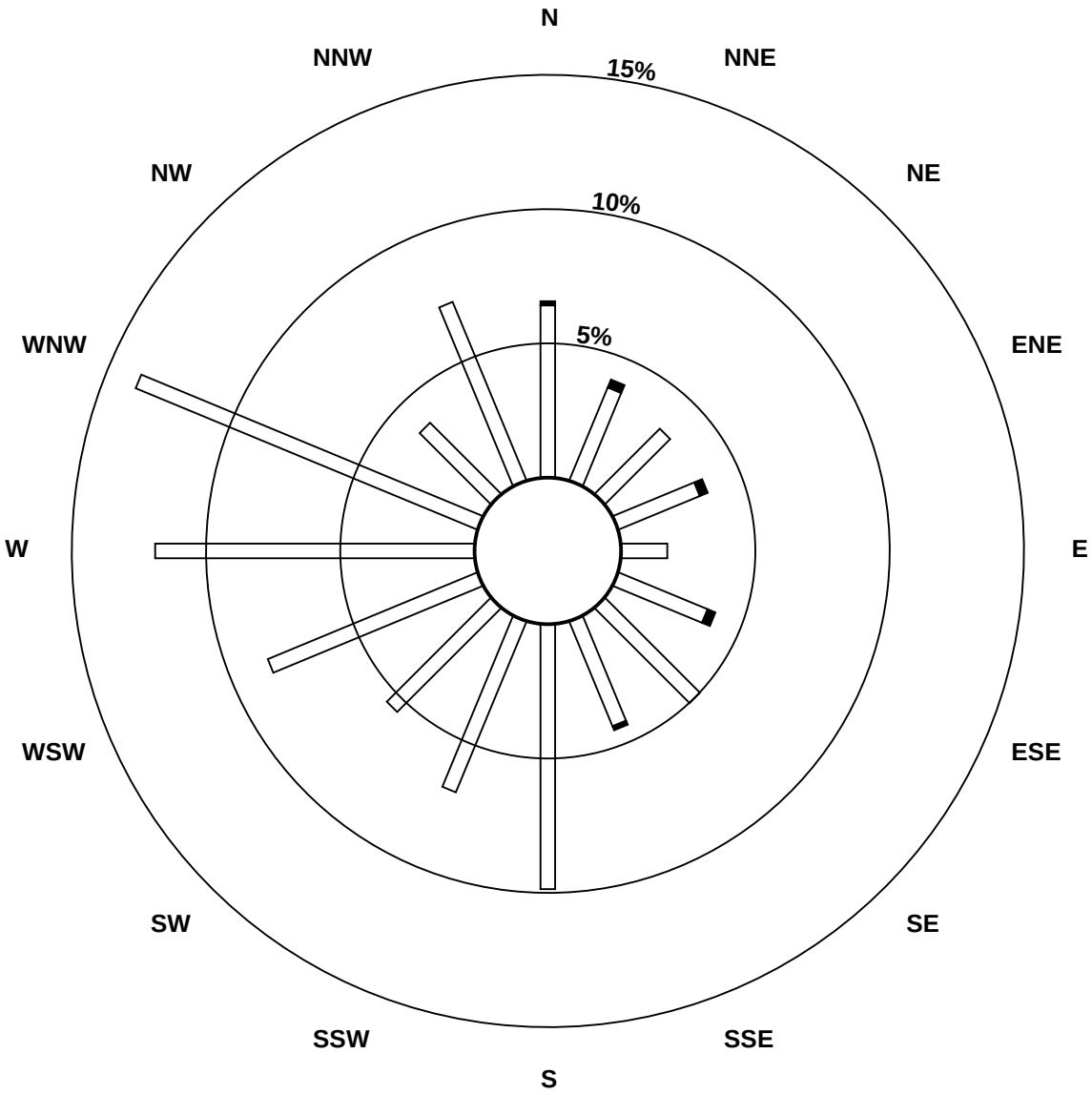
Total Number of Hours: 696

Wood Buffalo Environmental Association

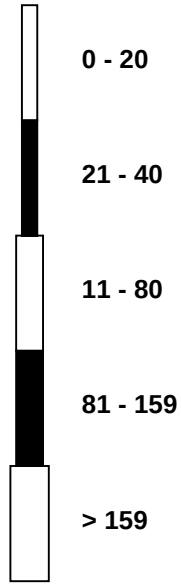
Wind Rose Feb 2016

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont (AMS502)



Classes (ppb)



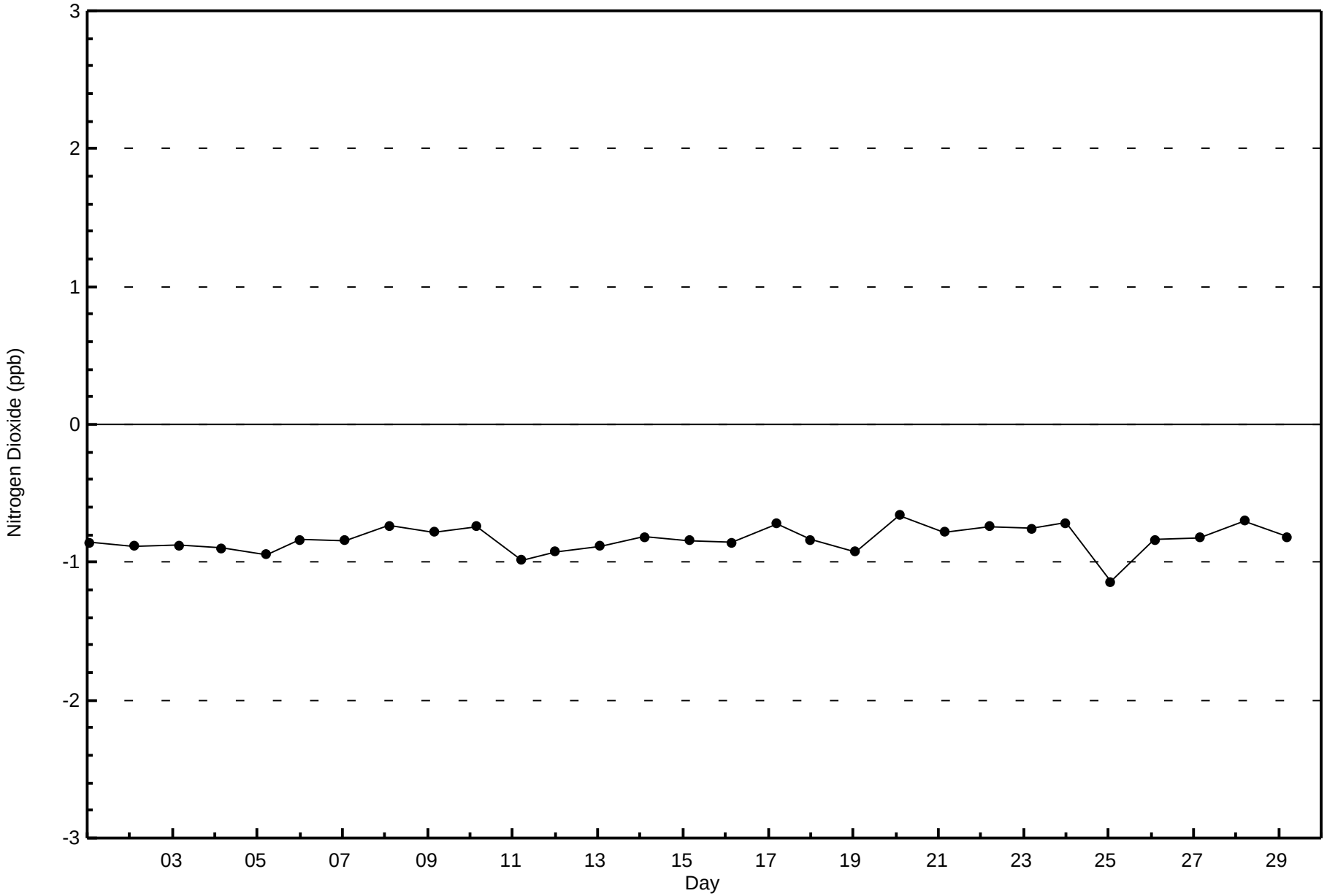
Total Number of Valid Hours: 639

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - February 2016



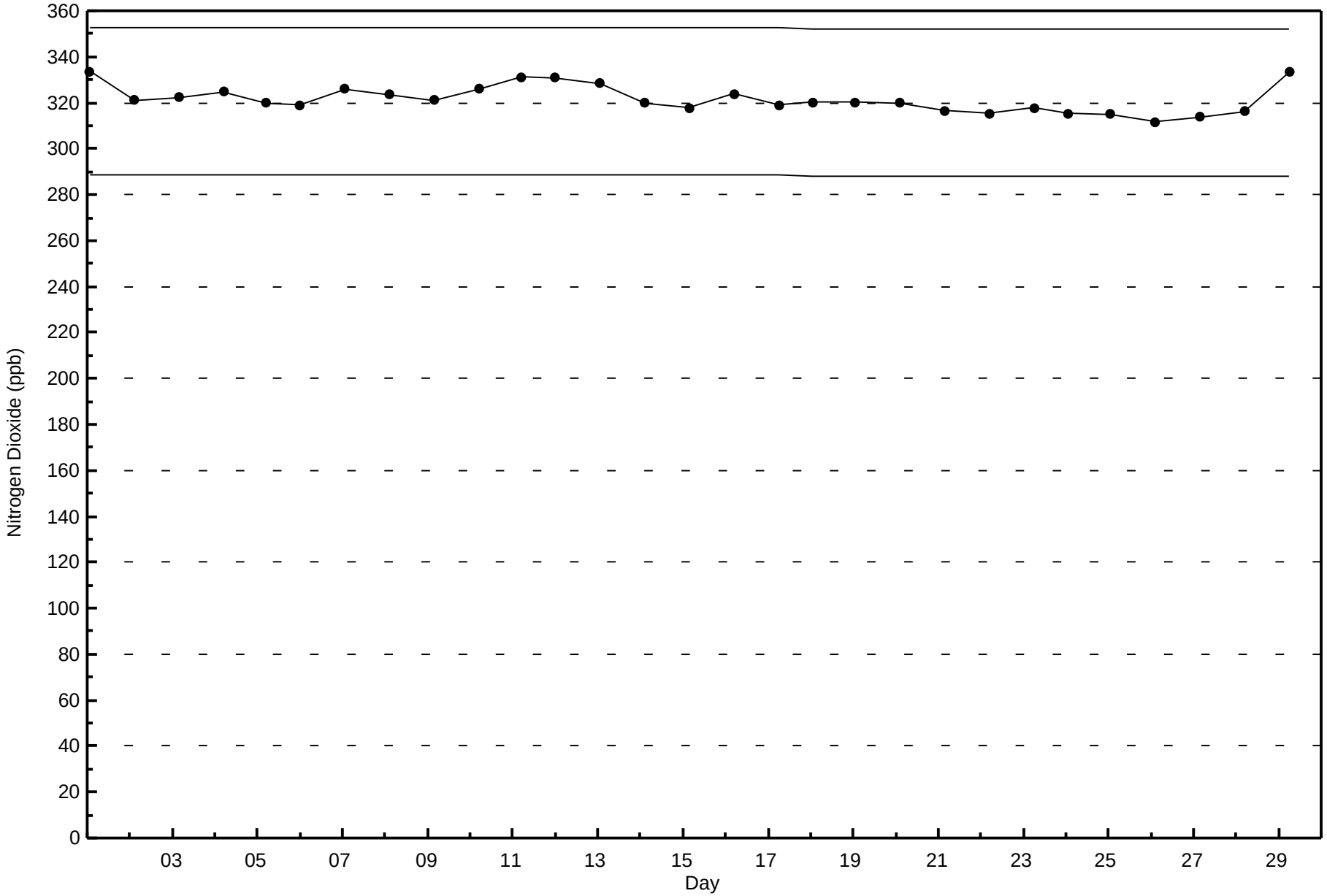
0216 R502-32

Wood Buffalo Environmental Association

Span Responses

Nitrogen Dioxide (NO_2) - ppb

ConocoPhillips - Surmont - February 2016



0216 R502-33

Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - February 2016

Maximum Value: 46 ppb on Feb 4 06:00

Maximum Daily Average: 16.4 ppb on Feb 4

Minimum Value: 0 ppb on Feb 25 23:00

Minimum Daily Average: 1.9 ppb on Feb 24

Maximum Diurnal Average: 7.8 ppb at hour 19

Minimum Diurnal Average: 4.2 ppb at hour 5

Monthly Average: 6.1 ppb

Percentiles: $P_1 = 1$ $P_{10} = 2$ $Q_1 = 2$ Median = 4 $Q_3 = 8$ $P_{90} = 12$ $P_{99} = 32$

Hours in Service:	696
Hours of Data:	663
Hours of Missing Data:	33
Hours of Calibration:	33
Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Feb	2	Z	3	2	4	5	8	6	6	8	7	5	6	9	10	14	13	12	7	1	2	5	7	1	6.2	14
2-Feb	4	3	Z	4	4	11	15	14	7	2	2	2	2	2	3	1	1	3	11	6	17	15	15	13	6.8	17
3-Feb	10	9	10	Z	9	6	9	9	16	11	10	14	16	13	14	14	9	10	10	9	8	6	4	5	10.0	16
4-Feb	8	15	31	44	Z	46	38	36	21	11	11	9	12	15	13	11	10	9	8	10	5	4	4	7	16.4	46
5-Feb	4	4	3	2	2	Z	5	6	6	10	6	5	12	10	9	14	10	9	6	6	7	8	7	7	6.8	14
6-Feb	Z	7	6	8	11	7	4	3	3	2	2	3	2	3	8	14	38	40	30	32	32	30	24	14	14.0	40
7-Feb	5	Z	8	3	1	3	2	1	1	3	4	4	4	3	3	1	1	1	3	24	20	24	22	18	6.9	24
8-Feb	11	6	Z	7	8	10	3	2	6	7	4	6	2	2	6	4	2	11	16	3	6	5	6	7	6.0	16
9-Feb	3	4	3	Z	4	3	11	8	11	11	8	4	6	12	6	2	4	2	8	13	14	10	14	6	7.3	14
10-Feb	3	3	3	3	Z	6	4	4	4	4	4	5	5	4	3	1	2	4	4	3	1	2	1	1	3.2	6
11-Feb	2	1	2	1	2	Z	6	5	3	3	3	3	3	2	3	4	3	8	9	5	9	4	5	5	4.0	9
12-Feb	Z	10	7	4	3	14	14	9	5	4	5	18	11	10	15	8	5	7	8	9	8	26	14	9	9.6	26
13-Feb	6	Z	6	10	10	10	5	4	7	3	2	2	5	4	3	4	4	18	9	4	4	4	2	1	5.5	18
14-Feb	2	1	Z	3	3	2	2	2	3	4	5	3	8	3	3	4	6	13	10	11	12	7	6	10	5.4	13
15-Feb	9	5	4	Z	4	3	5	3	4	3	2	3	2	4	6	3	2	4	5	4	3	3	3	6	3.9	9
16-Feb	5	4	5	5	Z	3	7	11	6	19	9	6	5	8	11	4	9	7	6	4	4	6	15	9	7.4	19
17-Feb	9	5	5	3	3	Z	27	22	25	14	9	C	C	C	C	8	9	9	9	8	7	6	5	1	9.8	27
18-Feb	Z	2	1	1	2	4	6	7	7	9	9	5	7	6	7	5	6	6	6	6	4	3	8	13	5.7	13
19-Feb	21	Z	6	5	10	11	11	11	8	6	4	6	6	5	3	4	6	9	10	9	6	4	6	6	7.6	21
20-Feb	4	4	Z	7	6	8	7	15	8	8	8	7	4	5	7	4	3	4	8	4	2	2	2	2	5.6	15
21-Feb	2	2	2	Z	3	5	3	6	4	5	3	2	4	3	2	2	2	2	6	8	6	2	2	2	3.4	8
22-Feb	2	2	2	4	Z	2	2	5	4	3	2	2	2	3	2	1	2	2	2	1	1	2	1	2	2.2	5
23-Feb	2	2	2	1	2	Z	1	3	6	2	3	8	4	9	15	8	13	5	7	7	7	3	2	2	5.1	15
24-Feb	Z	2	2	2	2	2	1	1	1	1	1	1	2	2	2	2	2	4	2	2	2	2	3	3	1.9	4
25-Feb	2	Z	2	3	3	3	2	3	3	4	4	3	3	3	2	2	2	2	1	1	1	1	0	1	2.2	4
26-Feb	1	1	Z	1	1	1	2	2	2	4	3	6	6	3	11	14	6	8	8	4	1	0	0	0	3.7	14
27-Feb	0	0	1	Z	1	1	2	1	4	2	2	2	2	2	2	2	8	7	5	3	3	3	3	9	2.9	9
28-Feb	12	19	15	7	Z	5	4	6	3	3	4	4	4	3	2	2	1	4	6	3	1	2	4	4	5.2	19
29-Feb	7	3	4	1	4	Z	2	2	2	2	3	3	5	5	3	3	3	3	6	3	3	2	2	3	3.2	7
	5.4	4.8	5.5	5.5	4.2	7.1	7.2	7.2	6.4	5.8	4.8	5.1	5.3	5.4	6.3	5.5	6.3	7.6	7.8	7.0	6.9	6.6	6.5	5.7	Diurnal Average	
	21	19	31	44	11	46	38	36	25	19	11	18	16	15	15	14	38	40	30	32	32	30	24	18	Diurnal Maximum	

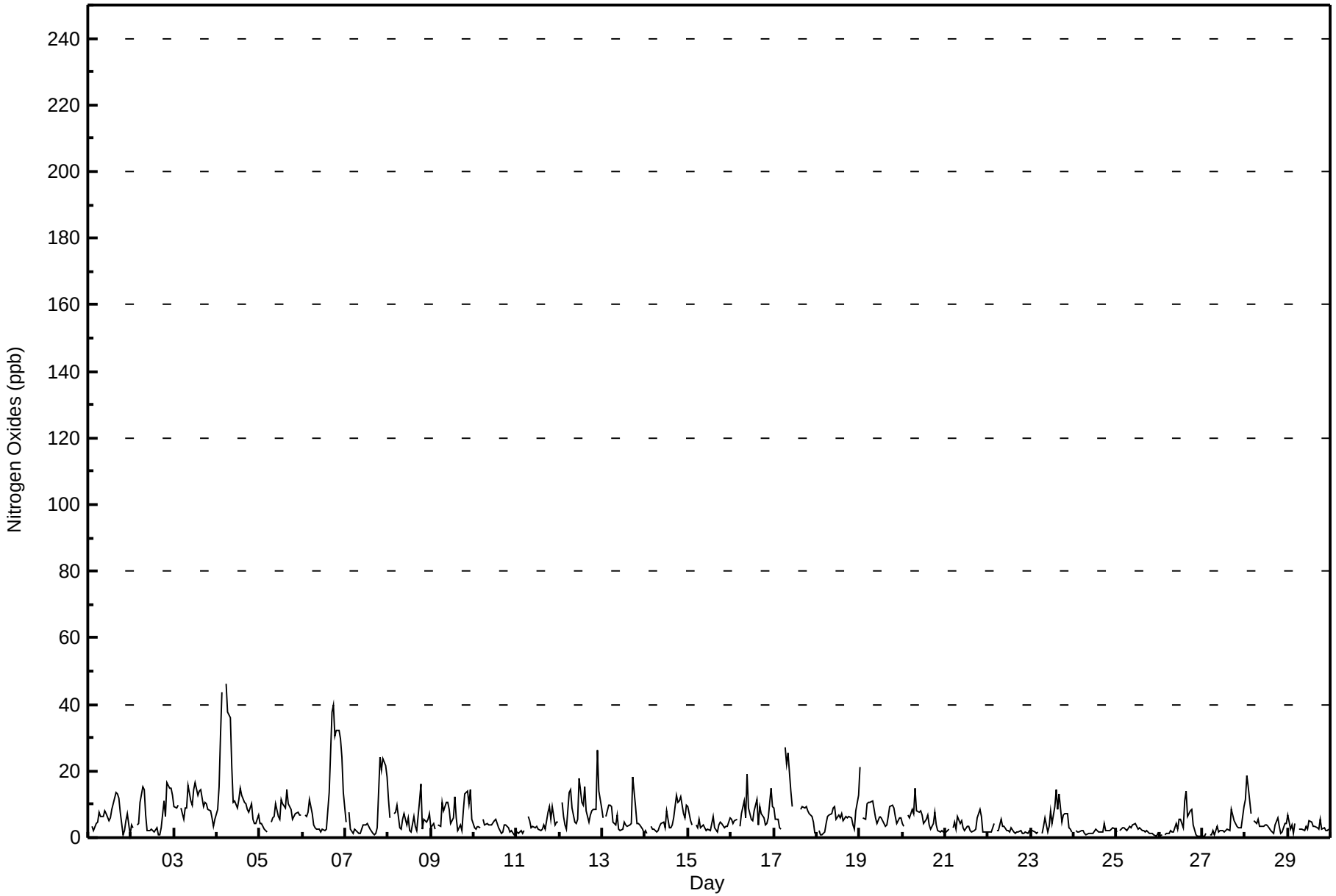
Z - zerospan C - Calibration

Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - February 2016



0216 R502-35

Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	642	96.83	96.83
21 - 40	19	2.87	99.70
11 - 80	2	0.30	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 663

Total Number of Hours: 696

Wood Buffalo Environmental Association

Frequency Distribution

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - February 2016

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 20	39	24	22	21	11	22	32	26	63	44	35	54	76	88	24	44	625
21 - 40	3	1	0	1	0	3	0	2	0	0	0	0	0	0	0	2	12
11 - 80	0	1	0	1	0	0	0	0	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	42	26	22	23	11	25	32	28	63	44	35	54	76	88	24	46	639

Total Number of Valid Hours: 639

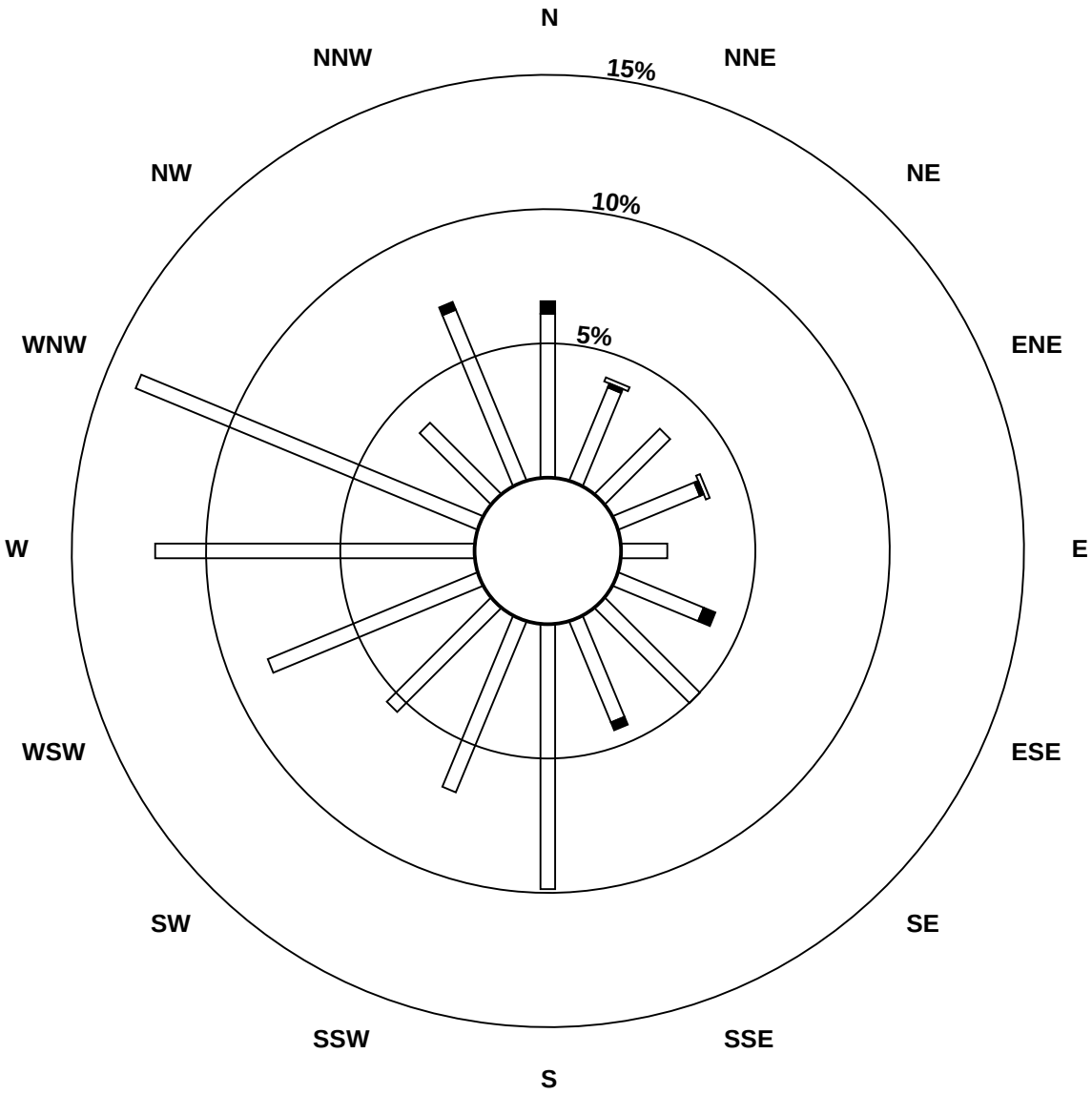
Total Number of Hours: 696

Wood Buffalo Environmental Association

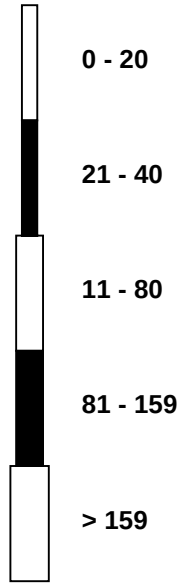
Wind Rose Feb 2016

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont (AMS502)



Classes (ppb)



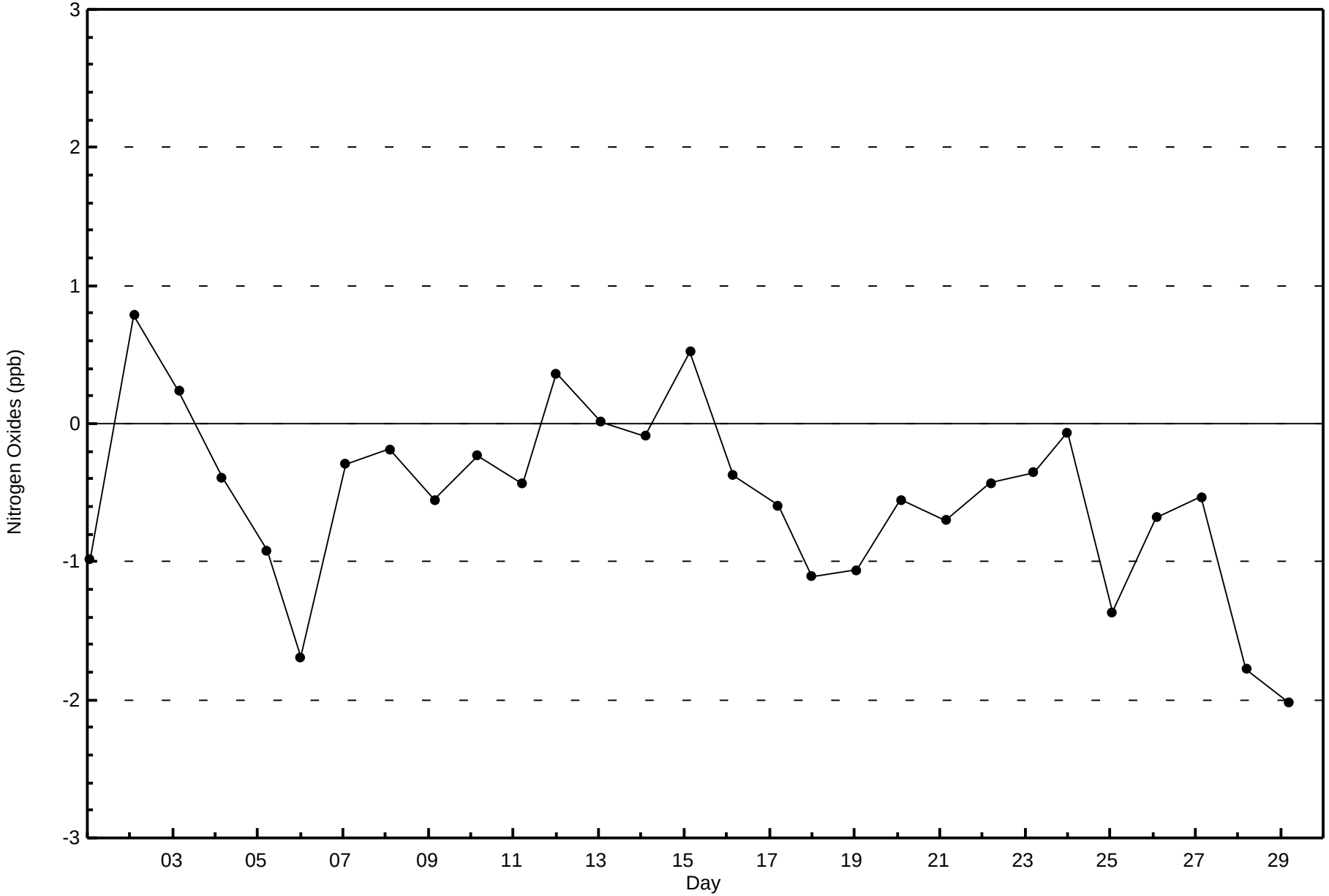
Total Number of Valid Hours: 639

Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - February 2016



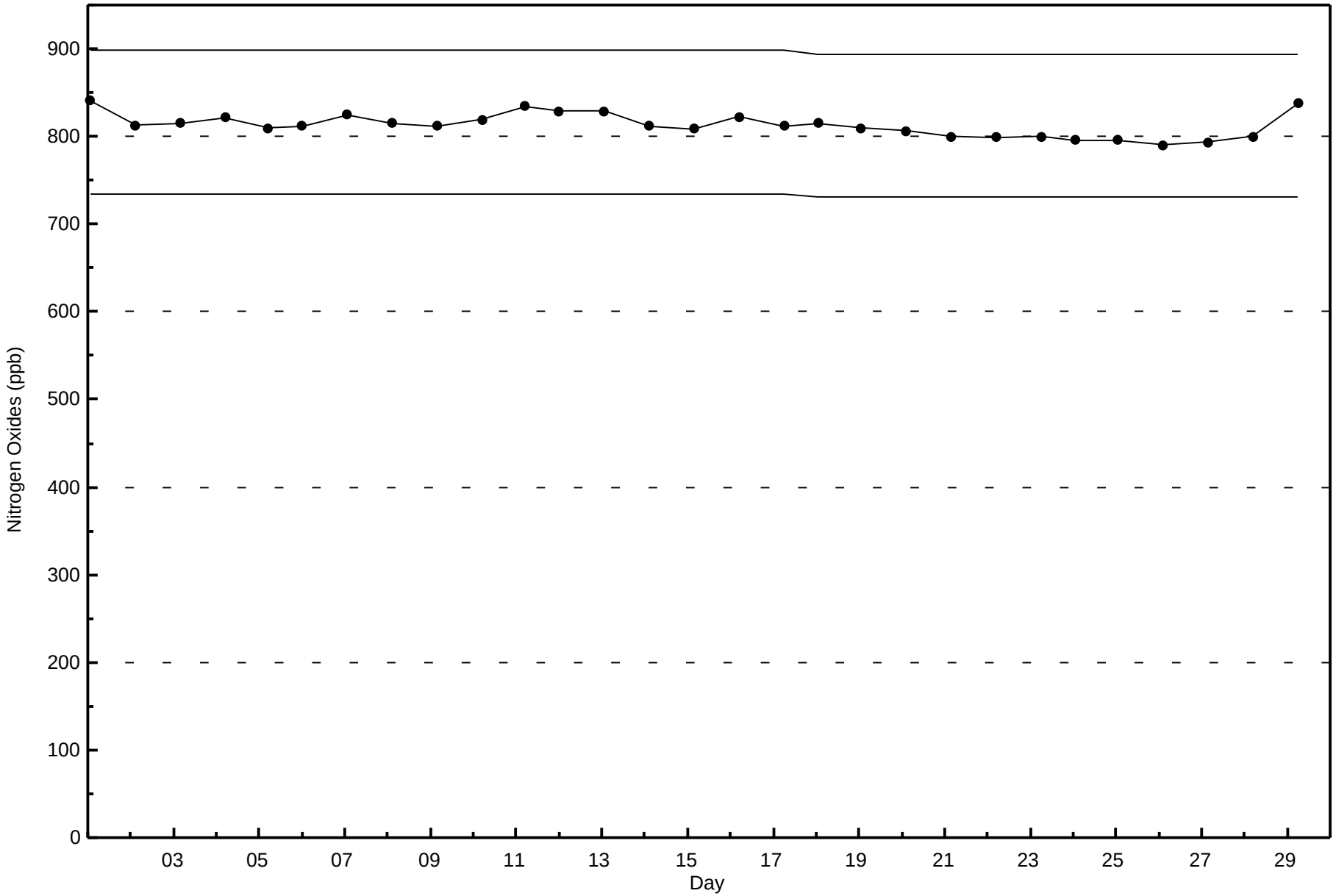
0216 R502-39

Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_X) - ppb

ConocoPhillips - Surmont - February 2016



0216 R502-40

Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

ConocoPhillips - Surmont - February 2016

Maximum Value: 8.0 C on Feb 26 15:00

Maximum Daily Average: 3.1 C on Feb 26

Minimum Value: -25.2 C on Feb 29 03:00

Minimum Daily Average: -18.6 C on Feb 28

Maximum Diurnal Average: -5.2 C at hour 16

Minimum Diurnal Average: -10.1 C at hour 8

Monthly Average: -7.77 C

Percentiles: P_1 = -23.7 P_{10} = -16.8 Q_1 = -12.9 Median = -8.2 Q_3 = -2.0 P_{90} = 1.2 P_{99} = 6.5

Hours in Service:	696
Hours of Data:	696
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

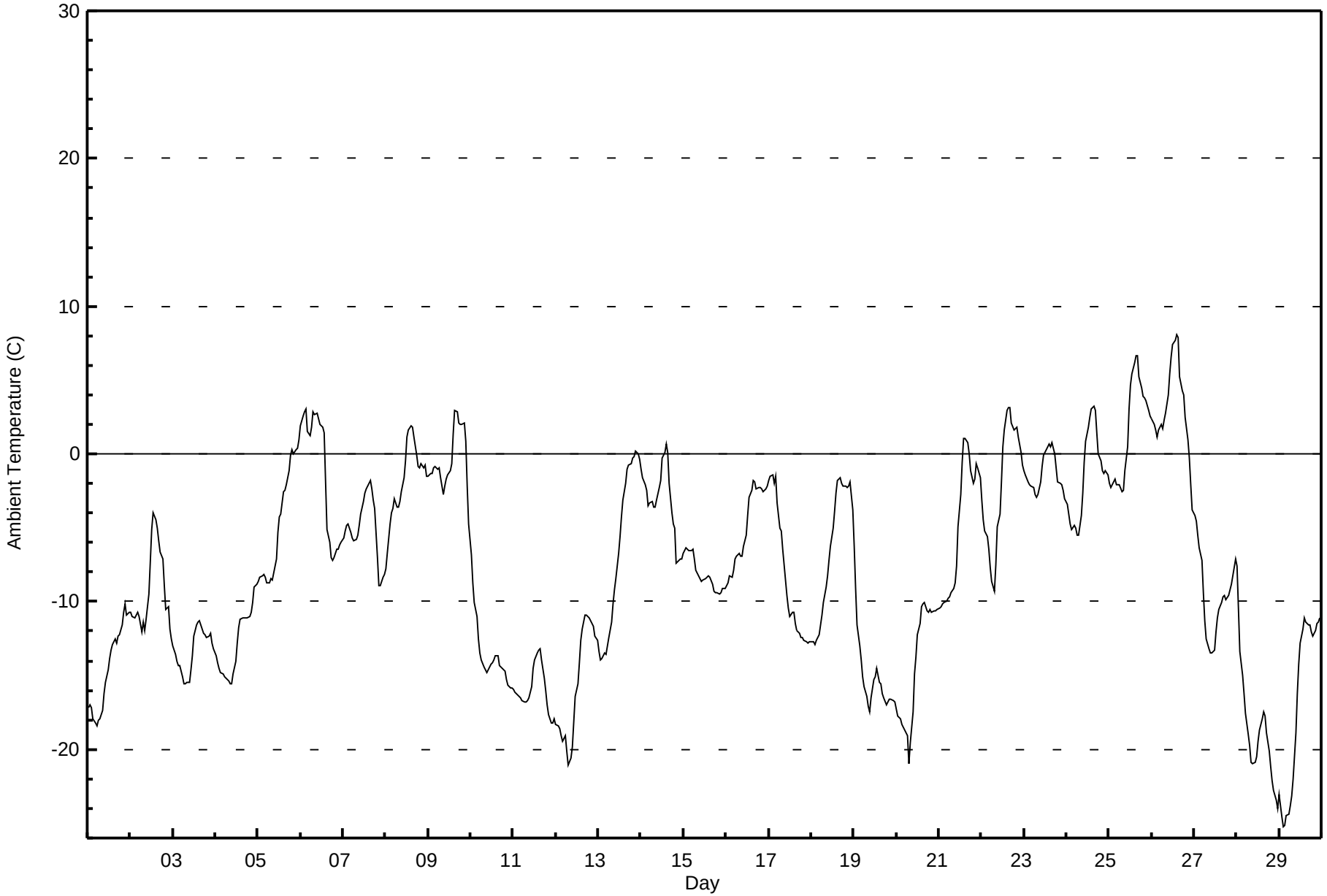
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Feb	-17.2	-17.0	-17.2	-17.9	-18.2	-18.4	-18.0	-18.0	-17.4	-16.2	-15.5	-14.6	-13.9	-13.3	-12.9	-12.5	-12.8	-12.4	-12.2	-11.6	-10.7	-10.2	-10.9	-10.7	-14.6	-10.2
2-Feb	-10.7	-11.0	-11.1	-10.9	-10.7	-11.0	-12.0	-11.4	-12.0	-11.2	-9.5	-7.3	-5.1	-4.0	-4.4	-5.0	-5.9	-6.7	-7.1	-8.9	-10.5	-10.3	-11.9	-12.6	-9.2	-4.0
3-Feb	-13.0	-13.6	-14.1	-14.3	-14.4	-15.1	-15.6	-15.6	-15.4	-15.5	-14.6	-13.6	-12.3	-11.6	-11.4	-11.3	-11.8	-12.2	-12.3	-12.4	-12.4	-12.2	-12.8	-13.2	-13.4	-11.3
4-Feb	-13.6	-14.1	-14.6	-14.8	-14.9	-15.1	-15.2	-15.4	-15.6	-15.6	-14.9	-14.1	-12.8	-11.8	-11.2	-11.1	-11.1	-11.1	-11.1	-11.0	-10.8	-10.1	-9.0	-8.8	-12.8	-8.8
5-Feb	-8.7	-8.3	-8.3	-8.2	-8.3	-8.7	-8.7	-8.5	-8.5	-8.1	-7.1	-5.3	-4.2	-4.1	-2.6	-2.5	-2.1	-1.1	-0.1	0.3	0.0	0.3	0.4	1.0	-4.6	1.0
6-Feb	1.9	2.5	2.9	3.0	1.5	1.2	1.8	2.9	2.6	2.7	2.3	2.0	1.8	1.4	-1.9	-5.1	-6.0	-7.0	-7.2	-7.0	-6.5	-6.4	-6.2	-6.0	-1.2	3.0
7-Feb	-5.7	-5.2	-4.8	-4.7	-5.3	-5.7	-5.9	-5.7	-5.5	-4.8	-4.1	-3.3	-2.7	-2.4	-2.2	-1.8	-2.3	-3.1	-3.7	-7.0	-8.9	-8.9	-8.4	-8.1	-5.0	-1.8
8-Feb	-7.8	-6.7	-4.8	-4.0	-3.7	-3.1	-3.6	-3.6	-3.3	-2.5	-1.6	-0.5	1.1	1.6	1.9	1.8	1.1	-0.1	-0.8	-1.0	-0.7	-1.0	-0.7	-1.5	-1.8	1.9
9-Feb	-1.5	-1.3	-1.4	-0.9	-0.8	-1.0	-1.0	-1.6	-2.7	-2.1	-1.7	-1.4	-1.1	-0.7	1.3	3.0	2.8	2.1	2.0	2.0	2.1	0.8	-2.1	-4.7	-0.4	3.0
10-Feb	-6.8	-8.7	-10.1	-11.0	-12.5	-13.5	-14.0	-14.4	-14.6	-14.8	-14.6	-14.3	-14.1	-13.9	-13.6	-13.7	-14.3	-14.4	-14.5	-14.7	-15.2	-15.7	-15.9	-15.9	-13.6	-6.8
11-Feb	-16.0	-16.1	-16.3	-16.4	-16.5	-16.7	-16.8	-16.8	-16.7	-16.5	-15.8	-14.6	-14.0	-13.5	-13.3	-13.2	-14.0	-15.2	-16.1	-16.9	-17.6	-18.2	-18.2	-18.0	-16.0	-13.2
12-Feb	-18.3	-18.4	-18.6	-19.1	-19.4	-19.0	-20.2	-21.1	-20.6	-19.8	-18.1	-16.4	-15.5	-14.2	-12.6	-11.9	-10.9	-10.9	-11.0	-11.1	-11.4	-11.7	-12.4	-12.6	-15.6	-10.9
13-Feb	-13.4	-13.9	-13.8	-13.5	-13.6	-13.0	-12.4	-11.4	-10.1	-9.2	-8.4	-6.7	-5.6	-4.3	-3.1	-2.0	-1.1	-0.8	-0.7	-0.3	-0.2	0.2	0.0	-0.4	-6.6	0.2
14-Feb	-1.0	-1.6	-2.1	-2.4	-3.5	-3.3	-3.2	-3.6	-3.6	-3.1	-2.3	-1.8	-0.2	0.1	0.7	0.1	-2.0	-3.9	-4.7	-5.0	-7.4	-7.2	-7.1	-7.1	-3.1	0.7
15-Feb	-6.7	-6.4	-6.4	-6.5	-6.6	-6.5	-7.1	-7.8	-8.3	-8.5	-8.6	-8.5	-8.4	-8.4	-8.3	-8.4	-8.8	-9.3	-9.4	-9.4	-9.4	-9.4	-9.1	-9.1	-8.1	-6.4
16-Feb	-8.9	-8.7	-8.2	-8.3	-7.9	-7.1	-7.0	-6.7	-6.9	-6.9	-6.2	-5.5	-4.2	-2.9	-2.5	-1.8	-1.9	-2.3	-2.3	-2.3	-2.4	-2.6	-2.3	-2.2	-4.9	-1.8
17-Feb	-1.8	-1.5	-1.4	-1.9	-1.5	-3.3	-5.0	-5.2	-6.5	-8.6	-9.6	-10.4	-11.0	-10.7	-10.8	-11.4	-12.0	-12.1	-12.4	-12.5	-12.6	-12.7	-12.8	-12.7	-8.4	-1.4
18-Feb	-12.7	-12.7	-12.9	-12.6	-12.2	-11.6	-10.9	-10.1	-9.1	-8.3	-7.2	-6.2	-5.1	-3.8	-2.6	-1.8	-1.6	-2.0	-2.2	-2.2	-2.3	-2.2	-1.9	-3.8	-6.6	-1.6
19-Feb	-6.3	-9.1	-11.5	-13.0	-13.9	-15.1	-15.8	-16.4	-17.1	-17.5	-16.5	-15.2	-15.1	-14.6	-15.5	-15.6	-16.3	-16.5	-17.0	-16.8	-16.6	-16.6	-16.7	-16.8	-15.1	-6.3
20-Feb	-17.3	-17.8	-18.0	-18.3	-18.5	-18.8	-19.1	-20.9	-19.6	-17.5	-14.9	-13.8	-12.2	-11.5	-10.3	-10.1	-10.0	-10.6	-10.7	-10.6	-10.7	-10.6	-10.6	-10.5	-14.3	-10.0
21-Feb	-10.4	-10.3	-10.2	-10.1	-9.9	-9.8	-9.7	-9.4	-9.1	-8.7	-7.6	-5.0	-2.7	-0.6	1.0	1.0	0.7	0.0	-1.1	-2.0	-1.7	-0.7	-0.9	-1.6	-4.9	1.0
22-Feb	-3.2	-4.5	-5.2	-5.6	-6.5	-7.7	-8.7	-9.3	-7.5	-5.0	-4.0	-1.9	0.5	1.6	2.9	3.1	3.1	2.1	1.6	1.7	1.8	1.2	0.1	-0.7	-2.1	3.1
23-Feb	-1.2	-1.4	-1.9	-2.1	-2.1	-2.3	-2.8	-3.0	-2.8	-1.9	-0.8	-0.1	0.1	0.5	0.7	0.5	0.7	0.0	-1.0	-1.9	-2.0	-2.1	-2.5	-3.0	-1.3	0.7
24-Feb	-3.4	-4.0	-4.7	-5.1	-4.8	-5.0	-5.5	-5.5	-4.2	-2.6	-0.6	0.9	1.9	2.4	3.0	3.3	2.9	1.4	0.0	-0.5	-1.2	-1.3	-1.1	-1.4	-1.5	3.3
25-Feb	-2.0	-2.3	-2.1	-1.7	-2.1	-2.1	-2.1	-2.5	-2.5	-1.1	0.5	3.1	4.6	5.4	6.2	6.6	6.6	5.2	4.5	3.9	3.8	3.6	3.0	2.6	1.6	6.6
26-Feb	2.4	2.0	1.7	1.2	1.6	2.0	1.8	2.3	2.8	4.0	5.4	6.5	7.4	7.7	8.0	7.8	5.2	4.3	4.0	2.5	1.0	-0.3	-2.1	-3.8	3.1	8.0
27-Feb	-4.2	-4.6	-5.5	-6.4	-7.2	-9.4	-11.3	-12.5	-13.2	-13.5	-13.5	-13.3	-12.0	-11.1	-10.5	-10.0	-9.7	-9.6	-9.9	-9.5	-9.2	-8.8	-8.2	-7.1	-9.6	-4.2
28-Feb	-7.6	-10.4	-13.4	-15.0	-16.3	-17.5	-19.0	-19.8	-20.8	-21.0	-20.9	-20.5	-19.5	-18.7	-18.0	-17.5	-17.7	-18.9	-20.1	-21.1	-22.1	-22.8	-23.5	-24.0	-18.6	-7.6
29-Feb	-23.1	-24.5	-25.2	-25.2	-24.4	-24.4	-23.8	-23.1	-22.0	-18.9	-16.3	-14.3	-12.8	-11.8	-11.1	-11.4	-11.6	-11.6	-12.1	-12.3	-11.9	-11.4	-11.4	-11.1	-16.9	-11.1
	-8.2	-8.6	-8.9	-9.2	-9.4	-9.7	-10.0	-10.1	-10.0	-9.4	-8.5	-7.4	-6.5	-5.8	-5.3	-5.2	-5.5	-6.1	-6.5	-6.8	-7.1	-7.1	-7.4	-7.7	Diurnal Average	
	2.4	2.5	2.9	3.0	1.6	2.0	1.8	2.9	2.8	4.0	5.4	6.5	7.4	7.7	8.0	7.8	6.6	5.2	4.5	3.9	3.8	3.6	3.0	2.6	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Ambient Temperature (AT) - C

ConocoPhillips - Surmont - February 2016



0216 R502-42

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	23	3.30	3.30
-20 - 0	573	82.33	85.63
0 - 10	100	14.37	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696

Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

ConocoPhillips - Surmont - February 2016

Maximum Value: 98 % on Feb 18 23:00

Maximum Daily Average: 94.8 % on Feb 16

Minimum Value: 37 % on Feb 24 16:00

Minimum Daily Average: 53.3 % on Feb 25

Maximum Diurnal Average: 84.4 % at hour 7

Minimum Diurnal Average: 71.8 % at hour 15

Monthly Average: 78.5 %

Percentiles: $P_1 = 41$ $P_{10} = 57$ $Q_1 = 69$ Median = 84 $Q_3 = 89$ $P_{90} = 93$ $P_{99} = 98$

Hours in Service:	696
Hours of Data:	696
Hours of Missing Data:	0
Hours of Calibration:	0
Percent Operational Time:	100.0

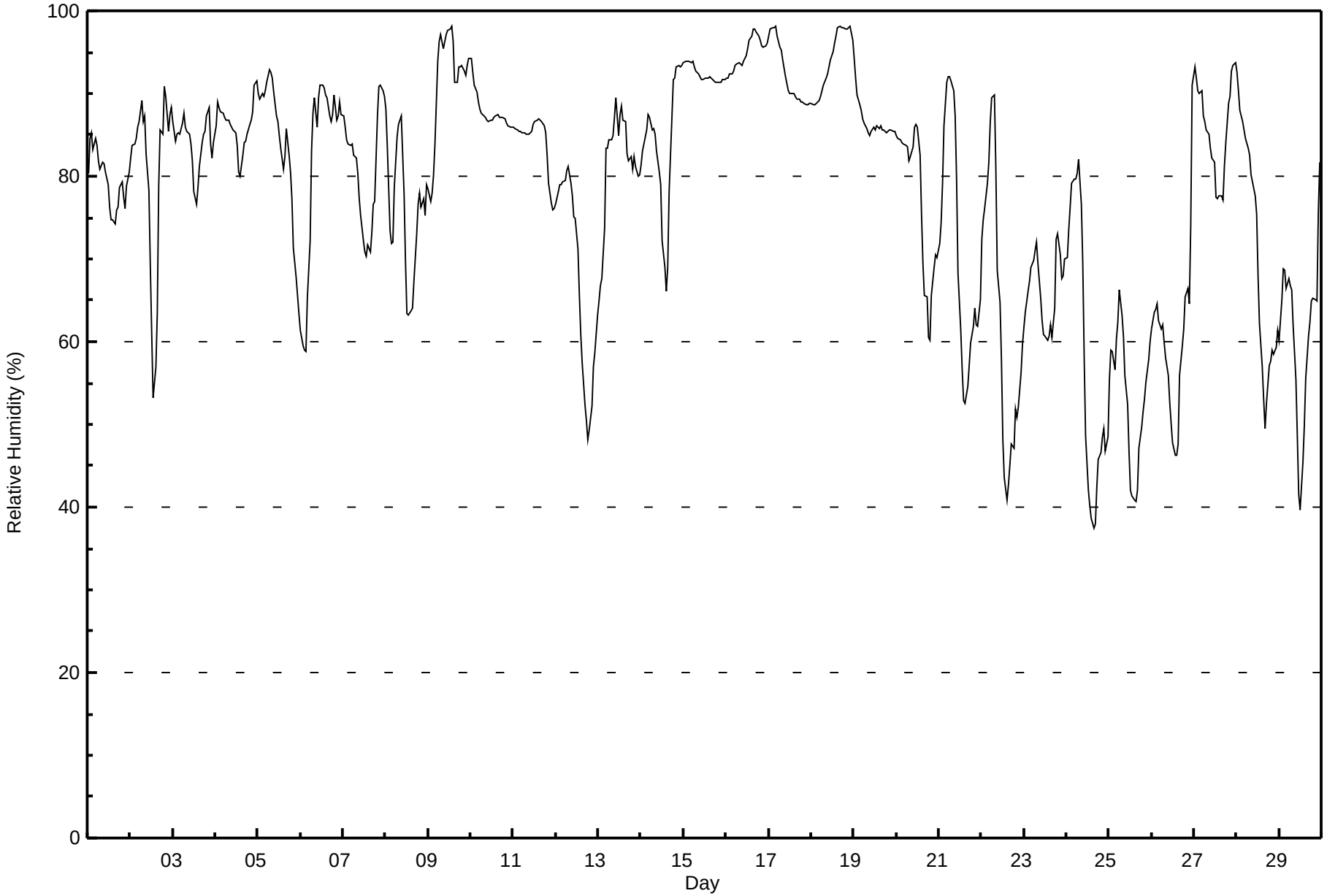
Day	Hourly Period Ending At (MST)																								Daily	Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average	Maximum
1-Feb	80	85	85	83	85	84	82	81	82	82	80	79	76	75	75	74	76	76	79	79	78	76	79	81	79.6	85
2-Feb	82	84	84	85	86	87	89	87	87	83	78	69	61	53	57	64	79	86	85	91	90	85	87	88	80.3	91
3-Feb	87	84	85	85	85	86	88	86	85	85	84	82	78	77	79	81	84	85	85	87	88	84	82	84	84.1	88
4-Feb	86	89	88	88	88	87	87	87	86	86	86	85	84	80	80	83	84	84	85	86	87	88	91	91	86.1	91
5-Feb	90	89	90	90	90	91	93	93	92	90	87	87	85	83	81	82	86	83	80	77	71	68	66	63	83.7	93
6-Feb	61	59	59	59	65	72	83	88	90	86	89	91	91	91	90	90	87	87	87	90	87	87	89	88	81.9	91
7-Feb	87	86	84	84	84	84	83	82	80	77	75	72	71	70	72	71	73	77	77	87	91	91	90	90	80.8	91
8-Feb	88	84	73	72	72	79	85	86	87	87	78	70	63	63	64	64	67	73	77	78	76	77	75	79	75.7	88
9-Feb	79	77	78	80	84	94	96	97	95	96	97	98	98	98	96	91	91	93	93	93	93	92	93	94	91.6	98
10-Feb	94	92	91	90	89	88	88	87	87	87	87	87	87	87	87	87	87	87	87	87	86	86	86	86	87.9	94
11-Feb	86	86	86	85	85	85	85	85	85	85	85	86	87	87	87	87	87	86	85	82	79	77	76	76	84.2	87
12-Feb	77	78	79	79	79	80	81	81	79	78	75	75	71	66	61	57	52	51	48	49	52	57	59	63	67.8	81
13-Feb	65	67	68	74	83	83	84	84	85	87	89	85	87	88	87	87	83	82	82	81	82	81	80	80	81.5	89
14-Feb	81	83	85	86	88	87	86	86	85	83	80	79	72	69	66	69	78	87	92	92	93	93	93	93	83.6	93
15-Feb	94	94	94	94	94	94	93	93	92	92	92	92	92	92	92	92	92	92	91	91	91	91	92	92	92.4	94
16-Feb	92	92	92	92	93	93	93	94	94	93	94	95	95	96	97	98	98	97	97	96	96	96	96	96	94.8	98
17-Feb	97	98	98	98	98	97	96	95	94	92	91	90	90	90	90	90	89	89	89	89	89	89	89	89	92.3	98
18-Feb	89	89	89	89	89	90	90	91	92	92	93	94	95	96	97	98	98	98	98	98	98	98	98	97	94.0	98
19-Feb	94	92	90	89	88	87	86	86	85	85	85	86	86	86	86	86	86	86	85	85	86	86	85	85	86.7	94
20-Feb	85	85	84	84	84	84	83	82	82	84	86	86	86	83	76	69	66	65	61	60	66	69	71	70	77.1	86
21-Feb	72	74	79	86	91	92	92	92	90	87	80	68	61	57	53	53	55	57	60	62	64	62	62	65	71.4	92
22-Feb	72	75	76	79	82	86	89	90	81	69	65	58	48	43	41	43	45	48	47	52	51	52	56	60	62.8	90
23-Feb	62	64	66	67	69	70	71	72	70	65	62	61	61	60	61	62	61	64	72	73	71	68	68	70	66.2	73
24-Feb	70	74	76	79	80	80	80	82	77	70	58	49	42	40	39	37	38	42	46	47	48	50	47	49	58.3	82
25-Feb	55	59	59	57	60	62	66	63	61	56	52	47	42	41	41	41	42	47	50	52	53	55	58	60	53.3	66
26-Feb	62	64	64	65	63	62	62	60	58	56	53	50	48	46	46	48	56	60	61	65	66	65	74	91	60.1	91
27-Feb	93	92	90	90	90	87	87	86	85	83	82	82	78	77	78	78	77	81	84	89	90	93	93	94	85.8	94
28-Feb	93	90	88	87	86	85	83	83	80	79	78	75	68	62	57	53	49	52	57	58	59	58	59	61	70.9	93
29-Feb	60	65	69	69	66	68	67	66	62	55	49	42	40	45	50	56	61	62	65	65	65	65	76	82	61.2	82
	80.4	81.0	81.0	81.5	82.6	83.6	84.4	84.2	83.1	81.1	79.0	76.5	73.9	72.6	71.8	72.0	73.3	75.1	76.1	77.3	77.4	77.2	78.3	79.9	Diurnal Average	
	97	98	98	98	98	97	96	97	95	96	97	98	98	98	97	98	98	98	98	98	98	98	98	97	Diurnal Maximum	

Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity (RH) - %

ConocoPhillips - Surmont - February 2016



0216 R502-45

Wood Buffalo Environmental Association

Cumulative Frequency Distribution

Relative Humidity (RH) - %

ConocoPhillips - Surmont - February 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	4	0.57	0.57
40 - 60	87	12.50	13.07
60 - 80	192	27.59	40.66
80 - 100	413	59.34	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

ConocoPhillips - Surmont - February 2016

Maximum Speed: 32 km/h on Feb 6 10:00

Maximum Daily Speed Average: 21.6 km/h on Feb 25

Minimum Speed Value: 1 km/h on Feb 2 06:00

Minimum Daily Speed Average: 1.9 km/h on Feb 18

Maximum Diurnal Speed Average: 6.2 km/h at hour 11

Minimum Diurnal Speed Average: 3.1 km/h at hour 17

Monthly Average Velocity: 4.9 km/h 268.7 deg

Percentiles: $P_1 = 1$ $P_{10} = 4$ $Q_1 = 6$ Median = 10 $Q_3 = 16$ $P_{90} = 21$ $P_{99} = 29$

Hours in Service:	696
Hours of Data:	671
Hours of Missing Data:	25
Percent Operational Time:	96.4

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-Feb	N12	NW10	NW8	NNW4	NW5	W5	SW8	SW9	WSW8	SSW7	SSW8	SSW7	S7	S7	SSE8	SSE8	SSE10	S8	SSW10	SW13	WSW16	W7	NNW1	WSW5	SW4.5	WSW16
2-Feb	NW4	WNW7	SW6	W4	WSW4	ESE1	W3	S3	SW5	SW9	SSW9	SSW6	SSW5	WSW9	WSW10	WSW9	WNW12	WNW12	NW14	N16	N15	NNW14	N14	NNW14	WNW5.1	N16
3-Feb	N13	N12	N9	N10	NW5	N7	NNW7	W5	ESE2	ENE4	SE4	SSE7	SE8	SE8	SE6	ENE4	N9	WNW6	NNW5	N6	NNW9	NW14	N10	NNW6	N3.9	NW14
4-Feb	NNE6	NE5	NNE7	NNE6	NNE5	ENE5	ENE5	E6	ESE7	SE6	S6	S8	S9	S11	S10	SSE11	S14	S15	S12	S6	S5	WSW5	WNW7	WNW3	SSE3.7	S15
5-Feb	WSW6	WSW7	SW6	SW7	SSW9	S11	S16	S17	S20	S16	SSW14	SSW11	S10	S10	S11	SSE12	S15	SSW15	SW16	WSW21	WSW20	WSW21	WSW21	WSW20	SSW12.2	WSW21
6-Feb	WSW17	WSW15	WSW16	SW9	WNW4	W10	W14	W18	W24	W32	W30	W31	W29	WNW30	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	W32
7-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	WNW23	WNW20	WNW17	WNW17	WNW15	WNW13	N5	NW5	ESE2	SSE5	SSW11	----	WNW23
8-Feb	SSW9	SW11	SSW8	W7	W20	W19	WSW12	WSW15	W5	W7	WSW15	W14	WNW13	WNW12	WNW12	WNW11	W9	WSW7	WSW6	WSW9	SW6	SW6	SW4	SSW3	WSW9.1	W20
9-Feb	SW7	WSW5	SW10	SW8	WNW2	N3	NE3	SE6	SE10	SSE11	S12	S11	SSE7	S6	WSW8	WNW14	WNW18	WNW18	WNW18	NW18	NW19	NNW25	NNW26	NNW27	WNW5.6	NNW27
10-Feb	NNW24	NNW22	NNW19	NNW19	NNW18	NNW15	N12	N12	NNW10	N9	N8	N7	NNE7	NNE5	NE5	NE5	ENE5	E4	E4	E4	ESE5	ESE5	ESE5	ESE5	N7.6	NNW24
11-Feb	ESE4	ESE4	ESE3	ESE3	ESE3	E3	E3	E3	ENE3	ENE3	ENE3	NE4	NNE5	NE5	NE7	NE8	ENE8	ENE6	E6	ESE8	ESE7	SE9	SE12	SE15	E4.5	SE15
12-Feb	SE18	SSE14	SSE11	S13	S17	S16	SSE11	S13	S18	S19	S20	SSE16	SSE18	SE20	SSE19	SE22	SE23	SE22	SE26	SE25	SE23	SSE22	SSE19	SSE15	SSE17.7	SE26
13-Feb	SE17	SE17	SSE14	S13	SSE11	S14	S13	S13	SSW11	SW14	SW13	WSW15	W14	W14	W17	W21	W18	WSW16	WSW20	W21	W21	W21	W23	W20	WSW11.3	W23
14-Feb	W13	WNW13	W17	W18	W19	W21	W23	WNW23	WNW18	WNW17	WNW16	WNW17	NW14	WNW18	WNW18	NNW9	NNE8	NNE5	W3	S3	NE5	NNE5	W1	SW2	WNW11.0	W23
15-Feb	S1	E4	E5	E4	ENE5	ENE5	NE8	NE7	ENE6	NE6	NNE6	NNE4	N6	N5	N3	N5	NNE6	N5	N3	AF	AF	S7	S7	SSE4	NE3.1	NE8
16-Feb	S6	SE4	S6	S7	SSW6	SSW5	S5	SSE5	S6	SE5	S5	S7	S7	S6	S6	SSW7	S7	S9	S8	SSW6	SW8	WSW9	WSW11	WSW9	S5.9	WSW11
17-Feb	WSW6	W4	WNW6	NW6	WNW8	N7	NNW9	N7	N8	N8	N8	N8	N8	N5	N6	NNW7	N4	N5	N5	NNE4	NNE4	NNE3	ENE3	E3	NNW4.9	NNW9
18-Feb	E3	ESE3	ESE3	ESE3	ESE3	ESE3	SE3	SE4	SE5	SE4	SSE4	SSE4	SE4	SE4	SE4	SE3	ESE2	E2	E2	NE1	NNW1	WNW3	WNW5	WNW6	SE1.9	WNW6
19-Feb	NNW7	NNW10	NNW12	NNW11	NW10	NW10	NW10	NNW9	NW9	WNW8	NW7	NW7	NW8	NNW7	N8	NNW7	NNW8	N6	N6	NNW9	NNW8	N6	N6	N6	NNW7.8	NNW12
20-Feb	N6	N6	N7	NNW6	NNW7	NNW7	NNW4	WSW3	WSW3	SW3	SE1	ESE2	S3	SE4	SSE3	S5	SSW5	SSW5	SSW7	SSW9	SSW9	SW10	SW8	SW8	SW2.1	SW10
21-Feb	WSW8	WSW10	WSW12	WSW10	WSW10	WSW11	WSW8	SSW6	SSW7	SSW6	SSW6	SSW7	SSW7	SW6	W9	W11	W9	W5	S3	S6	SSW6	WSW19	W21	W23	WSW8.3	W23
22-Feb	WNW19	WNW19	WNW19	WNW17	WNW14	WNW15	WNW13	WNW14	WNW13	WNW14	WNW13	WNW14	W15	W17	WNW17	W17	W14	WSW21	W21	W30	WNW29	WNW26	WNW22	WNW20	WNW17.6	W30
23-Feb	WNW20	WNW20	WNW21	WNW18	WNW20	W22	W26	WNW20	WNW18	WNW22	WNW22	WNW21	WNW24	WNW22	NW20	NW15	NW17	NNW15	NW11	WNW9	WNW14	WNW17	WNW18	WNW20	WNW18.3	W26
24-Feb	WNW20	WNW20	WNW17	WNW18	WNW17	WNW14	WNW12	W13	W15	W17	W14	W11	WNW11	W13	W10	W8	WSW8	SW7	SW8	SSW10	SSW10	SSW14	SSW15	SSW17	W11.2	WNW20
25-Feb	SW17	SW16	SW19	SW22	WSW24	WSW22	SW19	WSW24	WSW29	WSW28	W27	W23	W22	W21	W22	W19	W20	W20	W26	W28	W26	W21	W22	WSW25	WSW21.6	WSW29
26-Feb	WSW23	WSW22	WSW20	WSW21	W21	W15	WNW11	WNW18	WNW27	WNW26	W23	WNW22	WNW20	WNW21	WNW20	NW15	NNE10	N10	N9	NNE14	NE13	NE14	NE16	NE14	WNW12.1	WNW27
27-Feb	NE11	ENE13	E14	ENE13	ENE14	ENE16	ENE13	ENE11	ENE9	NE9	NE10	NNE10	NNE8	NNE10	NNE8	NNE6	NNE4	NW4	W2	WSW6	W9	W11	WNW10	NW14	NE5.7	ENE16
28-Feb	NW20	NNW22	NNW19	NNW21	NNW21	NNW21	NNW20	NNW20	NNW23	NNW22	NNW22	N19	N16	N16	NNE16	NNE13	NE12	NE10	ENE6	ENE7	ESE9	ESE8	SE10	SE11	N12.0	NNW23
29-Feb	SSE13	SE12	S10	SSW12	S14	SSW15	SSW16	SSW13	SSW10	SSW13	SSW11	SSW13	S13	S15	S15	S14	S10	SSW10	SW9	SSW8	SW10	SW10	SW9	SW9	SSW11.2	SSW16
	W4.8	WNW4.3	W4.8	W5.0	W5.8	W5.1	W4.8	W4.9	W5.4	W6.2	W6.2	W5.8	W4.9	W5.6	W4.8	W3.7	W3.1	WSW3.8	WSW4.3	WSW4.5	W4.9	W5.8	W5.1	W5.5	Diurnal Average	
	NNW24	NNW22	WNW21	SW22	WSW24	WSW22	W26	WSW24	WSW29	W32	W30	W31	W29	WNW30	W22	SE22	SE23	SE22	W26	W30	WNW29	WNW26	NNW26	NNW27	Diurnal Maximum	

AF - Analyzer Failure

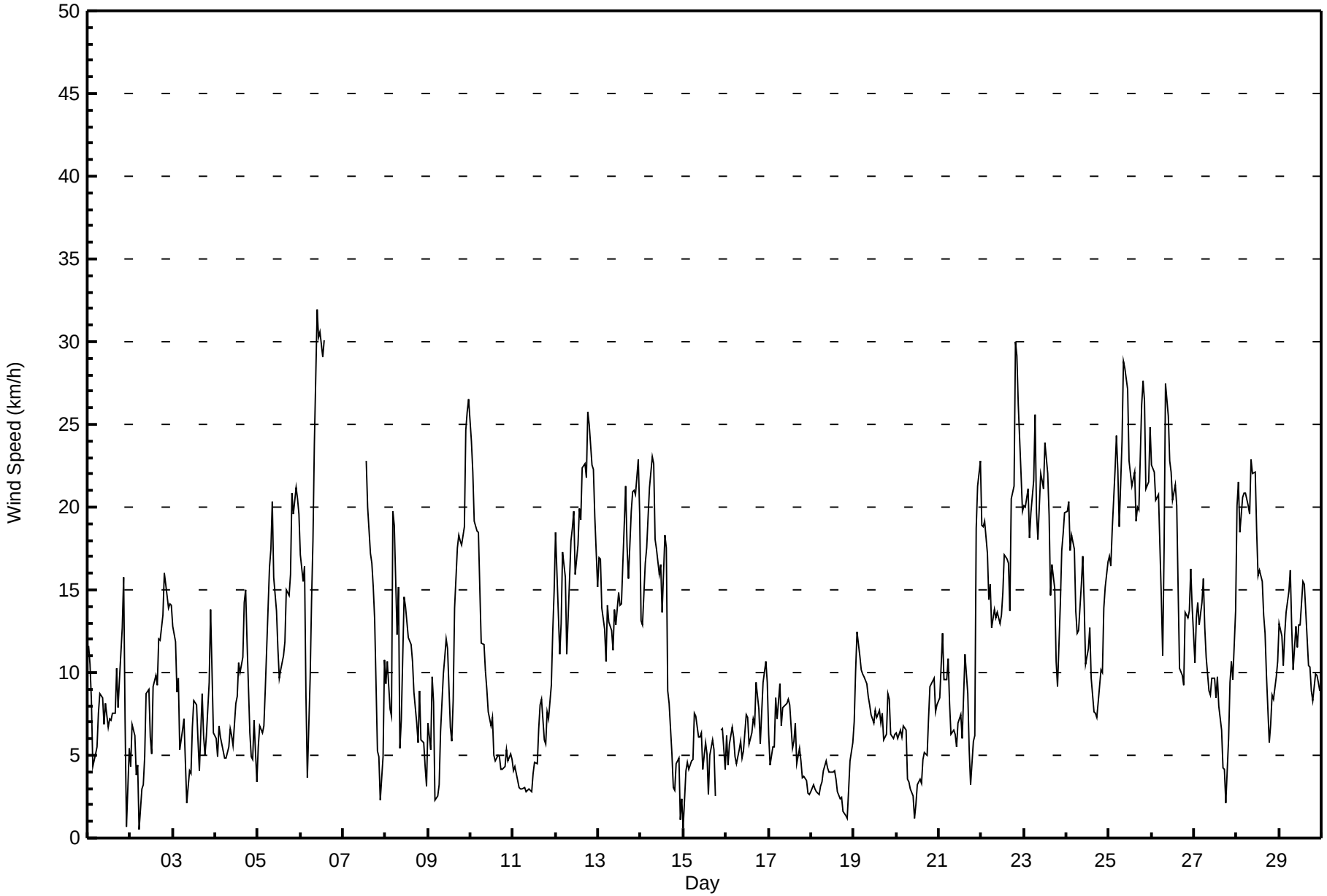
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Speed (WS) - km/h

ConocoPhillips - Surmont - February 2016



0216 R502-48

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	140	20.86	20.86
6 - 11	248	36.96	57.82
12 - 19	178	26.53	84.35
20 - 28	97	14.46	98.81
29 - 38	8	1.19	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 671

Total Number of Hours: 696

Wood Buffalo Environmental Association

Frequency Distribution

Wind Speed (WS) - km/h

ConocoPhillips - Surmont - February 2016

Wind Speed Ranges (km/h)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	**Totals**
0 - 5	10	11	8	12	12	19	12	8	8	5	4	6	10	6	3	6	140
6 - 11	29	13	9	7	1	6	9	10	31	31	25	22	13	12	11	19	248
12 - 19	10	3	5	5	1	0	6	9	23	11	8	12	21	45	9	10	178
20 - 28	0	0	0	0	0	0	7	1	2	0	1	16	29	25	2	14	97
29 - 38	0	0	0	0	0	0	0	0	0	0	0	1	5	2	0	0	8
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	49	27	22	24	14	25	34	28	64	47	38	57	78	90	25	49	671

Total Number of Valid Hours: 671

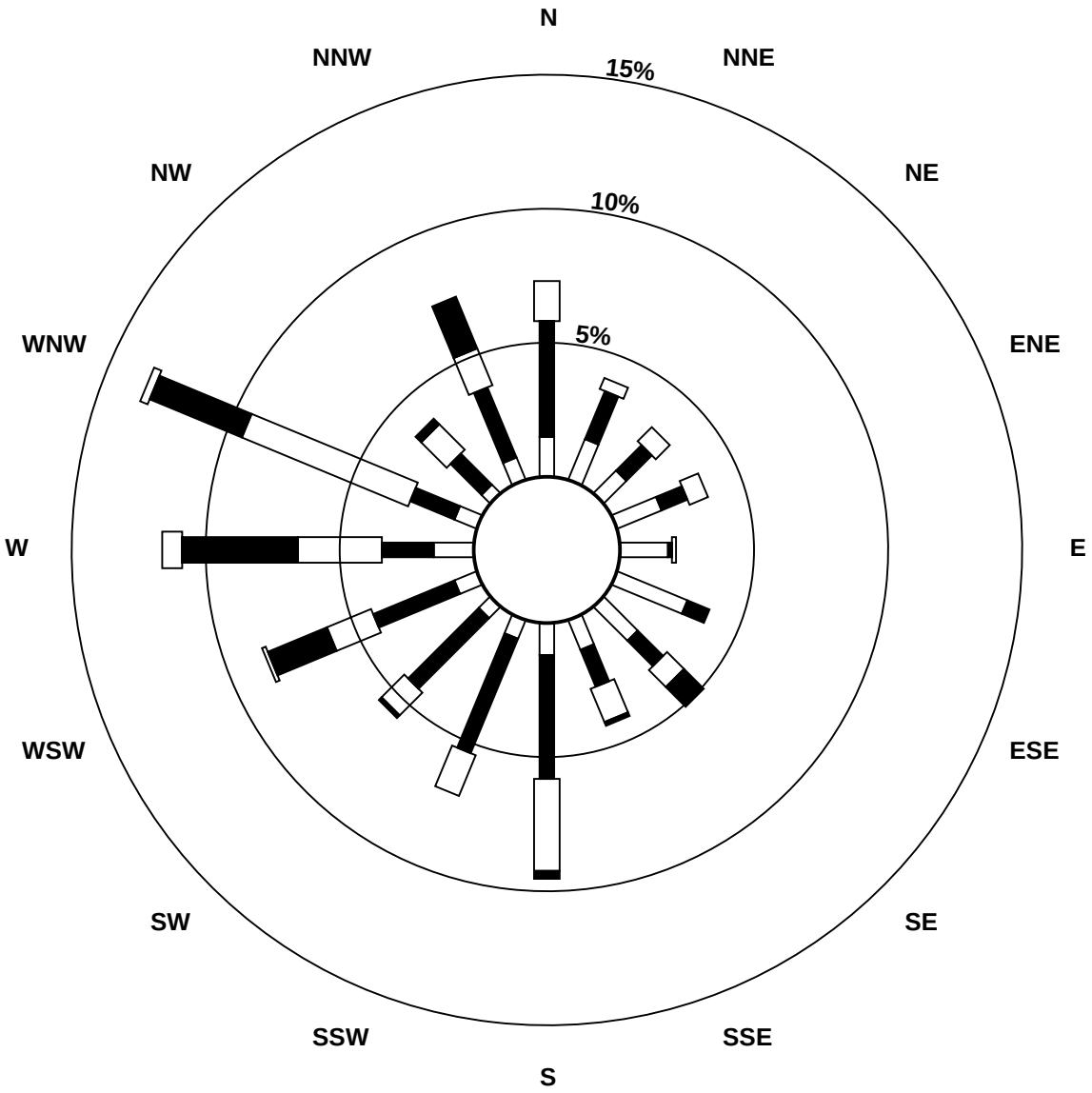
Total Number of Hours: 696

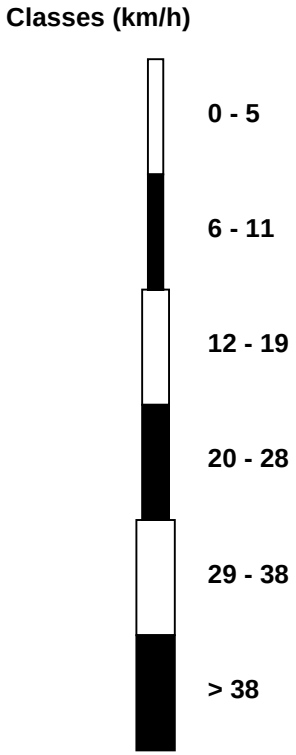
Wood Buffalo Environmental Association

Wind Rose Feb 2016

Wind Speed (WS) - km/h

ConocoPhillips - Surmont (AMS502)





Total Number of Valid Hours: 671

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

ConocoPhillips - Surmont - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 7 km/h on Feb 25 05:00

Minimum Value: 0 km/h on Feb 18 22:00

Percentiles: $P_1 = 0$ $P_{10} = 1$ $Q_1 = 1$ Median = 2 $Q_3 = 3$ $P_{90} = 4$ $P_{99} = 6$

Hours in Service:	696
Hours of Data:	671
Hours of Missing Data:	25
Hours of Calibration:	0
Percent Operational Time:	96.4

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

AF - Analyzer Failure

Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

ConocoPhillips - Surmont - February 2016

Direction of Maximum Speed: 274 deg on Feb 6 10:00
Direction of Maximum Daily Speed Average: 253.2 deg on Feb 25

Direction of Minimum Speed: 109 deg on Feb 2 06:00
Direction of Minimum Daily Speed Average: 1.9 deg on Feb 18

Monthly Average Direction: 274.0 deg

Hours in Service:	696
Hours of Data:	671
Hours of Missing Data:	25
Percent Operational Time:	96.4

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Average
1-Feb	354	319	325	336	304	270	227	226	237	211	193	194	189	171	157	155	154	182	203	221	242	278	330	257	227.0
2-Feb	323	284	220	277	253	109	273	181	224	228	207	201	199	242	258	256	282	292	324	353	350	341	353	347	293.8
3-Feb	349	356	3	358	322	350	343	268	103	71	138	155	141	130	125	78	11	287	344	355	331	309	358	348	356.3
4-Feb	29	50	14	33	24	59	70	101	119	140	172	182	186	185	181	159	185	188	183	169	169	245	283	284	164.5
5-Feb	255	252	234	218	213	189	187	185	182	186	195	206	177	185	178	151	190	200	220	238	238	241	243	242	209.0
6-Feb	242	240	246	233	290	271	274	275	268	274	275	272	275	286	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
7-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	298	293	284	285	287	303	5	310	113	163	209	--
8-Feb	207	214	209	261	262	266	247	249	263	278	252	264	284	286	296	285	279	251	256	246	232	232	224	201	256.7
9-Feb	226	237	233	219	296	351	36	126	138	147	173	189	162	179	239	285	295	296	301	304	325	338	341	341	292.9
10-Feb	344	345	345	345	345	343	351	355	348	349	353	11	22	26	43	52	77	81	79	97	102	103	112	109	3.2
11-Feb	104	120	116	117	110	89	91	98	71	67	76	38	32	51	40	48	58	60	88	104	122	125	141	146	95.4
12-Feb	144	149	155	180	188	170	163	176	185	181	179	161	151	145	149	146	143	143	145	145	146	166	154	160	157.8
13-Feb	145	143	158	173	158	175	177	183	204	222	232	248	265	275	276	268	259	249	253	263	262	272	274	281	236.5
14-Feb	280	282	274	273	263	276	281	286	298	296	298	295	305	291	288	342	26	28	263	190	38	31	274	222	290.1
15-Feb	180	79	98	98	73	72	39	37	59	38	29	20	3	2	5	7	13	10	3	AF	AF	184	178	154	47.0
16-Feb	182	145	172	170	198	192	186	166	177	146	172	178	176	170	173	197	176	181	184	203	221	239	244	249	191.2
17-Feb	255	271	302	305	292	357	348	353	350	349	349	349	354	6	358	348	360	354	11	25	21	24	62	95	345.8
18-Feb	93	116	110	119	115	121	128	134	138	141	148	147	146	146	143	133	115	101	84	52	332	289	300	303	129.7
19-Feb	328	344	343	345	307	312	321	330	316	302	309	318	315	337	351	338	343	351	355	347	347	356	5	1	333.9
20-Feb	358	359	356	342	347	343	331	240	243	232	130	121	170	144	157	174	206	199	196	193	205	224	229	224	230.6
21-Feb	247	248	253	250	248	248	241	206	195	204	204	196	207	216	264	275	280	266	189	187	205	253	262	279	245.0
22-Feb	284	286	293	299	301	296	290	300	293	292	287	286	277	279	283	273	268	252	265	273	286	292	293	292	284.4
23-Feb	290	290	289	285	293	281	279	293	292	289	291	298	294	301	314	323	317	339	319	300	299	296	296	296	296.7
24-Feb	293	299	296	294	293	293	282	281	281	275	278	277	284	281	266	268	238	223	215	211	205	210	209	213	267.5
25-Feb	217	214	225	230	237	241	233	237	244	253	261	265	264	272	278	277	273	261	264	262	264	264	259	256	253.2
26-Feb	256	254	250	252	267	281	286	285	284	290	280	298	294	289	301	325	25	9	352	29	40	39	37	36	298.2
27-Feb	53	70	82	74	72	75	73	68	65	50	42	31	33	28	13	14	16	326	270	258	266	260	282	316	40.9
28-Feb	305	341	345	343	343	342	344	348	344	344	346	349	4	2	12	20	42	54	73	78	114	121	127	136	358.2
29-Feb	161	133	176	199	188	196	205	206	203	209	193	192	178	177	181	184	189	205	222	208	216	214	224	229	193.9
	275.1	282.9	274.8	275.0	275.2	275.8	271.9	262.3	260.7	264.7	260.4	264.1	267.3	274.2	276.4	279.6	273.1	256.5	254.8	255.5	264.4	267.0	269.2	270.2	
	Diurnal Average																								

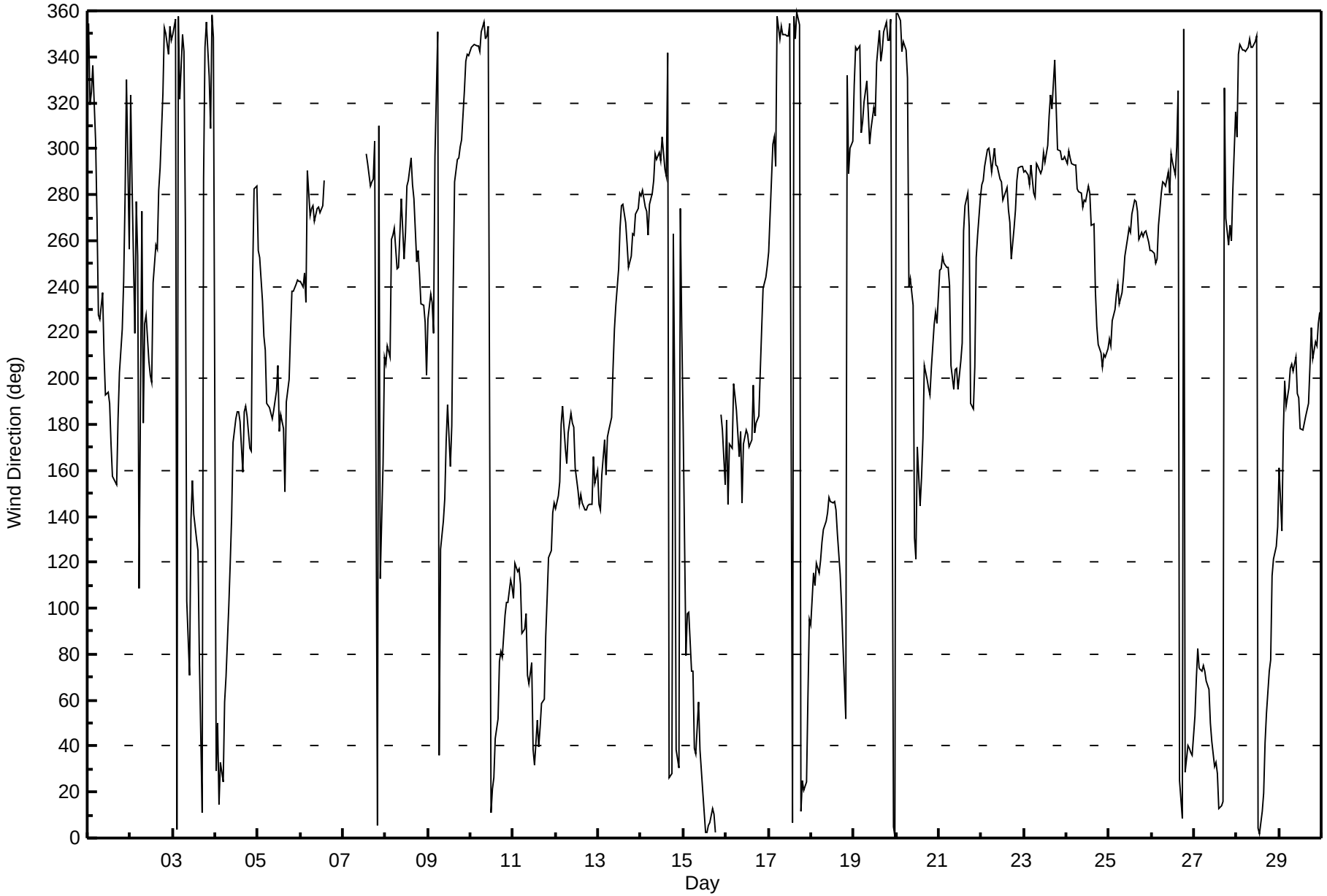
AF - Analyzer Failure
All monthly, daily, and diurnal averages have been calculated using vector methods

Wood Buffalo Environmental Association

Hourly Averages

Wind Direction (WD) - deg

ConocoPhillips - Surmont - February 2016



0216 R502-54

Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

ConocoPhillips - Surmont - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0
Maximum Value: 86 deg on Feb 2 06:00

Minimum Value: 6 deg on Feb 14 03:00

Percentiles: P_1 = 7 P_{10} = 9 Q_1 = 11 Median = 15 Q_3 = 20 P_{90} = 30 P_{99} = 70

Hours in Service:	696
Hours of Data:	671
Hours of Missing Data:	25
Hours of Calibration:	0
Percent Operational Time:	96.4

Day	Hourly Period Ending At (MST)																								Daily
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Maximum
1-Feb	14	27	32	48	38	19	9	19	9	18	17	19	18	26	27	28	25	17	16	13	11	40	83	24	83
2-Feb	50	19	14	52	33	86	43	49	37	10	14	17	29	18	19	18	11	10	25	15	13	17	15	12	86
3-Feb	14	15	16	15	52	37	22	36	55	17	37	29	15	14	17	43	16	28	44	25	30	18	17	35	55
4-Feb	22	18	14	21	33	22	16	13	15	16	26	20	19	17	21	20	17	14	14	29	34	30	13	70	70
5-Feb	15	14	12	16	18	14	14	14	12	14	14	12	22	18	16	20	14	12	16	11	10	9	8	9	22
6-Feb	9	10	12	38	84	33	10	10	10	10	9	9	10	10	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	84
7-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	11	12	10	8	8	24	23	70	53	35	11	70
8-Feb	12	7	17	42	9	9	8	11	25	16	11	12	13	12	21	11	7	9	12	6	19	20	19	61	61
9-Feb	16	21	10	17	67	71	40	14	11	18	25	15	23	26	32	11	9	8	9	11	16	15	13	11	71
10-Feb	11	13	11	11	11	11	14	17	15	16	16	21	20	31	23	19	16	16	14	20	13	12	13	12	31
11-Feb	14	13	18	16	20	16	19	20	21	21	20	22	20	28	16	18	14	9	24	14	8	9	11	10	28
12-Feb	9	16	16	20	14	15	16	21	14	13	13	17	16	12	15	10	10	10	10	10	11	15	15	19	21
13-Feb	12	12	22	20	18	18	14	17	18	16	15	15	14	14	12	9	10	12	9	8	8	10	9	9	22
14-Feb	9	8	6	9	8	8	8	8	9	9	10	12	22	13	14	45	17	24	58	58	24	16	77	54	77
15-Feb	75	14	17	13	16	17	12	14	17	19	15	34	20	30	78	21	13	19	53	AF	AF	16	19	46	78
16-Feb	18	28	21	19	21	19	21	23	34	20	30	14	13	23	19	15	24	15	14	18	14	14	9	8	34
17-Feb	10	7	33	28	14	15	11	14	14	12	14	15	17	17	18	11	19	16	17	17	14	16	13	16	33
18-Feb	18	12	12	12	13	10	12	12	11	12	10	11	10	10	11	14	14	16	38	22	55	8	14	11	55
19-Feb	19	13	11	13	17	17	18	18	21	13	24	24	25	27	15	29	23	20	15	12	13	16	13	16	29
20-Feb	14	15	13	24	10	17	42	22	18	15	41	50	31	35	34	28	24	19	16	17	16	14	16	16	50
21-Feb	17	12	9	11	12	8	9	16	16	31	30	22	24	37	26	18	13	22	44	36	33	9	9	8	44
22-Feb	9	7	9	11	8	7	9	6	8	12	12	13	13	14	14	13	12	9	9	9	10	9	8	9	14
23-Feb	8	8	9	10	10	11	10	12	13	10	12	12	11	13	18	22	17	17	19	13	8	8	8	8	22
24-Feb	9	7	8	8	8	8	7	8	10	8	11	16	21	19	30	28	28	9	9	12	13	15	16	15	30
25-Feb	15	14	14	14	13	11	13	12	9	11	10	10	14	13	13	12	12	8	8	8	8	9	8	7	15
26-Feb	7	8	8	8	12	11	10	13	11	13	19	16	12	11	12	33	13	15	14	14	12	13	12	10	33
27-Feb	14	13	13	14	14	14	13	13	14	25	20	15	16	18	23	26	23	45	70	19	11	11	16	20	70
28-Feb	12	16	11	10	11	12	12	15	13	12	13	16	21	21	22	21	25	13	14	11	12	9	10	10	25
29-Feb	18	10	30	16	15	14	13	12	14	15	19	21	22	19	16	16	18	20	19	18	16	18	18	18	30
	75	28	33	52	84	86	43	49	55	31	41	50	31	37	78	45	28	45	70	58	70	53	83	70	
	Diurnal Maximum																								

AF - Analyzer Failure

Wood Buffalo Environmental Association
SO2 Calibration Report

W B E A

Station Information

Calibration Date	February 17, 2016	Last Calibration	January 22, 2016
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:50	End Time (MST)	15:00
Gas Cert Reference	LL104215	Station temp.	21 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	12-Feb-18
Calibrator Make/Model	API T700	Serial Number	622
ZAG Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	DACS serial No.	7882

Analyzer Information

	Before	*After*		*Before*	*After*
Analyzer Range	0 - 1000 ppb		PMT voltage	518	518
Analyzer IP address	192.168.1.43		Lamp voltage	2040	1993
Calculated slope	1.006898	0.998556	Chamber temp	50.0	50.0
Calculated intercept	-0.848253	0.177287	Pressure	21.6	21.7
Analyzer Background	21.1	21.1	Flow	0.531	0.541
Analyzer Coefficient	1.011	1.011	Intensity	50	49

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	0.1	----
as found span	5000	83.2	803.7	804.6	0.999
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	83.2	803.7	804.6	0.999
second point	5000	41.6	401.9	402.9	0.997
third point	5000	20.8	200.9	200.1	1.004
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	83.2	803.7	799.1	1.006
				Average Correction Factor	1.000

Corrected As found	804.5	Previous response	799.1	% change	-0.7%

Notes:

Inlet filter replaced after as founds. No adjustments. As left zero began at 14:19 MST.

Calibration Performed By: Asad Hidayat

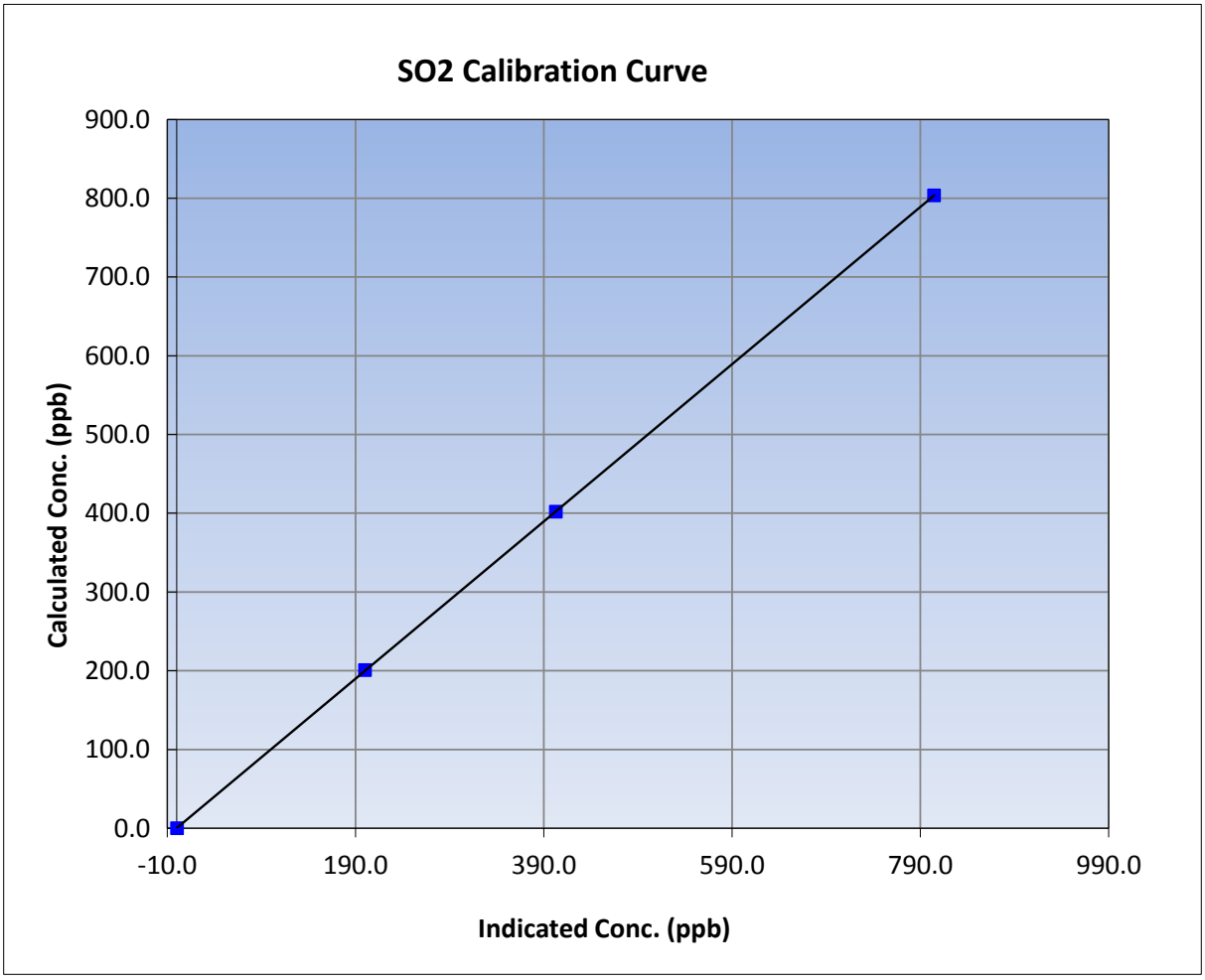
Wood Buffalo Environmental Association
SO2 Calibration Report

Station Information

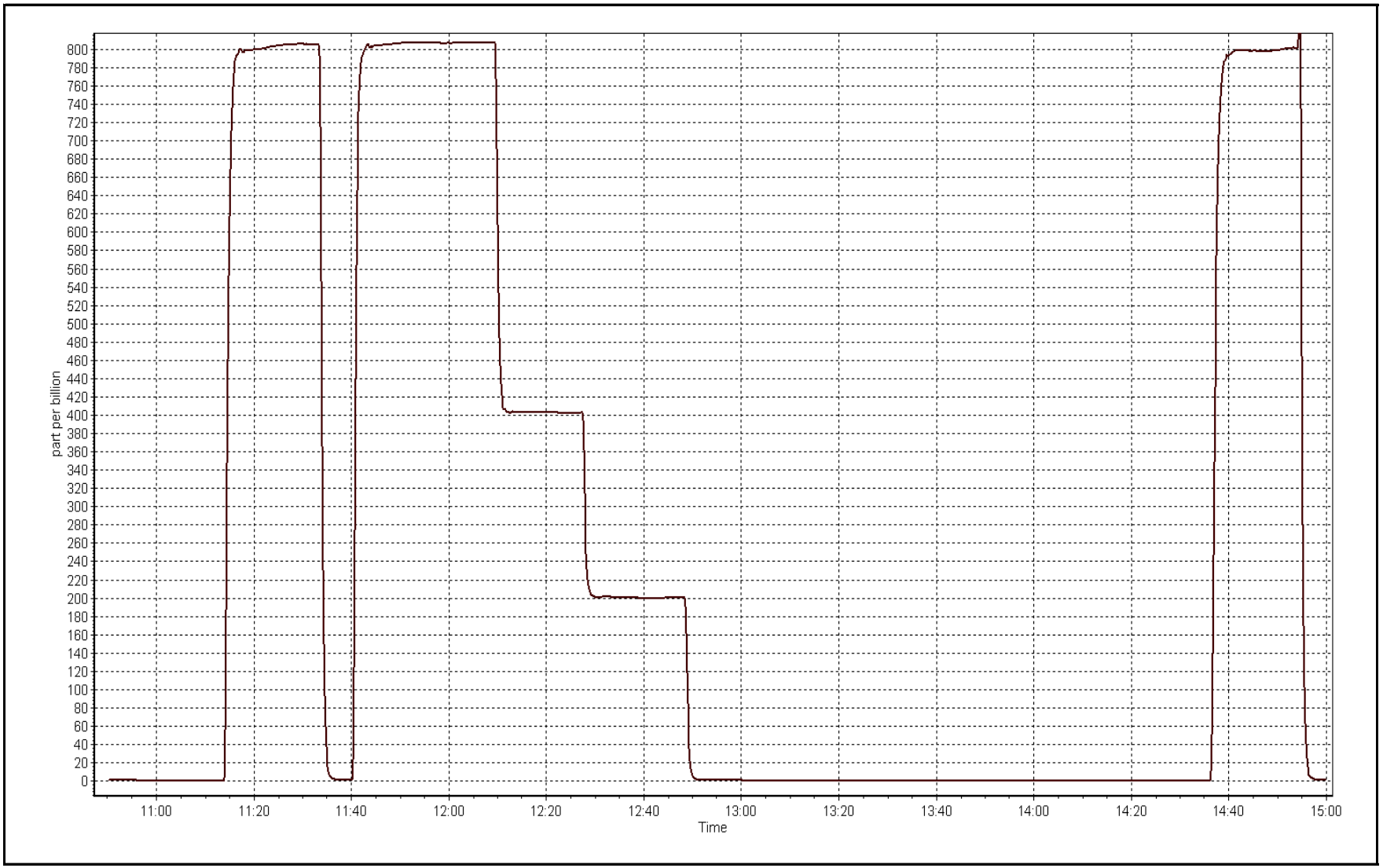
Calibration Date	February 17, 2016	Previous Calibration	January 22, 2016
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	10:50	End Time (MST)	15:00
Analyzer make	API T100	Analyzer serial #	598

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999996
803.7	804.6	0.9989		
401.9	402.9	0.9974	Slope	0.998556
200.9	200.1	1.0043		
			Intercept	0.177287



SO2 Calibration Plot Date: February 17, 2016



Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

Calibration Date	February 16, 2016	Last Calibration	January 21, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	13:18	End Time (MST)	15:55
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104215 12-Feb-18

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	2598	2568
Calculated slope	0.989837	0.995422	Chamber temp	50	50
Calculated intercept	-0.169574	0.114634	Pressure	23.3	23.1
Analyzer Background	17.4	17.4	Flow	0.613	0.611
Analyzer Coefficient	1.016	0.999	Intensity	58	57
			Converter temp.	316	316

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	0.1	----
as found span	5000	38.5	80.1	81.7	0.981
SO2 scrubber check	5000	20.7	200.0	3.7	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	38.5	80.1	80.4	0.996
second point	5000	19.3	40.1	40.1	1.000
third point	5000	12.1	25.2	25.1	1.002
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	38.5	80.1	80.2	0.999
				Average Correction Factor	0.999

Corrected As found	81.6	Previous response	81.1	% change	-0.6%

Notes:

Sample inlet filter replaced after as founds. Scrubber check done after as founds. Slightly adjusted span.

Calibration Performed By: Asad Hidayat

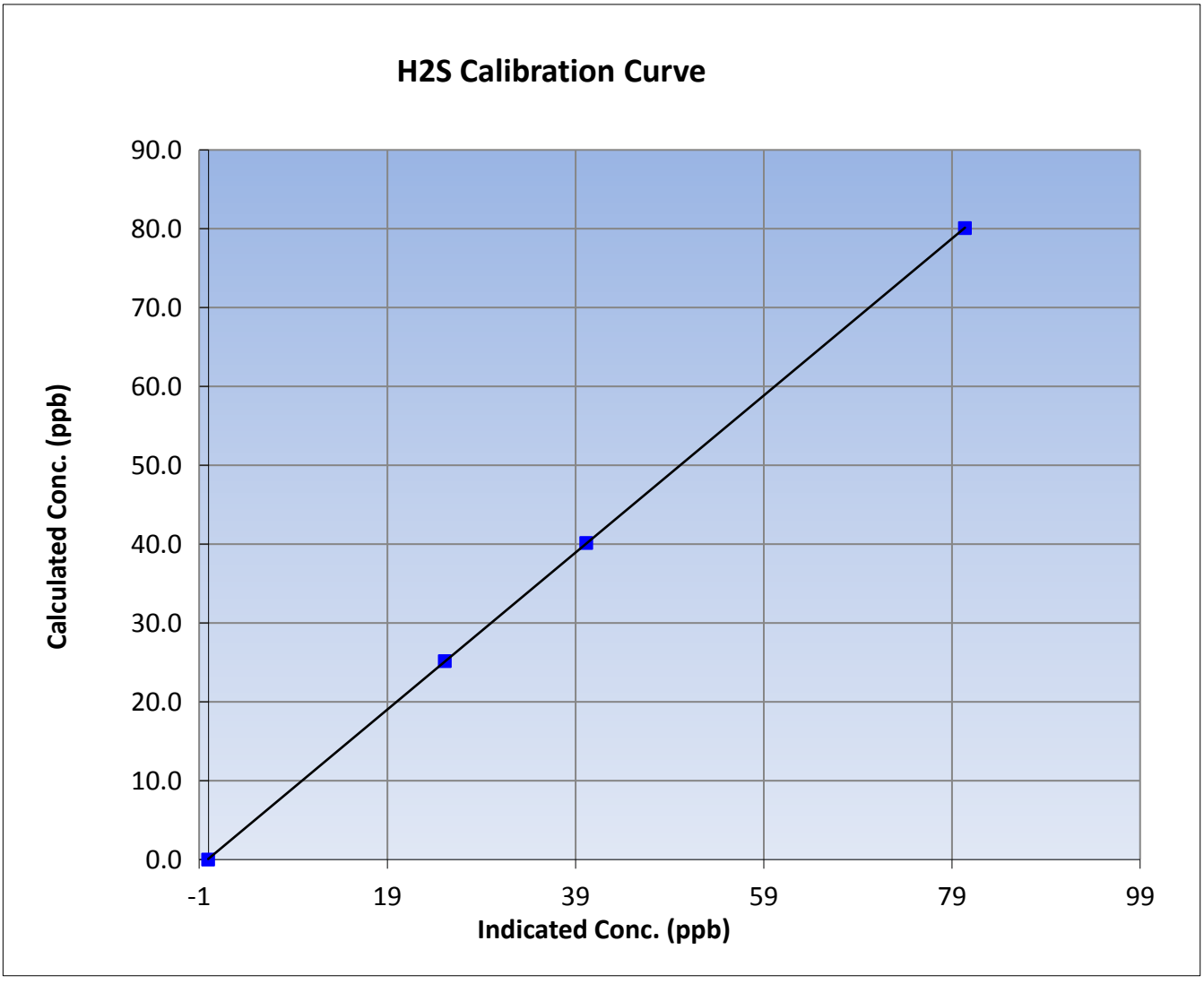
Wood Buffalo Environmental Association
H2S Calibration Report

Station Information

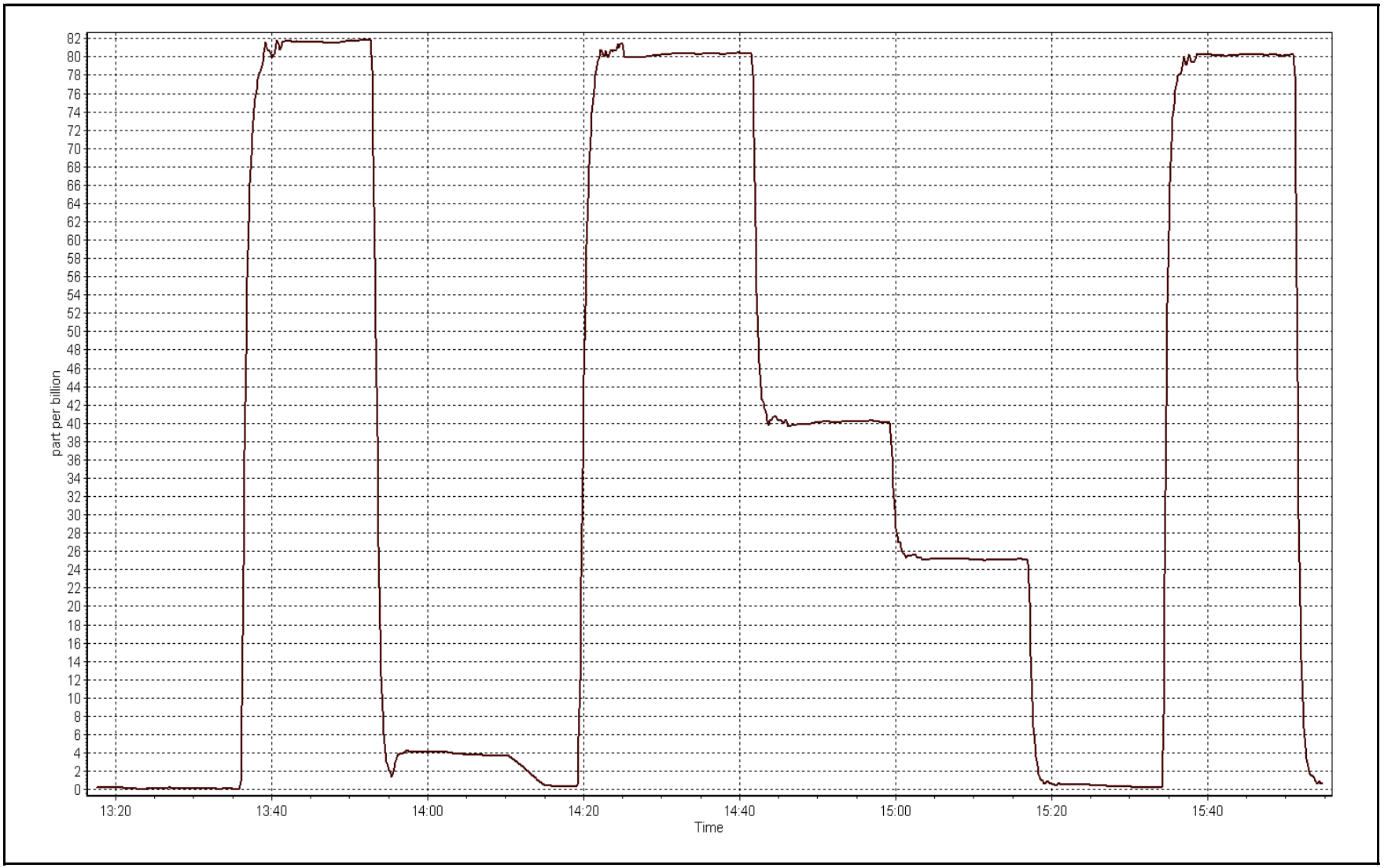
Calibration Date	February 16, 2016	Previous Calibration	January 21, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	13:18	End Time (MST)	15:55
Analyzer make	API T101	Analyzer serial #	197

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999995
80.1	80.4	0.9961		
40.1	40.1	1.0003	Slope	0.995422
25.2	25.1	1.0019		
			Intercept	0.114634



H2S Calibration Plot Date: February 16, 2016



Wood Buffalo Environmental Association
NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 17, 2016	Previous Calibration	January 22, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:50	End Time (MST)	15:00
NO Cal Gas Conc	48.1 ppm	Gas Cert Reference	LL104215
NOx Cal Gas Conc	48.1 ppm	Cal Gas Expiry Date	12-Feb-18
Calibrator	API T700	Serial Number	622
Zero air Generator	Teledyne API T701	Serial Number	4865

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	7882

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999582	0.999492	1.002663
	Data Offset	0.231709	0.046028	-0.082380
Current Calibration	Data Slope	0.998717	0.999442	0.988063
	Data Offset	1.797897	1.487522	-0.251878

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153356

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.969		0.955	
NOX coefficient	0.999		1.001	
NO2 coefficient	1.000		1.000	
NO bkgrnd	8.3		8.2	
NOX bkgrnd	9.3		9.1	
Chamber Temp	50.5	Deg C	50.5	Deg C
Moly Temp	322.1	Deg C	322.1	Deg C
PMT voltage	-866.5	V	-866.5	V
PMT Temp	-2.7	Deg C	-2.9	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	160.6	mmHg	160.9	mmHg
R Cell Press Nox	160.9	mmHg	160.6	mmHg
NO sample flow	0.654	lpm	0.662	lpm
Nox sample Flow	0.653	lpm	0.661	lpm

Notes:

Sample inlet filter replaced after as founds. Slightly adjusted span.

Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: February 17, 2016 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	-0.5	-0.4	-0.1	----	----
as found span	5000	83.2	800.4	800.4	0.0	810.0	810.2	-0.2	0.9881	0.9879
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
high point	5000	83.2	800.4	800.4	0.0	800.4	799.9	0.5	1.0000	1.0006
second point	5000	41.6	400.2	400.2	0.0	398.2	398.4	-0.2	1.0049	1.0044
third point	5000	20.8	200.1	200.1	0.0	196.9	197.3	-0.4	1.0162	1.0142
as left zero	5000	0.0	0.0	0.0	0.0	-0.6	0.2	-0.8	----	----
as left span	5000	83.2	800.4	489.3	311.1	804.8	489.4	315.5	0.9945	0.9998
								Average Correction Factor	1.0071	1.0064

Corrcted As found NO_X= 810.5 NO= 810.6 Percent Change NO_X= -1.2% NO= -1.2%

Previous Response NO_X= 800.5 NO= 800.7

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	799.9	798.0	0.0	1.0006	1.0031	----	----
1st NO2 (300)	489.3	308.7	800.2	489.3	312.9	1.0002	----	0.9865	101.4%
2nd NO2 (200)	583.9	214.0	800.0	583.9	216.1	1.0005	----	0.9907	100.9%
3rd NO2 (100)	685.0	113.0	800.5	685.0	115.5	0.9999	----	0.9784	102.2%
2nd NO ref point		0.0	799.8	797.5	2.2	1.0007	1.0036	----	----
				Average Correction Factor		1.0003		0.9852	101.5%

Calibration Performed By: Asad Hidayat

Wood Buffalo Environmental Association

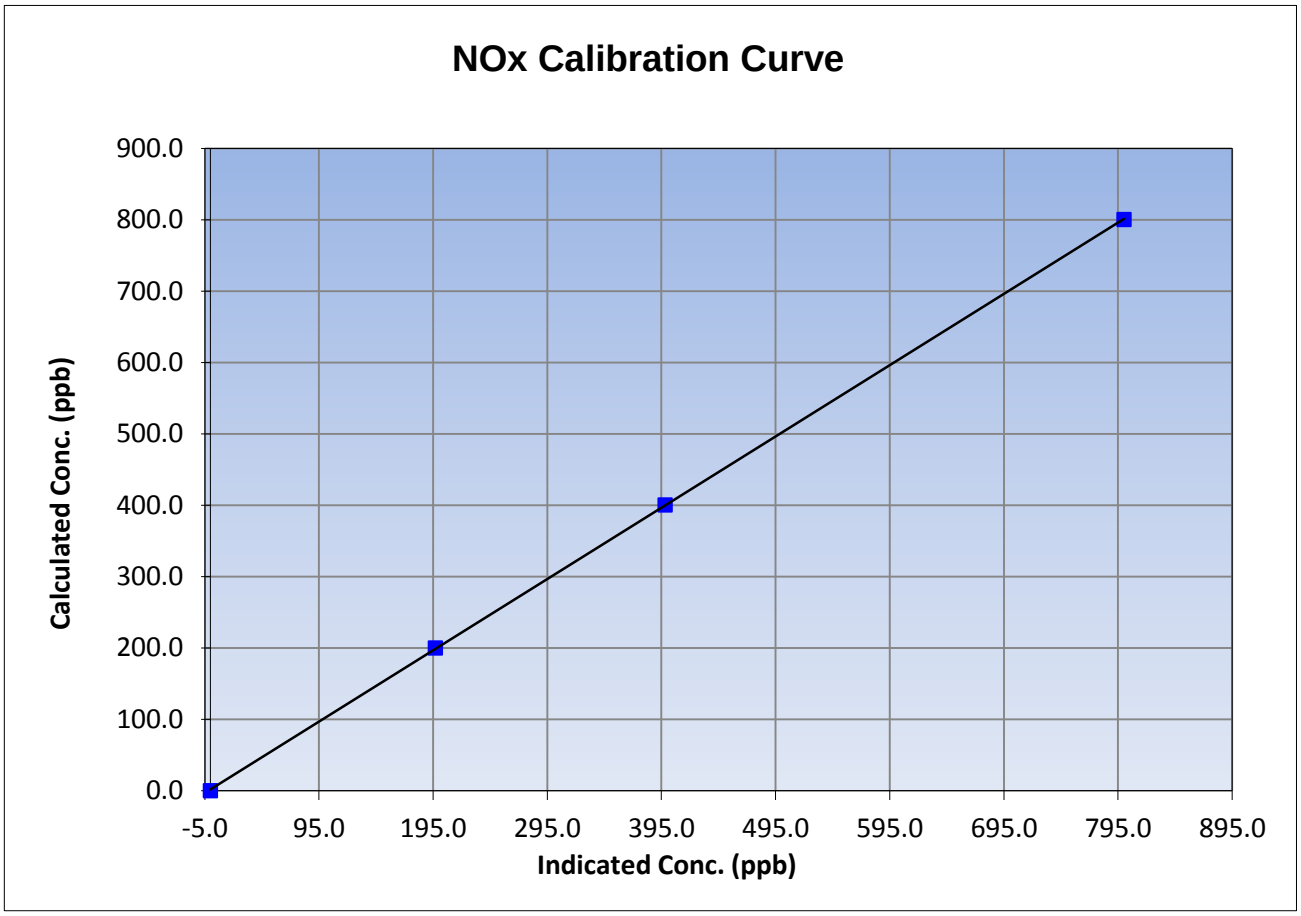
NO_X Calibration Summary

Station Information

Calibration Date	February 17, 2016	Previous Calibration	January 22, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:50	End Time (MST)	15:00
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	-0.2	----	Correlation Coefficient	0.999982
800.4	800.4	1.0000		
400.2	398.2	1.0049	Slope	0.998717
200.1	196.9	1.0162		
			Intercept	1.797897



Wood Buffalo Environmental Association

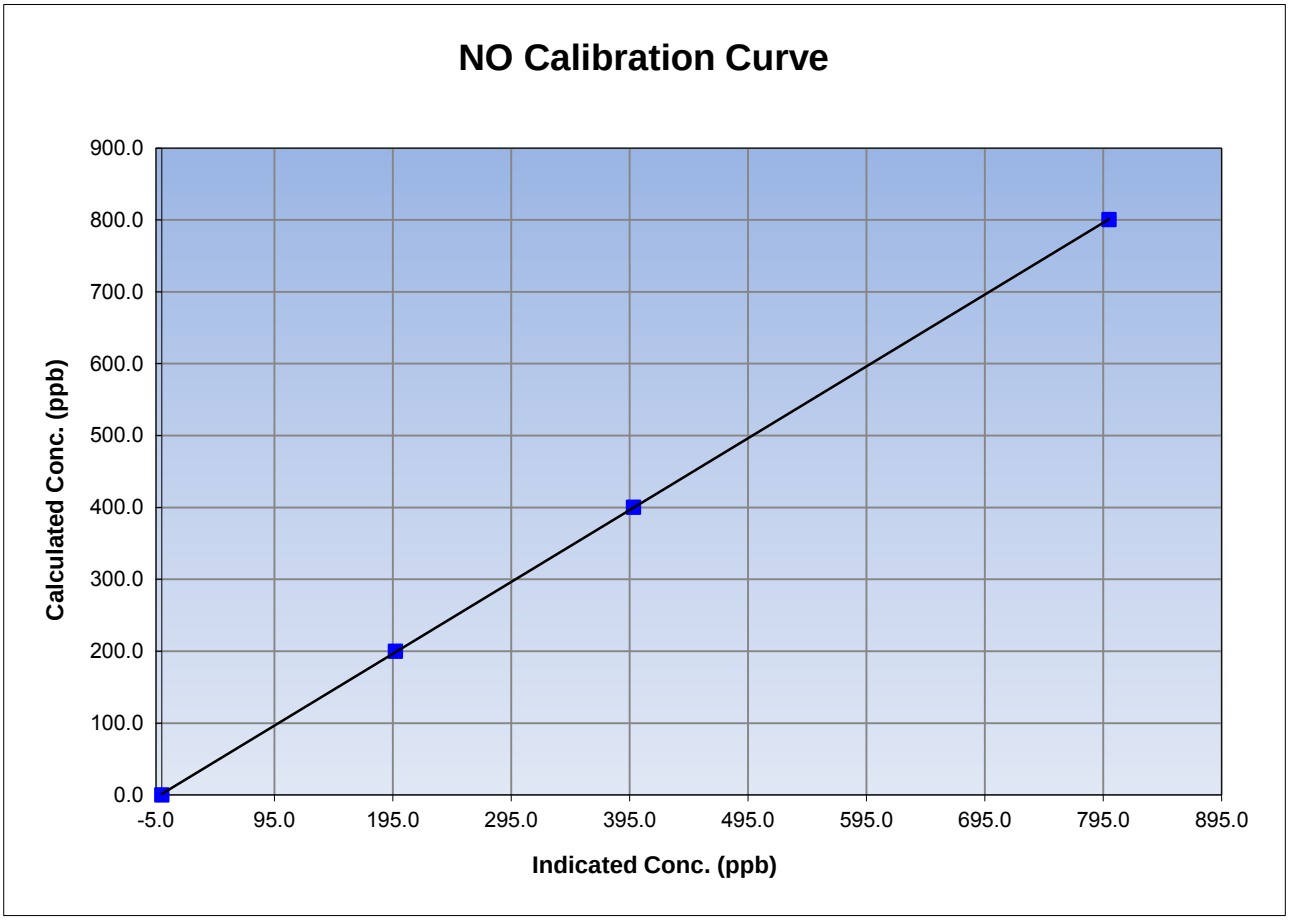
NO Calibration Summary

Station Information

Calibration Date	February 17, 2016	Previous Calibration	January 22, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:50	End Time (MST)	15:00
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	-0.2	N/A	Correlation Coefficient	0.999988
800.4	799.9	1.0006		
400.2	398.4	1.0044	Slope	0.999442
200.1	197.3	1.0142		
			Intercept	1.487522



Wood Buffalo Environmental Association

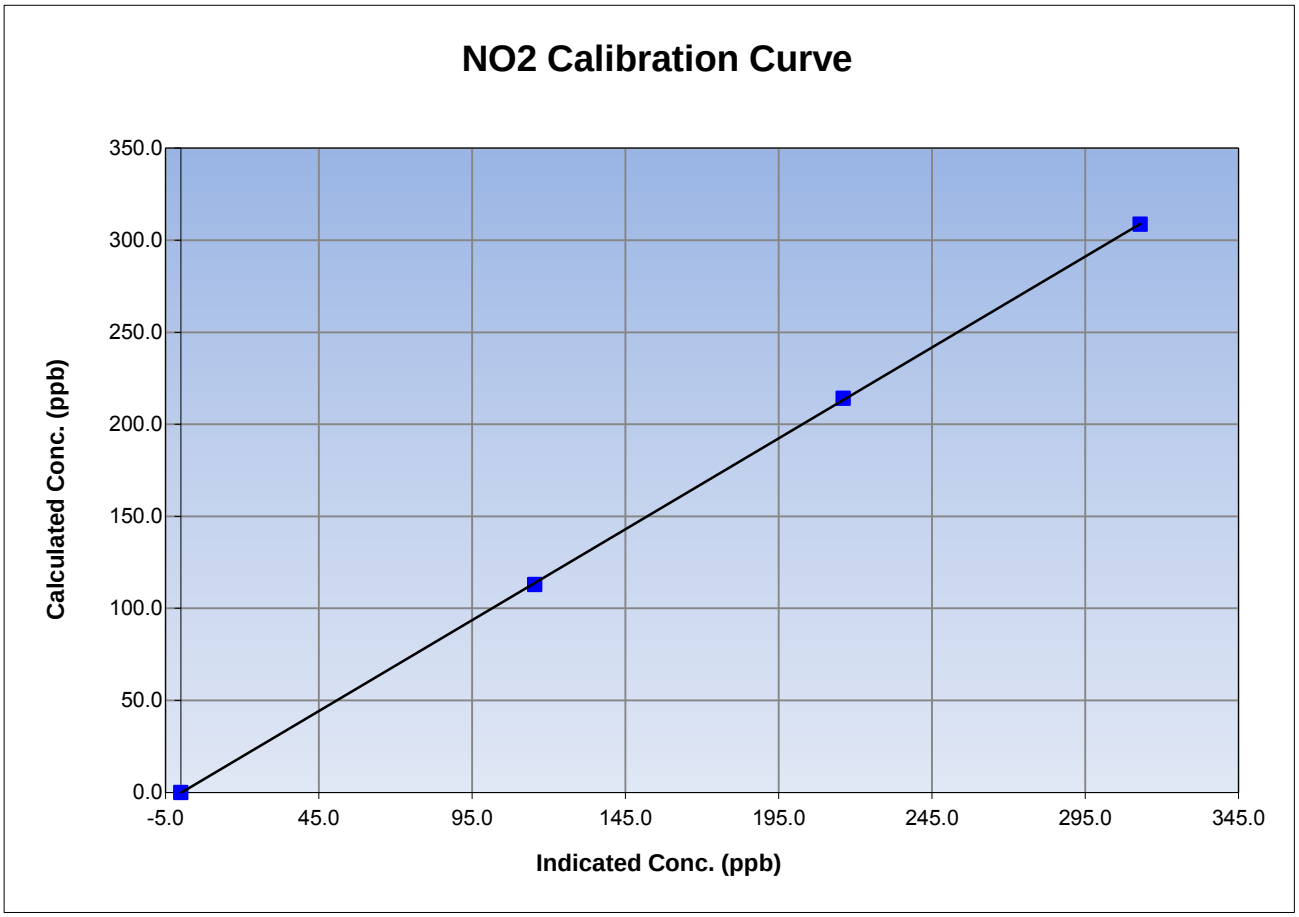
NO_2 Calibration Summary

Station Information

Calibration Date	February 17, 2016	Previous Calibration	January 22, 2016
Station Number	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:50	End Time (MST)	15:00
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	0.0	N/A	Correlation Coefficient	0.999971
308.7	312.9	0.9865		
214.0	216.1	0.9907	Slope	0.988063
113.0	115.5	0.9784		
			Intercept	-0.251878



NOX Calibration Plot Date: February 17, 2016