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ENVIRONMENTAL ASSOCIATION**

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Wood Buffalo Environmental Association

**JULY 2023
MONTHLY REPORT**

CONTINUOUS MONITORING

August 31, 2023

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





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August 31, 2023

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

**RE: Monthly Ambient Air Quality Monitoring Report July 2023
Wood Buffalo Environmental Association**

Enclosed is the July 2023 Ambient Air Quality Monitoring Report for the continuous ambient air quality monitoring stations of the Wood Buffalo Environmental Association (WBEA) regional air quality monitoring network.

The continuous ambient air quality monitoring network stations are:

AMS01 - Bertha Ganter - Fort McKay	AMS19 - Firebag
AMS02 - Mildred Lake	AMS20 - MacKay River
AMS03 - Lower Camp (Meteorology)	AMS21 - Conklin
AMS04 - Buffalo Viewpoint	AMS22 - Janvier
AMS05 - Mannix	AMS23 - Fort Hills
AMS06 - Patricia McInnes	AMS25 - Waskōw ohci Pimâtisiwin
AMS07 - Athabasca Valley	AMS26 - Christina Lake
AMS08 - Fort Chipewyan	AMS27 - Jackfish 2/3
AMS09 - Barge Landing	AMS29 - Surmont 2
AMS11 - Lower Camp (Air Quality)	AMS30 - Ells River
AMS13 - Fort McKay South	AMS505 - Sawbones Bay
AMS14 - Anzac	AMS506 - Jackfish 1
AMS17 - Wapasu	AMS507 - Kirby South
AMS18 - Stony Mountain	

The WBEA submits this report on behalf of its members and for some members to satisfy the requirements contained in their EPEA Approvals (as amended):



Industry Operators

Athabasca Oil Corporation
Canadian Natural

EPEA Approval No.

289664-00-00; 241311-00-00
149968-01-00; 153125-01-00;
20809-02-00; 224816-01-00; 228044-00-00;
237382-00-00

Cenovus Energy Inc.

48522-01-00

ChemTrade Logistics

404827-00-00

CNOOC International

137467-01-00; 236394-00-00

Connacher Oil and Gas Ltd.

240008-00-00

ConocoPhillips

48263-01-00

Fort Hills Energy Corporation

151469-01-00

Hammerstone Corporation

189942-00-00

Harvest Operations Corp.

246984-01-00

H.J. Baker Sulphur Canada ULC

426549-00-00

Husky Oil Operations Ltd.

206355-01-00

Imperial Oil Ltd.

00046586-00-00

Inter Pipeline Ltd.

73203-02-00

Keyera Energy Ltd.

187-03-00

MEG Energy Corp.

00216466-01-00

Parsons Creek Aggregates

231302-00

PetroChina Canada Ltd.

254465-00-00

Suncor Energy Inc.

094-02-00; 80105-01-00

Sunshine Oilsands Ltd.

305529-00-00

Surmont Energy

318401-00-00

Syncrude Canada Ltd.

026-02-00

Titan Tire Reclamation Corporation

364232-00-00

Government and Non-Government Organizations

Alberta Energy Regulator

Health Canada

Alberta Environment and Protected Areas

Keyano College

Alberta Health

Parks Canada

Alberta Health Services

Pembina Institute

Environment and Climate Change Canada

Regional Municipality of Wood Buffalo

Indigenous Communities

Athabasca Chipewyan First Nation

Fort McKay First Nation

Chard Métis Nation

Fort McMurray 468 First Nation

Chipewyan Prairie Dene First Nation

Fort McKay Métis

Christina River Dene Nation Council

Lakeland Métis

Conklin Resource Development Advisory
Council

McMurray Métis

Mikisew Cree First Nation

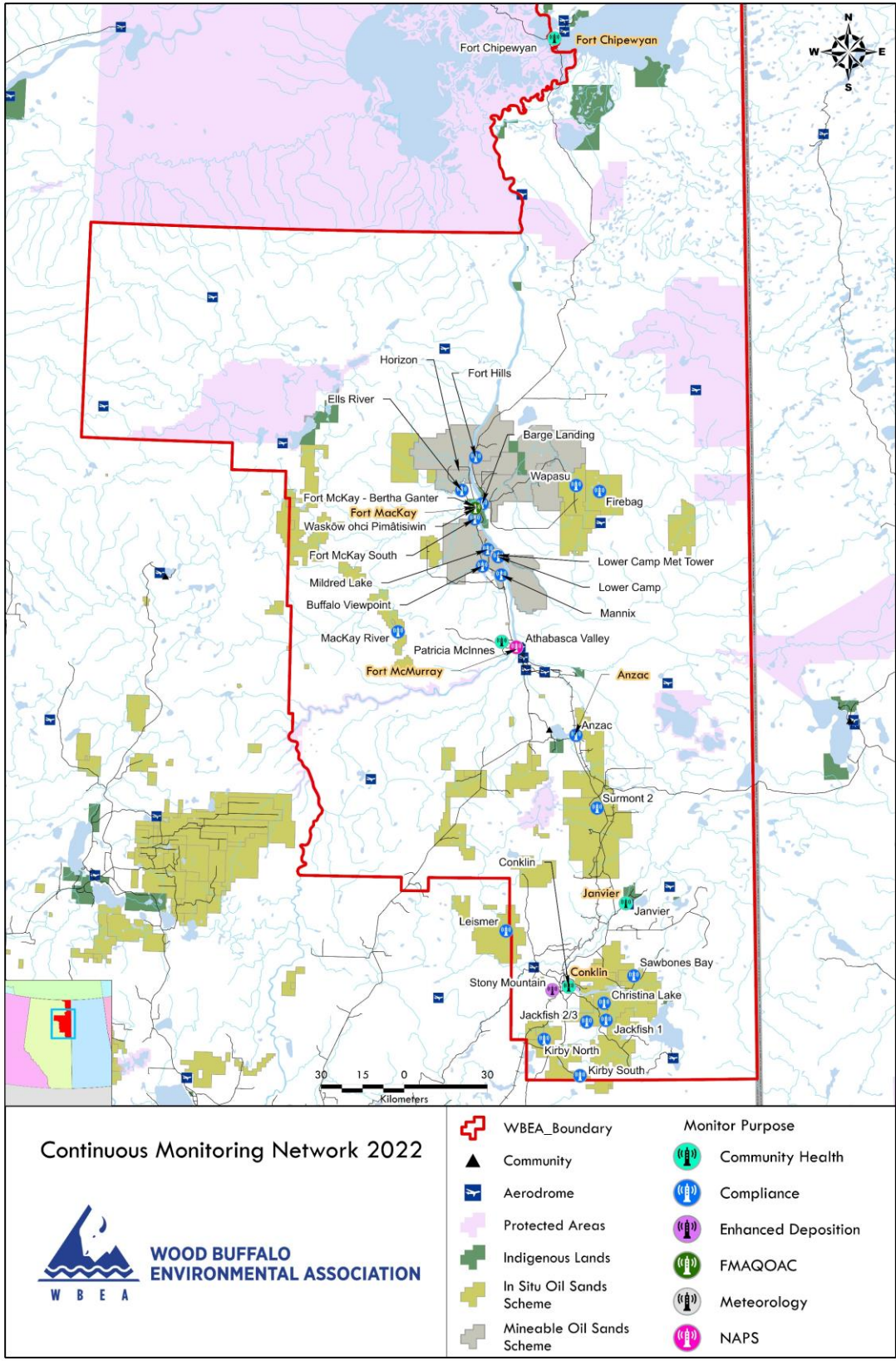


Figure 1: Map of WBEA Continuous Monitoring Network

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

1.0 Concentrations in Excess of Alberta Ambient Air Quality Guidelines and Objectives

There were no ambient concentrations in excess of the Alberta Ambient Air Quality Objectives or Guidelines (AAAQO/AAAQG) as indicated in the Air Monitoring Directive Section RC 5-F for CO, NH₃, NO₂, TRS, and SO₂.

There were ten ground-level concentrations in excess of the 1-hour H₂S objective reported to AEPA; following data validation and processing, eight of these exceedances were confirmed.

There was one ground-level concentrations in excess of the 24-hour H₂S objective reported to AEPA; following data validation and processing, the exceedance was not confirmed.

There was one ground-level concentrations in excess of the 1-hour O₃ objective reported to AEPA; following data validation and processing, the one exceedance was confirmed.

There were one thousand seven hundred sixty-nine ambient ground-level concentrations in excess of the 1-hour PM_{2.5} guideline reported to AEPA; following data validation and processing, two exceedances were retracted, and one thousand seven hundred sixty-seven were confirmed.

There were two hundred twenty-six ambient ground-level concentrations in excess of the 24-hour PM_{2.5} objective reported to AEPA; following data validation and processing, these exceedances were confirmed.

There was one ground-level concentrations in excess of the 24-hour TSP objective reported to AEPA; following data validation and processing, the exceedance was confirmed.

There were two ground-level concentrations in excess of the 30-day dustfall guideline reported to AEPA; following data validation and processing, the exceedances were confirmed.

A detailed summary of ambient concentrations in excess of the Alberta Ambient Air Quality Objectives (AAAQOs) and Ambient Air Quality Guidelines (AAAQGs), including site, parameter, date & time, reference number, exceedance period, reported and final concentration and status, are included in Appendix I of the report.

*status legend:

late	exceedance, raw values were not found to be in exceedance in real time, and/or were not reported, but final values were found to be an exceedance after data processing.
exc	exceedance, raw values reported in real time were confirmed to be in exceedance after data processing.
nae	not an exceedance, raw values reported in real time were found not in exceedance after data processing.
ret	retracted, reported exceedance was found to be not an exceedance after investigation of measurement system status and/or validation of raw data in conjunction with all associated measurement parameters.

2.0 Data Processing and Validation

Concentrations reported in near real-time are raw values. The final values are determined after processing data for reporting. For all parameters, except PM_{2.5}, the final 5-minute data values are determined by

subtracting the daily zero responses, interpolated to the time of each raw 5-minute value, from the raw 5-minute data values. The PM_{2.5} analyzers do not have the capability of performing zero's, therefore, the raw 5-minute values are validated through a comparison with associated parameters at the same, or a nearby, AMS. The final 5-minute data values are then rounded to one decimal place greater than the reporting precision indicated in the Air Monitoring Directive (AMD). The final 1-hour data values are calculated from final 5-minute data values and then rounded to reporting precision. The final 24-hour data values are calculated from final 1-hour values.

After data processing and validation, NO₂ concentrations are re-calculated from baseline-corrected NO_x and NO concentrations. Specifically, the NO concentration is subtracted from the NO_x concentration to determine the NO₂ concentration.

2.1 Revisions to ETS Electronic Transfer System – Data and Monthly Reports

The Patricia McInnes air monitoring station (AMS06) collected H₂S data from January 3, 2023, to June 12, 2023, but it was reported as TRS. On August 30, 2023, the data was resubmitted as H₂S to the Electronic Transfer System (ETS) and the TRS data was revised. The monthly report cover letter, station summary, network summary, and calibration report contained within have been revised to reflect the change.

3.0 Operational Status

3.1 Continuous Monitoring

In July 2023, there were two instances that resulted in monitoring instruments operating less than 90% of the time.

1. The THC, NMHC, and CH₄ analyzer at the Ells River AMS operated for less than 90% of July 2023, which is a contravention of the Air Monitoring Directive (AMD) (2016, as amended), Chapter 6, Clause DQ 4-C. This incident was reported to Alberta Environment and Protected Areas (AEPA) on August 17, 2023 (reference number 417942).

During the daily system check on July 19, the WBEA identified the analyzer baseline was slowly drifting below the expected response of atmospheric background levels, which is 1.8 ppm. A site investigation was conducted to identify the source of the issues, and it was found that the sample pump was failing. On July 21, the sample pump was replaced, and the baseline response returned to expected levels.

The monthly data validation process determined that the sample pump performance began to affect the analyzer baseline on July 9, 2023, through a comparison of concentrations with nearby stations. As a result, data was invalidated for a total of 292 hours, resulting in an operational time of 60% for the month of July.

2. The wind speed and wind direction sensor at Lower Camp AMS operated less than 90% of July and August 2023, which is a contravention of Clause DQ 4-C, of Chapter 6 of the Air Monitoring Directive (2016, as amended). This incident was reported to Alberta Environment and Protected Areas (AEPA) on August 17, 2023 (reference number 417947).
During the daily system check on August 16, the WBEA identified the wind direction was not comparing well with nearby sites and initiated a site visit that day. The WBEA determined that the

sensor had been out of alignment since the previous calibration on July 21. The sensor was aligned and secured properly, and the issue was rectified. During the monthly data validation process, 246 hours and 369 hours of data were invalidated for the months of July and August, respectively, due to this incident.

3.2 Intermittent Monitoring

The results for time-integrated sampling of precipitation, PAH, VOC, ECOC, PM_{2.5}, and PM₁₀ will be submitted in the 2023 Annual Report.

3.3 General Network Notes

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

Total hydrocarbon (THC), non-methane hydrocarbon (NMHC), and methane (CH₄) measurements are collected at some air monitoring stations in the WBEA network using the Thermo Environmental model 55i direct CH₄/NMHC analyzer. This analyzer uses a Gas Chromatography (GC) based system, which resets the baseline value at the start of every run. This may cause the ambient background to indicate a response below the expected 1.8 ppm background level. When all measurable criteria indicate valid data during the QAQC and validation process, the data is reported without any additional flags. However, a response below the expected 1.8 ppm triggers an investigation of the analyzer to determine if there is an issue.

Monitoring notes, including changes to monitoring locations, methods, or equipment, and any reporting or monitoring irregularities, for the continuous monitoring stations, are provided on a station-by-station basis. Notes of each interrupted event are provided in chronological order, and meteorological parameters are mentioned last.

Station 1, Bertha Ganter – Fort McKay

The NH₃ analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily spans and routine monthly multipoint calibrations. Additional time is required for stabilization after exposure to high concentrations of NH₃ gas, and this is an inherent behavior in the NH₃ analyzer operations due to the properties of the NH₃ gas. Data for 1 to 2 hours following the daily spans have been reported as invalid for a total of 32 hours this month.

Cleaning of the sample manifold on July 18 interrupted the normal operations of all gaseous analyzers, except for the H₂S and TRS analyzers, for 1 hour.

A flatline in the output signal of the TRS analyzer on July 26 and 27 resulted in 24 hours of invalid data. Subsequent maintenance to reboot the TRS analyzer on July 27 resulted in a further 1 hour of invalid data.

A flatline in the output signal of the H₂S analyzer on July 28 and 29 resulted in 12 hours of invalid data. Subsequent maintenance to reboot and reinitiate the QA check of the H₂S analyzer on July 27 resulted in a further 4 hours of invalid data.

A flatline in the output signal of the NH₃ analyzer on July 28 and 29 resulted in 15 hours of invalid data.

A flatline in the output signal of the wind sensor on July 11 resulted in 2 hours of downtime.

The surface leaf wetness sensor operated out of range on July 2 and 3 resulting in 25 hours of downtime.

Station 2, Mildred Lake

Cleaning of the sample manifold on July 20 interrupted the normal operations of the SO₂ and THC/NMHC/CH₄ analyzers for 1 hour.

Maintenance to replace the support gas cylinder on July 20 interrupted the normal operations of the SO₂ and THC/NMHC/CH₄ analyzers resulting in 1 to 2 hours of downtime.

The relative humidity sensor operated out of range on throughout the month resulting in 14 hours of downtime.

Intermittent flatlines in the output signal of the wind sensor throughout the month resulted in 3 hours of invalid data.

Station 3, Lower Camp – Meteorology

Failure to record data of all the meteorological sensors on July 27, 30, and 31 resulted in 18 hours of invalid data.

Unstable operations due to excessive noise in the output signal of the wind sensor at the 163-meters elevation on July 2 and 25 resulted in 3 hours of invalid data.

Station 4, Buffalo Viewpoint

Cleaning of the sample manifold on July 19 interrupted the normal operations of the H₂S, NO₂, and O₃ analyzers for 1 hour.

Maintenance to verify the daily QA check on July 25 interrupted the normal operations of the NO₂ analyzer for 5 hours.

Maintenance to replace the NO₂ analyzer, and the multipoint verification check on July 26 and 27, resulted in 23 hours of downtime.

Station 5, Mannix

Failure to record data for all the meteorological sensors at the station on July 21 and 22 resulted in 30 hours of downtime.

Unstable operations due to inconsistent response in the output signal of the wind sensor at 90-meter on July 25 and 30 resulted in 3 hours of invalid data.

Station 6, Patricia McInnes

The NH₃ analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily spans and routine monthly multipoint calibrations. NH₃ analyzers require additional time for stabilization after being exposed to high concentrations, this is due to the physical properties of the NH₃ gas. Data for 1 to 4 hours following each daily span has been reported as invalid for a total of 79 hours this month.

Cleaning of the sample manifold on July 14 interrupted the normal operations of the NO₂, NH₃, SO₂, THC/NMHC/CH₄, and TRS analyzers for 1 hour.

Unstable operations due to excessive baseline drift in the output signal of the THC/NMHC/CH₄ analyzer on July 10 and 30 resulted in 10 hours of invalid data.

Maintenance to replace the THC/NMHC/CH₄ analyzer on July 10 resulted in 4 hours of invalid data.

Maintenance to verify the daily QA check on July 12 interrupted the normal operations of the THC/NMHC/CH₄ analyzer for 1 hour.

Analyzer failure due to inconsistent response of the THC/NMHC/CH₄ analyzer on July 20 and 21 resulted in 19 hours of invalid data. Subsequent maintenance to reboot the analyzer resulted in a further 2 hours of invalid data.

Maintenance to replace sample pump of the THC/NMHC/CH₄ analyzer on July 31 resulted in 22 hours of downtime.

Station 7, Athabasca Valley

Unstable operations due to the THC/NMHC/CH₄ analyzer daily span being outside of AMD criteria on July 9 and 10 resulted in 53 hours of invalid data. Subsequent maintenance to adjust the chromatogram retention windows on July 10 and 21 resulted in an additional 14 hours of downtime.

Cleaning of the sample manifold on July 24 interrupted the normal operations of all gaseous analyzers, except for the CO analyzer, for 1 hour.

Automated daily zero-response checks of the O₃ analyzer did not meet WBEA's QC acceptance criteria for the month of July. Therefore, the calibrator zeros from the June, July and August multi-point calibrations were used to validate the analyzer baseline response.

Station 8, Fort Chipewyan

Cleaning of the sample manifold on July 10 interrupted the normal operations of the CO, CO₂, NO₂, SO₂, and TRS analyzers for 1 hour.

Maintenance to replace the power bar at the station on July 25 interrupted the normal operations of all air quality analyzers resulting in 2 to 22 hours of downtime.

Maintenance to perform a multipoint verification check to address the CO baseline drifting on July 25 resulted in 3 hours of downtime.

Maintenance to verify the daily QA check on July 26 interrupted the normal operations of the NO₂ analyzer for 1 hour.

Unstable operation due to a flatline in the output signal on July 26 through 28 interrupted the normal operations of the CO, CO₂, and O₃ analyzers resulting in 20 to 33 hours of downtime

Station operator activities on July 27 interrupted the normal operations of the O₃ analyzer for 1 hour.

Station power failure for multiple days throughout the month interrupted the normal operations of all air quality analyzers resulting in 3 to 35 hours of downtime.

The relative humidity sensor operated out of range throughout the month resulting in 17 hours of downtime.

Maintenance to replace the wind sensor on July 25 resulted in 1 hour of downtime.

A flatline in the output signal of the wind sensor on July 25 resulted in 1 hour of downtime.

Maintenance to replace the leaf wetness sensor on July 26 resulted in 2 hours of downtime.

Station 9, Barge Landing

Unstable operations due to excessive baseline noise in the output signal of the THC/NMHC/CH₄ analyzers throughout the month resulting in 50 hours of invalid data.

A flatline in the output signal of the wind sensor on July 16 resulted in 1 hour of invalid data.

Station 11, Lower Camp

A flatline in the output signal of the SO₂ analyzer on July 15 and 16 resulted in 34 hours of invalid data. Subsequent maintenance to either reboot the SO₂ analyzer on July 16 resulted in a further 1 hour of invalid data.

Maintenance to reset the logger and the modem on July 19 interrupted the normal operation of all parameters for 1 hour.

A flatline in the output signal of the SO₂ analyzer on July 29 and 30 resulted in 14 hours of invalid data.

Station power failure for multiple days throughout the month interrupted the normal operations of all air quality analyzers resulting in 9 to 11 hours of downtime.

The relative humidity sensor operated out of range throughout the month resulting in 23 hours of invalid data.

Unstable operations due to misalignment of the wind direction sensor from July 21 through 31 resulted in 247 hours of invalid data.

Station 13, Fort McKay South

Unstable operations due to excessive baseline noise in the output signal of the TRS analyzer on July 8 resulted in 5 hours of invalid data.

Station power failure on July 28 interrupted the normal operations of the NO₂ analyzer resulting in 1 hour of downtime.

A flatline in the output signal of the wind sensor on July 15 resulted in 1 hour of invalid data.

Station 14, Anzac

Analyzer failure due to flash lamp failure of the TRS analyzer on July 1 and 2 resulted in 35 hours of invalid data. Subsequent maintenance to replace the TRS analyzer on July 2 resulted in an additional 1 hour of downtime.

Station power failure on July 25 interrupted the normal operations of all air quality analyzers resulting in 5 to 6 hours of downtime.

Unstable operation due to inconsistent response of the PM_{2.5} analyzer on July 25 resulted in 9 hours of invalid data.

Maintenance to replace the support gas cylinder of the THC/NMHC/CH₄ analyzer on July 28 resulted in 3 hours of downtime.

Maintenance to verify the daily QA check on July 30 interrupted the normal operations of the O₃ analyzer for 1 hour.

The relative humidity sensor operated out of range throughout the month resulting in 17 hours of invalid data.

A flatline in the output signal of the wind sensor on July 11 and 15 resulted in 2 hours of invalid data.

The daily span check of all gaseous analyzers was outside the 10% AMD criteria on July 29 to 31 due to an interruption in the station calibrator configuration.

Station 17, Wapasu

A flatline in the output signal of the wind sensor on July 22 resulted in 1 hour of invalid data.

Station 18, Stony Mountain

No operational issues to report.

Station 19, Firebag

Analyzer failure due to inconsistent response of the THC analyzer on July 17 and 18 resulted in 27 hours of invalid data. Subsequent maintenance to reboot the analyzer resulted in a further 1 hour of invalid data.

Maintenance to perform a multipoint verification check to address the THC baseline drifting on July 24 resulted in 4 hours of downtime.

The relative humidity sensor operated out of range throughout the month resulting in 8 hours of invalid data.

Intermittent flatlines in the output signal of the wind sensor on July 4 and 28 resulted in 4 hours of invalid data.

Station 20, MacKay River

Intermittent flatlines in the output signal of the wind sensor on July 9 and 22 resulted in 4 hours of invalid data.

Station 21, Conklin

Maintenance to replace the support gas cylinder of the THC/NMHC/CH₄ analyzer on July 18 resulted in 2 hours of downtime.

A flatline in the output signal of the wind sensor on July 12 resulted in 1 hour of invalid data.

Automated daily zero-response checks of the O₃ analyzer did not meet WBEA's QC acceptance criteria for July. Therefore, the calibrator zeros from the June, July, August multi-point calibrations were used to validate the analyzer baseline response.

Station 22, Janvier

Unstable operations due to excessive baseline noise in the output signal of the NO₂ analyzer from July 11 through 18 resulted in 46 hours of invalid data.

Maintenance to verify the daily QA check on July 16 interrupted the normal operations of the NO₂ analyzer for 1 hour.

Maintenance to remove and install a new NO₂ analyzer on July 18 and 19 resulted in 24 hours of invalid data.

Maintenance to verify the daily QA check on July 21 and 24 interrupted the normal operations of the TRS analyzer for 3 hours.

Maintenance to replace the support gas cylinder on July 26 interrupted the normal operations of the THC/NMHC/CH₄ analyzer resulting in 2 hours of downtime.

A flatline in the output signal of the wind sensor on July 7 resulted in 1 hour of invalid data.

The daily spans check for the TRS analyzer were outside the 10% AMD throughout the month due to high atmospheric humidity.

Station 23, Fort Hills

Failure to record data for the SO₂ analyzer on July 8 resulted in 1 hour of downtime.

Failure to record data for the whole station on July 9 resulted in 1 hour of downtime.

Maintenance to verify the daily QA check on July 10 interrupted the normal operations of the THC/NMHC/CH₄ analyzer for 1 hour.

Cleaning of the sample manifold on July 10 interrupted the normal operations of the NO₂ and TRS analyzers for 1 hour.

Maintenance to replace the support gas cylinder on July 21 interrupted the normal operations of the THC/NMHC/CH₄ analyzer resulting in 3 hours of downtime.

Maintenance to reset the logger and the modem on July 26 interrupted the normal operation of the NO₂, PM_{2.5}, and THC/NMHC/CH₄ analyzers for 1 hour.

Failure to record data for the whole station on July 26 resulted in 1 to 4 hours of downtime.

Station 25, Waskōw ohci Pimâtisiwin

Cleaning of the sample manifold on July 24 interrupted the normal operations of the H₂S analyzer for 1 hour.

Intermittent flatlines in the output signal of the wind sensor throughout the month resulted in 4 hours of invalid data.

Station 26, Christina Lake

Maintenance to replace sample pump and a subsequent stabilization of the NO₂ analyzer on July 12 and 13 resulted in 20 hours of downtime.

An internal audit on July 20 interrupted the normal operations of H₂S, SO₂ and NO₂ analyzers for 3 to 4 hours.

Station 27, Jackfish 2/3

Maintenance to reset the logger and the modem on July 22 interrupted the normal operation of all parameters for 1 hour.

Station 29, Surmont 2

Cleaning of the sample manifold on July 21 interrupted the normal operations of the H₂S, SO₂, and THC analyzers for 1 hour.

A flatline in the output signal of the PM_{2.5} analyzer on July 25 and 26 resulted in 23 hours of invalid data. Subsequent maintenance to either reboot the PM_{2.5} analyzer on July 26 resulted in a further 1 hour of invalid data.

The relative humidity sensor operated out of range on throughout the month resulting in 20 hours of downtime.

Intermittent flatlines in the output signal of the wind sensor throughout the month resulted in 17 hours of invalid data.

Station 30, Ells River

Unstable operations due to excessive baseline drift in the output signal of the THC/NMHC/CH₄ analyzer throughout the month resulted in 292 hours of invalid data.

Maintenance to replace the pump of the THC/NMHC/CH₄ analyzer on July 21 resulted in 6 hours of downtime.

Maintenance to verify the daily QA check on July 22 interrupted the normal operations of the TRS analyzer for 1 hour.

The daily spans check for the TRS analyzer were outside the 10% AMD throughout the month due to high atmospheric humidity.

Station 505, Sawbones Bay

Cleaning of the sample manifold on July 13 interrupted the normal operations of the H₂S and SO₂ analyzers for 2 hours.

Station power failure on July 24 interrupted the normal operations of all air quality analyzers for 3 hours.

Analyzer failure of the NO₂ analyzer due to a sample pump failure on July 30 and 31 resulted in 46 hours of invalid data.

Maintenance to remotely troubleshoot the NO₂ analyzer on July 31 resulted in 1 hour of invalid data.

The relative humidity sensor operated out of range on throughout the month resulting in 53 hours of downtime.

Station 506, Jackfish 1

Note: The Jackfish portable completed monitoring on July 31, 2021. Removal calibration files are included with routine monthly calibration files, in the monthly calibration report for July 2023.

Intermittent flatlines in the output signal of the wind sensor throughout the month resulted in 4 hours of invalid data.

Station 507, Kirby South

Note: The Kirby South portable commenced monitoring on July 7, 2023. Install calibration files are included with routine monthly calibration files, in the monthly calibration report for July 2023.

Maintenance to restore the operations of the air monitoring station after the relocation interrupted the normal operations of all gaseous analyzers for 21 to 23 hours.

Maintenance to replace the SO₂ scrubber beads on July 25 interrupted the normal operations of the H₂S analyzer for 8 hours.

The daily span check for the H₂S analyzer was outside the 10% AMD criteria throughout the month due to high atmospheric humidity.

If additional information is required, please contact the Wood Buffalo Environmental Association at (780) 799-4420.

Yours sincerely,

Wood Buffalo Environmental Association

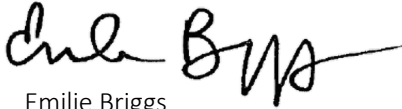
The representative of the Person Responsible for this monitoring program is Emilie Briggs, Operations Manager, WBEA.

Level one (L1) data review was completed by the Field Technicians responsible for each respective air monitoring station. Level two (L2) data validation, report preparation, and submission were completed by Asad Hidayat and Karina Fenwick of WBEA. The WBEA has retained the services of Whiteley Enterprises to conduct Level three (L3) review on its behalf. Contact information for WBEA staff is included below.

Asad Hidayat, Data Technician
Wood Buffalo Environmental Association
T: (780) 215-6000
E: ahidayat@wbea.org

Karina Fenwick, Data Technician
Wood Buffalo Environmental Association
T: (780) 215-7499
E: kfenwick@wbea.org

I certify that I have reviewed and verified this report and that the information is complete, accurate and representative of the monitoring results, reporting timeframe, and the specified analysis, summarization, and reporting requirements.



Emilie Briggs
Operations Manager

Wood Buffalo Environmental Association
Unit 3 - 805 Memorial Drive
Fort McMurray AB T9K 0K4
www.wbea.org
T: (780) 747-8219 | E: ebriggs@wbea.org

R00_2307

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
MONTHLY AIR MONITORING SUMMARY

July 2023
Page 1 of 3
Created: Aug 30 2023 9:30:00

APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	7	2023					
241311-00-00	CONTINUOUS AMBIENT MONITORING						
20809-02-00							
149968-01-00			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
237382-00-00	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
48522-01-00	SO2(ppb)	1	100	17	0	3.1	0
240008-00-00	SO2(ppb)	2	100	28.1	0	4.9	0
48263-01-00	SO2(ppb)	4	100	127.3	0	13.2	0
224816-00-00	SO2(ppb)	5	100	59.8	0	6.9	0
151469-01-00	SO2(ppb)	6	100	25.4	0	5.1	0
189942-00-00	SO2(ppb)	7	100	18.9	0	2.5	0
206355-00-00	SO2(ppb)	8	98	1.9	0	0.9	0
46586-00-00	SO2(ppb)	9	100	14.1	0	2.8	0
73203-02-00	SO2(ppb)	11	92	138.9	0	20.6	0
216466-01-00	SO2(ppb)	13	100	17.0	0	4.1	0
137467-01-00	SO2(ppb)	14	99	17.8	0	2.1	0
236394-00-00	SO2(ppb)	17	100	13.1	0	2.7	0
254465-00-00	SO2(ppb)	18	100	4.4	0	1.6	0
094-03-00	SO2(ppb)	19	100	18.5	0	2.7	0
80105-01-00	SO2(ppb)	20	100	15.3	0	3.3	0
305529-00-00	SO2(ppb)	21	100	3.5	0	1.0	0
318401-00-00	SO2(ppb)	22	100	3.6	0	0.7	0
026-03-00	SO2(ppb)	23	99	20.8	0	3.2	0
364232-00-00	SO2(ppb)	25	100	15.7	0	2.9	0
228044-00-00	SO2(ppb)	26	100	27.9	0	4.1	0
247548-00-00	SO2(ppb)	27	100	6.8	0	1.7	0
231302-00-00	SO2(ppb)	29	100	5.4	0	1.1	0
153125-01-00	SO2(ppb)	30	100	28.7	0	3.4	0
	SO2(ppb)	505	99	12.5	0	4.7	0
	SO2(ppb)	506	100	9.8	0	1.9	0
	SO2(ppb)	507	96	6.0	0	1.6	0
	H2S(ppb)	1	98	2.8	0	0.6	0
	H2S(ppb)	2	100	4.5	0	0.8	0
	H2S(ppb)	4	100	5.6	0	0.9	0
	H2S(ppb)	5	100	16.1	5	2.5	0
	H2S(ppb)	11	99	13.8	3	2.6	0
	H2S(ppb)	17	100	1.6	0	0.5	0
	H2S(ppb)	19	100	5.7	0	0.7	0
	H2S(ppb)	20	100	4.5	0	0.9	0
	H2S(ppb)	25	100	2.0	0	0.5	0
	H2S(ppb)	26	100	3.8	0	0.7	0
	H2S(ppb)	27	100	1.3	0	0.4	0
	H2S(ppb)	29	100	0.9	0	0.3	0
	H2S(ppb)	505	99	2.6	0	0.8	0
	H2S(ppb)	506	100	3.5	0	0.8	0
	H2S(ppb)	507	95	0.8	0	0.3	0
	TRS(ppb)	1	97	2.8	0	1.0	0
	TRS(ppb)	6	100	2.5	0	1.2	0
	TRS(ppb)	7	100	3.1	0	1.1	0
	TRS(ppb)	8	99	1.8	0	0.6	0
	TRS(ppb)	9	100	2.4	0	0.8	0
	TRS(ppb)	13	99	2.9	0	1.0	0
	TRS(ppb)	14	94	0.8	0	0.4	0
	TRS(ppb)	18	100	0.8	0	0.5	0
	TRS(ppb)	21	100	1.0	0	0.7	0
	TRS(ppb)	22	100	0.7	0	0.3	0
	TRS(ppb)	23	100	1.6	0	0.5	0
	TRS(ppb)	30	100	1.8	0	1.1	0
	THC(ppm)	1	100	3.5	-	2.4	-
	THC(ppm)	2	100	3.7	-	2.4	-
	THC(ppm)	4	100	4.6	-	2.7	-
	THC(ppm)	5	100	7.4	-	2.8	-
	THC(ppm)	6	92	3.0	-	2.4	-
	THC(ppm)	7	91	3.4	-	2.4	-
	THC(ppm)	9	93	3.3	-	2.4	-
	THC(ppm)	11	99	3.5	-	2.4	-
	THC(ppm)	13	100	3.0	-	2.3	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
MONTHLY AIR MONITORING SUMMARY

July 2023
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REPORT DATE							
MONTH	YEAR						
7	2023	CONTINUOUS AMBIENT MONITORING					
APPROVAL NUMBERS	PARAMETER	STN. NO.	% TIME OPERATIONAL	ONE-HOUR AVERAGE		24-HOUR AVERAGE	
				MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
289664-00-00	THC(ppm)	14	99	2.6	-	2.2	-
241311-00-00	THC(ppm)	17	100	3.0	-	2.5	-
20809-02-00	THC(ppm)	18	100	3.6	-	2.2	-
149968-01-00	THC(ppm)	19	96	2.9	-	2.5	-
237382-00-00	THC(ppm)	20	100	3.2	-	2.7	-
48522-01-00	THC(ppm)	21	100	3.5	-	2.3	-
240008-00-00	THC(ppm)	22	100	2.4	-	2.1	-
48263-01-00	THC(ppm)	23	99	10.3	-	2.7	-
224816-00-00	THC(ppm)	29	100	2.8	-	2.5	-
151469-01-00	THC(ppm)	30	60	3.5	-	2.4	-
189942-00-00	THC(ppm)	507	96	3.5	-	2.6	-
206355-00-00	O3(ppb)	1	100	68.4	0	31.2	-
46586-00-00	O3(ppb)	4	100	56.1	0	32.1	-
73203-02-00	O3(ppb)	6	100	61.6	0	37.9	-
216466-01-00	O3(ppb)	7	100	62.2	0	36.3	-
137467-01-00	O3(ppb)	8	92	63.4	0	42.7	-
236394-00-00	O3(ppb)	13	100	60.5	0	30.6	-
254465-00-00	O3(ppb)	14	99	62.4	0	35.2	-
094-03-00	O3(ppb)	17	100	79.1	1	43.4	-
80105-01-00	O3(ppb)	18	100	61.1	0	39.0	-
305529-00-00	O3(ppb)	21	100	65.8	0	36.9	-
318401-00-00	O3(ppb)	22	100	67.2	0	36.2	-
026-03-00	NO2(ppb)	1	100	28.9	0	8.0	-
364232-00-00	NO2(ppb)	4	97	43.4	0	11.3	-
228044-00-00	NO2(ppb)	6	100	15.8	0	6.4	-
247548-00-00	NO2(ppb)	7	100	15.1	0	7.8	-
231302-00-00	NO2(ppb)	8	99	9.2	0	2.3	-
153125-01-00	NO2(ppb)	9	100	30.6	0	9.8	-
	NO2(ppb)	13	100	34.7	0	7.9	-
	NO2(ppb)	14	99	11.9	0	4.2	-
	NO2(ppb)	17	100	20.0	0	6.1	-
	NO2(ppb)	18	100	7.7	0	4.0	-
	NO2(ppb)	19	100	15.2	0	4.3	-
	NO2(ppb)	20	100	17.0	0	5.4	-
	NO2(ppb)	21	100	9.0	0	4.4	-
	NO2(ppb)	22	90	5.1	0	2.7	-
	NO2(ppb)	23	99	40.6	0	15.0	-
	NO2(ppb)	26	97	16.9	0	5.4	-
	NO2(ppb)	27	100	8.3	0	3.1	-
	NO2(ppb)	29	100	8.8	0	4.0	-
	NO2(ppb)	30	100	29.0	0	10.0	-
	NO2(ppb)	505	93	18.7	0	7.6	-
	NO2(ppb)	506	100	13.8	0	4.9	-
	NO2(ppb)	507	97	31.4	0	4.3	-
	CO(ppm)	1	100	2.3	0	1.4	-
	CO(ppm)	7	100	1.7	0	1.2	-
	CO(ppm)	8	90	2.5	0	0.7	-
	CO(ppm)	18	100	1.4	0	1.0	-
	CO2(ppm)	1	100	526.3	-	448.4	-
	CO2(ppm)	8	90	451.2	-	436.3	-
	CO2(ppm)	18	100	470.4	-	434.2	-
	NH3(ppb)	1	94	114.1	0	60.0	-
	NH3(ppb)	6	90	72.9	0	42.1	-
	PM2.5(ug/m3)	1	100	490.4	134	269.5	17
	PM2.5(ug/m3)	4	100	450.4	156	271.8	18
	PM2.5(ug/m3)	6	100	431.0	123	273.3	13
	PM2.5(ug/m3)	7	100	406.3	128	256.4	13
	PM2.5(ug/m3)	8	100	419.6	151	167.3	17
	PM2.5(ug/m3)	9	100	451.0	128	247.7	17
	PM2.5(ug/m3)	13	100	441.8	134	285.6	16
	PM2.5(ug/m3)	14	98	362.3	119	199.6	12
	PM2.5(ug/m3)	17	100	311.1	125	189.3	19
	PM2.5(ug/m3)	18	100	390.3	62	230.6	12
	PM2.5(ug/m3)	21	100	350.2	64	214.7	13

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
MONTHLY AIR MONITORING SUMMARY

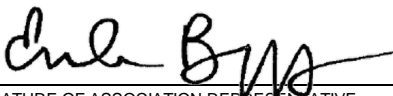
July 2023

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REPORT DATE	
MONTH	YEAR
7	2023

CONTINUOUS AMBIENT MONITORING

APPROVAL NUMBERS	PARAMETER	STN. NO.	% TIME OPERATIONAL	ONE-HOUR AVERAGE		24-HOUR AVERAGE	
				MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
289664-00-00	PM2.5(ug/m3)	22	100	295.4	69	152.5	13
241311-00-00	PM2.5(ug/m3)	23	99	453.3	152	289.9	19
20809-02-00	PM2.5(ug/m3)	29	97	326.1	98	153.8	11
149968-01-00	PM2.5(ug/m3)	30	100	451.3	124	296.4	16
237382-00-00	WS(km/h)	1	100	-	-	-	-
48522-01-00	WS(km/h)	2	100	-	-	-	-
240008-00-00	WS(km/h)	4	100	-	-	-	-
48263-01-00	WS(km/h)	5	96	-	-	-	-
224816-00-00	WS(km/h)	6	100	-	-	-	-
151469-01-00	WS(km/h)	7	100	-	-	-	-
189942-00-00	WS(km/h)	8	100	-	-	-	-
206355-00-00	WS(km/h)	9	100	-	-	-	-
46586-00-00	WS(km/h)	11	67	-	-	-	-
73203-02-00	WS(km/h)	13	100	-	-	-	-
216466-01-00	WS(km/h)	14	100	-	-	-	-
137467-01-00	WS(km/h)	17	100	-	-	-	-
236394-00-00	WS(km/h)	18	100	-	-	-	-
254465-00-00	WS(km/h)	19	99	-	-	-	-
094-03-00	WS(km/h)	20	99	-	-	-	-
80105-01-00	WS(km/h)	21	100	-	-	-	-
318401-00-00	WS(km/h)	22	100	-	-	-	-
026-03-00	WS(km/h)	23	100	-	-	-	-
364232-00-00	WS(km/h)	25	99	-	-	-	-
228044-00-00	WS(km/h)	26	100	-	-	-	-
247548-00-00	WS(km/h)	27	100	-	-	-	-
231302-00-00	WS(km/h)	29	98	-	-	-	-
153125-01-00	WS(km/h)	30	100	-	-	-	-
	WS(km/h)	505	100	-	-	-	-
	WS(km/h)	506	99	-	-	-	-
	WS(km/h)	507	100	-	-	-	-
							
SIGNATURE OF ASSOCIATION REPRESENTATIVE					FOR ALBERTA ENVIRONMENT USE ONLY		



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS01 BERTHA GANTER - FORT MCKAY JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY - BERTHA GANTER (AMS01)
JULY 2023

MONTHLY SUMMARY

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	16.5	0	3.1	0
H2S(ppb) Average	689	39	55	97.85	2.8	0	0.6	0
TRS(ppb) Average	681	38	63	96.64	2.8	0	1	0
THC(ppm) Average	707	36	37	99.87	3.5	-	2.4	-
NMHC(ppm) Average	707	36	37	99.87	0.385	-	0.215	-
CH4(ppm) Average	707	36	37	99.87	3.1	-	2.2	-
O3 (ppb) Average	708	35	36	99.87	68.4	0	31.2	-
NO2 (ppb) Average	706	37	38	99.87	28.9	0	8	-
NO (ppb) Average	706	37	38	99.87	38.8	-	5.5	-
NOX (ppb) Average	706	37	38	99.87	67.7	-	11.6	-
NH3 (ppb) Average	652	44	92	93.55	114.1	0	60	-
PM2.5 (ug/m3) Average	741	3	3	100	490.4	134	269.5	17
CO(ppm) Average	708	35	36	99.87	2.3	0	1.4	0
CO2(ppm) Average	707	36	37	99.87	526.3	0	448.4	0
Temperature 2 m (C) Average	744	0	0	100	30.7	-	23	-
Temperature 10 m (C) Average	744	0	0	100	29.7	-	22.9	-
Relative Humidity (%) Average	744	0	0	100	98.3	-	94.4	-
Wind Speed 10 m (km/h) Average	742	0	2	99.73	29	-	17	-
Wind Direction 10 m (deg) Average	742	0	2	99.73	-	-	-	-
Precipitation (mm) Total	744	0	0	100	5.2	-	34.3	-
Leaf Wetness (% of range) Average	719	0	25	96.64	87	-	26	-
Global Solar Radiation (W/m2) Average	744	0	0	100	881.4	-	359.8	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER FORT MCKAY (AMS01)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	0.61	1.7	-	0	0	0	0.1	0.3	1.3	16.5
H2S (ppb) Average	689	0.32	0.4	-	0	0	0.1	0.2	0.4	0.7	2.8
TRS (ppb) Average	681	0.63	0.3	-	0.3	0.4	0.4	0.5	0.7	1.1	2.8
THC (ppm) Average	707	2.14	0.2	-	1.9	2	2	2.1	2.2	2.4	3.5
NMHC(ppm) Average	707	0.067	0.087	-	0	0	0	0	0.1	0.2	0.385
CH4(ppm) Average	707	2.07	0.1	-	1.9	2	2	2	2.1	2.2	
O3 (ppb) Average	708	22.13	12.3	-	0	6.6	12.2	21.4	31.2	37.9	68.4
NO2 (ppb) Average	706	4.37	4.5	-	0	0.5	1.1	2.8	6.3	10.4	28.9
NO (ppb) Average	706	1.16	3.7	-	0	0	0	0	0.5	2.7	38.8
NOX (ppb) Average	706	5.53	7.4	-	0	0.5	1.2	3	7.4	12.6	67.7
NH3 (ppb) Average	652	4	14.5	-	0	0	0	0	0	11.1	114.1
PM2.5 (ug/m3) Average	741	51.29	74.2	-	2.2	5.1	9.5	22.8	55.5	120.2	490.4
CO(ppm) Average	708	0.52	0.3	-	0.2	0.3	0.3	0.4	0.6	0.9	2.3
CO2(ppm) Average	707	428.3	24.7	-	397.2	403.8	408.9	421.1	442.4	462.8	526.3
Temperature 2 m (C) Average	744	18.62	5.1	-	6.2	12.5	14.7	18.1	22.6	25.6	30.7
Temperature 10 m (C) Average	744	18.59	4.6	-	7	12.8	15.1	18.1	22.2	25	29.7
Relative Humidity (%) Average	744	65.44	20.2	-	28.4	37.5	48.7	65.1	83.4	93.8	98.3
Wind Speed 10 m (km/h) Average	742	6.7	4	-	0	2	4	6	9	13	29
Wind Direction 10 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	61.48	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	719	6.98	14.7	-	0	0.2	0.5	1.1	2.9	25.3	87
Global Solar Radiation (W/m2) Average	744	227.02	262.6	-	0	0	0.4	96.1	429	660.9	881.4

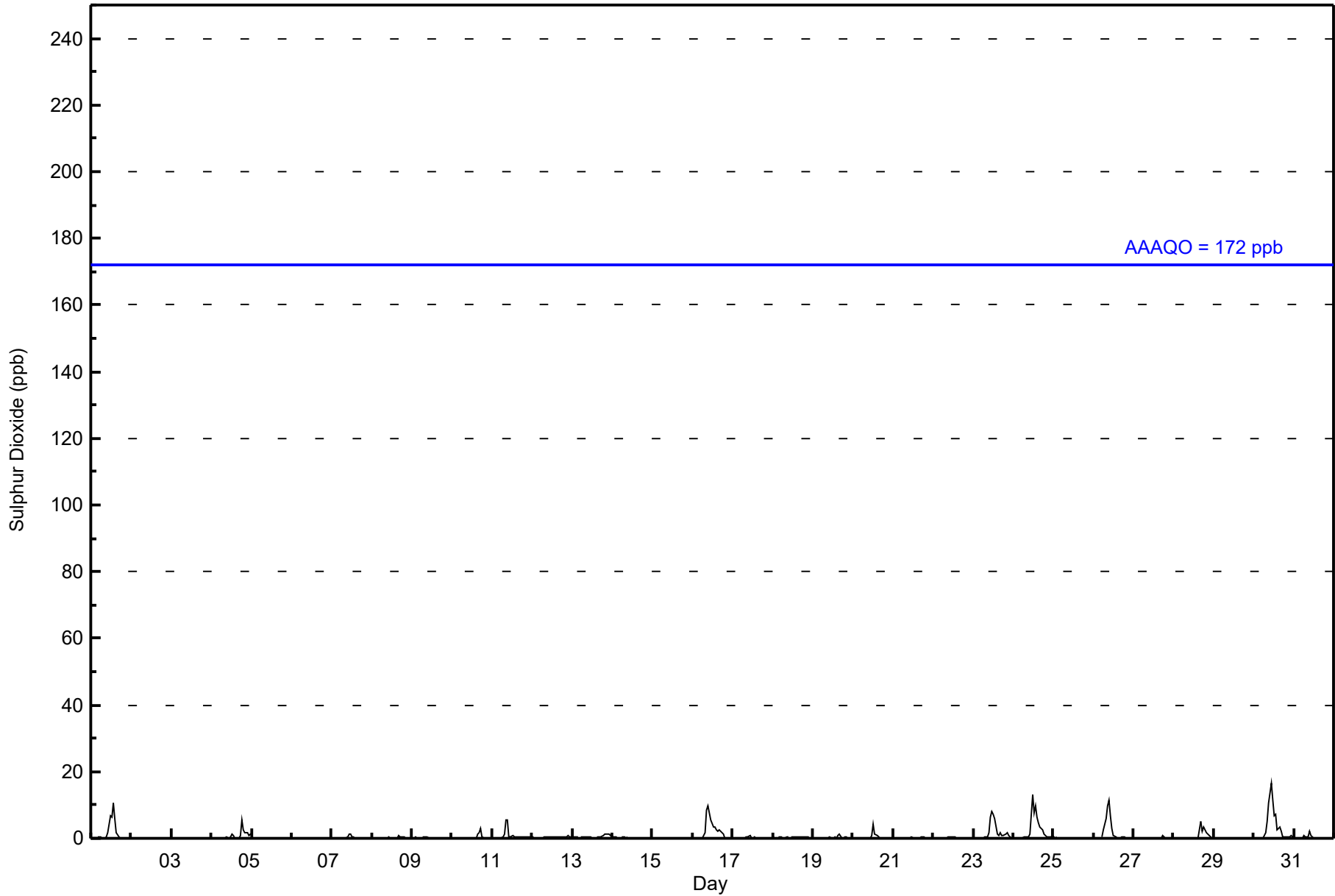
WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER FORT MCKAY (AMS01)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS (EXCEPT TRS/H2S)	18 Jul 2023 11:00	18 Jul 2023 11:00	1	Maintenance - sample manifold cleaned
H2S	28 Jul 2023 18:00	29 Jul 2023 02:00	9	Unstable Operation - flatline in analyzer output signal
H2S	29 Jul 2023 04:00	29 Jul 2023 06:00	3	Unstable Operation - flatline in analyzer output signal
H2S	29 Jul 2023 07:00	29 Jul 2023 10:00	4	Maintenance - reinitiated daily QA check
TRS	26 Jul 2023 10:00	27 Jul 2023 09:00	24	Unstable Operation - flatline in analyzer output signal
TRS	27 Jul 2023 10:00	27 Jul 2023 10:00	1	Maintenance - analyzer rebooted
NH3	28 Jul 2023 18:00	29 Jul 2023 08:00	15	Unstable Operation - flatline in analyzer output signal
NH3	01 Jul 2023 02:00	31 Jul 2023 02:00	32	Stabilization after daily QA check
Wind Speed, Wind Direction	11 Jul 2023 05:00	11 Jul 2023 06:00	2	Flat line in sensor output signal
Surface Leaf Wetness	02 Jul 2023 02:00	03 Jul 2023 02:00	25	Sensor operated out of range



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																			Hours in Service: 744								
Maximum Value: 16.5 ppb on Jul 30 11:00																			Maximum Daily Average: 3.1 ppb on Jul 30								
Minimum Value: 0.0 ppb on Jul 2 07:00																			Minimum Daily Average: 0.0 ppb on Jul 6								
Maximum Diurnal Average: 1.8 ppb at hour 12																			Minimum Diurnal Average: 0.1 ppb at hour 5								
Monthly Average: 0.61 ppb																			Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 1.3 P ₉₉ = 9.8								
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-Jul	0.1	0.1	0.1	Z	0.3	0.2	0.2	0.1	0.2	0.3	1.6	6.7	6.4	10.7	6.0	1.8	0.3	0.1	0.1	0.1	0.1	0.2	0.1	0.1	1.6	10.7	
2-Jul	0.0	0.0	0.1	0.1	Z	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2
3-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
4-Jul	Z	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.2	0.6	1.1	0.7	0.2	0.1	0.1	0.8	5.7	2.4	1.6	1.8	0.9	1.3	0.8	5.7	
5-Jul	0.6	Z	0.1	0.1	0.1	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	0.0	0.0	0.0	0.0	0.1	0.6	
6-Jul	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0
7-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.2	0.4	1.3	1.2	0.5	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.3	
8-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.1	0.5	0.1	0.2	0.2	0.2	0.2	0.6	0.2	0.2	0.3	0.1	0.2	0.2	0.2	0.2	0.6	0.6
9-Jul	0.1	0.1	0.3	0.2	0.2	Z	0.2	0.3	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.4	0.4
10-Jul	Z	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.3	1.8	2.8	0.3	0.0	0.0	0.0	0.0	0.0	0.3	2.8	
11-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.3	1.1	5.7	5.4	0.5	0.5	0.7	0.3	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.2	0.8	5.7	
12-Jul	0.3	0.2	Z	0.2	0.1	0.2	0.1	0.4	0.6	0.6	0.4	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.4	0.4	0.4	0.7	0.5	0.5	0.4	0.7	
13-Jul	0.5	0.5	0.5	0.5	Z	0.3	0.2	0.4	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.8	1.3	1.2	1.2	1.1	0.9	0.5	1.3	
14-Jul	0.6	0.5	0.5	0.2	Z	0.3	0.2	0.2	0.1	0.2	C	C	C	C	C	0.2	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.6	
15-Jul	0.1	0.0	0.0	0.1	0.0	Z	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	0.1	0.1	0.0	0.1	0.0	0.1	0.1	
16-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.1	1.6	8.3	9.9	7.4	5.6	3.6	3.5	2.7	2.2	2.5	1.8	1.3	0.1	0.1	0.1	0.1	0.0	2.2	9.9	
17-Jul	0.1	Z	0.1	0.0	0.1	0.0	0.1	0.2	0.3	0.4	0.7	0.1	0.1	0.2	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.7	
18-Jul	0.2	0.2	Z	0.2	0.2	0.2	0.1	0.2	0.3	0.4	M	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.1	0.2	0.4	0.4
19-Jul	0.1	0.1	0.1	Z	0.1	0.1	0.0	0.1	0.1	0.2	0.3	0.2	0.1	0.2	0.2	0.9	1.1	0.2	0.1	0.3	0.4	0.1	0.1	0.1	0.2	1.1	
20-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.0	0.1	0.2	0.7	4.2	1.4	1.0	0.5	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.4	4.2	
21-Jul	0.1	0.1	0.1	0.1	0.0	Z	0.0	0.0	0.1	0.0	0.2	0.4	0.1	0.0	0.0	0.0	0.2	0.4	0.3	0.2	0.1	0.0	0.0	0.0	0.1	0.4	
22-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.3	0.3	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	
23-Jul	0.1	Z	0.0	0.1	0.1	0.1	0.1	0.2	0.3	1.7	6.5	8.1	7.1	5.8	1.2	0.9	1.7	1.0	1.0	1.5	1.6	0.7	0.3	0.2	1.7	8.1	
24-Jul	0.1	0.1	Z	0.1	0.0	0.1	0.3	0.3	0.3	0.3	1.4	13.2	7.6	9.8	6.3	4.8	3.3	2.4	1.1	0.7	0.5	0.4	0.4	0.6	2.3	13.2	
25-Jul	0.4	0.2	0.2	Z	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.4	
26-Jul	0.0	0.0	0.0	0.2	Z	0.6	2.4	5.9	9.7	11.6	6.6	2.8	0.9	0.4	0.1	0.1	0.1	0.4	0.4	0.1	0.1	0.0	0.0	0.0	1.8	11.6	
27-Jul	0.0	0.1	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.9	
28-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	2.4	5.1	2.1	3.4	1.8	1.3	0.7	0.4	0.1	0.8	5.1	
29-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1
30-Jul	0.1	0.0	Z	0.0	0.0	0.1	0.7	1.8	5.2	10.6	16.5	11.4	6.9	7.1	2.4	3.4	2.3	0.2	0.3	0.3	0.2	0.3	1.0	0.5	3.1	16.5	
31-Jul	0.3	0.2	0.1	Z	0.1	0.1	0.7	0.6	0.2	2.1	1.0	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.3	2.1	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	701	99.15	99.15
11 - 20	6	0.85	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	105	46	18	10	12	14	40	80	75	45	16	30	36	59	50	63	699
11 - 20	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0	6
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	105	46	18	10	12	14	41	85	75	45	16	30	36	59	50	63	705

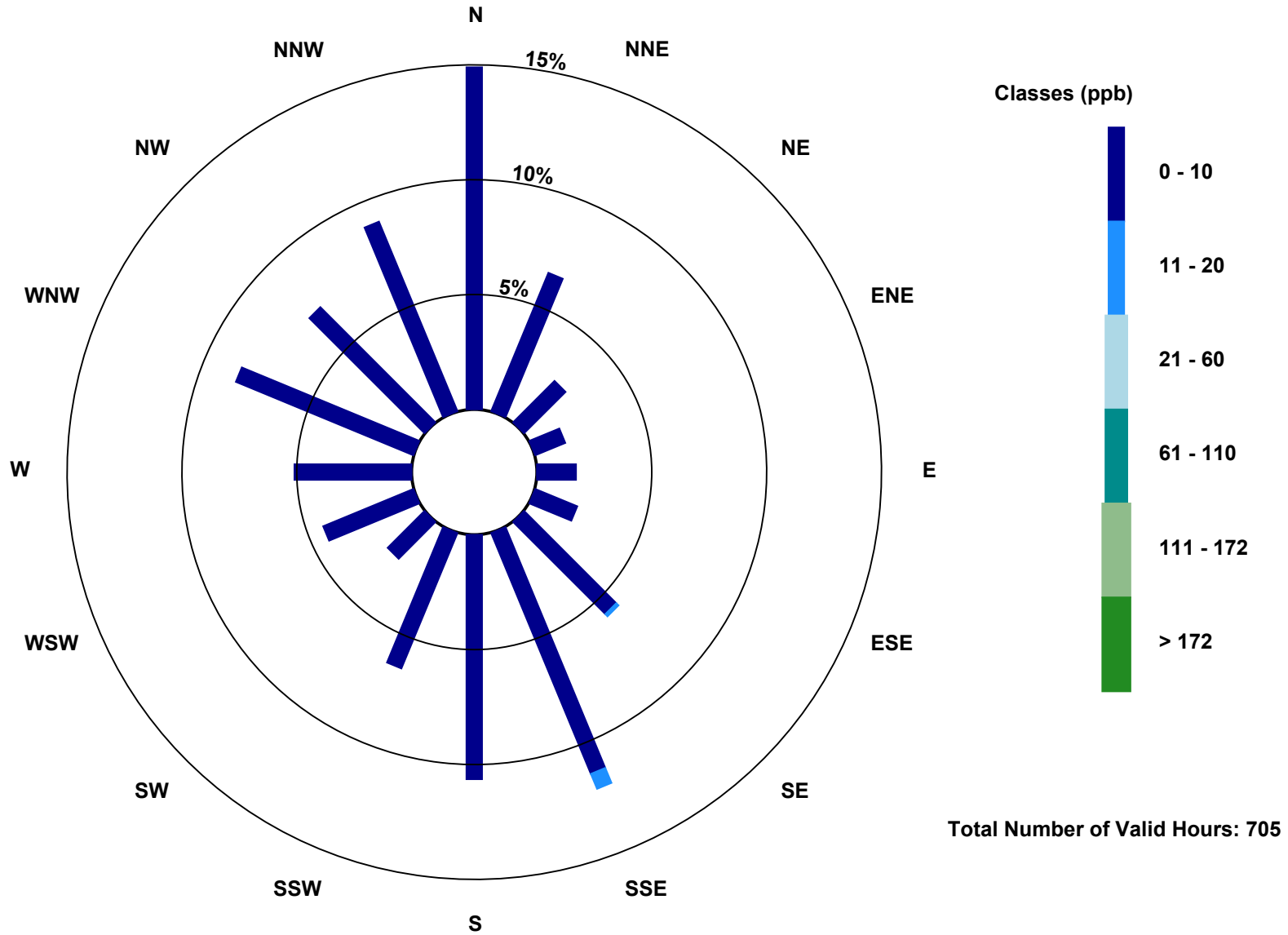
Total Number of Valid Hours: 705

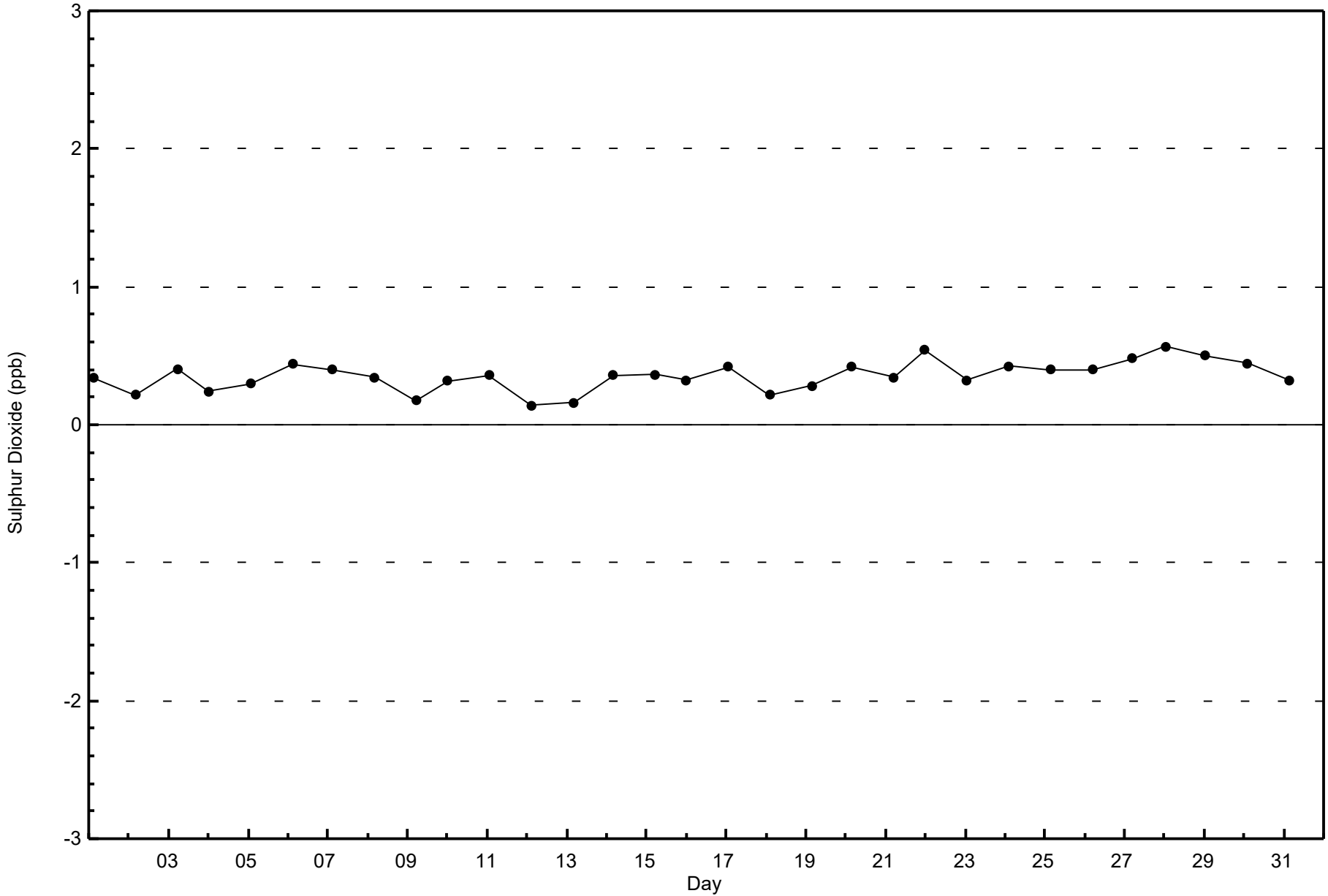
Total Number of Hours: 744

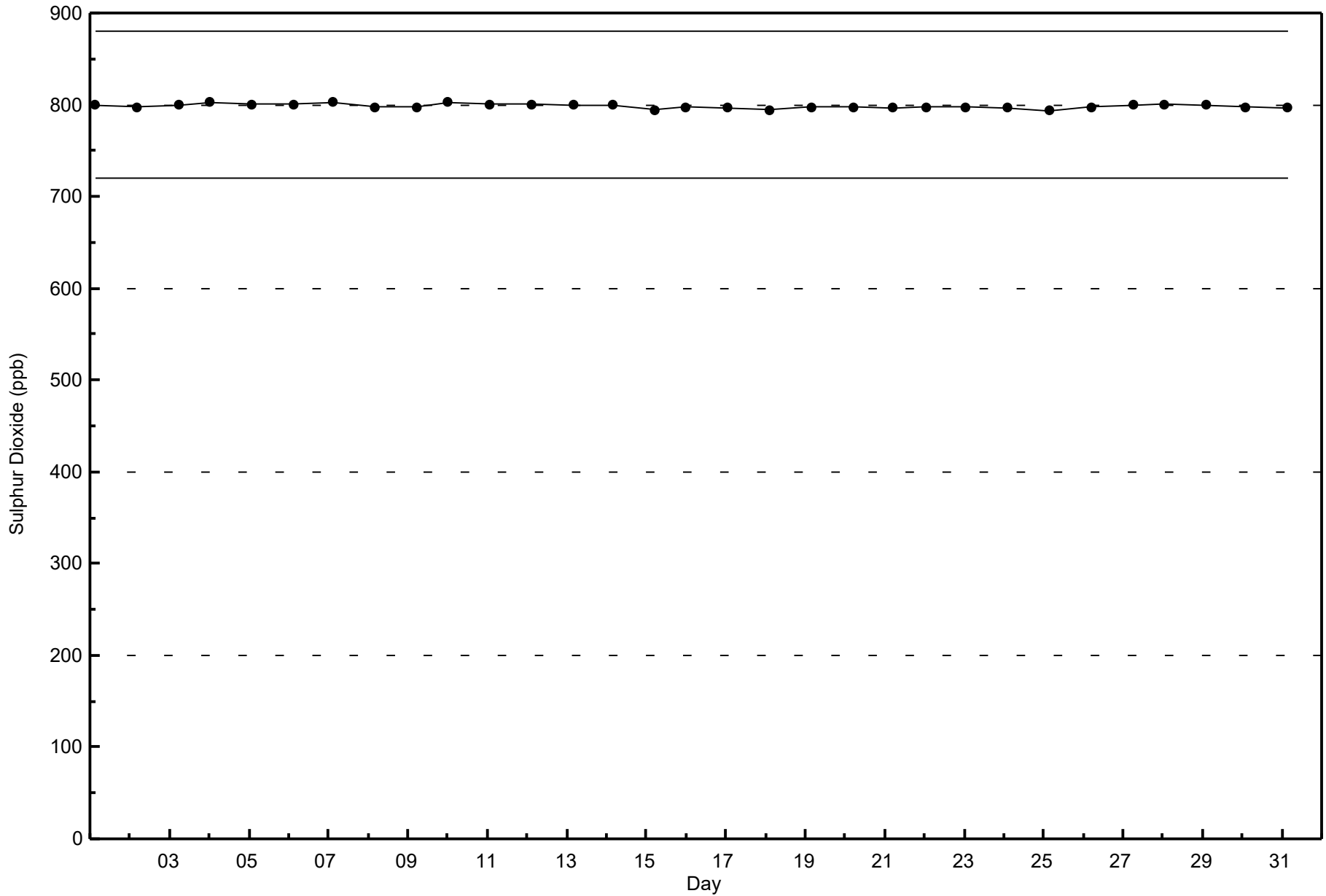


Wood Buffalo Environmental Association
Wind Rose Jul 2023

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









Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

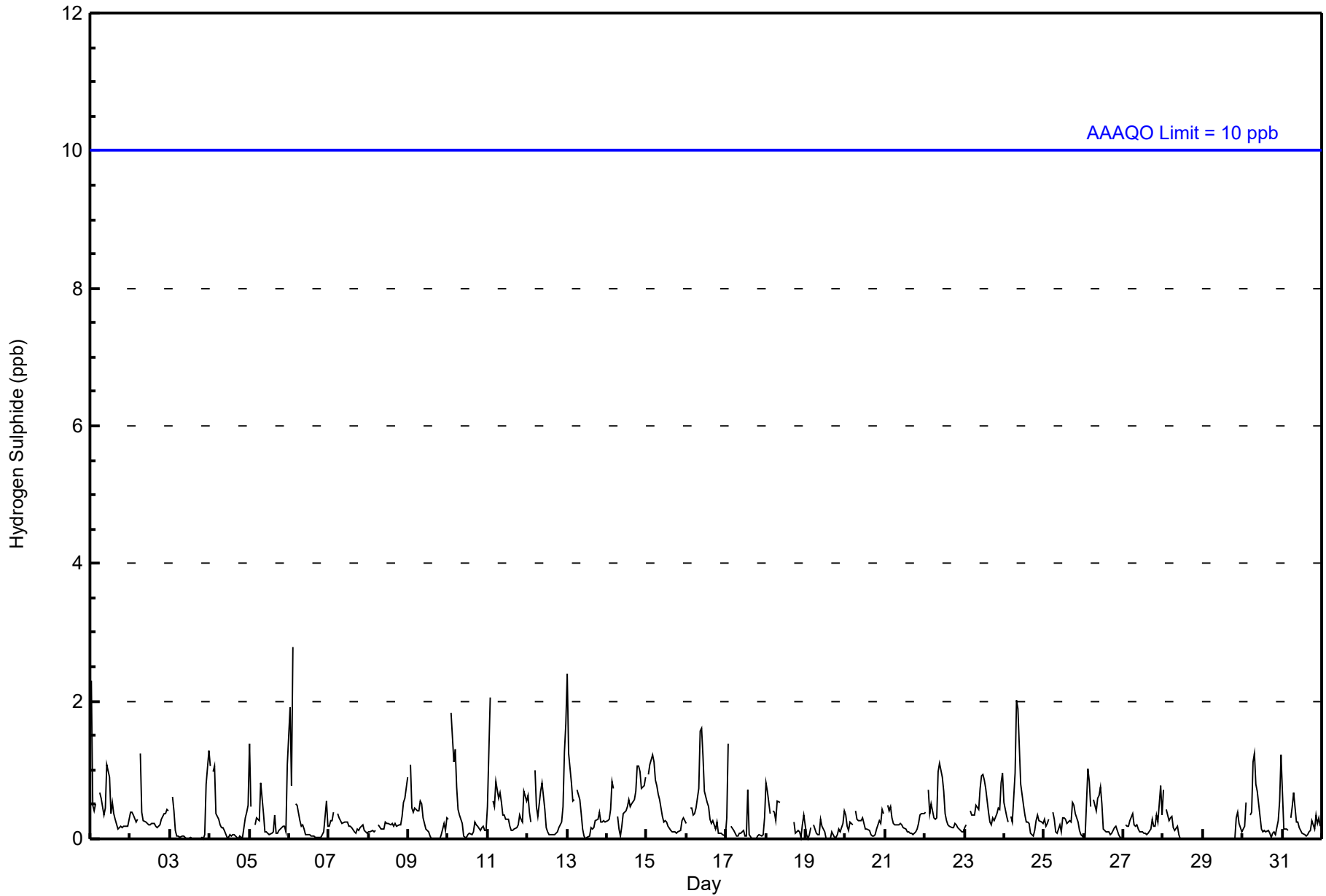
Fort McKay - Bertha Ganter - July 2023

Number of Exceedences (AAAQO):		1-hr: 0 24-hr: 0		Hours in Service:		744																					
Maximum Value: 2.8 ppb on Jul 6 03:00		Maximum Daily Average: 0.6 ppb on Jul 14		Hours of Data:		689																					
Minimum Value: 0.0 ppb on Jul 3 16:00		Minimum Daily Average: 0.1 ppb on Jul 19		Hours of Missing Data:		55																					
Maximum Diurnal Average: 0.6 ppb at hour 1		Minimum Diurnal Average: 0.1 ppb at hour 17		Hours of Calibration:		39																					
Monthly Average: 0.32 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.2 Q ₃ = 0.4 P ₉₀ = 0.7 P ₉₉ = 1.8		Percent Operational Time:		97.9																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	2.3	0.5	0.4	0.5	Z	0.7	0.6	0.5	0.3	0.4	1.1	0.9	0.4	0.5	0.4	0.3	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.5	2.3	
2-Jul	0.4	0.4	0.3	0.2	0.3	Z	1.3	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.3	1.3	
3-Jul	Z	0.6	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	0.1	0.8	1.3	0.2	1.3	
4-Jul	1.1	Z	1.0	1.0	0.4	0.3	0.2	0.2	0.2	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.5	0.3	1.1	
5-Jul	1.4	0.5	Z	0.2	0.3	0.3	0.3	0.8	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.2	0.2	0.1	1.1	0.3	1.4	
6-Jul	1.9	0.8	2.8	Z	0.5	0.5	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.5	0.2	0.4	2.8	
7-Jul	0.2	0.3	0.3	0.4	Z	0.4	0.3	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.4	
8-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.5	0.6	0.9	0.2	0.9	
9-Jul	Z	1.1	0.4	0.4	0.4	0.4	0.4	0.6	0.5	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.3	0.2	1.1	
10-Jul	0.3	Z	1.8	1.1	1.3	0.8	0.4	0.4	0.2	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.3	1.8	
11-Jul	0.5	2.1	Z	0.6	0.5	0.8	0.6	0.7	0.5	0.3	0.4	0.3	0.3	0.2	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.2	0.7	0.5	0.5	2.1	
12-Jul	0.6	0.4	0.3	Z	1.0	0.5	0.3	0.5	0.7	0.8	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.5	1.3	1.7	0.4	1.7	
13-Jul	2.4	1.2	0.8	0.5	0.6	Z	0.7	0.6	0.4	0.1	0.0	0.0	0.0	0.2	0.1	0.2	0.3	0.3	0.4	0.2	0.2	0.3	0.3	0.4	0.4	2.4	
14-Jul	0.3	0.3	0.4	0.8	0.7	Z	0.3	0.1	0.0	0.2	0.4	0.4	0.5	0.6	0.5	0.6	0.7	1.1	1.0	1.0	0.7	0.8	0.9	0.9	0.6	1.1	
15-Jul	Z	0.9	1.1	1.2	1.1	0.8	0.8	0.7	0.6	0.3	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.4	1.2	
16-Jul	0.2	Z	0.4	0.5	0.3	0.4	0.4	0.7	1.6	1.6	1.2	0.7	0.5	0.5	0.3	0.2	0.3	0.2	0.3	0.1	0.1	0.1	0.1	0.0	0.5	1.6	
17-Jul	0.3	1.4	Z	0.2	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.3	0.2	1.4	
18-Jul	0.8	0.7	0.4	Z	0.4	0.4	0.3	0.6	0.5	C	C	C	C	C	C	C	C	0.2	0.1	0.1	0.1	0.0	0.2	0.3	--	0.8	
19-Jul	0.1	0.0	0.1	0.2	Z	0.2	0.1	0.1	0.1	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.4	0.1	0.4	
20-Jul	0.4	0.2	0.1	0.2	0.2	Z	0.4	0.3	0.3	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.3	0.2	0.4	0.4	0.2	0.4	
21-Jul	Z	0.5	0.4	0.5	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.4	0.4	0.2	0.5	
22-Jul	0.4	Z	0.7	0.4	0.5	0.3	0.3	0.3	1.0	1.1	0.9	0.7	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.4	1.1	
23-Jul	0.2	0.2	Z	0.4	0.3	0.3	0.4	0.5	0.4	0.7	0.9	0.9	0.9	0.7	0.4	0.2	0.2	0.3	0.3	0.4	0.5	0.4	0.8	1.0	0.5	1.0	
24-Jul	0.5	0.3	0.2	Z	0.3	0.2	1.0	2.0	1.9	1.3	0.8	0.5	0.3	0.2	0.2	0.1	0.0	0.1	0.3	0.4	0.3	0.2	0.2	0.2	0.5	2.0	
25-Jul	0.3	0.2	0.2	0.3	Z	0.4	0.3	0.1	0.1	0.2	0.1	0.3	0.3	0.3	0.2	0.3	0.2	0.5	0.5	0.4	0.2	0.1	0.1	0.0	0.2	0.5	
26-Jul	0.0	0.0	1.0	0.8	0.5	Z	0.6	0.4	0.6	0.6	0.7	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.0	0.0	0.3	1.0	
27-Jul	Z	0.2	0.2	0.2	0.3	0.4	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.2	0.3	0.2	0.8	0.4	0.2	0.8	
28-Jul	0.7	Z	0.4	0.3	0.3	0.3	0.2	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	UO	UO	UO	UO	UO	UO	UO	--	0.7	
29-Jul	UO	UO	Z	UO	UO	UO	M	M	M	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.2	0.1	--	0.4		
30-Jul	0.1	0.2	0.5	Z	0.4	0.4	1.1	1.2	0.8	0.7	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.3	0.5	1.2	0.4	1.2	
31-Jul	0.7	0.1	0.1	0.1	Z	0.3	0.5	0.7	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.3	0.1	0.3	0.2	0.3	0.2	0.2	0.7	
		0.6	0.5	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.4	0.5	Diurnal Average		
		2.4	2.1	2.8	1.2	1.3	0.8	1.3	2.0	1.9	1.6	1.2	0.9	0.9	0.7	0.5	0.5	0.6	0.7	1.1	1.0	1.0	0.7	1.3	1.7	Diurnal Maximum	
Z - zerospan		C - Calibration					M - Maintenance					UO - Unstable Operation															
Alberta Ambient Air Quality Objectives (AAAQO):		1-hr 10 ppb				24-hr 3 ppb																					



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Fort McKay - Bertha Ganter - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	688	99.85	99.85
3 - 4	1	0.15	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: 689

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Fort McKay - Bertha Ganter - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	107	49	17	10	11	15	40	84	60	43	17	31	35	55	50	62	686
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	107	49	17	10	11	15	40	84	60	43	17	31	35	55	51	62	687

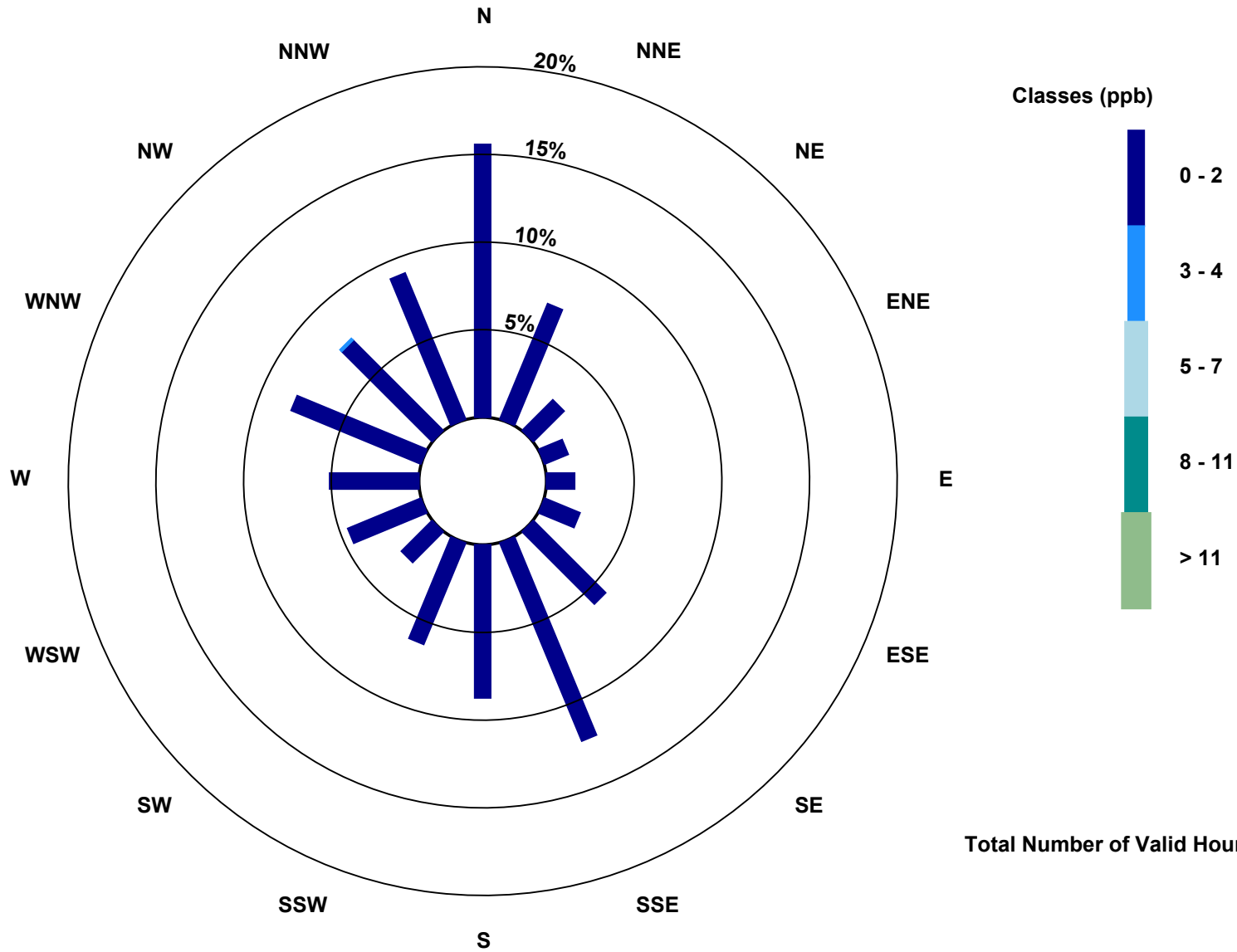
Total Number of Valid Hours: 687

Total Number of Hours: 744

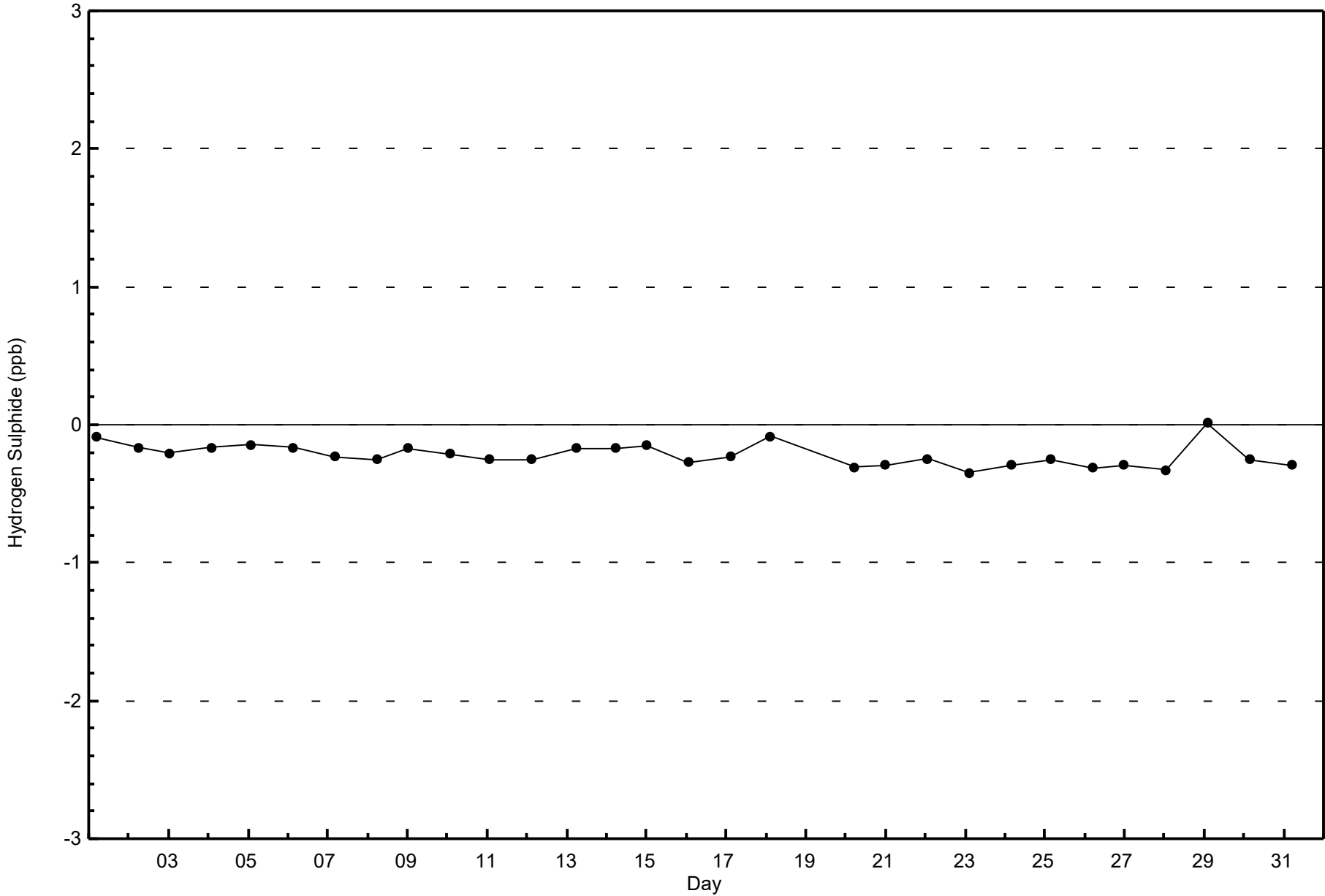


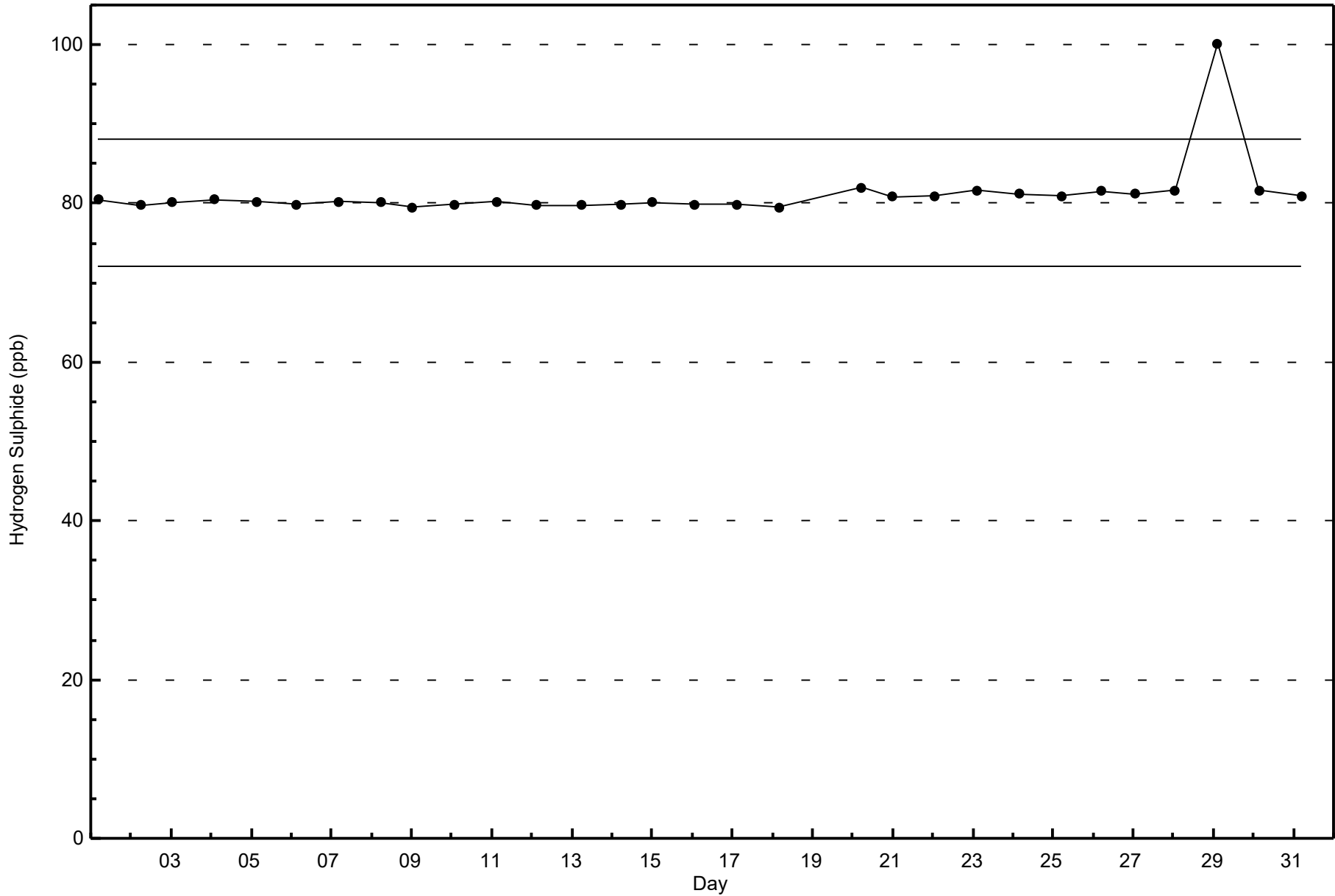
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Hydrogen Sulphide (H₂S) - ppb
Fort McKay - Bertha Ganter



Total Number of Valid Hours: 687







Wood Buffalo Environmental Association

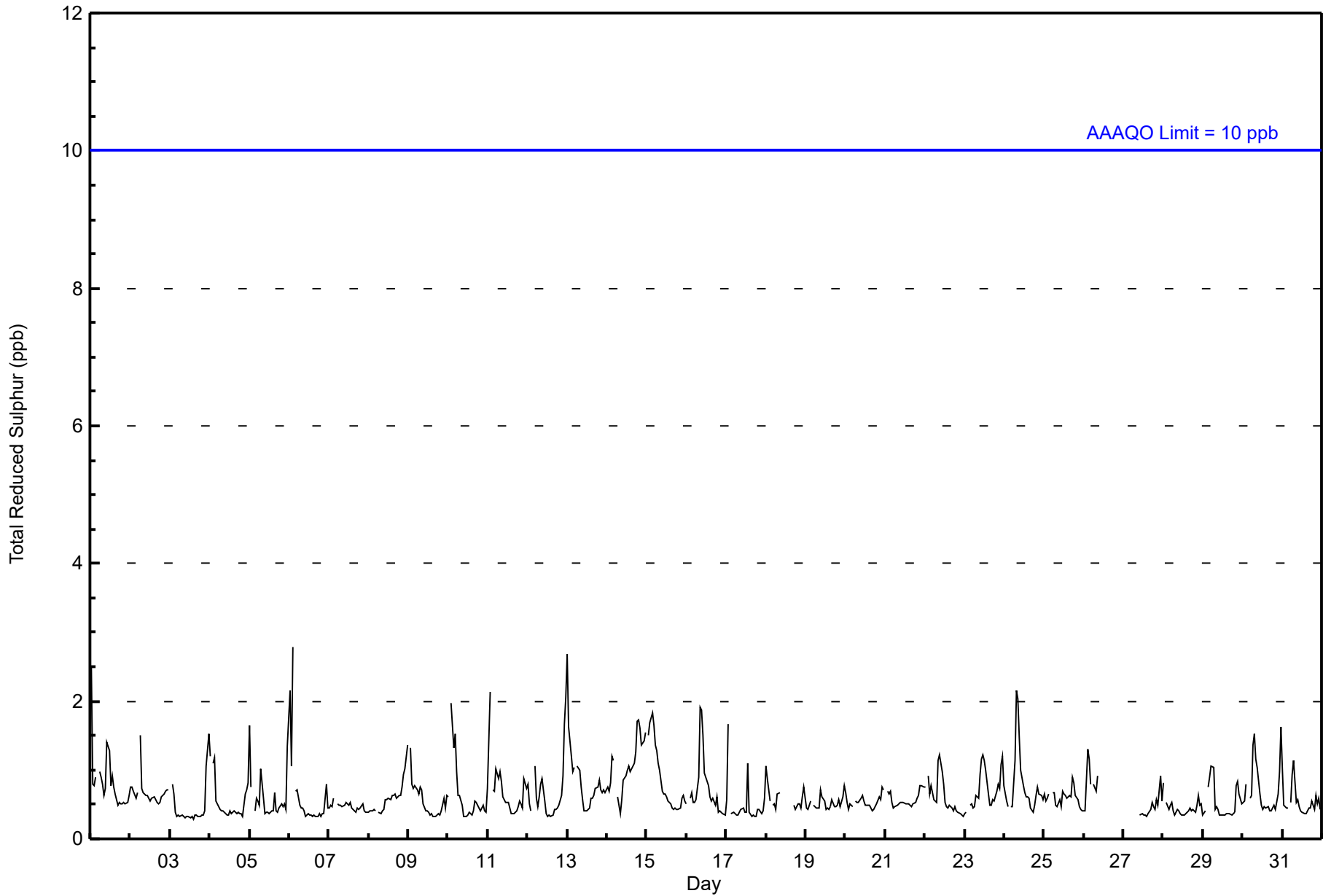
Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Fort McKay - Bertha Ganter - July 2023

Number of Exceedences (AAAQO):		1-hr: 0 24-hr: 0		Hours in Service:		744																				
Maximum Value: 2.8 ppb on Jul 6 03:00		Maximum Daily Average: 1.0 ppb on Jul 14		Hours of Data:		681																				
Minimum Value: 0.3 ppb on Jul 3 15:00		Minimum Daily Average: 0.4 ppb on Jul 28		Hours of Missing Data:		63																				
Maximum Diurnal Average: 0.9 ppb at hour 1		Minimum Diurnal Average: 0.5 ppb at hour 17		Hours of Calibration:		38																				
Monthly Average: 0.63 ppb		Percentiles: P ₁ = 0.3 P ₁₀ = 0.4 Q ₁ = 0.4 Median = 0.5 Q ₃ = 0.7 P ₉₀ = 1.1 P ₉₉ = 2.0		Percent Operational Time:		96.6																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	2.5	0.8	0.8	0.9	Z	1.0	0.9	0.8	0.6	0.7	1.4	1.3	0.8	0.9	0.7	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.8	2.5
2-Jul	0.7	0.8	0.7	0.6	0.7	Z	1.5	0.7	0.7	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.7	0.7	1.5
3-Jul	Z	0.8	0.7	0.4	0.3	0.3	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	0.4	1.1	1.5	1.5	
4-Jul	1.2	Z	1.1	1.2	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	0.4	0.4	0.4	0.3	0.6	0.7	0.8	1.2	
5-Jul	1.6	0.8	Z	0.4	0.6	0.6	0.5	1.0	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.7	0.4	0.4	0.5	0.5	0.5	0.4	1.3	0.6	1.6	
6-Jul	2.2	1.1	2.8	Z	0.7	0.7	0.5	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.8	0.4	2.8	
7-Jul	0.4	0.5	0.5	0.6	Z	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.6	
8-Jul	0.4	0.4	0.4	0.4	0.4	Z	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.7	0.9	1.0	1.4	1.4	
9-Jul	Z	1.3	0.8	0.7	0.8	0.7	0.7	0.8	0.7	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.4	0.3	0.4	0.6	0.4	0.6	1.3	
10-Jul	0.6	Z	2.0	1.3	1.5	1.0	0.6	0.6	0.5	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.5	0.5	0.5	0.4	0.4	0.5	0.4	0.4	2.0	
11-Jul	0.7	2.1	Z	0.7	0.7	1.0	0.9	1.0	0.8	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.5	0.5	0.9	0.7	2.1	
12-Jul	0.8	0.5	0.4	Z	1.1	0.6	0.5	0.6	0.8	0.9	0.6	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.6	0.9	1.7	2.1	2.1	
13-Jul	2.7	1.6	1.2	1.0	1.0	Z	1.1	1.0	0.8	0.6	0.4	0.4	0.4	0.6	0.6	0.6	0.7	0.8	0.9	0.7	0.7	0.7	0.7	0.7	2.7	
14-Jul	0.7	0.7	0.8	1.2	1.1	Z	0.6	0.5	0.4	0.6	0.8	0.9	1.0	1.1	1.0	1.1	1.3	1.7	1.7	1.6	1.4	1.4	1.5	1.5	1.7	
15-Jul	Z	1.5	1.7	1.8	1.6	1.4	1.3	1.1	1.0	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.5	0.4	0.4	0.6	0.6	0.5	0.5	1.8	
16-Jul	0.5	Z	0.6	0.7	0.5	0.5	0.6	0.9	1.9	1.9	1.5	1.0	0.8	0.8	0.6	0.5	0.6	0.5	0.6	0.4	0.4	0.4	0.4	0.4	1.9	
17-Jul	0.6	1.7	Z	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	1.1	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.6	1.7	
18-Jul	1.1	0.9	0.6	Z	0.5	0.5	0.4	0.7	0.7	C	C	C	C	C	C	C	C	C	0.5	0.4	0.5	0.5	0.4	0.6	1.1	
19-Jul	0.5	0.4	0.5	0.6	Z	0.5	0.5	0.4	0.4	0.7	0.6	0.5	0.4	0.5	0.4	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.6	0.8	0.8	
20-Jul	0.7	0.5	0.4	0.5	0.5	Z	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.8	0.7	0.8	
21-Jul	Z	0.7	0.6	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.8	0.8	0.8	0.8	
22-Jul	0.7	Z	0.9	0.6	0.8	0.6	0.5	0.5	1.1	1.2	1.0	0.8	0.5	0.5	0.4	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.3	0.3	1.2	
23-Jul	0.4	0.4	Z	0.5	0.5	0.5	0.5	0.6	0.6	0.9	1.2	1.2	1.1	1.0	0.6	0.5	0.6	0.6	0.7	0.8	0.7	1.1	1.2	1.2		
24-Jul	0.8	0.6	0.5	Z	0.5	0.5	1.1	2.1	2.0	1.5	1.0	0.8	0.7	0.6	0.6	0.4	0.4	0.5	0.6	0.8	0.8	0.6	0.6	0.6	2.1	
25-Jul	0.6	0.5	0.6	0.7	Z	0.7	0.7	0.5	0.5	0.6	0.5	0.7	0.7	0.6	0.6	0.6	0.6	0.9	0.8	0.6	0.6	0.5	0.4	0.4	0.9	
26-Jul	0.4	0.4	1.3	1.2	0.8	Z	0.8	0.7	0.9	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	1.3	
27-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.4	0.6	0.5	0.9	0.6	0.9	
28-Jul	0.8	Z	0.5	0.4	0.5	0.5	0.4	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.5	0.5	0.4	0.8	
29-Jul	0.4	0.4	Z	0.8	0.9	1.1	1.0	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.8	0.8	0.7	0.5	1.1	
30-Jul	0.5	0.6	0.8	Z	0.6	0.6	1.4	1.5	1.2	1.0	0.6	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.5	0.4	0.6	1.0	1.6	1.6	
31-Jul	1.0	0.5	0.4	0.5	Z	0.5	0.9	1.1	0.5	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.4	0.6	0.5	0.6	0.4	1.1	
																								Diurnal Average		
																								Diurnal Maximum		
																								0.9 2.7		
																								0.8 2.1		
																								0.9 2.8		
																								0.7 1.8		
																								0.7 1.6		
																								0.6 1.4		
																								0.7 1.5		
																								0.7 2.1		
																								0.7 2.0		
																								0.7 1.9		
																								0.6 1.5		
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																								0.5 1.1		
																								0.5 1.3		
																								0.5 1.7		
																								0.5 1.7		
																								0.6 1.6		
																								0.6 1.4		
																								0.7 1.7		
																								0.8 2.1		

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	679	99.71	99.71
3 - 4	2	0.29	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	96	44	16	8	10	15	38	85	75	43	17	31	35	55	49	60	677
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	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	96	44	16	8	10	15	38	85	75	43	17	31	35	55	51	60	679

Total Number of Valid Hours: 679

Total Number of Hours: 744

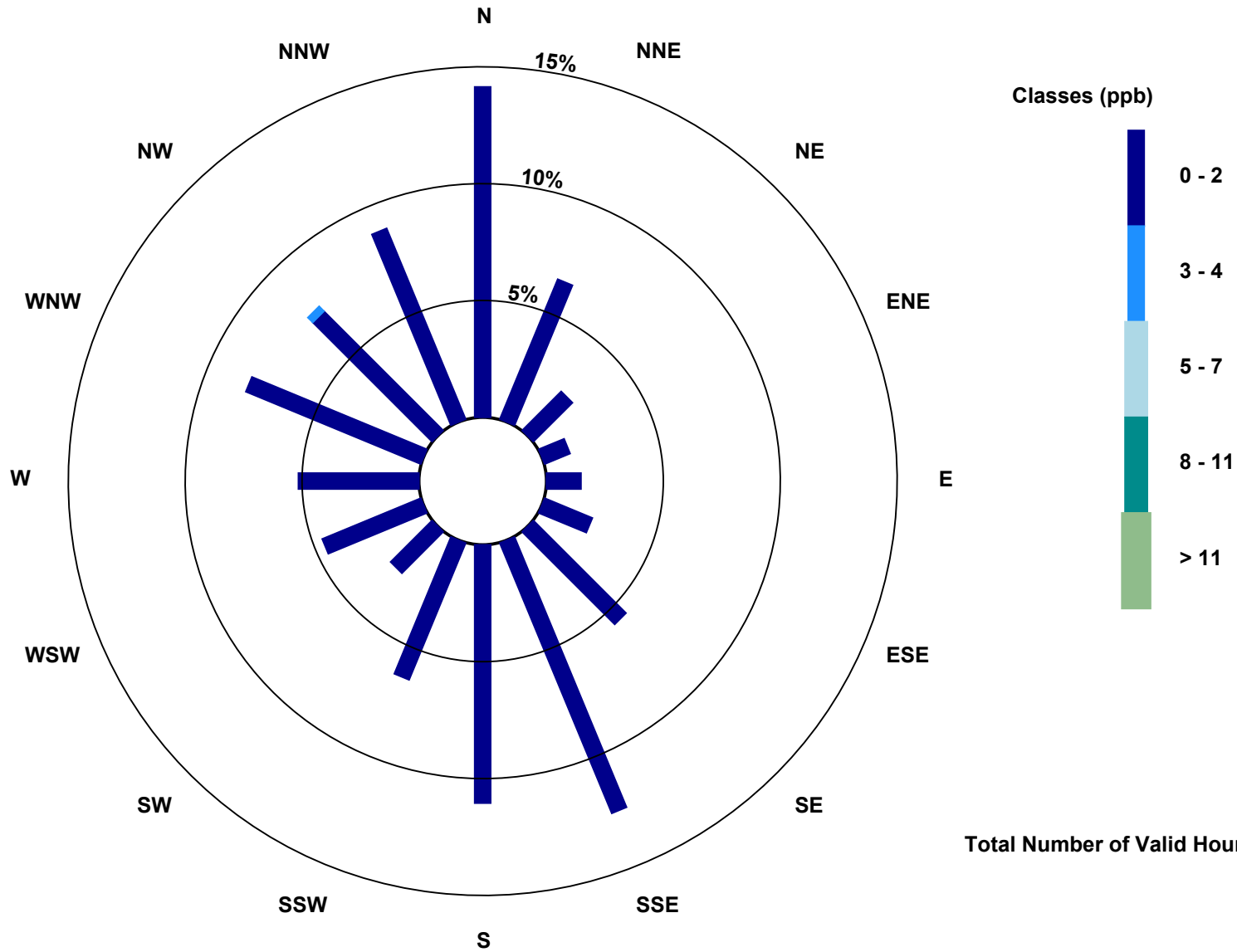


Wood Buffalo Environmental Association

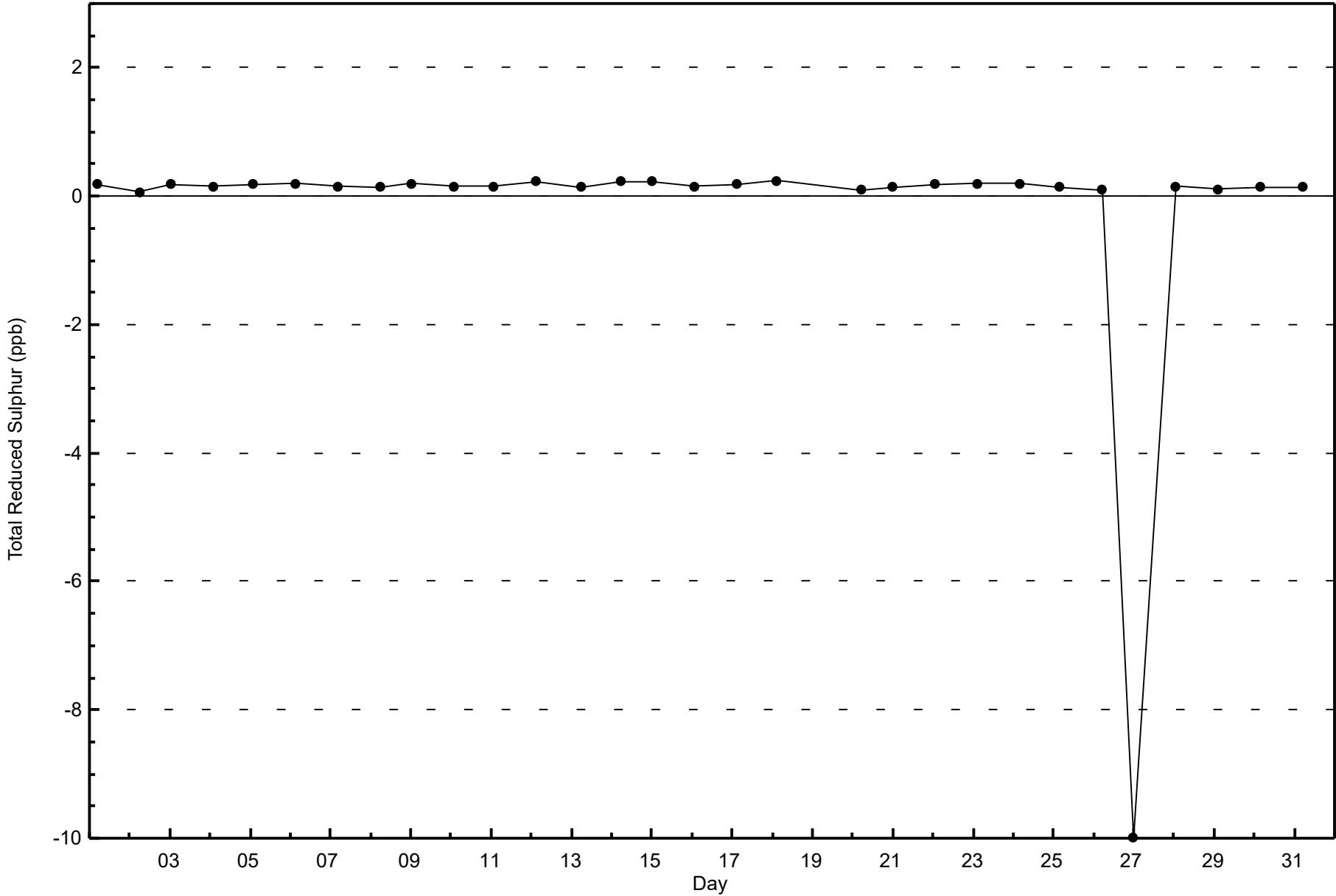
Wind Rose Jul 2023

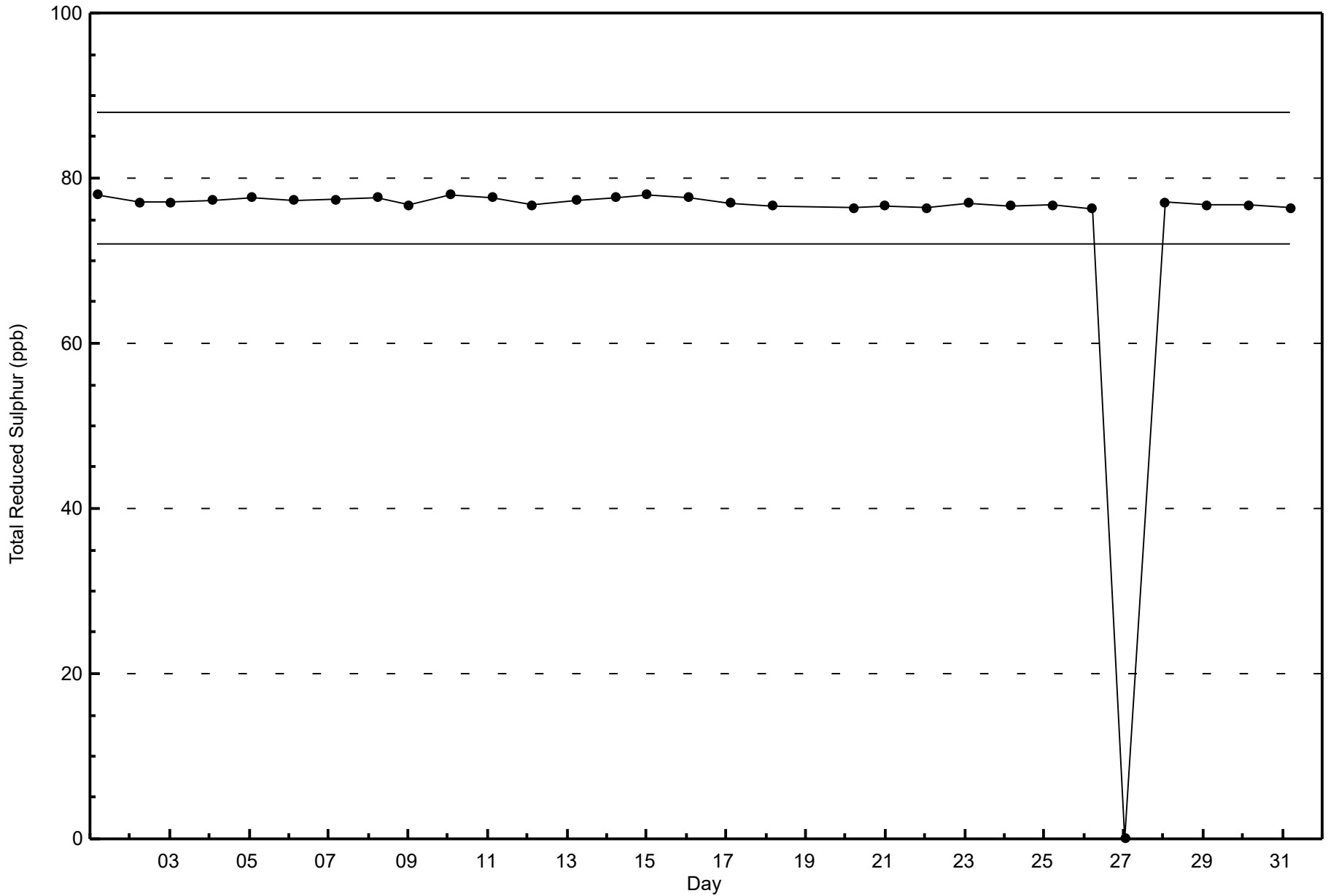
Total Reduced Sulphur (TRS) - ppb

Fort McKay - Bertha Ganter



Total Number of Valid Hours: 679







Wood Buffalo Environmental Association
Summary of Hour Averages

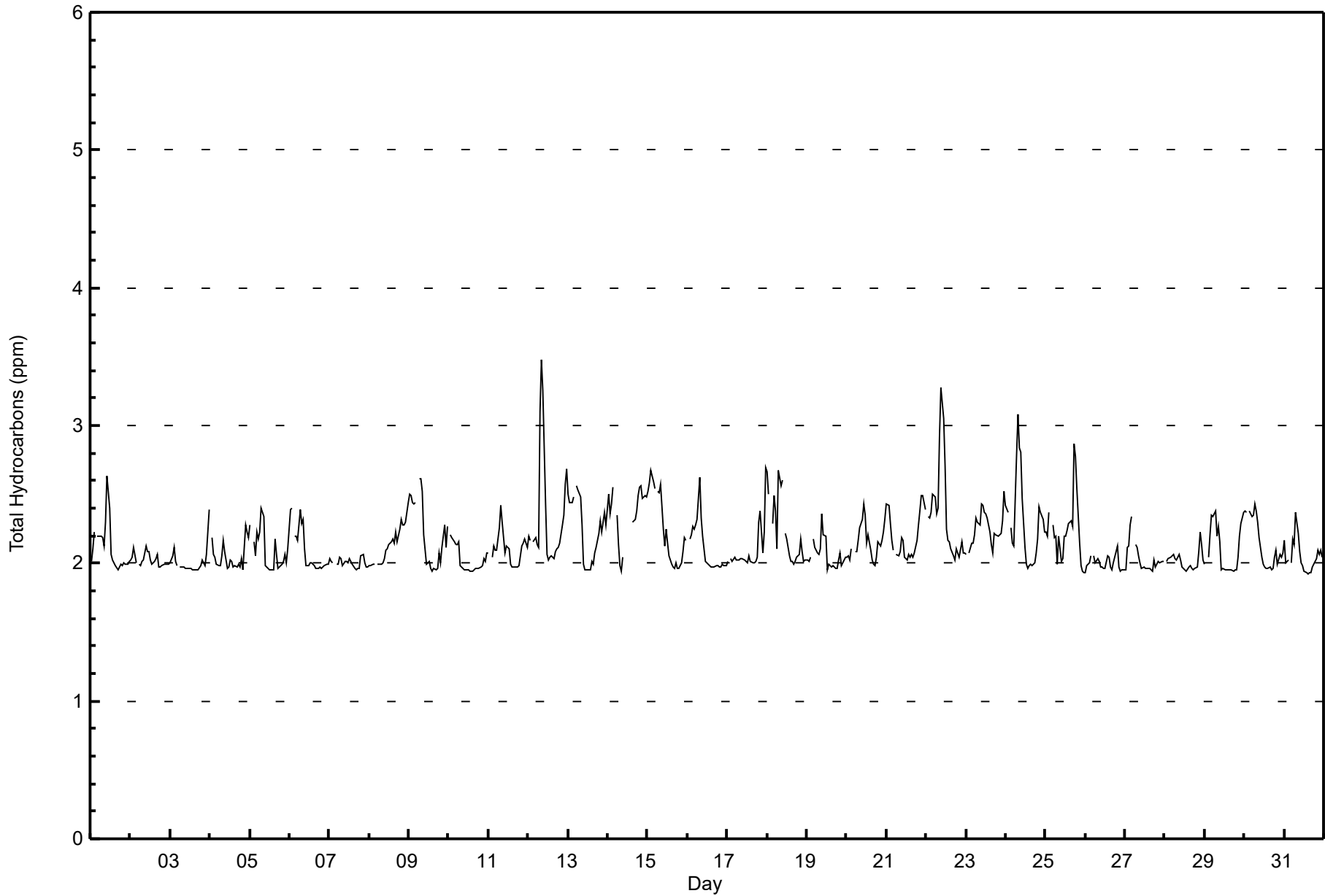
Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - July 2023

Maximum Value: 3.5 ppm on Jul 12 09:00 Maximum Daily Average: 2.4 ppm on Jul 14																				Hours in Service: 744 Hours of Data: 707 Hours of Missing Data: 37 Hours of Calibration: 36 Percent Operational Time: 99.9							
Minimum Value: 1.9 ppm on Jul 31 15:00 Minimum Daily Average: 2.0 ppm on Jul 26 Maximum Diurnal Average: 2.3 ppm at hour 8 Minimum Diurnal Average: 2.0 ppm at hour 17 Monthly Average: 2.14 ppm Percentiles: P ₁ = 1.9 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.4 P ₉₉ = 2.9																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	2.0	2.1	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.3	2.6	2.4	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	2.6	
2-Jul	2.0	2.0	2.1	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1
3-Jul	2.0	2.1	2.1	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.1	2.4	2.0	2.4	
4-Jul	Z	2.2	2.1	2.0	2.0	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	2.0	2.0	2.0	2.3	2.2	2.2	2.0	2.3	
5-Jul	2.3	Z	2.2	2.1	2.2	2.2	2.2	2.4	2.3	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.4	
6-Jul	2.4	2.4	Z	2.2	2.2	2.2	2.4	2.3	2.3	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	2.4	
7-Jul	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	
8-Jul	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.1	2.4	
9-Jul	2.5	2.5	2.4	2.4	2.4	Z	2.6	2.6	2.5	2.2	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.1	2.0	2.1	2.3	2.1	2.3	2.2	2.6	
10-Jul	Z	2.2	2.2	2.2	2.1	2.1	2.2	2.0	2.0	2.0	2.0	1.9	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.2	
11-Jul	2.1	Z	2.0	2.1	2.1	2.1	2.3	2.4	2.3	2.2	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	2.1	2.4	
12-Jul	2.2	2.2	Z	2.2	2.2	2.1	2.1	3.1	3.5	3.3	2.4	2.1	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.3	2.3	2.6	2.7	2.3	3.5	
13-Jul	2.5	2.4	2.4	2.5	Z	2.6	2.5	2.5	2.3	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.3	2.2	2.3	2.4	2.3	2.2	2.6	
14-Jul	2.5	2.4	2.4	2.5	Z	2.3	2.1	2.0	1.9	2.0	C	C	C	C	C	2.3	2.3	2.4	2.5	2.6	2.6	2.5	2.5	2.5	2.4	2.6	
15-Jul	2.5	2.6	2.7	2.6	2.5	Z	2.5	2.5	2.6	2.2	2.1	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.7	
16-Jul	Z	2.2	2.2	2.3	2.2	2.3	2.3	2.6	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.6	
17-Jul	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.4	2.1	2.2	2.7	2.1	2.7	
18-Jul	2.7	2.5	Z	2.3	2.5	2.4	2.1	2.7	2.6	2.6	M	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.0	2.0	2.2	2.7	
19-Jul	2.0	2.0	2.0	Z	2.2	2.1	2.1	2.1	2.1	2.4	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.4	
20-Jul	2.0	2.1	2.0	2.1	Z	2.1	2.1	2.2	2.3	2.3	2.4	2.3	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.2	2.1	2.2	2.2	2.3	2.1	2.4	
21-Jul	2.4	2.4	2.3	2.2	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.0	2.0	2.1	2.0	2.1	2.0	2.1	2.2	2.3	2.4	2.5	2.5	2.4	2.2	2.5	
22-Jul	Z	2.3	2.3	2.4	2.5	2.5	2.4	2.4	2.9	3.3	3.1	2.7	2.2	2.2	2.2	2.1	2.1	2.0	2.1	2.1	2.0	2.2	2.1	2.1	2.3	3.3	
23-Jul	2.1	Z	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.3	2.5	
24-Jul	2.4	2.4	Z	2.3	2.2	2.1	2.8	3.1	2.8	2.8	2.5	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.4	2.4	2.3	2.2	2.3	3.1	
25-Jul	2.2	2.2	2.4	Z	2.3	2.2	2.2	2.0	2.2	2.0	2.0	2.2	2.2	2.2	2.3	2.3	2.3	2.9	2.8	2.5	2.1	2.0	1.9	1.9	2.2	2.9	
26-Jul	1.9	2.0	2.0	2.0	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	1.9	2.0	2.0	2.0	2.0	2.1	
27-Jul	2.0	2.1	2.1	2.3	2.3	Z	2.1	2.1	2.1	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	2.3	
28-Jul	Z	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.0	2.0	2.2	
29-Jul	2.0	Z	2.0	2.2	2.3	2.3	2.4	2.2	2.3	2.2	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.2	2.3	2.4	2.1	2.4	
30-Jul	2.4	2.4	Z	2.4	2.3	2.3	2.4	2.4	2.3	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.1	2.1	2.4	
31-Jul	2.2	2.0	2.0	Z	2.0	2.2	2.1	2.4	2.2	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.4	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	336	47.52	47.52
2.1 - 3.0	365	51.63	99.15
3.1 - 10.0	6	0.85	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	46	18	9	8	4	10	20	50	38	27	7	18	23	25	13	20	336
2.1 - 3.0	56	26	9	2	8	4	21	34	37	18	9	12	13	34	37	43	363
3.1 - 10.0	3	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	6
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	105	46	18	10	12	14	41	85	75	45	16	30	36	59	50	63	705

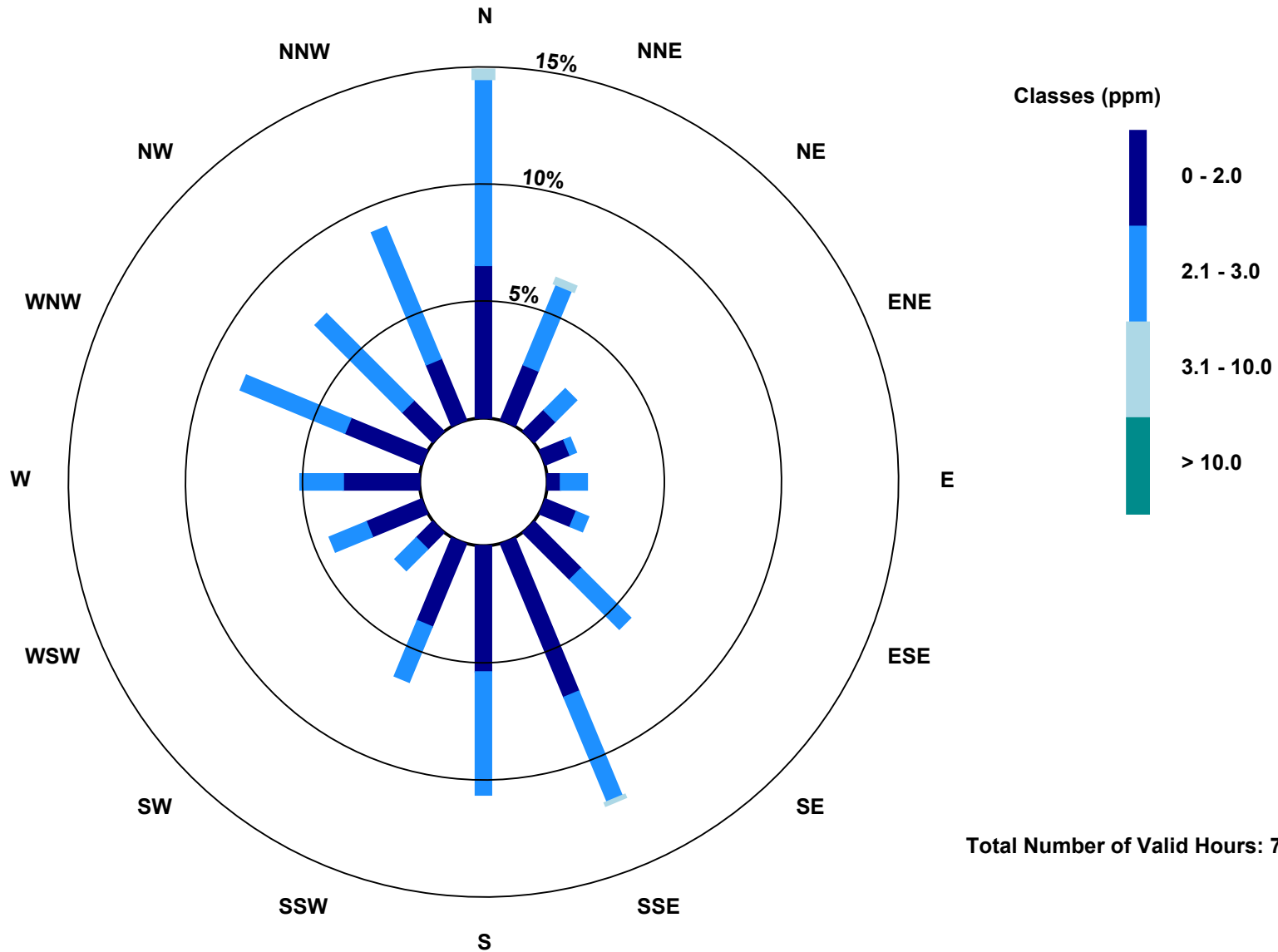
Total Number of Valid Hours: 705

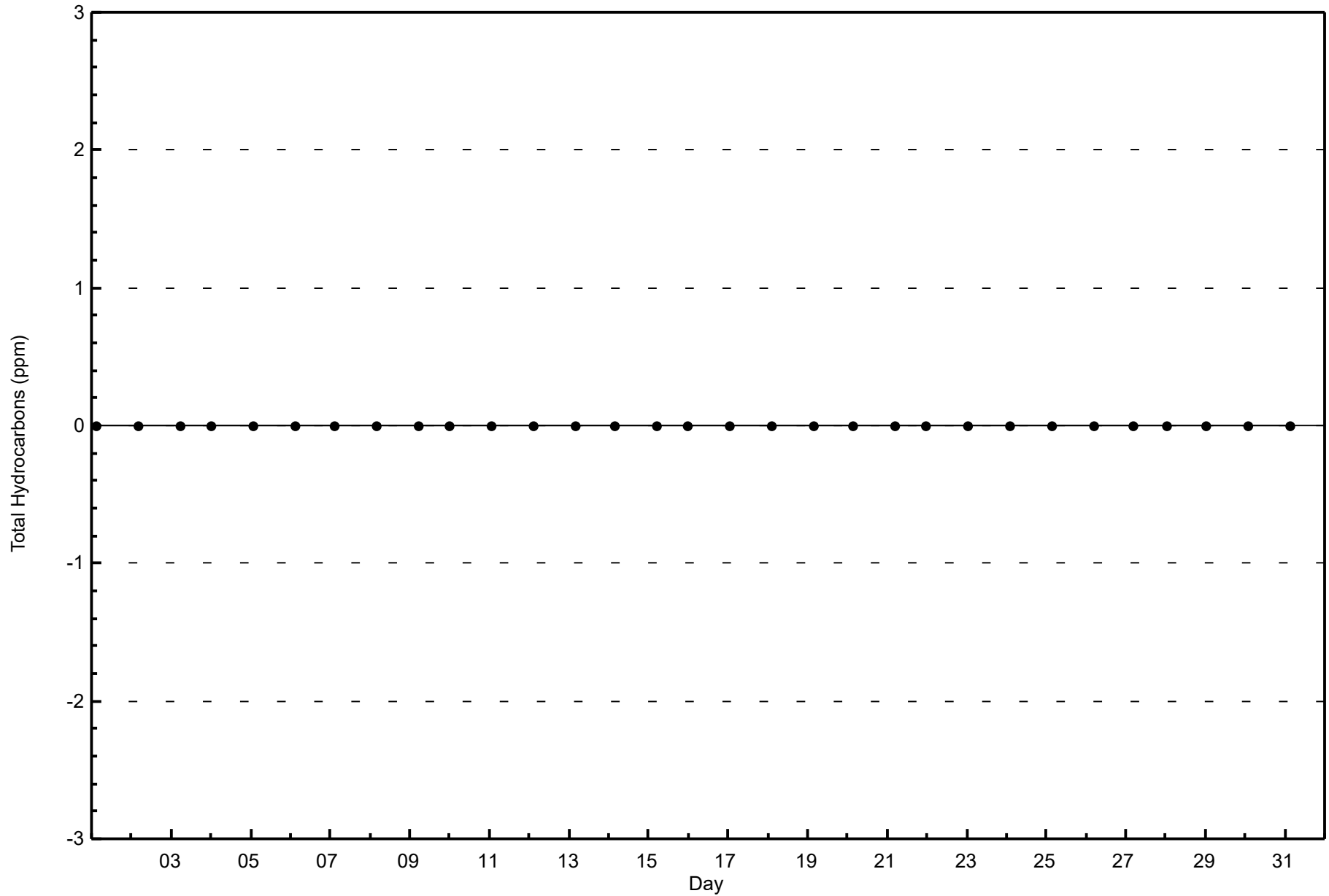
Total Number of Hours: 744

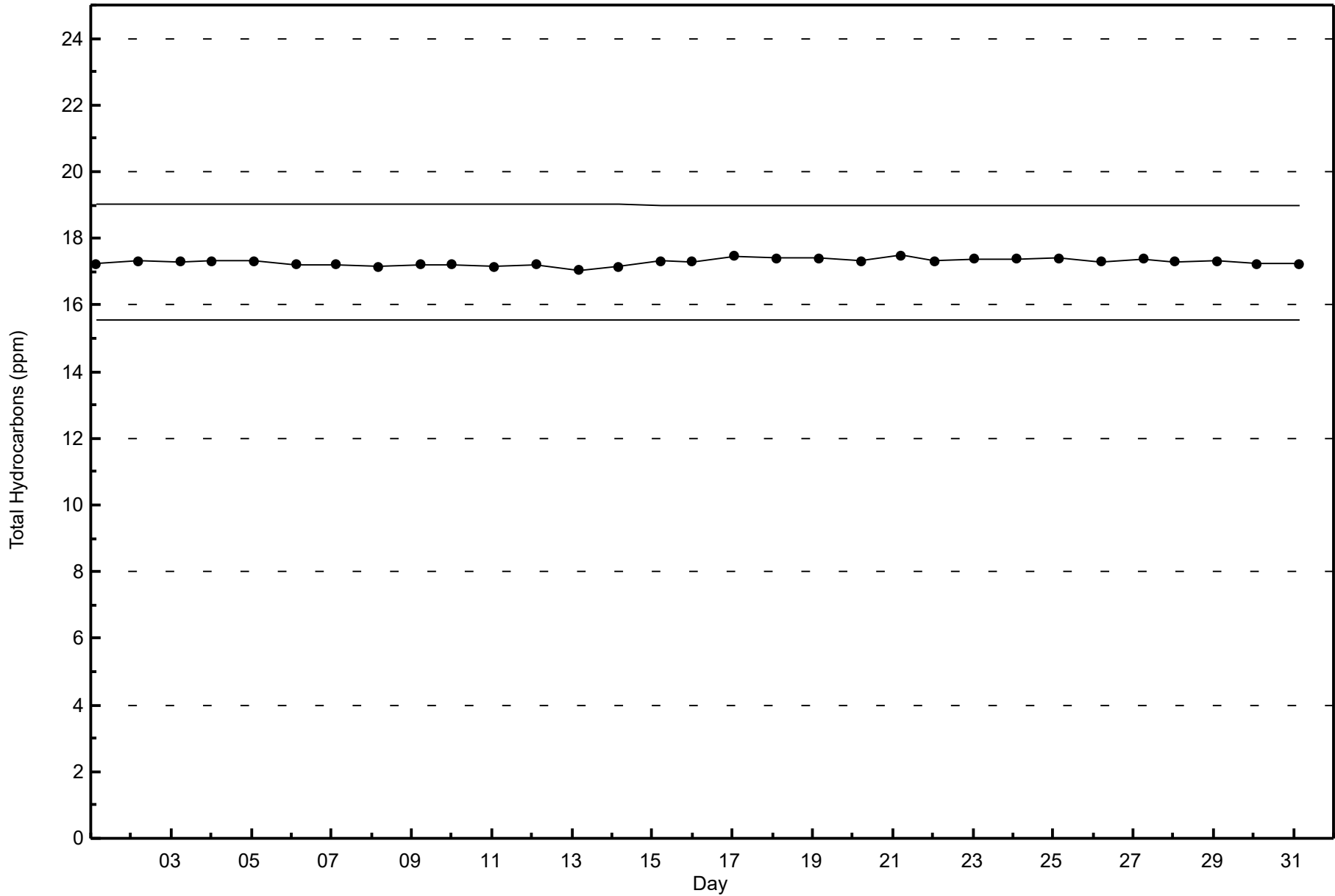


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Garter







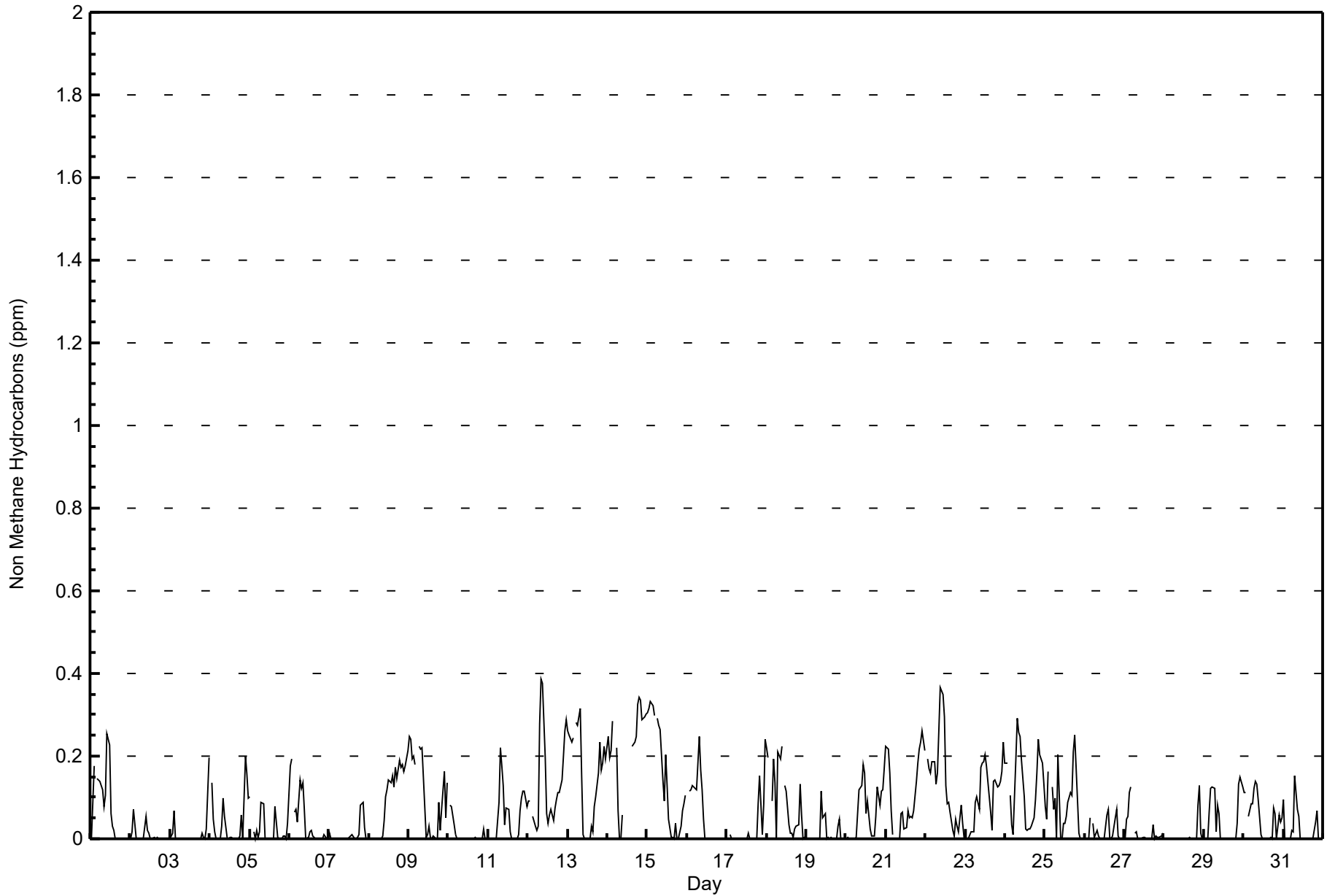


Maximum Value: 0.385 ppm on Jul 12 09:00		Maximum Daily Average: 0.215 ppm on Jul 14		Hours in Service: 744																						
Minimum Value: 0.000 ppm on Jul 1 01:00		Minimum Daily Average: 0.008 ppm on Jul 2		Hours of Data: 707																						
Maximum Diurnal Average: 0.105 ppm at hour 2		Minimum Diurnal Average: 0.025 ppm at hour 15		Hours of Missing Data: 37																						
Monthly Average: 0.067 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.1 P ₉₀ = 0.2 P ₉₉ = 0.3		Hours of Calibration: 36																						
				Percent Operational Time: 99.9																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.000	0.087	0.177	Z	0.147	0.138	0.128	0.120	0.078	0.106	0.255	0.226	0.061	0.030	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.069	0.255
2-Jul	0.000	0.018	0.070	0.000	Z	0.000	0.000	0.000	0.000	0.053	0.019	0.013	0.000	0.000	0.003	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.070
3-Jul	0.000	0.015	0.068	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	0.015	0.003	0.000	0.024	0.198	0.014	0.198
4-Jul	Z	0.137	0.048	0.017	0.000	0.000	0.000	0.032	0.100	0.055	0.000	0.000	0.003	0.002	0.000	0.000	0.000	0.001	0.006	0.058	0.000	0.200	0.157	0.099	0.040	0.200
5-Jul	0.101	Z	0.017	0.000	0.019	0.004	0.016	0.089	0.086	0.000	0.000	0.001	0.000	0.000	0.078	0.040	0.005	0.001	0.000	0.006	0.006	0.000	0.038	0.022	0.022	0.101
6-Jul	0.177	0.193	Z	0.066	0.072	0.040	0.143	0.123	0.136	0.070	0.000	0.002	0.017	0.020	0.008	0.003	0.000	0.000	0.000	0.000	0.009	0.000	0.001	0.047	0.193	0.193
7-Jul	0.014	0.002	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.005	0.006	0.010	0.001	0.000	0.003	0.009	0.083	0.088	0.027	0.001	0.000	0.011	0.088
8-Jul	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.001	0.007	0.045	0.103	0.118	0.141	0.136	0.153	0.126	0.172	0.146	0.189	0.174	0.179	0.164	0.176	0.215	0.098	0.215
9-Jul	0.248	0.241	0.195	0.199	0.179	Z	0.222	0.219	0.220	0.148	0.004	0.009	0.031	0.002	0.000	0.008	0.001	0.000	0.088	0.021	0.071	0.162	0.051	0.136	0.107	0.248
10-Jul	Z	0.080	0.077	0.035	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.001	0.000	0.000	0.000	0.025	0.000	0.000	0.010	0.080
11-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.088	0.222	0.178	0.130	0.035	0.076	0.071	0.016	0.001	0.000	0.001	0.001	0.011	0.067	0.098	0.115	0.115	0.080	0.057	0.222
12-Jul	0.092	0.092	Z	0.054	0.031	0.020	0.029	0.276	0.385	0.376	0.198	0.061	0.038	0.057	0.070	0.044	0.073	0.093	0.112	0.111	0.143	0.200	0.260	0.289	0.135	0.385
13-Jul	0.261	0.249	0.233	0.244	Z	0.282	0.274	0.314	0.152	0.009	0.000	0.000	0.001	0.030	0.015	0.078	0.103	0.160	0.235	0.167	0.182	0.223	0.194	0.148	0.314	0.314
14-Jul	0.246	0.196	0.215	0.285	Z	0.220	0.067	0.000	0.000	0.057	C	C	C	C	C	0.222	0.234	0.247	0.325	0.341	0.336	0.288	0.296	0.300	0.215	0.341
15-Jul	0.306	0.315	0.333	0.322	0.299	Z	0.293	0.274	0.265	0.142	0.090	0.202	0.128	0.047	0.003	0.002	0.000	0.039	0.001	0.001	0.029	0.068	0.085	0.105	0.146	0.333
16-Jul	Z	0.116	0.118	0.128	0.125	0.122	0.118	0.249	0.166	0.117	0.048	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.057	0.249
17-Jul	0.000	Z	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.084	0.152	0.010	0.085	0.240	0.026	0.240
18-Jul	0.221	0.196	Z	0.093	0.194	0.135	0.004	0.209	0.193	0.225	M	0.128	0.116	0.034	0.014	0.014	0.002	0.023	0.030	0.034	0.133	0.057	0.000	0.002	0.093	0.225
19-Jul	0.001	0.000	0.000	Z	0.001	0.000	0.000	0.000	0.001	0.115	0.050	0.061	0.000	0.004	0.000	0.003	0.000	0.000	0.000	0.029	0.049	0.000	0.000	0.000	0.014	0.115
20-Jul	0.000	0.002	0.000	0.000	Z	0.000	0.002	0.060	0.118	0.128	0.178	0.159	0.060	0.091	0.024	0.007	0.008	0.006	0.054	0.125	0.082	0.116	0.118	0.170	0.066	0.178
21-Jul	0.223	0.218	0.158	0.068	0.011	Z	0.002	0.000	0.000	0.061	0.066	0.024	0.028	0.067	0.050	0.055	0.051	0.067	0.138	0.183	0.217	0.235	0.262	0.214	0.104	0.262
22-Jul	Z	0.192	0.169	0.161	0.188	0.186	0.133	0.159	0.260	0.367	0.351	0.296	0.129	0.086	0.088	0.064	0.019	0.008	0.047	0.029	0.018	0.083	0.036	0.005	0.133	0.367
23-Jul	0.000	Z	0.000	0.018	0.018	0.016	0.089	0.103	0.071	0.174	0.185	0.185	0.204	0.177	0.102	0.063	0.019	0.138	0.143	0.127	0.128	0.139	0.164	0.233	0.108	0.233
24-Jul	0.183	0.182	Z	0.105	0.033	0.012	0.193	0.291	0.257	0.246	0.190	0.103	0.025	0.020	0.025	0.022	0.030	0.051	0.096	0.159	0.241	0.202	0.182	0.131	0.130	0.291
25-Jul	0.078	0.049	0.161	Z	0.126	0.072	0.098	0.000	0.205	0.000	0.000	0.037	0.054	0.087	0.111	0.106	0.212	0.252	0.172	0.015	0.000	0.000	0.000	0.000	0.081	0.252
26-Jul	0.000	0.000	0.000	0.051	Z	0.037	0.005	0.020	0.007	0.000	0.000	0.000	0.000	0.057	0.071	0.004	0.000	0.007	0.050	0.072	0.006	0.000	0.000	0.000	0.017	0.072
27-Jul	0.000	0.048	0.055	0.111	0.125	Z	0.014	0.018	0.001	0.000	0.000	0.003	0.005	0.000	0.000	0.000	0.033	0.001	0.007	0.004	0.004	0.007	0.013	0.019	0.125	0.125
28-Jul	Z	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.001	0.082	0.129	0.015	0.000	0.010	0.129
29-Jul	0.000	Z	0.000	0.065	0.124	0.126	0.123	0.017	0.083	0.061	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.038	0.131	0.148	0.125	0.045	0.148
30-Jul	0.111	0.110	Z	0.053	0.085	0.085	0.122	0.140	0.131	0.095	0.012	0.000	0.000	0.000	0.000	0.001	0.003	0.002	0.076	0.062	0.000	0.058	0.042	0.051	0.054	0.140
31-Jul	0.095	0.000	0.000	Z	0.000	0.019	0.015	0.151	0.072	0.053	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.039	0.069	0.001	0.000	0.000	0.000	0.023	0.151
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan		C - Calibration				M - Maintenance																				



Wood Buffalo Environmental Association
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	298	42.15	42.15
0.006 - 0.05	126	17.82	59.97
0.06 - 0.1	157	22.21	82.18
> 0.1	126	17.82	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	30	13	9	7	4	8	19	42	36	27	7	18	21	23	13	19	296
0.006 - 0.05	22	9	3	1	2	2	8	17	14	4	2	5	5	9	14	9	126
0.06 - 0.1	28	13	3	1	5	4	7	17	23	13	3	7	5	10	8	10	157
> 0.1	25	11	3	1	1	0	7	9	2	1	4	0	5	17	15	25	126
Totals	105	46	18	10	12	14	41	85	75	45	16	30	36	59	50	63	705

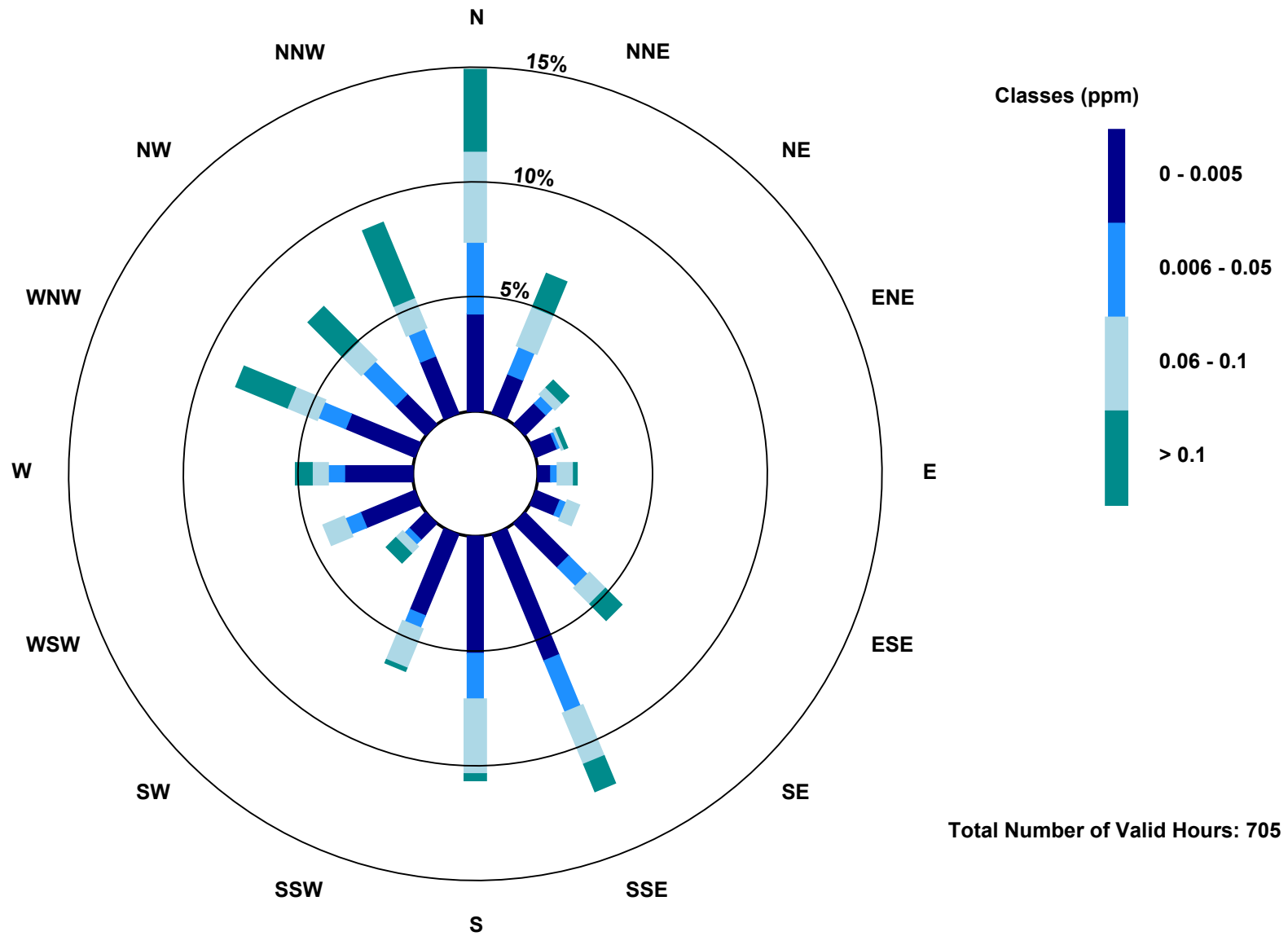
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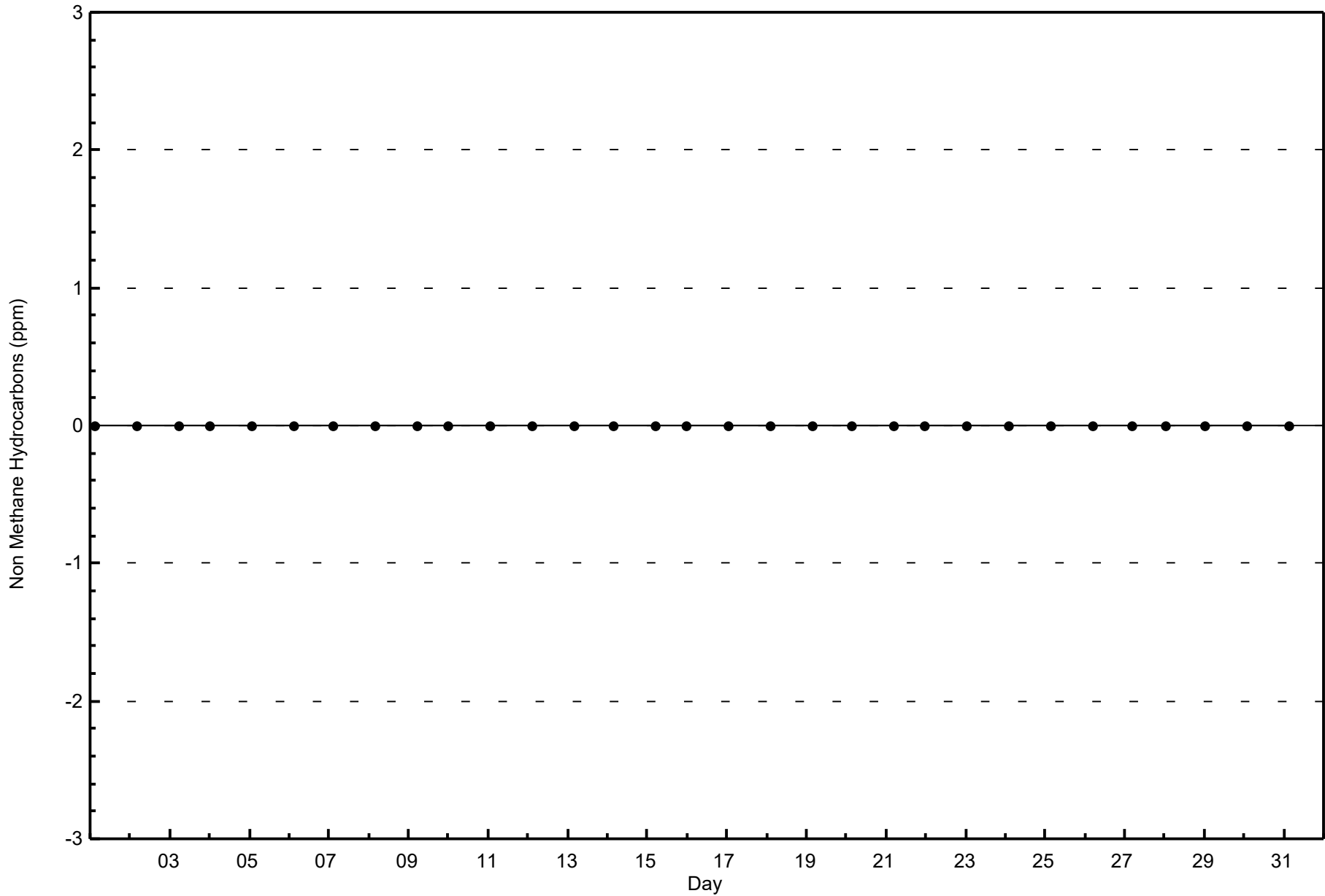
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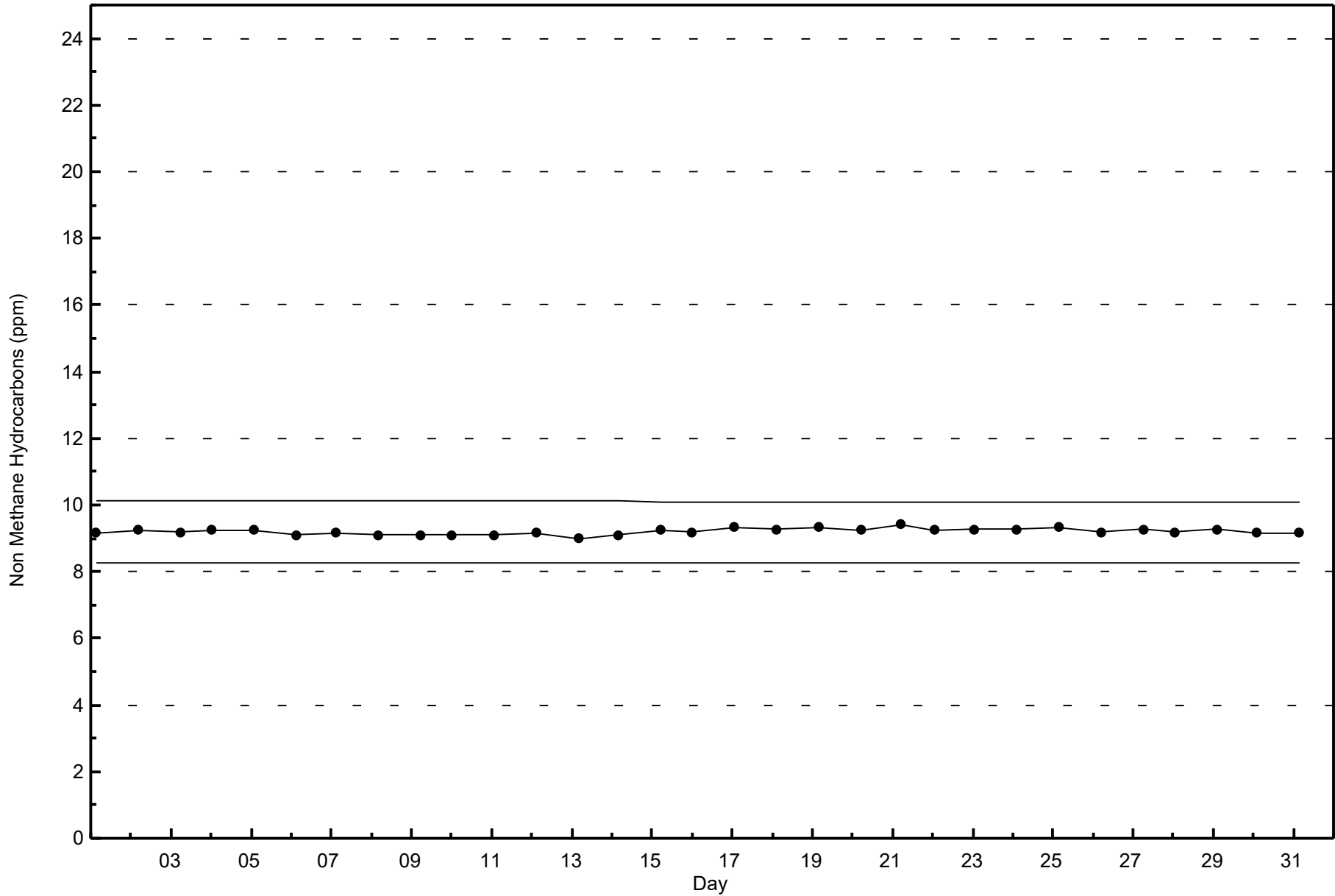


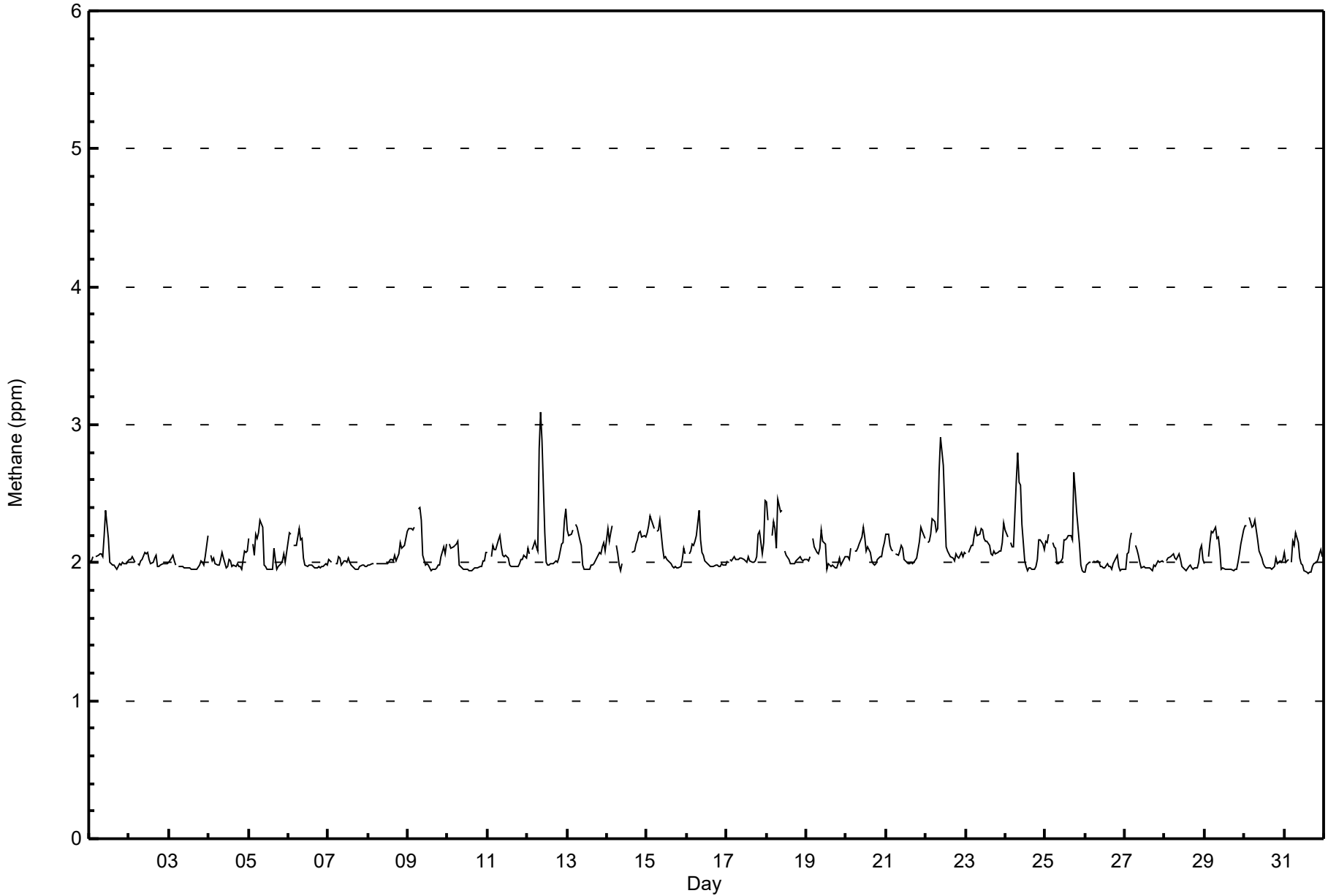
Wood Buffalo Environmental Association
Wind Rose Jul 2023

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











Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	411	58.13	58.13
2.1 - 3.0	295	41.73	99.86
3.1 - 10.0	1	0.14	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	61	23	13	10	5	11	24	58	43	31	9	22	26	34	16	25	411
2.1 - 3.0	43	23	5	0	7	3	17	27	32	14	7	8	10	25	34	38	293
3.1 - 10.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	105	46	18	10	12	14	41	85	75	45	16	30	36	59	50	63	705

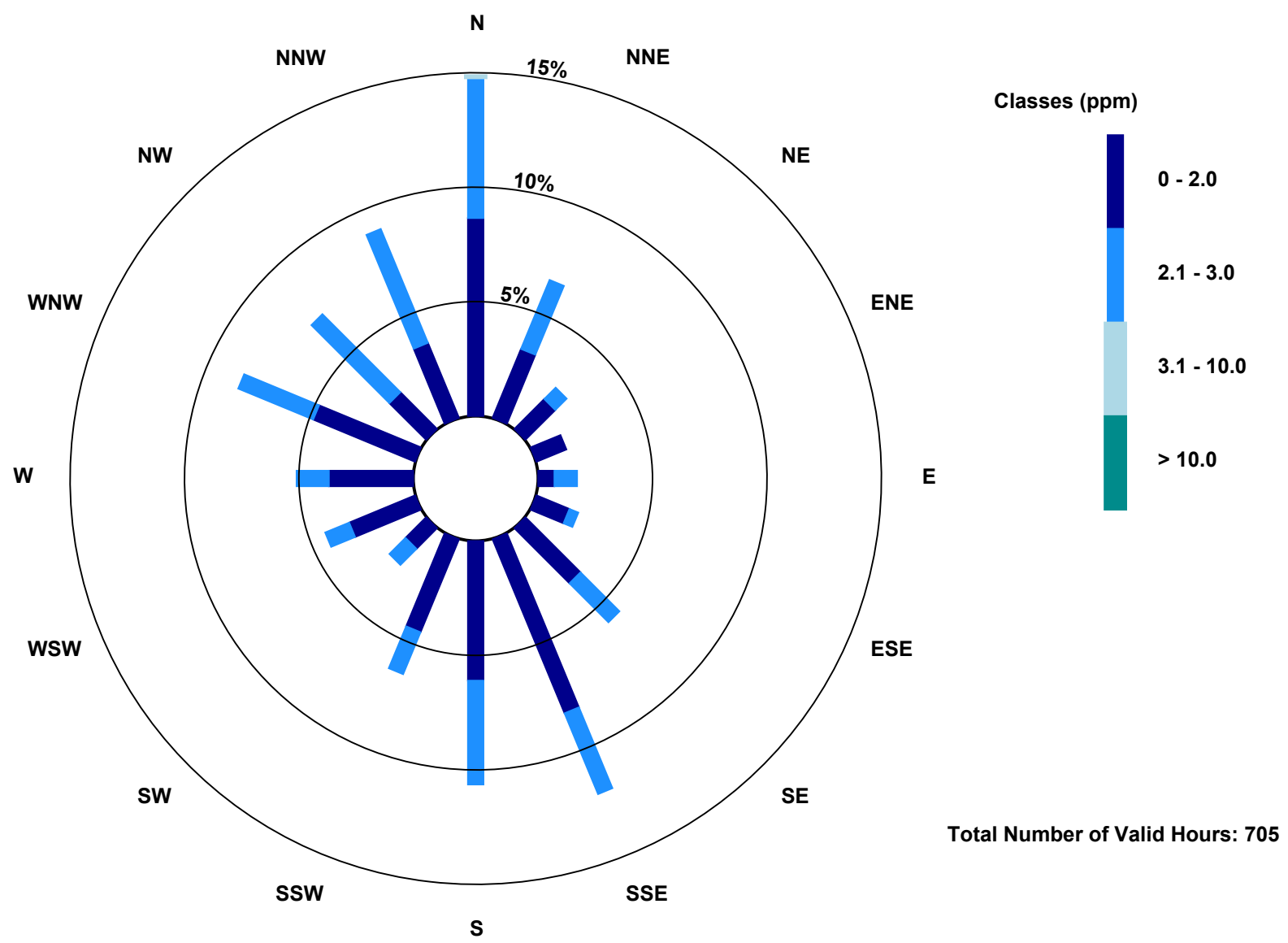
Total Number of Valid Hours: 705

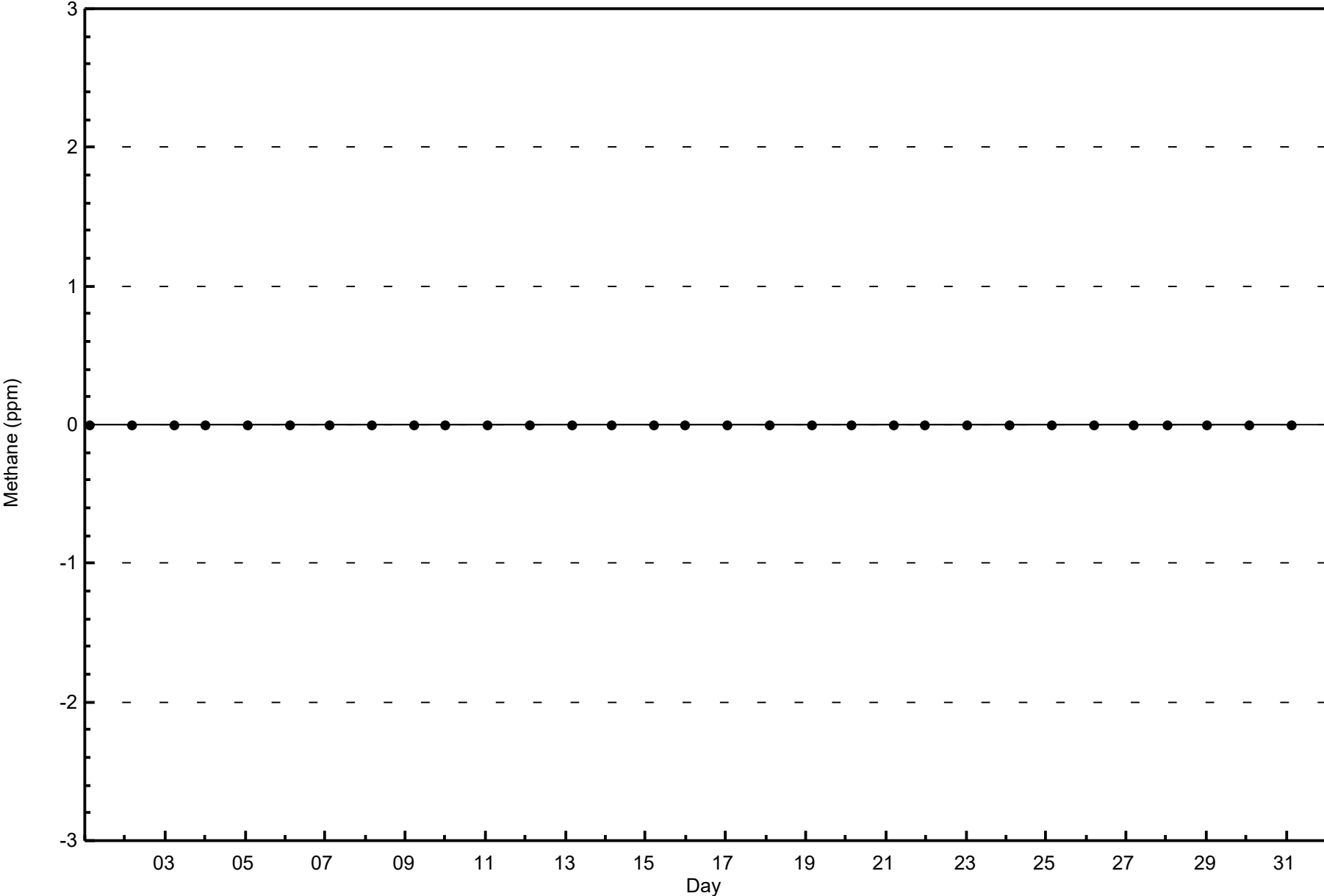
Total Number of Hours: 744

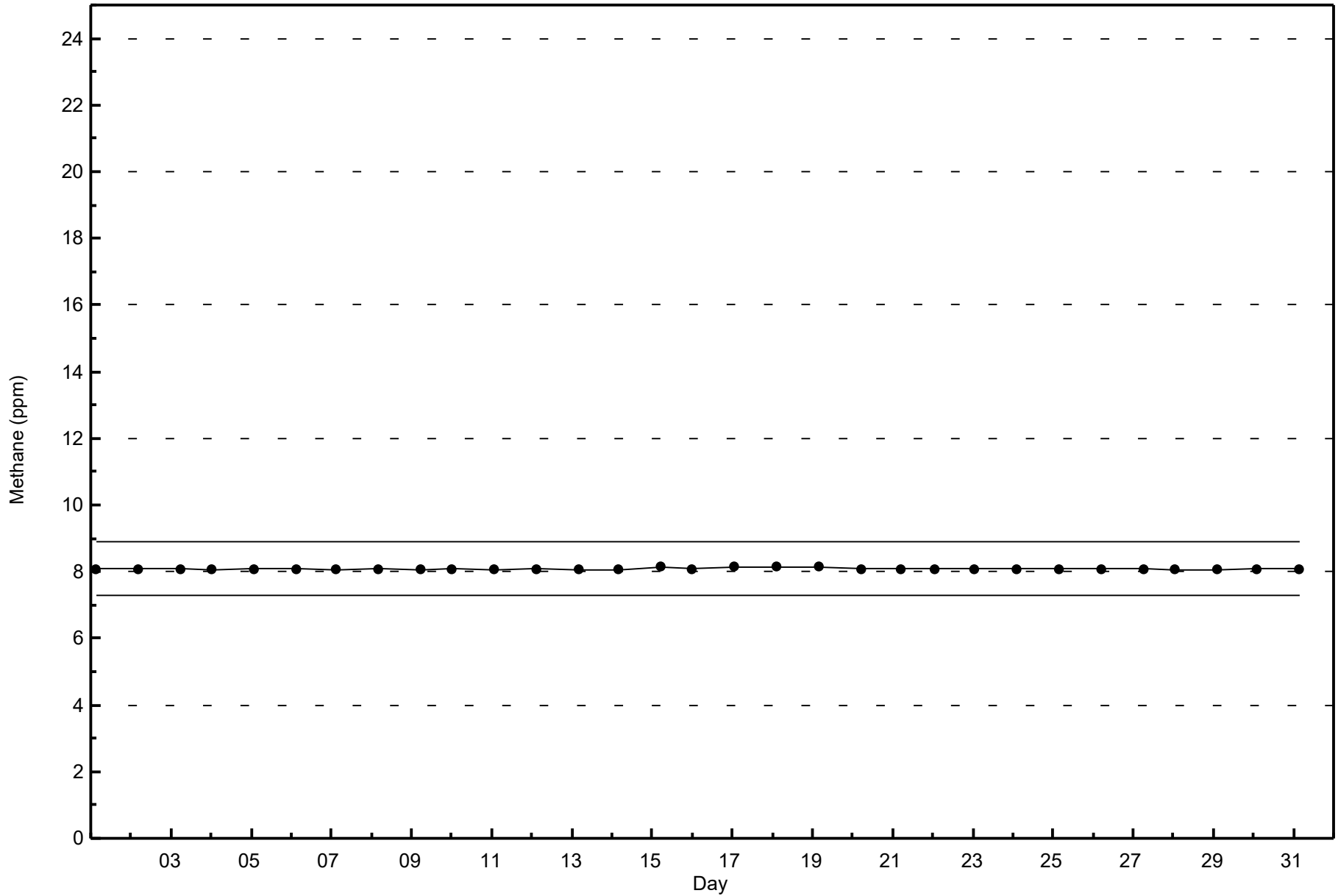


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter

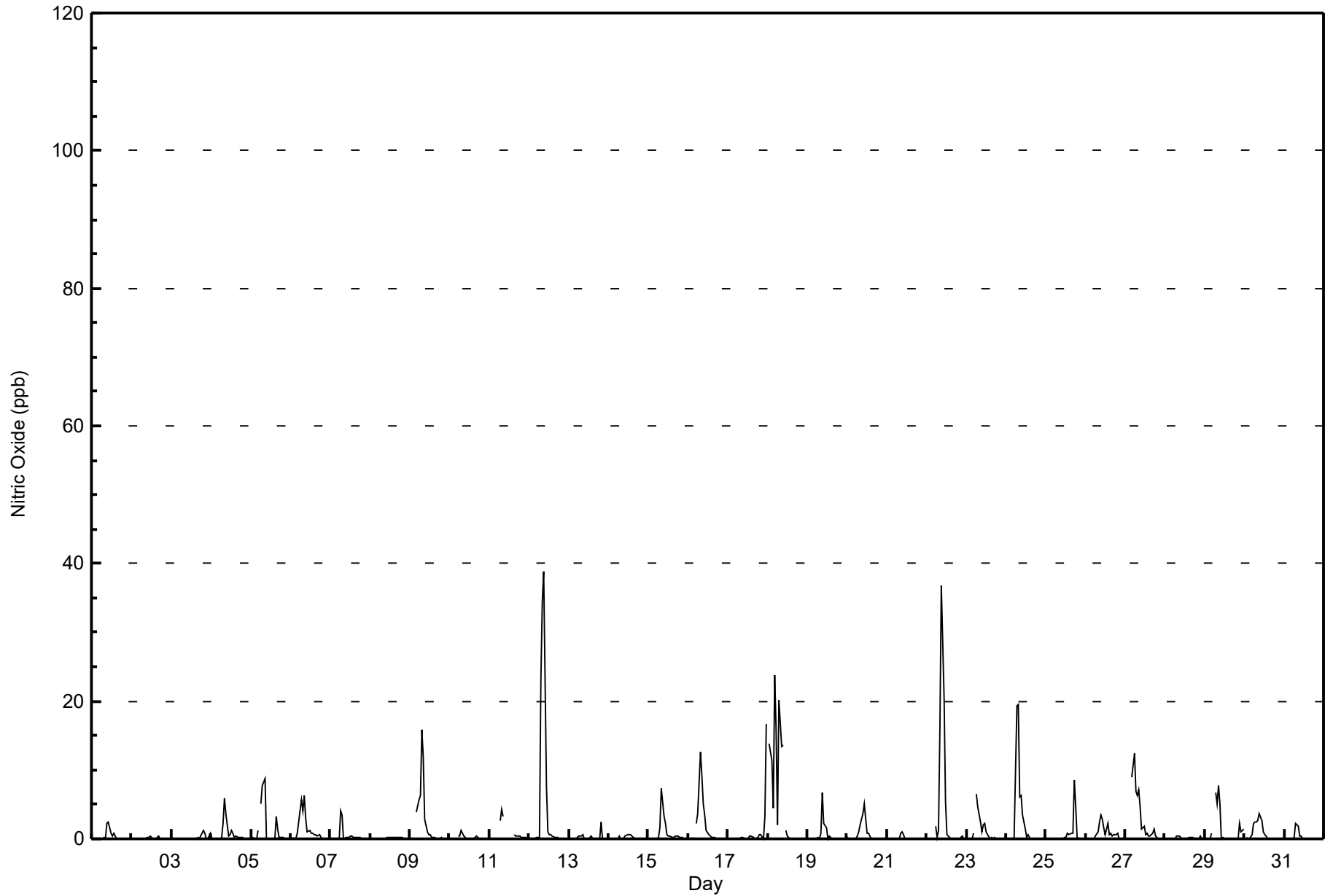








Maximum Value: 38.8 ppb on Jul 12 10:00		Maximum Daily Average: 5.5 ppb on Jul 18		Hours in Service: 744																						
Minimum Value: 0.0 ppb on Jul 1 01:00		Minimum Daily Average: 0.1 ppb on Jul 2		Hours of Data: 706																						
Maximum Diurnal Average: 4.9 ppb at hour 9		Minimum Diurnal Average: 0.0 ppb at hour 1		Hours of Missing Data: 38																						
Monthly Average: 1.16 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.5 P ₉₀ = 2.7 P ₉₉ = 19.5		Hours of Calibration: 37																						
				Percent Operational Time: 99.9																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.2	0.0	2.1	2.4	0.8	0.3	0.7	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.4
2-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.2	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4
3-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.8	1.2	0.7	0.0	0.0	0.7	0.2	1.2
4-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.2	2.3	6.0	3.6	0.4	0.6	1.3	0.8	0.2	0.3	0.2	0.1	0.3	0.1	0.0	0.0	0.0	0.0	0.7	6.0
5-Jul	0.0	0.1	0.0	0.0	1.2	Z	5.0	7.8	8.8	0.0	0.0	0.0	0.0	0.1	3.2	1.4	0.1	0.1	0.1	0.0	0.0	0.0	0.0	1.2	8.8	
6-Jul	Z	0.1	0.1	0.1	0.9	2.4	5.8	4.1	6.2	3.0	1.1	1.3	0.9	0.9	0.7	0.7	0.4	0.6	0.2	0.0	0.0	0.0	0.0	1.3	6.2	
7-Jul	0.0	Z	0.0	0.0	0.0	0.0	4.0	3.5	0.0	0.2	0.2	0.1	0.4	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.4	4.0	
8-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.1	0.0	0.0	0.1	0.3	0.3
9-Jul	0.0	0.0	0.1	Z	3.9	5.6	6.4	15.9	11.9	2.8	1.1	0.7	0.7	0.3	0.2	0.2	0.0	0.0	0.1	0.2	0.0	0.0	0.0	2.2	15.9	
10-Jul	0.0	0.0	0.0	0.0	Z	0.4	0.5	1.1	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.1	1.1	1.1
11-Jul	0.0	0.0	0.0	0.0	0.0	Z	2.6	4.3	3.3	C	C	C	C	C	C	0.5	0.5	0.5	0.4	0.3	0.2	0.1	0.1	0.1	--	4.3
12-Jul	Z	0.1	0.1	0.1	0.1	0.2	0.2	23.1	34.4	38.8	7.5	1.1	0.6	0.6	0.5	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	4.7	38.8	
13-Jul	0.0	0.0	Z	0.0	0.0	0.2	0.3	0.4	0.6	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.2	2.5	
14-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.3	0.6	0.6	0.6	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	
15-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.3	1.6	7.3	3.3	2.2	0.7	0.3	0.5	0.3	0.3	0.4	0.4	0.4	0.2	0.1	0.0	0.0	0.8	7.3	
16-Jul	0.0	0.0	0.0	0.1	Z	2.2	3.6	12.7	9.1	5.1	3.4	1.2	0.6	0.5	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.7	12.7	
17-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.4	0.4	0.1	0.0	0.0	0.1	0.6	0.5	0.0	3.2	16.7	1.0	16.7
18-Jul	Z	13.9	11.3	4.4	23.8	16.0	2.1	20.1	13.5	13.5	M	1.2	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	23.8	
19-Jul	0.0	Z	0.0	0.0	0.0	0.1	0.1	0.0	0.9	6.6	2.3	1.5	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	6.6	
20-Jul	0.1	0.0	Z	0.0	0.0	0.1	0.3	1.1	2.0	3.6	5.1	2.8	0.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	5.1	
21-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.8	1.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.1	1.1
22-Jul	0.0	0.0	0.0	0.0	Z	1.8	0.3	1.1	16.0	36.7	20.4	5.4	0.6	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	3.6	36.7	
23-Jul	0.0	0.0	0.0	0.0	0.8	Z	6.5	4.6	2.5	1.1	2.0	2.2	0.9	0.6	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.1	0.9	6.5	
24-Jul	Z	0.0	0.0	0.0	0.0	0.1	19.4	19.5	6.0	6.2	3.4	1.4	0.2	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	19.5	
25-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.8	0.6	0.9	0.8	8.6	4.6	0.3	0.0	0.0	0.0	0.7	8.6	
26-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.3	1.0	2.4	3.5	2.9	1.6	0.7	2.2	0.7	0.8	0.4	0.6	0.7	0.9	0.0	0.0	0.0	0.8	3.5	
27-Jul	0.0	0.0	0.0	Z	9.0	12.5	6.9	6.3	7.2	4.7	1.3	1.8	0.5	0.8	0.4	0.5	0.8	1.5	0.4	0.2	0.0	0.0	0.0	2.4	12.5	
28-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.3	0.4	0.3	0.1	0.0	0.0	0.0	0.2	0.2	0.2	0.1	0.0	0.0	0.0	0.5	0.0	0.1	0.5	0.5
29-Jul	0.0	0.0	0.0	0.0	0.8	Z	6.8	5.1	7.8	5.1	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	1.1	1.3	1.3	7.8
30-Jul	Z	0.1	0.0	0.0	0.5	2.1	2.5	2.4	2.6	3.7	2.6	1.1	0.5	0.5	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.8	3.7	
31-Jul	0.0	Z	0.0	0.0	0.0	0.1	0.2	2.2	1.8	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.2	
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	701	99.29	99.29
21 - 40	5	0.71	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



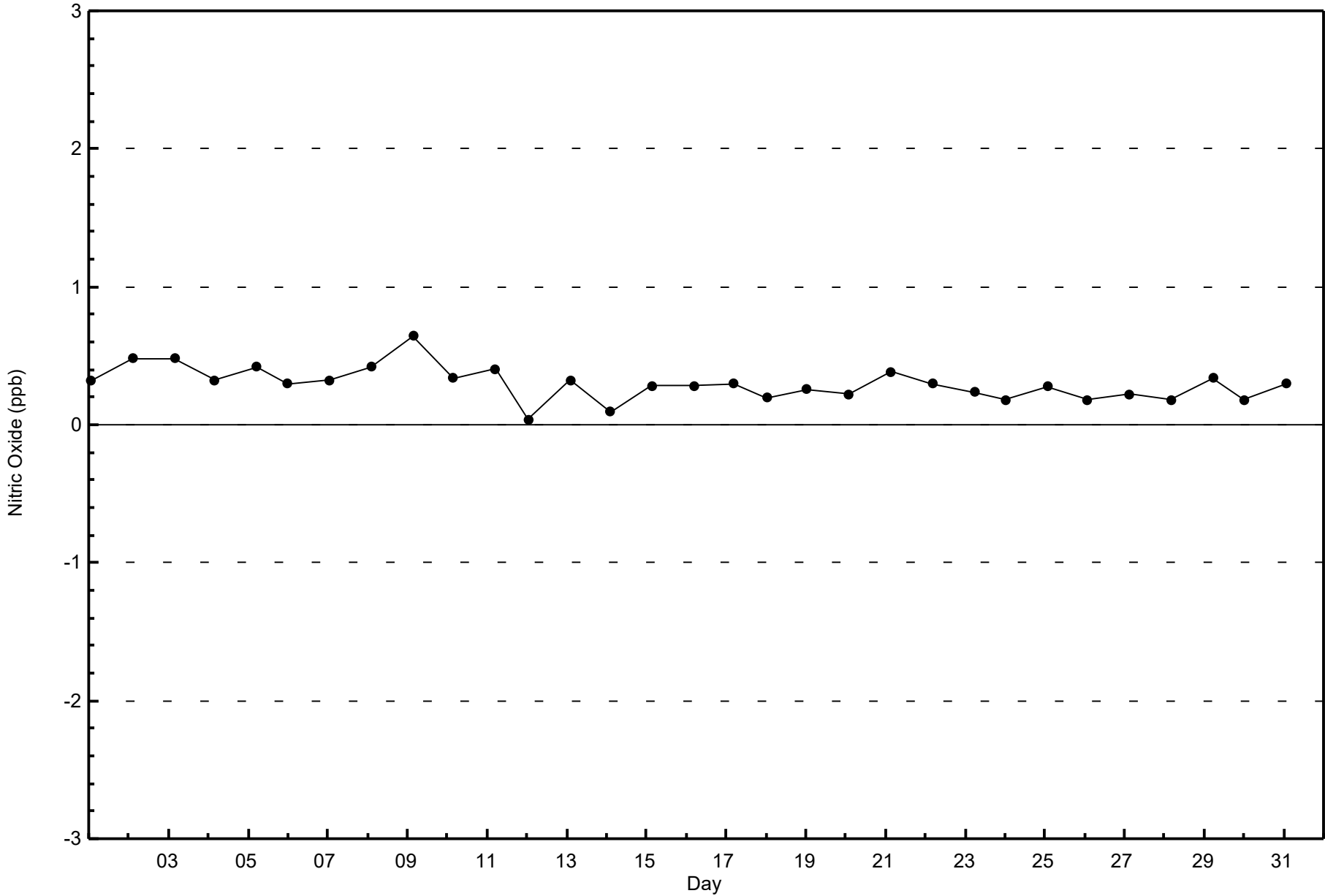
**Wood Buffalo Environmental Association
Frequency Distribution**

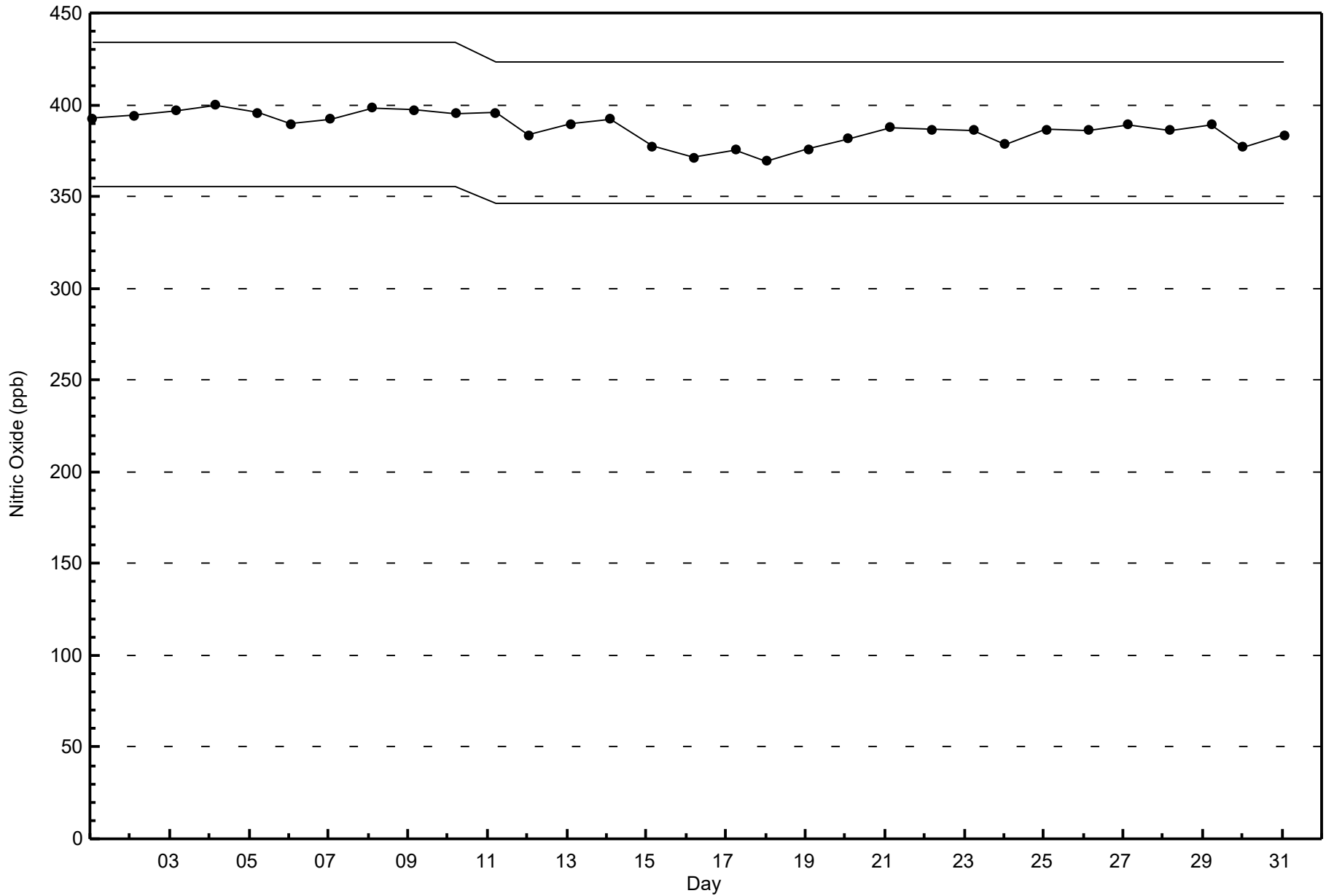
**Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	105	47	17	10	12	15	41	86	71	41	16	31	36	55	55	62	700
21 - 40	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	107	49	17	10	12	15	41	86	71	41	16	31	36	55	55	63	705

Total Number of Valid Hours: 705

Total Number of Hours: 744







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

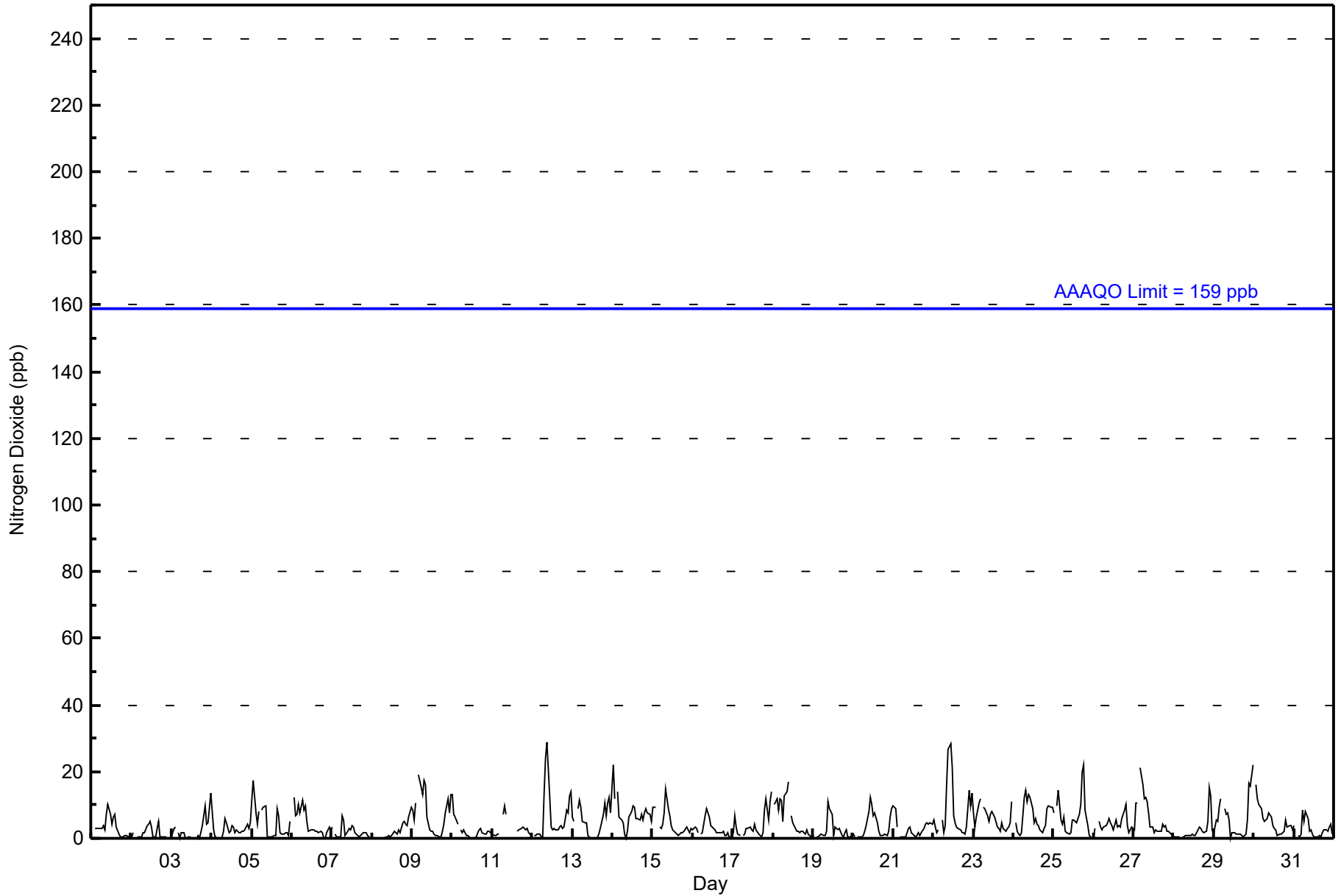
Fort McKay - Bertha Ganter - July 2023

Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0																		Hours in Service:	744					
Maximum Value: 28.9 ppb on Jul 12 10:00		Maximum Daily Average: 8.0 ppb on Jul 22																			Hours of Data:	706					
Minimum Value: 0.0 ppb on Jul 3 10:00		Minimum Daily Average: 1.5 ppb on Jul 2																			Hours of Missing Data:	38					
Maximum Diurnal Average: 6.6 ppb at hour 10		Minimum Diurnal Average: 2.3 ppb at hour 15																			Hours of Calibration:	37					
Monthly Average: 4.37 ppb		Percentiles: P ₁ = 0.1 P ₁₀ = 0.5 Q ₁ = 1.1 Median = 2.8 Q ₃ = 6.3 P ₉₀ = 10.4 P ₉₉ = 21.2																			Percent Operational Time:	99.9					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	1.3	Z	3.0	2.9	3.0	3.0	3.0	3.8	2.5	7.4	10.3	7.2	4.2	6.5	7.0	3.4	1.2	0.5	0.4	0.6	0.9	0.8	0.5	0.9	3.2	10.3	
2-Jul	0.6	1.5	Z	0.6	0.5	0.4	0.5	1.6	1.8	3.9	4.2	4.9	3.2	0.4	0.3	2.8	5.2	0.6	0.3	0.3	0.3	0.2	0.2	0.2	1.5	5.2	
3-Jul	0.4	2.8	3.5	Z	1.6	0.2	1.9	1.9	0.1	0.0	0.5	0.3	0.0	0.0	0.1	0.1	0.9	0.2	4.0	6.6	9.7	4.1	4.7	13.6	2.5	13.6	
4-Jul	7.9	2.6	0.6	0.5	Z	0.2	0.5	2.3	5.9	4.8	1.6	2.0	3.9	3.4	1.9	2.5	1.8	1.6	2.2	2.1	2.4	4.1	3.1	4.6	2.7	7.9	
5-Jul	11.6	17.3	7.8	4.2	8.0	Z	8.3	9.3	9.6	0.6	0.6	0.5	0.4	0.7	0.9	9.1	6.8	1.7	1.4	1.3	1.6	1.8	0.9	5.0	4.8	17.3	
6-Jul	Z	12.2	6.7	7.0	10.0	7.6	11.3	8.4	9.6	5.2	2.2	2.6	2.5	2.4	2.1	2.1	1.8	2.1	1.6	0.2	0.2	1.6	3.2	2.6	4.6	12.2	
7-Jul	3.3	Z	1.1	0.5	0.6	0.5	6.6	5.4	0.9	2.1	3.1	2.5	3.8	3.3	1.9	0.7	0.4	0.7	1.1	1.7	1.5	0.8	0.4	0.2	1.9	6.6	
8-Jul	0.2	0.2	Z	0.2	0.1	0.2	0.2	0.2	0.3	0.4	1.0	0.6	0.7	2.0	1.7	1.4	2.6	1.7	4.8	4.9	4.1	3.8	6.3	9.5	2.0	9.5	
9-Jul	8.5	5.7	10.6	Z	19.2	15.1	13.3	17.4	16.2	6.2	2.4	2.3	2.1	1.2	0.9	0.9	0.5	0.5	2.3	4.4	7.5	11.7	7.7	13.3	7.4	19.2	
10-Jul	13.0	7.3	6.2	4.4	Z	2.5	1.6	2.5	1.0	0.8	0.4	0.2	0.2	0.2	0.5	1.6	2.6	2.9	1.8	1.1	1.4	2.1	2.0	1.8	2.5	13.0	
11-Jul	1.1	0.8	0.7	1.2	1.3	Z	7.2	9.7	7.3	C	C	C	C	C	C	2.1	2.4	3.0	3.6	3.1	2.4	3.0	1.7	1.0	--	9.7	
12-Jul	Z	0.9	0.7	1.4	1.3	0.6	0.6	13.7	24.3	28.9	12.2	3.6	2.7	2.8	2.5	2.5	3.4	3.8	3.0	3.4	8.4	7.7	12.5	14.1	6.7	28.9	
13-Jul	6.2	5.0	Z	9.1	11.6	9.2	4.9	4.5	4.5	0.9	0.4	0.1	0.0	0.0	0.2	0.6	1.9	3.2	7.2	10.6	6.7	10.6	12.3	7.8	5.1	12.3	
14-Jul	21.9	12.0	Z	14.0	6.5	5.4	4.7	1.2	0.0	2.1	6.4	7.9	9.9	9.2	5.8	6.0	5.5	7.3	5.3	7.8	8.9	7.8	7.2	5.2	7.3	21.9	
15-Jul	9.4	9.2	9.5	Z	3.6	2.9	4.2	7.7	14.8	9.1	6.6	3.7	2.6	2.0	1.3	1.0	1.2	1.6	1.9	2.0	3.5	2.6	1.9	2.9	4.6	14.8	
16-Jul	2.5	3.5	2.9	1.9	Z	1.4	1.6	6.8	9.1	7.5	6.4	3.7	2.8	2.5	1.9	1.5	1.9	1.6	2.2	1.0	0.7	1.5	0.5	0.4	2.9	9.1	
17-Jul	1.8	6.7	3.2	1.1	1.0	Z	1.0	1.2	2.8	3.1	3.3	2.5	2.3	4.3	2.6	1.4	0.9	0.6	1.5	8.6	11.7	5.6	11.2	13.9	4.0	13.9	
18-Jul	Z	10.2	12.0	8.5	11.7	11.3	5.1	12.7	13.9	17.0	M	6.7	4.6	3.1	2.2	2.2	1.8	2.2	2.2	1.3	2.4	1.1	0.7	0.6	6.1	17.0	
19-Jul	0.7	Z	0.4	0.4	0.9	1.2	0.8	0.8	2.3	10.9	8.7	7.0	0.7	3.5	2.9	2.4	3.0	1.0	0.6	1.8	2.6	0.6	0.6	0.9	2.4	10.9	
20-Jul	1.1	0.5	Z	0.6	0.5	0.6	1.0	2.0	3.7	8.2	12.3	10.3	6.9	7.8	4.8	2.3	1.0	0.7	0.9	1.4	0.8	2.2	6.2	8.8	3.7	12.3	
21-Jul	9.9	9.0	3.4	Z	0.6	0.6	0.6	0.6	1.9	3.0	3.4	1.8	0.7	0.5	0.7	1.6	0.9	1.6	2.8	4.1	4.8	4.2	4.7	4.4	2.9	9.9	
22-Jul	5.4	3.2	1.7	2.7	Z	5.3	1.8	3.9	15.9	26.9	28.6	21.2	6.9	4.8	3.4	2.9	2.5	1.9	1.8	1.1	3.5	14.2	9.9	13.7	8.0	28.6	
23-Jul	7.7	3.2	6.4	10.4	11.8	Z	9.4	9.0	6.6	5.1	7.2	8.0	7.3	6.2	3.2	3.0	2.3	4.8	2.8	2.2	2.9	3.3	4.5	11.0	6.0	11.8	
24-Jul	Z	4.7	2.2	1.4	1.0	1.9	12.1	14.4	11.1	13.2	12.2	8.9	4.6	6.0	4.4	3.7	2.4	1.6	2.9	3.9	8.7	9.8	9.4	9.4	6.5	14.4	
25-Jul	7.5	Z	9.6	14.2	5.7	4.3	6.5	2.1	1.6	1.1	1.8	5.7	5.4	5.2	4.8	7.1	10.3	20.1	21.9	8.5	3.8	1.0	0.3	0.2	6.5	21.9	
26-Jul	0.1	3.0	Z	4.9	3.2	2.5	3.4	3.7	4.6	5.8	4.8	3.7	2.6	5.3	3.5	3.8	3.6	5.9	8.6	10.0	3.7	1.6	2.7	3.4	4.1	10.0	
27-Jul	2.7	10.4	10.8	Z	21.0	15.9	11.7	12.1	11.2	7.8	3.2	3.6	1.9	2.6	2.2	2.0	2.1	4.4	3.4	3.8	2.2	2.2	1.2	0.9	6.1	21.0	
28-Jul	0.4	0.3	0.5	0.4	Z	0.5	0.4	0.8	0.8	1.0	1.0	1.1	0.7	0.7	2.5	3.4	2.9	2.3	1.9	2.1	5.0	15.3	12.9	2.6	2.6	15.3	
29-Jul	1.2	5.7	5.1	9.5	12.0	Z	9.0	7.1	7.8	5.6	0.2	1.6	1.6	1.3	1.2	1.2	1.1	0.6	1.0	1.1	5.7	16.7	15.8	22.2	5.8	22.2	
30-Jul	Z	15.9	11.9	10.0	8.9	5.8	5.1	5.3	6.1	7.8	6.4	4.0	2.8	2.6	0.9	1.1	1.3	1.5	2.1	5.4	3.2	4.0	3.9	2.6	5.2	15.9	
31-Jul	3.8	Z	0.9	0.6	1.1	8.4	5.0	8.1	6.1	2.3	2.7	1.4	0.4	0.3	0.4	0.7	0.5	1.8	2.4	2.4	2.0	3.5	4.4	1.1	2.6	8.4	
		5.0	5.9	4.9	4.3	5.6	4.1	4.6	5.8	6.6	6.6	5.3	4.3	2.9	3.0	2.3	2.5	2.5	2.7	3.2	3.5	4.0	4.8	5.0	5.8	Diurnal Average	
		21.9	17.3	12.0	14.2	21.0	15.9	13.3	17.4	24.3	28.9	28.6	21.2	9.9	9.2	7.0	9.1	10.3	20.1	21.9	10.6	11.7	16.7	15.8	22.2	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	697	98.73	98.73
21 - 40	9	1.27	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	102	48	17	10	12	15	41	86	71	40	16	31	36	55	55	61	696
21 - 40	5	1	0	0	0	0	0	0	0	1	0	0	0	0	0	2	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	107	49	17	10	12	15	41	86	71	41	16	31	36	55	55	63	705

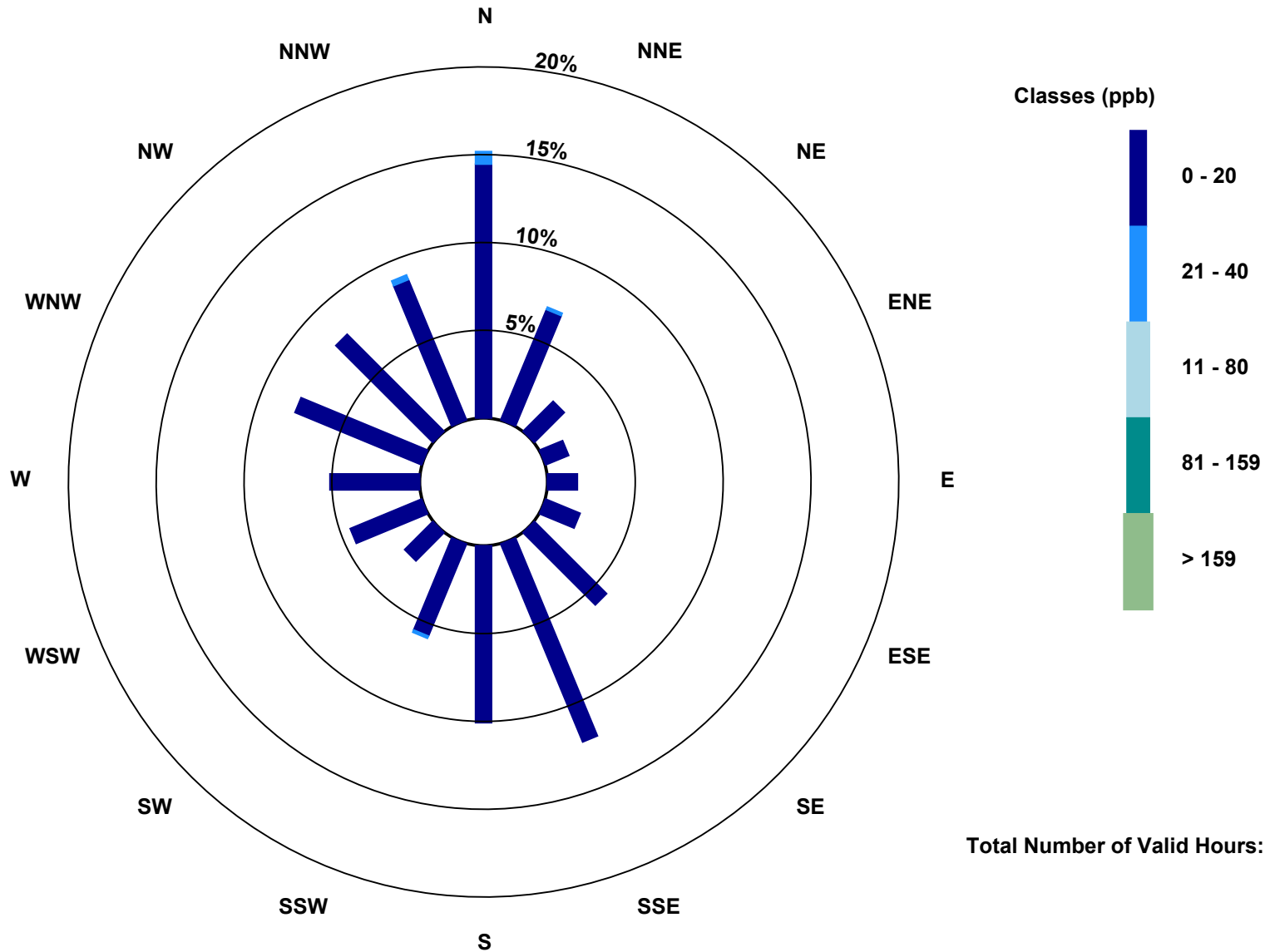
Total Number of Valid Hours: 705

Total Number of Hours: 744

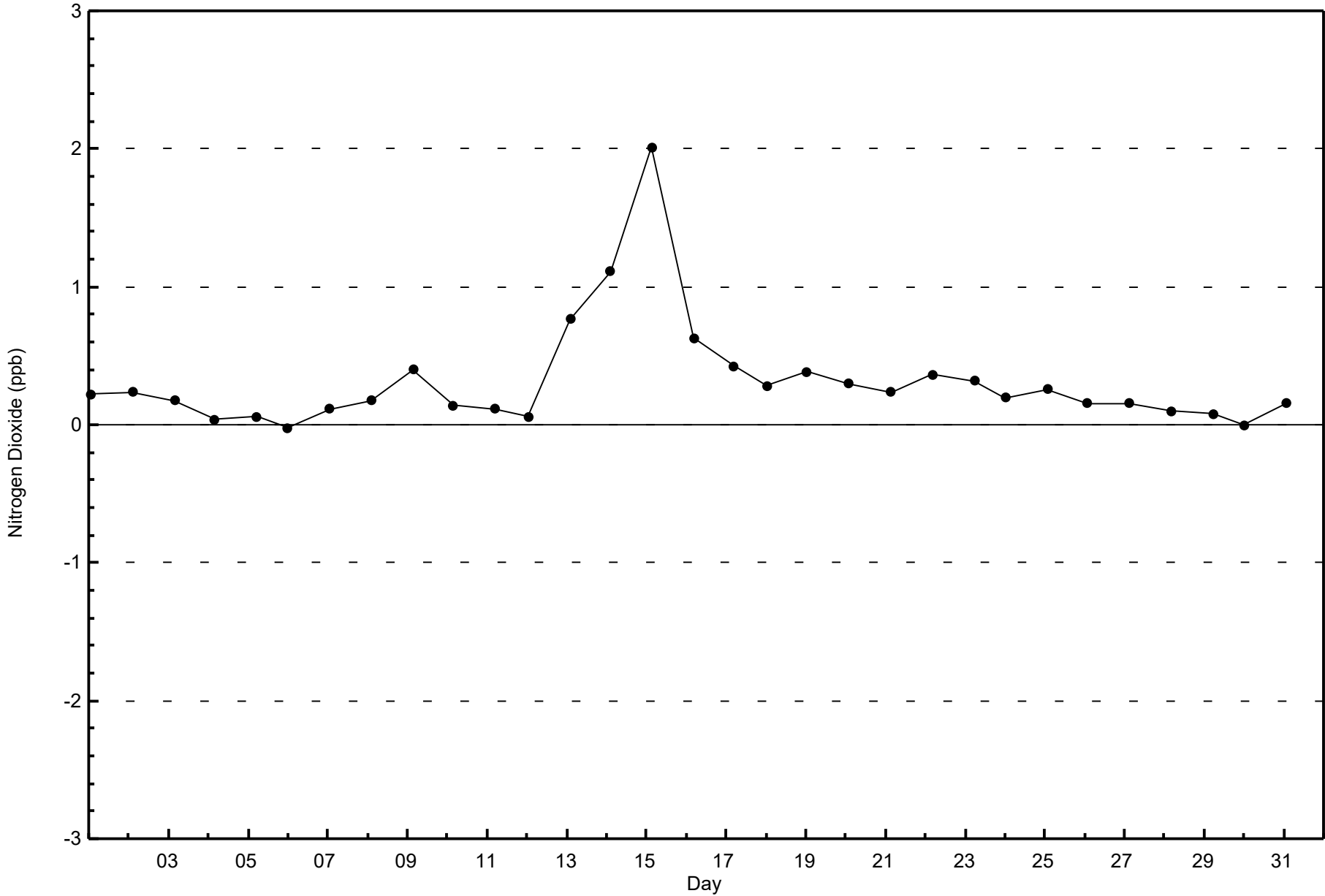


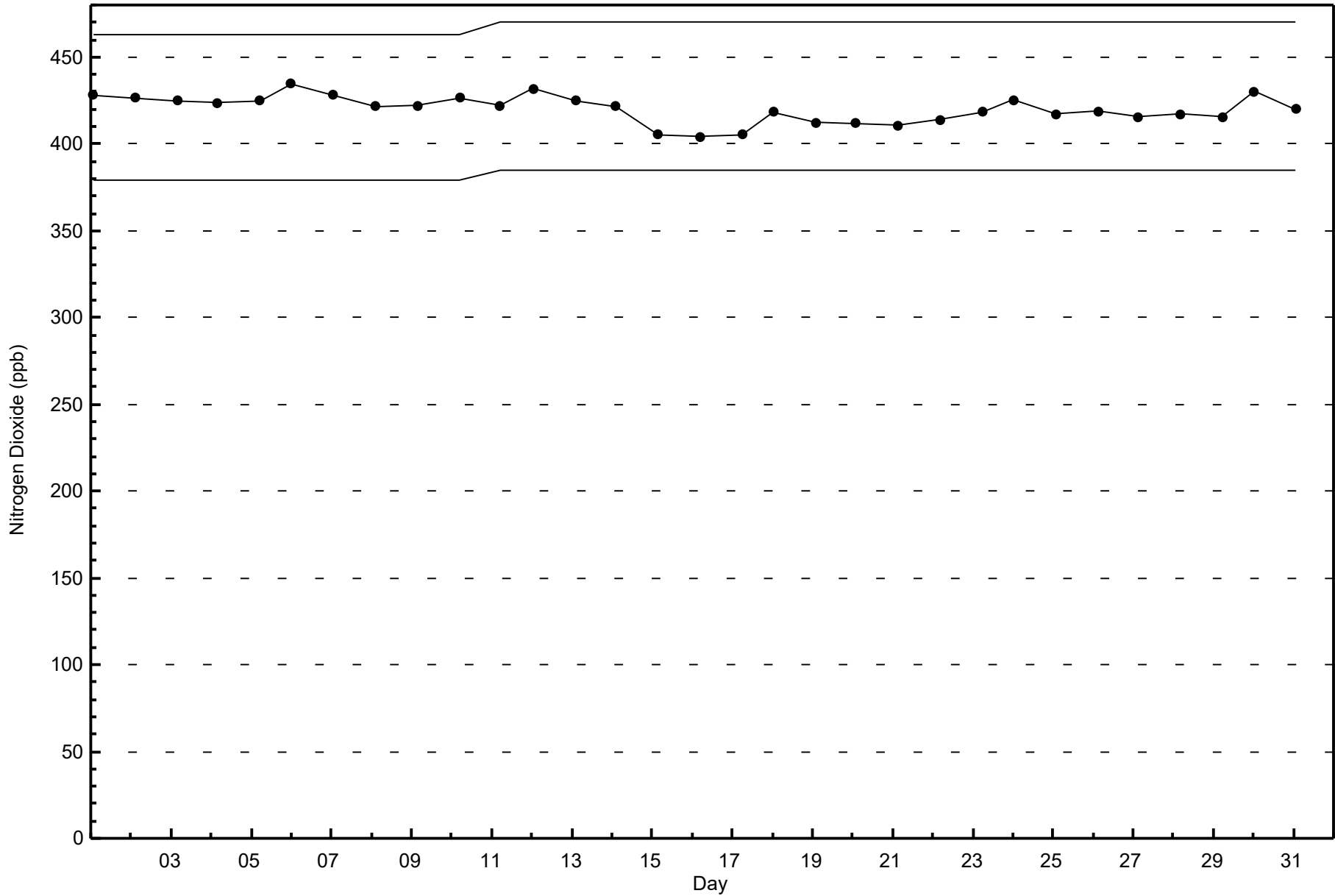
Wood Buffalo Environmental Association
Wind Rose Jul 2023

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



Total Number of Valid Hours: 705







Wood Buffalo Environmental Association
Summary of Hour Averages

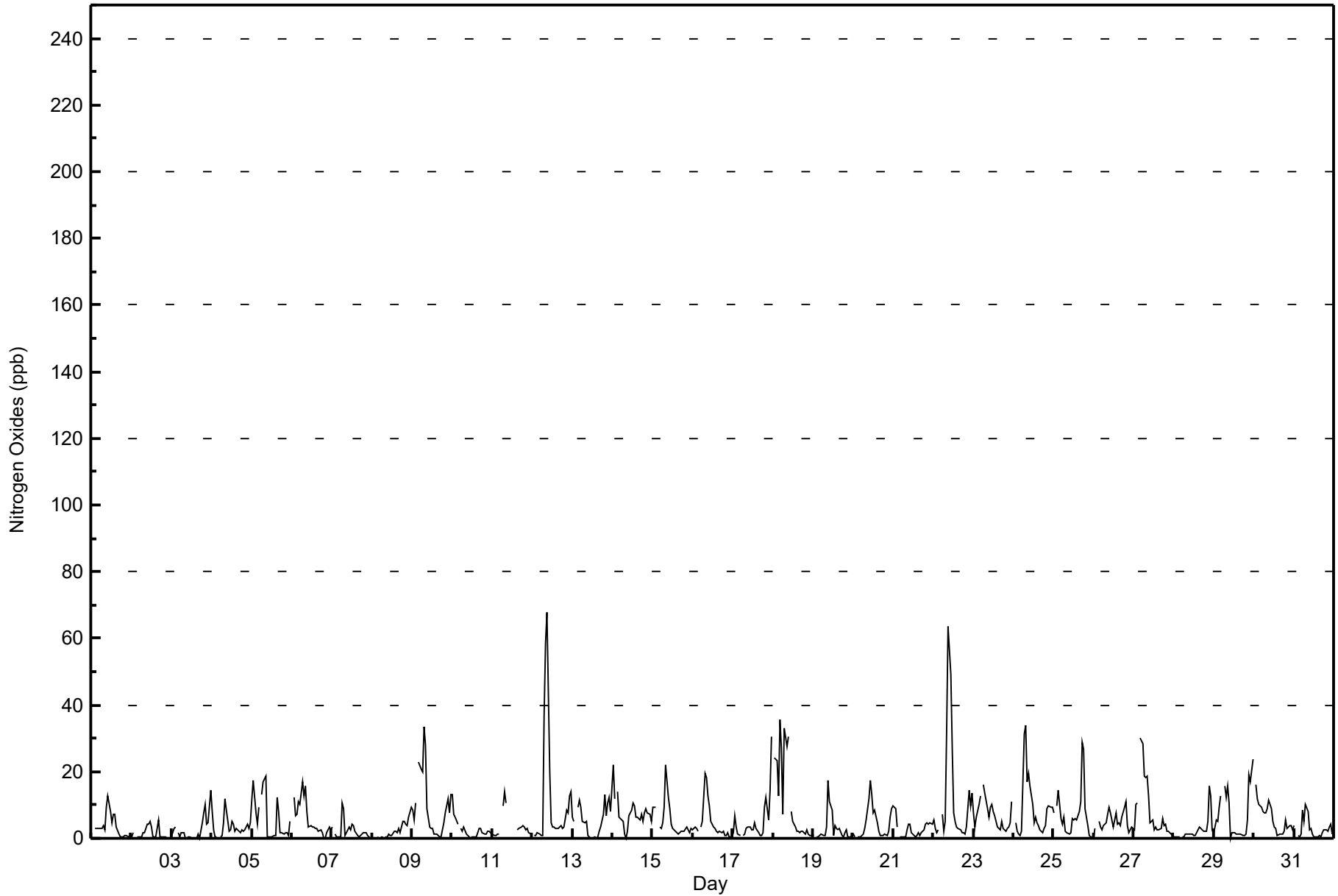
Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - July 2023

Maximum Value: 67.7 ppb on Jul 12 10:00																				Maximum Daily Average: 11.6 ppb on Jul 22					Hours in Service: 744																								
Minimum Value: 0.0 ppb on Jul 3 14:00																				Minimum Daily Average: 1.6 ppb on Jul 2					Hours of Data: 706																								
Maximum Diurnal Average: 11.5 ppb at hour 10																				Minimum Diurnal Average: 2.5 ppb at hour 15					Hours of Missing Data: 38																								
Monthly Average: 5.53 ppb																				Percentiles: P ₁ = 0.1 P ₁₀ = 0.5 Q ₁ = 1.2 Median = 3.0 Q ₃ = 7.4 P ₉₀ = 12.6 P ₉₉ = 33.3					Hours of Calibration: 37																								
																									Percent Operational Time: 99.9																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	1.3	Z	3.0	2.9	3.0	3.0	3.0	4.0	2.5	9.5	12.7	8.0	4.5	7.2	7.4	3.5	1.2	0.5	0.4	0.6	0.9	0.8	0.5	0.9	3.5	12.7																							
2-Jul	0.6	1.5	Z	0.6	0.5	0.4	0.5	1.6	1.8	4.0	4.4	5.3	3.4	0.4	0.3	3.0	5.5	0.6	0.3	0.3	0.3	0.2	0.2	0.2	1.6	5.5																							
3-Jul	0.4	2.8	3.5	Z	1.6	0.2	1.9	1.9	0.1	0.0	0.6	0.3	0.0	0.0	0.1	0.1	1.2	0.2	4.8	7.8	10.4	4.1	4.7	14.3	2.7	14.3																							
4-Jul	7.9	2.6	0.6	0.5	Z	0.2	0.7	4.6	11.9	8.4	2.0	2.6	5.2	4.2	2.1	2.8	2.0	1.7	2.5	2.2	2.4	4.1	3.1	4.6	3.4	11.9																							
5-Jul	11.6	17.4	7.8	4.2	9.2	Z	13.3	17.1	18.4	0.6	0.6	0.5	0.4	0.7	1.0	12.3	8.2	1.8	1.5	1.4	1.6	1.9	0.9	5.0	6.0	18.4																							
6-Jul	Z	12.3	6.8	7.1	10.9	10.0	17.1	12.5	15.8	8.2	3.3	3.9	3.4	3.3	2.8	2.8	2.2	2.7	1.8	0.2	0.2	1.6	3.2	2.6	5.9	17.1																							
7-Jul	3.3	Z	1.1	0.5	0.6	0.5	10.6	8.9	0.9	2.3	3.3	2.6	4.2	3.7	2.2	0.9	0.5	0.8	1.2	1.8	1.6	0.8	0.4	0.2	2.3	10.6																							
8-Jul	0.2	0.2	Z	0.2	0.1	0.2	0.2	0.2	0.3	0.4	1.1	0.7	0.9	2.3	1.9	1.6	2.8	1.9	5.1	5.1	4.2	3.8	6.3	9.5	2.1	9.5																							
9-Jul	8.5	5.7	10.7	Z	23.1	20.7	19.7	33.3	28.1	9.0	3.5	3.0	2.8	1.5	1.1	1.1	0.5	0.5	2.4	4.6	7.5	11.7	7.7	13.3	9.6	33.3																							
10-Jul	13.0	7.3	6.2	4.4	Z	2.9	2.1	3.6	1.4	1.0	0.4	0.2	0.2	0.2	0.5	1.9	2.9	3.1	1.8	1.1	1.4	2.1	2.0	1.8	2.7	13.0																							
11-Jul	1.1	0.8	0.7	1.2	1.3	Z	9.8	14.0	10.6	C	C	C	C	C	C	2.6	2.9	3.5	4.0	3.4	2.6	3.1	1.8	1.1	--	14.0																							
12-Jul	Z	1.0	0.8	1.5	1.4	0.8	0.8	36.8	58.7	67.7	19.7	4.7	3.3	3.4	3.0	2.8	3.6	3.9	3.0	3.4	8.4	7.7	12.5	14.1	11.4	67.7																							
13-Jul	6.2	5.0	Z	9.1	11.6	9.4	5.2	4.9	5.1	0.9	0.4	0.1	0.1	0.3	0.2	0.6	1.9	3.2	7.2	13.1	6.7	10.6	12.3	7.8	5.3	13.1																							
14-Jul	21.9	12.0	Z	14.0	6.5	5.4	5.2	1.2	0.0	2.1	6.7	8.5	10.5	9.8	6.2	6.2	5.6	7.3	5.3	7.8	8.9	7.8	7.2	5.2	7.4	21.9																							
15-Jul	9.4	9.2	9.5	Z	3.6	2.9	4.5	9.3	22.1	12.4	8.8	4.4	2.9	2.5	1.6	1.3	1.6	2.0	2.3	2.2	3.6	2.6	1.9	2.9	5.4	22.1																							
16-Jul	2.5	3.5	2.9	2.0	Z	3.6	5.2	19.5	18.2	12.6	9.8	4.9	3.4	3.0	2.1	1.6	2.1	1.6	2.2	1.0	0.7	1.5	0.5	0.4	4.6	19.5																							
17-Jul	1.8	6.7	3.2	1.1	1.0	Z	1.0	1.2	2.9	3.2	3.4	2.5	2.4	4.7	3.0	1.5	0.9	0.6	1.6	9.2	12.2	5.6	14.4	30.6	5.0	30.6																							
18-Jul	Z	24.1	23.3	12.9	35.5	27.3	7.2	32.8	27.4	30.5	M	7.9	5.0	3.2	2.2	2.2	1.8	2.2	2.2	1.3	2.4	1.1	0.7	0.6	11.5	35.5																							
19-Jul	0.7	Z	0.4	0.4	0.9	1.3	0.9	0.8	3.2	17.5	11.0	8.5	0.7	3.8	3.0	2.4	3.0	1.0	0.6	1.8	2.6	0.6	0.6	0.9	2.9	17.5																							
20-Jul	1.2	0.5	Z	0.6	0.5	0.7	1.3	3.1	5.7	11.8	17.4	13.1	7.7	8.5	4.8	2.3	1.0	0.7	0.9	1.4	0.8	2.2	6.2	8.8	4.4	17.4																							
21-Jul	9.9	9.0	3.4	Z	0.6	0.6	0.6	0.6	2.7	4.1	4.1	1.8	0.7	0.5	0.7	1.6	0.9	1.6	2.8	4.1	4.8	4.2	4.7	4.4	3.0	9.9																							
22-Jul	5.4	3.2	1.7	2.7	Z	7.1	2.1	5.0	31.9	63.6	49.0	26.6	7.5	5.1	3.5	2.9	2.5	1.9	1.8	1.1	3.5	14.5	9.9	13.7	11.6	63.6																							
23-Jul	7.7	3.2	6.4	10.4	12.6	Z	15.9	13.6	9.1	6.2	9.2	10.2	8.2	6.8	3.3	3.1	2.4	5.0	2.8	2.2	2.9	3.3	4.5	11.1	7.0	15.9																							
24-Jul	Z	4.7	2.2	1.4	1.0	2.0	31.5	33.9	17.1	19.4	15.6	10.3	4.8	6.5	4.6	3.7	2.4	1.6	2.9	3.9	8.7	9.8	9.4	9.4	9.0	33.9																							
25-Jul	7.5	Z	9.6	14.2	5.7	4.3	6.5	2.1	1.6	1.1	1.8	5.8	5.5	6.0	5.4	8.0	11.1	28.7	26.5	8.8	3.8	1.0	0.3	0.2	7.2	28.7																							
26-Jul	0.1	3.0	Z	4.9	3.2	2.5	3.7	4.7	7.0	9.3	7.7	5.3	3.3	7.5	4.2	4.6	4.0	6.5	9.3	10.9	3.7	1.6	2.7	3.4	4.9	10.9																							
27-Jul	2.7	10.4	10.8	Z	30.0	28.4	18.6	18.4	18.4	12.5	4.5	5.4	2.4	3.4	2.6	2.5	2.9	5.9	3.8	4.0	2.2	2.2	1.2	0.9	8.4	30.0																							
28-Jul	0.4	0.3	0.5	0.4	Z	0.5	0.4	1.1	1.2	1.3	1.1	1.1	0.7	0.7	2.7	3.6	3.1	2.4	1.9	2.1	5.0	15.8	12.9	2.6	2.7	15.8																							
29-Jul	1.2	5.7	5.1	9.5	12.8	Z	15.8	12.2	15.6	10.7	0.2	1.8	1.7	1.3	1.2	1.2	1.1	0.6	1.0	1.1	5.7	18.9	16.9	23.5	7.2	23.5																							
30-Jul	Z	16.0	11.9	10.0	9.4	7.9	7.6	7.7	8.7	11.5	9.0	5.1	3.3	3.1	0.9	1.1	1.4	1.5	2.1	5.4	3.2	4.0	3.9	2.6	6.0	16.0																							
31-Jul	3.8	Z	0.9	0.6	1.1	8.5	5.2	10.3	7.9	2.7	3.1	1.4	0.4	0.3	0.4	0.7	0.5	1.8	2.4	2.4	2.0	3.5	4.4	1.1	2.8	10.3																							
																								5.0	6.5	5.3	4.5	7.2	5.8	7.0	10.3	11.5	11.5	7.4	5.2	3.3	3.5	2.5	2.8	2.7	3.1	3.5	3.7	4.0	4.9	5.1	6.4	Diurnal Average	
																								21.9	24.1	23.3	14.2	35.5	28.4	31.5	36.8	58.7	67.7	49.0	26.6	10.5	9.8	7.4	12.3	11.1	28.7	26.5	13.1	12.2	18.9	16.9	30.6	Diurnal Maximum	
Z - zerospan																								C - Calibration				M - Maintenance																					



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	678	96.03	96.03
21 - 40	24	3.40	99.43
41 - 80	4	0.57	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



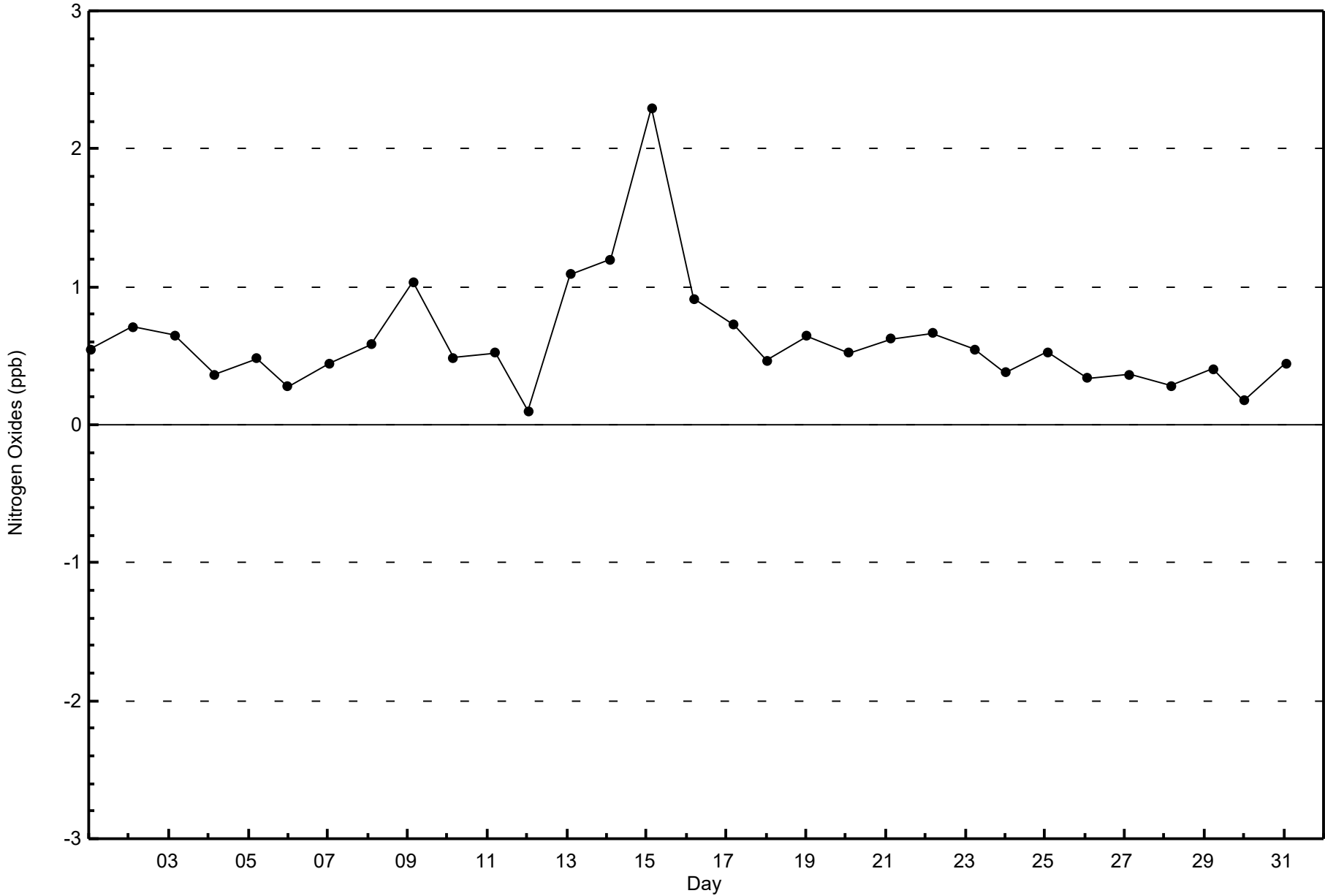
**Wood Buffalo Environmental Association
Frequency Distribution**

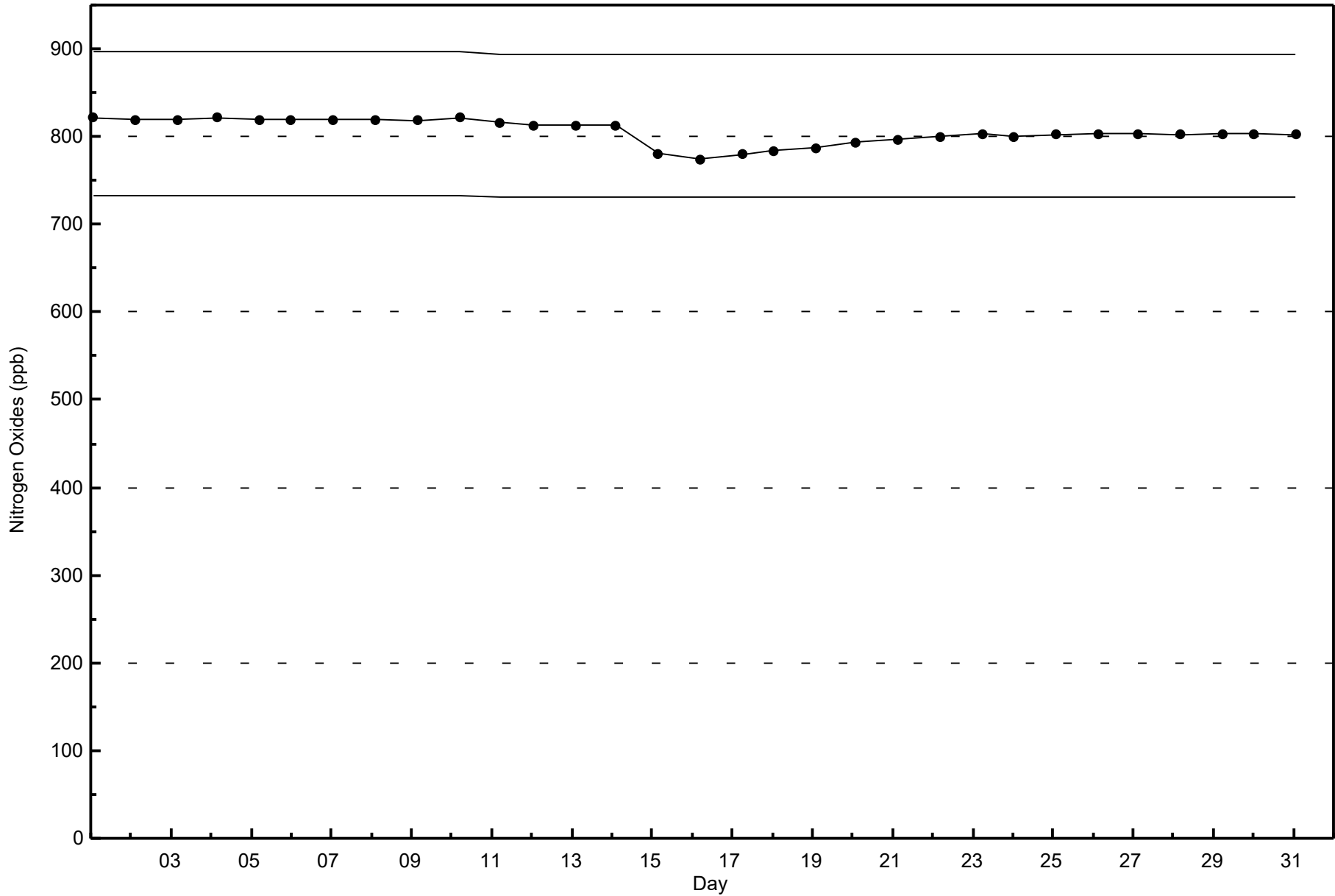
**Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	96	45	17	10	12	15	41	84	71	40	16	31	36	55	52	56	677
21 - 40	8	3	0	0	0	0	0	2	0	1	0	0	0	0	3	7	24
11 - 80	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	107	49	17	10	12	15	41	86	71	41	16	31	36	55	55	63	705

Total Number of Valid Hours: 705

Total Number of Hours: 744







Wood Buffalo Environmental Association

Summary of Hour Averages

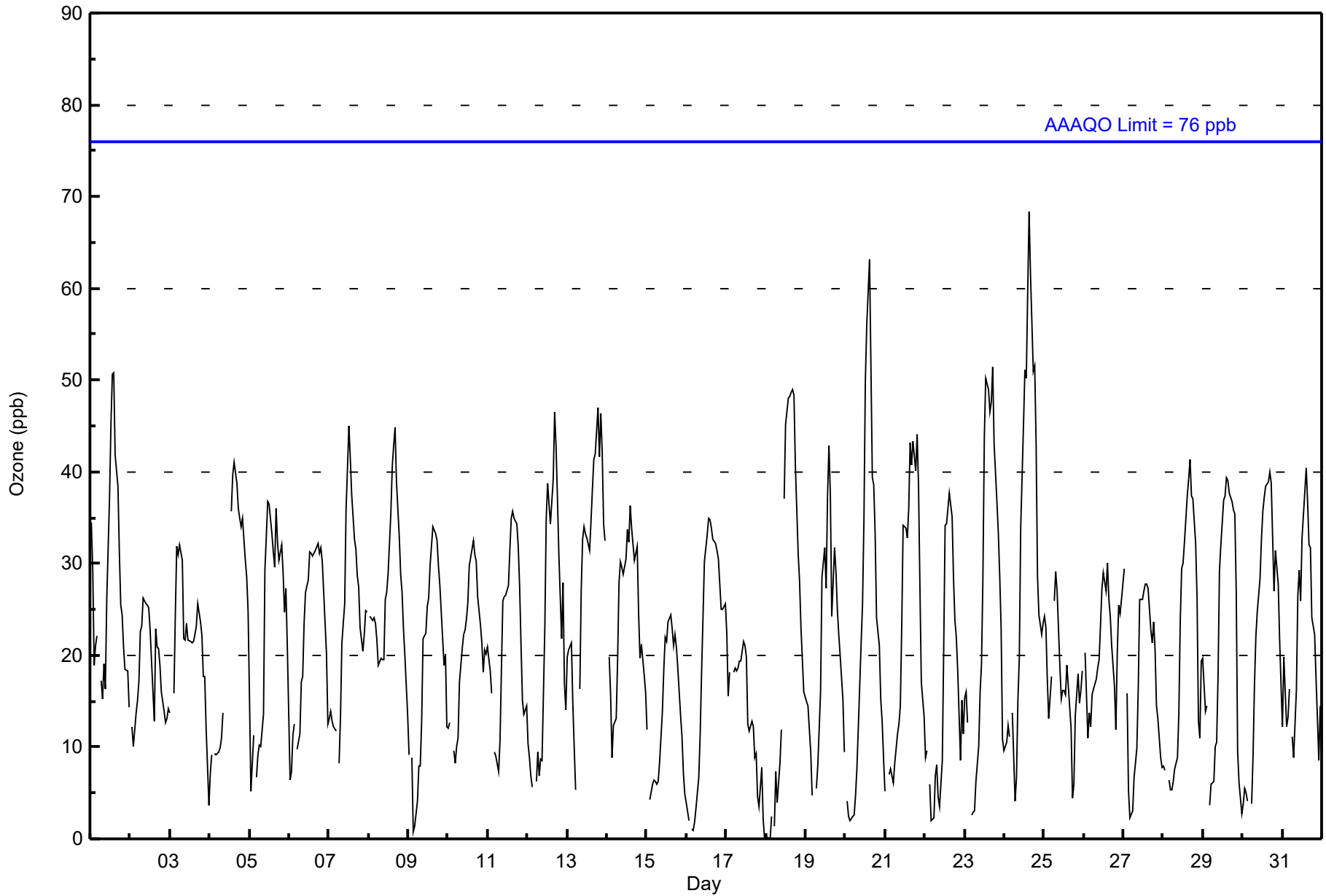
Ozone (O₃) - ppb

Fort McKay - Bertha Ganter - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 68.4 ppb on Jul 24 16:00	Maximum Daily Average: 31.2 ppb on Jul 24		Hours of Data:	708
Minimum Value: 0.0 ppb on Jul 18 01:00	Minimum Daily Average: 13.8 ppb on Jul 17		Hours of Missing Data:	36
Maximum Diurnal Average: 35.7 ppb at hour 15	Minimum Diurnal Average: 9.1 ppb at hour 6		Hours of Calibration:	35
Monthly Average: 22.13 ppb	Percentiles: P ₁ = 1.4 P ₁₀ = 6.6 Q ₁ = 12.2 Median = 21.4 Q ₃ = 31.2 P ₉₀ = 37.9 P ₉₉ = 51.3		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	34.5	29.2	18.9	21.0	22.2	Z	17.3	15.2	19.1	16.3	26.1	37.2	45.2	50.7	50.8	41.8	38.5	31.3	25.5	24.5	20.9	18.5	18.3	14.3	27.7	50.8																							
2-Jul	Z	12.2	10.1	13.8	15.1	17.2	22.6	23.2	26.3	25.6	25.5	25.2	22.8	19.3	12.8	22.8	20.8	20.8	18.8	16.0	13.8	12.7	13.0	14.2	18.5	26.3																							
3-Jul	13.7	Z	15.9	24.4	31.9	30.9	32.0	30.3	21.8	21.7	23.4	21.7	21.5	21.3	21.5	22.2	23.1	25.7	23.7	22.1	17.7	17.7	12.0	3.7	21.7	32.0																							
4-Jul	7.2	9.2	Z	9.4	9.2	9.4	10.0	10.9	13.7	C	C	C	C	35.6	39.7	41.1	38.8	36.1	34.9	34.1	34.9	30.3	28.6	24.8	24.1	41.1																							
5-Jul	15.2	5.1	11.3	Z	6.6	9.2	10.2	10.1	13.5	29.3	32.9	36.8	36.5	33.3	31.3	29.6	36.0	32.4	30.4	32.0	29.0	24.6	27.3	21.0	23.6	36.8																							
6-Jul	6.4	7.4	11.3	12.5	Z	9.8	11.5	17.0	17.8	23.4	26.9	28.3	31.3	31.1	30.8	31.1	31.5	32.2	31.0	31.7	30.3	26.9	20.2	12.6	22.3	32.2																							
7-Jul	13.1	13.9	12.8	12.2	11.7	Z	8.3	13.3	21.3	25.7	36.0	40.4	45.0	41.5	37.6	32.6	31.6	28.7	27.4	23.0	20.4	22.2	24.9	24.7	24.7	45.0																							
8-Jul	Z	24.3	23.9	24.0	23.5	21.7	18.9	19.6	19.5	19.5	26.1	26.9	28.9	35.5	40.7	42.9	44.8	38.9	33.0	28.9	26.9	22.8	20.0	13.4	27.2	44.8																							
9-Jul	9.1	Z	8.9	0.8	1.4	4.1	8.0	8.0	12.8	21.8	22.4	25.4	26.2	29.7	31.9	34.0	33.2	32.5	29.7	27.5	24.7	18.9	20.1	12.2	19.3	34.0																							
10-Jul	12.0	12.7	Z	9.7	8.2	10.1	11.0	17.0	20.8	22.3	22.7	24.0	25.8	29.7	31.5	32.5	30.9	30.3	26.3	23.4	21.4	18.2	20.6	20.1	20.9	32.5																							
11-Jul	20.9	18.2	15.8	Z	9.4	9.0	7.3	10.9	18.6	25.9	26.3	26.5	27.5	31.5	35.0	35.7	34.9	34.3	31.8	27.4	21.1	15.1	13.6	14.5	22.2	35.7																							
12-Jul	10.3	8.8	6.9	5.7	Z	6.3	9.4	6.9	8.6	8.6	23.0	34.9	38.7	36.4	34.3	39.2	46.6	42.8	37.2	31.1	21.9	27.9	16.9	14.0	22.4	46.6																							
13-Jul	19.8	20.6	21.4	14.7	9.9	5.4	Z	16.3	27.2	32.6	34.0	33.2	32.8	31.4	34.6	38.1	41.4	41.9	47.0	41.7	46.3	42.0	34.3	32.4	30.4	47.0																							
14-Jul	Z	19.9	15.7	8.8	12.3	13.1	19.5	27.9	30.2	29.6	28.9	30.5	33.8	32.3	36.4	33.9	30.4	31.1	31.9	24.5	19.8	21.3	17.8	16.0	24.6	36.4																							
15-Jul	11.9	Z	4.2	6.0	6.4	6.3	6.0	6.3	8.4	13.9	18.5	22.0	21.5	23.7	24.5	22.8	21.1	22.3	20.9	18.6	13.5	11.1	7.2	4.8	14.0	24.5																							
16-Jul	4.0	2.0	Z	1.0	0.9	1.8	3.4	6.7	11.4	18.2	24.1	30.2	33.1	34.9	34.8	33.8	32.6	32.3	31.4	30.4	27.8	24.9	25.0	25.7	20.4	34.9																							
17-Jul	22.5	15.5	18.2	Z	18.1	18.6	18.3	18.6	19.4	19.3	21.4	21.0	19.9	12.5	11.7	12.8	12.2	8.8	9.3	4.7	3.5	7.8	2.2	0.0	13.8	22.5																							
18-Jul	0.0	0.2	0.0	2.4	Z	1.4	7.4	3.9	8.2	11.8	M	37.0	45.1	48.0	48.3	48.7	49.0	48.4	40.7	31.2	28.1	23.1	19.5	16.1	23.6	49.0																							
19-Jul	14.9	14.5	12.0	9.5	4.8	Z	5.4	7.9	11.9	16.0	28.5	31.8	27.3	37.4	42.8	37.5	24.3	31.8	29.2	25.1	22.2	20.0	15.1	9.5	20.8	42.8																							
20-Jul	Z	4.1	2.4	2.0	2.5	2.7	4.7	7.8	12.2	21.4	25.7	34.8	49.9	55.9	63.2	51.4	39.4	38.6	33.2	24.1	21.0	15.3	12.9	8.9	23.2	63.2																							
21-Jul	5.2	Z	7.0	7.6	6.9	6.1	8.3	11.5	12.5	14.4	23.1	34.1	33.9	32.8	35.9	43.1	40.7	43.3	40.1	44.1	38.4	27.5	17.1	13.2	23.8	44.1																							
22-Jul	8.9	9.6	Z	5.9	2.0	2.3	6.8	8.1	4.6	3.6	8.5	20.9	34.1	34.2	36.0	37.7	35.1	28.3	23.8	21.9	18.3	8.5	15.1	11.5	16.8	37.7																							
23-Jul	15.3	16.1	12.7	Z	2.6	2.9	3.1	6.2	10.1	16.0	19.0	28.5	43.7	50.2	48.9	46.5	47.6	51.4	43.1	36.7	33.5	28.7	23.1	10.9	25.9	51.4																							
24-Jul	9.7	10.5	12.4	11.2	Z	13.7	4.1	6.7	15.1	19.7	33.9	45.2	51.1	50.3	59.6	68.4	61.5	51.0	51.6	43.2	28.6	24.4	22.3	23.5	31.2	68.4																							
25-Jul	24.3	23.0	17.4	13.2	17.8	Z	26.0	29.1	27.0	18.8	15.3	16.2	16.1	15.7	19.0	14.3	12.0	4.5	6.0	13.4	18.0	14.8	16.2	18.3	17.2	29.1																							
26-Jul	Z	20.3	11.0	13.8	12.2	15.7	16.3	17.4	18.7	19.5	23.1	27.2	29.0	27.0	30.0	26.0	24.3	21.0	16.7	11.9	20.4	25.5	24.6	26.2	20.8	30.0																							
27-Jul	29.5	Z	15.9	5.4	2.3	3.1	6.8	8.2	9.9	16.4	26.1	26.1	27.0	27.7	27.7	27.2	22.8	21.4	23.6	20.6	14.5	13.2	8.9	7.7	17.0	29.5																							
28-Jul	8.0	7.5	Z	6.4	5.4	5.3	6.3	7.6	8.9	13.7	23.8	29.4	30.1	32.4	37.3	39.2	41.3	37.3	37.0	32.1	26.3	12.9	11.0	19.4	20.8	41.3																							
29-Jul	19.7	13.8	14.5	Z	3.6	5.9	6.3	10.0	10.6	17.7	29.1	32.0	36.9	37.4	39.3	39.0	37.6	36.7	35.9	35.3	26.9	9.5	6.1	2.7	22.0	39.3																							
30-Jul	3.8	5.5	5.1	4.1	Z	3.8	9.0	16.6	22.0	24.8	28.3	32.7	35.7	37.2	38.4	38.9	40.0	38.8	32.7	27.0	31.5	27.7	21.7	16.7	23.6	40.0																							
31-Jul	12.2	19.8	12.3	13.3	16.3	Z	11.2	8.9	16.4	26.6	29.2	26.0	32.7	37.8	40.5	36.7	32.0	31.7	24.2	22.2	17.6	13.1	8.5	14.4	21.9	40.5																							
																								13.5	13.2	12.2	10.0	10.1	9.1	11.2	13.2	16.1	19.8	25.2	29.5	32.8	34.0	35.7	35.5	34.1	32.5	29.9	26.8	23.8	20.2	17.5	15.1	Diurnal Average	
																								34.5	29.2	23.9	24.4	31.9	30.9	32.0	30.3	30.2	32.6	36.0	45.2	51.1	55.9	63.2	68.4	61.5	51.4	51.6	44.1	46.3	42.0	34.3	32.4	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 76 ppb





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	331	46.75	46.75
21 - 50	365	51.55	98.31
51 - 82	12	1.69	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	16	3	1	4	3	15	34	36	18	14	18	24	45	34	28	329
21 - 50	73	31	15	6	6	9	23	50	35	27	4	12	11	10	19	34	365
51 - 82	1	0	0	1	2	2	1	3	1	0	0	0	0	0	1	0	12
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	110	47	18	8	12	14	39	87	72	45	18	30	35	55	54	62	706

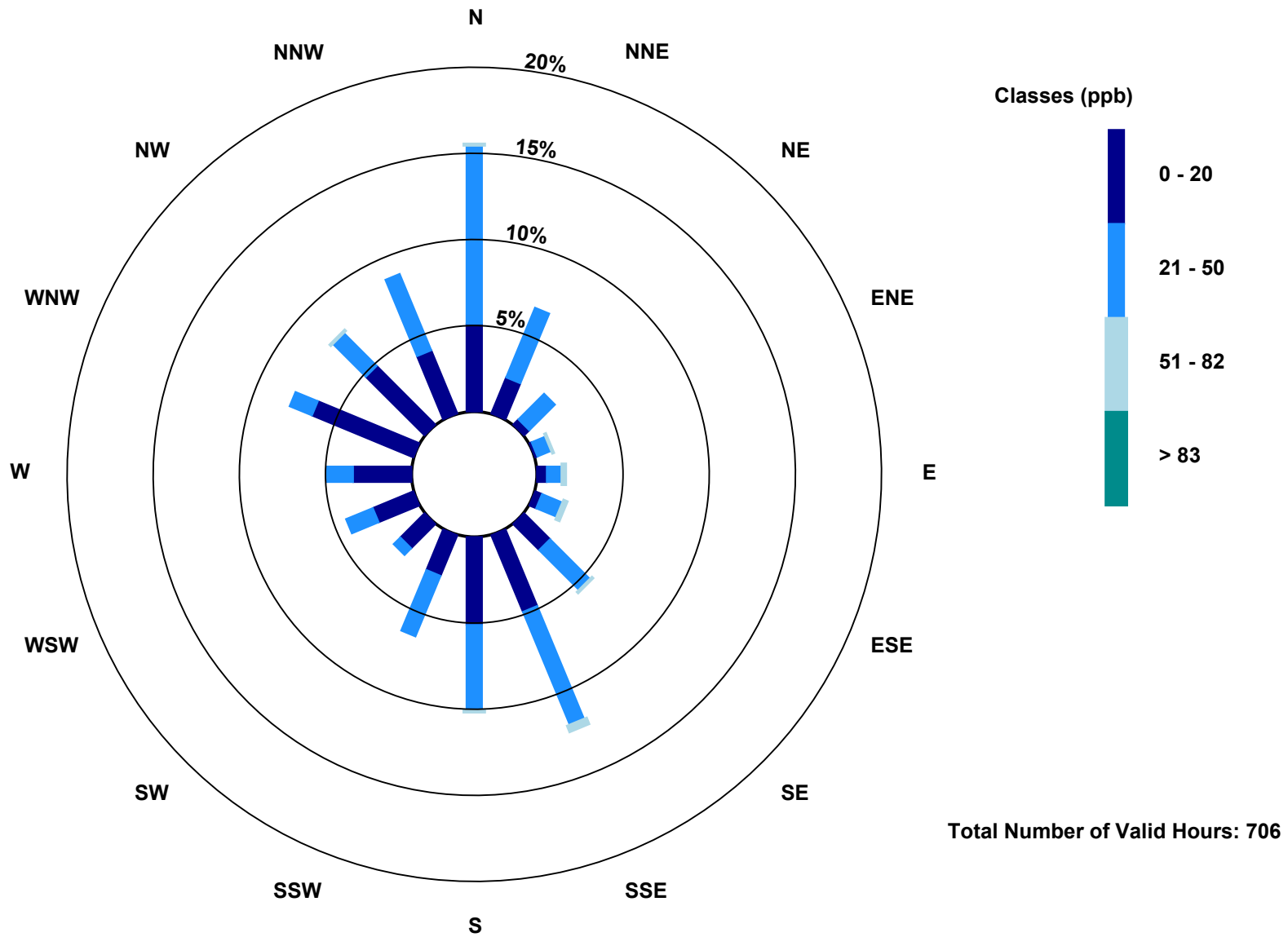
Total Number of Valid Hours: 706

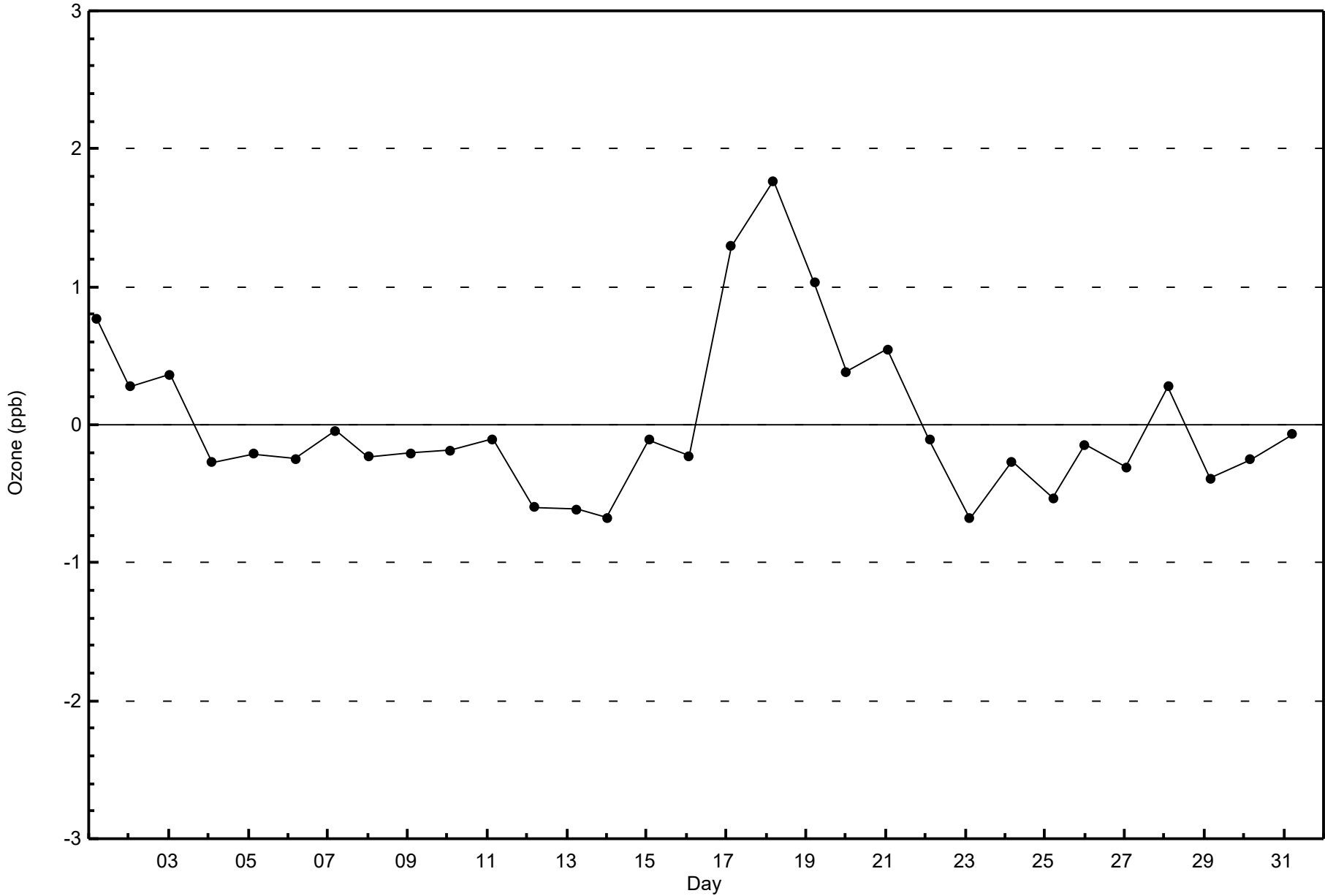
Total Number of Hours: 744

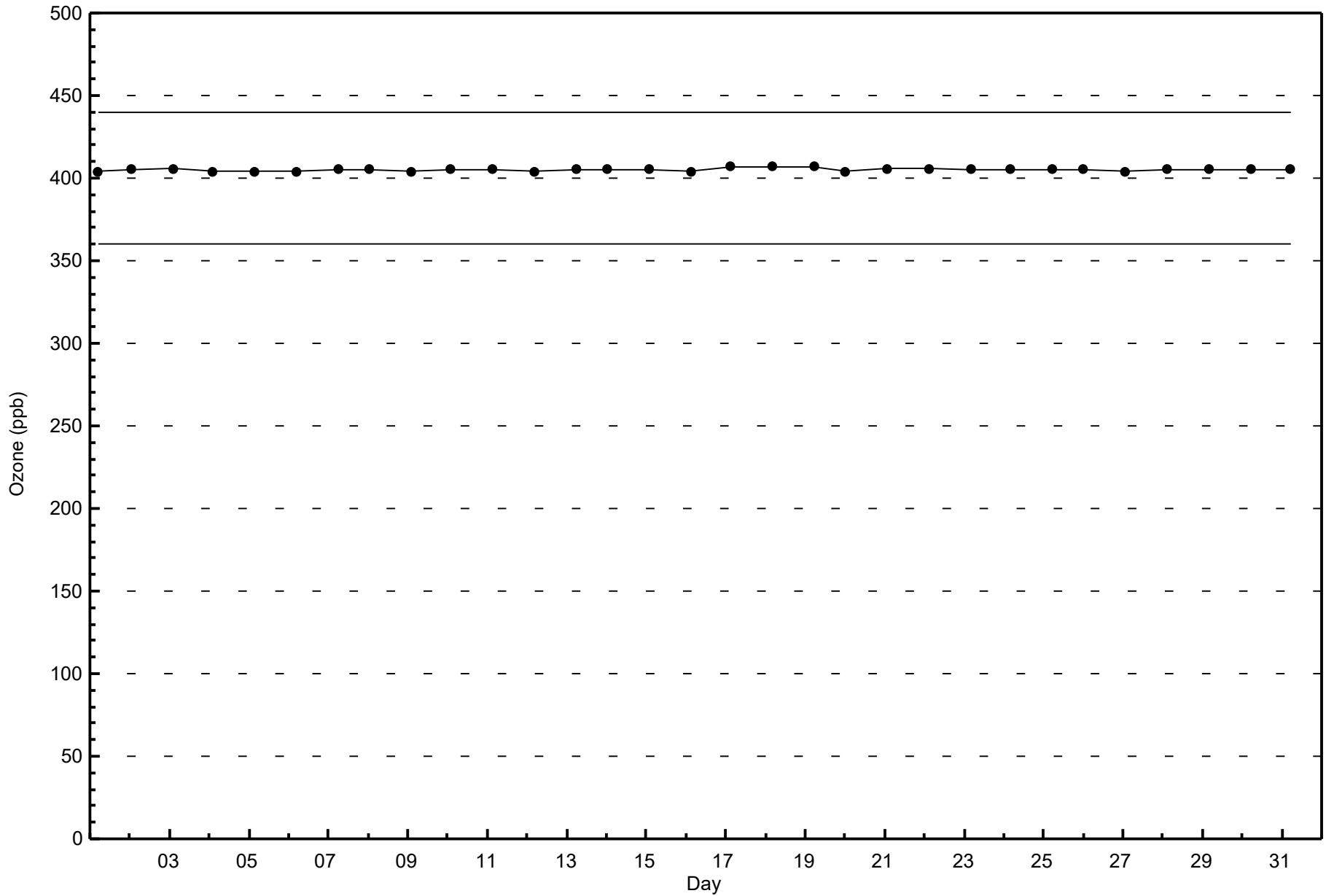


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter









Wood Buffalo Environmental Association

Summary of Hour Averages

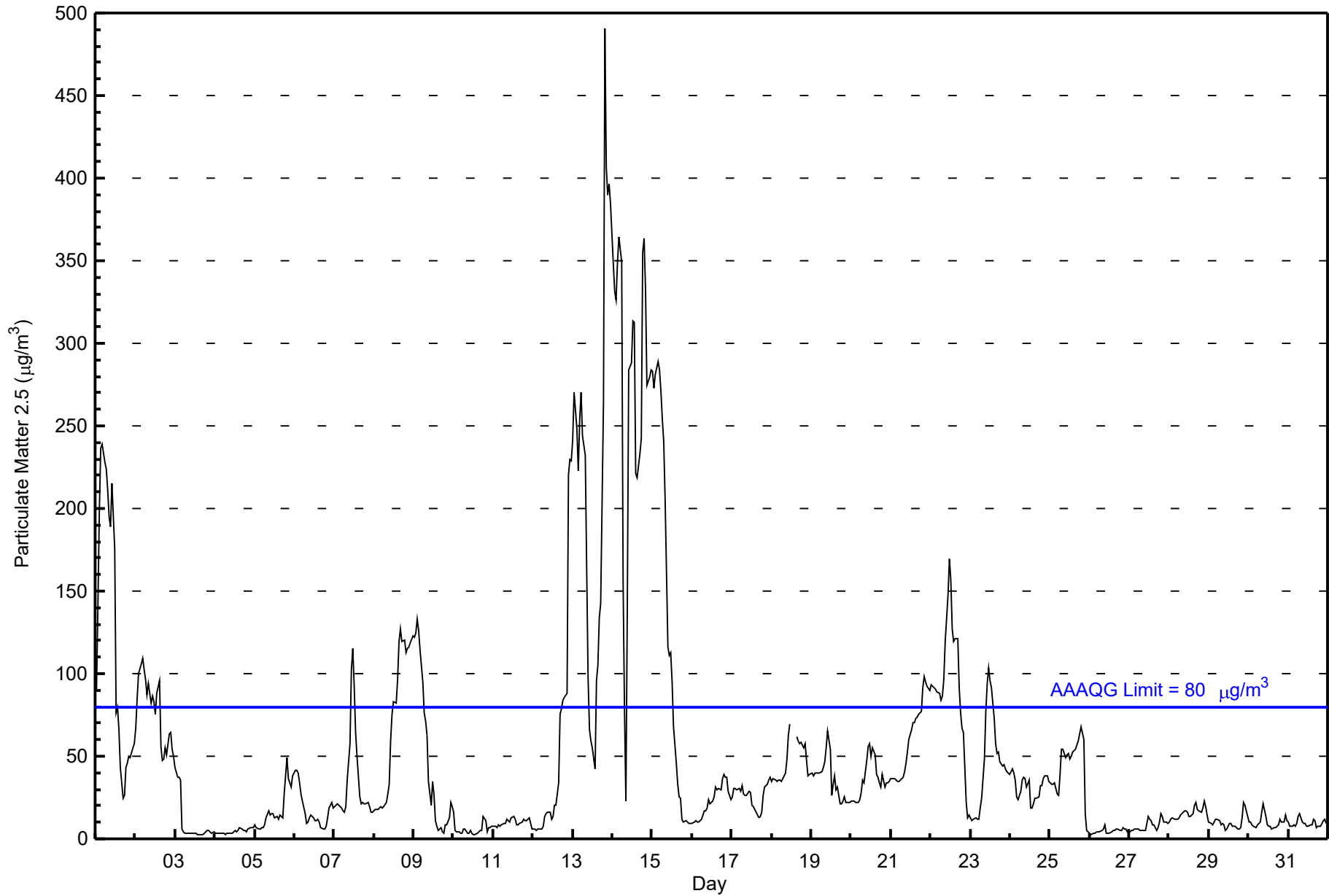
Particulate Matter 2.5 (PM_{2.5}) - µg/m³

Fort McKay - Bertha Ganter - July 2023

Number of Exceedences (AAAQO):	1-hr: 134	24-hr: 17	Hours in Service:	744
Maximum Value: 490.4 µg/m ³ on Jul 13 20:00	Maximum Daily Average: 269.5 µg/m ³ on Jul 14		Hours of Data:	741
Minimum Value: 2.2 µg/m ³ on Jul 3 18:00	Minimum Daily Average: 4.6 µg/m ³ on Jul 4		Hours of Missing Data:	3
Maximum Diurnal Average: 59.9 µg/m ³ at hour 4	Minimum Diurnal Average: 40.3 µg/m ³ at hour 16		Hours of Calibration:	3
Monthly Average: 51.29 µg/m ³	Percentiles: P ₁ = 2.9 P ₁₀ = 5.1 Q ₁ = 9.5 Median = 22.8 Q ₃ = 55.5 P ₉₀ = 120.2 P ₉₉ = 352.9		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	90.4	141.1	197.6	236.7	239.3	228.1	223.4	211.3	194.6	188.9	215.3	175.6	75.9	79.4	65.9	43.2	24.8	26.1	43.3	45.5	49.7	49.1	55.1	57.8	123.2	239.3
2-Jul	66.8	85.1	99.9	106.0	109.5	102.7	96.2	87.0	94.2	82.1	86.4	82.9	75.4	88.2	95.7	56.0	47.6	48.3	55.2	50.6	63.5	64.4	54.5	50.0	77.0	109.5
3-Jul	43.2	36.9	37.5	35.2	5.9	4.3	3.7	3.2	3.7	3.4	3.3	3.2	3.0	2.9	2.8	2.7	2.9	2.2	4.1	4.7	5.3	3.9	3.4	3.9	9.4	43.2
4-Jul	3.7	3.7	3.4	3.8	3.2	3.1	2.9	3.6	3.7	3.5	3.8	4.5	5.2	3.9	4.9	6.9	5.6	4.9	5.3	4.6	5.8	6.4	6.5	6.9	4.6	6.9
5-Jul	8.1	6.6	6.2	6.3	7.0	7.1	8.8	13.1	17.0	14.6	15.0	15.0	12.4	13.3	12.1	14.1	13.6	12.7	26.7	49.1	36.7	33.8	31.4	38.2	17.4	49.1
6-Jul	41.3	41.2	39.5	33.5	26.9	23.1	15.0	9.5	10.5	12.5	14.2	12.8	10.6	11.3	11.6	10.1	6.7	6.3	5.6	7.3	12.9	18.5	21.8	18.4	17.5	41.3
7-Jul	19.4	20.7	21.5	20.7	18.4	16.9	16.1	19.4	35.3	57.9	102.4	115.6	92.3	64.8	49.9	25.4	21.4	21.8	21.0	21.6	21.8	19.2	16.3	16.2	35.7	115.6
8-Jul	16.8	17.4	18.2	18.9	19.2	19.0	19.7	22.4	26.7	32.7	59.5	75.0	83.0	82.3	96.7	119.4	127.5	119.2	120.2	112.8	115.3	115.8	118.6	122.9	70.0	127.5
9-Jul	122.2	124.3	133.0	126.3	114.7	94.8	76.3	70.9	62.5	34.5	20.1	34.9	26.4	11.1	7.6	5.0	6.8	4.1	3.6	8.5	8.1	12.9	22.4	19.6	47.9	133.0
10-Jul	15.7	5.1	4.6	4.1	3.8	3.5	5.6	5.6	3.2	3.8	5.0	3.4	2.2	2.2	3.0	4.0	5.2	4.7	13.9	10.9	4.5	7.2	7.1	7.5	5.7	15.7
11-Jul	7.5	7.3	6.9	8.3	7.8	8.3	8.9	9.6	12.3	10.8	10.3	12.7	13.3	11.7	8.3	8.2	8.9	10.5	11.8	10.6	10.9	12.1	12.8	6.1	9.8	13.3
12-Jul	5.9	5.7	5.3	5.8	5.6	5.6	7.4	13.9	15.6	16.5	15.9	12.3	13.6	20.7	20.3	33.9	75.6	78.9	84.2	85.9	88.5	220.1	229.9	228.9	54.0	229.9
13-Jul	241.4	270.6	248.6	222.7	253.0	270.6	244.5	232.6	163.1	97.5	66.1	59.7	55.2	42.3	95.7	105.5	134.2	142.5	264.1	490.4	406.6	390.0	396.5	384.4	219.9	490.4
14-Jul	348.0	331.5	326.4	349.5	364.0	349.6	156.7	78.1	23.0	138.7	284.3	288.4	313.6	312.9	221.4	218.9	232.9	242.3	355.2	363.2	333.0	274.2	279.5	283.6	269.5	364.0
15-Jul	282.9	272.8	281.5	289.4	283.6	270.9	254.7	240.5	205.9	116.4	111.0	113.0	94.7	68.2	45.4	33.1	25.7	24.2	12.2	10.0	11.2	10.4	9.3	9.3	128.2	289.4
16-Jul	9.1	10.3	10.6	10.1	10.2	10.9	11.6	16.7	17.1	18.7	23.6	21.4	22.7	25.4	31.0	29.7	30.4	29.6	36.4	39.0	37.2	36.9	29.0	23.6	22.6	39.0
17-Jul	25.7	30.6	30.6	29.9	30.6	28.6	32.3	27.1	26.6	25.9	28.4	27.7	20.2	19.9	17.4	14.2	13.0	13.7	16.2	26.2	31.7	33.0	35.4	37.6	25.9	37.6
18-Jul	35.0	36.3	35.7	34.9	35.9	35.4	34.6	36.4	39.9	48.6	62.3	69.9	C	C	C	62.1	59.3	57.4	58.1	54.8	57.7	47.2	38.3	39.3	46.6	69.9
19-Jul	39.5	38.3	39.5	39.4	40.1	40.2	40.9	43.2	46.5	55.3	65.2	54.6	26.5	33.3	37.8	29.3	31.6	21.0	21.4	23.1	25.7	21.9	21.8	22.2	35.8	65.2
20-Jul	23.0	23.1	23.1	21.7	22.4	24.1	27.6	35.4	33.5	47.2	55.6	57.6	49.6	55.5	51.0	39.2	37.6	33.7	31.6	38.7	31.7	33.5	34.1	34.8	36.1	57.6
21-Jul	36.2	36.3	36.4	35.6	34.8	34.9	35.2	37.1	40.7	45.8	52.8	60.5	66.5	70.6	70.4	73.1	73.9	75.2	77.4	91.7	98.4	95.2	92.6	89.9	60.9	98.4
22-Jul	93.5	92.4	91.8	90.6	89.0	87.9	84.0	86.5	96.9	119.7	147.6	169.3	156.5	127.4	119.2	121.3	121.6	91.3	76.6	67.1	64.8	21.8	12.3	14.2	93.5	169.3
23-Jul	12.5	11.2	11.7	12.9	11.8	12.0	18.3	24.6	48.4	77.4	94.2	103.2	95.7	91.9	72.8	57.5	51.7	52.7	46.2	44.2	44.9	42.1	40.9	39.5	46.6	103.2
24-Jul	39.4	42.7	39.6	35.2	25.8	23.7	29.1	35.5	37.2	36.3	31.4	35.5	18.4	18.9	20.9	24.2	24.3	25.7	32.1	32.4	36.1	38.6	38.3	34.7	31.5	42.7
25-Jul	34.2	32.7	32.7	33.7	26.9	26.4	38.7	54.0	54.0	48.9	50.9	51.7	48.4	49.8	52.6	53.9	56.4	59.6	63.9	67.6	60.3	15.6	5.1	4.0	42.6	67.6
26-Jul	3.1	2.7	3.1	3.4	4.0	4.2	4.1	4.7	5.6	8.2	3.7	3.5	3.5	4.6	4.9	5.2	5.6	5.9	5.2	4.8	6.6	6.1	5.9	4.5	4.7	8.2
27-Jul	4.1	4.9	5.0	5.7	5.6	5.6	5.3	5.2	4.7	4.7	5.4	13.2	12.2	11.4	8.7	8.2	5.3	6.7	10.3	15.6	13.3	10.3	9.8	9.2	7.9	15.6
28-Jul	10.5	12.0	12.4	12.1	11.8	11.8	13.0	14.8	15.7	16.9	17.2	15.9	13.9	13.2	15.6	20.5	21.8	17.8	16.9	15.8	18.5	22.8	19.2	14.1	15.6	22.8
29-Jul	9.9	9.5	8.3	10.3	12.0	11.5	11.2	8.5	9.6	8.7	4.8	6.1	9.0	9.0	7.5	7.9	7.8	6.1	6.1	7.1	13.1	22.3	20.0	13.9	10.0	22.3
30-Jul	10.5	10.3	8.2	7.5	7.0	8.3	9.3	10.0	15.8	21.1	13.1	8.8	7.7	7.6	6.2	6.4	6.9	7.6	8.6	11.7	9.8	10.2	14.4	10.9	9.9	21.1
31-Jul	10.5	7.8	7.6	8.1	7.8	9.6	13.6	14.8	9.9	9.6	9.1	7.9	7.9	8.2	8.9	11.5	10.7	6.8	7.4	7.9	9.3	11.2	11.9	9.7	9.5	14.8
55.2 57.1 58.9 59.9 59.3 57.5 50.0 47.6 44.3 45.4 54.1 55.3 47.8 45.4 42.2 40.3 41.8 40.6 49.7 58.8 55.9 55.1 54.6 53.4																								Diurnal Average		
348.0 331.5 326.4 349.5 364.0 349.6 254.7 240.5 205.9 188.9 284.3 288.4 313.6 312.9 221.4 218.9 232.9 242.3 355.2 490.4 406.6 390.0 396.5 384.4																								Diurnal Maximum		

C - Calibration
 Alberta Ambient Air Quality Guideline/Objectives: 1-hr 80 µg/m³ 24-hr 29 µg/m³





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
0 - 5	86	11.61	11.61
6 - 15	208	28.07	39.68
16 - 25	94	12.69	52.36
26 - 80	219	29.55	81.92
> 81.0	134	18.08	100.00

Total Number of Valid Hours: 741

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	21	5	3	3	1	2	5	10	13	2	1	1	0	7	3	9	86
6 - 15	22	18	4	3	2	2	6	21	40	22	10	15	13	12	6	10	206
16 - 25	10	3	1	0	1	3	8	12	16	11	3	6	14	1	3	2	94
26 - 80	31	9	7	3	7	8	18	36	8	8	2	10	5	25	23	19	219
> 81.0	27	14	3	1	1	0	4	8	2	3	2	1	6	16	21	25	134
Totals	111	49	18	10	12	15	41	87	79	46	18	33	38	61	56	65	739

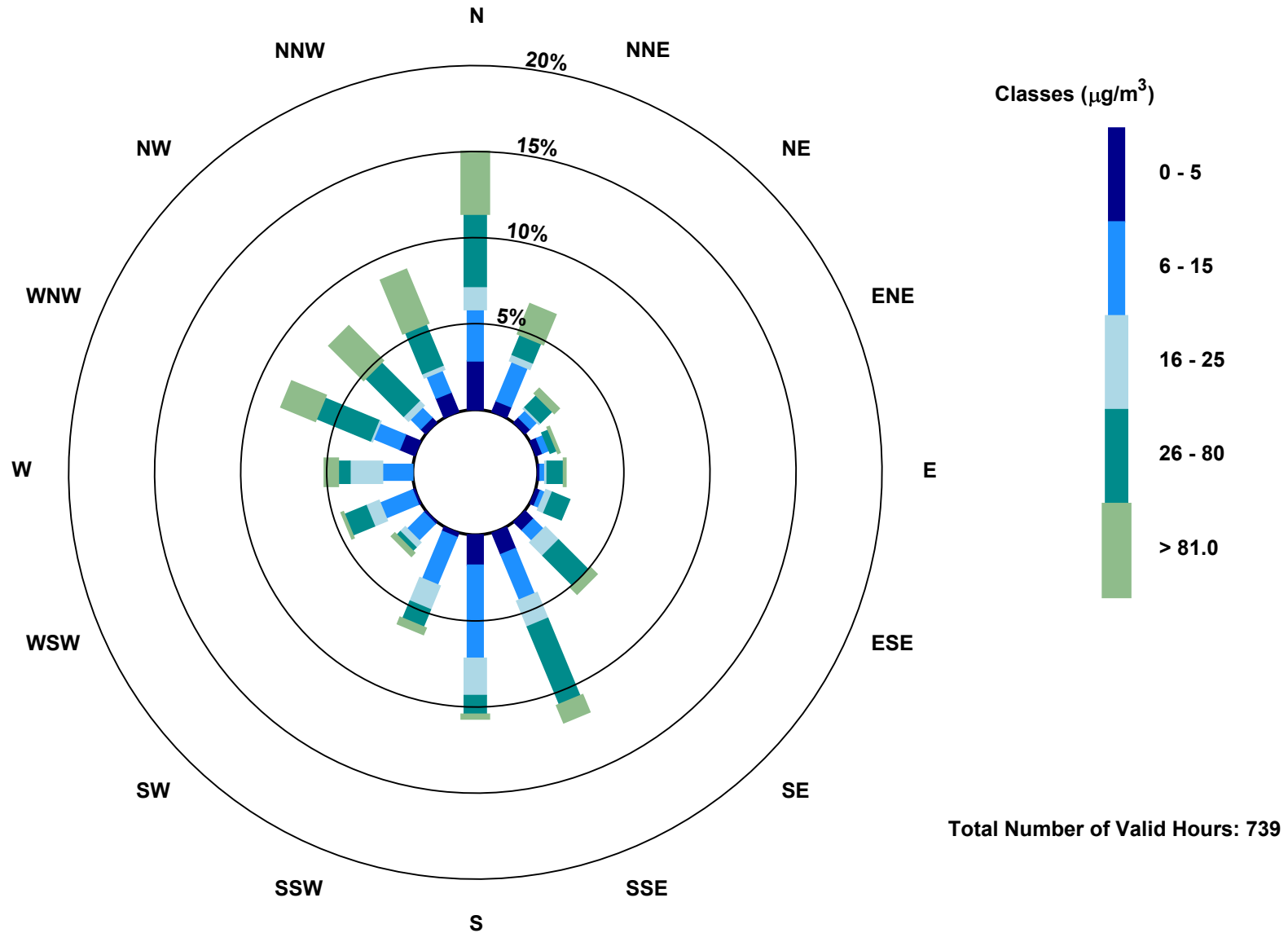
Total Number of Valid Hours: 739

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2.3 ppm on Jul 14 20:00	Maximum Daily Average: 1.4 ppm on Jul 14		Hours of Data:	708
Minimum Value: 0.2 ppm on Jul 10 02:00	Minimum Daily Average: 0.2 ppm on Jul 10		Hours of Missing Data:	36
Maximum Diurnal Average: 0.6 ppm at hour 1	Minimum Diurnal Average: 0.5 ppm at hour 16		Hours of Calibration:	35
Monthly Average: 0.52 ppm	Percentiles: P ₁ = 0.2 P ₁₀ = 0.3 Q ₁ = 0.3 Median = 0.4 Q ₃ = 0.6 P ₉₀ = 0.9 P ₉₉ = 1.9		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.5	0.7	Z	1.1	1.1	1.1	1.1	1.0	0.9	0.9	0.9	0.7	0.5	0.5	0.4	0.4	0.3	0.4	0.4	0.5	0.5	0.4	0.5	0.5	0.7	1.1
2-Jul	0.6	0.6	0.6	Z	0.7	0.7	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.7	1.0	0.6	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.6	1.0
3-Jul	0.6	0.5	0.5	0.4	Z	0.2	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	0.3	0.6
4-Jul	0.3	0.2	0.2	0.2	0.2	Z	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
5-Jul	Z	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5
6-Jul	0.4	Z	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	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.4
7-Jul	0.4	0.4	Z	0.3	0.4	0.3	0.4	0.4	0.4	0.5	0.6	0.7	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.7
8-Jul	0.3	0.3	0.3	Z	0.3	0.3	0.4	0.4	0.4	0.5	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.7	1.0
9-Jul	0.9	0.9	0.9	0.8	Z	0.6	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.9
10-Jul	0.2	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.3
11-Jul	Z	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	0.3
12-Jul	0.3	Z	0.3	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.3	0.3	0.2	0.3	0.2	0.3	0.4	0.5	0.4	0.5	0.5	1.2	1.2	1.1	0.4	1.2
13-Jul	1.2	1.2	1.1	Z	1.3	1.4	1.4	1.3	0.9	0.7	0.4	0.4	0.4	0.7	0.6	0.8	0.8	1.0	1.5	1.4	1.3	1.4	1.4	1.4	1.0	1.5
14-Jul	1.3	1.3	1.3	Z	1.5	1.4	0.8	0.5	0.3	0.8	1.4	1.5	1.6	1.7	1.2	1.3	1.4	1.4	2.2	2.3	2.1	1.8	1.9	1.9	1.4	2.3
15-Jul	1.9	1.9	1.9	1.9	Z	1.7	1.7	1.5	1.3	0.8	0.7	0.8	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.9	1.9
16-Jul	0.4	0.4	0.4	0.3	0.3	Z	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.6	0.5	0.5	0.5	0.6
17-Jul	Z	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	C	C	C	C	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
18-Jul	0.6	Z	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	M	0.7	0.7	0.6	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.6	0.7
19-Jul	0.5	0.5	Z	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7
20-Jul	0.6	0.6	0.6	Z	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.7
21-Jul	0.6	0.6	0.6	0.6	Z	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.7	0.9
22-Jul	0.9	0.9	0.8	0.8	0.8	Z	0.8	0.8	0.9	1.0	1.1	1.1	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.6	0.6	0.4	0.2	0.3	0.8	1.1
23-Jul	Z	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.6	0.7	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.8
24-Jul	0.6	Z	0.6	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.6
25-Jul	0.4	0.4	Z	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.6	0.4	0.4	0.3	0.6
26-Jul	0.3	0.3	0.3	Z	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	0.4	0.4	0.3	0.3	0.3	0.3	0.4
27-Jul	0.3	0.3	0.3	0.3	Z	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.4
28-Jul	0.3	0.3	0.3	0.3	0.3	Z	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	0.4	0.4	0.4	0.3	0.3	0.4
29-Jul	Z	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	0.4	0.4	0.3	0.3	0.4
30-Jul	0.3	Z	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.3	0.4	0.4	0.5	0.5	0.5	0.4	0.5
31-Jul	0.5	0.5	Z	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.5	0.5

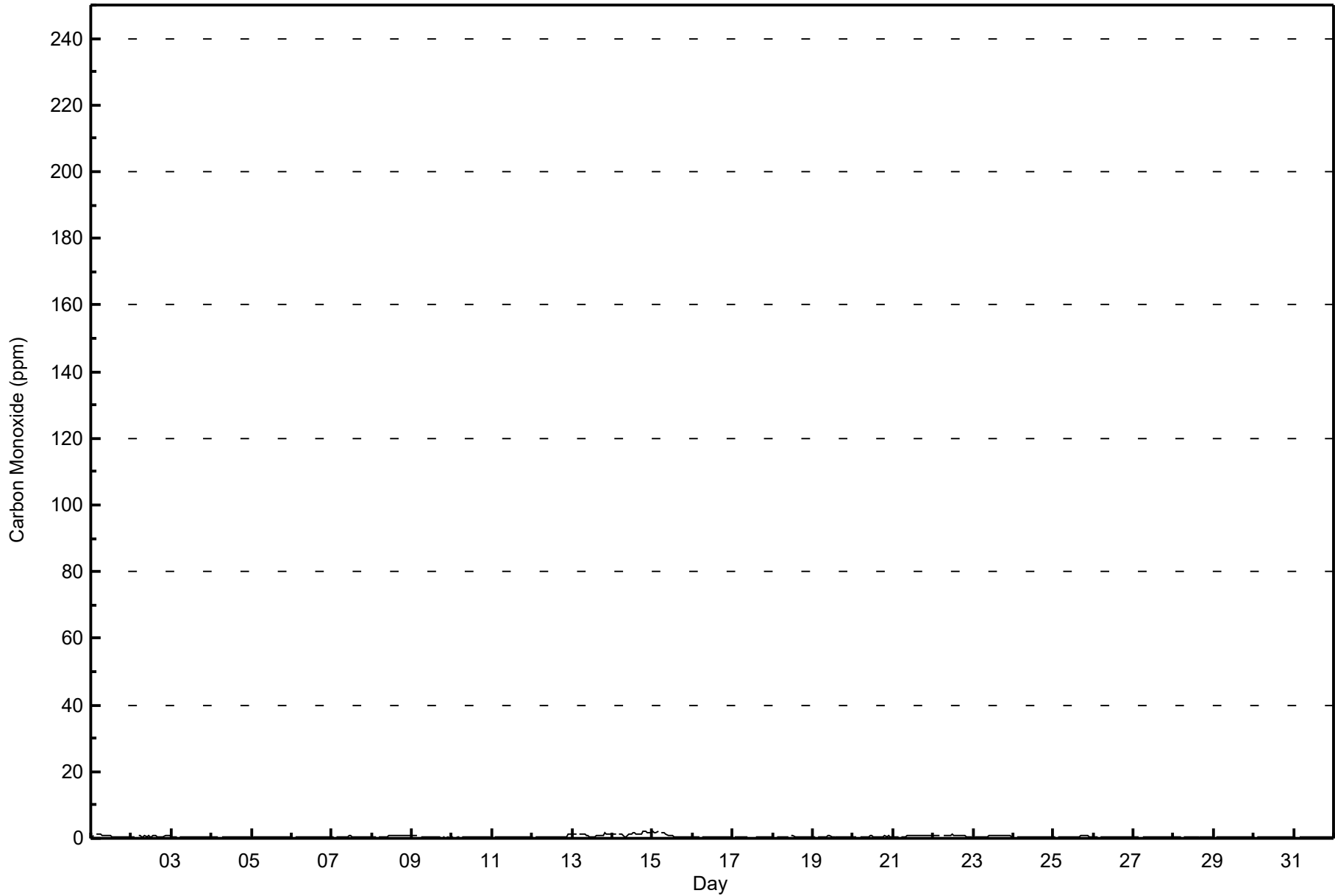
0.6	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.5	Diurnal Average
1.9	1.9	1.9	1.9	1.5	1.7	1.7	1.5	1.3	1.0	1.4	1.5	1.6	1.7	1.2	1.3	1.4	1.4	2.2	2.3	2.1	1.8	1.9	1.9	1.9	1.9	Diurnal Maximum

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 13 ppm



Wood Buffalo Environmental Association
Hourly Averages

Carbon Monoxide (CO) - ppm
Fort McKay - Bertha Ganter - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Carbon Monoxide (CO) - ppm
Fort McKay - Bertha Ganter - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	266	37.57	37.57
0.4 - 0.5	184	25.99	63.56
0.6 - 0.7	151	21.33	84.89
0.8 - 1.4	89	12.57	97.46
1.5 - 10	16	2.26	99.72
> 10	0	0.00	99.72

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Carbon Monoxide (CO) - ppm
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.3	43	27	8	6	3	5	16	31	47	16	3	10	11	13	10	15	264
0.4 - 0.5	22	4	3	1	3	3	10	27	23	19	8	16	13	10	10	12	184
0.6 - 0.7	22	4	5	2	5	5	7	19	5	6	3	4	7	23	19	15	151
0.8 - 1.4	19	10	1	1	0	2	6	7	2	3	1	1	2	7	11	16	89
1.5 - 10	1	2	0	0	0	0	0	0	0	0	0	0	0	4	3	6	16
> 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	107	47	17	10	11	15	39	84	77	44	15	31	33	57	53	64	704

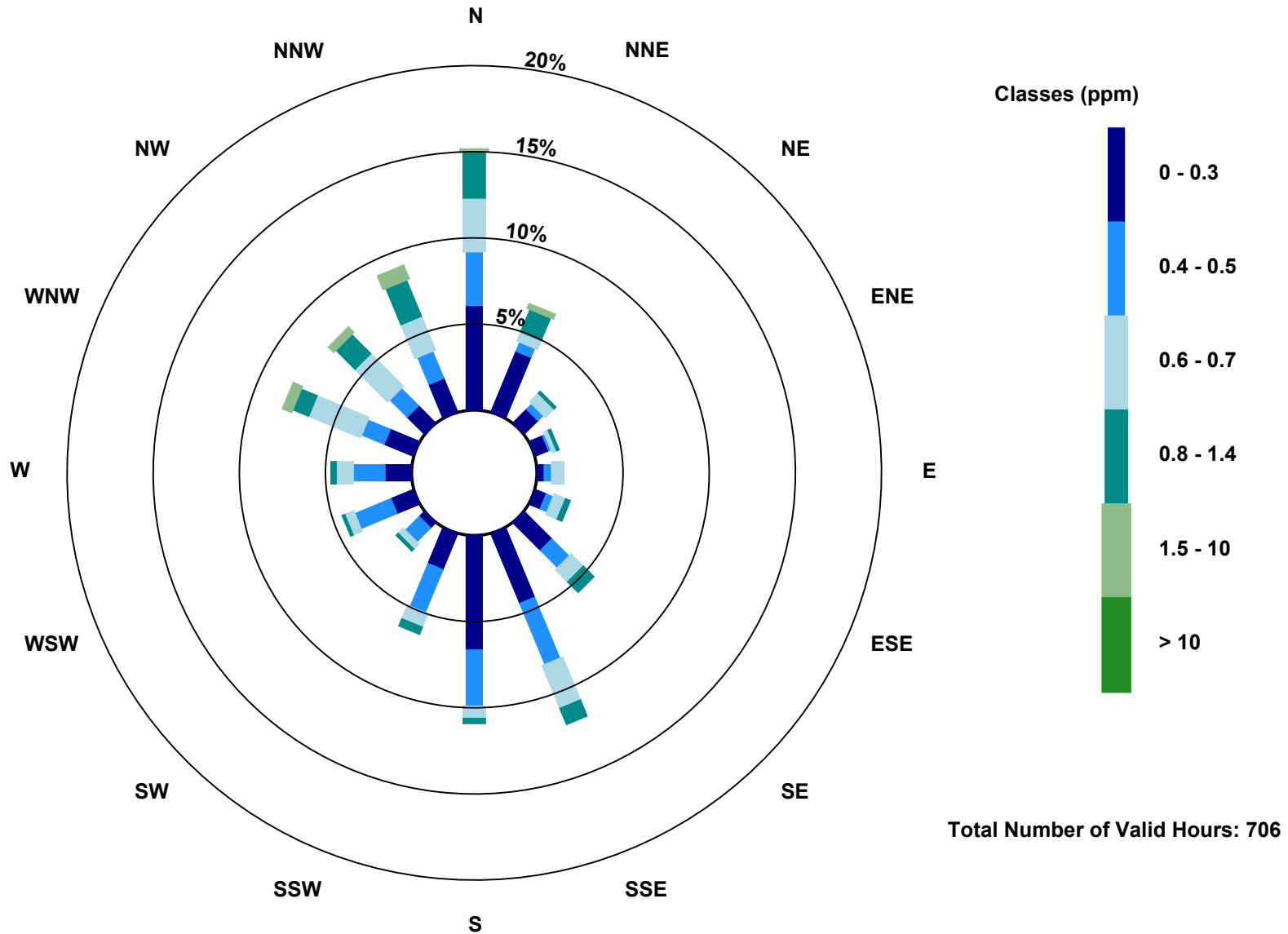
Total Number of Valid Hours: 706

Total Number of Hours: 744



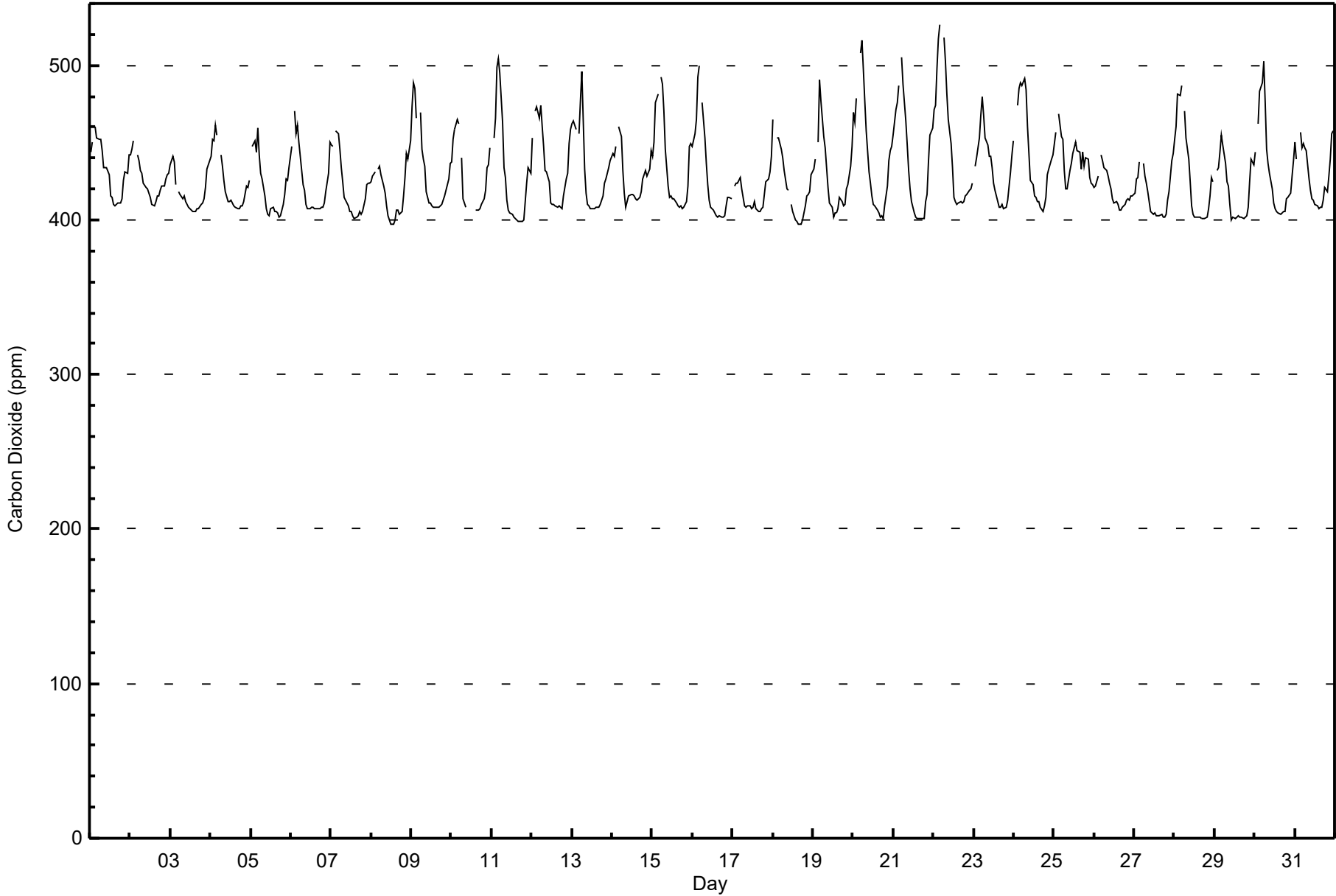
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Carbon Monoxide (CO) - ppm
Fort McKay - Bertha Ganter





Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0	Hours in Service:																	744						
Maximum Value: 526.3 ppm on Jul 22 05:00		Maximum Daily Average: 448.4 ppm on Jul 22																	Hours of Data:	707							
Minimum Value: 397.2 ppm on Jul 8 13:00		Minimum Daily Average: 416.0 ppm on Jul 17																	Hours of Missing Data:	37							
Maximum Diurnal Average: 466.9 ppm at hour 5		Minimum Diurnal Average: 407.2 ppm at hour 16																	Hours of Calibration:	36							
Monthly Average: 428.30 ppm		Percentiles: P ₁ = 399.1 P ₁₀ = 403.8 Q ₁ = 408.9 Median = 421.1 Q ₃ = 442.4 P ₉₀ = 462.8 P ₉₉ = 502.4																	Percent Operational Time:	99.9							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	443.6	449.9	Z	460.6	452.9	451.7	451.9	445.0	434.0	433.9	433.6	429.0	415.2	414.2	410.2	409.3	410.8	411.0	411.3	413.6	425.3	430.9	430.2	442.4	430.9	460.6	
2-Jul	442.3	445.9	451.3	Z	442.0	438.8	431.6	430.0	424.2	421.3	420.2	417.0	414.2	410.2	409.1	412.1	415.5	415.3	418.8	421.9	422.2	426.4	428.8	430.2	425.6	451.3	
3-Jul	435.2	441.6	437.8	422.8	Z	418.4	416.5	413.9	415.7	411.8	410.3	407.8	406.5	405.6	405.2	405.4	407.0	407.4	410.3	411.2	413.9	420.6	433.3	438.0	417.2	441.6	
4-Jul	441.4	452.4	451.1	461.1	455.0	Z	442.1	435.1	426.0	418.0	411.5	411.6	412.6	410.5	408.7	407.8	407.1	407.5	409.0	409.2	411.9	422.2	420.8	425.7	424.3	461.1	
5-Jul	Z	448.0	450.8	443.9	459.0	442.1	430.5	426.5	415.8	407.6	404.0	403.0	406.9	408.0	405.8	405.9	404.9	402.2	403.1	410.1	416.2	426.5	425.7	433.4	420.9	459.0	
6-Jul	447.8	Z	470.2	455.5	461.2	450.0	432.0	423.2	419.5	410.4	407.4	407.4	408.4	408.1	407.5	406.9	407.1	407.6	408.1	408.3	410.9	418.3	430.1	450.1	424.2	470.2	
7-Jul	448.7	448.0	Z	457.7	455.4	446.1	433.9	424.7	414.5	410.8	409.1	405.7	405.5	402.9	401.2	401.7	402.6	405.4	403.8	405.6	413.5	422.8	423.9	423.6	420.3	457.7	
8-Jul	425.0	428.2	430.9	Z	432.8	434.5	429.1	422.1	417.2	409.0	403.0	399.6	397.2	397.6	399.8	406.2	406.8	403.8	405.0	415.6	427.8	442.7	439.7	451.2	418.5	451.2	
9-Jul	473.1	488.8	484.7	465.8	Z	469.1	445.8	439.4	434.3	418.5	410.8	411.1	409.4	408.4	408.3	408.2	408.4	408.9	409.6	412.5	415.8	422.5	426.7	436.7	431.2	488.8	
10-Jul	437.4	451.9	458.7	465.2	462.6	Z	440.5	413.9	408.2	C	C	C	C	C	406.0	406.8	406.2	407.4	409.8	414.0	419.1	433.9	435.3	446.4	429.1	465.2	
11-Jul	Z	453.0	466.2	498.6	503.9	494.9	463.1	433.7	427.6	413.1	406.3	404.3	403.4	401.6	400.6	400.2	399.1	399.1	398.9	399.7	411.6	424.0	434.1	430.0	429.0	503.9	
12-Jul	452.7	Z	470.7	472.8	465.8	474.2	460.6	447.2	432.1	431.4	424.6	410.9	409.8	409.7	408.7	408.6	409.4	407.9	407.7	415.1	426.6	430.3	449.6	458.2	434.1	474.2	
13-Jul	462.1	464.3	458.6	Z	455.6	477.1	496.0	432.7	417.4	410.4	409.0	407.7	407.4	407.4	408.6	408.1	408.4	409.9	415.9	423.7	426.4	430.0	434.1	438.3	430.8	496.0	
14-Jul	443.1	440.7	447.6	Z	460.5	453.7	431.9	417.0	408.6	411.6	416.0	416.4	416.4	415.8	413.7	412.8	414.5	418.3	426.1	429.1	432.3	428.4	432.5	444.5	427.5	460.5	
15-Jul	440.9	450.5	476.2	481.6	Z	492.6	487.6	470.2	446.0	421.9	414.3	415.2	414.0	413.3	410.7	408.7	408.6	409.0	407.2	408.2	411.6	422.0	447.6	449.3	435.1	492.6	
16-Jul	447.6	456.2	465.2	492.3	499.5	Z	476.0	452.9	436.5	423.1	412.7	408.2	405.9	404.1	402.7	402.0	402.6	402.2	401.7	402.4	408.9	414.3	414.9	414.1	428.1	499.5	
17-Jul	Z	422.2	424.2	424.0	427.5	419.8	414.4	408.8	408.1	409.5	409.6	406.9	408.1	411.6	407.4	405.0	405.4	407.7	408.5	416.2	425.0	426.5	431.1	441.5	416.0	441.5	
18-Jul	465.1	Z	453.1	452.7	449.7	446.0	440.1	432.0	419.8	419.2	M	409.7	405.0	400.2	398.8	397.3	397.3	397.6	400.1	409.0	416.0	416.6	418.4	429.0	421.5	465.1	
19-Jul	432.6	439.4	Z	450.5	490.4	477.0	454.0	446.6	433.7	421.1	411.2	408.0	401.8	404.2	404.1	407.2	414.6	411.5	408.8	410.1	420.5	422.9	435.1	447.1	428.4	490.4	
20-Jul	469.3	463.3	478.6	Z	508.3	516.3	497.3	476.8	457.4	431.0	423.5	415.5	410.3	408.9	406.5	404.5	401.7	402.3	400.8	409.5	421.7	438.7	444.6	447.8	440.6	516.3	
21-Jul	455.0	471.7	475.6	487.2	Z	505.6	487.6	463.9	448.8	432.4	419.7	411.7	404.6	401.5	400.6	400.9	401.0	400.5	400.7	411.9	416.6	437.2	454.6	459.9	436.9	505.6	
22-Jul	471.4	473.7	497.9	516.8	526.3	Z	518.5	502.4	481.5	464.6	449.4	434.0	414.9	411.8	409.9	410.7	411.7	411.0	411.5	415.2	416.7	419.4	419.9	423.6	448.4	526.3	
23-Jul	Z	434.3	440.4	453.5	467.7	479.7	467.5	452.7	448.3	441.4	440.9	433.8	423.8	419.1	411.8	408.1	408.4	410.3	407.3	408.6	412.7	422.4	431.5	442.0	433.3	479.7	
24-Jul	450.9	Z	474.4	484.9	488.7	487.2	491.8	484.0	460.2	443.1	425.8	423.3	415.4	415.0	412.2	411.5	408.0	405.6	409.0	414.6	429.5	433.3	439.7	441.7	441.3	491.8	
25-Jul	449.0	456.7	Z	468.4	453.8	452.3	432.0	420.0	420.1	431.7	443.0	443.0	446.5	450.0	444.6	443.7	433.2	444.1	434.5	440.3	439.5	427.1	423.6	422.5	439.7	468.4	
26-Jul	421.0	422.3	428.1	Z	441.9	438.2	434.2	431.6	428.6	423.9	420.0	414.1	410.8	411.9	409.8	406.0	406.6	408.0	410.4	412.9	413.9	413.0	415.1	415.1	419.0	441.9	
27-Jul	417.0	426.9	427.8	437.3	Z	436.4	428.6	424.0	418.5	412.1	405.8	403.4	404.2	402.9	403.1	403.2	403.4	401.9	401.5	403.6	413.1	418.6	438.7	443.1	416.3	443.1	
28-Jul	452.2	460.3	481.8	480.2	486.8	Z	470.3	453.2	439.5	424.2	409.3	403.6	401.3	401.4	401.4	402.0	401.3	401.1	401.0	402.1	407.0	416.0	427.9	424.3	428.2	486.8	
29-Jul	Z	432.1	434.2	443.8	454.9	448.2	436.9	424.8	421.9	409.6	400.3	401.6	401.1	401.4	402.4	402.0	401.8	401.2	401.6	402.3	408.2	424.9	439.4	435.6	418.7	454.9	
30-Jul	443.7	Z	462.5	483.1	489.0	502.4	475.8	445.5	436.3	430.3	419.8	410.7	406.9	405.3	404.2	403.6	404.8	405.7	405.8	414.1	414.8	417.4	428.0	438.7	432.5	502.4	
31-Jul	450.3	439.1	Z	456.3	447.0	449.3	446.7	444.5	426.3	419.4	413.7	413.0	409.8	409.0	407.4	408.0	408.1	412.3	421.3	418.5	428.4	439.6	456.1	457.6	429.6	457.6	
		446.9	448.5	457.6	464.7	466.9	461.6	453.7	439.9	429.9	422.2	416.5	412.9	409.9	409.1	407.5	407.2	407.3	407.9	408.7	412.6	418.6	425.5	432.6	438.1	Diurnal Average	
		473.1	488.8	497.9	516.8	526.3	516.3	518.5	502.4	481.5	464.6	449.4	443.0	446.5	450.0	444.6	443.7	433.2	444.1	434.5	440.3	439.5	442.7	456.1	459.9	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance																					





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Carbon Dioxide (CO₂) - ppm
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
400 - 420	338	47.81	47.81
420 - 440	165	23.34	71.15
440 - 460	113	15.98	87.13
460 - 480	45	6.36	93.49
480 - 500	25	3.54	97.03
> 500	9	1.27	98.30

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Carbon Dioxide (CO₂) - ppm
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
400 - 420	74	34	13	9	5	12	22	48	32	25	5	9	7	11	13	19	338
420 - 440	21	8	3	0	2	0	15	19	20	7	1	9	9	15	14	22	165
440 - 460	6	4	0	0	3	2	3	9	15	7	6	2	7	17	15	17	113
460 - 480	3	2	1	0	0	1	1	1	2	2	3	6	2	10	9	2	45
480 - 500	1	0	0	0	0	0	0	3	2	2	0	4	5	3	2	2	24
> 500	1	0	0	0	0	0	0	1	2	1	0	0	1	1	1	0	8
Totals	106	48	17	9	10	15	41	81	73	44	15	30	31	57	54	62	693

Total Number of Valid Hours: 705

Total Number of Hours: 744



Number of Exceedences (AAAQO): 1-hr: 0	Hours in Service: 744
Maximum Value: 114.1 ppb on Jul 14 20:00	Maximum Daily Average: 60.0 ppb on Jul 14
Minimum Value: 0.0 ppb on Jul 1 03:00	Hours of Data: 652
Maximum Diurnal Average: 6.3 ppb at hour 5	Hours of Missing Data: 92
Monthly Average: 4.00 ppb	Hours of Calibration: 44
Minimum Daily Average: 0.0 ppb on Jul 2	Percent Operational Time: 93.6
Minimum Diurnal Average: 1.1 ppb at hour 3	
Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 11.1 P ₉₉ = 82.9	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	RE	0.0	10.4	11.3	11.0	10.2	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	1.9	11.3	
2-Jul	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
3-Jul	0.0	0.0	Z	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	Z	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	Z	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	Z	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-Jul	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
8-Jul	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	10.4	11.2	11.2	11.4	11.2	11.5	11.5	11.8	11.7	4.6	11.8	
9-Jul	11.1	10.7	Z	RE	10.3	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	1.5	11.1	
10-Jul	0.0	0.0	0.0	Z	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	Z	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	Z	RE	0.0	0.0	0.0	0.0	C	C	C	C	C	C	0.0	0.0	0.0	0.0	0.0	21.6	29.9	24.3	--	29.9
13-Jul	Z	RE	21.0	19.3	22.4	24.2	19.0	20.8	20.0	15.6	C	C	C	C	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	51.1	
14-Jul	30.9	Z	RE	27.2	26.0	25.4	19.7	15.5	11.1	17.0	44.5	61.4	66.8	77.1	74.1	73.9	73.3	74.1	102.2	114.1	101.1	95.7	99.1	89.2	60.0	114.1	
15-Jul	86.5	79.5	Z	RE	51.3	44.3	39.8	37.5	35.8	29.7	27.4	28.8	28.9	25.0	21.3	18.1	15.7	14.0	11.7	10.3	0.0	0.0	0.0	0.0	27.5	86.5	
16-Jul	0.0	0.0	0.0	Z	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	Z	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	11.5	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	0.5	11.5	
19-Jul	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
20-Jul	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
21-Jul	0.0	0.0	Z	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	Z	RE	0.0	0.0	0.0	0.0	0.0	0.0	10.8	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	10.8	0.0
23-Jul	0.0	0.0	0.0	0.0	Z	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	Z	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-Jul	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
26-Jul	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
27-Jul	0.0	0.0	Z	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	Z	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	UO	UO	UO	UO	UO	UO	UO	--	0.0
29-Jul	UO	UO	UO	UO	UO	UO	UO	UO	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	Z	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31-Jul	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

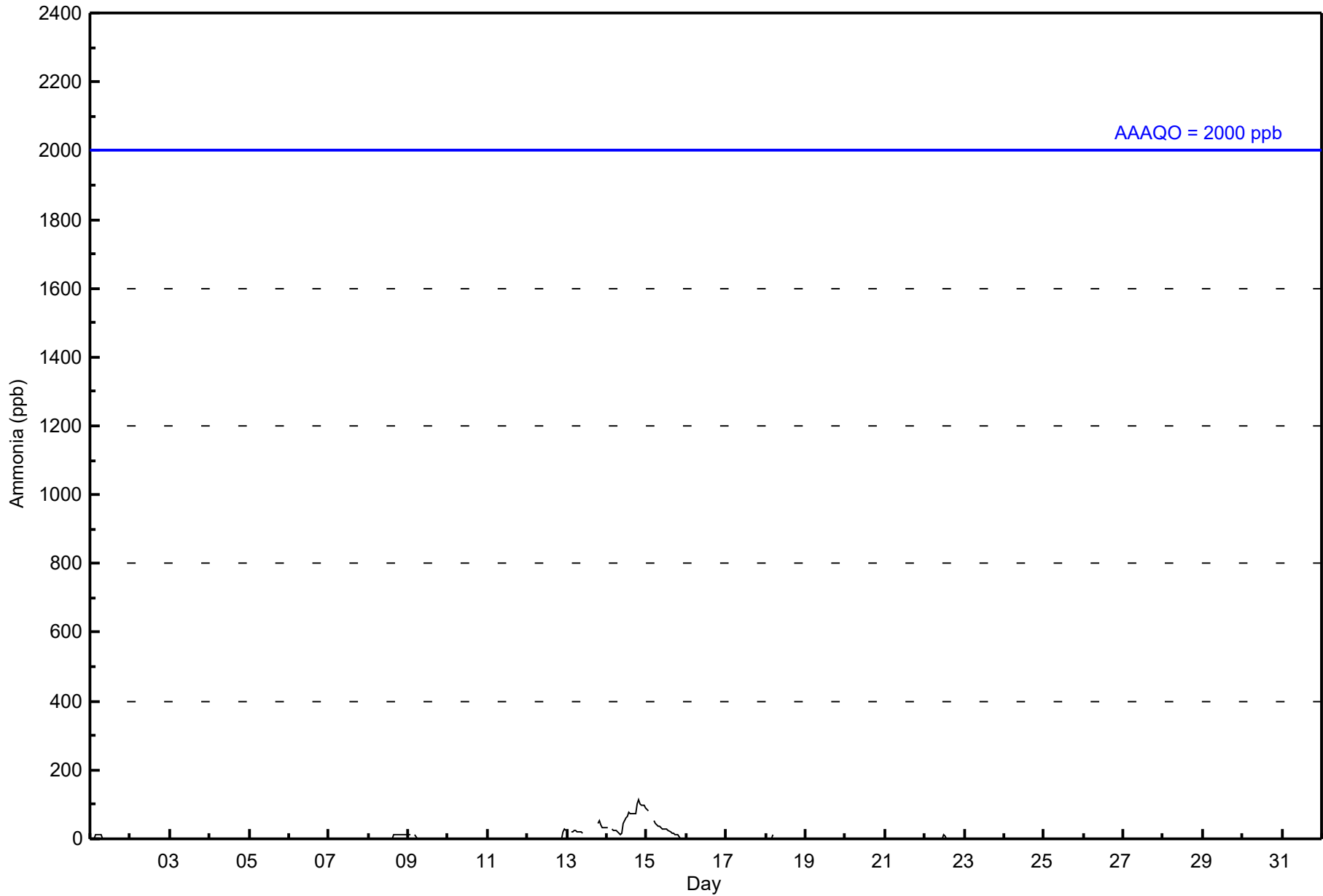
5.4	4.7	1.1	3.0	6.3	5.0	3.5	2.5	2.2	2.0	2.6	3.5	3.6	3.5	3.3	3.5	3.3	3.4	5.7	6.2	5.1	5.4	5.8	5.3	Diurnal Average	
86.5	79.5	21.0	27.2	51.3	44.3	39.8	37.5	35.8	29.7	44.5	61.4	66.8	77.1	74.1	73.9	73.3	74.1	102.2	114.1	101.1	95.7	99.1	89.2	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation RE - Recovery
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb



Wood Buffalo Environmental Association
Hourly Averages

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	576	88.34	88.34
6 - 10	6	0.92	89.26
11 - 15	17	2.61	91.87
16 - 20	9	1.38	93.25
21 - 25	9	1.38	94.63
> 26	35	5.37	100.00

Total Number of Valid Hours: 652

Total Number of Hours: 744



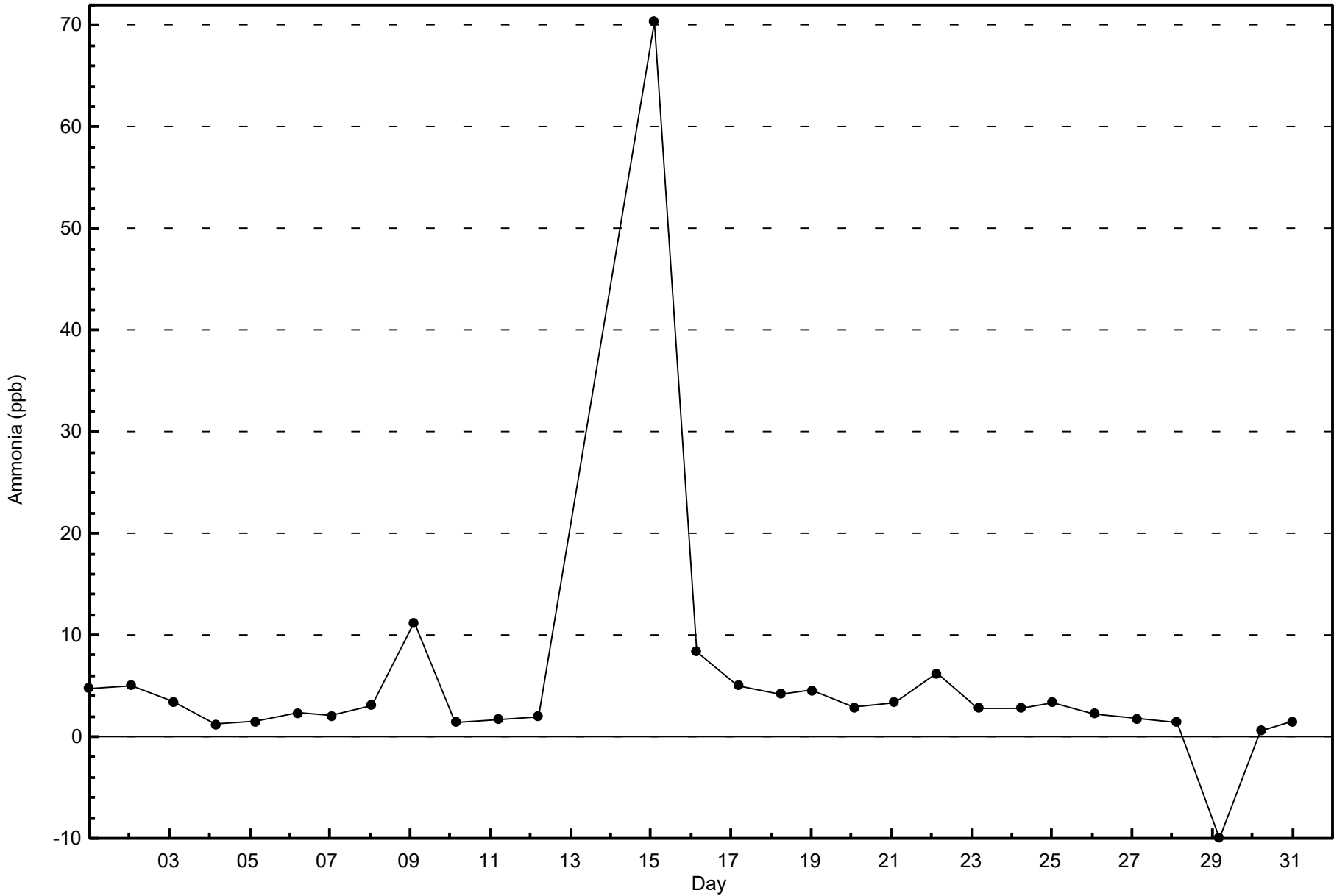
Wood Buffalo Environmental Association
Frequency Distribution

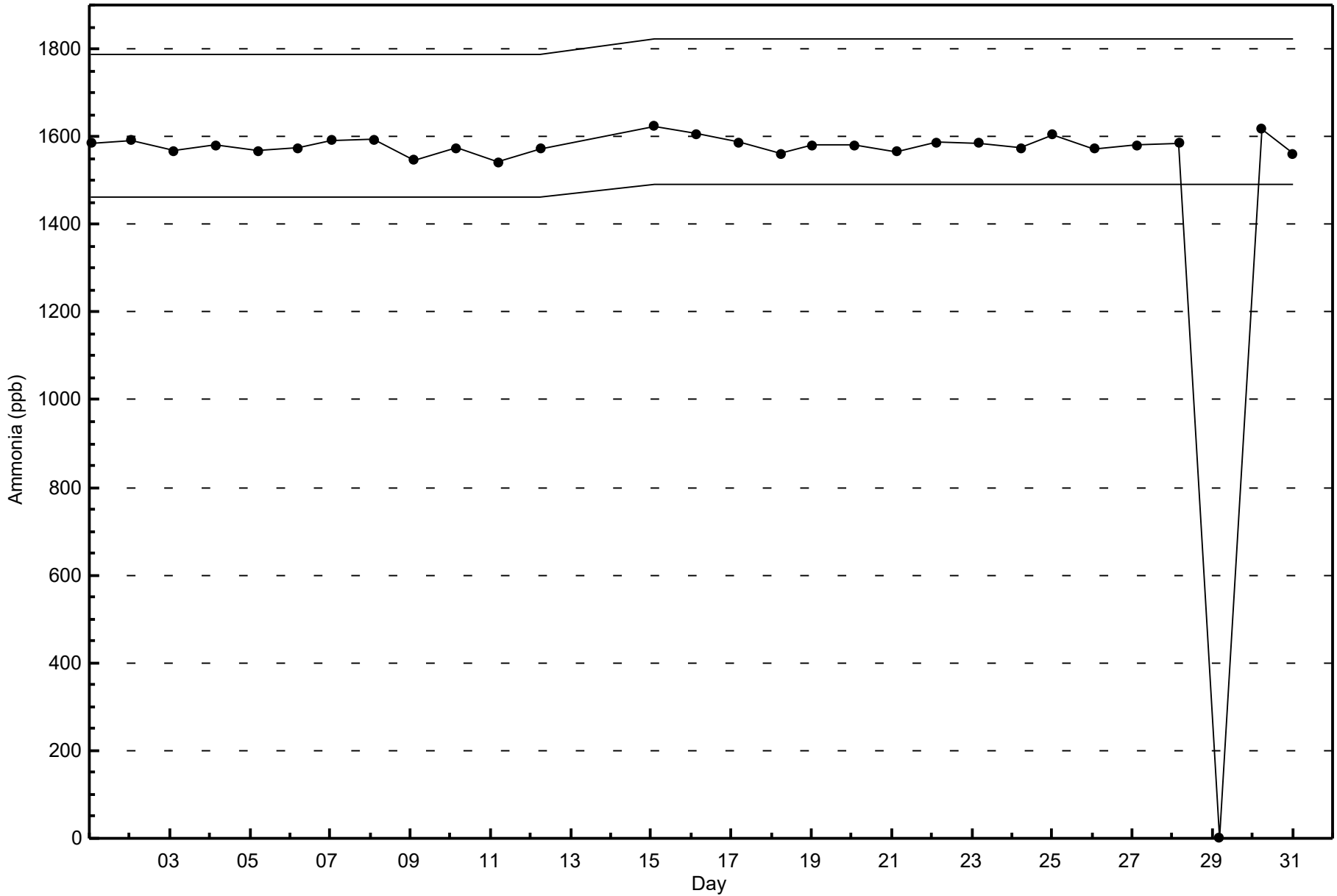
Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	76	38	9	8	12	15	41	82	56	42	16	26	30	47	40	38	576
6 - 10	1	1	0	1	0	0	0	0	1	0	0	1	0	0	0	1	6
11 - 15	5	1	1	1	0	0	0	0	1	1	0	0	0	2	1	4	17
16 - 20	3	1	2	0	0	0	0	0	0	0	0	0	1	0	0	2	9
21 - 25	0	0	2	0	0	0	0	0	0	0	1	0	0	0	3	3	9
> 26	6	6	3	0	0	0	0	0	0	0	0	0	0	3	5	12	35
Totals	91	47	17	10	12	15	41	82	58	43	17	27	31	52	49	60	652

Total Number of Valid Hours: 652

Total Number of Hours: 744



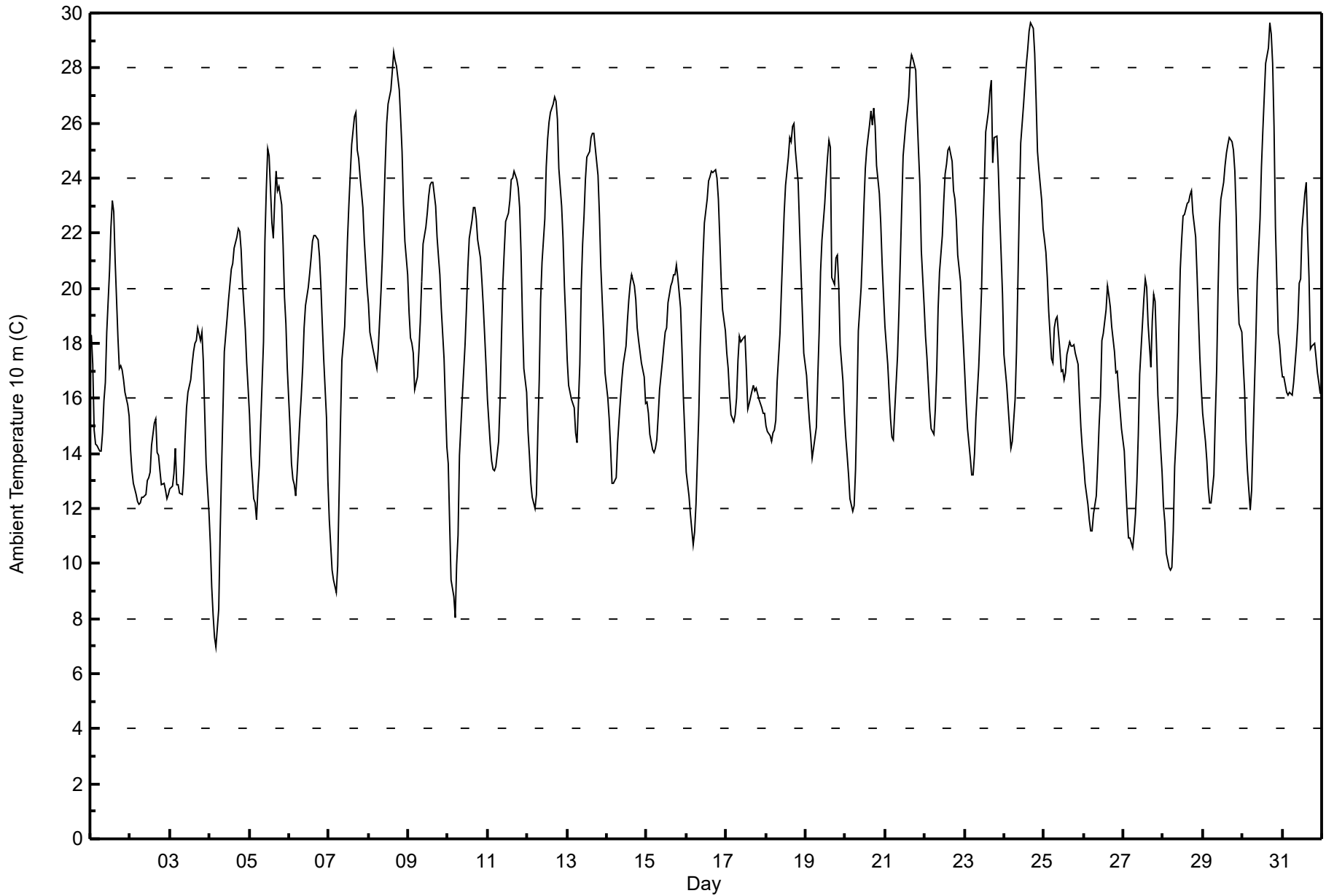




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature 10 m (AT 10m) - C
Fort McKay - Bertha Ganter - July 2023

Maximum Value: 29.7 C on Jul 30 17:00 Minimum Value: 7.0 C on Jul 4 05:00 Maximum Diurnal Average: 23.3 C at hour 16 Monthly Average: 18.59 C		Maximum Daily Average: 22.9 C on Jul 8 Minimum Daily Average: 13.2 C on Jul 2 Minimum Diurnal Average: 13.0 C at hour 5 Percentiles: P ₁ = 9.3 P ₁₀ = 12.8 Q ₁ = 15.1 Median = 18.1 Q ₃ = 22.2 P ₉₀ = 25.0 P ₉₉ = 28.6		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 Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	18.3	17.2	14.8	14.4	14.3	14.1	14.1	14.7	15.9	16.6	18.4	20.7	22.2	23.2	22.8	21.0	18.2	17.1	17.2	17.0	16.7	16.2	15.8	15.3	17.3	23.2																						
2-Jul	14.1	13.4	12.9	12.5	12.3	12.1	12.2	12.4	12.4	12.5	13.0	13.1	13.3	14.3	15.1	15.3	14.0	13.9	13.4	12.9	12.9	12.7	12.4	12.5	13.2	15.3																						
3-Jul	12.7	12.8	13.3	14.2	12.9	12.9	12.6	12.5	13.3	14.6	15.7	16.2	16.7	17.2	17.7	18.0	18.1	18.6	18.1	18.4	17.3	15.4	13.6	11.9	15.2	18.6																						
4-Jul	10.7	9.2	8.2	7.3	7.0	8.3	11.0	13.4	15.5	17.7	18.9	19.6	20.1	20.7	20.9	21.5	21.8	22.2	22.1	21.4	20.2	18.5	17.3	16.4	16.2	22.2																						
5-Jul	15.4	13.9	12.3	12.2	11.6	12.7	13.6	15.1	18.1	21.7	23.6	25.1	24.8	22.4	21.8	23.2	24.3	23.6	23.7	23.0	21.5	19.7	18.7	17.1	19.1	25.1																						
6-Jul	14.9	13.6	13.0	12.9	12.4	13.3	15.2	16.1	17.2	18.6	19.4	20.0	20.6	21.1	21.7	21.9	21.9	21.8	21.1	20.1	18.7	17.4	15.3	13.0	17.6	21.9																						
7-Jul	11.6	10.7	9.7	9.4	8.9	9.9	12.5	15.1	17.4	18.6	20.1	21.8	23.0	24.2	25.2	26.3	26.4	25.0	24.7	24.1	22.9	21.8	20.9	20.1	18.8	26.4																						
8-Jul	19.4	18.4	17.8	17.6	17.3	17.1	17.8	19.9	21.2	22.9	24.6	26.0	26.7	27.2	27.9	28.6	28.3	28.1	27.2	26.1	25.0	23.1	21.7	20.5	22.9	28.6																						
9-Jul	19.1	18.2	18.0	17.6	16.3	16.8	17.7	18.7	20.3	21.6	22.2	22.7	23.3	23.8	23.9	23.8	23.0	21.9	21.2	20.5	19.3	17.4	15.8	14.2	19.9	23.9																						
10-Jul	13.6	11.4	9.4	8.8	8.0	10.0	11.0	13.9	16.0	17.0	18.0	19.3	20.8	21.8	22.5	22.9	22.9	22.5	21.8	21.1	20.3	19.3	18.3	17.2	17.0	22.9																						
11-Jul	16.0	14.3	13.7	13.4	13.4	13.5	14.4	15.9	18.1	20.2	21.4	22.4	22.7	23.2	23.9	24.0	24.2	23.9	23.6	22.9	21.3	18.9	17.1	16.2	19.1	24.2																						
12-Jul	14.8	13.9	12.9	12.4	12.0	12.5	14.7	16.7	19.6	21.0	22.5	24.4	25.4	26.0	26.4	26.7	26.9	26.8	26.1	24.4	23.0	21.8	20.1	18.8	20.4	26.9																						
13-Jul	17.4	16.5	16.0	15.8	15.6	14.7	14.4	17.2	20.0	21.6	22.6	23.9	24.7	25.0	25.5	25.6	25.6	25.1	24.1	22.7	20.8	19.6	18.4	16.9	20.4	25.6																						
14-Jul	16.0	15.3	14.2	12.9	12.9	13.1	14.4	15.2	16.0	16.7	17.3	17.9	18.8	19.6	20.1	20.5	20.1	19.6	18.6	18.1	17.7	17.3	16.8	15.8	16.9	20.5																						
15-Jul	15.9	15.5	14.7	14.1	14.0	14.2	14.5	15.3	16.3	17.4	17.9	18.4	18.6	19.5	20.1	20.2	20.5	20.5	20.9	20.4	19.2	17.7	16.0	14.7	17.4	20.9																						
16-Jul	13.3	12.5	11.8	11.2	10.7	11.2	12.1	15.4	17.8	19.6	21.1	22.4	23.2	23.9	24.0	24.3	24.2	24.3	24.0	23.2	21.8	20.3	19.2	18.4	18.8	24.3																						
17-Jul	17.6	17.1	16.1	15.4	15.1	15.4	16.0	17.4	18.3	18.1	18.2	18.3	17.0	15.6	15.8	16.3	16.5	16.2	16.4	16.2	16.0	15.6	15.4	15.4	16.5	18.3																						
18-Jul	15.0	14.8	14.7	14.5	14.8	14.9	15.2	16.6	18.4	19.9	21.3	22.7	23.7	24.8	25.5	25.3	25.9	26.0	25.0	23.8	22.2	20.6	19.1	17.7	20.1	26.0																						
19-Jul	16.8	15.9	15.2	14.6	13.8	14.2	15.0	16.7	18.4	20.6	21.8	23.1	24.0	24.7	25.4	25.1	20.4	20.1	21.1	21.2	20.1	18.0	16.7	15.4	19.1	25.4																						
20-Jul	14.6	13.9	13.2	12.3	11.9	12.1	13.4	15.8	18.4	20.0	21.5	23.0	24.3	25.1	25.9	26.5	25.9	26.5	25.9	24.4	23.5	22.4	20.9	19.7	20.1	26.5																						
21-Jul	18.6	17.2	16.2	15.3	14.6	14.5	15.6	17.5	19.2	21.1	23.0	24.8	26.0	26.5	26.9	28.1	28.5	28.3	27.9	26.3	25.0	23.7	21.4	19.4	21.9	28.5																						
22-Jul	18.3	17.5	16.5	15.5	14.9	14.7	15.6	17.0	19.3	20.6	21.9	23.2	24.2	24.5	25.0	25.1	24.6	23.5	23.3	22.5	21.2	20.2	19.0	18.0	20.3	25.1																						
23-Jul	16.9	15.8	14.9	13.9	13.2	13.2	14.0	15.3	17.2	18.5	19.9	22.2	23.8	25.7	26.5	27.2	27.5	24.6	25.5	24.3	22.7	21.3	19.8	20.4	27.5																							
24-Jul	17.6	16.5	15.7	15.0	14.2	14.4	16.0	17.7	20.3	22.9	25.3	26.6	27.4	28.1	28.7	29.3	29.6	29.4	28.5	26.8	25.0	24.3	23.2	22.2	22.7	29.6																						
25-Jul	21.8	21.3	20.4	19.2	17.4	17.3	18.6	18.9	18.9	17.7	17.0	17.0	16.7	16.9	17.6	18.1	17.9	17.9	17.9	17.6	17.3	16.0	15.0	14.2	17.9	21.8																						
26-Jul	13.6	12.9	12.1	11.6	11.2	11.2	11.8	12.5	13.7	15.0	16.1	18.1	18.4	19.2	20.1	19.7	19.3	18.6	17.7	16.9	17.0	16.2	15.6	14.9	15.6	20.1																						
27-Jul	14.1	12.9	11.8	10.9	10.9	10.6	11.1	11.8	13.0	14.6	16.9	18.7	19.6	20.3	20.1	18.7	17.1	18.8	19.8	19.5	18.0	16.1	14.2	13.3	15.5	20.3																						
28-Jul	12.1	11.5	10.4	9.8	9.8	9.8	11.2	13.5	15.5	18.5	20.7	21.7	22.6	22.7	23.1	23.1	23.4	23.6	22.7	21.9	20.5	18.9	17.5	16.4	17.5	23.6																						
29-Jul	15.5	14.4	13.7	12.8	12.2	12.2	13.2	15.2	17.1	20.0	22.2	23.2	23.9	24.5	24.9	25.2	25.5	25.3	25.0	24.2	22.6	20.0	18.7	18.4	19.6	25.5																						
30-Jul	17.2	16.2	14.4	13.4	11.9	12.6	14.5	16.4	18.2	20.3	22.5	24.4	25.7	26.9	28.2	28.7	29.7	29.2	28.2	25.9	22.2	18.4	18.0	17.3	20.9	29.7																						
31-Jul	16.8	16.8	16.2	16.1	16.2	16.2	16.1	16.6	17.9	18.8	20.2	20.3	22.2	23.4	23.8	22.0	20.4	17.8	17.9	18.0	17.5	16.9	16.6	16.2	18.4	23.8																						
																								15.8	14.9	14.0	13.5	13.0	13.2	14.2	15.7	17.4	18.9	20.2	21.3	22.1	22.6	23.1	23.3	23.0	22.6	22.3	21.5	20.4	18.9	17.7	16.7	Diurnal Average
																								21.8	21.3	20.4	19.2	17.4	17.3	18.6	19.9	21.2	22.9	25.3	26.6	27.4	28.1	28.7	29.3	29.7	29.4	28.5	26.8	25.0	24.3	23.2	22.2	Diurnal Maximum





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature 10 m (AT 10m) - C
Fort McKay - Bertha Ganter - July 2023

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	16	2.15	2.15
10 - 20	441	59.27	61.42
> 20	287	38.58	100.00

Total Number of Valid Hours: 744

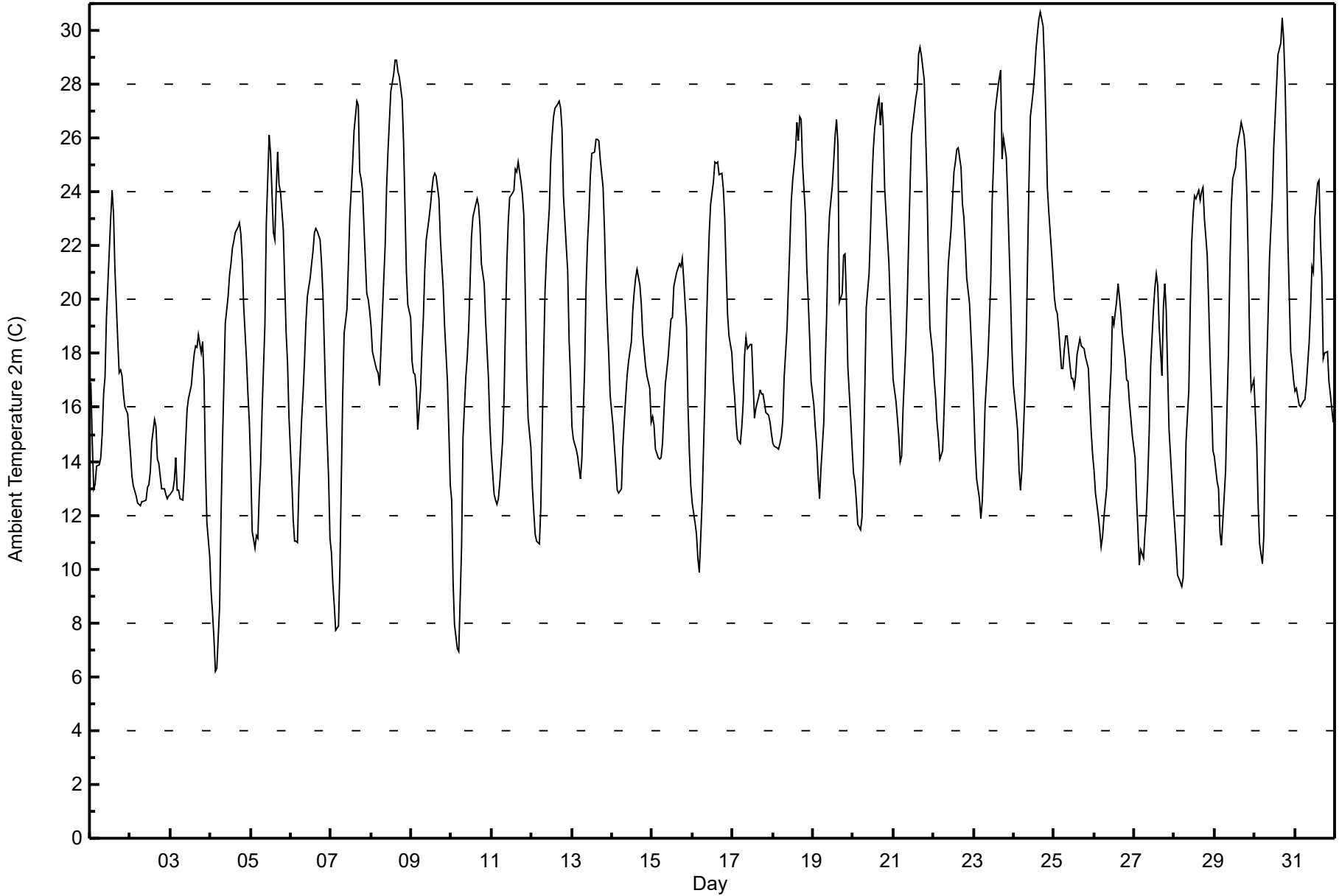
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature 2m (AT 2m) - C
Fort McKay - Bertha Ganter - July 2023

Maximum Value: 30.7 C on Jul 24 17:00 Maximum Daily Average: 23.0 C on Jul 8																						Hours in Service:	744																							
Minimum Value: 6.2 C on Jul 4 04:00 Minimum Daily Average: 13.3 C on Jul 2																						Hours of Data:	744																							
Maximum Diurnal Average: 23.9 C at hour 16 Minimum Diurnal Average: 12.3 C at hour 5																						Hours of Missing Data:	0																							
Monthly Average: 18.62 C Percentiles: P ₁ = 8.1 P ₁₀ = 12.5 Q ₁ = 14.7 Median = 18.1 Q ₃ = 22.6 P ₉₀ = 25.6 P ₉₉ = 29.3																						Hours of Calibration:	0																							
																						Percent Operational Time:	100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																						
1-Jul	16.9	14.7	13.0	13.2	13.8	13.9	14.2	15.0	16.5	17.1	19.3	21.8	23.0	24.1	23.2	21.1	18.5	17.3	17.4	17.2	16.5	16.0	15.8	15.0	17.3	24.1																				
2-Jul	14.3	13.4	13.1	12.7	12.5	12.4	12.4	12.5	12.5	12.6	13.0	13.2	13.6	14.7	15.6	15.3	14.1	14.0	13.4	13.0	13.0	12.8	12.6	12.7	13.3	15.6																				
3-Jul	12.8	12.9	13.3	14.1	12.9	12.9	12.6	12.6	13.5	14.8	15.9	16.4	16.8	17.5	18.0	18.3	18.3	18.7	18.0	18.5	17.0	13.8	11.7	10.5	15.1	18.7																				
4-Jul	9.1	8.4	7.4	6.2	6.3	8.6	12.0	14.7	16.8	19.1	20.1	20.9	21.4	21.9	22.2	22.5	22.7	22.9	22.4	21.5	19.8	17.8	16.5	15.5	16.5	22.9																				
5-Jul	13.8	11.4	10.8	11.2	11.1	12.7	13.9	15.8	19.1	22.9	24.5	26.1	25.4	22.5	22.2	24.1	25.5	24.3	24.0	22.6	20.6	18.7	17.7	15.7	19.0	26.1																				
6-Jul	13.3	11.8	11.0	11.0	11.0	13.1	15.6	16.5	17.8	19.2	20.1	20.8	21.3	21.8	22.5	22.7	22.6	22.2	21.4	20.2	18.3	16.3	13.4	11.2	17.3	22.7																				
7-Jul	10.6	9.5	8.7	7.7	7.9	10.1	13.3	16.5	18.7	19.7	21.3	23.1	24.1	25.0	26.3	27.4	27.2	24.8	24.5	24.1	21.5	20.2	20.0	19.6	18.8	27.4																				
8-Jul	19.0	18.1	17.6	17.4	17.3	16.8	18.1	20.8	22.0	24.2	25.5	26.6	27.8	28.4	28.9	28.9	28.5	28.3	27.4	25.8	23.5	21.0	19.8	19.3	23.0	28.9																				
9-Jul	17.7	17.3	17.2	16.7	15.2	16.7	18.2	19.4	21.1	22.2	23.0	23.5	24.1	24.6	24.7	24.6	23.7	22.3	21.3	20.4	19.0	16.9	15.1	13.1	19.9	24.7																				
10-Jul	12.5	9.5	7.9	7.0	6.9	8.9	10.8	14.9	17.1	17.9	18.9	20.6	22.3	23.1	23.6	23.8	23.5	22.8	21.4	20.6	19.2	18.1	17.1	15.4	16.8	23.8																				
11-Jul	14.3	12.8	12.6	12.4	12.6	13.2	14.8	16.3	19.0	21.4	22.9	23.8	24.0	24.0	24.9	24.7	25.1	24.4	23.9	23.1	20.3	17.5	15.6	14.5	19.1	25.1																				
12-Jul	13.1	12.2	11.3	11.1	10.9	12.3	15.2	17.8	20.4	21.7	23.4	25.2	26.1	26.8	27.1	27.3	27.4	27.1	26.3	23.8	21.9	21.0	18.5	17.1	20.2	27.4																				
13-Jul	15.3	14.8	14.4	14.2	13.7	13.4	14.1	17.5	20.5	22.1	23.2	24.6	25.4	25.5	25.9	26.0	25.9	25.2	24.2	22.6	20.5	19.2	17.9	16.5	20.1	26.0																				
14-Jul	15.4	14.6	13.8	12.9	12.8	13.0	14.6	15.5	16.4	17.2	17.7	18.5	19.6	20.3	20.8	21.1	20.6	19.9	18.7	18.1	17.6	17.2	16.7	15.5	17.0	21.1																				
15-Jul	15.7	15.3	14.5	14.2	14.1	14.1	14.7	15.8	16.8	17.9	18.6	19.3	20.5	21.0	21.2	21.3	21.2	21.6	20.7	19.0	16.1	14.4	13.1	17.5	21.6	21.6																				
16-Jul	12.5	11.7	11.3	10.4	9.9	11.2	12.5	16.5	18.9	20.8	22.4	23.6	24.4	25.1	25.1	25.1	24.6	24.7	24.1	23.0	21.1	19.4	18.7	18.0	19.0	25.1																				
17-Jul	17.0	16.4	15.4	14.8	14.6	15.3	16.1	17.9	18.6	18.2	18.3	18.4	17.0	15.6	15.9	16.4	16.7	16.5	16.5	16.2	15.8	15.7	15.4	15.0	16.4	18.6																				
18-Jul	14.7	14.6	14.5	14.4	14.7	14.9	15.5	17.1	18.9	20.5	22.0	23.6	24.4	25.5	26.6	25.9	26.8	26.7	25.0	23.2	21.2	20.0	18.6	17.0	20.3	26.8																				
19-Jul	16.1	15.2	14.6	13.4	12.6	13.7	15.5	17.6	19.4	21.9	23.1	24.2	25.1	26.1	26.7	25.8	19.9	20.2	21.6	21.7	20.0	17.5	15.6	14.5	19.3	26.7																				
20-Jul	13.6	13.2	12.5	11.7	11.4	12.0	13.9	16.7	19.7	21.0	22.6	24.3	25.6	26.4	27.2	27.5	26.5	27.3	26.5	24.2	22.3	21.4	19.8	18.3	20.2	27.5																				
21-Jul	17.0	16.2	15.6	14.9	14.0	14.2	15.9	18.4	20.1	22.2	24.3	26.1	27.0	27.5	27.8	29.1	29.3	29.1	28.2	26.1	24.2	21.2	19.0	18.0	21.9	29.3																				
22-Jul	17.0	16.4	15.4	14.9	14.1	14.4	15.9	17.6	19.9	21.3	22.7	23.7	24.7	25.1	25.6	25.6	24.9	23.6	23.1	22.1	20.8	19.8	18.7	17.5	20.2	25.6																				
23-Jul	16.0	14.4	13.4	12.6	11.9	12.5	14.1	16.1	17.9	19.2	20.7	23.7	25.1	27.0	27.8	28.2	28.5	25.2	26.0	25.3	23.7	21.9	20.1	18.1	20.4	28.5																				
24-Jul	16.8	15.8	15.1	13.6	12.9	13.7	16.3	18.3	21.4	24.3	26.8	27.7	28.4	29.3	29.9	30.4	30.7	30.2	28.7	26.6	24.2	23.3	21.7	20.9	22.8	30.7																				
25-Jul	20.1	19.7	19.5	18.9	17.4	18.2	18.6	18.6	17.6	17.1	17.1	16.8	17.2	18.0	18.6	18.3	18.2	18.2	17.9	17.4	16.2	15.1	14.2	17.8	20.1	20.1																				
26-Jul	13.7	12.8	12.0	11.5	10.8	11.2	11.9	13.1	14.5	16.2	17.3	19.4	19.1	20.0	20.6	20.1	19.5	18.7	17.8	17.0	17.0	16.2	15.6	15.0	15.9	20.6																				
27-Jul	14.1	12.7	11.5	10.1	10.7	10.4	11.3	12.1	13.4	15.1	17.5	19.6	20.4	21.0	20.5	19.0	17.2	19.7	20.6	19.6	17.3	15.2	13.4	12.4	15.6	21.0																				
28-Jul	11.6	10.8	9.8	9.5	9.4	9.7	11.7	14.7	16.6	19.8	22.1	23.2	23.9	23.8	24.1	23.7	24.0	24.2	23.0	21.7	19.9	17.9	16.3	14.4	17.7	24.2																				
29-Jul	14.2	13.3	13.0	11.3	10.9	11.8	13.7	16.0	18.0	21.2	23.5	24.5	24.9	25.6	26.0	26.2	26.6	26.1	25.5	23.9	21.4	18.4	16.6	17.0	19.6	26.6																				
30-Jul	15.8	14.6	12.3	10.9	10.2	11.3	14.8	17.4	19.4	21.5	23.8	25.6	26.8	27.9	29.1	29.5	30.5	29.7	28.1	25.5	22.2	18.1	17.6	17.0	20.8	30.5																				
31-Jul	16.6	16.7	16.1	16.0	16.1	16.2	16.3	16.8	18.4	19.6	21.2	21.0	23.0	24.3	24.4	22.3	20.9	17.8	18.0	18.1	17.0	16.5	15.9	15.4	18.5	24.4																				
																						14.9	13.9	13.2	12.6	12.3	13.0	14.5	16.3	18.1	19.7	21.1	22.3	22.9	23.5	23.9	23.9	23.5	23.0	22.5	21.4	19.8	18.1	16.8	15.7	Diurnal Average
																						20.1	19.7	19.5	18.9	17.4	17.4	18.2	20.8	22.0	24.3	26.8	27.7	28.4	29.3	29.9	30.4	30.7	30.2	28.7	26.6	24.2	23.3	21.7	20.9	Diurnal Maximum





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Fort McKay - Bertha Ganter - July 2023**

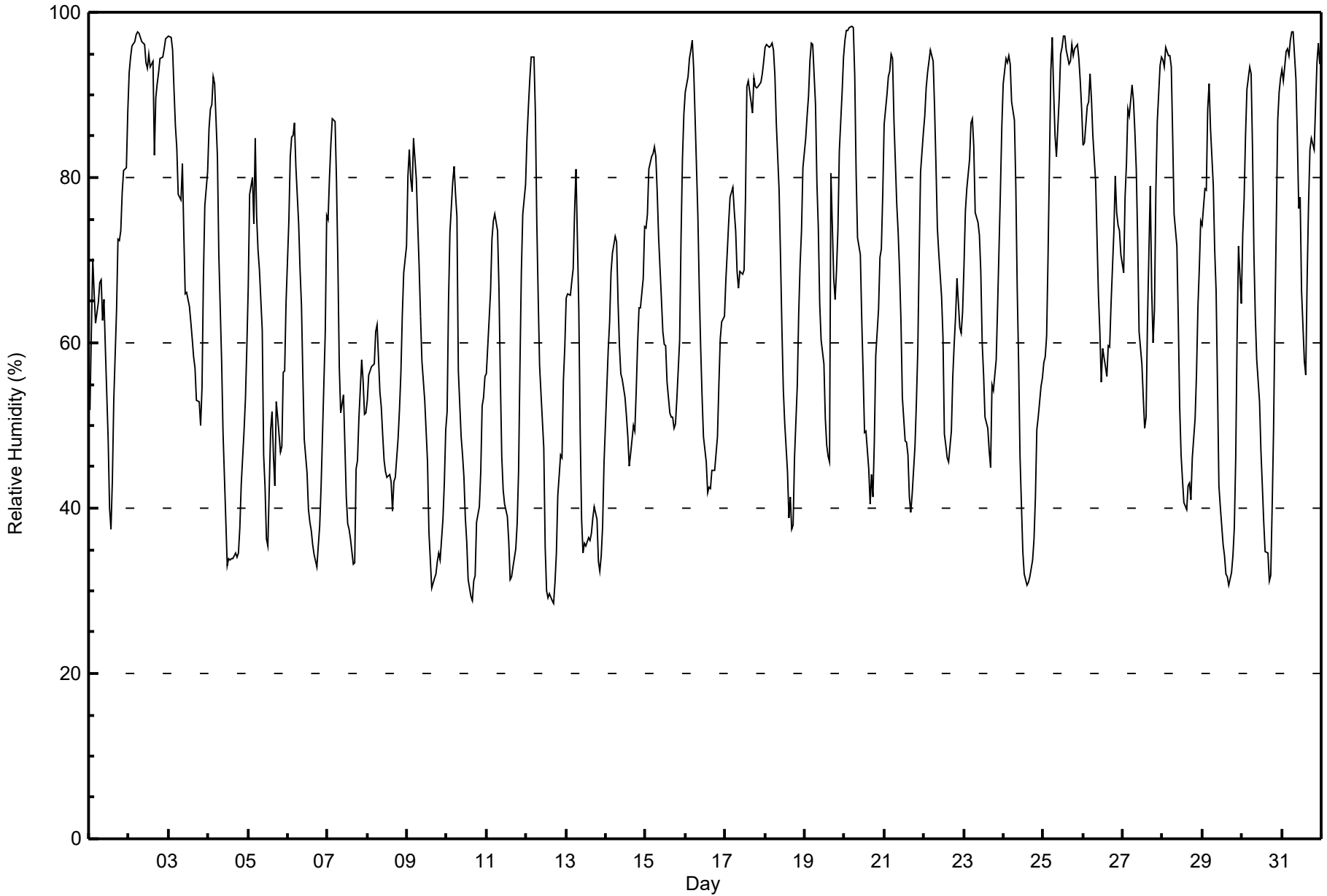
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	20	2.69	2.69
10 - 20	439	59.01	61.69
> 20	285	38.31	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 98.3 % on Jul 20 05:00																						Maximum Daily Average: 94.4 % on Jul 2				Hours in Service: 744																					
Minimum Value: 28.4 % on Jul 12 17:00																						Minimum Daily Average: 48.3 % on Jul 13				Hours of Data: 744																					
Maximum Diurnal Average: 86.9 % at hour 5																						Minimum Diurnal Average: 46.9 % at hour 16				Hours of Missing Data: 0																					
Monthly Average: 65.44 %																						Percentiles: P ₁ = 30.5 P ₁₀ = 37.5 Q ₁ = 48.7 Median = 65.1 Q ₃ = 83.4 P ₉₀ = 93.8 P ₉₉ = 97.5				Hours of Calibration: 0																					
																										Percent Operational Time: 100.0																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	51.8	61.4	70.2	65.9	62.4	64.9	67.3	67.6	62.7	65.3	59.3	48.4	39.9	37.5	43.4	53.1	64.2	72.5	72.4	73.6	78.2	80.9	81.2	88.0	63.8	88.0																					
2-Jul	92.8	94.7	95.9	96.5	97.2	97.6	97.5	97.0	96.4	96.0	93.8	93.2	94.9	93.4	94.1	82.7	89.7	91.4	92.8	94.4	94.5	95.6	96.7	97.0	94.4	97.6																					
3-Jul	97.1	97.0	95.4	90.8	86.3	83.6	77.9	77.3	81.7	73.3	66.0	66.1	64.4	62.5	60.4	58.3	56.9	53.1	52.9	50.1	54.5	67.9	76.5	80.7	72.1	97.1																					
4-Jul	85.9	88.2	88.8	92.2	91.3	82.5	70.6	64.3	57.9	49.2	38.4	33.0	33.8	33.7	34.0	34.0	34.6	34.1	34.5	37.6	42.9	49.4	53.3	59.4	55.2	92.2																					
5-Jul	66.8	77.9	80.0	74.4	84.8	75.3	71.2	68.9	61.5	46.5	42.5	36.2	35.5	49.5	51.7	46.2	42.7	52.8	51.1	46.8	47.4	56.4	56.6	65.0	57.8	84.8																					
6-Jul	74.7	82.5	84.9	85.0	86.7	81.4	74.4	68.8	64.6	55.9	48.2	44.3	39.8	38.3	37.3	35.6	34.4	32.9	35.3	37.7	42.6	48.9	61.3	75.4	57.1	86.7																					
7-Jul	75.0	80.0	84.1	87.1	86.8	79.7	69.7	57.1	51.6	53.7	47.6	41.3	38.1	37.4	36.3	33.3	33.4	44.7	45.8	50.9	58.0	55.4	51.4	51.6	56.3	87.1																					
8-Jul	53.1	56.1	57.1	57.2	57.5	61.3	62.2	54.1	52.2	48.9	45.8	44.5	43.7	44.1	43.2	39.7	43.2	43.7	48.4	52.0	56.5	63.5	68.4	71.6	52.8	71.6																					
9-Jul	80.1	83.4	79.9	78.2	84.8	79.8	74.5	69.3	63.3	57.9	53.1	49.3	45.7	37.0	33.8	30.4	31.4	32.0	33.6	34.6	33.7	38.7	43.0	49.5	54.0	84.8																					
10-Jul	51.8	65.1	73.4	79.6	81.4	78.0	75.3	56.6	48.7	46.4	43.7	38.9	35.9	31.3	29.4	28.9	31.3	31.8	38.3	40.2	44.5	52.4	53.4	56.0	50.5	81.4																					
11-Jul	56.2	62.8	66.2	72.6	74.7	75.6	73.5	66.6	55.6	46.3	42.2	40.5	39.0	35.9	31.4	31.8	32.8	35.0	38.2	44.4	57.4	68.6	75.7	79.2	54.3	79.2																					
12-Jul	84.7	88.5	91.8	94.6	94.6	87.8	74.7	65.6	57.3	54.0	47.3	35.3	30.1	29.2	29.7	28.9	28.4	31.0	34.6	41.5	46.4	46.0	55.4	59.6	55.7	94.6																					
13-Jul	65.4	65.9	65.7	67.5	69.0	76.0	81.0	64.1	49.1	38.6	34.6	35.8	35.5	36.5	36.2	36.9	38.9	40.2	38.6	33.5	32.4	34.2	37.8	45.4	48.3	81.0																					
14-Jul	54.6	59.1	62.5	68.6	70.8	72.9	72.1	65.1	59.7	56.2	55.5	53.5	51.1	48.7	45.1	46.7	49.9	49.3	54.2	60.0	64.2	64.3	67.9	74.1	59.4	74.1																					
15-Jul	73.9	75.6	81.1	82.6	82.9	83.8	82.5	78.2	72.6	65.3	61.3	59.9	59.6	55.3	51.5	51.0	51.0	49.6	50.2	53.3	60.3	72.8	82.2	87.6	67.7	87.6																					
16-Jul	90.4	92.2	94.3	95.5	96.6	93.2	87.5	75.4	66.7	59.6	53.5	48.7	45.6	41.9	42.6	42.4	44.6	46.6	46.6	48.7	54.9	60.5	62.5	63.2	64.7	96.6																					
17-Jul	67.7	71.1	74.6	77.7	78.8	76.0	73.6	68.6	66.6	68.6	68.3	68.8	77.5	91.0	91.7	89.2	87.9	92.1	91.0	90.9	90.9	91.5	92.5	94.1	80.8	94.1																					
18-Jul	95.8	96.1	95.8	95.9	96.2	95.5	92.5	86.6	78.4	70.6	61.9	54.4	50.3	44.4	38.8	41.3	37.4	38.0	46.1	54.9	63.5	69.4	73.6	81.1	69.1	96.2																					
19-Jul	84.7	87.5	89.9	94.1	96.2	96.1	88.7	79.4	73.9	64.7	60.4	57.5	50.8	47.6	46.2	45.7	80.5	67.7	65.2	68.7	73.7	83.2	90.3	94.5	74.5	96.2																					
20-Jul	96.7	97.8	97.8	98.1	98.3	98.2	92.3	80.5	72.7	70.7	62.9	56.2	49.2	49.3	44.7	40.6	44.0	41.3	48.2	58.4	64.1	70.3	71.3	77.9	70.1	98.3																					
21-Jul	86.4	90.0	92.1	92.9	95.0	94.5	86.9	76.8	73.4	68.7	62.7	53.3	48.1	48.0	46.5	41.3	39.4	41.6	47.5	52.7	59.1	70.3	80.6	85.4	68.0	95.0																					
22-Jul	87.5	90.8	92.8	94.1	95.5	94.0	88.4	81.5	73.9	70.9	65.6	60.6	48.9	47.6	46.1	45.6	49.3	56.0	59.9	63.1	67.7	61.9	61.2	63.7	69.4	95.5																					
23-Jul	69.3	75.9	78.6	82.2	86.5	87.1	83.8	75.8	74.5	73.1	68.7	59.9	56.1	51.0	49.7	46.9	45.0	54.9	54.3	58.0	64.3	71.4	78.2	86.1	68.0	87.1																					
24-Jul	91.3	94.4	93.8	94.8	93.8	89.1	86.9	78.9	66.6	57.6	46.3	34.8	32.0	31.4	30.6	31.1	31.7	33.7	36.2	41.3	49.5	51.0	54.8	55.7	58.6	94.8																					
25-Jul	57.6	58.3	60.8	70.3	92.9	96.9	90.4	85.1	82.6	89.6	94.8	95.8	97.1	97.1	95.4	93.8	94.1	96.1	94.7	95.6	96.2	94.4	91.7	88.4	87.9	97.1																					
26-Jul	84.0	84.2	88.6	89.2	92.6	89.5	85.1	79.6	72.5	65.7	61.3	55.3	59.3	57.1	56.0	59.7	59.5	64.8	73.3	80.1	75.8	74.3	73.6	70.8	73.0	92.6																					
27-Jul	68.4	77.5	81.7	88.3	87.5	91.1	89.4	85.5	81.0	72.3	61.4	57.4	53.4	49.6	51.0	62.6	78.9	66.4	60.0	64.0	78.5	86.7	93.5	94.5	74.2	94.5																					
28-Jul	94.2	93.3	95.7	94.8	94.8	93.4	85.0	75.7	71.6	62.7	52.2	46.4	43.4	40.8	39.8	42.7	43.0	41.1	46.2	50.9	56.3	64.3	69.0	74.8	65.5	95.7																					
29-Jul	74.3	78.6	78.5	88.4	91.4	86.0	79.0	71.2	66.3	54.8	42.7	40.2	35.7	34.3	32.1	31.7	30.7	32.2	34.2	37.6	46.1	61.0	71.7	64.8	56.8	91.4																					
30-Jul	73.1	77.5	85.0	90.7	93.5	92.6	83.3	70.8	63.1	58.0	52.9	47.0	42.7	38.3	34.8	34.5	31.2	31.8	40.0	49.4	62.9	87.0	90.4	92.1	63.4	93.5																					
31-Jul	93.1	91.7	95.2	95.5	94.7	96.6	97.7	97.6	91.8	84.8	76.3	77.6	66.3	57.9	56.0	67.8	76.7	83.4	84.8	83.5	88.6	94.0	96.3	93.7	85.1	97.7																					
																						76.7	80.5	83.0	85.0	86.9	85.5	81.1	73.9	68.1	62.8	57.1	52.7	49.8	48.3	47.1	46.9	49.6	51.0	53.2	56.4	61.5	67.3	71.4	74.9	Diurnal Average	
																						97.1	97.8	97.8	98.1	98.3	98.2	97.7	97.6	96.4	96.0	94.8	95.8	97.1	97.1	95.4	93.8	94.1	96.1	94.7	95.6	96.2	95.6	96.7	97.0	Diurnal Maximum	





Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

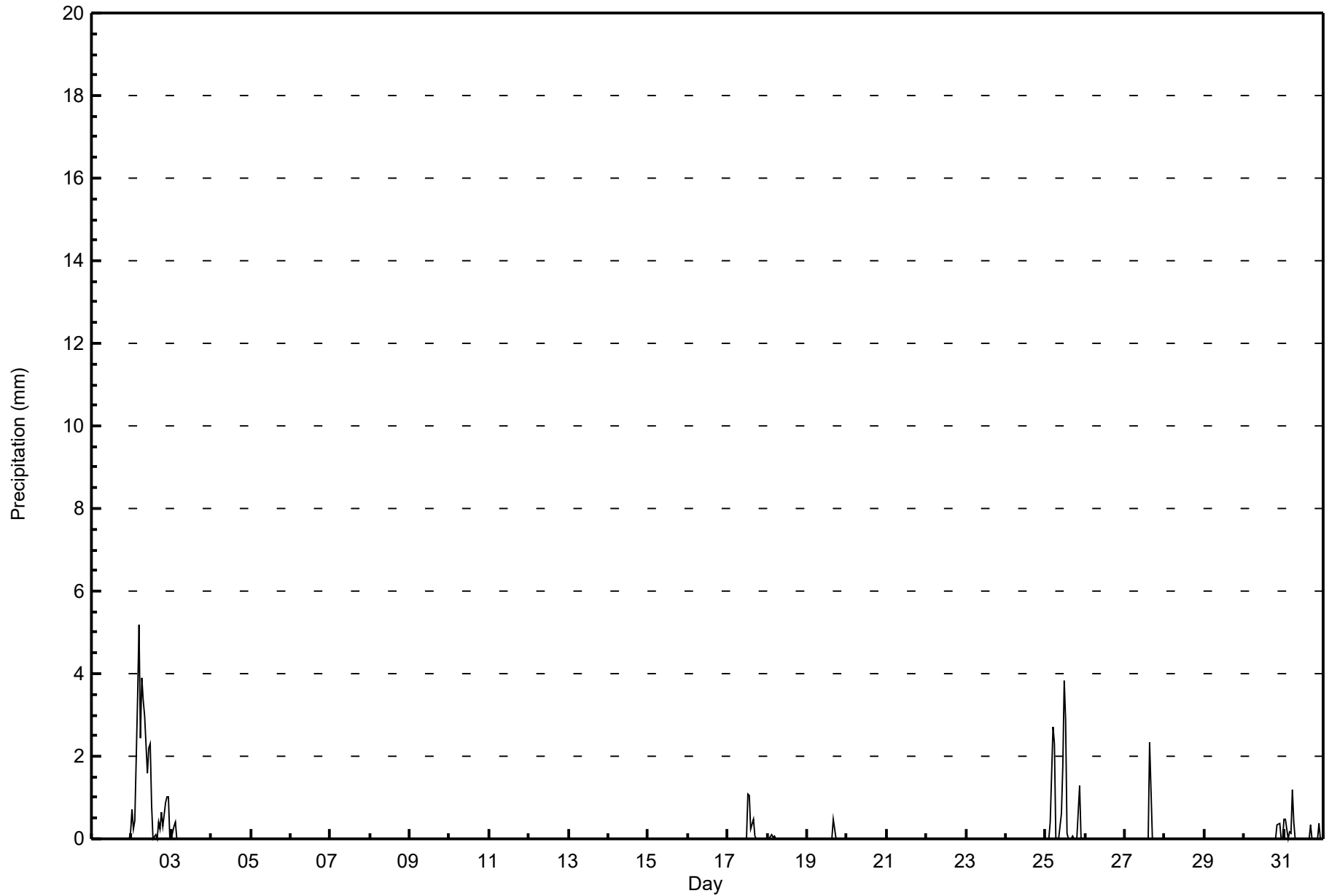
Fort McKay - Bertha Ganter - July 2023

Maximum Value: 5.2 mm on Jul 2 05:00																				Maximum Daily Total: 34.3 mm on Jul 2					Hours in Service: 744				
Minimum Value: 0.0 mm on Jul 1 01:00																				Minimum Daily Total: 0.0 mm on Jul 4					Hours of Data: 744				
Maximum Diurnal Total: 8.1 mm at hour 5																				Minimum Diurnal Total: 0.2 mm at hour 24					Hours of Missing Data: 0				
Monthly Total: 61.48 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 = 2.6					Hours of Calibration: 0				
																				Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Total	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2			
2-Jul	0.7	0.3	0.4	3.4	5.2	2.4	3.9	3.4	3.0	1.6	2.2	2.3	0.8	0.0	0.1	0.0	0.4	0.2	0.6	0.3	0.9	1.0	1.0	0.0	34.3	5.2			
3-Jul	0.0	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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			
4-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.0	0.3	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	1.1			
18-Jul	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1			
19-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5			
20-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.4	2.7	2.3	0.1	0.0	0.0	0.6	1.8	3.8	2.9	0.1	0.0	0.0	0.1	0.0	0.0	0.0	1.3	0.1	0.0	0.0	16.1	3.8			
26-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	2.4			
28-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.0	0.7	0.4			
31-Jul	0.5	0.5	0.0	0.2	0.2	1.2	0.4	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	0.4	0.0	0.0	3.5	1.2			
																								Diurnal Average					
																								Diurnal Maximum					



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Fort McKay - Bertha Ganter - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort McKay - Bertha Ganter - July 2023

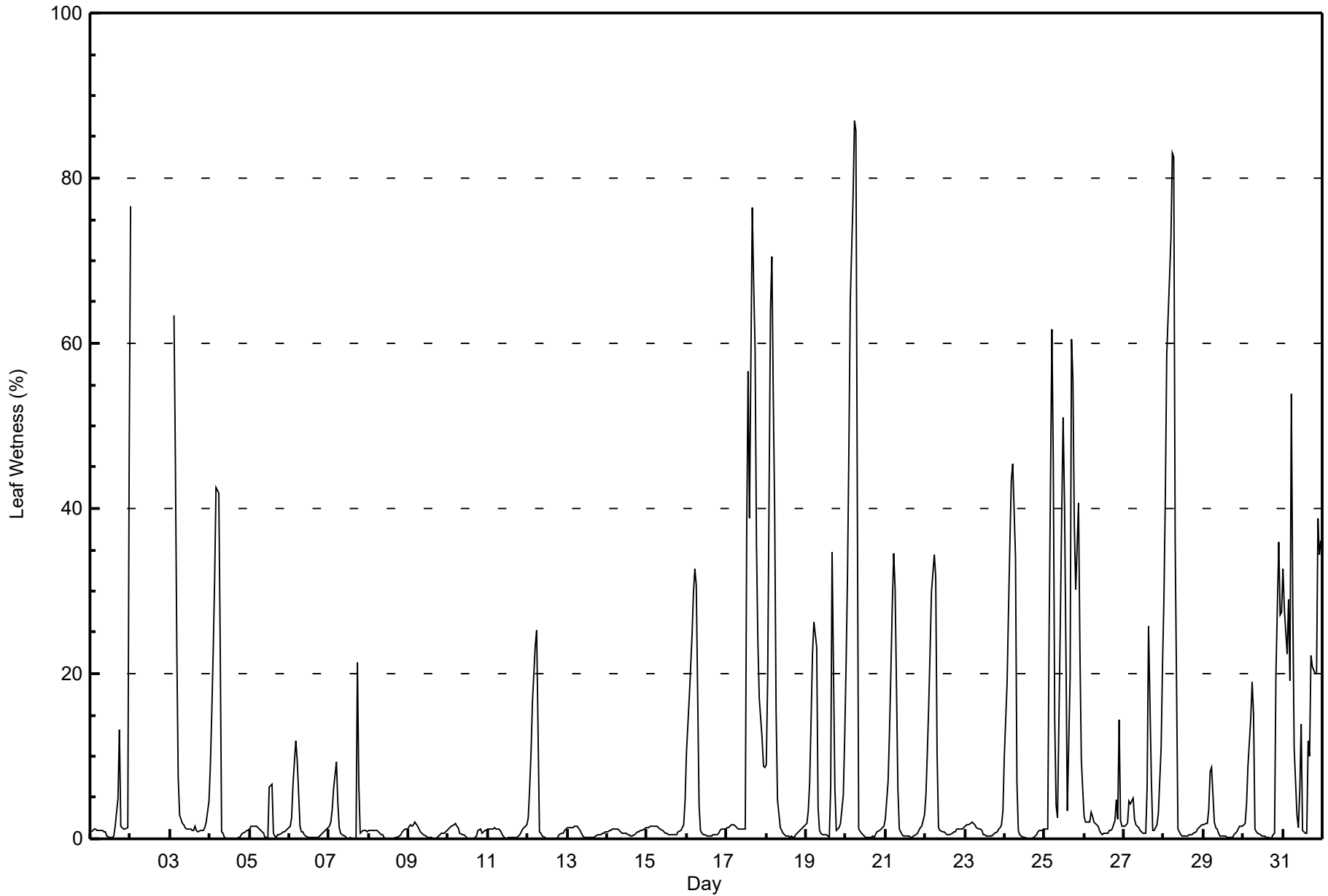
Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	707	95.03	95.03
0.4 - 0.5	11	1.48	96.51
0.6 - 0.7	3	0.40	96.91
0.8 - 1.4	8	1.08	97.98
1.5 - 10	15	2.02	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 87.0 % on Jul 20 06:00																								Maximum Daily Average: 26.0 % on Jul 25																								Hours in Service: 744	
Minimum Value: 0.0 % on Jul 4 12:00																								Minimum Daily Average: 0.6 % on Jul 8																								Hours of Data: 719	
Maximum Diurnal Average: 20.7 % at hour 6																								Minimum Diurnal Average: 1.1 % at hour 9																								Hours of Missing Data: 25	
Monthly Average: 6.98 %																								Percentiles: P ₁ = 0.0 P ₁₀ = 0.2 Q ₁ = 0.5 Median = 1.1 Q ₃ = 2.9 P ₉₀ = 25.3 P ₉₉ = 72.3																								Hours of Calibration: 0	
																																																Percent Operational Time: 96.6	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	0.8	1.0	1.1	1.2	1.1	1.0	1.0	0.9	0.8	0.8	0.4	0.2	0.1	0.1	0.3	1.5	4.9	13.3	1.5	1.3	1.1	1.2	1.3	46.3	3.5	46.3																							
2-Jul	76.5	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	--	76.5																						
3-Jul	OR	OR	63.4	45.6	23.1	7.5	2.9	1.9	1.7	1.4	1.2	1.2	1.1	1.0	1.0	1.6	0.9	0.9	0.9	1.0	1.1	1.4	2.1	4.5	7.6	63.4																							
4-Jul	9.0	15.3	22.8	31.2	42.6	41.8	23.3	0.8	0.7	0.2	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.5	0.7	0.8	0.9	1.0	8.0	42.6																							
5-Jul	1.2	1.5	1.6	1.5	1.5	1.4	1.2	1.0	0.7	0.2	0.1	0.0	6.3	6.6	0.6	0.3	0.2	0.4	0.5	0.7	0.8	0.9	1.0	1.2	1.3	6.6																							
6-Jul	1.5	2.5	6.6	9.3	11.9	9.4	1.5	0.9	0.8	0.5	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.4	0.5	0.7	0.9	1.1	1.4	2.1	11.9																								
7-Jul	1.5	2.0	3.5	6.1	9.4	4.3	1.3	0.7	0.6	0.4	0.3	0.0	0.1	0.1	0.0	0.0	0.0	21.3	6.4	0.7	1.0	1.0	1.0	0.9	2.6	21.3																							
8-Jul	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.6	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.5	0.8	1.0	1.2	1.3	0.6	1.3																								
9-Jul	1.5	1.7	1.5	1.6	2.0	1.5	1.3	0.8	0.6	0.4	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.1	0.8	2.0																							
10-Jul	1.1	1.3	1.5	1.8	1.8	1.5	1.3	0.7	0.5	0.5	0.4	0.2	0.0	0.0	0.0	0.1	0.1	0.3	1.0	1.2	0.7	0.8	1.0	1.1	0.8	1.8																							
11-Jul	1.1	1.2	1.2	1.3	1.3	1.3	1.2	1.0	0.7	0.3	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.3	0.6	0.9	1.2	1.4	1.6	0.7	1.6																							
12-Jul	2.6	6.1	10.5	16.7	23.4	25.2	13.0	0.8	0.6	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.7	0.7	1.0	1.1	4.3	25.2																							
13-Jul	1.3	1.3	1.3	1.4	1.4	1.4	1.5	1.0	0.6	0.4	0.3	0.1	0.1	0.2	0.2	0.2	0.2	0.4	0.4	0.5	0.6	0.6	0.7	0.8	0.7	1.5																							
14-Jul	0.9	1.0	1.1	1.2	1.3	1.3	1.2	1.1	0.9	0.7	0.7	0.6	0.5	0.4	0.4	0.4	0.5	0.7	0.8	0.9	1.0	1.0	1.1	1.3	0.9	1.3																							
15-Jul	1.3	1.3	1.4	1.5	1.5	1.5	1.5	1.3	1.1	1.0	0.8	0.7	0.7	0.5	0.5	0.4	0.5	0.5	0.6	0.8	1.1	1.4	1.7	4.5	1.2	4.5																							
16-Jul	10.5	17.1	20.8	24.8	29.8	32.8	30.7	4.1	1.0	0.7	0.5	0.4	0.4	0.3	0.3	0.4	0.5	0.5	0.6	0.7	1.0	1.2	1.2	1.2	7.6	32.8																							
17-Jul	1.3	1.4	1.6	1.7	1.7	1.6	1.4	1.1	1.1	1.2	1.2	1.2	36.9	56.6	38.8	76.4	67.2	59.3	35.5	23.8	17.0	12.2	8.9	8.6	19.1	76.4																							
18-Jul	8.9	19.6	64.0	70.5	53.6	39.5	15.6	4.7	1.3	0.9	0.7	0.4	0.4	0.3	0.2	0.3	0.2	0.2	0.5	0.8	1.1	1.3	1.4	1.6	12.0	70.5																							
19-Jul	1.9	3.4	6.9	14.4	22.3	26.4	23.2	3.7	1.1	0.7	0.6	0.5	0.5	0.3	0.2	6.2	34.7	6.2	1.0	1.1	1.3	1.8	5.2	12.2	7.3	34.7																							
20-Jul	21.2	31.8	47.2	65.3	77.9	87.0	85.7	41.7	1.2	0.7	0.5	0.3	0.2	0.2	0.2	0.1	0.3	0.2	0.5	0.8	1.1	1.2	1.4	1.6	19.5	87.0																							
21-Jul	2.4	6.9	13.1	20.3	28.2	34.6	30.4	6.0	1.2	0.8	0.5	0.4	0.3	0.3	0.3	0.2	0.2	0.3	0.5	0.8	1.0	1.3	1.6	2.8	6.4	34.6																							
22-Jul	5.3	10.3	16.1	22.9	29.9	34.4	31.8	10.2	1.3	1.0	0.9	0.8	0.6	0.5	0.5	0.5	0.6	0.8	0.9	1.1	1.2	1.3	1.3	1.3	7.3	34.4																							
23-Jul	1.5	1.7	1.8	1.8	2.0	1.8	1.7	1.4	1.2	1.1	1.0	0.6	0.5	0.3	0.3	0.4	0.3	0.5	0.6	0.9	1.1	1.3	1.6	3.4	1.2	3.4																							
24-Jul	10.1	19.0	27.8	35.9	43.4	45.4	34.1	6.9	1.1	0.5	0.3	0.2	0.2	0.1	0.0	0.0	0.0	0.1	0.3	0.6	0.8	1.0	1.0	1.1	9.6	45.4																							
25-Jul	1.2	1.2	1.2	25.2	61.7	45.1	14.5	4.1	2.5	26.3	39.5	51.0	40.5	22.8	3.4	19.7	60.6	55.6	37.8	30.2	40.7	22.9	9.6	6.0	26.0	61.7																							
26-Jul	2.7	2.0	2.1	2.1	3.3	2.7	2.0	1.7	1.5	1.1	0.8	0.5	0.7	0.7	0.7	0.9	1.0	1.1	2.2	4.7	2.5	14.4	2.2	1.6	2.3	14.4																							
27-Jul	1.6	1.7	1.9	4.6	4.2	4.9	2.4	1.7	1.6	1.3	1.0	0.6	0.6	0.7	6.2	25.7	7.3	1.1	1.1	1.3	1.6	3.0	11.1	21.2	4.5	25.7																							
28-Jul	29.2	41.5	58.6	68.0	72.7	83.1	82.5	36.4	1.2	0.8	0.5	0.4	0.4	0.4	0.4	0.6	0.5	0.5	0.7	0.9	1.1	1.4	1.5	1.7	20.2	83.1																							
29-Jul	1.7	1.9	1.8	3.6	8.1	8.7	2.0	1.3	1.1	0.7	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.4	0.7	0.9	1.2	1.5	1.5	1.6	8.7																							
30-Jul	1.6	1.9	4.3	8.7	14.5	19.0	15.1	1.2	0.9	0.7	0.5	0.4	0.3	0.3	0.2	0.2	0.0	0.1	0.4	0.7	20.2	35.9	27.1	27.4	7.6	35.9																							
31-Jul	32.6	27.8	22.5	29.0	19.2	53.9	28.7	10.9	2.9	1.4	5.7	13.9	1.0	0.7	0.7	11.9	9.9	22.2	20.9	20.0	20.1	38.9	34.4	36.0	19.4	53.9																							
																								7.8	7.8	13.7	17.3	19.9	20.7	15.2	5.0	1.1	1.6	2.0	2.5	3.1	3.1	1.9	5.0	6.4	6.3	3.9	3.3	4.1	5.1	4.2	6.6	Diurnal Average	
																								76.5	41.5	64.0	70.5	77.9	87.0	85.7	41.7	2.9	26.3	39.5	51.0	40.5	56.6	38.8	76.4	67.2	59.3	37.8	30.2	40.7	38.9	34.4	46.3	Diurnal Maximum	
OR - Out of Range																																																	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (LW) - %
Fort McKay - Bertha Ganter - July 2023

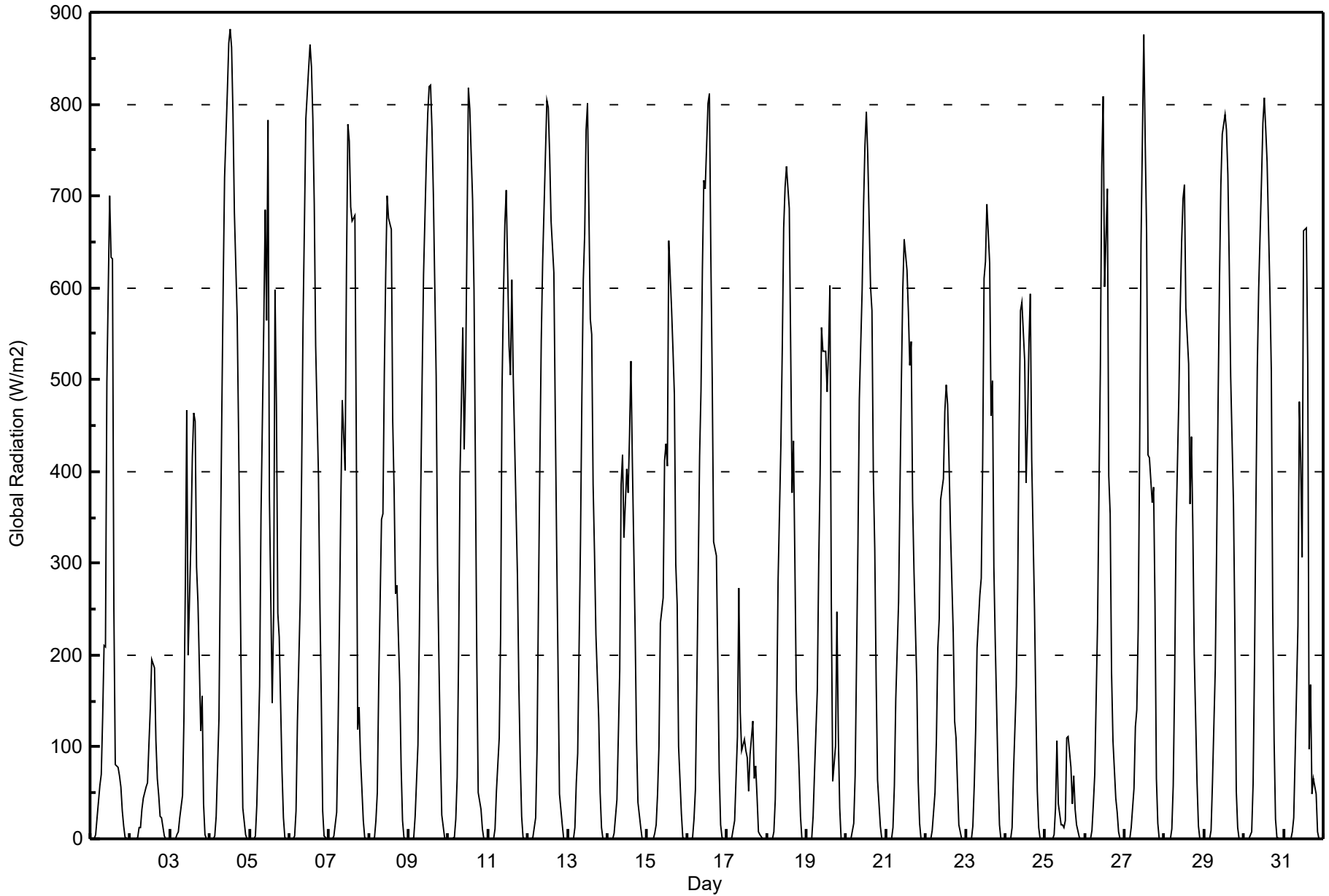
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	132	18.36	18.36
0.4 - 0.5	68	9.46	27.82
0.6 - 0.7	57	7.93	35.74
0.8 - 1.4	200	27.82	63.56
1.5 - 10	120	16.69	80.25
> 10	127	17.66	97.91

Total Number of Valid Hours: 719

Total Number of Hours: 744



Maximum Value: 881.4 W/m2 on Jul 4 13:00 Maximum Daily Average: 359.8 W/m2 on Jul 4																								Hours in Service:	744	
Minimum Value: 0.0 W/m2 on Jul 1 01:00 Minimum Daily Average: 29.2 W/m2 on Jul 25																								Hours of Data:	744	
Maximum Diurnal Average: 607.3 W/m2 at hour 12 Minimum Diurnal Average: 0.0 W/m2 at hour 24																								Hours of Missing Data:	0	
Monthly Average: 227.02 W/m2 Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.4 Median = 96.1 Q ₃ = 429.0 P ₉₀ = 660.9 P ₉₉ = 820.0																								Hours of Calibration:	0	
																								Percent Operational Time:	100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.0	0.0	0.0	4.4	22.5	57.6	70.3	133.2	211.2	209.0	496.7	700.7	632.4	631.0	250.5	81.5	77.5	69.2	55.7	30.9	13.2	0.9	0.0	0.0	156.2	700.7
2-Jul	0.0	0.0	0.0	0.0	2.1	12.4	12.2	32.4	44.8	56.6	61.2	101.5	142.1	194.9	186.6	106.7	66.2	47.9	24.5	22.6	3.3	0.4	0.0	0.0	46.6	194.9
3-Jul	0.0	0.0	0.0	0.1	4.6	8.2	23.1	47.2	131.9	276.2	466.1	199.2	326.9	417.0	463.7	454.2	296.4	257.5	117.0	156.1	38.5	4.2	0.0	0.0	153.7	466.1
4-Jul	0.0	0.0	0.0	3.4	24.5	131.8	305.3	460.5	601.7	720.1	815.2	866.0	881.4	862.3	788.1	681.8	568.0	440.6	295.3	150.4	33.7	4.4	0.1	0.0	359.8	881.4
5-Jul	0.0	0.0	0.1	3.4	36.0	99.7	166.7	352.1	563.6	684.5	563.8	783.1	372.0	148.0	243.4	598.1	471.5	246.1	220.4	73.8	23.6	1.8	0.0	0.0	235.5	783.1
6-Jul	0.0	0.0	0.0	2.6	30.2	128.5	261.2	400.3	562.2	671.3	783.9	839.6	865.1	839.9	784.8	690.4	536.4	395.5	258.1	154.5	31.2	2.9	0.0	0.0	343.3	865.1
7-Jul	0.0	0.0	0.0	2.6	28.3	120.8	238.0	371.2	476.9	401.2	620.9	778.1	759.2	688.3	672.2	679.4	434.8	118.6	143.1	88.6	20.3	1.9	0.0	0.0	276.9	778.1
8-Jul	0.0	0.0	0.0	1.6	20.6	49.9	167.7	348.0	353.7	506.3	616.2	700.2	676.5	662.9	454.8	378.2	267.7	275.8	169.7	77.8	20.3	1.9	0.0	0.0	239.6	700.2
9-Jul	0.0	0.0	0.0	1.6	24.6	102.8	222.9	376.8	503.4	614.2	739.7	790.4	818.4	821.3	773.6	701.0	502.8	298.9	190.7	99.4	26.3	2.1	0.0	0.0	317.1	821.3
10-Jul	0.0	0.0	0.0	1.6	21.8	66.8	198.4	395.3	556.5	424.6	501.8	656.5	817.5	794.1	694.9	597.3	405.3	195.1	50.8	31.5	10.4	0.7	0.0	0.0	267.5	817.5
11-Jul	0.0	0.0	0.0	0.5	10.6	51.3	109.5	222.2	490.2	590.0	668.0	706.7	537.4	505.2	609.3	503.9	431.6	286.4	167.5	84.7	23.9	2.3	0.0	0.0	250.0	706.7
12-Jul	0.0	0.0	0.0	2.2	23.4	97.0	259.4	409.4	543.6	628.6	746.3	804.3	796.5	745.1	672.5	616.7	462.7	316.5	185.1	49.5	16.0	0.2	0.0	0.0	307.3	804.3
13-Jul	0.0	0.0	0.0	0.0	12.7	60.9	93.5	325.3	484.2	608.4	658.5	771.6	801.4	566.2	549.5	386.5	311.8	222.5	131.6	50.7	12.3	0.5	0.0	0.0	252.0	801.4
14-Jul	0.0	0.0	0.0	0.1	6.0	43.2	110.8	183.5	386.7	418.4	327.5	402.7	377.4	439.0	519.7	411.2	226.1	106.9	39.5	26.3	12.8	0.6	0.0	0.0	168.3	519.7
15-Jul	0.0	0.0	0.0	0.3	6.5	15.7	48.7	100.4	234.8	263.1	412.3	430.4	405.4	651.8	576.8	531.8	484.0	298.8	254.2	100.2	27.6	1.8	0.0	0.0	201.9	651.8
16-Jul	0.0	0.0	0.0	0.9	20.7	53.8	161.1	416.0	488.7	620.5	716.7	708.0	800.4	811.6	638.3	501.1	322.8	307.9	191.7	73.8	15.2	1.1	0.0	0.0	285.4	811.6
17-Jul	0.0	0.2	0.2	1.1	20.1	65.1	111.0	272.8	137.7	96.2	108.1	96.0	88.9	51.1	92.2	127.8	65.5	79.8	46.4	7.2	3.9	0.1	0.0	0.0	61.3	272.8
18-Jul	0.0	0.0	0.0	0.0	8.3	43.5	133.5	280.4	428.5	533.2	665.3	708.6	732.9	687.0	534.0	377.3	432.6	300.9	161.6	74.2	24.1	0.6	0.0	0.0	255.3	732.9
19-Jul	0.0	0.0	0.0	0.3	25.2	71.6	162.4	299.4	396.6	557.5	530.3	530.9	486.2	531.5	602.5	258.1	63.3	100.6	247.1	112.1	33.5	0.7	0.0	0.0	208.7	602.5
20-Jul	0.0	0.0	0.0	0.3	17.0	69.3	193.1	322.5	478.9	598.4	689.3	755.8	791.3	744.1	600.8	574.9	394.9	316.4	173.1	64.6	14.1	0.6	0.0	0.0	283.3	791.3
21-Jul	0.0	0.0	0.0	0.0	12.2	58.5	152.0	258.4	379.6	499.1	598.4	652.6	619.4	573.8	515.1	541.8	369.9	291.7	169.7	63.2	16.8	0.4	0.0	0.0	240.5	652.6
22-Jul	0.0	0.0	0.0	0.0	9.9	49.6	107.6	207.2	239.4	369.7	392.8	465.6	494.8	472.9	410.9	338.3	224.2	127.4	109.2	61.2	15.4	0.2	0.0	0.0	170.7	494.8
23-Jul	0.0	0.0	0.0	0.1	13.9	58.0	117.8	206.8	265.3	283.7	409.5	610.0	629.2	691.6	627.5	460.2	499.1	295.9	213.6	69.3	14.6	0.6	0.0	0.0	227.8	691.6
24-Jul	0.0	0.0	0.0	0.0	12.4	71.8	166.8	273.8	444.6	575.7	584.6	520.7	386.9	450.4	537.9	592.7	413.1	249.5	140.7	51.9	11.7	0.0	0.0	0.0	228.5	592.7
25-Jul	0.0	0.0	0.0	0.0	0.1	4.8	34.1	106.5	37.4	15.4	15.8	12.6	20.6	110.6	110.7	78.0	37.6	68.4	32.1	14.7	1.2	0.1	0.0	0.0	29.2	110.7
26-Jul	0.0	0.0	0.0	0.2	8.9	38.4	70.1	234.2	376.5	512.9	732.2	807.9	601.7	708.5	394.4	353.5	179.7	107.2	44.9	28.8	8.2	0.2	0.0	0.0	217.0	807.9
27-Jul	0.0	0.0	0.0	0.0	12.4	55.4	121.8	139.9	228.6	418.4	647.2	875.4	760.1	658.5	417.5	415.1	366.5	382.2	255.1	65.9	16.1	0.4	0.0	0.0	243.2	875.4
28-Jul	0.0	0.0	0.0	0.0	10.5	57.7	171.3	333.8	480.2	578.4	649.5	697.0	711.7	578.8	516.6	364.1	437.6	339.0	201.8	60.9	14.0	0.4	0.0	0.0	258.5	711.7
29-Jul	0.0	0.0	0.0	0.1	8.8	60.6	185.3	320.8	472.6	606.0	712.9	766.7	789.3	771.5	722.6	624.6	503.4	364.5	228.7	52.2	12.9	0.2	0.0	0.0	300.2	789.3
30-Jul	0.0	0.0	0.0	0.0	8.2	59.6	189.3	360.0	512.7	598.8	716.9	779.6	807.7	773.2	736.8	597.0	509.7	250.6	106.1	21.7	0.9	0.0	0.0	0.0	292.9	807.7
31-Jul	0.0	0.0	0.0	0.0	0.7	8.2	23.2	89.8	232.6	475.5	409.4	306.4	661.9	664.9	516.8	98.0	168.2	49.4	66.2	49.2	8.0	0.0	0.0	0.0	159.5	664.9
																								Diurnal Average		
																								Diurnal Maximum		





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Fort McKay - Bertha Ganter - July 2023

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	270	36.29	36.29
21 - 100	109	14.65	50.94
101 - 300	115	15.46	66.40
301 - 600	147	19.76	86.16
601 - 900	103	13.84	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 - July 2023

Maximum Speed: 29 km/h on Jul 3 11:00	Maximum Daily Speed Average: 16.4 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 25 08:00	Minimum Daily Speed Average: 0.8 km/h on Jul 20	Hours of Data: 742
Maximum Diurnal Speed Average: 2.6 km/h at hour 19	Minimum Diurnal Speed Average: 0.2 km/h at hour 8	Hours of Missing Data: 2
Monthly Average Velocity: 1.0 km/h 340.7 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 6 Q ₃ = 9 P ₉₀ = 13 P ₉₉ = 22	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NW4	SSW2	SW4	WSW3	SSW3	S4	S3	SSW1	SSE5	SSE4	SE7	SSE11	SSE14	SSE12	S13	SSW12	WSW7	WNW8	NW5	WSW1	NW1	SW2	E0	W1	S3.6	SSE14
2-Jul	NW5	WNW8	W4	W5	W5	WNW6	WNW9	NW12	NNW12	NW14	NW14	WNW9	WNW7	WNW7	NW19	NW10	NW12	WNW10	WNW7	WNW7	WNW7	WNW5	WNW6	NW8.6	NW19	
3-Jul	WNW7	WNW6	NW10	NNW17	N18	N22	N26	N20	N22	N26	N29	NNW22	NNW25	N25	N24	N21	N16	N14	NNW12	N12	NNW10	NNW5	NW7	NNW6	NNW16.4	N29
4-Jul	WNW4	WNW6	WNW5	WNW3	W1	WNW2	WNW1	SE4	SE5	SE4	ENE6	E7	ESE8	SSE6	SE11	SSE11	SSE12	SSE11	S11	S9	S7	S8	S7	SSE4.3	SSE12	
5-Jul	SW3	S4	S6	S6	SSE5	S6	S7	S9	S9	WSW8	W6	SSW3	WSW5	W3	SW5	S9	SW5	W5	WNW9	NNW10	NNW9	N8	NNW9	NW6	WSW2.7	NNW10
6-Jul	NNW4	WNW3	NW6	NW4	WSW2	NW4	N8	N13	N14	N13	NNE12	NNE11	N12	N11	N11	NNE11	NNE11	NNE10	N14	N14	NNW8	NNW8	W1	WSW4	N7.8	N14
7-Jul	W2	SSW1	SSW2	SSW4	S4	S4	SSW4	SW4	SSW3	SE6	SSE6	SE10	SSE13	SSE11	S9	S8	SSW8	SSW4	S5	S2	W2	WSW4	W6	W6	S4.3	SSE13
8-Jul	W7	W7	W6	W7	W7	WSW3	SSE4	SSW5	W3	WSW3	WNW6	NNW7	E5	SSE8	ENE4	NNW8	N8	N9	NNE6	N5	NNW6	NNW3	WNW4	NW5	NW2.7	N9
9-Jul	NW5	NNW4	N9	N4	N1	N5	N6	NNE7	NNE7	NNE12	NNE12	NNE13	NNE14	NNE12	NNE12	NNE13	NE10	NE10	NNE9	N8	NNE9	NNE6	NNE5	N5	NNE7.9	NNE14
10-Jul	N4	NW4	NNW5	NW4	NNW5	NE3	NNE2	SSE8	SSE9	SSE10	SSE8	SSE4	SSE6	S9	S12	S12	S10	S8	SE5	ESE4	ESE1	SSE3	SE4	E3	SSE3.7	S12
11-Jul	E2	NNW3	NNW2	WSW1	UO	UO	S5	SSE8	SSE10	S8	S7	SSW8	SSW6	SSW9	S11	S10	S8	S9	S5	WSW2	N0	WSW1	NW2	WNW3	S4.5	S11
12-Jul	SW3	WSW3	SW3	SE1	WNW1	S1	NNE2	NNE3	N6	N9	N10	NNW12	N13	N13	N9	N11	N10	N9	N7	N7	NNW7	NNW9	NNW6	NNW7	N5.8	N13
13-Jul	NW8	NW6	NW6	NNE2	NNW2	SW1	W1	NW8	N11	N19	N21	N21	N22	N20	N22	N17	N14	N17	N18	NNW17	NNW15	NNW13	NNW11	N10	NNW12.1	N22
14-Jul	NNW10	NNW8	NW7	NW5	NW6	NW7	NNW13	NNW15	N16	N18	N14	NNE11	NNE8	NNE7	N13	NNE9	NNE8	N10	N11	NNW7	NNW7	NNW8	NNW6	NW6	N9.1	N18
15-Jul	NNW6	NW5	WNW4	WNW3	WNW3	NNW2	WNW3	WNW3	NNW4	NNE7	NE7	NE7	NE7	NE8	NE8	NE7	NE7	ENE5	ENE5	NNE3	WNW4	WNW3	WNW3	WNW3	NNE3.5	NE8
16-Jul	W4	W3	WNW3	W3	WSW3	SW2	N1	SE6	SSE9	SSE13	SSE14	S14	S15	SSE15	SSE15	SSE14	SSE13	SSE13	SSE13	SSE11	SE6	SSE5	SE8	SSE9	SSE7.7	SSE15
17-Jul	SSE6	SSE6	SSE6	SE6	SSE6	SSE8	SE6	SSE9	SSE11	SE13	SSE13	SE16	SSE12	SE5	ESE7	S2	W3	NNE5	N7	NW6	NNW6	N9	N6	NW1	SE3.8	SE16
18-Jul	WNW4	NW4	NW6	N6	NNW5	NNW5	N5	N5	N9	N7	N9	N5	NNW8	NW7	W1	NNW4	W2	N4	N7	NW5	WNW4	W5	WNW4	WNW5	NNW4.7	N9
19-Jul	WSW2	S3	WSW1	ESE0	WSW1	SSW3	SW1	SSE2	SE5	SSE5	SE6	SSE7	WSW4	ESE4	ESE5	SSE7	SSW3	W6	NNW2	NNE2	WNW3	W2	NW3	W0	S1.4	SSE7
20-Jul	WSW2	W1	SW1	W3	S2	SSW1	SSE3	ESE2	E3	NE4	NE4	E5	E6	ESE6	SSE1	NW6	NW7	N4	ENE3	N4	NNW4	WSW3	NW5	NNW5	N0.8	NW7
21-Jul	WNW4	WNW5	WNW4	WNW4	NW2	SSE2	S3	SSW3	S4	SE6	SE7	SSE8	ESE2	SE8	SE10	SSE7	SSW5	SSE5	ESE3	NNE4	N3	NW3	WNW3	WNW5	SSE1.7	SE10
22-Jul	NW4	WNW4	NW5	WNW4	W4	W2	NW2	N2	NNW2	NNE4	N5	N9	NNE9	NNE8	NNE8	NNE8	N10	NNW6	NNW5	NNW7	N9	N11	N10	NNW8	N5.3	N11
23-Jul	NNW6	NW5	NW4	WNW3	NW1	NE0	NW1	SSW1	SSE4	SSE7	SSE6	SE5	SE6	SSE7	SE7	SSE7	SSE10	N6	SE6	SSE6	S6	S7	SSW4	SW2	SSE2.6	SSE10
24-Jul	WNW2	W2	WSW2	SSW3	S3	SSW3	SSE6	SE3	SE3	SE5	SSE7	SSE5	SSE2	SE2	E1	ESE3	E4	ENE4	NNE3	N4	NE3	N1	ESE1	SE1.7	SSE7	
25-Jul	NNW3	N4	W4	WNW1	E0	NNE5	E5	ENE0	N1	NW4	N4	NNW7	NW4	NNW3	N4	NNE1	NNE3	N5	NNW5	NW5	WNW4	WSW6	SW6	S8	NNW1.9	S8
26-Jul	S8	S8	S9	S9	S6	S10	SSE6	SSE7	SE8	SE7	SE4	E2	N10	NNE9	N10	N17	NNE15	N16	N18	N13	NNE6	ENE6	NE6	ENE7	NE3.0	N18
27-Jul	NE5	NNE7	NNE6	N6	N6	NNW7	N9	N8	NNW8	N8	N11	NNE10	NNE10	N13	N13	NE4	SSW5	WSW4	NW5	SW2	SW2	SSW4	W2	WNW3	N4.8	N13
28-Jul	NW3	WNW3	W3	WSW2	WSW2	WNW2	W2	SSE4	SE5	SE5	SSE6	ESE6	ESE5	SE7	SE7	SE8	SSE13	S9	S10	S7	S6	S4	S4	S4	SSE3.9	SSE13
29-Jul	S5	S4	S6	S5	S5	S6	S6	S7	SSE9	S8	WSW8	SSW9	SSW11	SSW9	SSW10	S10	SSW9	SSW10	SSW7	SSW6	SSW5	S3	SSW4	SSW5	SSW6.9	SSW11
30-Jul	S4	SSW4	WSW1	W1	W2	S2	SSE5	SE6	SE9	SSE11	SSE12	SSE14	SSE16	SSE16	S15	SSE13	S9	SSW6	SSW4	SSW8	SSW10	SSE10	SSE4	WSW3	S6.9	SSE16
31-Jul	WSW4	W2	NNW3	SW2	SSE7	S4	SSE3	SW4	SSW5	SSE13	S8	S6	SW5	WNW7	NNW8	N4	N5	NNW6	WNW3	WSW1	S2	WSW2	SSW2	SW2	SW1.8	SSE13

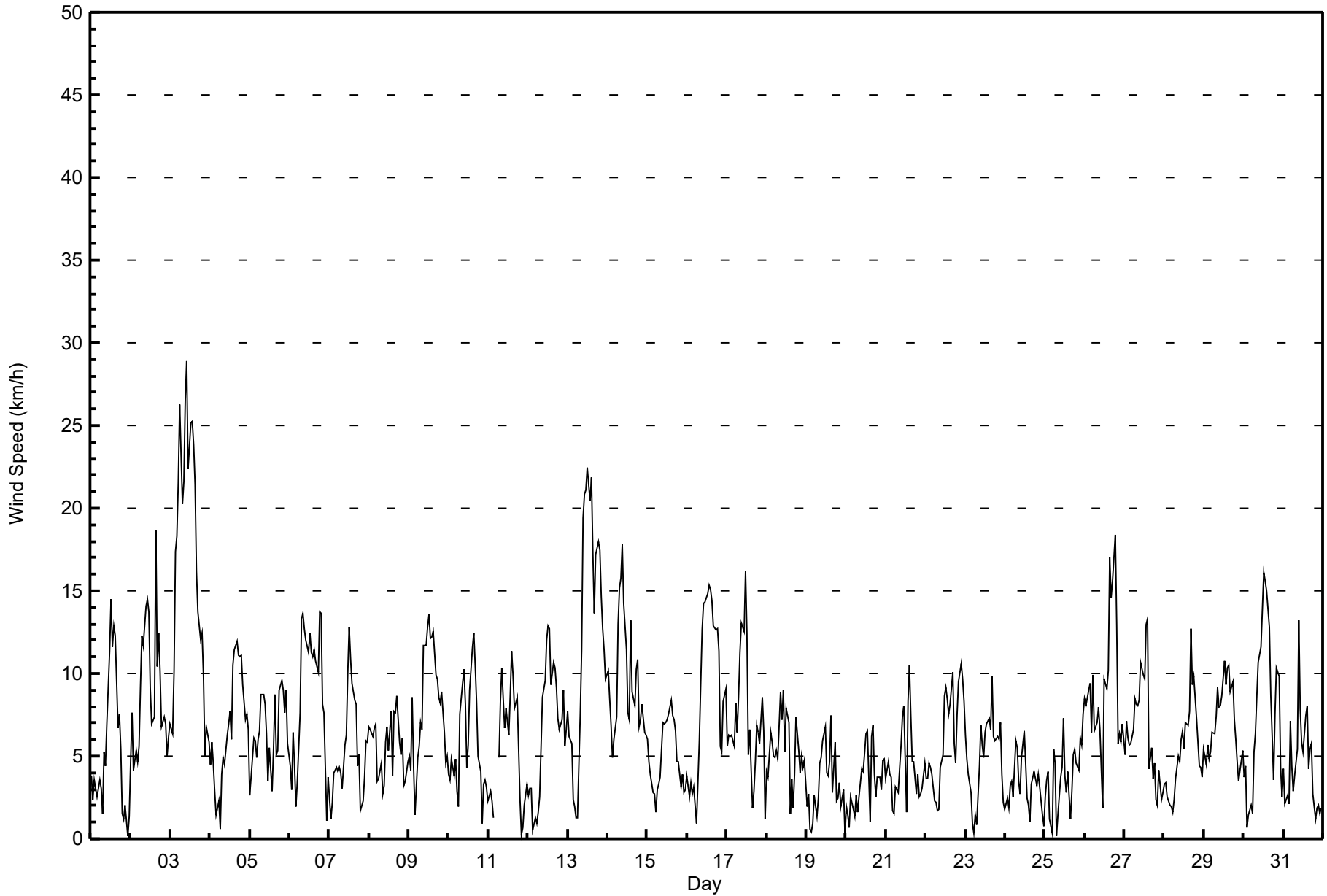
WNW2.4	NNW2.3	WNW2.4	NNW1.8	W1.3	W0.8	NNW0.6	NE0.2	E0.8	NE1.2	NE2.0	ENE1.9	NE1.4	ENE1.3	ENE1.7	NE0.9	N0.6	N2.3	N2.6	NNW2.4	NW2.5	NW1.8	NW1.9	WNW1.8	N10	Diurnal Average
NNW10	NNW8	NW10	NNW17	N18	N22	N26	N20	N22	N26	N29	NNW22	NNW25	N25	N24	N21	N16	N17	N18	NNW17	NNW15	NNW13	NNW11	N10		Diurnal Maximum

UO - Unstable Operation
 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 - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay - Bertha Ganter - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	343	46.23	46.23
6 - 11	302	40.70	86.93
12 - 19	81	10.92	97.84
20 - 28	15	2.02	99.87
29 - 38	1	0.13	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay - Bertha Ganter - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	26	14	7	6	11	11	16	20	28	29	18	29	31	43	32	22	343
6 - 11	44	26	11	4	1	4	23	46	45	16	0	4	8	18	19	33	302
12 - 19	27	9	0	0	0	0	2	21	6	1	0	0	0	0	6	9	81
20 - 28	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	15
29 - 38	1	0	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	111	49	18	10	12	15	41	87	79	46	18	33	39	61	57	66	742

Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Fort McKay - Bertha Ganter - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Jul 3 11:00 Minimum Value: 0 km/h on Jul 15 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: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7									
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	3	1	1	1	1	1	1	1	2	2	2	3	3	2	3	4	3	3	2	2	2	1	1	2	4	
2-Jul	2	3	2	2	2	2	3	3	2	3	3	3	3	3	3	4	4	4	3	2	3	2	1	2	4	
3-Jul	1	2	4	4	5	5	7	6	5	6	7	5	5	5	5	6	4	3	3	2	3	1	1	1	7	
4-Jul	1	1	1	1	1	1	1	1	1	2	3	3	3	3	3	3	2	2	3	2	2	3	1	1	3	
5-Jul	2	1	1	2	1	1	2	2	2	3	3	3	3	3	2	2	2	3	2	2	1	1	1	2	3	
6-Jul	1	1	2	1	2	1	3	4	3	4	4	5	5	5	4	5	4	4	3	3	2	1	2	1	5	
7-Jul	2	1	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	2	1	1	2	2	2	2	3	
8-Jul	3	3	2	3	3	2	1	2	2	2	3	3	2	2	2	4	2	3	2	1	1	2	1	1	4	
9-Jul	2	2	1	1	1	1	2	2	2	3	4	4	4	5	4	5	4	4	3	2	2	2	2	1	5	
10-Jul	1	1	1	1	1	1	1	2	3	3	3	3	3	3	3	3	3	2	1	1	1	1	1	1	3	
11-Jul	1	1	1	1	UO	UO	1	2	2	2	2	2	3	3	4	3	3	2	2	1	1	1	1	1	4	
12-Jul	2	2	1	1	1	1	2	1	3	3	3	3	3	4	3	4	3	3	2	1	2	2	1	1	4	
13-Jul	1	1	2	2	2	1	2	2	4	4	5	5	5	5	6	4	3	5	4	4	3	2	2	2	6	
14-Jul	1	1	1	1	1	1	3	4	4	4	3	4	3	4	3	4	3	3	3	1	2	1	1	1	4	
15-Jul	1	1	1	1	1	2	1	1	2	3	2	2	3	3	3	3	3	3	2	2	1	0	1	1	3	
16-Jul	1	1	1	1	1	1	1	2	2	3	3	4	4	4	4	4	3	3	3	3	1	1	2	2	4	
17-Jul	1	1	1	1	1	2	2	2	3	3	3	5	6	1	2	1	1	2	1	2	1	2	2	1	6	
18-Jul	2	1	1	3	2	2	2	2	2	2	3	2	3	3	2	2	2	2	2	1	1	2	2	2	3	
19-Jul	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	4	4	3	2	1	1	1	1	1	4	
20-Jul	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	3	3	2	1	1	1	1	2	1	3	
21-Jul	1	1	1	1	1	1	1	1	1	1	1	2	3	2	3	3	3	2	1	1	1	1	1	1	3	
22-Jul	1	1	2	2	1	1	1	1	1	3	2	2	3	2	2	3	2	2	1	1	1	2	2	2	3	
23-Jul	1	1	1	1	1	1	1	1	1	1	2	2	2	3	2	3	3	3	2	2	1	1	1	2	3	
24-Jul	2	1	1	2	2	1	2	1	1	2	1	2	1	1	1	1	2	2	2	1	1	1	1	1	2	
25-Jul	1	1	2	2	1	3	4	2	1	2	2	3	2	2	2	1	1	1	1	1	2	3	3	2	4	
26-Jul	2	2	2	2	1	2	3	3	2	3	2	2	3	3	4	4	4	4	4	3	3	3	3	3	4	
27-Jul	2	2	2	2	1	1	2	2	1	2	3	4	4	4	5	5	3	2	3	1	1	2	2	1	5	
28-Jul	1	1	1	1	1	1	1	1	1	1	2	2	3	3	2	3	3	3	3	2	1	1	1	2	3	
29-Jul	2	1	2	1	1	1	1	2	2	3	3	4	4	4	4	4	4	4	3	2	1	1	1	1	4	
30-Jul	1	1	1	2	1	1	2	2	2	2	3	3	4	4	4	4	4	3	1	4	4	2	3	2	4	
31-Jul	3	2	1	1	2	2	2	2	2	3	4	3	3	3	3	3	7	2	1	1	1	3	2	1	7	
	3	3	4	4	5	5	7	6	5	6	7	5	6	5	6	6	7	5	4	4	4	3	3	3		
Diurnal Maximum																										
UO - Unstable Operation																										



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort McKay - Bertha Ganter - July 2023

Direction of Maximum Speed: 354 deg on Jul 3 11:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 348.0 deg on Jul 3	Hours of Data: 742
Direction of Minimum Speed: 58 deg on Jul 25 08:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 0.8 deg on Jul 20	Percent Operational Time: 99.7
Monthly Average Direction: 340.7 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	314	201	218	257	198	180	190	210	165	163	143	160	158	161	174	195	246	298	307	239	324	236	84	260	189.9
2-Jul	311	298	274	267	264	285	296	317	328	309	321	317	294	288	291	322	319	305	296	287	289	295	291	297	303.8
3-Jul	299	299	315	344	356	351	1	1	350	350	354	346	346	352	350	349	353	353	348	351	345	346	313	330	348.0
4-Jul	300	289	297	297	281	299	303	139	140	127	66	79	109	149	143	147	152	161	171	173	180	179	183	183	157.3
5-Jul	218	185	171	182	163	172	185	172	170	255	266	205	247	267	222	182	220	268	324	335	331	355	329	323	238.8
6-Jul	329	299	313	314	242	326	355	4	0	9	21	18	7	7	10	25	16	20	3	358	348	334	275	237	0.2
7-Jul	266	194	193	194	187	186	196	218	197	141	147	139	155	168	180	191	199	208	189	174	259	254	260	272	187.0
8-Jul	278	260	281	265	267	257	164	213	278	245	290	334	99	154	67	331	5	4	12	6	332	329	297	304	306.7
9-Jul	322	347	350	356	6	358	8	24	23	13	22	15	17	27	29	24	43	37	23	10	14	17	18	357	16.6
10-Jul	4	321	338	317	340	43	24	155	158	150	148	149	164	171	169	172	176	175	136	109	106	149	127	100	155.1
11-Jul	100	328	336	245	UO	UO	172	159	161	179	188	192	194	197	188	182	187	177	187	238	350	245	312	284	186.5
12-Jul	218	238	230	135	288	174	18	23	9	354	356	342	352	359	11	351	356	4	5	353	341	340	327	338	350.3
13-Jul	307	305	316	21	329	224	269	318	352	349	356	353	350	352	352	359	3	6	2	348	336	329	330	358	347.8
14-Jul	345	337	321	317	306	322	348	342	354	358	359	12	18	30	8	17	20	9	350	333	332	341	341	314	351.3
15-Jul	328	321	295	293	301	320	283	295	338	18	41	40	43	51	47	48	37	35	57	62	14	296	300	294	13.2
16-Jul	272	276	291	277	257	234	357	142	161	168	165	169	170	162	154	163	153	160	161	149	144	150	145	152	163.7
17-Jul	155	152	153	144	147	148	145	148	162	146	154	141	159	146	103	170	279	12	352	323	338	1	360	317	140.6
18-Jul	303	320	325	354	334	342	358	355	357	6	8	10	343	323	263	330	260	352	350	319	282	281	300	295	335.9
19-Jul	244	186	251	118	256	203	216	153	144	148	137	151	237	123	103	158	210	278	343	25	303	272	309	273	176.7
20-Jul	245	275	221	259	187	201	162	109	94	41	41	91	91	116	166	306	306	353	66	352	332	244	312	328	3.9
21-Jul	293	294	289	296	310	167	185	198	170	137	137	148	117	138	139	166	204	154	114	25	358	323	284	298	168.3
22-Jul	312	285	317	287	278	271	308	4	339	25	3	2	21	26	18	21	7	348	329	348	356	350	356	343	352.4
23-Jul	328	321	310	292	307	52	319	196	155	155	160	142	136	165	140	157	155	9	145	158	181	176	210	234	164.2
24-Jul	303	265	255	204	187	199	164	168	136	132	143	157	168	159	139	97	119	87	70	32	1	40	360	103	143.8
25-Jul	332	354	267	301	95	20	90	58	7	311	8	348	318	343	11	33	17	357	343	325	288	241	214	184	331.5
26-Jul	184	183	176	181	171	172	156	149	145	133	127	100	7	12	8	8	12	6	4	7	32	61	35	58	50.1
27-Jul	49	19	15	11	353	346	356	353	344	354	354	22	18	9	5	42	200	258	320	226	236	196	265	282	357.7
28-Jul	312	291	270	248	256	302	278	158	138	146	151	119	117	144	140	138	159	176	178	185	181	186	187	181	166.2
29-Jul	190	183	189	186	185	181	182	178	167	183	238	192	196	198	195	187	199	194	198	195	200	182	199	200	191.7
30-Jul	174	193	252	264	279	189	157	146	143	154	151	152	157	159	173	165	190	209	211	204	213	162	153	240	170.5
31-Jul	251	278	332	221	165	169	149	234	201	159	174	185	229	284	335	350	351	343	288	246	184	254	213	215	223.8

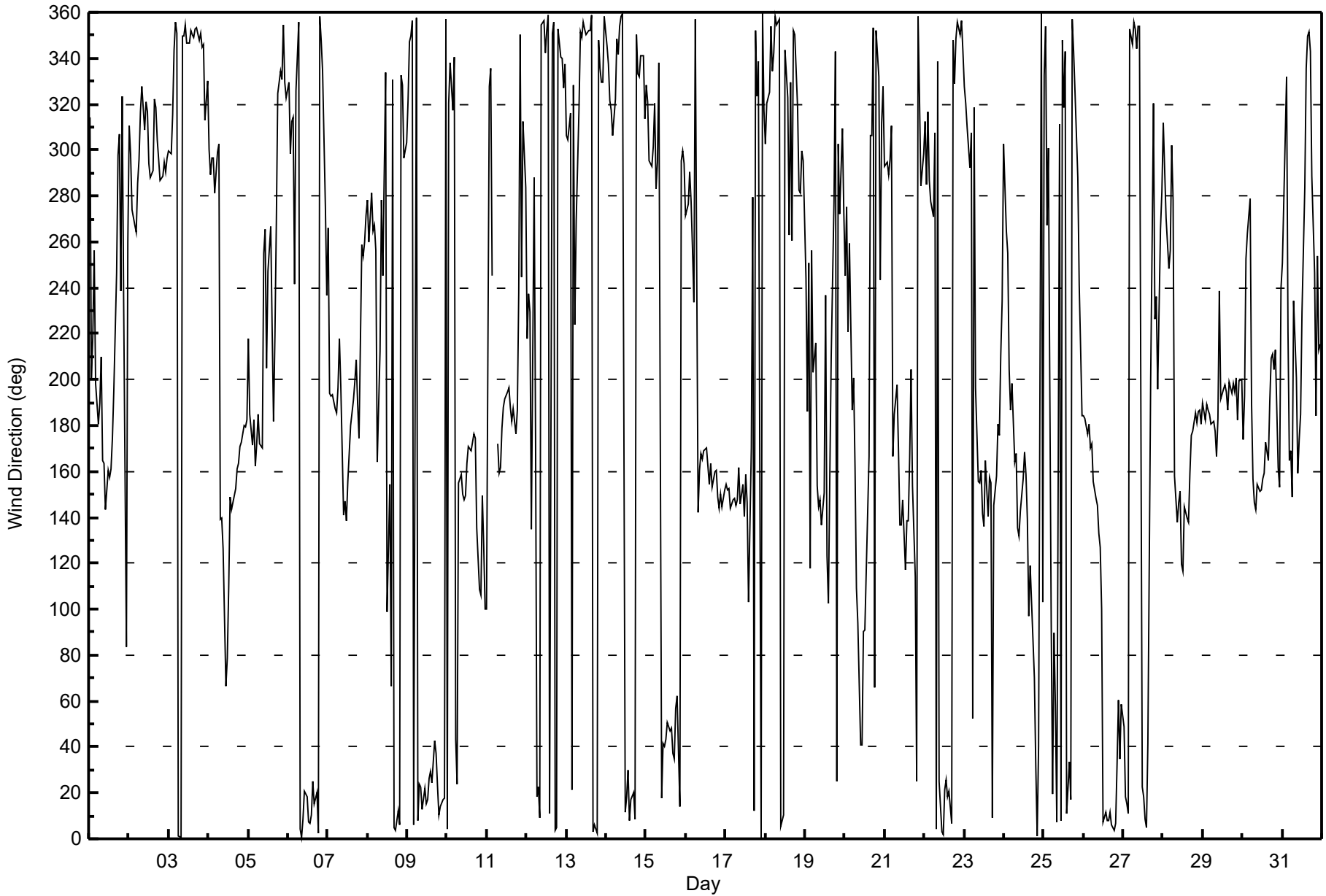
296.3 286.6 292.1 284.1 271.9 280.4 347.2 36.0 83.5 47.2 36.4 61.0 52.6 71.0 65.8 45.9 10.2 354.1 355.5 346.1 323.8 313.6 305.9 296.9
 Diurnal Average

UO - Unstable Operation
 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 - July 2023





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Fort McKay - Bertha Ganter - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 112 deg on Jul 20 15:00 Minimum Value: 6 deg on Jul 6 22:00 Percentiles: P ₁ = 10 P ₁₀ = 14 Q ₁ = 18 Median = 26 Q ₃ = 46 P ₉₀ = 65 P ₉₉ = 94																		Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7								
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	42	64	27	55	51	28	29	81	19	31	16	17	15	17	15	35	49	30	23	84	82	65	98	94	98	
2-Jul	55	26	41	50	43	37	18	19	13	13	14	14	23	33	27	12	14	19	18	24	26	20	25	21	55	
3-Jul	15	17	20	20	18	16	18	18	18	17	18	16	16	16	18	20	16	16	13	15	12	10	12	12	20	
4-Jul	14	14	12	19	61	33	89	23	20	51	44	48	35	66	21	17	16	17	11	12	12	10	12	13	89	
5-Jul	59	32	10	13	12	13	22	15	25	51	49	80	53	70	49	26	56	50	34	12	9	14	9	21	80	
6-Jul	21	23	16	29	85	35	18	18	18	22	30	32	29	33	33	34	31	28	18	18	15	6	78	24	85	
7-Jul	55	57	53	11	10	16	29	51	62	14	17	15	19	39	35	42	42	37	16	49	58	43	49	51	62	
8-Jul	38	50	42	47	44	68	43	65	92	74	47	51	43	24	48	43	18	17	17	12	6	14	18	15	92	
9-Jul	17	36	13	19	80	12	18	26	28	23	29	26	26	32	31	35	43	36	26	17	18	28	25	17	80	
10-Jul	18	32	16	26	21	33	58	23	22	19	30	70	62	38	21	20	20	16	30	23	64	32	19	26	70	
11-Jul	43	43	34	58	UO	UO	16	15	20	28	34	38	47	32	27	26	30	17	17	33	73	69	80	24	80	
12-Jul	73	58	46	86	60	82	75	65	27	25	23	23	22	24	27	28	20	20	16	11	15	16	21	17	86	
13-Jul	10	12	25	43	69	67	74	17	20	19	18	21	19	20	19	18	20	18	17	14	11	12	11	12	74	
14-Jul	9	8	17	29	19	11	16	15	19	20	19	26	31	33	23	26	26	19	15	12	15	11	14	13	33	
15-Jul	18	30	16	44	32	23	30	23	40	31	38	39	40	42	41	41	43	37	47	42	38	12	14	27	47	
16-Jul	16	22	25	30	18	51	81	21	19	18	16	19	21	19	16	19	18	15	14	13	14	14	13	14	81	
17-Jul	14	15	16	13	14	15	16	20	17	14	15	12	17	32	24	77	58	35	21	19	15	12	20	67	77	
18-Jul	44	23	15	28	20	17	22	25	20	25	22	42	29	40	96	55	81	49	13	25	32	26	37	23	96	
19-Jul	60	35	85	81	88	48	67	56	21	37	32	38	65	62	49	36	88	59	85	59	30	76	55	89	89	
20-Jul	55	93	89	33	44	72	42	61	57	46	57	38	33	40	112	51	28	72	32	14	33	54	32	20	112	
21-Jul	28	13	21	19	65	58	23	58	40	23	15	24	93	17	16	40	58	51	45	31	25	30	40	15	93	
22-Jul	26	26	12	19	20	45	45	74	56	50	26	18	26	25	24	24	20	22	21	12	11	13	13	13	74	
23-Jul	19	12	16	52	77	59	73	82	30	21	24	38	29	44	34	40	28	37	47	15	13	15	39	43	82	
24-Jul	25	31	44	18	69	58	17	24	36	87	27	26	31	71	71	100	62	35	57	33	14	34	73	82	100	
25-Jul	53	20	47	103	102	47	56	99	75	60	26	29	63	77	24	59	20	20	16	33	47	48	54	19	103	
26-Jul	19	18	14	17	14	14	38	20	24	33	66	93	23	30	25	19	19	17	16	17	41	40	42	40	93	
27-Jul	43	21	18	13	27	16	14	15	17	19	24	36	35	25	20	90	44	64	67	55	62	37	67	55	90	
28-Jul	21	24	38	62	64	73	59	46	22	23	46	32	55	57	24	26	17	20	18	16	10	18	17	37	73	
29-Jul	26	25	22	15	17	15	18	20	18	41	49	49	35	48	43	37	40	33	31	19	14	24	22	25	49	
30-Jul	22	13	81	58	22	59	28	22	17	17	17	17	18	20	22	25	46	36	25	35	43	18	32	62	81	
31-Jul	55	74	49	63	14	44	54	53	40	17	55	56	65	50	37	73	65	47	46	79	62	67	91	84	91	
	73	93	89	103	102	82	89	99	92	87	66	93	93	77	112	100	88	72	85	84	82	76	98	94		
	Diurnal Maximum																									
UO - Unstable Operation																										



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS02 MILDRED LAKE JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS02)
JULY 2023

MONTHLY SUMMARY

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	35	37	99.73	28.1	0	4.9	0
H2S (ppb) Average	706	38	38	100	4.5	0	0.8	0
THC (ppm) Average	706	35	38	99.6	3.7	-	2.4	-
NMHC(ppm) Average	706	35	38	99.6	0.691	-	0.205	-
CH4(ppm) Average	706	35	38	99.6	3.3	-	2.3	-
Temperature (C) Average	744	0	0	100	29.6	-	22.8	-
Relative Humidity (%) Average	730	0	14	98.12	100	-	84.6	-
Wind Speed 10 m (km/h) Average	741	0	3	99.6	24	-	16	-
Wind Direction 10 m (deg) Average	741	0	3	99.6	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS02)

JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	1.06	2.7	-	0	0	0.1	0.2	0.7	2.7	28.1
H2S (ppb) Average	706	0.44	0.5	-	0	0	0.1	0.3	0.6	1	4.5
THC (ppm) Average	706	2.18	0.3	-	1.9	1.9	2	2.1	2.3	2.5	3.7
NMHC(ppm) Average	706	0.088	0.102	-	0	0	0	0.1	0.1	0.2	0.691
CH4(ppm) Average	706	2.09	0.2	-	1.9	1.9	2	2	2.2	2.3	3.3
Temperature 2 m (C) Average	744	18.7	4.6	-	6.1	12.9	15.2	18.2	22.3	25.3	29.6
Relative Humidity (%) Average	730	64.34	20.3	-	25.9	36.5	47.4	64.7	81.4	93.5	100
Wind Speed 10 m (km/h) Average	741	7.8	4	-	0	3	5	7	10	14	24
Wind Direction 10 m (deg) Average	741	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS02)
JULY 2023

OPERATIONAL NOTES

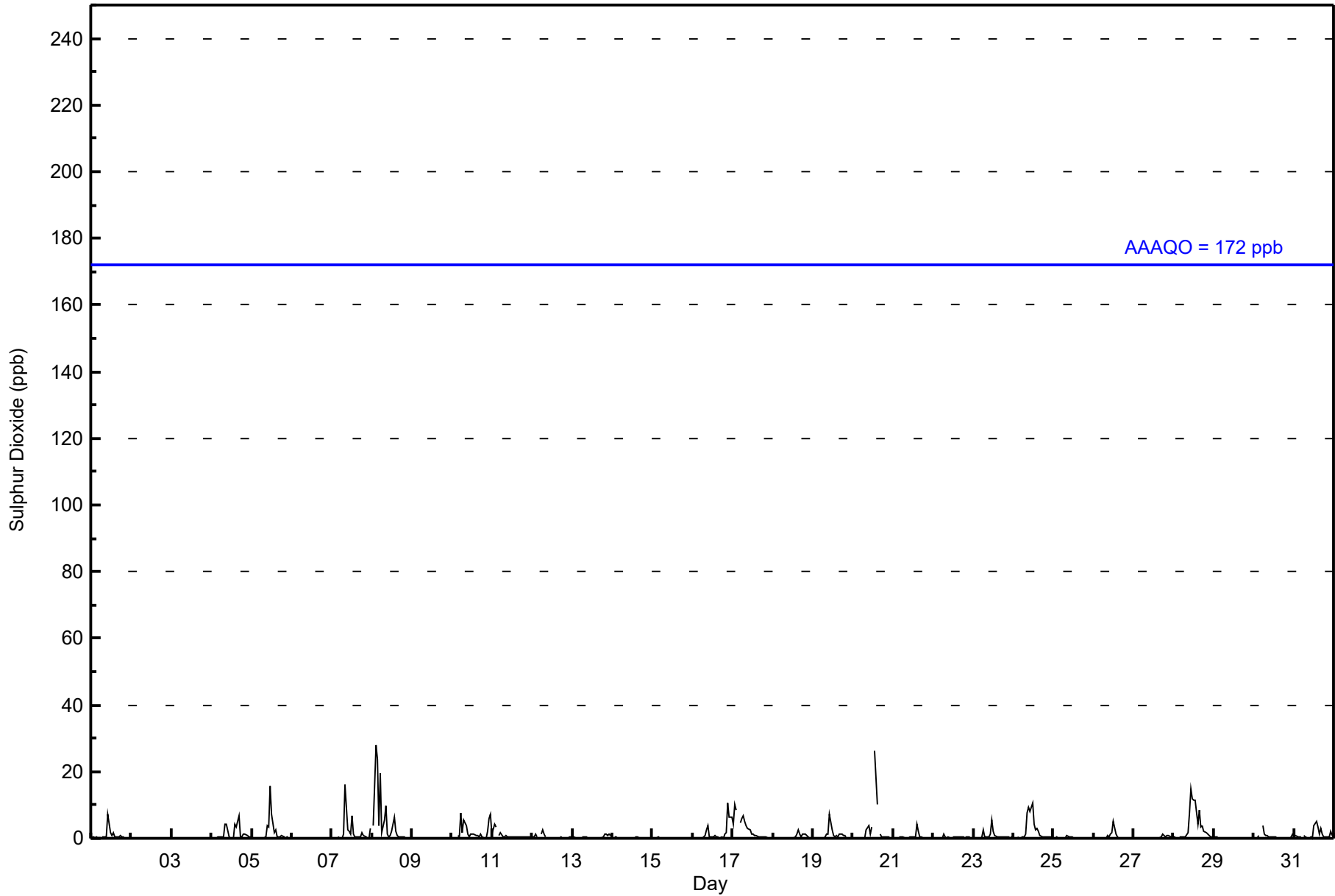
Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, THC/NMHC/CH4	20 Jul 2023 13:00	20 Jul 2023 13:00	1	Maintenance - sample manifold cleaned
SO2	20 Jul 2023 16:00	20 Jul 2023 16:00	1	Maintenance - replaced support gas cylinder
THC/NMHC/CH4	20 Jul 2023 16:00	20 Jul 2023 17:00	2	Maintenance - replaced support gas cylinder
Relative Humidity	02 Jul 2023 00:00	02 Jul 2023 00:00	1	Sensor operated out of range
Relative Humidity	02 Jul 2023 03:00	02 Jul 2023 12:00	10	Sensor operated out of range
Relative Humidity	02 Jul 2023 23:00	03 Jul 2023 00:00	2	Sensor operated out of range
Relative Humidity	03 Jul 2023 03:00	03 Jul 2023 03:00	1	Sensor operated out of range
Wind Speed, Wind Direction	08 Jul 2023 23:00	08 Jul 2023 23:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	11 Jul 2023 21:00	11 Jul 2023 21:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	16 Jul 2023 04:00	16 Jul 2023 04:00	1	Flat line in sensor output signal



Wood Buffalo Environmental Association
Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb
Mildred Lake - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		744																																									
Maximum Value: 28.1 ppb on Jul 8 03:00		Maximum Daily Average: 4.9 ppb on Jul 8				Hours of Data:		707																																									
Minimum Value: 0.0 ppb on Jul 2 06:00		Minimum Daily Average: 0.0 ppb on Jul 3				Hours of Missing Data:		37																																									
Maximum Diurnal Average: 2.1 ppb at hour 14		Minimum Diurnal Average: 0.4 ppb at hour 21				Hours of Calibration:		35																																									
Monthly Average: 1.06 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.2 Q ₃ = 0.7 P ₉₀ = 2.7 P ₉₉ = 12.0				Percent Operational Time:		99.7																																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	0.4	0.4	0.2	0.2	0.2	Z	0.3	0.3	0.5	0.5	7.2	1.7	1.0	1.9	0.6	0.3	0.6	0.7	0.5	0.3	0.2	0.2	0.1	0.1	0.8	7.2																							
2-Jul	Z	0.1	0.1	0.2	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2																						
3-Jul	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0																						
4-Jul	0.0	0.0	Z	0.2	0.3	0.6	0.3	0.4	4.4	4.3	0.3	0.2	0.2	0.2	4.4	3.5	6.9	0.4	0.6	1.3	1.4	0.7	0.3	0.3	1.3	6.9																							
5-Jul	0.2	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.2	3.7	3.5	15.5	7.2	1.5	2.4	0.6	0.3	0.6	0.9	0.4	0.2	0.2	0.2	0.1	1.6	15.5																							
6-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1																							
7-Jul	0.1	0.1	0.1	0.2	0.3	Z	0.1	1.4	16.2	2.4	2.2	1.4	6.7	1.4	0.3	0.3	0.3	0.5	1.7	0.8	0.3	0.0	0.1	3.2	1.7	16.2																							
8-Jul	Z	3.9	28.1	23.9	3.8	19.4	1.6	5.4	9.9	1.1	0.6	0.8	2.1	6.3	2.3	0.7	0.3	0.5	0.3	0.3	0.1	0.1	0.2	0.2	4.9	28.1																							
9-Jul	0.3	Z	0.1	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.3																							
10-Jul	0.0	0.1	Z	0.8	0.2	7.4	1.9	5.3	3.7	1.2	0.5	1.3	1.3	1.3	0.9	0.8	0.3	1.4	0.2	0.2	0.2	2.0	6.0	7.3	1.9	7.4																							
11-Jul	1.3	4.4	3.2	Z	0.8	1.8	0.4	0.5	0.7	0.5	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.3	0.2	0.3	0.2	0.2	0.8	4.4																							
12-Jul	0.2	0.3	1.1	0.4	Z	1.4	2.6	1.2	0.6	C	C	C	C	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.3	0.4	0.5	2.6																							
13-Jul	0.3	0.3	0.2	0.1	0.2	Z	0.3	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.4	1.4	1.1	0.9	1.1	0.9	0.4	1.4																							
14-Jul	Z	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.0	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.0	0.1	0.1	0.3																							
15-Jul	0.1	Z	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2																							
16-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.9	2.7	3.7	0.6	0.3	0.3	0.7	0.6	0.4	0.2	0.2	0.2	1.4	1.7	10.6	6.3	6.5	1.6	10.6																							
17-Jul	4.4	10.1	8.6	Z	4.7	5.8	6.8	5.0	3.8	3.1	2.4	1.4	1.1	0.9	0.8	0.5	0.4	0.3	0.2	0.3	0.3	0.2	0.2	0.1	2.7	10.1																							
18-Jul	0.0	0.0	0.0	0.2	Z	0.2	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.6	1.3	2.7	1.1	0.4	1.3	1.1	0.6	0.2	0.2	0.1	0.5	2.7																							
19-Jul	0.1	0.1	0.2	0.0	0.2	Z	0.1	0.5	1.2	1.4	7.3	2.3	1.0	0.6	0.8	0.5	1.2	1.2	1.0	0.7	0.1	0.0	0.0	0.0	0.9	7.3																							
20-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.7	3.9	1.3	3.5	M	26.5	10.3	M	1.1	0.5	0.4	0.4	0.6	0.4	0.2	0.1	2.5	26.5																							
21-Jul	0.1	Z	0.1	0.1	0.3	0.6	0.3	0.0	0.0	0.0	0.3	0.4	0.3	0.4	4.4	2.3	0.4	0.3	0.2	0.1	0.2	0.1	0.2	0.1	0.5	4.4																							
22-Jul	0.1	0.0	Z	0.0	0.0	0.2	1.1	0.3	0.1	0.2	0.2	0.1	0.2	0.3	0.4	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.2	0.1	0.2	1.1																							
23-Jul	0.1	0.0	0.1	Z	0.2	0.4	2.5	0.5	0.4	0.5	1.3	5.7	2.1	0.9	0.6	0.6	0.6	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.8	5.7																							
24-Jul	0.1	0.2	0.1	0.2	Z	0.3	0.2	1.4	7.8	9.3	8.1	10.7	4.1	2.7	3.1	2.1	0.7	0.4	0.3	0.5	0.4	0.4	0.2	0.1	2.3	10.7																							
25-Jul	0.1	0.1	0.3	0.2	0.0	Z	0.0	0.0	0.7	0.4	0.3	0.2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.7																							
26-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.2	1.3	1.7	5.1	1.2	0.3	0.2	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.5	5.1																							
27-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.2	1.4	0.9	0.4	0.9	0.8	0.3	0.4	0.3	1.4																							
28-Jul	0.4	0.3	Z	0.3	0.3	0.5	0.4	0.5	1.6	7.4	14.7	12.0	11.3	11.6	4.3	8.6	3.6	3.7	2.2	1.6	1.2	0.8	0.6	0.5	3.8	14.7																							
29-Jul	0.3	0.3	0.2	Z	0.1	0.0	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.3																							
30-Jul	0.0	0.0	0.0	0.8	Z	3.9	1.4	1.0	0.8	0.5	0.5	0.3	0.3	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.5	3.9																							
31-Jul	0.8	0.8	0.4	0.2	0.3	Z	0.7	0.3	0.2	0.2	0.2	0.1	3.7	5.2	3.3	1.4	3.0	1.2	0.6	0.5	0.3	0.5	2.2	0.6	1.2	5.2																							
																								0.4	0.8	1.7	1.1	0.5	1.7	0.7	0.8	1.9	1.5	1.8	2.0	1.7	2.1	1.4	0.9	0.7	0.5	0.4	0.4	0.6	0.6	0.7	Diurnal Average		
																								4.4	10.1	28.1	23.9	4.7	19.4	6.8	5.4	16.2	9.3	14.7	15.5	11.3	26.5	10.3	8.6	6.9	3.7	2.2	1.6	1.7	10.6	6.3	7.3	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
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mildred Lake - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	695	98.30	98.30
11 - 20	9	1.27	99.58
21 - 60	3	0.42	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mildred Lake - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	90	44	20	18	22	29	45	53	78	60	33	22	28	30	40	80	692
11 - 20	0	0	0	1	0	1	0	0	2	2	0	2	1	0	0	0	9
21 - 60	0	0	0	0	0	0	0	0	0	1	0	2	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	90	44	20	19	22	30	45	53	80	63	33	26	29	30	40	80	704

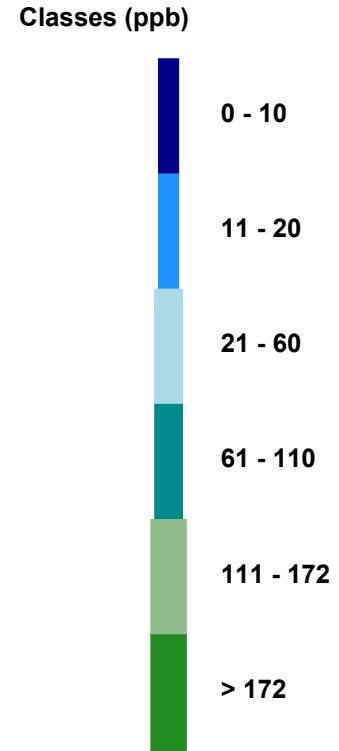
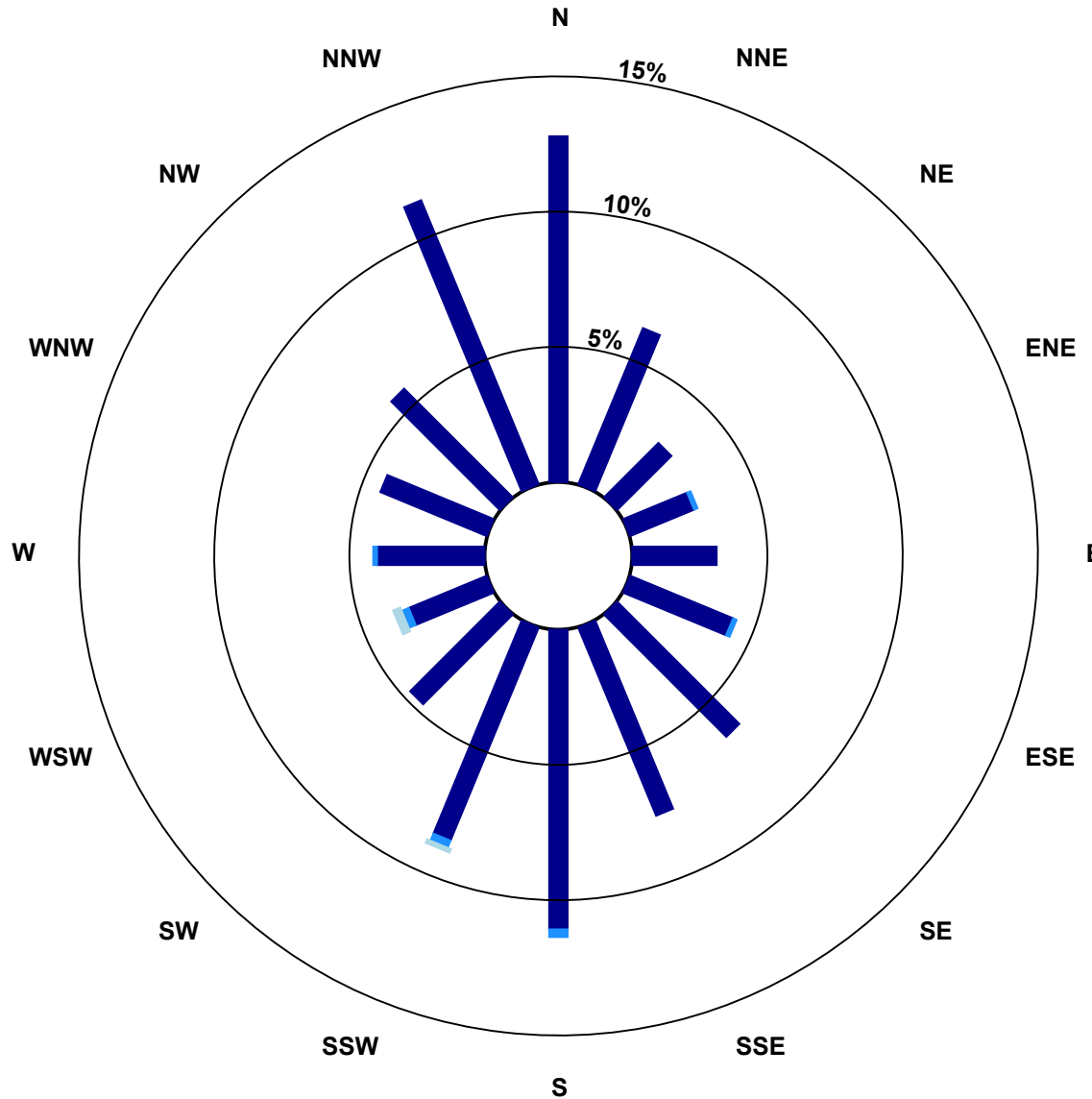
Total Number of Valid Hours: 704

Total Number of Hours: 744

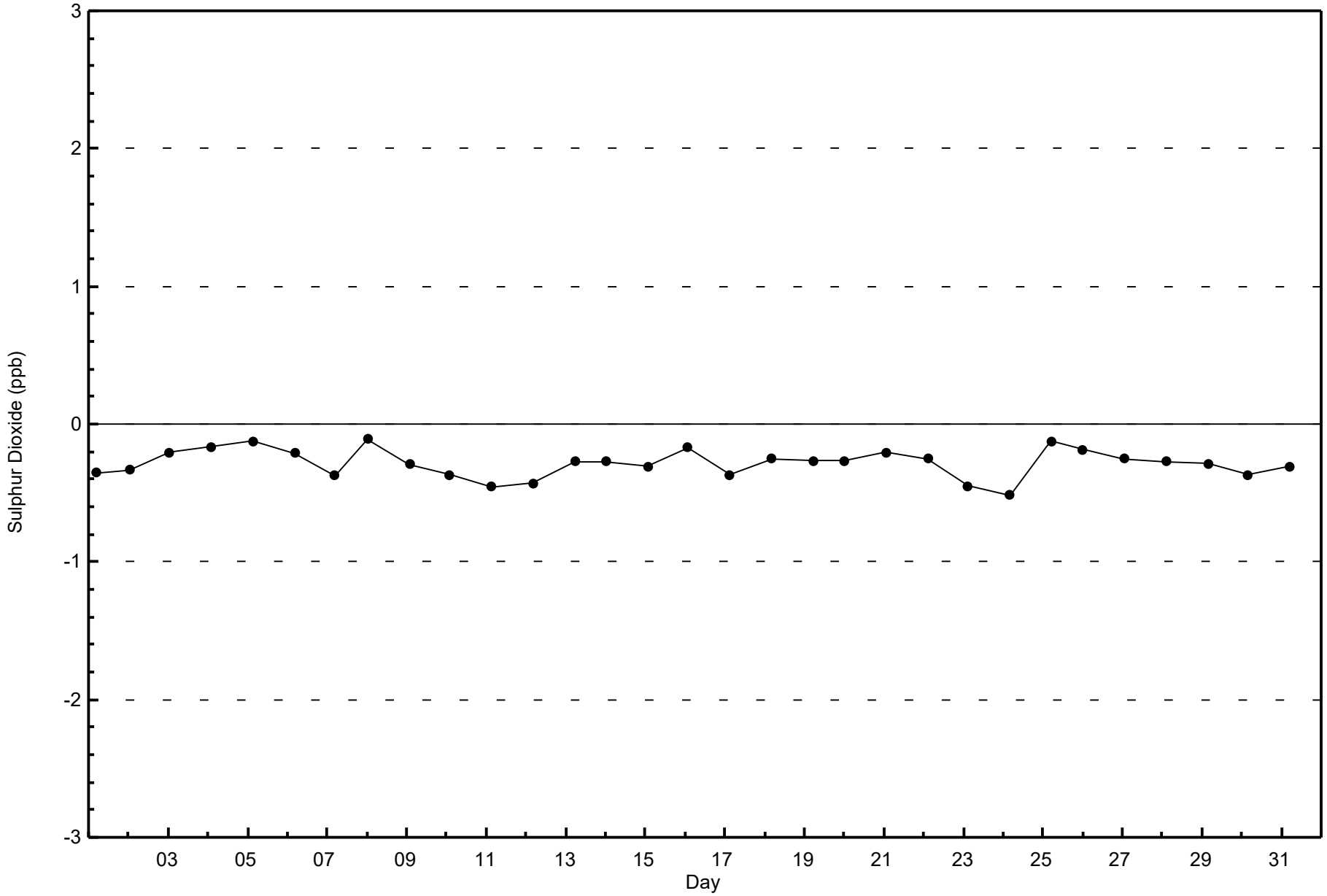


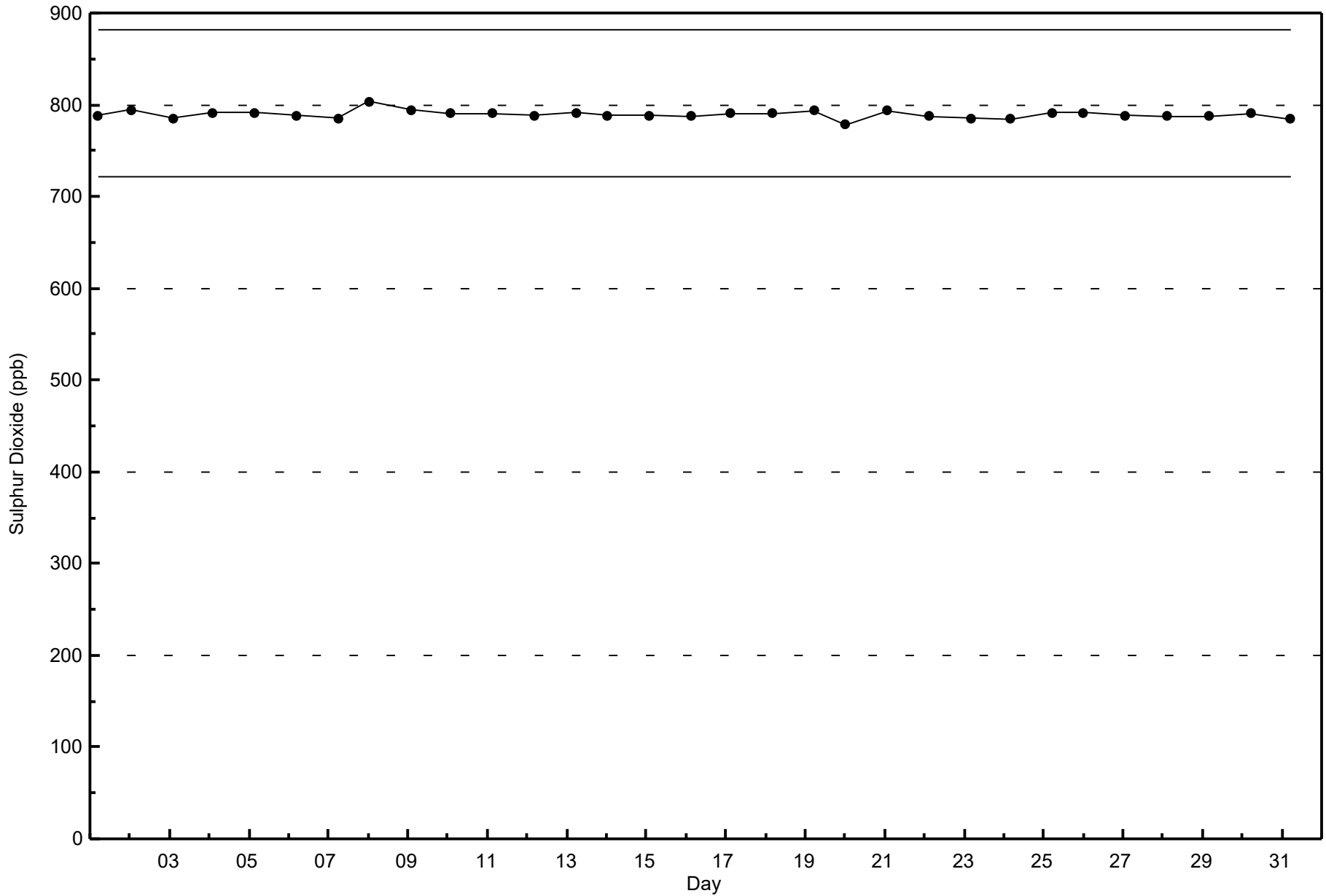
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Mildred Lake



Total Number of Valid Hours: 704







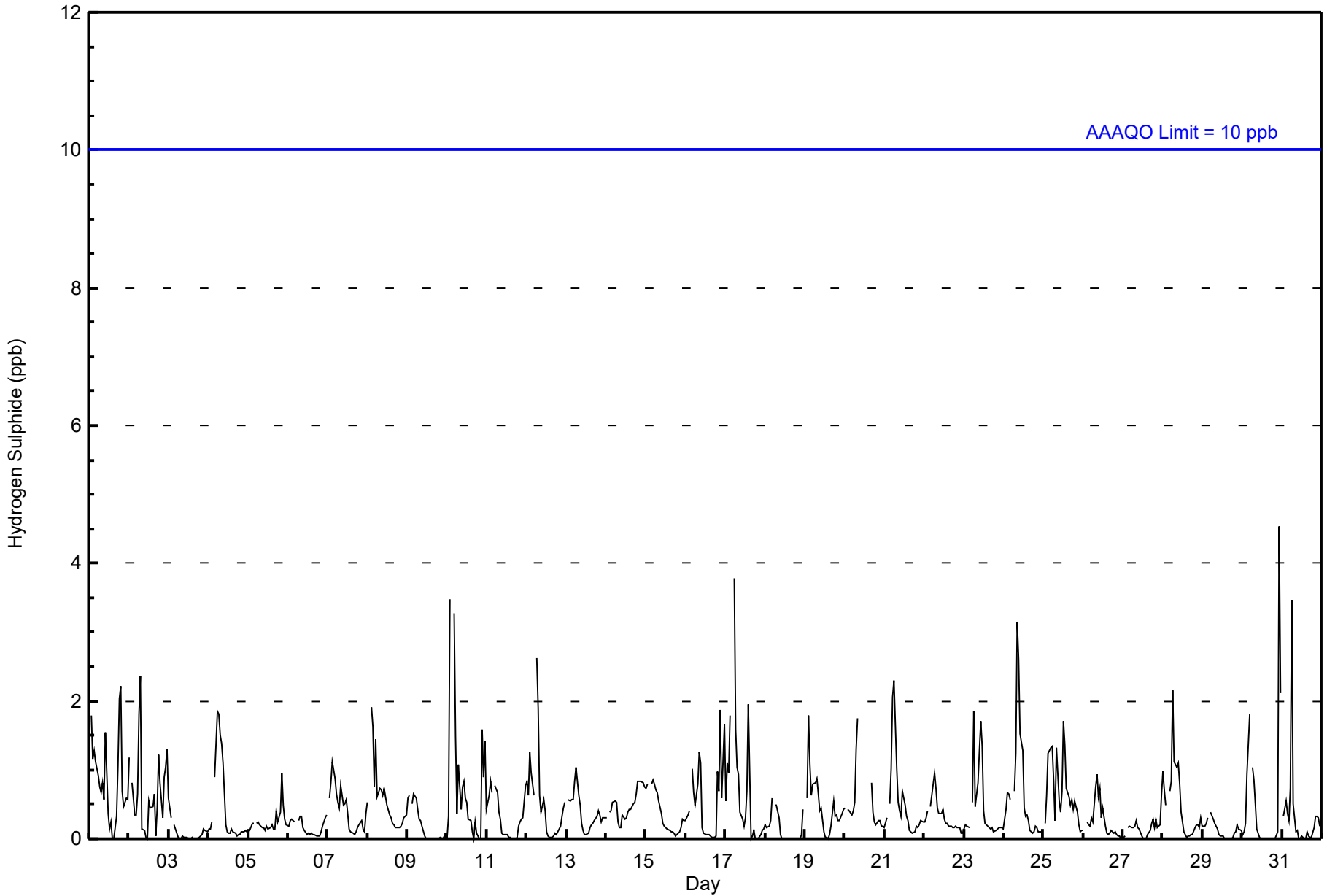
Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

Mildred Lake - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744														744						
Maximum Value: 4.5 ppb on Jul 30 23:00		Maximum Daily Average: 0.8 ppb on Jul 1		Hours of Data: 706														706								
Minimum Value: 0.0 ppb on Jul 1 16:00		Minimum Daily Average: 0.1 ppb on Jul 3		Hours of Missing Data: 38														38								
Maximum Diurnal Average: 1.0 ppb at hour 7		Minimum Diurnal Average: 0.1 ppb at hour 16		Hours of Calibration: 38														38								
Monthly Average: 0.44 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.3 Q ₃ = 0.6 P ₉₀ = 1.0 P ₉₉ = 2.6		Percent Operational Time: 100.0														100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	Z	1.8	1.2	1.3	1.1	0.9	0.7	0.7	0.8	0.6	1.5	0.4	0.2	0.3	0.0	0.0	0.3	1.1	2.0	2.2	0.7	0.5	0.6	0.6	0.8	2.2
2-Jul	1.2	Z	0.8	0.4	0.3	0.7	1.8	2.4	0.1	0.1	0.0	0.0	0.5	0.5	0.5	0.6	0.0	0.4	1.2	0.8	0.3	0.9	1.0	1.3	0.7	2.4
3-Jul	0.6	0.3	Z	0.2	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	0.1	0.1	0.1	0.1	0.1	0.6
4-Jul	0.1	0.1	0.2	Z	0.9	1.9	1.8	1.5	1.4	1.1	0.2	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	0.5	1.9
5-Jul	0.1	0.1	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.4	0.3	0.4	0.9	0.5	0.3	0.2	0.3	0.9
6-Jul	0.2	0.3	0.3	0.3	0.3	Z	0.3	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.2	0.3	0.3	0.2	0.3
7-Jul	Z	0.6	0.8	1.1	0.9	0.7	0.5	0.5	0.8	0.5	0.5	0.6	0.4	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.1	0.1	0.4	0.4	1.1
8-Jul	0.5	Z	1.9	1.6	0.8	1.4	0.6	0.7	0.7	0.6	0.7	0.6	0.5	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.6	1.9
9-Jul	0.6	0.6	Z	0.5	0.7	0.6	0.4	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.7
10-Jul	0.0	0.3	3.5	Z	3.3	1.5	0.4	1.1	0.4	0.8	0.8	0.6	0.5	0.3	0.3	0.1	0.0	0.2	0.1	0.0	0.0	1.6	0.9	1.4	0.8	3.5
11-Jul	0.4	0.6	0.8	0.7	Z	0.8	0.7	0.4	0.3	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.3	0.8	0.3	0.8
12-Jul	0.8	0.6	1.3	0.9	0.6	Z	2.6	1.9	0.6	0.4	0.6	0.4	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.4	0.5	0.6	2.6
13-Jul	Z	0.6	0.6	0.6	0.6	0.8	1.0	0.6	0.5	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.2	0.3	0.3	0.4	1.0
14-Jul	0.3	Z	0.4	0.4	0.5	0.6	0.5	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.8	0.8	0.8	0.8	0.7	0.5	0.8
15-Jul	0.7	0.8	Z	0.8	0.8	0.8	0.7	0.7	0.5	0.4	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.3	0.3	0.4	0.8
16-Jul	0.3	0.4	0.4	Z	1.0	0.7	0.5	0.8	1.3	1.1	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	1.0	0.7	1.9	0.6	1.7	0.6	1.9
17-Jul	0.6	1.1	1.0	1.8	Z	3.8	1.6	1.0	0.9	0.4	0.3	0.2	0.3	0.7	2.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.7	3.8
18-Jul	0.2	0.2	0.2	0.3	0.6	Z	0.5	0.5	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.4	0.1	0.6
19-Jul	Z	0.6	1.8	1.1	0.6	0.8	0.8	0.9	0.7	0.4	0.4	0.1	0.0	0.0	0.1	0.2	0.6	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	1.8
20-Jul	0.5	Z	0.4	0.4	0.3	0.4	0.5	1.3	1.8	C	C	C	C	C	C	C	0.8	0.4	0.2	0.2	0.3	0.3	0.2	0.2	--	1.8
21-Jul	0.2	0.3	Z	0.5	1.0	2.1	2.3	1.0	0.5	0.4	0.3	0.7	0.5	0.3	0.3	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.5	2.3
22-Jul	0.2	0.3	0.4	Z	0.5	0.8	1.0	0.7	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.3	1.0
23-Jul	0.1	0.2	0.2	0.2	Z	0.5	1.8	0.5	0.8	1.3	1.7	1.3	0.4	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.5	1.8
24-Jul	0.2	0.4	0.7	0.7	0.6	Z	0.7	1.2	3.1	2.6	1.5	1.3	0.5	0.3	0.3	0.3	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.7	3.1
25-Jul	Z	0.2	0.6	1.2	1.3	1.3	0.9	0.3	1.3	0.5	0.4	0.7	1.7	1.4	0.7	0.6	0.5	0.6	0.4	0.6	0.4	0.2	0.1	0.1	0.7	1.7
26-Jul	0.1	Z	0.3	0.2	0.2	0.3	0.2	0.7	0.9	0.6	0.7	0.3	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.3	0.9
27-Jul	0.0	0.0	Z	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.2	0.3	0.2	0.2	0.6	0.2	0.6
28-Jul	1.0	0.7	0.5	Z	0.7	0.8	2.2	1.1	1.0	1.1	0.8	0.4	0.2	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.5	2.2
29-Jul	0.2	0.2	0.2	0.3	Z	0.4	0.3	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.4
30-Jul	0.1	0.1	0.2	0.9	1.8	Z	1.0	0.9	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	4.5	2.1	0.5	4.5	
31-Jul	Z	0.3	0.5	0.4	0.3	0.7	3.5	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.3	0.3	0.3	0.2	0.3	3.5
																								Diurnal Average		
																								Diurnal Maximum		
																								0.4 0.5 0.7 0.7 0.8 0.9 1.0 0.7 0.7 0.5 0.4 0.3 0.3 0.2 0.2 0.1 0.1 0.2 0.2 0.3 0.2 0.3 0.4 0.5		
																								1.2 1.8 3.5 1.8 3.3 3.8 3.5 2.4 3.1 2.6 1.7 1.3 1.7 1.4 2.0 0.6 0.8 1.1 2.0 2.2 0.9 1.9 4.5 2.1		
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	698	98.87	98.87
3 - 4	7	0.99	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: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	89	43	22	19	20	27	43	51	78	61	35	25	28	31	41	83	696
3 - 4	0	1	0	0	1	2	2	1	0	0	0	0	0	0	0	0	7
5 - 7	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	89	44	22	19	21	30	45	52	78	61	35	25	28	31	41	83	704

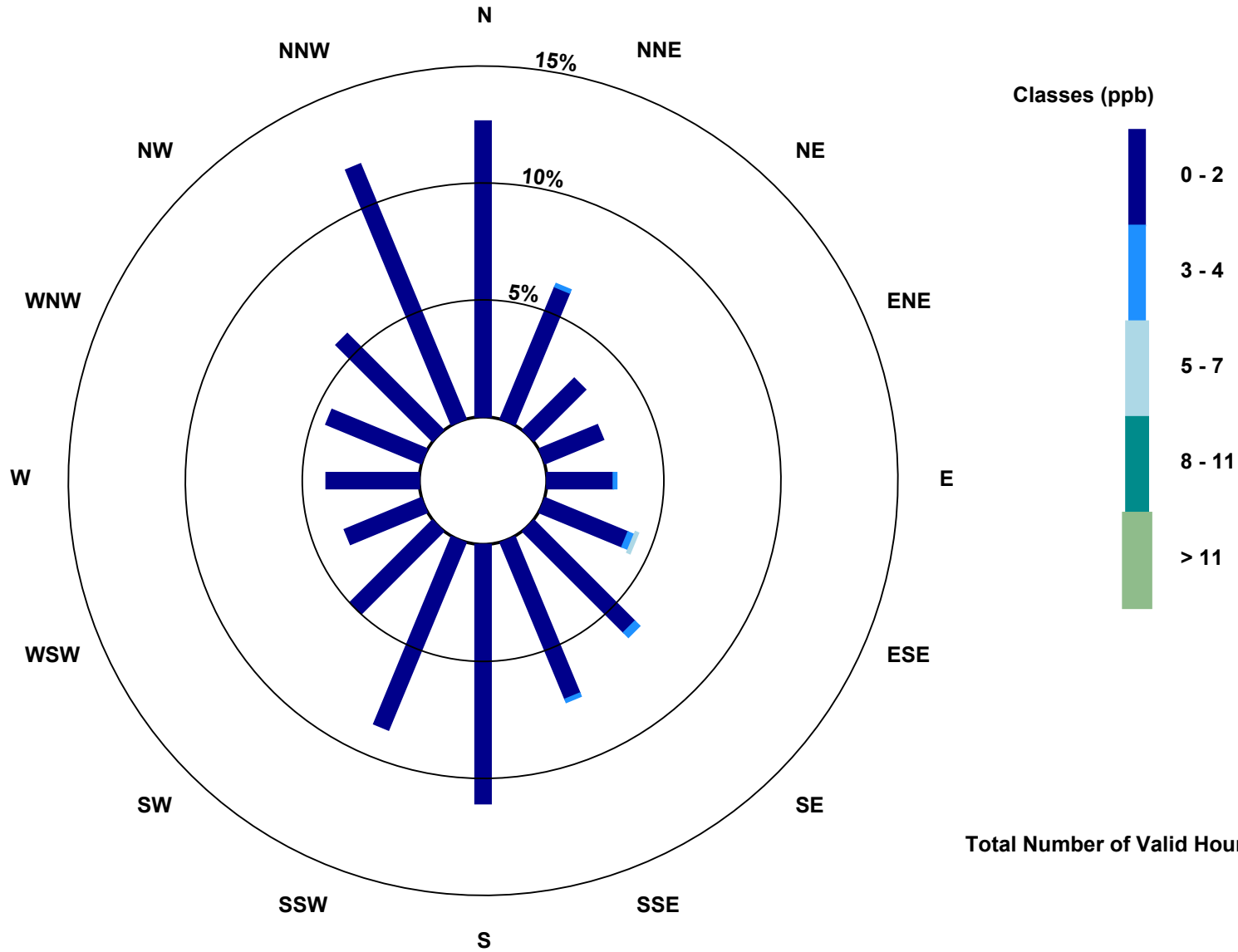
Total Number of Valid Hours: 704

Total Number of Hours: 744

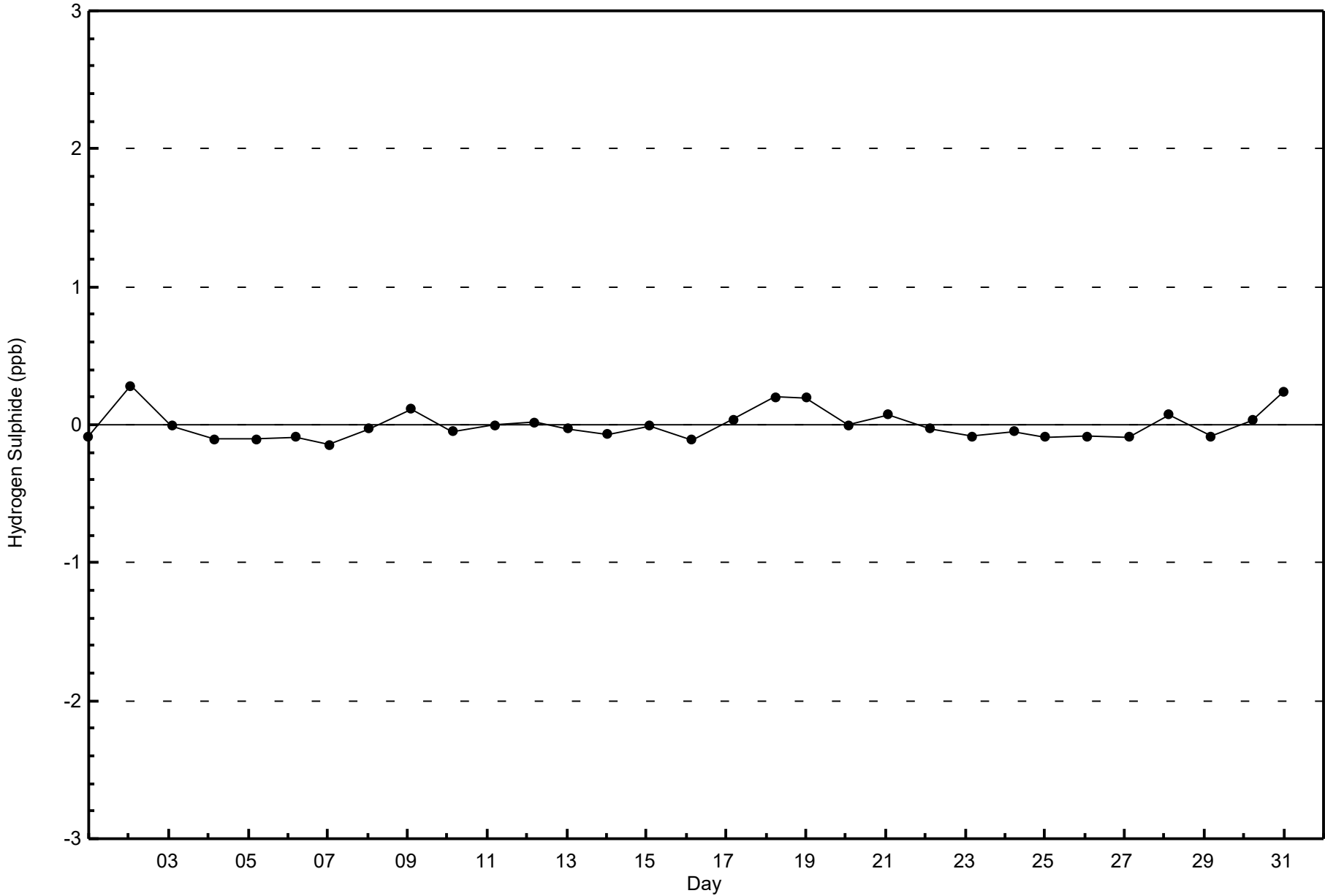


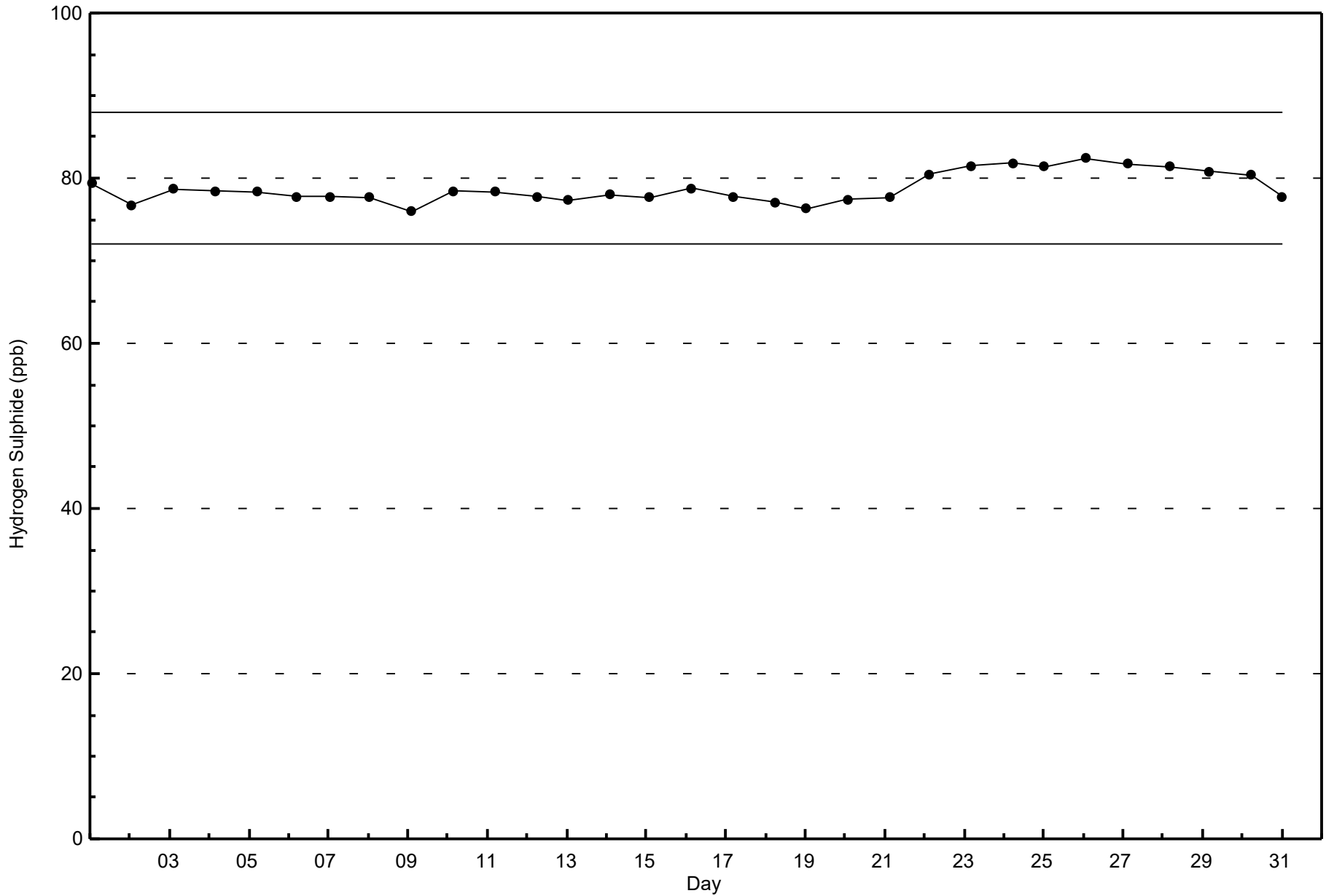
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Hydrogen Sulphide (H₂S) - ppb
Mildred Lake



Total Number of Valid Hours: 704





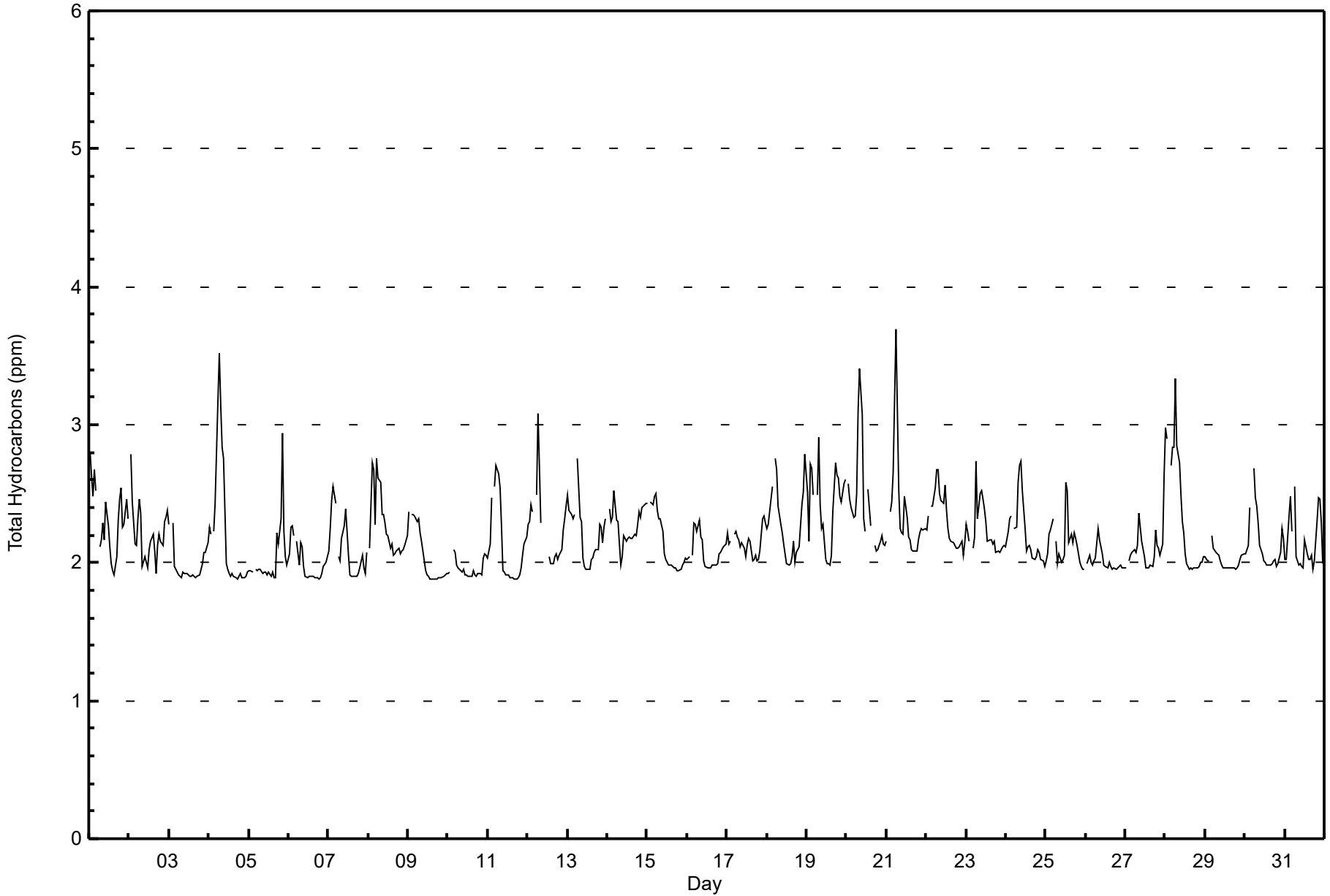


Maximum Value: 3.7 ppm on Jul 21 07:00		Maximum Daily Average: 2.4 ppm on Jul 20		Hours in Service: 744																						
Minimum Value: 1.9 ppm on Jul 4 18:00		Minimum Daily Average: 2.0 ppm on Jul 10		Hours of Data: 706																						
Maximum Diurnal Average: 2.5 ppm at hour 7		Minimum Diurnal Average: 2.0 ppm at hour 16		Hours of Missing Data: 38																						
Monthly Average: 2.18 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.3 P ₉₀ = 2.5 P ₉₉ = 3.1		Hours of Calibration: 35																						
				Percent Operational Time: 99.6																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	2.8	2.6	2.5	2.7	2.5	Z	2.1	2.2	2.3	2.2	2.4	2.3	2.1	2.0	1.9	1.9	2.0	2.3	2.5	2.5	2.3	2.3	2.5	2.3	2.3	2.8
2-Jul	Z	2.8	2.4	2.1	2.1	2.3	2.5	2.4	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.1	1.9	2.1	2.2	2.2	2.1	2.3	2.3	2.4	2.2	2.8
3-Jul	2.3	Z	2.3	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.0	2.3
4-Jul	2.3	2.2	Z	2.2	2.4	3.2	3.5	3.1	2.8	2.8	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	2.2	3.5
5-Jul	1.9	1.9	1.9	Z	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	2.2	2.1	2.3	2.9	2.2	2.0	2.0	2.0	2.9
6-Jul	2.1	2.3	2.3	2.2	Z	2.2	2.0	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	2.0	2.0	2.0	2.3
7-Jul	2.1	2.2	2.5	2.6	2.4	Z	2.0	2.0	2.2	2.3	2.4	2.2	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	1.9	2.1	2.1	2.6
8-Jul	Z	2.1	2.7	2.7	2.3	2.8	2.6	2.6	2.3	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.8
9-Jul	2.4	Z	2.3	2.3	2.3	2.3	2.3	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	1.9	1.9	1.9	2.0	2.4
10-Jul	1.9	1.9	Z	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.0	2.1
11-Jul	2.0	2.1	2.5	Z	2.5	2.7	2.6	2.5	2.3	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.2	2.1	2.7
12-Jul	2.3	2.3	2.4	2.4	Z	2.5	3.1	2.7	2.3	C	C	C	C	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.2	2.3	2.4	2.3	3.1
13-Jul	2.5	2.4	2.3	2.3	2.3	Z	2.8	2.3	2.3	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.3	2.3	2.1	2.3	2.3	2.2	2.8
14-Jul	Z	2.4	2.3	2.3	2.5	2.3	2.3	2.1	2.0	2.0	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.4	2.4	2.4	2.3	2.5
15-Jul	2.4	Z	2.4	2.4	2.5	2.5	2.4	2.3	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.5
16-Jul	2.0	2.0	Z	2.1	2.3	2.3	2.2	2.3	2.2	2.2	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	2.3
17-Jul	2.2	2.1	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.0	2.1	2.2	2.2	2.0	2.0	2.1	2.0	2.0	2.1	2.3	2.3	2.3	2.1	2.3
18-Jul	2.2	2.3	2.5	2.6	Z	2.8	2.7	2.4	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.2	2.0	2.1	2.1	2.3	2.4	2.5	2.8	2.3	2.8
19-Jul	2.5	2.2	2.7	2.7	2.5	Z	2.5	2.9	2.4	2.3	2.3	2.0	2.0	2.0	2.0	2.1	2.4	2.7	2.6	2.6	2.5	2.4	2.6	2.6	2.4	2.9
20-Jul	Z	2.6	2.5	2.4	2.3	2.3	2.5	3.1	3.4	3.1	2.3	2.2	M	2.5	2.3	M	M	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.4	3.4
21-Jul	2.2	Z	2.4	2.4	2.7	3.2	3.7	2.5	2.2	2.2	2.2	2.5	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.4	3.7
22-Jul	2.2	2.3	Z	2.4	2.4	2.5	2.7	2.7	2.5	2.4	2.4	2.6	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.3	2.7
23-Jul	2.3	2.2	2.2	Z	2.1	2.2	2.7	2.3	2.5	2.5	2.5	2.4	2.3	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.7
24-Jul	2.1	2.2	2.3	2.3	Z	2.2	2.3	2.6	2.7	2.7	2.5	2.3	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.2	2.7
25-Jul	2.0	2.1	2.2	2.2	2.3	Z	2.2	2.0	2.1	2.0	2.0	2.1	2.6	2.5	2.1	2.2	2.1	2.2	2.2	2.1	2.0	2.0	2.0	1.9	2.1	2.6
26-Jul	Z	2.0	2.1	2.0	2.0	2.0	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	2.2
27-Jul	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.1	2.4	2.3	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.1	2.1	2.1	2.6	2.1	2.6
28-Jul	3.0	2.9	Z	2.7	2.8	2.8	3.3	2.9	2.7	2.5	2.3	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	2.3	3.3
29-Jul	2.0	2.0	2.0	Z	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.2
30-Jul	2.1	2.1	2.1	2.4	Z	2.7	2.5	2.4	2.3	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.2	2.1	2.7
31-Jul	2.0	2.0	2.3	2.5	2.2	Z	2.6	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.0	2.0	2.1	2.0	2.0	2.3	2.5	2.5	2.3	2.0	2.1	2.6
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Mildred Lake - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mildred Lake - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	275	38.95	38.95
2.1 - 3.0	421	59.63	98.58
3.1 - 10.0	10	1.42	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
Mildred Lake - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	34	21	9	11	13	14	11	20	39	35	17	12	4	2	7	25	274
2.1 - 3.0	56	22	11	8	9	16	34	31	39	25	15	14	24	28	32	55	419
3.1 - 10.0	0	1	0	0	0	0	0	2	2	3	1	0	1	0	0	0	10
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	90	44	20	19	22	30	45	53	80	63	33	26	29	30	39	80	703

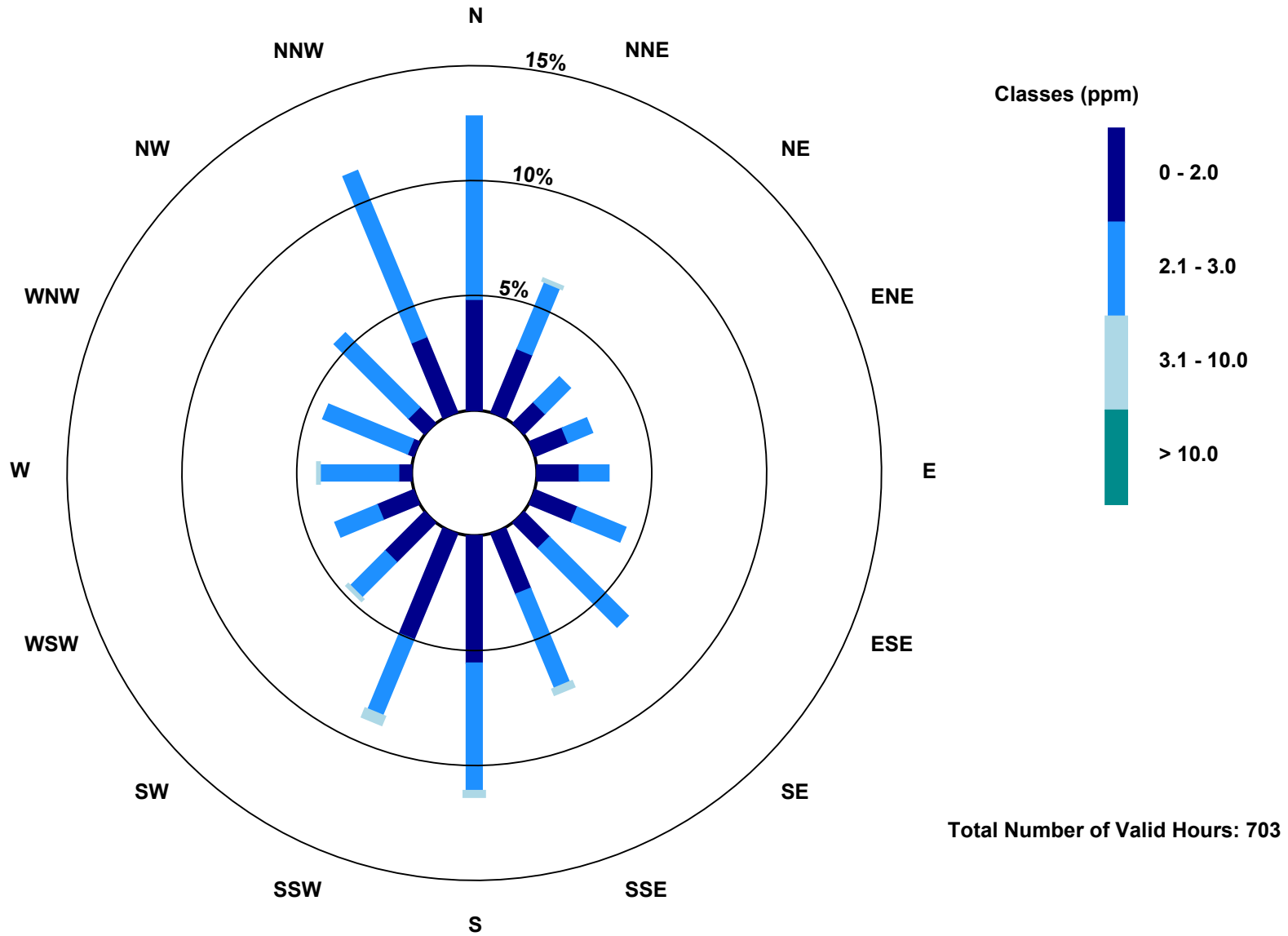
Total Number of Valid Hours: 703

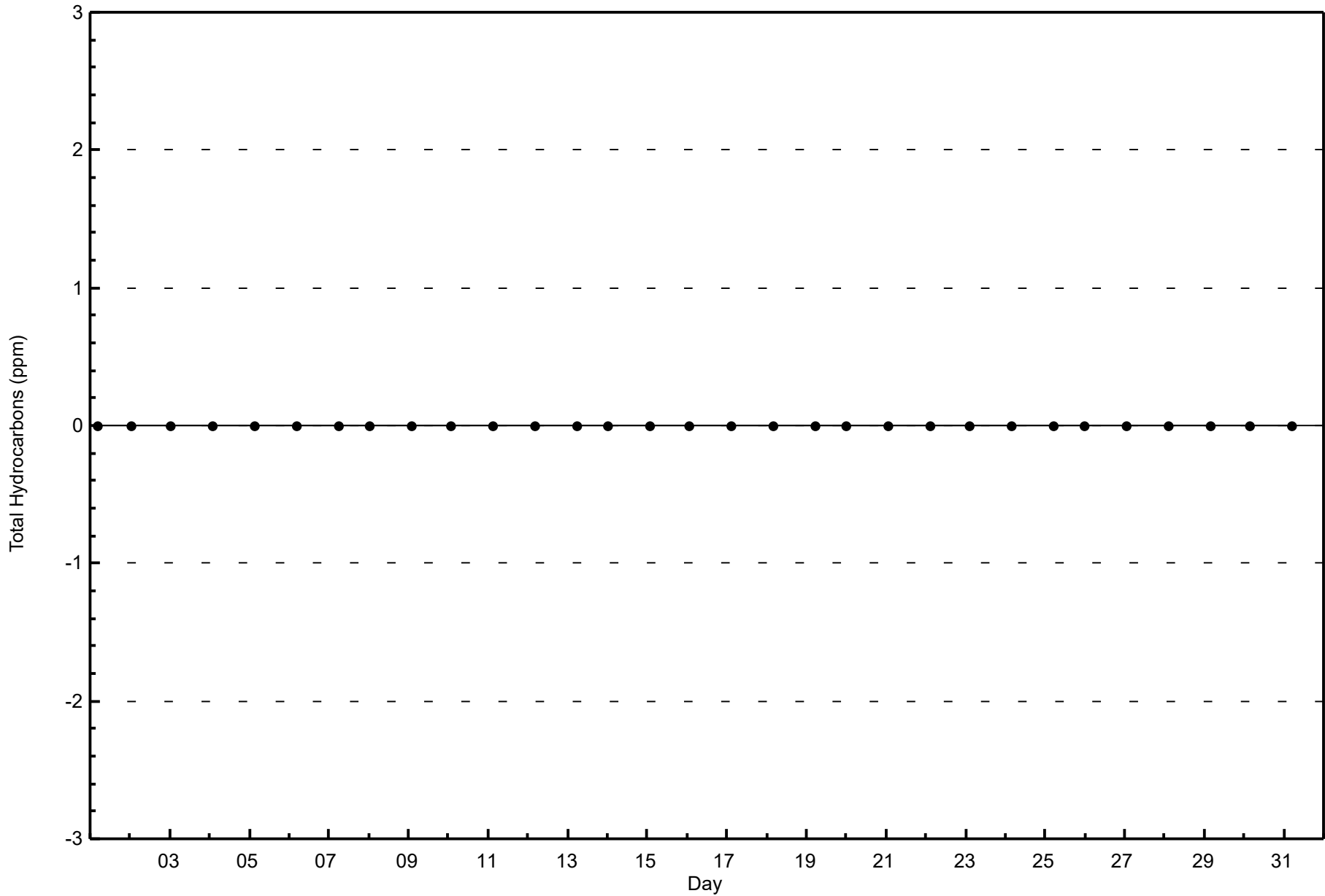
Total Number of Hours: 744

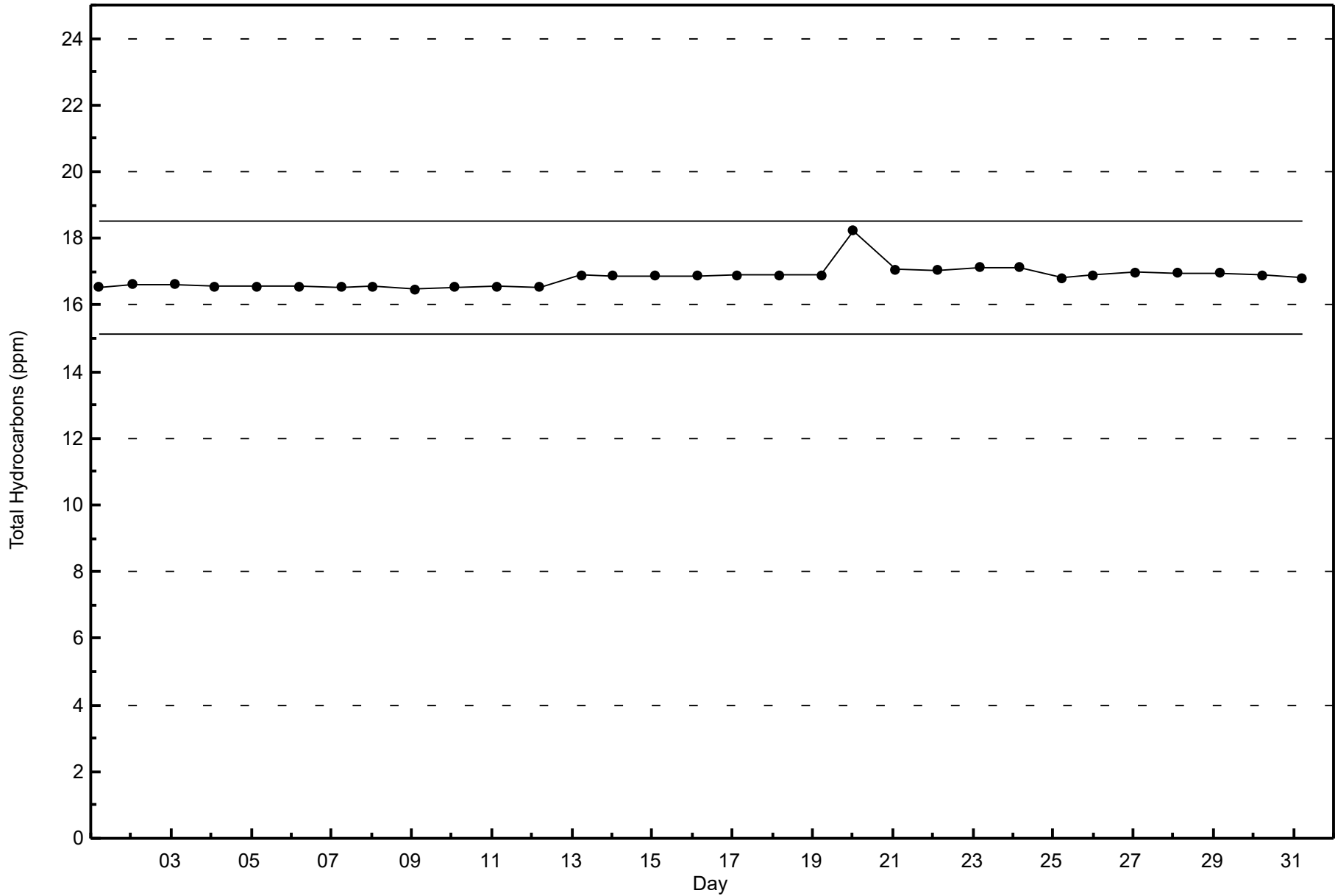


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Mildred Lake

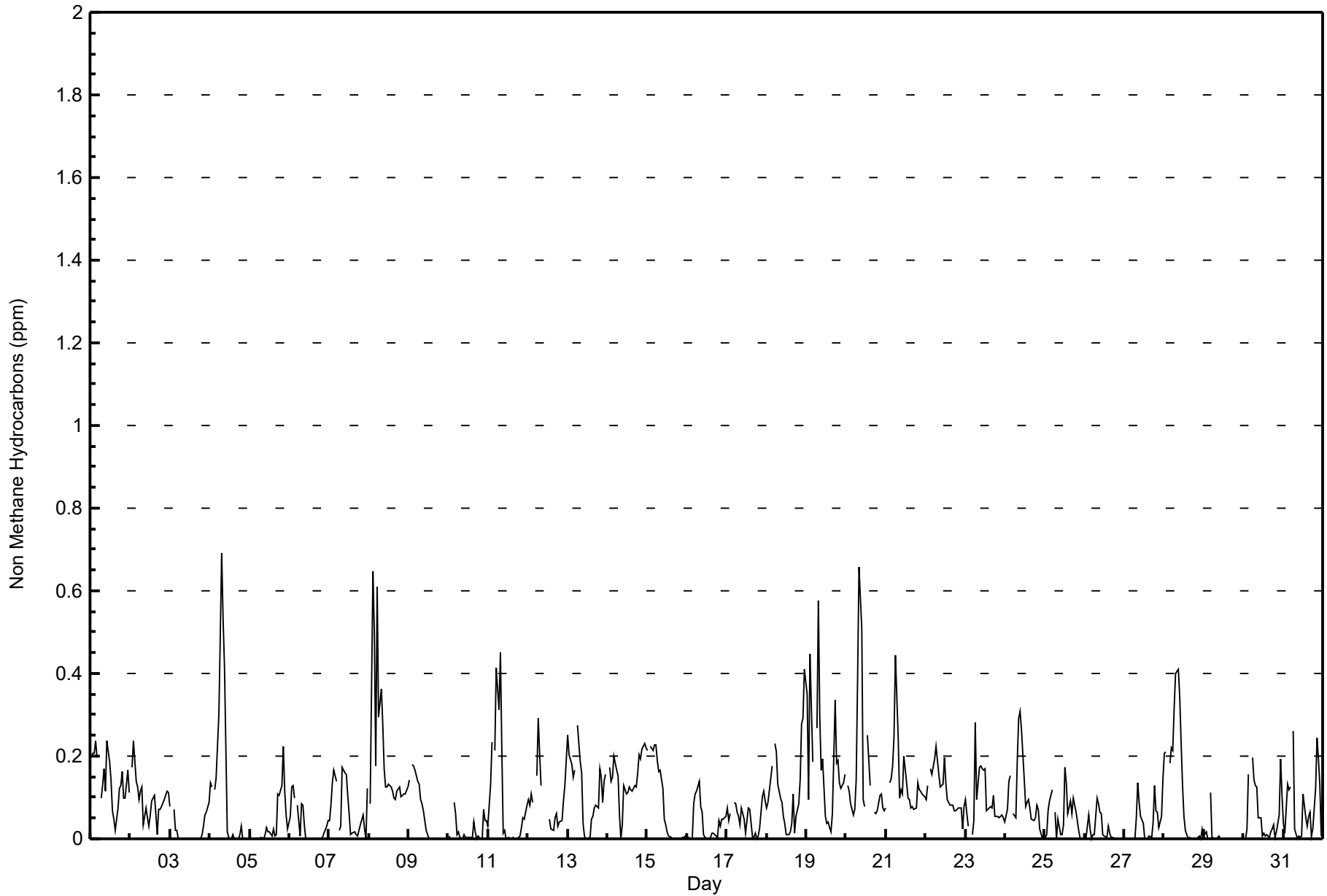








Maximum Value: 0.691 ppm on Jul 4 08:00																				Maximum Daily Average: 0.205 ppm on Jul 8					Hours in Service: 744	
Minimum Value: 0.000 ppm on Jul 3 06:00																				Minimum Daily Average: 0.007 ppm on Jul 29					Hours of Data: 706	
Maximum Diurnal Average: 0.171 ppm at hour 8																				Minimum Diurnal Average: 0.033 ppm at hour 16					Hours of Missing Data: 38	
Monthly Average: 0.088 ppm																				Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.1 P ₉₀ = 0.2 P ₉₉ = 0.5					Hours of Calibration: 35	
																									Percent Operational Time: 99.6	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.196	0.206	0.207	0.238	0.195	Z	0.098	0.129	0.168	0.115	0.237	0.185	0.141	0.067	0.046	0.019	0.076	0.123	0.128	0.162	0.097	0.099	0.167	0.111	0.140	0.238
2-Jul	Z	0.172	0.237	0.138	0.127	0.095	0.117	0.126	0.035	0.076	0.052	0.030	0.058	0.091	0.105	0.062	0.011	0.073	0.071	0.079	0.096	0.106	0.116	0.110	0.095	0.237
3-Jul	0.078	Z	0.070	0.019	0.020	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.011	0.030	0.057	0.064	0.089	0.019	0.089
4-Jul	0.137	0.126	Z	0.120	0.144	0.301	0.491	0.691	0.533	0.416	0.016	0.003	0.000	0.012	0.001	0.001	0.000	0.010	0.010	0.032	0.000	0.000	0.000	0.000	0.132	0.691
5-Jul	0.000	0.001	0.001	Z	0.002	0.001	0.001	0.002	0.001	0.011	0.026	0.017	0.018	0.006	0.024	0.008	0.012	0.107	0.104	0.130	0.222	0.117	0.058	0.024	0.039	0.222
6-Jul	0.053	0.126	0.129	0.098	Z	0.082	0.006	0.086	0.082	0.035	0.002	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.012	0.032	0.043	0.034	0.129
7-Jul	0.045	0.081	0.135	0.166	0.140	Z	0.019	0.031	0.172	0.160	0.155	0.105	0.063	0.009	0.014	0.016	0.010	0.008	0.019	0.033	0.058	0.024	0.001	0.120	0.069	0.172
8-Jul	Z	0.085	0.648	0.496	0.176	0.611	0.295	0.364	0.278	0.169	0.124	0.127	0.131	0.127	0.115	0.099	0.094	0.114	0.127	0.100	0.105	0.107	0.107	0.126	0.205	0.648
9-Jul	0.143	Z	0.179	0.175	0.166	0.140	0.132	0.096	0.086	0.068	0.020	0.009	0.001	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.053	0.179
10-Jul	0.000	0.006	Z	0.088	0.062	0.009	0.018	0.002	0.002	0.011	0.002	0.003	0.005	0.004	0.004	0.041	0.017	0.001	0.006	0.000	0.000	0.071	0.045	0.043	0.019	0.088
11-Jul	0.032	0.132	0.232	Z	0.212	0.414	0.313	0.451	0.217	0.014	0.021	0.000	0.003	0.001	0.001	0.005	0.001	0.001	0.002	0.006	0.029	0.050	0.047	0.080	0.098	0.451
12-Jul	0.094	0.082	0.107	0.089	Z	0.152	0.293	0.206	0.127	C	C	C	C	0.049	0.025	0.020	0.051	0.062	0.031	0.041	0.045	0.093	0.129	0.191	0.099	0.293
13-Jul	0.250	0.204	0.181	0.148	0.165	Z	0.274	0.188	0.159	0.036	0.008	0.001	0.001	0.005	0.047	0.055	0.073	0.082	0.074	0.168	0.148	0.089	0.138	0.157	0.115	0.274
14-Jul	Z	0.172	0.138	0.150	0.201	0.167	0.151	0.059	0.001	0.033	0.127	0.108	0.111	0.127	0.119	0.114	0.130	0.125	0.159	0.205	0.195	0.217	0.230	0.221	0.142	0.230
15-Jul	0.214	Z	0.222	0.212	0.226	0.229	0.189	0.164	0.165	0.121	0.049	0.035	0.017	0.007	0.004	0.002	0.000	0.000	0.000	0.000	0.000	0.003	0.003	0.008	0.081	0.229
16-Jul	0.004	0.003	Z	0.005	0.084	0.107	0.114	0.140	0.078	0.063	0.011	0.002	0.001	0.001	0.004	0.014	0.013	0.008	0.005	0.043	0.031	0.047	0.047	0.056	0.038	0.140
17-Jul	0.075	0.043	0.060	Z	0.088	0.086	0.065	0.056	0.035	0.074	0.049	0.013	0.045	0.075	0.072	0.003	0.005	0.013	0.001	0.006	0.024	0.102	0.115	0.093	0.052	0.115
18-Jul	0.075	0.088	0.146	0.177	Z	0.229	0.210	0.133	0.100	0.090	0.055	0.037	0.011	0.012	0.016	0.037	0.109	0.013	0.055	0.084	0.141	0.277	0.290	0.411	0.121	0.411
19-Jul	0.350	0.096	0.448	0.320	0.185	Z	0.269	0.575	0.295	0.165	0.193	0.054	0.039	0.039	0.029	0.015	0.061	0.336	0.184	0.191	0.136	0.123	0.135	0.155	0.191	0.575
20-Jul	Z	0.128	0.116	0.084	0.058	0.070	0.142	0.385	0.659	0.509	0.095	0.078	M	0.252	0.129	M	M	0.063	0.062	0.069	0.104	0.107	0.074	0.069	0.163	0.659
21-Jul	0.073	Z	0.135	0.144	0.178	0.249	0.442	0.244	0.099	0.120	0.109	0.200	0.137	0.099	0.094	0.076	0.076	0.073	0.073	0.135	0.117	0.117	0.110	0.100	0.139	0.442
22-Jul	0.097	0.127	Z	0.169	0.156	0.194	0.224	0.190	0.154	0.126	0.131	0.198	0.134	0.095	0.089	0.082	0.080	0.069	0.067	0.072	0.073	0.074	0.024	0.078	0.118	0.224
23-Jul	0.094	0.062	0.032	Z	0.012	0.044	0.281	0.096	0.173	0.176	0.171	0.165	0.169	0.067	0.075	0.076	0.075	0.105	0.056	0.054	0.052	0.054	0.059	0.052	0.096	0.281
24-Jul	0.042	0.073	0.140	0.152	Z	0.063	0.052	0.191	0.290	0.309	0.266	0.143	0.078	0.089	0.096	0.076	0.046	0.043	0.052	0.083	0.070	0.025	0.001	0.000	0.104	0.309
25-Jul	0.004	0.012	0.069	0.092	0.117	Z	0.065	0.002	0.048	0.011	0.009	0.033	0.174	0.135	0.061	0.092	0.062	0.098	0.082	0.064	0.016	0.000	0.000	0.000	0.054	0.174
26-Jul	Z	0.000	0.058	0.022	0.000	0.011	0.010	0.099	0.086	0.063	0.060	0.012	0.006	0.004	0.030	0.013	0.003	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.021	0.099
27-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.001	0.049	0.134	0.088	0.053	0.038	0.001	0.000	0.000	0.008	0.004	0.041	0.130	0.069	0.064	0.027	0.054	0.145	0.039	0.145
28-Jul	0.208	0.210	Z	0.182	0.221	0.214	0.315	0.399	0.410	0.341	0.231	0.128	0.054	0.022	0.001	0.003	0.000	0.001	0.000	0.001	0.004	0.006	0.001	0.024	0.129	0.410
29-Jul	0.005	0.018	0.001	Z	0.113	0.004	0.001	0.000	0.004	0.008	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.113
30-Jul	0.000	0.000	0.025	0.156	Z	0.195	0.142	0.129	0.124	0.052	0.049	0.007	0.014	0.006	0.009	0.004	0.017	0.025	0.035	0.003	0.016	0.058	0.192	0.106	0.059	0.195
31-Jul	0.036	0.015	0.131	0.118	0.124	Z	0.260	0.023	0.001	0.006	0.003	0.008	0.107	0.051	0.029	0.053	0.065	0.008	0.023	0.123	0.244	0.194	0.133	0.006	0.077	0.260
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Mildred Lake - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	162	22.95	22.95
0.006 - 0.05	164	23.23	46.18
0.06 - 0.1	247	34.99	81.16
> 0.1	133	18.84	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



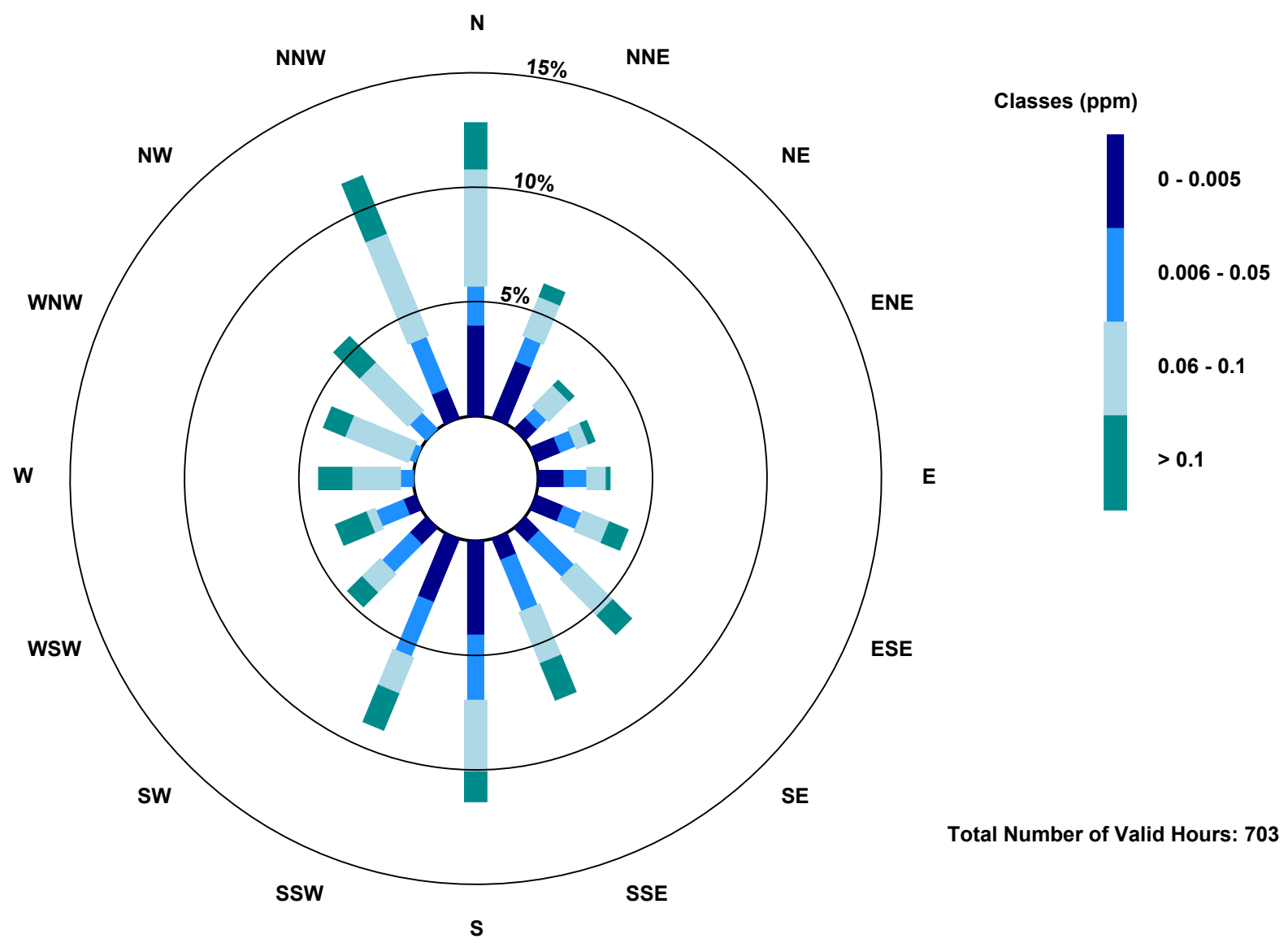
Wood Buffalo Environmental Association
Frequency Distribution

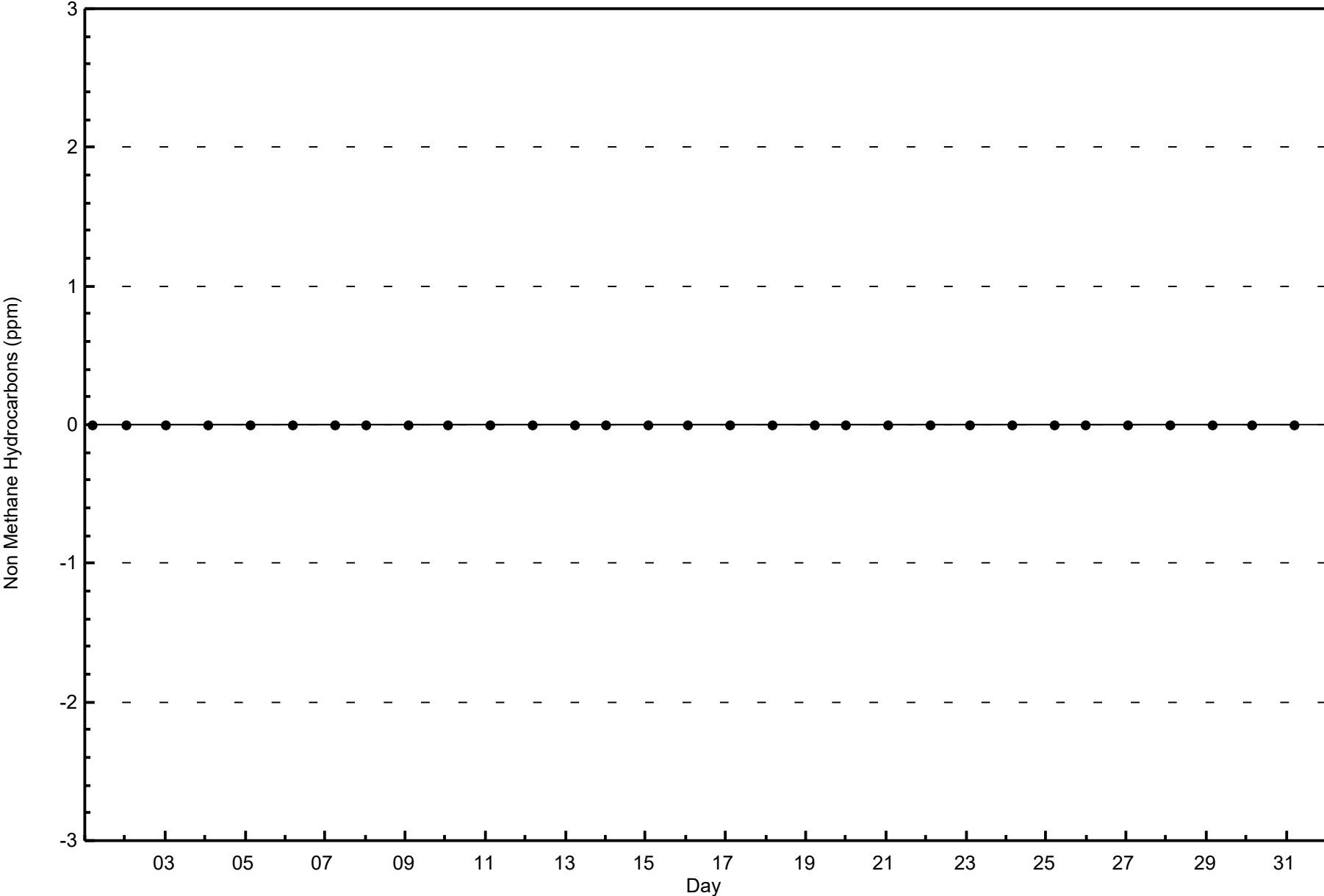
Non Methane Hydrocarbons (NMHC) - ppm
Mildred Lake - July 2023

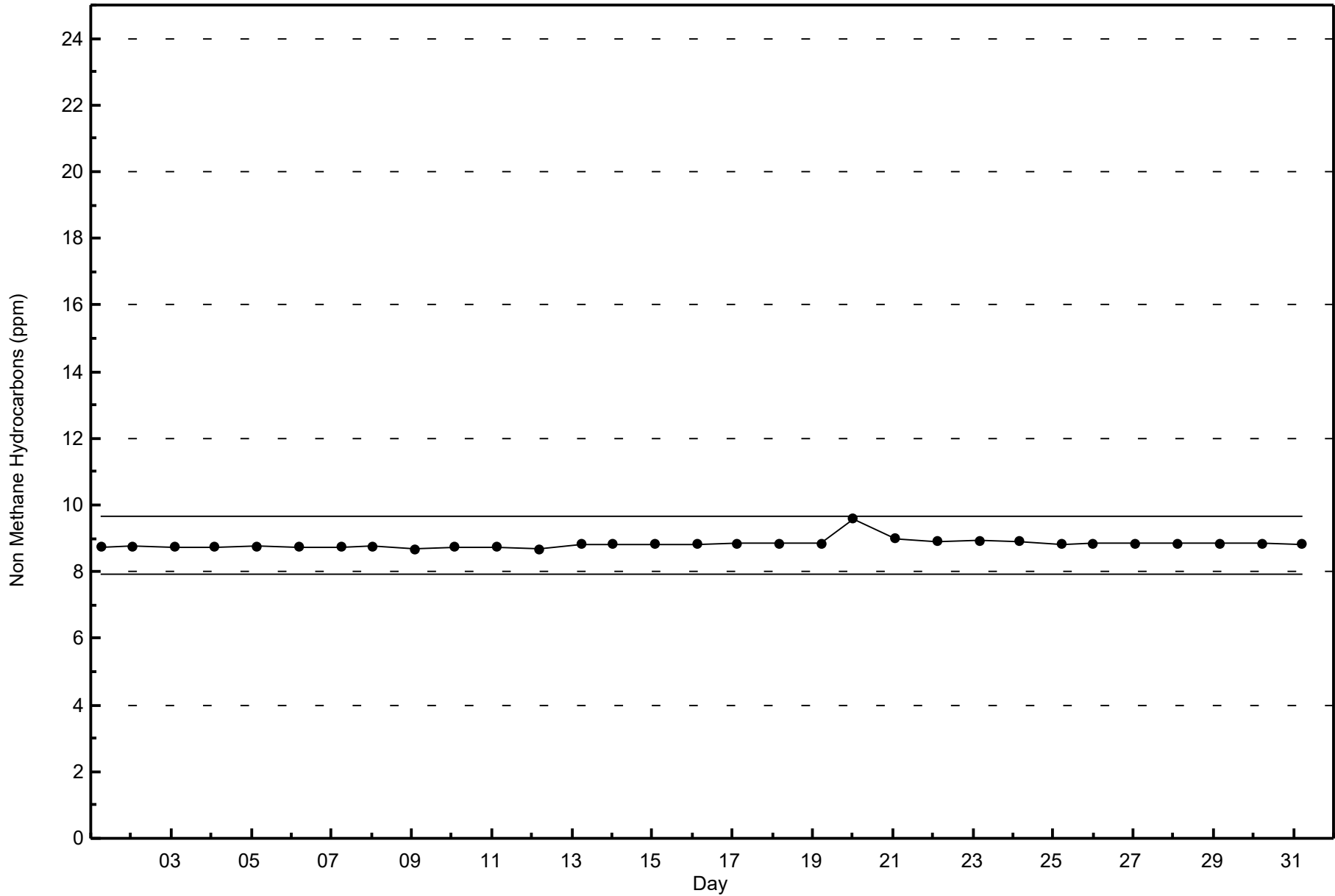
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	28	19	5	8	8	9	6	7	29	21	7	4	0	0	0	10	161
0.006 - 0.05	12	8	4	5	7	6	15	17	20	18	12	9	4	2	7	17	163
0.06 - 0.1	36	13	9	4	6	9	16	17	22	12	8	3	15	21	21	34	246
> 0.1	14	4	2	2	1	6	8	12	9	12	6	10	10	7	11	19	133
Totals	90	44	20	19	22	30	45	53	80	63	33	26	29	30	39	80	703

Total Number of Valid Hours: 703

Total Number of Hours: 744









Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

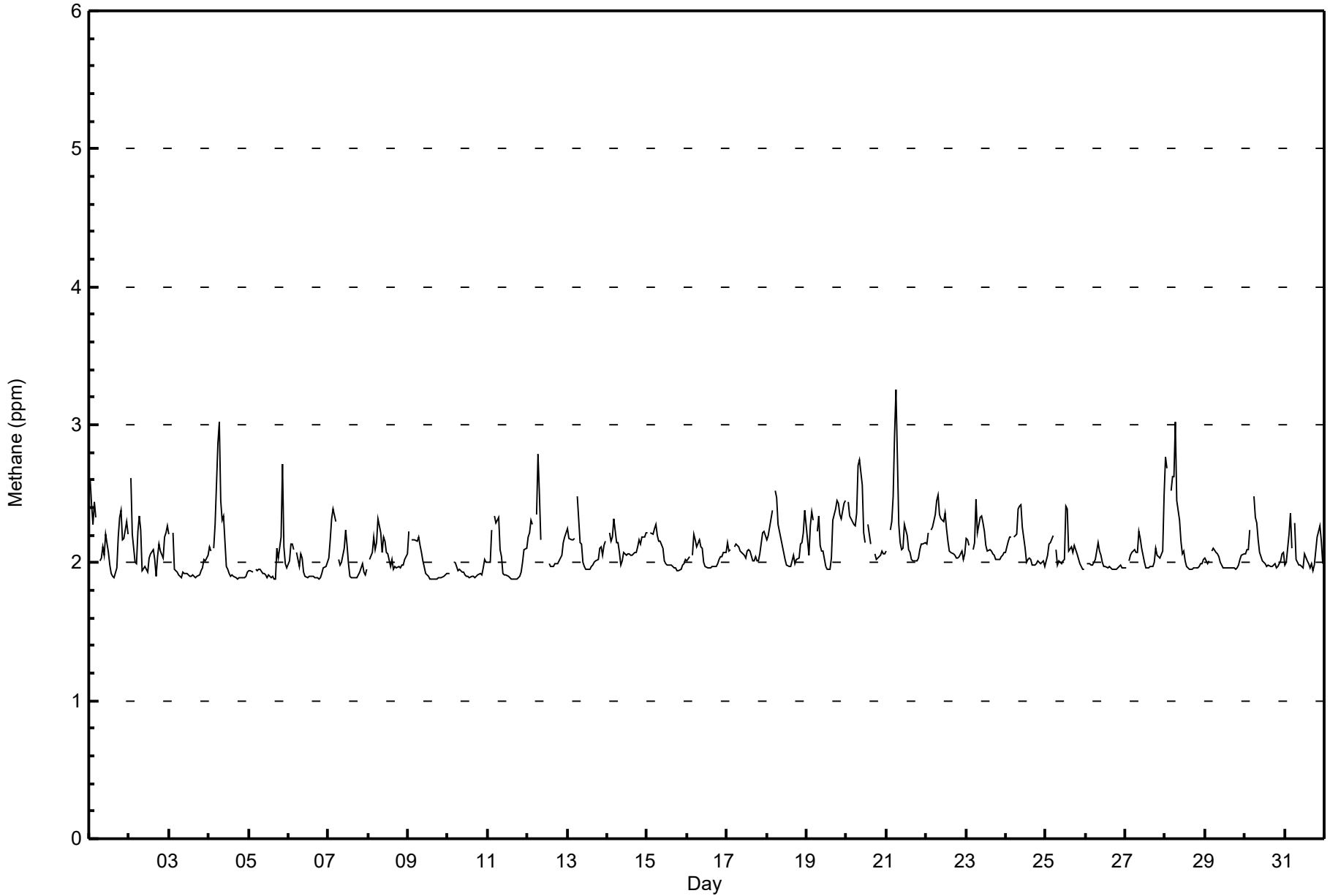
Mildred Lake - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		744																																									
Maximum Value: 3.3 ppm on Jul 21 07:00		Maximum Daily Average: 2.3 ppm on Jul 20				Hours of Data:		706																																									
Minimum Value: 1.9 ppm on Jul 4 18:00		Minimum Daily Average: 1.9 ppm on Jul 10				Hours of Missing Data:		38																																									
Maximum Diurnal Average: 2.3 ppm at hour 7		Minimum Diurnal Average: 2.0 ppm at hour 16				Hours of Calibration:		35																																									
Monthly Average: 2.09 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.2 P ₉₀ = 2.3 P ₉₉ = 2.7				Percent Operational Time:		99.6																																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	2.6	2.4	2.3	2.4	2.3	Z	2.0	2.0	2.1	2.1	2.2	2.1	2.0	1.9	1.9	1.9	2.0	2.2	2.3	2.4	2.2	2.2	2.3	2.2	2.2	2.6																							
2-Jul	Z	2.6	2.2	2.0	2.0	2.2	2.3	2.2	1.9	2.0	2.0	1.9	2.0	2.1	2.1	2.0	1.9	2.0	2.1	2.1	2.0	2.2	2.2	2.3	2.1	2.6																							
3-Jul	2.2	Z	2.2	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.0	2.2																							
4-Jul	2.1	2.1	Z	2.1	2.3	2.9	3.0	2.4	2.3	2.3	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	3.0																							
5-Jul	1.9	1.9	1.9	Z	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	2.1	2.0	2.2	2.7	2.1	2.0	2.0	2.7																							
6-Jul	2.0	2.1	2.1	2.1	Z	2.1	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	2.0	2.0	2.0	2.0	2.1																							
7-Jul	2.0	2.2	2.3	2.4	2.3	Z	2.0	2.0	2.0	2.1	2.2	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.0	2.4																							
8-Jul	Z	2.0	2.1	2.2	2.1	2.1	2.3	2.2	2.1	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3																							
9-Jul	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2																							
10-Jul	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	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0																							
11-Jul	2.0	2.0	2.2	Z	2.3	2.3	2.3	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.0	2.3																							
12-Jul	2.2	2.2	2.3	2.3	Z	2.3	2.8	2.5	2.2	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.8																							
13-Jul	2.2	2.2	2.2	2.2	2.2	Z	2.5	2.1	2.1	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.5																							
14-Jul	Z	2.2	2.2	2.2	2.3	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.3																							
15-Jul	2.2	Z	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.1	2.3																							
16-Jul	2.0	2.0	Z	2.1	2.2	2.2	2.1	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.2																							
17-Jul	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.1	2.2																							
18-Jul	2.2	2.2	2.3	2.4	Z	2.5	2.5	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.2	2.4	2.2	2.5																							
19-Jul	2.2	2.1	2.3	2.4	2.3	Z	2.2	2.3	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.3	2.4	2.4	2.4	2.3	2.3	2.4	2.5	2.2	2.5																							
20-Jul	Z	2.4	2.3	2.3	2.3	2.3	2.4	2.7	2.7	2.6	2.2	2.1	M	2.3	2.1	M	M	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.3	2.7																							
21-Jul	2.1	Z	2.2	2.3	2.5	2.9	3.3	2.3	2.1	2.1	2.1	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	3.3																							
22-Jul	2.1	2.2	Z	2.2	2.3	2.3	2.4	2.5	2.3	2.3	2.3	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.1	2.5																							
23-Jul	2.2	2.2	2.1	Z	2.1	2.1	2.5	2.2	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.5																							
24-Jul	2.1	2.2	2.2	2.2	Z	2.2	2.2	2.4	2.4	2.4	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.4																							
25-Jul	2.0	2.1	2.1	2.1	2.2	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.4	2.4	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	1.9	2.1	2.4																							
26-Jul	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																							
27-Jul	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.5	2.1	2.5																							
28-Jul	2.8	2.7	Z	2.5	2.6	2.6	3.0	2.5	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	3.0																							
29-Jul	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1																							
30-Jul	2.1	2.1	2.1	2.2	Z	2.5	2.3	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.5																							
31-Jul	2.0	2.0	2.2	2.4	2.1	Z	2.3	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	1.9	2.0	2.2	2.2	2.3	2.2	2.0	2.1	2.4																							
																								2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	Diurnal Average		
																								2.8	2.7	2.3	2.5	2.6	2.9	3.3	2.7	2.7	2.6	2.3	2.4	2.4	2.4	2.1	2.1	2.3	2.4	2.4	2.4	2.7	2.3	2.4	2.5	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance																																											



Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Mildred Lake - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Mildred Lake - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	359	50.85	50.85
2.1 - 3.0	346	49.01	99.86
3.1 - 10.0	1	0.14	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Mildred Lake - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	44	27	11	13	16	19	17	31	44	40	22	16	9	5	12	31	357
2.1 - 3.0	46	17	9	6	6	11	28	22	35	23	11	10	20	25	27	49	345
3.1 - 10.0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	90	44	20	19	22	30	45	53	80	63	33	26	29	30	39	80	703

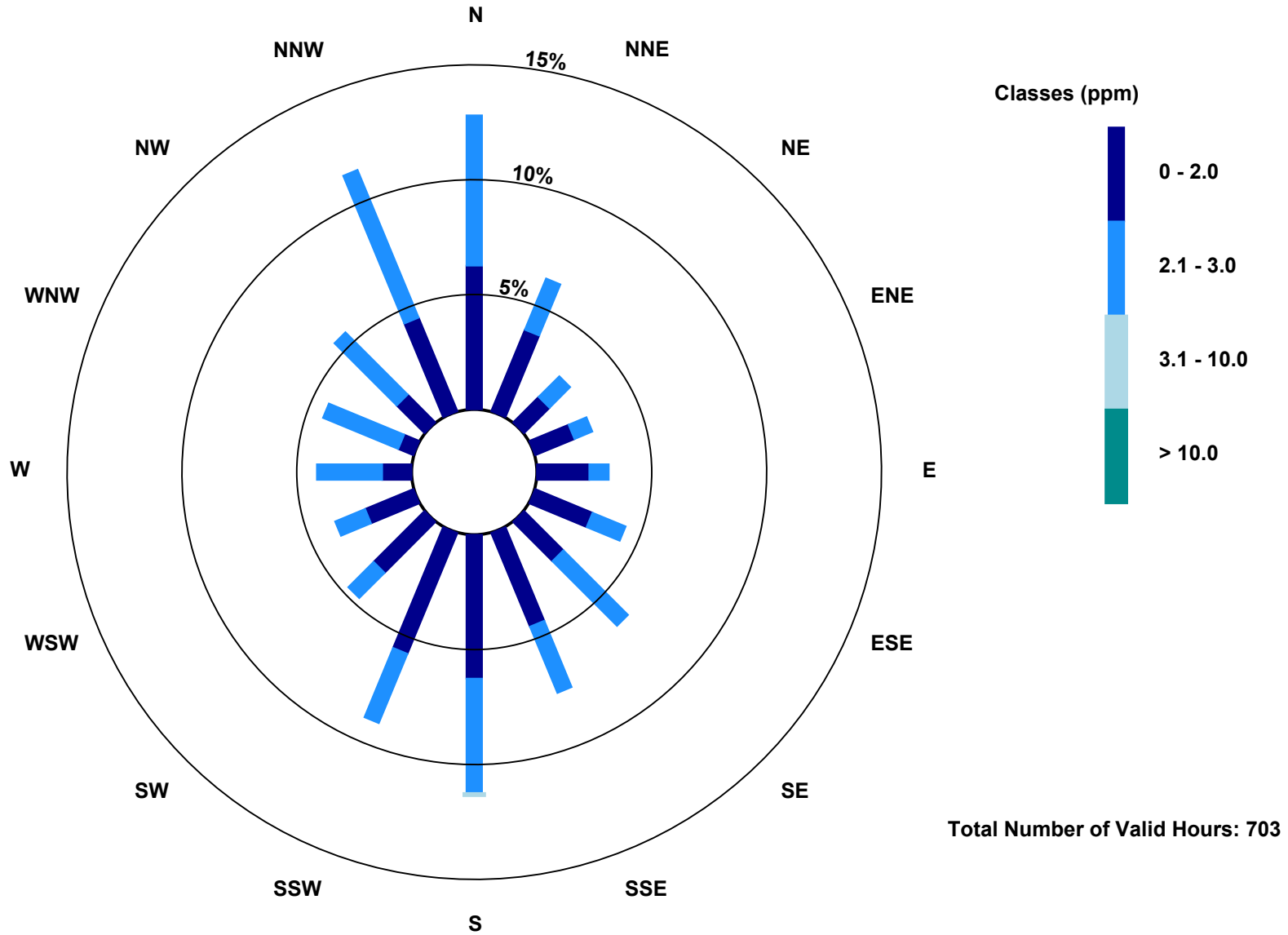
Total Number of Valid Hours: 703

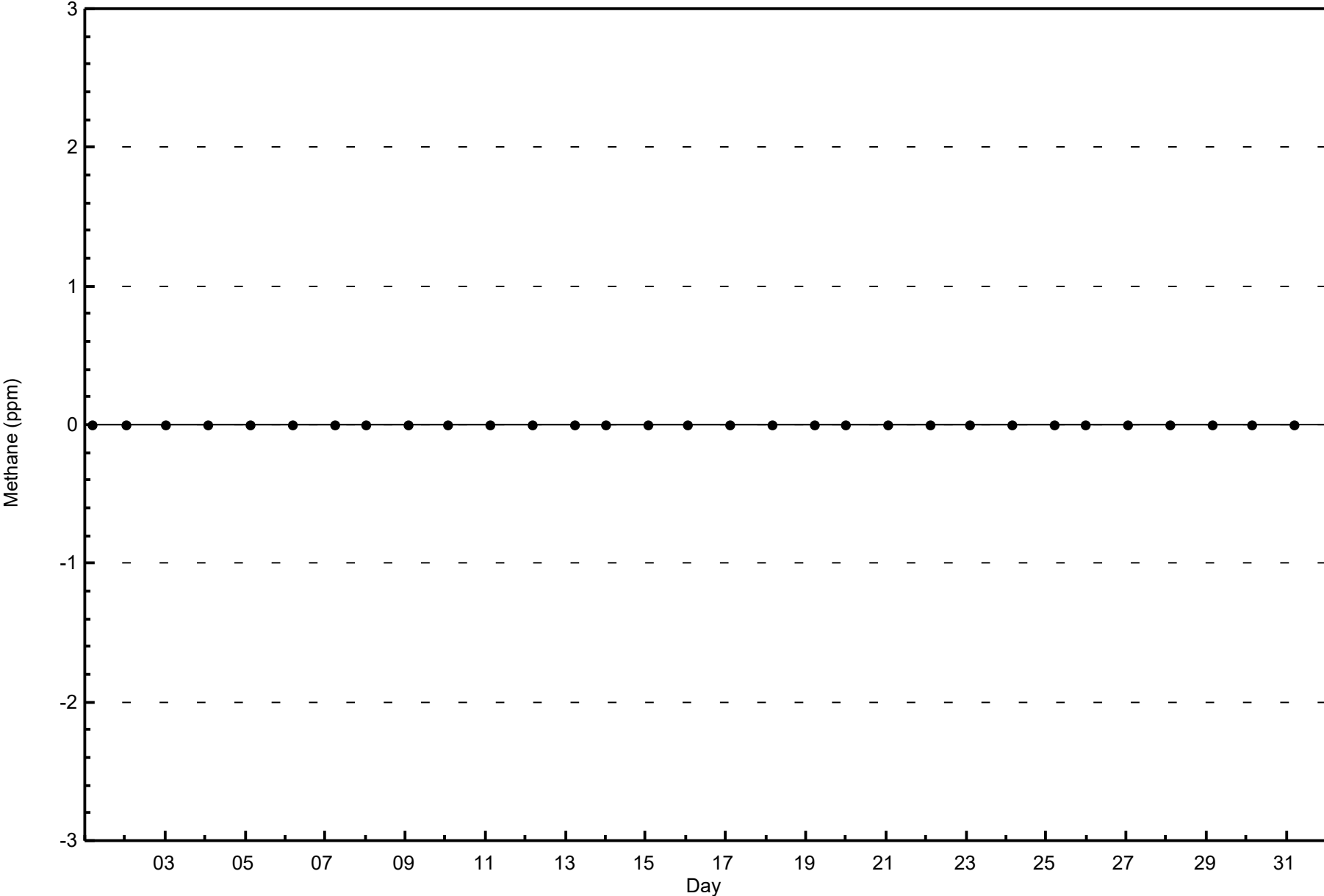
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Methane (CH₄) - ppm
Mildred Lake

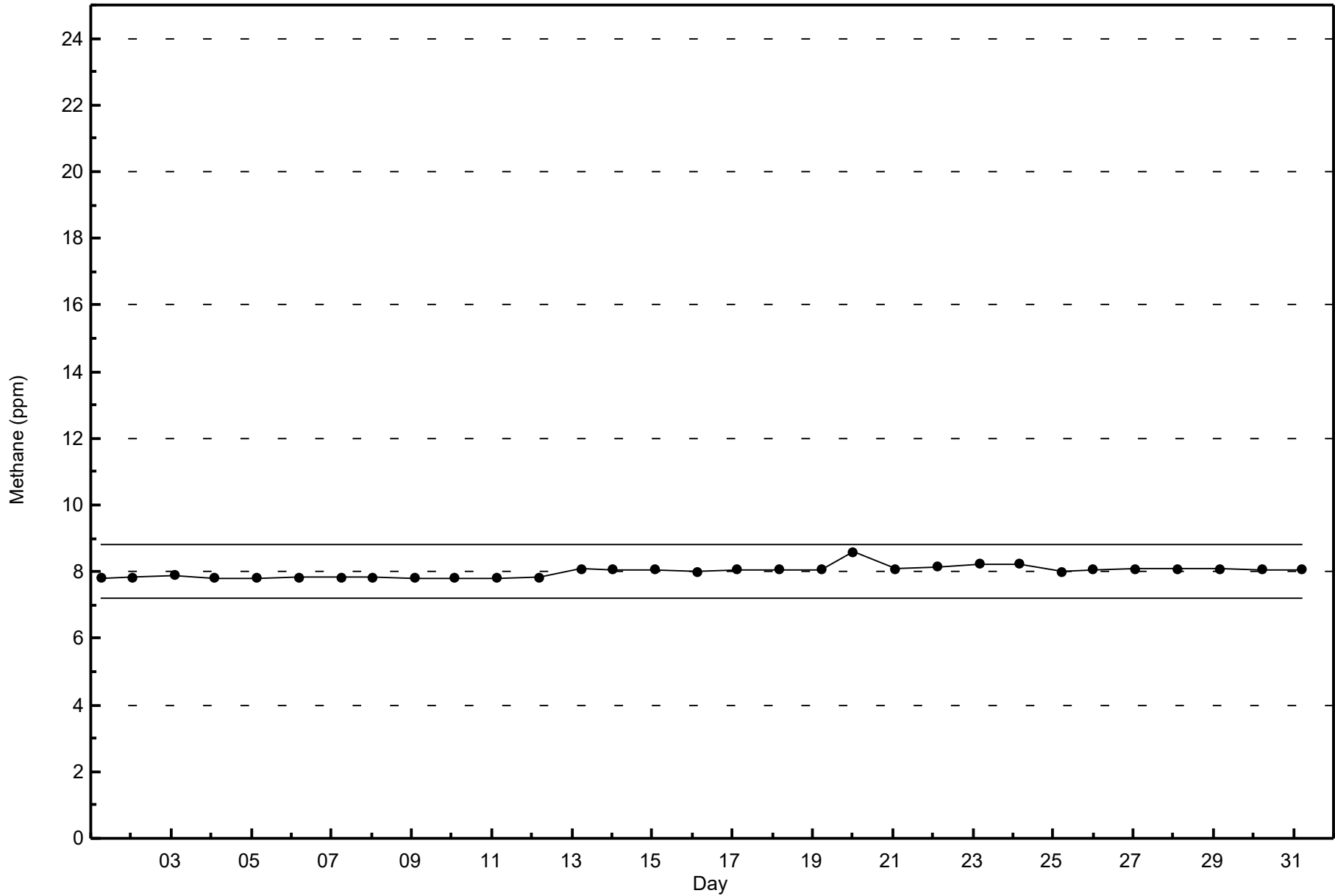






Wood Buffalo Environmental Association
Span Responses

Methane (CH₄) - ppm
Mildred Lake - July 2023





Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

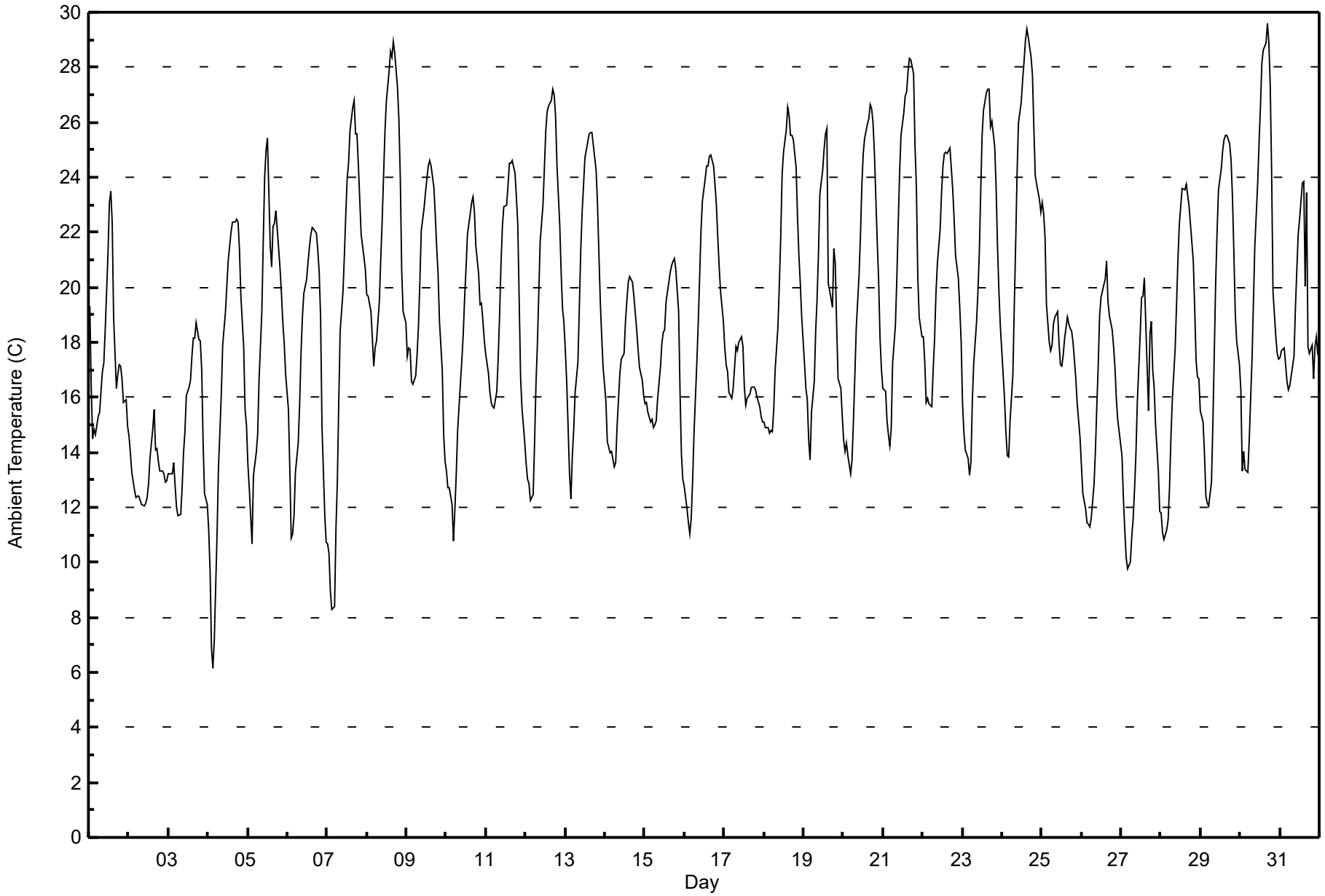
Mildred Lake - July 2023

Maximum Value: 29.6 C on Jul 30 17:00 Maximum Daily Average: 22.8 C on Jul 8																				Hours in Service: 744 Hours of Data: 744						
Minimum Value: 6.1 C on Jul 4 04:00 Minimum Daily Average: 13.2 C on Jul 2 Maximum Diurnal Average: 23.4 C at hour 15 Minimum Diurnal Average: 13.4 C at hour 5 Monthly Average: 18.70 C Percentiles: P ₁ = 9.9 P ₁₀ = 12.9 Q ₁ = 15.2 Median = 18.2 Q ₃ = 22.3 P ₉₀ = 25.3 P ₉₉ = 28.6																				Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	19.3	16.4	14.5	14.8	14.7	15.3	15.5	16.2	16.9	17.3	18.5	21.2	23.1	23.5	22.4	18.9	16.3	16.8	17.2	17.2	16.7	15.8	15.9	15.0	17.5	23.5
2-Jul	14.6	14.0	13.3	12.6	12.3	12.4	12.4	12.3	12.1	12.1	12.1	12.4	12.9	13.8	14.8	15.5	14.1	14.1	13.7	13.3	13.3	13.2	12.9	13.0	13.2	15.5
3-Jul	13.2	13.2	13.2	13.6	12.8	12.0	11.7	11.7	12.7	14.0	14.8	16.1	16.4	16.6	17.5	18.2	18.2	18.7	18.1	18.1	17.0	14.3	12.5	12.1	14.9	18.7
4-Jul	11.2	9.7	6.9	6.1	7.2	11.1	13.5	14.7	16.1	17.9	19.1	20.1	21.0	21.5	22.0	22.4	22.4	22.5	22.4	21.4	19.7	17.8	15.6	15.0	16.5	22.5
5-Jul	13.6	12.7	10.7	13.2	13.6	14.0	14.6	16.6	19.1	21.7	24.0	25.0	25.4	21.5	20.8	22.2	22.3	22.8	22.1	20.7	19.8	18.7	17.9	16.8	18.7	25.4
6-Jul	15.5	13.4	10.9	11.0	11.7	13.3	14.3	15.7	17.6	18.9	19.8	20.3	20.9	21.5	21.9	22.2	22.1	22.0	21.3	20.5	18.9	15.0	11.7	10.7	17.1	22.2
7-Jul	10.7	10.3	8.9	8.3	8.4	11.2	13.0	15.9	18.4	19.8	21.1	22.7	24.0	24.5	25.7	26.5	26.8	25.6	25.6	24.4	21.9	21.5	21.1	20.6	19.0	26.8
8-Jul	19.7	19.7	19.1	18.2	17.2	17.8	18.1	19.5	21.0	22.4	24.0	25.6	26.7	27.9	28.6	28.4	29.0	28.5	27.3	26.1	24.0	20.6	19.1	18.7	22.8	29.0
9-Jul	17.5	17.8	17.7	16.6	16.5	16.8	17.5	18.6	20.2	22.1	22.9	23.4	24.0	24.4	24.6	24.4	23.7	22.6	21.5	20.5	18.7	17.0	14.7	13.7	19.9	24.6
10-Jul	13.3	12.7	12.7	12.1	10.8	11.9	13.2	14.8	16.5	17.3	18.3	19.6	20.7	21.9	22.7	23.1	23.3	22.7	21.5	20.5	19.4	19.4	18.8	18.1	17.7	23.3
11-Jul	17.6	16.9	16.2	15.8	15.6	15.6	16.2	17.5	19.0	20.9	22.2	22.9	23.0	23.7	24.5	24.5	24.6	24.2	23.3	22.3	19.5	16.7	15.6	14.3	19.7	24.6
12-Jul	13.6	13.0	12.9	12.3	12.4	14.3	16.5	17.9	19.8	21.6	23.0	24.3	25.7	26.4	26.6	26.8	27.2	27.0	26.2	24.5	22.3	20.5	19.2	18.7	20.5	27.2
13-Jul	17.7	16.5	13.2	12.3	13.9	14.9	16.2	17.3	19.3	21.3	22.7	23.7	24.7	25.3	25.6	25.6	25.6	25.2	24.3	23.1	21.2	19.5	18.2	17.1	20.2	25.6
14-Jul	15.8	14.4	14.2	14.0	14.0	13.5	13.6	15.0	15.9	16.9	17.4	17.6	18.7	19.5	20.2	20.4	20.2	19.7	19.1	18.5	17.8	17.1	16.6	16.1	16.9	20.4
15-Jul	15.8	15.8	15.4	15.1	15.2	14.9	15.0	15.1	16.0	17.1	17.9	18.4	18.5	19.5	20.2	20.6	20.8	20.9	21.0	20.6	19.1	16.2	14.0	13.0	17.3	21.0
16-Jul	12.8	11.9	11.4	11.0	11.6	13.0	14.7	17.2	18.7	20.4	22.1	23.1	23.9	24.4	24.4	24.8	24.8	24.4	23.8	23.0	21.8	20.7	19.9	18.8	19.3	24.8
17-Jul	17.8	17.2	17.0	16.2	16.0	16.3	17.1	17.8	17.7	18.0	18.2	17.8	16.4	15.7	16.0	16.1	16.4	16.4	16.4	16.3	16.0	15.7	15.3	15.1	16.6	18.2
18-Jul	15.1	14.9	14.9	14.7	14.8	14.7	15.6	17.0	18.6	20.1	21.8	24.1	24.9	25.7	26.6	26.2	25.5	25.5	25.4	24.4	22.6	21.1	20.2	18.9	20.6	26.6
19-Jul	17.3	16.3	15.9	14.4	13.8	15.5	16.6	18.4	19.6	21.2	23.4	24.2	25.0	25.6	25.8	20.1	19.9	19.3	21.4	20.8	18.6	16.7	16.3	15.3	19.2	25.8
20-Jul	14.4	14.0	14.3	13.9	13.2	13.7	15.2	16.8	18.5	20.5	21.9	23.7	24.8	25.4	25.9	26.1	26.6	26.5	26.0	24.9	21.6	20.3	18.2	17.0	20.1	26.6
21-Jul	16.3	16.2	15.1	14.6	14.3	14.9	17.2	18.6	20.3	22.3	24.2	25.5	26.3	26.9	27.1	27.8	28.3	28.3	27.8	25.2	23.7	20.4	18.9	18.2	21.6	28.3
22-Jul	18.2	17.3	15.8	16.0	15.8	15.7	17.0	18.1	19.8	20.9	22.1	23.4	24.4	24.9	24.9	24.9	25.1	24.3	23.5	22.5	21.2	20.3	19.3	18.0	20.6	25.1
23-Jul	15.7	14.7	14.1	13.8	13.2	13.6	15.9	17.2	18.7	19.9	21.3	23.5	25.5	26.4	27.0	27.2	27.2	25.9	26.1	25.1	23.6	21.5	19.9	18.6	20.6	27.2
24-Jul	17.7	16.0	14.8	13.9	13.8	15.2	16.8	19.3	21.6	24.2	26.0	26.7	27.6	28.2	29.0	29.4	29.1	28.4	27.7	25.8	24.0	23.8	23.2	22.7	22.7	29.4
25-Jul	23.1	22.7	21.8	19.4	18.0	17.7	17.9	18.7	18.9	19.1	17.9	17.2	17.1	17.5	18.2	18.9	18.7	18.5	18.4	18.0	16.7	15.8	15.2	14.6	18.3	23.1
26-Jul	13.5	12.5	11.9	11.4	11.4	11.3	11.6	12.8	14.0	15.7	17.2	19.0	19.6	20.1	20.3	21.0	19.5	19.0	18.5	17.8	17.1	15.9	15.1	14.7	15.9	21.0
27-Jul	13.9	12.4	11.2	10.2	9.8	10.0	10.9	11.6	12.7	14.0	15.9	18.3	19.7	19.7	20.4	18.7	15.5	18.3	18.7	17.0	16.4	15.0	13.3	11.9	14.8	20.4
28-Jul	11.8	11.1	10.8	11.2	11.5	12.7	14.6	15.9	17.8	19.3	21.0	22.3	22.9	23.6	23.5	23.8	23.3	23.0	22.2	21.0	19.2	17.3	16.7	16.7	18.0	23.8
29-Jul	15.5	15.1	13.9	12.4	12.1	12.0	12.9	15.0	17.6	20.2	22.0	23.5	24.3	25.0	25.4	25.5	25.5	25.2	24.6	23.3	21.3	19.1	18.0	17.2	19.4	25.5
30-Jul	16.3	13.3	14.0	13.4	13.3	14.4	16.0	17.4	19.5	21.5	23.7	25.2	26.6	28.1	28.7	28.9	29.6	28.9	27.3	24.2	19.8	18.2	17.6	17.4	21.0	29.6
31-Jul	17.4	17.7	17.8	17.2	16.6	16.3	16.4	16.8	17.5	19.2	20.6	21.9	22.5	23.8	23.9	20.0	23.4	17.8	17.6	17.9	16.7	17.8	18.2	17.5	18.9	23.9
	15.7	14.8	14.0	13.5	13.4	14.1	15.1	16.4	17.8	19.3	20.5	21.7	22.5	23.0	23.4	23.2	23.1	22.7	22.3	21.2	19.7	18.2	17.1	16.3	Diurnal Average	
	23.1	22.7	21.8	19.4	18.0	17.8	18.1	19.5	21.6	24.2	26.0	26.7	27.6	28.2	29.0	29.4	29.6	28.9	27.8	26.1	24.0	23.8	23.2	22.7	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Mildred Lake - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Mildred Lake - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	8	1.08	1.08
10 - 20	459	61.69	62.77
> 20	277	37.23	100.00

Total Number of Valid Hours: 744

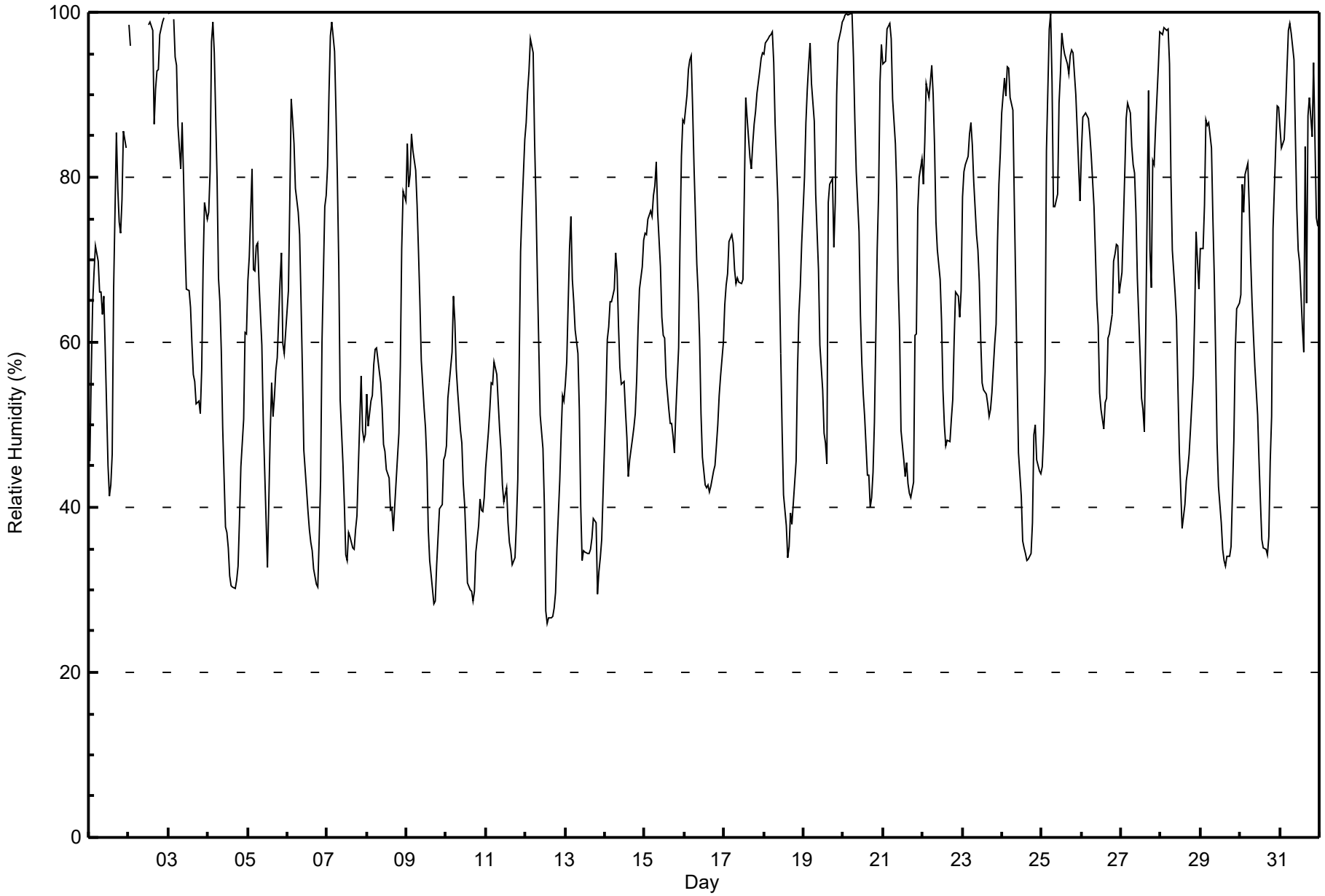
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Relative Humidity (RH) - %
Mildred Lake - July 2023

Maximum Value: 100.0 % on Jul 3 02:00																								Maximum Daily Average: 84.6 % on Jul 25																								Hours in Service: 744	
Minimum Value: 25.9 % on Jul 12 14:00																								Minimum Daily Average: 43.8 % on Jul 10																								Hours of Data: 730	
Maximum Diurnal Average: 84.5 % at hour 5																								Minimum Diurnal Average: 47.0 % at hour 15																								Hours of Missing Data: 14	
Monthly Average: 64.34 %																								Percentiles: P ₁ = 28.6 P ₁₀ = 36.5 Q ₁ = 47.4 Median = 64.7 Q ₃ = 81.4 P ₉₀ = 93.5 P ₉₉ = 99.5																								Hours of Calibration: 0	
																																																Percent Operational Time: 98.1	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	45.5	56.0	64.6	68.4	71.7	69.8	66.2	66.0	63.3	65.6	59.1	45.1	41.4	42.7	46.4	66.3	85.5	78.6	74.5	73.2	77.3	85.6	83.5	OR	65.1	85.6																							
2-Jul	98.4	96.0	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	98.4	98.8	97.8	86.4	90.7	92.8	93.1	97.2	98.8	99.3	OR	OR	--	99.3																							
3-Jul	99.9	100.0	OR	99.2	94.6	93.6	86.4	81.0	86.6	80.2	72.2	66.5	66.2	64.2	59.8	56.1	55.2	52.5	52.9	51.4	56.8	69.1	77.0	74.9	73.7	100.0																							
4-Jul	75.7	80.7	96.4	98.9	95.1	79.7	67.8	64.9	59.0	49.7	37.6	37.0	35.0	31.6	30.5	30.3	30.1	31.2	32.8	38.4	45.0	50.8	61.1	61.0	55.0	98.9																							
5-Jul	67.4	70.4	81.0	68.8	68.6	71.7	72.1	67.0	59.7	50.5	44.5	38.7	32.6	49.1	55.1	51.1	53.3	56.6	58.1	67.4	70.8	59.9	58.6	61.2	59.8	81.0																							
6-Jul	66.3	77.2	89.5	86.9	84.0	78.7	75.8	73.1	65.2	56.6	47.0	42.0	39.4	37.4	35.7	34.8	32.6	30.7	30.3	36.3	43.2	60.0	76.4	77.9	57.4	89.5																							
7-Jul	81.4	90.1	97.1	98.9	95.2	88.0	79.9	69.4	53.1	45.2	40.3	34.3	33.5	36.9	36.5	35.1	34.9	37.3	39.0	44.9	55.9	49.3	48.1	48.7	57.2	98.9																							
8-Jul	53.8	49.8	52.9	53.5	57.2	59.1	59.3	56.4	55.1	52.0	47.7	46.8	44.6	43.5	39.6	39.9	37.1	40.1	46.2	49.0	57.0	71.3	78.3	77.2	52.8	78.3																							
9-Jul	84.1	78.8	80.4	85.2	83.3	80.8	76.6	70.9	65.0	57.7	52.0	49.6	45.4	37.2	33.6	31.8	28.3	28.6	33.0	36.5	39.8	40.3	45.7	46.2	54.6	85.2																							
10-Jul	47.5	53.3	55.1	58.9	65.5	62.5	56.7	54.0	49.2	47.8	42.9	40.3	35.8	30.8	30.1	29.8	28.6	29.9	34.5	37.8	41.0	39.6	39.4	41.1	43.8	65.5																							
11-Jul	44.7	49.1	51.8	55.0	54.9	57.7	56.1	52.7	49.5	46.9	42.6	40.7	42.5	38.2	35.8	34.7	33.0	33.9	37.9	43.3	57.4	71.0	76.0	84.5	49.6	84.5																							
12-Jul	86.7	90.3	92.9	96.8	95.0	84.5	77.0	67.9	59.6	51.2	47.2	40.3	27.5	25.9	26.5	26.6	26.7	27.8	29.7	35.1	43.2	48.9	53.5	52.9	54.7	96.8																							
13-Jul	54.8	57.6	71.4	75.2	67.6	64.8	61.4	58.6	51.8	40.1	33.6	34.8	34.6	34.3	34.4	34.9	36.3	38.7	38.2	29.5	32.2	33.8	36.0	41.9	45.7	75.2																							
14-Jul	53.1	60.4	61.9	64.9	64.9	66.5	70.8	68.4	62.1	57.0	54.9	55.3	51.7	48.6	43.7	45.7	48.3	49.7	51.4	55.5	61.7	66.5	69.2	72.5	58.5	72.5																							
15-Jul	73.2	73.0	74.9	76.0	75.3	77.8	79.1	81.9	75.8	69.1	63.0	60.8	60.5	55.7	51.9	50.2	50.2	48.6	46.6	51.5	59.4	72.2	82.6	86.9	66.5	86.9																							
16-Jul	86.6	89.9	93.0	94.2	94.8	88.5	81.4	69.5	65.9	60.3	51.4	46.2	42.8	42.3	42.8	41.9	42.5	44.3	45.1	47.4	49.9	53.6	56.0	60.0	62.1	94.8																							
17-Jul	64.7	67.0	68.3	72.2	73.0	72.0	68.8	67.2	67.8	67.3	67.1	67.6	78.3	89.7	87.1	82.4	81.0	84.2	86.5	87.9	90.2	92.9	94.3	95.2	78.0	95.2																							
18-Jul	94.8	96.3	96.9	97.1	97.2	97.7	93.9	86.5	77.0	68.2	58.6	49.3	41.5	37.7	33.9	35.3	39.4	37.9	40.5	45.6	56.6	63.3	66.9	72.0	66.0	97.7																							
19-Jul	80.1	86.7	90.7	93.8	96.3	91.3	86.7	78.0	73.4	68.8	59.7	54.2	49.0	47.7	45.3	76.9	79.1	79.9	71.5	76.9	90.0	96.3	97.7	98.8	77.9	98.8																							
20-Jul	99.1	99.6	99.8	99.7	99.9	99.8	94.5	86.9	80.7	73.4	63.2	57.5	53.8	51.0	44.0	43.9	40.0	41.3	44.2	50.3	71.3	78.2	91.6	96.0	73.3	99.9																							
21-Jul	93.8	94.1	97.9	98.3	98.6	96.9	89.5	84.0	78.4	67.4	61.2	49.4	45.8	43.8	45.4	42.9	41.8	41.3	43.0	60.8	61.1	76.2	79.9	82.1	69.7	98.6																							
22-Jul	79.2	84.3	91.3	90.5	89.7	93.5	90.0	83.8	74.6	71.2	67.6	62.5	54.2	50.1	47.4	48.2	48.0	50.7	53.0	60.1	66.2	65.6	63.1	66.3	68.8	93.5																							
23-Jul	77.6	80.7	81.6	82.6	85.3	86.5	84.0	79.5	73.0	71.1	67.2	60.4	55.2	54.3	53.8	52.6	51.1	51.9	53.8	59.8	62.3	72.2	79.1	82.9	69.1	86.5																							
24-Jul	87.9	92.1	89.9	93.4	93.3	89.6	88.1	77.3	67.0	56.3	46.6	41.3	35.9	35.0	34.4	33.6	33.7	34.5	38.1	48.8	50.0	45.7	44.4	44.1	58.4	93.4																							
25-Jul	45.0	49.1	56.5	83.2	97.9	99.9	91.6	76.5	76.4	78.0	89.1	92.6	97.5	96.0	94.9	93.7	92.5	94.8	95.5	95.2	90.1	85.8	81.4	77.1	84.6	99.9																							
26-Jul	83.1	87.4	87.8	87.4	87.0	85.3	82.7	76.4	70.9	65.2	62.0	54.0	51.8	49.5	52.7	53.2	60.6	61.0	63.3	69.9	70.7	71.9	71.7	66.0	69.6	87.8																							
27-Jul	68.4	74.5	80.4	87.2	88.9	87.8	83.7	81.4	80.6	75.6	67.8	58.2	53.2	51.8	49.1	61.3	90.5	71.1	66.6	82.1	81.5	86.0	93.5	97.6	75.8	97.6																							
28-Jul	97.5	97.3	98.2	97.8	98.0	93.8	80.3	71.2	66.0	62.7	54.5	46.7	42.1	37.5	40.3	43.2	44.6	46.5	49.5	56.0	63.4	73.3	69.8	66.4	66.5	98.2																							
29-Jul	71.4	71.3	76.6	87.0	86.2	86.6	83.5	75.0	68.0	58.3	47.8	42.6	38.2	35.0	33.6	32.9	34.1	34.0	35.3	41.7	48.1	59.0	64.0	64.7	57.3	87.0																							
30-Jul	65.8	79.2	75.8	80.4	81.7	76.4	70.2	64.9	60.8	57.1	51.2	45.6	40.7	36.0	35.2	34.9	34.3	36.5	45.7	51.0	73.7	84.1	88.7	88.5	60.8	88.7																							
31-Jul	85.9	83.5	84.6	88.3	93.2	97.8	98.7	97.5	94.2	84.9	76.2	71.2	69.7	61.8	58.7	83.8	64.7	87.5	89.6	84.9	93.8	84.4	75.0	74.1	82.7	98.7																							
																								74.6	77.9	80.7	84.0	84.5	82.6	78.4	72.9	67.7	61.8	55.9	51.1	49.6	48.2	47.0	48.8	50.0	50.8	52.2	56.9	63.2	67.9	70.1	71.0	Diurnal Average	
																								99.9	100.0	99.8	99.7	99.9	99.9	98.7	97.5	94.2	84.9	89.1	92.6	98.4	98.8	97.8	93.7	92.5	94.8	95.5	97.2	98.8	99.3	97.7	98.8	Diurnal Maximum	
OR - Out of Range																																																	





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Mildred Lake - July 2023

Maximum Speed: 24 km/h on Jul 3 14:00	Maximum Daily Speed Average: 15.3 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 4 07:00	Minimum Daily Speed Average: 0.3 km/h on Jul 21	Hours of Data: 741
Maximum Diurnal Speed Average: 2.2 km/h at hour 18	Minimum Diurnal Speed Average: 0.2 km/h at hour 6	Hours of Missing Data: 3
Monthly Average Velocity: 0.8 km/h 332.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 10 P ₉₀ = 14 P ₉₉ = 21	Percent Operational Time: 99.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	WNW7	NNW2	WNW4	SSW5	SSW4	SSW4	SSW4	SSW3	S5	SE3	ESE9	SE13	SE11	ESE13	SSE13	SW13	WSW8	NW6	NW8	NW6	NNW5	SSW4	WNW4	W3	SSW2.5	SW13
2-Jul	WNW9	WNW9	WSW8	W7WNW1	WNW10	WNW9	NW13	NW15	NW17	NW18	NW22	NW17	WNW12	WNW11	NW20	NW15	NW14	WNW13	WNW11	W12	WNW12	WNW10	WNW10	WNW12.1	NW22	
3-Jul	NW11	NW10	NW11	NW14	N18	N15	N21	N22	NNW20	NNW22	N21	N21	NNW21	NNW24	N22	NNW20	N17	NNW15	N9	NNW11	NNW8	NW7	NNW7	NNW8	NNW15.3	NNW24
4-Jul	NNW8	NNW6	WNW1	NNW2	NW2	SSE0	SW0	SSW4	SSW3	WSW5	W7	WSW8	WSW7	WSW7	WSW6	S5	SSE3	SSE8	SSE10	SSE10	SSE8	S9	S7	SSW7	SSW3.2	SSE10
5-Jul	S4	SSE5	E1	SW7	SSW6	SSW7	S8	SSW8	SSW11	SW12	SW11	WSW8	WNW7	S1	WSW4	SSW8	SW6	WNW8	W7	WSW5	NW5	NW8	NNW10	NNW9	WSW4.3	SW12
6-Jul	NNW8	NNW4	WNW2	NW5	NNW6	N6	N7	N12	N14	N13	N15	N13	N14	N13	N12	N13	N13	NNE12	N9	N7	NNW4	NNE4	NE3	N9.0	N15	
7-Jul	SSW3	SSW2	S1	SSW2	S3	S4	S6	SSW6	WSW5	W4	WSW3	WNW3	S4	S10	SSW10	SSW11	SSW11	SW7	WSW2	WSW4	SW4	SW8	WSW11	WSW10	SW4.8	SSW11
8-Jul	W11	W13	WSW9	WSW9	SW9	W2	WSW4	SW6	W7	WNW5	WNW7	WNW7	WNW3	S6	NW6	NNW8	NW12	NNW10	N7	NNE6	NNE3	NNW3	UO	NW5	WNW4.6	W13
9-Jul	W2	NNW6	NNW7	NNW6	N7	N6	N7	N7	NNW7	N11	NNE12	N14	N14	N15	NNE14	NNE15	NNE15	NNE12	NNE11	N8	N10	NNE8	ENE7	ENE9	N9.0	NNE15
10-Jul	E9	E11	ESE11	ESE7	E4	ESE7	SE16	SE14	SE14	ESE13	ESE14	ESE11	ESE11	ESE13	ESE13	SSE11	SSE11	SE9	E8	E8	E8	ESE9	SE8	SE10	ESE9.8	SE16
11-Jul	SE11	SE8	SE7	SSE7	SSE11	SSE8	SSE9	SSE11	SSE13	SSW9	SSW7	SSW8	SSW9	SSW10	SSW10	SSW11	SSW8	S8	S7	S5	UO	WSW2	SSW3	ENE2	S7.2	SSE13
12-Jul	NE2	ESE2	SSW3	SSW4	ESE0	ESE2	NNE2	NNW4	NNW6	NW7	NNW10	NNW10	NW15	NNW14	N13	N9	N8	N9	NNE7	NNE6	N5	NW6	NNW8	NW9	NNW5.6	NW15
13-Jul	NNW8	NNW6	NW2	WNW1	WNW5	WNW6	NW9	NW12	NNW15	NNW17	NNW21	NNW23	NNW23	NNW23	NNW20	NNW18	NNW14	N14	N15	N15	NNW12	NNW12	NNW11	NNW10	NNW12.7	NNW23
14-Jul	NNW7	NNW8	NNW9	NW8	NW9	NNW9	NW7	NNW14	NNW16	NNW17	NNW15	N12	N11	N10	N13	N11	NNE10	NNE8	N9	N7	N5	NNW6	NNW5	NNW5	NNW9.2	NNW17
15-Jul	NNW6	NNW6	NNW5	NW6	NNW5	N5	N4	NNW2	NW5	N6	NNE9	NE10	NE10	NNE11	NNE11	NNE10	NE9	NNE7	ENE6	NE6	NNE4	NNE3	ENE3	NNE5.7	NNE11	
16-Jul	NE2	ESE1	NE3	UO	S5	SSE4	S5	SSE10	SE11	SE11	SSE14	SSE15	SSE15	SE14	SE14	SSE13	SSE13	SE13	SE14	SE10	SE12	ESE11	SE12	SE10	SE9.6	SSE15
17-Jul	SE8	ESE10	SE11	SE8	ESE7	ESE9	SE11	SE12	SE15	SE15	SE16	SE17	SE12	SE6	ESE14	ESE10	ESE6	ENE7	NNE7	NW5	NNW7	NNW8	N6	N5	ESE6.9	SE17
18-Jul	N4	N7	NNW8	N7	N8	N8	N6	N9	NNE7	N7	NNE7	SW0	E3	SSE5	SSW2	WNW5	W4	NW5	SW4	W2	W8	W10	W8	W7	NNW3.7	W10
19-Jul	WSW5	SW4	WSW4	E1	S2	SW4	SW3	SSW2	SSE3	SW3	S2	SW7	SSW7	S7	SW3	E7	W5	W7	W5	NE3	NE1	S2	SW2	NE3	SW2.3	SSW7
20-Jul	NE2	SW2	S4	SSW4	S3	S3	S3	SSW3	SSW3	S4	N3	S3	SSW5	SSW5	SSE4	WNW6	NW7	NNW6	NNE6	NNE5	NNE3	NNW4	NNE3	NW4	WSW0.7	NW7
21-Jul	NNW4	N5	W2	NNW2	N1	SSE1	S3	S5	S5	SW3	S4	NW4	NW4	NNW5	S4	SSE5	SSW8	S5	SSE2	NE4	ENE6	NE4	NE4	N3	SSW0.3	SSW8
22-Jul	N7	NNW5	NNW1	N6	NNW3	WSW1	NE4	NNE4	N6	N7	N8	N9	N11	NNE11	NNE11	NNE8	NE9	NNE6	N6	N9	N9	N9	N10	N7	N6.6	N11
23-Jul	NNW2	NNW3	N5	N5	NNE4	SE1	SSE4	S8	SSE11	SE8	ESE5	ESE6	S6	SSW5	SSW7	SE5	SSE13	SSE13	SSE12	SSE9	SSE8	S6	S3	S3	SSE4.4	SSE13
24-Jul	S4	SSW3	SSE2	SSW3	S1	S4	S7	SE4	SE4	SSE3	SE4	ENE5	ESE3	E2	SW1	ESE3	E6	E9	E8	ENE5	NE6	ENE9	ENE9	E10	ESE3.5	E10
25-Jul	E12	ENE10	SW8	W7	E2	NNE8	E9	ESE9	SE5	S7	NE3	SSW1	WNW5	N6	NE4	E5	NE0	N5	NNW5	WNW3	SW16	SW15	SW13	SW14	SSW1.0	WSW16
26-Jul	SSW9	S11	SSE9	SSE10	SSE11	S9	SE5	SSE9	SE9	SSE9	SSE7	SSE8	ESE7	ENE3	N6	N11	N15	N12	N14	NNE10	ENE15	E11	ENE8	ENE8	ESE3.7	ENE15
27-Jul	NE8	NNE8	NNE9	NNE8	NNE8	N8	N10	N9	NNW9	NW10	NNW10	NNW14	N12	NNE10	NE10	ENE5	SW6	W7	NW3	NNW2	SSE6	SW1	NW5	E1	N5.4	NNW14
28-Jul	NW0	NNE2	SW1	SE1	ENE1	ENE1	W1	SSW2	S3	S4	SSW5	SSW6	S6	S7	S10	S10	S11	S11	S10	S8	S7	SSW6	SSW7	WSW5	S4.7	S11
29-Jul	SSW6	SSW5	S4	S6	S6	S8	S9	S8	S8	SSW9	SSW10	SSW9	SSW10	SW10	SW10	SSW10	S10	S11	S11	S8	S7	SSW6	SSW7	S7	SSW7.8	S11
30-Jul	S5	E3	SE4	ESE4	ESE3	SE7	SE9	SE8	SE10	SSE12	SSE13	SSE15	SSE15	S16	S16	S14	S11	SSW7	S6	SW10	SSW16	SSE7	ESE11	S7	SSE8.4	S16
31-Jul	SSW10	S5	S3	WNW8	SSE4	SE5	SE6	S9	S14	S12	SSW9	SSW11	W7	WSW7	W4	SW6	WNW7	NNW14	W3	W5	SW1	W5	W9	SW10	SW4.4	S14

NW1.0	NNW0.9	W0.7	WNW1.2	NW0.4	S0.2	SE1.0	SE0.7	S0.6	NW0.8	N1.5	NNW1.3	NW1.6	NNW1.1	NNE1.1	N0.6	NW1.3	N2.2	N1.6	N1.9	NNW0.9	NNW1.0	NW1.0	WNW1.0	Diurnal Average
E12	W13	NW11	NW14	N18	N15	N21	N22	NNW20	NNW22	N21	NNW23	NNW23	NNW24	N22	NNW20	N17	NNW15	N15	N15	WSW16	SW15	SW13	SW14	Diurnal Maximum

UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

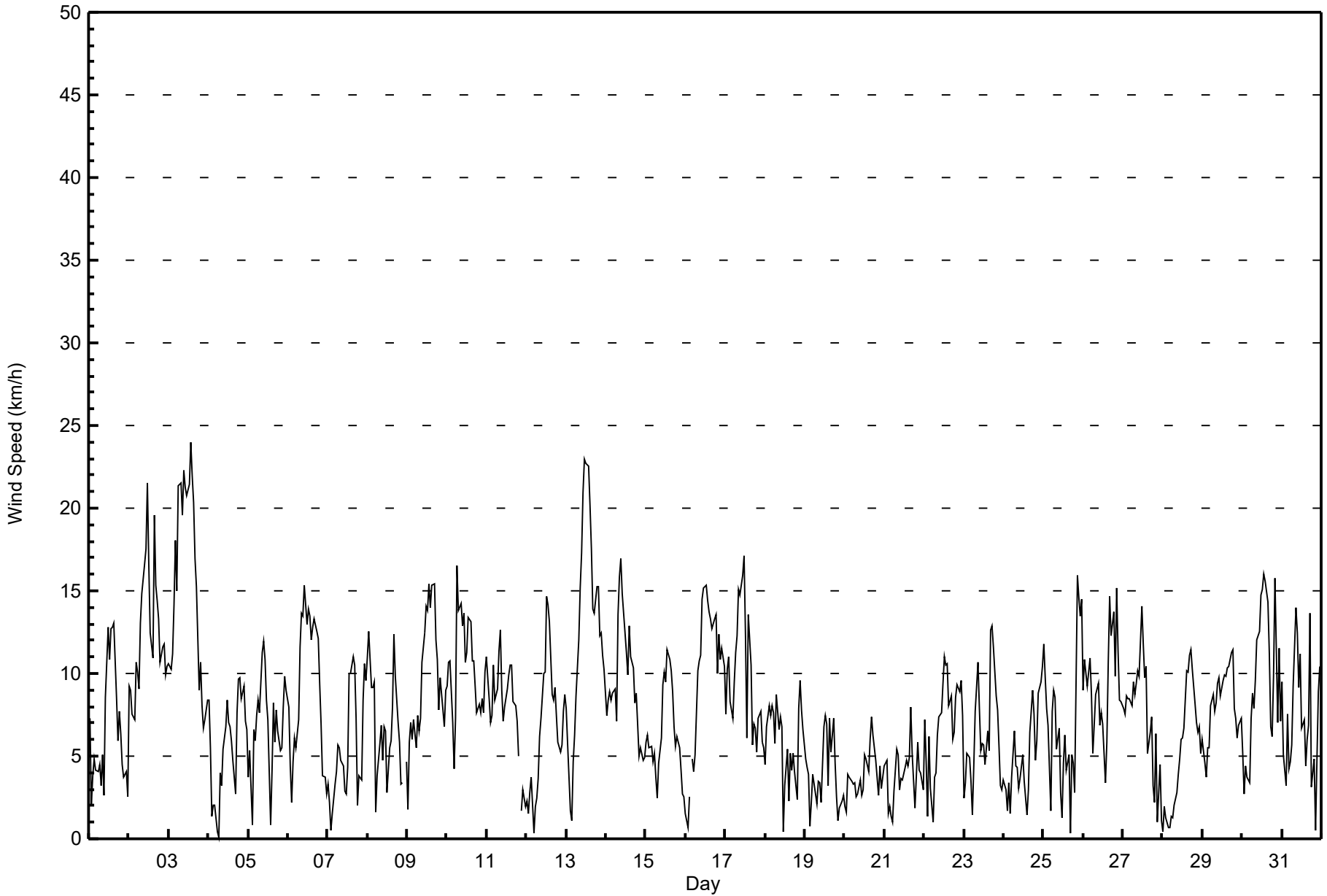
Wind Speed (WS) - km/h
Mildred Lake - July 2023

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Mildred Lake - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Mildred Lake - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	247	33.33	33.33
6 - 11	364	49.12	82.46
12 - 19	113	15.25	97.71
20 - 28	17	2.29	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
Mildred Lake - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	13	12	14	8	9	9	10	15	37	28	16	13	14	12	14	23	247
6 - 11	48	28	8	10	12	18	21	25	41	37	15	12	14	18	17	40	364
12 - 19	27	6	0	1	1	6	16	14	5	1	5	1	2	4	9	15	113
20 - 28	5	0	0	0	0	0	0	0	0	0	0	0	0	0	2	10	17
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	93	46	22	19	22	33	47	54	83	66	36	26	30	34	42	88	741

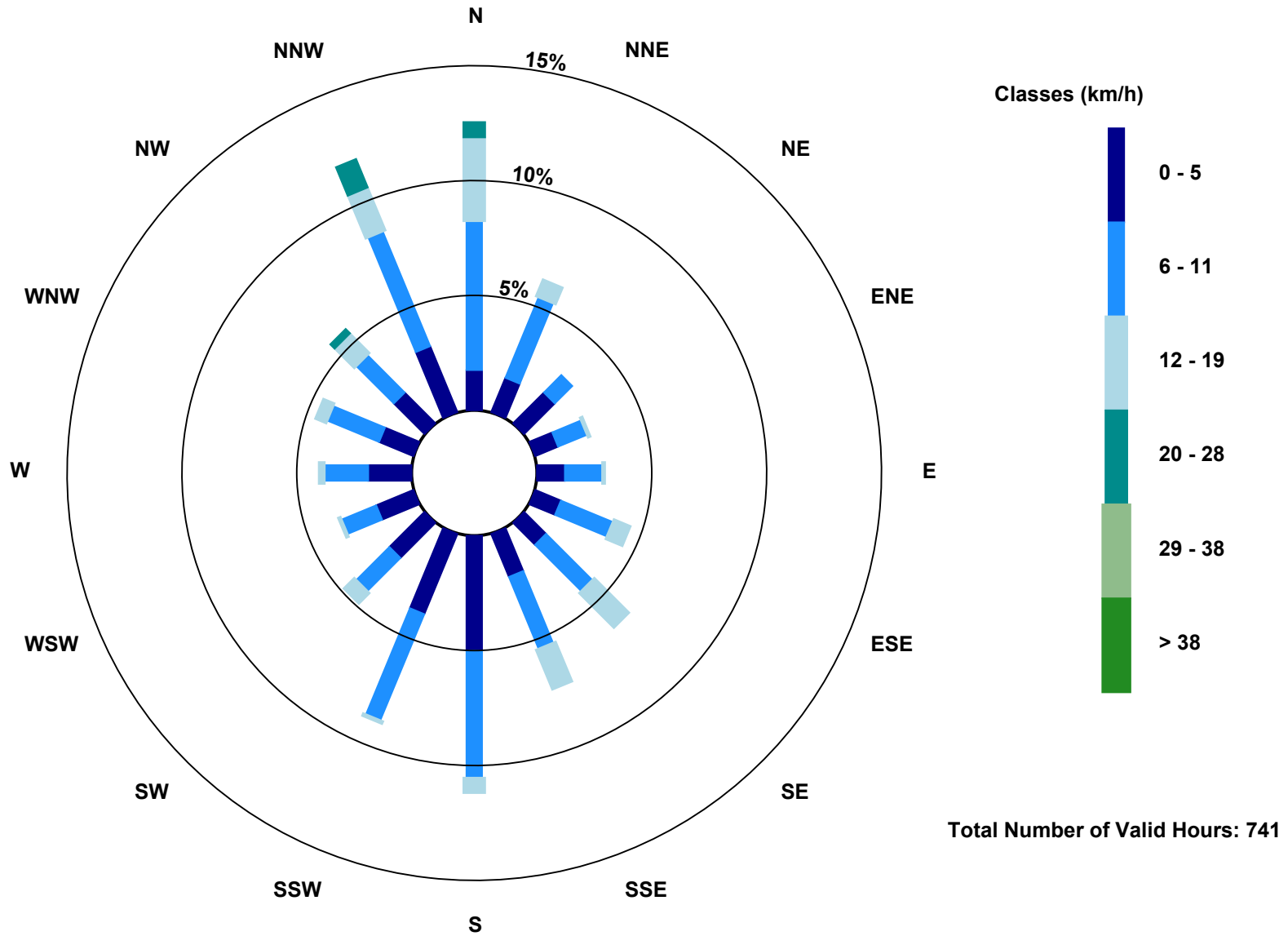
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Mildred Lake





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Mildred Lake - July 2023

Direction of Maximum Speed: 344 deg on Jul 3 14:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 343.0 deg on Jul 3	Hours of Data: 741
Direction of Minimum Speed: 231 deg on Jul 4 07:00	Direction of Minimum Daily Speed Average: 0.3 deg on Jul 21
Direction of Minimum Speed: 231 deg on Jul 4 07:00	Hours of Missing Data: 3
Monthly Average Direction: 332.0 deg	Percent Operational Time: 99.6

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	295	341	291	209	203	198	202	195	179	145	113	144	141	118	154	217	251	310	311	325	344	193	289	269	195.8
2-Jul	283	291	257	270	289	285	292	311	323	317	324	322	309	285	287	311	326	304	296	283	279	298	301	297	301.8
3-Jul	315	311	315	325	351	352	356	357	344	344	349	351	338	344	350	346	350	340	353	339	342	323	332	335	343.0
4-Jul	339	339	303	327	315	162	231	192	209	256	260	256	248	249	246	186	165	155	159	161	164	177	188	198	211.0
5-Jul	183	166	81	226	206	192	181	193	199	225	227	249	301	185	253	197	231	292	271	256	308	325	337	341	239.4
6-Jul	347	335	290	324	343	359	0	354	357	10	0	2	355	2	10	359	358	3	14	8	355	332	26	40	359.2
7-Jul	197	195	174	204	178	184	181	196	254	270	250	291	170	189	196	200	213	230	256	258	232	236	238	245	217.1
8-Jul	265	270	248	237	227	276	239	234	264	285	283	284	285	183	306	347	314	345	9	13	15	338	UO	320	286.2
9-Jul	269	342	337	346	355	0	357	1	341	358	16	6	11	6	15	21	24	19	14	358	350	29	59	66	9.4
10-Jul	89	90	110	117	92	120	146	126	143	113	104	116	117	106	106	147	156	126	100	81	90	119	128	138	117.9
11-Jul	143	140	142	150	147	165	163	156	156	192	201	208	212	199	194	194	200	181	169	171	UO	256	210	69	174.2
12-Jul	35	102	202	195	107	109	14	339	332	326	331	328	325	337	7	10	356	3	23	20	354	322	332	324	345.4
13-Jul	330	333	319	295	298	301	317	326	335	340	338	340	333	332	341	341	348	359	1	352	336	330	329	343	337.4
14-Jul	338	330	328	318	315	329	325	336	334	342	346	360	357	3	4	359	22	15	355	2	359	338	347	327	346.0
15-Jul	337	336	343	326	340	358	358	340	325	10	13	35	36	26	20	29	42	33	65	55	38	25	32	64	17.7
16-Jul	48	123	42	UO	184	166	184	149	130	135	151	153	152	143	130	156	156	138	139	124	133	122	137	128	141.8
17-Jul	127	122	136	124	116	116	131	128	135	137	139	137	144	131	103	107	106	64	17	325	348	348	1	0	116.1
18-Jul	4	350	346	354	352	352	8	0	13	355	16	228	82	148	198	285	275	322	226	277	277	275	268	273	328.2
19-Jul	244	235	246	100	173	218	233	194	165	232	187	223	205	185	236	90	278	274	271	47	56	175	224	34	220.9
20-Jul	51	216	184	192	178	173	181	198	200	190	10	174	208	207	161	291	309	345	16	15	26	344	15	318	255.8
21-Jul	340	349	279	334	2	156	184	190	187	215	185	324	319	328	174	147	206	190	162	40	60	52	48	1	200.0
22-Jul	357	337	345	1	346	239	51	14	355	2	349	358	359	18	18	29	41	27	0	350	353	4	8	355	5.5
23-Jul	342	332	360	5	12	131	154	172	154	146	111	120	180	192	202	146	164	159	168	159	163	190	186	173	159.5
24-Jul	183	197	166	193	180	185	171	142	127	153	124	77	108	89	216	111	88	95	86	60	44	64	77	92	106.3
25-Jul	93	77	218	264	95	12	87	104	128	188	45	195	284	3	43	81	51	8	346	294	236	231	228	230	202.4
26-Jul	197	179	162	168	166	177	138	150	138	149	150	159	120	62	357	349	2	3	9	14	74	98	65	78	106.0
27-Jul	34	25	19	12	13	0	4	1	327	323	337	346	357	12	39	77	225	275	317	330	161	217	306	92	357.0
28-Jul	308	27	234	131	66	77	265	207	186	188	213	209	182	178	182	180	190	183	184	182	186	195	201	241	190.2
29-Jul	202	194	189	172	169	188	177	169	179	194	209	207	209	219	216	198	185	188	182	181	174	193	195	188	191.7
30-Jul	190	101	133	109	117	142	141	146	146	147	159	160	161	183	183	174	184	204	182	224	208	150	111	175	165.9
31-Jul	193	170	174	294	152	133	134	176	170	179	193	196	261	243	261	227	286	338	277	273	224	260	267	229	217.8

310.6 336.8 264.3 281.9 306.6 177.1 135.0 136.9 176.8 304.2 349.9 333.0 322.7 348.2 17.2 358.9 312.1 348.9 10.1 353.6 342.0 302.5 313.6 300.4
 Diurnal Average

UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



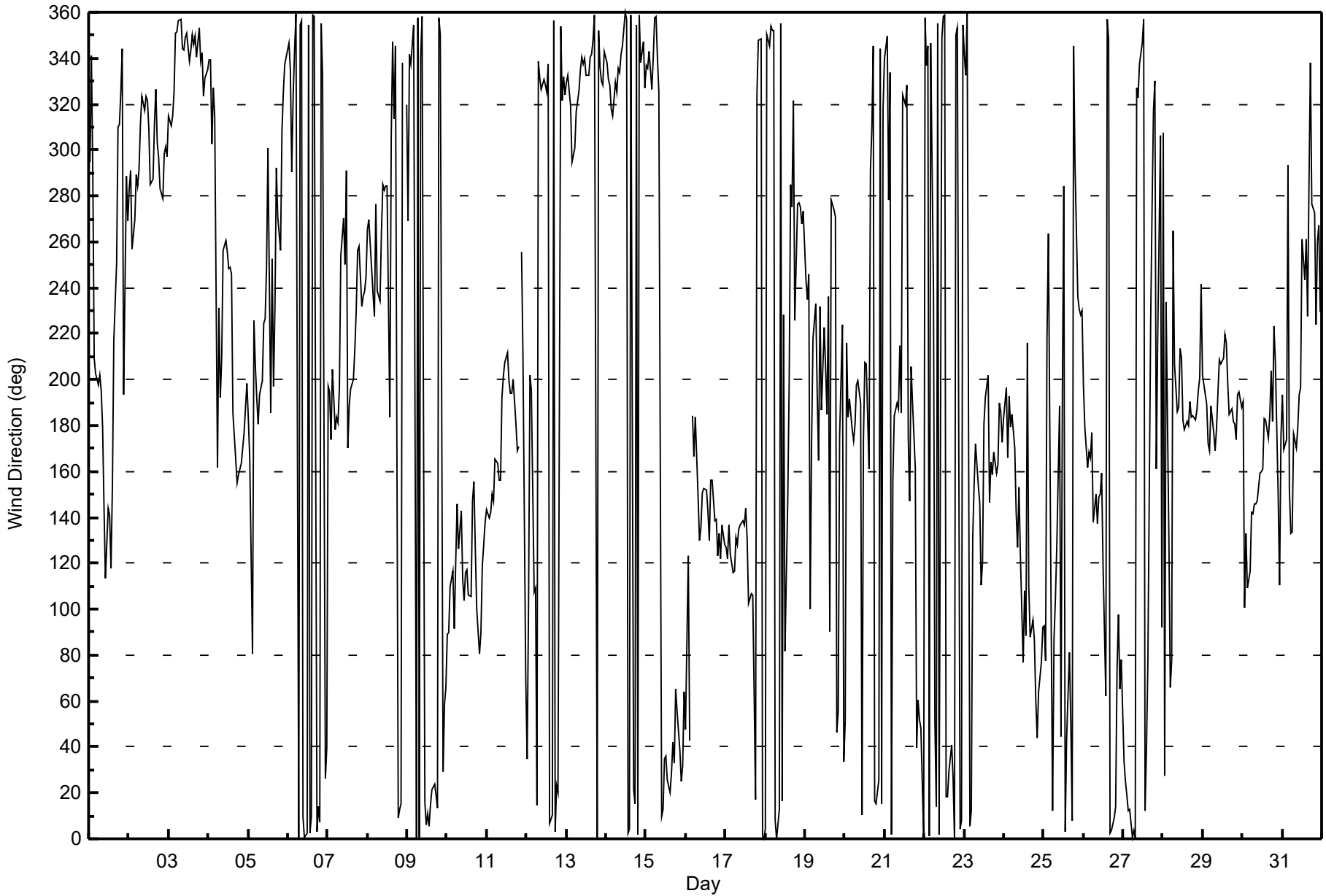
Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Mildred Lake - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 109 deg on Jul 5 14:00	Hours of Data: 741
Minimum Value: 7 deg on Jul 4 01:00	Hours of Missing Data: 3
Percentiles: P ₁ = 8 P ₁₀ = 13 Q ₁ = 17 Median = 23 Q ₃ = 37 P ₉₀ = 58 P ₉₉ = 91	Hours of Calibration: 0
	Percent Operational Time: 99.6

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	22	52	26	24	24	42	25	30	33	63	26	18	22	22	26	30	36	38	21	21	53	44	20	57	63
2-Jul	18	19	27	35	20	18	20	20	11	13	12	11	17	21	21	19	10	21	19	22	21	17	17	18	35
3-Jul	13	13	15	12	16	15	19	18	16	17	18	20	15	16	18	18	19	18	20	14	12	8	8	8	20
4-Jul	7	56	25	16	22	91	98	28	57	45	41	35	38	49	50	58	86	32	17	15	14	16	18	27	98
5-Jul	45	24	95	28	27	21	17	25	24	25	29	41	53	109	64	21	32	34	31	23	24	14	8	8	109
6-Jul	9	25	38	25	12	17	17	17	19	24	23	28	25	29	32	27	22	23	20	19	16	18	17	11	38
7-Jul	20	37	84	47	22	19	14	24	41	38	52	70	65	25	23	29	26	42	72	35	38	25	24	25	84
8-Jul	23	23	26	25	23	91	38	28	29	46	30	40	72	42	56	25	20	16	17	17	30	16	UO	11	91
9-Jul	61	10	9	13	12	18	17	19	26	27	24	27	26	26	28	27	24	24	22	15	11	21	13	13	61
10-Jul	14	13	17	18	24	34	12	21	18	24	19	26	23	21	25	31	24	20	18	10	13	17	17	14	34
11-Jul	16	12	15	15	12	17	16	15	17	25	36	30	28	24	24	22	23	20	13	15	UO	38	19	50	50
12-Jul	25	62	36	14	87	56	47	36	29	30	23	28	17	24	26	35	42	21	18	18	22	11	8	10	87
13-Jul	11	23	46	76	17	17	16	9	16	18	17	20	17	16	17	18	19	19	19	17	14	11	11	12	76
14-Jul	10	8	9	10	12	14	16	15	16	18	20	23	25	27	23	21	24	22	18	17	19	12	19	11	27
15-Jul	11	17	12	11	13	14	21	27	22	30	29	26	27	31	33	31	33	36	25	20	20	10	56	42	56
16-Jul	55	71	23	UO	32	32	28	17	22	23	19	22	22	23	22	26	20	18	17	19	18	20	18	19	71
17-Jul	19	19	14	14	16	18	20	20	18	16	17	17	20	34	17	21	38	24	25	34	19	13	14	13	38
18-Jul	17	12	12	16	12	12	22	17	27	29	38	107	83	53	80	41	40	29	26	46	22	22	23	19	107
19-Jul	39	16	24	79	35	25	36	78	40	64	83	35	32	40	75	58	78	31	45	64	66	71	75	42	83
20-Jul	69	67	31	26	29	31	24	60	64	57	75	79	51	50	59	47	29	33	19	14	23	41	48	38	79
21-Jul	17	42	59	39	54	76	18	18	21	60	42	62	63	56	64	57	29	31	62	27	10	13	13	41	76
22-Jul	11	18	69	15	61	81	49	40	37	21	20	20	19	23	20	22	25	21	15	10	10	17	18	13	81
23-Jul	46	35	17	26	30	55	42	22	17	29	35	39	40	53	30	46	25	17	15	17	18	32	39	58	58
24-Jul	40	52	46	21	79	45	17	23	34	58	52	29	30	44	87	85	25	11	11	12	16	15	10	11	87
25-Jul	12	13	36	42	91	25	37	29	57	58	83	94	49	20	30	26	101	19	22	63	22	22	25	22	101
26-Jul	29	13	14	16	14	17	35	18	24	30	54	41	62	64	52	47	18	18	20	24	17	19	19	17	64
27-Jul	20	16	16	17	18	15	16	16	16	17	23	21	30	41	34	76	34	26	60	51	23	88	13	76	88
28-Jul	85	51	79	85	80	53	66	65	67	38	38	28	37	40	27	24	20	19	16	14	15	16	24	43	85
29-Jul	35	49	35	21	17	13	14	17	19	25	26	32	30	30	28	31	27	20	17	13	13	16	14	14	49
30-Jul	50	68	16	18	18	17	15	22	20	17	21	20	22	22	22	20	26	20	16	27	35	43	22	37	68
31-Jul	36	48	68	29	27	38	41	19	16	19	26	30	45	42	59	45	73	17	31	21	86	43	28	27	86
	85	71	95	85	91	91	98	78	67	64	83	107	83	109	87	85	101	42	72	64	86	88	75	76	
	Diurnal Maximum																								

UO - Unstable Operation





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS03 LOWER CAMP METEOROLOGY JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS03)
JULY 2023

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	726	0	18	97.58	29.7	-	23.4	-
Temperature 45 m (C) Average	726	0	18	97.58	29.5	-	23.6	-
Temperature 100 m (C) Average	726	0	18	97.58	29	-	23.6	-
Temperature 163 m (C) Average	726	0	18	97.58	28.5	-	23.8	-
Relative Humidity 20 m (%) Average	726	0	18	97.58	99.6	-	90.6	-
Relative Humidity 45 m (%) Average	726	0	18	97.58	99.4	-	89.8	-
Relative Humidity 100 m (%) Average	726	0	18	97.58	94.8	-	86.6	-
Relative Humidity 163 m (%) Average	726	0	18	97.58	97.9	-	87.6	-
Wind Speed 20 m (km/h) Average	726	0	18	97.58	26	-	14.0	-
Wind Speed 45 m (km/h) Average	726	0	18	97.58	35	-	22.0	-
Wind Speed 100 m (km/h) Average	726	0	18	97.58	44	-	30.0	-
Wind Speed 163 m (km/h) Average	723	0	21	97.18	49	-	35.0	-
Wind Direction 20 m (deg) Average	726	0	18	97.58	-	-	-	-
Wind Direction 45 m (deg) Average	726	0	18	97.58	-	-	-	-
Wind Direction 100 m (deg) Average	726	0	18	97.58	-	-	-	-
Wind Direction 163 m (deg) Average	723	0	21	97.18	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	726	0	18	97.58	0.4	-	0.0	-
Vertical Wind Speed 45 m (km/h) Average	726	0	18	97.58	1.2	-	0.3	-
Vertical Wind Speed 100 m (km/h) Average	726	0	18	97.58	2	-	0.6	-
Vertical Wind Speed 163 m (km/h) Average	723	0	21	97.18	3.9	-	0.9	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS03)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
Temperature 20 m (C) Average	726	19.1	4.3	-	8.2	13.7	15.8	18.6	22.5	25.2	29.7
Temperature 45 m (C) Average	726	19.16	4.2	-	8.3	13.8	16	18.7	22.5	25.1	29.5
Temperature 100 m (C) Average	726	19.07	4.1	-	9.8	13.9	16.2	18.5	22.2	24.7	29
Temperature 163 m (C) Average	726	18.9	4	-	9.7	13.7	16.1	18.5	21.9	24.3	28.5
Relative Humidity 20 m (%) Average	726	64.57	21	-	25	35.8	46.3	65.3	83.1	92.9	99.6
Relative Humidity 45 m (%) Average	726	62.97	20.3	-	24.7	35.2	45.6	63.6	79.9	91.3	99.4
Relative Humidity 100 m (%) Average	726	58.48	18.5	-	23.7	33.5	43.2	57.3	73.7	84.4	94.8
Relative Humidity 163 m (%) Average	726	58.76	17.7	-	25.9	35.3	44	57.7	72.6	82.9	97.9
Wind Speed 20 m (km/h) Average	726	7.1	5	-	0	1	3	6	11	14	26
Wind Speed 45 m (km/h) Average	726	10.5	7	-	0	2	5	9	15	20	35
Wind Speed 100 m (km/h) Average	726	13.8	9	-	0	4	7	12	20	27	44
Wind Speed 163 m (km/h) Average	723	16.3	10	-	0	5	9	15	22	30	49
Wind Direction 20 m (deg) Average	726	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	726	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	726	-	-	-	-	-	-	-	-	-	-
Wind Direction 163 m (deg) Average	723	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	726	-0.27	0.3	-	-1.3	-0.7	-0.5	-0.2	0	0	0.4
Vertical Wind Speed 45 m (km/h) Average	726	-0.03	0.4	-	-1.4	-0.5	-0.2	0	0.2	0.4	1.2
Vertical Wind Speed 100 m (km/h) Average	726	0.06	0.4	-	-1.6	-0.4	-0.2	0	0.3	0.6	2
Vertical Wind Speed 163 m (km/h) Average	723	0.38	0.6	-	-1.6	-0.2	0.1	0.3	0.6	1	3.9

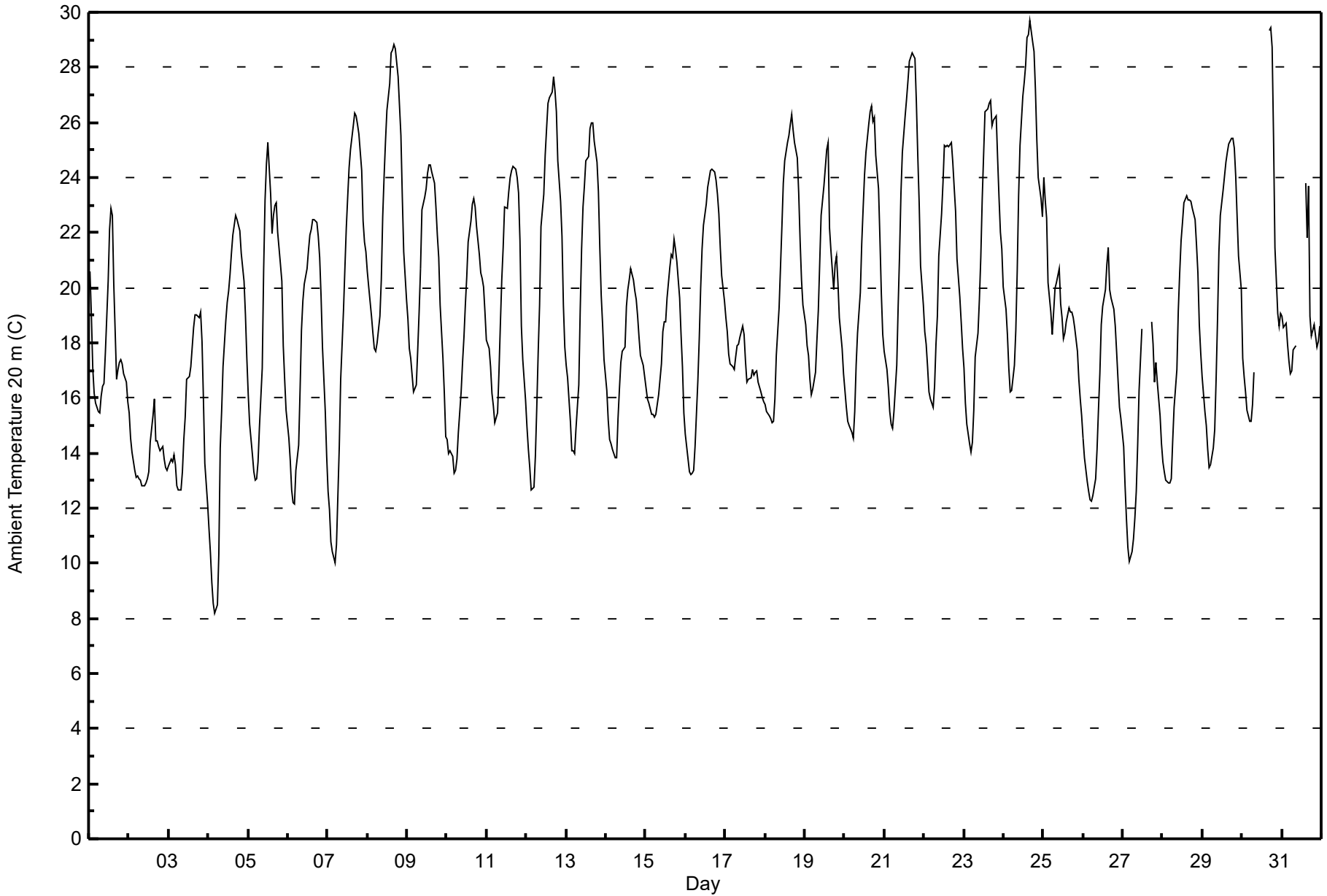
WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS03)
 JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	27 Jul 2023 13:00	27 Jul 2023 17:00	5	DAS Failure - data not recorded
ALL PARAMETERS	30 Jul 2023 09:00	30 Jul 2023 16:00	8	DAS Failure - data not recorded
ALL PARAMETERS	31 Jul 2023 10:00	31 Jul 2023 14:00	5	DAS Failure - data not recorded
Wind Speed, Wind Direction, Vertical Wind Speed 163m	02 Jul 2023 04:00	02 Jul 2023 04:00	1	Unstable Operation - excessive baseline drift
Wind Speed, Wind Direction, Vertical Wind Speed 163m	25 Jul 2023 05:00	25 Jul 2023 05:00	1	Unstable Operation - excessive baseline drift
Wind Speed, Wind Direction, Vertical Wind Speed 163m	25 Jul 2023 12:00	25 Jul 2023 12:00	1	Unstable Operation - excessive baseline drift



Maximum Value: 29.7 C on Jul 24 17:00																						Maximum Daily Average: 23.4 C on Jul 24																						Hours in Service: 744			
Minimum Value: 8.2 C on Jul 4 05:00																						Minimum Daily Average: 13.9 C on Jul 2																						Hours of Data: 726			
Maximum Diurnal Average: 23.5 C at hour 17																						Minimum Diurnal Average: 14.3 C at hour 5																						Hours of Missing Data: 18			
Monthly Average: 19.10 C																						Percentiles: P ₁ = 10.4 P ₁₀ = 13.7 Q ₁ = 15.8 Median = 18.6 Q ₃ = 22.5 P ₉₀ = 25.2 P ₉₉ = 28.7																						Hours of Calibration: 0			
																																												Percent Operational Time: 97.6			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	20.6	19.0	17.1	16.2	15.8	15.5	15.5	16.1	16.4	16.5	17.6	20.2	22.1	22.9	22.6	20.1	16.7	17.0	17.3	17.4	17.3	16.9	16.6	15.8	17.9	22.9																					
2-Jul	15.5	14.6	14.0	13.4	13.1	13.2	13.1	13.0	12.8	12.8	12.9	13.1	13.3	14.4	15.3	16.0	14.4	14.4	14.2	14.1	14.2	13.8	13.5	13.4	13.9	16.0																					
3-Jul	13.5	13.8	13.7	13.9	13.6	12.8	12.7	12.7	13.3	14.5	15.3	16.7	16.8	17.1	17.8	18.5	19.0	19.0	18.9	19.1	18.1	16.0	13.6	12.1	15.5	19.1																					
4-Jul	11.2	10.4	9.3	8.5	8.2	8.5	10.3	14.2	15.5	17.1	18.8	19.5	19.9	20.5	21.2	21.9	22.6	22.5	22.2	22.1	21.3	20.2	19.0	17.4	16.8	22.6																					
5-Jul	16.1	15.1	13.9	13.3	13.0	13.1	13.7	14.9	17.1	20.6	23.2	24.5	25.3	23.4	22.0	22.7	23.0	23.1	22.0	20.8	20.2	17.9	16.7	15.6	18.8	25.3																					
6-Jul	14.5	13.7	12.7	12.2	12.1	13.4	14.3	16.3	18.5	19.5	20.1	20.7	21.4	21.9	22.1	22.5	22.5	22.4	21.8	21.1	19.7	17.9	15.5	13.9	17.9	22.5																					
7-Jul	12.6	12.0	10.8	10.4	10.0	10.7	12.4	14.3	16.7	19.2	20.7	22.2	23.3	24.3	25.0	25.9	26.4	26.2	25.9	25.6	24.2	22.4	21.6	21.3	19.3	26.4																					
8-Jul	20.6	20.0	19.0	18.4	17.8	17.7	18.0	19.0	20.3	22.6	24.1	25.3	26.5	27.4	28.5	28.6	28.8	28.7	27.7	26.6	25.5	23.3	21.3	19.6	23.1	28.8																					
9-Jul	18.9	17.8	17.5	16.8	16.2	16.5	17.8	19.1	20.7	22.8	23.3	23.6	24.2	24.5	24.5	24.2	23.8	22.9	21.9	21.1	19.3	17.5	16.2	14.6	20.2	24.5																					
10-Jul	14.5	14.0	14.1	13.9	13.2	13.4	13.8	14.8	16.2	17.3	18.2	19.4	20.4	21.6	22.4	23.0	23.3	23.0	22.2	21.2	20.5	20.3	20.0	19.1	18.3	23.3																					
11-Jul	18.1	17.8	17.2	16.2	15.7	15.1	15.4	16.9	18.6	20.3	21.5	22.9	22.9	23.5	24.0	24.3	24.4	24.3	24.0	23.4	21.7	18.6	17.4	15.9	20.0	24.4																					
12-Jul	15.0	14.1	13.5	12.7	12.7	13.9	15.6	17.6	19.4	22.2	23.4	24.8	25.8	26.7	26.9	27.1	27.7	27.1	26.4	24.6	23.1	21.9	19.3	17.9	20.8	27.7																					
13-Jul	17.2	16.7	15.2	14.1	14.1	14.0	14.9	16.5	19.2	21.4	22.9	23.7	24.6	24.8	25.8	26.0	26.0	25.3	24.5	23.5	21.4	19.7	18.6	17.4	20.3	26.0																					
14-Jul	16.3	15.2	14.5	14.4	14.1	13.8	13.8	15.3	16.3	17.3	17.7	17.8	19.3	20.0	20.3	20.7	20.3	19.9	19.6	19.0	18.2	17.6	17.2	16.8	17.3	20.7																					
15-Jul	16.4	16.0	15.8	15.4	15.4	15.3	15.4	15.7	16.1	17.2	18.4	18.8	18.8	19.6	20.7	21.2	21.1	21.8	21.4	21.0	19.7	18.3	17.1	15.5	18.0	21.8																					
16-Jul	14.7	13.8	13.3	13.2	13.3	13.4	14.3	16.6	18.2	20.0	21.4	22.3	23.0	23.6	24.0	24.3	24.3	24.2	23.9	23.4	22.7	21.4	20.4	19.5	19.5	24.3																					
17-Jul	18.9	18.4	17.6	17.2	17.2	17.0	17.5	17.9	18.0	18.2	18.6	18.3	17.3	16.6	16.7	16.7	17.0	16.8	16.9	17.0	16.6	16.2	16.0	15.8	17.3	18.9																					
18-Jul	15.8	15.5	15.3	15.3	15.1	15.2	16.0	17.5	19.3	20.7	22.2	23.8	24.6	25.3	25.5	26.0	26.3	25.8	25.3	24.7	23.5	21.7	20.3	19.4	20.8	26.3																					
19-Jul	18.7	17.9	17.5	16.7	16.1	16.3	17.0	18.1	19.2	20.9	22.6	23.7	24.3	25.0	25.3	22.2	21.4	19.9	20.8	21.2	20.2	18.9	17.8	16.9	19.9	25.3																					
20-Jul	16.3	15.7	15.2	15.0	14.8	14.5	15.5	17.2	18.3	19.9	21.6	22.9	24.1	24.9	25.9	26.4	26.6	26.1	26.2	24.8	23.6	21.8	19.8	18.3	20.6	26.6																					
21-Jul	17.7	17.1	16.4	15.5	15.0	14.9	15.5	17.2	19.3	21.2	23.4	24.9	26.2	26.9	27.5	28.2	28.4	28.5	28.3	26.7	24.8	23.1	20.8	19.4	22.0	28.5																					
22-Jul	18.4	17.9	17.1	16.2	16.0	15.7	16.4	17.9	19.0	21.2	22.7	23.8	25.2	25.1	25.2	25.1	25.3	24.6	23.7	22.8	21.1	19.7	18.8	17.8	20.7	25.3																					
23-Jul	17.1	15.8	15.0	14.3	14.0	14.4	15.5	17.5	18.3	19.6	21.1	23.2	24.8	26.4	26.5	26.7	26.8	25.9	26.1	26.2	24.7	23.3	22.0	21.4	21.1	26.8																					
24-Jul	20.0	19.2	18.3	17.1	16.2	16.3	17.2	18.4	20.6	23.3	25.2	26.9	27.5	28.1	29.1	29.2	29.7	28.9	28.6	27.2	25.4	24.0	23.3	22.6	23.4	29.7																					
25-Jul	24.0	23.2	22.5	20.2	19.1	18.3	19.1	20.0	20.2	20.7	19.4	18.9	18.2	18.3	18.8	19.3	19.1	19.1	18.9	18.6	17.7	16.7	16.0	15.3	19.2	24.0																					
26-Jul	14.6	13.8	13.0	12.6	12.3	12.3	12.5	13.0	14.1	15.6	16.9	18.7	19.3	20.0	20.9	21.5	19.9	19.6	19.2	18.6	17.6	16.6	15.7	15.3	16.4	21.5																					
27-Jul	14.2	12.8	11.6	10.6	10.1	10.4	10.9	11.7	12.6	14.3	16.3	18.5	DF	DF	DF	DF	DF	18.8	18.0	16.6	17.3	16.6	15.3	14.4	14.2	18.8																					
28-Jul	13.7	13.3	13.0	12.9	12.9	13.1	14.4	15.7	17.1	19.2	20.6	21.7	22.4	23.1	23.4	23.2	23.2	23.2	22.9	22.5	21.6	20.5	18.7	17.7	18.7	23.4																					
29-Jul	16.8	15.5	15.0	14.1	13.5	13.6	14.2	14.8	16.7	18.8	21.3	22.6	23.6	24.0	24.6	24.9	25.2	25.4	25.4	25.1	24.0	22.6	21.2	19.9	20.1	25.4																					
30-Jul	17.4	16.8	16.2	15.5	15.2	15.1	15.8	16.9	DF	DF	DF	DF	DF	DF	DF	DF	DF	29.4	29.4	28.7	25.5	21.5	19.1	18.6	--	29.4																					
31-Jul	19.0	18.6	18.7	18.0	17.3	16.9	17.0	17.7	17.9	DF	DF	DF	DF	DF	DF	23.8	21.8	23.7	19.0	18.3	18.6	18.2	17.9	18.0	18.6	18.9	23.8																				
																						16.7	16.0	15.3	14.7	14.3	14.3	15.0	16.3	17.5	19.1	20.4	21.5	22.3	22.9	23.3	23.4	23.5	23.0	22.6	21.9	20.8	19.4	18.3	17.3	Diurnal Average	
																						24.0	23.2	22.5	20.2	19.1	18.3	19.1	20.0	20.7	23.3	25.2	26.9	27.5	28.1	29.1	29.2	29.7	29.4	28.7	27.2	25.5	24.0	23.3	22.6	Diurnal Maximum	
DF - DAS Failure																																															





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 20 m (AT20m) - C
Lower Camp Met Tower - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	4	0.55	0.55
10 - 20	436	60.06	60.61
> 20	286	39.39	100.00

Total Number of Valid Hours: 726

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 45 m (AT45m) - C

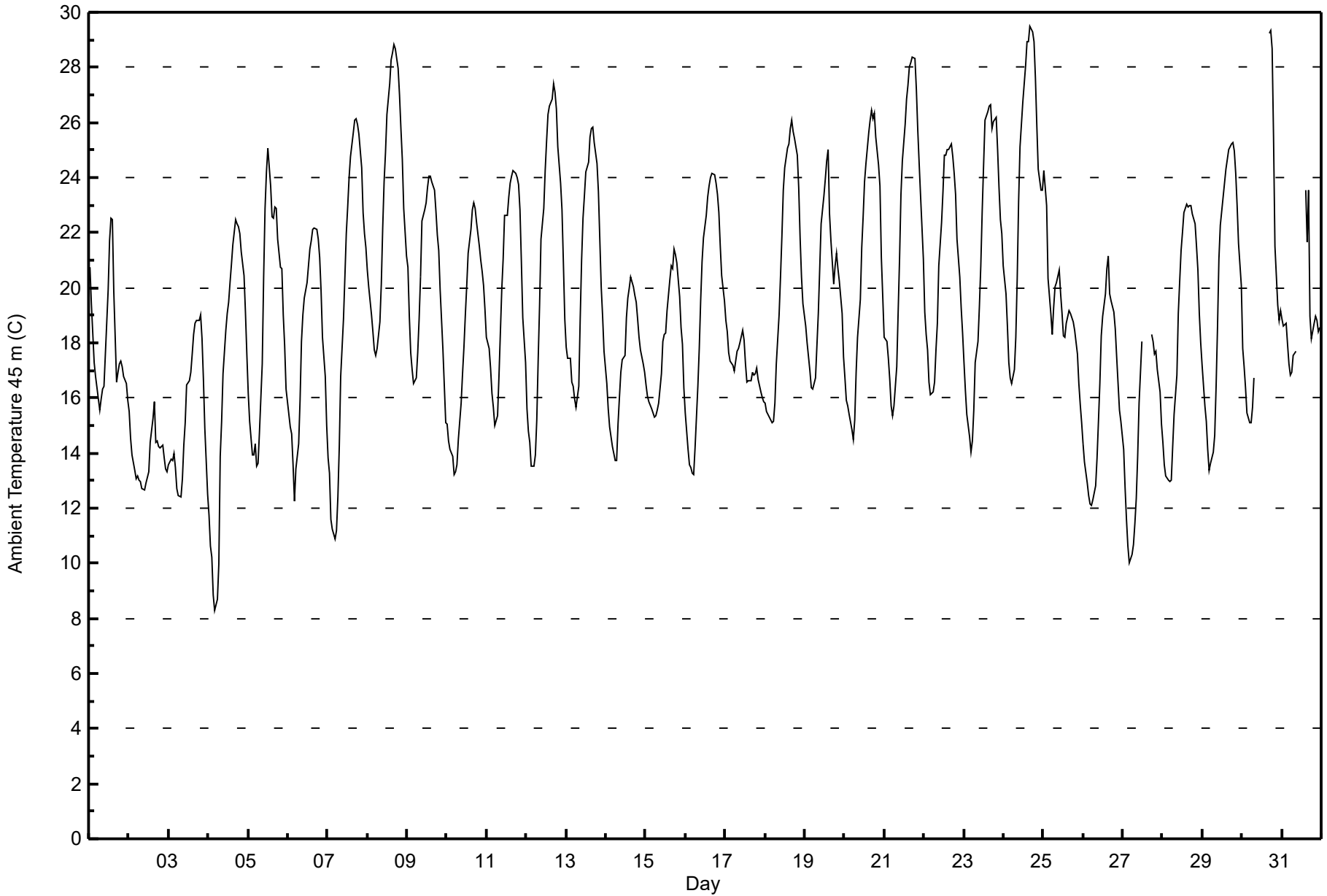
Lower Camp Met Tower - July 2023

Maximum Value: 29.5 C on Jul 24 17:00																						Maximum Daily Average: 23.6 C on Jul 24																						Hours in Service: 744			
Minimum Value: 8.3 C on Jul 4 05:00																						Minimum Daily Average: 13.8 C on Jul 2																						Hours of Data: 726			
Maximum Diurnal Average: 23.4 C at hour 17																						Minimum Diurnal Average: 14.5 C at hour 6																						Hours of Missing Data: 18			
Monthly Average: 19.16 C																						Percentiles: P ₁ = 10.6 P ₁₀ = 13.8 Q ₁ = 16.0 Median = 18.7 Q ₃ = 22.5 P ₉₀ = 25.1 P ₉₉ = 28.8																						Hours of Calibration: 0			
																																												Percent Operational Time: 97.6			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	20.7	19.4	18.4	17.3	16.8	16.0	15.6	16.0	16.3	16.4	17.6	19.9	21.7	22.5	19.9	16.6	17.0	17.2	17.3	17.2	16.8	16.5	15.9	18.0	22.5																						
2-Jul	15.5	14.5	14.0	13.4	13.1	13.2	13.0	13.0	12.7	12.7	12.9	13.1	13.3	14.4	15.3	15.9	14.4	14.4	14.3	14.2	14.3	13.8	13.4	13.3	13.8	15.9																					
3-Jul	13.6	13.8	13.7	14.0	13.5	12.7	12.5	12.4	13.1	14.3	15.1	16.5	16.6	17.0	17.6	18.3	18.7	18.8	18.8	19.0	18.2	16.7	14.9	12.5	15.5	19.0																					
4-Jul	11.8	10.6	10.2	8.8	8.3	8.7	10.0	13.9	15.2	16.9	18.4	19.1	19.5	20.2	20.9	21.6	22.4	22.3	22.2	22.0	21.3	20.4	19.1	17.6	16.7	22.4																					
5-Jul	16.2	15.2	13.9	13.9	14.3	13.5	13.6	14.7	17.2	20.4	22.9	24.2	25.1	23.7	22.6	22.5	22.9	22.9	21.7	20.7	20.7	19.0	17.9	16.3	19.0	25.1																					
6-Jul	15.4	15.0	14.7	13.6	12.3	13.4	14.3	15.9	18.0	19.0	19.7	20.2	20.8	21.4	21.7	22.1	22.2	22.1	21.7	21.1	19.9	18.2	16.8	15.0	18.1	22.2																					
7-Jul	13.8	13.3	11.6	11.3	10.9	11.2	12.4	14.3	16.8	18.9	20.4	22.0	23.0	24.0	24.7	25.6	26.1	26.1	25.9	25.6	24.4	22.7	21.9	21.4	19.5	26.1																					
8-Jul	20.6	20.0	19.0	18.4	17.7	17.6	17.8	18.8	20.1	22.2	23.9	24.9	26.3	27.4	28.3	28.5	28.8	28.7	28.0	27.0	25.8	24.7	22.9	21.1	23.3	28.8																					
9-Jul	20.7	19.0	17.6	17.0	16.5	16.7	17.6	18.9	20.4	22.4	22.8	23.1	23.6	24.1	24.0	23.8	23.5	22.8	21.9	21.3	19.9	17.7	16.4	15.1	20.3	24.1																					
10-Jul	15.1	14.5	14.2	13.9	13.2	13.3	13.6	14.5	15.8	16.9	17.8	19.0	20.1	21.3	22.1	22.8	23.1	22.9	22.4	21.5	21.0	20.6	20.1	19.2	18.3	23.1																					
11-Jul	18.2	17.8	17.1	16.1	15.7	15.0	15.4	16.8	18.3	19.9	21.1	22.6	22.6	23.3	23.8	24.1	24.2	24.2	24.0	23.7	22.8	20.9	18.9	17.3	20.2	24.2																					
12-Jul	15.6	14.8	14.4	13.5	13.5	13.9	15.2	17.4	19.4	21.8	22.9	24.3	25.3	26.3	26.6	26.9	27.4	27.1	26.5	25.1	23.8	22.8	20.9	18.9	21.0	27.4																					
13-Jul	17.9	17.4	17.4	16.6	16.4	16.0	15.7	16.4	18.9	21.0	22.5	23.3	24.2	24.5	25.5	25.8	25.8	25.3	24.5	23.5	21.7	20.0	19.0	17.7	20.7	25.8																					
14-Jul	16.5	15.6	14.9	14.6	14.2	13.7	13.7	15.1	16.0	16.9	17.4	17.5	18.9	19.6	20.0	20.4	20.0	19.7	19.5	18.8	18.2	17.8	17.2	16.9	17.2	20.4																					
15-Jul	16.5	16.1	15.9	15.6	15.5	15.3	15.4	15.6	15.8	16.9	18.1	18.3	18.4	19.2	20.3	20.8	20.7	21.4	21.2	20.9	19.7	18.5	18.0	16.4	17.9	21.4																					
16-Jul	15.5	14.2	13.6	13.5	13.3	13.2	14.2	16.4	17.8	19.5	21.0	21.8	22.6	23.3	23.7	24.0	24.1	24.1	23.8	23.4	22.7	21.5	20.5	19.5	19.5	24.1																					
17-Jul	18.8	18.4	17.6	17.4	17.2	17.0	17.3	17.7	17.8	18.0	18.5	18.1	17.3	16.6	16.6	16.6	17.0	16.8	16.9	17.1	16.7	16.2	16.0	15.9	17.2	18.8																					
18-Jul	15.8	15.5	15.3	15.2	15.1	15.1	15.8	17.2	19.0	20.4	21.8	23.5	24.3	25.1	25.2	25.8	26.1	25.7	25.4	24.8	23.7	21.8	20.4	19.4	20.7	26.1																					
19-Jul	18.6	18.0	17.5	17.0	16.3	16.3	16.7	17.9	19.1	20.7	22.3	23.3	24.0	24.6	25.0	22.7	21.7	20.1	20.8	21.2	20.7	20.2	19.1	17.5	20.1	25.0																					
20-Jul	16.7	15.9	15.7	15.4	14.9	14.5	15.2	16.9	18.2	19.6	21.5	22.6	23.9	24.5	25.6	26.1	26.5	26.2	26.4	25.5	24.4	23.7	21.1	19.7	20.9	26.5																					
21-Jul	18.2	18.0	17.4	16.7	15.7	15.4	15.7	17.2	19.1	21.1	23.4	24.6	25.9	26.8	27.4	28.0	28.1	28.4	28.3	27.2	25.7	24.5	23.3	21.1	22.4	28.4																					
22-Jul	19.1	18.3	17.8	16.6	16.1	16.2	16.6	17.7	18.7	20.8	22.4	23.5	24.8	24.8	25.0	25.0	25.2	24.7	24.1	23.4	21.7	20.4	19.3	18.3	20.9	25.2																					
23-Jul	17.3	16.3	15.4	14.6	14.0	14.4	15.5	17.3	18.1	19.3	20.8	22.8	24.5	26.1	26.4	26.6	26.6	25.8	26.0	26.2	25.0	23.6	22.5	22.0	21.1	26.6																					
24-Jul	20.8	19.8	18.6	17.3	16.7	16.5	17.0	18.2	20.3	23.1	25.1	26.8	27.4	28.0	28.9	28.9	29.5	29.3	28.9	27.6	25.9	24.3	23.5	23.6	23.6	29.5																					
25-Jul	24.2	23.6	23.0	20.4	19.0	18.3	19.3	20.0	20.2	20.7	19.8	19.1	18.3	18.2	18.7	19.2	19.1	18.9	18.8	18.5	17.6	16.5	15.8	15.1	19.3	24.2																					
26-Jul	14.4	13.7	12.9	12.5	12.2	12.1	12.3	12.8	13.8	15.1	16.5	18.3	19.0	19.8	20.7	21.1	19.8	19.5	19.1	18.5	17.5	16.5	15.6	15.2	16.2	21.1																					
27-Jul	14.1	12.8	11.6	10.6	10.0	10.3	10.7	11.4	12.4	13.9	15.8	18.1	DF	DF	DF	DF	DF	18.3	18.0	17.6	17.7	17.0	16.2	15.1	14.3	18.3																					
28-Jul	14.4	13.6	13.1	13.0	13.0	13.0	14.3	15.4	16.8	19.1	20.3	21.4	22.0	22.7	23.0	22.9	23.0	23.0	22.7	22.3	21.5	20.7	19.1	18.0	18.7	23.0																					
29-Jul	17.2	15.7	15.1	14.1	13.4	13.6	14.1	14.6	16.4	18.6	21.1	22.3	23.3	23.8	24.3	24.7	25.0	25.2	25.2	24.9	24.2	23.0	21.6	20.1	20.1	25.2																					
30-Jul	17.8	17.1	16.4	15.5	15.1	15.1	15.7	16.7	DF	DF	DF	DF	DF	DF	DF	DF	DF	29.2	29.3	28.7	25.5	21.5	19.4	18.8	--	29.3																					
31-Jul	18.9	18.6	18.7	17.9	17.2	16.8	16.9	17.6	17.7	DF	DF	DF	DF	DF	DF	23.5	21.7	23.6	18.9	18.1	18.7	19.0	18.8	18.4	18.6	18.9	23.6																				
																						17.1	16.3	15.7	15.0	14.6	14.5	14.9	16.1	17.3	18.8	20.1	21.2	22.0	22.6	23.1	23.2	23.4	22.9	22.6	22.1	21.1	20.0	18.9	17.8	Diurnal Average	
																						24.2	23.6	23.0	20.4	19.0	18.3	19.3	20.0	20.4	23.1	25.1	26.8	27.4	28.0	28.9	28.9	29.5	29.3	28.9	27.6	25.9	24.7	23.5	23.6	Diurnal Maximum	
DF - DAS Failure																																															



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 45 m (AT45m) - C
Lower Camp Met Tower - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 45 m (AT45m) - C
Lower Camp Met Tower - July 2023**

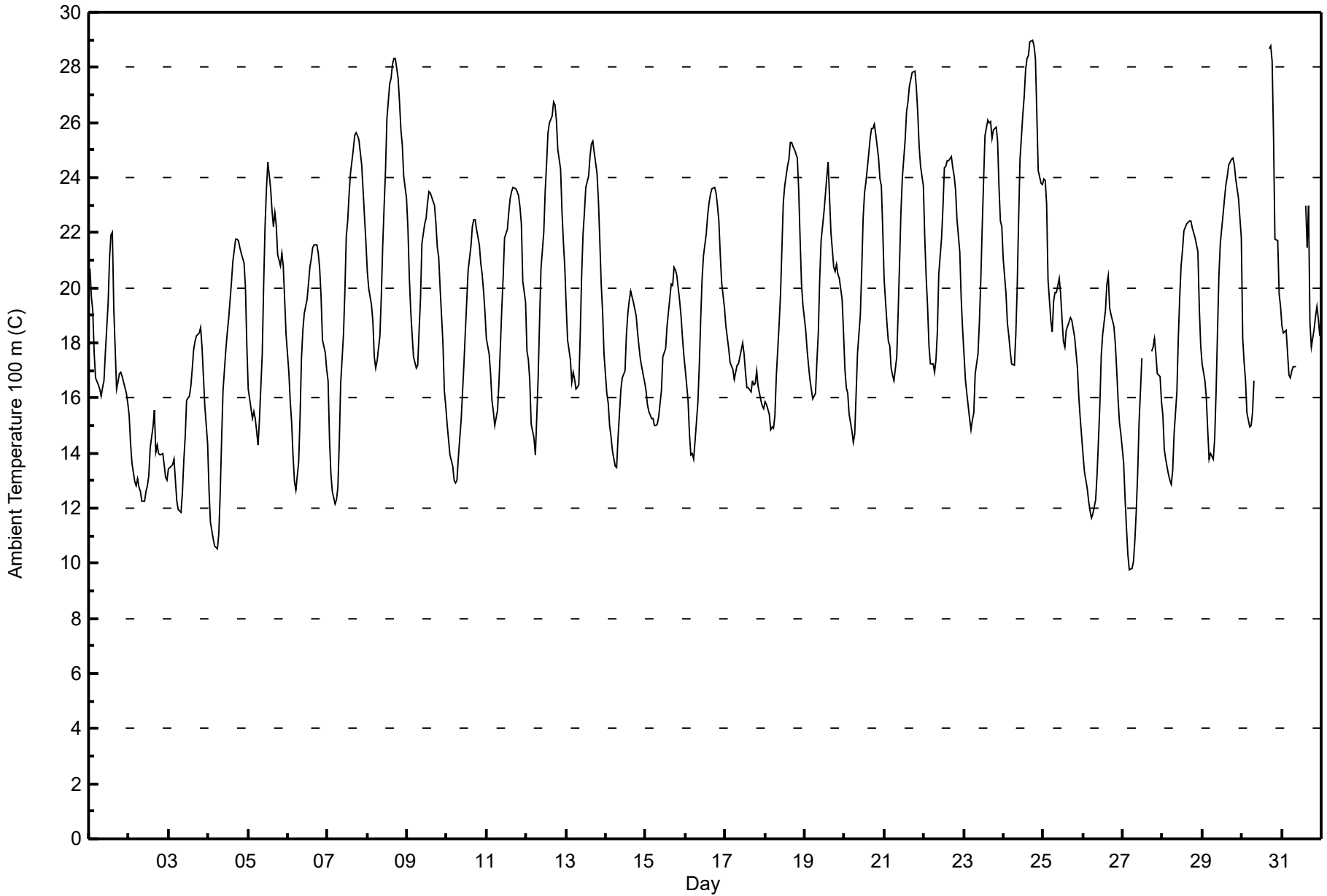
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	4	0.55	0.55
10 - 20	430	59.23	59.78
> 20	292	40.22	100.00

Total Number of Valid Hours: 726

Total Number of Hours: 744



Maximum Value: 29.0 C on Jul 24 18:00																						Maximum Daily Average: 23.6 C on Jul 24																						Hours in Service: 744		
Minimum Value: 9.8 C on Jul 27 05:00																						Minimum Daily Average: 13.6 C on Jul 2																						Hours of Data: 726		
Maximum Diurnal Average: 22.9 C at hour 17																						Minimum Diurnal Average: 14.6 C at hour 6																						Hours of Missing Data: 18		
Monthly Average: 19.07 C																						Percentiles: P ₁ = 10.9 P ₁₀ = 13.9 Q ₁ = 16.2 Median = 18.5 Q ₃ = 22.2 P ₉₀ = 24.7 P ₉₉ = 28.3																						Hours of Calibration: 0		
																																												Percent Operational Time: 97.6		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																						
1-Jul	20.7	19.7	19.2	17.7	16.7	16.5	16.3	16.1	16.4	16.6	17.7	19.5	21.1	21.9	22.0	19.3	16.3	16.6	16.9	16.9	16.8	16.6	16.2	15.8	17.9	22.0																				
2-Jul	15.4	14.3	13.6	13.0	12.8	13.1	12.7	12.6	12.3	12.3	12.6	12.8	13.2	14.2	14.9	15.6	14.0	14.3	14.0	13.9	14.0	13.6	13.1	13.0	13.6	15.6																				
3-Jul	13.4	13.5	13.6	13.8	13.0	12.2	11.9	11.9	12.6	13.7	14.6	15.9	16.1	16.4	17.0	17.7	18.1	18.2	18.4	18.6	17.9	16.8	15.7	14.3	15.2	18.6																				
4-Jul	12.7	11.5	11.2	10.9	10.6	10.5	11.1	12.6	14.5	16.3	17.8	18.4	18.9	19.5	20.2	20.9	21.8	21.8	21.7	21.5	21.2	20.9	20.0	17.9	16.8	21.8																				
5-Jul	16.3	16.0	15.3	15.5	15.3	14.8	14.3	15.2	17.6	20.1	22.2	23.6	24.6	23.6	22.8	22.2	22.7	22.3	21.2	20.8	21.2	20.8	19.6	18.3	19.4	24.6																				
6-Jul	16.9	15.8	15.1	13.9	13.0	12.6	13.7	15.3	17.4	18.5	19.1	19.6	20.1	20.7	21.1	21.5	21.6	21.6	21.2	20.7	19.7	18.1	17.7	17.0	18.0	21.6																				
7-Jul	16.6	14.6	13.2	12.6	12.1	12.3	12.8	14.4	16.5	18.3	19.9	21.9	22.4	23.4	24.2	25.0	25.5	25.6	25.5	25.4	24.5	23.5	22.6	21.6	19.8	25.6																				
8-Jul	20.6	20.0	19.4	18.8	17.5	17.1	17.3	18.3	19.7	21.5	23.0	24.3	26.1	27.4	27.6	28.1	28.3	28.3	27.6	26.7	25.7	25.2	24.0	23.2	23.2	28.3																				
9-Jul	22.2	20.4	19.2	18.3	17.5	17.1	17.2	18.5	19.6	21.6	22.3	22.5	23.1	23.5	23.5	23.3	23.0	22.3	21.4	21.1	20.0	18.0	16.3	15.7	20.3	23.5																				
10-Jul	15.1	14.5	13.9	13.5	13.0	12.9	13.0	13.8	15.2	16.2	17.2	18.4	19.5	20.6	21.5	22.2	22.5	22.5	22.1	21.6	20.9	20.5	19.9	19.1	17.9	22.5																				
11-Jul	18.2	17.6	16.9	15.9	15.5	15.0	15.6	16.6	17.9	19.2	20.4	21.8	22.1	22.7	23.2	23.5	23.6	23.6	23.5	23.3	22.9	22.3	20.2	19.5	20.0	23.6																				
12-Jul	17.7	17.4	16.6	15.0	14.6	13.9	15.3	16.8	18.8	20.7	22.0	23.5	24.5	25.6	26.0	26.2	26.7	26.7	26.1	25.0	24.3	22.8	21.7	20.7	21.2	26.7																				
13-Jul	19.3	18.1	17.4	16.6	16.9	16.7	16.3	16.5	18.3	20.4	21.9	22.7	23.6	24.0	24.8	25.2	25.3	24.9	24.1	23.2	21.7	20.1	19.1	17.6	20.6	25.3																				
14-Jul	16.1	15.8	15.0	14.6	14.1	13.5	13.5	14.5	15.4	16.3	16.7	17.0	18.3	19.1	19.5	19.9	19.5	19.2	19.0	18.4	17.8	17.4	16.8	16.6	16.8	19.9																				
15-Jul	16.3	15.8	15.5	15.3	15.2	15.0	15.0	15.1	15.3	16.3	17.5	17.7	17.8	18.6	19.6	20.1	20.1	20.8	20.7	20.4	19.5	19.0	18.2	17.5	17.6	20.8																				
16-Jul	17.0	15.9	14.7	13.9	14.0	13.8	14.4	15.8	17.1	18.8	20.3	21.2	22.0	22.6	23.1	23.4	23.6	23.6	23.4	23.0	22.4	21.2	20.2	19.3	19.4	23.6																				
17-Jul	18.6	18.2	17.8	17.3	17.0	16.7	16.9	17.2	17.3	17.5	18.0	17.6	17.0	16.4	16.4	16.2	16.6	16.5	16.5	17.0	16.4	15.9	15.7	15.6	16.9	18.6																				
18-Jul	15.9	15.8	15.4	14.8	15.0	14.9	15.4	16.8	18.7	19.7	21.4	23.1	23.7	24.4	24.6	25.3	25.3	25.1	25.0	24.7	23.5	21.7	20.1	19.4	20.4	25.3																				
19-Jul	18.5	17.8	17.2	16.7	16.3	15.9	16.2	17.4	18.4	20.4	21.7	22.7	23.3	24.0	24.5	23.3	22.0	20.7	20.6	20.8	20.5	20.4	19.6	18.3	19.9	24.5																				
20-Jul	17.0	16.3	16.2	15.4	14.8	14.4	14.7	16.2	17.6	19.0	20.6	22.5	23.4	23.8	24.8	25.4	25.8	25.8	25.9	25.6	24.7	24.0	23.7	22.1	20.8	25.9																				
21-Jul	20.3	18.7	18.1	17.9	17.1	16.8	16.6	17.5	19.1	20.9	22.8	24.0	25.4	26.4	26.7	27.3	27.6	27.8	27.9	27.3	26.3	25.1	24.4	23.7	22.7	27.9																				
22-Jul	21.8	20.4	19.3	17.9	17.3	17.2	16.9	17.4	18.4	20.5	21.8	22.9	24.3	24.4	24.6	24.6	24.8	24.4	24.0	23.5	22.5	21.3	19.6	18.5	21.2	24.8																				
23-Jul	17.6	16.7	16.2	15.2	14.8	15.2	15.5	16.9	17.6	18.8	20.3	22.2	23.9	25.5	26.1	26.0	26.0	25.4	25.7	25.9	25.3	23.6	22.4	22.2	21.0	26.1																				
24-Jul	21.1	19.8	18.7	18.3	17.7	17.3	17.2	18.3	20.0	22.4	24.7	26.3	27.0	27.9	28.3	28.4	28.9	29.0	28.8	28.3	26.4	24.3	23.8	23.7	23.6	29.0																				
25-Jul	24.0	23.9	23.1	20.3	18.8	18.4	19.5	19.8	19.8	20.3	19.8	18.9	18.0	17.8	18.4	18.8	18.9	18.8	18.5	18.2	17.1	16.0	15.3	14.6	19.0	24.0																				
26-Jul	13.9	13.3	12.7	12.3	11.9	11.7	11.8	12.3	13.2	14.4	15.8	17.5	18.3	19.2	20.1	20.4	19.3	19.0	18.6	18.0	17.0	16.0	15.1	14.7	15.7	20.4																				
27-Jul	13.6	12.3	11.3	10.3	9.8	9.8	10.1	10.9	11.9	13.3	15.1	17.5	DF	DF	DF	DF	DF	17.7	17.8	18.1	17.6	16.9	16.8	15.9	14.0	18.1																				
28-Jul	15.4	14.1	13.8	13.2	13.0	12.8	13.4	14.7	16.2	18.1	19.6	20.8	21.4	22.0	22.3	22.4	22.4	22.4	22.2	21.8	21.5	21.3	19.3	17.9	18.4	22.4																				
29-Jul	17.2	16.7	16.0	14.9	13.8	14.0	13.8	14.5	16.3	18.4	20.5	21.6	22.7	23.2	23.7	24.1	24.4	24.7	24.7	24.4	24.0	23.6	23.2	21.8	20.1	24.7																				
30-Jul	18.1	17.3	16.6	15.5	15.0	15.0	15.5	16.6	DF	DF	DF	DF	DF	DF	DF	DF	DF	28.7	28.8	28.2	25.5	21.8	21.7	19.8	--	28.8																				
31-Jul	18.6	18.4	18.4	17.6	16.8	16.7	17.0	17.1	17.2	DF	DF	DF	DF	DF	DF	23.0	21.4	23.0	18.7	17.8	18.5	19.0	19.3	18.9	18.3	18.7	23.0																			
																						17.6	16.8	16.1	15.4	14.9	14.6	14.9	15.7	16.9	18.3	19.6	20.6	21.5	22.1	22.6	22.7	22.9	22.5	22.2	21.9	21.1	20.3	19.3	18.5	Diurnal Average
																						24.0	23.9	23.1	20.3	18.8	18.4	19.5	19.8	20.0	22.4	24.7	26.3	27.0	27.9	28.3	28.4	28.9	29.0	28.8	28.3	26.4	25.2	24.4	23.7	Diurnal Maximum
DF - DAS Failure																																														





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 100 m (AT100m) - C
Lower Camp Met Tower - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	2	0.28	0.28
10 - 20	437	60.19	60.47
> 20	287	39.53	100.00

Total Number of Valid Hours: 726

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 163 m (AT163m) - C

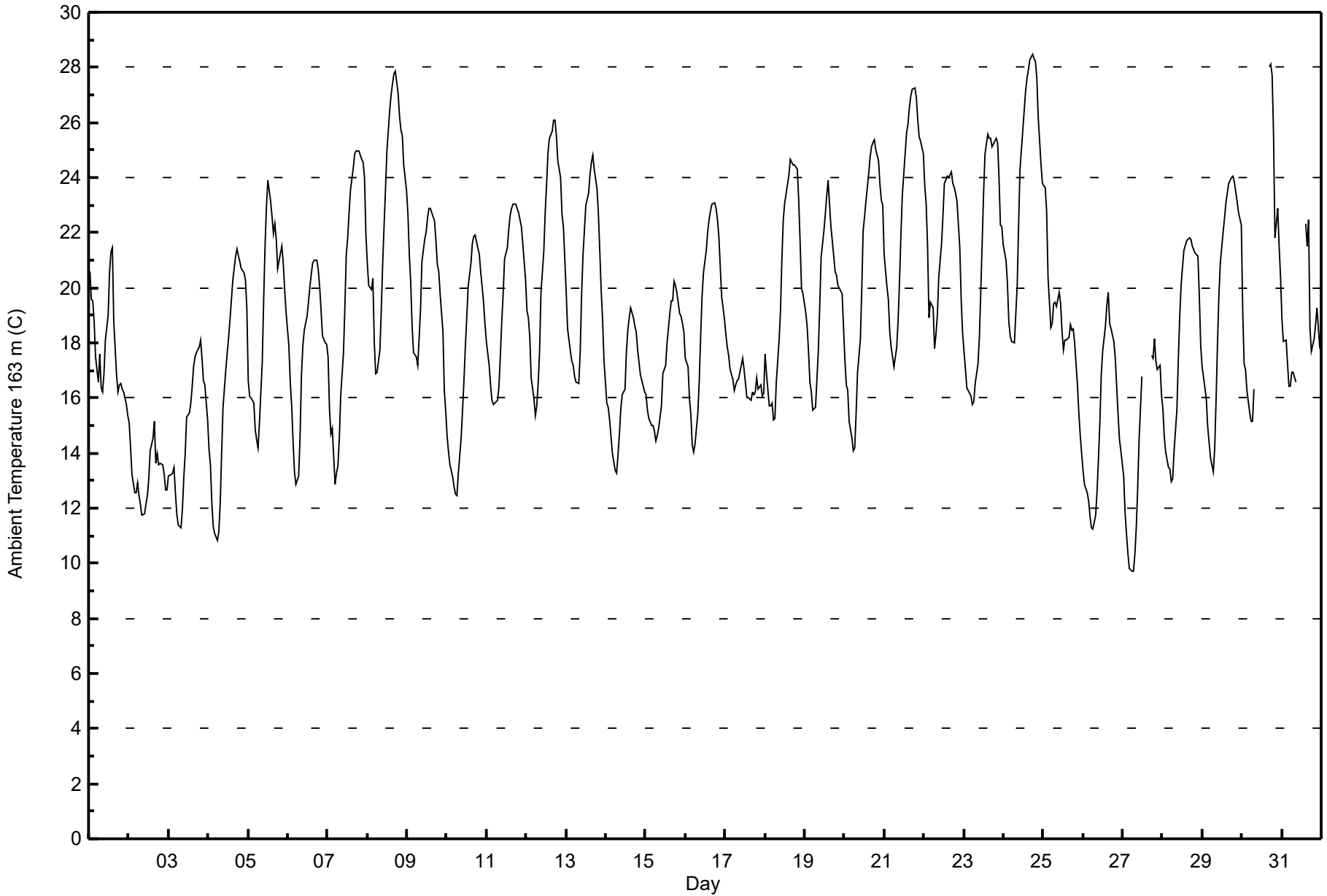
Lower Camp Met Tower - July 2023

Maximum Value: 28.5 C on Jul 24 18:00																						Maximum Daily Average: 23.8 C on Jul 24																						Hours in Service: 744	
Minimum Value: 9.7 C on Jul 27 07:00																						Minimum Daily Average: 13.2 C on Jul 2																						Hours of Data: 726	
Maximum Diurnal Average: 22.4 C at hour 17																						Minimum Diurnal Average: 14.8 C at hour 6																						Hours of Missing Data: 18	
Monthly Average: 18.90 C																						Percentiles: P ₁ = 11.1 P ₁₀ = 13.7 Q ₁ = 16.1 Median = 18.5 Q ₃ = 21.9 P ₉₀ = 24.3 P ₉₉ = 27.8																						Hours of Calibration: 0	
																																												Percent Operational Time: 97.6	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																					
1-Jul	20.6	19.6	19.5	18.7	17.5	16.6	17.6	16.4	16.2	16.9	18.1	19.0	20.6	21.3	21.5	18.8	16.9	16.2	16.5	16.5	16.3	16.2	15.8	15.4	17.9	21.5																			
2-Jul	15.1	14.2	13.2	12.6	12.6	12.9	12.5	12.2	11.8	11.8	12.2	12.5	13.1	14.1	14.6	15.1	13.6	14.0	13.6	13.6	13.6	13.2	12.7	12.7	13.2	15.1																			
3-Jul	13.2	13.2	13.3	13.5	12.5	11.8	11.4	11.3	12.0	13.1	14.0	15.3	15.5	15.8	16.4	17.1	17.5	17.6	17.8	18.1	17.4	16.6	16.5	15.2	14.8	18.1																			
4-Jul	14.1	13.6	12.2	11.3	11.1	10.9	11.1	12.2	14.0	15.7	17.1	17.7	18.2	18.9	19.6	20.3	21.1	21.4	21.2	20.9	20.7	20.5	20.3	19.3	16.8	21.4																			
5-Jul	16.7	16.1	15.9	15.8	14.8	14.5	14.2	15.1	17.3	19.5	21.5	22.9	23.9	23.1	22.6	22.0	22.3	21.7	20.7	21.3	21.5	20.9	19.9	19.1	19.3	23.9																			
6-Jul	17.9	16.6	15.7	14.4	13.3	12.9	13.2	14.6	16.8	17.9	18.5	19.0	19.5	20.1	20.5	20.9	21.0	21.0	20.6	20.1	19.2	18.2	18.0	17.9	17.8	21.0																			
7-Jul	17.5	15.6	14.7	14.9	12.9	13.3	13.5	14.5	16.1	17.7	19.3	21.2	21.8	22.7	23.5	24.4	24.9	25.0	25.0	25.0	24.7	24.6	24.0	22.0	19.9	25.0																			
8-Jul	20.9	20.1	19.9	20.3	18.0	16.9	16.9	17.7	19.2	20.9	22.3	23.6	25.0	26.4	27.0	27.4	27.8	27.9	27.1	26.3	25.7	25.5	24.5	23.6	23.0	27.9																			
9-Jul	22.7	21.2	20.2	18.6	17.7	17.5	17.2	18.1	19.2	21.0	21.8	22.0	22.5	22.9	22.9	22.7	22.4	21.7	20.9	20.6	19.8	18.4	16.3	15.5	20.1	22.9																			
10-Jul	14.6	14.1	13.6	13.1	12.8	12.5	12.5	13.3	14.6	15.6	16.6	17.8	18.9	20.0	20.9	21.6	21.9	21.9	21.6	21.2	20.5	20.1	19.5	18.7	17.4	21.9																			
11-Jul	18.0	17.2	16.5	15.9	15.7	15.8	15.9	16.4	17.6	18.8	19.8	21.1	21.5	22.1	22.6	22.9	23.0	23.0	22.9	22.7	22.5	22.2	21.6	20.3	19.8	23.0																			
12-Jul	19.2	18.9	18.2	16.7	16.0	15.4	15.7	16.5	17.7	19.8	21.3	22.7	23.8	24.9	25.4	25.7	26.1	26.1	25.5	24.6	24.0	22.7	22.2	21.1	21.3	26.1																			
13-Jul	19.8	18.5	17.7	17.3	17.2	16.8	16.6	16.5	17.7	19.7	21.2	22.0	23.0	23.4	24.1	24.6	24.8	24.3	23.6	22.7	21.3	19.9	18.8	17.3	20.4	24.8																			
14-Jul	15.8	15.7	15.2	14.6	14.0	13.4	13.3	13.9	14.7	15.6	16.1	16.3	17.7	18.5	18.9	19.3	18.9	18.6	18.4	17.8	17.3	16.8	16.4	16.2	16.4	19.3																			
15-Jul	16.1	15.5	15.2	15.0	15.0	14.8	14.5	14.6	14.9	15.7	16.9	17.0	17.2	18.0	19.1	19.5	19.5	20.2	20.1	19.8	19.0	18.9	18.7	18.4	17.2	20.2																			
16-Jul	17.4	17.1	16.0	15.4	14.3	14.0	14.3	15.5	16.6	18.2	19.7	20.5	21.4	22.0	22.5	22.8	23.0	23.1	22.9	22.5	21.9	20.7	19.7	18.9	19.2	23.1																			
17-Jul	18.3	17.9	17.6	17.1	16.7	16.3	16.5	16.6	16.7	16.9	17.4	17.0	16.5	16.0	16.0	15.9	16.2	16.1	16.2	16.8	16.3	16.5	16.0	16.2	16.7	18.3																			
18-Jul	17.6	16.9	15.7	15.7	15.8	15.2	15.2	16.6	18.1	19.2	21.1	22.5	23.1	23.7	24.1	24.7	24.6	24.5	24.5	24.3	23.2	21.7	20.0	19.8	20.3	24.7																			
19-Jul	19.1	18.6	17.7	16.6	16.2	15.6	15.7	16.7	17.7	19.3	21.1	22.1	22.7	23.3	23.9	23.0	22.2	21.1	20.6	20.4	20.1	20.0	19.8	18.6	19.7	23.9																			
20-Jul	17.3	16.5	16.3	15.2	14.5	14.1	14.2	15.4	16.9	18.1	19.9	22.1	22.6	23.2	24.1	24.8	25.1	25.3	25.4	25.0	24.6	23.8	23.2	23.0	20.4	25.4																			
21-Jul	21.2	20.0	19.6	18.4	17.9	17.5	17.1	17.8	18.9	20.3	22.0	23.4	24.9	25.6	25.9	26.5	26.9	27.2	27.3	26.9	26.1	25.5	25.3	24.9	22.8	27.3																			
22-Jul	23.7	23.0	21.5	18.9	19.5	19.3	17.8	18.3	19.0	20.4	21.6	22.6	23.8	23.9	24.0	24.0	24.2	23.8	23.7	23.4	23.2	21.5	19.6	18.4	21.6	24.2																			
23-Jul	17.7	17.1	16.4	16.2	16.1	15.8	15.9	16.5	17.3	18.2	19.9	21.7	23.4	24.9	25.6	25.4	25.4	25.1	25.2	25.4	25.3	24.0	22.2	22.2	21.0	25.6																			
24-Jul	21.5	21.0	20.2	18.8	18.3	18.1	18.0	19.1	20.1	22.3	24.3	25.7	26.5	27.2	27.6	27.9	28.3	28.5	28.3	28.2	27.6	26.2	24.4	23.8	23.8	28.5																			
25-Jul	23.7	23.6	22.8	20.4	18.6	18.7	19.4	19.5	19.3	19.8	19.4	18.4	17.7	18.1	18.1	18.2	18.7	18.5	18.5	18.0	16.5	15.4	14.7	14.0	18.8	23.7																			
26-Jul	13.4	12.9	12.6	12.2	11.7	11.3	11.3	11.7	12.6	13.8	15.1	16.8	17.7	18.6	19.4	19.8	18.7	18.5	18.0	17.4	16.4	15.4	14.5	14.1	15.2	19.8																			
27-Jul	13.2	11.9	11.1	10.4	9.8	9.7	9.7	10.3	11.3	12.7	14.5	16.8	DF	DF	DF	DF	DF	17.5	17.4	18.2	17.3	17.1	17.2	16.1	13.8	18.2																			
28-Jul	15.6	14.6	14.1	13.5	13.4	13.0	13.1	14.1	15.6	17.3	18.9	20.1	20.7	21.4	21.7	21.8	21.8	21.8	21.5	21.2	21.2	21.2	19.7	17.9	18.1	21.8																			
29-Jul	17.2	16.4	16.0	15.0	14.4	13.8	13.3	14.2	16.0	18.0	19.8	20.9	22.0	22.5	23.1	23.5	23.8	24.0	24.1	23.8	23.5	23.2	22.7	22.3	19.7	24.1																			
30-Jul	19.2	17.2	17.0	16.3	15.5	15.2	15.2	16.3	DF	DF	DF	DF	DF	DF	DF	DF	DF	28.0	28.1	27.7	25.6	21.8	22.9	21.5	20.4	--	28.1																		
31-Jul	18.8	18.1	18.1	17.2	16.4	16.4	16.9	16.9	16.6	DF	DF	DF	DF	DF	DF	22.3	21.5	22.5	18.6	17.7	18.2	18.7	19.3	18.6	17.8	18.5	22.5																		
18.0 17.2 16.6 15.8 15.2 14.8 14.8 15.4 16.4 17.7 19.0 20.0 20.9 21.5 22.0 22.1 22.4 22.0 21.8 21.5 20.9 20.3 19.5 18.7																						Diurnal Average																							
23.7 23.6 22.8 20.4 19.5 19.3 19.4 19.5 20.1 22.3 24.3 25.7 26.5 27.2 27.6 27.9 28.3 28.5 28.3 28.2 27.6 26.2 25.3 24.9																						Diurnal Maximum																							
DF - DAS Failure																																													



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 163 m (AT163m) - C
Lower Camp Met Tower - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 163 m (AT163m) - C
Lower Camp Met Tower - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	3	0.41	0.41
10 - 20	447	61.57	61.98
> 20	276	38.02	100.00

Total Number of Valid Hours: 726

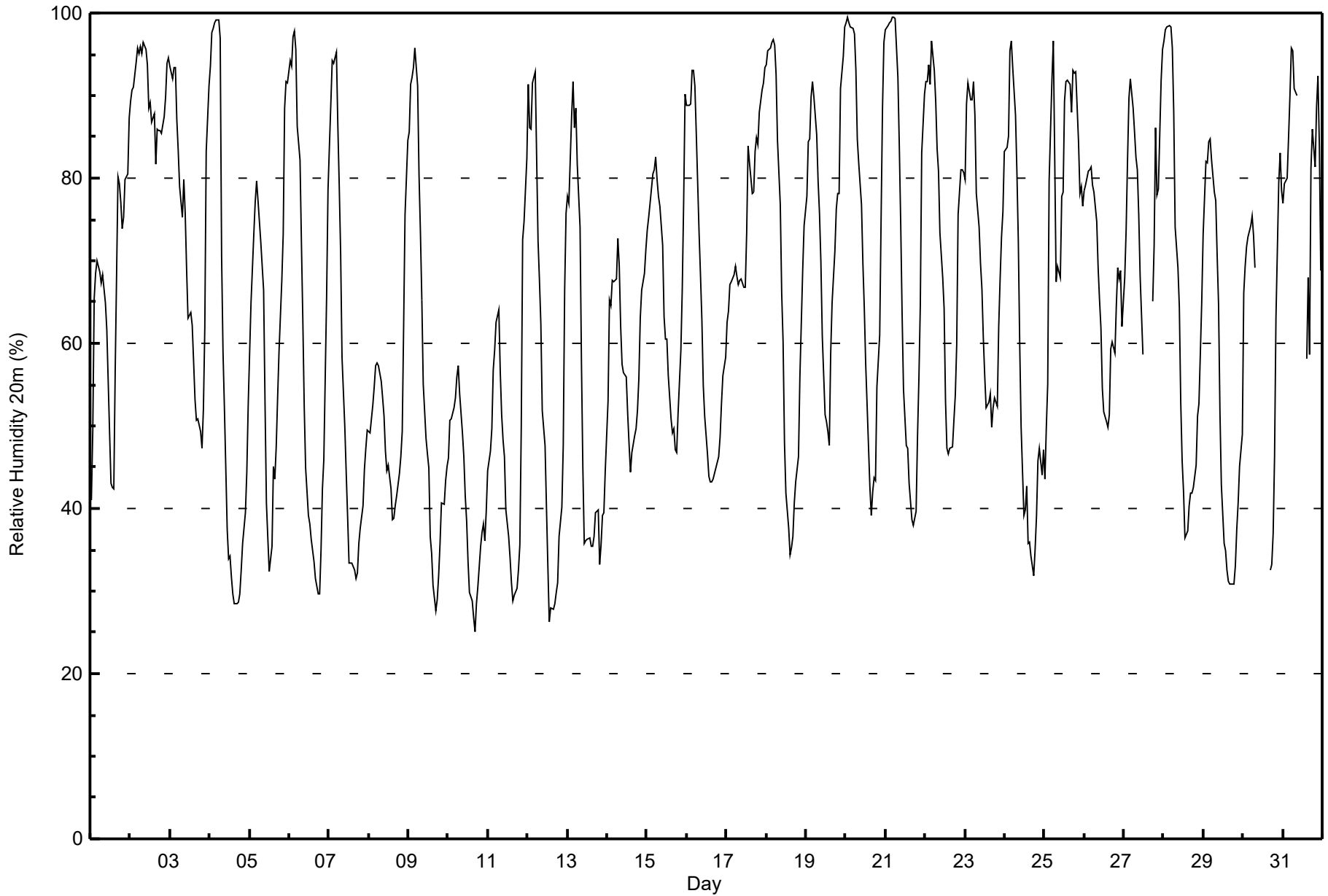
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Relative Humidity 20m (RH20m) - %
Lower Camp Met Tower - July 2023

Maximum Value: 99.6 % on Jul 20 02:00																						Maximum Daily Average: 90.6 % on Jul 2																						Hours in Service: 744			
Minimum Value: 25.0 % on Jul 10 17:00																						Minimum Daily Average: 41.0 % on Jul 10																						Hours of Data: 726			
Maximum Diurnal Average: 85.7 % at hour 5																						Minimum Diurnal Average: 45.5 % at hour 15																						Hours of Missing Data: 18			
Monthly Average: 64.57 %																						Percentiles: P ₁ = 28.5 P ₁₀ = 35.8 Q ₁ = 46.3 Median = 65.3 Q ₃ = 83.1 P ₉₀ = 92.9 P ₉₉ = 98.8																						Hours of Calibration: 0			
																																												Percent Operational Time: 97.6			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	41.1	49.5	65.4	68.5	70.1	68.7	67.3	68.2	66.5	64.9	61.7	49.1	43.0	42.5	42.4	56.5	80.2	79.2	77.0	73.9	75.2	79.8	80.5	87.3	65.0	87.3																					
2-Jul	89.3	90.6	91.0	94.0	95.7	95.1	95.9	95.1	96.5	95.6	93.7	88.5	89.2	86.7	87.8	81.7	86.0	85.8	85.8	85.5	87.5	89.9	93.9	94.5	90.6	96.5																					
3-Jul	93.5	92.0	93.4	93.4	87.2	83.3	79.0	75.3	79.8	75.8	68.9	63.0	63.6	62.2	57.7	53.2	50.7	50.8	49.3	47.2	52.0	61.8	83.3	91.2	71.2	93.5																					
4-Jul	93.5	97.6	98.1	98.8	99.1	99.2	99.2	96.9	70.5	59.0	52.2	37.4	33.9	34.2	31.8	29.7	28.4	28.5	28.6	29.6	32.5	35.8	39.5	44.3	52.6	56.3	99.2																				
5-Jul	58.8	65.0	73.3	77.2	79.6	77.4	74.8	72.2	66.4	52.8	40.6	36.5	32.4	35.5	45.1	43.5	47.4	53.4	59.0	67.6	73.2	88.4	91.7	91.6	62.6	91.7																					
6-Jul	94.3	93.5	97.1	97.8	95.5	86.2	82.1	72.2	62.8	52.4	44.9	39.1	38.1	36.3	35.0	33.6	31.5	29.7	29.7	34.9	42.5	45.9	65.7	78.6	59.1	97.8																					
7-Jul	84.0	88.9	94.3	93.9	95.3	86.5	79.2	70.9	58.3	49.8	44.3	38.9	33.4	33.4	32.5	31.5	32.2	35.7	37.6	40.3	44.7	47.3	49.5	55.7	55.7	95.3																					
8-Jul	49.3	49.2	52.5	54.8	57.3	57.6	57.3	55.4	53.5	51.2	47.0	44.5	45.2	42.3	38.6	38.8	40.4	41.6	44.2	46.3	49.3	62.0	75.6	84.6	51.6	84.6																					
9-Jul	85.6	91.3	92.3	93.4	95.8	91.3	80.4	73.4	65.2	55.1	48.5	46.6	45.0	36.6	34.6	30.6	27.6	29.0	31.9	35.7	40.7	40.4	43.4	45.0	56.6	95.8																					
10-Jul	46.1	50.7	50.9	52.2	53.4	55.9	57.3	53.9	49.2	46.2	41.6	38.5	33.5	29.8	28.8	26.7	25.0	28.5	30.5	35.4	37.0	38.1	36.1	39.6	41.0	57.3																					
11-Jul	44.6	46.9	49.7	56.7	59.1	62.5	64.0	56.6	51.3	48.3	46.2	39.8	36.6	34.1	31.0	28.8	29.4	30.4	32.6	35.6	49.6	72.5	74.8	82.4	48.5	82.4																					
12-Jul	91.4	86.1	85.9	91.5	92.8	82.5	72.4	67.7	62.3	51.8	47.6	40.2	33.0	26.3	28.0	27.7	28.4	29.9	31.0	36.6	40.1	47.7	66.4	75.7	56.0	92.8																					
13-Jul	77.8	77.0	87.6	91.7	86.1	88.5	81.7	74.1	57.7	45.0	35.7	36.1	36.3	36.4	35.4	35.4	36.6	39.6	39.9	33.2	35.6	39.1	39.5	44.5	53.8	91.7																					
14-Jul	53.1	65.2	64.5	67.6	67.5	67.8	72.8	69.4	62.0	57.5	56.4	55.9	51.5	47.7	44.4	46.7	48.8	49.7	51.8	55.7	63.0	66.5	68.5	71.4	59.4	72.8																					
15-Jul	73.7	75.3	77.0	80.5	81.0	82.5	79.9	77.7	76.6	71.8	63.2	60.5	60.4	56.1	50.8	49.2	49.7	47.2	46.8	51.6	59.1	66.6	77.3	90.2	66.9	90.2																					
16-Jul	88.9	88.9	89.0	93.0	93.0	91.2	85.4	73.3	68.3	63.0	55.0	51.1	46.6	43.9	43.3	43.1	43.6	45.0	45.5	46.3	48.6	52.7	56.0	58.4	63.1	93.0																					
17-Jul	62.5	64.0	67.1	67.4	68.4	69.3	68.2	67.1	67.6	67.7	66.8	66.8	73.3	83.9	81.9	78.2	78.3	83.2	85.0	84.0	88.0	90.7	91.5	93.3	75.6	93.3																					
18-Jul	93.7	95.4	95.7	96.4	96.7	96.2	92.5	84.5	76.8	66.0	60.2	47.9	41.8	37.6	34.3	35.2	36.7	40.6	43.2	46.2	55.9	62.4	68.8	74.3	65.8	96.7																					
19-Jul	77.8	84.5	84.7	89.9	91.7	89.9	85.2	79.7	75.8	69.8	60.8	51.4	50.5	49.3	47.6	58.8	64.9	71.1	76.3	78.2	78.1	90.9	94.7	98.2	75.0	98.2																					
20-Jul	98.8	99.6	98.8	98.4	98.2	97.5	93.0	84.8	81.9	76.8	69.6	64.2	57.5	52.6	42.6	39.2	42.1	43.7	43.3	54.8	61.1	75.1	88.5	96.4	73.3	99.6																					
21-Jul	98.0	98.5	98.8	99.0	99.4	99.5	99.3	92.1	83.9	74.6	63.5	54.4	47.7	47.2	43.0	40.8	38.6	38.0	39.7	48.6	55.8	64.5	83.1	90.2	70.8	99.5																					
22-Jul	91.8	91.8	93.8	91.3	96.6	93.0	89.4	83.5	80.9	73.4	68.0	64.2	53.0	47.2	46.6	47.2	47.5	50.6	53.7	59.7	75.5	81.0	81.0	80.6	72.6	96.6																					
23-Jul	79.8	88.9	91.5	89.5	89.5	91.7	87.7	78.2	74.0	69.6	66.7	60.7	56.1	52.1	52.8	53.9	49.9	52.2	53.4	52.3	62.0	67.7	72.9	75.9	69.5	91.7																					
24-Jul	83.2	83.7	85.0	95.4	96.6	93.3	87.7	80.7	72.3	59.9	49.8	39.1	39.9	42.6	35.8	35.8	34.3	31.9	35.1	39.2	45.8	47.3	44.1	47.1	58.6	96.6																					
25-Jul	43.6	49.9	55.1	79.6	91.9	96.6	82.4	67.4	69.4	68.0	77.7	78.3	89.3	91.7	91.9	91.3	88.1	93.1	92.8	92.9	84.4	78.1	79.1	76.6	79.5	96.6																					
26-Jul	78.5	79.2	80.9	81.0	81.4	79.2	78.2	74.8	69.1	65.3	61.9	54.6	51.7	50.5	49.9	51.3	59.3	60.1	58.8	64.5	69.2	67.7	68.9	62.0	66.6	81.4																					
27-Jul	67.9	73.8	82.2	89.7	92.1	88.5	85.7	82.5	81.1	75.6	68.1	58.7	DF	DF	DF	DF	DF	65.1	71.9	86.1	78.0	78.7	91.8	95.6	79.6	95.6																					
28-Jul	96.7	98.0	98.3	98.4	98.3	95.8	87.9	74.0	69.2	64.4	52.8	45.7	42.1	36.4	37.3	40.3	41.9	41.9	42.5	45.3	51.2	52.8	58.7	65.1	64.0	98.4																					
29-Jul	73.3	82.1	81.9	84.4	84.7	82.2	78.4	77.2	70.7	64.8	51.8	42.8	35.7	34.9	32.5	31.2	30.9	30.8	30.8	33.0	37.4	40.7	45.1	49.0	54.4	84.7																					
30-Jul	66.1	69.4	71.7	72.8	74.2	75.4	73.1	69.1	DF	DF	DF	DF	DF	DF	DF	DF	DF	32.5	33.3	36.9	46.3	63.1	79.6	83.0	--	83.0																					
31-Jul	76.9	79.4	80.0	84.9	90.0	95.8	95.5	90.9	90.0	DF	DF	DF	DF	DF	DF	58.2	68.0	58.6	81.2	85.9	81.4	88.7	92.3	83.9	68.8	81.6	95.8																				
																						75.9	78.9	81.5	84.6	85.7	84.5	81.0	74.6	69.9	63.1	56.9	51.4	48.6	46.7	45.5	45.8	46.3	48.9	50.6	53.8	58.8	64.7	70.3	73.8	Diurnal Average	
																						98.8	99.6	98.8	99.0	99.4	99.5	99.3	95.1	96.5	95.6	93.7	88.5	89.3	91.7	91.9	91.3	88.1	93.1	92.8	92.9	88.7	92.3	94.7	98.2	Diurnal Maximum	
DF - DAS Failure																																															





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity 20m (RH20m) - %
Lower Camp Met Tower - July 2023**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	115	15.84	15.84
40 - 60	205	28.24	44.08
60 - 80	192	26.45	70.52
80 - 100	214	29.48	100.00

Total Number of Valid Hours: 726

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

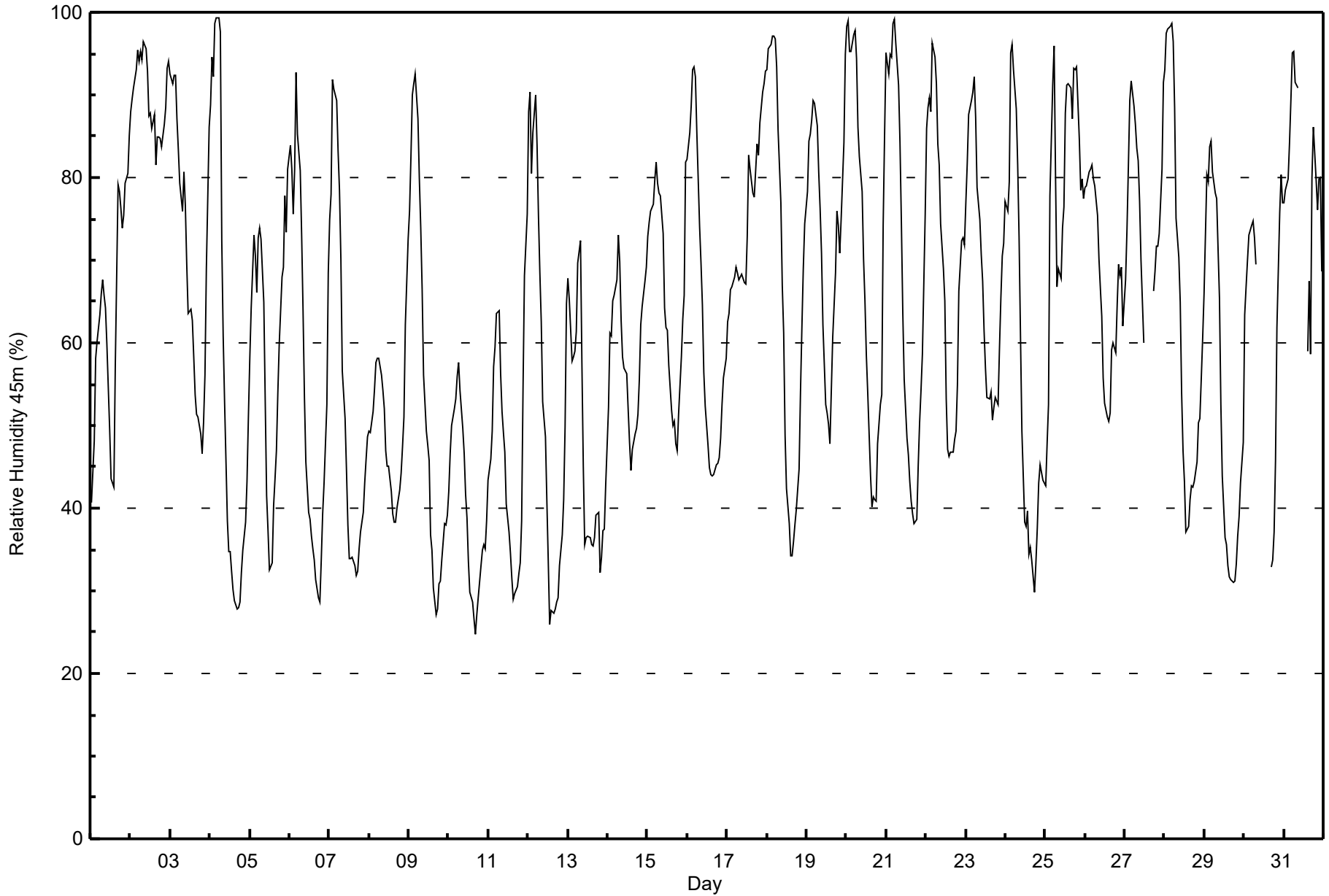
Relative Humidity 45m (RH45m) - %
Lower Camp Met Tower - July 2023

Maximum Value: 99.4 % on Jul 4 06:00 Maximum Daily Average: 89.8 % on Jul 2																						Hours in Service:	744																								
Minimum Value: 24.7 % on Jul 10 17:00 Minimum Daily Average: 40.2 % on Jul 10																						Hours of Data:	726																								
Maximum Diurnal Average: 83.4 % at hour 5 Minimum Diurnal Average: 45.6 % at hour 15																						Hours of Missing Data:	18																								
Monthly Average: 62.97 % Percentiles: P ₁ = 27.8 P ₁₀ = 35.2 Q ₁ = 45.6 Median = 63.6 Q ₃ = 79.9 P ₉₀ = 91.3 P ₉₉ = 98.3																						Hours of Calibration:	0																								
																						Percent Operational Time:	97.6																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	40.7	44.4	48.1	58.1	60.2	63.4	65.9	67.7	65.8	64.2	59.9	49.5	43.5	43.1	42.6	57.1	79.2	78.3	76.2	73.9	75.4	79.3	80.5	85.1	62.6	85.1																					
2-Jul	88.0	89.5	90.8	93.0	95.4	94.0	95.2	94.3	96.5	95.5	92.9	87.4	87.9	85.9	87.6	81.6	84.9	84.9	84.8	83.8	86.5	88.6	93.3	94.1	89.8	96.5																					
3-Jul	92.6	91.3	92.4	92.4	87.1	83.4	79.4	75.9	80.6	76.6	69.6	63.6	64.1	62.7	58.3	53.6	51.3	51.0	48.9	46.6	50.3	56.1	69.0	86.1	70.1	92.6																					
4-Jul	88.7	94.6	92.2	98.7	99.3	99.4	97.7	72.4	60.8	52.9	38.5	34.8	34.7	32.4	30.2	28.8	27.8	27.9	28.7	32.3	34.9	38.2	43.2	50.9	55.8	99.4																					
5-Jul	58.1	64.3	73.1	70.5	66.1	72.7	74.0	72.5	65.0	53.0	41.5	37.2	32.6	33.3	40.3	43.5	46.9	53.9	59.8	67.9	69.1	77.8	73.4	81.1	59.5	81.1																					
6-Jul	83.9	81.0	75.6	80.9	92.8	85.2	80.8	73.1	63.9	53.3	45.6	39.5	38.6	36.7	35.1	33.8	31.4	29.2	28.7	33.8	39.4	43.1	52.6	68.4	55.3	92.8																					
7-Jul	75.0	78.0	91.9	90.7	89.3	83.3	78.4	70.2	56.6	50.8	44.5	38.0	33.9	34.0	34.0	33.0	31.9	32.3	35.1	37.0	39.5	43.1	45.9	48.6	54.0	91.9																					
8-Jul	49.3	49.2	51.7	54.3	57.7	58.1	58.1	56.2	54.2	52.1	47.0	45.1	45.0	42.1	39.3	38.2	38.3	40.0	42.2	44.2	47.5	51.0	62.1	72.6	49.8	72.6																					
9-Jul	75.9	82.6	89.9	91.3	92.6	87.2	79.8	73.9	66.5	56.1	49.3	47.6	45.8	36.8	34.9	30.3	27.1	27.7	30.8	31.2	33.7	38.1	38.0	39.2	54.4	92.6																					
10-Jul	42.1	46.7	50.0	52.0	53.3	55.9	57.6	54.3	49.7	46.7	41.8	38.8	33.5	29.8	28.6	26.5	24.7	27.2	29.1	33.1	34.9	35.6	35.0	38.5	40.2	57.6																					
11-Jul	43.4	45.9	49.4	57.1	59.5	63.6	63.8	56.3	51.6	49.1	46.8	40.5	37.2	34.6	31.6	29.0	29.7	30.6	32.0	33.4	38.4	54.6	68.1	75.5	46.7	75.5																					
12-Jul	88.0	90.4	80.6	85.3	90.1	83.9	75.5	68.4	62.6	52.9	48.7	40.8	33.5	25.9	27.6	27.3	27.8	28.6	29.1	33.0	36.9	41.1	49.9	64.8	53.9	90.4																					
13-Jul	67.9	65.3	57.8	58.4	59.0	61.3	69.7	72.4	57.6	45.0	35.6	36.4	36.6	36.4	35.6	35.4	36.4	39.2	39.5	32.2	34.0	37.3	37.5	42.9	47.0	72.4																					
14-Jul	52.3	61.1	60.9	65.1	65.7	67.6	73.1	69.8	62.7	58.2	57.0	56.2	52.0	47.9	44.6	47.2	49.0	49.6	51.4	55.6	62.2	64.4	67.4	69.1	58.8	73.1																					
15-Jul	72.9	74.6	76.0	76.7	79.7	81.9	79.4	78.2	77.8	73.1	64.3	61.9	62.6	57.3	51.9	49.9	50.5	47.7	47.0	51.3	58.3	62.9	65.7	81.8	65.9	81.9																					
16-Jul	82.1	85.4	88.7	93.0	93.4	92.2	85.6	74.0	69.7	64.5	56.4	52.4	47.6	44.9	44.1	43.9	44.0	45.3	45.5	46.2	48.5	52.5	55.8	58.1	63.1	93.4																					
17-Jul	62.6	63.5	66.4	66.8	68.0	69.2	68.5	67.6	68.0	68.3	67.3	67.1	72.8	82.7	81.0	78.2	77.6	80.8	84.1	82.7	86.6	90.4	91.3	92.9	75.2	92.9																					
18-Jul	93.1	95.7	96.1	97.1	97.1	96.8	93.5	85.8	76.9	67.0	61.2	48.9	42.3	38.2	34.3	34.2	35.9	38.0	39.9	44.7	54.1	61.8	69.0	74.3	65.7	97.1																					
19-Jul	78.4	84.4	85.2	86.9	89.3	89.0	86.4	80.6	76.3	70.8	62.2	52.5	51.5	50.2	47.8	54.2	60.7	68.4	76.0	74.3	70.8	75.0	84.2	94.9	72.9	94.9																					
20-Jul	98.3	99.1	95.2	95.3	97.4	97.7	94.4	86.1	82.5	78.3	70.3	65.0	58.5	53.9	43.8	40.2	41.3	40.9	40.8	47.8	52.5	53.8	74.2	85.0	70.5	99.1																					
21-Jul	95.1	92.6	94.9	94.6	98.6	99.1	96.3	91.2	84.2	74.6	63.8	55.5	48.4	46.5	43.2	40.9	39.2	38.2	38.6	45.1	50.4	54.2	58.6	75.6	67.5	99.1																					
22-Jul	86.0	88.5	89.6	87.9	96.3	94.6	91.4	84.0	81.5	74.5	68.9	65.1	53.3	47.1	46.2	46.8	46.8	48.3	49.3	55.0	66.3	72.5	72.7	71.9	70.2	96.3																					
23-Jul	77.0	81.7	87.6	89.4	90.3	92.2	87.4	78.8	75.0	70.6	67.4	61.6	57.0	53.4	53.2	54.1	50.7	52.3	53.3	52.6	59.3	65.3	70.6	72.0	68.9	92.2																					
24-Jul	77.1	75.9	79.4	95.1	96.1	93.1	88.3	81.5	72.6	60.8	49.4	38.2	37.8	39.7	34.4	35.2	33.8	29.9	33.4	37.6	43.0	45.3	43.4	43.0	56.8	96.1																					
25-Jul	42.6	47.8	52.5	77.7	91.1	95.9	80.3	66.7	69.1	67.8	73.9	76.5	87.8	87.8	91.2	91.4	90.9	87.1	93.3	93.0	93.3	84.5	78.6	79.8	77.4	78.8	95.9																				
26-Jul	78.7	78.9	80.7	80.9	81.6	79.8	78.9	75.5	70.2	66.6	63.3	55.8	52.7	51.1	50.5	51.6	59.2	60.0	58.8	64.5	69.5	68.2	69.2	62.1	67.0	81.6																					
27-Jul	67.6	73.7	81.4	89.3	91.7	88.7	86.5	83.5	82.0	77.1	70.0	60.0	DF	DF	DF	DF	DF	66.3	68.7	71.6	71.7	73.2	81.0	91.5	77.7	91.7																					
28-Jul	93.1	97.5	98.0	98.2	98.7	96.5	88.5	75.1	70.3	64.9	53.9	46.9	43.3	37.1	37.8	41.0	42.7	42.6	43.2	45.7	50.4	50.9	55.6	60.5	63.8	98.7																					
29-Jul	66.0	80.3	79.5	83.8	84.3	80.7	78.1	77.4	71.3	65.5	52.5	43.9	36.5	35.6	33.0	31.7	31.3	31.1	31.1	33.2	36.6	39.0	43.1	47.9	53.9	84.3																					
30-Jul	63.3	66.7	70.0	73.0	74.2	74.7	72.8	69.5	DF	DF	DF	DF	DF	DF	DF	DF	DF	32.9	33.8	37.1	45.7	61.8	75.8	80.4	--	80.4																					
31-Jul	76.9	78.4	79.9	84.3	89.5	95.1	95.3	91.5	90.9	DF	DF	DF	DF	DF	DF	59.1	67.5	58.7	79.9	86.1	79.6	76.1	79.9	80.0	68.7	79.9	95.3																				
																						72.8	75.8	77.6	81.2	83.4	83.1	80.7	75.0	70.4	63.8	57.3	52.0	48.9	46.8	45.6	45.7	46.0	48.3	49.7	51.9	55.6	59.6	64.2	69.4	Diurnal Average	
																						98.3	99.1	98.0	98.7	99.3	99.4	97.7	94.3	96.5	95.5	92.9	87.4	87.9	91.2	91.4	90.9	87.1	93.3	93.0	93.3	86.6	90.4	93.3	94.9	Diurnal Maximum	
DF - DAS Failure																																															



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity 45m (RH45m) - %
Lower Camp Met Tower - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity 45m (RH45m) - %
Lower Camp Met Tower - July 2023**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	127	17.49	17.49
40 - 60	207	28.51	46.01
60 - 80	212	29.20	75.21
80 - 100	180	24.79	100.00

Total Number of Valid Hours: 726

Total Number of Hours: 744

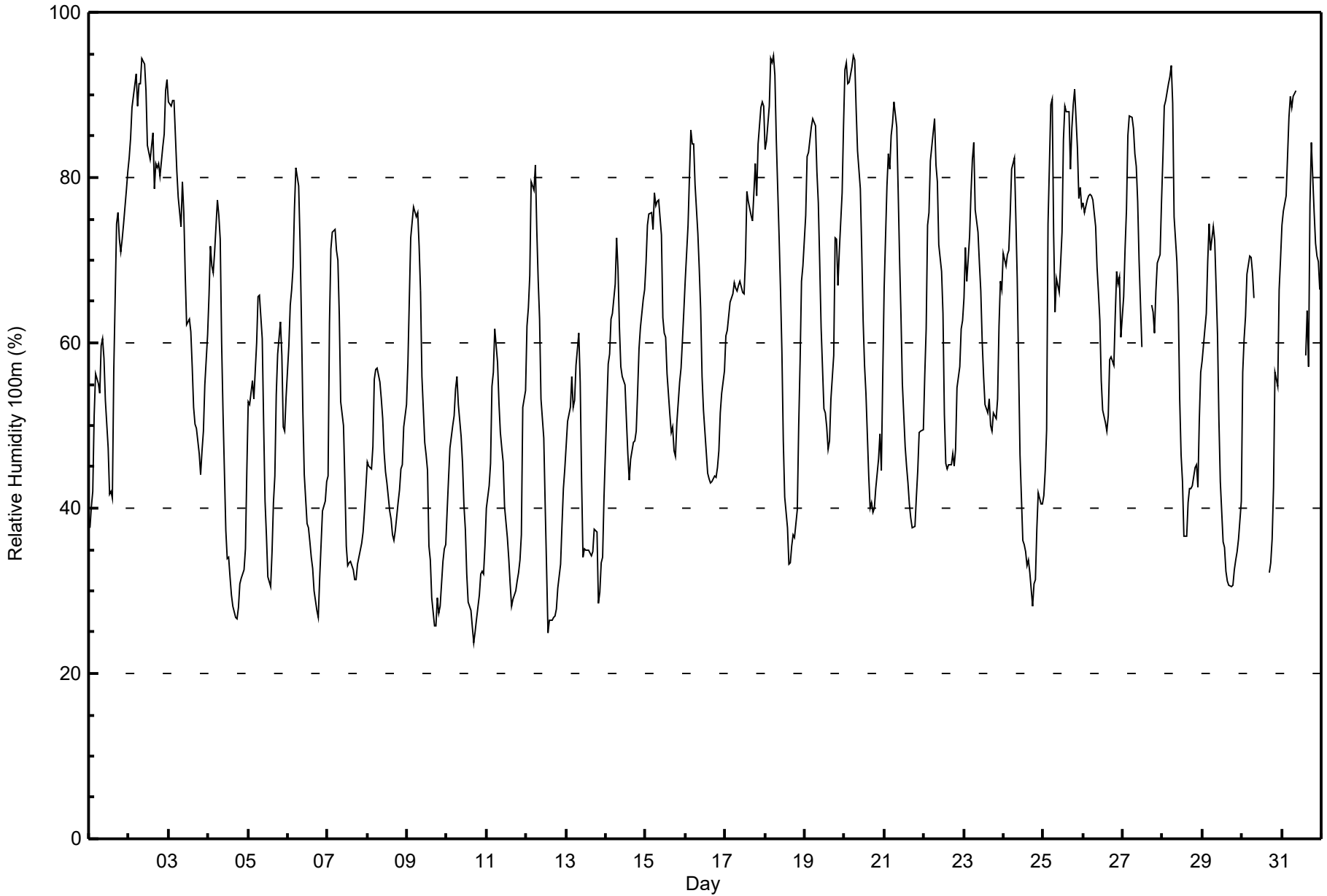


Maximum Value: 94.8 % on Jul 18 06:00 Maximum Daily Average: 86.6 % on Jul 2																						Hours in Service:	744																								
Minimum Value: 23.7 % on Jul 10 17:00 Minimum Daily Average: 38.2 % on Jul 10																						Hours of Data:	726																								
Maximum Diurnal Average: 76.9 % at hour 6 Minimum Diurnal Average: 44.2 % at hour 17																						Hours of Missing Data:	18																								
Monthly Average: 58.48 % Percentiles: P ₁ = 26.5 P ₁₀ = 33.5 Q ₁ = 43.2 Median = 57.3 Q ₃ = 73.7 P ₉₀ = 84.4 P ₉₉ = 93.7																						Hours of Calibration:	0																								
																						Percent Operational Time:	97.6																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	37.7	40.1	42.0	51.1	56.2	55.1	53.8	59.7	60.6	58.2	53.0	47.4	41.7	42.0	41.1	56.6	74.4	75.8	72.6	71.1	72.5	74.4	78.5	80.7	58.2	80.7																					
2-Jul	82.4	84.7	88.5	91.1	92.6	88.6	91.4	91.3	94.4	93.8	90.6	83.9	83.1	82.2	85.4	78.6	81.7	81.2	81.7	80.1	83.7	85.2	90.6	91.9	86.6	94.4																					
3-Jul	89.2	88.6	89.3	89.4	85.1	80.9	77.6	74.1	79.5	75.7	68.3	62.2	62.8	61.4	57.2	52.3	50.1	49.6	46.6	44.0	46.9	49.4	55.0	61.0	66.5	89.4																					
4-Jul	65.8	71.7	69.3	68.5	71.0	77.3	75.4	72.5	60.0	51.6	37.3	33.9	34.1	31.7	29.6	28.1	26.7	26.6	28.0	30.9	31.5	32.6	35.1	44.6	47.2	77.3																					
5-Jul	52.8	52.5	55.4	53.3	56.6	59.9	65.5	65.8	60.6	50.2	40.8	36.6	31.6	30.5	34.8	40.7	43.8	53.7	58.7	62.5	58.4	49.9	49.4	53.4	50.7	65.8																					
6-Jul	59.7	64.5	66.4	69.2	76.2	81.2	79.1	72.1	62.5	51.8	44.1	38.1	37.7	35.9	34.0	32.8	30.0	27.7	26.9	31.5	35.6	39.7	40.8	43.3	49.2	81.2																					
7-Jul	43.8	62.4	71.4	73.5	73.7	71.2	70.0	63.4	52.9	49.9	43.2	35.5	33.0	33.3	33.5	32.5	31.4	31.4	33.3	34.1	35.8	37.0	39.6	42.6	47.0	73.7																					
8-Jul	45.6	45.1	44.8	47.4	55.5	56.8	57.0	55.3	53.2	50.9	46.8	44.5	43.0	39.6	38.6	36.8	36.2	37.3	40.6	42.2	44.8	45.2	49.8	52.6	46.2	57.0																					
9-Jul	57.7	65.3	72.7	74.6	76.4	75.3	75.8	71.7	66.3	56.0	48.0	46.5	44.6	35.4	33.7	29.2	25.7	25.7	29.2	27.3	28.1	33.5	35.1	35.7	48.7	76.4																					
10-Jul	39.6	43.6	47.3	50.0	51.3	54.3	55.9	52.5	48.6	45.5	40.3	37.5	32.1	28.6	27.6	25.6	23.7	25.0	26.6	29.4	32.1	32.4	32.0	35.4	38.2	55.9																					
11-Jul	40.1	42.6	45.4	54.7	56.5	61.7	57.6	52.7	49.1	47.3	45.6	40.2	36.4	33.9	30.9	28.1	29.0	29.9	31.2	32.2	33.8	36.8	52.2	54.3	42.6	61.7																					
12-Jul	62.0	64.3	68.1	79.4	78.5	81.5	73.7	67.6	62.9	53.2	48.4	40.3	32.7	24.8	26.4	26.5	26.8	27.0	27.7	30.4	33.2	38.0	42.3	44.7	48.4	81.5																					
13-Jul	47.6	50.5	52.2	55.9	52.2	53.0	57.3	61.3	55.2	43.4	34.0	35.2	35.0	34.9	34.5	34.2	34.8	37.5	37.1	28.6	29.9	33.4	34.1	41.3	42.2	61.3																					
14-Jul	52.2	57.4	58.6	62.9	63.5	67.1	72.7	68.8	61.8	57.2	55.9	54.9	50.7	46.6	43.3	45.9	47.9	48.1	49.3	54.1	59.3	61.9	65.2	66.5	57.2	72.7																					
15-Jul	69.6	74.2	75.6	75.8	73.7	78.1	76.6	77.1	77.3	73.0	63.1	61.1	60.7	56.2	51.3	49.1	49.9	47.0	46.2	50.3	55.2	57.0	60.3	63.9	63.4	78.1																					
16-Jul	67.7	74.2	80.1	85.8	84.1	84.1	79.2	73.2	69.0	64.0	56.0	51.8	46.8	44.3	43.6	43.0	43.2	43.8	43.8	44.8	46.9	51.6	53.8	56.6	59.6	85.8																					
17-Jul	60.9	61.6	63.1	64.9	66.0	67.4	66.6	66.3	67.0	67.4	66.2	65.9	70.1	78.3	77.1	75.5	74.7	78.2	81.6	77.9	84.0	88.4	89.2	88.6	72.8	89.2																					
18-Jul	83.5	84.5	88.6	94.4	93.9	94.8	92.4	84.6	72.9	66.4	59.0	48.1	41.3	37.7	33.3	33.5	35.5	36.8	36.5	39.9	50.0	57.8	67.5	69.3	62.6	94.8																					
19-Jul	75.5	82.6	83.0	84.7	86.1	87.0	86.3	80.6	77.0	69.6	61.8	52.0	51.5	49.9	47.2	48.1	53.2	58.6	72.6	72.6	67.0	71.2	78.1	86.2	70.1	87.0																					
20-Jul	93.0	93.9	91.4	91.5	93.3	94.8	94.2	88.2	83.2	78.6	71.1	62.8	57.3	53.8	43.9	40.0	40.7	39.5	39.9	42.4	45.9	49.0	44.6	55.9	66.2	94.8																					
21-Jul	66.6	79.0	83.0	81.0	85.2	86.6	89.1	86.1	78.5	70.4	63.5	55.1	47.5	45.1	43.1	40.5	38.8	37.6	37.7	41.3	44.6	49.2	49.3	49.4	60.3	89.1																					
22-Jul	56.1	61.7	74.2	75.8	82.1	85.4	87.1	81.5	79.5	71.8	68.6	63.6	51.3	45.5	44.7	45.3	45.3	46.5	45.0	47.1	54.6	57.1	61.7	62.8	62.3	87.1																					
23-Jul	65.4	71.5	67.4	72.8	78.1	82.2	84.2	76.1	73.4	69.6	66.3	60.1	56.0	52.5	51.6	53.2	50.0	49.3	51.5	50.8	53.2	62.1	67.4	66.4	63.8	84.2																					
24-Jul	70.9	69.3	70.7	71.1	75.6	81.1	82.3	75.2	67.8	57.1	46.4	36.1	35.6	34.8	33.1	33.7	32.3	28.1	30.8	31.4	37.5	41.8	40.6	40.4	51.0	82.3																					
25-Jul	41.5	44.5	49.4	74.5	88.9	89.4	73.2	63.8	67.7	66.1	69.6	73.3	84.6	88.7	88.0	87.9	81.0	85.9	88.9	90.7	83.6	77.5	78.8	76.4	75.6	90.7																					
26-Jul	77.0	75.8	77.4	77.9	78.0	77.9	77.3	74.1	69.2	66.1	62.8	55.4	51.9	50.4	49.3	51.1	58.0	58.3	57.4	63.4	68.6	67.1	67.9	60.8	65.5	78.0																					
27-Jul	65.5	71.4	76.2	85.1	87.5	87.3	85.9	82.9	81.3	77.1	70.1	59.4	DF	DF	DF	DF	DF	64.6	63.8	61.3	66.2	69.7	70.6	76.9	73.8	87.5																					
28-Jul	82.3	88.7	89.3	91.4	92.1	93.5	89.0	75.2	69.9	64.5	53.2	46.4	43.2	36.5	36.7	40.6	42.4	42.3	42.8	45.0	45.2	42.5	50.6	56.5	60.8	93.5																					
29-Jul	57.7	61.7	63.5	69.8	74.4	71.3	74.0	72.4	66.7	61.0	50.7	43.2	36.0	35.2	32.4	31.2	30.7	30.6	30.7	32.5	33.8	34.8	36.3	40.9	48.8	74.4																					
30-Jul	56.4	60.6	63.2	68.3	70.4	70.3	68.6	65.4	DF	DF	DF	DF	DF	DF	DF	DF	DF	32.3	33.4	36.3	42.5	56.5	54.8	66.5	70.2	--	70.4																				
31-Jul	74.2	76.0	77.9	82.5	87.4	89.8	88.6	89.9	90.4	DF	DF	DF	DF	DF	DF	58.4	63.8	57.1	76.7	84.2	75.7	72.0	70.5	69.8	66.5	76.4	90.4																				
																						62.6	66.6	69.2	73.2	75.6	76.9	76.1	72.3	68.6	62.3	56.0	50.7	47.6	45.3	44.3	44.3	44.2	46.2	47.7	48.6	51.3	53.3	56.5	59.2	Diurnal Average	
																						93.0	93.9	91.4	94.4	93.9	94.8	94.2	91.3	94.4	93.8	90.6	83.9	84.6	88.7	88.0	87.9	81.7	85.9	88.9	90.7	84.0	88.4	90.6	91.9	Diurnal Maximum	
DF - DAS Failure																																															



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity 100m (RH100m) - %
Lower Camp Met Tower - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity 100m (RH100m) - %
Lower Camp Met Tower - July 2023**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	142	19.56	19.56
40 - 60	242	33.33	52.89
60 - 80	231	31.82	84.71
80 - 100	111	15.29	100.00

Total Number of Valid Hours: 726

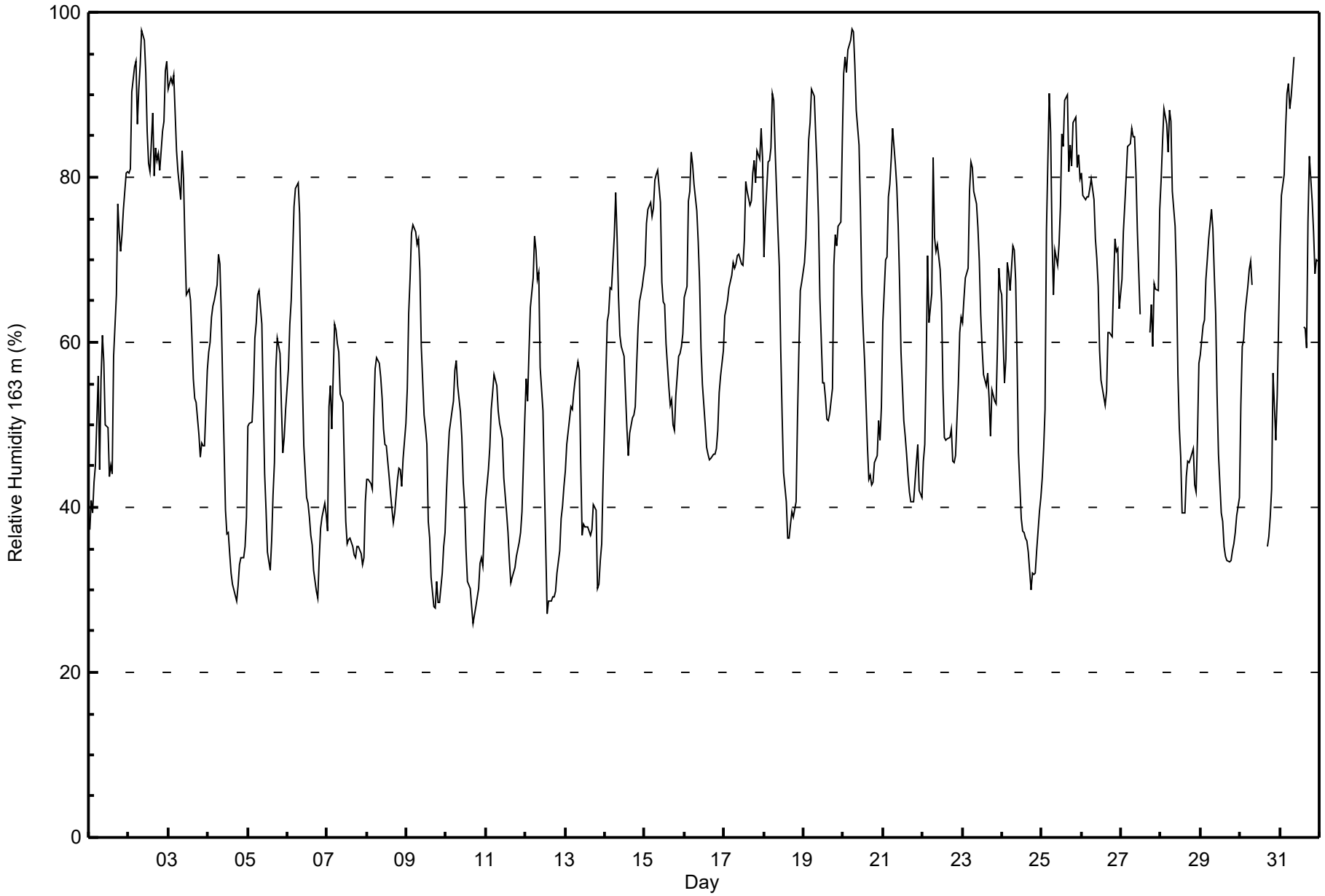
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Relative Humidity 163 m (RH163m) - %
Lower Camp Met Tower - July 2023

Maximum Value: 97.9 % on Jul 20 06:00 Maximum Daily Average: 87.6 % on Jul 2																						Hours in Service:	744																								
Minimum Value: 25.9 % on Jul 10 17:00 Minimum Daily Average: 40.3 % on Jul 10																						Hours of Data:	726																								
Maximum Diurnal Average: 75.0 % at hour 7 Minimum Diurnal Average: 46.3 % at hour 17																						Hours of Missing Data:	18																								
Monthly Average: 58.76 % Percentiles: P ₁ = 28.4 P ₁₀ = 35.3 Q ₁ = 44.0 Median = 57.7 Q ₃ = 72.6 P ₉₀ = 82.9 P ₉₉ = 94.4																						Hours of Calibration:	0																								
																						Percent Operational Time:	97.6																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	37.3	40.8	39.4	43.0	45.1	56.0	44.5	55.5	60.8	57.7	49.9	49.6	43.7	45.1	44.1	58.2	65.8	76.7	73.3	71.1	73.1	76.2	80.6	80.7	57.0	80.7																					
2-Jul	80.5	80.9	90.3	93.4	94.1	86.4	90.6	93.5	97.8	96.6	92.8	85.6	81.7	80.7	87.8	80.1	83.5	82.0	82.9	80.9	85.5	86.8	92.9	94.1	87.6	97.8																					
3-Jul	90.8	92.0	91.4	92.3	87.8	83.2	80.7	77.4	83.3	79.8	72.2	65.7	66.5	65.0	60.6	55.6	53.2	52.7	48.9	46.1	47.8	47.5	47.5	56.6	68.5	92.3																					
4-Jul	58.8	60.0	63.0	64.3	65.1	67.0	70.7	69.6	63.3	55.0	39.6	36.8	37.0	34.5	32.0	30.7	29.3	28.7	30.5	33.1	33.9	34.0	35.2	38.9	46.3	70.7																					
5-Jul	49.8	50.1	50.3	54.0	60.5	62.3	65.8	66.3	62.2	52.7	44.0	39.7	34.5	32.4	35.9	41.5	45.5	56.7	60.6	58.7	52.2	46.6	48.5	51.9	50.9	66.3																					
6-Jul	56.8	62.2	65.0	70.5	76.5	78.6	79.3	75.5	66.1	55.1	47.5	41.1	40.5	38.8	36.6	35.3	32.4	29.9	29.1	33.8	37.4	38.9	40.4	39.1	50.3	79.3																					
7-Jul	37.1	52.2	54.7	49.6	62.2	61.5	59.8	58.9	53.8	52.7	44.9	38.3	35.6	36.1	36.3	35.3	34.2	33.9	35.2	35.3	34.5	33.0	34.0	40.7	43.7	62.2																					
8-Jul	43.4	43.4	42.8	42.2	50.9	56.8	58.1	57.4	55.7	53.3	49.4	47.6	47.4	43.7	41.7	39.8	38.2	39.3	43.4	44.7	44.5	42.6	45.9	50.3	46.8	58.1																					
9-Jul	54.5	63.5	67.7	73.1	74.2	73.4	71.9	72.5	68.6	59.4	51.2	49.7	47.6	38.3	36.3	31.5	27.9	27.7	31.1	28.5	28.4	32.1	35.3	37.0	49.2	74.2																					
10-Jul	41.9	45.9	49.1	51.7	52.9	56.6	57.7	54.7	51.6	48.5	43.1	40.4	34.8	31.0	30.1	28.0	25.9	27.0	28.0	30.2	33.2	34.0	32.9	37.2	40.3	57.7																					
11-Jul	40.8	44.6	47.3	51.9	53.9	56.1	54.8	51.7	50.2	49.4	48.3	43.5	39.4	36.9	33.6	30.8	31.6	32.7	34.0	34.9	35.8	37.0	39.5	50.7	42.9	56.1																					
12-Jul	55.6	52.9	58.8	64.3	67.9	73.0	71.2	67.5	68.5	56.9	51.7	43.3	35.1	27.1	28.7	28.7	29.1	29.2	29.8	32.0	34.8	38.6	40.1	42.6	47.0	73.0																					
13-Jul	44.5	47.6	50.7	52.1	51.9	54.0	55.4	57.6	56.7	45.5	36.6	37.9	37.7	37.6	37.1	36.6	37.2	40.3	39.7	30.1	30.7	33.5	35.5	43.6	42.9	57.6																					
14-Jul	56.5	62.6	63.5	66.6	66.4	72.8	78.1	72.7	65.5	60.8	59.5	58.4	54.0	49.7	46.3	49.0	50.9	51.2	52.2	57.3	61.9	64.8	66.7	68.1	60.6	78.1																					
15-Jul	69.3	74.4	76.1	77.0	75.3	76.3	79.6	80.4	80.9	76.9	67.2	64.9	64.6	59.9	54.6	52.4	53.0	50.0	49.3	53.6	58.3	58.7	59.4	60.9	65.5	80.9																					
16-Jul	65.5	66.8	77.2	78.3	83.0	81.6	79.1	75.9	72.2	67.3	59.2	55.0	50.0	47.3	46.5	45.8	46.0	46.5	46.4	47.2	49.2	53.9	56.0	58.9	60.6	83.0																					
17-Jul	63.2	64.1	65.0	66.6	68.1	69.6	69.0	69.5	70.5	70.7	69.6	69.4	72.3	79.5	78.4	76.7	77.2	80.5	82.1	79.4	83.2	82.3	85.9	82.4	74.0	85.9																					
18-Jul	70.3	75.3	81.8	82.0	83.6	90.1	89.3	83.4	73.6	69.1	59.2	51.2	44.2	40.7	36.2	36.3	38.0	39.5	38.8	40.7	50.8	59.2	66.3	67.3	61.1	90.1																					
19-Jul	69.6	72.5	78.8	84.6	86.7	90.6	89.8	85.2	81.0	75.1	65.5	55.0	55.1	53.2	50.7	50.5	51.4	54.4	69.2	73.1	71.7	74.0	74.6	84.0	70.7	90.6																					
20-Jul	92.5	94.7	92.7	95.5	96.7	97.9	97.6	93.6	88.1	83.9	76.0	65.9	61.3	57.6	47.4	43.4	43.8	42.7	43.1	45.4	46.4	50.5	48.1	52.3	69.0	97.9																					
21-Jul	62.4	70.0	70.3	77.6	79.1	82.3	86.0	81.6	78.9	74.1	67.2	58.7	50.5	48.6	46.5	43.9	41.9	40.6	40.6	43.0	45.4	47.6	42.1	41.2	59.2	86.0																					
22-Jul	45.6	47.6	57.1	70.6	62.4	65.9	82.5	72.7	71.0	71.9	68.8	64.7	54.4	48.5	48.1	48.3	48.5	49.4	45.5	45.4	46.3	54.9	61.2	63.0	58.1	82.5																					
23-Jul	62.4	65.2	67.8	69.0	78.3	81.9	81.2	78.3	76.8	73.8	69.9	63.5	59.3	56.2	54.8	56.3	53.3	48.7	54.2	52.9	52.6	59.7	69.0	66.4	64.6	81.9																					
24-Jul	65.7	55.1	58.0	69.6	68.5	66.2	71.7	71.1	67.4	57.8	46.7	38.6	37.2	36.9	36.2	35.9	34.5	30.0	32.0	31.9	32.0	34.8	39.4	41.1	48.3	71.7																					
25-Jul	43.6	47.1	51.8	73.6	90.2	85.4	72.6	65.8	71.2	69.4	71.9	76.5	83.3	83.7	89.3	90.0	80.7	83.9	81.4	86.6	87.3	81.2	82.8	79.8	76.3	90.2																					
26-Jul	80.6	77.8	77.3	77.6	77.7	78.6	79.9	77.4	72.6	70.1	66.7	58.9	55.4	53.4	52.4	54.0	61.2	61.2	60.6	67.1	72.5	71.0	71.4	64.0	68.3	80.6																					
27-Jul	67.6	73.5	76.7	80.0	83.8	84.0	86.0	85.0	85.0	80.6	73.6	63.3	DF	DF	DF	DF	DF	61.1	64.5	59.5	67.1	66.5	66.3	76.1	73.7	86.0																					
28-Jul	79.7	84.2	88.3	86.5	83.1	88.1	86.9	78.3	74.0	67.9	56.1	49.6	46.1	39.3	39.3	43.7	45.5	45.5	46.0	47.1	42.6	41.9	48.6	57.4	61.1	88.3																					
29-Jul	58.5	62.0	62.7	67.7	69.9	72.5	76.1	73.8	68.3	63.4	53.6	46.4	39.2	38.3	35.3	34.1	33.6	33.4	33.5	34.8	35.6	37.0	39.0	41.2	50.4	76.1																					
30-Jul	52.5	59.5	60.4	63.5	66.8	68.8	69.8	67.0	DF	DF	DF	DF	DF	DF	DF	DF	DF	35.2	36.4	38.9	42.2	56.3	48.1	53.5	62.4	--	69.8																				
31-Jul	71.7	77.8	80.3	85.9	90.2	91.3	88.3	89.8	94.5	DF	DF	DF	DF	DF	DF	61.9	61.7	59.3	74.6	82.5	77.1	73.4	68.2	70.0	69.9	77.3	94.5																				
																						60.3	63.4	66.3	70.1	72.7	74.5	75.0	72.9	71.0	65.4	58.7	53.8	50.4	47.9	47.1	46.7	46.3	47.9	49.3	49.8	51.8	52.7	55.1	58.1	Diurnal Average	
																						92.5	94.7	92.7	95.5	96.7	97.9	97.6	93.6	97.8	96.6	92.8	85.6	85.3	83.7	89.3	90.0	83.5	83.9	82.9	86.6	87.3	86.8	92.9	94.1	Diurnal Maximum	
DF - DAS Failure																																															





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity 163 m (RH163m) - %
Lower Camp Met Tower - July 2023**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	135	18.60	18.60
40 - 60	257	35.40	53.99
60 - 80	227	31.27	85.26
80 - 100	107	14.74	100.00

Total Number of Valid Hours: 726

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 20 m (WS20m) - km/h

Lower Camp Met Tower - July 2023

Maximum Speed: 26 km/h on Jul 30 21:00	Maximum Daily Speed Average: 13.7 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 7 02:00	Minimum Daily Speed Average: 0.4 km/h on Jul 21	Hours of Data: 726
Maximum Diurnal Speed Average: 2.1 km/h at hour 11	Minimum Diurnal Speed Average: 0.2 km/h at hour 1	Hours of Missing Data: 18
Monthly Average Velocity: 0.1 km/h 285.8 deg	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 3 Median = 6 Q ₃ = 11 P ₉₀ = 14 P ₉₉ = 21	Percent Operational Time: 97.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Jul	WNW7	NW3	WNW1	SE4	SE7	ESE7	ESE5	ESE3	SE7	ESE4	SE11	SE11	SE10	SE13	SSE14	SW21	WSW10	N3	NNW3	NEE2	NW0	S5	WNW2	NW5	SSE3.1	SW21		
2-Jul	NW4	NNW4	WSW9	W13	NW5	WNW8	NW5	NW11	NW11	NW10	NW14	NW17	NW13	WNW13	NW8	NW15	NW11	NW13	WNW14	WNW14	W13	WNW14	NW10	NW7	NW10.0	NNW17		
3-Jul	NNW7	NW11	NW9	NW9	N18	NNW17	N23	N22	NNW16	NNW19	NNW22	NNW22	NNW18	NNW20	NNW20	N20	NNW18	NNW13	N9	NNW8	NNW5	NNW4	NNW3	WNW1	NNW13.7	N23		
4-Jul	NW1	WNW1	N1	NNW0	N1	NW0	E1	W0	WSW3	SW5	WNW5	W5	SW8	SW7	WSW6	WSW4	N4	SE5	SE10	S16	SSE18	SSE16	S14	SSE7	S3.7	SSE18		
5-Jul	ESE7	SE7	SE7	SE11	SE13	SE15	SE12	W8	SE11	SW7	WSW19	WSW18	WSW11	SW4	WSW7	S9	SW4	WNW5	W7	WSW5	WNW3	SE0	NNW1	W1	S4.3	WSW19		
6-Jul	W1	WNW1	NNW3	NNW3	NW2	NE1	NNW1	N7	NNW9	N12	N14	N13	NNW12	N13	NNW14	N12	N12	N13	N14	N12	N6	NNW3	NNW2	NW1	N7.3	N14		
7-Jul	SSE1	S0	N1	ESE1	ESE3	ESE6	SE7	SE7	S4	WSW6	W5	NE2	SW3	SW6	SW11	SW10	WSW14	WSW14	WSW5	SW11	SW11	WSW11	WSW10	W12	SW4.9	WSW14		
8-Jul	W15	W9	WSW14	WSW13	WSW7	SW9	SSW6	SW9	SW12	WNW2	N5	WNW7	N4	NE4	WNW5	N5	NNW5	NNW6	N7	N5	NW4	NW3	NW2	NW2	W4.3	W15		
9-Jul	NNW3	NW3	WNW2	NW2	NW2	NNW4	N3	NNW4	NNW4	N8	N12	N12	N12	N13	NNE13	NNE16	N16	N12	NNE12	N8	N7	NNE3	ENE4	NNE7	N7.3	N16		
10-Jul	E5	E6	ESE12	ESE10	E4	SE8	SE13	SE17	ESE16	SE14	SE12	SE12	SSE13	SE12	ESE12	SSE13	SSE12	SE10	E8	ENE4	E3	SE10	SE13	SE12	SE10.0	SE17		
11-Jul	SE6	SE10	SE8	E3	ESE5	ESE4	SE6	SSE12	SE9	ESE6	ESE6	S2	SSW14	SSW14	SSW17	S15	S10	S10	SSE7	SSE5	NNW1	NNW2	SE1	NNE0	SSE5.8	SSW17		
12-Jul	NW1	ESE2	NE1	N0	NNE1	NNE1	N3	N3	NNE3	NNW4	NW8	NW8	NW10	NNW12	NNW12	NNW11	NNW8	N9	NNE8	NNE5	NNW5	NW4	NNW4	S1	NNW4.7	NNW12		
13-Jul	NW1	W1	NNW2	NNW2	NNW2	NNW4	N4	NNW3	NNW9	NNW11	NNW15	NNW20	NNW22	NNW23	NNW17	NNW16	NNW14	N15	N16	N15	NNW8	NNW9	NNW8	NNW7	NNW9.9	NNW23		
14-Jul	NW5	NNW5	NNW5	NNW5	NNW5	NNW7	NW6	NNW10	NNW12	N16	N13	N13	NNW10	N11	N13	N10	NNE11	N9	N8	N7	NNW4	NNW4	NNW4	NW4	NNW7.9	N16		
15-Jul	NW4	NW3	NW4	NW2	N2	NNW3	NW2	NNW1	WNW3	NW4	N6	NNE8	NNE8	NNE8	N9	NNE7	NE7	N7	ENE5	ENE5	NNE4	NW2	NNW2	S1	N3.7	N9		
16-Jul	N1	NNE2	N1	ESE2	SE4	ESE5	SE5	SSE8	SE10	SE9	SE13	SE12	SE15	SE15	SSE15	SE13	SSE14	SSE13	SE13	ESE13	SE15	ESE10	SE11	ESE13	SE9.1	SE15		
17-Jul	SE12	ESE11	SE7	ESE12	ESE12	ESE13	SE14	SE16	SE18	SE16	SE15	SE19	SE9	SE5	ESE12	SE8	ESE3	NE3	NNW5	NNW5	NNW4	NNW4	NNW2	NNW3	ESE7.7	SE19		
18-Jul	NNW4	NNW4	NNW6	NNW4	NNW3	NW4	NNW3	NNW7	NNW5	N6	NNW3	SSE3	SE4	SSE3	SE7	SE2	NNW4	NNW4	W4	WSW7	WSW10	W10	NNW3	W6	NW2.4	WSW10		
19-Jul	WSW3	NW2	WSW5	E0	SSE4	S3	SW2	SW2	SSE3	NE1	WSW7	WSW8	W7	WNW7	N5	NNW9	W8	W7	W1	NNW2	WNW2	SSE2	SE1	NNW2	W2.4	NNW9		
20-Jul	NW2	SSE1	SE2	SE3	ESE1	ESE3	ESE2	SSW0	NE2	ESE1	E2	ENE3	WNW1	WSW6	W4	WSW6	NNW5	N6	N5	NW2	W1	NW1	NE1	N2	NNW0.6	WSW6		
21-Jul	WNW0	NNW2	NNW1	NNW1	ENE1	E1	ESE2	SE5	ESE3	ESE3	NNE1	WSW4	N1	NNE5	SSW1	WNW3	WSW7	SW7	WSW5	NE2	NE1	N3	NNW3	NNW3	WNW0.4	SW7		
22-Jul	NNW4	NW3	N0	NNE2	SSW1	SE1	NE2	NNW2	NNW5	NNW4	NNW6	NNW6	N8	NNE9	N11	N9	N9	N7	NNW5	NNW5	N3	NNW3	N3	N2	N4.2	N11		
23-Jul	N1	NW3	N2	N2	W1	N1	N1	SE4	SE6	SE6	ESE4	SE6	ESE5	NNE3	NNE3	ENE1	S20	SSE18	SSE13	SSE16	SSE13	SE4	SE1	SE1	SE4.1	SSE20		
24-Jul	ENE1	SSW3	SE5	SE3	E2	SSE2	SE6	SE5	SE5	E2	ESE3	E3	N3	NNW3	NNW3	WSW1	N3	E7	E6	NE2	NNW3	NE1	ENE4	NE1	E1.8	E7		
25-Jul	SSE5	E3	SW10	WSW10	S3	NNW6	ESE6	ESE7	SSE4	SSW12	ESE2	SSW4	WSW5	N4	NW2	NNE1	NE3	NNW3	NNW4	WNW5	WSW19	SW22	SW12	SSW14	SW3.7	SW22		
26-Jul	S11	S12	SSE14	SSE16	SSE16	SSE16	SE7	SSE9	SE10	SE9	SE7	SE4	SE6	SSE2	N1	NNW9	NNE16	N13	NNE15	NNE10	ENE10	ESE11	ENE6	E6	ESE5.0	NNE16		
27-Jul	NNE7	N5	N6	NNW4	NNW4	N5	NNW8	NNW7	NW6	NW7	NW6	NNW11	DF	DF	DF	DF	DF	W9	NNW3	ESE5	SE5	W1	NNW3	SE2	NNW3.7	NNW11		
28-Jul	N1	ESE2	ESE1	ENE1	ESE2	ESE3	ESE1	WSW3	SW1	NNE3	WSW4	SW4	WSW4	W4	S6	S12	S14	SSW14	SSW15	S15	S13	SSW11	SW4	S5	SSW4.8	SSW15		
29-Jul	SE6	ESE6	SE9	SE7	SE7	SE8	SE9	SE9	SE7	SE7	WSW3	W8	SSW12	S15	SSW14	SSW15	SSW17	S17	S17	S13	S11	SSW13	SSW13	S11	S9.1	S17		
30-Jul	ENE4	ESE8	SE9	SE10	SE11	SSE9	SSE9	SSE8	DF	DF	DF	DF	DF	DF	DF	DF	DF	S19	S18	S15	SSW14	SSW26	SE11	SE9	SE8	---	SSW26	
31-Jul	S9	S4	SSE4	NW3	SSE5	ESE6	SE6	SSE12	SSE18	DF	DF	DF	DF	DF	DF	DF	SW7	SW10	W6	NNW9	WNW4	NW1	NNW0	NE1	W3	SW14	SSW3.7	SSE18

WSW0.2 ESE0.4 S1.1 SSE0.8 ESE1.8 ESE1.8 ESE2.0 SE2.0 SE1.6 NNE1.2 NNW2.1 NNW2.1 NW1.5 NNW2.1 NW1.6 NNW1.9 NNW1.3 NW1.4 N1.1 W0.5 SW2.1 SW1.7 SSW0.6 SSW1.0 W15 S12 WSW14 SSE16 N18 NNW17 N23 N22 SE18 NNW19 NNW22 NNW22 NNW22 NNW23 NNW20 SW21 SSE20 SSE18 S17 SSE16 SSW26 SW22 S14 SW14	Diurnal Average
	Diurnal Maximum

DF - DAS Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

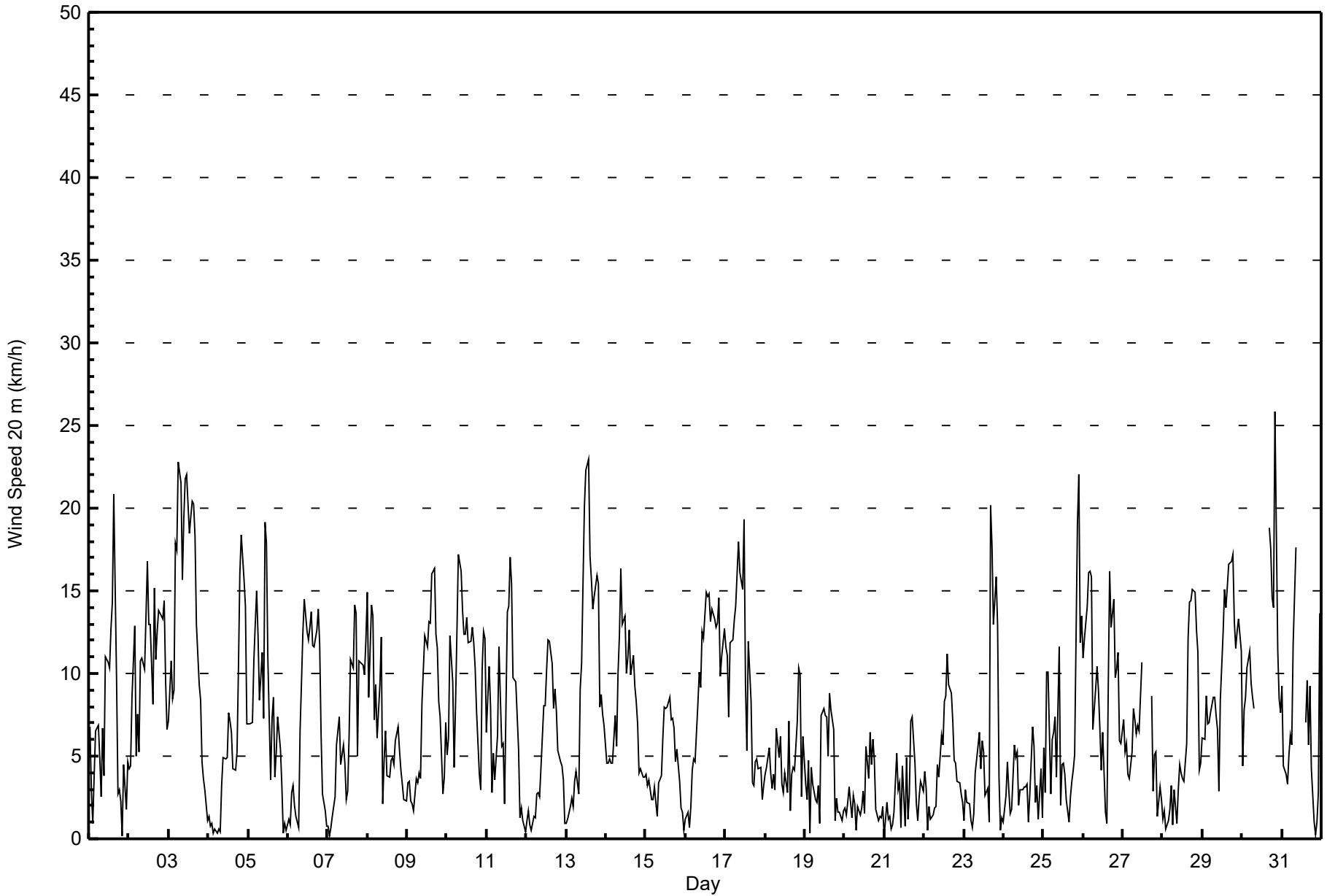
Wind Speed 20 m (WS20m) - km/h
Lower Camp Met Tower - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 13 km/h on Jul 30 21:00 Minimum Value: 0 km/h on Jul 4 01:00 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: 726 Hours of Missing Data: 18 Hours of Calibration: 0 Percent Operational Time: 97.6							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	4	1	1	2	2	2	2	2	3	2	4	3	4	4	6	5	7	1	3	2	1	1	1	2	7
2-Jul	2	2	7	4	3	3	3	4	4	4	6	7	6	5	4	7	4	6	5	5	5	5	3	3	7
3-Jul	2	3	2	3	7	8	8	7	7	8	8	9	7	8	8	7	7	5	4	4	2	1	1	1	9
4-Jul	0	1	1	1	1	1	1	2	2	2	3	3	4	4	4	3	2	3	2	3	3	3	3	3	4
5-Jul	3	2	2	3	3	3	3	3	3	5	5	4	4	7	5	4	3	4	4	3	2	1	1	1	7
6-Jul	1	1	1	1	1	1	1	3	4	5	5	5	5	5	5	5	4	5	5	4	3	2	1	1	5
7-Jul	1	1	1	1	1	2	1	1	2	2	2	2	2	3	5	4	4	3	4	4	2	2	3	4	5
8-Jul	5	4	5	4	4	3	2	3	3	2	3	3	2	2	3	2	2	2	3	2	1	1	1	1	5
9-Jul	1	1	1	1	1	1	2	2	2	4	5	5	5	5	6	6	6	5	5	3	2	3	2	2	6
10-Jul	2	3	6	5	2	4	5	6	5	5	4	4	4	4	4	4	4	3	4	2	2	4	5	4	6
11-Jul	4	5	4	2	2	1	4	3	3	3	3	4	3	4	4	4	3	3	2	2	2	1	1	1	5
12-Jul	1	1	1	1	1	1	2	2	2	2	4	4	4	5	5	4	4	3	3	2	2	2	1	1	5
13-Jul	1	1	1	1	1	1	1	3	4	5	7	9	8	8	8	6	5	5	6	6	3	3	3	2	9
14-Jul	2	1	2	2	2	3	2	4	6	6	5	5	4	4	4	4	5	3	3	3	2	2	1	1	6
15-Jul	1	1	1	1	1	1	1	1	2	2	3	4	4	4	4	4	4	3	2	3	2	1	1	1	4
16-Jul	1	1	1	1	2	2	2	4	3	4	5	5	5	5	4	6	5	4	5	5	5	4	4	5	6
17-Jul	4	4	3	4	4	4	5	5	5	5	5	7	6	2	5	4	2	2	2	3	2	2	2	1	7
18-Jul	1	2	2	2	1	2	2	2	2	2	2	2	3	3	3	2	2	2	2	2	4	4	2	3	4
19-Jul	2	2	2	2	1	2	2	2	1	2	3	4	3	3	2	5	6	6	2	2	1	1	1	2	6
20-Jul	1	1	2	2	1	1	1	1	2	2	2	2	2	3	2	4	2	2	2	1	1	2	3	1	4
21-Jul	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	2	2	2	2	2	1	3
22-Jul	1	1	1	1	1	1	1	2	3	2	2	2	3	4	3	4	4	3	1	2	1	1	1	1	4
23-Jul	1	1	1	1	1	1	1	4	2	2	2	2	3	2	1	2	7	7	4	3	3	4	1	1	7
24-Jul	1	2	1	1	1	1	2	2	1	1	1	1	1	2	2	2	2	2	2	2	1	1	2	2	2
25-Jul	2	3	6	6	3	4	6	5	6	5	4	6	4	2	1	1	2	2	2	6	6	5	3	5	6
26-Jul	2	3	4	3	3	3	4	5	3	3	3	3	3	1	2	4	6	4	5	5	5	6	3	3	6
27-Jul	3	2	2	2	2	3	3	3	2	3	3	5	DF	DF	DF	DF	DF	4	3	3	3	2	1	1	5
28-Jul	1	1	1	1	1	1	1	2	1	2	3	3	2	2	4	4	4	3	3	2	2	4	2	4	4
29-Jul	2	2	2	2	3	2	2	2	2	3	3	3	6	6	5	5	5	4	3	3	2	2	2	3	6
30-Jul	1	2	2	2	2	2	2	2	DF	UO	UO	UO	UO	UO	UO	UO	DF	5	4	4	7	13	5	4	13
31-Jul	5	5	5	2	2	2	2	4	4	DF	DF	DF	DF	DF	3	8	6	7	2	1	1	1	4	4	8
Diurnal Maximum																									
DF - DAS Failure UO - Unstable Operation																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed 20 m (WS20m) - km/h
Lower Camp Met Tower - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 20 m (WS20m) - km/h
Lower Camp Met Tower - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	347	47.80	47.80
6 - 11	214	29.48	77.27
12 - 19	151	20.80	98.07
20 - 28	14	1.93	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

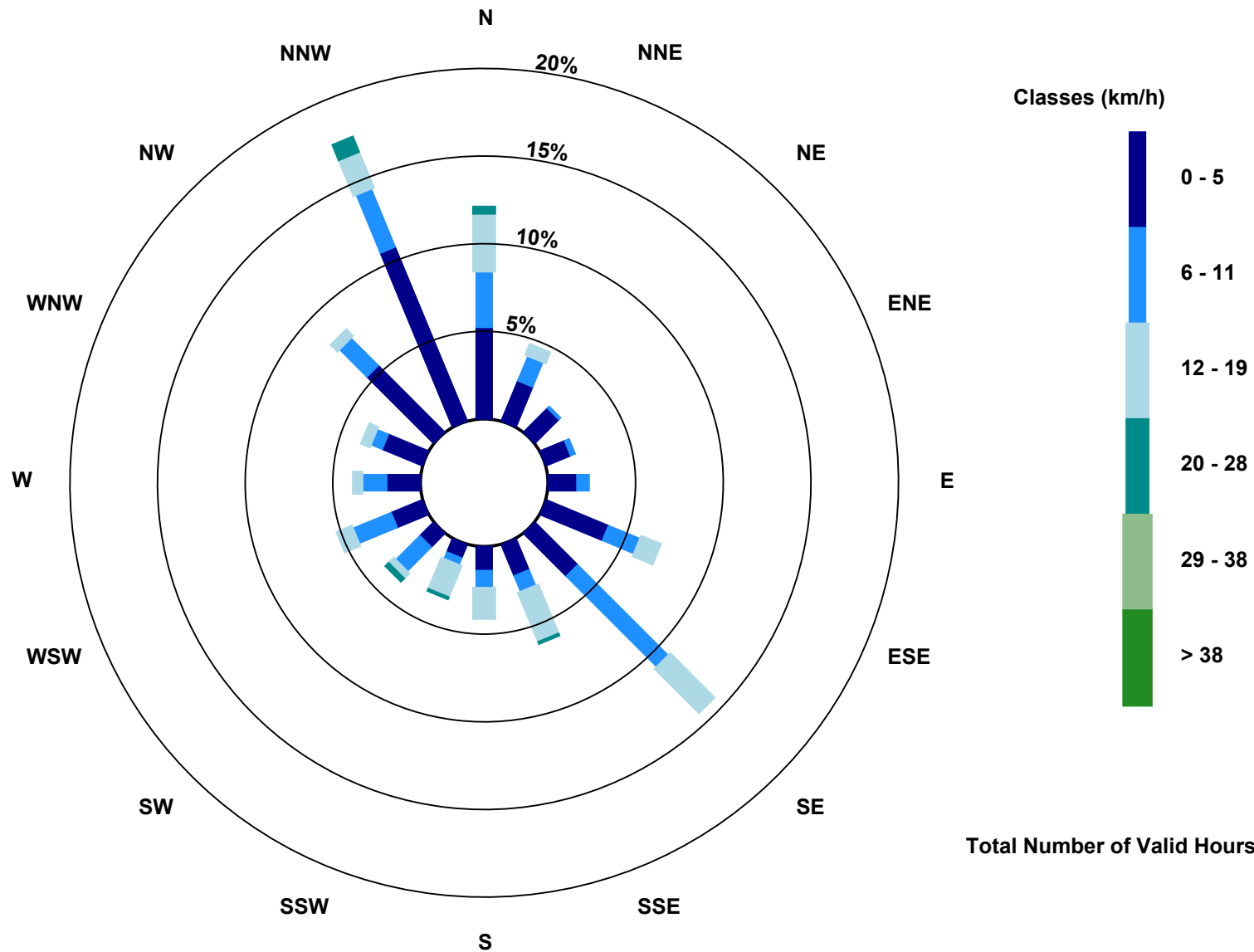
Total Number of Valid Hours: 726

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 45 m (WS45m) - km/h

Lower Camp Met Tower - July 2023

Maximum Speed: 35 km/h on Jul 13 14:00	Maximum Daily Speed Average: 21.8 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 22 06:00	Minimum Daily Speed Average: 0.6 km/h on Jul 21	Hours of Data: 726
Maximum Diurnal Speed Average: 3.7 km/h at hour 14	Minimum Diurnal Speed Average: 0.4 km/h at hour 1	Hours of Missing Data: 18
Monthly Average Velocity: 0.8 km/h 349.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 5 Median = 9 Q ₃ = 15 P ₉₀ = 20 P ₉₉ = 31	Percent Operational Time: 97.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	WNW11	NNW5	W3	S5	SSE6	SE9	SE7	SE4	SE8	ESE6	SE15	SE15	SE14	SE18	SE18	SW24	W15	NNW4	NNW5	N4	NW1	S6	W4	WNW7	SSE3.7	SW24	
2-Jul	WNW8	NW8WSW12	W20	WNW9WNW13WNW11	NW18	NW17	NW17	NW23	NW28	NW22WNW21WNW14	NW23	NW19	NW19WNW23WNW22	W21WNW22WNW15	NW11	WNW16.4	NW28										
3-Jul	NNW12	NW16	NW14	NW16	N28	N26	N35	N32	NNW25	NNW30	NNW33	N33	NNW30	NNW31	NNW31	N31	NNW27	NNW21	N15	NNW15	NNW11	NNW9	NNW9	N4	NNW21.8	N35	
4-Jul	NW2	WNW1	WNW2	WSW1	N2	NE1	E1	W1	W4	WSW5	WNW6	W6	WSW9	SW8	WSW8	WSW5	N5	SE6	SE12	SSE18	S23	S20	S20	SSE12	S4.6	SSE23	
5-Jul	ESE10	SE10	SE10	SE13	SE12	SE15	SE17	SE12	SE12	SW9WSW22WSW20WSW12	WSW5	WSW9	S10	SW7	WNW8WSW11	WSW9	WNW7	NNW2	NNW8	NNW4	SSW5.1	WSW22					
6-Jul	NNW2	WNW3	WNW6	NW5	NW2	NNE2	NNW2	N9	N13	N19	N21	N18	NNW18	N18	NNW20	N17	N17	N19	N21	N19	N12	NNW6	NNW5	NW2	N11.0	N21	
7-Jul	WSW1	SSE2	WSW1	SSE1	SE6	SE7	SE7	SE7	SSW5	W7	W6	NE2	SW4	SW8	SW13	SW12WSW17WSW16	WSW8	SW14	SW15WSW17WSW17WSW20	SW7.1	WSW20						
8-Jul	W24	W13WSW21WSW20WSW11WSW11	SW7	SW10	SW13	W4	NNW6	WNW9	N5	NNE3	WNW6	N8	NNW8	NNW10	NNE12	NNE10	NNW6	NNW6	WNW3	NNW2	W6.1	W24					
9-Jul	WNW4	NNW7	NNW4	NNW4	N5	NNW8	N5	NNW5	NNW5	N11	NNE18	NNE17	N17	N19	NNE19	NNE25	NNE25	N20	NNE19	N14	N14	NE6	ENE6	NE9	N11.2	NNE25	
10-Jul	ESE10	ESE14	ESE21	ESE15	ESE8	SE12	SE17	SE26	ESE24	ESE20	SE17	SE16	SE17	SE16	ESE17	SSE15	SSE15	SE17	ESE15	E8	ESE6	SE19	SE21	SE20	SE15.7	SE26	
11-Jul	SE12	SE15	SE13	ESE6	SE8	ESE6	SE10	SE15	SE13	ESE8	ESE8	S2	SSW15	SSW15	SSW18	S17	S11	S11	SSE9	S8	SSW4	WSW4	NW1	WSW1	SSE7.7	SSW18	
12-Jul	NW1	SE1	SE3	SSW1	NE1	N2	N2	N3	N3	NNW6	NW11	NW11	NW14	NNW17	NNW18	NNW15	NNW12	N14	NNE13	NNE12	N10	NW9	NNW10	NNW3	NNW7.3	NNW18	
13-Jul	NNW4	WNW3	WNW4	W6	W7	WNW8	NW8	NNW5	NNW15	NNW18	NNW25	NNW31	N33	NNW35	NNW26	NNW24	NNW21	N24	N26	N24	NNW16	NNW18	NNW16	NNW15	NNW16.4	NNW35	
14-Jul	NNW9	NNW10	NNW11	NNW10	NNW10	NNW13	NW9	NNW16	NNW20	N23	NNW18	N20	N15	N16	N19	N14	NNE17	N14	N13	N11	N8	NNW10	NNW8	NNW7	N12.9	N23	
15-Jul	NNW7	NNW7	NNW7	NNW6	NNW4	N6	NNW4	N2	WNW5	NW5	N9	NNE12	NNE12	N12	NNE11	NE11	N10	ENE7	NE11	NE8	N3	NNW3	N1	N6.4	NNE12		
16-Jul	NE2	NNW1	NNW1	SE4	SE6	SE7	SE5	SE10	SE14	ESE14	SE18	SE17	SE20	SE19	SSE17	SE18	SSE17	SE17	SE19	ESE20	SE23	ESE17	SE18	ESE21	SE13.1	SE23	
17-Jul	SE18	ESE20	ESE17	ESE21	ESE21	SE22	SE25	SE28	ESE24	SE24	SE30	SE15	ESE10	ESE20	SE13	ESE7	ENE6	N7	NNW8	NNW9	NNW9	N4	N5	ESE12.8	SE30		
18-Jul	N5	NNW8	NNW10	NNW7	NNW6	NNW7	NNW5	NNW9	NNW6	NNW7	NNW4	SE3	SE5	SE4	SE9	SE2	NW5	NNW7	W6WSW10WSW16WSW17	WNW4WSW10	NW3.9	WSW17					
19-Jul	WSW6	W7	WSW8	W2	S4	SSW4	SW4	SW2	SSE3	NW1	WSW9WSW10	W9WNW10	N6	NNW15	WNW9	W12	WSW4	N4	NNW2	SW3	S3	NNW2	W4.1	NNW15			
20-Jul	NNW3	SSW2	SSE4	SSE5	SSE2	ESE4	SE3	SW1	NNE2	SE1	E2	NE3	WNW3	WSW7	W5	W8	NNW7	N10	N8	N5	WNW1	NW4	N2	NW2	NW1.3	N10	
21-Jul	NNW1	WNW2	W2	NW3	NNE1	SSE2	SE4	SE6	ESE4	ESE3	WNW1	WSW5	NW1	N5	WSW2	W4	WSW9	SW9	WSW8	E2	ENE7	ENE2	NNE3	NNW7	WSW0.6	SW9	
22-Jul	N9	NNW5	NNW2	N4	W1	ESE0	E3	N3	NNW6	NNW5	NNW8	NNW8	N13	NNE14	N17	N15	NNE14	NNE13	N10	NNW11	NNW8	NNW9	NNW7	NNW7	N7.5	N17	
23-Jul	NNW3	NNW5	NNW5	N4	W1	SSW1	E2	SE6	SE8	SE9	ESE6	SE8	SE6	NNE3	NNE4	ESE1	SSE22	SSE20	SSE16	SSE19	SSE17	SSE7	SE2	SE5	SE5.4	SSE22	
24-Jul	SE1	SSW4	SSE6	SSE5	SE4	SE5	SE9	ESE7	SE6	E3	ESE4	ESE4	NNE2	NNW5	NNW2	SW2	NNE3	E13	E10	E6	NE3	E3	E6	SE5	ESE3.5	E13	
25-Jul	SE9	ESE8	SW13WSW16	SSE4	N9	E11	ESE12	SE8	S14	SE5	SSW5	WSW8	N6	NNW3	NE1	ENE3	N5	NNW6	WNW7WSW26	SW27	SW14	SW16	SW4.2	SW27			
26-Jul	S13	S15	SSE17	SSE20	SSE19	SSE18	SE8	SE12	SE13	SE11	ESE9	SE5	SE8	SSE2	N1	NNW14	NNE25	NNE20	NNE22	NNE16	ENE17	ESE18	ENE10	E9	ESE6.5	NNE25	
27-Jul	NNE12	NNE8	N10	N8	N7	N8	N11	N10	NW9	NW9	NW9	N15	DF	DF	DF	DF	DF	W13	NW6	SE5	SSE9	SSW2	NW5	SSE3	NNW5.4	NNW15	
28-Jul	SW1	SE3	SSE2	ESE1	SE2	SE5	SE1	WSW3	SW1	N2	W5	WSW4	W4	W5	S6	S13	S16	SSW15	SSW16	S16	S17	SSW16	SW9	S6	SSW6.0	SSW17	
29-Jul	SSE8	SE9	SE12	SE10	SE10	SSE10	SSE10	SE10	SE9	SE8	WSW5	W10	SSW14	SSW16	SSW15	SSW16	SSW18	S18	S18	SSW14	S15	SSW19	SSW19	SSW15	S11.0	SSW19	
30-Jul	ESE4	ESE9	SE10	SE13	SE13	SE11	SSE10	SSE9	DF	DF	DF	DF	DF	DF	DF	DF	DF	S20	S19	S17	SSW17	SSW31	SE16	ESE14	SE13	---	SSW31
31-Jul	S12	S8	SSE6	WNW6	SSE6	SE10	SE9	SSE13	SSE20	DF	DF	DF	DF	DF	DF	WSW8	SW13	W8	NNW16	WNW5	W3	WNW2	WSW3	W6	SW18	SSW4.8	SSE20

W0.4 ESE0.4 S1.3SSW1.2 SE1.7 ESE1.8 ESE2.7 ESE2.6 ESE1.8NNE2.1 N3.4 N3.5NNW2.8NNW3.7NNW2.8	NW3.2NNW2.7NNW3.1	N2.8	N1.5	SW1.9	SW2.4WSW0.9SSW1.1	Diurnal Average
W24 ESE20 WSW21 ESE21 N28 N26 N35 N32 SE28NNW30 NNW33	N33 N33 NNW35 NNW31	N31 NNW27	N24	N26	N24 SSW31 SW27 SE21 ESE21	Diurnal Maximum

DF - DAS Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



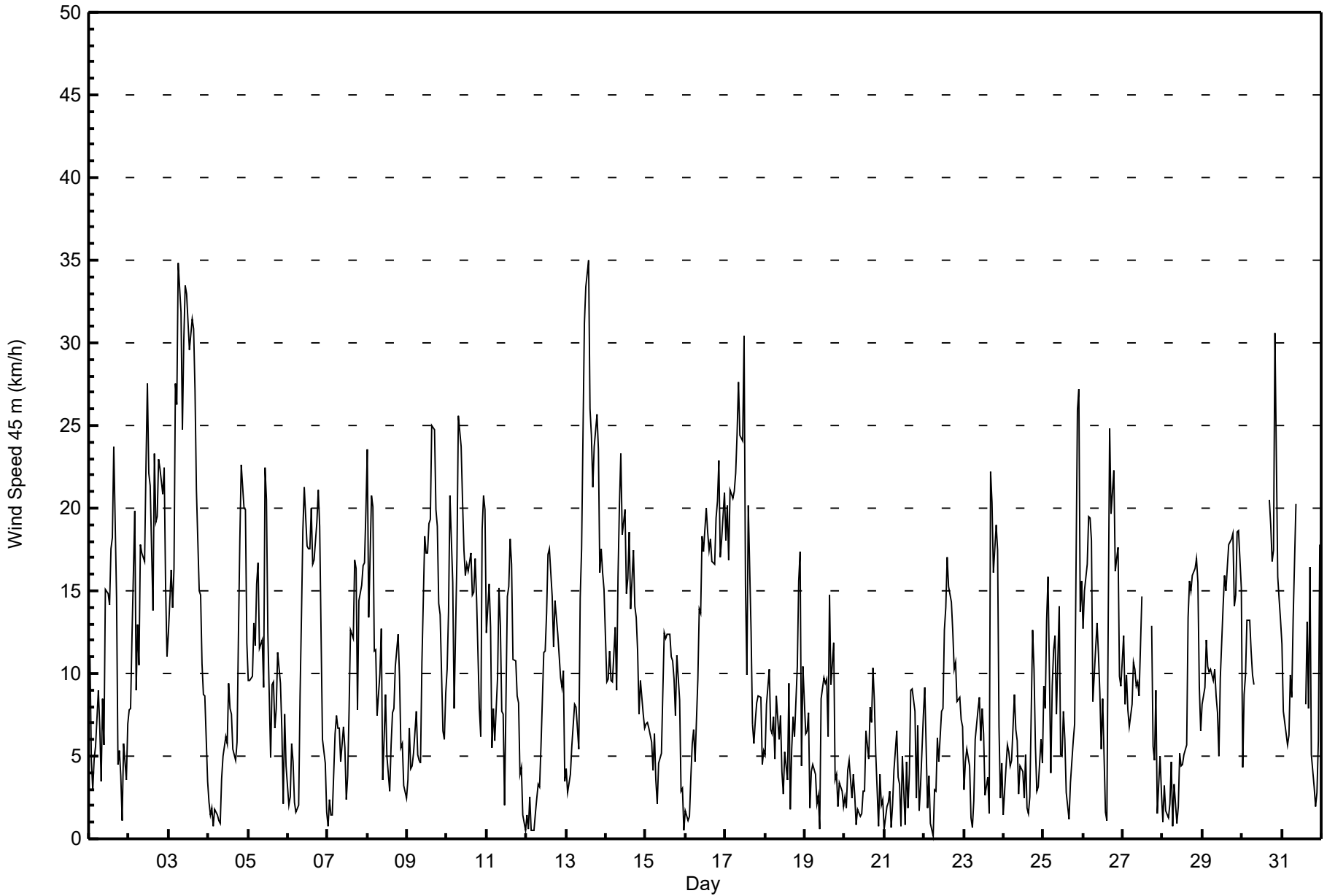
Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 45 m (WS45m) - km/h
Lower Camp Met Tower - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 14 km/h on Jul 30 21:00	Hours in Service: 744 Hours of Data: 726 Hours of Missing Data: 18 Hours of Calibration: 0 Percent Operational Time: 97.6
Minimum Value: 1 km/h on Jul 12 01:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 8	

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

DF - DAS Failure





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 45 m (WS45m) - km/h
Lower Camp Met Tower - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	215	29.61	29.61
6 - 11	232	31.96	61.57
12 - 19	194	26.72	88.29
20 - 28	71	9.78	98.07
29 - 38	14	1.93	100.00
> 38	0	0.00	100.00

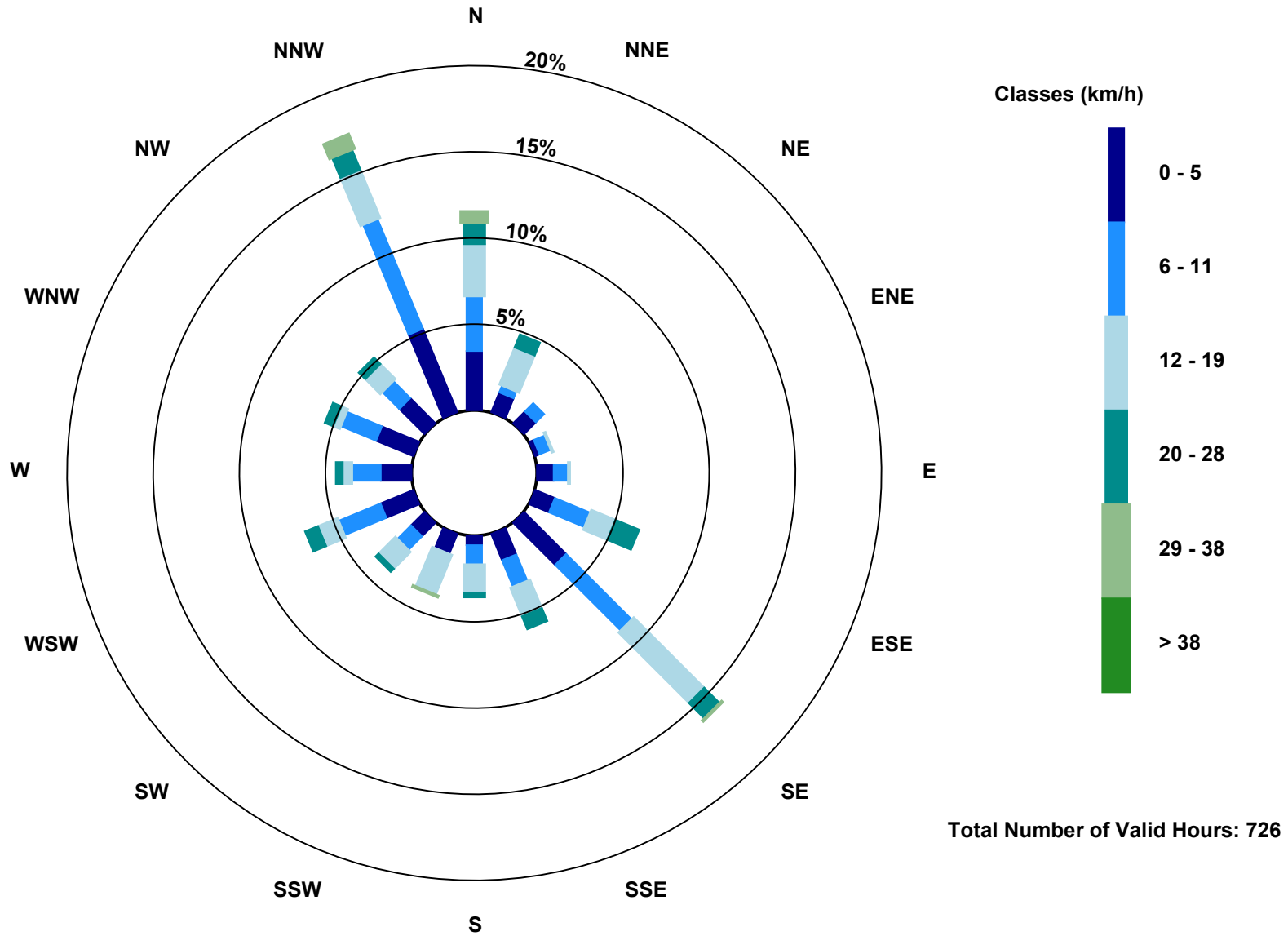
Total Number of Valid Hours: 726

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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





Maximum Speed: 44 km/h on Jul 3 07:00	Maximum Daily Speed Average: 29.2 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 20 11:00	Minimum Daily Speed Average: 1.3 km/h on Jul 21	Hours of Data: 726
Maximum Diurnal Speed Average: 4.4 km/h at hour 14	Minimum Diurnal Speed Average: 0.8 km/h at hour 6	Hours of Missing Data: 18
Monthly Average Velocity: 1.2 km/h 324.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 7 Median = 12 Q ₃ = 20 P ₉₀ = 27 P ₉₉ = 39	Percent Operational Time: 97.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	WNW17	NW8	WNW6	SW9	SSW6	S5	SSW4	SW5	SSE6	SE5	SE18	SE18	SE17	SE21	SE22	SW27	WSW20	NNW7	NW8	NNW6	NNW4	SW6	W7	WNW8	SSW3.9	SW27	
2-Jul	WNW14	WNW15	WSW17	W23	WNW15	WNW21	WNW18	NW24	NNW24	NW25	NW32	NW39	NW34	WNW30	WNW21	NW33	NNW28	NW28	WNW31	WNW30	W26	WNW30	WNW22	NW17	WNW23.7	NW39	
3-Jul	NW20	NW24	NW21	NNW26	N36	N35	N44	N40	NNW34	NNW39	NNW41	N41	NNW39	NNW39	NNW39	N37	NNW33	NNW27	N20	N20	N16	NNW15	NNW14	NNW14	NNW29.2	N44	
4-Jul	NNW13	NNW11	NW6	NW5	W4	WSW3	SW4	WSW3	WSW4	WSW5	WNW7	W6	WSW10	SW9	W8	W6	N4	SE6	SE13	SSE20	SSE27	S31	S34	S24	SSW6.0	S34	
5-Jul	SSE10	SSE10	S8	SSW9	SSW9	SSW11	S12	S9	S9	SW12	WSW24	WSW21	WSW13	WSW7	WSW13	SSW12	SW9	W10	W14	W15	NW11	NNW13	NNW18	NNW15	SW7.5	WSW24	
6-Jul	N12	NNW8	NW8	NW11	NNW13	N8	NNW6	NNW11	N16	N22	N24	N20	NNW20	NNW20	N23	N19	N20	N22	N24	N24	N19	N11	NNE9	ENE5	N15.1	N24	
7-Jul	SSE4	SSW3	W7	WSW5	SSW4	SSW5	SSW6	SSW6	SW8	W7	W6	N1	WSW6	SW8	SW14	SW13	SW18	SW18	SW11	SW21	WSW23	WSW28	WSW29	WSW31	WSW11.2	WSW31	
8-Jul	WSW31	W21	WSW28	WSW30	WSW18	WSW14	SW11	SW11	WSW12	W5	WNW7	WNW10	NNW6	NW1	WNW7	NNW10	NNW12	NNW14	NNE15	NNE16	NNE10	NNE9	NW5	NW3	WNW8.2	WSW31	
9-Jul	WNW6	NNW12	NNW15	NNW12	N9	N10	N7	N4	NW5	N12	NNE21	NNE20	NNE20	N23	NNE23	NNE28	NNE28	NNE23	NNE22	NNE19	NNE22	ENE17	ENE9	ESE12	NNE14.2	NNE28	
10-Jul	ESE16	ESE22	SE30	SE22	ESE14	SE20	SE23	SE32	SE28	ESE24	SE20	SE18	SE18	SE18	ESE20	SSE17	SSE17	SE21	ESE21	ESE15	ESE12	SE26	SE28	SE28	SE21.0	SE32	
11-Jul	SE21	SE22	SE19	SE12	SE13	SE10	SE15	SE16	SE15	SE11	ESE8	SSW2	SSW16	SSW16	SSW19	S17	S12	S12	SSE10	S9	SSW9	SW7	WSW6	SE4	SSE10.8	SE22	
12-Jul	E2	ESE7	SSE6	SSE3	SSE3	SE4	NNW2	NNW4	NNW3	NW6	NW13	NW14	NW16	NNW20	NNW21	NNW17	NNW14	N17	NNE16	NNE21	N19	NNW13	NNW17	NNW17	N8.9	NNE21	
13-Jul	NNW15	NW9	NW9	NW6	NW10	NW13	NW15	NNW13	NNW18	NNW22	NNW31	NNW39	N41	NNW42	NNW34	NNW31	N27	N29	N33	N32	NNW25	NNW27	NNW26	NNW20	NNW22.9	NNW42	
14-Jul	NNW12	NNW16	NNW18	NNW15	NNW14	NNW17	NNW13	NNW21	NNW25	N27	N22	N23	N18	N18	N21	N17	NNE19	N17	N18	NNE14	N12	NNW12	N10	NNW10	N16.6	N27	
15-Jul	NNW11	NNW9	NNW7	NNW8	NNW8	N9	N5	N3	WNW4	NW5	N11	NNE14	NNE13	NNE15	N14	NNE13	NE12	N11	ENE8	NE13	NE15	NE10	NE3	E5	NNE8.2	NE15	
16-Jul	ESE5	SSE3	SE1	SE9	SSE8	SSE7	SSE6	SE13	SE17	ESE17	SE22	SE21	SE23	SE22	SE20	SE23	SE20	SE22	SE26	SE27	SE30	SE23	SE27	SE28	SE17.3	SE30	
17-Jul	SE26	SE27	SE26	SE28	SE28	SE27	SE29	SE30	SE33	SE30	SE30	SE37	SE23	SE17	ESE28	ESE19	ESE13	E8	NNE7	NNW9	NNW11	N10	NNE6	NNE5	ESE17.9	SE37	
18-Jul	NE3	N6	NNW13	N10	N10	N10	N6	N10	N5	NNW8	NNW5	ESE2	ESE6	SE5	SE10	ESE2	NW6	NW8	WNW7	WSW12	W19	W25	WSW12	W16	NW4.5	W25	
19-Jul	WSW14	WSW15	WSW13	WSW6	SW7	SW7	WSW6	WSW3	SW2	W3	WSW9	WSW11	W10	W10	NNW6	NNW17	WNW9	W19	WSW9	NNW3	N2	SW5	SW6	SW2	W6.9	W19	
20-Jul	NW1	SW3	SW4	SSW6	S4	SSE3	S2	SW1	NW1	SSW1	NW0	NNE3	WNW3	WSW7	W6	W9	NNW8	N12	N9	N10	NNE7	N3	N5	NNW5	NW2.1	N12	
21-Jul	NNW8	NNW8	NW5	NW7	NNW4	WSW1	S3	SSW5	S2	S2	WSW4	W6	W2	NNW4	W4	WSW6	WSW11	SW10	SW9	ESE2	ENE14	E7	E8	ESE5	W1.3	ENE14	
22-Jul	NNE6	NNW4	NW2	N8	NNW9	WSW4	ESE2	N4	NNW6	NNW6	NNW8	NNW10	N15	NNE16	N19	NNE18	NNE16	NNE15	N14	N13	N11	N14	N13	NNW13	N9.7	N19	
23-Jul	N10	NNW10	N8	N7	ESE3	SSE7	SE8	SSE10	SE11	SE11	ESE8	SE8	SE6	NE2	NE3	SE4	S24	SSE23	SSE18	SSE24	SSE26	S13	SE6	SSE9	SSE7.3	SSE26	
24-Jul	SSW5	WSW9	SSW5	S4	SSE3	SSE5	SE9	SE9	ESE9	E5	E6	ESE5	ENE2	NNW3	E1	S3	ENE3	E17	E16	E15	ENE11	ENE9	E12	ESE10	ESE5.4	E17	
25-Jul	SE14	ESE14	SW16	W20	SSW5	NNE12	ESE20	ESE19	SE12	S17	SE11	S8	W11	N8	NE3	E3	ESE6	NNE4	N6	WNW6	WSW30	WSW31	SW19	SW19	SSW5.2	WSW31	
26-Jul	SSW16	S20	S19	S24	S24	SSE21	SE10	SE13	SE15	SE13	ESE10	SE6	SE10	SE2	ENE2	NNW15	NNE28	NNE24	NNE26	NE20	ENE20	ESE22	E12	ENE11	ESE7.1	NNE28	
27-Jul	NE17	NNE13	NNE16	N14	N10	N10	N13	N13	NNW11	NW10	NW10	N16	DF	DF	DF	DF	DF	W15	NW10	NNW2	SSE11	SSW3	WNW9	NNW1	NNW7.5	NE17	
28-Jul	WSW3	SE3	SW4	SW3	SW3	S3	SW2	WSW4	SW2	WNW2	W5	WSW4	W5	W5	S6	S14	S17	SSW16	SSW17	SSW19	SSW22	SSW25	SW19	SSW8	SSW7.9	SSW25	
29-Jul	SSW9	S9	S11	SSE12	SSE13	S11	S10	S9	SSE8	SSE6	WSW8	W10	SSW15	SSW16	SSW15	SSW18	SSW19	S20	SSW19	SSW16	S20	SSW26	SSW27	SSW31	SSW14.2	SSW31	
30-Jul	S8	SSE4	SSE11	SSE15	SE14	SSE15	SSE13	SSE11	DF	DF	DF	DF	DF	DF	DF	DF	DF	S22	S20	S20	SSW22	SSW39	SSE19	ESE21	SE19	----	SSW39
31-Jul	S18	S14	SSE11	WNW9	S6	SE11	ESE13	SSE17	S23	DF	DF	DF	DF	DF	DF	WSW9	SW18	W11	NNW24	NW4	W7	W4	WSW8	W14	WSW24	SW7.0	NNW24

WSW1.4	W0.9	WSW2.3	WSW2.8	SW1.0	S0.8	SE1.8	ESE1.9	ESE1.1	N2.4	N3.9	N4.4	NNW3.9	NNW4.4	NNW3.2	NW3.6	NNW2.9	NNW3.9	NNE3.5	N2.4	WSW1.0	WSW2.5	WSW1.8	SW2.4	Diurnal Average
WSW31	SE27	SE30	WSW30	N36	N35	N44	N40	NNW34	NNW39	NNW41	N41	N41	NNW42	NNW39	N37	NNW33	N29	N33	N32	SSW39	WSW31	S34	WSW31	Diurnal Maximum

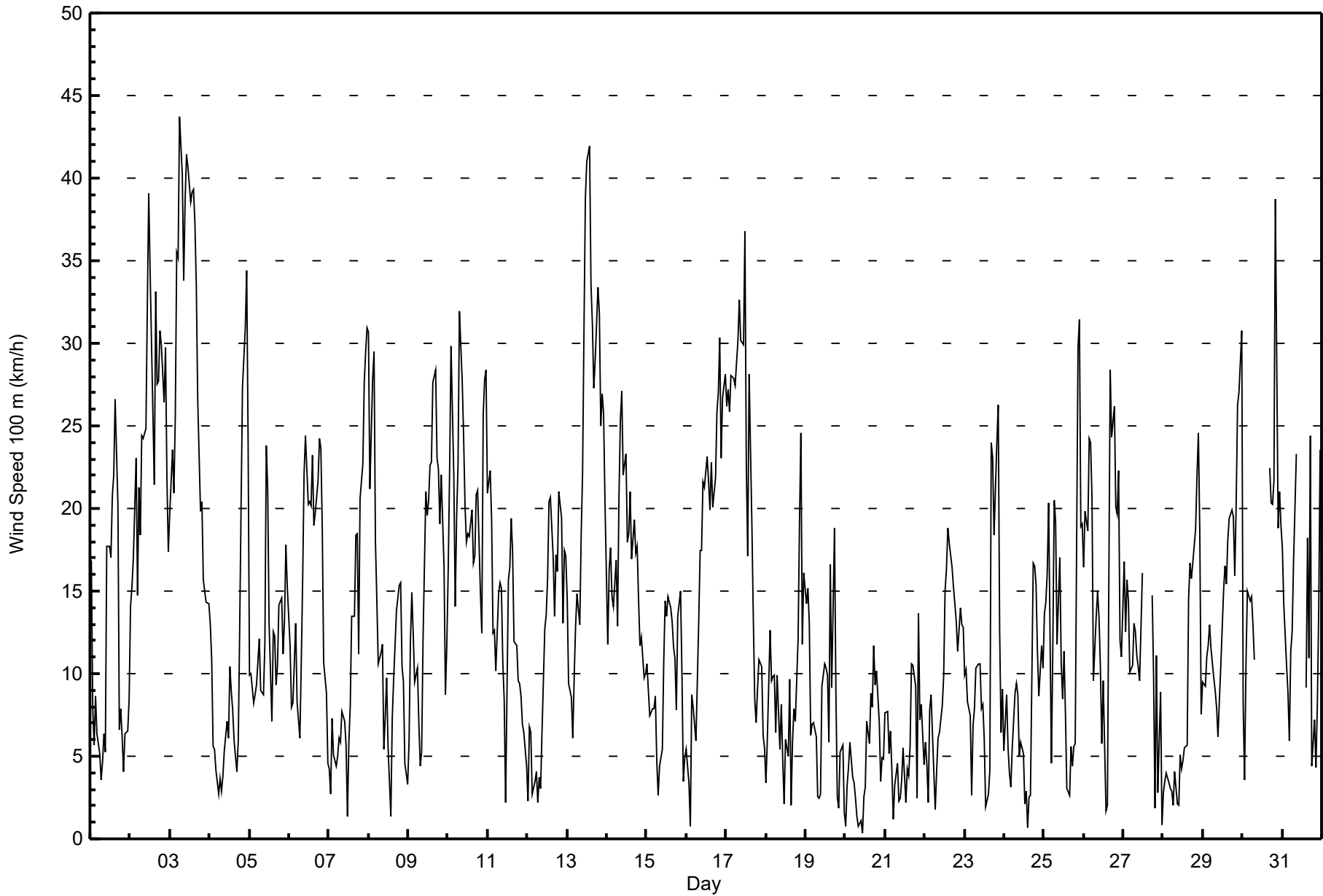
DF - DAS Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 100 m (WS100m) - km/h
Lower Camp Met Tower - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 17 km/h on Jul 30 21:00 Minimum Value: 1 km/h on Jul 4 06:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 9														Hours in Service: 744 Hours of Data: 726 Hours of Missing Data: 18 Hours of Calibration: 0 Percent Operational Time: 97.6											
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	6	2	2	3	2	2	1	2	3	4	4	3	4	3	4	5	7	3	4	3	2	3	2	3	7
2-Jul	3	3	6	3	6	3	4	4	4	5	6	6	6	3	6	9	5	7	4	3	7	4	3	4	9
3-Jul	4	2	2	4	6	8	7	6	6	8	7	7	7	7	8	6	7	4	4	5	3	2	2	2	8
4-Jul	1	2	1	1	1	1	1	2	1	3	3	3	3	3	4	3	2	4	2	3	1	1	2	7	7
5-Jul	3	2	1	2	2	2	2	2	2	6	3	4	4	9	9	6	3	6	5	2	1	2	2	2	9
6-Jul	1	2	2	2	1	2	3	3	4	3	4	4	5	5	5	5	5	4	4	3	3	3	2	1	5
7-Jul	2	2	2	2	1	2	1	2	2	2	2	1	3	4	4	4	3	3	4	3	3	2	2	2	4
8-Jul	3	6	4	3	5	4	3	4	2	2	4	2	3	3	3	4	4	2	3	3	2	2	1	1	6
9-Jul	2	3	2	1	2	1	2	1	2	5	4	4	6	5	5	5	5	4	5	2	2	7	2	3	7
10-Jul	4	4	5	6	4	4	7	6	4	4	3	3	4	4	4	3	4	3	3	3	3	5	4	4	7
11-Jul	8	3	3	3	3	2	4	2	2	4	2	4	3	4	3	3	4	2	2	2	2	1	3	2	8
12-Jul	1	2	4	2	1	1	1	2	2	2	4	3	3	4	5	4	4	3	3	5	4	3	2	2	5
13-Jul	2	5	2	1	1	2	2	2	4	7	7	9	7	6	8	7	5	5	5	6	4	2	3	4	9
14-Jul	2	2	2	2	2	2	2	5	5	5	3	4	4	4	4	5	2	2	3	2	2	2	1	5	5
15-Jul	2	2	2	1	1	2	3	1	2	2	4	4	4	4	6	4	4	4	3	5	3	3	1	1	6
16-Jul	2	1	1	2	2	2	2	5	2	3	3	4	5	6	4	4	4	4	4	4	4	4	3	5	6
17-Jul	4	4	2	3	3	3	4	4	3	4	4	5	8	3	5	7	4	2	3	3	2	2	2	1	8
18-Jul	1	2	2	3	1	2	2	2	1	2	3	3	4	4	3	2	2	1	3	2	5	2	5	3	5
19-Jul	3	4	3	2	2	2	2	2	1	3	3	3	3	3	2	10	10	6	3	1	2	1	2	1	10
20-Jul	1	3	2	2	1	2	1	1	2	2	2	1	2	2	2	3	2	1	2	1	2	5	4	2	5
21-Jul	3	1	1	1	1	1	1	1	1	1	2	2	3	2	2	4	3	3	2	3	3	2	2	2	4
22-Jul	2	1	1	3	3	1	1	2	2	2	2	2	3	3	2	4	3	2	2	1	1	2	2	2	4
23-Jul	2	2	1	1	2	1	2	3	2	2	3	1	3	1	2	3	6	5	3	2	3	9	3	2	9
24-Jul	2	3	3	1	1	1	2	2	1	2	2	1	2	1	1	2	3	3	3	4	3	2	4	6	6
25-Jul	3	3	8	8	6	3	11	7	8	6	7	6	4	3	2	3	2	1	1	7	6	4	4	6	11
26-Jul	3	3	3	3	3	4	3	4	3	3	3	4	3	2	2	5	5	5	5	4	5	7	4	4	7
27-Jul	3	3	2	2	2	3	2	2	3	2	3	6	DF	DF	DF	DF	DF	5	5	3	4	3	3	1	6
28-Jul	1	2	2	2	2	1	1	1	1	2	2	2	2	2	5	4	3	3	2	3	1	1	3	4	5
29-Jul	2	2	1	2	2	1	2	2	2	2	4	3	5	6	5	5	4	3	3	2	3	1	1	3	6
30-Jul	7	3	3	2	2	3	3	2	DF	DF	DF	DF	DF	DF	DF	DF	5	4	5	8	17	9	4	7	17
31-Jul	7	6	6	4	2	4	3	4	4	DF	DF	DF	DF	DF	3	9	9	11	2	2	2	2	6	3	11
Diurnal Maximum																									
DF - DAS Failure																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 100 m (WS100m) - km/h
Lower Camp Met Tower - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	133	18.32	18.32
6 - 11	215	29.61	47.93
12 - 19	196	27.00	74.93
20 - 28	133	18.32	93.25
29 - 38	36	4.96	98.21
> 38	13	1.79	100.00

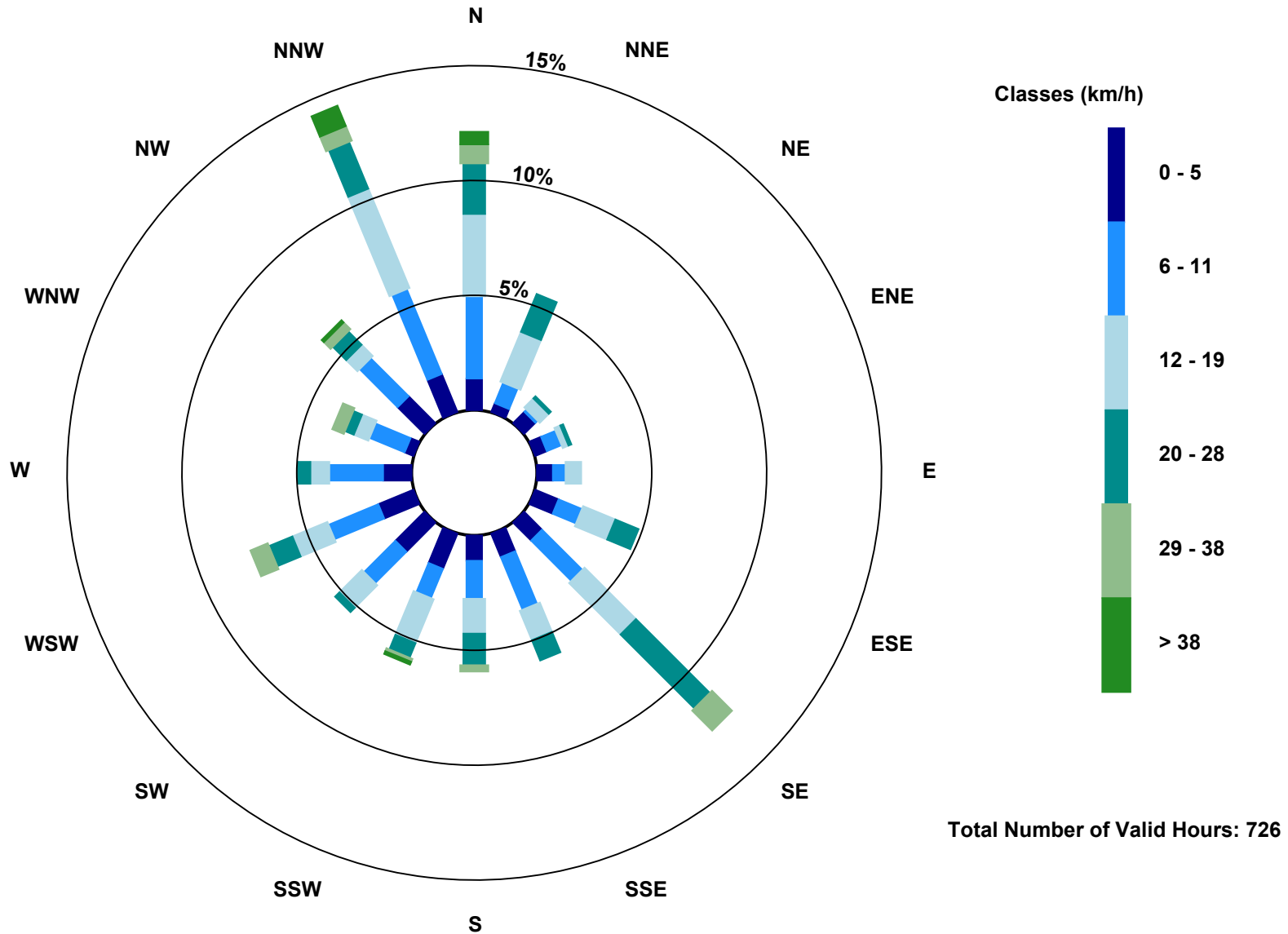
Total Number of Valid Hours: 726

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 163 m (WS163m) - km/h

Lower Camp Met Tower - July 2023

Maximum Speed: 49 km/h on Jul 3 07:00	Maximum Daily Speed Average: 34.0 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 21 20:00	Minimum Daily Speed Average: 1.5 km/h on Jul 21	Hours of Data: 723
Maximum Diurnal Speed Average: 5.3 km/h at hour 12	Minimum Diurnal Speed Average: 0.0 km/h at hour 6	Hours of Missing Data: 21
Monthly Average Velocity: 1.7 km/h 342.1 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 9 Median = 15 Q ₃ = 22 P ₉₀ = 30 P ₉₉ = 43	Percent Operational Time: 97.2

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	NW23	NNW13	N9	WSW4	WSW10	SW8	SW8	WSW8	SSW6	SSE3	SE16	SE18	SE19	SE22	SSE24	SW28	WSW23	NW9	NW11	NW10	NNW9	WSW4	W9	NW9	SW4.1	SW28	
2-Jul	WNNW16	WNNW22	W19	UO	WNNW19	WNNW22	NW24	NW29	NNW29	NNW31	NNW39	NNW46	NW42	WNNW35	WNNW27	NW40	NNW33	NW35	NW37	WNNW36	WNNW31	WNNW36	NW28	NW24	NW29.1	NNW46	
3-Jul	NNW26	NNW30	NNW28	NNW33	N40	N42	N49	N45	N39	NNW43	N45	N44	NNW42	N43	N42	N39	NNW36	NNW29	N24	N23	N20	N21	N23	N21	N34.0	N49	
4-Jul	N20	N16	NNW12	NNW10	NW9	NW7	W4	SW3	SW4	W5	WNNW7	W6	WSW11	SW9	W7	W6	NW3	SSE6	SSE13	SSE19	SSE26	S31	S39	S37	SSW5.1	S39	
5-Jul	SSW16	SSW13	WSW11	WSW15	SW15	SW13	SSW13	SSW10	SW11	WSW15	WSW26	WSW22	WSW14	WSW10	WSW14	SSW13	SSW10	W12	W15	WNNW14	NNW16	N20	N24	N20	WSW9.5	WSW26	
6-Jul	N18	N12	N12	N15	N20	NNE18	N12	N14	N17	NNE22	N24	N20	NNW21	N20	N23	N19	N20	NNE22	NNE25	NNE25	N23	NNE21	NNE16	ENE10	N18.3	NNE25	
7-Jul	SE7	SW4	W10	W10	WSW7	WSW4	SW8	SW10	WSW10	W8	W5	NW2	WSW6	WSW9	SW14	SW14	SW19	WSW20	SW14	WSW24	WSW30	WSW38	WSW43	WSW41	WSW14.1	WSW43	
8-Jul	W39	W29	W37	W39	W29	W17	WSW14	SW14	WSW11	WNNW7	WNNW9	WNNW11	NW6	WSW3	WNNW8	NNW11	NNW14	NNW16	NNE17	NNE18	NE18	NNE14	NNE9	N8	WNNW10.9	W39	
9-Jul	NNW10	N17	NNE14	NNE11	NNE12	NNE14	NE13	NE4	NNW5	N13	NNE21	NNE20	NNE21	NNE24	NNE24	NNE28	NNE29	NNE24	NNE25	NNE23	NNE29	ENE20	E15	ESE19	NNE16.1	NNE29	
10-Jul	ESE22	SE27	SE35	SE27	SE21	SE25	SE28	SE35	SE29	SE25	SE21	SE18	SE19	SE19	ESE21	SSE17	SSE18	SE22	ESE25	ESE22	ESE20	SE30	SE32	SE33	SE24.4	SE35	
11-Jul	SE26	SE24	SE22	SE19	SE18	SSE18	SSE18	SSE18	SSE15	SSE11	SE9	S3	SSW16	SSW17	SSW19	S18	S12	S12	S10	S10	SSW10	SW8	WSW9	WSW3	SSE12.4	SE26	
12-Jul	NE3	ENE4	SSE8	S7	S6	S4	SSW3	NNW4	NW5	NW8	NNW13	NNW14	NNW17	NNW21	N21	N17	N14	N18	NNE18	NE25	N23	N21	N26	NNW24	N10.4	N26	
13-Jul	NNW21	NNW18	NNW15	N17	NNW14	NNW15	NNW19	NNW21	NNW22	NNW25	NNW33	NNW42	N43	N43	NNW37	NNW35	N29	N31	N37	N36	N30	NNW33	NNW32	N26	NNW27.7	N43	
14-Jul	N19	N20	N22	NNW20	NNW20	N19	N16	NNW23	NNW27	N27	N23	N24	N19	N19	N22	NNE18	NNE21	NNE19	N19	NNE16	N15	N15	N15	N14	N19.2	N27	
15-Jul	N13	N11	N9	N9	NNW8	N11	NE6	N3	NNW4	NNW6	NNE11	NE14	NNE14	NNE15	NNE14	NNE14	NE12	N11	ENE7	ENE13	ENE14	ENE10	ENE10	ENE13	NNE9.4	NNE15	
16-Jul	E8	SE10	SSE5	SSE7	SSE9	SSE11	SSE10	SSE15	SE18	SE19	SE22	SE22	SE24	SE23	SE20	SE24	SSE21	SE23	SE28	SE32	SE34	SE29	SE32	SE33	SE19.7	SE34	
17-Jul	SSE28	SE31	SE30	SE34	SE33	SE33	SE32	SE33	SE34	SE33	SE33	SE38	SE27	SE23	ESE35	ESE28	SE19	ESE13	ENE9	N6	N11	NNE12	NE12	E9	SE22.2	SE38	
18-Jul	E10	ESE6	NNE5	NNE10	N14	NNE19	NNE13	NNE13	NE5	NNW8	N6	E3	ESE7	SE5	SE8	SE2	NW7	NW7	WNNW7	W11	W20	W26	W19	WNNW15	NNW4.2	W26	
19-Jul	W13	W17	W14	W10	WSW6	WSW10	WSW9	WSW3	WSW4	WSW5	WSW10	WSW11	W11	W10	NNW5	NNW13	W9	W18	W11	WNNW2	NE1	SW7	SW9	WSW6	W8.0	W18	
20-Jul	WSW3	WSW3	WSW5	SW5	SW5	SSW4	SW4	SSW1	W1	WSW2	W1	NNE2	WNNW3	W7	W7	W9	NW9	NNW12	N10	N11	NNE12	NNE7	N7	N12	NW3.0	N12	
21-Jul	N11	N10	N4	NW8	NW9	WNNW5	W5	SSW6	SSW6	WSW6	W6	W5	W3	NW4	W5	WSW7	WSW11	SW11	WSW10	SW0	ENE16	ENE13	E13	E10	WNNW1.5	ENE16	
22-Jul	E5	ESE3	WNNW2	N7	NNE7	NW3	NNW4	N9	N10	NNE7	N9	N11	N15	NNE17	NNE18	NNE20	NNE17	NNE17	NNE17	NNE18	NNE17	NNE21	NNE18	N15	NNE11.4	NNE21	
23-Jul	N11	N11	NNE9	NE6	SE8	SSE12	SSE14	SSE13	SSE13	SE12	SE9	SE8	SE5	E2	ENE2	SE6	S24	SSE24	SSE20	SSE25	SSE30	S24	S12	S15	SSE9.9	SSE30	
24-Jul	SSW11	WSW9	WSW8	WSW5	SW4	SSW6	S7	SSE6	SE9	SE3	ESE6	ESE6	E4	ESE1	ESE1	SE4	E4	ESE18	ESE20	E21	E17	E19	E18	ESE22	ESE6.4	ESE22	
25-Jul	ESE22	ESE20	SW17	W24	UO	ENE10	ESE29	ESE25	SE16	S19	SE17	UO	WSW13	N4	E4	ESE6	SE9	ENE3	NE1	W6	WSW33	WSW34	SW22	SW22	S7.2	WSW34	
26-Jul	SSW18	SSW22	SSW20	S25	S28	S24	SSE11	SSE13	SE15	SE13	SE12	SE6	SE10	E3	E4	N16	NNE31	NNE29	NNE30	NE25	ENE20	ESE25	E13	E12	ESE6.8	NNE31	
27-Jul	NE18	NE16	NE18	NNE16	NNE14	NNE15	N15	N13	NNW12	NNW11	NNW11	N16	DF	DF	DF	DF	DF	W13	NNW13	NNW7	SSE11	SSW4	WNNW11	WNNW5	N8.4	NE18	
28-Jul	WNNW4	WNNW2	WSW4	W8	W7	W7	WSW6	SW5	SW3	W4	W5	W4	WNNW4	W6	SSW6	S14	SSW16	SSW16	SSW17	SSW21	SSW23	SW26	WSW26	WSW12	SW8.9	SW26	
29-Jul	SW12	SSW8	SW10	SSW11	SSW12	SW12	SSW11	SSW10	SSW9	SSW6	WSW11	WSW11	SSW16	SSW17	SSW15	SSW18	SSW20	SSW20	SSW20	SSW18	SSW22	SW27	SW30	SW34	SSW15.3	SW34	
30-Jul	SSW21	SSW14	S17	S18	S19	SSE21	SSE18	SSE14	DF	DF	DF	DF	DF	DF	DF	DF	DF	S23	S22	S22	SSW25	SSW42	S16	ESE21	SE22	---	SSW42
31-Jul	S23	S22	SSE15	WNNW12	SW5	SE8	SE11	SSE19	S25	DF	DF	DF	DF	DF	DF	WSW10	SW21	W14	NNW30	N6	W8	W6	W12	W20	WSW26	SW8.3	NNW30

WNNW1.2	NW0.9	W2.0	WNNW3.1	W1.9	NW0.0	ESE1.5	SE1.7	ESE0.6	N2.6	N4.1	N5.3	NNW4.1	N4.2	N3.0	NNW3.5	NNW2.6	N4.2	NNE4.1	NNE3.3	N1.0	WNNW1.4	WNNW1.3	SW1.1	Diurnal Average	
W39	SE31	W37	W39	N40	N42	N49	N45	N39	NNW43	N45	NNW46	N43	N43	N42	NW40	NNW36	NW35	NW37	N36	SSW42	WSW38	WSW43	WSW41	Diurnal Maximum	

DF - DAS Failure UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



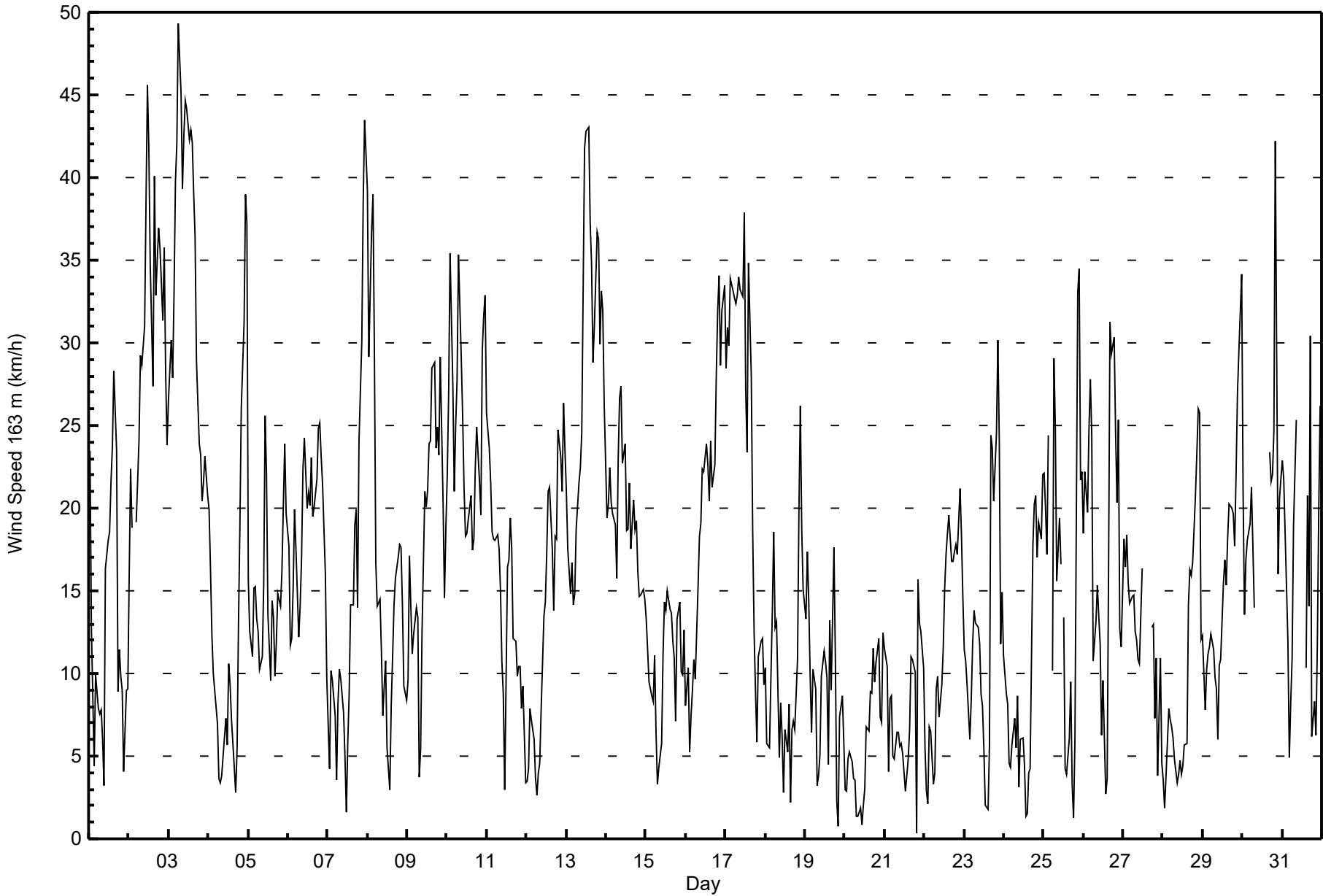
Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 163 m (WS163m) - km/h
Lower Camp Met Tower - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 18 km/h on Jul 30 21:00	Hours in Service: 744 Hours of Data: 723 Hours of Missing Data: 21 Hours of Calibration: 0 Percent Operational Time: 97.2
Minimum Value: 0 km/h on Jul 11 22:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 9	

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

DF - DAS Failure UO - Unstable Operation





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 163 m (WS163m) - km/h
Lower Camp Met Tower - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	92	12.72	12.72
6 - 11	184	25.45	38.17
12 - 19	204	28.22	66.39
20 - 28	152	21.02	87.41
29 - 38	66	9.13	96.54
> 38	25	3.46	100.00

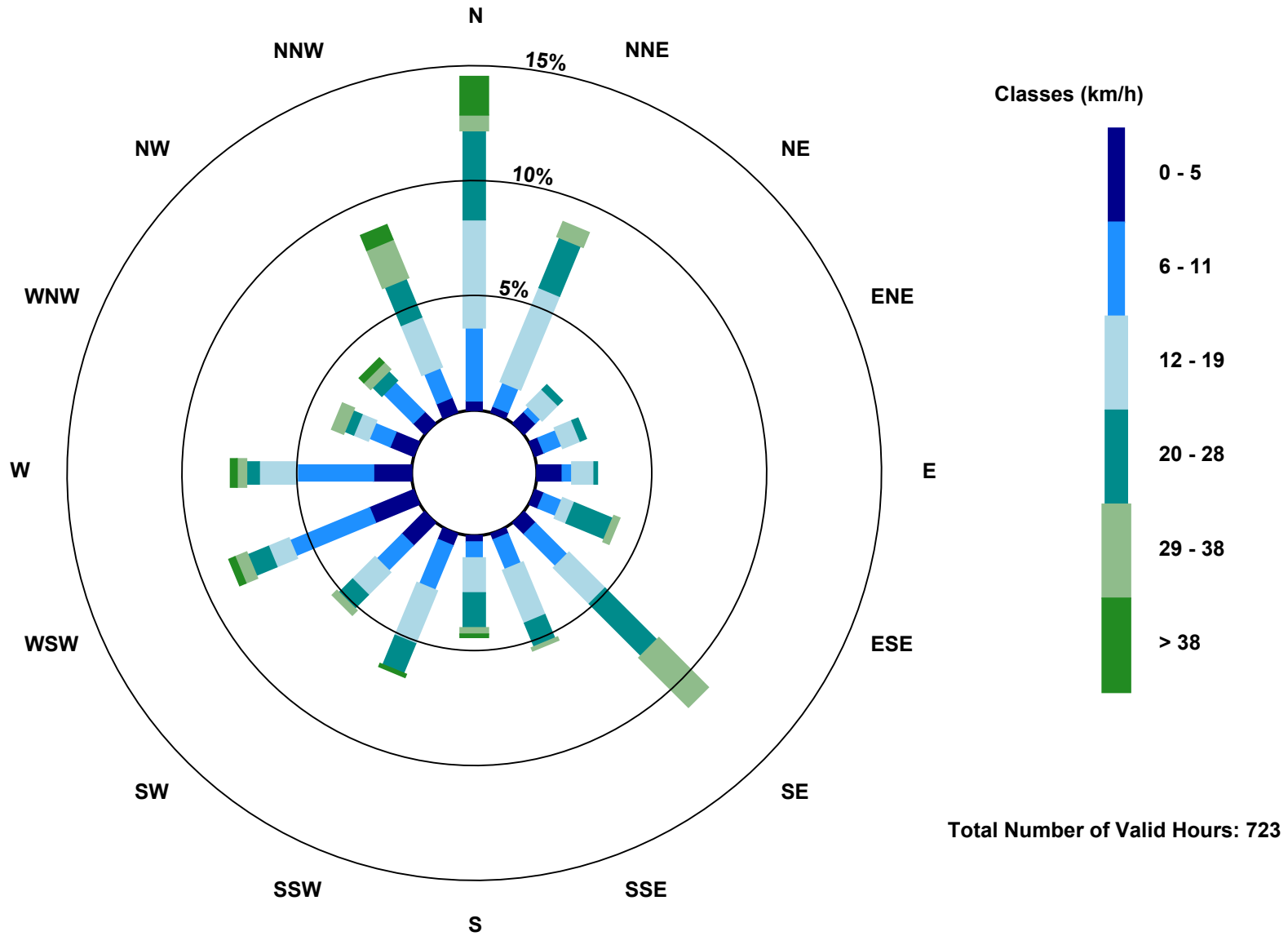
Total Number of Valid Hours: 723

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed 163 m (WS163m) - km/h
Lower Camp Met Tower





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 20 m (WD20m) - deg
Lower Camp Met Tower - July 2023

Direction of Maximum Speed: 204 deg on Jul 30 21:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 341.8 deg on Jul 3	Hours of Data: 726
Direction of Minimum Speed: 170 deg on Jul 7 02:00	Hours of Missing Data: 18
Direction of Minimum Daily Speed Average: 0.4 deg on Jul 21	Percent Operational Time: 97.6
Monthly Average Direction: 285.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	295	324	295	138	129	119	120	118	125	114	139	138	131	128	152	219	257	356	333	14	312	184	287	318	156.1	
2-Jul	311	335	246	266	308	303	314	309	322	325	323	326	318	294	310	314	325	308	296	288	276	291	304	321	304.8	
3-Jul	330	313	315	324	350	348	354	353	339	339	344	346	339	342	342	349	339	336	355	339	341	328	341	297	341.8	
4-Jul	316	302	9	332	352	307	90	260	252	236	289	260	234	218	248	245	6	124	140	169	168	164	175	147	186.9	
5-Jul	112	130	133	132	132	135	134	128	137	216	243	238	243	227	256	178	225	292	259	255	289	135	334	279	186.2	
6-Jul	266	302	335	339	306	34	336	350	348	5	0	357	342	350	347	352	357	1	4	5	359	331	331	310	353.4	
7-Jul	163	170	9	110	121	122	126	133	180	255	267	56	216	234	234	234	237	237	250	233	234	243	251	264	229.5	
8-Jul	267	269	249	251	239	234	209	223	231	286	355	298	9	35	297	357	341	329	4	3	322	322	318	322	277.5	
9-Jul	333	314	297	319	320	337	353	332	339	351	9	10	5	5	16	15	9	10	14	5	359	28	58	28	5.0	
10-Jul	82	90	116	117	92	124	141	134	122	125	137	142	148	137	114	156	152	129	97	72	91	124	130	125	127.4	
11-Jul	125	146	134	87	120	102	135	147	137	116	115	170	212	209	199	189	178	170	160	161	344	341	131	25	163.6	
12-Jul	324	110	34	8	29	23	7	2	12	347	322	326	325	344	345	346	342	352	14	21	329	325	335	170	345.7	
13-Jul	325	261	338	337	341	345	355	330	338	327	339	340	348	346	335	334	346	1	357	352	334	329	336	334	342.3	
14-Jul	323	338	332	328	341	338	311	335	336	349	349	356	347	351	4	1	18	5	355	7	347	332	343	305	348.1	
15-Jul	325	323	322	325	353	347	321	335	299	316	2	28	22	17	360	13	36	351	71	57	28	312	333	183	3.9	
16-Jul	1	13	10	106	132	121	135	148	138	132	126	130	139	144	156	142	155	154	135	121	130	123	126	119	135.3	
17-Jul	137	121	125	113	115	121	127	129	127	125	129	135	134	127	114	136	102	53	345	331	334	332	343	341	121.1	
18-Jul	348	336	338	339	327	319	337	348	344	349	340	153	139	151	143	136	328	333	276	252	257	260	331	268	305.0	
19-Jul	255	315	257	81	157	172	222	214	158	43	242	254	267	284	1	342	281	272	262	338	290	158	133	338	269.5	
20-Jul	325	166	146	136	113	105	121	212	37	119	99	63	303	252	271	253	346	351	350	319	281	326	45	3	333.8	
21-Jul	302	342	327	346	63	99	117	127	112	113	19	241	359	18	205	283	240	230	251	53	44	357	348	334	285.4	
22-Jul	334	314	10	22	212	130	54	333	339	334	343	334	354	16	360	6	11	8	341	345	352	342	350	358	354.6	
23-Jul	6	311	353	358	267	10	349	139	128	132	107	129	120	13	29	61	169	157	149	158	150	137	134	129	143.9	
24-Jul	68	197	137	135	97	159	125	128	141	97	112	86	6	329	345	238	4	88	89	52	341	46	72	44	92.9	
25-Jul	148	99	236	252	170	347	102	122	164	196	105	206	253	5	324	14	44	336	339	287	248	236	215	212	226.6	
26-Jul	184	170	152	160	156	154	137	148	134	138	127	142	130	166	9	344	12	11	12	29	74	107	66	84	117.6	
27-Jul	29	9	352	345	348	352	348	346	316	317	322	348	DF	DF	DF	DF	DF	268	341	121	133	276	344	132	343.9	
28-Jul	8	119	104	57	111	110	107	237	232	33	251	234	257	275	191	177	191	193	195	190	190	194	227	170	193.9	
29-Jul	144	119	137	134	130	143	146	140	137	126	252	267	202	190	201	195	193	187	189	191	181	198	194	186	179.1	
30-Jul	75	117	132	138	145	150	162	157	DF	DF	DF	DF	DF	DF	DF	DF	DF	175	186	169	212	204	135	129	145	--
31-Jul	184	180	158	310	153	122	141	165	166	DF	DF	DF	DF	DF	232	228	267	329	289	308	337	39	265	229	200.1	

254.0 118.1 178.0 164.8 123.7 113.3 112.1 128.3 128.1 21.6 347.7 336.8 314.8 332.8 317.7 291.1 298.5 312.8 0.9 278.8 222.4 218.0 203.2 206.3
 Diurnal Average

DF - DAS Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

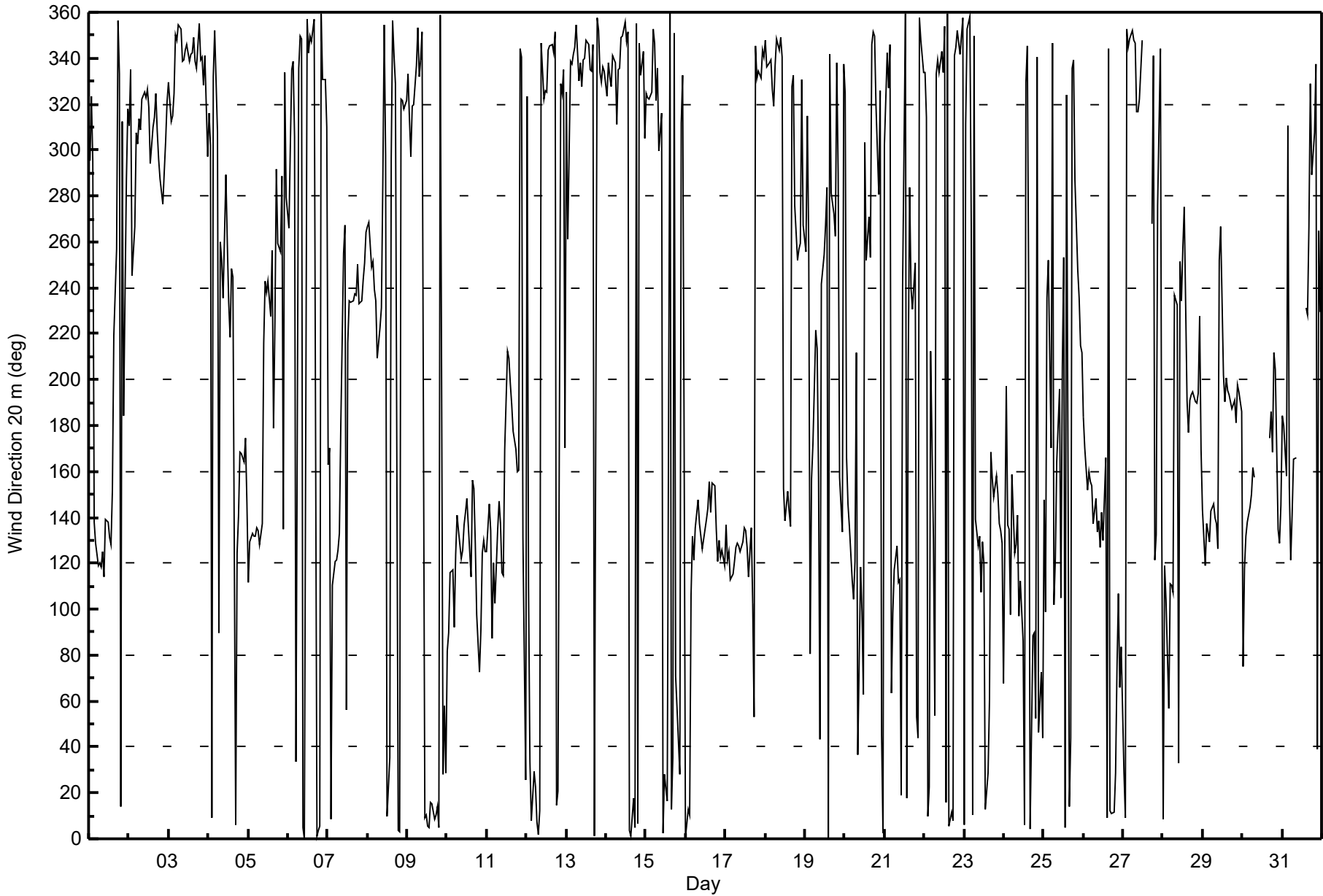
Wind Direction 20 m (WD20m) - deg
Lower Camp Met Tower - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 106 deg on Jul 4 08:00	Hours of Data: 726
Minimum Value: 6 deg on Jul 29 21:00	Hours of Missing Data: 18
Percentiles: P ₁ = 8 P ₁₀ = 15 Q ₁ = 19 Median = 26 Q ₃ = 48 P ₉₀ = 77 P ₉₉ = 98	Hours of Calibration: 0
	Percent Operational Time: 97.6

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	39	25	86	36	14	12	14	41	18	42	15	16	21	19	24	23	53	52	83	53	87	46	61	33	87
2-Jul	33	33	54	23	54	25	37	25	19	21	19	22	22	22	35	21	18	16	19	20	18	17	18	26	54
3-Jul	18	12	13	18	20	18	18	18	21	21	18	18	20	18	19	18	20	21	29	22	21	16	13	78	78
4-Jul	30	82	69	74	84	88	84	106	53	42	64	58	40	48	59	59	32	40	15	7	7	8	10	36	106
5-Jul	31	15	12	10	11	10	13	16	10	55	13	13	40	89	58	33	70	44	27	43	47	91	89	95	95
6-Jul	74	94	25	20	43	50	99	19	22	25	23	27	24	22	24	23	22	19	19	18	24	35	74	99	
7-Jul	58	97	82	54	20	15	14	11	53	34	38	61	78	43	25	25	18	14	67	24	10	11	14	16	97
8-Jul	16	23	15	14	44	21	23	19	11	77	45	38	44	37	56	28	23	19	23	17	17	34	35	24	77
9-Jul	26	25	29	36	49	20	32	31	40	22	24	29	31	28	33	24	21	22	20	15	12	81	26	14	81
10-Jul	35	35	23	28	36	26	20	19	18	21	18	17	19	22	23	25	25	20	20	24	44	19	17	16	44
11-Jul	35	19	27	46	22	25	36	12	22	40	33	95	18	16	15	14	21	22	22	13	93	65	72	77	95
12-Jul	77	47	87	80	66	65	34	58	80	41	28	33	24	21	18	18	25	21	23	23	29	20	23	67	87
13-Jul	72	78	35	25	41	12	22	60	24	25	23	22	19	20	22	23	20	19	20	16	17	15	17	16	78
14-Jul	18	21	15	21	20	18	20	21	25	19	19	21	24	22	20	27	25	24	21	24	19	17	22	24	27
15-Jul	25	25	23	25	29	18	31	76	38	36	32	38	34	37	37	39	34	36	31	32	40	46	63	79	79
16-Jul	87	29	62	38	23	20	25	36	21	27	22	25	22	22	22	25	18	16	20	18	17	20	18	17	87
17-Jul	19	19	28	16	17	15	18	16	16	18	20	18	33	35	24	34	69	43	24	38	21	25	60	17	69
18-Jul	13	21	20	31	23	20	37	17	30	21	41	58	58	85	20	70	37	17	30	17	16	21	55	23	85
19-Jul	51	73	40	86	11	38	65	62	41	88	28	29	33	33	35	36	47	70	97	62	68	50	85	93	97
20-Jul	58	53	59	43	89	56	37	100	89	80	73	63	81	41	64	43	30	13	23	54	70	78	78	45	100
21-Jul	98	41	76	80	67	79	43	12	19	22	85	51	96	42	101	69	30	24	34	66	95	37	30	16	101
22-Jul	14	22	78	51	76	57	45	76	36	35	25	25	27	29	19	20	25	19	15	20	23	26	27	27	78
23-Jul	77	42	39	58	73	74	43	74	23	22	36	23	37	53	60	82	23	21	19	8	16	54	94	73	94
24-Jul	67	31	26	25	67	62	20	23	17	50	42	23	47	32	37	84	45	17	14	46	27	80	32	80	84
25-Jul	23	78	56	42	79	64	79	48	92	35	96	87	67	48	39	83	58	30	27	40	16	12	14	20	96
26-Jul	11	14	8	9	8	9	27	41	21	24	31	53	39	85	99	23	19	19	19	29	29	25	39	32	99
27-Jul	25	26	25	38	34	27	21	26	20	24	38	27	DF	DF	DF	DF	DF	33	85	70	35	84	32	53	85
28-Jul	82	73	91	68	36	24	54	56	101	48	55	70	52	71	60	23	23	12	10	7	7	18	39	33	101
29-Jul	19	14	12	21	19	16	14	15	16	23	95	40	33	20	24	20	19	19	13	8	6	7	7	13	95
30-Jul	22	16	10	10	9	10	14	18	DF	DF	DF	DF	DF	DF	DF	DF	17	11	11	25	29	23	30	29	30
31-Jul	39	59	73	59	42	18	33	13	11	DF	DF	DF	DF	DF	28	67	73	27	18	88	92	72	101	11	101
	98	97	91	86	89	88	99	106	101	88	96	95	96	89	101	84	73	70	97	88	95	91	101	95	

Diurnal Maximum

DF - DAS Failure





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 45 m (WD45m) - deg
Lower Camp Met Tower - July 2023

Direction of Maximum Speed: 347 deg on Jul 13 14:00																						Hours in Service: 744				
Direction of Maximum Daily Speed Average: 343.7 deg on Jul 3																						Hours of Data: 726				
Direction of Minimum Speed: 111 deg on Jul 22 06:00											Direction of Minimum Daily Speed Average: 0.6 deg on Jul 21											Hours of Missing Data: 18				
Monthly Average Direction: 349.4 deg																						Percent Operational Time: 97.6				
Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	292	332	281	185	159	131	132	128	128	119	133	132	125	125	145	219	259	347	332	357	313	187	278	301	162.5	
2-Jul	295	317	247	263	293	297	302	307	324	325	323	324	310	290	303	311	324	306	295	288	277	292	299	314	302.1	
3-Jul	327	313	314	326	353	351	357	356	340	340	346	350	339	341	344	350	341	336	359	345	347	334	340	356	343.7	
4-Jul	314	294	303	246	353	38	100	267	260	248	289	267	237	224	257	249	360	128	140	167	169	169	177	158	190.2	
5-Jul	120	130	131	137	145	139	136	131	140	222	242	238	249	237	257	181	226	284	258	250	284	346	347	348	195.9	
6-Jul	339	292	294	307	310	15	348	349	350	8	2	1	342	349	348	353	360	3	7	7	5	344	344	322	354.3	
7-Jul	246	164	246	167	145	138	129	127	208	261	271	35	225	235	234	235	237	237	241	231	231	237	246	257	230.0	
8-Jul	262	264	247	250	242	237	215	222	232	273	331	296	354	25	288	350	333	331	18	20	344	340	287	348	279.6	
9-Jul	298	335	332	341	356	348	354	336	329	350	12	14	11	8	24	17	12	11	19	11	10	46	65	54	10.3	
10-Jul	109	108	118	118	105	124	136	129	121	122	131	135	142	130	114	155	147	125	102	94	121	125	128	127	125.0	
11-Jul	124	134	131	119	128	115	132	139	133	117	112	178	211	208	198	189	178	170	164	176	205	252	318	247	160.0	
12-Jul	321	144	128	195	46	349	11	358	358	337	321	324	324	343	346	346	343	356	21	29	352	319	334	339	346.1	
13-Jul	343	284	301	272	280	299	323	341	338	329	341	340	349	347	335	337	348	6	1	357	338	332	335	337	340.4	
14-Jul	330	340	333	333	337	336	320	337	335	352	348	358	349	353	5	7	20	8	358	9	357	340	345	327	349.5	
15-Jul	335	335	335	335	347	351	344	349	300	314	6	28	28	21	4	15	36	356	71	53	37	2	339	7	9.0	
16-Jul	42	346	338	137	136	126	136	138	127	122	124	125	131	137	148	133	147	141	127	120	127	123	127	121	129.7	
17-Jul	130	120	117	115	120	122	127	127	126	123	125	131	126	119	112	126	109	70	352	332	335	339	353	351	117.2	
18-Jul	357	345	343	348	339	334	342	348	344	343	331	138	124	138	138	127	315	327	280	248	256	257	283	258	305.7	
19-Jul	245	269	249	261	186	197	229	229	167	326	245	254	267	282	355	338	285	269	244	349	338	220	191	338	268.7	
20-Jul	336	192	157	162	156	123	133	228	19	142	82	55	302	254	273	263	336	353	359	4	298	314	352	314	322.1	
21-Jul	337	287	272	321	22	160	129	125	111	108	300	251	323	7	250	281	241	229	238	88	73	58	13	347	254.9	
22-Jul	349	334	339	3	269	111	92	349	338	330	337	330	359	18	2	10	14	16	355	345	342	340	344	345	355.9	
23-Jul	346	334	348	354	281	199	92	137	128	127	118	126	124	17	30	103	168	156	150	160	154	153	129	140	142.8	
24-Jul	132	210	153	148	125	146	126	123	128	99	105	106	22	327	337	220	30	94	84	84	35	81	88	129	108.9	
25-Jul	140	102	230	252	160	356	99	120	145	190	125	200	256	355	343	45	70	351	343	297	246	235	217	214	217.5	
26-Jul	190	176	155	162	158	155	136	138	131	133	121	129	129	153	359	343	15	14	13	31	74	106	71	82	106.4	
27-Jul	31	15	359	354	354	349	351	350	323	318	317	349	DF	DF	DF	DF	DF	264	326	129	147	199	321	148	344.1	
28-Jul	218	143	158	121	135	129	145	241	232	6	261	243	264	274	189	177	190	193	195	191	191	198	220	171	196.1	
29-Jul	157	132	138	135	134	150	150	139	134	125	254	267	204	192	201	197	193	189	189	192	185	203	202	195	180.9	
30-Jul	107	117	133	134	139	145	153	150	DF	DF	DF	DF	DF	DF	DF	DF	DF	175	186	171	211	206	138	123	139	--
31-Jul	183	183	150	303	155	126	128	164	167	DF	DF	DF	DF	DF	237	225	267	331	296	265	292	247	263	231	206.5	
267.9 121.5 189.1 202.7 130.0 111.7 106.5 110.2 105.4 16.6 354.2 350.1 333.7 341.4 340.8 319.5 330.0 340.4 9.3 352.3 232.2 230.8 254.1 211.7																										
Diurnal Average																										
DF - DAS Failure																										
All monthly, daily, and diurnal averages have been calculated using vector methods																										



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

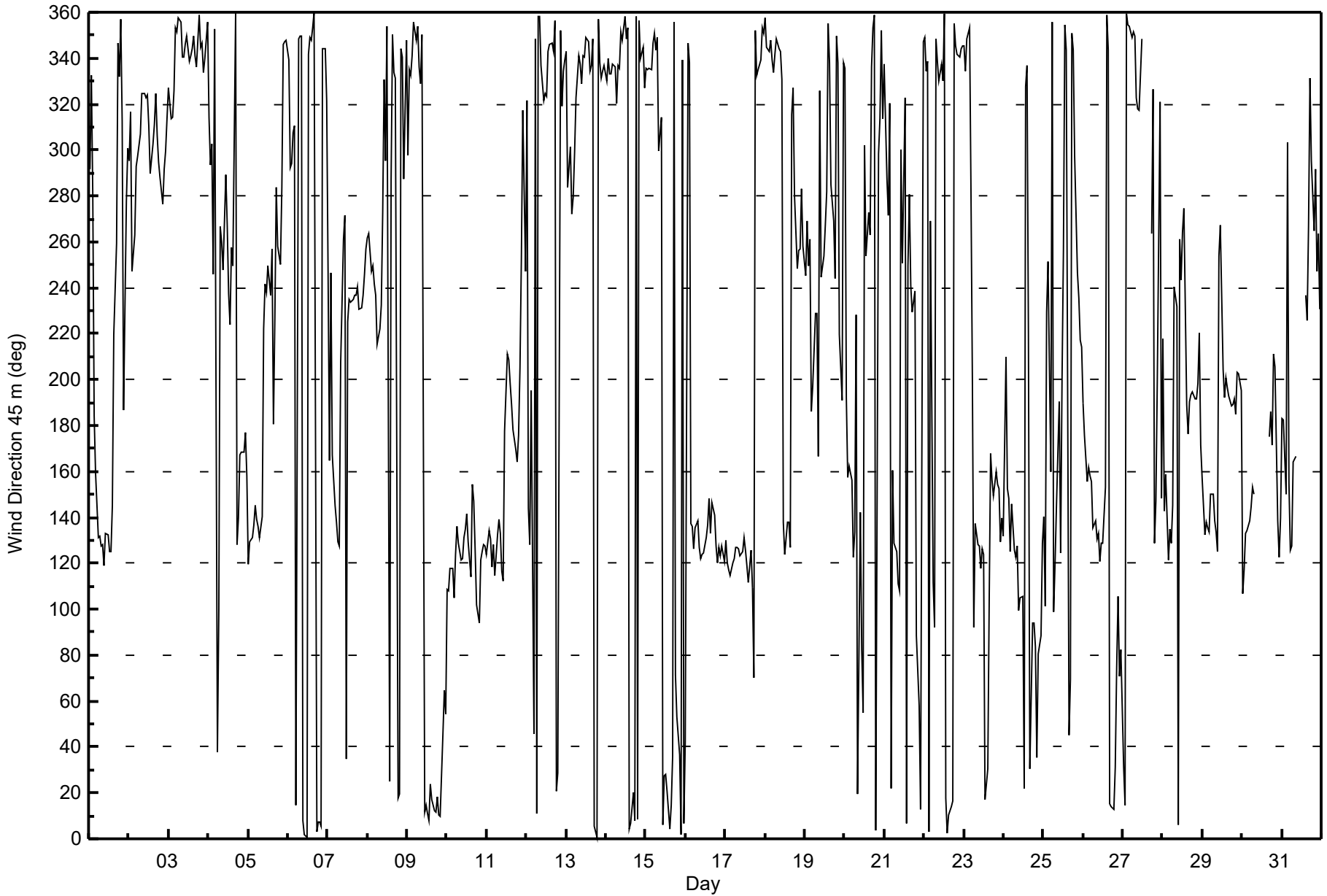
Wind Direction 45 m (WD45m) - deg
Lower Camp Met Tower - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 112 deg on Jul 4 08:00 Minimum Value: 4 deg on Jul 12 23:00 Percentiles: P ₁ = 6 P ₁₀ = 9 Q ₁ = 12 Median = 18 Q ₃ = 36 P ₉₀ = 59 P ₉₉ = 93																	Hours in Service: 744 Hours of Data: 726 Hours of Missing Data: 18 Hours of Calibration: 0 Percent Operational Time: 97.6								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	31	15	32	37	19	10	9	65	16	22	10	10	14	13	22	22	36	42	56	35	79	43	33	22	79
2-Jul	26	24	37	17	39	15	20	19	10	13	10	11	15	12	20	14	10	11	10	10	13	9	10	19	39
3-Jul	10	8	8	9	14	12	12	10	13	13	10	12	11	10	10	12	14	13	22	14	9	10	6	29	29
4-Jul	18	43	30	58	33	40	72	112	38	42	49	51	34	35	46	51	28	42	13	6	5	7	7	25	112
5-Jul	23	9	7	9	11	7	7	10	10	48	8	10	40	84	58	32	55	34	17	18	29	44	10	19	84
6-Jul	38	32	16	15	36	41	92	14	17	18	15	21	18	17	16	16	17	16	12	11	9	12	20	36	92
7-Jul	73	49	39	33	14	8	12	14	49	26	25	65	74	37	19	19	14	11	38	10	7	5	9	9	74
8-Jul	8	15	9	9	24	16	21	16	9	56	41	28	39	56	49	28	17	15	13	9	13	11	36	14	56
9-Jul	24	8	16	18	15	12	17	27	30	20	17	22	22	22	24	14	13	15	11	7	6	65	15	13	65
10-Jul	21	13	11	16	20	17	16	11	10	13	12	12	15	15	15	21	22	12	10	10	16	9	8	8	22
11-Jul	18	12	13	29	17	14	19	7	12	24	22	96	16	14	13	13	22	19	19	13	33	12	43	72	96
12-Jul	35	77	29	90	82	68	48	58	76	31	17	25	16	16	12	12	18	14	12	9	26	7	4	38	90
13-Jul	10	26	13	9	7	9	15	22	13	14	14	14	14	13	14	13	11	12	11	10	7	7	7	7	26
14-Jul	9	10	6	9	7	10	14	12	15	13	13	13	17	15	13	20	15	15	13	15	13	10	13	15	20
15-Jul	14	9	10	11	20	11	25	44	24	25	23	24	24	24	30	27	29	28	20	19	16	50	17	91	91
16-Jul	73	72	59	38	19	13	31	29	14	16	12	17	16	19	20	19	18	17	13	10	9	10	11	8	73
17-Jul	14	9	10	7	9	7	9	8	8	9	11	10	21	22	13	25	34	28	33	25	14	13	30	11	34
18-Jul	10	7	8	19	13	10	19	10	16	17	52	59	44	72	13	70	27	10	31	11	10	9	57	15	72
19-Jul	36	44	23	69	17	29	29	73	46	94	24	21	24	23	36	29	54	37	66	36	52	27	42	94	94
20-Jul	48	46	37	28	42	74	45	87	92	77	76	63	65	32	55	33	26	6	13	67	81	40	89	47	92
21-Jul	82	33	22	64	70	42	14	8	16	21	93	38	93	56	93	58	22	18	18	86	40	65	37	9	93
22-Jul	6	14	45	32	76	97	30	45	27	25	19	16	21	18	14	12	16	9	10	5	5	7	10	10	97
23-Jul	37	23	9	23	55	75	38	38	18	15	27	15	29	54	50	87	18	19	16	6	14	40	53	40	87
24-Jul	75	26	30	12	19	33	12	16	13	38	25	18	63	18	59	81	60	8	9	13	51	47	16	43	81
25-Jul	15	33	52	32	66	44	65	31	80	32	72	90	58	28	36	69	56	33	19	37	11	8	12	18	90
26-Jul	11	11	9	8	6	9	22	27	16	19	24	41	26	86	98	16	9	10	11	19	14	15	23	21	98
27-Jul	13	19	14	18	19	18	14	16	10	15	25	23	DF	DF	DF	DF	DF	20	81	81	27	70	23	53	81
28-Jul	93	42	64	55	41	16	88	45	90	68	42	58	40	50	64	20	20	11	8	6	6	8	13	29	93
29-Jul	15	10	6	11	13	16	15	12	14	16	78	38	29	19	23	19	17	18	13	8	6	6	5	10	78
30-Jul	43	15	7	6	7	9	12	14	DF	DF	DF	DF	DF	DF	DF	DF	16	9	11	26	26	25	21	24	43
31-Jul	34	46	68	47	39	10	25	12	9	DF	DF	DF	DF	DF	24	30	57	15	17	36	58	54	77	9	77
Diurnal Maximum																									
93 77 68 90 82 97 92 112 92 94 93 96 93 86 98 87 60 42 81 86 81 70 89 94																									
DF - DAS Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction 45 m (WD45m) - deg
Lower Camp Met Tower - July 2023





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 100 m (WD100m) - deg
Lower Camp Met Tower - July 2023

Direction of Maximum Speed: 358 deg on Jul 3 07:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 345.8 deg on Jul 3		Hours of Data:	726
Direction of Minimum Speed: 306 deg on Jul 20 11:00		Hours of Missing Data:	18
Direction of Minimum Daily Speed Average: 1.3 deg on Jul 21		Percent Operational Time:	97.6
Monthly Average Direction: 324.2 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	297	323	293	232	207	189	204	229	156	126	134	136	128	125	145	217	257	327	320	333	331	214	269	296	200.3
2-Jul	282	296	253	264	286	295	297	308	328	323	325	325	314	291	294	312	327	307	297	290	279	295	302	307	302.6
3-Jul	323	321	319	329	355	354	358	357	345	343	348	352	342	344	346	351	343	339	359	350	357	348	346	336	345.8
4-Jul	337	339	305	307	279	258	233	249	257	255	290	264	240	232	260	260	350	135	145	165	167	169	176	177	200.3
5-Jul	155	164	169	203	207	193	173	170	183	232	241	237	252	238	245	195	217	278	259	261	306	333	343	343	236.2
6-Jul	352	332	318	325	338	350	345	348	352	9	2	359	342	347	350	353	2	5	9	8	5	5	15	63	356.3
7-Jul	149	192	261	249	197	210	200	209	234	266	272	4	241	235	232	232	233	236	233	236	240	243	244	248	237.4
8-Jul	256	263	257	256	249	244	225	222	240	279	303	294	329	308	290	340	332	339	22	26	25	20	323	316	283.0
9-Jul	294	337	335	344	3	5	11	355	324	351	14	14	12	11	24	18	13	15	21	17	20	58	76	109	13.6
10-Jul	121	121	124	124	123	131	137	129	124	122	130	133	139	128	117	153	147	126	109	108	122	131	133	133	127.8
11-Jul	131	138	135	138	139	143	142	142	141	131	120	199	210	206	197	188	181	171	168	182	194	228	242	145	162.0
12-Jul	84	123	160	161	153	133	330	343	335	322	322	326	324	343	348	347	344	1	23	31	3	339	342	331	350.8
13-Jul	328	321	321	306	306	307	308	333	336	332	343	343	351	348	335	339	350	6	2	358	343	336	336	347	341.6
14-Jul	346	341	337	333	327	340	334	341	338	350	350	359	350	354	6	8	21	7	359	12	0	347	357	344	351.1
15-Jul	343	346	345	337	336	355	10	0	302	321	6	31	29	18	9	15	36	3	72	52	45	48	51	83	16.4
16-Jul	113	166	129	136	156	166	159	139	127	123	126	124	131	137	144	134	144	140	127	124	131	130	132	129	133.1
17-Jul	137	130	128	127	129	129	131	128	128	126	128	133	127	125	114	116	119	92	23	341	344	353	17	31	121.7
18-Jul	55	8	348	354	354	355	1	357	1	337	340	107	116	137	136	121	308	323	282	254	261	260	256	261	306.5
19-Jul	247	252	249	258	236	226	241	246	230	270	245	251	266	278	347	331	283	268	249	345	356	232	231	227	262.3
20-Jul	324	215	223	200	191	153	180	231	319	194	306	23	302	257	268	262	330	349	0	8	24	350	358	337	315.5
21-Jul	333	339	325	322	327	257	189	208	184	188	252	260	265	345	275	257	239	226	234	115	72	87	96	111	267.0
22-Jul	12	339	316	351	339	254	105	359	336	346	335	334	2	19	7	17	20	21	10	360	354	359	358	347	0.4
23-Jul	349	343	3	4	110	148	135	147	139	127	121	126	132	39	35	131	169	161	160	163	161	176	141	161	147.6
24-Jul	193	239	210	191	162	162	144	126	119	99	96	114	69	343	88	177	77	98	100	91	77	77	97	120	113.9
25-Jul	125	112	222	259	207	23	102	119	144	182	134	175	261	355	37	96	116	26	360	300	245	237	222	219	196.9
26-Jul	201	190	170	171	172	165	146	138	133	130	121	124	126	132	57	344	17	16	16	36	74	105	82	78	111.1
27-Jul	40	27	14	359	359	353	354	351	330	325	322	351	DF	DF	DF	DF	DF	262	326	347	163	200	289	348	347.3
28-Jul	253	143	220	236	224	182	232	239	220	284	266	255	279	274	191	181	189	195	195	194	199	210	222	194	207.3
29-Jul	198	169	181	168	162	190	186	173	168	157	256	261	208	198	202	199	193	191	192	193	191	209	212	213	196.8
30-Jul	185	163	157	149	146	151	153	150	DF	DF	DF	DF	DF	DF	DF	DF	DF	177	185	176	206	208	161	144	--
31-Jul	181	184	157	290	181	132	121	165	171	DF	DF	DF	DF	DF	243	223	259	336	322	261	263	250	262	238	214.2

257.9 261.0 237.9 256.9 222.9 172.4 127.4 119.5 111.0 5.9 354.4 353.0 335.2 342.5 345.5 320.9 330.8 342.9 12.8 5.5 246.3 237.3 244.3 216.4
 Diurnal Average

DF - DAS Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

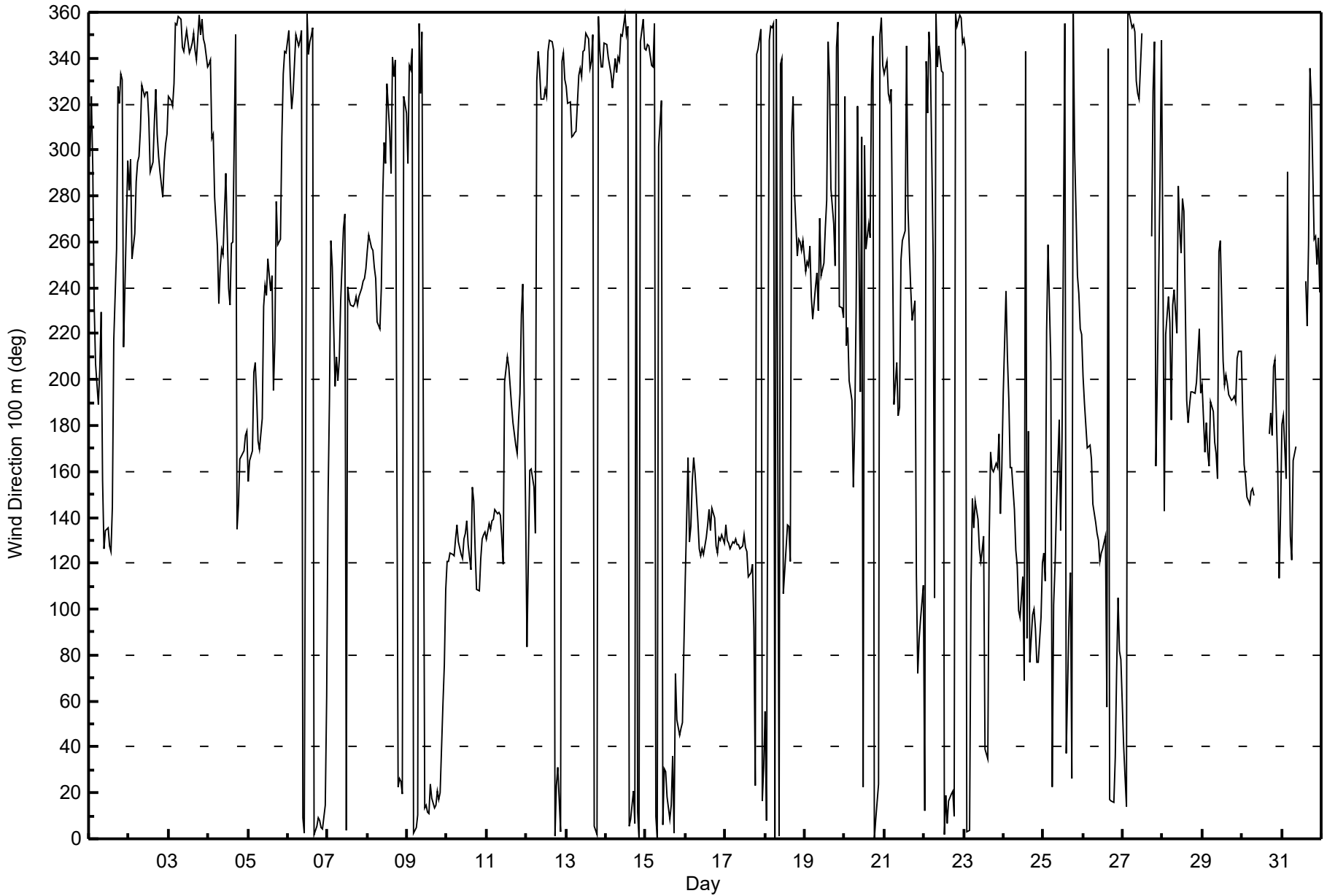
Wind Direction 100 m (WD100m) - deg
Lower Camp Met Tower - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 107 deg on Jul 20 09:00	Hours of Data: 726
Minimum Value: 2 deg on Jul 29 23:00	Hours of Missing Data: 18
Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 9 Median = 13 Q ₃ = 22 P ₉₀ = 42 P ₉₉ = 86	Hours of Calibration: 0
	Percent Operational Time: 97.6

Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	19	7	21	27	16	22	17	20	32	40	8	7	9	7	21	21	27	34	18	17	68	41	17	21	68	
2-Jul	14	13	20	13	20	6	8	16	7	8	6	7	11	6	12	11	6	10	7	8	11	7	7	10	20	
3-Jul	8	5	5	7	9	7	8	6	9	8	7	8	8	7	7	8	10	10	16	12	8	7	9	3	16	
4-Jul	2	9	11	14	13	12	16	37	30	33	44	47	28	29	35	41	39	44	11	4	2	3	3	13	47	
5-Jul	31	13	12	17	12	12	10	16	20	35	7	9	41	81	64	29	33	26	10	13	25	7	5	5	81	
6-Jul	7	24	12	9	6	10	19	11	10	13	11	16	14	15	13	15	16	11	9	6	4	10	13	16	24	
7-Jul	22	50	12	15	12	9	16	24	19	20	28	83	44	28	19	16	11	10	16	5	3	2	3	4	83	
8-Jul	3	10	4	5	11	11	14	13	15	37	42	20	31	87	41	17	15	15	11	6	7	8	13	30	87	
9-Jul	16	7	2	8	6	6	14	28	19	22	13	18	16	17	20	10	9	12	8	5	6	18	13	12	28	
10-Jul	10	8	6	9	13	9	9	6	6	8	8	9	11	12	11	21	20	9	5	6	9	6	4	5	21	
11-Jul	7	6	5	11	10	10	8	7	10	20	14	99	13	12	11	13	19	16	16	11	4	16	25	27	99	
12-Jul	14	17	31	46	39	16	55	42	79	23	12	18	12	13	9	11	17	14	10	5	15	6	4	6	79	
13-Jul	4	16	10	13	6	7	10	9	9	10	11	10	9	9	11	11	10	7	8	6	8	3	5	5	16	
14-Jul	10	6	4	9	5	6	9	10	12	10	10	9	11	12	8	15	11	9	8	12	7	8	11	10	15	
15-Jul	6	6	9	8	8	10	21	32	23	21	16	19	19	19	24	23	26	27	17	14	4	10	22	16	32	
16-Jul	21	38	71	6	12	12	20	12	8	9	8	10	12	16	17	14	15	14	8	6	5	7	6	5	71	
17-Jul	7	5	3	4	4	4	4	5	4	5	6	5	8	11	8	14	12	17	37	22	13	5	22	16	37	
18-Jul	22	15	4	7	7	7	13	12	22	14	48	85	39	31	13	69	24	9	29	13	12	5	17	7	85	
19-Jul	12	13	11	16	8	14	16	60	54	88	21	17	18	18	36	28	64	13	23	52	45	11	22	77	88	
20-Jul	75	59	39	26	20	34	44	63	107	91	106	74	61	28	34	28	23	5	8	9	16	60	28	34	107	
21-Jul	17	5	20	9	24	63	17	15	21	42	64	32	79	52	57	49	18	14	12	83	11	12	11	39	83	
22-Jul	15	21	25	17	18	18	62	41	33	18	14	12	15	13	10	9	11	8	6	6	4	8	7	5	62	
23-Jul	9	7	11	7	52	11	13	19	11	12	16	11	23	63	48	70	15	14	11	4	6	42	25	14	70	
24-Jul	22	12	28	17	29	21	14	10	9	20	13	13	74	39	86	67	85	6	7	3	13	12	12	24	86	
25-Jul	12	13	43	20	72	35	33	20	69	32	40	80	32	19	58	68	34	37	15	43	7	6	11	13	80	
26-Jul	9	7	11	7	7	10	21	17	12	13	17	37	15	87	78	18	7	7	8	17	14	11	19	18	87	
27-Jul	10	13	8	6	9	9	8	8	10	12	18	22	DF	DF	DF	DF	DF	21	28	72	26	64	13	86	86	
28-Jul	39	39	33	25	26	23	25	20	69	79	31	50	37	38	62	16	16	11	9	5	2	3	7	28	79	
29-Jul	14	12	11	19	14	13	16	21	20	29	43	33	29	19	21	16	16	17	11	7	7	5	2	4	43	
30-Jul	76	68	13	9	10	11	12	10	DF	DF	DF	DF	DF	DF	DF	DF	DF	13	8	11	30	24	29	18	22	76
31-Jul	30	28	53	33	38	16	19	9	7	DF	DF	DF	DF	DF	20	14	30	14	26	18	31	11	18	5	53	
	76	68	71	46	72	63	62	63	107	91	106	99	79	87	86	70	85	44	37	83	68	64	28	86		

Diurnal Maximum

DF - DAS Failure





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 163 m (WD163m) - deg
Lower Camp Met Tower - July 2023

Direction of Maximum Speed: 3 deg on Jul 3 07:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 352.0 deg on Jul 3	Hours of Data: 723
Direction of Minimum Speed: 223 deg on Jul 21 20:00	Hours of Missing Data: 21
Direction of Minimum Daily Speed Average: 1.5 deg on Jul 21	Percent Operational Time: 97.2
Monthly Average Direction: 342.1 deg	

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	307	345	5	254	251	233	233	241	204	167	144	143	132	128	147	218	250	309	309	319	334	241	279	311	231.6	
2-Jul	292	301	263	UO	287	302	306	316	336	327	334	333	324	301	294	317	333	312	305	299	287	303	309	312	311.2	
3-Jul	329	333	327	337	1	0	3	3	351	347	353	356	347	349	351	354	347	345	2	358	7	4	6	353	352.0	
4-Jul	358	3	347	337	314	311	266	232	234	272	297	269	246	236	263	267	323	149	155	166	168	173	178	186	207.9	
5-Jul	196	202	239	245	235	228	213	212	215	241	245	240	257	246	244	206	211	273	265	297	336	352	3	4	253.9	
6-Jul	358	358	354	358	4	15	4	357	1	15	8	3	348	351	354	358	6	14	15	13	10	16	31	61	6.3	
7-Jul	136	225	276	269	257	238	227	225	241	277	275	316	242	238	234	233	235	240	233	245	251	254	254	253	246.7	
8-Jul	259	270	270	274	261	262	241	234	257	293	297	292	313	247	297	336	332	348	27	32	34	26	13	3	292.7	
9-Jul	334	359	13	26	27	27	39	55	334	360	20	19	16	18	28	23	19	22	28	27	33	76	98	119	27.8	
10-Jul	122	126	128	128	133	135	138	132	129	124	130	134	138	127	120	154	150	127	113	114	121	133	136	137	130.2	
11-Jul	139	144	140	141	143	149	152	160	160	150	133	189	212	208	197	189	185	174	174	189	201	236	243	253	168.2	
12-Jul	36	59	167	183	180	177	201	333	310	315	329	330	330	346	353	353	349	7	28	34	6	351	350	344	353.8	
13-Jul	345	339	343	349	336	338	331	335	341	338	347	347	354	351	339	343	354	9	5	2	350	345	343	357	348.3	
14-Jul	7	358	355	348	337	354	353	346	343	353	353	3	355	359	11	14	24	12	3	19	9	359	11	0	359.4	
15-Jul	357	1	9	352	343	7	43	2	333	338	13	36	33	24	16	19	39	11	75	57	57	66	67	73	26.9	
16-Jul	98	132	147	159	162	159	149	147	131	129	130	127	132	141	146	138	147	144	130	129	134	134	134	135	136.3	
17-Jul	147	138	135	133	134	132	133	130	131	131	133	136	131	130	118	114	124	105	63	2	358	28	54	84	125.2	
18-Jul	101	102	18	17	7	19	29	27	49	348	7	86	118	133	134	127	309	324	289	268	271	278	268	296	335.6	
19-Jul	278	264	268	271	258	252	258	251	258	257	245	252	261	277	334	341	276	268	266	291	47	227	218	242	265.6	
20-Jul	253	246	241	219	230	209	231	208	269	253	260	26	292	265	263	266	322	347	3	9	27	27	8	3	321.7	
21-Jul	356	4	10	326	322	296	259	201	209	237	260	279	276	325	270	253	240	225	237	223	66	69	95	97	298.3	
22-Jul	83	116	282	360	13	317	334	9	3	15	352	352	9	25	15	24	29	28	22	20	22	18	19	10	16.3	
23-Jul	10	9	19	35	142	157	148	155	152	135	138	132	140	91	64	143	172	166	168	168	165	178	175	182	155.8	
24-Jul	212	252	255	248	227	210	181	156	140	125	109	118	97	111	110	141	96	102	104	99	90	85	100	110	119.2	
25-Jul	117	120	220	269	UO	61	109	121	139	171	138	UO	256	5	91	118	136	71	45	264	249	244	229	227	183.4	
26-Jul	212	205	194	188	189	179	166	152	139	130	125	125	124	79	89	352	25	23	24	44	77	106	90	79	116.2	
27-Jul	56	52	45	27	31	21	11	357	339	338	334	356	DF	DF	DF	DF	DF	270	335	342	163	200	300	296	5.9	
28-Jul	289	290	257	263	261	259	250	236	232	259	276	280	286	272	204	184	192	196	198	199	207	219	239	238	223.7	
29-Jul	234	206	216	212	202	223	211	202	201	208	257	258	210	202	206	202	197	194	195	195	196	215	218	221	210.3	
30-Jul	210	195	190	181	174	168	157	155	DF	DF	DF	DF	DF	DF	DF	DF	DF	179	188	182	204	213	185	112	134	--
31-Jul	173	186	167	284	220	140	132	160	176	DF	DF	DF	DF	DF	248	235	259	342	358	271	265	261	264	247	223.3	

288.7 313.4 261.9 283.8 269.8 316.3 122.9 127.7 122.2 356.5 0.2 358.4 342.6 348.8 351.7 331.1 334.9 351.9 19.4 18.1 351.4 289.2 291.5 221.9
 Diurnal Average

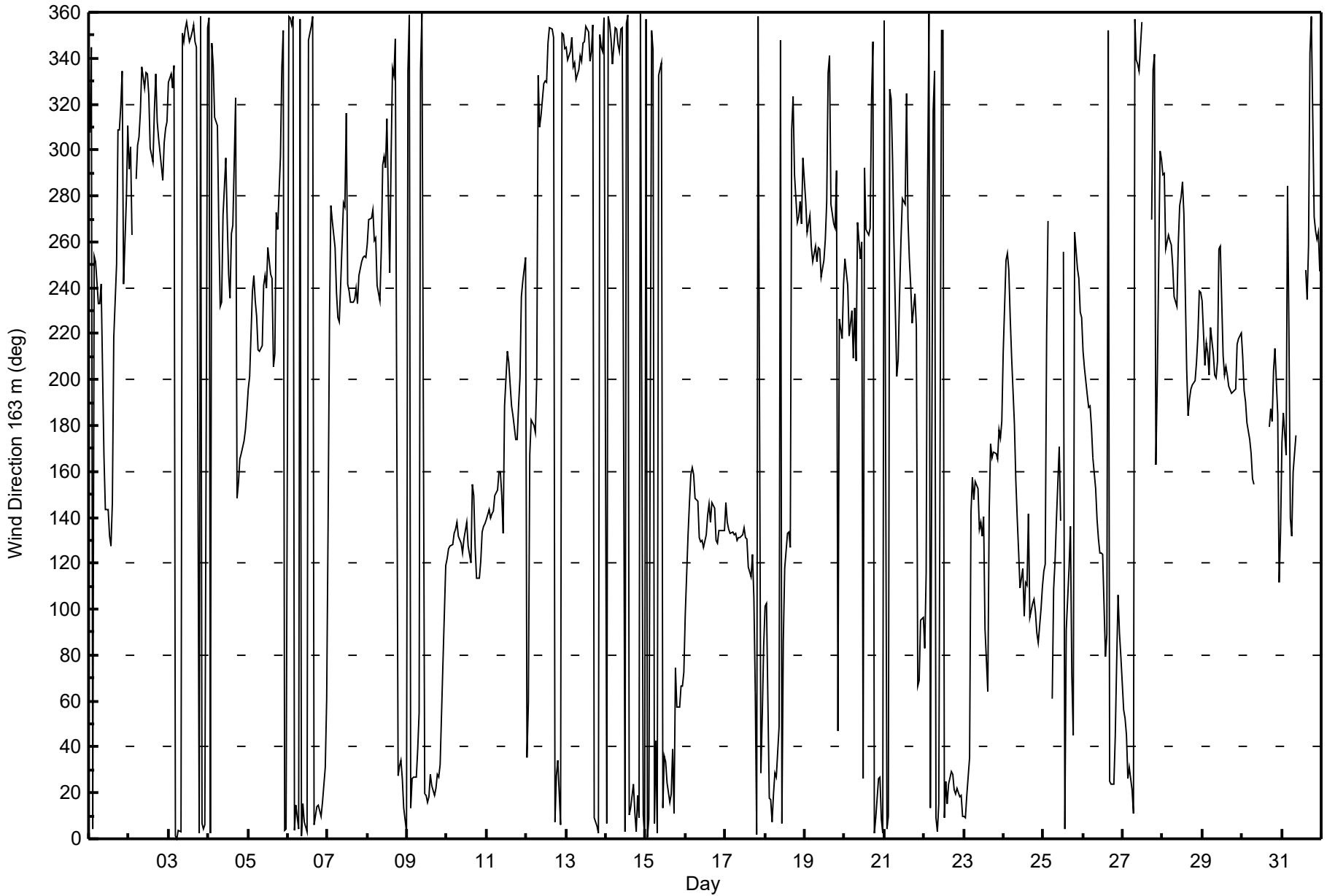
DF - DAS Failure UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 163 m (WD163m) - deg
Lower Camp Met Tower - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0											Hours in Service: 744															
Maximum Value: 94 deg on Jul 21 20:00											Hours of Data: 723															
Minimum Value: 1 deg on Jul 7 23:00											Hours of Missing Data: 21															
Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 7 Median = 11 Q ₃ = 19 P ₉₀ = 34 P ₉₉ = 80											Hours of Calibration: 0															
											Percent Operational Time: 97.2															
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	15	9	28	15	6	17	15	13	31	57	7	8	9	7	21	23	19	27	18	13	22	74	17	17	74	
2-Jul	11	6	13	UO	10	5	5	14	6	6	6	5	10	6	8	10	4	10	6	8	8	5	4	6	14	
3-Jul	10	4	5	6	8	5	8	6	8	7	6	8	7	6	6	7	8	9	15	11	8	5	6	3	15	
4-Jul	5	4	4	6	6	9	18	30	36	34	39	43	20	27	31	34	70	57	9	3	3	3	2	5	70	
5-Jul	21	7	15	8	10	10	9	9	17	16	5	8	37	62	65	29	21	20	10	19	19	8	5	5	65	
6-Jul	3	11	6	7	3	5	9	10	13	11	12	15	13	15	12	17	16	12	8	5	3	4	6	19	19	
7-Jul	19	50	16	11	7	22	10	10	17	18	30	64	42	21	16	13	10	8	9	5	2	1	1	2	64	
8-Jul	3	4	4	3	5	7	9	10	19	27	24	15	26	82	38	20	15	15	9	4	2	4	8	4	82	
9-Jul	7	12	6	7	5	9	13	40	23	25	14	15	15	16	18	9	8	11	7	4	8	6	10	8	40	
10-Jul	9	6	5	7	8	6	7	5	6	6	6	9	10	11	9	20	20	8	4	4	6	5	4	4	20	
11-Jul	6	5	5	6	5	5	7	6	12	22	17	92	10	11	11	12	19	16	15	10	4	10	3	24	92	
12-Jul	23	25	23	7	36	34	37	29	64	18	11	14	9	13	9	9	15	14	8	4	11	4	4	5	64	
13-Jul	3	6	6	4	8	9	9	4	7	8	10	9	9	8	10	10	10	6	7	5	7	3	4	7	10	
14-Jul	9	6	5	12	5	10	13	8	10	8	9	8	10	11	8	15	10	7	7	11	6	9	7	9	15	
15-Jul	9	10	7	11	6	15	16	20	22	18	17	18	17	17	23	21	22	25	15	11	4	4	3	5	25	
16-Jul	12	14	9	10	13	12	11	7	9	8	8	9	11	16	17	14	15	14	7	4	4	5	4	5	17	
17-Jul	7	5	3	3	4	3	4	3	4	4	6	6	6	8	7	8	8	14	24	59	15	8	15	16	59	
18-Jul	7	14	25	10	11	5	7	7	25	16	25	82	32	24	19	66	19	12	24	14	13	6	8	9	82	
19-Jul	22	5	9	13	10	7	9	45	29	50	16	14	15	16	47	31	68	14	19	63	79	13	11	18	79	
20-Jul	38	85	19	23	15	20	21	67	81	55	91	76	59	24	27	26	20	7	9	7	10	32	21	12	91	
21-Jul	7	6	35	10	6	27	12	11	6	24	25	29	67	63	41	33	16	13	9	94	5	6	6	6	94	
22-Jul	7	33	49	24	35	38	36	9	17	16	8	12	13	9	10	7	10	6	2	5	3	6	5	4	49	
23-Jul	8	5	4	37	12	10	14	15	11	13	18	15	27	54	62	70	13	9	8	4	4	12	18	9	70	
24-Jul	23	6	8	25	13	21	18	8	9	35	14	12	59	67	78	81	55	7	5	2	4	2	8	10	81	
25-Jul	8	9	42	14	UO	29	16	16	42	30	28	UO	20	42	15	36	20	44	75	33	5	5	10	11	75	
26-Jul	9	6	9	7	7	9	20	12	12	14	15	39	15	55	48	21	6	5	7	15	11	9	16	16	55	
27-Jul	8	8	5	7	10	11	8	11	11	11	16	19	DF	DF	DF	DF	DF	20	15	41	22	59	12	21	59	
28-Jul	22	24	38	5	8	6	15	18	34	27	27	46	31	28	58	16	18	11	7	4	2	4	6	20	58	
29-Jul	14	18	8	16	8	7	12	12	12	32	21	26	27	17	22	16	14	15	11	6	6	7	1	2	32	
30-Jul	13	13	7	6	8	7	9	8	DF	DF	DF	DF	DF	DF	DF	DF	DF	12	7	11	33	32	29	12	22	33
31-Jul	29	19	41	21	43	25	24	9	5	DF	DF	DF	DF	DF	16	15	21	16	25	20	24	10	14	4	43	
Diurnal Maximum																										
DF - DAS Failure UO - Unstable Operation																										





Maximum Value: 0.4 km/h on Jul 26 12:00		Maximum Daily Average: 0.0 km/h on Jul 21		Hours in Service: 744																							
Minimum Value: -1.3 km/h on Jul 5 11:00		Minimum Daily Average: -0.5 km/h on Jul 10		Hours of Data: 726																							
Maximum Diurnal Average: -0.1 km/h at hour 5		Minimum Diurnal Average: -0.4 km/h at hour 17		Hours of Missing Data: 18																							
Monthly Average: -0.27 km/h		Percentiles: P ₁ = -1.0 P ₁₀ = -0.7 Q ₁ = -0.5 Median = -0.2 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.2		Hours of Calibration: 0																							
				Percent Operational Time: 97.6																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	-0.4	0.0	0.0	0.0	0.1	0.1	0.1	0.0	-0.3	0.0	-0.8	-0.5	-0.6	-0.5	-0.4	-1.1	-0.4	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	0.1	
2-Jul	-0.1	0.0	-0.3	-0.5	-0.2	-0.2	0.0	-0.5	-0.5	-0.4	-0.4	-0.3	-0.3	-0.5	0.0	-0.6	-0.2	-0.7	-0.5	-0.5	-0.6	-0.8	-0.6	-0.3	-0.4	0.0	
3-Jul	-0.2	-0.7	-0.5	-0.3	-0.6	-0.6	-0.8	-0.9	-0.5	-0.6	-0.9	-1.0	-0.5	-0.5	-0.7	-0.9	-0.6	-0.2	-0.3	-0.2	-0.1	-0.1	0.0	0.0	-0.5	0.0	
4-Jul	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.2	0.2	-0.2	-0.3	0.1	-0.1	-0.2	-0.1	-0.5	-0.2	0.1	-0.2	-0.6	-0.8	-0.8	-0.3	-0.2	0.2	-0.2	0.2	
5-Jul	-0.6	0.0	0.0	0.0	0.1	-0.4	-0.8	-0.4	-0.8	-0.6	-1.3	-1.1	-0.6	-0.2	-0.4	-0.3	-0.2	-0.3	-0.4	-0.1	-0.1	0.0	0.0	0.0	-0.4	0.1	
6-Jul	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.4	-0.5	-0.5	-0.6	-0.7	-0.5	-0.6	-0.6	-0.7	-0.6	-0.6	-0.6	-0.3	-0.1	0.0	0.0	0.0	-0.3	0.0	
7-Jul	0.0	0.0	0.0	0.0	-0.2	0.0	-0.1	-0.3	-0.3	-0.3	-0.1	-0.3	0.0	-0.3	-0.7	-0.5	-0.7	-0.6	-0.1	-0.2	-0.3	-0.3	-0.3	-0.7	-0.3	0.0	
8-Jul	-0.8	-0.5	-0.7	-0.8	-0.2	-0.4	-0.2	-0.3	-0.7	0.3	-0.2	-0.4	0.0	-0.3	-0.2	-0.1	-0.1	-0.2	-0.1	0.1	-0.1	-0.1	0.0	-0.1	-0.3	0.3	
9-Jul	0.0	-0.2	-0.1	-0.1	0.0	-0.2	-0.1	-0.1	-0.2	-0.4	-0.5	-0.9	-0.4	-0.8	-0.7	-0.5	-0.8	-0.3	-0.2	-0.2	0.1	0.0	-0.2	-0.4	-0.3	0.1	
10-Jul	-0.1	-0.2	-0.7	-0.5	0.0	-0.4	-0.4	-0.5	-0.7	-0.6	-0.7	-0.8	-0.7	-0.7	-0.8	-0.5	-0.6	-0.5	-0.4	-0.1	0.0	-0.5	-0.5	-0.7	-0.5	0.0	
11-Jul	-0.2	-0.5	-0.4	0.0	-0.3	-0.3	-0.5	-0.8	-0.4	-0.1	-0.3	-0.1	-0.7	-0.5	-1.0	-0.8	-0.3	-0.4	-0.1	0.0	0.0	0.0	0.0	0.0	-0.3	0.0	
12-Jul	0.0	0.0	0.0	0.0	0.1	0.0	-0.2	0.2	-0.3	0.1	-0.3	-0.3	-0.6	-0.6	-0.5	-0.6	-0.3	-0.3	-0.2	-0.1	-0.1	-0.1	-0.1	0.0	-0.2	0.2	
13-Jul	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	0.0	-0.6	-0.6	-0.9	-1.1	-0.5	-0.6	-0.6	-0.5	-0.6	-0.7	-0.2	-0.1	-0.1	-0.1	-0.3	0.0	
14-Jul	-0.3	-0.2	-0.2	-0.2	-0.1	-0.2	-0.3	-0.3	-0.3	-0.9	-0.6	-0.6	-0.3	-0.7	-0.4	-0.4	-0.4	-0.5	-0.2	-0.1	-0.2	-0.2	-0.1	-0.2	-0.3	-0.1	
15-Jul	-0.2	-0.2	-0.2	-0.2	0.0	-0.1	-0.2	0.0	-0.2	-0.2	-0.1	-0.3	-0.4	-0.2	-0.6	-0.4	-0.3	-0.4	-0.3	-0.2	0.0	0.0	0.0	0.0	-0.2	0.0	
16-Jul	0.0	0.0	0.0	0.1	0.0	-0.1	-0.2	-0.5	-0.3	-0.2	-0.5	-0.1	-0.7	-0.7	-0.8	-0.3	-0.9	-0.4	-0.6	-0.6	-0.7	-0.3	-0.4	-0.8	-0.4	0.1	
17-Jul	-0.2	-0.6	-0.3	-0.8	-0.6	-0.6	-0.4	-0.6	-0.9	-0.8	-0.6	-0.5	-0.3	-0.1	-0.7	-0.2	-0.1	0.0	-0.1	-0.3	-0.2	-0.1	0.0	-0.2	-0.4	0.0	
18-Jul	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.2	-0.5	-0.3	-0.2	0.1	-0.2	0.0	-0.1	-0.2	0.0	0.0	-0.1	-0.2	-0.3	-0.5	-0.4	-0.1	-0.4	-0.2	0.1	
19-Jul	-0.2	0.1	-0.4	0.1	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	-0.5	-0.3	-0.5	-0.4	-0.1	-0.2	-0.6	-0.4	-0.1	-0.1	0.0	0.0	0.0	-0.1	-0.2	0.1	
20-Jul	0.0	0.0	0.0	0.0	0.0	-0.1	-0.3	-0.5	-0.2	0.3	0.2	0.2	0.1	-0.3	-0.3	-0.2	-0.2	-0.2	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	0.3	
21-Jul	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	-0.1	-0.2	0.1	0.1	0.2	-0.2	-0.3	-0.2	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.2	
22-Jul	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.3	-0.2	-0.4	-0.4	-0.5	-0.1	-0.1	0.0	-0.2	-0.1	0.0	0.0	0.0	0.0	-0.1	0.0	
23-Jul	0.0	-0.2	0.0	-0.1	0.0	0.0	0.1	-0.3	-0.2	-0.3	-0.1	0.1	0.0	0.0	0.1	0.1	-0.8	-0.9	-0.5	-0.7	-0.5	0.2	0.0	-0.1	-0.2	0.2	
24-Jul	0.0	-0.1	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.2	-0.2	-0.1	-0.4	0.0	-0.1	0.1	0.0	-0.2	-0.4	-0.1	0.0	0.0	0.0	-0.3	-0.1	-0.1	0.1	
25-Jul	-0.1	-0.2	-0.3	-0.5	0.0	-0.3	-0.6	-0.2	-0.5	-0.4	-0.2	-0.3	-0.3	0.0	-0.2	-0.1	-0.1	-0.2	-0.2	-0.2	-0.9	-0.8	-0.3	-0.5	-0.3	0.0	
26-Jul	-0.7	-0.4	-0.4	-0.6	-0.5	-0.7	-0.4	-0.3	-0.7	-0.4	-0.3	0.4	-0.5	0.0	-0.1	-0.3	-0.6	-0.5	-0.4	-0.4	-0.6	-0.8	-0.3	-0.4	-0.4	0.4	
27-Jul	-0.3	-0.1	0.0	-0.1	-0.1	-0.3	-0.3	-0.3	-0.3	-0.4	-0.2	-0.8	DF	DF	DF	DF	DF	-0.3	-0.2	0.0	-0.2	-0.3	0.0	0.0	-0.2	0.0	
28-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.2	0.1	-0.1	-0.2	0.0	-0.3	-0.5	-0.7	-0.8	-0.8	-0.8	-0.3	-0.1	-0.1	-0.2	-0.2	0.1	
29-Jul	0.0	0.0	0.0	-0.3	-0.3	0.0	-0.4	-0.8	-0.6	-0.2	-0.1	-0.8	-0.7	-0.6	-0.4	-0.9	-1.0	-0.8	-1.0	-0.6	-0.5	-0.4	-0.3	0.0	-0.4	0.0	
30-Jul	-0.1	-0.4	-0.3	-0.6	-0.6	-0.6	-0.7	-0.6	DF	DF	DF	DF	DF	DF	DF	DF	DF	-0.9	-0.9	-0.6	-0.5	-1.3	-0.5	-0.4	-0.5	--	-0.1
31-Jul	-0.3	0.0	-0.4	-0.2	-0.2	-0.4	-0.4	-0.5	-0.7	DF	DF	DF	DF	DF	DF	-0.4	-0.1	-0.4	-0.3	-0.3	-0.1	0.0	0.0	-0.1	-0.4	-0.3	0.0
																								Diurnal Average			
																								Diurnal Maximum			
DF - DAS Failure																											



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 20 m (VW20m) - km/h
Lower Camp Met Tower - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.4 km/h on Jul 13 13:00 Minimum Value: 0.1 km/h on Jul 21 01:00 Percentiles: P ₁ = 0.1 P ₁₀ = 0.3 Q ₁ = 0.7 Median = 1.3 Q ₃ = 2.0 P ₉₀ = 2.7 P ₉₉ = 4.1																				Hours in Service: 744 Hours of Data: 726 Hours of Missing Data: 18 Hours of Calibration: 0 Percent Operational Time: 97.6						
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	1.4	0.2	0.2	0.6	0.6	0.9	0.7	0.5	1.2	0.9	1.9	2.1	2.2	2.7	2.2	2.5	2.1	0.8	0.7	0.7	0.4	0.8	0.6	0.7	2.7	
2-Jul	1.1	1.2	1.5	2.5	1.6	1.7	1.6	2.3	2.2	2.2	2.8	3.7	3.2	2.7	2.1	3.1	2.3	2.4	2.7	2.5	2.5	2.5	1.8	1.5	3.7	
3-Jul	1.3	1.6	1.3	1.8	3.5	3.4	4.3	4.1	3.4	4.2	4.2	4.3	3.9	3.9	4.1	3.8	3.7	2.9	2.2	1.8	1.0	0.3	0.3	0.2	4.3	
4-Jul	0.2	0.1	0.2	0.1	0.3	0.3	0.5	1.1	1.3	1.6	1.9	2.1	2.0	2.0	1.7	1.8	1.4	1.3	1.4	1.3	1.5	1.2	1.5	1.4	2.1	
5-Jul	1.3	0.8	0.9	1.4	1.9	2.0	2.1	1.7	1.6	1.7	2.5	2.2	1.9	2.0	1.5	1.4	1.3	1.4	1.7	1.2	0.8	0.2	0.3	0.2	2.5	
6-Jul	0.2	0.3	0.2	0.2	0.2	0.4	0.7	1.4	2.1	2.7	3.0	2.7	2.7	2.7	2.8	2.4	2.4	2.6	2.7	2.3	1.4	0.5	0.2	0.1	3.0	
7-Jul	0.1	0.3	0.2	0.2	0.3	0.7	1.0	1.0	1.2	1.5	1.3	1.2	1.5	1.8	1.7	1.9	2.1	1.6	1.1	1.3	1.2	1.2	1.5	2.2	2.2	
8-Jul	2.6	2.0	2.0	2.1	1.7	1.6	1.3	1.5	1.3	1.2	1.2	1.7	1.3	0.9	1.5	0.9	1.0	1.1	1.3	0.9	0.3	0.2	0.2	0.2	2.6	
9-Jul	0.3	0.3	0.2	0.3	0.3	0.6	0.9	1.2	1.2	1.8	2.7	2.6	2.8	3.0	3.2	3.5	3.5	2.7	2.5	1.4	1.1	1.1	0.8	1.0	3.5	
10-Jul	1.3	1.6	2.9	2.4	1.3	1.9	2.5	3.9	3.4	3.1	2.6	2.3	2.0	2.4	2.6	1.9	2.0	2.1	1.7	0.8	0.4	2.1	2.6	2.3	3.9	
11-Jul	1.7	1.9	1.7	1.0	1.1	0.9	1.4	1.7	2.1	1.8	1.6	1.7	1.9	2.0	2.2	1.8	1.7	1.3	1.1	0.5	0.3	0.2	0.2	0.1	2.2	
12-Jul	0.1	0.2	0.2	0.1	0.2	0.3	0.7	1.1	1.2	1.5	2.0	2.2	2.3	2.3	2.4	1.9	1.7	1.7	1.6	1.2	0.7	0.3	0.2	0.2	2.4	
13-Jul	0.1	0.2	0.2	0.2	0.3	0.3	0.5	0.9	2.2	2.7	3.5	4.2	4.4	4.4	3.7	3.3	2.7	3.0	3.4	3.0	1.5	1.6	1.4	1.3	4.4	
14-Jul	0.7	0.6	0.8	0.7	0.9	1.5	1.0	2.3	2.8	3.1	2.5	2.8	2.3	2.1	2.5	2.2	2.6	1.9	1.7	1.5	0.8	0.8	0.7	0.5	3.1	
15-Jul	0.5	0.5	0.5	0.4	0.4	0.7	0.5	0.5	1.1	1.2	1.7	2.2	2.1	2.3	2.3	2.2	2.0	1.6	1.3	1.6	1.1	0.3	0.2	0.1	2.3	
16-Jul	0.3	0.2	0.2	0.3	0.7	0.9	0.9	1.4	2.3	2.3	2.8	2.9	3.1	3.0	2.3	2.8	2.1	2.2	2.7	2.8	3.0	2.1	2.4	2.6	3.1	
17-Jul	2.5	2.5	2.0	2.4	2.4	2.5	3.1	3.4	3.7	3.4	3.2	4.1	2.3	1.4	2.6	2.2	1.1	0.9	0.9	0.9	0.7	0.8	0.5	0.5	4.1	
18-Jul	0.5	0.8	1.1	0.9	0.7	0.7	0.8	1.2	1.3	1.4	1.4	1.3	1.4	1.3	1.6	0.8	1.0	0.7	0.6	0.8	1.6	2.0	1.0	1.4	2.0	
19-Jul	1.2	1.3	1.2	0.5	0.3	0.6	0.9	1.1	1.1	1.3	1.7	1.8	1.7	1.8	1.0	2.1	1.8	1.8	0.9	0.5	0.2	0.2	0.3	0.3	2.1	
20-Jul	0.3	0.3	0.4	0.4	0.3	0.6	0.6	0.9	1.1	1.5	1.4	1.6	1.7	1.7	1.6	1.7	1.0	0.8	0.7	0.3	0.3	0.4	0.5	0.2	1.7	
21-Jul	0.1	0.2	0.2	0.2	0.2	0.2	0.5	0.8	1.0	1.1	1.2	1.5	1.2	1.4	1.3	1.2	1.4	1.2	0.9	0.4	0.7	0.3	0.4	0.3	1.5	
22-Jul	0.4	0.2	0.1	0.3	0.3	0.2	0.4	0.6	1.2	1.2	1.3	1.4	1.7	2.1	2.1	2.0	2.0	1.4	0.8	0.6	0.4	0.4	0.4	0.4	2.1	
23-Jul	0.3	0.3	0.3	0.4	0.1	0.2	0.4	1.1	1.4	1.4	1.1	1.8	1.6	1.3	1.0	1.2	2.3	2.0	1.6	1.4	1.3	0.8	0.4	0.7	2.3	
24-Jul	0.3	0.5	0.5	0.4	0.3	0.5	1.2	1.1	1.2	1.0	1.0	0.7	0.6	0.7	0.7	1.0	0.7	1.4	0.9	0.4	0.4	0.6	0.6	0.8	1.4	
25-Jul	1.0	1.1	1.5	1.7	1.3	1.5	2.5	2.1	2.1	2.1	1.5	2.0	1.0	1.0	0.7	0.6	0.6	0.8	0.7	1.3	2.9	2.5	1.7	1.9	2.9	
26-Jul	1.2	1.3	1.2	1.4	1.5	1.5	1.3	1.6	2.0	1.9	1.8	1.7	1.6	1.0	1.1	2.0	3.3	2.7	3.0	2.4	2.7	2.7	1.9	1.7	3.3	
27-Jul	1.7	1.3	1.3	1.0	1.0	1.3	1.6	1.7	1.3	1.7	1.9	2.3	DF	DF	DF	DF	DF	2.1	1.0	0.6	0.9	0.7	0.3	0.2	2.3	
28-Jul	0.2	0.3	0.2	0.3	0.3	0.6	0.4	0.9	1.1	1.1	1.4	1.5	1.5	1.7	1.9	1.8	1.9	1.6	1.5	1.4	1.2	1.3	0.9	0.6	1.9	
29-Jul	0.8	0.9	1.1	1.2	1.2	1.1	1.2	1.4	1.5	1.7	2.0	2.0	1.9	2.3	2.3	2.1	2.0	1.8	1.6	1.2	0.6	1.1	1.2	1.3	2.3	
30-Jul	0.8	1.1	0.8	1.4	1.2	1.1	1.1	1.3	DF	DF	DF	DF	DF	DF	DF	DF	DF	2.0	1.7	1.3	1.8	3.0	1.7	1.7	3.0	
31-Jul	1.7	1.4	1.4	0.9	0.8	1.1	1.0	1.3	1.8	DF	DF	DF	DF	DF	DF	1.5	1.6	1.8	2.3	0.6	0.3	0.2	0.3	1.1	1.6	2.3
Diurnal Maximum																										
2.6 2.5 2.9 2.5 3.5 3.4 4.3 4.1 3.7 4.2 4.2 4.3 4.4 4.4 4.1 3.8 3.7 3.0 3.4 3.0 3.0 2.7 2.6 2.6																										
DF - DAS Failure																										



Maximum Value: 1.2 km/h on Jul 30 00:00		Maximum Daily Average: 0.3 km/h on Jul 16		Hours in Service: 744																							
Minimum Value: -1.4 km/h on Jul 13 14:00		Minimum Daily Average: -0.7 km/h on Jul 3		Hours of Data: 726																							
Maximum Diurnal Average: 0.1 km/h at hour 5		Minimum Diurnal Average: -0.2 km/h at hour 17		Hours of Missing Data: 18																							
Monthly Average: -0.03 km/h		Percentiles: P ₁ = -1.1 P ₁₀ = -0.5 Q ₁ = -0.2 Median = 0.0 Q ₃ = 0.2 P ₉₀ = 0.4 P ₉₉ = 0.8		Hours of Calibration: 0																							
				Percent Operational Time: 97.6																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	-0.2	-0.1	0.0	0.2	0.2	0.6	0.6	0.2	0.1	0.2	0.3	0.2	0.2	0.2	0.5	0.5	0.1	-0.1	-0.2	-0.1	0.0	0.4	0.0	-0.3	0.1	0.6	
2-Jul	0.1	0.1	0.3	-0.2	-0.1	-0.1	0.0	-0.5	-0.8	-0.7	-1.0	-1.1	-0.6	-0.2	0.0	-0.9	-0.7	-0.8	-0.8	-0.6	-0.4	-1.0	-0.7	-0.6	-0.5	0.3	
3-Jul	-0.4	-1.1	-0.7	-0.7	-0.7	-0.8	-1.1	-0.8	-0.6	-1.1	-0.8	-1.0	-1.0	-1.1	-1.0	-1.1	-1.0	-0.6	-0.4	-0.1	-0.1	-0.1	0.0	0.0	-0.7	0.0	
4-Jul	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	0.1	0.1	0.2	0.5	0.1	0.1	0.4	-0.3	0.0	0.1	0.1	0.2	-0.2	-0.1	0.4	0.8	1.1	0.1	1.1
5-Jul	-0.4	0.6	0.4	0.8	0.8	0.6	0.1	0.1	0.0	-0.2	-0.5	-0.1	-0.1	-0.1	0.0	0.5	0.5	-0.2	-0.1	0.3	-0.1	0.1	0.0	0.1	0.1	0.8	
6-Jul	0.1	0.0	-0.1	-0.2	0.0	0.0	0.0	-0.4	-0.5	-0.3	-0.9	-0.8	-0.6	-0.9	-0.9	-0.8	-0.5	-0.6	-0.5	-0.4	-0.1	0.0	0.1	0.1	-0.4	0.1	
7-Jul	0.0	0.1	0.1	0.1	0.3	0.5	0.4	0.3	0.0	0.3	0.2	-0.3	0.6	0.2	-0.2	0.1	0.1	0.2	0.4	0.4	0.3	0.2	0.1	-0.4	0.2	0.6	
8-Jul	-0.7	-0.4	0.1	-0.1	0.4	0.0	0.3	0.4	0.0	0.6	-0.2	-0.2	-0.1	-0.4	-0.2	-0.2	-0.2	-0.2	0.0	0.0	-0.1	0.0	0.1	0.1	0.0	0.6	
9-Jul	0.0	-0.1	-0.1	-0.1	0.0	-0.2	-0.1	0.0	-0.3	-0.4	-0.4	-0.8	-0.2	-0.6	-0.6	-0.7	-0.6	-0.3	-0.3	0.0	0.1	0.1	-0.4	-0.7	-0.3	0.1	
10-Jul	0.2	0.2	0.3	0.2	0.0	-0.1	0.5	0.6	0.2	0.3	0.3	0.0	0.2	0.1	-0.2	0.3	-0.2	0.2	0.0	0.0	0.2	0.3	0.2	0.2	0.2	0.6	
11-Jul	0.5	0.5	0.2	0.2	-0.2	-0.2	0.1	0.1	0.1	0.5	0.1	0.4	0.1	0.6	-0.2	-0.1	0.5	0.2	0.4	0.4	0.1	0.1	0.1	0.1	0.2	0.6	
12-Jul	0.1	0.0	0.1	0.0	0.1	0.0	-0.1	0.2	-0.2	0.3	0.1	0.1	-0.6	-0.6	-0.8	-0.7	-0.3	-0.4	-0.3	0.1	0.0	-0.2	-0.1	0.0	-0.1	0.3	
13-Jul	0.1	0.0	-0.1	0.0	-0.1	-0.4	-0.4	0.0	-0.4	-0.4	-0.8	-1.1	-1.3	-1.4	-0.8	-0.8	-0.5	-0.6	-0.5	-0.7	-0.4	-0.5	-0.4	-0.4	-0.5	0.1	
14-Jul	-0.3	-0.2	-0.3	-0.2	-0.2	-0.4	-0.3	-0.4	-0.8	-0.8	-0.8	-0.7	-0.5	-0.8	-0.8	-0.5	-0.5	-0.5	-0.3	-0.2	-0.1	-0.2	-0.2	-0.1	-0.4	-0.1	
15-Jul	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	0.0	-0.4	-0.1	-0.3	-0.1	-0.5	-0.2	-0.4	-0.4	-0.6	-0.3	-0.4	-0.4	-0.1	0.0	0.0	0.1	-0.2	0.1	
16-Jul	0.1	0.0	0.1	0.2	0.2	0.3	0.1	0.2	0.4	0.5	0.2	0.7	0.2	0.5	0.4	0.7	0.2	0.8	0.6	0.3	0.3	0.3	0.2	0.1	0.3	0.8	
17-Jul	0.8	0.3	0.5	0.1	0.2	0.2	0.4	0.1	0.2	0.4	0.4	0.7	0.6	0.4	0.2	0.3	0.1	-0.2	-0.2	-0.4	-0.2	-0.2	0.0	-0.2	0.2	0.8	
18-Jul	-0.3	-0.3	-0.3	0.0	-0.2	-0.2	0.1	-0.5	-0.2	-0.2	-0.1	-0.2	0.4	0.0	0.2	0.2	0.1	-0.3	-0.1	0.0	0.0	0.3	0.1	-0.1	-0.1	0.4	
19-Jul	0.0	0.3	-0.6	0.1	0.0	0.2	0.1	0.1	-0.1	0.0	0.0	-0.1	-0.5	-0.4	0.0	-0.6	-0.3	-0.2	0.2	0.0	0.0	0.1	0.0	0.0	-0.1	0.3	
20-Jul	0.1	0.0	0.2	0.3	0.2	0.0	-0.4	-0.5	-0.1	0.7	0.4	0.3	0.6	0.2	0.0	0.1	-0.3	-0.2	0.0	0.2	0.0	-0.1	0.0	0.1	0.1	0.7	
21-Jul	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.2	0.3	0.1	0.4	0.0	0.6	0.1	0.1	0.5	0.3	0.2	0.1	0.1	0.1	0.1	0.2	0.6	
22-Jul	0.0	-0.1	0.1	0.1	0.1	0.1	0.2	-0.1	-0.1	-0.1	-0.5	-0.2	-0.2	-0.3	-0.4	-0.4	-0.3	0.0	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	0.2	
23-Jul	0.0	-0.1	-0.1	-0.1	0.0	0.1	0.2	0.0	0.1	0.0	0.0	0.3	0.2	0.0	0.1	0.3	0.5	0.2	0.3	0.1	0.4	0.7	0.0	0.1	0.1	0.7	
24-Jul	0.2	-0.1	0.3	0.2	0.3	0.0	0.0	0.1	0.0	0.0	0.2	-0.3	0.1	-0.1	0.2	0.2	-0.2	-0.3	0.0	0.0	0.1	-0.1	-0.4	0.1	0.0	0.3	
25-Jul	0.1	0.1	0.3	0.2	0.3	-0.4	0.0	0.2	-0.2	0.6	0.1	0.2	0.0	0.0	-0.2	0.1	0.0	-0.2	-0.1	-0.1	0.2	0.2	0.5	0.6	0.1	0.6	
26-Jul	0.1	0.2	0.6	0.4	0.4	0.1	0.0	0.5	0.1	0.3	0.1	0.9	-0.1	0.3	0.1	-0.3	-0.5	-0.4	-0.4	-0.3	-0.4	-0.1	-0.1	-0.2	0.1	0.9	
27-Jul	-0.2	-0.1	-0.2	0.2	0.0	-0.1	-0.2	-0.1	-0.5	-0.5	0.0	-0.8	DF	DF	DF	DF	DF	0.0	-0.2	0.1	0.2	-0.1	-0.2	0.1	-0.1	0.2	
28-Jul	0.1	0.2	0.1	0.1	0.1	0.3	-0.1	0.1	0.2	0.2	0.6	0.3	0.0	0.1	0.1	0.3	0.1	0.1	0.0	0.1	0.7	1.0	0.6	0.3	0.2	1.0	
29-Jul	0.5	0.4	0.9	0.4	0.2	0.7	0.1	-0.2	-0.1	0.3	0.3	-0.6	0.2	0.4	0.7	0.1	0.0	0.2	-0.1	0.3	0.2	0.6	0.7	1.2	0.3	1.2	
30-Jul	0.1	-0.2	0.0	-0.1	0.2	-0.1	-0.1	0.0	DF	DF	DF	DF	DF	DF	DF	DF	0.0	0.1	0.2	0.6	0.2	0.2	0.3	0.3	--	0.6	
31-Jul	0.3	0.3	0.0	-0.2	0.1	0.1	0.1	0.4	0.2	DF	DF	DF	DF	DF	0.1	0.7	-0.1	-0.5	-0.3	0.0	0.0	0.0	0.0	0.3	0.1	0.7	
																								Diurnal Average			
																								Diurnal Maximum			
DF - DAS Failure																											



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 45 m (VW45m) - km/h
Lower Camp Met Tower - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																				Hours in Service: 744					
Maximum Value: 4.2 km/h on Jul 13 12:00																				Hours of Data: 726					
Minimum Value: 0.1 km/h on Jul 12 04:00																				Hours of Missing Data: 18					
Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.7 Median = 1.4 Q ₃ = 2.0 P ₉₀ = 2.5 P ₉₉ = 3.8																				Hours of Calibration: 0					
																				Percent Operational Time: 97.6					
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	1.3	0.3	0.2	0.9	0.7	0.9	0.6	0.7	0.9	0.8	1.6	1.9	1.9	2.3	2.3	2.6	1.9	0.9	0.7	0.7	0.5	0.7	0.8	0.6	2.6
2-Jul	1.4	1.5	1.5	2.1	1.7	1.9	1.9	2.4	2.2	2.5	2.9	3.6	3.1	2.6	2.3	3.2	2.3	2.4	2.5	2.3	2.4	2.1	1.8	1.5	3.6
3-Jul	1.3	1.5	1.3	1.9	3.4	3.2	4.0	3.6	3.4	4.0	4.1	3.8	3.8	3.6	3.8	3.3	3.3	2.6	1.9	1.9	1.1	0.5	0.5	0.3	4.1
4-Jul	0.4	0.2	0.2	0.2	0.4	0.4	0.4	1.3	1.5	1.7	2.4	2.2	2.6	2.5	2.1	2.2	1.4	1.2	1.3	1.4	1.4	1.4	1.5	1.8	2.6
5-Jul	1.5	0.9	0.9	1.1	1.4	1.3	1.5	1.4	1.3	1.9	2.4	2.3	2.0	2.2	1.6	1.6	1.2	1.4	1.6	1.3	1.0	0.3	0.5	0.4	2.4
6-Jul	0.3	0.3	0.3	0.3	0.4	0.4	0.8	1.3	1.8	2.5	2.6	2.5	2.8	2.4	2.5	2.3	2.3	2.4	2.1	2.0	1.3	0.8	0.3	0.2	2.8
7-Jul	0.2	0.4	0.2	0.2	0.4	0.6	0.9	0.9	1.3	1.7	1.5	1.0	1.9	2.1	2.1	2.3	2.5	1.7	1.4	1.6	1.1	1.0	1.3	2.1	2.5
8-Jul	2.1	2.0	1.9	2.1	1.9	1.8	1.6	1.8	1.3	1.4	1.3	1.8	1.4	1.0	1.7	1.1	1.2	1.0	1.2	1.0	0.4	0.3	0.2	0.2	2.1
9-Jul	0.3	0.3	0.3	0.3	0.4	0.6	0.9	1.2	1.3	1.7	2.5	2.2	2.9	2.7	3.2	2.9	2.9	2.5	2.1	1.2	1.0	1.4	0.9	0.8	3.2
10-Jul	1.5	1.6	2.6	2.3	1.3	2.0	2.7	3.3	2.7	2.8	2.2	2.0	1.7	2.2	2.3	2.0	2.0	1.7	1.5	0.8	0.8	1.7	2.1	1.8	3.3
11-Jul	1.6	2.0	1.6	1.5	1.2	0.9	1.3	1.3	1.8	1.9	1.6	1.7	2.4	2.4	2.8	2.4	2.3	1.7	1.3	0.7	0.4	0.3	0.3	0.2	2.8
12-Jul	0.1	0.1	0.3	0.1	0.2	0.3	0.7	1.2	1.2	1.7	2.3	2.4	2.4	2.2	2.0	1.6	1.5	1.4	1.4	1.2	0.8	0.5	0.3	0.4	2.4
13-Jul	0.2	0.4	0.3	0.3	0.5	0.4	0.7	1.1	2.2	2.8	3.3	4.2	3.8	3.6	3.7	3.1	2.7	2.9	3.1	2.7	1.5	1.4	1.3	1.1	4.2
14-Jul	0.7	0.7	0.6	0.6	0.7	1.3	0.9	2.2	2.9	2.8	2.3	2.2	2.2	1.8	2.2	2.2	2.2	1.8	1.7	1.4	0.9	0.6	0.8	0.5	2.9
15-Jul	0.4	0.5	0.3	0.2	0.5	0.5	0.6	0.5	1.0	1.4	1.6	2.2	1.9	2.3	2.3	2.1	1.9	1.6	1.3	1.4	1.1	0.4	0.2	0.3	2.3
16-Jul	0.3	0.2	0.2	0.5	0.7	0.8	0.9	1.0	2.1	2.3	2.7	2.6	2.6	3.0	2.5	2.6	2.2	2.4	2.4	2.2	2.5	1.9	2.2	2.0	3.0
17-Jul	2.6	2.0	1.9	1.6	1.8	1.9	2.5	2.7	2.8	2.8	2.8	3.6	2.3	1.4	2.5	2.3	1.3	0.9	0.9	0.9	0.6	0.7	0.5	0.5	3.6
18-Jul	0.5	0.6	0.9	0.9	0.7	0.7	0.8	1.0	1.2	1.5	1.5	1.5	1.6	1.3	1.4	0.7	1.1	0.6	0.6	0.8	1.3	1.8	1.4	1.5	1.8
19-Jul	1.5	1.8	1.5	0.7	0.4	0.8	1.1	1.1	1.1	1.3	2.0	2.0	1.9	1.9	1.1	2.0	1.7	1.8	1.2	0.5	0.3	0.3	0.3	0.3	2.0
20-Jul	0.3	0.4	0.6	0.7	0.5	0.5	0.6	0.9	1.2	1.6	1.4	1.6	1.9	1.9	1.9	1.8	1.0	0.5	0.5	0.4	0.5	0.5	0.4	0.2	1.9
21-Jul	0.2	0.2	0.1	0.2	0.2	0.2	0.5	0.6	0.8	1.0	1.3	1.6	1.3	1.4	1.9	1.4	1.6	1.6	1.1	0.5	0.8	0.5	0.4	0.3	1.9
22-Jul	0.3	0.2	0.2	0.4	0.4	0.2	0.4	0.6	1.1	1.1	1.2	1.4	1.5	1.8	1.6	1.7	1.9	1.3	0.6	0.4	0.3	0.4	0.5	0.5	1.9
23-Jul	0.4	0.4	0.4	0.3	0.2	0.3	0.6	1.3	1.4	1.2	1.3	1.5	1.6	1.4	1.0	1.4	2.8	2.2	1.7	1.5	1.5	1.1	0.7	0.9	2.8
24-Jul	0.6	0.8	0.8	0.4	0.4	0.5	0.9	1.1	0.9	0.9	1.0	0.6	0.7	0.7	0.8	1.3	0.9	1.1	1.0	0.6	0.8	0.7	0.6	1.1	1.3
25-Jul	1.3	1.4	1.6	1.3	1.3	1.5	2.9	2.4	2.4	2.6	1.7	2.2	1.1	0.9	0.5	0.8	0.9	0.7	0.6	1.2	2.5	2.2	2.2	2.2	2.9
26-Jul	1.4	1.3	1.1	1.3	1.5	1.5	1.5	1.7	1.9	2.1	1.8	2.0	1.7	1.1	1.4	2.0	2.6	2.3	2.8	2.3	2.7	2.6	2.0	1.6	2.8
27-Jul	1.6	1.4	1.5	1.4	1.0	1.5	1.6	1.6	1.2	1.8	2.1	2.2	DF	DF	DF	DF	DF	1.8	1.0	0.5	0.9	0.7	0.4	0.3	2.2
28-Jul	0.3	0.3	0.3	0.3	0.3	0.7	0.5	1.0	1.2	1.4	1.5	1.6	1.8	2.1	2.0	2.4	2.4	2.2	1.9	1.5	1.3	1.5	1.3	0.8	2.4
29-Jul	1.0	1.0	0.9	1.4	1.1	1.0	1.4	1.4	1.5	1.6	2.1	2.2	2.5	2.9	3.1	2.8	2.5	2.3	1.9	1.5	0.7	1.2	1.4	1.7	3.1
30-Jul	1.2	1.0	0.8	1.1	1.2	1.1	1.3	1.3	DF	DF	DF	DF	DF	DF	DF	DF	2.5	2.1	1.6	1.9	3.3	1.8	1.5	1.4	3.3
31-Jul	2.0	1.6	1.5	0.9	0.7	0.8	0.8	1.5	2.0	DF	DF	DF	DF	DF	1.8	1.8	1.9	2.4	0.5	0.6	0.4	0.4	1.2	1.5	2.4
Diurnal Maximum																									
2.6 2.0 2.6 2.3 3.4 3.2 4.0 3.6 3.4 4.0 4.1 4.2 3.8 3.6 3.8 3.3 3.3 2.9 3.1 2.7 3.3 2.6 2.2 2.2																									
DF - DAS Failure																									



Maximum Value: 2.0 km/h on Jul 5 00:00		Maximum Daily Average: 0.6 km/h on Jul 16		Hours in Service: 744																							
Minimum Value: -1.6 km/h on Jul 2 22:00		Minimum Daily Average: -0.4 km/h on Jul 2		Hours of Data: 726																							
Maximum Diurnal Average: 0.2 km/h at hour 10		Minimum Diurnal Average: -0.1 km/h at hour 9		Hours of Missing Data: 18																							
Monthly Average: 0.06 km/h		Percentiles: P ₁ = -1.0 P ₁₀ = -0.4 Q ₁ = -0.2 Median = 0.0 Q ₃ = 0.3 P ₉₀ = 0.6 P ₉₉ = 1.2		Hours of Calibration: 0																							
				Percent Operational Time: 97.6																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	-0.1	-0.2	-0.1	0.0	-0.1	-0.1	0.0	-0.1	-0.2	0.1	0.0	-0.2	0.1	0.1	1.0	0.2	0.2	-0.1	-0.3	-0.2	-0.1	0.3	-0.3	-0.2	0.0	1.0	
2-Jul	0.6	0.8	0.6	-0.1	1.1	0.2	0.2	-0.3	-0.6	-0.7	-1.0	-1.0	-0.2	-0.2	0.2	-0.7	-0.9	-0.8	-0.9	-0.8	-0.6	-1.6	-1.1	-0.9	-0.4	1.1	
3-Jul	-0.8	-1.0	-0.9	-0.7	0.1	0.0	0.0	0.3	-0.4	-0.8	-0.3	0.1	-0.9	-0.7	-0.5	-0.3	-0.8	-0.4	0.2	0.3	0.4	-0.1	0.0	0.0	-0.3	0.4	
4-Jul	0.0	0.1	-0.1	-0.1	0.1	0.0	0.1	0.2	0.0	0.5	0.3	0.1	0.3	0.5	-0.5	0.1	-0.1	-0.1	-0.1	-0.5	0.0	0.5	1.1	2.0	0.2	2.0	
5-Jul	-0.7	0.0	-0.3	-0.3	-0.3	-0.2	-0.2	0.1	-0.2	-0.5	-0.8	-0.4	-0.4	0.3	-0.2	0.2	0.9	-0.3	-0.1	0.5	-0.2	0.1	0.1	0.1	-0.1	0.9	
6-Jul	0.2	0.0	-0.2	-0.2	-0.1	0.1	0.1	-0.2	0.1	0.3	-0.7	-0.1	-0.5	-0.4	-0.8	-0.5	0.0	0.2	0.4	0.2	0.4	0.1	0.4	0.1	-0.1	0.4	
7-Jul	0.1	0.0	-0.1	0.0	0.0	-0.1	-0.1	0.2	-0.1	0.5	0.6	0.0	0.8	0.2	-0.6	-0.1	-0.3	0.0	0.9	0.1	-0.3	-0.4	-0.5	-0.9	0.0	0.9	
8-Jul	-1.0	-0.8	-0.1	-0.3	0.8	0.0	0.2	0.0	-0.3	0.5	0.1	-0.3	-0.4	-0.4	-0.3	-0.3	-0.3	-0.2	0.6	0.4	0.2	0.4	0.0	0.0	-0.1	0.8	
9-Jul	0.0	-0.1	-0.1	0.0	0.1	0.0	0.2	0.1	-0.3	-0.2	0.4	0.1	0.4	0.4	0.8	-0.2	0.3	0.8	0.6	0.6	1.2	1.0	-0.1	0.1	0.3	1.2	
10-Jul	0.2	0.5	0.6	0.4	0.3	0.1	0.5	0.5	0.0	0.3	0.1	-0.2	-0.2	0.0	-0.4	0.5	0.1	0.3	0.6	0.5	0.2	-0.1	-0.2	-0.3	0.2	0.6	
11-Jul	0.8	0.8	0.1	0.5	-0.8	-0.3	0.5	-0.1	0.2	1.0	0.5	1.1	-0.4	0.7	-0.5	-0.6	0.4	0.0	0.6	0.2	-0.1	-0.1	-0.1	0.1	0.2	1.1	
12-Jul	0.0	0.2	0.1	0.0	0.1	0.1	0.0	0.2	-0.5	-0.1	0.0	0.2	-0.5	-0.6	-0.7	-0.7	-0.1	0.0	0.2	0.9	0.5	-0.2	-0.1	-0.2	0.0	0.9	
13-Jul	-0.1	-0.2	-0.2	-0.2	-0.3	-0.5	-0.7	0.0	-0.4	-0.4	-0.4	-0.7	-0.5	-0.9	-0.6	-0.3	-0.1	0.4	0.3	0.2	-0.1	-0.2	-0.3	-0.2	-0.3	0.4	
14-Jul	-0.1	-0.2	-0.1	-0.2	-0.2	-0.3	-0.2	0.0	-1.0	0.0	-0.1	-0.1	-0.3	-0.4	-0.5	0.2	0.5	0.2	0.2	0.2	0.1	-0.1	0.0	-0.1	-0.1	0.5	
15-Jul	-0.1	0.0	0.0	-0.1	-0.2	0.0	0.0	0.3	-0.3	0.0	0.3	0.9	0.5	0.4	0.2	0.1	-0.4	0.1	-0.3	0.1	0.4	0.3	0.2	0.2	0.1	0.9	
16-Jul	0.2	0.1	0.1	0.4	0.2	0.1	0.1	0.2	0.8	1.0	0.1	0.9	1.0	0.9	1.4	1.0	0.9	1.9	1.0	0.5	0.3	0.5	0.0	0.0	0.6	1.9	
17-Jul	1.8	0.3	0.9	-0.1	-0.2	-0.3	-0.1	-0.5	-0.4	0.4	0.8	0.5	1.2	0.9	0.8	1.1	0.4	-0.1	-0.2	-0.2	0.0	-0.1	0.1	-0.1	0.3	1.8	
18-Jul	-0.1	0.0	-0.2	0.1	0.0	0.1	0.3	-0.1	0.2	0.0	-0.2	-0.2	0.3	-0.6	-0.2	0.1	0.3	-0.3	0.1	-0.2	0.0	0.9	0.7	-0.4	0.0	0.9	
19-Jul	-0.4	1.2	-1.4	0.1	-0.2	0.0	0.1	0.0	-0.2	0.2	-0.4	-0.5	-0.8	-0.3	0.3	-0.3	-0.1	0.1	0.4	0.1	0.1	0.0	-0.1	0.0	-0.1	1.2	
20-Jul	0.2	0.0	0.1	0.0	0.1	0.0	-0.3	-0.5	0.3	1.2	1.0	0.3	0.7	0.6	0.1	0.1	-0.4	-0.1	0.2	0.6	0.3	0.1	0.0	0.0	0.2	1.2	
21-Jul	-0.1	-0.1	0.0	-0.1	0.0	0.0	-0.1	-0.2	0.0	0.1	0.3	0.4	0.6	-0.2	0.3	0.4	-0.1	0.5	0.0	0.4	0.4	0.4	0.4	0.2	0.1	0.6	
22-Jul	0.2	0.1	0.0	0.1	0.1	0.0	0.2	0.0	-0.3	0.0	-0.4	-0.3	0.3	0.4	0.0	0.4	0.5	0.4	0.2	-0.1	0.1	0.2	0.2	0.0	0.1	0.5	
23-Jul	0.1	-0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.1	-0.1	-0.1	0.0	0.2	-0.1	-0.1	0.8	0.0	0.1	0.0	-0.3	0.7	1.1	0.1	-0.1	0.1	1.1	
24-Jul	0.2	-0.4	0.0	0.0	0.1	0.0	-0.1	-0.2	-0.1	0.2	0.1	-0.2	0.5	0.0	0.0	0.3	-0.2	0.0	0.3	0.6	0.4	0.4	0.0	0.2	0.1	0.6	
25-Jul	-0.5	1.0	0.1	0.2	0.6	0.2	0.5	0.3	-0.1	0.2	0.3	0.5	0.0	0.2	-0.1	0.5	0.2	0.0	0.0	0.1	-0.1	-0.4	0.1	0.2	0.2	1.0	
26-Jul	-0.2	0.0	0.1	0.1	0.0	-0.2	0.4	0.7	-0.2	0.6	0.6	1.0	0.0	0.4	0.4	0.3	0.4	0.3	0.5	0.5	0.4	0.3	0.6	0.1	0.3	1.0	
27-Jul	0.2	0.4	0.3	0.5	0.3	0.2	0.4	0.4	-0.5	-0.1	0.0	-0.5	DF	DF	DF	DF	DF	0.3	-0.2	0.0	-0.1	0.1	-0.3	0.1	0.1	0.5	
28-Jul	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.7	0.4	0.5	-0.1	0.1	0.2	-0.1	-0.1	-0.5	0.0	0.7	1.1	0.6	-0.1	0.2	1.1	
29-Jul	0.0	-0.3	0.2	0.2	0.2	0.5	0.0	0.1	0.2	0.2	0.0	-0.4	0.5	0.4	0.8	-0.1	-0.6	-0.1	-0.3	-0.1	-0.2	0.0	0.2	2.0	0.1	2.0	
30-Jul	0.9	-0.3	-0.7	-0.5	-0.4	-0.9	-0.3	0.0	DF	DF	DF	DF	DF	DF	DF	DF	DF	-0.4	-0.6	-0.1	0.7	-0.1	0.5	0.6	0.4	--	0.9
31-Jul	0.4	0.0	0.2	-0.4	0.0	0.0	0.4	0.3	0.1	DF	DF	DF	DF	DF	0.0	0.7	-0.2	-0.4	-0.1	0.0	-0.2	-0.1	0.0	0.0	0.0	0.7	
																								Diurnal Average			
																								Diurnal Maximum			
DF - DAS Failure																											



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

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

Lower Camp Met Tower - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																				Hours in Service: 744					
Maximum Value: 4.0 km/h on Jul 13 12:00																				Hours of Data: 726					
Minimum Value: 0.1 km/h on Jul 21 06:00																				Hours of Missing Data: 18					
Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.8 Median = 1.4 Q ₃ = 2.1 P ₉₀ = 2.7 P ₉₉ = 3.6																				Hours of Calibration: 0					
Percent Operational Time: 97.6																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	1.7	0.5	0.3	1.0	0.8	0.8	0.3	0.8	0.9	0.5	1.2	1.7	1.9	2.3	2.5	2.4	1.7	1.2	0.9	0.8	0.8	0.6	1.1	0.6	2.5
2-Jul	1.5	1.7	1.4	1.7	2.1	1.2	1.5	2.1	2.0	2.3	2.3	2.9	2.5	1.9	2.4	2.9	1.9	2.3	2.2	1.9	2.3	1.9	1.7	1.5	2.9
3-Jul	1.4	1.3	1.1	1.7	3.0	2.8	3.5	3.2	3.3	3.8	3.7	3.6	3.8	3.4	3.4	3.1	3.2	2.6	2.1	1.8	1.2	1.0	0.9	0.2	3.8
4-Jul	0.2	0.3	0.4	0.2	0.2	0.1	0.4	1.3	1.5	2.1	2.6	2.7	3.3	2.9	2.7	2.5	1.6	1.5	1.8	1.1	0.6	0.6	0.8	1.6	3.3
5-Jul	1.7	0.9	0.8	1.0	1.2	1.0	1.1	1.1	1.5	2.1	2.4	2.7	2.5	2.8	1.5	1.5	1.5	1.5	1.4	1.3	0.9	0.5	0.6	0.2	2.8
6-Jul	0.3	0.5	0.5	0.5	0.5	0.7	1.2	1.3	1.8	2.6	2.6	2.8	2.9	2.8	2.4	2.4	2.5	2.6	2.2	1.7	1.0	1.3	0.6	0.4	2.9
7-Jul	0.3	0.5	0.5	0.3	0.4	0.2	0.8	0.8	1.6	1.7	1.8	1.0	2.3	2.5	2.6	3.0	3.0	1.7	2.0	1.1	0.4	0.5	1.0	1.1	3.0
8-Jul	0.9	2.0	1.0	1.3	2.2	1.7	1.8	2.0	1.4	1.6	1.7	1.9	1.6	1.4	2.3	1.4	1.4	1.1	1.5	1.0	0.7	0.4	0.2	0.3	2.3
9-Jul	0.3	0.4	0.2	0.3	0.5	0.5	0.8	1.0	1.4	1.9	3.0	2.8	3.1	3.3	3.6	3.1	2.9	2.5	2.2	1.2	1.2	1.6	1.0	1.4	3.6
10-Jul	2.1	1.6	2.3	2.3	1.8	2.2	2.6	2.9	2.5	2.8	2.0	2.1	1.9	2.7	2.6	2.7	2.5	1.5	1.3	1.1	1.2	1.2	1.6	1.5	2.9
11-Jul	1.5	1.8	1.3	1.6	1.3	1.1	1.4	1.2	1.8	2.2	1.9	2.2	2.7	2.9	3.5	3.0	3.0	2.1	1.8	1.1	0.5	0.3	0.5	0.3	3.5
12-Jul	0.2	0.3	0.4	0.3	0.3	0.2	0.2	0.8	1.1	2.0	2.4	2.6	2.6	2.4	2.0	1.5	1.9	1.5	1.6	1.1	1.1	0.8	0.5	0.3	2.6
13-Jul	0.3	0.5	0.6	0.4	0.5	0.5	0.8	1.0	2.1	2.6	3.3	4.0	3.5	3.4	3.7	3.3	2.4	2.5	3.0	2.3	1.3	1.0	1.0	1.2	4.0
14-Jul	1.1	0.7	0.4	0.5	0.6	0.8	0.8	2.3	2.8	2.6	2.2	2.0	2.0	1.8	2.3	2.3	2.8	1.7	1.4	1.4	0.9	0.9	1.0	0.8	2.8
15-Jul	0.4	0.3	0.4	0.3	0.5	0.7	0.8	0.7	1.1	1.6	1.9	2.7	2.6	2.7	2.7	2.1	2.3	1.7	1.6	1.4	0.7	0.8	0.6	0.6	2.7
16-Jul	0.5	0.6	0.3	0.6	0.7	0.7	0.7	1.1	1.7	2.2	2.5	2.8	2.9	3.0	3.3	3.0	2.4	2.3	2.1	2.3	2.1	2.0	1.9	1.9	3.3
17-Jul	2.3	1.7	1.4	1.5	1.4	1.5	1.9	2.0	1.9	2.3	2.4	2.6	2.0	1.5	2.3	2.7	1.7	1.2	1.2	1.2	0.5	0.6	0.7	0.9	2.7
18-Jul	0.4	0.5	0.5	0.7	0.7	0.6	0.8	0.7	1.0	1.6	1.1	1.8	2.0	1.6	1.3	0.9	1.4	0.8	0.5	0.7	1.1	1.3	2.2	1.2	2.2
19-Jul	2.1	1.8	1.8	1.1	0.5	0.7	1.0	1.1	0.9	1.5	2.1	2.0	2.0	2.1	1.6	2.0	1.8	2.2	1.5	0.7	0.3	0.3	0.4	0.4	2.2
20-Jul	0.5	0.5	0.7	0.7	0.5	0.5	0.7	1.0	1.5	1.7	1.5	1.6	1.9	2.4	2.5	2.2	1.3	0.6	0.6	0.4	0.9	0.7	0.6	0.4	2.5
21-Jul	0.3	0.2	0.2	0.1	0.2	0.1	0.4	0.4	0.4	0.8	1.7	2.0	1.6	1.6	2.2	2.0	2.0	2.0	1.3	0.7	0.8	1.0	0.8	0.5	2.2
22-Jul	0.4	0.3	0.2	0.5	0.3	0.2	0.3	0.5	0.6	1.1	1.2	1.2	1.8	2.1	1.6	1.8	1.9	1.2	0.6	0.5	0.3	0.8	0.7	0.4	2.1
23-Jul	0.3	0.2	0.3	0.4	0.5	0.5	0.8	1.7	1.4	1.2	1.2	0.9	1.3	1.5	1.1	2.1	3.1	2.3	1.8	1.2	1.2	1.4	1.3	1.5	3.1
24-Jul	1.1	0.9	0.6	0.4	0.3	0.4	0.6	0.7	0.8	0.7	0.8	0.5	1.1	0.8	0.9	1.4	1.1	1.1	1.0	0.5	0.9	1.1	0.9	2.0	2.0
25-Jul	1.9	1.9	1.8	1.4	1.1	1.5	3.5	3.2	2.8	3.5	2.3	3.2	1.2	1.0	0.6	1.2	1.3	0.8	0.6	1.1	2.4	2.0	2.1	2.3	3.5
26-Jul	1.4	1.2	0.9	1.0	1.2	1.5	1.8	1.7	1.9	2.2	2.0	2.3	2.1	1.2	1.8	2.2	2.5	2.3	3.0	2.7	2.7	2.9	2.6	1.9	3.0
27-Jul	1.5	1.6	1.2	1.3	1.0	1.6	1.6	1.4	1.2	1.8	2.2	2.3	DF	DF	DF	DF	DF	1.5	1.1	0.3	1.2	0.8	0.6	0.3	2.3
28-Jul	0.2	0.3	0.4	0.3	0.3	0.6	0.5	1.0	1.2	1.4	1.7	1.9	2.4	2.4	2.2	3.1	2.9	2.7	2.1	1.5	0.4	0.7	1.0	0.9	3.1
29-Jul	1.0	1.0	0.7	1.4	0.9	0.9	1.4	1.4	1.3	1.6	2.4	2.8	3.4	3.6	3.9	3.5	3.1	3.0	2.4	1.7	0.5	0.3	0.5	1.0	3.9
30-Jul	1.9	1.1	1.0	1.2	1.6	1.7	2.0	1.4	DF	DF	DF	DF	DF	DF	DF	DF	3.0	2.7	1.8	1.8	2.8	2.0	1.6	1.4	3.0
31-Jul	2.0	1.7	1.6	1.2	0.8	0.5	0.7	1.5	2.0	DF	DF	DF	DF	DF	2.1	2.0	2.0	2.0	0.6	0.6	0.4	0.6	1.5	1.2	2.1
Diurnal Maximum																									
2.3 2.0 2.3 2.3 3.0 2.8 3.5 3.2 3.3 3.8 3.7 4.0 3.8 3.6 3.9 3.5 3.2 3.0 3.0 2.7 2.8 2.9 2.6 2.3																									
DF - DAS Failure																									



Maximum Value: 3.9 km/h on Jul 5 00:00 Maximum Daily Average: 0.9 km/h on Jul 2																				Hours in Service: 744 Hours of Data: 723							
Minimum Value: -1.6 km/h on Jul 30 06:00 Minimum Daily Average: -0.2 km/h on Jul 10 Maximum Diurnal Average: 0.6 km/h at hour 22 Minimum Diurnal Average: 0.1 km/h at hour 9 Monthly Average: 0.38 km/h Percentiles: $P_1 = -1.2$ $P_{10} = -0.2$ $Q_1 = 0.1$ Median = 0.3 $Q_3 = 0.6$ $P_{90} = 1.0$ $P_{99} = 2.7$																				Hours of Missing Data: 21 Hours of Calibration: 0 Percent Operational Time: 97.2							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0.9	0.3	0.2	0.7	0.8	0.1	0.3	0.2	0.2	0.1	-0.1	-0.5	-0.6	-0.5	1.3	1.1	1.9	0.6	0.0	0.2	0.2	0.3	0.1	0.1	0.3	1.9	
2-Jul	1.6	2.3	2.0	UO	3.0	1.2	1.3	0.7	0.4	0.4	0.4	0.8	1.5	1.1	1.7	0.8	0.3	0.3	0.6	0.5	0.9	-0.5	0.1	0.0	0.9	3.0	
3-Jul	0.2	0.2	0.2	0.8	0.7	0.8	0.5	0.4	0.5	0.5	1.1	0.8	0.4	0.7	0.2	0.5	0.1	0.7	0.6	0.9	0.8	0.3	0.3	0.7	0.5	1.1	
4-Jul	0.6	0.4	0.4	0.3	0.3	0.1	0.2	0.2	0.2	1.0	0.2	0.1	1.1	0.7	-0.5	0.9	0.0	-0.1	-0.7	-0.6	0.8	1.1	2.0	3.9	0.5	3.9	
5-Jul	-0.4	-0.1	0.0	0.2	-0.1	0.4	0.5	0.5	0.1	0.2	0.2	0.6	0.3	0.0	0.4	0.6	1.7	0.4	0.8	0.7	0.4	0.6	0.4	0.5	0.4	1.7	
6-Jul	0.5	0.4	0.4	0.5	0.2	0.6	0.2	0.1	0.5	0.6	-0.4	0.0	0.0	0.1	-0.5	-0.1	0.2	0.5	0.7	0.3	0.5	0.9	0.8	-0.2	0.3	0.9	
7-Jul	0.1	0.3	0.2	0.5	0.4	0.2	0.1	0.6	-0.1	1.1	0.9	0.3	1.1	0.5	-0.5	0.3	0.0	0.7	1.7	0.8	0.8	1.4	1.7	1.0	0.6	1.7	
8-Jul	0.8	0.7	1.3	1.3	3.7	1.2	0.9	0.1	0.4	0.4	0.3	0.3	-0.7	-0.5	0.0	-0.2	0.2	0.5	0.8	0.7	0.5	0.7	0.4	0.2	0.6	3.7	
9-Jul	0.3	0.4	0.3	0.5	0.6	0.2	0.3	0.2	-0.5	0.2	0.5	0.0	0.2	0.6	1.5	-0.3	0.2	1.4	0.7	0.8	1.5	0.5	-0.2	-0.1	0.4	1.5	
10-Jul	-0.2	0.3	0.4	0.3	0.5	0.2	0.3	0.2	-0.7	-0.4	-0.3	-1.0	-0.6	-0.7	-1.6	0.6	0.3	0.0	0.2	0.2	-0.1	-0.5	-0.5	-0.6	-0.2	0.6	
11-Jul	1.0	0.7	0.1	0.5	-1.2	-0.4	0.7	0.3	0.4	1.1	0.3	1.6	-0.1	1.7	-0.1	-0.6	0.6	0.2	0.9	0.3	0.1	0.2	0.4	0.3	0.4	1.7	
12-Jul	0.1	0.0	0.0	-0.1	0.0	0.0	0.1	0.3	-0.5	0.1	0.4	0.7	-0.1	-0.2	-0.2	-0.4	0.2	0.5	0.4	1.2	0.7	0.2	0.6	0.7	0.2	1.2	
13-Jul	0.6	0.6	0.5	0.5	0.3	0.3	0.2	0.7	0.3	0.3	0.9	0.5	0.4	-0.1	0.9	0.8	0.5	0.5	0.5	0.5	0.7	0.9	0.8	0.2	0.5	0.9	
14-Jul	0.2	0.2	0.4	0.3	0.7	0.3	0.4	0.7	0.0	0.5	0.6	0.0	0.1	0.0	-0.5	0.5	0.3	0.3	0.3	0.7	0.3	0.2	0.2	0.3	0.3	0.7	
15-Jul	0.2	0.1	0.2	0.1	0.2	0.1	0.0	0.2	0.2	0.3	0.6	1.0	0.5	0.3	0.5	0.4	-0.8	0.1	-0.5	-0.1	0.0	0.2	0.1	0.0	0.2	1.0	
16-Jul	0.1	0.3	0.1	0.2	0.0	0.1	0.4	0.7	0.9	0.9	-0.2	0.2	1.2	0.7	2.3	0.6	1.7	3.0	1.0	0.1	0.0	0.5	-0.4	-0.2	0.6	3.0	
17-Jul	2.9	1.0	1.1	-0.3	-0.6	-0.6	-0.8	-1.6	-1.2	-0.1	0.7	0.6	1.2	1.1	0.3	0.8	0.3	-0.3	-0.4	0.2	0.2	0.3	-0.1	-0.3	0.2	2.9	
18-Jul	0.0	0.1	0.1	0.3	0.2	0.7	0.6	0.9	0.4	0.3	0.3	-0.7	0.4	-1.0	-0.6	0.0	0.7	-0.1	0.4	0.4	1.1	2.4	2.5	0.4	0.4	2.5	
19-Jul	0.8	3.1	-0.8	0.3	0.1	0.3	0.5	0.2	-0.1	1.1	0.1	-0.2	-0.2	0.1	0.8	0.2	0.7	1.6	0.9	0.4	0.2	0.2	0.3	0.3	0.5	3.1	
20-Jul	0.2	0.2	0.2	0.3	0.2	0.1	0.0	0.1	0.1	1.3	1.5	0.2	0.7	0.8	0.2	0.4	-0.3	0.2	0.2	0.6	0.7	0.1	-0.2	0.3	0.3	1.5	
21-Jul	0.3	0.3	0.1	0.3	0.2	0.2	0.1	-0.1	-0.1	0.0	0.2	0.9	0.6	0.2	0.0	1.0	0.0	0.9	0.1	0.6	0.1	0.0	0.2	0.1	0.3	1.0	
22-Jul	0.0	0.1	0.2	0.2	0.3	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.6	0.6	-0.1	0.5	0.7	0.5	0.8	0.5	0.9	0.9	1.0	0.2	0.4	1.0	
23-Jul	0.3	0.2	0.4	0.3	0.1	0.0	0.2	0.6	0.5	-0.2	-0.1	-0.3	-0.2	-0.4	-0.2	0.9	-0.1	0.7	0.1	0.4	1.3	2.5	0.5	-0.5	0.3	2.5	
24-Jul	0.9	0.1	0.3	0.3	0.1	0.1	-0.1	0.0	-0.1	0.2	-0.2	-0.3	0.8	0.1	0.0	0.3	-0.1	-0.3	-0.1	0.0	0.6	0.7	0.1	0.0	0.1	0.9	
25-Jul	-1.4	0.8	0.5	1.3	UO	0.3	0.0	0.0	-0.3	0.6	0.1	UO	0.9	0.3	0.0	0.8	0.3	-0.1	0.0	0.4	1.4	1.1	1.2	1.1	0.4	1.4	
26-Jul	0.3	0.8	0.7	0.3	0.5	0.1	0.6	0.7	-0.3	0.4	0.3	0.3	-0.7	-0.1	0.0	0.9	0.6	0.5	0.8	0.0	-0.3	0.1	0.7	0.1	0.3	0.9	
27-Jul	-0.2	0.2	0.3	1.4	0.9	0.4	0.8	0.6	0.1	0.5	0.3	-0.2	DF	DF	DF	DF	DF	1.3	0.4	0.4	0.3	0.3	0.1	0.2	0.4	1.4	
28-Jul	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.1	0.1	0.7	0.5	0.3	0.2	0.4	0.5	0.2	0.2	-0.2	0.3	1.3	2.2	2.0	0.6	0.5	2.2	
29-Jul	0.4	-0.1	0.5	0.3	0.4	0.7	0.4	0.3	0.3	-0.2	0.7	0.4	1.3	0.5	1.1	0.4	-0.4	0.0	0.3	-0.1	-0.2	0.6	1.4	3.2	0.5	3.2	
30-Jul	2.8	-1.2	-1.4	-1.0	-1.2	-1.6	-0.9	-0.2	DF	DF	DF	DF	DF	DF	DF	DF	DF	-0.3	-0.8	0.1	1.8	1.0	0.7	0.1	0.4	--	2.8
31-Jul	1.7	0.3	0.5	0.1	0.3	-0.1	0.2	1.1	1.0	DF	DF	DF	DF	DF	0.4	1.4	0.5	0.3	0.1	0.4	0.2	0.4	0.9	1.0	0.6	1.7	
																								Diurnal Average			
																								Diurnal Maximum			
																								2.9 3.1 2.0 1.4 3.7 1.2 1.3 1.1 1.0 1.3 1.5 1.6 1.5 1.7 2.3 1.4 1.9 3.0 1.7 1.8 1.5 2.5 2.5 3.9			
DF - DAS Failure UO - Unstable Operation																											



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Vertical Wind Speed 163 m (VW163m) - km/h

Lower Camp Met Tower - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																				Hours in Service: 744																											
Maximum Value: 4.4 km/h on Jul 25 10:00																				Hours of Data: 723																											
Minimum Value: 0.2 km/h on Jul 12 04:00																				Hours of Missing Data: 21																											
Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.7 Median = 1.4 Q ₃ = 2.3 P ₉₀ = 3.0 P ₉₉ = 4.1																				Hours of Calibration: 0																											
Percent Operational Time: 97.2																																															
Day	Hourly Period Ending At (MST)																								Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	1.9	0.5	0.4	1.1	1.1	0.7	0.3	0.5	0.8	0.6	1.2	1.9	1.8	2.3	2.5	2.2	1.6	1.5	1.0	1.0	0.7	0.8	1.0	0.7	2.5																						
2-Jul	1.4	1.6	1.5	UO	2.3	1.3	1.2	2.0	1.6	2.3	3.0	2.7	2.1	1.7	2.0	2.8	1.5	2.0	2.0	1.6	2.3	1.6	1.4	1.6	3.0																						
3-Jul	1.4	1.3	1.4	1.5	3.2	2.8	3.7	3.4	3.1	3.7	3.9	3.7	3.8	3.2	3.1	3.0	3.0	2.4	2.1	2.2	1.5	1.1	0.6	0.3	3.9																						
4-Jul	0.2	0.2	0.5	0.2	0.3	0.2	0.2	1.0	1.2	2.4	2.7	3.2	3.8	3.7	3.0	3.1	2.0	1.8	1.9	1.0	0.5	0.3	0.7	1.5	3.8																						
5-Jul	2.2	1.1	0.9	1.3	1.5	1.4	1.1	1.2	1.9	2.2	2.0	3.0	2.9	3.4	1.9	1.7	1.9	1.8	1.5	1.4	1.0	1.1	0.9	0.6	3.4																						
6-Jul	0.3	0.4	0.6	0.5	0.5	0.8	0.8	1.0	2.0	3.2	3.1	3.2	3.0	3.4	3.0	3.0	2.9	3.0	2.4	1.6	1.0	1.2	0.6	0.4	3.4																						
7-Jul	0.3	0.5	0.6	0.5	0.3	0.3	0.6	0.9	1.6	1.4	1.6	1.6	2.7	2.9	3.2	3.8	3.6	1.8	1.9	0.8	0.5	0.3	0.5	0.8	3.8																						
8-Jul	0.9	1.1	0.8	0.5	2.2	1.5	1.6	1.8	1.4	1.6	1.8	2.0	1.7	2.0	2.8	1.9	1.7	1.1	1.3	0.7	0.4	0.2	0.3	0.2	2.8																						
9-Jul	0.4	0.4	0.3	0.5	0.6	0.7	0.7	0.9	1.3	2.3	3.4	3.3	3.7	4.1	4.2	3.7	3.3	3.0	1.9	1.0	0.9	0.9	0.8	1.9	4.2																						
10-Jul	2.6	1.9	2.4	2.5	1.9	2.0	2.7	2.6	2.4	2.9	2.1	2.6	2.6	3.1	3.0	3.3	3.2	1.6	0.9	1.1	1.4	1.3	1.7	1.7	3.3																						
11-Jul	2.0	2.1	1.7	1.5	1.5	1.3	1.4	1.3	1.9	2.5	2.2	2.6	3.1	3.6	4.2	3.6	3.9	2.7	2.3	1.1	0.3	0.2	0.2	0.3	4.2																						
12-Jul	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.5	1.2	2.2	2.3	2.7	2.4	2.6	2.4	1.8	2.2	1.8	1.3	1.0	0.9	0.8	0.4	0.4	2.7																						
13-Jul	0.3	0.3	0.5	0.7	0.7	0.8	0.8	0.8	2.0	2.5	3.3	4.0	3.5	3.4	3.7	3.2	2.4	2.5	3.0	2.4	1.2	0.9	1.1	1.5	4.0																						
14-Jul	1.2	0.8	0.7	0.7	0.6	1.0	0.9	2.2	2.8	3.0	2.4	2.2	2.0	2.0	2.7	3.0	1.7	1.5	1.4	0.8	1.1	1.2	0.6	0.6	3.0																						
15-Jul	0.4	0.5	0.6	0.5	0.4	0.6	0.7	0.6	1.1	1.7	2.4	3.4	3.3	3.2	3.5	2.9	3.1	2.0	1.7	1.5	0.7	0.5	0.7	0.6	3.5																						
16-Jul	0.7	0.7	0.4	0.4	0.7	0.9	0.9	1.2	1.8	2.3	2.9	3.2	3.6	3.8	3.7	3.4	2.8	2.6	2.3	1.8	2.0	2.3	2.0	2.2	3.8																						
17-Jul	2.9	1.8	1.6	1.6	1.8	1.6	1.9	1.8	1.8	2.3	2.5	3.0	2.2	1.7	2.0	2.5	1.6	1.0	1.3	1.5	0.5	0.8	0.9	1.2	3.0																						
18-Jul	0.6	0.6	0.5	0.6	0.6	0.8	0.7	0.9	1.1	1.8	1.2	2.0	2.4	1.8	1.6	1.0	1.7	1.1	0.6	1.0	1.3	1.1	2.8	0.9	2.8																						
19-Jul	1.5	1.2	1.0	0.9	0.4	0.6	1.0	1.2	0.9	2.0	2.3	2.1	2.4	2.3	2.4	2.8	2.1	2.2	1.6	0.9	0.4	0.4	0.5	0.6	2.8																						
20-Jul	0.6	0.5	0.5	0.6	0.5	0.5	0.7	0.9	1.3	1.9	1.5	2.0	2.4	2.7	3.3	2.7	1.5	0.7	0.8	0.5	0.6	1.2	0.7	0.3	3.3																						
21-Jul	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.7	2.1	2.3	2.0	2.0	2.9	2.8	2.4	2.3	1.4	0.9	0.8	0.6	0.6	0.6	2.9																						
22-Jul	0.5	0.4	0.4	0.5	0.5	0.2	0.2	0.3	0.6	0.6	0.8	1.2	2.0	2.2	1.9	1.8	2.0	1.1	0.5	0.4	0.6	1.0	1.0	0.5	2.2																						
23-Jul	0.3	0.3	0.3	0.4	0.6	0.8	1.0	1.7	1.4	1.3	1.0	1.0	1.6	1.7	1.2	2.3	3.2	1.8	1.8	0.9	0.8	1.4	1.8	1.9	3.2																						
24-Jul	1.5	0.6	0.5	0.3	0.2	0.4	0.3	0.6	0.6	0.7	0.9	0.6	1.5	0.8	1.1	1.5	1.4	0.9	0.8	0.6	0.6	0.6	0.9	2.3	2.3																						
25-Jul	2.2	2.5	2.4	3.4	UO	1.5	3.6	3.5	3.8	4.4	3.2	UO	1.4	1.3	0.7	1.6	1.8	0.9	0.6	1.3	2.1	2.1	2.2	2.5	4.4																						
26-Jul	1.4	1.2	1.1	1.1	1.3	1.4	2.0	1.6	2.1	2.5	2.2	2.5	2.7	1.6	2.2	2.5	2.4	2.2	2.9	2.5	2.2	2.6	2.5	2.1	2.9																						
27-Jul	1.2	1.3	0.8	0.8	1.4	1.5	1.4	1.3	1.1	1.7	2.3	2.7	DF	DF	DF	DF	DF	1.3	1.4	0.4	1.2	0.9	0.5	0.3	2.7																						
28-Jul	0.3	0.3	0.3	0.4	0.3	0.4	0.3	0.9	1.0	1.5	1.9	2.5	2.5	2.9	2.6	3.5	3.4	3.0	2.1	1.2	0.5	0.5	0.7	1.0	3.5																						
29-Jul	0.9	1.1	0.8	1.3	1.0	0.9	1.5	1.3	1.3	1.7	2.9	3.3	4.2	4.2	4.3	4.3	3.8	3.3	2.9	1.7	0.4	0.5	0.5	0.6	4.3																						
30-Jul	2.8	1.7	1.1	1.0	1.2	1.4	2.2	1.7	DF	DF	DF	DF	DF	DF	DF	DF	3.3	2.6	1.8	1.8	4.1	3.0	1.4	1.5	4.1																						
31-Jul	2.1	1.9	2.1	1.2	0.9	0.5	0.7	1.3	1.6	DF	DF	DF	DF	DF	2.1	2.3	2.1	1.8	0.6	0.7	0.6	1.0	1.6	1.3	2.3																						
Diurnal Maximum																								2.9	2.5	2.4	3.4	3.2	2.8	3.7	3.5	3.8	4.4	3.9	4.0	4.2	4.2	4.3	4.3	3.9	3.3	3.0	2.5	4.1	3.0	2.8	2.5
DF - DAS Failure UO - Unstable Operation																																															



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS04 BUFFALO VIEWPOINT JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS04)
 JULY 2023

MONTHLY SUMMARY

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	127.3	0	13.2	0
H2S (ppb) Average	706	35	38	99.6	5.6	0	0.9	0
THC (ppm) Average	709	35	35	100	4.6	-	2.7	-
NMHC(ppm) Average	709	35	35	100	2.033	-	0.338	-
CH4(ppm) Average	709	35	35	100	3.6	-	2.4	-
O3(ppb) Average	709	34	35	99.87	56.1	0	32.1	-
NO2(ppb) Average	674	46	70	96.77	43.4	0	11.3	-
NO(ppb) Average	674	46	70	96.77	69.2	-	6.3	-
NOX(ppb) Average	674	46	70	96.77	82.2	-	12.8	-
PM2.5(ug/m3) Average	744	0	0	100	450.4	156	271.8	18
Temperature (C) Average	744	0	0	100	29.4	-	22.7	-
Relative Humidity (%) Average	744	0	0	100	98	-	93.3	-
Wind Speed 10 m (km/h) Average	744	0	0	100	28	-	19	-
Wind Direction 10 m (deg) Average	744	0	0	100	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS04)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	1.26	7.2	-	0	0	0	0.2	0.4	1.6	127.3
H2S (ppb) Average	706	0.35	0.5	-	0	0	0.1	0.2	0.4	0.8	5.6
THC (ppm) Average	709	2.3	0.4	-	2	2	2.1	2.2	2.4	2.7	4.6
NMHC(ppm) Average	709	0.149	0.209	-	0	0	0	0.1	0.2	0.4	2.033
CH4(ppm) Average	709	2.15	0.2	-	2	2	2	2.1	2.2	2.4	3.6
O3(ppb) Average	709	25.56	11.8	-	1.7	7	18	26.3	34.1	40.2	56.1
NO2(ppb) Average	674	3.55	6	-	0	0	0	0.8	4.3	10.6	43.4
NO(ppb) Average	674	0.85	4	-	0	0	0	0	0	1.2	69.2
NOX(ppb) Average	674	4.39	8.7	-	0	0	0	0.9	4.5	12.8	82.2
PM2.5(ug/m3) Average	744	55.26	77	-	2.5	5.3	8.8	26.2	63.3	134.3	450.4
Temperature 2 m (C) Average	744	18.58	4.7	-	8.1	12.7	15.1	18	22.1	25.1	29.4
Relative Humidity (%) Average	744	65.26	19.7	-	27.2	38.5	48.5	65.3	83.7	92.9	98
Wind Speed 10 m (km/h) Average	744	7.9	4	-	0	3	5	7	10	14	28
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS04)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S, NO2,O3	19 Jul 2023 07:00	19 Jul 2023 07:00	1	Maintenance - sample manifold cleaned
NO2	25 Jul 2023 08:00	25 Jul 2023 12:00	5	Maintenance - verify daily QA response
NO2	26 Jul 2023 13:00	27 Jul 2023 06:00	18	Maintenace - to replace analyzer and multi-point verification



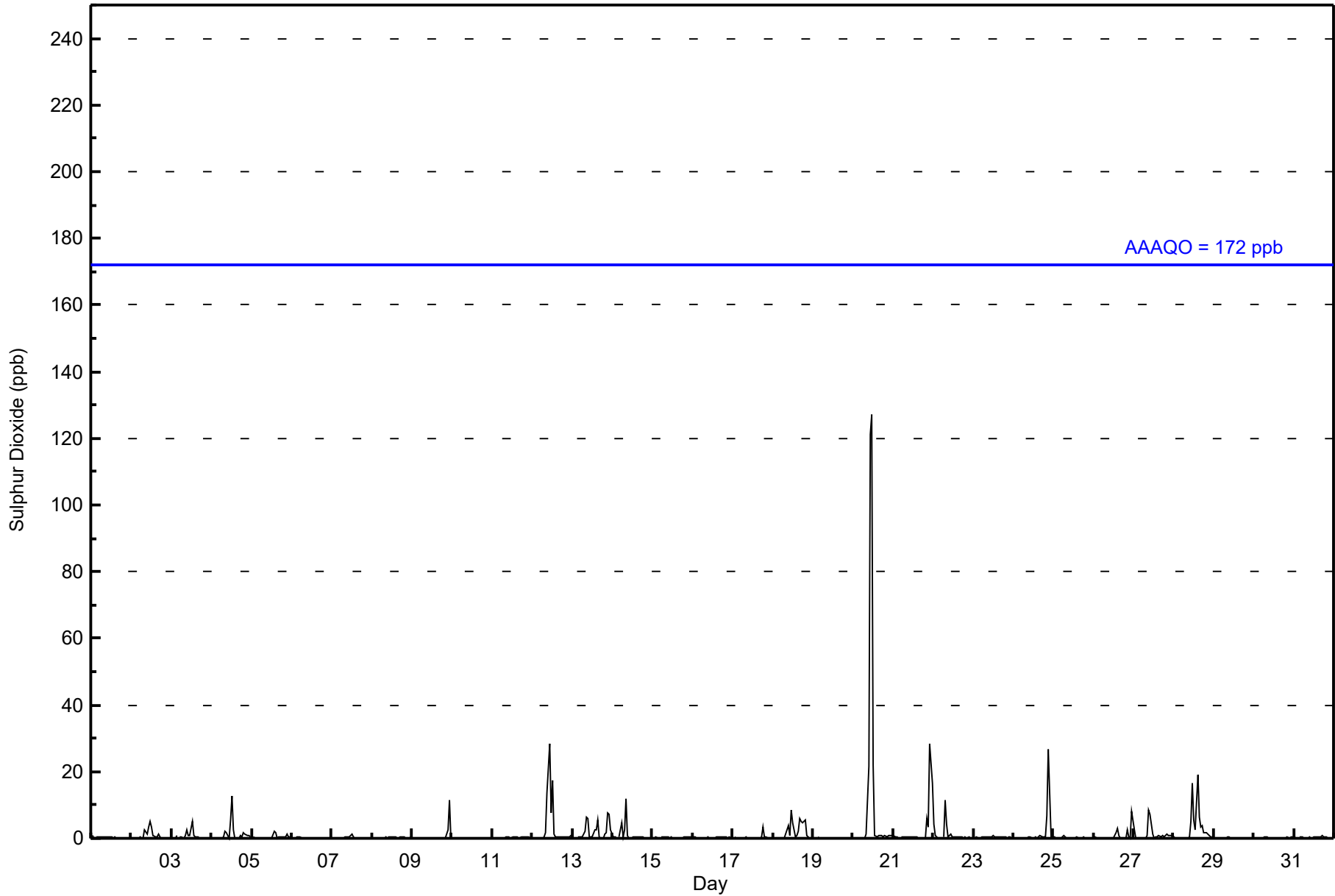
Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Buffalo Viewpoint - July 2023

Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0	Hours in Service: 744																	Daily Average		Daily Maximum										
Maximum Value: 127.3 ppb on Jul 20 12:00		Maximum Daily Average: 13.2 ppb on Jul 20		Hours of Data: 709																	Hours of Missing Data: 35		Hours of Calibration: 35										
Minimum Value: 0.0 ppb on Jul 1 18:00		Minimum Daily Average: 0.0 ppb on Jul 10		Hours of Operational Time: 100.0																													
Maximum Diurnal Average: 5.7 ppb at hour 12		Minimum Diurnal Average: 0.1 ppb at hour 5		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.2 Q ₃ = 0.4 P ₉₀ = 1.6 P ₉₉ = 18.9																													
Monthly Average: 1.26 ppb																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24									
1-Jul	0.8	0.5	Z	0.3	0.3	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.2	0.3	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.8							
2-Jul	0.0	0.0	0.0	Z	0.1	0.2	0.2	0.1	2.4	1.3	3.2	5.0	3.2	0.9	0.5	0.2	1.3	0.4	0.2	0.1	0.1	0.2	0.2	0.1	0.9	5.0							
3-Jul	0.1	0.1	0.1	0.7	Z	0.5	0.3	0.2	0.8	2.6	0.8	0.8	5.3	0.8	0.3	0.5	0.2	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.6	5.3							
4-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.2	0.4	1.9	1.8	0.1	5.5	12.8	2.7	0.1	0.0	0.0	0.7	0.6	1.6	1.1	0.9	0.6	0.5	1.4	12.8							
5-Jul	Z	0.4	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	2.0	1.7	0.1	0.4	0.3	0.2	0.6	0.6	1.2	0.4	0.3	0.4	2.0							
6-Jul	0.4	Z	0.1	0.2	0.4	0.3	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.4							
7-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.6	0.9	1.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.2	1.2							
8-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.1	0.2	0.1	0.3	0.3	0.4	0.3	0.3	0.1	0.1	0.6	0.3	0.2	0.1	0.1	0.2	0.2	0.2	0.6							
9-Jul	0.1	0.2	0.2	0.2	Z	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.1	0.0	2.7	11.6	0.2	0.7	11.6							
10-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0							
11-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.3	0.2	0.3	0.3	0.2	0.3	0.2	0.2	0.5	0.2	0.3	0.3	0.3	0.2	0.2	0.5							
12-Jul	0.1	Z	0.2	0.0	0.0	0.1	0.1	0.4	1.8	13.4	28.3	7.6	17.5	1.2	0.4	0.2	0.3	0.3	0.2	0.3	0.2	0.3	0.5	0.8	3.2	28.3							
13-Jul	0.3	0.4	Z	0.4	0.3	0.3	0.3	1.9	6.5	6.0	0.4	0.2	0.4	2.4	2.6	5.5	0.3	0.1	0.2	1.2	1.5	7.6	7.0	2.8	2.1	7.6							
14-Jul	0.5	0.3	0.4	Z	0.3	4.6	0.5	2.4	11.8	0.8	0.2	0.2	0.3	0.2	0.4	0.3	0.2	0.2	0.3	0.2	0.2	0.0	0.2	0.2	1.1	11.8							
15-Jul	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.5	0.2	0.3	0.5	0.4	0.2	0.5							
16-Jul	0.3	0.3	0.0	0.0	0.0	Z	0.1	0.1	0.2	0.2	0.0	0.0	0.1	0.2	0.2	0.4	0.4	0.3	0.3	0.4	0.4	0.1	0.4	0.2	0.2	0.4							
17-Jul	Z	0.3	0.1	0.1	0.1	0.1	0.0	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.4	3.4	0.6	0.3	0.1	0.0	0.0	0.3	3.4							
18-Jul	0.0	Z	0.0	0.0	0.0	0.1	0.0	0.0	2.6	4.0	0.7	8.5	4.7	0.5	1.0	2.0	5.9	5.2	4.7	5.6	0.9	0.2	0.2	0.1	2.0	8.5							
19-Jul	0.0	0.1	Z	0.3	0.2	0.1	C	C	C	C	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3							
20-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	1.4	21.7	121.3	127.3	22.2	0.6	0.5	1.0	0.8	0.9	0.6	0.9	0.6	1.0	1.0	0.8	13.2	127.3							
21-Jul	0.7	0.6	0.5	0.2	Z	0.4	0.3	0.2	0.3	0.2	0.6	0.4	0.4	0.3	0.3	0.1	0.0	0.0	0.0	0.1	5.8	3.4	28.5	16.4	2.6	28.5							
22-Jul	4.4	0.7	0.3	0.1	0.1	Z	0.3	11.4	4.4	0.5	1.2	0.4	0.4	0.4	0.4	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.1	0.1	1.2	11.4							
23-Jul	Z	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.5	0.4	0.6	0.7	0.6	0.5	0.4	0.3	0.3	0.2	0.2	0.3	0.3	0.1	0.3	0.3	0.7							
24-Jul	0.1	Z	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.2	0.1	0.3	0.2	0.6	0.7	0.6	0.5	0.4	7.0	26.9	0.6	0.4	1.7	26.9							
25-Jul	0.2	0.2	Z	0.1	0.0	0.6	0.7	0.2	0.2	0.1	0.2	0.0	0.2	0.1	0.3	0.1	0.0	0.0	0.6	0.2	0.0	0.0	0.0	0.0	0.2	0.7							
26-Jul	0.4	0.3	0.1	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	1.7	3.0	1.0	0.0	0.1	0.0	0.0	2.6	0.3	0.2	8.0	0.8	8.0							
27-Jul	2.7	0.1	0.0	0.0	Z	0.1	0.0	0.1	0.8	8.4	7.0	1.5	0.1	0.2	0.3	0.8	0.2	0.7	0.6	0.8	1.2	1.0	0.9	0.9	1.2	8.4							
28-Jul	0.3	0.2	0.1	0.0	0.0	Z	0.0	0.0	0.0	0.3	5.0	16.4	5.4	2.5	19.0	6.4	3.4	4.0	1.8	1.6	1.3	0.9	0.5	0.3	3.0	19.0							
29-Jul	Z	0.2	0.1	0.0	0.0	0.2	0.1	0.1	0.3	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3							
30-Jul	0.0	Z	0.0	0.0	0.0	0.1	0.3	0.2	0.4	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.0	0.1	0.2	0.1	0.3	0.2	0.4	0.5	0.2	0.5							
31-Jul	0.3	0.3	Z	0.2	0.3	0.3	0.2	0.1	0.1	0.3	0.2	0.2	0.2	0.3	0.4	0.2	0.2	0.9	0.4	0.5	0.1	0.0	0.1	0.0	0.3	0.9							
		0.5	0.2	0.1	0.1	0.1	0.3	0.2	0.7	1.3	2.2	5.5	5.7	2.5	0.6	1.1	0.7	0.5	0.5	0.5	0.5	0.8	1.6	1.8	1.1	Diurnal Average							
		4.4	0.7	0.5	0.7	0.4	4.6	0.7	11.4	11.8	21.7	121.3	127.3	22.2	2.7	19.0	6.4	5.9	5.2	4.7	5.6	7.0	26.9	28.5	16.4	Diurnal Maximum							
Z - zerospan		C - Calibration																															
Alberta Ambient Air Quality Objectives (AAAQO):		1-hr 172 ppb				24-hr 48 ppb																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	693	97.74	97.74
11 - 20	9	1.27	99.01
21 - 60	5	0.71	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: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	106	49	12	12	11	16	61	80	70	37	37	42	43	46	40	31	693
11 - 20	2	0	0	1	0	0	0	0	0	1	0	0	0	2	1	2	9
21 - 60	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1	1	5
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	109	49	12	14	12	16	61	80	70	38	37	42	45	48	42	34	709

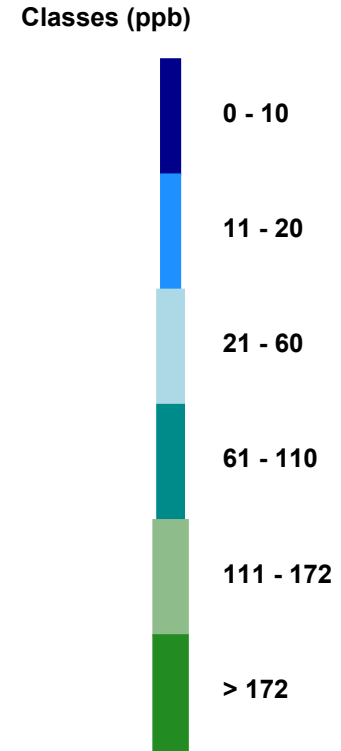
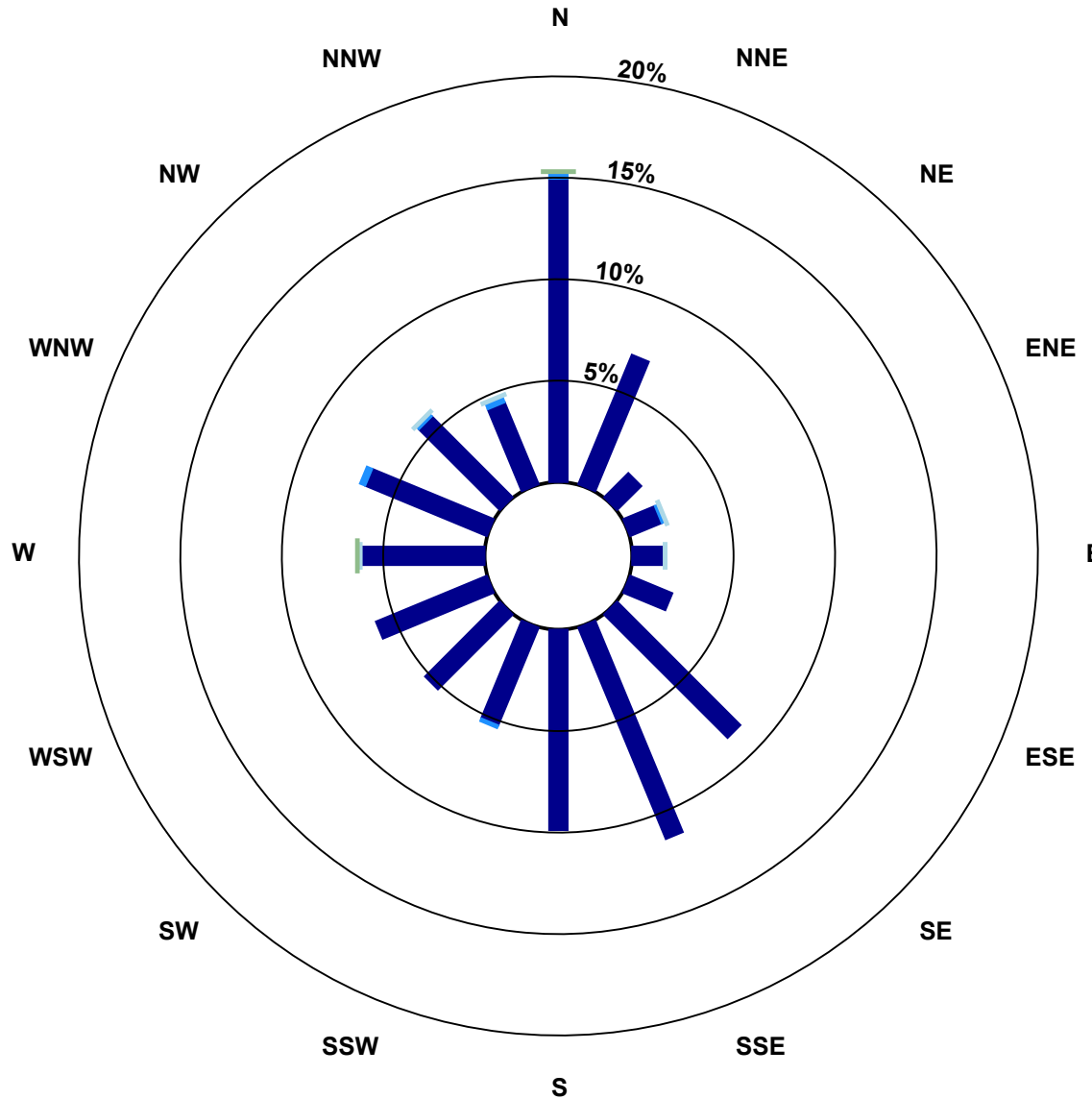
Total Number of Valid Hours: 709

Total Number of Hours: 744

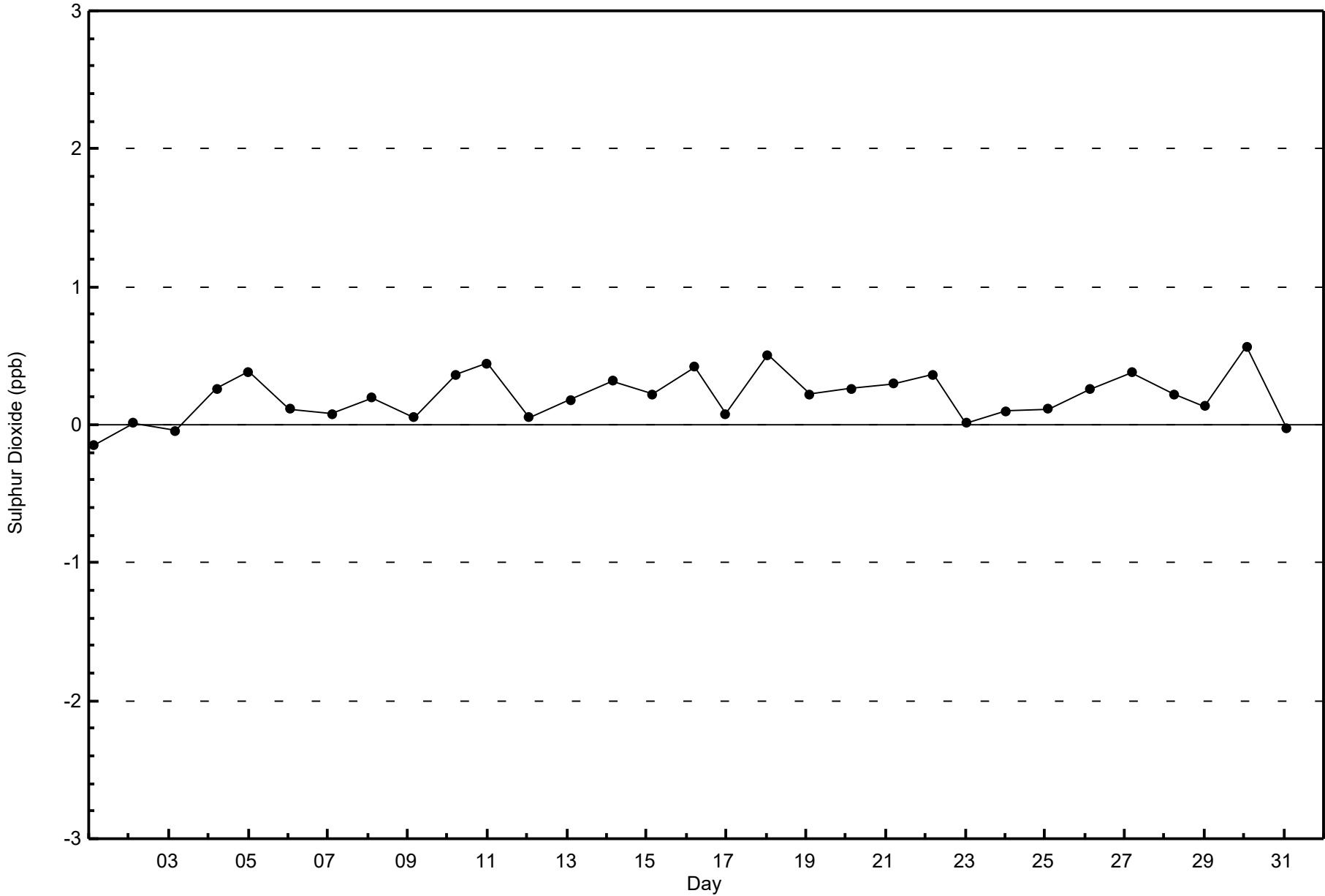


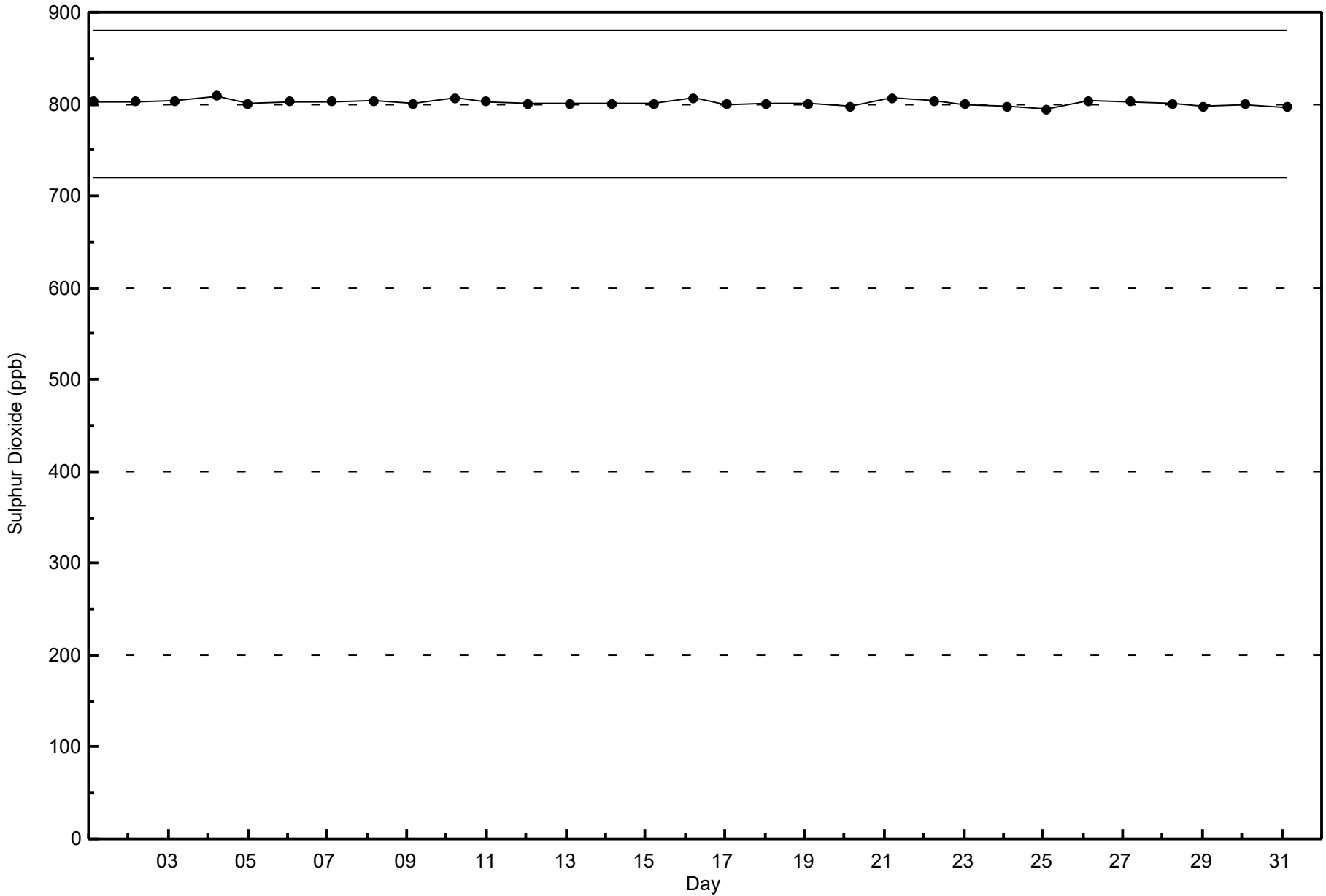
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint



Total Number of Valid Hours: 709







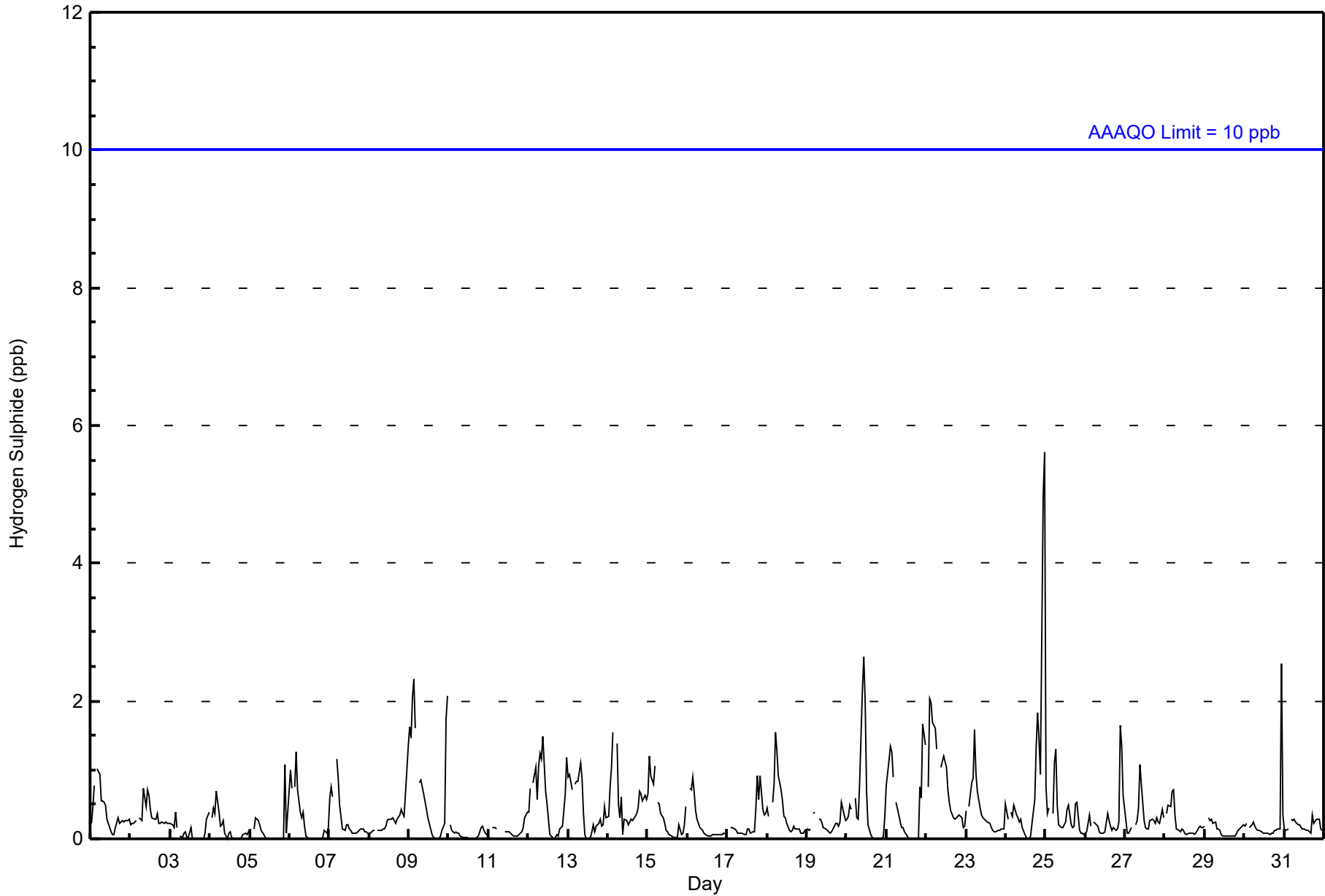
Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

Buffalo Viewpoint - July 2023

Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0																		Hours in Service:	744					
Maximum Value: 5.6 ppb on Jul 25 00:00		Maximum Daily Average: 0.9 ppb on Jul 24																	Hours of Data:	706							
Minimum Value: 0.0 ppb on Jul 3 14:00		Minimum Daily Average: 0.1 ppb on Jul 10																	Hours of Missing Data:	38							
Maximum Diurnal Average: 0.7 ppb at hour 5		Minimum Diurnal Average: 0.1 ppb at hour 5																	Hours of Calibration:	35							
Monthly Average: 0.35 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.2 Q ₃ = 0.4 P ₉₀ = 0.8 P ₉₉ = 2.1																	Percent Operational Time:	99.6							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0.2	0.5	0.8	Z	1.0	0.9	0.5	0.6	0.5	0.5	0.3	0.2	0.1	0.1	0.1	0.2	0.3	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.4	0.1	1.0
2-Jul	0.2	0.2	0.2	0.3	Z	0.3	0.3	0.3	0.7	0.5	0.7	0.6	0.4	0.3	0.3	0.3	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.7
3-Jul	0.2	0.2	0.2	0.4	0.2	Z	0.0	0.0	0.1	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.4	0.1	0.4	
4-Jul	Z	0.3	0.4	0.4	0.7	0.4	0.2	0.2	0.3	0.1	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	0.1	0.1	0.7	
5-Jul	0.1	Z	0.1	0.3	0.3	0.3	0.2	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	1.1	0.1	0.4	0.1	1.1	
6-Jul	1.0	0.7	Z	0.7	1.3	0.7	0.4	0.3	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	1.3		
7-Jul	0.6	0.8	0.6	Z	1.2	0.9	0.5	0.3	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	1.2	
8-Jul	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.4	0.3	0.7	1.3	0.3	1.3	
9-Jul	1.6	1.5	2.1	2.3	1.6	Z	0.8	0.8	0.8	0.7	0.4	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	1.8	2.1	0.8	2.3	
10-Jul	Z	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	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.1	0.1	0.1	0.2	
11-Jul	0.1	Z	0.2	0.2	0.2	0.1	C	C	C	C	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.4	0.1	0.4	
12-Jul	0.4	0.7	Z	0.8	1.0	0.6	1.1	1.2	1.2	1.5	0.7	0.5	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.4	0.6	1.2	0.6	1.5	
13-Jul	0.9	0.9	0.7	Z	0.8	0.8	0.8	1.1	0.9	0.4	0.1	0.0	0.0	0.1	0.2	0.1	0.2	0.2	0.3	0.2	0.2	0.5	0.3	0.4	1.1		
14-Jul	0.3	0.8	1.0	1.6	Z	1.4	0.5	0.3	0.6	0.1	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.7	0.7	0.5	0.6	0.6	0.5	1.6	
15-Jul	0.6	1.2	0.9	0.8	1.1	Z	0.5	0.5	0.4	0.3	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.2	0.5	0.3	1.2	
16-Jul	Z	0.7	0.7	0.9	0.7	0.4	0.3	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.9	
17-Jul	0.1	Z	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.9	0.6	0.9	0.4	0.3	0.4	0.2	0.9	
18-Jul	0.4	0.3	Z	0.5	0.8	1.5	1.3	0.9	0.7	0.5	0.3	0.3	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	1.5	
19-Jul	0.1	0.1	0.1	Z	0.4	0.4	M	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.5	0.3	0.3	0.2	0.5	
20-Jul	0.3	0.3	0.5	0.4	Z	0.6	0.3	0.3	0.8	2.1	2.6	2.0	0.7	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	2.6	
21-Jul	0.8	1.1	1.3	1.3	0.9	Z	0.5	0.3	0.3	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.6	1.7	1.4	0.5	1.7	
22-Jul	Z	0.8	2.0	2.0	1.7	1.6	1.3	M	M	1.0	1.2	1.1	1.0	0.7	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.8	2.0	
23-Jul	0.4	Z	0.5	0.8	0.9	1.6	0.9	0.7	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	1.6	
24-Jul	0.5	0.3	Z	0.4	0.3	0.5	0.3	0.3	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.1	0.2	0.6	1.3	1.8	1.4	0.9	5.0	5.6	0.9	5.6	
25-Jul	0.8	0.4	0.4	Z	0.4	1.1	1.3	0.5	0.2	0.2	0.2	0.2	0.2	0.4	0.5	0.2	0.2	0.2	0.5	0.5	0.1	0.1	0.1	0.1	0.4	1.3	
26-Jul	0.1	0.1	0.3	0.2	Z	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.4	0.3	0.2	0.1	0.2	0.1	0.1	0.2	1.6	1.3	0.6	0.3	1.6	
27-Jul	0.3	0.1	0.1	0.1	0.2	Z	0.2	0.3	0.4	1.1	0.8	0.3	0.2	0.2	0.1	0.3	0.3	0.3	0.2	0.3	0.3	0.2	0.4	0.3	0.3	1.1	
28-Jul	Z	0.4	0.5	0.5	0.7	0.7	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.7	
29-Jul	0.2	Z	0.3	0.3	0.3	0.2	0.2	0.1	0.1	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	0.2	0.2	0.1	0.3	
30-Jul	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.5	0.4	0.2	2.5	
31-Jul	0.1	0.1	0.1	Z	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.3	0.3	0.3	0.1	0.1	0.2	0.3	
																								Diurnal Average	0.4		
																								Diurnal Maximum	1.6		
Z - zerospan C - Calibration M - Maintenance																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	702	99.43	99.43
3 - 4	2	0.28	99.72
5 - 7	2	0.28	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	107	49	12	14	11	16	56	85	62	38	41	43	46	49	40	33	702
3 - 4	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	2
5 - 7	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	107	49	12	14	12	16	58	85	62	38	41	43	47	49	40	33	706

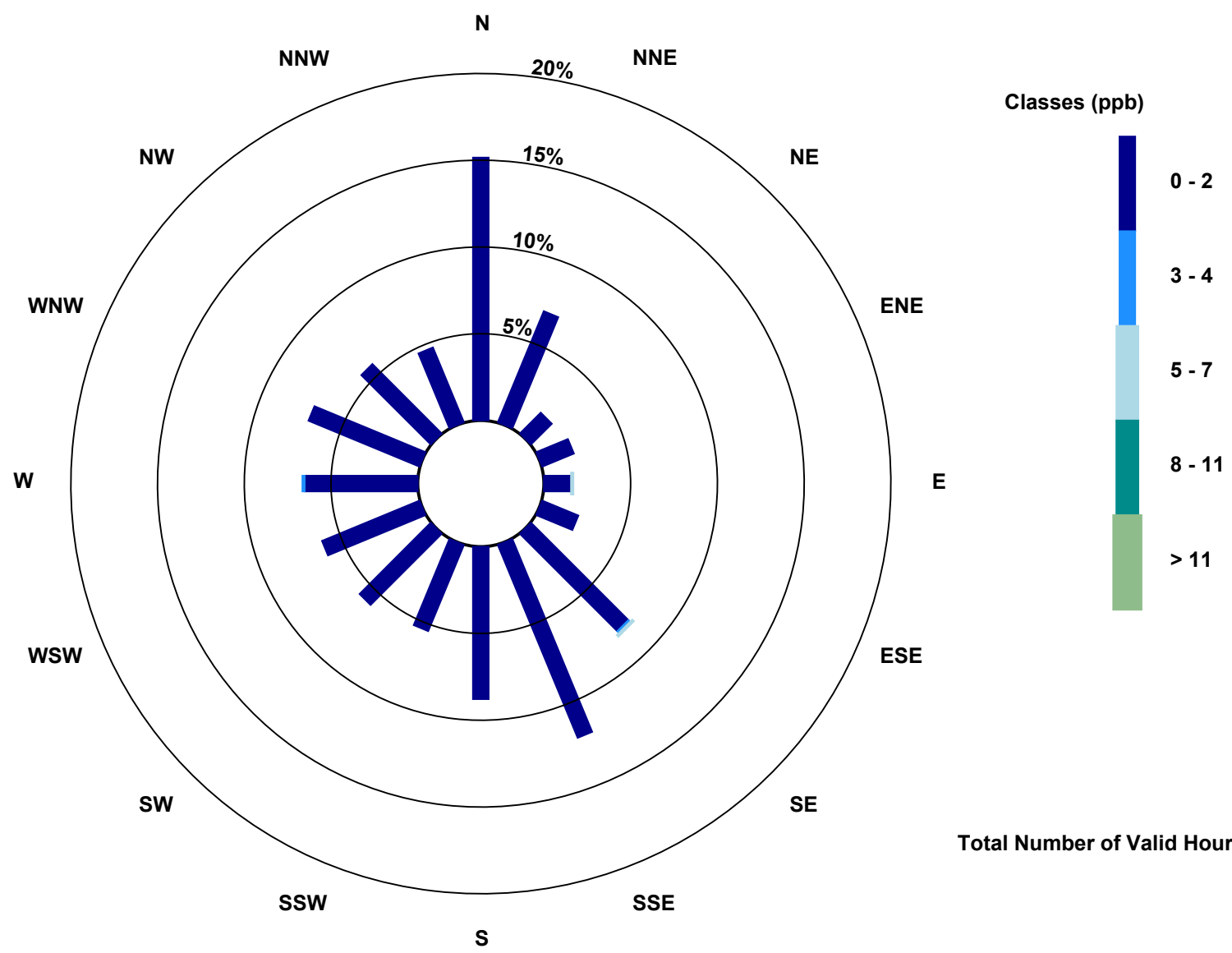
Total Number of Valid Hours: 706

Total Number of Hours: 744

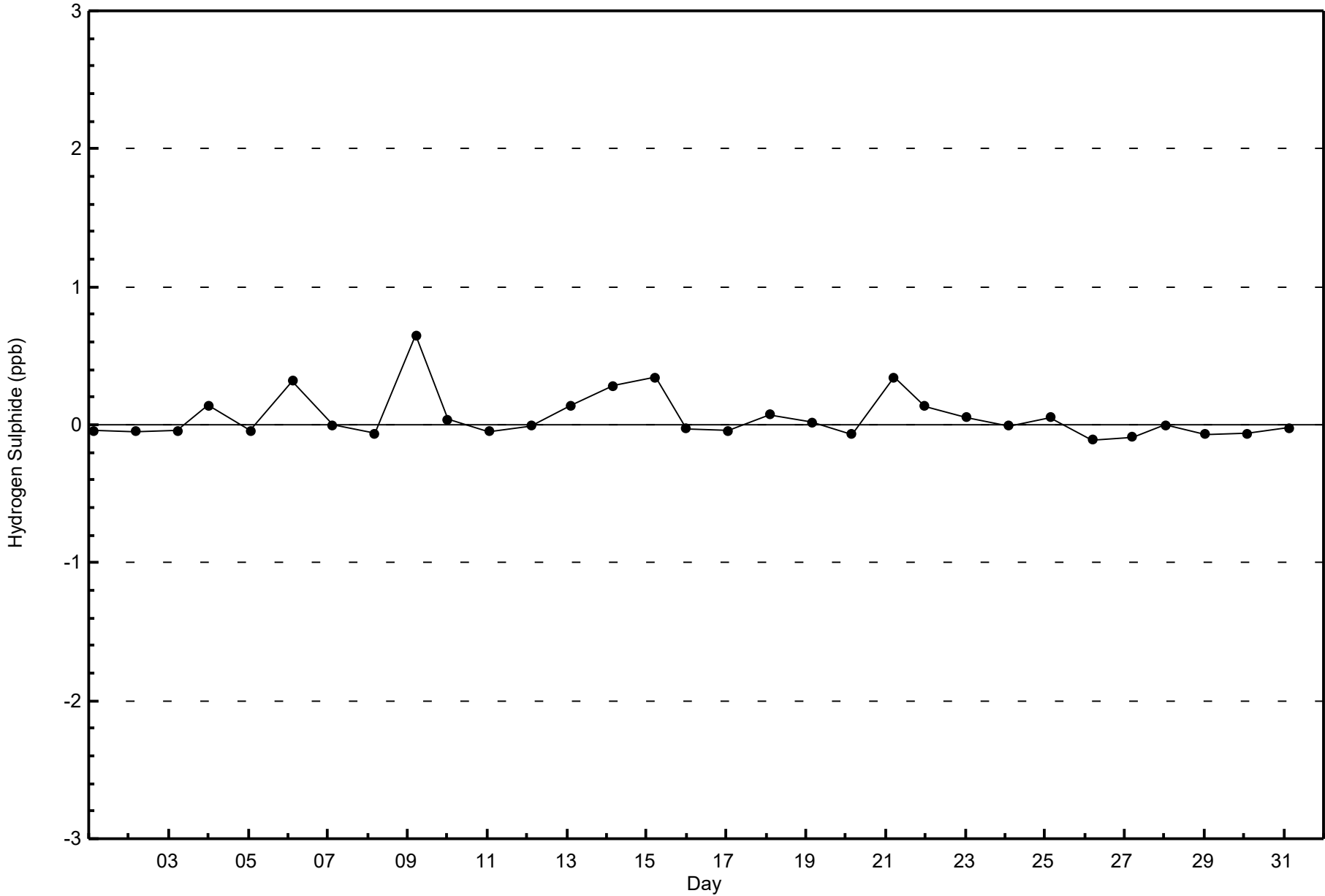


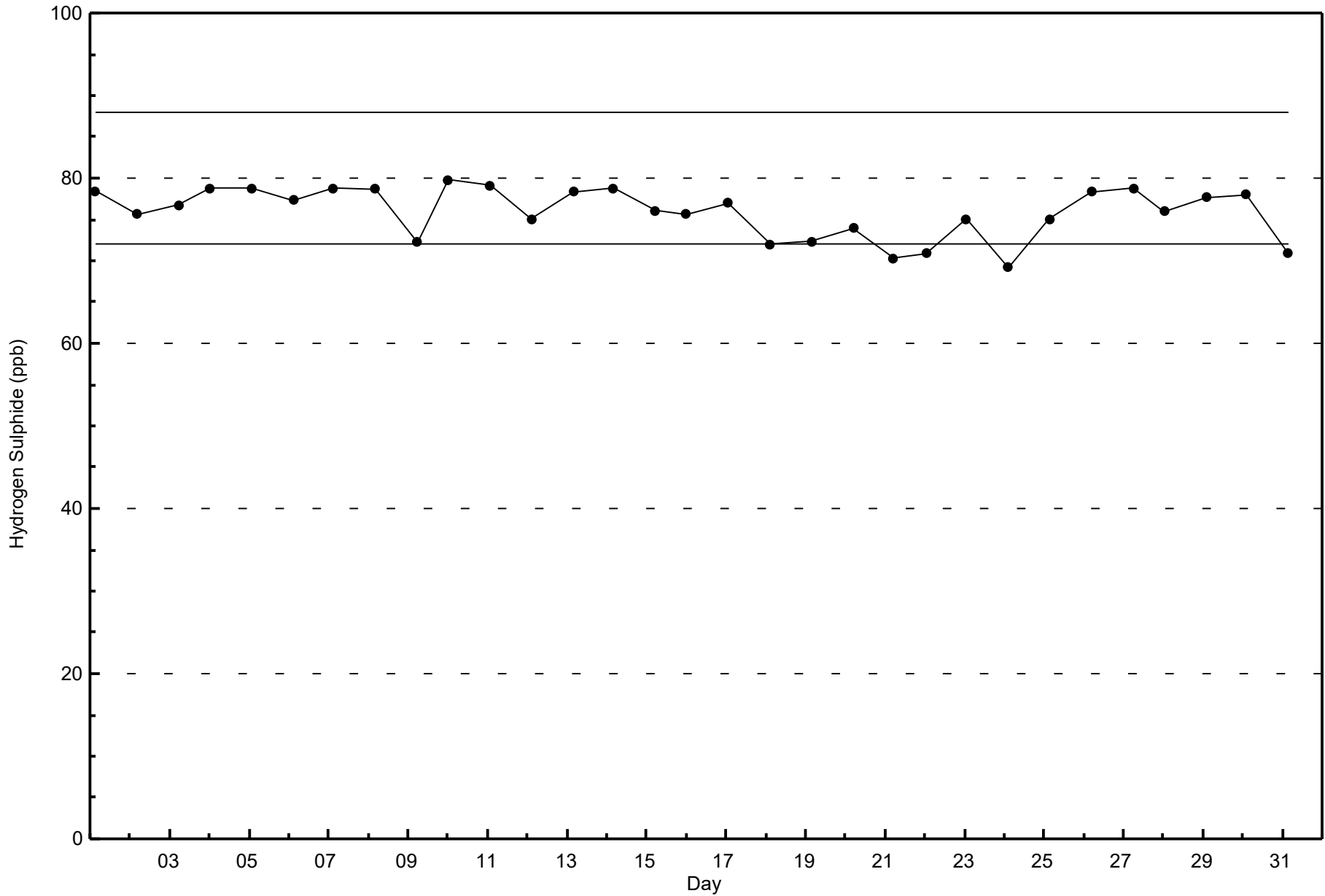
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Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint



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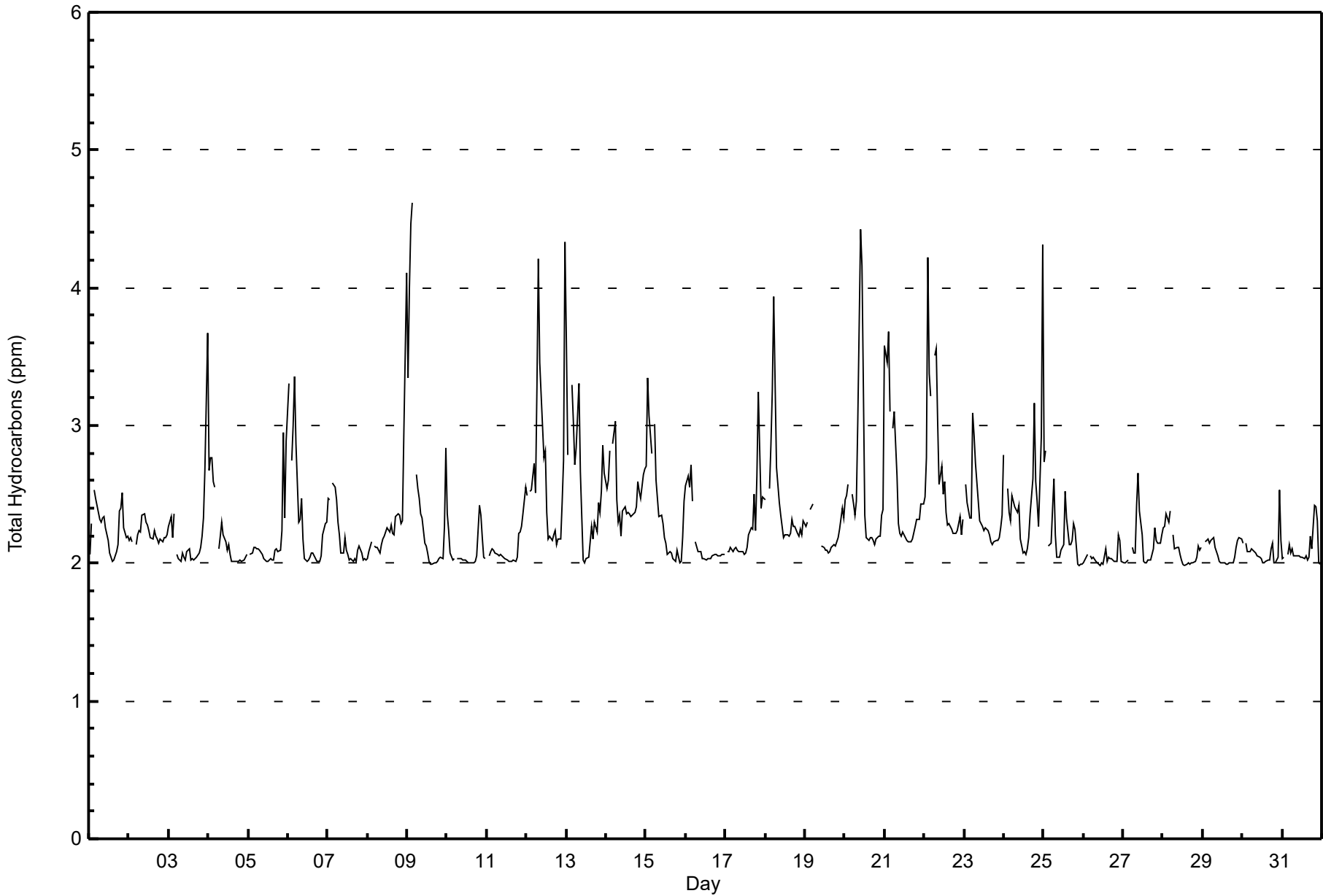






Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	165	23.27	23.27
2.1 - 3.0	506	71.37	94.64
3.1 - 10.0	38	5.36	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
Buffalo Viewpoint - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	26	12	5	6	0	5	17	17	23	16	18	14	1	2	2	1	165
2.1 - 3.0	77	37	7	8	11	11	42	62	46	22	19	24	41	41	32	26	506
3.1 - 10.0	6	0	0	0	1	0	2	1	1	0	0	4	3	5	8	7	38
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	109	49	12	14	12	16	61	80	70	38	37	42	45	48	42	34	709

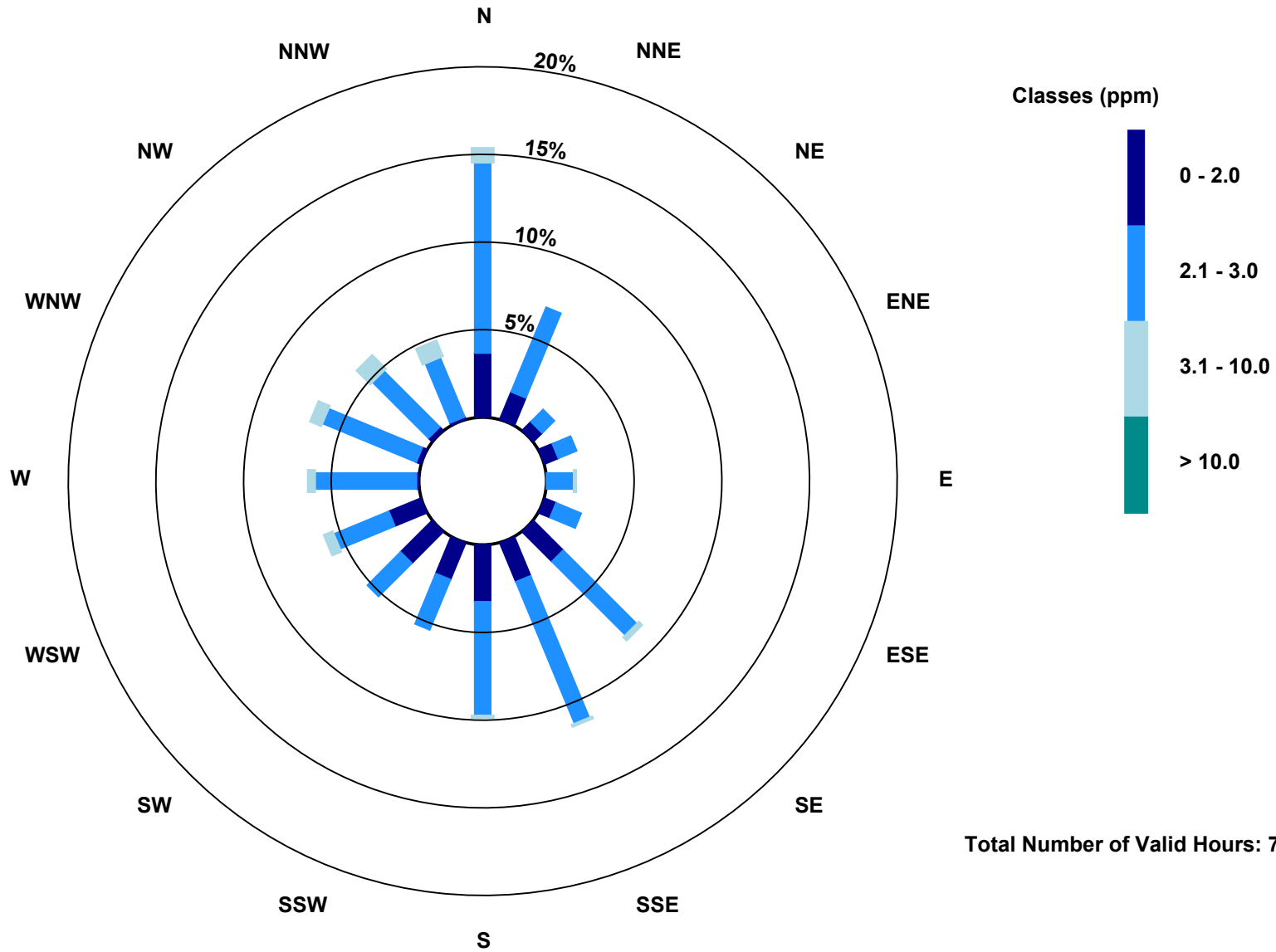
Total Number of Valid Hours: 709

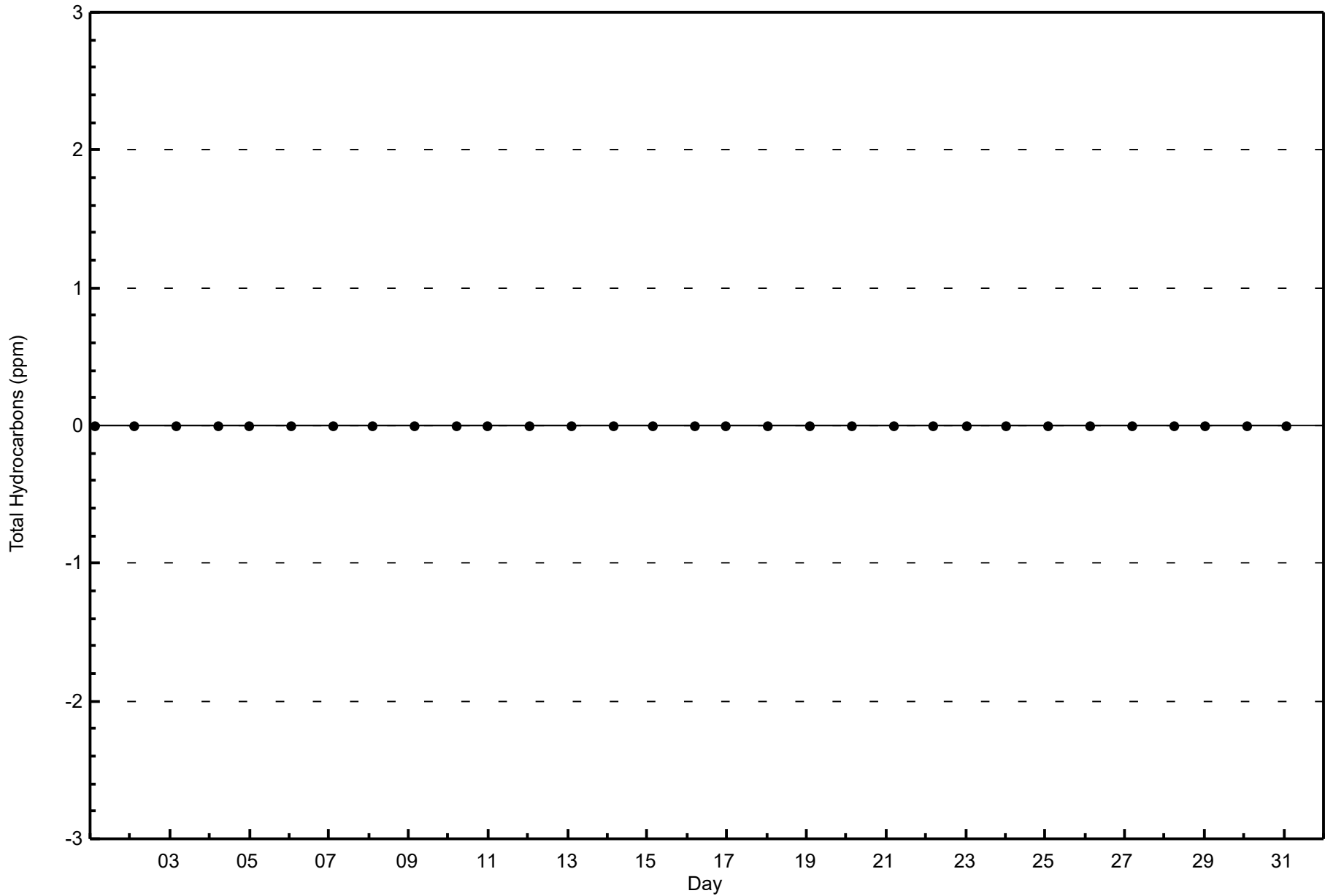
Total Number of Hours: 744

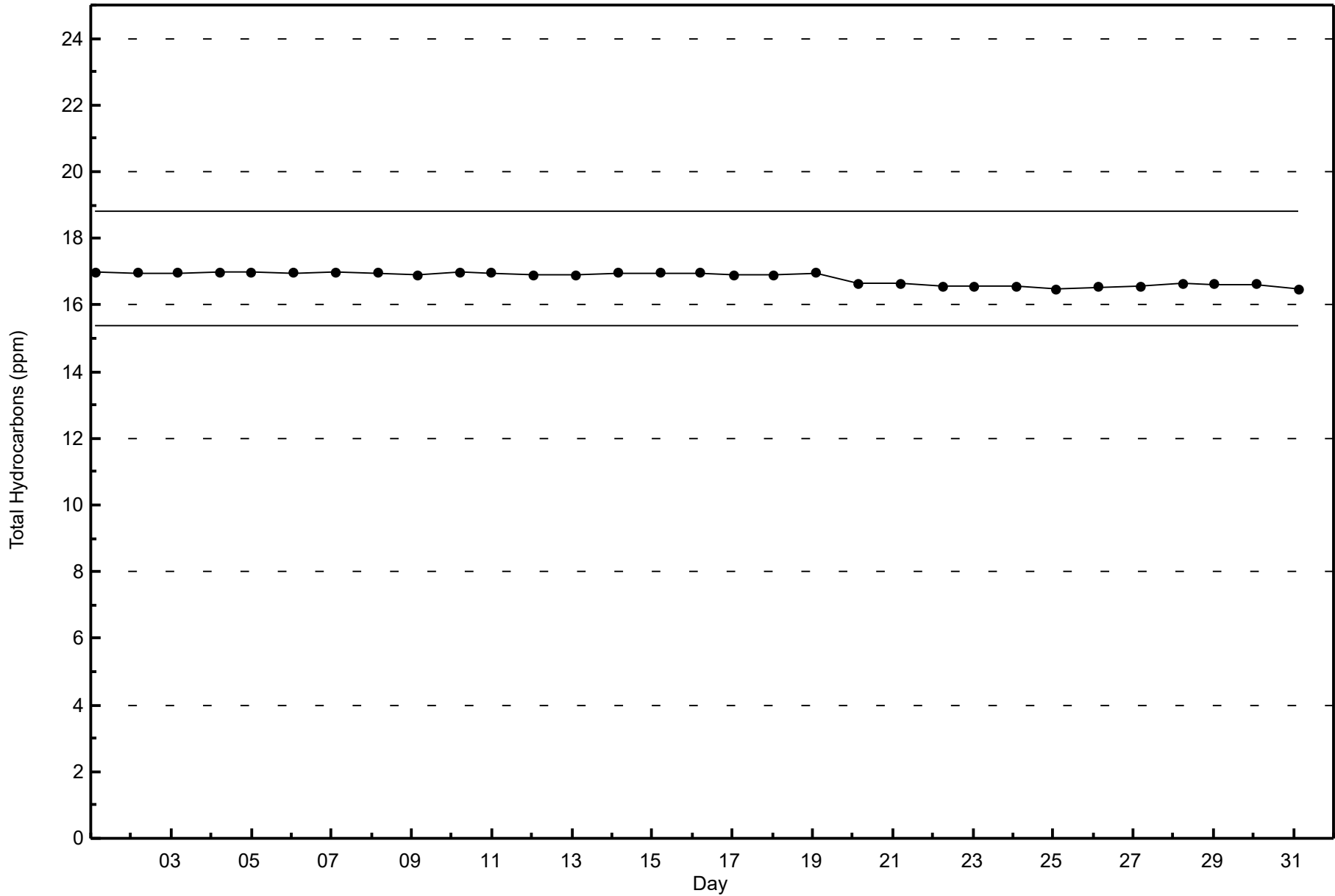


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint

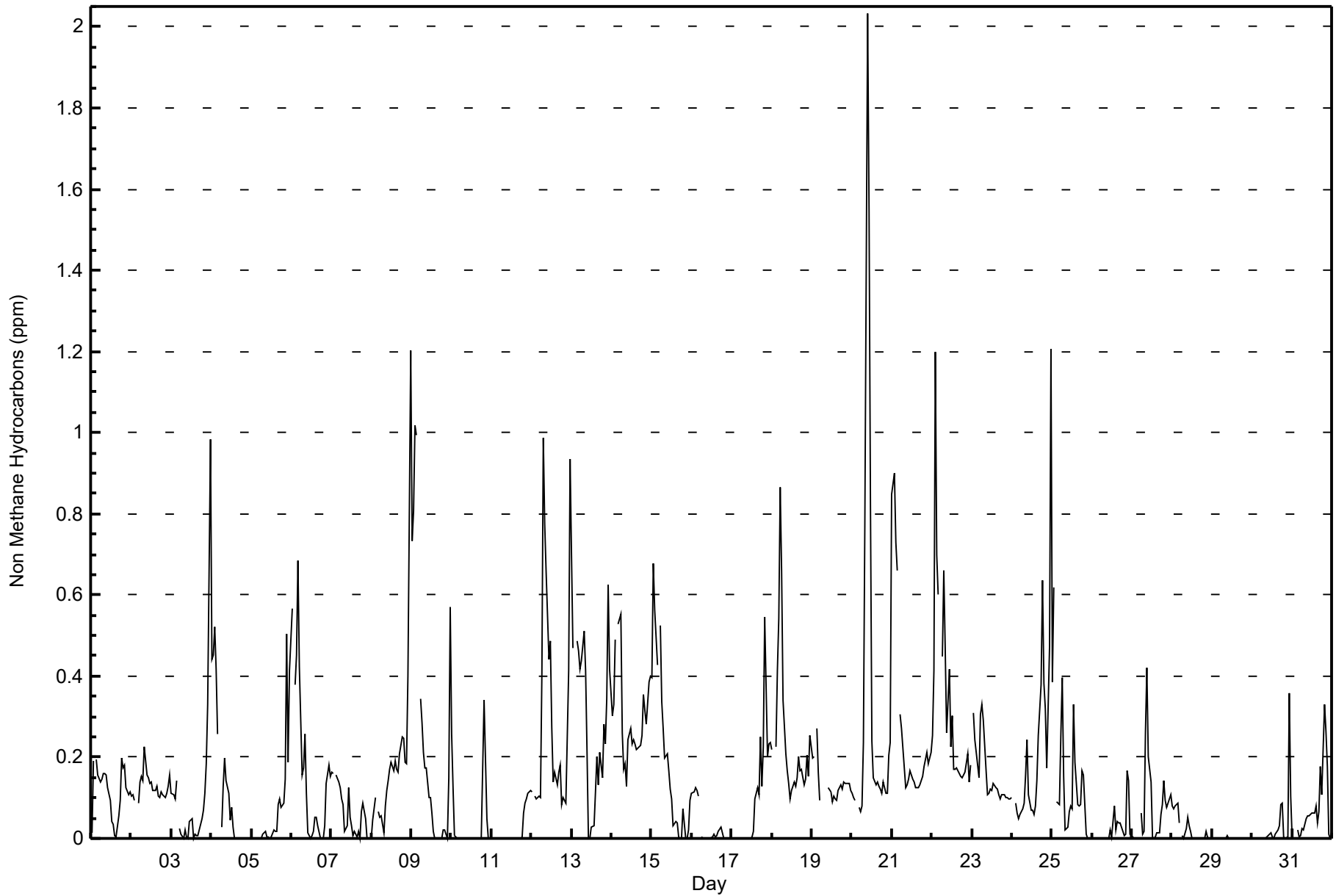








Maximum Value: 2.033 ppm on Jul 20 10:00 Maximum Daily Average: 0.338 ppm on Jul 22																								Hours in Service: 744 Hours of Data: 709			
Minimum Value: 0.000 ppm on Jul 3 08:00 Minimum Daily Average: 0.000 ppm on Jul 29 Maximum Diurnal Average: 0.268 ppm at hour 24 Minimum Diurnal Average: 0.072 ppm at hour 15 Monthly Average: 0.149 ppm Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.2 P ₉₀ = 0.4 P ₉₉ = 1.0																								Hours of Missing Data: 35 Hours of Calibration: 35 Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0.013	0.190	Z	0.193	0.156	0.137	0.147	0.160	0.159	0.157	0.124	0.092	0.041	0.034	0.006	0.005	0.056	0.092	0.199	0.174	0.182	0.123	0.109	0.115	0.116	0.199	
2-Jul	0.103	0.106	0.093	Z	0.087	0.139	0.153	0.143	0.224	0.155	0.148	0.136	0.141	0.119	0.117	0.128	0.104	0.103	0.114	0.109	0.102	0.111	0.128	0.157	0.127	0.224	
3-Jul	0.113	0.108	0.096	0.144	Z	0.026	0.011	0.000	0.021	0.004	0.001	0.043	0.050	0.000	0.010	0.006	0.008	0.020	0.047	0.068	0.110	0.185	0.332	0.984	0.104	0.984	
4-Jul	0.443	0.453	0.521	0.418	0.259	Z	0.028	0.127	0.198	0.142	0.110	0.045	0.076	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.124	0.521	
5-Jul	Z	0.000	0.000	0.000	0.001	0.000	0.000	0.009	0.018	0.005	0.003	0.000	0.002	0.022	0.016	0.016	0.084	0.097	0.078	0.087	0.145	0.502	0.188	0.413	0.073	0.502	
6-Jul	0.568	Z	0.379	0.451	0.683	0.425	0.156	0.174	0.256	0.110	0.014	0.000	0.007	0.018	0.051	0.052	0.031	0.000	0.000	0.000	0.030	0.135	0.179	0.153	0.168	0.683	
7-Jul	0.164	0.160	Z	0.155	0.140	0.126	0.097	0.082	0.018	0.030	0.127	0.050	0.031	0.007	0.017	0.003	0.018	0.001	0.067	0.088	0.049	0.000	0.000	0.000	0.062	0.164	
8-Jul	0.000	0.047	0.099	Z	0.066	0.053	0.057	0.014	0.081	0.118	0.143	0.169	0.188	0.166	0.191	0.169	0.165	0.207	0.250	0.247	0.186	0.185	0.401	1.204	0.192	1.204	
9-Jul	0.733	0.807	1.018	0.994	Z	0.345	0.283	0.212	0.173	0.173	0.102	0.100	0.061	0.017	0.000	0.000	0.000	0.000	0.000	0.022	0.021	0.000	0.150	0.570	0.251	1.018	
10-Jul	0.259	0.125	0.006	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	0.339	0.195	0.049	0.000	0.000	0.042	0.339	
11-Jul	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.061	0.087	0.097	0.110	0.117	0.021	0.117	
12-Jul	0.115	Z	0.105	0.098	0.104	0.100	0.408	0.986	0.775	0.656	0.442	0.485	0.273	0.140	0.165	0.132	0.164	0.180	0.084	0.101	0.086	0.251	0.414	0.936	0.313	0.986	
13-Jul	0.698	0.470	Z	0.487	0.464	0.417	0.437	0.510	0.412	0.216	0.000	0.000	0.028	0.030	0.116	0.201	0.132	0.213	0.149	0.283	0.231	0.345	0.626	0.417	0.299	0.698	
14-Jul	0.302	0.329	0.491	Z	0.527	0.552	0.262	0.170	0.185	0.127	0.242	0.270	0.232	0.243	0.234	0.218	0.227	0.229	0.253	0.356	0.317	0.283	0.387	0.401	0.297	0.552	
15-Jul	0.397	0.677	0.563	0.427	Z	0.524	0.338	0.272	0.199	0.208	0.168	0.123	0.097	0.031	0.040	0.038	0.003	0.002	0.002	0.074	0.000	0.000	0.020	0.093	0.187	0.677	
16-Jul	0.110	0.114	0.124	0.117	0.103	Z	0.002	0.000	0.001	0.000	0.000	0.001	0.002	0.009	0.005	0.006	0.018	0.027	0.015	0.000	0.000	0.000	0.000	0.000	0.028	0.124	
17-Jul	Z	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.003	0.019	0.098	0.126	0.108	0.249	0.130	0.227	0.544	0.200	0.233	0.237	0.095	0.544	
18-Jul	0.219	Z	0.227	0.414	0.540	0.866	0.658	0.341	0.208	0.168	0.136	0.099	0.118	0.138	0.129	0.148	0.201	0.166	0.172	0.131	0.146	0.205	0.155	0.254	0.254	0.866	
19-Jul	0.200	0.203	Z	0.272	0.164	0.092	C	C	C	C	0.124	0.116	0.092	0.105	0.096	0.092	0.120	0.134	0.123	0.138	0.135	0.134	0.134	0.118	0.136	0.272	
20-Jul	0.111	0.100	0.092	Z	0.077	0.066	0.079	0.237	0.768	2.033	1.547	0.820	0.239	0.151	0.131	0.141	0.128	0.122	0.111	0.138	0.110	0.113	0.205	0.238	0.337	2.033	
21-Jul	0.847	0.900	0.731	0.658	Z	0.306	0.271	0.175	0.124	0.133	0.146	0.166	0.148	0.137	0.124	0.125	0.126	0.130	0.153	0.177	0.194	0.213	0.185	0.213	0.277	0.900	
22-Jul	0.252	0.413	1.197	0.698	0.600	Z	0.447	0.661	0.469	0.261	0.417	0.226	0.303	0.170	0.171	0.174	0.160	0.151	0.149	0.156	0.165	0.210	0.137	0.180	0.338	1.197	
23-Jul	Z	0.310	0.243	0.180	0.150	0.307	0.329	0.290	0.168	0.108	0.112	0.120	0.120	0.134	0.124	0.120	0.108	0.099	0.109	0.109	0.100	0.100	0.098	0.098	0.158	0.329	
24-Jul	0.102	Z	0.087	0.063	0.049	0.061	0.073	0.088	0.156	0.243	0.108	0.070	0.071	0.060	0.079	0.141	0.253	0.379	0.636	0.383	0.320	0.174	0.473	1.207	0.229	1.207	
25-Jul	0.387	0.619	Z	0.091	0.084	0.254	0.395	0.154	0.021	0.027	0.067	0.079	0.074	0.329	0.189	0.082	0.081	0.084	0.168	0.157	0.009	0.000	0.000	0.000	0.146	0.619	
26-Jul	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.021	0.005	0.081	0.021	0.043	0.038	0.038	0.018	0.009	0.011	0.166	0.142	0.011	0.026	0.166	
27-Jul	0.005	0.000	0.000	0.001	Z	0.061	0.012	0.016	0.260	0.419	0.202	0.138	0.002	0.000	0.004	0.013	0.013	0.059	0.083	0.141	0.094	0.077	0.097	0.107	0.078	0.419	
28-Jul	0.078	0.072	0.081	0.086	0.040	Z	0.007	0.001	0.024	0.053	0.030	0.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.017	0.003	0.000	0.000	0.022	0.086	
29-Jul	Z	0.000	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	0.000	0.006	0.006
30-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.011	0.014	0.005	0.000	0.012	0.022	0.030	0.083	0.085	0.002	0.001	0.004	0.357	0.103	0.032	0.357	
31-Jul	0.002	0.001	Z	0.021	0.005	0.006	0.023	0.023	0.048	0.055	0.055	0.057	0.063	0.064	0.080	0.037	0.066	0.176	0.108	0.332	0.264	0.178	0.011	0.000	0.073	0.332	
0.239 0.239 0.246 0.230 0.165 0.187 0.156 0.162 0.165 0.187 0.148 0.112 0.080 0.073 0.072 0.072 0.079 0.098 0.107 0.133 0.124 0.130 0.170 0.268																								Diurnal Average			
0.847 0.900 1.197 0.994 0.683 0.866 0.658 0.986 0.775 2.033 1.547 0.820 0.303 0.329 0.234 0.218 0.253 0.379 0.636 0.383 0.544 0.502 0.626 1.207																								Diurnal Maximum			
Z - zerospan C - Calibration																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Buffalo Viewpoint - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	183	25.81	25.81
0.006 - 0.05	93	13.12	38.93
0.06 - 0.1	203	28.63	67.56
> 0.1	230	32.44	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



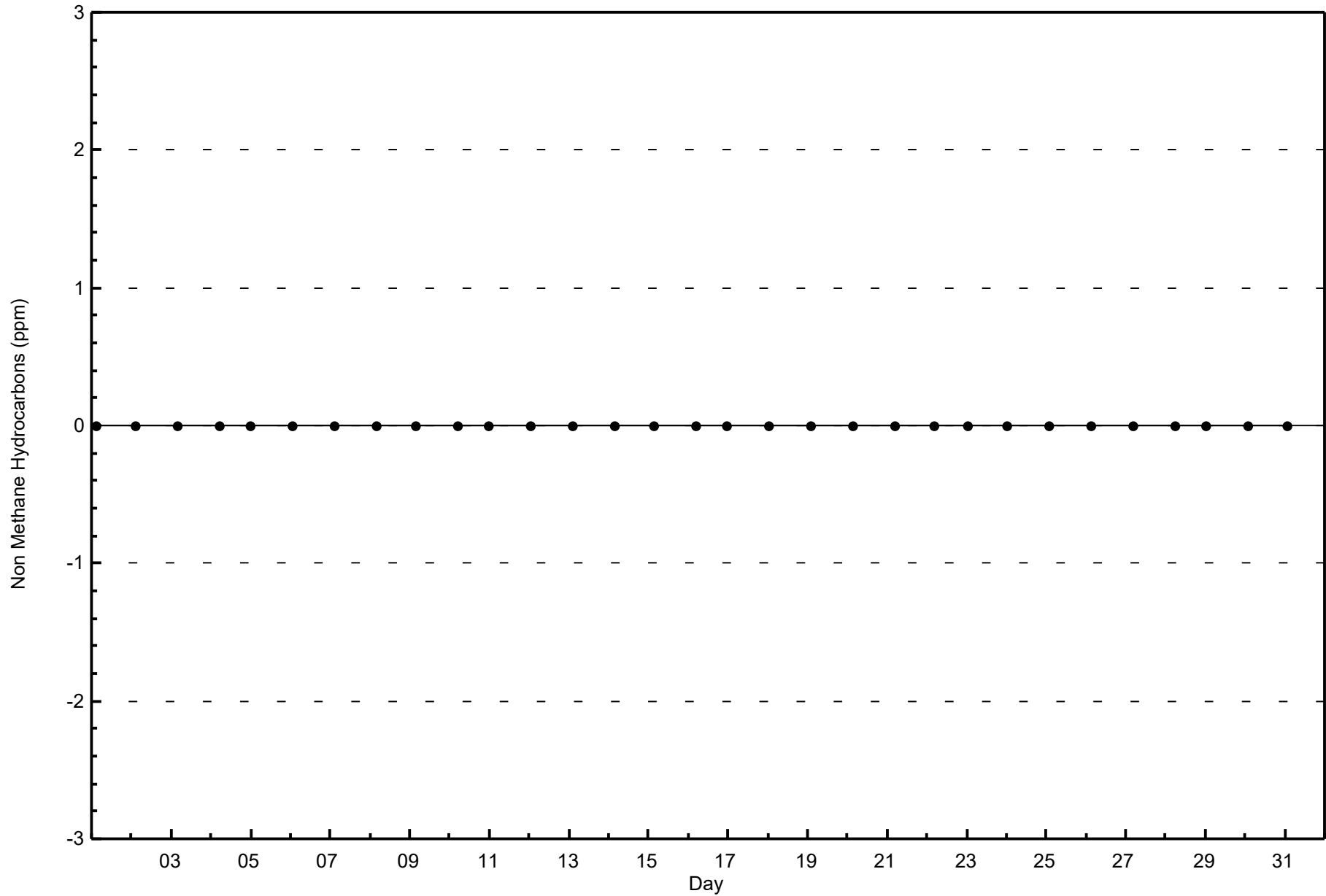
**Wood Buffalo Environmental Association
Frequency Distribution**

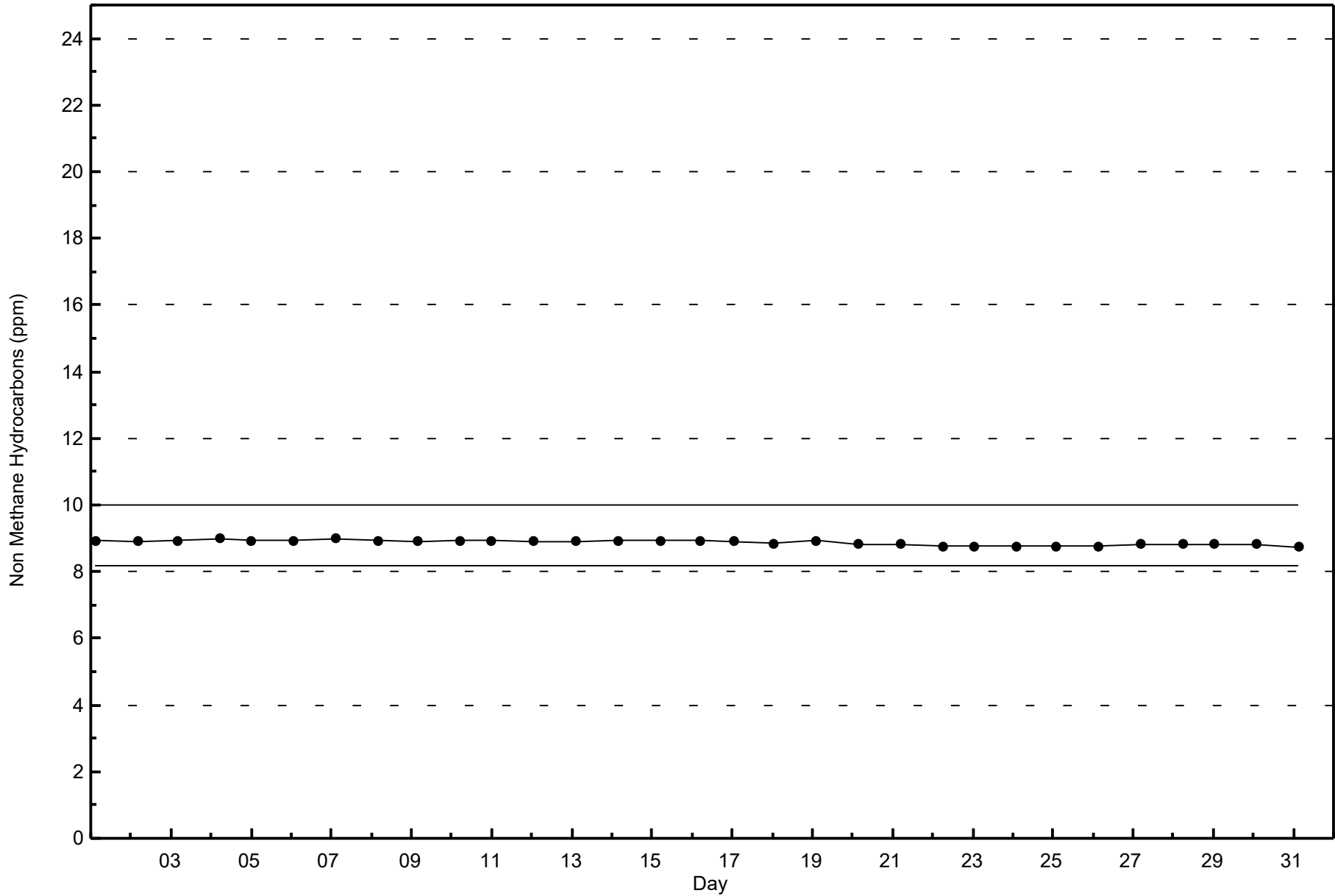
**Non Methane Hydrocarbons (NMHC) - ppm
Buffalo Viewpoint - July 2023**

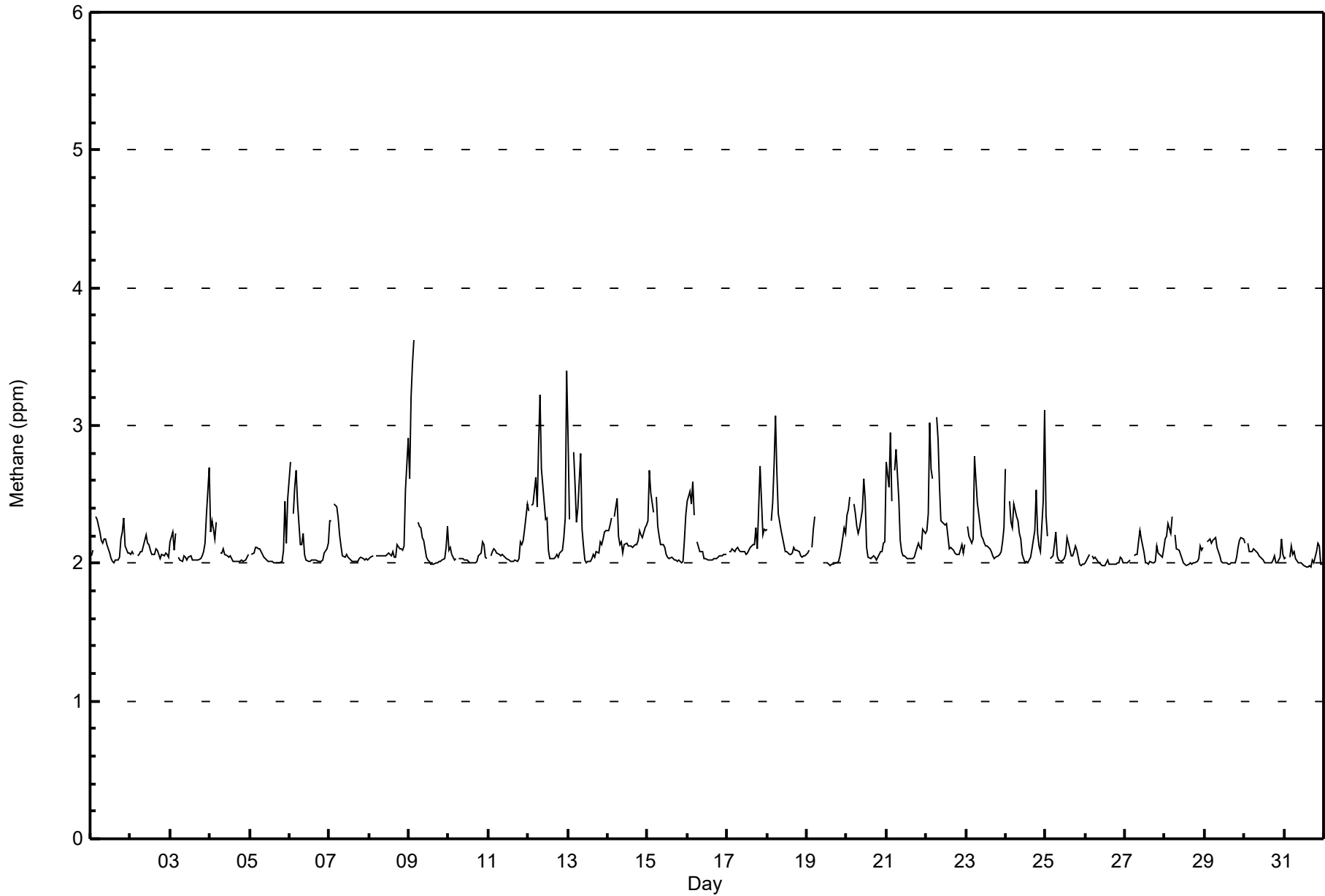
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	12	8	3	4	0	6	30	47	31	15	13	10	1	0	2	1	183
0.006 - 0.05	23	6	4	2	0	1	11	3	11	3	8	10	8	2	0	1	93
0.06 - 0.1	15	10	3	3	3	4	12	24	21	16	13	11	24	26	14	4	203
> 0.1	59	25	2	5	9	5	8	6	7	4	3	11	12	20	26	28	230
Totals	109	49	12	14	12	16	61	80	70	38	37	42	45	48	42	34	709

Total Number of Valid Hours: 709

Total Number of Hours: 744









**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Buffalo Viewpoint - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	265	37.38	37.38
2.1 - 3.0	436	61.50	98.87
3.1 - 10.0	8	1.13	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**

**Methane (CH₄) - ppm
Buffalo Viewpoint - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	45	15	9	7	3	6	22	20	26	22	26	18	19	20	4	3	265
2.1 - 3.0	63	34	3	7	9	10	37	60	44	16	11	24	26	28	35	29	436
3.1 - 10.0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	3	2	8
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	109	49	12	14	12	16	61	80	70	38	37	42	45	48	42	34	709

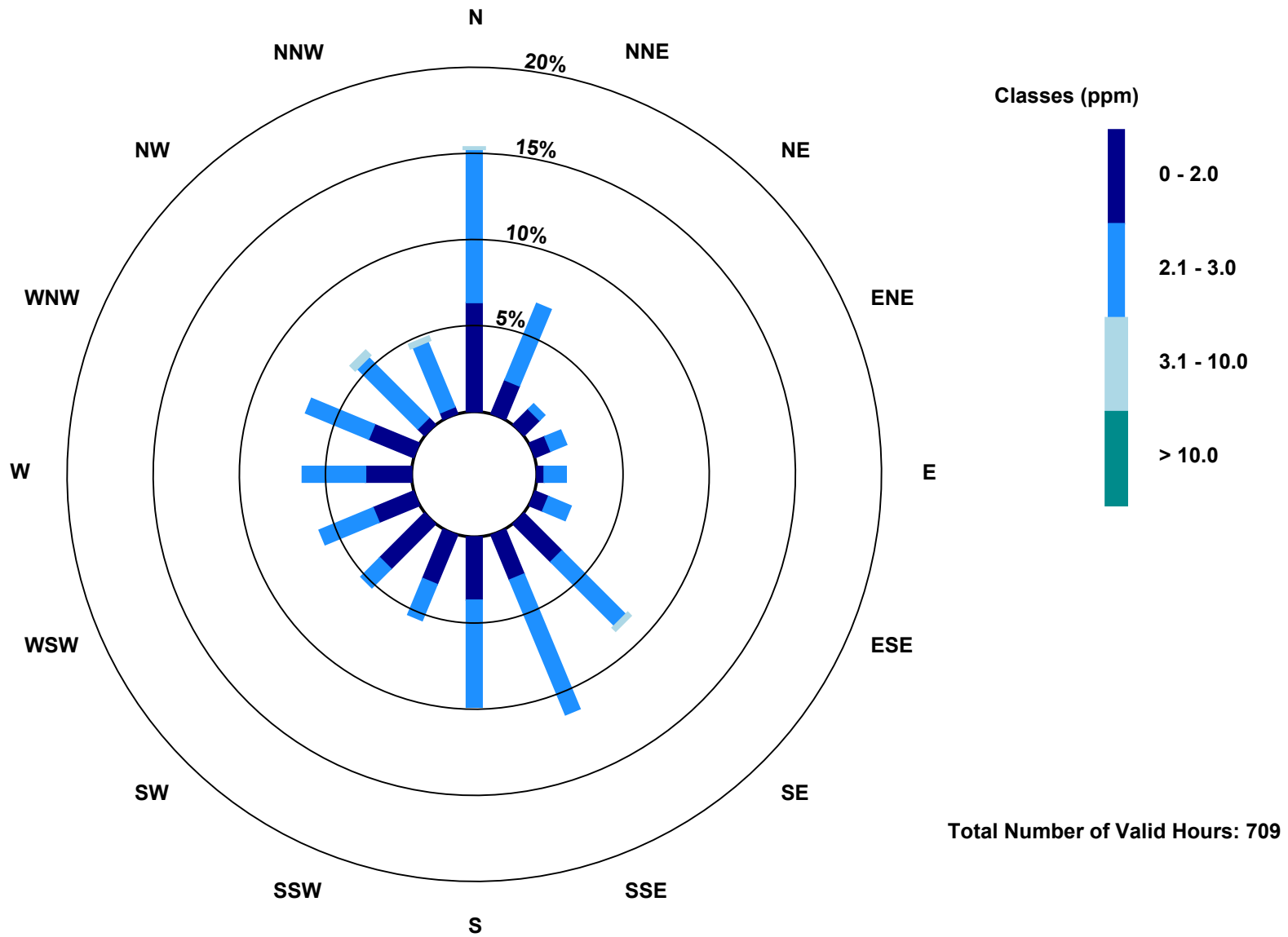
Total Number of Valid Hours: 709

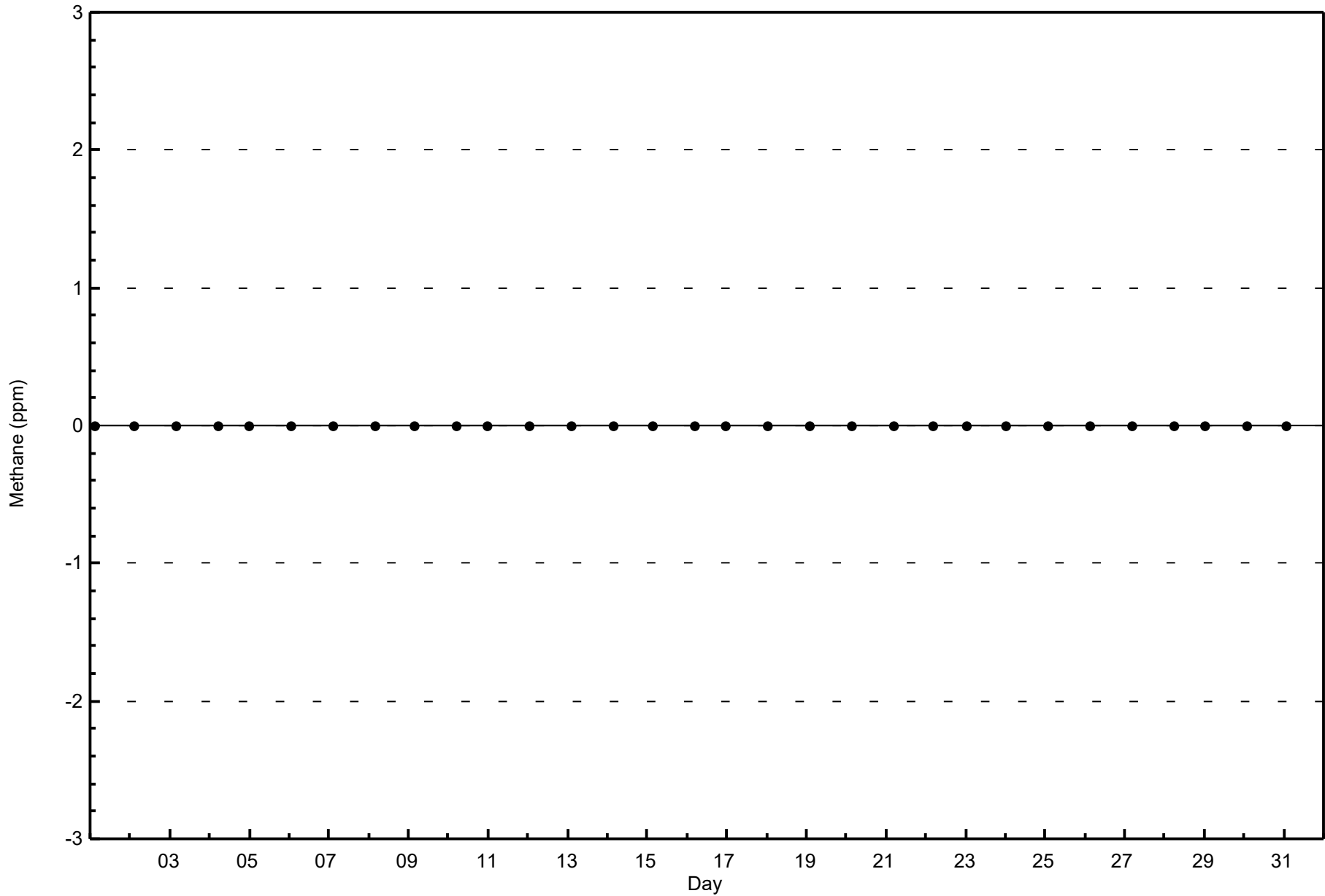
Total Number of Hours: 744

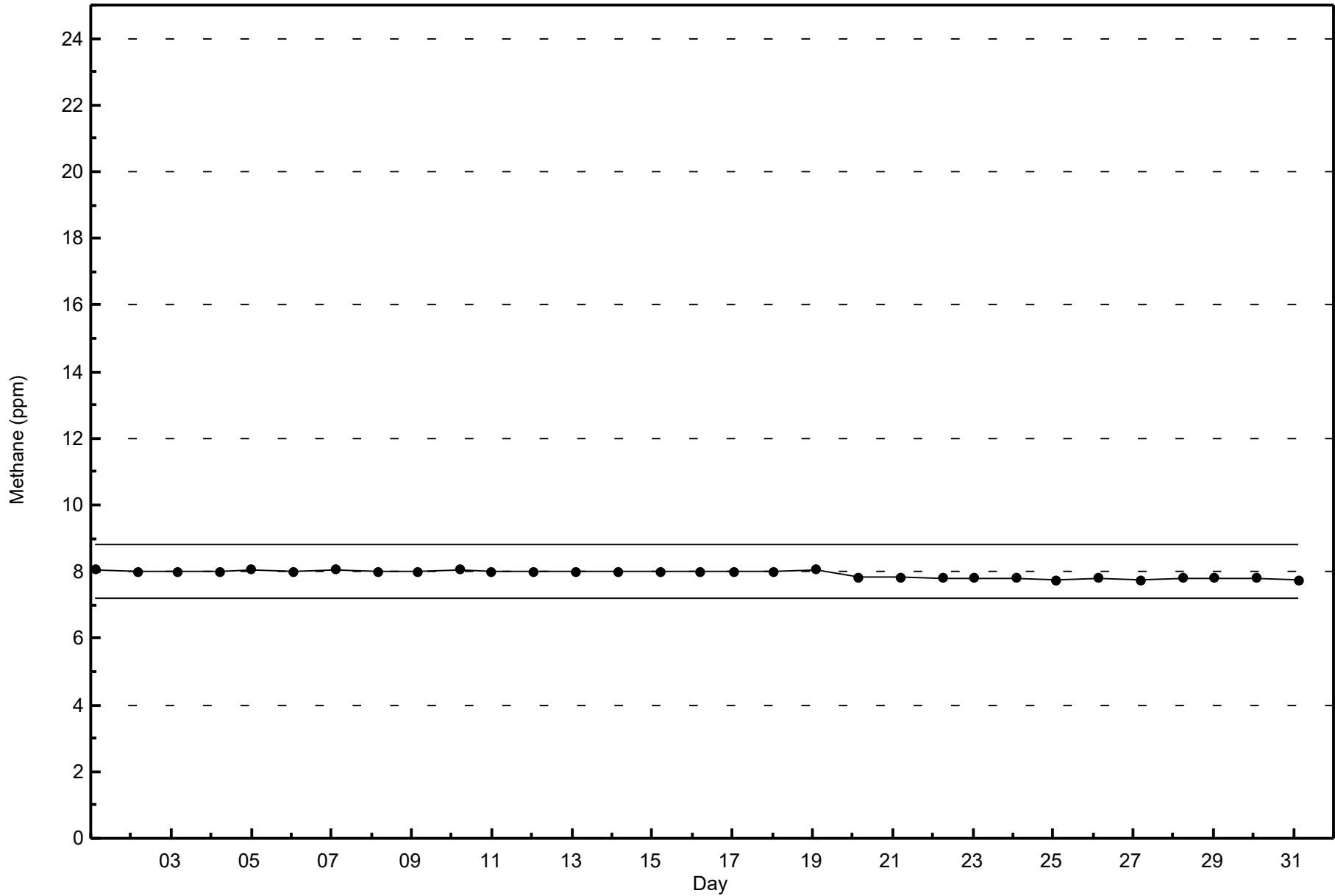


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Methane (CH₄) - ppm
Buffalo Viewpoint



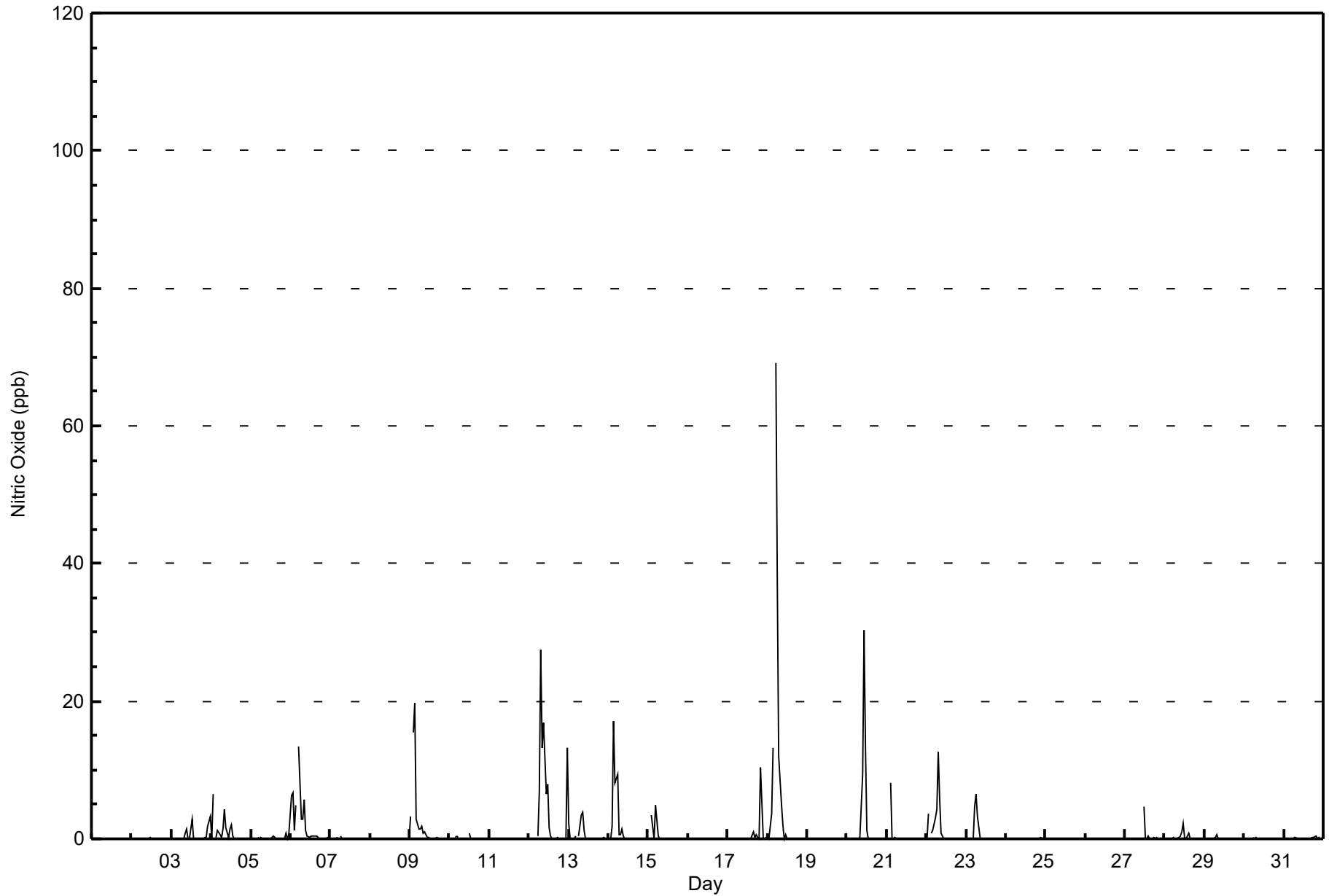






Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Buffalo Viewpoint - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Buffalo Viewpoint - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	670	99.41	99.41
21 - 40	3	0.45	99.85
41 - 80	1	0.15	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 674

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Buffalo Viewpoint - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	105	43	9	10	10	11	52	79	66	39	40	42	47	49	39	29	670
21 - 40	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	3
11 - 80	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	107	43	9	10	10	11	52	79	66	39	40	42	48	49	40	29	674

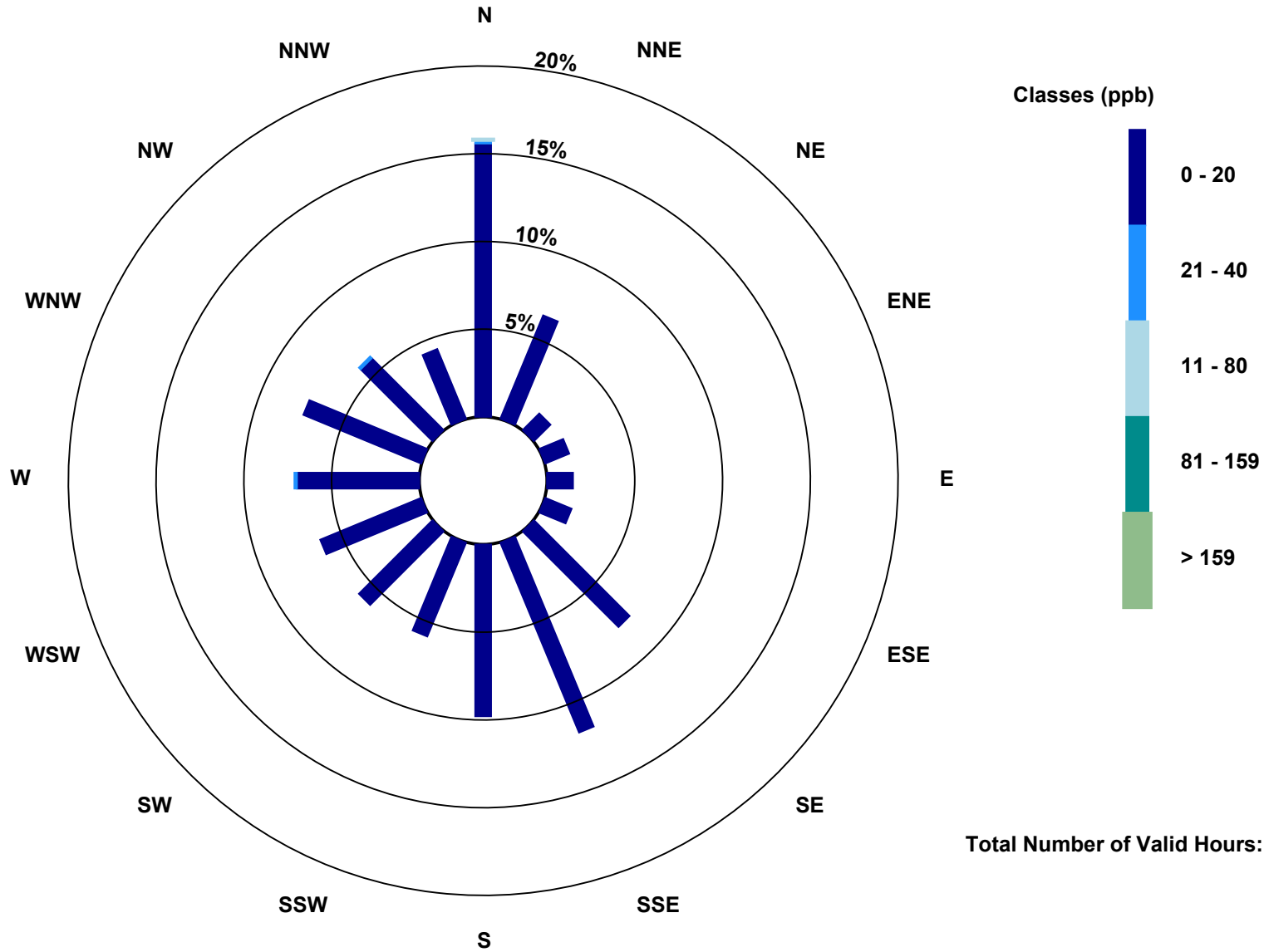
Total Number of Valid Hours: 674

Total Number of Hours: 744

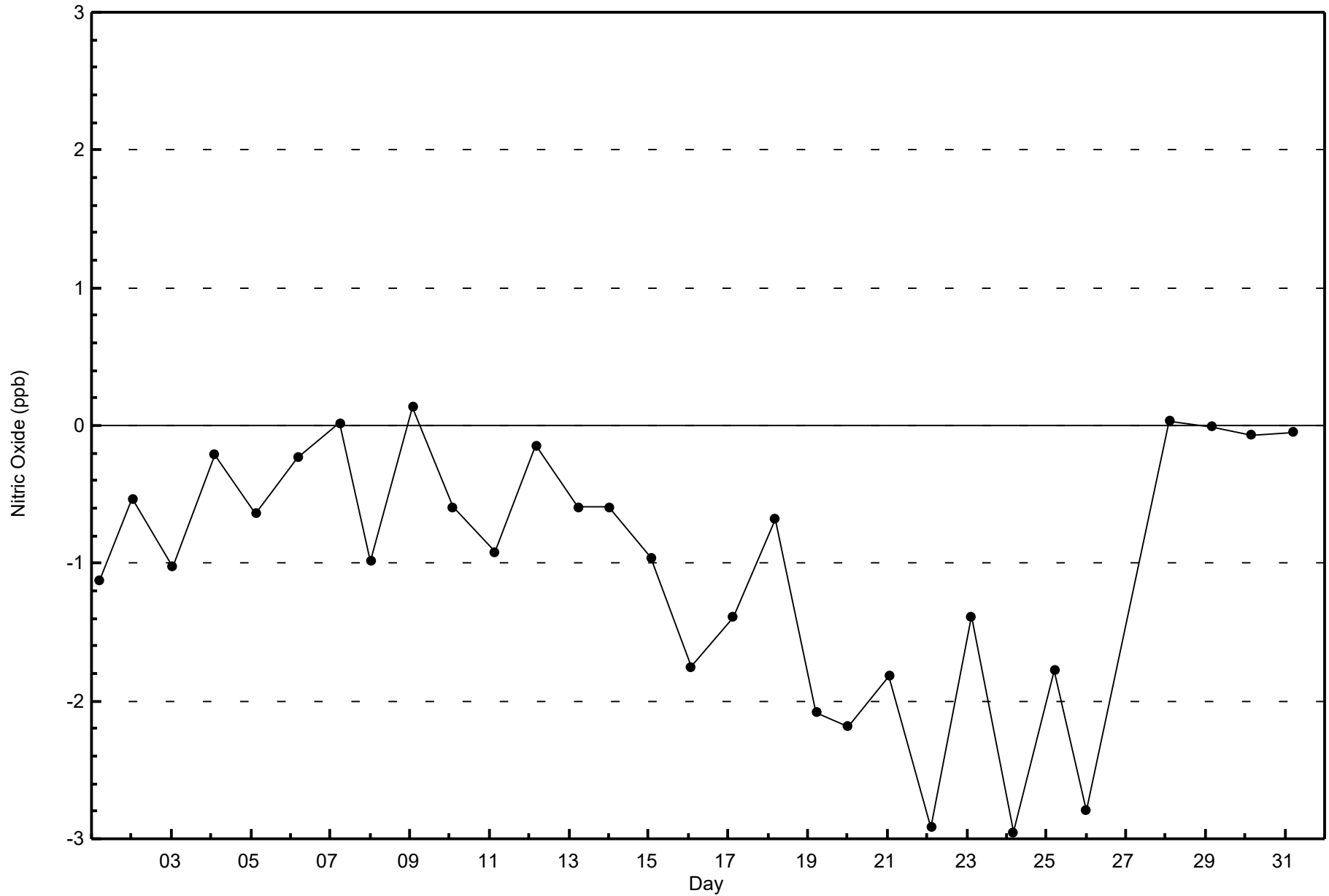


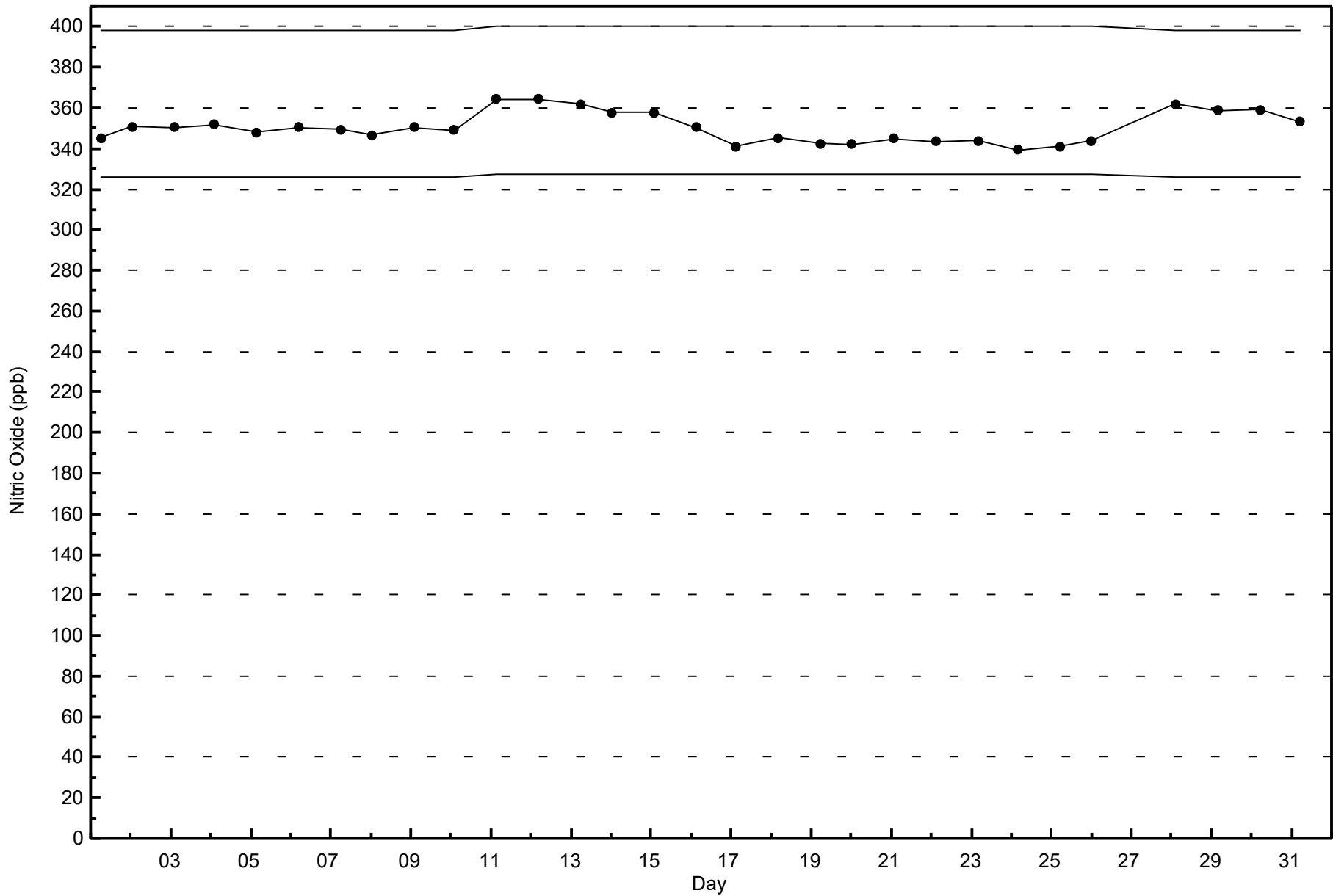
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Buffalo Viewpoint



Total Number of Valid Hours: 674







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Buffalo Viewpoint - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 43.4 ppb on Jul 20 11:00	Maximum Daily Average: 11.3 ppb on Jul 13		Hours of Data:	674
Minimum Value: 0.0 ppb on Jul 1 13:00	Minimum Daily Average: 0.0 ppb on Jul 19		Hours of Missing Data:	70
Maximum Diurnal Average: 7.0 ppb at hour 1	Minimum Diurnal Average: 0.9 ppb at hour 16		Hours of Calibration:	46
Monthly Average: 3.55 ppb	Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.8 Q ₃ = 4.3 P ₉₀ = 10.6 P ₉₉ = 26.2		Percent Operational Time:	96.8

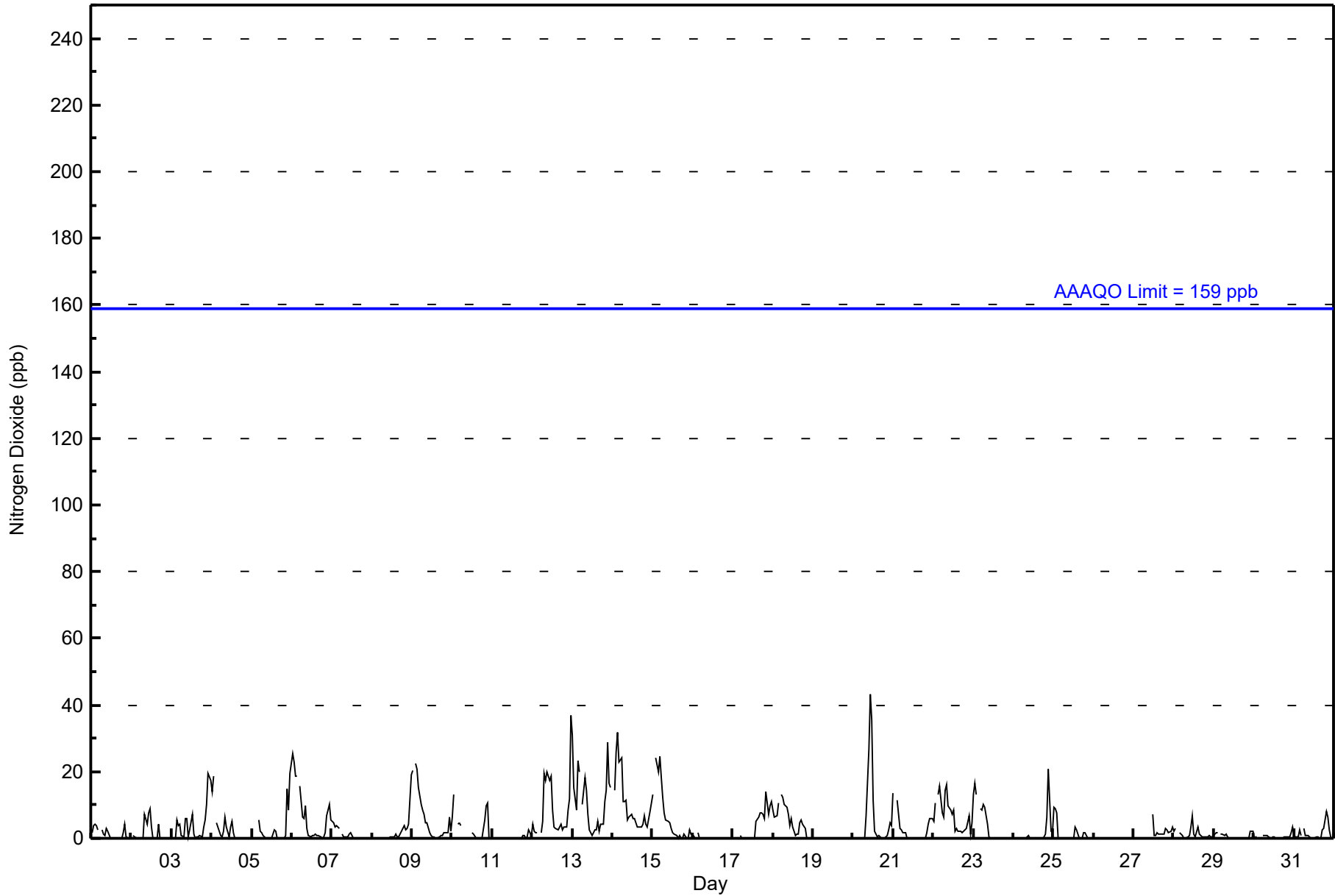
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	1.9	4.0	4.1	3.8	2.5	Z	2.6	1.2	1.0	3.1	2.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	4.2	0.5	0.2	0.0	1.4	4.2																							
2-Jul	Z	0.8	0.4	0.0	0.0	0.2	0.1	0.2	7.1	4.1	7.6	8.9	3.5	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	8.9																							
3-Jul	0.0	Z	0.0	5.5	3.9	4.4	0.9	0.3	5.9	6.0	0.6	2.5	7.4	1.1	0.0	0.6	0.4	1.0	0.3	3.4	5.6	10.3	19.5	17.5	4.2	19.5																							
4-Jul	14.0	18.6	Z	4.7	3.3	0.7	0.3	2.0	6.4	3.4	0.3	3.3	4.9	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	18.6																							
5-Jul	0.0	0.0	0.0	Z	5.4	2.1	1.6	0.8	0.0	0.0	0.0	0.0	0.0	2.4	2.1	0.0	0.0	0.0	0.0	0.0	0.8	15.0	8.6	19.7	2.5	19.7																							
6-Jul	25.4	22.9	18.7	18.6	Z	15.6	6.4	6.1	9.6	2.9	0.7	0.3	0.7	0.9	1.3	0.8	0.9	0.5	0.2	0.5	1.6	6.7	10.0	5.4	6.8	25.4																							
7-Jul	4.9	4.8	3.6	3.7	2.9	Z	1.2	0.3	0.3	0.5	1.3	1.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	4.9																							
8-Jul	Z	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	1.1	0.4	0.5	1.4	3.0	3.9	2.6	2.8	4.3	19.0	1.7	19.0																							
9-Jul	20.3	Z	22.5	20.8	15.2	10.1	8.6	7.2	4.8	4.8	1.9	1.0	0.5	0.4	0.1	0.0	0.6	1.0	1.0	1.8	1.6	1.5	6.3	2.3	5.8	22.5																							
10-Jul	6.3	13.1	Z	4.4	4.8	3.7	C	C	C	C	C	C	1.7	1.1	0.0	0.0	0.0	0.0	0.0	5.7	9.8	10.7	0.0	0.0	--	13.1																							
11-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.8	0.7	0.1	0.5	2.5	0.7	0.3	2.5																							
12-Jul	4.3	2.0	1.8	1.7	Z	1.5	5.1	19.3	17.4	20.0	17.3	18.8	8.6	3.6	3.0	2.5	3.2	4.1	2.6	3.4	3.3	8.4	12.0	36.8	8.7	36.8																							
13-Jul	31.1	15.3	8.4	23.5	20.1	Z	10.2	18.1	14.2	7.3	2.6	1.7	0.9	2.7	2.6	5.0	2.1	4.1	4.2	11.0	14.5	28.7	16.6	15.3	11.3	31.1																							
14-Jul	Z	14.2	26.0	31.7	22.8	24.3	11.1	10.9	11.5	5.3	6.5	7.1	6.0	5.8	4.7	3.6	3.5	3.2	4.3	6.9	4.1	3.2	8.1	10.4	10.2	31.7																							
15-Jul	13.1	Z	24.2	20.1	24.7	18.1	12.4	7.8	5.3	5.2	4.5	2.8	1.6	1.2	0.9	3.2	0.2	0.7	0.2	1.4	0.0	0.2	2.6	1.3	6.5	24.7																							
16-Jul	1.2	0.1	Z	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.5																							
17-Jul	0.0	0.0	0.0	Z	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	6.5	7.5	7.8	7.0	5.9	14.0	7.4	9.7	11.1	3.6	14.0																							
18-Jul	8.5	6.4	6.6	10.5	Z	13.0	12.1	10.0	9.5	7.0	3.9	6.0	3.4	0.7	1.2	1.4	4.6	5.5	4.3	2.9	0.0	0.0	0.0	0.0	5.1	13.0																							
19-Jul	0.0	0.0	0.0	0.0	0.0	Z	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	26.6	43.4	35.5	11.5	2.3	0.6	0.7	0.6	0.0	0.0	0.0	0.7	2.5	4.6	3.9	6.1	43.4																							
21-Jul	13.5	Z	11.5	7.4	2.9	2.7	1.9	1.6	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	4.4	5.8	6.0	2.6	13.5																							
22-Jul	5.0	10.4	Z	13.3	15.5	7.8	6.4	14.6	15.9	9.8	8.6	7.4	8.4	2.3	2.8	2.2	2.1	1.7	2.3	2.5	2.8	6.7	1.3	4.5	6.7	15.9																							
23-Jul	13.0	16.4	13.1	Z	8.8	8.5	10.2	9.2	4.2	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	3.6	16.4																							
24-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.4	6.4	20.9	2.3	1.7	1.5	20.9																							
25-Jul	9.2	8.8	7.5	0.0	0.0	Z	3.5	M	M	M	M	M	0.0	3.2	2.7	0.0	0.0	0.0	1.9	1.5	0.0	0.0	0.0	0.0	2.1	9.2																							
26-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	C	C	C	C	C	M	M	M	M	M	M	M	M	M	M	M	M	M	--	0.0																						
27-Jul	M	M	M	M	M	M	C	C	C	C	C	7.0	0.7	0.7	1.5	1.1	1.1	1.4	1.4	3.1	2.4	1.9	2.3	3.2	--	7.0																							
28-Jul	2.3	2.9	Z	1.5	1.1	0.9	0.2	0.0	0.3	1.0	3.6	6.8	1.4	0.4	3.6	1.3	0.7	0.6	0.4	0.5	0.5	0.7	0.4	0.4	1.4	6.8																							
29-Jul	0.9	1.8	1.7	Z	1.4	1.1	0.8	1.2	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	2.2	2.2	0.6	2.2																								
30-Jul	0.2	0.3	0.2	0.0	Z	0.9	0.9	0.7	0.7	0.5	0.2	0.3	0.3	0.1	0.2	0.0	0.0	0.2	0.3	0.4	0.5	0.3	1.6	3.5	0.5	3.5																							
31-Jul	0.9	0.5	0.4	2.7	0.7	Z	2.9	0.8	0.7	0.4	0.2	0.1	0.2	0.3	0.3	0.1	0.1	2.6	3.0	8.0	6.3	2.6	0.4	0.2	1.5	8.0																							
																								7.0	5.5	6.0	7.0	5.5	4.8	3.6	4.2	4.5	4.0	3.9	4.0	2.1	1.0	1.1	0.9	1.1	1.2	1.3	2.2	2.8	4.5	4.0	5.5	Diurnal Average	
																								31.1	22.9	26.0	31.7	24.7	24.3	12.4	19.3	17.4	26.6	43.4	35.5	11.5	5.8	5.1	6.5	7.5	7.8	7.0	11.0	14.5	28.7	19.5	36.8	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Buffalo Viewpoint - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Buffalo Viewpoint - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	656	97.33	97.33
21 - 40	17	2.52	99.85
41 - 80	1	0.15	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 674

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Buffalo Viewpoint - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	104	43	9	9	10	11	52	79	66	39	40	42	47	47	34	24	656
21 - 40	3	0	0	1	0	0	0	0	0	0	0	0	0	2	6	5	17
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	107	43	9	10	10	11	52	79	66	39	40	42	48	49	40	29	674

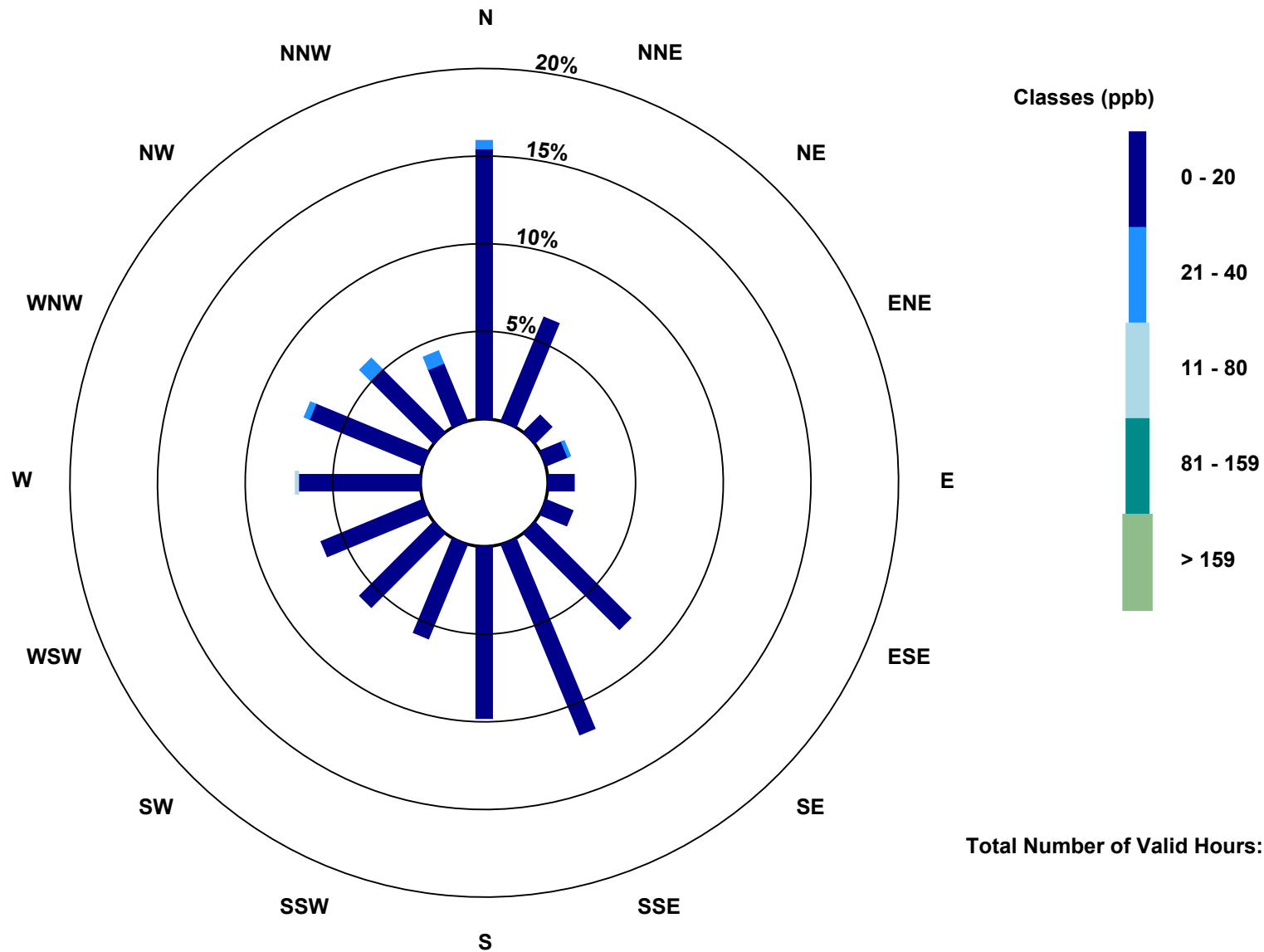
Total Number of Valid Hours: 674

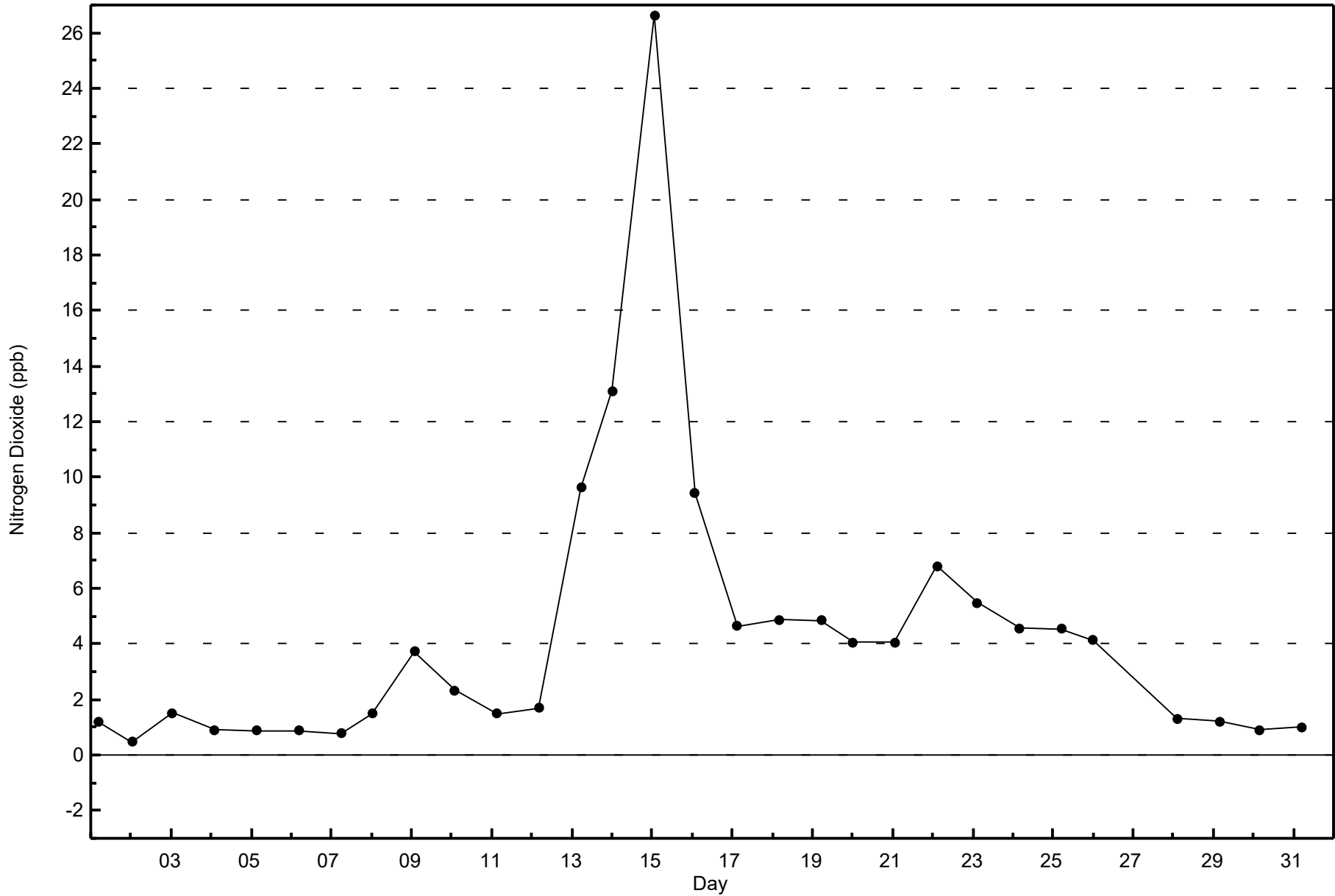
Total Number of Hours: 744

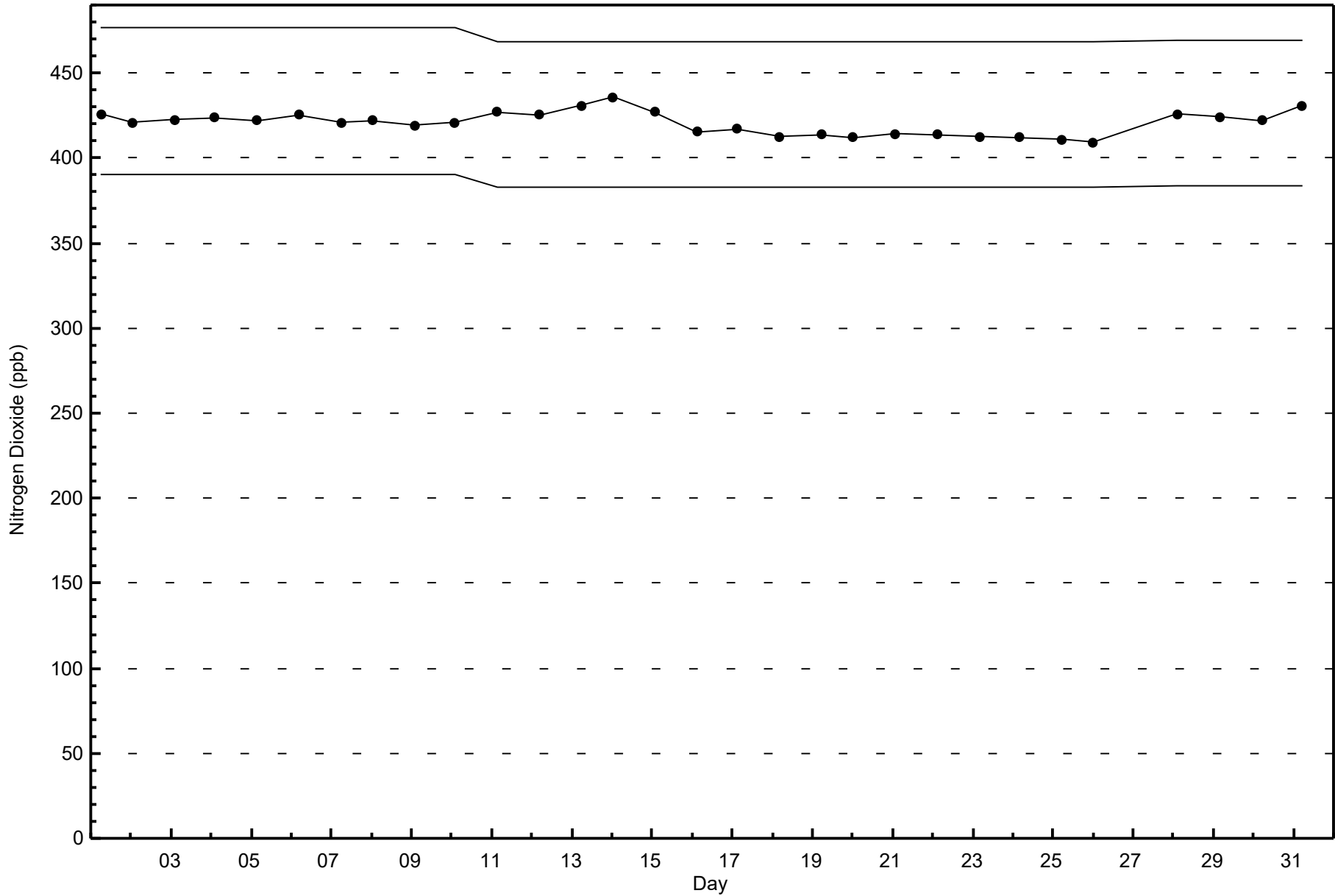


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Buffalo Viewpoint









Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
Buffalo Viewpoint - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 82.2 ppb on Jul 18 06:00	Maximum Daily Average: 12.8 ppb on Jul 12
Minimum Value: 0.0 ppb on Jul 1 13:00	Hours of Data: 674
Maximum Diurnal Average: 9.3 ppb at hour 4	Hours of Missing Data: 70
Monthly Average: 4.39 ppb	Hours of Calibration: 46
Minimum Daily Average: 0.0 ppb on Jul 19	Percent Operational Time: 96.8
Minimum Diurnal Average: 0.9 ppb at hour 16	
Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.9 Q ₃ = 4.5 P ₉₀ = 12.8 P ₉₉ = 42.2	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	1.9	4.1	4.2	3.8	2.5	Z	2.6	1.2	1.0	3.1	2.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	4.2	0.5	0.2	0.0	1.4	4.2	
2-Jul	Z	0.8	0.4	0.0	0.0	0.2	0.1	0.2	7.1	4.1	7.6	9.2	3.5	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	9.2	
3-Jul	0.0	Z	0.0	5.5	3.9	4.4	0.9	0.3	6.8	7.5	0.6	2.5	10.3	1.1	0.0	0.6	0.4	1.0	0.3	3.4	5.7	10.4	21.3	20.7	4.7	21.3	
4-Jul	14.0	25.0	Z	4.8	4.5	1.3	0.6	3.5	10.7	5.0	0.5	4.6	6.9	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	25.0	
5-Jul	0.0	0.0	0.0	Z	5.6	2.1	1.7	0.8	0.0	0.0	0.0	0.0	0.0	2.8	2.3	0.0	0.0	0.0	0.0	0.0	0.8	15.8	8.6	20.2	2.6	20.2	
6-Jul	31.7	29.7	19.9	23.5	Z	29.1	9.2	9.0	15.4	4.1	1.0	0.5	1.2	1.3	1.6	1.2	1.2	0.5	0.2	0.5	1.6	6.7	10.3	5.4	8.9	31.7	
7-Jul	4.9	4.8	3.6	3.7	3.1	Z	1.7	0.3	0.3	0.5	1.3	1.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	4.9	
8-Jul	Z	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	1.1	0.4	0.5	1.4	3.0	3.9	2.6	2.8	4.3	19.1	1.7	19.1	
9-Jul	23.6	Z	37.9	40.5	18.0	11.4	10.1	9.0	5.5	5.8	2.1	1.2	0.5	0.4	0.1	0.0	0.8	1.0	1.0	1.8	1.6	1.5	6.3	2.7	8.0	40.5	
10-Jul	6.3	13.2	Z	4.6	5.1	4.0	C	C	C	C	C	C	2.6	1.2	0.0	0.0	0.0	0.0	0.0	5.7	9.8	10.7	0.0	0.0	--	13.2	
11-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.8	0.7	0.1	0.5	2.5	0.7	0.3	2.5	
12-Jul	4.3	2.0	1.8	1.7	Z	1.8	11.9	46.8	30.7	36.8	23.8	26.7	10.2	4.0	3.0	2.6	3.2	4.4	2.6	3.4	3.3	8.4	12.0	50.0	12.8	50.0	
13-Jul	33.3	15.3	8.4	23.5	20.5	Z	10.6	21.6	18.1	8.5	2.6	1.7	0.9	2.7	2.6	5.0	2.1	4.1	4.2	11.0	14.5	28.9	16.6	15.3	11.8	33.3	
14-Jul	Z	14.3	27.9	48.7	31.0	33.7	11.7	11.5	12.9	5.7	6.5	7.1	6.0	5.8	4.7	3.6	3.5	3.2	4.3	6.9	4.1	3.2	8.1	10.4	11.9	48.7	
15-Jul	13.1	Z	27.7	20.1	29.5	20.7	12.9	7.8	5.3	5.2	4.5	2.8	1.6	1.2	0.9	0.2	0.7	0.2	0.2	1.4	0.0	0.2	2.6	1.3	6.9	29.5	
16-Jul	1.2	0.1	Z	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.5	
17-Jul	0.0	0.0	0.0	Z	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	7.4	7.7	8.4	7.2	5.9	24.4	7.4	9.7	11.3	4.1	24.4	
18-Jul	8.7	6.4	10.4	23.6	Z	82.2	49.9	22.1	14.7	9.0	3.9	6.5	3.4	0.7	1.2	1.4	4.6	5.5	4.3	2.9	0.0	0.0	0.0	0.0	11.4	82.2	
19-Jul	0.0	0.0	0.0	0.0	0.0	Z	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	36.0	73.8	48.9	12.8	2.3	0.6	0.7	0.6	0.0	0.0	0.0	0.7	2.5	4.6	3.9	8.4	73.8	
21-Jul	13.5	Z	19.6	7.4	2.9	2.9	1.9	1.6	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	4.4	5.8	6.0	2.9	19.6	
22-Jul	5.0	14.2	Z	14.0	16.7	10.9	10.6	27.3	21.9	10.7	8.6	7.4	8.4	2.3	2.8	2.2	2.1	1.7	2.3	2.5	2.8	6.7	1.3	4.5	8.1	27.3	
23-Jul	13.0	16.4	13.1	Z	8.8	13.1	16.7	12.4	4.2	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	4.3	16.7	
24-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.4	6.4	21.1	2.3	1.7	1.5	21.1	
25-Jul	9.2	8.8	7.5	0.0	0.0	Z	3.5	M	M	M	M	M	0.0	3.2	2.7	0.0	0.0	0.0	1.9	1.5	0.0	0.0	0.0	0.0	2.1	9.2	
26-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	C	C	C	C	C	M	M	M	M	M	M	M	M	M	M	M	M	M	--	0.0
27-Jul	M	M	M	M	M	M	C	C	C	C	C	C	11.8	0.8	0.7	1.8	1.1	1.1	1.7	1.5	3.3	2.4	1.9	2.3	3.2	--	11.8
28-Jul	2.3	2.9	Z	1.5	1.1	1.1	0.3	0.0	0.5	1.3	4.6	9.0	1.7	0.4	4.4	1.3	0.7	0.6	0.4	0.5	0.5	0.7	0.4	0.4	1.6	9.0	
29-Jul	0.9	1.8	1.7	Z	1.4	1.1	1.0	1.8	0.5	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	2.2	2.2	0.7	2.2	0.7	2.2
30-Jul	0.2	0.3	0.2	0.0	Z	1.0	0.9	0.9	0.7	0.5	0.2	0.3	0.4	0.1	0.2	0.0	0.0	0.2	0.3	0.5	0.5	0.3	1.6	3.5	0.6	3.5	
31-Jul	0.9	0.5	0.4	2.7	0.7	Z	3.1	0.9	0.8	0.4	0.2	0.1	0.2	0.3	0.3	0.1	0.2	2.9	3.2	8.3	6.3	2.7	0.4	0.3	1.6	8.3	

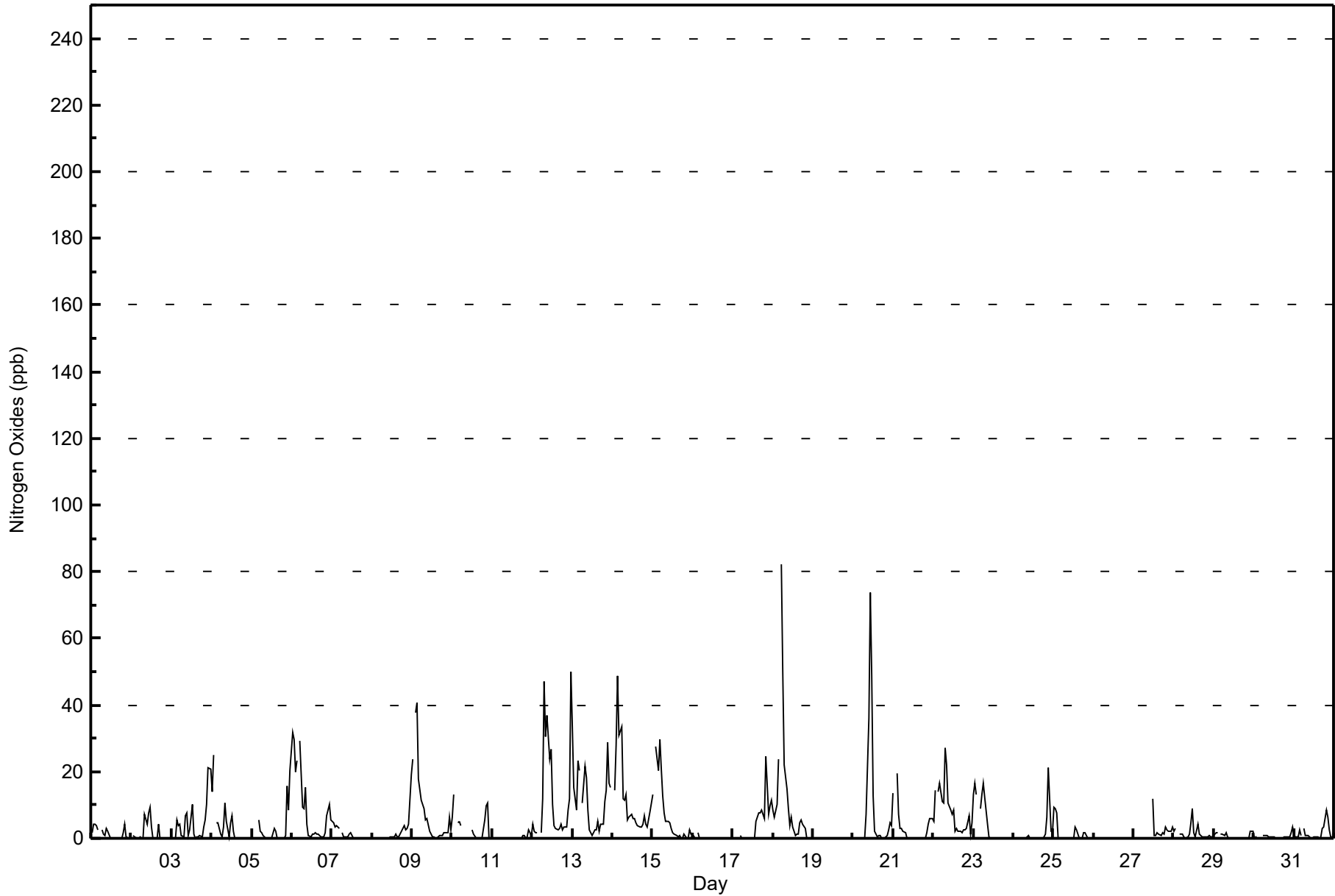
7.5	6.2	7.4	9.3	6.2	9.2	5.8	6.6	6.1	5.4	5.3	5.1	2.4	1.1	1.2	0.9	1.1	1.2	1.3	2.2	3.1	4.6	4.1	6.1	Diurnal Average	
33.3	29.7	37.9	48.7	31.0	82.2	49.9	46.8	30.7	36.8	73.8	48.9	12.8	5.8	5.1	7.4	7.7	8.4	7.2	11.0	24.4	28.9	21.3	50.0	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Buffalo Viewpoint - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Buffalo Viewpoint - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	636	94.36	94.36
21 - 40	30	4.45	98.81
41 - 80	7	1.04	99.85
81 - 159	1	0.15	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 674

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Buffalo Viewpoint - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	96	43	9	9	10	11	52	79	66	39	40	42	46	45	30	19	636
21 - 40	8	0	0	1	0	0	0	0	0	0	0	0	1	4	7	9	30
11 - 80	2	0	0	0	0	0	0	0	0	0	0	0	1	0	3	1	7
81 - 159	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	107	43	9	10	10	11	52	79	66	39	40	42	48	49	40	29	674

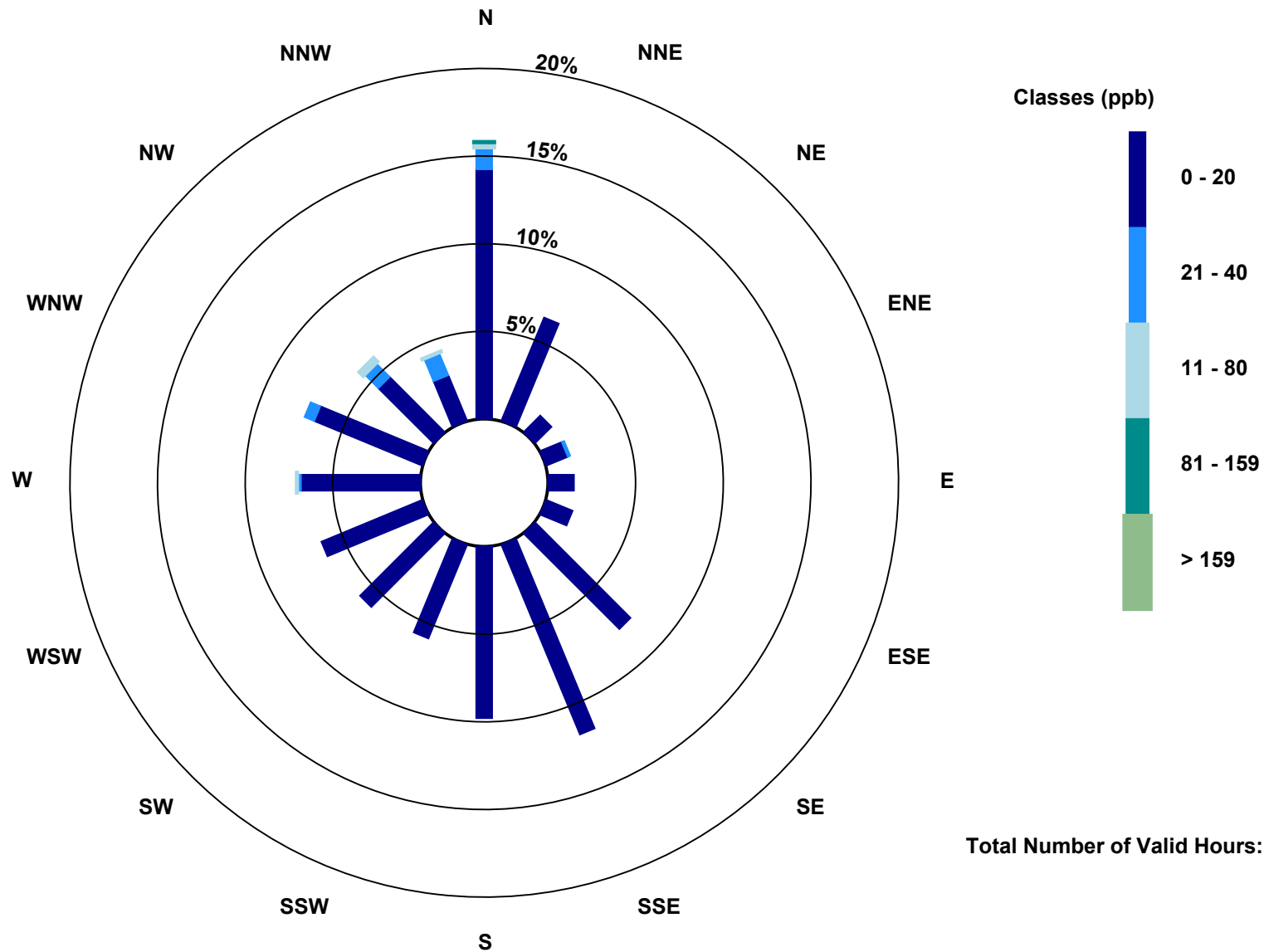
Total Number of Valid Hours: 674

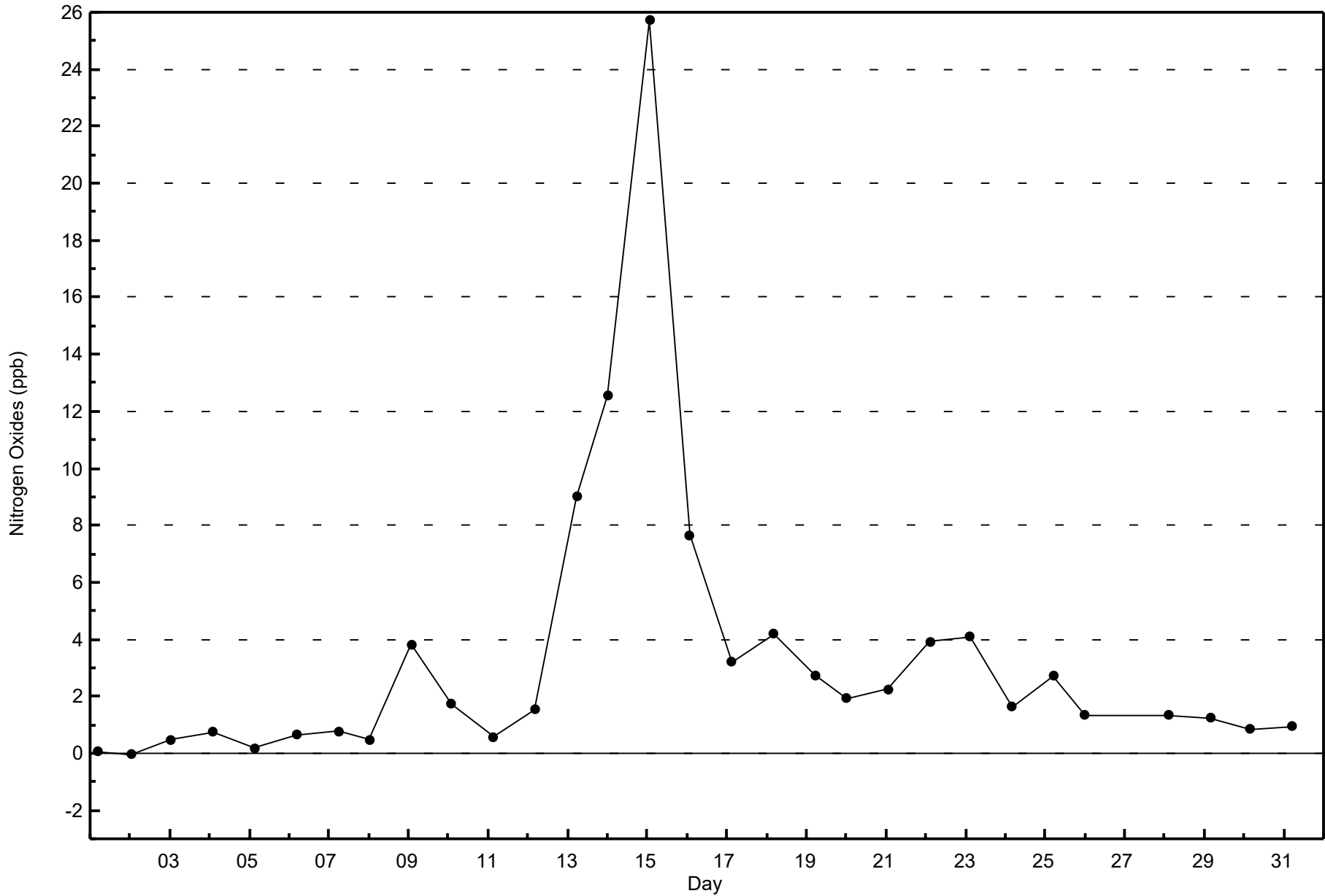
Total Number of Hours: 744

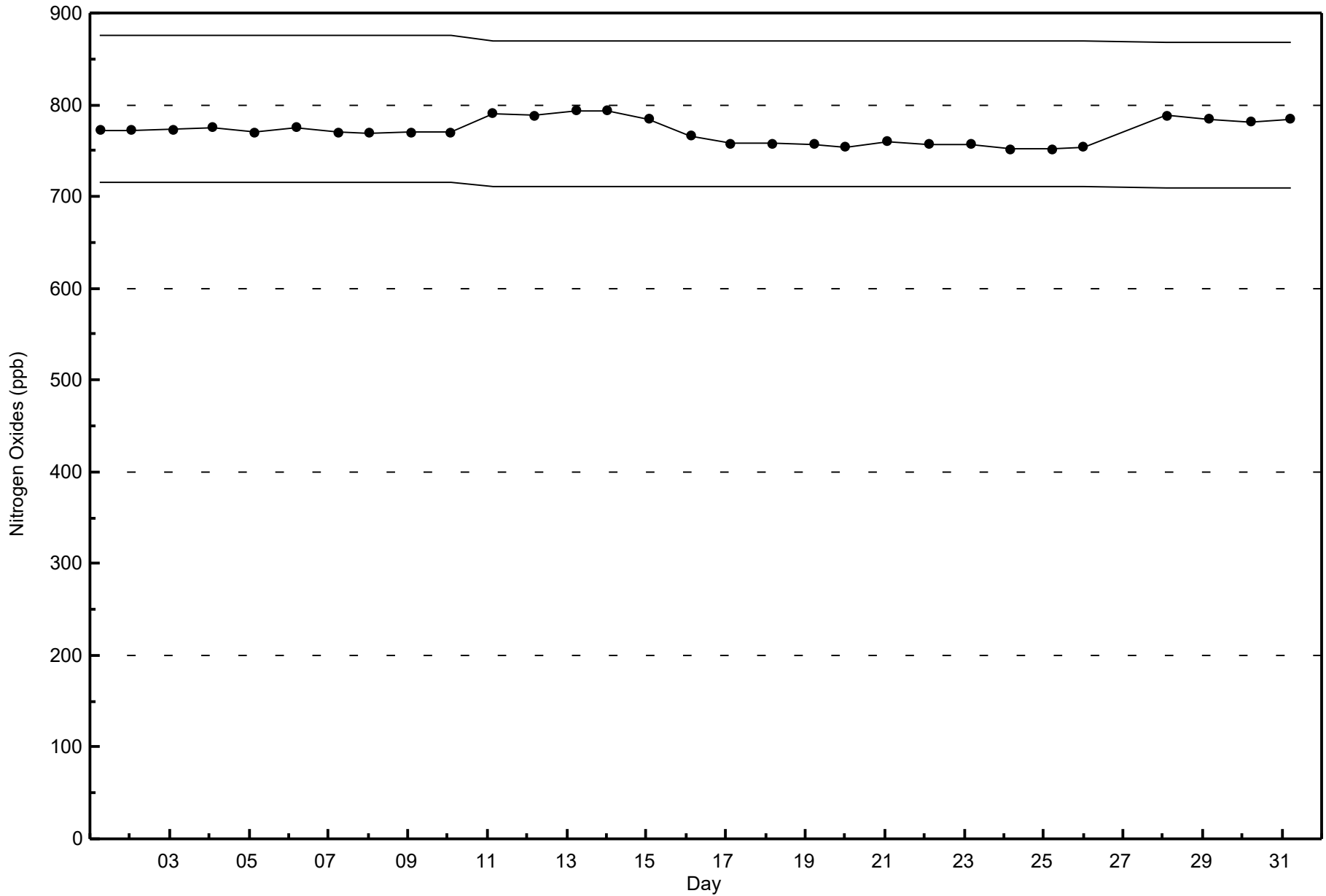


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Buffalo Viewpoint









Wood Buffalo Environmental Association

Summary of Hour Averages

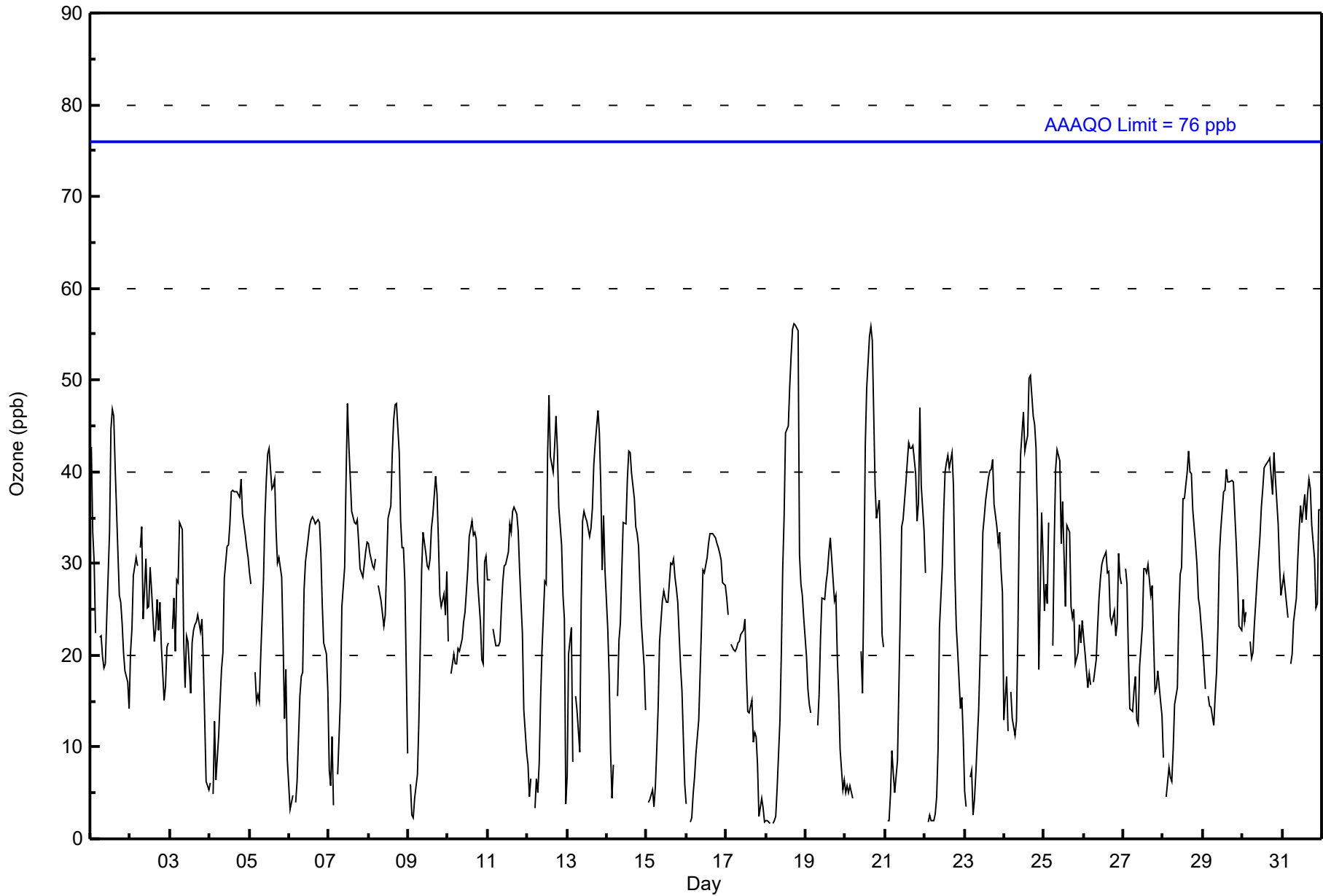
Ozone (O₃) - ppb

Buffalo Viewpoint - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 56.1 ppb on Jul 18 18:00	Maximum Daily Average: 32.1 ppb on Jul 8		Hours of Data:	709
Minimum Value: 1.7 ppb on Jul 18 05:00	Minimum Daily Average: 15.7 ppb on Jul 17		Hours of Missing Data:	35
Maximum Diurnal Average: 36.9 ppb at hour 16	Minimum Diurnal Average: 12.3 ppb at hour 6		Hours of Calibration:	34
Monthly Average: 25.56 ppb	Percentiles: P ₁ = 2.0 P ₁₀ = 7.0 Q ₁ = 18.0 Median = 26.3 Q ₃ = 34.1 P ₉₀ = 40.2 P ₉₉ = 52.5		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	42.7	33.5	30.2	22.4	Z	21.9	22.2	19.8	18.6	19.1	24.0	33.5	44.7	46.8	46.0	40.6	31.1	26.5	25.8	23.5	20.3	18.3	17.0	14.3	27.9	46.8
2-Jul	20.3	22.9	28.6	30.7	29.7	Z	31.7	34.0	24.0	30.5	25.2	25.3	29.6	27.1	21.6	22.9	26.1	22.7	25.8	21.1	15.1	16.6	20.8	21.4	25.0	34.0
3-Jul	Z	22.8	26.2	20.4	28.2	27.9	34.5	33.7	21.3	16.5	22.1	21.5	15.9	21.3	22.7	23.3	23.6	24.4	22.6	23.9	19.4	13.0	6.2	5.3	21.6	34.5
4-Jul	6.1	Z	4.9	12.8	6.5	11.3	15.1	18.4	20.3	28.4	31.9	32.0	34.3	37.9	38.0	37.9	37.9	37.6	37.3	39.3	35.4	33.0	31.8	30.7	26.9	39.3
5-Jul	28.9	27.8	Z	18.1	15.0	15.7	14.9	19.8	28.2	35.0	39.0	41.9	42.6	38.1	38.5	39.2	33.5	30.1	30.6	28.5	21.7	13.1	18.4	8.7	27.3	42.6
6-Jul	3.3	4.0	4.7	Z	3.9	6.3	15.6	17.7	18.2	27.2	30.3	32.8	34.1	34.8	35.0	34.7	34.4	34.8	34.5	31.2	25.4	21.4	20.1	16.1	22.6	35.0
7-Jul	7.4	5.8	11.2	3.7	Z	7.0	11.1	15.5	25.3	29.6	39.2	47.5	42.9	39.4	35.7	34.4	34.3	34.8	32.4	29.5	28.6	29.9	31.3	32.4	26.5	47.5
8-Jul	32.2	31.2	29.7	29.5	30.4	Z	27.6	25.9	24.5	23.2	24.5	29.7	34.9	36.3	41.9	45.6	47.3	47.4	42.1	34.6	31.7	31.7	28.1	9.2	32.1	47.4
9-Jul	Z	5.9	2.5	2.2	4.4	7.1	12.7	20.9	29.2	33.4	31.1	29.8	29.4	30.6	33.8	35.2	39.5	37.5	32.5	26.5	25.3	26.7	24.4	29.1	23.9	39.5
10-Jul	21.5	Z	18.0	20.1	19.1	19.1	20.7	20.4	21.8	23.6	24.6	27.0	29.4	33.0	34.6	33.2	33.5	32.7	28.1	23.6	19.5	19.0	30.1	30.8	25.4	34.6
11-Jul	28.2	28.2	Z	22.8	22.0	21.0	21.0	21.6	25.2	28.1	29.7	29.9	31.2	34.3	33.4	35.7	36.2	35.5	33.5	29.4	25.9	22.4	14.1	9.4	26.9	36.2
12-Jul	8.0	4.6	6.6	Z	3.4	6.6	5.1	8.2	15.2	20.6	28.1	27.8	41.9	48.3	41.7	40.0	42.6	46.0	42.4	36.2	32.1	26.6	23.9	3.8	24.3	48.3
13-Jul	6.9	20.1	23.0	8.4	Z	15.6	14.1	9.4	25.8	34.6	35.6	35.0	34.7	33.0	33.8	36.0	40.8	43.1	46.7	44.2	38.5	29.3	35.2	29.3	29.3	46.7
14-Jul	22.8	17.7	9.5	4.4	8.1	Z	15.6	21.6	23.5	29.1	34.5	34.2	39.1	42.3	42.1	39.8	37.0	34.1	33.3	31.9	27.5	23.4	18.7	14.0	26.3	42.3
15-Jul	Z	3.9	4.2	5.4	3.5	5.6	9.8	14.3	21.5	25.9	27.0	26.3	25.8	25.7	30.1	29.9	30.6	28.5	27.3	25.7	18.7	16.2	11.0	5.9	18.4	30.6
16-Jul	3.9	Z	1.8	2.3	5.0	6.7	9.3	12.9	18.1	23.3	29.3	29.0	30.7	32.2	33.2	33.3	33.3	32.9	32.2	31.8	31.1	30.3	27.9	27.6	22.5	33.3
17-Jul	26.2	24.5	Z	21.2	20.6	20.5	20.8	21.3	21.6	22.3	22.8	24.0	18.2	13.8	13.7	15.2	10.5	11.6	11.2	8.1	2.5	4.5	3.4	1.8	15.7	26.2
18-Jul	2.0	2.0	1.8	Z	1.7	1.9	2.5	5.4	12.8	20.1	29.4	35.1	44.2	45.0	49.2	52.7	55.5	56.1	56.0	55.4	30.9	27.7	26.5	24.1	27.7	56.1
19-Jul	19.8	16.3	14.6	13.8	Z	7.1	M	12.4	15.7	21.9	26.3	26.1	28.0	29.2	31.3	32.7	30.5	26.0	26.6	19.8	15.7	9.7	5.3	6.5	19.8	32.7
20-Jul	5.1	5.9	5.1	5.8	4.5	Z	C	C	C	20.4	15.9	27.7	42.9	49.1	54.7	55.8	54.4	46.6	38.5	34.9	37.0	31.1	22.2	20.8	28.9	55.8
21-Jul	Z	2.0	2.0	4.9	9.6	7.1	5.1	8.5	16.5	24.6	34.0	34.8	38.7	41.0	43.2	42.6	42.6	42.9	39.9	34.6	36.6	46.9	38.4	33.5	27.4	46.9
22-Jul	29.0	Z	1.8	2.6	2.0	1.9	2.7	4.5	9.8	23.0	29.7	35.6	40.0	41.1	41.7	40.4	42.0	38.4	29.0	23.2	20.5	14.3	15.4	10.9	21.7	42.0
23-Jul	5.1	3.6	Z	6.7	7.5	2.6	4.2	7.2	14.1	19.7	25.8	33.4	35.1	37.0	39.3	40.0	40.2	41.3	36.5	34.0	32.2	33.4	29.3	26.8	24.1	41.3
24-Jul	12.9	17.6	11.7	Z	16.0	13.1	11.3	12.9	21.9	34.6	41.9	46.5	42.3	43.1	43.9	50.2	50.5	46.0	45.2	42.5	34.9	18.4	35.6	30.9	31.5	50.5
25-Jul	24.9	27.8	25.7	34.5	Z	21.0	32.2	40.3	42.4	41.2	32.2	36.7	30.9	25.4	34.1	33.4	25.4	24.0	25.0	19.0	20.3	23.3	21.3	23.8	28.9	42.4
26-Jul	22.0	20.3	16.5	18.0	16.8	Z	17.1	19.6	23.1	26.3	28.4	29.9	30.5	31.2	29.0	29.2	24.3	23.5	24.9	22.2	23.6	31.0	28.5	27.8	24.5	31.2
27-Jul	Z	29.4	27.8	20.0	14.2	13.9	16.2	17.7	13.0	12.5	18.7	23.2	29.4	29.5	28.9	29.9	26.6	27.6	21.9	16.0	16.4	18.3	14.9	13.4	20.8	29.9
28-Jul	8.8	Z	4.6	7.8	6.7	6.3	9.8	14.7	16.5	24.4	28.8	29.6	37.1	37.1	40.0	42.2	40.0	39.9	35.9	32.0	29.9	26.2	25.2	23.2	24.6	42.2
29-Jul	21.3	16.3	Z	15.6	14.4	14.3	12.3	15.5	18.2	23.2	30.9	33.7	37.8	38.0	40.3	38.9	38.9	39.1	38.9	35.5	32.4	28.6	23.2	22.8	27.4	40.3
30-Jul	26.0	23.6	24.7	Z	21.5	19.7	20.4	23.4	25.7	28.3	32.9	36.1	38.2	40.4	40.7	41.1	41.6	39.6	37.5	42.2	39.3	34.4	29.7	26.5	31.9	42.2
31-Jul	27.5	28.6	25.7	24.1	Z	19.0	20.1	23.6	26.3	30.4	33.8	36.2	34.5	37.5	34.7	37.5	39.2	38.2	34.2	30.6	25.2	25.7	35.9	35.9	30.6	39.2
	17.8	17.2	14.0	14.5	12.6	12.3	15.7	18.0	21.3	25.8	29.3	32.0	34.5	35.5	36.4	36.9	36.3	35.1	33.2	30.0	26.2	24.0	23.0	19.9		Diurnal Average
	42.7	33.5	30.2	34.5	30.4	27.9	34.5	40.3	42.4	41.2	41.9	47.5	44.7	49.1	54.7	55.8	55.5	56.1	56.0	55.4	39.3	46.9	38.4	35.9		Diurnal Maximum

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 76 ppb





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Buffalo Viewpoint - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	224	31.59	31.59
21 - 50	476	67.14	98.73
51 - 82	9	1.27	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Buffalo Viewpoint - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	32	13	1	4	0	4	15	36	27	8	9	18	11	11	19	16	224
21 - 50	79	37	11	9	11	11	45	41	42	30	31	25	36	32	20	16	476
51 - 82	0	0	0	0	1	0	0	0	0	0	0	1	1	1	5	0	9
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	111	50	12	13	12	15	60	77	69	38	41	44	48	48	39	32	709

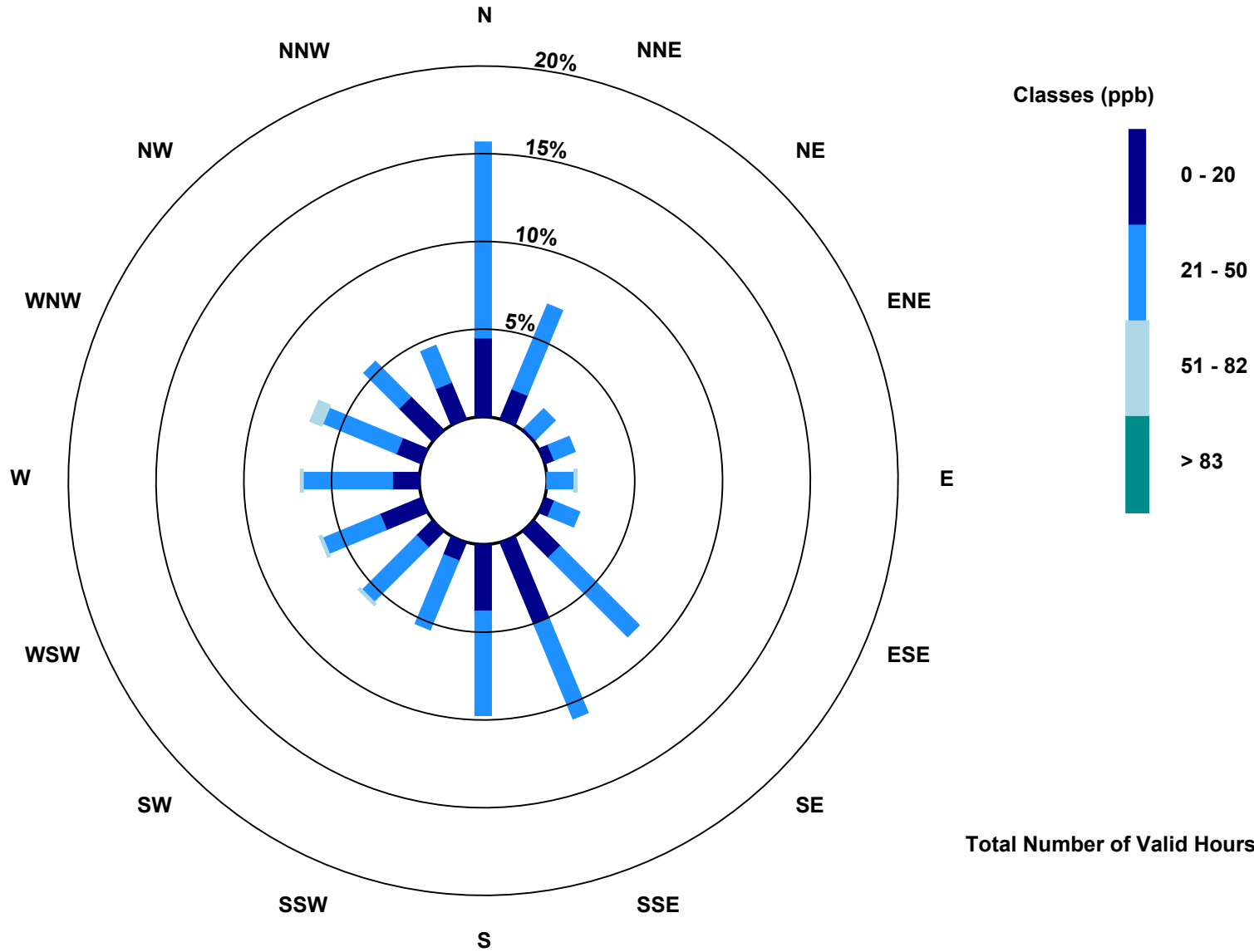
Total Number of Valid Hours: 709

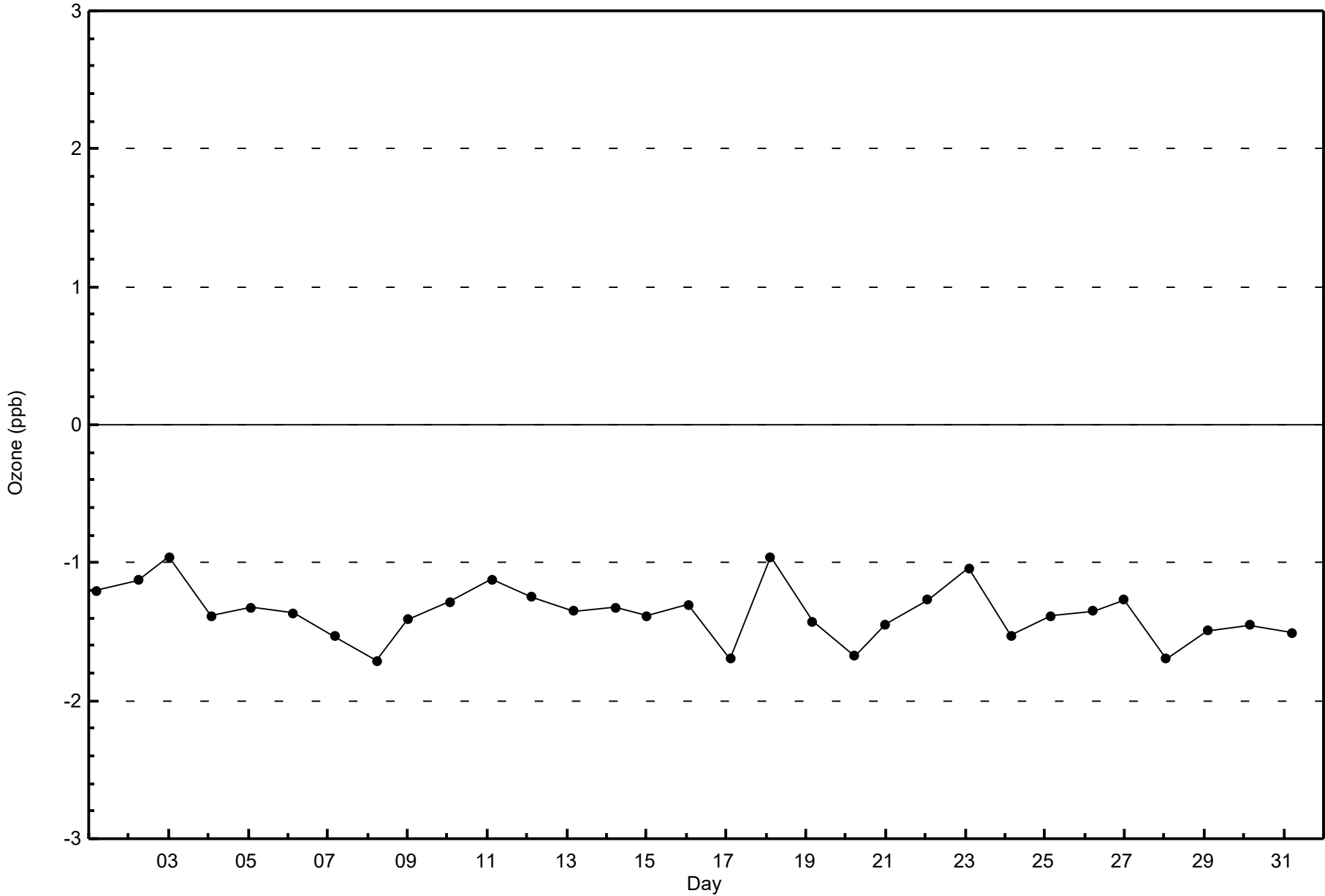
Total Number of Hours: 744

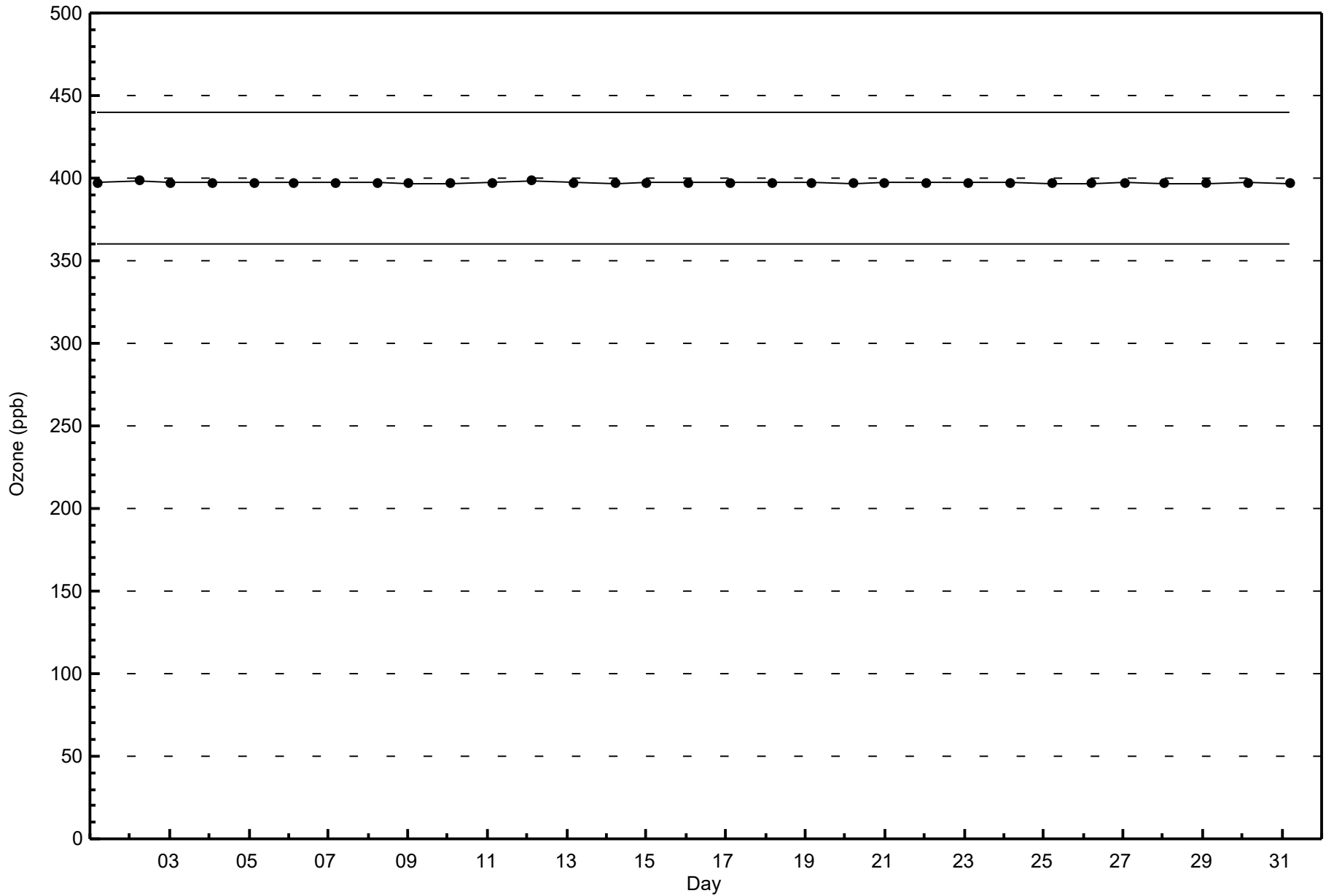


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Ozone (O₃) - ppb
Buffalo Viewpoint









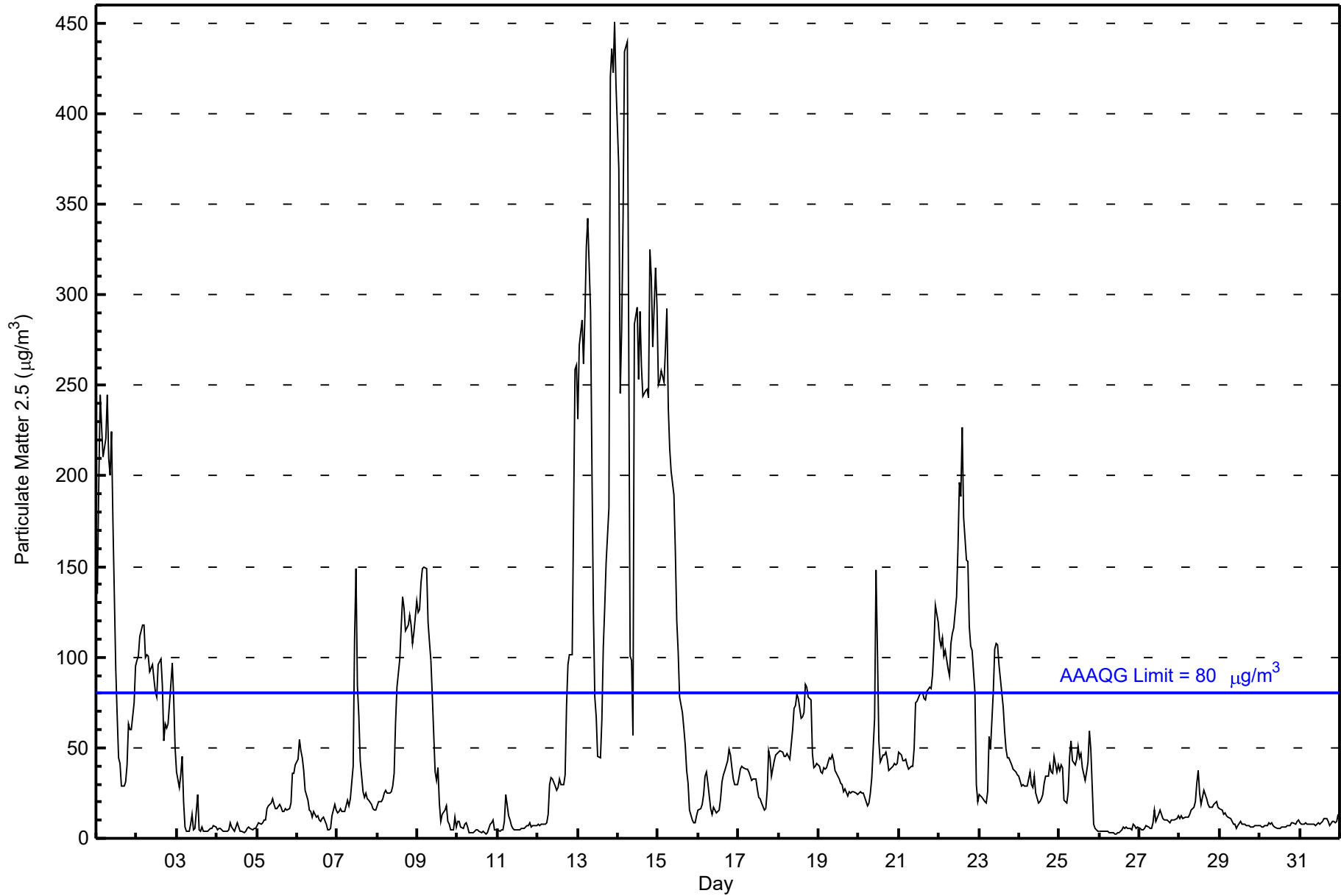
Summary of Hour Averages

Buffalo Viewpoint - July 2023

Number of Exceedences (AAAQO):	1-hr: 156	24-hr: 18	Hours in Service:	744
Maximum Value: 450.4 µg/m ³ on Jul 13 23:00	Maximum Daily Average: 271.8 µg/m ³ on Jul 14		Hours of Data:	744
Minimum Value: 2.5 µg/m ³ on Jul 26 11:00	Minimum Daily Average: 4.5 µg/m ³ on Jul 26		Hours of Missing Data:	0
Maximum Diurnal Average: 67.9 µg/m ³ at hour 6	Minimum Diurnal Average: 44.5 µg/m ³ at hour 17		Hours of Calibration:	0
Monthly Average: 55.26 µg/m ³	Percentiles: P ₁ = 3.0 P ₁₀ = 5.3 Q ₁ = 8.8 Median = 26.2 Q ₃ = 63.3 P ₉₀ = 134.3 P ₉₉ = 358.0		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	134.7	196.2	244.6	227.2	210.8	221.0	244.6	209.7	200.6	224.8	174.5	93.3	68.1	44.6	41.0	28.9	28.6	31.1	40.6	63.1	59.9	60.2	75.0	95.0	125.7	244.6
2-Jul	98.3	100.5	111.8	117.7	117.4	99.8	101.2	100.5	91.6	96.1	88.2	81.3	78.3	96.1	98.9	84.5	53.9	63.3	61.1	63.3	85.2	97.0	77.2	50.0	88.0	117.7
3-Jul	36.4	28.0	35.1	45.5	20.6	6.0	4.2	3.8	7.9	13.2	4.7	5.8	24.2	4.5	4.0	6.1	4.0	3.8	3.8	4.3	5.1	5.3	7.2	5.9	12.1	45.5
4-Jul	4.7	5.6	5.4	4.7	4.3	3.8	3.8	4.4	8.3	5.8	3.6	5.9	8.3	6.0	4.1	3.6	3.2	3.6	5.1	6.3	5.4	4.9	5.2	5.7	5.1	8.3
5-Jul	6.9	8.2	8.2	8.3	10.2	10.0	16.7	18.2	19.2	21.8	19.0	16.7	16.5	18.7	17.1	14.8	14.7	16.5	15.8	16.5	19.3	36.0	35.8	40.4	17.7	40.4
6-Jul	43.8	54.2	48.4	44.3	37.7	26.6	21.0	15.7	14.6	11.9	14.9	11.8	12.9	10.3	9.2	11.2	11.5	7.5	5.0	4.7	5.7	12.1	18.5	15.4	19.5	54.2
7-Jul	13.8	14.5	16.1	14.7	14.8	18.2	21.4	17.7	21.8	40.1	109.8	148.6	84.1	68.0	42.7	25.6	22.6	24.8	22.2	20.7	18.4	16.4	15.5	15.7	34.5	148.6
8-Jul	18.3	20.1	20.6	21.6	24.9	26.9	24.6	25.3	25.6	29.1	35.6	64.0	83.3	99.1	116.9	133.3	127.2	114.5	117.7	123.0	117.7	107.7	114.2	131.1	71.8	133.3
9-Jul	124.7	126.2	141.2	149.2	149.9	148.6	119.5	108.1	98.4	78.4	36.3	32.4	38.7	19.6	9.4	13.1	15.8	18.0	9.4	7.7	5.0	4.5	11.6	6.6	61.3	149.9
10-Jul	9.5	9.3	6.2	5.8	7.4	8.8	6.3	3.2	2.9	3.0	3.9	4.5	4.8	4.0	3.2	3.6	2.9	2.7	3.0	7.4	8.5	9.9	4.5	4.5	5.4	9.9
11-Jul	4.6	4.1	4.4	4.7	9.2	24.0	12.7	10.4	7.1	5.2	4.8	4.9	4.9	5.0	5.2	5.1	5.8	6.9	6.8	8.6	6.4	6.8	6.7	6.7	7.1	24.0
12-Jul	8.1	7.3	7.7	7.8	7.5	8.4	13.5	29.4	33.7	32.6	28.7	26.7	27.8	33.1	29.8	29.9	34.9	73.4	95.8	101.2	101.5	180.4	259.2	261.5	60.0	261.5
13-Jul	231.3	272.3	286.2	261.8	288.5	326.8	341.9	291.0	201.7	125.8	78.2	67.0	45.0	44.3	65.5	105.2	127.4	152.1	182.1	420.4	435.9	422.8	450.4	415.8	235.0	450.4
14-Jul	369.7	245.9	280.4	342.6	434.4	439.8	275.3	100.5	98.5	56.6	283.8	293.4	253.1	290.7	260.7	244.1	247.2	248.2	243.5	325.3	309.3	271.7	314.8	294.3	271.8	439.8
15-Jul	250.4	252.5	257.7	251.9	270.8	292.6	237.6	215.2	202.7	189.4	158.6	120.3	103.2	78.0	69.2	60.8	51.3	37.5	30.8	15.4	10.1	8.3	8.9	12.2	132.7	292.6
16-Jul	15.3	16.7	18.5	24.2	34.7	36.8	30.5	16.1	13.1	17.1	15.9	13.9	15.7	22.1	30.9	34.8	37.4	42.5	49.1	46.2	39.3	32.9	29.6	29.9	27.6	49.1
17-Jul	33.5	37.9	39.7	39.1	38.3	37.9	36.9	34.7	32.0	32.5	32.9	27.2	23.0	21.6	19.7	15.2	16.6	26.7	48.1	44.7	34.5	42.8	45.8	46.4	33.7	48.1
18-Jul	47.3	48.3	47.3	45.1	45.2	46.6	45.0	43.6	59.7	71.5	73.5	79.6	77.4	66.6	67.3	69.2	85.3	83.3	77.6	76.7	47.0	39.2	39.7	41.0	59.3	85.3
19-Jul	39.4	36.6	36.1	38.7	38.3	38.9	44.7	43.4	45.8	42.9	37.7	34.5	32.9	30.0	29.8	26.0	27.4	23.7	25.5	24.9	25.6	25.7	25.1	24.5	33.3	45.8
20-Jul	24.9	25.5	24.7	24.8	20.7	17.7	19.4	24.8	33.5	66.5	148.5	104.0	53.9	42.3	46.2	46.3	47.3	43.6	37.4	38.4	39.9	41.1	40.9	41.2	43.9	148.5
21-Jul	47.3	45.7	42.7	42.8	43.5	40.8	38.1	40.0	40.1	49.6	74.8	75.5	79.4	80.5	80.2	77.5	76.5	80.8	83.3	82.5	90.7	106.5	128.3	119.4	69.4	128.3
22-Jul	109.8	106.3	110.5	100.8	104.0	93.4	90.0	107.3	113.2	115.8	133.2	160.7	196.7	188.8	227.0	177.2	153.5	153.0	116.7	106.4	103.5	80.3	29.3	20.5	120.7	227.0
23-Jul	23.8	23.1	22.5	20.3	19.6	25.4	56.0	49.5	81.4	104.7	107.8	107.1	95.6	88.3	72.8	59.1	49.4	44.1	44.4	40.7	38.5	37.3	36.7	35.3	53.5	107.8
24-Jul	34.0	28.9	30.0	29.0	28.8	28.8	36.5	29.5	27.7	34.1	24.7	19.5	20.5	22.1	24.2	30.4	34.2	34.6	40.3	36.4	36.2	45.6	37.0	40.3	31.4	45.6
25-Jul	37.4	40.2	39.0	21.1	19.7	26.1	45.5	53.4	43.2	40.5	43.5	50.8	44.6	46.7	38.9	32.2	36.9	41.9	59.3	49.1	7.5	5.1	4.9	3.9	34.6	59.3
26-Jul	3.7	3.7	4.0	3.8	3.8	3.8	3.4	3.0	2.8	2.6	2.5	2.9	3.5	4.8	6.4	5.6	6.0	5.1	5.3	5.1	8.0	7.3	5.5	6.6	4.5	8.0
27-Jul	5.6	4.7	4.7	5.3	7.2	6.5	5.7	5.5	8.7	15.7	9.0	13.0	15.6	13.2	10.8	10.4	10.4	9.6	8.6	10.2	10.3	10.0	11.2	12.4	9.3	15.7
28-Jul	11.2	12.1	11.1	11.4	11.4	11.5	13.2	15.9	17.2	20.1	30.6	37.7	25.2	19.1	26.3	24.3	22.2	18.6	17.0	17.2	18.7	19.2	20.0	16.8	18.7	37.7
29-Jul	16.3	15.7	13.5	14.0	12.8	11.8	11.0	9.4	8.0	7.4	5.7	6.7	9.1	7.7	7.5	7.7	6.8	6.7	6.3	6.0	6.2	6.6	7.2	7.4	9.1	16.3
30-Jul	6.8	6.5	6.4	6.7	7.4	8.4	7.8	8.8	7.2	6.5	5.5	5.7	5.7	5.7	5.9	6.1	6.6	7.0	7.0	7.1	8.3	8.9	8.1	9.2	7.2	10.1
31-Jul	8.7	8.0	8.0	8.3	8.1	8.1	8.0	7.8	7.7	7.3	7.8	8.9	7.8	9.3	11.0	11.1	11.0	9.3	7.1	9.1	9.3	9.0	9.6	12.9	8.9	12.9
58.7 58.2 62.4 62.7 66.2 67.9 62.5 53.1 50.8 50.6 58.0 55.6 50.3 48.1 47.8 45.3 44.5 46.3 47.6 57.7 55.4 56.8 60.8 59.0																								Diurnal Average		
369.7 272.3 286.2 342.6 434.4 439.8 341.9 291.0 202.7 224.8 283.8 293.4 253.1 290.7 260.7 244.1 247.2 248.2 243.5 420.4 435.9 422.8 450.4 415.8																								Diurnal Maximum		

Alberta Ambient Air Quality Guideline/Objectives: 1-hr 80 µg/m³ 24-hr 29 µg/m³





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Buffalo Viewpoint - July 2023**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
0 - 5	81	10.89	10.89
6 - 15	186	25.00	35.89
16 - 25	97	13.04	48.92
26 - 80	227	30.51	79.44
> 81.0	153	20.56	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Buffalo Viewpoint - July 2023**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	15	4	3	0	1	6	10	13	9	7	3	0	4	2	4	0	81
6 - 15	21	7	1	7	3	5	12	37	36	16	12	10	5	5	5	4	186
16 - 25	8	4	2	0	0	2	8	13	14	7	10	16	6	3	2	2	97
26 - 80	32	12	5	5	7	2	25	25	10	6	15	11	24	22	17	9	227
> 81.0	37	23	1	2	1	1	6	2	3	4	1	7	11	18	16	20	153
Totals	113	50	12	14	12	16	61	90	72	40	41	44	50	50	44	35	744

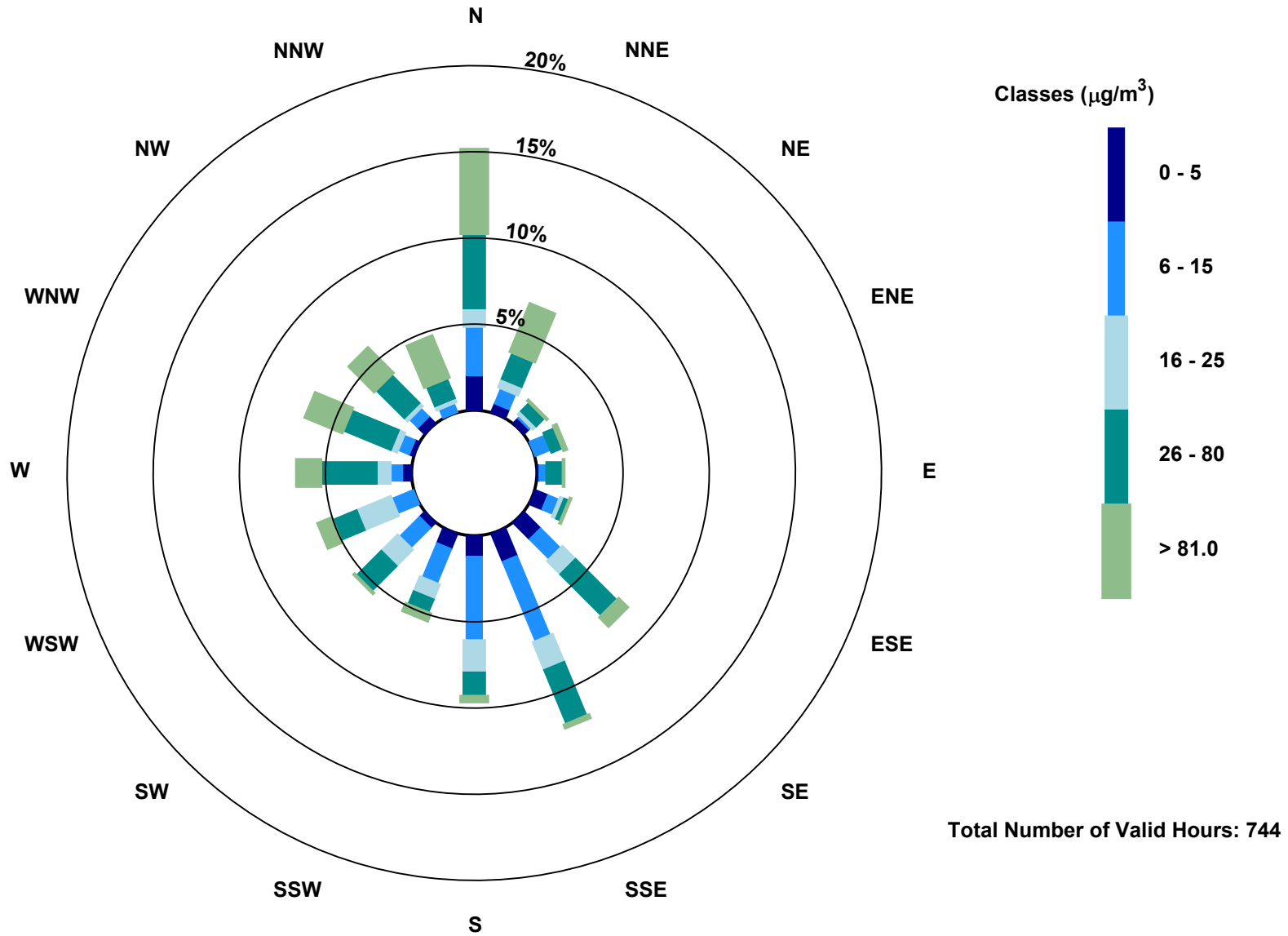
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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





Wood Buffalo Environmental Association
Summary of Hour Averages

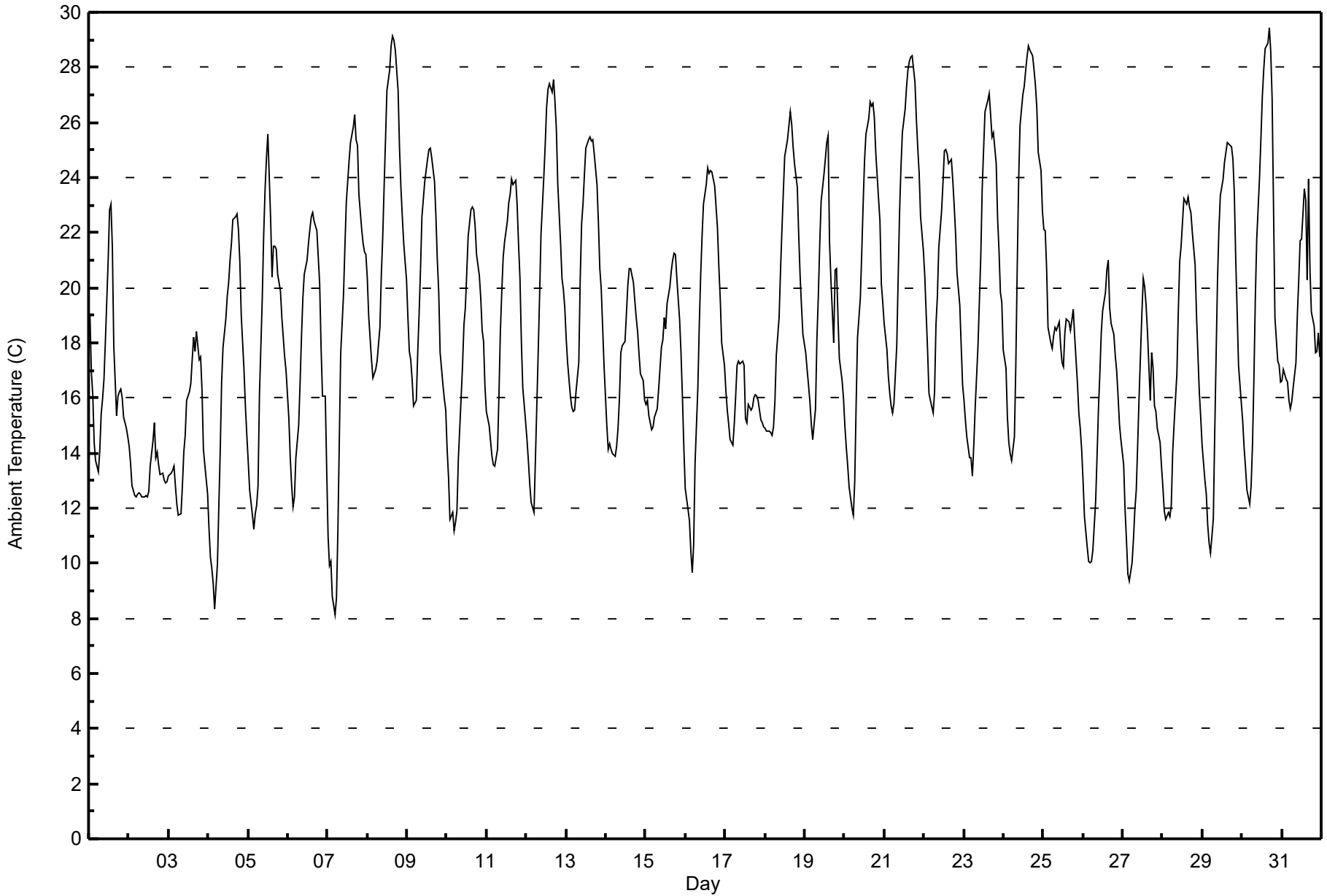
Ambient Temperature (AT) - C
Buffalo Viewpoint - July 2023

Maximum Value: 29.4 C on Jul 30 17:00 Maximum Daily Average: 22.7 C on Jul 8																						Hours in Service: 744 Hours of Data: 744																											
Minimum Value: 8.1 C on Jul 7 05:00 Minimum Daily Average: 13.1 C on Jul 2 Maximum Diurnal Average: 23.3 C at hour 15 Minimum Diurnal Average: 13.1 C at hour 5 Monthly Average: 18.58 C Percentiles: P ₁ = 9.7 P ₁₀ = 12.7 Q ₁ = 15.1 Median = 18.0 Q ₃ = 22.1 P ₉₀ = 25.1 P ₉₉ = 28.6																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	19.0	16.9	16.1	14.4	13.7	13.3	14.1	15.4	16.0	16.7	18.0	21.0	22.8	23.1	21.5	17.9	15.4	16.1	16.2	16.3	16.0	15.3	14.9	14.6	16.9	23.1																							
2-Jul	14.2	13.6	12.8	12.4	12.4	12.5	12.6	12.5	12.4	12.4	12.4	12.4	12.6	13.5	14.5	15.1	13.8	14.0	13.6	13.2	13.3	13.0	12.9	13.0	13.1	15.1																							
3-Jul	13.2	13.3	13.4	13.5	12.8	12.2	11.8	11.8	12.8	14.0	14.7	15.9	16.2	16.5	17.4	18.2	17.7	18.4	17.4	17.5	16.3	14.1	13.6	12.5	14.8	18.4																							
4-Jul	11.3	10.2	9.8	9.2	8.3	10.0	12.1	14.1	16.6	17.8	18.9	19.7	20.2	21.0	21.6	22.5	22.6	22.7	22.1	21.0	19.0	17.0	15.7	14.7	16.6	22.7																							
5-Jul	13.7	12.7	11.7	11.3	11.8	12.1	12.8	16.1	19.6	21.9	23.5	24.7	25.6	22.5	20.4	21.5	21.5	21.4	20.5	19.9	18.9	18.2	17.5	17.0	18.2	25.6																							
6-Jul	15.2	13.8	12.8	12.1	12.4	13.8	15.0	16.5	18.2	19.6	20.5	21.0	21.6	22.1	22.6	22.7	22.4	22.1	21.1	20.1	17.9	16.1	16.1	13.4	17.9	22.7																							
7-Jul	11.0	9.9	10.1	8.8	8.1	8.7	11.2	14.4	17.6	19.7	21.5	23.1	23.8	24.6	25.3	25.9	26.3	25.4	25.1	23.4	22.1	21.6	21.3	21.2	18.8	26.3																							
8-Jul	20.3	19.0	17.4	16.7	16.9	17.1	17.3	18.6	20.5	21.8	23.7	25.4	27.2	27.9	28.8	29.1	29.0	28.7	27.1	25.1	23.7	22.6	21.6	20.3	22.7	29.1																							
9-Jul	18.9	17.7	17.4	16.7	15.7	15.9	17.6	19.1	20.7	22.6	23.8	24.3	24.7	25.0	25.1	24.7	23.9	22.6	21.0	19.8	17.6	16.5	16.0	15.6	20.1	25.1																							
10-Jul	14.1	13.1	11.6	11.8	11.2	11.5	11.9	13.8	16.0	17.2	18.6	19.3	20.5	21.9	22.8	22.9	22.8	22.2	21.2	20.4	19.6	18.5	18.0	16.4	17.4	22.9																							
11-Jul	15.5	15.0	14.5	13.9	13.6	13.5	14.1	16.1	18.4	19.8	21.1	21.6	22.4	23.1	23.4	24.0	23.8	23.9	23.0	21.6	20.3	18.1	16.4	15.2	18.8	24.0																							
12-Jul	14.5	13.7	12.8	12.2	11.9	13.7	15.7	17.6	19.7	21.9	24.0	25.2	26.5	27.2	27.4	27.1	27.5	26.8	25.7	23.7	21.6	20.4	19.9	19.3	20.7	27.5																							
13-Jul	18.2	17.3	16.1	15.6	15.5	15.6	16.2	17.3	20.3	22.3	23.1	24.1	25.1	25.4	25.5	25.3	25.4	24.9	23.8	22.4	20.7	20.0	18.6	17.2	20.7	25.5																							
14-Jul	15.0	14.2	14.3	14.1	14.0	13.9	14.2	14.9	16.0	17.6	17.9	18.0	19.1	20.1	20.7	20.7	20.2	19.5	18.9	18.4	17.6	16.9	16.6	15.9	17.0	20.7																							
15-Jul	15.8	15.9	15.4	14.8	14.9	15.3	15.4	15.6	16.3	17.8	18.1	18.9	18.5	19.4	20.0	20.6	21.0	21.2	21.2	20.3	18.8	17.6	16.0	14.2	17.6	21.2																							
16-Jul	12.7	11.9	11.6	10.4	9.7	10.7	13.6	16.4	18.6	20.4	21.9	23.0	23.7	24.4	24.2	24.3	24.2	23.7	22.9	22.1	20.7	19.6	18.0	17.2	18.6	24.4																							
17-Jul	16.3	15.5	15.1	14.5	14.3	15.1	16.1	17.2	17.3	17.3	17.3	17.2	15.2	15.1	15.7	15.5	15.6	16.0	16.1	16.1	15.9	15.2	15.1	15.0	15.8	17.3																							
18-Jul	14.9	14.8	14.8	14.7	14.7	14.9	15.8	17.5	18.9	20.6	22.1	23.5	24.8	25.4	25.9	26.4	25.9	25.1	24.5	23.7	21.9	20.4	19.3	18.3	20.4	26.4																							
19-Jul	17.7	17.0	16.5	15.9	15.1	14.5	15.6	18.2	19.7	21.6	23.2	24.1	24.7	25.3	25.5	21.7	20.3	18.0	20.6	20.7	19.0	17.4	16.6	15.9	19.4	25.5																							
20-Jul	14.9	14.2	13.5	12.8	12.0	11.7	13.0	15.8	18.2	19.6	21.3	23.0	24.6	25.6	26.2	26.7	26.6	26.7	26.2	24.9	23.2	22.4	20.1	19.5	20.1	26.7																							
21-Jul	18.7	17.8	16.8	16.2	15.7	15.4	15.8	17.9	20.3	22.7	24.4	25.6	26.5	27.3	27.9	28.2	28.4	28.4	27.4	26.2	25.1	24.1	22.6	21.3	22.5	28.4																							
22-Jul	20.5	19.1	17.7	16.2	15.9	15.5	16.2	18.6	19.7	21.5	22.8	23.8	25.0	25.0	24.9	24.5	24.7	23.9	23.0	21.9	20.5	19.4	17.9	16.5	20.6	25.0																							
23-Jul	15.9	15.2	14.6	13.8	13.8	13.2	14.3	15.7	17.9	19.5	21.2	23.6	25.0	26.4	26.8	27.1	26.3	25.5	25.6	24.5	22.5	21.3	19.8	19.5	20.4	27.1																							
24-Jul	17.7	17.1	15.3	14.4	14.0	13.7	14.6	17.2	20.7	23.8	25.9	27.0	27.3	27.8	28.4	28.8	28.6	28.4	27.9	27.4	26.5	24.9	24.2	22.8	22.7	28.8																							
25-Jul	22.1	22.1	20.7	18.5	18.0	17.8	18.3	18.6	18.5	18.8	17.9	17.3	17.1	18.4	18.9	18.8	18.4	18.8	19.2	18.2	16.5	15.5	14.9	14.2	18.2	22.1																							
26-Jul	13.0	11.7	10.6	10.1	10.0	10.1	10.5	12.3	13.9	15.6	16.9	18.3	19.1	19.8	20.6	21.0	19.3	18.7	18.3	17.6	17.0	16.1	15.1	14.5	15.4	21.0																							
27-Jul	13.6	12.0	10.8	9.6	9.4	10.0	10.9	12.0	12.7	14.3	16.0	19.1	20.3	20.0	19.4	18.4	15.9	17.7	17.1	15.7	15.5	14.9	14.4	13.5	14.7	20.3																							
28-Jul	12.8	11.9	11.6	11.8	11.7	12.1	14.0	15.0	16.9	19.1	20.9	21.5	22.4	23.2	23.0	23.3	22.9	22.7	22.0	20.8	19.0	17.6	16.2	15.3	17.8	23.3																							
29-Jul	14.3	13.0	12.5	11.4	10.7	10.4	11.6	14.7	17.5	20.3	22.1	23.3	23.9	24.6	24.9	25.3	25.2	25.1	24.7	23.5	21.0	19.2	17.2	15.8	18.8	25.3																							
30-Jul	15.1	14.2	13.5	12.7	12.2	12.8	14.4	16.7	19.6	21.8	24.0	25.4	26.9	27.9	28.7	28.9	29.4	28.6	26.8	22.9	18.9	17.3	17.2	16.6	20.5	29.4																							
31-Jul	16.6	17.0	16.7	16.6	15.9	15.6	15.9	16.4	17.3	19.0	20.3	21.7	21.8	23.6	23.2	20.3	24.0	20.7	19.1	18.6	17.6	17.7	18.4	17.5	18.8	24.0																							
																								15.7	14.9	14.1	13.5	13.1	13.3	14.3	15.9	17.7	19.3	20.6	21.7	22.4	23.0	23.3	23.1	22.9	22.5	21.9	20.9	19.5	18.3	17.5	16.6	Diurnal Average	
																								22.1	22.1	20.7	18.5	18.0	17.8	18.3	19.1	20.7	23.8	25.9	27.0	27.3	27.9	28.8	29.1	29.4	28.7	27.9	27.4	26.5	24.9	24.2	22.8	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Buffalo Viewpoint - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Buffalo Viewpoint - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	11	1.48	1.48
10 - 20	450	60.48	61.96
> 20	283	38.04	100.00

Total Number of Valid Hours: 744

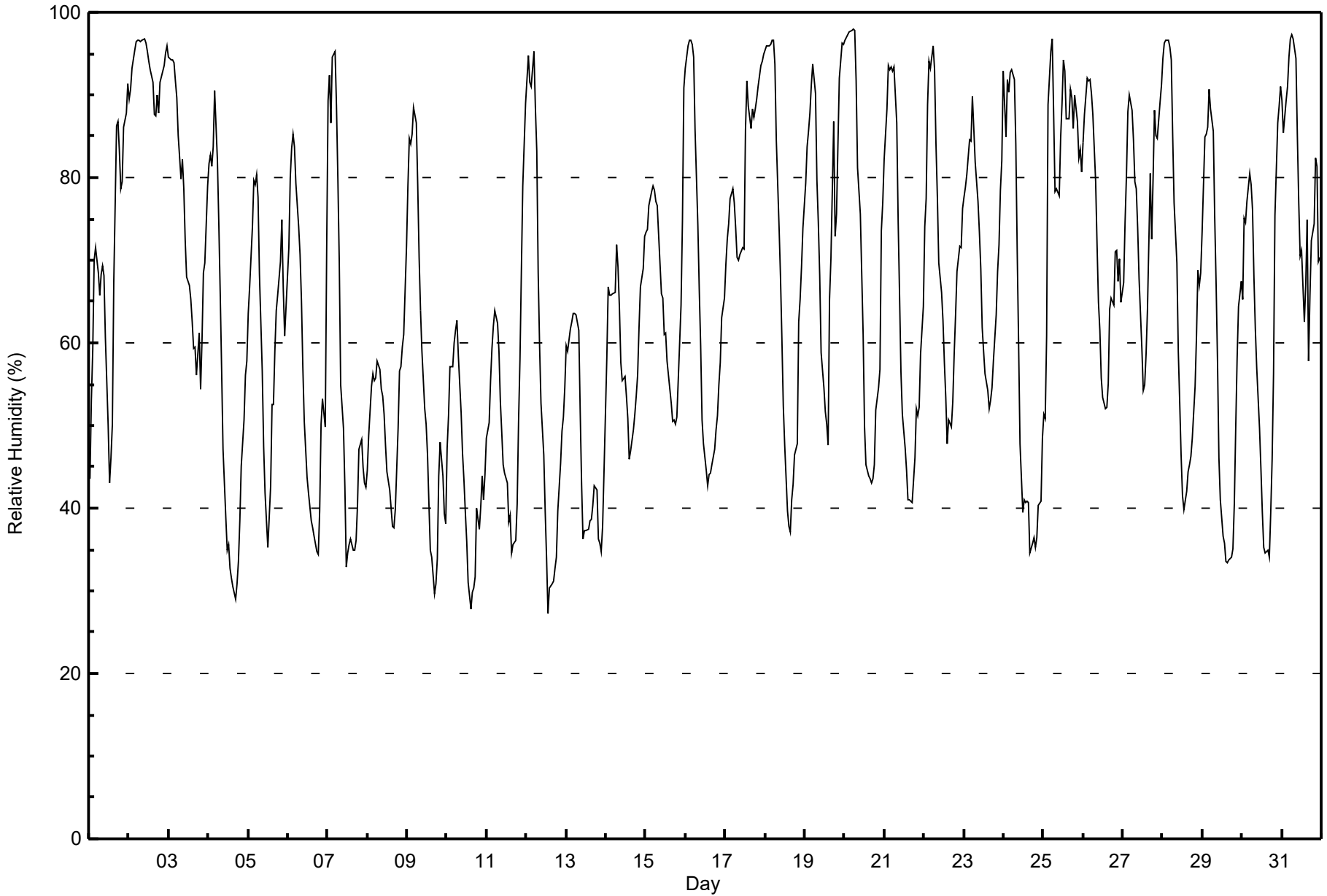
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Relative Humidity (RH) - %
Buffalo Viewpoint - July 2023

Maximum Value: 98.0 % on Jul 20 06:00																						Maximum Daily Average: 93.3 % on Jul 2																						Hours in Service: 744			
Minimum Value: 27.2 % on Jul 12 14:00																						Minimum Daily Average: 44.6 % on Jul 10																						Hours of Data: 744			
Maximum Diurnal Average: 85.2 % at hour 5																						Minimum Diurnal Average: 48.2 % at hour 15																						Hours of Missing Data: 0			
Monthly Average: 65.26 %																						Percentiles: P ₁ = 30.7 P ₁₀ = 38.5 Q ₁ = 48.5 Median = 65.3 Q ₃ = 83.7 P ₉₀ = 92.9 P ₉₉ = 96.8																						Hours of Calibration: 0			
																																												Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	43.6	53.1	59.2	70.0	71.5	68.5	65.8	68.3	69.3	68.2	60.7	50.0	43.1	46.1	50.2	67.3	86.3	86.8	83.2	78.7	79.6	86.0	87.8	91.4	68.1	91.4																					
2-Jul	89.4	90.6	93.3	95.5	96.5	96.7	96.7	96.4	96.6	96.8	96.3	95.2	94.1	93.0	91.4	87.7	87.4	89.9	87.9	91.6	93.0	93.5	95.0	95.9	93.3	96.8																					
3-Jul	94.6	94.3	94.2	93.9	91.6	89.6	85.1	79.8	82.2	78.6	72.4	68.0	67.0	65.2	62.5	59.3	59.4	56.0	61.2	54.4	60.3	68.4	69.6	79.0	74.4	94.6																					
4-Jul	81.8	82.8	81.4	83.7	90.5	82.0	74.4	65.9	56.7	47.1	38.8	34.8	35.6	32.7	31.5	30.6	29.1	30.8	33.5	38.5	45.0	50.7	56.0	57.9	53.8	90.5																					
5-Jul	63.6	66.8	74.1	79.7	79.2	80.4	77.7	68.3	56.5	47.5	41.9	38.5	35.2	42.7	52.5	52.6	58.9	63.9	65.7	69.9	75.0	66.6	60.8	64.5	61.8	80.4																					
6-Jul	71.6	80.0	83.5	85.2	83.7	79.3	74.1	70.7	65.1	56.9	50.4	43.6	41.8	40.2	38.4	37.6	36.7	34.7	34.4	39.6	50.2	53.3	49.9	71.4	57.2	85.2																					
7-Jul	89.3	92.3	86.6	94.5	95.2	88.6	79.9	69.6	54.9	49.7	42.5	32.9	34.6	35.6	36.3	34.9	34.9	36.2	40.3	47.1	48.4	44.9	43.0	42.6	56.5	95.2																					
8-Jul	44.5	48.9	54.8	56.3	55.4	55.8	57.8	56.8	54.4	53.6	51.4	47.6	44.4	42.3	40.1	37.8	37.7	39.8	49.7	56.5	57.1	59.6	61.0	71.6	51.5	71.6																					
9-Jul	78.9	84.8	84.1	85.2	88.5	86.6	79.2	70.4	64.0	58.9	52.0	50.2	46.4	40.6	34.9	34.1	29.6	30.8	33.9	44.0	48.0	44.0	39.3	38.2	56.1	88.5																					
10-Jul	47.2	51.2	57.2	57.1	60.1	61.5	62.7	58.5	51.5	46.6	43.3	39.4	35.9	31.0	27.8	29.8	30.3	31.6	39.9	37.5	40.1	43.9	41.0	44.1	44.6	62.7																					
11-Jul	48.5	50.4	55.5	59.4	62.0	63.9	62.4	58.9	52.9	49.1	45.3	44.3	43.1	38.3	39.1	34.6	35.6	36.1	40.5	50.6	57.9	68.6	79.0	89.0	52.7	89.0																					
12-Jul	91.9	94.7	91.5	91.1	95.2	88.5	83.2	68.4	59.7	52.8	46.5	39.7	33.9	27.2	30.3	30.8	31.3	32.7	34.0	39.7	45.5	49.4	51.0	54.6	56.8	95.2																					
13-Jul	59.6	59.0	61.7	62.6	63.5	63.6	63.4	61.5	51.8	42.9	36.2	37.3	37.4	37.4	38.5	38.7	40.4	42.8	42.2	36.3	35.7	34.7	37.9	44.4	47.1	63.6																					
14-Jul	58.2	66.8	65.8	65.8	65.9	66.1	71.8	69.2	64.2	57.6	55.5	55.9	53.5	50.9	45.9	47.0	49.5	51.4	53.5	56.2	61.9	66.8	69.0	73.0	60.1	73.0																					
15-Jul	73.3	73.7	76.5	78.3	79.0	78.5	77.1	76.6	73.0	66.0	65.4	61.1	61.2	57.8	54.4	52.7	50.5	50.7	50.2	51.0	60.0	64.6	74.7	90.8	66.5	90.8																					
16-Jul	93.2	95.9	96.7	96.5	96.0	94.6	85.7	74.2	66.5	59.7	50.8	47.8	44.6	42.7	44.0	44.2	45.2	47.1	49.4	51.3	55.0	57.6	63.0	65.4	65.3	96.7																					
17-Jul	69.5	72.5	74.5	77.4	78.6	76.9	73.8	70.3	70.0	70.7	71.6	71.3	85.7	91.7	88.6	86.0	88.3	87.4	88.3	89.6	91.1	93.6	94.0	94.9	81.5	94.9																					
18-Jul	95.5	95.9	95.9	96.2	96.6	96.7	93.8	84.6	73.9	67.9	60.6	52.3	47.6	39.7	37.8	37.0	41.0	42.8	46.5	47.8	62.6	65.3	69.1	74.0	67.5	96.7																					
19-Jul	79.3	83.7	85.6	87.8	91.3	93.8	90.1	79.7	74.6	68.1	58.9	54.6	51.6	50.2	47.6	65.3	70.1	86.8	72.9	75.6	84.0	92.0	96.2	96.1	76.5	96.2																					
20-Jul	96.7	97.0	97.4	97.7	97.9	98.0	97.8	91.7	81.1	75.6	68.2	61.0	49.8	45.3	44.0	43.6	43.0	43.5	45.3	51.9	54.5	56.7	73.6	77.0	70.3	98.0																					
21-Jul	82.2	88.4	93.6	93.0	93.4	92.9	93.5	86.6	74.8	65.7	56.4	51.4	47.3	44.6	41.1	41.0	40.8	40.6	46.1	52.1	51.3	52.3	58.6	64.4	64.7	93.6																					
22-Jul	74.1	77.4	88.7	94.2	93.3	96.0	93.1	84.0	77.6	69.7	66.1	62.7	57.7	53.4	47.9	50.6	49.7	52.9	58.6	63.3	68.7	71.6	71.6	76.2	70.8	96.0																					
23-Jul	77.7	78.8	80.3	84.6	84.5	89.8	85.9	81.9	77.1	73.4	69.0	61.9	59.0	56.2	54.2	52.1	53.1	54.6	57.7	63.3	68.7	71.9	78.5	82.1	70.7	89.8																					
24-Jul	92.9	84.8	91.9	90.3	92.6	93.0	91.9	84.1	71.0	59.9	47.9	39.4	41.0	40.6	40.9	40.6	34.6	35.7	36.4	35.2	36.4	40.3	40.8	48.5	58.8	93.0																					
25-Jul	51.4	50.9	60.9	88.8	95.2	96.8	87.7	78.3	78.6	77.9	84.7	89.0	94.2	92.9	87.2	87.1	90.7	89.6	85.9	90.0	86.8	82.3	83.4	80.7	83.0	96.8																					
26-Jul	84.2	87.6	92.1	91.7	91.9	90.1	87.7	79.6	71.9	64.9	61.5	55.8	53.3	52.0	52.3	55.2	64.0	65.4	64.6	71.0	71.3	67.5	70.2	64.9	71.3	92.1																					
27-Jul	67.3	74.5	80.3	88.0	90.0	88.2	84.5	79.5	78.7	73.9	67.8	59.4	54.2	54.9	58.6	64.1	80.5	72.6	79.8	88.1	85.1	84.7	89.2	91.3	76.5	91.3																					
28-Jul	94.5	96.3	96.7	96.5	95.7	94.2	85.1	76.9	69.6	58.9	52.9	46.4	41.6	39.8	42.1	44.4	45.3	46.3	48.5	54.7	60.8	68.9	66.9	68.5	66.3	96.7																					
29-Jul	73.3	84.9	85.3	86.2	90.6	88.3	85.6	75.3	67.2	57.8	46.0	41.1	36.6	35.7	33.5	33.4	33.7	34.1	35.1	40.6	49.7	58.1	64.3	67.5	58.5	90.6																					
30-Jul	65.3	75.1	74.7	77.1	80.5	79.1	76.0	67.9	61.6	56.9	49.6	44.7	39.5	35.3	34.5	34.9	34.1	39.4	45.9	56.3	75.4	86.7	88.6	91.0	61.3	91.0																					
31-Jul	89.3	85.4	89.4	91.0	94.5	96.8	97.4	96.8	94.4	85.2	76.9	70.5	71.2	62.5	67.2	74.9	57.9	65.7	72.4	74.3	82.5	81.3	69.9	70.3	79.9	97.4																					
																						74.9	78.0	80.7	83.7	85.2	84.3	81.3	75.2	69.1	63.2	57.7	53.2	51.0	49.0	48.2	49.3	50.6	52.2	54.3	58.0	62.6	65.3	67.5	71.6	Diurnal Average	
																						96.7	97.0	97.4	97.7	97.9	98.0	97.8	96.8	96.6	96.8	96.3	95.2	94.2	93.0	91.4	87.7	90.7	89.9	88.3	91.6	93.0	93.6	96.2	96.1	Diurnal Maximum	





Maximum Speed: 28 km/h on Jul 3 11:00	Maximum Daily Speed Average: 18.8 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 12 06:00	Minimum Daily Speed Average: 1.6 km/h on Jul 20	Hours of Data: 744
Maximum Diurnal Speed Average: 3.0 km/h at hour 14	Minimum Diurnal Speed Average: 0.1 km/h at hour 7	Hours of Missing Data: 0
Monthly Average Velocity: 1.3 km/h 318.9 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 10 P ₉₀ = 14 P ₉₉ = 25	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	W11	NW7	W4	SSW5	SSE6	SE7	SSW4	WSW3	S3	ESE3	SE8	SE10	SE11	SE11	SSE10	SW12	W6	WNW5	WNW9	NW6	WNW2	SW4	SW5	W7	SSW2.6	SW12
2-Jul	W10	W10WSW10	W10WNW10	WNW11	WNW9	NW13	NNW14	NW17	NNW19	NW23	NW20WNW14	WNW14	NW21	NNW19	NW17WNW17	WNW11	W15WNW13	NW13	NW13	WNW13.5	NW23				WNW13.5	NW23
3-Jul	NW15	NW14	NW15	NW16	N25	N22	N27	N27	N23	NNW25	N28	N27	NNW26	N28	N25	N22	N20	N18	N11	N16	N12	N9	NNW6	NW7	NNW18.8	N28
4-Jul	NW7	NW6	NW5	WNW4	W4	W4	W3	W4	WNW2	WNW5	WNW7	W6	NW2	WNW6	NW5	NW3	SSW2	SSE5	SSE7	SSE7	SSE6	S6	S7	SSE6	WSW2.4	SSE7
5-Jul	SSE9	SSE7	SSE7	SE7	SSE4	SE7	SSE6	SSE5	SW6WSW11	WSW15	WSW14	WSW10	NE7	SW4	S6	SW3	W8	W7	WSW5	NW6	NNW11	N8	NW5	SW3.1	WSW15	
6-Jul	N6	NNW5	NW7	NNW8	N6	N7	NNE8	N9	N9	N12	N15	N14	N14	N15	N13	N13	N14	N15	N14	N11	N8	NNE6	NE6	SSE3	N9.4	N15
7-Jul	S5	SSW4	SW4	S5	SSE6	SSE6	SSE6	SSW5	WSW6	WSW6	WNW3	W4	WSW5	SW6	SW7	SW10	SW9	WSW9	SW7	SW7	SW9	SW11	SW11	WSW14	SW6.0	WSW14
8-Jul	WSW16	W11	WNW6	WNW7	W15	W15	WSW11	WSW8	W12	W9	W6	W7	WNW3	WSW4	WNW8	WNW12	WNW12	NW9	N6	NNE5	NNE5	WNW1	NNW4	WNW5	W7.1	WSW16
9-Jul	W4	NNW6	NW6	NNW7	N8	N7	N8	NNE7	N6	N7	N12	N14	N14	NNE16	NNE16	NNE16	NNE16	NNE16	NNE14	N8	NNE9	NE10	ENE9	E8	NNE9.2	NNE16
10-Jul	SE5	ESE7	SE5	SSE8	SE7	SSE9	SSE9	SSE11	SE11	ESE13	ESE12	SE10	ESE9	SE10	SE9	S8	SE8	SE8	ESE5	ESE6	ESE5	SE6	SSE8	SSE6	SE7.9	ESE13
11-Jul	SSE5	S5	S6	S6	SSE6	S5	S7	S6	S8	S8	SSW9	SW7	SSW8	SSW10	SSW7	SSW7	SSW6	S5	SSE4	SSW3	SSW4	SW3	SW5	S3	S5.6	SSW10
12-Jul	SE2	S3	S7	SSE3	S4	SSE0	WSW2	NW5	WNW5	WNW7	NNW9	N10	N11	N12	N12	N11	N8	NNE9	NNE9	NNE7	NNE6	N11	NNW11	NW9	N5.1	N12
13-Jul	WNW6	WNW8	NW7	NW6	NW7	WNW6	NW8	NW9	NNW13	N15	N23	N25	N22	N22	N20	NNW19	N16	N16	N18	N20	N18	NNW20	NNW15	N15	NNW13.9	N25
14-Jul	N9	NNW7	NNW10	NW9	NW10	NNW10	N11	NNW16	NNW15	N17	N18	N14	NNE9	N9	N12	N11	NNE12	NNE10	N10	N8	NNE7	N6	NNE6	N5	NNW13.9	N18
15-Jul	NW5	NNW4	N4	NNE3	WNW2	N3	N3	N2	N6	N6	NNE8	NE9	NNE10	NE11	NE8	NNE9	NNE10	NNE8	N6	E6	ENE7	ENE6	ESE3	SSE4	NNE5.0	NE11
16-Jul	S4	SSW2	S4	SSE6	SSE6	SSE6	S6	SSE6	SE9	SE10	SE12	SE10	SE12	SE10	SE11	SE11	SE10	SE9	SE10	SE8	SE8	SSE8	SSE6	SSE8	SSE7.7	SE12
17-Jul	SSE7	SSE7	SSE7	SE6	SSE6	SE8	SE8	SE9	SE10	SE11	SE8	SE13	SSE7	SE5	ESE11	SE7	WSW2	ENE5	NNE5	NW6	NNW6	N6	NNE6	NNE4	SE4.6	SE13
18-Jul	N3	N5	N6	N6	NNW6	N8	N7	N8	NNE7	N7	NNE6	NW3	SW2	SSE1	WNW5	WNW7	WNW7	W6	SW5	WSW6	W11	W12	W11	W9	NW4.2	W12
19-Jul	WSW7	WSW5	WSW7	WSW5	SSW4	S4	SSE2	SW2	S3	W3	W8	WNW5	W3	N6	NNW5	NE8	W6	WNW5	W7	WSW2	WSW4	SW3	SSW5	S5	WSW2.9	W8
20-Jul	S5	S4	SSE5	SSE5	S6	SSE5	S4	S2	NW2	NW3	W3	N3	W4	WNW6	WNW7	WNW7	WNW8	WNW7	WNW6	NE2	ESE2	ENE4	ENE1	W3	WSW1.6	WNW8
21-Jul	WNW4	NW4	WSW3	W5	W4	SSW3	S4	SSE4	SSW4	SW5	W6	WNW7	WNW5	WNW7	W5	SW5	SW5	SSW4	SW5	WSW1	ENE7	ENE7	E4	N3	WSW2.0	ENE7
22-Jul	NNW4	NNW4	WSW2	N4	WSW1	SSW4	SE2	NNW2	N6	NNE5	N7	N7	N10	NNE12	NNE12	NNE11	NNE10	NNE8	NNE7	NNE6	NNE6	N7	NNE10	N8	N5.6	NNE12
23-Jul	N6	N6	N6	N5	NW0	SSE3	S4	SSE6	SSE7	SE5	SE5	S3	S4	NNW4	WSW2	SE4	SSE9	SSE9	SSE8	SSE6	SSE5	S6	SSE5	SSE6	SSE2.8	SSE9
24-Jul	SSW6	SW6	SSE6	S6	SSE6	S6	SSE6	S4	SE4	N2	ESE5	SE4	SSE4	SSW3	SSW2	WNW0	E7	E8	E7	E9	E10	ENE11	E7	SE4	SE3.8	ENE11
25-Jul	SE6	SE4	WSW8	W8	SE3	NNE6	E9	SE6	SSE7	SW6	ENE3	W3	W4	NE4	ESE5	SE4	SE3	SSW2	NNE1	WSW5	WSW12	SW12	SW9	SSW9	SSW2.4	SW12
26-Jul	S7	S6	SE7	SSE7	SE7	SSE7	SSE5	SSE7	SE7	SSE7	ESE8	SE4	ESE7	E2	NE7	N12	N17	N15	NNE18	NNE14	ENE13	ESE14	E10	ENE12	E4.6	NNE18
27-Jul	ENE9	NE9	NE9	NNE8	NNE9	NNE11	NNE11	N8	NNW6	NNW8	NW8	N12	N14	N12	ENE7	S8	WSW6	W10	NW6	SSE3	S5	WSW4	WNW7	SSE3	N4.5	N14
28-Jul	S5	SSE5	SSW4	WSW4	SW4	SW3	WSW4	W4	WSW3	WSW3	W4	WNW4	SW4	WSW2	SSW7	SSW8	S9	SSW9	S7	S5	S5	S6	S8	S7	SSW4.3	SSW9
29-Jul	SSE6	SE8	SSE6	SSE7	SSE6	S7	SSE5	S5	S6	SSW6	WSW7	SW9	SW12	SW10	SSW11	S10	S10	SSW9	S8	S5	S5	SSW6	S6	SSE6	S6.6	SW12
30-Jul	SSE8	SSE8	SSE7	SSE7	SSE6	SSE7	SSE7	SSE7	SSE7	SSE10	S11	S12	S11	SSW17	S14	S12	S12	SSW6	SSW7	SW9	SW15	SE8	SE7	S9	S8.6	SSW17
31-Jul	S8	SSE6	SSW3	W9	SSE5	SSE6	S6	S7	S9	S9	SSW8	SSW10	WNW8	W8	SW3	SSW10	WSW9	NNW12	N6	W4	S4	SW4	WSW9	WSW10	SW4.5	NNW12

WSW1.8	W1.1	WSW1.5	W1.5	SW1.0	SW0.5	SSE0.1	NW0.6	NW0.6	NW2.0	NNW2.9	NNW3.0	NNW2.8	NNW3.0	N1.9	NW1.9	NNW2.4	NNW2.9	NNW2.6	N1.6	NNW0.7	NNW0.7	NNW0.6	WSW1.5		Diurnal Average
WSW16	NW14	NW15	NW16	N25	N22	N27	N27	N23	NNW25	N28	N27	NNW26	N28	N25	N22	N20	N18	N18	N20	N18	NNW20	NNW15	N15		Diurnal Maximum

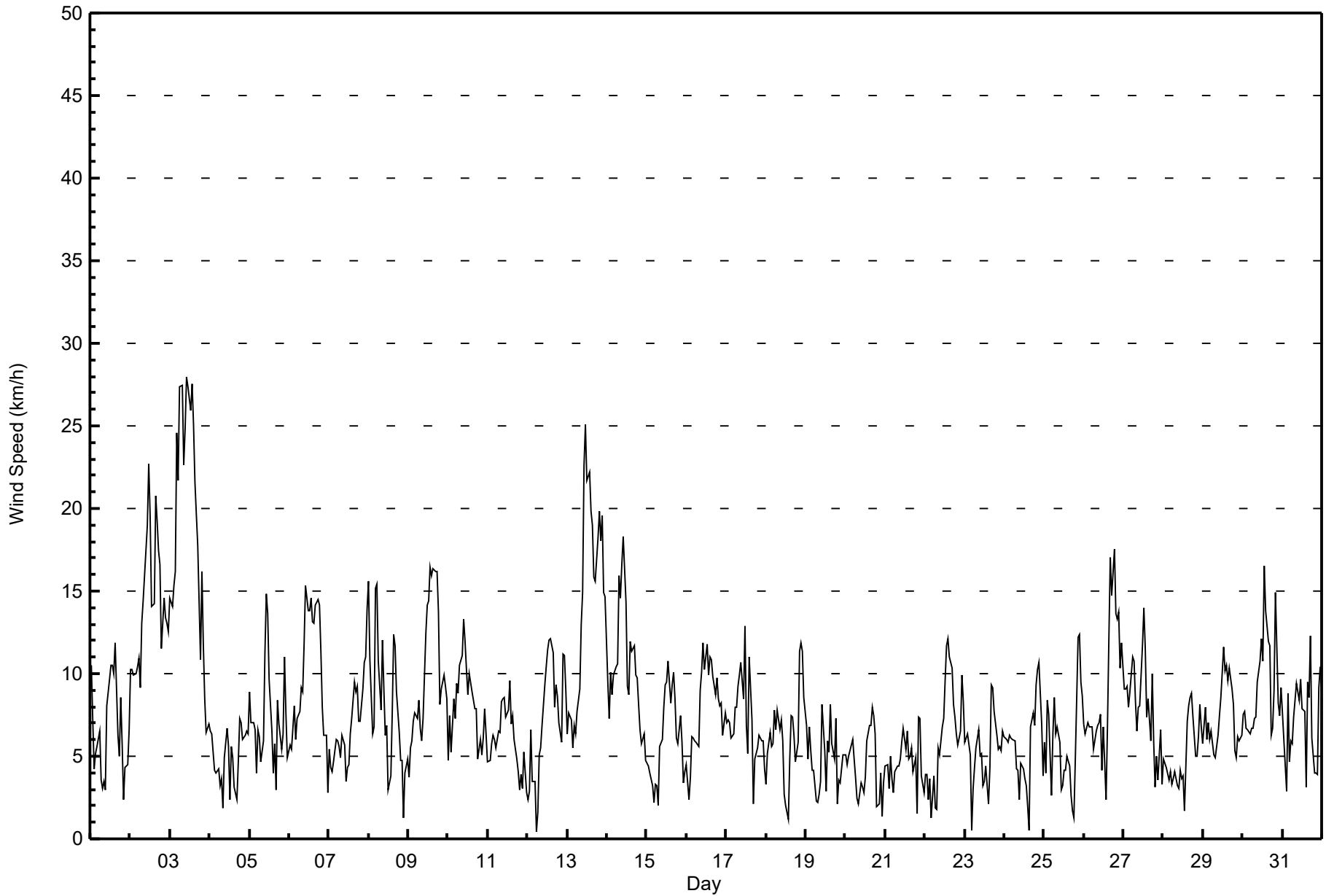
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Buffalo Viewpoint - July 2023

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Buffalo Viewpoint - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	225	30.24	30.24
6 - 11	400	53.76	84.01
12 - 19	96	12.90	96.91
20 - 28	23	3.09	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
Buffalo Viewpoint - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	12	7	2	4	2	7	16	25	31	19	20	22	20	18	12	8	225
6 - 11	50	32	10	8	10	6	42	65	37	20	17	17	25	26	20	15	400
12 - 19	34	11	0	2	0	3	3	0	4	1	4	5	5	6	9	9	96
20 - 28	17	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	23
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	50	12	14	12	16	61	90	72	40	41	44	50	50	44	35	744

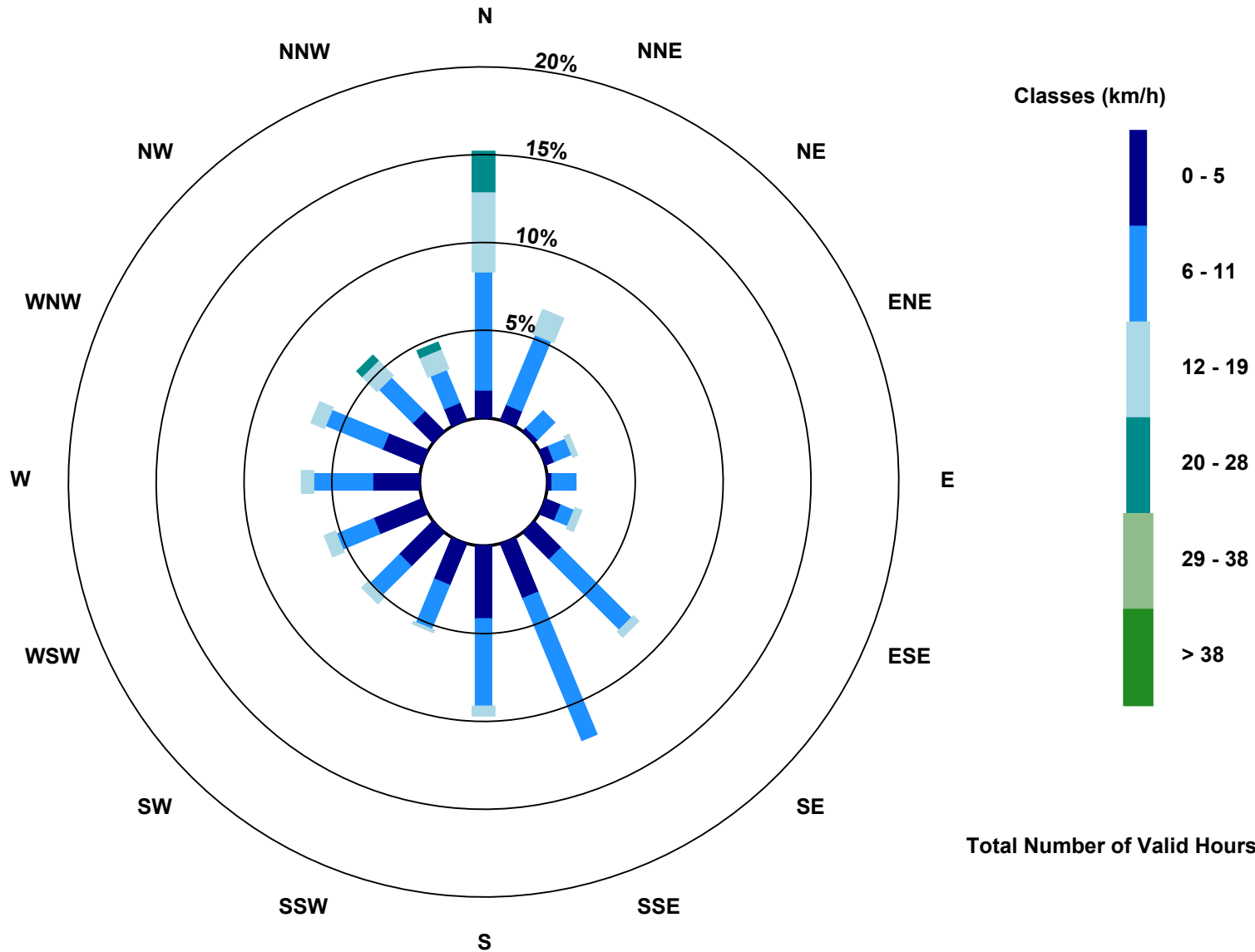
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Buffalo Viewpoint



Total Number of Valid Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Buffalo Viewpoint - July 2023

Direction of Maximum Speed: 352 deg on Jul 3 11:00 Direction of Maximum Daily Speed Average: 347.3 deg on Jul 3	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0
Direction of Minimum Speed: 151 deg on Jul 12 06:00 Direction of Minimum Daily Speed Average: 1.6 deg on Jul 20	Percent Operational Time: 100.0
Monthly Average Direction: 318.9 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	279	306	269	213	160	146	199	255	176	106	126	135	125	128	166	220	266	293	302	308	293	216	231	277	209.1
2-Jul	276	276	249	269	287	298	295	308	329	319	327	325	317	289	286	315	328	307	302	284	268	286	306	309	302.4
3-Jul	316	317	314	325	354	353	356	359	349	346	352	353	345	350	354	353	354	352	359	353	353	354	339	305	347.3
4-Jul	318	320	308	288	261	267	264	267	301	290	284	276	308	291	309	312	210	167	160	157	165	178	181	166	251.6
5-Jul	151	153	152	142	155	141	149	147	226	247	255	247	240	50	231	189	227	270	265	250	314	342	1	310	229.5
6-Jul	350	332	319	336	349	1	12	4	359	360	358	8	360	360	1	3	360	6	8	8	6	23	53	166	1.5
7-Jul	182	207	226	186	162	157	165	203	252	252	289	272	258	214	214	223	233	238	223	216	221	227	236	248	223.1
8-Jul	250	276	298	293	268	268	258	248	266	272	273	277	283	238	293	285	289	317	352	22	19	297	342	290	281.1
9-Jul	263	328	323	348	3	2	359	18	358	354	3	4	3	12	17	22	27	20	21	4	15	49	71	86	13.7
10-Jul	131	122	143	149	145	153	151	149	139	120	123	130	119	127	131	173	132	133	115	112	123	142	153	155	136.3
11-Jul	168	170	169	178	164	169	169	169	172	190	208	222	211	206	194	194	202	180	160	192	199	235	217	179	188.9
12-Jul	139	173	171	158	191	151	243	308	298	301	348	349	351	353	355	8	6	12	21	28	15	352	341	320	351.1
13-Jul	303	288	310	318	306	291	315	325	344	349	350	355	352	353	345	1	5	4	358	349	346	333	351	345.4	
14-Jul	358	343	341	323	310	329	355	344	341	352	357	4	14	359	1	5	26	33	8	9	16	2	13	5	356.2
15-Jul	318	329	351	15	285	353	350	352	6	4	22	37	29	47	42	25	32	13	11	81	58	57	106	147	26.8
16-Jul	184	200	181	163	167	163	184	165	138	139	139	138	136	145	133	141	132	141	136	138	141	151	153	154	146.9
17-Jul	160	155	152	145	151	144	138	134	141	144	145	142	158	133	116	136	245	76	26	312	345	3	28	31	130.9
18-Jul	356	354	355	10	348	351	0	5	29	4	17	326	234	156	288	287	298	275	236	252	259	262	272	272	311.2
19-Jul	252	247	247	253	200	170	166	226	188	261	263	293	271	357	340	50	274	291	269	247	248	234	202	176	255.0
20-Jul	172	177	161	167	176	157	176	191	320	316	276	3	277	297	283	293	298	303	296	50	121	63	77	261	256.0
21-Jul	303	312	248	280	280	212	181	163	199	231	279	296	296	288	264	229	216	207	218	241	65	70	80	357	256.7
22-Jul	336	344	258	3	237	198	146	340	6	17	359	4	0	12	23	33	30	23	13	16	16	7	12	352	10.4
23-Jul	356	349	2	6	311	155	176	165	158	145	143	172	185	333	245	137	151	155	167	157	163	180	159	163	156.0
24-Jul	195	226	157	172	160	174	162	187	141	358	112	127	156	195	192	300	92	98	98	85	80	78	95	135	128.6
25-Jul	129	142	242	261	126	20	91	132	158	233	65	265	281	37	119	140	134	209	12	254	243	235	219	213	202.6
26-Jul	185	169	142	155	142	159	153	147	139	158	120	129	123	94	47	356	4	6	13	19	73	102	84	76	82.4
27-Jul	61	51	43	15	17	13	13	360	342	336	318	356	1	9	59	184	248	272	311	162	172	242	300	165	0.3
28-Jul	186	151	208	242	217	219	257	262	237	240	275	297	233	240	192	195	179	198	180	171	172	179	175	189	201.4
29-Jul	163	131	157	154	166	170	163	181	184	209	244	220	218	218	203	191	190	195	188	190	184	197	178	157	188.5
30-Jul	154	149	156	159	158	157	157	165	154	164	175	170	177	194	180	184	189	198	197	220	215	146	145	185	176.0
31-Jul	190	152	192	271	159	149	179	184	177	189	200	211	285	277	234	213	255	340	354	260	182	229	253	239	222.7

239.9 264.1 249.7 260.1 235.0 214.3 166.4 304.2 305.5 312.0 334.0 336.9 333.7 346.4 350.7 318.8 334.1 338.7 348.3 352.2 336.7 340.8 301.0 239.6
 Diurnal Average

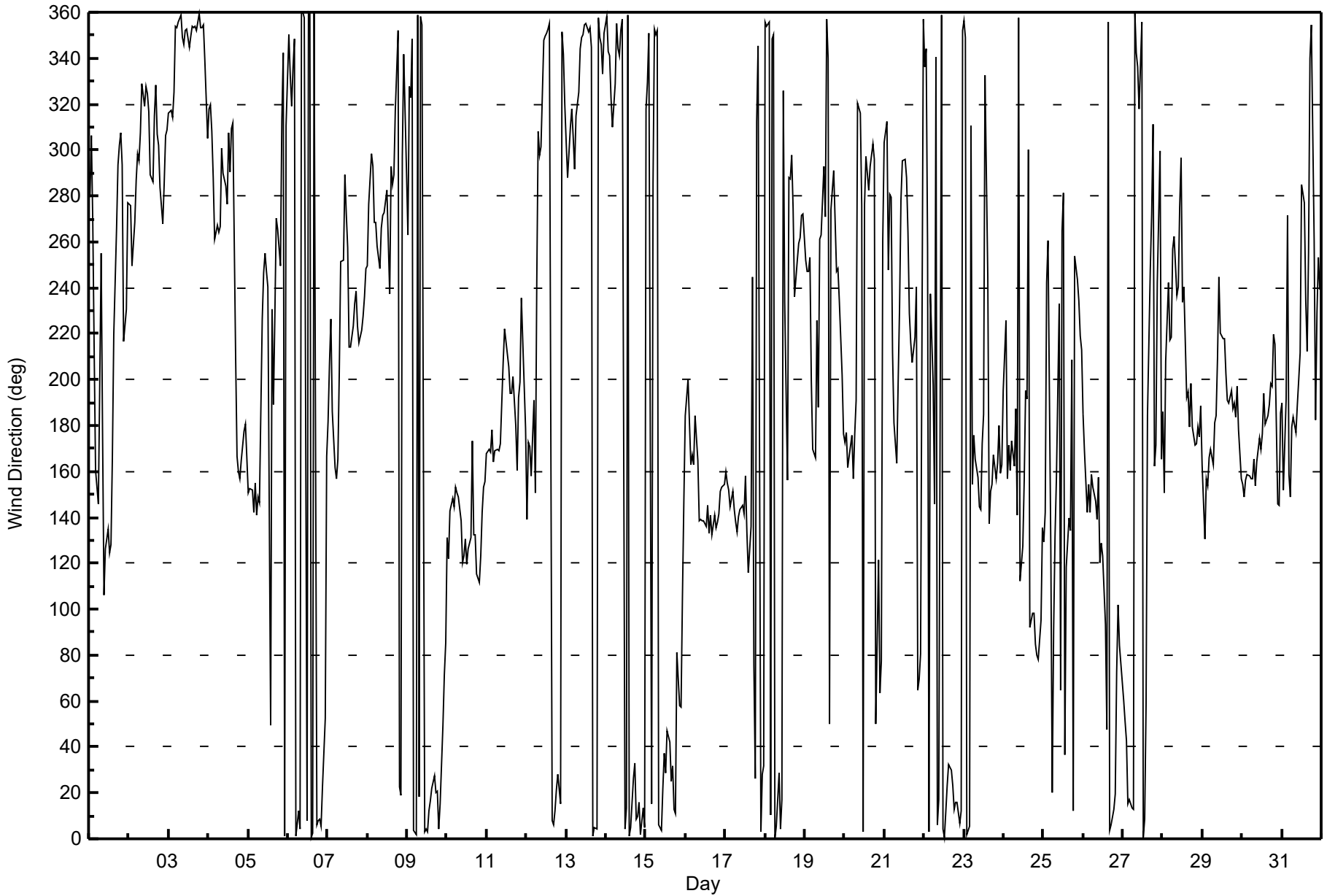
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Buffalo Viewpoint - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 98 deg on Jul 18 13:00 Minimum Value: 9 deg on Jul 11 22:00 Percentiles: P ₁ = 11 P ₁₀ = 16 Q ₁ = 20 Median = 25 Q ₃ = 34 P ₉₀ = 52 P ₉₉ = 88																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	18	17	38	24	31	10	21	25	40	40	29	29	29	29	34	23	38	31	21	42	70	40	28	20	70
2-Jul	18	18	19	25	20	21	20	22	18	19	19	18	21	22	23	22	19	22	21	21	17	20	21	19	25
3-Jul	18	17	18	18	23	22	23	23	21	20	21	22	21	21	22	23	20	20	23	19	16	13	27	16	27
4-Jul	15	10	22	21	14	15	29	30	80	56	36	56	96	43	53	68	89	44	29	27	27	19	20	20	96
5-Jul	13	18	21	17	47	14	31	43	31	22	21	23	34	46	83	38	84	24	21	14	31	17	17	23	84
6-Jul	16	21	13	15	16	16	18	21	22	23	23	25	24	24	27	27	23	22	24	21	18	15	12	56	56
7-Jul	15	19	33	12	11	14	17	28	23	32	53	54	54	31	25	27	24	19	16	11	13	15	18	17	54
8-Jul	16	33	27	25	14	13	18	20	16	21	29	29	76	40	46	23	23	21	24	29	16	83	13	15	83
9-Jul	27	28	12	23	17	15	19	25	24	27	25	24	27	24	26	26	25	21	21	18	17	21	11	22	28
10-Jul	56	33	48	35	41	33	36	32	34	26	28	31	31	33	36	35	33	28	22	20	23	30	29	31	56
11-Jul	34	30	23	19	24	26	28	33	31	25	20	20	25	21	30	32	23	29	24	30	19	9	10	38	38
12-Jul	53	73	12	60	27	92	62	24	29	31	27	28	25	24	25	26	32	24	21	18	21	15	20	16	92
13-Jul	25	17	13	15	18	23	20	18	23	24	22	23	23	23	23	22	22	21	23	22	19	20	19	19	25
14-Jul	15	15	18	17	20	20	20	22	23	22	21	23	25	27	24	23	25	24	24	18	24	18	17	17	27
15-Jul	27	28	29	23	44	40	23	44	20	34	31	30	30	26	30	31	26	27	31	18	14	35	36	29	44
16-Jul	18	48	21	14	19	19	26	35	32	30	33	36	35	39	34	32	33	32	27	27	31	34	30	29	48
17-Jul	28	28	31	32	31	30	30	28	29	30	34	30	35	35	26	36	67	35	43	26	36	17	23	17	67
18-Jul	31	12	16	22	15	16	17	21	26	28	59	83	98	96	46	25	25	24	16	18	13	12	16	17	98
19-Jul	24	29	13	15	38	30	45	67	63	61	31	49	73	41	37	66	77	48	23	72	25	40	17	24	77
20-Jul	35	29	26	26	15	29	22	50	68	56	61	81	66	42	41	37	26	23	21	69	42	25	81	38	81
21-Jul	22	24	44	14	19	52	19	22	32	32	34	30	43	43	55	50	28	26	17	83	40	12	48	56	83
22-Jul	23	37	51	52	76	17	50	60	30	27	22	25	24	25	22	21	20	19	16	13	20	20	14	14	76
23-Jul	15	11	15	26	86	30	30	32	35	39	40	61	60	66	87	66	38	30	30	30	30	17	20	19	87
24-Jul	14	21	23	18	23	22	21	38	32	82	36	44	44	46	75	96	25	19	19	12	17	14	21	38	96
25-Jul	24	53	35	33	74	37	27	47	52	36	64	83	52	28	37	31	41	61	36	95	19	21	22	25	95
26-Jul	24	26	22	30	28	29	31	34	35	43	38	76	40	71	49	28	22	21	21	23	18	21	18	16	76
27-Jul	24	18	17	18	17	18	18	18	19	21	28	25	23	42	42	50	28	20	31	76	27	47	14	52	76
28-Jul	20	17	18	41	28	32	28	19	42	52	39	55	71	89	34	30	28	25	25	22	14	12	13	30	89
29-Jul	25	13	22	16	25	17	19	29	30	34	34	34	27	31	32	34	29	25	26	19	14	9	13	15	34
30-Jul	12	13	16	16	16	23	29	30	34	31	34	33	34	27	33	32	26	27	28	29	41	31	38	21	41
31-Jul	35	34	71	31	38	24	36	25	26	29	21	24	34	40	62	17	37	23	19	35	24	61	18	19	71
Diurnal Maximum																									





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS05
MANNIX
JULY 2023**

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS05)
JULY 2023

MONTHLY SUMMARY

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	59.8	0	6.9	0
H2S (ppb) Average	708	36	36	100	16	5	2.5	0
THC (ppm) Average	708	36	36	100	7.4	-	2.8	-
NMHC(ppm) Average	708	36	36	100	3.246	-	0.501	-
CH4(ppm) Average	708	36	36	100	4.1	-	2.3	-
Temperature 2 m (C) Average	714	0	30	95.97	29.5	-	22.6	-
Temperature 20 m (C) Average	714	0	30	95.97	28.9	-	23.3	-
Temperature 45 m (C) Average	714	0	30	95.97	28.6	-	23.4	-
Temperature 75 m (C) Average	714	0	30	95.97	28.3	-	23.6	-
Temperature 90 m (C) Average	714	0	30	95.97	28.3	-	23.8	-
Relative Humidity 2 m (%) Average	714	0	30	95.97	98	-	96	-
Relative Humidity 20 m (%) Average	714	0	30	95.97	99	-	92	-
Relative Humidity 45 m (%) Average	714	0	30	95.97	97	-	90	-
Relative Humidity 75 m (%) Average	713	0	31	95.83	100	-	93	-
Relative Humidity 90 m (%) Average	714	0	30	95.97	100	-	91	-
Wind Speed 20 m (km/h) Average	714	0	30	95.97	27	-	18	-
Wind Speed 45 m (km/h) Average	714	0	30	95.97	39	-	27	-
Wind Speed 75 m (km/h) Average	714	0	30	95.97	44	-	30	-
Wind Speed 90 m (km/h) Average	711	0	33	95.56	46	-	32	-
Wind Direction 20 m (deg) Average	714	0	30	95.97	-	-	-	-
Wind Direction 45 m (deg) Average	714	0	30	95.97	-	-	-	-
Wind Direction 75 m (deg) Average	714	0	30	95.97	-	-	-	-
Wind Direction 90 m (deg) Average	711	0	33	95.56	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	714	0	30	95.97	1.5	-	0.8	-
Vertical Wind Speed 45 m (km/h) Average	714	0	30	95.97	2.3	-	0.9	-
Vertical Wind Speed 75 m (km/h) Average	714	0	30	95.97	1.8	-	0.4	-
Vertical Wind Speed 90 m (km/h) Average	711	0	33	95.56	1.9	-	0.6	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS05)

JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1.67	4.4	-	0	0	0.1	0.3	1.2	3.9	59.8
H2S (ppb) Average	708	0.73	1.5	-	0	0.1	0.1	0.2	0.7	1.7	16.1
THC (ppm) Average	708	2.3	0.5	-	1.9	2	2	2.1	2.4	2.8	7.4
NMHC(ppm) Average	708	0.215	0.317	-	0	0	0	0.1	0.3	0.5	3.246
CH4(ppm) Average	708	2.08	0.2	-	1.9	2	2	2	2.1	2.3	4.1
Temperature 2 m (C) Average	714	18.43	4.9	-	7.1	12.4	14.6	17.8	22.2	25.2	29.5
Temperature 20 m (C) Average	714	18.8	4.2	-	9.2	13.3	15.7	18.4	21.9	24.6	28.9
Temperature 45 m (C) Average	714	18.73	4.1	-	9.7	13.4	15.8	18.5	21.7	24.3	28.6
Temperature 75 m (C) Average	714	18.69	3.9	-	9.6	13.7	15.9	18.4	21.7	24.1	28.3
Temperature 90 m (C) Average	714	18.77	3.9	-	9.7	13.8	16	18.4	21.7	24.1	28.3
Relative Humidity 2 m (%) Average	714	66.5	20	-	28	39	50	66	84	95	98
Relative Humidity 20 m (%) Average	714	60.9	19	-	25	36	46	61	76	87	99
Relative Humidity 45 m (%) Average	714	58.8	18	-	25	35	44	58	73	84	97
Relative Humidity 75 m (%) Average	713	58.4	18	-	25	35	44	57	73	83	100
Relative Humidity 90 m (%) Average	714	57.6	18	-	25	34	43	56	72	81	100
Wind Speed 20 m (km/h) Average	714	9.4	5	-	0	4	6	9	12	16	27
Wind Speed 45 m (km/h) Average	714	13.6	7	-	1	5	8	13	18	22	39
Wind Speed 75 m (km/h) Average	714	15.1	8	-	0	5	9	15	20	25	44
Wind Speed 90 m (km/h) Average	711	15.8	8	-	1	6	9	15	21	26	46
Wind Direction 20 m (deg) Average	714	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	714	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	714	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	711	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	714	0.09	0.4	-	-1.3	-0.4	-0.2	0.1	0.4	0.6	1.5
Vertical Wind Speed 45 m (km/h) Average	714	0.03	0.5	-	-1.3	-0.5	-0.3	0	0.3	0.7	2.3
Vertical Wind Speed 75 m (km/h) Average	714	0.19	0.4	-	-0.8	-0.2	0	0.2	0.4	0.7	1.8
Vertical Wind Speed 90 m (km/h) Average	711	0.11	0.5	-	-1.2	-0.5	-0.2	0.1	0.4	0.7	1.9

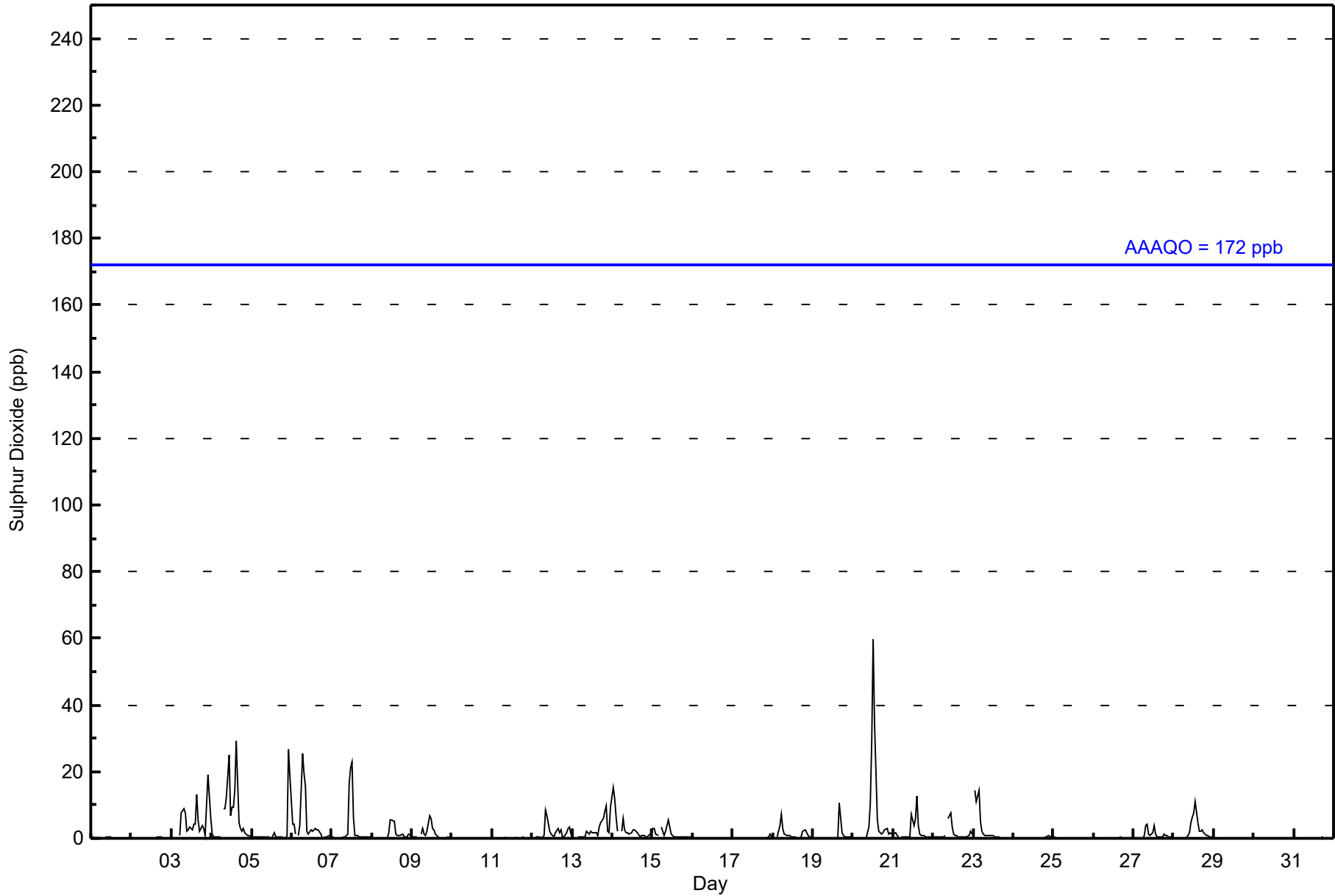
WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS05)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL MET PARAMETERS	21 Jul 2023 01:00	21 Jul 2023 09:00	9	DAS Failure - data not recorded
ALL MET PARAMETERS	21 Jul 2023 16:00	22 Jul 2023 12:00	21	DAS Failure - data not recorded
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	25 Jul 2023 04:00	25 Jul 2023 04:00	1	Unstable Operation - inconsistent response
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	30 Jul 2023 20:00	30 Jul 2023 21:00	2	Unstable Operation - inconsistent response



Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0	Hours in Service: 744																	744																												
Maximum Value: 59.8 ppb on Jul 20 13:00		Maximum Daily Average: 6.9 ppb on Jul 20																	Hours of Data: 708																														
Minimum Value: 0.0 ppb on Jul 25 10:00		Minimum Daily Average: 0.0 ppb on Jul 25																	Hours of Missing Data: 36																														
Maximum Diurnal Average: 4.3 ppb at hour 13		Minimum Diurnal Average: 0.5 ppb at hour 5																	Hours of Calibration: 36																														
Monthly Average: 1.67 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.3 Q ₃ = 1.2 P ₉₀ = 3.9 P ₉₉ = 22.7																	Percent Operational Time: 100.0																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	0.3	0.5	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.5																							
2-Jul	0.1	0.0	0.1	Z	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.4	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.4																							
3-Jul	0.2	0.1	0.1	0.1	Z	1.0	7.5	9.1	7.5	2.0	2.7	3.6	2.4	4.1	4.2	13.0	5.3	2.1	3.8	2.8	0.9	10.0	18.9	5.8	4.7	18.9																							
4-Jul	1.2	0.6	0.4	0.3	0.3	0.3	Z	9.0	8.8	12.2	25.2	6.8	9.5	9.1	14.4	29.2	4.8	2.9	2.1	3.0	1.6	1.0	0.8	0.6	6.3	29.2																							
5-Jul	Z	0.5	0.3	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.3	0.2	0.2	1.7	0.6	0.4	0.2	0.2	0.2	0.2	0.2	0.9	26.9	18.7	2.3	26.9																							
6-Jul	4.3	4.3	1.3	Z	0.8	3.9	25.6	19.5	15.7	2.2	1.4	2.4	2.0	2.5	2.8	2.5	2.3	1.2	0.2	0.1	0.3	0.5	0.8	0.3	4.2	25.6																							
7-Jul	0.4	0.3	Z	0.2	0.1	0.2	0.2	0.2	0.5	1.3	16.5	21.2	22.8	6.4	1.0	0.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.3	22.8																							
8-Jul	0.3	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.2	0.2	1.8	5.7	5.5	5.0	1.1	0.9	0.7	0.9	1.4	0.5	0.3	0.3	1.2	1.0	1.2	5.7																							
9-Jul	0.5	0.4	0.4	0.4	Z	1.3	2.9	1.1	0.7	2.2	6.9	6.0	2.8	2.4	1.5	0.9	0.2	0.1	0.1	0.1	0.0	0.3	0.2	0.1	1.4	6.9																							
10-Jul	0.1	0.2	0.2	0.2	0.2	Z	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.2																							
11-Jul	Z	0.1	0.1	0.0	0.0	0.1	0.0	0.2	0.4	C	C	C	C	C	0.4	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.4																							
12-Jul	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.9	8.6	6.7	2.3	1.4	0.7	0.6	1.6	2.9	1.8	2.5	0.5	0.4	1.6	2.9	3.5	1.5	1.8	8.6																							
13-Jul	0.9	0.7	Z	0.5	0.5	0.5	0.5	0.6	2.0	1.9	1.1	2.1	1.9	1.8	1.7	1.0	3.2	4.7	6.1	8.2	9.6	2.1	1.5	9.3	2.7	9.6																							
14-Jul	15.1	11.8	6.3	2.2	Z	2.3	5.8	2.7	1.9	1.7	1.4	1.7	2.5	2.5	2.3	1.8	0.6	0.8	0.9	0.9	0.4	0.6	1.1	1.0	3.0	15.1																							
15-Jul	3.1	3.1	1.2	1.1	Z	3.4	2.1	1.0	2.1	5.6	3.3	1.3	0.8	0.6	0.5	0.4	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.4	1.4	5.6																							
16-Jul	0.3	0.2	0.2	0.2	0.1	0.1	Z	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.3																							
17-Jul	Z	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.3	1.2	0.6	0.1	1.2																							
18-Jul	0.4	Z	0.4	2.0	3.9	7.0	3.1	1.5	1.0	0.9	0.7	0.5	0.3	0.2	0.1	0.2	0.1	0.3	2.3	2.5	1.6	0.7	0.4	0.2	1.3	7.0																							
19-Jul	0.2	0.1	Z	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.5	10.6	1.6	0.7	0.4	0.3	0.3	0.2	0.2	0.7	10.6																							
20-Jul	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	3.2	10.7	29.0	59.8	34.3	5.5	2.0	1.8	1.3	1.5	2.6	3.1	1.3	1.5	1.3	6.9	59.8																							
21-Jul	1.4	1.9	0.9	0.6	Z	0.6	0.4	0.3	0.3	0.3	0.3	7.1	3.8	5.8	12.8	3.8	1.3	0.9	0.7	0.5	0.4	0.6	0.6	0.5	2.0	12.8																							
22-Jul	0.5	0.4	0.3	0.3	0.4	0.5	0.4	0.7	Z	6.0	7.8	3.5	1.5	0.9	0.7	0.6	0.5	0.4	0.4	0.4	0.3	1.0	1.9	1.2	1.3	7.8																							
23-Jul	Z	14.4	11.0	14.4	5.2	2.2	1.3	1.0	0.8	0.8	0.7	0.7	0.7	0.6	0.4	0.3	0.2	0.0	0.1	0.1	0.0	0.1	0.0	0.0	2.4	14.4																							
24-Jul	0.0	Z	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.3	0.5	0.6	0.3	0.3	0.1	0.6																							
25-Jul	0.3	0.3	Z	0.1	0.1	0.2	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	0.3																							
26-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.5	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.5																							
27-Jul	0.1	0.1	0.0	0.1	Z	0.1	0.7	4.0	4.1	1.1	0.8	1.5	3.6	1.5	0.6	0.4	0.3	0.4	1.5	0.9	0.7	0.3	0.2	0.2	1.0	4.1																							
28-Jul	0.2	0.2	0.2	0.2	0.1	Z	0.1	0.2	0.9	1.8	4.8	6.2	7.6	11.1	4.7	2.3	2.2	2.6	1.7	1.0	0.7	0.5	0.4	0.2	2.2	11.1																							
29-Jul	Z	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2																							
30-Jul	0.0	Z	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.2																							
31-Jul	0.0	0.0	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	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.3																							
																								1.2	1.5	1.0	0.9	0.5	0.9	1.8	1.7	1.9	1.7	3.0	3.4	4.3	3.1	1.9	2.1	1.2	0.8	0.8	0.8	0.8	0.8	2.0	1.4	Diurnal Average	
																								15.1	14.4	11.0	14.4	5.2	7.0	25.6	19.5	15.7	12.2	25.2	29.0	59.8	34.3	14.4	29.2	10.6	4.7	6.1	8.2	9.6	10.0	26.9	18.7	Diurnal Maximum	
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	682	96.33	96.33
11 - 20	17	2.40	98.73
21 - 60	9	1.27	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: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	30	63	26	15	14	16	66	83	51	39	37	49	47	31	31	56	654
11 - 20	7	0	0	0	0	0	0	1	0	0	0	0	4	2	0	3	17
21 - 60	1	1	0	0	0	0	0	0	0	0	0	2	4	1	0	0	9
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	38	64	26	15	14	16	66	84	51	39	37	51	55	34	31	59	680

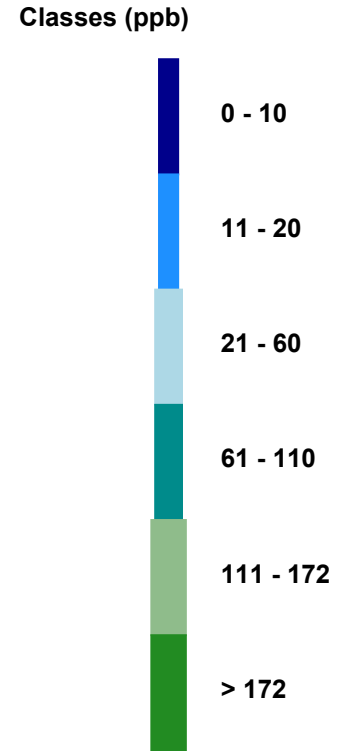
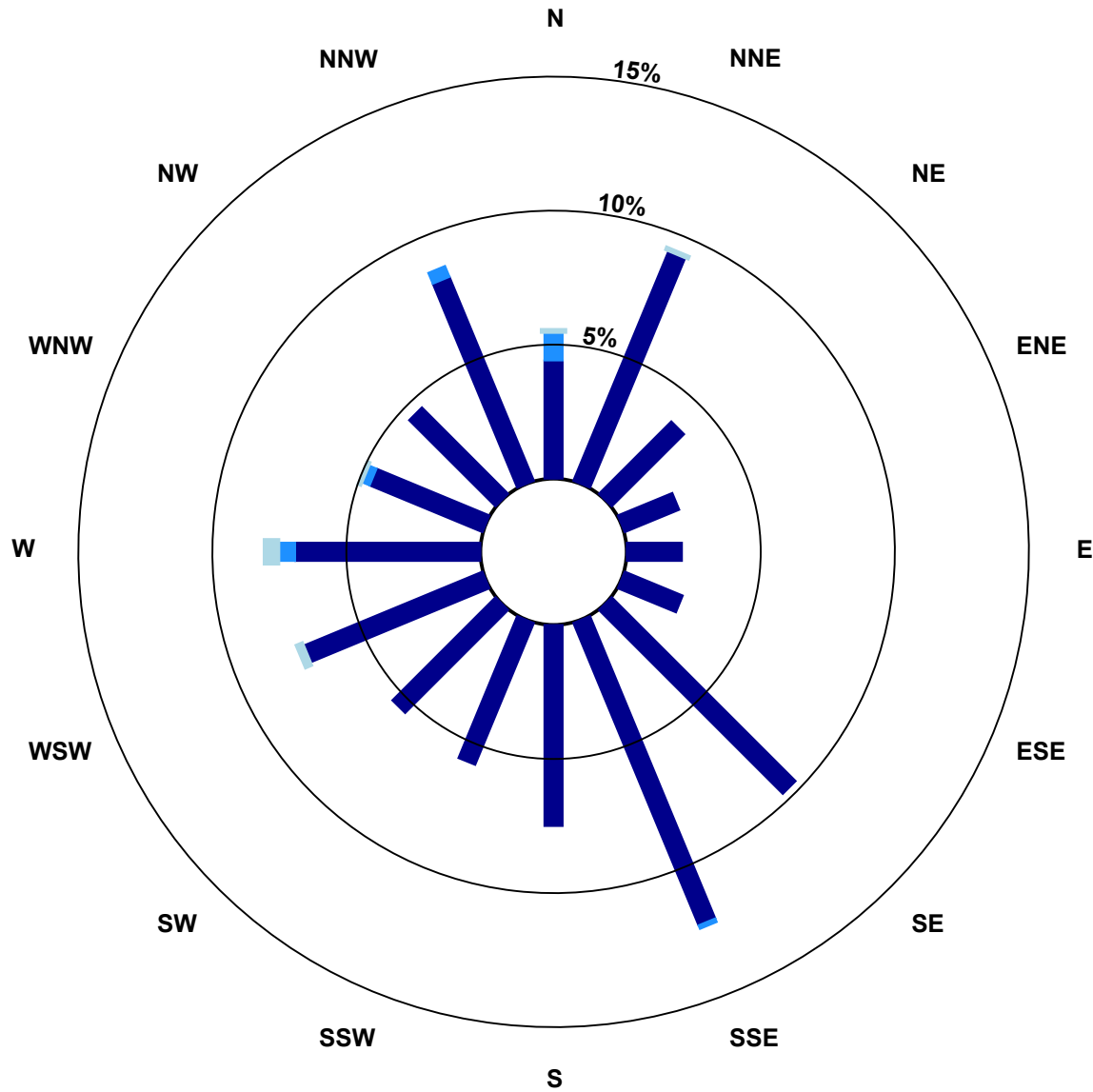
Total Number of Valid Hours: 680

Total Number of Hours: 744

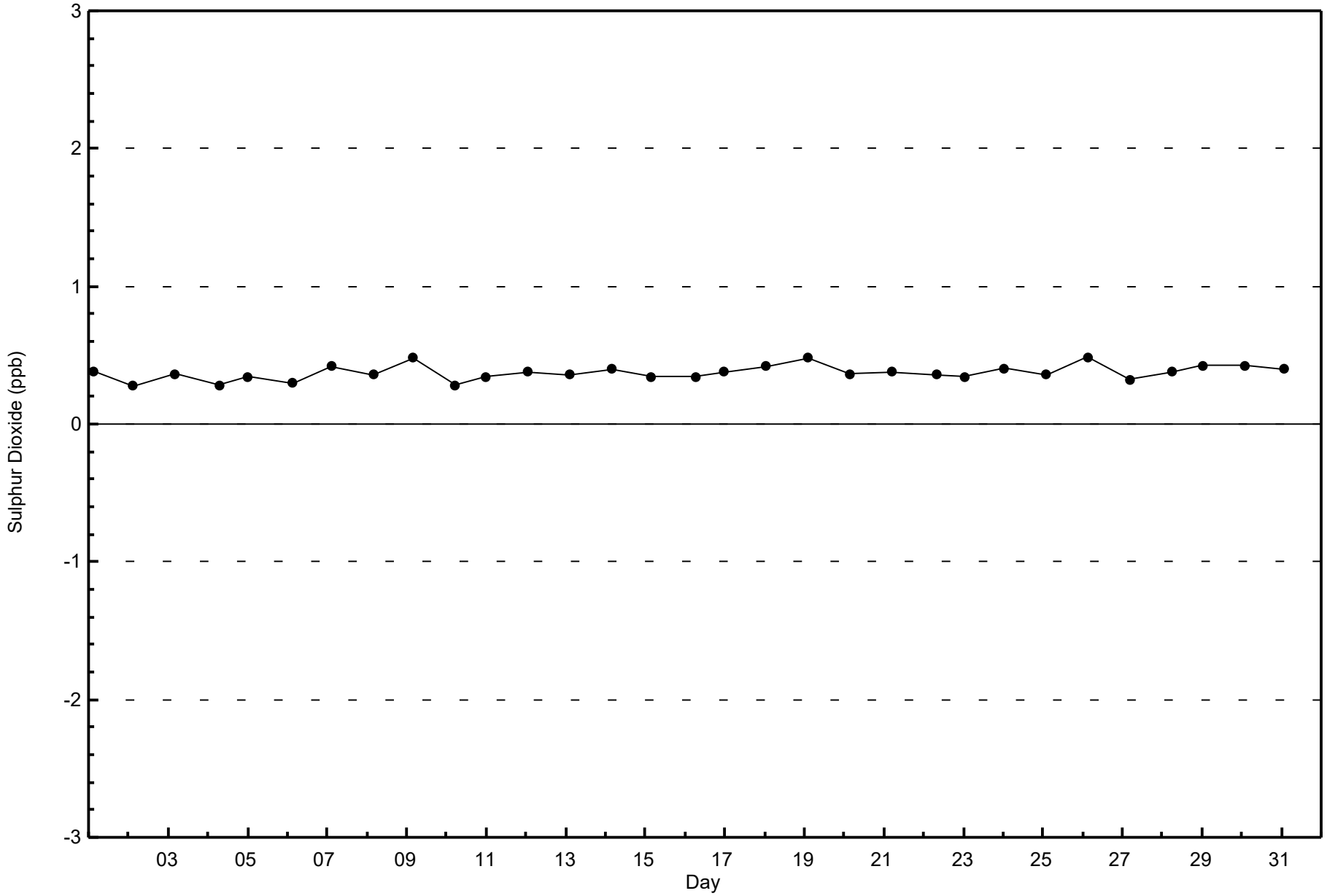


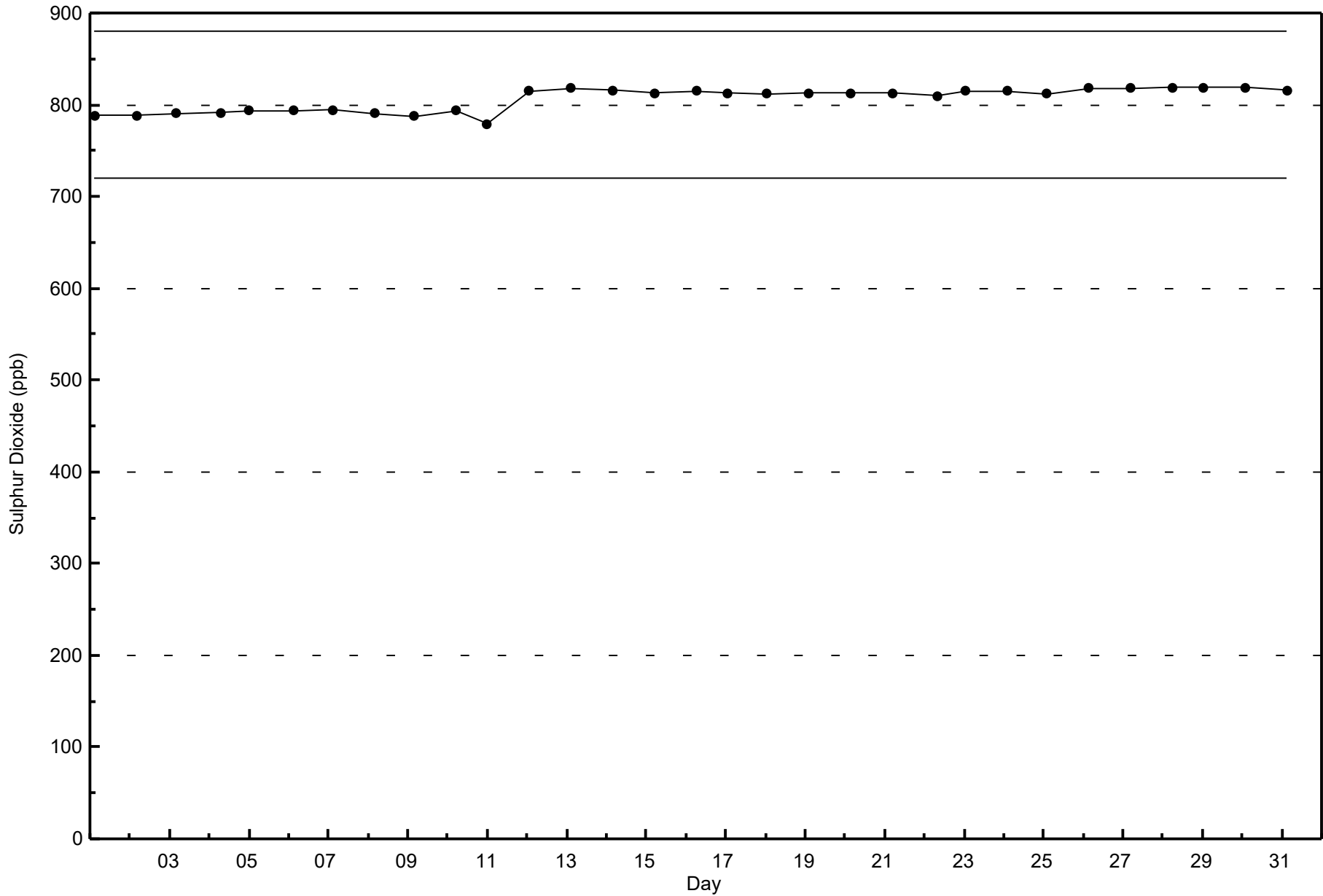
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Mannix



Total Number of Valid Hours: 680







Wood Buffalo Environmental Association

Summary of Hour Averages

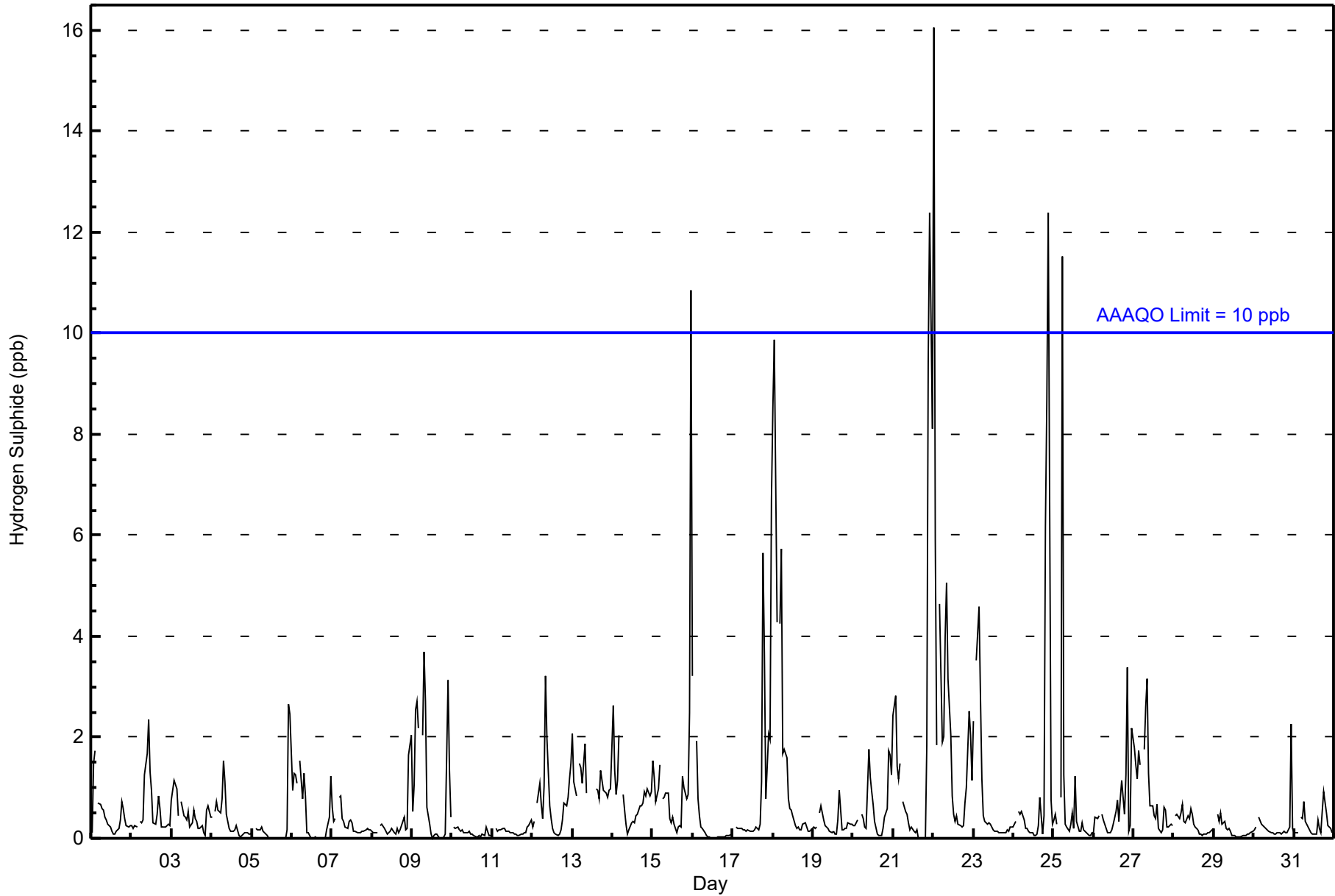
Hydrogen Sulphide (H₂S) - ppb

Mannix - July 2023

Number of Exceedences (AAAQO):	1-hr: 5	24-hr: 0	Hours in Service:	744
Maximum Value: 16.1 ppb on Jul 22 01:00	Maximum Daily Average: 2.5 ppb on Jul 22		Hours of Data:	708
Minimum Value: 0.0 ppb on Jul 5 11:00	Minimum Daily Average: 0.1 ppb on Jul 10		Hours of Missing Data:	36
Maximum Diurnal Average: 1.6 ppb at hour 1	Minimum Diurnal Average: 0.2 ppb at hour 16		Hours of Calibration:	36
Monthly Average: 0.73 ppb	Percentiles: P ₁ = 0.0 P ₁₀ = 0.1 Q ₁ = 0.1 Median = 0.2 Q ₃ = 0.7 P ₉₀ = 1.7 P ₉₉ = 8.7		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	0.1	1.5	1.7	Z	0.7	0.7	0.6	0.6	0.4	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.2	0.4	0.7	0.6	0.4	0.2	0.2	0.2	0.5	1.7																							
2-Jul	0.2	0.2	0.3	0.2	Z	0.3	0.3	0.4	1.2	1.7	2.3	1.3	0.9	0.3	0.3	0.5	0.8	0.6	0.2	0.2	0.2	0.2	0.3	0.3	0.6	2.3																							
3-Jul	0.8	1.1	1.1	1.0	0.5	Z	0.7	0.5	0.4	0.4	0.5	0.2	0.3	0.6	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.6	0.7	0.4	0.5	1.1																							
4-Jul	0.4	Z	0.5	0.7	0.6	0.5	0.8	1.5	1.1	0.5	0.2	0.1	0.1	0.1	0.2	0.2	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.4	1.5																							
5-Jul	0.1	Z	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.6	2.5	0.3	2.6																							
6-Jul	0.9	1.3	1.2	1.1	Z	1.5	0.8	1.3	0.8	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	1.2	0.5	1.5																								
7-Jul	0.6	0.3	0.4	Z	0.8	0.8	0.4	0.3	0.2	0.2	0.3	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.8																							
8-Jul	0.1	0.1	0.1	0.1	Z	0.2	0.3	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.3	0.4	0.2	0.2	1.7	2.1	0.3	2.1																							
9-Jul	0.5	1.0	2.5	2.7	2.2	Z	2.0	3.7	2.7	0.6	0.3	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	3.1	1.4	0.4	1.0	3.7																							
10-Jul	Z	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2																							
11-Jul	0.1	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.1	0.4																							
12-Jul	0.2	0.3	Z	0.7	1.1	0.7	0.4	1.0	3.2	2.0	0.7	0.4	0.2	0.1	0.1	0.1	0.1	0.2	0.4	0.7	0.7	0.8	1.2	1.5	0.7	3.2																							
13-Jul	2.1	1.1	0.9	Z	1.5	1.4	1.1	1.9	0.9	C	C	C	C	C	1.0	0.9	0.8	1.3	0.9	0.9	0.9	0.8	0.9	1.0	1.1	2.1																							
14-Jul	2.6	1.3	0.9	1.1	2.0	Z	0.9	0.6	0.3	0.1	0.2	0.3	0.3	0.3	0.4	0.5	0.6	0.6	0.7	0.9	0.8	1.0	0.8	0.9	0.8	2.6																							
15-Jul	1.5	1.2	0.7	1.0	1.4	Z	0.8	0.8	0.9	0.9	0.4	0.3	0.4	0.3	0.1	0.2	0.3	0.2	1.2	1.0	0.8	0.9	2.5	10.8	1.3	10.8																							
16-Jul	3.2	Z	1.9	0.8	0.4	0.2	0.2	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	0.1	0.1	0.1	0.1	0.3	3.2																							
17-Jul	0.1	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.3	1.1	5.6	3.7	0.8	2.1	2.0	6.7	1.1	6.7																							
18-Jul	8.5	9.9	4.3	Z	4.2	5.7	1.7	1.8	1.6	0.8	0.6	0.6	0.4	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	1.8	9.9																							
19-Jul	0.2	0.2	0.2	Z	0.5	0.6	0.4	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.4	0.9	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.9																							
20-Jul	0.3	0.2	0.3	0.4	Z	0.5	0.4	0.2	0.2	1.7	1.2	0.9	0.7	0.3	0.1	0.1	0.1	0.1	0.2	0.4	0.6	1.7	1.6	1.3	0.6	1.7																							
21-Jul	2.4	2.8	1.4	1.2	1.5	Z	0.7	0.5	0.5	0.3	0.2	0.2	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	1.9	9.4	12.4	8.1	1.9	12.4																							
22-Jul	16.1	5.9	1.8	Z	4.6	1.9	2.0	4.0	5.1	3.2	2.0	0.8	0.5	0.3	0.4	0.3	0.2	0.2	0.3	0.7	1.0	2.5	2.0	1.2	2.5	16.1																							
23-Jul	2.3	Z	3.5	4.6	2.8	1.2	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.8	4.6																							
24-Jul	0.2	0.3	Z	0.5	0.5	0.5	0.4	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.1	0.3	0.8	0.1	0.4	6.2	8.7	12.4	0.8	0.3	1.4	12.4																							
25-Jul	0.4	0.5	0.3	Z	0.8	11.5	1.3	0.3	0.2	0.1	0.3	0.5	0.2	1.2	0.3	0.2	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.8	11.5																							
26-Jul	0.1	0.4	0.4	0.4	Z	0.5	0.4	0.2	0.1	0.1	0.1	0.2	0.3	0.5	0.8	0.3	0.8	1.2	0.5	1.3	3.4	0.1	0.3	2.2	0.6	3.4																							
27-Jul	1.8	1.4	1.2	1.7	1.5	Z	1.8	2.6	3.2	1.3	0.7	0.7	0.5	0.4	0.7	0.2	0.1	0.2	0.6	0.6	0.2	0.2	0.3	0.3	1.0	3.2																							
28-Jul	Z	0.4	0.5	0.4	0.5	0.7	0.3	0.3	0.4	0.4	0.6	0.5	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.7																							
29-Jul	0.2	Z	0.5	0.3	0.5	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.5																							
30-Jul	0.2	0.2	Z	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	2.3	0.3	2.3																							
31-Jul	0.1	0.1	0.1	Z	0.4	0.4	0.7	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.4	0.2	0.1	0.5	0.9	0.5	0.2	0.2	0.2	0.1	0.3	0.9																							
																								1.6	1.3	1.0	0.9	1.2	1.2	0.7	0.8	0.8	0.5	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.5	0.6	0.7	1.2	1.2	1.4	Diurnal Average	
																								16.1	9.9	4.3	4.6	4.6	11.5	2.0	4.0	5.1	3.2	2.3	1.3	0.9	1.2	1.0	0.9	0.9	1.3	5.6	6.2	8.7	12.4	12.4	10.8	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mannix - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	669	94.49	94.49
3 - 4	21	2.97	97.46
5 - 7	8	1.13	98.59
8 - 11	5	0.71	99.29
> 11	5	0.71	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Mannix - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	30	63	21	10	13	16	67	86	49	43	35	52	53	35	30	48	651
3 - 4	4	1	2	2	0	0	0	0	2	0	0	0	2	0	2	3	18
5 - 7	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	1	5
8 - 11	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	3
> 11	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	3
Totals	35	65	26	15	14	16	67	86	51	43	35	52	55	36	32	52	680

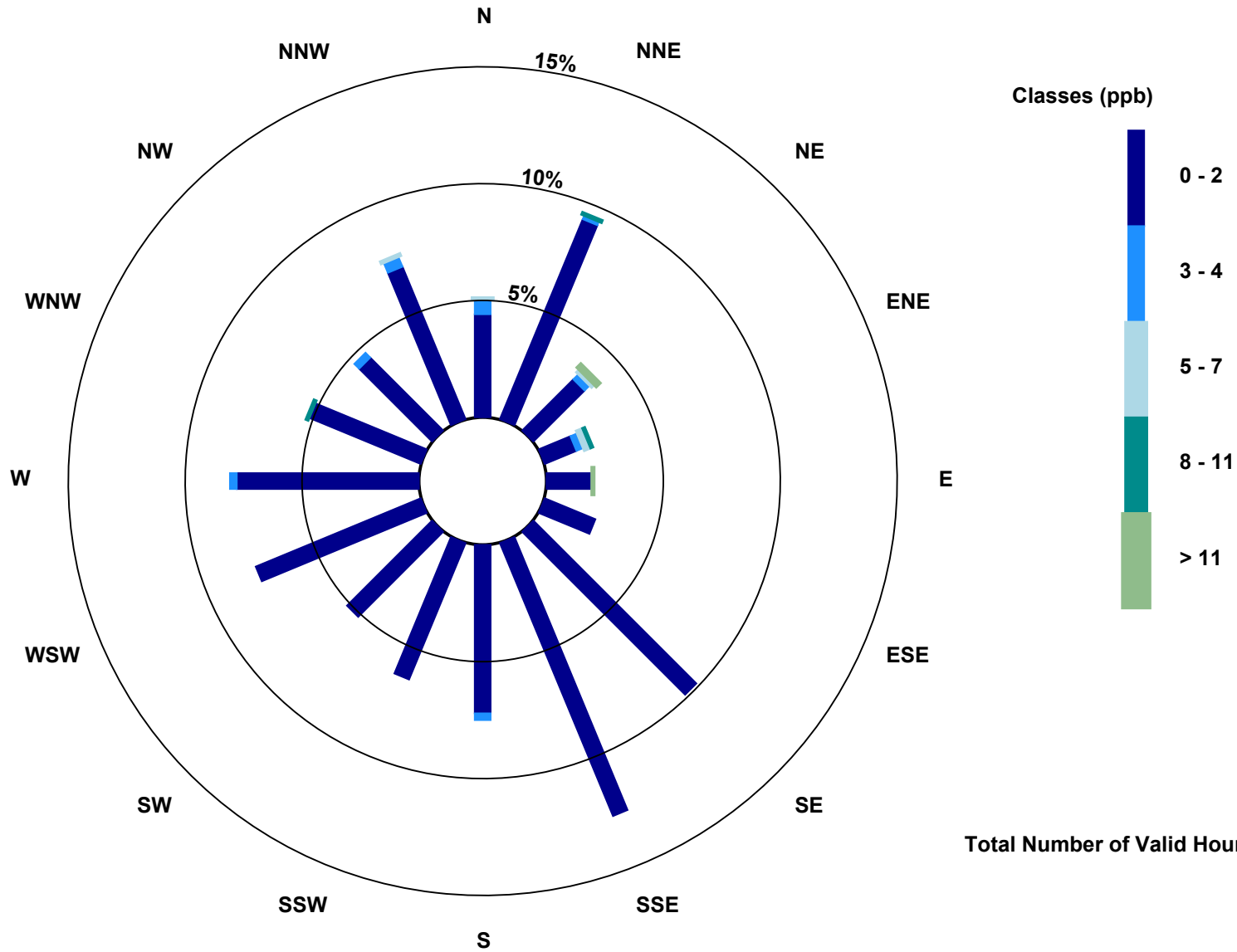
Total Number of Valid Hours: 680

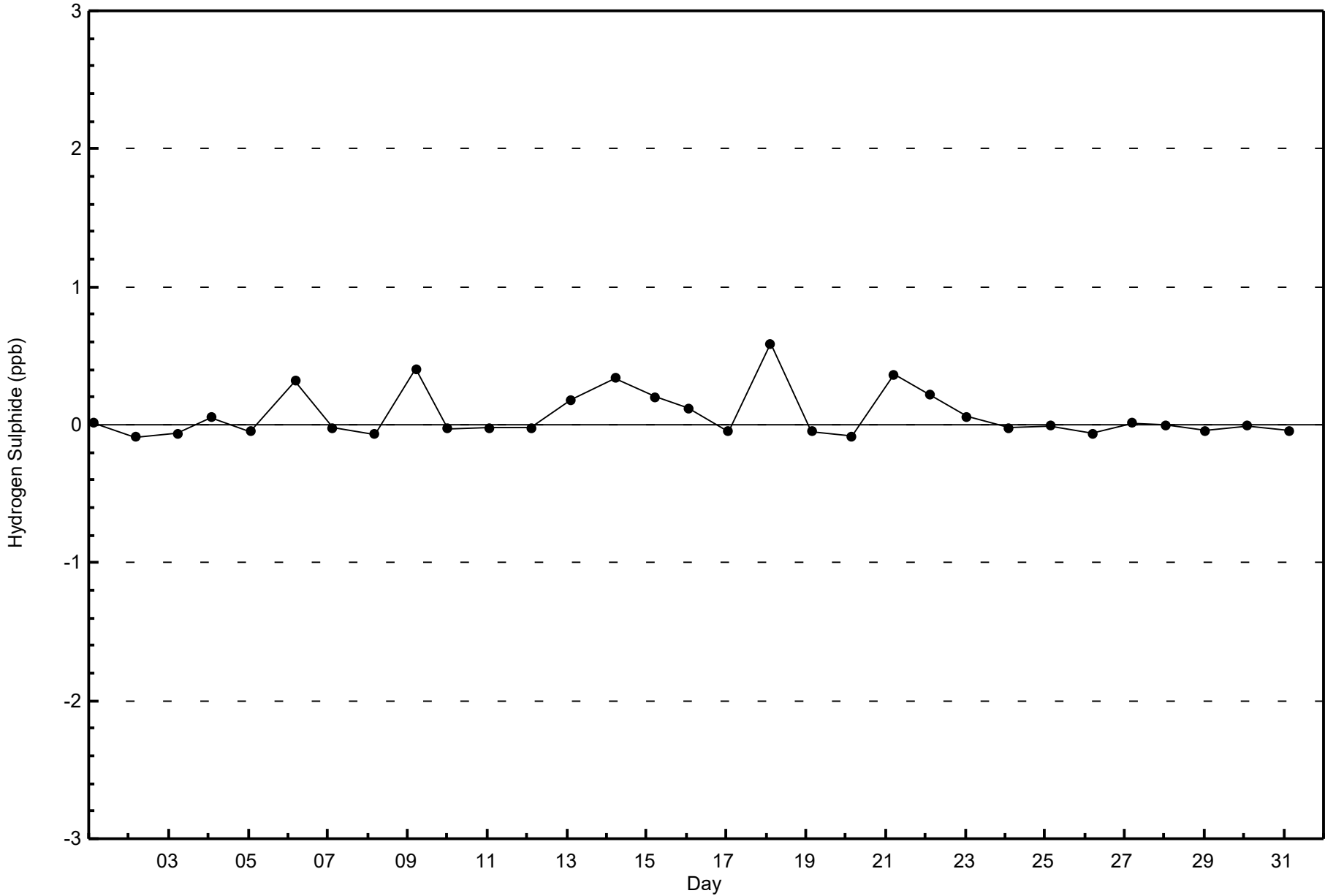
Total Number of Hours: 744

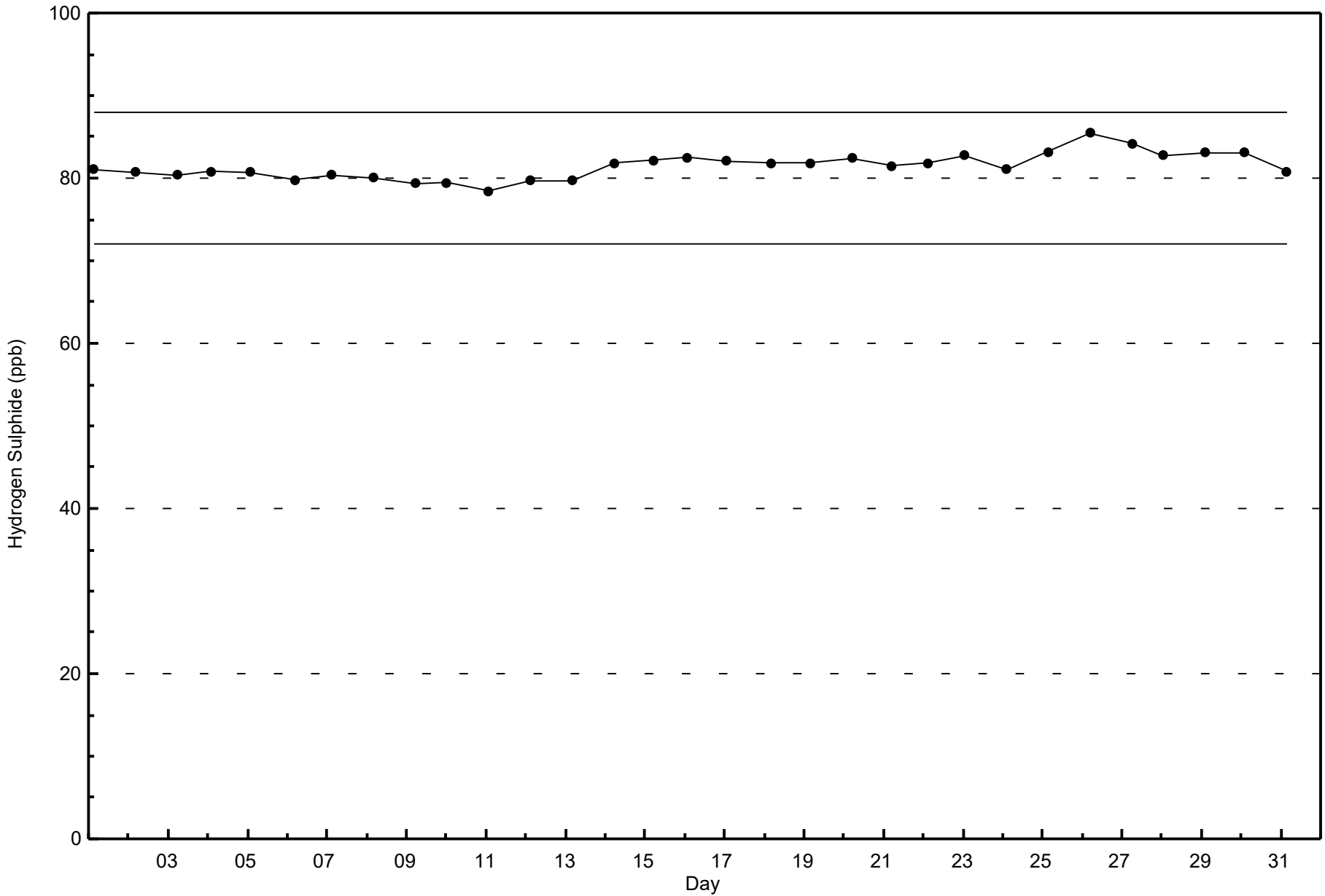


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Hydrogen Sulphide (H₂S) - ppb
Mannix









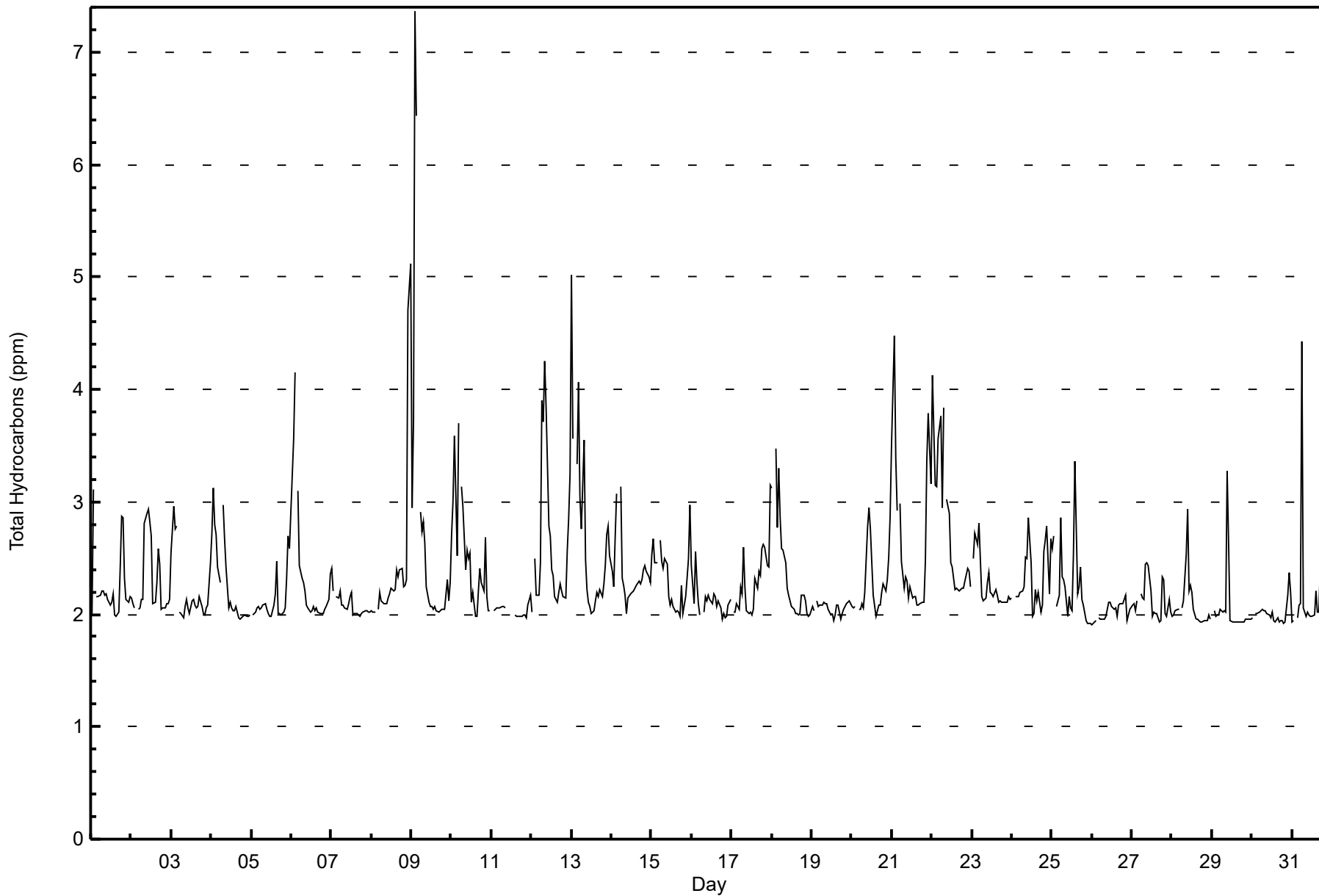
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Mannix - July 2023

Maximum Value: 7.4 ppm on Jul 9 03:00																				Maximum Daily Average: 2.8 ppm on Jul 22					Hours in Service: 744		
Minimum Value: 1.9 ppm on Jul 26 01:00																				Minimum Daily Average: 2.0 ppm on Jul 30					Hours of Data: 708		
Maximum Diurnal Average: 2.7 ppm at hour 3																				Minimum Diurnal Average: 2.1 ppm at hour 16					Hours of Missing Data: 36		
Monthly Average: 2.30 ppm																				Percentiles: P ₁ = 1.9 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.4 P ₉₀ = 2.8 P ₉₉ = 4.2					Hours of Calibration: 36		
																									Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	2.0	3.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.0	2.0	2.0	2.4	2.9	2.9	2.3	2.1	2.1	2.2	2.2	2.2	3.1
2-Jul	2.1	2.1	2.1	Z	2.0	2.1	2.1	2.1	2.8	2.9	2.9	2.8	2.7	2.1	2.1	2.3	2.6	2.4	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.9
3-Jul	2.5	3.0	2.8	2.8	Z	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.0	2.1	2.1	2.5	2.2	3.0	
4-Jul	2.7	3.1	2.8	2.7	2.4	2.3	Z	3.0	2.7	2.4	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.1	
5-Jul	Z	2.0	2.0	2.1	2.1	2.0	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.2	2.5	2.0	2.0	2.0	2.0	2.1	2.3	2.7	2.6	2.1	2.7	
6-Jul	3.2	3.6	4.2	Z	3.1	2.4	2.3	2.3	2.2	2.1	2.1	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.4	2.4	4.2	
7-Jul	2.4	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.4	
8-Jul	2.0	2.0	2.0	Z	2.0	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.4	2.3	2.4	2.4	2.2	2.3	2.3	4.7	5.1	2.4	5.1	
9-Jul	3.0	3.7	7.4	6.4	Z	2.9	2.7	2.8	2.6	2.2	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.1	2.3	2.7	7.4	
10-Jul	2.7	3.0	3.6	2.5	3.7	Z	3.1	3.0	2.4	2.6	2.5	2.6	2.1	2.2	2.0	2.0	2.2	2.4	2.3	2.2	2.7	2.2	2.0	2.0	2.5	3.7	
11-Jul	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.0	2.2	2.2	
12-Jul	2.0	Z	2.5	2.2	2.2	2.5	3.9	3.7	4.3	3.9	2.8	2.7	2.4	2.3	2.2	2.1	2.2	2.3	2.2	2.2	2.1	2.6	2.9	3.2	2.7	4.3	
13-Jul	5.0	3.6	Z	3.3	4.1	3.1	2.8	3.6	2.5	2.2	2.1	2.1	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.3	2.4	2.7	2.8	2.5	2.7	5.0	
14-Jul	2.4	2.2	2.7	3.1	Z	3.1	2.3	2.3	2.2	2.0	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.3	2.3	2.4	3.1	
15-Jul	2.5	2.7	2.5	2.5	Z	2.7	2.5	2.4	2.5	2.4	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.3	2.0	2.2	2.3	2.5	3.0	2.3	3.0	
16-Jul	2.4	2.1	2.6	2.3	2.1	2.0	Z	2.0	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.6	
17-Jul	Z	2.0	2.0	2.1	2.0	2.2	2.2	2.6	2.3	2.0	2.0	2.0	2.0	2.0	2.3	2.2	2.4	2.3	2.6	2.6	2.6	2.4	2.4	3.2	2.3	3.2	
18-Jul	3.1	Z	3.5	2.8	3.3	2.9	2.6	2.6	2.5	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.1	2.0	2.0	2.0	2.4	3.5	
19-Jul	2.1	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	1.9	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1
20-Jul	2.1	2.1	2.1	Z	2.0	2.0	2.1	2.1	2.2	2.8	2.9	2.8	2.5	2.2	2.0	2.0	2.1	2.1	2.2	2.3	2.2	2.3	2.5	2.9	2.3	2.9	
21-Jul	3.5	4.5	3.4	2.9	Z	3.0	2.5	2.2	2.3	2.3	2.1	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.5	3.4	3.8	3.2	2.6	4.5	
22-Jul	4.1	3.6	3.2	3.1	3.6	3.8	2.9	3.8	Z	3.0	2.9	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.2	2.8	4.1	
23-Jul	Z	2.5	2.7	2.6	2.8	2.5	2.2	2.1	2.1	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.3	2.8	
24-Jul	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.9	2.5	2.0	2.0	2.2	2.1	2.2	2.0	2.1	2.6	2.7	2.8	2.2	2.7	2.3	2.9	
25-Jul	2.6	2.7	Z	2.1	2.2	2.9	2.3	2.3	2.2	2.0	2.2	2.1	2.0	2.5	3.4	2.2	2.2	2.4	2.1	2.1	1.9	1.9	1.9	1.9	2.3	3.4	
26-Jul	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2	1.9	2.0	2.0	2.0	2.2	
27-Jul	2.1	2.1	2.0	2.1	Z	2.2	2.1	2.1	2.4	2.5	2.4	2.2	2.0	2.0	2.0	2.0	1.9	1.9	2.3	2.3	2.0	2.0	2.1	2.0	2.1	2.5	
28-Jul	2.0	2.0	2.0	2.0	2.1	Z	2.1	2.1	2.5	2.9	2.2	2.3	2.2	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.9	
29-Jul	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.3	2.7	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	3.3	
30-Jul	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	2.0	1.9	1.9	1.9	1.9	1.9	2.2	2.4	2.2	2.0	2.4	
31-Jul	1.9	1.9	Z	2.0	2.1	2.1	4.4	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.0	2.0	2.4	2.5	2.5	2.2	2.2	2.1	2.0	2.2	4.4	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	222	31.36	31.36
2.1 - 3.0	439	62.01	93.36
3.1 - 10.0	47	6.64	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
Mannix - July 2023

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	4	17	4	4	4	1	18	42	33	22	19	25	17	5	0	7	222
2.1 - 3.0	33	46	21	11	10	15	42	41	18	17	18	26	35	24	25	42	424
3.1 - 10.0	1	1	1	0	0	0	6	1	0	0	0	0	3	5	6	10	34
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	38	64	26	15	14	16	66	84	51	39	37	51	55	34	31	59	680

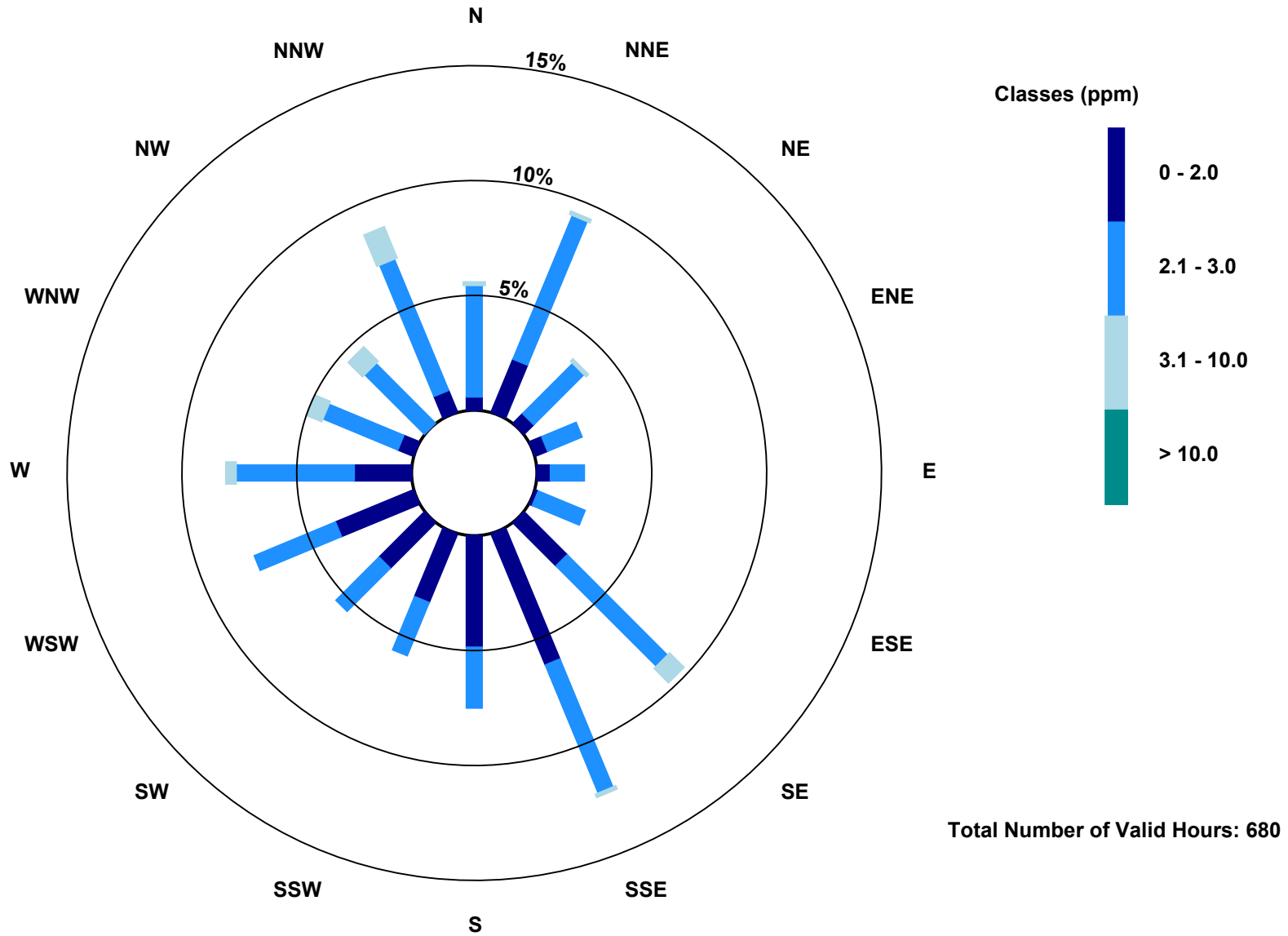
Total Number of Valid Hours: 680

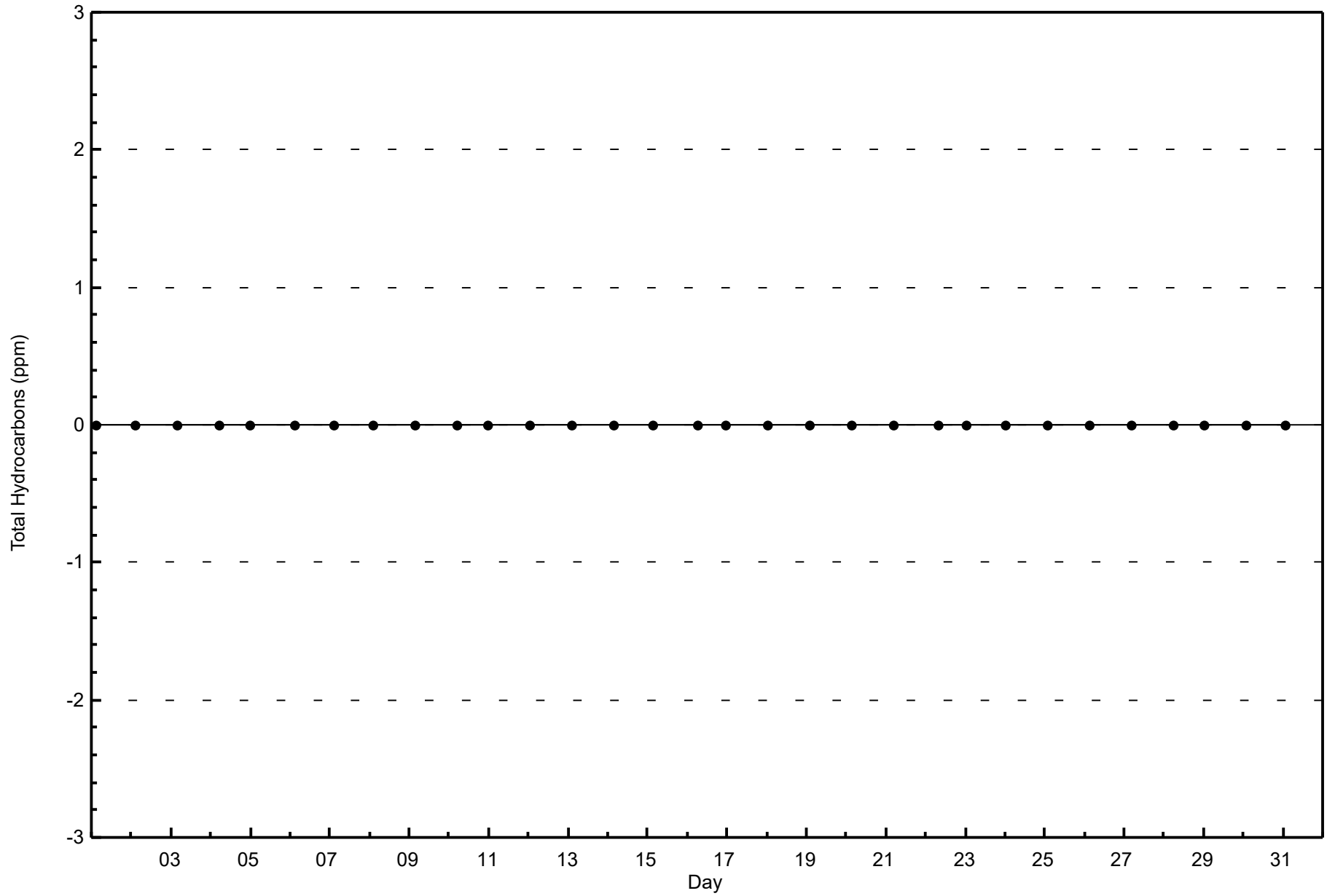
Total Number of Hours: 744

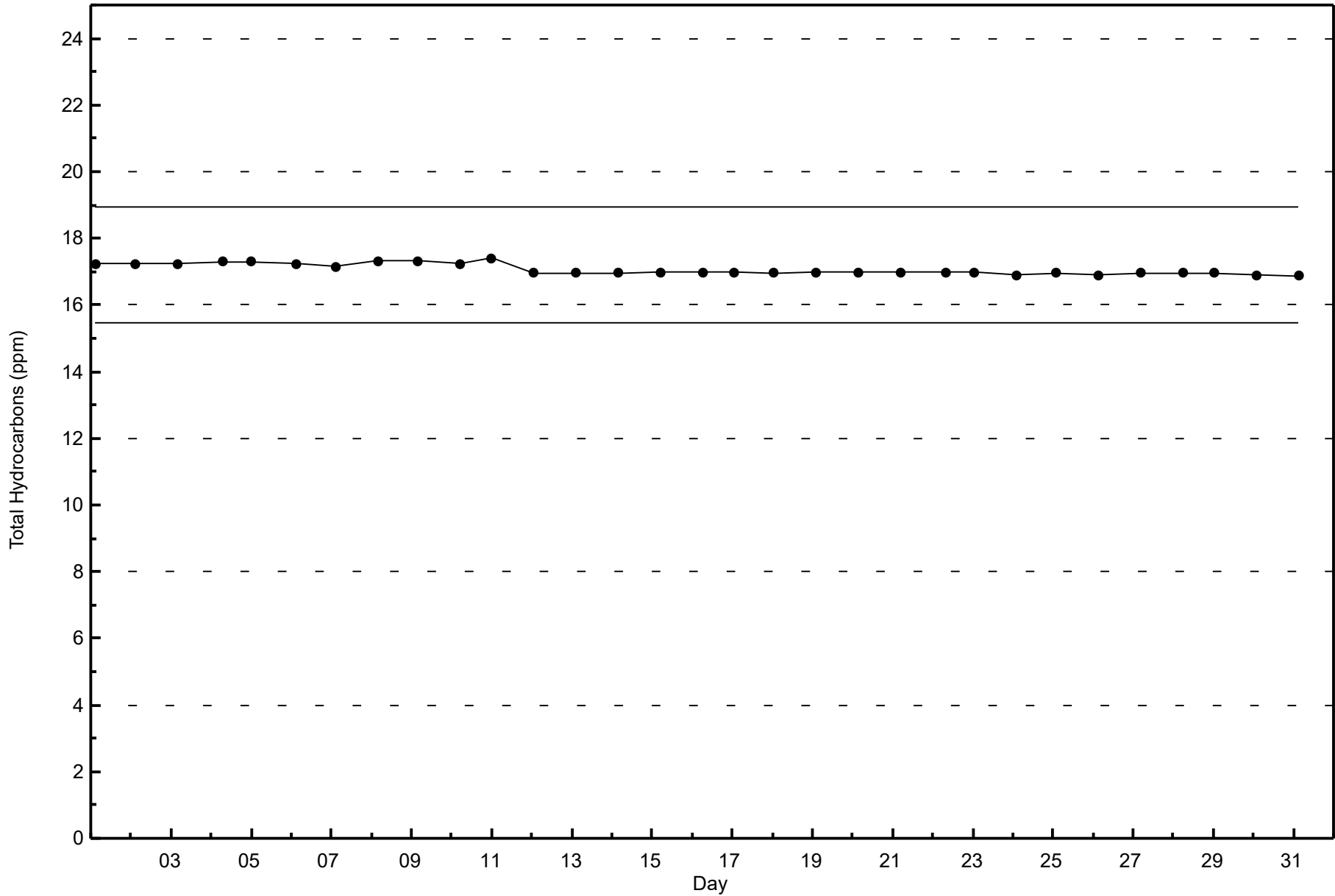


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Mannix





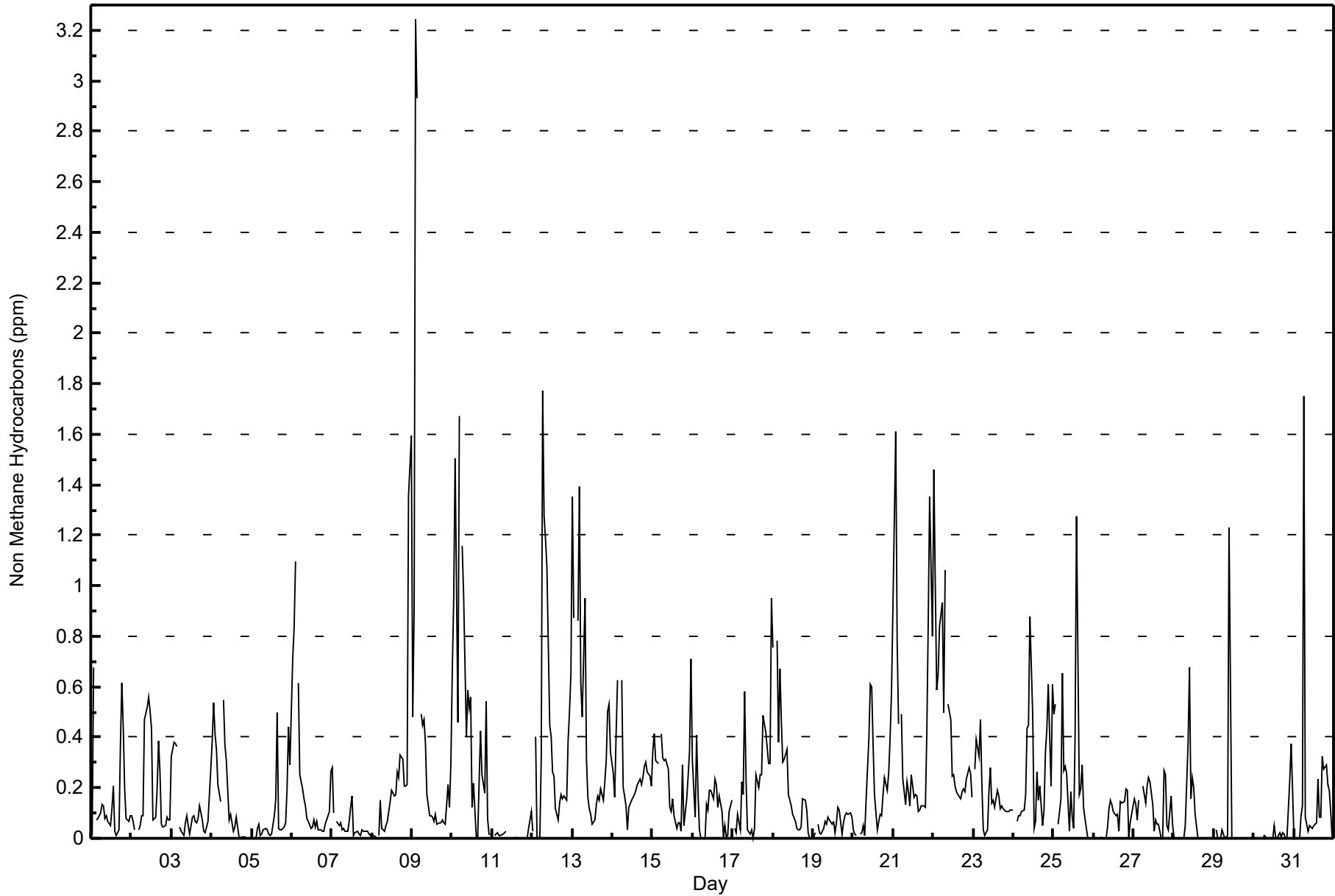




Summary of Hour Averages

Mannix - July 2023

Maximum Value: 3.246 ppm on Jul 9 03:00																				Maximum Daily Average: 0.501 ppm on Jul 10					Hours in Service: 744	
Minimum Value: 0.000 ppm on Jul 4 22:00																				Minimum Daily Average: 0.017 ppm on Jul 11					Hours of Data: 708	
Maximum Diurnal Average: 0.438 ppm at hour 3																				Minimum Diurnal Average: 0.106 ppm at hour 16					Hours of Missing Data: 36	
Monthly Average: 0.215 ppm																				Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 0.5 P ₉₉ = 1.5					Hours of Calibration: 36	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.009	0.680	Z	0.075	0.080	0.103	0.137	0.128	0.076	0.091	0.067	0.052	0.119	0.209	0.026	0.010	0.035	0.371	0.617	0.443	0.197	0.079	0.069	0.092	0.164	0.680
2-Jul	0.087	0.069	0.035	Z	0.034	0.052	0.087	0.089	0.468	0.523	0.561	0.501	0.434	0.071	0.082	0.198	0.383	0.262	0.053	0.047	0.051	0.081	0.073	0.074	0.188	0.561
3-Jul	0.326	0.382	0.377	0.362	Z	0.045	0.029	0.008	0.061	0.089	0.049	0.016	0.082	0.092	0.065	0.062	0.077	0.127	0.071	0.031	0.022	0.046	0.067	0.273	0.120	0.382
4-Jul	0.387	0.539	0.412	0.353	0.215	0.145	Z	0.549	0.370	0.307	0.073	0.095	0.061	0.029	0.044	0.082	0.006	0.001	0.008	0.008	0.008	0.000	0.000	0.001	0.161	0.549
5-Jul	Z	0.001	0.000	0.037	0.056	0.012	0.015	0.036	0.038	0.032	0.018	0.011	0.015	0.092	0.155	0.495	0.038	0.035	0.033	0.033	0.027	0.029	0.057	0.071	0.106	0.263
6-Jul	0.709	0.833	1.097	Z	0.613	0.252	0.195	0.156	0.130	0.080	0.065	0.039	0.045	0.073	0.044	0.065	0.035	0.033	0.027	0.029	0.057	0.071	0.106	0.263	0.218	1.097
7-Jul	0.279	0.098	Z	0.069	0.048	0.064	0.032	0.037	0.025	0.029	0.067	0.123	0.170	0.012	0.022	0.028	0.017	0.011	0.034	0.027	0.030	0.029	0.016	0.013	0.056	0.279
8-Jul	0.018	0.011	0.008	Z	0.011	0.153	0.042	0.030	0.053	0.068	0.108	0.144	0.191	0.167	0.175	0.264	0.239	0.332	0.315	0.206	0.209	0.212	1.351	1.593	0.257	1.593
9-Jul	0.480	0.909	3.246	2.933	Z	0.491	0.448	0.472	0.374	0.174	0.089	0.087	0.085	0.067	0.096	0.057	0.060	0.063	0.073	0.063	0.055	0.211	0.121	0.298	0.476	3.246
10-Jul	0.668	0.944	1.507	0.458	1.675	Z	1.157	0.969	0.402	0.586	0.515	0.560	0.122	0.216	0.004	0.006	0.226	0.424	0.253	0.177	0.542	0.078	0.016	0.018	0.501	1.675
11-Jul	Z	0.010	0.019	0.022	0.014	0.012	0.019	0.022	0.025	C	C	C	C	C	0.008	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.041	0.105	0.017	0.105
12-Jul	0.029	Z	0.400	0.001	0.006	0.326	1.771	1.275	1.185	1.074	0.447	0.402	0.266	0.249	0.117	0.075	0.138	0.173	0.155	0.167	0.150	0.388	0.506	0.649	0.433	1.771
13-Jul	1.356	0.870	Z	0.864	1.395	0.608	0.479	0.950	0.314	0.164	0.118	0.094	0.053	0.075	0.132	0.166	0.152	0.199	0.154	0.223	0.307	0.503	0.532	0.341	0.437	1.395
14-Jul	0.255	0.165	0.411	0.627	Z	0.625	0.203	0.165	0.128	0.032	0.124	0.151	0.164	0.171	0.191	0.214	0.235	0.211	0.240	0.283	0.304	0.265	0.246	0.206	0.244	0.627
15-Jul	0.347	0.413	0.308	0.296	Z	0.413	0.319	0.309	0.316	0.274	0.126	0.105	0.154	0.091	0.038	0.059	0.063	0.029	0.288	0.049	0.157	0.247	0.348	0.711	0.237	0.711
16-Jul	0.307	0.082	0.407	0.180	0.031	0.000	Z	0.000	0.136	0.112	0.191	0.190	0.155	0.235	0.211	0.121	0.168	0.108	0.004	0.052	0.008	0.011	0.109	0.151	0.129	0.407
17-Jul	Z	0.039	0.022	0.096	0.034	0.224	0.172	0.580	0.237	0.032	0.019	0.032	0.000	0.038	0.252	0.203	0.251	0.254	0.484	0.451	0.417	0.296	0.297	0.952	0.234	0.952
18-Jul	0.756	Z	0.782	0.379	0.670	0.464	0.301	0.311	0.351	0.176	0.152	0.131	0.097	0.067	0.040	0.035	0.034	0.047	0.157	0.150	0.111	0.021	0.001	0.003	0.228	0.782
19-Jul	0.004	0.023	Z	0.055	0.025	0.019	0.040	0.067	0.056	0.087	0.071	0.055	0.068	0.023	0.064	0.120	0.113	0.017	0.064	0.090	0.100	0.095	0.103	0.083	0.063	0.120
20-Jul	0.036	0.017	0.009	Z	0.015	0.024	0.050	0.011	0.149	0.396	0.608	0.599	0.366	0.168	0.033	0.066	0.096	0.091	0.176	0.240	0.190	0.259	0.396	0.574	0.199	0.608
21-Jul	0.912	1.613	0.783	0.455	Z	0.490	0.234	0.137	0.221	0.186	0.126	0.253	0.161	0.172	0.166	0.105	0.113	0.129	0.131	0.123	0.414	0.849	1.351	0.798	0.431	1.613
22-Jul	1.461	1.009	0.586	0.652	0.837	0.933	0.497	1.065	Z	0.532	0.469	0.248	0.251	0.205	0.183	0.173	0.155	0.187	0.198	0.187	0.234	0.279	0.257	0.163	0.468	1.461
23-Jul	Z	0.275	0.389	0.327	0.471	0.212	0.032	0.012	0.036	0.183	0.278	0.140	0.149	0.125	0.189	0.168	0.115	0.128	0.120	0.108	0.106	0.105	0.114	0.110	0.169	0.471
24-Jul	0.112	Z	0.064	0.087	0.090	0.109	0.114	0.172	0.436	0.446	0.881	0.485	0.041	0.068	0.261	0.153	0.209	0.049	0.112	0.339	0.430	0.607	0.207	0.612	0.265	0.881
25-Jul	0.489	0.534	Z	0.058	0.154	0.655	0.270	0.283	0.256	0.030	0.184	0.086	0.040	0.405	1.276	0.172	0.195	0.288	0.121	0.079	0.001	0.000	0.000	0.000	0.243	1.276
26-Jul	0.000	0.000	0.000	Z	0.003	0.000	0.003	0.000	0.042	0.120	0.148	0.134	0.105	0.089	0.097	0.030	0.145	0.139	0.148	0.193	0.189	0.004	0.061	0.093	0.076	0.193
27-Jul	0.154	0.137	0.075	0.151	Z	0.208	0.176	0.139	0.207	0.240	0.221	0.136	0.026	0.071	0.054	0.056	0.000	0.000	0.266	0.250	0.052	0.036	0.167	0.056	0.125	0.266
28-Jul	0.005	0.000	0.000	0.000	0.000	Z	0.000	0.049	0.376	0.678	0.159	0.239	0.201	0.093	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.078	0.678
29-Jul	Z	0.033	0.000	0.000	0.000	0.031	0.000	0.004	0.012	1.230	0.620	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.084	1.230
30-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.010	0.007	0.001	0.000	0.000	0.002	0.048	0.007	0.001	0.025	0.006	0.021	0.015	0.000	0.000	0.228	0.376	0.190	0.041	0.376
31-Jul	0.001	0.008	Z	0.000	0.092	0.130	1.749	0.082	0.029	0.051	0.043	0.042	0.052	0.062	0.233	0.086	0.082	0.322	0.272	0.290	0.211	0.190	0.108	0.005	0.180	1.749
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Mannix - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	85	12.01	12.01
0.006 - 0.05	151	21.33	33.33
0.06 - 0.1	169	23.87	57.20
> 0.1	303	42.80	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Mannix - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	0	0	0	0	1	0	3	24	19	18	11	6	3	0	0	0	85
0.006 - 0.05	5	7	2	3	2	0	16	29	16	10	16	20	15	3	0	7	151
0.06 - 0.1	7	21	6	5	4	3	12	20	8	8	7	16	17	11	1	17	163
> 0.1	26	36	18	7	7	13	35	11	8	3	3	9	20	20	30	35	281
Totals	38	64	26	15	14	16	66	84	51	39	37	51	55	34	31	59	680

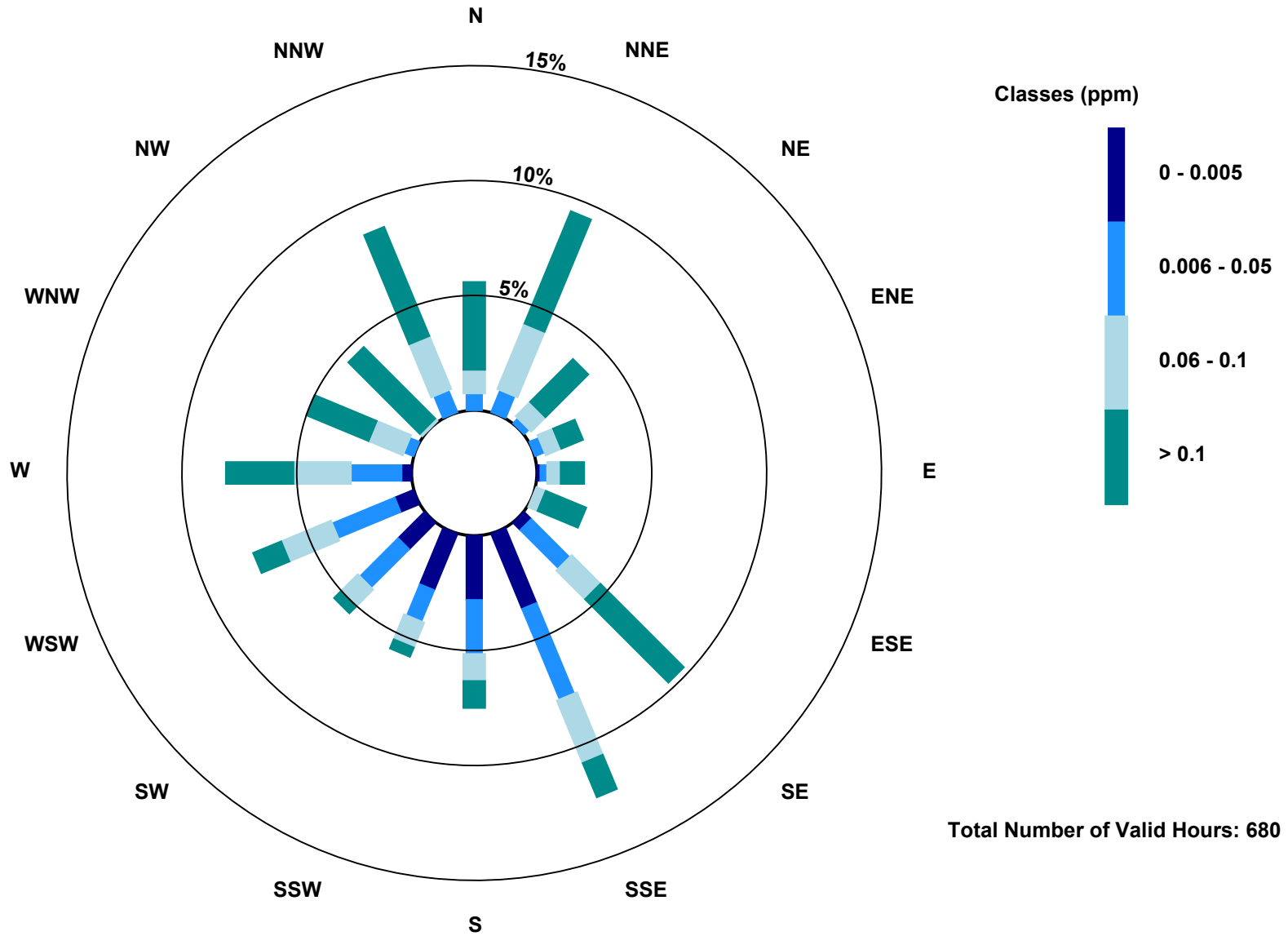
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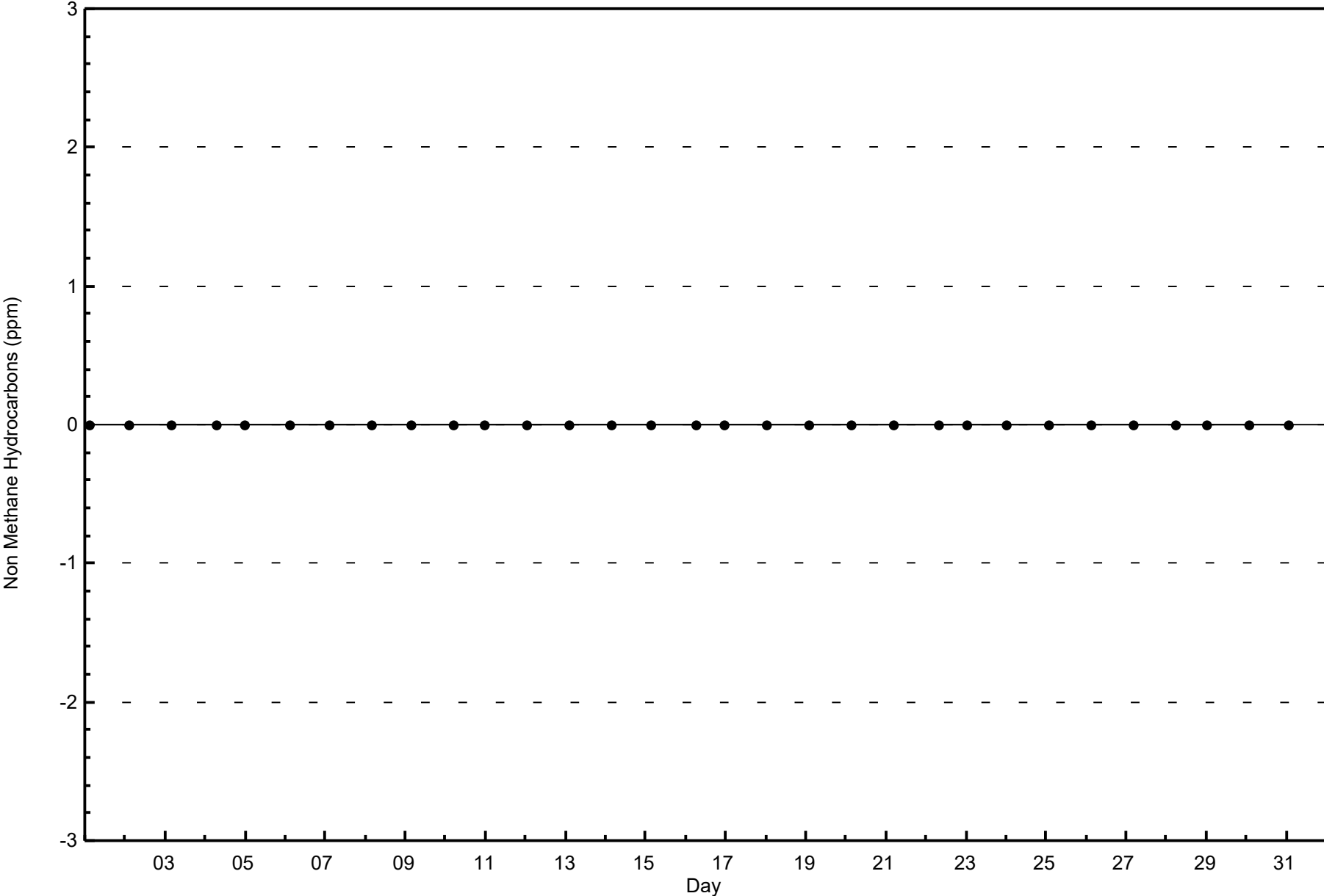
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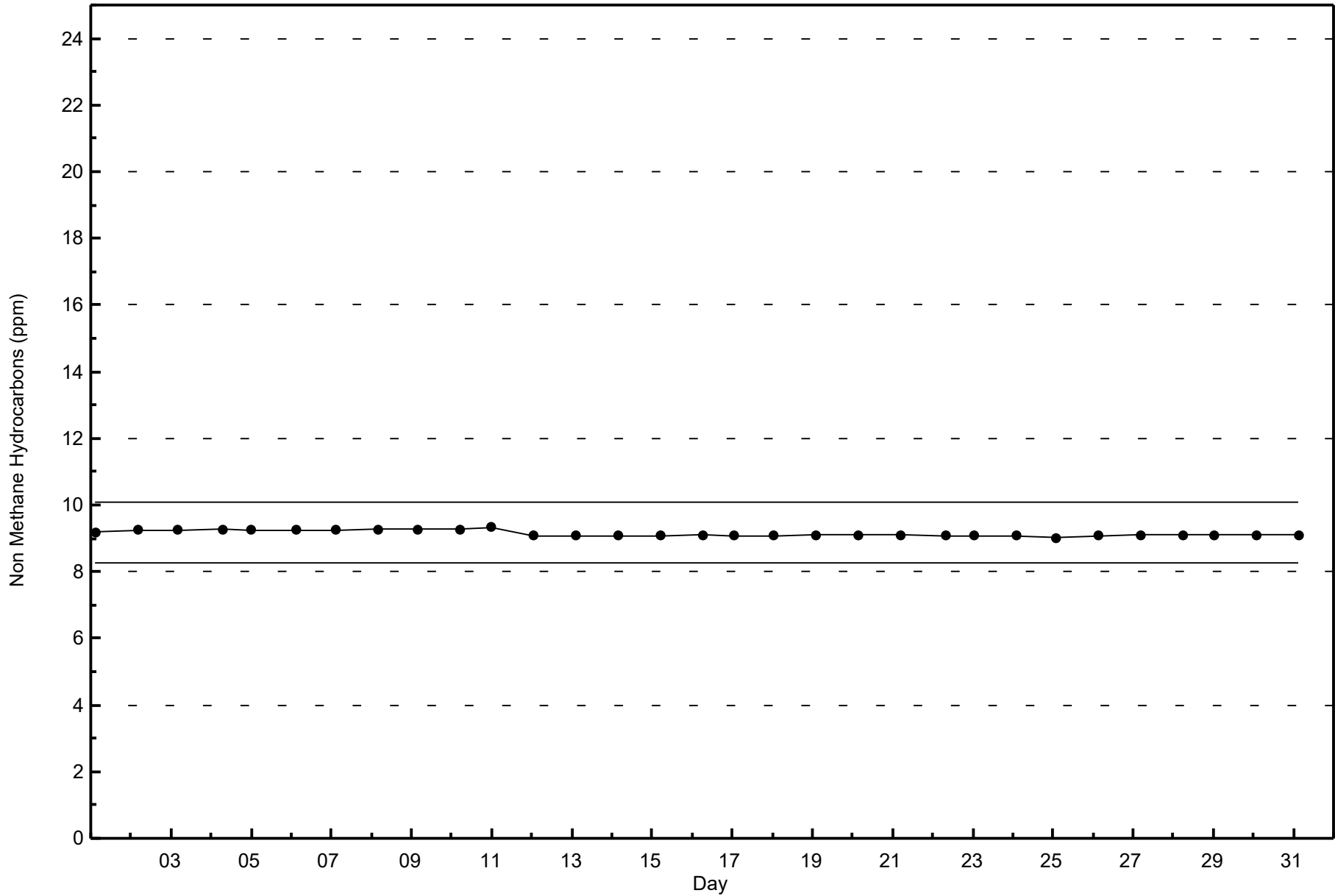


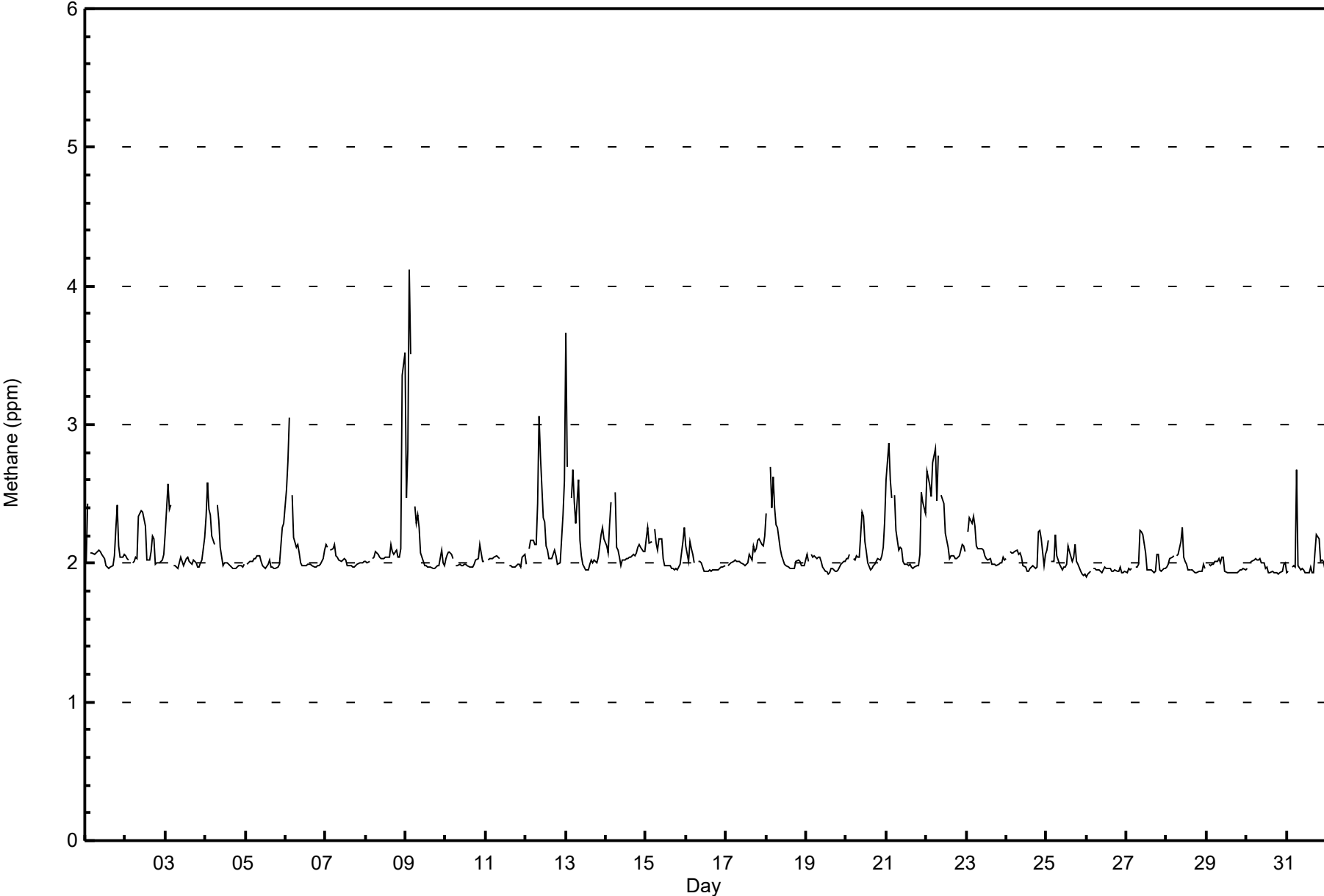
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Non Methane Hydrocarbons (NMHC) - ppm
Mannix











**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Mannix - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	459	64.83	64.83
2.1 - 3.0	242	34.18	99.01
3.1 - 10.0	7	0.99	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Mannix - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	16	40	16	11	10	9	55	66	39	33	26	45	39	18	2	29	454
2.1 - 3.0	21	24	10	4	4	7	11	18	12	6	11	6	15	15	26	29	219
3.1 - 10.0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	3	1	7
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	38	64	26	15	14	16	66	84	51	39	37	51	55	34	31	59	680

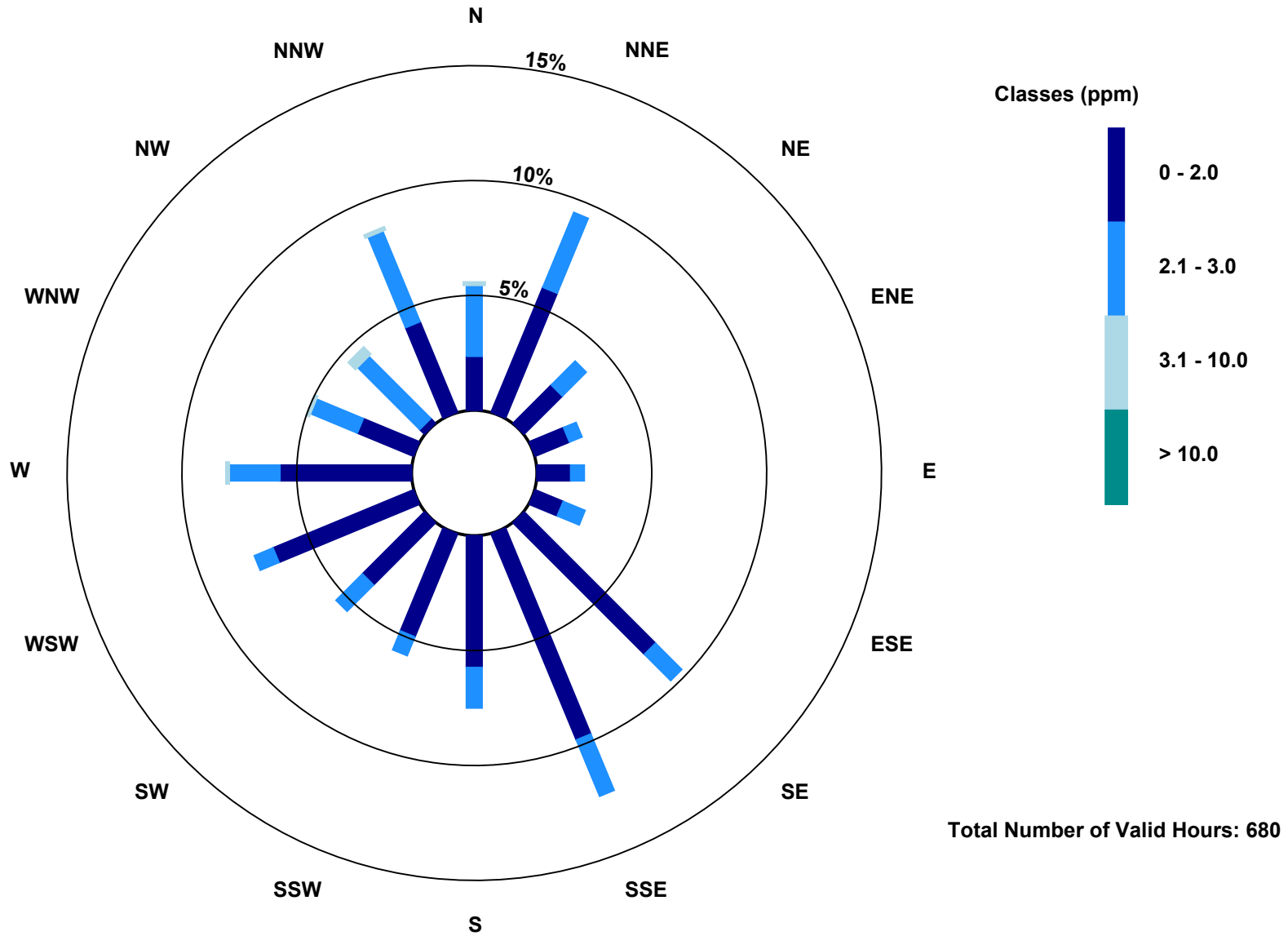
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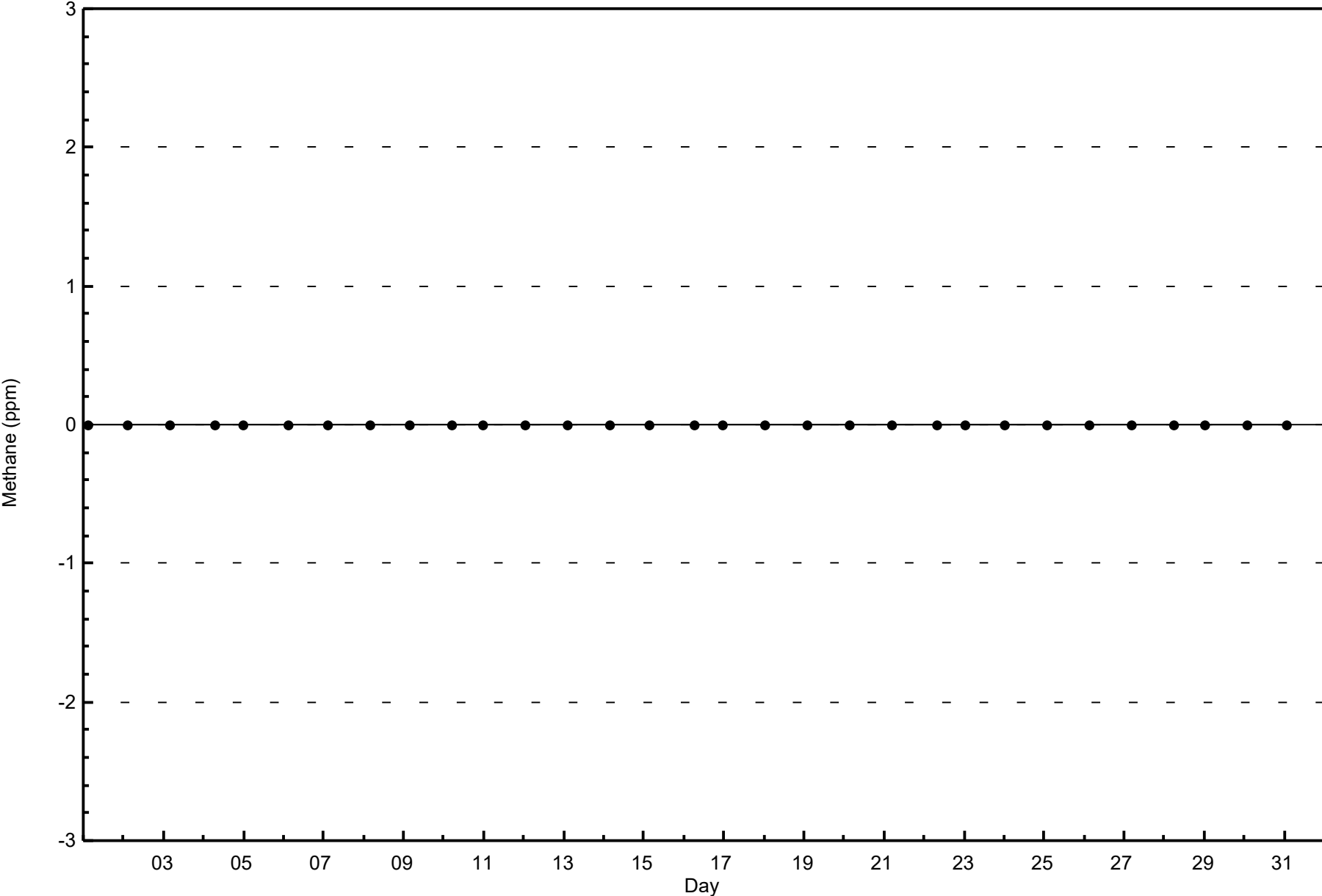
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Methane (CH₄) - ppm
Mannix

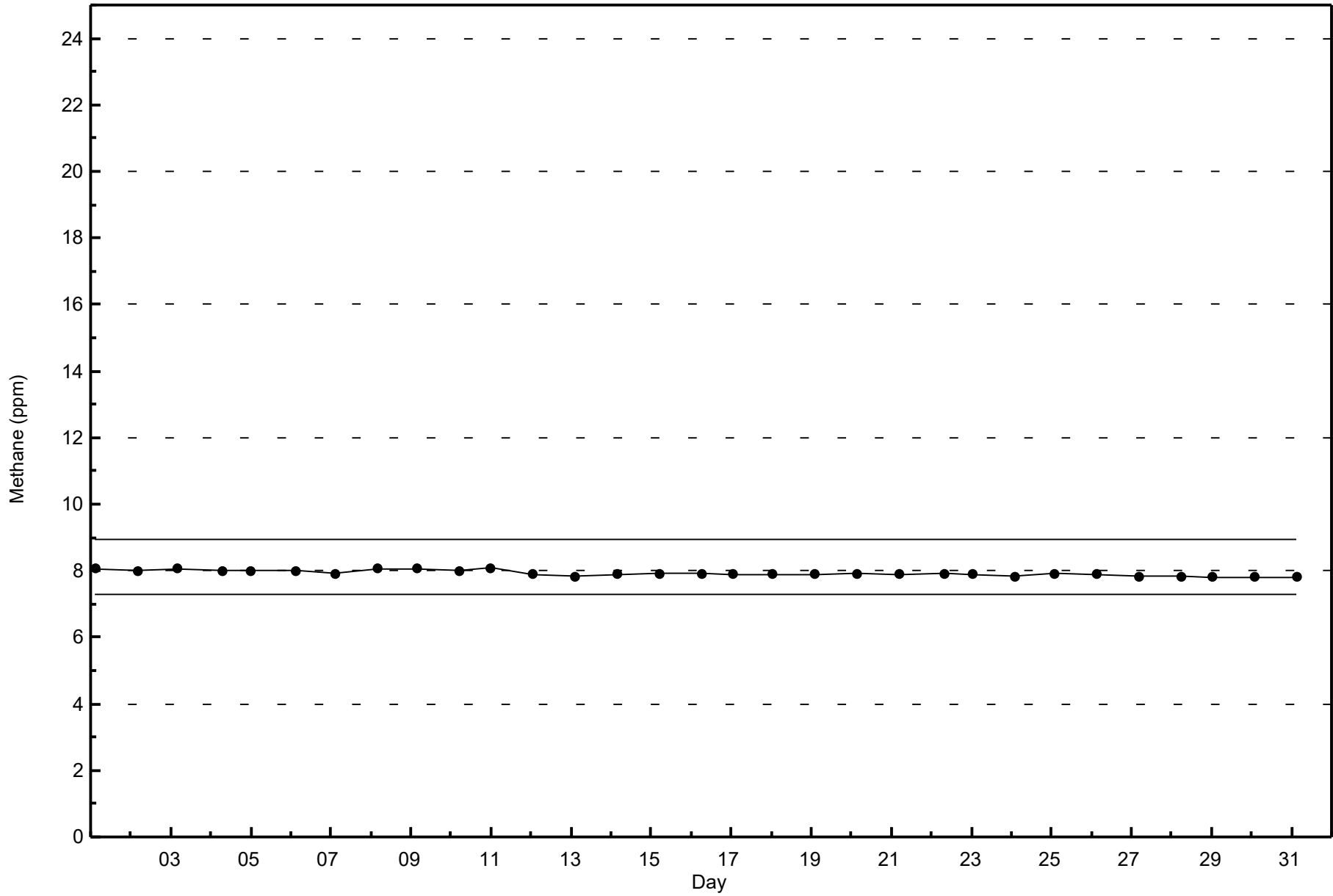






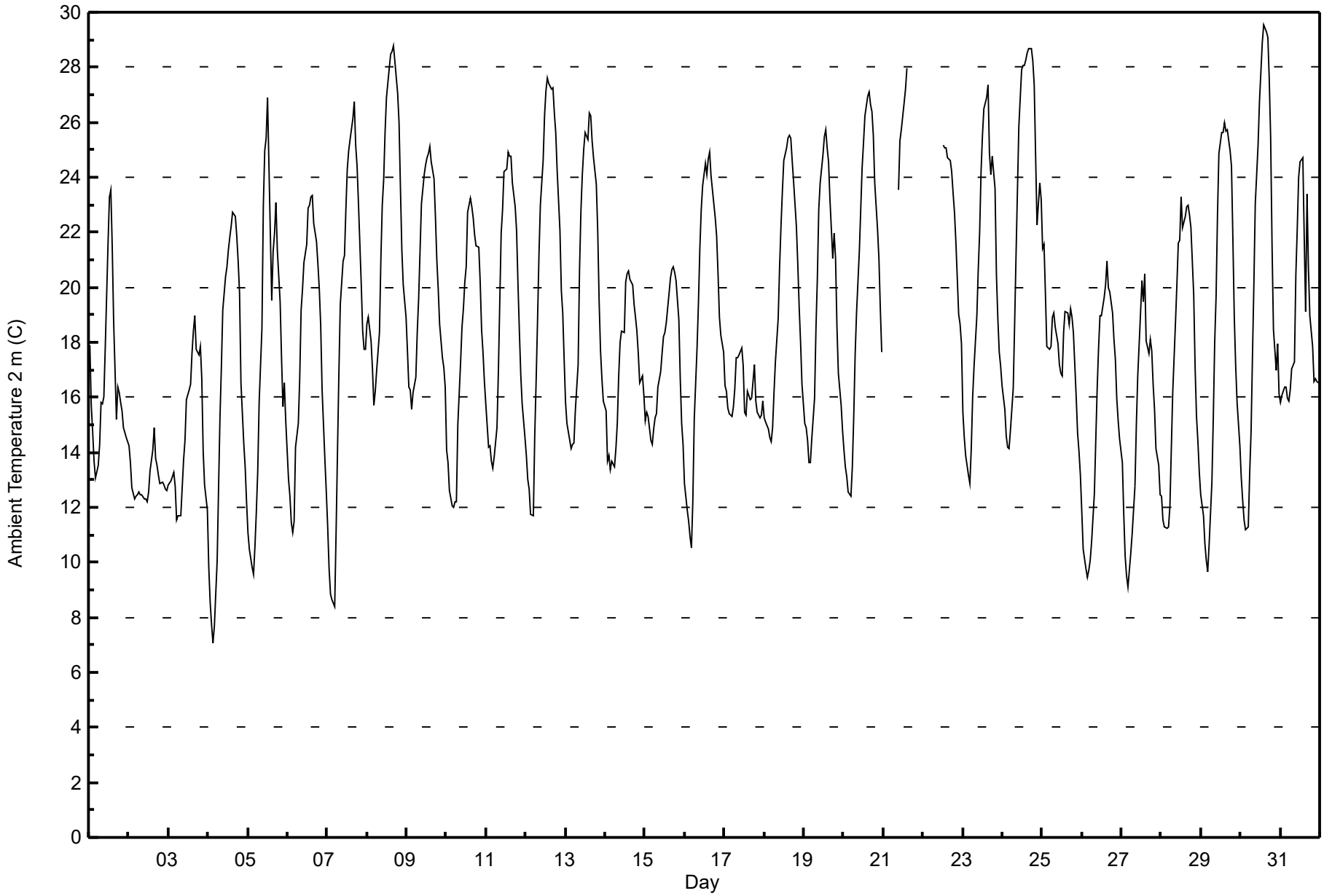
Wood Buffalo Environmental Association
Span Responses

Methane (CH₄) - ppm
Mannix - July 2023





Maximum Value: 29.5 C on Jul 30 15:00 Maximum Daily Average: 22.6 C on Jul 24																						Hours in Service:	744																							
Minimum Value: 7.1 C on Jul 4 04:00 Minimum Daily Average: 13.0 C on Jul 2																						Hours of Data:	714																							
Maximum Diurnal Average: 23.4 C at hour 15 Minimum Diurnal Average: 12.6 C at hour 5																						Hours of Missing Data:	30																							
Monthly Average: 18.43 C Percentiles: P ₁ = 9.1 P ₁₀ = 12.4 Q ₁ = 14.6 Median = 17.8 Q ₃ = 22.2 P ₉₀ = 25.2 P ₉₉ = 28.6																						Hours of Calibration:	0																							
																						Percent Operational Time:	96.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																						
1-Jul	17.9	15.7	14.7	13.7	13.1	13.5	14.3	15.8	15.8	16.0	17.8	21.6	23.3	23.6	21.4	18.8	15.2	16.4	16.2	15.8	15.5	14.9	14.5	14.4	16.7	23.6																				
2-Jul	14.2	13.6	12.7	12.3	12.4	12.4	12.5	12.5	12.5	12.3	12.3	12.2	12.6	13.3	14.1	14.9	13.8	13.5	13.2	12.9	12.9	12.8	12.7	12.6	13.0	14.9																				
3-Jul	12.8	13.0	13.1	13.3	12.8	11.5	11.7	11.7	12.7	13.7	14.4	15.9	16.3	16.5	17.6	18.4	19.0	17.7	17.6	17.8	16.7	14.1	12.8	11.9	14.7	19.0																				
4-Jul	9.8	8.5	7.7	7.1	7.7	10.1	12.7	15.3	17.1	19.2	20.4	20.8	21.3	21.8	22.2	22.7	22.6	21.9	20.9	19.8	16.5	14.3	13.5	12.2	16.1	22.7																				
5-Jul	11.1	10.5	9.8	9.6	10.6	11.8	13.3	15.8	18.5	23.0	25.0	25.4	26.9	22.0	19.5	21.3	22.0	23.1	21.3	19.5	17.5	15.7	16.5	15.1	17.7	26.9																				
6-Jul	13.0	12.4	11.4	11.1	11.5	14.2	15.1	16.7	19.2	19.9	20.9	21.5	22.9	23.0	23.3	23.3	22.3	21.7	20.9	19.9	18.6	16.3	13.8	12.6	17.7	23.3																				
7-Jul	11.3	9.7	8.8	8.6	8.4	11.1	14.0	16.9	19.4	20.9	21.2	22.8	24.3	25.0	25.4	26.1	26.8	25.2	24.4	23.0	20.1	18.4	17.8	17.7	18.6	26.8																				
8-Jul	18.6	18.9	18.0	17.0	15.7	16.2	17.0	18.4	21.0	23.0	23.9	25.6	26.9	28.0	28.5	28.6	28.8	28.2	27.0	26.0	23.6	21.4	20.1	18.9	22.5	28.8																				
9-Jul	17.7	16.4	16.3	15.6	16.2	16.7	18.4	19.6	21.3	23.0	24.1	24.4	24.7	24.8	25.1	24.6	23.9	22.6	21.0	20.0	18.7	17.5	17.1	16.4	20.3	25.1																				
10-Jul	14.1	13.6	12.6	12.0	12.0	12.2	12.2	15.0	17.3	18.6	19.2	20.2	20.7	22.7	23.2	22.9	22.5	21.9	21.5	21.5	20.2	18.4	17.6	16.6	17.9	23.2																				
11-Jul	15.7	14.2	14.2	13.7	13.4	13.8	14.9	16.9	19.5	22.0	22.8	24.2	24.3	24.9	24.8	24.8	23.8	23.0	22.0	20.1	18.4	16.8	15.7	14.5	19.1	24.9																				
12-Jul	13.9	13.0	12.6	11.8	11.7	14.7	16.6	18.8	21.2	23.0	24.6	26.2	27.2	27.6	27.4	27.2	27.2	26.4	25.6	24.2	22.1	19.9	19.1	17.4	20.8	27.6																				
13-Jul	15.8	15.0	14.5	14.1	14.3	14.3	15.5	17.2	20.6	22.8	24.1	25.0	25.6	25.4	26.3	26.2	25.3	24.7	23.7	22.1	19.5	17.7	16.7	15.9	20.1	26.3																				
14-Jul	15.5	13.7	13.9	13.4	13.7	13.5	14.1	15.1	16.8	18.0	18.4	18.3	20.2	20.6	20.3	20.1	19.4	18.9	18.4	17.6	16.5	16.8	16.0	16.0	17.1	20.6																				
15-Jul	15.2	15.5	15.3	14.4	14.3	14.9	15.2	15.4	16.4	16.9	17.6	18.2	18.4	18.7	19.8	20.3	20.7	20.8	20.5	20.2	18.8	16.7	15.1	14.3	17.2	20.8																				
16-Jul	12.9	11.9	11.5	10.9	10.5	12.2	15.2	17.8	19.4	21.4	22.8	23.7	24.5	24.1	24.7	24.9	24.0	23.1	22.5	21.9	20.5	18.9	18.2	17.6	19.0	24.9																				
17-Jul	16.4	16.2	15.6	15.4	15.3	15.7	16.3	17.5	17.5	17.6	17.8	17.1	15.4	15.3	16.2	15.9	16.0	16.6	17.2	15.9	15.4	15.3	15.4	15.9	16.2	17.8																				
18-Jul	15.3	15.1	14.9	14.5	14.4	14.9	16.2	17.3	18.9	20.7	22.2	23.5	24.6	25.1	25.4	25.5	25.4	24.6	23.9	22.2	20.8	19.3	18.0	16.5	20.0	25.5																				
19-Jul	15.1	14.9	14.4	13.6	13.6	14.5	15.9	18.5	20.4	22.9	23.8	24.8	25.5	25.7	25.1	24.6	23.2	21.0	22.0	21.0	18.6	16.9	15.7	14.8	19.4	25.7																				
20-Jul	14.1	13.5	13.1	12.5	12.4	13.5	15.3	17.5	19.1	21.3	22.8	24.3	25.3	26.2	27.0	27.1	26.6	26.4	25.5	23.8	22.1	21.1	19.2	17.7	20.3	27.1																				
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	23.5	25.3	25.7	26.7	27.2	27.9	DF	DF	DF	DF	DF	DF	DF	DF	--	27.9																				
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	25.1	25.1	25.1	24.7	24.6	24.2	23.5	22.7	21.7	19.0	18.7	17.9	--	25.1																			
23-Jul	15.4	14.5	13.9	13.1	12.9	14.2	16.0	17.1	19.0	20.6	22.0	24.2	25.5	26.5	26.9	27.3	24.8	24.1	24.8	23.6	20.4	18.9	17.7	17.2	20.0	27.3																				
24-Jul	16.4	15.6	14.6	14.2	14.1	14.8	16.3	18.6	21.1	23.5	25.9	27.9	28.1	28.1	28.3	28.5	28.7	28.7	28.2	27.3	24.8	22.3	23.8	23.2	22.6	28.7																				
25-Jul	21.4	21.6	19.8	17.8	17.8	17.8	18.9	19.1	18.5	18.0	17.2	16.9	18.1	18.4	19.1	19.1	18.7	19.2	18.9	18.3	16.0	14.7	14.0	13.2	18.0	21.6																				
26-Jul	11.8	10.5	9.8	9.5	9.7	10.1	10.7	12.5	14.5	16.3	17.8	19.0	19.0	19.6	20.1	20.9	20.0	19.8	19.1	18.1	17.4	16.0	15.1	14.5	15.5	20.9																				
27-Jul	13.6	11.7	10.2	9.5	9.1	10.3	11.1	11.9	12.8	15.0	16.8	19.1	20.2	19.5	20.5	18.1	17.6	18.1	17.7	16.5	15.6	14.2	13.5	12.4	14.8	20.5																				
28-Jul	12.4	11.5	11.3	11.2	11.3	12.1	14.1	16.2	18.8	20.1	21.6	21.7	23.3	22.2	22.6	22.9	23.0	22.6	22.2	19.8	17.1	15.3	14.4	13.3	17.5	23.3																				
29-Jul	12.4	11.7	10.7	10.1	9.6	10.6	12.9	15.3	18.0	19.7	22.6	24.9	25.6	25.6	26.0	25.7	25.7	25.0	24.4	21.8	18.9	17.2	15.8	14.2	18.5	26.0																				
30-Jul	13.1	12.3	11.5	11.2	11.3	13.2	14.7	17.5	20.1	23.0	25.2	26.7	27.8	28.9	29.5	29.3	29.1	27.6	25.4	21.5	18.5	17.0	18.0	16.1	20.3	29.5																				
31-Jul	15.8	16.1	16.4	16.4	16.0	15.9	16.3	17.0	17.3	20.5	22.1	24.0	24.6	24.7	21.8	19.1	23.4	20.7	19.0	17.9	16.6	16.7	16.6	16.5	18.8	24.7																				
																						14.6	13.8	13.2	12.7	12.6	13.5	14.7	16.4	18.1	19.9	21.1	22.2	23.0	23.2	23.4	23.1	22.8	22.3	21.6	20.5	18.7	17.1	16.5	15.6	Diurnal Average
																						21.4	21.6	19.8	17.8	17.8	17.8	18.9	19.6	21.3	23.5	25.9	27.9	28.1	28.9	29.5	29.3	29.1	28.7	28.2	27.3	24.8	22.3	23.8	23.2	Diurnal Maximum
DF - DAS Failure																																														





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2 m (AT2m) - C
Mannix - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	17	2.38	2.38
10 - 20	434	60.78	63.17
> 20	263	36.83	100.00

Total Number of Valid Hours: 714

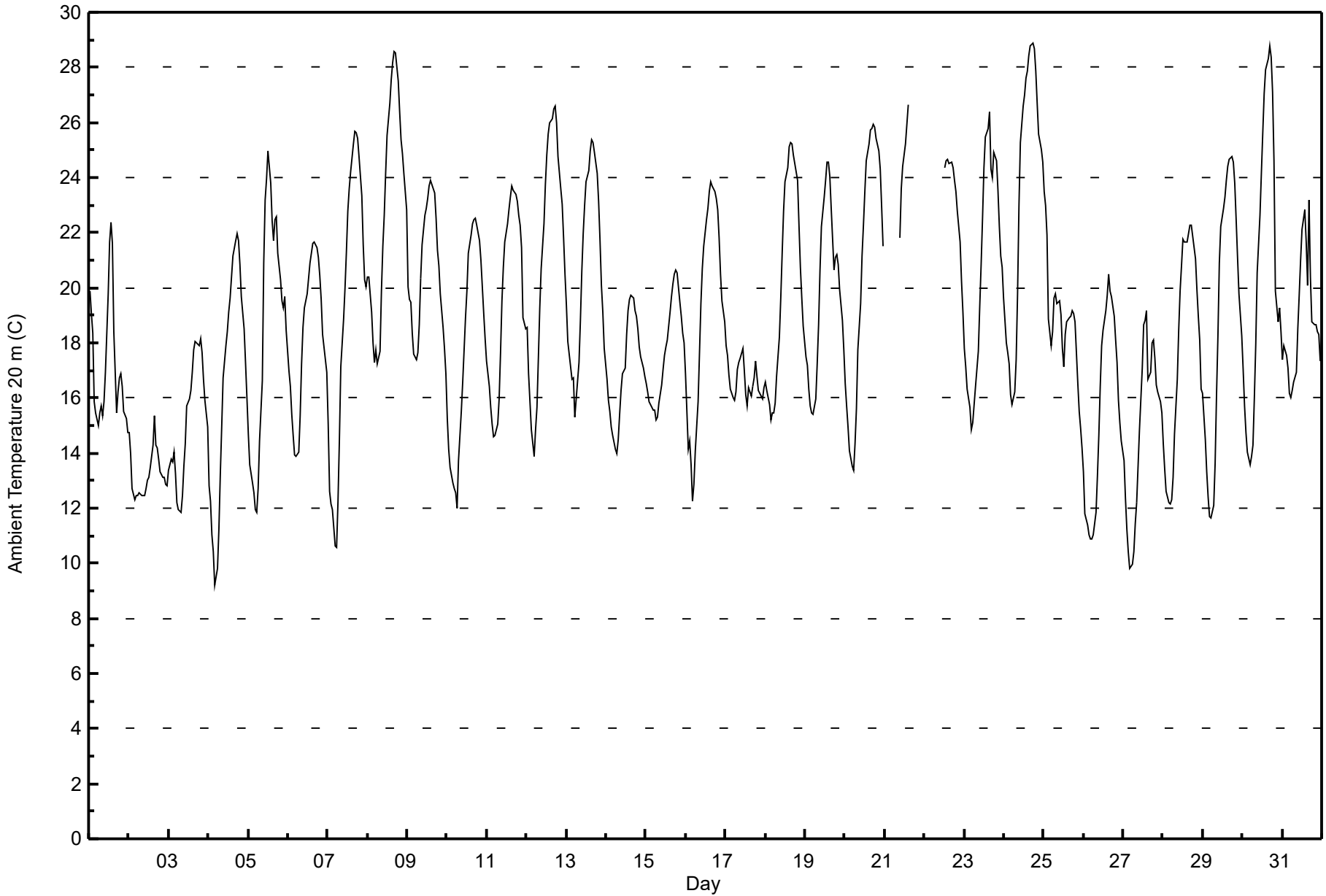
Total Number of Hours: 744



Summary of Hour Averages

Mannix - July 2023

Maximum Value: 28.9 C on Jul 24 18:00																						Maximum Daily Average: 23.3 C on Jul 24				Hours in Service: 744																					
Minimum Value: 9.2 C on Jul 4 05:00																						Minimum Daily Average: 13.3 C on Jul 2				Hours of Data: 714																					
Maximum Diurnal Average: 22.6 C at hour 15																						Minimum Diurnal Average: 14.0 C at hour 6				Hours of Missing Data: 30																					
Monthly Average: 18.80 C																						Percentiles: P ₁ = 10.6 P ₁₀ = 13.3 Q ₁ = 15.7 Median = 18.4 Q ₃ = 21.9 P ₉₀ = 24.6 P ₉₉ = 28.4				Hours of Calibration: 0																					
																										Percent Operational Time: 96.0																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	19.9	19.1	18.4	15.9	15.5	15.0	15.5	15.7	15.4	15.9	16.9	19.8	21.6	22.4	21.6	18.4	15.4	16.2	16.7	16.9	16.4	15.5	15.3	14.7	17.3	22.4																					
2-Jul	14.7	14.0	12.7	12.3	12.5	12.5	12.6	12.5	12.4	12.5	12.7	13.0	13.1	13.5	14.3	15.4	14.3	14.2	13.8	13.3	13.1	13.1	12.9	12.8	13.3	15.4																					
3-Jul	13.4	13.8	13.7	14.1	13.3	12.2	12.0	11.8	12.5	13.5	14.3	15.7	16.0	16.3	17.0	17.7	18.1	18.0	17.9	18.1	17.6	16.7	15.9	14.9	15.2	18.1																					
4-Jul	12.8	12.3	11.1	10.4	9.2	9.8	11.2	13.2	15.0	16.8	17.9	18.4	19.1	19.6	20.4	21.1	21.7	22.0	21.7	20.8	19.7	18.5	17.3	16.0	16.5	22.0																					
5-Jul	14.7	13.6	12.9	12.6	12.0	11.9	12.7	14.4	16.6	20.9	23.2	24.0	25.0	23.8	22.4	21.7	22.5	22.6	21.3	20.3	19.5	19.3	19.7	18.5	18.6	25.0																					
6-Jul	17.0	16.4	15.4	14.6	13.9	13.9	14.0	15.3	17.2	18.5	19.3	19.8	20.3	20.9	21.3	21.6	21.7	21.4	21.1	20.5	19.6	18.3	17.4	17.0	18.2	21.7																					
7-Jul	15.0	12.6	12.2	12.0	10.6	10.6	12.3	14.5	17.1	18.9	20.0	21.3	22.8	23.6	24.2	25.2	25.7	25.6	25.4	24.8	23.3	21.6	20.3	20.0	19.1	25.7																					
8-Jul	20.4	20.4	19.1	18.0	17.3	17.7	17.3	17.7	19.9	21.5	22.6	24.2	25.5	26.7	27.6	28.2	28.6	28.5	27.5	26.4	25.4	24.9	24.2	22.8	23.0	28.6																					
9-Jul	20.0	19.6	19.5	18.4	17.6	17.4	17.7	18.7	20.3	21.6	22.6	22.9	23.2	23.7	23.9	23.8	23.4	22.5	21.4	20.8	19.8	18.6	17.8	16.9	20.5	23.9																					
10-Jul	15.2	14.1	13.5	12.9	12.7	12.5	12.0	13.7	15.5	16.6	17.8	18.9	19.9	21.3	21.9	22.3	22.5	22.5	22.3	21.7	21.0	20.1	19.1	18.2	17.8	22.5																					
11-Jul	17.3	16.4	15.7	15.0	14.6	14.6	15.0	16.0	17.7	19.5	20.7	21.7	22.3	22.8	23.3	23.7	23.5	23.4	23.1	22.6	22.3	21.5	18.9	18.5	19.6	23.7																					
12-Jul	18.5	16.9	15.8	14.8	13.9	14.9	15.6	17.5	19.2	20.7	22.3	23.7	24.8	25.6	26.0	26.1	26.5	26.6	26.0	24.8	23.6	23.0	21.8	20.5	21.2	26.6																					
13-Jul	19.4	18.1	17.2	16.7	16.7	15.3	16.0	17.3	18.8	20.6	22.0	23.0	23.8	24.3	25.0	25.4	25.3	24.9	24.1	23.2	21.7	20.1	19.1	17.8	20.6	25.4																					
14-Jul	16.7	15.9	15.5	15.0	14.6	14.1	14.0	14.5	15.4	16.3	16.9	17.1	18.3	19.2	19.6	19.7	19.6	19.2	19.0	18.5	17.9	17.5	17.1	16.8	17.0	19.7																					
15-Jul	16.5	16.2	15.9	15.7	15.6	15.6	15.2	15.3	15.8	16.5	17.0	17.6	17.8	18.1	19.1	19.7	20.2	20.5	20.6	20.5	19.5	19.0	18.3	18.0	17.7	20.6																					
16-Jul	16.9	14.1	14.5	13.6	12.3	12.9	14.1	15.9	17.7	19.4	20.7	21.5	22.5	22.9	23.5	23.9	23.7	23.5	23.2	22.8	21.8	20.5	19.5	18.7	19.2	23.9																					
17-Jul	17.9	17.5	16.8	16.3	16.0	15.9	16.2	17.0	17.3	17.4	17.8	17.0	16.1	15.7	16.4	16.1	16.4	16.7	17.3	16.8	16.3	16.1	16.0	16.4	16.6	17.9																					
18-Jul	16.6	16.2	15.8	15.2	15.4	15.4	15.8	16.8	18.2	19.6	21.3	22.8	23.9	24.3	25.1	25.3	25.2	24.8	24.5	23.9	22.3	20.7	19.6	18.6	20.3	25.3																					
19-Jul	17.5	17.2	16.3	15.7	15.5	15.4	16.0	17.3	18.6	20.7	22.2	23.3	23.9	24.6	24.6	24.1	22.9	20.7	21.1	21.2	20.9	19.9	18.8	17.7	19.8	24.6																					
20-Jul	16.5	15.7	15.0	14.1	13.5	13.4	14.3	15.6	17.7	19.4	21.2	22.3	23.5	24.6	25.2	25.7	25.8	25.9	25.8	25.4	25.0	24.3	22.9	21.5	20.6	25.9																					
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	21.8	23.6	24.4	25.2	25.9	26.7	DF	DF	DF	DF	DF	DF	DF	DF	--	26.7																					
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	24.4	24.6	24.7	24.5	24.6	24.4	23.9	23.5	22.8	21.7	20.2	19.1	--	24.7																					
23-Jul	17.8	17.1	16.3	15.6	14.8	15.1	15.8	16.4	17.7	19.3	20.9	22.5	24.4	25.5	25.8	26.4	24.3	24.0	24.9	24.6	23.6	22.2	21.2	20.8	20.7	26.4																					
24-Jul	19.6	18.0	17.6	17.2	16.1	15.8	16.2	17.4	19.8	23.0	25.3	26.6	27.0	27.6	27.9	28.4	28.8	28.9	28.7	27.9	26.7	25.6	25.0	24.5	23.3	28.9																					
25-Jul	23.5	23.0	21.9	18.8	17.9	18.4	19.6	19.8	19.4	19.5	19.0	17.8	17.1	18.3	18.8	18.9	19.0	19.2	19.1	18.7	16.5	15.5	14.9	14.2	18.7	23.5																					
26-Jul	13.3	11.8	11.4	11.1	10.9	10.9	11.0	11.9	13.1	14.7	16.4	17.9	18.5	19.2	19.8	20.5	19.9	19.7	19.0	18.1	17.3	15.9	15.1	14.4	15.5	20.5																					
27-Jul	13.7	12.3	11.2	10.4	9.8	9.9	10.4	11.4	12.2	13.5	14.9	17.1	18.7	18.8	19.2	16.7	16.9	18.0	18.1	17.4	16.5	16.2	15.9	15.5	14.8	19.2																					
28-Jul	14.3	13.4	12.6	12.2	12.2	12.3	13.1	14.7	16.7	18.4	19.9	20.8	21.8	21.6	21.7	21.9	22.3	22.3	21.8	21.0	19.9	19.0	18.1	16.3	17.8	22.3																					
29-Jul	16.2	14.5	13.3	12.4	11.7	11.7	12.1	13.6	16.1	18.3	20.9	22.2	22.9	23.3	23.9	24.4	24.6	24.8	24.6	23.8	22.5	21.1	19.8	18.3	19.0	24.8																					
30-Jul	17.0	15.7	14.7	14.0	13.6	13.9	14.3	16.0	17.9	20.6	22.6	24.1	25.6	27.0	27.9	28.3	28.8	28.4	27.1	24.6	19.9	18.8	19.3	18.4	20.8	28.8																					
31-Jul	17.4	17.9	17.6	17.1	16.2	16.0	16.3	16.6	16.9	18.5	19.7	21.0	22.1	22.9	21.7	20.1	23.2	20.4	18.7	18.6	18.6	18.4	18.3	17.3	18.8	23.2																					
																						16.9	16.0	15.3	14.6	14.0	14.0	14.4	15.5	16.8	18.5	19.8	20.7	21.6	22.2	22.6	22.5	22.3	22.0	21.4	20.4	19.4	18.7	17.8	Diurnal Average		
																						23.5	23.0	21.9	18.8	17.9	18.4	19.6	19.8	20.3	23.0	25.3	26.6	27.0	27.6	27.9	28.4	28.8	28.9	28.7	27.9	26.7	25.6	25.0	24.5	Diurnal Maximum	
DF - DAS Failure																																															





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 20 m (AT20m) - C
Mannix - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	4	0.56	0.56
10 - 20	446	62.46	63.03
> 20	264	36.97	100.00

Total Number of Valid Hours: 714

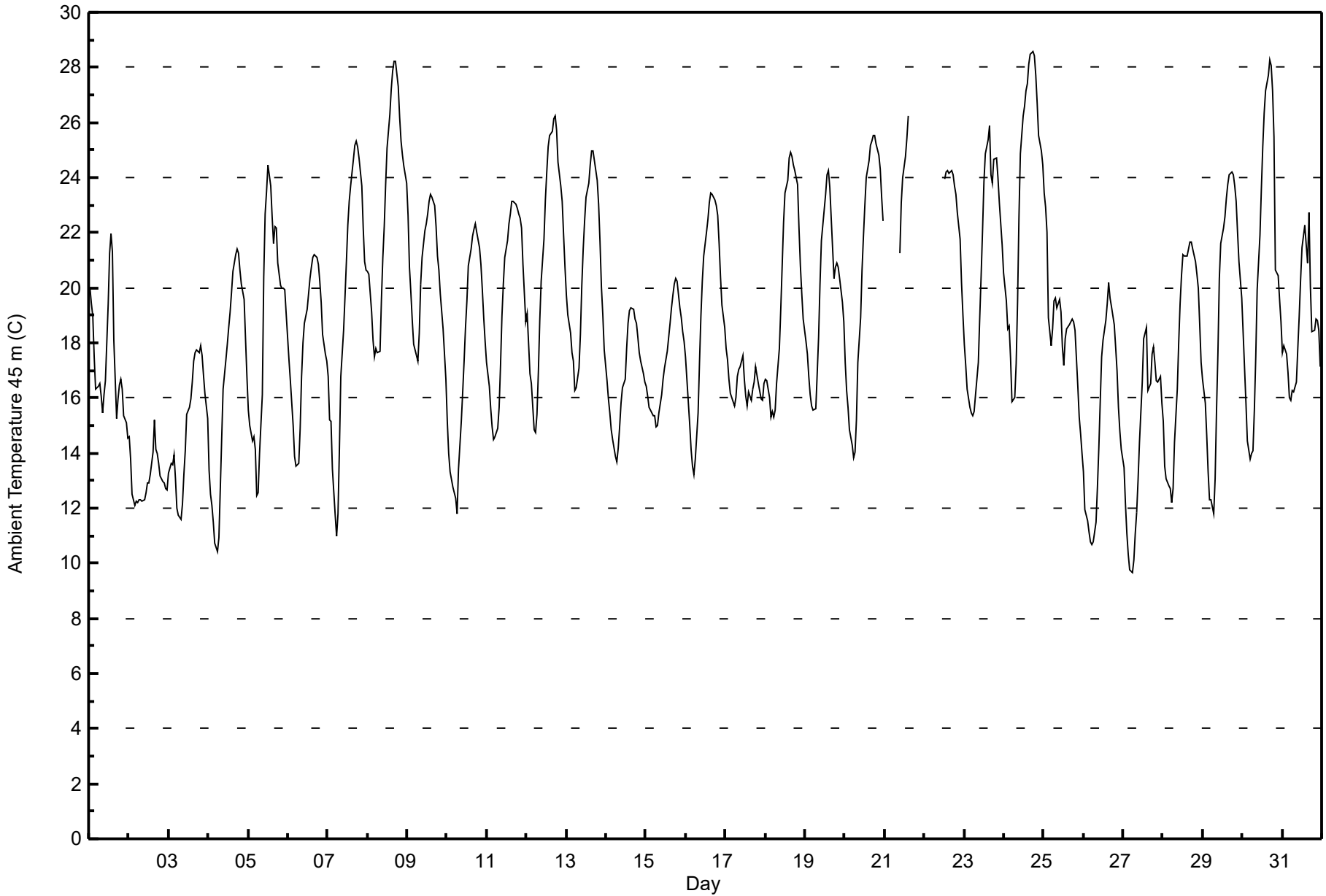
Total Number of Hours: 744



Summary of Hour Averages

Mannix - July 2023

Maximum Value: 28.6 C on Jul 24 18:00 Maximum Daily Average: 23.4 C on Jul 24																						Hours in Service:	744																							
Minimum Value: 9.7 C on Jul 27 06:00 Minimum Daily Average: 13.1 C on Jul 2																						Hours of Data:	714																							
Maximum Diurnal Average: 22.2 C at hour 15 Minimum Diurnal Average: 14.1 C at hour 6																						Hours of Missing Data:	30																							
Monthly Average: 18.73 C Percentiles: P ₁ = 10.8 P ₁₀ = 13.4 Q ₁ = 15.8 Median = 18.5 Q ₃ = 21.7 P ₉₀ = 24.3 P ₉₉ = 28.0																						Hours of Calibration:	0																							
																						Percent Operational Time:	96.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																						
1-Jul	20.0	19.4	19.0	17.5	16.3	16.4	16.5	16.1	15.5	16.1	16.6	19.4	21.2	22.0	21.3	18.1	15.3	16.0	16.5	16.7	16.3	15.4	15.1	14.5	17.4	22.0																				
2-Jul	14.6	13.8	12.5	12.1	12.2	12.2	12.3	12.3	12.3	12.3	12.6	12.9	12.9	13.2	14.0	15.2	14.1	14.0	13.6	13.2	13.0	12.9	12.7	12.7	13.1	15.2																				
3-Jul	13.3	13.6	13.6	13.9	13.1	12.0	11.7	11.6	12.2	13.2	14.1	15.4	15.7	15.9	16.6	17.4	17.6	17.7	17.7	17.9	17.6	16.8	16.2	15.3	15.0	17.9																				
4-Jul	13.4	12.5	12.1	11.5	10.7	10.4	10.9	12.7	14.5	16.3	17.4	17.9	18.5	19.1	19.9	20.6	21.2	21.4	21.3	20.6	20.2	19.6	18.2	16.8	16.6	21.4																				
5-Jul	15.6	15.0	14.4	14.6	14.1	12.4	12.6	14.0	16.1	20.4	22.7	23.5	24.5	23.7	22.6	21.6	22.2	22.2	20.9	20.1	20.0	20.0	20.0	19.1	18.8	24.5																				
6-Jul	17.4	16.7	15.8	15.0	13.9	13.5	13.6	14.9	16.8	18.0	18.7	19.2	19.8	20.3	20.7	21.1	21.2	21.1	20.8	20.2	19.5	18.3	17.6	17.3	18.0	21.2																				
7-Jul	16.8	15.2	15.1	13.4	11.8	11.0	11.8	14.1	16.8	18.5	19.7	21.0	22.3	23.1	23.7	24.7	25.2	25.3	25.1	24.7	23.7	22.2	21.0	20.6	19.4	25.3																				
8-Jul	20.6	20.5	19.1	18.1	17.5	17.8	17.6	17.7	19.6	21.1	22.2	23.7	25.1	26.3	27.2	27.9	28.2	28.2	27.3	26.2	25.3	24.8	24.4	23.8	22.9	28.2																				
9-Jul	22.6	20.7	19.8	18.8	18.0	17.6	17.4	18.4	20.1	21.1	22.0	22.3	22.7	23.1	23.4	23.3	23.0	22.2	21.1	20.6	19.8	18.5	17.6	16.7	20.5	23.4																				
10-Jul	15.1	14.0	13.3	12.7	12.5	12.3	11.8	13.4	15.2	16.2	17.3	18.6	19.5	20.8	21.4	21.9	22.1	22.3	22.0	21.5	20.9	19.9	18.9	18.0	17.6	22.3																				
11-Jul	17.3	16.4	15.6	14.9	14.5	14.6	14.9	15.7	17.2	18.9	20.1	21.1	21.7	22.3	22.7	23.1	23.1	23.0	22.9	22.7	22.5	22.2	20.9	18.8	19.5	23.1																				
12-Jul	19.1	18.0	16.9	16.5	14.9	14.7	15.4	16.9	18.8	20.2	21.7	23.2	24.2	25.1	25.5	25.7	26.1	26.2	25.7	24.6	23.7	23.1	21.9	20.7	21.2	26.2																				
13-Jul	19.7	19.0	18.3	17.6	17.3	16.3	16.4	17.1	18.3	20.1	21.4	22.4	23.3	23.8	24.5	25.0	25.0	24.6	23.9	23.0	21.7	20.0	19.0	17.8	20.6	25.0																				
14-Jul	16.6	16.0	15.4	14.9	14.5	13.9	13.7	14.2	14.9	15.8	16.3	16.7	17.8	18.7	19.2	19.3	19.2	18.8	18.7	18.2	17.6	17.3	16.9	16.6	16.7	19.3																				
15-Jul	16.4	16.1	15.7	15.5	15.3	15.4	14.9	15.0	15.5	16.1	16.7	17.1	17.4	17.7	18.7	19.3	19.7	20.1	20.3	20.2	19.3	18.9	18.4	18.0	17.4	20.3																				
16-Jul	17.5	15.9	15.1	14.1	13.5	13.2	13.8	15.5	17.3	19.0	20.2	21.1	22.0	22.5	23.1	23.4	23.4	23.2	23.0	22.6	21.6	20.4	19.4	18.6	19.1	23.4																				
17-Jul	17.8	17.4	16.7	16.2	15.8	15.7	16.0	16.8	17.0	17.1	17.5	16.7	16.1	15.7	16.2	15.9	16.3	16.6	17.2	16.8	16.5	16.0	15.9	16.5	16.5	17.8																				
18-Jul	16.7	16.7	16.0	15.3	15.5	15.3	15.6	16.5	17.8	19.2	20.8	22.4	23.4	23.9	24.7	24.9	24.8	24.5	24.2	23.7	22.2	20.8	19.8	18.9	20.2	24.9																				
19-Jul	18.1	17.6	16.8	16.1	15.7	15.6	15.6	16.9	18.2	20.1	21.7	22.8	23.4	24.1	24.3	23.7	22.5	20.4	20.7	20.9	20.7	20.3	19.5	18.8	19.8	24.3																				
20-Jul	17.3	16.3	15.6	14.8	14.3	13.8	14.0	15.2	17.3	18.9	20.7	21.9	23.0	24.0	24.6	25.2	25.3	25.5	25.5	25.2	24.8	24.3	23.3	22.4	20.6	25.5																				
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	21.2	23.1	24.0	24.8	25.4	26.2	DF	DF	DF	DF	DF	DF	DF	DF	--	26.2																				
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	23.9	24.2	24.3	24.1	24.3	24.1	23.7	23.4	22.7	21.7	20.2	19.0	--	24.3																			
23-Jul	18.0	17.2	16.3	15.7	15.5	15.4	15.5	16.1	17.3	18.9	20.4	22.0	23.8	24.9	25.4	25.9	24.1	23.8	24.6	24.7	24.0	23.1	22.3	21.6	20.7	25.9																				
24-Jul	20.5	19.5	18.5	18.6	17.4	15.9	16.0	17.2	19.5	22.6	24.9	26.2	26.6	27.1	27.4	28.1	28.5	28.6	28.4	27.7	26.7	25.5	24.9	24.5	23.4	28.6																				
25-Jul	23.5	22.9	22.0	18.9	17.9	18.5	19.5	19.6	19.3	19.6	19.1	17.8	17.2	18.2	18.5	18.6	18.7	18.9	18.8	18.5	16.4	15.3	14.7	14.0	18.6	23.5																				
26-Jul	13.3	12.0	11.5	11.1	10.8	10.7	10.8	11.5	12.7	14.2	15.8	17.5	18.1	18.8	19.4	20.2	19.6	19.3	18.7	17.8	17.0	15.6	14.8	14.1	15.2	20.2																				
27-Jul	13.5	12.2	11.1	10.3	9.8	9.7	10.1	11.1	11.8	13.0	14.4	16.6	18.1	18.4	18.5	16.2	16.5	17.6	17.8	17.3	16.7	16.6	16.8	15.8	14.6	18.5																				
28-Jul	15.1	13.5	13.1	12.8	12.7	12.2	12.7	14.4	16.3	18.0	19.4	20.4	21.2	21.2	21.2	21.4	21.7	21.7	21.4	20.9	20.5	20.0	18.7	17.3	17.8	21.7																				
29-Jul	16.7	15.8	14.6	13.3	12.3	12.3	11.8	13.1	15.6	17.7	20.3	21.6	22.2	22.6	23.2	23.7	24.1	24.2	24.1	23.7	23.1	22.0	20.9	19.7	19.1	24.2																				
30-Jul	18.3	17.1	15.8	14.5	13.8	14.0	14.1	15.5	17.5	20.0	21.9	23.6	25.1	26.4	27.1	27.7	28.3	28.1	27.2	25.5	20.7	20.5	19.6	18.8	20.9	28.3																				
31-Jul	17.6	17.9	17.6	16.9	16.0	15.9	16.3	16.2	16.6	17.8	19.0	20.3	21.5	22.2	21.6	20.9	22.7	20.0	18.4	18.5	18.9	18.8	18.4	17.2	18.6	22.7																				
																						17.3	16.5	15.8	15.0	14.4	14.1	14.3	15.2	16.5	18.1	19.3	20.3	21.2	21.8	22.2	22.1	22.1	22.0	21.7	21.3	20.4	19.7	18.9	18.1	Diurnal Average
																						23.5	22.9	22.0	18.9	18.0	18.5	19.5	19.6	20.1	22.6	24.9	26.2	26.6	27.1	27.4	28.1	28.5	28.6	28.4	27.7	26.7	25.5	24.9	24.5	Diurnal Maximum
DF - DAS Failure																																														





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature 45 m (AT45m) - C
Mannix - July 2023

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	2	0.28	0.28
10 - 20	444	62.18	62.47
> 20	268	37.54	100.00

Total Number of Valid Hours: 714

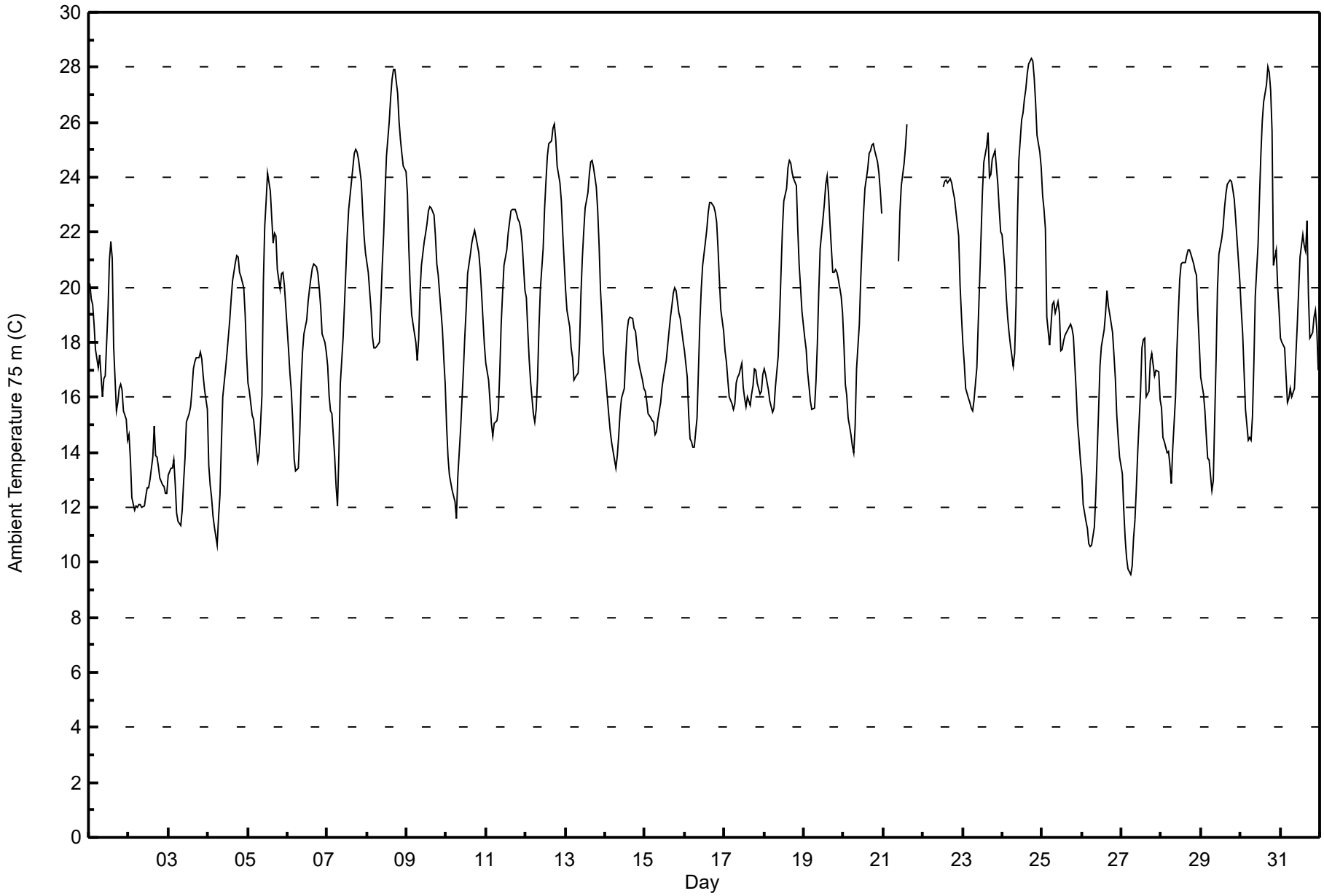
Total Number of Hours: 744



Summary of Hour Averages

Mannix - July 2023

Maximum Value: 28.3 C on Jul 24 18:00 Maximum Daily Average: 23.6 C on Jul 24																						Hours in Service:	744																							
Minimum Value: 9.6 C on Jul 27 06:00 Minimum Daily Average: 12.9 C on Jul 2																						Hours of Data:	714																							
Maximum Diurnal Average: 21.9 C at hour 15 Minimum Diurnal Average: 14.4 C at hour 7																						Hours of Missing Data:	30																							
Monthly Average: 18.69 C Percentiles: P ₁ = 10.7 P ₁₀ = 13.7 Q ₁ = 15.9 Median = 18.4 Q ₃ = 21.7 P ₉₀ = 24.1 P ₉₉ = 27.7																						Hours of Calibration:	0																							
																						Percent Operational Time:	96.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																						
1-Jul	20.1	19.6	19.4	18.7	17.7	17.1	17.5	16.8	16.0	16.7	16.8	19.2	21.0	21.7	21.0	17.8	15.5	15.8	16.3	16.5	16.3	15.5	15.2	14.5	17.6	21.7																				
2-Jul	14.7	13.7	12.3	11.9	12.1	12.0	12.1	12.1	12.0	12.1	12.4	12.7	12.7	13.0	13.8	15.0	13.9	13.8	13.5	13.0	12.8	12.8	12.5	12.5	12.9	15.0																				
3-Jul	13.2	13.4	13.4	13.7	12.9	11.8	11.5	11.3	11.9	12.9	13.8	15.1	15.4	15.7	16.3	17.0	17.3	17.4	17.4	17.6	17.4	16.8	16.3	15.5	14.8	17.6																				
4-Jul	13.5	12.8	12.3	11.7	11.3	10.7	11.6	12.5	14.3	16.0	17.0	17.6	18.2	18.8	19.6	20.2	20.9	21.1	21.1	20.6	20.4	20.0	19.0	17.6	16.6	21.1																				
5-Jul	16.5	16.2	15.3	15.2	14.7	14.2	13.7	14.0	16.1	20.2	22.2	23.1	24.1	23.5	22.5	21.6	22.0	21.8	20.6	19.9	20.5	20.6	20.1	19.3	19.1	24.1																				
6-Jul	17.7	16.9	16.2	15.2	13.8	13.3	13.4	14.6	16.5	17.6	18.3	18.8	19.5	19.9	20.4	20.7	20.8	20.7	20.5	19.9	19.3	18.3	18.0	17.7	17.8	20.8																				
7-Jul	17.2	16.1	15.5	15.4	13.8	12.8	12.0	13.9	16.5	18.2	19.4	20.7	21.9	22.8	23.4	24.3	24.9	25.0	24.9	24.6	23.9	22.8	21.9	21.3	19.7	25.0																				
8-Jul	20.9	20.5	19.2	18.2	17.8	17.8	17.9	18.0	19.4	20.8	21.9	23.4	24.8	26.0	26.9	27.5	27.9	27.9	27.0	26.0	25.4	24.9	24.4	24.2	22.9	27.9																				
9-Jul	23.4	21.4	20.0	19.0	18.7	18.0	17.4	18.1	19.8	20.8	21.6	21.9	22.3	22.8	23.0	22.9	22.6	21.8	20.8	20.4	19.8	18.5	17.4	16.5	20.4	23.4																				
10-Jul	15.0	13.8	13.2	12.6	12.4	12.2	11.6	13.1	14.8	15.9	17.0	18.2	19.2	20.5	21.2	21.6	21.9	22.0	21.8	21.2	20.7	19.8	18.8	17.9	17.3	22.0																				
11-Jul	17.2	16.6	15.8	15.0	14.6	15.1	15.2	15.6	16.9	18.7	19.8	20.8	21.4	22.0	22.4	22.8	22.8	22.8	22.7	22.5	22.4	22.1	21.6	19.9	19.4	22.8																				
12-Jul	19.7	18.5	17.4	16.6	15.4	15.1	15.5	16.7	18.5	19.9	21.4	22.8	23.9	24.7	25.2	25.3	25.8	25.9	25.4	24.4	23.8	23.2	21.9	21.0	21.2	25.9																				
13-Jul	19.9	19.2	18.6	17.8	17.4	16.6	16.7	16.9	18.0	19.8	21.0	22.0	22.9	23.4	24.1	24.6	24.6	24.3	23.6	22.8	21.5	19.9	18.9	17.6	20.5	24.6																				
14-Jul	16.5	15.9	15.3	14.8	14.3	13.7	13.4	13.9	14.6	15.5	16.0	16.3	17.5	18.4	18.8	18.9	18.9	18.5	18.4	17.9	17.3	17.1	16.6	16.3	16.4	18.9																				
15-Jul	16.2	15.9	15.4	15.3	15.1	15.1	14.7	14.7	15.2	15.8	16.4	16.7	17.0	17.3	18.4	18.9	19.3	19.8	20.0	19.9	19.1	18.9	18.4	18.1	17.2	20.0																				
16-Jul	17.7	16.7	15.4	14.5	14.4	14.2	14.2	15.3	17.0	18.7	19.9	20.8	21.7	22.1	22.7	23.1	23.1	22.9	22.7	22.4	21.4	20.2	19.2	18.4	19.1	23.1																				
17-Jul	17.7	17.3	16.6	16.0	15.8	15.6	15.8	16.5	16.7	16.8	17.3	16.4	16.0	15.7	16.0	15.7	16.1	16.4	17.0	16.5	16.1	16.2	16.8	16.4	17.7																					
18-Jul	17.1	16.8	16.3	15.9	15.7	15.4	15.6	16.4	17.5	18.9	20.5	22.1	23.1	23.6	24.3	24.6	24.5	24.2	24.0	23.7	22.1	20.8	20.0	19.1	20.1	24.6																				
19-Jul	18.2	17.7	16.9	16.4	15.9	15.5	15.6	16.6	17.9	19.8	21.4	22.5	23.1	23.8	24.0	23.4	22.3	20.5	20.5	20.7	20.6	20.3	19.7	19.1	19.7	24.0																				
20-Jul	17.9	16.5	16.1	15.2	14.7	14.2	14.0	14.9	17.0	18.7	20.3	21.6	22.7	23.6	24.3	24.9	24.9	25.2	25.2	25.0	24.6	24.2	23.5	22.7	20.5	25.2																				
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	20.9	22.7	23.7	24.5	25.1	25.9	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	25.9																				
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	23.6	23.8	23.9	23.8	23.9	23.8	23.5	23.2	22.8	21.9	20.1	19.0	--	23.9																				
23-Jul	17.9	17.2	16.3	16.0	15.8	15.6	15.5	15.9	17.1	18.7	20.2	21.8	23.5	24.6	25.1	25.6	24.0	24.1	24.7	25.0	24.3	23.7	22.9	22.0	20.7	25.6																				
24-Jul	21.9	20.7	19.7	18.9	18.4	17.9	17.2	17.6	19.3	22.4	24.6	26.1	26.3	26.9	27.2	27.8	28.1	28.3	28.2	27.6	26.7	25.5	24.9	24.4	23.6	28.3																				
25-Jul	23.4	22.9	22.1	18.9	17.9	18.6	19.4	19.5	19.0	19.5	19.0	17.7	17.8	18.1	18.2	18.4	18.5	18.6	18.5	18.2	16.2	15.1	14.4	13.7	18.5	23.4																				
26-Jul	13.2	12.1	11.5	11.2	10.7	10.6	10.6	11.3	12.5	13.9	15.5	17.1	17.9	18.5	19.1	19.9	19.3	19.0	18.4	17.6	16.7	15.4	14.5	13.8	15.0	19.9																				
27-Jul	13.2	11.9	10.9	10.2	9.8	9.6	9.9	10.9	11.6	12.7	14.0	16.2	17.8	18.1	18.2	16.0	16.2	17.3	17.6	17.2	16.8	17.0	16.9	15.9	14.4	18.2																				
28-Jul	15.6	14.5	14.4	14.0	14.0	13.5	12.9	14.1	16.0	17.7	19.1	20.3	20.9	20.9	20.9	21.1	21.3	21.4	21.2	20.8	20.6	20.4	19.0	17.9	18.0	21.4																				
29-Jul	16.7	16.1	15.5	14.6	13.8	13.7	12.6	12.9	15.2	17.4	20.0	21.2	21.8	22.2	22.9	23.4	23.7	23.9	23.8	23.6	23.2	22.5	21.7	20.2	19.3	23.9																				
30-Jul	19.2	18.3	16.9	15.6	14.4	14.5	14.5	15.3	17.2	19.7	21.6	23.2	24.8	26.0	26.7	27.4	28.0	27.8	27.2	25.7	20.8	21.4	20.0	19.2	21.1	28.0																				
31-Jul	18.2	18.0	17.8	16.8	15.8	16.0	16.3	16.0	16.3	17.5	18.6	19.9	21.1	21.9	21.5	21.3	22.4	19.7	18.2	18.4	18.9	19.2	18.5	17.0	18.6	22.4																				
																						17.6	16.8	16.1	15.4	14.8	14.5	14.4	15.0	16.2	17.8	19.0	20.0	20.9	21.5	21.9	21.9	21.9	21.7	21.5	21.1	20.4	19.8	19.1	18.3	Diurnal Average
																						23.4	22.9	22.1	19.0	18.7	18.6	19.4	19.5	19.8	22.4	24.6	26.1	26.3	26.9	27.2	27.8	28.1	28.3	28.2	27.6	26.7	25.5	24.9	24.4	Diurnal Maximum
DF - DAS Failure																																														





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 75 m (AT75m) - C
Mannix - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	3	0.42	0.42
10 - 20	451	63.17	63.59
> 20	260	36.41	100.00

Total Number of Valid Hours: 714

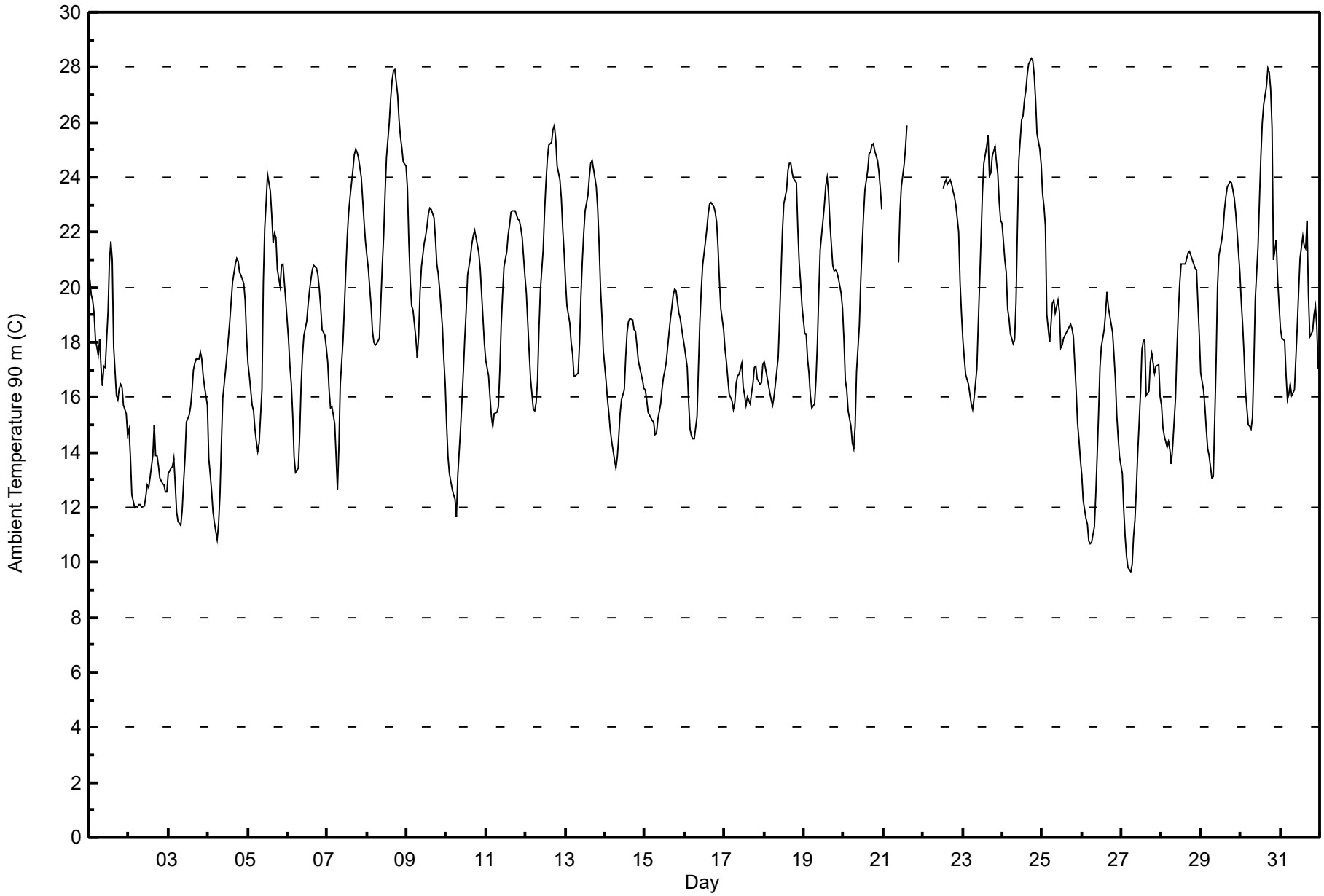
Total Number of Hours: 744



Summary of Hour Averages

Mannix - July 2023

Maximum Value: 28.3 C on Jul 24 18:00																						Maximum Daily Average: 23.8 C on Jul 24										Hours in Service: 744														
Minimum Value: 9.7 C on Jul 27 06:00																						Minimum Daily Average: 12.9 C on Jul 2										Hours of Data: 714														
Maximum Diurnal Average: 21.8 C at hour 17																						Minimum Diurnal Average: 14.6 C at hour 7										Hours of Missing Data: 30														
Monthly Average: 18.77 C																						Percentiles: P ₁ = 10.8 P ₁₀ = 13.8 Q ₁ = 16.0 Median = 18.4 Q ₃ = 21.7 P ₉₀ = 24.1 P ₉₉ = 27.7										Hours of Calibration: 0														
																																Percent Operational Time: 96.0														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																						
1-Jul	20.3	19.7	19.5	19.0	18.1	17.5	18.1	17.1	16.4	17.2	17.1	19.1	21.0	21.6	21.0	17.9	16.0	15.9	16.3	16.5	16.4	15.7	15.4	14.7	17.8	21.6																				
2-Jul	14.8	13.8	12.4	12.0	12.1	12.0	12.1	12.1	12.0	12.1	12.4	12.8	12.7	13.1	13.9	15.0	13.9	13.9	13.5	13.1	12.9	12.8	12.5	12.5	12.9	15.0																				
3-Jul	13.2	13.4	13.5	13.8	12.9	11.8	11.5	11.3	11.9	12.9	13.8	15.1	15.4	15.6	16.2	17.0	17.2	17.4	17.4	17.6	17.4	16.8	16.4	15.7	14.8	17.6																				
4-Jul	13.8	13.2	12.6	11.8	11.4	10.8	11.4	12.5	14.3	16.0	17.0	17.5	18.1	18.8	19.5	20.2	20.9	21.0	21.0	20.5	20.4	20.1	19.5	18.2	16.7	21.0																				
5-Jul	17.2	16.8	15.7	15.5	14.8	14.4	14.0	14.4	16.3	20.2	22.2	23.1	24.1	23.5	22.6	21.6	22.0	21.8	20.6	20.0	20.8	20.9	20.2	19.5	19.3	24.1																				
6-Jul	18.1	17.1	16.5	15.4	13.8	13.3	13.4	14.6	16.4	17.6	18.2	18.7	19.4	19.9	20.3	20.6	20.8	20.7	20.4	19.9	19.3	18.4	18.2	17.8	17.9	20.8																				
7-Jul	17.3	16.3	15.6	15.7	15.1	13.9	12.7	14.2	16.5	18.1	19.4	20.6	21.9	22.7	23.3	24.3	24.8	25.0	24.9	24.7	24.0	23.2	22.4	21.6	19.9	25.0																				
8-Jul	21.1	20.7	19.3	18.4	18.0	17.9	18.0	18.2	19.5	20.8	21.9	23.4	24.7	26.0	26.9	27.5	27.9	27.9	27.0	26.1	25.5	25.1	24.6	24.4	22.9	27.9																				
9-Jul	23.6	21.7	20.2	19.3	19.2	18.2	17.4	18.2	19.8	20.7	21.6	21.9	22.2	22.7	22.9	22.8	22.5	21.8	20.8	20.5	19.9	18.5	17.4	16.5	20.4	23.6																				
10-Jul	15.0	13.8	13.2	12.7	12.4	12.3	11.6	13.2	14.9	15.9	17.0	18.2	19.2	20.5	21.1	21.5	21.9	22.1	21.8	21.2	20.7	19.8	18.9	17.9	17.4	22.1																				
11-Jul	17.3	16.8	16.0	15.3	15.0	15.4	15.5	15.7	16.9	18.6	19.7	20.7	21.3	21.9	22.3	22.7	22.8	22.8	22.6	22.5	22.4	22.2	21.8	20.4	19.5	22.8																				
12-Jul	19.8	18.7	17.7	16.7	15.5	15.5	15.8	16.6	18.5	19.9	21.4	22.8	23.8	24.7	25.2	25.3	25.7	25.9	25.4	24.4	23.9	23.2	22.1	21.2	21.2	25.9																				
13-Jul	20.2	19.3	18.7	18.0	17.6	16.8	16.8	16.9	17.9	19.7	21.0	21.9	22.8	23.4	24.0	24.5	24.6	24.3	23.6	22.8	21.6	20.0	19.0	17.7	20.5	24.6																				
14-Jul	16.6	15.9	15.4	14.8	14.4	13.7	13.4	13.8	14.6	15.4	15.9	16.3	17.4	18.4	18.8	18.9	18.8	18.5	18.4	17.9	17.3	17.1	16.6	16.3	16.4	18.9																				
15-Jul	16.2	15.9	15.4	15.3	15.1	15.1	14.7	14.7	15.2	15.8	16.3	16.7	17.0	17.3	18.3	18.9	19.3	19.7	19.9	19.9	19.1	18.9	18.5	18.2	17.1	19.9																				
16-Jul	17.9	17.1	15.8	14.9	14.6	14.5	14.5	15.3	17.1	18.7	19.9	20.8	21.7	22.1	22.7	23.1	23.1	22.9	22.7	22.4	21.4	20.2	19.2	18.4	19.2	23.1																				
17-Jul	17.8	17.3	16.7	16.1	15.9	15.6	15.8	16.5	16.8	16.9	17.3	16.4	16.0	15.7	16.0	15.7	16.2	16.5	17.1	17.1	16.7	16.5	16.5	17.2	16.5	17.8																				
18-Jul	17.3	17.0	16.5	16.2	15.9	15.7	16.0	16.5	17.5	18.9	20.4	22.0	23.0	23.6	24.3	24.5	24.5	24.2	23.9	23.8	22.2	20.9	20.2	19.3	20.2	24.5																				
19-Jul	18.3	18.3	17.4	16.9	16.1	15.6	15.7	16.6	17.9	19.8	21.3	22.4	23.0	23.7	24.0	23.4	22.3	20.8	20.6	20.7	20.6	20.3	19.8	19.2	19.8	24.0																				
20-Jul	18.1	16.6	16.2	15.5	14.9	14.3	14.1	15.0	16.9	18.6	20.2	21.5	22.6	23.5	24.2	24.8	24.9	25.1	25.2	25.0	24.6	24.2	23.6	22.8	20.5	25.2																				
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	20.9	22.7	23.7	24.5	25.1	25.9	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	25.9																				
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	23.6	23.8	23.9	23.8	23.9	23.8	23.5	23.3	23.0	22.0	20.2	19.1	--	23.9																				
23-Jul	18.1	17.4	16.8	16.4	16.1	15.8	15.6	16.0	17.1	18.7	20.2	21.8	23.4	24.5	25.1	25.5	24.0	24.2	24.8	25.1	24.6	24.1	23.1	22.4	20.9	25.5																				
24-Jul	22.3	21.0	20.6	19.2	18.9	18.3	18.0	18.1	19.5	22.2	24.6	26.1	26.3	26.8	27.2	27.7	28.1	28.3	28.2	27.7	26.8	25.6	25.0	24.5	23.8	28.3																				
25-Jul	23.4	22.9	22.2	19.0	18.0	18.7	19.4	19.5	19.1	19.5	19.1	17.8	17.9	18.1	18.3	18.5	18.6	18.7	18.5	18.2	16.2	15.1	14.4	13.7	18.5	23.4																				
26-Jul	13.2	12.3	11.6	11.4	10.8	10.7	10.8	11.3	12.5	13.9	15.4	17.1	17.8	18.4	19.1	19.8	19.3	19.0	18.3	17.5	16.7	15.3	14.5	13.8	15.0	19.8																				
27-Jul	13.2	11.9	10.9	10.2	9.8	9.7	9.9	10.9	11.6	12.7	14.0	16.2	17.7	18.1	18.1	16.1	16.2	17.3	17.6	17.2	16.9	17.1	17.2	16.0	14.4	18.1																				
28-Jul	15.7	14.9	14.6	14.2	14.4	14.1	13.6	14.2	16.0	17.7	19.0	20.1	20.8	20.9	20.8	21.1	21.3	21.3	21.2	20.8	20.7	20.6	19.4	18.2	18.2	21.3																				
29-Jul	16.9	16.3	15.7	14.9	14.1	13.9	13.1	13.1	15.1	17.2	20.0	21.1	21.7	22.1	22.8	23.3	23.7	23.8	23.8	23.6	23.2	22.7	22.0	20.5	19.4	23.8																				
30-Jul	19.5	18.6	17.5	16.2	15.0	14.9	14.8	15.3	17.2	19.6	21.5	23.2	24.8	26.0	26.7	27.3	27.9	27.8	27.2	25.8	21.0	21.7	20.3	19.4	21.2	27.9																				
31-Jul	18.5	18.2	18.1	16.8	15.9	16.1	16.5	16.1	16.3	17.4	18.6	19.8	21.0	21.9	21.5	21.4	22.4	19.7	18.2	18.4	19.0	19.3	18.6	17.0	18.6	22.4																				
																						17.7	17.0	16.3	15.6	15.0	14.7	14.6	15.1	16.3	17.8	19.0	20.0	20.9	21.4	21.8	21.8	21.8	21.7	21.5	21.1	20.5	20.0	19.2	18.5	Diurnal Average
																						23.6	22.9	22.2	19.3	19.2	18.7	19.4	19.5	19.8	22.2	24.6	26.1	26.3	26.8	27.2	27.7	28.1	28.3	28.2	27.7	26.8	25.6	25.0	24.5	Diurnal Maximum
DF - DAS Failure																																														





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 90 m (AT90m) - C
Mannix - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	3	0.42	0.42
10 - 20	446	62.46	62.89
> 20	265	37.11	100.00

Total Number of Valid Hours: 714

Total Number of Hours: 744



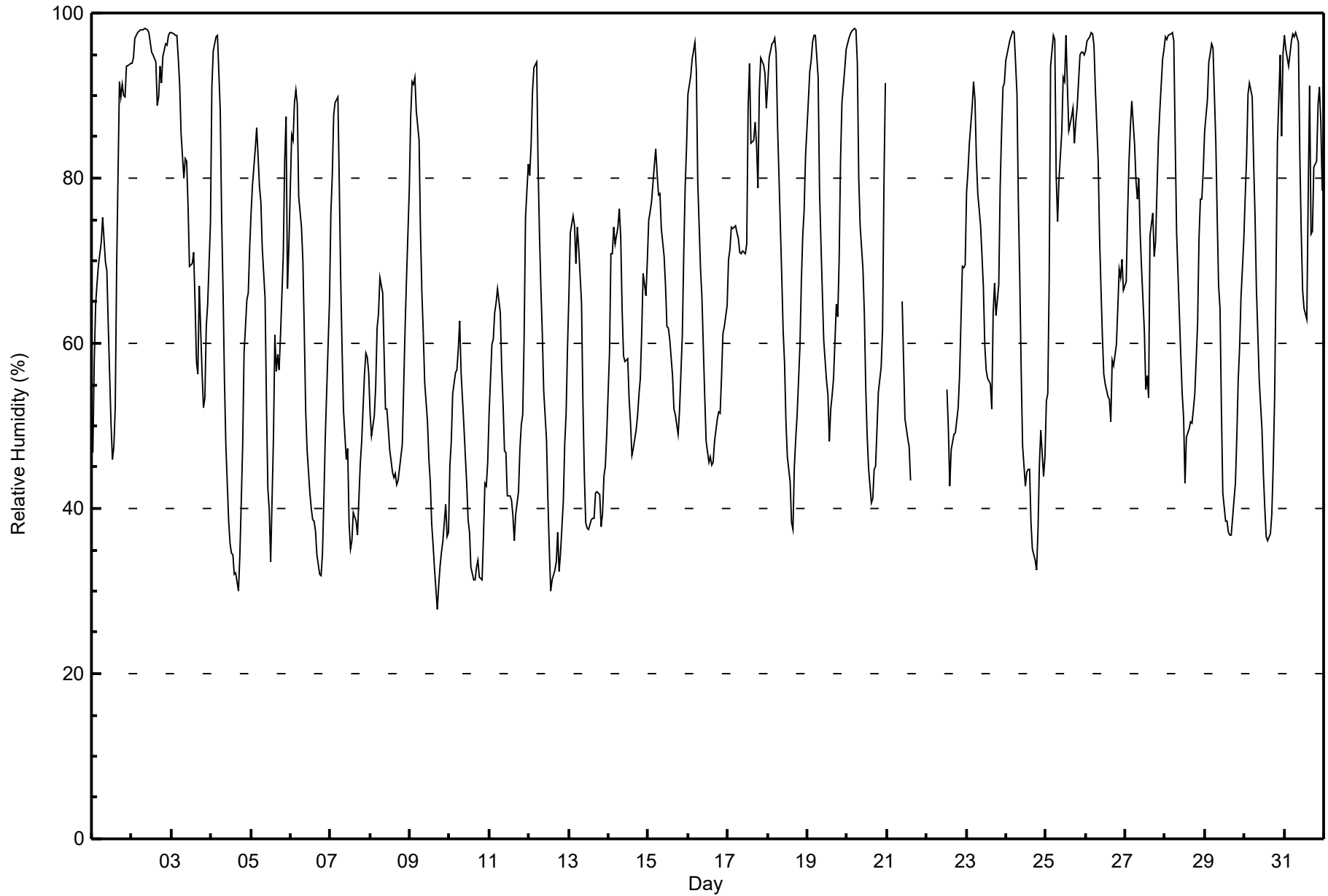
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Mannix - July 2023

Maximum Value: 98 % on Jul 20 05:00														Maximum Daily Average: 95.6 % on Jul 2														Hours in Service: 744	
Minimum Value: 28 % on Jul 9 17:00														Minimum Daily Average: 43.6 % on Jul 10														Hours of Data: 714	
Maximum Diurnal Average: 87.2 % at hour 5														Minimum Diurnal Average: 49.8 % at hour 15														Hours of Missing Data: 30	
Monthly Average: 66.5 %														Percentiles: P ₁ = 31 P ₁₀ = 39 Q ₁ = 50 Median = 66 Q ₃ = 84 P ₉₀ = 95 P ₉₉ = 98														Hours of Calibration: 0	
																												Percent Operational Time: 96.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Jul	47	58	65	67	69	72	75	73	70	69	62	50	46	47	52	69	92	90	91	90	90	94	94	94	71.9	94			
2-Jul	94	95	97	98	98	98	98	98	98	98	98	96	95	95	94	89	90	94	92	95	96	96	97	98	95.6	98			
3-Jul	98	98	97	97	94	91	85	80	82	82	77	69	70	71	65	58	56	67	56	52	53	62	65	75	75.1	98			
4-Jul	91	95	96	97	97	88	75	66	55	48	39	36	35	34	32	32	30	34	41	48	59	65	66	71	59.6	97			
5-Jul	76	79	84	86	83	79	77	72	65	52	42	40	34	49	61	57	59	57	61	71	82	87	67	72	66.2	87			
6-Jul	85	85	89	91	89	78	74	70	61	52	47	42	40	39	38	37	34	32	32	35	41	49	60	65	56.9	91			
7-Jul	76	80	88	89	90	79	68	59	52	46	47	38	35	36	39	38	37	41	45	48	56	59	58	56	56.8	90			
8-Jul	52	49	51	55	62	64	68	66	59	52	52	50	47	44	44	44	43	43	46	48	55	62	68	79	54.2	79			
9-Jul	87	92	91	92	88	85	73	66	61	55	50	46	43	38	36	33	28	31	33	35	36	40	37	37	54.8	92			
10-Jul	45	48	54	56	57	59	63	57	50	46	43	39	37	33	31	31	33	34	32	31	37	43	43	46	43.6	63			
11-Jul	52	60	61	64	65	67	64	57	53	47	47	41	42	41	39	36	39	42	47	50	51	60	75	82	53.4	82			
12-Jul	80	84	91	93	94	81	73	67	61	54	48	41	35	30	31	33	34	37	32	35	41	48	52	59	55.6	94			
13-Jul	66	73	75	74	70	74	72	65	53	44	38	38	37	39	39	39	42	42	42	38	39	44	45	49	51.5	75			
14-Jul	59	71	71	74	72	74	76	73	64	59	58	58	53	50	46	47	49	51	54	56	61	68	66	70	61.7	76			
15-Jul	75	76	77	82	84	81	78	78	74	70	67	62	62	60	56	52	51	50	49	52	61	71	79	84	67.9	84			
16-Jul	90	92	94	95	96	93	80	69	66	59	54	48	46	46	45	46	48	51	52	52	56	61	62	65	65.3	96			
17-Jul	70	71	74	74	74	73	73	71	71	71	71	72	89	94	84	84	87	84	79	91	95	94	93	89	80.3	95			
18-Jul	91	95	96	96	97	95	86	80	68	62	58	50	46	43	38	37	45	48	51	60	67	73	76	83	68.5	97			
19-Jul	89	93	94	96	97	97	92	78	72	66	60	56	54	48	52	54	56	65	63	70	82	89	93	96	75.6	97			
20-Jul	96	97	98	98	98	98	94	80	74	69	64	55	49	45	41	41	45	45	50	54	57	62	79	91	69.9	98			
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	65	58	51	49	48	43	DF	DF	DF	DF	DF	DF	DF	DF	--	65			
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	54	50	43	47	49	49	51	52	56	69	69	70	--	70		
23-Jul	78	81	84	89	92	89	82	78	74	71	67	60	57	56	55	52	64	67	63	67	79	86	91	92	73.9	92			
24-Jul	94	96	97	97	98	98	90	77	68	57	48	43	44	45	45	38	35	34	33	37	45	50	44	46	60.7	98			
25-Jul	53	54	68	93	97	97	80	75	80	86	92	92	97	91	86	88	88	84	87	89	95	95	95	95	85.7	97			
26-Jul	95	97	97	98	97	96	91	82	73	67	61	56	55	54	53	51	58	57	60	64	69	68	70	66	72.3	98			
27-Jul	68	76	82	86	89	84	80	77	80	73	69	61	54	56	53	73	76	71	72	79	85	88	94	96	75.9	96			
28-Jul	97	97	97	97	98	97	85	73	63	58	54	51	43	49	50	50	50	52	54	62	73	78	78	81	70.3	98			
29-Jul	86	89	94	95	96	96	84	75	67	64	52	42	38	38	37	37	37	41	43	49	56	59	66	73	63.1	96			
30-Jul	78	83	90	91	90	82	76	67	61	56	50	44	40	37	36	37	39	45	53	68	84	95	85	95	65.9	95			
31-Jul	97	96	94	95	97	97	97	98	96	83	73	66	64	63	78	91	73	73	81	82	89	91	87	78	85.0	98			
														78.1 81.3 84.3 86.8 87.2 84.9 79.6 73.3 68.0 62.7 58.2 53.1 51.3 50.6 49.8 50.7 52.2 53.7 54.8 58.6 64.9 70.2 71.7 75.0														Diurnal Average	
														98 98 98 98 98 98 98 98 98 98 98 98 96 97 95 94 91 92 94 92 95 96 96 97 98														Diurnal Maximum	
DF - DAS Failure																													





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Mannix - July 2023

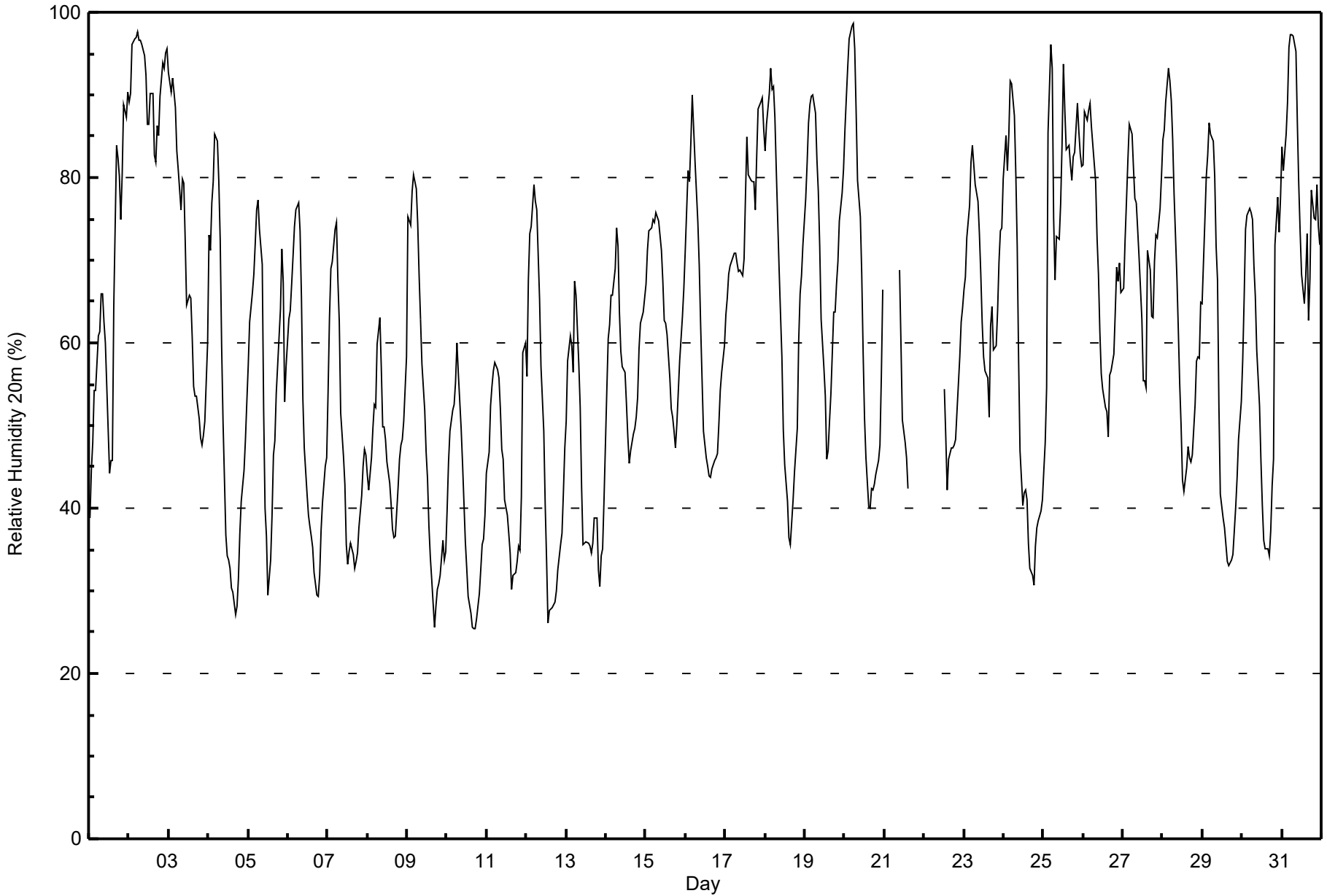
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	80	11.20	11.20
40 - 60	220	30.81	42.02
60 - 80	198	27.73	69.75
80 - 100	216	30.25	100.00

Total Number of Valid Hours: 714

Total Number of Hours: 744



Maximum Value: 99 % on Jul 20 06:00														Maximum Daily Average: 91.7 % on Jul 2														Hours in Service: 744	
Minimum Value: 25 % on Jul 10 17:00														Minimum Daily Average: 39.5 % on Jul 10														Hours of Data: 714	
Maximum Diurnal Average: 79.6 % at hour 6														Minimum Diurnal Average: 46.5 % at hour 15														Hours of Missing Data: 30	
Monthly Average: 60.9 %														Percentiles: P ₁ = 27 P ₁₀ = 36 Q ₁ = 46 Median = 61 Q ₃ = 76 P ₉₀ = 87 P ₉₉ = 97														Hours of Calibration: 0	
																												Percent Operational Time: 96.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Jul	39	45	48	54	54	61	61	66	66	63	60	50	44	46	46	64	84	82	80	75	80	89	87	90	63.9	90			
2-Jul	89	90	96	97	97	98	97	97	96	95	92	87	86	90	90	83	82	86	85	90	94	93	95	96	91.7	98			
3-Jul	93	90	92	90	88	83	81	76	80	79	72	65	66	65	61	55	54	54	51	49	48	49	50	60	68.8	93			
4-Jul	73	71	77	80	85	84	79	72	60	50	37	34	34	33	30	30	28	28	31	37	41	45	48	53	51.7	85			
5-Jul	57	62	66	68	72	76	77	74	69	52	40	37	30	34	39	46	48	54	57	64	71	67	53	57	57.2	77			
6-Jul	63	64	67	70	74	76	77	74	65	53	47	42	39	38	37	35	32	30	29	32	37	41	45	46	50.6	77			
7-Jul	54	63	69	70	74	75	68	63	51	46	43	36	33	35	36	34	33	33	35	38	42	45	47	46	48.6	75			
8-Jul	44	42	46	50	52	52	60	63	57	50	50	48	46	43	40	37	37	37	43	46	48	48	50	58	47.8	63			
9-Jul	75	75	74	78	80	79	74	68	63	57	52	47	44	38	34	31	26	28	30	31	32	36	34	35	50.9	80			
10-Jul	40	46	49	52	53	55	60	56	50	45	41	36	33	29	27	26	25	26	27	30	33	36	36	39	39.5	60			
11-Jul	44	47	52	55	57	58	57	56	52	47	46	41	39	37	35	30	32	32	34	35	35	41	59	60	45.0	60			
12-Jul	56	68	73	74	79	77	76	71	65	57	49	40	34	26	28	28	28	29	30	33	36	37	42	47	49.3	79			
13-Jul	51	58	61	60	56	67	66	57	52	43	36	36	36	36	35	35	36	39	39	32	30	34	35	41	44.6	67			
14-Jul	54	60	62	66	66	69	74	72	64	59	57	56	53	49	45	47	49	50	51	53	59	62	64	66	58.6	74			
15-Jul	67	71	74	74	75	75	76	75	75	71	67	63	62	61	56	52	51	49	47	50	58	61	63	67	64.1	76			
16-Jul	71	81	80	84	90	86	82	75	69	62	56	49	46	45	44	44	45	46	46	47	50	54	56	60	61.1	90			
17-Jul	63	65	68	69	70	71	71	70	69	69	68	70	78	85	80	80	79	79	76	83	88	89	90	86	75.7	90			
18-Jul	83	86	90	93	91	91	87	81	69	64	58	50	45	41	36	36	38	41	44	50	60	66	68	72	64.2	93			
19-Jul	78	82	87	89	90	90	88	82	78	72	63	57	54	46	47	50	54	64	64	67	70	75	78	81	71.0	90			
20-Jul	86	90	93	97	98	99	96	88	80	75	68	59	51	46	40	40	42	42	43	44	46	48	56	66	66.4	99			
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	69	60	51	48	46	42	DF	DF	DF	DF	DF	DF	DF	DF	--	69			
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	54	49	42	46	47	47	48	48	52	58	62	64	--	64		
23-Jul	66	68	73	77	82	84	82	79	77	73	68	62	58	57	56	51	62	64	59	60	64	70	74	74	68.3	84			
24-Jul	80	85	81	85	92	91	87	81	72	58	47	40	42	42	41	36	33	32	31	35	38	38	40	41	56.1	92			
25-Jul	45	48	55	85	96	93	75	68	73	73	77	84	94	88	83	84	81	80	83	83	89	86	83	81	78.6	96			
26-Jul	81	88	87	88	89	86	84	80	73	68	61	56	54	52	52	49	56	57	59	64	69	67	70	66	69.0	89			
27-Jul	67	72	77	82	86	85	81	77	77	74	70	63	56	55	55	71	69	63	63	70	73	73	76	80	71.5	86			
28-Jul	85	86	89	93	92	89	85	78	68	62	55	50	43	42	45	47	46	46	46	52	58	58	58	65	64.1	93			
29-Jul	65	75	80	83	87	85	84	80	72	68	52	42	39	38	36	34	33	34	34	37	40	44	48	53	55.9	87			
30-Jul	58	65	74	75	76	76	75	69	66	59	52	46	40	36	35	35	34	37	43	46	72	78	73	78	58.3	78			
31-Jul	84	81	85	89	96	97	97	97	95	87	79	73	68	65	68	73	63	68	78	75	75	79	74	72	80.0	97			
														65.9 69.8 73.3 76.8 79.2 79.6 77.8 73.9 69.0 63.3 57.5 52.3 50.0 48.1 46.5 47.0 47.6 48.5 49.5 51.8 56.2 58.9 60.6 63.3														Diurnal Average	
														93 90 96 97 98 99 97 97 96 95 92 87 94 90														Diurnal Maximum	
DF - DAS Failure																													





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 20m (RH20m) - %
Mannix - July 2023

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	117	16.39	16.39
40 - 60	235	32.91	49.30
60 - 80	225	31.51	80.81
80 - 100	137	19.19	100.00

Total Number of Valid Hours: 714

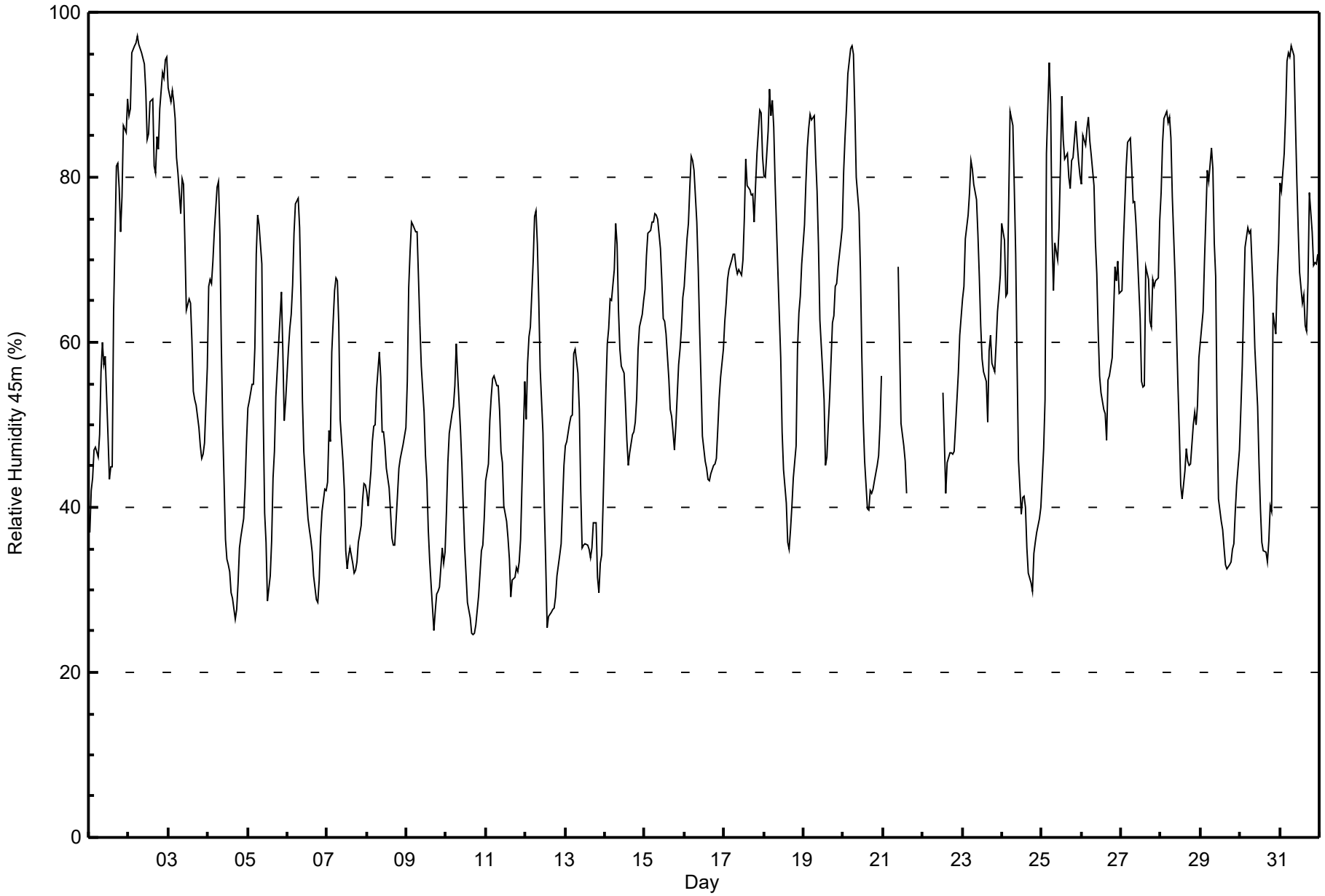
Total Number of Hours: 744



Summary of Hour Averages

Mannix - July 2023

Maximum Value: 97 % on Jul 2 06:00														Maximum Daily Average: 90.5 % on Jul 2														Hours in Service: 744											
Minimum Value: 25 % on Jul 10 17:00														Minimum Daily Average: 39.0 % on Jul 10														Hours of Data: 714											
Maximum Diurnal Average: 76.5 % at hour 6														Minimum Diurnal Average: 45.8 % at hour 15														Hours of Missing Data: 30											
Monthly Average: 58.8 %														Percentiles: P ₁ = 27 P ₁₀ = 35 Q ₁ = 44 Median = 58 Q ₃ = 73 P ₉₀ = 84 P ₉₉ = 96														Hours of Calibration: 0											
																												Percent Operational Time: 96.0											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24															
1-Jul	37	42	44	47	47	46	49	57	60	57	58	49	43	45	45	64	81	82	79	73	78	86	85	89	60.1	89													
2-Jul	87	88	95	96	96	97	96	96	95	94	91	85	85	89	90	81	81	85	83	88	93	92	94	95	90.5	97													
3-Jul	91	89	90	89	87	82	80	76	80	79	72	64	65	65	60	54	53	52	50	47	46	46	48	57	67.7	91													
4-Jul	67	68	67	70	73	79	80	73	60	50	36	34	33	32	30	29	27	28	31	35	36	39	42	48	48.6	80													
5-Jul	52	53	55	55	59	71	75	74	69	51	39	36	29	32	36	44	47	53	57	63	66	59	51	53	53.3	75													
6-Jul	59	62	63	67	73	77	77	74	65	53	47	41	39	37	36	35	32	29	29	31	36	39	42	42	49.4	77													
7-Jul	43	49	48	59	66	68	68	62	51	46	42	35	33	34	35	33	32	32	33	36	38	41	43	43	44.5	68													
8-Jul	42	40	44	48	50	50	54	59	56	49	49	48	45	42	40	36	35	35	42	45	46	47	48	50	45.8	59													
9-Jul	55	67	71	74	74	73	73	68	62	57	51	46	43	37	34	31	25	27	30	30	30	35	33	35	48.5	74													
10-Jul	40	45	49	51	52	55	60	56	49	45	40	35	32	28	27	25	25	25	26	29	32	35	35	39	39.0	60													
11-Jul	43	45	50	53	56	56	55	55	52	47	45	40	38	36	34	29	31	32	33	32	33	36	43	55	42.9	56													
12-Jul	51	58	61	62	70	75	76	72	65	57	49	40	33	25	27	27	28	28	29	32	34	36	41	45	46.6	76													
13-Jul	47	48	50	51	51	59	59	56	52	42	35	35	36	35	34	35	38	38	38	32	30	33	34	41	42.0	59													
14-Jul	54	60	62	65	65	69	74	72	64	59	57	56	53	48	45	47	49	49	50	53	59	62	63	65	58.4	74													
15-Jul	66	70	73	74	75	75	76	75	75	71	68	63	63	61	56	52	51	49	47	50	57	59	62	65	63.8	76													
16-Jul	67	72	74	79	82	82	81	75	69	62	55	49	46	45	43	43	44	45	45	46	49	53	56	59	59.3	82													
17-Jul	63	65	68	69	70	71	71	69	68	69	68	70	75	82	79	78	78	78	75	79	83	88	88	82	74.4	88													
18-Jul	80	80	86	91	87	89	86	79	69	63	58	49	45	40	36	35	37	40	44	47	59	64	66	69	62.5	91													
19-Jul	74	79	84	86	88	87	87	82	78	72	63	56	53	45	46	50	53	62	63	67	67	69	72	74	69.1	88													
20-Jul	81	85	88	93	96	96	95	88	80	76	69	58	50	46	40	40	42	42	42	43	45	46	50	56	64.4	96													
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	69	60	50	47	46	42	DF	DF	DF	DF	DF	DF	DF	DF	--	69													
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	54	48	42	45	47	47	46	47	50	56	61	63	--	63												
23-Jul	65	67	73	75	78	82	81	79	77	73	68	62	58	56	55	50	59	61	57	56	60	64	66	68	66.3	82													
24-Jul	74	72	66	66	77	88	86	79	71	57	46	39	41	41	40	35	32	31	30	34	36	37	39	40	52.4	88													
25-Jul	44	47	53	83	94	89	73	66	72	70	74	81	90	85	82	83	80	79	82	82	87	84	82	80	76.7	94													
26-Jul	79	85	84	86	87	84	83	79	72	68	61	56	54	52	51	48	55	56	58	63	69	67	70	66	68.2	87													
27-Jul	66	72	77	81	84	85	81	77	77	74	71	63	55	55	55	69	68	63	62	68	67	67	68	75	69.9	85													
28-Jul	78	84	87	88	87	87	85	78	68	61	55	49	43	41	44	47	46	45	45	50	52	50	52	58	61.7	88													
29-Jul	60	64	70	75	81	79	83	81	72	68	51	41	38	37	35	33	33	33	33	35	36	39	43	47	52.9	83													
30-Jul	52	57	65	71	74	73	74	69	65	59	52	45	40	36	35	34	33	36	40	39	63	61	68	72	54.8	74													
31-Jul	79	78	83	88	94	95	95	96	95	87	80	74	68	65	66	62	61	67	78	73	69	70	70	71	77.7	96													
														62.0	65.3	68.2	72.2	75.0	76.5	76.3	73.2	68.6	62.9	57.0	51.7	49.2	47.3	45.8	45.8	46.6	47.6	48.6	50.3	53.6	55.4	57.1	60.1	Diurnal Average	
														91	89	95	96	96	97	96	96	95	94	91	85	90	89	90	83	81	85	83	88	93	92	94	95	Diurnal Maximum	
DF - DAS Failure																																							





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 45m (RH45m) - %
Mannix - July 2023

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	133	18.63	18.63
40 - 60	249	34.87	53.50
60 - 80	221	30.95	84.45
80 - 100	111	15.55	100.00

Total Number of Valid Hours: 714

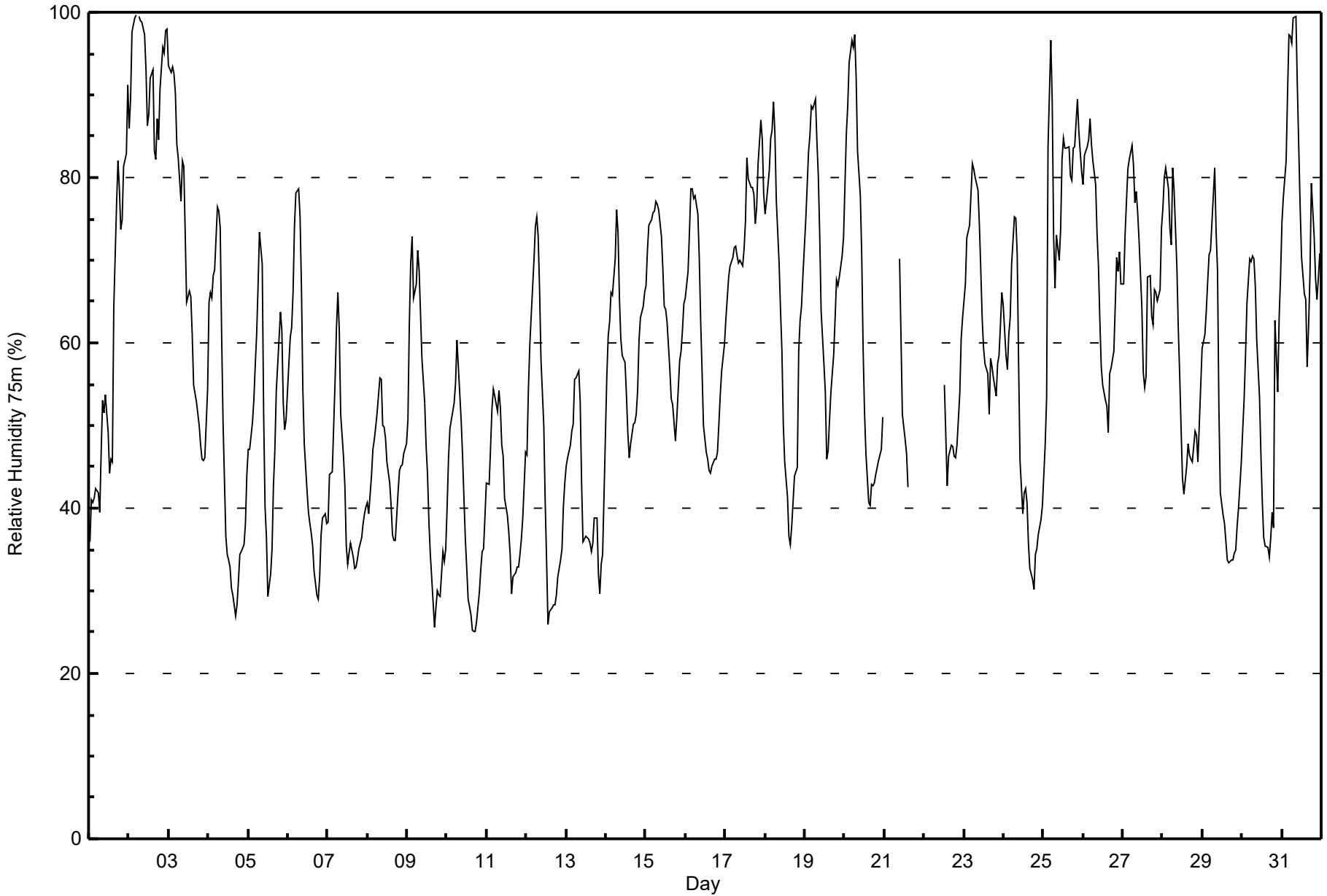
Total Number of Hours: 744



Summary of Hour Averages

Mannix - July 2023

Maximum Value: 100 % on Jul 2 05:00										Maximum Daily Average: 92.7 % on Jul 2										Hours in Service: 744																													
Minimum Value: 25 % on Jul 10 18:00										Minimum Daily Average: 39.5 % on Jul 10										Hours of Data: 713																													
Maximum Diurnal Average: 74.8 % at hour 7										Minimum Diurnal Average: 46.3 % at hour 16										Hours of Missing Data: 31																													
Monthly Average: 58.4 %										Percentiles: P ₁ = 27 P ₁₀ = 35 Q ₁ = 44 Median = 57 Q ₃ = 73 P ₉₀ = 83 P ₉₉ = 98										Hours of Calibration: 0																													
																				Percent Operational Time: 95.8																													
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-Jul	36	41	41	41	42	42	40	47	53	52	54	49	44	46	46	64	77	82	79	74	75	81	83	91	57.4	91																							
2-Jul	86	90	98	99	100	OR	100	99	99	97	93	86	88	92	93	83	82	87	85	91	96	95	98	98	92.7	100																							
3-Jul	94	93	93	92	90	84	82	77	82	81	73	65	66	66	61	55	54	53	50	48	46	46	46	54	68.8	94																							
4-Jul	65	66	65	68	69	76	76	74	61	51	37	34	34	33	30	29	27	28	31	34	35	36	38	44	47.6	76																							
5-Jul	47	47	50	53	57	61	67	73	70	51	40	36	29	32	35	43	47	54	57	64	62	53	49	51	51.2	73																							
6-Jul	58	61	62	66	74	78	79	75	67	54	48	42	39	38	37	35	32	29	29	32	37	39	39	38	49.5	79																							
7-Jul	38	44	44	44	55	62	66	62	51	46	43	35	33	35	36	34	33	33	34	35	36	38	39	40	42.4	66																							
8-Jul	41	39	44	47	48	50	52	56	56	50	50	48	46	43	40	37	36	36	42	45	45	45	47	48	45.4	56																							
9-Jul	51	62	70	73	65	67	71	69	63	58	53	47	44	38	34	31	26	28	30	30	29	35	34	35	47.7	73																							
10-Jul	40	46	50	52	53	55	60	57	51	46	41	36	33	29	27	25	25	25	26	30	33	35	35	39	39.5	60																							
11-Jul	43	43	47	52	54	54	52	54	52	48	46	41	39	37	34	30	32	32	33	33	34	36	39	47	42.2	54																							
12-Jul	46	54	60	63	70	74	75	73	66	58	50	41	34	26	27	28	28	28	30	32	34	35	40	43	46.5	75																							
13-Jul	45	46	48	49	50	56	56	57	53	43	36	36	37	36	36	35	36	39	39	32	30	33	34	41	41.8	57																							
14-Jul	56	61	63	66	66	70	76	73	65	61	59	58	54	49	46	48	50	50	51	54	60	63	64	66	59.6	76																							
15-Jul	67	71	74	75	76	76	77	77	76	73	69	64	64	63	57	53	52	50	48	51	58	59	62	65	64.9	77																							
16-Jul	65	69	73	79	79	78	78	76	70	63	57	50	47	46	45	44	45	46	46	47	50	54	57	60	59.2	79																							
17-Jul	63	65	68	69	70	72	72	70	70	70	69	71	75	82	80	79	79	78	74	76	82	87	85	78	74.4	87																							
18-Jul	76	77	81	85	86	89	85	77	70	64	59	50	46	41	37	36	38	41	44	45	59	63	64	68	61.7	89																							
19-Jul	75	79	83	85	89	88	90	84	80	73	64	58	54	46	47	51	54	59	63	68	67	68	70	73	69.4	90																							
20-Jul	79	85	89	94	97	96	97	92	83	78	70	59	51	47	41	40	43	43	43	44	46	46	47	51	65.1	97																							
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	70	61	51	48	47	42	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	70																							
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	55	49	43	46	48	47	46	46	48	54	60	63	--	63																							
23-Jul	65	67	73	74	78	82	81	80	78	74	69	63	59	57	56	51	58	57	56	54	58	59	62	66	65.7	82																							
24-Jul	65	59	57	61	63	69	75	75	71	57	46	39	42	42	41	36	33	31	30	34	35	37	39	40	49.0	75																							
25-Jul	44	48	53	84	97	89	73	67	73	70	74	82	85	84	84	84	80	84	84	84	89	86	83	81	77.3	97																							
26-Jul	79	83	84	85	87	84	82	79	73	69	63	57	55	53	52	49	56	57	59	64	70	69	71	67	68.7	87																							
27-Jul	67	73	77	81	82	84	81	77	78	76	72	64	56	55	56	68	68	63	62	66	66	65	67	74	70.0	84																							
28-Jul	76	80	81	79	74	72	81	78	69	62	56	50	44	42	45	48	47	46	46	49	49	46	50	55	59.3	81																							
29-Jul	59	61	64	68	71	71	78	81	73	69	52	42	39	38	36	34	33	34	34	35	35	38	40	46	51.2	81																							
30-Jul	49	53	58	65	70	70	71	70	67	60	53	46	41	36	35	35	34	36	39	38	63	54	63	68	53.2	71																							
31-Jul	75	78	82	90	97	97	96	99	99	91	84	76	70	66	65	57	62	68	79	73	68	65	68	71	78.2	99																							
																								60.3	63.5	66.6	70.3	72.7	73.1	74.8	73.4	69.7	63.9	58.0	52.7	50.0	48.2	46.6	46.3	47.2	48.1	49.0	50.2	53.1	53.9	55.8	58.7	Diurnal Average	
																								94	93	98	99	100	97	100	99	99	97	93	86	88	92	93	84	82	87	85	91	96	95	98	98	Diurnal Maximum	
DF - DAS Failure			OR - Out of Range																																														





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 75m (RH75m) - %
Mannix - July 2023

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	136	19.07	19.07
40 - 60	250	35.06	54.14
60 - 80	227	31.84	85.97
80 - 100	100	14.03	100.00

Total Number of Valid Hours: 713

Total Number of Hours: 744



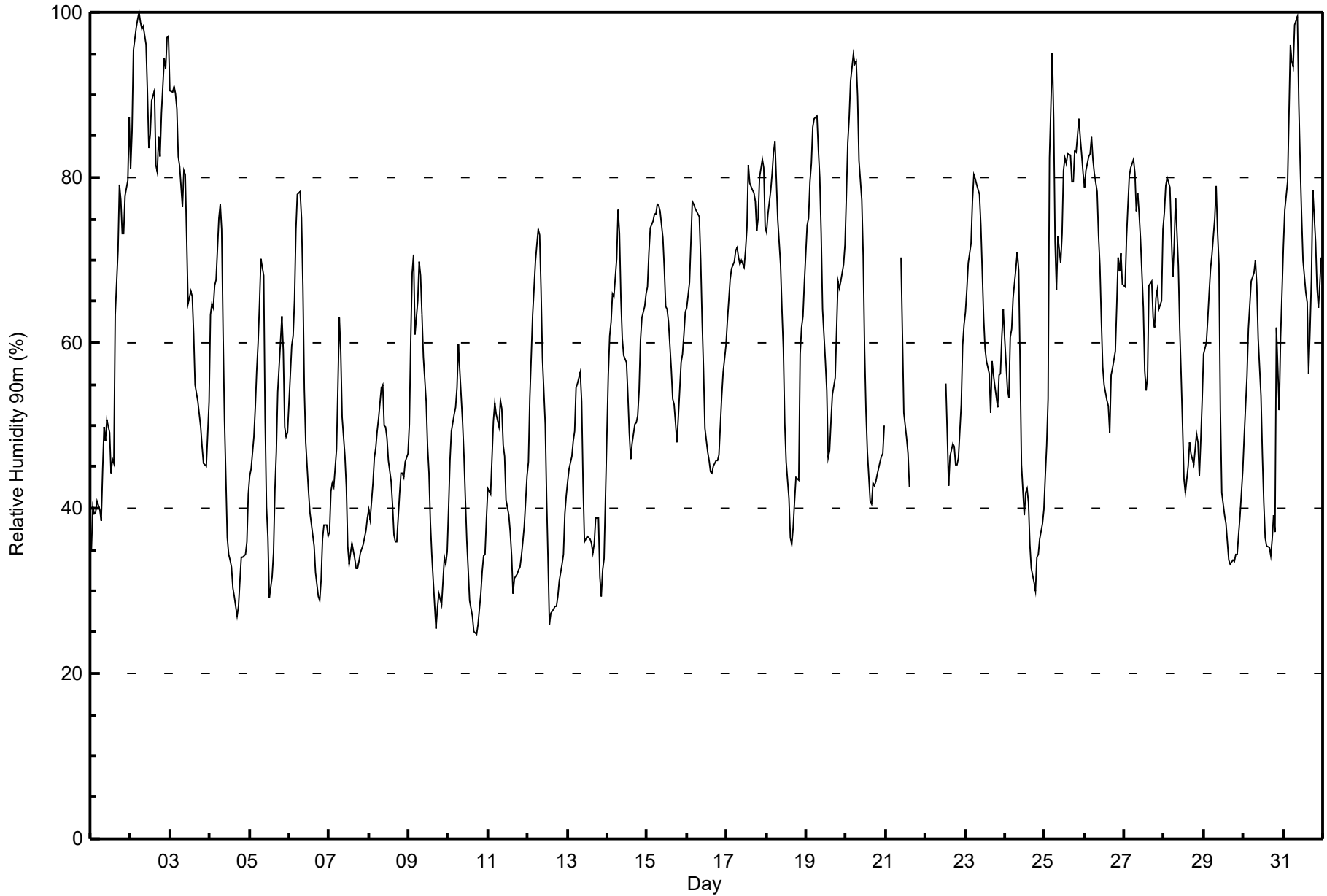
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 90m (RH90m) - %

Mannix - July 2023

Maximum Value: 100 % on Jul 2 06:00 Maximum Daily Average: 91.2 % on Jul 2																			Hours in Service: 744 Hours of Data: 714 Hours of Missing Data: 30 Hours of Calibration: 0 Percent Operational Time: 96.0																														
Minimum Value: 25 % on Jul 10 18:00 Minimum Daily Average: 39.2 % on Jul 10 Maximum Diurnal Average: 72.8 % at hour 7 Minimum Diurnal Average: 46.1 % at hour 16 Monthly Average: 57.6 % Percentiles: P ₁ = 27 P ₁₀ = 34 Q ₁ = 43 Median = 56 Q ₃ = 72 P ₉₀ = 81 P ₉₉ = 98																																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	35	40	39	40	41	40	38	45	50	48	51	49	44	46	45	63	71	79	77	73	73	78	80	87	55.5	87																							
2-Jul	81	86	95	98	99	100	99	98	98	96	90	84	85	89	91	82	81	85	82	88	94	93	97	97	91.2	100																							
3-Jul	91	90	91	90	88	82	81	76	81	80	73	65	66	66	61	55	54	53	50	47	45	45	45	53	67.9	91																							
4-Jul	63	65	64	67	68	75	77	74	61	51	37	34	34	33	30	29	27	28	31	34	34	34	36	42	47.0	77																							
5-Jul	44	45	49	52	57	60	65	70	68	51	40	36	29	32	35	42	47	54	57	63	59	50	49	49	50.1	70																							
6-Jul	56	60	61	65	74	78	78	75	67	54	48	42	39	38	37	35	32	29	29	31	36	38	38	37	49.1	78																							
7-Jul	37	42	43	42	47	55	63	59	51	46	43	35	33	35	36	34	33	33	34	35	36	36	37	39	41.0	63																							
8-Jul	40	39	43	46	47	49	51	55	55	50	50	48	46	43	40	37	36	36	42	44	44	44	46	47	44.9	55																							
9-Jul	50	61	69	71	61	65	70	68	63	58	53	47	44	38	34	31	25	28	30	29	28	34	33	35	46.9	71																							
10-Jul	40	46	49	51	52	55	60	57	50	46	41	36	33	29	27	25	25	25	26	30	32	34	34	39	39.2	60																							
11-Jul	42	42	46	51	53	51	50	53	52	48	46	41	39	37	34	30	32	32	33	33	34	36	38	44	41.5	53																							
12-Jul	46	53	58	63	70	72	74	73	66	58	50	41	34	26	27	28	28	28	29	31	33	34	39	41	46.0	74																							
13-Jul	43	45	46	48	49	55	55	56	53	43	36	36	37	36	36	35	36	39	39	32	29	33	34	41	41.3	56																							
14-Jul	56	61	63	66	66	70	76	73	65	61	59	58	54	49	46	48	50	50	51	54	60	63	64	66	59.5	76																							
15-Jul	67	71	74	75	76	76	77	77	76	73	69	64	64	63	57	53	53	50	48	51	58	59	61	64	64.7	77																							
16-Jul	64	67	72	77	77	76	76	75	70	63	57	50	47	46	44	44	45	46	46	47	50	54	56	60	58.7	77																							
17-Jul	62	65	68	69	70	71	71	70	69	70	69	71	74	82	79	78	78	77	74	75	80	82	81	74	73.4	82																							
18-Jul	73	76	78	81	83	84	80	75	70	64	59	50	46	41	37	36	38	41	44	43	59	62	63	67	60.4	84																							
19-Jul	74	75	80	82	86	87	88	83	80	73	64	58	54	46	47	51	54	56	62	67	67	67	70	72	68.4	88																							
20-Jul	78	84	87	92	95	94	94	90	82	77	70	59	52	47	41	40	43	43	43	44	46	46	47	50	64.3	95																							
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	70	61	51	49	47	43	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	70																							
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	55	49	43	46	48	47	45	45	46	52	60	62	--	62																							
23-Jul	64	66	70	72	77	80	80	79	78	74	69	63	59	58	56	51	58	56	55	52	56	56	61	64	64.8	80																							
24-Jul	61	54	53	61	62	65	69	71	69	58	45	39	42	42	41	36	33	31	30	34	34	36	38	40	47.7	71																							
25-Jul	44	48	53	82	95	87	72	66	73	70	73	81	82	82	83	83	79	79	83	83	87	85	83	80	76.4	95																							
26-Jul	79	81	83	83	85	82	80	78	73	69	63	57	55	53	52	49	56	57	59	64	70	69	71	67	68.2	85																							
27-Jul	67	73	77	80	81	82	80	76	78	76	72	64	57	54	56	67	67	63	62	65	66	64	65	74	69.5	82																							
28-Jul	76	79	80	79	73	68	72	77	69	62	56	50	44	42	45	48	47	46	45	49	48	44	48	53	58.3	80																							
29-Jul	59	60	63	66	69	71	75	79	73	69	52	42	39	38	36	34	33	34	34	34	34	37	39	45	50.6	79																							
30-Jul	49	52	56	62	67	68	68	70	67	61	54	46	41	36	35	35	34	36	39	37	62	52	61	66	52.3	70																							
31-Jul	72	76	80	88	96	94	93	99	100	89	82	75	70	66	65	56	62	68	79	72	67	64	67	70	77.0	100																							
																								59.0	62.1	65.2	68.9	71.2	72.2	72.8	72.3	69.3	63.6	57.7	52.5	49.9	48.0	46.4	46.1	46.8	47.6	48.5	49.6	52.3	52.7	54.7	57.5	Diurnal Average	
																								91	90	95	98	99	100	99	99	100	96	90	84	85	89	91	83	81	85	83	88	94	93	97	97	Diurnal Maximum	
DF - DAS Failure																																																	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity 90m (RH90m) - %
Mannix - July 2023**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	144	20.17	20.17
40 - 60	250	35.01	55.18
60 - 80	233	32.63	87.82
80 - 100	86	12.04	99.86

Total Number of Valid Hours: 714

Total Number of Hours: 744



Summary of Hour Averages

Mannix - July 2023

Maximum Speed: 27 km/h on Jul 3 07:00	Maximum Daily Speed Average: 17.2 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 16 03:00	Minimum Daily Speed Average: 1.9 km/h on Jul 18	Hours of Data: 714
Maximum Diurnal Speed Average: 2.8 km/h at hour 3	Minimum Diurnal Speed Average: 0.5 km/h at hour 21	Hours of Missing Data: 30
Monthly Average Velocity: 0.6 km/h 265.6 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 22	Percent Operational Time: 96.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	W13	NW6	W6	WSW6	SSW6	S7	SSE3	S2	SSE6	SSE6	SSE11	SSE11	SE11	SE11	SSE12	SW17	WSW12	NW5	WNW6	NW4	WSW4	SW6	WSW8	W10	SSW4.4	SW17
2-Jul	W11	W14	WSW15	W15	W13	W12	WNW13	WNW14	NW14	NW20	NW21	NW20	NW14	WNW17	WNW13	WNW22	NW19	WNW17	WNW21	W16	W17	W17	WNW15	WNW14	WNW14.9	WNW22
3-Jul	NW13	NW14	NW15	NW15	NNW21	NNW21	N27	N24	NNW20	NNW22	NNW23	NNW26	NNW23	NNW22	NNW22	N19	N18	NNW16	N14	NNE12	N14	N10	N9	NNW8	NNW17.2	N27
4-Jul	WNW4	NW4	W4	WNW3	W5	WSW3	WSW2	SW2	W2	W4	W8	W8	W8	WSW11	W8	W7	W4	S4	SSE8	SSE9	SSE10	S10	S10	S10	SW3.9	WSW11
5-Jul	SSE8	SSE8	SSE7	SSE9	SSE9	SSE9	SSE7	SSE6	SE6	SW7	WSW16	W19	W12	WNW8	WSW9	S6	SW6	WSW8	WSW9	WSW8	WSW6	NW3	N10	N9	SW4.1	W19
6-Jul	NNW5	NNW4	WNW6	NW5	NNW5	N4	NNE8	N7	N10	NNE15	NNE13	N13	NNW12	NNW13	NNW13	NNW12	NNE13	NNE16	NNE16	NNE15	NNE13	N10	N8	NE3	N9.5	NNE16
7-Jul	SW6	SW8	W8	W5	SW4	SSW4	SSW5	SSW5	WSW8	W6	W6	WSW7	WNW5	SW4	S7	WSW7	WSW11	WSW10	WSW9	SW10	SW10	SW12	WSW13	WSW14	WSW7.2	WSW14
8-Jul	WSW14	W14	W18	W16	SW8	SSW3	SSE4	S4	WSW4	W10	W10	W10	WNW8	W5	W8	NW9	WNW12	NW11	NNE9	NE11	NNE6	N4	N4	NW3	W5.9	W18
9-Jul	W8	NW5	NW5	NNW7	NNE9	N7	NNE6	NE4	ENE2	NNE8	NNE14	NNE15	NNE16	NNE17	NNE17	NNE18	NNE18	NNE18	NNE16	NNE14	NNE14	NE9	E11	E11	NNE9.7	NNE18
10-Jul	SE12	ESE14	SE15	SE15	SE16	SE21	SE17	SE15	SE17	SE16	SE14	SE12	SE10	SSE12	SSE14	SSE14	SE12	SE12	ESE11	ESE12	SE10	SE13	SE14	SE13	SE13.5	SE21
11-Jul	SE11	SSE9	SE8	SSE7	SE7	SSE7	SSE10	SSE11	SSE10	S10	S7	SSW8	SSW9	SSW11	SSW10	SSW10	S7	SSE8	SSE6	S6	SSW6	WSW6	WSW6	SE2	S7.0	SSE11
12-Jul	SSE3	SSE3	SSW5	SSW5	S3	ESE2	SSE2	W2	W3	WNW8	NW9	NNW11	NW10	NW13	NNW12	NNW13	NNW10	NNW11	NNE11	NE11	NNE10	NNW12	N11	NNW8	NNW5.2	NW13
13-Jul	NW6	WNW9	WNW10	WNW10	WNW10	W10	WNW9	NW11	NNW15	NNW17	NNW19	NNW21	NNW26	NNW23	NNW20	NNW19	NNW17	N17	N20	N16	NNW14	NNW14	NNW14	NNW14	NNW13.8	NNW26
14-Jul	N12	N9	NNW9	NNW7	WNW8	NNW9	NNW8	NNW13	NNW16	NNW18	NNW14	NNW14	NNW12	NNW11	N13	NNE13	NNE15	NNE11	NNE9	NNE9	NNE7	N6	NNE9	N7	N10.1	NNW18
15-Jul	N6	N4	N7	NNW5	NW3	N4	NNE5	NNE2	NNW3	NE3	NNE8	NE13	NE12	NE11	NNE9	NE11	NE10	NE9	NE8	ENE9	NE8	NE6	ESE1	E2	NE6.0	NE13
16-Jul	S1	WSW5	W0	S5	S6	S7	SSE5	SSE8	SE10	SE12	SE13	SE15	SE16	SE15	SE14	SE13	SE15	SE14	SE14	SE14	SE13	SE12	SE15	SE16	SE10.4	SE16
17-Jul	SE11	SE13	SE13	SE17	SE17	SE18	SE15	SE13	SE16	SE17	SE19	SE20	SSE12	SE10	ESE16	ESE12	SE9	E7	ENE10	W4	NW5	N7	NNE6	NE6	SE10.0	SE20
18-Jul	NNE4	WNW3	NNW4	N6	NNW4	N7	NNE8	NNE8	NE5	NNE6	NE4	E7	ENE5	ESE5	ENE4	NE4	SSW5	WSW8	WSW8	WSW7	WSW11	WSW12	WSW11	WSW8	NW1.9	WSW12
19-Jul	SW9	WSW10	WSW8	SW3	SSW5	SW5	SW5	WSW5	SSW3	WSW5	WNW4	W4	SW6	SSW5	SSE6	NE5	WNW9	W12	W9	WSW6	WSW1	SW3	SSW6	SW5	WSW4.5	W12
20-Jul	SSW7	SSW4	SSW5	SSW6	S5	S5	SW4	SW3	SSE1	WNW3	WNW2	W5	WSW6	W6	WNW7	WNW9	WNW12	W12	NW6	N4	NNE3	NE2	N3	W3	W3.2	W12
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	S3	WSW4	W9	WNW8	WNW10	W6	DF	DF	DF	DF	DF	DF	DF	DF	---	WNW10
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	NNE9	NNE12	NNE16	NNE14	NNE13	NNE12	NNE10	NNE9	NNE8	N6	NNE11	NNE9	---	NNE16
23-Jul	NNW6	NNW5	N4	NNW2	S4	SSE9	SSE9	SSE9	SSE8	SSE7	SSE5	SSE7	SSE4	SSE4	SE7	SSE9	SSE12	SSE11	SSE9	SSE9	SSE9	S7	S5	SSW6	SSE5.4	SSE12
24-Jul	SSW5	SSW6	S5	S7	SSE5	SSE5	SSE6	SSE5	SE5	ESE3	ESE4	SSE5	S4	SSW1	S2	ENE5	ENE8	E12	E11	ENE10	ENE7	NE5	E8	ESE8	ESE4.1	E12
25-Jul	SE9	SE7	WSW10	W12	SE4	NE3	E16	SE12	SSE12	S10	S5	SSW5	W6	E4	SE6	SE5	SE5	ESE3	SW3	WSW7	WSW18	SW14	SW11	SSW10	S4.6	WSW18
26-Jul	SSW9	S10	SSE8	SSE10	SSE9	SSE11	SSE8	SSE9	SE10	SE9	ESE8	ESE6	E4	ENE7	ENE7	ENE5	NNE14	NE14	NNE17	NE18	ENE21	E18	E11	ENE13	E6.7	ENE21
27-Jul	NE10	NNE9	NNE10	NNE9	NNE10	NNE10	NNE12	NNE7	NW6	NW8	NW10	NW11	N12	NNE15	E8	S14	W11	W13	WNW7	S4	SSW6	WNW5	W2	WSW3	NNW4.2	NNE15
28-Jul	SW5	SSW3	SW5	WSW3	SW4	SW3	SW4	SW2	WSW2	W3	WSW4	WNW1	W5	SSE6	S8	S9	S9	SSW9	SSW9	S7	S8	SSW10	SW9	S7	SSW5.0	SSW10
29-Jul	SSE5	SSE8	SSE9	SSE8	SSE10	SSE7	SSE8	SE6	SSE5	SE5	SSW4	SW9	SSW11	SSW11	SW11	SSW10	SSW11	SSW8	SSW8	S7	SSW10	SSW10	S9	S10	S7.8	SSW11
30-Jul	S10	SSE11	SSE11	SSE10	SSE11	SSE10	SSE9	SSE8	SE9	SSE12	SSE16	SSE17	SSE15	S17	S15	SSE14	S12	S10	S10	SSW12	SW18	ESE5	E10	SSE9	SSE10.8	SW18
31-Jul	S12	SSE14	SSE8	W11	SSE4	SE5	SE6	S8	S12	S11	S8	S9	SW7	W10	NNW5	WSW11	SW7	NW15	NNW5	WSW7	WSW5	SW4	WSW8	WSW13	SW5.3	NW15

SW2.5	SW2.1	SW2.8	SW2.6	S1.9	SSE2.0	SE1.8	SE1.4	SSE1.4	WSW0.8	WNW1.3	NW1.6	NW2.2	NW1.8	N0.6	NW0.8	NW1.8	NNW2.5	N2.5	NNE1.3	W0.5	W1.0	WNW0.5	SSW1.1	Diurnal Average
WSW14	W14	W18	SE17	NNW21	NNW21	N27	N24	NNW20	NNW22	NNW23	NNW26	NNW26	NNW23	NNW22	NNW22	NW19	NNE18	WNW21	NE18	ENE21	E18	WNW15	SE16	Diurnal Maximum

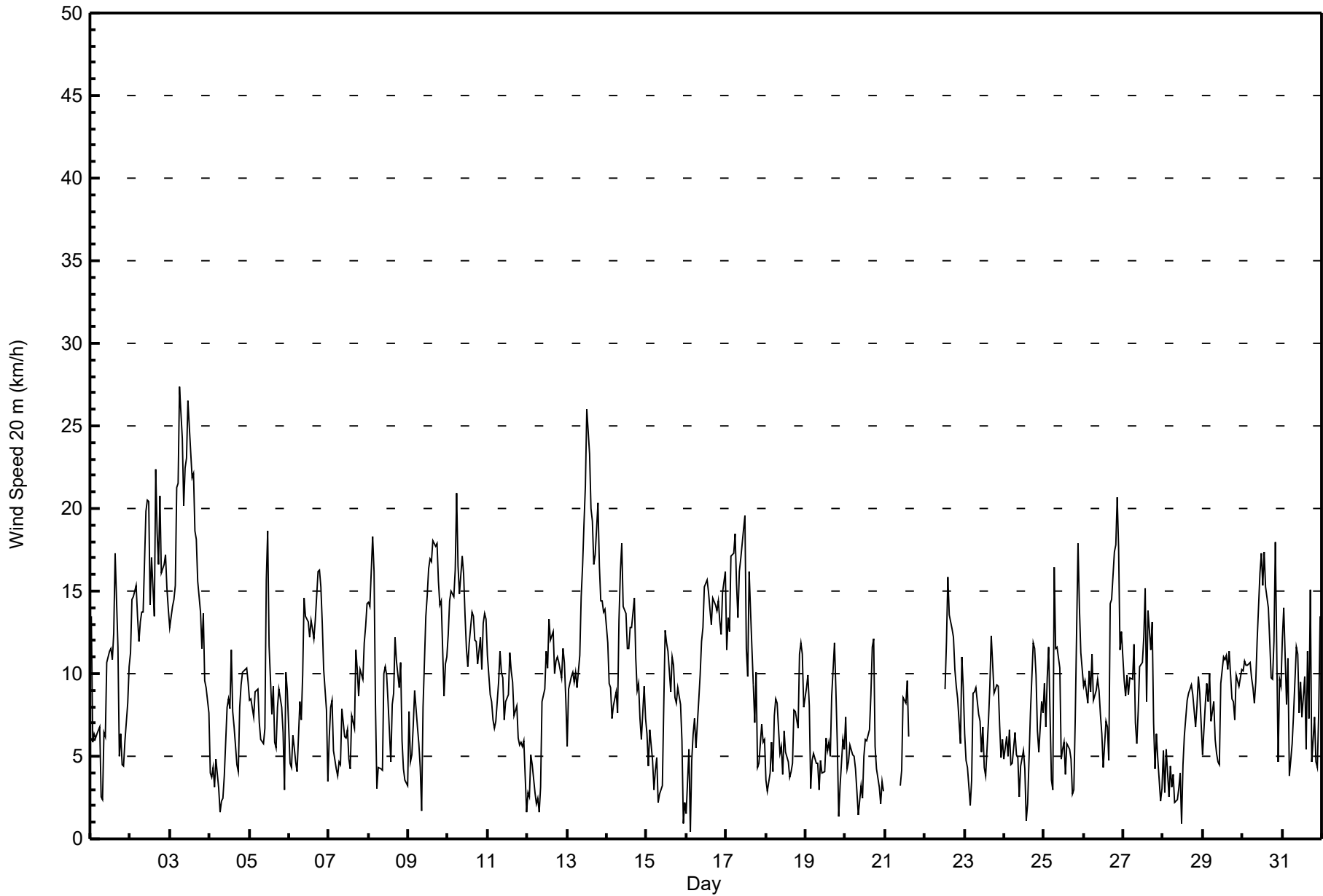
DF - DAS Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 20 m (WS20m) - km/h
Mannix - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Jul 30 21:00														Hours in Service: 744 Hours of Data: 714 Hours of Missing Data: 30 Hours of Calibration: 0 Percent Operational Time: 96.0												
Minimum Value: 1 km/h on Jul 11 21:00																										
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 8																										
Day	Hourly Period Ending At (MST)																							Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24	
1-Jul	3	2	2	2	2	2	1	1	3	3	3	4	5	5	5	8	6	2	2	2	3	2	2	2	8	
2-Jul	3	3	4	3	3	2	4	4	5	7	7	7	6	5	4	8	8	7	6	4	4	6	5	4	8	
3-Jul	4	5	5	5	8	7	9	9	8	8	8	9	8	7	8	7	7	6	6	4	4	3	3	2	9	
4-Jul	1	1	1	1	2	1	1	2	2	2	3	4	4	4	4	3	2	4	3	2	2	3	2	4	4	
5-Jul	2	2	2	1	2	2	3	2	2	4	5	5	5	5	5	4	2	4	4	2	2	4	3	3	5	
6-Jul	2	2	2	2	2	3	3	3	4	5	6	5	6	6	5	6	5	6	5	4	4	3	1	2	6	
7-Jul	2	2	2	2	1	2	2	2	3	2	2	3	3	3	4	5	5	4	3	3	2	2	2	2	5	
8-Jul	3	4	3	3	3	2	2	2	3	4	3	3	3	3	4	4	6	5	3	3	3	1	1	1	6	
9-Jul	1	2	1	2	2	2	2	2	1	4	5	5	6	6	6	5	6	5	4	3	3	3	3	4	6	
10-Jul	4	5	5	5	6	6	5	6	6	5	5	5	5	6	5	5	4	4	4	4	4	4	4	4	6	
11-Jul	4	2	3	2	2	2	3	3	4	4	4	4	4	4	4	4	3	3	2	1	1	1	3	1	4	
12-Jul	2	3	2	1	2	1	2	2	2	3	4	4	5	5	5	5	4	4	4	3	3	3	3	3	5	
13-Jul	3	2	2	2	3	2	3	4	6	6	7	8	9	8	8	7	6	6	7	6	5	5	5	4	9	
14-Jul	4	3	3	3	2	4	3	5	6	6	6	5	5	6	5	4	4	4	4	3	3	3	3	2	6	
15-Jul	2	3	2	2	1	2	2	2	2	2	4	4	4	4	4	4	3	4	3	3	2	2	1	1	4	
16-Jul	2	1	1	1	2	2	2	3	4	4	5	5	6	5	5	5	5	5	5	5	4	4	5	5	6	
17-Jul	4	4	4	5	5	6	5	5	6	6	6	7	5	5	5	5	4	3	4	3	3	3	1	1	7	
18-Jul	1	2	1	2	2	3	3	3	2	2	2	3	3	3	3	3	3	2	2	2	2	2	2	2	3	
19-Jul	1	1	2	3	1	2	2	2	2	3	3	3	3	3	3	5	7	4	3	4	1	1	1	2	7	
20-Jul	2	1	2	2	1	2	2	2	2	2	3	3	3	3	3	4	4	4	3	2	2	1	3	2	4	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	2	3	3	3	4	4	DF	DF	DF	DF	DF	DF	DF	DF	4	
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	4	4	4	4	4	3	3	2	2	1	3	3	4
23-Jul	2	2	1	1	2	3	3	3	3	3	3	2	3	3	3	6	4	3	3	3	3	2	3	1	2	6
24-Jul	2	2	2	2	2	2	3	2	2	1	2	2	2	2	2	3	3	3	3	2	2	2	3	3	3	3
25-Jul	3	2	5	2	4	4	8	6	7	4	4	5	4	2	2	2	2	3	1	9	4	5	4	4	9	
26-Jul	4	3	2	3	3	3	4	3	4	3	3	3	3	3	2	3	6	5	6	6	6	6	5	4	6	
27-Jul	3	2	2	2	2	3	3	3	3	4	4	5	5	7	5	5	4	3	3	3	2	3	3	1	7	
28-Jul	2	1	1	2	2	1	1	1	1	2	2	2	3	3	3	4	4	4	3	2	2	2	2	2	4	
29-Jul	1	2	2	2	2	2	3	2	2	2	3	5	5	5	5	5	5	4	4	2	2	2	2	2	5	
30-Jul	2	2	2	2	2	3	3	4	3	4	6	6	7	7	7	6	6	4	3	6	11	2	5	3	11	
31-Jul	5	5	4	3	2	2	2	4	4	5	4	4	5	4	7	5	3	8	3	2	2	3	3	3	8	
Diurnal Maximum																										
DF - DAS Failure																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 20 m (WS20m) - km/h
Mannix - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	173	24.23	24.23
6 - 11	333	46.64	70.87
12 - 19	184	25.77	96.64
20 - 28	24	3.36	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 714

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed 20 m (WS20m) - km/h
Mannix - July 2023

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	4	10	5	3	7	6	18	16	17	18	14	17	9	9	12	173
6 - 11	18	31	12	8	8	5	20	60	31	26	16	31	25	17	12	13	333
12 - 19	9	31	4	1	3	4	41	13	6	1	4	9	17	9	9	23	184
20 - 28	3	0	0	1	0	0	2	0	0	0	0	0	0	2	3	13	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	38	66	26	15	14	16	69	91	53	44	38	54	59	37	33	61	714

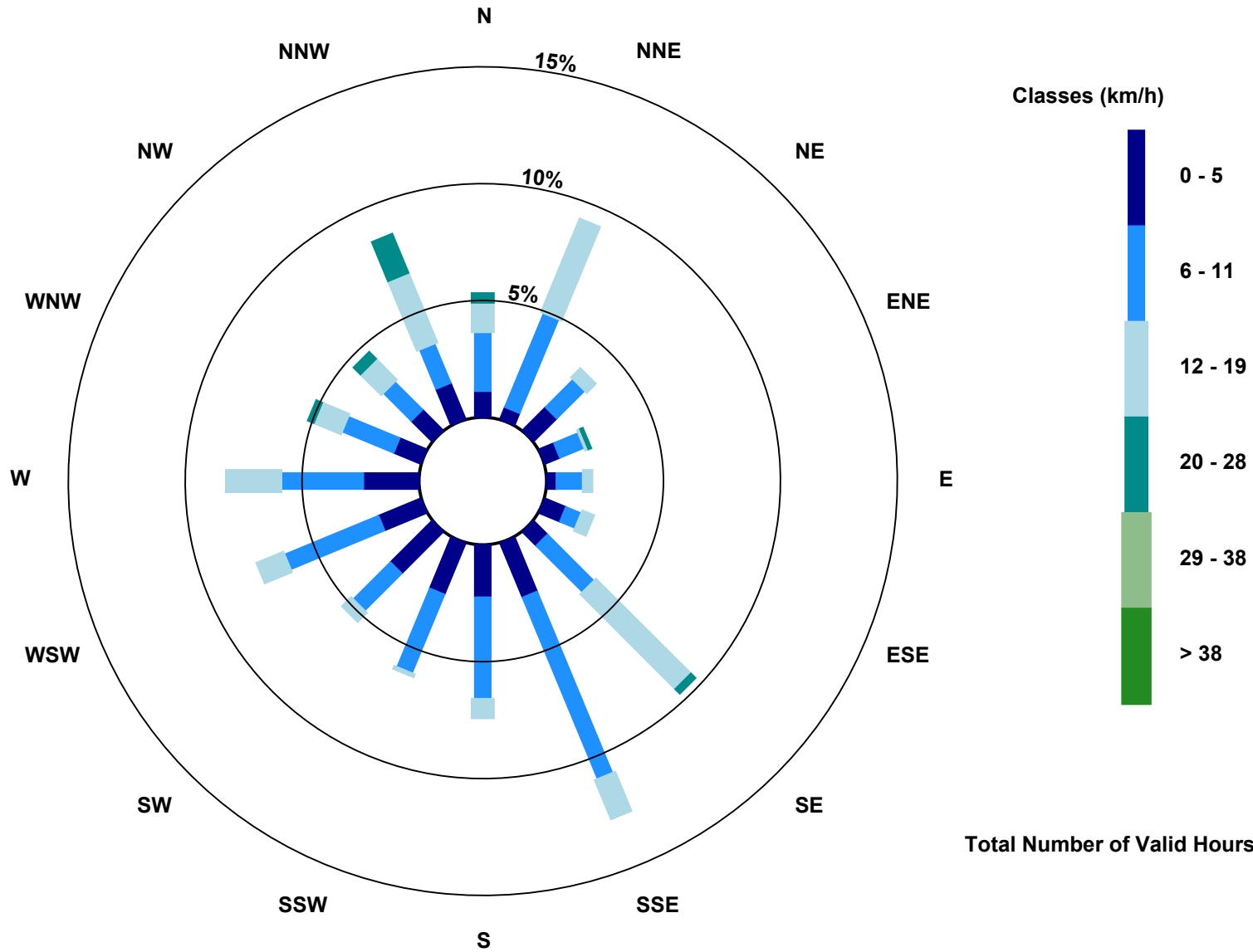
Total Number of Valid Hours: 714

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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





Summary of Hour Averages

Mannix - July 2023

Maximum Speed: 39 km/h on Jul 3 07:00	Maximum Daily Speed Average: 25.8 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jul 12 00:00	Minimum Daily Speed Average: 3.1 km/h on Jul 18	Hours of Data: 714
Maximum Diurnal Speed Average: 3.4 km/h at hour 18	Minimum Diurnal Speed Average: 0.8 km/h at hour 10	Hours of Missing Data: 30
Monthly Average Velocity: 0.9 km/h 271.2 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 8 Median = 13 Q ₃ = 18 P ₉₀ = 22 P ₉₉ = 33	Percent Operational Time: 96.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	W20	NW12	WNW7	W10	SW9	S11	SSE4	SSW2	SSE10	SE9	SE15	SE14	SE16	SE15	SSE18	SW24	WSW16	NW8	WNW9	NW7	W5	SW10	WSW11	W13	SW5.5	SW24	
2-Jul	W16	W19	WSW20	WSW19	W16	W15	W18	WNW20	NW22	NW30	NW32	NW32	NW23	WNW24	W18	WNW33	NW29	WNW25	WNW30	W22	W21	W23	WNW22	WNW21	WNW21.4	WNW33	
3-Jul	WNW22	NW23	NW24	NW25	NNW32	NNW31	N39	N35	NNW30	NNW33	NNW35	NNW38	NNW34	NNW32	NNW32	N26	NNW26	NNW24	N20	N17	N20	N17	N16	NNW14	NNW25.8	N39	
4-Jul	NW9	NNW9	NW7	NNW6	WNW9	NW5	WSW1	SSW3	WSW3	W5	W10	W10	WSW9	WSW13	W9	W9	W6	S6	SSE11	SSE15	SSE20	SSE23	S24	S21	SW4.8	S24	
5-Jul	SSE18	SSE17	S12	SSE8	SSE11	SSE14	SSE12	SSE9	SE8	SW10	WSW19	W22	W15	WNW11	WSW13	S11	SW9	WSW10	WSW12	WSW11	W10	NNW9	N16	N16	SW6.3	W22	
6-Jul	NNW9	NNW9	NW11	NNW11	NNW9	NNW6	N11	N9	N13	NNE19	N19	N18	NNW18	NNW18	NNW18	NNW18	N18	N22	NNE22	NNE22	NNE18	N16	N13	ENE7	N14.0	NNE22	
7-Jul	SSE3	SSW9	WSW13	W11	WSW6	SW6	SSW6	SSW6	WSW10	WSW8	W7	WSW7	W7	SW5	S10	WSW9	SW15	WSW14	SW12	SW16	SW17	SW20	WSW21	WSW24	WSW10.3	WSW24	
8-Jul	WSW23	W21	W24	WSW23	WSW15	SW5	SSW5	S6	WSW6	W12	W12	W12	WNW11	W6	WSW10	NW13	WNW17	NW16	NNE13	NNE16	NNE11	N7	N7	NNW7	W8.6	W24	
9-Jul	WNW9	NNW11	NNW10	NNW12	NNE13	N10	NNE7	NE5	NE2	NNE10	N18	NNE20	NNE21	NNE22	N22	NNE24	NNE24	NNE24	NNE21	NNE20	NNE21	NE12	E13	E13	NNE13.7	NNE24	
10-Jul	ESE16	ESE17	ESE20	SE19	ESE21	SE28	SE22	SE19	SE22	SE21	ESE17	SE15	SE14	SE17	SSE18	SSE18	SE16	SE16	ESE14	E14	ESE13	SE19	SE20	SE20	SE17.9	SE28	
11-Jul	SE17	SE15	SE15	SSE13	SE11	SE13	SE15	SSE15	SSE14	S14	S11	SSW12	SSW13	SSW16	S15	S15	S11	SSE11	SSE8	SSE10	SSW9	SW8	SW10	E1	SSE10.7	SE17	
12-Jul	ESE1	SE4	SSE8	SSE9	SSE8	SE4	SE2	WNW2	W4	W10	NW13	NW16	NW16	NW19	NNW17	NNW18	NNW15	NNW16	NNE16	NNE16	N17	NNW20	NNW16	NNW16	NNW7.7	NNW20	
13-Jul	NW14	WNW14	NW16	NW15	NW18	WNW16	WNW16	NW18	NNW22	NNW24	NNW27	NNW31	NNW36	NNW33	NNW30	NNW28	NNW24	N24	N29	N24	NNW23	NNW23	NNW22	NNW22	NNW21.8	NNW36	
14-Jul	N18	N15	NNW16	NNW13	NW14	NNW15	NNW12	NNW19	NNW24	NNW25	NNW21	NNW20	NNW17	NNW16	N16	NNE17	NNE19	NNE15	N13	N14	NNE10	N9	N13	N11	N15.1	NNW25	
15-Jul	NNW10	N7	N9	NNW7	NW5	N6	NNE7	NNE3	NNW3	NNE4	NNE10	NNE17	NE16	NE14	NNE12	NE14	NE13	NE10	NE10	NE11	NE11	NE10	ENE3	E4	NNE8.3	NNE17	
16-Jul	SE3	SSW6	SSW2	SSE9	SSE14	SSE14	SSE8	SE11	SE13	SE16	SE17	SE20	SE20	SE20	SE18	SE18	SE20	SE20	SE19	SE20	SE19	SE18	SE21	SE23	SE15.1	SE23	
17-Jul	SE18	SE21	SE19	SE24	SE25	SE25	SE22	SE18	SE23	SE24	SE26	SE27	SE18	SE15	ESE19	ESE15	ESE13	E10	ENE14	W5	NW8	N11	NNE9	NE9	ESE14.4	SE27	
18-Jul	NE6	N4	N7	N9	NNW8	N12	N12	NNE11	NE7	NNE7	NE5	E7	ENE6	ESE5	ENE5	NE4	S6	WSW9	WSW9	WSW10	WSW17	WSW18	WSW18	WSW14	NW3.1	WSW18	
19-Jul	WSW13	W15	WSW13	W6	SW4	SW8	SW6	SW5	SSW4	WSW6	W5	W5	SSW8	SSW8	SSE7	NNE6	WNW10	W15	W11	WSW7	WSW3	SSW6	SSW9	SW10	WSW6.5	W15	
20-Jul	SW11	SSW7	SSW7	SSW8	S8	S8	SW5	SW3	S2	WNW4	WNW3	WSW6	WSW7	W7	WNW9	WNW11	W15	W15	NW8	NNW6	NNE4	NE5	NNE7	NNE2	WSW4.1	W15	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	S5	SW5	W10	WNW10	W13	W8	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	---	W13
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	NNE12	NNE16	NNE21	NNE18	NNE17	NNE16	NNE14	NNE14	NNE13	N10	N16	N14	---	NNE21	
23-Jul	NNW10	NNW9	N7	N4	SE5	SE16	SSE14	SSE13	SSE11	SE9	SE7	SSE9	S6	SSE6	SE9	SSE13	SSE20	SSE16	SSE13	SSE18	SSE18	S17	S15	S15	SSE9.0	SSE20	
24-Jul	S13	SW11	SSW6	S6	SSE6	SSE9	SE8	SE6	SE2	ESE5	SSE7	S5	SSW3	S3	ENE6	ENE9	E15	E15	ENE13	ENE11	ENE8	E12	ESE11	E15	ESE5.4	E15	
25-Jul	SE12	ESE8	SW13	W17	SE3	NNE5	E21	ESE16	SE16	S16	SSE9	S8	W10	ENE4	SE8	SE7	SE7	ESE3	SW4	WSW9	WSW24	SW20	SW17	SSW16	S6.3	WSW24	
26-Jul	SSW16	S17	SSE15	SSE19	SSE15	SSE18	SSE13	SE13	SE13	SE12	ESE9	ESE7	E5	NE8	ENE8	NE6	NNE20	NE19	NNE24	NE25	ENE26	E21	E14	ENE15	E8.5	ENE26	
27-Jul	NE13	NNE11	NNE13	NNE12	NNE14	N14	N15	N10	NW10	NW12	NW15	NW16	N16	NNE21	E9	S21	WSW13	W15	NW11	S6	S12	W7	NW6	WNW1	NNW6.0	S21	
28-Jul	SW5	SW3	WSW7	W8	W7	WSW4	WSW4	SW2	SW2	W3	WSW5	W2	WSW5	SSE9	S12	SSE12	S14	SSW15	SSW14	S14	S17	SSW19	SW16	SSW13	SSW7.5	SSW19	
29-Jul	SSW8	SSE13	SSE15	SSE14	SSE18	SSE12	SSE13	SSE8	SSE7	SE6	SSW7	SSW14	SSW16	SSW16	SSW15	SSW15	SSW16	SSW13	SSW14	S14	S20	SSW20	SSW19	S17	S12.9	SSW20	
30-Jul	S18	S18	SSE20	SSE20	SSE18	SSE17	SSE15	SE12	SE13	SSE17	SSE22	SSE24	SSE21	S26	S24	SSE21	S19	SSE16	S18	SSW19	SSW29	ESE7	E14	SSE17	SSE17.1	SSW29	
31-Jul	S23	SSE23	SSE15	W15	SSE4	ESE6	SE9	S13	S18	S18	S12	S15	SW11	W13	NW8	SW19	SW10	NW23	NNW7	WSW10	WSW7	SW9	WSW13	WSW19	SSW8.3	SSE23	

SW3.2 SW2.7 SW3.4	WSW3.1 S1.8	SSE2.7 ESE2.4 SE1.8	SSE1.5 W0.8	NW1.9 NW2.3	NW3.2 NW2.5	NNW0.9	NNW1.3	NW2.3	NNW3.4	N3.3	NNE1.5	WSW0.9	WSW1.6	W1.2	SSW1.5	Diurnal Average								
S23 SSE23	W24	NW25	NNW32	NNW31	N39	N35	NNW30	NNW33	NNW35	NNW38	NNW36	NNW33	NNW32	WNW33	NW29	WNW25	WNW30	NE25	SSW29	NNW23	S24	WSW24	Diurnal Maximum	

DF - DAS Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods

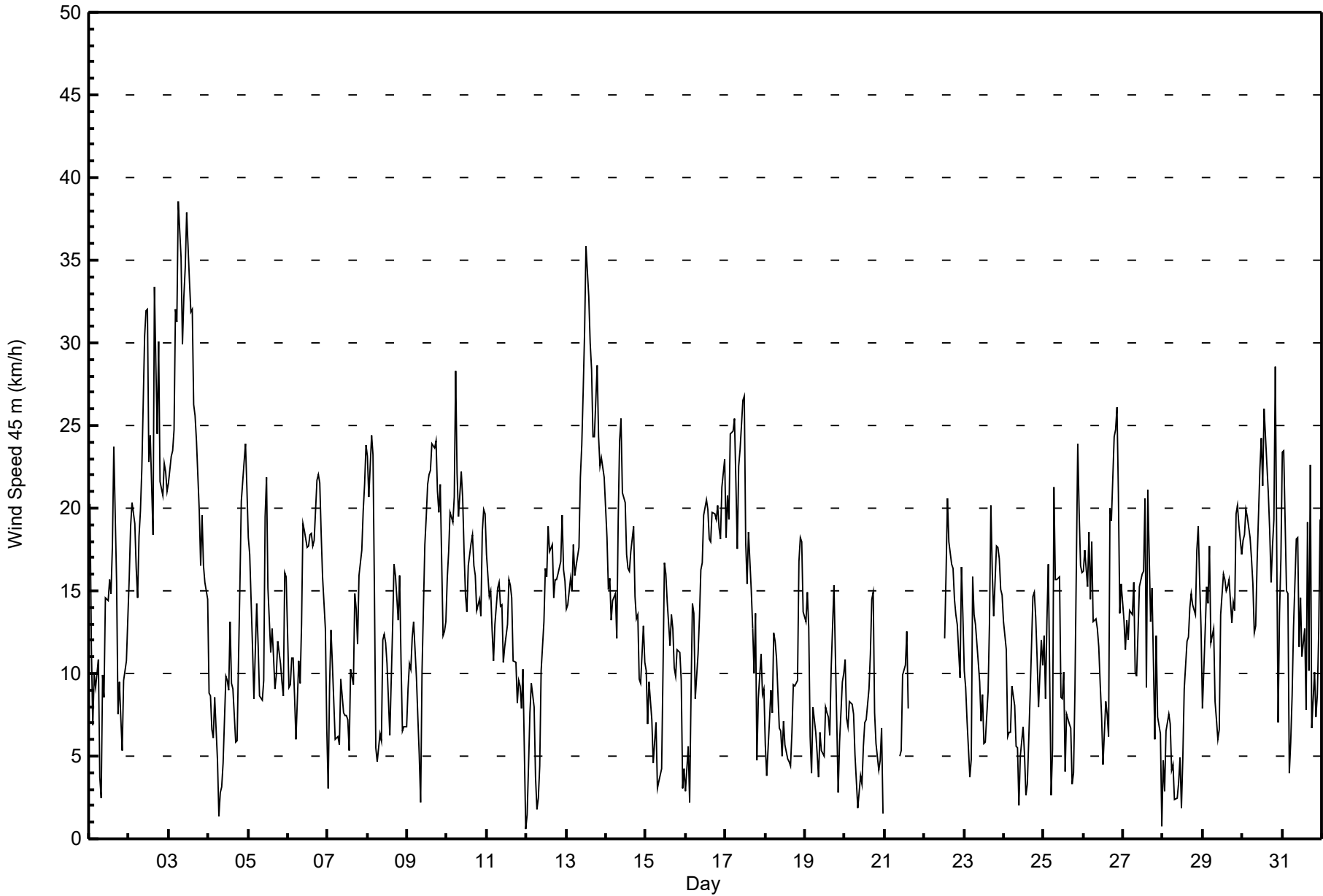


Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 45 m (WS45m) - km/h

Mannix - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 14 km/h on Jul 30 21:00														Hours in Service: 744 Hours of Data: 714 Hours of Missing Data: 30 Hours of Calibration: 0 Percent Operational Time: 96.0												
Minimum Value: 1 km/h on Jul 7 05:00																										
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 9																										
Day	Hourly Period Ending At (MST)																							Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24	
1-Jul	3	3	1	2	2	3	2	1	3	4	3	4	4	4	4	8	6	3	2	2	3	2	1	2	8	
2-Jul	2	2	3	3	2	2	2	4	4	5	5	6	5	4	3	9	8	7	4	4	4	5	3	3	9	
3-Jul	3	4	4	4	8	7	9	8	7	7	7	8	7	6	7	7	7	5	6	4	5	3	3	2	9	
4-Jul	1	2	1	2	2	2	1	2	2	2	3	4	3	3	3	4	3	3	5	3	1	1	2	2	5	
5-Jul	1	2	1	1	2	1	4	1	2	4	5	5	5	5	5	7	7	3	4	5	3	1	6	3	4	7
6-Jul	4	3	2	2	2	3	3	3	4	4	5	5	6	5	5	5	4	6	4	4	3	4	2	2	6	
7-Jul	2	3	1	2	1	1	1	2	2	2	2	3	4	4	4	5	4	4	3	2	1	3	1	2	5	
8-Jul	3	3	2	3	5	3	2	1	4	3	2	2	3	3	4	4	5	5	3	3	4	2	2	1	5	
9-Jul	2	2	1	3	3	1	1	3	2	4	5	5	5	6	6	5	5	4	4	3	3	4	3	4	6	
10-Jul	5	5	6	6	6	6	6	6	6	5	5	5	5	5	4	3	4	4	4	4	4	3	4	4	6	
11-Jul	4	2	3	3	3	2	3	3	3	4	4	3	3	3	3	4	3	2	1	2	1	1	3	1	4	
12-Jul	2	2	3	2	2	2	1	2	2	2	3	4	4	4	5	4	4	3	4	3	3	4	3	3	5	
13-Jul	3	2	1	2	2	3	3	4	5	5	7	8	8	6	7	6	5	6	7	6	4	4	4	4	8	
14-Jul	4	2	4	4	2	3	3	5	5	5	5	4	4	4	5	5	4	4	5	4	2	3	2	3	5	
15-Jul	3	4	2	2	1	2	2	2	2	2	5	4	4	4	4	4	3	4	3	3	2	2	1	3	5	
16-Jul	1	1	1	3	1	1	3	3	4	4	5	5	5	6	5	5	4	4	4	4	4	4	4	4	6	
17-Jul	3	4	4	4	4	5	4	6	5	5	6	6	5	5	6	6	4	4	4	3	2	2	1	2	6	
18-Jul	1	1	1	1	2	3	3	3	3	2	3	3	3	4	4	3	3	2	2	2	2	2	1	2	4	
19-Jul	1	1	1	5	2	2	2	1	2	3	3	4	3	4	3	6	8	4	2	4	1	2	1	2	8	
20-Jul	3	2	1	1	1	2	1	2	2	2	3	2	3	3	3	4	3	4	4	2	3	2	3	1	4	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	2	3	3	3	4	DF	DF	DF	DF	DF	DF	DF	DF	DF	4	
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	4	3	3	4	3	3	3	2	2	2	3	3	4
23-Jul	3	2	1	1	3	2	3	2	2	2	2	3	3	3	3	7	3	3	3	2	2	4	2	2	7	
24-Jul	2	1	2	2	2	3	3	3	2	2	2	2	3	2	2	3	3	3	3	2	3	3	3	4	4	
25-Jul	4	3	7	2	4	4	9	7	7	4	5	5	6	2	2	2	2	3	1	11	4	5	4	3	11	
26-Jul	4	2	3	3	3	2	4	3	3	3	4	3	4	3	2	4	7	5	6	6	6	6	6	4	7	
27-Jul	3	3	2	2	1	2	2	2	2	3	3	5	4	9	5	4	3	2	3	5	2	3	6	1	9	
28-Jul	1	1	2	2	2	2	1	2	1	2	2	2	3	3	2	3	3	3	2	1	1	1	1	2	3	
29-Jul	2	2	1	2	1	2	3	1	2	2	4	4	6	5	5	6	5	3	3	2	2	1	3	1	6	
30-Jul	1	1	1	2	2	2	4	3	2	4	5	5	6	6	6	6	6	3	3	9	14	4	6	4	14	
31-Jul	6	6	4	4	2	2	3	3	3	4	3	4	4	4	9	7	3	9	3	2	2	4	3	3	9	
														Diurnal Maximum												
DF - DAS Failure																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed 45 m (WS45m) - km/h
Mannix - July 2023

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	76	10.64	10.64
6 - 11	219	30.67	41.32
12 - 19	283	39.64	80.95
20 - 28	113	15.83	96.78
29 - 38	22	3.08	99.86
> 38	1	0.14	100.00

Total Number of Valid Hours: 714

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed 45 m (WS45m) - km/h
Mannix - July 2023

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	5	5	3	3	4	7	3	4	6	12	7	8	4	2	1	76
6 - 11	16	12	10	7	3	6	14	25	14	15	15	22	20	12	10	18	219
12 - 19	25	24	7	4	7	9	38	39	26	19	8	18	19	6	15	19	283
20 - 28	7	15	1	1	2	2	23	10	7	1	3	6	7	6	6	16	113
29 - 38	2	0	0	0	0	0	0	0	0	1	0	0	0	2	4	13	22
> 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	53	56	23	15	15	21	82	77	51	42	38	53	54	30	37	67	714

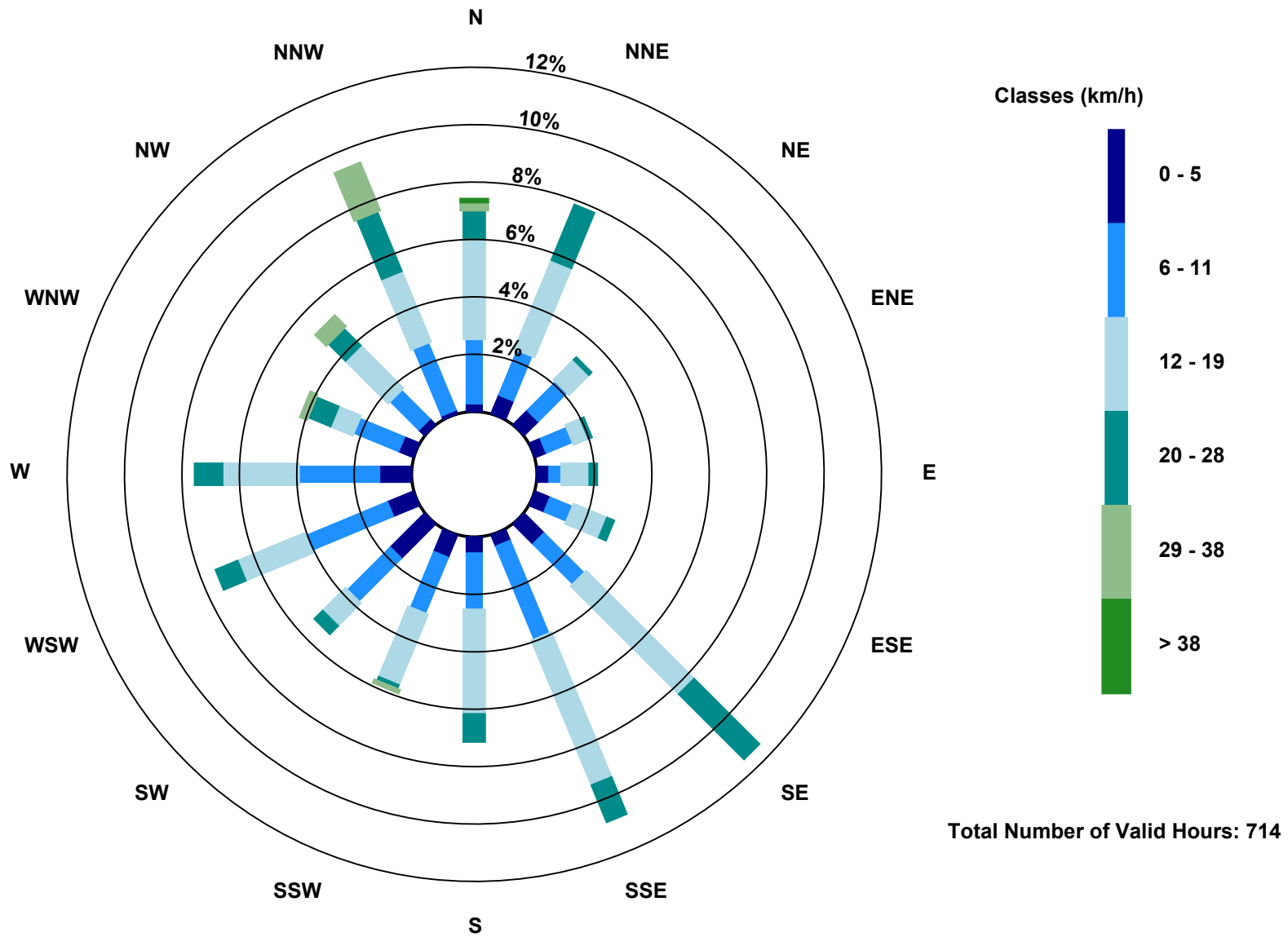
Total Number of Valid Hours: 714

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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





Maximum Speed: 44 km/h on Jul 3 07:00	Maximum Daily Speed Average: 29.4 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 28 00:00	Minimum Daily Speed Average: 3.4 km/h on Jul 18	Hours of Data: 714
Maximum Diurnal Speed Average: 3.8 km/h at hour 18	Minimum Diurnal Speed Average: 0.7 km/h at hour 21	Hours of Missing Data: 30
Monthly Average Velocity: 1.2 km/h 292.2 deg	Percentiles: $P_1 = 2$ $P_{10} = 5$ $Q_1 = 9$ Median = 15 $Q_3 = 20$ $P_{90} = 25$ $P_{99} = 37$	Percent Operational Time: 96.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	WNW24	NNW15	NNW8	W7	WSW9	SSW9	SW4	SW2	SSE9	SSE10	SE18	SSE15	SE15	SE14	SSE19	SW26	WSW19	NW9	WNW11	NW8	WNW5	SW11	W13	W16	SW5.7	SW26	
2-Jul	WNW19	WNW21	WSW24	W22	W18	W17	WNW21	WNW22	NW25	NW33	NW37	NW37	NW27	WNW27	WNW21	WNW37	NW32	WNW28	WNW34	W24	W24	W26	WNW25	WNW24	WNW24.3	NW37	
3-Jul	NW25	NW26	NW27	NW29	NNW36	N36	N44	N39	NNW34	NNW37	NNW39	N42	NNW38	NNW36	NNW35	N30	NNW28	NNW27	N22	NNE19	N23	N20	N19	N17	NNW29.4	N44	
4-Jul	NNW13	NNW13	NNW10	NNW8	NNW9	NNW4	NNE1	SSW3	WSW3	W5	W10	W9	W10	WSW13	W9	W9	W6	S7	SSE11	SSE18	SSE25	SSE29	S33	S30	SSW4.9	S33	
5-Jul	S25	SSW18	SSW12	SW8	SSW9	S12	S13	S9	S9	SW11	WSW21	W22	W15	WNW12	WSW13	S14	SSW11	WSW11	WSW13	WSW12	WNW13	NNW15	N19	N19	WSW8.2	S25	
6-Jul	N14	NNW13	NNW14	NNW14	NNW11	N7	N12	N10	N14	NNE21	NNE20	N19	NNW18	NNW19	NNW19	NNW19	NNE20	NNE24	NNE25	NNE25	NNE22	N20	NNE18	ENE9	N16.2	NNE25	
7-Jul	SSE4	S10	WSW9	W9	WNW11	W8	SW6	SW6	WSW10	WSW8	W7	W8	W7	SW6	SSW11	WSW10	SW15	WSW15	SW13	SW19	WSW23	WSW27	WSW31	WSW32	WSW11.9	WSW32	
8-Jul	WSW31	W25	W29	W29	WSW22	WSW10	WSW7	SW8	WSW7	W12	W13	W12	WNW11	W7	WSW10	NW14	WNW17	NW17	NNE16	NNE20	NNE16	NNE11	N8	N8	WNW10.1	WSW31	
9-Jul	NNW9	NNW15	NNW12	N13	NNE14	NNE9	NE8	ENE5	NE2	NNE11	NNE19	NNE20	NNE23	NNE23	NNE24	NNE26	NNE26	NNE27	NNE24	NNE24	NNE26	ENE15	E13	E13	NNE15.4	NNE27	
10-Jul	ESE12	ESE14	SE15	SE17	SE17	SE25	SE20	SE17	SE20	SE18	SE15	SE13	SE13	SE16	SSE19	SSE19	SE16	SE15	ESE12	ESE12	ESE11	SE18	SE22	SE21	SE16.3	SE25	
11-Jul	SE20	SE20	SE20	SSE18	SE17	SE19	SSE21	SSE18	SSE15	S15	S12	SSW12	SSW14	SSW16	SSW16	S16	S11	SSE11	SSE9	S10	SSW10	SW8	SW12	SW5	SSE12.8	SSE21	
12-Jul	WNW2	SE5	SSE9	SE11	SSE11	SE4	ESE1	WNW2	WNW5	WNW10	NW13	NNW17	NW16	NW20	NNW18	NNW19	NNW15	NNW17	NNE18	NNE21	NNE22	NNW24	N20	NNW21	NNW8.9	NNW24	
13-Jul	NNW19	NW16	NW19	NW17	NW20	NW17	NW19	NNW20	NNW23	NNW25	NNW29	NNW33	NNW39	NNW36	NNW33	NNW31	NNW27	N27	N32	N28	NNW27	NNW28	NNW28	N26	NNW25.1	NNW39	
14-Jul	N22	N17	NNW20	NNW17	NW17	NNW18	NNW14	NNW21	NNW26	NNW27	NNW23	NNW22	NNW18	NNW17	NNE17	NNE19	NNE20	NNE16	NNE15	NNE16	NNE11	N10	N14	N12	N17.0	NNW27	
15-Jul	N12	N9	N11	N8	NNW5	N7	NNE7	NNE4	NNW3	NNE5	NNE11	NNE18	NE17	NE15	NNE12	NE14	NE13	NE11	NE11	ENE12	NE14	NE11	ENE6	E7	NNE9.3	NNE18	
16-Jul	ESE4	SSE8	SSE6	SSE10	SE13	SE18	SE11	SE12	SE13	SE15	SE14	SE18	SE18	SE17	SE17	SE18	SE18	SE20	SE21	SE21	SE20	SE19	SE19	SE22	SE15.4	SE22	
17-Jul	SE24	SE23	SE21	SE24	SE22	SE21	SE20	SE13	SE21	SE25	SE27	SE26	SE20	SE14	ESE15	ESE13	ESE10	E12	ENE15	SW2	NNW8	N12	NE11	ENE12	ESE14.5	SE27	
18-Jul	E8	NE5	NNE7	NNE8	N8	N17	NNE15	NNE12	NE8	NNE7	NE5	E7	NE5	ESE5	ENE5	NE5	S7	WSW10	WSW10	WSW12	WSW21	W22	W22	W18	NW3.4	W22	
19-Jul	WSW16	W19	W16	W10	W6	WSW10	WSW9	WSW5	SSW4	SW7	W5	W5	SSW8	SSW9	SSE7	NNE6	WNW10	W19	W12	WSW8	SW4	SSW6	SSW9	SW10	WSW7.7	W19	
20-Jul	WSW11	SW5	SW6	SW6	SW7	SW6	SW6	SW3	S2	WNW3	WNW4	WSW5	WSW7	W8	WNW9	WNW11	W15	W15	NW8	NNW6	NNE5	NE7	NNE8	NE5	W4.5	W15	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	SSW5	SW6	W10	WNW10	WNW13	W9	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	---	WNW13
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	NNE13	NNE17	NNE22	NNE19	NNE18	NNE19	NNE18	NNE17	NNE18	NNE14	NNE20	N17	---	NNE22	
23-Jul	N12	N10	N9	N4	SE7	SE19	SE17	SSE16	SSE11	SE9	SSE7	SSE8	S6	SSE6	SE9	SSE14	SSE23	SSE20	SSE17	SSE24	SSE24	SSE23	SSE21	S20	SSE11.1	SSE24	
24-Jul	SSW15	WSW13	WSW7	S5	S3	SSE7	SSE9	SE4	SE5	SE2	SE5	SSE7	S5	S3	ENE7	ENE9	E14	E15	E16	E15	E12	E13	ESE10	ESE5.2	E16		
25-Jul	ESE10	ESE7	SW16	W20	SSW1	NE6	E21	ESE16	SE15	S18	SSE11	S9	WSW13	E4	SE7	SE7	SE7	SE3	SSW4	WSW10	WSW27	SW22	SW19	SSW19	S6.9	WSW27	
26-Jul	SSW19	S20	S18	SSE23	SSE19	SSE22	SSE16	SSE15	SE13	SE11	SE9	ESE7	E4	ENE9	ENE8	NE7	NNE22	NE22	NNE28	NE28	ENE28	E21	E13	ENE17	ESE9.0	ENE28	
27-Jul	NE16	NE13	NNE15	NNE14	NNE14	NNE15	NNE17	N11	NW10	NW13	NW15	NNW16	N17	NNE24	ENE10	S23	WSW13	W15	NW11	S5	S13	W6	NW7	E0	N6.4	NNE24	
28-Jul	W2	SW1	WSW4	W8	WNW6	WNW7	W5	SW3	SW2	W3	WSW5	W2	WSW5	S10	S12	S13	S15	SSW16	SSW16	S16	S21	SSW24	SW21	SW17	SSW8.1	SSW24	
29-Jul	SW12	S10	S10	S11	S13	SSW10	S12	SSE9	S8	SSE6	SSW8	SSW15	SSW17	SSW17	SSW16	SSW17	SSW17	SSW17	SSW14	SSW16	S16	SSW24	SSW26	SSW27	SSW14.2	SSW27	
30-Jul	SSW22	SSW20	S21	SSE24	SSE25	SSE24	SSE21	SSE15	SSE13	SSE18	SSE24	SSE26	SSE22	S28	S26	SSE23	S20	S17	S22	SSW21	SSW32	ESE6	E15	SE19	S19.2	SSW32	
31-Jul	S30	S30	SSE22	W17	S2	ESE4	SE10	S15	S20	S19	S13	S16	SW12	W13	WNW9	SW22	SW11	NNW25	NNW7	W11	W8	WSW11	WSW16	WSW24	SSW9.6	S30	

WSW3.5	WSW2.6	WSW3.5	WSW3.6	SW1.3	SSE1.5	ESE1.9	SE1.4	SSE1.1	W0.9	NW2.2	NW2.7	NW3.4	NW2.9	NNW1.2	NNW1.4	NW2.5	NNW3.8	N3.8	NNE2.0	NNW0.7	W1.5	W1.5	SW2.0	Diurnal Average
WSW31	S30	W29	NNW29	NNW36	NNW36	N44	N39	NNW34	NNW37	NNW39	N42	NNW39	NNW36	NNW35	NNW37	NW32	WNW28	WNW34	NE28	SSW32	SSE29	S33	WSW32	Diurnal Maximum

DF - DAS Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods

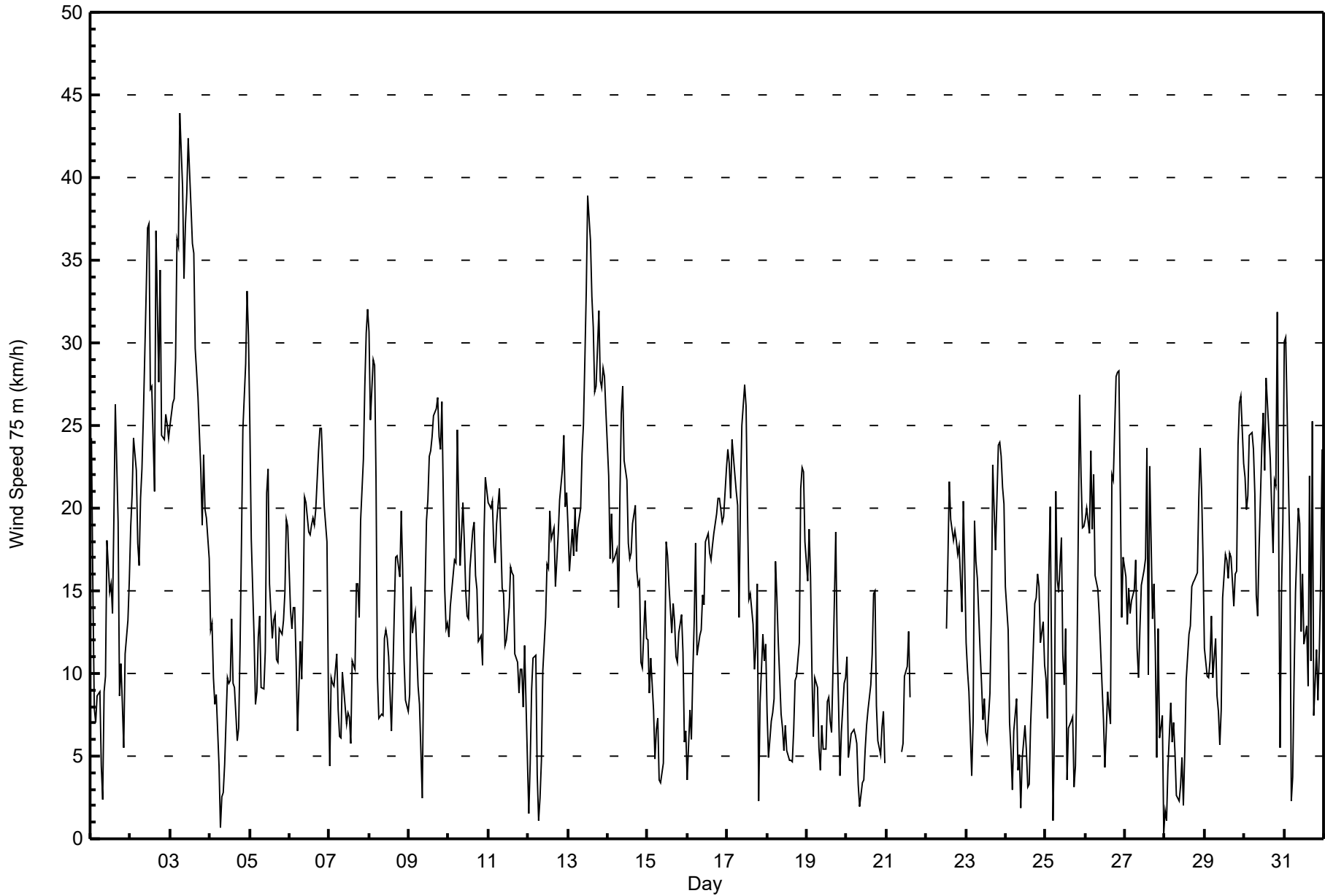


Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 75 m (WS75m) - km/h

Mannix - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744												
Maximum Value: 16 km/h on Jul 30 21:00														Hours of Data: 714												
Minimum Value: 1 km/h on Jul 4 05:00														Hours of Missing Data: 30												
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 9														Hours of Calibration: 0												
														Percent Operational Time: 96.0												
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	3	5	2	2	1	1	2	1	3	4	3	4	5	5	4	7	7	3	2	3	3	3	1	2	7	
2-Jul	2	2	3	3	2	3	2	4	4	5	5	6	5	4	4	9	8	7	4	5	4	5	3	2	9	
3-Jul	3	4	4	4	8	7	9	9	7	7	7	8	7	6	7	7	6	5	6	4	5	4	3	2	9	
4-Jul	2	2	2	1	1	2	1	1	2	2	3	4	3	3	3	3	3	2	5	4	1	1	1	2	5	
5-Jul	2	2	2	2	1	2	2	1	2	4	6	5	5	5	7	8	3	4	5	3	3	6	3	3	8	
6-Jul	3	3	2	2	2	3	3	3	4	4	5	5	6	5	5	5	4	6	4	3	3	4	2	3	6	
7-Jul	2	1	2	2	1	1	1	2	2	2	1	3	4	4	4	5	5	4	4	3	1	3	1	2	5	
8-Jul	3	4	2	2	4	6	3	2	3	3	2	2	3	3	3	4	5	4	3	2	4	2	2	2	6	
9-Jul	2	3	2	4	3	1	1	3	2	4	4	4	5	6	5	5	5	4	4	2	2	5	4	5	6	
10-Jul	5	5	6	7	7	9	8	7	7	6	5	6	5	6	4	3	4	5	5	4	4	6	5	6	9	
11-Jul	5	1	2	3	3	2	2	3	2	3	3	3	3	4	3	3	3	2	1	1	1	1	1	2	5	
12-Jul	1	2	2	1	1	3	1	2	2	2	3	4	4	4	4	3	4	3	4	3	4	4	3	3	4	
13-Jul	4	2	2	2	2	3	2	3	5	6	7	8	7	7	7	6	5	6	6	7	4	4	4	4	8	
14-Jul	3	2	4	4	2	2	4	5	5	5	4	4	4	5	5	4	4	4	6	4	2	3	2	3	6	
15-Jul	3	4	3	2	1	3	3	2	3	2	5	3	4	4	4	3	4	3	3	3	2	1	2	3	5	
16-Jul	2	1	2	2	3	1	4	3	5	5	5	6	7	7	6	5	5	5	5	6	5	5	6	6	7	
17-Jul	3	5	5	6	7	7	6	5	7	6	7	8	6	5	5	6	5	5	5	3	3	2	1	2	8	
18-Jul	1	1	1	2	3	3	3	3	2	2	3	3	3	4	3	4	3	2	1	3	2	2	1	2	4	
19-Jul	1	1	1	4	2	2	2	2	2	2	3	4	3	4	3	6	9	4	2	4	1	1	2	2	9	
20-Jul	3	1	1	2	2	2	1	2	2	2	3	3	3	3	3	4	3	3	4	2	3	2	2	1	4	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	2	3	2	3	3	DF	DF	DF	DF	DF	DF	DF	DF	DF	3	
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	4	3	3	4	3	3	2	2	1	2	3	3	4
23-Jul	4	2	1	2	4	3	3	3	3	3	2	2	4	3	3	7	3	3	4	2	2	5	2	2	7	
24-Jul	3	2	4	1	2	3	5	3	2	1	2	2	2	2	3	3	4	3	3	3	3	3	4	4	5	
25-Jul	4	3	9	2	5	5	10	7	7	5	6	6	7	2	3	2	2	3	1	12	3	5	4	3	12	
26-Jul	4	3	3	3	2	3	4	3	3	4	4	3	3	3	2	5	7	4	6	6	6	7	6	5	7	
27-Jul	3	3	2	2	1	2	2	2	2	3	3	5	4	10	5	5	3	2	3	6	2	3	5	1	10	
28-Jul	1	1	2	2	2	1	1	2	1	2	2	2	3	3	2	3	3	3	2	1	2	1	1	3	3	
29-Jul	3	1	1	2	3	2	3	1	2	2	4	4	6	5	5	6	5	4	3	2	2	2	3	1	6	
30-Jul	1	1	2	1	1	2	3	3	3	3	4	5	6	6	6	6	5	3	3	11	16	5	7	6	16	
31-Jul	6	7	4	4	3	2	4	3	3	4	3	3	4	4	8	7	3	9	4	3	2	3	4	3	9	
Diurnal Maximum																										
DF - DAS Failure																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 75 m (WS75m) - km/h
Mannix - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	73	10.22	10.22
6 - 11	192	26.89	37.11
12 - 19	254	35.57	72.69
20 - 28	158	22.13	94.82
29 - 38	32	4.48	99.30
> 38	5	0.70	100.00

Total Number of Valid Hours: 714

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed 75 m (WS75m) - km/h
Mannix - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	4	6	2	3	4	7	1	8	5	10	6	7	6	0	3	73
6 - 11	13	11	9	7	3	7	10	23	12	12	17	20	22	11	6	9	192
12 - 19	18	30	7	5	11	9	35	18	21	20	8	12	18	5	12	25	254
20 - 28	9	26	2	1	2	0	25	19	11	8	4	8	9	9	7	18	158
29 - 38	2	0	0	0	0	0	0	1	4	1	0	3	2	2	5	12	32
> 38	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5
Totals	46	71	24	15	19	20	77	62	56	46	39	49	58	33	30	69	714

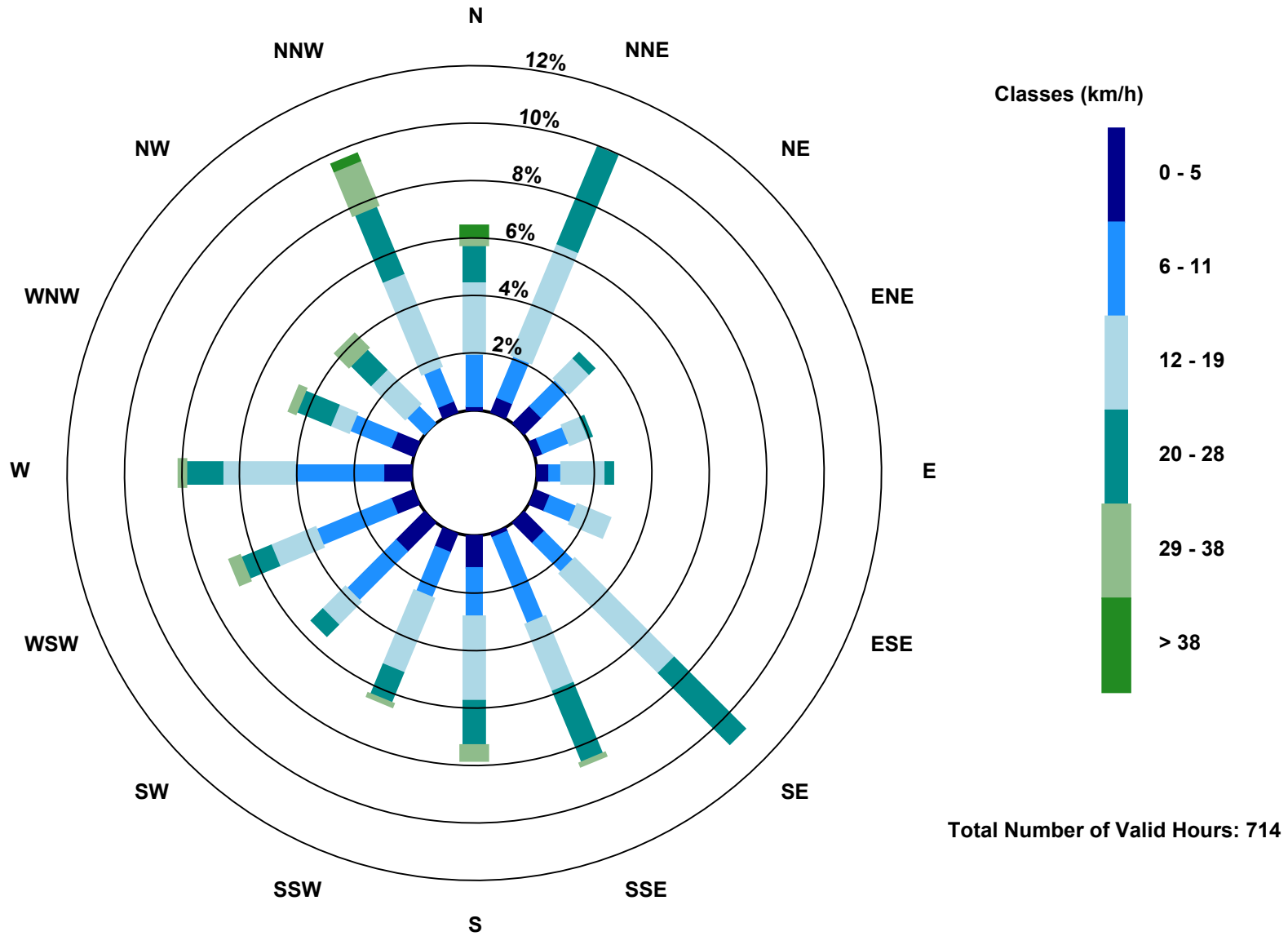
Total Number of Valid Hours: 714

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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





Maximum Speed: 46 km/h on Jul 3 07:00	Maximum Daily Speed Average: 30.9 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jul 25 05:00	Minimum Daily Speed Average: 3.8 km/h on Jul 18	Hours of Data: 711
Maximum Diurnal Speed Average: 4.3 km/h at hour 18	Minimum Diurnal Speed Average: 0.8 km/h at hour 9	Hours of Missing Data: 33
Monthly Average Velocity: 1.5 km/h 306.7 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 9 Median = 15 Q ₃ = 21 P ₉₀ = 26 P ₉₉ = 40	Percent Operational Time: 95.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	WNW26	NNW17	NNW9	WNW4	WSW7	SW8	SW5	WSW3	SSE7	S9	SSE19	SSE15	SE15	SE15	SSE20	SW27	WSW21	NW9	WNW11	NW9	WNW6	SW10	W14	W16	SW5.6	SW27
2-Jul	WNW19	WNW22	WSW26	W24	W19	W18	WNW22	WNW24	NW27	NW34	NW40	NW40	NW29	WNW29	WNW23	WNW39	NW34	WNW29	WNW36	W26	W25	WNW28	WNW27	WNW26	WNW26.0	NW40
3-Jul	NW26	NW28	NW28	NW31	NNW38	NNW38	N46	N41	NNW36	NNW39	NNW41	NNW44	NNW40	NNW38	NNW37	N31	NNW30	NNW28	N23	N20	N25	N21	N21	N18	NNW30.9	N46
4-Jul	NNW15	N15	NNW11	NNW9	NNW9	NNW6	NNE2	SSW2	WSW2	W4	W10	W9	W10	WSW13	W9	W9	W6	S6	SSE11	SSE18	SSE24	SSE29	S35	S33	SSW4.6	S35
5-Jul	SSW26	SSW19	SW14	SW11	SW10	SSW11	SSW13	SSW10	S9	SW12	WSW21	W22	W16	WNW13	WSW13	S14	SW11	WSW11	WSW13	W13	WNW15	NNW18	N21	N20	WSW9.3	SSW26
6-Jul	N16	NNW13	NNW15	NNW15	NNW12	N7	N12	N10	N14	NNE21	NNE21	N19	NNW19	NNW19	NNW20	NNW20	N20	N24	NNE25	NNE26	N23	N22	NNE19	ENE10	N16.9	NNE26
7-Jul	SSE5	SSE10	SW9	WSW8	WNW10	WNW9	WSW7	SW7	WSW10	WSW8	W7	W8	W8	SW6	SSW11	WSW10	SW15	WSW16	WSW14	WSW21	WSW25	WSW31	WSW35	WSW35	WSW12.4	WSW35
8-Jul	WSW34	W27	W31	W31	WSW24	WSW12	WSW9	WSW9	W8	W12	W13	W12	WNW11	W7	W10	NW14	WNW18	NW18	NNE17	NNE21	NNE18	NNE13	N9	N8	WNW11.0	WSW34
9-Jul	NNW8	NNW17	N13	N13	NE12	NNE8	NE8	ENE5	NE2	NNE11	N19	NNE21	NNE23	NNE24	N25	NNE26	NNE26	NNE27	NNE25	NNE25	NNE27	ENE16	E14	E16	NNE15.7	NNE27
10-Jul	ESE16	ESE20	ESE20	ESE21	ESE21	SE27	SE22	SE19	SE21	SE19	ESE17	SE15	ESE14	SE17	SSE18	SSE19	SE16	SE16	ESE15	ESE17	ESE13	SE19	SE23	SE23	SE18.4	SE27
11-Jul	SE22	SE21	SE21	SSE19	SSE19	SE21	SSE23	SSE19	SSE15	S14	S11	SSW12	SSW14	SSW16	SSW16	S16	S11	SSE11	SSE9	S10	SSW10	SW8	SW11	SW7	SSE13.2	SSE23
12-Jul	WNW2	SE5	SSE10	SE10	SE10	SE3	E1	WNW3	WNW5	WNW10	NW14	NW17	NW17	NW20	NNW18	NNW19	NNW16	NNW17	NNE19	NNE22	N24	NNW26	N22	NNW23	NNW9.6	NNW26
13-Jul	NNW21	NW18	NNW20	NNW19	NW21	NW18	NW20	NNW21	NNW24	NNW26	NNW30	NNW34	NNW40	NNW38	NNW34	NNW32	NNW28	N28	N33	N29	NNW29	NNW32	NNW31	N28	NNW26.6	NNW40
14-Jul	N23	N18	NNW21	NNW19	NW18	NNW19	NNW15	NNW22	NNW27	NNW28	NNW24	NNW22	NNW18	NNW17	N17	NNE19	NNE20	NNE17	N16	N16	NNE11	N11	N15	N13	N17.8	NNW28
15-Jul	NNW13	N10	N12	N8	NNW5	N7	NNE8	NNE4	NNW4	NNE5	NNE11	NNE18	NE17	NE15	NNE12	NNE14	NE13	NE11	NE11	NE13	NE14	NE11	ENE7	E8	NNE9.6	NNE18
16-Jul	ESE5	SE7	SE6	SE9	SE12	SE18	SE12	SE12	SE13	SE15	SE16	SE19	SE20	SE19	SE18	SE18	SE19	SE21	SE22	SE22	SE21	SE21	SE21	SE24	SE16.3	SE24
17-Jul	SE25	SE24	SE22	SE26	SE23	SE23	SE22	ESE16	SE22	SE26	SE28	SE28	SE21	SE16	ESE21	ESE18	ESE12	E13	ENE17	S2	NNW8	N12	NE11	ENE12	ESE16.2	SE28
18-Jul	E9	ENE6	NNE7	NNE7	N9	N19	NNE16	NNE12	NE7	NNE7	NE6	E7	NE5	E4	ENE5	NE5	SSW6	WSW9	WSW10	WSW12	WSW22	W24	W24	W19	NW3.8	W24
19-Jul	WSW17	W20	W17	W11	W7	WSW11	W11	WSW6	SW4	WSW7	W5	W6	SW8	SSW9	SSE7	NNE6	WNW10	W20	W13	WSW8	WSW4	SSW6	SW9	WSW9	WSW8.1	W20
20-Jul	WSW11	SW5	WSW6	SW6	SW6	SW6	WSW6	SW3	SSW2	WNW3	WNW4	W5	WSW6	W8	WNW10	WNW11	W15	W15	NW8	NNW6	NNE6	NE7	NNE8	NNE6	W4.7	W15
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	SSW5	WSW6	W10	WNW11	WNW13	W9	DF	DF	DF	DF	DF	DF	DF	DF	DF	---	WNW13
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	NNE13	NNE17	NNE22	NNE20	NNE18	NNE19	NNE19	NNE19	NNE19	NNE15	NNE22	N18	---	NNE22
23-Jul	N13	N11	N10	NNE4	SE9	SE19	SE17	SE17	SE12	SE9	SE7	SSE8	S6	SSE6	SE9	SSE14	SSE23	SSE20	SSE19	SSE24	SSE25	SSE25	SSE23	S21	SSE11.4	SSE25
24-Jul	SSW13	WSW13	WSW7	SSW3	SSW1	S4	SE7	ESE5	SE5	SSE2	SE5	SE6	S5	S3	SSW3	ENE7	ENE9	E16	E17	E18	E17	E14	E17	ESE16	ESE5.5	E18
25-Jul	ESE13	ESE10	SW16	UO	E1	ENE7	E26	ESE19	SE18	SSE19	SSE12	S10	WSW12	ESE4	SE8	SE7	SE8	ESE4	SSW4	WSW10	WSW28	SW23	SW19	SW20	S7.4	WSW28
26-Jul	SSW20	S20	S19	S24	SSE20	S23	SSE16	SSE15	SE14	SE12	ESE10	ESE8	E4	NE9	ENE8	NE7	NNE22	NE22	NNE29	NE29	ENE29	E23	E16	ENE17	ESE8.7	ENE29
27-Jul	NE16	NE14	NNE16	NNE14	NNE14	NNE15	NNE17	N12	NW10	NW13	NW16	NNW17	N17	NNE24	ENE10	S22	WSW13	W16	NW12	SSE4	S11	WNW5	NW9	N1	N7.0	NNE24
28-Jul	WNW2	NNW1	W4	W6	WNW3	WNW4	WNW5	WSW2	SW2	W3	WSW5	W2	WSW5	S9	S12	S13	S15	SSW15	SSW16	S16	SSW21	SSW24	SW24	SW19	SSW7.9	SSW24
29-Jul	SW13	SSW9	SSW8	SSW9	S10	SSW9	S11	S9	S8	SSE6	SSW8	SSW15	SSW17	SSW17	SSW16	SSW17	SSW17	SSW14	SSW16	S16	SSW24	SSW28	SSW29	SSW26	SSW14.3	SSW29
30-Jul	SSW24	SSW21	S20	S24	SSE25	SSE26	SSE22	SSE16	SSE14	SSE17	SSE23	SSE25	SSE22	S27	S26	SSE23	S20	S17	S22	UO	UO	ESE4	E18	SE19	SSE19.1	S27
31-Jul	S31	S32	SSE24	W18	SSW2	ESE5	ESE11	SSE15	S20	S19	S12	S16	SW12	W13	WNW11	WSW20	SW11	NW27	NNW8	W11	W9	WSW12	WSW17	WSW25	SW9.7	S32

WSW3.3	WSW2.5	WSW3.5	W3.0	WSW1.2	SE0.9	ESE1.7	SE1.2	SSE0.8	NNW1.2	NW2.5	NW3.0	NW3.8	NW3.3	NNW1.5	NW1.9	NW2.9	NNW4.3	N4.2	NNE3.2	N1.8	NNW1.7	WNW1.7	SW2.0	Diurnal Average
WSW34	S32	W31	NNW31	NNW38	NNW38	N46	N41	NNW36	NNW39	NNW41	NNW44	NNW40	NNW38	NNW37	WNW39	NW34	WNW29	WNW36	NE29	NNW29	NNW32	S35	WSW35	Diurnal Maximum

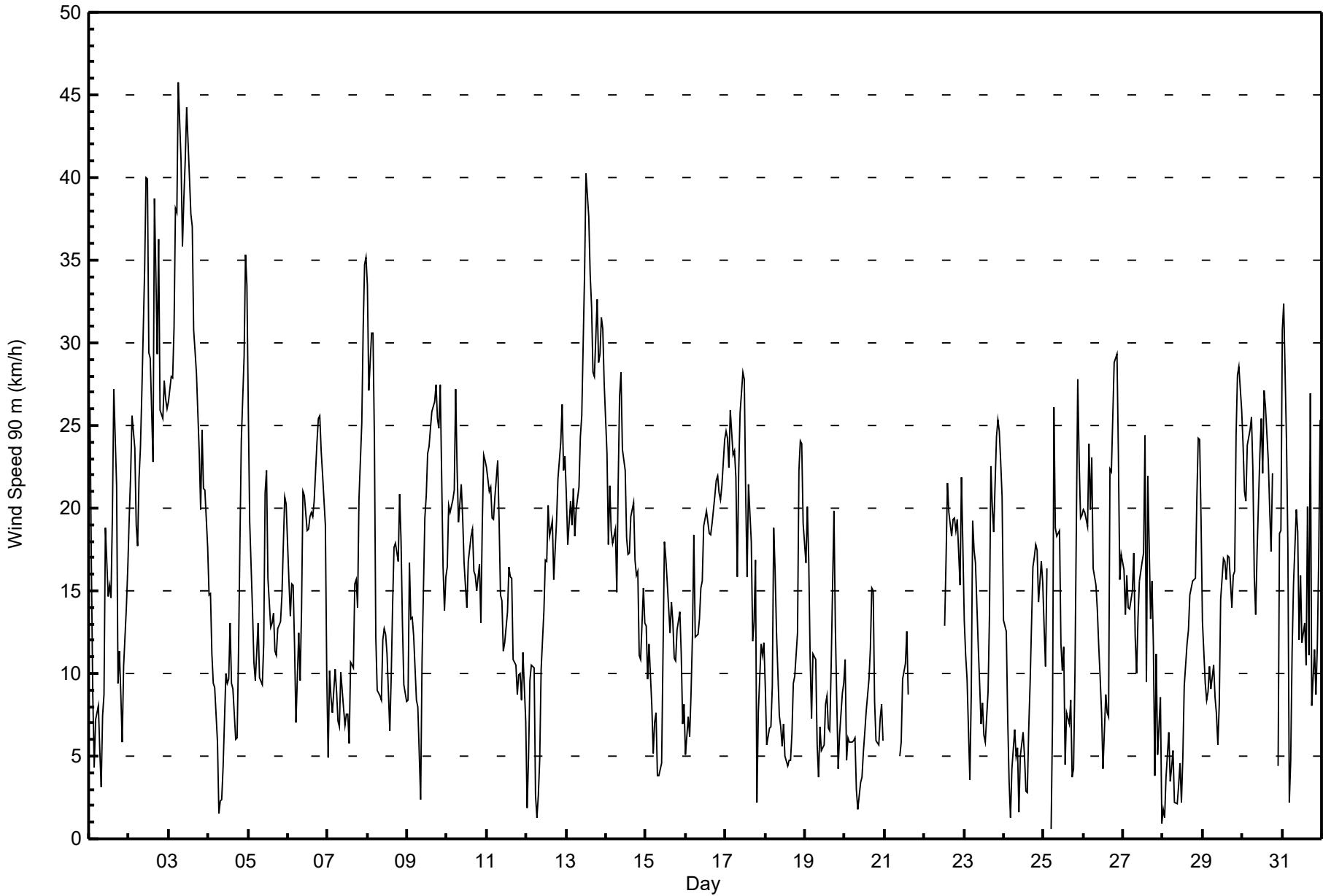
DF - DAS Failure UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 90 m (WS90m) - km/h
Mannix - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 12 km/h on Jul 25 20:00														Hours in Service: 744 Hours of Data: 711 Hours of Missing Data: 33 Hours of Calibration: 0 Percent Operational Time: 95.6												
Minimum Value: 0 km/h on Jul 4 05:00																										
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 9																										
Day	Hourly Period Ending At (MST)																							Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24	
1-Jul	3	5	2	2	1	1	1	1	3	4	3	4	4	5	4	7	7	3	2	3	2	3	2	2	7	
2-Jul	2	3	3	3	2	3	2	4	4	5	5	6	5	4	4	9	8	7	4	5	4	5	3	2	9	
3-Jul	3	4	4	4	8	7	9	9	7	7	7	8	7	6	7	7	6	5	6	4	5	4	3	2	9	
4-Jul	1	1	2	1	0	1	1	1	2	2	3	4	3	3	3	3	3	2	5	4	1	2	1	2	5	
5-Jul	4	2	2	2	1	2	2	1	2	4	6	4	4	6	7	8	3	4	5	4	3	5	3	3	8	
6-Jul	3	2	3	2	2	3	3	3	4	4	5	5	6	5	5	5	4	5	3	3	3	4	3	3	6	
7-Jul	2	2	2	2	1	1	1	2	2	2	2	3	4	4	4	5	4	4	4	3	2	2	1	2	5	
8-Jul	2	5	2	3	4	6	3	2	3	3	2	2	3	3	3	4	5	4	3	1	3	2	2	2	6	
9-Jul	2	2	1	3	2	1	1	3	2	4	4	4	5	6	5	5	5	4	3	2	2	5	4	5	6	
10-Jul	5	5	5	6	6	7	6	5	5	5	4	5	4	5	4	3	3	3	5	4	4	5	4	4	7	
11-Jul	4	1	2	3	2	2	1	3	2	3	3	3	3	4	3	3	3	2	1	1	1	1	1	2	4	
12-Jul	1	2	2	1	1	2	1	2	2	2	3	4	4	4	4	3	4	3	3	2	4	4	2	3	4	
13-Jul	4	2	2	2	2	2	2	3	5	6	7	8	7	7	7	6	5	6	6	7	5	4	4	5	8	
14-Jul	3	2	4	4	2	2	4	5	5	4	4	4	4	5	5	4	4	4	6	5	2	3	2	3	6	
15-Jul	3	4	3	2	1	3	3	2	3	2	5	3	4	4	4	3	4	3	3	3	1	2	3	3	5	
16-Jul	2	1	1	2	2	1	3	3	4	4	4	4	5	6	5	4	4	4	4	5	4	4	5	5	6	
17-Jul	2	4	4	5	5	5	5	5	5	5	6	6	5	5	6	7	4	5	5	3	4	1	2	1	7	
18-Jul	1	2	2	3	4	3	3	3	3	2	3	3	3	4	3	3	3	2	1	3	2	2	1	1	4	
19-Jul	2	1	1	4	3	2	3	2	2	2	3	4	3	3	3	6	9	4	2	4	1	1	2	2	9	
20-Jul	3	1	2	2	2	2	1	2	2	2	3	3	2	3	3	4	3	3	4	2	3	1	2	1	4	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	2	3	2	3	3	DF	DF	DF	DF	DF	DF	DF	DF	DF	3	
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	4	3	3	4	3	3	1	1	1	2	3	3	4
23-Jul	4	3	1	2	3	3	3	3	3	3	2	2	2	3	3	7	3	2	3	1	2	5	2	1	7	
24-Jul	2	1	3	1	2	2	2	1	2	1	2	2	2	2	2	3	3	3	3	3	4	4	4	5	5	
25-Jul	4	4	9	UO	6	6	10	7	8	5	6	6	7	2	2	2	2	3	1	12	3	5	4	3	12	
26-Jul	4	3	3	3	2	3	4	2	3	3	4	3	3	3	2	5	7	4	6	6	6	7	7	5	7	
27-Jul	3	3	2	2	1	2	2	2	2	3	3	5	4	11	6	4	3	2	3	5	2	3	4	1	11	
28-Jul	1	1	2	2	1	1	1	2	1	2	2	2	3	3	2	3	3	3	1	1	2	1	2	4	4	
29-Jul	3	1	1	1	2	2	2	1	2	2	4	4	6	5	5	6	5	4	3	2	2	2	2	1	6	
30-Jul	2	1	1	1	1	2	3	3	3	3	4	5	6	6	6	5	5	3	3	UO	UO	5	6	6	6	
31-Jul	7	7	4	5	3	2	3	2	2	3	3	4	4	4	8	4	3	9	4	3	1	2	4	3	9	
Diurnal Maximum																										
DF - DAS Failure UO - Unstable Operation																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed 90 m (WS90m) - km/h
Mannix - July 2023

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	70	9.85	9.85
6 - 11	185	26.02	35.87
12 - 19	237	33.33	69.20
20 - 28	170	23.91	93.11
29 - 38	39	5.49	98.59
> 38	10	1.41	100.00

Total Number of Valid Hours: 711

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed 90 m (WS90m) - km/h
Mannix - July 2023

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	4	3	2	3	7	4	3	4	8	5	6	6	11	0	3	70
6 - 11	11	12	10	8	3	4	14	10	14	13	16	23	22	11	5	9	185
12 - 19	22	25	8	4	11	13	29	19	13	17	8	13	17	5	11	22	237
20 - 28	16	22	1	0	2	5	29	18	12	9	4	10	9	8	7	18	170
29 - 38	3	1	1	1	0	0	0	1	4	1	0	4	2	3	4	14	39
> 38	2	0	0	0	0	0	0	0	0	0	0	0	0	1	2	5	10
Totals	55	64	23	15	19	29	76	51	47	48	33	56	56	39	29	71	711

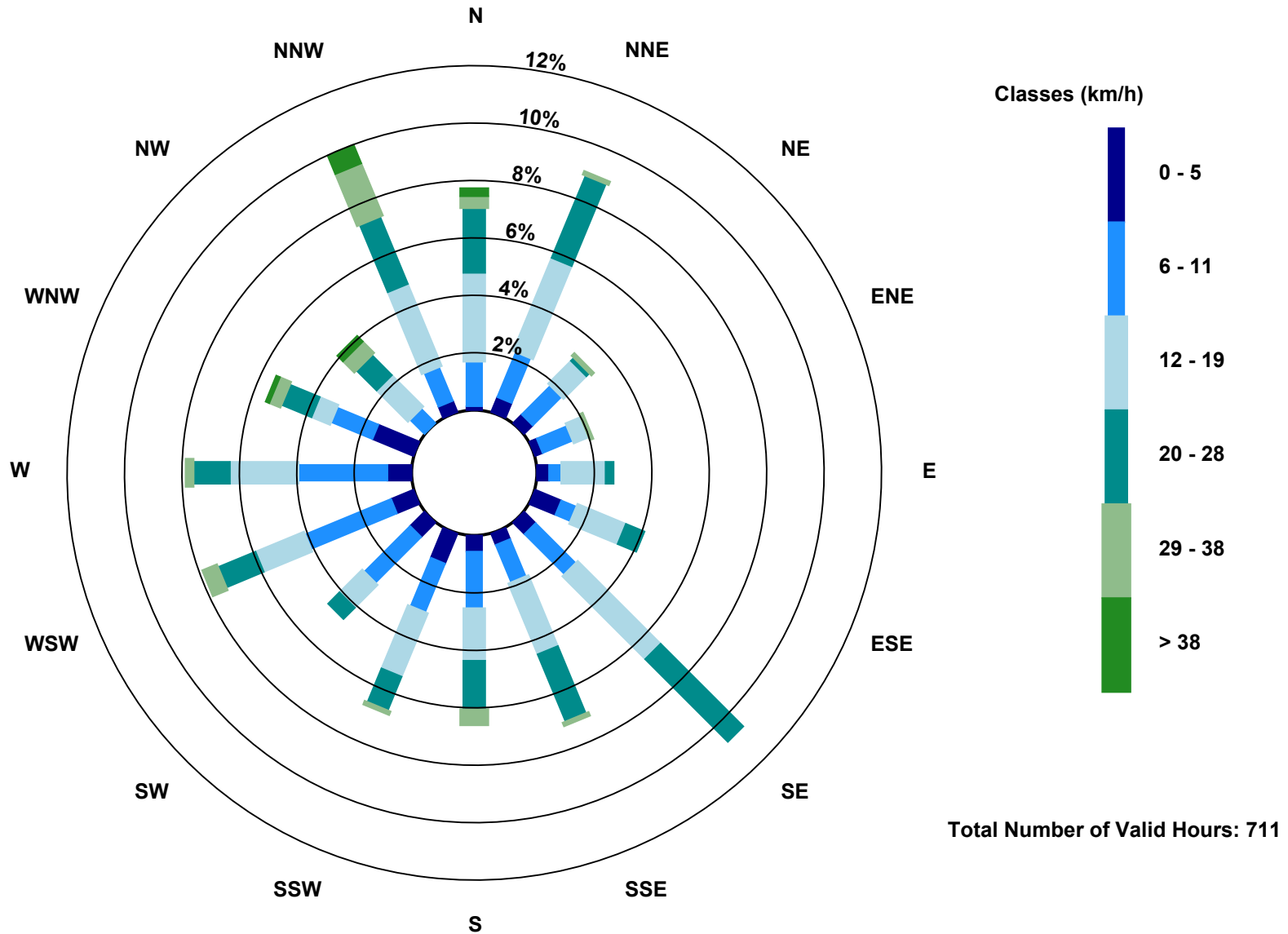
Total Number of Valid Hours: 711

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 20 m (WD20m) - deg

Mannix - July 2023

Direction of Maximum Speed: 352 deg on Jul 3 07:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 343.5 deg on Jul 3	Hours of Data: 714
Direction of Minimum Speed: 264 deg on Jul 16 03:00	Hours of Missing Data: 30
Direction of Minimum Daily Speed Average: 1.9 deg on Jul 18	Percent Operational Time: 96.0
Monthly Average Direction: 265.6 deg	

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	281	324	267	239	203	170	153	186	168	151	150	151	146	136	158	228	258	316	290	308	247	222	255	263	213.5	
2-Jul	277	274	245	263	269	269	283	289	319	314	320	324	319	288	283	300	324	294	287	277	264	279	291	289	291.0	
3-Jul	305	313	304	318	345	344	352	352	340	339	345	348	339	343	345	358	350	338	2	16	11	351	354	342	343.5	
4-Jul	297	314	276	300	264	258	257	220	259	281	277	277	260	255	266	274	269	175	161	162	163	171	179	175	231.1	
5-Jul	165	164	151	151	153	155	157	148	145	224	258	268	277	298	246	179	222	257	252	245	250	319	1	359	225.7	
6-Jul	333	329	294	325	337	352	16	6	3	25	14	10	342	348	342	341	13	15	16	18	16	8	2	54	2.5	
7-Jul	234	234	272	263	218	205	201	209	238	263	264	257	289	226	187	249	242	249	238	234	233	236	239	243	239.9	
8-Jul	250	267	264	261	235	202	160	176	247	279	270	276	285	279	259	315	289	312	17	37	18	353	5	310	280.8	
9-Jul	266	326	313	340	15	2	22	54	69	18	15	18	17	27	12	23	19	18	19	15	15	53	79	92	20.0	
10-Jul	130	117	129	131	129	136	135	132	136	135	129	130	130	149	157	157	143	138	112	104	124	141	142	139	133.9	
11-Jul	138	147	142	154	144	151	154	153	167	178	186	207	205	210	197	197	180	161	162	172	201	246	253	139	175.3	
12-Jul	153	152	204	196	191	123	158	276	280	283	305	328	317	320	336	343	333	342	31	34	14	343	355	338	336.2	
13-Jul	313	283	286	282	303	270	287	321	341	336	337	343	346	346	336	336	344	4	6	359	345	334	332	348	335.1	
14-Jul	6	349	344	332	299	343	340	338	335	343	342	345	333	348	9	27	30	25	13	16	17	3	14	360	354.7	
15-Jul	351	351	6	347	314	3	13	29	338	41	33	36	44	44	30	45	55	54	53	57	42	37	106	96	34.2	
16-Jul	172	250	264	170	174	169	164	152	138	142	137	137	138	131	134	145	141	138	140	139	144	143	138	136	143.4	
17-Jul	142	137	139	136	139	135	136	133	134	139	139	137	151	144	110	113	128	86	62	271	308	358	29	39	128.2	
18-Jul	31	296	344	349	345	4	16	18	45	32	52	93	78	106	69	52	195	256	255	248	255	258	254	255	319.0	
19-Jul	227	252	240	227	196	215	227	240	208	249	285	266	217	199	161	36	295	273	278	252	251	219	205	224	240.8	
20-Jul	204	201	199	193	178	175	214	229	161	290	290	267	255	268	296	287	282	277	311	354	26	48	7	265	260.1	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	191	238	268	288	284	280	DF	DF	DF	DF	DF	DF	DF	DF	DF	--
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	16	22	32	25	21	24	17	16	24	11	16	15	--
23-Jul	341	330	355	339	174	155	158	159	158	150	151	152	165	162	144	155	168	154	158	164	158	184	186	193	161.1	
24-Jul	209	213	171	173	151	166	153	151	136	117	111	156	177	203	186	64	75	92	90	75	69	56	86	113	119.4	
25-Jul	142	125	239	260	129	36	99	127	150	178	174	192	271	89	131	152	138	123	222	251	246	232	221	211	185.9	
26-Jul	194	169	162	165	152	165	157	148	145	141	121	107	88	64	72	57	25	41	20	40	75	92	89	76	97.6	
27-Jul	46	31	17	22	16	15	17	12	314	319	308	325	9	21	84	172	260	271	303	184	196	293	278	240	348.4	
28-Jul	236	197	230	255	230	215	233	235	240	262	240	295	261	168	175	171	182	200	200	186	183	195	215	187	203.7	
29-Jul	165	153	164	155	163	157	162	146	166	140	204	219	207	210	218	207	213	208	200	186	195	203	190	171	186.9	
30-Jul	169	162	157	157	153	155	153	148	145	160	160	156	153	177	181	168	190	171	174	209	215	107	97	160	165.5	
31-Jul	189	168	162	269	153	138	140	180	174	179	188	191	222	272	328	238	229	326	336	258	256	221	242	244	217.1	

221.2 221.3 231.9 233.5 183.9 159.2 127.8 137.3 155.6 255.6 301.9 309.3 316.5 325.8 350.4 318.3 315.8 337.0 6.3 17.7 274.2 269.1 285.1 210.1
Diurnal Average

DF - DAS Failure

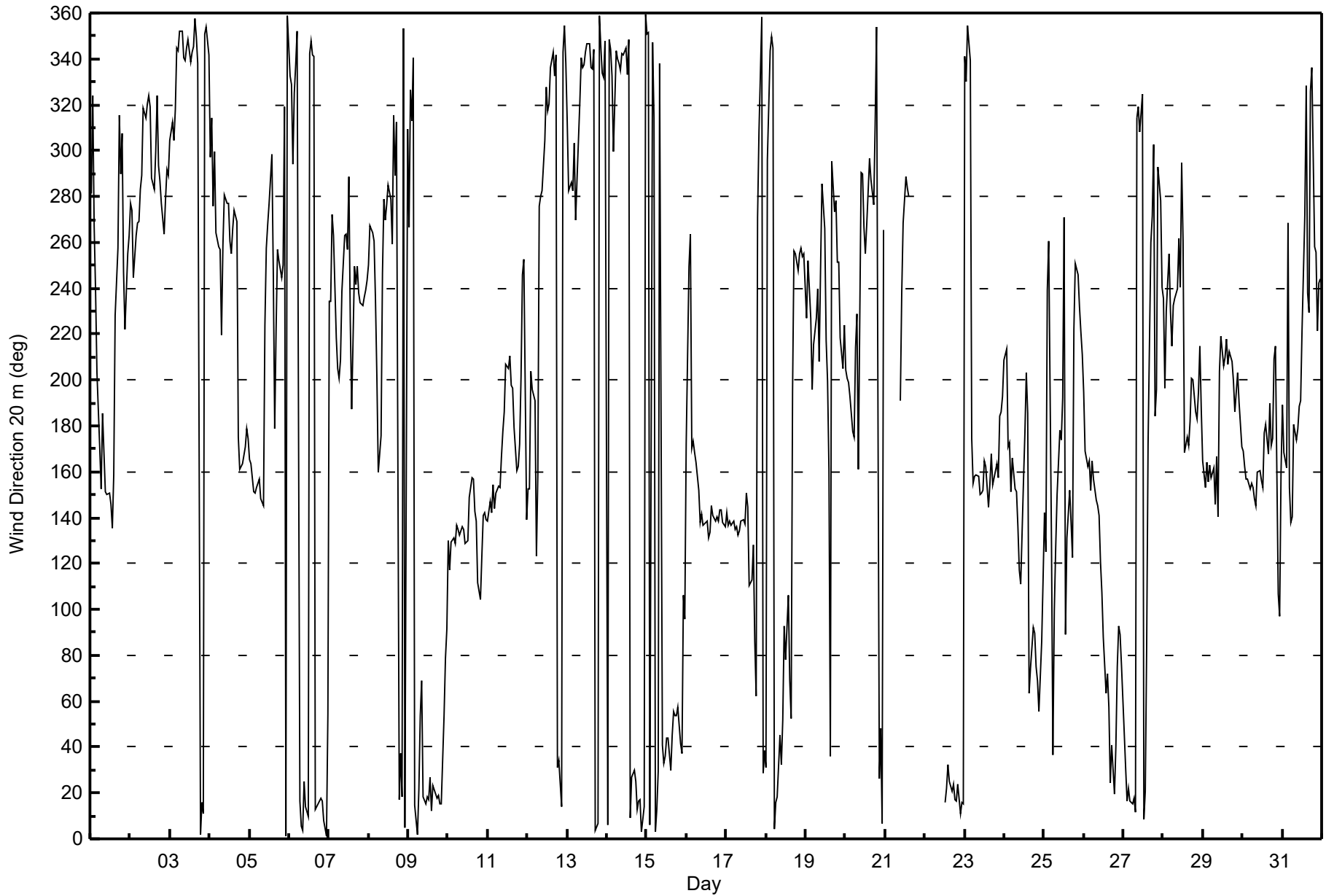
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 20 m (WD20m) - deg
Mannix - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 103 deg on Jul 24 14:00										Hours of Data: 714																
Minimum Value: 6 deg on Jul 7 22:00										Hours of Missing Data: 30																
Percentiles: P ₁ = 8 P ₁₀ = 11 Q ₁ = 14 Median = 20 Q ₃ = 29 P ₉₀ = 49 P ₉₉ = 80										Hours of Calibration: 0																
										Percent Operational Time: 96.0																
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	13	36	26	21	19	13	27	30	16	14	13	18	19	23	21	20	22	35	20	30	59	23	12	12	59	
2-Jul	13	11	11	10	10	11	12	16	15	14	14	16	20	12	12	17	15	19	10	11	9	11	12	11	20	
3-Jul	17	14	15	16	17	15	17	17	18	15	16	16	16	15	17	19	22	17	21	18	12	16	13	18	22	
4-Jul	13	25	15	30	13	25	78	64	72	47	32	35	37	24	32	39	44	41	26	13	10	10	12	12	78	
5-Jul	11	10	11	7	8	10	18	18	19	49	17	14	28	50	64	43	32	23	23	25	29	62	12	33	64	
6-Jul	37	23	14	22	21	31	18	26	26	20	26	27	28	29	26	29	29	17	14	15	12	11	10	30	37	
7-Jul	37	9	11	10	16	16	20	25	18	23	25	21	77	59	32	51	24	20	16	12	8	6	6	7	77	
8-Jul	10	15	8	8	32	57	24	23	54	17	16	20	23	58	32	30	24	33	21	12	29	19	27	42	58	
9-Jul	14	36	15	29	12	13	19	45	77	29	22	22	20	18	22	19	18	14	12	10	10	22	15	26	77	
10-Jul	16	15	14	14	13	11	12	13	13	15	22	22	29	21	17	16	16	15	23	13	20	11	12	11	29	
11-Jul	13	11	12	14	13	14	12	12	19	26	30	28	28	22	23	22	28	17	14	16	13	7	61	54	61	
12-Jul	28	79	24	13	53	41	41	100	79	26	26	24	26	23	27	23	22	21	16	13	21	15	9	18	100	
13-Jul	24	9	11	9	15	16	13	19	18	19	20	17	17	17	19	18	17	19	17	17	16	14	14	16	24	
14-Jul	14	12	21	20	16	28	22	18	19	16	22	21	21	25	23	20	18	26	23	27	21	17	14	14	28	
15-Jul	18	48	14	17	31	22	23	57	64	54	34	19	24	20	27	24	24	29	21	19	12	14	80	46	80	
16-Jul	54	20	96	15	12	15	21	17	19	17	20	16	18	15	23	19	16	13	12	12	12	13	11	11	96	
17-Jul	12	11	12	11	11	11	12	15	12	12	12	12	20	21	13	25	20	32	32	61	37	18	16	13	61	
18-Jul	29	34	29	23	32	17	12	19	31	31	51	29	49	64	71	57	34	23	12	9	10	9	9	10	71	
19-Jul	10	9	13	63	16	18	21	26	63	42	53	66	39	50	46	72	59	15	20	45	71	37	22	32	72	
20-Jul	11	36	36	20	18	19	25	42	87	58	93	41	36	42	33	30	16	15	38	16	43	49	46	37	93	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	49	49	21	27	23	46	DF	DF	DF	DF	DF	DF	DF	DF	49	
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	24	20	15	15	17	13	12	11	11	13	10	11	24
23-Jul	23	17	13	34	36	20	15	15	19	20	25	25	51	70	37	34	20	13	14	13	10	24	21	17	70	
24-Jul	24	21	24	14	26	26	19	17	24	42	31	23	46	103	68	50	22	10	12	12	16	27	17	22	103	
25-Jul	15	16	37	16	72	80	22	27	45	38	62	72	52	42	16	17	34	52	35	65	11	15	16	15	80	
26-Jul	21	12	12	13	12	14	16	15	16	21	34	40	54	28	30	57	21	16	14	20	17	15	23	20	57	
27-Jul	27	20	12	12	9	12	12	19	19	23	21	31	28	21	61	32	16	16	23	56	35	48	81	25	81	
28-Jul	17	17	13	58	24	19	24	50	47	64	64	102	53	33	21	22	24	19	15	14	10	8	10	24	102	
29-Jul	22	8	9	10	11	11	16	17	29	28	58	28	31	31	33	30	25	30	19	13	10	10	18	7	58	
30-Jul	8	8	9	9	9	11	15	18	16	17	15	17	21	21	21	23	24	19	20	35	35	47	34	19	47	
31-Jul	16	22	28	13	32	18	36	19	15	22	28	27	49	29	56	18	26	30	26	14	19	31	18	11	56	
Diurnal Maximum																										
54 79 96 63 72 80 78 100 87 64 93 102 77 103 71 72 59 52 38 65 71 62 81 54																										
DF - DAS Failure																										





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 45 m (WD45m) - deg

Mannix - July 2023

Direction of Maximum Speed: 350 deg on Jul 3 07:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 340.6 deg on Jul 3	Hours of Data: 714
Direction of Minimum Speed: 98 deg on Jul 12 00:00	Direction of Minimum Daily Speed Average: 3.1 deg on Jul 18
Direction of Minimum Speed: 98 deg on Jul 12 00:00	Hours of Missing Data: 30
Monthly Average Direction: 271.2 deg	Percent Operational Time: 96.0

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	280	324	300	264	222	173	160	199	162	145	142	144	140	130	152	221	254	310	292	305	260	217	254	262	215.8	
2-Jul	275	273	241	258	269	270	281	288	316	311	319	321	315	285	280	296	320	292	284	275	261	277	290	289	290.3	
3-Jul	303	310	304	317	343	342	350	351	339	336	342	346	335	339	342	355	346	334	358	11	7	352	354	344	340.6	
4-Jul	321	329	325	347	300	309	254	203	253	275	276	275	257	250	264	271	264	172	156	156	158	164	172	173	217.3	
5-Jul	167	168	170	163	164	156	159	150	146	216	252	262	270	293	242	182	214	252	245	245	268	333	358	359	220.7	
6-Jul	347	332	312	330	340	347	8	358	360	18	10	3	341	344	338	337	8	10	12	13	12	6	8	57	358.4	
7-Jul	157	213	256	270	254	227	202	206	237	256	261	258	279	217	188	244	234	242	234	231	232	234	237	241	236.8	
8-Jul	247	262	260	258	248	232	203	190	248	276	268	273	283	277	255	310	287	311	14	29	19	3	3	343	281.0	
9-Jul	301	330	327	346	17	5	23	52	52	14	9	13	12	22	9	18	15	15	17	12	13	54	79	90	15.5	
10-Jul	119	111	122	124	121	128	128	126	130	129	122	124	124	142	150	150	137	131	109	101	118	132	134	131	127.4	
11-Jul	132	141	138	147	140	143	146	149	163	174	182	198	199	203	190	188	175	156	159	165	196	230	234	98	168.5	
12-Jul	108	140	164	147	158	133	139	285	280	281	304	323	318	318	332	341	330	339	25	28	10	340	348	332	337.8	
13-Jul	315	303	310	304	311	288	296	320	336	332	334	340	342	343	334	332	340	1	2	355	342	331	328	344	333.3	
14-Jul	4	350	338	331	305	338	338	334	331	339	338	342	332	343	6	19	26	17	10	11	12	0	9	356	349.9	
15-Jul	346	352	4	347	318	1	13	23	332	25	25	29	36	37	21	37	47	44	48	51	36	35	67	83	27.0	
16-Jul	126	194	197	161	151	151	151	143	132	135	130	130	131	127	130	141	134	132	133	131	135	135	129	129	135.9	
17-Jul	137	130	131	128	129	127	128	124	128	133	133	131	141	134	108	108	122	84	62	268	316	358	29	51	121.1	
18-Jul	49	8	350	354	343	3	11	12	37	25	45	87	62	108	61	39	191	249	250	247	251	257	256	256	316.0	
19-Jul	239	260	252	262	229	232	234	236	205	238	275	267	213	199	154	28	293	270	273	248	239	201	202	232	243.2	
20-Jul	224	193	195	195	190	183	214	219	186	297	285	258	249	263	292	285	278	273	307	345	21	42	12	19	257.4	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	186	230	266	283	281	277	DF	DF	DF	DF	DF	DF	DF	DF	--	
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	12	16	25	21	15	20	14	13	16	5	10	9	--
23-Jul	347	342	360	351	141	143	148	151	149	143	146	148	169	163	139	149	163	149	153	160	151	173	171	172	153.3	
24-Jul	183	227	199	180	161	162	146	134	134	128	114	147	171	195	181	57	67	87	85	74	71	71	86	107	120.6	
25-Jul	127	117	231	260	143	28	93	121	143	173	164	186	263	78	125	145	136	119	214	244	241	227	218	209	183.6	
26-Jul	193	171	166	161	149	161	153	144	139	136	120	109	85	56	67	42	21	35	16	35	68	87	83	69	99.5	
27-Jul	40	30	16	17	12	11	11	5	311	316	305	322	3	15	79	169	253	267	304	176	188	277	304	291	343.9	
28-Jul	231	221	244	279	271	248	240	228	232	259	243	274	249	166	172	167	179	194	194	181	182	197	218	200	203.4	
29-Jul	196	160	163	159	158	166	156	148	164	139	201	208	201	204	209	200	205	200	193	181	189	202	200	189	185.8	
30-Jul	180	170	158	152	150	151	149	146	142	156	157	151	149	172	177	165	187	168	172	201	209	111	88	150	163.1	
31-Jul	180	166	156	268	149	122	130	173	169	175	186	186	215	264	310	232	224	323	332	258	257	223	243	240	210.1	
222.2 221.3 231.3 243.9 189.4 150.3 118.3 126.1 149.1 260.2 307.2 316.3 313.8 320.2 328.2 295.5 309.8 334.0 3.3 18.9 243.5 250.5 266.8 212.7																										
Diurnal Average																										

DF - DAS Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



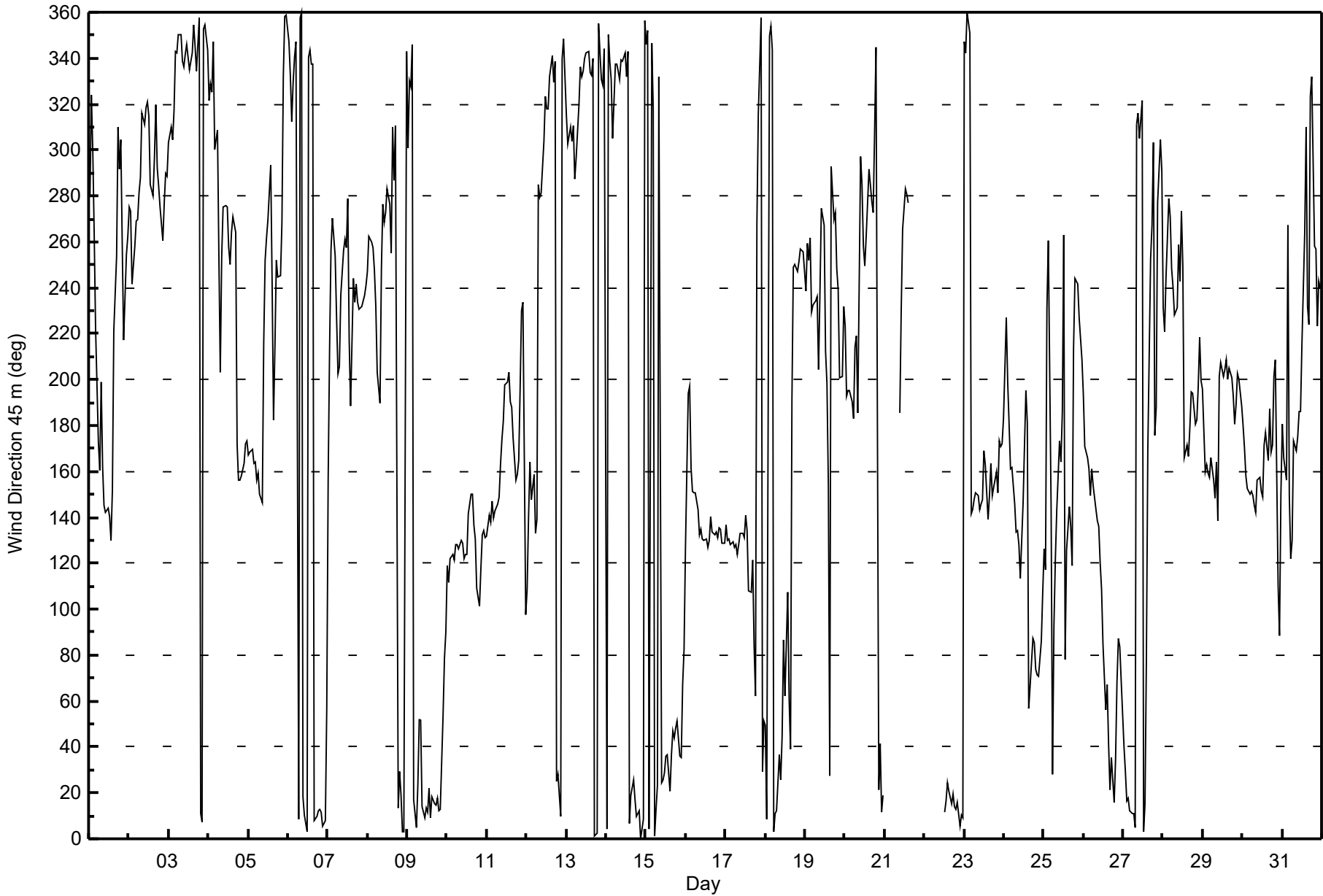
Summary of Hour Standard Deviations

Mannix - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 93 deg on Jul 28 12:00			Hours of Data:	714
Minimum Value: 2 deg on Jul 28 21:00			Hours of Missing Data:	30
			Hours of Calibration:	0
			Percent Operational Time:	96.0
Percentiles: P ₁ = 4 P ₁₀ = 7 Q ₁ = 9 Median = 14 Q ₃ = 22 P ₉₀ = 40 P ₉₉ = 74				

Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	12	26	26	7	17	15	23	41	10	14	8	11	14	18	19	17	20	27	17	25	41	20	9	9	41	
2-Jul	9	8	8	8	7	8	8	13	9	8	8	10	16	8	8	14	10	16	7	9	6	9	7	6	16	
3-Jul	11	7	9	10	13	10	12	11	13	11	10	10	10	10	12	14	18	11	17	12	8	11	9	9	18	
4-Jul	8	12	8	19	8	22	57	41	43	39	27	35	34	19	24	30	37	32	24	9	3	5	3	4	57	
5-Jul	4	6	7	9	6	5	9	12	11	42	13	11	23	48	64	36	23	20	17	21	36	35	8	12	64	
6-Jul	20	13	9	15	12	17	12	15	19	13	20	19	20	22	18	22	23	10	9	9	7	6	6	18	23	
7-Jul	40	22	9	6	10	13	13	17	13	19	18	19	45	52	25	38	20	17	13	6	4	3	3	4	52	
8-Jul	6	12	5	4	16	62	37	19	41	13	13	16	16	37	28	25	20	30	16	7	12	16	9	14	62	
9-Jul	10	18	10	20	13	17	14	40	63	25	15	15	12	13	15	14	13	9	8	6	6	21	14	20	63	
10-Jul	13	12	10	11	9	7	9	9	9	11	18	18	27	16	13	10	12	11	19	12	15	6	8	6	27	
11-Jul	9	6	6	8	9	8	8	6	13	17	18	19	20	16	13	13	20	13	10	11	10	5	21	87	87	
12-Jul	58	29	12	5	9	41	75	68	63	21	22	18	18	17	19	15	14	16	11	8	16	10	8	11	75	
13-Jul	9	4	6	7	6	11	8	13	10	11	13	12	12	11	14	13	11	14	11	13	12	9	9	12	14	
14-Jul	8	6	15	14	8	23	17	12	12	10	14	13	14	18	18	13	13	21	17	23	12	12	9	11	23	
15-Jul	13	35	11	12	24	18	14	36	55	45	29	13	18	15	19	18	21	23	16	14	7	6	38	31	55	
16-Jul	25	34	40	11	6	11	17	10	12	12	14	11	14	9	19	15	12	8	8	7	8	9	6	6	40	
17-Jul	7	5	7	5	6	6	6	10	7	8	7	7	13	15	10	19	15	26	26	84	27	10	16	9	84	
18-Jul	15	28	21	15	18	9	9	13	20	19	43	27	47	62	67	61	34	18	10	6	7	6	4	6	67	
19-Jul	9	4	8	71	34	14	12	19	68	29	36	63	32	38	41	71	56	12	18	31	28	24	16	15	71	
20-Jul	10	21	25	12	14	15	22	29	69	50	83	36	26	34	23	27	13	11	34	15	54	24	11	59	83	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	32	43	17	20	16	39	DF	DF	DF	DF	DF	DF	DF	DF	43	
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	16	14	9	10	11	8	8	7	6	9	6	7	16
23-Jul	15	11	8	24	30	9	9	11	13	14	17	18	43	48	33	29	16	8	9	7	4	12	7	6	48	
24-Jul	13	9	28	17	25	15	17	15	17	73	27	16	42	58	51	40	22	9	10	9	12	21	14	18	73	
25-Jul	11	13	39	12	79	64	18	25	43	35	54	70	41	46	10	18	28	51	26	55	8	10	11	9	79	
26-Jul	14	5	6	7	8	8	11	8	11	18	30	35	56	24	26	57	16	11	9	16	15	13	22	17	57	
27-Jul	22	14	9	8	5	7	7	14	11	13	12	24	21	16	63	27	13	15	18	57	29	41	85	85	85	
28-Jul	14	24	13	11	11	19	17	53	44	47	40	93	46	28	15	13	17	11	6	5	2	6	7	26	93	
29-Jul	20	7	7	12	9	11	9	9	19	21	54	22	21	21	27	24	19	23	11	6	5	4	9	4	54	
30-Jul	6	4	6	4	4	5	8	11	10	12	10	13	15	14	13	18	17	14	16	28	30	44	24	17	44	
31-Jul	10	18	19	12	46	13	31	9	7	12	18	16	45	25	47	15	19	30	25	12	11	23	14	7	47	
58 35 40 71 79 64 75 68 69 73 83 93 56 62 67 71 56 51 34 84 54 44 85 87																										
Diurnal Maximum																										

DF - DAS Failure





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 75 m (WD75m) - deg

Mannix - July 2023

Direction of Maximum Speed: 355 deg on Jul 3 07:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 345.5 deg on Jul 3	Hours of Data: 714
Direction of Minimum Speed: 87 deg on Jul 28 00:00	Direction of Minimum Daily Speed Average: 3.4 deg on Jul 18
Direction of Minimum Speed: 87 deg on Jul 28 00:00	Hours of Missing Data: 30
Monthly Average Direction: 292.2 deg	Percent Operational Time: 96.0

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	285	329	339	279	250	205	224	217	163	159	145	148	143	133	153	221	254	312	300	311	288	225	265	271	229.8	
2-Jul	282	282	246	261	275	277	287	292	323	316	325	326	318	288	283	300	325	296	289	280	263	281	294	294	294.9	
3-Jul	310	316	311	323	348	349	355	356	344	340	345	350	340	342	347	358	348	339	1	14	9	2	2	355	345.5	
4-Jul	337	345	340	340	327	345	28	195	249	273	280	279	259	253	265	274	262	175	158	157	159	163	171	180	210.3	
5-Jul	182	195	210	215	203	190	185	176	169	220	252	262	268	297	243	188	212	248	246	254	292	342	3	3	236.6	
6-Jul	359	344	337	343	348	351	7	358	3	20	14	7	346	347	342	342	12	12	15	15	14	10	21	64	3.7	
7-Jul	155	171	240	264	283	275	227	216	240	255	264	261	275	220	193	246	234	242	235	235	237	239	241	245	239.8	
8-Jul	249	261	260	259	254	251	237	225	254	277	270	273	284	277	258	312	288	314	18	32	25	21	9	358	283.8	
9-Jul	327	344	348	2	33	23	36	60	49	18	12	16	16	25	12	22	18	19	22	17	19	65	86	96	21.6	
10-Jul	116	115	124	126	124	130	131	129	133	131	124	127	125	143	151	151	140	133	111	105	119	133	135	134	130.2	
11-Jul	137	144	139	147	146	140	147	153	166	175	181	197	199	205	192	188	175	158	162	169	198	227	228	235	168.4	
12-Jul	299	141	152	146	148	137	115	287	291	286	309	327	321	322	337	346	336	344	28	30	13	347	351	339	346.0	
13-Jul	327	317	324	322	322	307	313	327	340	337	339	343	346	346	337	336	344	5	5	360	347	337	335	350	339.4	
14-Jul	10	357	344	339	315	343	343	337	335	343	342	346	339	348	12	20	28	18	14	15	17	3	11	360	354.3	
15-Jul	350	3	9	351	330	10	19	30	345	24	28	31	39	39	25	37	48	45	52	57	44	48	67	81	31.6	
16-Jul	114	149	158	150	138	140	138	144	135	136	132	133	133	130	134	143	137	135	135	133	135	135	131	133	136.3	
17-Jul	141	134	134	132	131	130	132	124	132	137	136	134	139	133	112	108	121	90	72	234	328	7	45	69	122.9	
18-Jul	81	50	15	15	355	8	16	21	42	25	47	83	54	109	69	45	191	250	254	254	255	261	263	263	319.1	
19-Jul	253	263	259	268	260	247	258	243	209	234	271	268	212	200	156	32	291	272	271	245	235	201	210	236	249.7	
20-Jul	242	220	236	217	223	217	232	222	180	293	292	256	251	265	293	286	280	276	309	343	24	45	18	34	273.0	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	196	235	271	285	282	278	DF	DF	DF	DF	DF	DF	DF	DF	--	
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	16	19	26	24	19	23	18	19	23	14	14	10	--
23-Jul	2	355	3	7	142	140	144	148	147	146	147	149	174	166	145	152	164	150	157	162	153	168	165	170	152.5	
24-Jul	196	244	245	189	190	164	149	124	136	144	125	148	177	185	185	62	69	89	89	83	80	82	94	108	120.5	
25-Jul	119	113	230	268	200	47	95	123	146	170	161	188	247	93	130	141	138	126	210	244	242	229	219	212	190.2	
26-Jul	199	181	176	167	157	166	162	149	143	139	126	115	89	59	71	42	27	39	20	38	70	89	88	70	106.3	
27-Jul	46	40	28	28	22	17	14	7	318	323	310	328	5	18	76	171	251	269	312	172	184	276	320	87	355.8	
28-Jul	261	214	253	278	288	288	266	233	230	265	248	266	250	170	172	169	180	195	195	184	189	205	226	216	208.5	
29-Jul	216	183	187	183	172	200	174	165	170	153	206	209	202	205	207	202	205	199	193	183	193	208	208	205	196.6	
30-Jul	203	197	177	168	161	157	155	152	150	159	161	153	151	172	178	166	188	170	177	202	211	115	86	146	169.3	
31-Jul	176	171	162	270	181	110	125	170	170	176	188	188	214	263	296	235	225	328	335	265	263	238	250	241	212.2	

238.7 240.9 247.4 256.4 236.1 153.6 117.4 129.6 152.9 275.6 315.6 323.4 318.3 325.2 328.2 300.2 315.5 339.1 8.4 24.5 285.9 264.3 273.8 227.1
Diurnal Average

DF - DAS Failure

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



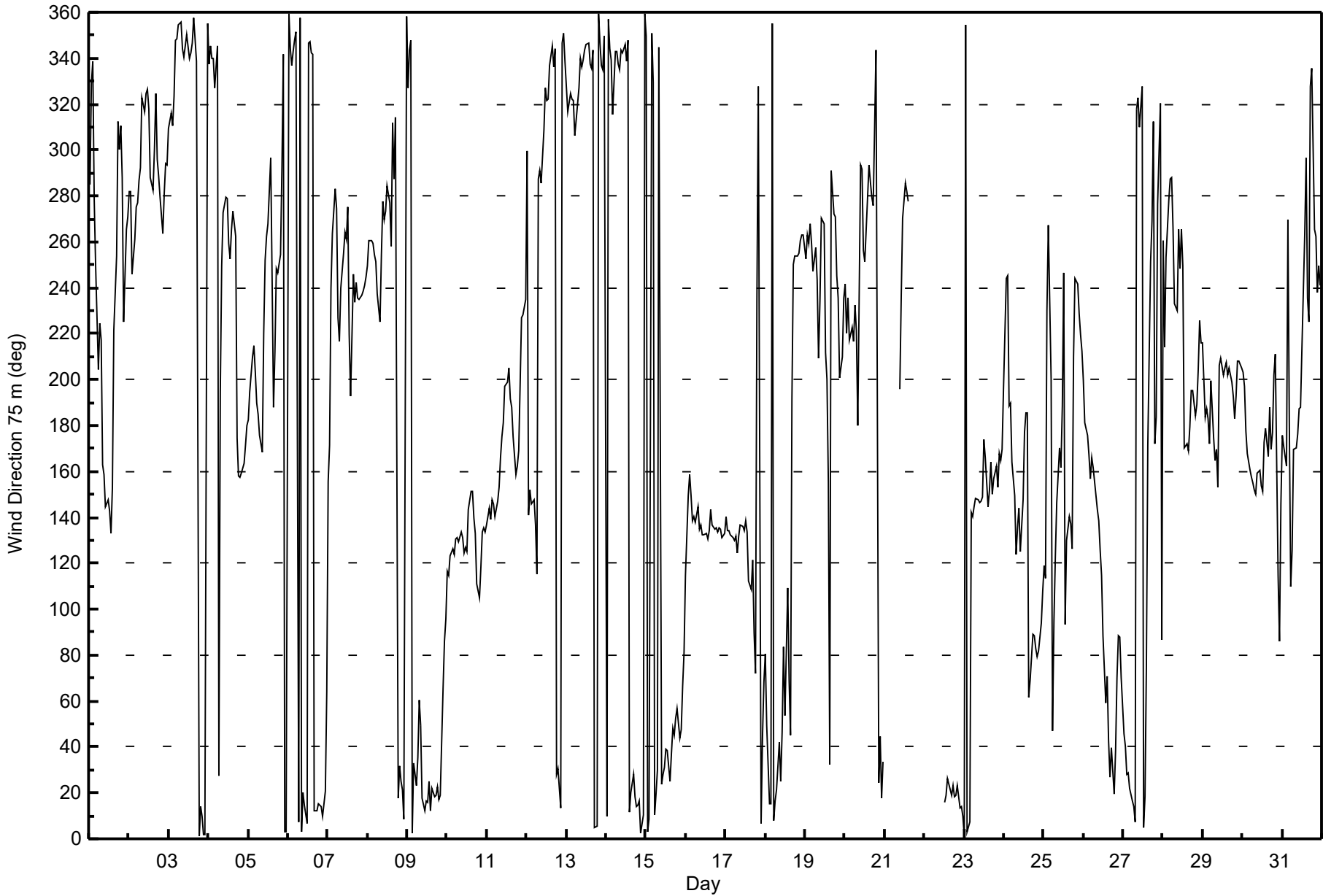
Summary of Hour Standard Deviations

Mannix - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 94 deg on Jul 28 02:00			Hours of Data:	714
Minimum Value: 2 deg on Jul 4 21:00			Hours of Missing Data:	30
			Hours of Calibration:	0
			Percent Operational Time:	96.0
Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 8 Median = 13 Q ₃ = 20 P ₉₀ = 36 P ₉₉ = 77				

Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	14	17	15	13	15	20	17	40	15	19	7	10	12	18	17	18	16	23	15	21	44	21	7	7	44	
2-Jul	6	7	7	8	7	8	6	12	8	7	7	9	15	8	8	14	8	15	6	9	6	7	6	6	15	
3-Jul	10	7	7	9	12	8	9	9	11	9	8	9	9	8	10	13	16	9	16	10	7	9	8	6	16	
4-Jul	5	7	5	10	7	10	93	36	43	39	26	36	32	18	23	29	33	20	20	7	2	3	3	2	93	
5-Jul	5	9	6	13	11	8	12	14	14	32	12	11	19	46	68	30	16	20	15	15	35	21	6	3	68	
6-Jul	8	11	9	9	9	17	10	12	17	10	16	17	18	21	17	19	20	8	7	7	5	5	6	18	21	
7-Jul	29	19	14	20	8	16	15	20	13	16	16	18	50	51	26	37	20	17	11	5	3	2	2	3	51	
8-Jul	4	9	4	3	7	54	24	16	25	13	11	15	15	37	26	26	23	29	14	3	4	9	10	10	54	
9-Jul	12	9	7	12	16	16	12	39	58	18	12	14	11	11	13	12	11	7	7	4	5	19	14	17	58	
10-Jul	14	13	12	12	12	8	10	11	9	11	17	17	26	15	12	9	12	11	18	14	15	8	7	6	26	
11-Jul	8	3	4	6	6	5	7	5	11	13	16	16	17	14	12	11	17	12	10	13	8	4	2	15	17	
12-Jul	74	21	6	3	4	35	77	57	51	20	22	15	16	16	17	13	12	15	9	4	14	7	8	8	77	
13-Jul	6	6	7	7	5	8	8	11	9	10	12	11	10	10	12	9	13	10	11	9	7	7	10	13	13	
14-Jul	7	5	11	11	7	20	15	12	10	9	12	11	13	19	16	10	12	20	16	21	11	10	8	10	21	
15-Jul	11	20	10	11	23	17	14	31	60	35	27	12	15	13	19	18	20	22	14	11	6	6	22	15	60	
16-Jul	22	14	16	14	6	6	10	10	11	11	16	11	13	10	17	13	12	7	6	7	7	8	8	8	22	
17-Jul	5	5	6	5	7	8	6	12	8	6	6	6	9	13	12	17	15	20	19	88	23	7	18	7	88	
18-Jul	9	27	19	16	7	6	8	13	17	17	43	24	46	63	68	59	39	18	10	5	6	5	3	4	68	
19-Jul	6	4	6	4	13	9	10	18	36	23	28	61	29	30	36	71	58	11	18	21	20	21	16	12	71	
20-Jul	10	28	28	23	8	12	14	29	66	55	78	40	23	31	21	23	11	9	32	16	58	14	9	12	78	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	28	38	15	20	14	27	DF	DF	DF	DF	DF	DF	DF	DF	DF	38
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	13	12	8	7	8	6	6	4	4	8	5	5	13
23-Jul	12	11	6	46	21	6	8	9	11	14	15	15	35	41	27	26	14	6	7	6	3	6	4	3	46	
24-Jul	17	8	29	21	44	22	20	20	17	59	23	19	23	43	45	29	20	10	9	7	9	13	13	17	59	
25-Jul	16	16	40	10	83	57	18	23	42	32	44	70	32	46	11	13	24	47	24	36	8	9	9	8	83	
26-Jul	11	6	6	7	6	6	10	7	10	16	29	30	60	24	24	59	15	10	8	16	13	14	21	13	60	
27-Jul	19	14	10	8	6	6	7	13	11	13	11	24	21	14	63	23	15	14	18	73	24	42	54	79	79	
28-Jul	52	94	24	9	11	6	16	44	54	50	32	82	44	22	14	11	14	9	5	4	3	3	8	24	94	
29-Jul	13	12	13	19	12	12	12	10	17	26	48	19	19	19	25	21	17	21	10	6	5	4	3	2	48	
30-Jul	3	4	9	3	5	4	5	9	10	11	8	11	13	12	11	17	16	13	14	20	29	73	20	15	73	
31-Jul	12	15	14	12	62	17	26	7	6	10	16	13	45	25	33	14	19	32	26	10	10	20	12	5	62	
74 94 40 46 83 57 93 57 66 59 78 82 60 63 68 71 58 47 32 88 58 73 54 79																										
Diurnal Maximum																										

DF - DAS Failure





Summary of Hour Standard Deviations

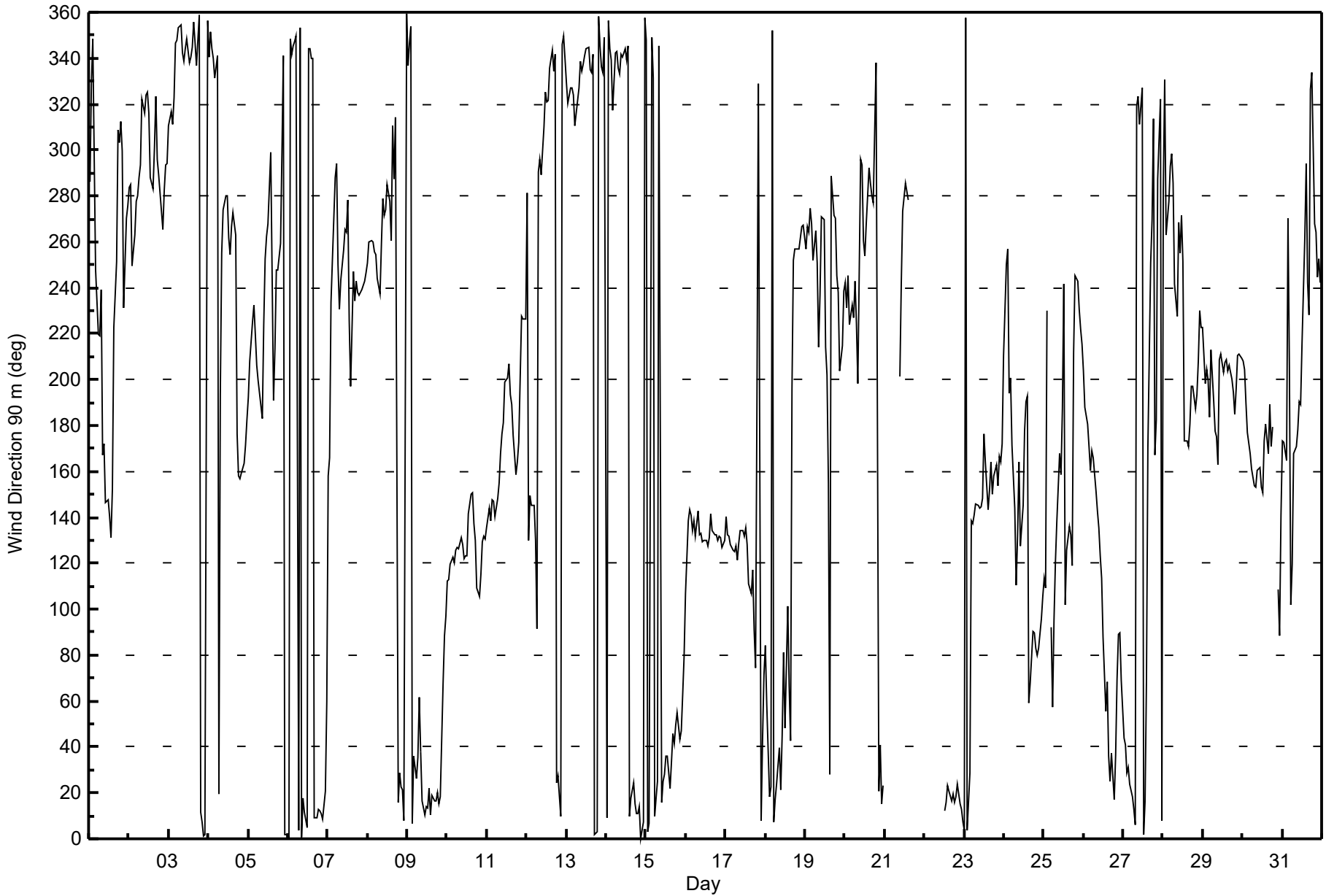
Mannix - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 88 deg on Jul 24 05:00			Hours of Data:	711
Minimum Value: 1 deg on Jul 4 21:00			Hours of Missing Data:	33
			Hours of Calibration:	0
			Percent Operational Time:	95.6
Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 8 Median = 12 Q ₃ = 18 P ₉₀ = 33 P ₉₉ = 75				

Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	15	12	11	26	14	15	13	30	22	22	7	10	13	17	18	18	13	22	14	18	40	23	7	7	40	
2-Jul	5	7	8	8	6	7	5	11	7	7	6	8	14	7	7	13	7	15	5	8	6	6	5	5	15	
3-Jul	9	6	6	8	11	8	9	9	11	9	8	8	8	8	10	12	16	9	15	10	6	8	7	6	16	
4-Jul	6	5	6	7	6	8	72	36	42	39	24	35	29	17	21	27	31	21	22	7	1	3	3	4	72	
5-Jul	7	7	8	10	10	9	12	13	16	27	11	10	18	49	70	29	13	19	14	13	33	18	6	3	70	
6-Jul	6	9	7	7	9	14	9	12	16	10	15	16	18	20	16	18	19	8	7	6	4	4	6	17	20	
7-Jul	28	12	18	18	9	14	13	19	13	15	15	18	35	50	25	34	21	16	11	4	2	2	2	3	50	
8-Jul	3	8	3	3	5	35	17	14	19	13	11	15	14	33	25	25	22	28	14	3	3	5	9	7	35	
9-Jul	11	8	5	9	13	11	12	33	63	17	11	12	10	10	12	11	10	7	6	3	5	19	14	15	63	
10-Jul	11	9	9	9	9	7	9	10	9	10	15	16	25	16	12	9	13	11	14	11	12	7	7	5	25	
11-Jul	7	2	3	6	5	4	6	5	12	12	15	16	17	13	12	11	18	13	10	14	8	4	2	8	18	
12-Jul	50	18	6	4	4	34	75	48	41	19	20	15	15	15	16	13	12	15	8	4	13	7	7	6	75	
13-Jul	5	6	7	6	6	8	7	10	8	10	11	11	10	10	12	11	9	12	10	10	9	5	6	9	12	
14-Jul	6	6	10	10	6	19	14	11	10	8	11	11	11	18	15	10	12	19	15	20	11	10	8	10	20	
15-Jul	11	15	10	12	22	16	14	23	51	32	26	12	14	12	20	17	19	21	14	11	5	6	14	12	51	
16-Jul	18	10	12	18	6	4	9	11	11	12	15	10	13	9	17	14	12	7	6	6	7	8	7	8	18	
17-Jul	5	5	5	4	5	7	6	10	7	6	6	6	8	12	9	13	12	17	18	81	25	7	17	10	81	
18-Jul	6	26	19	16	8	5	8	12	17	15	40	24	41	64	67	53	48	17	10	4	6	5	3	3	67	
19-Jul	5	6	8	6	14	7	8	19	31	22	29	54	26	28	34	71	57	10	16	19	17	20	16	12	71	
20-Jul	9	26	26	27	12	11	10	32	66	43	69	37	22	29	19	19	10	9	30	15	53	13	9	11	69	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	28	36	16	18	13	25	DF	DF	DF	DF	DF	DF	DF	DF	DF	36
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	13	12	7	7	8	5	4	3	3	7	4	4	13
23-Jul	10	12	5	51	17	5	8	9	12	14	16	14	35	38	26	27	13	6	6	6	3	5	4	6	51	
24-Jul	17	6	17	31	88	41	22	15	17	65	22	21	26	50	54	29	20	10	9	7	8	12	11	12	88	
25-Jul	12	12	44	UO	86	57	16	22	41	32	43	67	37	40	10	13	21	53	24	32	7	8	9	8	86	
26-Jul	10	7	7	6	6	6	10	8	10	15	28	29	73	22	24	52	15	9	7	16	14	13	21	13	73	
27-Jul	18	14	10	8	6	7	8	14	10	12	11	23	20	14	65	24	15	13	18	83	25	44	36	81	83	
28-Jul	42	60	32	12	24	9	16	43	53	44	31	69	40	22	13	11	15	9	4	4	3	3	9	22	69	
29-Jul	11	13	13	21	16	12	14	11	17	29	44	18	18	19	24	19	17	20	9	6	6	4	2	2	44	
30-Jul	2	2	10	4	5	4	5	9	10	11	8	11	14	13	11	16	16	14	14	UO	UO	81	18	16	81	
31-Jul	14	14	13	12	76	15	24	8	6	9	16	13	44	24	30	11	17	30	24	10	10	18	12	5	76	
Diurnal Maximum																										
50 60 44 51 88 57 75 48 66 65 69 69 73 64 70 71 57 53 30 83 53 81 36 81																										

DF - DAS Failure

UO - Unstable Operation





Summary of Hour Averages

Mannix - July 2023

Maximum Value: 1.5 km/h on Jul 17 15:00		Maximum Daily Average: 0.8 km/h on Jul 10		Hours in Service: 744																																													
Minimum Value: -1.3 km/h on Jul 3 07:00		Minimum Daily Average: -0.7 km/h on Jul 3		Hours of Data: 714																																													
Maximum Diurnal Average: 0.2 km/h at hour 8		Minimum Diurnal Average: 0.0 km/h at hour 23		Hours of Missing Data: 30																																													
Monthly Average: 0.09 km/h		Percentiles: P ₁ = -0.9 P ₁₀ = -0.4 Q ₁ = -0.2 Median = 0.1 Q ₃ = 0.4 P ₉₀ = 0.6 P ₉₉ = 1.0		Hours of Calibration: 0																																													
				Percent Operational Time: 96.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	-0.1	-0.2	-0.1	-0.1	0.0	0.2	0.0	0.0	0.4	0.3	0.7	0.6	0.6	0.9	0.6	0.3	0.2	0.0	0.0	-0.1	0.1	0.1	0.1	0.2	0.2	0.9																							
2-Jul	0.1	0.1	0.2	0.0	0.1	0.1	-0.1	-0.3	-0.6	-0.9	-1.0	-0.9	-0.4	-0.3	0.0	-0.6	-0.9	-0.4	-0.4	0.0	0.1	0.2	-0.5	-0.2	-0.3	0.2																							
3-Jul	-0.5	-0.6	-0.6	-0.7	-0.8	-0.9	-1.3	-1.0	-0.8	-1.0	-0.9	-1.0	-0.7	-0.9	-1.0	-0.7	-0.7	-0.5	-0.4	-0.3	-0.5	-0.3	-0.5	-0.2	-0.7	-0.2																							
4-Jul	-0.1	-0.2	0.0	-0.1	-0.1	0.0	0.3	0.5	-0.2	0.2	0.1	-0.2	0.0	0.0	0.3	0.0	0.4	0.4	0.6	0.6	0.5	0.4	0.4	0.2	0.6	0.6																							
5-Jul	0.5	0.3	0.2	0.2	0.3	0.4	0.6	0.4	0.4	0.4	0.3	-0.1	-0.2	-0.2	0.0	0.4	0.2	0.2	0.3	0.1	0.1	-0.1	-0.4	-0.4	0.2	0.6																							
6-Jul	-0.2	-0.2	-0.1	-0.2	-0.1	0.0	-0.2	0.0	-0.3	-0.2	0.0	-0.1	-0.3	-0.3	-0.2	-0.3	-0.3	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	0.1	-0.2	0.1																							
7-Jul	-0.2	-0.3	0.0	0.0	-0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.1	-0.2	0.1	0.4	0.2	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.5																							
8-Jul	0.0	0.1	0.2	0.0	0.0	0.2	0.1	0.2	0.1	0.0	0.0	-0.2	-0.1	-0.2	0.0	-0.1	0.0	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	0.0	0.2																							
9-Jul	-0.1	-0.1	-0.2	-0.4	-0.3	-0.3	0.0	0.4	0.1	0.0	-0.3	-0.3	-0.4	-0.1	-0.2	-0.3	-0.4	-0.5	-0.4	-0.6	-0.5	0.2	0.7	0.8	-0.1	0.8																							
10-Jul	0.8	1.2	1.0	0.9	1.0	1.0	0.7	0.8	0.7	0.8	0.8	1.1	0.7	0.8	0.6	0.8	0.7	0.6	1.2	1.0	0.8	0.5	0.5	0.4	0.8	1.2																							
11-Jul	0.6	0.5	0.4	0.5	0.4	0.3	0.6	0.5	0.5	0.4	0.3	0.1	0.2	0.1	0.3	0.1	0.4	0.5	0.3	0.2	0.0	0.0	0.0	0.0	0.3	0.6																							
12-Jul	0.1	0.2	-0.1	0.1	0.1	0.4	0.4	0.4	0.5	0.0	-0.2	-0.5	-0.2	-0.7	-0.3	-0.5	-0.4	-0.4	0.1	-0.1	-0.3	-0.4	-0.6	-0.3	-0.1	0.5																							
13-Jul	0.1	0.1	-0.2	0.1	-0.4	0.0	-0.1	-0.5	-0.5	-0.6	-0.8	-0.9	-1.1	-0.8	-0.6	-0.8	-0.5	-0.5	-0.9	-0.6	-0.5	-0.7	-0.6	-0.7	-0.5	0.1																							
14-Jul	-0.4	-0.4	-0.2	-0.2	-0.2	-0.2	-0.3	-0.6	-0.7	-0.7	-0.2	-0.4	-0.4	-0.4	-0.4	0.1	-0.3	-0.1	0.0	0.0	-0.2	-0.1	-0.2	-0.3	-0.3	0.1																							
15-Jul	-0.1	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	0.1	0.0	0.2	0.1	0.1	0.3	0.1	0.0	0.2	0.4	0.2	0.5	0.4	0.0	0.0	0.0	0.1	0.1	0.5																							
16-Jul	0.0	-0.1	0.0	0.0	0.5	0.4	0.3	0.4	0.5	0.7	0.7	0.8	0.9	0.9	1.0	0.9	0.8	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.5	1.0																							
17-Jul	0.6	0.6	0.5	0.7	0.8	0.8	0.7	1.1	0.8	0.7	0.9	0.9	0.5	0.4	1.5	0.8	0.8	0.5	0.5	0.0	0.0	-0.3	-0.2	0.0	0.6	1.5																							
18-Jul	0.0	-0.2	-0.1	-0.3	-0.1	-0.2	-0.2	-0.1	0.2	-0.1	0.0	0.4	0.5	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.1	0.0	-0.1	0.0	0.0	0.5																							
19-Jul	-0.1	-0.1	0.0	0.1	-0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.1	0.2	0.2	-0.1	-0.2	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.2																							
20-Jul	-0.1	0.0	0.1	0.0	0.1	0.2	-0.1	0.1	0.5	0.2	0.4	-0.1	0.0	0.2	0.0	-0.2	0.1	0.0	-0.1	-0.2	-0.1	0.0	-0.1	0.0	0.0	0.5																							
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	0.4	0.4																						
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	0.0																						
23-Jul	-0.3	-0.2	-0.2	-0.1	0.0	0.4	0.5	0.5	0.5	0.3	0.3	0.4	0.4	0.6	0.4	0.7	0.7	0.5	0.5	0.6	0.5	0.2	0.1	0.1	0.3	0.7																							
24-Jul	0.1	0.0	0.0	0.1	0.1	0.2	0.3	0.1	0.2	0.3	0.3	0.2	0.0	0.3	0.2	0.4	0.9	0.7	0.5	0.3	0.1	0.6	0.6	0.6	0.3	0.9																							
25-Jul	0.4	0.4	0.1	0.0	0.3	0.2	1.0	0.7	0.6	0.4	0.0	0.2	0.0	0.4	0.2	0.2	0.4	0.3	0.1	0.0	0.1	0.1	0.0	0.0	0.3	1.0																							
26-Jul	0.2	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.4	0.6	0.4	0.2	0.3	0.3	0.1	-0.2	0.1	-0.5	-0.1	1.2	1.1	0.9	0.9	0.4	1.2																							
27-Jul	0.3	-0.1	-0.4	-0.3	-0.3	-0.3	-0.4	-0.1	0.0	0.0	-0.3	-0.2	-0.2	-0.2	0.3	0.5	-0.1	-0.1	-0.2	0.3	0.2	-0.2	-0.1	0.0	-0.1	0.5																							
28-Jul	-0.1	0.0	-0.1	0.1	-0.1	0.0	-0.1	0.0	0.0	-0.2	0.0	0.2	0.0	0.4	0.4	0.3	0.4	0.2	0.1	0.1	0.2	0.0	0.0	0.1	0.1	0.4																							
29-Jul	0.0	0.4	0.4	0.4	0.5	0.3	0.5	0.3	0.4	0.5	0.3	0.3	0.2	0.0	0.2	0.3	0.0	0.4	0.3	0.2	0.1	0.0	0.1	0.3	0.3	0.5																							
30-Jul	0.4	0.6	0.7	0.7	0.7	0.6	0.6	0.7	0.5	0.6	0.9	0.9	0.9	0.5	0.6	0.5	0.3	0.5	0.4	0.0	0.1	0.2	0.5	0.5	0.5	0.9																							
31-Jul	0.1	0.6	0.4	0.1	0.2	0.3	0.4	0.3	0.4	0.6	0.3	0.4	0.3	-0.1	-0.2	0.1	0.1	-0.5	-0.2	0.1	0.0	0.1	0.0	0.1	0.2	0.6																							
																								0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	Diurnal Average		
																								0.8	1.2	1.0	0.9	1.0	1.0	1.0	1.1	0.8	0.8	0.9	1.1	0.9	0.9	1.5	0.9	0.8	0.9	1.2	1.0	1.2	1.1	0.9	0.9	Diurnal Maximum	
DF - DAS Failure																																																	



Summary of Hour Standard Deviations

Mannix - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																				Hours in Service: 744						
Maximum Value: 4.4 km/h on Jul 3 07:00																				Hours of Data: 714						
Minimum Value: 0.1 km/h on Jul 11 22:00																				Hours of Missing Data: 30						
Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 1.0 Median = 1.5 Q ₃ = 2.0 P ₉₀ = 2.5 P ₉₉ = 3.7																				Hours of Calibration: 0						
																				Percent Operational Time: 96.0						
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	1.5	0.8	0.5	0.4	0.6	0.8	0.3	0.4	1.0	0.9	1.6	1.8	2.0	2.2	2.0	2.4	1.5	1.1	1.1	0.8	0.7	0.8	0.7	1.0	2.4	
2-Jul	1.2	1.5	1.9	1.6	1.4	1.3	1.8	2.0	2.5	2.9	3.3	3.3	2.5	2.3	1.9	3.4	3.0	2.4	2.7	1.8	1.6	2.0	2.1	1.9	3.4	
3-Jul	2.1	2.3	2.2	2.6	3.5	3.6	4.4	4.0	3.5	3.7	3.9	4.2	3.7	3.6	3.7	3.2	3.2	2.7	2.3	1.9	1.8	1.6	1.3	1.1	4.4	
4-Jul	0.5	0.6	0.3	0.3	0.4	0.6	0.9	1.2	1.2	1.5	1.7	1.9	1.8	2.0	1.8	1.7	1.5	1.1	1.3	1.3	1.3	1.2	1.4	1.3	2.0	
5-Jul	1.1	1.0	0.6	0.7	0.9	1.1	1.2	1.2	1.3	1.7	2.3	2.1	2.0	1.6	1.5	1.6	1.1	1.4	1.3	0.8	0.7	1.0	1.2	0.9	2.3	
6-Jul	0.5	0.5	0.8	0.8	0.9	0.9	1.5	1.6	2.0	2.6	2.7	2.6	2.6	2.7	2.5	2.6	2.5	2.6	2.4	2.3	1.8	1.3	0.6	0.3	2.7	
7-Jul	0.4	0.4	0.5	0.3	0.4	0.7	1.0	1.1	1.3	1.4	1.2	1.4	1.6	1.6	1.8	1.7	1.9	1.7	1.3	1.2	0.9	0.8	0.9	1.3	1.9	
8-Jul	1.8	1.6	1.5	1.6	1.1	1.0	0.7	0.8	1.1	1.5	1.5	1.7	1.7	1.4	1.4	1.8	1.9	2.0	1.6	1.5	1.0	0.4	0.3	0.2	2.0	
9-Jul	0.3	0.5	0.6	0.7	0.9	0.8	1.0	1.3	1.2	1.9	2.4	2.5	2.8	2.9	3.0	3.0	2.8	2.6	2.3	1.7	1.7	1.3	1.6	1.9	3.0	
10-Jul	2.1	2.3	2.3	2.4	2.7	2.8	2.3	2.4	2.6	2.4	2.2	2.1	2.1	2.2	2.1	1.9	1.8	1.8	1.8	1.9	1.7	1.8	2.0	1.9	2.8	
11-Jul	1.6	1.2	1.3	1.1	1.1	1.1	1.3	1.5	1.7	2.0	1.7	1.8	1.9	2.0	2.2	1.9	1.4	1.3	0.9	0.6	0.3	0.1	0.3	0.2	2.2	
12-Jul	0.2	0.4	0.2	0.3	0.4	0.6	0.9	1.1	1.4	1.6	2.0	2.3	2.3	2.4	2.4	2.3	2.1	2.0	1.8	1.6	1.5	1.9	1.3	1.2	2.4	
13-Jul	1.2	0.7	0.8	0.8	1.4	0.9	1.3	2.1	2.8	3.0	3.3	3.6	4.2	3.8	3.5	3.4	2.9	2.7	3.2	2.8	2.4	2.4	2.4	2.2	4.2	
14-Jul	1.7	1.2	1.6	1.4	1.4	1.8	1.5	2.4	2.9	3.0	2.8	2.6	2.4	2.4	2.3	2.4	2.3	2.0	1.7	1.7	1.1	1.0	1.4	1.0	3.0	
15-Jul	1.0	0.9	0.9	0.6	0.5	0.7	0.9	0.7	1.0	1.1	1.7	2.1	2.2	2.0	1.9	2.0	2.0	1.7	1.5	1.5	1.1	0.6	0.3	0.3	2.2	
16-Jul	0.3	0.2	0.2	0.3	0.9	1.0	1.2	1.5	1.7	2.0	2.2	2.3	2.5	2.4	2.5	2.2	2.2	2.2	2.0	2.2	2.0	1.8	2.2	2.3	2.5	
17-Jul	1.8	2.0	1.9	2.5	2.6	2.7	2.3	2.4	2.3	2.6	2.7	2.7	1.8	1.6	2.4	2.1	1.8	1.3	1.7	0.7	0.6	0.9	0.7	0.6	2.7	
18-Jul	0.4	0.4	0.5	0.7	0.7	1.1	1.3	1.2	1.3	1.4	1.5	1.5	1.7	1.6	1.5	1.4	1.1	1.1	0.8	0.7	1.2	1.2	1.1	0.6	1.7	
19-Jul	0.5	0.4	0.4	0.3	0.4	0.6	0.8	1.0	1.2	1.4	1.5	1.5	1.7	1.5	1.4	1.8	1.8	1.6	1.4	0.9	0.2	0.3	0.4	0.3	1.8	
20-Jul	0.6	0.3	0.4	0.4	0.6	0.8	0.8	1.0	1.3	1.6	1.6	1.6	1.7	1.9	1.7	1.8	1.8	1.7	1.1	0.5	0.5	0.4	0.4	0.3	1.9	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	1.3	1.4	1.5	1.7	1.7	1.5	DF	DF	DF	DF	DF	DF	DF	DF	DF	1.7
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	1.8	2.1	2.2	2.2	1.9	1.8	1.4	1.2	1.1	0.6	1.2	1.1	2.2
23-Jul	0.7	0.6	0.4	0.3	0.4	1.2	1.3	1.4	1.4	1.4	1.2	1.5	1.5	1.5	1.7	1.9	2.0	1.5	1.3	1.3	1.1	1.0	0.6	0.5	2.0	
24-Jul	0.6	0.5	0.4	0.5	0.4	0.7	1.0	0.9	1.2	1.1	1.3	1.2	1.1	1.0	1.1	1.4	1.4	1.6	1.5	1.4	1.2	1.0	1.6	1.6	1.6	
25-Jul	1.7	1.3	1.6	1.2	1.1	1.5	2.7	2.3	2.8	1.9	1.6	2.1	0.9	0.9	1.0	0.8	0.9	0.7	0.5	1.3	2.2	1.9	1.8	1.7	2.8	
26-Jul	1.6	1.3	1.2	1.4	1.2	1.7	1.3	1.5	1.5	1.7	1.9	1.8	1.4	1.6	1.4	1.6	2.3	2.3	2.6	2.8	3.1	2.5	2.2	2.0	3.1	
27-Jul	1.6	1.3	1.2	0.9	1.0	1.3	1.6	1.3	1.3	1.7	2.1	2.4	2.4	2.7	2.8	2.5	1.4	1.5	1.3	0.9	1.0	0.6	0.8	0.2	2.8	
28-Jul	0.3	0.2	0.3	0.3	0.5	0.5	0.9	1.0	1.1	1.3	1.3	1.2	1.6	1.3	1.6	1.6	1.8	1.9	1.6	1.0	0.9	0.8	0.7	0.8	1.9	
29-Jul	0.5	0.7	0.9	0.9	1.1	0.8	1.4	1.2	1.4	1.5	1.8	2.1	2.3	2.3	2.1	2.3	2.2	1.8	1.7	1.1	1.0	1.0	0.9	0.8	2.3	
30-Jul	1.0	1.1	1.1	1.2	1.3	1.3	1.5	1.6	1.6	2.0	2.4	2.7	2.5	3.0	3.0	2.5	2.3	1.7	1.5	1.9	2.9	0.8	1.4	1.4	3.0	
31-Jul	2.0	2.3	1.2	1.2	0.6	0.7	0.9	1.5	1.9	2.3	1.8	2.2	2.1	1.9	1.5	1.6	1.4	2.8	1.1	0.7	0.3	0.6	0.9	1.7	2.8	
2.1 2.3 2.3 2.6 3.5 3.6 4.4 4.0 3.5 3.7 3.9 4.2 4.2 3.8 3.7 3.4 3.2 2.8 3.2 2.8 3.1 2.5 2.4 2.3																										
Diurnal Maximum																										
DF - DAS Failure																										



Summary of Hour Averages

Mannix - July 2023

Maximum Value: 2.3 km/h on Jul 10 02:00		Maximum Daily Average: 0.9 km/h on Jul 10		Hours in Service: 744																							
Minimum Value: -1.3 km/h on Jul 13 13:00		Minimum Daily Average: -0.6 km/h on Jul 3		Hours of Data: 714																							
Maximum Diurnal Average: 0.2 km/h at hour 8		Minimum Diurnal Average: -0.1 km/h at hour 23		Hours of Missing Data: 30																							
Monthly Average: 0.03 km/h		Percentiles: P ₁ = -0.9 P ₁₀ = -0.5 Q ₁ = -0.3 Median = 0.0 Q ₃ = 0.3 P ₉₀ = 0.7 P ₉₉ = 1.4		Hours of Calibration: 0																							
				Percent Operational Time: 96.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	-0.6	-0.4	-0.4	-0.4	-0.4	0.0	0.0	-0.1	0.2	0.2	0.7	0.5	0.9	1.4	0.6	-0.5	-0.5	-0.1	-0.2	-0.2	-0.2	-0.2	-0.3	-0.2	0.0	1.4	
2-Jul	-0.3	-0.4	-0.6	-0.3	-0.2	-0.1	-0.3	-0.3	-0.3	-0.7	-0.8	-0.7	-0.4	-0.4	-0.3	-0.9	-0.5	-0.7	-0.7	-0.3	-0.5	-0.1	-0.6	-0.5	-0.5	-0.1	-0.1
3-Jul	-0.3	-0.4	-0.5	-0.6	-0.9	-0.9	-1.0	-0.7	-0.7	-1.1	-0.9	-1.2	-0.9	-1.1	-0.9	-0.2	-0.4	-0.6	-0.3	-0.1	-0.2	-0.1	-0.4	-0.4	-0.6	-0.1	-0.1
4-Jul	-0.3	-0.4	-0.3	-0.2	-0.4	-0.2	0.4	0.5	0.0	0.2	0.5	-0.3	-0.1	-0.1	-0.2	0.6	-0.3	0.3	0.2	0.6	0.7	0.4	0.2	0.4	0.1	0.7	
5-Jul	0.4	0.0	-0.1	-0.1	-0.2	0.2	0.6	0.4	0.5	0.4	0.2	-0.2	-0.5	0.1	-0.4	0.2	-0.1	0.0	-0.1	-0.3	-0.4	-0.3	-0.4	-0.4	0.0	0.6	
6-Jul	-0.3	-0.4	-0.4	-0.2	-0.2	-0.1	-0.2	0.2	-0.4	-0.1	0.4	0.3	0.3	0.0	-0.2	0.1	0.1	-0.2	-0.1	-0.1	-0.4	-0.3	-0.4	0.0	-0.1	0.4	
7-Jul	0.1	-0.3	-0.3	-0.3	-0.3	-0.2	-0.2	0.0	-0.1	-0.2	-0.1	-0.3	0.1	-0.2	0.1	0.3	-0.2	0.3	-0.3	-0.4	-0.5	-0.6	-0.7	-0.9	-0.2	0.3	
8-Jul	-0.8	-0.4	-0.4	-0.6	-0.5	-0.1	-0.1	-0.1	0.0	-0.3	0.0	-0.5	-0.4	-0.4	-0.3	-0.1	-0.1	-0.2	0.0	0.0	-0.2	-0.3	-0.2	-0.3	-0.3	0.0	
9-Jul	-0.4	-0.3	-0.3	-0.4	-0.1	-0.2	0.1	0.4	0.1	0.1	-0.5	0.0	-0.2	0.4	0.2	0.1	0.0	-0.1	0.3	-0.2	-0.3	0.2	0.2	0.6	0.0	0.6	
10-Jul	1.3	2.3	1.0	1.0	1.4	1.0	0.3	0.6	0.5	0.5	0.9	1.5	0.7	1.3	0.5	0.6	0.4	0.5	1.3	1.0	1.1	0.4	0.7	0.5	0.9	2.3	
11-Jul	0.6	0.5	0.3	0.4	0.4	0.2	0.7	0.7	0.4	0.1	0.2	-0.4	-0.3	-0.1	-0.2	-0.1	0.5	0.5	0.1	0.0	-0.3	-0.3	-0.3	-0.1	0.2	0.7	
12-Jul	0.0	0.2	0.1	0.3	0.2	0.3	0.3	0.5	0.9	0.0	-0.2	-0.2	-0.5	-0.7	-0.4	-0.8	-0.3	-0.3	0.3	0.1	-0.2	-0.6	-0.9	-0.5	-0.1	0.9	
13-Jul	0.1	-0.2	-0.6	-0.3	-0.6	-0.3	-0.4	-0.6	-0.7	-0.7	-0.9	-0.8	-1.3	-0.9	-0.6	-0.5	-0.7	-0.3	-0.5	-0.3	-0.8	-0.9	-1.0	-0.9	-0.6	0.1	
14-Jul	-0.1	-0.6	-0.3	-0.5	-0.4	-0.3	-0.2	-0.5	-0.5	-1.0	-0.2	-0.5	-0.1	-0.5	0.3	0.2	0.1	0.2	0.2	0.1	-0.1	-0.1	-0.2	-0.5	-0.2	0.3	
15-Jul	-0.3	-0.1	-0.2	-0.3	-0.2	-0.1	-0.1	0.1	0.2	0.0	0.3	0.4	0.6	0.1	0.1	0.2	0.6	0.5	0.7	0.4	0.1	0.0	0.0	0.1	0.1	0.7	
16-Jul	0.0	-0.2	-0.1	0.1	0.8	0.4	0.2	0.3	0.4	0.8	0.6	0.4	0.7	0.8	1.1	1.2	0.4	0.5	0.4	0.6	0.3	0.4	0.4	0.5	0.5	1.2	
17-Jul	0.7	0.7	0.6	0.7	0.7	0.4	0.4	1.7	0.9	0.7	0.8	1.0	0.4	0.4	1.9	0.6	1.5	0.6	0.4	-0.1	-0.2	-0.2	-0.2	0.1	0.6	1.9	
18-Jul	0.1	0.0	-0.1	-0.2	-0.2	-0.1	-0.2	-0.1	0.5	-0.3	-0.1	0.7	0.8	0.2	0.3	0.3	0.0	-0.2	-0.2	-0.2	-0.5	-0.5	-0.5	-0.5	0.0	0.8	
19-Jul	-0.5	-0.5	-0.3	0.0	-0.2	-0.3	-0.3	0.0	-0.2	0.2	-0.2	0.1	0.0	0.2	0.1	-0.2	-0.4	-0.3	-0.2	-0.1	-0.2	-0.1	-0.2	-0.3	-0.2	0.2	
20-Jul	-0.3	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	0.1	1.1	0.3	0.7	0.0	-0.2	0.1	-0.2	-0.5	-0.2	-0.2	-0.2	-0.2	-0.1	0.1	-0.2	0.0	0.0	1.1	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	0.5	0.0	-0.6	-0.6	-0.4	-0.5	DF	DF	DF	DF	DF	DF	DF	DF	--	0.5	
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	0.0	0.1	0.0	0.0	-0.2	-0.1	-0.2	-0.2	-0.3	--	0.4
23-Jul	-0.3	-0.3	-0.2	-0.2	0.0	0.4	0.4	0.6	0.5	0.2	0.4	0.3	0.7	1.0	0.2	0.9	0.5	0.4	0.4	0.6	0.6	0.3	0.3	0.0	0.3	1.0	
24-Jul	0.0	-0.3	-0.2	-0.1	0.0	0.1	0.2	0.1	0.2	0.3	0.3	0.2	-0.2	0.3	0.0	0.1	0.3	0.6	0.5	0.6	0.3	0.1	0.3	0.7	0.2	0.7	
25-Jul	0.3	0.3	-0.2	-0.4	0.2	0.3	1.0	0.9	0.5	0.3	0.0	0.0	-0.5	0.4	0.1	0.1	0.2	0.1	0.0	-0.4	-0.6	-0.5	-0.3	-0.4	0.1	1.0	
26-Jul	-0.1	0.3	0.4	0.5	0.7	0.7	0.6	0.9	0.4	0.3	0.6	0.6	0.2	0.1	0.5	0.3	0.1	0.7	0.0	0.3	1.5	1.1	1.1	1.3	0.5	1.5	
27-Jul	0.4	0.1	-0.3	-0.1	-0.1	-0.1	-0.2	0.0	0.0	0.3	-0.2	-0.2	0.2	0.1	0.8	0.2	-0.3	-0.3	-0.3	0.3	0.0	-0.4	0.0	0.0	0.0	0.8	
28-Jul	-0.3	-0.1	-0.3	-0.3	-0.4	-0.2	-0.1	-0.1	0.1	0.0	-0.1	0.7	0.1	0.5	0.4	0.5	0.3	-0.1	-0.3	0.1	0.1	-0.3	-0.5	-0.2	0.0	0.7	
29-Jul	-0.2	0.2	0.2	0.3	0.3	-0.1	0.5	0.4	0.7	0.4	0.4	0.0	0.2	-0.5	0.0	0.3	-0.4	0.1	-0.1	0.0	-0.1	-0.5	-0.4	-0.2	0.1	0.7	
30-Jul	0.0	0.2	0.7	0.7	0.7	0.8	0.9	0.9	0.7	0.8	0.8	1.3	1.4	0.5	0.5	0.9	0.2	0.6	0.3	-0.4	-0.6	0.0	0.5	0.7	0.5	1.4	
31-Jul	0.1	0.6	0.5	-0.2	0.1	0.2	0.3	0.1	0.4	0.4	0.1	0.3	0.4	-0.3	-0.6	-0.5	-0.2	-0.6	-0.2	-0.2	-0.4	-0.3	-0.4	-0.6	0.0	0.6	
																								Diurnal Average			
																								Diurnal Maximum			
DF - DAS Failure																											



Summary of Hour Standard Deviations

Mannix - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																				Hours in Service: 744					
Maximum Value: 4.6 km/h on Jul 3 07:00																				Hours of Data: 714					
Minimum Value: 0.1 km/h on Jul 11 22:00																				Hours of Missing Data: 30					
Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.9 Median = 1.6 Q ₃ = 2.2 P ₉₀ = 2.8 P ₉₉ = 4.1																				Hours of Calibration: 0					
																				Percent Operational Time: 96.0					
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	1.3	0.8	0.5	0.3	0.3	0.4	0.2	0.4	0.7	1.0	1.8	2.1	2.5	3.0	2.1	2.3	1.3	1.1	1.0	0.9	0.5	0.7	0.6	0.8	3.0
2-Jul	1.0	1.1	1.8	1.5	1.2	1.3	1.4	1.8	2.6	2.7	3.3	3.6	2.8	2.1	1.8	2.9	3.1	2.3	2.4	1.5	1.6	1.8	1.8	1.6	3.6
3-Jul	1.8	2.0	1.8	2.6	3.7	3.6	4.6	4.5	3.8	4.0	4.2	4.4	4.1	3.7	3.8	3.4	3.6	2.9	2.5	2.2	1.9	1.8	1.3	0.9	4.6
4-Jul	0.6	0.7	0.4	0.2	0.2	0.4	0.9	1.4	1.5	1.9	2.3	2.4	2.4	2.5	2.4	2.4	1.8	1.9	1.4	1.1	0.5	0.5	0.8	0.8	2.5
5-Jul	0.7	0.9	0.4	0.5	0.5	0.6	1.0	1.1	1.4	2.1	3.2	2.4	2.2	2.0	1.7	1.5	1.2	1.6	1.2	0.7	0.8	1.2	1.2	0.7	3.2
6-Jul	0.6	0.5	0.8	0.7	0.9	1.1	1.7	2.0	2.2	2.6	3.0	3.0	3.3	3.5	3.2	3.2	2.8	2.5	2.6	2.4	1.8	1.2	0.7	0.4	3.5
7-Jul	0.3	0.4	0.6	0.2	0.2	0.4	0.8	1.2	1.7	1.9	1.6	2.0	2.1	2.3	2.2	2.5	2.3	1.9	1.3	1.1	0.7	0.7	0.6	1.0	2.5
8-Jul	1.7	1.5	1.5	1.3	1.2	1.2	1.0	0.6	1.4	1.9	2.0	1.9	2.1	1.8	2.0	2.1	2.0	2.0	1.7	1.3	1.1	0.7	0.3	0.3	2.1
9-Jul	0.2	0.6	0.5	0.3	0.6	0.5	1.0	1.3	1.5	2.2	2.5	2.8	3.1	3.3	3.1	3.1	2.8	2.6	2.5	1.6	1.4	1.6	2.0	2.5	3.3
10-Jul	2.6	2.9	2.7	2.8	3.0	2.7	2.5	2.7	2.5	2.6	2.8	2.8	2.5	2.8	2.6	2.2	2.0	2.2	2.2	2.4	2.1	1.7	1.9	1.8	3.0
11-Jul	1.5	1.0	1.3	1.0	1.3	1.1	1.3	1.5	1.9	2.1	2.1	2.1	2.2	2.3	2.1	2.1	1.8	1.6	0.9	0.3	0.1	0.1	0.3	0.3	2.3
12-Jul	0.2	0.3	0.2	0.2	0.3	0.7	1.0	1.3	1.8	2.0	2.3	2.6	2.6	2.8	2.7	2.5	2.3	2.0	1.9	1.5	1.7	1.7	1.2	1.2	2.8
13-Jul	1.1	0.6	0.6	0.7	0.9	0.6	0.9	2.1	2.8	3.2	3.4	4.0	4.4	4.2	4.1	3.7	3.2	2.8	3.0	3.0	2.4	2.4	2.4	2.0	4.4
14-Jul	1.7	1.0	1.7	1.5	1.4	1.6	1.8	2.5	3.2	3.0	3.1	2.6	2.7	2.7	2.8	2.6	2.3	2.0	1.8	1.8	1.3	1.3	1.4	1.1	3.2
15-Jul	1.0	1.0	1.1	0.7	0.5	0.9	1.0	1.0	1.4	1.4	2.0	2.2	2.2	2.3	2.3	2.3	2.3	2.1	1.8	1.6	0.9	0.5	0.5	0.5	2.3
16-Jul	0.4	0.5	0.3	0.3	0.7	0.6	1.4	1.7	2.1	2.7	2.8	2.8	3.1	2.8	3.1	2.7	2.3	2.2	2.3	2.3	2.2	2.1	2.0	2.1	3.1
17-Jul	1.9	1.7	1.8	2.0	2.1	2.5	2.1	2.9	2.4	2.5	2.6	2.8	1.9	1.6	3.1	2.4	2.1	1.4	1.8	0.8	0.4	0.6	0.5	0.7	3.1
18-Jul	0.5	0.4	0.3	0.3	0.5	1.1	1.2	1.2	1.6	1.7	1.8	2.0	2.2	2.1	1.9	1.9	1.4	1.3	1.0	0.6	1.2	1.0	0.7	0.5	2.2
19-Jul	0.4	0.3	0.3	0.2	0.2	0.4	0.9	1.4	1.4	2.0	1.9	2.1	2.2	2.0	1.8	2.0	1.9	1.5	1.4	1.1	0.4	0.3	0.3	0.3	2.2
20-Jul	0.4	0.3	0.3	0.3	0.2	0.4	0.8	1.4	1.5	1.9	2.1	2.3	2.5	2.4	2.3	2.1	2.2	1.9	1.5	0.5	0.7	0.6	0.4	0.3	2.5
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	1.8	1.9	2.0	2.1	2.1	2.1	DF	DF	DF	DF	DF	DF	DF	DF	2.1
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	2.3
23-Jul	0.6	0.4	0.3	0.3	0.4	1.1	1.2	1.7	1.6	1.6	1.6	2.0	2.2	2.0	2.2	2.3	1.6	1.4	1.3	1.0	0.8	0.6	0.5	0.4	2.3
24-Jul	0.5	0.3	0.4	0.2	0.4	0.5	0.8	0.9	1.3	1.3	1.6	1.7	1.3	1.5	1.5	1.7	1.8	1.6	1.6	1.6	1.6	1.6	2.0	2.2	2.2
25-Jul	2.1	1.4	1.9	1.1	1.1	1.8	3.2	2.9	3.5	2.7	2.2	2.4	0.7	1.0	1.3	1.0	1.1	0.8	0.6	1.3	2.1	2.0	1.9	1.6	3.5
26-Jul	1.4	0.7	0.9	0.9	1.2	1.3	1.2	1.5	1.8	2.1	2.5	2.3	1.9	2.0	1.8	2.0	2.1	2.4	2.6	2.7	3.1	3.1	2.6	2.3	3.1
27-Jul	1.7	1.5	1.4	1.0	0.7	1.2	1.5	1.2	1.3	2.2	2.2	2.8	2.8	2.8	3.1	2.3	1.7	1.6	1.3	0.9	0.7	0.6	0.6	0.3	3.1
28-Jul	0.2	0.2	0.3	0.3	0.3	0.4	0.9	1.1	1.3	1.6	1.8	1.7	2.1	1.8	1.8	2.1	2.3	1.8	0.9	0.5	0.3	0.3	0.5	0.7	2.3
29-Jul	0.8	0.6	0.4	0.5	0.6	0.5	0.9	1.2	1.8	1.7	2.2	2.5	2.7	2.5	2.5	2.7	2.4	1.9	1.4	0.7	0.4	0.4	0.5	0.4	2.7
30-Jul	0.4	0.4	0.6	0.8	1.0	1.1	1.3	1.8	1.8	2.4	2.6	3.1	3.1	3.0	2.8	2.9	2.3	1.7	1.2	1.5	2.3	0.9	1.5	1.2	3.1
31-Jul	1.6	2.1	1.0	1.2	0.6	0.6	0.7	1.2	1.7	2.2	2.1	2.6	2.3	2.4	1.7	1.3	1.8	2.9	1.2	0.7	0.2	0.4	0.9	1.9	2.9
Diurnal Maximum																									
2.6 2.9 2.7 2.8 3.7 3.6 4.6 4.5 3.8 4.0 4.2 4.4 4.4 4.2 4.1 3.7 3.6 2.9 3.0 3.0 3.1 3.1 2.6 2.5																									
DF - DAS Failure																									



Summary of Hour Averages

Mannix - July 2023

Maximum Value: 1.8 km/h on Jul 20 09:00		Maximum Daily Average: 0.4 km/h on Jul 26		Hours in Service: 744																						
Minimum Value: -0.8 km/h on Jul 17 07:00		Minimum Daily Average: -0.1 km/h on Jul 16		Hours of Data: 714																						
Maximum Diurnal Average: 0.3 km/h at hour 8		Minimum Diurnal Average: 0.0 km/h at hour 23		Hours of Missing Data: 30																						
Monthly Average: 0.19 km/h		Percentiles: P ₁ = -0.6 P ₁₀ = -0.2 Q ₁ = 0.0 Median = 0.2 Q ₃ = 0.4 P ₉₀ = 0.7 P ₉₉ = 1.2		Hours of Calibration: 0																						
				Percent Operational Time: 96.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.2	0.1	-0.1	0.2	0.1	0.0	0.1	0.2	0.2	0.2	0.2	0.1	0.5	1.1	0.3	-0.2	-0.1	0.3	0.3	0.1	0.2	0.1	0.2	0.3	0.2	1.1
2-Jul	0.2	0.1	-0.2	0.4	0.3	0.5	0.4	0.4	0.3	0.2	-0.2	-0.1	0.3	0.4	0.5	0.4	0.1	0.5	0.2	0.3	0.1	0.5	0.3	0.4	0.3	0.5
3-Jul	0.4	0.1	0.4	0.1	-0.1	-0.2	-0.5	-0.1	-0.2	-0.5	-0.5	-0.6	-0.3	-0.4	-0.1	0.4	0.1	-0.1	0.1	0.0	-0.1	0.2	-0.1	0.1	-0.1	0.4
4-Jul	0.2	0.1	0.0	0.1	0.0	0.2	0.7	0.6	0.2	0.5	1.2	0.0	0.4	0.3	0.2	1.2	-0.4	0.4	0.1	0.6	0.9	0.7	0.4	0.7	0.4	1.2
5-Jul	0.4	-0.1	-0.1	0.0	-0.2	0.0	0.5	0.4	0.4	0.7	0.9	0.8	-0.1	1.0	-0.1	0.3	0.2	0.4	0.5	0.1	0.0	0.1	-0.2	-0.2	0.2	1.0
6-Jul	0.0	0.1	-0.1	0.2	0.3	0.2	-0.1	0.5	-0.1	-0.2	0.7	0.7	1.0	0.5	0.2	0.8	0.7	-0.2	0.1	0.0	-0.1	0.1	0.0	0.1	0.2	1.0
7-Jul	0.3	0.3	0.1	0.1	0.0	0.1	0.1	0.1	0.4	0.0	0.2	-0.2	0.3	0.0	0.2	0.7	0.1	0.8	-0.1	-0.1	-0.1	-0.2	-0.3	-0.3	0.1	0.8
8-Jul	-0.1	0.3	0.4	0.1	0.1	0.1	0.2	-0.1	0.3	0.2	0.3	0.0	-0.3	0.0	0.1	0.5	0.6	0.5	0.4	0.2	0.2	0.1	-0.1	0.1	0.2	0.6
9-Jul	0.0	0.2	0.2	-0.1	0.2	0.1	0.3	0.5	0.0	0.4	-0.4	0.0	-0.1	0.1	0.5	0.3	0.0	0.2	0.4	0.1	0.0	0.1	-0.4	0.0	0.1	0.5
10-Jul	0.7	1.7	0.2	0.4	1.1	-0.3	-0.5	-0.1	-0.4	-0.4	0.4	1.1	0.3	0.9	-0.1	0.0	-0.3	-0.1	1.2	0.8	0.9	-0.5	-0.2	-0.4	0.3	1.7
11-Jul	-0.3	0.0	-0.1	0.2	0.2	0.0	0.5	0.6	0.4	0.2	0.1	-0.4	-0.3	0.3	0.0	0.1	0.7	0.6	0.2	0.2	-0.1	0.0	0.1	0.1	0.1	0.7
12-Jul	0.1	0.3	0.2	0.1	0.3	0.2	0.4	0.6	1.4	0.8	0.3	0.4	-0.2	-0.1	0.3	-0.6	0.2	0.3	0.2	0.2	0.1	0.0	-0.5	0.0	0.2	1.4
13-Jul	0.9	0.2	-0.2	0.0	-0.3	0.5	0.1	-0.3	-0.1	0.0	-0.4	0.0	-0.5	-0.3	-0.1	0.3	-0.5	0.2	0.2	0.6	-0.1	-0.5	-0.5	-0.4	0.0	0.9
14-Jul	0.4	-0.2	0.2	0.1	0.1	0.1	0.3	0.0	-0.2	-0.6	-0.1	-0.1	0.4	0.2	1.2	0.1	0.4	0.4	0.8	0.2	0.1	0.1	-0.1	-0.2	0.1	1.2
15-Jul	0.1	0.3	0.1	0.0	0.1	0.4	0.1	0.3	0.5	0.2	0.6	0.3	0.8	0.0	0.2	0.0	0.7	0.7	0.7	0.4	0.2	0.2	0.1	0.1	0.3	0.8
16-Jul	0.2	0.3	0.2	0.3	0.2	0.1	0.0	0.0	-0.4	0.4	0.0	-0.6	-0.2	0.1	0.5	0.9	-0.5	-0.5	-0.6	-0.3	-0.7	-0.6	-0.5	-0.5	-0.1	0.9
17-Jul	-0.2	-0.6	-0.2	-0.4	-0.3	-0.6	-0.8	1.4	-0.5	-0.3	-0.4	-0.4	-0.2	0.0	1.3	0.1	1.4	0.4	0.1	0.1	0.3	0.1	0.0	0.1	0.0	1.4
18-Jul	0.1	0.3	0.3	0.1	0.1	0.1	-0.1	0.1	0.6	-0.5	0.0	1.1	1.3	0.1	0.5	0.3	0.1	0.1	0.2	0.3	0.2	0.1	0.1	0.0	0.2	1.3
19-Jul	0.0	-0.1	0.2	0.4	0.1	0.0	0.1	0.5	0.1	0.5	0.0	0.4	0.2	0.5	0.1	-0.2	0.2	0.2	0.2	0.2	0.0	0.2	0.0	0.1	0.2	0.5
20-Jul	0.1	0.1	0.1	0.0	0.0	0.1	0.2	0.1	1.8	0.4	1.2	0.2	0.0	0.5	0.3	0.1	0.2	0.3	0.5	0.3	0.1	0.4	0.0	0.1	0.3	1.8
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	0.6	0.0	-0.1	-0.1	0.0	-0.3	DF	DF	DF	DF	DF	DF	DF	DF	DF	0.6
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	0.4	0.3	-0.1	0.4	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.4
23-Jul	0.1	0.1	0.1	0.1	0.2	-0.1	0.0	0.3	0.3	0.1	0.4	0.0	0.7	1.1	0.0	1.0	0.4	0.2	0.5	0.7	0.6	0.8	0.8	0.3	0.4	1.1
24-Jul	0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.4	0.4	0.1	-0.2	0.7	0.1	0.0	0.3	0.1	0.1	0.4	0.3	0.0	0.0	0.5	0.2	0.7
25-Jul	0.0	0.0	0.1	0.1	0.4	0.4	0.0	0.4	0.2	0.3	0.2	0.2	0.0	0.5	-0.1	0.1	0.2	0.2	0.3	-0.1	-0.1	0.2	0.1	-0.1	0.2	0.5
26-Jul	0.0	0.3	0.5	0.6	0.7	0.6	0.5	0.5	-0.2	-0.1	0.4	0.7	0.2	0.0	0.6	0.4	0.2	0.8	0.2	0.4	0.8	0.6	0.7	1.1	0.4	1.1
27-Jul	0.4	0.3	-0.2	0.1	0.2	0.3	0.1	0.2	0.5	0.7	0.3	0.3	0.7	0.2	0.8	0.0	0.2	0.4	0.3	0.6	0.2	0.1	0.3	0.2	0.3	0.8
28-Jul	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.3	0.2	0.0	0.2	1.1	0.4	0.5	0.7	0.8	0.3	-0.1	-0.2	0.3	0.1	-0.3	-0.2	0.0	0.2	1.1
29-Jul	0.0	0.1	0.1	0.2	0.2	-0.1	0.5	0.3	0.8	0.4	0.5	0.2	0.5	-0.6	0.3	0.5	-0.3	0.3	0.0	0.2	-0.1	-0.4	-0.3	-0.4	0.1	0.8
30-Jul	-0.3	0.0	0.5	0.5	0.6	0.7	1.1	0.8	0.4	0.7	0.5	0.9	1.0	0.2	0.3	0.7	0.3	0.8	0.3	-0.2	-0.5	-0.1	0.2	0.5	0.4	1.1
31-Jul	0.2	0.4	0.6	0.3	0.2	0.1	0.2	0.3	0.3	0.3	0.3	0.2	0.7	0.2	-0.3	0.1	0.0	0.1	0.0	0.3	0.0	0.0	0.1	0.0	0.2	0.7
																								Diurnal Average		
																								Diurnal Maximum		
																								0.2		
																								0.9		
																								0.1		
																								0.6		
																								1.1		
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																								1.2		
																								0.8		
																								0.9		
																								0.8		
																								0.8		
																								1.1		

DF - DAS Failure



Summary of Hour Standard Deviations

Mannix - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																				Hours in Service: 744						
Maximum Value: 4.6 km/h on Jul 3 07:00																				Hours of Data: 714						
Minimum Value: 0.1 km/h on Jul 11 22:00																				Hours of Missing Data: 30						
Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.8 Median = 1.7 Q ₃ = 2.5 P ₉₀ = 3.1 P ₉₉ = 4.1																				Hours of Calibration: 0						
																				Percent Operational Time: 96.0						
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	1.4	0.9	0.7	0.4	0.4	0.3	0.2	0.4	0.6	0.6	1.6	2.1	2.8	3.4	1.8	2.1	1.1	1.1	0.9	0.9	0.6	0.5	0.4	0.7	3.4	
2-Jul	0.9	1.0	1.3	1.3	1.2	1.4	1.1	1.7	2.4	2.7	3.0	3.4	2.9	2.1	2.0	2.9	2.8	2.2	2.3	1.4	1.6	1.9	1.7	1.5	3.4	
3-Jul	1.7	2.0	1.9	2.5	3.7	3.6	4.6	4.5	3.9	4.0	4.0	4.5	4.2	3.7	3.9	3.6	3.5	2.8	2.5	2.2	1.9	2.2	1.6	1.0	4.6	
4-Jul	0.7	0.6	0.4	0.3	0.2	0.2	0.8	1.4	1.6	2.1	2.7	2.9	2.8	2.7	2.8	2.2	2.4	1.6	0.9	0.2	0.3	0.4	0.6	0.6	2.9	
5-Jul	0.8	1.1	0.5	0.8	0.8	0.6	0.8	0.9	1.1	2.3	3.3	2.6	2.5	2.5	2.7	2.1	1.3	1.3	1.7	1.1	0.7	0.8	1.5	1.0	3.3	
6-Jul	0.6	0.6	0.8	0.8	1.2	1.1	1.7	1.9	2.4	2.5	3.1	3.4	3.9	3.7	3.4	3.7	3.2	2.5	2.4	2.0	1.5	1.1	0.4	0.4	3.9	
7-Jul	0.5	0.4	0.7	0.4	0.3	0.3	0.5	1.2	1.9	2.0	1.7	2.0	2.5	2.6	2.4	2.9	2.6	2.1	1.4	1.1	0.7	0.7	0.6	0.8	2.9	
8-Jul	1.4	1.5	1.3	1.1	1.0	1.6	1.2	0.6	1.6	2.0	2.1	2.1	2.4	2.3	2.3	2.2	2.1	2.2	1.5	0.8	0.7	0.7	0.5	0.4	2.4	
9-Jul	0.3	0.6	0.5	0.4	0.5	0.3	0.9	1.4	1.7	2.6	2.6	3.1	3.2	3.4	3.3	3.4	2.7	2.3	2.2	1.1	0.9	1.7	2.5	3.1	3.4	
10-Jul	3.3	3.7	3.0	3.0	3.2	2.6	2.5	2.8	2.9	2.9	3.3	3.2	2.8	3.1	2.8	2.4	2.2	2.5	2.8	3.2	2.7	1.7	1.8	1.8	3.7	
11-Jul	1.5	0.6	0.8	0.7	1.0	0.7	0.9	1.2	1.9	2.4	2.4	2.4	2.6	2.7	2.3	2.3	1.9	1.7	0.9	0.3	0.1	0.1	0.2	0.4	2.7	
12-Jul	0.3	0.5	0.3	0.2	0.3	0.4	0.9	1.2	2.0	2.2	2.7	3.1	3.1	3.2	3.1	2.6	2.5	2.2	1.7	1.0	1.5	1.5	1.4	1.0	3.2	
13-Jul	1.1	0.8	0.8	0.9	0.9	0.8	1.0	2.1	2.8	3.5	3.6	4.3	4.3	4.1	4.4	3.8	3.2	2.7	3.1	3.0	2.3	2.2	2.4	1.9	4.4	
14-Jul	1.5	1.2	1.9	1.7	1.2	1.5	1.8	2.7	3.2	3.0	3.3	2.8	2.8	2.9	3.1	2.6	2.5	2.1	2.0	1.7	1.5	1.3	1.5	1.2	3.3	
15-Jul	1.0	1.2	1.2	0.8	0.6	1.1	1.1	1.2	1.6	1.7	2.1	2.4	2.6	2.3	2.6	2.4	2.3	2.4	2.1	1.5	0.7	0.4	0.7	0.7	2.6	
16-Jul	0.7	0.3	0.4	0.5	0.6	0.6	1.5	1.5	2.3	3.0	3.1	2.9	3.4	3.0	3.6	3.2	2.4	2.1	2.1	2.2	2.1	2.1	2.0	2.1	3.6	
17-Jul	1.6	1.5	1.6	1.6	1.8	2.2	2.0	3.5	2.5	2.5	2.4	2.6	1.7	1.8	4.1	3.2	2.6	1.7	1.7	1.2	0.5	0.4	0.5	0.6	4.1	
18-Jul	0.6	0.5	0.3	0.3	0.5	1.1	1.1	1.1	1.7	1.8	2.0	2.4	2.7	2.5	2.4	2.3	1.6	1.4	0.9	0.5	0.9	0.9	0.6	0.4	2.7	
19-Jul	0.4	0.2	0.3	0.2	0.3	0.3	0.7	1.4	1.6	2.2	2.1	2.6	2.6	2.6	1.9	2.1	2.0	1.4	1.3	1.2	0.5	0.4	0.3	0.2	2.6	
20-Jul	0.4	0.2	0.2	0.3	0.3	0.3	0.5	1.4	1.7	2.0	2.4	2.7	2.7	2.8	2.8	2.5	2.5	2.2	1.8	0.7	0.7	0.7	0.5	0.4	2.8	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	2.0	2.2	2.3	2.6	2.6	2.4	DF	DF	DF	DF	DF	DF	DF	DF	DF	2.6
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	2.5	2.5	2.1	2.2	2.1	1.5	1.2	0.9	0.6	0.7	1.0	0.9	2.5
23-Jul	0.8	0.4	0.3	0.4	0.7	0.9	1.2	1.6	1.5	1.7	1.8	2.1	2.5	2.5	2.6	2.3	1.3	0.9	1.0	0.6	0.6	0.4	0.5	0.4	2.6	
24-Jul	0.6	0.3	0.5	0.2	0.3	0.3	0.7	0.8	1.2	1.4	1.7	1.8	1.4	1.7	1.7	1.9	2.1	1.9	1.9	1.8	1.9	2.1	2.7	2.9	2.9	
25-Jul	2.4	2.0	2.3	1.1	1.2	2.0	4.1	3.5	4.1	3.2	2.9	2.7	0.7	1.2	1.3	1.0	1.3	1.1	0.6	1.3	2.1	2.0	1.9	1.5	4.1	
26-Jul	1.3	0.7	1.0	0.7	0.9	1.1	1.0	1.3	1.9	2.2	2.8	2.7	2.4	2.1	2.2	2.2	2.0	2.3	2.5	2.7	3.2	3.9	3.2	2.6	3.9	
27-Jul	1.6	1.5	1.6	1.0	0.6	0.9	1.3	1.2	1.4	2.2	2.4	3.0	3.1	2.7	3.3	2.1	1.7	1.7	1.4	0.9	0.5	0.8	0.8	0.4	3.3	
28-Jul	0.2	0.2	0.2	0.3	0.3	0.3	0.7	1.2	1.4	1.7	2.1	2.0	2.6	2.0	2.0	2.5	2.5	1.9	0.9	0.4	0.2	0.2	0.5	0.8	2.6	
29-Jul	1.0	0.9	0.6	0.4	0.6	0.5	0.7	0.9	1.8	1.6	2.6	2.8	3.1	2.7	2.9	3.1	2.5	2.1	1.4	0.6	0.4	0.4	0.3	0.3	3.1	
30-Jul	0.2	0.3	0.4	0.5	0.8	1.1	0.8	1.6	1.6	2.6	2.8	3.3	3.4	3.4	2.9	3.2	2.5	1.8	1.0	1.4	2.3	1.2	2.2	1.1	3.4	
31-Jul	1.3	1.9	0.8	1.2	0.7	0.9	0.9	1.1	1.7	2.2	2.5	2.8	2.6	2.6	2.1	1.2	1.9	2.8	1.2	0.6	0.2	0.4	1.1	1.8	2.8	
3.3 3.7 3.0 3.0 3.7 3.6 4.6 4.5 4.1 4.0 4.0 4.5 4.3 4.1 4.4 3.8 3.5 2.8 3.1 3.2 3.2 3.9 3.2 3.1																										
Diurnal Maximum																										
DF - DAS Failure																										



Summary of Hour Averages

Mannix - July 2023

Maximum Value: 1.9 km/h on Jul 14 15:00		Maximum Daily Average: 0.6 km/h on Jul 6		Hours in Service: 744																																												
Minimum Value: -1.2 km/h on Jul 7 23:00		Minimum Daily Average: -0.4 km/h on Jul 29		Hours of Data: 711																																												
Maximum Diurnal Average: 0.3 km/h at hour 19		Minimum Diurnal Average: -0.1 km/h at hour 23		Hours of Missing Data: 33																																												
Monthly Average: 0.11 km/h		Percentiles: P ₁ = -1.1 P ₁₀ = -0.5 Q ₁ = -0.2 Median = 0.1 Q ₃ = 0.4 P ₉₀ = 0.7 P ₉₉ = 1.4		Hours of Calibration: 0																																												
				Percent Operational Time: 95.6																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	-0.3	0.1	-0.1	0.1	-0.2	-0.3	-0.1	0.0	0.0	-0.1	0.3	0.0	0.4	1.3	0.1	-1.1	-0.7	0.2	0.2	0.0	0.0	-0.2	-0.2	0.0	0.0	1.3																						
2-Jul	-0.3	-0.3	-0.7	-0.1	-0.1	0.1	0.0	0.0	0.3	0.3	0.1	0.1	0.3	-0.1	0.0	0.0	0.1	0.1	-0.3	-0.1	-0.3	-0.1	-0.1	0.0	0.0	0.3																						
3-Jul	0.3	0.1	0.2	0.1	0.7	0.4	0.6	0.9	0.4	0.1	0.2	0.2	0.1	0.1	0.4	1.3	0.8	0.2	0.7	0.6	0.5	0.7	0.4	0.4	0.4	1.3																						
4-Jul	0.3	0.4	0.1	0.1	0.0	0.1	0.5	0.3	-0.1	0.3	1.0	-0.3	0.1	-0.2	0.9	-0.9	0.1	-0.2	0.2	0.1	-0.1	-0.2	-0.4	-0.4	0.1	1.0																						
5-Jul	-0.6	-0.7	-0.5	-0.4	-0.5	-0.5	0.0	-0.1	0.0	0.4	0.3	0.3	-0.6	1.0	-0.6	-0.1	-0.3	0.1	0.2	-0.3	-0.2	0.4	0.3	0.3	-0.1	1.0																						
6-Jul	0.3	0.2	0.1	0.4	0.4	0.2	-0.1	0.6	0.2	0.3	1.3	1.3	1.3	1.0	0.5	1.2	1.4	0.5	0.7	0.8	0.5	0.7	0.5	0.2	0.6	1.4																						
7-Jul	0.1	0.1	-0.3	-0.1	-0.1	0.0	-0.1	-0.3	0.1	-0.5	-0.2	-0.8	-0.2	-0.5	-0.5	0.3	-0.3	0.3	-0.6	-0.7	-0.8	-1.1	-1.2	-1.2	-0.4	0.3																						
8-Jul	-0.9	-0.3	-0.3	-0.6	-0.4	-0.4	-0.1	-0.4	0.0	-0.1	-0.1	-0.4	-0.8	-0.4	-0.3	0.3	0.3	0.3	0.8	0.7	0.7	0.4	0.1	0.1	-0.1	0.8																						
9-Jul	0.1	0.4	0.4	0.2	0.4	0.3	0.3	0.6	-0.1	0.6	0.0	0.6	0.4	0.6	1.1	1.3	0.7	1.0	1.0	0.8	0.9	0.4	-0.4	0.3	0.5	1.3																						
10-Jul	0.9	1.4	-0.1	0.2	0.9	-0.6	-0.7	-0.3	-0.2	-0.4	0.6	1.0	0.3	0.8	-0.5	-0.3	-0.5	-0.2	1.4	1.0	1.0	-0.5	-0.1	-0.3	0.2	1.4																						
11-Jul	0.0	0.3	0.5	0.3	0.4	0.5	0.6	0.4	0.1	-0.3	-0.5	-1.0	-1.1	-0.2	-0.5	-0.5	0.4	0.4	-0.2	-0.2	-0.4	-0.3	-0.3	-0.2	-0.1	0.6																						
12-Jul	0.0	0.2	0.0	0.1	0.2	0.1	0.3	0.4	1.4	0.6	0.1	0.4	-0.4	-0.1	0.4	-0.4	0.5	0.5	0.7	0.7	0.7	0.4	-0.1	0.3	0.3	1.4																						
13-Jul	1.0	0.1	-0.2	-0.1	-0.3	0.3	-0.1	-0.3	0.2	0.2	-0.1	0.7	0.3	0.3	0.3	0.7	-0.1	1.0	1.4	1.5	0.5	-0.2	-0.2	0.2	0.3	1.5																						
14-Jul	1.0	0.1	0.7	0.4	0.0	0.4	0.4	0.2	-0.1	-0.2	0.1	0.1	0.6	0.5	1.9	0.5	1.0	0.9	1.4	0.5	0.3	0.3	0.2	0.0	0.5	1.9																						
15-Jul	0.2	0.5	0.4	0.1	0.0	0.5	0.2	0.2	0.4	0.0	0.7	0.6	1.4	0.3	0.3	0.3	0.9	1.0	0.9	0.6	0.5	0.3	0.3	0.3	0.5	1.4																						
16-Jul	0.2	0.2	0.1	0.2	0.3	0.5	-0.2	0.0	-0.5	0.5	0.0	-0.8	-0.4	0.2	0.4	0.7	-0.5	-0.4	-0.5	-0.3	-0.5	-0.6	-0.6	-0.6	-0.1	0.7																						
17-Jul	0.4	-0.2	-0.1	-0.6	-0.7	-1.2	-1.0	1.4	-0.5	0.0	0.0	-0.3	-0.2	-0.3	1.4	0.3	1.3	0.7	0.4	-0.1	0.2	0.4	0.2	0.2	0.1	1.4																						
18-Jul	0.2	0.3	0.4	0.2	0.1	0.5	0.4	0.4	0.7	-0.5	0.0	1.2	1.6	-0.1	0.4	0.2	-0.3	-0.2	-0.2	0.0	-0.3	-0.5	-0.4	-0.3	0.1	1.6																						
19-Jul	-0.3	-0.5	-0.2	0.1	-0.1	-0.3	-0.1	0.2	-0.2	0.1	-0.5	0.0	-0.1	0.0	-0.2	-0.2	-0.1	-0.2	-0.1	-0.3	-0.3	-0.1	-0.3	-0.2	-0.2	0.2																						
20-Jul	-0.3	-0.1	-0.1	-0.2	-0.2	-0.2	-0.1	-0.1	1.7	0.1	1.1	-0.2	-0.5	0.1	-0.1	-0.2	-0.3	-0.2	0.5	0.2	0.1	0.6	0.1	0.2	0.1	1.7																						
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	0.3	-0.3	-0.5	-0.5	-0.5	-0.7	DF	DF	DF	DF	DF	DF	DF	DF	DF	0.3																						
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	0.8																					
23-Jul	0.3	0.2	0.2	0.2	0.0	0.2	0.1	0.1	0.2	-0.1	0.3	-0.3	0.5	1.1	-0.5	0.9	0.0	0.0	0.1	0.0	0.2	0.1	0.2	-0.2	0.2	1.1																						
24-Jul	-0.4	-0.1	0.0	-0.1	0.0	0.0	-0.1	0.1	0.0	0.3	0.2	-0.1	-0.6	0.6	-0.1	-0.1	0.4	0.6	0.6	0.8	0.6	0.3	0.3	0.5	0.2	0.8																						
25-Jul	-0.1	-0.2	-0.5	UO	0.5	0.4	0.6	0.3	-0.1	-0.2	0.0	0.2	-0.4	0.3	-0.2	0.0	0.1	0.1	0.1	-0.4	-0.9	-0.6	-0.5	-0.7	-0.1	0.6																						
26-Jul	-0.6	-0.4	-0.2	-0.1	0.2	-0.1	0.0	0.4	-0.3	-0.1	0.2	0.6	0.2	0.0	0.7	0.5	0.8	1.5	1.1	1.3	1.4	1.2	1.1	1.6	0.5	1.6																						
27-Jul	0.9	0.5	0.1	0.4	0.5	0.7	0.5	0.5	0.4	0.6	-0.1	0.4	1.0	0.8	1.0	-0.5	-0.3	0.0	0.1	0.4	-0.2	-0.2	0.2	0.1	0.3	1.0																						
28-Jul	0.0	0.0	-0.1	0.0	0.0	0.0	0.1	0.1	0.0	-0.3	-0.2	1.0	-0.1	0.0	0.3	0.3	-0.2	-0.6	-0.7	-0.3	-0.5	-1.0	-0.9	-0.7	-0.2	1.0																						
29-Jul	-0.5	-0.4	-0.3	-0.2	-0.2	-0.3	0.0	-0.1	0.5	0.1	0.4	-0.4	0.0	-1.2	-0.3	0.0	-0.8	-0.2	-0.5	-0.3	-0.8	-1.1	-1.1	-1.1	-0.4	0.5																						
30-Jul	-0.9	-0.7	-0.2	0.0	-0.1	0.1	0.8	0.7	0.2	0.4	-0.1	0.7	0.8	-0.5	-0.5	0.2	-0.3	0.3	-0.3	UO	UO	-0.1	0.5	0.4	0.1	0.8																						
31-Jul	-0.4	-0.4	0.0	-0.1	-0.1	0.0	0.4	-0.1	-0.3	-0.3	-0.1	-0.5	0.1	-0.3	-0.6	-0.4	-0.3	0.3	-0.1	-0.1	-0.3	-0.4	-0.4	-0.8	-0.2	0.4																						
																								0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.2	0.1	0.3	0.3	0.3	0.1	0.0	-0.1	0.0	Diurnal Average
																								1.0	1.4	0.7	0.4	0.9	0.7	0.8	1.4	1.7	0.6	1.3	1.3	1.6	1.3	1.9	1.3	1.4	1.5	1.4	1.5	1.4	1.2	1.1	1.6	Diurnal Maximum
DF - DAS Failure																								UO - Unstable Operation																								



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 90 m (VW90m) - km/h

Mannix - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.7 km/h on Jul 3 08:00		Hours in Service: 744 Hours of Data: 711 Hours of Missing Data: 33 Hours of Calibration: 0 Percent Operational Time: 95.6																								
Minimum Value: 0.1 km/h on Jul 11 22:00																										
Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.8 Median = 1.7 Q ₃ = 2.6 P ₉₀ = 3.2 P ₉₉ = 4.2																										
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	1.4	1.0	0.8	0.4	0.5	0.3	0.2	0.4	0.6	0.5	1.5	2.1	3.1	3.7	1.9	2.1	1.1	1.1	0.9	0.8	0.5	0.5	0.3	0.6	3.7	
2-Jul	0.8	0.9	1.3	1.4	1.2	1.5	1.0	1.8	2.4	2.6	3.3	3.5	2.8	2.0	1.9	2.9	2.7	2.2	2.1	1.5	1.7	1.9	1.7	1.5	3.5	
3-Jul	1.7	2.1	1.9	2.5	4.0	3.6	4.7	4.7	4.0	4.0	4.1	4.6	4.1	3.6	4.0	3.8	3.7	2.8	2.5	2.3	2.0	2.3	1.8	1.2	4.7	
4-Jul	0.7	0.6	0.4	0.3	0.2	0.2	0.9	1.5	1.7	2.3	3.0	3.3	3.2	3.0	3.0	3.2	2.5	2.7	1.7	0.8	0.1	0.2	0.3	0.5	3.3	
5-Jul	0.7	1.1	0.7	1.1	0.9	0.7	0.8	0.9	1.2	2.5	3.5	2.7	2.5	3.0	2.3	1.3	1.4	1.9	1.2	0.8	0.8	1.7	1.6	1.0	3.5	
6-Jul	0.6	0.7	0.8	0.8	1.2	1.2	1.7	2.0	2.5	2.7	3.4	3.8	4.1	4.2	3.8	4.0	3.4	2.7	2.3	1.8	1.4	1.0	0.4	0.4	4.2	
7-Jul	0.4	0.3	0.8	0.3	0.2	0.3	0.5	1.1	2.0	2.1	1.7	2.2	2.8	3.0	2.5	3.2	2.9	2.1	1.4	1.0	0.6	0.6	0.5	0.7	3.2	
8-Jul	1.4	1.7	1.2	1.1	1.0	1.7	1.2	0.8	1.7	2.1	2.2	2.1	2.6	2.7	2.5	2.2	2.2	2.2	1.5	0.7	0.6	0.6	0.5	0.5	2.7	
9-Jul	0.3	0.6	0.6	0.5	0.5	0.3	0.8	1.5	2.0	2.8	2.7	3.2	3.2	3.6	3.4	3.8	2.8	2.3	2.1	1.0	0.8	1.8	2.5	3.0	3.8	
10-Jul	3.3	3.4	3.1	3.1	3.5	2.6	2.5	2.8	3.1	3.1	3.5	3.3	2.9	3.6	3.1	2.5	2.3	2.6	2.5	2.8	2.8	1.7	1.7	1.7	3.6	
11-Jul	1.5	0.5	0.7	0.7	0.8	0.6	0.7	1.1	2.0	2.5	2.6	2.7	2.6	2.9	2.5	2.5	2.2	1.9	0.8	0.3	0.1	0.1	0.2	0.5	2.9	
12-Jul	0.3	0.4	0.2	0.2	0.3	0.3	0.8	1.3	2.2	2.4	2.9	3.4	3.4	3.5	3.4	2.8	2.7	2.2	1.6	0.9	1.5	1.5	1.3	1.0	3.5	
13-Jul	1.0	1.0	0.9	1.0	0.8	0.9	1.1	2.1	2.7	3.6	3.7	4.6	4.4	4.0	4.5	3.7	3.2	2.9	3.2	3.2	2.4	2.1	2.2	1.8	4.6	
14-Jul	1.5	1.3	2.0	1.8	1.2	1.5	1.9	2.8	3.2	2.9	3.4	3.0	3.0	3.1	3.4	2.7	2.6	2.1	2.1	1.7	1.5	1.5	1.6	1.2	3.4	
15-Jul	1.1	1.4	1.2	0.9	0.6	1.2	1.1	1.3	1.7	2.0	2.3	2.6	2.7	2.5	2.9	2.6	2.6	2.7	2.2	1.5	0.7	0.4	0.7	0.7	2.9	
16-Jul	0.6	0.3	0.4	0.6	0.6	0.5	1.5	1.6	2.4	3.2	3.4	3.1	3.5	3.3	3.9	3.5	2.6	2.0	2.0	2.1	2.2	2.3	2.1	2.0	3.9	
17-Jul	1.5	1.4	1.6	1.4	1.8	2.2	2.0	3.6	2.6	2.5	2.4	2.7	1.7	1.9	3.6	2.6	2.7	1.6	1.7	1.3	0.5	0.5	0.4	0.5	3.6	
18-Jul	0.6	0.5	0.4	0.4	0.5	1.2	1.0	1.1	1.8	1.9	2.2	2.7	3.1	2.8	2.8	2.7	1.7	1.6	0.9	0.4	0.7	0.8	0.6	0.3	3.1	
19-Jul	0.4	0.3	0.3	0.2	0.3	0.4	0.8	1.4	1.7	2.5	2.3	3.0	3.0	2.8	2.2	2.4	2.1	1.2	1.3	1.2	0.6	0.4	0.3	0.2	3.0	
20-Jul	0.5	0.3	0.2	0.3	0.3	0.3	0.5	1.4	1.8	2.3	2.8	3.0	3.0	3.1	3.1	2.9	2.5	2.3	1.8	0.8	0.8	0.8	0.6	0.4	3.1	
21-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	2.2	2.6	2.4	3.0	2.7	2.8	DF	DF	DF	DF	DF	DF	DF	DF	DF	3.0
22-Jul	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	2.7	2.6	2.1	2.2	2.2	1.4	0.9	0.8	0.5	0.7	1.0	0.8	2.7
23-Jul	0.9	0.4	0.3	0.5	0.7	0.8	1.0	1.6	1.4	1.7	1.9	2.2	2.8	2.9	3.0	2.5	1.4	0.8	0.9	0.3	0.4	0.5	0.5	0.5	3.0	
24-Jul	0.6	0.4	0.4	0.2	0.3	0.2	0.5	0.5	1.1	1.5	1.9	2.0	1.6	2.0	1.9	2.1	2.2	1.5	1.5	1.7	1.9	2.0	2.4	2.7	2.7	
25-Jul	2.5	2.0	2.5	UO	1.9	2.1	3.9	3.6	4.2	3.5	3.2	3.7	0.8	1.2	1.3	1.1	1.2	0.9	0.6	1.3	2.0	2.0	2.1	1.6	4.2	
26-Jul	1.3	0.7	1.1	0.7	0.9	1.1	0.9	1.2	1.9	2.4	3.2	2.9	2.6	2.3	2.4	2.6	2.0	2.3	2.4	2.5	3.0	3.6	3.0	2.7	3.6	
27-Jul	1.7	1.6	1.7	1.1	0.6	1.0	1.2	1.2	1.4	2.1	2.5	3.3	3.3	2.8	3.5	2.2	1.7	1.8	1.5	1.0	0.5	0.9	0.8	0.5	3.5	
28-Jul	0.3	0.2	0.2	0.2	0.2	0.2	0.5	1.2	1.5	1.9	2.3	2.2	2.9	2.2	2.2	2.8	2.7	1.9	0.8	0.3	0.2	0.1	0.5	0.9	2.9	
29-Jul	1.1	1.0	0.6	0.5	0.7	0.5	0.7	0.8	1.8	1.7	3.0	3.0	3.5	2.9	3.1	3.3	2.8	2.4	1.5	0.7	0.4	0.3	0.3	0.3	3.5	
30-Jul	0.3	0.2	0.4	0.3	0.6	1.1	0.7	1.5	1.6	2.7	3.0	3.5	3.7	3.8	3.1	3.4	2.7	1.8	1.0	UO	UO	1.2	1.5	1.1	3.8	
31-Jul	1.3	1.9	0.7	1.2	0.8	0.6	0.6	1.0	1.7	2.4	2.9	2.9	2.8	2.9	2.5	1.5	2.1	2.7	1.4	0.5	0.3	0.6	1.1	1.7	2.9	
Diurnal Maximum																										
DF - DAS Failure UO - Unstable Operation																										



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS06
PATRICIA MCINNES
JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS06)
 JULY 2023

MONTHLY SUMMARY

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	35	36	99.87	25.4	0	5.1	0
TRS (ppb) Average	704	39	40	99.87	2.5	0	1.2	0
THC (ppm) Average	644	41	100	92.07	2.9	-	2.3	-
NMHC(ppm) Average	644	41	100	92.07	0.127	-	0.034	-
CH4(ppm) Average	644	41	100	92.07	2.9	-	2.3	-
O3 (ppb) Average	709	35	35	100	61.6	0	37.9	-
NO2 (ppb) Average	706	36	38	99.73	15.8	0	6.4	-
NO (ppb) Average	706	36	38	99.73	24.4	-	4.4	-
NOX (ppb) Average	706	36	38	99.73	36.2	-	9.3	-
NH3 (ppb) Average	628	40	116	89.78	72.9	0	42.1	-
PM2.5 (ug/m3) Average	742	2	2	100	431	123	273.3	13
Temperature 2 m (C) Average	744	0	0	100	29.8	-	23.2	-
Relative Humidity (%) Average	744	0	0	100	97.4	-	91.3	-
Wind Speed 10 m (km/h) Average	744	0	0	100	31	-	19	-
Wind Direction 10 m (deg) Average	744	0	0	100	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS06)

JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.76	2.3	-	0	0	0	0.1	0.4	1.6	25.4
TRS (ppb) Average	704	0.55	0.4	-	0.2	0.3	0.3	0.4	0.6	1.1	2.5
THC (ppm) Average	644	2.06	0.2	-	1.1	1.9	2	2	2.1	2.3	2.9
NMHC(ppm) Average	644	0.013	0.017	-	0	0	0	0	0	0	0.127
CH4(ppm) Average	644	2.05	0.2	-	1.1	1.9	2	2	2.1	2.3	2.9
O3 (ppb) Average	709	29.14	11.5	-	2.3	13.7	21.1	29.2	38	43.4	61.6
NO2 (ppb) Average	706	2.39	2.9	-	0	0.1	0.5	1.3	3	6.2	15.8
NO (ppb) Average	706	0.7	1.7	-	0	0	0.1	0.3	0.7	1.4	24.4
NOX (ppb) Average	706	3.08	4.1	-	0	0.3	0.7	1.7	3.7	7.3	36.2
NH3 (ppb) Average	628	3.59	11.2	-	0	0	0	0	0	12.7	72.9
PM2.5 (ug/m3) Average	742	46.81	71.4	-	1.7	4.2	6.7	20.7	48.2	115.3	431
Temperature 2 m (C) Average	744	18.26	4.9	-	6.2	12.3	14.6	17.6	22	25.2	29.8
Relative Humidity (%) Average	744	64.39	19.5	-	26.7	37.4	47.7	64.1	81.8	90.8	97.4
Wind Speed 10 m (km/h) Average	744	9.2	5	-	0	3	6	8	12	16	31
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS06)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NO2, NH3, SO2, TRS,THC	14 Jul 2023 13:00	14 Jul 2023 13:00	1	Maintenance - sample manifold cleaned
THC/NMHC/CH4	10 Jul 2023 01:00	10 Jul 2023 05:00	5	Unstable Operation - excessive baseline drift
THC/NMHC/CH4	10 Jul 2023 09:00	10 Jul 2023 12:00	4	Maintenance - to replace analyzer
THC/NMHC/CH4	12 Jul 2023 10:00	12 Jul 2023 10:00	1	Maintenance - verify daily QA response
THC/NMHC/CH4	20 Jul 2023 15:00	21 Jul 2023 09:00	19	Analyzer Failure - inconsistent response
THC/NMHC/CH4	21 Jul 2023 10:00	21 Jul 2023 11:00	2	Maintenance - analyzer rebooted
THC/NMHC/CH4	30 Jul 2023 06:00	30 Jul 2023 10:00	5	Unstable Operation - excessive baseline drift
THC/NMHC/CH4	30 Jul 2023 11:00	31 Jul 2023 08:00	22	Maintenance - to replaced sample pump
NO2	07 Jul 2023 09:00	07 Jul 2023 09:00	1	Unstable Operation
NH3	01 Jul 2023 07:00	31 Jul 2023 09:00	79	Stabilization after daily span



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

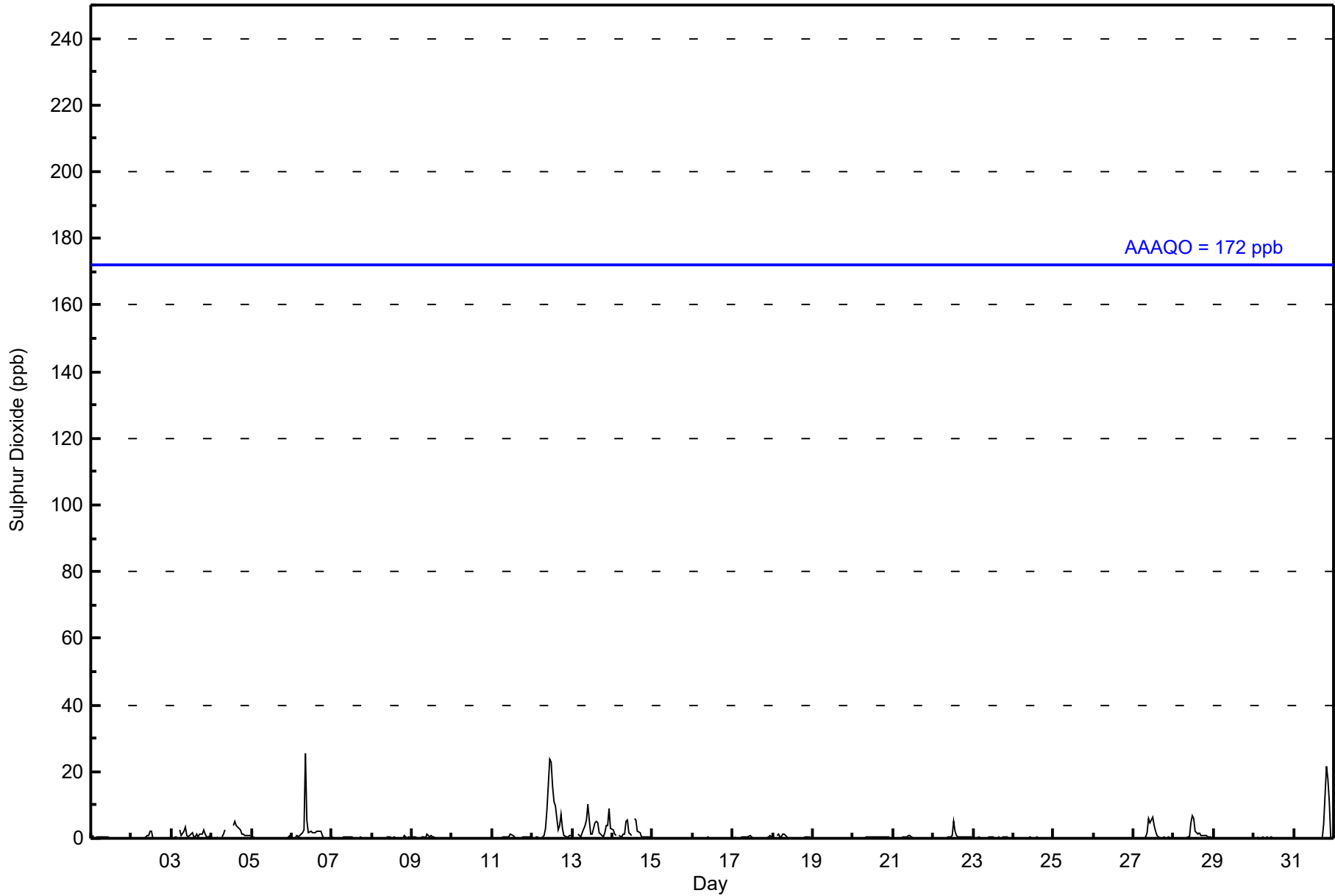
Patricia McInnes - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744																Daily Average		Daily Maximum			
Maximum Value: 25.4 ppb on Jul 6 09:00		Maximum Daily Average: 5.1 ppb on Jul 12		Hours of Data: 708																Daily Average		Daily Maximum					
Minimum Value: 0.0 ppb on Jul 1 15:00		Minimum Daily Average: 0.0 ppb on Jul 25		Hours of Missing Data: 36																Daily Average		Daily Maximum					
Maximum Diurnal Average: 1.6 ppb at hour 12		Minimum Diurnal Average: 0.2 ppb at hour 3		Hours of Calibration: 35																Daily Average		Daily Maximum					
Monthly Average: 0.76 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.4 P ₉₀ = 1.6 P ₉₉ = 10.9		Percent Operational Time: 99.9																Daily Average		Daily Maximum					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0.4	0.8	Z	0.4	0.4	0.5	0.5	0.4	0.2	0.4	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	0.2	0.8	
2-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.7	0.9	2.3	2.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.3	2.3	
3-Jul	0.0	0.1	0.2	0.3	Z	2.5	0.9	2.3	3.3	0.7	0.4	0.8	1.7	0.5	0.3	1.1	0.6	1.1	1.2	2.6	1.1	0.6	0.6	0.7	1.0	3.3	
4-Jul	0.2	0.1	0.2	0.1	0.2	Z	0.6	1.4	2.5	C	C	C	C	3.6	4.9	3.8	3.2	2.4	1.5	1.3	0.9	1.0	0.7	0.9	1.6	4.9	
5-Jul	Z	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.8	0.1	0.8	
6-Jul	0.4	Z	0.2	0.9	0.6	0.9	1.5	2.6	25.4	5.4	1.5	2.2	1.9	1.8	1.8	2.0	2.1	2.0	0.6	0.0	0.0	0.0	0.1	0.3	2.4	25.4	
7-Jul	0.3	0.1	Z	0.0	0.0	0.0	0.1	0.2	0.2	0.6	0.4	0.3	0.2	0.2	0.1	0.2	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.6	
8-Jul	0.1	0.1	0.1	Z	0.1	0.2	0.2	0.1	0.1	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.9	0.5	0.2	0.2	0.2	0.2	0.9	
9-Jul	0.4	0.4	0.4	0.2	Z	0.4	0.5	0.2	0.2	1.2	0.3	0.8	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.3	1.2	
10-Jul	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	
11-Jul	Z	0.2	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.6	1.1	0.7	0.2	0.0	0.1	0.2	0.2	0.3	0.3	0.4	0.3	0.2	0.2	0.3	1.1	
12-Jul	0.3	Z	0.3	0.2	0.1	0.1	0.2	1.0	3.1	8.4	23.9	22.9	15.7	11.0	9.7	2.4	3.7	7.0	2.8	0.6	0.5	0.5	0.9	0.9	5.1	23.9	
13-Jul	0.8	0.7	Z	1.1	0.8	0.6	1.9	4.0	5.4	10.4	5.5	1.4	1.4	4.6	5.1	4.8	1.6	1.4	0.6	1.7	3.9	3.7	8.7	3.1	3.2	10.4	
14-Jul	2.4	1.2	0.8	Z	0.9	0.6	1.4	1.2	5.0	5.4	1.6	0.8	M	6.0	5.5	2.3	1.7	0.2	0.3	0.6	0.6	0.4	0.6	0.3	1.8	6.0	
15-Jul	0.2	0.1	0.0	0.0	Z	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	
16-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.2	0.4	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.1	0.4	
17-Jul	Z	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.4	0.5	0.7	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.6	0.6	0.6	0.3	0.7
18-Jul	0.6	Z	0.8	1.1	0.6	0.3	1.1	1.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.5	0.4	0.4	0.0	0.4	1.4	
19-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.2	0.2	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	0.2	
20-Jul	0.0	0.0	0.0	Z	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.6	0.5	0.3	0.2	0.3	0.3	0.3	0.1	0.1	0.2	0.6	
21-Jul	0.1	0.1	0.1	0.1	Z	0.2	0.4	0.4	0.4	0.8	0.7	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.8	
22-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.2	0.2	0.3	0.8	5.2	2.2	0.7	0.6	0.4	0.3	0.3	0.2	0.3	0.3	0.4	0.3	0.6	5.2	
23-Jul	Z	0.2	0.2	0.2	0.2	0.1	0.0	0.0	0.1	0.3	0.4	0.6	0.4	0.1	0.2	0.3	0.2	0.2	0.3	0.4	0.2	0.2	0.1	0.1	0.2	0.6	
24-Jul	0.0	Z	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.1	0.1	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.5	
25-Jul	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	
26-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	
27-Jul	0.0	0.0	0.0	0.0	Z	0.1	0.1	0.4	1.8	6.1	4.6	6.3	4.0	2.2	1.0	0.4	0.0	0.1	0.3	0.0	0.1	0.2	0.2	0.2	1.2	6.3	
28-Jul	0.1	0.1	0.0	0.1	0.2	Z	0.0	0.0	0.3	0.5	4.5	6.7	5.9	1.9	1.1	1.6	0.9	0.7	0.9	0.8	0.5	0.4	0.3	0.0	1.2	6.7	
29-Jul	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	0.0	0.0	0.0	0.1	0.0	0.1	
30-Jul	0.1	Z	0.2	0.2	0.2	0.3	0.1	0.2	0.2	0.2	0.4	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	0.1	0.4	
31-Jul	0.0	0.0	Z	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	0.1	0.2	4.1	21.5	17.9	11.0	0.3	0.2	2.4	21.5	
																								Diurnal Average		Diurnal Maximum	
																								0.3		2.4	
																								0.2		1.2	
																								0.2		0.8	
																								0.2		1.1	
																								0.2		0.9	
																								0.3		2.5	
																								0.3		1.9	
																								0.6		4.0	
																								1.6		25.4	
																								1.4		10.4	
																								1.6		23.9	
																								1.4		15.7	
																								1.2		11.0	
																								1.1		9.7	
																								0.7		4.8	
																								0.5		3.7	
																								0.6		7.0	
																								0.5		4.1	
																								1.0		21.5	
																								0.9		17.9	
																								0.7		11.0	
																								0.5		8.7	
																								0.3		3.1	
																								Z - zerospan		C - Calibration	
																								M - Maintenance		Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb	



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	700	98.87	98.87
11 - 20	4	0.56	99.44
21 - 60	4	0.56	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	51	34	15	15	24	77	47	16	43	68	60	46	30	44	54	76	700
11 - 20	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	4
21 - 60	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	53	34	15	15	24	77	47	16	43	68	60	47	30	44	54	81	708

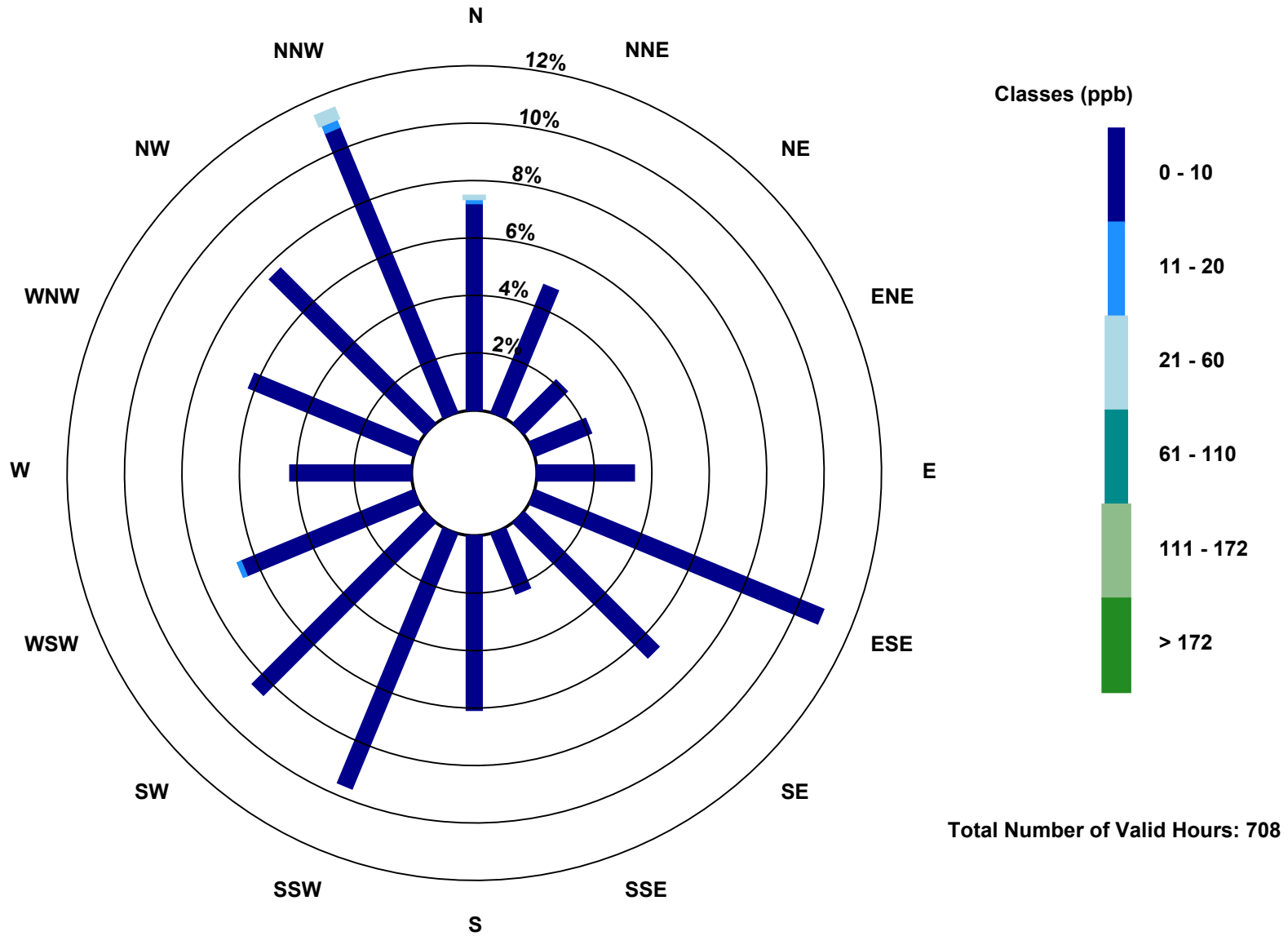
Total Number of Valid Hours: 708

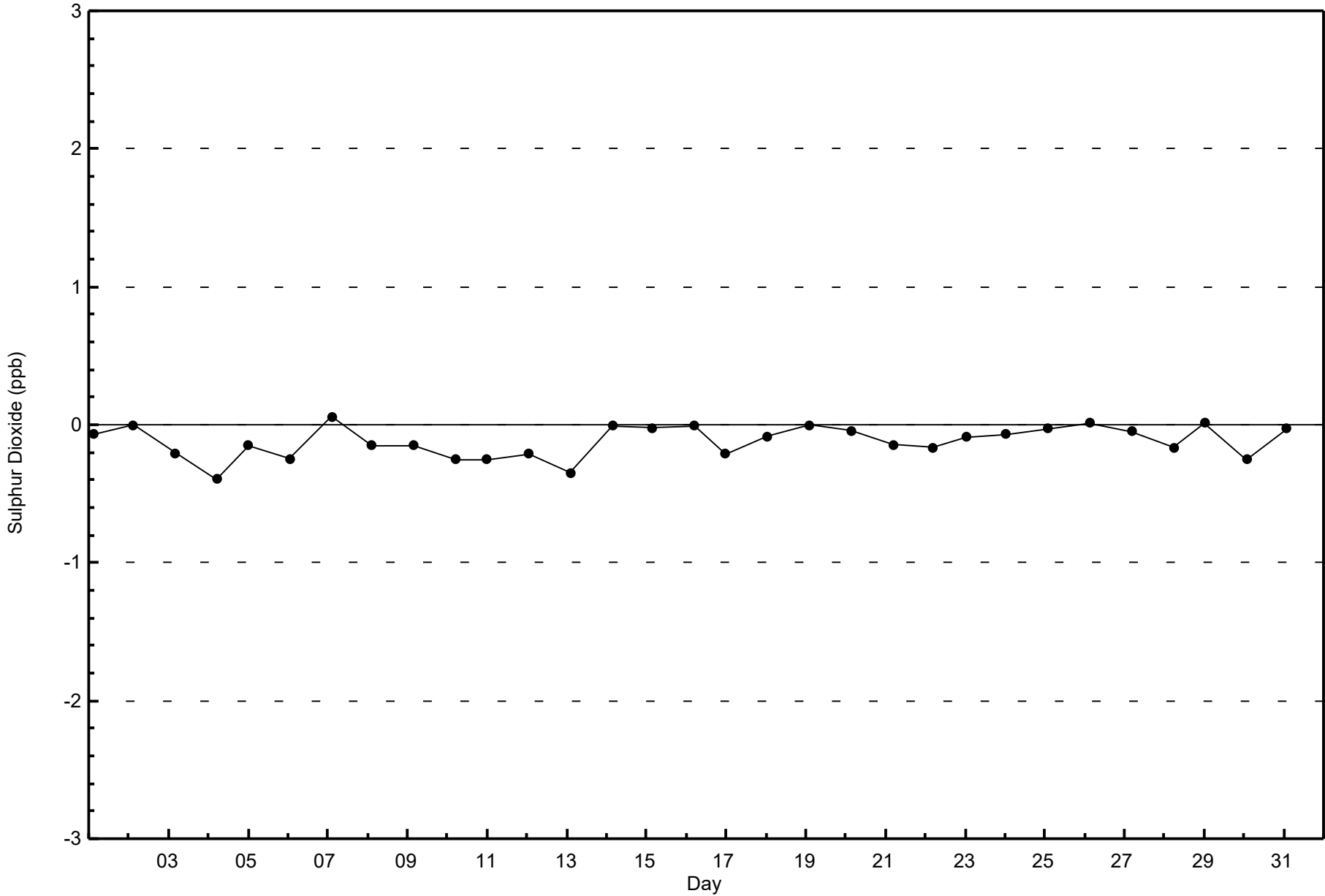
Total Number of Hours: 744

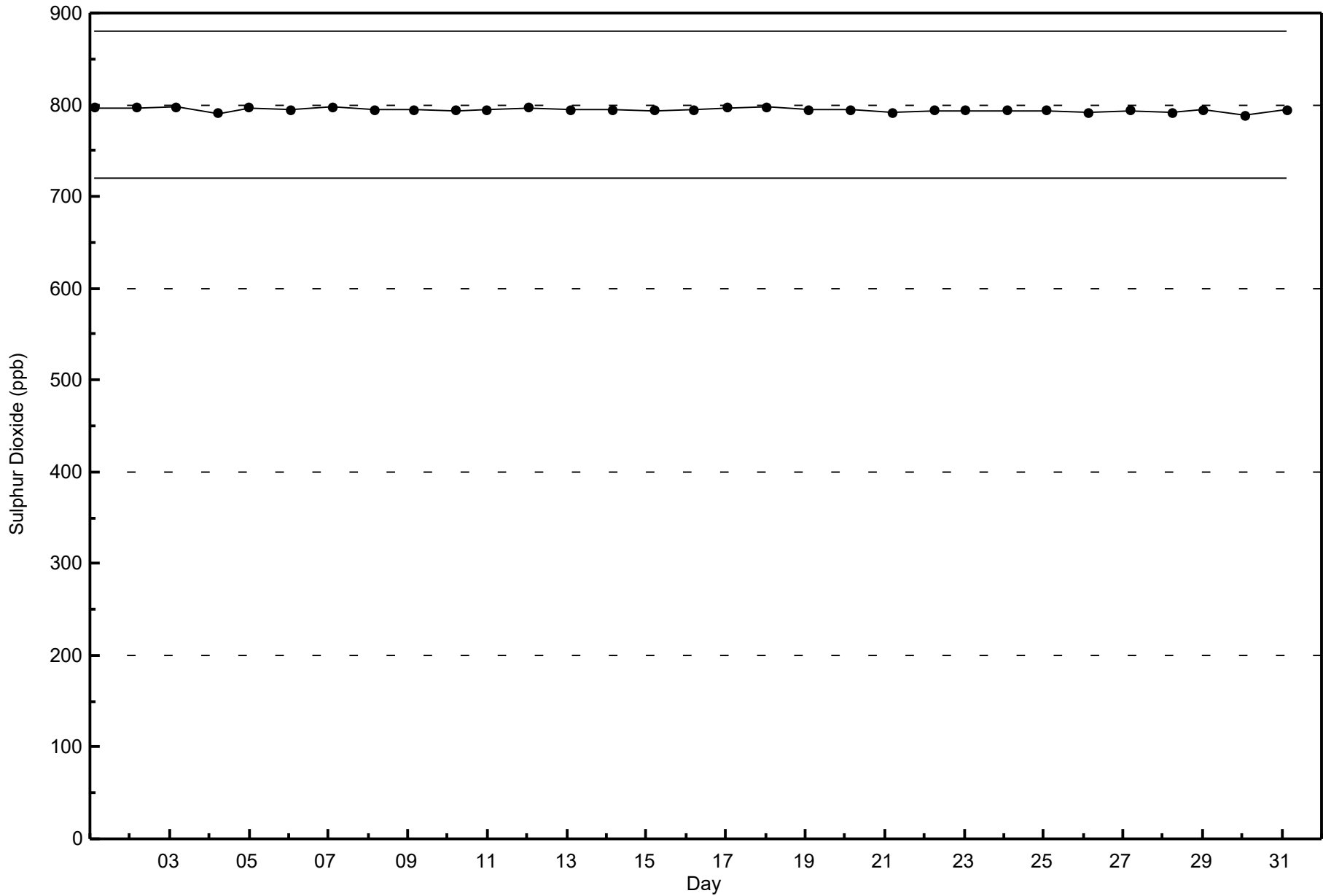


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes









Wood Buffalo Environmental Association

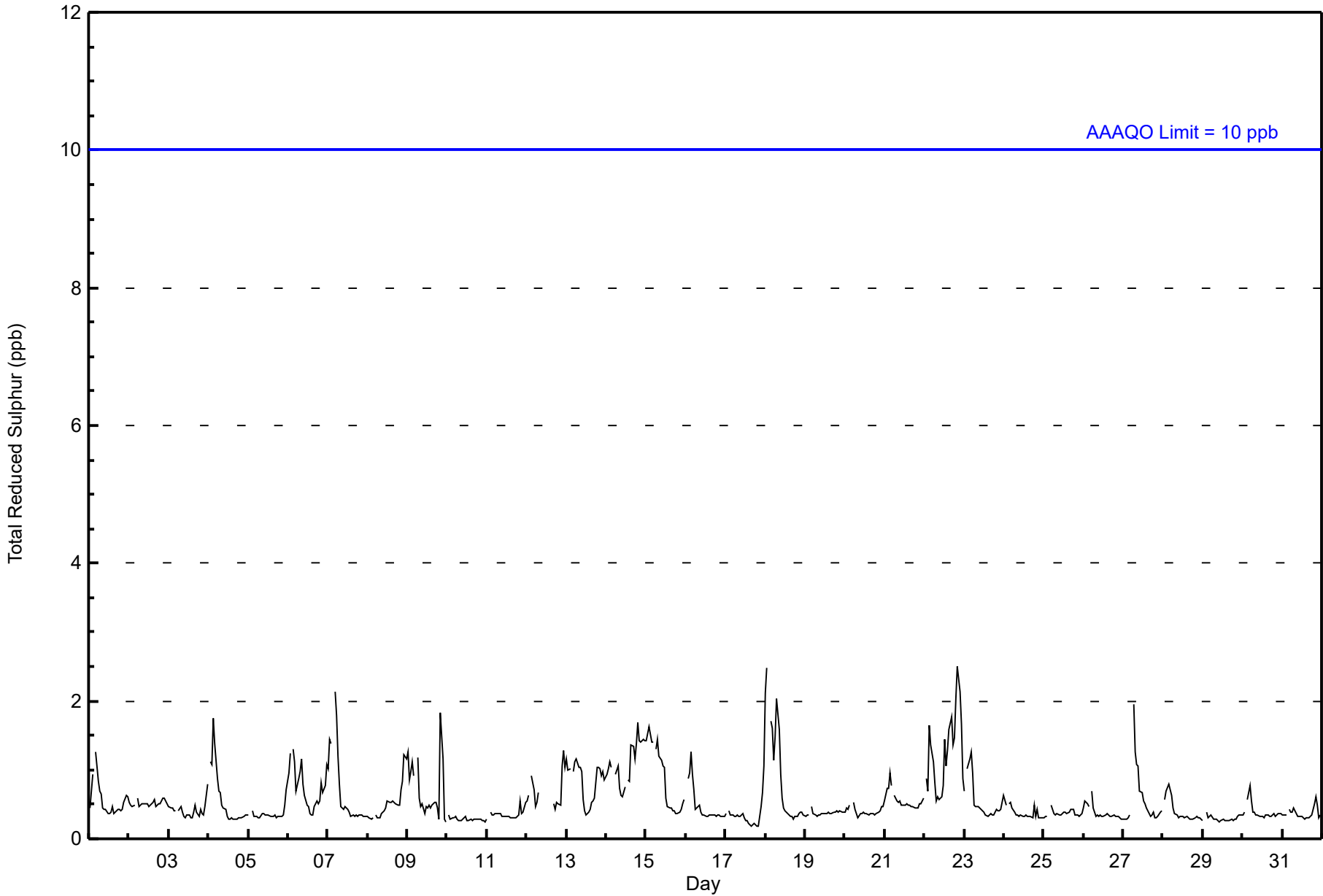
Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Patricia McInnes - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		744																			
Maximum Value: 2.5 ppb on Jul 22 21:00		Maximum Daily Average: 1.2 ppb on Jul 22		Minimum Value: 0.2 ppb on Jul 17 20:00		Minimum Daily Average: 0.3 ppb on Jul 10		Hours of Data: 704																			
Maximum Diurnal Average: 0.8 ppb at hour 5		Minimum Diurnal Average: 0.4 ppb at hour 14		Hours of Missing Data: 40		Hours of Calibration: 39		Percent Operational Time: 99.9																			
Monthly Average: 0.55 ppb		Percentiles: P ₁ = 0.3 P ₁₀ = 0.3 Q ₁ = 0.3 Median = 0.4 Q ₃ = 0.6 P ₉₀ = 1.1 P ₉₉ = 1.9																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0.4	0.7	0.9	Z	1.3	0.8	0.7	0.7	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	0.5	0.6	0.6	0.5	1.3	
2-Jul	0.5	0.5	0.5	0.5	Z	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.5	0.6
3-Jul	0.5	0.5	0.5	0.4	0.4	Z	0.4	0.5	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.5	0.4	0.3	0.4	0.4	0.3	0.5	0.8	0.4	0.8	
4-Jul	Z	1.1	1.1	1.8	1.4	0.9	0.7	0.7	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.6	1.8	
5-Jul	0.3	Z	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.7	0.4	0.7
6-Jul	1.0	1.2	Z	1.3	1.1	0.7	0.9	1.0	1.2	0.8	0.6	0.5	0.5	0.4	0.3	0.4	0.5	0.5	0.5	0.6	0.8	0.7	0.8	1.1	0.7	1.3	
7-Jul	1.0	1.4	1.4	Z	2.1	1.8	1.2	0.8	0.5	0.4	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.7	2.1	
8-Jul	0.3	0.3	0.3	0.3	Z	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.7	0.8	1.2	1.2	0.5	1.2	
9-Jul	1.3	0.9	1.0	1.1	0.9	Z	1.2	0.6	0.5	0.5	0.4	0.5	0.4	0.5	0.4	0.5	0.5	0.5	0.4	0.3	1.8	1.2	0.3	0.3	0.7	1.8	
10-Jul	Z	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	0.3	
11-Jul	0.3	Z	0.4	0.3	0.3	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	0.3	0.6	0.4	0.4	0.5	0.4	0.6	
12-Jul	0.6	0.6	Z	0.9	0.7	0.5	0.5	0.7	C	C	C	C	C	C	C	C	0.5	0.4	0.5	0.5	0.5	1.1	1.3	1.0	--	1.3	
13-Jul	1.2	1.0	1.0	Z	1.0	1.1	1.2	1.0	1.0	1.0	0.6	0.4	0.4	0.4	0.5	0.5	0.6	1.0	1.0	1.0	0.9	1.0	0.9	0.9	0.8	1.2	
14-Jul	0.9	1.0	1.1	1.0	Z	0.9	1.0	1.1	0.7	0.6	0.6	0.7	M	0.9	0.8	1.4	1.3	1.2	1.4	1.7	1.4	1.4	1.5	1.4	1.1	1.7	
15-Jul	1.4	1.5	1.6	1.4	1.4	Z	1.3	1.4	1.2	1.1	1.1	1.0	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.9	1.6	
16-Jul	Z	0.9	0.9	1.3	0.9	0.7	0.4	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.5	1.3	
17-Jul	0.4	Z	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.5	0.7	1.0	0.3	1.0
18-Jul	2.1	2.5	Z	1.7	1.6	1.1	1.5	2.0	1.6	0.9	0.6	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.9	2.5	
19-Jul	0.3	0.3	0.3	Z	0.5	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5
20-Jul	0.4	0.4	0.4	0.5	Z	0.5	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.5	0.5	0.4	0.5	
21-Jul	0.5	0.7	0.7	1.0	0.8	Z	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	1.0	
22-Jul	Z	0.9	0.7	1.6	1.4	1.1	0.8	0.6	0.6	0.6	0.6	0.8	1.4	1.1	1.3	1.6	1.8	1.4	1.5	2.0	2.5	2.1	1.7	0.9	1.2	2.5	
23-Jul	0.7	Z	1.0	1.2	1.3	1.0	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	1.3	
24-Jul	0.6	0.5	Z	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.3	0.4	0.3	0.3	0.3	0.4	0.6	
25-Jul	0.3	0.3	0.3	Z	0.5	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.5	
26-Jul	0.4	0.6	0.5	0.5	Z	0.7	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.7	
27-Jul	0.3	0.3	0.3	0.3	0.4	Z	1.9	1.3	1.1	1.1	0.7	0.7	0.5	0.5	0.5	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.6	1.9	
28-Jul	Z	0.6	0.7	0.8	0.7	0.6	0.5	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	0.4	0.8	
29-Jul	0.3	Z	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	0.3	0.3	0.4	0.3	0.3	0.4	
30-Jul	0.3	0.4	Z	0.6	0.8	0.6	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.8	
31-Jul	0.3	0.3	0.3	Z	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	0.5	0.6	0.5	0.3	0.3	0.4	0.6	
																								Diurnal Average			
																								Diurnal Maximum			
																								0.6 2.1			
																								0.8 2.5			
																								0.7 1.6			
																								0.8 1.8			
																								0.8 2.1			
																								0.7 1.8			
																								0.7 1.9			
																								0.6 2.0			
																								0.5 1.6			
																								0.5 1.1			
																								0.4 1.1			
																								0.4 1.0			
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																								0.4 1.1			
																								0.4 1.3			
																								0.4 1.6			
																								0.5 1.8			
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																								0.5 1.5			
																								0.5 2.0			
																								0.6 2.5			
																								0.6 2.1			
																								0.6 1.7			
																								0.6 1.4			

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - July 2023

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

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	50	35	16	15	24	76	48	19	44	66	60	46	32	43	52	78	704
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	50	35	16	15	24	76	48	19	44	66	60	46	32	43	52	78	704

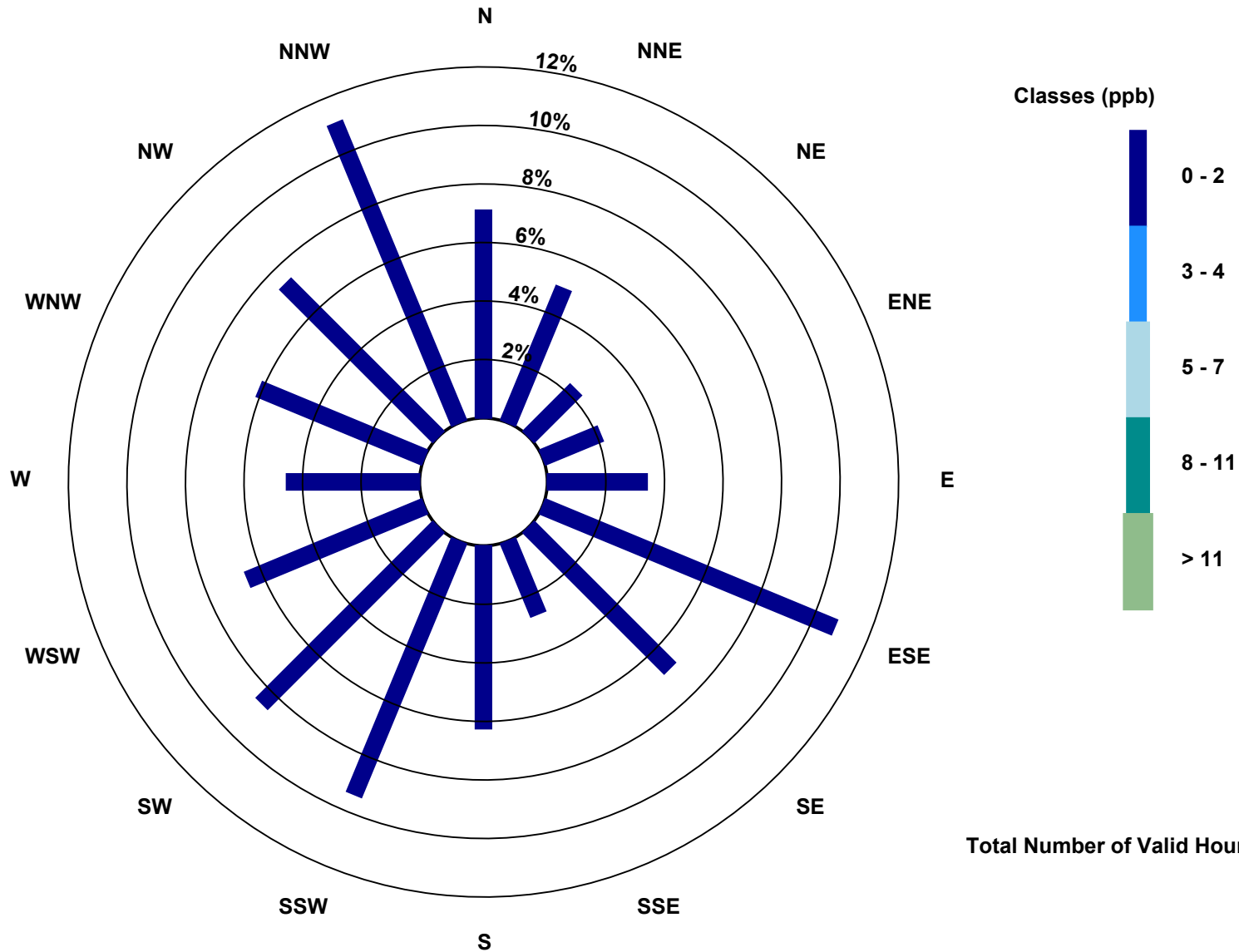
Total Number of Valid Hours: 704

Total Number of Hours: 744

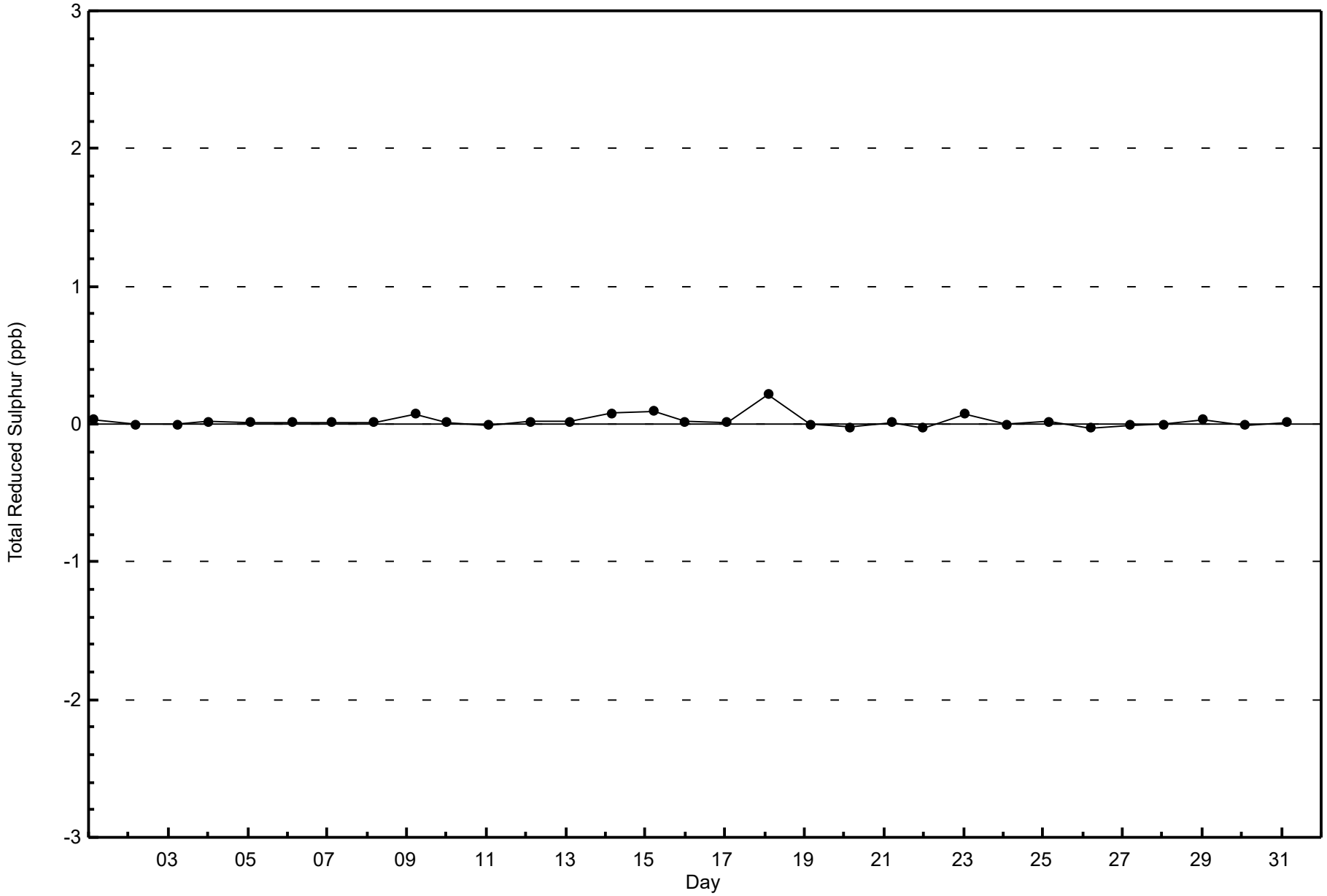


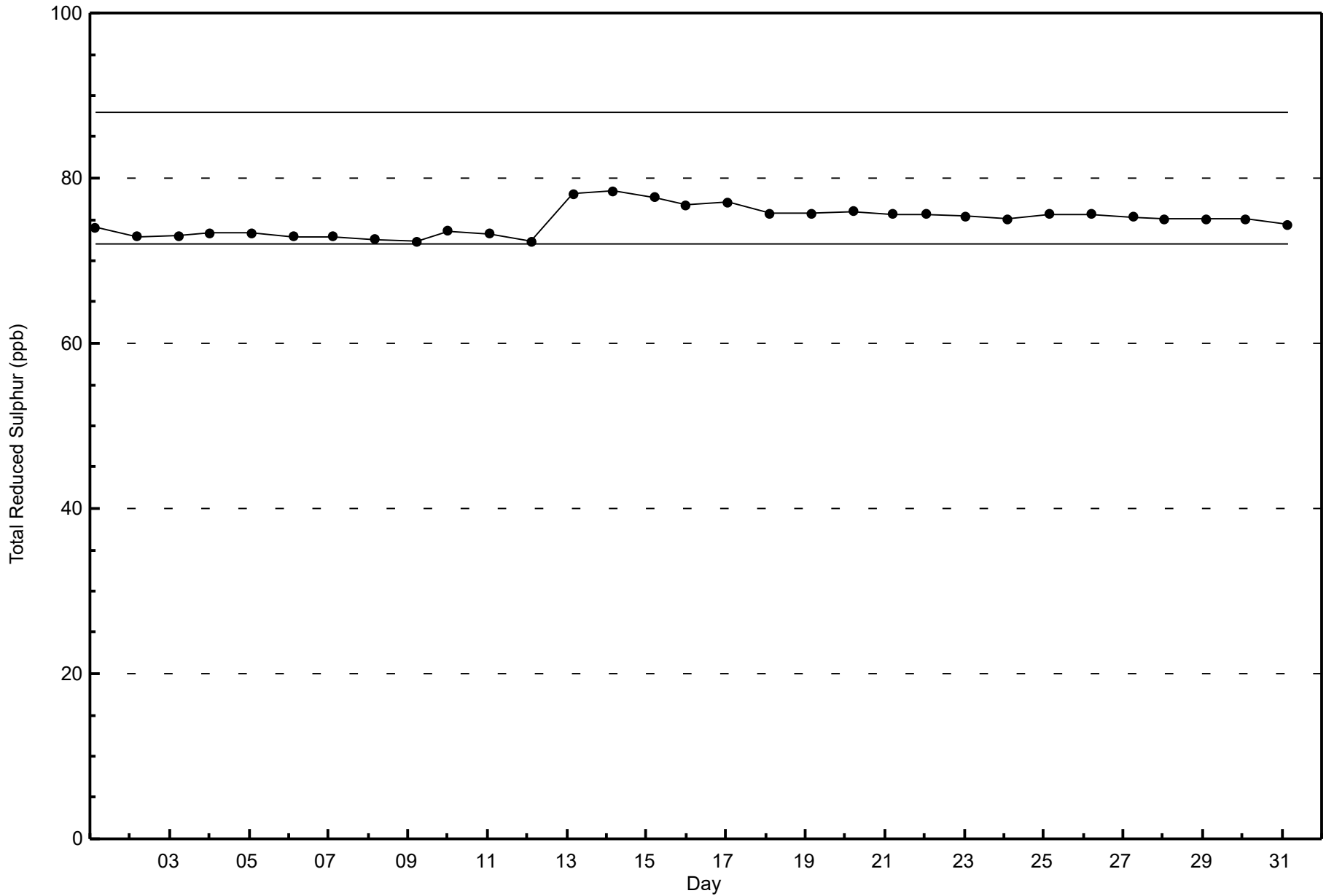
Wood Buffalo Environmental Association
Wind Rose Jul 2023

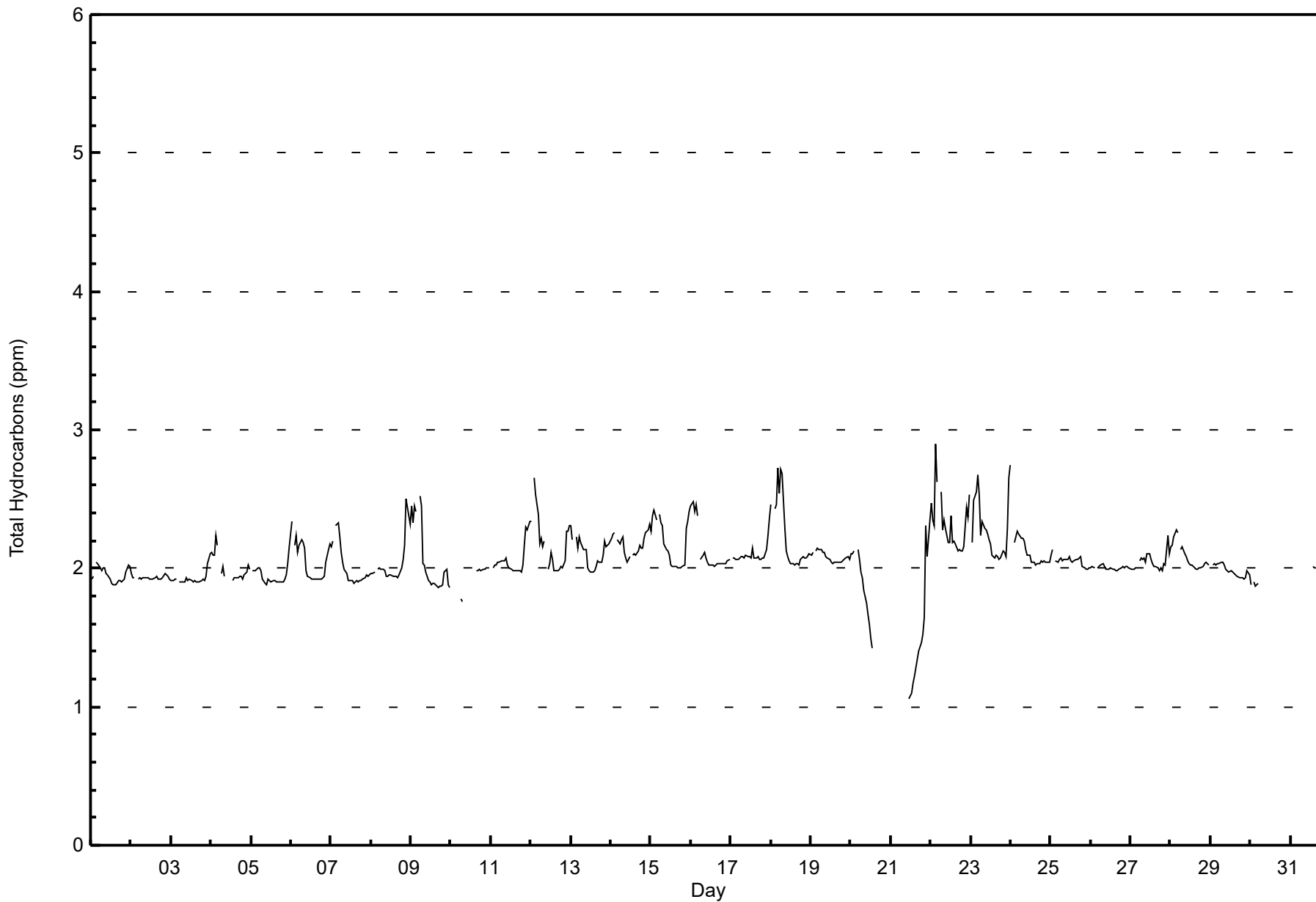
Total Reduced Sulphur (TRS) - ppb
Patricia McInnes



Total Number of Valid Hours: 704









Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Patricia McInnes - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	369	57.30	57.30
2.1 - 3.0	275	42.70	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 644

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Patricia McInnes - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	24	19	8	11	22	32	22	6	24	41	35	32	13	20	22	38	369
2.1 - 3.0	28	15	6	3	2	29	22	7	9	21	22	11	11	20	29	40	275
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	52	34	14	14	24	61	44	13	33	62	57	43	24	40	51	78	644

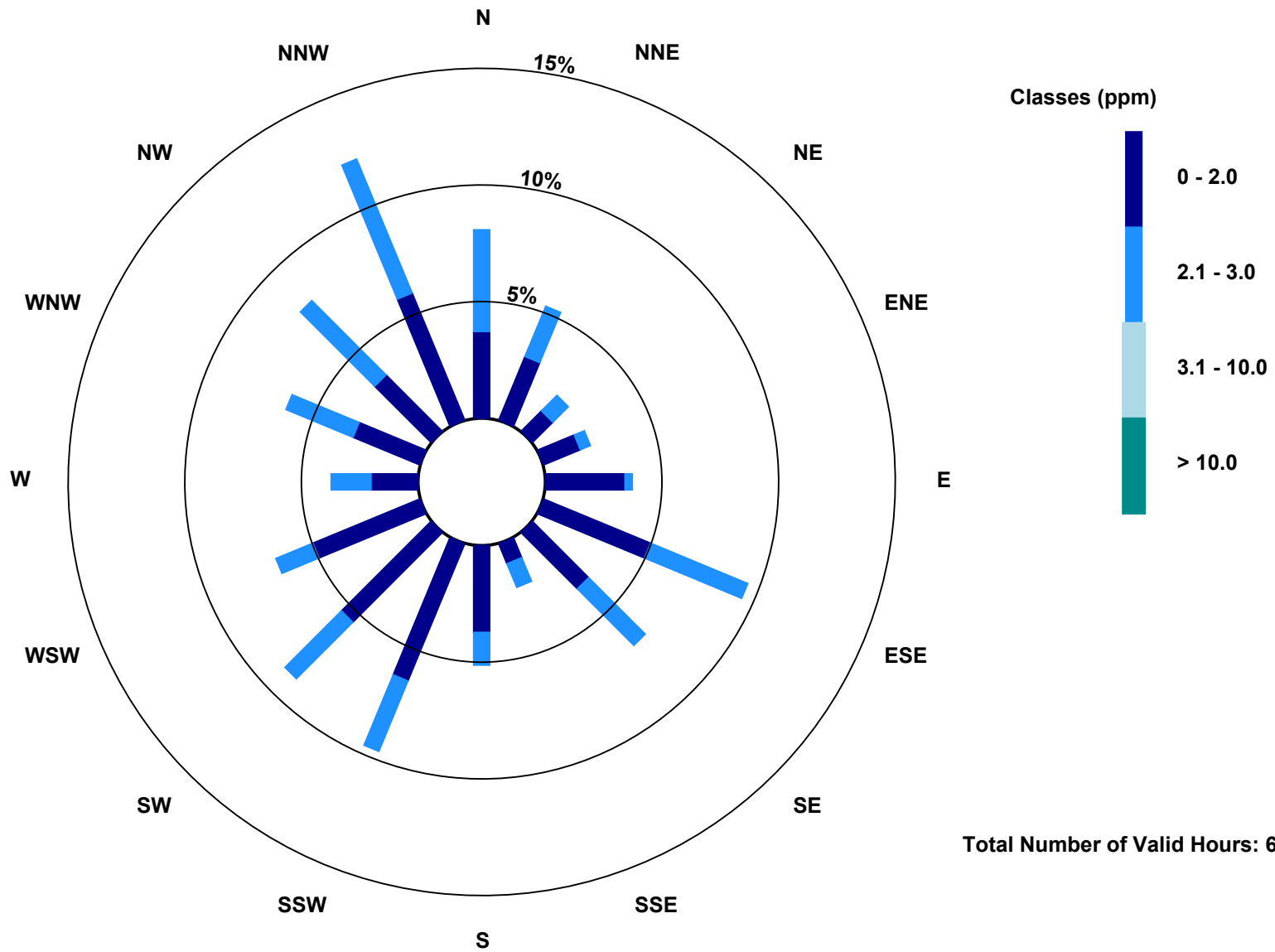
Total Number of Valid Hours: 644

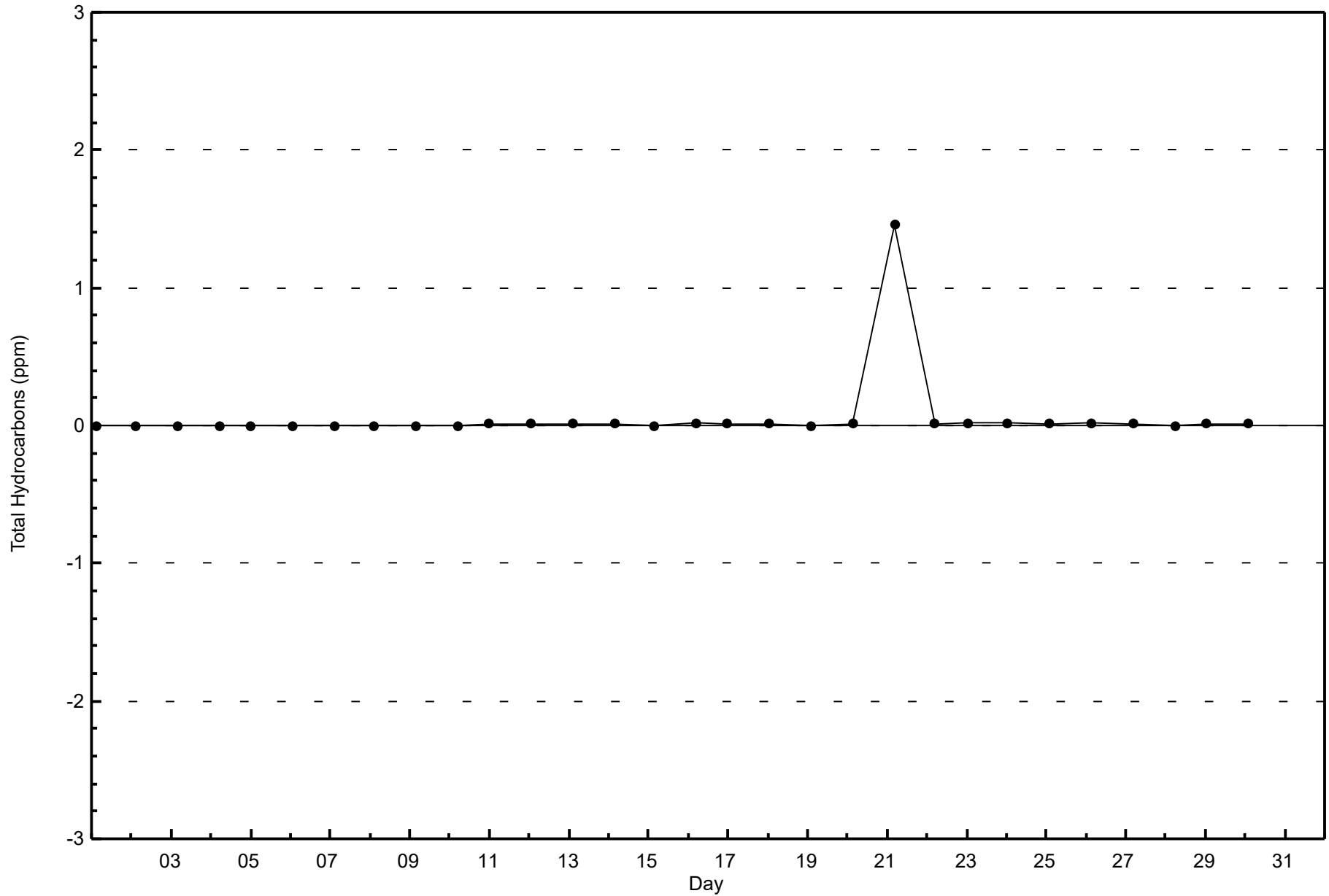
Total Number of Hours: 744

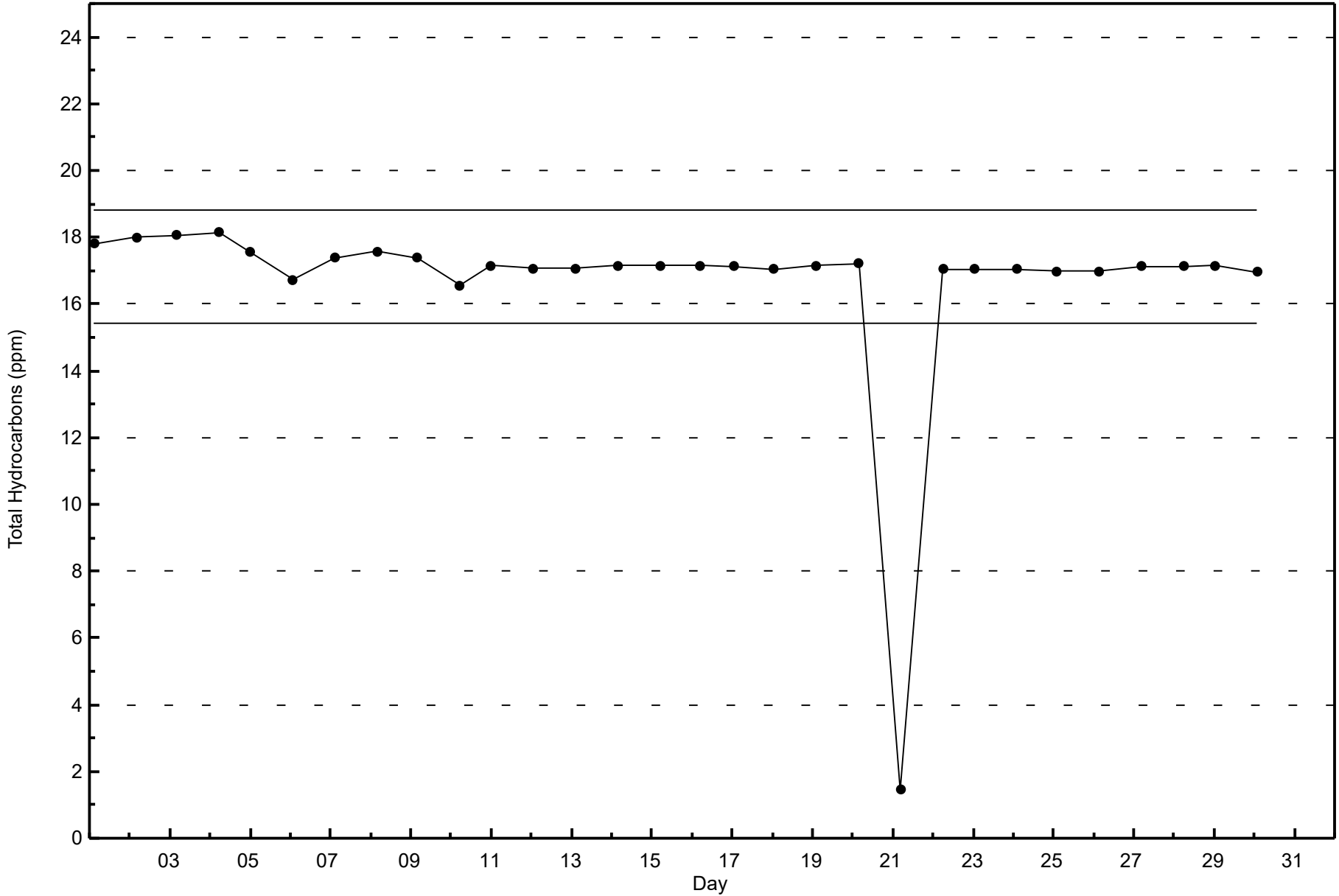


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Patricia McInnes

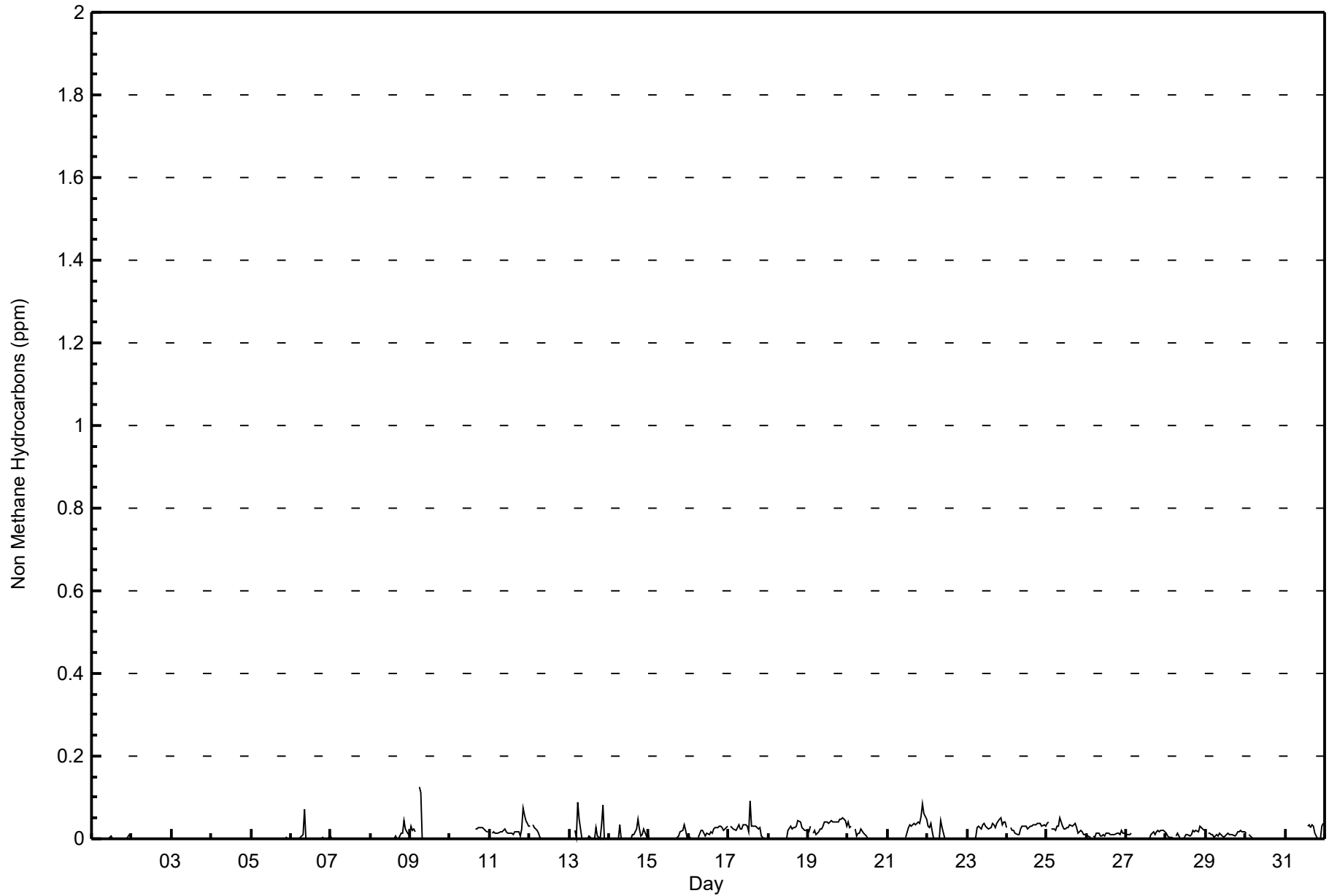








Maximum Value: 0.127 ppm on Jul 9 06:00																				Maximum Daily Average: 0.034 ppm on Jul 19					Hours in Service:	744					
Minimum Value: 0.000 ppm on Jul 1 01:00																				Minimum Daily Average: 0.000 ppm on Jul 3					Hours of Data:	644					
Maximum Diurnal Average: 0.021 ppm at hour 21																				Minimum Diurnal Average: 0.007 ppm at hour 5					Hours of Missing Data:	100					
Monthly Average: 0.013 ppm																				Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.1					Hours of Calibration:	41					
																									Percent Operational Time:	92.1					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Jul	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.004	0.001	0.011						
2-Jul	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	0.001	0.000	0.000	0.000	0.001						
3-Jul	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						
4-Jul	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
5-Jul	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	0.003	0.000	0.000	0.003						
6-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.007	0.012	0.072	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.001	0.011	0.005	0.072						
7-Jul	0.005	0.002	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	0.005						
8-Jul	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	0.006	0.000	0.000	0.012	0.014	0.044	0.024	0.016	0.005	0.044						
9-Jul	0.031	0.020	0.024	0.015	Z	0.127	0.113	0.000	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	0.014	0.127						
10-Jul	UO	UO	UO	UO	UO	Z	0.000	0.000	M	M	M	M	C	C	C	0.024	0.022	0.026	0.026	0.026	0.024	0.019	0.018	--	0.026						
11-Jul	Z	0.013	0.016	0.014	0.015	0.014	0.017	0.018	0.020	0.024	0.016	0.014	0.013	0.012	0.011	0.017	0.017	0.016	0.008	0.024	0.073	0.059	0.044	0.022	0.073						
12-Jul	0.030	Z	0.033	0.026	0.020	0.013	0.005	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	0.006	0.033						
13-Jul	0.000	0.000	Z	0.020	0.003	0.089	0.047	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.027	0.006	0.000	0.033	0.081	0.000	0.000	0.014	0.089						
14-Jul	0.000	0.000	0.000	Z	0.000	0.000	0.033	0.000	0.000	0.000	0.000	0.000	M	0.000	0.009	0.009	0.024	0.049	0.024	0.006	0.011	0.022	0.008	0.010	0.049						
15-Jul	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	0.004	0.007	0.017	0.021	0.033	0.019	0.005	0.033						
16-Jul	0.007	0.000	0.000	0.000	0.000	Z	0.004	0.021	0.021	0.014	0.008	0.012	0.010	0.018	0.015	0.023	0.026	0.027	0.029	0.031	0.026	0.022	0.024	0.016	0.032						
17-Jul	Z	0.030	0.028	0.023	0.021	0.027	0.032	0.023	0.022	0.033	0.033	0.031	0.018	0.092	0.031	0.029	0.032	0.027	0.023	0.026	0.006	0.000	0.000	0.026	0.092						
18-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.021	0.031	0.024	0.027	0.027	0.030	0.045	0.040	0.028	0.025	0.021	0.015	0.045						
19-Jul	0.017	0.029	Z	0.013	0.019	0.011	0.015	0.023	0.024	0.032	0.041	0.042	0.038	0.042	0.043	0.042	0.040	0.040	0.042	0.046	0.048	0.051	0.045	0.034	0.051						
20-Jul	0.039	0.028	0.030	Z	0.023	0.008	0.014	0.014	0.023	0.013	0.009	0.008	0.000	0.000	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.039						
21-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	0.005	0.026	0.034	0.030	0.035	0.037	0.034	0.041	0.036	0.054	0.084	0.062	--	0.084						
22-Jul	0.032	0.027	0.037	0.018	0.000	Z	0.000	0.000	0.043	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.043						
23-Jul	Z	0.000	0.000	0.000	0.000	0.003	0.029	0.029	0.023	0.033	0.037	0.032	0.026	0.024	0.026	0.038	0.035	0.029	0.037	0.049	0.050	0.035	0.039	0.027	0.050						
24-Jul	0.027	Z	0.026	0.019	0.020	0.015	0.011	0.010	0.024	0.030	0.031	0.030	0.023	0.025	0.029	0.029	0.035	0.035	0.038	0.039	0.037	0.031	0.033	0.027	0.039						
25-Jul	0.038	0.039	Z	0.024	0.025	0.022	0.031	0.029	0.049	0.030	0.022	0.024	0.026	0.027	0.033	0.030	0.033	0.038	0.029	0.013	0.019	0.017	0.009	0.027	0.049						
26-Jul	0.011	0.007	0.003	Z	0.006	0.004	0.014	0.012	0.008	0.008	0.010	0.008	0.014	0.012	0.012	0.009	0.009	0.009	0.014	0.013	0.011	0.019	0.015	0.011	0.019						
27-Jul	0.011	0.012	0.010	0.012	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.018	0.010	0.017	0.021	0.016	0.019	0.020	0.008	0.021						
28-Jul	0.015	0.008	0.003	0.002	0.000	Z	0.007	0.013	0.002	0.000	0.000	0.003	0.009	0.010	0.008	0.011	0.019	0.016	0.020	0.018	0.031	0.027	0.024	0.011	0.031						
29-Jul	Z	0.015	0.014	0.009	0.010	0.005	0.009	0.006	0.013	0.009	0.008	0.005	0.012	0.014	0.009	0.009	0.009	0.006	0.009	0.016	0.018	0.019	0.015	0.011	0.019						
30-Jul	0.014	Z	0.009	0.007	0.001	UO	UO	UO	UO	UO	M	M	M	M	M	M	M	M	M	M	M	M	M	--	0.014						
31-Jul	M	M	M	M	M	M	M	M	M	C	C	C	C	C	0.031	0.033	0.028	0.033	0.032	0.013	0.000	0.000	0.031	--	0.037						
																								Diurnal Average							
																								Diurnal Maximum							
Z - zerospan																								C - Calibration		M - Maintenance		AF - Analyzer Failure		UO - Unstable Operation	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	317	49.22	49.22
0.006 - 0.05	317	49.22	98.45
0.06 - 0.1	10	1.55	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 644

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	45	26	4	2	5	9	8	7	13	16	18	24	14	31	33	62	317
0.006 - 0.05	7	7	10	12	19	52	35	6	20	46	39	19	7	9	16	13	317
0.06 - 0.1	0	1	0	0	0	0	1	0	0	0	0	0	3	0	2	3	10
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	52	34	14	14	24	61	44	13	33	62	57	43	24	40	51	78	644

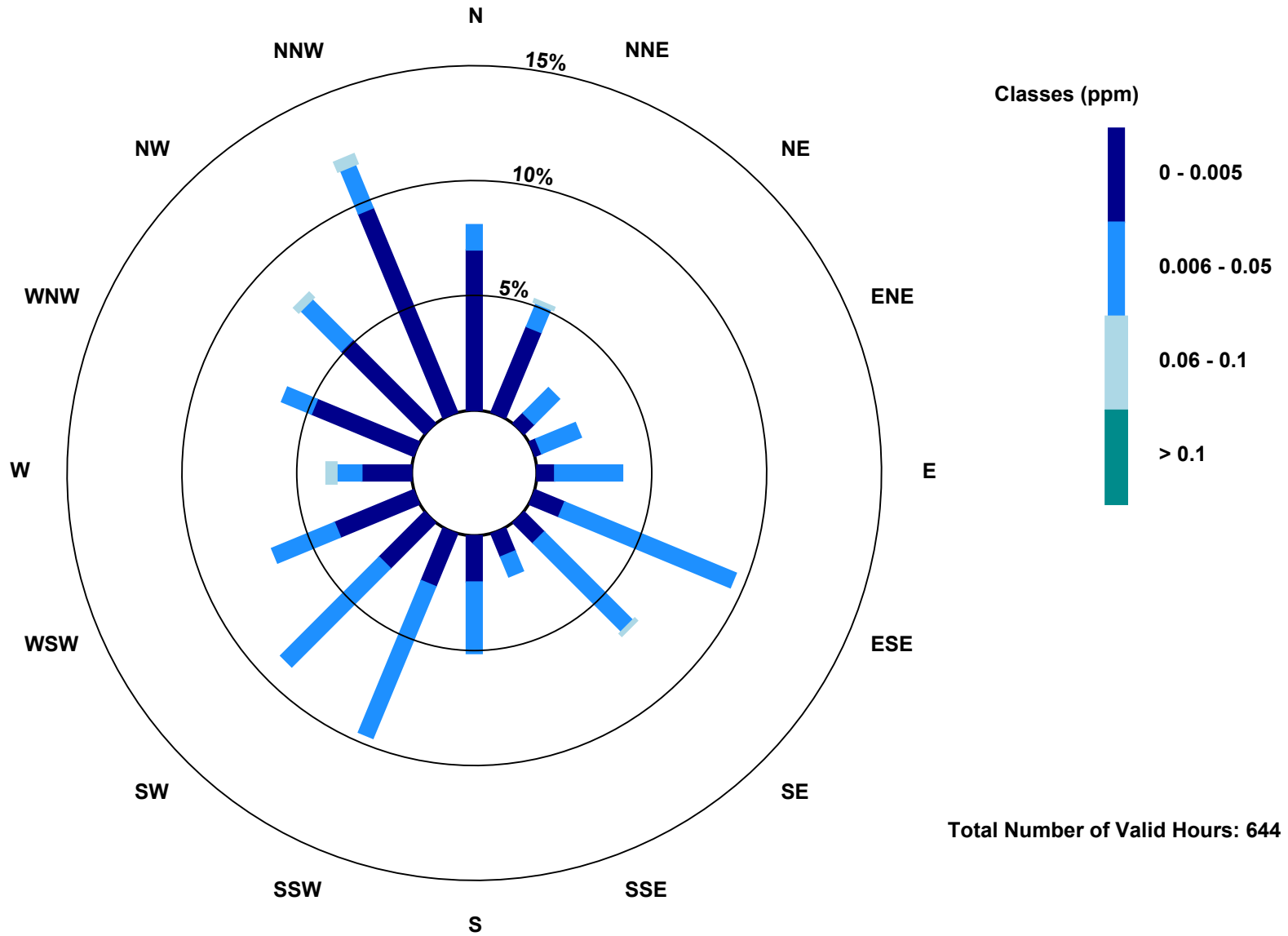
Total Number of Valid Hours: 644

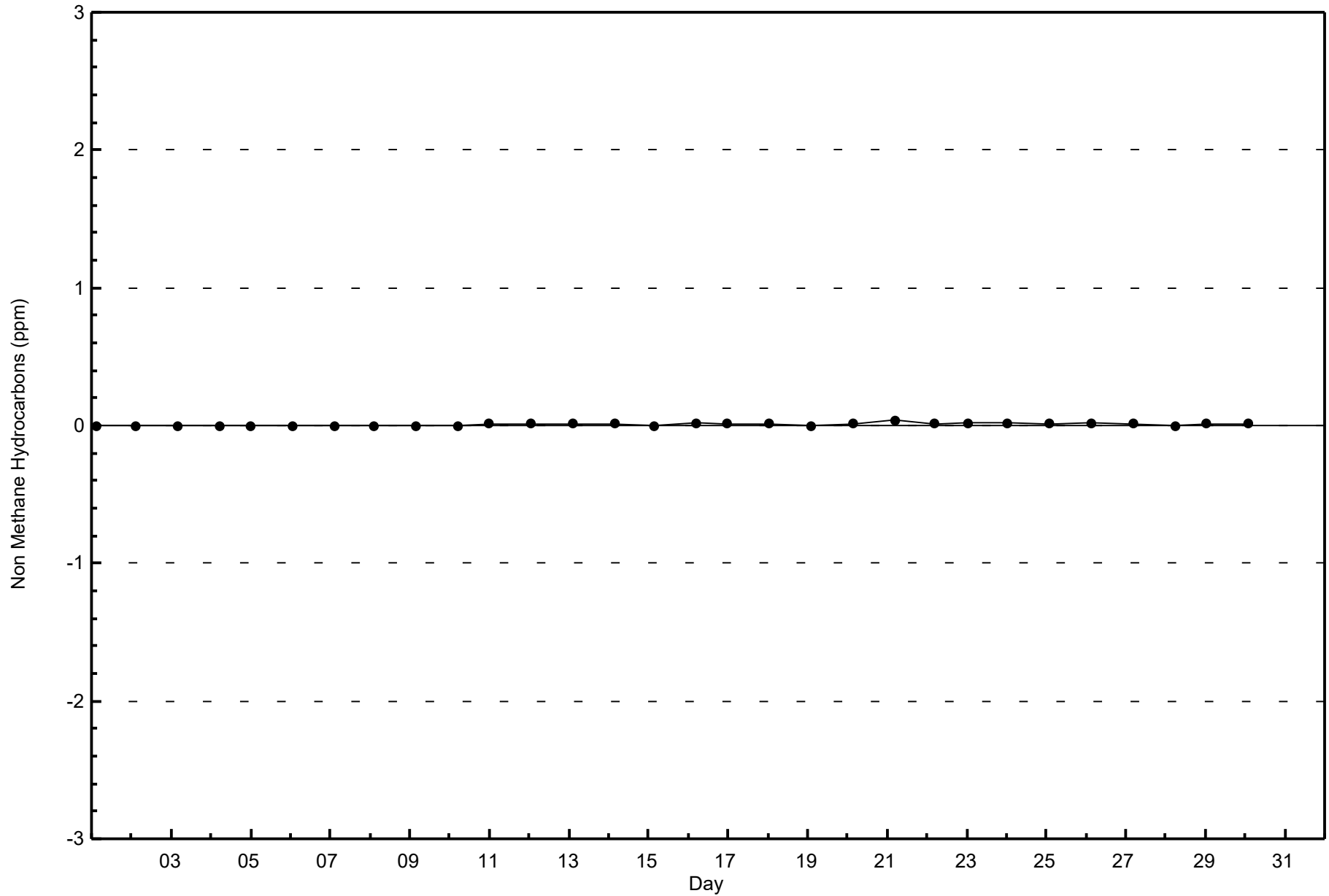
Total Number of Hours: 744

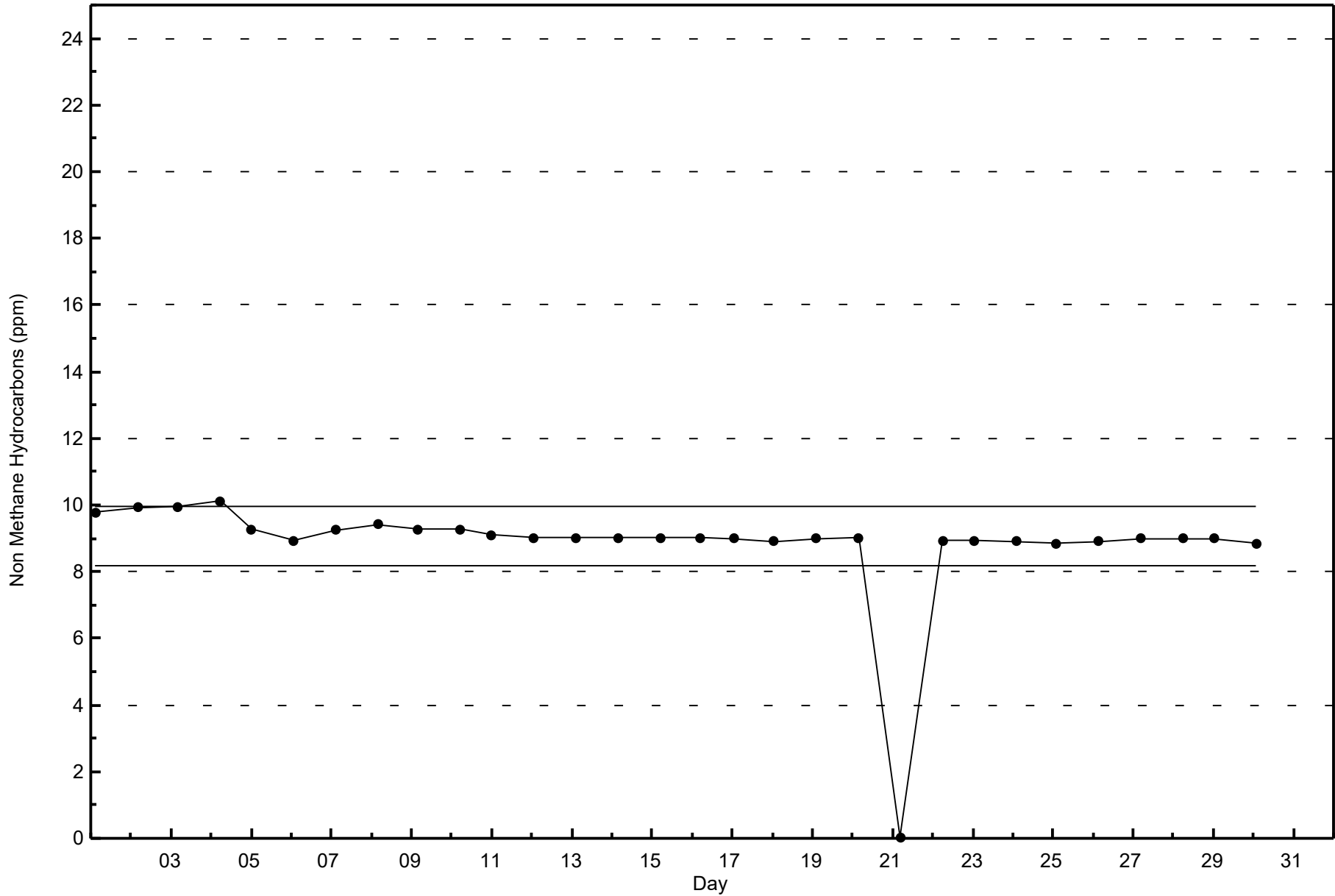


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes







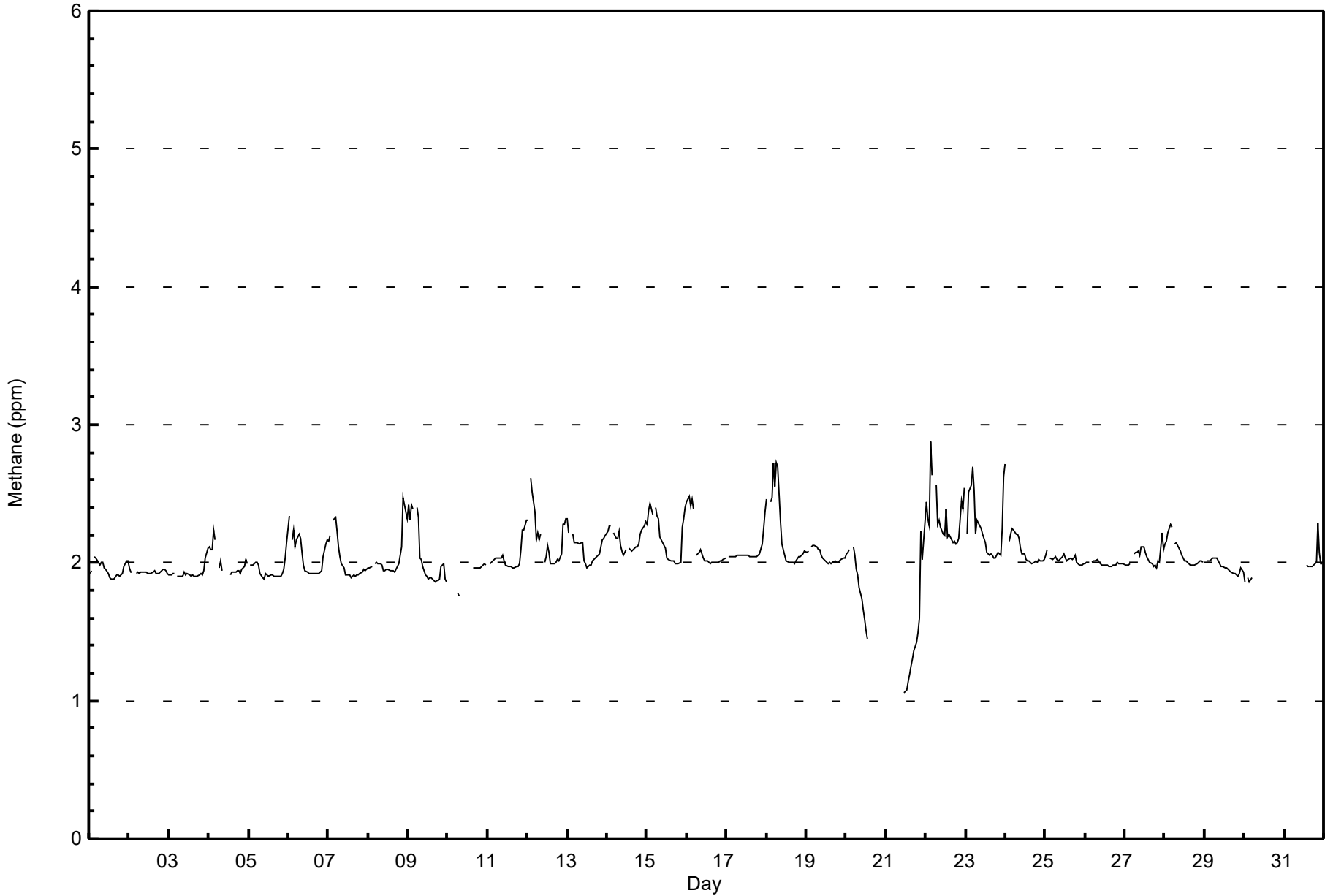


Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm
Patricia McInnes - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		744																																									
Maximum Value: 2.9 ppm on Jul 22 04:00		Maximum Daily Average: 2.3 ppm on Jul 22				Hours of Data:		644																																									
Minimum Value: 1.1 ppm on Jul 21 12:00		Minimum Daily Average: 1.9 ppm on Jul 3				Hours of Missing Data:		100																																									
Maximum Diurnal Average: 2.2 ppm at hour 4		Minimum Diurnal Average: 1.9 ppm at hour 14				Hours of Calibration:		41																																									
Monthly Average: 2.05 ppm		Percentiles: P ₁ = 1.4 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.1 P ₉₀ = 2.3 P ₉₉ = 2.6				Percent Operational Time:		92.1																																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	1.9	1.9	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0																						
2-Jul	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	2.0	2.0	1.9	1.9	1.9	1.9	1.9																						
3-Jul	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	2.1	1.9	2.1																						
4-Jul	2.1	2.1	2.1	2.2	2.2	Z	2.0	2.0	1.9	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	2.0	2.0	2.2																						
5-Jul	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	2.0	2.1	1.9	2.1	2.1																						
6-Jul	2.3	Z	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.0	2.3	2.3																						
7-Jul	2.2	2.2	Z	2.3	2.3	2.2	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.3	2.3																						
8-Jul	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.5	2.4	2.3	2.0	2.5	2.5																						
9-Jul	2.4	2.3	2.4	2.4	Z	2.4	2.3	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	1.9	1.9	2.0	2.4	2.4																						
10-Jul	UO	UO	UO	UO	UO	Z	1.8	1.8	M	M	M	M	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																						
11-Jul	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.3	2.0	2.3	2.3																						
12-Jul	2.3	Z	2.6	2.5	2.4	2.2	2.2	2.2	2.2	M	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.3	2.3	2.2	2.6	2.6																						
13-Jul	2.3	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.3	2.3																						
14-Jul	2.2	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.1	M	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.2	2.3	2.3																						
15-Jul	2.3	2.4	2.4	2.4	Z	2.4	2.3	2.3	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.3	2.4	2.2	2.4	2.4																						
16-Jul	2.4	2.5	2.4	2.5	2.4	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.5	2.5																						
17-Jul	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.3	2.1	2.4	2.4																						
18-Jul	2.5	Z	2.4	2.5	2.7	2.6	2.7	2.7	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	2.0	2.1	2.1	2.2	2.7	2.7																						
19-Jul	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1																					
20-Jul	2.1	2.1	2.1	Z	2.1	2.1	2.0	1.9	1.8	1.7	1.7	1.6	1.5	1.4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF																						
21-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	1.1	1.1	1.1	1.2	1.2	1.3	1.4	1.4	1.5	1.6	2.2	2.0	2.3	--	2.3	2.3																						
22-Jul	2.4	2.3	2.3	2.9	2.6	Z	2.6	2.3	2.3	2.3	2.2	2.2	2.4	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.5	2.4	2.5	2.3	2.9	2.9																						
23-Jul	Z	2.2	2.5	2.6	2.7	2.5	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.2	2.6	2.2	2.7	2.7																						
24-Jul	2.7	Z	2.2	2.2	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	2.0	2.0	2.0	2.0	2.0	2.1	2.7	2.7																						
25-Jul	2.1	2.1	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1																					
26-Jul	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																					
27-Jul	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.0	2.2	2.2																						
28-Jul	2.1	2.2	2.2	2.3	2.3	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	2.1	2.3	2.3																						
29-Jul	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	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																						
30-Jul	1.9	Z	1.9	1.9	1.9	UO	UO	UO	UO	UO	UO	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	1.9																					
31-Jul	M	M	M	M	M	M	M	M	M	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.1	2.0	2.0	--	2.3	2.3																					
																								2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	Diurnal Average		
																								2.7	2.5	2.6	2.9	2.7	2.6	2.7	2.7	2.3	2.3	2.2	2.2	2.4	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.3	2.5	2.4	2.6	Diurnal Maximum	
Z - zerospan																								C - Calibration				M - Maintenance				AF - Analyzer Failure				UO - Unstable Operation													





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	412	63.98	63.98
2.1 - 3.0	232	36.02	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 644

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Patricia McInnes - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	23	20	10	13	23	43	32	7	26	45	40	34	16	20	23	37	412
2.1 - 3.0	29	14	4	1	1	18	12	6	7	17	17	9	8	20	28	41	232
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	52	34	14	14	24	61	44	13	33	62	57	43	24	40	51	78	644

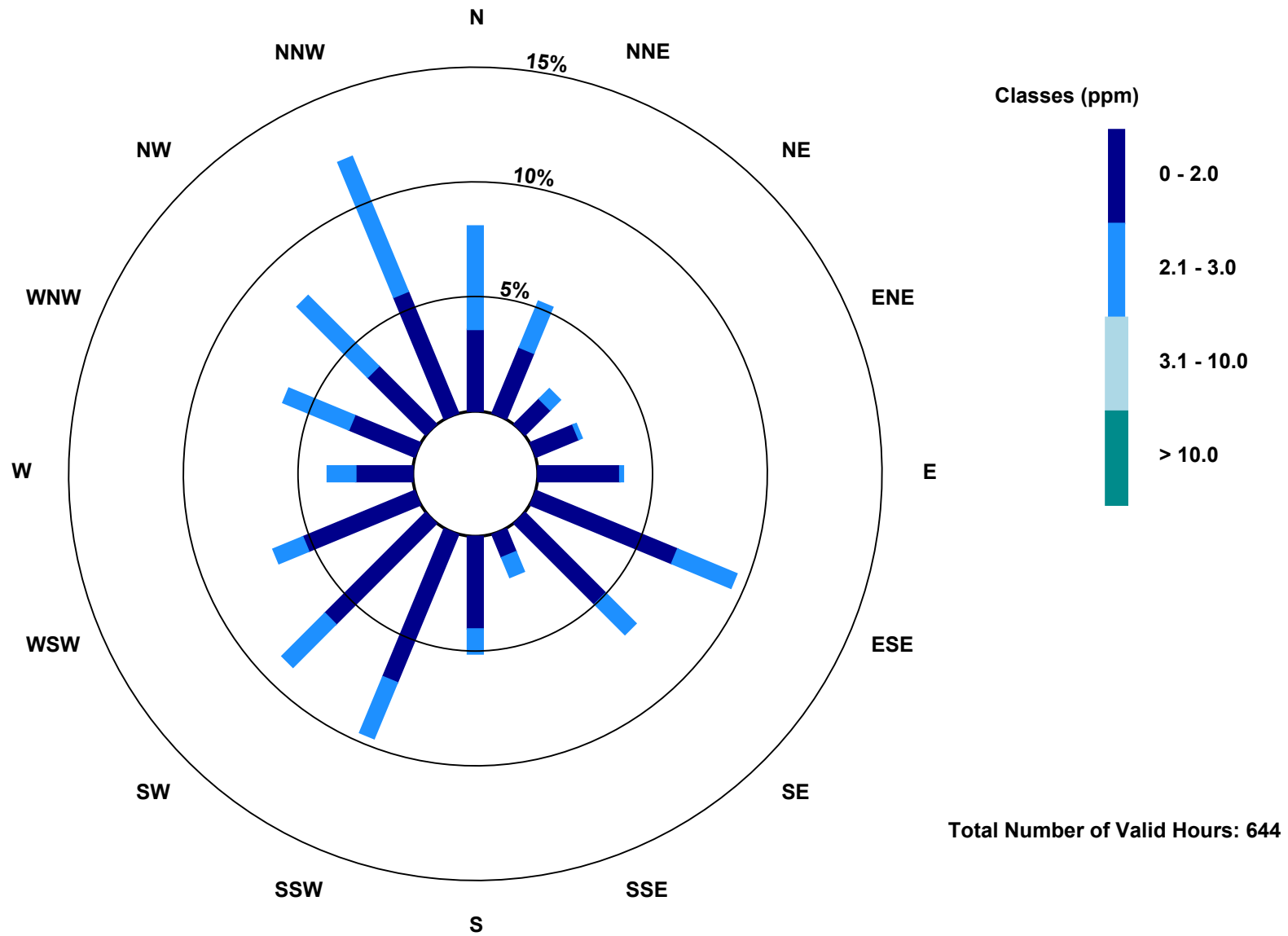
Total Number of Valid Hours: 644

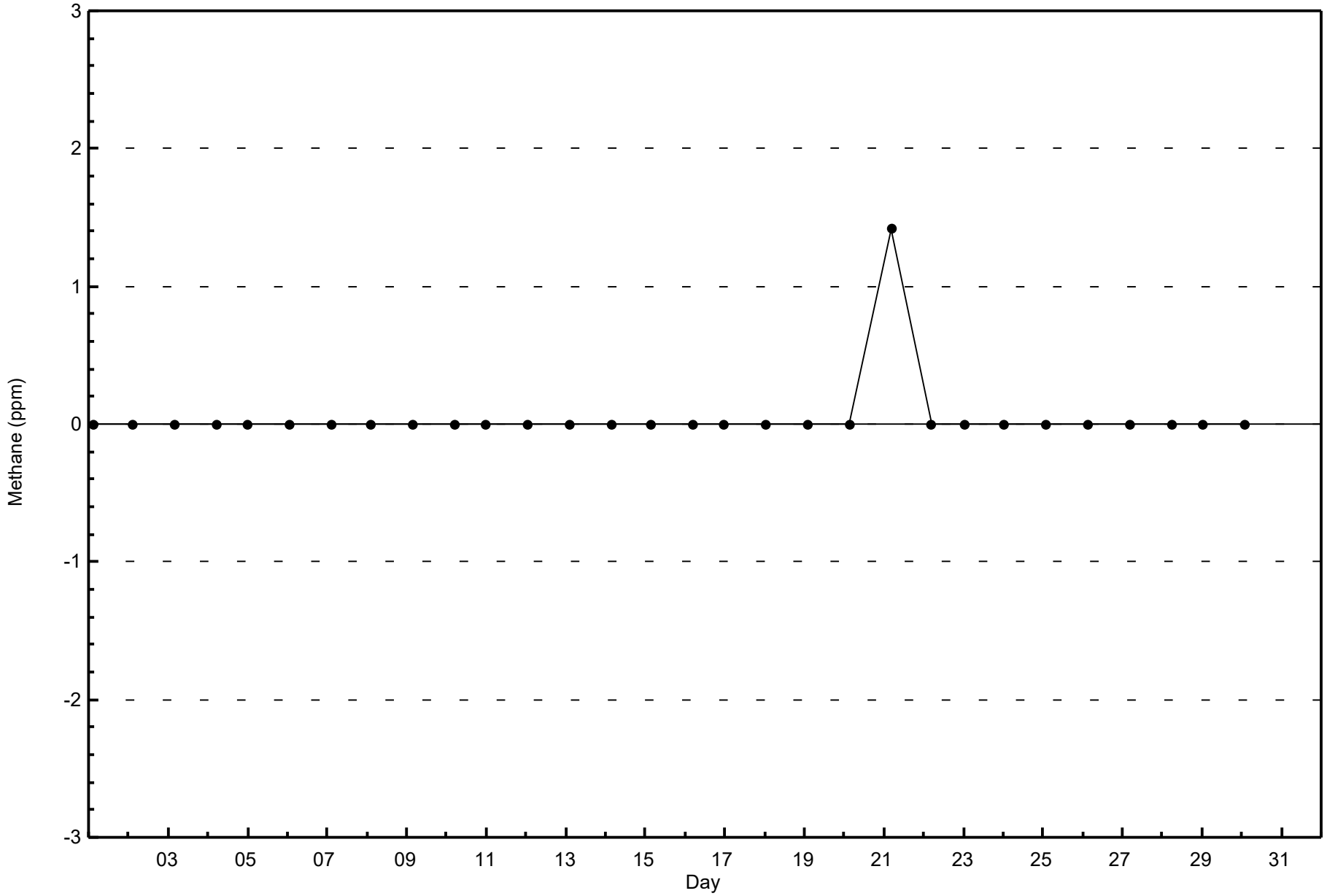
Total Number of Hours: 744

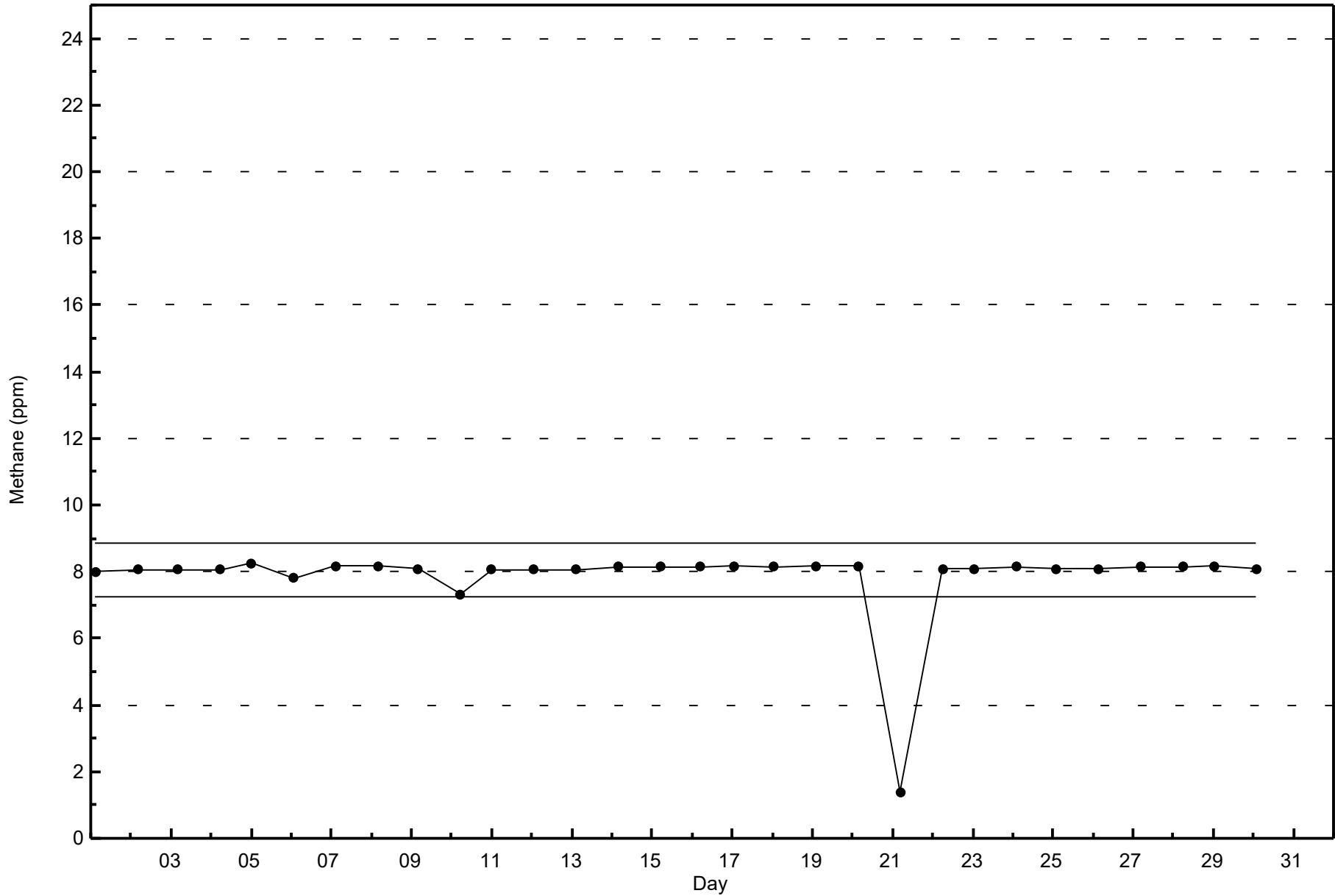


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Methane (CH₄) - ppm
Patricia McInnes









Wood Buffalo Environmental Association

Summary of Hour Averages

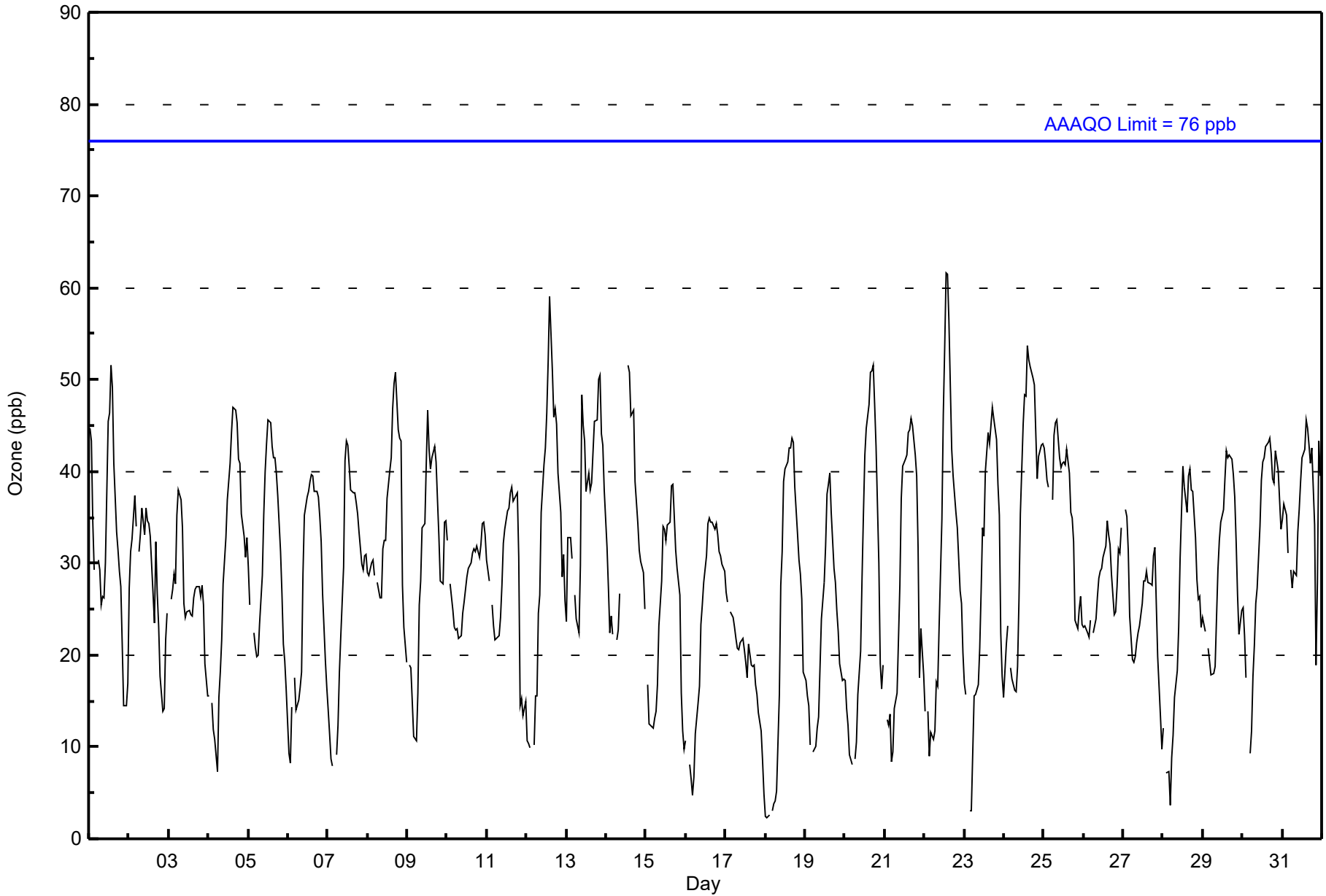
Ozone (O₃) - ppb

Patricia McInnes - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 61.6 ppb on Jul 22 14:00	Maximum Daily Average: 37.9 ppb on Jul 13		Hours of Data:	709
Minimum Value: 2.3 ppb on Jul 18 02:00	Minimum Daily Average: 19.0 ppb on Jul 17		Hours of Missing Data:	35
Maximum Diurnal Average: 40.5 ppb at hour 15	Minimum Diurnal Average: 16.2 ppb at hour 5		Hours of Calibration:	35
Monthly Average: 29.14 ppb	Percentiles: P ₁ = 3.8 P ₁₀ = 13.7 Q ₁ = 21.1 Median = 29.2 Q ₃ = 38.0 P ₉₀ = 43.4 P ₉₉ = 52.0		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	44.6	43.4	34.4	29.3	Z	30.3	29.3	25.5	26.5	26.2	30.0	45.5	46.3	51.5	49.1	40.8	33.4	31.4	29.1	27.4	21.1	14.4	14.5	16.9	32.2	51.5																						
2-Jul	27.3	31.2	32.7	37.4	34.1	Z	31.2	33.3	36.0	33.1	36.0	34.6	34.3	32.9	26.7	23.5	32.3	26.8	23.2	17.7	13.9	14.2	21.6	24.6	28.6	37.4																						
3-Jul	Z	26.1	27.1	28.8	27.8	35.2	38.0	36.9	33.9	25.7	24.1	24.7	24.8	24.4	24.2	26.2	27.2	27.4	27.5	26.3	27.6	25.5	19.1	15.6	27.1	38.0																						
4-Jul	15.5	Z	14.8	11.9	10.8	7.4	15.4	18.1	21.7	27.8	32.8	37.0	38.9	40.9	44.2	46.9	46.7	45.3	41.4	40.8	35.4	33.0	30.6	32.8	30.0	46.9																						
5-Jul	29.7	25.5	Z	22.4	20.9	19.9	20.0	23.3	28.7	35.3	40.0	43.1	45.6	45.3	42.7	41.5	39.7	37.4	31.3	26.6	21.3	19.4	16.4	31.2	45.6																							
6-Jul	9.3	8.2	14.4	Z	17.6	14.1	15.1	16.5	18.2	28.8	35.2	37.2	37.9	38.8	39.6	39.4	37.8	37.8	37.2	35.1	32.3	26.7	19.4	16.5	26.7	39.6																						
7-Jul	14.0	11.5	8.7	7.9	Z	9.2	12.4	18.2	22.1	29.6	41.3	43.3	42.9	40.6	38.0	37.7	37.7	36.5	35.4	33.4	29.8	29.2	30.8	31.0	27.9	43.3																						
8-Jul	29.0	28.6	30.0	30.3	28.7	Z	27.9	26.3	26.3	31.6	32.5	32.6	37.1	40.1	41.5	46.8	49.5	50.8	44.5	43.6	43.4	27.6	23.0	19.2	34.4	50.8																						
9-Jul	Z	19.0	18.6	14.9	11.1	10.6	15.9	25.5	28.0	33.9	34.4	40.8	46.7	42.3	40.3	41.5	42.7	41.1	36.9	33.0	28.0	27.8	34.4	34.6	30.5	46.7																						
10-Jul	32.5	Z	27.7	24.9	23.1	22.8	22.8	21.9	22.2	24.5	25.8	27.1	28.5	29.4	30.1	31.1	31.6	31.3	31.9	30.6	32.1	34.3	34.5	33.1	28.4	34.5																						
11-Jul	30.3	28.0	Z	25.4	23.2	21.6	22.0	22.1	24.1	27.5	32.1	33.7	35.7	36.0	37.8	38.3	36.8	37.4	37.6	30.7	14.5	15.3	13.5	14.9	27.8	38.3																						
12-Jul	10.6	10.4	9.9	Z	10.2	15.6	15.5	24.5	26.6	35.6	40.8	42.6	46.4	52.0	59.0	50.9	45.9	46.9	45.2	39.9	35.5	28.5	31.0	25.9	32.6	59.0																						
13-Jul	23.6	32.7	32.7	30.5	Z	26.6	24.0	22.5	29.8	48.4	45.0	43.3	37.8	39.8	38.0	38.8	42.1	45.4	45.6	50.0	50.5	44.1	42.8	38.0	37.9	50.5																						
14-Jul	31.7	27.4	22.4	24.2	22.2	Z	21.7	22.7	26.7	C	C	C	C	51.5	50.8	46.0	46.6	39.0	36.6	34.3	31.4	30.2	29.1	25.1	32.6	51.5																						
15-Jul	Z	16.8	12.5	12.2	12.1	13.1	13.8	16.8	23.2	28.0	34.1	33.8	32.5	34.1	34.5	38.5	38.6	35.1	31.5	29.4	26.6	15.8	11.7	9.8	24.1	38.6																						
16-Jul	10.7	Z	8.0	6.6	4.7	6.7	11.4	14.8	16.6	23.3	25.5	27.9	30.8	34.3	34.9	34.4	34.5	33.8	34.3	33.1	31.2	30.8	29.9	29.1	23.8	34.9																						
17-Jul	26.9	25.8	Z	24.7	24.1	23.1	21.8	20.8	20.6	21.4	21.9	20.6	19.3	17.5	21.2	19.0	18.8	19.0	16.9	15.7	13.8	11.7	8.6	4.8	19.0	26.9																						
18-Jul	2.4	2.3	2.6	Z	3.0	3.8	4.2	5.2	15.7	27.6	31.2	38.9	40.3	41.0	42.5	42.6	43.6	43.2	38.2	33.2	30.4	28.8	26.2	18.1	24.6	43.6																						
19-Jul	17.3	15.5	14.5	10.2	Z	9.5	10.1	12.0	13.3	18.6	23.9	27.8	31.9	37.6	38.5	39.9	35.5	29.5	27.8	24.9	22.5	19.1	17.3	17.3	22.4	39.9																						
20-Jul	17.3	14.2	12.4	9.2	8.0	Z	8.8	10.6	15.7	20.4	28.4	35.4	41.8	44.7	47.3	50.7	51.0	51.6	47.3	42.7	30.0	19.0	16.3	18.9	27.9	51.6																						
21-Jul	Z	13.0	12.4	13.5	8.4	9.5	14.2	15.8	21.7	27.7	37.1	40.6	41.3	41.8	44.2	44.5	45.7	45.0	41.9	39.5	31.8	17.6	22.9	17.8	28.2	45.7																						
22-Jul	13.9	Z	13.8	8.9	11.7	10.9	11.7	17.1	16.6	23.1	34.7	46.3	53.5	61.6	61.4	56.4	42.5	39.5	37.5	35.5	33.9	26.9	25.6	20.3	30.6	61.6																						
23-Jul	17.0	15.7	Z	3.1	3.0	9.3	15.6	15.7	16.8	20.7	27.0	33.9	33.0	39.9	44.3	43.0	45.0	47.0	45.7	43.4	38.6	35.3	22.4	17.7	27.5	47.0																						
24-Jul	15.4	21.1	23.3	Z	18.6	17.5	16.2	16.1	18.7	26.0	35.5	45.2	48.3	48.2	53.6	52.2	51.5	50.3	49.4	44.3	39.2	41.6	42.9	43.1	35.6	53.6																						
25-Jul	42.6	41.0	39.1	38.3	Z	37.0	44.0	45.4	45.6	41.5	40.4	40.8	41.1	40.8	42.4	39.8	35.5	35.0	32.3	23.8	22.9	24.9	26.4	23.3	36.7	45.6																						
26-Jul	23.1	23.2	22.4	21.9	23.8	Z	22.5	23.9	26.4	28.3	29.1	29.4	30.7	31.9	34.6	33.2	32.0	28.8	24.4	24.7	27.5	31.6	31.1	33.9	27.8	34.6																						
27-Jul	Z	35.9	35.0	31.4	24.3	19.5	19.2	19.9	21.4	22.4	23.2	25.7	28.1	28.0	29.1	28.0	27.8	27.6	30.8	31.7	25.7	19.9	13.3	9.8	25.1	35.9																						
28-Jul	12.1	Z	7.2	7.3	3.7	8.8	11.3	15.4	18.3	23.0	30.6	35.5	40.6	38.3	35.6	39.5	40.3	38.1	37.9	32.9	28.2	26.1	26.5	23.0	25.2	40.6																						
29-Jul	24.1	22.5	Z	20.7	19.4	17.9	18.0	18.8	24.1	29.2	32.5	34.5	35.8	39.2	42.2	41.5	41.8	41.4	39.7	37.2	32.4	26.6	22.3	24.8	29.8	42.2																						
30-Jul	25.2	22.1	17.6	Z	9.3	11.8	17.7	21.1	25.7	27.3	34.0	39.1	41.1	41.5	42.6	43.1	43.6	42.0	39.1	38.7	42.3	40.1	36.9	33.8	32.0	43.6																						
31-Jul	34.8	36.4	35.2	31.1	Z	29.3	27.3	29.2	28.6	33.5	35.8	38.9	41.5	42.4	45.7	44.6	42.9	40.8	42.5	34.2	18.9	27.9	43.3	39.4	35.8	45.7																						
																								22.3	23.0	20.4	20.3	16.2	16.9	19.3	21.2	23.9	28.3	32.5	36.0	37.8	39.6	40.5	40.0	39.4	38.2	36.3	33.5	29.6	26.3	25.4	23.5	Diurnal Average
																								44.6	43.4	39.1	38.3	34.1	37.0	44.0	45.4	45.6	48.4	45.0	46.3	53.5	61.6	61.4	56.4	51.5	51.6	49.4	50.0	50.5	44.1	43.3	43.1	Diurnal Maximum

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 76 ppb





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	171	24.12	24.12
21 - 50	520	73.34	97.46
51 - 82	18	2.54	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Patricia McInnes - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	16	2	4	2	1	6	10	7	9	21	23	10	13	17	14	16	171
21 - 50	36	31	10	11	22	70	38	11	35	44	40	37	17	24	34	60	520
51 - 82	3	2	1	1	1	1	0	0	0	0	0	0	1	1	1	6	18
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	35	15	14	24	77	48	18	44	65	63	47	31	42	49	82	709

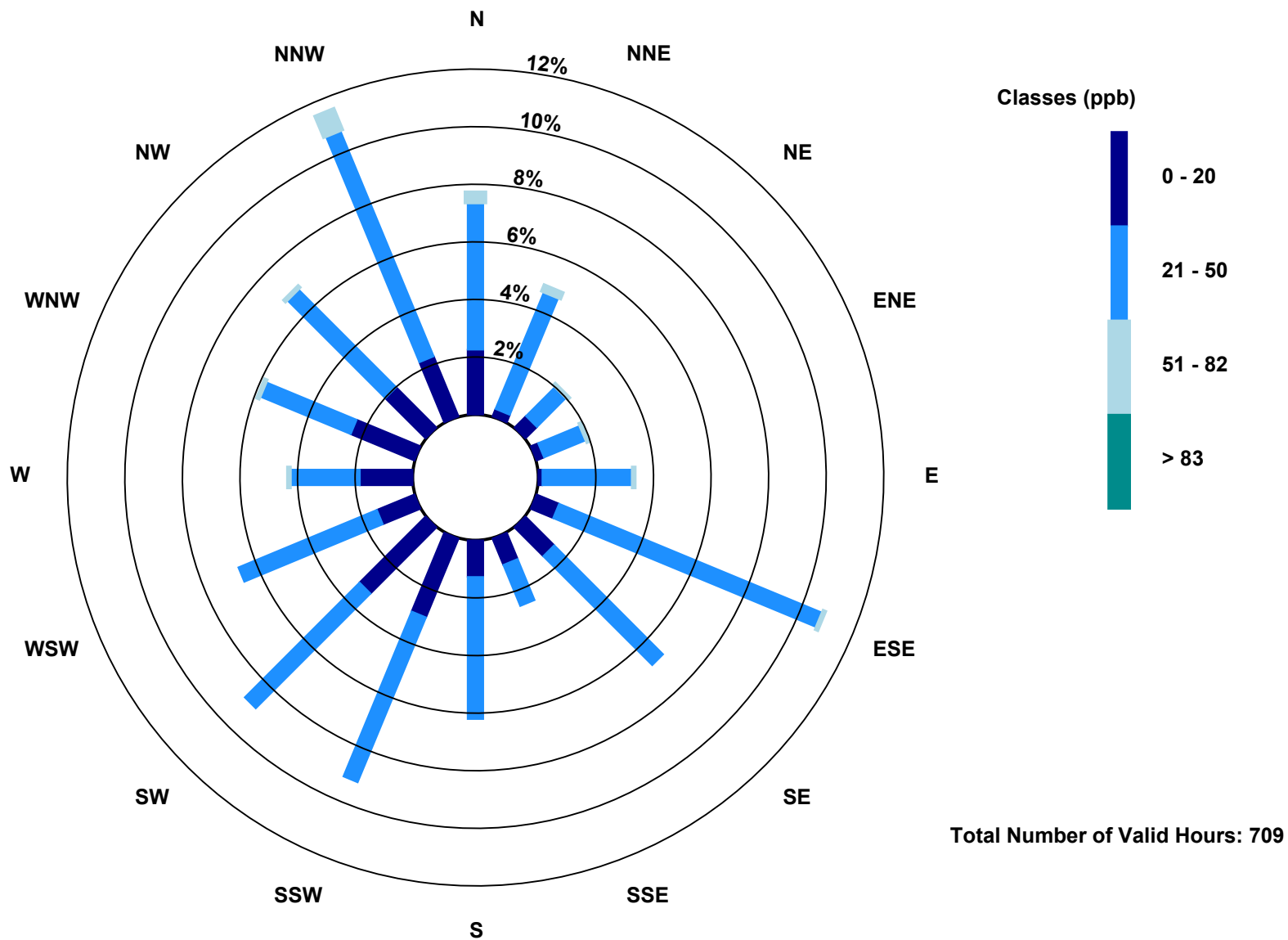
Total Number of Valid Hours: 709

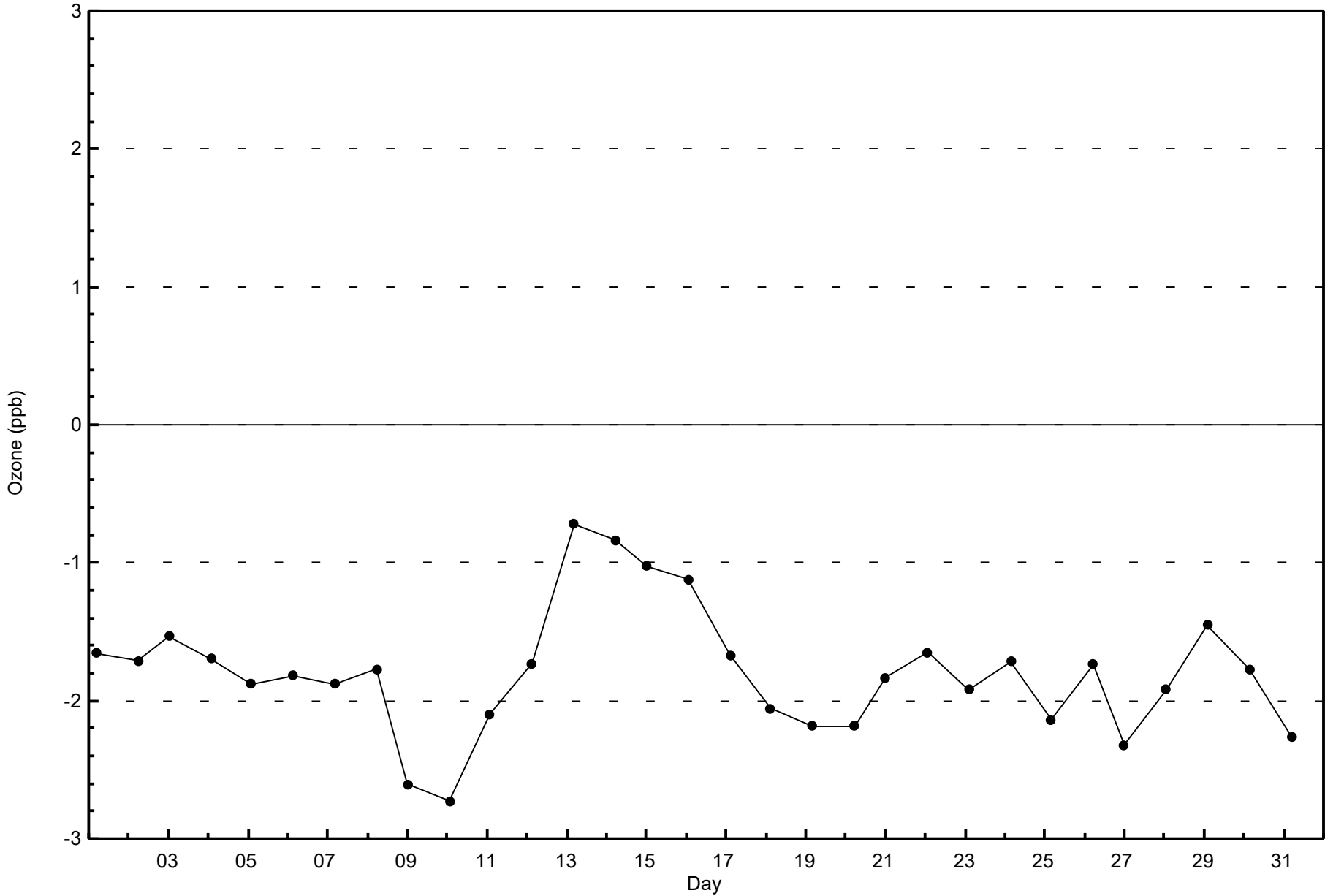
Total Number of Hours: 744

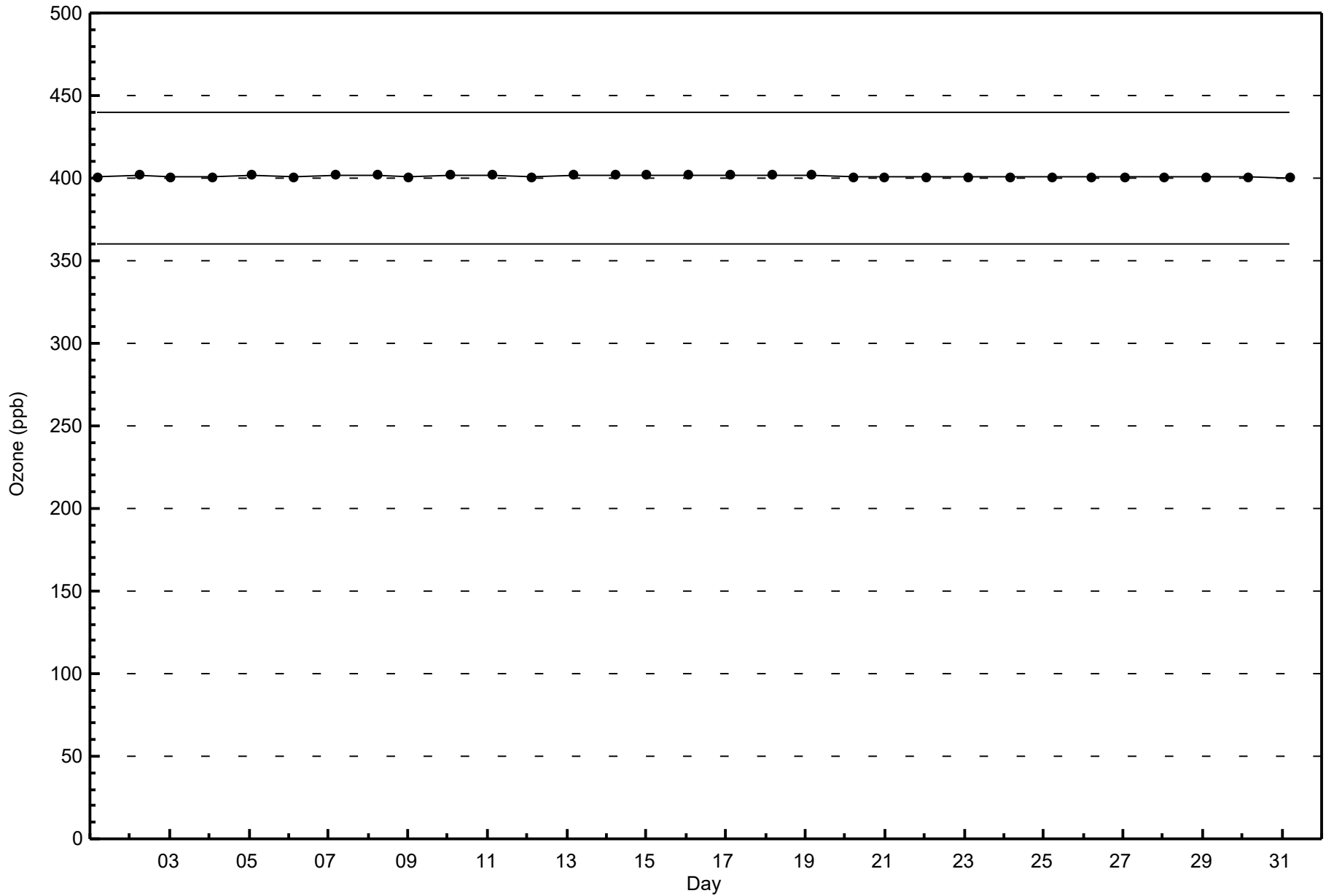


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Ozone (O₃) - ppb
Patricia McInnes







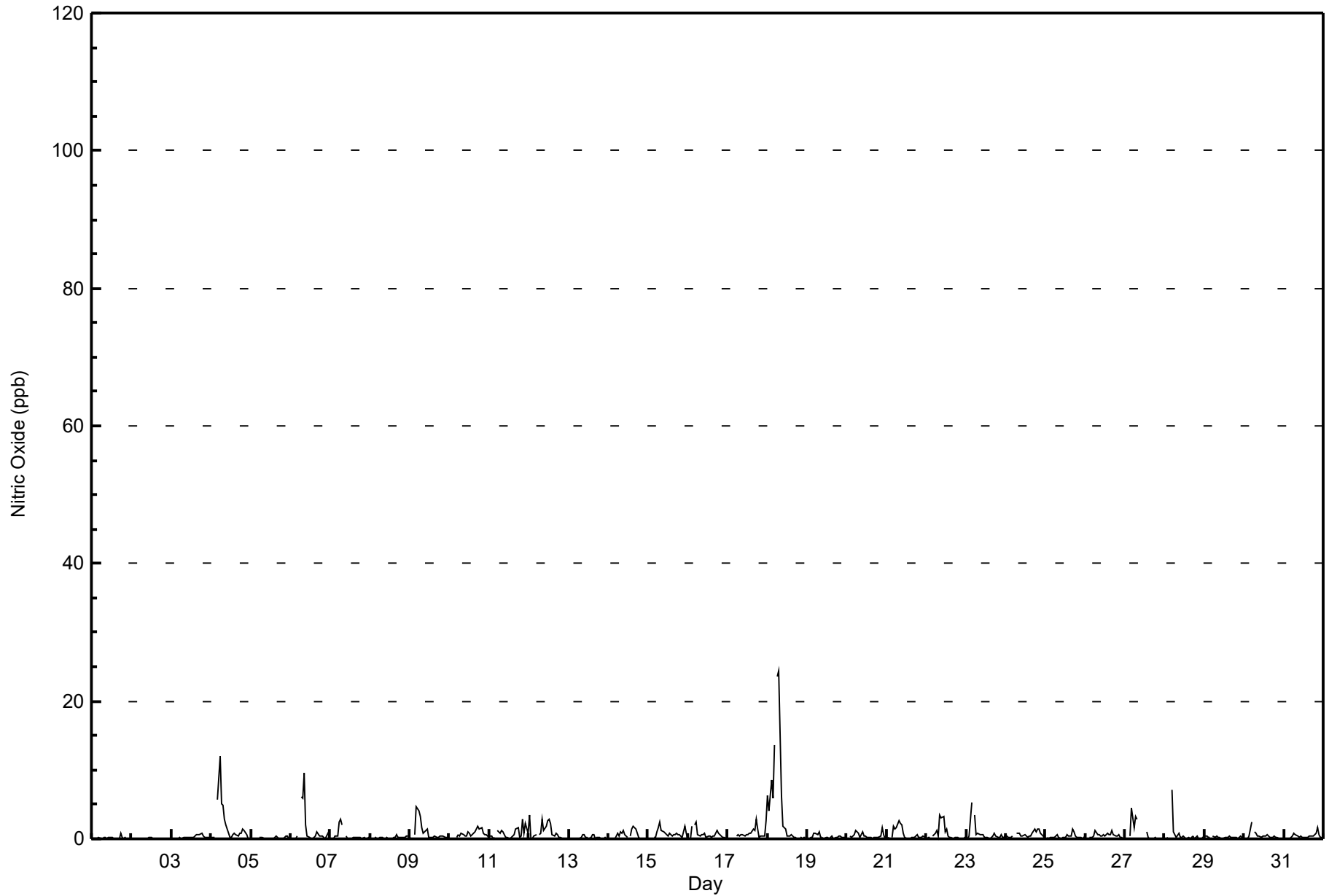


Maximum Value: 24.4 ppb on Jul 18 08:00		Maximum Daily Average: 4.4 ppb on Jul 18		Hours in Service: 744																									
Minimum Value: 0.0 ppb on Jul 1 03:00		Minimum Daily Average: 0.1 ppb on Jul 2		Hours of Data: 706																									
Maximum Diurnal Average: 1.9 ppb at hour 8		Minimum Diurnal Average: 0.2 ppb at hour 8		Hours of Missing Data: 38																									
Monthly Average: 0.70 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.3 Q ₃ = 0.7 P ₉₀ = 1.4 P ₉₉ = 6.3		Hours of Calibration: 36																									
				Percent Operational Time: 99.7																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Jul	Z	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.1	0.1	0.3	0.3	0.1	0.1	0.1	0.0	0.0	0.8	0.2	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.8	0.1	0.8
2-Jul	0.0	Z	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1	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	0.0	0.0	0.0	0.1	0.3
3-Jul	0.0	0.0	Z	0.0	0.0	0.1	0.0	0.1	0.2	0.3	0.2	0.2	0.2	0.2	0.4	0.6	0.5	0.7	0.8	0.5	0.1	0.2	0.1	0.1	0.1	0.3	0.3	0.8	
4-Jul	0.3	0.2	0.2	Z	5.7	12.0	5.1	4.9	2.9	2.0	0.8	0.2	0.2	0.7	0.8	0.5	0.5	0.8	0.9	1.4	1.1	0.5	0.1	0.0	0.0	1.8	12.0		
5-Jul	0.0	0.0	0.0	0.1	Z	0.3	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.4	0.2	0.0	0.0	0.0	0.1	0.4	0.4	0.0	0.1	0.1	0.4	0.4	
6-Jul	0.0	0.0	0.0	0.0	0.3	Z	6.1	6.0	9.6	2.0	0.4	0.1	0.1	0.0	0.2	0.4	1.0	0.5	0.4	0.3	0.2	0.1	0.8	1.2	1.3	9.6	9.6		
7-Jul	Z	0.1	0.1	0.3	0.4	2.5	2.8	2.0	UO	0.3	0.1	0.0	0.0	0.1	0.1	0.1	0.3	0.3	0.1	0.0	0.1	0.1	0.1	0.1	0.5	2.8	2.8		
8-Jul	0.2	Z	0.1	0.1	0.0	0.0	0.2	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.5	0.2	0.1	0.2	0.2	0.2	0.3	0.3	0.2	0.5	0.5		
9-Jul	0.1	0.1	Z	0.6	4.6	4.1	3.2	1.6	0.8	1.1	1.3	0.3	0.3	0.1	0.2	0.3	0.2	0.2	0.4	0.4	0.4	0.3	0.1	0.0	0.9	4.6	4.6		
10-Jul	0.0	0.0	0.0	Z	0.2	0.7	0.5	0.8	0.6	0.3	0.5	1.0	0.8	0.4	0.8	1.0	1.4	1.8	1.4	1.6	0.8	0.6	0.5	0.4	0.7	1.8	1.8		
11-Jul	0.4	0.4	0.1	0.2	Z	1.2	0.8	1.2	1.1	0.7	0.2	0.2	0.1	0.3	0.4	0.6	1.5	1.6	0.3	0.3	2.9	0.7	2.2	0.8	0.8	2.9	2.9		
12-Jul	3.5	0.0	0.0	0.3	0.6	Z	0.5	0.8	2.8	1.3	1.8	2.6	2.8	2.1	0.7	0.4	0.8	0.7	0.2	0.1	0.1	0.0	0.0	0.0	1.0	3.5	3.5		
13-Jul	Z	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.6	0.7	0.3	0.1	0.1	0.1	0.6	0.7	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.7	0.7		
14-Jul	0.0	Z	0.0	0.1	0.1	0.9	0.4	0.9	0.9	1.2	0.5	0.2	M	0.5	1.5	1.8	1.4	0.8	0.2	0.1	0.0	0.0	0.0	0.2	0.5	1.8	1.8		
15-Jul	0.0	0.0	Z	0.1	0.3	0.9	1.7	2.4	1.1	1.0	0.8	0.7	0.5	0.7	0.4	0.6	0.7	0.8	0.5	0.6	0.1	1.0	1.9	0.8	0.8	2.4	2.4		
16-Jul	0.1	0.1	1.9	Z	2.0	2.4	0.7	0.5	0.7	0.7	0.8	0.3	0.5	0.4	0.3	0.5	0.3	1.1	0.8	0.7	0.4	0.2	0.2	0.1	0.7	2.4	2.4		
17-Jul	0.1	0.0	0.0	0.1	Z	0.5	0.6	0.5	0.5	0.5	0.5	0.7	0.7	0.9	0.7	1.5	1.1	2.8	1.3	0.2	0.3	0.4	0.3	2.7	0.7	2.8			
18-Jul	6.3	4.1	8.6	5.8	13.7	Z	23.5	24.4	6.3	1.8	1.7	1.4	0.4	0.4	0.6	0.4	0.2	0.2	0.0	0.1	0.2	0.0	0.1	0.1	4.4	24.4	24.4		
19-Jul	Z	0.1	0.2	0.3	0.7	0.7	0.6	1.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.3	0.1	0.2	0.1	0.4	0.3	0.2	0.2	0.1	0.3	1.1	1.1		
20-Jul	0.0	Z	0.4	0.3	0.5	1.2	1.0	0.8	0.3	1.1	0.3	0.4	0.2	0.3	0.1	0.1	0.1	0.1	0.2	0.2	0.4	1.6	0.6	0.0	0.4	1.6	1.6		
21-Jul	0.0	0.1	Z	0.2	1.9	1.4	1.5	2.7	2.3	2.0	0.9	0.3	0.0	0.1	0.0	0.2	0.3	0.3	0.7	0.2	0.2	0.3	0.3	0.2	0.7	2.7	2.7		
22-Jul	0.1	0.2	0.2	Z	0.3	0.8	1.3	0.4	3.5	3.0	3.2	1.0	1.4	0.4	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.0	0.1	0.1	0.7	3.5	3.5		
23-Jul	0.0	0.1	0.5	5.4	Z	3.4	0.5	0.7	0.6	0.5	0.7	0.2	0.1	0.1	0.2	0.3	0.7	0.4	0.2	0.3	0.7	0.3	0.2	0.7	5.4	5.4			
24-Jul	0.6	0.2	0.2	0.2	0.3	Z	0.9	0.9	0.8	0.4	0.4	0.5	0.4	0.3	0.4	0.4	0.8	1.4	1.0	1.3	1.5	0.7	0.4	0.0	0.6	1.5	1.5		
25-Jul	Z	0.2	0.0	0.1	0.2	0.2	0.3	0.6	0.2	0.1	0.1	0.2	0.2	0.5	0.4	0.4	1.5	1.0	0.4	0.1	0.1	0.2	0.1	0.1	0.3	1.5	1.5		
26-Jul	0.3	Z	0.2	0.2	0.3	0.4	1.3	0.7	0.5	0.5	0.4	0.5	0.5	0.7	0.6	0.5	1.3	0.6	0.5	0.4	0.7	0.2	0.3	0.0	0.5	1.3	1.3		
27-Jul	0.0	0.0	Z	0.3	4.4	1.5	3.2	2.9	C	C	C	C	C	1.1	0.3	0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.3	0.8	4.4	4.4		
28-Jul	0.1	0.0	0.2	Z	7.2	1.1	0.6	0.3	0.8	0.2	0.2	0.5	0.2	0.0	0.3	0.0	0.1	0.4	0.1	0.4	0.0	0.0	0.0	0.3	0.6	7.2	7.2		
29-Jul	0.3	0.4	0.2	0.2	Z	0.4	0.3	0.5	0.3	0.2	0.1	0.1	0.2	0.2	0.3	0.4	0.2	0.1	0.2	0.1	0.1	0.3	0.4	0.0	0.2	0.5	0.5		
30-Jul	0.0	0.0	0.0	0.5	2.5	Z	0.9	0.8	0.5	0.4	0.3	0.4	0.5	0.5	0.6	0.3	0.3	0.2	0.3	0.1	0.2	0.1	0.1	0.0	0.4	2.5	2.5		
31-Jul	Z	0.0	0.1	0.0	0.2	0.4	0.8	0.6	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5	0.8	1.6	0.5	0.3	0.2	0.4	1.6	1.6		
		0.5	0.2	0.5	0.6	1.8	1.4	1.9	1.9	1.3	0.8	0.6	0.4	0.4	0.4	0.4	0.5	0.6	0.4	0.4	0.4	0.3	0.3	0.3	Diurnal Average				
		6.3	4.1	8.6	5.8	13.7	12.0	23.5	24.4	9.6	3.0	3.2	2.6	2.8	2.1	1.5	1.8	1.5	2.8	1.4	1.6	2.9	1.6	2.2	2.7	Diurnal Maximum			
Z - zerospan		C - Calibration					M - Maintenance					UO - Unstable Operation																	



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Patricia McInnes - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Patricia McInnes - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	704	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: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Patricia McInnes - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	54	34	15	15	24	74	49	18	42	66	63	46	30	43	52	79	704
21 - 40	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	34	15	15	24	74	49	18	42	66	63	46	30	43	52	80	706

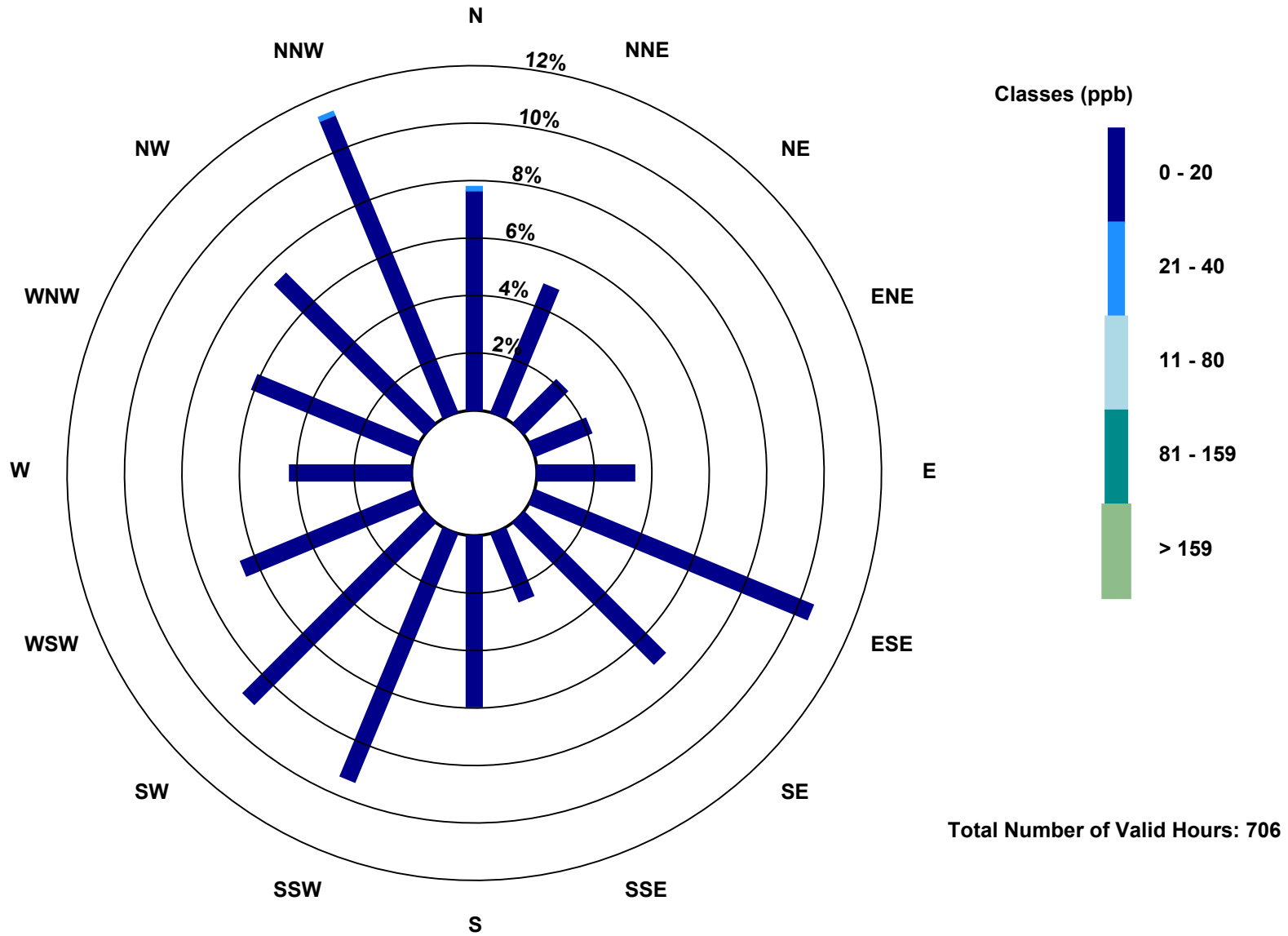
Total Number of Valid Hours: 706

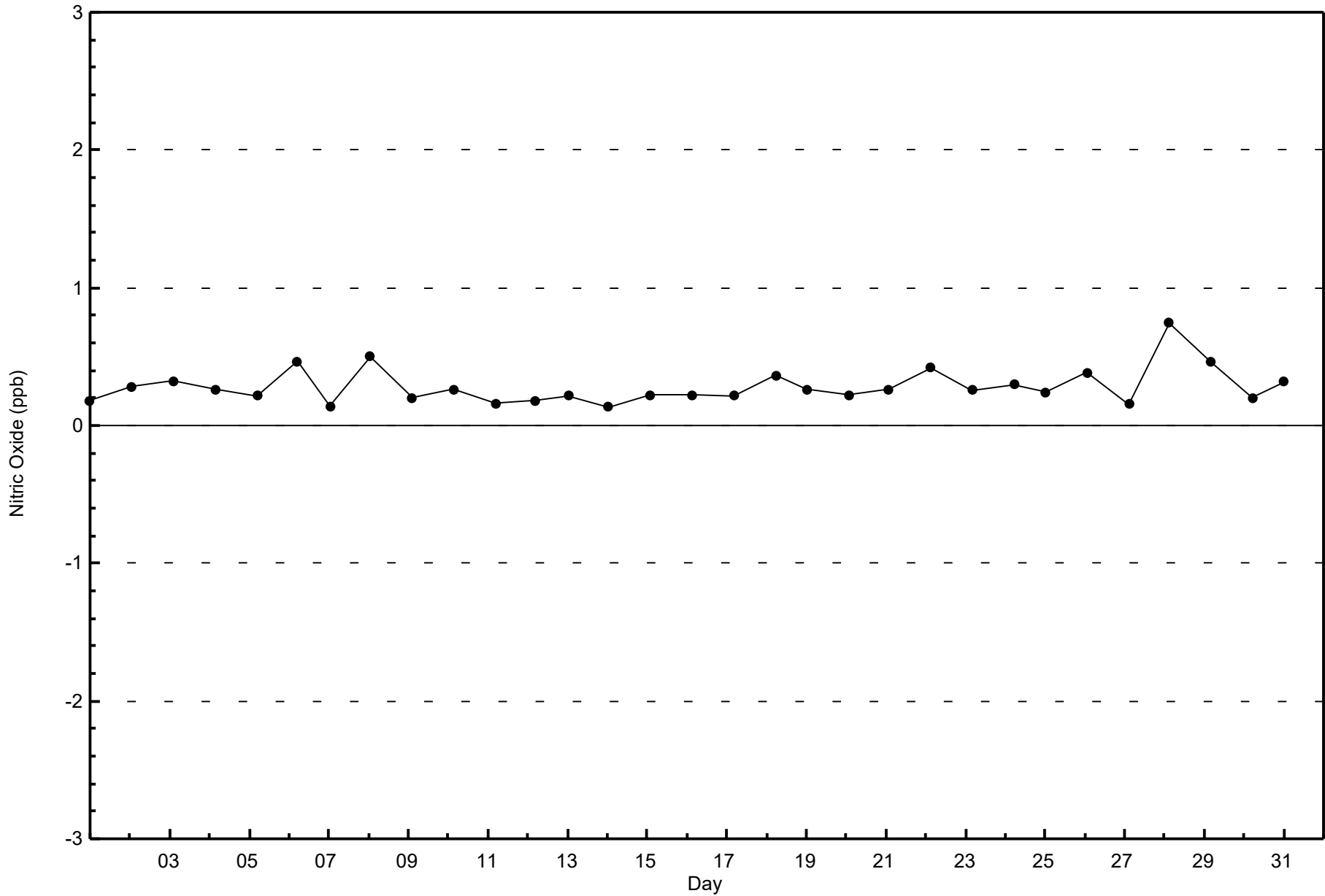
Total Number of Hours: 744

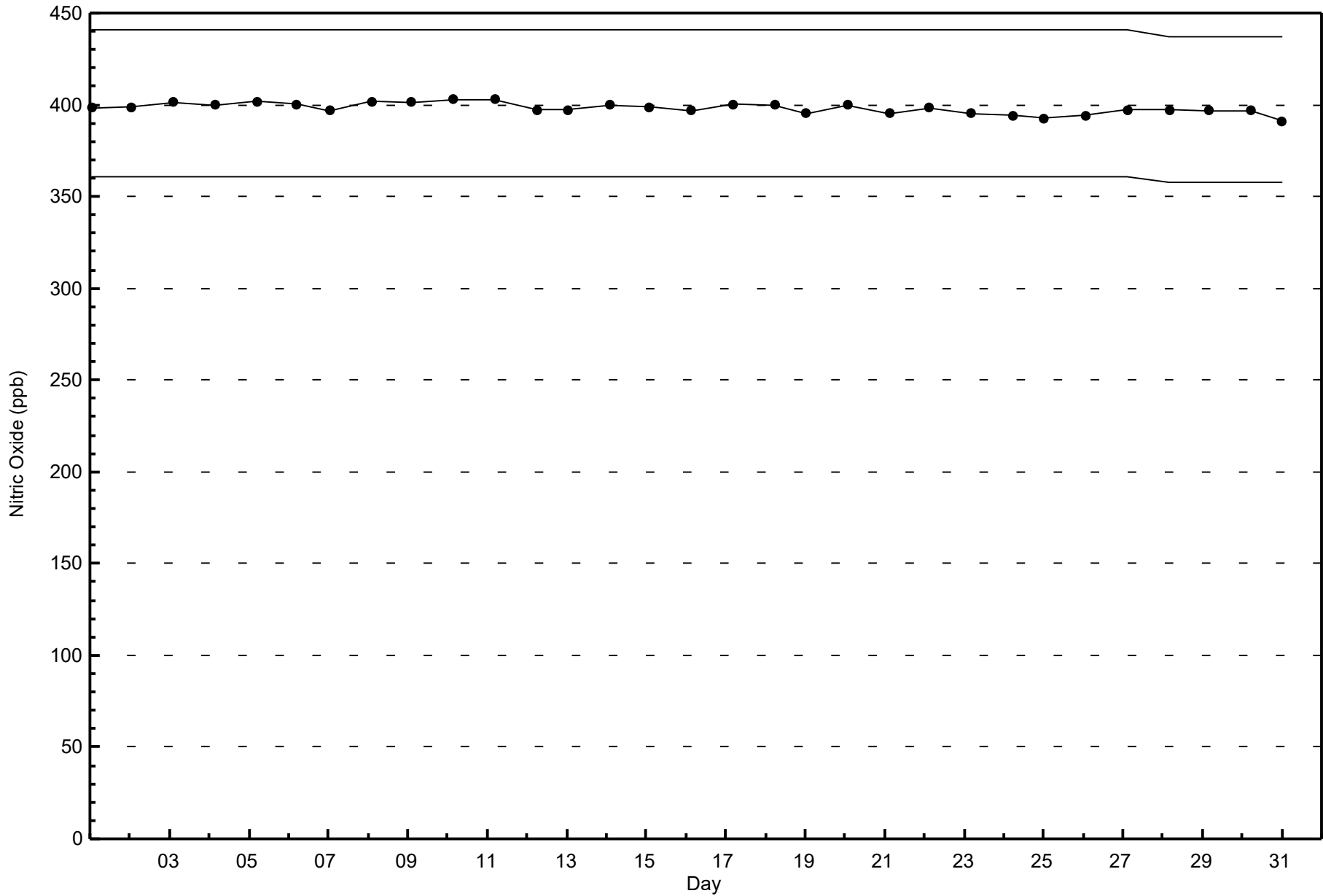


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Patricia McInnes









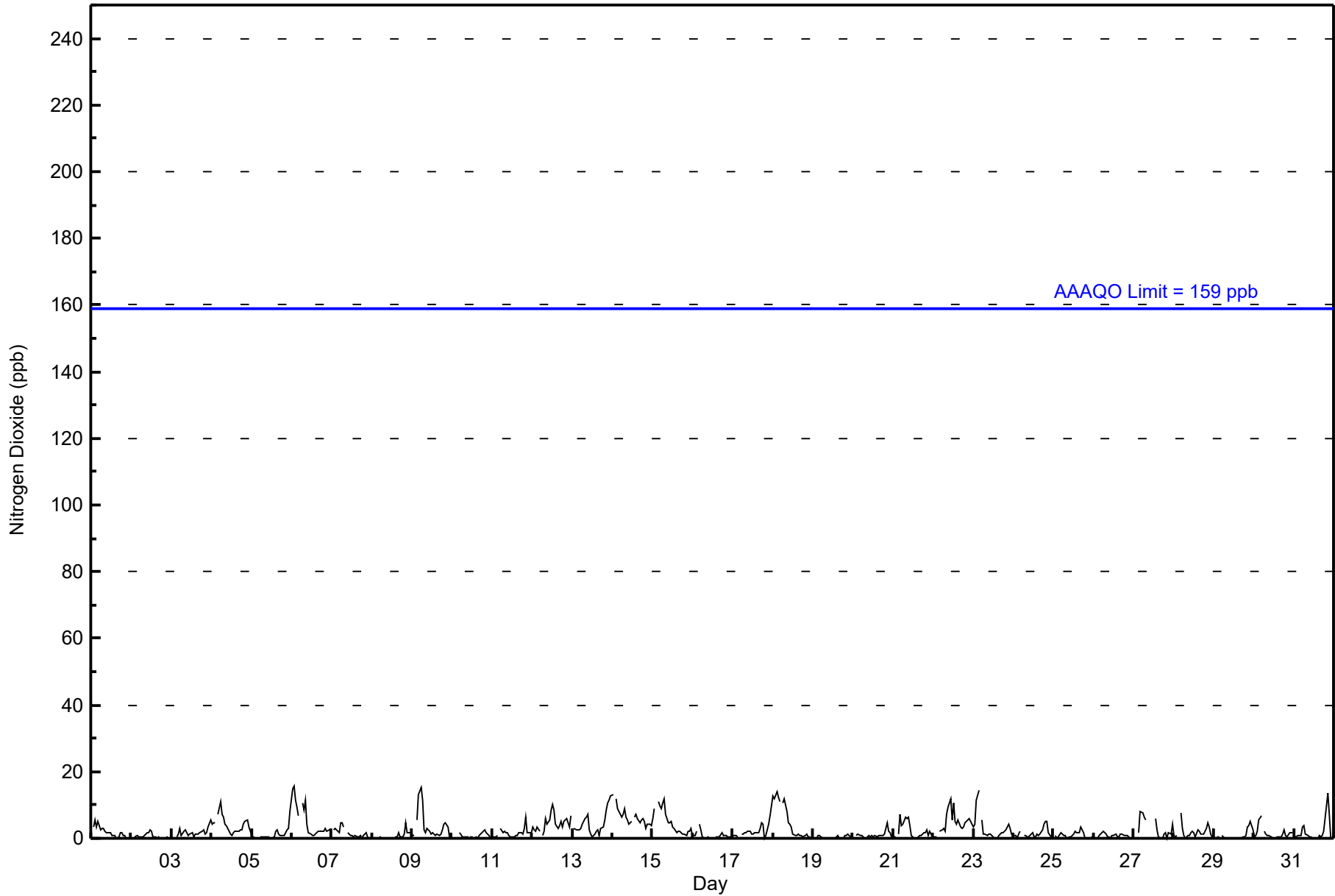
Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Patricia McInnes - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		744																		
Maximum Value: 15.8 ppb on Jul 6 02:00		Maximum Daily Average: 6.4 ppb on Jul 14		Minimum Value: 0.0 ppb on Jul 1 16:00		Minimum Daily Average: 0.4 ppb on Jul 19		Hours of Data: 706																		
Maximum Diurnal Average: 4.4 ppb at hour 5		Minimum Diurnal Average: 1.4 ppb at hour 5		Hours of Missing Data: 38		Hours of Calibration: 36		Percent Operational Time: 99.7																		
Monthly Average: 2.39 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.1 Q ₁ = 0.5 Median = 1.3 Q ₃ = 3.0 P ₉₀ = 6.2 P ₉₉ = 13.1																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	Z	3.3	5.3	3.3	4.9	2.4	2.9	2.8	2.1	1.8	1.6	1.6	0.9	0.7	0.8	0.0	0.3	1.9	1.7	0.8	1.0	0.1	0.0	0.1	1.8	5.3
2-Jul	0.4	Z	0.5	0.7	0.5	0.5	0.4	0.5	0.9	1.5	1.6	2.6	2.0	0.6	0.4	0.2	0.4	0.2	0.1	0.2	0.2	0.4	0.2	0.0	0.7	2.6
3-Jul	0.0	0.0	Z	0.4	1.4	3.0	1.0	2.1	2.6	1.6	0.9	1.4	1.5	0.6	1.3	1.1	1.2	1.6	2.0	2.6	1.4	1.5	3.2	5.5	1.6	5.5
4-Jul	4.3	4.6	4.8	Z	7.0	10.9	7.4	6.2	4.2	3.7	2.1	1.1	1.0	1.6	2.2	2.0	2.1	2.5	2.4	4.2	4.9	5.5	3.4	2.0	3.9	10.9
5-Jul	0.9	0.5	0.2	0.1	Z	0.4	0.3	0.4	0.3	0.3	0.3	0.2	0.2	0.4	2.0	2.5	1.1	0.8	0.8	1.0	1.9	2.6	3.0	8.1	1.2	8.1
6-Jul	14.9	15.8	11.3	9.5	6.8	Z	10.6	8.5	11.5	4.1	1.8	1.3	1.0	1.0	1.4	1.6	2.3	2.0	2.0	2.0	2.8	2.1	2.7	2.2	5.2	15.8
7-Jul	Z	2.7	3.0	2.7	1.9	4.7	4.7	3.2	UO	1.5	1.2	1.0	0.9	0.6	0.7	0.5	0.5	0.7	0.2	0.7	1.5	0.5	0.0	0.0	1.5	4.7
8-Jul	0.0	Z	0.0	0.1	0.2	0.3	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.2	0.3	0.4	1.7	0.6	0.4	1.4	4.5	1.9	1.7	1.9	0.7	4.5
9-Jul	0.8	0.8	Z	5.5	13.2	15.1	11.5	2.6	1.5	3.0	2.1	1.3	1.5	1.1	0.8	1.1	1.0	1.3	2.7	4.4	4.8	3.6	0.5	0.0	3.5	15.1
10-Jul	0.0	0.0	0.2	Z	1.6	1.3	0.4	0.6	0.4	0.3	0.0	0.4	0.3	0.2	0.4	0.2	1.0	1.4	1.7	2.5	1.5	1.1	0.7	0.2	0.7	2.5
11-Jul	0.4	0.6	0.6	0.8	Z	2.8	1.8	2.3	1.9	1.7	0.7	0.6	0.5	0.5	0.7	0.7	1.7	1.8	1.4	3.0	6.2	1.7	1.8	1.6	1.6	6.2
12-Jul	3.5	2.5	2.2	3.4	2.3	Z	0.8	2.3	5.8	4.3	5.4	8.3	10.1	8.4	4.4	2.9	3.8	4.9	3.4	5.1	6.1	4.8	3.6	6.8	4.6	10.1
13-Jul	Z	2.8	2.6	2.7	2.6	2.9	4.4	5.8	6.2	7.0	2.7	1.3	0.3	1.1	2.0	2.7	1.0	2.9	3.5	5.4	8.6	10.4	11.6	12.6	4.5	12.6
14-Jul	13.1	Z	11.8	8.9	8.0	6.2	7.0	8.7	6.3	5.5	4.2	5.1	M	6.2	7.1	5.8	4.8	5.3	6.0	5.0	3.1	4.3	4.3	3.8	6.4	13.1
15-Jul	6.0	8.7	Z	11.1	9.6	8.9	10.4	11.8	7.3	4.7	4.5	5.2	3.3	3.1	1.8	2.0	2.2	1.9	1.3	1.4	1.0	2.0	2.3	3.0	4.9	11.8
16-Jul	0.8	0.7	2.3	Z	4.4	2.7	0.3	0.1	0.1	0.5	0.0	0.0	0.0	0.2	0.3	0.4	0.5	1.6	0.9	1.0	0.7	0.3	0.3	0.4	0.8	4.4
17-Jul	0.8	0.9	0.9	0.6	Z	1.2	1.3	1.9	1.5	2.0	2.3	1.4	1.4	1.9	1.7	1.7	2.8	4.6	4.1	0.1	0.9	4.1	6.9	9.7	2.4	9.7
18-Jul	12.7	11.8	13.9	12.4	10.9	Z	10.7	11.8	8.1	4.6	4.3	3.5	1.1	0.9	0.9	1.1	1.0	0.9	0.5	0.7	1.1	0.3	0.4	0.0	4.9	13.9
19-Jul	Z	0.0	0.2	0.9	0.9	0.6	0.1	0.1	0.0	0.0	0.0	0.1	0.2	0.1	0.3	0.8	0.2	0.2	0.2	1.0	0.9	1.3	0.4	0.3	0.4	1.3
20-Jul	0.1	Z	0.7	1.2	0.7	0.9	0.4	0.2	0.0	1.0	0.4	0.9	0.5	0.9	0.6	0.8	0.9	0.9	1.0	1.3	4.8	2.1	1.8	0.4	1.0	4.8
21-Jul	0.6	0.6	Z	1.4	7.3	3.8	4.4	6.3	5.9	6.4	3.9	1.0	0.1	0.0	0.1	0.6	0.9	0.8	1.8	1.8	2.4	0.8	2.0	0.5	2.3	7.3
22-Jul	0.3	0.4	0.3	Z	2.1	2.7	3.1	2.1	7.4	9.5	11.8	5.4	10.6	5.1	4.4	5.4	3.6	2.9	3.5	4.5	5.1	6.0	5.0	4.2	4.6	11.8
23-Jul	3.6	4.2	11.6	14.6	Z	5.5	1.1	1.2	0.9	1.2	1.1	0.9	0.4	0.1	0.1	0.7	1.1	1.5	1.6	2.4	3.6	4.2	3.1	1.1	2.9	14.6
24-Jul	1.0	1.0	0.1	1.1	2.0	Z	1.0	0.7	0.5	0.4	0.8	1.5	0.4	0.5	1.2	1.0	1.4	2.6	4.1	4.9	5.2	1.6	0.5	0.4	1.5	5.2
25-Jul	Z	0.9	0.1	0.4	1.9	1.1	0.7	0.8	0.2	0.3	0.6	0.7	1.3	2.0	1.6	1.8	3.6	2.7	1.8	0.0	0.0	0.0	0.0	0.6	1.0	3.6
26-Jul	0.5	Z	0.1	0.9	1.2	1.9	2.1	1.4	0.6	0.3	0.2	0.7	0.7	1.1	0.6	0.6	1.4	1.3	0.9	0.9	1.0	0.3	0.2	0.0	0.8	2.1
27-Jul	0.0	0.0	Z	1.5	8.0	7.7	6.4	5.4	C	C	C	C	C	6.0	2.7	0.6	0.0	0.2	1.1	1.6	0.2	1.7	1.3	4.1	2.7	8.0
28-Jul	1.0	0.5	0.9	Z	7.5	3.0	0.7	0.2	1.0	0.9	1.5	2.2	1.9	0.5	2.5	2.0	1.4	1.3	1.2	3.1	4.6	3.3	1.1	0.4	1.9	7.5
29-Jul	0.1	0.0	0.3	0.3	Z	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.5	1.0	3.5	3.8	5.2	2.6	0.8	5.2
30-Jul	0.6	0.7	2.3	5.4	6.8	Z	2.3	1.1	0.8	0.8	0.6	0.2	0.2	0.2	0.3	0.4	0.6	1.2	2.6	0.7	0.6	1.9	1.5	1.7	1.5	6.8
31-Jul	Z	0.5	0.7	0.9	0.8	3.5	3.7	1.3	0.7	0.3	0.3	0.2	0.1	0.0	0.1	0.8	0.5	0.7	2.2	9.8	13.6	7.4	0.6	0.0	2.1	13.6
																								Diurnal Average		
																								Diurnal Maximum		
																								2.7 2.5 3.0 3.5 4.4 3.6 3.3 3.0 2.7 2.3 1.9 1.7 1.5 1.5 1.4 1.4 1.5 1.7 1.9 2.4 3.2 2.6 2.2 2.4		
																								14.9 15.8 13.9 14.6 13.2 15.1 11.5 11.8 11.5 9.5 11.8 8.3 10.6 8.4 7.1 5.8 4.8 5.3 6.0 9.8 13.6 10.4 11.6 12.6		
Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	55	34	15	15	24	74	49	18	42	66	63	46	30	43	52	80	706
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	55	34	15	15	24	74	49	18	42	66	63	46	30	43	52	80	706

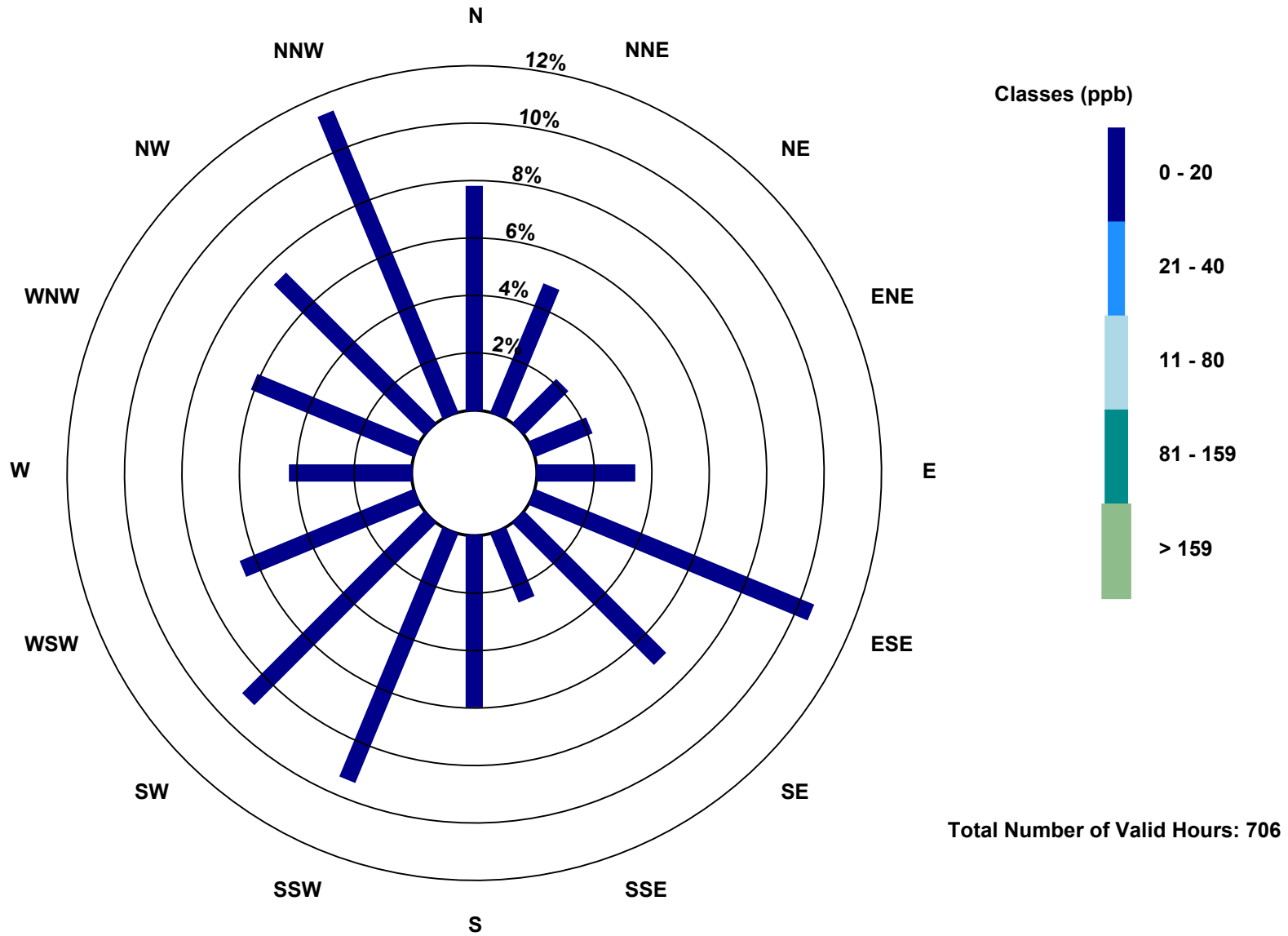
Total Number of Valid Hours: 706

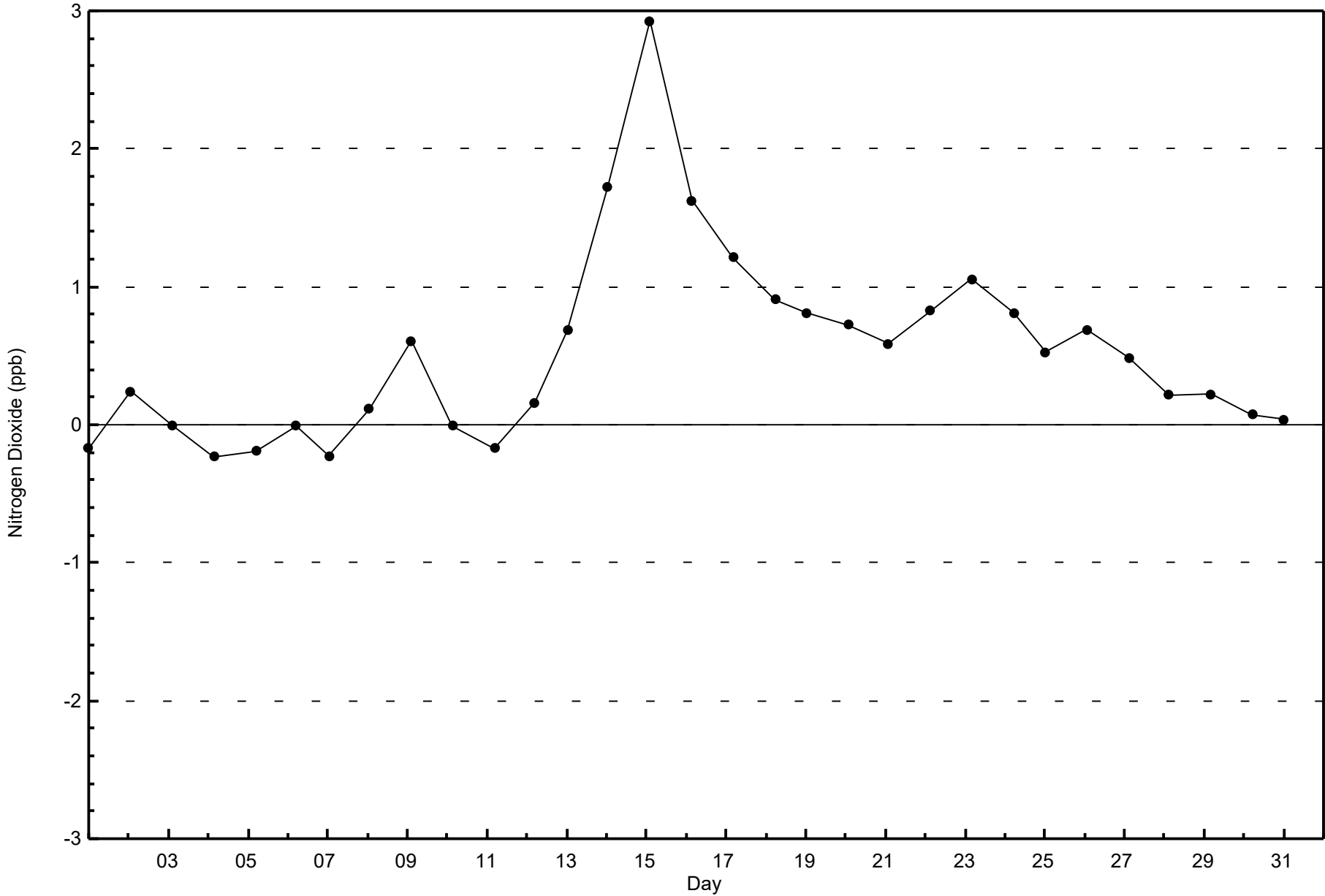
Total Number of Hours: 744

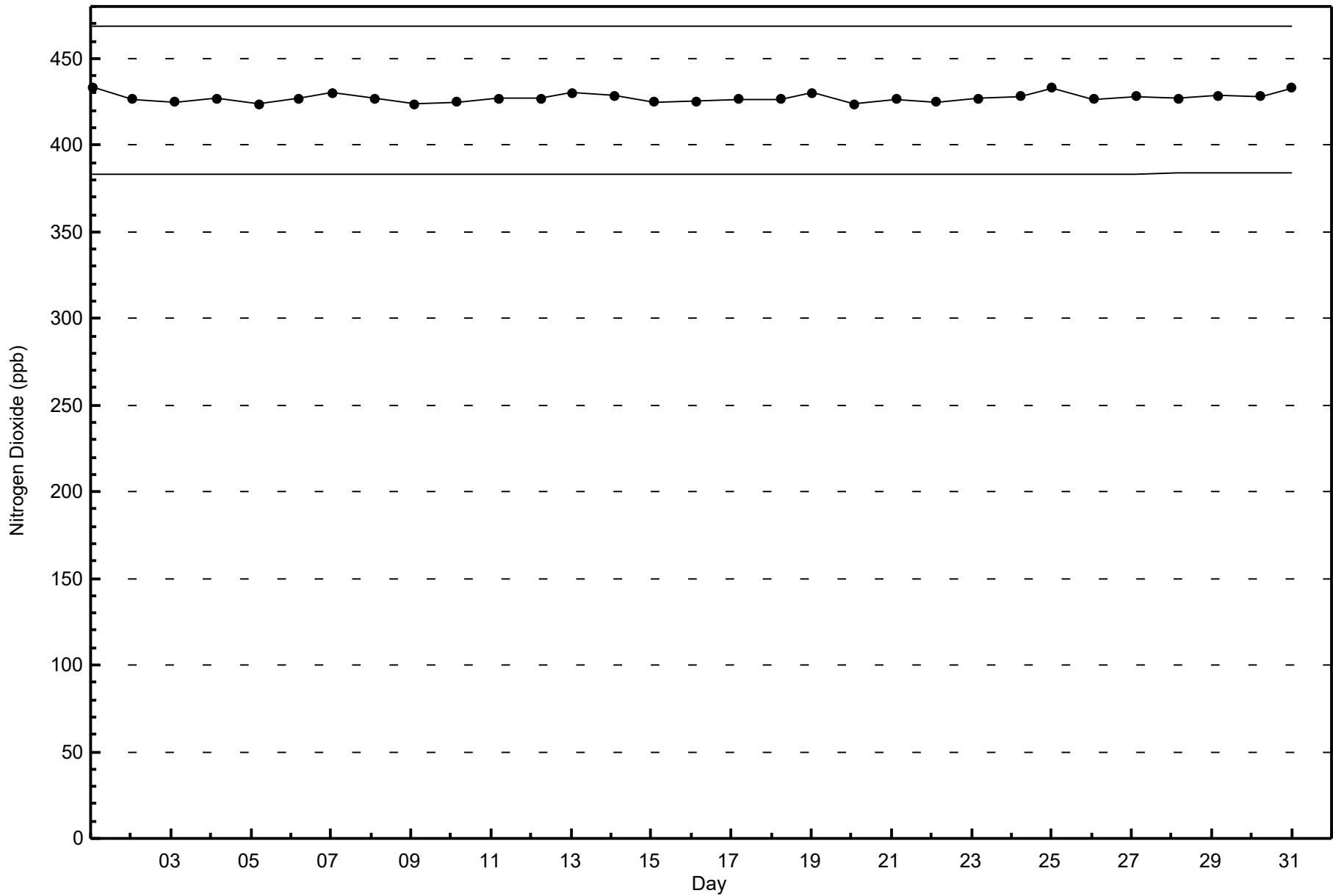


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes









Wood Buffalo Environmental Association
Summary of Hour Averages

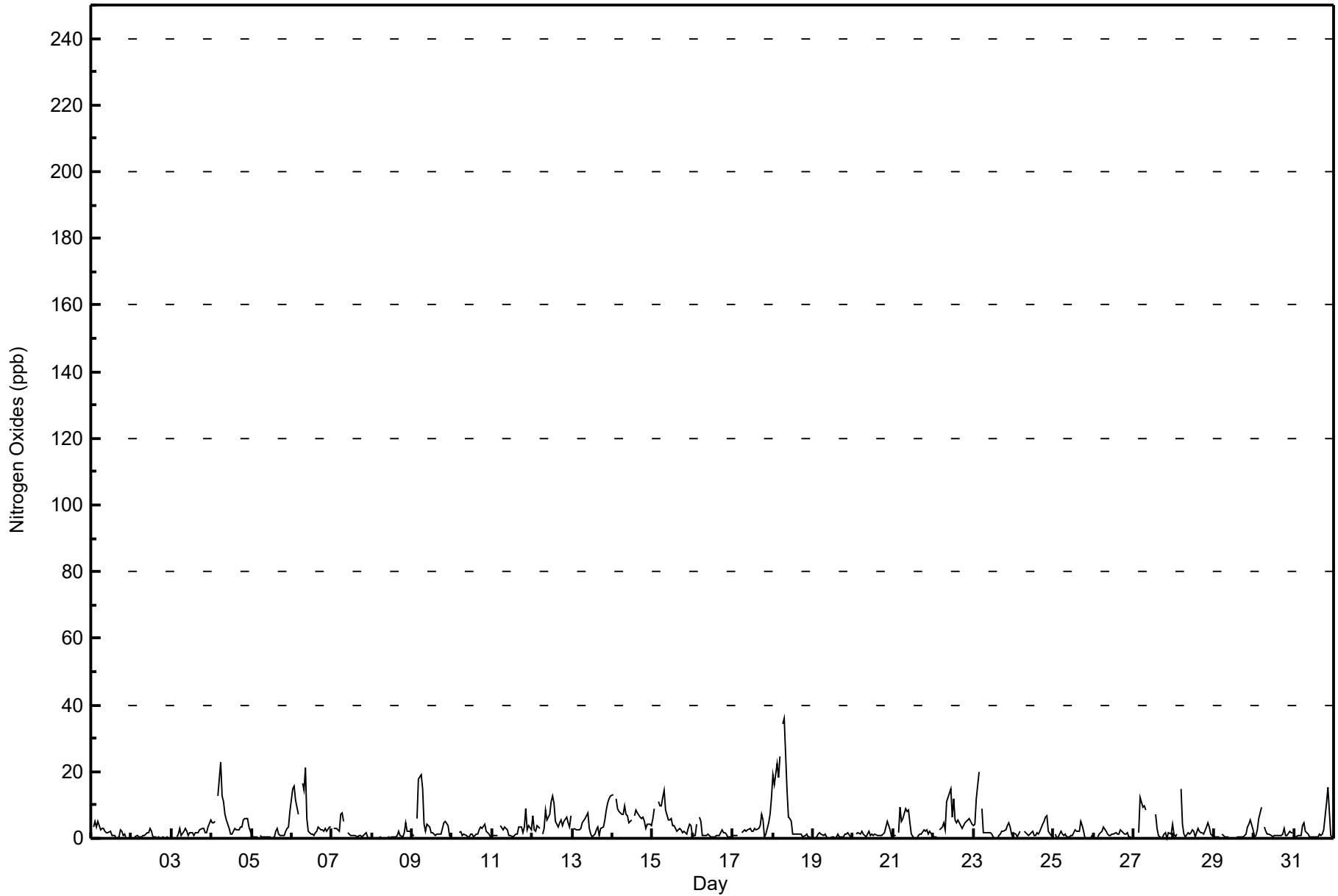
Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - July 2023

Maximum Value: 36.2 ppb on Jul 18 08:00		Maximum Daily Average: 9.3 ppb on Jul 18		Hours in Service: 744																															
Minimum Value: 0.0 ppb on Jul 1 16:00		Minimum Daily Average: 0.7 ppb on Jul 19		Hours of Data: 706																															
Maximum Diurnal Average: 6.2 ppb at hour 5		Minimum Diurnal Average: 1.8 ppb at hour 15		Hours of Missing Data: 38																															
Monthly Average: 3.08 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.3 Q ₁ = 0.7 Median = 1.7 Q ₃ = 3.7 P ₉₀ = 7.3 P ₉₉ = 19.2		Hours of Calibration: 36																															
				Percent Operational Time: 99.7																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Jul	Z	3.3	5.3	3.3	5.0	2.4	3.0	3.0	2.2	1.9	1.9	1.9	1.0	0.8	0.9	0.0	0.3	2.7	1.9	0.8	1.1	0.1	0.0	0.1	1.9	5.3									
2-Jul	0.4	Z	0.5	0.8	0.6	0.6	0.5	0.6	0.9	1.6	1.8	2.9	2.1	0.6	0.4	0.2	0.4	0.2	0.1	0.2	0.2	0.4	0.2	0.0	0.7	2.9									
3-Jul	0.0	0.0	Z	0.4	1.4	3.1	1.0	2.2	2.8	1.9	1.1	1.6	1.7	0.8	1.7	1.7	1.7	2.3	2.8	3.1	1.5	1.7	3.3	5.6	1.9	5.6									
4-Jul	4.6	4.8	5.0	Z	12.7	22.9	12.5	11.1	7.1	5.7	2.9	1.3	1.2	2.3	3.0	2.5	2.6	3.3	3.3	5.6	6.0	6.0	3.5	2.0	5.7	22.9									
5-Jul	0.9	0.5	0.2	0.2	Z	0.7	0.5	0.6	0.4	0.4	0.3	0.2	0.2	0.4	2.1	2.9	1.3	0.8	0.8	1.0	2.0	3.0	3.4	8.1	1.4	8.1									
6-Jul	14.9	15.8	11.3	9.5	7.1	Z	16.7	14.5	21.1	6.1	2.2	1.4	1.1	1.0	1.6	2.0	3.3	2.5	2.4	2.3	3.0	2.2	3.5	3.4	6.5	21.1									
7-Jul	Z	2.8	3.1	3.0	2.3	7.2	7.5	5.2	UO	1.8	1.3	1.0	0.9	0.7	0.8	0.6	0.8	1.0	0.3	0.7	1.6	0.6	0.1	0.1	2.0	7.5									
8-Jul	0.2	Z	0.1	0.2	0.2	0.3	0.2	0.2	0.1	0.0	0.3	0.1	0.2	0.3	0.5	0.6	2.2	0.8	0.5	1.6	4.7	2.1	2.0	2.2	0.8	4.7									
9-Jul	0.9	0.9	Z	6.1	17.8	19.2	14.7	4.2	2.3	4.1	3.4	1.6	1.8	1.2	1.0	1.4	1.2	1.5	3.1	4.8	5.2	3.9	0.6	0.0	4.4	19.2									
10-Jul	0.0	0.0	0.2	Z	1.8	2.0	0.9	1.4	1.0	0.6	0.5	1.4	1.1	0.6	1.2	1.2	2.4	3.2	3.1	4.1	2.3	1.7	1.2	0.6	1.4	4.1									
11-Jul	0.8	1.0	0.7	1.0	Z	4.0	2.6	3.5	3.0	2.4	0.9	0.8	0.6	0.8	1.1	1.3	3.2	3.4	1.7	3.3	9.1	2.4	4.0	2.4	2.3	9.1									
12-Jul	7.0	2.5	2.2	3.7	2.9	Z	1.3	3.1	8.6	5.6	7.2	10.9	12.9	10.5	5.1	3.3	4.6	5.6	3.6	5.2	6.2	4.8	3.6	6.8	5.5	12.9									
13-Jul	Z	2.9	2.6	2.7	2.6	2.9	4.5	5.9	6.8	7.7	3.0	1.4	0.4	1.2	2.6	3.4	1.0	3.1	3.6	5.4	8.6	10.4	11.7	12.7	4.7	12.7									
14-Jul	13.1	Z	11.8	9.0	8.1	7.1	7.4	9.6	7.2	6.7	4.7	5.3	M	6.7	8.6	7.6	6.2	6.1	6.2	5.1	3.1	4.3	4.3	4.0	6.9	13.1									
15-Jul	6.0	8.7	Z	11.2	9.9	9.8	12.1	14.2	8.4	5.7	5.3	5.9	3.8	3.8	2.2	2.6	2.9	2.7	1.8	2.0	1.1	3.0	4.2	3.8	5.7	14.2									
16-Jul	0.9	0.8	4.2	Z	6.4	5.1	1.0	0.6	0.8	1.2	0.8	0.3	0.5	0.6	0.6	0.9	0.8	2.7	1.7	1.7	1.1	0.5	0.5	0.5	1.5	6.4									
17-Jul	0.9	0.9	0.9	0.7	Z	1.7	1.9	2.4	2.0	2.5	2.8	2.1	2.1	2.8	2.4	3.2	3.9	7.4	5.4	0.3	1.2	4.5	7.2	12.4	3.1	12.4									
18-Jul	19.0	15.9	22.5	18.2	24.6	Z	34.2	36.2	14.4	6.4	6.0	4.9	1.5	1.3	1.5	1.5	1.2	1.1	0.5	0.8	1.3	0.3	0.5	0.1	9.3	36.2									
19-Jul	Z	0.1	0.4	1.2	1.6	1.3	0.7	1.2	0.2	0.1	0.1	0.3	0.3	0.2	0.4	1.1	0.3	0.4	0.3	1.4	1.2	1.5	0.6	0.4	0.7	1.6									
20-Jul	0.1	Z	1.1	1.5	1.2	2.1	1.4	1.0	0.3	2.1	0.7	1.3	0.7	1.2	0.7	0.9	1.0	1.0	1.2	1.5	5.2	3.7	2.4	0.4	1.4	5.2									
21-Jul	0.6	0.7	Z	1.6	9.2	5.2	5.9	9.0	8.2	8.4	4.8	1.3	0.1	0.1	0.1	0.8	1.2	1.1	2.5	2.0	2.6	1.1	2.3	0.7	3.0	9.2									
22-Jul	0.4	0.6	0.5	Z	2.4	3.5	4.4	2.5	10.9	12.5	15.0	6.4	12.0	5.5	4.5	5.5	3.7	3.0	3.7	4.7	5.2	6.0	5.1	4.3	5.3	15.0									
23-Jul	3.6	4.3	12.1	20.0	Z	8.9	1.6	1.9	1.5	1.7	1.8	1.1	0.5	0.2	0.2	0.9	1.4	2.2	2.0	2.6	3.9	4.9	3.4	1.3	3.6	20.0									
24-Jul	1.6	1.2	0.3	1.3	2.3	Z	1.9	1.6	1.3	0.8	1.2	2.0	0.8	0.8	1.6	1.4	2.2	4.0	5.1	6.2	6.7	2.3	0.9	0.4	2.1	6.7									
25-Jul	Z	1.1	0.1	0.5	2.1	1.3	1.0	1.4	0.4	0.4	0.7	0.9	1.5	2.5	2.0	2.2	5.1	3.7	2.2	0.1	0.1	0.2	0.1	0.7	1.3	5.1									
26-Jul	0.8	Z	0.3	1.1	1.5	2.3	3.4	2.1	1.1	0.8	0.6	1.2	1.2	1.8	1.2	1.1	2.7	1.9	1.4	1.3	1.7	0.5	0.5	0.0	1.3	3.4									
27-Jul	0.0	0.0	Z	1.8	12.4	9.2	9.6	8.3	C	C	C	C	C	7.1	3.0	0.7	0.0	0.2	1.3	1.7	0.2	1.7	1.3	4.4	3.5	12.4									
28-Jul	1.1	0.5	1.1	Z	14.7	4.1	1.3	0.5	1.8	1.1	1.7	2.7	2.1	0.5	2.8	2.0	1.5	1.7	1.3	3.5	4.6	3.3	1.1	0.7	2.4	14.7									
29-Jul	0.4	0.4	0.5	0.5	Z	1.2	0.3	0.5	0.3	0.2	0.1	0.1	0.2	0.2	0.3	0.6	0.4	0.5	0.7	1.1	3.6	4.1	5.6	2.6	1.1	5.6									
30-Jul	0.6	0.7	2.3	5.9	9.3	Z	3.2	1.9	1.3	1.2	0.9	0.6	0.7	0.7	0.9	0.7	0.9	1.4	2.9	0.8	0.8	2.0	1.6	1.7	1.9	9.3									
31-Jul	Z	0.5	0.8	0.9	1.0	3.9	4.5	1.9	1.1	0.6	0.6	0.4	0.3	0.2	0.3	1.3	1.0	1.2	2.7	10.6	15.2	7.9	0.9	0.2	2.5	15.2									
																								Diurnal Average			Diurnal Maximum								
																								3.2 2.7 3.5 4.1 6.2 5.1 5.2 4.9 4.1 3.1 2.5 2.1 1.8 1.9 1.8 1.8 2.0 2.3 2.3 2.8 3.6 2.9 2.6 2.7			19.0 15.9 22.5 20.0 24.6 22.9 34.2 36.2 21.1 12.5 15.0 10.9 12.9 10.5 8.6 7.6 6.2 7.4 6.2 10.6 15.2 10.4 11.7 12.7								
Z - zerospan																								C - Calibration				M - Maintenance				UO - Unstable Operation			



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	700	99.15	99.15
21 - 40	6	0.85	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	53	34	15	15	24	74	49	17	42	66	63	46	30	43	52	77	700
21 - 40	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	6
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	34	15	15	24	74	49	18	42	66	63	46	30	43	52	80	706

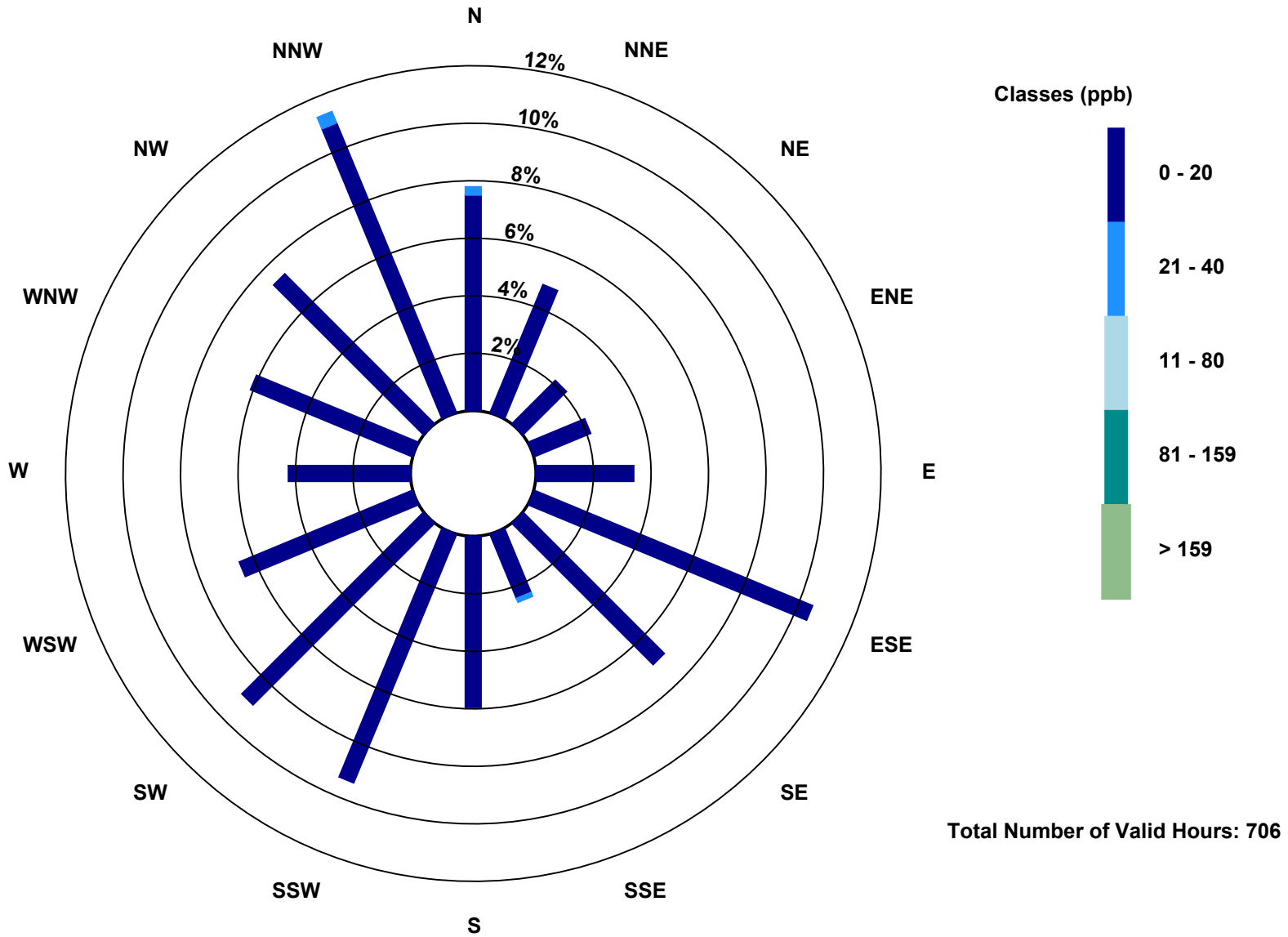
Total Number of Valid Hours: 706

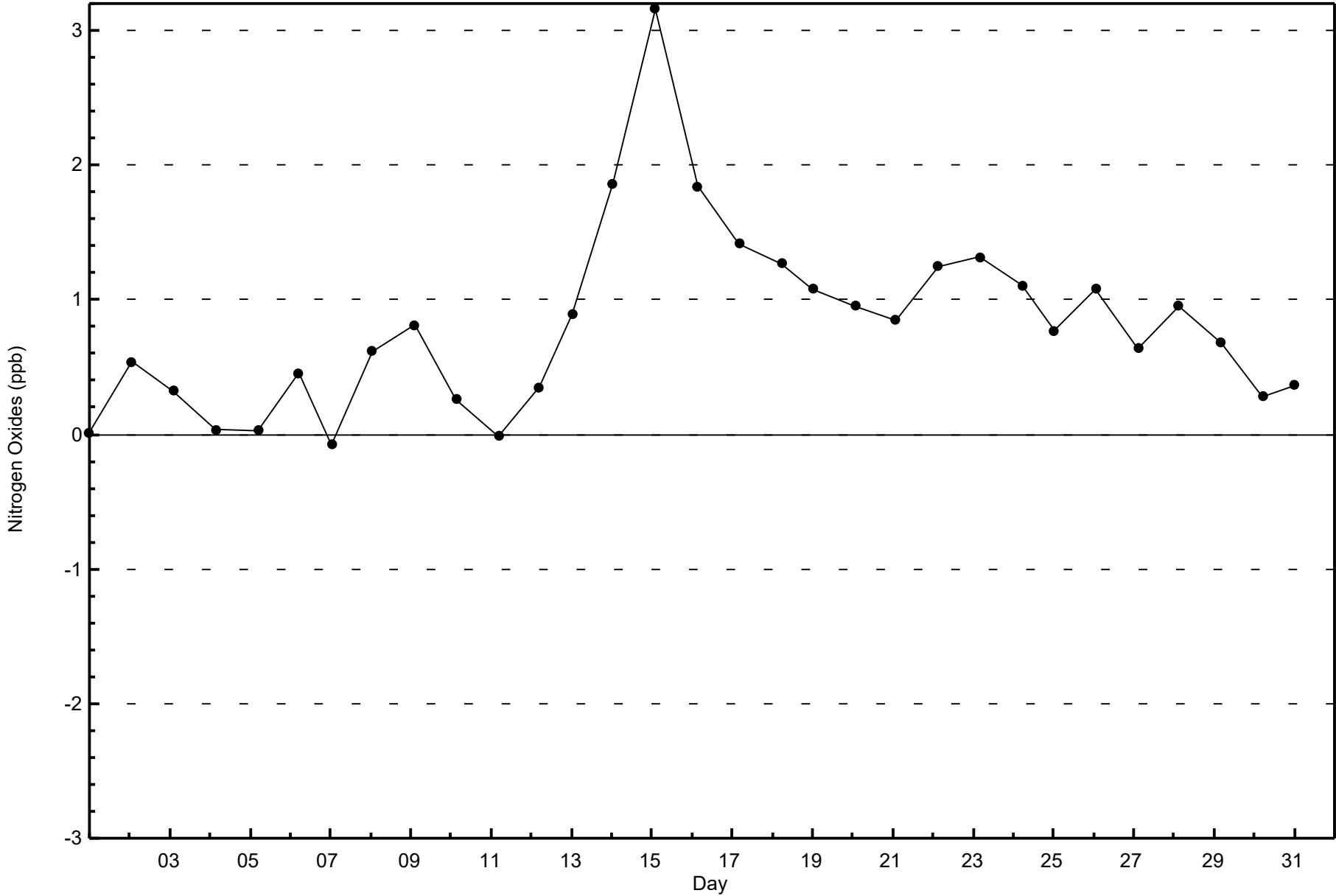
Total Number of Hours: 744

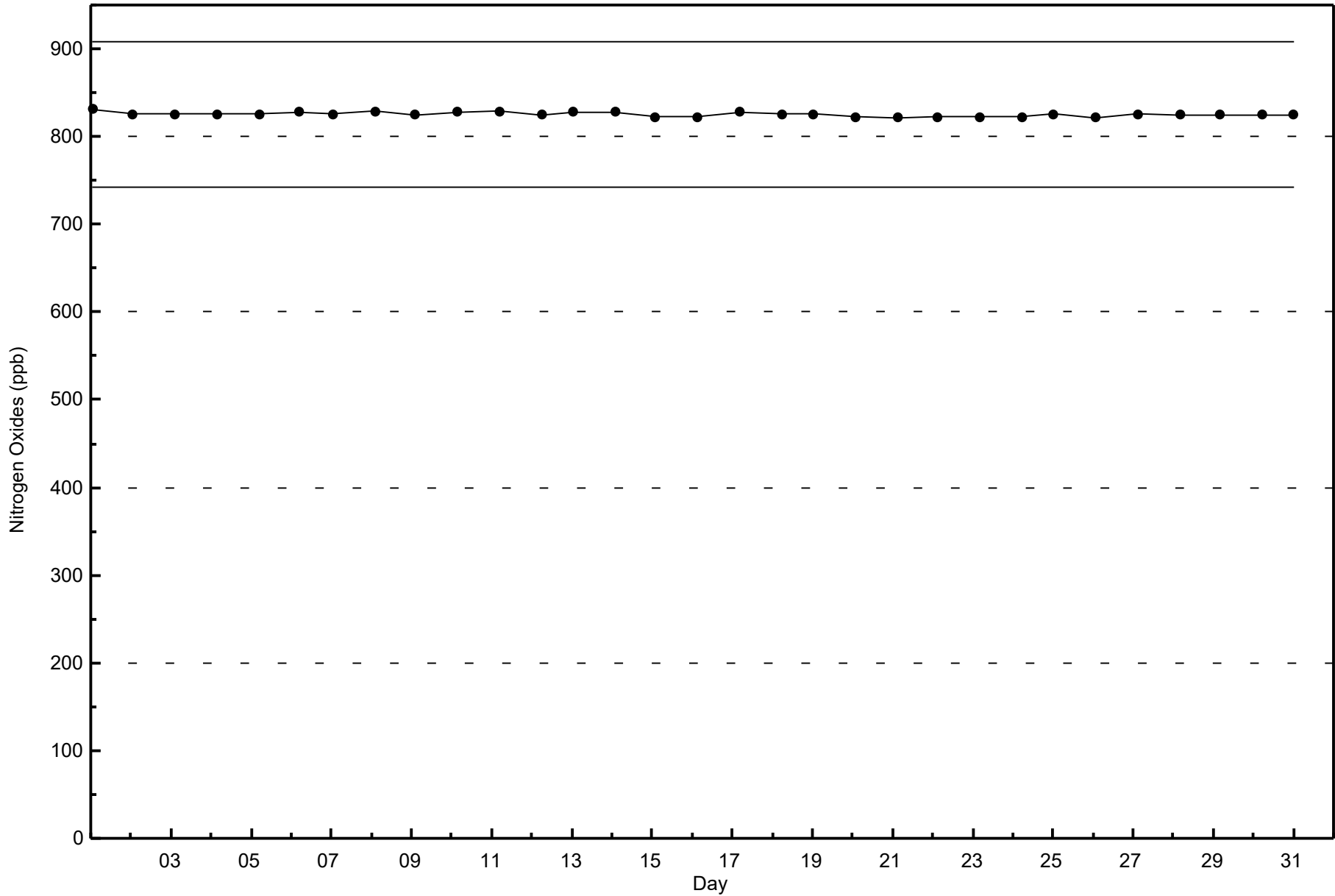


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes









Wood Buffalo Environmental Association

Summary of Hour Averages

Ammonia (NH₃) - ppb

Patricia McInnes - July 2023

Number of Exceedences (AAAQO): 1-hr: 0	Maximum Value: 72.9 ppb on Jul 14 19:00	Maximum Daily Average: 42.1 ppb on Jul 14	Hours in Service: 744
Minimum Value: 0.0 ppb on Jul 1 01:00	Maximum Diurnal Average: 7.5 ppb at hour 5	Minimum Diurnal Average: 1.1 ppb at hour 3	Hours of Data: 628
Monthly Average: 3.59 ppb	Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 12.7 P ₉₉ = 60.5		Hours of Missing Data: 116
			Hours of Calibration: 40
			Percent Operational Time: 89.8

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-Jul	0.0	0.0	0.0	0.0	0.0	Z	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2-Jul	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
3-Jul	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
4-Jul	0.0	0.0	Z	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	Z	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	Z	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	Z	RE	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8-Jul	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	11.5	10.1	0.0	0.0	1.0	11.5	
9-Jul	0.0	Z	RE	RE	12.2	11.8	10.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	12.2	
10-Jul	0.0	0.0	Z	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	Z	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	Z	RE	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.6	0.7	13.6
13-Jul	17.6	18.7	18.3	17.4	16.9	Z	RE	RE	28.3	22.5	14.7	12.3	10.5	10.1	0.0	12.5	14.3	18.9	22.4	25.4	35.6	38.2	34.2	33.0	20.1	38.2	20.1	
14-Jul	Z	RE	RE	27.1	26.4	24.0	26.6	26.6	18.4	15.4	17.2	28.5	M	34.8	37.9	45.8	60.2	68.8	72.9	69.2	60.6	57.1	61.3	63.6	42.1	72.9	42.1	
15-Jul	63.4	Z	RE	RE	57.1	54.1	51.9	54.1	53.5	48.7	44.3	40.1	32.6	27.1	23.5	21.1	18.3	16.3	14.4	13.0	12.9	12.7	12.8	12.4	32.6	63.4	32.6	
16-Jul	11.5	11.3	Z	RE	RE	12.5	10.1	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	2.2	12.5	2.2	
17-Jul	0.0	0.0	0.0	Z	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	Z	RE	RE	RE	0.0	C	C	C	C	C	C	C	C	C	C	22.5	16.5	13.3	10.9	0.0	0.0	--	22.5	--
19-Jul	0.0	0.0	0.0	0.0	0.0	Z	RE	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-Jul	Z	RE	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	Z	RE	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	Z	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.4	14.2	12.8	10.6	12.2	13.3	12.8	11.6	10.8	10.4	0.0	5.7	14.2	5.7	
23-Jul	0.0	0.0	0.0	Z	RE	RE	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	10.5	0.5	
24-Jul	0.0	0.0	0.0	0.0	Z	RE	RE	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-Jul	0.0	0.0	0.0	0.0	0.0	Z	RE	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26-Jul	Z	RE	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	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
28-Jul	0.0	0.0	Z	RE	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	Z	RE	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	Z	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	Z	RE	RE	RE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

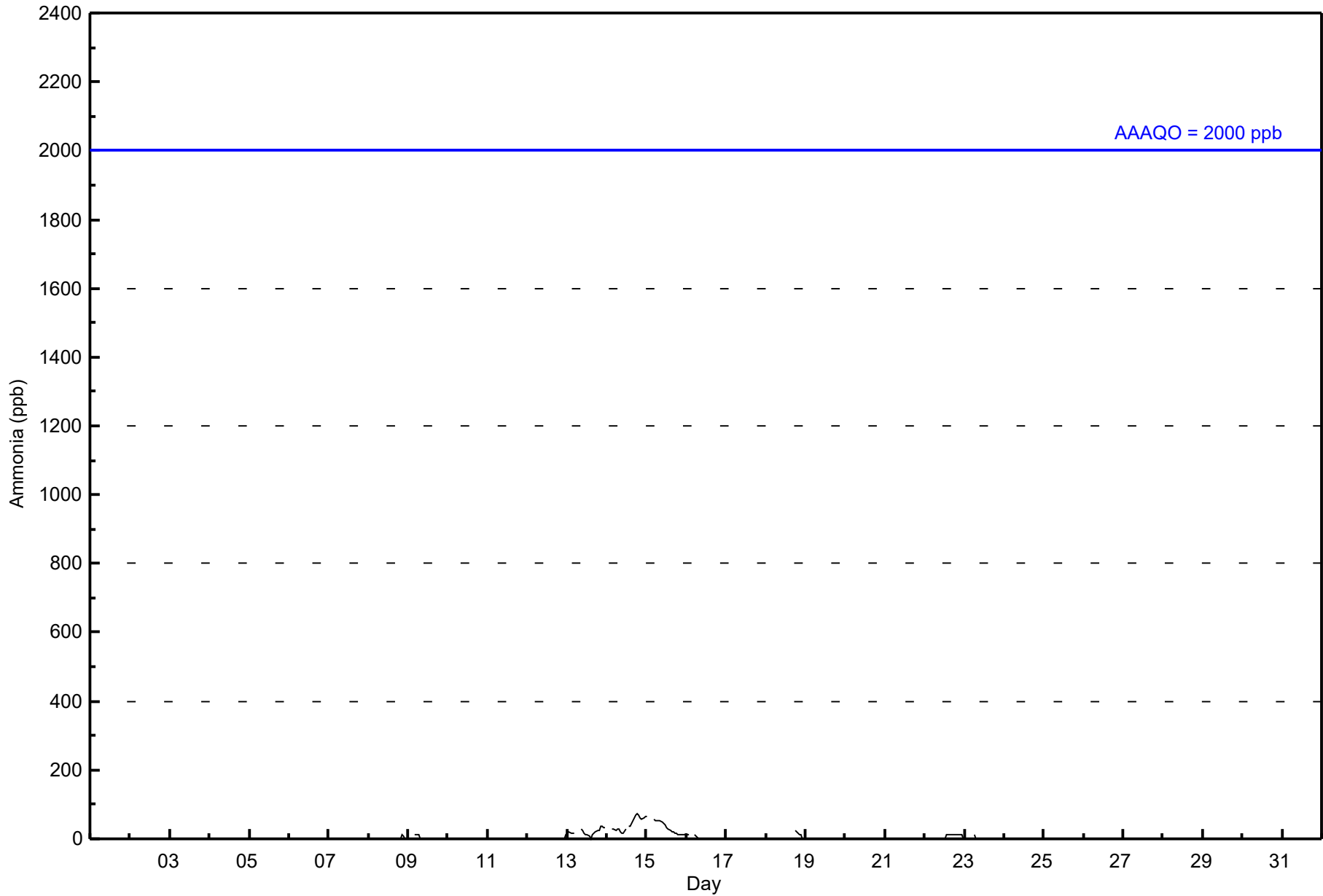
3.6	1.4	1.1	3.2	7.5	7.3	5.8	3.7	3.9	2.9	2.5	2.7	1.5	2.8	2.5	3.1	3.5	3.9	4.7	4.4	4.7	4.5	3.8	4.0	Diurnal Average	
63.4	18.7	18.3	27.1	57.1	54.1	51.9	54.1	53.5	48.7	44.3	40.1	32.6	34.8	37.9	45.8	60.2	68.8	72.9	69.2	60.6	57.1	61.3	63.6	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Ammonia (NH₃) - ppb
Patricia McInnes - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	542	86.31	86.31
6 - 10	6	0.96	87.26
11 - 15	30	4.78	92.04
16 - 20	11	1.75	93.79
21 - 25	7	1.11	94.90
> 26	32	5.10	100.00

Total Number of Valid Hours: 628

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	39	20	9	12	21	64	40	15	33	56	52	39	25	30	34	53	542
6 - 10	2	0	0	0	0	0	2	0	0	0	0	0	0	0	1	1	6
11 - 15	7	2	1	0	2	0	1	0	0	0	1	2	2	3	0	9	30
16 - 20	0	0	1	1	0	0	0	0	0	0	0	1	0	2	3	3	11
21 - 25	2	2	0	0	0	0	0	0	0	0	0	1	0	1	0	1	7
> 26	3	6	2	0	0	0	0	0	0	0	0	0	1	3	4	13	32
Totals	53	30	13	13	23	64	43	15	33	56	53	43	28	39	42	80	628

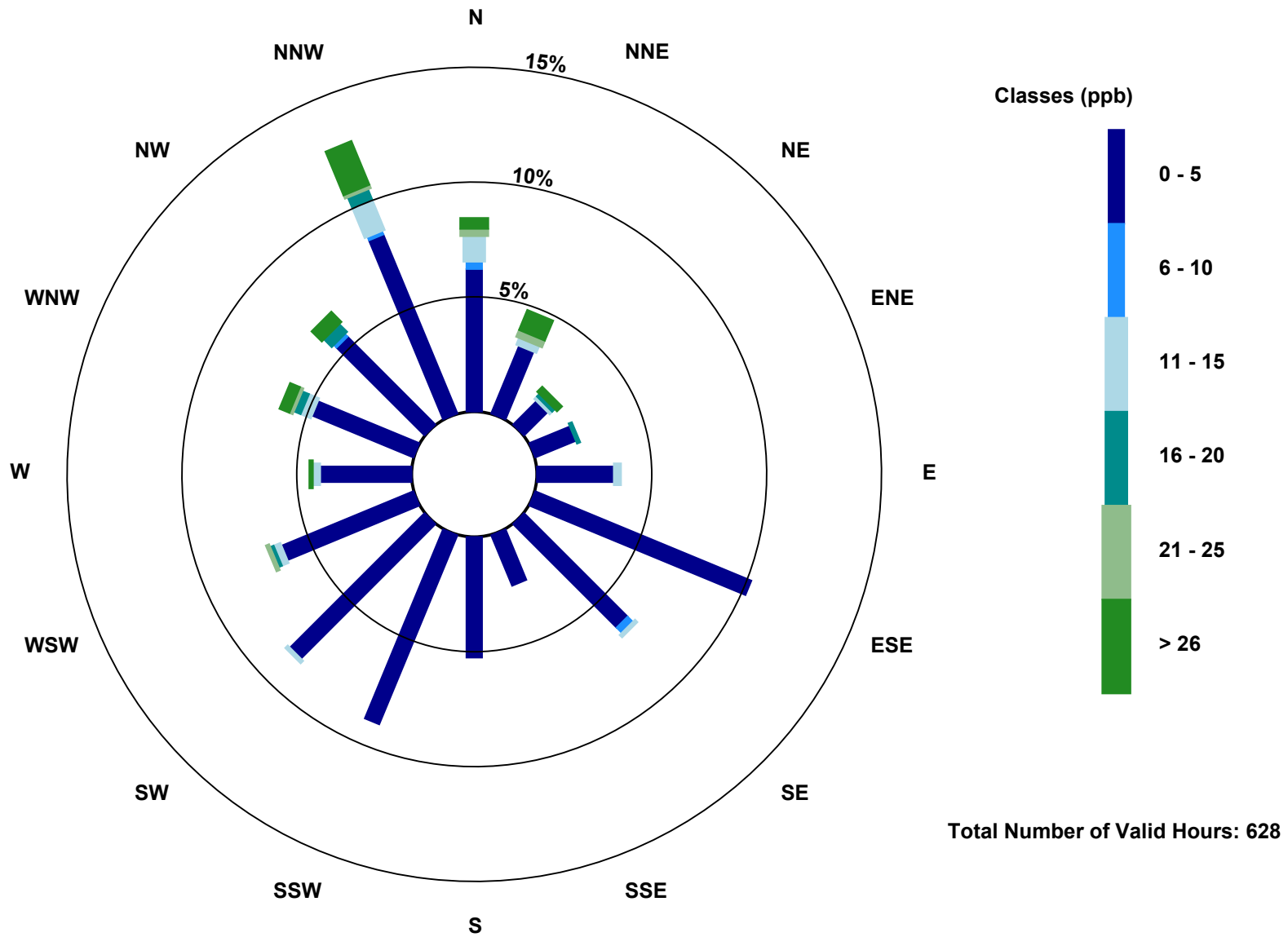
Total Number of Valid Hours: 628

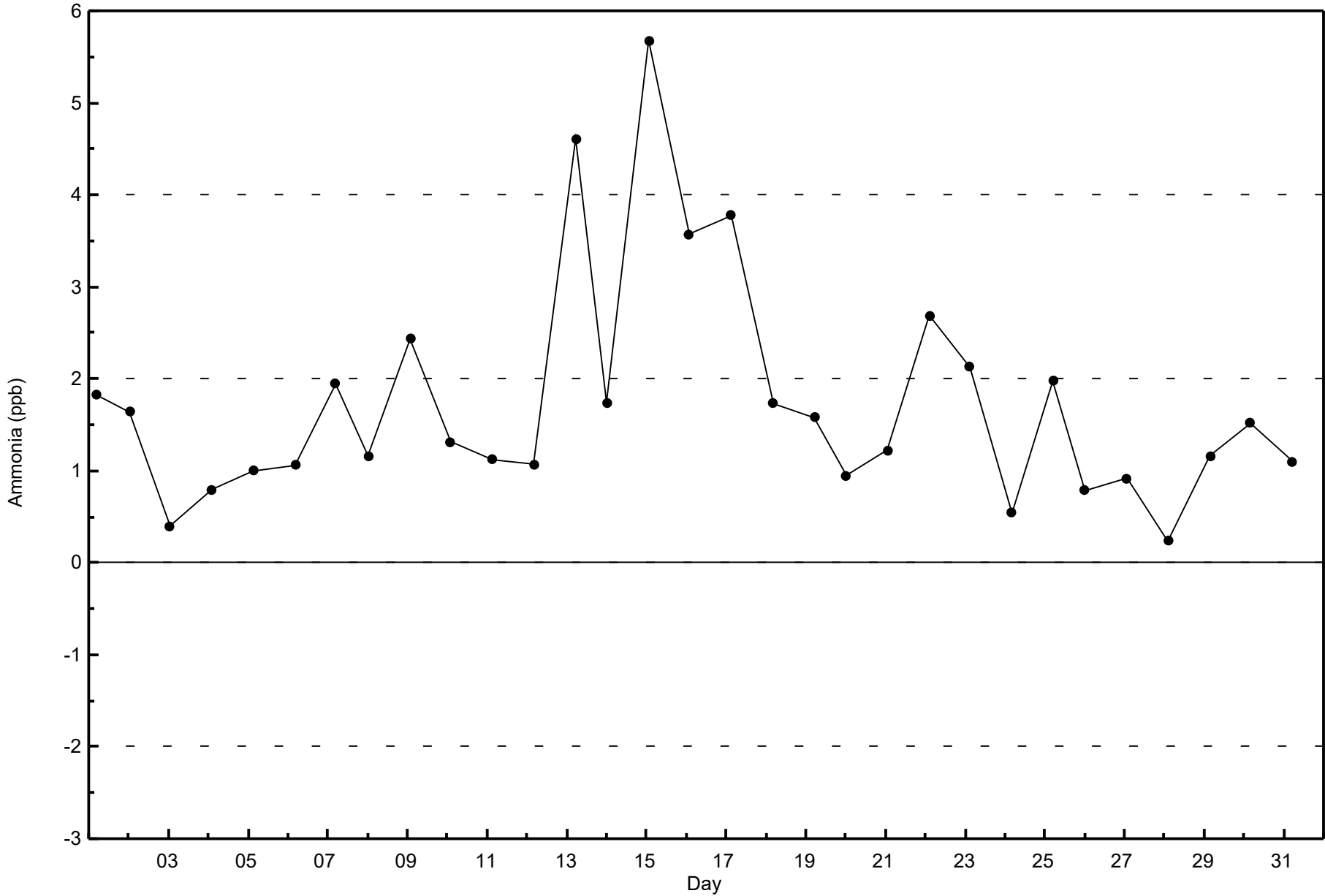
Total Number of Hours: 744

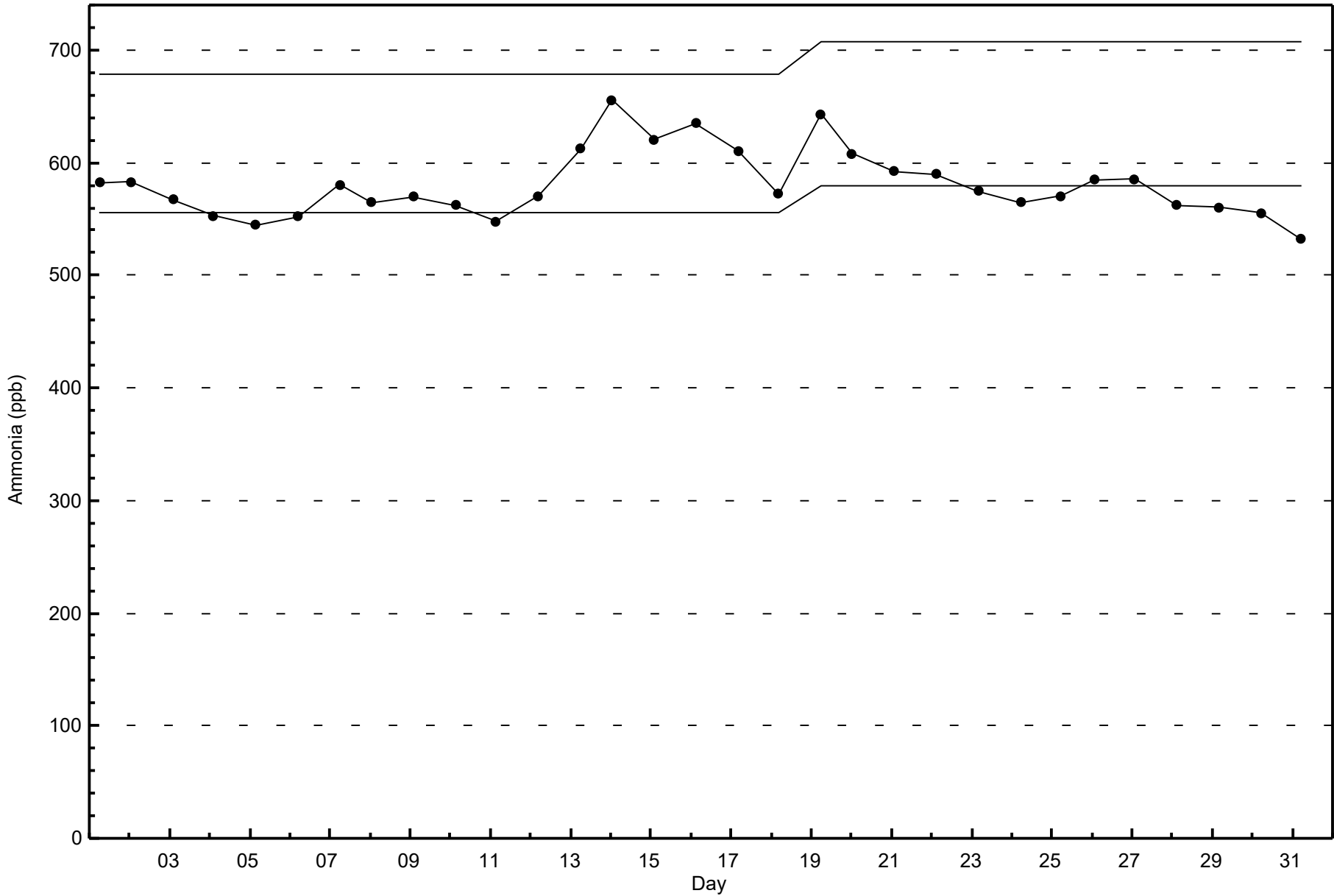


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Ammonia (NH₃) - ppb
Patricia McInnes





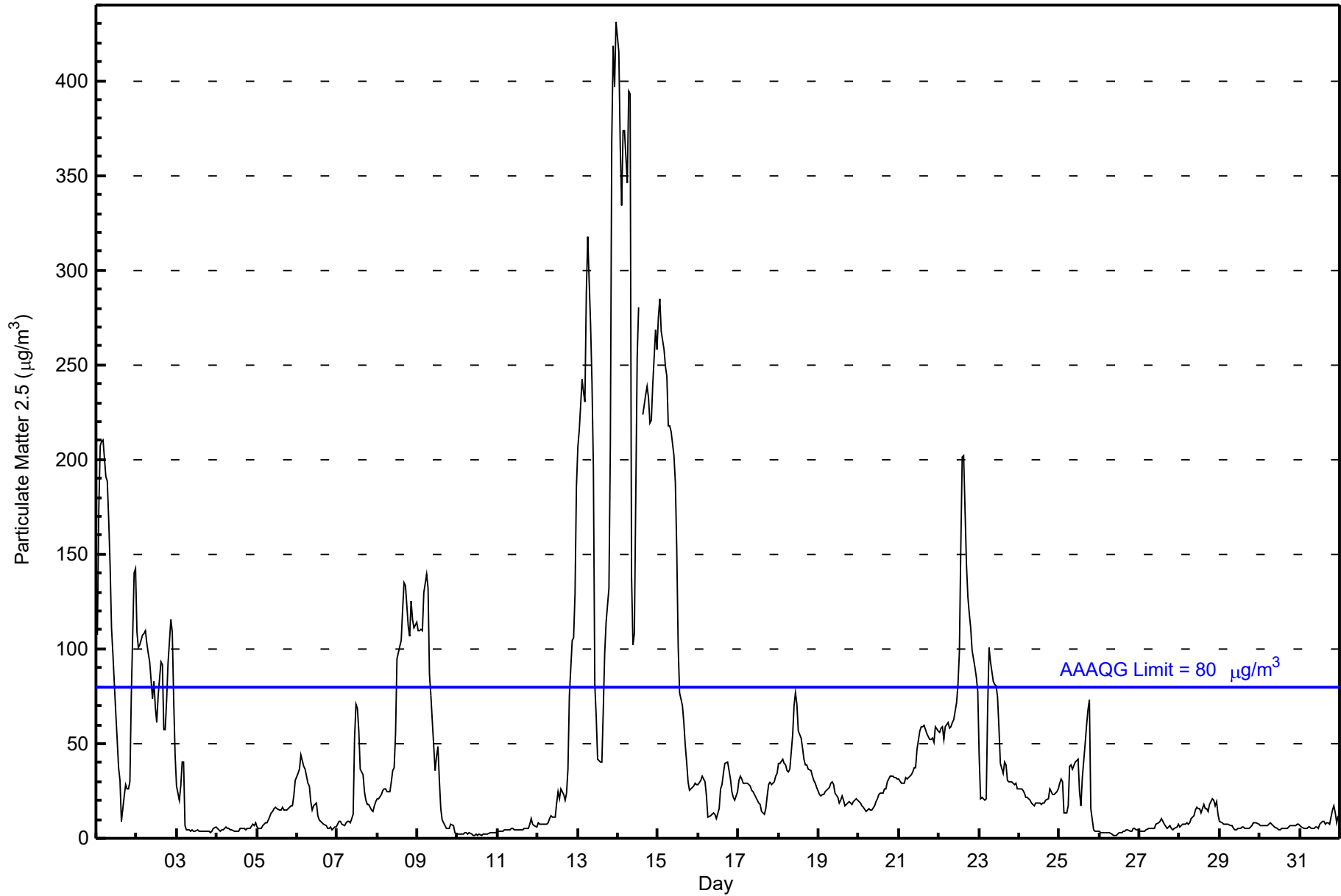




Number of Exceedences (AAAQO):	1-hr: 123	24-hr: 13	Hours in Service:	744
Maximum Value: 431.0 µg/m ³ on Jul 14 00:00	Maximum Daily Average: 273.3 µg/m ³ on Jul 14		Hours of Data:	742
Minimum Value: 1.7 µg/m ³ on Jul 26 10:00	Minimum Daily Average: 2.4 µg/m ³ on Jul 10		Hours of Missing Data:	2
Maximum Diurnal Average: 59.8 µg/m ³ at hour 7	Minimum Diurnal Average: 31.8 µg/m ³ at hour 14		Hours of Calibration:	2
Monthly Average: 46.81 µg/m ³	Percentiles: P ₁ = 1.9 P ₁₀ = 4.2 Q ₁ = 6.7 Median = 20.7 Q ₃ = 48.2 P ₉₀ = 115.3 P ₉₉ = 371.3		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	107.4	174.0	207.3	209.6	210.4	190.9	188.9	168.9	143.6	111.4	97.1	66.1	52.5	36.9	30.3	9.0	22.5	28.3	25.7	26.3	30.2	75.3	140.0	142.1	103.9	210.4
2-Jul	108.9	100.6	102.0	107.4	107.9	109.4	103.2	97.8	93.1	73.8	82.6	69.6	61.4	75.2	93.3	91.6	57.7	57.6	73.2	92.5	115.4	108.6	73.2	44.1	87.5	115.4
3-Jul	27.7	20.3	27.7	40.5	40.1	6.7	4.3	4.1	3.8	4.1	4.0	3.9	4.6	3.8	3.7	3.7	3.5	3.7	3.7	3.4	3.2	3.4	5.1	5.8	9.8	40.5
4-Jul	4.9	4.3	4.0	4.1	4.4	5.8	4.9	5.1	4.3	4.3	3.8	3.7	3.5	4.0	4.9	4.8	5.0	4.8	5.2	5.1	5.4	7.7	6.6	7.9	4.9	7.9
5-Jul	6.0	5.4	5.5	6.7	7.2	8.0	8.4	10.0	13.4	14.1	15.6	16.3	16.0	14.7	14.9	16.2	15.2	15.2	14.9	16.1	17.3	17.5	22.6	30.8	13.7	30.8
6-Jul	34.6	36.2	44.2	41.2	38.0	36.5	29.4	27.9	19.0	14.8	17.0	18.8	12.3	9.6	8.7	8.2	7.3	6.6	5.1	5.2	6.3	4.6	5.9	6.3	18.5	44.2
7-Jul	7.7	8.9	8.6	7.2	6.9	8.2	9.2	8.9	8.5	12.7	53.0	70.7	68.6	56.5	36.8	33.3	24.3	19.9	18.0	18.2	15.1	14.3	17.1	19.7	23.0	70.7
8-Jul	20.6	20.9	23.2	25.6	26.2	26.0	25.0	24.8	29.7	35.8	37.6	54.9	94.7	101.5	104.7	121.1	134.8	133.4	111.8	106.8	125.2	115.4	110.9	114.4	71.9	134.8
9-Jul	109.5	109.8	110.6	109.8	129.4	139.5	131.6	86.5	75.2	62.2	36.0	43.4	48.2	30.8	15.7	9.4	6.7	5.5	5.4	5.5	7.4	6.7	3.2	2.1	53.8	139.5
10-Jul	2.0	2.1	2.3	2.5	2.7	2.9	2.5	2.7	2.2	1.9	1.7	1.9	1.8	2.0	1.8	2.0	2.6	2.2	2.2	2.7	2.7	3.0	3.3	3.2	2.4	3.3
11-Jul	3.4	3.5	3.6	3.9	4.4	4.8	4.4	4.6	5.0	4.9	4.3	4.3	4.4	4.7	4.6	4.5	5.1	5.0	5.6	7.6	10.5	7.2	6.9	6.2	5.1	10.5
12-Jul	8.4	7.2	7.3	7.7	7.2	7.8	8.4	10.7	11.8	11.3	11.5	18.5	24.7	21.0	26.2	23.3	20.5	24.0	36.8	75.6	104.4	105.8	128.7	186.0	37.3	186.0
13-Jul	206.5	215.7	242.3	235.5	230.5	287.9	317.7	271.3	240.7	195.6	81.0	64.3	41.8	40.0	40.4	68.2	98.0	113.9	132.3	207.5	368.4	418.0	397.0	431.0	206.1	431.0
14-Jul	415.1	365.5	334.4	373.9	373.3	345.9	394.2	393.2	137.7	102.5	108.4	254.4	280.5	C	C	223.6	234.5	238.8	232.5	218.9	221.0	239.6	268.3	257.7	273.3	415.1
15-Jul	274.9	284.6	267.5	258.2	248.8	243.7	218.0	218.1	214.5	201.9	187.6	151.9	101.1	76.7	70.2	61.0	49.2	40.2	29.7	25.1	26.5	27.6	29.3	28.7	139.0	284.6
16-Jul	28.6	30.8	32.8	31.1	29.6	22.3	11.5	11.8	13.0	13.4	12.7	10.3	16.0	26.1	28.2	34.6	39.9	40.3	35.8	31.6	24.9	21.7	20.2	24.6	24.6	40.3
17-Jul	30.9	33.0	31.3	29.4	29.3	28.9	28.6	27.5	25.2	24.5	21.7	20.0	18.7	17.6	14.0	12.5	15.6	22.5	28.1	29.7	28.4	29.6	32.5	34.4	25.6	34.4
18-Jul	39.2	39.9	41.5	39.4	38.6	35.7	35.1	36.3	54.4	70.2	76.6	70.5	56.5	52.7	48.0	41.8	38.8	38.4	36.7	35.9	33.2	30.4	28.8	27.0	43.6	76.6
19-Jul	22.9	22.5	23.0	23.5	24.6	25.4	26.6	29.0	29.5	28.0	23.9	21.4	18.8	20.1	22.5	20.2	17.2	18.9	19.8	18.8	18.2	19.7	21.1	19.9	22.3	29.5
20-Jul	19.4	18.8	17.5	16.2	14.3	15.2	15.9	15.1	15.2	17.4	19.1	20.9	23.2	24.1	24.1	25.9	26.3	29.7	31.3	32.5	32.6	31.8	32.0	31.0	22.9	32.6
21-Jul	31.0	29.4	28.7	29.4	31.8	31.1	32.0	33.9	35.0	37.0	37.2	47.3	56.8	59.1	59.0	59.6	57.5	54.8	52.1	52.0	52.7	50.5	58.6	56.9	44.7	59.6
22-Jul	56.0	57.9	59.2	52.5	58.9	61.1	58.4	58.5	61.1	62.6	71.9	81.0	98.7	153.6	201.3	202.1	144.9	127.7	118.5	110.8	99.1	90.4	84.8	77.8	93.7	202.1
23-Jul	43.2	21.2	21.3	20.1	21.2	68.7	100.6	93.3	83.0	81.5	80.5	74.3	58.2	39.8	34.5	40.6	38.7	30.6	29.9	29.6	28.8	28.3	28.9	26.4	46.8	100.6
24-Jul	26.0	26.3	25.7	23.7	21.8	21.5	20.3	18.8	17.5	16.8	18.5	18.9	18.7	18.2	18.9	19.0	20.5	20.9	25.8	24.3	23.1	23.3	24.5	26.3	21.6	26.3
25-Jul	28.9	31.2	29.7	13.4	13.3	17.3	37.8	38.6	36.8	40.5	40.7	41.6	24.4	17.5	31.8	49.8	59.6	67.8	72.8	15.9	4.2	3.7	3.5	3.7	30.2	72.8
26-Jul	3.6	3.3	3.4	3.2	3.1	3.2	2.8	2.3	1.9	1.7	1.8	2.4	3.0	3.1	3.9	3.8	4.6	4.5	3.9	3.8	5.1	5.6	4.8	4.3	3.5	5.6
27-Jul	3.9	3.7	3.7	3.7	4.2	5.5	5.4	5.5	5.6	5.2	7.4	8.4	9.2	10.4	9.3	7.6	5.4	5.9	6.9	5.0	4.3	5.4	5.7	7.2	6.0	10.4
28-Jul	6.3	6.7	7.3	7.7	8.6	7.6	7.9	10.1	12.0	14.6	16.2	15.3	15.9	13.8	17.7	15.8	15.7	14.0	17.8	20.8	20.4	16.9	19.6	12.5	13.4	20.8
29-Jul	9.3	8.4	7.6	7.2	7.2	7.2	6.8	6.4	5.1	4.2	4.5	5.1	5.5	6.3	6.2	5.4	5.5	5.3	5.7	6.4	8.1	8.1	8.0	7.3	6.5	9.3
30-Jul	6.7	7.1	6.7	6.4	6.6	7.3	8.2	7.8	7.0	6.2	5.2	4.4	4.7	4.9	5.0	5.4	5.5	5.8	6.7	6.4	7.0	7.1	7.1	7.1	6.4	8.2
31-Jul	6.6	6.1	5.4	5.5	5.3	5.6	6.1	5.3	5.4	5.9	5.6	5.6	7.1	9.1	9.0	7.7	8.0	8.1	7.5	15.2	17.4	13.8	8.5	11.7	8.0	17.4
54.8 55.0 56.0 56.3 56.6 57.7 59.8 56.0 45.5 41.3 38.2 41.6 40.4 31.8 33.0 39.7 38.4 38.5 38.8 40.5 47.3 49.7 51.8 53.7																								Diurnal Average		
415.1 365.5 334.4 373.9 373.3 345.9 394.2 393.2 240.7 201.9 187.6 254.4 280.5 153.6 201.3 223.6 234.5 238.8 232.5 218.9 368.4 418.0 397.0 431.0																								Diurnal Maximum		

C - Calibration
 Alberta Ambient Air Quality Guideline/Objectives: 1-hr 80 µg/m³ 24-hr 29 µg/m³





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - July 2023

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
0 - 5	143	19.27	19.27
6 - 15	160	21.56	40.84
16 - 25	115	15.50	56.33
26 - 80	201	27.09	83.42
> 81.0	123	16.58	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



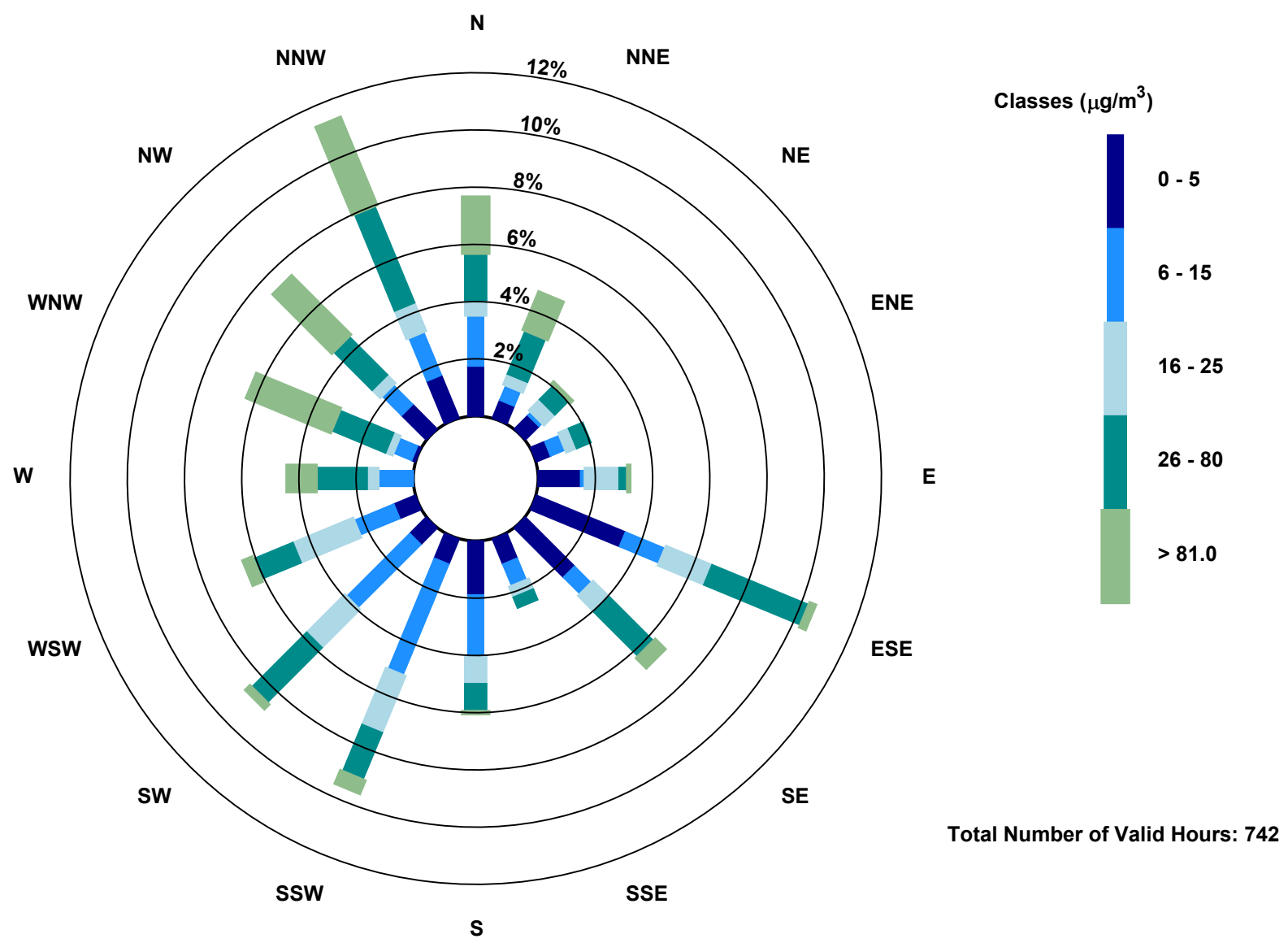
Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - July 2023

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	13	5	5	4	11	25	18	7	14	7	6	6	0	1	9	12	143
6 - 15	13	4	1	4	1	11	6	6	16	31	23	11	9	5	7	12	160
16 - 25	4	3	4	3	9	13	6	3	7	16	14	17	3	2	3	8	115
26 - 80	12	12	5	4	2	27	16	3	7	13	20	11	13	15	14	27	201
> 81.0	15	11	1	0	1	2	4	0	1	4	2	3	8	24	22	25	123
Totals	57	35	16	15	24	78	50	19	45	71	65	48	33	47	55	84	742

Total Number of Valid Hours: 742

Total Number of Hours: 744





Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

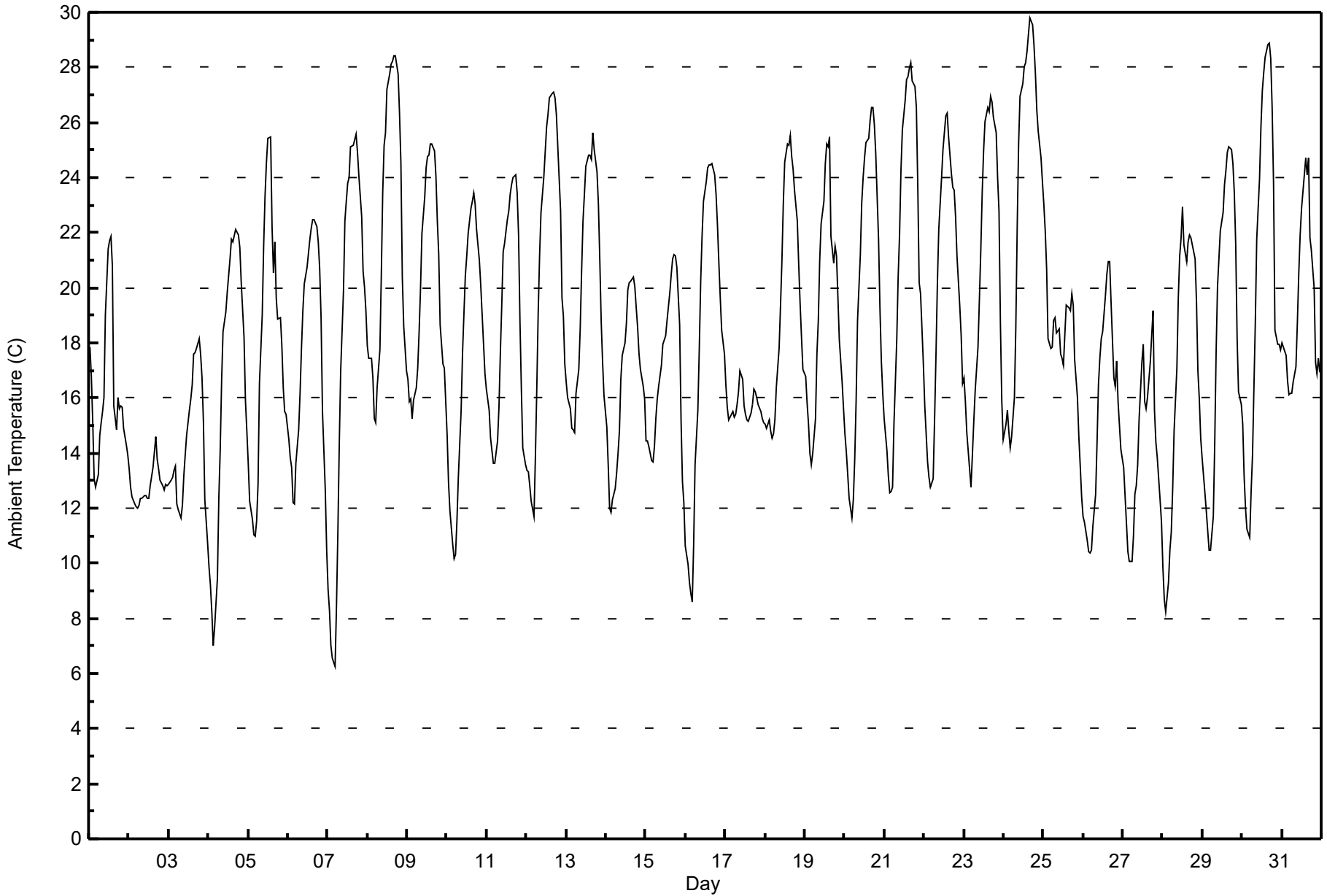
Patricia McInnes - July 2023

Maximum Value: 29.8 C on Jul 24 17:00 Maximum Daily Average: 23.2 C on Jul 24																						Hours in Service:	744																								
Minimum Value: 6.2 C on Jul 7 05:00 Minimum Daily Average: 12.8 C on Jul 2																						Hours of Data:	744																								
Maximum Diurnal Average: 23.0 C at hour 17 Minimum Diurnal Average: 12.4 C at hour 5																						Hours of Missing Data:	0																								
Monthly Average: 18.26 C Percentiles: P ₁ = 8.3 P ₁₀ = 12.3 Q ₁ = 14.6 Median = 17.6 Q ₃ = 22.0 P ₉₀ = 25.2 P ₉₉ = 28.4																						Hours of Calibration:	0																								
																						Percent Operational Time:	100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	17.8	16.8	15.1	13.1	12.8	13.2	14.6	15.1	15.5	16.0	19.0	21.4	21.7	21.8	20.8	15.7	14.8	16.0	15.6	15.7	15.7	14.9	14.3	13.9	16.3	21.8																					
2-Jul	13.4	12.8	12.4	12.2	12.0	12.0	12.1	12.3	12.4	12.5	12.5	12.4	12.4	12.8	13.5	14.1	14.6	13.8	13.4	13.0	12.8	12.7	12.8	12.8	12.8	14.6																					
3-Jul	12.9	13.0	13.1	13.3	13.5	12.2	11.9	11.6	12.1	13.2	13.9	14.6	15.6	15.9	16.5	17.6	17.7	17.8	18.1	17.6	16.7	15.1	12.3	10.7	14.5	18.1																					
4-Jul	9.9	9.2	8.2	7.0	7.7	9.4	12.3	14.1	16.6	18.4	19.1	19.8	20.5	21.0	21.8	21.7	22.1	22.0	21.9	21.4	20.2	18.2	15.9	14.8	16.4	22.1																					
5-Jul	13.6	12.2	11.6	11.0	11.0	11.5	12.9	16.5	19.0	21.5	23.3	24.6	25.4	25.5	22.2	20.5	21.7	19.6	18.8	18.9	17.9	16.4	15.5	15.4	17.8	25.5																					
6-Jul	14.5	13.8	13.5	12.2	12.1	13.6	14.9	16.2	17.8	19.2	20.1	20.8	21.3	21.8	22.2	22.5	22.5	22.2	21.7	20.7	18.9	15.5	12.7	10.5	17.5	22.5																					
7-Jul	9.1	8.3	7.0	6.6	6.2	8.4	11.1	14.3	17.0	19.9	22.4	23.1	23.8	24.0	25.1	25.2	25.4	25.6	24.9	24.1	22.6	20.6	20.0	19.2	18.1	25.6																					
8-Jul	17.9	17.4	17.4	16.7	15.3	15.1	16.4	17.8	20.4	23.4	25.2	25.6	27.2	27.7	28.1	28.2	28.4	28.4	27.8	26.3	24.5	20.4	18.6	17.0	22.1	28.4																					
9-Jul	16.7	15.8	16.0	15.3	15.9	16.4	17.1	18.4	20.0	22.0	23.3	24.4	24.8	24.8	25.2	25.2	24.9	24.0	22.4	21.2	18.6	17.2	17.1	15.9	20.1	25.2																					
10-Jul	14.6	12.9	11.9	10.7	10.2	10.3	11.6	13.1	15.5	17.6	19.1	20.5	21.2	22.0	22.9	23.1	23.4	23.0	22.1	21.0	20.1	19.0	17.9	16.9	17.5	23.4																					
11-Jul	16.3	15.6	14.5	14.1	13.6	13.6	14.4	15.7	17.6	19.3	21.3	21.6	22.5	22.8	23.4	23.8	24.0	24.1	23.4	21.9	18.8	16.3	14.2	13.6	18.6	24.1																					
12-Jul	13.4	13.3	12.8	12.3	11.7	13.8	16.3	19.0	21.1	22.7	24.0	24.9	25.8	26.3	26.9	27.0	27.1	26.9	26.3	25.1	22.8	19.6	19.0	17.3	20.6	27.1																					
13-Jul	16.6	16.0	15.6	14.9	14.9	14.8	16.2	17.0	18.5	20.6	22.4	23.4	24.4	24.8	24.8	24.6	25.7	25.0	24.2	23.0	21.0	18.7	17.3	16.1	20.0	25.7																					
14-Jul	15.0	13.6	12.0	11.8	12.3	12.7	13.3	14.0	14.8	16.7	17.6	18.0	18.7	19.9	20.2	20.4	20.0	19.3	18.5	17.6	17.0	16.4	15.9	15.9	16.5	20.4																					
15-Jul	14.5	14.4	14.3	13.7	13.7	14.2	15.2	16.0	16.4	17.2	18.0	18.1	18.2	18.8	19.8	20.5	21.0	21.2	21.2	20.7	18.7	15.2	12.9	12.2	16.9	21.2																					
16-Jul	10.6	10.0	9.3	8.9	8.6	10.7	13.6	15.6	17.7	20.2	21.9	23.2	23.9	24.4	24.5	24.5	24.1	23.4	22.3	20.9	19.6	18.5	17.6	17.6	18.3	24.5																					
17-Jul	16.5	15.7	15.2	15.3	15.5	15.3	15.4	15.7	16.2	17.0	16.7	15.7	15.4	15.2	15.2	15.5	15.8	16.3	16.2	16.0	15.8	15.5	15.3	15.1	15.7	17.0																					
18-Jul	15.0	14.9	15.2	14.8	14.5	14.7	15.2	16.4	17.8	19.3	21.0	23.0	24.6	25.2	25.2	25.5	24.8	24.3	23.6	22.4	20.9	19.4	18.2	17.0	19.7	25.5																					
19-Jul	16.8	15.8	15.0	14.0	13.6	14.0	15.2	17.6	18.8	21.0	22.3	23.1	24.5	25.2	25.1	25.5	21.9	20.9	21.5	21.1	19.6	18.1	16.6	15.6	19.3	25.5																					
20-Jul	14.7	14.0	13.2	12.4	11.6	12.3	13.8	15.9	18.8	21.2	23.1	24.0	24.7	25.3	25.4	26.1	26.5	26.6	25.9	24.9	21.8	19.3	17.4	16.2	19.8	26.6																					
21-Jul	15.2	14.1	13.2	12.6	12.6	12.8	15.1	18.1	20.4	21.9	24.3	25.7	26.8	27.6	27.7	28.0	28.2	27.5	27.3	26.5	23.7	20.2	19.8	17.2	21.1	28.2																					
22-Jul	15.7	14.7	13.7	13.1	12.8	13.1	15.2	17.6	20.1	22.1	24.0	25.0	25.6	26.2	26.3	25.5	24.1	23.6	23.5	22.6	21.1	19.3	18.3	16.5	20.0	26.3																					
23-Jul	16.7	15.9	14.7	13.4	12.8	13.9	15.2	16.3	17.9	19.6	21.3	23.4	25.0	26.1	26.6	26.4	26.9	26.8	26.2	25.6	24.0	22.8	18.7	15.9	20.5	26.9																					
24-Jul	14.5	15.0	15.6	14.8	14.2	14.6	16.0	18.6	22.2	25.2	27.0	27.4	28.0	28.2	28.6	29.2	29.8	29.6	28.8	27.8	26.4	25.7	24.7	23.9	23.2	29.8																					
25-Jul	23.0	22.1	20.7	18.2	17.8	17.8	18.8	18.9	18.3	18.5	17.6	17.4	17.2	18.3	19.4	19.3	19.2	19.8	19.4	17.4	16.0	14.6	13.5	12.4	18.2	23.0																					
26-Jul	11.7	11.5	10.8	10.4	10.4	10.5	11.3	12.5	14.4	16.5	17.4	18.2	18.4	19.7	20.5	20.9	20.9	19.5	16.7	16.4	17.3	15.9	15.0	14.1	15.5	20.9																					
27-Jul	13.5	12.4	11.4	10.4	10.1	10.1	11.0	12.5	12.8	13.6	15.2	17.3	18.0	15.9	15.6	16.0	17.3	18.2	19.2	15.6	14.4	13.8	12.3	11.5	14.1	19.2																					
28-Jul	9.9	8.7	8.3	9.3	10.5	11.1	12.7	14.8	17.1	19.6	21.1	21.8	22.9	21.6	21.0	21.7	21.9	21.8	21.6	21.1	19.5	17.0	16.0	14.6	16.9	22.9																					
29-Jul	13.8	12.6	11.9	11.2	10.5	10.5	11.7	14.3	17.6	20.0	21.1	22.1	22.7	23.8	24.3	24.9	25.1	25.0	24.5	23.4	21.6	18.1	16.2	15.7	18.4	25.1																					
30-Jul	15.0	13.1	12.0	11.2	10.9	12.6	13.9	16.4	18.8	21.7	23.9	25.8	27.2	27.8	28.4	28.9	28.9	28.3	26.6	23.8	18.5	18.0	17.9	17.8	20.3	28.9																					
31-Jul	18.0	17.8	17.5	16.6	16.1	16.2	16.2	16.6	17.2	18.7	20.5	21.9	22.9	24.1	24.7	24.1	24.7	21.8	21.4	20.0	17.3	16.9	17.4	16.9	19.4	24.7																					
																						14.7	14.0	13.3	12.6	12.4	13.0	14.2	15.8	17.5	19.2	20.6	21.6	22.3	22.7	23.0	23.0	22.7	22.2	21.2	19.5	17.8	16.5	15.5	Diurnal Average		
																						23.0	22.1	20.7	18.2	17.8	17.8	18.8	19.0	22.2	25.2	27.0	27.4	28.0	28.2	28.6	29.2	29.8	29.6	28.8	27.8	26.4	25.7	24.7	23.9	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Patricia McInnes - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Patricia McInnes - July 2023

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	20	2.69	2.69
10 - 20	452	60.75	63.44
> 20	272	36.56	100.00

Total Number of Valid Hours: 744

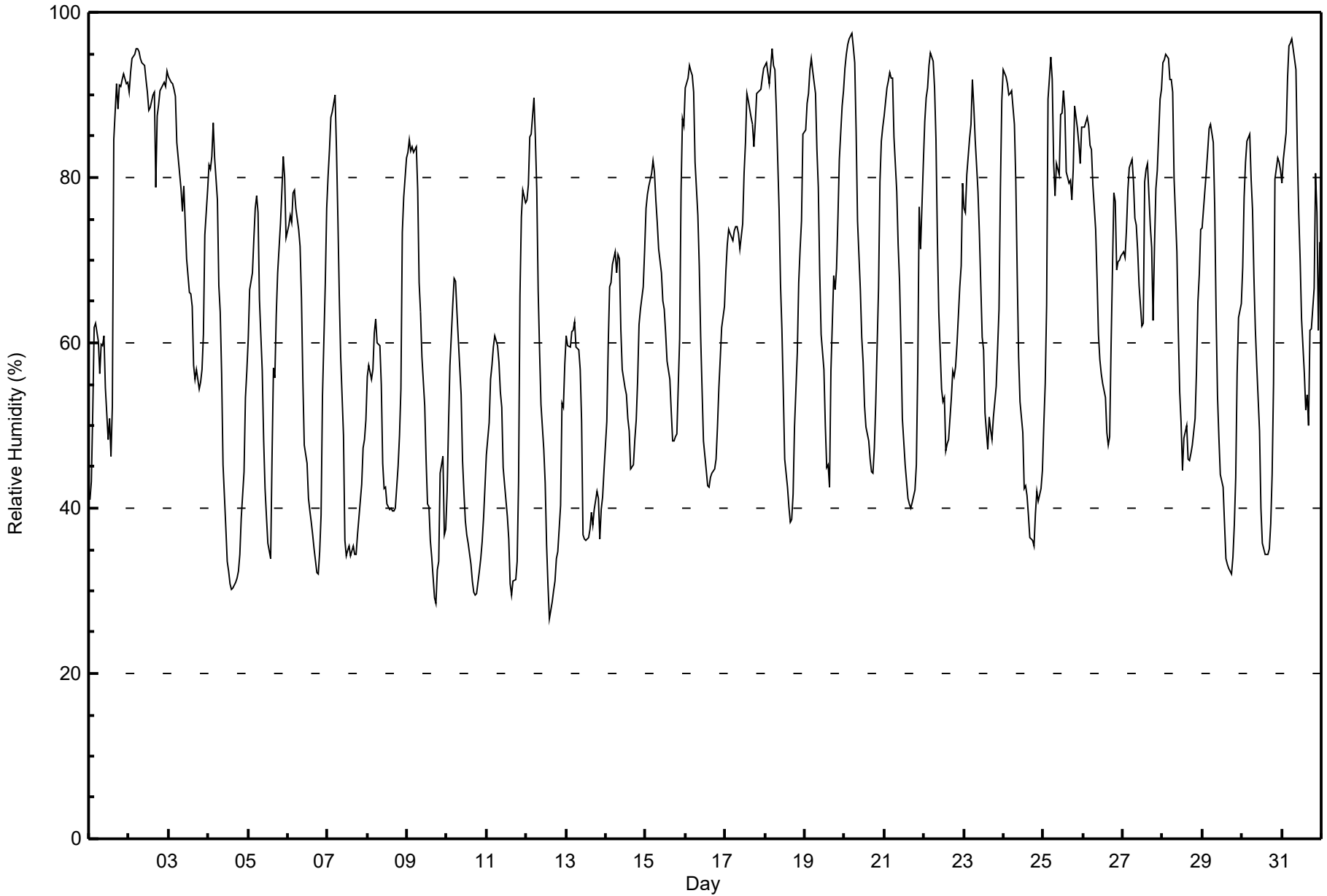
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Relative Humidity (RH) - %
Patricia McInnes - July 2023

Maximum Value: 97.4 % on Jul 20 05:00 Maximum Daily Average: 91.3 % on Jul 2 Minimum Value: 26.7 % on Jul 12 15:00 Minimum Daily Average: 44.3 % on Jul 10 Maximum Diurnal Average: 83.3 % at hour 5 Minimum Diurnal Average: 48.0 % at hour 15 Monthly Average: 64.39 % Percentiles: P ₁ = 29.9 P ₁₀ = 37.4 Q ₁ = 47.7 Median = 64.1 Q ₃ = 81.8 P ₉₀ = 90.8 P ₉₉ = 95.6																								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 Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	41.1	43.2	51.7	61.9	62.4	60.2	56.2	59.8	59.7	60.8	54.6	48.3	50.9	46.3	52.4	84.6	91.3	88.4	91.2	91.0	91.9	92.5	91.3	91.4	67.6	92.5																							
2-Jul	90.3	92.6	94.4	94.8	95.5	95.6	95.3	94.4	94.0	93.6	91.9	90.3	88.1	88.5	90.0	90.3	78.8	87.4	88.9	90.5	91.1	91.4	91.0	92.8	91.3	95.6																							
3-Jul	92.3	91.6	91.4	90.7	89.9	84.2	82.4	78.7	75.9	79.0	74.6	70.1	66.2	66.0	64.4	57.4	55.6	56.8	54.4	55.3	56.7	61.0	73.0	78.4	72.7	92.3																							
4-Jul	81.5	81.1	82.5	86.7	82.3	77.2	67.0	63.7	56.3	45.2	37.6	33.6	32.3	30.8	30.2	30.4	31.0	31.6	32.4	34.4	38.8	44.4	53.5	56.7	51.7	86.7																							
5-Jul	60.6	66.5	68.4	72.6	76.2	77.9	75.7	65.3	56.6	48.3	42.3	39.0	35.7	34.0	46.3	57.0	55.7	63.4	68.5	74.4	78.4	82.5	80.0	72.7	62.4	82.5																							
6-Jul	74.2	75.5	74.6	78.1	78.4	76.2	73.7	71.8	65.4	55.4	47.7	45.4	41.1	39.6	38.4	36.8	35.0	32.2	32.0	34.7	39.1	53.5	67.2	76.2	55.9	78.4																							
7-Jul	80.2	83.5	87.3	88.0	90.0	83.4	75.1	65.7	58.3	48.9	36.0	34.3	34.8	35.4	34.2	35.4	34.4	34.4	36.8	38.9	42.9	47.3	48.3	50.7	54.3	90.0																							
8-Jul	56.0	57.2	55.7	56.9	61.2	62.9	60.1	59.6	55.0	45.4	42.3	42.6	40.5	39.9	39.9	39.6	39.7	40.0	45.0	48.8	54.5	73.5	77.7	82.4	53.2	82.4																							
9-Jul	83.0	84.5	83.2	83.7	83.1	83.8	78.5	67.2	63.7	58.3	52.3	45.7	40.5	40.2	36.2	34.0	29.1	28.5	32.5	33.6	44.2	46.2	36.7	37.4	54.4	84.5																							
10-Jul	42.0	50.3	57.3	64.5	67.8	67.4	63.8	60.4	53.7	45.8	41.9	38.4	36.8	35.7	33.2	31.2	29.8	29.6	29.6	32.3	34.0	36.0	38.8	42.5	44.3	67.8																							
11-Jul	46.4	50.4	55.6	57.3	59.5	60.8	59.7	57.6	54.1	52.1	44.9	42.9	39.0	36.3	30.9	29.6	31.2	31.3	33.6	43.3	65.7	75.3	78.5	76.9	50.5	78.5																							
12-Jul	77.2	79.2	85.0	85.3	89.6	84.7	78.5	66.3	59.0	52.6	47.1	43.1	35.5	30.6	26.7	28.6	30.0	31.3	33.8	34.8	40.3	52.7	52.2	57.4	54.2	89.6																							
13-Jul	60.9	59.7	59.4	61.3	61.6	62.6	59.5	59.2	56.8	50.6	36.7	36.2	36.2	36.5	37.4	39.4	38.0	39.8	42.1	41.3	36.3	39.9	41.3	44.6	47.4	62.6																							
14-Jul	50.5	59.7	66.7	67.3	69.5	71.0	68.5	70.7	70.2	61.8	56.8	54.6	53.7	50.8	49.3	44.7	45.3	48.2	48.2	50.6	55.5	62.2	64.1	66.7	71.1	59.6	71.1																						
15-Jul	76.2	77.9	79.0	80.5	82.0	80.6	77.3	74.6	71.3	68.6	65.2	64.0	61.1	57.8	55.6	51.7	48.2	48.1	48.7	49.0	60.4	78.2	87.2	86.2	67.9	87.2																							
16-Jul	90.8	92.0	93.6	93.0	92.4	90.4	81.9	75.5	69.4	60.8	54.3	48.2	44.5	42.8	42.6	43.7	44.2	44.7	45.9	49.9	54.6	58.2	61.9	64.5	64.2	93.6																							
17-Jul	68.7	71.9	73.7	73.2	72.4	73.5	74.0	74.0	73.2	71.3	74.4	80.5	84.2	90.2	89.3	87.3	86.5	83.7	86.6	90.2	90.3	90.7	92.1	93.2	81.0	93.2																							
18-Jul	93.5	93.9	91.3	93.4	95.6	93.6	93.1	88.3	76.0	67.1	61.7	54.1	45.9	42.6	40.2	38.2	38.7	41.6	49.8	58.8	67.3	71.3	74.7	85.3	69.0	95.6																							
19-Jul	85.7	88.9	90.1	93.0	94.3	92.8	90.2	83.5	78.8	68.5	61.0	56.8	49.9	44.9	45.3	42.5	56.7	68.1	66.4	68.9	75.1	82.2	88.7	90.5	73.5	94.3																							
20-Jul	93.2	94.9	96.1	96.8	97.4	95.7	93.9	85.6	74.7	66.5	60.6	57.6	52.3	49.8	48.1	46.0	44.5	44.3	47.2	52.7	66.6	79.5	84.4	86.2	71.4	97.4																							
21-Jul	87.5	90.9	91.7	92.7	92.0	92.1	84.9	78.4	71.8	67.5	60.0	50.8	45.3	43.2	41.1	40.5	40.0	40.7	42.2	45.2	57.0	76.5	71.4	81.9	66.1	92.7																							
22-Jul	86.8	89.7	90.9	93.6	95.2	94.1	90.8	84.6	72.7	63.7	54.5	52.8	53.3	46.9	47.7	48.3	53.4	56.6	56.0	57.2	59.9	66.7	69.4	79.4	69.3	95.2																							
23-Jul	76.2	75.8	80.3	84.7	86.4	91.8	88.7	84.6	78.3	73.3	67.0	60.7	59.1	51.5	47.1	50.9	49.4	48.3	51.1	54.7	59.3	64.1	78.7	89.3	68.8	91.8																							
24-Jul	93.1	92.3	91.4	90.1	90.1	90.5	86.5	79.5	68.3	58.3	52.9	49.1	42.4	42.7	41.5	39.1	36.5	36.1	35.3	39.3	42.1	40.8	42.4	44.6	59.4	93.1																							
25-Jul	50.1	55.1	64.5	89.5	94.6	91.8	81.9	77.8	81.7	80.3	87.6	87.9	90.4	88.2	80.7	79.3	79.7	77.3	80.9	88.7	85.9	84.0	81.8	86.1	81.1	94.6																							
26-Jul	86.1	86.0	87.2	86.2	84.0	83.4	79.2	73.7	67.8	61.0	58.0	56.4	55.1	53.5	49.1	47.6	48.7	59.5	78.1	77.0	68.8	69.8	70.0	70.5	69.0	87.2																							
27-Jul	71.0	70.4	73.8	78.6	81.2	82.2	79.5	75.2	74.3	71.2	66.9	62.0	62.3	79.4	81.0	81.7	74.3	71.5	62.7	71.8	78.6	80.8	89.5	90.7	75.4	90.7																							
28-Jul	93.9	94.2	94.9	94.4	91.9	91.8	90.3	79.8	71.0	61.6	54.0	50.3	44.6	48.5	50.1	46.0	45.7	46.5	47.5	50.8	56.7	64.9	68.2	73.7	67.1	94.9																							
29-Jul	73.9	78.5	80.7	83.2	86.0	86.4	84.2	76.4	63.4	53.6	48.4	44.1	42.5	38.1	33.9	33.2	32.7	32.1	34.0	37.9	43.8	56.4	63.0	64.7	57.1	86.4																							
30-Jul	69.2	77.7	81.9	84.5	85.2	79.9	76.1	67.9	61.7	57.3	49.3	40.0	35.7	35.0	34.4	34.3	35.1	38.1	44.1	55.1	79.9	82.3	81.9	80.9	61.1	85.2																							
31-Jul	79.3	82.2	85.5	92.0	95.9	96.3	96.7	95.6	93.1	82.8	75.7	70.0	62.9	56.3	51.8	53.8	49.9	61.5	61.7	66.6	80.4	75.7	61.5	72.1	75.0	96.7																							
																								74.6	77.0	79.3	82.2	83.3	82.4	78.8	74.0	68.6	62.3	56.7	53.2	50.4	49.1	48.0	48.5	48.0	49.7	51.9	55.6	61.4	67.2	69.8	73.3	Diurnal Average	
																								93.9	94.9	96.1	96.8	97.4	96.3	96.7	95.6	94.0	93.6	91.9	90.3	90.4	90.2	90.0	90.3	91.3	88.4	91.2	91.0	91.9	92.5	92.1	93.2	Diurnal Maximum	





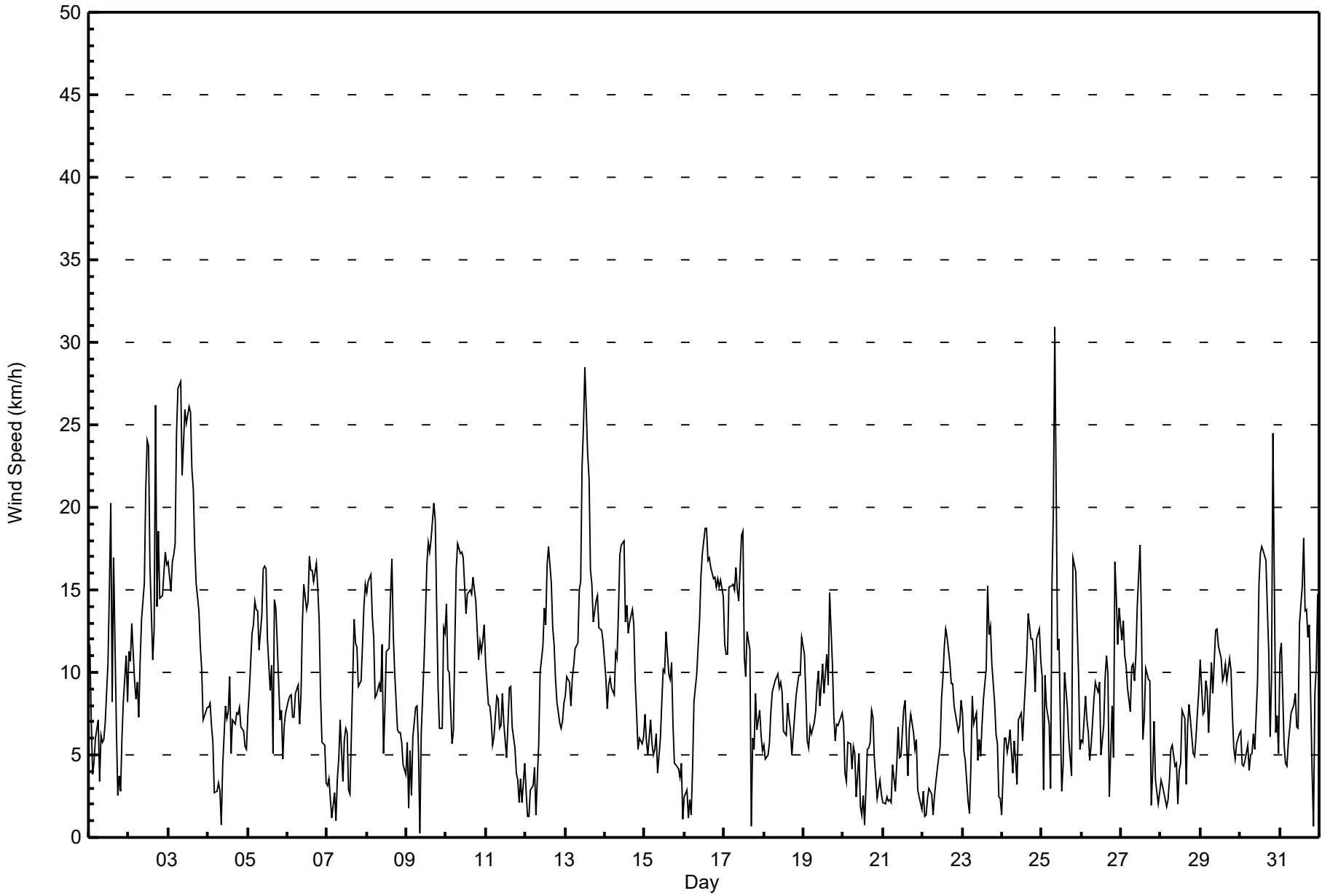
Maximum Speed: 31 km/h on Jul 25 09:00 Maximum Daily Speed Average: 17.8 km/h on Jul 3		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Percent Operational Time: 100.0																								
Minimum Speed Value: 0 km/h on Jul 9 09:00 Maximum Diurnal Speed Average: 3.7 km/h at hour 13 Monthly Average Velocity: 1.0 km/h 312.9 deg		Minimum Daily Speed Average: 1.0 km/h on Jul 4 Minimum Diurnal Speed Average: 0.7 km/h at hour 7 Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 6 Median = 8 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 25																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	W12	WNW7	SW4	SW5	SSW6	WSW7	SSW3	S6	SSW6	S6	SE7	ESE11	ESE15	ESE20	SE8WSW17	NW7	ENE3	SSE4	WSW3	SSW6	WSW8WSW11	W8	SSW3.5	ESE20		
2-Jul	W11	W11	W13WNW10	WNW8	WNW9	W7WNW11	NW13	NW15	NNW21	NNW24	NNW24	NW16WNW11WNW13	NW26WNW14WNW19WNW15	W15WNW16WNW17	NW17	WNW14.0	NW26									
3-Jul	NW17	NW15	NW17	NW17	NNW18	N24	N27	N28	N22	NNW24	NNW26	NNW25	NNW26	N22	N21	N18	N15	N14	NNW12	NNW10	NNW7	NW7	NW8	NNW17.8	N28	
4-Jul	NW8	NW8	NW7	WNW6	NW3	SSE3	SSE3	S3	WSW1	NNE4	NNW8	N7	N8	NNE10	E5	SE7	ESE7	ESE8	ESE7	ESE8	SE7	SSE6	SSW6	SSW5	ENE1.0	NNE10
5-Jul	SSW7	SSW9	SW12	SW13	SW14	SW14	SW14	SW11	SW13WSW16WSW16WSW16	W12	WNW9	NNE10	S5	SSW14WSW14	SW12	WSW7	WSW8	W5	WNW7	NW8	WSW9.3	WSW16				
6-Jul	NNW8	NNW9	NNW9	NW7	NNW7	NNW9	N9	N7	NNW9	NNE13	NNE15	N14	NNW14	NNW17	NNW16	NNW16	N15	NNE17	NNE15	N13	N9	NNW6	NNW6	WNW3	N10.3	NNW17
7-Jul	W3	W4	W2	WNW1	NW3	SSW1	S4	S5	S7	S3	NW6	NNW7	NNW6	SW3	WSW3	S10	SSW13	SW12WSW12	WSW9	SW9WSW12WSW14WSW15	SW5.1	WSW15				
8-Jul	WSW15WSW15WSW16WSW13	SW12	SW8	SW9	SW9	SW9	SW9	W12	WNW5	WSW8	NW11	NW11WNW15WNW17	NW12	NW10	NW7	NW6	N6	NW6	WNW4	WSW4	W8.3	WNW17				
9-Jul	WNW6	WNW2	NNE5	NW3	N6	NNW8	NNE8	E5	SSW0	NNE6	NNE11	NNE13	N17	NNE18	NNE17	N18	N20	N19	N14	NNE9	N7	E7	E13	E12	NNE8.5	N20
10-Jul	ESE14	ESE10	ESE10	ESE6	ESE6	ESE12	ESE16	ESE18	ESE17	ESE17	ESE17	ESE15	ESE14	ESE15	ESE15	E15	E16	E15	E14	ESE11	ESE12	ESE11	SE12	SE13	ESE13.2	ESE18
11-Jul	SE11	SE8	SE8	SE7	ESE6	SE6	SE9	SE8	ESE7	S7	SSW9	SW7	WSW5	SSW7	S9	SE9	SE7	SE5	SSW4	SW4	W2	W4	SW2	SW4	SSE4.7	SE11
12-Jul	SSE3	SSE1	ESE1	SSW3	SW3	SSW4	WNW1	NW4	N6	N10	NNW12	NNW14	NNW13	NNW17	NNW18	N15	NNW13	NNW12	N10	NNE8	N7	NW7	NW7	WNW8	NNW6.7	NNW18
13-Jul	WNW9WNW10	NW9	NW8	NW10	NW10	NW11	NNW12	NNW15	NNW15	NNW23	NNW25	N28	NNW23	NNW22	NNW16	NNW15	NNW13	N14	N15	NNW13	NNW13	NNW13	NNW12	NNW14.2	N28	
14-Jul	NNW10	NW8	WNW9WNW10	WNW9	WNW9	NNW11	NW11	NNW14	NNW17	NNW18	NNW18	N13	NNW14	NNW12	NNE13	NNE14	NE13	NNE9	NNW7	NW5	NNW6	NNW6	NW6	NNW9.8	NNW18	
15-Jul	W7	NW6	WNW5	WNW7	WNW6	NW5	NNW5	N6	N4	N6	NNE8	NNE10	NNE10	NE12	NNE10	NNE10	NE11	ENE7	E4	SW4	WSW4	WNW4	NE1	N4.3	NE12	
16-Jul	WSW2	WNW3	SSW1	S2	SE1	SE4	SE8	SE10	ESE12	ESE13	ESE16	ESE17	ESE19	ESE19	ESE17	ESE17	ESE16	ESE16	ESE15	ESE16	ESE15	SE16	SE15	ESE11.3	ESE19	
17-Jul	SE12	SE11	SE11	ESE15	ESE15	ESE15	ESE15	ESE16	ESE15	ESE14	ESE18	ESE19	ESE11	SE10	ESE12	ESE11	NE1	E6	NE5	W9	N7	N8	N6	N5	ESE8.5	ESE19
18-Jul	NNW6	NNW5	N5	NNW6	NNW8	N9	NNW9	N9	N10	NNE9	NNE9	NNE9	ESE6	SE6	E8	E7	S7	SW5	WSW6	WSW9	W9	W10	SW10	SW12	NNW2.5	SW12
19-Jul	WSW11	WSW9	SW6	SSW5	SSW7	SSW6	SW7	SSW8	SW9	SW10	SSW8	SW10	SW9	SSW10	SSW11	S9WSW15WSW10	WSW7	SSW6	SW7	SW7	SW7	SW7	SSW8	SW8.1	WSW15	
20-Jul	SW7	SSE4	SSW3	SW6	SW6	SSW4	SSW5	SSW5	SSW2	ENE5	NNW2	ESE1	NW3	WNW1	W5	W5	WNW6	NNW8	NNW7	NNW5	W2	WSW3	W3	WNW3	WSW2.1	NNW8
21-Jul	W2	WNW2	WNW2	W2	SW2	SSW2	SW4	SW3	SSW4	SSW7	S5	WNW5	NNW8	NNW8	NW6	SSW4	SE7	SSW7	S6	SSW5	SW6	W3	NW2	NW2	SW2.2	NNW8
22-Jul	WNW3	WNW1	W1	NW2	NW3	W3	SW1	WNW3	ENE3	NE4	NNE6	NNE8	NNE10	NNE12	N13	N12	NNW11	NNW9	N9	N8	NNW7	N6	N7	NNW8	N5.4	N13
23-Jul	NNW8	NNW5	N5	NE2	SSW1	ESE4	SE9	SE7	ESE8	ESE5	SE6	SE5	S7	SW8	SSW10	SE15	ESE12	SE13	SSE11	SE8	SE6	SE6	SSE2	SW2	SE4.6	SE15
24-Jul	SW1	SSW6	SW6	SSW5	SSW6	SSW7	S4	SSE6	SE5	ESE3	E7	ESE8	E6	NE8	NE9	ENE11	E14	E12	ENE12	E11	ENE9	E12	ESE13	ESE11	ESE5.5	E14
25-Jul	ESE10	ESE3	W10	W8	ENE7	NNE3	ESE15	ESE20	ESE31	S11	SE12	SW7	SW3	SE4	SE10	SE8	ESE6	SE5	SSW4WSW17WSW16	SW13	SW10	SSW5	SSE4.8	ESE31		
26-Jul	SSW6	S6	S9	S7	S6	SSE5	ESE6	SE8	SE9	SE9	ESE9	E9	NE5	E7	E10	ENE11	NNE10	NNE2	SSW8	NNW5	ENE17	ENE15	E12	ENE14	ESE5.5	ENE17
27-Jul	NE12	ENE13	NE11	NE10	NE9	N8	N10	N11	NNW10	NNW11	NNW14	NNW18	NNW13	S6	W7	NW10	NW10	NNW9	ENE2	SSE4	NW7	NW4	NW2	S3	N6.0	NNW18
28-Jul	SW3	SW3	WSW3	SW2	S2	S3	SSW5	SSW6	S4	SSE5	SSE2	SE4	E4	NNW8	ESE7	S3	S7	S8	S7	S5	SW5	SW6	SW8	SW9	SSW3.4	SW9
29-Jul	SW11	SSW7	SSW8	SSW10	SSW9	SSW6	SW11	SSW9	SW11WSW13WSW13	SW12	SW11	SSW10	SSW10	S11	S9	SSW11	S10	SSW7	SSW5	SSW5	SSW6	SSW6	SSW6	SSW8.8	WSW13	
30-Jul	SW6	SW4	S4	S5	SSE6	SE4	SE5	SE5	ESE6	ESE5	SSE10	SSE15	S17	S18	S17	S17	S14	S11	SSW6	NW10	NW24	NE6	ESE7	S5	S6.1	NW24
31-Jul	SSW11	S12	SSE6	WSW4	NW4	ENE6	ESE7	SSE8	S8	SSW9	SW7	WSW7WSW13	SW15	SW18	W14	W14	WNW12	N13	N4	N1	WSW9WSW10WSW15	WSW5.7	SW18			
W2.9 W2.3 W2.4WSW2.8WSW1.7 W0.9 SSE0.7 SE1.2 SE1.2 N0.7 N2.4 N3.2 N3.7 N2.5 N1.7 NNE1.5 N1.9 NNE1.6 N1.2 NW1.6NNW2.1 W1.7WSW1.9WSW2.2																								Diurnal Average		
NNW17 WSW15 NW17 NW17 NNW18 N24 N27 N28 ESE31 NNW24 NNW26 NNW25 N28 NNW26 N22 N21 NW26 N19WNW19WSW17 NW24WNW16WNW17 NW17																								Diurnal Maximum		
All monthly, daily, and diurnal averages have been calculated using vector methods																										



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Patricia McInnes - July 2023

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Patricia McInnes - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	179	24.06	24.06
6 - 11	347	46.64	70.70
12 - 19	193	25.94	96.64
20 - 28	24	3.23	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
Patricia McInnes - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	4	6	4	5	7	11	11	16	27	18	12	15	17	14	6	179
6 - 11	27	20	7	6	9	27	32	7	23	41	34	16	11	20	31	36	347
12 - 19	16	11	3	5	10	41	7	1	6	3	13	20	7	10	8	32	193
20 - 28	8	0	0	0	0	2	0	0	0	0	0	0	0	0	2	12	24
29 - 38	0	0	0	0	0	1	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	57	35	16	15	24	78	50	19	45	71	65	48	33	47	55	86	744

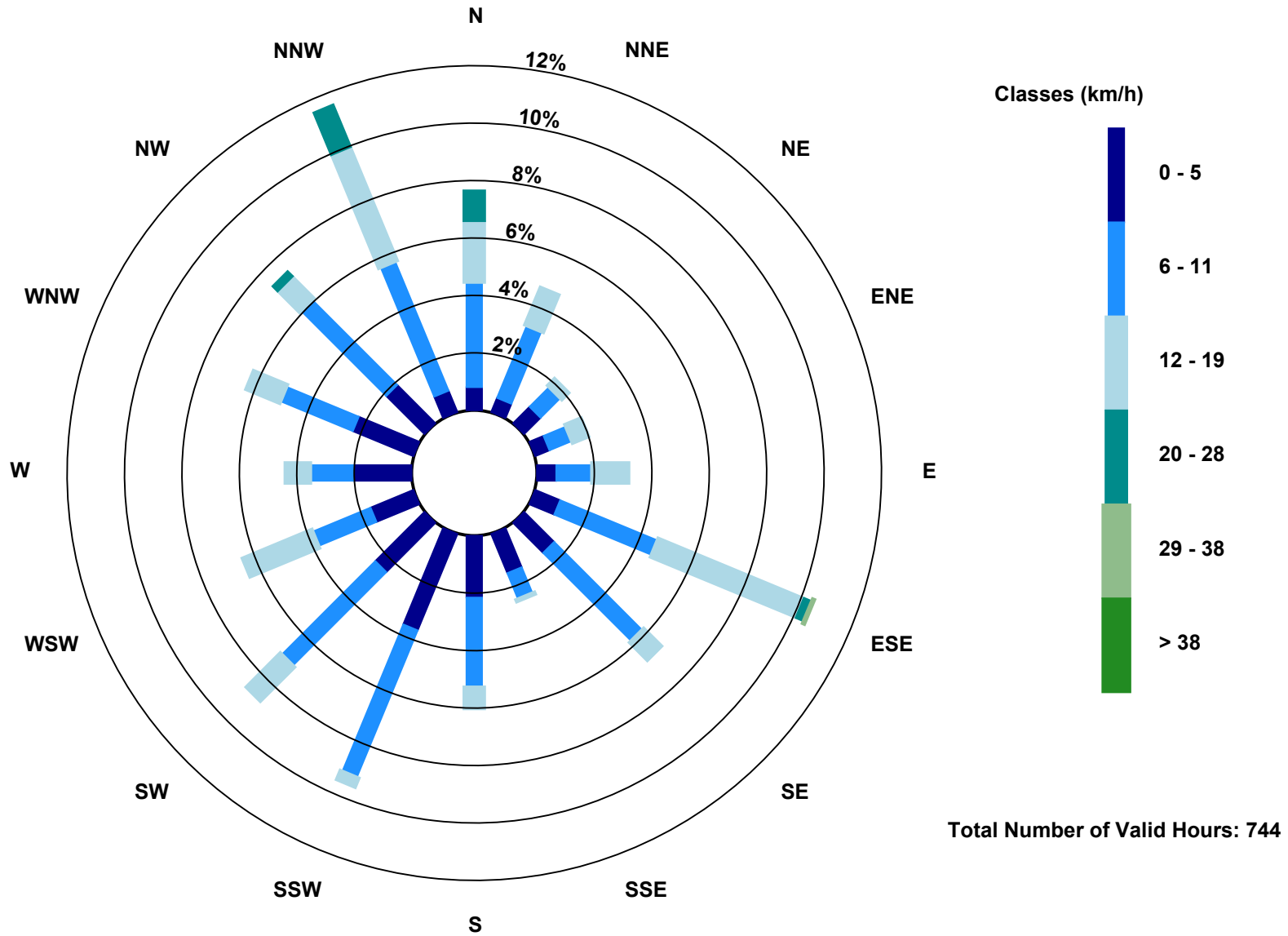
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Patricia McInnes





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Patricia McInnes - July 2023

Direction of Maximum Speed: 116 deg on Jul 25 09:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 342.8 deg on Jul 3	Hours of Data: 744
Direction of Minimum Speed: 200 deg on Jul 9 09:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.0 deg on Jul 4	Percent Operational Time: 100.0
Monthly Average Direction: 312.9 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	272	300	228	234	197	246	206	191	196	176	144	111	116	117	141	253	310	65	152	239	209	241	253	281	203.7
2-Jul	270	273	280	282	288	297	270	303	307	304	327	328	328	305	285	288	323	300	288	282	269	284	299	310	300.0
3-Jul	307	310	311	316	335	352	352	354	357	348	346	348	342	344	349	6	5	357	355	342	336	333	304	304	342.8
4-Jul	315	315	310	300	313	161	149	180	237	14	329	358	3	31	82	129	126	106	113	108	138	159	198	203	66.2
5-Jul	211	209	227	224	223	223	223	225	226	239	240	247	264	288	29	175	201	239	233	250	243	266	294	311	236.5
6-Jul	328	328	327	323	333	338	358	8	334	19	16	358	344	337	337	347	4	21	13	10	359	339	344	296	352.1
7-Jul	270	279	261	288	310	194	189	172	178	190	317	336	335	215	257	179	210	214	244	247	231	240	242	238	235.1
8-Jul	247	248	247	241	230	235	227	234	236	267	283	258	319	309	289	282	306	325	308	324	3	318	287	257	271.5
9-Jul	295	297	12	307	6	347	29	91	200	13	21	15	11	17	18	7	5	7	11	21	357	79	95	101	19.0
10-Jul	102	106	102	112	118	119	116	120	114	121	113	104	102	109	103	98	93	98	100	112	118	123	125	125	110.2
11-Jul	131	130	125	128	121	132	129	131	117	178	195	223	252	212	180	139	141	135	200	215	271	279	234	226	159.1
12-Jul	154	160	107	196	223	206	289	310	351	2	339	341	336	334	341	349	336	336	354	22	5	323	314	301	338.1
13-Jul	301	303	311	310	313	309	318	328	336	330	344	342	353	339	336	336	339	347	6	360	341	328	328	329	335.1
14-Jul	332	309	298	300	296	300	327	324	333	344	345	345	355	345	338	20	21	34	25	348	310	335	331	318	340.1
15-Jul	281	319	298	299	301	317	328	356	3	351	23	20	24	37	18	21	43	70	89	95	232	254	291	44	1.5
16-Jul	257	293	194	173	127	135	142	126	108	109	103	106	110	115	117	112	108	110	115	116	120	123	124	131	116.7
17-Jul	127	125	127	122	122	123	122	121	120	119	123	119	121	124	105	105	46	94	35	277	349	356	352	353	113.3
18-Jul	342	333	4	343	328	353	347	358	5	17	15	25	122	136	101	96	188	223	251	254	265	267	235	236	326.6
19-Jul	241	239	224	204	194	204	214	211	218	218	213	220	218	209	206	183	239	249	257	196	215	214	221	212	219.1
20-Jul	226	168	193	216	225	192	196	204	204	72	340	118	308	297	265	278	286	335	344	330	281	246	279	302	257.5
21-Jul	280	296	285	274	215	208	216	216	193	192	171	299	334	346	312	202	139	198	175	205	230	265	305	312	234.7
22-Jul	303	290	260	326	314	264	236	284	60	38	15	30	32	18	9	358	336	335	354	354	344	351	349	335	355.1
23-Jul	337	341	355	56	195	115	131	137	121	112	129	136	181	217	200	139	122	124	150	143	136	144	159	229	140.9
24-Jul	225	208	217	213	205	199	184	168	139	110	99	102	92	52	52	66	96	99	76	79	78	92	106	105	104.0
25-Jul	103	105	274	263	73	12	110	118	116	178	139	217	214	131	136	127	118	143	211	255	242	235	235	194	161.6
26-Jul	196	182	177	179	177	160	105	143	145	130	106	87	48	84	87	58	28	30	192	346	68	78	90	78	103.6
27-Jul	46	60	54	41	35	7	353	350	333	335	344	339	331	169	281	304	312	327	74	152	307	313	307	187	351.9
28-Jul	234	236	256	223	172	187	211	210	184	148	165	132	92	333	111	189	177	180	189	189	219	228	218	228	195.8
29-Jul	227	211	197	212	209	192	216	204	231	238	237	215	214	202	210	184	187	197	190	198	205	212	210	208	209.8
30-Jul	215	214	191	186	163	139	130	135	122	123	157	160	180	183	181	183	179	179	196	313	306	42	123	184	178.8
31-Jul	203	181	165	237	314	60	122	158	179	199	214	240	250	233	234	280	271	303	355	4	359	253	243	257	240.1
261.2 260.2 261.6 254.7 256.0 264.9 148.4 144.6 124.7 349.6 10.2 1.3 354.1 358.6 4.7 23.9 358.4 14.4 6.1 319.2 294.4 275.8 255.4 252.6																									
Diurnal Average																									

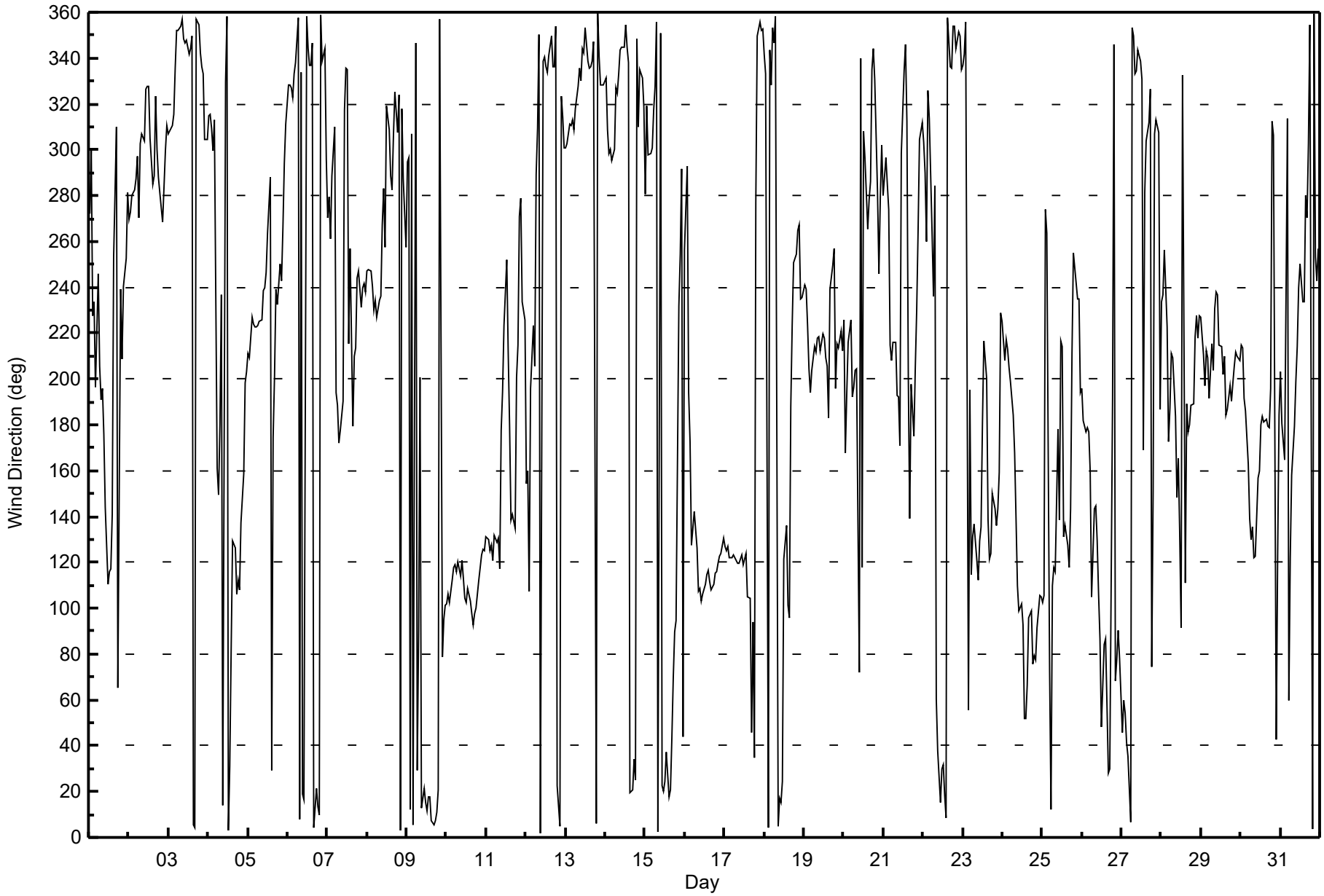
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Patricia McInnes - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 106 deg on Jul 9 09:00 Minimum Value: 5 deg on Jul 13 00:00 Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 15 Median = 19 Q ₃ = 30 P ₉₀ = 50 P ₉₉ = 87																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	23	39	53	28	20	12	29	25	31	29	32	28	18	16	51	16	40	67	37	42	18	12	13	15	67
2-Jul	15	13	12	13	18	15	16	11	12	13	12	12	10	14	15	26	11	18	11	12	11	11	11	15	26
3-Jul	11	11	10	11	19	17	18	18	18	16	16	17	15	16	18	18	20	21	18	13	12	13	7	6	21
4-Jul	6	5	10	9	67	15	25	61	103	61	46	50	61	38	67	46	47	29	22	16	12	16	15	17	103
5-Jul	12	12	9	10	10	11	12	15	16	16	18	19	28	31	44	84	47	21	15	21	11	37	11	9	84
6-Jul	8	9	11	11	15	14	19	28	22	25	22	26	30	25	19	24	27	18	16	14	16	16	12	37	37
7-Jul	20	17	32	73	27	69	24	18	20	76	55	43	53	82	85	27	21	27	22	14	9	9	9	9	85
8-Jul	10	9	10	10	11	14	16	15	15	16	69	41	23	27	21	15	19	14	15	16	20	21	41	15	69
9-Jul	14	60	12	44	20	14	20	28	106	41	29	28	22	19	20	20	18	16	13	14	18	38	13	14	106
10-Jul	13	15	13	20	15	13	12	13	15	18	20	20	27	22	22	18	17	15	13	14	11	11	12	13	27
11-Jul	13	11	11	11	15	15	14	14	18	27	27	29	54	31	23	20	31	33	34	17	39	13	28	6	54
12-Jul	31	61	80	42	34	23	76	34	32	21	25	19	27	20	19	21	16	15	20	15	15	16	11	5	80
13-Jul	6	7	9	11	10	9	11	10	13	16	18	17	21	17	16	16	16	15	16	18	14	9	9	9	21
14-Jul	9	9	8	7	10	8	11	12	13	21	17	18	20	20	22	19	14	19	18	17	12	11	12	12	22
15-Jul	10	13	24	14	10	16	11	18	37	37	36	27	23	21	27	33	25	50	50	33	19	20	14	75	75
16-Jul	30	32	58	44	50	22	18	15	16	17	18	19	19	19	18	20	16	15	13	13	12	13	12	15	58
17-Jul	13	12	13	12	13	13	14	13	14	14	13	12	17	19	17	17	96	22	57	23	15	15	19	17	96
18-Jul	18	26	22	17	17	17	13	15	15	22	22	32	50	45	28	33	32	32	6	10	10	8	22	11	50
19-Jul	14	13	24	15	16	16	15	18	20	22	31	27	43	37	25	29	18	13	27	23	20	21	18	16	43
20-Jul	17	33	57	25	19	32	23	34	77	49	99	89	83	104	39	50	43	28	18	8	38	19	14	42	104
21-Jul	74	46	27	40	41	32	18	39	38	26	60	71	40	33	48	65	37	25	19	15	8	44	45	56	74
22-Jul	42	51	40	25	37	42	79	34	47	37	43	24	25	20	19	20	12	13	15	15	11	11	24	8	79
23-Jul	17	21	16	78	58	59	19	19	25	30	29	48	33	40	35	22	22	19	15	20	23	21	42	21	78
24-Jul	60	15	24	25	17	22	39	22	28	60	32	28	43	30	22	31	17	18	14	11	12	18	12	12	60
25-Jul	13	73	21	23	76	79	25	19	13	40	51	52	54	36	17	16	21	31	48	16	12	15	17	22	79
26-Jul	21	20	16	21	21	21	22	17	22	41	29	23	32	47	22	25	27	89	29	56	20	16	16	17	89
27-Jul	15	15	13	14	17	17	16	16	15	11	14	19	24	56	52	11	18	15	83	78	11	74	72	20	83
28-Jul	21	24	42	65	52	35	18	25	37	42	85	81	67	25	27	76	25	20	19	16	15	8	18	9	85
29-Jul	10	16	23	16	18	24	14	18	17	15	21	28	32	35	33	35	30	24	17	18	15	12	10	11	35
30-Jul	11	12	11	11	11	14	16	22	21	53	30	21	23	21	18	19	18	15	25	38	26	44	27	20	53
31-Jul	25	22	38	48	58	19	26	25	18	22	40	48	19	21	24	41	27	37	16	46	89	20	13	11	89
																		74 73 80 78 76 79 79 61 106 76 99 89 83 104 85 84 96 89 83 78 89 74 72 75							
Diurnal Maximum																									





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS07 ATHABASCA VALLEY JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS07)
 JULY 2023

MONTHLY SUMMARY

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	18.9	0	2.5	0
TRS (ppb) Average	707	36	37	99.87	3.1	0	1.1	0
THC (ppm) Average	639	37	105	90.86	3.4	-	2.4	-
NMHC (ppm) Average	639	37	105	90.86	0.713	-	0.245	-
CH4(ppm) Average	639	37	105	90.86	2.7	-	2.2	-
O3 (ppb) Average	707	36	37	99.87	62.2	0	36.3	-
NO2 (ppb) Average	706	37	38	99.87	15.1	0	7.8	-
NO (ppb) Average	706	37	38	99.87	18.2	-	3.2	-
NOX (ppb) Average	706	37	38	99.87	27.7	-	9.5	-
PM2.5 (ug/m3) Average	740	4	4	100	406.3	128	256.4	13
CO(ppm) Average	709	35	35	100	1.7	0	1.2	-
Temperature 2 m (C) Average	744	0	0	100	30.4	-	23.4	-
Relative Humidity (%) Average	744	0	0	100	98.1	-	88.4	-
Barometric Pressure (inHg) Average	744	0	0	100	29.3	-	29.3	-
Wind Speed 10 m (km/h) Average	744	0	0	100	28	-	16	-
Wind Direction 10 m (deg) Average	744	0	0	100	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS07)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	703	0.45	1.3	-	0	0	0	0.1	0.2	1	18.9
TRS (ppb) Average	707	0.34	0.4	-	0.1	0.1	0.2	0.2	0.3	0.7	3.1
THC (ppm) Average	639	2.13	0.2	-	1.9	2	2	2.1	2.2	2.4	3.4
NMHC (ppm) Average	639	0.034	0.102	-	0	0	0	0	0	0.1	0.713
CH4(ppm) Average	639	2.09	0.1	-	1.9	2	2	2.1	2.1	2.2	2.7
O3 (ppb) Average	707	26.91	12.1	-	2.8	10	17.1	27.2	36.3	43	62.2
NO2 (ppb) Average	706	3.79	2.8	-	0.2	1.2	1.8	3	5.1	7.3	15.1
NO (ppb) Average	706	0.94	1.6	-	0	0.1	0.2	0.4	0.9	2.4	18.2
NOX (ppb) Average	706	4.73	3.7	-	0.4	1.4	2.2	3.5	6.2	9.8	27.7
PM2.5 (ug/m3) Average	740	46.01	68.6	-	1.5	4.1	6.6	20.7	50	116.5	406.3
CO(ppm) Average	709	0.34	0.3	-	0.1	0.1	0.2	0.2	0.4	0.7	1.7
Temperature 2 m (C) Average	744	19.03	4.7	-	8.1	13.3	15.6	18.5	22.7	25.7	30.4
Relative Humidity (%) Average	744	65.75	18.6	-	28.9	39.5	48.9	67.4	81.8	90.2	98.1
Barometric Pressure (inHg) Average	744	29	0.1	-	28.7	28.8	28.9	29	29.1	29.2	29.3
Wind Speed 10 m (km/h) Average	744	7.7	5	-	0	3	4	7	10	15	28
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS07)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS (except CO)	24 Jul 2023 13:00	24 Jul 2023 13:00	1	Maintenance - sample manifold cleaned
THC/NMHC/CH4	08 Jul 2023 05:00	10 Jul 2023 09:00	53	Unstable Operation - span outside of AMD criteria
THC/NMHC/CH4	10 Jul 2023 10:00	10 Jul 2023 15:00	6	Maintenance - retention timing adjustment
THC/NMHC/CH4	21 Jul 2023 10:00	21 Jul 2023 17:00	8	Maintenance - retention timing adjustment



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Athabasca Valley - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 18.9 ppb on Jul 28 12:00	Maximum Daily Average: 2.5 ppb on Jul 12		Hours of Data:	703
Minimum Value: 0.0 ppb on Jul 10 19:00	Minimum Daily Average: 0.0 ppb on Jul 10		Hours of Missing Data:	41
Maximum Diurnal Average: 1.8 ppb at hour 12	Minimum Diurnal Average: 0.1 ppb at hour 4		Hours of Calibration:	40
Monthly Average: 0.45 ppb	Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.2 P ₉₀ = 1.0 P ₉₉ = 5.2		Percent Operational Time:	99.9

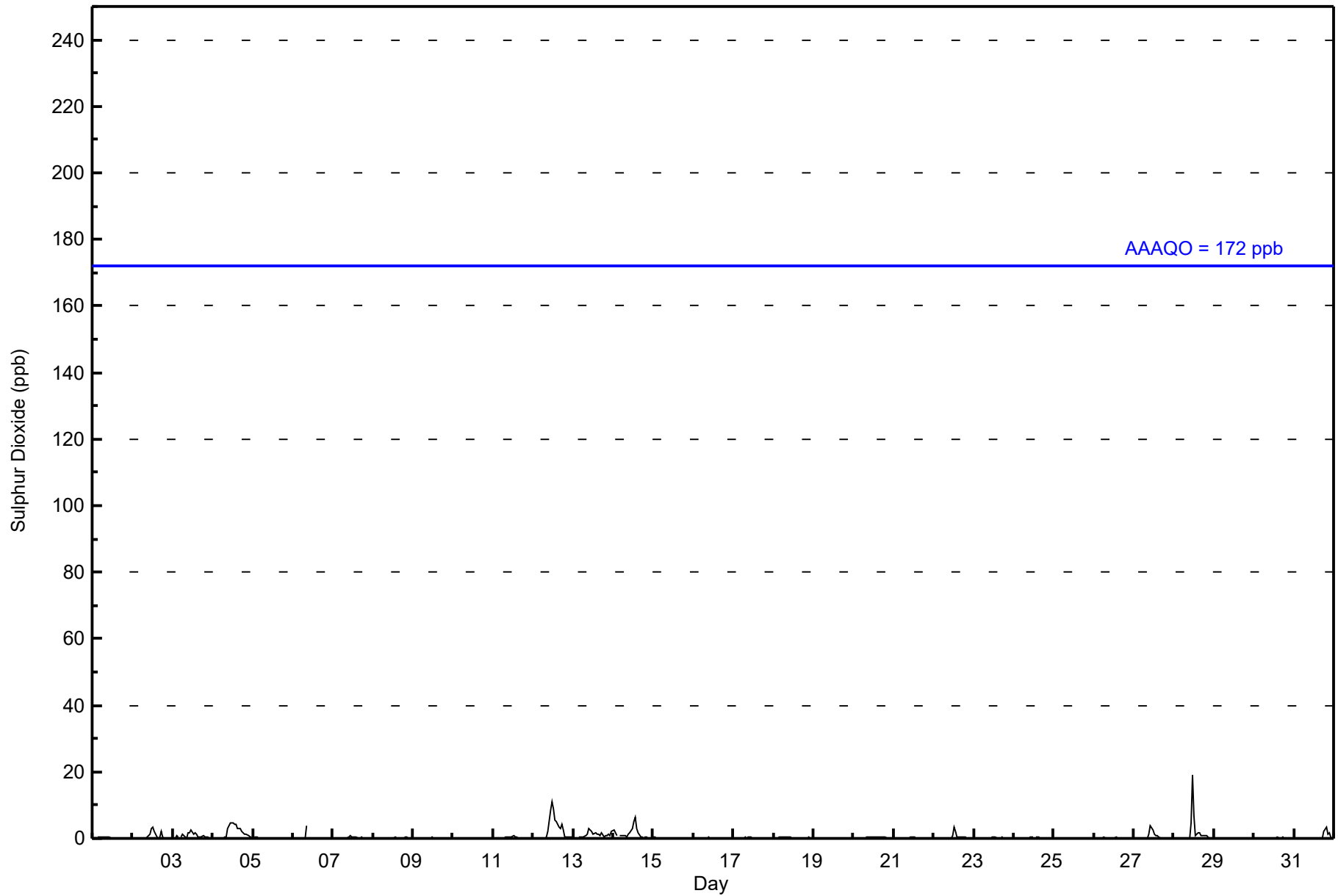
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0.2	0.2	Z	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.4	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.6	0.4
2-Jul	0.1	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.1	0.9	1.4	3.1	3.3	2.0	0.4	0.2	0.6	1.9	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.2	3.3
3-Jul	0.1	0.2	0.7	0.3	Z	0.2	1.5	0.6	0.2	1.9	1.7	2.7	1.3	1.9	1.2	0.4	0.2	0.2	0.9	0.4	0.4	0.2	0.1	0.1	0.1	0.8	2.7
4-Jul	0.2	0.1	0.1	0.1	0.1	Z	0.2	0.2	0.5	3.2	4.8	4.5	4.7	4.3	4.3	3.0	2.9	2.1	1.7	1.2	1.1	0.7	0.4	0.4	0.1	1.8	4.8
5-Jul	Z	0.4	0.2	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	0.1	0.1	0.0	0.0	0.1	0.1	0.4
6-Jul	0.0	Z	0.1	0.0	0.0	0.0	0.1	0.2	3.7	C	C	C	C	C	C	C	C	C	0.0	0.0	0.0	0.1	0.1	0.1	--	3.7	
7-Jul	0.0	0.1	Z	0.1	0.0	0.0	0.1	0.1	0.2	0.2	0.7	0.6	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.7
8-Jul	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.3
9-Jul	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2
10-Jul	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
11-Jul	Z	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.4	0.3	0.4	0.7	0.4	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.7
12-Jul	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.2	0.4	2.0	8.4	10.9	8.9	5.7	5.2	3.4	3.1	4.1	2.6	0.6	0.4	0.4	0.3	0.2	2.5	10.9	
13-Jul	0.2	0.2	Z	0.3	0.3	0.3	0.5	1.0	1.4	3.0	2.7	2.0	1.4	1.5	1.4	1.4	0.8	1.7	0.5	0.7	1.0	1.5	1.0	2.3	1.2	3.0	
14-Jul	2.5	1.8	1.0	Z	0.8	1.0	0.9	0.9	0.5	1.3	1.6	3.2	4.9	6.6	2.9	1.7	0.5	0.2	0.2	0.2	0.3	0.2	0.2	0.3	1.5	6.6	
15-Jul	0.3	0.2	0.2	0.1	Z	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.3	
16-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.4	0.1	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	0.4	0.4
17-Jul	Z	0.1	0.0	0.0	0.0	0.1	0.1	0.3	0.2	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.3	
18-Jul	0.2	Z	0.2	0.3	0.4	0.4	0.6	0.5	0.4	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.1	0.2	0.6	
19-Jul	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	0.1	0.1	0.1
20-Jul	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.2	0.4	0.4
21-Jul	0.1	0.0	0.0	0.1	Z	0.1	0.1	0.1	0.1	0.2	0.4	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.4	0.4
22-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.1	0.1	1.0	3.3	2.0	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.0	0.4	3.3	
23-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.5	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.5	0.5
24-Jul	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	M	0.2	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3
25-Jul	0.1	0.1	Z	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1
26-Jul	0.0	0.0	0.0	Z	0.1	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3
27-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.1	0.1	0.1	1.2	3.7	2.4	1.5	0.8	0.7	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.5	3.7	3.7
28-Jul	0.0	0.0	0.1	0.0	0.0	Z	0.1	0.1	0.1	0.1	4.9	18.9	6.6	0.8	1.7	1.8	0.9	0.9	1.0	0.7	0.3	0.2	0.2	0.1	1.7	18.9	18.9
29-Jul	Z	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	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1
30-Jul	0.2	Z	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.3	0.3
31-Jul	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	0.0	0.0	0.0	0.0	0.0	2.3	3.2	1.4	1.7	0.5	0.1	0.4	3.2	3.2
																								Diurnal Average	Diurnal Maximum		
0.2 0.2 0.1 0.1 0.1 0.1 0.2 0.2 0.3 0.6 1.1 1.8 1.4 1.0 0.7 0.5 0.4 0.5 0.4 0.3 0.2 0.2 0.1 0.2																								Diurnal Average	Diurnal Maximum		
2.5 1.8 1.0 0.3 0.8 1.0 1.5 1.0 3.7 3.2 8.4 18.9 8.9 6.6 5.2 3.4 3.1 4.1 2.6 3.2 1.4 1.7 1.0 2.3																								Diurnal Average	Diurnal Maximum		

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	701	99.72	99.72
11 - 20	2	0.28	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	45	17	11	16	44	50	115	48	22	51	73	36	24	14	34	101	701
11 - 20	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	45	17	11	16	45	50	115	48	22	51	73	36	24	14	34	102	703

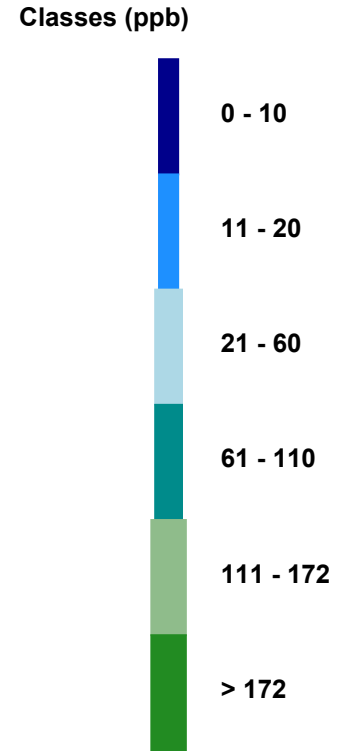
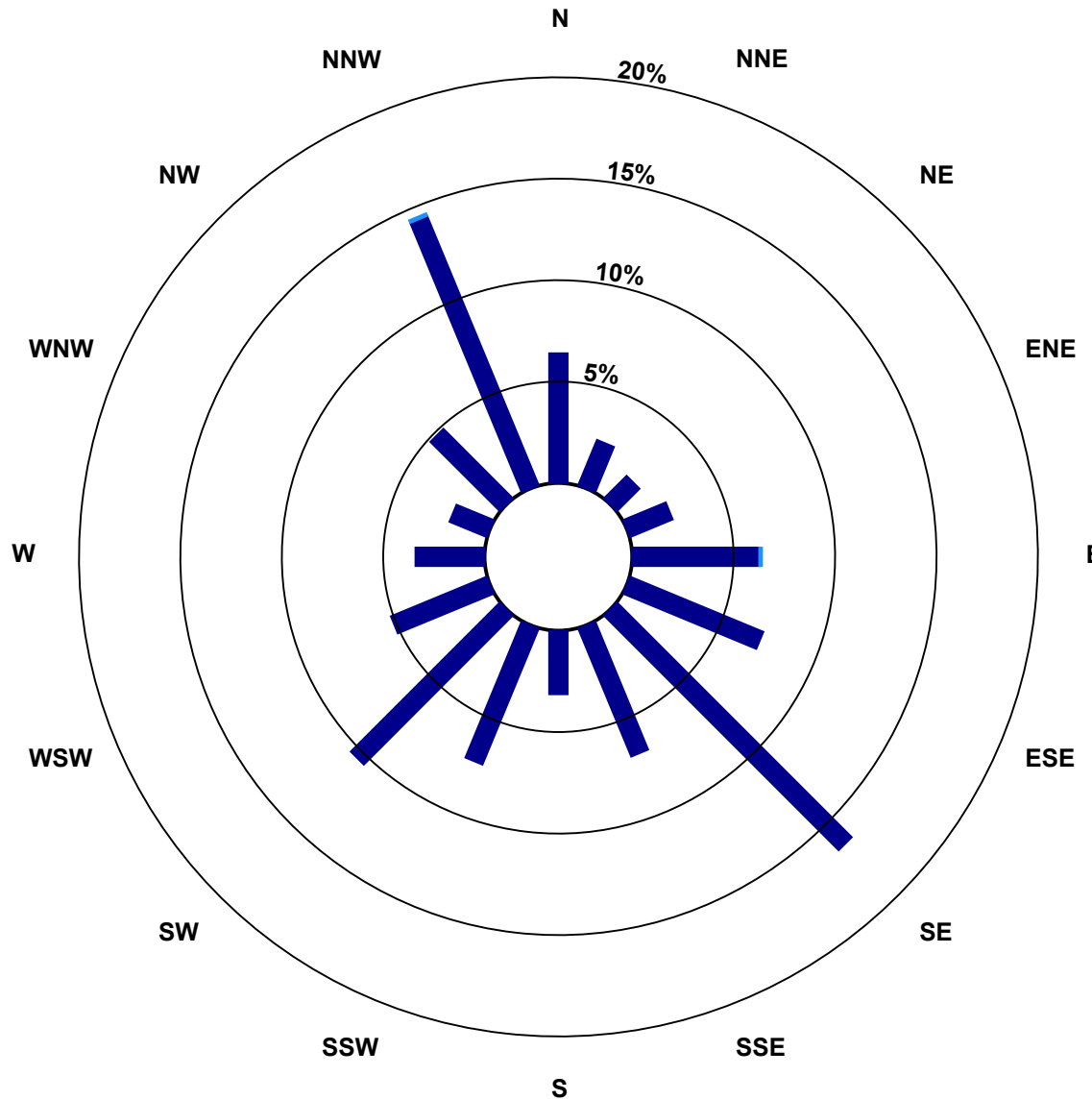
Total Number of Valid Hours: 703

Total Number of Hours: 744

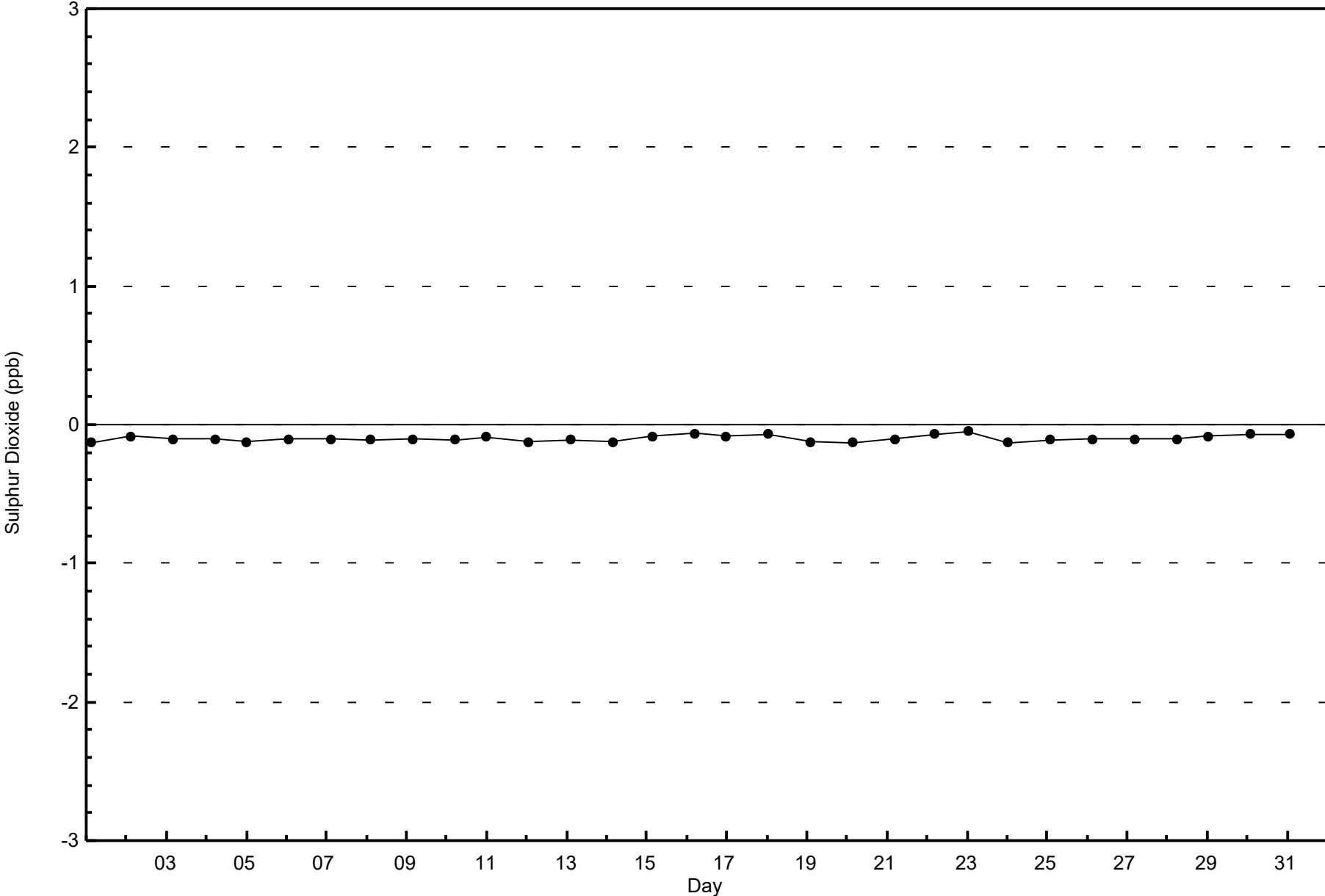


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley



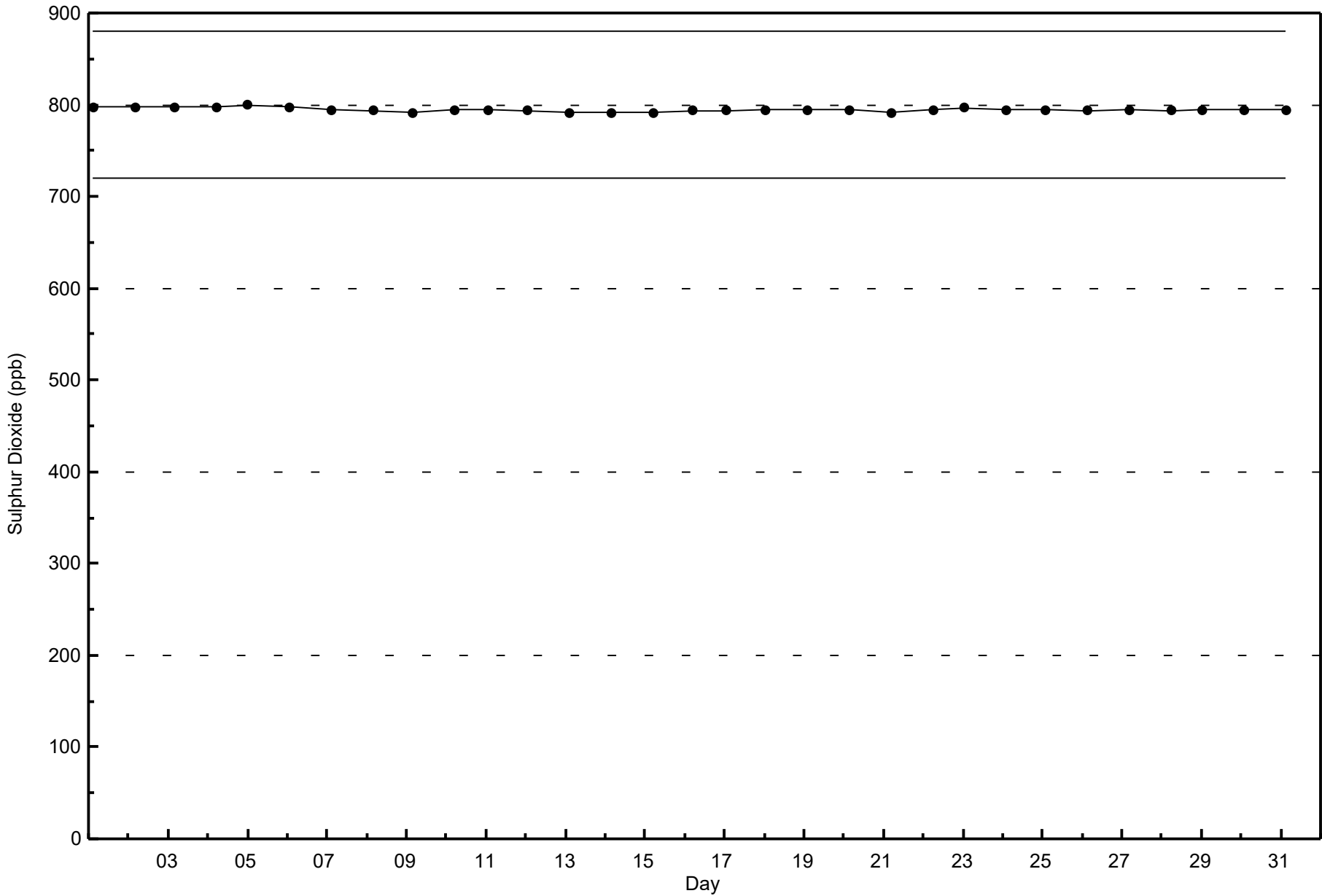
Total Number of Valid Hours: 703





Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - July 2023





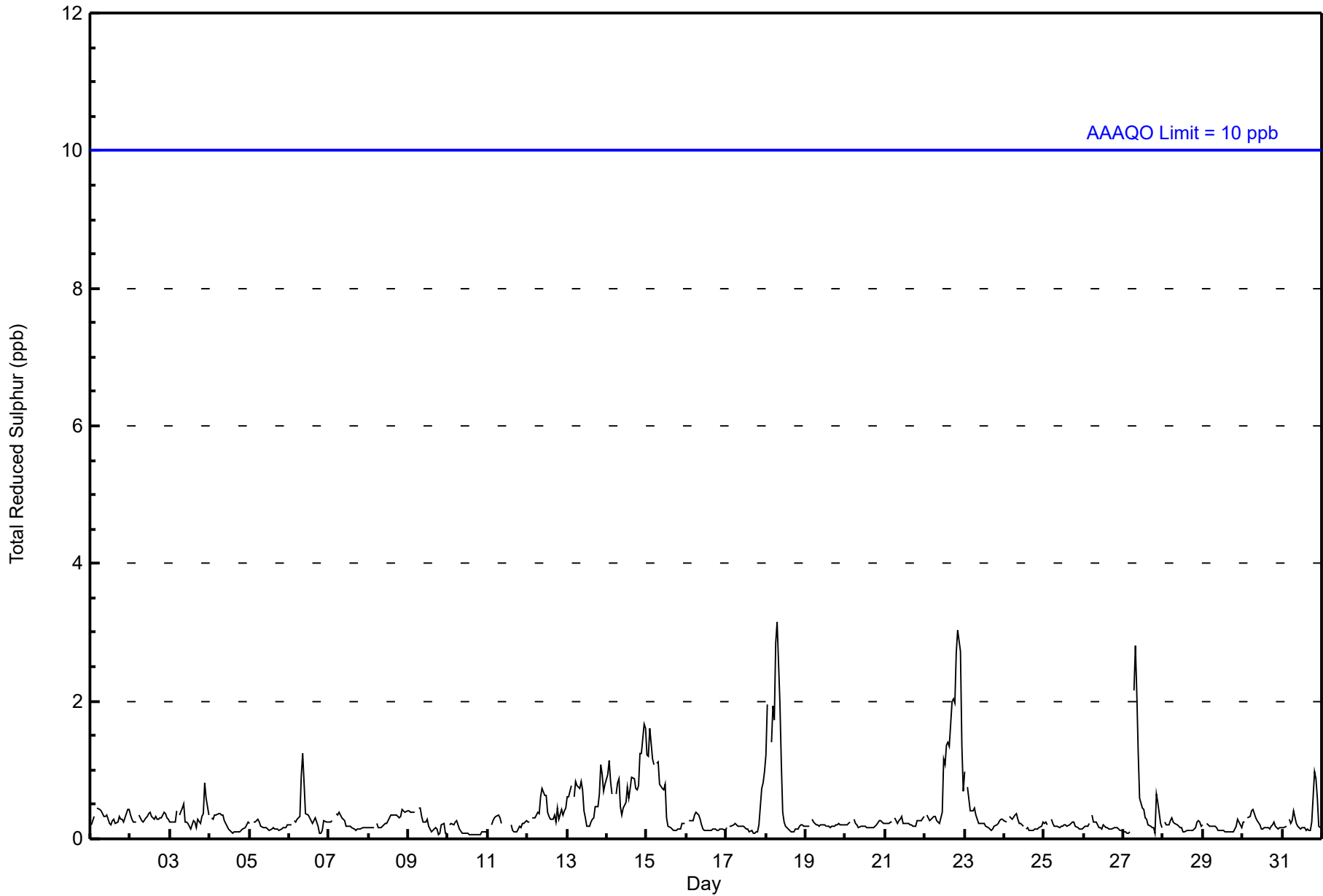
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Athabasca Valley - July 2023

Number of Exceedences (AAAQO):		1-hr: 0 24-hr: 0		Hours in Service:		744																						
Maximum Value: 3.1 ppb on Jul 18 08:00		Maximum Daily Average: 1.1 ppb on Jul 22		Hours of Data:		707																						
Minimum Value: 0.1 ppb on Jul 10 19:00		Minimum Daily Average: 0.1 ppb on Jul 10		Hours of Missing Data:		37																						
Maximum Diurnal Average: 0.5 ppb at hour 8		Minimum Diurnal Average: 0.2 ppb at hour 8		Hours of Calibration:		36																						
Monthly Average: 0.34 ppb		Percentiles: P ₁ = 0.1 P ₁₀ = 0.1 Q ₁ = 0.2 Median = 0.2 Q ₃ = 0.3 P ₉₀ = 0.7 P ₉₉ = 2.1		Percent Operational Time:		99.9																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Jul	0.2	0.3	0.3	Z	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.2	0.3	0.4	0.4	0.3	0.4		
2-Jul	0.3	0.3	0.2	0.2	Z	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.4		
3-Jul	0.2	0.2	0.3	0.2	0.4	Z	0.3	0.5	0.5	0.2	0.2	0.1	0.2	0.3	0.2	0.2	0.3	0.2	0.3	0.4	0.8	0.6	0.3	0.3	0.3	0.8		
4-Jul	Z	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.4	
5-Jul	0.2	Z	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	
6-Jul	0.2	0.2	Z	0.3	0.2	0.3	0.3	0.9	1.2	0.8	0.4	0.4	0.3	0.3	0.2	0.3	0.3	0.2	0.1	0.1	0.1	0.3	0.2	0.2	0.3	1.2	0.3	
7-Jul	0.2	0.2	0.3	Z	0.4	0.3	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.4	
8-Jul	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.3	
9-Jul	0.4	0.4	0.4	0.4	0.4	Z	0.4	0.4	0.3	0.2	0.2	0.3	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.4	0.4	
10-Jul	Z	0.2	0.2	0.2	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	
11-Jul	0.1	Z	0.2	0.3	0.3	0.3	0.3	0.3	0.2	C	C	C	C	C	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.3	
12-Jul	0.2	0.2	Z	0.3	0.3	0.4	0.4	0.4	0.6	0.7	0.6	0.6	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.5	0.4	0.7	0.4	
13-Jul	0.6	0.6	0.8	Z	0.6	0.8	0.8	0.7	0.8	0.7	0.4	0.3	0.2	0.2	0.2	0.3	0.3	0.5	0.5	0.6	1.1	0.9	0.7	0.8	0.6	1.1	0.6	
14-Jul	0.9	1.1	0.8	0.7	Z	0.7	0.8	0.8	0.9	0.5	0.3	0.5	0.5	0.7	0.6	0.7	0.9	0.9	0.7	0.7	0.8	1.3	1.2	1.7	1.6	0.8	1.7	
15-Jul	1.2	1.2	1.6	1.2	1.1	Z	1.1	1.1	0.8	0.7	0.7	0.8	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.6	1.6	
16-Jul	Z	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.4	0.2	
17-Jul	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.7	0.8	1.0	0.2	1.0	0.2	
18-Jul	1.2	1.9	Z	1.4	1.9	1.7	2.8	3.1	2.0	1.1	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.9	3.1	
19-Jul	0.2	0.2	0.2	Z	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	0.2	0.2	0.3	0.2
20-Jul	0.2	0.2	0.2	0.2	Z	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	0.3	0.3	0.2	0.2	0.2	0.2	0.3	
21-Jul	0.2	0.2	0.2	0.2	0.2	Z	0.3	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3
22-Jul	Z	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.4	1.2	1.1	1.4	1.4	1.3	2.0	2.0	2.0	2.7	3.0	2.7	1.4	0.7	1.1	3.0	1.1	
23-Jul	1.0	Z	0.8	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	1.0	0.3	
24-Jul	0.3	0.3	Z	0.3	0.3	0.3	0.3	0.4	0.3	0.2	0.2	0.2	0.2	M	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.4	
25-Jul	0.2	0.3	0.2	Z	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	0.1	0.1	0.1	0.1	0.2	0.3	
26-Jul	0.2	0.2	0.2	0.2	Z	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.3	0.2	
27-Jul	0.1	0.1	0.1	0.1	0.1	Z	2.2	2.8	2.1	1.3	0.6	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.7	0.5	0.2	0.2	0.6	2.8	0.6	
28-Jul	Z	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.3	
29-Jul	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.2	0.2	0.2	0.3	
30-Jul	0.2	0.3	Z	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	
31-Jul	0.2	0.2	0.2	Z	0.3	0.2	0.3	0.4	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.2	1.0	0.9	0.6	0.2	0.2	0.3	1.0	0.3	
																								0.4 0.4 0.3 0.4 0.4 0.4 0.5 0.5 0.4 0.4 0.3 0.3 0.3 0.2 0.2 0.2 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.3		Diurnal Average		
																								1.2 1.9 1.6 1.4 1.9 1.7 2.8 3.1 2.1 1.3 0.7 1.2 1.1 1.4 1.4 1.3 2.0 2.0 2.0 2.7 3.0 2.7 1.7 1.6		Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																												
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																												





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - July 2023**

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
Athabasca Valley - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	44	17	10	16	45	51	114	48	24	50	71	35	23	14	32	107	701
3 - 4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	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	46	17	10	16	45	51	114	48	24	50	71	35	23	14	32	111	707

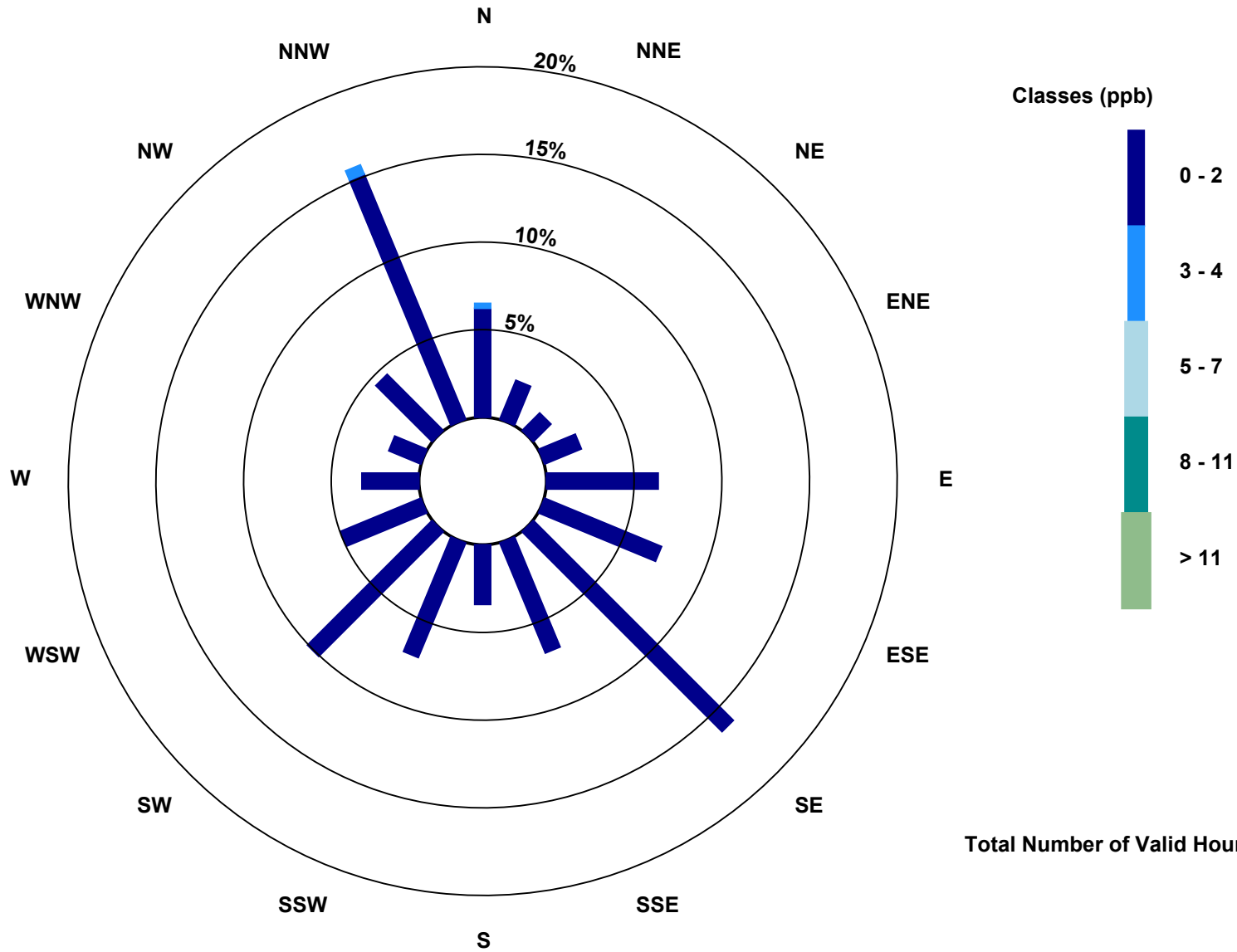
Total Number of Valid Hours: 707

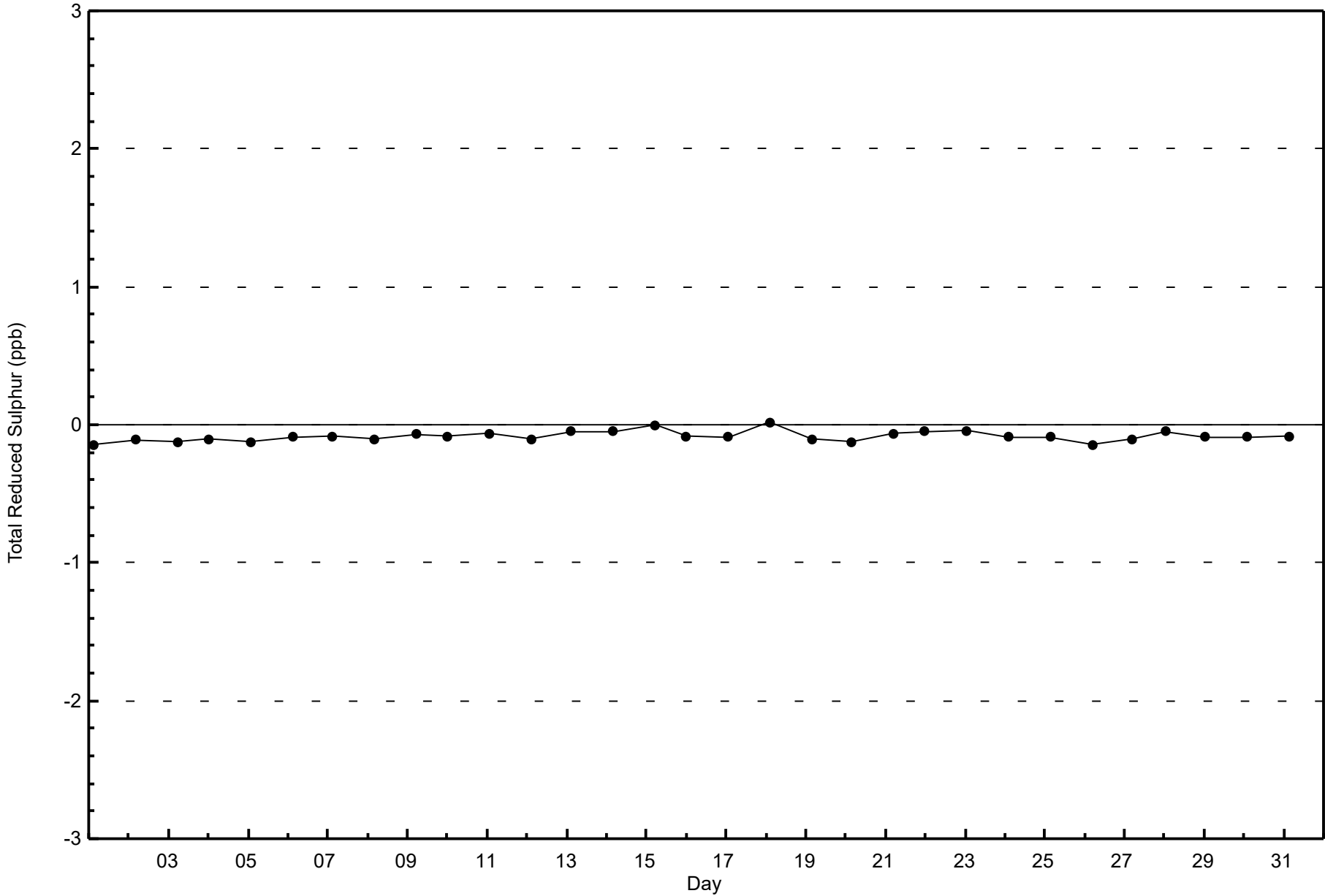
Total Number of Hours: 744

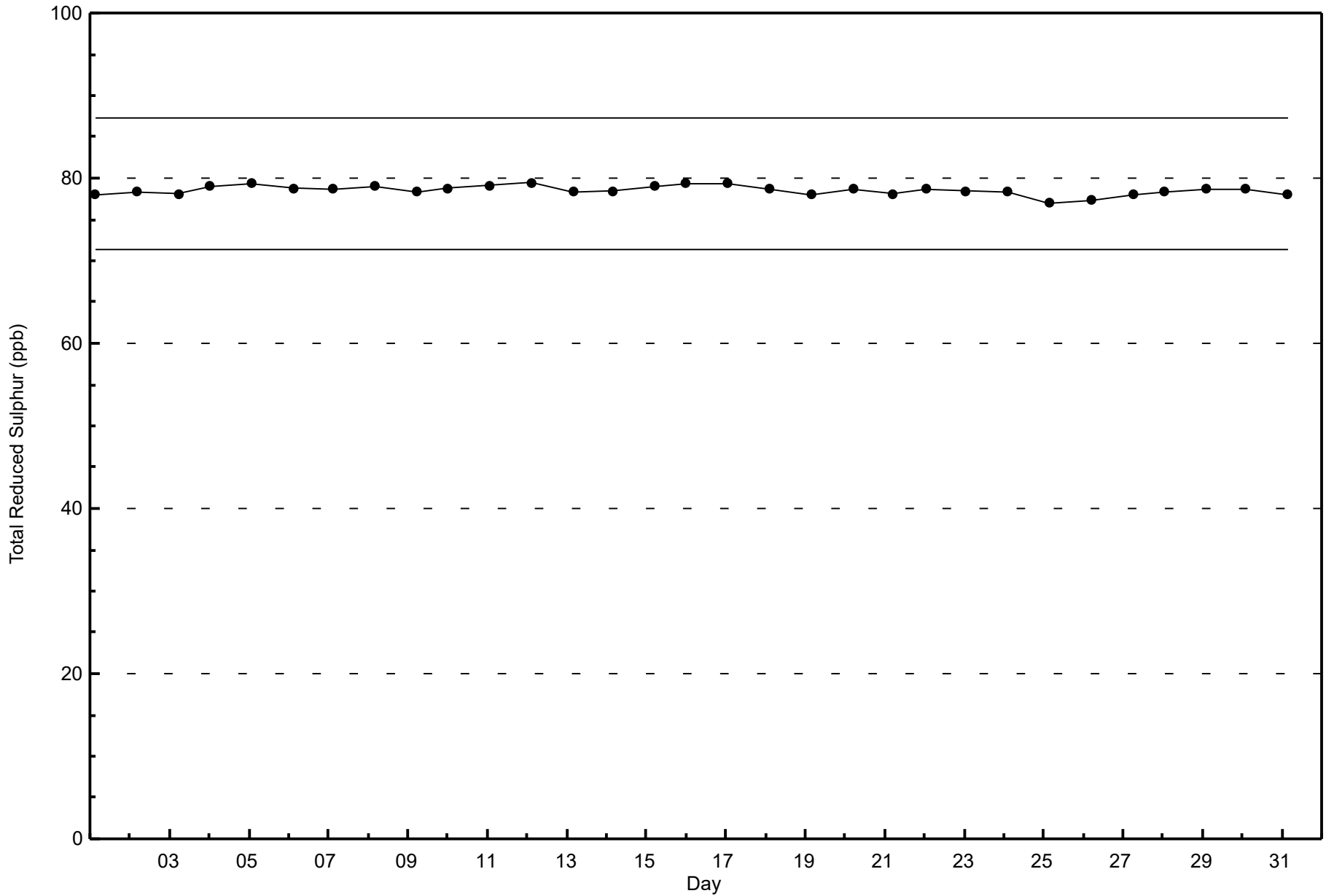


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley









Wood Buffalo Environmental Association
Summary of Hour Averages

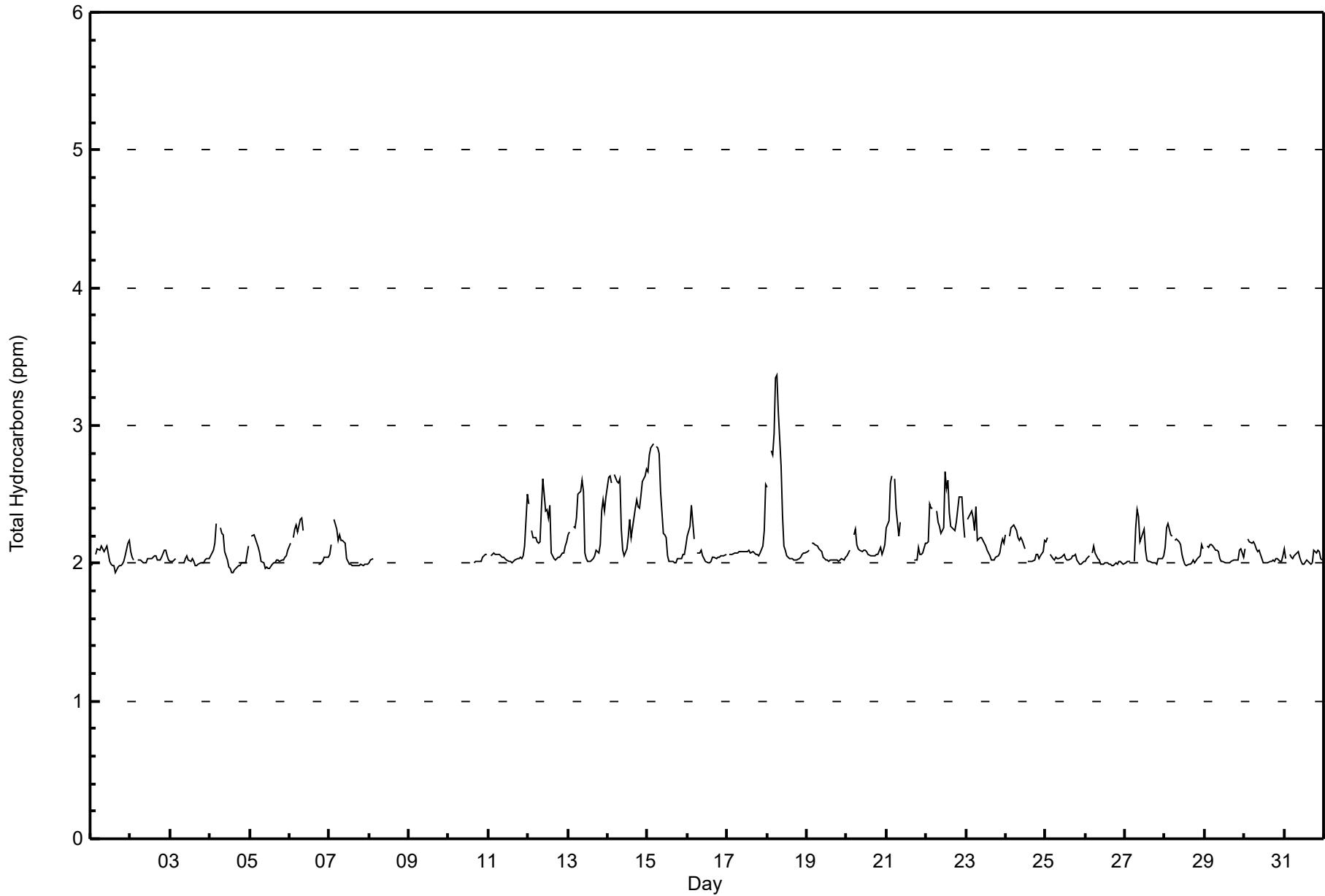
Total Hydrocarbons (THC) - ppm
Athabasca Valley - July 2023

Maximum Value: 3.4 ppm on Jul 18 07:00																				Maximum Daily Average: 2.4 ppm on Jul 14					Hours in Service: 744																												
Minimum Value: 1.9 ppm on Jul 4 15:00										Minimum Daily Average: 2.0 ppm on Jul 3										Hours of Data: 639																																	
Maximum Diurnal Average: 2.3 ppm at hour 3										Minimum Diurnal Average: 2.0 ppm at hour 16										Hours of Missing Data: 105																																	
Monthly Average: 2.13 ppm										Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.4 P ₉₉ = 2.8										Hours of Calibration: 37																																	
															Percent Operational Time: 90.9																																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																													
1-Jul	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.0	2.2																											
2-Jul	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	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.1	2.1																										
3-Jul	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																										
4-Jul	2.1	2.1	2.1	2.1	2.3	Z	2.3	2.2	2.2	2.1	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1																										
5-Jul	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.2																											
6-Jul	2.1	Z	2.2	2.2	2.3	2.2	2.3	2.3	2.2	C	C	C	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	--	2.3																										
7-Jul	2.1	2.1	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3																										
8-Jul	2.0	2.0	2.0	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	2.0																									
9-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--																									
10-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	M	M	M	M	M	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	--	2.1																											
11-Jul	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.5	2.1	2.5	2.1	2.5																									
12-Jul	2.4	Z	2.2	2.2	2.2	2.2	2.1	2.2	2.4	2.6	2.4	2.4	2.3	2.4	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.2	2.6	2.6																									
13-Jul	2.2	2.2	Z	2.3	2.3	2.3	2.5	2.5	2.6	2.5	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.4	2.5	2.4	2.5	2.2	2.2	2.6	2.6																									
14-Jul	2.6	2.6	2.6	Z	2.6	2.6	2.6	2.6	2.2	2.1	2.1	2.1	2.2	2.3	2.2	2.3	2.4	2.5	2.4	2.4	2.5	2.6	2.6	2.7	2.4	2.4	2.7	2.7																									
15-Jul	2.7	2.8	2.8	2.9	Z	2.8	2.8	2.8	2.5	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.3	2.9	2.9																									
16-Jul	2.2	2.3	2.4	2.3	2.2	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.4																									
17-Jul	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	2.2	2.6	2.1	2.6	2.1	2.6																								
18-Jul	2.6	Z	2.8	2.8	2.9	3.3	3.4	3.1	2.7	2.4	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.4	3.4	3.4																									
19-Jul	2.1	2.1	Z	2.1	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	2.0	2.1	2.2	2.2	2.2																								
20-Jul	2.1	2.1	2.1	Z	2.2	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.3																								
21-Jul	2.3	2.3	2.6	2.6	Z	2.6	2.4	2.2	2.3	M	M	M	M	M	M	M	M	2.0	2.0	2.1	2.1	2.1	2.1	2.1	--	2.6	2.6	2.6																									
22-Jul	2.1	2.2	2.4	2.4	2.4	Z	2.4	2.3	2.3	2.2	2.3	2.7	2.5	2.6	2.4	2.3	2.2	2.2	2.3	2.4	2.5	2.5	2.3	2.2	2.3	2.7	2.7	2.7	2.7																								
23-Jul	Z	2.3	2.3	2.4	2.3	2.2	2.4	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.1	2.2	2.4	2.4	2.4																								
24-Jul	2.2	Z	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	M	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.2	2.1	2.1	2.3	2.3	2.3																								
25-Jul	2.2	2.2	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.2																								
26-Jul	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1																								
27-Jul	2.0	2.0	2.0	2.0	Z	2.0	2.3	2.4	2.3	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.4	2.4	2.4																								
28-Jul	2.1	2.3	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.3	2.3																								
29-Jul	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1																								
30-Jul	2.1	Z	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.2																								
31-Jul	2.1	2.0	Z	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	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1																								
																								2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	Diurnal Average	
																								2.7	2.8	2.8	2.9	2.9	3.3	3.4	3.1	2.7	2.6	2.4	2.7	2.5	2.6	2.4	2.3	2.4	2.5	2.4	2.4	2.5	2.6	2.6	2.7	2.7	2.7	2.7	2.7	2.7	Diurnal Maximum
Z - zerospan			C - Calibration					M - Maintenance					UO - Unstable Operation																																								



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Athabasca Valley - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Athabasca Valley - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	286	44.76	44.76
2.1 - 3.0	350	54.77	99.53
3.1 - 10.0	3	0.47	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Athabasca Valley - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	18	8	6	7	19	23	13	13	14	26	53	18	11	8	19	30	286
2.1 - 3.0	24	7	1	8	17	23	95	30	6	20	19	15	12	4	11	58	350
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	42	15	7	15	36	46	108	43	20	46	72	33	23	12	30	91	639

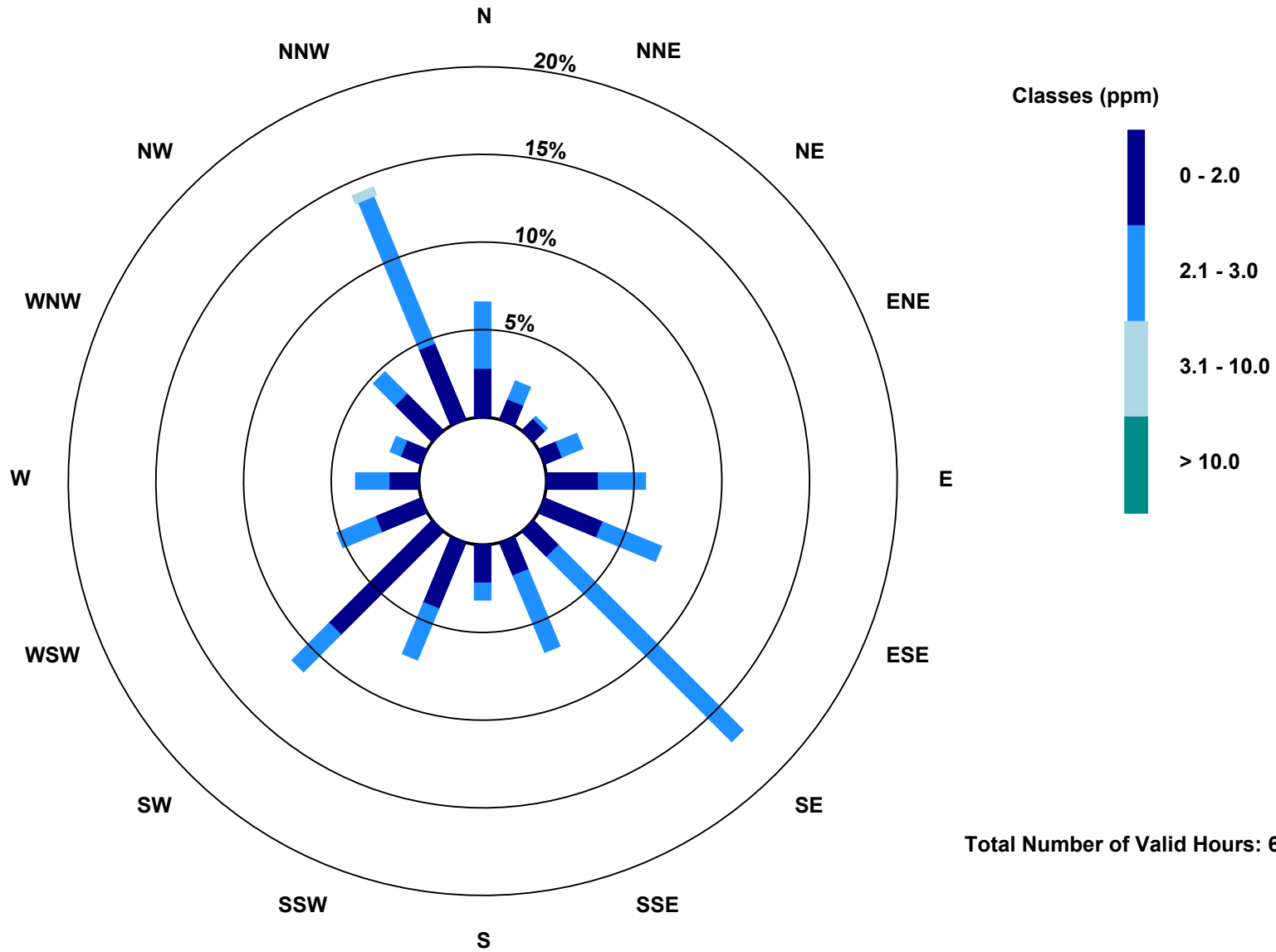
Total Number of Valid Hours: 639

Total Number of Hours: 744

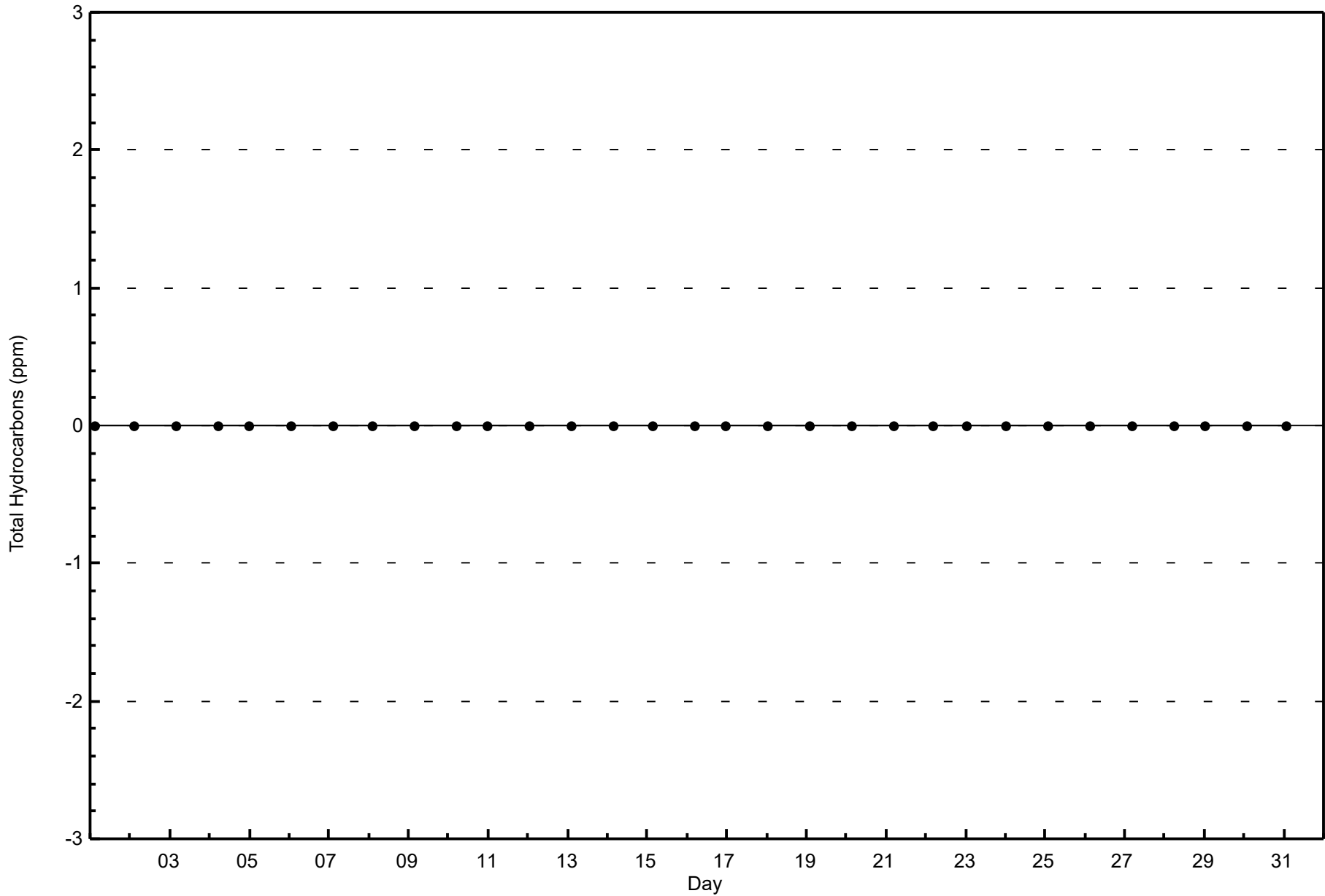


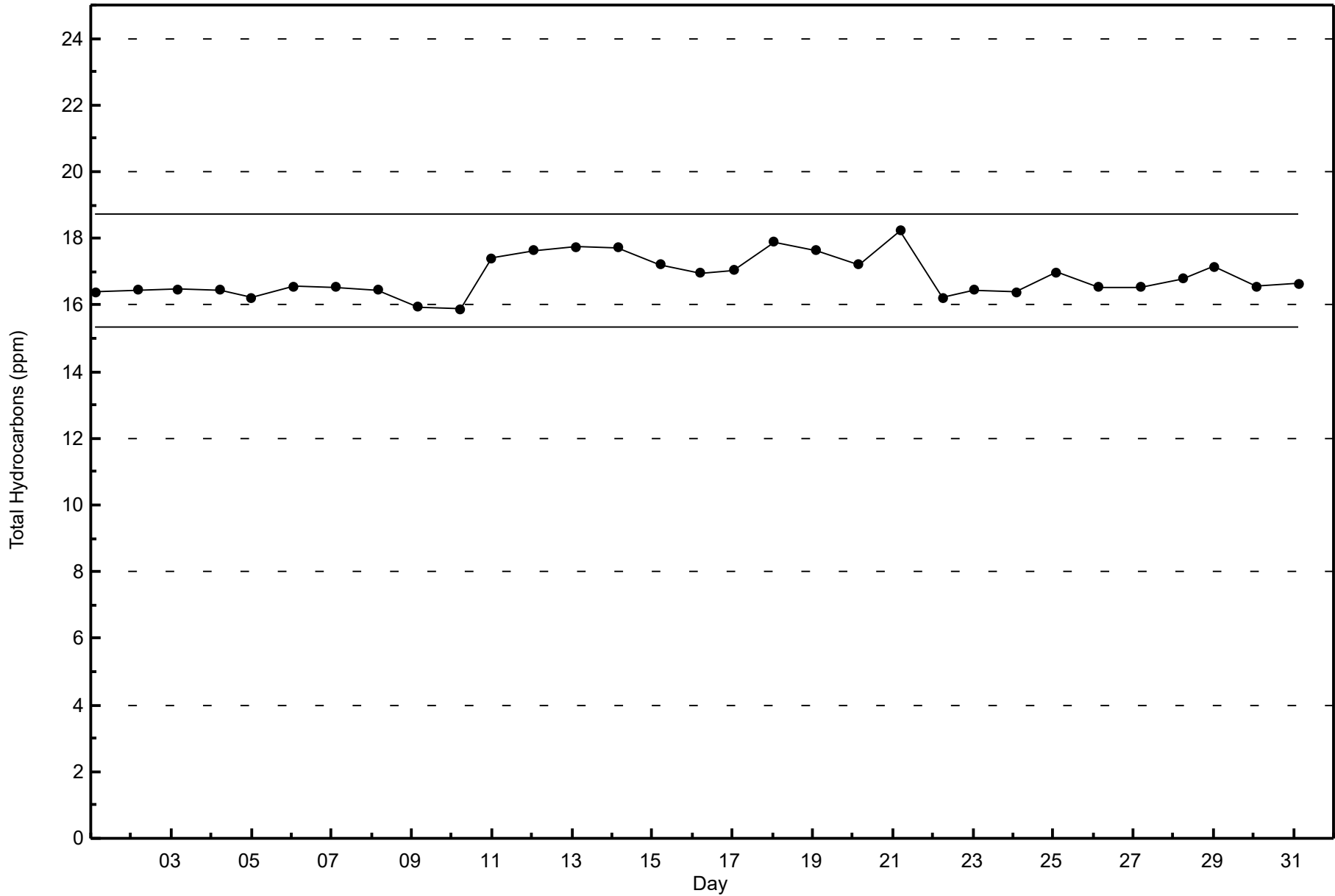
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Athabasca Valley



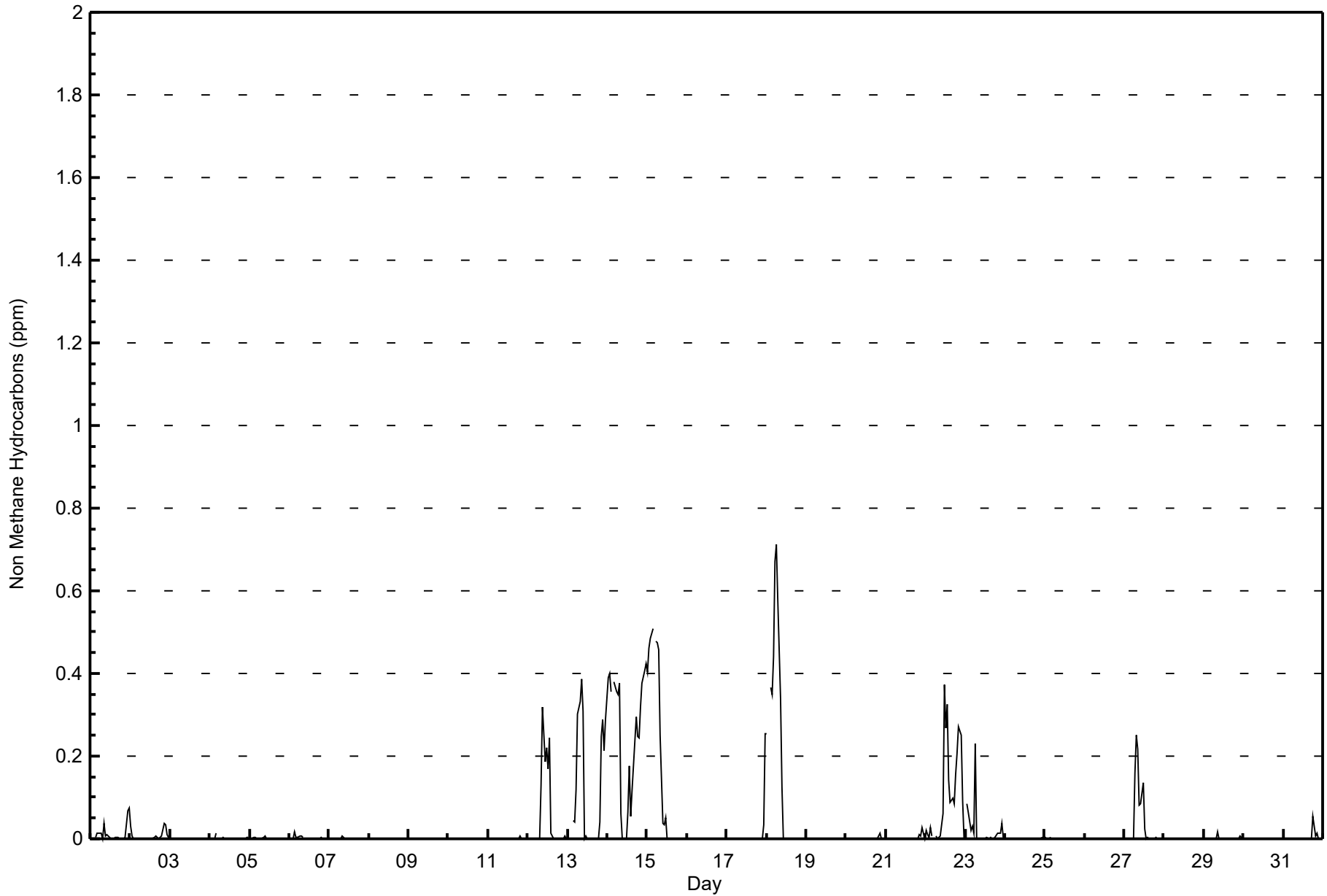
Total Number of Valid Hours: 639







Maximum Value: 0.713 ppm on Jul 18 07:00		Maximum Daily Average: 0.245 ppm on Jul 14		Hours in Service: 744																																													
Minimum Value: 0.000 ppm on Jul 1 13:00		Minimum Daily Average: 0.000 ppm on Jul 3		Hours of Data: 639																																													
Maximum Diurnal Average: 0.081 ppm at hour 7		Minimum Diurnal Average: 0.008 ppm at hour 16		Hours of Missing Data: 105																																													
Monthly Average: 0.034 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 = 0.5		Hours of Calibration: 37																																													
				Percent Operational Time: 90.9																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	0.002	0.001	Z	0.003	0.014	0.012	0.013	0.001	0.037	0.006	0.009	0.003	0.000	0.000	0.002	0.002	0.002	0.001	0.000	0.001	0.000	0.002	0.068	0.075	0.011	0.075																							
2-Jul	0.030	0.006	0.000	Z	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.004	0.006	0.004	0.000	0.002	0.005	0.038	0.034	0.011	0.002	0.006	0.038																							
3-Jul	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																							
4-Jul	0.000	0.000	0.000	0.000	0.013	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	0.005	0.002	0.001	0.013																							
5-Jul	Z	0.001	0.003	0.003	0.000	0.000	0.000	0.000	0.004	0.006	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	0.001	0.001	0.006																							
6-Jul	0.002	Z	0.000	0.018	0.003	0.002	0.007	0.008	0.003	C	C	C	C	C	C	C	C	0.000	0.000	0.004	0.000	0.000	0.000	0.000	--	0.018																							
7-Jul	0.000	0.000	Z	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	0.000	0.000	0.006																							
8-Jul	0.000	0.000	0.000	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	0.000																						
9-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--																						
10-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	M	M	M	M	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	--	0.000																							
11-Jul	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	0.006	0.000	0.000	0.000	0.000	0.000	0.006																							
12-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.129	0.319	0.186	0.219	0.169	0.243	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.056	0.319																							
13-Jul	0.000	0.000	Z	0.045	0.039	0.118	0.301	0.334	0.387	0.310	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.041	0.247	0.287	0.215	0.287	0.114	0.387																							
14-Jul	0.388	0.399	0.357	Z	0.381	0.357	0.351	0.377	0.062	0.000	0.000	0.065	0.176	0.056	0.119	0.236	0.294	0.248	0.244	0.320	0.377	0.408	0.422	0.245	0.422																								
15-Jul	0.404	0.463	0.484	0.509	Z	0.477	0.474	0.457	0.252	0.037	0.036	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.158	0.509																								
16-Jul	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																							
17-Jul	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	0.033	0.254	0.012	0.254																							
18-Jul	0.253	Z	0.368	0.348	0.441	0.670	0.713	0.581	0.339	0.127	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.167	0.713																							
19-Jul	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																							
20-Jul	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	0.015	0.000	0.000	0.001	0.015																							
21-Jul	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	M	M	M	M	M	M	M	M	0.000	0.000	0.000	0.010	0.006	0.026	0.000	--	0.026																							
22-Jul	0.020	0.010	0.004	0.028	0.005	Z	0.008	0.000	0.003	0.008	0.062	0.373	0.267	0.326	0.141	0.089	0.100	0.086	0.157	0.206	0.271	0.250	0.091	0.000	0.109	0.373																							
23-Jul	Z	0.086	0.065	0.022	0.032	0.015	0.232	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.002	0.000	0.000	0.002	0.015	0.014	0.014	0.036	0.003	0.024	0.232																							
24-Jul	0.008	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.001	0.008																								
25-Jul	0.003	0.000	Z	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003																							
26-Jul	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																							
27-Jul	0.000	0.000	0.000	0.000	Z	0.000	0.159	0.250	0.217	0.081	0.084	0.134	0.024	0.000	0.002	0.000	0.000	0.000	0.001	0.002	0.001	0.000	0.000	0.003	0.042	0.250																							
28-Jul	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																							
29-Jul	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.001	0.018																								
30-Jul	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																							
31-Jul	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	0.053	0.007	0.013	0.000	0.000	0.000	0.003	0.053																							
																								0.046	0.040	0.056	0.041	0.039	0.069	0.081	0.072	0.052	0.034	0.015	0.030	0.021	0.029	0.008	0.008	0.013	0.013	0.016	0.018	0.032	0.033	0.031	0.036	Diurnal Average	
																								0.404	0.463	0.484	0.509	0.441	0.670	0.713	0.581	0.387	0.319	0.186	0.373	0.267	0.326	0.141	0.119	0.236	0.294	0.248	0.244	0.320	0.377	0.408	0.422	Diurnal Maximum	
Z - zerospan																								C - Calibration				M - Maintenance				UO - Unstable Operation																	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	510	79.81	79.81
0.006 - 0.05	52	8.14	87.95
0.06 - 0.1	20	3.13	91.08
> 0.1	57	8.92	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	25	12	7	13	35	44	99	33	20	41	69	25	15	9	24	39	510
0.006 - 0.05	3	0	0	2	1	1	8	10	0	5	2	3	5	2	2	8	52
0.06 - 0.1	1	1	0	0	0	1	0	0	0	0	1	1	1	0	0	14	20
> 0.1	13	2	0	0	0	0	1	0	0	0	0	4	2	1	4	30	57
Totals	42	15	7	15	36	46	108	43	20	46	72	33	23	12	30	91	639

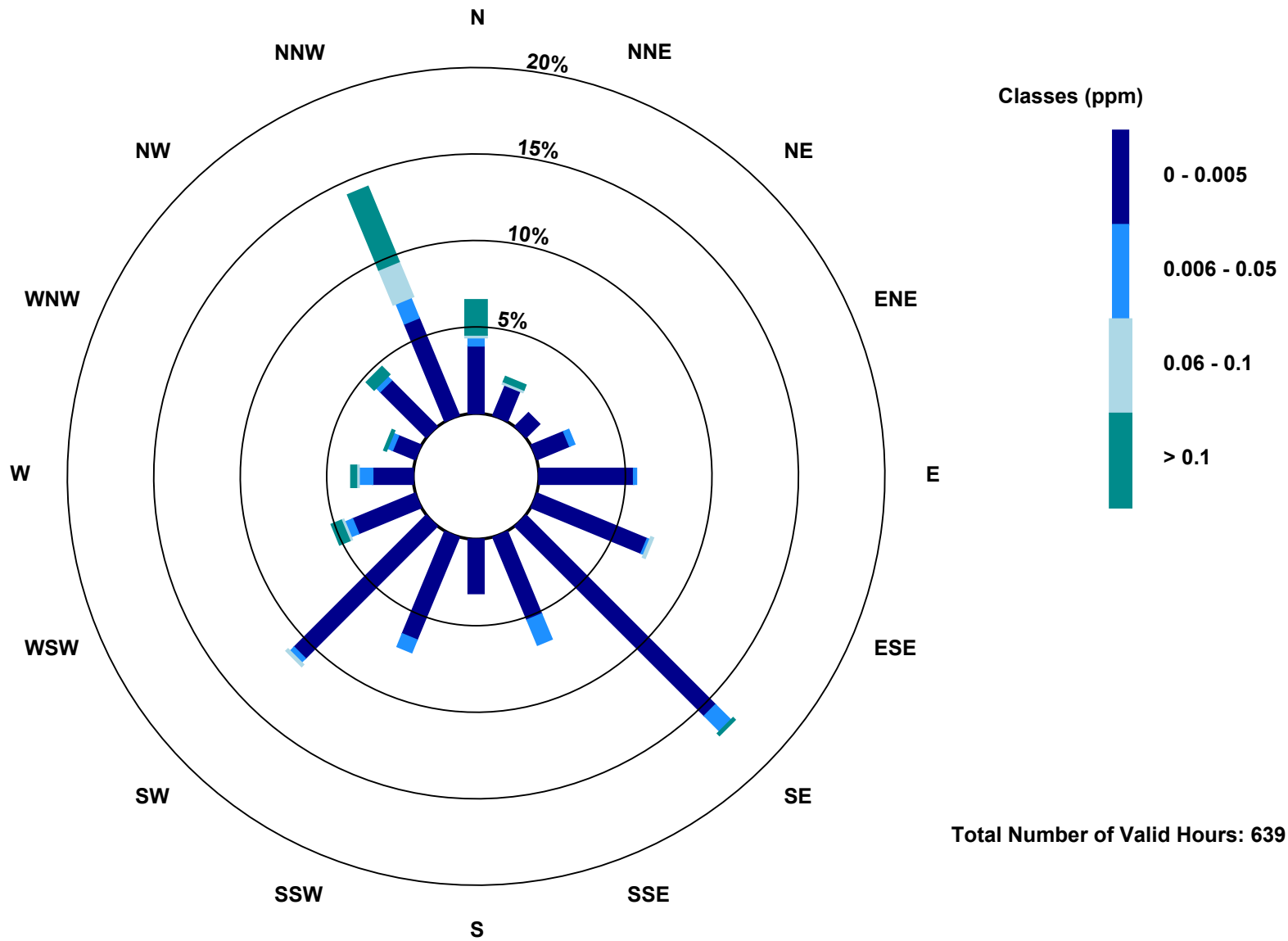
Total Number of Valid Hours: 639

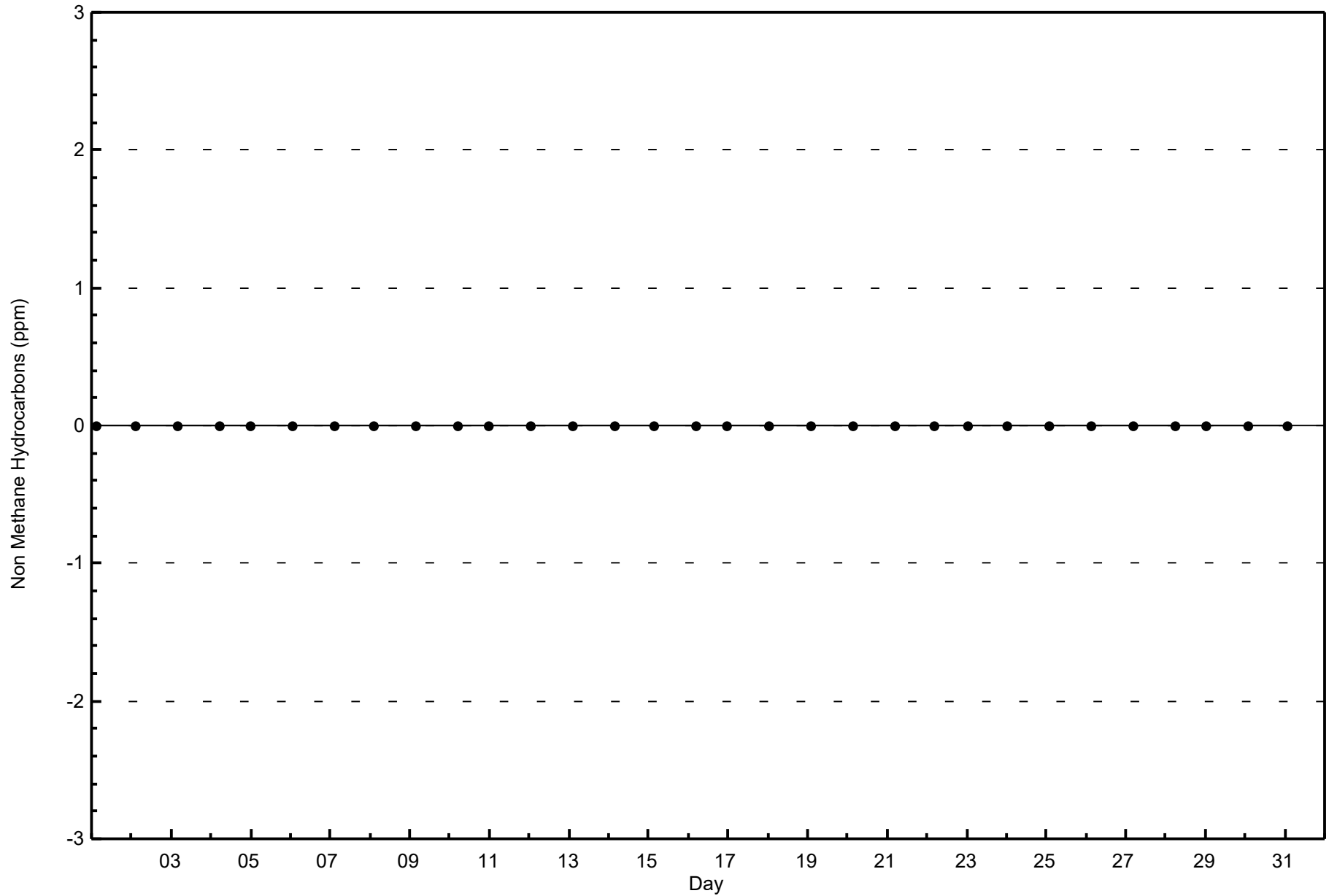
Total Number of Hours: 744

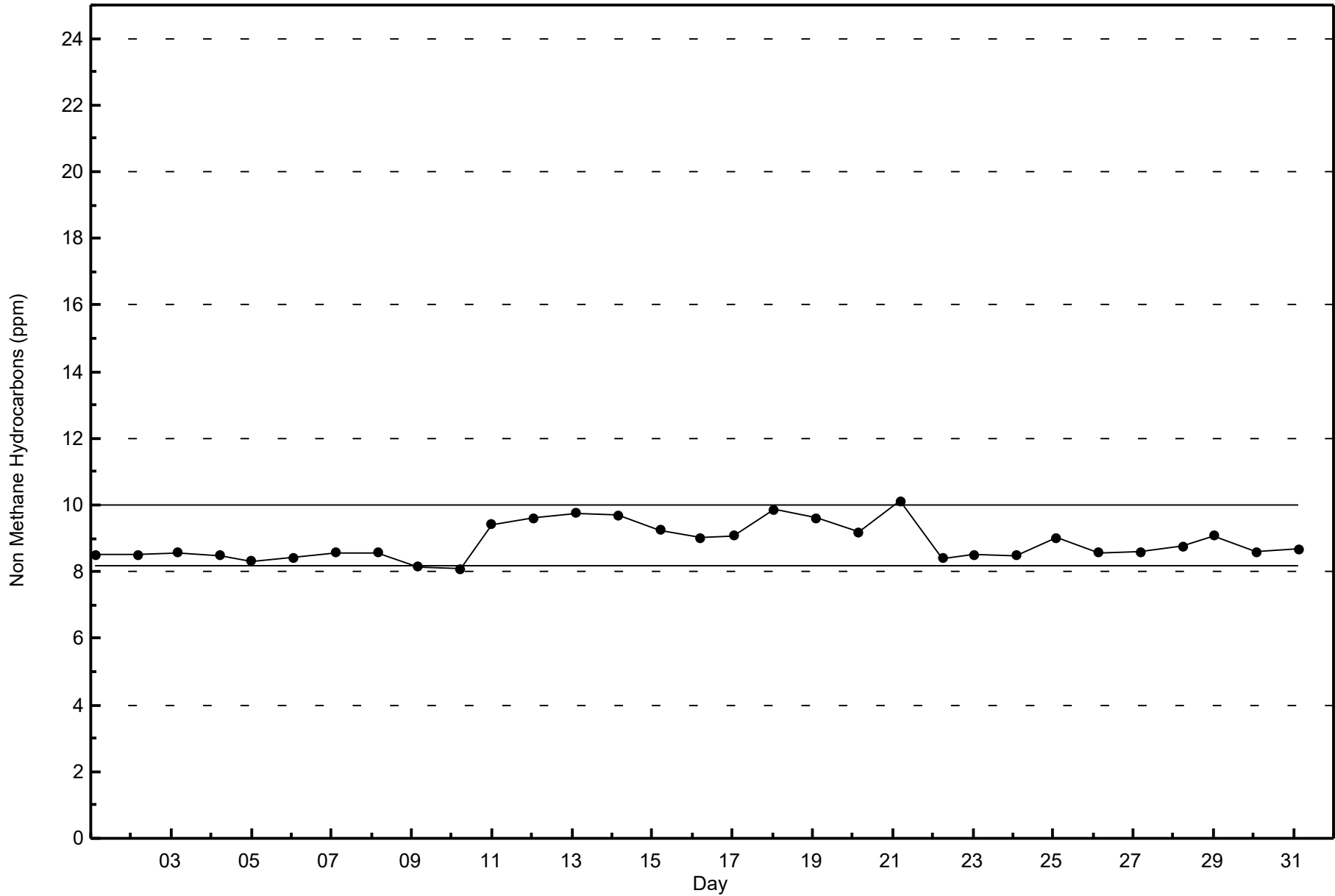


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley





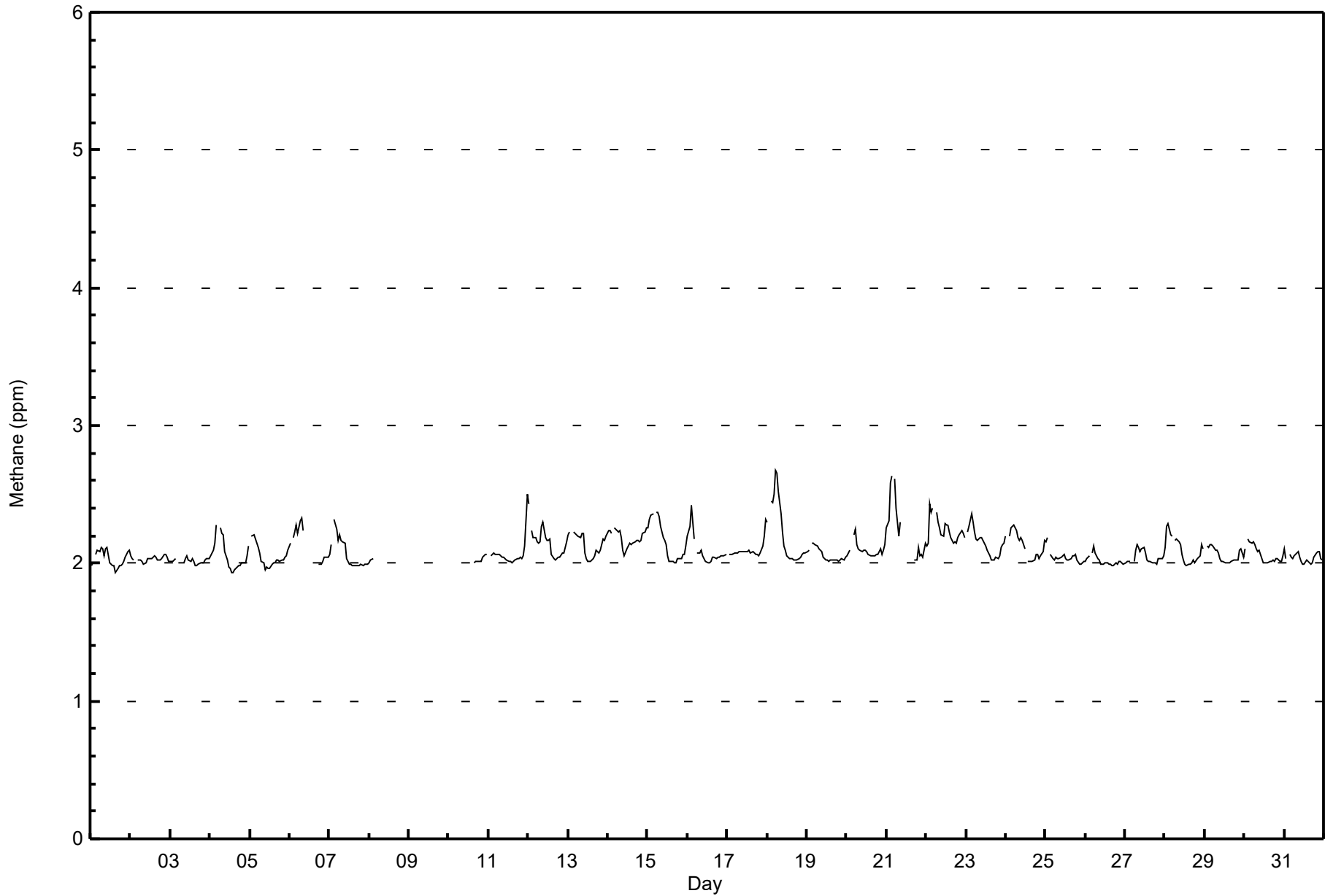




Wood Buffalo Environmental Association
Summary of Hour Averages

Methane (CH₄) - ppm
Athabasca Valley - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744																																																		
Maximum Value: 2.7 ppm on Jul 18 06:00		Maximum Daily Average: 2.2 ppm on Jul 22		Hours of Data: 639																																																				
Minimum Value: 1.9 ppm on Jul 4 15:00		Minimum Daily Average: 2.0 ppm on Jul 3		Hours of Missing Data: 105																																																				
Maximum Diurnal Average: 2.2 ppm at hour 4		Minimum Diurnal Average: 2.0 ppm at hour 16		Hours of Calibration: 37																																																				
Monthly Average: 2.09 ppm		Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.1 P ₉₀ = 2.2 P ₉₉ = 2.5		Percent Operational Time: 90.9																																																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																																
1-Jul	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.1																													
2-Jul	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	2.1	2.1	2.0	2.0	2.0	2.0	2.1																													
3-Jul	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																													
4-Jul	2.1	2.1	2.1	2.1	2.3	Z	2.3	2.2	2.2	2.1	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.3																													
5-Jul	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.2	2.0																													
6-Jul	2.1	Z	2.2	2.2	2.3	2.2	2.3	2.3	2.2	C	C	C	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	--	2.3																												
7-Jul	2.1	2.1	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3																												
8-Jul	2.0	2.0	2.0	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	2.0																											
9-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--																											
10-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	M	M	M	M	M	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	--	2.1	--																												
11-Jul	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.5	2.1	2.1	2.5	2.1	2.5																											
12-Jul	2.4	Z	2.2	2.2	2.2	2.2	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.1	2.4																											
13-Jul	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.2																										
14-Jul	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.3																										
15-Jul	2.3	2.3	2.4	2.4	Z	2.4	2.4	2.3	2.3	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	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.4																										
16-Jul	2.2	2.3	2.4	2.3	2.2	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4																										
17-Jul	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	2.2	2.3	2.1	2.1	2.1	2.1	2.3																										
18-Jul	2.3	Z	2.4	2.4	2.5	2.7	2.7	2.5	2.4	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.7																										
19-Jul	2.1	2.1	Z	2.1	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	2.0	2.0	2.0	2.1	2.1	2.2	2.1	2.2																								
20-Jul	2.1	2.1	2.1	Z	2.2	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3																								
21-Jul	2.3	2.3	2.6	2.6	Z	2.6	2.4	2.2	2.3	M	M	M	M	M	M	M	M	2.0	2.0	2.1	2.1	2.1	2.0	2.1	--	--	--	--	--	2.6																										
22-Jul	2.1	2.1	2.4	2.4	2.4	Z	2.4	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4																								
23-Jul	Z	2.2	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4																								
24-Jul	2.2	Z	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	M	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3																								
25-Jul	2.2	2.2	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2																								
26-Jul	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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																							
27-Jul	2.0	2.0	2.0	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1																							
28-Jul	2.1	2.3	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3																							
29-Jul	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1																							
30-Jul	2.1	Z	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2																							
31-Jul	2.1	2.0	Z	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	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1																						
																								2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	Diurnal Average	
																								2.4	2.3	2.6	2.6	2.5	2.7	2.7	2.5	2.4	2.3	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.5	2.5	Diurnal Maximum
Z - zerospan																								C - Calibration				M - Maintenance				UO - Unstable Operation																								





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Athabasca Valley - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	292	45.70	45.70
2.1 - 3.0	347	54.30	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Athabasca Valley - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	18	8	6	7	19	23	13	14	14	26	53	19	13	9	19	31	292
2.1 - 3.0	24	7	1	8	17	23	95	29	6	20	19	14	10	3	11	60	347
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	42	15	7	15	36	46	108	43	20	46	72	33	23	12	30	91	639

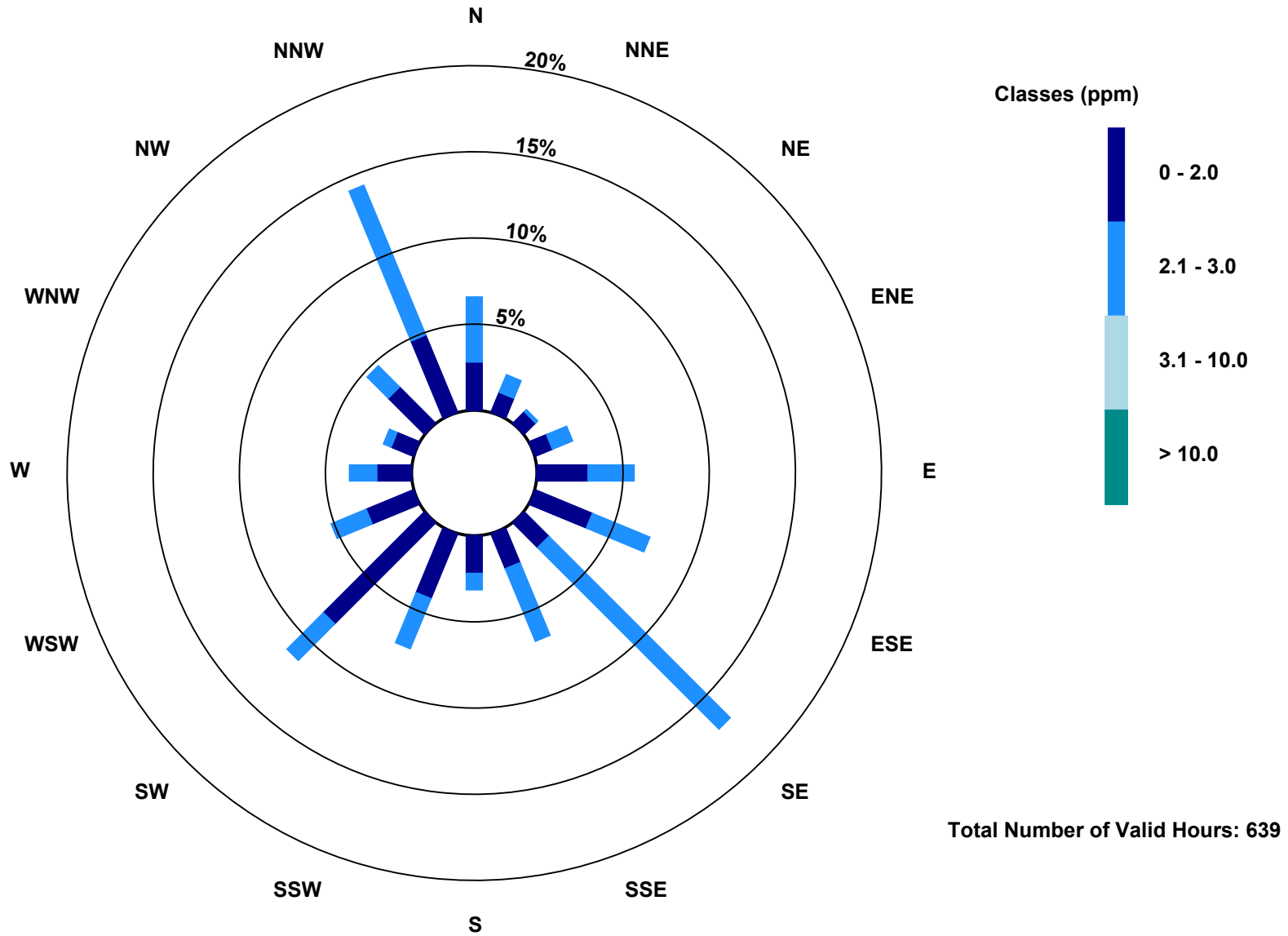
Total Number of Valid Hours: 639

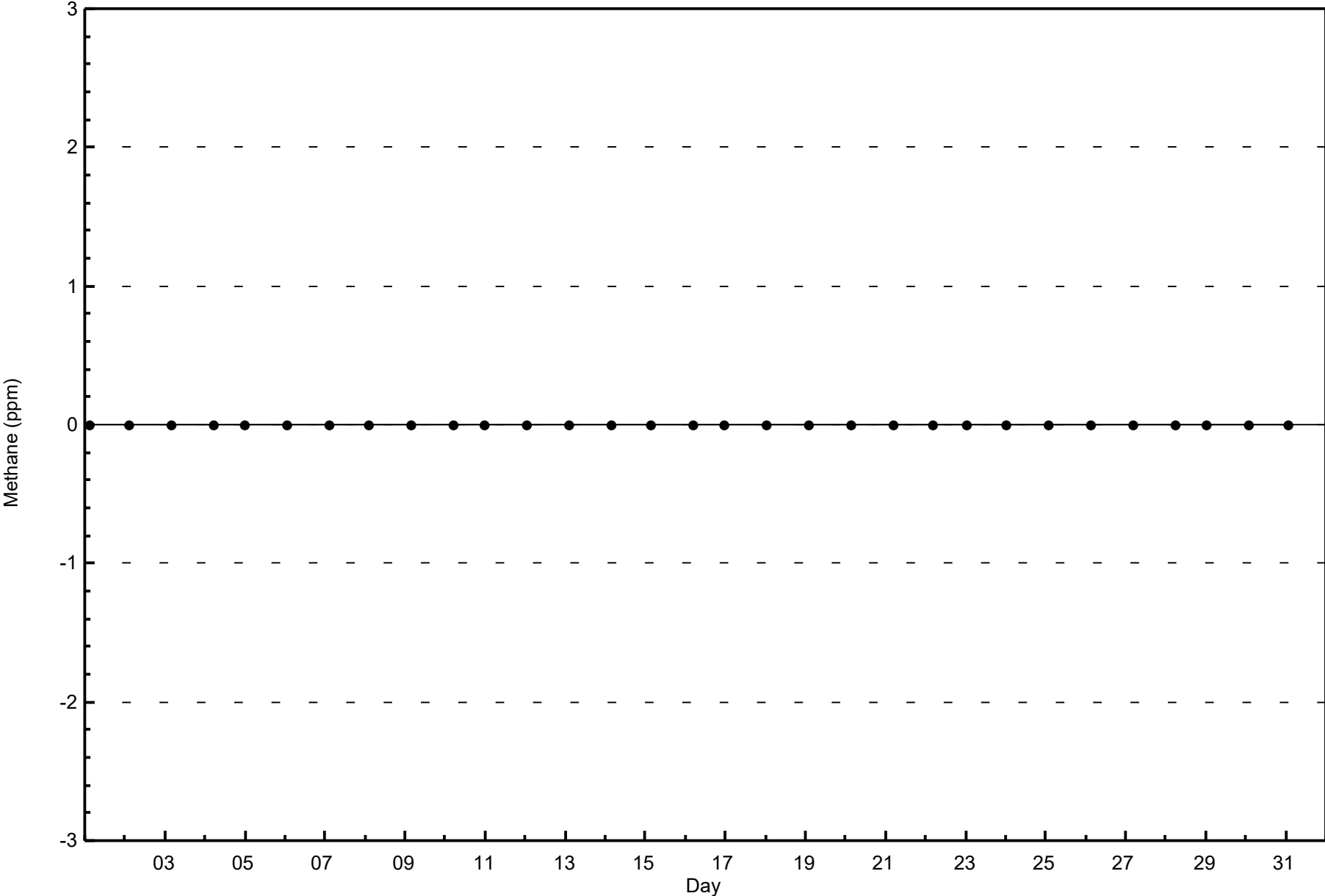
Total Number of Hours: 744

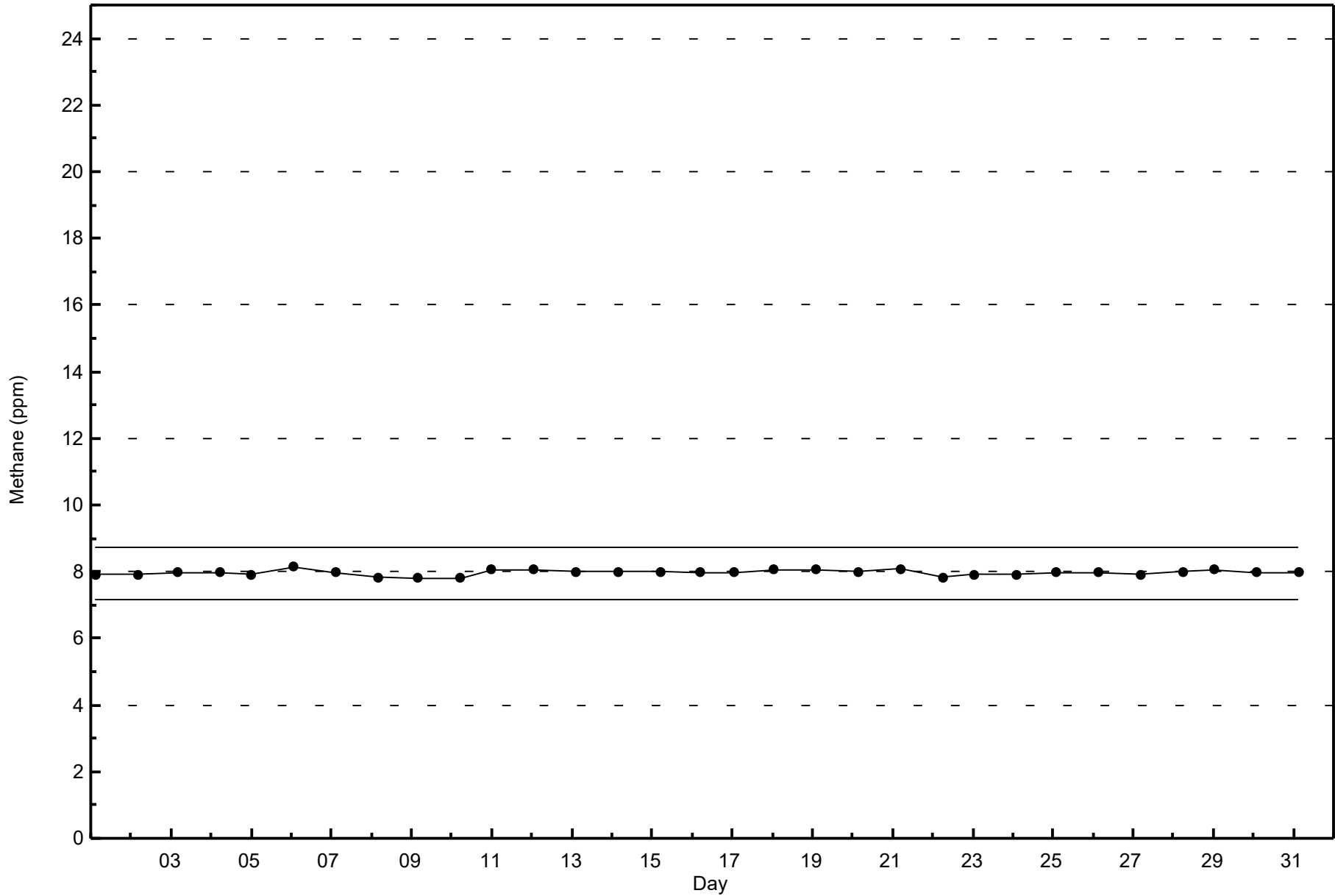


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Methane (CH₄) - ppm
Athabasca Valley









Wood Buffalo Environmental Association
Summary of Hour Averages

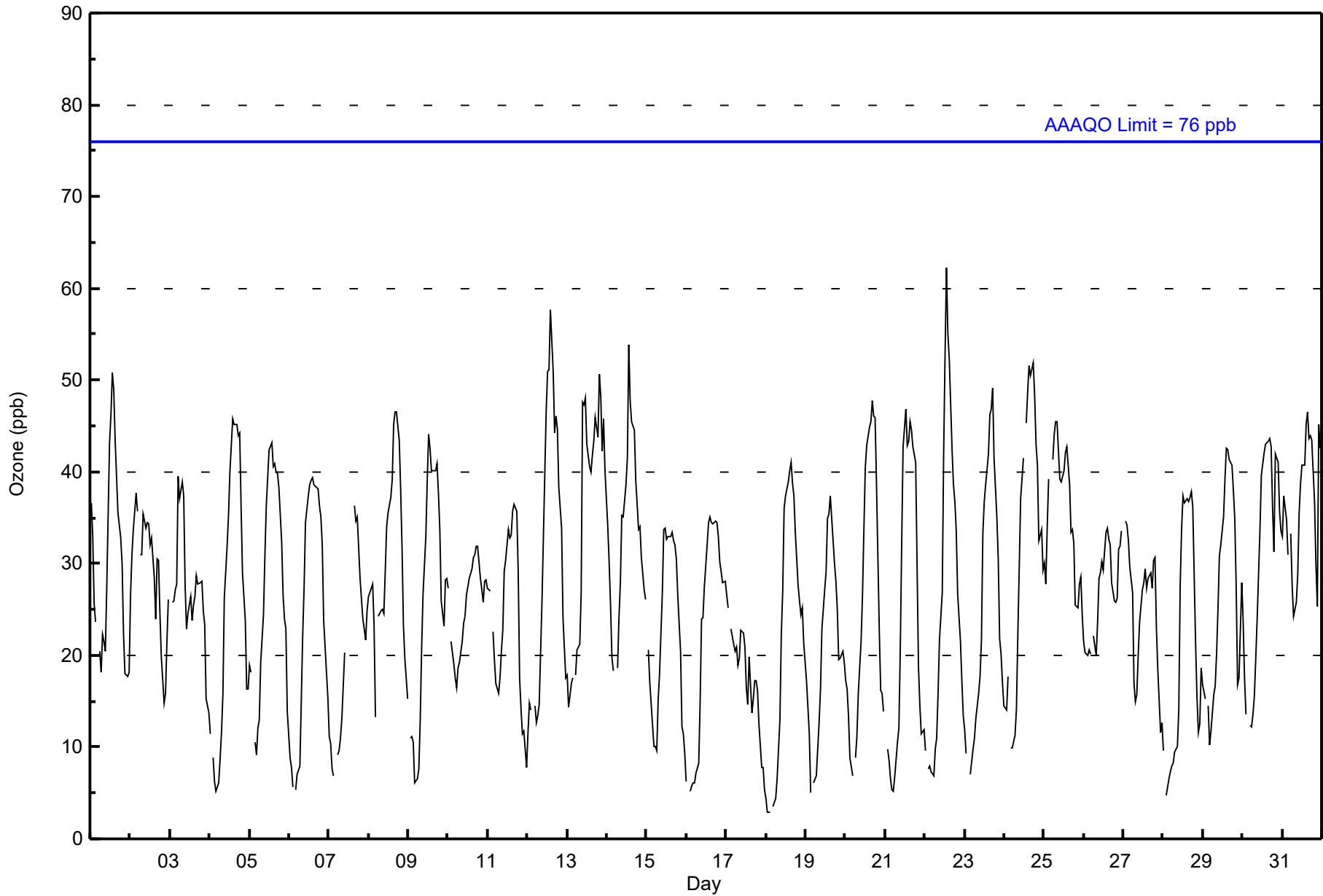
Ozone (O₃) - ppb
Athabasca Valley - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 62.2 ppb on Jul 22 14:00	Maximum Daily Average: 36.3 ppb on Jul 31		Hours of Data:	707
Minimum Value: 2.8 ppb on Jul 18 03:00	Minimum Daily Average: 17.6 ppb on Jul 17		Hours of Missing Data:	37
Maximum Diurnal Average: 39.5 ppb at hour 15	Minimum Diurnal Average: 13.2 ppb at hour 5		Hours of Calibration:	36
Monthly Average: 26.91 ppb	Percentiles: P ₁ = 5.0 P ₁₀ = 10.0 Q ₁ = 17.1 Median = 27.2 Q ₃ = 36.3 P ₉₀ = 43.0 P ₉₉ = 51.5		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	36.5	32.9	25.7	23.6	Z	20.4	18.1	22.3	21.5	20.4	27.3	43.2	46.2	50.9	48.9	43.5	35.5	34.1	32.8	29.9	22.2	17.9	17.7	18.2	30.0	50.9
2-Jul	26.5	31.0	33.8	37.7	35.7	Z	30.9	31.0	35.4	33.9	34.5	34.3	32.0	32.8	28.4	24.0	30.5	30.3	24.5	19.8	14.8	15.9	21.5	26.1	28.9	37.7
3-Jul	Z	25.8	26.0	27.1	27.7	39.5	37.1	38.9	37.3	27.6	22.9	24.5	26.3	23.8	25.5	26.4	28.6	27.7	27.9	28.1	24.9	23.3	15.2	13.7	27.2	39.5
4-Jul	11.5	Z	8.9	6.2	5.2	6.1	8.7	11.6	15.7	26.2	31.9	35.2	39.9	42.9	45.8	45.1	45.2	44.0	44.3	36.2	29.0	23.8	16.4	16.3	25.9	45.8
5-Jul	19.0	18.2	Z	10.6	9.2	12.0	13.0	19.2	24.4	30.8	36.3	39.4	42.3	43.2	40.6	40.9	39.9	39.8	38.2	32.4	26.5	24.0	22.9	13.9	27.7	43.2
6-Jul	8.8	7.8	5.7	Z	5.4	7.0	8.0	15.0	22.1	27.3	34.4	37.4	38.6	39.1	39.4	38.6	38.4	38.2	36.3	35.1	32.0	23.9	18.1	15.4	24.9	39.4
7-Jul	11.1	10.4	7.7	6.8	Z	9.2	9.6	10.9	13.1	20.3	C	C	C	C	C	36.3	34.7	35.1	31.7	28.4	23.9	22.8	21.6	24.9	19.9	36.3
8-Jul	26.4	26.9	27.7	23.3	13.2	Z	24.3	24.8	25.1	24.6	29.1	34.0	35.6	37.3	39.2	45.1	46.6	46.5	43.5	38.2	31.7	23.2	19.6	15.2	30.5	46.6
9-Jul	Z	11.0	11.2	10.5	6.1	6.6	7.6	13.0	20.7	26.7	33.0	39.0	44.1	42.5	40.1	40.1	40.0	40.9	37.7	33.8	26.0	23.2	28.2	28.4	26.5	44.1
10-Jul	27.3	Z	21.5	19.0	17.5	16.5	18.6	19.3	21.5	23.5	24.2	26.5	27.4	28.4	29.4	30.6	30.9	31.9	31.9	28.4	27.1	25.8	28.1	28.2	25.4	31.9
11-Jul	27.3	27.0	Z	22.6	19.5	16.9	15.9	17.5	20.4	22.7	29.1	30.3	33.8	32.8	33.1	35.6	36.4	35.7	29.1	17.6	14.2	11.5	11.7	7.8	23.8	36.4
12-Jul	11.5	14.8	14.1	Z	14.5	12.7	13.5	14.6	20.2	26.0	39.8	46.7	51.0	51.2	57.7	50.9	44.3	46.1	44.6	38.3	33.9	24.2	20.7	17.6	30.8	57.7
13-Jul	17.9	14.4	17.0	17.6	Z	17.9	20.7	21.3	26.8	47.7	47.2	48.0	43.1	40.5	40.0	41.9	43.3	45.9	43.7	50.6	48.2	42.3	45.8	40.1	35.7	50.6
14-Jul	34.1	30.1	25.4	19.7	18.2	Z	18.6	24.2	27.9	35.2	35.1	38.6	41.5	53.8	47.8	45.4	44.5	39.0	36.4	33.8	34.0	30.6	27.2	26.0	33.4	53.8
15-Jul	Z	20.6	17.1	12.4	10.1	10.1	9.6	15.1	18.1	26.9	33.6	33.9	32.7	32.9	32.9	33.5	32.6	32.0	30.5	26.5	20.4	12.1	11.5	9.3	22.4	33.9
16-Jul	6.3	Z	5.2	5.8	6.0	6.1	7.2	8.3	14.9	24.0	24.1	27.5	32.0	34.5	35.2	34.4	34.4	34.6	34.5	32.9	30.2	29.1	27.9	28.1	22.8	35.2
17-Jul	26.5	25.1	Z	22.9	21.2	20.5	20.9	19.0	19.7	22.8	22.4	20.9	16.4	14.6	19.9	13.8	15.3	17.2	17.2	16.2	12.5	7.8	7.8	5.3	17.6	26.5
18-Jul	4.4	2.9	2.8	Z	3.6	4.0	4.4	6.5	12.9	22.2	27.0	35.9	37.4	38.9	40.1	41.1	38.7	37.4	33.4	27.6	25.9	24.4	25.2	21.4	22.5	41.1
19-Jul	17.3	14.4	11.4	5.0	Z	6.1	6.9	9.7	12.7	16.3	22.9	27.2	29.2	35.0	35.3	37.4	34.9	30.0	28.1	25.0	19.5	19.8	20.4	19.3	21.0	37.4
20-Jul	17.2	16.3	13.4	8.9	6.8	Z	8.8	11.2	15.9	21.6	26.6	33.6	40.4	42.9	44.8	45.4	47.7	46.1	45.9	38.7	22.8	16.2	15.8	13.9	26.1	47.7
21-Jul	Z	9.7	8.6	6.5	5.3	5.2	6.8	10.6	12.0	20.7	32.0	42.7	46.8	42.9	43.3	45.5	44.5	42.7	41.1	29.9	18.8	14.5	11.4	11.9	24.1	46.8
22-Jul	9.6	Z	7.6	8.0	7.3	6.9	9.8	10.9	15.8	21.6	26.8	42.1	52.9	62.2	55.1	52.3	42.4	38.6	36.8	33.5	26.7	21.5	17.2	13.4	26.9	62.2
23-Jul	12.0	9.3	Z	7.0	8.4	9.8	10.9	13.1	15.8	17.7	21.7	33.2	36.8	38.6	42.0	46.3	46.9	49.1	41.4	35.1	30.5	21.8	20.1	17.1	25.4	49.1
24-Jul	14.5	14.0	17.7	Z	9.9	9.9	11.3	14.2	22.2	29.6	37.1	41.5	M	45.3	48.6	51.6	50.6	51.9	48.3	43.0	40.7	32.5	33.8	29.2	31.7	51.9
25-Jul	30.0	27.7	34.0	39.2	Z	41.3	44.1	45.5	45.4	39.3	38.9	39.6	40.1	42.1	42.6	38.6	33.4	33.6	32.3	25.5	25.2	27.7	28.6	24.4	35.6	45.5
26-Jul	21.5	20.3	19.9	20.6	20.1	Z	22.1	19.9	23.6	28.4	28.9	30.1	29.3	33.4	33.9	32.7	32.1	28.0	25.9	25.7	26.2	31.5	31.9	33.5	26.9	33.9
27-Jul	Z	34.6	34.1	32.5	29.5	26.8	16.9	15.0	15.8	20.0	23.7	27.1	27.9	29.4	27.2	28.4	28.9	27.2	30.4	30.7	23.0	18.5	11.6	12.6	24.9	34.6
28-Jul	9.6	Z	4.7	6.6	7.3	8.0	8.3	9.4	10.0	14.1	27.6	33.7	37.3	36.7	37.1	36.8	37.2	37.8	36.2	21.3	15.5	11.7	12.5	18.5	20.8	37.8
29-Jul	16.8	15.3	Z	14.5	10.3	11.7	15.7	16.7	20.1	25.0	30.9	32.1	35.1	39.2	42.5	42.3	41.3	40.7	38.0	34.9	27.7	16.8	17.5	27.9	26.6	42.5
30-Jul	23.6	17.4	13.6	Z	12.3	12.2	13.5	15.5	19.7	24.0	33.8	39.6	40.9	42.1	43.0	43.4	43.6	42.6	36.1	31.3	42.0	41.1	35.8	33.6	30.5	43.6
31-Jul	32.9	37.3	34.7	30.9	Z	33.3	27.6	24.3	25.8	28.8	35.5	38.7	40.7	40.7	45.2	46.6	43.6	43.9	43.5	36.8	30.0	25.3	45.1	42.6	36.3	46.6

19.2	19.8	17.3	17.1	13.2	14.5	15.8	17.7	21.1	25.7	30.6	35.2	37.2	39.0	39.5	39.2	38.3	37.7	35.6	31.1	26.6	22.7	22.2	21.1	Diurnal Average	
36.5	37.3	34.7	39.2	35.7	41.3	44.1	45.5	45.4	47.7	47.2	48.0	52.9	62.2	57.7	52.3	50.6	51.9	48.3	50.6	48.2	42.3	45.8	42.6	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 76 ppb





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Athabasca Valley - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	236	33.38	33.38
21 - 50	457	64.64	98.02
51 - 82	14	1.98	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 (O₃) - ppb
Athabasca Valley - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	4	3	1	7	17	19	76	29	5	16	16	14	7	0	2	20	236
21 - 50	40	12	10	9	25	31	37	20	18	33	57	25	17	12	28	83	457
51 - 82	4	0	0	0	3	0	1	0	0	0	0	0	0	0	0	6	14
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	48	15	11	16	45	50	114	49	23	49	73	39	24	12	30	109	707

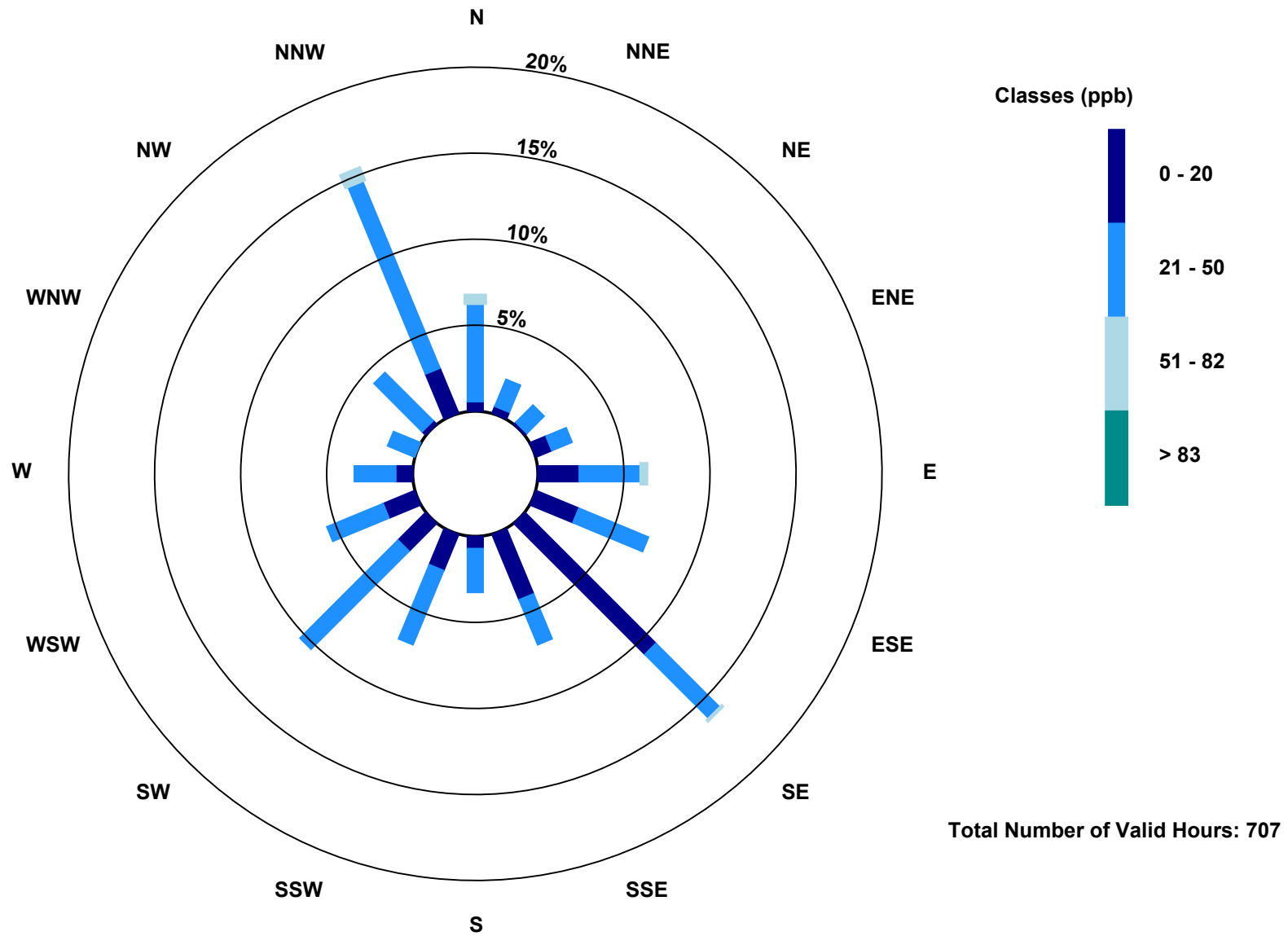
Total Number of Valid Hours: 707

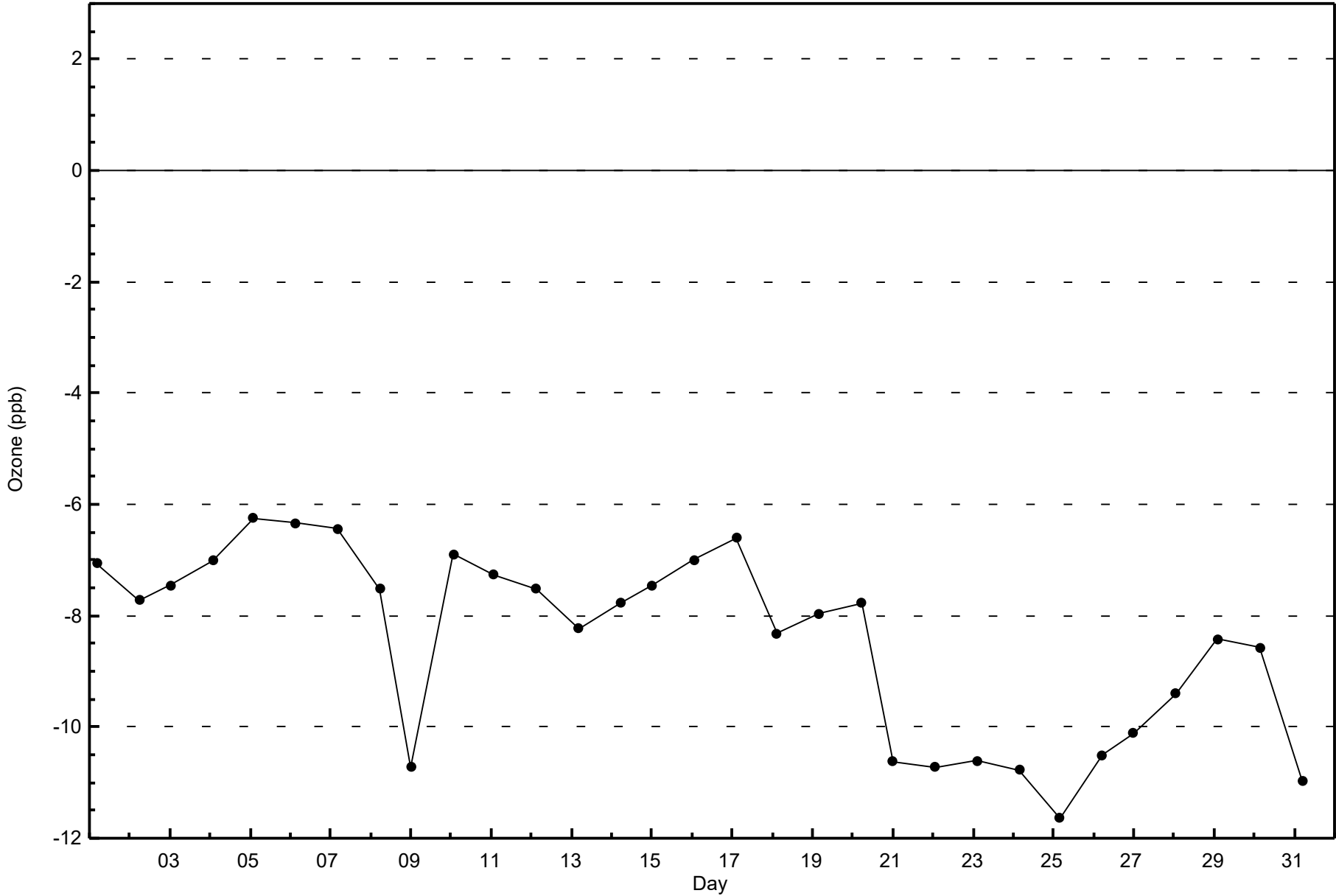
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Ozone (O₃) - ppb
Athabasca Valley

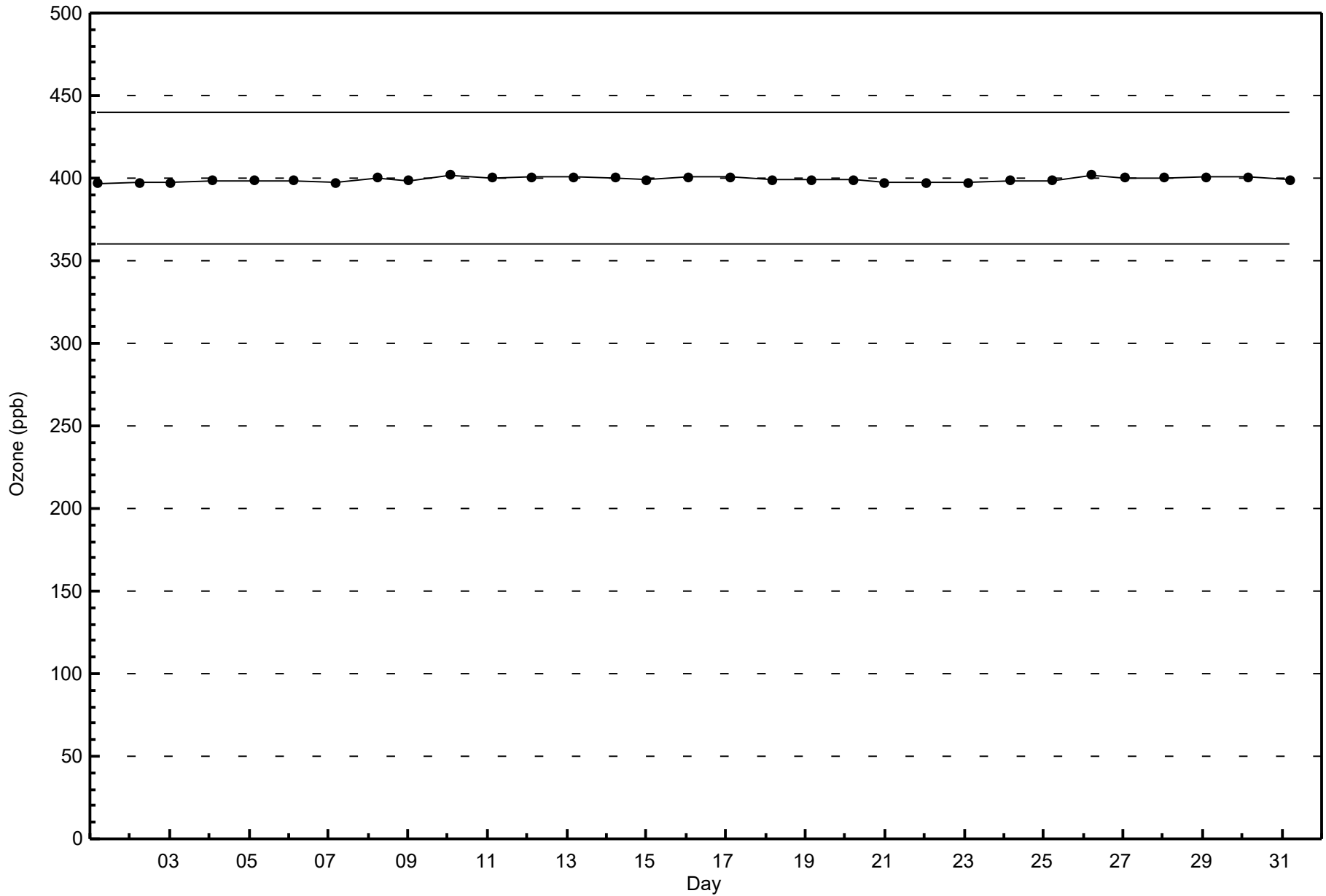






Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Athabasca Valley - July 2023





Wood Buffalo Environmental Association
Summary of Hour Averages

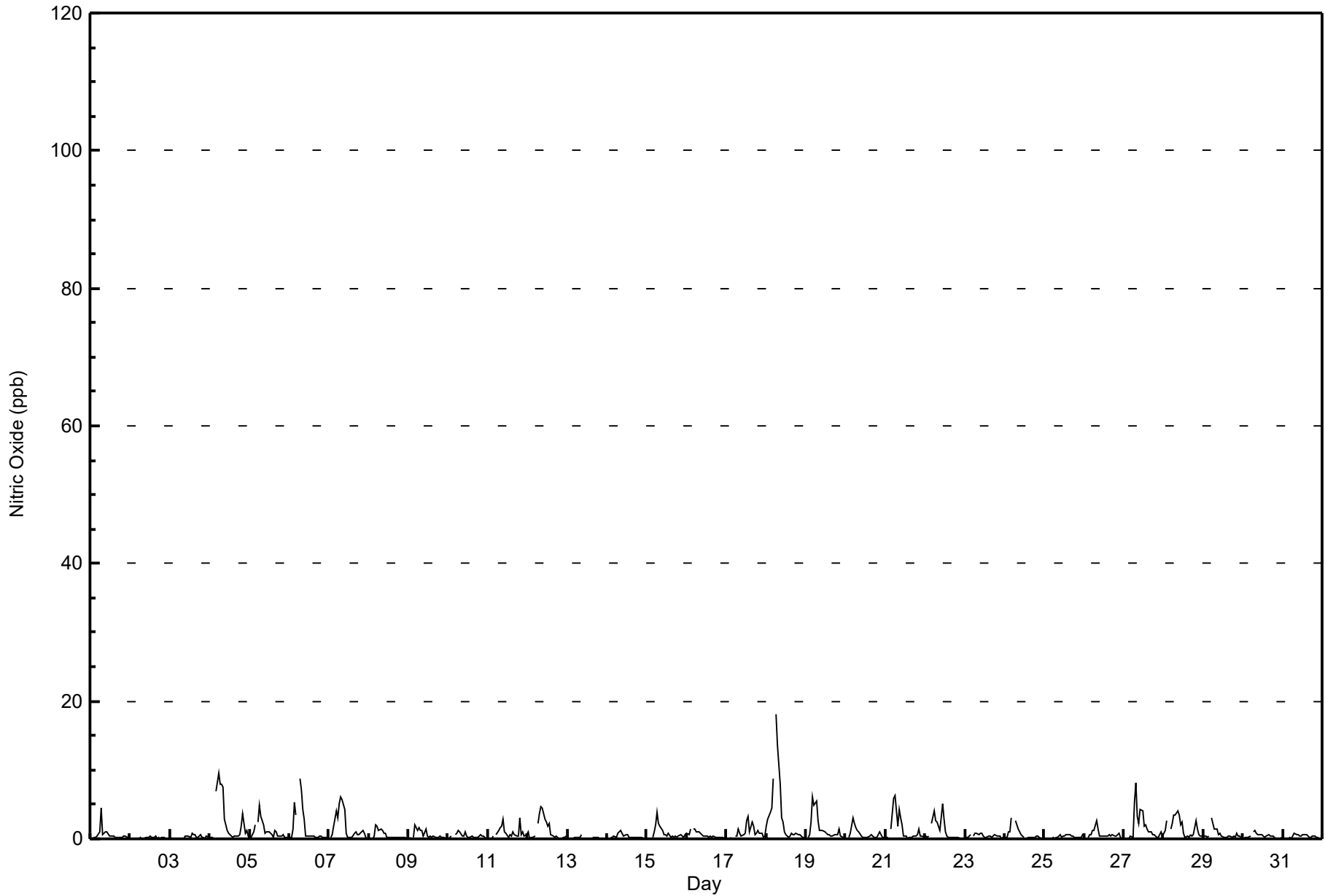
Nitric Oxide (NO) - ppb
Athabasca Valley - July 2023

Maximum Value: 18.2 ppb on Jul 18 07:00		Maximum Daily Average: 3.2 ppb on Jul 18		Hours in Service: 744																							
Minimum Value: 0.0 ppb on Jul 2 23:00		Minimum Daily Average: 0.1 ppb on Jul 2		Hours of Data: 706																							
Maximum Diurnal Average: 3.1 ppb at hour 7		Minimum Diurnal Average: 0.2 ppb at hour 24		Hours of Missing Data: 38																							
Monthly Average: 0.94 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.1 Q ₁ = 0.2 Median = 0.4 Q ₃ = 0.9 P ₉₀ = 2.4 P ₉₉ = 7.9		Hours of Calibration: 37																							
				Percent Operational Time: 99.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	0.1	0.1	0.3	0.3	1.1	4.5	0.6	0.7	1.1	1.1	0.4	0.4	0.4	0.4	0.2	0.2	0.1	0.2	0.2	0.3	0.4	0.1	0.1	0.6	4.5	
2-Jul	0.1	Z	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.2	0.2	0.4	0.1	0.1	0.1	0.2	0.2	0.1	0.0	0.0	0.1	0.4
3-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.4	0.4	0.2	0.8	0.5	0.6	0.2	0.3	0.6	0.3	0.3	0.1	0.3	0.2	0.3	0.8	
4-Jul	0.2	0.2	0.2	Z	7.0	9.5	7.9	8.0	7.5	2.8	1.3	0.8	0.6	0.3	0.2	0.4	0.3	0.4	0.5	1.9	3.8	0.7	1.2	0.4	2.4	9.5	
5-Jul	0.1	0.2	1.0	1.9	Z	2.4	5.0	3.3	2.1	0.9	1.0	1.0	1.0	0.5	0.2	1.2	1.0	0.3	0.3	0.3	0.7	0.2	0.2	0.2	1.1	5.0	
6-Jul	0.1	0.3	1.4	5.3	3.5	Z	8.7	7.0	4.3	2.8	0.5	0.4	0.4	0.4	0.3	0.4	0.3	0.2	0.3	0.5	0.2	0.3	0.2	0.2	1.6	8.7	
7-Jul	Z	0.1	0.7	1.9	4.1	3.1	5.0	6.2	5.7	4.2	0.8	0.3	0.1	0.1	0.3	0.7	1.0	0.5	0.6	0.7	1.2	0.8	0.2	0.1	1.7	6.2	
8-Jul	0.1	Z	0.1	0.4	2.1	1.8	1.2	1.4	1.3	0.9	0.7	0.1	0.1	0.2	0.3	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.5	2.1	
9-Jul	0.1	0.1	Z	0.2	2.1	1.2	1.7	1.2	1.2	0.4	1.4	0.4	0.2	0.3	0.2	0.4	0.3	0.1	0.2	0.4	0.2	0.3	0.1	0.0	0.6	2.1	
10-Jul	0.1	0.3	0.4	Z	0.7	0.9	1.1	1.1	0.5	0.4	0.9	0.4	0.2	0.3	0.5	0.2	0.3	0.2	0.2	0.5	0.4	0.5	0.1	0.1	0.4	1.1	
11-Jul	0.1	0.1	0.1	0.4	Z	0.6	1.2	1.5	1.8	2.9	1.0	0.9	0.3	0.7	0.5	1.0	0.7	0.3	0.4	3.1	0.7	1.0	0.4	0.5	0.9	3.1	
12-Jul	1.1	0.1	0.2	0.2	0.4	Z	2.3	3.6	4.7	4.6	2.9	2.4	1.8	2.3	0.6	0.3	0.3	0.3	0.1	0.0	0.0	0.1	0.1	0.4	1.3	4.7	
13-Jul	Z	0.1	0.1	0.1	0.2	0.2	0.3	0.1	0.7	C	C	C	C	C	C	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	--	0.7	
14-Jul	0.0	Z	0.1	0.2	0.4	0.3	0.9	1.0	1.3	0.9	0.4	0.6	0.5	0.3	0.1	0.1	0.1	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.4	1.3	
15-Jul	0.1	0.1	Z	0.2	1.1	2.0	3.8	2.1	1.9	1.1	0.7	0.6	0.5	0.8	0.3	0.4	0.2	0.4	0.2	0.5	0.6	0.5	0.3	0.5	0.8	3.8	
16-Jul	0.7	0.7	1.5	Z	1.3	1.4	1.1	1.0	0.8	0.6	0.3	0.3	0.3	0.2	0.3	0.2	0.4	0.3	0.2	0.2	0.3	0.2	0.1	0.1	0.5	1.5	
17-Jul	0.1	0.1	0.1	0.1	Z	0.3	0.4	1.3	0.8	0.5	0.6	0.9	2.7	3.4	1.0	2.5	1.8	0.7	0.8	1.1	0.8	0.8	0.2	0.3	0.9	3.4	
18-Jul	1.9	2.9	3.9	4.5	8.7	Z	18.2	13.7	7.9	3.1	2.4	1.0	0.6	0.3	0.3	0.8	0.7	0.6	0.8	0.7	0.5	0.4	0.1	0.2	3.2	18.2	
19-Jul	Z	0.3	0.6	2.4	6.0	4.9	5.5	2.6	1.3	1.3	1.3	1.0	0.9	0.5	0.7	0.4	0.5	0.5	0.6	0.7	1.4	0.4	0.2	0.2	1.5	6.0	
20-Jul	0.2	Z	0.1	0.9	3.1	2.2	1.7	1.1	1.1	0.5	0.3	0.2	0.3	0.2	0.3	0.5	0.4	0.3	0.2	0.2	1.1	0.6	0.2	0.1	0.7	3.1	
21-Jul	0.2	0.2	Z	1.4	3.8	5.9	6.3	1.9	4.3	3.0	2.1	0.4	0.3	0.1	0.2	0.1	0.2	0.4	0.4	0.7	1.4	0.4	0.3	0.2	1.5	6.3	
22-Jul	0.3	0.3	0.4	Z	2.2	4.1	2.6	2.4	1.8	1.3	5.0	2.8	1.0	0.5	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.0	0.0	0.1	1.1	5.0	
23-Jul	0.1	0.2	0.1	0.7	Z	0.3	0.7	0.9	0.6	0.8	0.8	0.5	0.3	0.2	0.4	0.3	0.3	0.4	0.5	0.4	0.3	0.5	0.1	0.1	0.4	0.9	
24-Jul	0.1	0.2	1.0	1.0	3.1	Z	2.7	2.1	1.5	1.0	0.7	0.3	M	0.0	0.2	0.2	0.1	0.1	0.3	0.4	0.5	0.1	0.0	0.0	0.7	3.1	
25-Jul	Z	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.2	0.6	0.3	0.5	0.4	0.7	0.6	0.6	0.5	0.4	0.2	0.3	0.2	0.1	0.1	0.6	0.3	0.7	
26-Jul	0.3	Z	0.2	0.6	0.6	1.2	1.2	2.7	1.4	0.5	0.4	0.4	0.3	0.3	0.5	0.5	0.4	0.6	0.5	0.4	0.5	0.8	0.1	0.1	0.6	2.7	
27-Jul	0.1	0.1	Z	0.1	0.3	0.3	5.4	8.1	3.4	2.3	4.4	4.1	1.9	2.1	1.5	1.1	1.0	0.6	0.5	0.5	0.3	0.3	0.9	0.4	1.7	8.1	
28-Jul	0.8	1.3	2.7	Z	1.4	2.2	3.5	3.4	4.0	3.5	2.0	2.4	0.9	0.2	0.4	0.2	0.7	0.5	0.6	2.6	1.3	0.7	0.5	0.4	1.6	4.0	
29-Jul	0.4	0.4	0.3	0.4	Z	3.1	1.4	1.5	1.5	0.6	0.8	0.5	0.2	0.2	0.3	0.3	0.4	0.3	0.4	0.2	0.7	0.4	0.4	0.0	0.6	3.1	
30-Jul	0.0	0.1	0.2	0.3	0.5	Z	1.0	1.3	0.8	0.5	0.5	0.5	0.4	0.3	0.4	0.5	0.5	0.4	0.4	0.3	0.1	0.1	0.1	0.1	0.4	1.3	
31-Jul	Z	0.0	0.0	0.1	0.1	0.1	0.4	0.8	0.6	0.6	0.3	0.3	0.5	0.6	0.7	0.3	0.2	0.2	0.3	0.5	0.2	0.3	0.1	0.1	0.3	0.8	
																								Diurnal Average			
																								Diurnal Maximum			
																								0.3 1.9 0.3 2.9 0.6 3.9 0.9 5.3 2.0 8.7 1.9 9.5 3.1 18.2 2.7 13.7 2.1 7.9 1.5 4.6 1.2 5.0 0.8 4.1 0.6 2.7 0.6 3.4 0.4 1.5 0.5 2.5 0.4 1.8 0.3 0.7 0.4 0.8 0.6 3.1 0.4 3.8 0.4 1.0 0.2 0.6			
Z - zerospan C - Calibration M - Maintenance																											



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Athabasca Valley - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Athabasca Valley - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	46	16	11	16	47	50	113	50	23	49	70	40	24	13	34	104	706
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	46	16	11	16	47	50	113	50	23	49	70	40	24	13	34	104	706

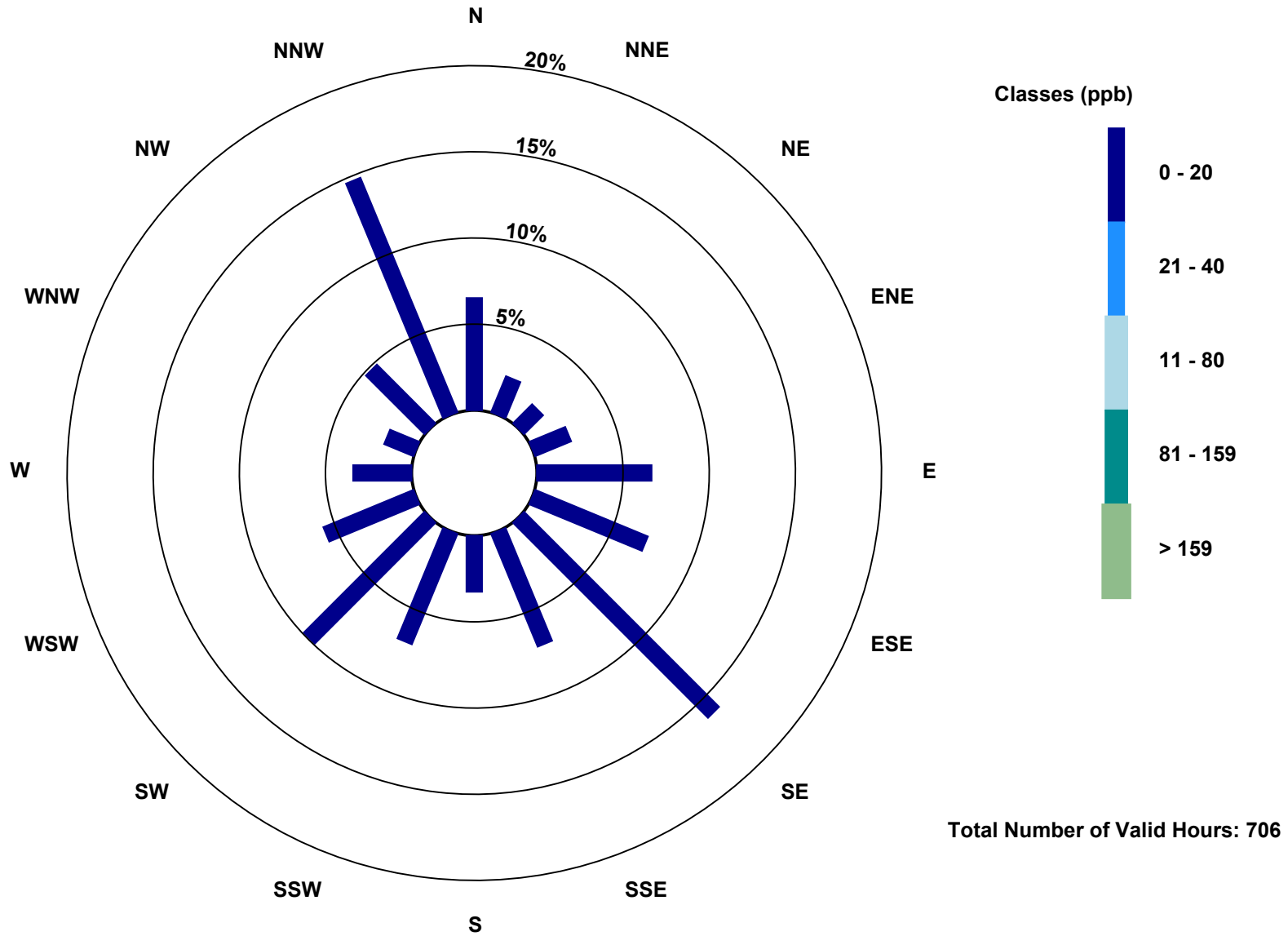
Total Number of Valid Hours: 706

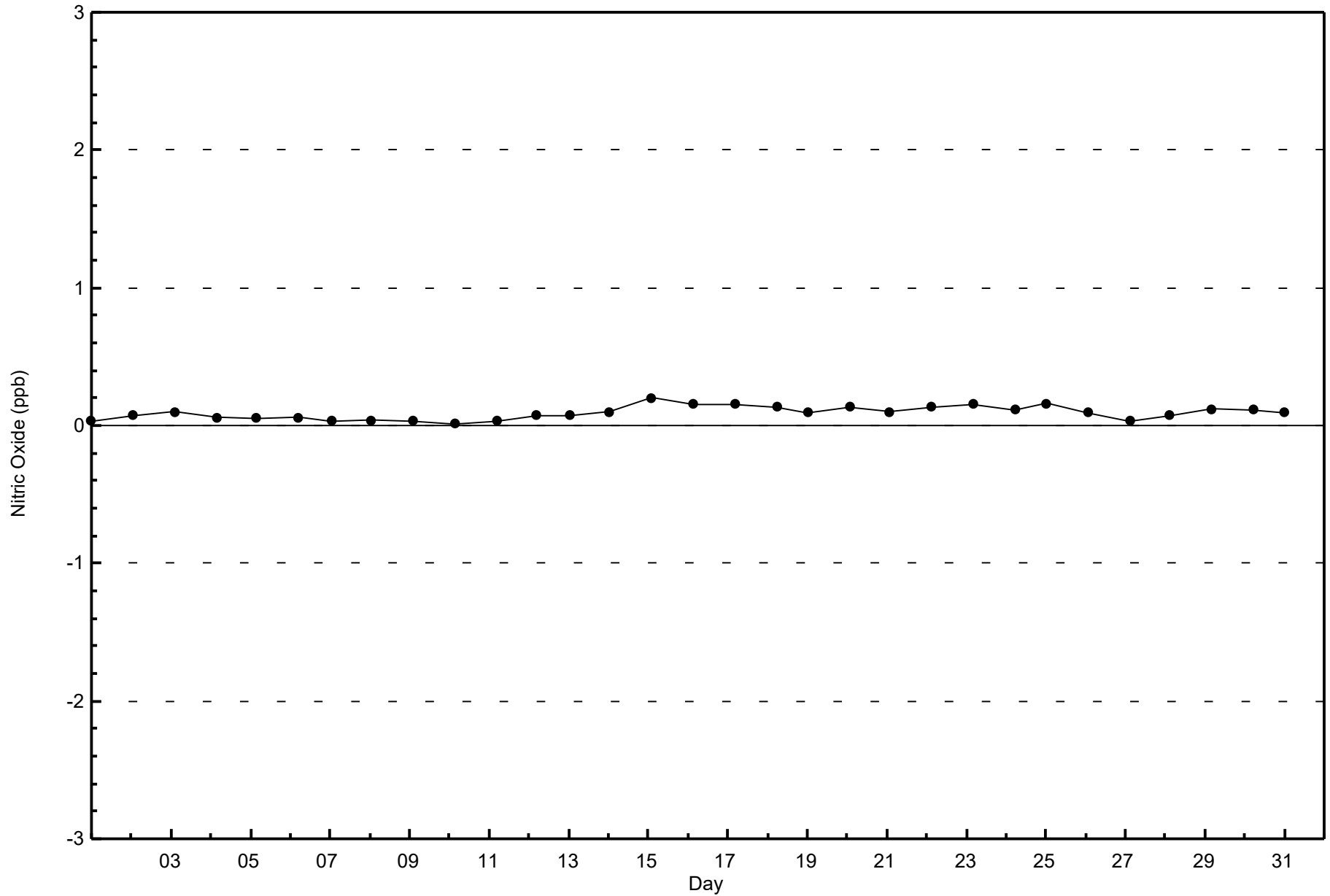
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Athabasca Valley

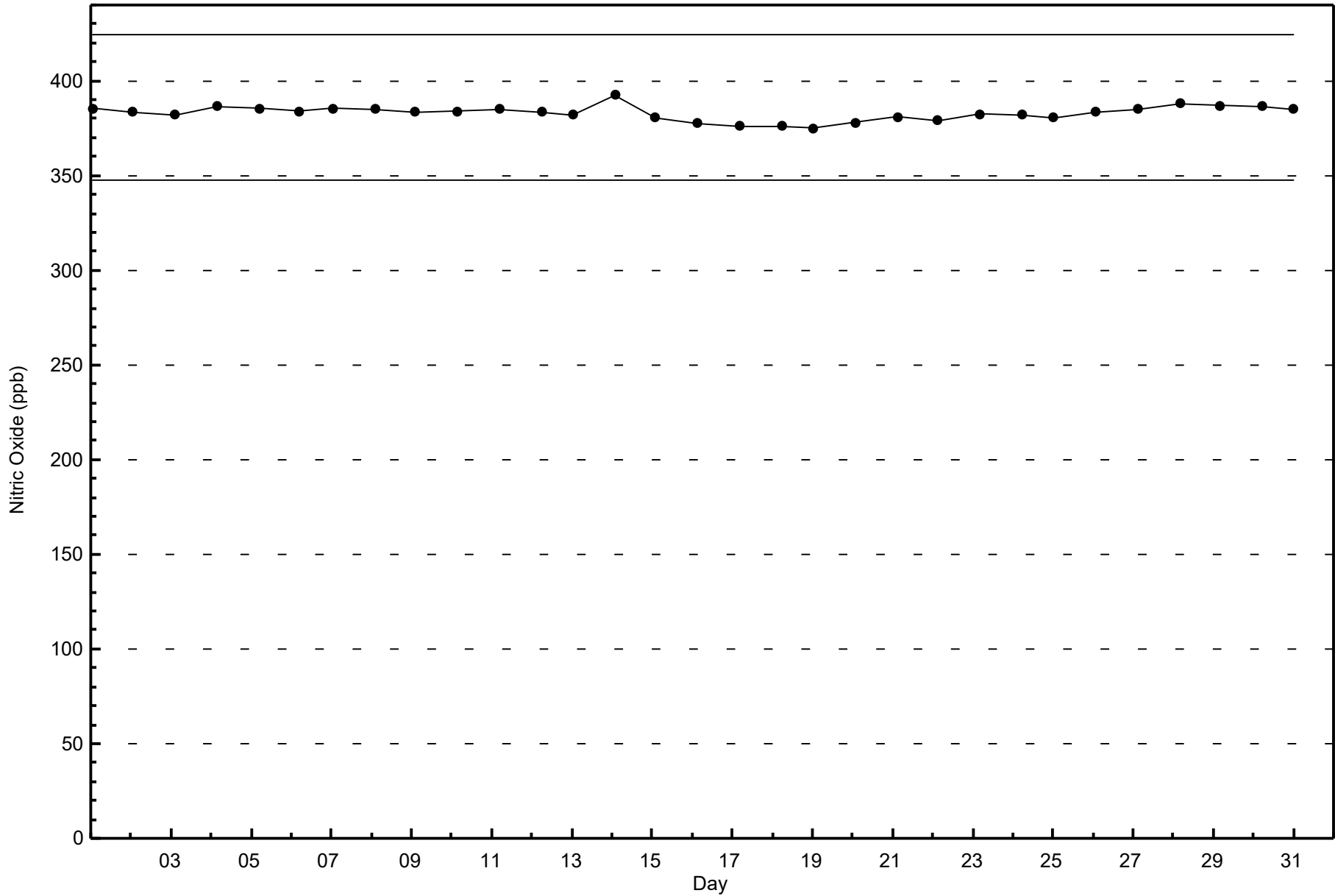






Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Athabasca Valley - July 2023





Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 15.1 ppb on Jul 15 05:00	Maximum Daily Average: 7.8 ppb on Jul 14		Hours of Data:	706
Minimum Value: 0.2 ppb on Jul 10 18:00	Minimum Daily Average: 1.6 ppb on Jul 16		Hours of Missing Data:	38
Maximum Diurnal Average: 5.7 ppb at hour 5	Minimum Diurnal Average: 2.3 ppb at hour 15		Hours of Calibration:	37
Monthly Average: 3.79 ppb	Percentiles: P ₁ = 0.4 P ₁₀ = 1.2 Q ₁ = 1.8 Median = 3.0 Q ₃ = 5.1 P ₉₀ = 7.3 P ₉₉ = 13.7		Percent Operational Time:	99.9

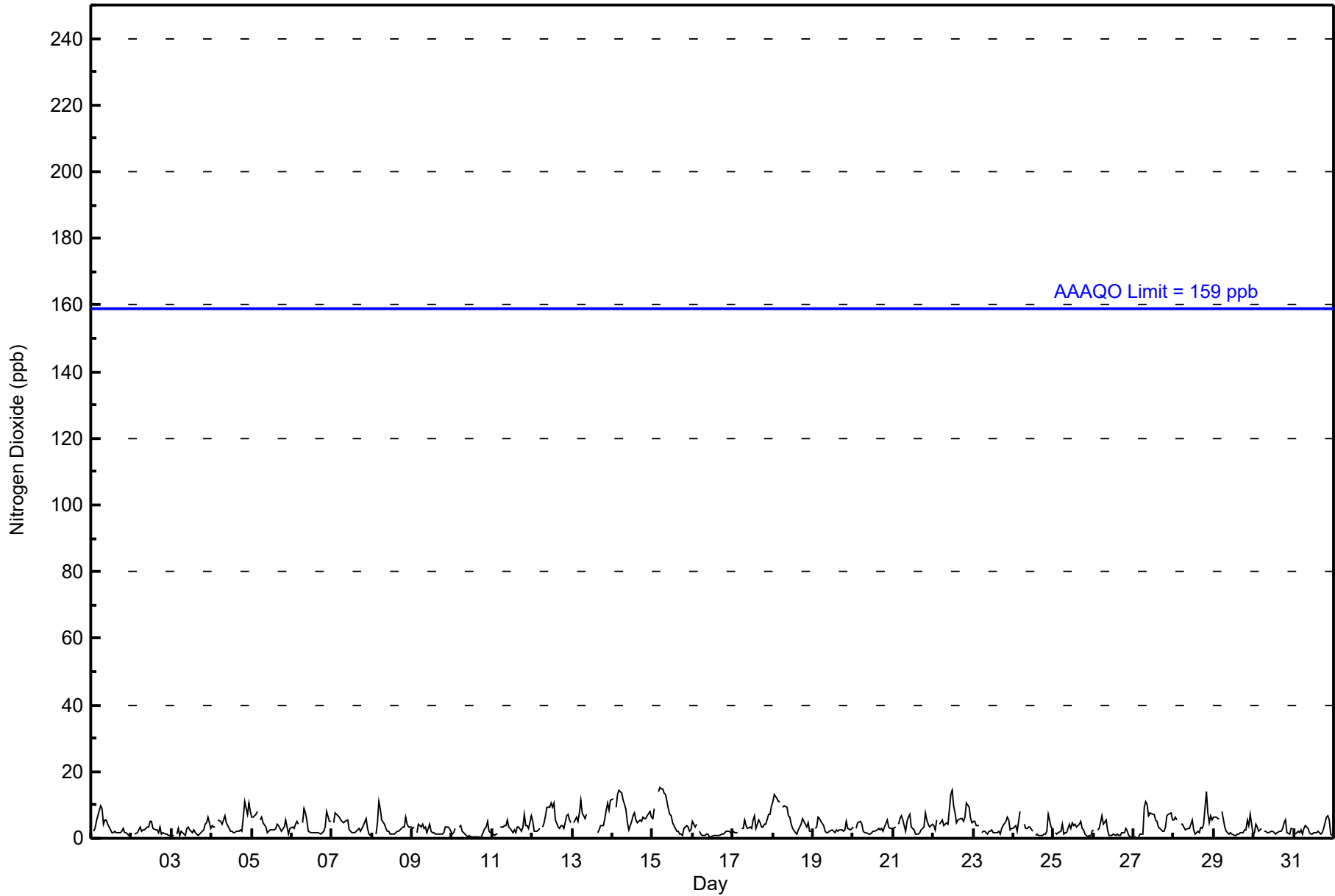
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	Z	2.2	3.0	5.0	6.7	9.8	9.0	4.4	5.3	5.7	4.4	2.6	1.9	1.6	2.0	1.8	1.9	1.9	2.2	3.1	1.6	1.6	0.9	1.0	3.5	9.8																							
2-Jul	1.3	Z	1.4	1.6	2.6	3.2	2.1	2.4	2.4	3.3	3.6	5.0	4.9	2.8	2.6	2.5	1.9	3.4	1.3	1.5	1.1	1.1	0.9	0.9	2.3	5.0																							
3-Jul	0.7	0.8	Z	1.3	2.8	0.9	2.3	1.1	0.8	2.9	3.2	2.6	1.5	2.5	1.9	1.4	0.8	1.2	2.1	2.5	4.1	4.7	6.3	2.8	2.2	6.3																							
4-Jul	4.0	3.4	3.4	Z	5.4	4.9	4.3	5.3	6.6	4.6	3.0	2.3	2.3	1.9	1.8	2.3	2.3	2.7	2.2	6.5	11.0	7.3	10.6	8.2	4.6	11.0																							
5-Jul	6.2	6.3	7.4	8.2	Z	5.6	6.2	4.8	3.2	1.8	2.2	2.4	2.4	2.7	2.8	4.1	3.7	3.1	2.3	3.4	5.4	3.3	1.3	2.9	4.0	8.2																							
6-Jul	3.6	2.9	4.2	5.1	4.2	Z	4.7	8.7	7.5	5.5	2.0	1.8	1.6	1.6	1.6	1.7	1.5	1.2	1.7	2.0	3.3	8.0	4.9	4.9	3.7	8.7																							
7-Jul	Z	4.8	7.5	7.2	6.3	5.4	4.9	4.5	5.1	5.3	2.5	2.0	1.9	1.5	1.7	2.4	2.9	2.1	2.8	3.9	5.8	3.0	1.2	0.8	3.7	7.5																							
8-Jul	1.1	Z	1.2	4.7	11.2	8.8	5.4	4.3	2.8	2.1	2.0	1.3	1.4	1.3	1.8	2.2	2.0	2.6	3.2	3.3	6.3	4.4	3.3	3.6	3.5	11.2																							
9-Jul	3.0	3.2	Z	1.9	4.4	3.4	4.1	3.0	3.2	1.5	4.1	2.3	1.9	1.8	1.2	1.4	1.3	1.2	1.2	1.6	3.5	3.3	3.0	2.1	2.5	4.4																							
10-Jul	1.4	1.8	2.8	Z	3.5	3.9	2.0	1.8	0.8	0.6	1.0	0.5	0.3	0.3	0.3	0.3	0.5	0.2	0.7	2.9	3.5	5.2	2.3	1.6	1.7	5.2																							
11-Jul	1.7	0.9	1.2	1.1	Z	3.4	3.6	3.7	3.9	5.5	3.6	3.1	1.5	2.5	1.9	3.2	3.2	2.3	3.6	7.2	3.7	3.8	2.8	6.9	3.2	7.2																							
12-Jul	4.9	2.2	2.3	2.3	3.0	Z	3.4	4.6	6.8	9.4	9.3	10.6	9.4	10.6	5.3	3.5	2.8	3.9	3.8	3.1	6.8	7.3	5.7	4.5	5.5	10.6																							
13-Jul	Z	4.6	6.2	5.2	7.7	11.6	7.7	5.9	7.2	C	C	C	C	C	C	1.9	2.4	3.9	3.8	5.8	8.6	10.6	8.4	11.3	--	11.6																							
14-Jul	11.9	Z	9.5	13.2	14.6	13.7	11.5	10.0	8.3	4.7	2.7	5.2	6.7	7.5	5.5	4.8	5.3	5.1	6.5	6.1	6.0	6.8	7.9	6.2	7.8	14.6																							
15-Jul	6.0	9.1	Z	14.0	15.1	14.8	14.9	13.5	13.1	8.7	7.3	6.9	4.5	3.9	2.2	2.1	1.2	1.2	0.7	2.8	3.8	3.3	2.3	2.5	6.7	15.1																							
16-Jul	5.0	3.2	4.3	Z	2.2	1.3	0.8	1.0	1.1	1.2	0.5	0.5	0.9	0.9	0.9	1.0	0.9	1.1	1.1	1.5	2.2	2.2	2.0	1.4	1.6	5.0																							
17-Jul	2.0	1.7	1.5	1.9	Z	3.1	2.9	5.3	3.7	3.0	3.4	2.8	5.6	6.8	3.1	5.7	4.7	3.6	3.4	4.2	4.1	7.1	7.2	9.9	4.2	9.9																							
18-Jul	10.9	13.2	11.7	11.2	10.9	Z	9.5	9.8	9.5	6.7	6.3	4.3	3.0	1.7	1.4	2.6	3.5	4.4	6.0	4.4	3.5	4.5	2.3	2.1	6.2	13.2																							
19-Jul	Z	2.8	3.6	6.5	5.8	5.2	4.0	2.1	1.5	1.6	2.1	2.7	2.0	1.8	2.4	2.0	2.7	2.4	2.2	2.7	5.1	3.0	2.5	3.0	3.0	6.5																							
20-Jul	3.3	Z	3.0	4.6	5.1	4.2	2.1	1.5	1.5	1.4	1.4	1.6	2.0	2.0	2.5	3.1	2.7	2.8	2.2	3.3	5.5	3.5	3.1	2.8	2.8	5.5																							
21-Jul	2.9	3.5	Z	4.4	6.0	6.7	5.7	2.3	5.2	6.2	7.4	3.4	2.6	1.4	1.4	1.2	1.8	2.7	3.2	7.8	5.6	4.1	3.4	4.1	4.0	7.8																							
22-Jul	3.7	2.5	5.3	Z	4.2	5.3	3.9	4.3	4.7	4.1	13.1	14.6	9.8	7.7	4.8	5.3	5.8	6.1	4.9	6.2	10.4	9.4	5.9	4.6	6.4	14.6																							
23-Jul	5.1	5.0	4.0	3.7	Z	1.8	2.1	2.0	1.3	2.0	2.2	2.6	1.9	1.5	1.9	2.3	1.4	2.8	3.8	4.9	6.3	5.4	2.5	2.9	3.0	6.3																							
24-Jul	3.0	4.0	2.0	5.2	7.9	Z	4.2	2.9	3.1	3.5	3.2	2.2	M	0.7	1.3	0.9	1.0	0.8	1.2	1.3	2.3	7.3	3.6	2.9	2.9	7.9																							
25-Jul	Z	1.8	1.2	1.8	2.1	4.4	1.1	1.8	1.6	4.3	2.8	4.5	4.0	4.3	3.5	4.1	5.2	3.1	2.7	1.4	0.6	0.7	0.6	2.3	2.6	5.2																							
26-Jul	2.7	Z	2.5	3.0	4.8	6.9	4.4	5.6	2.6	1.0	0.8	0.9	1.4	1.0	1.1	0.9	0.9	1.6	1.9	2.8	2.1	0.7	0.4	0.3	2.2	6.9																							
27-Jul	0.4	0.5	Z	0.4	1.4	1.4	9.3	10.9	10.2	6.6	7.5	7.2	7.2	5.3	5.2	3.2	2.7	2.0	2.0	3.5	6.6	7.1	7.7	5.4	4.9	10.9																							
28-Jul	5.6	6.3	5.6	Z	4.2	4.3	3.3	2.7	3.0	3.1	4.3	5.6	2.5	1.2	2.2	1.6	3.5	2.8	4.1	13.9	7.6	4.6	6.6	5.4	4.5	13.9																							
29-Jul	6.3	6.5	5.8	6.1	Z	7.9	3.4	2.3	1.9	1.1	1.5	1.3	0.9	0.9	1.2	1.3	1.8	1.6	2.5	2.4	5.5	3.9	7.3	1.1	3.2	7.9																							
30-Jul	1.8	4.2	3.3	2.3	3.1	Z	2.2	2.0	1.8	1.7	2.0	2.0	1.5	1.4	1.6	2.1	2.2	3.0	4.8	5.7	1.7	1.2	2.9	3.0	2.5	5.7																							
31-Jul	Z	1.4	2.1	1.9	2.5	1.4	2.9	3.9	3.0	1.8	1.3	1.4	1.7	1.8	2.1	1.5	1.1	1.6	3.0	6.2	6.9	5.7	1.3	0.8	2.5	6.9																							
																								3.9	3.8	4.1	4.8	5.7	5.5	4.8	4.5	4.3	3.7	3.7	3.5	3.1	2.8	2.3	2.4	2.4	2.5	2.8	4.1	4.9	4.6	3.9	3.6	Diurnal Average	
																								11.9	13.2	11.7	14.0	15.1	14.8	14.9	13.5	13.1	9.4	13.1	14.6	9.8	10.6	5.5	5.7	5.8	6.1	6.5	13.9	11.0	10.6	10.6	11.3	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	46	16	11	16	47	50	113	50	23	49	70	40	24	13	34	104	706
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	46	16	11	16	47	50	113	50	23	49	70	40	24	13	34	104	706

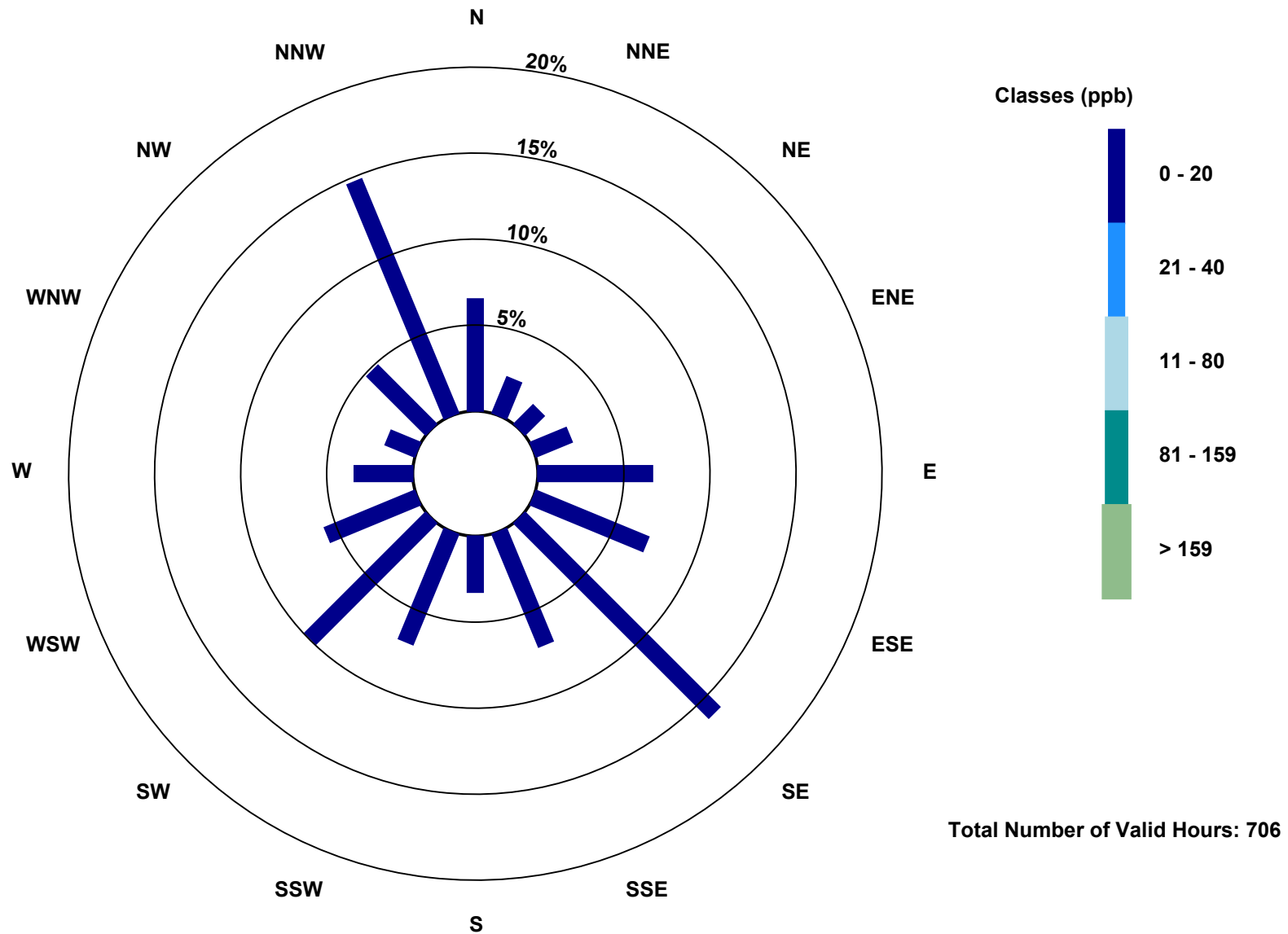
Total Number of Valid Hours: 706

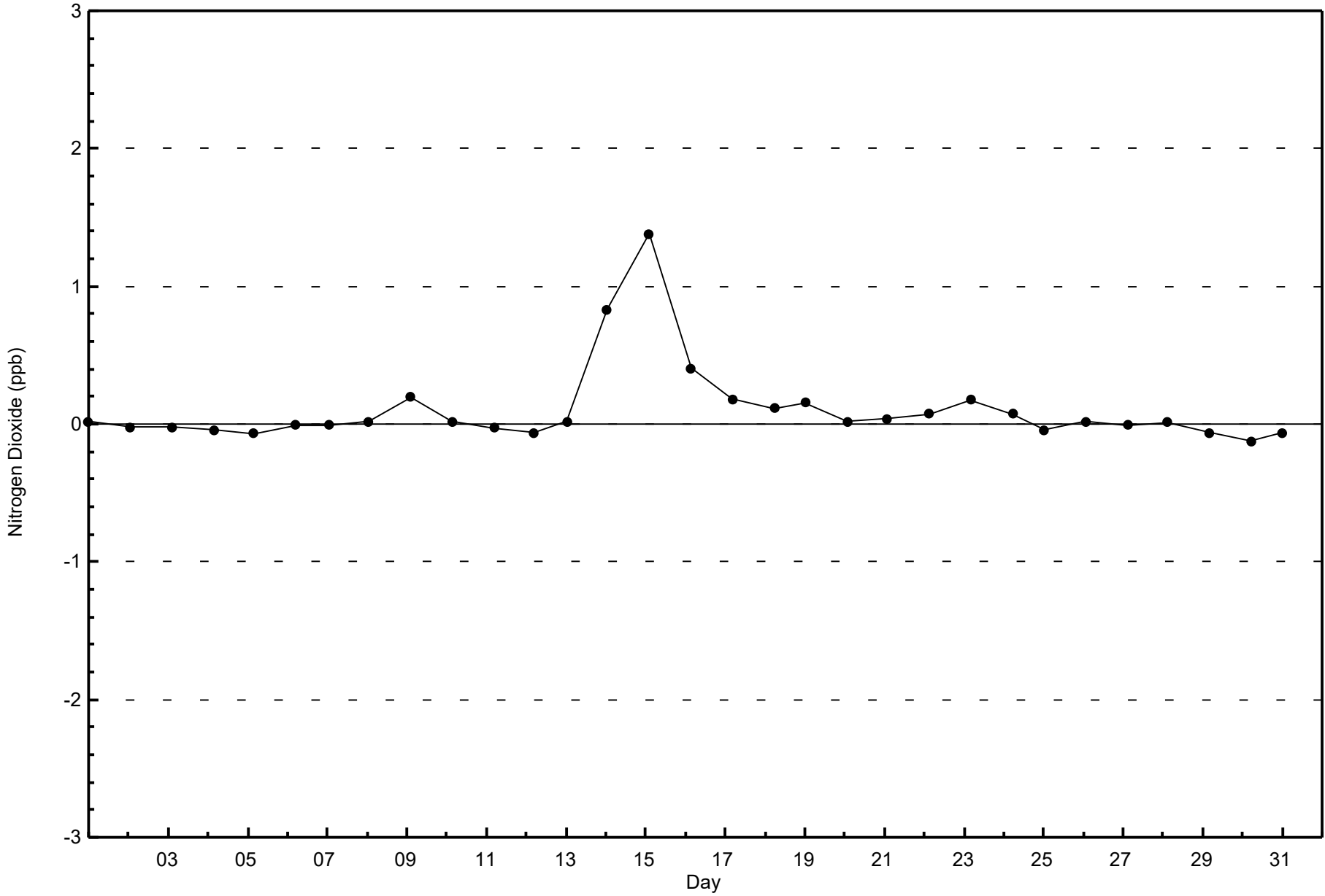
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley

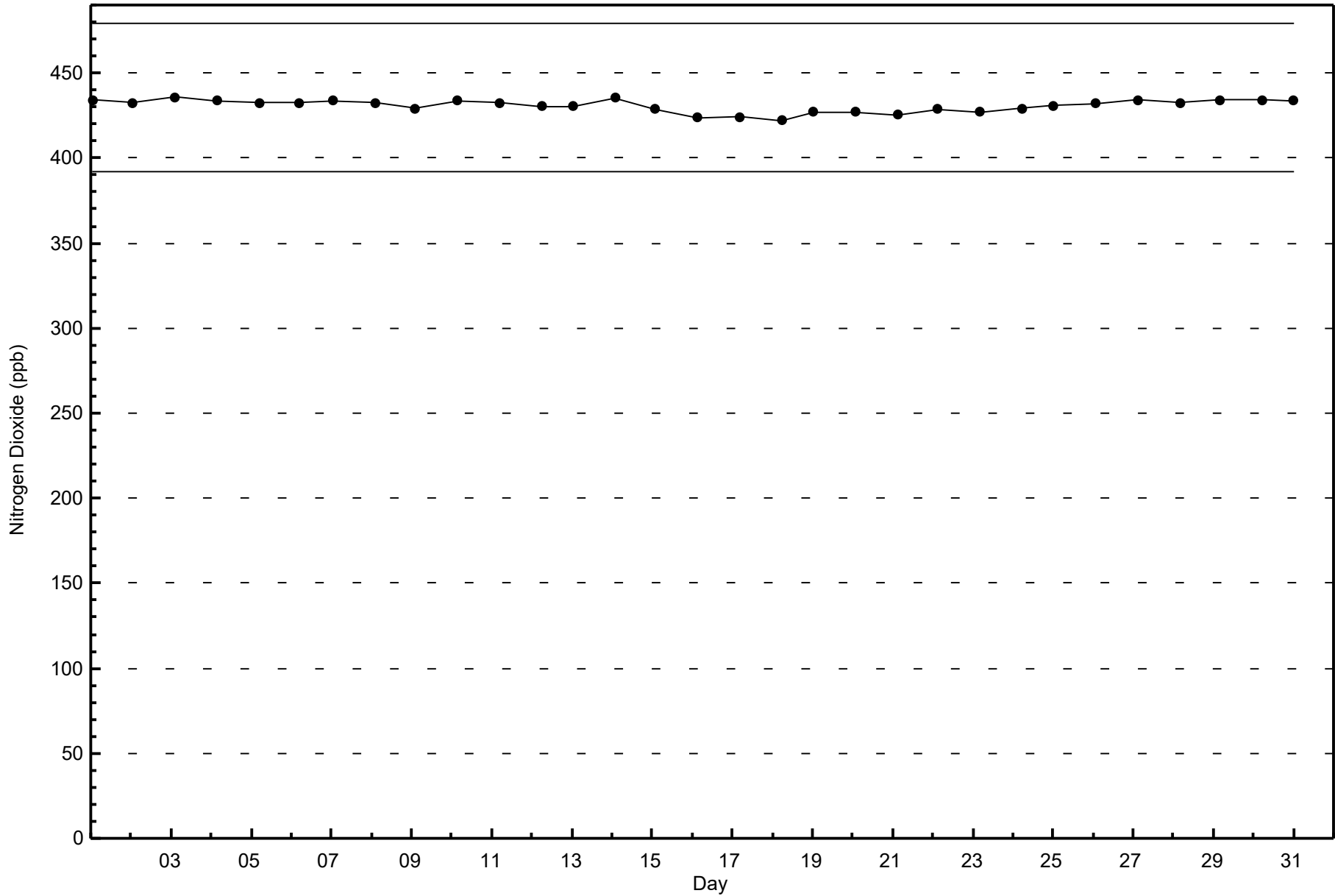






Wood Buffalo Environmental Association
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - July 2023





Wood Buffalo Environmental Association
Summary of Hour Averages

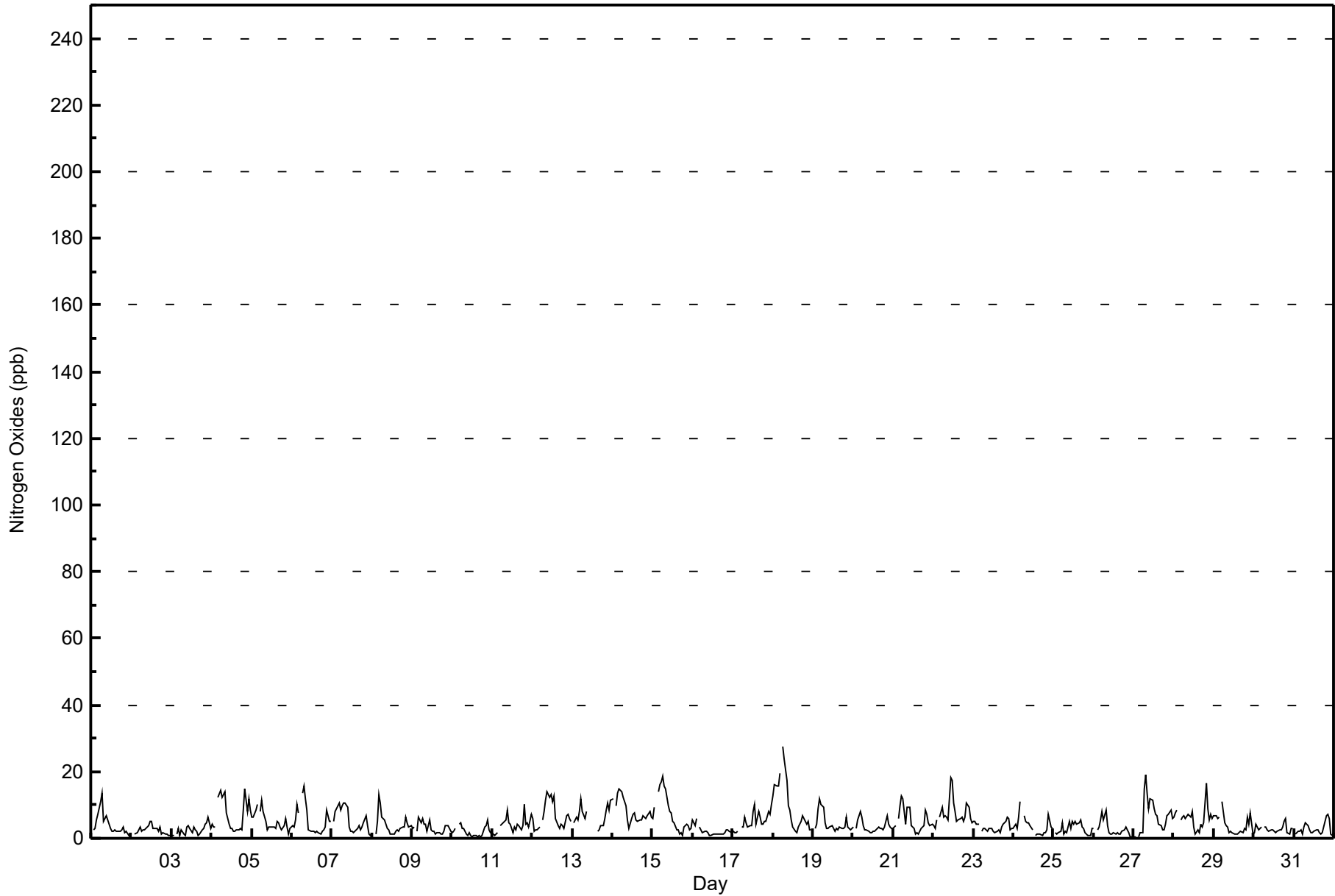
Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - July 2023

Maximum Value: 27.7 ppb on Jul 18 07:00																		Maximum Daily Average: 9.5 ppb on Jul 18																		Hours in Service: 744	
Minimum Value: 0.4 ppb on Jul 27 00:00																		Minimum Daily Average: 2.1 ppb on Jul 10																		Hours of Data: 706	
Maximum Diurnal Average: 7.9 ppb at hour 7																		Minimum Diurnal Average: 2.7 ppb at hour 15																		Hours of Missing Data: 38	
Monthly Average: 4.73 ppb																		Percentiles: P ₁ = 0.6 P ₁₀ = 1.4 Q ₁ = 2.2 Median = 3.5 Q ₃ = 6.2 P ₉₀ = 9.8 P ₉₉ = 17.3																		Hours of Calibration: 37	
																																				Percent Operational Time: 99.9	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Jul	Z	2.3	3.1	5.3	7.0	10.9	13.5	5.0	6.0	6.8	5.5	3.0	2.3	2.0	2.4	2.0	2.1	2.0	2.4	3.3	1.9	2.0	1.0	1.1	4.0	13.5											
2-Jul	1.4	Z	1.4	1.6	2.6	3.3	2.2	2.5	2.5	3.4	3.8	5.3	5.2	3.0	2.8	2.9	2.0	3.5	1.4	1.7	1.3	1.2	0.9	0.9	2.5	5.3											
3-Jul	0.7	0.8	Z	1.3	2.8	0.9	2.4	1.1	0.8	3.3	3.6	3.0	1.7	3.3	2.4	2.0	1.0	1.5	2.7	2.8	4.4	4.8	6.6	3.0	2.5	6.6											
4-Jul	4.2	3.6	3.6	Z	12.4	14.4	12.2	13.3	14.1	7.4	4.3	3.1	2.9	2.2	2.0	2.7	2.6	3.1	2.7	8.4	14.8	8.0	11.8	8.6	7.1	14.8											
5-Jul	6.3	6.5	8.4	10.1	Z	8.0	11.2	8.1	5.3	2.7	3.2	3.4	3.4	3.2	3.0	5.3	4.7	3.4	2.6	3.7	6.1	3.5	1.5	3.1	5.1	11.2											
6-Jul	3.7	3.2	5.6	10.4	7.7	Z	13.4	15.7	11.8	8.3	2.5	2.2	2.0	2.0	1.9	2.1	1.8	1.4	2.0	2.5	3.5	8.3	5.1	5.1	5.3	15.7											
7-Jul	Z	4.9	8.2	9.1	10.4	8.5	9.9	10.7	10.8	9.5	3.3	2.3	2.0	1.6	2.0	3.1	3.9	2.6	3.4	4.6	7.0	3.8	1.4	0.9	5.4	10.8											
8-Jul	1.2	Z	1.3	5.1	13.3	10.6	6.6	5.7	4.1	3.0	2.7	1.4	1.5	1.5	2.1	2.4	2.1	2.8	3.4	3.4	6.5	4.6	3.5	3.7	4.0	13.3											
9-Jul	3.1	3.3	Z	2.1	6.5	4.6	5.8	4.2	4.4	1.9	5.5	2.7	2.1	2.1	1.4	1.8	1.6	1.3	1.4	2.0	3.7	3.6	3.1	2.1	3.1	6.5											
10-Jul	1.5	2.1	3.2	Z	4.2	4.8	3.1	2.9	1.3	1.0	1.9	0.9	0.5	0.6	0.8	0.5	0.8	0.4	0.9	3.4	3.9	5.7	2.4	1.7	2.1	5.7											
11-Jul	1.8	1.0	1.3	1.5	Z	4.0	4.8	5.2	5.7	8.4	4.6	4.0	1.8	3.2	2.4	4.2	3.9	2.6	4.0	10.3	4.4	4.8	3.2	7.4	4.1	10.3											
12-Jul	6.0	2.3	2.5	2.5	3.4	Z	5.7	8.2	11.5	14.0	12.2	13.0	11.2	12.9	5.9	3.8	3.1	4.2	3.9	3.1	6.8	7.4	5.8	4.9	6.7	14.0											
13-Jul	Z	4.7	6.3	5.3	7.9	11.8	8.0	6.0	7.9	C	C	C	C	C	C	2.1	2.5	4.0	3.9	5.8	8.6	10.6	8.4	11.3	--	11.8											
14-Jul	11.9	Z	9.6	13.4	15.0	14.0	12.4	11.0	9.6	5.6	3.1	5.8	7.2	7.8	5.6	4.9	5.4	5.3	6.8	6.3	6.1	6.9	8.0	6.3	8.2	15.0											
15-Jul	6.1	9.2	Z	14.2	16.2	16.8	18.7	15.6	15.0	9.8	8.0	7.5	5.0	4.7	2.5	2.5	1.4	1.6	0.9	3.3	4.4	3.8	2.6	3.0	7.5	18.7											
16-Jul	5.7	3.9	5.8	Z	3.5	2.7	1.9	2.0	1.9	1.8	0.8	0.8	1.2	1.1	1.2	1.2	1.3	1.4	1.3	1.7	2.5	2.4	2.1	1.5	2.1	5.8											
17-Jul	2.1	1.8	1.6	2.0	Z	3.4	3.3	6.6	4.5	3.5	4.0	3.7	8.3	10.2	4.1	8.2	6.5	4.3	4.2	5.3	4.9	7.9	7.4	10.2	5.1	10.2											
18-Jul	12.8	16.1	15.6	15.7	19.6	Z	27.7	23.5	17.4	9.8	8.7	5.3	3.6	2.0	1.7	3.4	4.2	5.0	6.8	5.1	4.0	4.9	2.4	2.3	9.5	27.7											
19-Jul	Z	3.1	4.2	8.9	11.8	10.1	9.5	4.7	2.8	2.9	3.4	3.7	2.9	2.3	3.1	2.4	3.2	2.9	2.8	3.4	6.5	3.4	2.7	3.2	4.5	11.8											
20-Jul	3.5	Z	3.1	5.5	8.2	6.4	3.8	2.6	2.6	1.9	1.7	1.8	2.3	2.2	2.8	3.6	3.1	3.1	2.4	3.5	6.6	4.1	3.3	2.9	3.5	8.2											
21-Jul	3.1	3.7	Z	5.8	9.8	12.6	12.0	4.2	9.5	9.2	9.5	3.8	2.9	1.5	1.6	1.3	2.0	3.1	3.6	8.5	7.0	4.5	3.7	4.3	5.5	12.6											
22-Jul	4.0	2.8	5.7	Z	6.4	9.4	6.5	6.7	6.5	5.4	18.1	17.4	10.8	8.2	5.0	5.5	6.0	6.3	5.0	6.3	10.6	9.4	5.9	4.7	7.5	18.1											
23-Jul	5.2	5.2	4.1	4.4	Z	2.1	2.8	2.9	1.9	2.8	3.0	3.1	2.2	1.7	2.3	2.6	1.7	3.2	4.3	5.3	6.6	5.9	2.6	3.0	3.4	6.6											
24-Jul	3.1	4.2	3.0	6.2	11.0	Z	6.9	5.0	4.6	4.5	3.9	2.5	M	0.7	1.5	1.1	1.1	0.9	1.5	1.7	2.8	7.4	3.6	2.9	3.6	11.0											
25-Jul	Z	1.8	1.2	1.8	2.2	4.6	1.2	1.9	1.8	4.9	3.1	5.0	4.4	5.0	4.1	4.7	5.7	3.5	2.9	1.7	0.8	0.8	0.7	2.9	2.9	5.7											
26-Jul	3.0	Z	2.7	3.6	5.4	8.1	5.6	8.3	4.0	1.5	1.2	1.3	1.7	1.3	1.6	1.4	1.3	2.2	2.4	3.2	2.6	1.5	0.5	0.4	2.8	8.3											
27-Jul	0.5	0.6	Z	0.5	1.7	1.7	14.7	19.0	13.6	8.9	11.9	11.3	9.1	7.4	6.7	4.3	3.7	2.6	2.5	4.0	6.9	7.4	8.6	5.8	6.7	19.0											
28-Jul	6.4	7.6	8.3	Z	5.6	6.5	6.8	6.1	7.0	6.6	6.3	8.0	3.4	1.4	2.6	1.8	4.2	3.3	4.7	16.5	8.9	5.3	7.1	5.8	6.1	16.5											
29-Jul	6.7	6.9	6.1	6.5	Z	11.0	4.8	3.8	3.4	1.7	2.3	1.8	1.1	1.1	1.5	1.6	2.2	1.9	2.9	2.6	6.2	4.3	7.7	1.1	3.9	11.0											
30-Jul	1.8	4.3	3.5	2.6	3.6	Z	3.2	3.3	2.6	2.2	2.5	2.5	1.9	1.7	2.0	2.6	2.7	3.4	5.2	6.0	1.8	1.3	3.0	3.1	2.9	6.0											
31-Jul	Z	1.4	2.1	2.0	2.6	1.5	3.3	4.7	3.6	2.4	1.6	1.7	2.2	2.4	2.8	1.8	1.3	1.8	3.3	6.7	7.1	6.0	1.4	0.9	2.8	7.1											
																								Diurnal Average													
																								Diurnal Maximum													
Z - zerospan C - Calibration M - Maintenance																																					



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	704	99.72	99.72
21 - 40	2	0.28	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	46	16	11	16	47	50	113	50	23	49	70	40	24	13	34	102	704
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	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	46	16	11	16	47	50	113	50	23	49	70	40	24	13	34	104	706

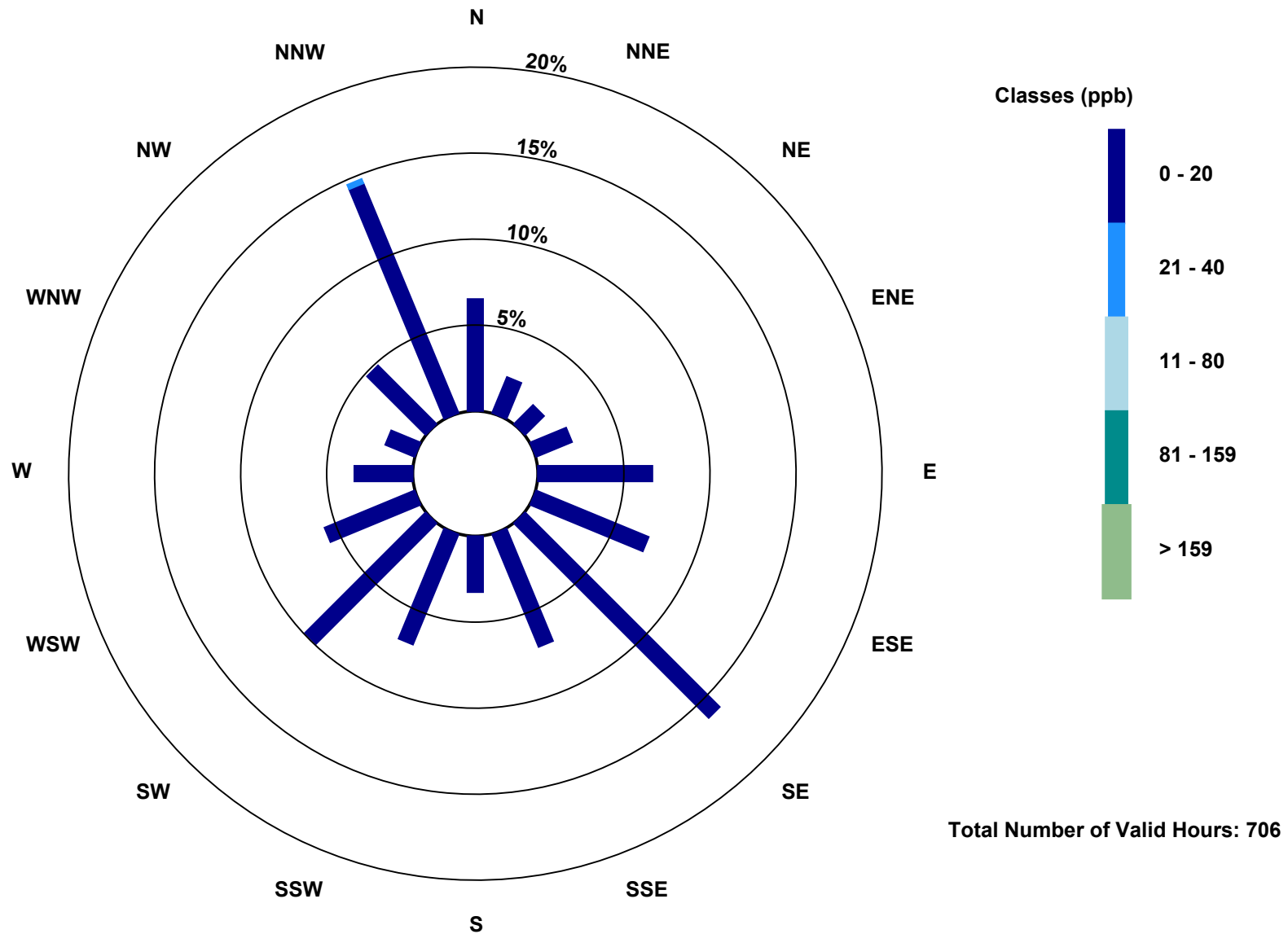
Total Number of Valid Hours: 706

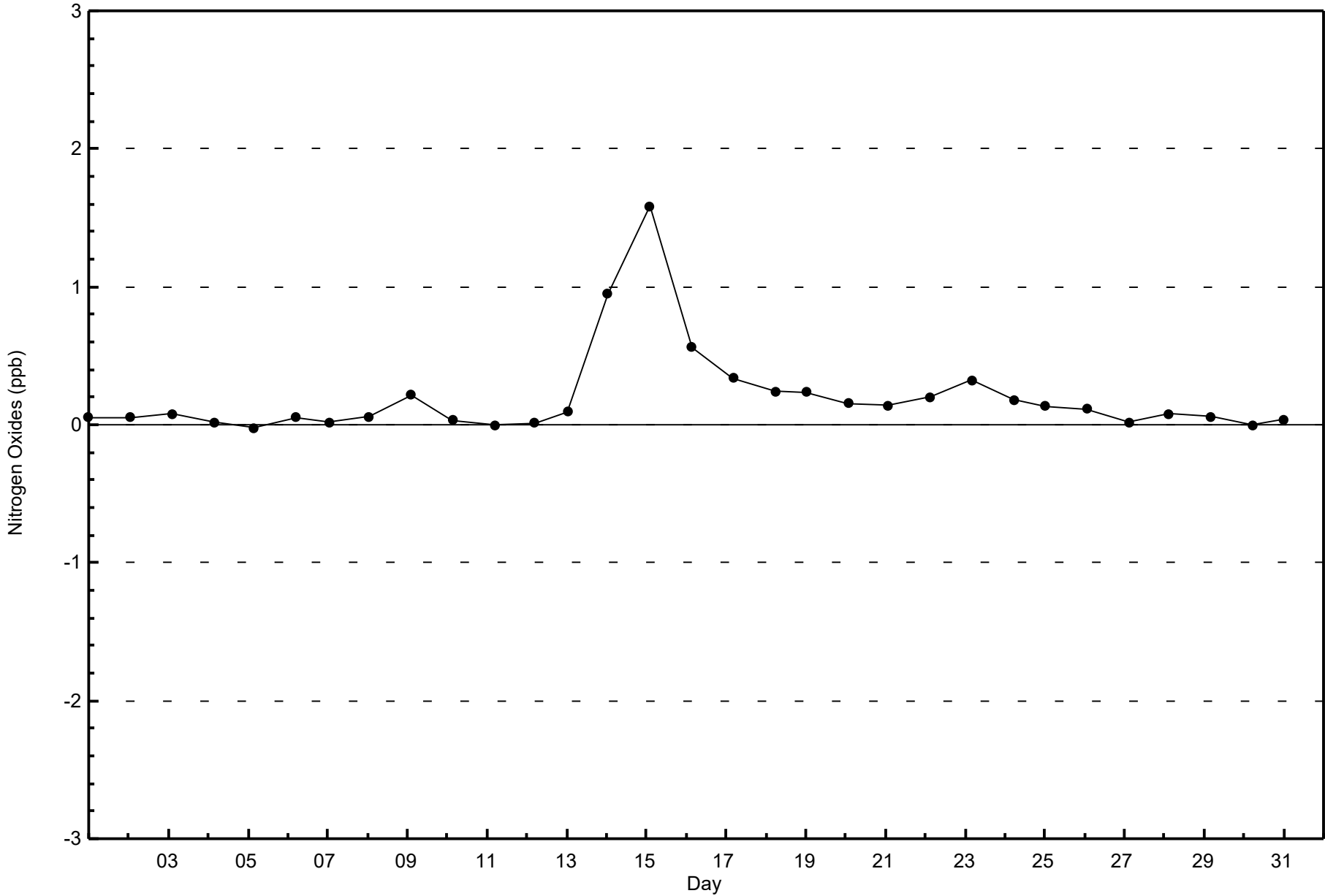
Total Number of Hours: 744

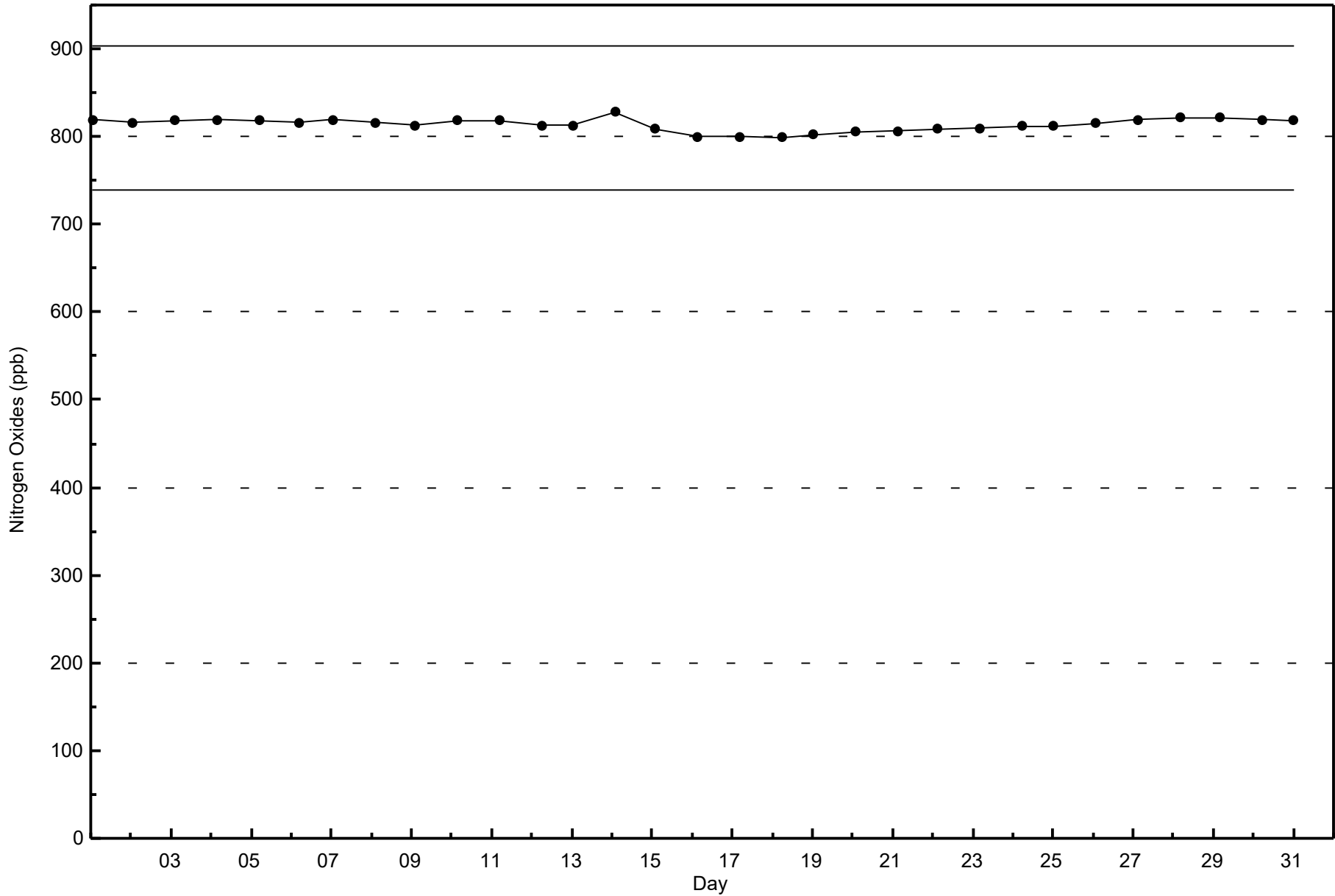


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley









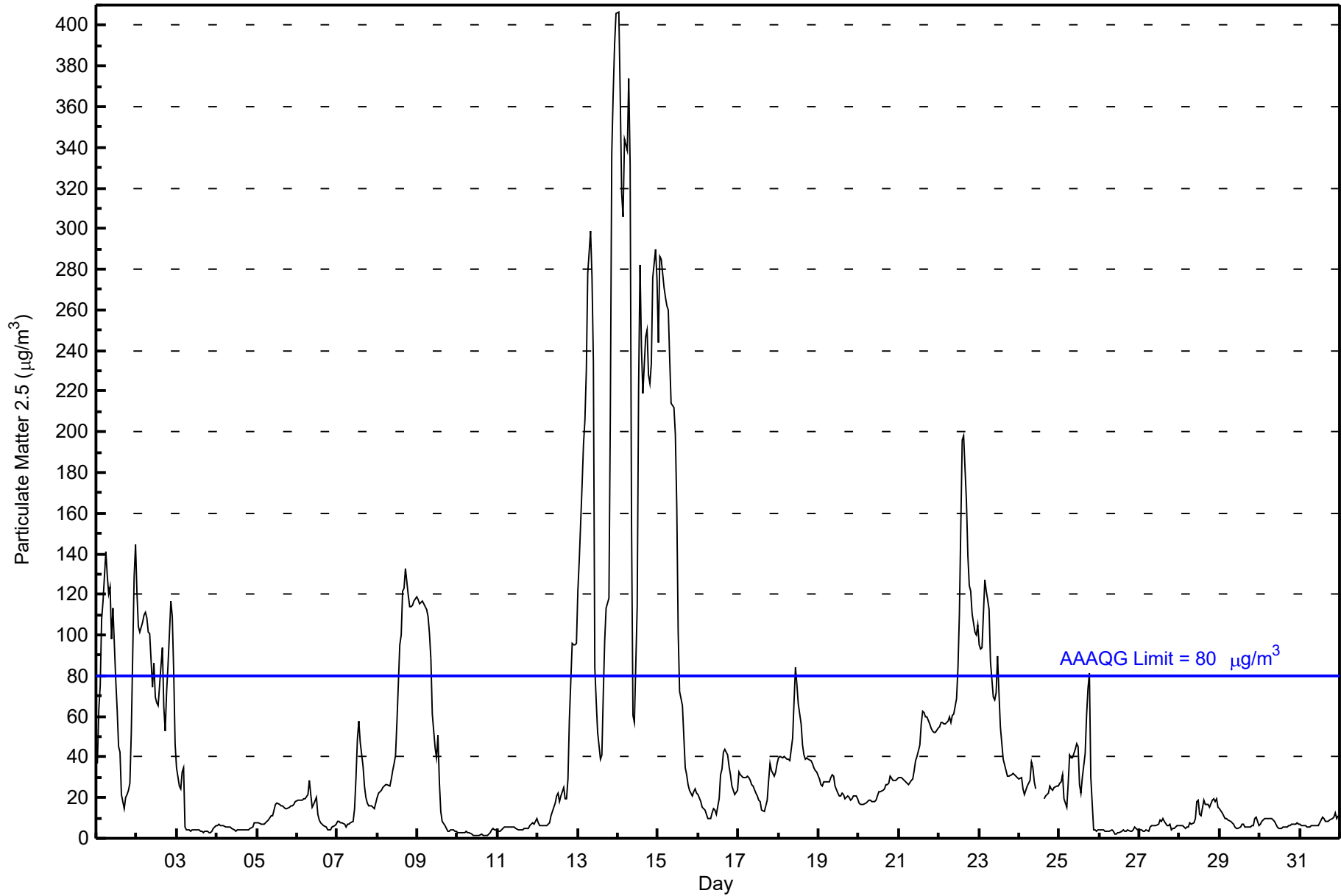
Summary of Hour Averages

Athabasca Valley - July 2023

Number of Exceedences (AAAQO):	1-hr: 128	24-hr: 13	Hours in Service:	744
Maximum Value: 406.3 µg/m ³ on Jul 14 01:00	Maximum Daily Average: 256.4 µg/m ³ on Jul 14		Hours of Data:	740
Minimum Value: 1.5 µg/m ³ on Jul 10 12:00	Minimum Daily Average: 2.6 µg/m ³ on Jul 10		Hours of Missing Data:	4
Maximum Diurnal Average: 57.5 µg/m ³ at hour 7	Minimum Diurnal Average: 37.2 µg/m ³ at hour 11		Hours of Calibration:	4
Monthly Average: 46.01 µg/m ³	Percentiles: P ₁ = 1.7 P ₁₀ = 4.1 Q ₁ = 6.6 Median = 20.7 Q ₃ = 50.0 P ₉₀ = 116.5 P ₉₉ = 338.1		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	36.6	63.0	75.0	108.0	117.0	141.1	128.9	120.3	124.0	98.1	113.2	78.0	63.4	45.1	42.7	21.6	14.4	20.4	21.3	23.4	26.8	52.2	128.3	144.2	75.3	144.2
2-Jul	120.9	104.2	101.2	106.0	109.6	111.5	108.2	101.3	101.0	74.2	86.3	69.7	66.5	65.3	84.8	93.6	64.4	52.5	72.2	85.4	116.5	109.2	82.0	46.6	88.9	120.9
3-Jul	34.5	25.9	24.1	32.8	34.7	5.8	4.3	3.9	3.5	4.0	4.1	4.1	3.9	3.8	3.7	3.6	3.0	3.2	3.3	2.9	3.1	3.3	4.8	6.0	9.4	34.7
4-Jul	6.5	6.8	6.5	6.1	6.3	5.7	5.4	5.6	5.4	4.5	4.0	3.7	4.1	4.0	4.4	4.2	4.4	4.2	4.1	4.3	5.2	5.6	7.9	7.6	5.3	7.9
5-Jul	7.4	7.6	7.0	6.8	7.2	7.3	8.3	9.3	11.0	11.2	13.8	17.0	17.1	16.5	15.7	15.8	15.0	14.7	14.3	15.5	16.0	16.2	16.9	17.8	12.7	17.8
6-Jul	18.5	18.4	19.0	18.9	19.7	19.2	21.6	28.4	21.3	15.1	16.4	20.4	11.9	8.7	7.9	7.2	6.5	5.8	4.3	4.1	4.5	5.5	6.4	7.2	13.2	28.4
7-Jul	8.1	8.0	7.9	7.4	6.6	5.8	6.8	7.1	7.5	8.4	14.3	29.5	48.4	57.9	47.5	35.7	25.8	20.0	17.4	16.1	15.6	15.0	14.9	17.1	18.7	57.9
8-Jul	19.9	22.3	23.8	25.0	25.4	26.6	26.6	25.4	29.3	33.0	36.7	41.0	57.5	95.1	100.2	121.4	123.1	133.0	119.8	114.2	114.0	115.0	116.5	118.8	69.3	133.0
9-Jul	117.2	115.1	116.0	116.6	115.5	112.4	109.4	100.9	88.3	61.1	44.2	39.4	50.6	27.9	13.2	8.3	6.0	5.0	3.5	3.2	4.5	4.5	3.2	3.3	52.9	117.2
10-Jul	3.0	2.8	2.8	2.7	3.1	3.3	3.0	2.8	2.1	1.7	1.6	1.5	1.6	1.7	1.8	1.6	1.6	1.6	1.6	2.9	4.1	4.7	4.0	3.8	2.6	4.7
11-Jul	3.6	3.6	3.9	4.8	5.5	5.5	5.8	5.7	5.7	5.8	5.3	4.5	4.4	4.5	4.5	4.5	4.7	4.7	5.2	6.4	6.7	7.3	6.9	9.5	5.4	9.5
12-Jul	7.8	6.5	6.4	6.2	6.4	6.5	7.2	7.6	11.3	13.0	17.1	21.2	22.0	18.1	21.0	25.0	19.6	19.5	29.3	58.4	95.8	95.3	95.5	96.2	29.7	96.2
13-Jul	121.9	137.2	173.6	193.6	205.5	230.0	277.8	298.8	276.8	234.0	83.8	67.7	52.4	39.1	40.7	70.7	97.4	113.6	118.1	209.8	337.3	366.4	390.3	405.7	189.3	405.7
14-Jul	406.3	364.7	317.4	305.8	343.9	338.6	374.2	331.4	153.6	60.4	57.0	114.0	222.0	281.8	241.7	219.0	247.0	249.8	227.9	223.8	233.6	275.8	289.6	275.0	256.4	406.3
15-Jul	243.9	286.1	284.9	271.0	266.5	262.2	259.6	235.8	214.4	211.6	199.0	163.0	101.3	72.6	65.2	49.8	34.5	31.5	26.3	23.5	20.7	23.2	24.0	22.5	141.4	286.1
16-Jul	21.9	18.2	15.5	14.7	13.9	11.8	10.0	9.7	12.8	14.7	13.8	11.8	19.5	31.5	34.0	42.5	43.7	40.8	35.2	31.2	25.4	23.3	21.4	23.7	22.5	43.7
17-Jul	32.6	30.9	30.9	30.1	30.0	30.3	29.7	28.7	26.5	25.8	22.4	20.8	18.9	18.0	14.0	13.5	15.9	18.8	28.4	36.9	33.3	30.5	32.8	36.6	26.5	36.9
18-Jul	39.3	40.3	39.5	40.1	39.7	39.0	38.8	37.9	49.6	67.3	83.9	75.7	65.9	56.2	46.1	40.9	39.2	39.9	38.9	38.0	36.5	34.9	33.1	32.4	45.6	83.9
19-Jul	29.1	26.6	25.6	27.5	27.6	27.5	28.1	29.8	31.6	30.7	25.4	22.1	20.9	20.5	22.4	21.8	19.5	20.6	20.0	18.7	19.3	20.8	20.6	19.2	24.0	31.6
20-Jul	17.7	16.6	16.7	16.9	17.7	18.2	18.7	18.6	17.7	17.9	18.7	21.1	22.7	22.8	23.4	24.2	26.2	26.1	27.3	30.5	28.4	28.7	28.2	28.8	22.3	30.5
21-Jul	29.6	29.8	28.9	28.2	27.5	27.0	26.5	28.3	29.5	33.3	38.2	40.3	45.8	56.2	62.5	61.8	59.5	59.6	55.9	54.5	52.7	52.2	52.2	54.4	43.1	62.5
22-Jul	54.6	57.0	57.0	56.6	56.3	57.9	59.8	57.1	60.2	61.3	69.0	84.4	110.2	153.6	196.1	197.9	165.3	138.9	124.4	121.3	110.8	101.8	100.2	104.6	98.2	197.9
23-Jul	95.2	92.9	93.9	126.8	121.5	117.5	112.9	87.2	69.3	68.1	71.3	89.5	71.6	54.9	38.9	36.3	33.5	30.3	30.4	31.0	32.3	31.3	30.6	29.9	66.5	126.8
24-Jul	29.0	29.6	24.1	21.6	23.4	25.6	28.6	37.5	34.8	27.6	24.3	C	C	C	C	19.6	20.7	22.3	25.5	24.1	23.9	24.7	25.4	25.8	25.9	37.5
25-Jul	27.1	27.8	30.9	19.6	15.4	27.1	41.2	39.9	39.3	44.0	46.5	45.3	26.2	22.3	30.2	41.9	60.2	73.6	81.1	29.6	4.5	3.9	3.7	3.9	32.7	81.1
26-Jul	4.0	3.9	3.9	3.7	3.7	3.8	3.3	3.9	3.7	2.2	2.1	2.5	2.7	3.4	3.9	3.6	3.5	3.8	3.7	3.4	4.2	5.6	4.8	4.4	3.7	5.6
27-Jul	4.1	3.9	3.8	3.8	3.9	3.8	5.7	6.6	6.6	6.2	6.0	6.8	8.8	8.4	9.8	8.5	6.2	6.5	6.9	4.5	4.6	5.1	6.4	6.2	6.0	9.8
28-Jul	6.3	6.3	6.2	4.9	5.3	5.4	7.3	6.9	7.8	9.5	18.2	18.6	11.8	11.2	18.6	16.8	16.7	16.4	15.4	18.9	19.1	18.4	19.5	15.6	12.5	19.5
29-Jul	14.6	12.7	11.2	10.0	9.8	9.2	8.2	7.7	6.8	5.3	4.6	5.2	5.7	7.0	7.0	5.6	5.6	5.4	5.8	6.1	6.5	9.5	10.5	6.4	7.8	14.6
30-Jul	7.2	8.0	9.3	9.9	10.0	10.1	9.9	10.0	9.2	8.3	5.8	4.8	5.1	5.1	5.2	5.5	5.6	6.1	6.4	7.2	7.1	7.0	7.4	7.3	7.4	10.1
31-Jul	7.0	6.2	6.0	6.2	5.8	5.5	5.8	6.2	6.0	6.6	6.1	6.0	7.6	10.2	9.9	8.4	8.3	8.1	9.2	10.1	10.7	12.8	9.6	11.3	7.9	12.8
50.8 51.1 50.7 52.7 54.3 54.9 57.5 54.9 47.3 40.8 37.2 37.7 39.0 40.8 40.6 39.7 38.6 38.6 38.2 40.6 45.9 48.7 51.5 51.4																								Diurnal Average		
406.3 364.7 317.4 305.8 343.9 338.6 374.2 331.4 276.8 234.0 199.0 163.0 222.0 281.8 241.7 219.0 247.0 249.8 227.9 223.8 337.3 366.4 390.3 405.7																								Diurnal Maximum		

C - Calibration
 Alberta Ambient Air Quality Guideline/Objectives: 1-hr 80 µg/m³ 24-hr 29 µg/m³





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - July 2023**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
0 - 5	128	17.30	17.30
6 - 15	174	23.51	40.81
16 - 25	117	15.81	56.62
26 - 80	193	26.08	82.70
> 81.0	128	17.30	100.00

Total Number of Valid Hours: 740

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - µg/m³
Athabasca Valley - July 2023

Concentration Ranges (µg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	12	7	3	4	18	8	20	11	3	6	6	7	4	1	6	12	128
6 - 15	6	2	3	4	9	14	49	10	6	12	23	9	1	1	5	20	174
16 - 25	7	2	0	3	9	7	18	11	6	9	25	4	4	1	1	10	117
26 - 80	10	1	3	4	9	21	36	9	8	22	16	5	3	3	12	31	193
> 81.0	13	4	1	1	2	2	4	11	1	2	4	15	13	8	10	37	128
Totals	48	16	10	16	47	52	127	52	24	51	74	40	25	14	34	110	740

Total Number of Valid Hours: 740

Total Number of Hours: 744

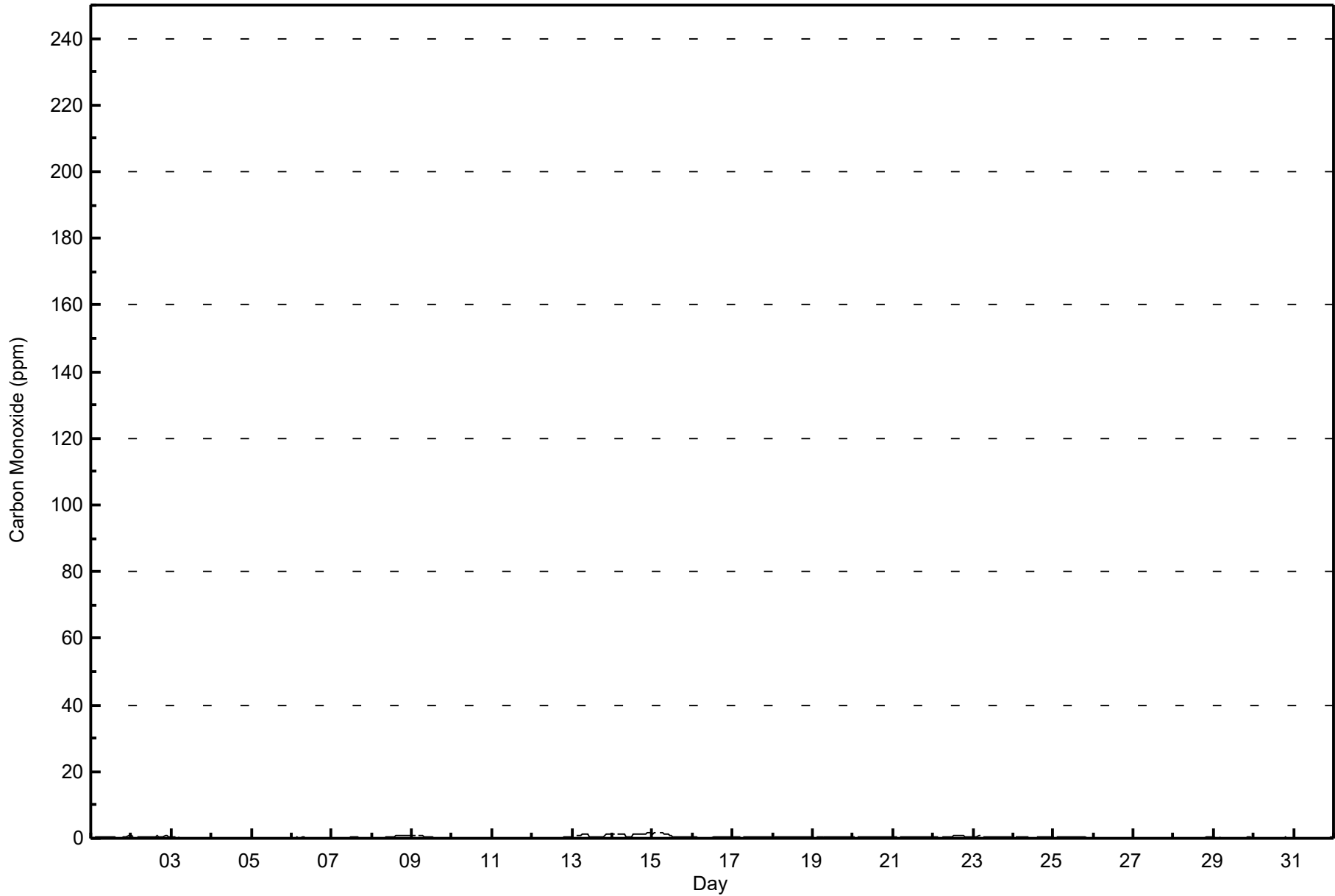


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 1.7 ppm on Jul 14 23:00 Maximum Daily Average: 1.2 ppm on Jul 14		Hours in Service: 744 Hours of Data: 709 Hours of Missing Data: 35 Hours of Calibration: 35 Percent Operational Time: 100.0																									
Minimum Value: 0.1 ppm on Jul 3 13:00 Maximum Diurnal Average: 0.4 ppm at hour 5 Monthly Average: 0.34 ppm		Minimum Daily Average: 0.1 ppm on Jul 10 Minimum Diurnal Average: 0.3 ppm at hour 12 Percentiles: P ₁ = 0.1 P ₁₀ = 0.1 Q ₁ = 0.2 Median = 0.2 Q ₃ = 0.4 P ₉₀ = 0.7 P ₉₉ = 1.5																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0.2	Z	0.3	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.5	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.4	1.0	1.1	0.4	1.1	
2-Jul	0.7	0.6	Z	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.7	0.5	0.4	0.5	0.6	0.8	0.8	0.6	0.5	0.5	0.5	0.5	0.8
3-Jul	0.4	0.3	0.3	Z	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4
4-Jul	0.1	0.1	0.1	0.1	Z	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2
5-Jul	0.2	0.1	0.1	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
6-Jul	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	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	0.2	0.2
7-Jul	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
8-Jul	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.3	0.4	0.6	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.5	0.8
9-Jul	0.7	0.7	0.7	Z	0.6	0.7	0.6	0.6	0.5	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.7
10-Jul	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	0.1
11-Jul	0.1	0.1	0.1	0.1	0.1	Z	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	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2
12-Jul	Z	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.2	0.4
13-Jul	0.6	Z	0.8	0.8	0.9	1.0	1.3	1.4	1.3	1.1	0.5	0.4	0.3	0.3	0.3	0.5	0.6	0.6	0.6	0.6	0.8	1.1	1.2	1.3	1.3	0.8	1.4
14-Jul	1.3	1.2	Z	1.1	1.2	1.3	1.5	1.3	0.6	0.3	0.4	0.6	1.1	1.3	1.2	1.1	1.3	1.4	1.3	1.3	1.3	1.6	1.7	1.6	1.2	1.7	
15-Jul	1.4	1.7	1.6	Z	1.5	1.5	1.5	1.4	1.2	1.1	1.1	0.8	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.8	1.7	
16-Jul	0.3	0.2	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
17-Jul	0.3	0.3	0.3	0.3	0.3	Z	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
18-Jul	Z	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5
19-Jul	0.3	Z	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4
20-Jul	0.4	0.3	Z	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	0.4	0.4	0.4	0.4	0.3	0.3	0.4
21-Jul	0.3	0.3	0.3	Z	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.6
22-Jul	0.5	0.5	0.5	0.5	Z	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.9	1.0	0.9	0.7	0.7	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	1.0
23-Jul	0.5	0.5	0.5	0.7	0.7	Z	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.5	0.7	
24-Jul	Z	0.3	0.3	0.2	0.3	0.3	0.3	0.4	0.3	0.3	0.3	C	C	C	C	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
25-Jul	0.2	Z	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.4	0.5	0.6	0.6	0.3	0.1	0.1	0.1	0.1	0.3	0.6
26-Jul	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	0.2	0.2	0.2	0.1	0.1	0.1	0.2
27-Jul	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	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2
28-Jul	0.2	0.2	0.2	0.1	Z	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.3
29-Jul	0.2	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
30-Jul	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
31-Jul	0.2	Z	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
0.4 0.4 0.3 0.3 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 0.3 0.3 0.3 0.4 0.4 0.4 0.4																								Diurnal Average			
1.4 1.7 1.6 1.1 1.5 1.5 1.5 1.4 1.3 1.1 1.1 0.8 1.1 1.3 1.2 1.1 1.3 1.4 1.3 1.3 1.3 1.6 1.7 1.6																								Diurnal Maximum			
Z - zerospan C - Calibration																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 13 ppm																											



Wood Buffalo Environmental Association
Hourly Averages

Carbon Monoxide (CO) - ppm
Athabasca Valley - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Carbon Monoxide (CO) - ppm
Athabasca Valley - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	499	70.38	70.38
0.4 - 0.5	108	15.23	85.61
0.6 - 0.7	49	6.91	92.52
0.8 - 1.4	44	6.21	98.73
1.5 - 10	7	0.99	99.72
> 10	0	0.00	99.72

Total Number of Valid Hours: 709

Total Number of Hours: 744



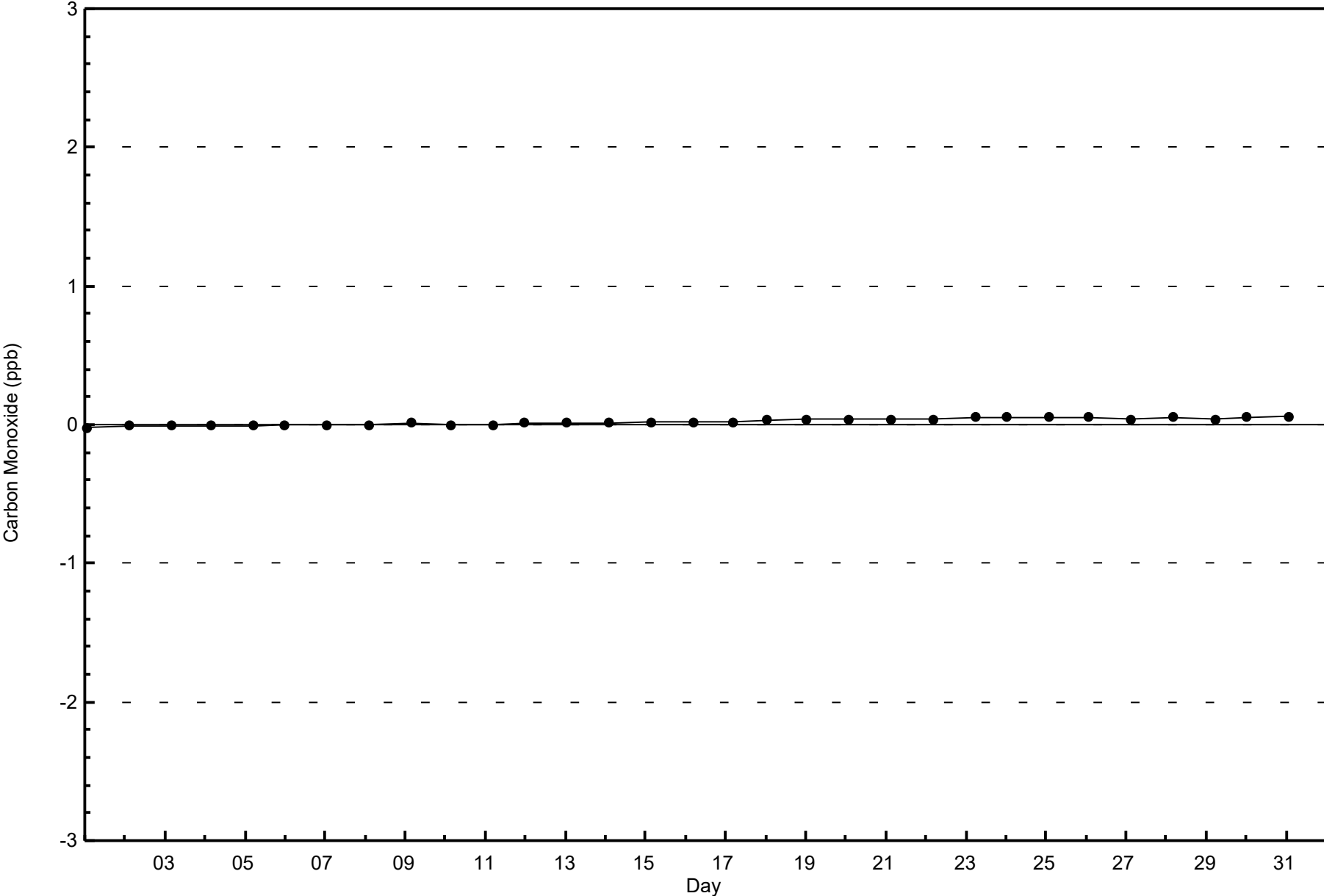
**Wood Buffalo Environmental Association
Frequency Distribution**

**Carbon Monoxide (CO) - ppm
Athabasca Valley - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.3	30	11	8	13	39	40	104	31	19	35	59	21	9	3	16	61	499
0.4 - 0.5	5	1	2	0	5	7	12	12	3	9	12	6	7	6	9	12	108
0.6 - 0.7	5	2	1	2	2	0	3	3	1	4	3	3	3	2	3	12	49
0.8 - 1.4	6	2	0	0	0	0	0	0	0	0	0	5	4	3	4	20	44
1.5 - 10	1	0	0	0	0	0	0	0	0	0	0	2	0	0	1	3	7
> 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	47	16	11	15	46	47	119	46	23	48	74	37	23	14	33	108	707

Total Number of Valid Hours: 709

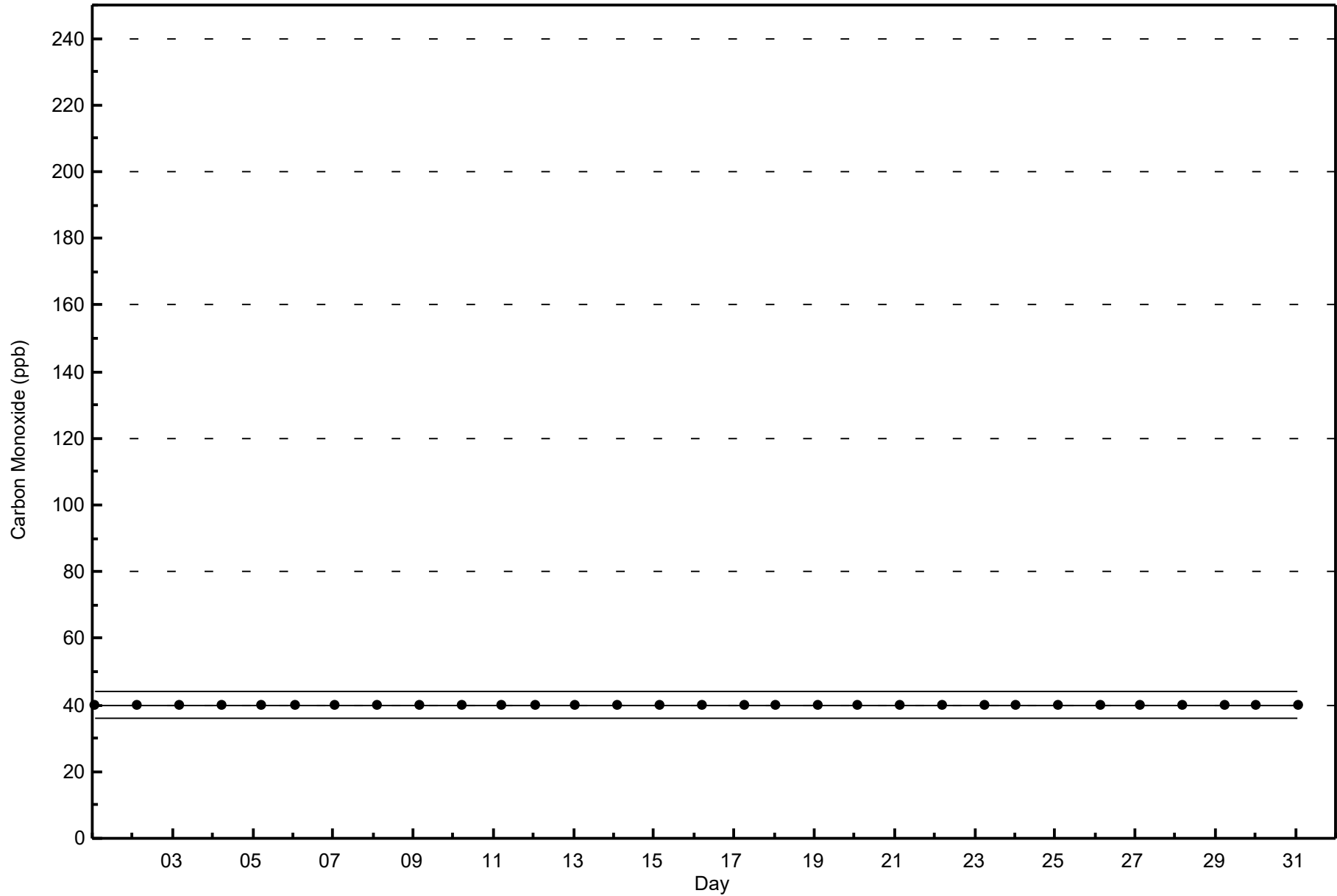
Total Number of Hours: 744





Wood Buffalo Environmental Association
Span Responses

Carbon Monoxide (CO) - ppb
Athabasca Valley - July 2023





Wood Buffalo Environmental Association
Summary of Hour Averages

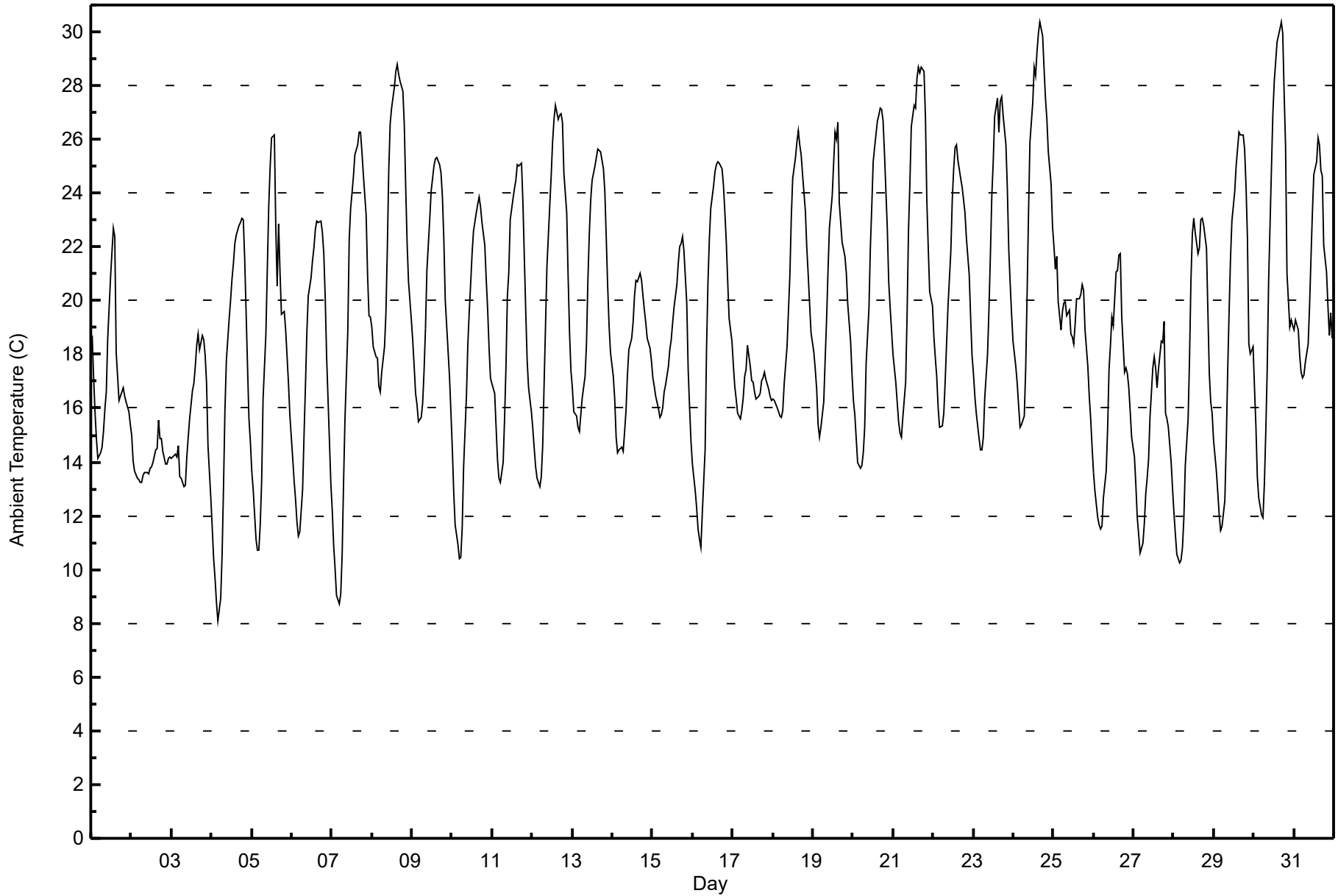
Ambient Temperature (AT) - C
Athabasca Valley - July 2023

Maximum Value: 30.4 C on Jul 24 17:00 Maximum Daily Average: 23.4 C on Jul 24																						Hours in Service: 744 Hours of Data: 744																										
Minimum Value: 8.1 C on Jul 4 05:00 Minimum Daily Average: 14.0 C on Jul 2 Maximum Diurnal Average: 23.8 C at hour 17 Minimum Diurnal Average: 13.5 C at hour 5 Monthly Average: 19.03 C Percentiles: P ₁ = 10.1 P ₁₀ = 13.3 Q ₁ = 15.6 Median = 18.5 Q ₃ = 22.7 P ₉₀ = 25.7 P ₉₉ = 29.1																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	18.7	17.2	15.9	14.9	14.1	14.3	14.6	15.2	16.0	16.6	18.6	20.9	21.8	22.7	22.4	18.1	16.3	16.4	16.6	16.7	16.5	16.2	15.9	15.4	17.2	22.7																						
2-Jul	15.0	14.0	13.7	13.4	13.3	13.2	13.3	13.5	13.6	13.6	13.6	13.8	13.8	14.0	14.4	14.5	15.5	14.9	14.9	14.4	13.9	13.9	14.1	14.2	14.0	15.5																						
3-Jul	14.1	14.3	14.3	14.2	14.6	13.5	13.4	13.1	13.1	14.2	14.9	15.6	16.7	16.9	17.5	18.3	18.7	18.2	18.7	18.6	18.0	16.9	14.6	12.7	15.6	18.7																						
4-Jul	11.6	10.4	9.7	8.8	8.1	8.9	10.6	13.1	15.9	17.8	19.3	20.0	20.8	21.4	22.1	22.4	22.8	22.9	23.1	23.0	21.6	17.6	15.6	14.8	16.8	23.1																						
5-Jul	13.7	13.0	11.2	10.7	10.7	11.7	13.3	16.3	18.7	21.2	23.5	25.0	26.1	26.2	22.7	20.5	22.9	21.1	19.5	19.6	18.9	17.9	16.9	15.7	18.2	26.2																						
6-Jul	14.1	13.3	12.6	11.7	11.2	11.4	13.0	15.0	16.8	18.8	20.2	20.9	21.5	21.9	22.6	23.0	22.9	23.0	22.6	21.7	20.1	17.9	14.8	13.2	17.7	23.0																						
7-Jul	12.2	10.9	10.0	9.0	8.7	9.1	10.6	13.3	15.6	18.8	22.3	23.4	24.0	24.6	25.4	25.8	26.3	26.3	25.5	24.7	23.2	20.9	19.4	19.4	18.7	26.3																						
8-Jul	19.0	18.3	17.9	17.9	16.8	16.6	17.3	18.3	19.6	22.0	24.8	26.6	27.1	28.0	28.5	28.8	28.4	28.2	27.8	26.5	24.2	22.1	20.7	19.3	22.7	28.8																						
9-Jul	18.5	17.6	16.5	16.1	15.5	15.7	16.2	17.4	19.0	21.1	23.0	24.1	24.5	25.0	25.3	25.3	25.1	24.7	23.8	22.3	20.0	18.1	17.2	15.8	20.3	25.3																						
10-Jul	14.5	12.9	11.7	10.9	10.4	10.5	11.5	13.8	16.5	18.4	19.6	20.7	21.7	22.6	23.3	23.6	23.9	23.5	22.9	22.0	20.8	19.7	18.3	17.1	18.0	23.9																						
11-Jul	16.9	16.6	15.3	14.1	13.4	13.2	14.0	15.6	17.6	20.2	21.1	23.0	23.8	24.2	24.5	25.1	25.0	25.1	23.7	21.6	19.6	17.8	16.8	15.9	19.3	25.1																						
12-Jul	15.2	14.5	13.8	13.4	13.1	13.4	14.6	16.9	19.1	21.3	23.6	24.6	25.9	26.7	27.3	26.8	26.9	27.0	26.6	24.8	23.3	20.9	18.8	17.4	20.7	27.3																						
13-Jul	16.7	15.8	15.7	15.3	15.1	15.8	16.4	17.2	18.4	20.8	22.5	23.8	24.5	25.0	25.3	25.6	25.5	24.9	24.0	22.3	20.6	19.1	18.1	18.1	20.6	25.6																						
14-Jul	17.2	16.4	14.9	14.4	14.4	14.5	14.4	15.1	15.9	17.2	18.2	18.6	19.2	20.2	20.8	20.7	21.0	20.7	20.2	19.6	19.2	18.6	18.2	17.8	17.8	21.0																						
15-Jul	17.1	16.8	16.5	16.0	15.7	15.8	16.0	16.6	16.9	17.6	18.2	18.5	19.2	19.7	20.6	21.4	22.0	22.1	22.4	21.8	19.9	17.4	16.0	14.8	18.3	22.4																						
16-Jul	13.9	12.9	12.3	11.5	11.2	10.8	12.1	14.5	18.2	20.7	22.3	23.5	24.3	24.8	25.1	25.2	25.1	24.9	24.3	23.3	22.2	20.7	19.3	18.5	19.2	25.2																						
17-Jul	17.6	16.8	16.4	15.8	15.6	15.9	16.4	17.2	17.4	18.3	17.6	17.0	17.0	16.6	16.3	16.4	16.5	17.0	17.1	17.3	17.1	16.7	16.4	16.3	16.8	18.3																						
18-Jul	16.4	16.3	16.1	15.9	15.7	15.7	15.9	16.9	18.3	19.6	20.9	23.1	24.5	25.3	25.9	26.3	25.8	25.4	24.7	23.3	22.0	21.0	19.9	18.8	20.6	26.3																						
19-Jul	18.1	17.4	16.7	15.4	14.9	15.3	16.2	17.8	19.3	21.1	22.7	23.9	25.1	26.3	26.0	26.6	23.7	22.2	21.9	21.7	21.0	19.8	18.5	17.3	20.4	26.6																						
20-Jul	16.3	15.8	14.9	14.0	13.8	13.8	14.3	15.3	17.7	19.7	22.0	23.5	25.2	25.7	26.7	26.9	27.2	27.1	26.7	25.5	22.7	20.7	19.8	18.9	20.6	27.2																						
21-Jul	18.0	17.0	16.2	15.5	15.1	14.9	15.7	16.9	19.5	22.6	24.4	26.5	27.3	27.1	28.3	28.7	28.5	28.7	28.5	26.8	23.7	22.0	20.3	19.8	22.2	28.7																						
22-Jul	18.7	17.8	17.2	16.0	15.3	15.3	15.8	17.0	18.4	19.8	21.8	23.7	24.9	25.7	25.8	25.2	24.6	24.2	23.7	23.3	22.3	21.0	19.4	18.0	20.6	25.8																						
23-Jul	17.3	16.4	15.8	14.9	14.4	14.4	14.9	16.4	18.0	19.7	21.7	23.9	25.2	26.9	27.5	26.3	27.4	27.6	26.9	25.8	24.1	21.9	20.7	19.5	21.1	27.6																						
24-Jul	18.5	17.6	16.9	16.1	15.3	15.4	15.7	17.5	20.3	23.3	25.9	27.4	28.7	28.4	29.3	30.0	30.4	29.8	28.7	27.6	26.7	25.5	24.3	22.7	23.4	30.4																						
25-Jul	22.0	21.2	21.6	20.0	18.9	19.6	19.9	20.0	19.5	19.6	18.7	18.7	18.4	19.1	20.1	20.1	20.2	20.6	20.4	18.9	17.6	16.5	15.6	14.5	19.2	22.0																						
26-Jul	13.6	12.9	12.0	11.7	11.5	11.6	12.7	13.7	15.2	17.5	18.3	19.4	19.1	21.0	21.1	21.7	21.8	19.4	17.3	17.5	17.3	16.7	15.9	14.9	16.4	21.8																						
27-Jul	14.2	13.2	11.9	11.3	10.6	11.0	11.7	12.8	13.4	14.1	15.7	17.5	17.9	17.5	16.8	17.4	18.5	18.5	19.2	15.8	15.6	15.3	14.0	13.0	14.9	19.2																						
28-Jul	12.1	11.3	10.5	10.2	10.3	10.8	11.9	13.8	15.6	17.8	20.7	22.5	23.1	22.6	21.7	22.0	23.0	23.1	22.8	22.0	19.6	17.3	16.2	15.8	17.4	23.1																						
29-Jul	14.8	13.7	12.9	12.0	11.4	11.6	12.6	14.7	17.3	19.5	21.6	23.0	24.1	25.0	25.7	26.3	26.1	26.2	25.6	24.3	22.3	18.4	18.0	18.3	19.4	26.3																						
30-Jul	16.8	15.3	13.5	12.7	12.0	11.9	13.2	15.1	17.4	20.7	24.9	27.0	28.1	28.9	29.6	30.1	30.4	30.0	27.7	25.7	21.0	19.0	19.3	19.1	21.2	30.4																						
31-Jul	18.9	19.3	18.9	18.0	17.4	17.1	17.2	17.7	18.4	19.8	21.6	23.3	24.7	25.2	26.1	25.8	24.9	24.7	22.1	21.0	19.8	18.7	19.6	18.6	20.8	26.1																						
																								16.2	15.4	14.6	13.9	13.5	13.6	14.4	15.7	17.3	19.1	20.8	22.0	22.8	23.4	23.7	23.7	23.8	23.5	22.9	22.0	20.5	19.0	17.9	17.0	Diurnal Average
																								22.0	21.2	21.6	20.0	18.9	19.6	19.9	20.0	20.3	23.3	25.9	27.4	28.7	28.9	29.6	30.1	30.4	30.0	28.7	27.6	26.7	25.5	24.3	22.7	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Athabasca Valley - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Athabasca Valley - July 2023

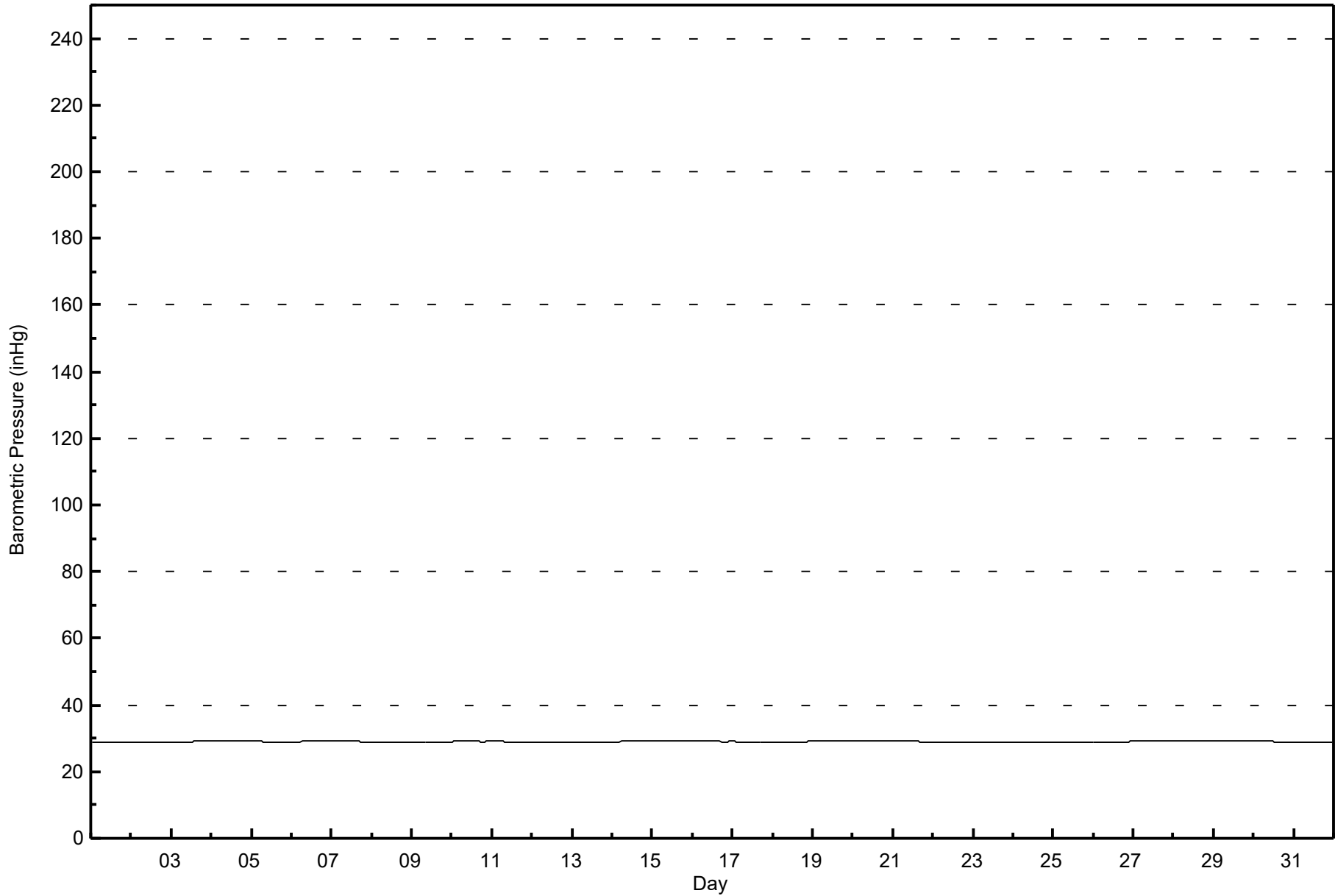
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	7	0.94	0.94
10 - 20	448	60.22	61.16
> 20	289	38.84	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 29.3 inHg on Jul 28 08:00																						Maximum Daily Average: 29.3 inHg on Jul 28																						Hours in Service: 744						
Minimum Value: 28.7 inHg on Jul 25 08:00																						Minimum Daily Average: 28.8 inHg on Jul 25																						Hours of Data: 744						
Maximum Diurnal Average: 29.0 inHg at hour 6																						Minimum Diurnal Average: 29.0 inHg at hour 19																						Hours of Missing Data: 0						
Monthly Average: 29.00 inHg																						Percentiles: P ₁ = 28.7 P ₁₀ = 28.8 Q ₁ = 28.9 Median = 29.0 Q ₃ = 29.1 P ₉₀ = 29.2 P ₉₉ = 29.3																						Hours of Calibration: 0						
																																												Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Jul	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	29.0																							
2-Jul	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8																						
3-Jul	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	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2																						
4-Jul	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	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	29.1	29.1	29.1	29.1	29.2	29.3																						
5-Jul	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.1																						
6-Jul	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.1	29.1																						
7-Jul	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.2	29.2																						
8-Jul	29.0	29.0	29.0	29.0	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	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	29.0																						
9-Jul	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	28.9	29.0	29.0																						
10-Jul	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	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																						
11-Jul	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0																						
12-Jul	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9																						
13-Jul	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	29.0	29.0	28.9	29.0	29.0																						
14-Jul	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	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																						
15-Jul	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	29.1	29.1																						
16-Jul	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1																						
17-Jul	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0																						
18-Jul	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	28.9	29.1	29.1																						
19-Jul	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.2	29.2																						
20-Jul	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	29.1	29.1	29.2	29.2	29.2																						
21-Jul	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1																						
22-Jul	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	28.9	29.0	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0																						
23-Jul	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0																						
24-Jul	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	29.0	29.0																						
25-Jul	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.8	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																						
26-Jul	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	29.0	29.0	29.0	29.1	28.9	29.1	29.1																							
27-Jul	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.3	29.3																						
28-Jul	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	29.3	29.3	29.3	29.3																						
29-Jul	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	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.3																						
30-Jul	29.1	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	29.0	29.0	29.0	28.9	29.0	29.0	29.0	29.2																						
31-Jul	29.0	28.9	28.9	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	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	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	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	29.3	29.3	29.3	29.3	Diurnal Maximum





Wood Buffalo Environmental Association
Summary of Hour Averages

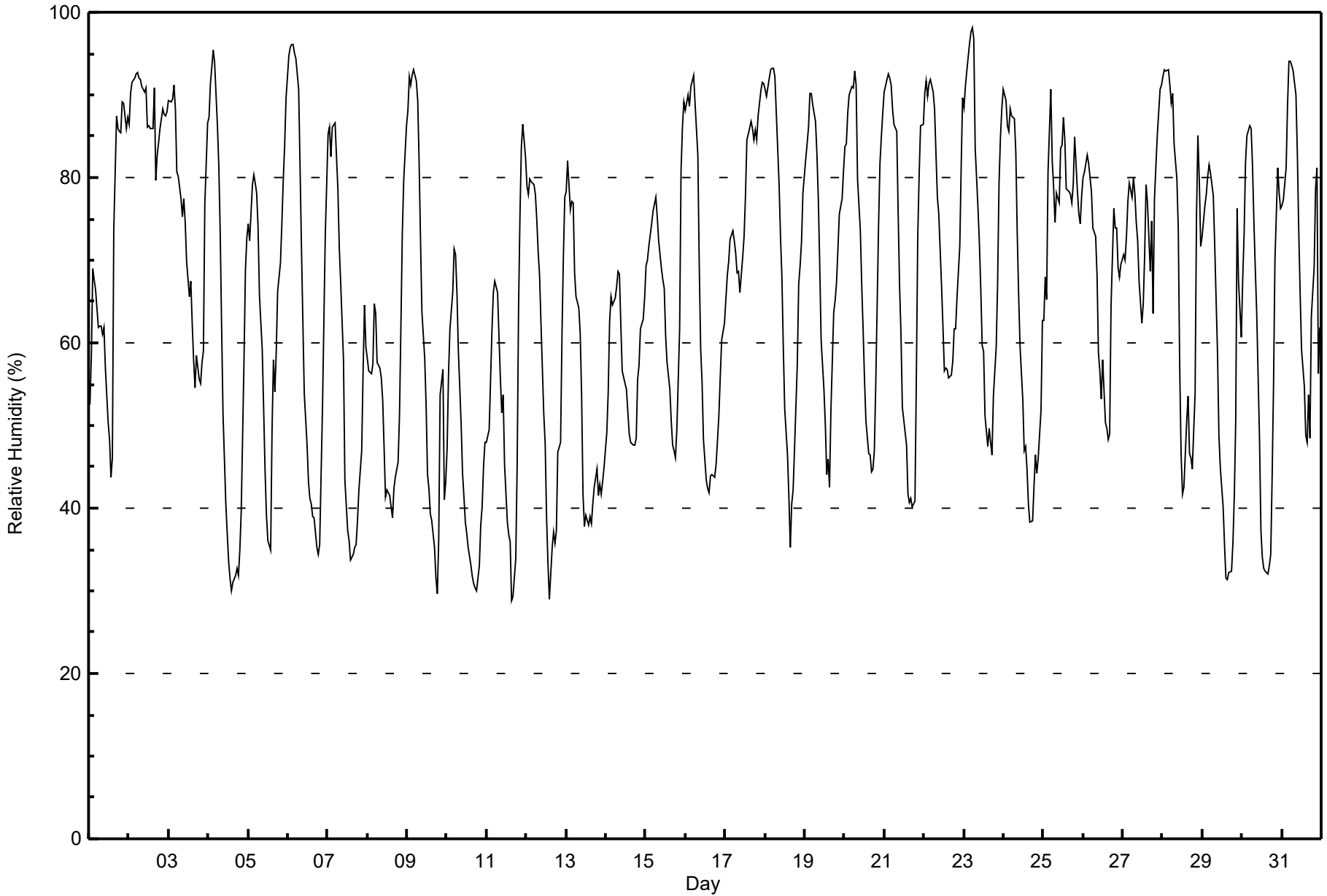
Relative Humidity (RH) - %
Athabasca Valley - July 2023

Maximum Value: 98.1 % on Jul 23 06:00 Maximum Daily Average: 88.4 % on Jul 2																						Hours in Service:	744			
Minimum Value: 28.9 % on Jul 11 16:00 Minimum Daily Average: 46.0 % on Jul 10																						Hours of Data:	744			
Maximum Diurnal Average: 84.0 % at hour 5 Minimum Diurnal Average: 48.1 % at hour 15																						Hours of Missing Data:	0			
Monthly Average: 65.75 % Percentiles: P ₁ = 30.9 P ₁₀ = 39.5 Q ₁ = 48.9 Median = 67.4 Q ₃ = 81.8 P ₉₀ = 90.2 P ₉₉ = 95.2																						Hours of Calibration:	0			
																						Percent Operational Time:	100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	52.6	58.4	69.0	67.7	66.4	61.9	62.0	62.0	61.0	61.8	56.9	50.3	48.3	43.8	46.0	73.7	87.5	85.9	85.7	85.5	89.1	89.0	86.0	87.3	68.2	89.1
2-Jul	86.5	90.2	91.6	92.0	92.6	92.7	92.0	91.9	90.9	90.3	90.8	86.1	86.3	86.0	86.0	90.8	79.7	82.7	84.3	85.9	88.3	87.6	87.5	88.0	88.4	92.7
3-Jul	89.3	89.2	89.6	91.2	88.3	80.7	80.2	77.4	75.3	77.4	74.6	69.9	65.6	67.4	62.4	58.0	54.6	58.5	55.6	55.0	57.7	59.0	76.8	86.6	72.5	91.2
4-Jul	87.3	91.4	93.5	95.4	93.8	86.3	81.4	73.2	61.8	51.3	40.5	36.9	33.6	31.6	30.0	31.0	31.8	32.8	31.9	34.9	39.7	58.1	68.8	72.7	57.9	95.4
5-Jul	74.4	72.4	79.2	80.3	79.3	78.1	74.0	65.7	59.1	52.0	44.6	39.2	36.1	34.9	49.4	57.9	54.1	59.0	66.3	69.7	74.4	79.6	83.9	89.6	64.7	89.6
6-Jul	94.7	95.8	96.1	96.1	95.0	94.5	90.6	81.1	71.5	62.5	53.9	47.6	43.2	41.2	40.5	39.0	38.9	35.3	34.4	35.5	43.9	52.1	73.0	79.1	64.0	96.1
7-Jul	85.3	86.0	82.5	86.0	86.5	82.5	78.6	71.5	67.3	58.0	43.4	40.4	37.3	36.1	33.7	34.4	35.3	35.5	38.5	42.2	46.9	56.6	64.5	59.6	57.9	86.5
8-Jul	58.2	56.6	56.3	57.4	64.8	63.6	57.6	57.0	55.7	53.1	47.2	41.3	42.1	41.5	40.3	38.8	42.3	43.8	45.5	51.3	62.1	73.2	79.6	86.2	54.8	86.2
9-Jul	88.1	92.1	91.3	92.4	93.1	91.6	89.3	81.9	72.4	63.7	58.2	52.4	44.0	42.5	39.4	38.4	35.2	31.5	29.7	36.2	53.7	56.7	41.0	43.2	60.8	93.1
10-Jul	47.2	56.3	61.6	66.0	71.3	70.7	66.1	59.2	50.2	44.2	41.4	38.3	37.0	35.2	33.1	31.7	30.8	30.4	29.9	33.1	37.9	40.2	45.1	47.9	46.0	71.3
11-Jul	48.0	49.5	55.4	61.5	66.1	67.5	66.1	60.8	55.7	51.6	53.8	45.2	38.2	36.7	35.9	28.9	29.3	33.8	45.2	64.3	75.4	83.7	86.4	82.4	55.1	86.4
12-Jul	78.9	77.9	79.8	79.4	79.1	77.9	74.9	71.0	68.2	62.4	51.4	47.8	38.7	33.3	29.0	35.2	37.1	35.7	37.3	46.8	48.0	61.0	70.5	77.5	58.3	79.8
13-Jul	78.2	82.0	76.0	77.1	76.9	68.5	65.6	64.3	61.2	53.7	41.7	37.7	39.1	37.9	39.0	38.2	40.5	42.5	44.7	41.5	42.8	41.8	43.2	44.9	53.3	82.0
14-Jul	49.2	54.1	62.5	65.6	64.6	65.4	66.7	68.6	68.3	62.3	56.7	55.0	54.5	51.6	48.9	48.0	47.6	47.6	48.4	55.6	57.2	61.7	62.8	65.5	57.8	68.6
15-Jul	69.2	70.0	71.7	74.4	75.9	76.7	77.6	75.2	72.3	69.0	67.7	66.6	60.8	57.5	54.3	50.6	47.6	46.9	46.1	49.5	61.7	80.8	86.1	89.1	66.6	89.1
16-Jul	88.1	90.0	88.6	91.1	91.7	92.4	89.0	82.7	69.3	59.2	55.2	48.3	43.4	42.4	41.8	43.9	44.1	43.7	45.3	48.1	51.2	55.9	60.3	62.4	63.7	92.4
17-Jul	65.2	68.2	69.8	72.5	73.5	72.3	70.9	68.5	68.6	66.2	70.4	72.9	77.8	84.6	85.3	86.8	86.0	84.6	85.7	84.6	87.5	90.5	91.4	91.3	78.1	91.4
18-Jul	90.6	89.9	92.1	93.1	93.2	93.2	92.2	87.8	79.2	72.9	68.0	59.5	52.0	46.5	41.3	35.3	40.5	42.1	47.2	57.5	67.1	69.3	72.3	78.2	69.2	93.2
19-Jul	82.1	84.0	86.0	90.2	90.1	88.9	86.7	82.9	77.4	69.5	60.3	54.4	50.2	44.1	45.9	42.5	51.9	63.7	65.0	67.3	71.3	75.6	77.5	80.8	70.3	90.2
20-Jul	83.7	84.1	87.8	90.0	91.0	90.9	92.9	91.2	79.9	73.5	66.9	61.5	55.4	50.5	46.6	46.5	44.4	44.7	47.0	54.9	74.1	81.7	85.0	87.8	71.3	92.9
21-Jul	90.3	91.8	92.6	92.0	91.1	88.3	86.5	85.6	75.8	67.0	61.1	52.2	49.2	47.7	41.7	40.8	41.1	40.2	40.8	55.9	73.1	80.4	86.3	86.4	69.1	92.6
22-Jul	90.3	91.6	89.9	91.3	91.9	90.4	88.3	82.8	77.6	75.6	66.8	61.8	56.7	56.9	56.9	55.8	56.0	57.7	61.7	61.7	65.5	71.7	81.3	89.7	73.7	91.9
23-Jul	88.5	91.1	92.9	96.3	97.7	98.1	96.8	83.6	76.3	72.0	66.5	59.7	59.0	51.2	47.4	49.6	48.0	46.4	53.5	59.6	67.0	79.2	84.7	88.3	73.1	98.1
24-Jul	90.6	89.3	86.3	85.6	88.4	87.4	87.2	83.0	73.3	65.8	59.7	53.1	46.9	47.5	44.8	40.5	38.2	38.5	42.6	46.5	44.3	46.2	51.8	62.7	62.5	90.6
25-Jul	62.7	67.9	65.2	80.7	90.7	82.1	78.9	74.6	78.1	76.9	83.5	83.9	87.3	84.6	78.6	78.3	77.9	77.0	79.2	84.9	78.3	75.7	74.3	77.8	78.3	90.7
26-Jul	80.0	80.6	82.7	81.7	80.0	78.4	73.9	73.0	68.1	58.7	56.5	53.2	57.9	50.3	49.7	48.3	48.9	64.5	76.3	73.9	73.9	69.1	67.9	69.5	67.4	82.7
27-Jul	70.7	70.0	72.8	77.1	79.4	77.6	80.1	77.9	74.6	72.3	67.4	62.5	64.8	70.6	79.1	76.9	68.6	74.7	63.6	77.4	81.3	85.1	90.6	91.1	75.3	91.1
28-Jul	92.2	93.0	92.8	93.0	91.2	89.0	90.2	84.0	79.9	73.7	57.1	46.6	41.6	42.6	50.5	53.5	46.5	46.0	44.8	53.9	75.4	85.1	79.6	71.6	69.8	93.0
29-Jul	73.0	76.7	77.9	80.1	81.5	80.5	77.8	71.8	65.3	58.8	48.9	45.0	40.2	35.7	31.5	31.3	32.2	32.5	35.7	41.5	50.5	76.2	67.5	60.6	57.2	81.5
30-Jul	67.8	73.2	81.8	85.1	86.2	86.0	81.3	74.6	68.8	63.6	48.4	37.3	34.1	32.7	32.4	32.0	33.0	34.4	43.8	54.8	70.0	81.2	78.1	76.2	60.7	86.2
31-Jul	76.7	77.2	81.2	88.7	94.0	94.1	93.5	92.8	90.0	82.8	73.5	66.0	59.2	54.7	48.8	47.9	53.6	48.5	63.2	69.2	78.6	81.2	56.2	61.9	72.2	94.1
																						Diurnal Average				
																						Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Athabasca Valley - July 2023





Maximum Speed: 28 km/h on Jul 3 12:00	Maximum Daily Speed Average: 14.9 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 21 22:00	Minimum Daily Speed Average: 0.4 km/h on Jul 4	Hours of Data: 744
Maximum Diurnal Speed Average: 3.5 km/h at hour 13	Minimum Diurnal Speed Average: 0.9 km/h at hour 19	Hours of Missing Data: 0
Monthly Average Velocity: 0.3 km/h 268.6 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 7 Q ₃ = 10 P ₉₀ = 15 P ₉₉ = 24	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	SW9	SSW6	SE3	SSE4	SE6	SSE5	SSE6	SSE6	SE6	SSE6	SE3	SE10	SE15	SE17	ESE9	WSW17	NW3	WNW5	W1	W2	SSW7	SW7	WSW11	W11	S4.2	SE17
2-Jul	W10	W9	W11	W5	NW5	WNW6	WSW8	WNW6	WNW11	WNW19	NW19	NW26	NNW22	NNW11	W6	WSW7	NW24	NW14	W24	W18	WSW16	W20	WNW18	WNW21	WNW12.6	NW26
3-Jul	NW12	NNW9	NNW12	NW13	NNW17	N25	NNW28	NNW28	N18	NNW21	NNW27	NNW28	NNW22	NNW19	N15	N14	N18	NNW13	NNE6	NNW10	NW6	NNW5	W3	WSW5	NNW14.9	NNW28
4-Jul	WSW4	WSW5	SW4	SE2	SE2	E4	E4	ENE4	ENE3	WSW3	N7	N9	NNE9	N9	NW4	SW7	WSW5	W4	ENE5	ESE4	SE7	S4	SSE4	E3	NE0.4	N9
5-Jul	SE4	SE7	SSE8	SSE8	SE6	ESE6	SE6	SSW7	SSW10	SW13	SW15	SW16	SW16	SW11	N9	SSW9	SSW9	SW11	SW11	SW5	SSW5	SW5	SW10	W1	SSW6.5	SW16
6-Jul	E3	E2	E1	SE2	E2	SW4	SSE1	NNW8	NNW10	NNW15	NNW14	NNW16	NNW15	NNW16	NNW15	NNW13	NNW14	N12	N11	NNE9	NNW6	NW4	WSW5	SW5	NNW6.9	NNW16
7-Jul	SE1	ESE2	SE3	ESE3	SE5	SE6	SE3	ESE4	E5	E6	SW2	NNW3	NW5	NW3	SSW4	S9	SW10	SW11	SW9	SW8	SSW8	SW12	SW13	SW11	SSW3.7	SW13
8-Jul	SW9	S7	S7	S5	SE4	ESE3	S6	SSW7	SSW9	SSW8	NE3	NE3	N5	N7	WNW8	WNW17	NNW10	NW9	NW6	NW5	NNW7	WSW4	SSW4	SSE2	WSW2.5	WNW17
9-Jul	S2	ENE3	SW3	SSE2	SSE1	E2	E3	NE2	W3	NW3	NNW9	NNW14	NNW20	NNW17	NNW18	NNW18	NNW19	N14	NE9	NNE4	N5	E3	SE3	SE5	NNW5.5	NNW20
10-Jul	SE6	SSE5	SSE6	SE4	SSE5	ESE6	SE9	SE13	ESE14	ESE15	ESE13	E14	E13	E15	E16	E15	E16	E16	E12	ESE6	ESE6	SE3	SE7	SSE4	ESE9.3	E16
11-Jul	SSE6	SE12	SE12	SE10	SE7	SE8	SE9	SE9	SE7	SSE3	NW5	WSW5	W3	SW5	WSW6	SSW7	SSW5	W3	WNW3	SSW4	SW3	SSW2	ESE1	ESE3	SSE3.7	SE12
12-Jul	SE7	SE7	SE6	SE8	ESE7	SE7	SE6	ENE6	N5	N7	N9	NNW11	N11	N11	N13	NNW12	NNW10	NNW9	N7	NNW5	NNW5	W4	WSW6	SW7	N3.1	N13
13-Jul	SW6	WSW5	WSW4	W6	WNW6	NNW6	NNW8	NNW9	N8	NNW9	NNW17	NNW16	N20	N21	NNW18	NNW22	NNW15	NNW11	N10	N11	N7	NNW8	NNW10	NNW8	NNW9.8	NNW22
14-Jul	NW8	WNW8	W6	WSW7	WSW6	NW6	NNW9	NNW10	NNW14	NNW17	N15	N13	NNW14	NNW12	NNW10	NNW11	N11	NNE10	NNE6	N4	N4	NNW4	N4	NNW5	NNW7.7	NNW17
15-Jul	W8	NW6	NNW5	WSW7	WSW5	WSW2	WSW4	NNW6	NNW4	NNW6	NNW8	NNW11	N9	N10	N8	NE6	E7	ENE8	ENE4	SSW3	SSW2	SW3	S1	SSE2	NNW2.8	NNW11
16-Jul	SE3	SE2	SSE5	SE6	SE6	SE7	SE6	E4	ESE6	ESE12	E15	ESE16	ESE16	ESE16	ESE15	ESE14	E14	ESE13	ESE10	SE12	SE11	SE12	SE11	SE12	ESE9.8	ESE16
17-Jul	SE11	SE9	SE8	ESE9	ESE9	SE11	SE12	SE10	SE13	SE14	SE17	ESE15	SE8	ESE7	ESE8	SE7	SSW4	NNE2	NW2	SW8	N5	NNW5	NNW5	NNW6	SE6.0	SE17
18-Jul	NNW5	N5	N5	NNW6	NNW9	NNW10	NNW12	NNW10	NNW12	NNW12	NNW11	NW5	W7	NNW3	ENE3	SSE6	SW6	WSW6	SW6	SW8	SW9	S4	S4	SSW4	NW3.6	NNW12
19-Jul	SSW4	SSW4	S4	SE4	SE5	SE5	SSE4	SW7	SW10	SW11	SW11	SW10	SW8	SW9	SW11	SW6	WSW12	SW9	SW11	SW10	S5	SSE4	S6	SSE6	SSW6.6	WSW12
20-Jul	SE5	SE6	SE5	SE5	SSE5	SE6	SSW5	SW6	SW6	NW4	N3	N6	NNW2	W4	WSW5	SW8	SW7	SW6	NW3	WNW3	SW2	SSW1	SSW3	S1	SSW2.1	SW8
21-Jul	E1	SE1	ESE2	ESE2	SE3	SE5	SE3	SSW5	E5	WSW1	E2	SSW1	E3	NNW6	NNE6	NNW4	WSW4	SSW5	SSW4	SE3	SSW3	ENE0	W2	NNW1	SSE0.6	NNE6
22-Jul	SSW2	SSW2	ESE3	SE2	SSW0	ESE2	SSE3	E4	E1	NW4	NNW6	NNW10	NNW11	NNW12	NNW12	NNW11	NNW10	NNW9	NNW9	N8	NNW8	N6	NNE2	NNE2	NNW4.3	NNW12
23-Jul	WSW1	SW3	ESE1	SSE4	SE4	ESE4	SE6	SSE8	SE10	SSE7	SE6	SSW1	WSW5	SSW9	S11	SE11	ESE10	SE10	SE8	SSE8	SE5	SE4	E2	SSE2	SSE4.9	SE11
24-Jul	SSE2	SSE5	SSE5	SSE5	SE5	SE6	SE7	SE8	SE8	E2	ENE7	NNE3	N4	NNW8	NE6	E11	E11	E13	ENE10	E8	ESE5	SSE4	SE6	ESE5	ESE4.5	E13
25-Jul	SE5	ESE1	SW8	WSW4	E10	SSW4	ESE19	SE16	SE20	S13	S8	SSW9	SSE2	ESE5	SE8	ESE5	ESE2	SW3	NW4	WSW16	WSW18	WSW12	WSW10	SSE6	S4.8	SE20
26-Jul	SSE7	SSE8	SSE7	SSE5	SE6	SE4	E3	SSE7	SE9	ESE9	E8	E5	NW8	E8	E8	ENE10	ENE10	SSW9	SSW9	N1	E12	E16	E13	E8	ESE5.6	E16
27-Jul	NNE8	NE8	NNE7	N8	N7	NE6	NNW9	NNW13	NNW11	NNW9	NNW11	NNW15	NNW3	WSW6	NW7	NNW10	NNW8	N9	ESE9	SW0	NNW7	NW2	ESE4	SE7	N5.4	NNW15
28-Jul	SE4	SE5	SE4	SE6	SE7	SE7	SE3	E8	E8	ENE6	NNE2	E5	NW5	NE6	E4	NNW2	SW6	SSW7	S6	SSE5	ESE2	SE1	SE5	ESE4	SE3.0	E8
29-Jul	SE7	SE7	SE7	SE7	SE7	SE6	SE6	SE6	SSW4	SW11	SW13	SW9	SW7	SW8	SW10	SW9	SW11	SW10	SW8	SW6	SSW4	SE2	SSE5	S8	SSW5.8	SW13
30-Jul	SSE5	SE5	SE6	SE10	SE9	SE8	SE5	SE8	SE6	NE4	SSE5	S13	S15	S17	SSW15	S14	SSW12	S10	SSW4	ESE1	NW26	NNE5	SSE7	S7	S6.0	NW26
31-Jul	SSW9	SSE8	SE4	SW6	NNE4	NE4	SE9	SSE7	SSW5	SW4	WSW4	SSW3	SW15	SW17	SW20	W15	NNW7	WNW17	NNW15	N4	NW2	WSW8	WSW14	WSW14	WSW5.3	SW20

S2.1 SSE2.2 SSE2.3 SSE2.4 SE2.3 ESE2.2 ESE2.3 ESE1.4 ESE1.2 NNW1.0 NNW2.8 NNW3.4 NNW3.5 NNW2.6 NNW2.0 NW1.7 NW2.5 NNW2.0 NW0.9 WSW1.6 W1.8 SW1.5 SSW2.5 SSW2.1	Diurnal Average
NW12 SE12 SE12 NW13 NNW17 N25 NNW28 NNW28 SE20 NNW21 NNW27 NNW28 NNW22 N21 SW20 NNW22 NW24 WNW17 W24 W18 NW26 W20 WNW18 WNW21	Diurnal Maximum

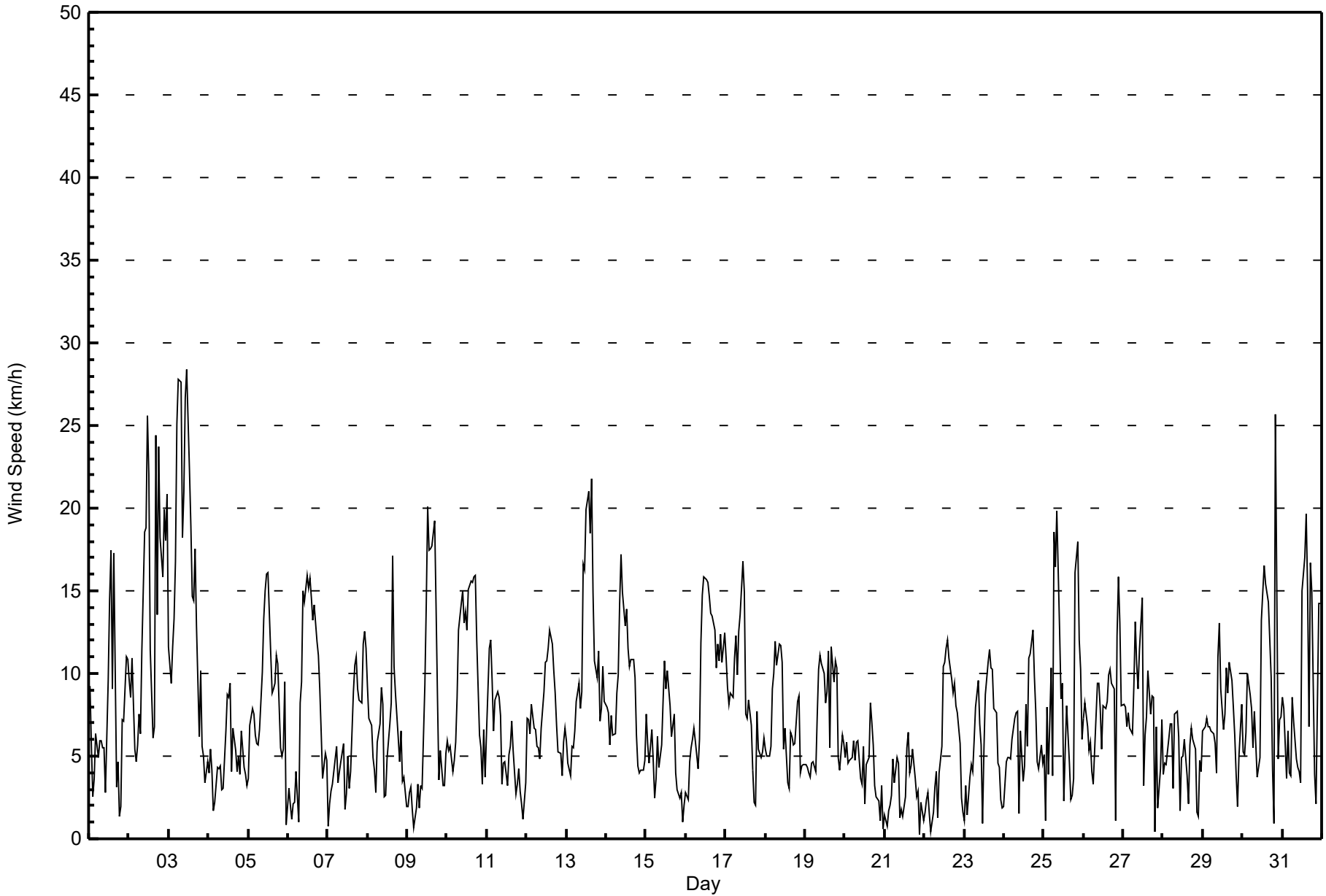
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Athabasca Valley - July 2023

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Athabasca Valley - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	279	37.50	37.50
6 - 11	329	44.22	81.72
12 - 19	116	15.59	97.31
20 - 28	20	2.69	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 - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	13	8	5	9	22	23	45	30	9	30	15	20	12	3	18	17	279
6 - 11	24	9	6	7	12	15	69	22	10	19	49	12	9	6	9	51	329
12 - 19	9	0	0	0	13	14	12	0	5	2	9	8	2	4	4	34	116
20 - 28	3	0	0	0	0	0	1	0	0	0	1	0	2	1	3	9	20
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	17	11	16	47	52	127	52	24	51	74	40	25	14	34	111	744

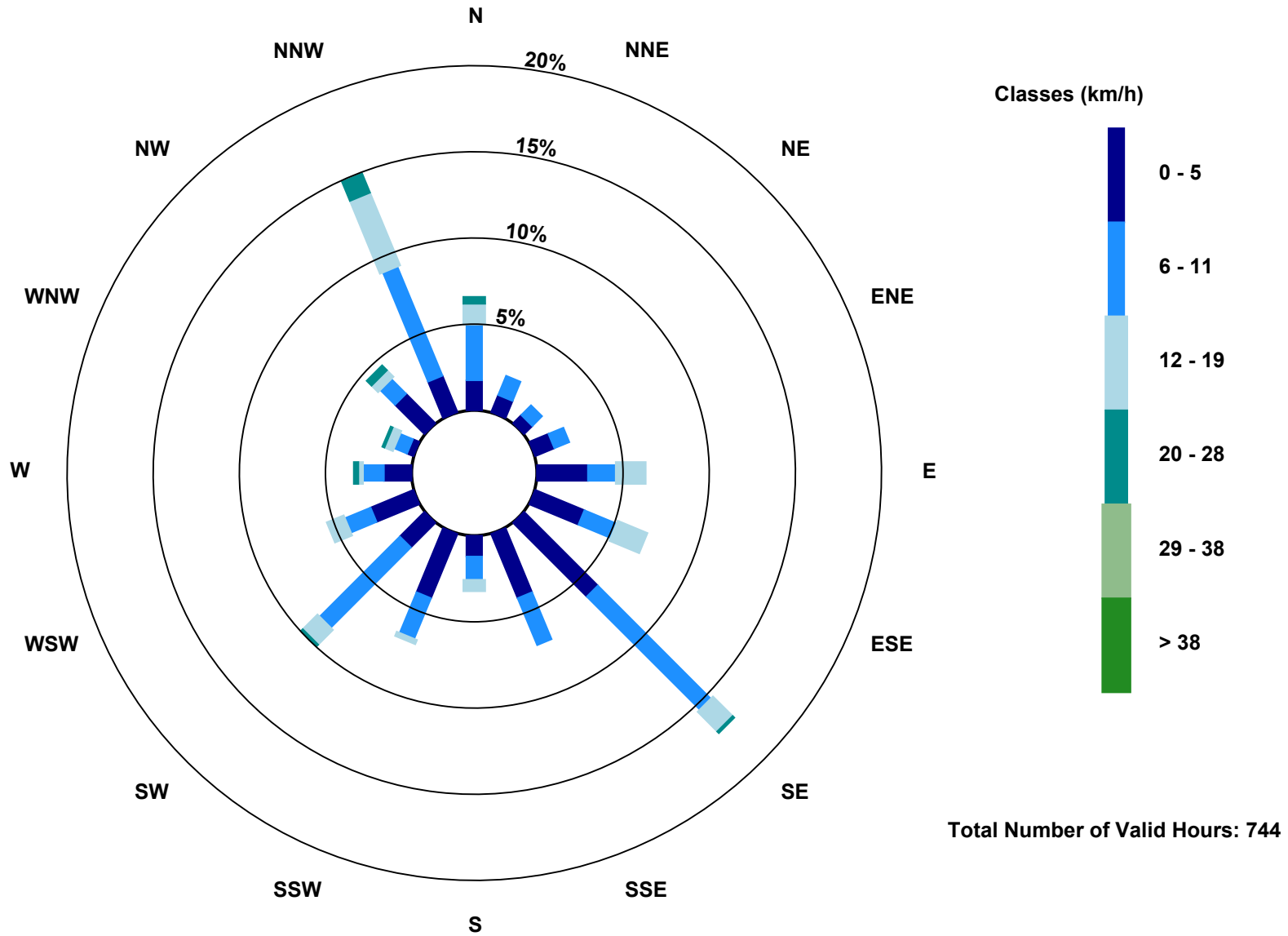
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Athabasca Valley





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Athabasca Valley - July 2023

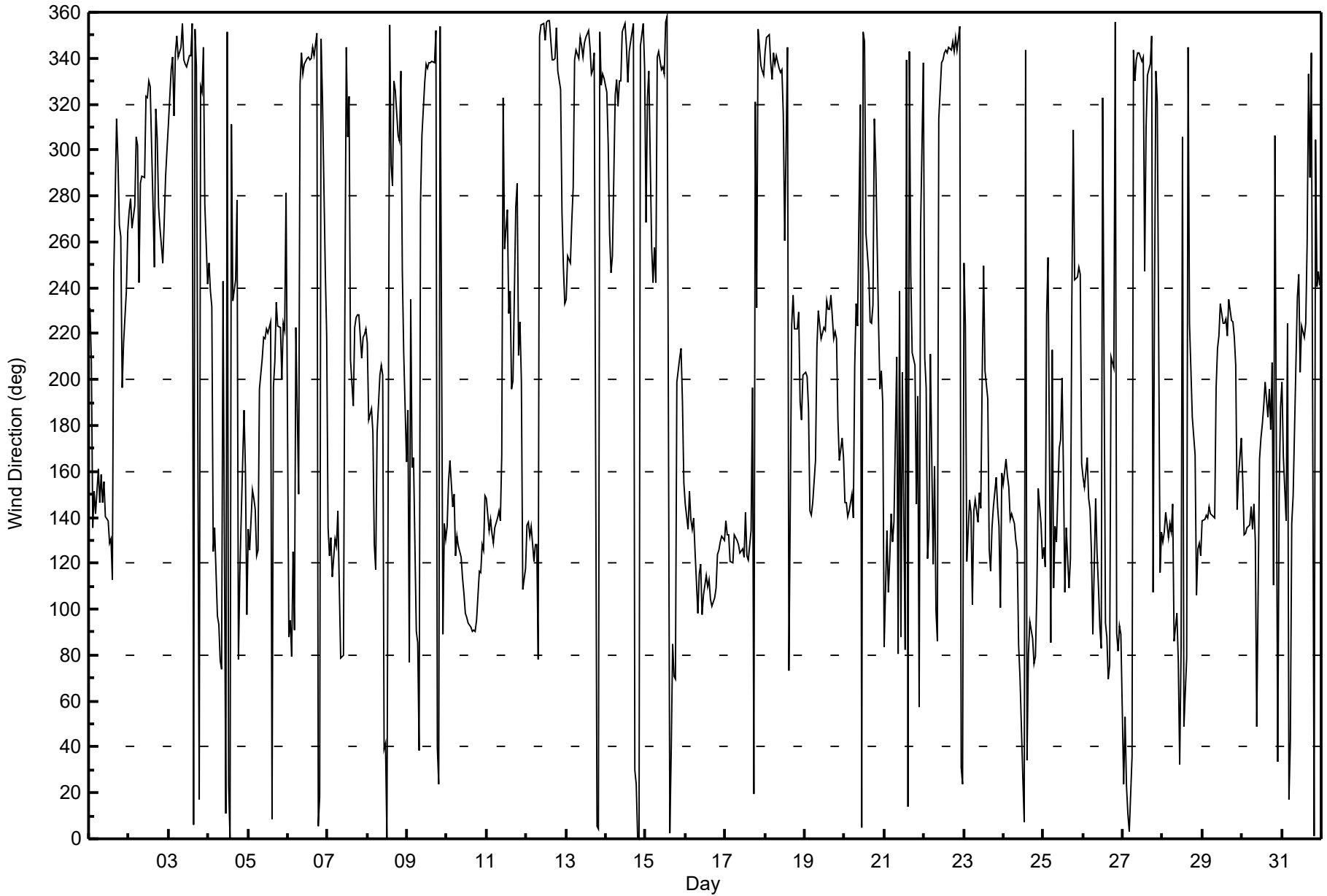
Direction of Maximum Speed: 336 deg on Jul 3 12:00 Direction of Maximum Daily Speed Average: 340.6 deg on Jul 3																							Hours in Service: 744		
Direction of Minimum Speed: 58 deg on Jul 21 22:00 Direction of Minimum Daily Speed Average: 0.4 deg on Jul 4																							Hours of Data: 744		
Monthly Average Direction: 268.6 deg																							Hours of Missing Data: 0		
																							Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	231	208	136	151	141	161	147	158	146	156	141	138	128	131	113	246	313	295	267	262	197	216	238	265	180.5
2-Jul	274	279	266	276	306	302	242	286	289	288	323	323	330	328	277	249	318	305	275	266	251	268	288	300	292.3
3-Jul	311	335	340	315	342	350	341	345	355	339	337	336	341	341	355	6	352	337	17	327	325	345	277	242	340.6
4-Jul	251	238	232	125	135	97	93	78	74	243	11	352	23	0	311	234	244	278	78	115	141	187	161	97	50.3
5-Jul	135	126	152	148	143	123	126	196	209	219	218	222	220	225	8	197	208	234	223	223	200	224	222	281	203.7
6-Jul	88	95	79	125	91	223	150	329	342	333	337	340	340	339	340	345	341	351	5	18	348	322	247	219	342.3
7-Jul	136	123	131	114	131	128	143	110	79	80	231	345	306	323	209	189	223	227	228	228	209	218	220	222	203.5
8-Jul	216	183	187	177	128	117	177	202	206	202	39	42	0	355	294	284	330	326	306	304	335	248	212	164	257.1
9-Jul	187	77	235	162	166	90	86	38	277	306	330	338	336	338	338	339	338	352	40	23	354	89	138	130	346.8
10-Jul	136	156	165	145	150	123	132	128	123	113	107	98	96	94	92	90	91	90	95	117	116	128	126	149	110.2
11-Jul	148	134	139	133	129	136	139	143	139	167	323	257	274	229	238	196	200	275	286	211	225	199	109	118	163.9
12-Jul	137	138	132	136	121	128	128	78	350	354	355	348	356	356	356	339	339	340	353	334	327	273	249	233	2.2
13-Jul	235	254	251	269	284	339	344	340	349	345	341	347	349	352	344	333	335	342	5	4	351	328	333	331	338.2
14-Jul	325	302	263	247	254	324	331	319	330	330	351	355	346	329	343	347	355	30	24	0	345	355	336	336.3	
15-Jul	269	323	334	258	242	257	242	340	343	335	336	333	356	358	2	39	85	71	70	199	209	214	190	155	337.6
16-Jul	146	135	151	139	135	140	125	99	115	120	97	106	115	110	113	104	101	105	109	124	126	129	132	130	117.0
17-Jul	138	132	133	121	120	133	131	130	128	125	126	123	142	123	122	134	196	20	321	232	353	337	334	332	127.7
18-Jul	343	349	350	338	330	342	338	341	335	334	335	315	260	345	73	147	224	237	222	222	230	190	182	202	308.9
19-Jul	203	201	187	143	141	146	165	214	230	224	218	223	221	234	230	231	237	218	221	218	183	165	175	166	210.5
20-Jul	146	146	140	143	150	140	206	233	223	320	5	351	347	264	246	225	224	233	314	294	224	196	204	190	213.2
21-Jul	84	135	107	122	142	130	138	210	80	239	88	203	82	339	14	343	246	212	206	146	193	58	265	338	154.6
22-Jul	209	197	122	135	211	120	162	100	86	314	338	339	342	343	343	345	344	347	343	349	344	354	31	24	347.6
23-Jul	251	223	121	148	142	102	143	148	138	151	144	201	250	204	191	127	117	136	145	157	145	136	101	159	150.4
24-Jul	155	165	158	153	139	141	137	130	126	84	70	27	7	343	34	80	95	87	77	80	107	152	137	122	102.0
25-Jul	127	118	228	253	86	213	109	136	130	170	174	201	161	107	135	109	122	233	309	243	245	249	246	163	174.4
26-Jul	157	153	166	148	143	125	89	148	124	110	92	83	323	94	88	69	76	210	205	356	90	82	93	89	110.8
27-Jul	24	53	23	11	3	36	344	330	339	342	343	339	340	247	310	333	338	350	108	233	334	321	116	134	353.3
28-Jul	129	134	142	131	137	134	146	86	98	78	32	83	306	49	79	345	225	204	184	167	106	126	129	123	124.6
29-Jul	139	139	141	140	144	142	140	140	196	214	219	233	225	224	226	219	235	226	225	219	206	143	158	174	194.7
30-Jul	156	132	133	136	137	145	135	146	129	49	166	174	181	188	199	184	196	178	207	110	307	33	151	188	172.7
31-Jul	199	167	139	224	17	43	137	149	208	235	246	203	223	218	225	260	333	288	342	1	305	240	247	241	238.2
186.9 158.6 164.1 158.7 126.3 111.6 119.8 117.7 114.0 302.9 348.1 339.2 330.3 338.4 336.6 307.9 321.9 303.5 312.6 251.3 269.2 230.0 210.0 203.4 Diurnal Average																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Athabasca Valley - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 105 deg on Jul 21 10:00 Minimum Value: 9 deg on Jul 2 19:00 Percentiles: P ₁ = 11 P ₁₀ = 14 Q ₁ = 18 Median = 25 Q ₃ = 43 P ₉₀ = 66 P ₉₉ = 93																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	26	56	71	59	16	17	18	59	28	33	76	30	19	16	29	20	72	38	76	65	14	18	17	25	76
2-Jul	25	27	22	39	50	35	14	26	19	16	17	11	11	15	34	65	16	22	9	14	11	12	16	9	65
3-Jul	37	23	20	15	23	22	18	21	24	17	14	14	19	19	22	23	24	17	50	19	21	19	46	21	50
4-Jul	48	13	37	73	56	31	31	20	61	52	41	29	34	27	59	27	27	37	46	34	29	38	49	73	73
5-Jul	46	19	13	10	13	12	20	40	29	13	14	15	15	39	47	94	27	26	19	32	18	18	33	96	96
6-Jul	30	57	80	46	37	68	81	22	14	12	14	17	18	16	17	20	18	24	23	18	21	57	45	79	81
7-Jul	88	64	29	33	29	20	48	55	82	36	80	64	52	62	52	26	16	13	13	11	13	11	11	14	88
8-Jul	18	30	39	27	28	69	32	25	12	20	71	66	57	39	40	21	17	14	22	26	19	51	50	67	71
9-Jul	69	54	18	65	78	80	79	65	31	31	20	14	12	15	15	16	15	24	19	44	30	45	56	26	80
10-Jul	28	32	29	37	33	28	18	17	22	23	25	22	25	20	18	14	14	12	15	23	27	45	22	54	54
11-Jul	28	14	11	15	19	13	15	14	22	83	22	31	45	22	18	31	26	50	20	57	57	70	80	40	83
12-Jul	19	25	27	20	22	17	21	18	37	27	23	21	23	23	22	17	16	16	20	19	17	33	12	11	37
13-Jul	22	19	25	20	22	22	16	16	20	21	20	23	23	23	24	18	18	19	22	23	23	15	12	16	25
14-Jul	20	17	37	11	21	29	15	16	14	16	23	22	20	17	19	22	26	31	21	24	22	26	19	23	37
15-Jul	27	30	33	28	21	62	46	21	20	15	13	13	25	26	51	57	57	21	53	63	65	72	82	63	82
16-Jul	51	71	23	29	19	24	30	40	36	22	21	23	22	23	21	21	19	20	21	19	15	14	16	16	71
17-Jul	17	18	20	19	25	19	16	18	17	19	16	18	30	38	24	38	49	75	84	30	32	42	30	15	84
18-Jul	15	24	34	24	12	18	13	17	12	12	13	44	19	68	71	48	23	11	10	13	17	39	47	52	71
19-Jul	41	52	41	33	20	18	33	21	12	13	12	13	24	25	17	45	49	23	15	14	30	47	26	34	52
20-Jul	34	16	29	28	20	20	43	30	24	47	65	37	76	29	28	17	50	30	19	40	84	78	70	102	102
21-Jul	72	86	86	55	43	16	41	31	27	105	81	91	77	36	36	53	43	21	31	66	54	88	73	77	105
22-Jul	86	65	42	61	104	69	57	41	93	25	36	13	14	16	16	18	17	17	18	21	14	33	48	69	104
23-Jul	88	58	80	32	34	32	30	23	23	31	34	96	25	36	21	26	25	31	24	39	48	81	68	96	96
24-Jul	63	28	26	27	33	20	15	16	23	87	28	68	53	20	43	11	17	11	9	10	32	29	25	38	87
25-Jul	28	87	58	74	50	75	23	26	19	33	50	43	53	24	21	47	61	85	56	15	13	19	22	20	87
26-Jul	18	17	16	30	22	31	55	30	22	30	31	43	15	52	22	20	19	78	41	82	24	15	17	34	82
27-Jul	20	25	17	18	23	30	29	12	16	15	18	18	88	45	32	19	20	24	51	96	26	80	24	18	96
28-Jul	28	17	23	21	18	13	60	17	24	17	80	56	28	57	65	71	24	22	14	12	61	66	40	44	80
29-Jul	14	12	11	15	11	13	17	23	63	11	12	17	35	41	24	34	14	15	16	13	36	50	17	16	63
30-Jul	45	31	20	12	14	16	23	22	36	64	79	27	29	25	24	24	22	22	74	92	44	55	26	28	92
31-Jul	29	31	54	31	50	35	23	22	31	33	55	89	16	12	13	44	54	34	20	35	56	21	13	14	89
Diurnal Maximum																									





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS08 FORT CHIPEWYAN JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS08)

JULY 2023

MONTHLY SUMMARY

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	697	35	47	98.39	1.9	0	0.9	0
TRS (ppb) Average	698	36	46	98.66	1.8	0	0.6	0
O3(ppb) Average	656	31	88	92.34	63.4	0	42.7	-
NO2(ppb) Average	698	35	46	98.52	9.2	0	2.3	-
NO(ppb) Average	698	35	46	98.52	1	-	0.2	-
NOX(ppb) Average	698	35	46	98.52	9.4	-	2.5	-
PM2.5(ug/m3) Average	739	3	5	99.73	419.6	151	167.3	17
CO(ppm) Average	636	31	108	89.65	2.5	0	0.7	-
CO2(ppm) Average	635	35	109	90.05	451.2	-	436.3	-
Temperature 2 m (C) Average	744	0	0	100	27.7	-	22.6	-
Relative Humidity (%) Average	727	0	17	97.72	99.4	-	87.4	-
Wind Speed 10 m (km/h) Average	742	0	2	99.73	46	-	33	-
Wind Direction 10 m (deg) Average	742	0	2	99.73	-	-	-	-
PC(mm) Total	744	0	0	100	7	-	27.4	-
Leaf Wetness (% of range) Average	742	0	2	99.73	49.2	-	22.3	-
Global Solar Radiation (W/m2) Average	744	0	0	100	911	-	357.4	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS08)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	697	0.23	0.3	-	0	0	0.1	0.1	0.3	0.6	1.9
TRS (ppb) Average	698	0.25	0.2	-	0.1	0.1	0.1	0.2	0.3	0.4	1.8
O3(ppb) Average	656	32.01	7.9	-	13	22.5	27.1	31.3	36.2	42.3	63.4
NO2(ppb) Average	698	0.75	0.9	-	0	0.1	0.2	0.5	0.9	1.6	9.2
NO(ppb) Average	698	0.08	0.1	-	0	0	0	0.1	0.1	0.2	1
NOX(ppb) Average	698	0.84	1	-	0	0.1	0.3	0.6	1	1.7	9.4
PM2.5(ug/m3) Average	739	50.69	67.7	-	0.8	2.8	5.8	25.5	65.3	132.1	419.6
CO(ppm) Average	636	0.19	0.4	-	0	0	0	0	0.2	0.6	2.5
CO2(ppm) Average	635	399.61	13.8	-	379.3	387.2	390.6	394.2	406.4	418.8	451.2
Temperature 2 m (C) Average	744	18.95	3.3	-	11.2	14.8	16.6	18.6	21.2	23.5	27.7
Relative Humidity (%) Average	727	61.59	15	-	22	42.2	51.3	62.3	71.4	81	99.4
Wind Speed 10 m (km/h) Average	742	14.3	8	-	1	6	9	12	18	26	46
Wind Direction 10 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	41.62	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	742	1.25	5.7	-	0	0	0	0	0	0.9	49.2
Global Solar Radiation (W/m2) Average	744	223.52	255	-	0	0	1.5	104	401.3	664.3	911

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS08)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
CO,CO2,NO2,SO2,TRS	10 Jul 2023 13:00	10 Jul 2023 13:00	1	Maintenance - sample manifold cleaned
CO,CO2,O3	13 Jul 2023 19:00	14 Jul 2023 12:00	18	Station power failure
CO2,NO2,TRS,SO2	16 Jul 2023 22:00	16 Jul 2023 22:00	1	Station power failure
CO,NO2,O3, TRS,SO2	25 Jul 2023 15:00	25 Jul 2023 20:00	6	Maintenance - to install a new power bar
CO,O3	26 Jul 2023 05:00	26 Jul 2023 10:00	6	Unstable Operation - flatline in analyzer output signal
CO, CO2	28 Jul 2023 08:00	28 Jul 2023 18:00	11	Unstable Operation - flatline in analyzer output signal
NO2, TRS	16 Jul 2023 18:00	16 Jul 2023 18:00	1	Station power failure
O3	16 Jul 2023 22:00	17 Jul 2023 09:00	12	Station power failure
O3	26 Jul 2023 19:00	27 Jul 2023 08:00	14	Unstable Operation - flatline in analyzer output signal
O3	27 Jul 2023 09:00	27 Jul 2023 09:00	1	Maintenance - station operator activities
CO	16 Jul 2023 18:00	17 Jul 2023 09:00	16	Station power failure
CO	25 Jul 2023 09:00	25 Jul 2023 11:00	3	Maintenance - multi-point verification check
CO	26 Jul 2023 18:00	27 Jul 2023 09:00	16	Unstable Operation - flatline in analyzer output signal
CO2	16 Jul 2023 22:00	17 Jul 2023 09:00	12	Station power failure
CO2	25 Jul 2023 14:00	26 Jul 2023 11:00	22	Maintenance - to install a new power bar
CO2	26 Jul 2023 19:00	27 Jul 2023 03:00	9	Unstable Operation - flatline in analyzer output signal
NO2	17 Jul 2023 00:00	17 Jul 2023 00:00	1	Station power failure
NO2	26 Jul 2023 10:00	26 Jul 2023 10:00	1	Maintenance - verify daily QA response
SO2	16 Jul 2023 15:00	16 Jul 2023 18:00	4	Station power failure

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS08)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	17 Jul 2023 00:00	17 Jul 2023 00:00	1	Station power failure
PM2.5	25 Jul 2023 16:00	25 Jul 2023 17:00	2	Maintenance - to install a new power bar
Relative Humidity	02 Jul 2023 14:00	21 Jul 2023 07:00	17	Sensor operated out of range
Wind Speed, Wind Direction	25 Jul 2023 13:00	25 Jul 2023 13:00	1	Maintenance - to repalce the sensor
Wind Speed, Wind Direction	25 Jul 2023 14:00	25 Jul 2023 14:00	1	Flat line in sensor output signal
Surface Leaf Wetness	26 Jul 2023 12:00	26 Jul 2023 13:00	2	Maintenance - to repalce the sensor



Wood Buffalo Environmental Association
Summary of Hour Averages

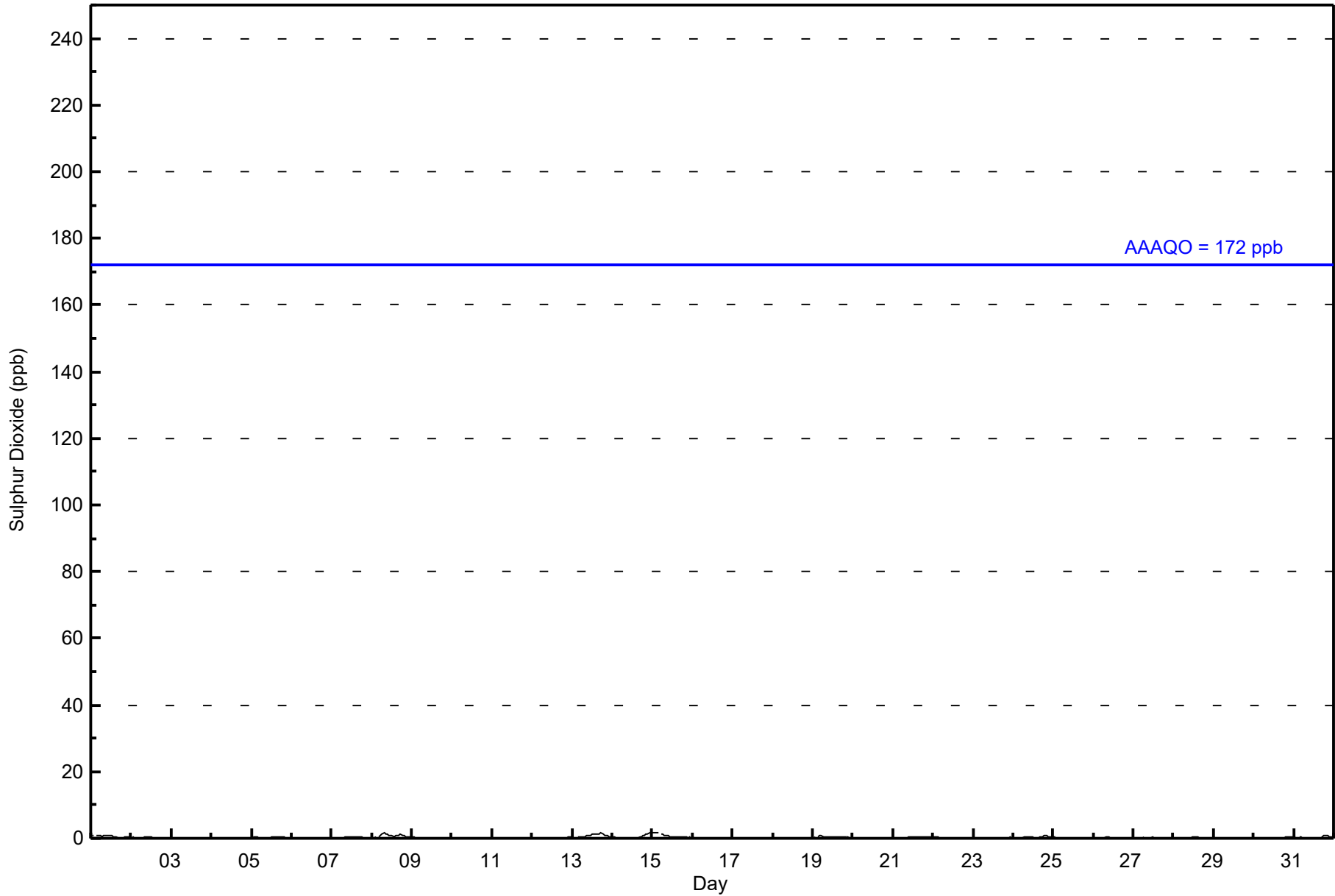
Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - July 2023

Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0	Hours in Service: 744																	Daily Average		Daily Maximum																									
Maximum Value: 1.9 ppb on Jul 15 01:00		Maximum Daily Average: 0.9 ppb on Jul 13		Hours of Data: 697																	0.5		1.0																									
Minimum Value: 0.0 ppb on Jul 3 14:00		Minimum Daily Average: 0.0 ppb on Jul 6		Hours of Missing Data: 47																	0.2		0.3																									
Maximum Diurnal Average: 0.3 ppb at hour 2		Minimum Diurnal Average: 0.2 ppb at hour 5		Hours of Calibration: 35																	0.0		0.1																									
Monthly Average: 0.23 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 0.6 P ₉₉ = 1.5		Hours of Operational Time: 98.4																	0.1		0.1																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	0.9	1.0	Z	0.8	0.7	0.7	0.6	0.7	0.7	0.8	0.8	0.7	0.5	0.4	0.3	0.2	0.2	0.1	0.1	0.2	0.3	0.3	0.2	0.5	1.0																							
2-Jul	0.2	0.2	0.2	Z	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3																							
3-Jul	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1																							
4-Jul	0.0	0.0	0.0	0.0	0.1	Z	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1																							
5-Jul	Z	0.4	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.1	0.1	0.2																							
6-Jul	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0																							
7-Jul	0.1	0.1	Z	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.2																							
8-Jul	0.1	0.1	0.2	Z	0.6	0.9	1.3	1.5	1.4	1.2	1.0	0.8	0.7	0.6	0.7	0.7	0.9	1.2	1.0	0.9	0.6	0.5	0.5	0.4	0.8																							
9-Jul	0.3	0.2	0.2	0.2	Z	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.3																							
10-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.0	0.0	0.1	0.0	M	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-Jul	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	0.0	0.1	0.0	0.1																							
12-Jul	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.5	0.1																							
13-Jul	0.5	0.6	Z	0.5	0.5	0.5	0.4	0.5	0.8	0.8	0.8	1.0	1.1	1.4	1.4	1.3	1.4	1.5	1.4	0.8	0.8	0.7	0.6	0.4	0.9																							
14-Jul	0.3	0.3	0.2	Z	0.1	0.0	0.0	0.0	0.0	0.0	0.1	C	C	C	C	0.2	0.3	0.6	0.9	1.0	1.2	1.4	1.6	1.8	0.5																							
15-Jul	1.9	1.8	1.7	1.6	Z	1.2	1.1	0.9	0.8	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.7																							
16-Jul	0.2	0.2	0.2	0.2	0.2	Z	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	PF	PF	PF	PF	0.1	0.1	0.1	PF	0.1	0.1	0.1																							
17-Jul	Z	0.1	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	0.1	0.1	0.1	0.1	0.1	0.1																							
18-Jul	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	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1																							
19-Jul	0.1	0.3	Z	0.4	0.7	0.7	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.4																							
20-Jul	0.2	0.1	0.1	Z	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1																							
21-Jul	0.1	0.2	0.2	0.2	Z	0.1	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.3																							
22-Jul	0.3	0.4	0.4	0.3	0.2	Z	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	0.1	0.1	0.1	0.1	0.1																							
23-Jul	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	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1																							
24-Jul	0.2	Z	0.2	0.2	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.4	1.0	0.8	0.8	0.6	0.5	0.4	0.3																							
25-Jul	0.3	0.3	Z	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	M	M	M	M	M	M	M	0.1	0.1	0.1	--																							
26-Jul	0.1	0.1	0.1	Z	0.2	0.1	0.1	0.3	0.4	0.5	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																							
27-Jul	0.1	0.1	0.1	0.1	Z	0.4	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1																							
28-Jul	0.1	0.1	0.1	0.2	0.1	Z	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2																							
29-Jul	Z	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	0.1	0.1	0.0																							
30-Jul	0.1	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.3	0.3	0.4	0.3	0.2	0.1																							
31-Jul	0.2	0.3	Z	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	0.1	0.4	0.6	0.8	0.7	0.6	0.5	0.4	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	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.2	Diurnal Average
																								1.9	1.8	1.7	1.6	0.7	1.2	1.3	1.5	1.4	1.2	1.0	1.0	1.1	1.4	1.4	1.3	1.4	1.5	1.4	1.0	1.2	1.4	1.6	1.8	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	697	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: 697

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	32	18	38	95	121	60	18	7	16	16	36	42	68	42	27	59	695
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	32	18	38	95	121	60	18	7	16	16	36	42	68	42	27	59	695

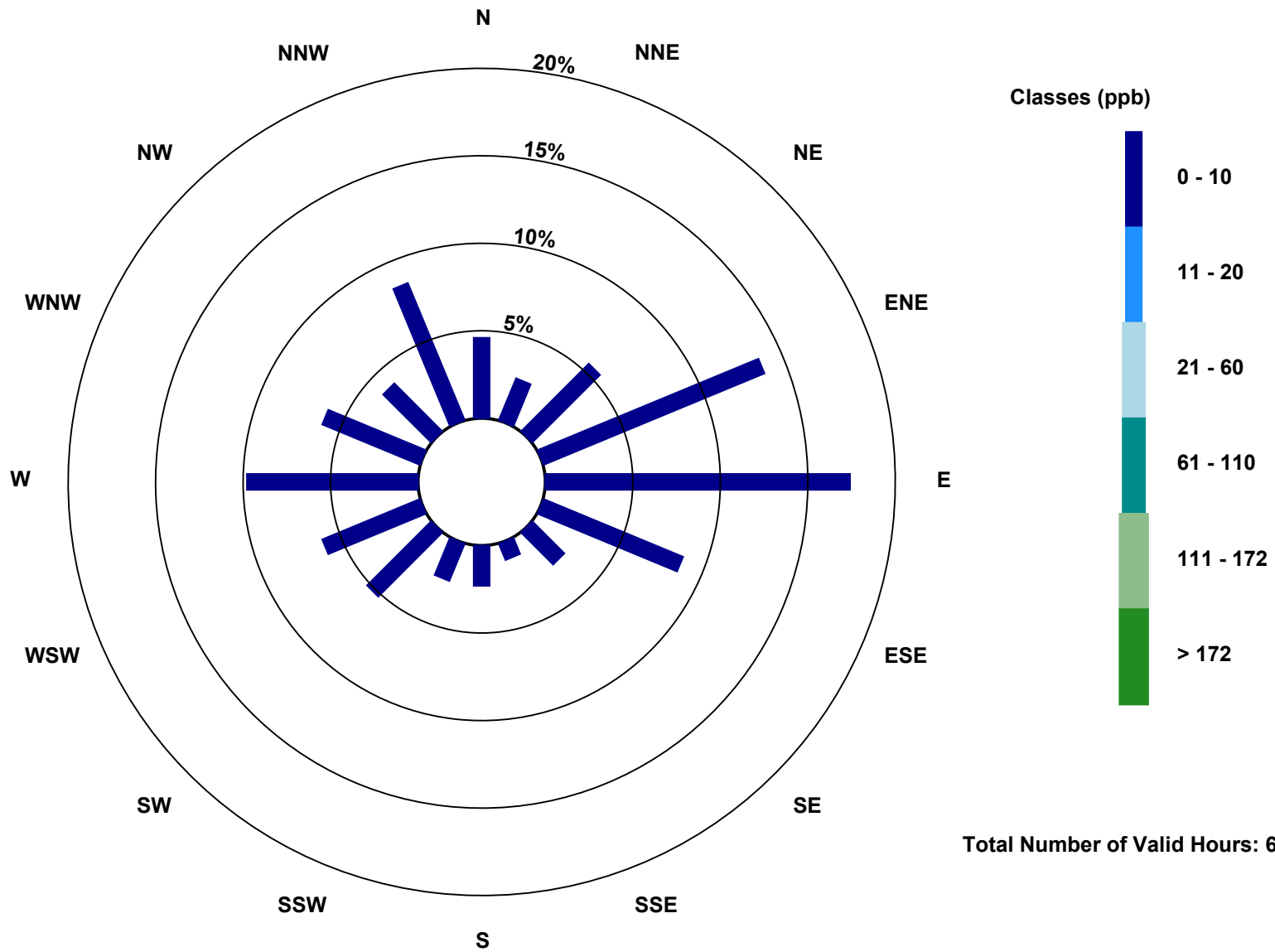
Total Number of Valid Hours: 695

Total Number of Hours: 744

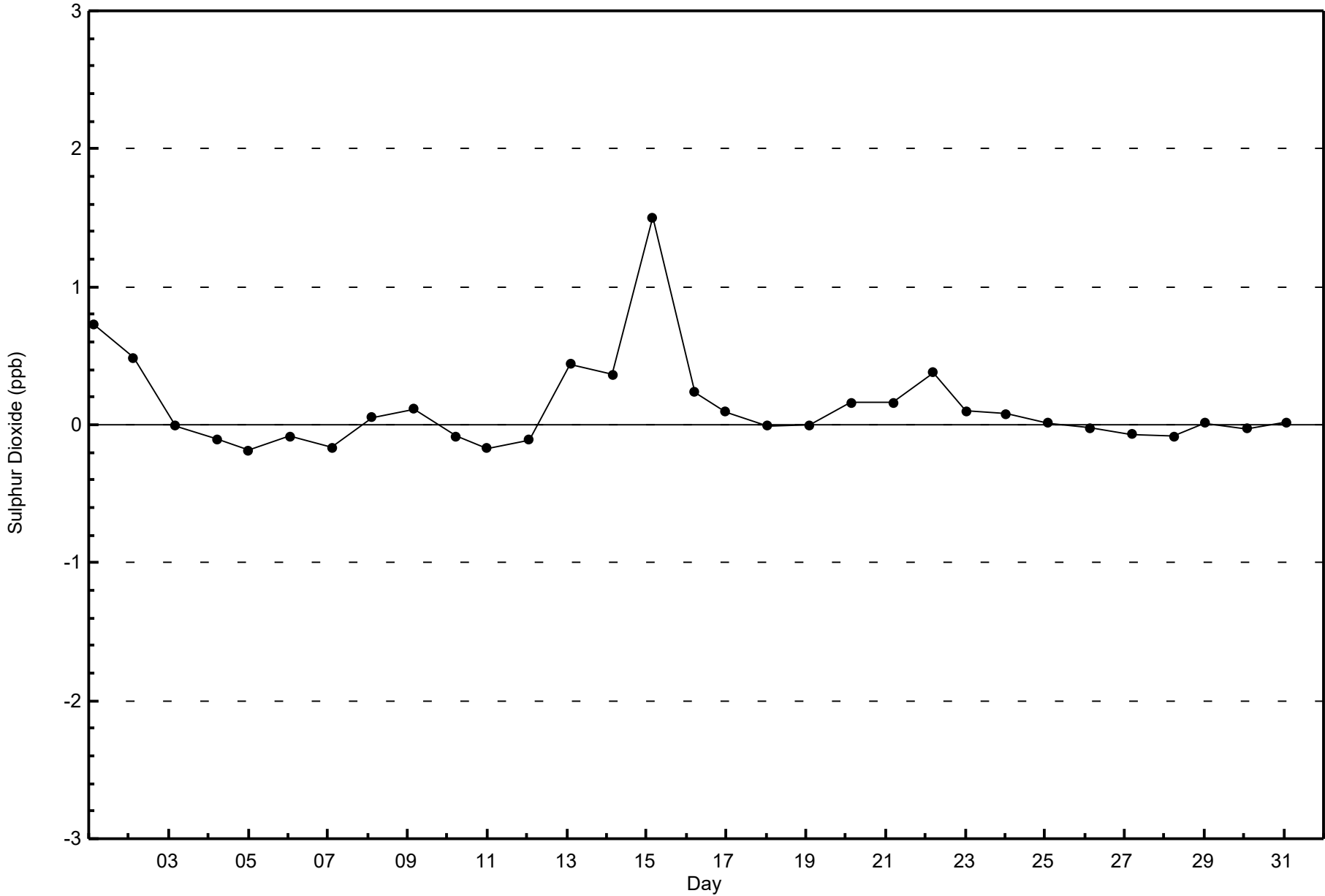


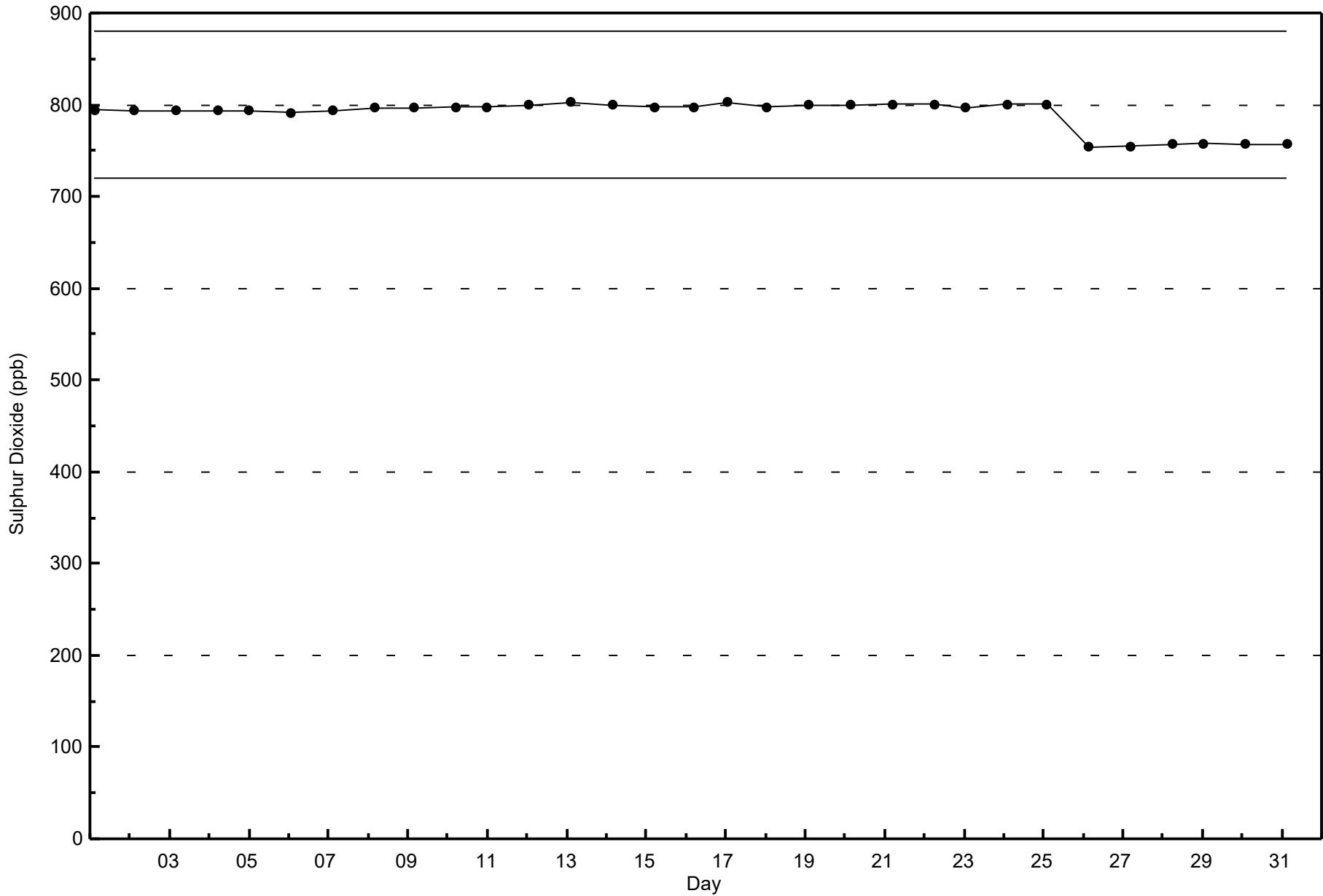
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan



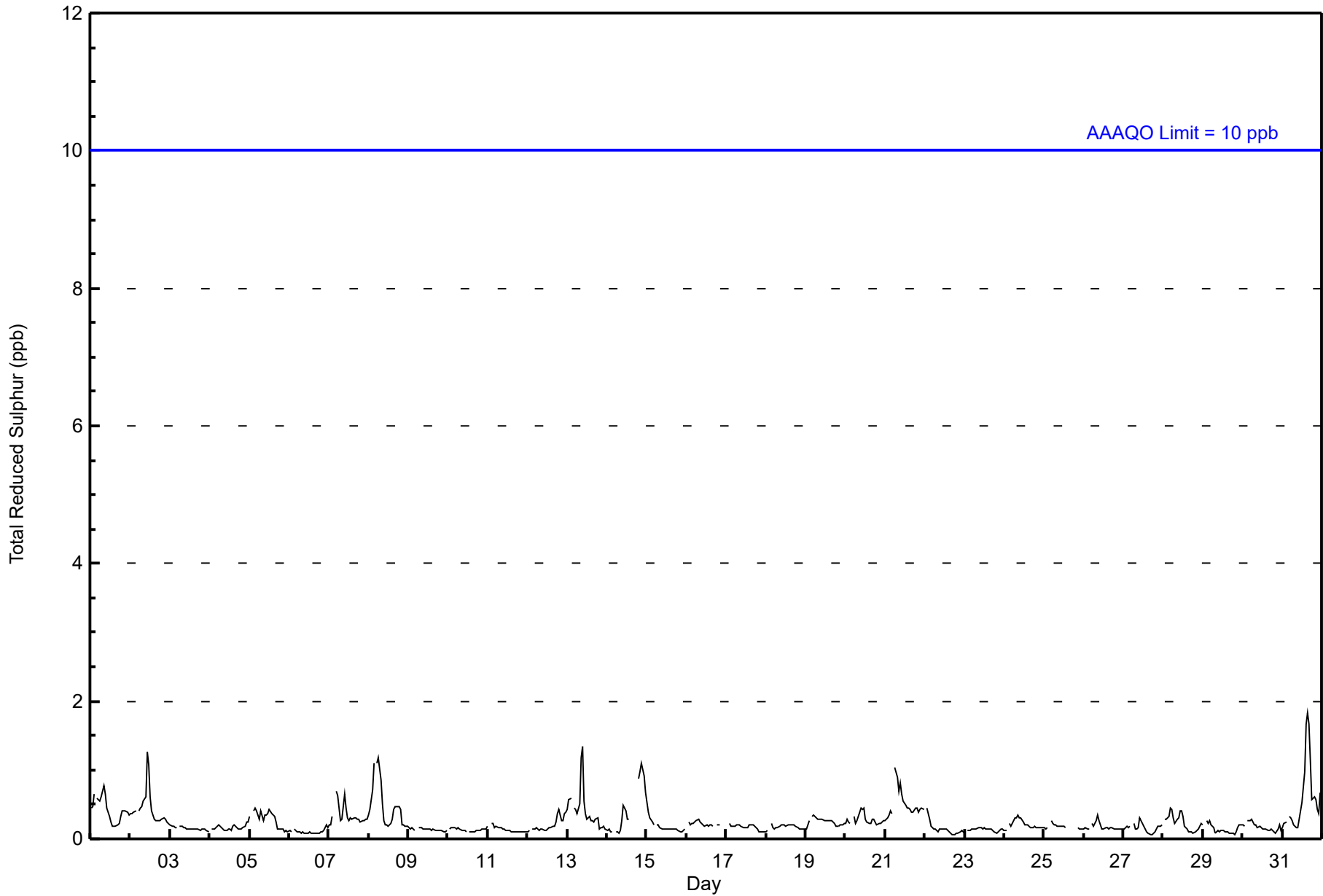
Total Number of Valid Hours: 695







Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0																		Hours in Service:	744				
Maximum Value: 1.8 ppb on Jul 31 16:00		Maximum Daily Average: 0.6 ppb on Jul 31																	Hours of Data:	698						
Minimum Value: 0.1 ppb on Jul 22 17:00		Minimum Daily Average: 0.1 ppb on Jul 6																	Hours of Missing Data:	46						
Maximum Diurnal Average: 0.3 ppb at hour 10		Minimum Diurnal Average: 0.2 ppb at hour 19																	Hours of Calibration:	36						
Monthly Average: 0.25 ppb		Percentiles: P ₁ = 0.1 P ₁₀ = 0.1 Q ₁ = 0.1 Median = 0.2 Q ₃ = 0.3 P ₉₀ = 0.4 P ₉₉ = 1.1																	Percent Operational Time:	98.7						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.4	0.5	0.6	Z	0.6	0.5	0.6	0.7	0.8	0.6	0.5	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.3	0.4	0.8
2-Jul	0.4	0.4	0.4	0.4	Z	0.4	0.4	0.5	0.6	0.6	1.3	1.1	0.6	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.4	1.3
3-Jul	0.2	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
4-Jul	Z	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
5-Jul	0.3	Z	0.4	0.4	0.4	0.3	0.3	0.4	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.4
6-Jul	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	0.2	0.2	0.1	0.2
7-Jul	0.2	0.2	0.3	Z	0.7	0.6	0.5	0.3	0.3	0.6	0.5	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	0.7
8-Jul	0.3	0.4	0.7	1.1	Z	1.1	1.2	0.9	0.5	0.3	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.5	0.5	0.4	0.2	0.2	0.2	0.2	0.5	1.2
9-Jul	0.2	0.2	0.2	0.1	0.1	Z	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
10-Jul	Z	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	M	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
11-Jul	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
12-Jul	0.1	0.1	Z	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.3	0.3	0.4	0.4	0.2	0.4
13-Jul	0.4	0.6	0.6	Z	0.4	0.4	0.4	0.5	1.2	1.3	0.6	0.4	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.1	0.2	0.2	0.2	0.1	0.4	1.3
14-Jul	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.3	0.5	0.4	0.3	0.3	C	C	C	C	C	0.9	1.0	1.1	0.9	0.7	0.4	1.1
15-Jul	0.5	0.4	0.3	0.2	0.2	Z	0.2	0.2	0.2	0.2	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	0.2	0.5
16-Jul	Z	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	PF	0.2	0.2	0.2	0.2	0.2	0.2	0.3
17-Jul	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2
18-Jul	0.1	0.1	Z	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2
19-Jul	0.2	0.2	0.3	Z	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	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4
20-Jul	0.2	0.3	0.2	0.2	Z	0.3	0.2	0.3	0.3	0.5	0.4	0.5	0.3	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.5	0.5
21-Jul	0.3	0.3	0.3	0.4	0.4	Z	1.0	0.9	0.7	0.8	0.7	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.5	1.0
22-Jul	Z	0.4	0.4	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4
23-Jul	0.1	Z	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.2	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	0.2
24-Jul	0.1	0.1	Z	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
25-Jul	0.2	0.2	0.2	Z	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	M	M	M	M	M	M	M	0.2	0.1	0.1	0.1	0.3
26-Jul	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.3	0.4	0.3	0.2	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.2	0.4
27-Jul	0.1	0.2	0.2	0.2	0.2	Z	0.2	0.1	0.1	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
28-Jul	Z	0.3	0.3	0.3	0.5	0.4	0.3	0.2	0.3	0.3	0.4	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.5
29-Jul	0.2	Z	0.3	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.3
30-Jul	0.2	0.2	Z	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.3
31-Jul	0.2	0.2	0.2	Z	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.4	0.5	1.0	1.7	1.8	1.7	1.1	0.6	0.6	0.6	0.4	0.4	0.7	0.6	1.8
																								Diurnal Average		
																								Diurnal Maximum		
																								0.2 0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2		
																								0.5 0.6 0.7 1.1 0.7 1.1 1.2 0.9 1.2 1.3 1.3 1.1 0.6 1.0 1.7 1.8 1.7 1.1 0.6 0.9 1.0 1.1 0.9 0.7		
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
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort Chipewyan - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	698	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: 698

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort Chipewyan - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	32	16	36	98	120	64	17	7	16	17	37	43	65	42	27	59	696
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	32	16	36	98	120	64	17	7	16	17	37	43	65	42	27	59	696

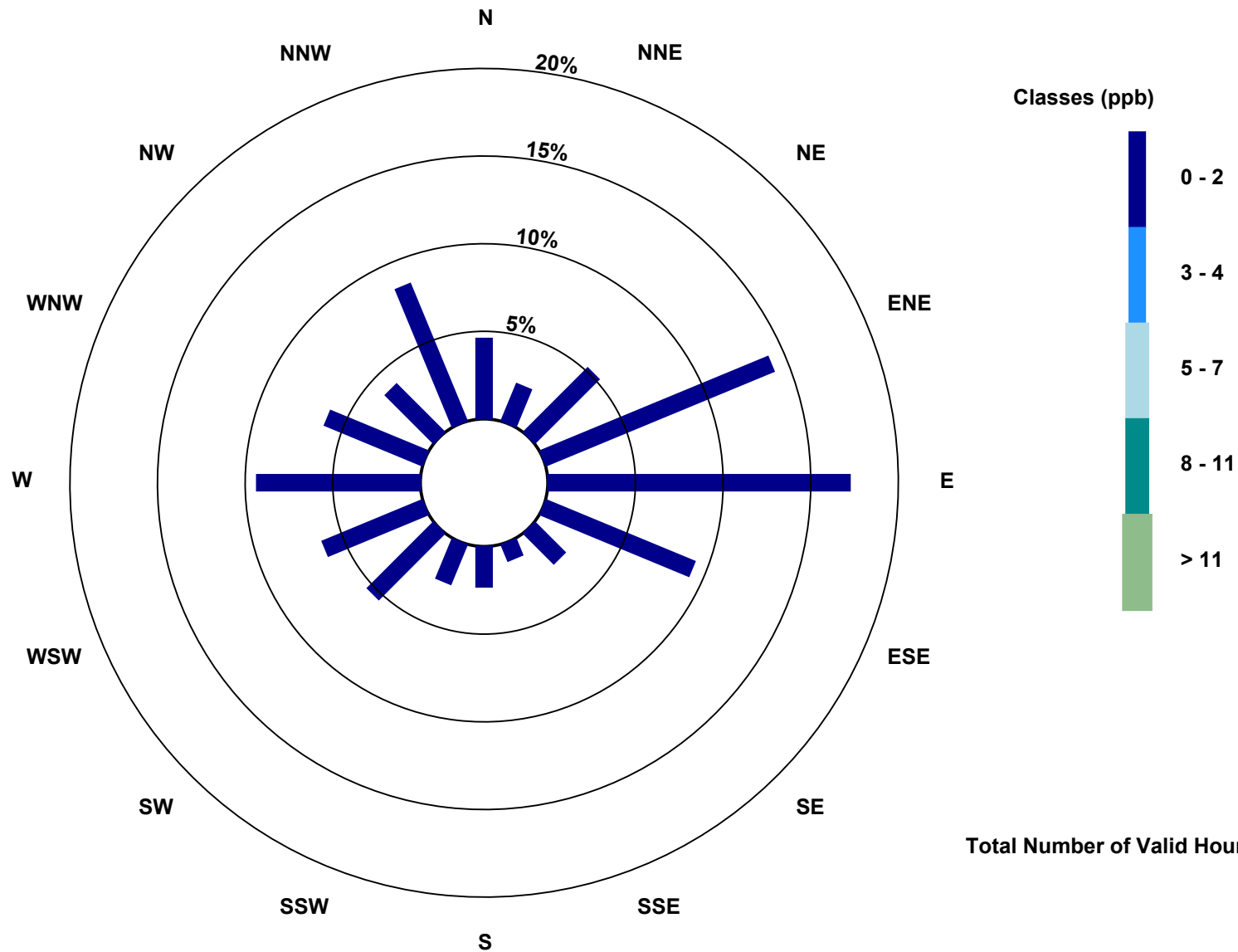
Total Number of Valid Hours: 696

Total Number of Hours: 744

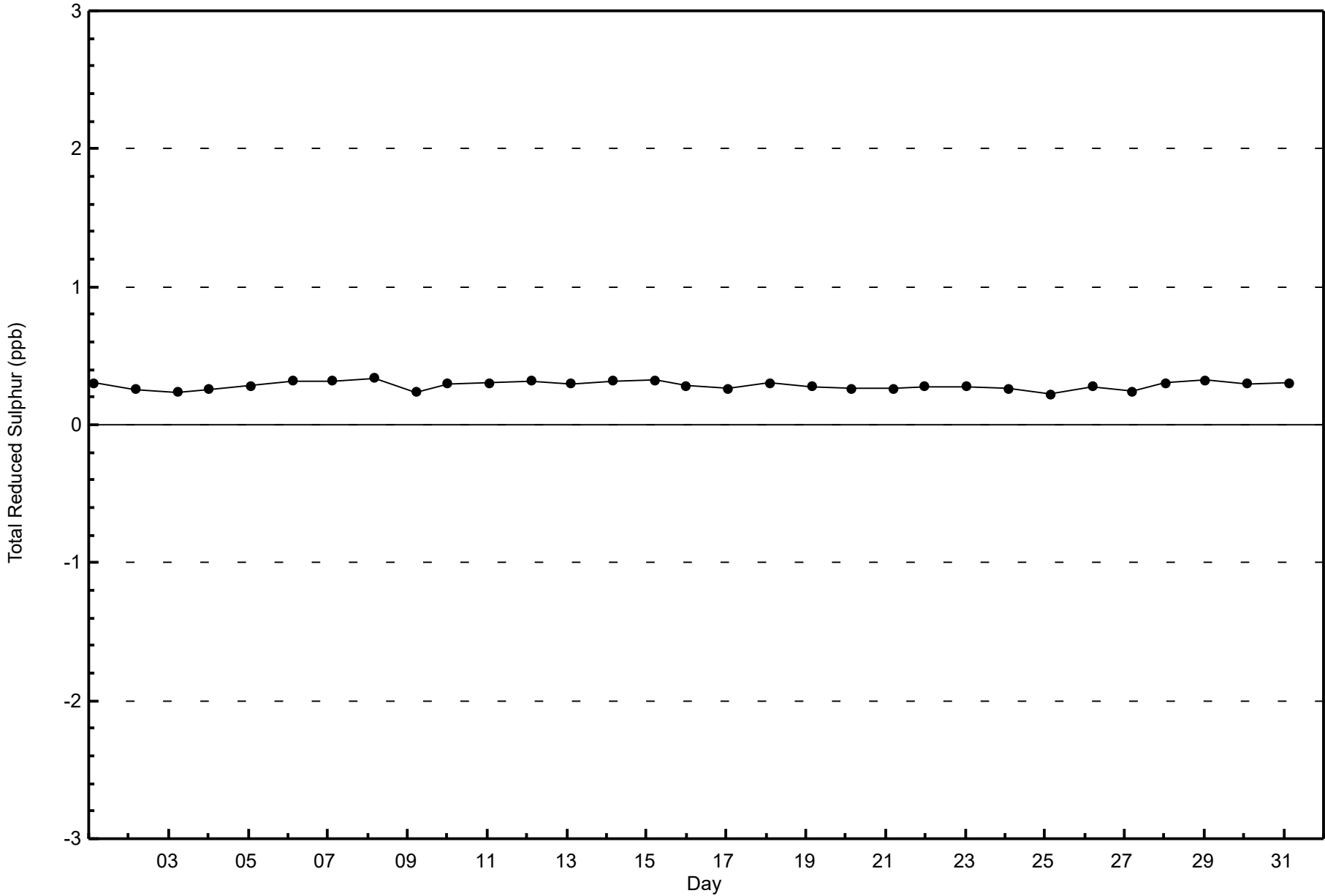


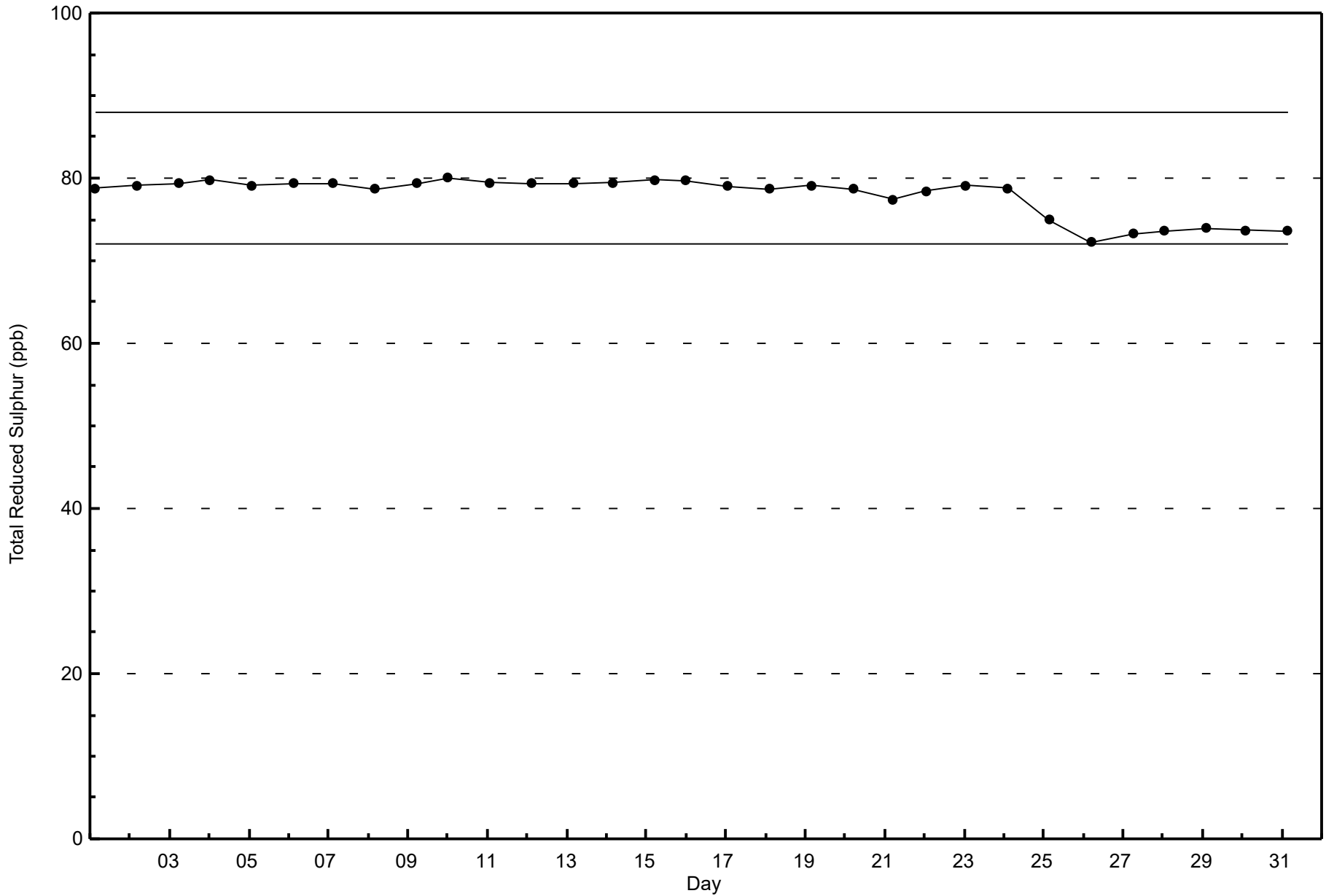
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Reduced Sulphur (TRS) - ppb
Fort Chipewyan



Total Number of Valid Hours: 696







Wood Buffalo Environmental Association
Summary of Hour Averages

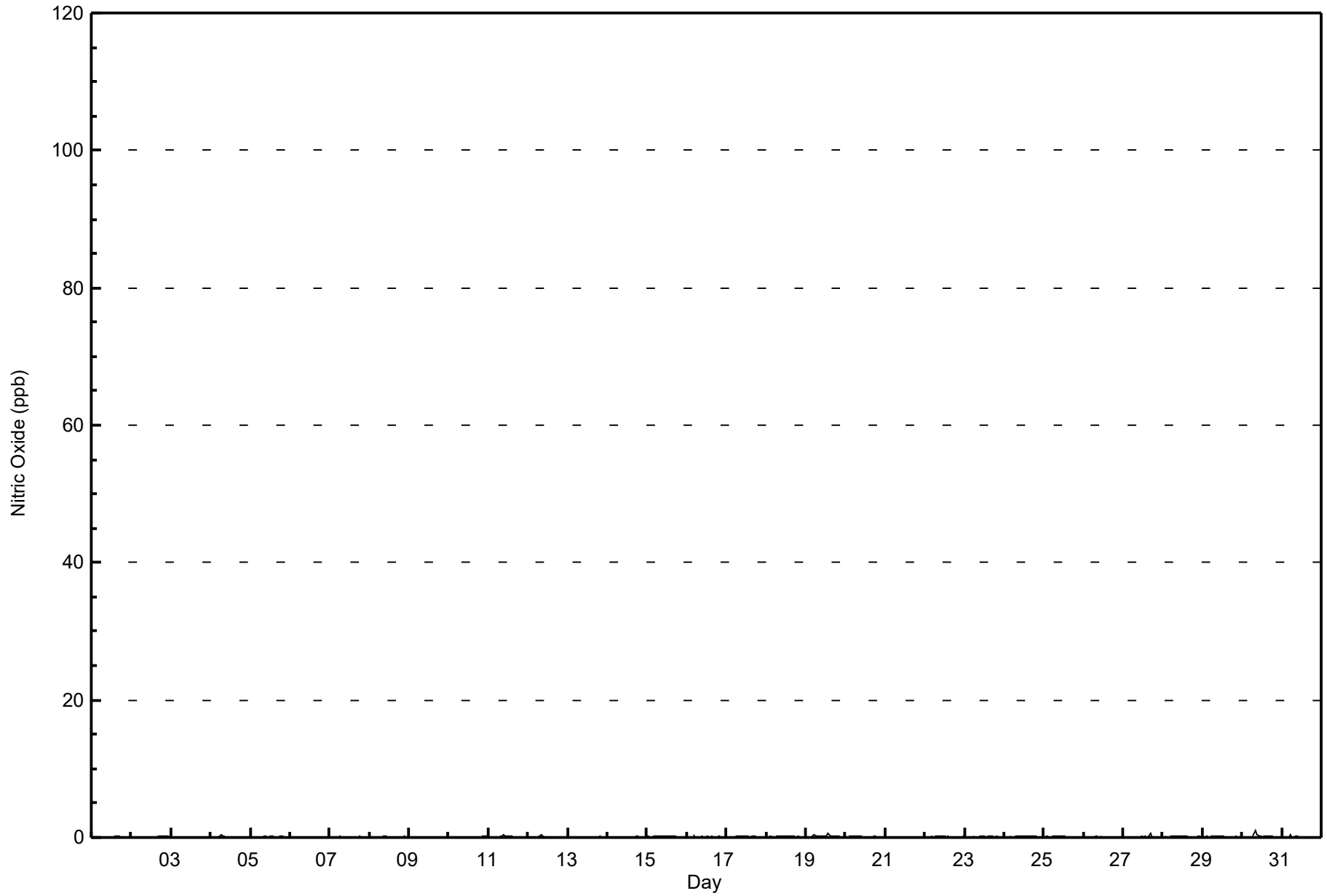
Nitric Oxide (NO) - ppb
Fort Chipewyan - July 2023

Maximum Value: 1.0 ppb on Jul 30 09:00		Maximum Daily Average: 0.2 ppb on Jul 19		Hours in Service: 744																							
Minimum Value: 0.0 ppb on Jul 1 09:00		Minimum Daily Average: 0.0 ppb on Jul 3		Hours of Data: 698																							
Maximum Diurnal Average: 0.1 ppb at hour 9		Minimum Diurnal Average: 0.0 ppb at hour 3		Hours of Missing Data: 46																							
Monthly Average: 0.08 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.1 P ₉₀ = 0.2 P ₉₉ = 0.4		Hours of Calibration: 35																							
				Percent Operational Time: 98.5																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.2	
2-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	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
3-Jul	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	0.0	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
4-Jul	0.0	0.0	0.0	Z	0.1	0.1	0.4	0.2	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	0.1	0.1	0.1	0.4	0.4
5-Jul	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	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.1	0.2	0.2
6-Jul	0.0	0.0	0.0	0.0	0.1	Z	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
7-Jul	Z	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1
8-Jul	0.1	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2
9-Jul	0.1	0.1	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
10-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	M	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	0.1
11-Jul	0.1	0.1	0.0	0.0	Z	0.1	0.1	0.1	0.2	0.3	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
12-Jul	0.0	0.0	0.1	0.1	0.1	Z	0.2	0.2	0.3	0.3	0.1	0.1	0.1	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	0.3
13-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1
14-Jul	0.0	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	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
15-Jul	0.1	0.1	Z	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2
16-Jul	0.0	0.0	0.0	Z	0.3	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	PF	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3
17-Jul	0.1	0.1	0.1	0.1	Z	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	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.2
18-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.2
19-Jul	Z	0.1	0.0	0.0	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.6	0.4	0.2	0.3	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.6
20-Jul	0.1	Z	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.2
21-Jul	0.0	0.0	Z	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
22-Jul	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	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
23-Jul	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	0.0	0.0	0.0	0.0	0.0	0.2
24-Jul	0.0	0.0	0.0	0.1	0.3	Z	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3
25-Jul	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	M	M	M	M	M	M	M	0.0	0.0	0.0	0.0	--	0.2
26-Jul	0.0	Z	0.1	0.1	0.0	0.1	0.1	0.1	0.2	M	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
27-Jul	0.0	0.0	Z	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.6	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.6
28-Jul	0.1	0.1	0.1	Z	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
29-Jul	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	0.1
30-Jul	0.1	0.0	0.0	0.1	0.1	Z	0.2	0.6	1.0	0.4	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.0	0.1	0.1	0.1	1.0
31-Jul	Z	0.1	0.1	0.1	0.1	0.4	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	0.0	0.0	0.0	0.0	0.0	0.4
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																											



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Fort Chipewyan - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort Chipewyan - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	698	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort Chipewyan - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	16	36	96	119	63	18	8	15	15	38	43	66	43	24	60	696
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	36	16	36	96	119	63	18	8	15	15	38	43	66	43	24	60	696

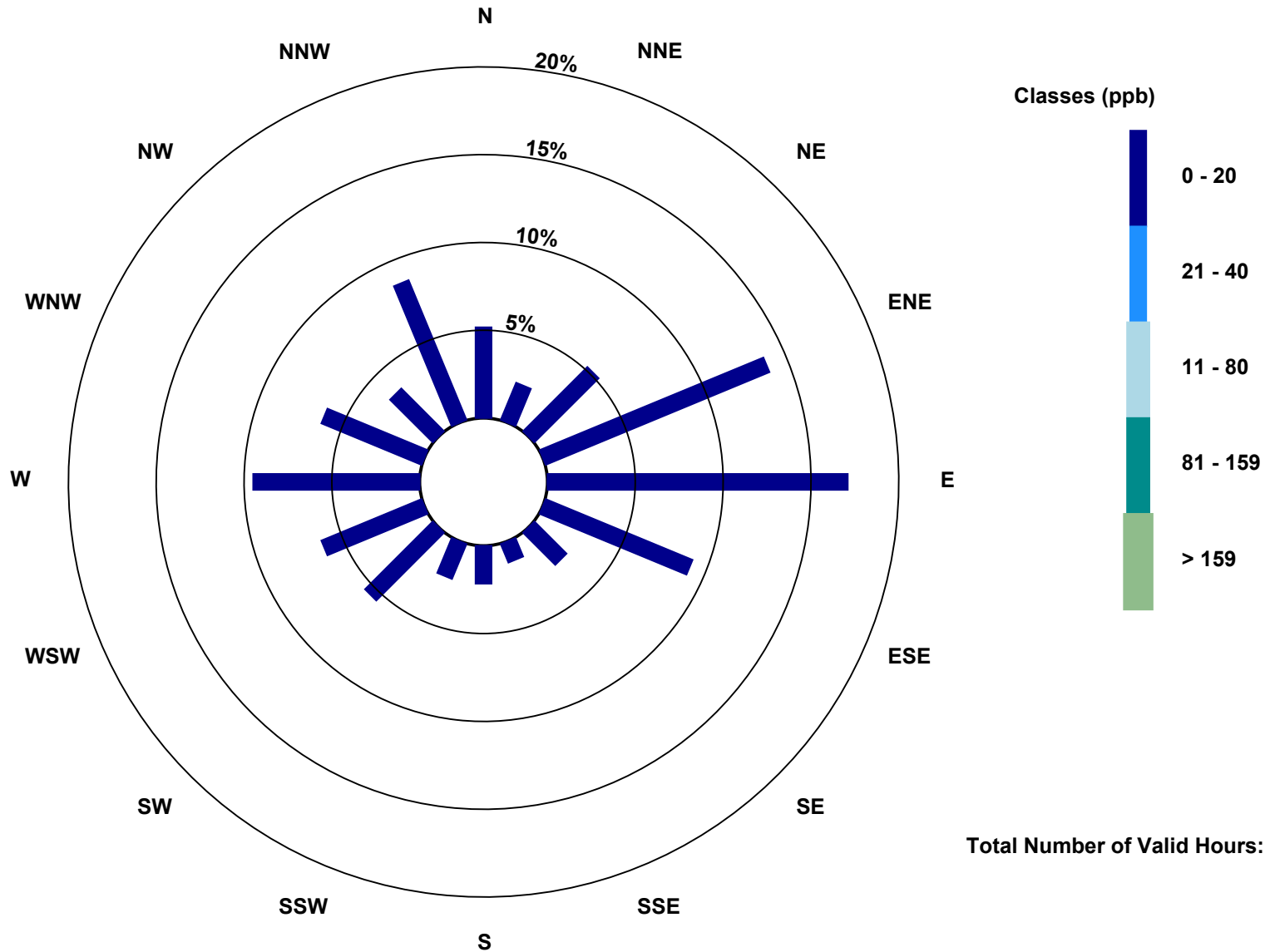
Total Number of Valid Hours: 696

Total Number of Hours: 744

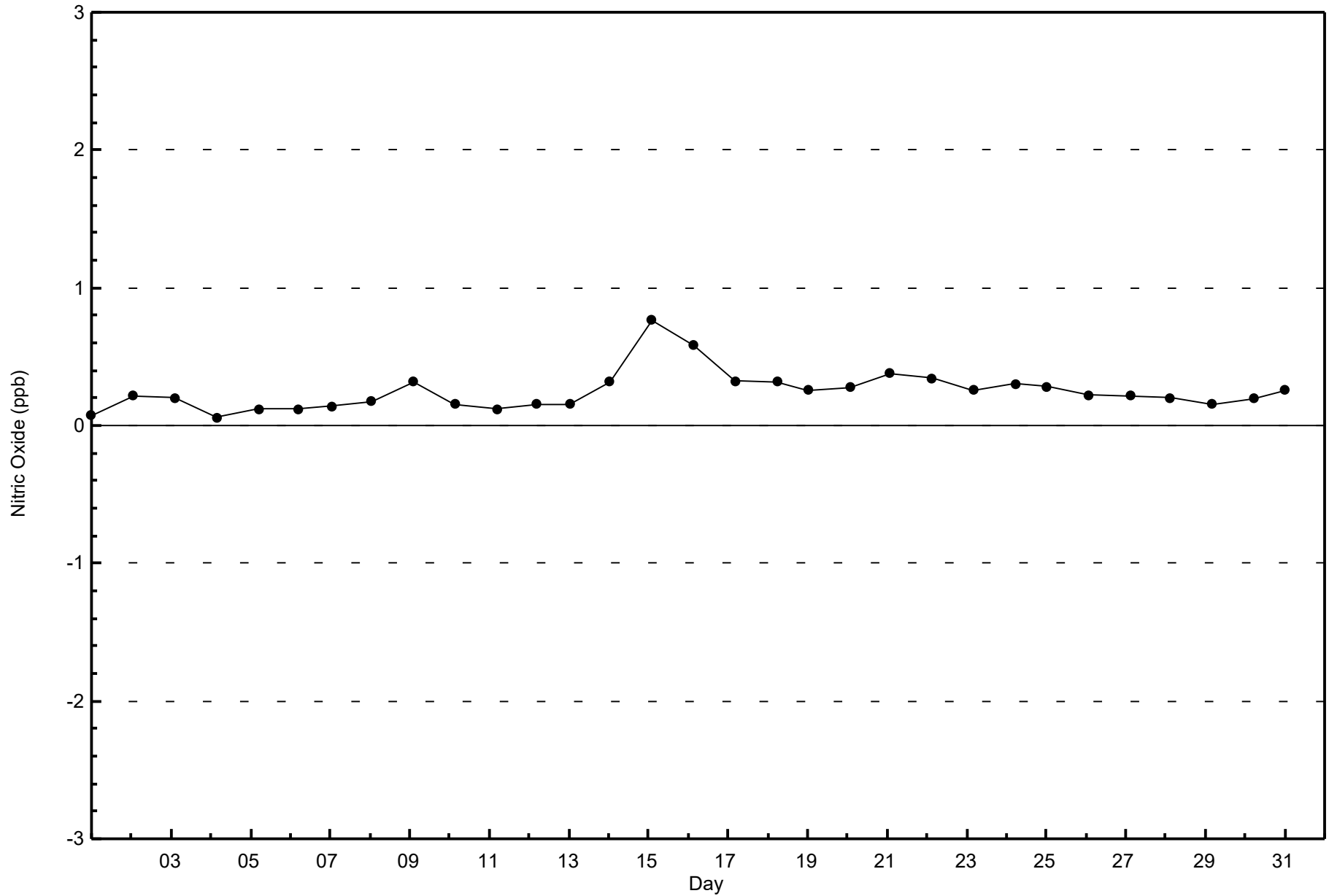


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Fort Chipewyan



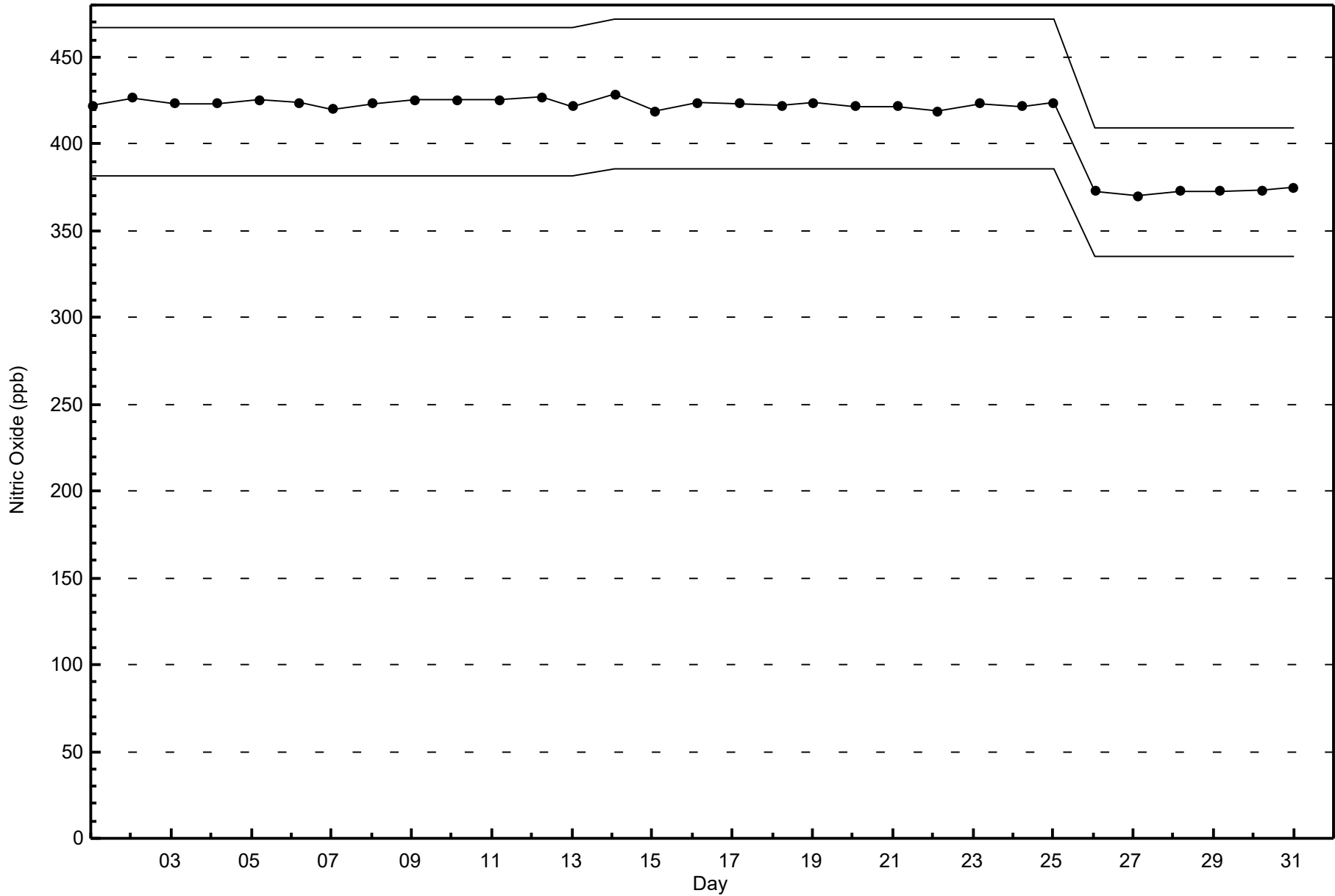
Total Number of Valid Hours: 696





Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Fort Chipewyan - July 2023





Wood Buffalo Environmental Association
Summary of Hour Averages

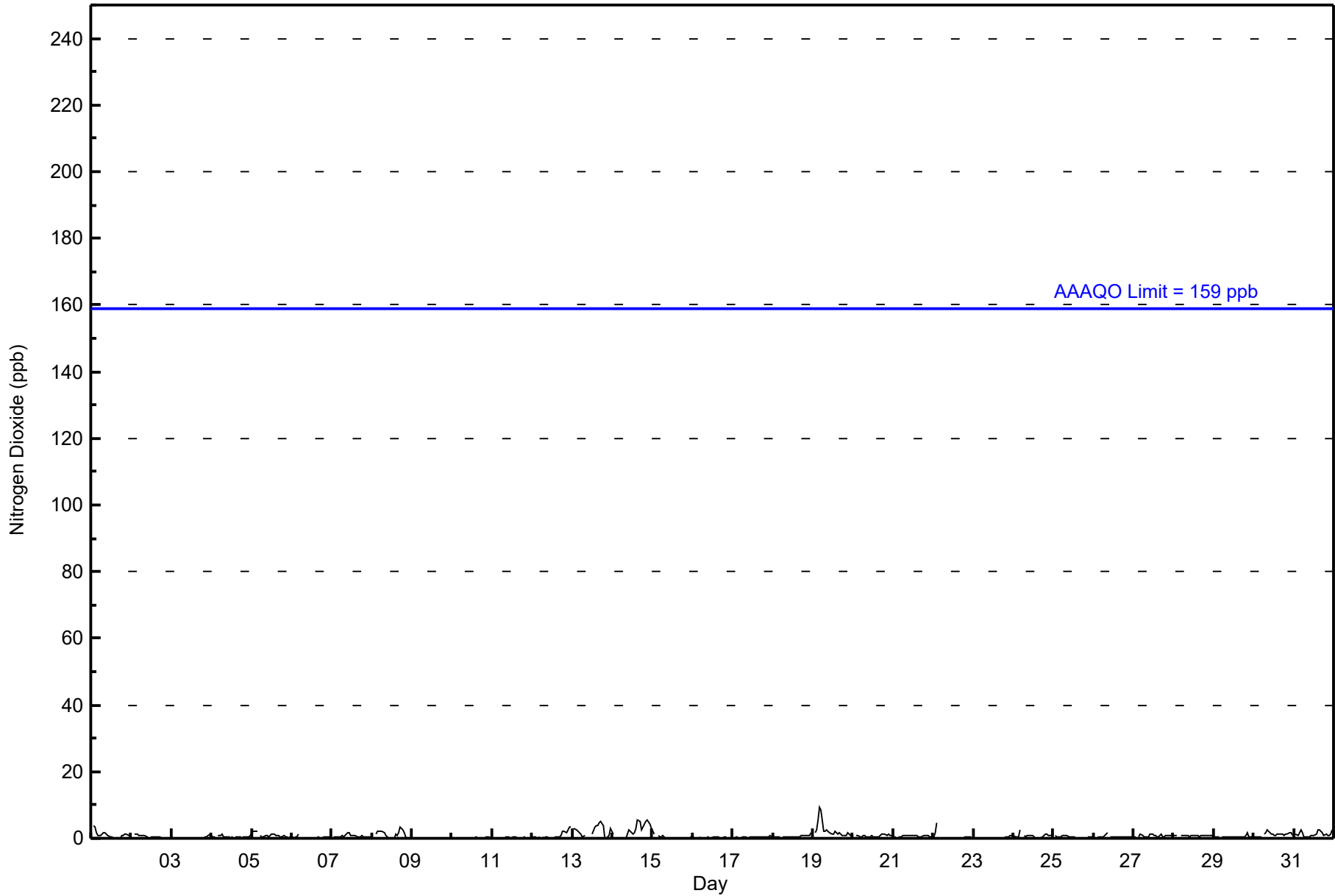
Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		744																			
Maximum Value: 9.2 ppb on Jul 19 05:00		Maximum Daily Average: 2.3 ppb on Jul 19				Hours of Data:		698																			
Minimum Value: 0.0 ppb on Jul 1 14:00		Minimum Daily Average: 0.0 ppb on Jul 9				Hours of Missing Data:		46																			
Maximum Diurnal Average: 1.2 ppb at hour 5		Minimum Diurnal Average: 0.5 ppb at hour 12				Hours of Calibration:		35																			
Monthly Average: 0.75 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.1 Q ₁ = 0.2 Median = 0.5 Q ₃ = 0.9 P ₉₀ = 1.6 P ₉₉ = 4.9				Percent Operational Time:		98.5																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	3.7	3.5	1.8	0.9	0.9	1.1	1.5	1.6	1.1	0.7	0.5	0.3	0.0	0.1	0.0	0.1	0.2	0.9	1.0	1.3	1.1	0.9	0.7	1.0	3.7	
2-Jul	0.8	Z	1.1	1.1	1.0	0.9	0.8	0.9	0.8	0.6	0.2	0.1	0.3	0.6	0.4	0.3	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.5	1.1	
3-Jul	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	0.1	0.1	0.2	0.3	0.3	1.0	1.3	0.2	1.3	
4-Jul	0.5	0.3	0.6	Z	1.0	0.8	1.1	0.6	0.4	0.3	0.3	0.2	0.3	0.2	0.3	0.3	0.3	0.2	0.3	0.2	0.3	0.6	0.5	0.3	0.7	0.4	1.1
5-Jul	1.5	2.0	2.2	2.0	Z	0.7	0.4	0.5	0.7	0.9	0.6	0.8	1.3	1.1	0.9	0.9	0.7	0.3	0.4	1.0	0.5	0.4	0.2	0.3	0.9	2.2	
6-Jul	0.3	0.2	0.6	0.6	1.3	Z	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.3	1.3	
7-Jul	Z	0.3	0.4	0.5	0.5	0.5	0.7	0.6	0.9	1.5	1.6	0.9	0.8	0.8	0.8	0.5	0.4	0.6	0.7	0.4	0.3	0.3	0.6	0.6	0.7	1.6	
8-Jul	0.5	Z	1.2	2.0	2.2	2.0	2.2	1.9	1.0	0.3	0.1	0.0	0.0	0.2	1.1	1.0	1.9	3.3	2.6	1.6	0.3	0.0	0.0	0.0	1.1	3.3	
9-Jul	0.0	0.0	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	0.1	0.0	0.1	
10-Jul	0.1	0.1	0.1	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	M	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.3	0.2	0.2	0.4	
11-Jul	0.1	0.1	0.2	0.2	Z	0.2	0.2	0.2	0.3	0.5	0.4	0.2	0.3	0.5	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.5	
12-Jul	0.3	0.4	0.3	0.2	0.3	Z	0.6	0.2	0.5	0.4	0.2	0.1	0.2	0.2	0.4	0.6	0.4	0.7	2.1	2.1	1.5	2.7	3.4	3.4	0.9	3.4	
13-Jul	Z	3.1	2.6	2.2	1.8	1.3	0.6	0.8	C	C	C	C	1.4	3.6	3.7	4.0	4.5	4.9	3.8	0.1	0.0	0.5	0.7	3.0	2.2	4.9	
14-Jul	1.2	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.1	2.5	1.9	1.4	1.6	3.0	5.3	5.1	2.7	3.4	4.3	4.9	5.3	4.2	2.9	2.2	5.3	
15-Jul	2.1	1.3	Z	0.7	0.4	0.4	0.8	0.4	0.0	0.0	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	0.3	0.3	2.1	
16-Jul	0.3	0.2	0.2	Z	0.5	0.2	0.2	0.2	0.1	0.3	0.1	0.2	0.3	0.3	0.4	0.6	0.6	PF	0.4	0.6	0.4	PF	0.3	PF	0.3	0.6	
17-Jul	0.2	0.2	0.3	0.3	Z	0.4	0.4	0.4	0.3	0.2	0.3	0.4	0.4	0.4	0.5	0.4	0.6	0.6	0.4	0.4	0.6	0.5	0.7	0.6	0.4	0.7	
18-Jul	0.5	0.5	0.5	0.6	0.6	Z	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.6	0.6	0.6	0.8	0.8	0.8	0.7	1.0	1.0	1.9	0.7	1.9	
19-Jul	Z	1.6	2.5	5.6	9.2	8.5	2.2	2.1	2.6	2.1	1.8	1.2	1.2	2.1	1.8	1.3	1.6	0.9	0.8	1.0	0.8	1.5	0.7	0.8	2.3	9.2	
20-Jul	0.8	Z	0.9	0.7	0.6	0.6	0.8	0.7	0.5	0.6	0.6	0.7	0.5	0.4	0.5	0.5	0.7	1.4	1.1	1.1	0.9	1.1	0.7	0.7	0.7	1.4	
21-Jul	0.6	0.6	Z	0.4	0.4	0.4	0.9	0.8	0.7	1.0	0.9	0.8	0.8	0.9	0.7	0.6	0.5	0.5	0.9	0.9	0.8	0.8	0.6	0.5	0.7	1.0	
22-Jul	0.6	1.9	4.8	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	0.2	0.4	0.6	0.4	0.4	0.1	0.4	4.8	
23-Jul	0.0	0.0	0.1	0.1	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.4	0.6	0.9	0.8	0.3	0.9	
24-Jul	0.7	0.6	0.6	0.6	2.5	Z	0.8	0.5	0.7	0.7	0.7	0.7	0.3	0.1	0.2	0.1	0.2	0.5	1.0	1.1	1.2	1.0	1.0	1.1	0.7	2.5	
25-Jul	Z	0.7	0.6	0.5	0.6	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	M	M	M	M	M	M	M	0.4	0.4	0.4	0.5	--	0.8
26-Jul	0.5	Z	0.6	0.6	0.6	0.5	0.5	1.2	1.5	M	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.4	0.4	0.3	0.4	0.5	1.5	
27-Jul	0.4	0.5	Z	0.5	1.3	0.8	0.6	0.5	0.4	0.4	1.1	1.2	0.8	0.7	0.5	0.4	1.1	0.5	0.6	0.7	1.0	0.9	0.7	0.7	0.7	1.3	
28-Jul	0.7	0.8	0.8	Z	0.9	0.9	0.7	0.9	0.7	0.6	0.9	1.0	0.9	0.9	0.9	0.6	0.8	0.8	0.8	0.7	0.7	0.7	1.0	0.7	0.8	1.0	
29-Jul	0.6	0.5	0.5	0.5	Z	0.5	0.4	0.3	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.7	1.5	0.6	0.5	0.4	0.5	1.5	
30-Jul	0.4	0.5	0.5	0.4	0.5	Z	1.2	1.9	2.7	2.0	1.4	1.2	0.8	1.0	1.2	1.4	1.1	1.1	0.8	1.1	1.1	1.8	1.7	0.9	1.2	2.7	
31-Jul	Z	1.1	0.9	1.6	2.5	1.7	0.6	0.5	0.6	0.6	0.7	0.9	1.0	1.3	2.4	2.6	2.1	1.6	1.0	1.1	1.0	1.0	1.2	2.5	1.3	2.6	
																								Diurnal Average			
																								Diurnal Maximum			
																								0.6 0.8 1.0 0.9 1.2 0.9 0.6 0.6 0.6 0.6 0.6 0.5 0.5 0.6 0.7 0.8 0.8 0.8 0.8 0.8 0.7 0.8 0.8 0.9			
																								2.1 3.7 4.8 5.6 9.2 8.5 2.2 2.1 2.7 2.1 2.5 1.9 1.4 3.6 3.7 5.3 5.1 4.9 3.8 4.3 4.9 5.3 4.2 3.4			
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 (NO₂) - ppb
Fort Chipewyan - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	698	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	16	36	96	119	63	18	8	15	15	38	43	66	43	24	60	696
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	16	36	96	119	63	18	8	15	15	38	43	66	43	24	60	696

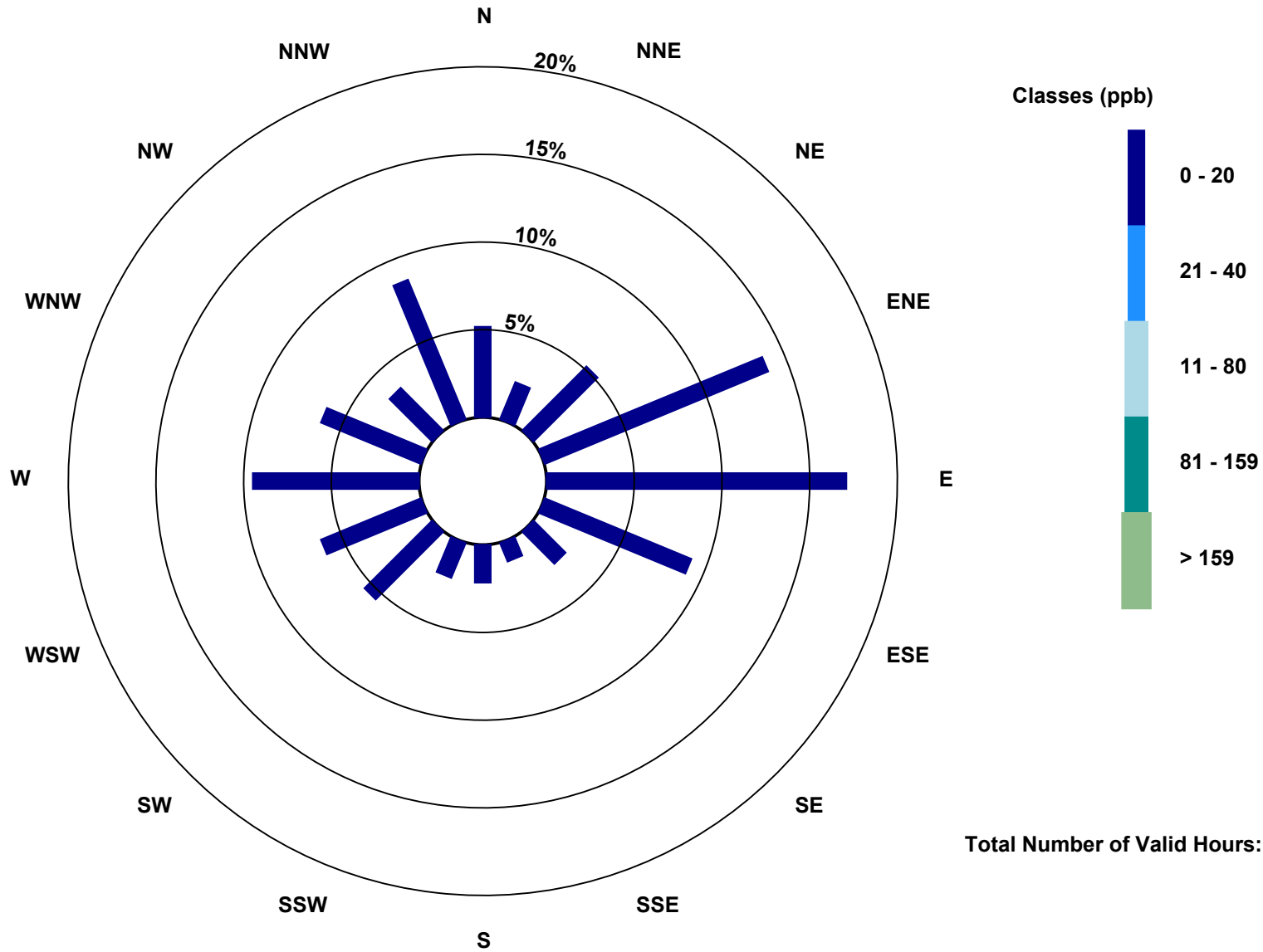
Total Number of Valid Hours: 696

Total Number of Hours: 744

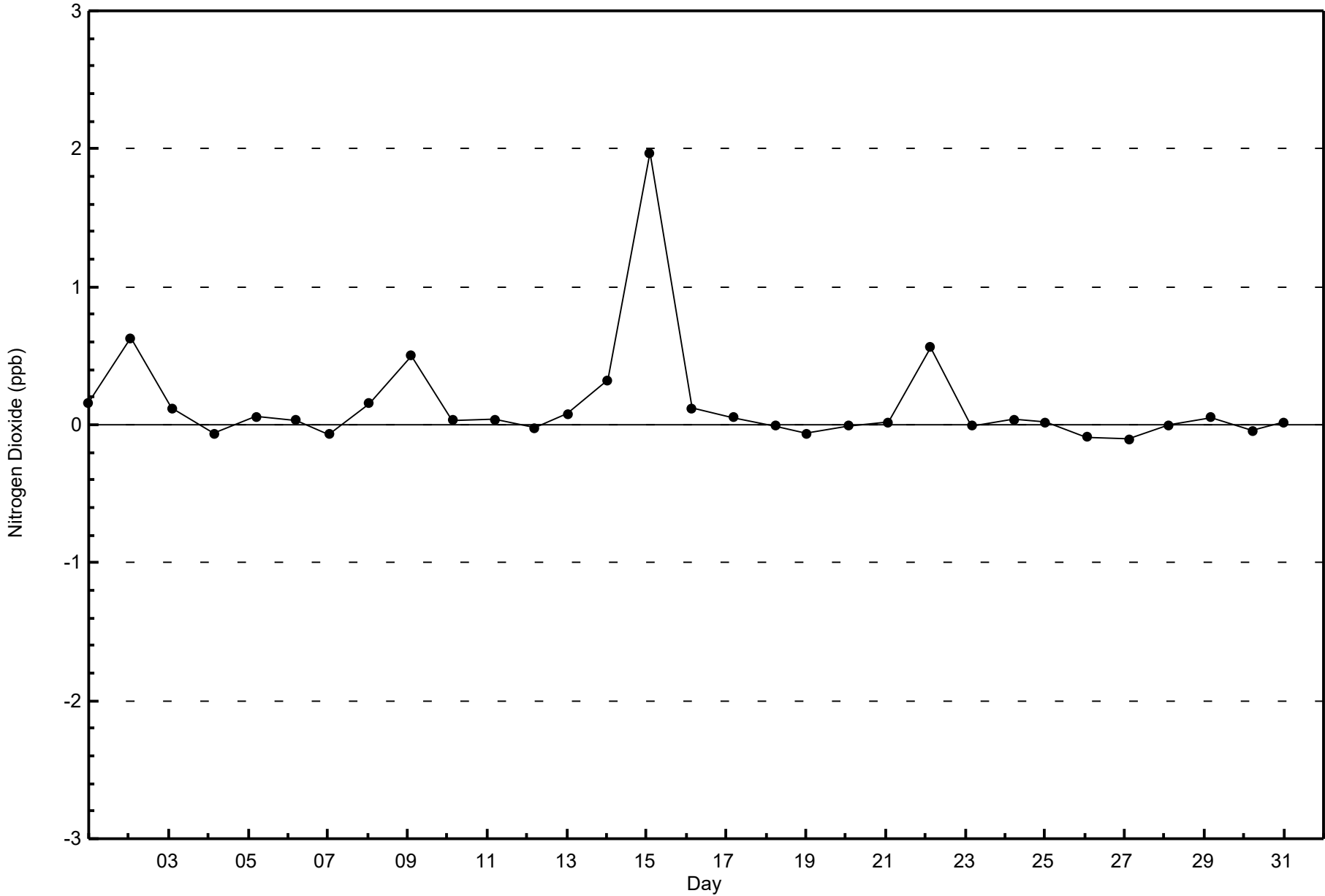


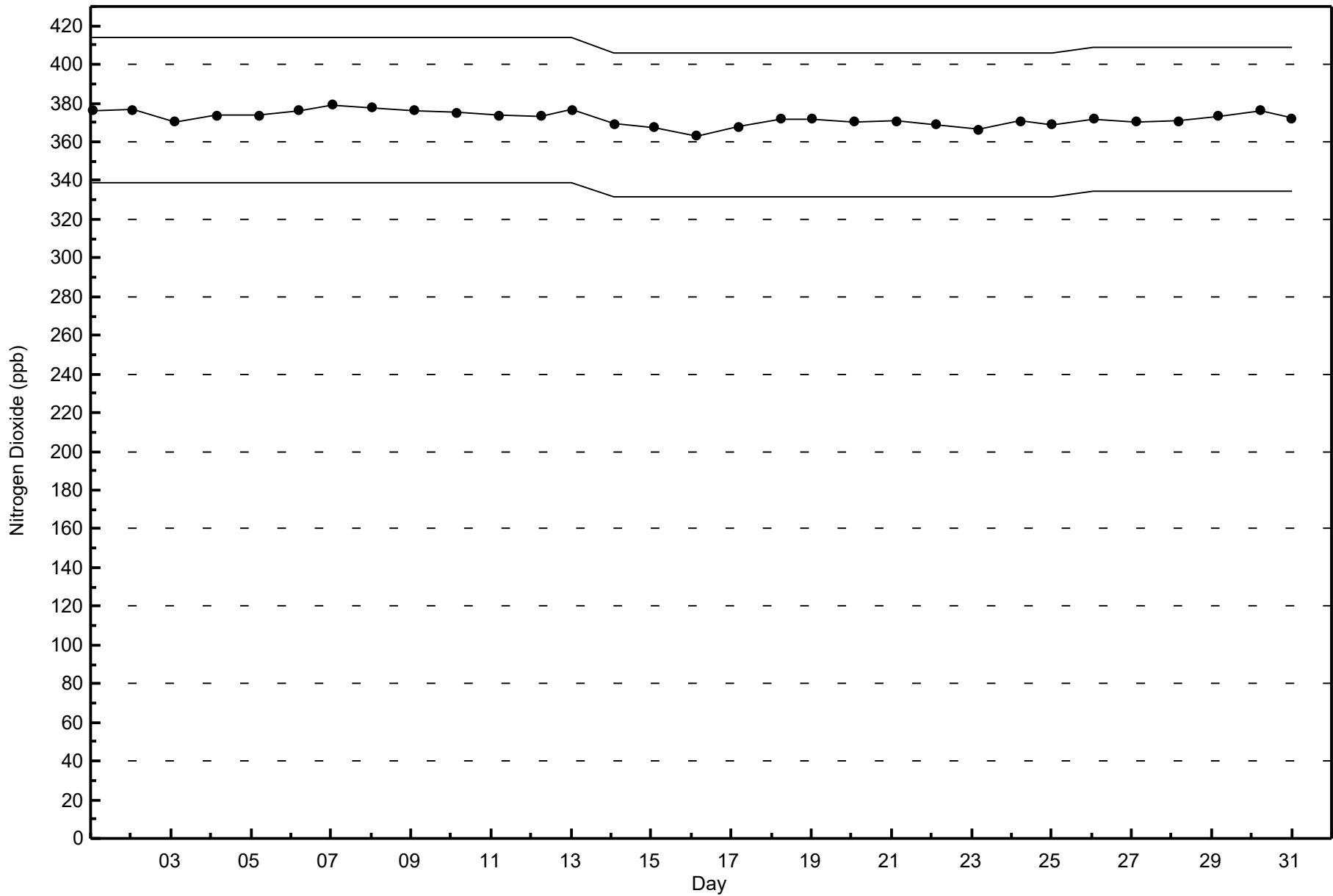
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan



Total Number of Valid Hours: 696







Wood Buffalo Environmental Association
Summary of Hour Averages

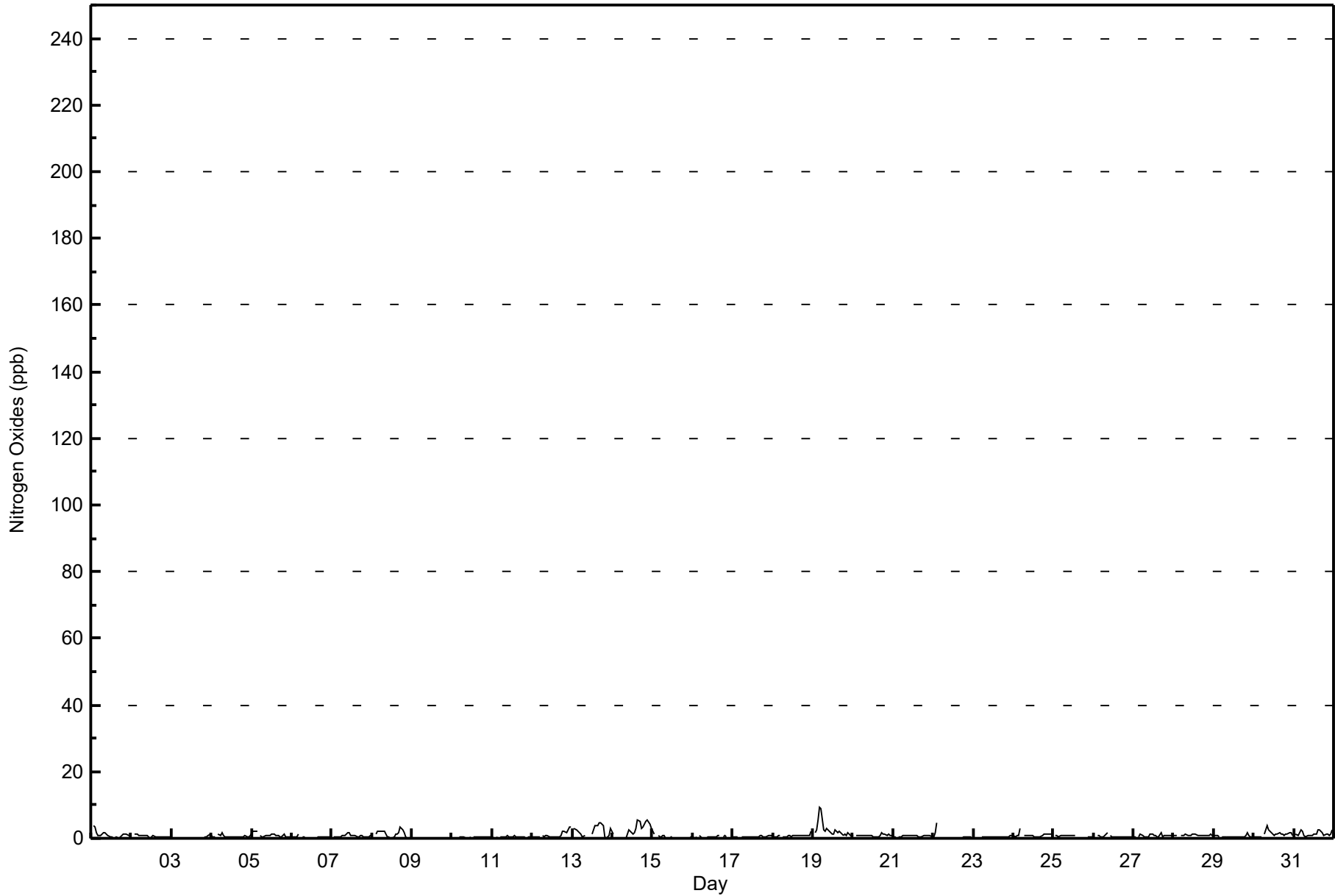
Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - July 2023

Maximum Value: 9.4 ppb on Jul 19 05:00		Maximum Daily Average: 2.5 ppb on Jul 19		Hours in Service: 744																							
Minimum Value: 0.0 ppb on Jul 9 07:00		Minimum Daily Average: 0.0 ppb on Jul 9		Hours of Data: 698																							
Maximum Diurnal Average: 1.2 ppb at hour 5		Minimum Diurnal Average: 0.6 ppb at hour 1		Hours of Missing Data: 46																							
Monthly Average: 0.84 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.1 Q ₁ = 0.3 Median = 0.6 Q ₃ = 1.0 P ₉₀ = 1.7 P ₉₉ = 4.9		Hours of Calibration: 35																							
				Percent Operational Time: 98.5																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	3.7	3.5	1.8	0.9	0.9	1.1	1.5	1.6	1.2	0.8	0.6	0.4	0.1	0.2	0.2	0.2	0.3	1.0	1.1	1.4	1.1	0.9	0.7	1.1	3.7	
2-Jul	0.8	Z	1.1	1.1	1.0	0.9	0.8	0.9	0.8	0.7	0.2	0.2	0.3	0.7	0.5	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.6	1.1	
3-Jul	0.2	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.3	0.3	1.0	1.3	0.2	1.3	
4-Jul	0.5	0.3	0.6	Z	1.1	0.9	1.5	0.8	0.5	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.6	0.5	0.4	0.8	0.5	1.5	
5-Jul	1.5	2.0	2.2	2.0	Z	0.8	0.5	0.6	0.8	1.0	0.7	0.9	1.4	1.2	1.0	1.0	0.7	0.4	0.5	1.2	0.6	0.4	0.2	0.3	1.0	2.2	
6-Jul	0.3	0.2	0.6	0.6	1.4	Z	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.3	1.4	
7-Jul	Z	0.4	0.4	0.5	0.5	0.6	0.8	0.7	0.9	1.6	1.6	1.0	0.9	0.9	0.9	0.6	0.5	0.7	0.8	0.5	0.4	0.4	0.6	0.7	0.7	1.6	
8-Jul	0.6	Z	1.2	2.0	2.2	2.0	2.2	2.0	1.2	0.4	0.2	0.1	0.1	0.3	1.1	1.1	1.9	3.3	2.6	1.6	0.4	0.1	0.1	0.1	1.2	3.3	
9-Jul	0.1	0.1	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	
10-Jul	0.1	0.1	0.1	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	M	0.3	0.4	0.3	0.3	0.2	0.3	0.3	0.4	0.5	0.4	0.3	0.3	0.5	
11-Jul	0.2	0.2	0.2	0.2	Z	0.3	0.3	0.3	0.5	0.8	0.6	0.3	0.4	0.7	0.4	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.8	
12-Jul	0.3	0.4	0.4	0.3	0.4	Z	0.8	0.4	0.8	0.7	0.3	0.2	0.3	0.2	0.4	0.6	0.5	0.8	2.1	2.1	1.5	2.7	3.4	3.4	1.0	3.4	
13-Jul	Z	3.1	2.6	2.2	1.8	1.3	0.6	0.8	C	C	C	C	1.4	3.6	3.7	4.0	4.5	4.9	3.8	0.2	0.1	0.6	0.7	3.0	2.3	4.9	
14-Jul	1.2	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.1	2.5	1.9	1.4	1.6	3.0	5.3	5.2	2.9	3.5	4.4	5.0	5.4	4.3	3.0	2.3	5.4	
15-Jul	2.2	1.4	Z	0.8	0.5	0.5	1.0	0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.4	0.4	2.2	
16-Jul	0.3	0.2	0.2	Z	0.8	0.2	0.2	0.2	0.2	0.4	0.2	0.3	0.5	0.4	0.5	0.7	0.7	PF	0.5	0.7	0.5	PF	0.4	PF	0.4	0.8	
17-Jul	0.3	0.3	0.4	0.4	Z	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.5	0.7	0.8	0.5	0.5	0.6	0.6	0.7	0.7	0.5	0.8
18-Jul	0.6	0.6	0.6	0.7	0.7	Z	0.6	0.6	0.6	0.7	0.8	0.6	0.7	0.7	0.8	0.8	0.8	0.9	0.9	0.9	0.8	1.1	1.0	2.0	0.8	2.0	
19-Jul	Z	1.7	2.5	5.6	9.4	8.8	2.4	2.3	2.8	2.3	2.1	1.4	1.4	2.7	2.2	1.5	1.9	1.1	0.9	1.2	0.9	1.6	0.8	0.9	2.5	9.4	
20-Jul	0.9	Z	1.0	0.8	0.7	0.7	1.0	0.8	0.6	0.7	0.7	0.7	0.6	0.5	0.5	0.5	0.7	1.6	1.3	1.2	1.0	1.2	0.8	0.7	0.8	1.6	
21-Jul	0.6	0.6	Z	0.5	0.5	0.5	0.9	0.8	0.7	1.0	1.0	0.9	0.8	0.9	0.7	0.6	0.5	0.5	1.0	1.0	0.9	0.9	0.7	0.6	0.7	1.0	
22-Jul	0.6	1.9	4.8	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	0.0	0.1	0.2	0.4	0.6	0.5	0.5	0.2	0.5	4.8	
23-Jul	0.1	0.1	0.2	0.2	Z	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	0.4	0.4	0.6	0.9	0.8	0.3	0.9	
24-Jul	0.7	0.6	0.6	0.7	2.8	Z	1.1	0.7	0.9	1.0	1.0	1.0	0.6	0.4	0.5	0.4	0.5	0.7	1.1	1.2	1.3	1.1	1.1	1.2	0.9	2.8	
25-Jul	Z	0.8	0.7	0.6	0.7	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	M	M	M	M	M	M	M	0.4	0.4	0.4	0.5	--	0.9
26-Jul	0.5	Z	0.7	0.7	0.6	0.6	0.6	1.3	1.7	M	0.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.3	0.4	0.6	1.7	
27-Jul	0.4	0.5	Z	0.5	1.4	0.9	0.6	0.6	0.5	0.5	1.2	1.3	0.9	0.8	0.5	0.5	1.7	0.5	0.6	0.8	1.0	0.9	0.8	0.8	0.8	1.7	
28-Jul	0.8	0.9	0.9	Z	1.0	1.0	0.9	1.1	0.9	0.8	1.0	1.1	1.1	1.1	1.0	0.7	0.8	0.9	0.9	0.8	0.8	0.8	1.1	0.8	0.9	1.1	
29-Jul	0.7	0.6	0.6	0.6	Z	0.6	0.5	0.4	0.5	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.4	0.5	0.5	0.8	1.6	0.7	0.6	0.5	0.6	1.6	
30-Jul	0.5	0.5	0.5	0.5	0.6	Z	1.4	2.5	3.7	2.4	1.6	1.3	0.9	1.1	1.3	1.6	1.3	1.3	1.0	1.2	1.2	1.8	1.8	1.0	1.3	3.7	
31-Jul	Z	1.2	1.0	1.7	2.6	2.1	0.7	0.6	0.7	0.7	0.8	1.0	1.1	1.4	2.5	2.7	2.1	1.6	1.0	1.1	1.1	1.0	1.2	2.5	1.4	2.7	
																								Diurnal Average			
																								Diurnal Maximum			
																								0.6 0.9 1.1 1.0 1.2 1.0 0.7 0.7 0.8 0.7 0.7 0.6 0.6 0.7 0.8 0.9 0.9 0.9 0.9 0.8 0.8 0.9 0.8 0.9			
																								2.2 3.7 4.8 5.6 9.4 8.8 2.4 2.5 3.7 2.4 2.5 1.9 1.4 3.6 3.7 5.3 5.2 4.9 3.8 4.4 5.0 5.4 4.3 3.4			
																								Z - zerospan C - Calibration M - Maintenance PF - Power Failure			



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	698	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - July 2023**

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	16	36	96	119	63	18	8	15	15	38	43	66	43	24	60	696
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	36	16	36	96	119	63	18	8	15	15	38	43	66	43	24	60	696

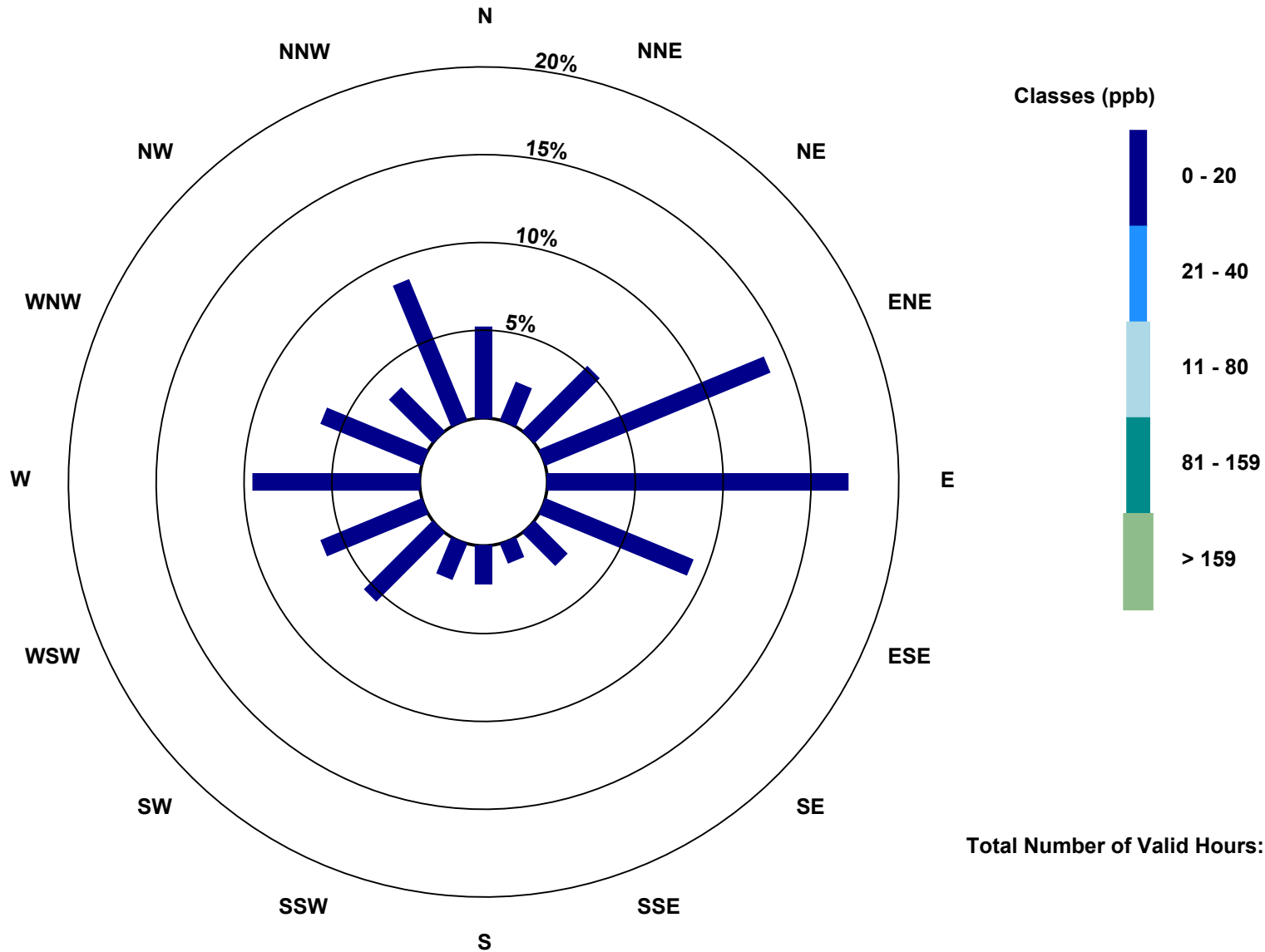
Total Number of Valid Hours: 696

Total Number of Hours: 744

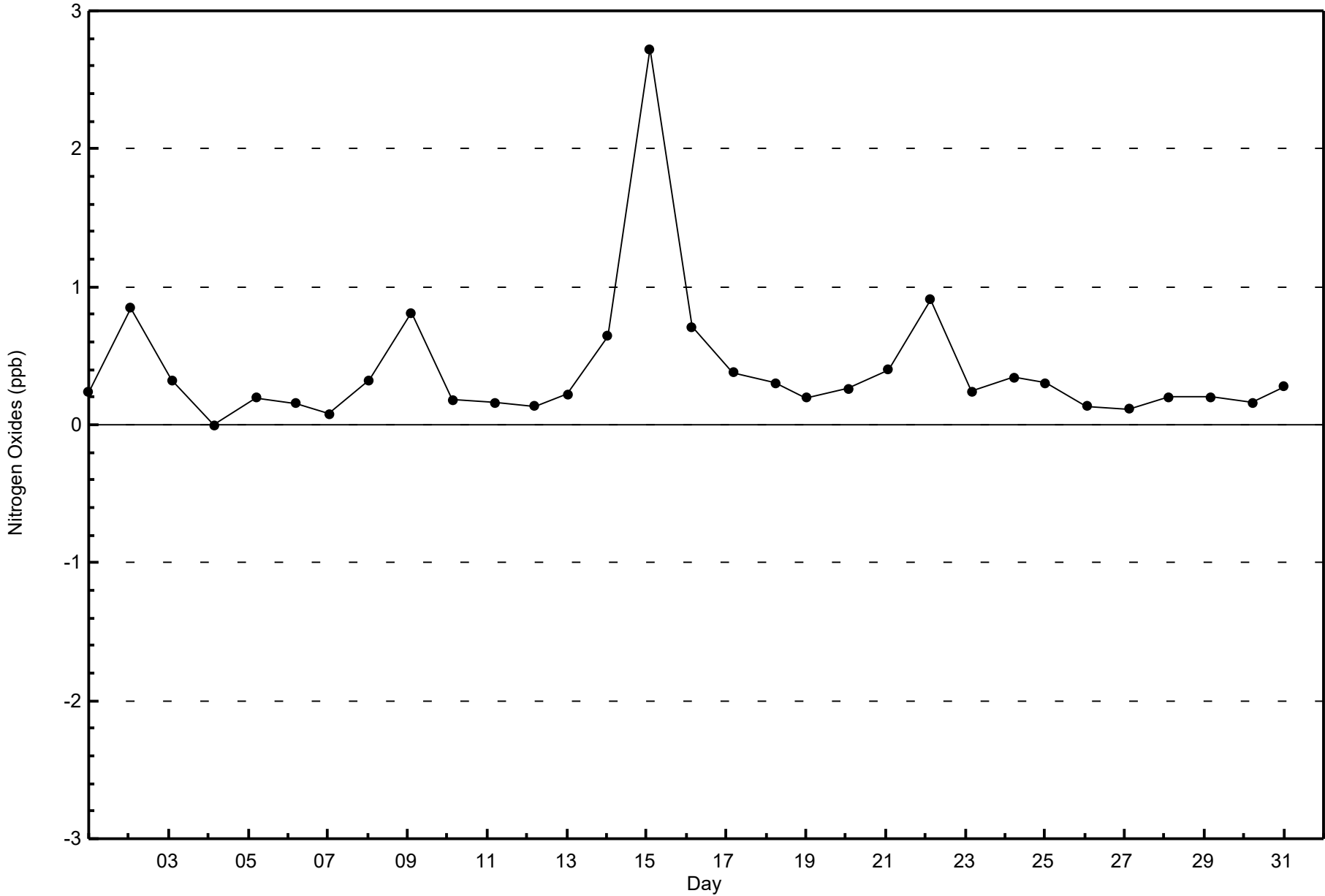


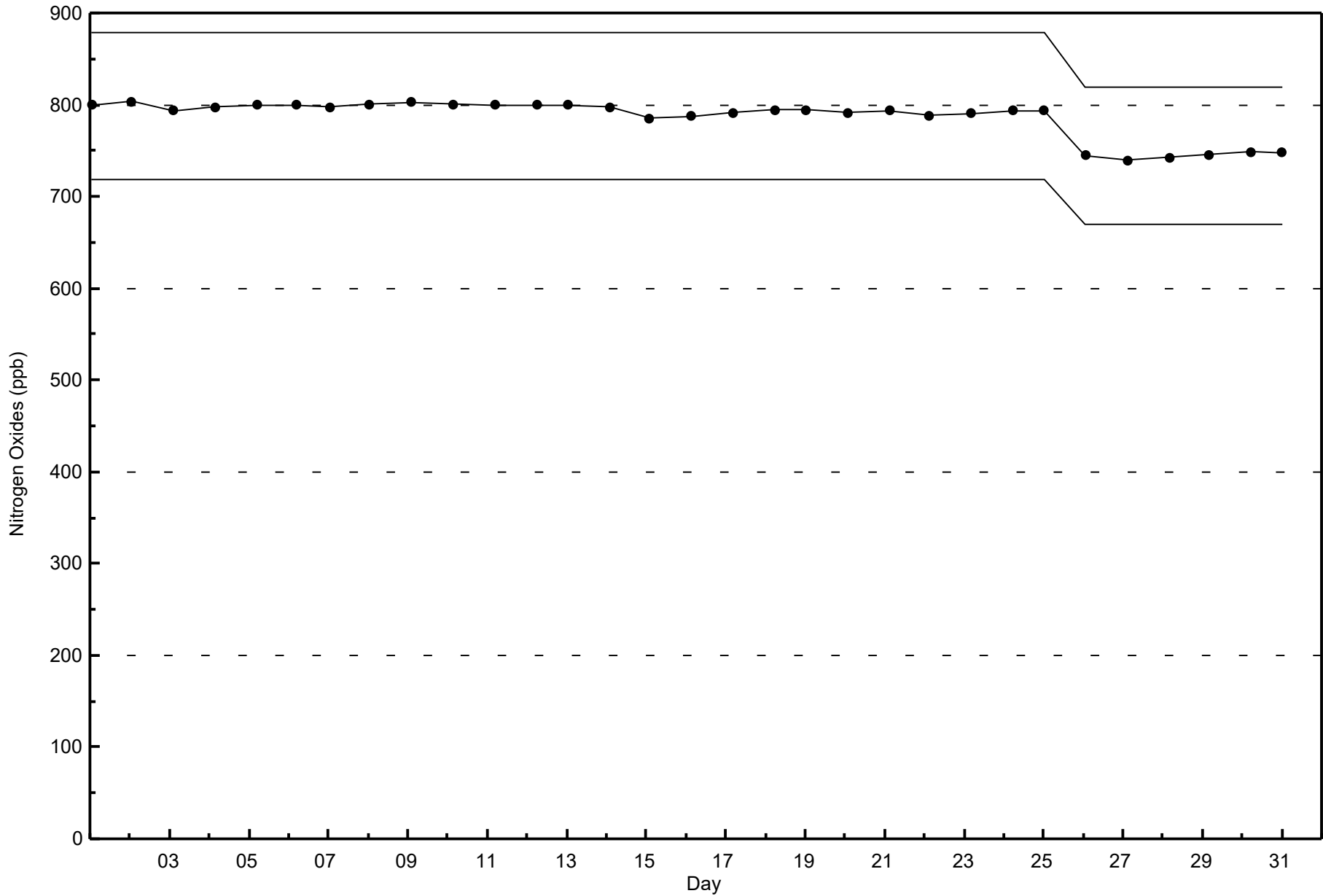
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan



Total Number of Valid Hours: 696







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Fort Chipewyan - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 63.4 ppb on Jul 13 15:00	Maximum Daily Average: 42.7 ppb on Jul 1		Hours of Data:	656
Minimum Value: 13.0 ppb on Jul 15 06:00	Minimum Daily Average: 22.2 ppb on Jul 15		Hours of Missing Data:	88
Maximum Diurnal Average: 37.0 ppb at hour 18	Minimum Diurnal Average: 24.7 ppb at hour 5		Hours of Calibration:	31
Monthly Average: 32.01 ppb	Percentiles: P ₁ = 15.5 P ₁₀ = 22.5 Q ₁ = 27.1 Median = 31.3 Q ₃ = 36.2 P ₉₀ = 42.3 P ₉₉ = 55.6		Percent Operational Time:	92.3

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Jul	42.3	42.3	38.1	38.8	Z	38.7	38.3	39.3	39.2	40.7	43.3	45.9	45.9	45.5	44.9	45.5	45.5	46.3	44.1	43.2	43.8	43.3	44.0	42.8	42.7	46.3			
2-Jul	38.6	37.6	36.8	33.1	30.0	Z	27.9	29.9	28.9	28.5	29.4	28.2	29.5	31.3	37.3	32.6	31.6	31.2	26.8	23.9	21.7	20.1	21.2	20.8	29.4	38.6			
3-Jul	Z	25.5	30.1	29.7	23.7	21.3	21.9	24.1	26.2	27.9	29.1	31.0	32.3	34.1	36.0	36.2	37.0	36.9	37.0	35.4	35.0	34.8	33.5	31.3	30.9	37.0			
4-Jul	30.1	Z	28.5	25.6	23.4	19.5	20.6	27.0	29.3	30.8	30.9	31.5	33.0	35.4	35.5	34.4	35.7	34.8	34.9	33.3	31.3	29.0	26.1	27.5	29.9	35.7			
5-Jul	29.5	29.7	Z	28.2	26.0	25.3	26.4	28.2	28.6	26.6	28.4	32.5	36.2	39.3	39.1	39.1	38.1	38.6	36.4	34.8	35.8	33.5	32.4	32.0	32.4	39.3			
6-Jul	32.3	30.0	28.7	Z	24.3	25.8	28.3	27.8	28.4	28.6	30.8	32.2	33.3	34.1	33.6	33.5	33.2	33.6	33.9	33.5	32.5	30.6	29.2	30.9	30.8	34.1			
7-Jul	29.2	28.0	26.1	24.9	Z	18.5	17.9	26.5	30.6	30.0	38.2	36.0	33.4	35.1	36.3	32.6	32.5	30.0	28.2	25.2	24.0	24.8	26.9	25.5	28.7	38.2			
8-Jul	23.1	21.6	19.7	18.2	16.2	Z	16.0	21.9	25.6	32.9	37.0	36.2	38.3	42.0	49.2	45.2	45.6	47.1	40.3	34.5	33.6	27.4	25.5	24.3	31.4	49.2			
9-Jul	Z	27.3	28.3	31.0	31.1	31.1	32.9	33.0	31.6	32.4	32.9	32.4	33.7	31.0	32.2	31.7	30.4	29.7	29.4	29.2	29.5	30.3	29.9	26.7	30.8	33.7			
10-Jul	25.8	Z	24.5	23.7	23.2	22.6	21.5	21.8	22.6	C	C	C	C	29.0	29.3	28.8	27.3	27.0	26.4	25.9	25.0	24.5	24.2	26.4	25.2	29.3			
11-Jul	30.4	28.8	Z	27.4	27.1	26.9	27.1	25.7	25.5	25.5	25.0	26.9	27.7	31.3	31.0	32.1	32.3	32.0	33.2	36.9	37.2	37.3	35.8	34.3	30.3	37.3			
12-Jul	33.1	31.2	30.8	Z	29.5	28.2	29.4	29.1	28.3	29.2	32.1	30.2	33.5	33.8	33.8	32.9	31.4	32.3	38.6	39.0	39.9	43.1	40.0	35.9	33.3	43.1			
13-Jul	33.5	29.9	28.5	28.6	Z	30.4	30.5	31.6	36.5	36.7	39.5	41.1	48.2	63.0	63.4	58.1	49.4	51.4	PF	PF	PF	PF	PF	PF	--	63.4			
14-Jul	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	30.0	29.4	31.8	36.7	34.7	30.8	31.1	30.2	28.6	26.5	23.5	19.5	--	36.7		
15-Jul	Z	15.9	15.0	14.5	13.7	13.0	13.9	16.6	15.6	15.9	15.3	15.9	17.0	20.5	25.3	30.9	33.2	30.7	31.6	32.7	33.9	34.5	28.5	26.6	22.2	34.5			
16-Jul	26.3	Z	25.7	25.8	25.4	23.8	21.6	21.4	23.4	26.8	30.6	32.1	34.0	37.6	41.0	43.1	42.5	41.0	37.9	35.4	33.5	PF	PF	PF	31.4	43.1			
17-Jul	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	29.3	34.0	34.9	35.8	35.8	33.3	31.9	32.8	31.9	31.0	36.3	43.2	42.5	42.4	41.4	--	43.2
18-Jul	39.6	34.0	32.9	Z	30.5	28.9	29.1	29.0	28.6	27.1	27.7	28.9	29.6	30.3	30.4	31.8	32.1	36.7	38.8	39.9	41.3	40.2	40.1	36.6	33.2	41.3			
19-Jul	31.8	32.6	32.1	30.6	Z	21.7	18.3	19.2	19.6	21.0	21.4	24.1	30.2	33.6	35.9	35.7	37.4	36.9	34.6	31.0	29.0	27.0	27.1	25.8	28.5	37.4			
20-Jul	25.0	22.4	23.0	21.4	17.4	Z	20.9	28.4	33.1	34.5	33.3	35.6	39.4	41.3	43.7	42.3	39.9	41.6	42.9	44.7	43.3	40.2	39.1	39.3	34.5	44.7			
21-Jul	Z	36.6	31.8	29.9	28.0	24.5	21.6	20.0	24.7	28.1	29.9	32.7	41.4	45.9	44.9	47.2	50.5	47.0	47.9	42.7	41.2	41.0	39.3	37.4	36.3	50.5			
22-Jul	37.2	Z	27.8	28.6	27.5	25.1	24.7	24.2	22.4	21.3	22.3	25.5	28.0	29.4	30.5	32.0	36.9	36.2	36.6	38.2	35.3	31.6	31.5	32.0	29.8	38.2			
23-Jul	33.1	31.8	Z	29.2	27.8	26.4	25.2	25.1	24.6	24.5	25.6	27.0	28.4	29.8	29.6	30.8	32.4	32.8	34.6	33.3	33.6	33.9	34.0	31.4	29.8	34.6			
24-Jul	29.4	28.1	28.3	Z	20.5	19.7	22.5	22.5	27.4	32.6	30.3	33.4	30.1	28.2	28.6	28.3	32.3	47.4	59.9	59.0	57.6	53.5	53.0	50.1	35.8	59.9			
25-Jul	46.2	43.7	39.8	37.5	Z	37.2	36.2	34.9	33.8	32.2	31.7	33.1	33.3	33.3	M	M	M	M	M	M	M	35.1	33.4	32.9	33.2	--	46.2		
26-Jul	31.0	32.0	31.4	29.8	UO	UO	UO	UO	UO	UO	UO	26.7	25.6	21.9	22.0	28.0	28.7	29.1	33.0	UO	UO	UO	UO	UO	UO	--	33.0		
27-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	30.3	32.7	36.7	36.7	38.1	39.4	38.8	39.3	40.4	40.0	37.6	36.1	32.3	31.4	32.1	--	40.4		
28-Jul	29.7	Z	25.8	23.4	23.7	23.9	21.4	21.2	22.3	22.4	24.8	27.0	30.4	34.8	38.1	39.8	39.7	37.9	35.3	33.0	32.6	31.9	28.7	28.9	29.4	39.8			
29-Jul	28.2	28.6	Z	26.5	24.0	23.9	23.9	27.6	28.1	28.3	28.8	30.9	33.4	34.8	35.3	36.4	37.7	38.2	37.6	36.0	32.2	33.2	32.4	31.3	31.2	38.2			
30-Jul	30.0	29.5	28.6	Z	26.0	25.5	25.3	26.9	29.7	38.8	45.2	47.4	47.7	49.7	53.1	55.5	55.7	55.1	52.9	55.5	52.0	50.2	45.4	42.8	42.1	55.7			
31-Jul	40.0	31.7	30.6	30.0	Z	26.7	33.1	36.1	38.2	35.9	32.1	28.7	28.9	22.7	18.3	15.9	13.9	21.2	27.1	21.7	20.2	22.3	27.8	35.4	27.8	40.0			

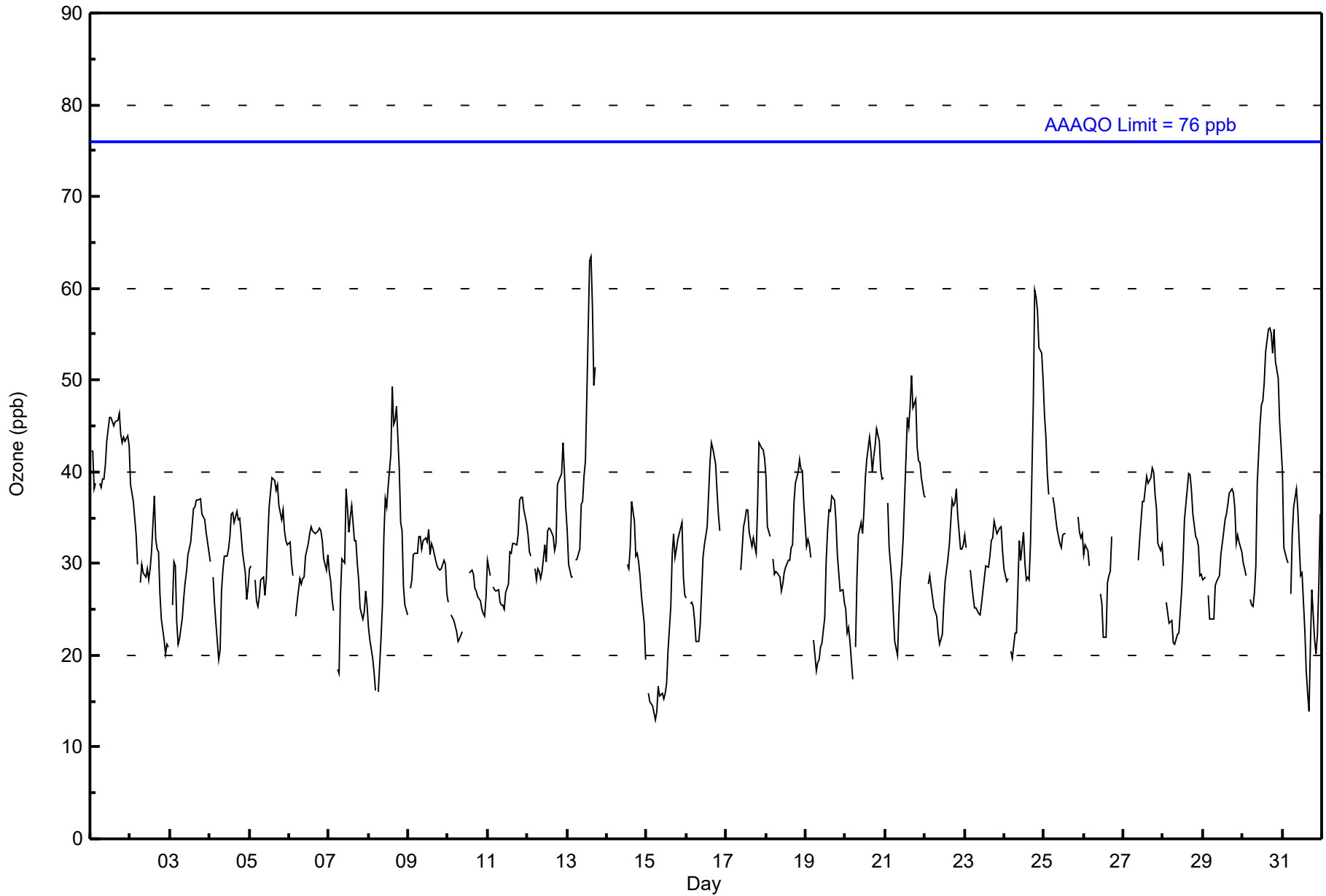
32.3	30.4	28.9	27.7	24.7	25.4	25.1	26.6	27.9	29.2	30.7	31.9	33.4	34.9	36.3	36.3	36.3	37.0	36.7	35.8	35.1	34.0	33.1	32.2	Diurnal Average	
46.2	43.7	39.8	38.8	31.1	38.7	38.3	39.3	39.2	40.7	45.2	47.4	48.2	63.0	63.4	58.1	55.7	55.1	59.9	59.0	57.6	53.5	53.0	50.1	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation PF - Power Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 76 ppb



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Fort Chipewyan - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Fort Chipewyan - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	33	5.03	5.03
21 - 50	607	92.53	97.56
51 - 82	16	2.44	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 656

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Fort Chipewyan - July 2023**

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Totals
0 - 20	2	0	1	3	5	1	0	0	0	0	0	0	1	10	3	7	33
21 - 50	23	15	33	86	105	51	13	5	15	16	35	43	64	32	24	45	605
51 - 82	2	0	0	7	4	0	0	1	0	0	0	0	0	0	0	2	16
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	27	15	34	96	114	52	13	6	15	16	35	43	65	42	27	54	654

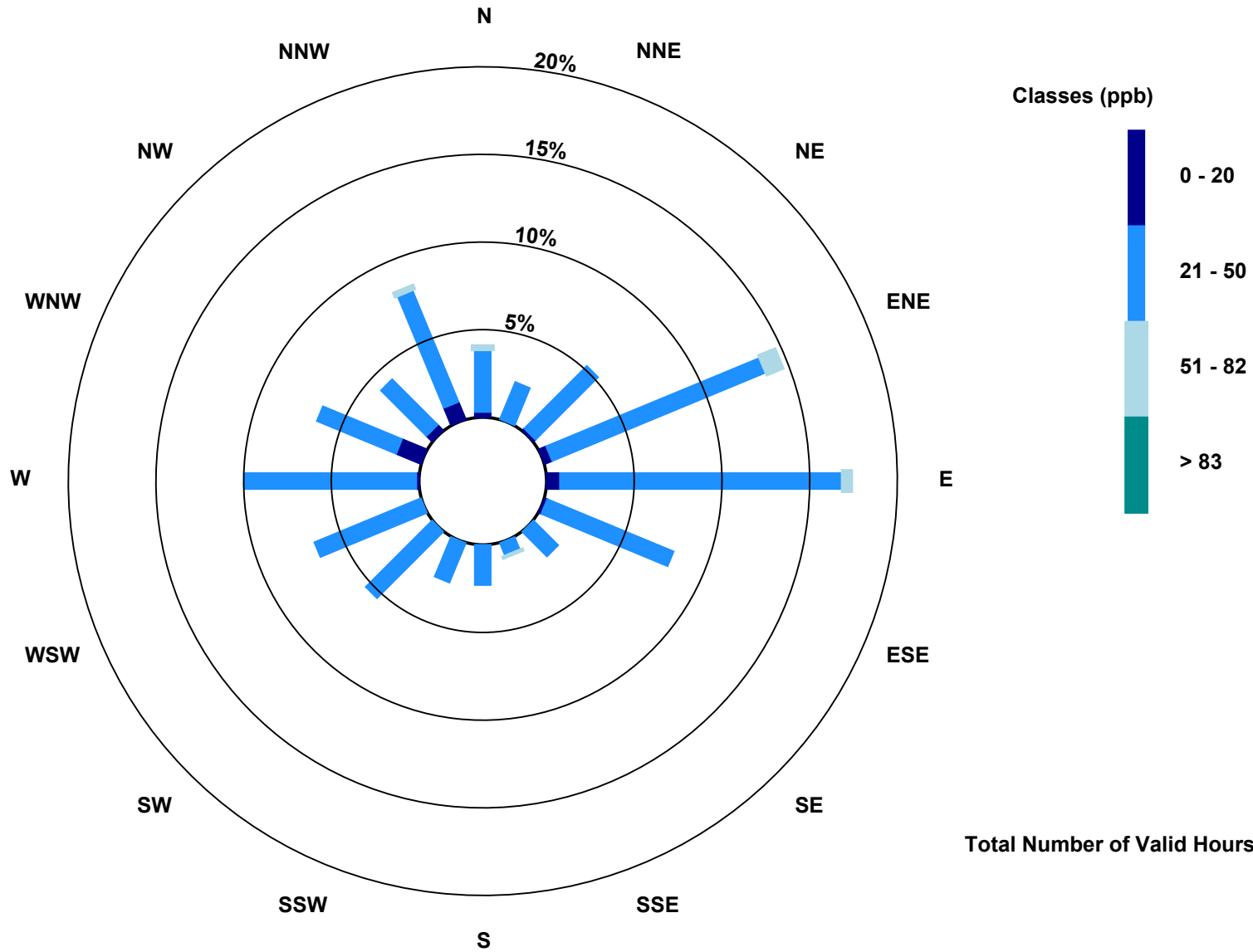
Total Number of Valid Hours: 654

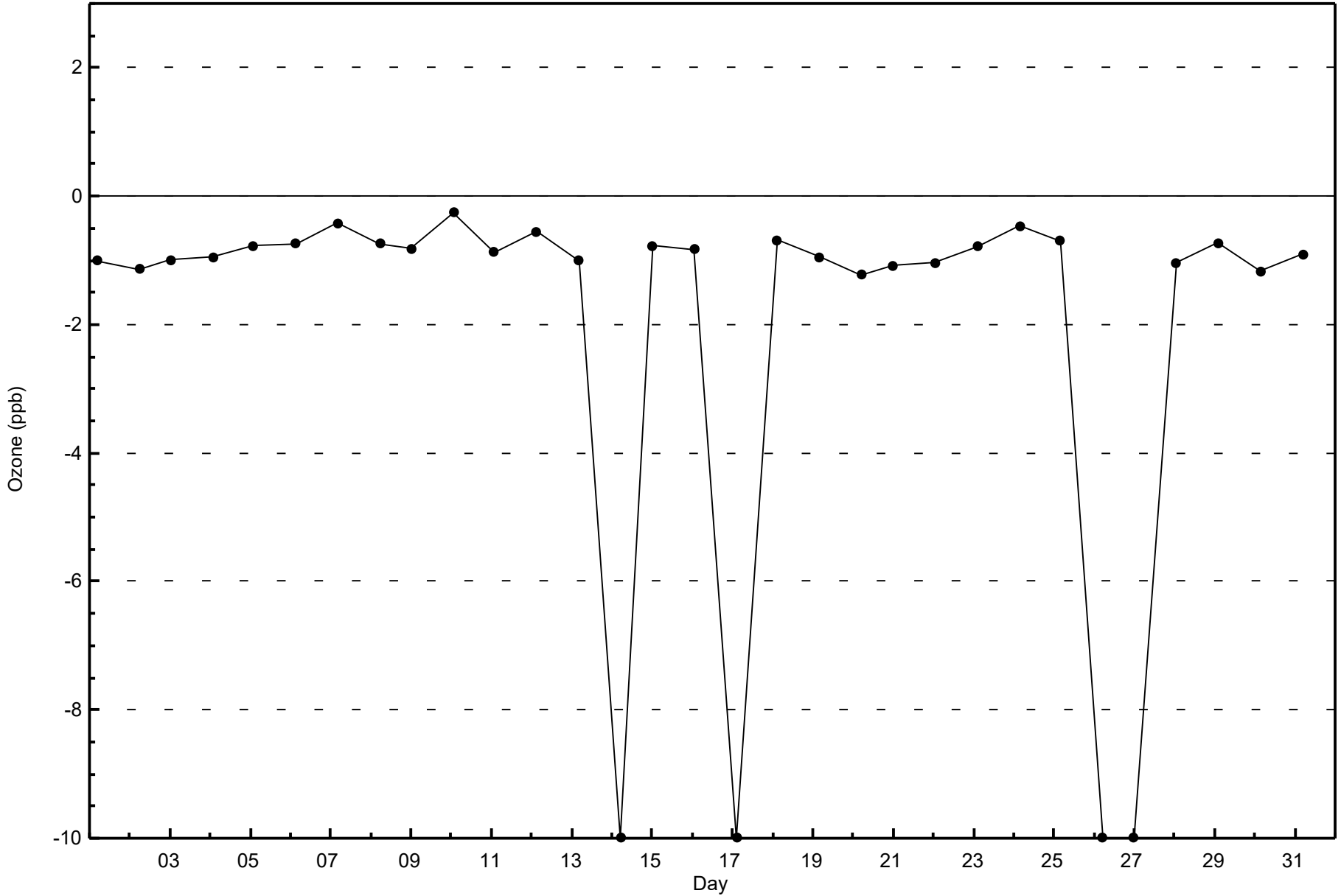
Total Number of Hours: 744

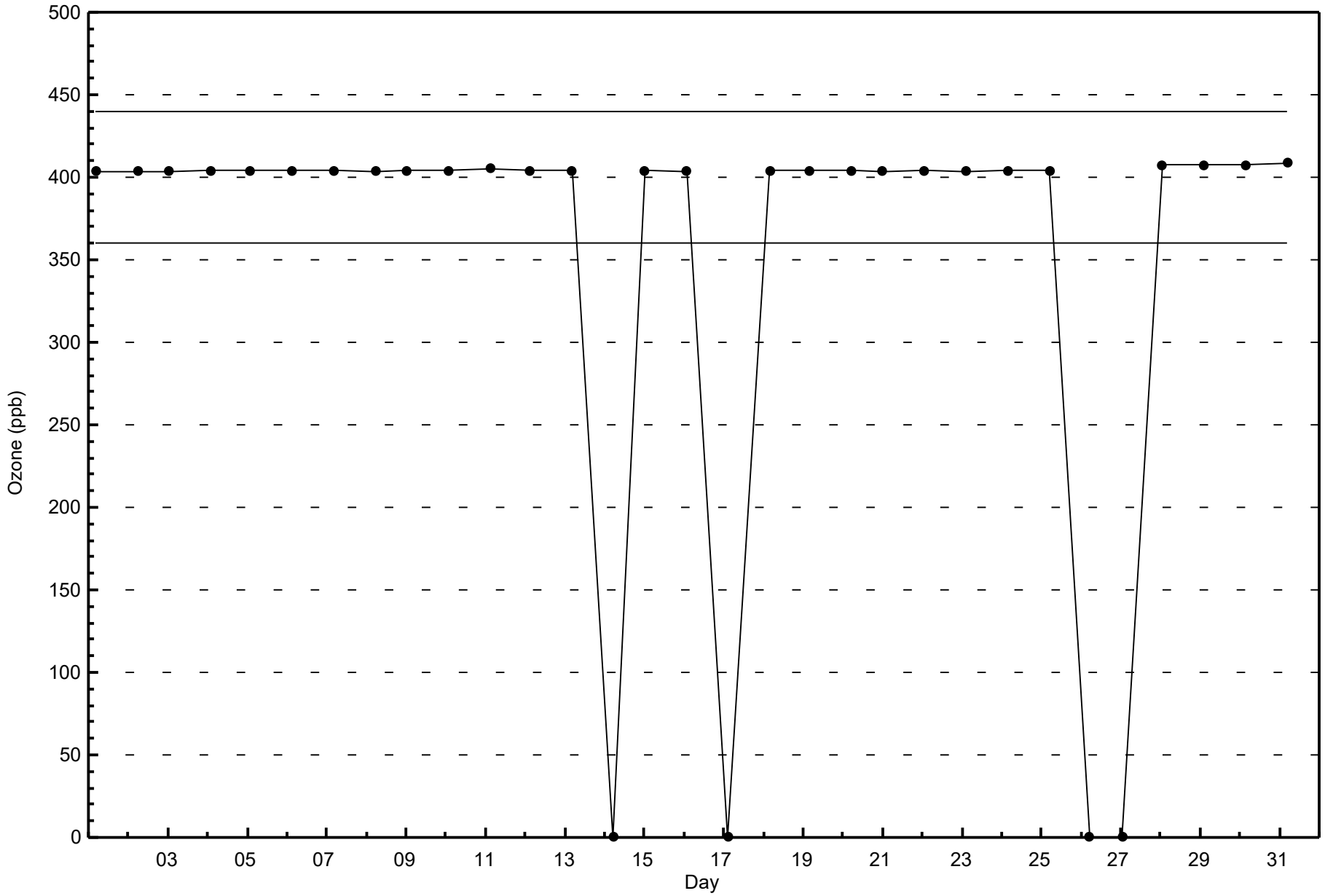


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Ozone (O₃) - ppb
Fort Chipewyan





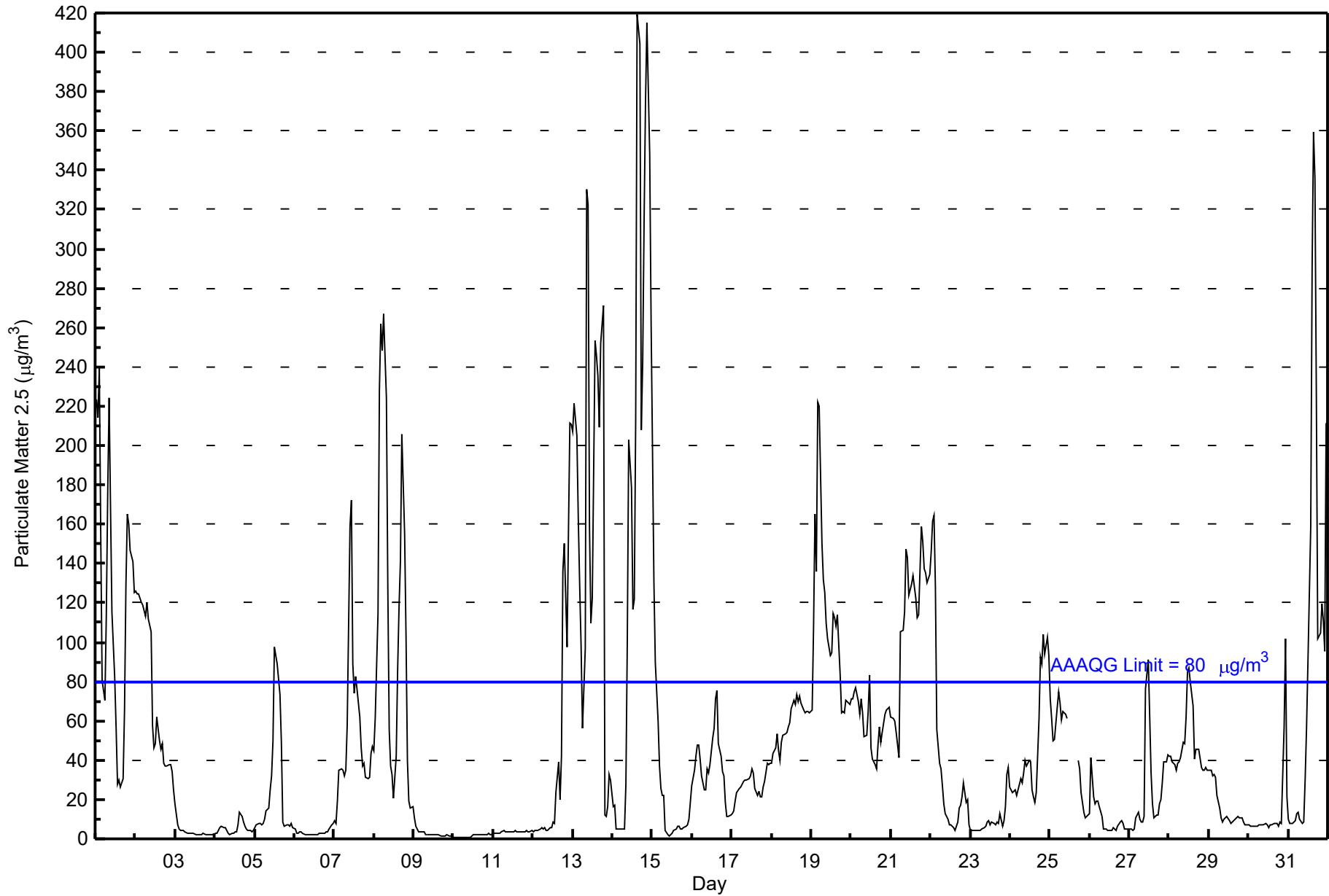




Summary of Hour Averages

Fort Chipewyan - July 2023

Number of Exceedences (AAAQO):		1-hr: 151	24-hr: 17																		Hours in Service:	744					
Maximum Value: 419.6 µg/m ³ on Jul 14 16:00		Maximum Daily Average: 167.3 µg/m ³ on Jul 14																			Hours of Data:	739					
Minimum Value: 0.8 µg/m ³ on Jul 10 01:00		Minimum Daily Average: 1.6 µg/m ³ on Jul 10																			Hours of Missing Data:	5					
Maximum Diurnal Average: 65.1 µg/m ³ at hour 16		Minimum Diurnal Average: 42.6 µg/m ³ at hour 6																			Hours of Calibration:	3					
Monthly Average: 50.69 µg/m ³		Percentiles: P ₁ = 0.9 P ₁₀ = 2.8 Q ₁ = 5.8 Median = 25.5 Q ₃ = 65.3 P ₉₀ = 132.1 P ₉₉ = 327.1																			Percent Operational Time:	99.7					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	223.7	214.4	239.3	156.5	80.6	70.3	113.9	175.6	224.5	169.1	115.4	82.2	56.5	27.6	30.0	26.4	30.9	65.2	128.8	165.1	159.8	147.0	141.2	125.4	123.7	239.3	
2-Jul	125.7	124.4	124.4	120.0	118.7	116.2	113.5	120.2	112.0	105.1	57.5	46.1	48.3	61.6	49.6	45.5	48.1	38.3	37.0	37.0	38.0	38.0	33.8	25.2	74.3	125.7	
3-Jul	17.7	7.1	5.1	4.4	4.3	4.2	3.4	2.7	2.6	2.7	2.9	2.8	2.3	2.2	2.3	2.4	2.5	2.7	2.5	2.3	2.3	2.5	2.3	2.4	3.7	17.7	
4-Jul	2.7	2.8	3.9	6.0	6.5	5.9	5.8	4.0	2.7	2.0	3.0	2.7	3.7	3.8	7.0	13.7	11.3	8.7	6.2	4.8	4.5	4.2	3.8	4.5	5.2	13.7	
5-Jul	5.9	7.4	7.9	7.7	7.0	7.7	9.8	14.5	15.6	24.8	32.4	49.7	97.8	89.1	81.3	73.6	49.1	8.3	6.7	7.0	7.2	6.5	7.7	5.6	26.3	97.8	
6-Jul	5.2	2.8	2.7	3.7	3.7	3.0	2.2	2.3	2.3	2.3	2.2	2.1	1.9	1.9	2.4	3.0	3.1	3.0	3.1	3.6	3.4	4.9	7.0	8.0	3.3	8.0	
7-Jul	9.2	8.0	19.2	34.5	35.5	34.8	32.1	34.7	57.7	158.6	172.5	88.8	74.0	82.3	76.3	62.2	46.2	37.1	38.1	31.3	30.7	31.0	43.7	46.9	53.6	172.5	
8-Jul	45.0	61.6	114.4	228.2	261.7	248.7	266.8	224.2	128.3	55.3	37.3	32.8	20.7	41.9	85.1	117.1	140.9	205.7	155.5	103.1	39.5	19.3	15.4	16.3	111.0	266.8	
9-Jul	10.6	6.2	4.9	3.4	3.3	3.5	3.2	2.4	2.3	2.1	2.2	2.2	2.0	2.2	1.9	2.0	1.8	1.7	1.7	1.7	2.3	1.6	1.4	1.1	2.8	10.6	
10-Jul	0.8	0.8	0.8	0.8	0.9	0.9	1.0	0.9	0.9	0.9	1.0	1.4	2.0	2.0	2.2	2.3	2.4	2.3	2.3	2.1	2.1	2.5	2.3	2.4	1.6	2.5	
11-Jul	2.7	3.1	3.1	3.2	3.1	3.6	4.1	3.8	3.8	3.7	3.4	3.6	3.9	4.3	3.9	3.8	3.8	3.6	3.6	3.8	4.1	3.9	3.9	4.0	3.7	4.3	
12-Jul	3.9	4.3	4.4	4.6	5.1	5.5	5.1	5.6	4.6	4.1	5.9	5.5	8.4	7.5	23.4	39.3	19.7	42.2	136.1	150.4	97.4	157.0	211.4	210.5	48.4	211.4	
13-Jul	206.9	221.1	204.8	162.9	128.8	97.9	56.3	96.5	330.0	322.4	158.7	109.4	122.2	253.3	245.3	235.4	209.4	252.3	271.5	12.4	11.3	16.5	32.8	30.0	157.8	330.0	
14-Jul	16.3	17.0	4.9	5.1	5.1	4.9	5.1	5.2	27.7	100.2	202.6	178.9	116.9	121.5	213.7	419.6	404.5	207.9	242.8	314.6	374.3	415.2	348.0	262.8	167.3	419.6	
15-Jul	197.9	130.7	89.9	60.0	37.4	25.6	22.0	22.0	4.2	2.3	1.3	2.1	3.0	4.3	5.1	6.1	6.5	5.0	5.0	5.7	6.4	7.3	10.2	18.8	28.3	197.9	
16-Jul	27.1	34.9	42.0	48.0	47.9	40.5	32.4	25.0	25.1	35.4	33.5	37.5	51.5	56.5	70.8	75.4	48.3	42.0	34.0	32.3	18.5	11.1	11.4	11.9	37.2	75.4	
17-Jul	12.5	14.4	19.1	23.7	25.5	26.4	27.5	29.5	29.6	30.0	30.9	31.9	35.5	33.7	25.5	22.4	23.9	21.5	21.6	26.1	29.5	38.2	37.8	38.6	27.3	38.6	
18-Jul	38.6	43.2	46.3	53.5	45.0	40.2	48.8	53.0	53.7	54.0	56.7	59.2	66.3	70.7	68.0	73.3	69.5	72.7	68.9	65.4	64.1	65.1	65.1	64.4	58.6	73.3	
19-Jul	65.2	107.7	165.2	135.9	222.2	219.7	150.0	131.7	125.4	109.5	101.8	93.6	94.4	114.4	112.6	108.3	113.9	83.5	64.0	65.1	63.9	70.2	69.0	68.4	110.6	222.2	
20-Jul	71.4	71.2	74.7	76.9	69.7	63.6	71.2	63.8	51.8	52.6	64.4	83.5	46.5	40.4	37.8	35.4	48.0	57.2	49.3	54.1	63.1	65.4	66.0	66.9	60.2	83.5	
21-Jul	61.8	61.5	60.1	54.0	47.8	41.1	105.5	106.2	115.3	147.7	143.0	124.1	129.3	134.0	128.0	122.8	112.7	113.7	158.7	150.8	137.1	135.6	130.3	134.4	110.6	158.7	
22-Jul	146.1	161.6	164.3	128.5	55.5	38.3	35.8	26.9	18.1	13.1	9.9	7.4	6.8	6.4	5.4	4.5	8.8	15.8	16.9	21.6	28.1	18.2	19.8	7.0	40.2	164.3	
23-Jul	4.1	4.0	4.1	4.3	4.3	4.4	4.4	4.7	5.5	6.7	8.6	9.5	7.5	8.5	7.8	7.1	8.4	7.8	12.8	6.5	9.3	16.1	32.5	36.0	9.4	36.0	
24-Jul	26.4	23.7	24.1	24.6	22.4	24.9	30.4	28.3	33.4	39.8	37.0	39.6	39.2	24.7	21.3	18.7	23.6	61.5	92.5	89.0	103.7	94.2	102.6	93.6	46.6	103.7	
25-Jul	71.1	61.5	49.7	50.3	66.8	74.8	68.8	60.3	64.7	63.6	61.3	C	C	C	70.8	M	M	39.7	35.7	23.5	13.7	10.6	11.6	11.9	47.9	74.8	
26-Jul	12.6	41.6	21.4	18.1	19.0	19.4	16.3	11.7	5.2	4.8	5.0	4.5	4.3	4.2	5.5	5.1	4.5	6.3	8.7	9.4	7.9	5.3	4.8	5.2	10.4	41.6	
27-Jul	5.2	4.7	4.4	4.7	10.4	13.3	9.8	8.7	8.5	11.6	76.5	91.4	62.4	33.2	17.5	10.8	12.1	12.1	18.0	20.3	28.6	39.3	39.2	43.0	24.4	91.4	
28-Jul	41.9	41.7	39.1	38.0	34.6	38.2	39.2	41.1	49.0	48.6	62.0	84.9	87.0	79.4	67.8	40.3	45.9	45.4	45.7	36.7	34.8	34.7	36.2	35.1	47.8	87.0	
29-Jul	34.9	34.9	32.2	32.7	31.4	22.3	16.0	10.3	8.5	9.8	10.9	11.4	9.1	8.0	8.3	9.3	10.3	11.2	10.9	10.6	10.6	8.4	6.8	6.9	15.2	34.9	
30-Jul	6.9	6.6	6.2	6.2	6.3	6.6	7.0	7.2	7.3	7.2	7.7	7.2	5.8	6.9	7.3	7.9	7.7	7.8	6.5	8.6	8.1	56.7	101.6	21.0	13.7	101.6	
31-Jul	9.6	8.0	7.7	8.4	9.3	12.9	13.5	10.0	7.9	8.7	30.1	56.1	89.5	158.7	291.2	359.8	335.8	226.1	101.5	104.6	119.9	110.8	95.4	211.1	99.4	359.8	
48.7 49.5 51.3 48.7 45.8 42.6 42.6 43.0 49.3 51.6 49.6 45.1 43.3 49.5 57.3 65.1 61.8 55.1 57.6 50.6 49.2 52.8 54.7 52.2																								Diurnal Average			
223.7 221.1 239.3 228.2 261.7 248.7 266.8 224.2 330.0 322.4 202.6 178.9 129.3 253.3 291.2 419.6 404.5 252.3 271.5 314.6 374.3 415.2 348.0 262.8																								Diurnal Maximum			
C - Calibration M - Maintenance																											
Alberta Ambient Air Quality Guideline/Objectives: 1-hr 80 µg/m ³ 24-hr 29 µg/m ³																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - July 2023**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
0 - 5	180	24.36	24.36
6 - 15	136	18.40	42.76
16 - 25	54	7.31	50.07
26 - 80	218	29.50	79.57
> 81.0	151	20.43	100.00

Total Number of Valid Hours: 739

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort Chipewyan - July 2023**

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	18	7	18	39	46	30	3	2	0	1	6	4	1	1	0	4	180
6 - 15	2	3	7	15	30	8	2	7	9	10	15	15	7	0	0	6	136
16 - 25	1	2	5	10	11	6	4	0	4	1	1	1	6	1	0	1	54
26 - 80	2	2	5	31	35	22	9	0	3	2	12	16	29	19	11	20	218
> 81.0	13	5	3	7	3	3	1	0	0	3	4	9	25	24	17	34	151
Totals	36	19	38	102	125	69	19	9	16	17	38	45	68	45	28	65	739

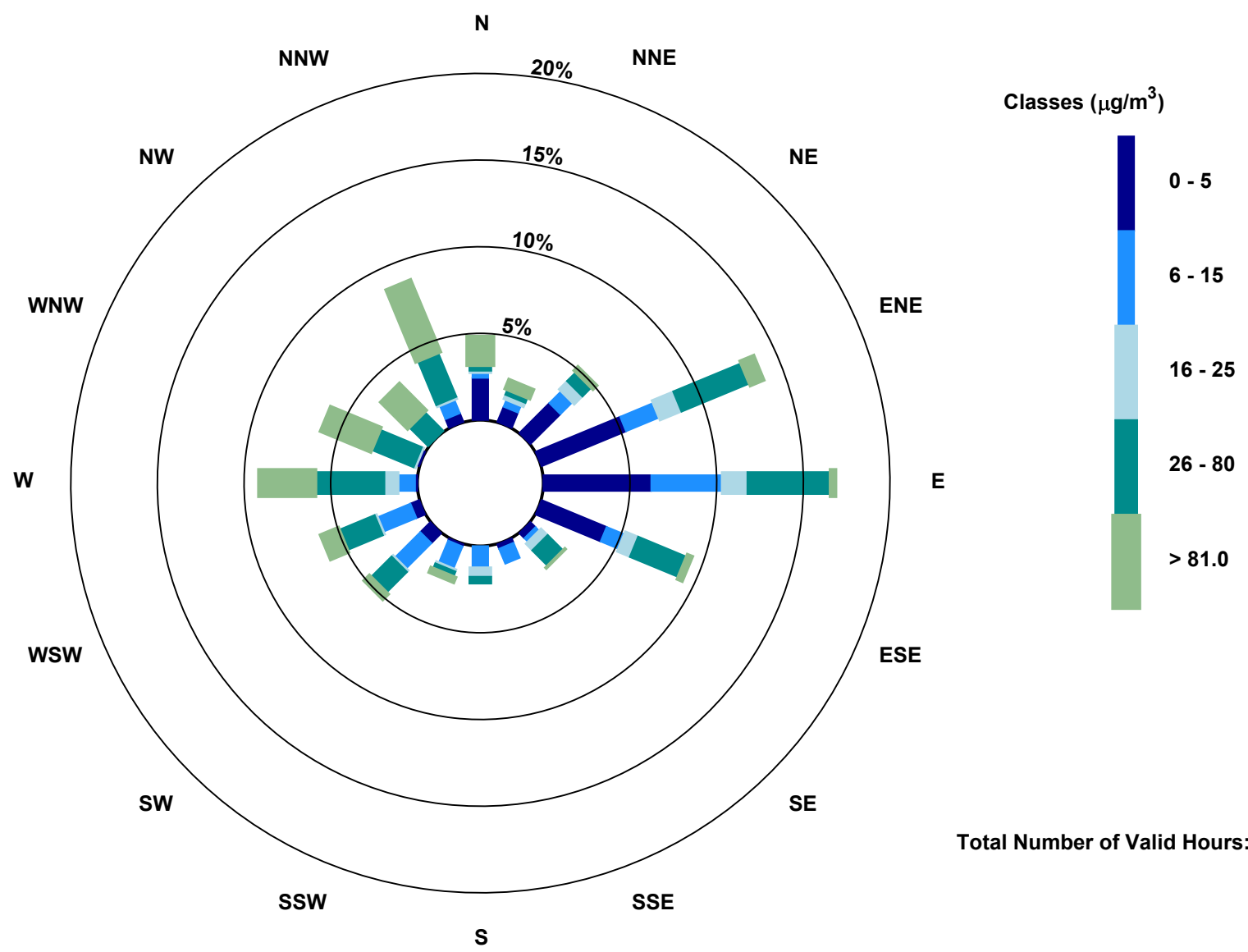
Total Number of Valid Hours: 739

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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



Total Number of Valid Hours: 739

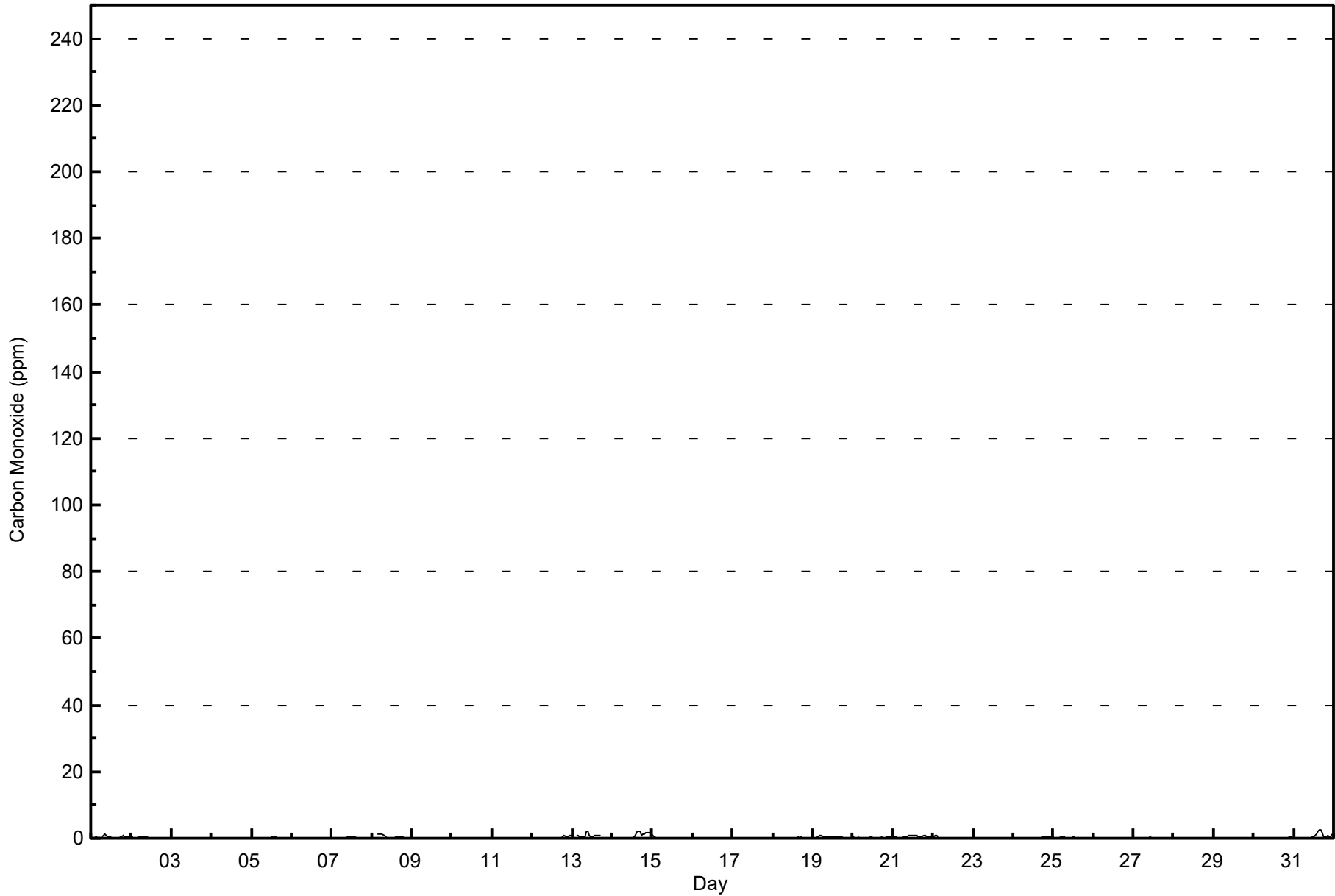


Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0																		Hours in Service:	744				
Maximum Value: 2.5 ppm on Jul 31 16:00		Maximum Daily Average: 0.7 ppm on Jul 31																	Hours of Data:	636						
Minimum Value: 0.0 ppm on Jul 2 18:00		Minimum Daily Average: 0.0 ppm on Jul 3																	Hours of Missing Data:	108						
Maximum Diurnal Average: 0.3 ppm at hour 16		Minimum Diurnal Average: 0.1 ppm at hour 2																	Hours of Calibration:	31						
Monthly Average: 0.19 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.2 P ₉₀ = 0.6 P ₉₉ = 1.9																	Percent Operational Time:	89.7						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.6	Z	0.6	0.4	0.2	0.2	0.4	0.8	1.1	0.7	0.5	0.3	0.1	0.0	0.0	0.0	0.0	0.2	0.5	0.7	0.6	0.5	0.5	0.4	0.4	1.1
2-Jul	0.4	0.4	Z	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
3-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.3	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
6-Jul	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	0.0	0.0	0.0	0.0	0.0	0.0
7-Jul	0.0	Z	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.5	0.5	0.3	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.5
8-Jul	0.1	0.2	Z	1.2	1.3	1.2	1.4	1.0	0.5	0.2	0.1	0.1	0.0	0.1	0.2	0.4	0.4	0.4	0.3	0.2	0.0	0.0	0.0	0.0	0.0	1.4
9-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12-Jul	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	0.1	0.0	0.2	0.6	0.7	0.4	0.5	0.7	0.7	0.7	0.7
13-Jul	0.8	Z	0.9	0.8	0.6	0.4	0.3	0.6	2.0	2.0	0.8	0.5	0.9	0.8	0.7	0.7	0.9	0.9	PF	PF	PF	PF	PF	PF	PF	2.0
14-Jul	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	0.5	0.5	1.1	1.9	1.9	0.9	1.1	1.4	1.6	1.9	1.6	1.1	1.9
15-Jul	0.9	0.5	0.3	Z	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	0.9
16-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.1	PF	PF	PF	PF	PF	PF	PF	PF	0.2
17-Jul	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	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	0.1	0.1	0.1
18-Jul	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
19-Jul	0.2	Z	0.6	0.6	0.9	0.9	0.6	0.5	0.5	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.9
20-Jul	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4
21-Jul	0.3	0.2	0.2	Z	0.2	0.1	0.5	0.5	0.6	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.6	0.5	0.5	0.5	0.8
22-Jul	0.6	0.7	0.7	0.5	Z	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	0.1	0.1	0.0	0.0	0.0	0.7
23-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
24-Jul	Z	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	0.0	0.0	0.1	0.2	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.4
25-Jul	0.3	Z	0.2	0.2	0.3	0.3	0.3	0.3	M	M	M	0.4	0.3	0.2	M	M	M	M	M	M	M	0.1	0.1	0.1	0.1	0.4
26-Jul	0.1	0.2	Z	0.1	UO	UO	UO	UO	UO	UO	UO	0.0	0.0	0.0	C	C	C	UO	UO	UO	UO	UO	UO	UO	UO	0.2
27-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0.0	0.3	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	0.3
28-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-Jul	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	0.0	0.0	0.2	0.4	0.0	0.4
31-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.6	1.2	2.1	2.5	2.5	1.7	0.5	0.6	0.7	0.6	0.5	1.2	1.2	2.5
																								Diurnal Average		
																								Diurnal Maximum		
0.2 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.1 0.1 0.2 0.2 0.2 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2																										
0.9 0.7 0.9 1.2 1.3 1.2 1.4 1.0 2.0 2.0 0.8 0.7 0.7 1.2 2.1 2.5 2.5 1.7 1.1 1.4 1.6 1.9 1.6 1.2																										
Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 13 ppm																										



Wood Buffalo Environmental Association
Hourly Averages

Carbon Monoxide (CO) - ppm
Fort Chipewyan - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Carbon Monoxide (CO) - ppm
Fort Chipewyan - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	518	81.45	81.45
0.4 - 0.5	47	7.39	88.84
0.6 - 0.7	34	5.35	94.18
0.8 - 1.4	26	4.09	98.27
1.5 - 10	11	1.73	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 636

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Carbon Monoxide (CO) - ppm
Fort Chipewyan - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.3	17	11	32	88	110	48	10	5	16	15	32	36	38	20	13	25	516
0.4 - 0.5	2	0	1	4	1	3	1	0	0	1	2	2	6	8	4	12	47
0.6 - 0.7	4	3	0	0	0	0	0	0	0	0	1	4	8	5	4	5	34
0.8 - 1.4	3	2	1	0	0	0	0	0	0	0	0	0	6	4	2	8	26
1.5 - 10	1	0	0	0	0	0	0	0	0	0	0	1	0	3	3	3	11
> 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	27	16	34	92	111	51	11	5	16	16	35	43	58	40	26	53	634

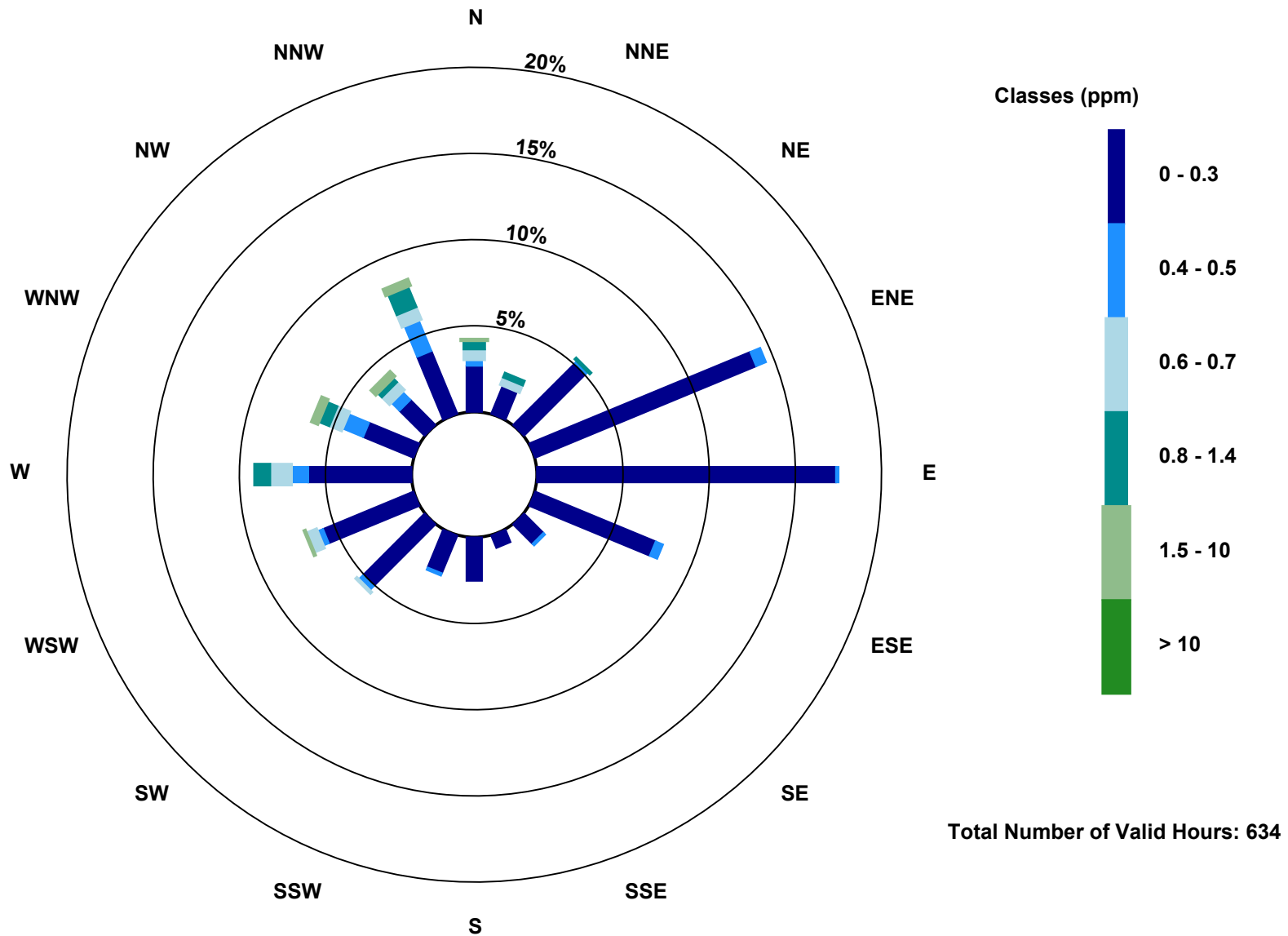
Total Number of Valid Hours: 634

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Carbon Monoxide (CO) - ppm
Fort Chipewyan





Wood Buffalo Environmental Association

Summary of Hour Averages

Carbon Dioxide (CO₂) - ppm

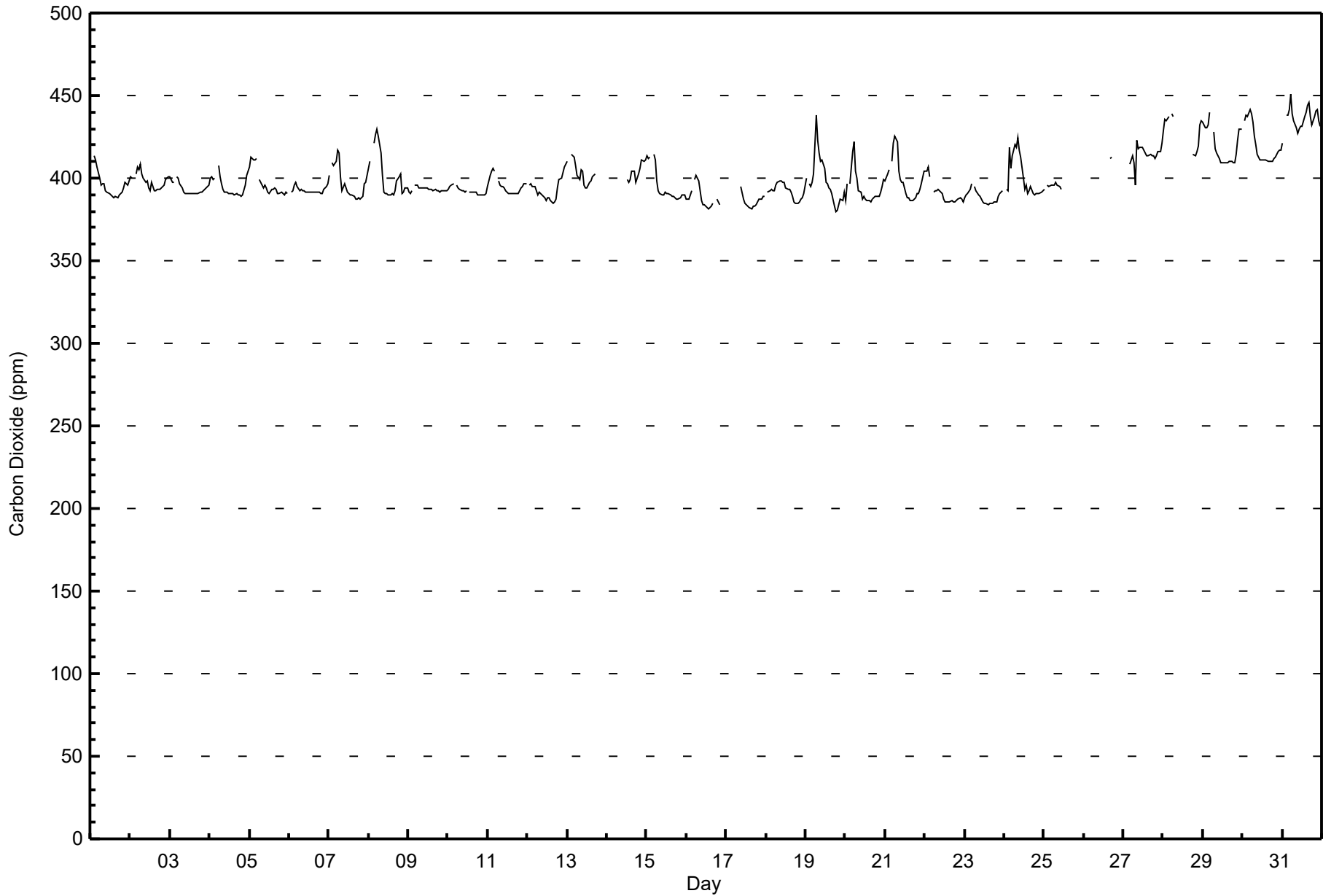
Fort Chipewyan - July 2023

Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0	Hours in Service:		744																					
Maximum Value: 451.2 ppm on Jul 31 06:00		Maximum Daily Average: 436.3 ppm on Jul 31				Hours of Data:		635																			
Minimum Value: 379.3 ppm on Jul 19 19:00		Minimum Daily Average: 388.1 ppm on Jul 16				Hours of Missing Data:		109																			
Maximum Diurnal Average: 409.9 ppm at hour 6		Minimum Diurnal Average: 394.2 ppm at hour 15				Hours of Calibration:		35																			
Monthly Average: 399.61 ppm		Percentiles: P ₁ = 382.4 P ₁₀ = 387.2 Q ₁ = 390.6 Median = 394.2 Q ₃ = 406.4 P ₉₀ = 418.8 P ₉₉ = 440.4				Percent Operational Time:		90.1																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	410.1	Z	413.9	410.6	406.8	400.1	395.9	396.5	396.8	392.7	391.6	390.6	389.8	389.1	388.4	388.6	388.4	389.4	390.5	391.2	394.3	397.2	396.1	398.3	396.0	413.9	
2-Jul	401.1	400.1	Z	402.3	406.4	405.5	408.9	403.0	399.8	397.7	398.3	394.1	392.5	397.8	392.6	392.2	393.1	392.8	392.9	394.2	396.1	399.0	400.2	400.5	398.3	408.9	
3-Jul	401.0	397.4	397.3	Z	400.9	399.8	396.6	393.8	391.8	390.6	390.7	390.6	390.4	390.9	390.9	390.8	390.7	390.8	391.4	391.4	392.2	393.5	393.9	395.9	393.6	401.0	
4-Jul	399.6	400.7	399.1	400.4	Z	407.7	400.5	396.7	393.4	391.3	391.2	390.5	390.7	390.9	390.3	389.7	390.3	390.2	389.9	388.7	390.1	395.5	402.0	404.2	394.9	407.7	
5-Jul	406.9	412.8	411.3	411.2	411.8	Z	399.3	397.1	394.5	395.5	393.8	391.7	390.9	393.6	393.5	394.2	393.3	390.6	390.7	391.3	390.4	390.1	391.1	390.9	396.8	412.8	
6-Jul	Z	391.2	392.8	395.9	397.3	394.6	392.5	392.9	392.3	392.0	391.4	391.6	391.6	391.8	391.8	391.9	391.8	391.4	391.3	390.8	390.3	392.8	394.7	396.9	392.7	397.3	
7-Jul	401.6	Z	409.4	408.0	409.9	416.7	415.3	400.8	392.5	396.8	394.2	391.2	390.6	389.8	390.0	389.1	387.1	387.2	387.7	387.3	389.3	396.3	397.5	401.4	396.9	416.7	
8-Jul	406.2	410.0	Z	421.6	425.9	429.8	425.2	415.6	401.6	391.4	390.9	390.6	389.4	389.7	391.0	390.1	392.5	398.2	401.1	402.7	390.7	391.3	394.3	394.0	401.5	429.8	
9-Jul	391.2	391.0	392.7	Z	395.7	395.7	394.3	394.0	394.3	393.8	394.0	393.8	393.3	393.2	393.0	392.8	392.8	392.6	392.1	391.9	392.1	392.2	392.2	392.7	393.1	395.7	
10-Jul	393.3	394.7	395.7	396.7	Z	395.8	394.1	393.0	392.4	392.1	391.3	392.0	M	391.1	391.1	391.2	391.9	391.2	389.9	389.9	389.8	389.9	390.2	390.6	392.2	396.7	
11-Jul	395.1	401.4	404.6	406.1	404.6	Z	398.2	395.5	395.0	395.0	394.2	392.0	391.0	390.5	390.4	390.5	390.5	390.5	390.9	392.3	393.7	394.7	396.5	396.9	395.2	406.1	
12-Jul	Z	396.0	396.3	395.3	394.8	392.6	390.2	391.5	390.5	389.9	388.4	386.3	387.9	387.9	386.4	385.0	385.2	387.7	393.8	399.5	400.4	403.5	406.4	408.1	393.2	408.1	
13-Jul	410.0	Z	414.3	413.6	412.4	407.5	401.4	399.2	405.0	404.6	395.6	393.7	394.0	397.5	398.6	401.0	401.7	402.6	PF	PF	PF	PF	PF	PF	--	414.3	
14-Jul	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	398.8	397.2	399.2	404.6	404.2	397.7	400.1	402.6	406.0	410.6	409.9	410.7	--	410.7
15-Jul	413.8	411.6	412.7	Z	414.4	411.2	398.5	392.2	390.5	389.9	389.5	391.4	390.9	390.3	389.6	389.2	388.8	388.4	387.6	387.2	388.3	390.0	390.2	389.9	395.1	414.4	
16-Jul	387.0	387.2	389.7	392.3	Z	399.3	402.0	398.7	392.3	386.1	383.6	383.5	382.2	381.8	382.3	383.4	384.7	PF	387.7	385.2	384.2	PF	PF	PF	388.1	402.0	
17-Jul	PF	PF	PF	PF	PF	PF	PF	PF	PF	394.5	387.0	384.7	383.9	383.3	382.1	381.1	382.9	382.7	384.0	385.8	387.7	387.3	388.6	389.3	--	394.5	
18-Jul	Z	391.8	392.5	393.2	392.2	392.7	395.8	397.6	398.2	398.0	397.6	397.1	394.4	393.5	393.4	391.9	389.1	385.8	385.1	384.7	385.2	387.7	388.2	390.7	392.0	398.2	
19-Jul	400.3	Z	396.9	394.7	397.5	402.1	437.8	422.6	415.0	410.4	410.7	405.6	397.6	396.4	394.2	393.2	390.4	383.3	379.3	380.5	383.8	387.0	386.0	391.4	398.1	437.8	
20-Jul	386.8	396.5	Z	396.4	416.1	422.0	404.3	399.7	392.3	391.1	387.0	389.0	387.7	386.6	386.4	385.9	387.3	388.5	388.7	388.6	388.9	391.8	394.8	399.0	393.7	422.0	
21-Jul	398.3	402.4	405.2	Z	410.6	421.0	425.7	422.3	404.6	398.8	397.4	397.8	390.9	388.3	388.1	386.8	386.3	386.1	388.0	391.0	390.3	392.9	396.9	404.5	398.9	425.7	
22-Jul	404.1	404.2	406.7	401.3	Z	391.6	392.1	392.5	393.1	392.5	390.3	387.3	385.8	385.3	385.4	385.5	386.3	385.8	385.9	386.5	387.0	388.1	387.2	385.7	390.9	406.7	
23-Jul	388.1	389.6	390.9	393.3	396.5	Z	394.7	392.0	390.0	388.9	387.2	385.9	384.7	384.4	384.2	384.4	384.8	385.1	385.6	385.8	388.6	390.7	391.6	392.4	388.7	396.5	
24-Jul	Z	393.1	392.1	418.9	406.3	413.6	420.3	418.5	425.0	416.7	413.0	400.4	393.5	395.9	391.0	392.1	394.7	390.6	390.2	390.5	390.8	391.0	391.8	392.2	401.0	425.0	
25-Jul	393.5	Z	395.9	394.9	395.5	396.2	396.1	397.1	395.8	394.5	393.5	C	C	M	M	M	M	M	M	M	M	M	M	M	--	397.1	
26-Jul	M	M	M	M	M	M	M	M	M	M	M	C	C	C	C	C	412.1	412.3	UO	UO	UO	UO	UO	UO	--	412.3	
27-Jul	UO	UO	UO	Z	408.2	413.8	409.0	396.0	423.0	418.2	418.7	418.4	417.1	414.9	413.8	413.5	414.0	413.4	413.2	412.1	413.5	415.7	416.5	421.5	414.2	423.0	
28-Jul	428.8	435.5	434.9	437.4	Z	439.2	436.9	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	414.5	413.8	416.4	419.7	432.5	435.0	--	439.2
29-Jul	433.5	430.5	430.9	432.3	439.5	Z	428.0	417.7	415.3	413.6	411.6	409.4	409.0	409.7	409.2	409.6	409.9	410.0	409.5	409.1	414.5	422.9	429.7	429.9	418.9	439.5	
30-Jul	Z	434.9	438.0	437.4	441.5	438.6	434.1	425.5	420.3	414.0	411.4	411.3	411.3	411.1	411.0	410.3	410.2	409.9	410.2	411.9	413.1	415.8	417.2	417.2	419.8	441.5	
31-Jul	421.6	Z	437.8	437.9	441.6	451.2	438.7	434.9	430.3	426.8	429.5	431.1	431.5	436.9	439.8	444.2	445.8	437.7	432.1	437.7	440.8	441.3	435.0	431.1	436.3	451.2	
		403.3	403.5	406.3	408.3	409.8	409.9	408.1	402.8	400.9	398.5	396.9	395.6	394.5	394.6	394.2	394.4	395.2	394.7	394.4	395.1	396.0	398.8	400.4	401.9	Diurnal Average	
		433.5	435.5	438.0	437.9	441.6	451.2	438.7	434.9	430.3	426.8	429.5	431.1	431.5	436.9	439.8	444.2	445.8	437.7	432.1	437.7	440.8	441.3	435.0	435.0	Diurnal Maximum	
Z - zerospan		C - Calibration					M - Maintenance					UO - Unstable Operation					PF - Power Failure										



Wood Buffalo Environmental Association
Hourly Averages

Carbon Dioxide (CO₂) - ppm
Fort Chipewyan - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Carbon Dioxide (CO₂) - ppm
Fort Chipewyan - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
400 - 420	152	23.94	23.94
420 - 440	53	8.35	32.28
440 - 460	7	1.10	33.39
460 - 480	0	0.00	33.39
480 - 500	0	0.00	33.39
> 500	0	0.00	33.39

Total Number of Valid Hours: 635

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Carbon Dioxide (CO₂) - ppm
Fort Chipewyan - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
400 - 420	11	3	1	7	17	8	2	2	4	6	14	8	19	13	7	30	152
420 - 440	0	0	0	0	2	0	1	1	2	4	7	11	8	13	2	2	53
440 - 460	0	0	0	0	0	0	0	0	1	1	1	0	0	4	0	0	7
460 - 480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
480 - 500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	11	3	1	7	19	8	3	3	7	11	22	19	27	30	9	32	212

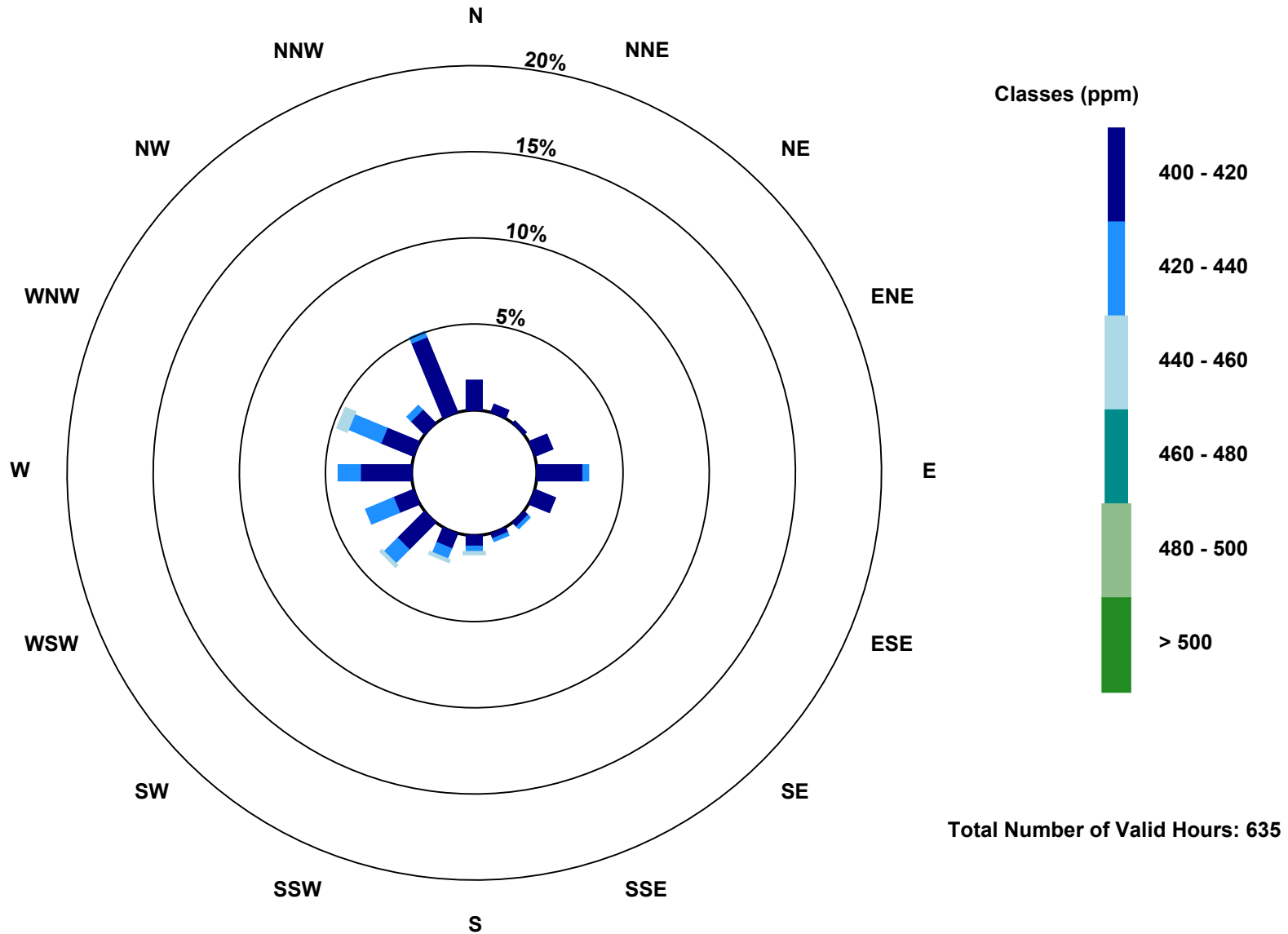
Total Number of Valid Hours: 635

Total Number of Hours: 744



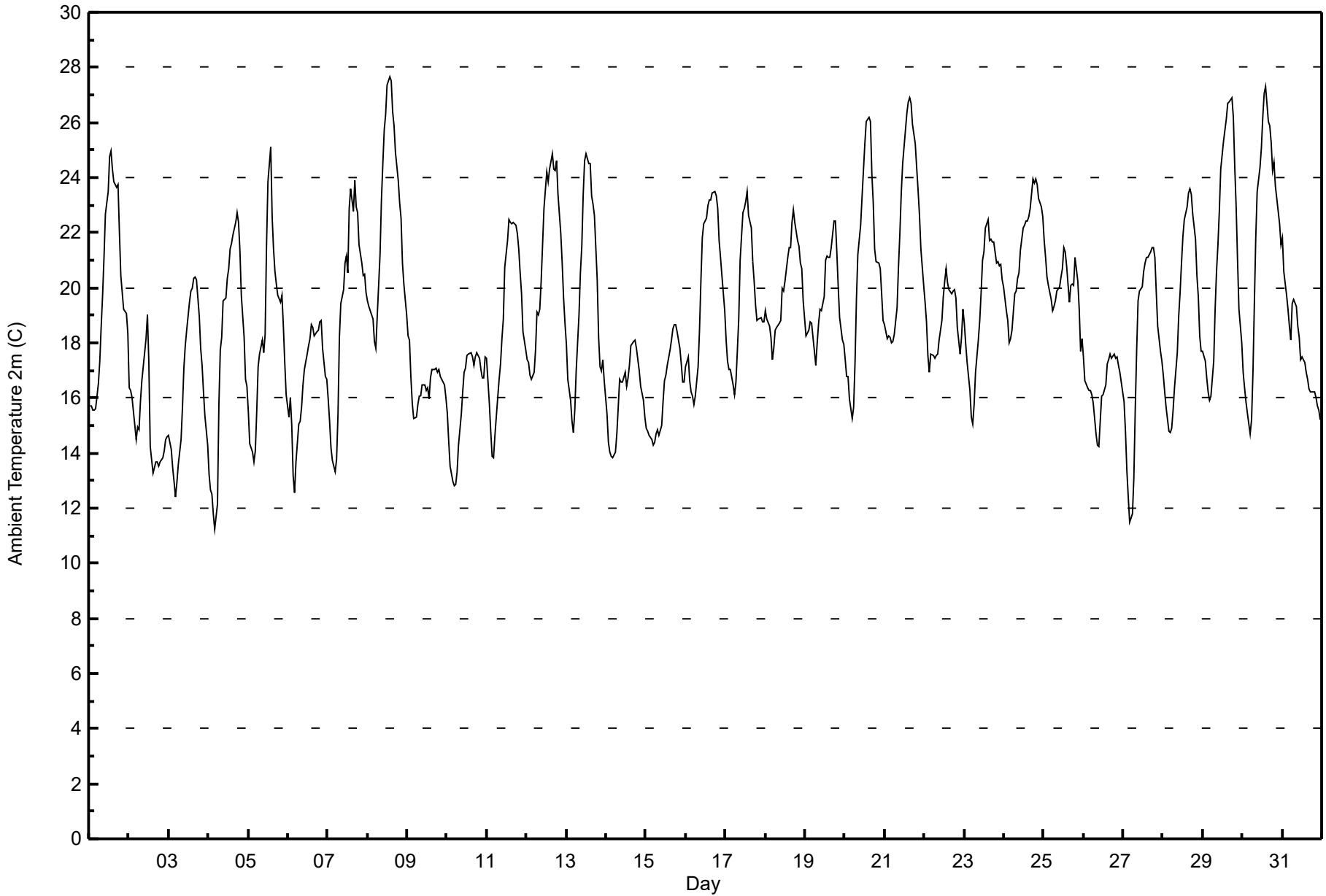
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Carbon Dioxide (CO₂) - ppm
Fort Chipewyan





Maximum Value: 27.7 C on Jul 8 14:00 Maximum Daily Average: 22.6 C on Jul 8																						Hours in Service: 744 Hours of Data: 744																										
Minimum Value: 11.2 C on Jul 4 05:00 Minimum Daily Average: 15.2 C on Jul 2 Maximum Diurnal Average: 21.6 C at hour 15 Minimum Diurnal Average: 15.4 C at hour 5 Monthly Average: 18.95 C Percentiles: P ₁ = 12.5 P ₁₀ = 14.8 Q ₁ = 16.6 Median = 18.6 Q ₃ = 21.2 P ₉₀ = 23.5 P ₉₉ = 26.7																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	15.7	15.7	15.6	15.6	15.6	16.5	17.4	18.6	19.7	21.1	22.7	23.5	24.7	25.0	24.3	23.9	23.7	23.7	22.0	20.5	19.8	19.2	19.1	18.3	20.1	25.0																						
2-Jul	16.4	16.2	16.0	15.0	14.5	15.0	14.9	15.9	16.6	17.6	18.2	19.0	17.3	14.2	13.3	13.5	13.7	13.7	13.5	13.7	13.8	14.1	14.5	14.6	15.2	19.0																						
3-Jul	14.6	14.1	13.5	13.0	12.4	12.9	13.6	14.5	15.7	17.1	17.9	18.5	19.5	19.9	20.0	20.3	20.4	20.3	19.0	17.8	17.2	16.2	15.4	14.3	16.6	20.4																						
4-Jul	13.2	12.7	12.5	11.8	11.2	12.1	15.8	17.7	18.2	19.5	19.6	20.3	20.7	21.4	21.6	21.9	22.4	22.7	22.4	21.3	19.7	18.2	16.7	16.4	17.9	22.7																						
5-Jul	15.5	14.3	14.0	13.7	14.1	15.5	17.2	17.6	18.1	17.6	18.3	21.6	23.8	25.1	22.6	21.4	20.6	20.1	19.7	19.5	19.7	18.6	17.3	16.1	18.4	25.1																						
6-Jul	15.3	16.0	15.0	13.2	12.6	13.7	15.1	15.2	15.7	16.5	17.0	17.6	17.9	18.1	18.6	18.6	18.3	18.4	18.5	18.7	18.8	17.8	16.8	16.7	16.7	18.8																						
7-Jul	16.0	15.1	14.2	13.7	13.3	13.8	15.4	18.2	19.4	19.9	20.9	21.2	20.5	22.9	23.6	22.8	23.9	22.9	22.7	21.6	20.9	20.5	20.5	19.8	19.3	23.9																						
8-Jul	19.5	19.3	19.0	18.9	18.1	17.8	19.0	21.2	23.2	24.5	25.7	26.3	27.4	27.7	27.5	26.4	25.9	24.9	23.9	23.1	22.5	20.9	20.2	19.0	22.6	27.7																						
9-Jul	18.3	18.1	16.8	15.8	15.3	15.3	15.8	16.0	16.1	16.5	16.5	16.3	16.3	16.0	16.7	17.0	17.1	17.1	16.9	17.0	16.8	16.6	16.5	16.0	16.5	18.3																						
10-Jul	15.5	14.4	13.5	13.0	12.8	12.9	13.3	14.3	15.4	16.2	16.9	17.1	17.6	17.6	17.5	17.2	17.5	17.6	17.5	17.0	16.7	16.7	17.5	16.0	16.0	17.6																						
11-Jul	17.4	15.8	14.8	13.9	13.8	14.7	16.0	16.7	17.2	18.2	18.8	20.8	21.7	22.5	22.4	22.3	22.4	22.2	22.0	21.4	20.6	19.8	18.4	17.7	18.8	22.5																						
12-Jul	17.4	17.3	16.8	16.7	16.9	17.7	19.1	19.0	19.2	20.3	22.9	23.5	24.2	23.8	24.3	24.8	24.3	24.3	24.6	23.4	22.0	20.9	19.6	18.7	20.9	24.8																						
13-Jul	17.9	16.7	15.9	15.1	14.7	15.5	17.0	19.0	20.5	21.5	23.4	24.6	24.9	24.5	23.3	23.1	22.6	20.3	18.2	17.2	17.0	17.4	16.6	16.6	19.6	24.9																						
14-Jul	15.4	14.4	14.0	13.9	13.8	14.1	14.7	15.7	16.7	16.6	16.6	16.9	16.4	16.7	17.2	17.9	18.1	18.1	17.8	17.4	17.0	16.4	15.9	15.3	16.1	18.1																						
15-Jul	14.9	14.8	14.6	14.5	14.3	14.4	14.7	14.9	14.6	15.0	15.9	16.6	16.8	17.2	17.7	18.1	18.5	18.7	18.7	18.4	17.8	17.2	16.6	16.6	16.3	18.7																						
16-Jul	17.1	17.5	16.6	16.2	16.1	15.8	16.1	17.1	18.5	20.2	21.8	22.3	22.5	23.0	23.2	23.2	23.5	23.5	23.3	22.9	21.7	21.1	20.4	19.1	20.1	23.5																						
17-Jul	18.1	17.3	17.0	17.0	16.5	16.1	16.6	17.7	18.9	21.0	22.7	22.9	23.2	23.5	22.6	22.2	20.9	20.2	19.4	18.8	18.9	18.9	18.8	18.8	19.5	23.5																						
18-Jul	19.2	18.8	18.6	18.2	17.4	17.8	18.4	18.6	18.7	18.8	20.0	19.9	20.2	21.1	21.4	21.5	22.3	22.8	22.4	21.7	21.5	20.9	20.7	19.5	20.0	22.8																						
19-Jul	18.3	18.4	18.5	18.8	18.7	18.2	17.2	18.0	18.7	19.2	19.2	19.7	21.0	21.1	21.1	21.1	21.4	22.4	22.4	21.3	20.0	18.9	18.1	18.0	19.6	22.4																						
20-Jul	17.4	16.8	16.8	15.9	15.2	15.7	17.3	19.6	21.2	22.3	23.3	24.2	25.2	26.0	26.2	26.0	24.2	23.1	21.4	20.9	20.9	20.7	19.8	18.8	20.8	26.2																						
21-Jul	18.6	18.1	18.3	18.2	18.0	18.0	18.3	19.3	20.7	22.0	23.5	24.5	25.8	26.3	26.8	26.9	26.7	25.9	25.2	24.3	23.6	22.6	21.4	20.1	22.2	26.9																						
22-Jul	19.5	18.8	17.5	16.9	17.6	17.5	17.4	17.5	17.6	18.1	18.8	19.7	20.2	20.7	20.2	19.9	19.8	19.9	19.9	19.6	18.5	17.6	18.2	19.2	18.8	20.7																						
23-Jul	18.7	18.0	17.3	16.2	15.3	15.1	15.7	17.0	18.1	18.8	19.8	21.0	21.3	22.2	22.5	21.7	21.8	21.7	21.7	20.9	21.0	20.8	20.9	20.3	19.5	22.5																						
24-Jul	20.0	19.2	18.8	18.0	18.1	18.5	19.8	19.9	20.3	20.5	21.4	22.2	22.3	22.4	22.4	22.6	22.9	23.9	23.8	24.0	23.8	23.2	23.0	22.6	21.4	24.0																						
25-Jul	21.7	21.1	20.4	20.1	19.6	19.2	19.3	19.5	19.9	20.0	20.4	20.7	21.5	21.3	20.8	19.5	20.1	20.2	20.1	21.1	20.2	19.2	17.7	18.2	20.1	21.7																						
26-Jul	17.5	16.6	16.4	16.3	16.2	16.1	15.8	14.7	14.3	14.2	15.2	16.1	16.1	16.5	17.2	17.4	17.6	17.5	17.6	17.4	17.5	17.2	16.9	16.6	16.5	17.6																						
27-Jul	15.9	14.8	13.4	12.4	11.5	11.8	13.1	15.6	17.7	19.5	19.9	20.0	20.6	20.9	21.1	21.1	21.3	21.5	21.5	21.1	19.8	18.6	17.7	17.3	17.8	21.5																						
28-Jul	16.8	16.2	15.7	14.8	14.8	14.9	15.6	16.4	17.6	18.9	19.8	20.9	21.9	22.5	22.9	23.4	23.6	23.4	22.7	21.7	20.4	19.7	18.3	17.7	19.2	23.6																						
29-Jul	17.7	17.3	16.7	16.2	15.9	16.1	17.4	19.2	20.6	21.6	22.8	24.3	25.3	25.7	26.1	26.7	26.7	26.9	26.2	24.4	22.9	21.0	19.2	18.0	21.5	26.9																						
30-Jul	16.9	16.4	15.9	15.4	14.7	15.2	17.0	19.4	21.8	23.5	24.4	25.1	26.2	27.0	27.3	26.1	25.9	25.3	24.3	24.6	23.7	22.8	22.3	21.6	21.8	27.3																						
31-Jul	21.8	20.6	19.7	19.2	18.6	18.1	19.4	19.6	19.3	18.6	18.2	17.4	17.5	17.3	17.0	16.7	16.3	16.2	16.2	16.2	16.0	15.7	15.6	15.2	17.8	21.8																						
																								17.4	16.8	16.3	15.7	15.4	15.7	16.6	17.5	18.4	19.2	20.1	20.8	21.3	21.6	21.6	21.5	21.4	21.3	20.9	20.3	19.7	19.0	18.4	17.9	Diurnal Average
																								21.8	21.1	20.4	20.1	19.6	19.2	19.8	21.2	23.2	24.5	25.7	26.3	27.4	27.7	27.5	26.9	26.7	26.9	26.2	24.6	23.8	23.2	23.0	22.6	Diurnal Maximum





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	0	0.00	0.00
10 - 20	479	64.38	64.38
> 20	265	35.62	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

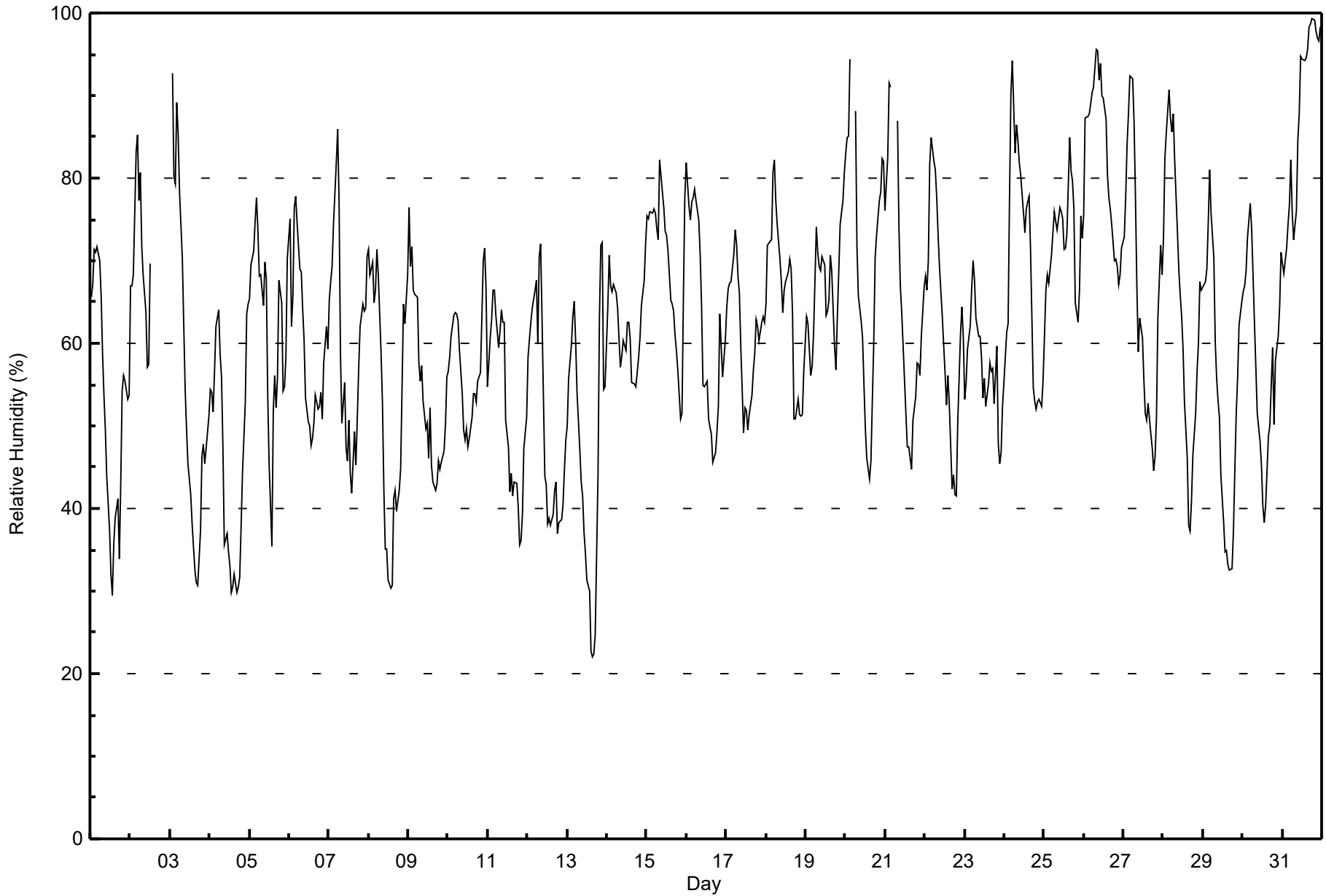
Relative Humidity (RH) - %
Fort Chipewyan - July 2023

Maximum Value: 99.4 % on Jul 31 19:00																								Hours in Service: 744		
Maximum Daily Average: 87.4 % on Jul 31																								Hours of Data: 727		
Minimum Value: 22.0 % on Jul 13 16:00																								Hours of Missing Data: 17		
Minimum Daily Average: 45.5 % on Jul 4																								Hours of Calibration: 0		
Maximum Diurnal Average: 75.3 % at hour 5																								Percent Operational Time: 97.7		
Minimum Diurnal Average: 50.9 % at hour 18																										
Monthly Average: 61.59 %																										
Percentiles: P ₁ = 30.1 P ₁₀ = 42.2 Q ₁ = 51.3 Median = 62.3 Q ₃ = 71.4 P ₉₀ = 81.0 P ₉₉ = 96.3																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	65.7	67.1	71.4	71.0	71.7	70.0	65.8	58.8	53.8	49.5	43.9	37.5	32.0	29.5	35.6	38.9	41.2	33.9	43.0	54.2	56.1	55.5	53.3	53.7	52.2	71.7
2-Jul	67.0	67.0	68.4	83.2	85.3	77.2	80.6	71.8	68.3	63.7	57.1	57.4	69.6	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	--	85.3
3-Jul	OR	92.7	80.2	79.3	89.2	85.4	78.3	70.3	62.4	54.6	49.7	45.4	41.7	38.1	35.3	32.6	30.9	30.6	37.4	46.3	47.8	45.3	47.2	51.2	55.3	92.7
4-Jul	54.4	54.1	51.7	56.6	62.0	64.1	58.6	56.0	47.4	35.6	36.9	34.8	33.0	29.8	30.5	32.0	29.8	30.5	31.7	37.7	44.4	52.9	63.5	64.7	45.5	64.7
5-Jul	65.4	69.4	71.2	74.7	77.6	73.7	68.1	68.3	64.7	69.8	67.8	53.8	45.4	35.4	51.9	56.2	52.1	55.9	67.6	64.8	54.2	54.7	58.4	70.4	62.1	77.6
6-Jul	75.1	62.0	65.8	76.5	77.9	74.7	69.0	68.7	64.0	60.4	53.4	50.5	50.1	47.6	48.4	50.3	53.7	52.0	52.4	54.0	50.8	57.6	62.0	59.4	59.8	77.9
7-Jul	65.3	67.5	69.3	74.4	81.9	86.0	77.0	58.5	50.3	55.3	47.3	45.7	50.6	44.3	41.8	49.3	45.2	50.9	57.0	62.0	64.7	63.8	64.2	70.4	60.1	86.0
8-Jul	71.4	68.4	69.8	64.9	66.5	71.3	68.3	58.9	52.7	42.2	35.0	35.1	31.4	30.3	30.7	41.2	42.2	39.6	42.3	44.8	54.8	64.7	62.3	68.3	52.4	71.4
9-Jul	76.4	69.2	71.7	66.5	66.0	65.6	57.7	55.4	57.3	53.0	49.7	50.3	46.1	52.1	45.3	43.2	42.2	43.1	45.8	44.8	45.6	47.0	50.1	55.9	54.2	76.4
10-Jul	56.7	58.4	60.9	63.5	63.8	63.5	62.7	59.2	53.8	49.5	48.3	49.6	47.4	48.5	51.1	53.9	53.8	52.9	55.5	56.4	63.0	70.0	71.5	66.6	57.5	71.5
11-Jul	54.8	60.7	62.9	66.4	66.4	63.4	59.4	61.6	64.2	62.6	62.6	50.7	47.5	42.0	44.2	41.5	43.2	43.0	40.1	35.6	36.0	39.3	47.3	51.0	51.9	66.4
12-Jul	58.3	60.4	62.5	64.2	66.4	67.7	60.0	70.5	72.1	63.0	43.9	43.0	38.2	38.8	38.0	39.3	42.3	43.2	37.0	38.2	38.7	40.6	44.7	48.3	50.8	72.1
13-Jul	50.0	55.8	59.8	63.3	65.2	60.4	54.1	47.1	43.1	41.6	37.2	34.5	31.4	30.0	22.8	22.0	22.3	24.7	44.0	63.1	71.9	72.2	54.5	54.8	46.9	72.2
14-Jul	64.4	70.6	67.0	66.2	67.0	66.1	64.2	60.5	57.1	58.4	60.3	59.2	62.5	62.5	60.6	55.3	55.1	54.7	56.4	58.3	60.7	64.6	67.6	72.0	62.1	72.0
15-Jul	75.4	75.0	75.9	75.8	76.2	75.7	73.9	72.6	82.3	78.2	76.4	73.6	72.0	71.2	65.2	64.8	63.9	61.0	59.2	56.7	50.9	51.5	65.4	77.6	69.6	82.3
16-Jul	81.9	76.6	74.9	77.2	77.7	78.7	77.3	74.9	70.7	64.4	54.9	54.7	55.4	50.9	49.9	49.0	45.6	46.8	49.3	52.5	63.5	59.7	56.0	60.5	62.6	81.9
17-Jul	64.5	66.7	67.3	67.5	70.7	73.8	72.1	68.1	66.0	59.6	49.2	52.2	51.8	49.6	51.4	53.7	56.8	58.8	62.8	62.0	60.3	62.6	63.2	62.5	61.4	73.8
18-Jul	64.8	71.8	72.4	72.6	80.7	82.1	77.3	74.4	70.1	67.5	63.7	66.4	67.4	68.7	70.1	68.9	63.4	50.9	50.8	53.3	51.4	51.2	51.4	56.6	65.3	82.1
19-Jul	63.1	62.3	59.1	56.1	57.3	61.1	74.0	71.0	69.4	68.8	70.5	69.4	63.4	63.9	65.3	70.7	68.6	59.6	56.8	63.2	68.6	74.5	77.3	80.6	66.4	80.6
20-Jul	83.0	85.0	85.1	94.4	OR	OR	88.2	71.7	65.8	62.7	60.6	55.1	49.6	46.2	43.6	45.8	53.1	60.0	70.3	73.1	77.2	78.2	82.4	82.0	68.8	94.4
21-Jul	76.1	82.5	91.4	91.1	OR	OR	OR	87.0	74.0	66.9	63.7	59.7	51.3	47.4	47.4	46.1	44.8	50.7	53.5	57.6	57.5	56.0	60.8	66.8	63.5	91.4
22-Jul	68.2	66.5	70.1	81.8	84.9	82.1	81.0	77.7	73.1	69.1	63.3	59.7	56.3	52.6	56.2	52.5	42.4	44.1	41.7	41.5	50.3	61.2	64.3	60.7	62.5	84.9
23-Jul	53.2	55.2	59.4	62.2	66.7	70.0	67.7	63.0	60.9	60.8	58.3	53.3	55.7	52.3	55.1	57.7	56.7	57.0	52.7	59.7	47.9	45.5	46.8	52.4	57.1	70.0
24-Jul	55.2	61.4	62.4	77.4	90.1	94.3	83.1	86.4	84.5	81.9	80.4	75.8	73.4	76.3	77.1	77.8	71.5	54.5	53.0	52.0	52.9	53.2	52.4	55.6	70.1	94.3
25-Jul	61.0	66.4	68.2	67.3	70.7	73.5	76.0	74.7	73.7	76.4	75.9	75.1	71.3	71.6	73.3	84.8	80.9	79.6	76.3	64.8	62.5	66.5	75.5	72.7	72.4	84.8
26-Jul	75.6	87.3	87.4	87.7	89.0	90.4	91.0	95.6	95.4	91.9	93.9	90.0	89.6	87.1	80.3	77.6	76.3	74.4	70.0	70.2	69.3	67.2	68.3	71.5	82.4	95.6
27-Jul	72.9	77.7	84.1	87.7	92.3	92.1	86.9	77.6	66.8	59.0	63.1	60.7	55.6	51.6	50.7	52.8	48.9	47.2	44.6	46.3	50.9	63.0	71.9	68.3	65.5	92.3
28-Jul	72.5	82.4	85.3	90.7	87.2	85.6	87.8	82.1	73.4	68.8	65.7	63.1	59.3	53.0	46.2	37.9	37.3	40.9	46.4	51.4	56.6	60.0	67.4	66.5	65.3	90.7
29-Jul	66.7	67.4	68.9	74.5	81.0	75.7	70.3	60.1	55.8	53.0	51.1	44.0	38.3	34.8	34.8	33.2	32.6	32.7	37.3	44.7	51.5	55.9	62.2	65.0	53.8	81.0
30-Jul	66.3	66.9	68.7	72.7	76.9	74.0	68.3	62.5	57.1	51.5	48.1	45.2	40.4	38.2	40.4	48.8	50.1	54.9	59.5	50.1	58.0	60.9	64.5	71.0	58.1	76.9
31-Jul	69.7	68.5	71.4	74.4	76.8	82.2	75.7	72.6	76.2	84.6	87.7	94.7	94.5	94.2	94.6	95.6	98.3	98.6	99.4	99.1	97.7	97.0	96.6	98.4	87.4	99.4
																								Diurnal Average		
																								Diurnal Maximum		
OR - Out of Range																										



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Fort Chipewyan - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Fort Chipewyan - July 2023**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	58	7.98	7.98
40 - 60	270	37.14	45.12
60 - 80	318	43.74	88.86
80 - 100	81	11.14	100.00

Total Number of Valid Hours: 727

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

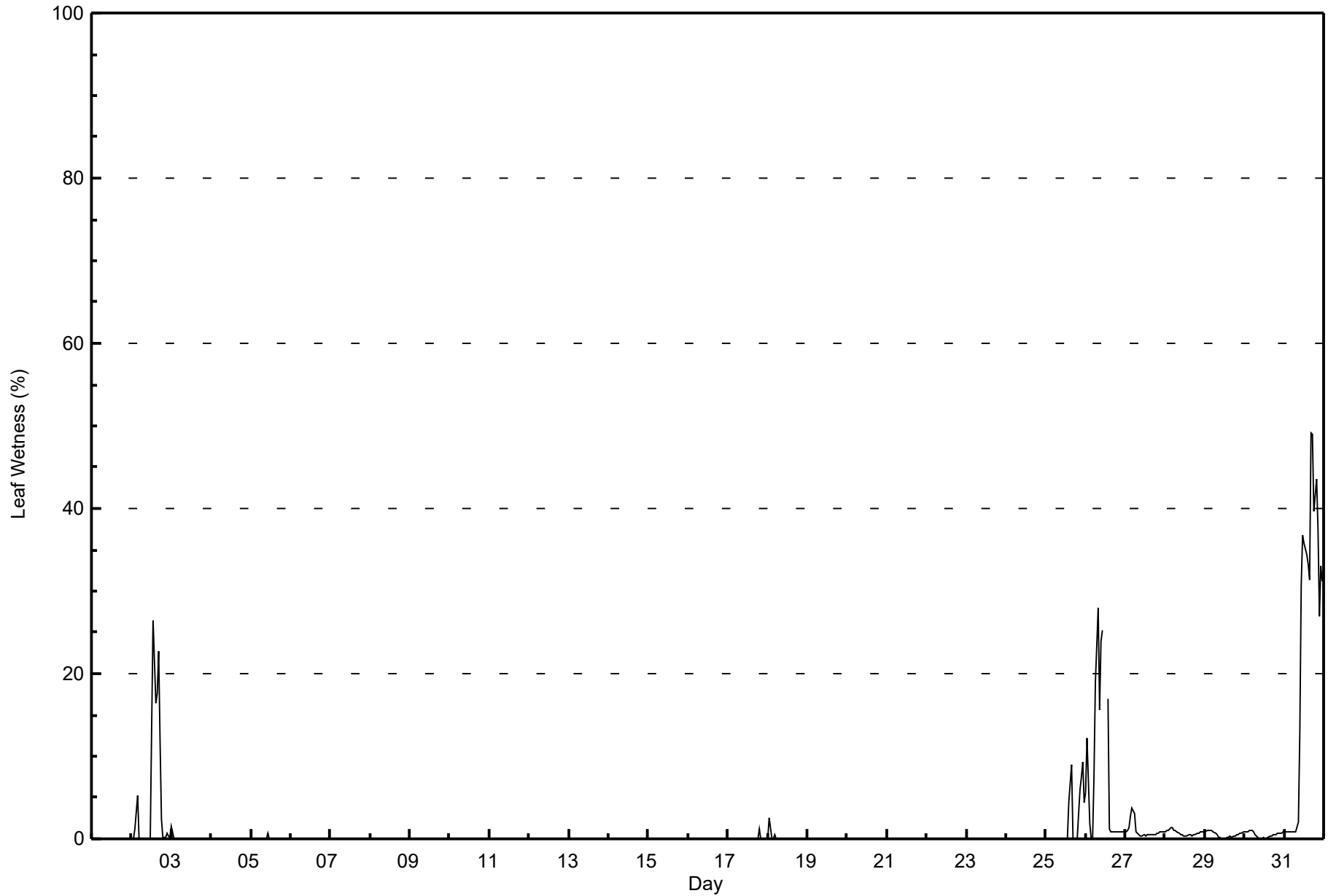
Leaf Wetness (LW) - %
Fort Chipewyan - July 2023

Maximum Value: 49.2 % on Jul 31 17:00																								Hours in Service: 744										
Maximum Daily Average: 22.3 % on Jul 31																								Hours of Data: 742										
Minimum Value: 0.0 % on Jul 1 01:00																								Hours of Missing Data: 2										
Minimum Daily Average: 0.0 % on Jul 1																								Hours of Calibration: 0										
Maximum Diurnal Average: 2.5 % at hour 14																								Percent Operational Time: 99.7										
Minimum Diurnal Average: 0.3 % at hour 3																																		
Monthly Average: 1.25 %																																		
Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.9 P ₉₉ = 33.9																																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24										
1-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	1.2	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.6	26.4	16.4	17.6	22.7	11.9	2.3	0.2	0.1	0.6	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	26.4
3-Jul	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.6		
4-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	
6-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	2.5	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.5	
19-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	9.0	0.1	0.0	0.0	0.0	0.0	6.0	7.4	9.3	4.3	0.0	0.0	0.0	0.0	0.0	1.7	9.3	
26-Jul	5.6	12.1	1.9	0.0	0.0	7.6	19.1	28.0	15.6	23.9	25.2	M	M	16.9	1.3	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	7.5	28.0	
27-Jul	0.9	1.0	1.3	2.7	3.8	3.1	0.9	0.7	0.5	0.3	0.4	0.4	0.4	0.4	0.5	0.6	0.5	0.5	0.6	0.6	0.7	0.8	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.8		
28-Jul	0.9	1.0	1.0	1.4	1.4	1.0	1.0	0.9	0.7	0.5	0.5	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.6	0.7	0.8	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.4		
29-Jul	0.9	1.0	1.0	1.0	1.0	0.9	0.7	0.5	0.2	0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.3	0.3	0.3	0.5	0.6	0.7	0.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.0		
30-Jul	0.9	0.9	0.9	1.0	1.0	0.8	0.6	0.4	0.2	0.0	0.0	0.1	0.0	0.0	0.2	0.4	0.4	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.0		
31-Jul	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	2.1	12.8	30.8	36.7	35.8	34.5	33.2	31.4	49.2	48.9	39.7	43.6	37.4	26.9	33.1	31.2	0.0	0.0	0.0	0.0	0.0	0.0	22.3	49.2		
																								Diurnal Average										
																								Diurnal Maximum										
M - Maintenance																																		



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (LW) - %
Fort Chipewyan - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (LW) - %
Fort Chipewyan - July 2023

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	600	80.86	80.86
0.4 - 0.5	25	3.37	84.23
0.6 - 0.7	20	2.70	86.93
0.8 - 1.4	52	7.01	93.94
1.5 - 10	17	2.29	96.23
> 10	28	3.77	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

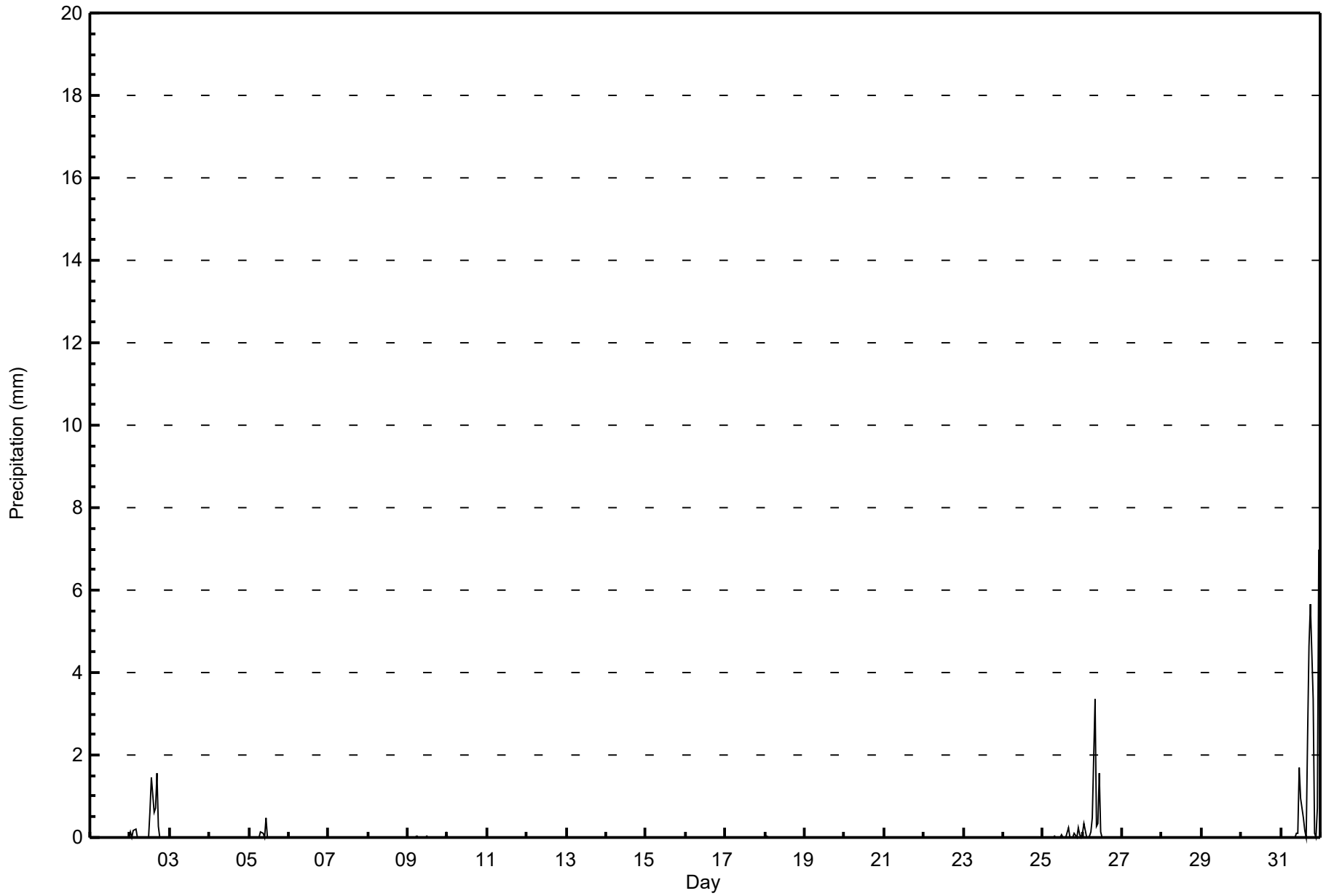
**Precipitation (PC) - mm
Fort Chipewyan - July 2023**

Maximum Value: 7.0 mm on Aug 1 00:00		Maximum Daily Total: 27.4 mm on Jul 31		Hours in Service: 744																								
Minimum Value: 0.0 mm on Jul 1 01:00		Minimum Daily Total: 0.0 mm on Jul 1		Hours of Data: 744																								
Maximum Diurnal Total: 7.1 mm at hour 24		Minimum Diurnal Total: 0.1 mm at hour 5		Hours of Missing Data: 0																								
Monthly Total: 41.62 mm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 1.6		Hours of Calibration: 0																								
				Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.2	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.5	0.6	0.7	1.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	1.6
3-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	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	0.7	0.5	
6-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.1	
10-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	
19-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.2	0.1	0.0	0.0	0.8	0.3	
26-Jul	0.1	0.3	0.0	0.0	0.1	0.1	0.5	3.4	0.3	0.4	1.6	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	6.8	3.4		
27-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	1.7	0.9	0.5	0.2	0.0	2.4	4.6	5.7	3.4	0.1	0.0	0.7	7.0	27.4	7.0			
																								Diurnal Average				
																								Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Fort Chipewyan - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Precipitation (PC) - mm
Fort Chipewyan - July 2023**

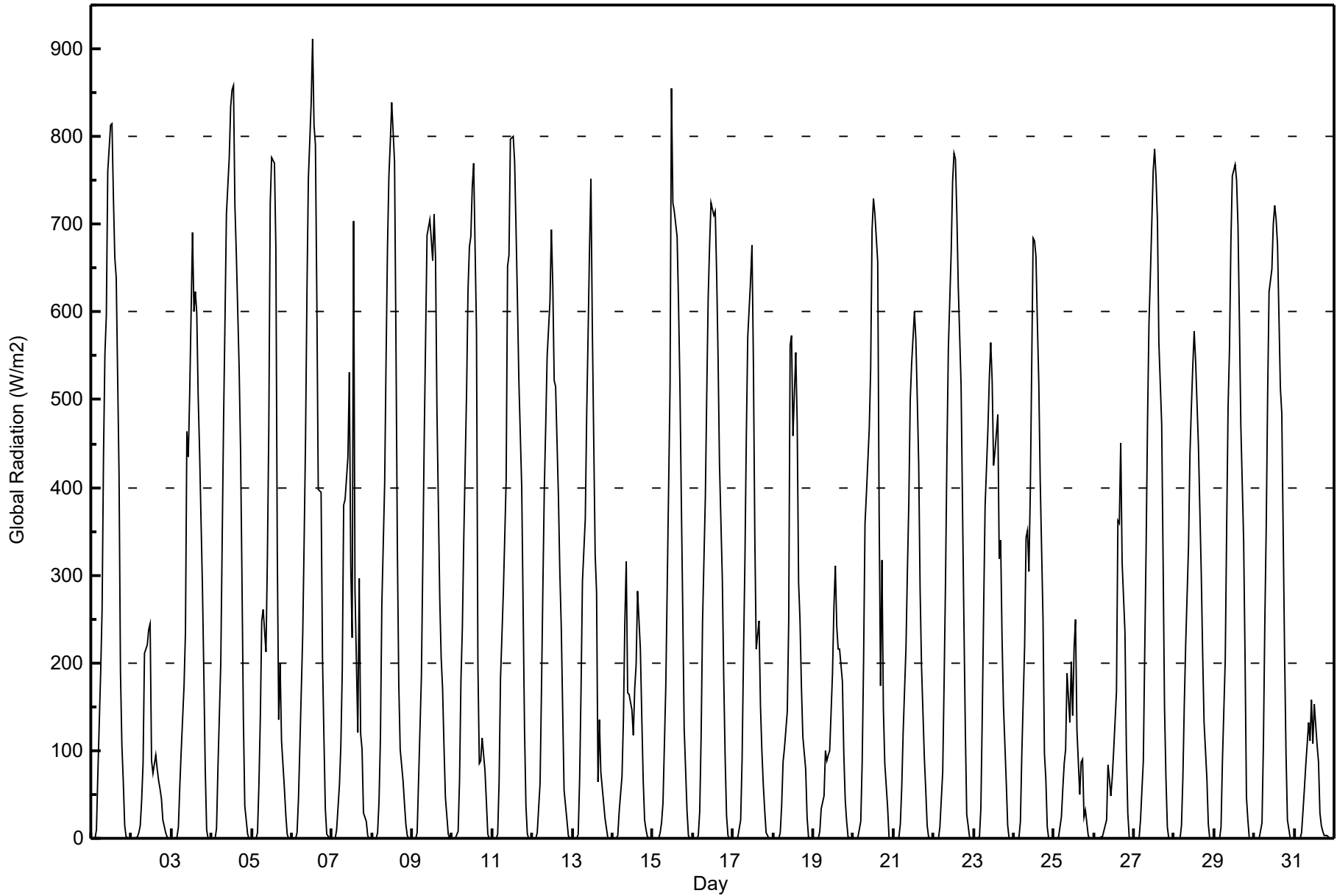
Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	726	97.58	97.58
0.4 - 0.5	3	0.40	97.98
0.6 - 0.7	4	0.54	98.52
0.8 - 1.4	1	0.13	98.66
1.5 - 10	9	1.21	99.87
> 10	0	0.00	99.87

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 911.0 W/m2 on Jul 6 13:00 Maximum Daily Average: 357.4 W/m2 on Jul 4																								Hours in Service:	744	
Minimum Value: 0.0 W/m2 on Jul 1 01:00 Minimum Daily Average: 45.4 W/m2 on Jul 31																								Hours of Data:	744	
Maximum Diurnal Average: 584.0 W/m2 at hour 12 Minimum Diurnal Average: 0.0 W/m2 at hour 2																								Hours of Missing Data:	0	
Monthly Average: 223.52 W/m2 Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 1.5 Median = 104.0 Q ₃ = 401.3 P ₉₀ = 664.3 P ₉₉ = 814.6																								Hours of Calibration:	0	
																								Percent Operational Time:	100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.0	0.0	0.2	9.2	74.3	189.8	260.6	436.5	551.9	595.6	759.6	813.1	815.4	731.6	661.8	640.0	414.3	190.4	106.5	64.3	13.8	1.4	0.0	0.0	305.4	815.4
2-Jul	0.0	0.0	0.0	0.8	6.7	14.1	43.5	85.6	211.5	220.5	237.8	244.8	88.9	74.7	94.5	78.5	65.9	56.1	45.0	21.7	7.0	1.5	0.0	0.0	66.6	244.8
3-Jul	0.0	0.0	0.0	2.2	12.2	59.1	99.9	174.3	235.7	464.0	435.0	507.2	691.3	600.0	623.9	599.6	504.0	441.6	288.7	189.0	78.7	10.4	0.2	0.1	250.7	691.3
4-Jul	0.2	0.0	0.4	10.6	80.2	200.2	340.2	477.5	592.2	712.3	776.1	834.5	854.2	858.8	720.8	666.1	536.1	443.4	295.8	136.3	36.7	4.5	0.2	0.0	357.4	858.8
5-Jul	0.0	0.0	0.1	5.9	61.8	138.8	248.2	260.9	211.9	320.9	468.3	722.8	776.0	770.3	673.6	327.0	135.6	199.2	111.3	58.1	27.9	5.4	0.1	0.0	230.2	776.0
6-Jul	0.0	0.0	0.2	6.2	45.4	107.1	231.1	338.4	455.6	623.2	752.4	838.7	911.0	813.5	790.5	613.9	397.1	394.0	205.3	115.3	34.1	4.6	0.1	0.0	319.9	911.0
7-Jul	0.0	0.0	0.2	9.5	60.5	106.7	191.5	380.8	386.7	434.6	530.9	311.0	228.8	704.2	284.1	121.1	295.5	118.6	100.7	28.5	19.8	3.6	0.0	0.0	179.9	704.2
8-Jul	0.0	0.0	0.0	6.7	42.2	114.0	266.4	403.6	546.4	673.8	754.8	794.1	838.6	771.4	566.3	329.7	175.9	101.5	65.3	40.0	15.7	2.4	0.0	0.0	271.2	838.6
9-Jul	0.0	0.0	0.1	7.2	65.6	182.8	315.0	455.7	571.5	686.8	705.2	682.7	658.9	711.1	662.0	489.4	274.5	206.5	170.6	105.1	47.4	5.1	0.1	0.0	291.8	711.1
10-Jul	0.0	0.0	0.1	7.6	65.7	180.7	240.4	340.9	510.3	625.5	674.9	685.8	742.4	769.7	577.8	198.3	84.8	89.0	114.2	77.3	41.1	5.1	0.1	0.0	251.3	769.7
11-Jul	0.0	0.0	0.0	4.6	63.9	181.3	280.6	342.9	408.3	652.5	664.4	796.9	799.7	770.7	693.6	612.1	521.8	401.7	263.4	123.5	37.0	5.2	0.1	0.0	317.7	799.7
12-Jul	0.0	0.0	0.1	5.9	62.2	169.1	287.1	398.2	470.5	548.8	611.6	694.4	630.8	522.4	514.8	389.2	303.0	241.1	146.8	54.2	20.4	2.6	0.0	0.0	253.1	694.4
13-Jul	0.0	0.0	0.0	4.7	68.3	169.2	292.8	364.6	482.3	575.3	672.0	752.0	581.8	322.9	280.2	63.8	134.9	76.1	39.7	22.6	10.6	0.5	0.0	0.0	204.8	752.0
14-Jul	0.0	0.0	0.0	2.8	30.2	71.2	135.5	246.8	315.3	166.0	164.8	145.8	118.2	171.4	198.3	281.4	215.8	138.3	65.6	21.4	10.3	0.9	0.0	0.0	104.2	315.3
15-Jul	0.0	0.0	0.0	0.5	6.1	17.0	39.5	106.5	173.3	401.2	514.8	855.8	724.8	715.1	685.4	609.9	514.9	383.5	258.6	125.4	31.8	3.3	0.0	0.0	257.0	855.8
16-Jul	0.0	0.0	0.0	2.8	31.3	115.2	245.6	389.6	508.7	616.6	676.6	725.0	710.7	715.2	643.2	546.9	426.2	297.1	184.1	91.3	26.2	2.5	0.0	0.0	289.8	725.0
17-Jul	0.0	0.0	0.0	2.2	21.7	90.7	209.4	317.2	459.4	572.0	635.9	676.2	542.8	343.9	215.9	247.4	151.4	99.3	61.9	32.0	5.8	0.2	0.0	0.0	195.2	676.2
18-Jul	0.0	0.0	0.0	0.7	6.8	37.8	86.8	102.8	144.3	247.5	561.4	572.9	459.2	553.7	473.9	291.1	248.3	173.0	116.4	78.7	24.7	1.3	0.0	0.0	174.2	572.9
19-Jul	0.0	0.0	0.0	0.5	8.0	34.0	48.3	99.8	88.3	95.2	100.6	189.0	264.0	310.9	241.4	216.2	215.3	178.3	96.3	43.8	19.8	1.8	0.0	0.0	93.8	310.9
20-Jul	0.0	0.0	0.0	1.2	19.6	87.2	202.8	359.3	392.1	466.7	535.3	694.0	729.2	712.1	657.5	372.1	174.4	316.7	147.4	85.1	35.4	1.8	0.0	0.0	249.6	729.2
21-Jul	0.0	0.0	0.0	1.0	16.8	58.3	121.1	216.6	304.1	380.9	499.9	541.1	601.0	567.7	501.5	426.9	284.1	197.0	92.2	55.4	14.2	0.8	0.0	0.0	203.4	601.0
22-Jul	0.0	0.0	0.0	0.8	13.4	75.9	178.9	294.8	441.1	558.1	668.8	749.3	781.1	774.9	712.4	629.4	516.2	380.7	248.7	124.1	28.1	1.5	0.0	0.0	299.1	781.1
23-Jul	0.0	0.0	0.0	1.7	34.5	140.3	263.4	378.3	467.1	525.7	565.5	521.3	425.1	441.4	483.7	318.5	339.0	229.2	151.1	62.3	15.0	0.8	0.0	0.0	223.5	565.5
24-Jul	0.0	0.0	0.0	1.3	20.1	97.4	220.5	342.3	351.3	304.0	393.9	684.1	680.7	664.0	587.3	519.4	409.6	249.5	96.6	68.1	13.3	0.7	0.0	0.0	237.7	684.1
25-Jul	0.0	0.0	0.0	1.6	24.0	56.5	85.4	100.9	187.9	132.3	200.8	139.9	217.6	250.0	124.2	49.9	87.2	89.4	24.6	32.1	3.7	0.6	0.1	0.0	75.4	250.0
26-Jul	0.0	0.0	0.0	0.1	1.3	2.1	7.8	21.6	83.6	68.1	49.1	69.9	100.3	168.2	362.9	359.2	450.3	314.4	235.5	101.1	28.8	0.9	0.0	0.0	101.0	450.3
27-Jul	0.0	0.0	0.0	0.8	20.2	88.6	214.6	334.5	478.5	588.5	642.5	761.7	786.0	753.2	703.6	565.5	472.1	314.8	149.0	69.7	13.7	0.5	0.0	0.0	289.9	786.0
28-Jul	0.0	0.0	0.0	0.5	14.6	70.0	152.9	222.4	334.1	438.5	490.6	537.5	578.3	544.3	447.3	375.6	302.1	209.4	132.2	67.3	16.4	0.4	0.0	0.0	205.6	578.3
29-Jul	0.0	0.0	0.0	0.3	13.3	88.9	205.2	355.5	492.6	558.0	681.1	755.6	767.9	751.1	698.7	591.2	472.2	340.4	205.5	46.1	20.5	0.3	0.0	0.0	293.5	767.9
30-Jul	0.0	0.0	0.0	0.3	18.0	107.6	246.5	356.4	506.4	623.5	648.7	700.0	721.2	705.7	675.6	513.0	484.8	347.8	209.8	96.0	20.3	0.6	0.0	0.0	290.9	721.2
31-Jul	0.0	0.0	0.0	0.1	7.0	30.2	55.7	83.6	132.0	110.4	157.7	108.6	153.4	106.9	87.1	29.0	14.3	7.3	3.3	3.1	1.0	0.0	0.0	0.0	45.4	157.7
																								Diurnal Average		
																								Diurnal Maximum		





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Fort Chipewyan - July 2023

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	258	34.68	34.68
21 - 100	108	14.52	49.19
101 - 300	141	18.95	68.15
301 - 600	139	18.68	86.83
601 - 900	97	13.04	99.87
> 900	1	0.13	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 - July 2023

Maximum Speed: 46 km/h on Jul 26 03:00	Maximum Daily Speed Average: 32.1 km/h on Jul 26	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jul 2 10:00	Minimum Daily Speed Average: 1.2 km/h on Jul 5	Hours of Data: 742
Maximum Diurnal Speed Average: 8.3 km/h at hour 21	Minimum Diurnal Speed Average: 3.2 km/h at hour 10	Hours of Missing Data: 2
Monthly Average Velocity: 5.8 km/h 76.6 deg	Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 9 Median = 12 Q ₃ = 18 P ₉₀ = 26 P ₉₉ = 41	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	WSW6	SW8	SW8	W10	W11	W10	W11	W12	W11	WSW9	SSW11	SSW12	SSW9	S8	ESE11	E13	E10	WSW4	W12WNW13	NW7	NW9	NW14WNW12	W5.4	NW14		
2-Jul	WNW11	NNW13	NW7	SSW4	WNW8	W4	W10	W7	WSW8	NW1	NNW10	NNW7	NNW6	NE10	NNW10	NNW10	NNW11	NW10	NW11	NNW11	NNW10	NNW10	NNW12	NNW12	NW7.5	NNW13
3-Jul	N11	NNE15	NNE14	N12	NNW12	N12	N13	N13	N14	N17	NNE18	NNE20	N18	N16	N16	N16	N14	NNE15	ENE18	ENE19	ENE13	NE10	NNE9	NNW9	NNE13.2	NNE20
4-Jul	NNW9	N11	N9	NNE7	N8	N6	ENE3	SE4	SSE7	WSW8	WSW10	WSW13	WSW13	SW13	WSW15	WSW14	W13	WSW13	SW13	SW10	SW8	SW7	SW10	SW13	WSW6.1	WSW15
5-Jul	SW12	SW10	SW10	SW9	WSW9	WSW11	WSW12	W15	W11	W9	W11	W10	NW11	N9	E23	E15	ENE19	E14	E6	WSW2	ENE16	NE13	NE15	NE17	NNW1.2	E23
6-Jul	NE16	ENE20	NE15	NNE11	NNE10	NE11	ENE17	ENE15	E12	ESE10	ESE12	E15	E18	E17	E17	E22	E22	E20	E18	E14	ESE9	SSE4	S6	S11	E12.3	E22
7-Jul	S11	SW8	WSW7	W7	W6	WNW4	WNW4	SW6	SW11	SW14	SW15	WSW15	WSW10	W12	WSW11	SW7	WSW9	SW7	SSW7	SW8	SW10	WSW9	W10	WNW10	WSW8.2	WSW15
8-Jul	WNW9	WNW8	WNW9	WNW9	NW8	WNW5	W6	WNW5	WNW6	NW12	NNW11	NW11	WNW12	WNW15	WNW19	W15	W10	WNW9	WNW8	NW7	ENE19	ENE14	NE13	NE16	NW6.8	ENE19
9-Jul	ENE20	ENE24	ENE27	ENE29	ENE32	E36	E36	E31	ENE29	ENE28	ENE30	E33	ENE31	ENE30	ENE31	ENE30	ENE26	ENE25	ENE23	ENE25	E30	E31	E32	E39	ENE29.3	E39
10-Jul	ESE36	ESE32	ESE26	ESE26	ESE28	ESE25	ESE21	ESE24	ESE23	ESE21	ESE19	E25	E28	ENE29	ENE29	ENE24	NE19	NE20	NE18	NE19	NE19	ENE18	ENE17	E18	E21.2	ESE36
11-Jul	ESE16	ESE15	ESE14	E9	ENE10	E13	ESE14	E13	E17	E21	E22	E22	E24	E25	ENE24	ENE25	ENE24	ENE22	ENE23	NE16	NE12	NE13	NE10	NE12	E16.5	ENE25
12-Jul	NE15	ENE13	NE11	NE11	NE11	ENE9	E9	E12	E10	ESE6	S5	W11	WSW13	WSW13	W13	W12	W13	WNW9	NNW6	NW7	NNW8	NNW10	NNW9	NNW10	N3.1	NE15
13-Jul	NNW11	NNW11	NNW13	NNW13	NNW11	NNW12	NW10	NW11	NW13	NW16	NW20	NNW23	NNW21	NNW16	N15	N12	N10	NNW11	NE13	ENE24	ENE21	NE9	NNE11	N11	N11.7	ENE24
14-Jul	NNE11	NNE9	N9	N10	NNW7	N7	N7	N6	NNW8	NNW6	NW5	NNW6	N8	N7	NNW9	NNW10	N11	NNE10	NNE6	N5	NNW4	NW5	NNW6	NNW6	N7.0	N11
15-Jul	NNW7	NNW6	NNW6	NNW7	NNW6	N6	NE9	ENE12	ENE17	E13	E13	E27	E26	E24	E22	E23	E23	E21	ENE20	ENE15	NNE10	NE9	NE10	ENE12	ENE12.4	E27
16-Jul	ENE16	E20	E15	E15	ESE15	ESE11	ESE7	ESE11	ESE12	ESE13	SE16	SE18	ESE21	SE25	ESE26	ESE25	ESE25	SE21	SE17	SE15	ESE19	ESE25	SE27	SSE21	ESE17.5	SE27
17-Jul	SSE19	SSE19	SE19	SE21	ESE19	ESE18	ESE18	ESE18	ESE20	ESE15	SE23	ESE24	ESE23	SE20	S27	S21	SSW20	S18	S14	ESE17	ESE22	E19	ENE15	ENE11	SE16.0	S27
18-Jul	ENE18	ENE19	E23	ENE17	ENE14	ENE18	E16	E10	E8	E8	E11	E18	E16	E15	E17	E15	E13	ENE15	ENE13	ENE12	NE11	NE8	NE6	NNW6	ENE13.0	E23
19-Jul	NW8	N8	NNE4	NNE7	NE3	N2	NW7	NNW4	NW3	NNW3	NNW4	NNW6	E3	SE5	ESE5	ESE5	SE5	N3	NW5	NW4	NNW5	NNW3	NW5	WNW3	N2.7	N8
20-Jul	NNW5	NNW8	NNW8	NW5	WNW4	SW4	W5	W6	W8	W9	W7	WNW9	WSW10	WSW10	W10	NW7	NNE10	ENE9	E7	E9	E8	SE4	S2	SW5	WNW2.8	WSW10
21-Jul	WSW8	W8	W9	W9	WNW9	WNW9	WNW8	WNW6	WNW10	W12	W11	W11	W12	W12	W12	W13	WSW12	WSW10	W9	WNW7	NNW6	NNW7	NNW8	NNW10	W8.6	W13
22-Jul	N10	N8	NNE7	NE7	ENE19	ENE24	ENE24	ENE24	ENE26	ENE25	ENE25	E26	ENE25	ENE24	ENE29	ENE31	ENE28	ENE25	ENE26	NE19	NE17	NE15	ENE16	E26	ENE20.2	ENE31
23-Jul	ESE29	ESE24	E21	ESE21	ESE21	ESE17	ESE16	ESE14	E13	E14	E18	E17	E18	E17	E17	E20	E17	E17	E14	E13	NE9	ENE8	E8	ENE9	E15.9	ESE29
24-Jul	E7	E4	ENE5	SE4	ESE5	E5	S2	ESE8	E7	E9	E6	E11	E14	E15	E16	E19	E17	E18	ENE20	ENE19	ENE22	ENE21	ENE25	ENE28	E12.3	ENE28
25-Jul	ENE27	ENE26	ENE24	ENE30	ENE30	ENE34	E33	E38	ENE35	ENE27	ENE29	E33	M	UO	ESE21	ENE11	E20	E26	ENE19	E36	ESE36	ESE34	E34	E34	E28.2	ENE38
26-Jul	ESE26	E43	E46	E41	E42	E44	ESE41	ESE31	ESE21	E18	E30	E43	ENE41	ENE40	E42	E41	E37	E34	E28	E21	E25	ESE20	ESE17	ESE15	E32.1	ESE46
27-Jul	SE10	SE6	SSW3	WNW7	NNW6	NNW11	NNW11	NNW10	NNW11	NNW10	E12	E16	E12	E15	E15	E11	ESE8	ESE8	SE6	SW3	SW6	W7	W7	W11	ENE2.4	E16
28-Jul	W11	WNW11	WNW9	WNW9	WNW9	WNW9	WNW11	WNW11	WNW10	W9	W12	WSW13	W13	W14	W14	W13	W11	W9	W6	WSW8	SW8	SW9	WSW8	SW8	W9.7	W14
29-Jul	WSW8	WSW8	WSW8	WSW10	W11	W11	W9	W13	WSW12	SW15	SW17	WSW16	WSW14	W15	W15	W13	W11	WSW6	S4	ESE2	SSE3	SSW10	SSW14	SW14	WSW9.8	SW17
30-Jul	SW10	WSW7	WSW6	SW8	SW10	SSW9	S8	S9	S8	SSW12	SSW15	S15	SSW14	SSW10	SSE8	E12	E18	E19	E20	ENE15	ENE15	ENE17	ENE18	ENE16	SE5.6	E20
31-Jul	E17	SSE14	SSE11	SE9	S13	SSW17	SW27	SW21	SSW18	SW13	WSW14	WSW10	W13	WNW14	WNW10	WNW8	WNW7	WSW11	WSW12	W14	WNW11	WNW9	WNW12	W13	WSW8.5	SW27

ENE5.4	ENE6.1	ENE5.4	ENE4.9	ENE5.1	ENE5.5	E4.7	E4.8	E4.3	E3.2	E4.2	E6.3	ENE5.4	E5.8	E6.9	ENE7.7	ENE7.4	ENE7.4	ENE6.9	ENE7.3	ENE8.3	ENE6.6	ENE6.0	ENE5.6	Diurnal Average
ESE36	ESE43	ESE46	E41	E42	E44	ESE41	ENE38	ENE35	ENE28	E30	E43	ENE41	ENE40	E42	E41	E37	E34	E28	E36	ESE36	ESE34	E34	E39	Diurnal Maximum

M - Maintenance UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



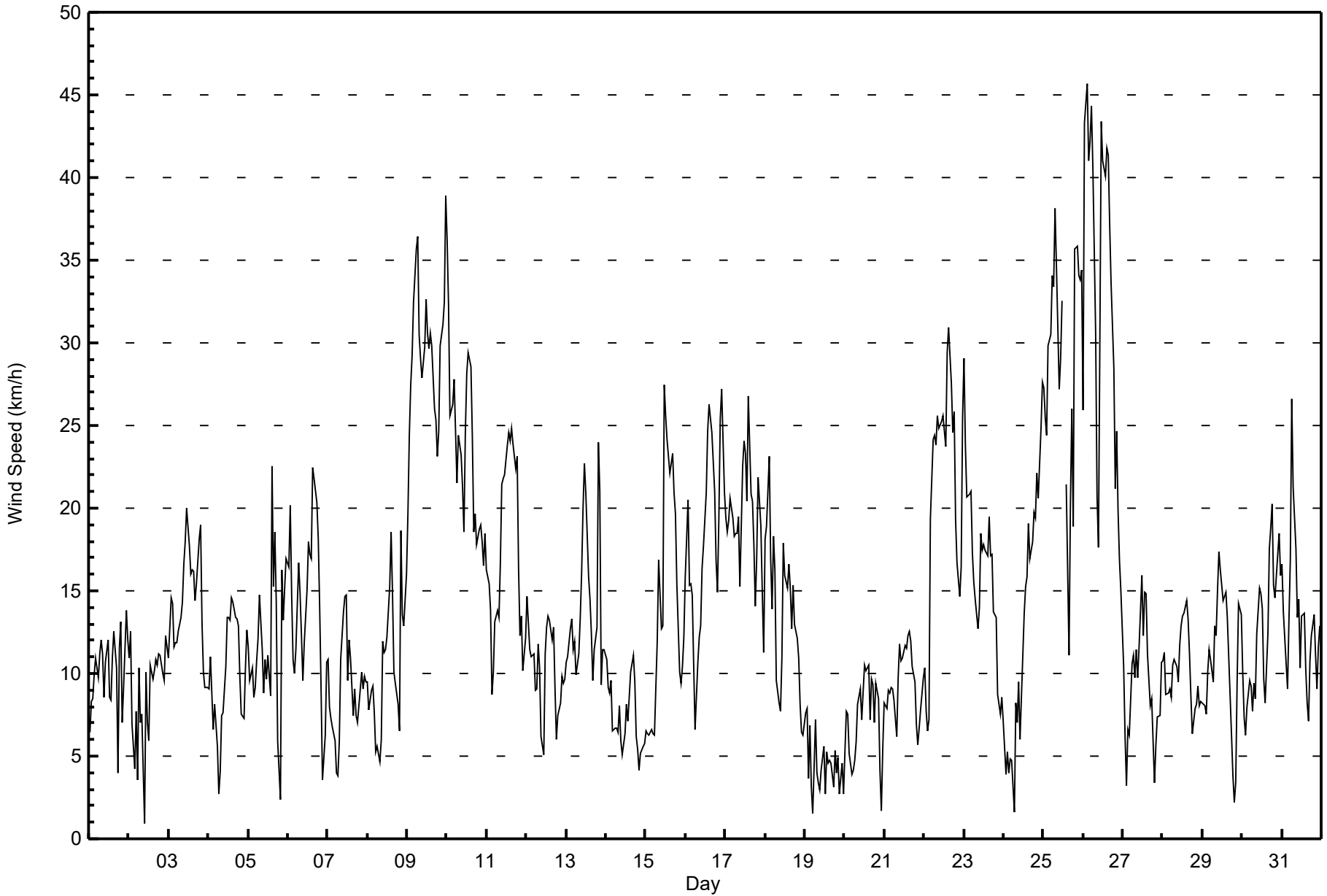
Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Fort Chipewyan - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Jul 26 11:00	Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7
Minimum Value: 1 km/h on Jul 19 17:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 7	

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

M - Maintenance UO - Unstable Operation





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Chipewyan - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	55	7.41	7.41
6 - 11	290	39.08	46.50
12 - 19	237	31.94	78.44
20 - 28	109	14.69	93.13
29 - 38	39	5.26	98.38
> 38	12	1.62	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Chipewyan - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	1	1	2	3	5	4	2	3	3	3	2	2	6	8	7	55
6 - 11	20	13	16	7	19	10	4	3	7	6	23	27	40	32	15	48	290
12 - 19	13	4	20	36	53	21	5	3	4	7	10	16	26	7	4	8	237
20 - 28	0	1	1	38	30	24	6	1	2	1	2	0	0	0	1	2	109
29 - 38	0	0	0	18	15	6	0	0	0	0	0	0	0	0	0	0	39
> 38	0	0	0	2	7	3	0	0	0	0	0	0	0	0	0	0	12
Totals	36	19	38	103	127	69	19	9	16	17	38	45	68	45	28	65	742

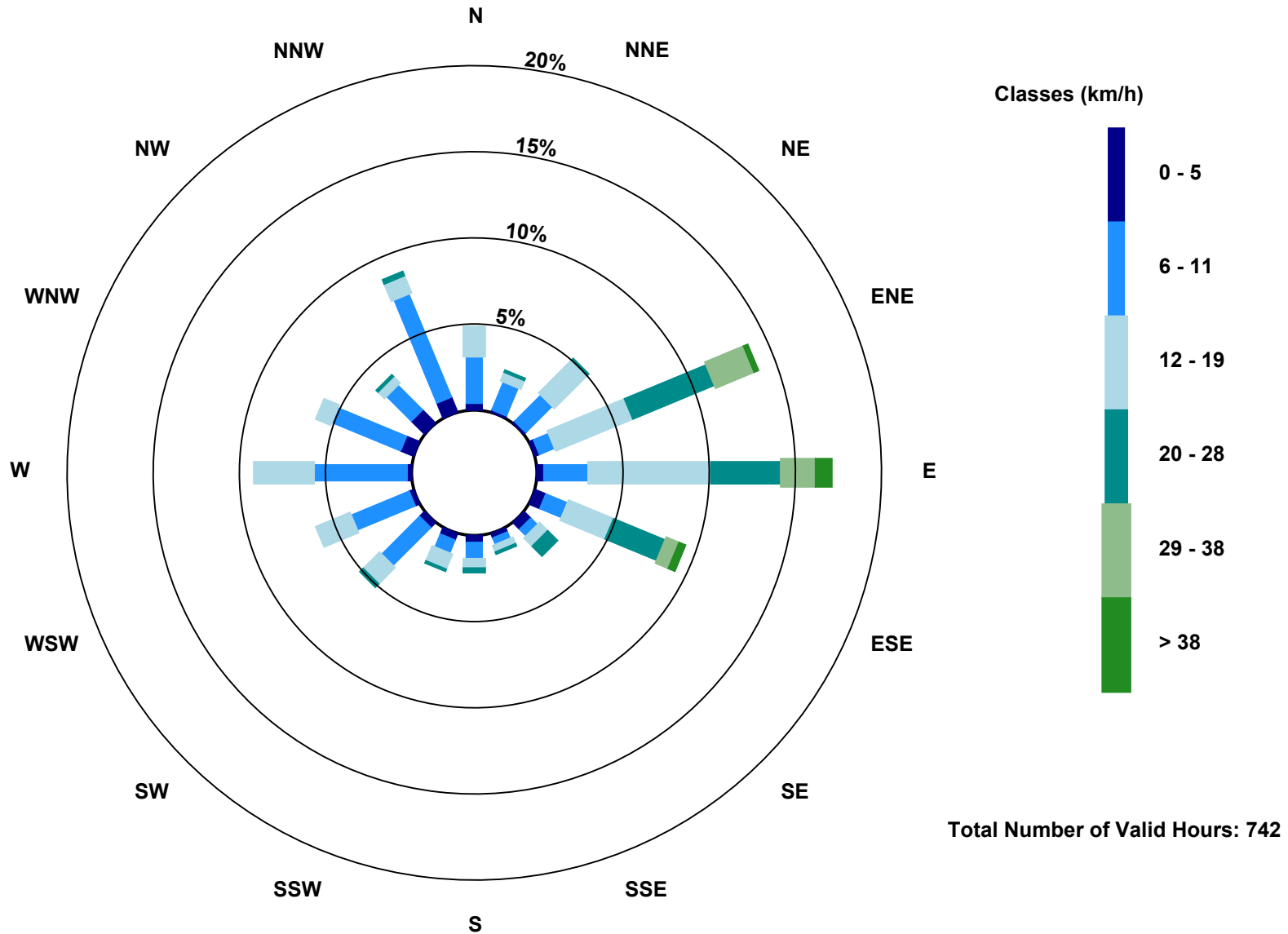
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Fort Chipewyan





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort Chipewyan - July 2023

Direction of Maximum Speed: 101 deg on Jul 26 03:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 94.7 deg on Jul 26	Hours of Data: 742
Direction of Minimum Speed: 321 deg on Jul 2 10:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 1.2 deg on Jul 5	Percent Operational Time: 99.7
Monthly Average Direction: 76.6 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	246	234	235	269	269	278	276	266	273	250	202	197	194	185	115	92	95	243	275	288	314	318	322	302	258.8
2-Jul	297	346	322	210	301	271	280	275	242	321	329	327	348	36	341	336	329	318	320	328	335	334	343	348	324.3
3-Jul	0	16	18	358	348	352	355	356	2	5	16	22	10	9	8	10	9	22	59	76	65	45	21	344	16.2
4-Jul	329	355	7	22	354	354	73	139	159	244	250	241	252	224	241	254	264	239	233	227	218	222	218	215	249.0
5-Jul	222	235	231	235	246	256	256	261	271	279	276	260	304	7	84	91	73	81	101	254	66	49	37	40	346.9
6-Jul	41	64	52	32	13	47	70	78	91	123	108	100	101	97	96	90	91	90	91	89	115	148	181	172	85.5
7-Jul	185	220	242	259	279	285	290	226	223	231	223	254	256	264	250	232	238	221	204	225	236	244	270	285	241.2
8-Jul	290	300	297	301	318	292	277	297	290	316	337	311	297	289	289	273	274	282	282	315	69	58	49	49	314.2
9-Jul	59	68	69	72	75	82	82	79	70	73	78	81	76	76	74	76	76	72	67	70	81	84	87	92	76.6
10-Jul	103	103	114	118	118	119	114	111	120	121	118	80	79	76	74	64	49	47	50	49	56	65	73	80	90.2
11-Jul	107	109	122	98	65	98	106	97	84	82	81	81	81	81	77	71	76	70	63	52	44	47	52	54	78.9
12-Jul	52	57	53	51	55	57	82	92	96	117	183	266	254	257	263	269	275	290	332	321	327	335	334	343	349.9
13-Jul	343	339	342	342	344	333	322	320	316	316	325	335	343	341	360	5	358	345	38	69	72	38	19	6	353.6
14-Jul	30	13	4	5	346	356	354	7	340	333	312	328	355	351	336	343	355	15	15	7	338	322	332	333	353.2
15-Jul	338	336	339	344	343	5	45	69	77	80	79	86	85	86	90	89	86	83	78	63	33	47	53	67	69.8
16-Jul	74	91	99	96	102	115	107	112	110	105	139	126	116	125	121	116	118	125	126	127	121	122	133	150	117.6
17-Jul	148	148	140	138	123	106	122	116	102	116	132	117	118	140	184	183	208	181	183	118	107	95	69	63	133.0
18-Jul	75	74	80	74	68	77	81	84	88	98	99	94	89	97	92	88	80	62	65	58	53	45	42	344	76.9
19-Jul	326	353	30	25	34	10	321	348	313	327	335	330	82	124	105	115	129	4	325	314	328	338	326	301	353.4
20-Jul	329	331	332	320	289	231	264	275	260	280	267	285	256	250	271	325	22	74	98	93	99	125	186	233	291.6
21-Jul	250	268	274	277	286	293	295	284	284	270	268	267	271	276	267	265	256	243	273	295	328	334	335	336	279.3
22-Jul	354	10	21	50	61	63	65	71	59	65	67	82	75	66	76	77	66	64	59	54	51	55	68	89	64.9
23-Jul	104	106	99	105	116	102	104	111	93	82	82	84	84	81	82	84	84	83	84	85	54	63	80	72	91.5
24-Jul	81	88	74	129	103	80	174	105	87	89	87	91	92	90	86	87	83	74	60	57	63	71	73	79.5	
25-Jul	72	71	66	75	74	74	79	79	74	77	74	84	M	UO	121	57	91	92	63	94	103	104	98	95	83.6
26-Jul	108	101	101	101	93	100	104	114	121	101	94	84	78	76	81	82	83	86	97	95	94	105	104	118	94.7
27-Jul	132	125	198	297	332	339	342	336	344	341	82	96	101	95	96	101	114	110	131	224	231	262	270	280	67.9
28-Jul	280	288	286	289	283	283	290	289	289	272	263	258	259	260	261	260	266	266	259	243	229	234	242	234	266.6
29-Jul	240	243	245	258	263	266	264	265	250	235	227	237	257	266	273	277	271	257	191	103	159	211	212	217	247.0
30-Jul	232	244	240	221	219	213	183	178	169	203	199	175	202	208	157	91	83	83	80	75	64	63	73	76	134.6
31-Jul	92	152	163	143	174	201	219	219	207	232	237	246	269	282	294	300	293	249	253	276	294	286	294	279	237.0

76.8 75.5 77.0 75.3 69.3 76.2 81.6 90.5 85.0 82.1 96.1 86.7 78.4 80.1 86.0 75.5 73.6 76.3 72.8 69.6 71.3 69.2 64.0 67.9
 Diurnal Average

M - Maintenance UO - Unstable Operation
 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 - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 96 deg on Jul 2 10:00	Hours of Data: 742
Minimum Value: 4 deg on Jul 23 18:00	Hours of Missing Data: 2
Percentiles: P ₁ = 4 P ₁₀ = 6 Q ₁ = 10 Median = 14 Q ₃ = 21 P ₉₀ = 30 P ₉₉ = 66	Hours of Calibration: 0
	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	35	17	17	13	14	16	17	17	21	32	19	15	25	32	28	9	12	47	21	18	23	19	30	19	47
2-Jul	24	23	51	66	53	71	15	41	24	96	26	34	48	30	26	26	22	19	20	20	20	21	21	22	96
3-Jul	23	23	21	24	21	24	24	25	24	25	24	22	25	25	25	26	28	26	29	9	13	6	12	15	29
4-Jul	14	15	18	18	10	12	42	25	31	41	34	32	27	30	24	23	22	18	14	9	9	11	10	11	42
5-Jul	15	14	9	12	13	13	16	16	19	19	16	25	31	55	7	10	17	13	44	55	36	14	10	10	55
6-Jul	15	12	28	17	20	23	12	10	10	14	10	6	6	7	8	6	5	6	6	9	11	34	25	32	34
7-Jul	22	14	16	10	14	23	26	33	17	13	15	21	19	18	19	14	19	14	14	18	11	15	14	13	33
8-Jul	15	14	15	16	11	39	20	37	45	25	36	30	33	28	20	16	15	13	14	25	16	10	8	9	45
9-Jul	12	14	13	13	12	8	7	9	13	14	11	7	12	13	14	14	12	11	14	13	7	6	6	6	14
10-Jul	5	6	6	6	5	5	6	7	9	8	11	7	8	12	13	17	13	12	12	11	13	15	16	7	17
11-Jul	9	7	7	22	20	15	11	8	5	5	5	6	6	8	11	13	14	15	14	11	9	8	9	9	22
12-Jul	7	5	7	7	9	10	13	5	7	13	46	24	21	20	18	19	17	25	32	19	15	19	17	16	46
13-Jul	15	14	15	14	17	20	21	24	24	22	25	25	26	26	26	23	25	25	46	14	13	22	19	25	46
14-Jul	18	21	23	25	23	23	26	43	34	44	66	38	31	36	30	29	25	24	24	21	20	14	13	13	66
15-Jul	13	14	17	16	14	22	16	16	12	22	59	5	5	5	4	5	4	8	9	17	14	9	9	15	59
16-Jul	13	10	6	6	8	20	18	15	8	16	14	20	18	9	6	6	6	5	7	8	4	4	9	8	20
17-Jul	7	7	6	7	8	8	13	8	7	28	11	7	7	22	9	10	10	14	10	11	6	10	15	15	28
18-Jul	12	12	11	14	14	11	6	13	7	8	6	4	6	5	4	4	12	14	16	12	22	16	16	14	22
19-Jul	14	27	38	13	51	94	17	69	26	40	22	22	66	15	13	20	19	75	29	25	11	62	31	66	94
20-Jul	23	16	15	18	26	23	20	22	28	22	42	34	37	34	33	48	21	37	21	8	10	25	67	23	67
21-Jul	12	12	11	9	11	11	14	19	17	18	23	21	23	18	20	19	19	16	15	14	17	12	14	17	23
22-Jul	16	20	20	16	13	14	16	15	13	14	14	9	14	14	11	12	14	14	13	11	10	9	13	9	20
23-Jul	5	6	7	7	7	8	8	8	9	6	5	4	5	5	5	5	7	4	5	13	9	14	12	12	14
24-Jul	13	25	16	23	25	9	65	12	11	9	19	5	6	6	5	5	5	5	12	13	9	14	15	13	65
25-Jul	13	14	15	14	13	12	9	9	13	11	12	8	M	UO	20	17	24	10	10	13	6	6	7	8	24
26-Jul	9	5	5	5	6	6	5	11	10	8	9	6	6	8	7	5	6	7	9	7	10	5	6	11	11
27-Jul	9	25	46	17	26	16	17	23	25	27	44	5	6	6	7	6	12	7	20	36	18	15	15	9	46
28-Jul	8	10	10	10	10	14	14	15	17	21	17	18	18	18	17	17	17	17	17	11	9	11	13	16	21
29-Jul	13	12	12	13	13	13	17	16	22	15	13	19	25	22	21	20	23	45	49	39	65	11	9	9	65
30-Jul	17	16	20	17	12	15	20	13	16	12	18	28	22	30	41	10	5	4	6	9	11	11	10	10	41
31-Jul	13	20	13	14	15	15	9	11	13	18	17	19	16	16	17	18	17	18	32	19	15	14	18	15	32
	35	27	51	66	53	94	65	69	45	96	66	38	66	55	41	48	28	75	49	55	65	62	67	66	

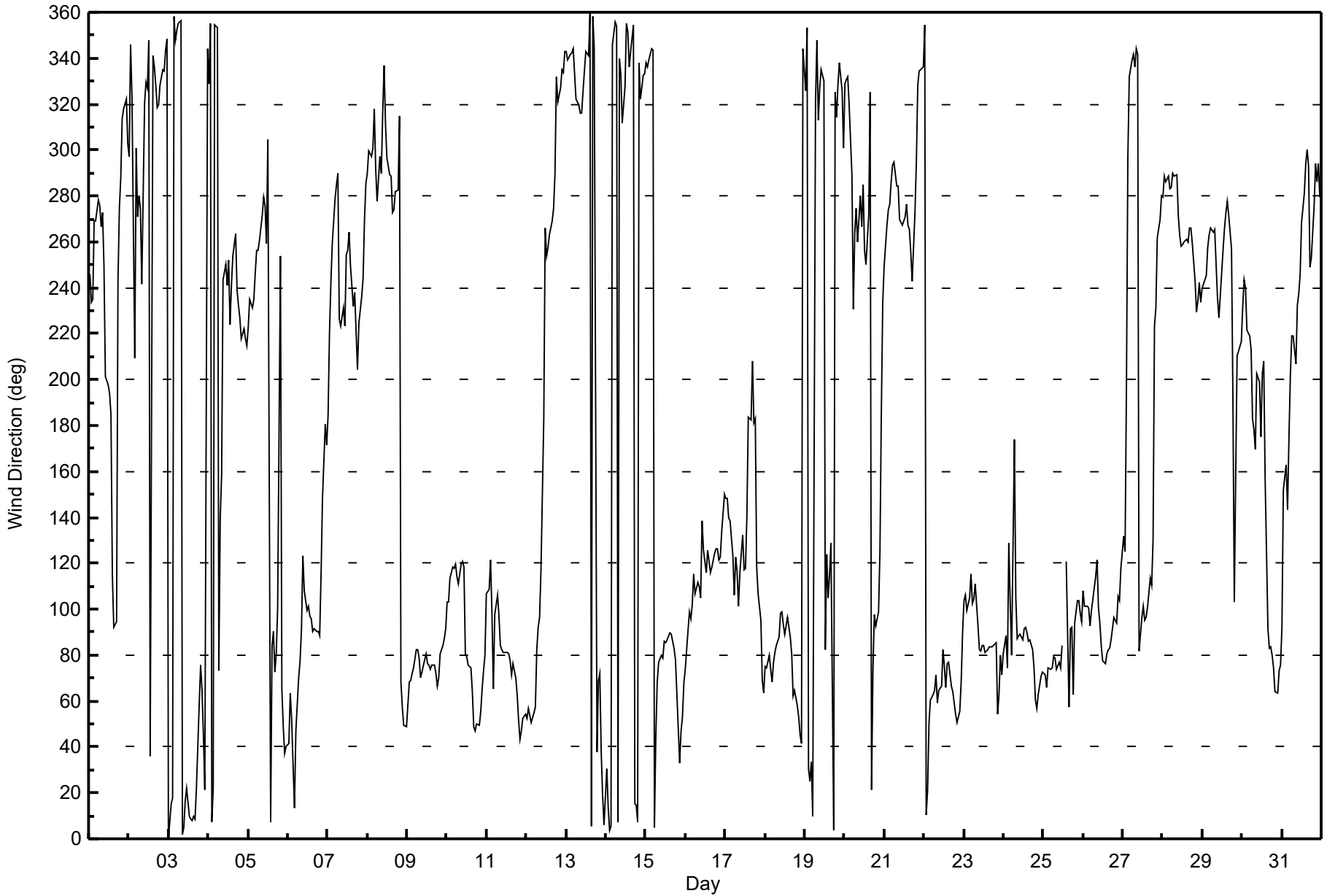
Diurnal Maximum

M - Maintenance UO - Unstable Operation



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Fort Chipewyan - July 2023





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS09 BARGE LANDING JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS09)
JULY 2023

MONTHLY SUMMARY

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	14.1	0	2.8	0
TRS(ppb) Average	708	36	36	100	2.4	0	0.8	0
THC(ppm) Average	660	34	84	93.28	3.3	-	2.4	-
NMHC(ppm) Average	660	34	84	93.28	0.363	-	0.15	-
CH4(ppm) Average	660	34	84	93.28	2.9	-	2.3	-
NO2 (ppb) Average	708	36	36	100	30.6	0	9.8	-
NO (ppb) Average	708	36	36	100	44.3	-	7.5	-
NOX (ppb) Average	708	36	36	100	74.4	-	17.4	-
PM2.5(ug/m3) Average	744	0	0	100	451	128	247.7	17
Temperature (C) Average	744	0	0	100	31.3	-	23.1	-
Relative Humidity (%) Average	744	0	0	100	98.9	-	95.9	-
Barometric Pressure (inHg) Average	744	0	0	100	29.2	-	29.2	-
Wind Speed 20 m (km/h) Average	743	0	1	99.87	28	-	18	-
Wind Direction 20 m (deg) Average	743	0	1	99.87	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS09)

JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	710	0.54	1.6	-	0	0	0.1	0.1	0.3	1	14.1
TRS(ppb) Average	708	0.44	0.3	-	0	0.2	0.3	0.4	0.5	0.8	2.4
THC(ppm) Average	660	2.13	0.2	-	1.9	1.9	2	2.1	2.2	2.4	3.3
NMHC(ppm) Average	660	0.06	0.062	-	0	0	0	0	0.1	0.1	0.363
CH4(ppm) Average	660	2.07	0.2	-	1.9	1.9	2	2	2.1	2.3	2.9
NO2 (ppb) Average	708	5.38	4.8	-	0.2	0.9	2	3.9	7.5	11.8	30.6
NO (ppb) Average	708	2.57	5.9	-	0	0	0.1	0.4	2.1	6.5	44.3
NOX (ppb) Average	708	7.95	9.4	-	0.2	1.1	2.3	4.8	10.2	16.7	74.4
PM2.5(ug/m3) Average	744	47.92	68.6	-	1.4	4.9	9.5	22.3	49.3	113.5	451
Temperature (C) Average	744	18.68	5.3	-	5.4	12.3	14.6	18	22.9	26.2	31.3
Relative Humidity (%) Average	744	66.69	21.9	-	24	36.6	47.6	67.1	88.3	96.7	98.9
Barometric Pressure (inHg) Average	744	28.91	0.1	-	28.6	28.7	28.8	28.9	29	29.1	29.2
Wind Speed 20 m (km/h) Average	743	9	5	-	0	4	6	8	12	15	28
Wind Direction 20 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS09)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC/ NMHC/ CH4	24 Jul 2023 18:00	25 Jul 2023 02:00	9	Unstable Operation - excessive baseline drift
THC/ NMHC/ CH4	25 Jul 2023 04:00	25 Jul 2023 13:00	10	Unstable Operation - excessive baseline drift
THC/ NMHC/ CH4	30 Jul 2023 17:00	31 Jul 2023 02:00	10	Unstable Operation - excessive baseline drift
THC/ NMHC/ CH4	31 Jul 2023 04:00	01 Aug 2023 00:00	21	Unstable Operation - excessive baseline drift
Wind Speed, Wind Direction 20m	16 Jul 2023 04:00	16 Jul 2023 04:00	1	Flat line in sensor output signal



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Barge Landing - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 14.1 ppb on Jul 16 09:00	Maximum Daily Average: 2.8 ppb on Jul 30		Hours of Data:	710
Minimum Value: 0.0 ppb on Jul 1 05:00	Minimum Daily Average: 0.0 ppb on Jul 6		Hours of Missing Data:	34
Maximum Diurnal Average: 1.5 ppb at hour 13	Minimum Diurnal Average: 0.1 ppb at hour 3		Hours of Calibration:	34
Monthly Average: 0.54 ppb	Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 1.0 P ₉₉ = 9.0		Percent Operational Time:	100.0

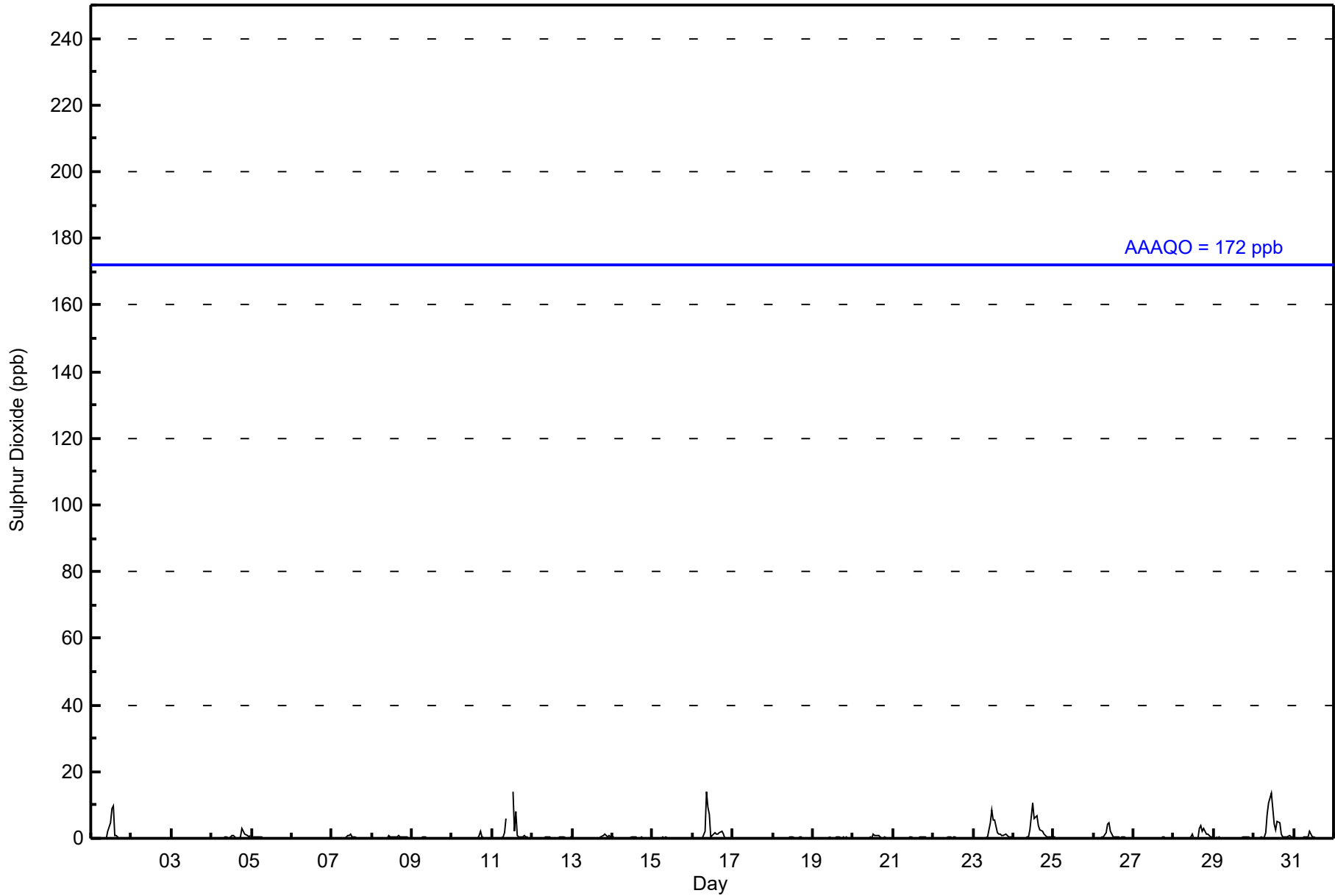
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	0.2	0.0	Z	0.1	0.0	0.0	0.1	0.1	0.2	0.1	2.1	4.6	9.1	9.6	1.0	0.9	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1	1.2	9.6																							
2-Jul	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	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1																						
3-Jul	0.0	0.0	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.2																						
4-Jul	0.1	0.1	0.1	0.0	0.0	Z	0.2	0.1	0.3	0.5	0.2	0.6	0.8	0.7	0.3	0.2	0.1	0.2	0.1	0.2	3.0	2.3	1.2	0.9	0.6	0.9	0.6	3.0																					
5-Jul	Z	0.5	0.3	0.5	0.3	0.2	0.2	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	0.1	0.5																					
6-Jul	0.0	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	0.0	0.1	0.1	0.0	0.0	0.1	0.1																					
7-Jul	0.1	0.1	Z	0.1	0.1	0.0	0.1	0.2	0.2	0.9	1.0	1.2	0.5	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.2	0.2	1.2																					
8-Jul	0.2	0.1	0.1	Z	0.1	0.1	0.1	0.0	0.1	0.2	0.7	0.3	0.3	0.3	0.3	0.3	0.7	0.3	0.3	0.3	0.3	0.2	0.1	0.1	0.2	0.2	0.7	0.7																					
9-Jul	0.1	0.1	0.2	0.1	Z	0.1	0.2	0.2	0.3	0.2	0.2	0.2	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	0.3																					
10-Jul	0.2	0.1	0.2	0.2	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.8	2.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	2.1																					
11-Jul	Z	0.1	0.0	0.0	0.1	0.1	0.2	1.7	5.8	C	C	C	13.8	2.2	8.1	0.8	0.3	0.4	0.4	0.7	0.4	0.4	0.2	0.1	1.8	1.8	13.8	13.8																					
12-Jul	0.2	Z	0.1	0.1	0.1	0.1	0.1	0.2	0.4	0.5	0.3	0.2	0.1	0.2	0.1	0.1	0.3	0.3	0.2	0.3	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.5																					
13-Jul	0.1	0.1	Z	0.1	0.0	0.0	0.1	0.2	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.8	1.3	0.8	0.6	0.7	0.5	0.3	0.3	1.3	1.3																					
14-Jul	0.3	0.2	0.0	Z	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3																				
15-Jul	0.1	0.1	0.2	0.1	Z	0.1	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3																				
16-Jul	0.1	0.1	0.1	0.1	0.2	Z	0.2	2.3	14.1	9.2	7.4	0.6	1.2	1.7	1.3	1.4	1.8	2.0	1.2	0.1	0.1	0.1	0.1	0.1	2.0	2.0	14.1	14.1																					
17-Jul	Z	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.2	0.2																					
18-Jul	0.1	Z	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.2	0.4	0.3	0.3	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.4	0.4																					
19-Jul	0.1	0.1	Z	0.1	0.2	0.1	0.0	0.0	0.2	0.1	0.2	0.1	0.1	0.2	0.3	0.5	0.3	0.2	0.2	0.2	0.3	0.2	0.1	0.1	0.2	0.2	0.5	0.5																					
20-Jul	0.0	0.1	0.1	Z	0.2	0.1	0.1	0.0	0.1	0.2	0.2	0.2	1.3	0.8	0.7	0.8	0.3	0.2	0.1	0.2	0.1	0.2	0.1	0.1	0.3	0.3	1.3	1.3																					
21-Jul	0.2	0.1	0.1	0.1	Z	0.1	0.0	0.1	0.1	0.1	0.5	0.3	0.1	0.1	0.1	0.2	0.5	0.3	0.3	0.3	0.2	0.1	0.1	0.2	0.2	0.2	0.5	0.5																					
22-Jul	0.2	0.1	0.1	0.1	0.2	Z	0.2	0.1	0.2	0.3	0.3	0.2	0.3	0.2	0.2	0.1	0.2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.3	0.3																					
23-Jul	Z	0.0	0.0	0.1	0.1	0.2	0.1	0.2	0.4	2.7	4.8	8.6	5.7	5.6	1.5	1.1	1.3	0.8	1.0	1.1	0.8	0.6	0.4	0.2	1.6	1.6	8.6	8.6																					
24-Jul	0.1	Z	0.2	0.1	0.1	0.1	0.1	0.2	0.4	0.3	2.6	10.8	6.0	6.4	6.6	4.0	2.6	1.9	1.3	0.7	0.5	0.4	0.2	0.6	2.0	2.0	10.8	10.8																					
25-Jul	0.3	0.3	Z	0.2	0.1	0.1	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	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3																					
26-Jul	0.0	0.0	0.0	Z	0.1	0.4	0.5	1.8	4.4	4.7	2.3	1.4	0.5	0.4	0.2	0.2	0.2	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.8	0.8	4.7	4.7																					
27-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4																					
28-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.2	0.4	1.1	0.2	0.1	0.1	3.0	3.7	2.0	3.1	1.5	1.1	0.8	0.4	0.3	0.8	0.8	3.7	3.7																					
29-Jul	Z	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.3	0.2	0.4	0.2	0.2	0.2	0.1	0.2	0.2	0.4	0.4																					
30-Jul	0.0	Z	0.1	0.2	0.2	0.2	0.6	1.8	7.3	10.6	13.5	8.9	4.2	2.6	5.2	4.8	1.4	0.3	0.3	0.4	0.4	0.7	0.5	0.2	2.8	2.8	13.5	13.5																					
31-Jul	0.3	0.2	Z	0.1	0.1	0.2	0.3	0.5	0.5	1.9	1.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.3	1.9	1.9																					
																								0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	1.2	1.1	1.3	1.4	1.5	1.1	0.9	0.6	0.5	0.4	0.5	0.3	0.3	0.2	0.2	0.2	Diurnal Average	
																								0.3	0.5	0.3	0.5	0.3	0.4	0.6	2.3	14.1	10.6	13.5	10.8	13.8	9.6	8.1	4.8	3.7	2.1	3.1	2.3	1.2	0.9	0.7	0.9	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Barge Landing - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Barge Landing - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	705	99.30	99.30
11 - 20	5	0.70	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: 710

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Barge Landing - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	45	57	28	17	12	9	48	39	59	58	66	57	20	36	66	87	704
11 - 20	0	0	0	0	0	0	0	1	2	1	0	0	1	0	0	0	5
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	45	57	28	17	12	9	48	40	61	59	66	57	21	36	66	87	709

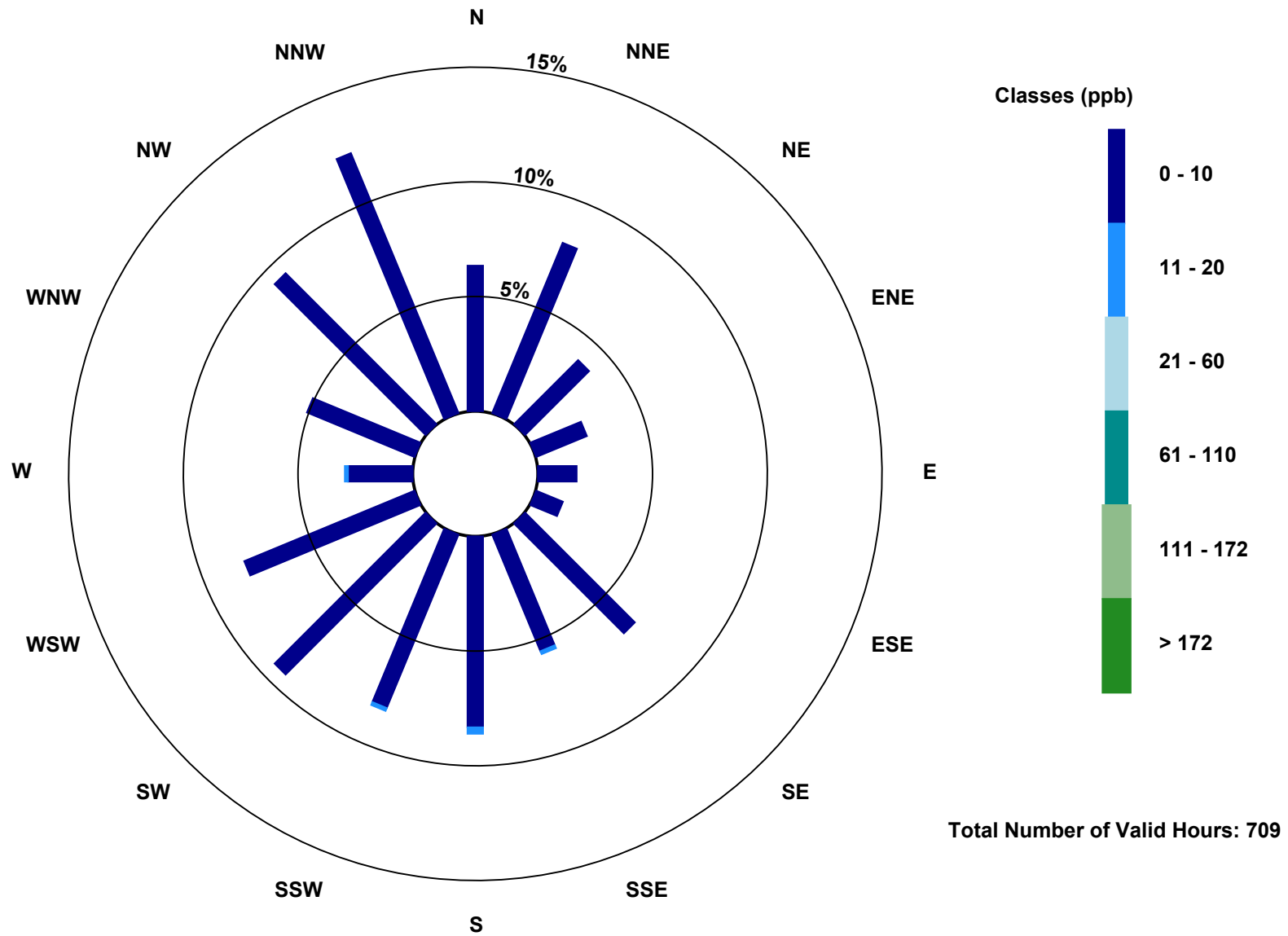
Total Number of Valid Hours: 709

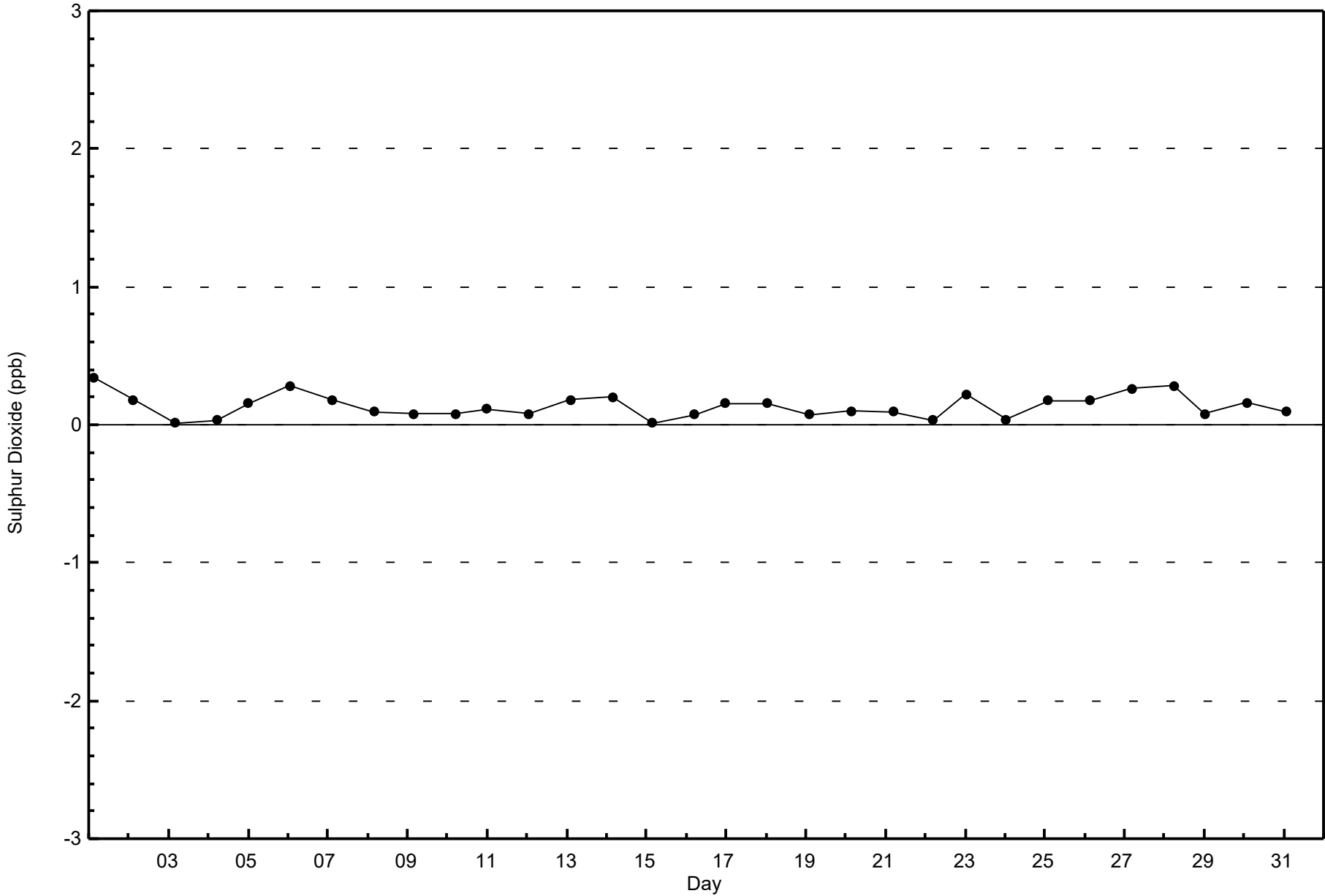
Total Number of Hours: 744

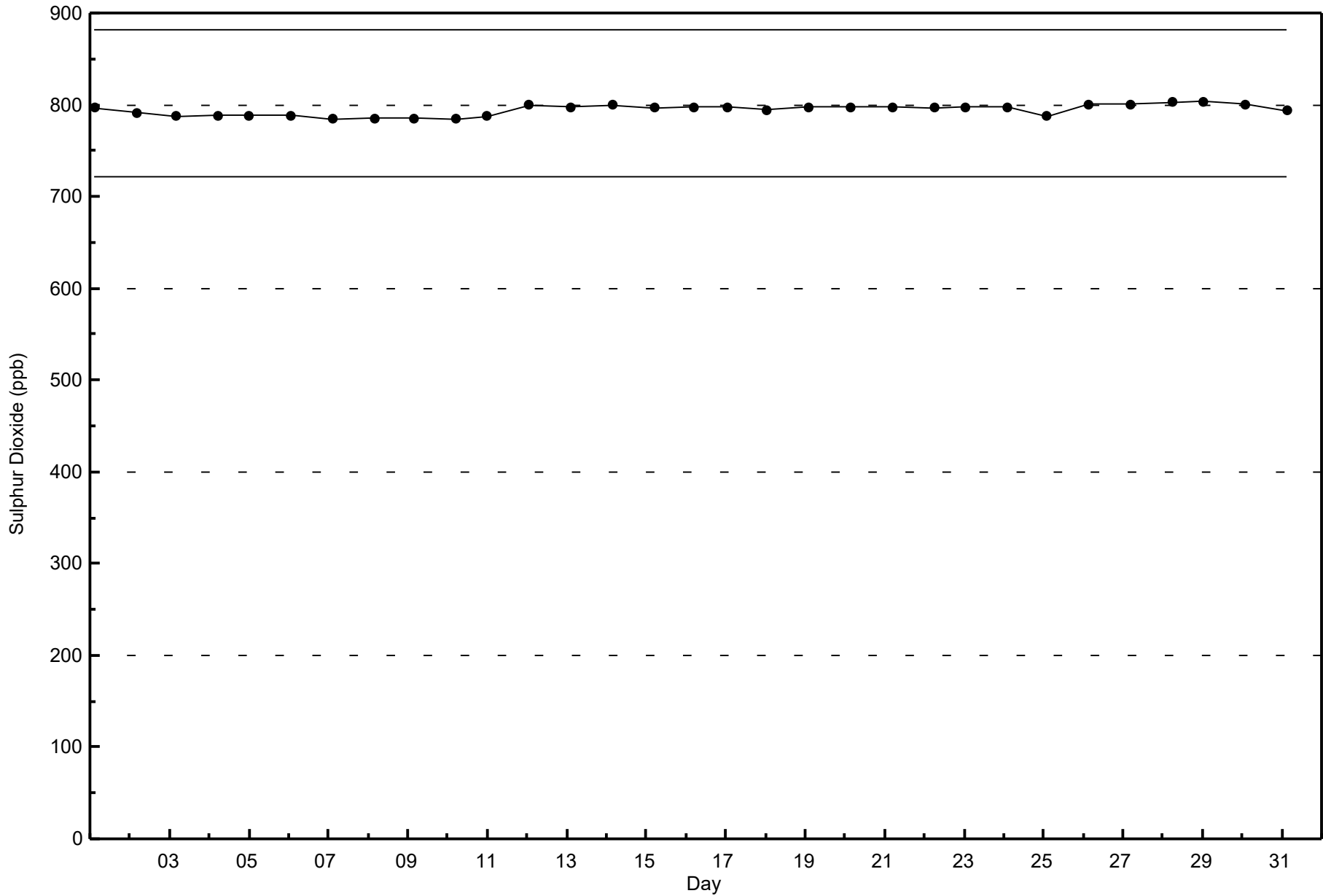


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Barge Landing



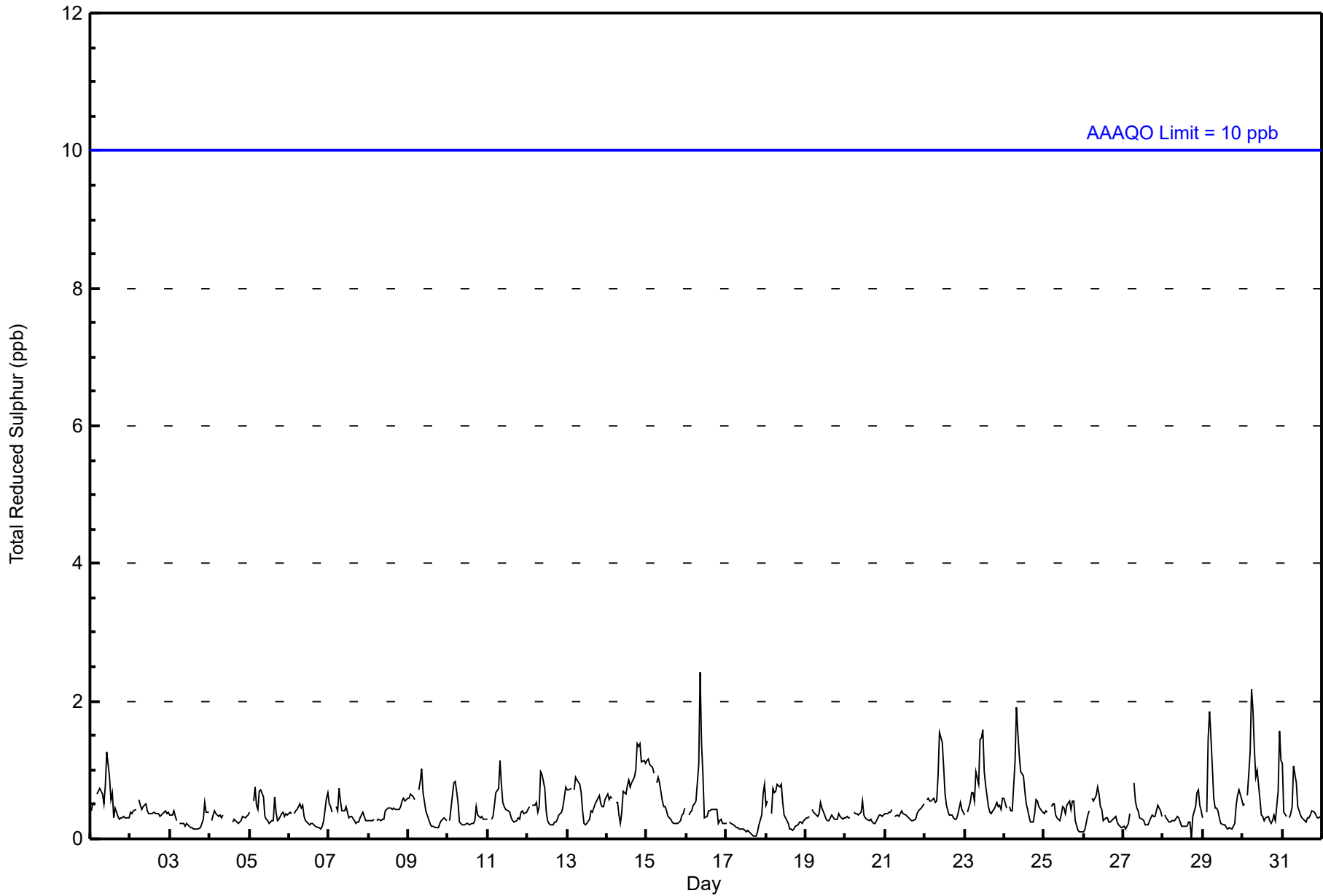






Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744														Daily Average		Daily Maximum					
Maximum Value: 2.4 ppb on Jul 16 09:00		Maximum Daily Average: 0.8 ppb on Jul 14		Hours of Data: 708																							
Minimum Value: 0.0 ppb on Jul 28 18:00		Minimum Daily Average: 0.2 ppb on Jul 17		Hours of Missing Data: 36																							
Maximum Diurnal Average: 0.6 ppb at hour 9		Minimum Diurnal Average: 0.3 ppb at hour 17		Hours of Calibration: 36																							
Monthly Average: 0.44 ppb		Percentiles: P ₁ = 0.1 P ₁₀ = 0.2 Q ₁ = 0.3 Median = 0.4 Q ₃ = 0.5 P ₉₀ = 0.8 P ₉₉ = 1.6		Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0.4	0.5	0.5	Z	0.7	0.7	0.7	0.7	0.5	0.8	1.3	0.9	0.6	0.7	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	1.3	
2-Jul	0.4	0.4	0.4	0.4	Z	0.6	0.5	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.6	
3-Jul	0.3	0.4	0.4	0.3	0.3	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.5	0.4	0.4	0.5	
4-Jul	Z	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	C	C	C	C	C	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	
5-Jul	0.4	Z	0.5	0.7	0.5	0.4	0.7	0.7	0.6	0.3	0.3	0.3	0.2	0.3	0.3	0.6	0.4	0.3	0.3	0.4	0.4	0.3	0.4	0.3	0.7		
6-Jul	0.4	0.4	Z	0.4	0.4	0.4	0.5	0.5	0.5	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	0.3	0.6	0.7	0.7	
7-Jul	0.5	0.5	0.4	Z	0.5	0.4	0.7	0.6	0.4	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.7	
8-Jul	0.3	0.3	0.3	0.3	Z	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.6	
9-Jul	0.6	0.7	0.6	0.6	0.6	Z	0.7	0.8	1.0	0.7	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	1.0	
10-Jul	Z	0.3	0.4	0.8	0.8	0.7	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.8		
11-Jul	0.3	Z	0.3	0.3	0.5	0.7	0.7	1.1	0.8	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	1.1		
12-Jul	0.4	0.5	Z	0.5	0.5	0.5	0.4	0.5	1.0	0.9	0.7	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.6	0.7	1.0		
13-Jul	0.7	0.7	0.7	Z	0.7	0.9	0.8	0.8	0.7	0.4	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.5	0.6	0.6	0.5	0.5	0.5	0.6	0.9		
14-Jul	0.6	0.6	0.6	0.6	Z	0.5	0.5	0.4	0.2	0.4	0.7	0.6	0.8	0.9	0.7	0.8	0.9	1.0	1.4	1.3	1.4	1.1	1.1	1.1	1.4		
15-Jul	1.1	1.2	1.1	1.0	1.0	Z	0.8	0.9	0.8	0.6	0.5	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.5	1.2		
16-Jul	Z	0.3	0.4	0.4	0.5	0.5	1.1	2.4	1.4	0.9	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.2	0.3	0.3	0.2	0.2	0.2	2.4		
17-Jul	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.2	0.4	0.7	0.8	0.8		
18-Jul	0.5	0.6	Z	0.4	0.7	0.7	0.7	0.8	0.8	0.8	0.5	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.3	0.8		
19-Jul	0.3	0.3	0.3	Z	0.4	0.4	0.4	0.3	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.5		
20-Jul	0.3	0.3	0.3	0.3	Z	0.4	0.4	0.4	0.3	0.4	0.6	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.6		
21-Jul	0.4	0.4	0.4	0.4	0.4	Z	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5		
22-Jul	Z	0.6	0.6	0.5	0.5	0.6	0.5	0.5	0.9	1.6	1.4	1.0	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.5	0.4	0.4	1.6		
23-Jul	0.3	Z	0.4	0.5	0.7	0.7	0.6	1.0	0.8	1.4	1.5	1.6	1.0	0.8	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.6	1.6		
24-Jul	0.6	0.5	Z	0.5	0.4	0.4	1.1	1.9	1.6	1.2	1.0	0.9	0.7	0.5	0.4	0.3	0.2	0.3	0.4	0.6	0.5	0.5	0.4	0.4	1.9		
25-Jul	0.4	0.4	0.4	Z	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.5	0.3	0.1	0.1	0.1	0.1	0.5		
26-Jul	0.1	0.1	0.3	0.4	Z	0.6	0.6	0.6	0.8	0.7	0.5	0.4	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.8		
27-Jul	0.2	0.1	0.2	0.2	0.4	Z	0.8	0.5	0.5	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.4	0.3	0.3	0.4	0.5	0.4	0.3	0.8		
28-Jul	Z	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.0	0.3	0.5	0.7	0.7	0.5	0.4	0.7		
29-Jul	0.3	Z	0.4	1.5	1.8	1.5	0.6	0.4	0.5	0.4	0.3	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.2	0.2	0.5	0.6	0.7	0.6	1.8		
30-Jul	0.5	0.5	Z	0.6	1.3	2.2	1.9	1.3	0.9	1.0	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.7	1.6	1.1	2.2		
31-Jul	1.1	0.4	0.3	Z	0.3	0.4	0.5	1.1	0.8	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	1.1		
																								Diurnal Average		Diurnal Maximum	
																								0.4		1.1	
																								0.4		1.5	
																								0.4		1.8	
																								0.4		2.2	
																								0.4		1.9	
																								0.4		1.9	
																								0.4		2.4	
																								0.4		1.6	
																								0.4		1.5	
																								0.4		1.6	
																								0.4		1.0	
																								0.4		0.9	
																								0.4		0.8	
																								0.4		0.9	
																								0.4		1.0	
																								0.4		1.4	
																								0.4		1.3	
																								0.4		1.4	
																								0.4		1.1	
																								0.4		1.6	
																								0.4		1.1	
																								0.4		1.1	

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Barge Landing - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	708	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Barge Landing - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	45	54	28	17	11	9	47	41	61	61	67	59	22	36	62	87	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	45	54	28	17	11	9	47	41	61	61	67	59	22	36	62	87	707

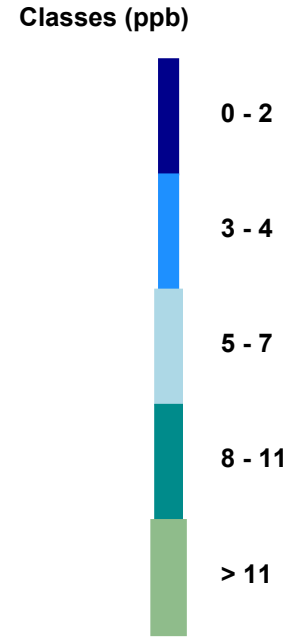
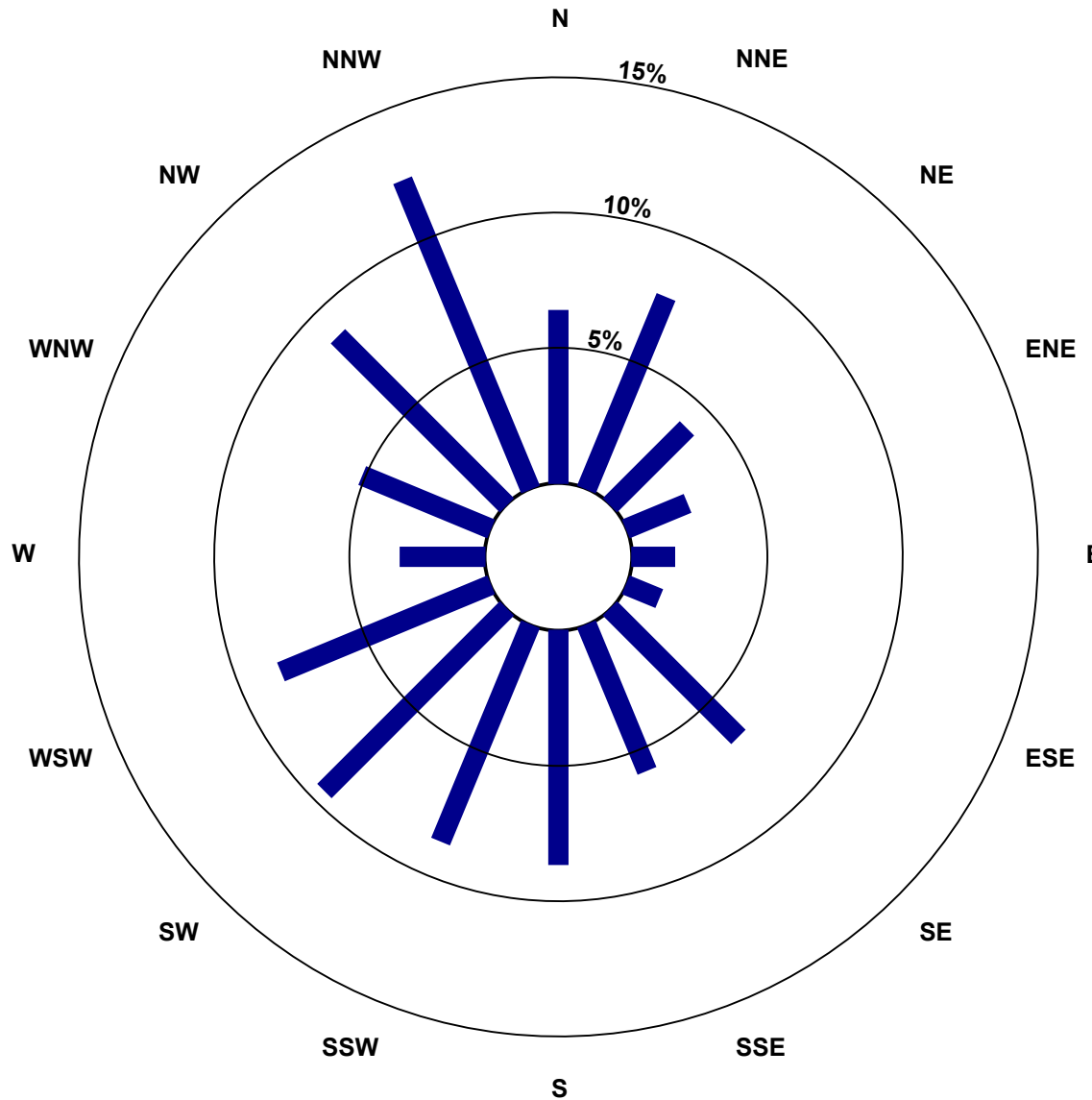
Total Number of Valid Hours: 707

Total Number of Hours: 744

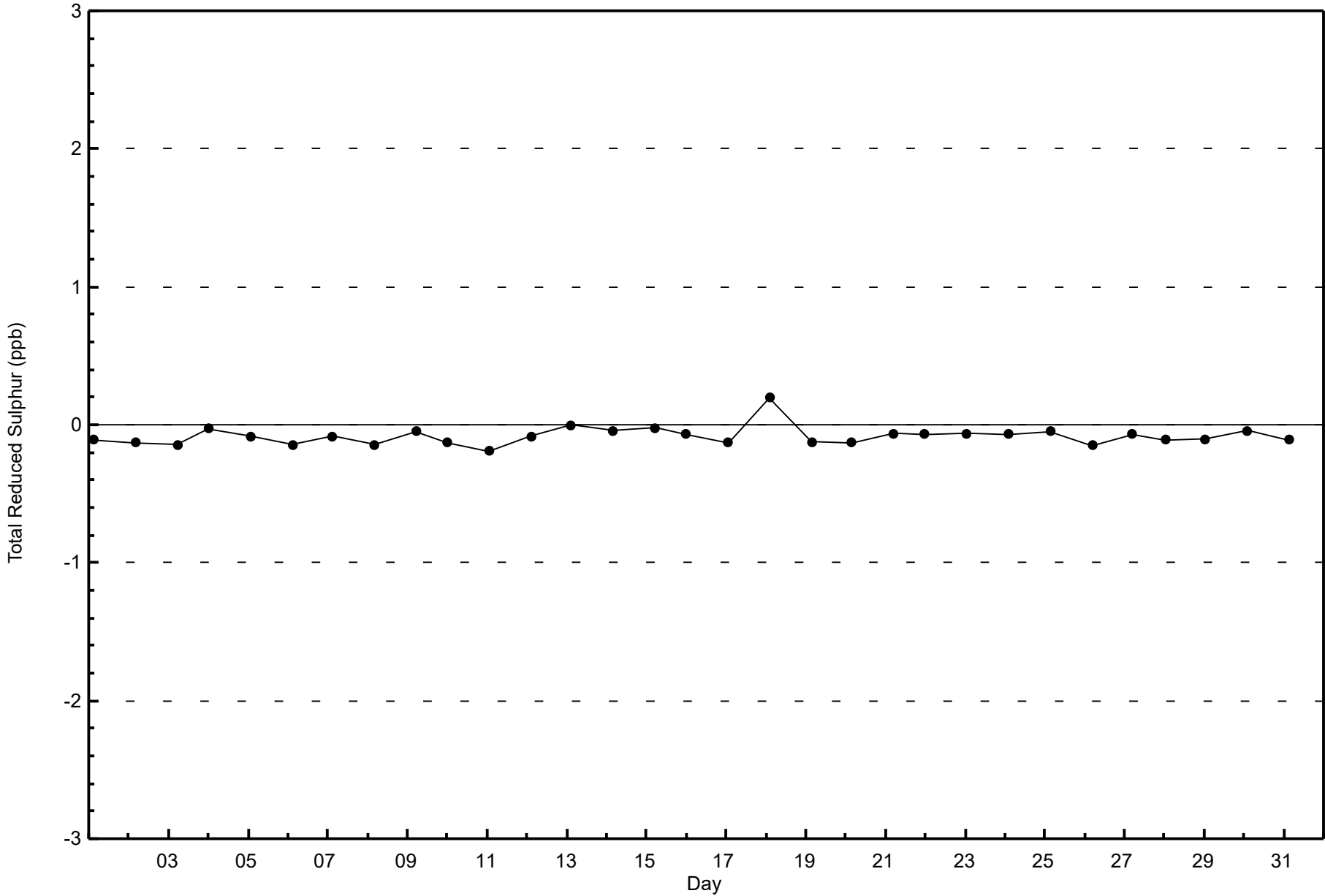


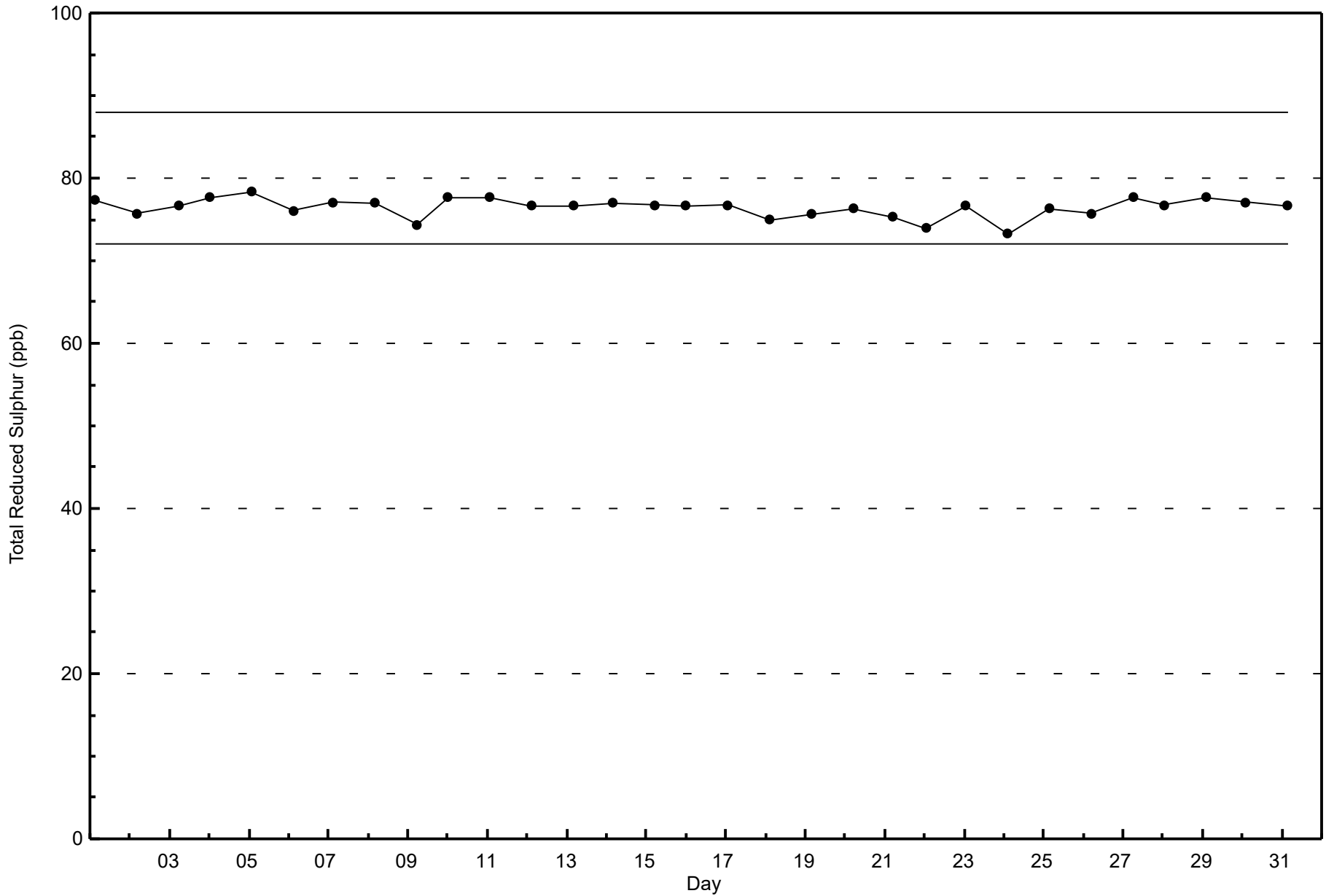
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Reduced Sulphur (TRS) - ppb
Barge Landing



Total Number of Valid Hours: 707





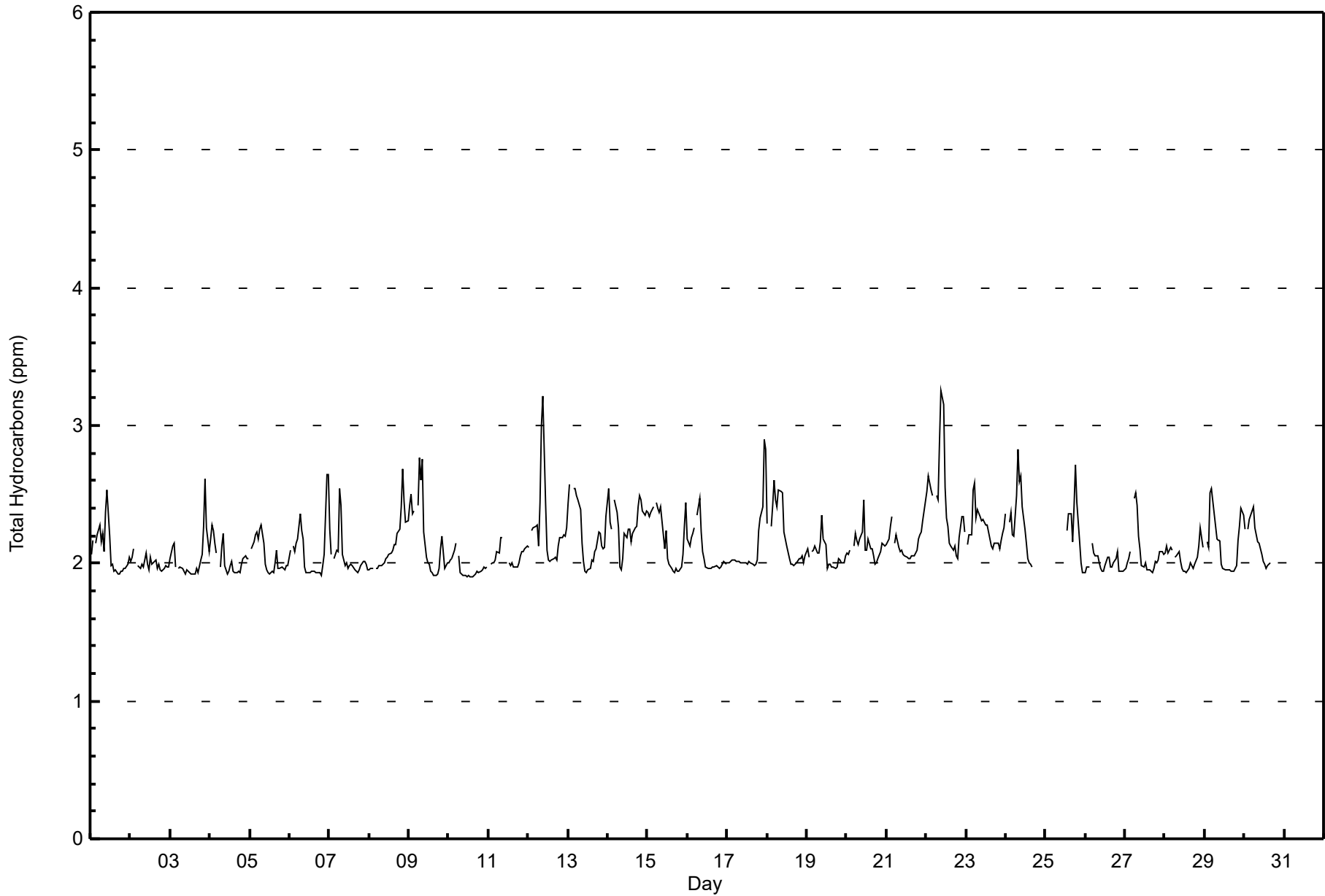


Maximum Value: 3.3 ppm on Jul 22 10:00																				Maximum Daily Average: 2.4 ppm on Jul 22					Hours in Service: 744				
Minimum Value: 1.9 ppm on Jul 10 15:00																				Minimum Daily Average: 2.0 ppm on Jul 10					Hours of Data: 660				
Maximum Diurnal Average: 2.2 ppm at hour 6																				Minimum Diurnal Average: 2.0 ppm at hour 17					Hours of Missing Data: 84				
Monthly Average: 2.13 ppm																				Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.4 P ₉₉ = 2.8					Hours of Calibration: 34				
																				Percent Operational Time: 93.3									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Jul	2.1	2.2	Z	2.2	2.2	2.3	2.2	2.2	2.1	2.4	2.5	2.2	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.5			
2-Jul	2.0	2.0	2.1	Z	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	1.9	2.0	2.0	2.0	2.0	2.0	2.1			
3-Jul	2.0	2.1	2.1	2.0	Z	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.1	2.3	2.6	2.3	2.1	2.6				
4-Jul	2.2	2.3	2.2	2.1	2.1	Z	2.0	2.1	2.2	2.0	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.0	2.0	2.3				
5-Jul	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.1	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3				
6-Jul	2.1	Z	2.1	2.1	2.2	2.2	2.4	2.2	2.2	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.6	2.6	2.6				
7-Jul	2.2	2.1	Z	2.0	2.1	2.1	2.5	2.4	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.5				
8-Jul	2.0	2.0	2.0	Z	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	2.2	2.2	2.4	2.7	2.5	2.3	2.3	2.7				
9-Jul	2.4	2.5	2.4	2.4	Z	2.4	2.8	2.6	2.8	2.2	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.0	2.0	2.0	2.8				
10-Jul	2.0	2.0	2.0	2.1	2.1	Z	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	2.0	2.0	2.1				
11-Jul	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.2				
12-Jul	2.1	Z	2.2	2.3	2.3	2.3	2.1	2.4	3.0	3.2	2.4	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.3	3.2				
13-Jul	2.4	2.6	Z	2.5	2.5	2.5	2.5	2.4	2.1	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.3	2.6				
14-Jul	2.5	2.3	2.3	Z	2.5	2.4	2.3	2.0	2.0	2.0	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.5	2.5	2.4	2.3	2.4	2.5				
15-Jul	2.4	2.3	2.4	2.4	Z	2.4	2.4	2.4	2.4	2.2	2.1	2.2	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	2.0	2.1	2.3	2.4	2.4				
16-Jul	2.2	2.1	2.2	2.2	2.3	Z	2.4	2.5	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	2.5				
17-Jul	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	2.2	2.3	2.4	2.9	2.8	2.9				
18-Jul	2.3	Z	2.3	2.4	2.6	2.5	2.4	2.5	2.5	2.5	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.6				
19-Jul	2.1	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.3	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	2.1	2.3				
20-Jul	2.1	2.1	2.1	Z	2.1	2.2	2.2	2.1	2.2	2.2	2.5	2.1	2.1	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.5				
21-Jul	2.1	2.2	2.3	2.3	Z	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.4	2.4				
22-Jul	2.5	2.6	2.6	2.5	2.5	Z	2.5	2.5	2.9	3.3	3.1	2.5	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.0	2.2	2.3	2.3	2.2	3.3				
23-Jul	Z	2.1	2.2	2.2	2.5	2.6	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.6				
24-Jul	2.4	Z	2.3	2.4	2.2	2.2	2.5	2.8	2.6	2.6	2.4	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.8				
25-Jul	UO	UO	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	2.7				
26-Jul	1.9	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	1.9	1.9	1.9	1.9	2.1				
27-Jul	2.0	2.0	2.0	2.1	Z	2.5	2.5	2.4	2.2	2.1	2.0	2.0	2.0	1.9	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.5				
28-Jul	2.1	2.1	2.1	2.1	2.1	Z	2.0	2.1	2.1	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.2	2.1	2.3				
29-Jul	Z	2.2	2.1	2.5	2.5	2.5	2.3	2.2	2.2	2.2	2.0	2.0	2.0	2.0	1.9	2.0	1.9	1.9	2.0	2.0	2.2	2.3	2.4	2.4	2.5				
30-Jul	2.3	Z	2.2	2.3	2.4	2.4	2.3	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	2.4				
31-Jul	UO	UO	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--				
																								Diurnal Average					
																								Diurnal Maximum					
Z - zerospan C - Calibration UO - Unstable Operation																													



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Barge Landing - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Barge Landing - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	311	47.12	47.12
2.1 - 3.0	346	52.42	99.55
3.1 - 10.0	3	0.45	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Barge Landing - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	15	32	14	7	4	7	37	16	25	21	34	22	11	19	15	32	311
2.1 - 3.0	27	25	10	5	6	0	8	21	32	30	25	33	8	16	47	52	345
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	42	57	24	12	10	7	45	37	57	51	59	55	19	36	63	85	659

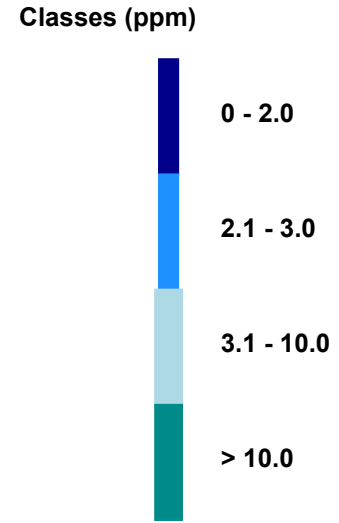
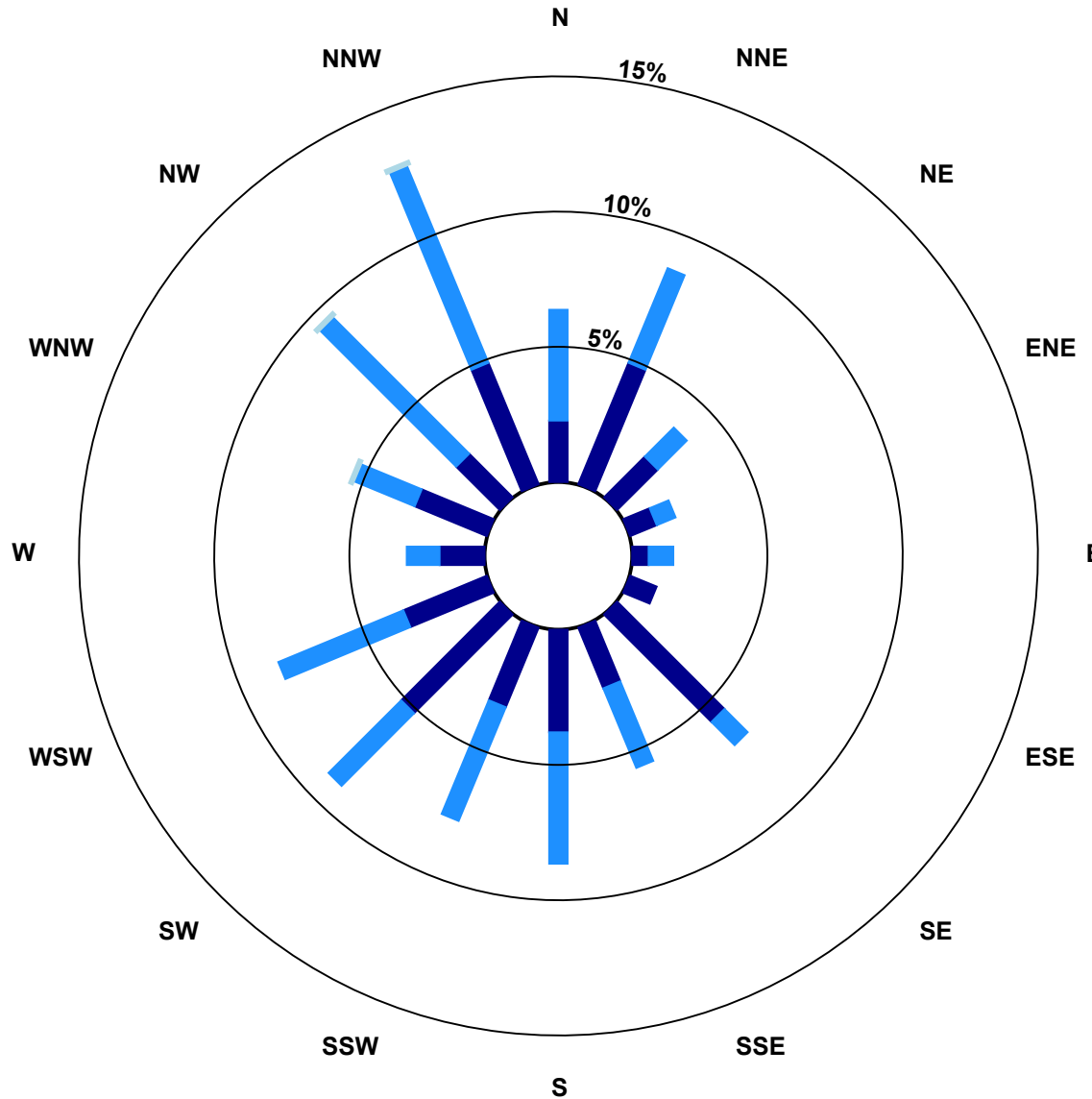
Total Number of Valid Hours: 659

Total Number of Hours: 744

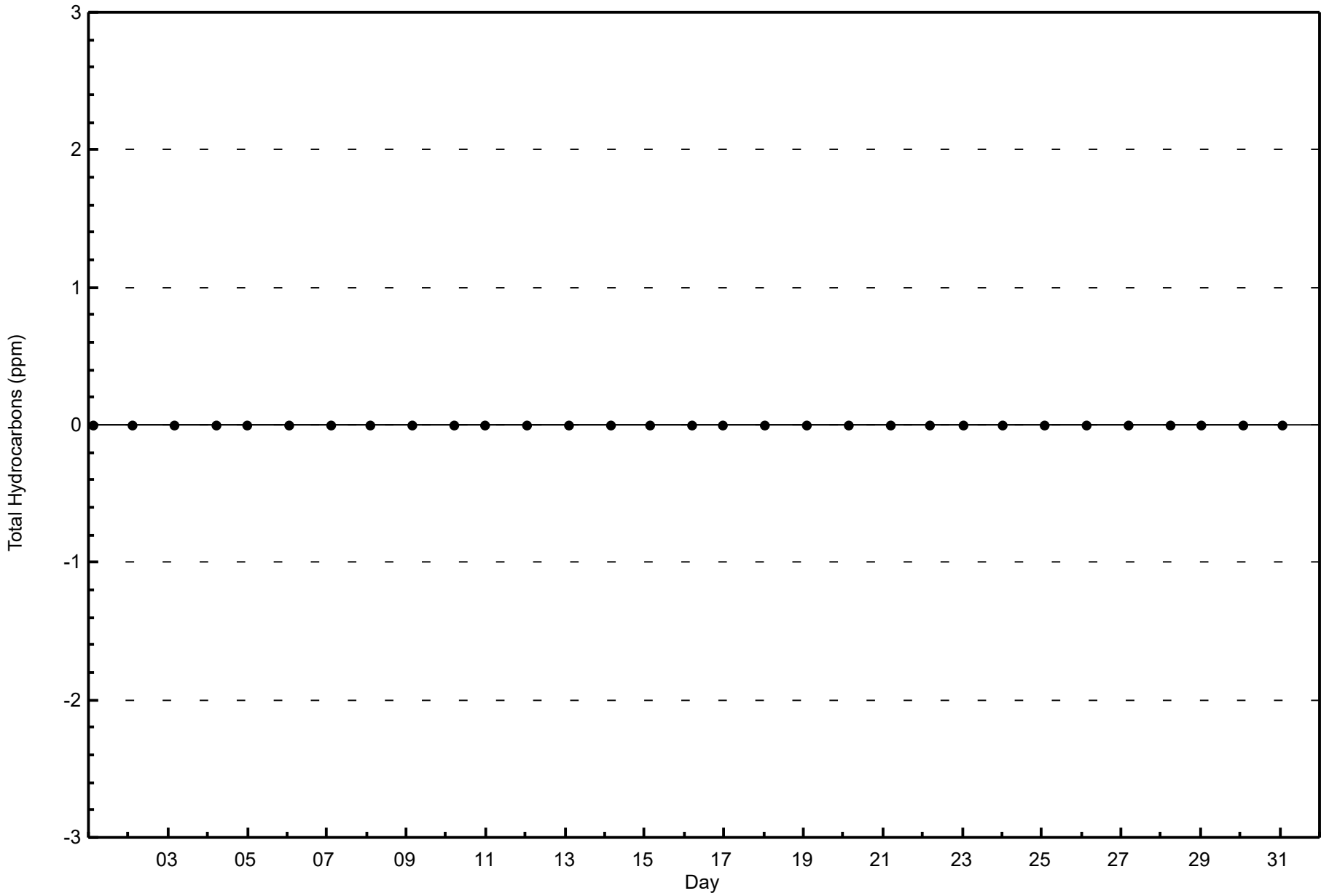


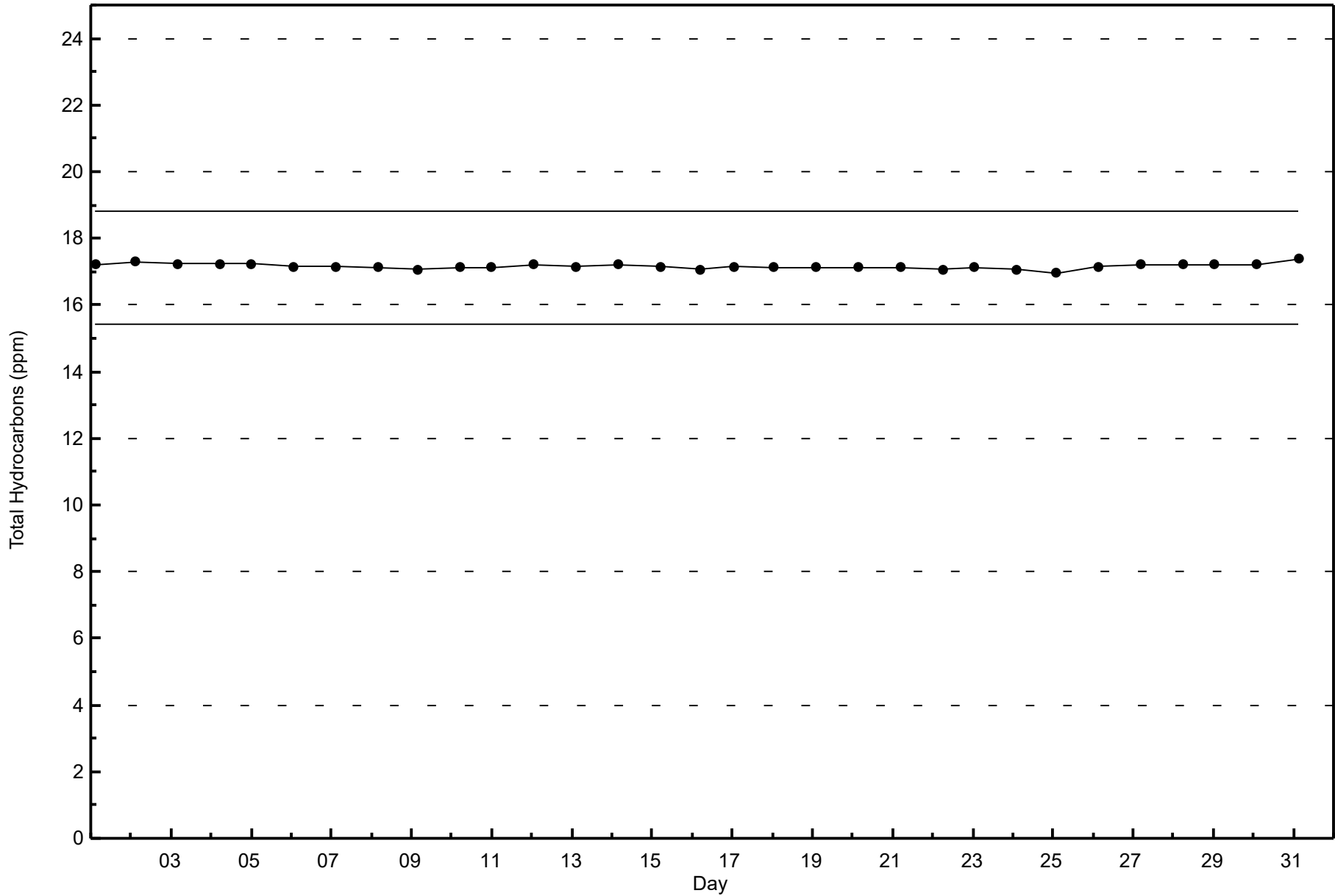
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Barge Landing



Total Number of Valid Hours: 659





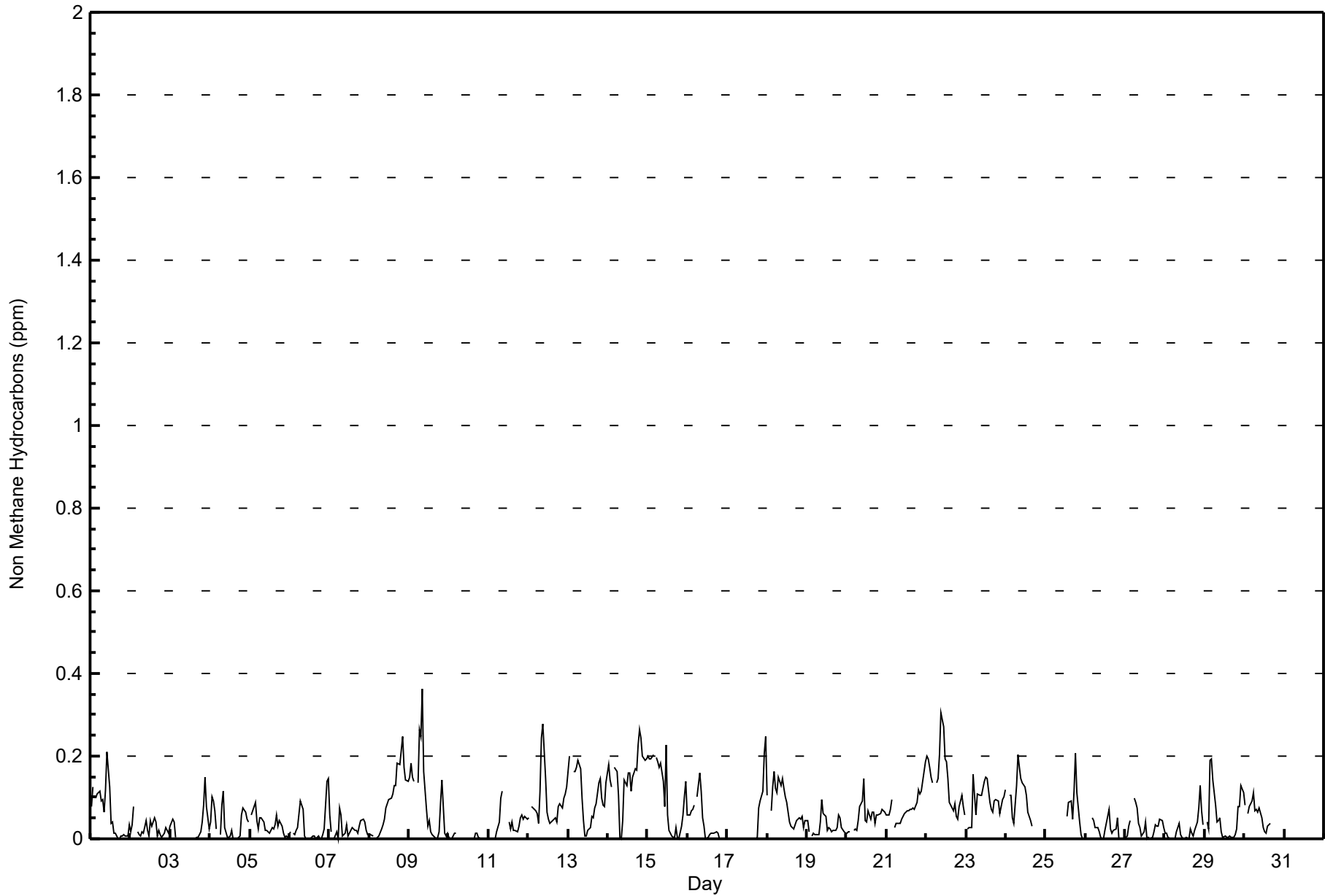


Maximum Value: 0.363 ppm on Jul 9 09:00																								Maximum Daily Average: 0.150 ppm on Jul 14																								Hours in Service: 744	
Minimum Value: 0.000 ppm on Jul 3 07:00																								Minimum Daily Average: 0.003 ppm on Jul 10																								Hours of Data: 660	
Maximum Diurnal Average: 0.084 ppm at hour 9																								Minimum Diurnal Average: 0.034 ppm at hour 17																								Hours of Missing Data: 84	
Monthly Average: 0.060 ppm																								Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.1 P ₉₀ = 0.1 P ₉₉ = 0.2																								Hours of Calibration: 34	
Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.1 P ₉₀ = 0.1 P ₉₉ = 0.2																								Percent Operational Time: 93.3																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	0.077	0.126	Z	0.097	0.109	0.115	0.091	0.094	0.066	0.118	0.210	0.127	0.037	0.042	0.014	0.015	0.000	0.000	0.006	0.006	0.010	0.007	0.006	0.034	0.061	0.210																							
2-Jul	0.018	0.033	0.077	Z	0.018	0.009	0.008	0.019	0.012	0.046	0.021	0.007	0.043	0.032	0.051	0.042	0.006	0.021	0.011	0.003	0.013	0.028	0.020	0.015	0.024	0.077																							
3-Jul	0.030	0.047	0.039	0.002	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.002	0.002	0.003	0.003	0.016	0.040	0.083	0.148	0.078	0.023	0.022	0.148																						
4-Jul	0.040	0.103	0.092	0.066	0.024	Z	0.011	0.082	0.114	0.026	0.002	0.003	0.008	0.021	0.002	0.002	0.000	0.005	0.007	0.059	0.075	0.065	0.047	0.042	0.039	0.114																							
5-Jul	Z	0.057	0.077	0.089	0.044	0.023	0.050	0.051	0.039	0.019	0.019	0.016	0.013	0.027	0.024	0.034	0.057	0.031	0.042	0.029	0.012	0.005	0.008	0.003	0.033	0.089																							
6-Jul	0.017	Z	0.015	0.012	0.021	0.027	0.091	0.080	0.072	0.007	0.001	0.001	0.002	0.004	0.006	0.006	0.000	0.005	0.000	0.000	0.011	0.024	0.140	0.146	0.030	0.146																							
7-Jul	0.059	0.018	Z	0.002	0.018	0.001	0.075	0.057	0.006	0.015	0.035	0.008	0.014	0.019	0.026	0.020	0.020	0.013	0.032	0.043	0.046	0.041	0.019	0.009	0.026	0.075																							
8-Jul	0.009	0.009	0.005	Z	0.001	0.002	0.007	0.025	0.032	0.049	0.074	0.084	0.096	0.100	0.109	0.129	0.129	0.183	0.178	0.212	0.247	0.173	0.143	0.138	0.093	0.247																							
9-Jul	0.149	0.183	0.149	0.140	Z	0.135	0.266	0.246	0.363	0.163	0.071	0.029	0.045	0.016	0.009	0.005	0.000	0.004	0.018	0.085	0.141	0.012	0.007	0.015	0.098	0.363																							
10-Jul	0.003	0.001	0.000	0.014	0.014	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.012	0.014	0.002	0.000	0.000	0.000	0.000	0.000	0.003	0.014																							
11-Jul	Z	0.000	0.000	0.000	0.001	0.017	0.040	0.100	0.116	C	C	C	0.041	0.025	0.040	0.022	0.020	0.017	0.032	0.052	0.057	0.047	0.054	0.049	0.036	0.116																							
12-Jul	0.049	Z	0.079	0.074	0.067	0.062	0.038	0.116	0.245	0.278	0.146	0.064	0.048	0.038	0.040	0.047	0.052	0.040	0.078	0.086	0.074	0.097	0.109	0.127	0.089	0.278																							
13-Jul	0.164	0.202	Z	0.164	0.162	0.171	0.188	0.171	0.099	0.043	0.007	0.008	0.019	0.026	0.055	0.050	0.075	0.085	0.135	0.144	0.098	0.081	0.080	0.135	0.103	0.202																							
14-Jul	0.181	0.143	0.127	Z	0.173	0.164	0.105	0.004	0.000	0.043	0.142	0.128	0.161	0.161	0.114	0.148	0.169	0.166	0.227	0.265	0.243	0.201	0.191	0.194	0.150	0.265																							
15-Jul	0.199	0.195	0.192	0.202	Z	0.196	0.186	0.174	0.183	0.140	0.078	0.227	0.056	0.020	0.005	0.002	0.002	0.026	0.005	0.001	0.031	0.057	0.100	0.139	0.105	0.227																							
16-Jul	0.059	0.059	0.066	0.072	0.082	Z	0.103	0.158	0.115	0.050	0.032	0.002	0.003	0.010	0.013	0.015	0.014	0.017	0.013	0.001	0.000	0.001	0.000	0.000	0.038	0.158																							
17-Jul	Z	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.004	0.073	0.092	0.114	0.208	0.246	0.032	0.246																							
18-Jul	0.106	Z	0.069	0.126	0.164	0.121	0.110	0.148	0.129	0.145	0.121	0.101	0.089	0.042	0.031	0.027	0.023	0.033	0.044	0.052	0.046	0.053	0.028	0.044	0.081	0.164																							
19-Jul	0.045	0.017	Z	0.007	0.014	0.011	0.009	0.011	0.042	0.095	0.061	0.054	0.019	0.029	0.023	0.017	0.020	0.019	0.026	0.057	0.050	0.028	0.016	0.014	0.030	0.095																							
20-Jul	0.012	0.018	0.018	Z	0.019	0.025	0.022	0.044	0.078	0.092	0.144	0.042	0.042	0.067	0.047	0.065	0.065	0.039	0.059	0.059	0.061	0.070	0.068	0.066	0.053	0.144																							
21-Jul	0.059	0.057	0.073	0.094	Z	0.028	0.038	0.038	0.036	0.049	0.053	0.062	0.067	0.069	0.071	0.070	0.075	0.073	0.089	0.117	0.110	0.114	0.137	0.186	0.077	0.186																							
22-Jul	0.199	0.193	0.173	0.148	0.135	Z	0.134	0.147	0.203	0.305	0.270	0.194	0.186	0.146	0.089	0.082	0.069	0.083	0.053	0.048	0.078	0.106	0.078	0.057	0.138	0.305																							
23-Jul	Z	0.023	0.027	0.027	0.155	0.105	0.059	0.110	0.106	0.104	0.122	0.138	0.148	0.144	0.088	0.070	0.065	0.091	0.096	0.092	0.062	0.079	0.094	0.103	0.092	0.155																							
24-Jul	0.118	Z	0.105	0.106	0.050	0.038	0.129	0.203	0.174	0.145	0.135	0.126	0.104	0.066	0.054	0.046	0.030	UO	UO	UO	UO	UO	UO	UO	--	0.203																							
25-Jul	UO	UO	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0.056	0.087	0.092	0.049	0.114	0.207	0.112	0.040	0.009	0.000	--	0.207																							
26-Jul	0.000	0.000	0.001	Z	0.051	0.044	0.028	0.027	0.015	0.003	0.000	0.001	0.021	0.054	0.070	0.023	0.014	0.020	0.025	0.050	0.000	0.000	0.000	0.000	0.019	0.070																							
27-Jul	0.002	0.008	0.031	0.045	Z	0.097	0.088	0.073	0.037	0.026	0.006	0.017	0.039	0.001	0.002	0.001	0.004	0.019	0.033	0.029	0.032	0.047	0.044	0.026	0.031	0.097																							
28-Jul	0.015	0.014	0.003	0.000	0.001	Z	0.000	0.015	0.037	0.010	0.004	0.000	0.001	0.002	0.001	0.024	0.014	0.008	0.021	0.040	0.076	0.130	0.068	0.033	0.022	0.130																							
29-Jul	Z	0.041	0.025	0.188	0.194	0.144	0.082	0.041	0.045	0.049	0.016	0.003	0.005	0.004	0.003	0.008	0.005	0.002	0.012	0.023	0.079	0.079	0.130	0.113	0.056	0.194																							
30-Jul	0.083	Z	0.060	0.077	0.092	0.113	0.066	0.072	0.065	0.076	0.049	0.028	0.017	0.014	0.030	0.037	UO	UO	UO	UO	UO	UO	UO	UO	--	0.113																							
31-Jul	UO	UO	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--																						
0.071 0.064 0.060 0.073 0.067 0.069 0.070 0.079 0.084 0.075 0.065 0.052 0.046 0.041 0.037 0.037 0.034 0.040 0.052 0.064 0.067 0.065 0.067 0.070																								Diurnal Average																									
0.199 0.202 0.192 0.202 0.194 0.196 0.266 0.246 0.363 0.305 0.270 0.227 0.186 0.161 0.114 0.148 0.169 0.183 0.227 0.265 0.247 0.201 0.208 0.246																								Diurnal Maximum																									
Z - zerospan C - Calibration UO - Unstable Operation																																																	



Wood Buffalo Environmental Association
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Barge Landing - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Barge Landing - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	128	19.39	19.39
0.006 - 0.05	262	39.70	59.09
0.06 - 0.1	209	31.67	90.76
> 0.1	61	9.24	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 744



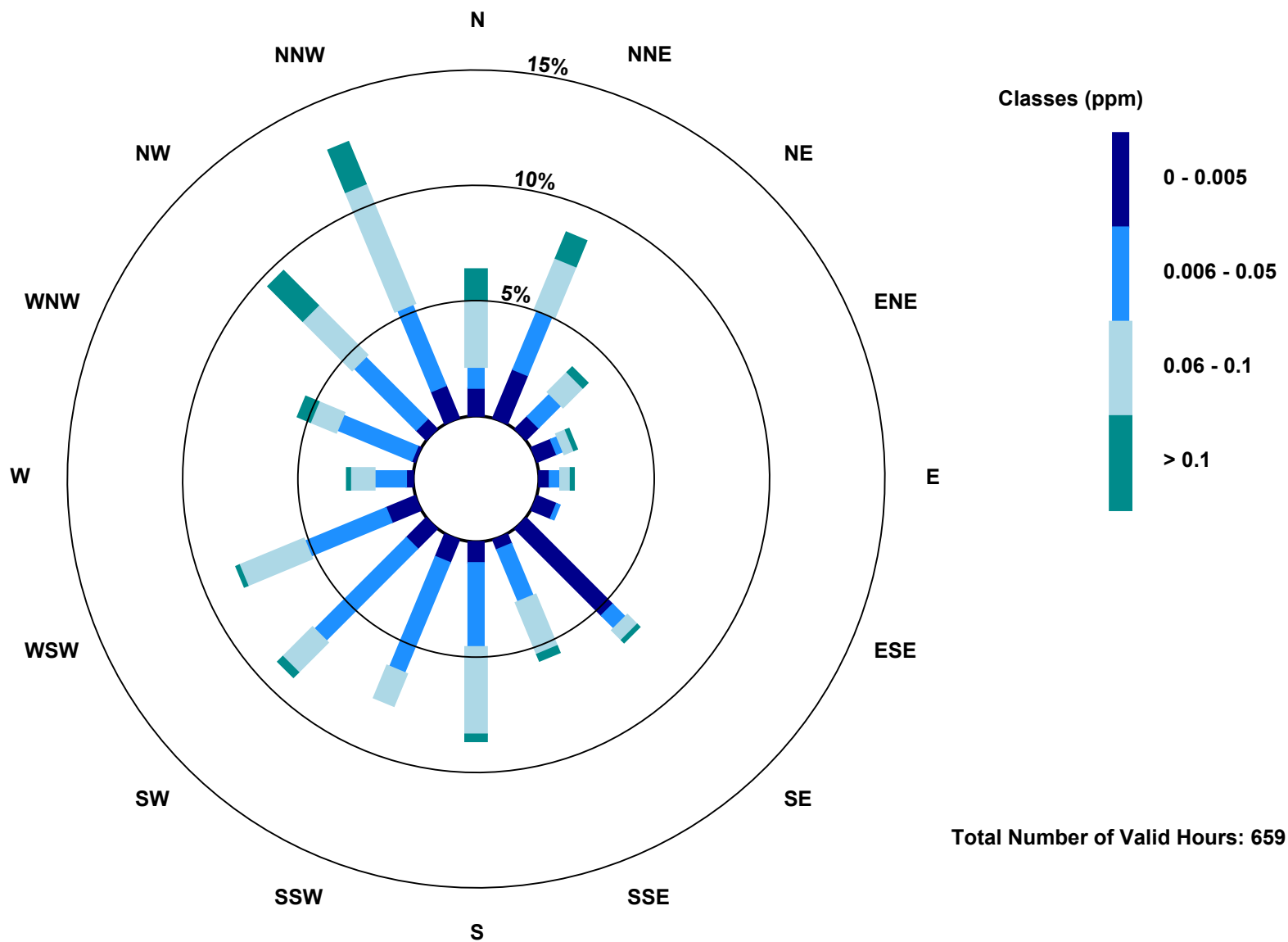
**Wood Buffalo Environmental Association
Frequency Distribution**

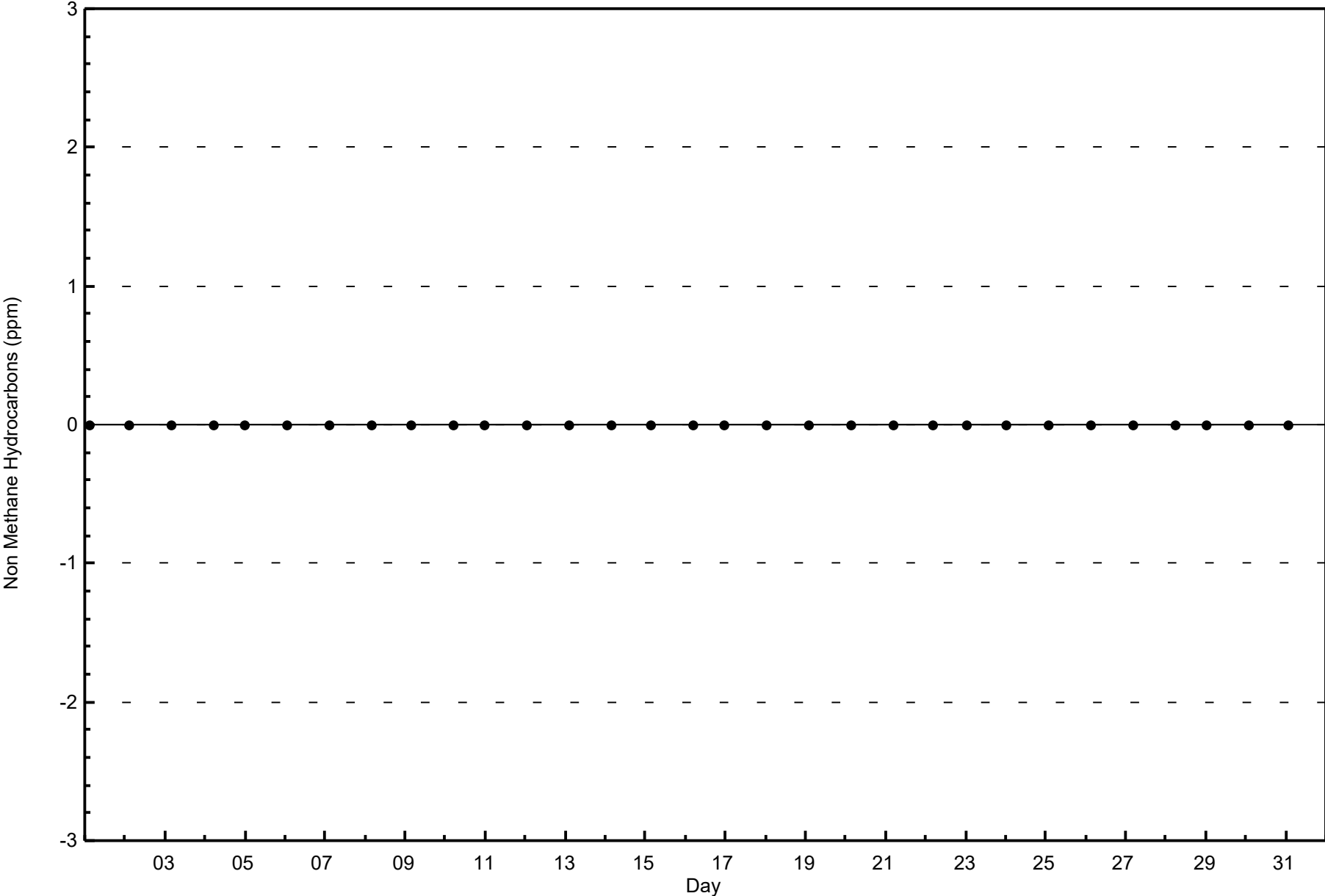
**Non Methane Hydrocarbons (NMHC) - ppm
Barge Landing - July 2023**

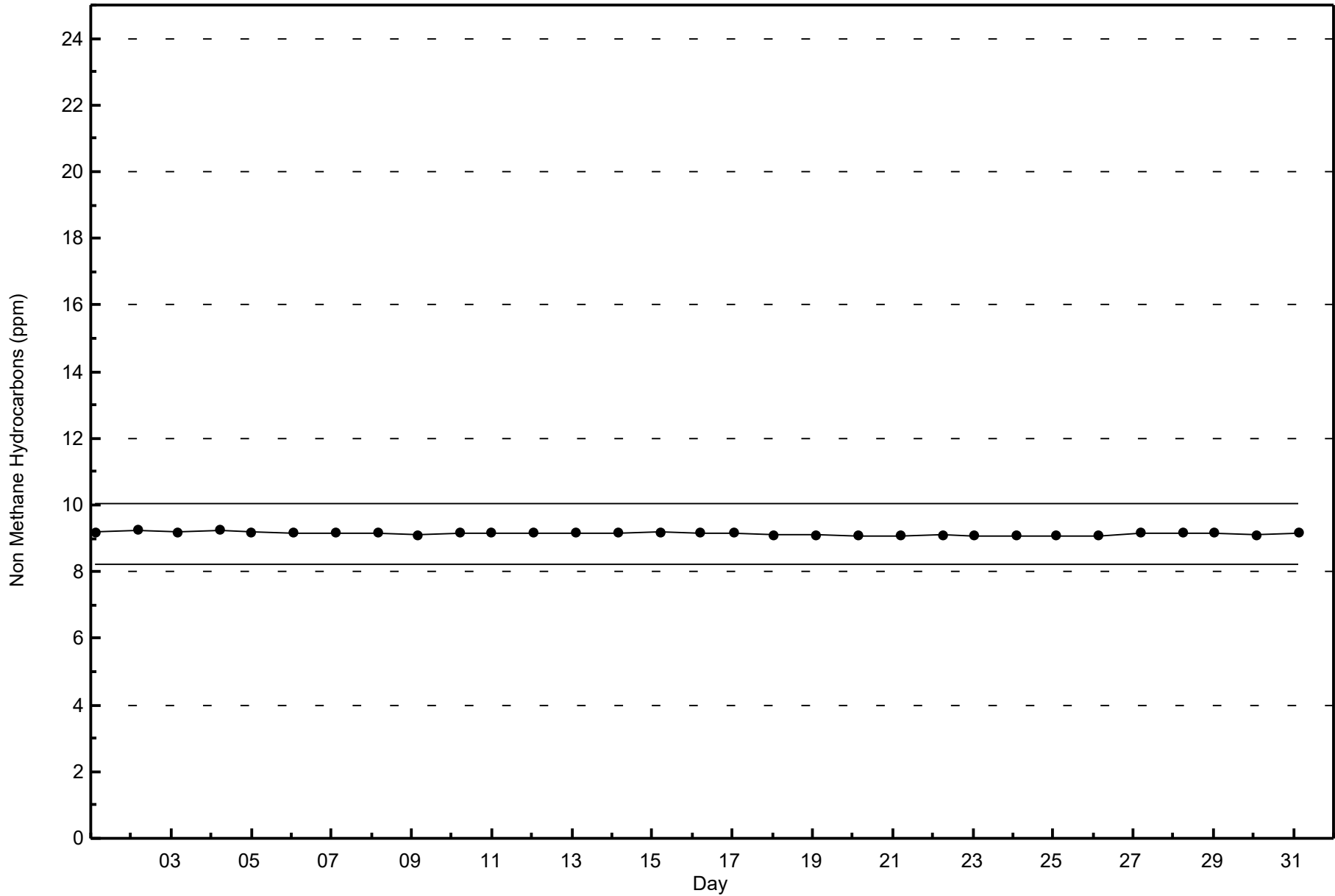
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	8	15	5	6	3	6	35	3	6	7	8	9	2	1	4	10	128
0.006 - 0.05	6	18	9	2	3	1	5	16	24	34	37	25	9	23	25	25	262
0.06 - 0.1	19	16	8	3	3	0	4	16	25	10	12	20	7	8	20	37	208
> 0.1	9	8	2	1	1	0	1	2	2	0	2	1	1	4	14	13	61
Totals	42	57	24	12	10	7	45	37	57	51	59	55	19	36	63	85	659

Total Number of Valid Hours: 659

Total Number of Hours: 744



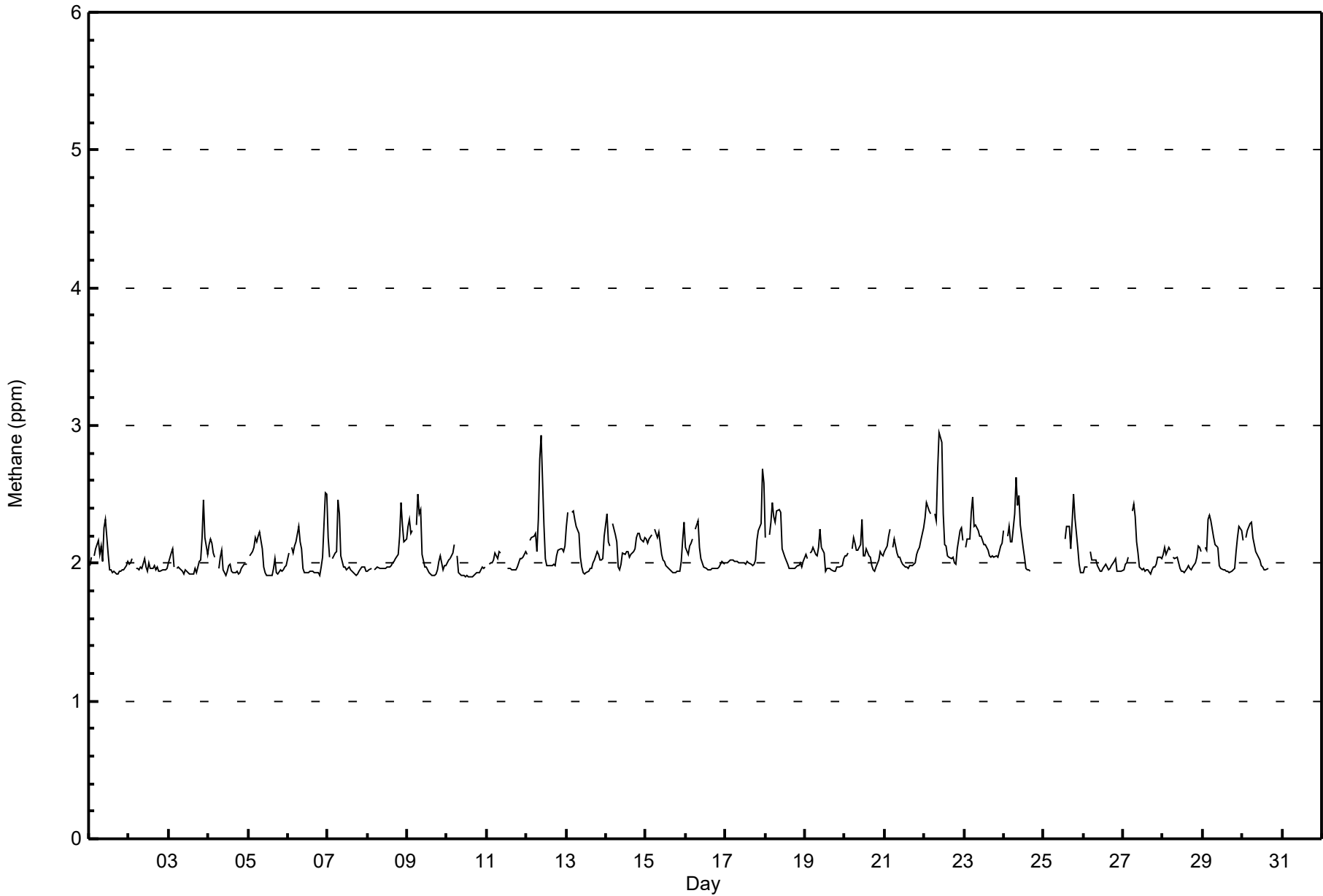






Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Barge Landing - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Barge Landing - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	385	58.33	58.33
2.1 - 3.0	275	41.67	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Barge Landing - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	21	40	18	7	4	7	39	22	32	25	44	32	12	20	24	38	385
2.1 - 3.0	21	17	6	5	6	0	6	15	25	26	15	23	7	16	39	47	274
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	42	57	24	12	10	7	45	37	57	51	59	55	19	36	63	85	659

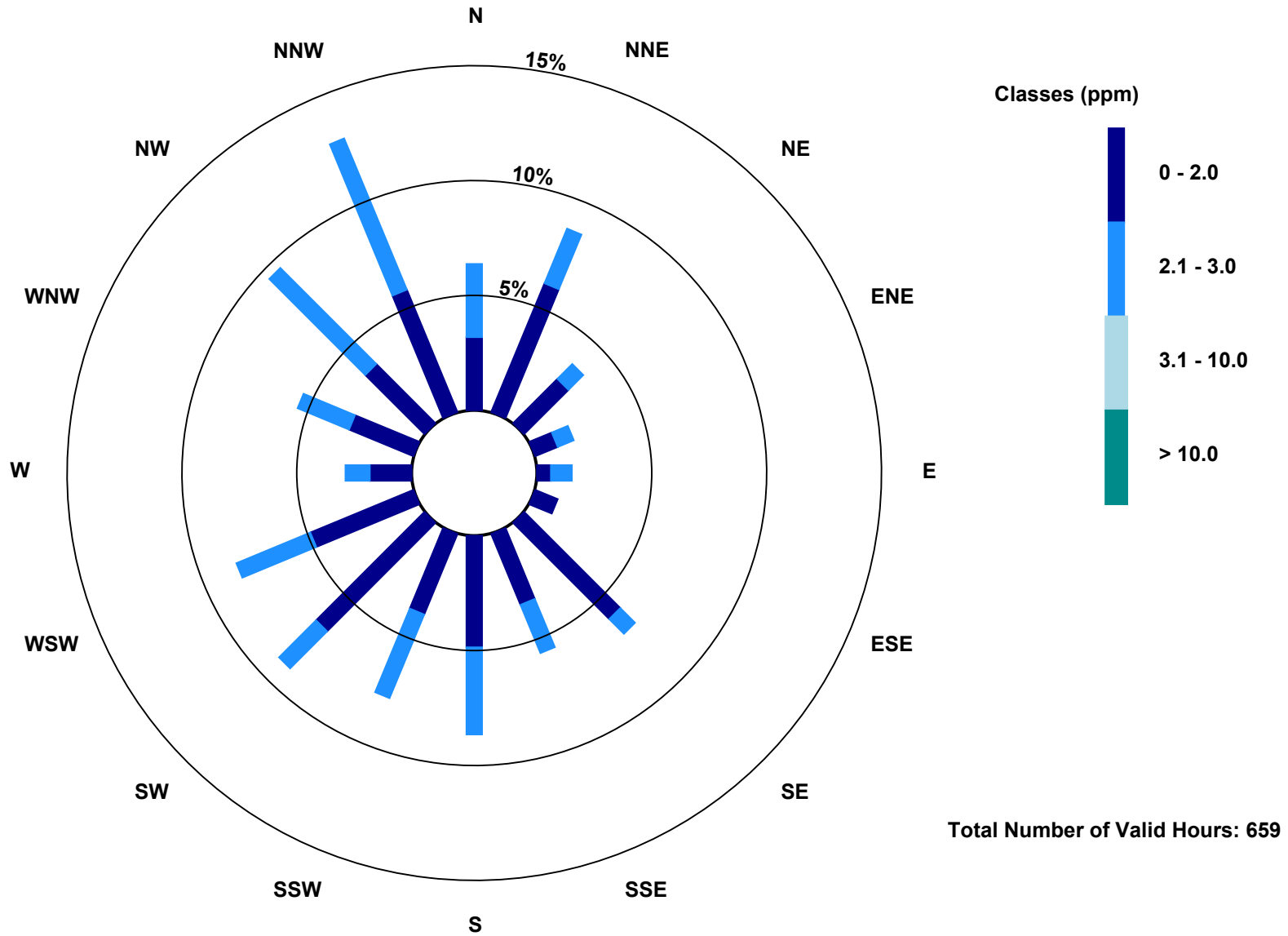
Total Number of Valid Hours: 659

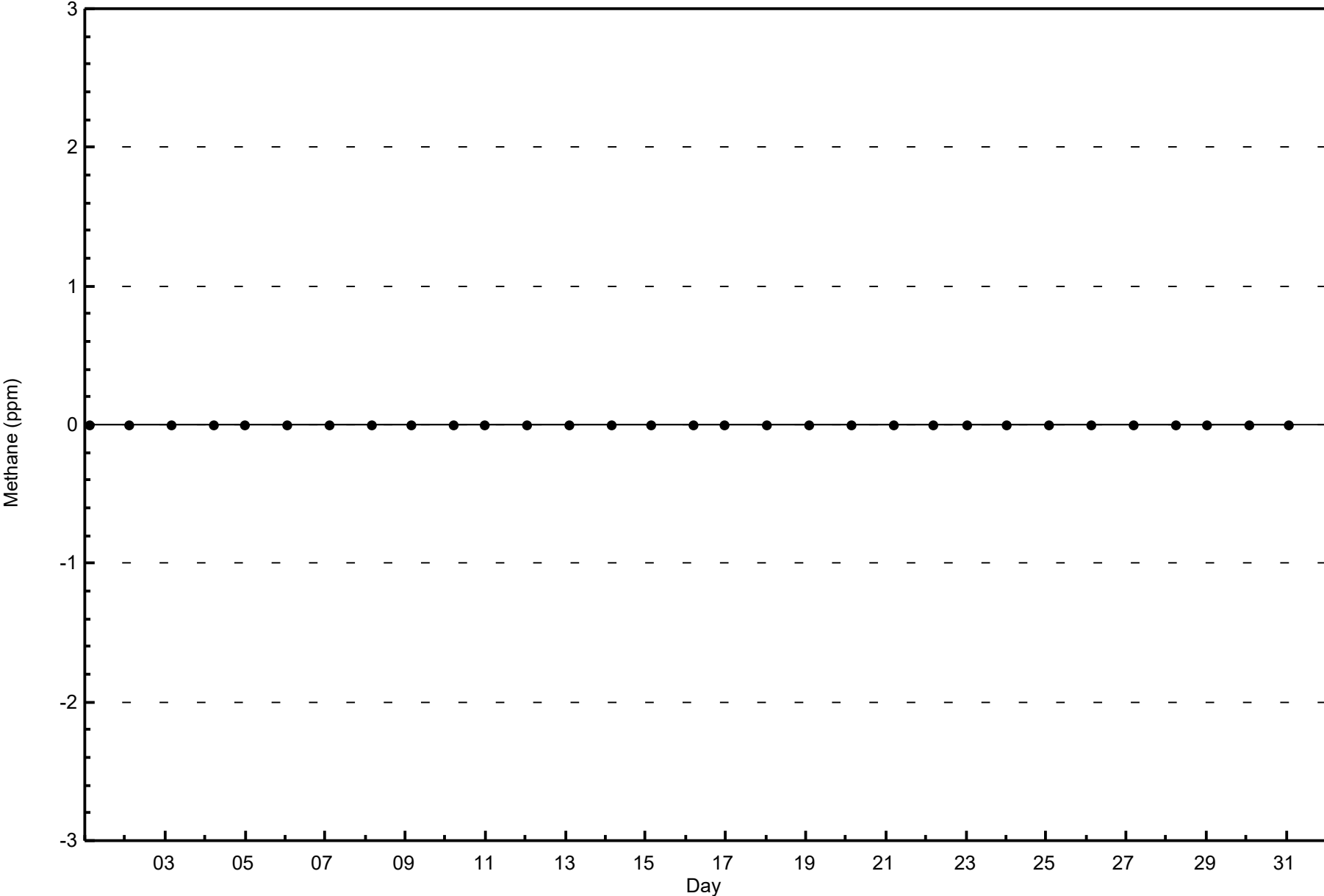
Total Number of Hours: 744

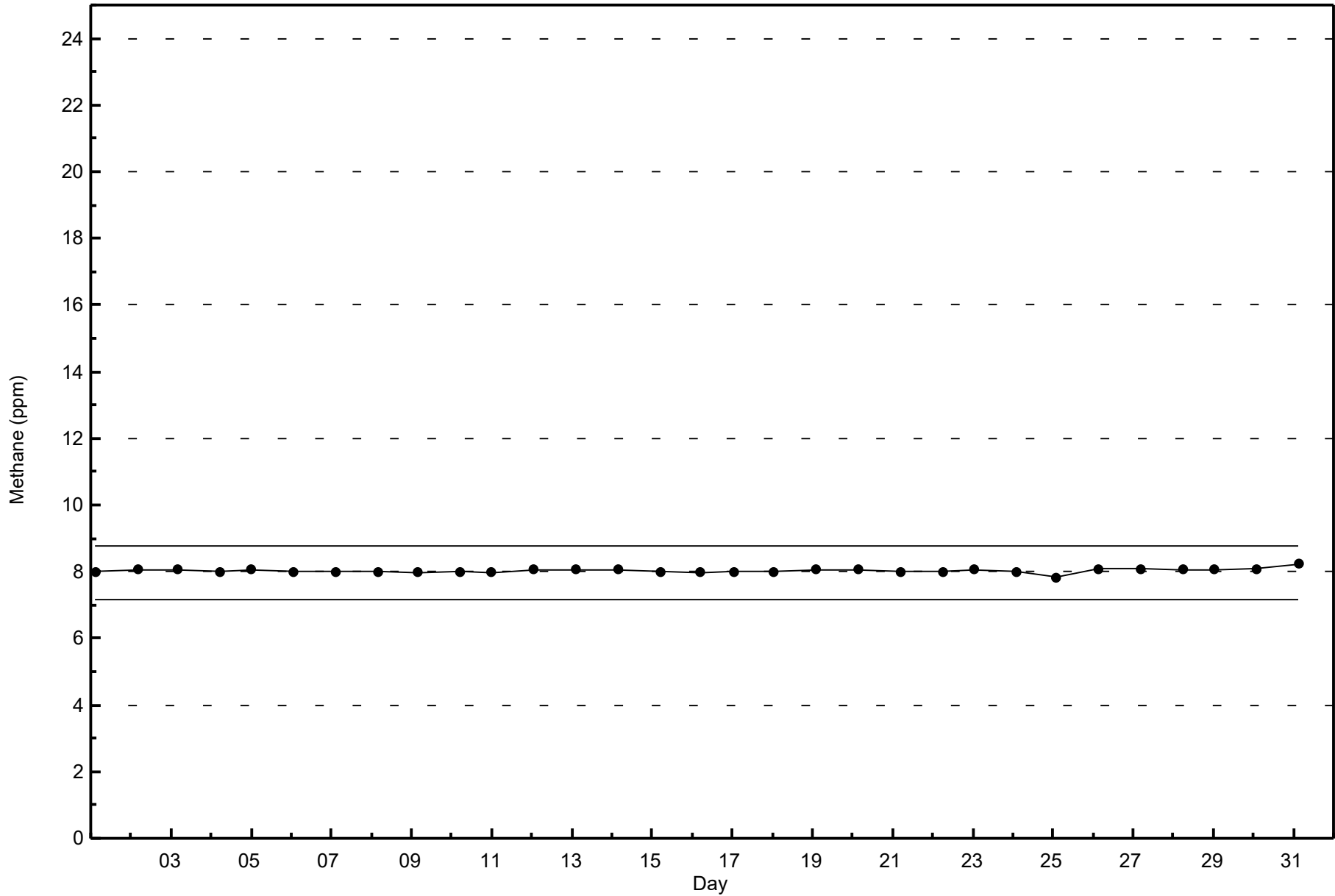


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Methane (CH₄) - ppm
Barge Landing







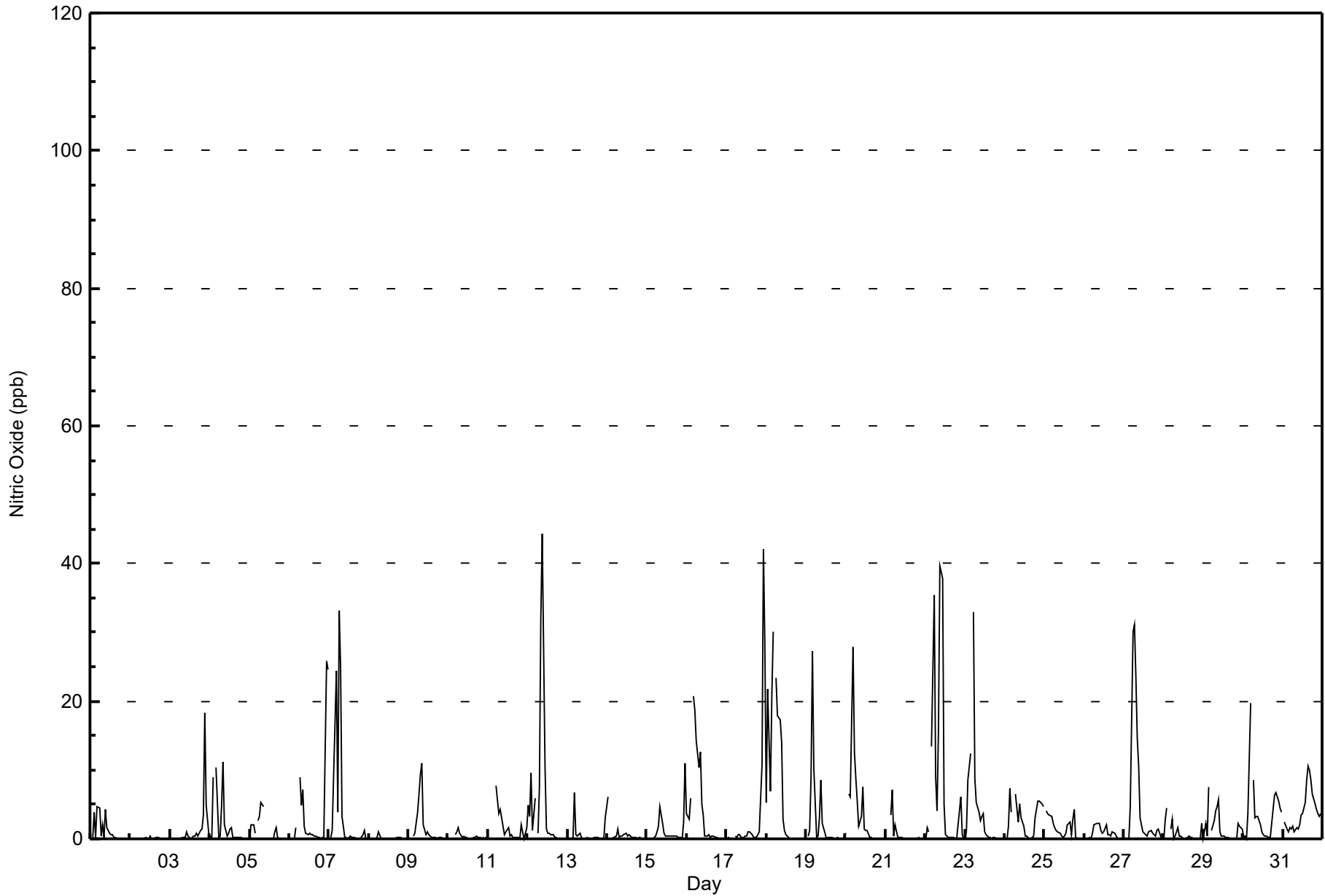


Maximum Value: 44.3 ppb on Jul 12 10:00		Maximum Daily Average: 7.5 ppb on Jul 22		Hours in Service: 744																						
Minimum Value: 0.0 ppb on Jul 1 21:00		Minimum Daily Average: 0.1 ppb on Jul 2		Hours of Data: 708																						
Maximum Diurnal Average: 8.3 ppb at hour 5		Minimum Diurnal Average: 0.6 ppb at hour 17		Hours of Missing Data: 36																						
Monthly Average: 2.57 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.4 Q ₃ = 2.1 P ₉₀ = 6.5 P ₉₉ = 32.0		Hours of Calibration: 36																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	Z	0.3	3.9	0.1	4.7	4.6	0.4	2.0	0.2	4.4	1.7	0.7	0.7	0.7	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.1	4.7
2-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.1	0.1	0.5	0.1	0.0	0.3	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5
3-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.1	0.3	0.2	0.1	0.9	0.4	0.0	0.3	0.4	0.4	0.9	0.4	1.1	1.5	3.4	18.4	4.9	0.5	1.5	18.4
4-Jul	0.3	0.2	8.9	Z	10.4	0.1	0.5	4.9	11.2	2.0	0.4	0.9	1.4	1.7	0.3	0.3	0.2	0.2	0.3	0.2	0.0	0.0	0.0	0.1	1.9	11.2
5-Jul	0.0	2.0	2.1	0.8	Z	2.7	3.3	5.3	4.8	C	C	C	C	C	0.0	1.1	1.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.3	5.3
6-Jul	0.0	0.0	0.0	0.0	1.6	Z	8.9	4.9	7.1	1.7	0.8	0.7	0.8	0.7	0.7	0.5	0.3	0.2	0.2	0.0	0.2	0.2	25.9	24.7	3.5	25.9
7-Jul	Z	0.3	1.2	9.2	24.3	4.0	33.1	24.9	3.3	0.3	0.1	0.1	0.1	0.4	0.2	0.1	0.0	0.0	0.0	0.1	0.6	1.3	0.0	0.0	4.5	33.1
8-Jul	0.0	Z	0.0	0.0	0.0	0.3	1.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.1	1.0
9-Jul	0.0	0.0	Z	0.3	0.8	3.8	6.5	9.4	10.9	2.1	0.6	1.0	0.5	0.3	0.2	0.3	0.2	0.1	0.2	0.1	0.1	0.0	0.0	0.2	1.6	10.9
10-Jul	0.0	0.0	0.0	Z	0.6	0.9	1.6	0.8	0.3	0.3	0.3	0.2	0.0	0.1	0.1	0.1	0.3	0.4	0.2	0.1	0.1	0.2	0.1	0.2	0.3	1.6
11-Jul	0.0	0.0	0.0	0.0	Z	7.7	3.6	4.3	3.1	1.9	0.6	1.0	1.5	0.5	0.6	0.2	0.2	0.2	0.1	0.0	2.1	1.0	0.0	1.7	1.3	7.7
12-Jul	4.9	3.3	9.6	1.3	6.0	Z	0.8	7.5	32.0	44.3	10.6	1.5	0.8	0.7	0.7	0.5	0.3	0.1	0.1	0.0	0.1	0.0	0.0	0.0	5.4	44.3
13-Jul	Z	0.0	0.0	0.3	6.6	0.6	0.5	0.8	0.1	0.0	0.0	0.1	0.2	0.1	0.0	0.1	0.2	0.2	0.1	0.0	0.0	0.0	0.0	3.0	0.6	6.6
14-Jul	6.1	Z	0.0	0.0	0.2	0.4	1.4	0.2	0.5	0.3	0.5	0.8	0.5	0.7	0.4	0.2	0.2	0.2	0.1	0.2	0.1	0.0	0.0	0.0	0.6	6.1
15-Jul	0.1	0.0	Z	0.1	0.2	0.4	1.1	1.8	4.6	2.2	0.9	0.4	0.5	0.5	0.3	0.3	0.4	0.5	0.4	0.3	0.2	0.1	2.3	11.0	1.2	11.0
16-Jul	3.7	2.8	5.9	Z	20.7	18.7	14.3	10.4	12.6	5.1	3.5	0.4	0.5	0.5	0.3	0.3	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.0	4.4	20.7
17-Jul	0.0	0.2	0.0	0.1	Z	0.5	0.3	0.7	0.6	0.3	0.1	0.4	0.5	1.1	1.0	0.5	0.2	0.2	0.3	0.6	1.0	10.7	42.2	28.2	3.9	42.2
18-Jul	5.3	21.8	6.9	20.7	30.1	Z	23.5	18.0	17.3	14.1	2.8	1.2	0.6	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	30.1
19-Jul	Z	0.3	1.2	8.9	27.3	10.1	0.3	0.4	3.0	8.6	2.3	0.8	0.1	0.2	0.2	0.1	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.6	2.8	27.3
20-Jul	0.8	Z	6.5	6.0	27.8	12.6	8.6	5.5	1.9	3.3	7.5	1.4	1.2	1.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	27.8
21-Jul	0.0	0.0	Z	3.5	7.1	0.3	2.0	0.2	0.2	0.3	0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.6	7.1
22-Jul	0.0	1.7	1.0	Z	13.4	35.4	8.9	4.1	15.7	39.7	37.9	5.1	0.6	0.5	0.3	0.2	0.1	0.1	0.0	0.0	1.9	6.0	0.6	0.1	7.5	39.7
23-Jul	0.1	1.2	8.6	12.5	Z	32.9	8.8	5.3	3.8	2.7	3.2	3.8	1.1	0.5	0.1	0.2	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	3.7	32.9
24-Jul	0.0	0.0	1.8	7.2	3.9	Z	6.4	4.4	2.4	5.1	3.1	1.9	0.3	0.3	0.3	0.1	0.0	0.5	3.0	4.4	5.6	5.4	5.0	4.7	2.9	7.2
25-Jul	Z	4.1	3.8	3.5	3.2	2.3	1.6	1.1	1.0	0.7	0.5	0.3	0.4	0.8	2.1	2.4	0.6	2.9	4.2	0.3	0.0	0.0	0.0	0.0	1.6	4.2
26-Jul	0.0	Z	0.0	0.2	0.1	0.9	1.9	2.3	2.3	2.2	1.3	0.9	1.0	2.0	0.7	0.7	0.4	1.0	0.8	0.4	0.0	0.0	0.0	0.0	0.8	2.3
27-Jul	0.0	0.0	Z	0.0	4.6	30.1	31.2	23.5	14.7	10.6	3.0	1.0	0.8	0.6	0.4	1.1	1.1	0.7	0.7	0.5	1.3	1.4	0.3	0.1	5.6	31.2
28-Jul	0.0	2.8	4.4	Z	1.4	2.9	0.1	0.5	1.6	0.5	0.4	0.1	0.0	0.0	0.3	0.5	0.2	0.2	0.1	0.1	0.0	0.0	0.1	2.1	0.8	4.4
29-Jul	0.1	2.3	0.4	7.6	Z	1.2	2.6	4.0	4.6	5.7	1.0	0.4	0.3	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	2.3	1.7	1.4	1.6	7.6
30-Jul	0.1	0.3	0.1	3.7	19.8	Z	8.5	3.0	3.2	3.2	2.0	1.1	0.5	0.4	0.3	0.2	0.1	2.3	4.2	6.2	6.6	5.5	4.5	4.0	3.5	19.8
31-Jul	Z	2.4	1.3	1.0	1.6	1.5	1.8	0.9	1.6	1.5	2.0	3.4	3.7	5.4	8.5	10.5	9.9	8.5	6.5	5.1	4.3	3.6	3.3	3.6	4.0	10.5
																								Diurnal Average		
																								Diurnal Maximum		
0.9 1.8 2.6 3.4 8.3 6.7 5.9 4.9 5.3 5.4 3.0 1.0 0.6 0.7 0.6 0.7 0.6 0.6 0.7 0.7 0.9 1.8 2.9 2.8																										
6.1 21.8 9.6 20.7 30.1 35.4 33.1 24.9 32.0 44.3 37.9 5.1 3.7 5.4 8.5 10.5 9.9 8.5 6.5 6.2 6.6 18.4 42.2 28.2																										
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Barge Landing - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Barge Landing - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	685	96.75	96.75
21 - 40	21	2.97	99.72
41 - 80	2	0.28	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Barge Landing - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	43	55	28	14	11	9	46	41	61	58	63	56	22	35	60	83	685
21 - 40	3	1	0	1	1	0	1	0	1	2	3	1	0	1	1	5	21
11 - 80	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	47	56	28	15	12	9	47	41	62	60	66	57	22	36	62	88	708

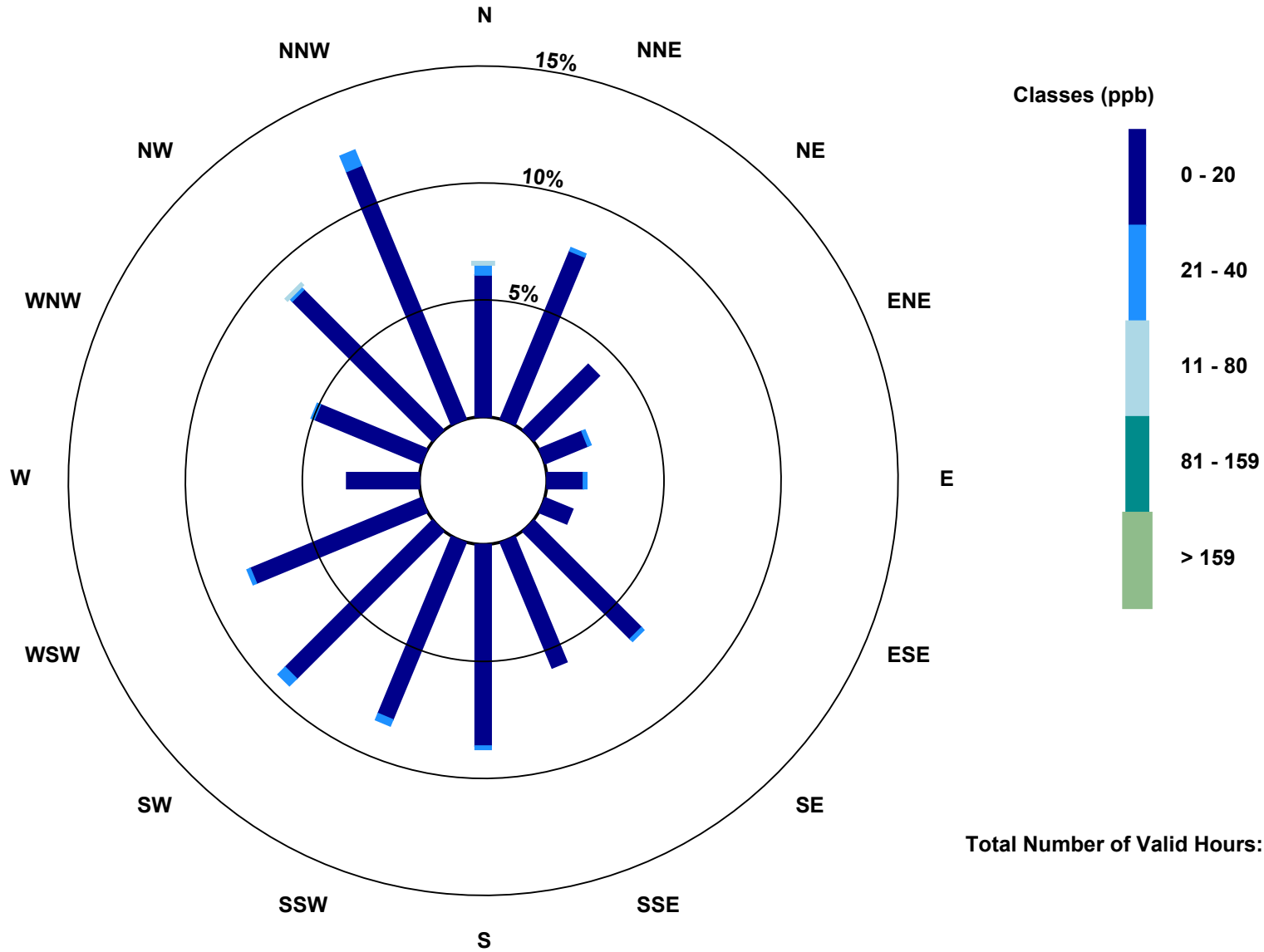
Total Number of Valid Hours: 708

Total Number of Hours: 744

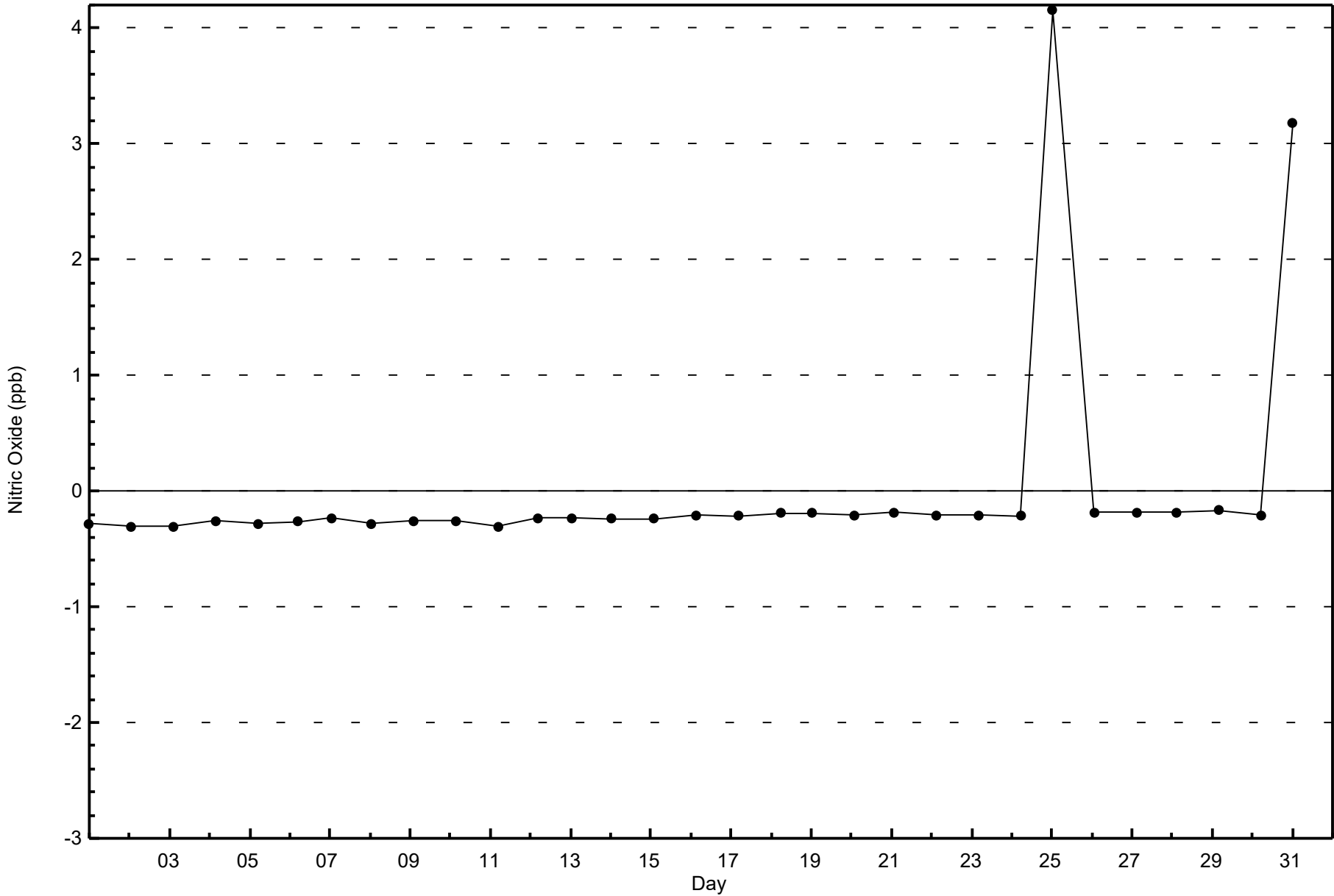


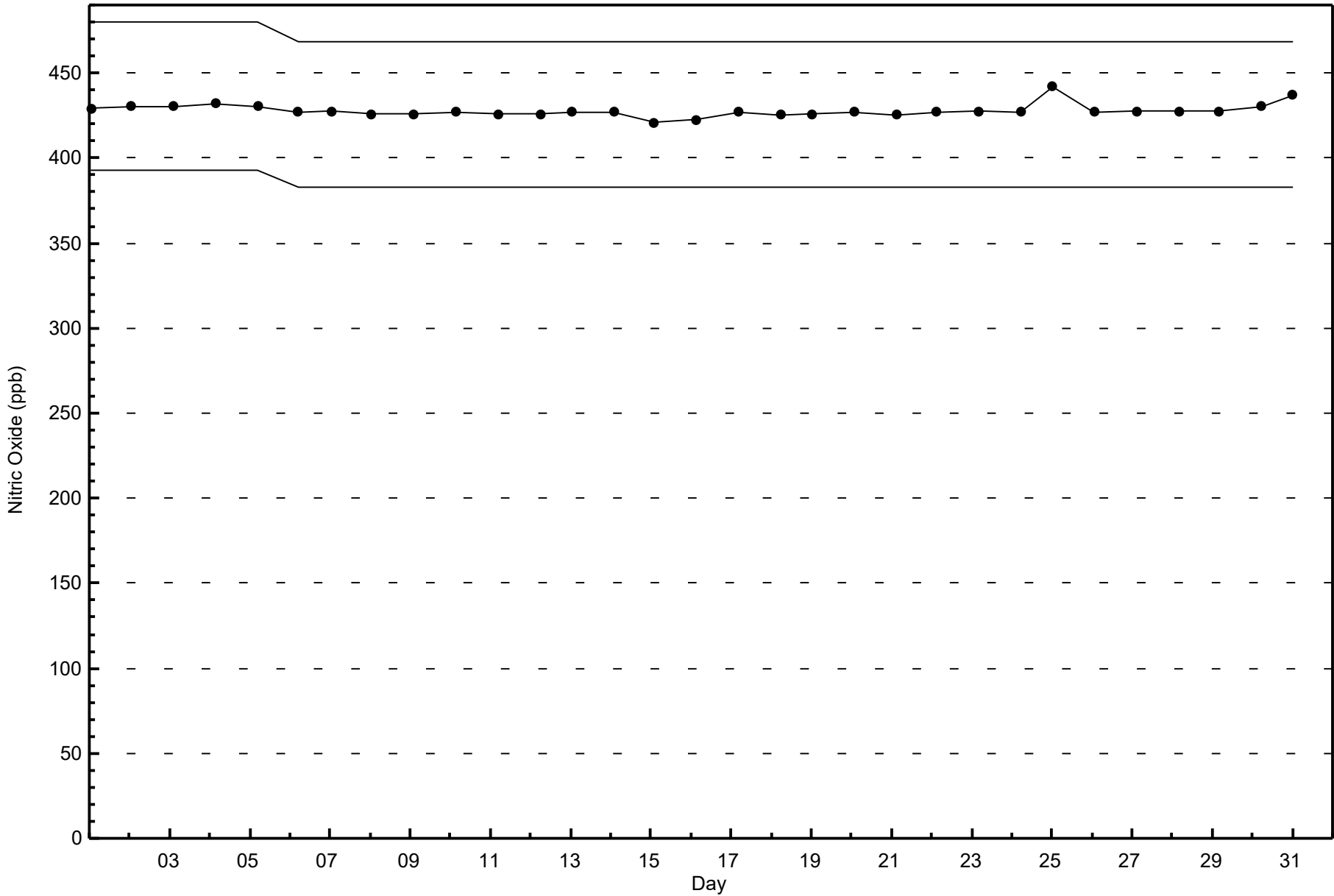
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Barge Landing



Total Number of Valid Hours: 708







Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb
Barge Landing - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 30.6 ppb on Jul 22 11:00	Maximum Daily Average: 9.8 ppb on Jul 22		Hours of Data:	708
Minimum Value: 0.2 ppb on Jul 3 13:00	Minimum Daily Average: 1.6 ppb on Jul 2		Hours of Missing Data:	36
Maximum Diurnal Average: 7.4 ppb at hour 22	Minimum Diurnal Average: 2.6 ppb at hour 15		Hours of Calibration:	36
Monthly Average: 5.38 ppb	Percentiles: P ₁ = 0.3 P ₁₀ = 0.9 Q ₁ = 2.0 Median = 3.9 Q ₃ = 7.5 P ₉₀ = 11.8 P ₉₉ = 21.0		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	Z	8.7	10.6	5.6	11.9	14.7	6.6	11.3	3.5	13.2	10.5	7.1	6.1	7.0	3.7	4.2	1.6	0.7	0.7	0.7	0.8	1.0	1.3	3.4	5.9	14.7
2-Jul	1.7	Z	4.0	1.2	0.8	0.7	0.7	1.7	1.2	5.1	2.0	1.1	3.8	0.7	0.5	3.0	2.1	2.9	0.6	0.5	0.5	0.5	0.7	0.7	1.6	5.1
3-Jul	2.7	5.2	Z	1.8	3.2	2.4	2.6	3.7	1.6	0.5	2.0	1.7	0.2	0.8	1.0	1.3	3.1	2.0	6.2	9.4	16.7	23.4	19.6	8.1	5.2	23.4
4-Jul	8.6	9.2	7.1	Z	2.7	0.6	0.8	4.8	11.9	3.9	1.5	2.6	4.3	5.4	2.1	2.4	2.3	1.8	2.5	2.6	2.9	3.4	4.1	5.4	4.0	11.9
5-Jul	6.7	9.9	11.9	8.7	Z	10.6	8.6	8.9	7.5	C	C	C	C	C	0.5	4.9	8.3	2.9	1.0	2.4	0.8	2.7	2.9	1.5	5.6	11.9
6-Jul	5.3	6.4	6.5	5.1	9.2	Z	11.7	9.7	11.2	4.1	2.1	2.0	2.5	2.2	2.2	2.0	1.6	1.5	2.3	0.9	6.5	10.6	20.0	20.4	6.3	20.4
7-Jul	Z	4.5	3.4	6.0	8.9	5.2	12.9	14.8	5.3	3.2	3.5	2.2	2.4	3.6	2.3	1.3	0.6	0.5	0.9	2.0	5.4	6.3	1.3	0.3	4.2	14.8
8-Jul	0.3	Z	0.5	0.3	0.2	1.0	3.4	0.3	0.3	0.3	1.1	0.9	1.1	1.0	1.4	2.1	2.8	4.9	4.8	5.6	9.2	11.0	7.2	5.0	2.8	11.0
9-Jul	6.4	7.8	Z	7.9	10.9	10.8	13.1	15.2	17.7	5.6	1.8	2.6	1.6	1.2	1.0	1.0	1.2	1.1	2.2	3.8	7.1	3.3	7.3	16.1	6.4	17.7
10-Jul	7.2	3.9	3.9	Z	5.5	4.2	3.9	2.0	0.8	0.9	0.8	0.5	0.4	0.4	0.5	0.8	1.7	3.6	2.7	4.5	4.2	3.3	2.2	4.5	2.7	7.2
11-Jul	1.5	1.7	2.5	2.2	Z	13.4	10.2	10.8	8.0	6.0	2.9	4.0	5.9	2.5	3.1	1.5	1.6	2.3	2.6	2.0	8.4	10.3	3.0	4.6	4.8	13.4
12-Jul	7.5	7.2	8.9	7.2	6.0	Z	2.1	7.5	21.0	30.1	16.1	5.2	3.8	3.6	3.5	3.7	4.0	3.5	4.4	5.1	15.0	9.3	5.2	5.7	8.1	30.1
13-Jul	Z	16.7	13.8	10.8	8.9	7.9	9.5	5.8	2.4	1.1	0.8	0.7	1.3	0.6	0.5	1.7	4.4	5.5	11.8	12.2	6.9	5.7	6.0	20.5	6.8	20.5
14-Jul	29.0	Z	9.5	7.2	15.1	7.7	9.5	2.5	2.2	3.5	7.1	7.5	7.5	7.2	4.5	3.7	4.3	5.9	7.3	7.8	8.6	7.8	6.2	6.1	7.7	29.0
15-Jul	5.6	2.9	Z	5.7	5.4	5.9	7.1	9.2	11.8	6.9	3.4	2.1	1.5	1.2	0.7	0.6	0.6	1.3	1.6	1.8	3.4	7.6	8.6	10.8	4.6	11.8
16-Jul	6.4	3.4	4.2	Z	4.0	3.7	4.7	6.5	13.0	8.1	7.1	1.5	1.8	2.6	1.7	2.2	2.3	2.7	3.1	1.6	0.7	1.2	1.4	0.9	3.7	13.0
17-Jul	1.4	3.9	1.3	1.7	Z	2.8	2.4	3.2	2.4	1.9	1.9	2.3	2.3	4.6	3.3	2.1	1.4	1.2	3.2	8.9	11.8	15.5	15.6	12.6	4.7	15.6
18-Jul	9.0	11.6	9.5	11.2	11.0	Z	9.7	12.0	14.1	17.6	11.1	6.7	5.0	3.3	2.3	2.1	1.8	2.0	1.7	1.2	1.3	1.4	0.9	1.8	6.4	17.6
19-Jul	Z	3.0	5.3	6.1	8.5	5.7	0.9	1.1	4.4	11.3	7.7	5.4	1.0	2.6	3.1	3.4	3.8	1.1	0.7	2.0	1.8	0.8	0.6	1.6	3.6	11.3
20-Jul	3.6	Z	3.0	2.7	4.7	3.2	3.3	3.6	4.1	7.4	15.5	5.9	6.5	8.9	5.7	4.5	1.9	1.1	0.8	2.3	4.8	6.0	3.9	4.2	4.7	15.5
21-Jul	2.1	2.1	Z	4.4	4.5	1.1	2.8	0.9	0.9	1.5	2.1	1.4	0.8	0.6	0.9	1.8	1.4	1.2	2.8	7.8	15.2	21.8	20.8	13.1	4.9	21.8
22-Jul	11.1	6.8	4.6	Z	4.8	7.5	5.4	7.7	16.2	26.6	30.6	18.2	6.9	5.1	3.7	3.5	3.3	3.2	1.5	1.1	11.3	20.2	13.7	13.4	9.8	30.6
23-Jul	11.7	11.2	14.2	14.2	Z	11.2	11.7	9.5	8.0	8.6	9.2	11.0	7.3	6.0	3.0	2.9	2.3	5.0	3.4	2.7	3.7	3.2	3.4	3.0	7.2	14.2
24-Jul	7.1	4.8	4.5	7.6	5.7	Z	8.2	8.7	6.5	12.9	13.0	13.0	6.4	5.1	5.0	3.3	2.3	3.0	4.9	4.2	8.7	14.8	11.6	9.5	7.4	14.8
25-Jul	Z	13.6	9.5	11.4	9.1	8.7	8.7	3.4	4.1	2.2	3.4	5.0	8.2	6.7	11.3	14.1	7.2	14.5	21.3	9.6	4.2	1.3	0.4	0.6	7.8	21.3
26-Jul	0.9	Z	4.0	3.1	2.2	5.1	5.3	5.6	5.4	4.5	3.1	2.5	3.6	5.9	4.1	3.0	3.1	7.1	8.7	7.5	3.0	3.2	4.1	3.9	4.3	8.7
27-Jul	3.9	5.7	Z	12.3	16.7	18.1	17.6	17.5	15.1	12.8	5.8	3.5	2.1	1.9	2.5	3.5	3.1	2.6	4.5	5.2	6.8	6.3	4.0	2.1	7.5	18.1
28-Jul	0.8	2.5	3.0	Z	1.3	1.8	0.5	0.8	2.0	1.4	1.7	1.0	0.7	0.5	2.1	4.1	2.6	2.2	1.8	2.6	3.1	8.8	15.7	11.9	3.2	15.7
29-Jul	4.8	14.0	9.8	10.3	Z	6.4	6.7	6.9	6.2	7.4	2.5	2.0	1.9	1.6	1.3	1.2	1.0	0.8	0.9	0.9	4.7	11.7	10.1	12.2	5.4	14.0
30-Jul	12.9	8.3	8.1	11.7	13.6	Z	11.4	7.4	7.7	7.8	6.2	4.0	2.6	2.1	2.1	2.2	1.8	1.5	2.0	5.2	4.5	5.0	4.9	3.0	5.9	13.6
31-Jul	Z	3.2	1.8	1.2	5.8	9.1	9.4	6.0	6.6	3.6	2.5	2.0	1.0	0.9	1.3	1.7	1.5	2.3	2.7	2.2	2.1	2.7	4.4	5.8	3.5	9.4

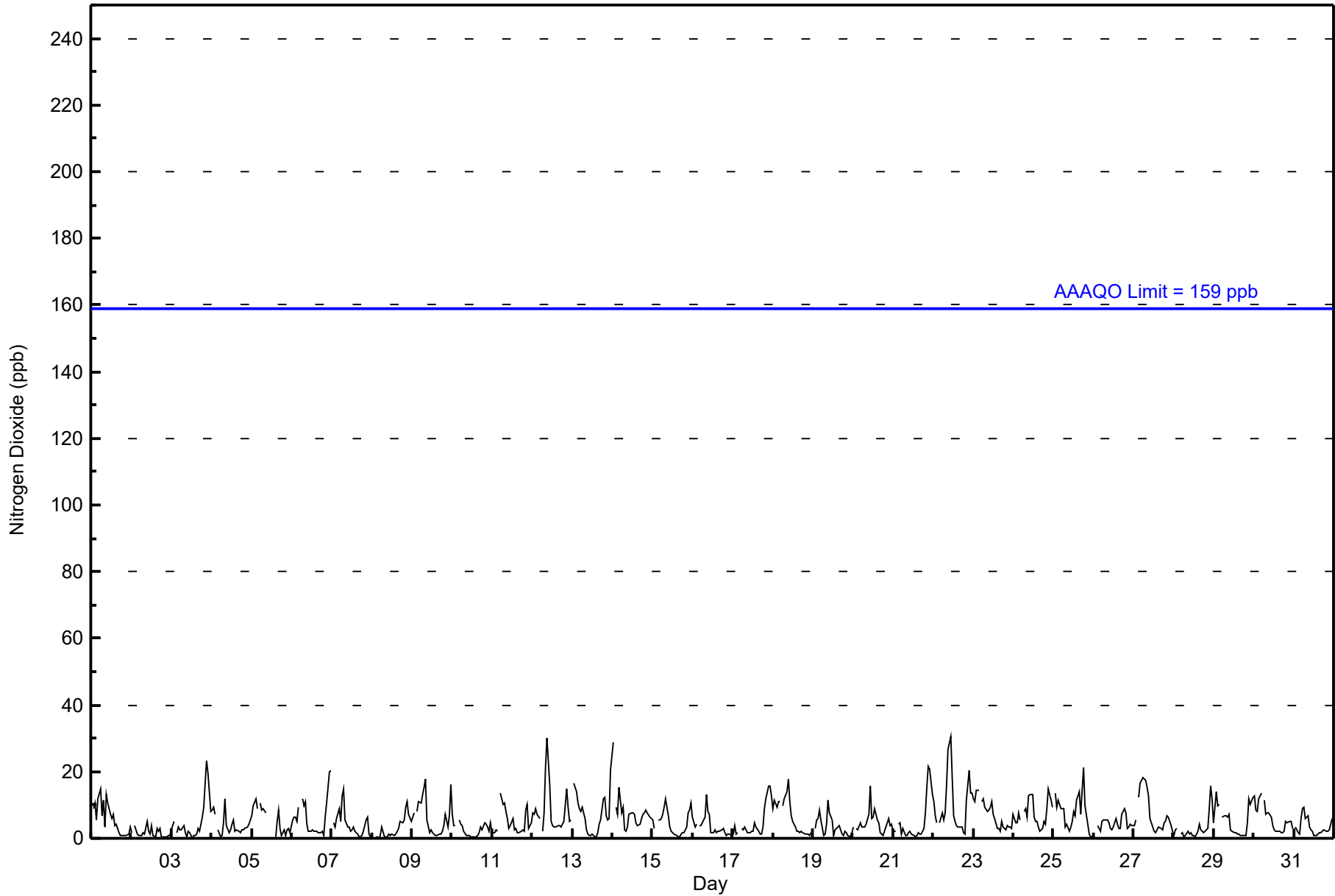
6.3	6.9	6.4	6.4	6.9	6.5	6.8	6.7	7.2	7.3	6.0	4.2	3.4	3.2	2.6	2.9	2.6	3.0	3.7	4.1	5.9	7.4	6.8	6.9	Diurnal Average	
29.0	16.7	14.2	14.2	16.7	18.1	17.6	17.5	21.0	30.1	30.6	18.2	8.2	8.9	11.3	14.1	8.3	14.5	21.3	12.2	16.7	23.4	20.8	20.5	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Barge Landing - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Barge Landing - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	698	98.59	98.59
21 - 40	10	1.41	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Barge Landing - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	45	55	28	14	12	9	47	41	62	60	66	57	22	35	60	85	698
21 - 40	2	1	0	1	0	0	0	0	0	0	0	0	0	1	2	3	10
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	47	56	28	15	12	9	47	41	62	60	66	57	22	36	62	88	708

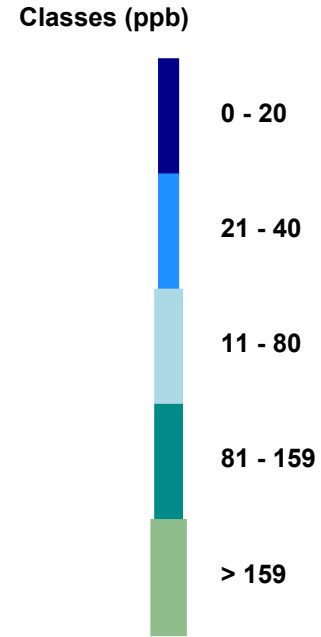
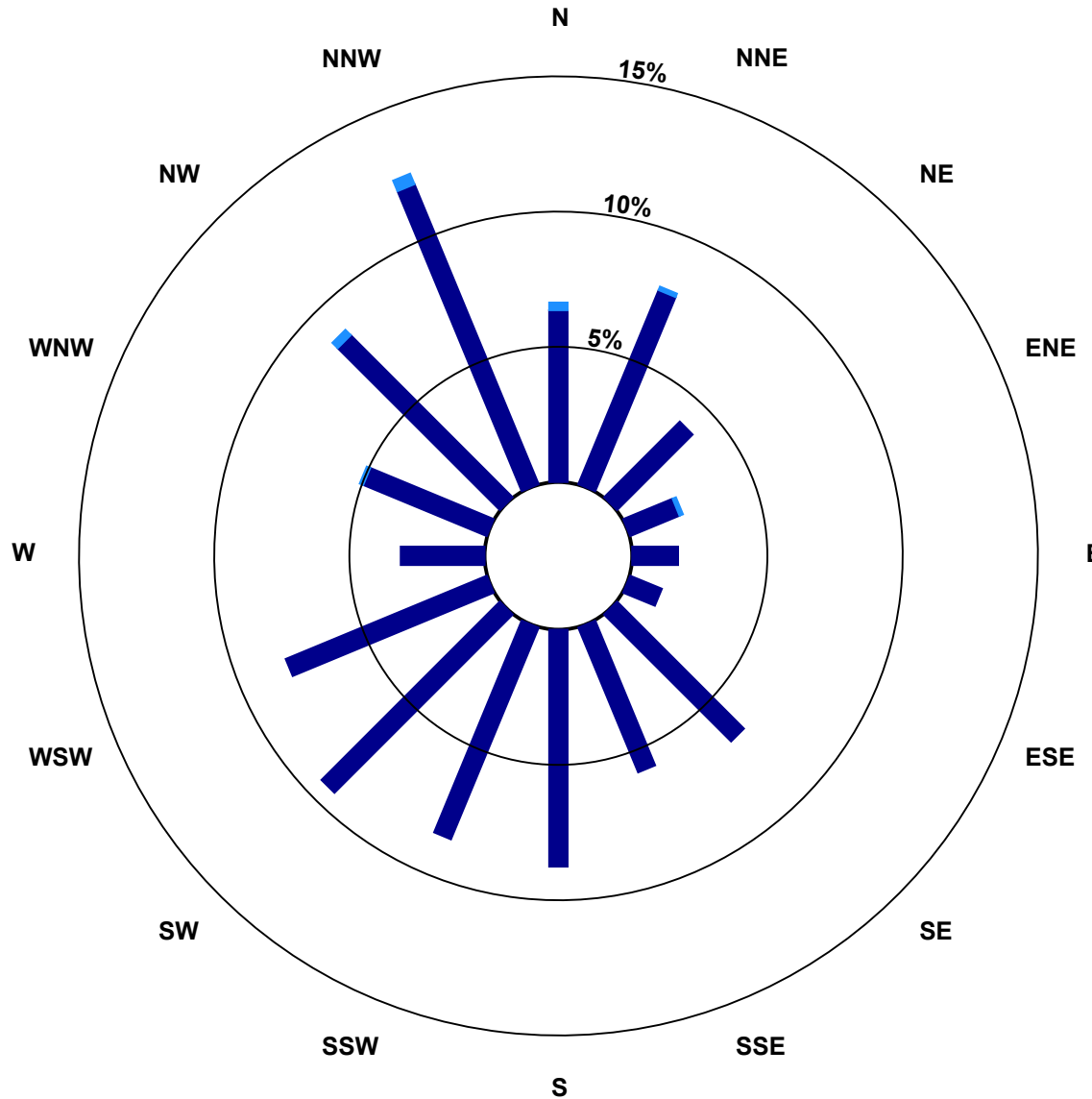
Total Number of Valid Hours: 708

Total Number of Hours: 744

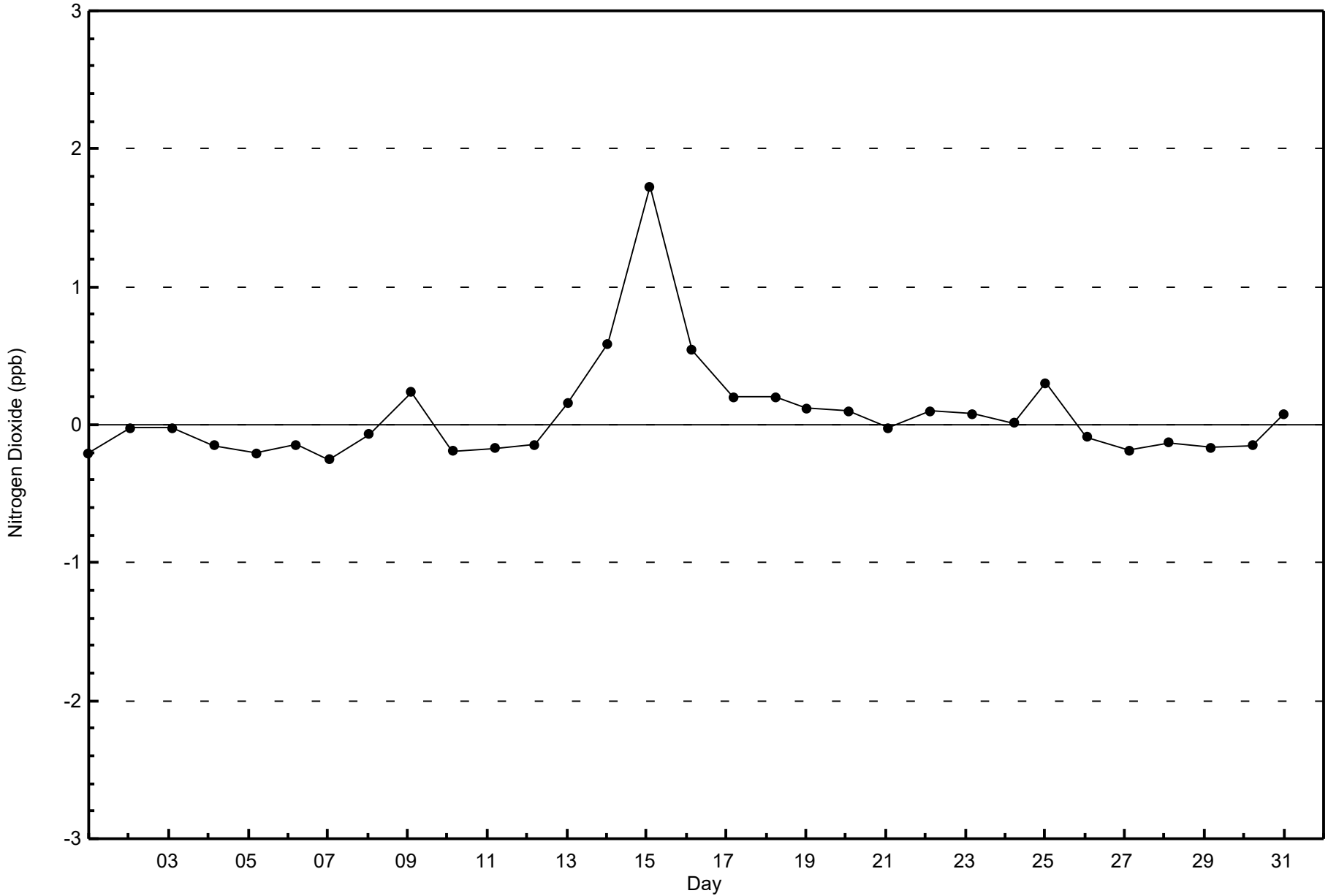


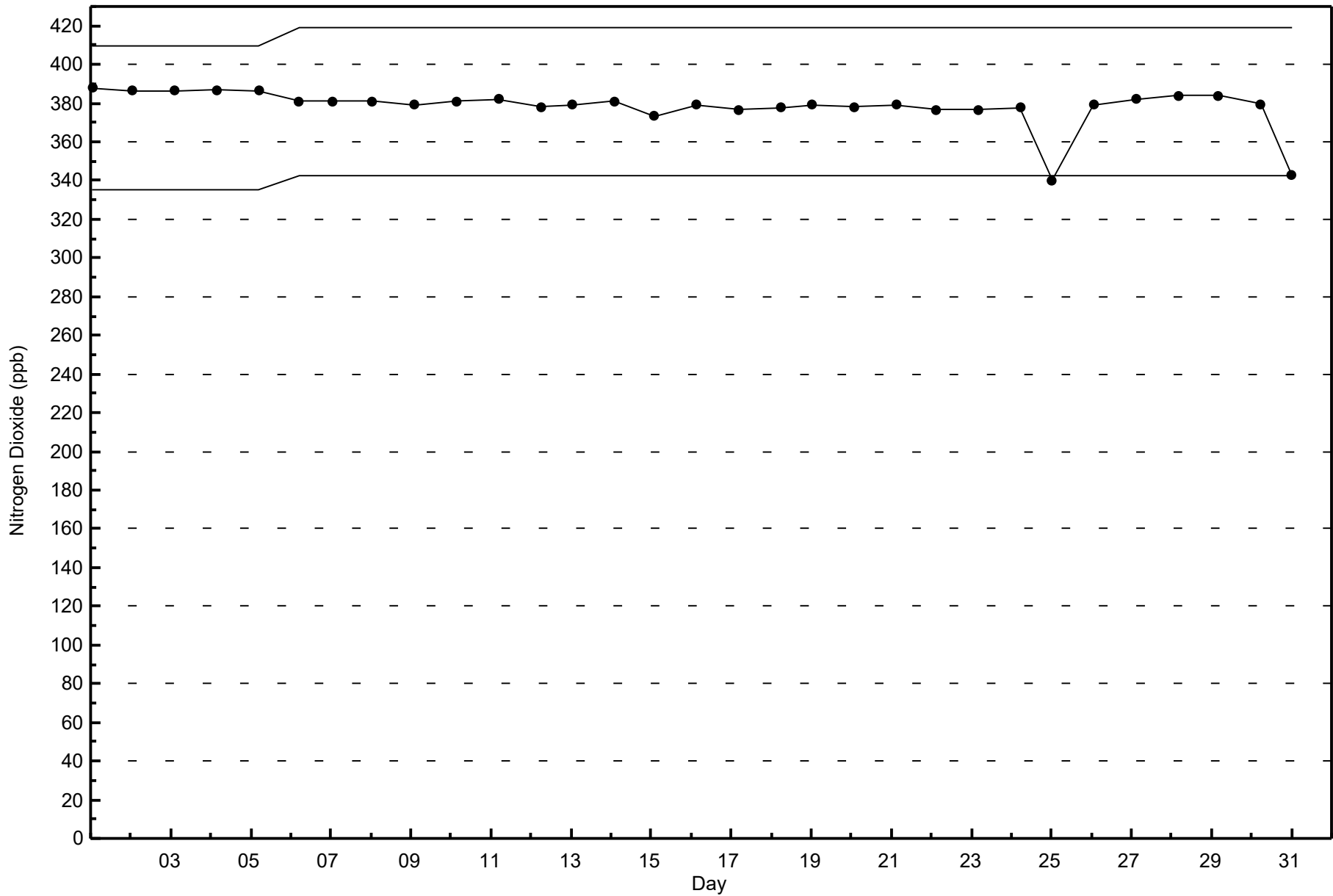
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Barge Landing



Total Number of Valid Hours: 708







Wood Buffalo Environmental Association
Summary of Hour Averages

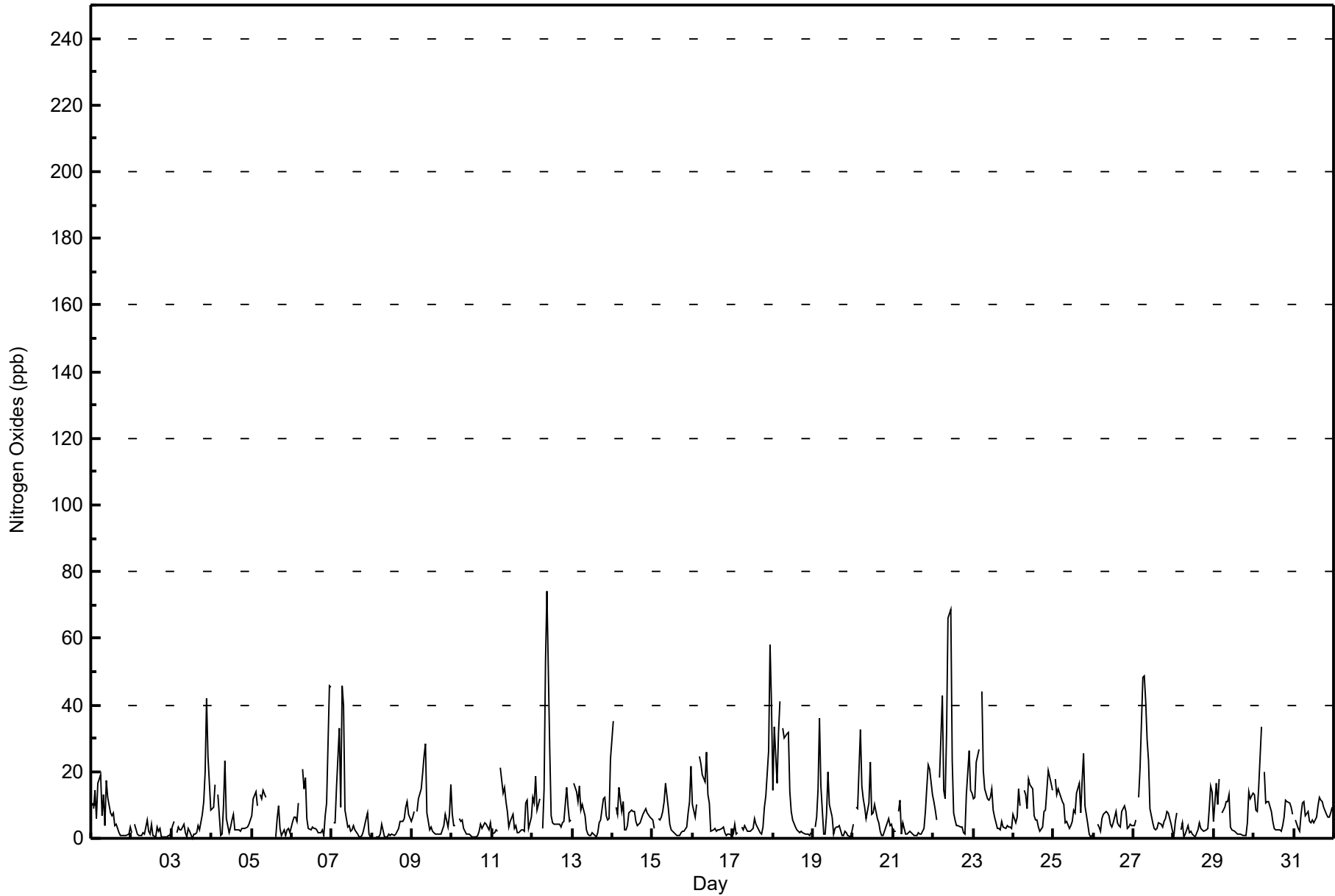
Nitrogen Oxides (NO_x) - ppb
Barge Landing - July 2023

Maximum Value: 74.4 ppb on Jul 12 10:00		Maximum Daily Average: 17.4 ppb on Jul 22		Hours in Service: 744																							
Minimum Value: 0.2 ppb on Jul 3 13:00		Minimum Daily Average: 1.7 ppb on Jul 2		Hours of Data: 708																							
Maximum Diurnal Average: 15.3 ppb at hour 5		Minimum Diurnal Average: 3.2 ppb at hour 17		Hours of Missing Data: 36																							
Monthly Average: 7.95 ppb		Percentiles: P ₁ = 0.3 P ₁₀ = 1.1 Q ₁ = 2.3 Median = 4.8 Q ₃ = 10.2 P ₉₀ = 16.7 P ₉₉ = 46.0		Hours of Calibration: 36																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	9.0	14.5	5.7	16.6	19.3	7.0	13.3	3.7	17.6	12.2	7.8	6.8	7.7	3.9	4.3	1.6	0.7	0.7	0.7	0.8	1.0	1.4	3.4	6.9	19.3	
2-Jul	1.7	Z	4.0	1.2	0.8	0.7	0.7	1.8	1.2	5.4	2.1	1.2	4.3	0.8	0.5	3.3	2.2	3.1	0.6	0.5	0.5	0.5	0.7	0.7	1.7	5.4	
3-Jul	2.7	5.2	Z	1.8	3.2	2.4	2.7	4.0	1.8	0.6	2.9	2.1	0.2	1.1	1.4	1.7	4.0	2.4	7.3	10.9	20.1	41.8	24.5	8.6	6.7	41.8	
4-Jul	8.9	9.4	16.0	Z	13.1	0.7	1.3	9.7	23.1	5.9	1.9	3.5	5.7	7.1	2.4	2.7	2.5	2.0	2.8	2.8	2.9	3.4	4.1	5.5	6.0	23.1	
5-Jul	6.7	11.9	14.0	9.5	Z	13.3	11.9	14.2	12.3	C	C	C	C	C	0.5	6.0	9.9	3.0	1.0	2.4	0.8	2.7	2.9	1.5	6.9	14.2	
6-Jul	5.3	6.4	6.5	5.1	10.8	Z	20.6	14.6	18.3	5.8	2.9	2.7	3.3	2.9	2.9	2.5	1.9	1.7	2.5	0.9	6.7	10.8	45.9	45.1	9.8	45.9	
7-Jul	Z	4.8	4.6	15.2	33.2	9.2	46.0	39.7	8.6	3.5	3.6	2.3	2.5	4.0	2.5	1.4	0.6	0.5	0.9	2.1	6.0	7.6	1.3	0.3	8.7	46.0	
8-Jul	0.3	Z	0.5	0.3	0.2	1.3	4.4	0.3	0.3	0.3	1.2	0.9	1.2	1.1	1.4	2.2	2.9	5.1	5.0	5.7	9.3	11.0	7.2	5.0	2.9	11.0	
9-Jul	6.4	7.8	Z	8.2	11.7	14.6	19.6	24.6	28.6	7.7	2.4	3.6	2.1	1.5	1.2	1.3	1.4	1.2	2.4	3.9	7.2	3.3	7.3	16.3	8.0	28.6	
10-Jul	7.2	3.9	3.9	Z	6.1	5.1	5.5	2.8	1.1	1.2	1.1	0.7	0.4	0.5	0.6	0.9	2.0	4.0	2.9	4.6	4.3	3.5	2.3	4.7	3.0	7.2	
11-Jul	1.5	1.7	2.5	2.2	Z	21.1	13.8	15.1	11.1	7.9	3.5	5.0	7.4	3.0	3.7	1.7	1.8	2.5	2.7	2.0	10.5	11.3	3.0	6.3	6.1	21.1	
12-Jul	12.4	10.5	18.5	8.5	12.0	Z	2.9	15.0	53.0	74.4	26.7	6.7	4.6	4.3	4.2	4.2	4.3	3.6	4.5	5.1	15.1	9.3	5.2	5.7	13.5	74.4	
13-Jul	Z	16.7	13.8	11.1	15.5	8.5	10.0	6.6	2.5	1.1	0.8	0.8	1.5	0.7	0.5	1.8	4.6	5.7	11.9	12.2	6.9	5.7	6.0	23.5	7.3	23.5	
14-Jul	35.1	Z	9.5	7.2	15.3	8.1	10.9	2.7	2.7	3.8	7.6	8.3	8.0	7.9	4.9	3.9	4.5	6.1	7.4	8.0	8.7	7.8	6.2	6.1	8.3	35.1	
15-Jul	5.7	2.9	Z	5.8	5.6	6.3	8.2	11.0	16.4	9.1	4.3	2.5	2.0	1.7	1.0	0.9	1.0	1.8	2.0	2.1	3.6	7.7	10.9	21.8	5.8	21.8	
16-Jul	10.1	6.2	10.1	Z	24.7	22.4	19.0	16.9	25.6	13.2	10.6	1.9	2.3	3.1	2.0	2.5	2.6	3.0	3.3	1.7	0.7	1.2	1.4	0.9	8.1	25.6	
17-Jul	1.4	4.1	1.3	1.8	Z	3.3	2.7	3.9	3.0	2.2	2.0	2.7	2.8	5.7	4.3	2.6	1.6	1.4	3.5	9.5	12.8	26.2	57.8	40.8	8.6	57.8	
18-Jul	14.3	33.4	16.4	31.9	41.1	Z	33.2	30.0	31.4	31.7	13.9	7.9	5.6	3.5	2.4	2.1	1.8	2.0	1.7	1.2	1.3	1.4	0.9	1.8	13.5	41.1	
19-Jul	Z	3.3	6.5	15.0	35.8	15.8	1.2	1.5	7.4	19.9	10.0	6.2	1.1	2.8	3.3	3.5	4.0	1.1	0.7	2.1	1.8	0.8	0.6	2.2	6.4	35.8	
20-Jul	4.4	Z	9.5	8.7	32.5	15.8	11.9	9.1	6.0	10.7	23.0	7.3	7.7	10.1	6.0	4.6	1.9	1.1	0.8	2.3	4.8	6.0	3.9	4.2	8.4	32.5	
21-Jul	2.1	2.1	Z	7.9	11.6	1.4	4.8	1.1	1.1	1.8	2.3	1.5	0.8	0.6	0.9	1.9	1.4	1.2	2.8	7.9	15.3	21.9	20.9	13.1	5.5	21.9	
22-Jul	11.1	8.5	5.6	Z	18.2	42.9	14.3	11.8	31.9	66.3	68.5	23.3	7.5	5.6	4.0	3.7	3.4	3.3	1.5	1.1	13.2	26.2	14.3	13.5	17.4	68.5	
23-Jul	11.8	12.4	22.8	26.7	Z	44.1	20.5	14.8	11.8	11.3	12.4	14.8	8.4	6.5	3.1	3.1	2.4	5.2	3.5	2.8	3.7	3.2	3.4	3.0	10.9	44.1	
24-Jul	7.1	4.8	6.3	14.8	9.6	Z	14.6	13.1	8.9	18.0	16.1	14.9	6.7	5.4	5.3	3.4	2.3	3.5	7.9	8.6	14.3	20.2	16.6	14.2	10.3	20.2	
25-Jul	Z	17.7	13.3	14.9	12.3	11.0	10.3	4.5	5.1	2.9	3.9	5.3	8.6	7.5	13.4	16.5	7.8	17.4	25.5	9.9	4.2	1.3	0.4	0.6	9.3	25.5	
26-Jul	0.9	Z	4.0	3.3	2.3	6.0	7.2	7.9	7.7	6.7	4.4	3.4	4.6	7.9	4.8	3.7	3.5	8.1	9.5	7.9	3.0	3.2	4.1	3.9	5.1	9.5	
27-Jul	3.9	5.7	Z	12.3	21.3	48.2	48.8	41.0	29.8	23.4	8.8	4.5	2.9	2.5	2.9	4.6	4.2	3.3	5.2	5.7	8.1	7.7	4.3	2.2	13.1	48.8	
28-Jul	0.8	5.3	7.4	Z	2.7	4.7	0.6	1.3	3.6	1.9	2.1	1.1	0.7	0.5	2.4	4.6	2.8	2.4	1.9	2.7	3.1	8.8	15.8	14.0	4.0	15.8	
29-Jul	4.9	16.3	10.2	17.9	Z	7.6	9.3	10.9	10.8	13.1	3.5	2.4	2.2	1.8	1.4	1.3	1.1	0.8	0.9	0.9	4.7	14.0	11.8	13.6	7.0	17.9	
30-Jul	13.0	8.6	8.2	15.4	33.4	Z	19.9	10.4	10.9	11.0	8.2	5.1	3.1	2.5	2.4	2.4	1.9	3.8	6.2	11.4	11.1	10.5	9.4	7.0	9.4	33.4	
31-Jul	Z	5.6	3.1	2.2	7.4	10.6	11.2	6.9	8.2	5.1	4.5	5.4	4.7	6.3	9.8	12.2	11.4	10.8	9.2	7.3	6.4	6.3	7.7	9.4	7.5	12.2	
		7.2	8.6	9.0	9.8	15.3	13.3	12.7	11.6	12.5	12.8	8.9	5.2	4.0	3.9	3.2	3.6	3.2	3.6	4.5	4.7	6.8	9.2	9.8	9.6	Diurnal Average	
		35.1	33.4	22.8	31.9	41.1	48.2	48.8	41.0	53.0	74.4	68.5	23.3	8.6	10.1	13.4	16.5	11.4	17.4	25.5	12.2	20.1	41.8	57.8	45.1	Diurnal Maximum	
Z - zerospan		C - Calibration																									



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Barge Landing - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Barge Landing - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	654	92.37	92.37
21 - 40	38	5.37	97.74
41 - 80	16	2.26	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
Barge Landing - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	38	53	27	13	11	9	44	40	59	58	63	56	21	33	56	73	654
21 - 40	6	2	1	1	0	0	3	1	2	2	1	1	1	2	4	11	38
11 - 80	3	1	0	1	1	0	0	0	1	0	2	0	0	1	2	4	16
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	47	56	28	15	12	9	47	41	62	60	66	57	22	36	62	88	708

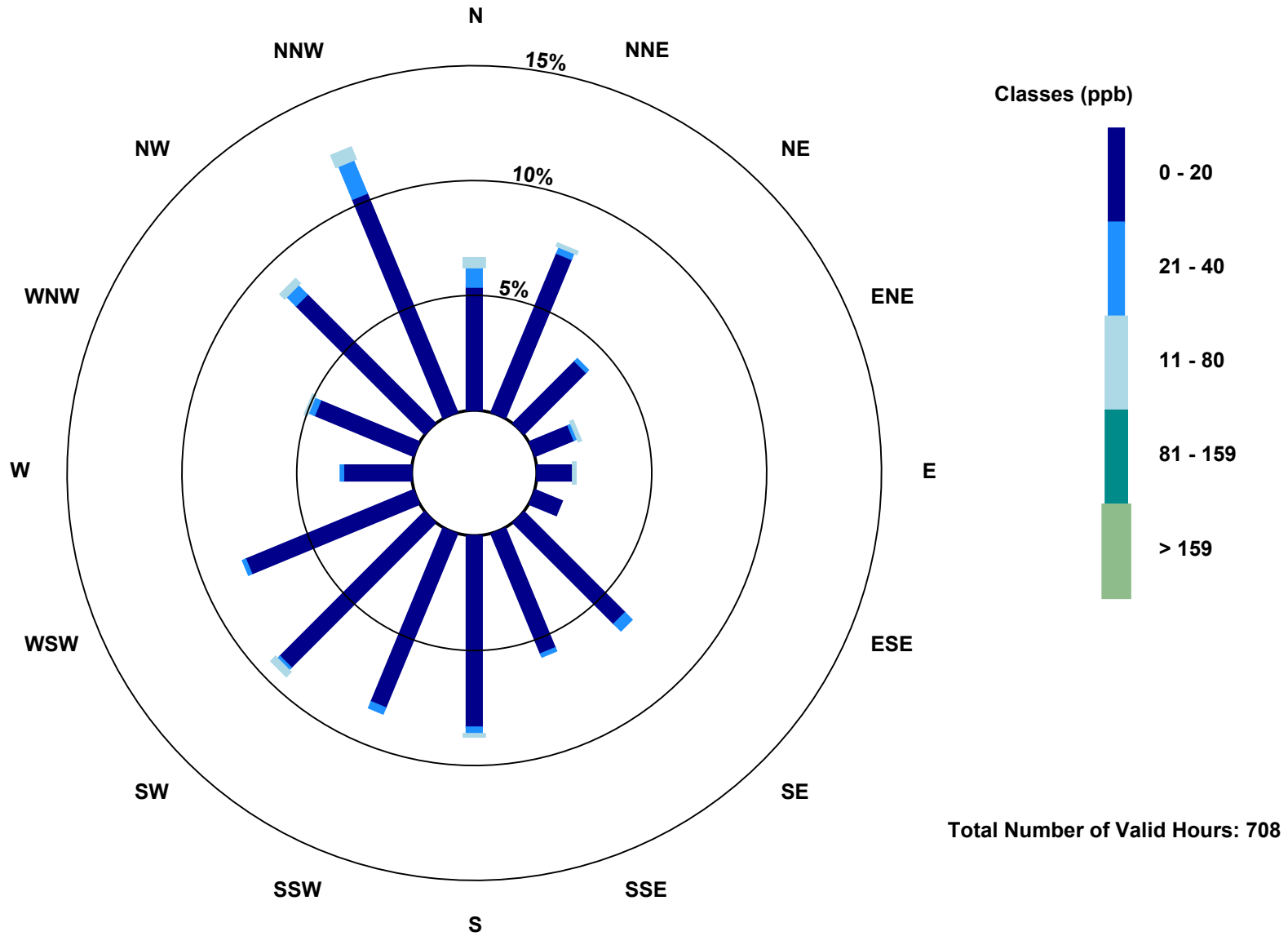
Total Number of Valid Hours: 708

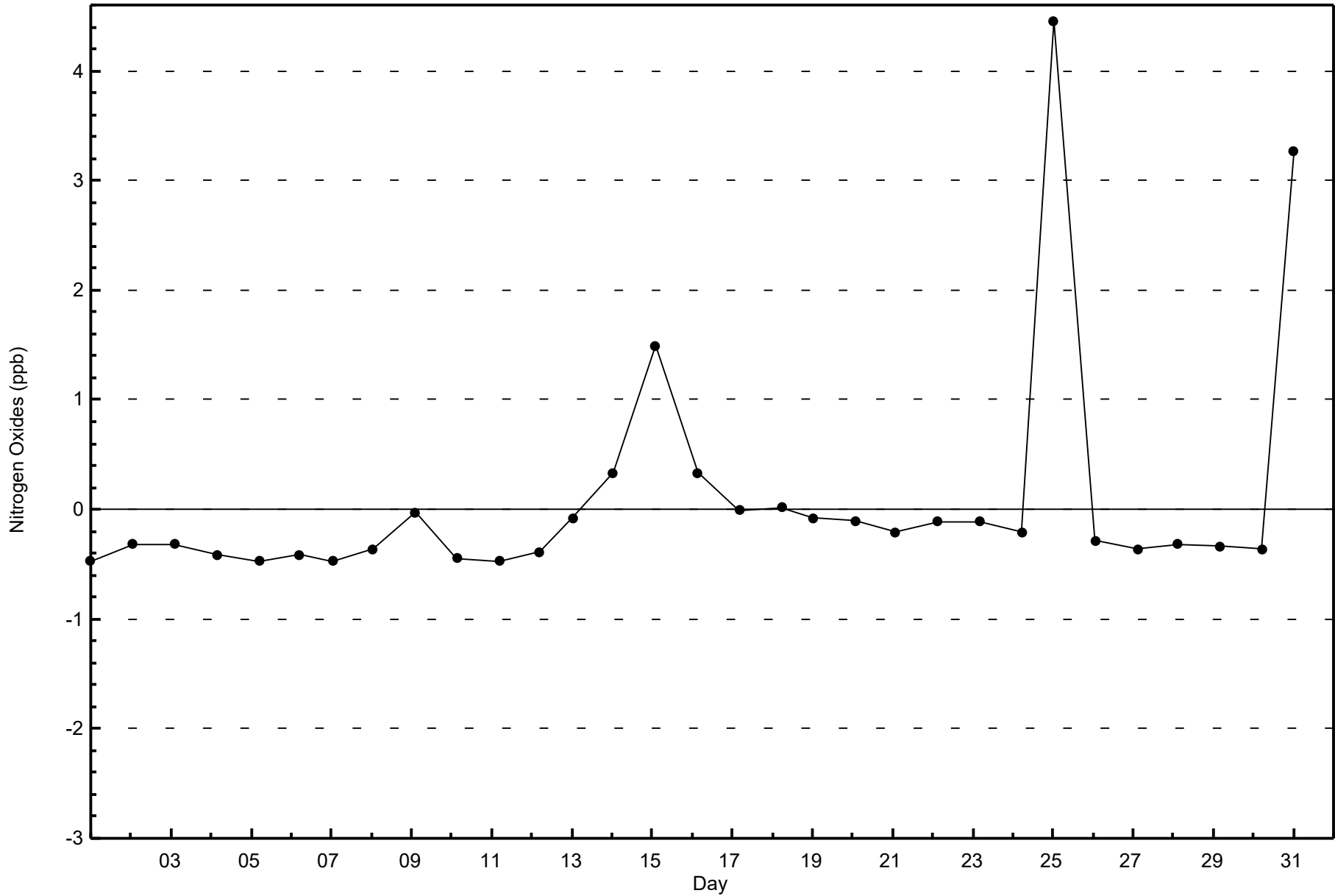
Total Number of Hours: 744

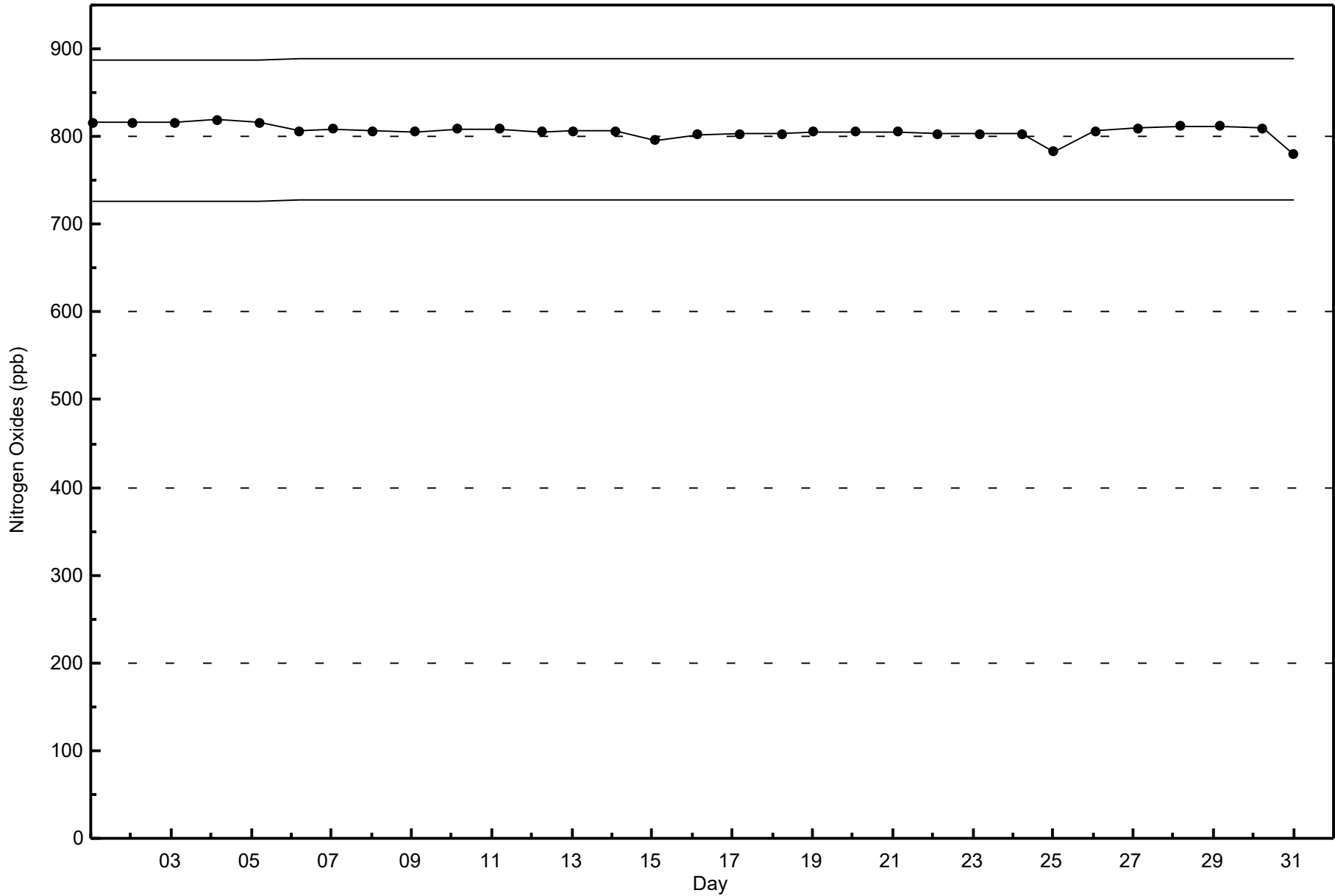


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Barge Landing





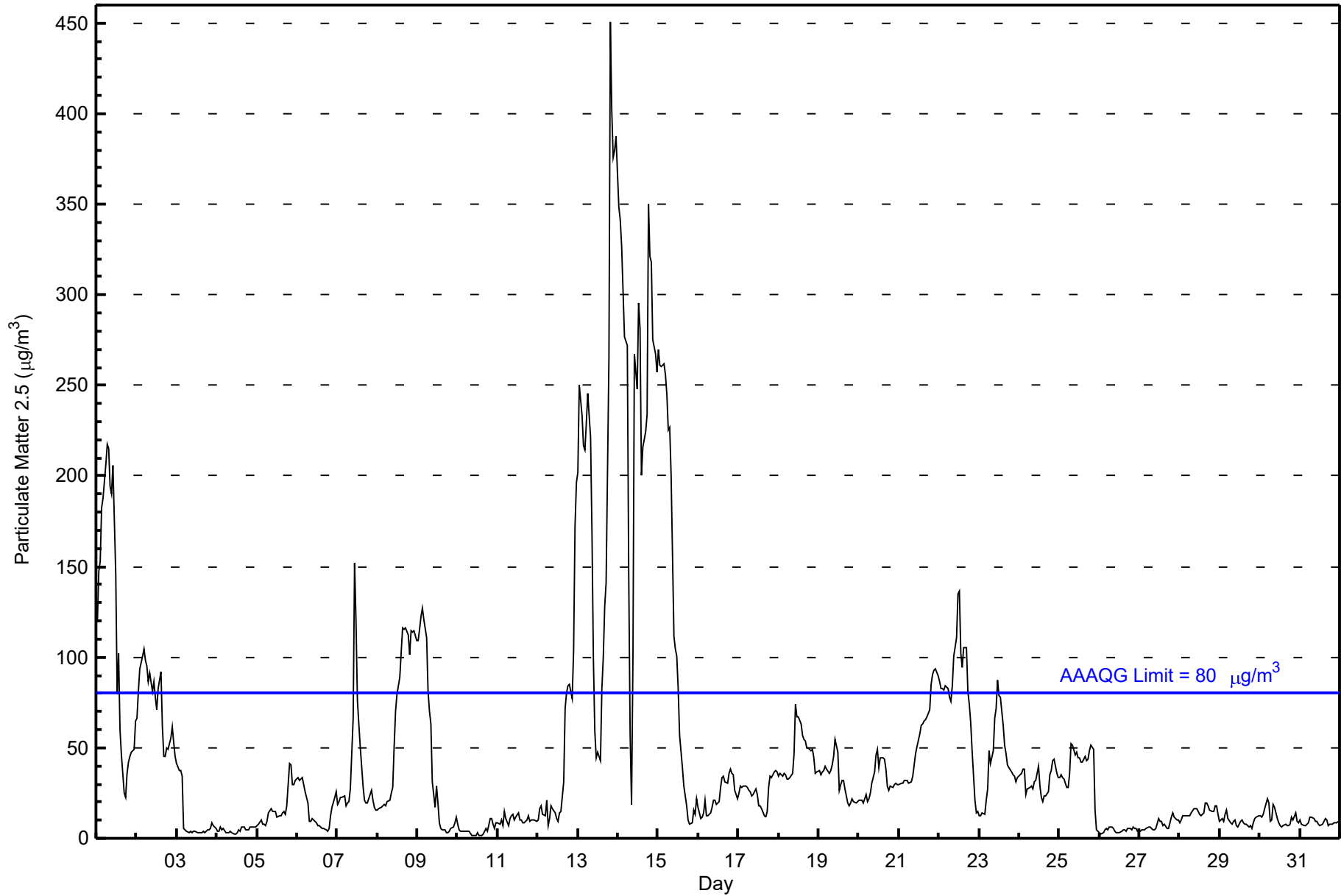




Number of Exceedences (AAAQO):	1-hr: 128	24-hr: 17	Hours in Service:	744
Maximum Value: 451.0 µg/m ³ on Jul 13 20:00	Maximum Daily Average: 247.7 µg/m ³ on Jul 14		Hours of Data:	744
Minimum Value: 1.4 µg/m ³ on Jul 10 09:00	Minimum Daily Average: 4.5 µg/m ³ on Jul 26		Hours of Missing Data:	0
Maximum Diurnal Average: 55.8 µg/m ³ at hour 3	Minimum Diurnal Average: 37.8 µg/m ³ at hour 18		Hours of Calibration:	0
Monthly Average: 47.92 µg/m ³	Percentiles: P ₁ = 2.3 P ₁₀ = 4.9 Q ₁ = 9.5 Median = 22.3 Q ₃ = 49.3 P ₉₀ = 113.5 P ₉₉ = 335.1		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	119.2	147.4	152.8	182.1	187.7	206.5	217.4	215.1	194.3	190.3	205.6	145.5	79.2	102.0	59.9	45.9	24.7	22.6	35.6	41.8	45.1	47.3	49.2	64.7	115.9	217.4
2-Jul	65.9	80.9	93.5	100.4	104.6	98.5	95.5	86.7	91.0	81.3	86.3	78.2	70.7	82.7	91.8	61.8	45.2	44.9	49.8	49.3	55.3	62.0	52.7	45.6	73.9	104.6
3-Jul	41.5	37.1	37.8	34.3	5.3	4.4	3.7	3.4	3.7	3.5	3.6	3.6	3.1	3.2	3.3	3.4	3.9	3.2	4.5	5.1	5.4	8.9	7.3	5.3	9.9	41.5
4-Jul	4.3	3.9	6.5	4.5	5.1	3.2	3.1	3.4	3.7	2.9	2.2	2.4	3.4	4.6	4.0	6.1	6.2	4.9	4.9	4.9	6.4	6.6	6.1	6.3	4.6	6.6
5-Jul	6.8	7.5	9.9	8.1	8.0	7.1	9.5	13.8	16.3	14.9	14.8	15.2	12.0	12.4	12.2	13.8	14.5	13.2	18.3	41.4	40.8	30.0	29.7	31.9	16.8	41.4
6-Jul	33.8	32.2	33.0	33.2	29.5	25.6	19.8	9.6	9.6	10.6	10.2	8.7	6.9	6.9	6.4	5.6	5.1	4.6	3.9	5.2	12.7	16.8	22.5	25.7	15.8	33.8
7-Jul	18.6	20.1	22.5	22.5	23.3	17.8	19.4	19.9	27.1	66.5	152.4	120.2	76.5	62.9	51.0	29.2	20.7	19.7	19.8	21.5	26.7	21.1	17.2	15.5	38.0	152.4
8-Jul	15.8	16.6	17.2	17.8	18.6	18.3	19.9	21.3	25.0	28.1	51.0	70.3	79.8	88.7	102.8	116.0	115.6	116.1	112.0	101.5	114.4	114.2	115.0	109.4	66.9	116.1
9-Jul	109.0	115.3	122.5	127.2	120.6	110.9	80.8	69.8	62.8	31.0	17.4	29.0	19.7	8.4	5.4	4.6	4.6	3.2	3.3	3.6	5.3	6.1	8.9	11.9	45.1	127.2
10-Jul	7.8	4.9	4.2	4.2	4.2	3.9	3.8	3.8	1.4	1.8	1.9	1.9	3.1	1.8	1.9	2.3	3.9	5.8	3.6	11.2	10.6	7.9	5.1	8.5	4.6	11.2
11-Jul	8.7	8.1	10.0	6.8	14.4	10.8	7.2	10.7	12.4	13.3	9.8	12.0	13.9	9.8	9.9	8.3	8.6	10.3	12.5	9.7	10.4	10.0	9.8	9.1	10.3	14.4
12-Jul	9.9	16.7	17.7	13.2	12.8	20.9	7.0	10.8	17.6	16.6	14.4	11.3	9.5	14.2	14.7	31.5	72.0	80.3	84.2	85.1	77.5	103.7	172.1	196.7	46.3	196.7
13-Jul	201.7	250.4	232.9	216.9	214.7	229.2	246.0	221.7	168.7	99.3	59.5	44.4	47.7	42.6	82.6	99.8	127.6	140.8	265.4	451.0	401.6	375.8	380.0	387.4	207.8	451.0
14-Jul	348.7	341.6	326.4	302.0	276.9	271.9	146.1	57.7	18.3	100.8	267.1	248.1	295.1	281.1	200.2	215.9	224.2	233.6	349.9	321.6	318.4	275.1	267.6	256.9	247.7	349.9
15-Jul	269.8	261.4	260.6	262.3	255.6	245.1	225.4	227.0	200.3	111.3	104.8	100.6	82.6	57.1	39.3	28.9	23.6	17.9	10.5	8.0	8.9	15.6	13.0	21.9	118.8	269.8
16-Jul	17.5	10.7	11.5	13.9	20.7	12.6	12.2	14.1	17.2	20.9	21.0	18.6	20.5	28.3	33.9	34.0	31.2	30.5	35.9	38.0	35.7	35.1	26.4	22.0	23.4	38.0
17-Jul	24.7	28.5	28.4	28.5	28.5	28.2	26.7	26.0	23.5	24.0	27.5	24.1	17.5	17.8	16.3	12.4	12.0	14.8	28.4	34.0	33.6	36.3	37.4	36.7	25.7	37.4
18-Jul	34.5	35.5	34.4	35.5	35.4	32.7	32.4	33.8	36.1	46.5	73.9	67.1	67.2	63.1	57.0	54.9	54.1	50.3	50.1	48.4	49.4	44.6	35.7	36.7	46.2	73.9
19-Jul	37.6	35.0	36.3	37.2	40.1	38.0	36.2	37.7	40.7	44.9	54.3	47.2	26.9	29.7	31.8	32.3	27.6	19.8	17.8	19.2	22.2	20.4	19.8	20.4	32.2	54.3
20-Jul	20.9	21.0	21.4	19.2	24.3	20.1	21.8	24.6	30.3	36.6	46.4	49.5	39.0	44.5	44.2	43.3	38.5	29.0	26.7	28.7	28.4	30.0	30.1	29.8	31.2	49.5
21-Jul	29.7	30.7	30.7	32.2	32.3	31.6	30.2	31.5	34.7	40.9	47.1	51.0	57.3	62.3	62.8	65.1	65.5	67.4	71.3	85.3	90.6	92.6	93.9	89.3	55.3	93.9
22-Jul	86.9	82.8	82.9	81.6	84.2	82.4	78.2	75.4	83.9	100.5	110.6	135.2	136.4	102.4	94.1	105.0	105.5	81.4	74.1	64.0	48.4	21.0	14.1	14.5	81.1	136.4
23-Jul	12.6	12.1	13.9	13.2	20.9	27.5	48.0	41.4	48.5	66.0	71.7	87.3	78.7	77.7	62.6	51.6	47.1	40.3	39.1	36.4	35.1	33.9	31.3	33.2	42.9	87.3
24-Jul	34.2	36.1	38.1	37.9	24.0	27.5	28.3	28.5	27.5	31.4	31.6	39.7	29.2	22.6	20.0	23.7	23.2	25.9	34.8	37.0	43.0	43.7	35.8	33.4	31.5	43.7
25-Jul	33.5	34.9	33.2	32.9	28.4	27.9	35.6	52.4	51.4	46.2	47.4	44.2	44.7	41.8	42.3	45.2	43.0	43.9	48.1	51.2	48.8	16.0	4.3	3.6	37.5	52.4
26-Jul	2.9	2.6	3.1	4.3	5.2	4.9	6.0	6.4	5.5	3.9	2.9	2.8	3.1	4.2	4.3	4.3	4.1	5.2	5.3	4.4	6.5	5.8	5.6	4.2	4.5	6.5
27-Jul	4.1	4.5	4.7	4.7	5.1	6.0	6.1	5.7	5.0	4.9	5.1	11.1	9.6	9.3	7.4	8.0	5.5	5.2	8.3	11.7	13.7	11.3	10.2	10.0	7.4	13.7
28-Jul	8.7	9.9	12.3	12.4	12.2	12.8	12.2	14.1	16.1	16.4	16.6	14.9	13.0	12.4	14.3	19.8	19.9	17.7	15.3	15.1	14.8	18.0	18.1	13.5	14.6	19.9
29-Jul	9.3	11.2	9.5	13.5	15.6	11.2	8.9	8.1	9.0	10.2	6.7	6.2	9.5	10.0	8.3	7.6	7.5	6.1	7.2	5.7	8.2	10.6	11.9	12.1	9.3	15.6
30-Jul	12.7	12.0	13.3	16.0	21.7	19.7	9.7	10.5	18.4	17.5	10.8	8.6	6.8	6.3	6.9	7.8	7.1	7.2	7.7	11.9	10.0	13.9	9.4	8.4	11.4	21.7
31-Jul	9.9	8.1	7.4	7.0	7.5	8.8	11.8	11.8	10.9	9.5	9.3	7.7	7.2	8.0	9.3	11.2	10.4	7.4	7.6	7.9	8.2	8.8	8.8	9.1	8.9	11.8
52.9 55.5 55.8 55.7 54.4 53.8 48.7 45.1 42.3 41.7 51.1 48.6 44.2 42.5 38.7 38.7 38.8 37.8 47.0 53.5 52.8 49.8 50.0 50.8																								Diurnal Average		
348.7 341.6 326.4 302.0 276.9 271.9 246.0 227.0 200.3 190.3 267.1 248.1 295.1 281.1 200.2 215.9 224.2 233.6 349.9 451.0 401.6 375.8 380.0 387.4																								Diurnal Maximum		

Alberta Ambient Air Quality Guideline/Objectives: 1-hr 80 µg/m³ 24-hr 29 µg/m³





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Barge Landing - July 2023**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
0 - 5	95	12.77	12.77
6 - 15	200	26.88	39.65
16 - 25	95	12.77	52.42
26 - 80	227	30.51	82.93
> 81.0	127	17.07	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Barge Landing - July 2023**

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	14	15	5	3	5	2	11	5	4	4	2	6	1	0	9	9	95
6 - 15	7	15	4	5	1	4	14	16	33	29	28	14	3	7	7	12	199
16 - 25	0	3	4	0	3	1	10	5	13	12	15	14	2	5	5	3	95
26 - 80	13	8	9	6	4	2	14	13	11	15	20	23	11	19	23	36	227
> 81.0	13	16	6	3	0	0	1	3	2	3	6	7	5	6	26	30	127
Totals	47	57	28	17	13	9	50	42	63	63	71	64	22	37	70	90	743

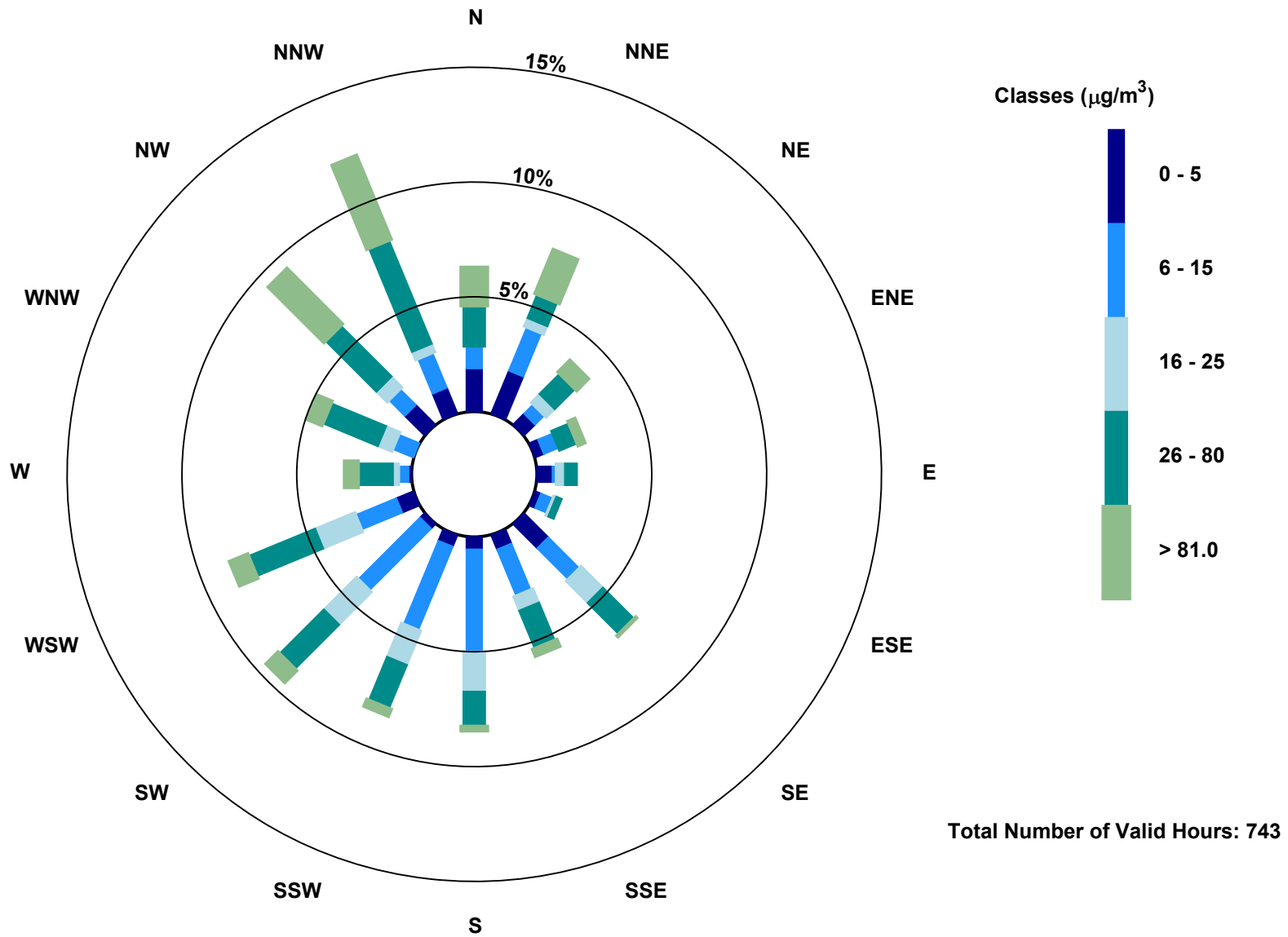
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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





Wood Buffalo Environmental Association
Summary of Hour Averages

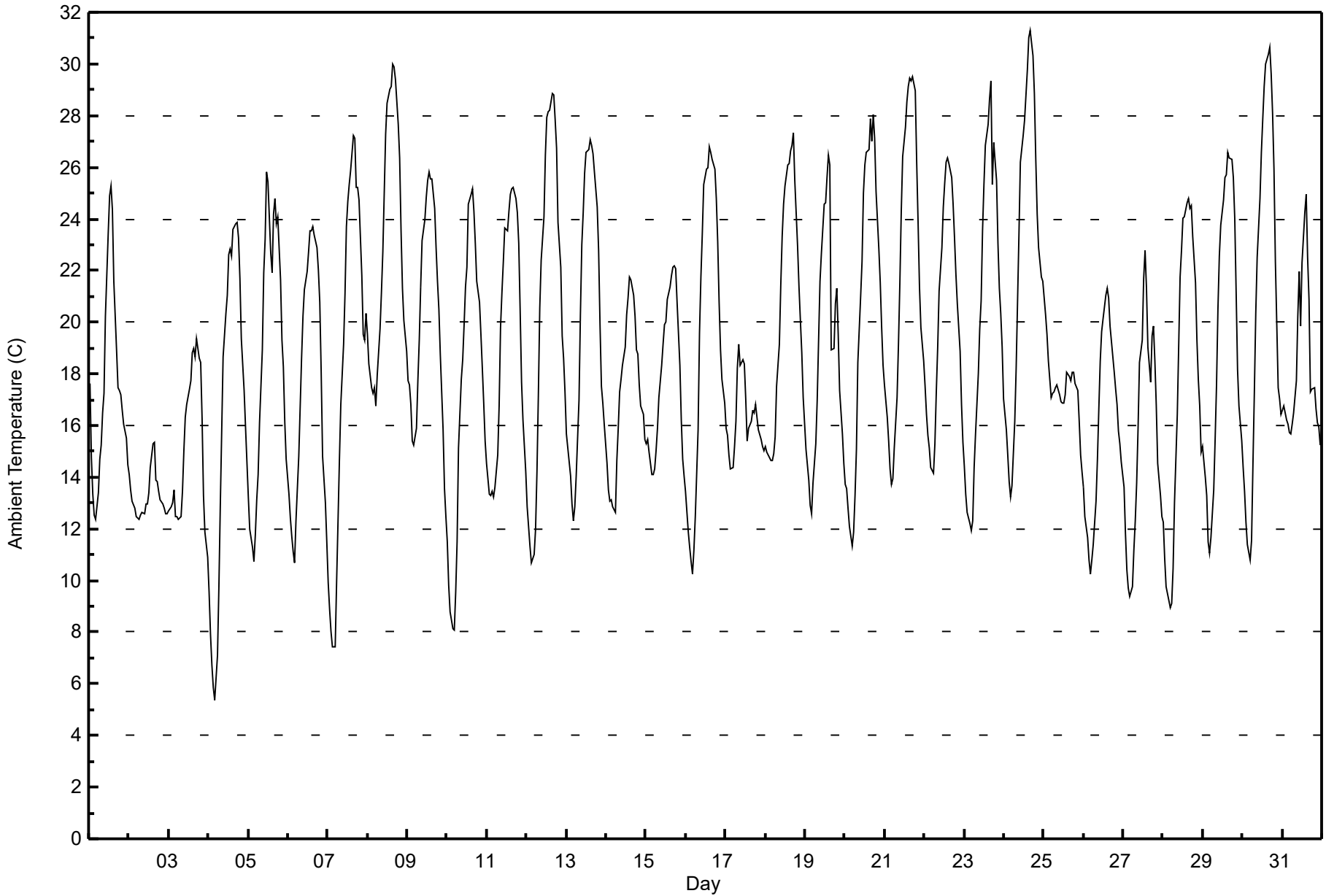
Ambient Temperature (AT) - C
Barge Landing - July 2023

Maximum Value: 31.3 C on Jul 24 17:00 Maximum Daily Average: 23.1 C on Jul 8																						Hours in Service: 744 Hours of Data: 744																											
Minimum Value: 5.4 C on Jul 4 05:00 Minimum Daily Average: 13.2 C on Jul 2 Maximum Diurnal Average: 24.5 C at hour 16 Minimum Diurnal Average: 12.1 C at hour 5 Monthly Average: 18.68 C Percentiles: P ₁ = 8.1 P ₁₀ = 12.3 Q ₁ = 14.6 Median = 18.0 Q ₃ = 22.9 P ₉₀ = 26.2 P ₉₉ = 29.9																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	17.6	14.8	13.3	12.5	12.4	13.4	14.7	15.3	16.5	17.2	20.3	23.4	24.9	25.3	24.4	21.6	18.9	17.5	17.4	17.2	16.6	16.1	15.5	14.5	17.5	25.3																							
2-Jul	14.1	13.5	13.0	12.8	12.5	12.4	12.4	12.6	12.6	12.6	12.9	13.0	13.4	14.4	15.3	15.3	13.9	13.8	13.5	13.1	12.9	12.8	12.6	12.6	13.2	15.3																							
3-Jul	12.7	12.9	13.0	13.5	12.5	12.5	12.4	12.5	13.5	15.0	16.3	16.8	17.4	17.7	18.8	19.0	18.7	19.4	18.6	18.4	16.3	13.3	11.9	10.9	15.2	19.4																							
4-Jul	9.5	7.9	6.7	5.9	5.4	7.1	9.8	12.9	15.8	18.7	20.3	21.0	22.6	22.8	22.6	23.6	23.8	23.9	23.3	21.7	19.3	17.3	15.9	14.6	16.4	23.9																							
5-Jul	13.2	12.0	11.3	10.8	11.7	13.1	14.1	16.1	18.9	21.9	23.2	25.8	25.4	22.7	21.9	24.2	24.8	23.8	24.1	21.6	19.3	18.3	16.2	14.7	18.7	25.8																							
6-Jul	13.4	12.4	11.7	11.1	10.7	12.3	14.8	16.7	18.6	20.2	21.2	21.9	22.7	23.5	23.6	23.7	23.4	22.9	22.0	20.8	18.0	14.8	13.0	11.5	17.7	23.7																							
7-Jul	10.0	8.9	8.0	7.4	7.4	9.9	12.2	14.7	16.8	19.1	21.1	23.7	24.7	25.3	25.9	27.2	27.1	25.2	25.2	24.7	21.8	19.5	19.3	20.3	18.6	27.2																							
8-Jul	19.5	18.4	17.5	17.2	17.5	16.7	18.0	19.7	21.2	22.7	25.0	27.3	28.5	29.0	29.1	30.0	29.9	29.4	27.6	26.4	23.5	21.3	20.1	18.9	23.1	30.0																							
9-Jul	17.7	17.6	16.8	15.4	15.2	15.9	17.7	19.3	21.4	23.2	24.0	24.8	25.5	25.8	25.6	25.5	24.4	22.9	21.6	20.5	18.7	15.8	13.6	12.5	20.1	25.8																							
10-Jul	11.5	9.8	8.8	8.1	8.1	9.5	11.5	15.1	17.8	18.5	19.9	21.4	22.1	24.6	24.9	25.2	24.3	23.1	21.6	20.8	19.5	18.2	16.9	15.4	17.4	25.2																							
11-Jul	14.5	13.3	13.3	13.5	13.2	13.6	14.9	16.8	19.8	21.2	22.4	23.6	23.6	24.3	25.0	25.2	25.2	24.8	24.3	23.0	20.4	17.7	16.2	14.2	19.3	25.2																							
12-Jul	12.8	12.1	11.3	10.7	11.0	12.0	14.2	17.2	20.5	22.4	24.1	26.5	27.9	28.2	28.2	28.9	28.8	27.8	26.7	23.9	22.1	19.5	18.6	17.3	20.5	28.9																							
13-Jul	15.7	15.1	14.1	12.9	12.3	12.9	14.1	17.0	20.3	23.0	24.2	25.8	26.6	26.7	27.1	26.8	26.5	25.8	24.5	22.8	19.9	17.5	16.9	16.1	20.2	27.1																							
14-Jul	14.6	13.5	13.1	13.1	12.9	12.6	14.6	15.9	17.3	17.8	18.3	19.0	20.3	20.9	21.7	21.6	21.0	20.2	18.9	18.7	17.6	16.8	16.4	15.5	17.2	21.7																							
15-Jul	15.3	15.5	15.0	14.1	14.1	14.3	15.0	15.9	17.1	18.3	19.2	19.9	20.0	20.9	21.4	21.8	22.1	22.2	22.1	20.8	18.3	16.2	14.7	14.0	17.8	22.2																							
16-Jul	13.4	11.9	11.3	10.7	10.3	11.2	12.5	15.9	19.6	21.8	23.4	25.3	25.9	26.0	26.8	26.6	26.3	25.9	24.8	23.1	20.8	19.0	17.8	16.8	19.5	26.8																							
17-Jul	15.9	15.6	14.9	14.3	14.4	15.2	16.1	18.2	19.2	18.3	18.5	18.4	17.0	15.4	15.9	16.2	16.6	16.5	16.8	16.3	15.9	15.5	15.2	15.0	16.3	19.2																							
18-Jul	15.2	14.9	14.8	14.6	14.6	14.9	15.6	17.5	19.1	21.4	23.3	24.6	25.3	26.1	26.1	26.6	26.8	27.3	25.5	22.9	21.4	20.1	18.8	17.1	20.6	27.3																							
19-Jul	15.1	14.5	13.9	12.9	12.6	13.8	15.3	17.0	19.3	21.6	22.7	24.6	24.6	25.6	26.5	26.1	18.9	19.0	20.7	21.3	19.5	17.4	15.7	14.6	18.9	26.5																							
20-Jul	13.7	13.6	12.8	12.1	11.3	11.9	13.3	15.1	18.5	21.0	22.3	25.0	26.1	26.6	26.7	27.9	27.0	28.1	27.1	25.0	22.8	21.5	19.8	18.3	20.3	28.1																							
21-Jul	17.6	16.3	15.4	14.3	13.7	14.0	15.1	17.1	19.2	21.6	24.3	26.4	27.5	28.5	29.1	29.4	29.4	29.5	29.0	26.2	23.9	21.4	19.8	18.5	22.0	29.5																							
22-Jul	17.5	16.4	15.6	15.1	14.4	14.2	15.3	17.3	19.1	21.2	22.9	24.5	25.4	26.2	26.3	26.2	25.6	24.5	23.3	21.8	20.7	18.9	16.8	15.3	20.2	26.3																							
23-Jul	14.4	13.3	12.6	12.2	11.9	12.3	14.4	15.7	18.0	19.7	20.8	23.5	25.3	26.9	27.7	28.6	29.4	25.3	26.9	25.5	23.0	21.3	20.4	19.1	20.3	29.4																							
24-Jul	17.0	15.8	14.9	13.8	13.2	13.7	16.1	18.2	20.9	23.4	26.2	27.2	27.8	28.8	29.8	31.0	31.3	30.3	28.9	26.3	24.2	22.9	21.8	21.6	22.7	31.3																							
25-Jul	21.0	20.3	19.6	18.5	17.1	17.2	17.3	17.4	17.6	17.2	16.9	16.8	16.9	17.2	18.1	17.9	17.7	18.1	18.1	17.6	17.4	16.2	14.8	14.2	17.5	21.0																							
26-Jul	13.6	12.5	11.7	10.8	10.3	10.8	11.4	13.0	14.7	16.7	18.5	19.6	20.1	21.1	21.3	20.9	19.9	19.3	18.1	17.4	16.8	15.8	15.3	14.6	16.0	21.3																							
27-Jul	13.6	11.8	10.4	9.7	9.4	9.7	11.2	12.3	13.8	15.9	18.5	19.3	21.7	22.8	21.3	19.0	17.7	19.5	19.8	18.5	16.7	14.5	13.3	12.5	15.5	22.8																							
28-Jul	12.3	10.8	9.8	9.2	9.0	9.1	10.5	13.0	16.4	19.1	21.7	22.8	24.0	24.1	24.6	24.8	24.4	24.5	23.3	21.5	19.3	17.8	16.8	15.0	17.7	24.8																							
29-Jul	15.2	14.0	13.3	11.5	11.1	11.7	13.5	15.5	17.6	20.5	22.6	23.7	24.7	25.6	25.7	26.6	26.4	26.3	25.6	24.0	21.1	18.2	16.8	15.4	19.4	26.6																							
30-Jul	14.4	13.4	12.3	11.4	10.8	11.5	14.5	17.3	20.3	22.5	24.8	26.6	27.9	29.1	30.0	30.4	30.6	29.6	28.1	25.9	22.4	17.4	17.0	16.4	21.0	30.6																							
31-Jul	16.6	16.8	16.2	16.0	15.7	15.7	16.1	16.5	17.7	20.2	22.0	19.9	22.3	24.2	25.0	22.5	20.9	17.3	17.4	17.5	16.7	16.1	15.9	15.2	18.4	25.0																							
																								14.8	13.9	13.1	12.5	12.1	12.7	14.1	16.0	18.0	19.8	21.4	22.7	23.5	24.1	24.4	24.5	23.9	23.3	22.7	21.5	19.6	17.7	16.6	15.6	Diurnal Average	
																								21.0	20.3	19.6	18.5	17.5	17.2	18.0	19.7	21.4	23.4	26.2	27.3	28.5	29.1	30.0	31.0	31.3	30.3	29.0	26.4	24.2	22.9	21.8	21.6	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Barge Landing - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Barge Landing - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	25	3.36	3.36
10 - 20	430	57.80	61.16
> 20	289	38.84	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

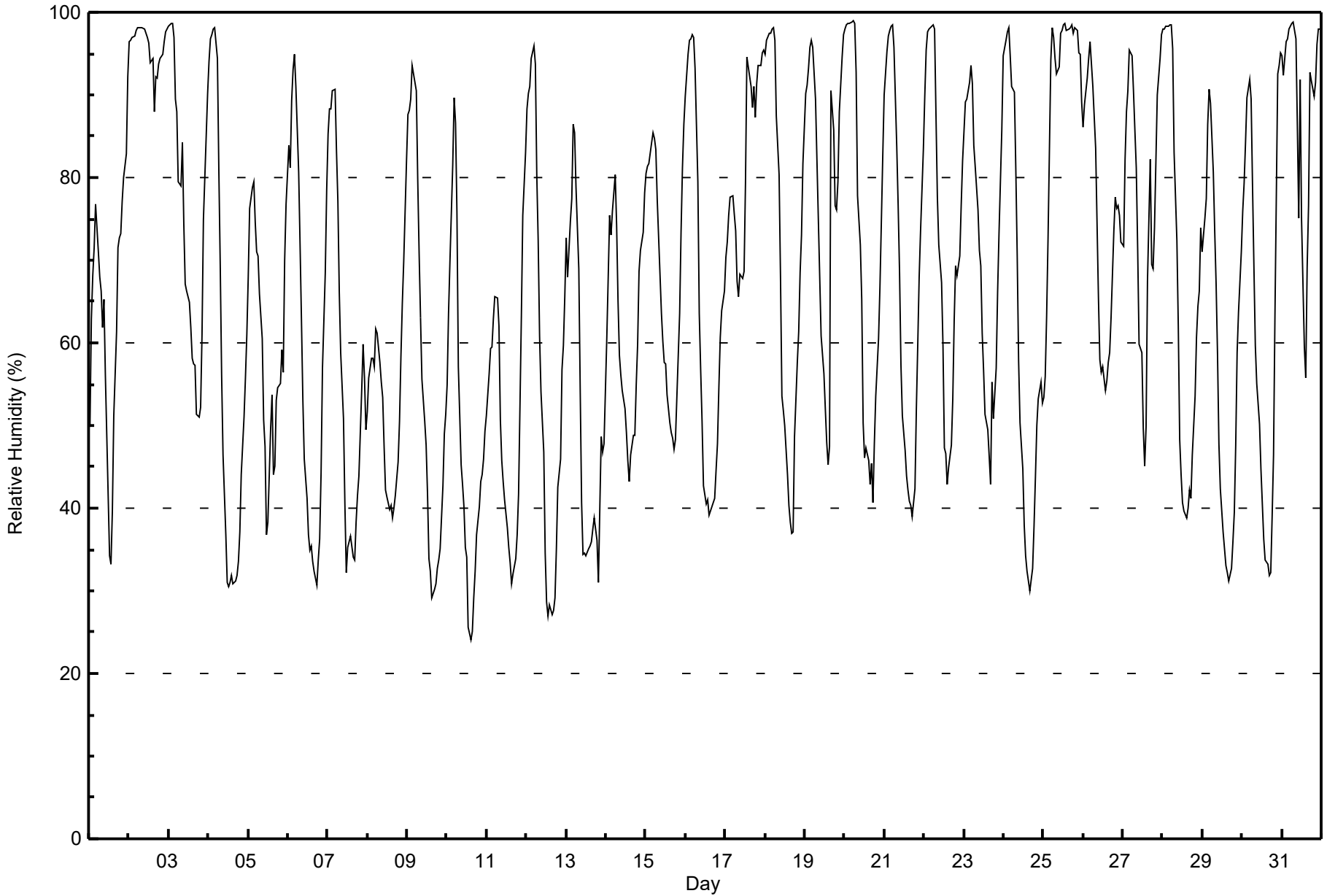
Relative Humidity (RH) - %
Barge Landing - July 2023

Maximum Value: 98.9 % on Jul 20 06:00																						Maximum Daily Average: 95.9 % on Jul 2																						Hours in Service: 744			
Minimum Value: 24.0 % on Jul 10 15:00																						Minimum Daily Average: 48.9 % on Jul 10																						Hours of Data: 744			
Maximum Diurnal Average: 89.9 % at hour 5																						Minimum Diurnal Average: 46.2 % at hour 15																						Hours of Missing Data: 0			
Monthly Average: 66.69 %																						Percentiles: P ₁ = 28.9 P ₁₀ = 36.6 Q ₁ = 47.6 Median = 67.1 Q ₃ = 88.3 P ₉₀ = 96.7 P ₉₉ = 98.7																						Hours of Calibration: 0			
																																												Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	49.9	62.8	68.2	71.6	76.8	70.9	68.0	66.3	61.9	65.3	56.1	41.6	34.3	33.3	39.7	51.3	61.4	71.6	72.7	73.2	77.2	79.9	82.9	92.2	63.7	92.2																					
2-Jul	96.4	96.6	96.9	97.1	97.7	98.1	98.1	98.2	98.2	97.9	97.5	97.0	96.4	93.9	94.4	88.0	92.3	92.1	93.7	94.4	94.9	96.5	97.6	98.0	95.9	98.2																					
3-Jul	98.4	98.7	98.7	97.0	89.4	88.0	79.5	78.9	84.2	74.4	67.2	66.2	65.0	61.9	58.1	57.4	57.3	51.3	51.1	52.2	61.1	74.9	80.0	90.2	74.2	98.7																					
4-Jul	94.1	96.8	97.3	97.9	98.1	94.4	81.0	69.4	56.1	46.5	36.7	30.9	30.6	31.0	31.8	30.8	31.3	31.9	33.5	37.1	44.1	51.0	55.8	61.1	57.0	98.1																					
5-Jul	68.0	76.3	78.8	79.5	74.5	71.1	70.5	66.0	60.6	50.6	47.4	36.8	38.2	49.6	53.7	44.0	45.0	53.0	54.6	55.1	59.1	56.4	70.1	76.8	59.8	79.5																					
6-Jul	83.9	81.1	89.4	93.1	95.0	90.9	80.8	71.9	62.8	53.0	45.9	41.1	36.8	34.9	35.4	33.6	32.4	30.8	33.8	36.3	44.3	56.9	68.4	78.4	58.8	95.0																					
7-Jul	85.2	88.3	88.2	90.6	90.6	83.3	77.1	66.0	58.8	50.9	40.5	32.2	35.3	36.0	36.6	34.1	33.6	38.4	41.5	43.9	54.2	59.8	55.7	49.5	57.1	90.6																					
8-Jul	51.7	55.7	58.1	58.1	57.1	61.7	61.2	57.6	55.3	53.3	47.5	42.2	41.3	39.8	40.3	38.8	40.1	41.6	45.7	50.5	58.2	64.7	69.8	82.0	53.0	82.0																					
9-Jul	87.6	88.1	89.5	93.6	92.5	90.6	79.8	70.8	63.0	55.5	50.6	47.6	41.7	33.9	32.4	29.2	30.2	30.8	32.8	33.7	35.1	42.6	49.0	51.4	56.3	93.6																					
10-Jul	54.9	63.6	69.9	81.5	89.7	86.6	75.8	57.1	45.2	43.0	40.1	35.3	34.1	25.6	24.0	25.0	29.1	32.4	36.8	40.2	43.2	44.1	46.0	49.4	48.9	89.7																					
11-Jul	51.2	56.2	59.4	59.4	62.9	65.7	65.4	62.0	50.7	45.7	43.2	41.0	37.7	35.2	33.4	30.8	32.1	33.9	36.8	41.8	52.4	63.3	75.5	83.0	50.8	83.0																					
12-Jul	88.3	90.2	91.0	94.5	95.9	93.8	80.4	72.4	60.8	54.1	46.8	34.5	28.7	27.0	28.4	27.2	27.7	29.1	35.1	42.5	45.9	56.8	59.7	65.7	57.4	95.9																					
13-Jul	72.6	68.0	74.7	77.4	86.5	85.4	78.9	69.0	54.3	40.7	34.3	34.6	34.2	35.2	35.5	35.9	37.4	38.7	36.1	31.0	40.0	48.6	46.8	47.8	51.8	86.5																					
14-Jul	60.6	67.9	75.5	73.0	75.9	80.4	74.2	65.1	58.5	56.1	54.3	52.1	49.2	45.8	43.2	46.4	48.8	48.9	54.8	59.8	68.6	71.1	73.3	78.1	61.7	80.4																					
15-Jul	80.6	81.4	81.7	84.2	85.4	84.8	83.3	77.3	72.8	63.5	60.1	57.6	57.4	53.7	50.3	49.2	48.4	47.1	48.3	53.4	63.5	73.4	81.3	86.4	67.7	86.4																					
16-Jul	89.9	95.0	96.7	96.7	97.3	96.9	93.2	79.4	63.6	56.7	50.6	42.8	40.5	41.0	39.1	39.6	40.2	41.2	44.7	47.9	54.6	60.6	63.8	66.3	64.1	97.3																					
17-Jul	70.4	72.2	75.4	77.6	77.8	75.7	73.6	67.5	65.6	68.3	67.9	68.7	79.3	94.5	93.5	91.0	88.5	90.9	87.3	91.4	93.5	93.5	95.1	95.5	81.4	95.5																					
18-Jul	95.0	96.7	97.5	97.5	98.0	98.2	96.7	87.5	80.4	68.0	53.6	51.9	50.0	44.1	40.3	38.3	36.9	37.2	48.7	57.6	61.4	68.5	73.0	81.7	69.1	98.2																					
19-Jul	90.2	91.2	93.2	95.7	96.5	95.7	89.5	82.2	75.2	67.9	60.9	56.3	52.0	48.0	45.2	47.4	90.5	85.8	76.6	76.2	79.4	88.0	94.5	97.2	78.1	97.2																					
20-Jul	98.0	98.4	98.6	98.7	98.8	98.9	98.7	92.8	77.7	71.8	65.3	50.3	46.2	47.3	45.7	42.9	45.3	40.7	47.7	53.6	60.5	66.8	74.5	82.5	70.9	98.9																					
21-Jul	90.0	95.3	97.1	97.8	98.2	98.5	95.8	83.7	76.6	68.4	57.3	51.1	47.0	43.8	42.2	40.8	40.3	39.0	42.4	52.0	59.8	68.0	73.5	83.4	68.4	98.5																					
22-Jul	89.9	95.4	97.6	98.0	98.2	98.5	97.9	87.7	77.6	71.9	67.3	59.6	47.3	46.6	42.8	45.0	47.6	53.2	62.7	69.4	68.1	70.4	76.6	82.0	73.0	98.5																					
23-Jul	85.7	89.2	89.4	91.5	93.6	91.3	83.9	81.3	76.1	71.2	69.2	61.1	56.7	51.3	49.5	46.2	42.9	55.2	50.9	57.0	66.1	73.3	79.5	85.8	70.7	93.6																					
24-Jul	94.7	96.6	97.6	98.1	94.7	91.0	90.4	80.9	70.5	57.8	50.3	44.8	37.9	34.3	32.4	31.2	29.9	32.8	37.8	43.7	50.1	53.3	55.3	52.8	60.8	98.1																					
25-Jul	53.4	56.0	63.3	72.5	94.3	98.2	97.0	94.4	92.5	93.3	97.4	97.8	98.5	98.7	97.8	98.0	98.2	98.4	97.5	98.1	97.9	95.1	94.8	89.1	90.5	98.7																					
26-Jul	86.1	88.8	92.0	94.4	96.5	93.8	91.0	83.5	74.4	65.4	57.9	56.4	57.1	54.2	55.4	57.7	58.8	63.1	73.6	77.6	76.3	76.7	75.4	72.3	74.1	96.5																					
27-Jul	71.8	82.3	87.9	90.5	95.5	94.7	90.5	85.8	81.2	71.4	59.9	58.9	49.7	45.0	49.8	67.5	82.3	69.5	69.0	73.9	81.9	89.9	94.5	97.3	76.7	97.3																					
28-Jul	97.9	98.0	98.2	98.4	98.4	98.5	95.6	83.1	72.4	62.0	48.3	44.1	40.6	39.6	38.8	40.0	42.3	41.2	46.5	53.6	60.6	64.4	66.2	73.8	66.8	98.5																					
29-Jul	71.0	75.1	77.4	86.5	90.7	88.9	80.6	73.6	67.1	58.6	47.8	42.4	37.1	35.1	33.1	32.1	31.2	32.7	36.0	39.6	47.6	58.9	63.7	71.0	57.4	90.7																					
30-Jul	76.0	79.4	84.2	89.6	91.9	89.5	79.0	69.1	59.7	55.1	50.2	44.7	40.5	36.3	33.8	33.3	31.8	32.1	39.1	46.4	63.3	92.5	93.6	95.1	62.8	95.1																					
31-Jul	94.8	92.4	96.4	96.7	98.0	98.4	98.7	98.8	96.8	86.3	75.0	91.8	75.0	59.4	55.7	69.1	76.5	92.7	91.8	89.8	91.4	96.1	97.9	98.1	88.2	98.8																					
																						79.9	83.0	85.8	88.0	89.9	88.8	84.1	76.8	69.4	62.7	56.4	52.0	48.9	47.0	46.2	46.5	49.4	50.9	53.5	57.2	63.0	69.6	73.7	77.9	Diurnal Average	
																						98.4	98.7	98.7	98.7	98.8	98.9	98.7	98.8	98.2	97.9	97.5	97.8	98.5	98.7	97.8	98.0	98.2	98.4	97.5	98.1	97.9	96.5	97.9	98.1	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Barge Landing - July 2023



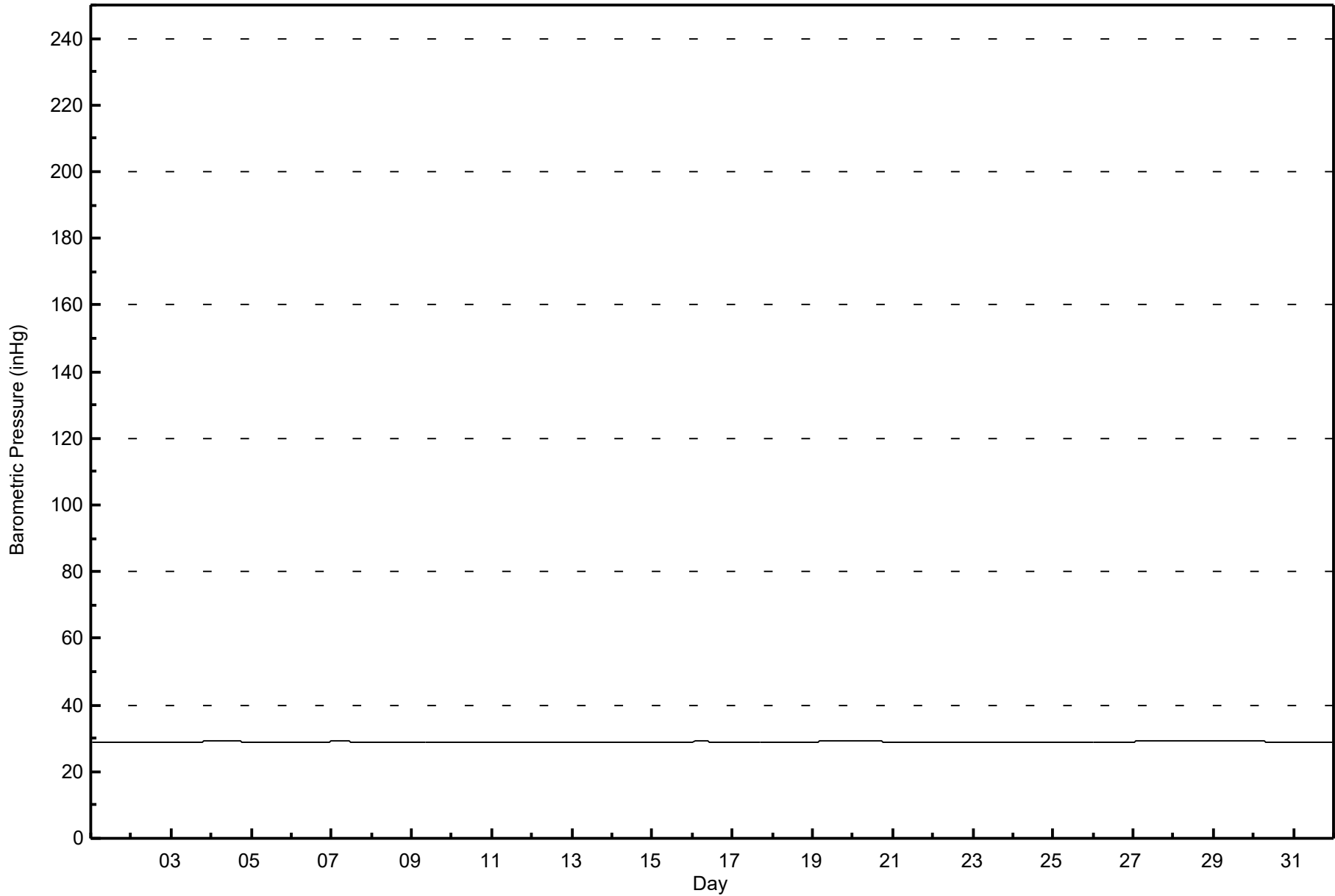


Maximum Value: 29.2 inHg on Jul 28 08:00 Maximum Daily Average: 29.2 inHg on Jul 28																						Hours in Service:	744				
Minimum Value: 28.6 inHg on Jul 25 09:00 Minimum Daily Average: 28.7 inHg on Jul 2																						Hours of Data:	744				
Maximum Diurnal Average: 28.9 inHg at hour 8 Minimum Diurnal Average: 28.9 inHg at hour 19																						Hours of Missing Data:	0				
Monthly Average: 28.91 inHg Percentiles: $P_1 = 28.7$ $P_{10} = 28.7$ $Q_1 = 28.8$ Median = 28.9 $Q_3 = 29.0$ $P_{90} = 29.1$ $P_{99} = 29.2$																						Hours of Calibration:	0				
																						Percent Operational Time:	100.0				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.9	
2-Jul	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7
3-Jul	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	28.9
4-Jul	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1
5-Jul	29.0	29.0	29.0	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	28.9	28.9	28.9	29.0
6-Jul	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	29.0	29.0	29.0	29.0	29.0	29.0	29.0
7-Jul	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.1
8-Jul	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.9
9-Jul	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	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.8
10-Jul	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0
11-Jul	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	28.8	28.8	28.9
12-Jul	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	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8
13-Jul	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	28.9	28.9	28.9	28.8
14-Jul	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	29.0	29.0	29.0	29.0	29.0	29.0	29.0
15-Jul	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	29.0
16-Jul	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0
17-Jul	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	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9
18-Jul	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	28.9	28.9	28.9	28.9	29.0	29.0	28.8	29.0
19-Jul	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1
20-Jul	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1
21-Jul	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0
22-Jul	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
23-Jul	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	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9
24-Jul	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	28.7	28.7	28.7	28.8
25-Jul	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7
26-Jul	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	28.9	28.9	28.9	29.0	29.0	28.8	29.0	29.0
27-Jul	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	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
28-Jul	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2
29-Jul	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	29.0	29.0	29.0	29.0	29.0	29.1	29.2
30-Jul	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.9	28.9	28.9	28.8	28.8	28.9	28.9	29.0
31-Jul	28.8	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9
28.9																						Diurnal Average					
29.2																						Diurnal Maximum					



Wood Buffalo Environmental Association
Hourly Averages

Barometric Pressure (BP) - inHg
Barge Landing - July 2023





Maximum Speed: 28 km/h on Jul 3 07:00	Maximum Daily Speed Average: 17.2 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 2 00:00	Minimum Daily Speed Average: 0.8 km/h on Jul 25	Hours of Data: 743
Maximum Diurnal Speed Average: 2.9 km/h at hour 1	Minimum Diurnal Speed Average: 0.3 km/h at hour 22	Hours of Missing Data: 1
Monthly Average Velocity: 1.1 km/h 311.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 8 Q ₃ = 12 P ₉₀ = 15 P ₉₉ = 23	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NW9	S4	SSW7	WSW8	SSW5	S7	WSW6	WSW6	SSW5	SSE5	SE7	SSE13	SSE16	S12	SSE12	SSW16	SW13	WNW10	WNW8	WSW6	WNW3	SW5	SSW2	W0	SSW5.1	SSE16
2-Jul	WNW8	NW8	WSW5	WSW9	SW9	WSW9	WNW9	NNW12	NW14	NW13	NNW15	NW15	WNW11	W10	W7	NW16	NW10	WNW14	WNW9	W6	W9	WNW7	WNW5	WNW7	WNW8.8	NW16
3-Jul	WNW9	NW9	NW8	N18	N19	N20	N28	N23	NNW22	NNW27	N26	NNW24	NNW23	N26	NNW24	N19	N16	NNW16	N15	N11	N9	N9	NNW11	NW11	NNW17.2	N28
4-Jul	NW9	NW9	WNW4	WSW6	WSW7	WSW5	WSW3	WSW4	W5	NW2	NW8	NW7	E7	NNE2	WSW7	S5	SSE9	S11	SSE13	SSE14	S13	S12	S12	S11	SSW3.7	SSE14
5-Jul	S7	S8	S9	S8	SSW8	SSW9	SSW10	SSW9	S9	SW11	SW7	WSW5	SW4	SW6	SW9	SSW11	SW8	WSW9	NW9	NNW11	NNW10	NNW12	NNW11	NW11	SSW4.8	NNW12
6-Jul	NNW11	NNW10	NW9	NW7	WNW2	NW3	NW3	NNW11	N12	NNE15	NNE16	NNE16	NNE16	NNE13	NNE13	NNE17	NNE17	NNE16	NNE15	N16	N10	NNW8	NNE3	S5	N9.6	NNE17
7-Jul	WSW7	WSW7	WSW6	SW6	SSW6	SSW8	SW8	SW7	SW5	SW3	SW4	SW3	SSW9	SSW12	SSW12	SSW11	SW12	SW10	SSW7	S6	SW8	SW9	WSW13	WSW15	SSW7.7	WSW15
8-Jul	W15	WSW13	WSW6	SW7	WSW12	SW7	SSW5	SW7	SW6	SW6	SW7	NNW4	NNE6	W3	NW5	NNW5	N8	NNE10	NNE11	NE8	N6	NNW7	NNW7	NW8	WNW3.4	WSW15
9-Jul	NNW11	NNW10	NNW10	NNW7	NNW9	NNW5	N6	N8	NNE9	NNE14	NNE16	NNE14	NNE19	NNE19	NNE19	NNE19	NE19	NE17	NE15	NNE15	NE18	NE16	ENE12	NE9	NNE12.1	NNE19
10-Jul	NNE7	NNE2	E6	ENE5	E4	E3	E3	SE9	SE13	SE12	SE9	ESE7	SW8	SE10	SE11	SE10	SSE10	SSE10	SE9	ESE9	ESE8	SE10	SE10	SE10	SE6.9	SE13
11-Jul	SE11	SE9	ESE8	SE9	SE7	SE8	SSE8	SSE11	S12	SSW10	SW9	SW10	SW12	SW12	SW13	SSW11	SW9	SW8	SSW8	SSW7	SW4	WSW5	WNW6	NW6	S6.3	SW13
12-Jul	SSW5	SSW5	SSW5	SW2	WSW4	SSW3	WNW2	NW1	NW5	NW9	NW10	NW11	NNW11	N13	N11	NNW10	NNW9	NNE12	NE10	NNE11	N9	NNW10	NW11	NW12	NNW5.7	N13
13-Jul	NW12	NW12	NW11	NW10	NW9	WNW5	WSW6	NW9	NW12	NNW17	NNW21	NNW23	NNW21	NNW20	NNW23	NNW19	N17	N19	N21	NNW18	NNW13	NNW13	NNW13	N12	NNW14.0	NNW23
14-Jul	NNW10	NW9	NW8	NW8	NW6	NW7	NNW14	NNW15	NNW15	NNW17	N15	NNE14	NNE12	N12	NNE15	NNE15	NNE11	N13	N11	N8	NNW7	NNW9	NNW7	NW6	N10.1	NNW17
15-Jul	NNW7	NW7	NW6	NW4	WNW4	NE3	SW2	WNW3	W4	NNE9	NE11	NE13	NE11	NE12	NE13	NNE13	NE11	NE11	E8	ENE11	NE9	NE5	NNE4	NE5	NNE6.0	NNE13
16-Jul	E1	SW2	WNW2	UO	SE5	S3	SSW3	S5	S11	S12	S12	SE16	SSE17	SSE16	SSE17	SSE14	SSE15	SSE14	SSE15	SE14	SE11	SE12	SE14	SE13	SSE10.1	SSE17
17-Jul	SE11	SE12	SE12	SE13	SE12	SE13	SE9	SE10	SSE13	SE15	SE15	SE16	SE15	SE9	ESE13	SE6	WSW4	NNE6	NNE8	NNW8	NNW8	NNW9	N7	ENE5	SE6.7	SE16
18-Jul	NNW6	NNW6	NW9	N8	NNW8	NNW6	N5	NNW5	NNW8	NNW7	N10	NNW9	NW11	WNW8	W5	W5	W5	NW6	NW9	NW8	W7	WSW7	WNW7	NW7	NW6.2	NW11
19-Jul	WSW7	SW7	WSW6	WSW5	WSW3	SSW6	SW5	SW2	SSW3	WSW4	WSW6	SSW4	SW8	WSW6	NE1	ESE6	SE5	W7	WNW4	W1	WNW4	WSW7	NW5	WSW3	WSW3.5	SW8
20-Jul	S4	SW4	SSW3	SW5	SSW3	SSW4	S3	SW3	NW1	WNW6	WNW6	NNW3	NW5	WSW4	WNW5	NNW6	NW7	NNW6	NNW6	N5	N6	W4	WNW6	NNW10	WNW3.0	NNW10
21-Jul	NNW9	NW6	WNW4	WNW4	WSW5	WSW6	SSW4	SW4	SW6	SW6	SW4	SW4	WSW4	S4	S7	S9	SW7	SW4	N1	ENE11	ENE9	ENE7	NNE2	NNW6	WSW1.7	ENE11
22-Jul	NNW8	NW4	NNW5	NW5	W2	SW5	W3	NW2	WNW3	NNW5	WNW6	N8	NNE14	NNE11	NNE13	NNE13	NNE12	NE6	NW5	NNW9	N11	NNW10	NNW9	NNW8	N5.9	NNE14
23-Jul	NW7	NNW7	NNW4	NNW3	E6	E8	SSE4	SSW3	S4	SSW5	SSW4	SW3	WSW6	WSW10	WSW8	S8	SSW7	NNW6	S7	SSE9	SSE10	SSE13	S7	SW6	SSW3.1	SSE13
24-Jul	WSW6	WSW7	WSW5	S5	SSW8	S5	SSE7	S6	SW4	WSW4	WSW5	W6	WSW6	WNW5	WNW4	S1	E9	E9	NE12	NE14	ENE13	ENE14	ENE12	ENE13	E1.7	NE14
25-Jul	ENE10	NE6	W7	SW6	SSW3	NE11	E9	ESE4	SE4	NW9	N7	N4	NNW6	NNW4	NE4	S5	NE3	NNE5	NNW6	NNW6	W6	SW12	SSW11	SSW13	NNW0.8	SSW13
26-Jul	SSW14	SSW13	S13	SSE12	SSE14	S14	SE8	SE6	SE8	ESE9	SE5	NW8	NNW10	N9	N15	NNE21	NNE20	NNE19	NNE20	NNE18	ENE13	ENE12	ENE13	ENE15	ENE4.7	NNE21
27-Jul	ENE11	NE12	NNE11	NNE8	N8	N7	NNW8	NNW8	NW7	NW8	NNW9	NNE14	NNE13	NNE16	NNE14	NE10	S6	SW8	WNW5	S3	SW3	SSE8	WSW5	WSW5	N4.9	NNE16
28-Jul	WNW5	WNW3	SW6	WSW6	WSW6	WSW5	WSW4	SSW3	SW4	WSW5	WSW4	WSW3	W4	SW6	SE7	S7	S12	S12	S13	S10	S11	S11	SSW9	SW7	SSW5.4	S13
29-Jul	SSW9	S7	S8	SSE10	SSE10	S11	S9	SSW9	SSW9	SSW9	SW11	SW12	SW14	SSW13	SSW13	SSW12	S15	S12	SSW10	SSW8	S9	S10	S10	SSE9	SSW9.7	S15
30-Jul	SSE8	SSE9	SE7	SSE4	SE6	SE8	SSE7	SSE8	SSE9	S10	SSE12	S15	S16	SSE17	S17	S15	S13	SW10	SSW7	SSW12	SSW17	SSE14	ESE12	SW4	S9.8	SSW17
31-Jul	WSW9	SW5	NW6	SW6	SSE9	SE7	SE4	SW6	S7	SSE14	S10	SSW6	SW7	W10	NW9	NNW6	NNW6	N7	W6	WSW6	SW5	S1	SSW6	SSW5	SSW3.6	SSE14

WNW2.9	W2.3	W2.1	WSW2.1	SW2.1	SSW1.8	SW1.1	WSW1.2	WSW1.4	WNW1.7	NW2.4	NNW2.6	NNW1.8	NNW1.6	N1.8	NNE1.5	N0.6	NNW2.5	N2.8	NNE2.6	N1.4	NW0.3	NW1.0	NW1.5	Diurnal Average
WSW15	WSW13	S13	N18	N19	N20	N28	N23	NNW22	NNW27	N26	NNW24	NNW23	NNW26	NNW24	NNE21	NNE20	N19	N21	NNW18	NE18	NE16	SE14	WSW15	Diurnal Maximum

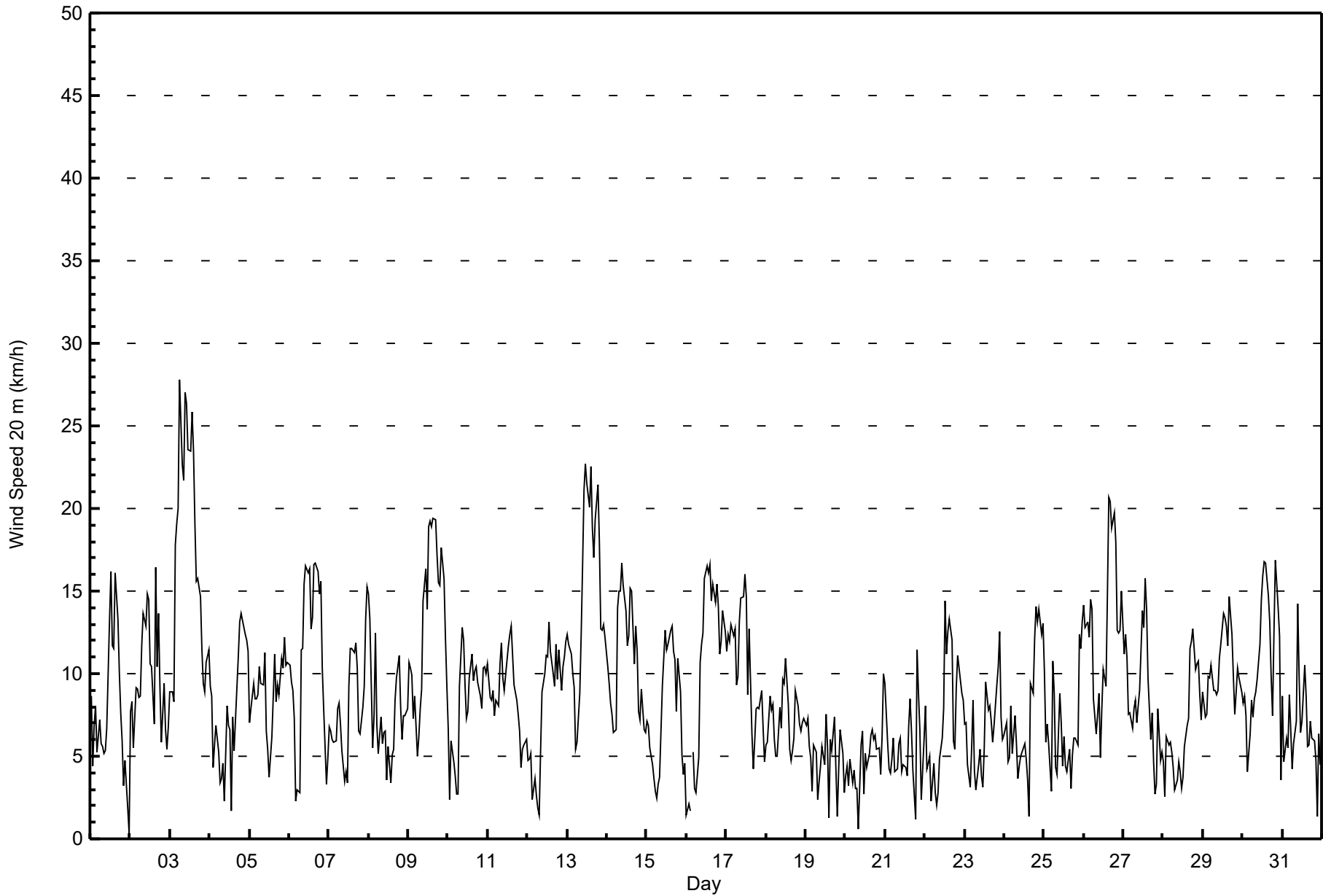
UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 20 m (WS20m) - km/h
Barge Landing - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Jul 3 07:00 Minimum Value: 1 km/h on Jul 15 22:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 8																	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9									
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	2	2	1	2	1	1	2	1	2	2	2	5	4	4	5	6	5	4	2	2	2	2	1	2	6	
2-Jul	3	2	2	3	2	2	3	4	3	3	4	3	4	3	3	6	3	4	3	3	4	2	2	2	6	
3-Jul	1	1	2	8	7	6	9	8	6	8	8	7	8	8	7	6	6	5	5	4	3	1	1	1	9	
4-Jul	1	1	2	1	1	1	1	1	1	2	3	3	3	3	3	3	3	3	3	3	2	2	2	1	3	
5-Jul	2	1	2	2	2	2	3	3	3	4	3	2	4	4	3	3	3	3	3	2	2	3	1	1	4	
6-Jul	1	3	2	1	2	2	2	3	4	5	5	5	4	4	5	5	5	5	5	5	2	1	3	2	5	
7-Jul	1	2	1	1	1	2	2	2	1	1	2	2	4	3	4	3	3	3	2	1	2	1	4	3	4	
8-Jul	3	3	2	2	2	2	1	2	2	2	2	2	2	2	2	2	3	3	3	2	1	2	1	1	3	
9-Jul	1	2	2	1	2	2	2	2	4	4	5	5	6	6	5	6	6	5	4	4	4	3	5	2	6	
10-Jul	3	2	2	1	2	2	3	2	4	3	3	4	3	4	3	4	4	3	2	2	1	1	1	1	4	
11-Jul	2	1	1	1	1	1	1	2	3	3	2	3	4	3	4	4	3	3	2	1	1	1	1	3	4	
12-Jul	1	2	1	1	2	2	2	1	3	2	2	3	3	5	4	4	3	4	3	2	2	1	2	2	5	
13-Jul	1	1	1	2	2	3	1	2	3	5	6	8	6	7	6	6	5	6	7	5	4	2	2	2	8	
14-Jul	1	2	1	1	1	1	6	5	5	5	5	4	4	4	5	4	4	4	3	4	1	1	1	1	6	
15-Jul	1	2	1	2	1	1	1	1	1	3	3	3	4	4	4	4	3	3	2	2	2	1	1	2	4	
16-Jul	2	2	2	UO	2	2	2	2	3	4	4	4	5	5	5	4	5	4	3	3	2	1	2	2	5	
17-Jul	2	2	2	2	2	3	3	3	3	4	4	4	5	1	3	3	1	2	2	2	1	2	2	2	5	
18-Jul	1	1	2	2	1	1	2	2	2	2	3	3	3	3	2	1	2	2	2	1	1	2	3	2	3	
19-Jul	2	1	1	1	3	1	1	1	1	2	2	2	2	2	2	4	5	5	2	2	1	1	2	2	5	
20-Jul	1	2	2	1	1	2	1	1	1	2	2	2	2	2	2	3	3	2	2	1	1	2	2	1	3	
21-Jul	1	1	1	2	1	1	1	1	1	1	1	2	2	2	4	3	2	2	4	2	1	2	1	1	4	
22-Jul	1	1	2	2	1	2	1	2	1	1	2	3	4	3	3	4	3	4	2	1	2	2	2	1	4	
23-Jul	1	1	1	2	1	1	2	1	2	2	2	2	2	3	3	3	3	4	3	2	1	2	3	3	4	
24-Jul	1	1	2	2	1	2	2	2	1	1	1	1	1	1	2	2	3	3	3	2	2	3	3	2	3	
25-Jul	3	2	4	3	2	5	5	4	3	2	3	3	2	2	2	2	2	2	1	1	2	3	3	4	5	
26-Jul	3	3	2	2	2	3	3	2	2	3	4	2	3	3	4	6	6	5	5	5	5	3	3	3	6	
27-Jul	4	3	2	2	2	2	2	2	2	3	4	4	4	5	6	7	3	2	2	2	3	2	3	2	7	
28-Jul	2	2	1	1	2	1	1	1	1	1	1	2	2	2	2	3	4	3	3	2	1	1	2	1	4	
29-Jul	2	1	2	1	1	2	2	3	2	3	3	3	4	5	4	4	4	4	4	2	1	1	1	1	5	
30-Jul	1	1	2	1	1	1	2	2	2	3	4	4	5	6	5	5	5	3	2	5	6	3	3	2	6	
31-Jul	4	5	1	2	2	3	2	2	3	3	3	3	3	4	4	4	6	4	2	2	2	3	2	2	6	
																	Diurnal Maximum									
UO - Unstable Operation																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 20 m (WS20m) - km/h
Barge Landing - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	175	23.55	23.55
6 - 11	376	50.61	74.16
12 - 19	173	23.28	97.44
20 - 28	19	2.56	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 20 m (WS20m) - km/h
Barge Landing - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	7	5	2	5	1	5	4	13	21	27	26	11	20	14	10	175
6 - 11	23	13	12	6	8	6	29	18	31	30	37	33	11	16	48	55	376
12 - 19	15	34	11	9	0	2	16	20	19	12	7	5	0	1	8	14	173
20 - 28	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	11	19
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	47	57	28	17	13	9	50	42	63	63	71	64	22	37	70	90	743

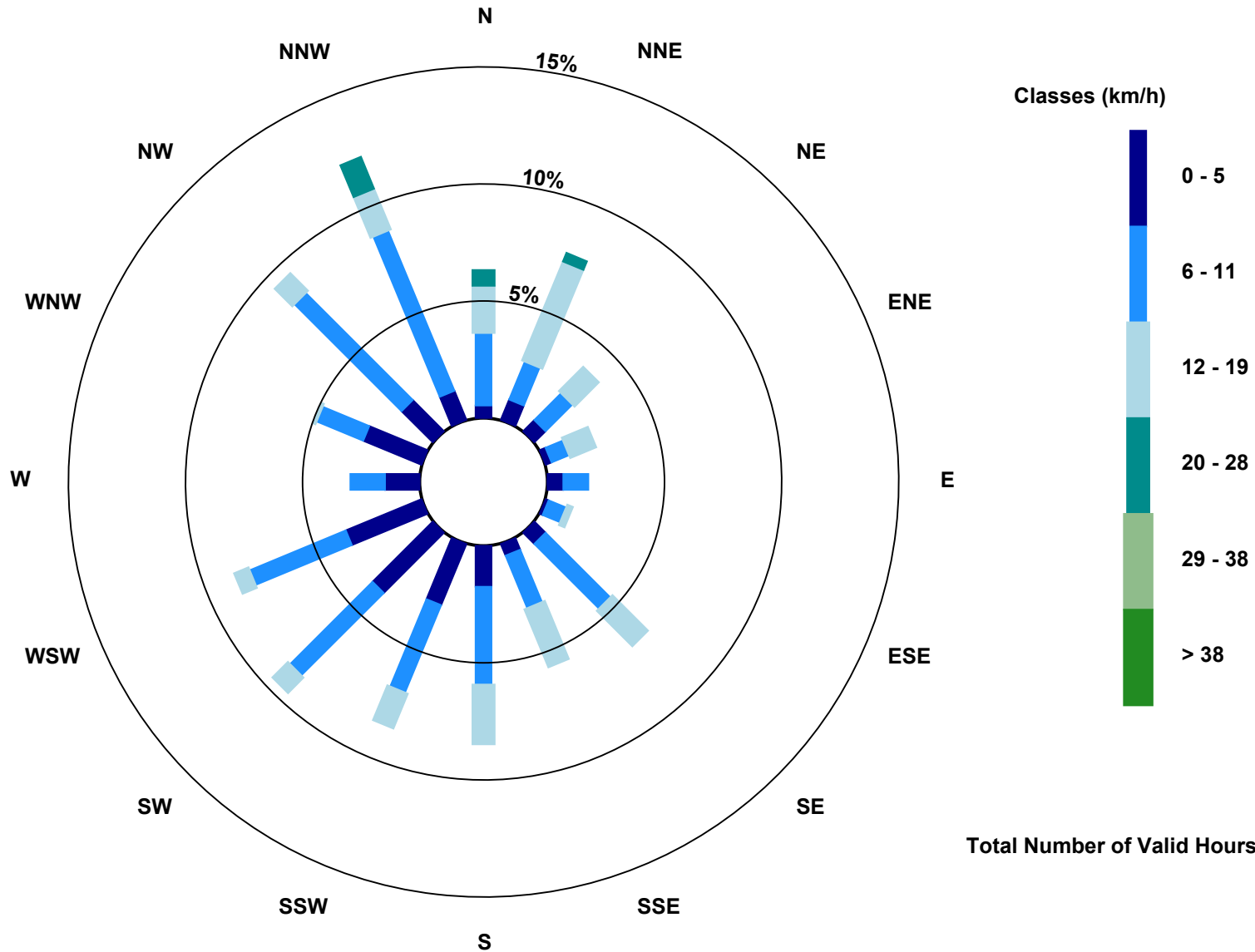
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed 20 m (WS20m) - km/h
Barge Landing





Direction of Maximum Speed: 3 deg on Jul 3 07:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 347.6 deg on Jul 3		Hours of Data:	743
Direction of Minimum Speed: 280 deg on Jul 2 00:00		Hours of Missing Data:	1
Direction of Minimum Daily Speed Average: 0.8 deg on Jul 25		Percent Operational Time:	99.9
Monthly Average Direction: 311.4 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	313	169	196	237	209	189	242	240	193	165	131	157	154	171	152	196	234	287	296	243	303	235	194	280	202.8
2-Jul	291	304	242	241	230	257	289	329	320	316	328	318	293	268	271	319	321	296	299	278	273	293	282	288	295.5
3-Jul	303	308	316	354	357	351	3	1	346	346	350	347	340	349	347	351	353	348	350	353	1	354	334	323	347.6
4-Jul	320	306	302	252	245	250	246	252	260	305	321	325	80	25	246	178	163	169	160	165	169	170	175	170	202.6
5-Jul	185	172	185	173	197	192	206	200	183	235	234	253	215	226	217	213	224	246	318	335	338	346	327	325	234.5
6-Jul	335	342	315	306	285	309	314	327	354	20	14	14	27	23	24	27	24	24	12	352	356	328	12	185	3.7
7-Jul	238	247	238	216	198	195	217	221	222	216	227	220	209	204	205	205	226	236	202	188	223	233	243	251	221.3
8-Jul	259	244	240	221	237	233	207	222	220	220	229	341	27	269	310	333	356	17	33	35	357	341	335	325	287.4
9-Jul	329	330	338	339	334	337	360	10	30	28	30	28	33	30	25	32	44	37	35	29	34	54	58	47	24.9
10-Jul	31	33	91	66	100	91	101	143	130	130	132	121	217	136	142	141	167	167	128	108	110	135	127	126	129.3
11-Jul	134	130	119	130	125	143	152	156	173	201	230	217	214	221	217	211	216	216	209	208	220	246	300	317	191.1
12-Jul	208	197	201	215	257	209	290	309	324	324	304	319	334	4	3	346	329	16	37	28	352	328	320	322	336.2
13-Jul	306	313	318	325	319	297	252	312	323	334	337	345	348	344	331	346	356	6	2	347	335	331	337	355	337.5
14-Jul	341	320	314	304	306	322	345	342	342	347	360	12	17	9	14	30	29	7	352	11	331	331	338	321	351.5
15-Jul	333	325	313	305	296	34	234	294	281	27	43	40	47	46	40	32	46	46	79	60	56	36	15	36	30.7
16-Jul	87	215	288	UO	135	183	197	175	171	170	172	139	152	153	151	149	154	161	151	138	135	132	137	137	151.4
17-Jul	142	141	138	138	138	135	136	135	149	137	143	137	145	141	102	129	252	33	24	331	337	345	355	66	127.7
18-Jul	346	335	326	350	329	339	354	333	331	343	359	333	313	284	270	265	259	315	325	315	271	255	290	310	317.3
19-Jul	241	220	238	247	238	207	221	222	196	250	240	211	230	258	45	105	141	259	303	269	303	254	309	257	238.3
20-Jul	183	234	208	228	199	200	186	230	316	297	287	347	307	256	291	333	307	329	337	8	3	279	298	334	295.0
21-Jul	332	321	282	287	240	239	206	214	223	226	234	229	244	185	188	187	226	227	4	63	69	68	17	330	241.1
22-Jul	333	314	328	304	273	224	261	312	283	329	302	354	28	32	24	30	22	36	321	332	358	339	344	332	351.9
23-Jul	323	336	339	337	85	96	155	201	187	197	194	230	243	238	241	177	198	331	173	154	152	168	191	222	194.3
24-Jul	248	238	245	182	205	189	154	171	236	242	258	262	257	297	303	175	94	90	56	49	59	60	67	74	96.6
25-Jul	72	50	261	232	209	37	93	104	132	306	10	358	313	340	51	98	36	21	331	331	269	226	200	207	338.7
26-Jul	207	192	180	164	165	169	139	133	125	109	140	309	338	9	8	18	21	13	13	23	67	65	58	66	61.0
27-Jul	57	40	32	16	353	5	345	343	315	319	344	14	22	18	23	52	188	230	296	177	216	161	250	254	6.9
28-Jul	284	295	225	238	248	244	243	194	232	241	240	244	276	223	126	174	178	180	188	178	176	187	200	215	204.3
29-Jul	209	189	180	167	160	177	190	193	192	203	234	236	217	200	212	203	189	189	196	192	182	174	178	163	194.0
30-Jul	159	152	144	149	137	131	153	161	162	175	166	173	169	163	171	180	175	217	200	205	209	160	120	224	169.8
31-Jul	242	235	318	232	158	143	129	214	191	166	178	213	221	265	323	332	336	0	260	251	230	188	213	202	224.0

289.6 274.6 260.9 247.5 216.3 195.1 215.3 252.1 242.9 300.9 323.1 339.4 333.8 326.3 359.1 31.0 1.6 348.0 2.9 17.7 4.2 312.1 314.9 308.6

Diurnal Average

UO - Unstable Operation

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



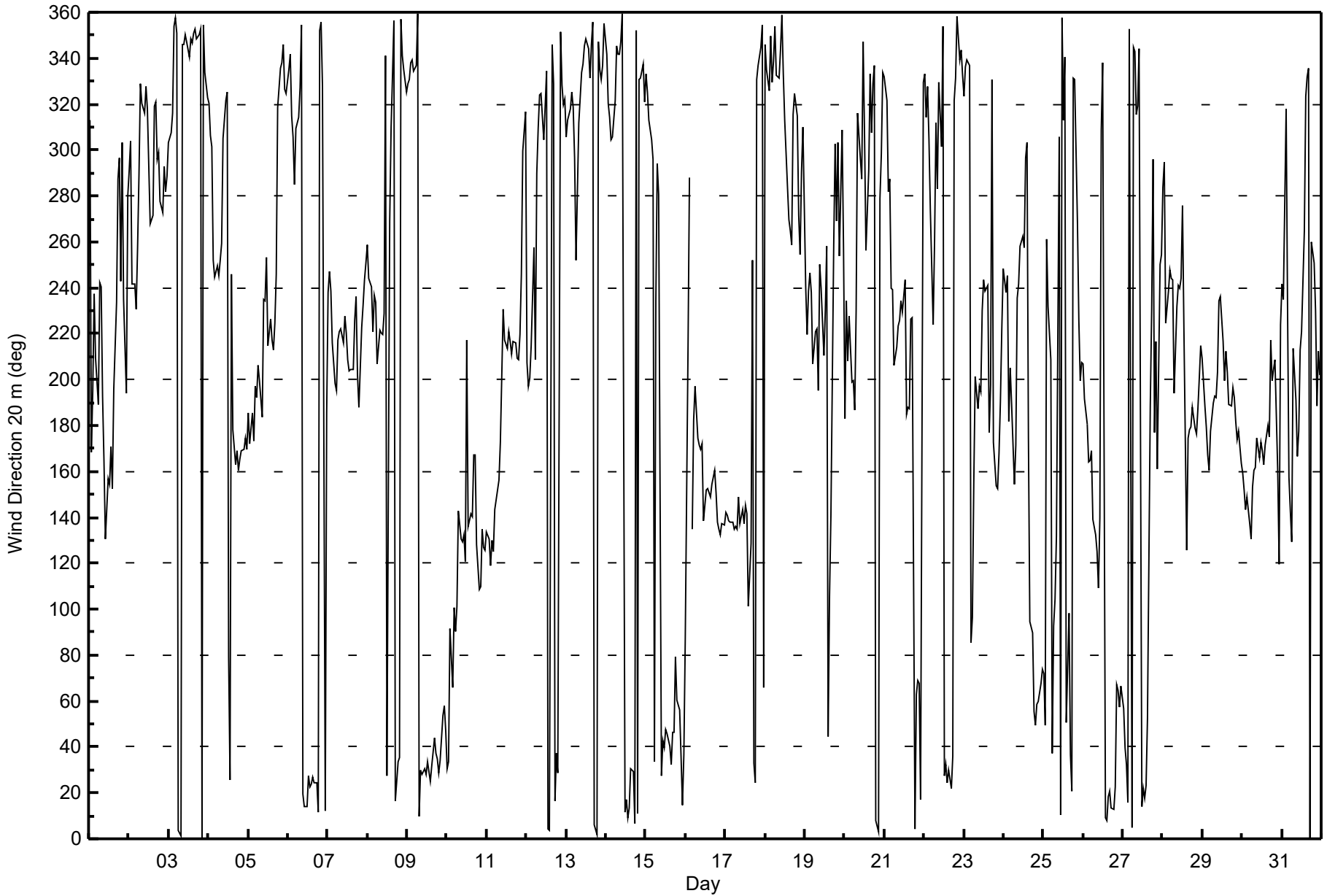
Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 20 m (WD20m) - deg
Barge Landing - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 101 deg on Jul 2 00:00	Hours of Data: 743
Minimum Value: 5 deg on Jul 4 05:00	Hours of Missing Data: 1
Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 15 Median = 22 Q ₃ = 32 P ₉₀ = 49 P ₉₉ = 83	Hours of Calibration: 0
	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	11	43	16	22	24	18	14	17	27	25	22	22	17	31	32	25	20	24	17	26	60	30	60	101	101
2-Jul	37	13	26	17	16	22	18	21	15	15	17	16	20	17	24	20	17	18	20	32	21	23	21	12	37
3-Jul	11	11	14	22	22	20	22	23	19	20	22	22	20	22	22	24	24	22	20	21	19	17	7	8	24
4-Jul	8	7	16	11	5	9	21	25	29	71	32	39	46	88	43	66	35	24	14	12	11	10	9	8	88
5-Jul	22	10	12	16	15	17	18	21	28	25	33	45	76	49	20	23	20	21	29	13	14	17	11	8	76
6-Jul	9	22	12	13	52	43	62	17	26	20	23	24	21	30	24	21	19	18	21	22	18	14	48	34	62
7-Jul	9	9	18	10	11	14	18	19	22	34	39	75	31	27	26	33	23	25	19	11	23	9	12	12	75
8-Jul	15	14	67	20	12	18	24	18	19	21	24	59	41	71	46	44	28	30	15	14	22	8	7	12	71
9-Jul	8	10	13	14	11	27	34	31	25	19	19	25	19	18	20	23	17	17	15	14	14	13	22	17	34
10-Jul	27	71	25	27	46	52	67	22	20	21	29	81	55	42	32	42	36	17	14	13	11	6	7	7	81
11-Jul	6	7	8	10	8	13	11	14	21	29	32	35	24	22	24	26	30	20	18	15	12	7	21	25	35
12-Jul	16	14	13	53	37	62	53	96	39	21	17	21	33	31	32	34	27	21	19	17	26	7	9	11	96
13-Jul	8	8	13	17	16	45	26	16	16	19	21	25	25	24	18	23	23	23	23	20	15	9	14	15	45
14-Jul	17	9	12	13	13	13	21	21	23	24	24	21	23	28	25	22	23	26	29	27	14	10	14	17	29
15-Jul	12	15	17	34	28	47	47	18	50	26	20	20	26	24	21	20	27	29	25	15	9	12	26	50	50
16-Jul	90	81	58	UO	32	23	39	50	25	26	28	25	21	20	25	26	19	19	17	12	7	7	9	9	90
17-Jul	8	9	8	8	9	13	13	16	16	13	15	12	13	23	13	28	35	35	18	20	11	11	18	33	35
18-Jul	28	7	12	19	11	18	31	30	19	32	25	28	20	28	27	36	33	21	13	10	20	16	21	13	36
19-Jul	17	14	17	15	62	21	15	62	48	65	32	50	21	35	91	39	60	42	39	74	24	14	47	55	91
20-Jul	43	33	40	36	35	32	35	46	96	32	22	78	50	50	49	34	28	27	19	17	27	52	40	7	96
21-Jul	9	20	18	26	11	11	18	22	23	25	40	53	73	73	44	36	30	38	75	10	10	14	50	8	75
22-Jul	13	8	36	18	46	13	49	55	49	38	19	38	17	20	23	17	18	50	27	9	16	13	8	9	55
23-Jul	13	11	18	32	15	16	34	42	47	43	53	77	45	33	39	31	47	66	49	12	6	10	35	27	77
24-Jul	9	9	18	32	19	42	17	20	55	41	23	25	17	32	70	96	28	30	23	10	12	14	15	11	96
25-Jul	16	22	30	37	76	34	39	60	66	24	43	80	42	44	42	17	52	34	11	34	41	19	20	19	80
26-Jul	16	15	13	13	8	13	15	22	24	30	70	33	25	29	24	18	17	19	20	19	21	16	16	13	70
27-Jul	19	15	15	20	15	21	17	18	24	24	38	21	25	24	28	51	44	19	65	43	47	14	57	30	65
28-Jul	13	76	27	25	14	12	21	41	44	31	44	79	70	40	37	43	30	23	18	13	9	12	16	11	79
29-Jul	22	18	29	6	8	14	19	22	22	30	21	22	23	28	31	35	27	25	25	15	8	7	8	11	35
30-Jul	8	10	10	12	7	9	15	22	24	25	27	25	24	27	23	25	30	19	21	17	27	24	14	62	62
31-Jul	22	65	29	28	17	19	42	19	25	18	31	36	46	40	43	55	73	50	40	20	33	85	14	33	85
	90	81	67	53	76	62	67	96	96	71	70	81	76	88	91	96	73	66	75	74	60	85	60	101	
	Diurnal Maximum																								

UO - Unstable Operation





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS11 LOWER CAMP JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS11)
 JULY 2023

MONTHLY SUMMARY

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	653	31	91	91.94	138.9	0	20.6	0
H2S (ppb) Average	698	36	46	98.66	13.8	3	2.6	0
THC (ppm) Average	699	34	45	98.52	3.5	-	2.4	-
CH4(ppm) Average	699	34	45	98.52	3.2	-	2.3	-
NMHC(ppm) Average	699	34	45	98.52	0.584	-	0.112	-
Temperature (C) Average	743	0	1	99.87	29.5	-	22.5	-
Relative Humidity (%) Average	720	0	24	96.77	100	-	93.4	-
Barometric Pressure (inHg) Average	743	0	1	99.87	29.4	-	29.4	-
Wind Speed 10 m (km/h) Average	494	2	250	66.67	23	-	14	-
Wind Direction 10 m (deg) Average	494	2	250	66.67	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS11)
JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	653	2.23	7.8	-	0	0	0.1	0.3	1.3	4.4	138.9
H2S (ppb) Average	698	0.88	1.3	-	0	0	0.2	0.5	1.1	2	13.8
THC (ppm) Average	699	2.23	0.2	-	1.9	2	2	2.2	2.4	2.6	3.5
CH4(ppm) Average	699	2.18	0.2	-	1.9	2	2	2.1	2.3	2.5	3.2
NMHC(ppm) Average	699	0.057	0.052	-	0	0	0	0.1	0.1	0.1	0.584
Temperature 2 m (C) Average	743	19.01	4.4	-	7.8	13.3	15.7	18.6	22.4	25.3	29.5
Relative Humidity (%) Average	720	69.06	20.1	-	29.8	41	52.7	70.1	87	96.4	100
Barometric Pressure (inHg) Average	743	29.09	0.1	-	28.8	28.9	29	29.1	29.2	29.3	29.4
Wind Speed 10 m (km/h) Average	494	7.7	5	-	0	1	4	7	12	16	23
Wind Direction 10 m (deg) Average	494	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS11)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	15 Jul 2023 02:00	16 Jul 2023 11:00	34	Unstable Operation - flatline in analyzer output signal
SO2	16 Jul 2023 12:00	16 Jul 2023 12:00	1	Maintenance - analyzer rebooted
SO2	29 Jul 2023 19:00	30 Jul 2023 08:00	14	Unstable Operation - flatline in analyzer output signal
ALL PARAMETERS	19 Jul 2023 12:00	19 Jul 2023 12:00	1	Maintenance - station logger/modem reset
SO2	30 Jul 2023 09:00	30 Jul 2023 09:00	1	Station power failure
H2S, SO2	27 Jul 2023 13:00	27 Jul 2023 17:00	5	Station power failure
THC/NMHC/CH4	27 Jul 2023 13:00	27 Jul 2023 18:00	6	Station power failure
AIR QUALITY ANALYZERS	29 Jul 2023 10:00	29 Jul 2023 10:00	1	Station power failure
AIR QUALITY ANALYZERS	29 Jul 2023 18:00	29 Jul 2023 18:00	1	Station power failure
AIR QUALITY ANALYZERS	30 Jul 2023 17:00	30 Jul 2023 17:00	1	Station power failure
AIR QUALITY ANALYZERS	31 Jul 2023 10:00	31 Jul 2023 10:00	1	Station power failure
Relative Humidity	04 Jul 2023 04:00	04 Jul 2023 07:00	4	Sensor operated out of range
Relative Humidity	20 Jul 2023 00:00	20 Jul 2023 07:00	8	Sensor operated out of range
Relative Humidity	21 Jul 2023 02:00	21 Jul 2023 07:00	6	Sensor operated out of range
Relative Humidity	24 Jul 2023 04:00	24 Jul 2023 04:00	1	Sensor operated out of range
Relative Humidity	28 Jul 2023 03:00	28 Jul 2023 06:00	4	Sensor operated out of range
Wind Speed, Wind Direction	21 Jul 2023 18:00	01 Aug 2023 00:00	247	Unstable Operations - wind direction sensor misaligned



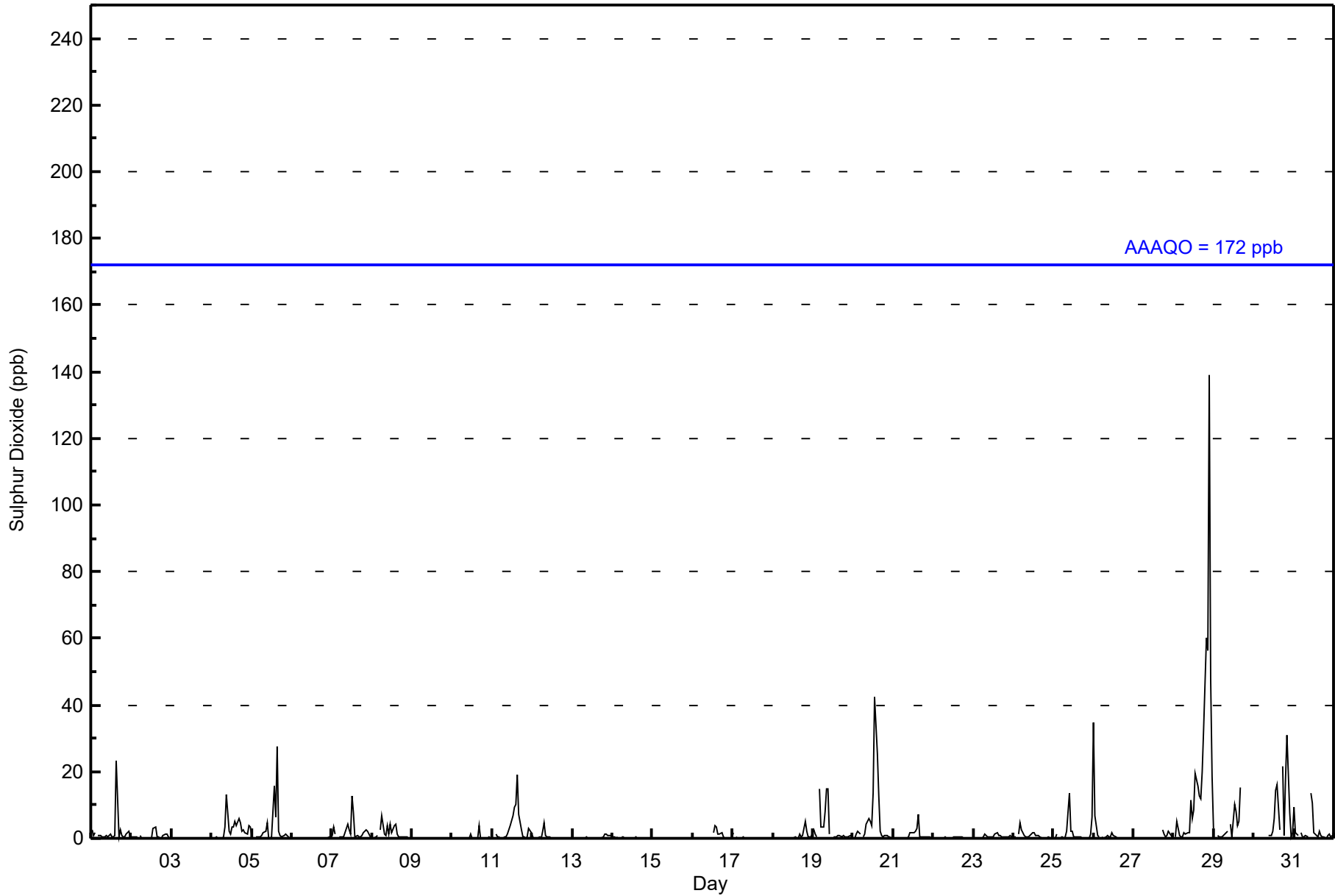
Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Lower Camp - July 2023

Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0	Hours in Service: 744																	Daily Average		Daily Maximum																									
Maximum Value: 138.9 ppb on Jul 28 22:00		Maximum Daily Average: 20.6 ppb on Jul 28		Hours of Data: 653																	Hours of Missing Data: 91		Hours of Calibration: 31		Percent Operational Time: 91.9																							
Minimum Value: 0.0 ppb on Jul 2 11:00		Minimum Daily Average: 0.0 ppb on Jul 3		Hours of Missing Data: 91																	Hours of Calibration: 31		Percent Operational Time: 91.9																									
Maximum Diurnal Average: 5.6 ppb at hour 22		Minimum Diurnal Average: 0.4 ppb at hour 4		Hours of Missing Data: 91																	Hours of Calibration: 31		Percent Operational Time: 91.9																									
Monthly Average: 2.23 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.3 Q ₃ = 1.3 P ₉₀ = 4.4 P ₉₉ = 31.7		Hours of Missing Data: 91																	Hours of Calibration: 31		Percent Operational Time: 91.9																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	2.5	0.9	1.7	Z	0.8	0.7	0.6	0.6	0.6	0.7	0.5	1.3	0.3	0.3	1.0	23.4	0.5	2.5	0.9	0.3	0.3	1.3	2.2	0.4	1.9	23.4																						
2-Jul	0.4	0.4	0.5	0.4	Z	0.8	0.2	0.1	0.0	0.0	0.0	0.0	0.0	2.9	3.6	0.6	0.2	0.2	0.1	0.9	1.4	1.4	0.3	0.2	0.6	3.6																						
3-Jul	0.1	0.1	0.0	0.1	0.1	Z	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1																						
4-Jul	Z	0.0	0.0	0.3	0.1	0.0	0.0	0.3	3.5	13.2	2.3	1.3	3.5	3.3	5.1	3.6	6.1	4.5	2.0	2.7	1.7	1.3	3.7	3.2	2.7	13.2																						
5-Jul	0.9	Z	0.6	0.6	0.4	0.5	0.7	1.5	2.2	4.7	0.2	0.2	0.3	15.6	6.2	27.7	2.0	1.0	0.5	0.8	1.2	0.7	0.3	0.1	3.0	27.7																						
6-Jul	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	0.2	0.5	0.1	0.5																						
7-Jul	0.8	3.4	1.4	Z	0.4	0.4	0.3	0.6	1.8	4.4	2.6	1.5	12.5	7.8	0.5	0.9	0.5	0.6	0.7	1.7	2.3	2.0	1.3	0.3	2.1	12.5																						
8-Jul	0.2	0.1	0.6	0.7	Z	2.3	6.9	1.1	0.9	3.8	1.1	4.1	1.7	3.7	4.1	1.4	0.5	0.4	0.4	0.2	0.4	0.3	0.2	0.2	1.5	6.9																						
9-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.2	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	0.1	0.2																						
10-Jul	Z	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	0.2	3.9	0.2	0.0	0.1	0.0	0.1	0.2	0.2	0.3	3.9																						
11-Jul	0.4	Z	1.2	0.6	0.3	0.2	0.2	0.3	0.6	1.2	2.4	3.6	6.6	9.1	10.0	18.9	7.2	2.4	0.3	0.4	0.2	0.3	2.8	1.7	3.1	18.9																						
12-Jul	0.5	0.1	Z	0.2	0.4	0.2	2.0	4.5	0.7	0.3	0.3	0.2	0.1	0.1	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.5	4.5																						
13-Jul	0.1	0.1	0.0	Z	0.1	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.4	1.3	1.1	0.8	0.9	0.9	0.3	1.3																						
14-Jul	0.5	0.2	0.2	0.3	Z	0.3	0.2	0.2	0.1	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.2	0.5																					
15-Jul	0.0	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	0.0																					
16-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	1.9	3.8	3.3	1.5	1.1	1.7	0.2	0.0	0.0	0.0	0.0	0.0	--	3.8																						
17-Jul	1.9	Z	0.2	0.1	0.0	0.1	0.2	0.2	0.1	0.1	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.9																						
18-Jul	0.0	0.0	Z	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.4	0.0	0.0	1.1	0.4	0.8	4.9	2.1	0.5	0.4	0.3	0.5	4.9																						
19-Jul	2.7	1.4	0.6	Z	14.8	3.5	3.3	8.0	14.8	14.6	1.2	M	0.3	0.4	0.4	0.8	0.6	0.3	0.9	0.5	0.3	0.4	0.7	0.3	3.2	14.8																						
20-Jul	0.2	0.1	1.4	2.3	1.5	Z	0.6	1.4	4.4	6.1	5.1	3.7	13.7	42.3	25.6	12.6	2.2	0.8	0.5	0.8	0.8	0.6	0.2	0.1	5.5	42.3																						
21-Jul	0.0	0.0	0.0	0.0	0.1	Z	0.1	0.1	0.2	0.3	1.5	1.9	1.7	2.0	3.2	7.3	0.5	0.3	0.5	0.4	0.4	0.2	0.2	0.2	0.9	7.3																						
22-Jul	Z	0.2	0.0	0.1	0.2	0.1	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.3																						
23-Jul	0.0	Z	0.2	0.1	0.2	0.2	0.2	1.2	0.6	0.4	0.4	0.4	0.6	1.3	1.6	0.7	0.9	0.5	0.3	0.3	0.2	0.3	0.7	0.6	0.5	1.6																						
24-Jul	0.6	0.5	Z	1.2	4.8	2.5	0.8	0.5	0.4	0.4	0.8	1.8	1.6	1.0	0.7	0.7	0.4	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.8	4.8																						
25-Jul	0.0	0.0	1.1	Z	0.4	0.4	0.1	0.3	2.2	13.7	2.0	2.2	0.6	0.3	0.5	0.4	0.3	0.1	0.0	0.1	0.1	0.0	1.1	6.3	1.4	13.7																						
26-Jul	34.8	7.0	0.8	0.4	Z	0.3	0.2	0.3	0.7	0.6	0.2	1.9	0.9	0.5	0.2	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.1	2.2	34.8																						
27-Jul	0.1	0.0	0.1	0.1	0.1	Z	0.2	0.1	0.1	0.2	0.2	0.1	PF	PF	PF	PF	PF	2.4	1.3	0.2	1.0	2.3	0.9	0.4	0.5	2.4																						
28-Jul	Z	0.3	5.1	0.9	0.5	0.5	1.5	1.4	1.7	1.8	11.3	6.0	8.5	19.3	15.5	12.9	11.7	19.9	32.5	60.2	56.5	138.9	48.0	18.8	20.6	138.9																						
29-Jul	2.9	Z	0.8	0.5	0.4	0.5	1.4	1.9	2.3	PF	4.4	0.6	10.0	7.9	3.6	5.0	15.1	PF	UO	UO	UO	UO	UO	UO	--	15.1																						
30-Jul	UO	UO	UO	UO	UO	UO	UO	UO	PF	0.8	1.0	2.0	5.8	14.4	16.3	2.4	PF	21.5	1.0	17.8	31.0	7.8	0.4	1.7	--	31.0																						
31-Jul	9.2	1.5	0.8	Z	1.7	0.3	0.3	0.8	0.4	PF	13.7	10.6	1.9	0.7	0.5	2.1	0.7	0.2	0.2	0.2	0.8	1.1	0.6	1.0	2.2	13.7																						
2.4																								0.7	0.7	0.4	1.1	0.6	0.7	0.9	1.4	2.5	1.8	1.7	2.6	4.8	3.5	4.3	2.0	2.1	1.5	3.3	3.5	5.6	2.3	1.3	Diurnal Average	
34.8																								7.0	5.1	2.3	14.8	3.5	6.9	8.0	14.8	14.6	13.7	10.6	13.7	42.3	25.6	27.7	15.1	21.5	32.5	60.2	56.5	138.9	48.0	18.8	Diurnal Maximum	
Z - zerospan																								C - Calibration				M - Maintenance				UO - Unstable Operation				PF - Power Failure												
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Lower Camp - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	618	94.64	94.64
11 - 20	23	3.52	98.16
21 - 60	11	1.68	99.85
61 - 110	0	0.00	99.85
111 - 172	1	0.15	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 653

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Lower Camp - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	57	31	18	12	7	30	67	14	5	5	3	15	24	31	57	48	424
11 - 20	1	0	1	0	0	1	0	1	0	1	0	0	1	1	1	1	9
21 - 60	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	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	58	31	19	12	7	31	67	16	5	6	4	15	25	33	58	50	437

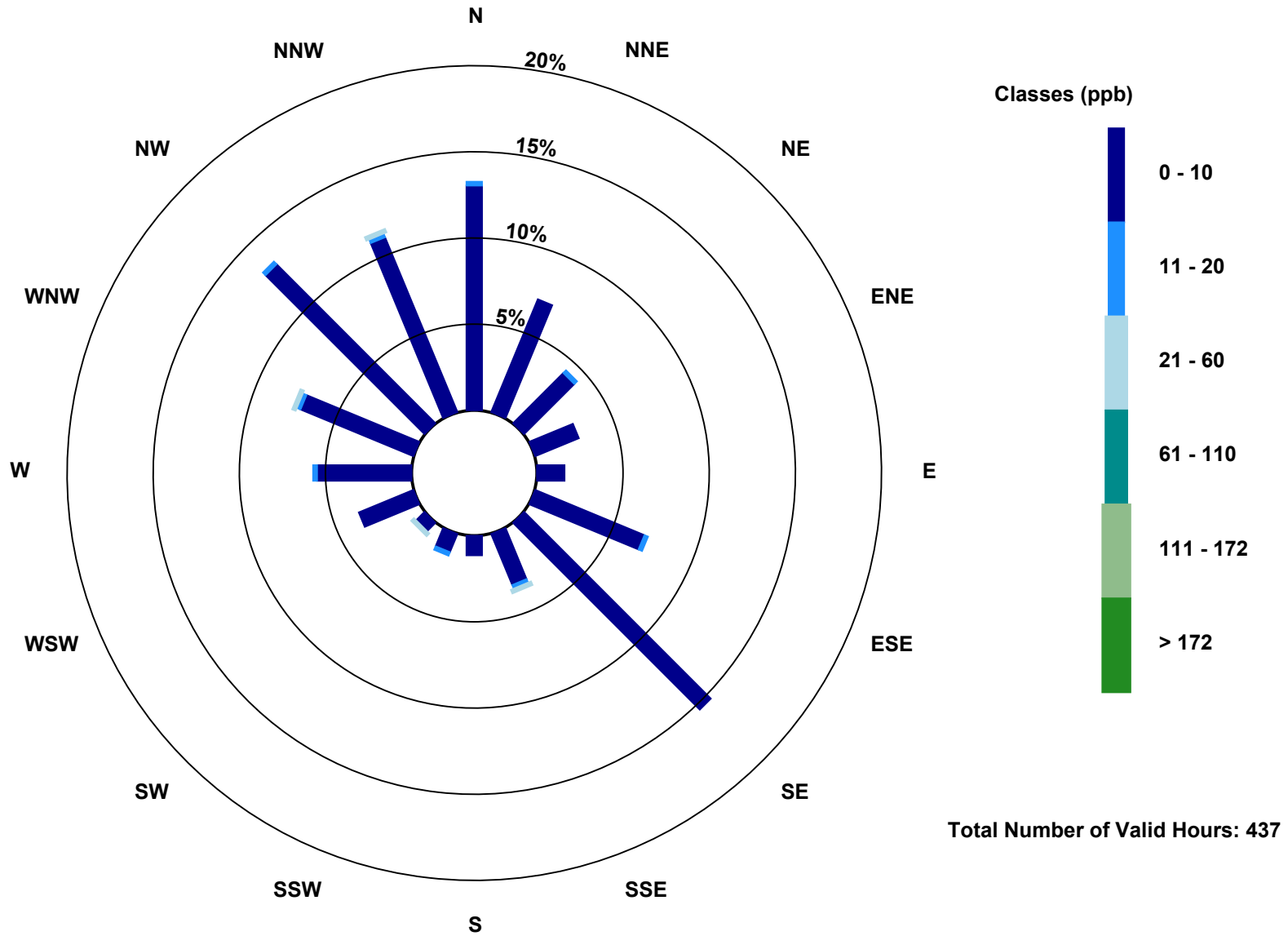
Total Number of Valid Hours: 437

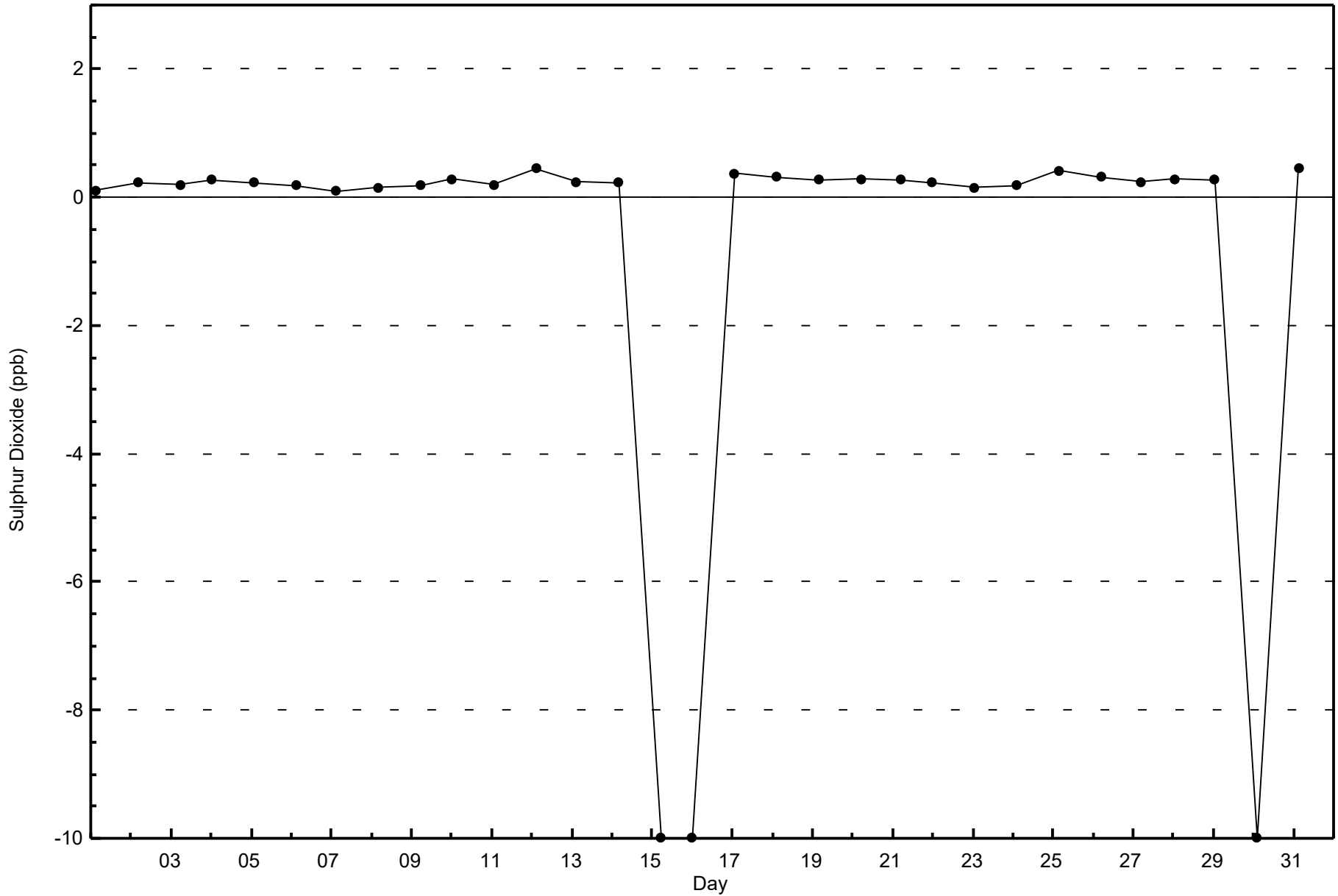
Total Number of Hours: 744

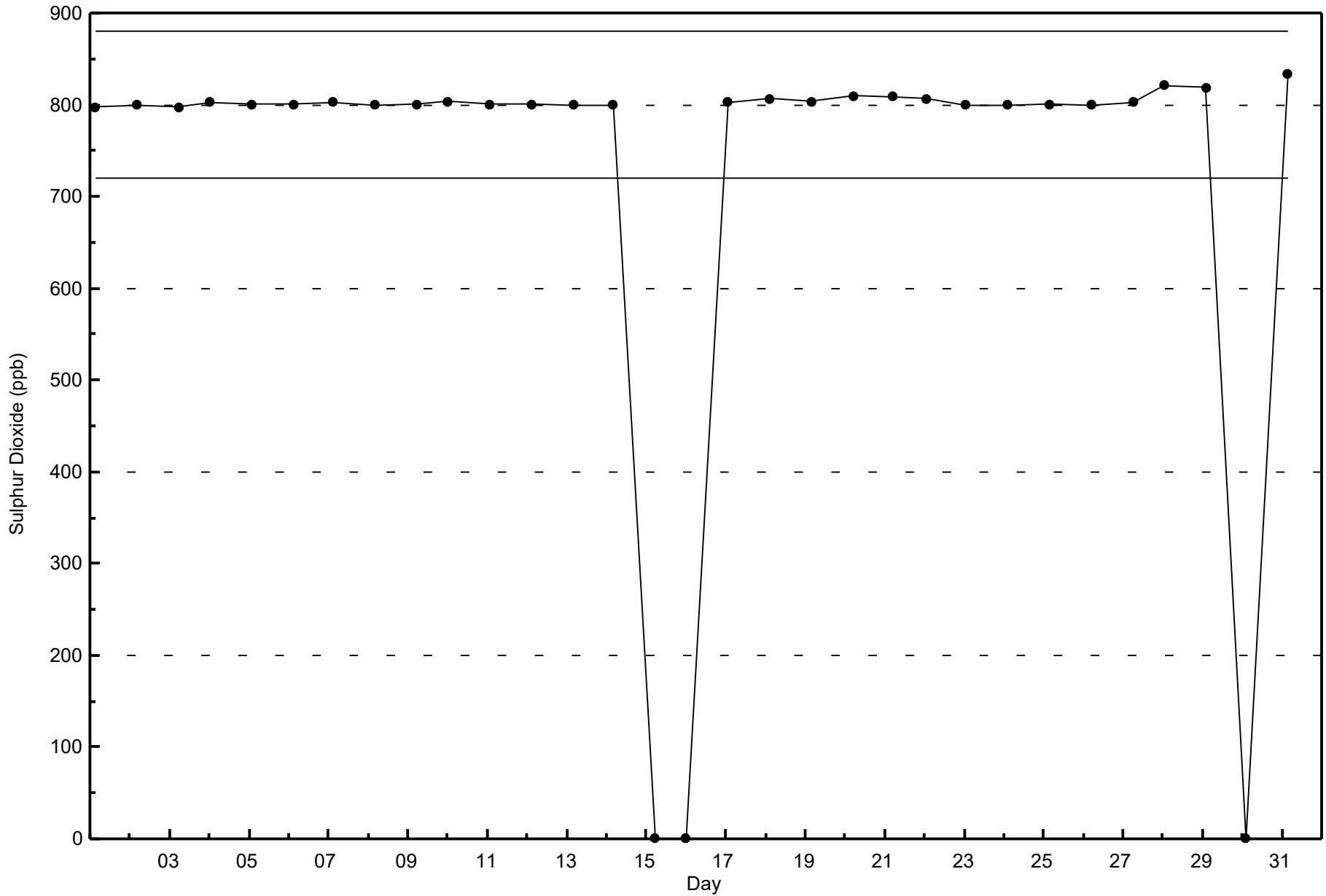


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Lower Camp









Wood Buffalo Environmental Association

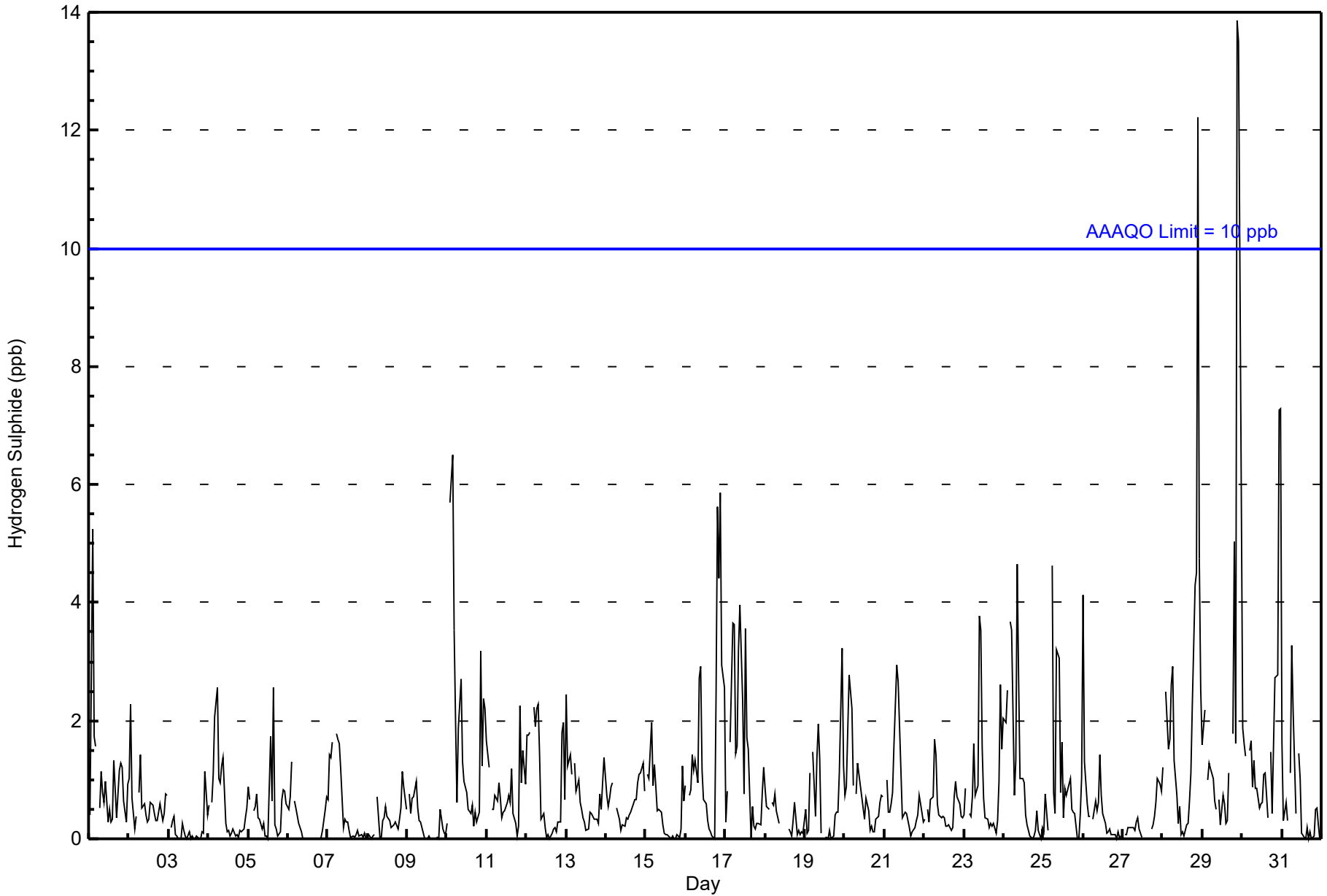
Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

Lower Camp - July 2023

Number of Exceedences (AAAQO):		1-hr: 3 24-hr: 0		Hours in Service:		744																				
Maximum Value: 13.8 ppb on Jul 29 22:00		Maximum Daily Average: 2.6 ppb on Jul 29		Hours of Data:		698																				
Minimum Value: 0.0 ppb on Jul 3 07:00		Minimum Daily Average: 0.1 ppb on Jul 3		Hours of Missing Data:		46																				
Maximum Diurnal Average: 1.7 ppb at hour 23		Minimum Diurnal Average: 0.3 ppb at hour 17		Hours of Calibration:		36																				
Monthly Average: 0.88 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.2 Median = 0.5 Q ₃ = 1.1 P ₉₀ = 2.0 P ₉₉ = 5.8		Percent Operational Time:		98.7																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.4	2.8	5.2	1.7	1.6	Z	0.5	1.1	0.8	0.6	1.0	0.3	0.5	0.3	0.3	1.3	0.4	0.8	1.2	1.3	1.2	0.6	0.3	0.9	1.1	5.2
2-Jul	1.0	2.3	0.7	0.2	0.4	Z	0.8	1.4	0.5	0.6	0.4	0.3	0.3	0.6	0.6	0.4	0.3	0.3	0.4	0.6	0.3	0.4	0.8	0.7	0.6	2.3
3-Jul	Z	0.2	0.3	0.4	0.1	0.0	0.0	0.0	0.3	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.1	1.1	0.4	0.1	1.1
4-Jul	0.6	Z	0.6	1.1	2.1	2.6	1.0	1.0	1.2	1.4	0.3	0.1	0.1	0.0	0.1	0.2	0.1	0.1	0.0	0.1	0.1	0.2	0.4	0.5	0.6	2.6
5-Jul	0.9	0.7	Z	0.5	0.5	0.8	0.4	0.3	0.2	0.3	0.1	0.0	0.0	1.7	0.6	2.6	0.2	0.2	0.1	0.1	0.7	0.8	0.8	0.6	0.6	2.6
6-Jul	0.5	0.7	1.3	Z	0.6	0.5	0.3	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	0.1	0.5	0.7	0.2	1.3
7-Jul	0.7	1.4	1.4	1.6	Z	1.8	1.7	1.6	1.2	0.2	0.3	0.3	0.3	0.1	0.0	0.1	0.0	0.1	0.2	0.0	0.1	0.0	0.1	0.0	0.6	1.8
8-Jul	0.0	0.1	0.0	0.0	0.1	Z	0.7	0.0	0.0	0.3	0.4	0.5	0.4	0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.5	1.1	0.9	0.5	0.3	1.1
9-Jul	Z	0.8	0.4	0.7	0.7	1.0	0.5	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	0.1	0.1	0.3	1.0
10-Jul	0.3	Z	5.7	6.5	3.5	2.0	0.6	1.9	2.7	1.3	1.0	0.9	0.8	0.5	0.4	0.6	0.2	0.5	0.3	0.5	3.2	1.2	2.4	2.2	1.7	6.5
11-Jul	1.7	1.2	Z	0.5	0.5	0.7	0.6	0.9	0.7	0.4	0.4	0.5	0.6	0.7	0.6	1.2	0.4	0.3	0.0	0.2	2.3	1.0	1.5	0.9	0.8	2.3
12-Jul	1.7	1.8	1.8	Z	2.2	1.9	2.2	2.3	1.4	0.3	0.4	0.2	0.0	0.1	0.0	0.1	0.2	0.2	0.1	0.3	0.3	1.8	2.0	0.7	1.0	2.3
13-Jul	2.4	1.2	1.4	1.1	Z	1.3	0.8	1.0	0.6	0.5	0.4	0.3	0.2	0.2	0.4	0.4	0.4	0.3	0.3	0.2	0.8	0.5	1.0	1.4	0.7	2.4
14-Jul	0.7	0.6	0.7	0.9	0.9	Z	0.5	0.4	0.3	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.7	0.9	1.1	1.1	1.3	0.8	0.6	1.3
15-Jul	Z	1.1	1.0	2.0	0.9	1.3	0.9	0.5	0.5	0.5	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	1.2	0.6	0.5	2.0
16-Jul	0.9	Z	0.7	0.8	1.4	1.2	1.3	1.0	2.7	2.9	1.2	0.7	0.6	0.3	0.2	0.1	0.1	0.0	2.5	5.6	4.4	5.9	2.9	2.6	1.7	5.9
17-Jul	0.3	0.8	Z	1.6	3.6	3.6	1.4	1.6	3.2	4.0	2.3	0.8	3.6	1.7	1.5	0.0	0.5	0.2	0.2	0.3	0.3	0.2	0.8	1.2	1.5	4.0
18-Jul	0.9	0.5	0.5	Z	0.6	0.6	0.7	0.5	0.3	C	C	C	C	C	0.2	0.1	0.1	0.3	0.6	0.1	0.1	0.1	0.1	0.1	0.4	0.9
19-Jul	0.5	0.1	0.1	1.1	Z	1.5	0.4	1.4	2.0	1.4	0.1	M	0.0	0.0	0.0	0.1	0.0	0.0	0.4	0.4	0.5	1.1	3.2	1.2	0.7	3.2
20-Jul	0.7	0.9	1.8	2.8	2.2	0.9	Z	0.8	1.3	0.9	0.7	0.5	0.3	0.7	0.5	0.1	0.2	0.1	0.1	0.3	0.4	0.6	0.7	0.7	0.8	2.8
21-Jul	Z	1.0	0.5	0.5	0.6	0.8	1.6	2.9	2.7	1.9	1.1	0.3	0.4	0.4	0.3	0.2	0.1	0.1	0.2	0.3	0.4	0.7	0.6	0.3	0.8	2.9
22-Jul	0.3	Z	0.5	0.3	0.7	0.7	1.7	1.4	0.6	0.4	0.4	0.4	0.3	0.2	0.2	0.2	0.1	0.2	0.7	1.0	0.7	0.6	0.4	0.4	0.5	1.7
23-Jul	0.4	0.9	Z	0.4	0.4	0.7	1.6	0.7	0.9	3.8	3.5	1.6	0.7	0.4	0.3	0.2	0.3	0.2	0.3	0.1	0.3	1.0	2.6	1.5	1.0	3.8
24-Jul	2.0	2.0	2.5	Z	3.7	3.5	0.7	1.3	4.7	2.7	1.0	1.0	0.9	0.4	0.2	0.2	0.1	0.0	0.0	0.1	0.5	0.1	0.0	0.2	1.2	4.7
25-Jul	0.1	0.8	0.4	0.2	Z	4.6	0.8	0.4	3.2	3.1	0.8	1.6	0.4	0.9	0.7	0.9	1.0	0.5	0.4	0.4	0.0	0.0	0.4	1.0	1.0	4.6
26-Jul	4.1	1.3	0.6	0.4	0.4	Z	0.3	0.6	0.5	0.6	1.4	0.7	0.4	0.3	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.5	4.1
27-Jul	Z	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.3	0.3	0.2	0.0	PF	PF	PF	PF	PF	0.2	0.2	0.4	0.6	1.0	0.9	0.8	0.3	1.0
28-Jul	1.2	Z	2.5	1.5	1.7	2.6	2.9	1.3	0.7	0.3	0.5	0.1	0.1	0.1	0.2	0.3	0.6	1.1	2.2	4.3	4.5	12.2	4.7	2.5	2.1	12.2
29-Jul	1.6	2.2	Z	1.0	1.3	1.2	1.0	0.6	0.5	PF	0.7	0.2	0.7	0.6	0.3	0.3	1.1	PF	1.8	5.0	1.6	13.8	13.5	5.8	2.6	13.8
30-Jul	1.9	1.6	1.4	Z	1.5	1.7	0.9	1.3	0.9	0.8	0.5	0.6	0.6	1.1	1.1	0.4	PF	1.5	0.4	1.6	2.7	2.8	7.3	7.3	1.8	7.3
31-Jul	1.6	0.3	0.6	0.3	Z	1.1	3.3	2.2	0.4	PF	1.5	1.0	0.1	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.5	0.5	0.2	0.0	0.6	3.3
																								Diurnal Average		
																								Diurnal Maximum		
																								1.1 4.1		
																								1.0 2.8		
																								1.3 5.7		
																								1.1 6.5		
																								1.2 3.7		
																								1.5 4.6		
																								1.0 3.3		
																								1.0 2.9		
																								1.1 4.7		
																								1.1 4.0		
																								0.7 3.5		
																								0.5 1.6		
																								0.4 3.6		
																								0.4 1.7		
																								0.3 1.5		
																								0.4 2.6		
																								0.3 1.1		
																								0.3 1.5		
																								0.4 2.5		
																								0.8 5.6		
																								0.9 4.5		
																								1.6 13.8		
																								1.7 13.5		
																								1.2 7.3		

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
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	645	92.41	92.41
3 - 4	37	5.30	97.71
5 - 7	13	1.86	99.57
8 - 11	0	0.00	99.57
> 11	3	0.43	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Lower Camp - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	60	33	25	13	8	28	62	13	6	5	6	14	25	32	62	51	443
3 - 4	1	0	0	0	1	3	11	2	0	0	0	1	0	0	1	0	20
5 - 7	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	1	5
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	33	25	13	9	33	75	15	6	5	6	15	25	32	63	52	468

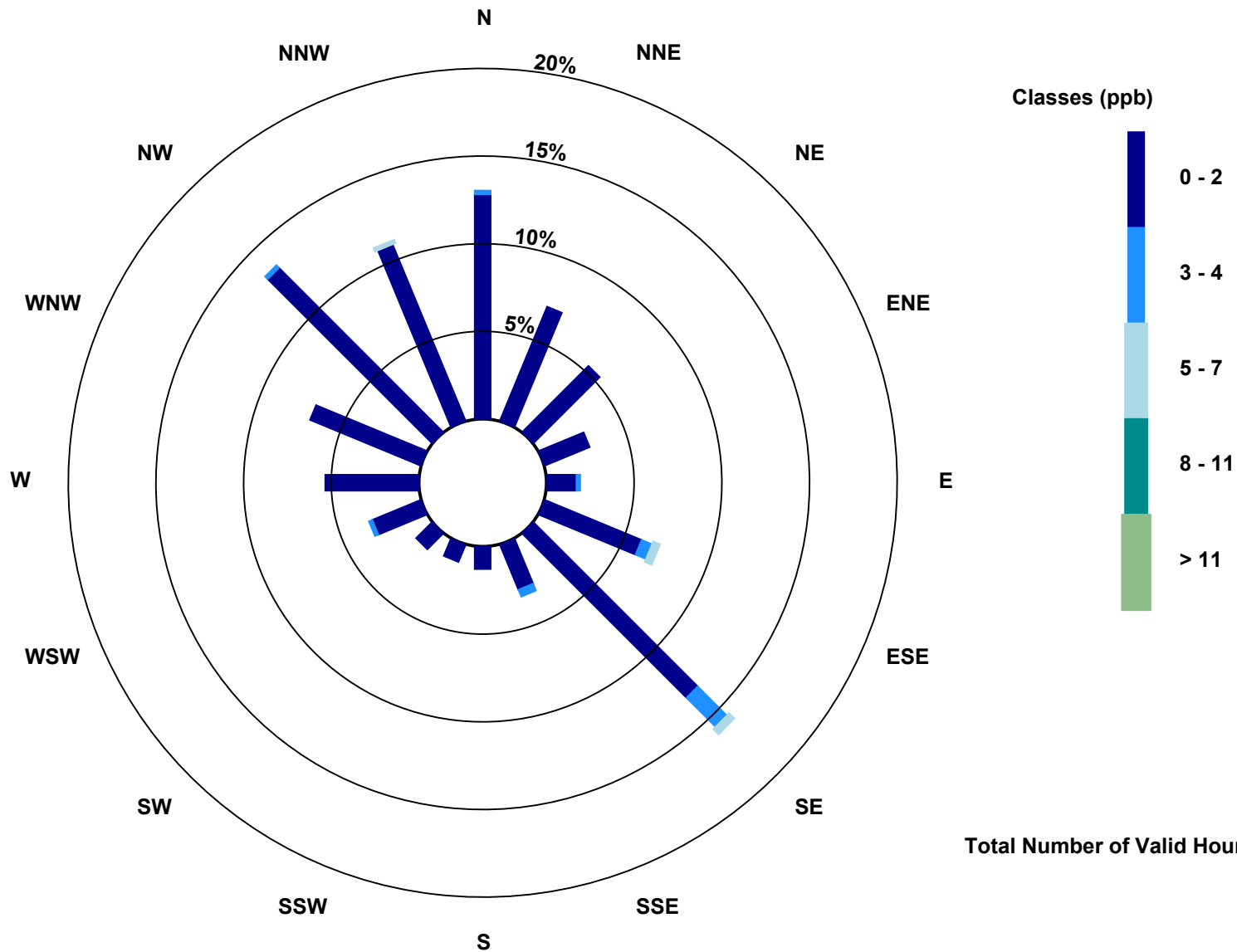
Total Number of Valid Hours: 468

Total Number of Hours: 744

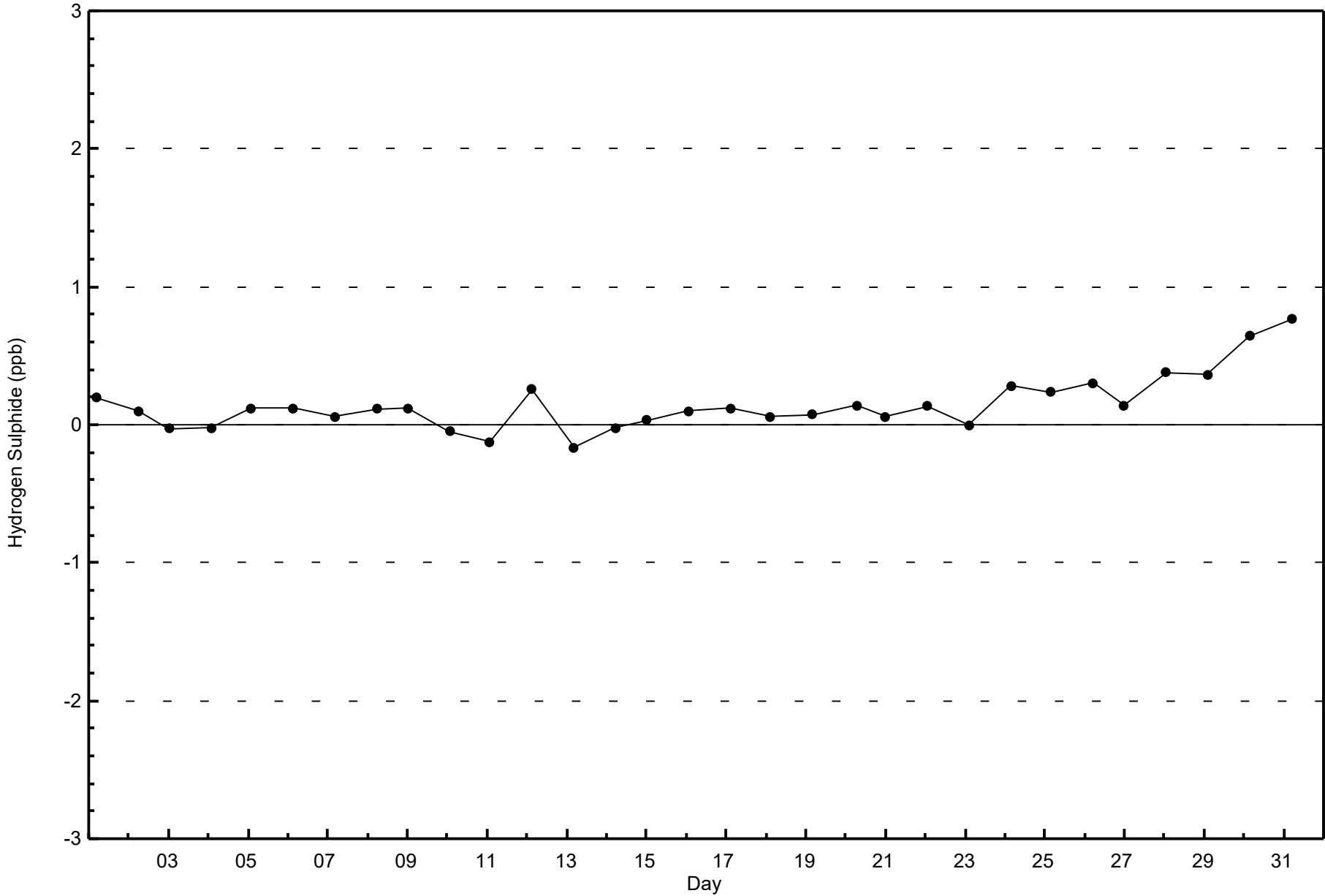


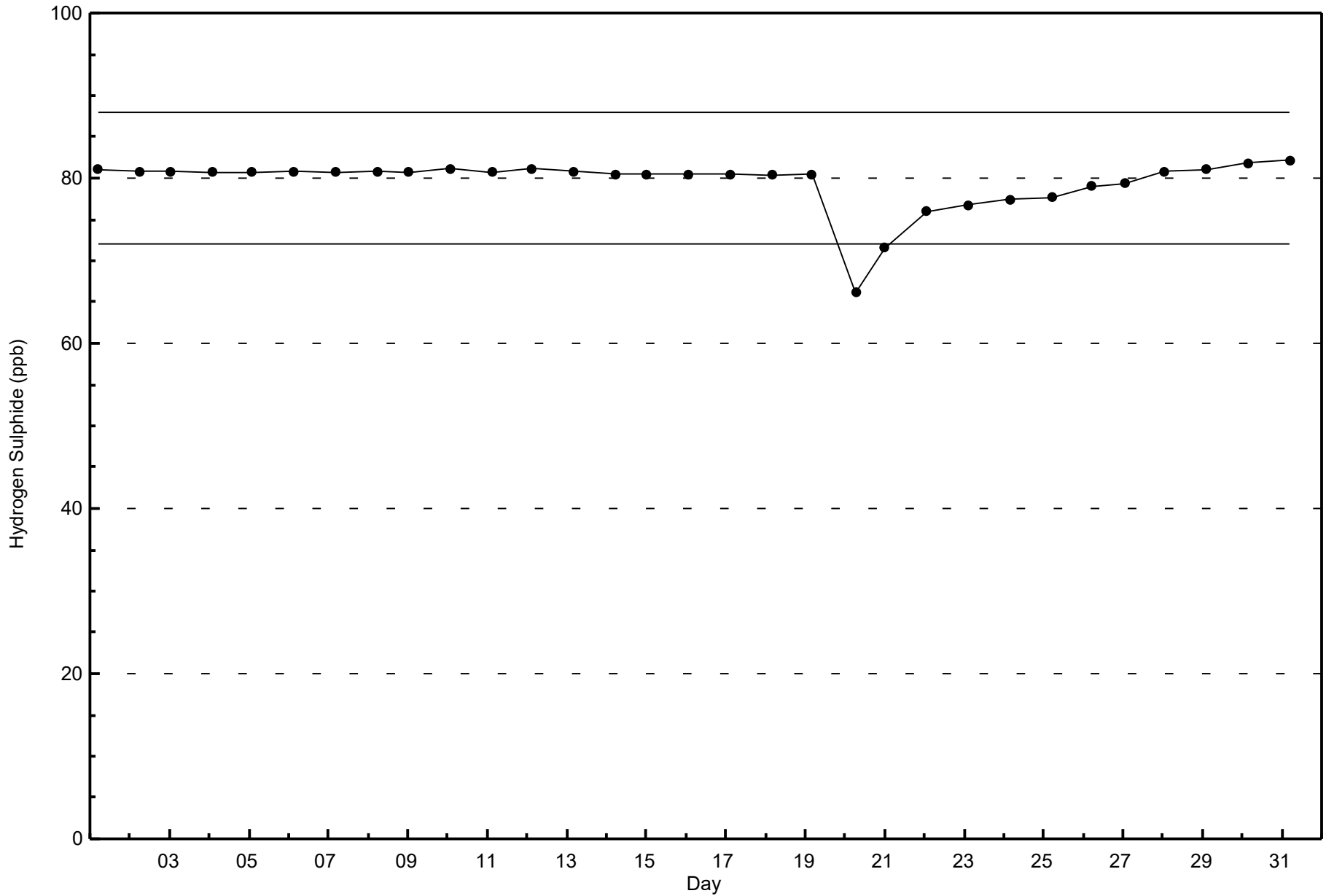
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Hydrogen Sulphide (H₂S) - ppb
Lower Camp



Total Number of Valid Hours: 468





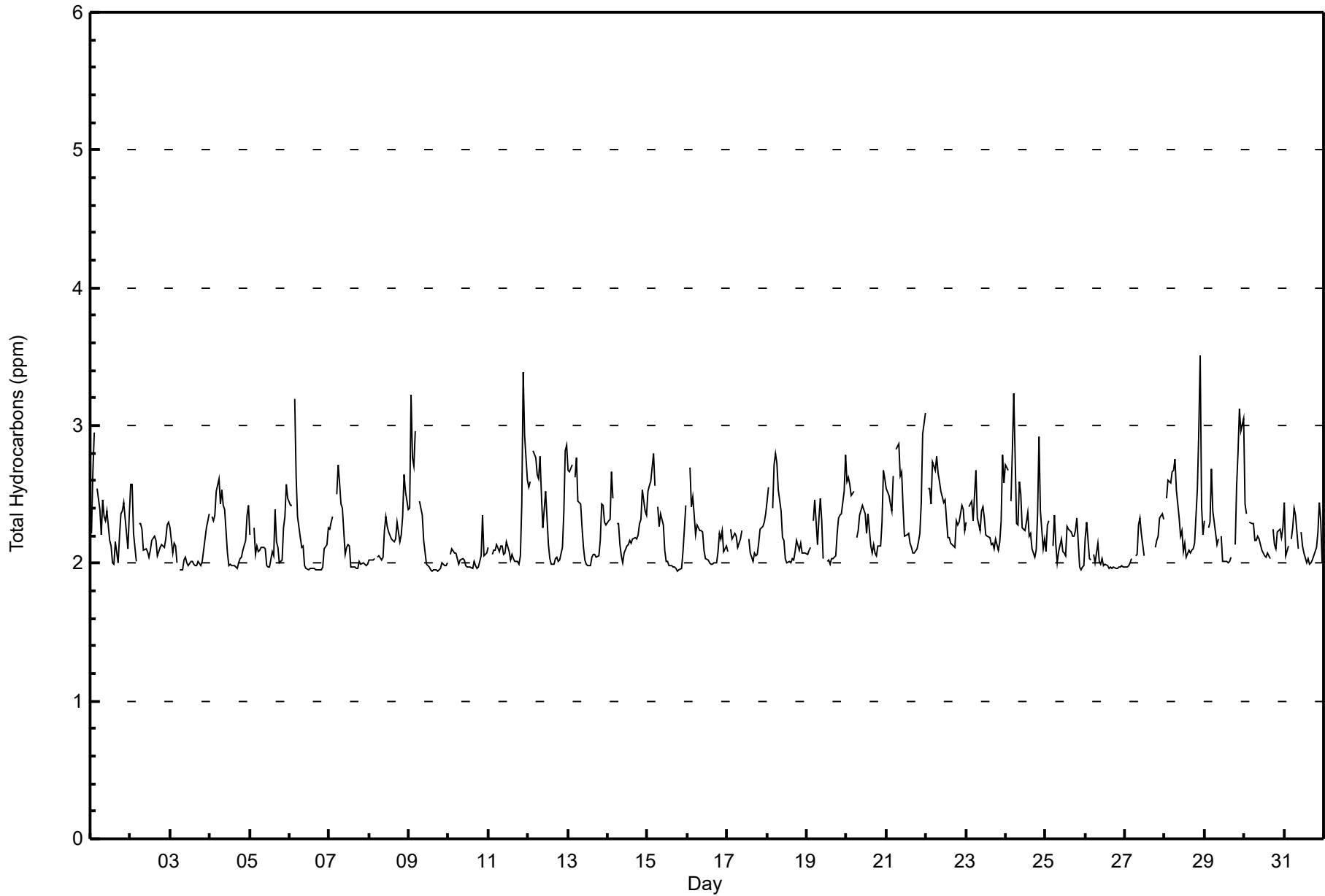


Maximum Value: 3.5 ppm on Jul 28 22:00																				Maximum Daily Average: 2.4 ppm on Jul 21					Hours in Service: 744						
Minimum Value: 1.9 ppm on Jul 15 19:00																				Minimum Daily Average: 2.0 ppm on Jul 26					Hours of Data: 699						
Maximum Diurnal Average: 2.4 ppm at hour 5																				Minimum Diurnal Average: 2.1 ppm at hour 17					Hours of Missing Data: 45						
Monthly Average: 2.23 ppm																				Percentiles: P ₁ = 1.9 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.2 Q ₃ = 2.4 P ₉₀ = 2.6 P ₉₉ = 3.0					Hours of Calibration: 34						
																				Percent Operational Time: 98.5											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Jul	2.2	2.7	2.9	Z	2.5	2.4	2.2	2.5	2.3	2.3	2.4	2.2	2.1	2.0	2.0	2.2	2.0	2.2	2.4	2.4	2.4	2.3	2.1	2.4	2.3	2.9					
2-Jul	2.6	2.6	2.2	2.0	Z	2.3	2.3	2.2	2.1	2.1	2.1	2.0	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.6					
3-Jul	2.3	2.1	2.1	2.1	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.4	2.1	2.4					
4-Jul	Z	2.3	2.3	2.3	2.5	2.6	2.4	2.5	2.4	2.4	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.4	2.4	2.2	2.6					
5-Jul	2.2	Z	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.4	2.2	2.1	2.0	2.0	2.3	2.3	2.6	2.5	2.2	2.6					
6-Jul	2.4	2.4	Z	3.2	2.6	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.1	2.1	2.3	2.2	3.2					
7-Jul	2.2	2.3	2.3	Z	2.5	2.7	2.6	2.4	2.4	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	2.2	2.7					
8-Jul	2.0	2.0	2.0	2.0	Z	2.0	2.1	2.0	2.0	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.6	2.5	2.4	2.2	2.6				
9-Jul	2.4	3.2	2.8	2.7	3.0	Z	2.4	2.4	2.3	2.2	2.0	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.2	3.2					
10-Jul	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.1	2.1	2.1	2.0	2.3					
11-Jul	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.4	3.4	2.9	2.6	2.2	3.4					
12-Jul	2.5	2.6	Z	2.8	2.8	2.6	2.6	2.8	2.5	2.3	2.5	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.4	2.8	2.9	2.4	2.9					
13-Jul	2.7	2.7	2.7	Z	2.6	2.8	2.5	2.4	2.3	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.0	2.1	2.2	2.4	2.4	2.3	2.3	2.3	2.8				
14-Jul	2.3	2.3	2.7	2.5	Z	2.3	2.3	2.1	2.1	2.0	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.5	2.4	2.4	2.3	2.7					
15-Jul	2.5	2.6	2.6	2.8	2.6	Z	2.4	2.3	2.4	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.1	2.2	2.4	2.2	2.8				
16-Jul	Z	2.7	2.4	2.5	2.4	2.2	2.3	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.7					
17-Jul	2.1	Z	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.2	C	C	C	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.4	2.2	2.4					
18-Jul	2.4	2.6	Z	2.4	2.7	2.8	2.7	2.5	2.4	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.8					
19-Jul	2.1	2.1	2.1	Z	2.3	2.5	2.1	2.3	2.5	2.3	2.0	M	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.4	2.4	2.5	2.8	2.2	2.8					
20-Jul	2.6	2.6	2.6	2.5	2.5	Z	2.2	2.2	2.3	2.4	2.4	2.4	2.2	2.4	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.7	2.6	2.3	2.7					
21-Jul	2.5	2.5	2.4	2.4	2.6	Z	2.8	2.9	2.6	2.7	2.4	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.4	2.9	3.1	2.4	3.1					
22-Jul	Z	2.5	2.5	2.4	2.7	2.7	2.8	2.6	2.6	2.5	2.4	2.5	2.3	2.2	2.2	2.2	2.1	2.1	2.3	2.3	2.3	2.4	2.4	2.2	2.4	2.8					
23-Jul	2.3	Z	2.4	2.5	2.3	2.5	2.7	2.3	2.2	2.4	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.3	2.8	2.6	2.3	2.8					
24-Jul	2.7	2.7	Z	2.5	2.8	3.2	2.3	2.3	2.6	2.5	2.3	2.2	2.3	2.4	2.2	2.2	2.1	2.0	2.1	2.4	2.9	2.4	2.1	2.2	2.4	3.2					
25-Jul	2.1	2.3	2.3	Z	2.1	2.4	2.1	2.0	2.1	2.2	2.1	2.1	2.1	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.0	1.9	2.0	2.0	2.1	2.4					
26-Jul	2.2	2.3	2.0	2.0	Z	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3				
27-Jul	2.0	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.3	2.3	2.2	2.1	PF	PF	PF	PF	PF	PF	PF	2.1	2.2	2.2	2.3	2.4	2.3	--	2.4				
28-Jul	Z	2.5	2.6	2.6	2.7	2.7	2.8	2.5	2.3	2.2	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.5	3.0	3.5	2.4	2.2	2.4	3.5				
29-Jul	2.3	Z	2.3	2.3	2.7	2.4	2.2	2.1	2.2	PF	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	PF	2.1	2.6	2.8	3.1	3.0	2.4	3.1				
30-Jul	2.4	2.4	Z	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.0	PF	2.2	2.1	2.1	2.2	2.3	2.2	2.3	2.2	2.4	2.4				
31-Jul	2.4	2.1	2.1	Z	2.2	2.3	2.4	2.3	2.1	PF	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.4	2.3	2.0	2.2	2.4	2.4				
																								Diurnal Average							
																								Diurnal Maximum							
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																															



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Lower Camp - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	186	26.61	26.61
2.1 - 3.0	506	72.39	99.00
3.1 - 10.0	7	1.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 699

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Lower Camp - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	23	17	12	2	2	5	21	7	1	2	1	11	13	7	3	14	141
2.1 - 3.0	35	17	14	11	7	29	52	9	5	4	3	4	12	25	59	40	326
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	58	34	26	13	9	34	73	16	6	6	4	15	25	34	63	54	470

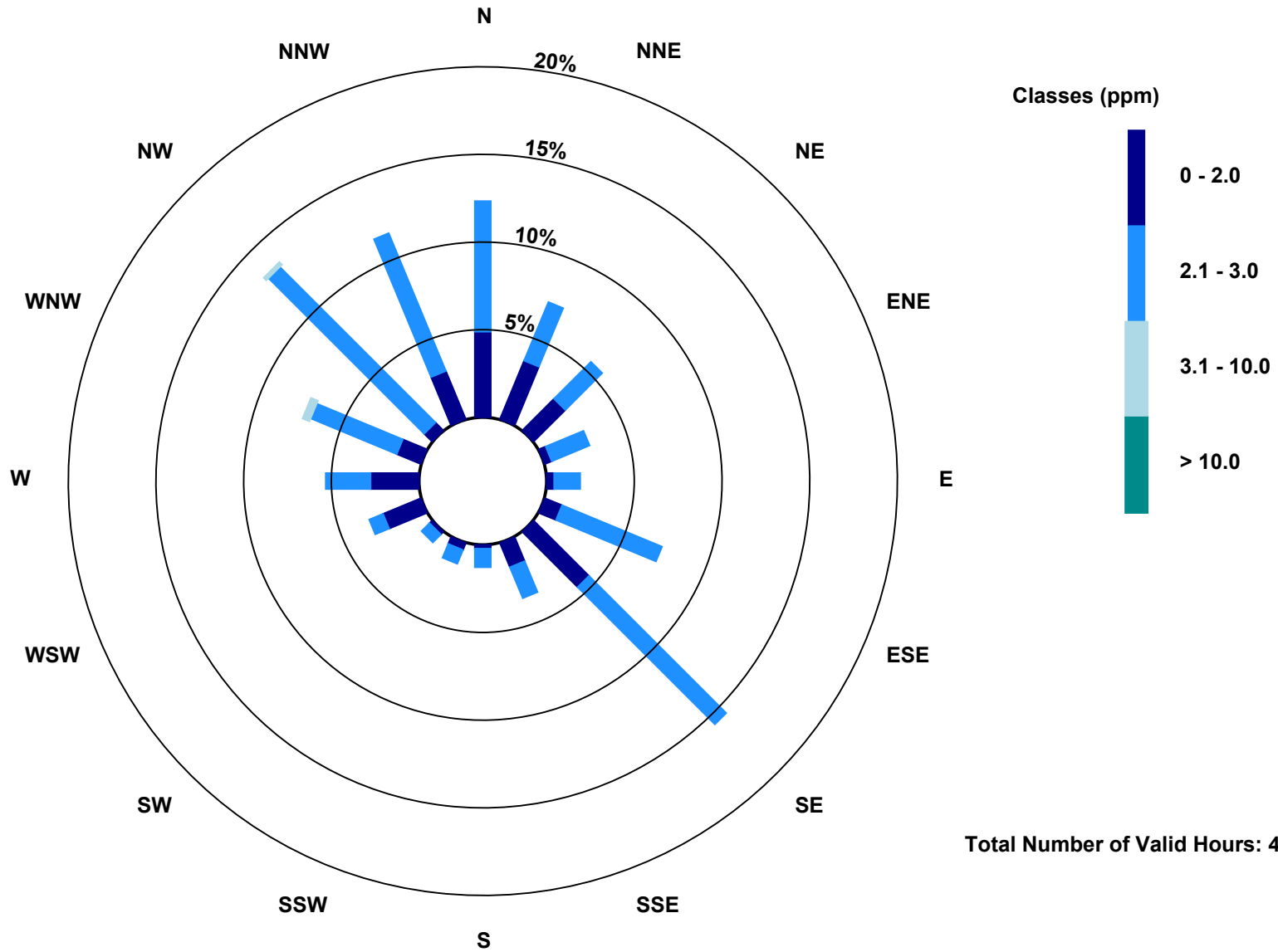
Total Number of Valid Hours: 470

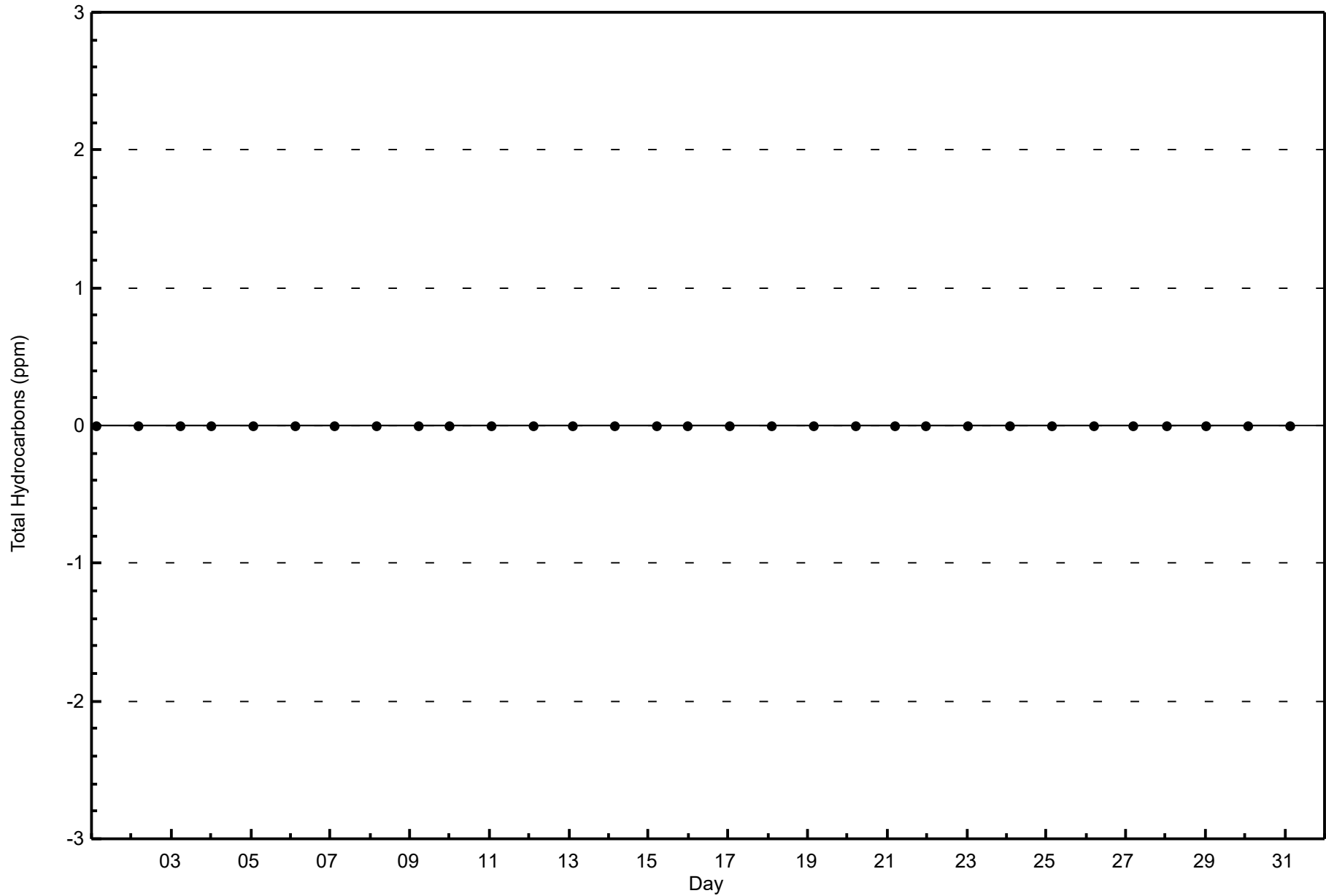
Total Number of Hours: 744

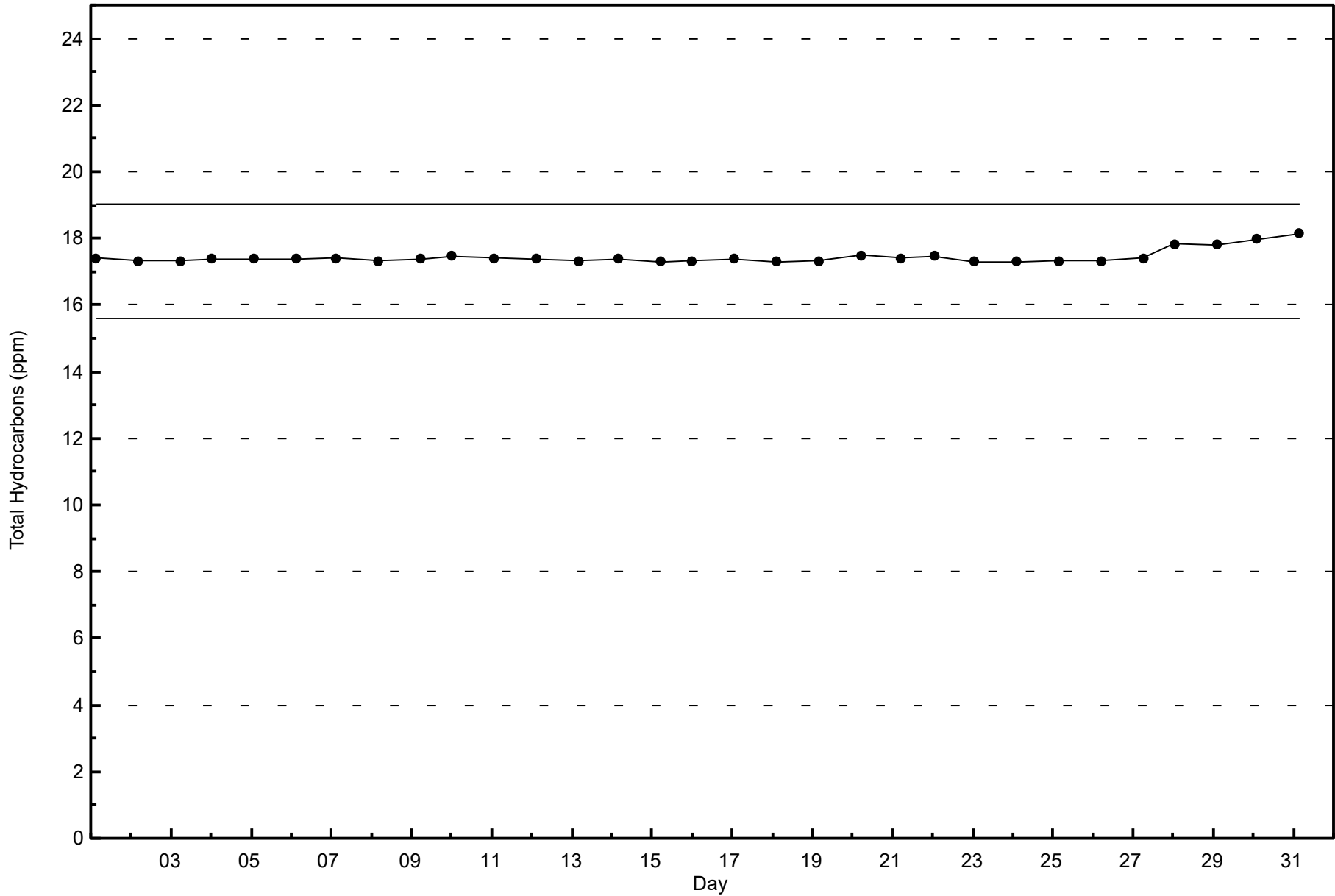


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Lower Camp









Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm Lower Camp - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 3.2 ppm on Jul 11 22:00	Maximum Daily Average: 2.3 ppm on Jul 21		Hours of Data:	699
Minimum Value: 1.9 ppm on Jul 15 19:00	Minimum Daily Average: 2.0 ppm on Jul 26		Hours of Missing Data:	45
Maximum Diurnal Average: 2.4 ppm at hour 2	Minimum Diurnal Average: 2.0 ppm at hour 17		Hours of Calibration:	34
Monthly Average: 2.18 ppm	Percentiles: P ₁ = 1.9 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.3 P ₉₀ = 2.5 P ₉₉ = 2.9		Percent Operational Time:	98.5

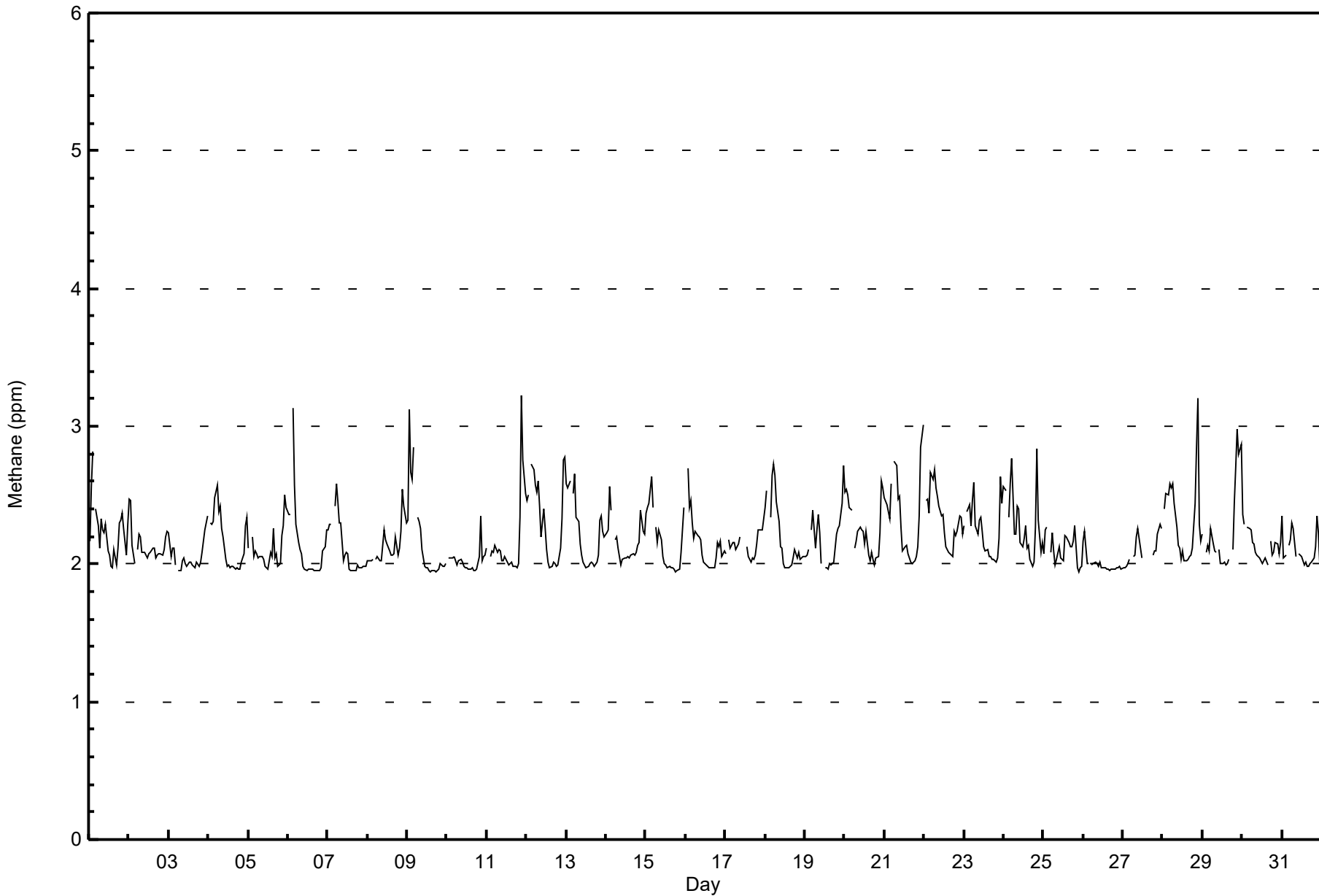
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	2.2	2.6	2.8	Z	2.4	2.3	2.1	2.3	2.2	2.2	2.3	2.1	2.1	2.0	2.0	2.1	2.0	2.1	2.3	2.3	2.4	2.3	2.1	2.3	2.2	2.8																							
2-Jul	2.5	2.5	2.1	2.0	Z	2.1	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.5																							
3-Jul	2.2	2.1	2.1	2.1	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.3	2.1	2.3																							
4-Jul	Z	2.3	2.3	2.3	2.5	2.6	2.4	2.4	2.3	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.3	2.2	2.6																							
5-Jul	2.1	Z	2.2	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3	2.0	2.1	2.0	2.0	2.2	2.3	2.5	2.4	2.1	2.5																							
6-Jul	2.4	2.4	Z	3.1	2.6	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.1	2.1	2.2	2.1	3.1																							
7-Jul	2.2	2.3	2.3	Z	2.4	2.6	2.5	2.3	2.3	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.6																							
8-Jul	2.0	2.0	2.0	2.0	Z	2.0	2.1	2.0	2.0	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.5	2.4	2.3	2.1	2.5																						
9-Jul	2.3	3.1	2.7	2.6	2.8	Z	2.3	2.3	2.3	2.1	2.0	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.2	3.1																							
10-Jul	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	2.3	2.0	2.1	2.1	2.0	2.3																							
11-Jul	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	3.2	2.8	2.5	2.2	3.2																							
12-Jul	2.5	2.5	Z	2.7	2.7	2.6	2.5	2.6	2.4	2.2	2.4	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.8	2.8	2.3	2.8																							
13-Jul	2.6	2.6	2.6	Z	2.5	2.7	2.3	2.3	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.3	2.2	2.2	2.2	2.7																							
14-Jul	2.2	2.2	2.6	2.4	Z	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.2	2.2	2.2	2.6																							
15-Jul	2.4	2.4	2.4	2.6	2.4	Z	2.3	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.1	2.2	2.4	2.2	2.6																							
16-Jul	Z	2.7	2.4	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.2	2.1	2.1	2.2	2.7																							
17-Jul	2.1	Z	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.2	C	C	C	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.3	2.3	2.1	2.3																							
18-Jul	2.4	2.5	Z	2.3	2.6	2.7	2.6	2.5	2.3	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.1	2.2	2.7																							
19-Jul	2.1	2.1	2.1	Z	2.3	2.4	2.1	2.2	2.4	2.2	2.0	M	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.3	2.4	2.7	2.2	2.7																							
20-Jul	2.5	2.5	2.5	2.4	2.4	Z	2.1	2.2	2.2	2.3	2.2	2.2	2.1	2.2	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.2	2.6	2.6	2.2	2.6																							
21-Jul	2.5	2.4	2.4	2.3	2.6	Z	2.7	2.7	2.5	2.5	2.3	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.3	2.9	3.0	2.3	3.0																							
22-Jul	Z	2.5	2.5	2.4	2.7	2.6	2.7	2.5	2.5	2.4	2.3	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.4	2.3	2.2	2.3	2.7																						
23-Jul	2.3	Z	2.4	2.4	2.3	2.5	2.6	2.3	2.2	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.2	2.6	2.4	2.2	2.6																							
24-Jul	2.6	2.5	Z	2.3	2.6	2.8	2.2	2.2	2.4	2.4	2.2	2.1	2.2	2.3	2.1	2.1	2.0	2.0	2.0	2.3	2.8	2.3	2.1	2.2	2.3	2.8																							
25-Jul	2.1	2.2	2.3	Z	2.1	2.2	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.3	2.0	1.9	2.0	2.1	2.3																							
26-Jul	2.2	2.2	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	2.2																						
27-Jul	2.0	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.2	2.3	2.2	2.0	PF	PF	PF	PF	PF	PF	PF	2.1	2.1	2.1	2.2	2.3	2.3	--	2.3																						
28-Jul	Z	2.4	2.5	2.5	2.6	2.6	2.6	2.4	2.3	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.4	2.9	3.2	2.3	2.2	2.3	3.2																							
29-Jul	2.2	Z	2.1	2.1	2.1	2.3	2.1	2.1	2.1	PF	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.4	2.7	3.0	2.8	2.9	2.2	3.0																						
30-Jul	2.4	2.3	Z	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.1	2.2	2.2	2.1	2.4	2.4																						
31-Jul	2.3	2.0	2.1	Z	2.1	2.2	2.3	2.3	2.1	PF	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.2	2.0	2.1	2.3																							
																								2.3	2.4	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.3	2.3	Diurnal Average		
																								2.6	3.1	2.8	3.1	2.8	2.8	2.7	2.7	2.5	2.5	2.4	2.4	2.2	2.3	2.2	2.3	2.1	2.2	2.3	2.4	2.9	3.2	2.9	3.0	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Lower Camp - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Lower Camp - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	252	36.05	36.05
2.1 - 3.0	443	63.38	99.43
3.1 - 10.0	4	0.57	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 699

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Lower Camp - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	30	18	12	4	3	11	25	8	2	4	2	12	16	9	6	16	178
2.1 - 3.0	28	16	14	9	6	23	48	8	4	2	2	3	9	23	56	38	289
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	58	34	26	13	9	34	73	16	6	6	4	15	25	34	63	54	470

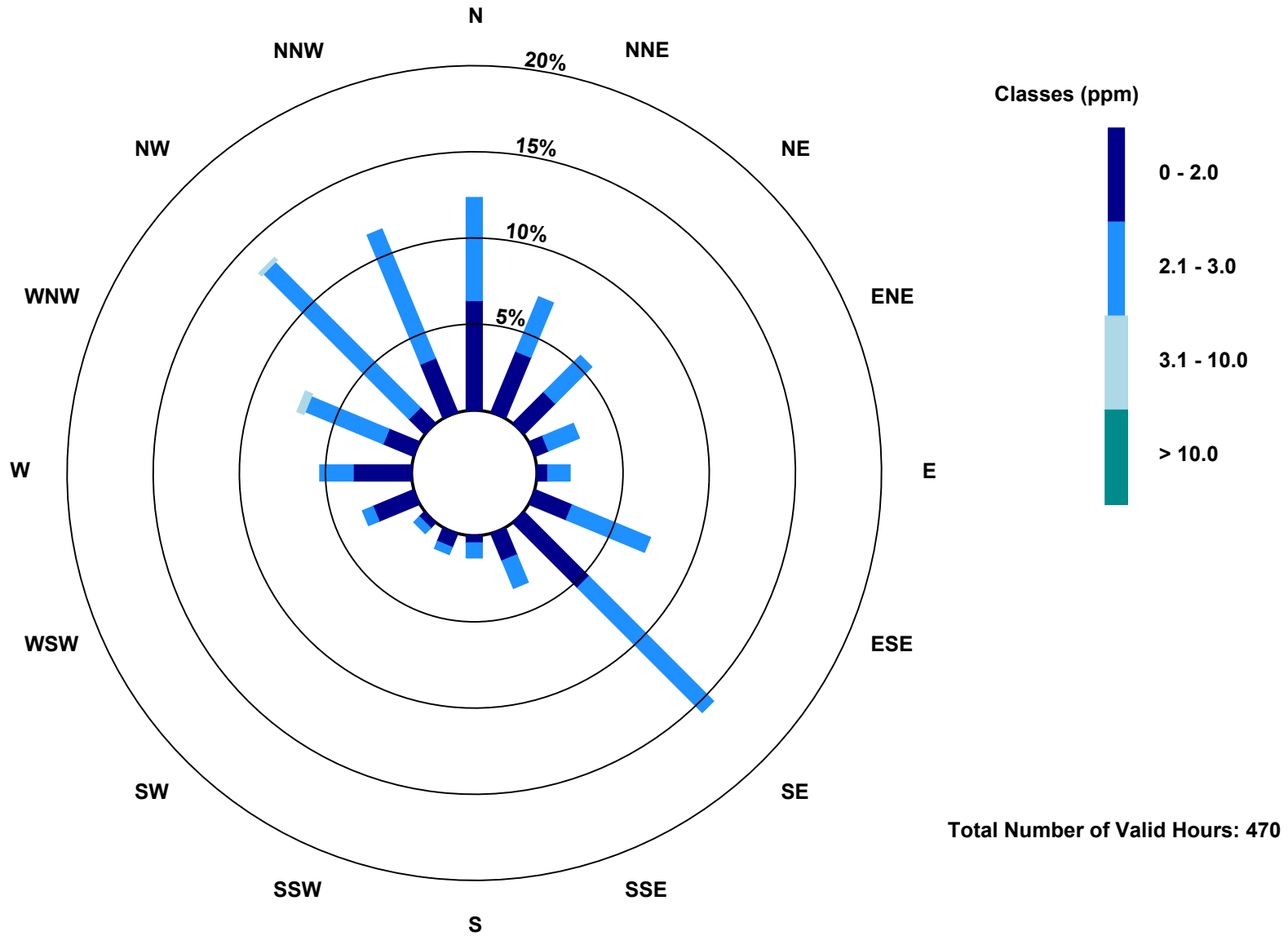
Total Number of Valid Hours: 470

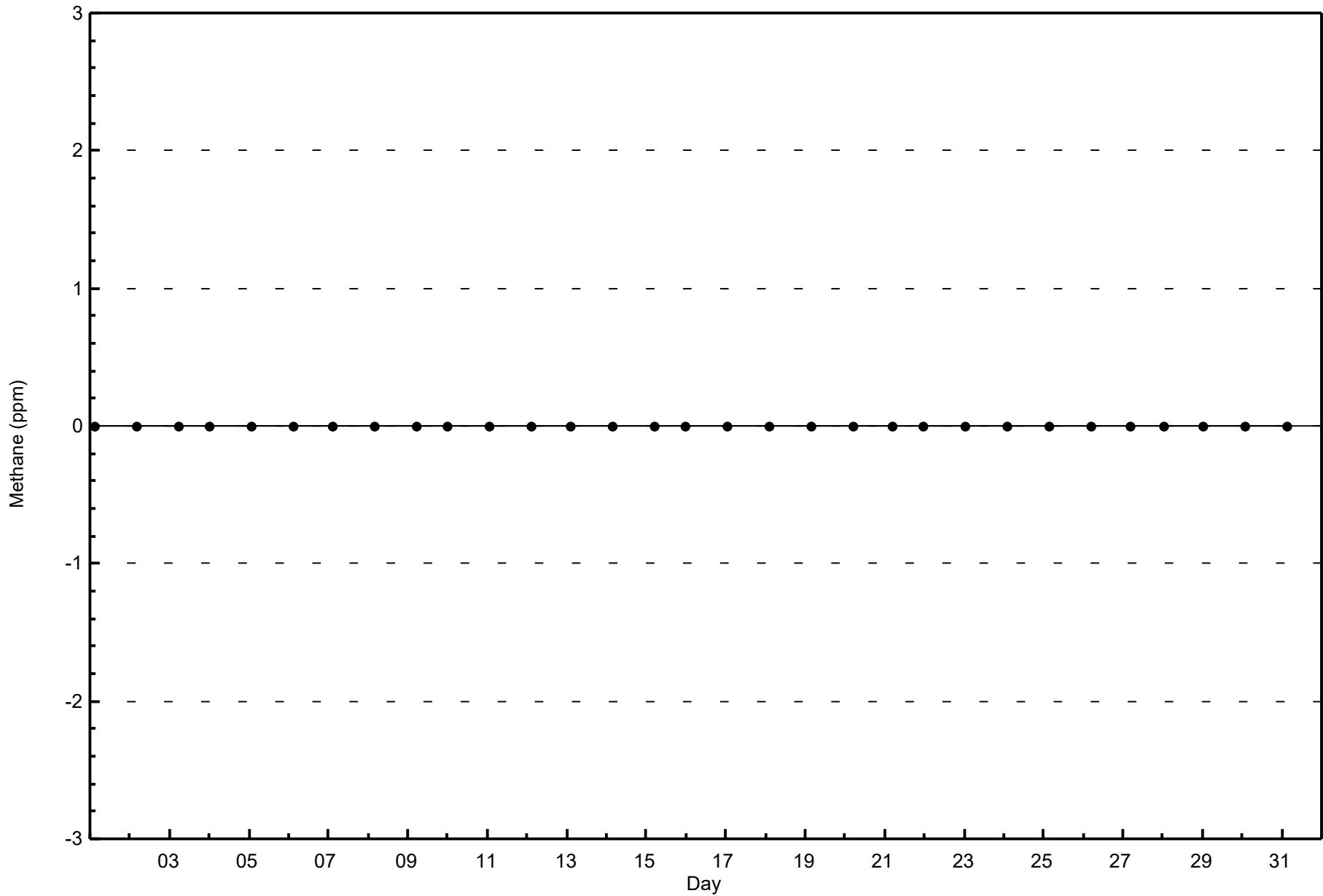
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Methane (CH₄) - ppm
Lower Camp

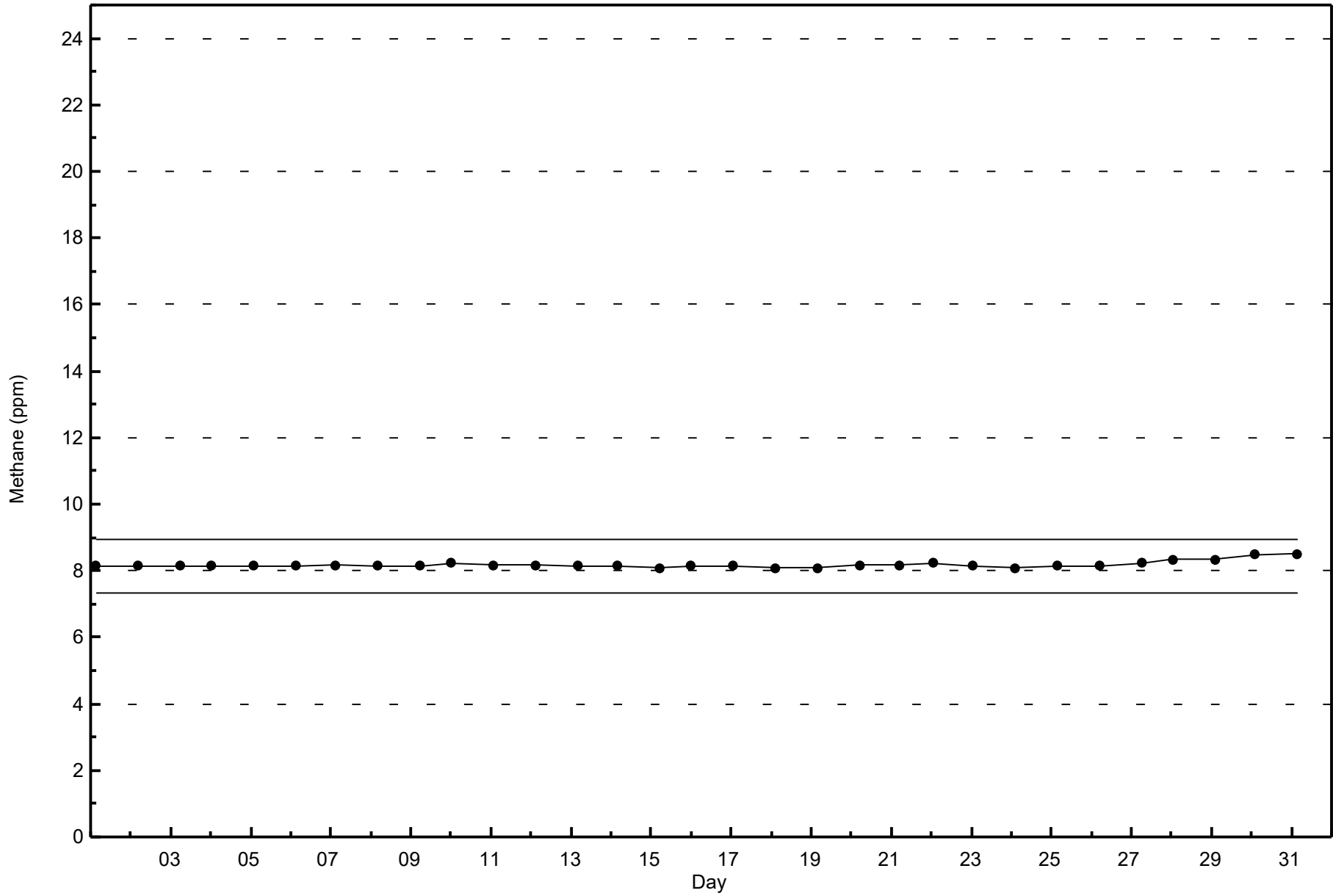






Wood Buffalo Environmental Association
Span Responses

Methane (CH₄) - ppm
Lower Camp - July 2023

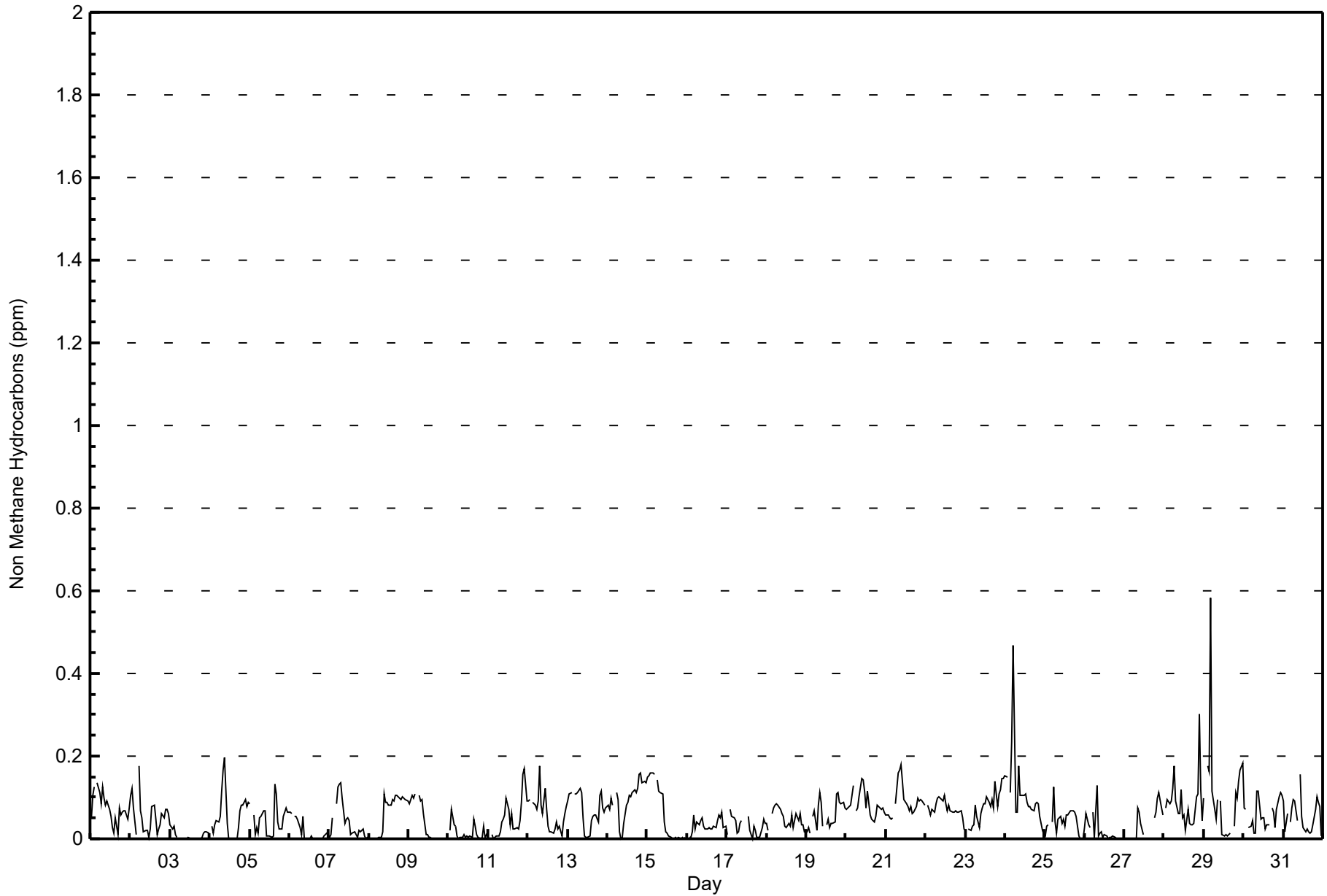




Summary of Hour Averages

Lower Camp - July 2023

Maximum Value: 0.584 ppm on Jul 29 05:00		Maximum Daily Average: 0.112 ppm on Jul 24		Hours in Service: 744																						
Minimum Value: 0.000 ppm on Jul 3 08:00		Minimum Daily Average: 0.008 ppm on Jul 3		Hours of Data: 699																						
Maximum Diurnal Average: 0.088 ppm at hour 5		Minimum Diurnal Average: 0.037 ppm at hour 15		Hours of Missing Data: 45																						
Monthly Average: 0.057 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.1 P ₉₀ = 0.1 P ₉₉ = 0.2		Hours of Calibration: 34																						
				Percent Operational Time: 98.5																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.049	0.104	0.127	Z	0.134	0.111	0.086	0.126	0.097	0.080	0.091	0.073	0.055	0.026	0.013	0.050	0.011	0.074	0.056	0.065	0.066	0.066	0.046	0.076	0.073	0.134
2-Jul	0.104	0.120	0.075	0.010	Z	0.178	0.069	0.051	0.017	0.021	0.019	0.004	0.025	0.079	0.081	0.047	0.010	0.025	0.035	0.060	0.050	0.073	0.073	0.061	0.056	0.178
3-Jul	0.034	0.024	0.032	0.010	0.005	Z	0.000	0.000	0.002	0.000	0.000	0.002	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.003	0.015	0.016	0.017	0.014	0.008	0.034
4-Jul	Z	0.031	0.014	0.034	0.043	0.042	0.053	0.114	0.167	0.195	0.038	0.000	0.001	0.001	0.000	0.001	0.001	0.027	0.067	0.081	0.081	0.095	0.078	0.088	0.054	0.195
5-Jul	0.083	Z	0.059	0.009	0.028	0.015	0.050	0.056	0.069	0.068	0.006	0.006	0.008	0.002	0.006	0.134	0.108	0.040	0.022	0.024	0.056	0.066	0.074	0.064	0.046	0.134
6-Jul	0.063	0.060	Z	0.054	0.055	0.047	0.028	0.009	0.053	0.000	0.001	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.008	0.012	0.009	0.018	0.063
7-Jul	0.002	0.011	0.051	Z	0.083	0.127	0.134	0.136	0.099	0.039	0.048	0.052	0.045	0.009	0.013	0.016	0.009	0.005	0.019	0.019	0.023	0.006	0.001	0.002	0.041	0.136
8-Jul	0.002	0.000	0.001	0.002	Z	0.002	0.004	0.004	0.017	0.107	0.089	0.088	0.080	0.083	0.095	0.091	0.105	0.107	0.097	0.094	0.100	0.098	0.096	0.091	0.063	0.107
9-Jul	0.085	0.094	0.104	0.099	0.107	Z	0.104	0.091	0.093	0.062	0.010	0.011	0.002	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.038	0.107
10-Jul	Z	0.020	0.070	0.034	0.029	0.006	0.000	0.002	0.004	0.010	0.004	0.005	0.003	0.006	0.005	0.047	0.030	0.009	0.005	0.002	0.004	0.030	0.005	0.010	0.015	0.070
11-Jul	0.004	Z	0.009	0.001	0.004	0.006	0.006	0.018	0.040	0.048	0.056	0.099	0.072	0.032	0.061	0.025	0.024	0.028	0.025	0.045	0.087	0.157	0.171	0.091	0.048	0.171
12-Jul	0.091	0.095	Z	0.088	0.082	0.072	0.091	0.176	0.083	0.060	0.123	0.072	0.030	0.017	0.018	0.012	0.025	0.039	0.025	0.029	0.007	0.041	0.061	0.080	0.062	0.176
13-Jul	0.090	0.107	0.111	Z	0.110	0.110	0.113	0.123	0.112	0.051	0.008	0.002	0.003	0.005	0.044	0.054	0.056	0.057	0.040	0.107	0.115	0.075	0.064	0.076	0.071	0.123
14-Jul	0.081	0.070	0.100	0.080	Z	0.113	0.095	0.017	0.001	0.004	0.038	0.081	0.090	0.106	0.101	0.111	0.118	0.110	0.122	0.155	0.159	0.137	0.139	0.135	0.094	0.159
15-Jul	0.148	0.152	0.159	0.160	0.156	Z	0.141	0.115	0.113	0.109	0.041	0.018	0.013	0.006	0.005	0.001	0.002	0.002	0.001	0.004	0.000	0.002	0.000	0.002	0.059	0.160
16-Jul	Z	0.003	0.002	0.018	0.057	0.025	0.041	0.033	0.044	0.051	0.031	0.024	0.025	0.027	0.024	0.023	0.029	0.027	0.045	0.058	0.050	0.064	0.028	0.032	0.033	0.064
17-Jul	0.012	Z	0.071	0.056	0.051	0.045	0.012	0.016	0.038	0.044	C	C	C	0.054	0.021	0.000	0.032	0.021	0.003	0.003	0.004	0.026	0.046	0.038	0.030	0.071
18-Jul	0.037	0.021	Z	0.062	0.076	0.081	0.083	0.082	0.070	0.062	0.054	0.030	0.026	0.038	0.030	0.058	0.029	0.042	0.061	0.045	0.062	0.034	0.033	0.016	0.049	0.083
19-Jul	0.016	0.028	0.014	Z	0.054	0.069	0.020	0.082	0.113	0.090	0.031	M	0.035	0.048	0.028	0.038	0.039	0.042	0.107	0.111	0.089	0.085	0.087	0.074	0.059	0.113
20-Jul	0.072	0.075	0.077	0.081	0.130	Z	0.067	0.073	0.103	0.147	0.141	0.117	0.076	0.117	0.058	0.047	0.043	0.041	0.056	0.082	0.074	0.071	0.074	0.064	0.082	0.147
21-Jul	0.058	0.059	0.051	0.046	0.052	Z	0.086	0.158	0.165	0.180	0.139	0.094	0.084	0.079	0.069	0.078	0.062	0.064	0.079	0.097	0.092	0.095	0.090	0.083	0.090	0.180
22-Jul	Z	0.083	0.071	0.056	0.073	0.065	0.086	0.100	0.102	0.099	0.092	0.106	0.086	0.069	0.080	0.068	0.064	0.063	0.069	0.063	0.065	0.069	0.050	0.025	0.074	0.106
23-Jul	0.019	Z	0.022	0.022	0.032	0.034	0.082	0.055	0.027	0.060	0.075	0.085	0.085	0.103	0.088	0.078	0.094	0.076	0.140	0.077	0.109	0.118	0.145	0.145	0.077	0.145
24-Jul	0.153	0.148	Z	0.113	0.235	0.468	0.066	0.064	0.177	0.107	0.103	0.106	0.107	0.087	0.077	0.078	0.072	0.067	0.085	0.088	0.086	0.055	0.020	0.011	0.112	0.468
25-Jul	0.006	0.032	0.036	Z	0.040	0.125	0.041	0.013	0.049	0.054	0.039	0.047	0.029	0.059	0.057	0.067	0.068	0.067	0.065	0.055	0.007	0.002	0.000	0.000	0.042	0.125
26-Jul	0.027	0.062	0.034	0.026	Z	0.066	0.003	0.130	0.008	0.013	0.018	0.002	0.012	0.007	0.001	0.002	0.002	0.007	0.002	0.001	0.000	0.000	0.000	0.000	0.018	0.130
27-Jul	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.076	0.065	0.038	0.011	PF	PF	PF	PF	PF	PF	0.052	0.064	0.100	0.111	0.074	0.058	--	0.111
28-Jul	Z	0.076	0.094	0.084	0.090	0.121	0.177	0.091	0.062	0.060	0.118	0.052	0.058	0.021	0.071	0.036	0.035	0.035	0.037	0.100	0.109	0.302	0.117	0.045	0.087	0.302
29-Jul	0.099	Z	0.175	0.163	0.584	0.115	0.072	0.048	0.096	PF	0.092	0.011	0.007	0.009	0.006	0.009	0.013	PF	0.031	0.114	0.098	0.138	0.164	0.182	0.106	0.584
30-Jul	0.074	0.072	Z	0.029	0.031	0.044	0.012	0.015	0.116	0.114	0.047	0.051	0.050	0.023	0.032	0.034	PF	0.075	0.065	0.028	0.070	0.102	0.111	0.106	0.059	0.116
31-Jul	0.091	0.018	0.061	Z	0.041	0.074	0.096	0.092	0.044	PF	0.158	0.054	0.026	0.018	0.025	0.015	0.015	0.018	0.035	0.071	0.101	0.087	0.078	0.006	0.056	0.158
																								Diurnal Average		
																								Diurnal Maximum		
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan																										
C - Calibration																										
M - Maintenance																										
PF - Power Failure																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Lower Camp - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	114	16.31	16.31
0.006 - 0.05	250	35.77	52.07
0.06 - 0.1	308	44.06	96.14
> 0.1	27	3.86	100.00

Total Number of Valid Hours: 699

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Lower Camp - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	19	14	6	2	4	3	12	0	1	2	0	4	5	5	5	11	93
0.006 - 0.05	12	4	10	6	1	15	35	9	0	1	3	10	17	16	20	17	176
0.06 - 0.1	25	15	10	5	4	15	23	7	5	3	1	1	3	12	34	23	186
> 0.1	2	1	0	0	0	1	3	0	0	0	0	0	0	1	4	3	15
Totals	58	34	26	13	9	34	73	16	6	6	4	15	25	34	63	54	470

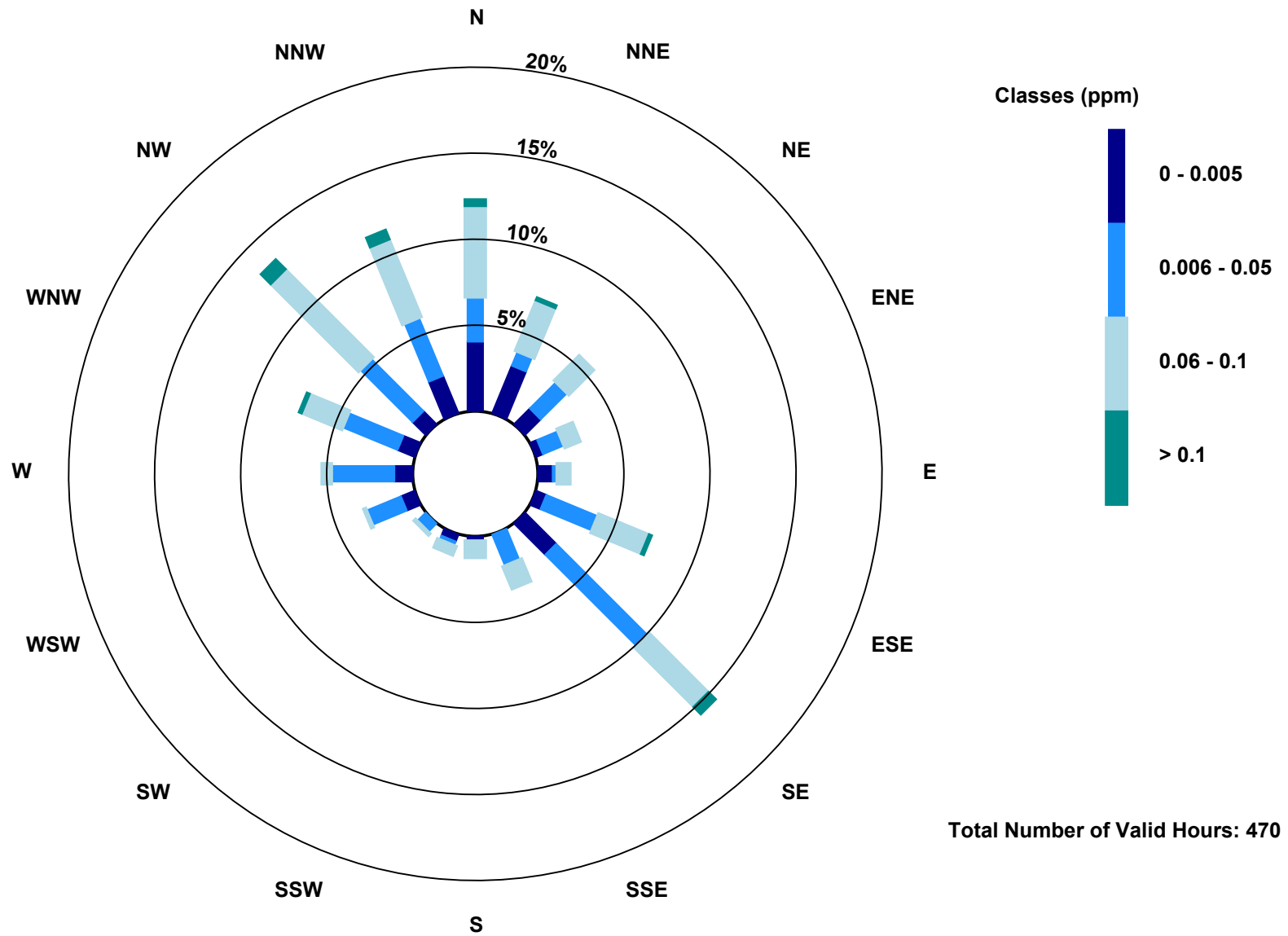
Total Number of Valid Hours: 470

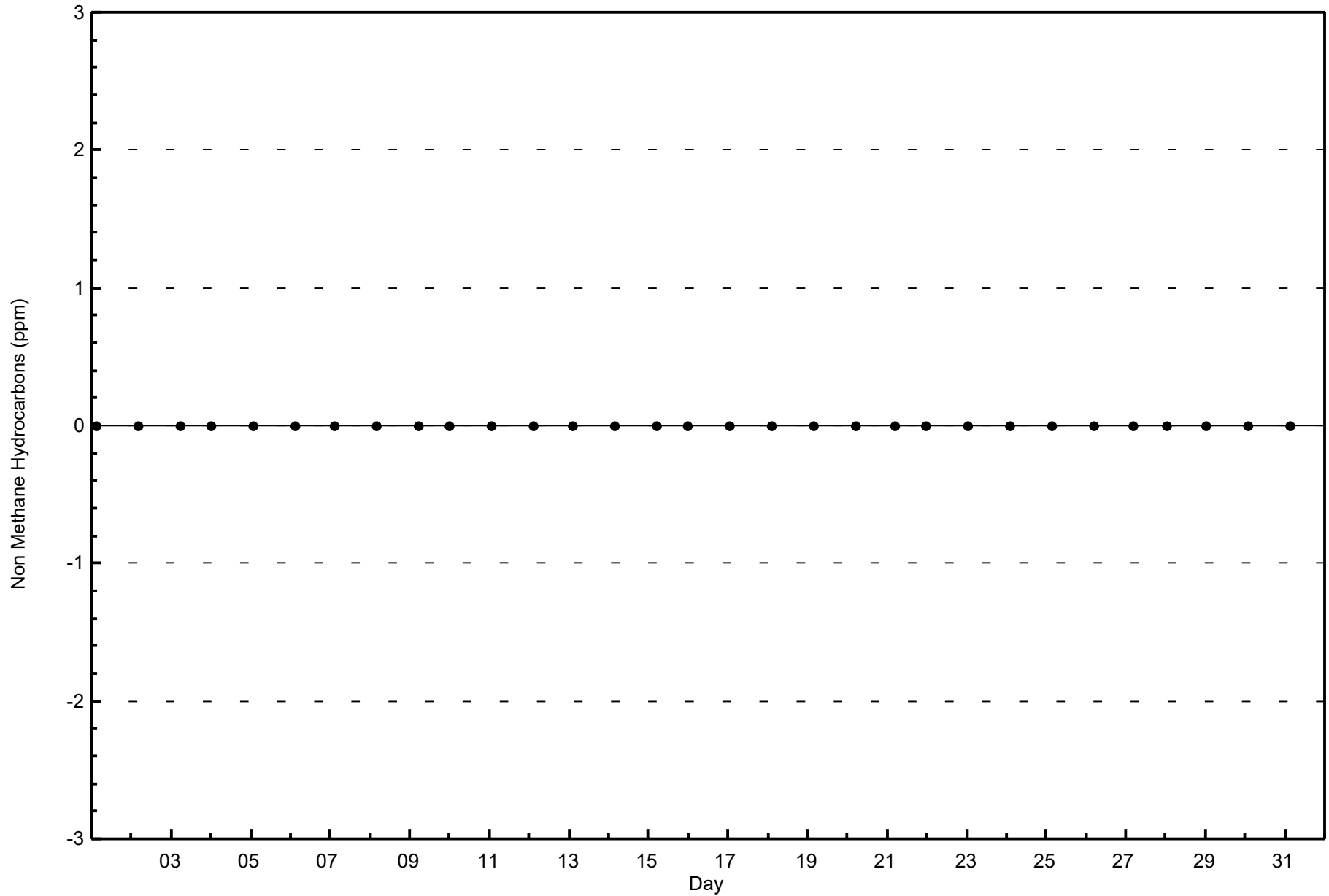
Total Number of Hours: 744

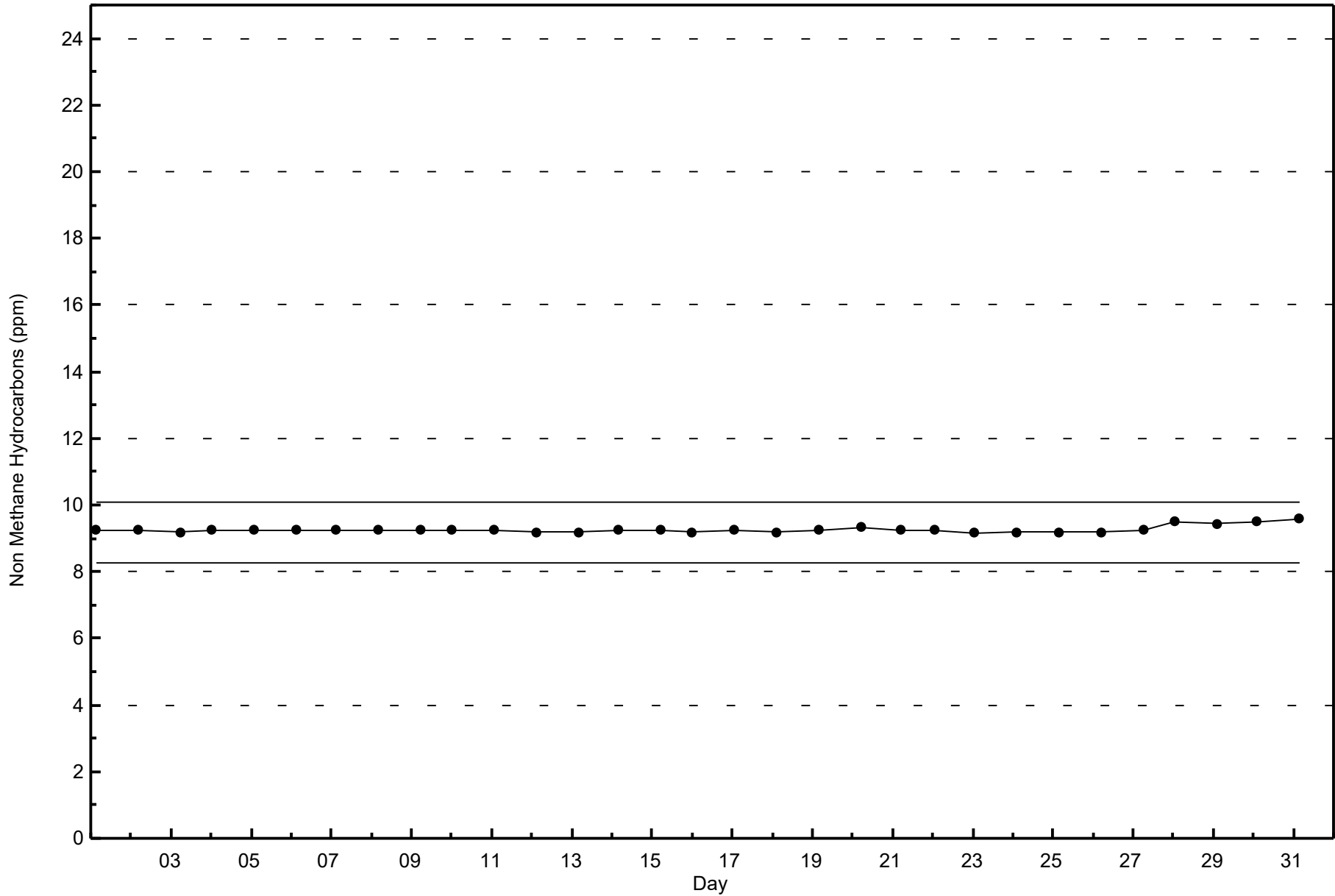


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Non Methane Hydrocarbons (NMHC) - ppm
Lower Camp









Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

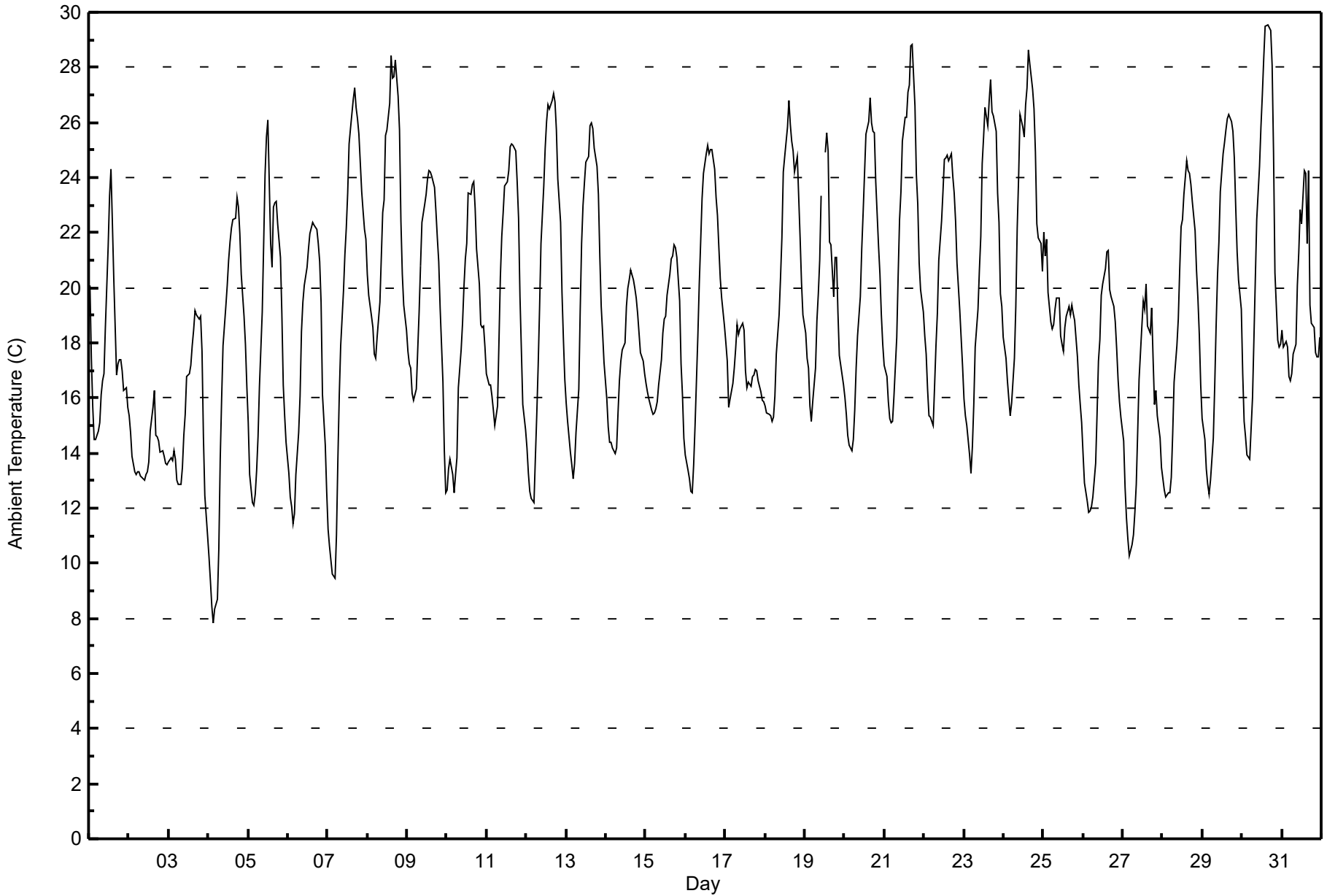
Lower Camp - July 2023

Maximum Value: 29.5 C on Jul 30 16:00 Maximum Daily Average: 22.5 C on Jul 8																						Hours in Service:	744																								
Minimum Value: 7.8 C on Jul 4 04:00 Minimum Daily Average: 14.0 C on Jul 2																						Hours of Data:	743																								
Maximum Diurnal Average: 23.5 C at hour 15 Minimum Diurnal Average: 13.8 C at hour 5																						Hours of Missing Data:	1																								
Monthly Average: 19.01 C Percentiles: P ₁ = 10.2 P ₁₀ = 13.3 Q ₁ = 15.7 Median = 18.6 Q ₃ = 22.4 P ₉₀ = 25.3 P ₉₉ = 28.4																						Hours of Calibration:	0																								
																						Percent Operational Time:	99.9																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	20.1	17.5	15.7	14.5	14.5	14.8	15.1	16.1	16.6	16.9	18.6	21.5	23.3	24.3	22.4	20.3	16.8	17.2	17.4	17.4	17.0	16.3	16.4	15.7	17.8	24.3																					
2-Jul	15.4	14.7	13.9	13.3	13.2	13.3	13.3	13.1	13.1	13.0	13.2	13.3	13.7	14.8	15.7	16.3	14.7	14.6	14.5	14.0	14.1	13.9	13.6	13.6	14.0	16.3																					
3-Jul	13.7	13.8	13.7	14.1	13.8	13.0	12.9	12.9	13.5	14.6	15.4	16.8	16.9	17.2	17.9	18.5	19.2	19.0	18.9	19.0	17.7	14.6	12.5	11.0	15.4	19.2																					
4-Jul	10.2	9.4	8.5	7.8	8.3	8.7	10.5	13.8	15.9	17.9	19.3	20.1	21.0	21.6	22.2	22.5	22.5	23.3	23.0	22.0	20.5	19.0	18.0	16.4	16.8	23.3																					
5-Jul	15.1	13.2	12.2	12.1	12.5	13.4	14.6	16.4	19.1	21.6	24.1	25.5	26.1	21.6	20.8	22.9	23.1	23.1	23.0	22.3	21.1	19.1	16.5	15.4	14.4	18.6	26.1																				
6-Jul	13.3	12.4	12.0	11.4	11.8	13.2	14.7	16.1	18.4	19.5	20.1	20.7	21.4	22.0	22.2	22.4	22.3	22.1	21.6	20.9	19.5	16.1	14.3	12.6	17.5	22.4																					
7-Jul	11.2	10.6	10.1	9.6	9.4	11.0	13.8	16.1	17.9	19.9	21.2	22.2	23.4	25.2	25.8	26.8	27.3	26.5	26.2	25.6	23.5	22.8	22.1	21.7	19.6	27.3																					
8-Jul	20.5	19.7	19.0	18.6	17.6	17.5	18.2	19.5	21.1	22.7	23.2	25.5	25.7	26.7	28.4	27.6	27.7	28.2	26.9	25.7	22.4	20.5	19.4	18.5	22.5	28.4																					
9-Jul	17.7	17.2	17.1	16.2	15.9	16.3	17.7	19.1	20.8	22.4	23.1	23.4	23.9	24.2	24.2	24.0	23.7	22.8	21.8	21.0	19.3	16.6	14.1	12.6	19.8	24.2																					
10-Jul	12.6	13.4	13.8	13.2	12.6	13.2	13.9	16.4	17.7	18.7	20.0	21.0	21.6	23.4	23.4	23.7	23.9	22.9	21.4	20.2	18.7	18.6	18.6	17.8	18.4	23.9																					
11-Jul	16.9	16.5	16.5	16.1	15.5	15.0	15.7	18.1	20.4	21.9	22.7	23.7	23.8	24.3	25.1	25.2	25.2	25.0	23.8	22.5	19.7	17.8	15.7	14.8	20.1	25.2																					
12-Jul	14.2	13.3	12.6	12.4	12.2	13.8	15.4	17.2	19.3	21.6	23.7	25.1	26.0	26.7	26.5	26.8	27.1	26.7	25.7	23.9	22.4	19.9	18.2	16.7	20.3	27.1																					
13-Jul	15.8	15.1	14.0	13.6	13.1	13.6	14.8	16.3	19.2	21.6	23.0	23.8	24.5	24.8	25.9	26.0	25.8	25.1	24.4	23.4	21.1	19.3	18.3	17.3	20.0	26.0																					
14-Jul	16.0	15.0	14.4	14.4	14.2	14.0	14.2	15.5	16.6	17.4	17.8	18.0	19.3	20.0	20.3	20.6	20.3	20.0	19.6	19.1	18.3	17.6	17.4	16.9	17.4	20.6																					
15-Jul	16.6	16.2	15.9	15.6	15.4	15.5	15.6	15.9	16.5	17.4	18.3	18.9	18.9	19.7	20.5	21.1	21.1	21.6	21.4	21.1	19.5	17.2	16.1	14.6	17.9	21.6																					
16-Jul	13.9	13.4	13.0	12.6	12.5	13.6	15.0	18.2	20.2	21.7	23.2	24.2	24.9	25.1	24.9	25.0	25.0	24.3	23.3	22.6	21.4	20.4	19.6	18.6	19.9	25.1																					
17-Jul	18.0	17.4	15.7	16.0	16.5	17.1	17.8	18.7	18.3	18.5	18.7	18.5	17.0	16.4	16.6	16.4	16.8	16.8	17.0	17.0	16.6	16.2	15.9	15.9	17.1	18.7																					
18-Jul	15.7	15.5	15.4	15.4	15.2	15.3	16.1	17.6	19.0	20.3	21.8	24.2	24.8	25.8	26.8	25.9	25.3	25.0	24.2	24.8	23.3	21.8	20.2	19.0	20.8	26.8																					
19-Jul	18.4	17.4	17.1	15.7	15.1	15.9	17.1	18.8	19.8	21.0	23.3	M	24.9	25.6	25.0	21.7	21.5	19.7	21.1	21.1	19.1	17.6	16.8	16.5	19.6	25.6																					
20-Jul	16.0	15.4	14.7	14.3	14.1	14.5	15.6	17.1	18.2	19.7	21.4	22.7	24.1	25.6	26.1	26.9	26.0	25.7	25.6	23.8	21.5	20.5	19.0	17.9	20.3	26.9																					
21-Jul	17.2	16.8	15.9	15.2	15.1	15.2	16.1	18.2	20.5	22.5	23.5	25.3	26.2	26.2	27.1	27.3	28.8	28.8	26.6	24.1	23.0	20.9	19.9	19.1	21.6	28.8																					
22-Jul	18.3	17.6	16.3	15.4	15.3	15.0	16.4	17.9	19.0	21.0	22.4	23.5	24.7	24.7	24.8	24.6	24.9	24.1	23.4	22.4	20.9	19.2	18.2	17.1	20.3	24.9																					
23-Jul	16.0	15.4	15.0	13.9	13.3	14.2	15.8	17.8	19.2	20.6	21.9	24.5	25.5	26.6	25.9	26.8	27.6	26.4	26.2	25.7	23.5	22.4	19.8	19.3	21.0	27.6																					
24-Jul	18.2	17.4	16.6	16.0	15.3	15.8	17.5	19.3	22.2	24.0	26.3	25.8	25.5	26.7	27.2	28.6	28.1	27.2	26.5	24.9	22.3	21.8	21.6	20.6	22.3	28.6																					
25-Jul	22.0	21.2	21.7	19.8	18.8	18.5	18.7	19.2	19.6	19.6	18.3	17.9	17.7	18.5	19.0	19.3	19.0	19.4	19.1	18.8	17.5	16.5	15.7	15.1	18.8	22.0																					
26-Jul	14.0	12.9	12.2	11.9	11.9	12.0	12.4	13.7	15.4	17.4	18.1	19.7	20.1	20.7	21.3	21.3	20.0	19.7	19.3	18.7	17.8	16.7	15.9	15.3	16.6	21.3																					
27-Jul	14.4	12.8	11.6	10.9	10.3	10.7	11.0	11.9	12.9	14.7	16.7	18.6	19.5	19.2	20.1	18.6	18.3	19.3	17.4	15.8	16.3	15.4	14.6	13.5	15.2	20.1																					
28-Jul	13.1	12.7	12.4	12.6	12.6	13.1	14.7	16.6	17.9	18.9	20.6	22.2	22.5	23.4	24.6	24.2	24.1	23.8	23.1	22.1	20.7	19.6	18.3	16.5	18.8	24.6																					
29-Jul	15.2	14.5	13.4	12.9	12.5	13.0	14.5	16.4	18.6	20.4	21.7	23.5	24.8	25.3	25.7	26.1	26.3	26.1	25.7	24.7	22.9	21.3	20.3	19.2	20.2	26.3																					
30-Jul	16.9	15.2	14.6	13.9	13.8	14.9	16.0	18.2	20.4	22.5	24.4	25.8	27.0	28.3	29.5	29.5	29.4	29.4	28.1	24.9	20.5	18.1	17.8	18.0	21.5	29.5																					
31-Jul	18.4	17.8	18.1	17.9	16.8	16.6	16.9	17.6	18.0	20.1	21.3	22.8	22.3	24.3	24.2	21.6	24.3	19.4	18.7	18.5	17.7	17.5	17.5	18.2	19.4	24.3																					
																						16.0	15.2	14.6	14.1	13.8	14.3	15.2	16.8	18.2	19.7	20.9	22.0	22.6	23.2	23.5	23.5	23.4	23.0	22.4	21.5	19.9	18.5	17.5	16.6	Diurnal Average	
																						22.0	21.2	21.7	19.8	18.8	18.5	18.7	19.5	22.2	24.0	26.3	25.8	27.0	28.3	29.5	29.5	29.4	29.4	28.1	25.7	23.5	22.8	22.1	21.7	Diurnal Maximum	
M - Maintenance																																															



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Lower Camp - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Lower Camp - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	7	0.94	0.94
10 - 20	445	59.89	60.83
> 20	291	39.17	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

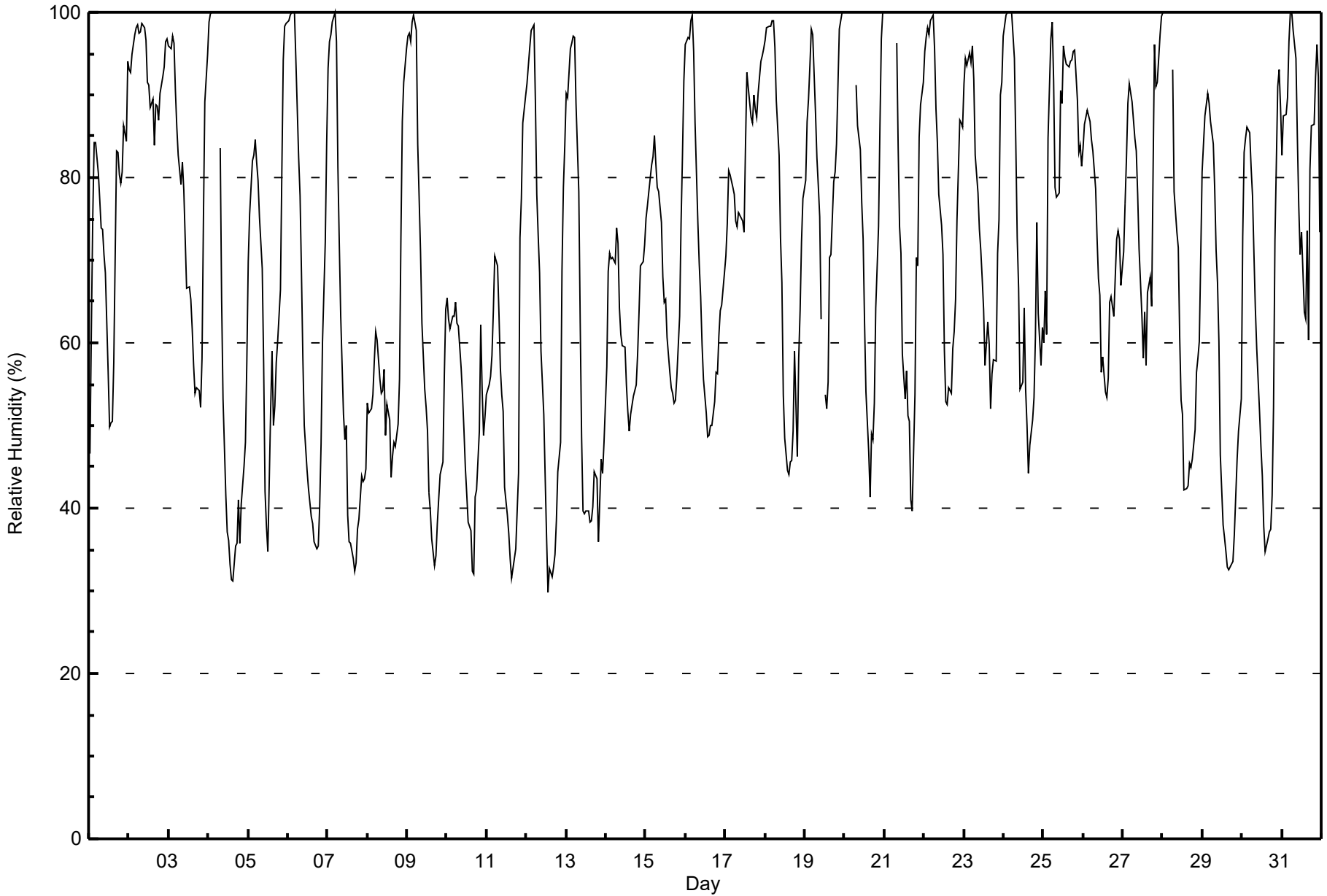
Relative Humidity (RH) - %
Lower Camp - July 2023

Maximum Value: 100.0 % on Jul 4 03:00																								Maximum Daily Average: 93.4 % on Jul 2																								Hours in Service: 744	
Minimum Value: 29.8 % on Jul 12 14:00																								Minimum Daily Average: 51.7 % on Jul 10																								Hours of Data: 720	
Maximum Diurnal Average: 89.1 % at hour 5																								Minimum Diurnal Average: 50.9 % at hour 15																								Hours of Missing Data: 24	
Monthly Average: 69.06 %																								Percentiles: P ₁ = 32.4 P ₁₀ = 41.0 Q ₁ = 52.7 Median = 70.1 Q ₃ = 87.0 P ₉₀ = 96.4 P ₉₉ = 100.0																								Hours of Calibration: 0	
																																																Percent Operational Time: 96.8	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	46.6	61.5	75.3	84.3	84.3	80.6	77.3	73.8	73.7	70.7	68.5	56.4	49.9	50.4	50.5	57.6	83.3	83.0	80.3	79.4	80.7	86.2	84.3	94.0	72.2	94.0																							
2-Jul	93.0	92.7	95.0	97.3	98.2	98.4	97.5	97.6	98.6	98.1	96.6	91.5	91.2	88.5	89.5	83.9	88.9	88.7	87.0	90.2	92.2	93.4	96.4	96.7	93.4	98.6																							
3-Jul	95.9	95.5	97.1	96.3	90.5	86.0	82.7	79.1	81.9	78.5	72.5	66.7	66.7	65.3	61.7	57.4	53.9	54.6	54.2	52.2	58.1	74.8	89.1	94.8	75.2	97.1																							
4-Jul	98.9	99.8	100.0	OR	OR	OR	OR	83.5	65.3	53.2	41.5	37.1	36.1	33.2	31.3	31.2	35.4	35.8	41.0	35.8	40.5	45.1	48.0	57.9	52.5	100.0																							
5-Jul	69.9	75.6	82.0	82.7	84.7	81.9	79.6	75.2	69.0	57.5	42.1	37.9	34.7	51.9	59.0	50.0	52.4	57.6	60.2	66.4	80.9	94.3	98.2	98.7	68.4	98.7																							
6-Jul	99.0	99.6	100.0	100.0	100.0	94.2	82.4	77.8	68.5	58.2	50.0	44.6	42.4	40.6	38.9	38.2	35.9	35.1	35.4	40.2	47.9	60.0	72.2	84.3	64.4	100.0																							
7-Jul	93.2	96.5	97.3	98.9	100.0	96.4	81.4	72.0	63.4	51.3	48.2	49.9	39.2	36.0	35.7	33.9	32.4	33.4	37.5	38.6	43.8	43.2	43.6	44.7	58.8	100.0																							
8-Jul	52.6	51.5	52.0	53.7	57.9	61.4	60.4	55.6	54.0	54.2	56.9	48.7	52.5	50.6	43.8	46.3	48.0	47.5	50.1	55.6	72.7	86.7	91.6	95.6	58.3	95.6																							
9-Jul	97.2	97.5	96.4	98.7	99.7	97.8	84.1	77.6	70.9	62.4	54.4	52.2	49.4	41.9	39.7	36.3	33.0	34.2	38.1	41.1	44.1	45.6	56.1	64.1	63.0	99.7																							
10-Jul	65.5	62.9	61.6	63.2	63.2	64.9	62.4	62.0	56.9	53.6	49.6	44.9	41.7	38.2	37.3	32.4	32.1	41.4	42.1	49.4	62.2	54.3	48.8	51.0	51.7	65.5																							
11-Jul	53.7	54.9	56.0	58.4	63.9	70.5	69.3	63.6	56.9	53.7	51.6	42.6	39.1	36.9	33.9	31.5	32.8	35.2	39.7	44.2	72.7	77.5	86.6	89.9	54.8	89.9																							
12-Jul	91.4	93.6	95.8	97.7	98.5	89.3	78.0	73.1	68.6	58.9	51.3	43.7	36.4	29.8	32.8	31.7	32.9	34.4	38.5	44.5	48.0	68.9	78.8	84.0	62.5	98.5																							
13-Jul	90.1	89.7	95.6	96.2	97.2	96.9	89.0	78.3	62.5	48.7	39.6	39.7	39.7	38.3	38.5	40.1	44.4	43.6	35.9	41.0	46.0	44.3	47.9	59.3	97.2																								
14-Jul	57.1	68.6	70.9	70.1	70.4	69.7	73.9	72.0	64.3	61.0	59.7	59.5	55.0	51.7	49.3	51.4	53.6	54.3	54.9	58.6	63.7	69.3	69.8	71.9	62.5	73.9																							
15-Jul	75.1	76.6	78.3	81.5	82.6	85.0	81.7	78.8	78.3	74.6	67.9	64.9	65.3	60.6	56.4	54.5	53.9	52.7	53.1	56.0	63.3	74.3	82.5	91.8	70.4	91.8																							
16-Jul	96.1	97.0	96.8	99.0	99.7	95.2	86.6	74.6	69.5	65.5	59.9	55.6	51.6	48.7	48.7	49.9	50.0	52.8	56.4	56.4	60.9	63.8	64.5	68.5	69.5	99.7																							
17-Jul	70.5	74.4	80.9	80.3	78.8	78.0	74.8	74.1	75.7	75.4	74.7	73.3	83.6	92.8	90.9	87.4	86.7	89.9	88.3	87.4	90.2	94.0	94.8	95.7	83.0	95.7																							
18-Jul	96.5	98.2	98.2	98.3	99.1	98.9	95.8	89.3	82.8	72.7	67.4	53.8	48.4	44.5	44.0	45.6	45.8	49.3	59.0	46.2	58.1	63.9	72.3	77.5	71.1	99.1																							
19-Jul	79.7	86.8	89.4	93.6	97.9	97.3	87.9	82.4	79.0	75.2	62.8	M	53.8	52.0	55.2	70.3	70.8	79.5	80.7	84.1	91.1	98.0	100.0	OR	80.3	100.0																							
20-Jul	OR	OR	OR	OR	OR	OR	OR	91.1	86.2	83.3	77.0	72.5	62.5	54.1	46.8	41.4	49.0	48.3	52.7	64.2	74.1	86.3	96.8	100.0	--	100.0																							
21-Jul	100.0	OR	OR	OR	OR	OR	OR	96.2	83.7	74.1	70.9	58.7	53.2	56.7	51.1	50.6	41.0	39.7	53.7	70.3	69.3	84.9	88.8	91.6	68.6	100.0																							
22-Jul	95.3	97.0	98.1	97.3	99.1	99.6	95.6	88.3	84.2	78.0	74.2	70.7	59.2	52.9	52.5	54.6	53.9	59.4	61.4	65.3	74.8	87.0	86.7	86.1	78.0	99.6																							
23-Jul	91.4	94.3	93.6	95.1	93.9	95.9	91.9	82.7	78.1	73.7	71.1	67.8	64.2	57.2	62.5	59.8	52.1	56.2	58.0	57.8	70.9	74.9	90.0	91.5	76.0	95.9																							
24-Jul	97.2	99.7	100.0	OR	100.0	100.0	94.3	84.0	72.7	66.6	54.4	55.3	64.2	54.3	50.1	44.2	47.7	50.7	53.4	60.7	74.6	63.6	57.3	61.9	69.9	100.0																							
25-Jul	60.0	66.2	61.1	84.8	96.8	98.9	91.7	78.8	77.6	78.1	90.6	89.1	95.9	94.6	93.8	93.4	94.0	94.3	95.3	95.4	89.2	83.0	83.8	81.3	86.1	98.9																							
26-Jul	83.5	86.5	88.1	87.5	86.7	84.6	83.2	78.6	72.8	67.7	65.7	56.4	58.3	54.0	53.3	55.7	65.0	65.5	63.2	68.0	72.5	73.6	72.5	66.9	71.2	88.1																							
27-Jul	71.0	76.8	82.4	88.9	91.3	89.2	87.0	84.8	83.3	78.0	71.3	63.4	58.1	63.7	57.3	66.1	68.0	64.4	80.6	96.1	91.1	91.5	97.4	99.5	79.2	99.5																							
28-Jul	100.0	100.0	OR	OR	OR	OR	93.0	78.3	73.4	71.5	60.7	53.1	51.3	42.2	42.4	42.8	45.4	44.9	46.0	49.5	56.4	58.1	60.1	70.1	62.0	100.0																							
29-Jul	80.7	87.4	88.9	90.1	89.0	86.8	84.1	78.6	71.2	67.3	60.2	46.5	37.9	36.5	34.7	32.9	32.5	33.3	33.6	36.8	41.4	46.0	49.3	53.3	58.3	90.1																							
30-Jul	72.8	83.1	84.7	86.1	85.3	81.2	77.7	70.8	64.2	59.3	51.6	47.4	43.9	37.8	34.7	36.3	37.2	37.5	41.5	52.2	72.4	91.0	93.1	88.6	63.8	93.1																							
31-Jul	82.8	87.5	87.6	89.7	96.4	99.9	100.0	97.8	94.4	84.9	76.6	70.7	73.3	63.7	62.8	73.6	60.4	81.0	86.3	86.5	92.2	96.2	92.1	73.4	83.7	100.0																							
																								81.9	84.5	85.8	87.3	89.1	88.1	83.7	79.0	73.6	67.9	62.6	57.1	54.8	52.3	50.9	50.9	51.9	54.2	57.0	60.1	67.5	73.4	77.1	79.1	Diurnal Average	
																								100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.8	98.6	98.1	96.6	91.5	95.9	94.6	93.8	93.4	94.0	94.3	95.3	96.1	92.2	98.0	100.0	100.0	Diurnal Maximum	
M - Maintenance																								OR - Out of Range																									



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Lower Camp - July 2023



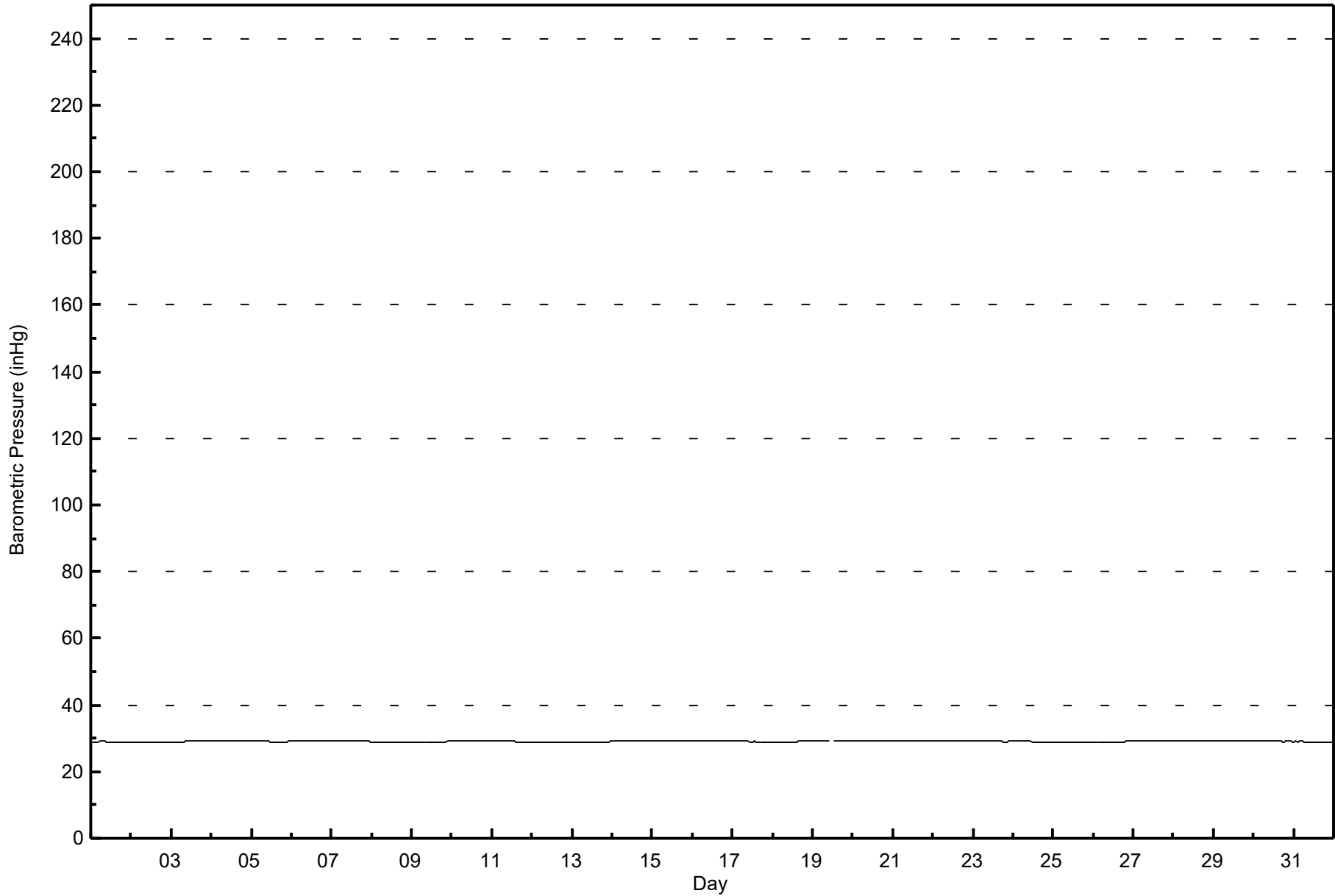


Maximum Value: 29.4 inHg on Jul 28 08:00 Maximum Daily Average: 29.4 inHg on Jul 28																						Hours in Service:	744				
Minimum Value: 28.8 inHg on Jul 25 09:00 Minimum Daily Average: 28.9 inHg on Jul 2																						Hours of Data:	743				
Maximum Diurnal Average: 29.1 inHg at hour 7 Minimum Diurnal Average: 29.1 inHg at hour 19																						Hours of Missing Data:	1				
Monthly Average: 29.09 inHg Percentiles: P ₁ = 28.8 P ₁₀ = 28.9 Q ₁ = 29.0 Median = 29.1 Q ₃ = 29.2 P ₉₀ = 29.3 P ₉₉ = 29.4																						Hours of Calibration:	0				
																						Percent Operational Time:	99.9				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	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	29.0	29.0	
2-Jul	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
3-Jul	28.9	28.9	28.9	28.9	28.9	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	29.2	29.2	29.2	29.2	29.3	29.3	29.1	29.3
4-Jul	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	29.2	29.3	29.3
5-Jul	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.2
6-Jul	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	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.2
7-Jul	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	29.0	29.0	29.0	29.0	29.0	29.0	29.2	29.2
8-Jul	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	29.0
9-Jul	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.0	29.1
10-Jul	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2
11-Jul	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1
12-Jul	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0
13-Jul	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	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
14-Jul	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.2	29.2	29.1	29.2	29.2
15-Jul	29.2	29.2	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2
16-Jul	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	29.1	29.1	29.1	29.2	29.2
17-Jul	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1
18-Jul	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.1
19-Jul	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	M	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.3
20-Jul	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	29.2	29.2	29.3
21-Jul	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	29.1	29.1	29.1	29.1	29.2
22-Jul	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	29.1
23-Jul	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1
24-Jul	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.1
25-Jul	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
26-Jul	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	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.2	29.0	29.2
27-Jul	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.4	29.4	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	29.3	29.4
28-Jul	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	29.4	29.4	29.4
29-Jul	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	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.4
30-Jul	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	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.0	29.0	29.1	29.1	29.2
31-Jul	29.0	29.0	29.0	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1
																						Diurnal Average					
																						Diurnal Maximum					
M - Maintenance																											



Wood Buffalo Environmental Association
Hourly Averages

Barometric Pressure (BP) - inHg
Lower Camp - July 2023





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Lower Camp - July 2023

Maximum Speed: 23 km/h on Jul 3 07:00	Maximum Daily Speed Average: 13.6 km/h on Jul 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 5 23:00	Minimum Daily Speed Average: 1.3 km/h on Jul 4	Hours of Data: 494
Maximum Diurnal Speed Average: 4.5 km/h at hour 17	Minimum Diurnal Speed Average: 0.6 km/h at hour 4	Hours of Missing Data: 250
Monthly Average Velocity: 2.0 km/h 358.3 deg	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 4 Median = 7 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 21	Percent Operational Time: 66.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	WNW10	NW3	NNW1	ESE3	SE4	SE5	SE5	SE4	SE7	SE6	SE9	SE11	SE12	SE14	SSE10	SW16	W11	NNW4	NNW5	NNE3	NNE1	SSW4	W5	NW5	SSE2.3	SW16	
2-Jul	WNW8	NW8	W11	W15	WNW8	WNW9	NW10	NW15	NW14	NW13	NW18	NW20	NW19	WNW16	NW11	NW20	NW14	NW17	WNW19	WNW15	WNW16	WNW18	NW14	NW10	NW13.6	NW20	
3-Jul	NNW9	WNW12	NW10	NW11	N18	N16	N23	N20	NNW17	NNW21	N19	N22	NNW19	NNW19	NNW18	N20	NNW19	NNW14	N10	N9	NNW6	WNW4	NW4	WNW2	NNW13.5	N23	
4-Jul	NNW1	NNE0	E2	WSW1	W2	WSW2	ENE2	ENE3	NNW5	NW6	NW7	WNW6	WSW6	WSW6	WNW6	NW5	N4	SE5	SE7	S8	S8	SSE8	S7	SSE7	SW1.3	S8	
5-Jul	ESE6	SE5	SE6	SE8	SE8	SE8	SE8	SE8	SE7	SSW4	W17	WSW16	W11	W1	W6	SSE6	WSW2	WNW7	W10	W9	N1	SE1	ESE0	NW0	SSW2.9	W17	
6-Jul	NNW1	E1	NW2	WNW4	NW3	NE2	NE3	NNW7	N9	NNE15	N15	NNE12	NNW13	N12	N14	N12	N12	NNE13	NNE16	NNE13	NNE7	WNW3	NNW1	ENE1	N7.3	NNE16	
7-Jul	ESE2	ENE1	NE0	ESE2	ESE3	SE6	SE7	SE7	SSE4	WNW7	NW6	NE5	NNW3	W7	W9	WSW9	WSW13	WSW12	W7	WSW10	WSW8	WSW12	W13	W14	WSW4.1	W14	
8-Jul	WNW14	WNW12	W16	W14	SW3	SSW3	SSW3	WSW9	WSW10	WNW4	N5	NW8	N6	NNE5	NW6	N5	NNW5	NW7	NNE7	N3	WNW3	N2	N1	NNE1	WNW4.3	W16	
9-Jul	NNE2	WNW3	NW3	NW1	NW1	NW4	N4	NNW5	N4	N7	NNE14	NNE13	NNE14	NNE16	NE18	NNE18	NNE18	NNE15	NE14	NNE8	N6	ENE1	E4	NE3	NNE7.5	NNE18	
10-Jul	E8	ESE14	ESE20	ESE13	E8	SE10	SE12	SE19	SE21	SE19	SE12	SE10	SE10	SE12	ESE15	SSE8	SE9	SE12	ESE14	E3	N2	ESE12	SE13	SE13	SE11.6	SE21	
11-Jul	SE7	SE8	SE8	SE7	SE6	ESE5	SE7	SE8	SE9	SE10	ESE8	SSE5	SW7	SW9	SSW8	S7	SSE6	SSE5	SSE5	SSE3	N2	NW2	ESE2	E1	SSE4.9	SE10	
12-Jul	ENE1	ESE2	N1	WNW1	NE1	NNE2	NNE4	N4	NNE5	N5	NW10	NW10	NW12	NNW12	N12	NNW10	N8	N9	NE10	NE7	NW4	NW3	NNW2	ESE1	N4.8	NW12	
13-Jul	NNW1	ENE1	NNE1	NNE1	E1	N3	N3	NW4	NNW10	NNW14	NNW16	NNW20	N22	N22	NNW18	NNW17	N13	NNE15	N18	N15	NW8	NW9	NNW8	NNW9	NNW10.0	N22	
14-Jul	NW6	NW5	NW6	NW6	NW6	NNW8	NW8	NNW11	NNW15	N17	N14	N13	N11	N10	NNE13	NNE10	NE14	NNE9	N9	NNE8	N5	NNW6	NNW5	NW5	N8.2	N17	
15-Jul	NW5	NW5	NW5	NNW4	NNW3	N4	NNW3	NE3	NW4	NW5	NNE8	NE12	NE10	NE10	NNE9	NE10	NE9	NNE5	E8	ENE9	NE5	WNW3	NNW1	S0	NNE4.5	NE12	
16-Jul	N1	NW1	E0	ESE2	SE3	ESE6	ESE6	SE6	SE10	SE12	SE14	SE12	SE13	SE12	SE10	SE13	SSE8	SSE8	SE12	SE19	SE13	SE12	SE12	ESE15	SE8.9	SE19	
17-Jul	SE9	ESE13	ESE11	ESE16	ESE15	SE16	SE15	SE16	SE19	SE19	SE16	SE16	SE10	ESE6	ESE17	SE10	ESE8	ENE4	N5	NW5	NW4	NW5	NNW3	NNW4	ESE8.7	SE19	
18-Jul	NNW4	WNW5	NW6	NNW5	NW5	NW6	NW5	NNW5	NNW5	N7	NW5	NE2	ESE4	ESE4	SE6	ESE2	N4	NNW5	WNW4	W8	W12	W14	NW5	W9	NW3.4	W14	
19-Jul	WSW7	WNW5	W5	SW2	SSE3	SSE2	SW3	SE4	ESE3	NE4	WNW8	M	WNW9	NW7	N6	NNW7	WNW8	W7	NW2	NNW2	W2	SE2	ESE1	NNW1	WNW2.3	WNW9	
20-Jul	WNW1	S0	SE1	SSE1	S1	ESE4	ESE3	ENE3	NE4	NE5	NE4	NE6	N4	WNW6	NNW6	WNW8	N7	N5	N3	ENE0	E1	N1	ESE0	NNW2	N1.8	WNW8	
21-Jul	NW1	NNW1	ENE1	N1	ENE1	ESE2	ESE3	SE5	SE4	SE4	NE3	NNW6	N3	NNE6	NE4	C	C	UO	UO	UO	UO	UO	UO	UO	---	NNE6	
22-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	---	---
23-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	---	---
24-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	---	---
25-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	---	---
26-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	---	---
27-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	---	---
28-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	---	---
29-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	---	---
30-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	---	---
31-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	---	---

WNW1.4	NW0.8	WSW0.6	WSW0.6	ENE0.9	E1.5	ENE1.6	ENE1.5	NE1.8	NNE3.1	N4.2	N4.4	N4.1	N3.8	N3.7	NNW3.9	N4.5	N4.3	NNE4.0	N2.4	NW2.3	W2.1	WNW0.9	WNW0.9	Diurnal Average
WNW14	ESE14	ESE20	ESE16	N18	N16	N23	N20	SE21	NNW21	N19	N22	N22	N22	NNW18	NW20	NNW19	NW17	WNW19	SE19	WNW16	WNW18	NW14	ESE15	Diurnal Maximum

C - Calibration M - Maintenance UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

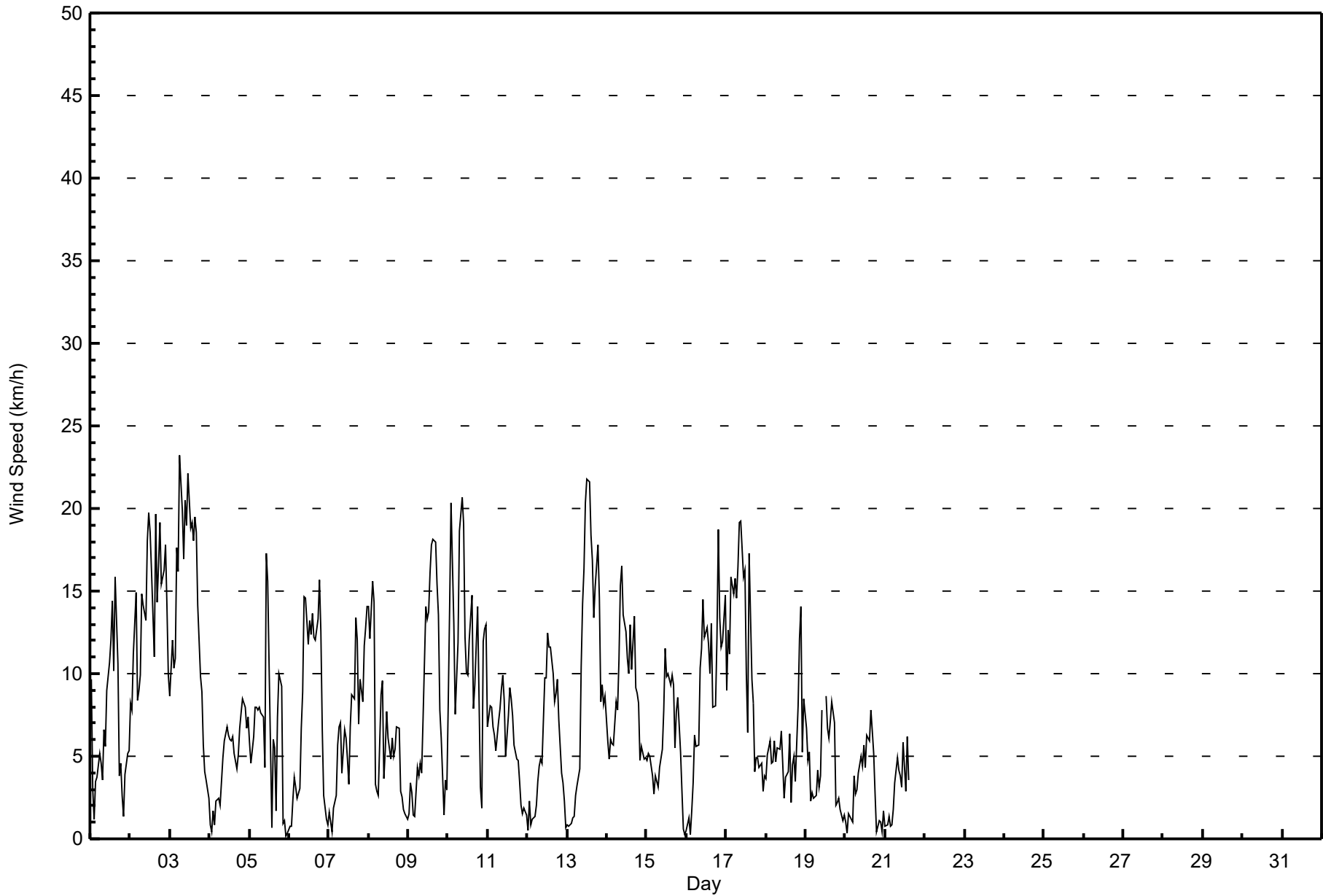
Wind Speed (WS) - km/h
Lower Camp - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Jul 3 12:00 Minimum Value: 1 km/h on Jul 11 21:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 6																	Hours in Service: 744 Hours of Data: 494 Hours of Missing Data: 250 Hours of Calibration: 2 Percent Operational Time: 66.7													
Day	Hourly Period Ending At (MST)																								Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24						
1-Jul	4	1	1	1	1	2	2	1	3	1	3	3	5	4	5	7	5	2	2	2	1	2	1	2	7					
2-Jul	2	3	4	3	4	2	2	4	3	4	4	5	4	4	3	6	4	6	4	3	4	4	3	3	6					
3-Jul	2	2	2	2	5	5	6	6	5	6	5	7	5	5	5	6	5	4	4	3	2	2	1	1	7					
4-Jul	1	1	1	1	1	1	1	1	2	2	2	3	4	3	3	3	2	2	3	2	3	2	2	2	4					
5-Jul	3	1	2	2	2	2	3	2	2	4	4	4	4	5	5	2	2	4	3	4	1	1	1	1	5					
6-Jul	2	2	1	1	1	1	1	2	3	3	4	4	4	4	4	4	4	4	4	3	2	1	1	1	4					
7-Jul	1	1	1	1	1	2	2	2	2	2	2	1	2	3	4	4	4	3	3	3	3	2	3	3	4					
8-Jul	3	3	4	3	3	2	2	3	2	2	2	2	1	2	3	2	2	2	2	1	1	1	1	1	4					
9-Jul	1	1	1	2	2	1	1	1	2	4	4	4	4	4	5	4	4	4	4	2	2	2	2	2	5					
10-Jul	4	4	4	5	2	4	4	6	5	5	4	4	4	4	5	4	4	4	3	2	1	4	4	4	6					
11-Jul	4	3	2	2	2	2	2	2	3	4	3	3	4	4	4	3	3	2	1	1	1	1	1	1	4					
12-Jul	2	2	1	1	1	1	1	2	2	2	2	3	3	3	4	3	2	3	3	2	1	1	1	1	4					
13-Jul	1	1	2	1	1	1	1	1	3	4	5	6	6	6	5	5	4	4	5	4	2	2	2	1	6					
14-Jul	1	1	1	1	1	2	1	4	4	5	3	4	3	3	4	3	2	2	2	1	1	1	1	1	5					
15-Jul	1	1	1	1	1	1	1	1	1	2	3	3	3	3	4	3	4	2	2	3	4	1	1	1	4					
16-Jul	1	1	1	1	1	2	2	2	4	4	4	4	5	6	4	5	3	3	5	4	5	3	4	4	6					
17-Jul	3	3	3	2	3	4	4	4	5	5	5	5	6	3	5	5	5	2	2	2	1	1	2	1	6					
18-Jul	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2	1	1	1	2	2	4	3	2	3	4					
19-Jul	3	2	2	1	1	1	1	1	1	1	3	M	3	3	2	5	6	4	2	2	2	1	1	1	6					
20-Jul	2	1	2	2	1	2	1	1	1	1	1	1	2	2	2	3	2	1	1	1	1	2	2	1	3					
21-Jul	1	1	2	1	2	1	1	2	1	1	1	2	2	2	1	C	C	UO	UO	UO	UO	UO	UO	UO	2					
22-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--					
23-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--					
24-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--					
25-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--					
26-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--					
27-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--					
28-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--					
29-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--					
30-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--					
31-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--					
																	Diurnal Maximum													
																	4 4 4 5 5 5 6 6 5 6 5 7 6 6 5 7 6 6 5 4 5 4 4 4													
C - Calibration																	M - Maintenance							UO - Unstable Operation						



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Lower Camp - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Lower Camp - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	207	41.90	41.90
6 - 11	161	32.59	74.49
12 - 19	114	23.08	97.57
20 - 28	12	2.43	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 494

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Lower Camp - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	27	12	15	12	7	21	14	8	3	4	3	3	5	14	32	27	207
6 - 11	14	9	7	1	3	7	35	8	3	2	2	8	12	13	24	13	161
12 - 19	15	14	4	0	0	10	28	0	0	0	1	4	8	8	9	13	114
20 - 28	6	0	0	0	0	1	1	0	0	0	0	0	0	0	2	2	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	62	35	26	13	10	39	78	16	6	6	6	15	25	35	67	55	494

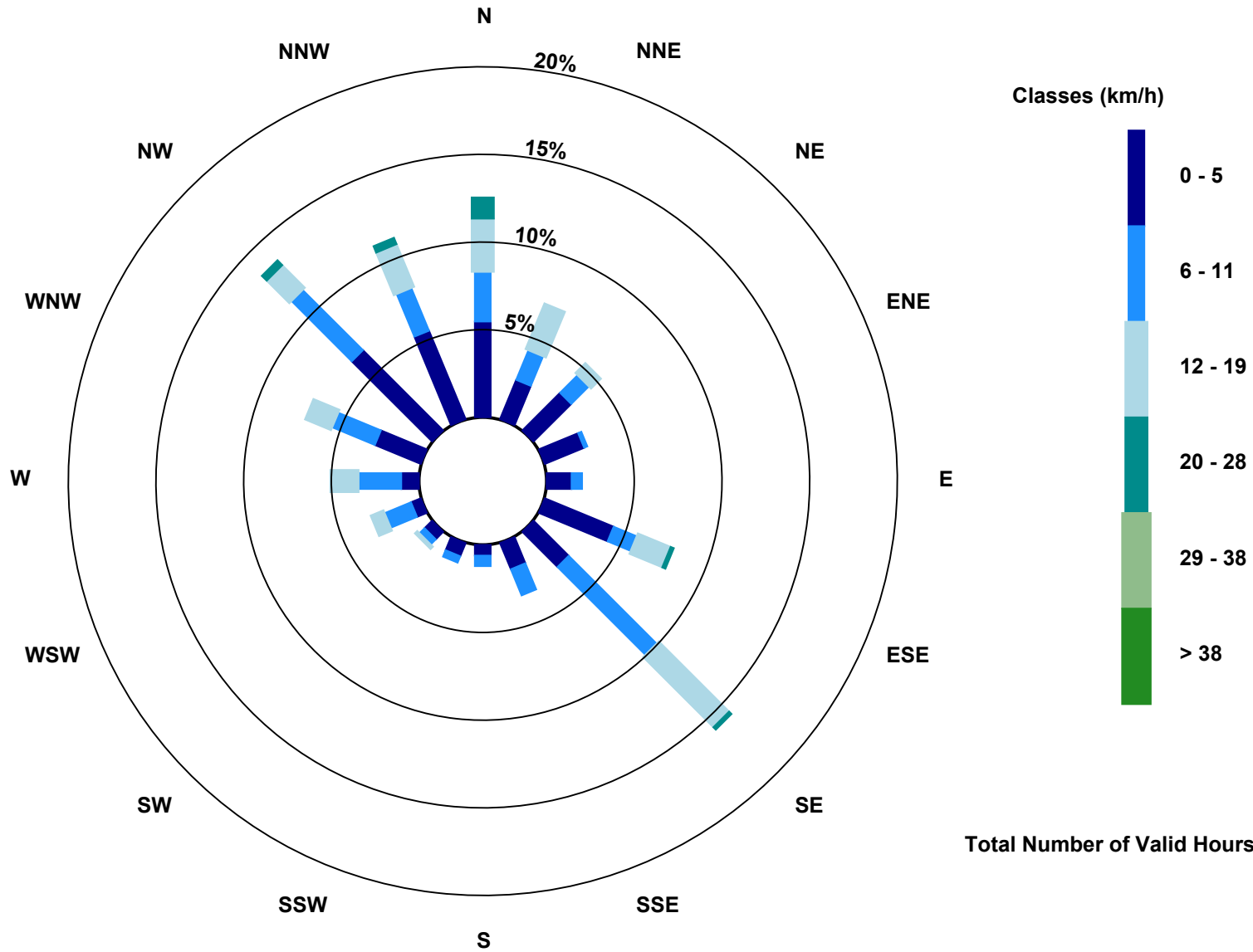
Total Number of Valid Hours: 494

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Lower Camp





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Lower Camp - July 2023

Direction of Maximum Speed: 5 deg on Jul 3 07:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 304.6 deg on Jul 2	Hours of Data: 494
Direction of Minimum Speed: 123 deg on Jul 5 23:00	Direction of Minimum Daily Speed Average: 1.3 deg on Jul 4
Direction of Minimum Speed: 123 deg on Jul 5 23:00	Hours of Missing Data: 250
Monthly Average Direction: 358.3 deg	Percent Operational Time: 66.7

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	282	308	347	112	130	129	133	140	134	128	137	132	129	129	147	233	268	345	337	18	22	203	265	316	161.2	
2-Jul	291	318	260	272	297	300	309	305	322	324	319	324	314	294	311	313	322	308	298	292	282	297	305	318	304.6	
3-Jul	327	303	308	320	360	356	5	4	341	340	350	357	340	341	347	356	340	337	3	351	327	294	305	287	344.4	
4-Jul	340	32	101	241	271	241	69	71	346	308	312	284	251	253	285	320	10	129	140	180	177	165	169	154	219.9	
5-Jul	120	139	143	143	141	139	138	138	139	209	262	257	271	274	260	154	249	296	273	263	356	131	123	310	209.4	
6-Jul	329	86	323	299	317	41	43	348	354	22	9	17	345	354	350	358	8	24	23	20	14	298	339	66	5.1	
7-Jul	117	72	53	117	114	125	132	136	150	288	321	52	330	274	266	258	251	256	260	246	248	258	261	274	254.2	
8-Jul	282	283	261	264	227	203	206	251	256	296	11	313	9	31	316	1	346	325	16	352	282	1	4	23	296.6	
9-Jul	27	297	312	325	307	319	351	338	3	358	22	20	20	24	44	22	25	31	36	16	0	66	80	56	20.1	
10-Jul	98	104	120	120	97	124	145	136	125	125	134	132	137	129	115	151	143	129	111	93	3	122	128	127	124.4	
11-Jul	127	145	137	146	128	113	138	139	136	128	123	157	224	222	200	191	168	158	150	152	2	326	113	97	151.6	
12-Jul	60	104	351	289	49	33	31	356	30	353	321	324	319	342	354	347	350	356	38	40	319	325	331	119	351.7	
13-Jul	331	63	21	20	83	357	355	314	341	327	346	344	355	351	337	339	353	12	9	1	325	319	328	327	346.5	
14-Jul	314	319	318	314	325	335	312	336	334	358	358	6	354	355	14	21	37	22	5	20	350	328	340	310	351.7	
15-Jul	319	322	324	327	342	359	342	47	311	313	17	47	55	37	33	35	48	16	84	68	45	292	338	187	23.0	
16-Jul	7	326	79	122	141	122	113	138	134	129	130	134	135	139	145	135	149	147	132	127	134	129	132	121	132.4	
17-Jul	143	121	118	111	121	127	135	133	132	131	133	139	130	122	118	138	111	72	355	326	326	318	339	337	123.7	
18-Jul	332	299	321	334	308	308	320	344	346	352	325	48	119	123	133	122	353	346	288	265	265	262	324	277	306.9	
19-Jul	246	285	264	220	154	147	234	131	106	38	284	M	301	318	9	334	284	280	318	343	268	131	121	284	291.1	
20-Jul	295	181	126	148	175	123	118	59	48	38	40	44	358	297	338	291	358	354	353	65	89	9	119	331	9.0	
21-Jul	311	345	69	2	77	102	106	133	139	132	55	327	4	24	34	C	C	UO	UO	UO	UO	UO	UO	UO	--	
22-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
23-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
24-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
25-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
26-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
27-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
28-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
29-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
30-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
31-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--

295.6	314.0	247.8	236.6	73.2	82.4	77.8	72.1	48.0	17.9	359.4	6.4	349.7	356.9	11.2	344.8	354.0	355.6	15.4	357.1	305.5	275.2	293.5	302.8
Diurnal Average																							

C - Calibration M - Maintenance UO - Unstable Operation
 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 - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 101 deg on Jul 5 14:00	Hours of Data: 494
Minimum Value: 9 deg on Jul 10 19:00	Hours of Missing Data: 250
Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 21 Median = 27 Q ₃ = 41 P ₉₀ = 66 P ₉₉ = 92	Hours of Calibration: 2
	Percent Operational Time: 66.7

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	25	50	89	26	18	22	25	17	21	21	21	19	20	17	33	29	29	45	33	38	73	47	22	34	89
2-Jul	26	28	25	18	29	18	19	19	12	18	12	16	15	14	26	17	14	13	12	14	14	13	12	27	29
3-Jul	17	12	13	14	23	22	19	19	23	21	22	21	20	20	22	23	21	20	30	31	28	39	28	66	66
4-Jul	61	70	33	83	30	39	64	19	45	33	45	64	78	64	62	69	51	24	26	31	30	25	26	25	83
5-Jul	39	22	23	20	22	25	25	23	25	66	16	18	34	101	62	46	88	36	17	31	85	79	86	88	101
6-Jul	77	67	41	23	39	40	30	26	30	19	25	29	25	28	26	28	27	24	18	16	24	31	56	62	77
7-Jul	49	61	75	25	25	24	20	23	66	34	32	14	67	41	39	49	27	19	40	18	17	13	13	15	75
8-Jul	13	14	14	16	74	64	64	20	18	73	35	33	32	55	42	31	26	25	21	44	46	29	48	40	74
9-Jul	38	36	48	62	51	17	33	30	41	36	19	25	23	25	22	20	21	19	16	16	25	94	24	68	94
10-Jul	39	17	14	23	31	34	30	19	14	16	22	27	24	22	19	40	33	21	9	67	57	23	22	21	67
11-Jul	40	31	27	33	32	32	27	24	26	27	22	59	49	38	45	50	42	39	23	34	41	71	32	35	71
12-Jul	84	40	73	60	71	56	34	33	32	39	19	26	19	24	24	23	25	24	16	14	46	42	44	84	84
13-Jul	63	76	50	41	38	34	35	24	23	18	23	24	23	24	22	22	23	18	19	20	17	13	13	11	76
14-Jul	22	32	16	19	19	17	17	20	19	22	22	25	23	25	21	30	18	23	23	25	22	18	27	31	32
15-Jul	25	19	19	26	46	30	29	32	24	25	40	25	28	29	33	28	27	38	26	19	41	27	83	86	86
16-Jul	70	70	98	28	39	24	23	28	23	22	20	22	26	30	35	29	37	37	30	14	24	26	23	16	98
17-Jul	35	21	19	10	16	16	20	17	16	17	21	23	35	39	19	37	37	44	34	43	32	34	44	21	44
18-Jul	16	14	18	33	26	16	20	24	31	25	41	64	63	40	21	58	29	25	36	17	15	13	36	26	64
19-Jul	38	37	31	48	33	42	61	25	29	34	40	M	30	63	32	59	63	47	79	57	67	52	88	76	88
20-Jul	95	76	92	80	82	36	68	47	20	16	17	10	54	41	40	36	23	21	43	59	47	76	95	61	95
21-Jul	90	64	60	74	77	66	23	24	25	27	39	29	77	38	56	C	C	UO	UO	UO	UO	UO	UO	UO	90
22-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
23-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
24-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
25-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
26-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
27-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
28-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
29-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
30-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
31-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
	95	76	98	83	82	66	68	47	66	73	45	64	78	101	62	69	88	47	79	67	85	94	95	88	

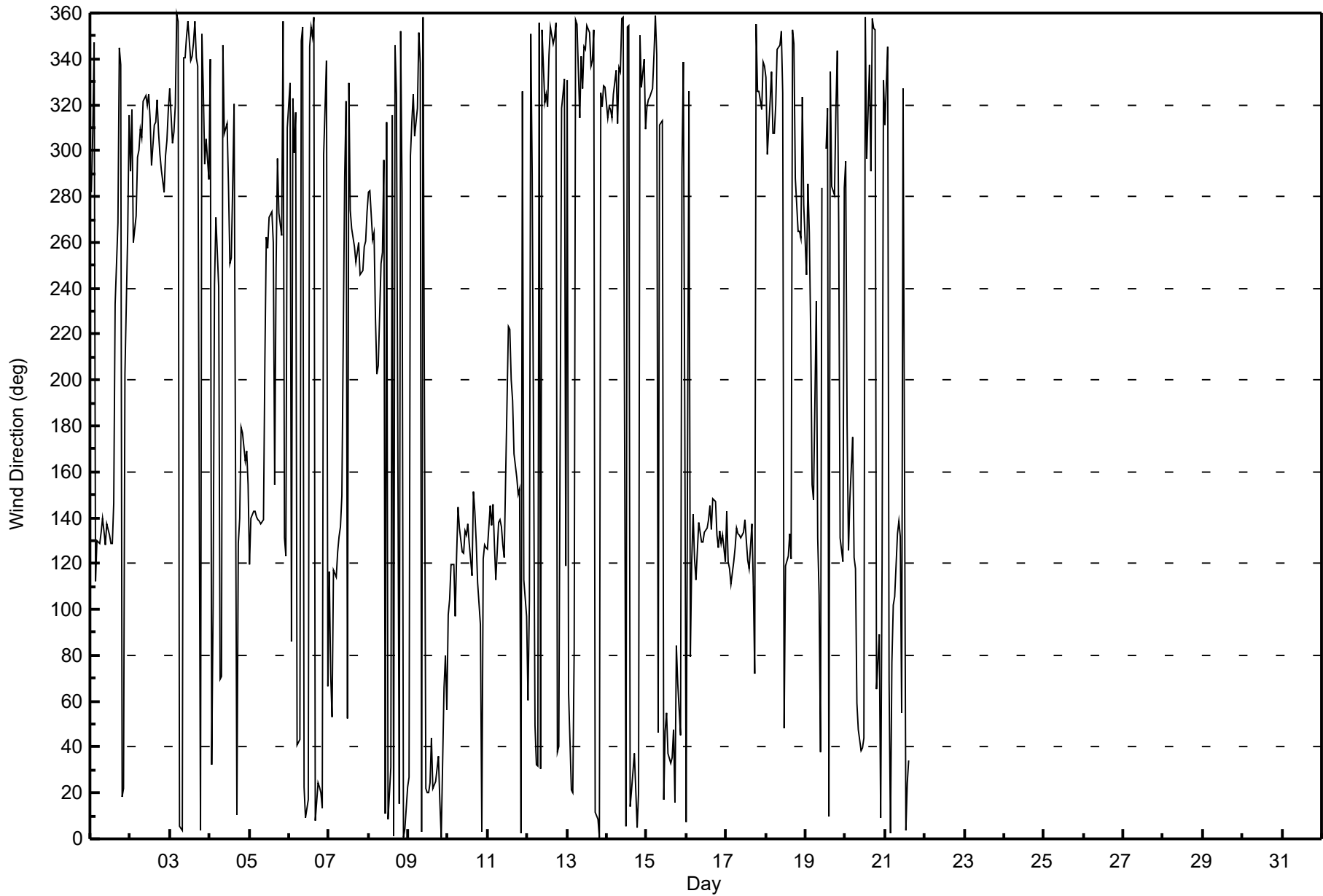
Diurnal Maximum

C - Calibration M - Maintenance UO - Unstable Operation



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Lower Camp - July 2023





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS13 FORT MCKAY SOUTH JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT McKAY SOUTH (AMS13)
 JULY 2023

MONTHLY SUMMARY

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	17	0	4.1	0
TRS(ppb) Average	704	35	40	99.33	2.9	0	1	0
THC(ppm) Average	709	35	35	100	3	-	2.3	-
NMHC(ppm) Average	709	35	35	100	0.164	-	0.015	-
CH4(ppm) Average	709	35	35	100	3	-	2.3	-
O3(ppb) Average	710	34	34	100	60.5	0	30.6	-
NO2(ppb) Average	707	36	37	99.87	34.7	0	7.9	-
NO(ppb) Average	707	36	37	99.87	50.2	-	5.3	-
NOX(ppb) Average	707	36	37	99.87	73.7	-	12.1	-
PM2.5(ug/m3) Average	743	1	1	100	441.8	134	285.6	16
ET(C) Average	744	0	0	100	30.7	-	22.7	-
RH(%) Average	744	0	0	100	98.6	-	96	-
WS(km/h) Average	743	0	1	99.87	25	-	15	-
WD(deg) Average	743	0	1	99.87	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS13)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	709	0.97	1.8	-	0.1	0.3	0.4	0.5	0.7	1.7	17
TRS(ppb) Average	704	0.62	0.3	-	0.3	0.4	0.4	0.5	0.7	1	2.9
THC(ppm) Average	709	2.14	0.2	-	2	2	2	2.1	2.2	2.3	3
NMHC(ppm) Average	709	0.004	0.017	-	0	0	0	0	0	0	0.164
CH4(ppm) Average	709	2.14	0.1	-	2	2	2	2.1	2.2	2.3	3
O3(ppb) Average	710	20.04	13	-	0.8	3.7	9	18.3	30.4	37.5	60.5
NO2(ppb) Average	707	4.02	4.2	-	0	0.5	1.2	2.7	5.4	9.1	34.7
NO(ppb) Average	707	1.59	4.7	-	0	0	0	0.1	0.7	4	50.2
NOX(ppb) Average	707	5.61	8	-	0	0.5	1.3	3	6.3	12.7	73.7
PM2.5(ug/m3) Average	743	51	76.1	-	2.2	4.8	8.6	22.4	53.9	117.8	441.8
Temperature 2 m (C) Average	744	18.12	5.5	-	4	11	14	17.9	22.4	25.5	30.7
Relative Humidity (%) Average	744	67.45	20.8	-	27.8	38.2	50.2	68.1	86.5	95.5	98.6
Wind Speed 10 m (km/h) Average	743	6.6	4	-	0	2	3	5	9	13	25
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS13)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	08 Jul 2023 20:00	09 Jul 2023 00:00	5	Unstable Operation - excessive baseline noise
NO2	28 Jul 2023 18:00	28 Jul 2023 18:00	1	Station power failure
Wind Speed, Wind Direction	15 Jul 2023 06:00	15 Jul 2023 06:00	1	Flat line in sensor output signal



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Fort McKay South - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 17.0 ppb on Jul 30 11:00	Maximum Daily Average: 4.1 ppb on Jul 30		Hours of Data:	709
Minimum Value: 0.1 ppb on Jul 10 04:00	Minimum Daily Average: 0.3 ppb on Jul 3		Hours of Missing Data:	35
Maximum Diurnal Average: 2.4 ppb at hour 12	Minimum Diurnal Average: 0.3 ppb at hour 5		Hours of Calibration:	35
Monthly Average: 0.97 ppb	Percentiles: P ₁ = 0.2 P ₁₀ = 0.3 Q ₁ = 0.4 Median = 0.5 Q ₃ = 0.7 P ₉₀ = 1.7 P ₉₉ = 10.1		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	0.5	0.4	0.4	Z	0.6	0.8	0.7	0.6	0.6	0.8	2.5	9.5	6.5	10.1	6.6	1.7	0.8	0.6	0.6	0.6	0.6	0.5	0.5	0.5	2.0	10.1																						
2-Jul	0.4	0.4	0.4	0.4	Z	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5																						
3-Jul	0.4	0.4	0.4	0.5	0.4	Z	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	0.4	0.3	0.3	0.3	0.3	0.3	0.5																						
4-Jul	Z	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.5	0.7	0.5	0.4	0.6	0.6	0.5	0.5	0.5	2.3	6.5	1.5	2.1	0.9	0.8	0.7	0.9	6.5																						
5-Jul	0.5	Z	0.4	0.4	0.4	0.6	0.8	0.7	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.8	0.8	0.7	0.7	0.6	0.6	0.5	0.4	0.6	0.8																						
6-Jul	0.4	0.4	Z	0.4	0.4	0.3	0.5	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	0.4	0.3	0.2	0.2	0.4	0.5																						
7-Jul	0.2	0.2	0.2	Z	0.2	0.3	1.1	0.5	0.4	1.1	1.4	1.2	0.7	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.5	0.4	0.4	0.4	0.6	1.4																						
8-Jul	0.4	0.4	0.3	0.4	Z	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.9	0.8	0.7	0.7	0.6	0.5	0.4	0.6	0.9																						
9-Jul	0.4	0.4	0.3	0.3	0.2	Z	0.4	0.6	0.6	0.5	0.4	0.5	0.5	0.4	0.5	0.4	0.4	0.3	0.4	0.3	0.4	0.2	0.2	0.2	0.4	0.6																						
10-Jul	Z	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.9	1.1	0.2	0.3	0.3	0.3	2.8	2.8	2.7	3.3	0.5	0.4	0.4	0.4	0.4	0.3	0.8	3.3																						
11-Jul	0.3	Z	0.3	0.3	0.3	0.3	0.5	2.0	12.1	4.5	1.0	0.8	0.7	0.6	0.6	0.7	0.7	0.8	0.7	0.7	0.5	0.5	0.4	0.4	1.3	12.1																						
12-Jul	0.3	0.3	Z	0.4	0.7	0.7	0.4	0.5	0.7	1.0	0.9	0.5	0.6	0.5	0.5	0.6	0.8	0.8	0.8	0.6	0.5	0.5	0.6	0.5	0.6	1.0																						
13-Jul	0.6	0.7	0.7	Z	0.4	0.3	0.4	0.5	0.8	0.7	0.4	0.5	0.5	0.5	0.8	0.7	0.6	0.7	1.1	1.9	1.6	1.5	1.6	1.1	0.8	1.9																						
14-Jul	0.6	0.6	0.4	0.5	Z	0.4	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.6																						
15-Jul	0.4	0.4	0.4	0.4	0.4	Z	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5																						
16-Jul	Z	0.4	0.3	0.3	0.3	0.4	0.6	2.9	7.3	10.1	7.2	6.8	4.2	4.2	2.7	2.5	1.1	1.9	2.2	0.5	0.4	0.4	0.4	0.3	2.5	10.1																						
17-Jul	2.2	Z	1.5	0.6	0.4	0.4	0.4	0.5	2.8	1.7	1.2	1.2	0.8	0.7	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.8	2.8																						
18-Jul	0.4	0.5	Z	0.4	0.3	0.4	0.3	0.6	0.6	0.7	0.7	0.7	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.5	0.4	0.4	0.5	0.7																						
19-Jul	0.4	0.4	0.5	Z	0.3	0.3	0.4	0.3	0.6	0.7	0.6	0.5	0.5	0.6	0.5	1.9	1.3	0.5	0.5	0.5	0.5	0.4	0.3	0.3	0.6	1.9																						
20-Jul	0.3	0.3	0.3	0.3	Z	0.3	0.4	0.4	0.4	0.4	0.5	1.7	2.5	2.0	1.8	1.2	0.7	0.6	0.7	0.7	0.6	0.6	0.5	0.5	0.8	2.5																						
21-Jul	0.4	0.4	0.4	0.4	0.4	Z	0.4	0.4	0.5	0.5	0.9	0.6	0.6	0.6	0.5	0.5	1.1	1.2	0.8	0.8	0.6	0.6	0.5	0.4	0.6	1.2																						
22-Jul	Z	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6	1.1	1.3	0.9	0.8	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.4	0.4	0.6	1.3																						
23-Jul	0.4	Z	0.3	0.3	0.3	0.4	0.4	0.5	0.8	2.6	4.5	10.5	16.7	4.8	1.5	0.9	2.8	2.0	1.0	1.5	1.3	0.8	0.7	0.5	2.4	16.7																						
24-Jul	0.5	0.5	Z	0.4	0.3	0.4	1.1	0.6	0.7	1.0	1.0	9.5	5.7	5.4	3.7	3.1	1.8	1.3	0.9	1.1	0.8	0.6	0.6	0.5	1.8	9.5																						
25-Jul	0.5	0.5	0.5	Z	0.4	0.3	0.4	0.3	C	C	C	C	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5																						
26-Jul	0.4	0.4	0.4	0.4	Z	0.6	0.9	3.8	7.5	5.5	6.3	5.2	2.5	1.3	0.9	0.8	0.7	0.8	1.0	0.7	0.6	0.5	0.5	0.3	1.8	7.5																						
27-Jul	0.4	0.3	0.3	0.3	0.3	Z	0.6	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	1.5	1.1	0.7	0.5	0.4	0.4	0.3	0.5	1.5																						
28-Jul	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.6	1.8	1.6	0.7	0.4	2.6	3.4	4.7	3.0	3.6	1.8	1.3	0.7	0.7	0.4	1.3	4.7																						
29-Jul	0.3	Z	0.5	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.4	0.3	0.4	0.5																						
30-Jul	0.6	0.3	Z	0.2	0.2	0.2	1.3	1.9	6.7	8.4	17.0	13.1	14.3	15.4	2.7	6.1	1.8	0.7	0.9	0.9	0.6	0.5	0.7	0.6	4.1	17.0																						
31-Jul	0.6	0.5	0.4	Z	0.2	0.3	0.4	0.6	0.4	1.3	0.9	0.6	0.5	0.5	0.5	0.5	0.5	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.5	1.3																						
																								0.5	0.4	0.4	0.4	0.3	0.4	0.5	0.7	1.7	1.6	1.8	2.4	2.1	1.8	1.2	1.1	1.0	0.9	1.0	0.7	0.6	0.5	0.5	0.4	Diurnal Average
																								2.2	0.7	1.5	0.6	0.7	0.8	1.3	3.8	12.1	10.1	17.0	13.1	16.7	15.4	6.6	6.1	4.7	3.3	6.5	1.9	2.1	1.5	1.6	1.1	Diurnal Maximum

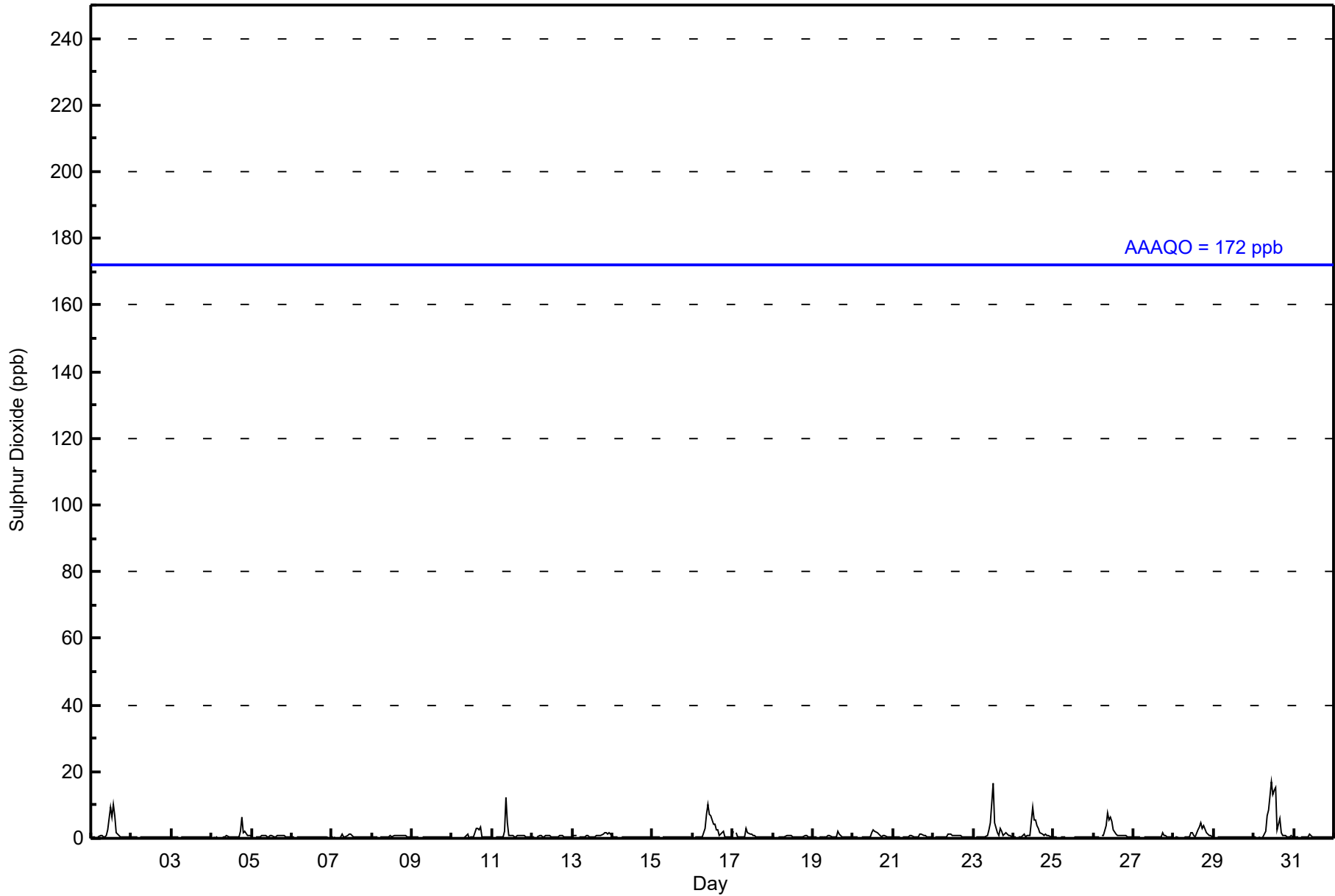
Z - zerospan C - Calibration

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort McKay South - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	703	99.15	99.15
11 - 20	6	0.85	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort McKay South - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	88	49	18	7	4	11	44	57	59	52	67	60	36	44	50	57	703
11 - 20	0	0	0	0	1	0	0	4	1	0	0	0	0	0	0	0	6
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	88	49	18	7	5	11	44	61	60	52	67	60	36	44	50	57	709

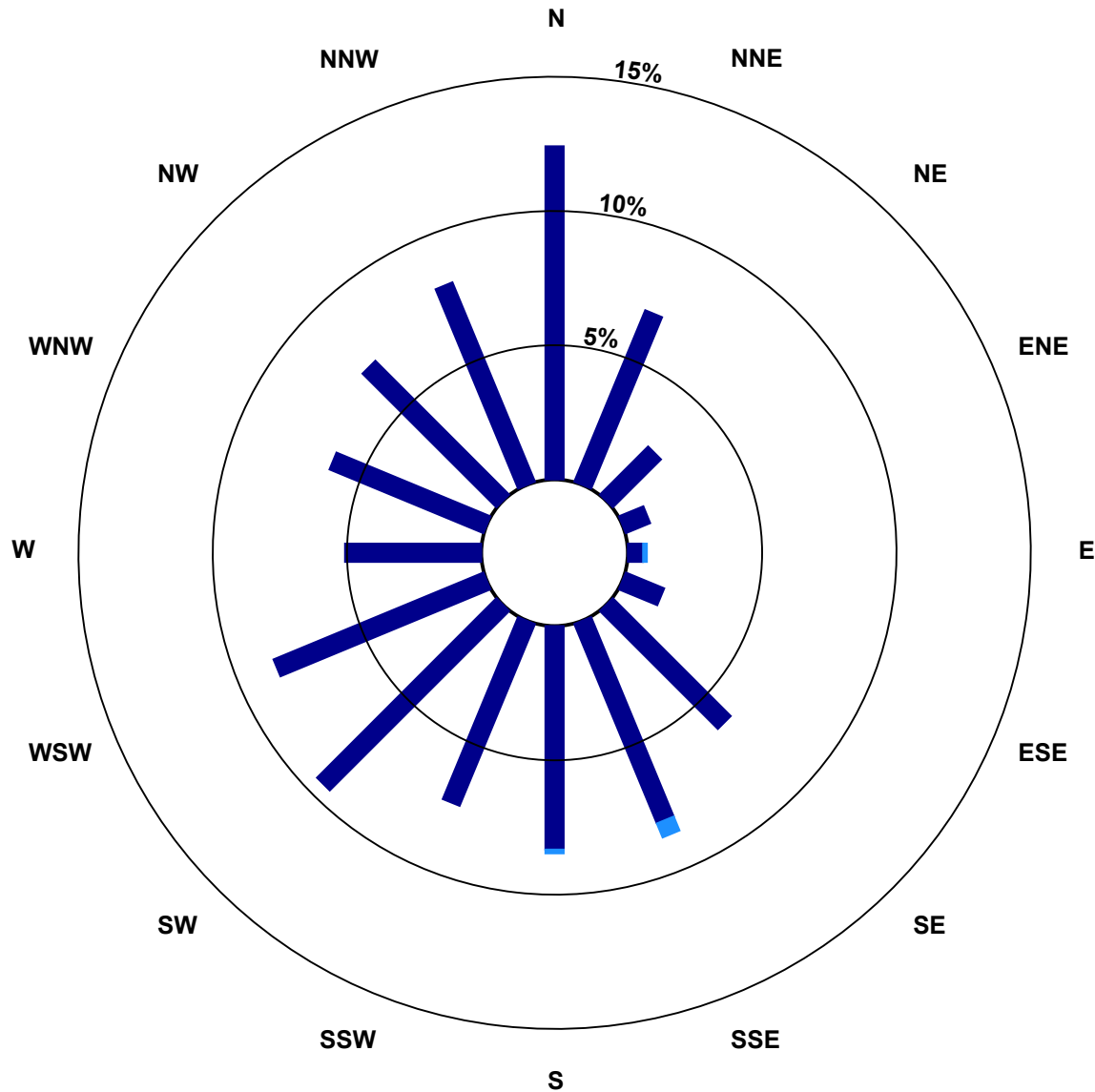
Total Number of Valid Hours: 709

Total Number of Hours: 744

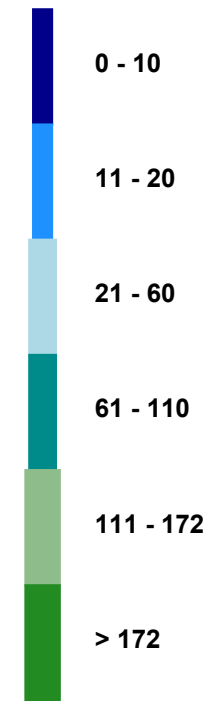


Wood Buffalo Environmental Association
Wind Rose Jul 2023

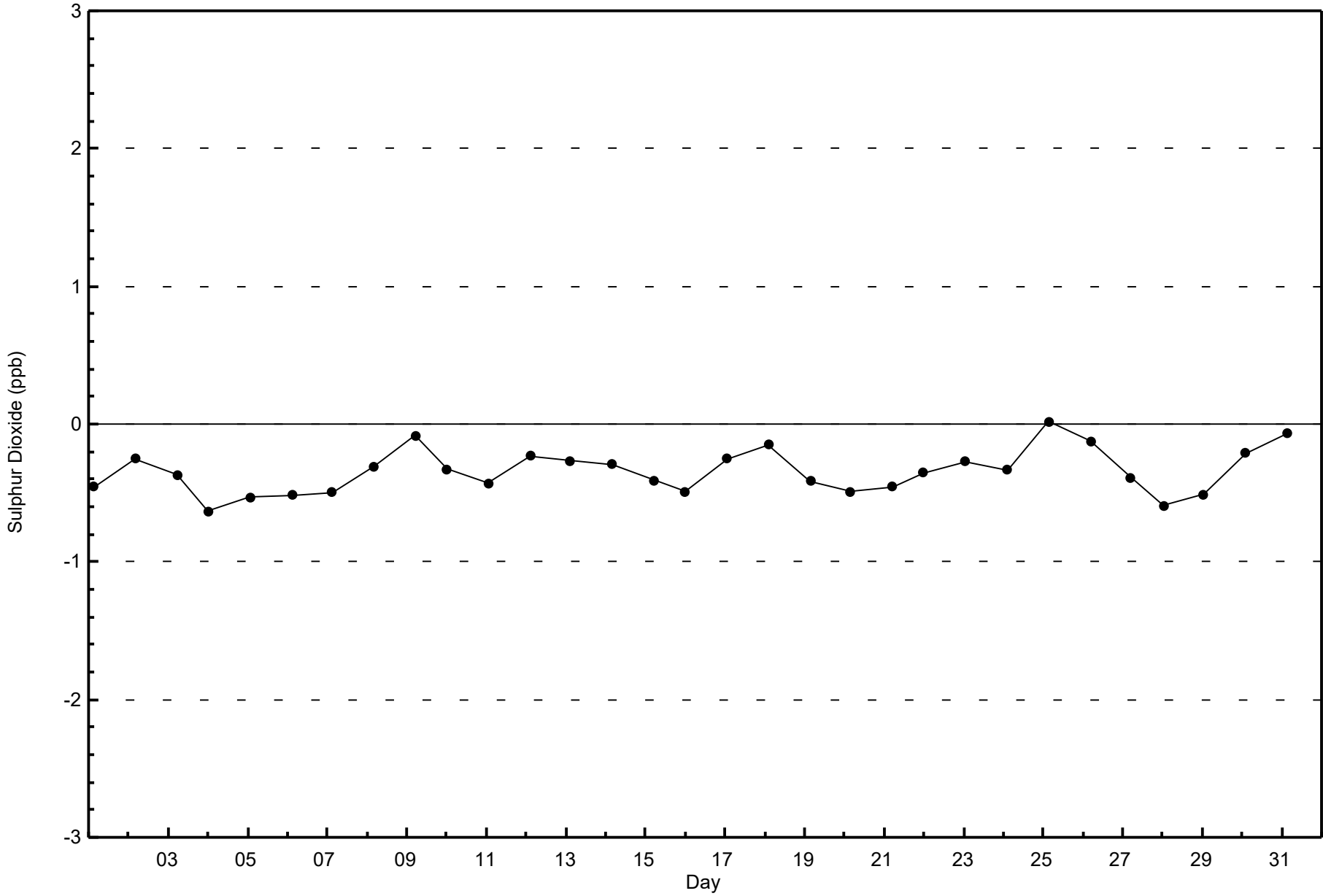
Sulphur Dioxide (SO₂) - ppb
Fort McKay South

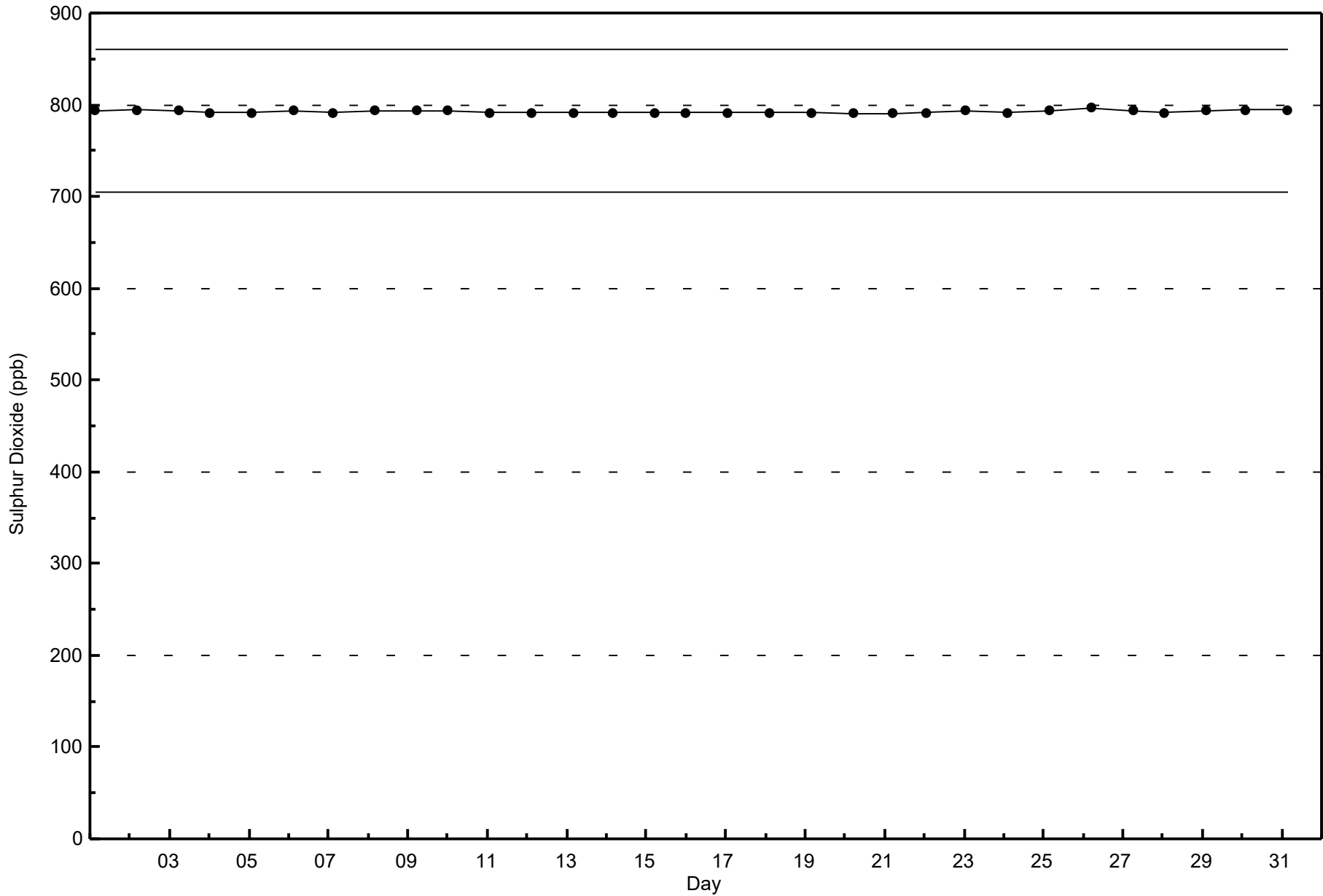


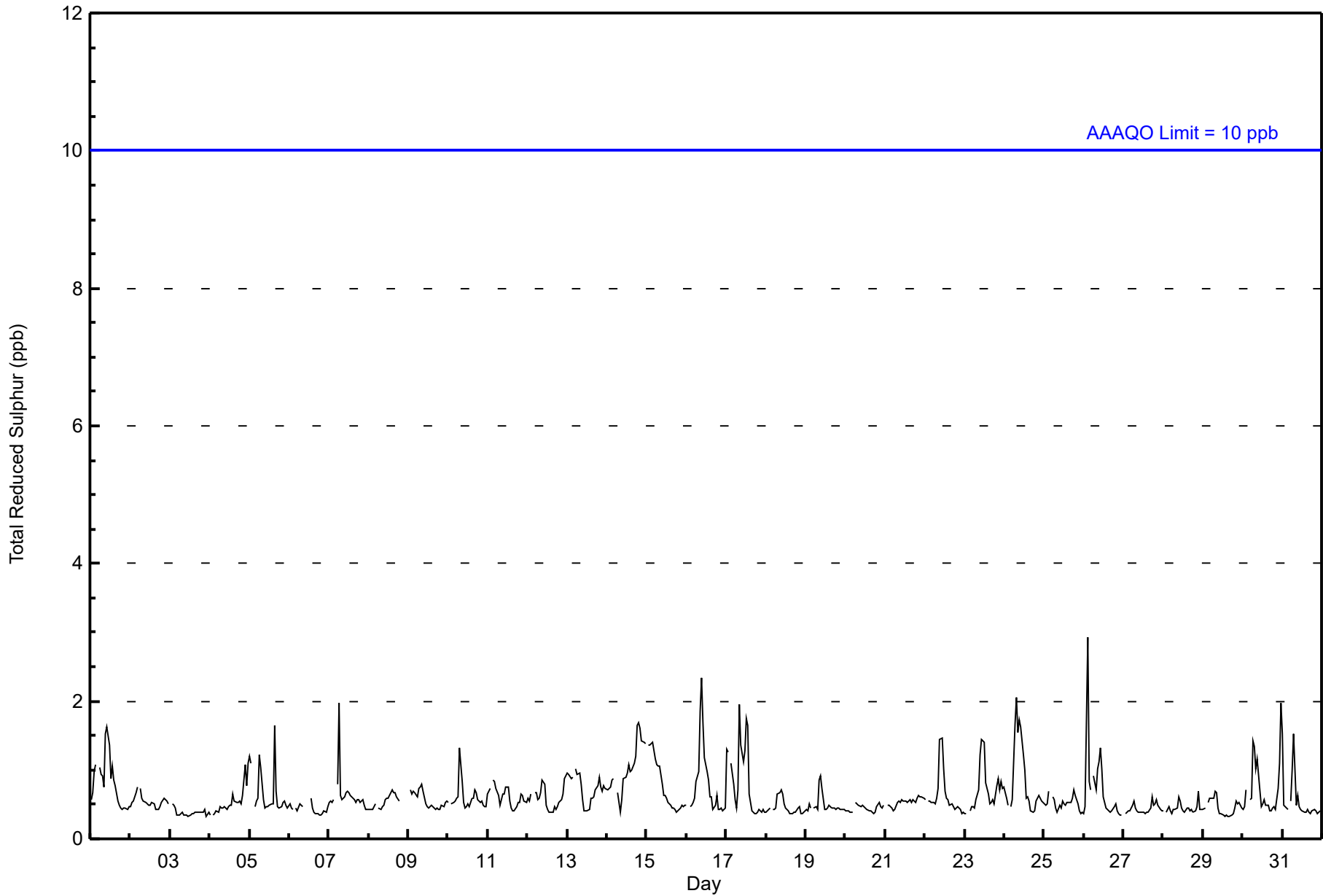
Classes (ppb)



Total Number of Valid Hours: 709









**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay South - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	703	99.86	99.86
3 - 4	1	0.14	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay South - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	84	48	18	7	5	11	44	60	60	53	66	60	33	46	51	56	702
3 - 4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	84	48	18	7	5	11	44	60	61	53	66	60	33	46	51	56	703

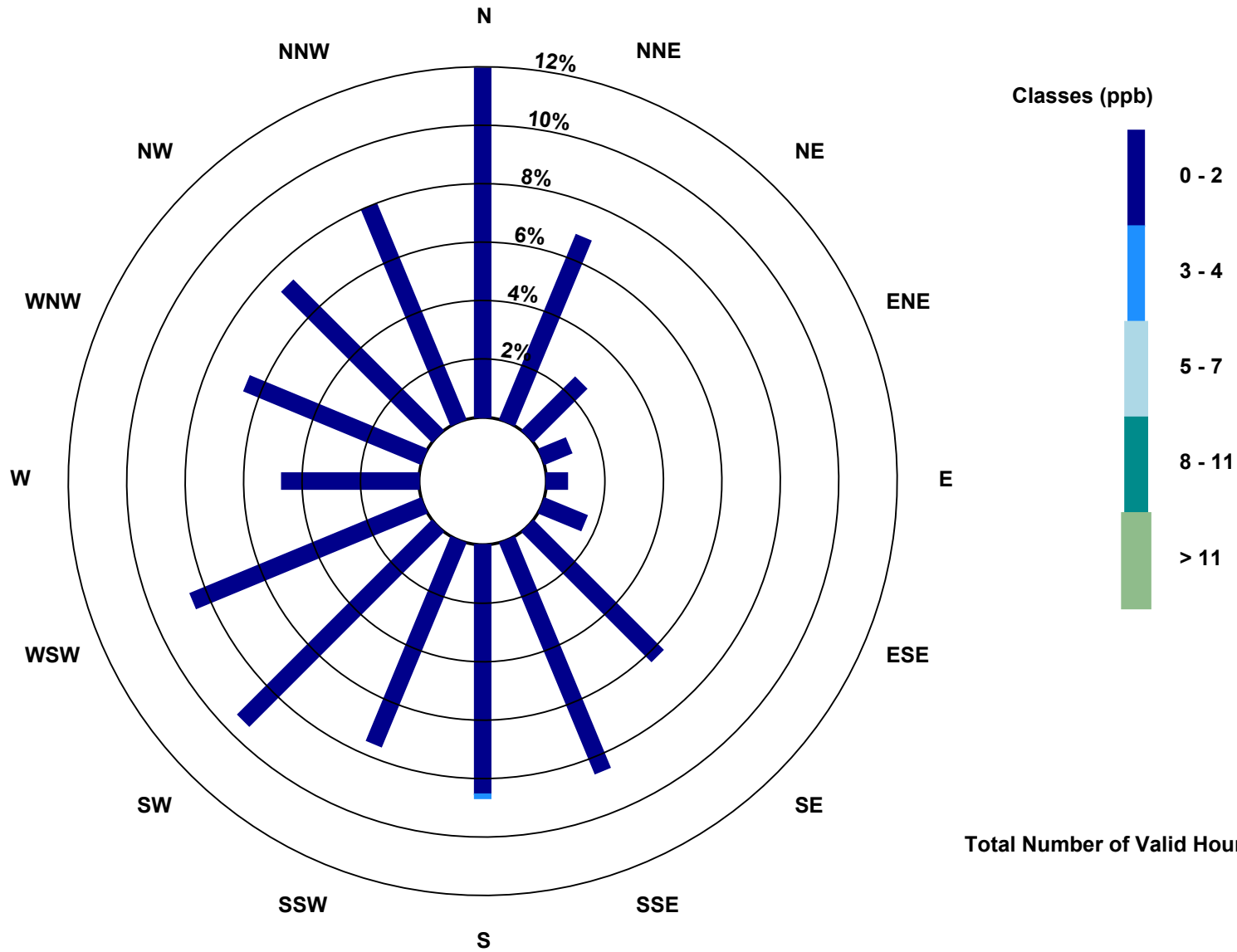
Total Number of Valid Hours: 703

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Reduced Sulphur (TRS) - ppb
Fort McKay South

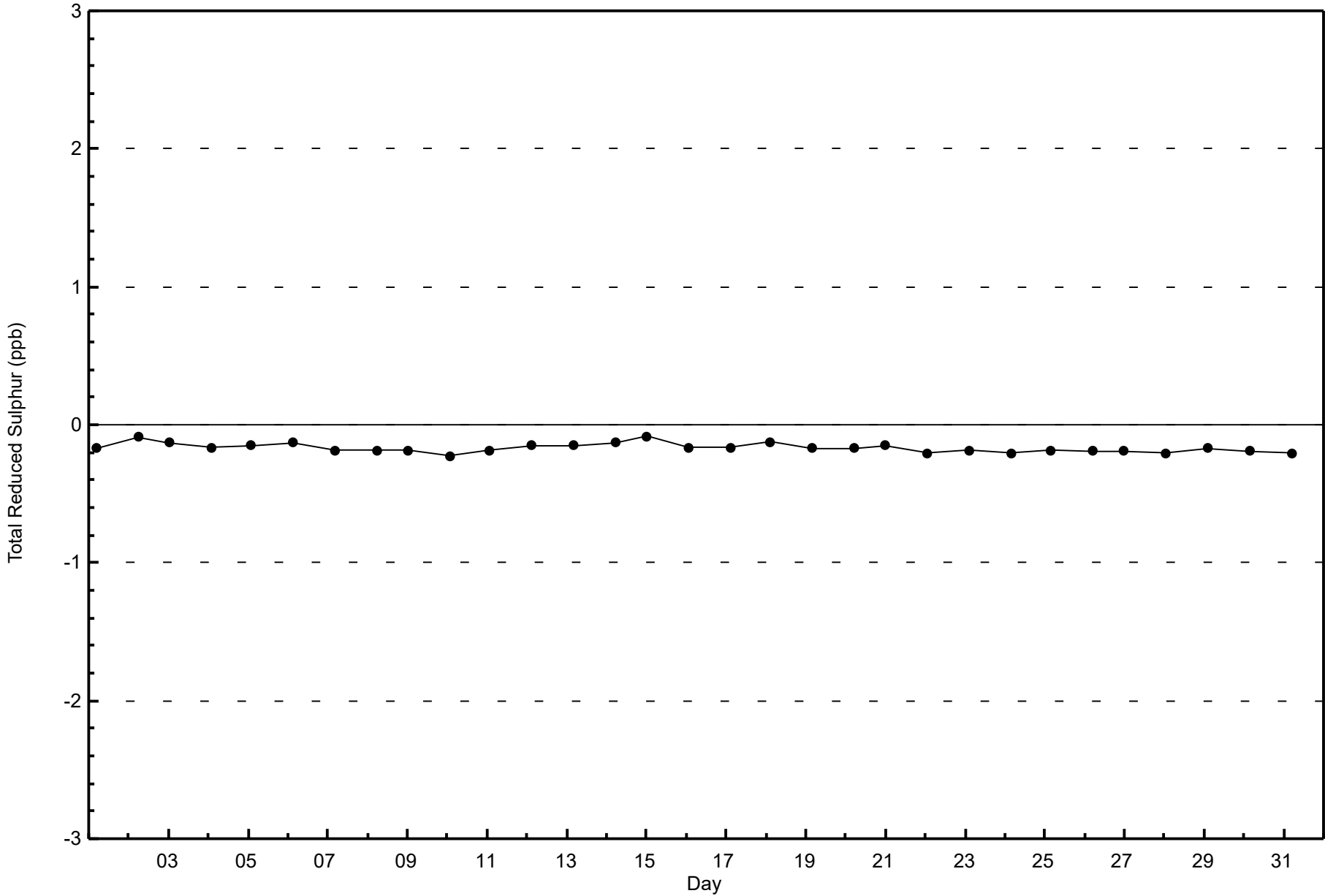


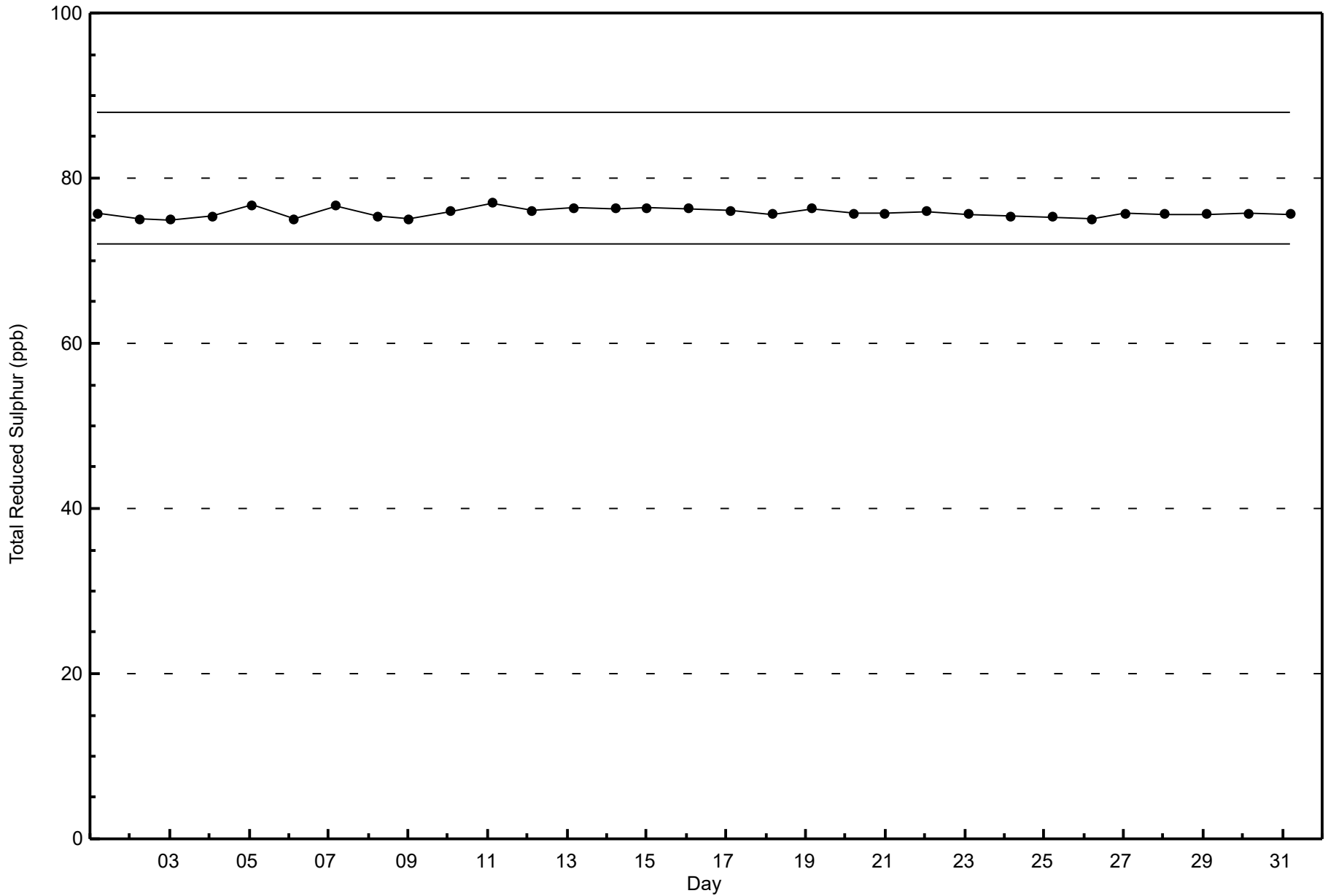
Total Number of Valid Hours: 703



Wood Buffalo Environmental Association
Zero Responses

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - July 2023







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

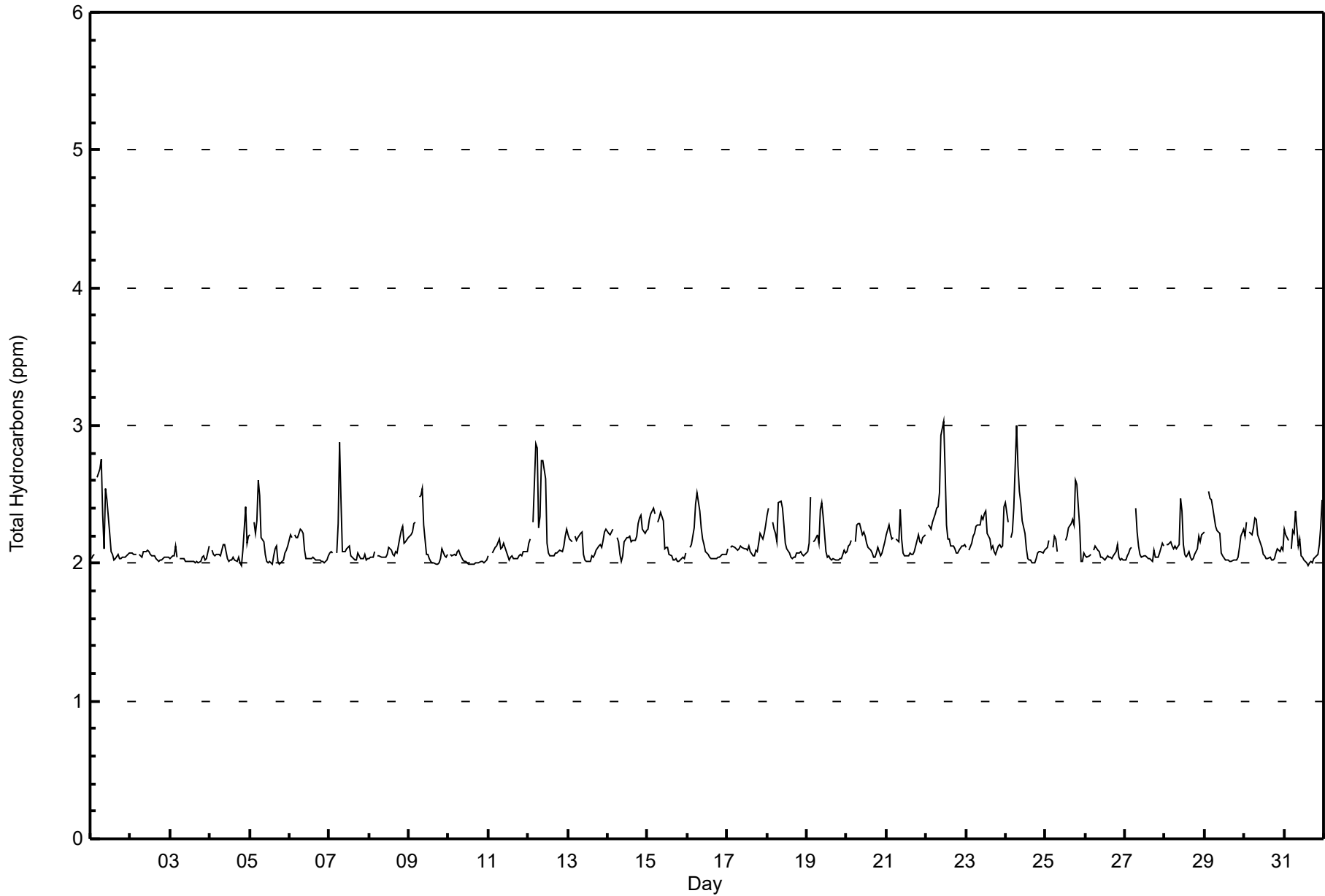
Fort McKay South - July 2023

Maximum Value: 3.0 ppm on Jul 22 11:00																				Maximum Daily Average: 2.3 ppm on Jul 22					Hours in Service: 744			
Minimum Value: 2.0 ppm on Jul 31 15:00																				Minimum Daily Average: 2.0 ppm on Jul 10					Hours of Data: 709			
Maximum Diurnal Average: 2.3 ppm at hour 7																				Minimum Diurnal Average: 2.1 ppm at hour 16					Hours of Missing Data: 35			
Monthly Average: 2.14 ppm																				Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.3 P ₉₉ = 2.7					Hours of Calibration: 35			
																									Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Jul	2.0	2.1	2.1	Z	2.6	2.7	2.8	2.3	2.1	2.5	2.5	2.2	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.8	
2-Jul	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1
3-Jul	2.0	2.1	2.0	2.1	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.0	2.1	2.1	
4-Jul	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.4	2.1	2.2	2.1	2.2	2.4	
5-Jul	2.2	Z	2.3	2.2	2.3	2.6	2.5	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.6	
6-Jul	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.3	
7-Jul	2.1	2.1	2.1	Z	2.1	2.3	2.9	2.5	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.1	2.1	2.9	
8-Jul	2.0	2.0	2.0	2.1	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.1	2.2	2.2	2.1	2.1	2.3	
9-Jul	2.2	2.2	2.2	2.3	2.3	Z	2.5	2.5	2.5	2.3	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.5	
10-Jul	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
11-Jul	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
12-Jul	2.1	2.2	Z	2.3	2.9	2.8	2.3	2.3	2.7	2.7	2.6	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.9	
13-Jul	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	
14-Jul	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.1	2.0	2.1	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	2.2	2.2	2.3	
15-Jul	2.3	2.3	2.4	2.4	2.4	Z	2.3	2.3	2.4	2.3	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.4	
16-Jul	Z	2.1	2.1	2.2	2.3	2.4	2.5	2.4	2.3	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.5	
17-Jul	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	2.2	2.2	2.2	2.3	2.1	2.1	2.3	
18-Jul	2.3	2.4	Z	2.3	2.2	2.2	2.2	2.4	2.4	2.4	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	
19-Jul	2.1	2.1	2.5	Z	2.2	2.2	2.2	2.1	2.4	2.4	2.3	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.5	
20-Jul	2.1	2.1	2.1	2.2	Z	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.3	
21-Jul	2.2	2.3	2.2	2.2	2.2	Z	2.2	2.2	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.4	
22-Jul	Z	2.3	2.3	2.2	2.3	2.4	2.4	2.4	2.5	2.9	3.0	2.7	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	3.0	
23-Jul	2.1	Z	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.2	2.4	
24-Jul	2.4	2.3	Z	2.2	2.2	2.4	3.0	2.7	2.5	2.4	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	3.0	
25-Jul	2.1	2.1	2.2	Z	2.1	2.2	2.2	2.1	C	C	C	C	2.2	2.2	2.3	2.3	2.3	2.3	2.6	2.6	2.3	2.0	2.0	2.1	2.1	2.1	2.6	
26-Jul	2.1	2.0	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
27-Jul	2.0	2.1	2.1	2.1	2.1	Z	2.4	2.2	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.4	
28-Jul	Z	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.5	2.4	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.5	
29-Jul	2.2	Z	2.5	2.5	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.5	
30-Jul	2.2	2.3	Z	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.3	
31-Jul	2.2	2.2	2.2	Z	2.1	2.2	2.2	2.4	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.3	2.5	2.1	2.1	2.5	
																								Diurnal Average				
																								Diurnal Maximum				
Z - zerospan C - Calibration																												



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Fort McKay South - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	207	29.20	29.20
2.1 - 3.0	502	70.80	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
Fort McKay South - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	35	17	6	1	1	1	14	19	20	16	12	16	16	15	8	10	207
2.1 - 3.0	53	32	12	6	4	10	30	42	40	36	55	44	20	29	42	47	502
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	88	49	18	7	5	11	44	61	60	52	67	60	36	44	50	57	709

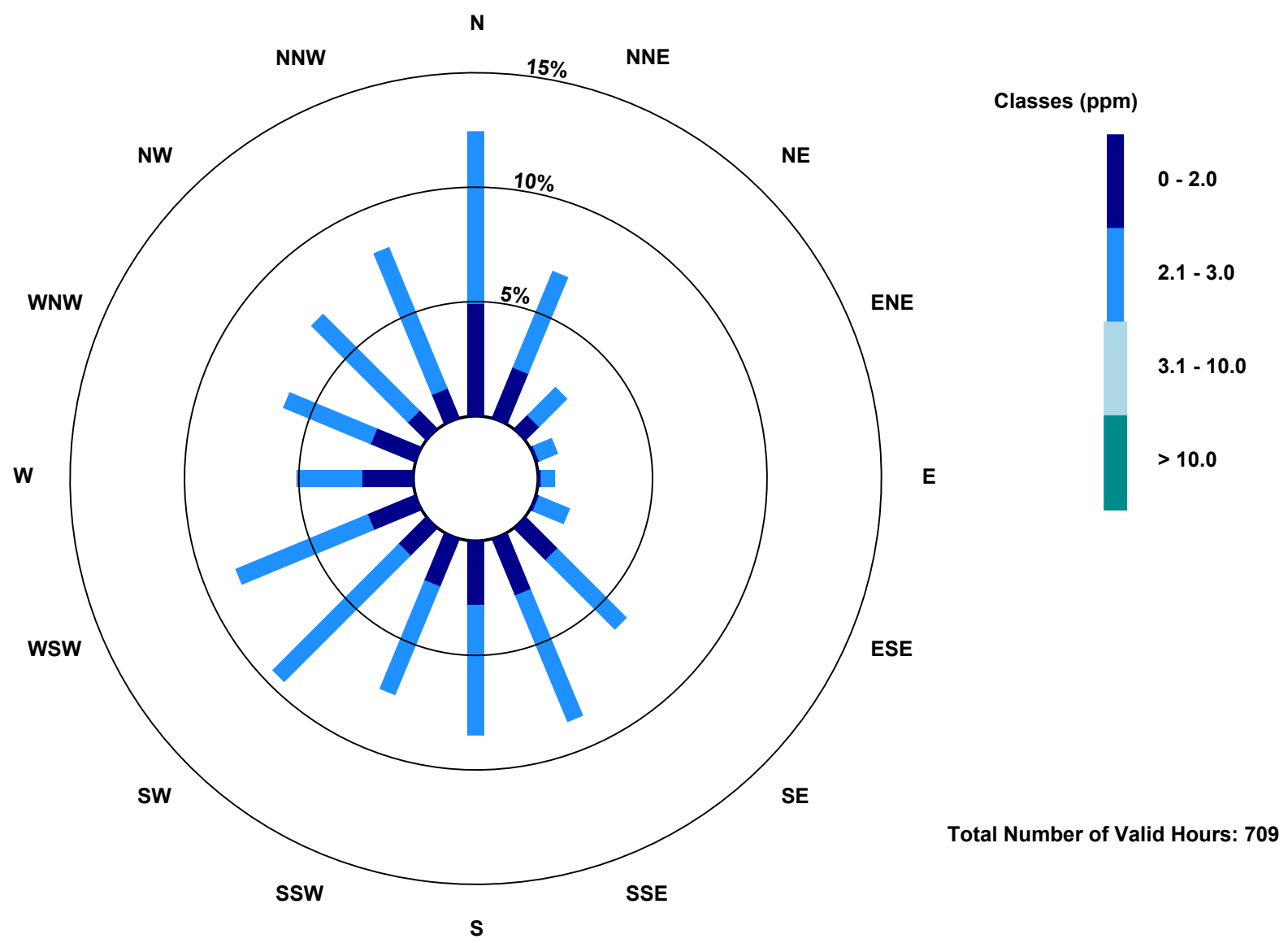
Total Number of Valid Hours: 709

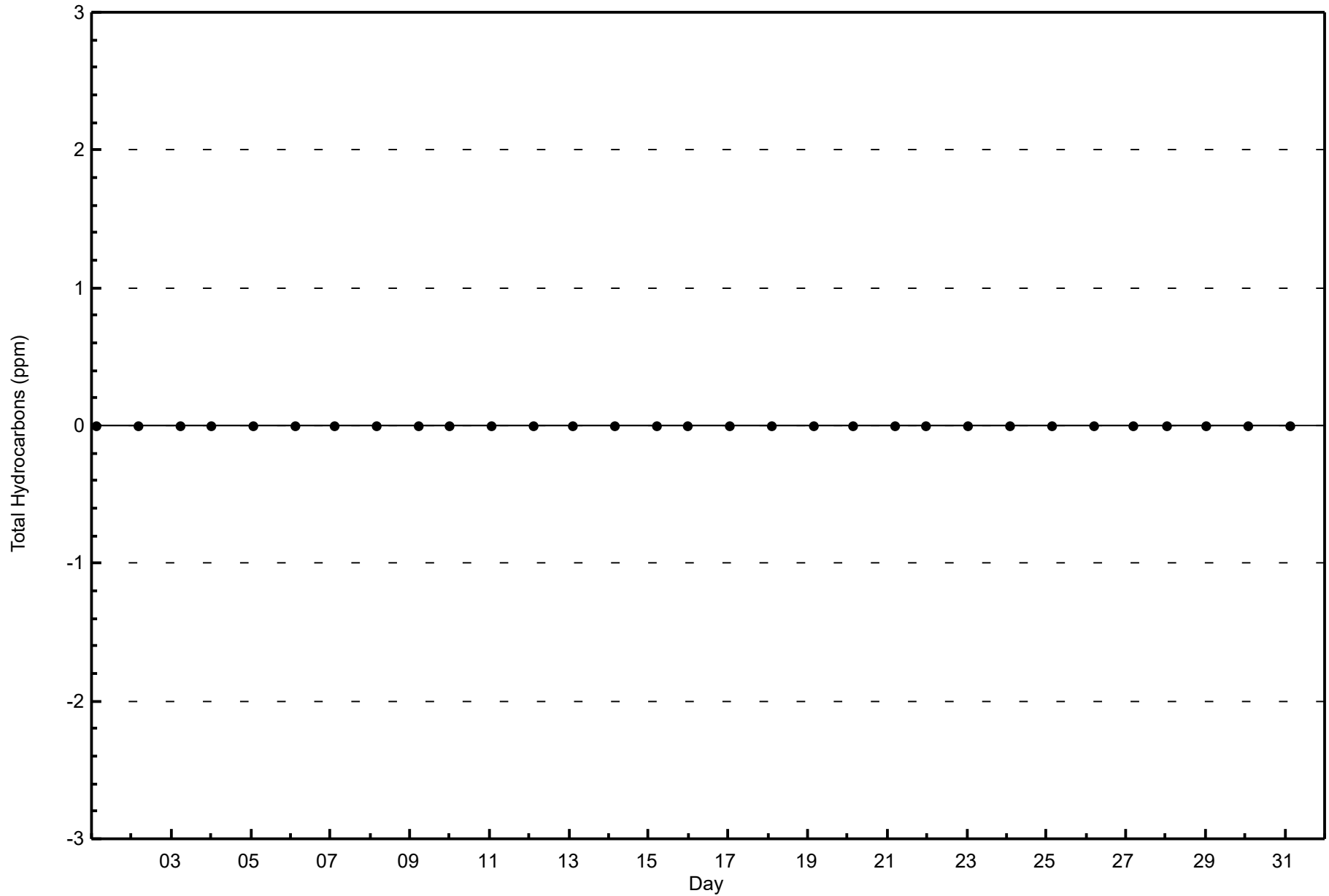
Total Number of Hours: 744

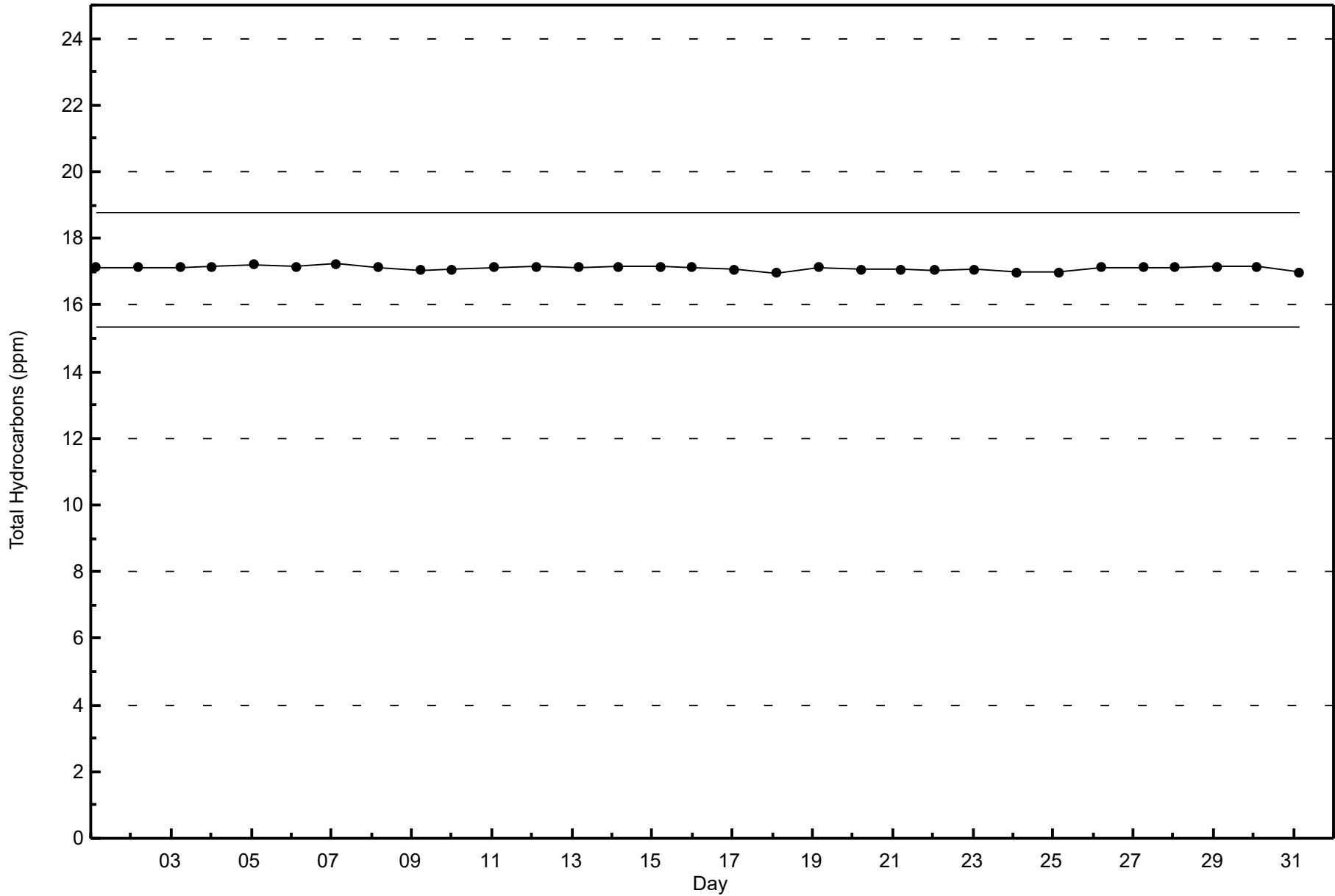


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Fort McKay South







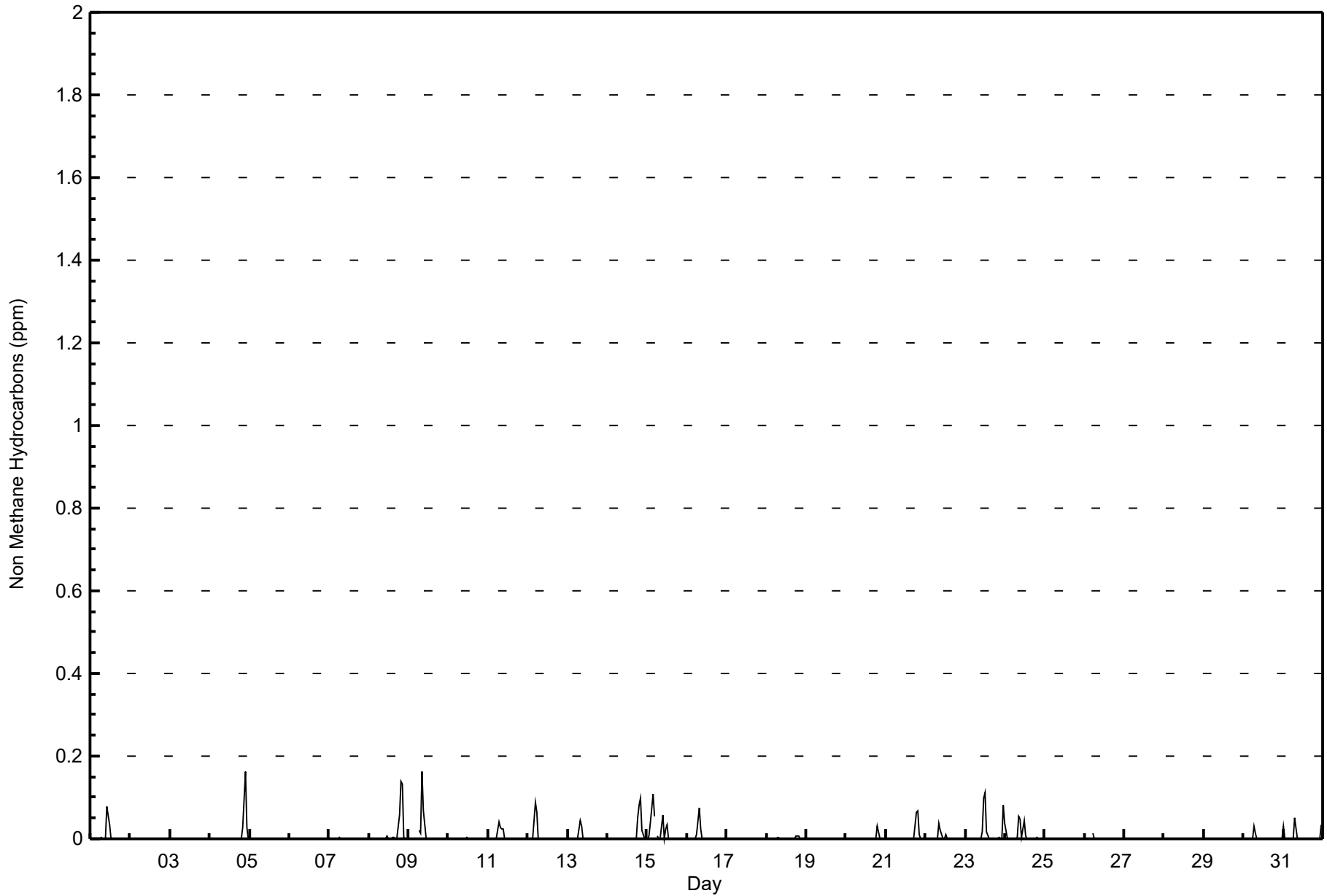


Maximum Value: 0.164 ppm on Jul 4 22:00		Maximum Daily Average: 0.015 ppm on Jul 8		Hours in Service: 744																								
Minimum Value: 0.000 ppm on Jul 1 01:00		Minimum Daily Average: 0.000 ppm on Jul 2		Hours of Data: 709																								
Maximum Diurnal Average: 0.011 ppm at hour 9		Minimum Diurnal Average: 0.000 ppm at hour 17		Hours of Missing Data: 35																								
Monthly Average: 0.004 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.1		Hours of Calibration: 35																								
				Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Jul	0.000	0.000	0.000	Z	0.000	0.000	0.004	0.000	0.000	0.000	0.080	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.080		
2-Jul	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
3-Jul	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
4-Jul	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	0.028	0.164	0.026	0.000	0.009	0.164
5-Jul	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
6-Jul	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7-Jul	0.000	0.000	0.000	Z	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8-Jul	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.005	0.005	0.000	0.000	0.057	0.138	0.132	0.002	0.000	0.000	0.015	0.138		
9-Jul	0.000	0.000	0.000	0.000	0.000	Z	0.022	0.014	0.164	0.068	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.164		
10-Jul	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
11-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.039	0.027	0.022	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.039		
12-Jul	0.000	0.000	Z	0.000	0.087	0.063	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.087		
13-Jul	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.043	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.043	0.043		
14-Jul	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	0.052	0.083	0.097	0.020	0.000	0.002	0.011	0.097		
15-Jul	0.000	0.007	0.036	0.108	0.055	Z	0.008	0.000	0.000	0.056	0.000	0.023	0.034	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.108			
16-Jul	Z	0.000	0.000	0.000	0.000	0.000	0.010	0.076	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.076			
17-Jul	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
18-Jul	0.000	0.000	Z	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	0.000	0.007	0.006	0.000	0.000	0.000	0.001	0.007	0.007		
19-Jul	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20-Jul	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	0.030	0.000	0.000	0.000	0.001	0.030			
21-Jul	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	0.065	0.068	0.011	0.000	0.000	0.000	0.006	0.068			
22-Jul	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.037	0.019	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.037			
23-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.018	0.100	0.112	0.016	0.000	0.000	0.000	0.001	0.000	0.000	0.003	0.000	0.082	0.014	0.112			
24-Jul	0.037	0.000	Z	0.000	0.000	0.000	0.000	0.004	0.056	0.048	0.004	0.045	0.008	0.000	0.000	0.000	0.000	0.000	0.002	0.002	0.000	0.000	0.000	0.009	0.056			
25-Jul	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26-Jul	0.000	0.000	0.000	0.000	Z	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.014			
27-Jul	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28-Jul	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
29-Jul	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
30-Jul	0.000	0.000	Z	0.000	0.000	0.000	0.031	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.031			
31-Jul	0.031	0.000	0.000	Z	0.000	0.000	0.000	0.052	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.035	0.005	0.052			
		0.003	0.000	0.001	0.004	0.005	0.003	0.004	0.008	0.011	0.007	0.003	0.007	0.005	0.001	0.000	0.000	0.000	0.000	0.006	0.011	0.009	0.006	0.001	0.004	Diurnal Average		
		0.037	0.007	0.036	0.108	0.087	0.063	0.039	0.076	0.164	0.068	0.080	0.100	0.112	0.016	0.005	0.005	0.000	0.001	0.065	0.138	0.132	0.164	0.026	0.082	Diurnal Maximum		
Z - zerospan		C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay South - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay South - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	648	91.40	91.40
0.006 - 0.05	40	5.64	97.04
0.06 - 0.1	19	2.68	99.72
> 0.1	2	0.28	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay South - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	80	44	17	5	3	9	38	56	53	51	63	59	32	39	47	52	648
0.006 - 0.05	4	4	0	1	1	1	4	4	6	1	3	0	3	3	2	3	40
0.06 - 0.1	3	1	1	1	1	1	2	1	0	0	1	1	1	2	1	2	19
> 0.1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
Totals	88	49	18	7	5	11	44	61	60	52	67	60	36	44	50	57	709

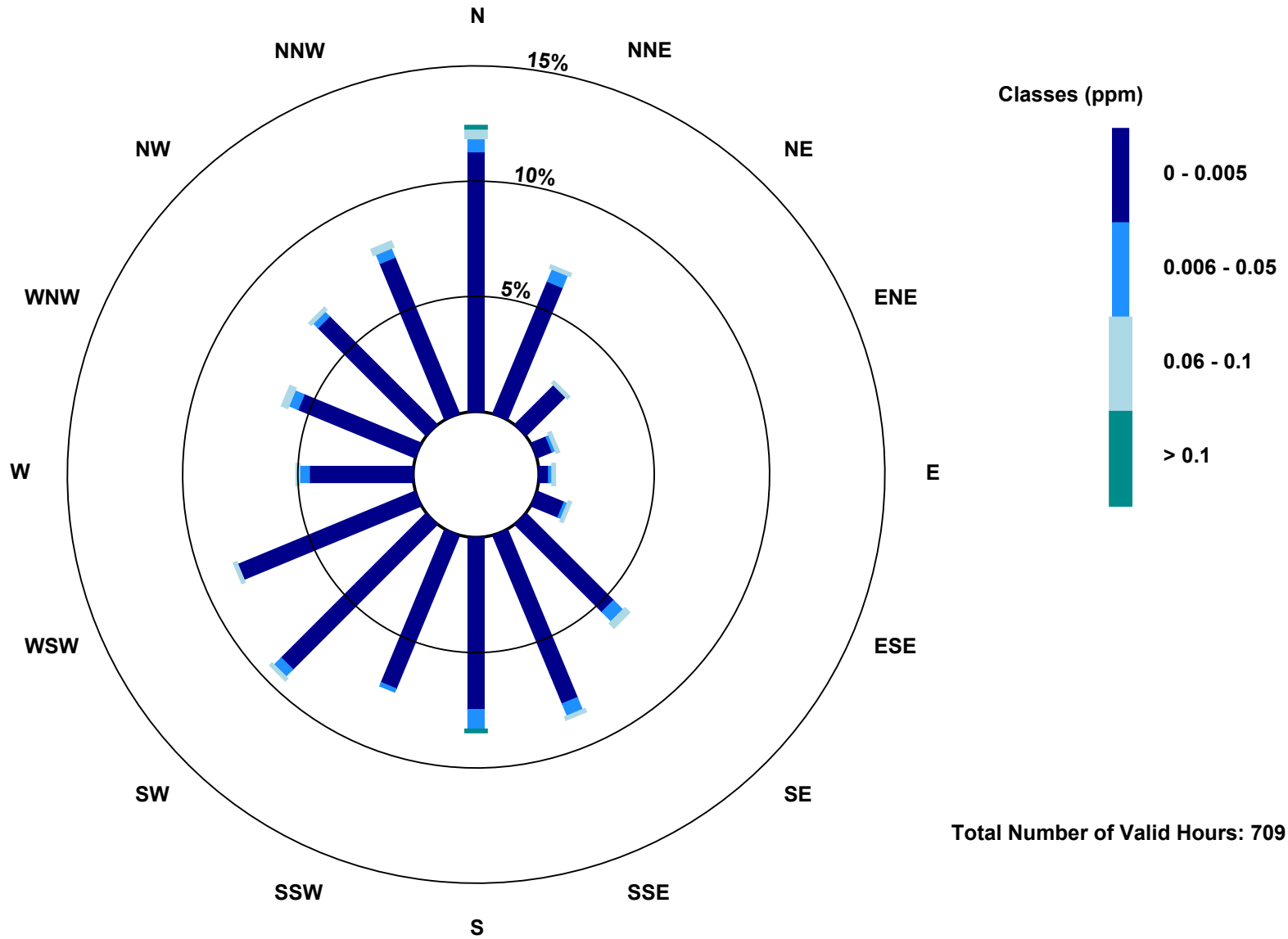
Total Number of Valid Hours: 709

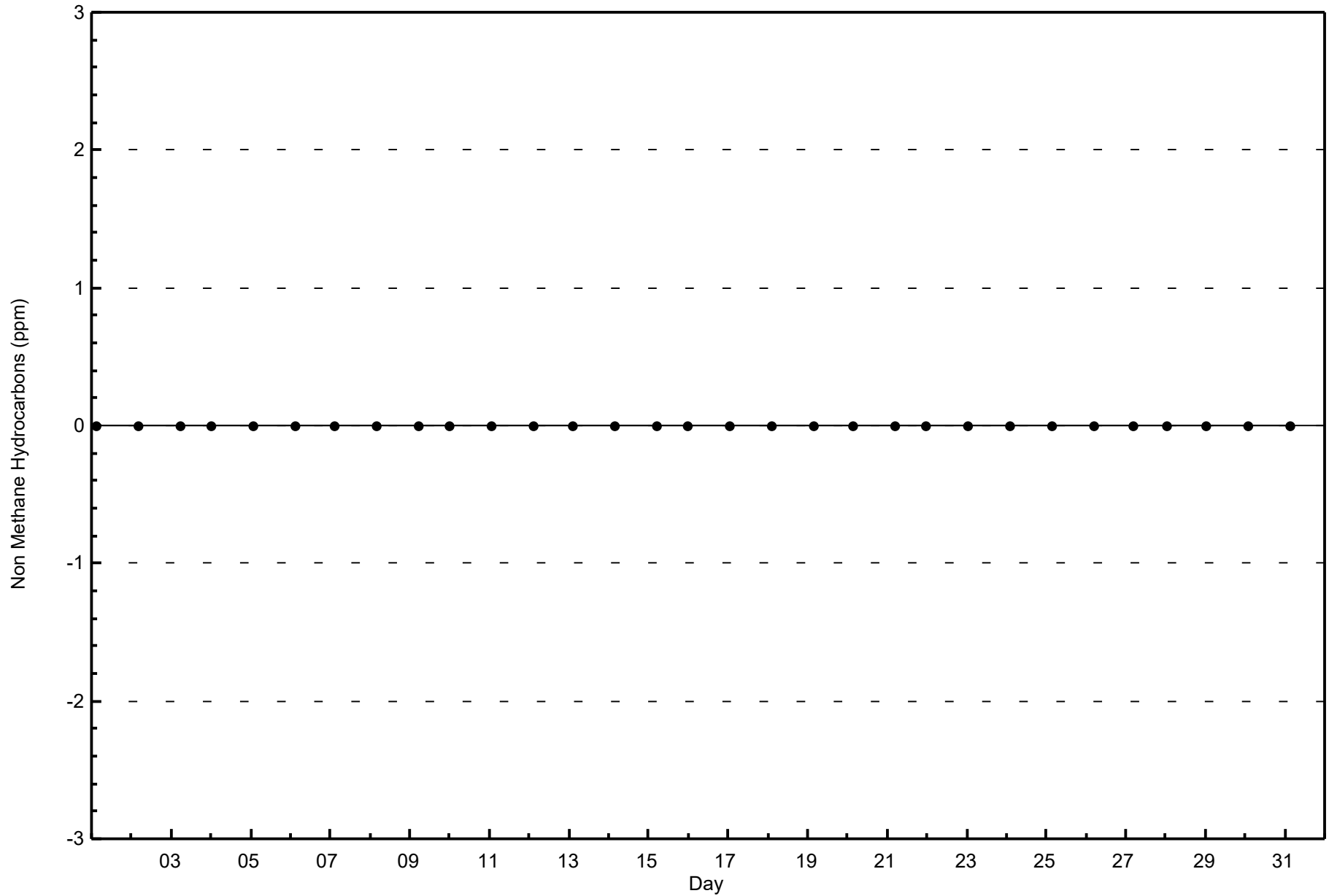
Total Number of Hours: 744

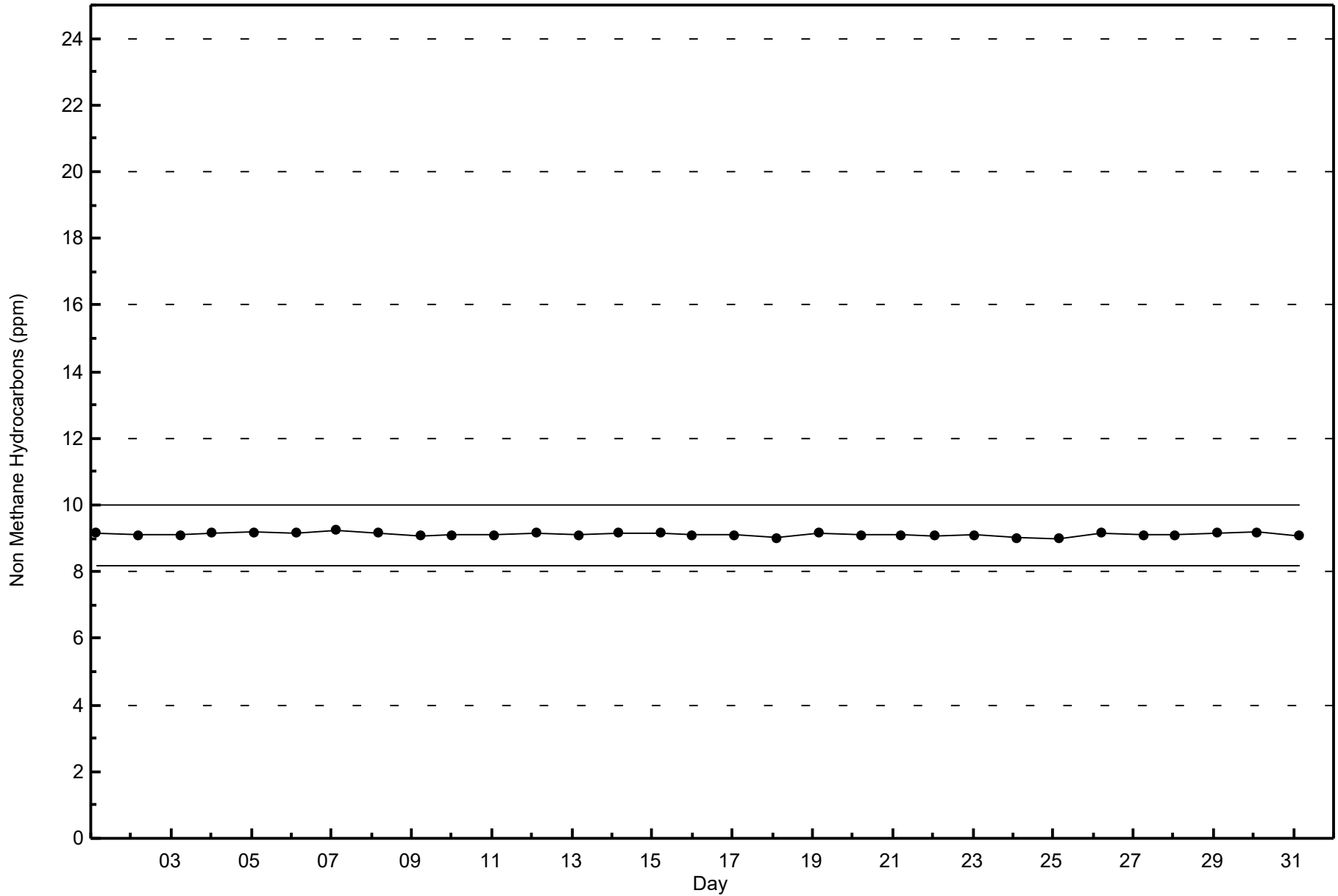


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay South









Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 3.0 ppm on Jul 22 11:00	Maximum Daily Average: 2.3 ppm on Jul 22		Hours of Data:	709
Minimum Value: 2.0 ppm on Jul 31 15:00	Minimum Daily Average: 2.0 ppm on Jul 10		Hours of Missing Data:	35
Maximum Diurnal Average: 2.3 ppm at hour 7	Minimum Diurnal Average: 2.1 ppm at hour 16		Hours of Calibration:	35
Monthly Average: 2.14 ppm	Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.3 P ₉₉ = 2.7		Percent Operational Time:	100.0

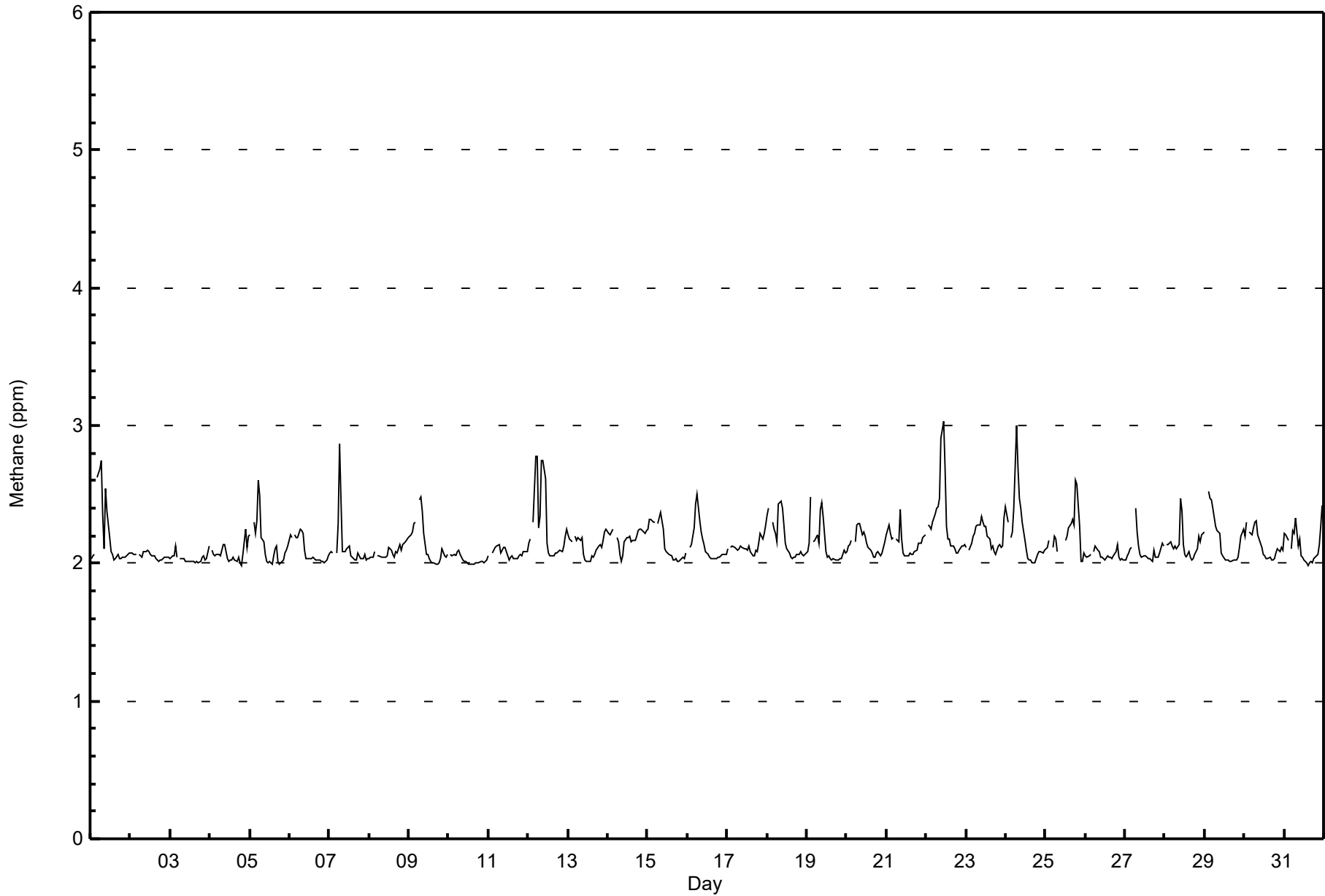
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	2.0	2.1	2.1	Z	2.6	2.7	2.8	2.3	2.1	2.5	2.4	2.2	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2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

Z - zerospan C - Calibration



Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Fort McKay South - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Fort McKay South - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	208	29.34	29.34
2.1 - 3.0	501	70.66	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



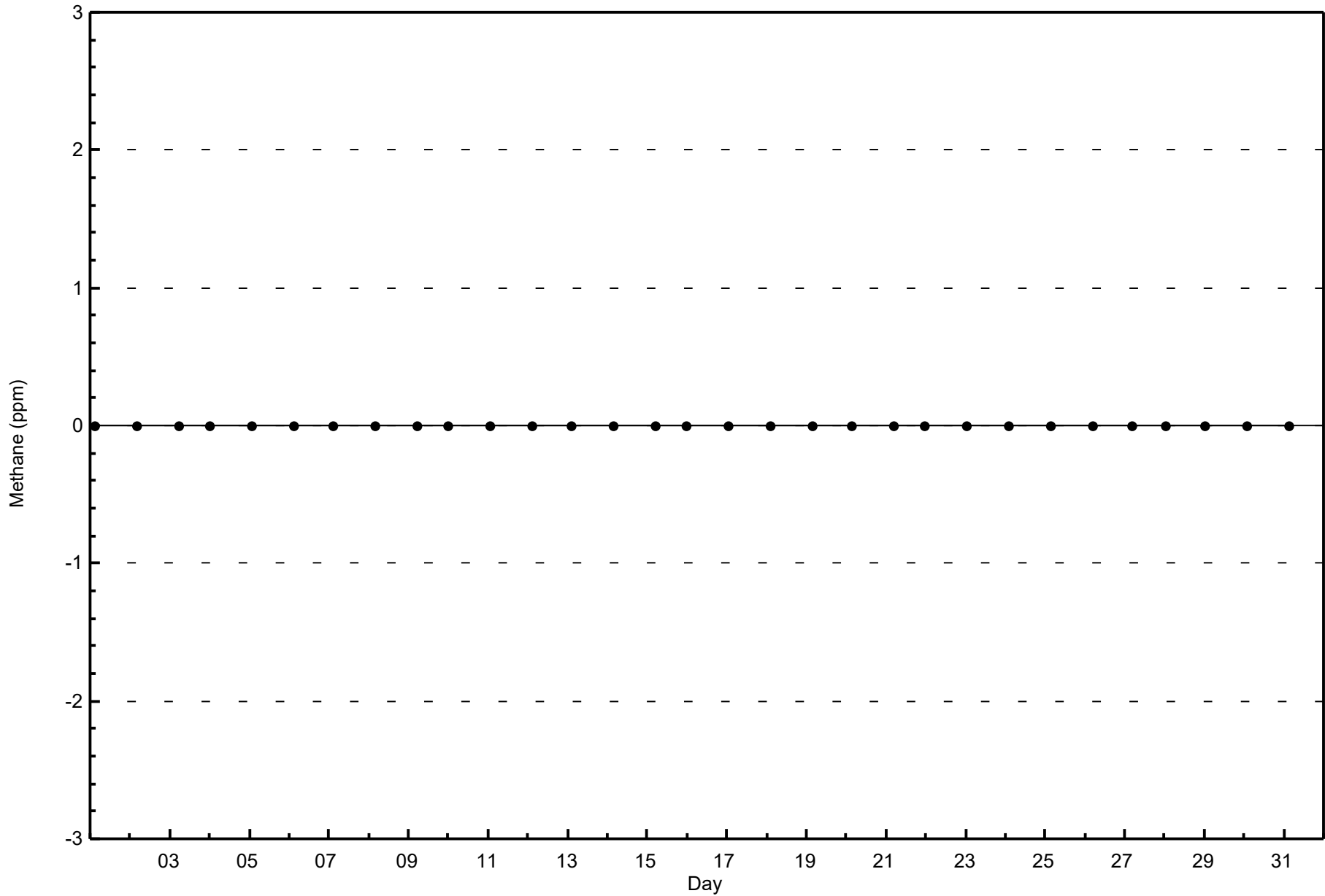
**Wood Buffalo Environmental Association
Frequency Distribution**

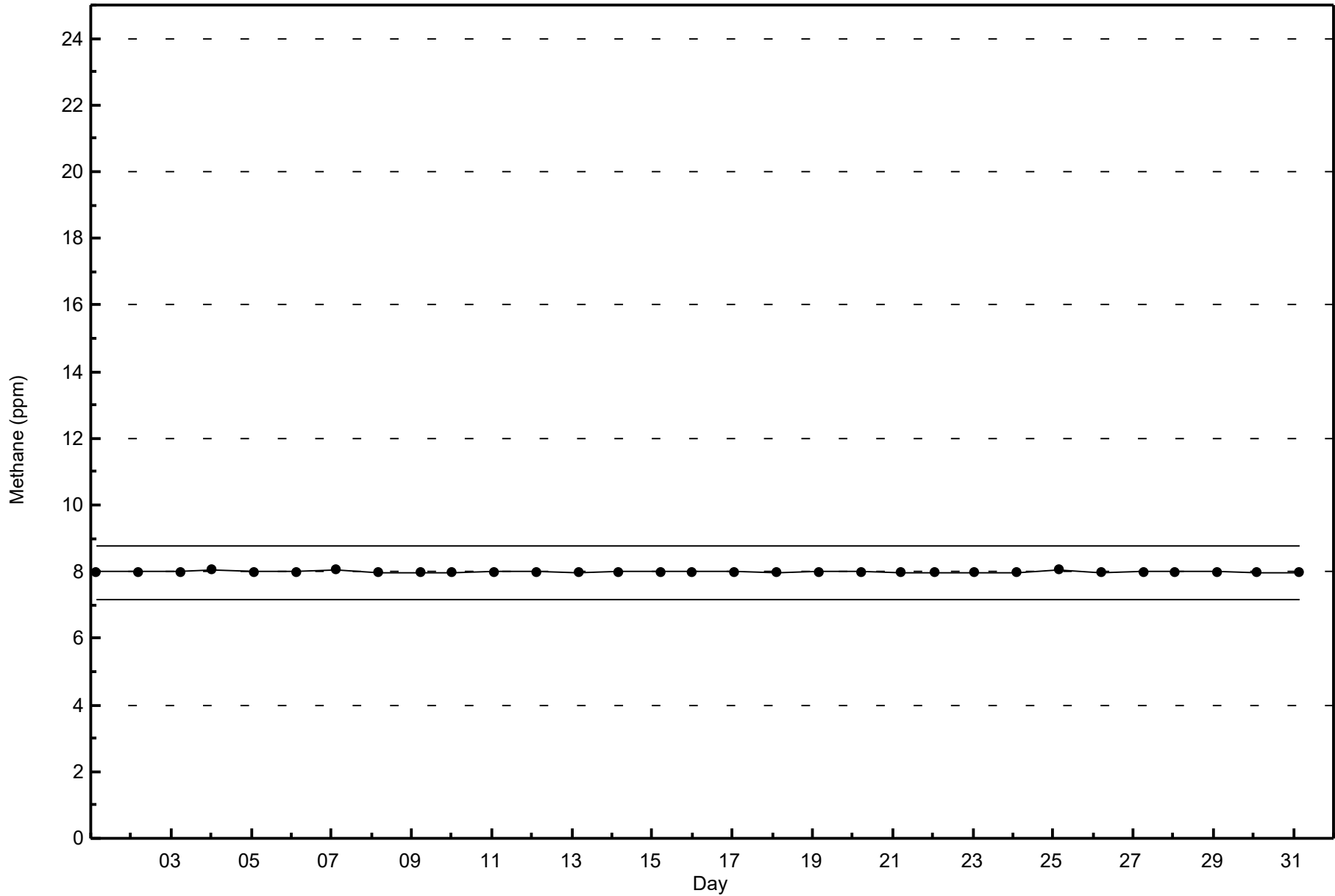
**Methane (CH₄) - ppm
Fort McKay South - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	35	17	6	1	1	1	14	19	20	16	12	16	16	15	8	11	208
2.1 - 3.0	53	32	12	6	4	10	30	42	40	36	55	44	20	29	42	46	501
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	88	49	18	7	5	11	44	61	60	52	67	60	36	44	50	57	709

Total Number of Valid Hours: 709

Total Number of Hours: 744







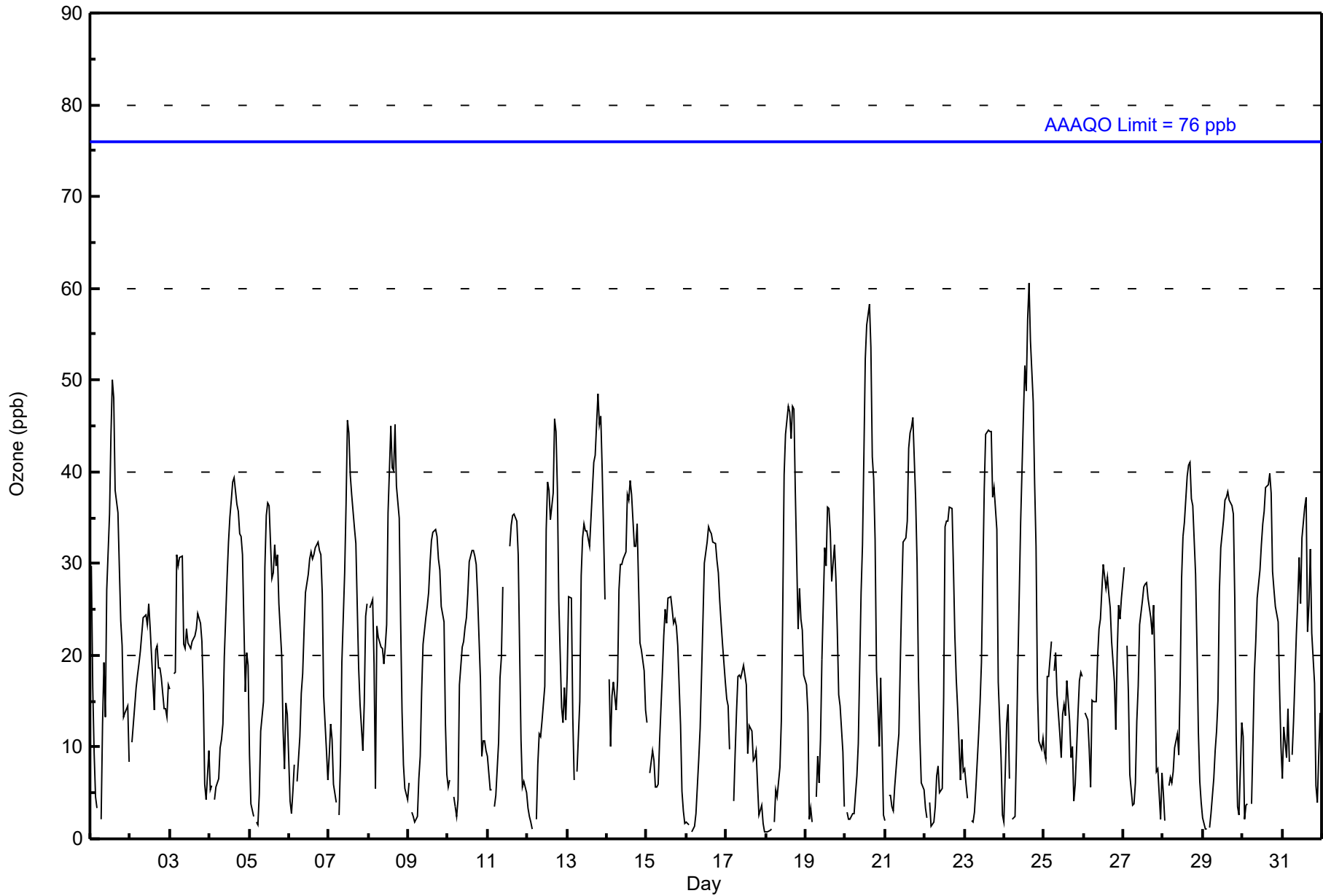
Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Fort McKay South - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		744																																									
Maximum Value: 60.5 ppb on Jul 24 16:00		Maximum Daily Average: 30.6 ppb on Jul 13				Hours of Data:		710																																									
Minimum Value: 0.8 ppb on Jul 18 02:00		Minimum Daily Average: 10.8 ppb on Jul 17				Hours of Missing Data:		34																																									
Maximum Diurnal Average: 35.0 ppb at hour 15		Minimum Diurnal Average: 6.8 ppb at hour 5				Hours of Calibration:		34																																									
Monthly Average: 20.04 ppb		Percentiles: P ₁ = 1.0 P ₁₀ = 3.7 Q ₁ = 9.0 Median = 18.3 Q ₃ = 30.4 P ₉₀ = 37.5 P ₉₉ = 51.4				Percent Operational Time:		100.0																																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	29.8	16.5	9.3	4.6	3.3	Z	2.1	12.5	19.3	13.2	27.2	35.5	43.9	50.0	48.0	38.1	35.6	29.6	23.8	21.1	13.3	13.7	14.5	8.4	22.3	50.0																							
2-Jul	Z	10.5	12.5	16.5	17.8	19.1	20.4	22.3	24.1	24.4	23.4	25.7	23.0	20.0	14.0	20.6	21.1	18.7	18.7	17.5	14.2	14.2	13.2	16.8	18.6	25.7																							
3-Jul	16.3	Z	17.9	18.2	30.9	29.7	30.7	30.8	21.3	20.8	22.9	21.3	20.8	21.5	21.8	22.1	22.9	24.6	23.5	21.6	15.7	5.9	4.3	9.6	20.7	30.9																							
4-Jul	5.3	5.7	Z	4.3	5.7	6.5	9.9	10.8	12.5	19.9	28.5	32.4	35.1	36.9	39.0	39.3	36.4	35.7	33.2	32.9	31.0	16.0	20.2	18.9	22.4	39.3																							
5-Jul	9.1	3.8	2.4	Z	1.9	1.5	4.9	11.8	14.9	29.6	35.3	36.7	36.3	28.3	28.9	32.0	29.8	31.0	25.6	20.0	11.9	7.6	14.8	13.6	18.8	36.7																							
6-Jul	4.0	2.8	5.2	8.0	Z	6.2	11.2	15.9	18.0	22.8	26.9	28.8	30.5	31.3	30.6	31.0	31.7	32.4	31.4	31.0	26.6	15.6	9.6	6.3	19.9	32.4																							
7-Jul	9.2	12.5	10.8	6.0	3.9	Z	2.6	8.4	19.2	28.9	36.4	45.7	44.2	39.7	37.5	33.9	32.1	25.3	18.6	14.6	9.7	14.8	24.3	25.6	21.9	45.7																							
8-Jul	Z	25.1	26.0	19.1	5.5	23.2	21.9	20.9	20.8	19.1	20.9	23.3	35.6	44.9	40.4	40.1	45.2	38.4	34.9	23.6	13.8	8.1	5.4	4.2	24.4	45.2																							
9-Jul	6.1	Z	2.9	2.4	1.8	2.5	6.5	9.0	15.9	21.3	24.2	25.3	26.8	30.0	32.4	33.4	33.7	32.9	30.6	29.3	25.3	23.6	12.4	7.0	18.9	33.7																							
10-Jul	5.6	6.4	Z	4.5	3.5	2.5	4.2	16.8	20.8	21.5	23.0	24.1	26.7	30.2	31.4	31.4	30.8	29.9	26.4	17.4	9.0	10.7	10.7	9.6	17.3	31.4																							
11-Jul	9.0	5.4	5.3	Z	3.4	4.8	10.6	17.5	19.9	27.5	C	C	C	31.8	34.2	35.3	35.4	34.6	30.9	20.8	10.9	5.6	6.2	5.1	17.7	35.4																							
12-Jul	3.4	2.4	1.8	1.0	Z	2.2	8.1	11.4	11.1	12.8	16.7	33.8	38.8	38.0	34.8	37.6	45.7	44.3	38.1	25.9	14.4	12.6	16.4	13.0	20.2	45.7																							
13-Jul	17.8	26.5	26.3	13.3	6.4	Z	7.4	15.0	28.7	32.7	34.3	33.6	33.6	31.9	34.9	38.0	41.1	41.8	48.4	45.1	46.0	40.3	33.5	26.0	30.6	48.4																							
14-Jul	Z	17.3	10.1	15.6	17.1	14.0	17.2	27.2	30.0	29.9	30.6	31.3	37.6	37.0	39.0	37.5	31.8	31.9	34.4	27.6	21.3	20.6	18.4	14.0	25.7	39.0																							
15-Jul	12.6	Z	7.2	9.7	8.6	5.6	5.7	6.0	10.6	18.0	22.0	25.0	23.5	26.2	26.4	25.1	23.5	23.9	33.2	21.1	12.3	5.2	3.0	1.7	15.1	26.4																							
16-Jul	1.9	1.6	Z	0.8	1.0	1.3	2.7	8.7	12.0	17.9	23.7	30.1	32.4	34.0	33.5	33.2	32.3	32.1	30.4	28.9	26.0	23.4	21.3	17.0	19.4	34.0																							
17-Jul	15.2	14.5	9.7	Z	4.2	9.4	13.9	17.7	17.9	17.6	18.9	17.9	16.8	9.3	12.4	11.7	8.5	8.8	9.6	6.0	2.6	3.7	1.8	0.8	10.8	18.9																							
18-Jul	0.8	0.8	0.9	1.1	Z	1.8	5.4	4.6	7.7	12.8	24.7	39.7	44.1	47.1	46.5	43.6	47.2	46.8	37.8	22.9	27.4	24.0	22.7	17.9	23.0	47.2																							
19-Jul	16.8	13.7	2.2	3.4	1.9	Z	4.6	8.9	6.1	10.8	19.5	31.7	29.8	36.2	36.1	33.4	28.1	32.1	28.3	22.7	15.6	14.4	9.4	3.6	17.8	36.2																							
20-Jul	Z	2.9	2.1	2.2	2.8	2.7	4.9	6.9	10.4	26.8	32.0	41.8	52.3	56.0	58.2	53.6	41.7	39.2	32.7	18.4	10.1	17.5	10.6	2.6	23.0	58.2																							
21-Jul	2.0	Z	4.8	4.7	3.6	3.0	5.7	9.6	11.4	19.1	26.3	32.3	32.9	34.6	42.6	44.2	44.9	45.9	37.0	30.0	17.7	10.9	6.0	5.4	20.6	45.9																							
22-Jul	3.4	2.2	Z	4.0	1.3	1.9	3.5	6.9	8.0	5.0	5.5	15.4	34.0	34.6	34.6	36.1	35.9	29.4	22.1	17.4	14.2	6.4	10.9	7.3	14.8	36.1																							
23-Jul	7.7	5.9	4.3	Z	2.0	1.8	2.9	5.6	11.5	14.8	19.2	28.8	38.1	44.1	44.5	44.5	44.4	37.2	38.2	33.8	17.1	13.0	8.9	2.7	20.5	44.5																							
24-Jul	1.8	12.5	14.6	6.6	Z	2.2	2.4	9.7	18.8	26.5	34.5	46.3	51.5	48.9	56.5	60.5	54.2	47.6	38.7	31.9	16.4	10.7	9.7	11.0	26.7	60.5																							
25-Jul	9.5	8.7	17.8	17.6	21.6	Z	18.3	20.3	15.8	11.4	8.9	13.6	14.7	13.4	17.2	12.8	8.8	10.0	4.1	5.9	13.7	17.3	18.2	17.7	13.8	21.6																							
26-Jul	Z	13.7	12.9	9.7	5.7	15.0	15.0	19.8	22.9	24.0	26.9	29.8	27.3	28.5	26.8	25.2	21.5	17.1	11.8	20.3	25.4	24.0	26.3	20.2	29.8																								
27-Jul	29.5	Z	21.0	15.8	7.0	3.7	3.8	6.1	12.8	16.6	23.3	25.9	27.5	27.8	27.9	26.2	24.1	22.3	25.4	18.2	7.4	7.7	2.1	7.2	16.9	29.5																							
28-Jul	4.9	2.0	Z	5.7	6.8	6.1	7.4	9.9	11.5	9.1	17.2	28.4	32.9	34.5	39.6	40.7	41.0	37.1	36.4	28.9	20.9	11.5	6.2	4.0	19.2	41.0																							
29-Jul	2.3	1.1	1.0	Z	1.2	2.7	6.5	9.6	11.7	15.1	27.1	31.8	34.7	37.0	37.3	37.8	36.9	36.3	35.4	26.2	11.3	3.6	2.6	12.7	18.3	37.8																							
30-Jul	11.1	2.1	3.7	3.9	Z	3.8	10.6	18.1	21.5	26.2	29.3	32.0	34.3	35.6	38.2	38.5	39.8	37.6	29.1	27.1	25.3	23.6	16.3	10.1	22.5	39.8																							
31-Jul	6.5	12.2	8.9	14.2	8.3	Z	9.1	12.8	22.3	25.9	30.7	25.6	32.7	36.1	37.2	22.5	25.5	31.5	22.5	16.9	5.8	3.9	9.1	13.7	18.9	37.2																							
																								9.3	8.8	9.3	8.2	6.8	6.9	9.0	13.1	16.3	20.0	24.6	29.7	33.2	34.0	35.0	34.2	33.4	31.9	28.6	23.1	17.0	13.9	12.5	11.0	Diurnal Average	
																								29.8	26.5	26.3	19.1	30.9	29.7	30.7	30.8	30.0	32.7	36.4	46.3	52.3	56.0	58.2	60.5	54.2	47.6	48.4	45.1	46.0	40.3	33.5	26.3	Diurnal Maximum	
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 76 ppb																																																	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	380	53.52	53.52
21 - 50	322	45.35	98.87
51 - 82	8	1.13	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Fort McKay South - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	13	7	3	1	7	17	31	27	31	52	44	22	37	35	30	379
21 - 50	67	33	11	2	4	3	25	32	33	17	14	19	11	9	14	28	322
51 - 82	0	1	0	2	0	1	2	0	0	0	0	0	0	1	1	0	8
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	89	47	18	7	5	11	44	63	60	48	66	63	33	47	50	58	709

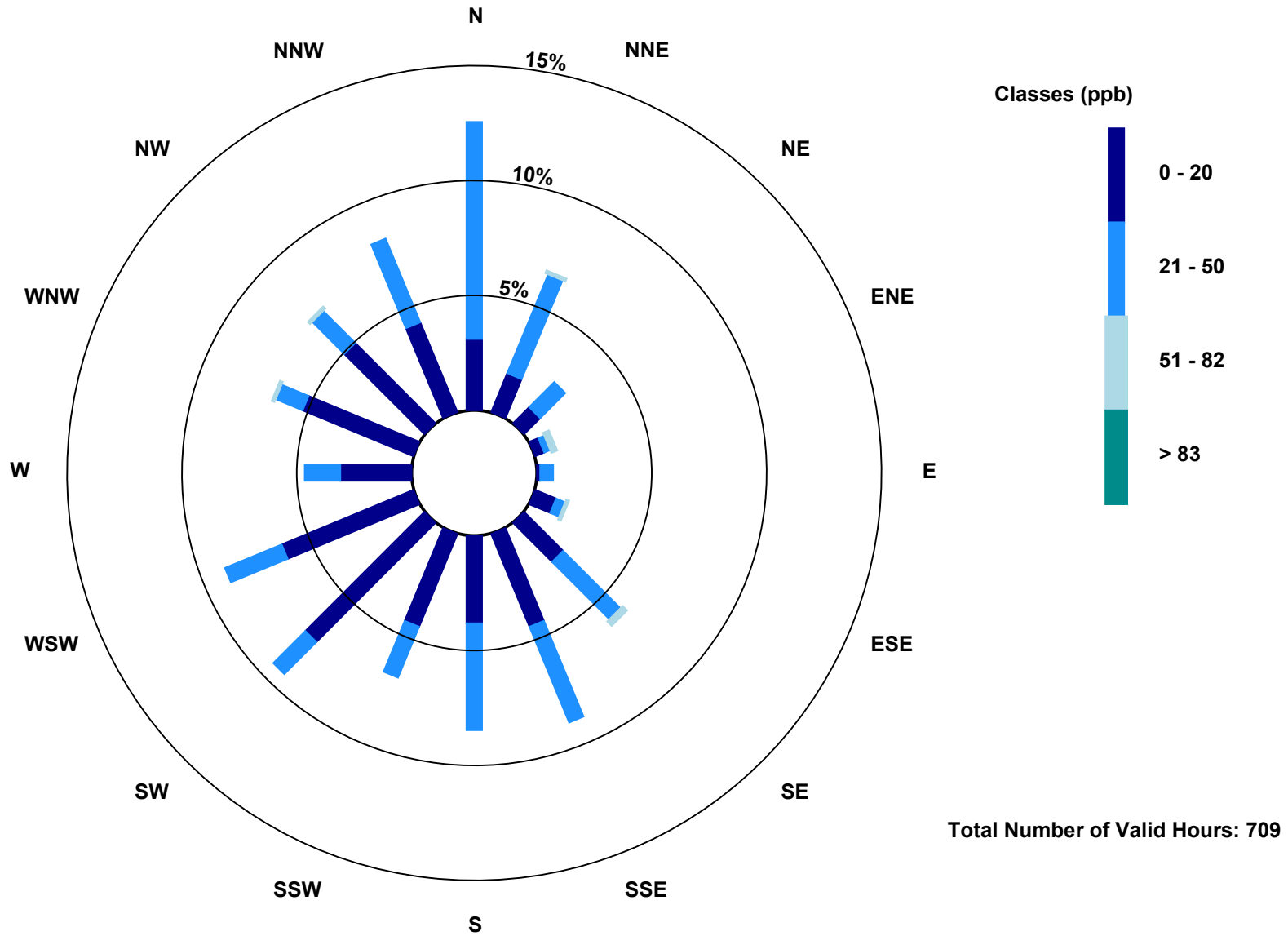
Total Number of Valid Hours: 709

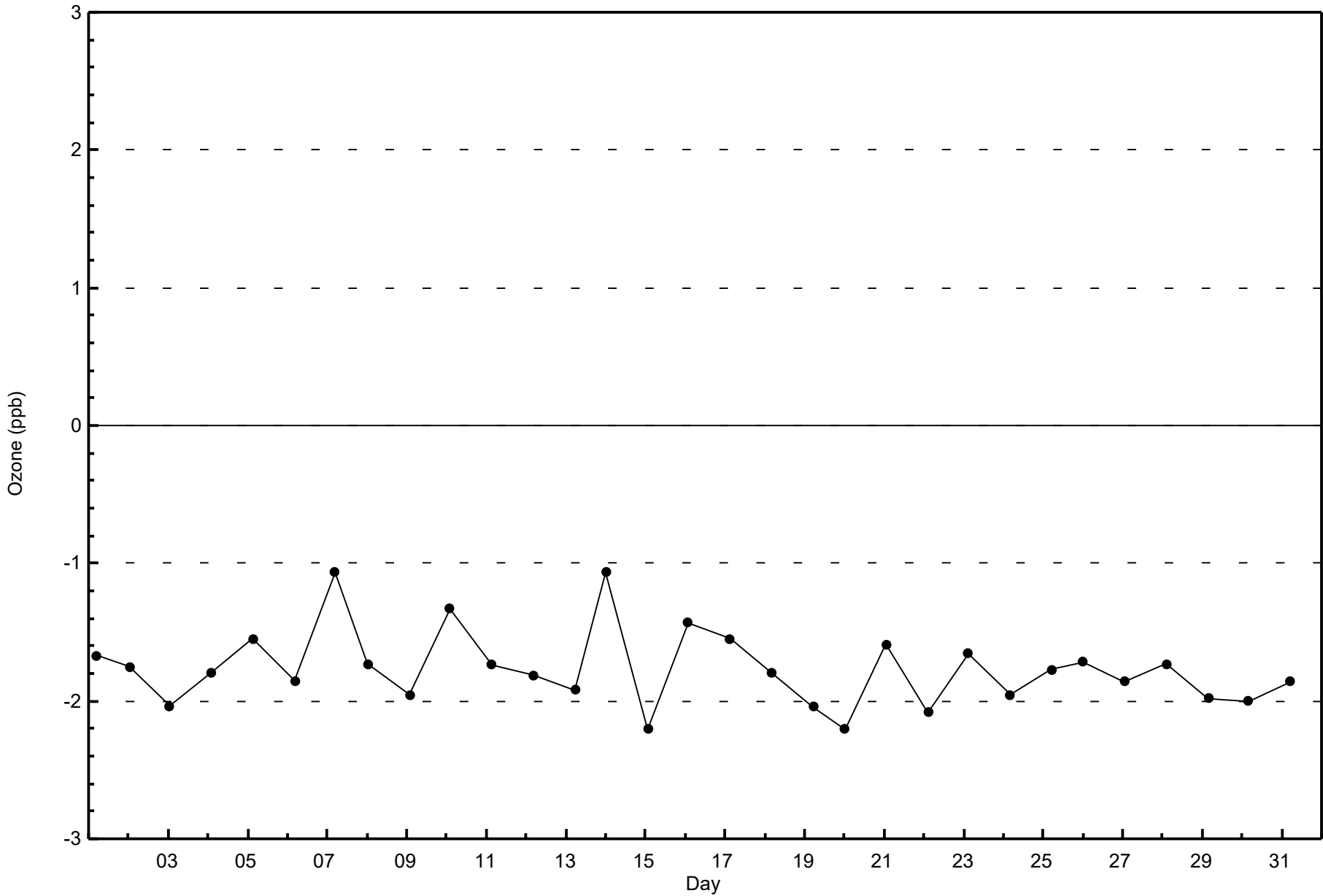
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Ozone (O₃) - ppb
Fort McKay South

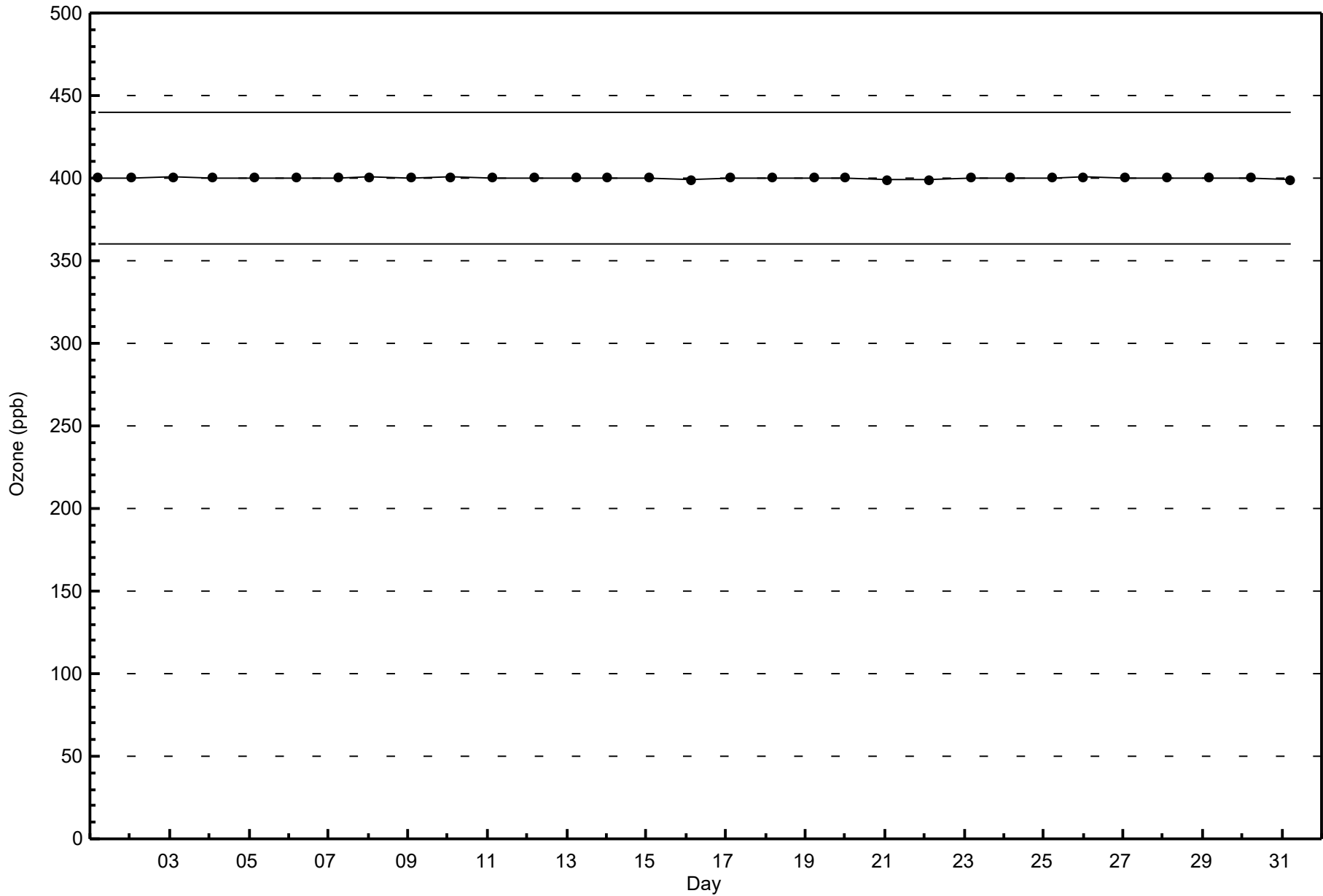






Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Fort McKay South - July 2023



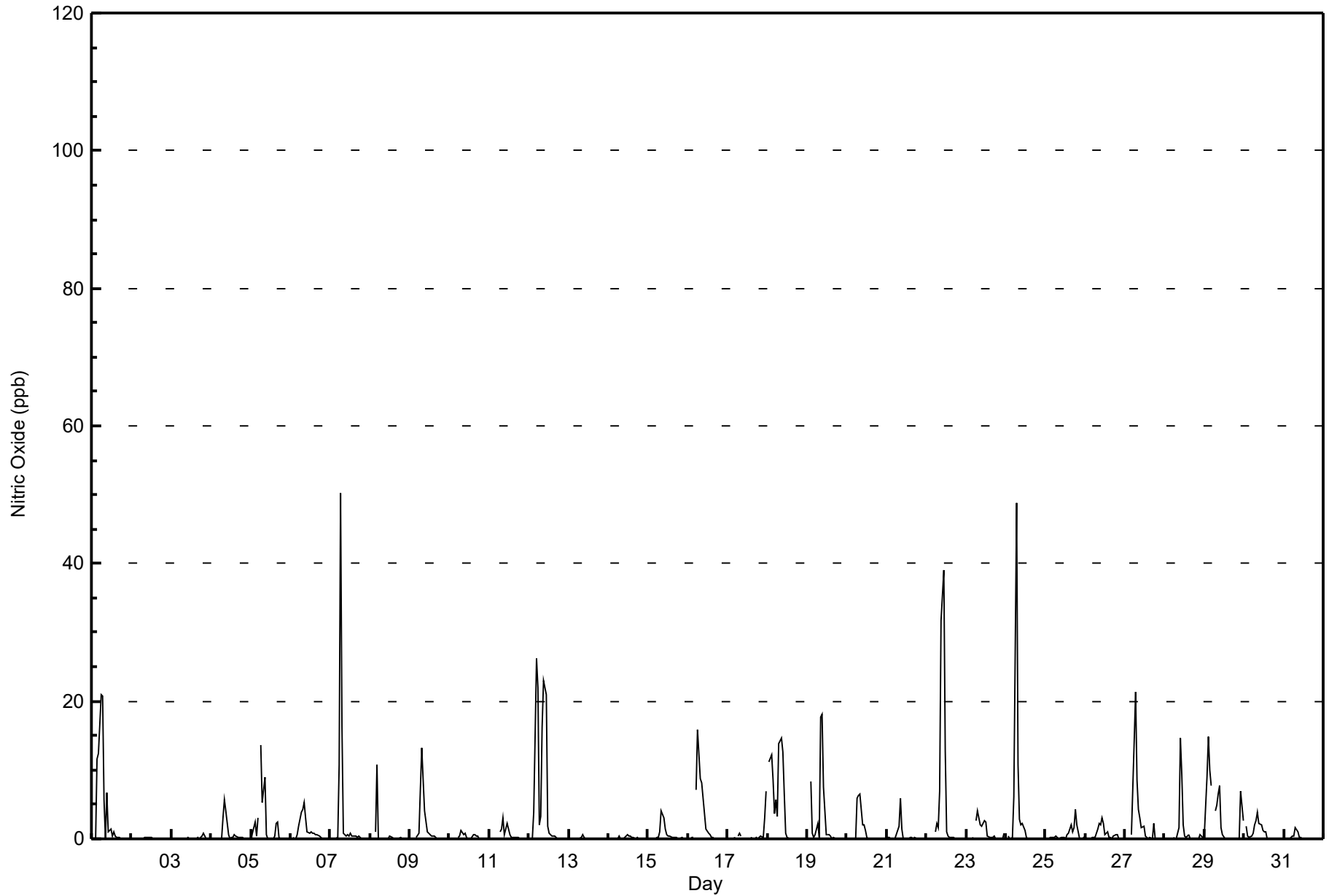


Maximum Value: 50.2 ppb on Jul 7 07:00		Maximum Daily Average: 5.3 ppb on Jul 12		Hours in Service: 744																							
Minimum Value: 0.0 ppb on Jul 1 01:00		Minimum Daily Average: 0.0 ppb on Jul 2		Hours of Data: 707																							
Maximum Diurnal Average: 6.8 ppb at hour 7		Minimum Diurnal Average: 0.0 ppb at hour 1		Hours of Missing Data: 37																							
Monthly Average: 1.59 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.7 P ₉₀ = 4.0 P ₉₉ = 21.4		Hours of Calibration: 36																							
				Percent Operational Time: 99.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0.0	Z	0.0	11.6	12.4	21.0	20.6	5.6	0.1	6.6	1.1	1.5	0.4	1.1	0.5	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	3.6	21.0	
2-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	
3-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.3	0.0	0.4	0.9	0.4	0.1	0.0	0.0	0.1	0.9	
4-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.1	3.0	5.8	4.1	0.6	0.1	0.2	0.2	0.6	0.4	0.2	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.7	5.8	
5-Jul	0.0	0.8	2.5	0.4	3.0	Z	13.6	5.2	9.0	0.5	0.0	0.0	0.0	0.0	0.4	2.3	2.4	0.3	0.0	0.0	0.0	0.0	0.0	1.8	13.6		
6-Jul	Z	0.2	0.1	0.1	0.6	1.8	3.9	4.3	5.4	3.0	1.0	0.9	0.9	0.7	0.8	0.7	0.6	0.4	0.3	0.1	0.0	0.0	0.0	1.1	5.4		
7-Jul	0.0	Z	0.0	0.0	0.1	10.9	50.2	16.2	0.8	0.5	0.6	0.4	0.9	0.4	0.4	0.3	0.2	0.3	0.2	0.1	0.0	0.0	0.0	3.6	50.2		
8-Jul	0.0	0.0	Z	1.0	10.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.6	10.8		
9-Jul	0.0	0.0	0.0	Z	0.3	0.8	7.0	13.1	8.4	4.1	1.0	0.9	0.6	0.4	0.3	0.3	0.1	0.0	0.1	0.1	0.1	0.0	0.0	1.6	13.1		
10-Jul	0.1	0.0	0.0	0.0	Z	0.3	0.4	1.1	0.7	0.9	0.3	0.1	0.1	0.1	0.5	0.5	0.5	0.4	0.0	0.0	0.0	0.0	0.0	0.3	1.1		
11-Jul	0.0	0.0	0.0	0.0	0.1	Z	1.0	1.4	3.1	0.6	1.3	2.2	0.6	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.5	3.1		
12-Jul	Z	0.0	0.0	4.0	26.2	21.9	2.0	3.2	16.3	22.9	21.0	1.8	0.8	0.5	0.5	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0	5.3	26.2		
13-Jul	0.0	Z	0.0	0.0	0.0	0.1	0.1	0.1	0.6	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	0.1	0.6		
14-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.2	0.6	0.5	0.4	0.3	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.6		
15-Jul	0.0	0.0	0.1	Z	0.0	0.1	0.2	1.1	4.0	3.1	1.3	0.6	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.5	4.0		
16-Jul	0.1	0.1	0.2	0.3	Z	7.2	15.9	8.8	8.1	5.8	3.7	1.5	0.9	0.6	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	15.9		
17-Jul	0.0	0.0	0.0	0.1	0.2	Z	0.5	0.7	0.4	C	C	C	C	C	0.2	0.0	0.0	0.1	0.1	0.1	0.4	0.2	3.0	6.9	6.9		
18-Jul	Z	11.3	12.1	8.6	3.7	5.7	3.3	13.9	14.7	12.6	6.5	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	14.7		
19-Jul	0.0	Z	8.3	0.8	0.2	0.7	2.3	0.3	17.7	18.2	7.5	0.6	0.6	0.6	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.5	18.2		
20-Jul	0.0	0.0	Z	0.1	0.0	0.1	5.9	6.3	6.5	2.0	2.1	1.2	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	6.5		
21-Jul	0.1	0.2	0.0	Z	0.0	0.0	0.7	1.9	6.0	1.5	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.5	6.0		
22-Jul	0.0	0.0	0.0	0.0	Z	1.0	2.2	1.6	7.0	31.7	39.0	12.8	1.0	0.4	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.0	4.2	39.0		
23-Jul	0.0	0.0	0.0	0.1	0.2	Z	2.6	4.0	2.1	1.8	2.2	2.7	2.5	0.4	0.2	0.1	0.1	0.3	0.1	0.0	0.0	0.0	0.9	0.9	4.0		
24-Jul	Z	0.5	0.0	0.0	0.3	6.1	48.8	10.8	2.9	2.0	2.3	1.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	48.8		
25-Jul	0.0	Z	0.1	0.1	0.2	0.2	0.3	0.1	0.1	0.1	0.2	0.1	0.0	0.6	0.8	2.1	1.1	1.5	4.3	2.1	0.1	0.1	0.1	0.6	4.3		
26-Jul	0.1	0.1	Z	0.1	0.3	0.2	0.2	1.4	2.3	2.1	3.1	2.3	0.6	1.0	0.1	0.2	0.0	0.4	0.6	0.7	0.0	0.0	0.0	0.7	3.1		
27-Jul	0.0	0.0	0.0	Z	0.7	14.3	21.4	8.5	4.2	3.1	1.7	1.8	0.5	0.2	0.1	0.3	0.0	2.1	0.0	0.0	0.0	0.1	0.0	2.6	21.4		
28-Jul	0.0	0.0	0.0	0.0	Z	0.1	0.0	0.0	1.7	14.6	9.4	2.1	0.4	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.3	0.3	1.4	14.6		
29-Jul	0.2	8.9	14.8	10.0	7.7	Z	4.1	5.0	6.5	7.8	1.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	2.6	3.3	14.8		
30-Jul	Z	1.7	0.5	0.3	0.5	0.9	2.1	2.7	3.8	2.3	2.0	1.2	1.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	3.8		
31-Jul	0.0	Z	0.1	0.0	0.2	0.5	0.5	1.6	1.0	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	1.6		
		0.0	1.0	1.5	1.4	2.6	3.6	6.8	3.9	4.5	5.1	3.7	1.3	0.5	0.3	0.3	0.2	0.2	0.2	0.1	0.0	0.0	0.3	0.4	Diurnal Average		
		0.2	11.3	14.8	11.6	26.2	21.9	50.2	16.2	17.7	31.7	39.0	12.8	2.5	1.1	0.8	2.3	2.4	2.1	4.3	2.1	0.4	0.6	7.0	6.9	Diurnal Maximum	
Z - zerospan		C - Calibration				PF - Power Failure																					



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Fort McKay South - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort McKay South - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	696	98.44	98.44
21 - 40	9	1.27	99.72
41 - 80	2	0.28	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort McKay South - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	86	45	18	7	5	11	41	57	59	53	64	59	34	49	51	56	695
21 - 40	1	4	0	0	0	0	0	1	0	1	0	1	0	1	0	0	9
11 - 80	0	0	0	0	0	0	0	2	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	87	49	18	7	5	11	41	60	59	54	64	60	34	50	51	56	706

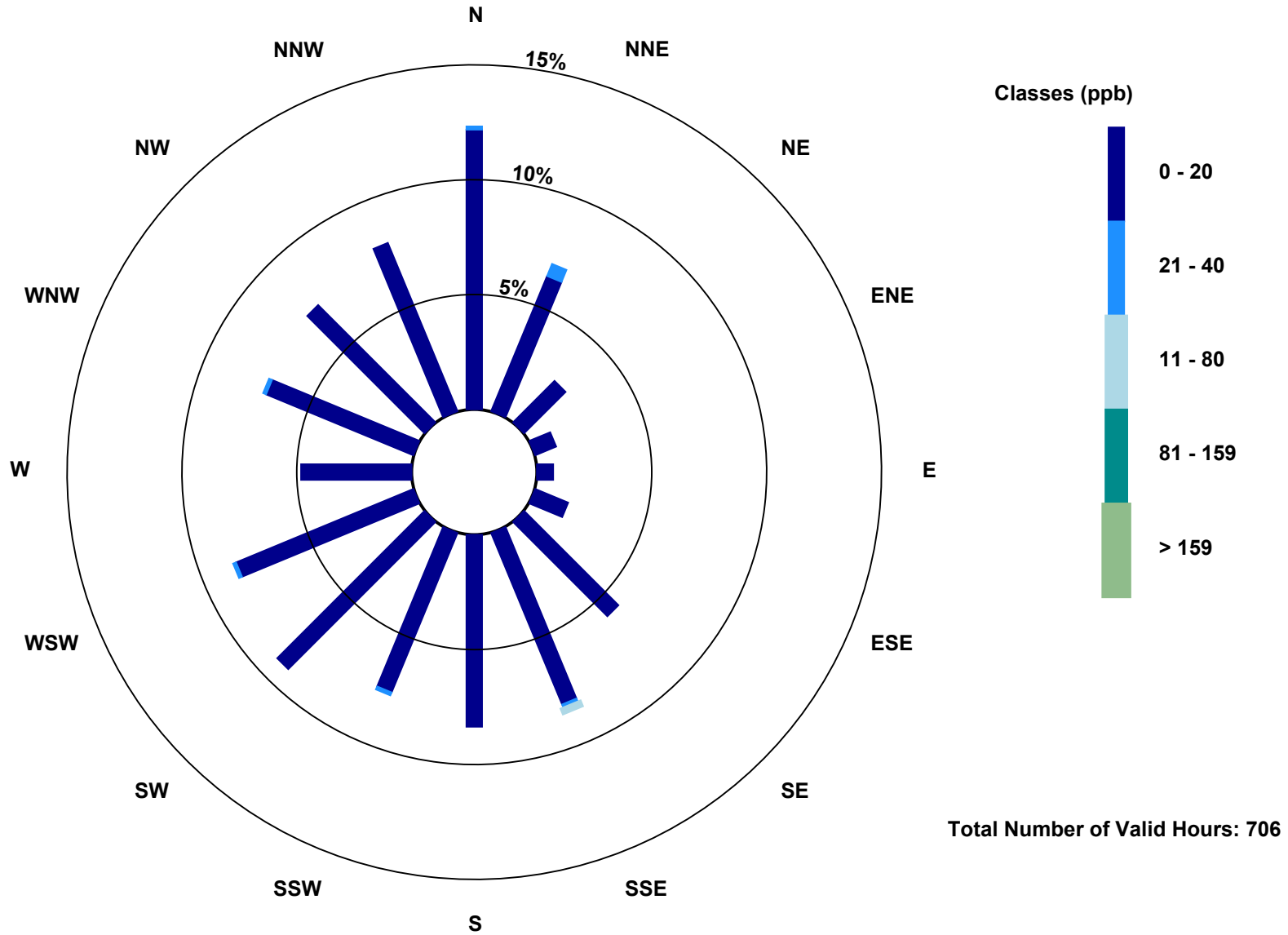
Total Number of Valid Hours: 706

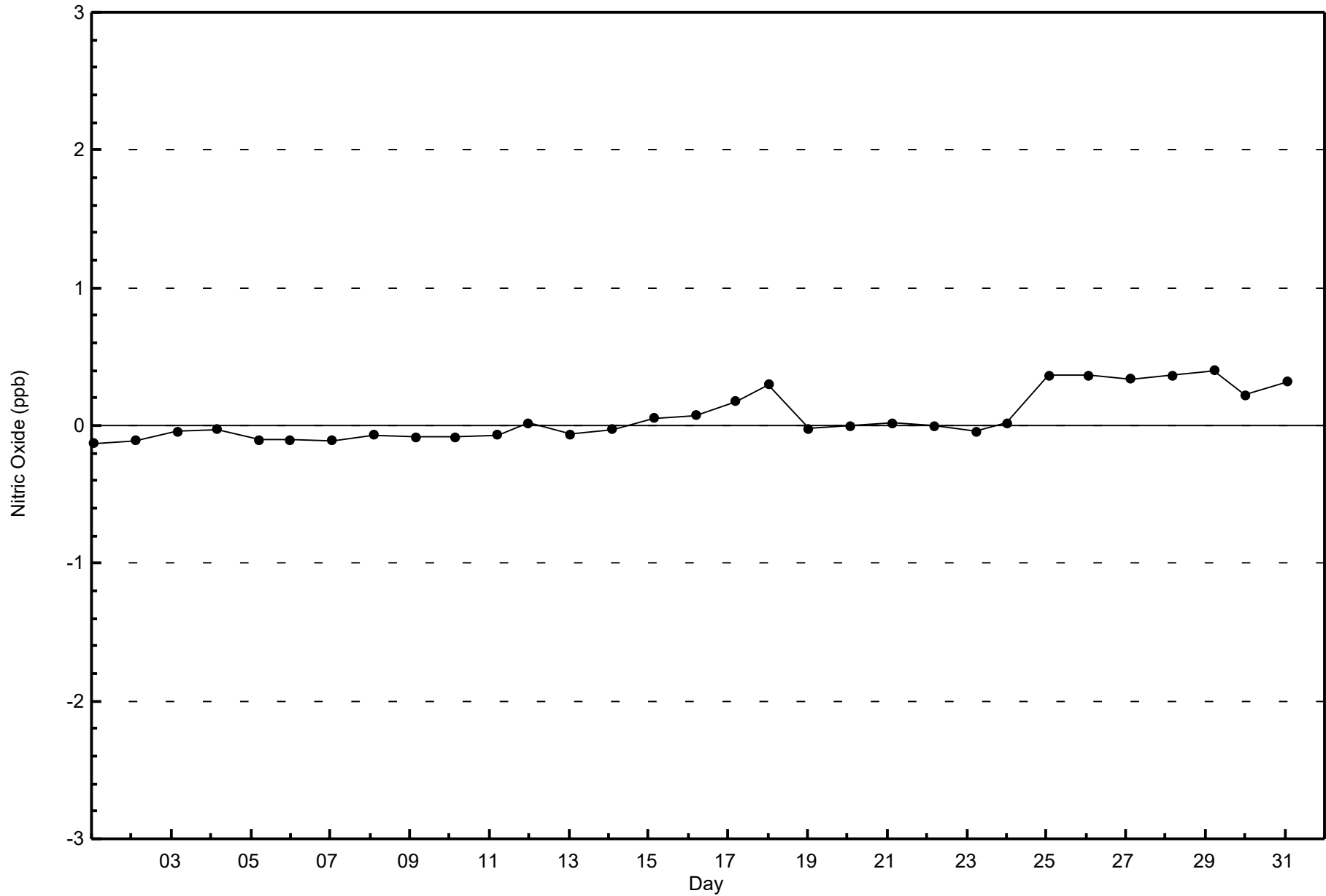
Total Number of Hours: 744

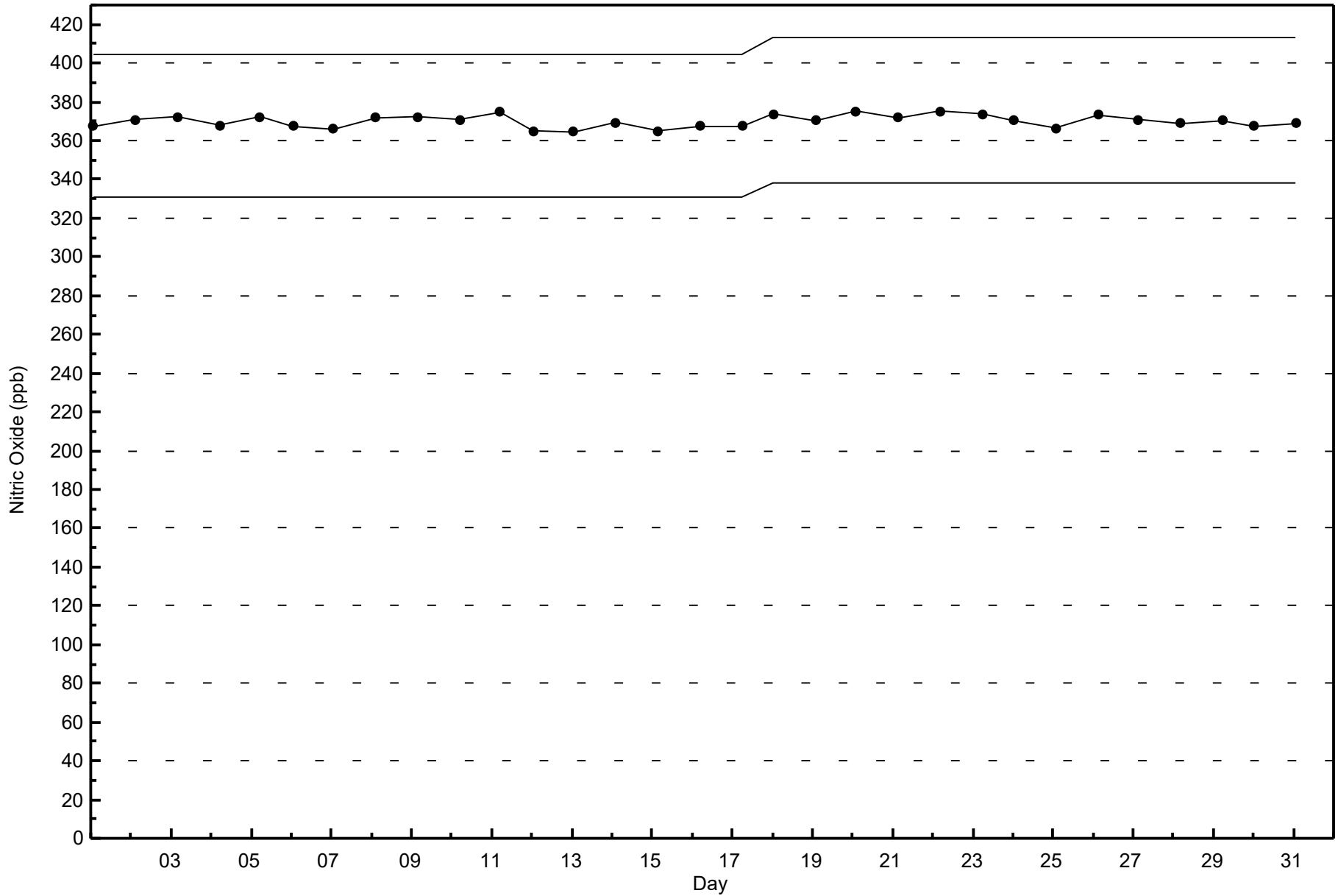


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Fort McKay South









Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 34.7 ppb on Jul 22 11:00	Maximum Daily Average: 7.9 ppb on Jul 22		Hours of Data:	707
Minimum Value: 0.0 ppb on Jul 17 17:00	Minimum Daily Average: 1.2 ppb on Jul 2		Hours of Missing Data:	37
Maximum Diurnal Average: 7.2 ppb at hour 10	Minimum Diurnal Average: 2.3 ppb at hour 17		Hours of Calibration:	36
Monthly Average: 4.02 ppb	Percentiles: P ₁ = 0.1 P ₁₀ = 0.5 Q ₁ = 1.2 Median = 2.7 Q ₃ = 5.4 P ₉₀ = 9.1 P ₉₉ = 20.9		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	1.8	Z	1.5	10.5	15.0	13.8	10.5	9.2	2.3	15.3	8.0	8.4	4.2	8.1	6.5	4.6	4.5	1.6	0.7	0.7	0.8	0.7	0.7	0.7	5.7	15.3
2-Jul	0.9	0.7	Z	0.8	0.8	0.7	0.7	1.0	3.2	3.1	3.7	3.8	2.4	0.6	0.4	0.5	1.0	0.4	0.5	0.5	0.5	0.5	0.4	0.4	1.2	3.8
3-Jul	0.4	1.4	0.5	Z	2.2	0.5	1.9	1.7	0.7	0.2	0.5	0.5	0.3	0.1	0.3	0.3	1.2	0.2	2.7	5.4	6.7	3.5	2.4	6.6	1.7	6.7
4-Jul	3.5	1.1	0.8	0.2	Z	0.2	0.3	2.7	5.4	5.7	1.8	0.8	1.1	1.4	2.9	2.4	1.6	1.7	2.1	2.0	3.2	2.7	2.7	5.5	2.3	5.7
5-Jul	5.4	8.4	10.7	4.3	3.6	Z	8.7	8.1	10.1	1.8	0.5	0.5	1.0	0.6	2.3	7.3	9.8	2.3	0.5	1.0	0.8	2.5	2.5	5.0	4.2	10.7
6-Jul	Z	4.6	3.7	5.7	4.2	3.9	8.0	8.3	8.8	5.5	2.2	2.1	2.5	2.2	2.4	2.1	2.0	1.8	1.9	0.6	0.2	0.8	2.1	2.1	3.4	8.8
7-Jul	2.2	Z	0.7	0.5	1.1	4.2	12.2	12.1	2.1	3.6	4.6	4.9	6.3	3.5	2.9	1.8	1.4	4.9	3.3	1.8	1.3	0.8	0.9	0.4	3.4	12.2
8-Jul	0.2	0.2	Z	7.0	21.7	0.9	0.2	0.2	0.3	0.3	0.5	0.7	3.8	3.3	1.6	1.3	2.3	2.0	4.1	2.6	3.3	3.3	2.9	2.9	2.9	21.7
9-Jul	4.2	3.2	3.5	Z	2.7	2.3	11.8	16.6	15.2	8.6	2.4	2.7	2.2	1.5	1.2	1.2	0.6	0.9	1.1	2.3	4.1	3.5	4.6	7.5	4.5	16.6
10-Jul	8.1	4.9	2.8	1.6	Z	0.7	0.7	2.4	1.5	2.0	0.9	0.5	0.5	0.5	1.9	2.5	2.7	3.0	1.8	1.1	1.0	1.1	1.1	1.1	1.9	8.1
11-Jul	1.5	1.5	1.8	2.2	1.6	Z	4.8	5.3	7.6	2.7	4.2	6.1	2.7	2.0	1.8	1.6	1.6	2.3	2.3	2.5	3.6	2.0	1.2	0.7	2.8	7.6
12-Jul	Z	0.7	0.6	1.7	2.6	3.1	2.9	4.3	15.3	24.9	22.5	6.0	4.0	3.2	3.0	3.2	4.0	4.1	4.3	2.9	4.0	5.9	5.9	5.7	5.9	24.9
13-Jul	4.0	Z	3.7	2.8	2.0	1.7	1.8	2.7	5.3	2.0	1.0	0.7	0.6	0.4	1.3	1.6	2.4	3.9	7.3	9.4	7.8	10.5	13.6	12.4	4.3	13.6
14-Jul	12.8	12.1	Z	10.0	5.8	5.2	5.1	1.9	0.2	1.9	5.6	7.5	8.2	7.6	5.3	5.1	4.3	6.5	5.2	6.0	5.4	5.7	6.3	5.8	6.1	12.8
15-Jul	6.7	9.8	7.1	Z	3.2	2.0	2.7	4.2	9.5	8.8	4.8	3.2	1.9	1.5	0.9	0.6	0.8	1.0	0.4	0.9	2.8	2.2	1.9	1.5	3.4	9.8
16-Jul	1.2	0.8	0.9	0.4	Z	1.4	4.4	7.1	8.3	8.0	6.5	3.8	2.9	2.7	1.5	1.7	0.6	1.1	2.1	2.1	2.4	1.8	2.5	1.9	2.9	8.3
17-Jul	6.2	6.7	7.6	6.1	3.1	Z	2.7	2.9	4.0	C	C	C	C	C	1.3	0.4	0.0	0.4	0.5	3.2	6.5	7.2	8.5	2.1	3.9	8.5
18-Jul	Z	3.1	8.7	10.0	6.0	7.1	5.2	10.0	13.2	16.6	14.3	6.0	3.3	2.3	1.5	1.1	1.4	1.5	2.2	2.0	1.6	0.5	0.4	0.5	5.2	16.6
19-Jul	0.4	Z	11.5	4.8	0.6	0.7	2.2	0.7	10.1	16.5	13.8	3.3	3.1	3.5	2.8	2.2	2.6	0.9	0.8	0.4	0.4	0.3	0.4	0.3	3.6	16.5
20-Jul	0.1	0.1	Z	0.1	0.1	0.2	3.5	4.0	6.0	5.8	7.0	6.4	4.2	3.2	2.9	2.2	1.0	0.8	0.9	1.3	1.2	2.8	4.2	4.1	2.7	7.0
21-Jul	4.1	2.7	2.5	Z	0.4	0.3	1.4	2.9	8.1	4.0	0.9	0.5	0.6	0.6	2.1	2.0	2.1	3.1	3.4	3.9	3.5	2.9	2.6	3.2	2.5	8.1
22-Jul	2.6	1.8	1.4	1.8	Z	2.0	3.3	3.7	13.1	26.6	34.7	29.5	8.5	4.9	3.9	3.1	3.0	2.5	2.1	1.9	2.3	11.2	9.0	8.4	7.9	34.7
23-Jul	7.6	3.4	2.0	2.3	2.6	Z	4.1	7.3	6.3	6.3	7.0	9.5	12.7	4.1	2.9	2.0	2.3	3.8	2.1	2.1	2.5	2.8	2.9	7.2	4.6	12.7
24-Jul	Z	4.7	1.2	1.2	2.9	4.9	15.4	11.0	7.4	7.6	11.3	10.6	6.5	4.0	3.1	2.7	1.5	1.2	1.4	4.5	4.6	6.4	5.8	5.1	5.4	15.4
25-Jul	3.3	Z	5.9	10.3	2.0	3.7	6.7	1.4	0.8	1.2	2.1	2.9	2.9	3.5	4.8	9.9	9.8	9.1	17.3	16.8	5.2	0.5	1.0	4.4	5.5	17.3
26-Jul	3.9	6.8	Z	2.5	2.9	1.1	0.4	3.3	4.3	4.1	5.2	4.5	2.5	4.2	3.4	3.7	2.5	5.6	9.3	10.9	2.7	0.5	1.1	1.2	3.8	10.9
27-Jul	0.9	2.8	4.6	Z	6.5	16.5	16.9	12.1	8.4	6.1	3.6	3.7	1.7	2.1	1.6	1.9	0.7	6.9	1.9	1.4	0.7	1.6	4.6	2.3	4.8	16.9
28-Jul	0.4	0.2	0.2	0.3	Z	0.3	0.1	0.2	1.7	10.2	11.4	5.7	2.9	2.5	4.9	2.4	2.2	PF	1.6	2.0	6.8	13.5	21.1	15.1	4.8	21.1
29-Jul	11.9	11.0	9.6	7.8	6.7	Z	5.2	6.4	6.7	9.6	3.5	2.5	0.8	0.7	0.5	0.2	0.2	0.3	0.5	0.9	1.7	5.9	25.1	15.9	5.8	25.1
30-Jul	Z	17.3	12.0	5.6	3.4	1.9	5.1	6.0	7.5	5.8	5.3	4.1	4.1	4.2	0.3	1.5	0.8	0.8	1.7	6.3	8.8	3.1	2.6	1.9	4.8	17.3
31-Jul	8.2	Z	3.1	0.7	3.7	8.5	4.3	6.7	3.8	1.8	1.9	1.7	0.4	0.1	0.0	0.6	0.4	0.5	1.4	1.1	0.5	2.2	4.2	13.1	3.0	13.1

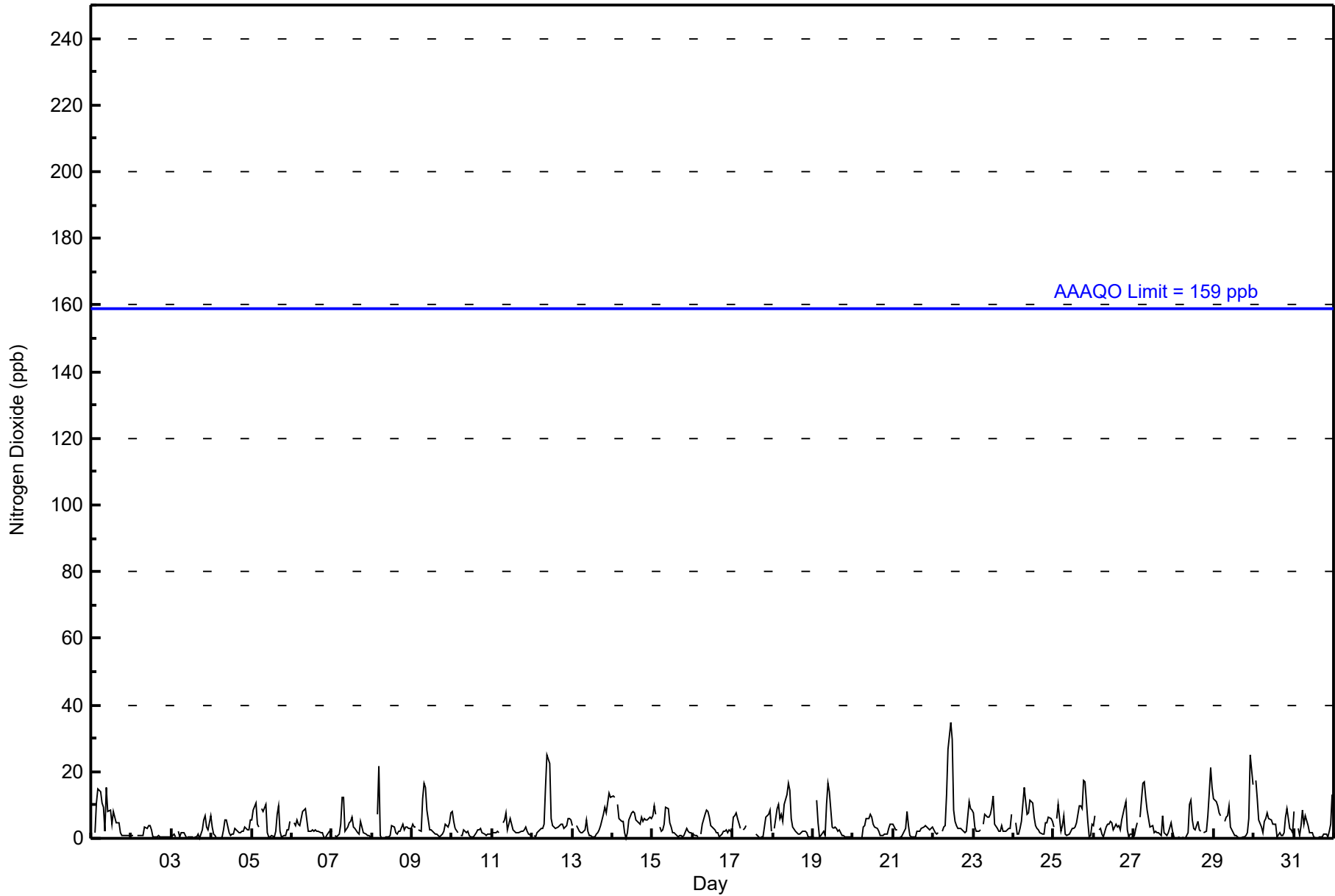
3.9	4.4	4.2	3.9	4.1	3.4	4.9	5.4	6.4	7.2	6.4	4.8	3.3	2.6	2.3	2.4	2.3	2.5	2.8	3.2	3.1	3.5	4.7	4.7	Diurnal Average	
12.8	17.3	12.0	10.5	21.7	16.5	16.9	16.6	15.3	26.6	34.7	29.5	12.7	8.1	6.5	9.9	9.8	9.1	17.3	16.8	8.8	13.5	25.1	15.9	Diurnal Maximum	

Z - zerospan C - Calibration PF - Power Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	699	98.87	98.87
21 - 40	8	1.13	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	86	45	18	7	5	11	41	60	59	53	63	59	34	50	51	56	698
21 - 40	1	4	0	0	0	0	0	0	0	1	1	1	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	87	49	18	7	5	11	41	60	59	54	64	60	34	50	51	56	706

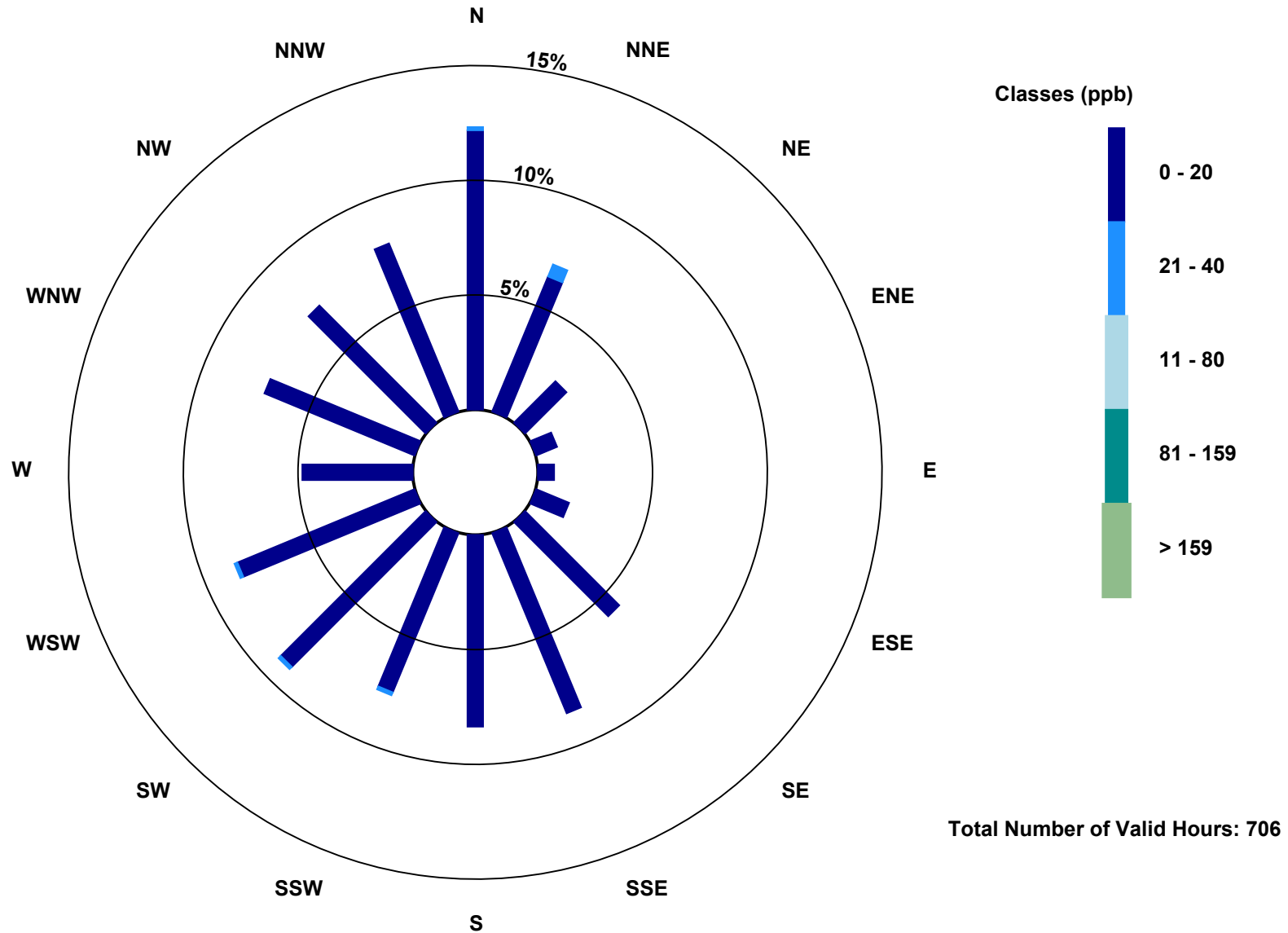
Total Number of Valid Hours: 706

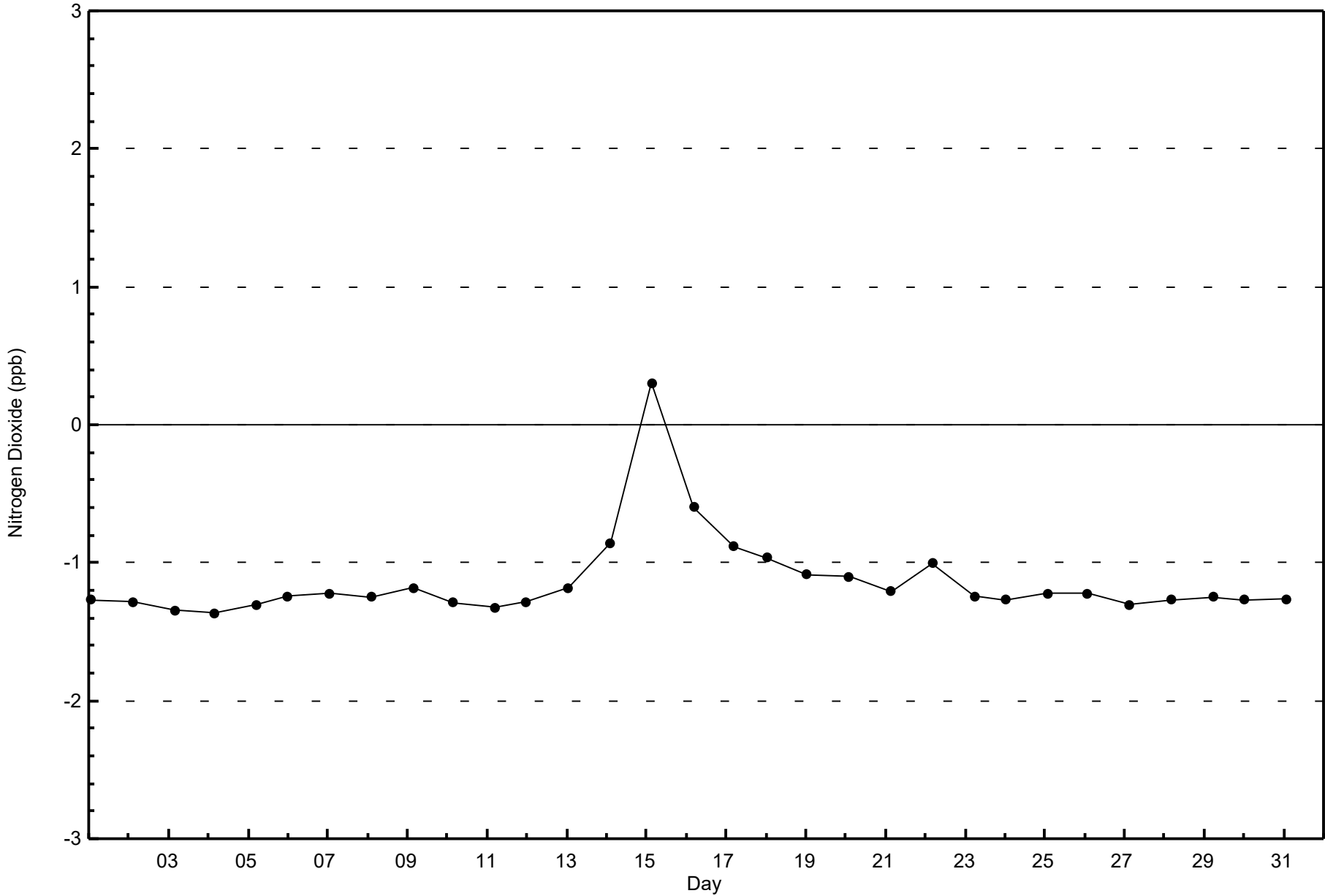
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South

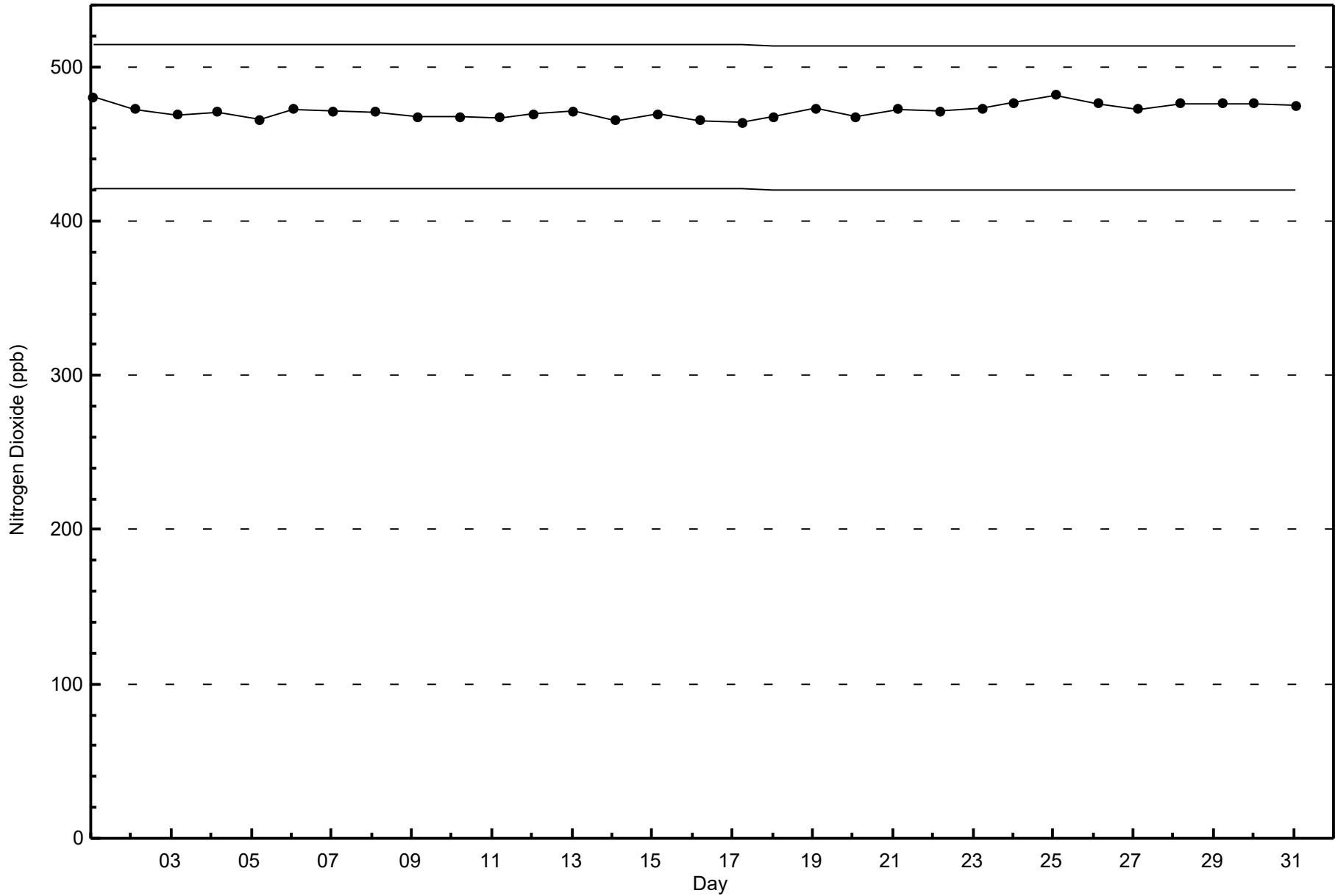






Wood Buffalo Environmental Association
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - July 2023





Wood Buffalo Environmental Association
Summary of Hour Averages

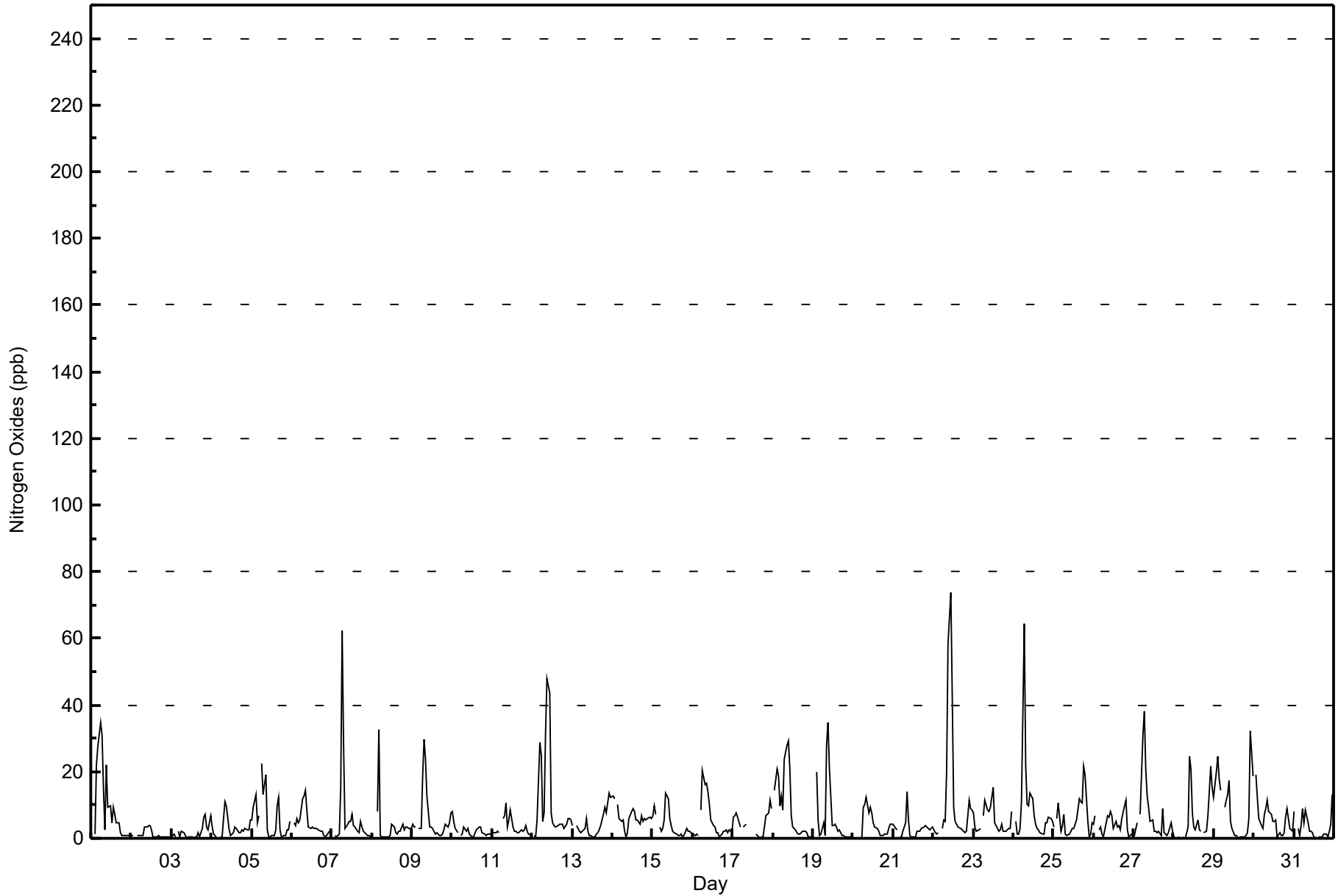
Nitrogen Oxides (NO_x) - ppb
Fort McKay South - July 2023

Maximum Value: 73.7 ppb on Jul 22 11:00																						Maximum Daily Average: 12.1 ppb on Jul 22																						Hours in Service: 744			
Minimum Value: 0.0 ppb on Jul 17 17:00																						Minimum Daily Average: 1.2 ppb on Jul 2																						Hours of Data: 707			
Maximum Diurnal Average: 12.3 ppb at hour 10																						Minimum Diurnal Average: 2.5 ppb at hour 17																						Hours of Missing Data: 37			
Monthly Average: 5.61 ppb																						Percentiles: P ₁ = 0.1 P ₁₀ = 0.5 Q ₁ = 1.3 Median = 3.0 Q ₃ = 6.3 P ₉₀ = 12.7 P ₉₉ = 38.1																						Hours of Calibration: 36			
																																												Percent Operational Time: 99.9			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	1.8	Z	1.5	22.1	27.4	34.8	31.1	14.8	2.4	21.9	9.1	9.9	4.6	9.2	7.0	4.8	4.7	1.7	0.7	0.7	0.8	0.7	0.7	0.7	9.3	34.8																					
2-Jul	0.9	0.7	Z	0.8	0.8	0.7	0.7	1.0	3.3	3.2	3.9	4.0	2.6	0.6	0.4	0.5	1.0	0.4	0.5	0.5	0.5	0.5	0.4	0.4	1.2	4.0																					
3-Jul	0.4	1.4	0.5	Z	2.2	0.5	1.9	1.7	0.7	0.2	0.6	0.6	0.3	0.1	0.3	0.3	1.5	0.2	3.1	6.3	7.1	3.6	2.4	6.6	1.8	7.1																					
4-Jul	3.5	1.1	0.8	0.2	Z	0.2	0.4	5.7	11.2	9.8	2.4	0.9	1.3	1.6	3.5	2.8	1.8	1.9	2.4	2.1	3.2	2.7	2.7	5.5	2.9	11.2																					
5-Jul	5.4	9.2	13.2	4.7	6.6	Z	22.3	13.3	19.1	2.3	0.5	0.5	1.0	0.6	2.7	9.6	12.2	2.6	0.5	1.0	0.8	2.5	2.5	5.0	6.0	22.3																					
6-Jul	Z	4.8	3.8	5.8	4.8	5.7	11.9	12.6	14.2	8.5	3.2	3.0	3.4	2.9	3.2	2.8	2.6	2.2	2.2	0.7	0.2	0.8	2.1	2.1	4.5	14.2																					
7-Jul	2.2	Z	0.7	0.5	1.2	15.1	62.4	28.3	2.9	4.1	5.2	5.3	7.2	3.9	3.3	2.1	1.6	5.2	3.5	1.9	1.3	0.8	0.9	0.4	6.9	62.4																					
8-Jul	0.2	0.2	Z	8.0	32.5	0.9	0.2	0.2	0.3	0.3	0.5	0.7	4.2	3.4	1.6	1.3	2.3	2.0	4.2	2.6	3.3	3.3	2.9	2.9	3.4	32.5																					
9-Jul	4.2	3.2	3.5	Z	3.0	3.1	18.8	29.7	23.6	12.7	3.4	3.6	2.8	1.9	1.5	1.5	0.7	0.9	1.2	2.4	4.2	3.5	4.6	7.5	6.1	29.7																					
10-Jul	8.2	4.9	2.8	1.6	Z	1.0	1.1	3.5	2.2	2.9	1.2	0.6	0.6	0.6	2.4	3.0	3.2	3.4	1.8	1.1	1.0	1.1	1.1	1.1	2.2	8.2																					
11-Jul	1.5	1.5	1.8	2.2	1.7	Z	5.8	6.7	10.7	3.3	5.5	8.3	3.3	2.2	2.0	1.7	1.7	2.4	2.3	2.5	3.6	2.0	1.2	0.7	3.3	10.7																					
12-Jul	Z	0.7	0.6	5.7	28.8	25.0	4.9	7.5	31.6	47.8	43.5	7.8	4.8	3.7	3.5	3.6	4.2	4.2	4.3	2.9	4.0	5.9	5.9	5.7	11.1	47.8																					
13-Jul	4.0	Z	3.7	2.8	2.0	1.8	1.9	2.8	5.9	2.1	1.0	0.7	0.6	0.4	1.3	1.6	2.4	3.9	7.3	9.4	7.8	10.5	13.6	12.4	4.3	13.6																					
14-Jul	12.8	12.1	Z	10.0	5.8	5.2	5.4	2.0	0.2	1.9	5.8	8.1	8.7	8.0	5.6	5.4	4.4	6.6	5.2	6.0	5.4	5.7	6.3	5.8	6.2	12.8																					
15-Jul	6.7	9.8	7.2	Z	3.2	2.1	2.9	5.3	13.5	11.9	6.1	3.8	2.2	1.8	1.2	0.8	1.0	1.2	0.5	1.0	2.9	2.2	1.9	1.6	4.0	13.5																					
16-Jul	1.3	0.9	1.1	0.7	Z	8.6	20.3	15.9	16.4	13.8	10.2	5.3	3.8	3.3	1.7	1.9	0.6	1.1	2.1	2.1	2.4	1.8	2.5	1.9	5.2	20.3																					
17-Jul	6.2	6.7	7.6	6.2	3.3	Z	3.2	3.6	4.4	C	C	C	C	C	1.5	0.4	0.0	0.5	0.6	3.3	6.9	7.4	11.5	9.0	4.6	11.5																					
18-Jul	Z	14.4	20.8	18.6	9.7	12.8	8.5	23.9	27.9	29.2	20.8	6.9	3.5	2.3	1.5	1.1	1.4	1.5	2.2	2.0	1.6	0.5	0.4	0.5	9.2	29.2																					
19-Jul	0.4	Z	19.8	5.6	0.8	1.4	4.5	1.0	27.8	34.7	21.3	3.9	3.7	4.1	3.3	2.3	2.7	0.9	0.8	0.4	0.4	0.3	0.4	0.3	6.1	34.7																					
20-Jul	0.1	0.1	Z	0.2	0.1	0.3	9.4	10.3	12.5	7.8	9.1	7.6	4.5	3.3	3.0	2.2	1.0	0.8	0.9	1.3	1.2	2.8	4.2	4.1	3.8	12.5																					
21-Jul	4.2	2.9	2.5	Z	0.4	0.3	2.1	4.8	14.1	5.5	1.0	0.5	0.6	0.6	2.2	2.1	2.2	3.2	3.5	3.9	3.5	2.9	2.6	3.2	3.0	14.1																					
22-Jul	2.6	1.8	1.4	1.8	Z	3.0	5.5	5.3	20.1	58.3	73.7	42.3	9.5	5.3	4.2	3.3	3.1	2.6	2.1	1.9	2.3	11.3	9.0	8.5	12.1	73.7																					
23-Jul	7.6	3.4	2.0	2.4	2.8	Z	6.7	11.3	8.4	8.1	9.2	12.2	15.2	4.5	3.1	2.1	2.4	4.1	2.2	2.1	2.5	2.8	2.9	8.1	5.5	15.2																					
24-Jul	Z	5.2	1.2	1.2	3.2	11.0	64.2	21.8	10.3	9.6	13.6	11.8	6.7	4.1	3.1	2.7	1.5	1.2	1.4	4.5	4.6	6.4	5.8	5.1	8.7	64.2																					
25-Jul	3.3	Z	6.0	10.4	2.2	3.9	7.0	1.5	0.9	1.3	2.3	3.0	2.9	4.1	5.6	12.0	10.9	10.6	21.6	18.9	5.3	0.5	1.1	4.5	6.1	21.6																					
26-Jul	4.0	6.9	Z	2.6	3.2	1.3	0.6	4.7	6.6	6.2	8.3	6.8	3.1	5.2	3.5	3.9	2.5	6.0	9.9	11.6	2.7	0.5	1.1	1.2	4.5	11.6																					
27-Jul	0.9	2.8	4.6	Z	7.2	30.8	38.3	20.6	12.6	9.2	5.3	5.5	2.2	2.3	1.7	2.2	0.7	9.0	1.9	1.4	0.7	1.6	4.7	2.3	7.3	38.3																					
28-Jul	0.4	0.2	0.2	0.3	Z	0.4	0.1	0.2	3.4	24.8	20.8	7.8	3.3	2.6	5.5	2.4	2.2	PF	1.6	2.0	6.8	14.1	21.4	15.4	6.2	24.8																					
29-Jul	12.1	19.9	24.4	17.8	14.4	Z	9.3	11.4	13.2	17.4	5.1	3.1	0.8	0.7	0.5	0.2	0.2	0.3	0.5	0.9	1.7	5.9	32.1	18.5	9.1	32.1																					
30-Jul	Z	19.0	12.5	5.9	3.9	2.8	7.2	8.7	11.3	8.1	7.3	5.3	5.1	5.3	0.3	1.5	0.8	0.8	1.7	6.3	8.8	3.1	2.6	1.9	5.7	19.0																					
31-Jul	8.2	Z	3.2	0.7	3.9	9.0	4.8	8.3	4.8	2.1	2.2	1.8	0.4	0.1	0.0	0.6	0.4	0.5	1.4	1.1	0.5	2.2	4.2	13.2	3.2	13.2																					
																						4.0	5.4	5.7	5.3	6.7	7.0	11.7	9.3	10.9	12.3	10.1	6.1	3.8	3.0	2.6	2.7	2.5	2.7	3.0	3.4	3.2	3.5	5.0	5.0	Diurnal Average	
																						12.8	19.9	24.4	22.1	32.5	34.8	64.2	29.7	31.6	58.3	73.7	42.3	15.2	9.2	7.0	12.0	12.2	10.6	21.6	18.9	8.8	14.1	32.1	18.5	Diurnal Maximum	
Z - zerospan																						C - Calibration			PF - Power Failure																						



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay South - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	669	94.63	94.63
21 - 40	31	4.38	99.01
41 - 80	7	0.99	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay South - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	79	44	17	7	4	9	40	55	57	52	60	58	34	49	50	53	668
21 - 40	7	1	1	0	1	2	1	3	2	2	4	2	0	1	1	3	31
11 - 80	1	4	0	0	0	0	0	2	0	0	0	0	0	0	0	0	7
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	87	49	18	7	5	11	41	60	59	54	64	60	34	50	51	56	706

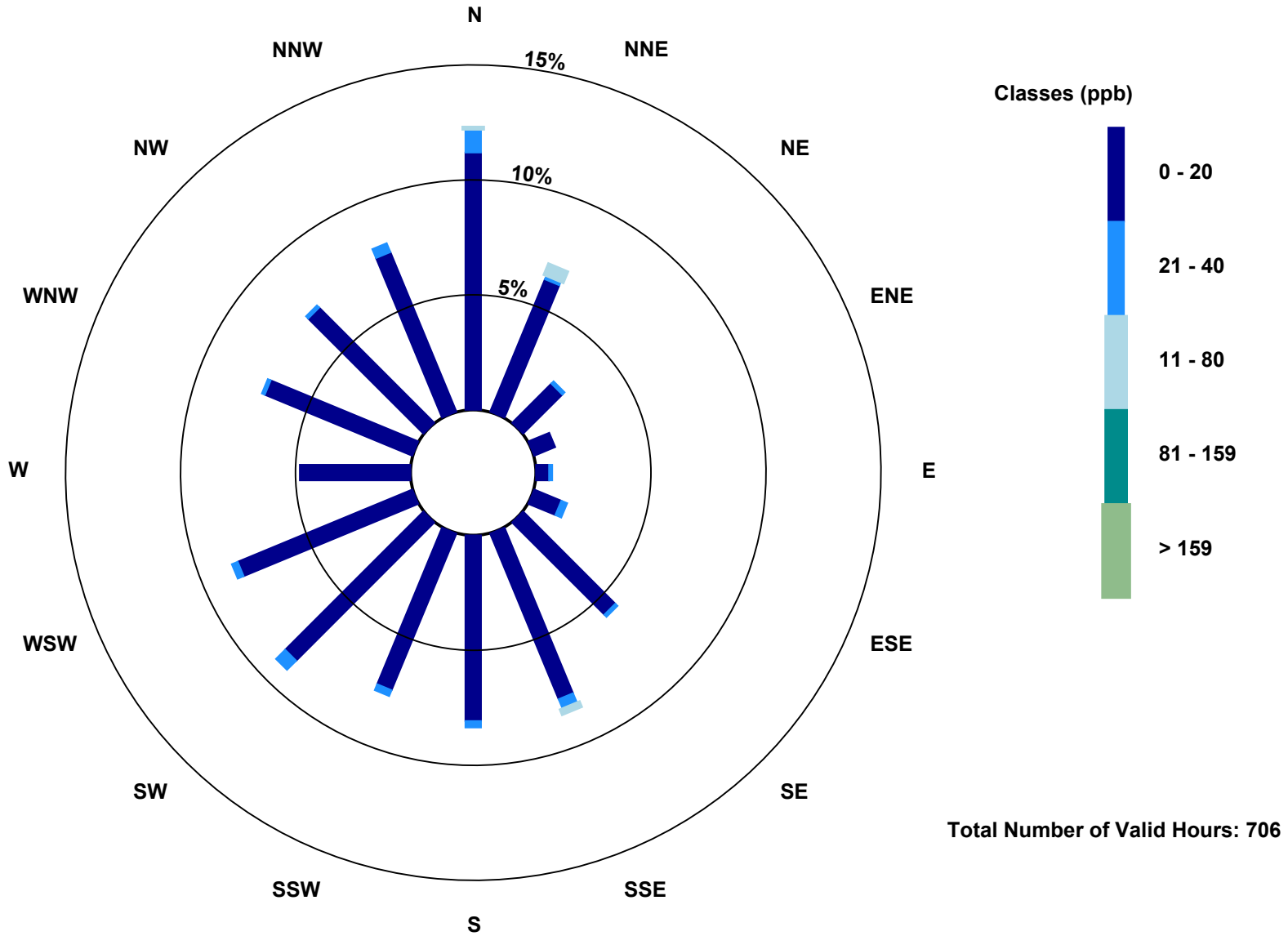
Total Number of Valid Hours: 706

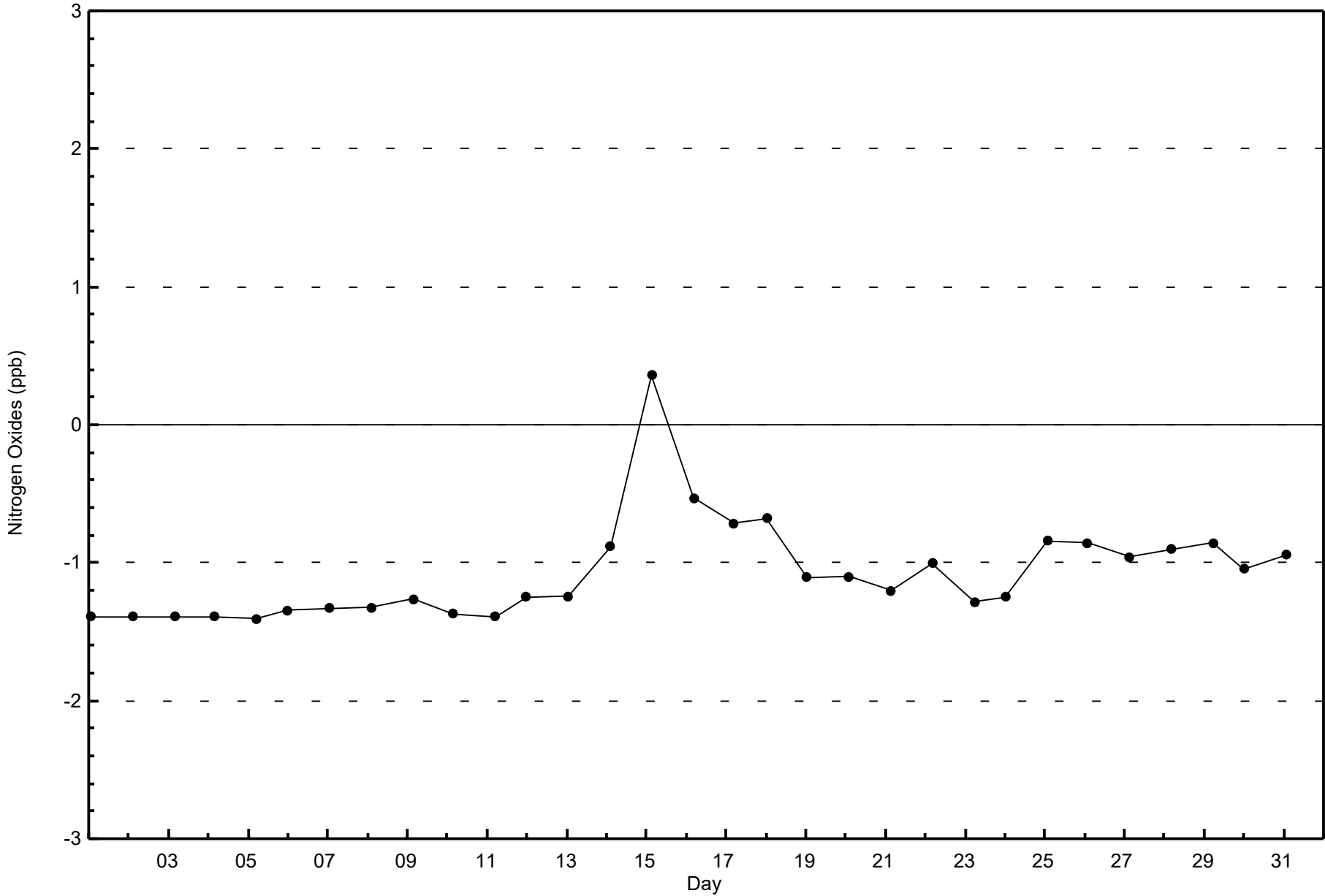
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Fort McKay South

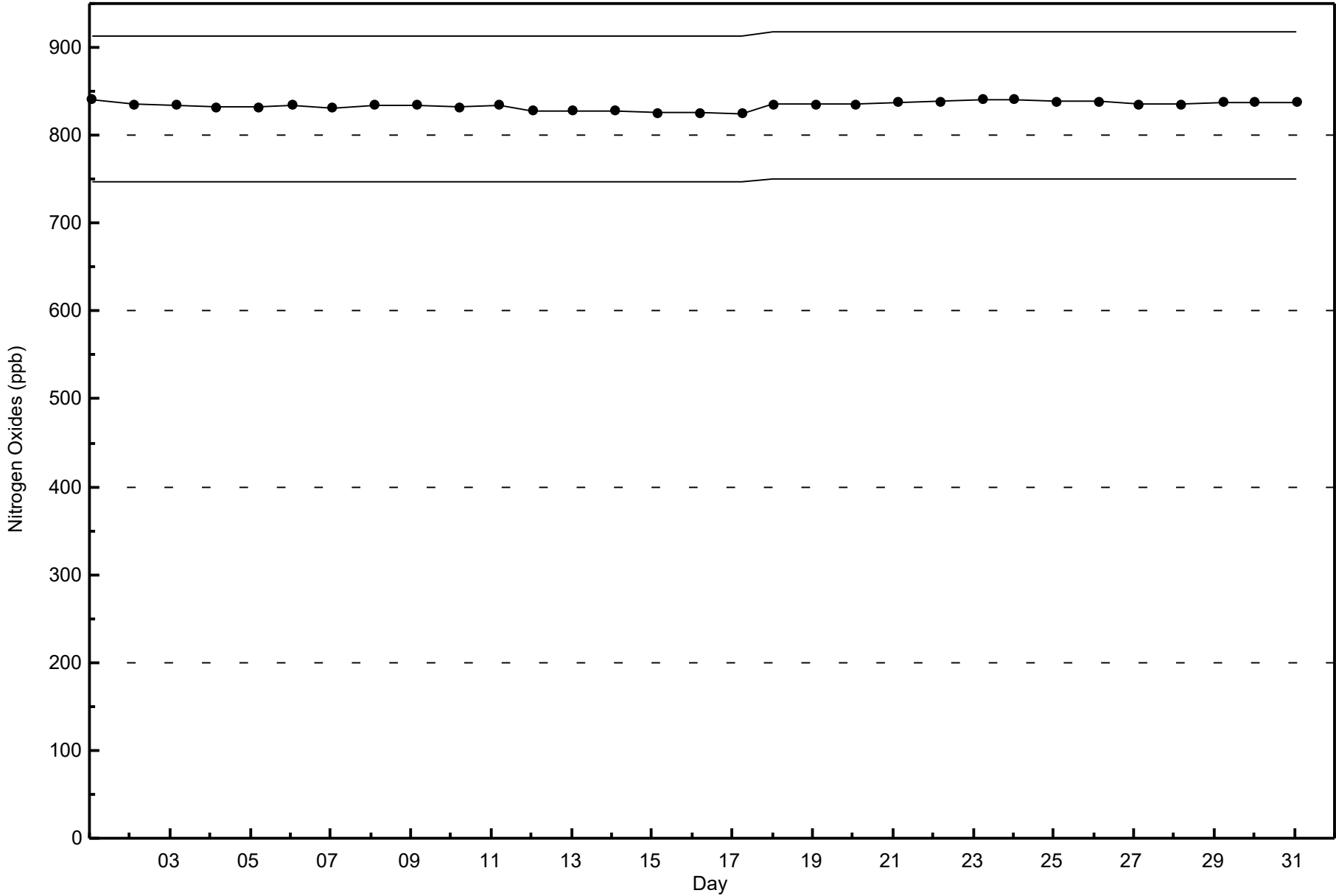






Wood Buffalo Environmental Association
Span Responses

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - July 2023





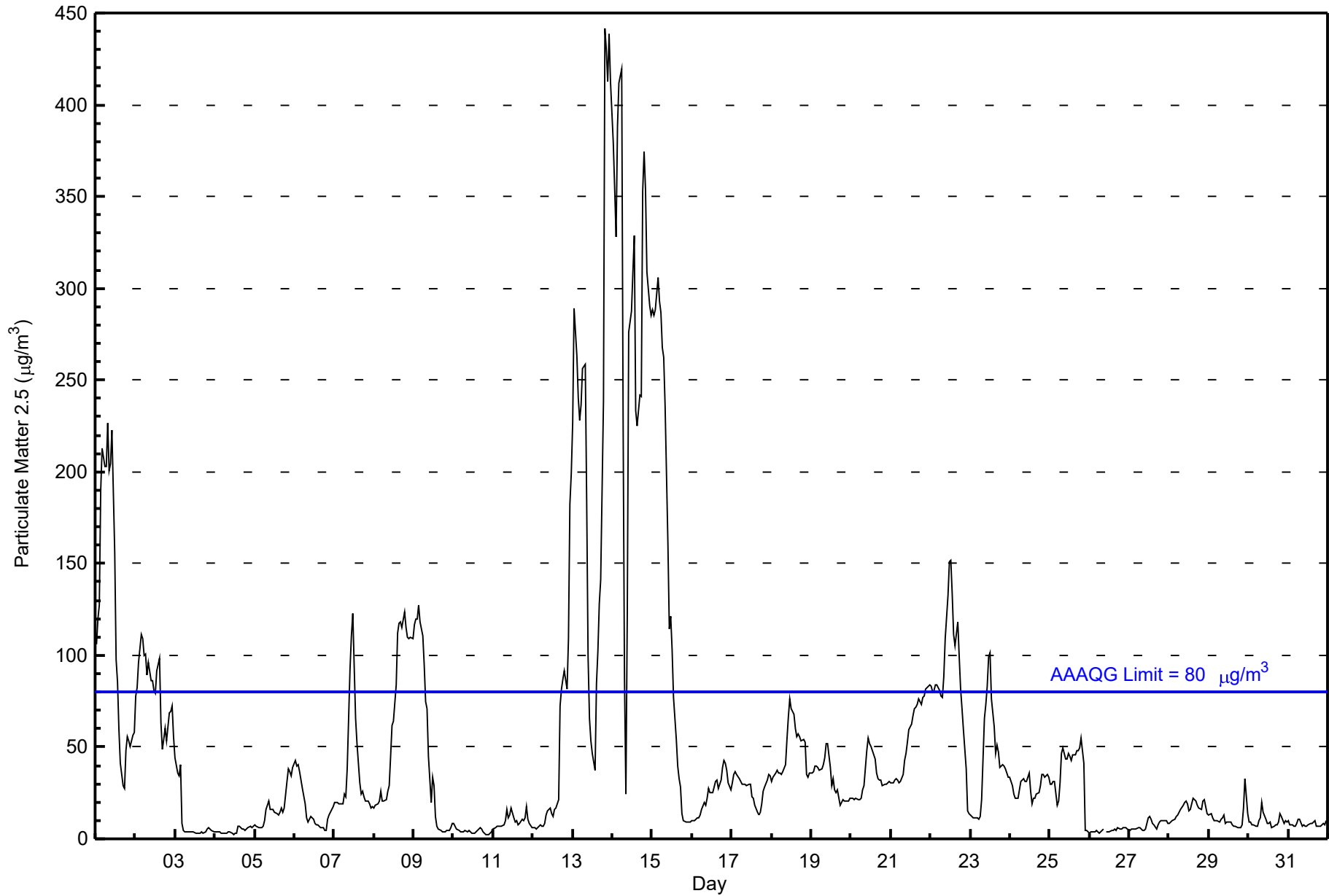
Summary of Hour Averages

Fort McKay South - July 2023

Number of Exceedences (AAAQO):	1-hr: 134	24-hr: 16	Hours in Service:	744
Maximum Value: 441.8 µg/m ³ on Jul 13 20:00	Maximum Daily Average: 285.6 µg/m ³ on Jul 14		Hours of Data:	743
Minimum Value: 2.2 µg/m ³ on Jul 10 20:00	Minimum Daily Average: 4.2 µg/m ³ on Jul 10		Hours of Missing Data:	1
Maximum Diurnal Average: 60.6 µg/m ³ at hour 4	Minimum Diurnal Average: 38.8 µg/m ³ at hour 16		Hours of Calibration:	1
Monthly Average: 51.00 µg/m ³	Percentiles: P ₁ = 2.8 P ₁₀ = 4.8 Q ₁ = 8.6 Median = 22.4 Q ₃ = 53.9 P ₉₀ = 117.8 P ₉₉ = 384.1		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	105.9	119.9	127.5	189.9	213.1	203.0	202.8	226.5	200.8	204.6	222.7	156.7	97.3	85.3	59.8	41.2	29.1	27.1	47.9	55.4	53.3	50.5	56.3	58.0	118.1	226.5
2-Jul	77.5	82.6	96.1	111.5	108.7	99.7	100.6	89.4	96.2	86.4	85.9	80.6	79.5	91.6	98.2	63.3	48.5	53.8	60.3	53.5	68.7	69.5	72.5	55.6	80.4	111.5
3-Jul	44.3	36.1	34.2	40.7	8.5	4.8	4.2	3.8	4.0	3.7	3.7	3.6	3.4	3.3	3.3	3.2	3.6	2.8	4.2	5.1	5.8	5.2	4.7	4.1	10.0	44.3
4-Jul	4.1	3.9	3.5	3.4	3.4	3.3	3.2	3.4	4.1	3.8	2.8	2.4	2.8	3.4	6.8	7.2	5.1	5.3	4.6	5.0	6.1	6.7	6.2	7.1	4.5	7.2
5-Jul	7.4	7.1	6.4	6.1	6.4	6.7	9.6	15.7	20.2	16.0	15.8	15.8	14.8	13.8	13.3	14.6	16.7	14.8	16.5	31.0	37.9	36.3	34.2	38.9	17.3	38.9
6-Jul	42.6	39.6	40.7	36.7	31.8	27.2	19.4	11.8	9.2	11.0	12.2	10.4	8.4	8.0	7.4	7.0	5.9	5.8	4.4	4.5	10.4	13.3	16.2	17.4	16.7	42.6
7-Jul	19.7	20.1	20.0	19.0	19.0	19.3	24.8	22.7	38.2	92.2	110.3	122.5	94.0	65.3	51.9	30.7	24.2	26.3	23.2	20.5	20.7	19.4	17.0	17.3	39.1	122.5
8-Jul	16.8	18.2	19.1	20.6	25.8	20.9	20.7	21.3	25.6	29.3	45.0	62.0	64.2	83.8	112.3	117.5	118.3	115.5	123.9	114.8	109.8	109.3	109.8	109.3	67.2	123.9
9-Jul	116.6	119.4	119.9	127.2	117.9	110.3	94.8	74.9	70.9	44.7	19.8	33.5	28.7	12.2	6.7	5.5	4.9	3.7	3.6	3.8	4.6	4.6	6.1	8.3	47.6	127.2
10-Jul	8.8	6.7	5.1	4.5	4.0	3.7	3.5	4.5	3.8	4.7	3.7	2.8	2.8	3.1	4.3	5.2	5.9	5.0	3.8	2.2	2.6	2.5	2.8	4.0	4.2	8.8
11-Jul	5.5	6.2	6.7	6.8	6.6	6.9	8.0	9.6	16.1	11.3	13.3	17.0	11.2	9.3	9.6	7.9	8.2	10.5	10.1	11.5	17.2	10.8	8.1	6.3	9.8	17.2
12-Jul	5.8	5.7	5.5	6.0	7.7	7.0	6.5	8.6	13.0	15.5	17.2	13.6	12.1	15.9	16.5	21.7	72.8	82.0	86.7	91.8	81.3	109.2	182.1	199.0	45.1	199.0
13-Jul	226.3	288.8	263.5	239.9	228.0	236.4	256.5	258.9	183.6	99.2	65.3	53.6	46.4	37.7	84.7	101.9	128.0	141.4	239.1	441.8	430.1	413.0	438.6	412.5	221.5	441.8
14-Jul	379.0	353.9	327.9	387.9	411.8	419.6	230.0	87.3	24.1	123.3	276.2	287.5	309.0	329.0	233.6	224.9	241.7	240.8	353.0	374.7	354.0	309.1	290.3	285.2	285.6	419.6
15-Jul	287.9	285.1	288.6	306.0	293.0	287.1	267.8	262.1	235.5	161.2	114.5	121.3	103.1	76.7	53.9	40.0	32.7	28.1	13.4	9.6	9.4	9.2	9.2	9.4	137.7	306.0
16-Jul	9.6	9.7	10.9	11.5	11.7	13.2	15.9	19.5	18.5	22.1	27.2	25.3	24.9	28.5	31.4	31.8	27.2	32.4	39.0	42.6	41.0	37.0	30.6	26.9	24.5	42.6
17-Jul	30.7	35.4	36.4	35.2	32.6	30.9	29.9	29.5	29.7	29.0	29.6	29.5	22.6	22.1	18.1	14.8	13.3	14.2	18.9	25.7	27.8	32.3	35.1	34.2	27.4	36.4
18-Jul	30.9	33.4	35.8	37.1	35.7	35.6	34.8	36.5	40.3	54.5	66.7	76.0	70.9	67.9	60.3	55.5	57.5	55.9	53.6	53.9	52.5	35.4	33.5	35.9	47.9	76.0
19-Jul	36.2	37.0	39.4	39.5	39.2	37.6	37.8	40.1	44.4	51.9	51.7	38.5	29.4	33.2	26.7	25.2	27.0	18.1	20.0	21.3	20.7	20.7	20.7	21.7	32.4	51.9
20-Jul	22.5	22.1	21.6	22.4	21.1	21.4	22.4	27.0	28.9	48.4	55.1	52.0	50.5	47.8	43.4	36.0	32.8	31.8	31.9	29.0	29.8	30.1	30.5	31.3	32.9	55.1
21-Jul	30.9	30.8	32.0	32.6	31.9	30.7	31.4	34.7	42.8	46.6	52.4	59.6	62.3	67.2	70.9	71.8	73.1	76.0	73.1	77.2	78.1	81.3	82.6	84.0	56.4	84.0
22-Jul	83.3	79.9	81.0	83.8	84.2	80.6	77.5	76.8	88.1	109.3	132.6	151.3	151.8	133.1	111.1	105.3	118.6	99.1	81.6	70.7	59.5	37.8	15.6	13.6	88.6	151.8
23-Jul	13.2	12.0	11.2	11.4	11.4	11.0	11.9	21.4	65.9	72.9	83.3	99.4	101.7	76.3	60.9	46.7	51.3	47.1	38.9	40.3	39.6	38.2	36.1	33.6	43.2	101.7
24-Jul	33.6	29.0	24.4	22.2	22.4	22.1	30.9	32.3	32.7	30.9	31.0	35.5	26.1	19.1	22.1	22.0	24.6	25.3	29.0	35.4	34.9	33.9	34.8	33.3	28.7	35.5
25-Jul	29.9	29.9	31.2	31.4	18.6	20.6	30.2	46.2	49.5	43.4	43.6	46.2	45.2	43.0	45.8	46.0	48.3	48.1	49.9	54.6	41.1	4.6	4.5	3.8	35.6	54.6
26-Jul	3.0	3.5	3.5	4.0	4.2	3.7	3.4	4.3	5.4	C	3.8	4.0	3.9	4.3	4.7	5.2	4.5	5.9	5.7	5.4	5.9	6.0	6.3	5.3	4.6	6.3
27-Jul	4.6	5.2	5.2	5.0	5.2	6.3	6.4	5.5	4.8	4.6	5.1	11.3	12.0	10.4	8.6	7.7	5.1	7.8	8.9	10.2	9.8	9.9	9.7	8.8	7.4	12.0
28-Jul	8.5	9.1	9.7	10.9	11.9	13.2	14.6	15.9	18.0	19.6	20.4	18.7	15.2	16.0	22.3	21.3	21.0	18.0	16.7	15.9	20.5	21.6	17.6	13.4	16.2	22.3
29-Jul	13.0	13.7	11.6	10.2	10.1	9.8	9.3	10.5	11.4	12.7	8.0	9.1	9.4	8.9	7.5	7.0	7.0	6.3	6.3	6.3	8.0	16.8	33.1	13.4	10.8	33.1
30-Jul	9.0	9.5	8.0	7.3	7.1	7.0	9.8	11.3	19.6	14.7	10.4	8.7	8.5	9.1	6.2	6.9	7.3	7.5	9.1	13.7	11.9	8.6	9.6	8.9	9.6	19.6
31-Jul	9.7	7.4	7.3	6.9	7.0	8.6	10.5	10.8	6.6	7.4	6.8	7.0	7.2	8.0	8.6	9.1	9.7	6.8	7.0	7.2	7.5	8.1	8.0	9.8	8.0	10.8
55.4 56.8 55.9 60.6 59.4 58.3 52.6 49.1 46.8 49.2 52.8 53.4 49.0 46.2 42.3 38.8 41.1 40.8 47.9 56.0 54.9 51.3 53.6 51.9																								Diurnal Average		
379.0 353.9 327.9 387.9 411.8 419.6 267.8 262.1 235.5 204.6 276.2 287.5 309.0 329.0 233.6 224.9 241.7 240.8 353.0 441.8 430.1 413.0 438.6 412.5																								Diurnal Maximum		

C - Calibration
 Alberta Ambient Air Quality Guideline/Objectives: 1-hr 80 µg/m³ 24-hr 29 µg/m³





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - July 2023**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
0 - 5	97	13.06	13.06
6 - 15	192	25.84	38.90
16 - 25	97	13.06	51.95
26 - 80	223	30.01	81.97
> 81.0	134	18.03	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort McKay South - July 2023

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	20	8	3	2	1	2	8	12	7	5	4	2	4	4	4	11	97
6 - 15	20	11	4	0	0	2	4	17	31	27	25	22	8	8	5	8	192
16 - 25	3	10	2	0	0	3	9	12	9	11	19	12	3	2	0	2	97
26 - 80	24	8	8	5	2	3	15	19	15	7	19	20	13	20	25	20	223
> 81.0	22	12	1	0	2	1	7	3	2	6	5	9	8	17	20	18	133
Totals	89	49	18	7	5	11	43	63	64	56	72	65	36	51	54	59	742

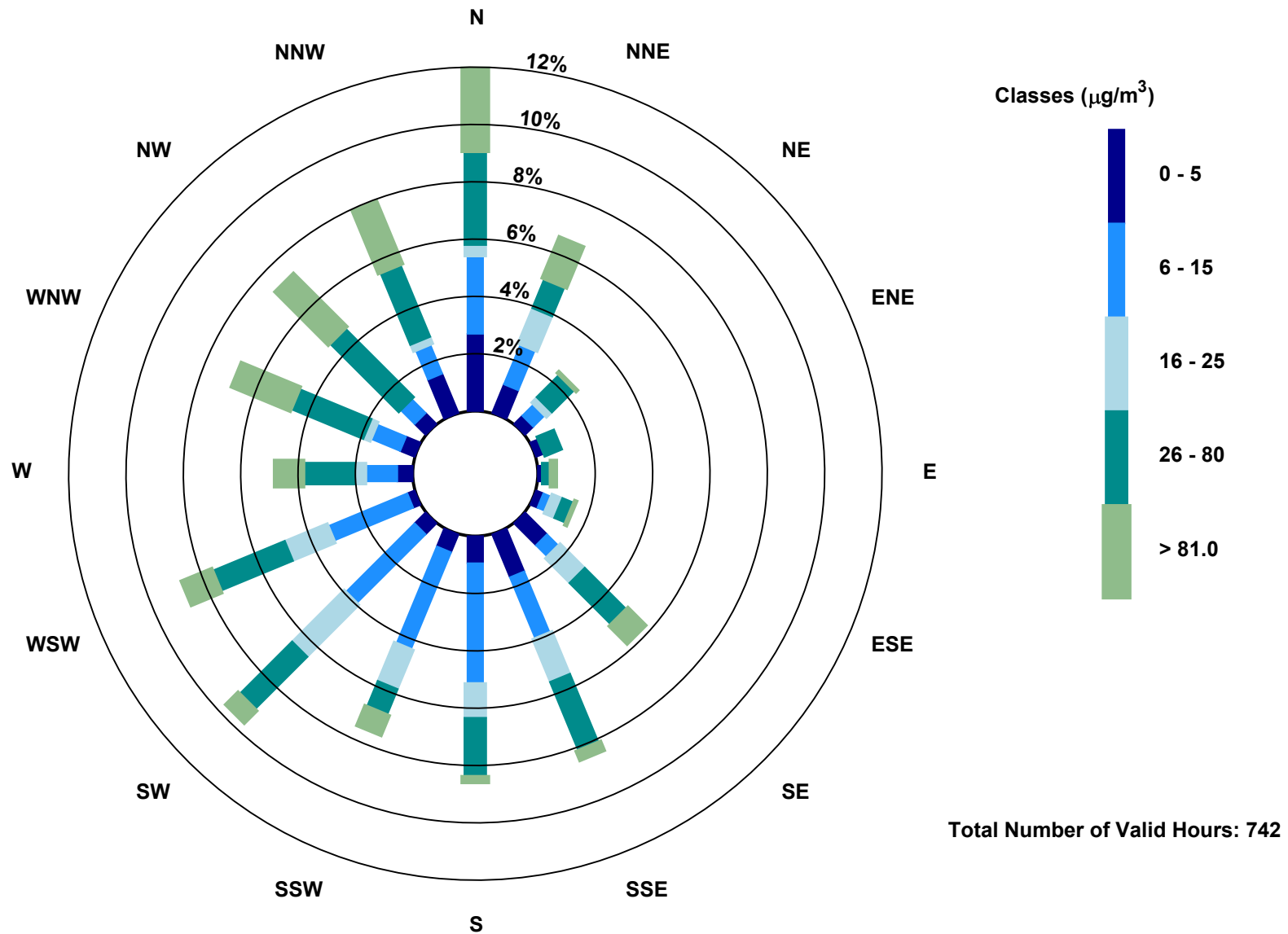
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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





Wood Buffalo Environmental Association
Summary of Hour Averages

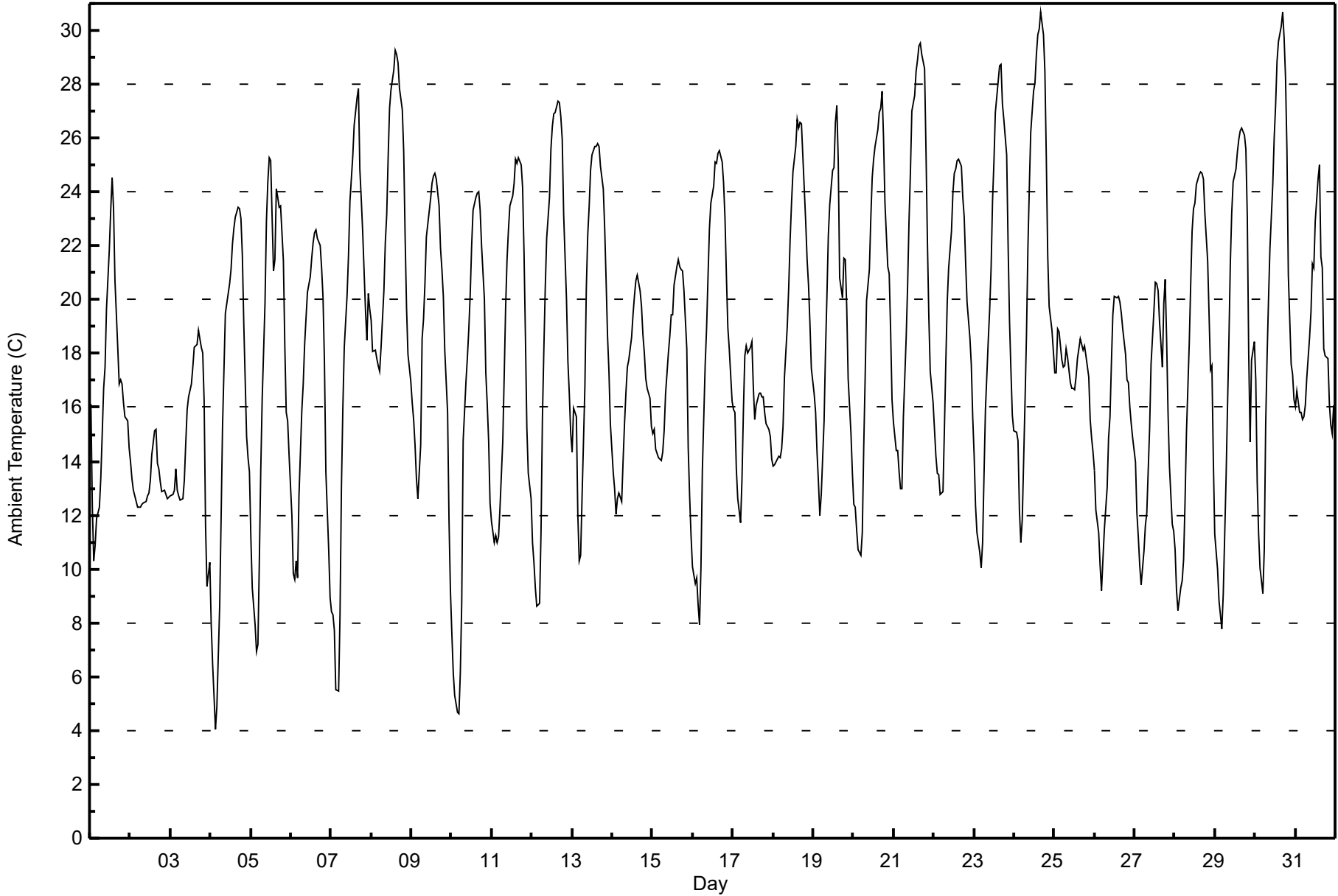
Ambient Temperature (AT) - C
Fort McKay South - July 2023

Maximum Value: 30.7 C on Jul 30 17:00 Maximum Daily Average: 22.7 C on Jul 8																						Hours in Service: 744 Hours of Data: 744																									
Minimum Value: 4.0 C on Jul 4 04:00 Minimum Daily Average: 13.1 C on Jul 2 Maximum Diurnal Average: 24.0 C at hour 15 Minimum Diurnal Average: 10.9 C at hour 5 Monthly Average: 18.12 C Percentiles: P ₁ = 5.8 P ₁₀ = 11.0 Q ₁ = 14.0 Median = 17.9 Q ₃ = 22.4 P ₉₀ = 25.5 P ₉₉ = 29.6																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	16.1	12.4	10.3	10.9	11.9	12.3	13.4	15.0	16.7	17.5	19.7	21.9	23.3	24.5	23.4	20.7	18.2	16.9	17.0	16.9	16.2	15.7	15.5	14.5	16.7	24.5																					
2-Jul	14.0	13.4	12.9	12.5	12.3	12.3	12.4	12.5	12.5	12.7	12.8	13.3	14.2	15.1	15.2	13.9	13.7	13.2	12.9	12.9	12.7	12.6	12.7	13.1	15.2																						
3-Jul	12.7	12.8	12.9	13.7	12.9	12.7	12.6	13.3	14.7	15.9	16.4	16.9	17.5	18.2	18.3	18.3	18.9	18.2	18.0	16.2	11.6	9.4	10.3	14.8	18.9																						
4-Jul	7.9	6.5	5.3	4.0	4.9	8.7	11.9	15.3	17.4	19.5	20.2	20.6	21.1	22.0	22.6	23.1	23.4	23.4	23.0	21.7	19.1	14.9	14.1	13.6	16.0	23.4																					
5-Jul	11.2	9.3	7.9	6.9	7.2	10.3	13.7	16.3	19.8	22.9	24.4	25.3	25.1	21.1	21.5	24.1	23.8	23.4	23.5	21.5	18.3	15.8	15.5	14.2	17.6	25.3																					
6-Jul	12.0	9.8	9.6	10.3	9.6	12.7	15.9	16.9	18.3	19.4	20.3	20.8	21.5	22.1	22.5	22.6	22.3	22.0	21.2	20.1	17.7	13.6	10.7	8.9	16.7	22.6																					
7-Jul	8.4	8.3	7.7	5.5	5.4	8.3	13.0	16.0	18.2	20.2	21.6	23.6	24.5	25.3	26.5	27.5	27.9	24.9	23.7	22.5	19.6	18.5	20.2	19.6	18.2	27.9																					
8-Jul	19.2	18.1	18.2	17.8	17.6	17.3	18.2	20.3	22.1	23.2	25.3	27.1	27.8	28.5	29.3	29.1	28.8	27.8	27.0	25.5	22.3	19.7	18.0	17.0	22.7	29.3																					
9-Jul	16.2	15.6	14.6	13.3	12.6	14.6	18.6	19.3	20.6	22.3	23.3	23.7	24.4	24.6	24.7	24.5	23.5	21.9	21.1	20.1	18.2	15.8	11.8	9.2	18.9	24.7																					
10-Jul	7.6	6.1	5.3	4.7	4.6	6.1	8.8	14.8	17.0	17.9	18.9	20.2	22.0	23.3	23.8	24.0	24.0	23.3	22.0	20.0	17.3	16.1	14.8	12.4	15.6	24.0																					
11-Jul	11.8	11.0	11.2	11.0	11.2	12.2	14.8	17.2	19.7	21.5	22.6	23.5	23.9	24.3	25.2	25.1	25.3	25.0	24.2	21.8	18.6	15.3	13.6	12.6	18.4	25.3																					
12-Jul	11.0	10.2	9.3	8.6	8.7	11.4	15.6	18.1	20.4	22.3	23.8	25.6	26.5	26.9	27.0	27.4	27.3	26.8	25.9	23.2	20.0	17.7	16.5	15.0	19.4	27.4																					
13-Jul	14.3	16.0	15.7	12.0	10.3	10.5	12.7	16.8	20.4	22.4	23.4	24.8	25.4	25.7	25.7	25.8	25.7	25.0	24.1	22.6	20.7	18.7	17.3	15.4	19.6	25.8																					
14-Jul	13.6	13.0	12.0	12.6	12.8	12.5	14.0	15.4	16.6	17.5	17.8	18.6	19.5	20.1	20.7	20.9	20.3	19.8	18.7	18.0	17.1	16.7	16.4	15.3	16.7	20.9																					
15-Jul	15.0	15.2	14.5	14.1	14.1	14.0	14.4	15.1	16.5	18.0	18.7	19.4	19.4	20.6	21.2	21.5	21.3	21.1	21.1	20.3	18.2	14.5	12.7	11.2	17.2	21.5																					
16-Jul	10.1	9.4	9.6	8.7	7.9	10.0	13.6	17.6	19.0	20.8	22.6	23.6	24.2	25.1	25.1	25.4	25.5	25.1	24.3	23.0	20.8	19.0	18.2	16.2	18.5	25.5																					
17-Jul	15.9	15.8	13.7	12.6	11.7	13.3	15.9	17.9	18.3	18.0	18.2	18.4	16.8	15.6	16.1	16.5	16.5	16.4	16.4	15.8	15.4	15.2	14.9	14.1	15.8	18.4																					
18-Jul	13.8	13.9	14.1	14.2	14.2	14.5	15.3	17.2	19.0	20.5	22.2	23.6	24.8	25.7	26.7	26.4	26.6	26.6	25.3	22.9	21.5	20.5	19.1	17.4	20.2	26.7																					
19-Jul	16.5	15.8	14.3	13.3	12.0	12.8	15.5	18.1	20.1	22.4	23.5	24.8	24.9	26.6	27.2	25.2	20.8	20.1	21.5	21.5	19.7	17.1	15.0	13.6	19.3	27.2																					
20-Jul	12.4	12.3	11.5	10.7	10.5	11.3	14.5	17.1	20.0	21.1	23.0	24.5	25.2	25.7	26.3	27.0	27.1	27.7	26.0	23.6	21.2	21.0	18.8	16.3	19.8	27.7																					
21-Jul	15.4	14.4	14.4	13.6	13.0	13.0	15.6	18.6	20.5	22.9	24.8	27.0	27.6	28.5	28.9	29.4	29.5	29.1	28.6	25.5	22.2	19.4	17.3	16.2	21.5	29.5																					
22-Jul	15.2	14.2	13.6	13.5	12.8	12.9	15.2	17.6	19.9	21.2	22.5	23.9	24.7	24.9	25.2	25.2	25.0	23.8	23.1	21.4	19.9	18.6	17.6	15.7	19.5	25.2																					
23-Jul	14.2	12.4	11.4	10.6	10.0	11.0	13.5	15.9	18.5	19.6	21.2	23.7	25.1	27.0	28.1	28.7	28.7	27.3	26.7	25.4	22.1	19.3	17.4	15.7	19.7	28.7																					
24-Jul	15.1	15.1	14.8	12.2	11.0	11.8	16.3	18.7	21.9	24.2	26.2	27.7	28.1	29.1	29.9	30.1	30.7	29.8	28.5	25.2	21.7	19.8	18.9	18.1	21.9	30.7																					
25-Jul	17.3	17.3	18.9	18.8	17.8	17.5	17.5	18.2	17.9	16.9	16.7	16.7	16.6	17.1	17.8	18.5	18.3	18.2	18.3	17.9	17.1	15.5	14.9	14.3	17.3	18.9																					
26-Jul	13.7	12.2	11.4	10.1	9.2	10.4	11.4	13.1	14.8	15.7	17.6	19.4	20.1	20.1	19.9	19.5	18.9	18.0	17.0	16.9	16.0	15.4	14.9	15.7	20.1																						
27-Jul	14.0	12.1	11.2	10.1	9.4	10.7	11.6	12.1	13.6	15.2	17.6	19.6	20.7	20.6	20.4	19.2	17.5	19.8	20.7	18.6	15.8	13.8	11.7	11.4	15.3	20.7																					
28-Jul	10.7	9.2	8.4	9.3	9.5	10.4	12.5	15.0	18.4	20.5	22.5	23.4	23.6	24.3	24.6	24.7	24.7	24.5	23.2	21.5	19.5	17.4	17.6	14.1	17.9	24.7																					
29-Jul	11.3	10.0	8.8	8.3	7.8	9.1	13.3	16.0	18.4	21.3	23.2	24.4	24.8	25.5	26.0	26.3	26.4	26.1	25.6	23.1	18.0	14.7	17.8	18.5	18.5	26.4																					
30-Jul	17.0	13.2	11.3	10.1	9.1	10.7	15.4	17.9	20.0	21.9	24.3	26.0	27.2	28.9	29.6	30.1	30.7	29.7	28.3	25.6	20.9	17.6	17.2	16.3	20.8	30.7																					
31-Jul	16.0	16.6	15.8	15.8	15.5	15.7	16.1	17.1	18.6	19.5	21.4	21.2	22.9	24.5	25.0	21.6	21.2	18.2	17.9	17.8	16.2	15.3	15.1	16.1	18.4	25.0																					
																						13.5	12.6	12.0	11.3	10.9	12.0	14.3	16.4	18.3	19.8	21.2	22.3	23.0	23.5	24.0	24.0	23.6	23.1	22.5	21.0	18.8	16.7	15.7	14.5	Diurnal Average	
																						19.2	18.1	18.9	18.8	17.8	17.5	18.6	20.3	22.1	24.2	26.2	27.7	28.1	29.1	29.9	30.1	30.7	29.8	28.6	25.6	22.3	21.0	20.2	19.6	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Fort McKay South - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Fort McKay South - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	48	6.45	6.45
10 - 20	418	56.18	62.63
> 20	278	37.37	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

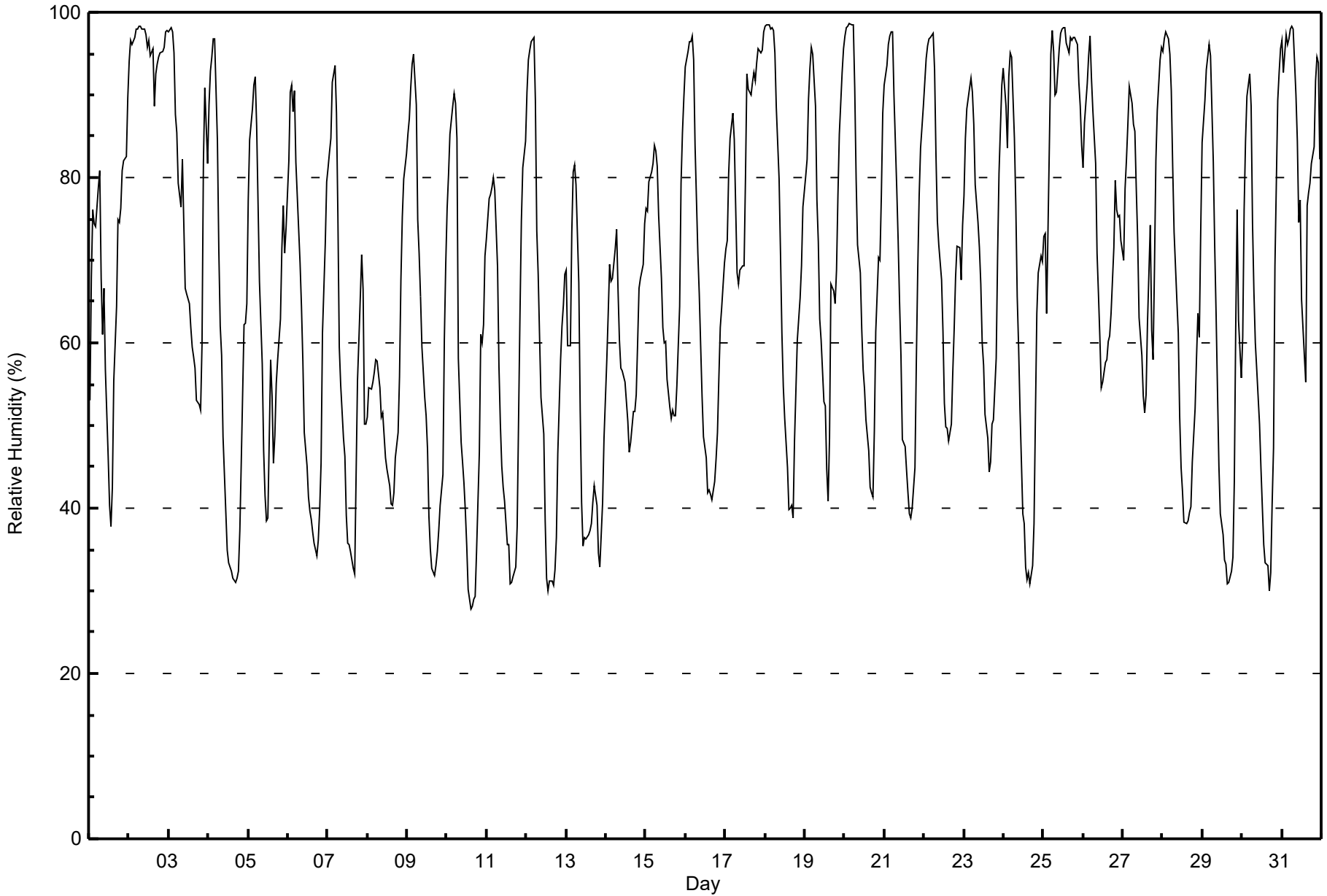
Relative Humidity (RH) - %
Fort McKay South - July 2023

Maximum Value: 98.6 % on Jul 20 04:00 Maximum Daily Average: 96.0 % on Jul 2 Minimum Value: 27.8 % on Jul 10 15:00 Minimum Daily Average: 50.0 % on Jul 13 Maximum Diurnal Average: 90.5 % at hour 5 Minimum Diurnal Average: 47.0 % at hour 15 Monthly Average: 67.45 % Percentiles: P ₁ = 30.8 P ₁₀ = 38.2 Q ₁ = 50.2 Median = 68.1 Q ₃ = 86.5 P ₉₀ = 95.5 P ₉₉ = 98.3																								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 Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	53.1	68.0	76.1	74.4	74.1	78.7	80.8	67.8	60.9	66.6	56.8	46.2	40.3	37.8	42.6	55.5	64.4	75.0	74.5	76.3	80.8	82.0	82.6	89.7	66.9	89.7																						
2-Jul	94.0	96.6	96.1	97.0	97.9	98.0	98.3	98.3	98.0	97.9	97.3	95.8	96.6	94.8	95.5	88.6	92.6	93.7	94.6	95.0	95.3	95.8	97.6	97.7	96.0	98.3																						
3-Jul	97.7	98.1	97.7	95.1	87.7	85.4	79.3	76.4	82.2	74.4	66.6	65.9	64.7	61.8	59.6	58.4	56.9	53.0	52.5	51.8	59.8	81.9	90.9	81.7	74.1	98.1																						
4-Jul	88.8	92.9	94.5	96.7	96.7	84.5	71.2	62.1	58.5	48.6	39.5	35.0	33.4	32.8	32.4	31.5	31.1	31.5	32.4	37.3	45.5	62.2	62.4	64.8	56.9	96.7																						
5-Jul	77.3	84.6	88.3	91.2	92.2	86.3	77.0	67.5	57.5	47.0	41.6	38.4	38.8	58.0	53.5	45.4	48.8	55.1	57.9	62.9	71.3	76.5	70.8	73.9	65.1	92.2																						
6-Jul	82.1	90.4	91.2	88.0	90.6	81.8	73.7	69.7	64.4	57.8	49.2	45.1	41.4	39.6	38.7	37.1	35.7	34.3	36.1	39.8	45.5	61.1	72.0	79.4	60.2	91.2																						
7-Jul	81.1	83.1	84.7	91.6	93.5	87.8	75.5	59.5	54.9	48.4	46.3	39.2	35.8	35.7	34.7	32.7	32.0	43.9	55.5	60.3	70.6	66.5	50.1	50.2	58.9	93.5																						
8-Jul	51.0	54.5	54.3	55.3	56.5	58.0	57.7	54.5	51.0	51.5	48.9	46.0	44.7	42.8	40.6	40.3	41.8	46.1	49.1	55.9	67.7	75.3	79.9	82.8	54.4	82.8																						
9-Jul	85.2	87.1	90.8	93.8	94.9	88.8	75.0	70.8	65.7	59.5	53.4	51.3	47.1	39.1	35.1	32.7	31.9	33.0	34.8	37.3	40.3	44.0	60.4	69.6	59.2	94.9																						
10-Jul	76.2	80.4	85.3	88.6	90.2	89.0	84.7	58.2	48.0	45.7	43.1	39.7	35.4	30.1	27.8	28.1	29.0	29.3	34.7	46.8	60.9	59.9	62.1	70.5	56.0	90.2																						
11-Jul	72.6	77.5	78.0	78.8	80.1	78.5	69.2	57.1	50.2	45.1	42.5	40.8	35.6	35.6	30.8	31.0	31.7	32.9	37.8	50.6	63.4	74.7	81.2	84.4	56.7	84.4																						
12-Jul	90.3	94.3	95.4	96.4	97.0	89.3	73.5	68.3	60.7	53.4	49.0	38.4	31.5	29.9	31.2	31.2	30.7	32.6	36.4	46.6	58.0	62.0	64.6	68.4	59.6	97.0																						
13-Jul	68.8	59.7	59.6	73.3	80.8	81.5	79.1	67.3	51.9	40.6	35.5	36.4	36.3	36.8	37.3	38.1	40.7	42.7	40.3	34.5	32.9	36.8	40.7	48.5	50.0	81.5																						
14-Jul	58.0	63.5	69.5	67.5	67.8	71.3	73.7	66.4	60.4	56.9	56.7	55.3	52.8	50.5	46.8	48.0	51.8	51.7	53.7	60.0	66.6	67.7	69.5	74.4	60.9	74.4																						
15-Jul	76.3	75.9	79.5	80.7	81.7	83.8	83.3	81.3	75.5	67.8	61.9	60.0	60.1	55.5	52.2	50.9	51.9	51.1	51.1	54.7	64.3	79.4	85.4	89.6	68.9	89.6																						
16-Jul	93.4	95.3	96.5	96.4	97.1	94.2	83.9	70.9	65.9	59.7	53.6	48.6	46.1	41.8	42.1	41.7	41.0	43.2	46.0	49.2	55.7	61.8	64.2	69.6	64.9	97.1																						
17-Jul	71.3	72.4	80.5	84.7	87.9	84.6	76.4	68.4	67.2	68.8	69.3	69.3	80.0	92.5	90.6	90.1	91.5	92.8	91.7	93.9	95.6	95.1	95.4	97.7	83.6	97.7																						
18-Jul	98.4	98.5	98.4	98.0	98.1	97.9	95.0	88.5	79.9	70.8	61.2	54.8	50.8	44.9	39.9	40.0	40.3	38.8	48.1	60.3	62.9	65.4	69.4	76.4	69.9	98.5																						
19-Jul	80.1	82.2	89.5	93.2	95.8	94.9	88.7	77.3	72.3	62.9	60.3	52.8	52.4	44.7	40.8	48.5	67.1	66.3	64.7	68.9	77.8	85.3	92.8	95.6	73.1	95.8																						
20-Jul	97.1	98.1	98.4	98.6	98.5	98.6	90.8	79.9	71.8	68.5	61.7	56.8	54.4	50.7	46.9	42.5	41.8	41.3	49.4	61.4	70.4	70.0	77.8	87.8	71.4	98.6																						
21-Jul	91.1	93.5	96.1	97.1	97.6	97.6	90.0	78.6	72.3	65.0	58.5	48.4	47.4	44.5	41.9	39.3	38.8	40.0	44.9	57.9	69.0	77.7	83.5	88.7	69.1	97.6																						
22-Jul	91.5	94.5	95.9	96.8	97.0	97.4	93.0	82.8	74.8	71.9	67.6	61.3	52.8	49.8	49.7	48.1	50.2	56.4	61.7	68.0	71.7	71.5	67.6	74.2	72.8	97.4																						
23-Jul	77.8	84.8	88.3	90.8	92.0	90.3	86.5	79.2	74.6	71.5	67.2	60.0	57.4	51.4	48.4	44.4	45.6	50.3	50.7	58.1	70.6	80.4	86.0	91.2	70.7	92.0																						
24-Jul	93.3	88.6	83.5	92.2	95.2	94.6	84.7	76.6	65.6	59.5	51.9	39.4	38.1	32.9	31.3	32.3	30.8	33.0	38.2	51.2	63.6	68.5	70.5	69.8	61.9	95.2																						
25-Jul	72.9	73.2	63.5	73.9	95.0	97.8	95.2	90.1	90.3	95.6	97.5	98.0	98.1	98.2	96.3	95.1	96.9	96.7	98.9	97.0	96.1	91.6	88.6	83.9	90.8	98.2																						
26-Jul	81.2	86.6	91.4	94.8	97.1	92.0	88.1	81.7	70.9	66.0	60.7	54.6	55.3	57.6	57.9	60.2	60.8	63.6	71.5	79.7	76.1	75.2	75.5	72.4	73.8	97.1																						
27-Jul	70.0	78.6	82.3	86.5	91.0	89.1	86.5	85.6	78.6	72.6	63.1	58.4	53.6	51.5	53.8	62.4	74.3	61.5	57.9	69.2	82.1	88.1	94.2	95.8	74.4	95.8																						
28-Jul	95.2	96.7	97.6	96.9	94.9	90.5	81.3	73.4	65.0	61.2	51.1	44.9	42.0	38.3	38.1	38.6	39.5	40.2	45.5	52.0	58.1	63.6	60.7	73.4	64.1	97.6																						
29-Jul	84.2	89.3	93.1	94.6	96.1	94.7	81.9	71.7	63.3	54.1	45.1	39.3	36.7	33.7	33.3	30.9	31.0	32.4	34.1	43.2	61.9	76.1	62.7	55.8	60.0	96.1																						
30-Jul	60.7	76.1	84.4	89.8	92.5	88.7	74.4	66.0	60.1	56.7	50.2	44.9	40.1	35.5	33.4	33.0	30.0	32.2	40.5	47.4	69.4	89.3	92.7	95.6	61.8	95.6																						
31-Jul	96.6	92.7	97.3	96.0	96.9	97.9	98.3	97.9	90.0	84.4	74.6	77.3	65.3	58.4	55.2	76.7	78.1	79.3	81.6	83.7	91.7	94.6	93.9	82.3	85.0	98.3																						
80.9																								84.1	86.4	88.7	90.5	88.5	82.2	74.0	67.8	62.9	57.5	53.0	50.5	48.6	47.0	47.5	49.3	50.8	53.7	59.7	67.6	73.6	75.7	78.6	Diurnal Average	
98.4																								98.5	98.4	98.6	98.5	98.6	98.3	98.3	98.0	97.9	97.5	98.0	98.1	98.2	96.3	95.1	96.9	96.7	96.9	97.0	96.1	95.8	97.6	97.7	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Fort McKay South - July 2023





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Fort McKay South - July 2023

Maximum Speed: 25 km/h on Jul 3 11:00	Maximum Daily Speed Average: 14.3 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 29 00:00	Minimum Daily Speed Average: 0.9 km/h on Jul 24	Hours of Data: 743
Maximum Diurnal Speed Average: 2.6 km/h at hour 11	Minimum Diurnal Speed Average: 0.4 km/h at hour 8	Hours of Missing Data: 1
Monthly Average Velocity: 0.9 km/h 309.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 9 P ₉₀ = 13 P ₉₉ = 20	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	W5	SSW3	S4	SW4	SSE2	SSW1	WNW2	SW4	SSW4	SE4	SE7	SE12	SE14	SE14	SSE13	SSW15	WSW8	W5	WNW4	WSW2	W1	SW4	WNW2	WSW4	S3.9	SSW15
2-Jul	W7	W7	WSW8	WSW8	WSW9	WSW9	WNW7	NW10	NNW10	NW10	NW11	NW12	WNW9	W9	W8	NW13	NW8	WNW10	WNW8	W8	W9	WNW7	WNW5	WNW6	WNW7.9	NW13
3-Jul	WNW6	WNW6	WNW8	NNW13	N17	NNW20	N25	N20	NNW18	NNW23	N25	N20	NNW21	NNW24	N21	N18	N15	N13	NNW12	NNW11	NNW8	W3	WNW4	NW5	NNW14.3	N25
4-Jul	WNW2	W2	SW2	SW2	W1	SSE2	WSW1	ENE3	ENE3	ESE3	NE5	NE8	NNE7	E5	S9	S10	S8	SSE10	SSE12	SSE12	S8	S6	SSE6	SSE7	SSE3.3	SSE12
5-Jul	SW1	WSW2	SSW3	SSW3	SW2	SW2	S3	SSE7	SSW8	SW10	SW10	SSW5	WSW3	WSW2	SW7	S9	WSW5	W7	WNW6	NW5	NW5	NW6	NW6	NW4	WSW3.3	SW10
6-Jul	NNW3	NW2	WNW5	NNW5	WNW4	NW3	NNE4	N11	NNE12	N14	N17	N15	N14	NNE12	NNE13	NNE14	N15	N14	N14	N12	NNW7	NW3	SW2	SSW2	N8.2	N17
7-Jul	SW3	N1	SSE1	SSW2	S3	S4	SSE4	SW5	WSW4	NE1	E4	ESE6	S6	S8	S8	SW8	SW9	SW4	SW4	SW3	WSW5	SW6	SW7	WSW8	SSW3.6	SW9
8-Jul	W8	WSW9	WSW9	WSW9	WSW9	WSW8	WSW5	WSW5	WSW3	WSW3	W4	WNW4	ESE8	SSE4	NNW3	NNW7	N7	N8	N6	NNW4	WNW3	WNW2	WSW2	WSW1	W3.0	WSW9
9-Jul	NNW2	NW4	NNW3	SW2	WSW3	WNW0	NNE4	N9	N10	N13	NNE14	N15	NNE14	NNE16	N16	NNE16	NNE15	NNE13	NNE12	N9	N8	NNW8	NNW5	NNW5	N8.5	NNE16
10-Jul	NW4	W2	NW3	NW4	NW3	WNW3	WNW2	SE8	SE12	SE13	SSE11	SSE9	SSE8	SSE12	SSE13	SSE12	SSE10	SSE10	SE6	ESE2	W2	S3	SSW1	WSW2	SSE4.6	SSE13
11-Jul	W2	WNW3	NW2	SW2	SSE2	S3	S6	SSE8	SSE11	S10	S7	SSW9	SSW11	SSW10	S13	S12	SSW9	S8	S5	SW4	WSW3	SSW3	SE0	WSW1	S5.4	S13
12-Jul	SW3	WSW3	SSW3	WSW2	WSW2	SSE3	NE2	NE4	NNE6	NNE9	NNE8	NNE9	N12	NNE13	NNE12	NNE10	NNE9	N11	N7	NNW5	WNW4	WNW3	WNW5	NW2	N4.5	NNE13
13-Jul	NW6	NW7	NW6	SSW2	SSE4	SSW4	SSW2	NW5	NNW11	N16	N20	N20	N22	N20	NNW18	N16	N13	N15	N19	NNW16	NNW13	NW9	NW9	NNW6	NNW10.3	N22
14-Jul	NW5	NW5	NW5	WNW5	WNW6	NW5	NNW10	NNW13	N14	N16	N13	NNE11	N11	N11	N13	N12	NNE9	N11	N12	NNW7	NW4	NNW7	NNW5	WNW4	NNW8.1	N16
15-Jul	NW4	WNW4	WNW3	W3	WNW3	UO	W3	W3	WNW4	NNE7	NNE9	NNE10	NNE10	NNE9	NNE11	NNE11	N12	N10	NNE7	NNE7	N2	WSW2	WSW2	WSW3	N4.5	N12
16-Jul	SW2	SW3	WNW1	SW3	WSW3	SW2	S1	ESE5	SE9	SSE11	SE14	SE15	SE14	SE15	SE14	SE14	SSE14	SSE13	SE12	SSE10	SSE6	SSE7	SSE7	SSE4	SSE7.7	SE15
17-Jul	S8	S7	SSE4	S4	SW2	SSE2	SE4	SE10	SSE13	SE13	SSE11	SE11	SSE11	SE4	ESE5	SSE3	WNW3	NNE5	NNW6	NW5	NNW5	NNW6	NNW4	W1	SSE3.1	SE13
18-Jul	WNW3	NW3	NW4	N5	NNW4	NNW5	N4	NNW5	N7	N9	N10	N8	N8	NNW5	NE1	ENE1	WNW4	NW3	NNW3	W4	W7	WSW8	W7	W3	NNW3.9	N10
19-Jul	WSW8	SW5	W1	SSE1	SSW2	SW1	SW2	S1	E3	ESE4	S1	SW4	WNW6	SSW4	S6	SSE9	SW5	WSW9	WNW2	SSW3	W4	SW3	N2	SSE1	SW2.4	SSE9
20-Jul	SW3	SW3	S1	WSW2	S1	SSW2	SSE3	NE3	NE3	NNE5	NE6	NE4	ENE6	ENE4	NW0	WNW5	WNW7	NW2	N4	NW2	WSW2	SW5	NW2	WSW3	NNW0.9	WNW7
21-Jul	NW4	SW2	WSW2	SW2	WSW1	S2	SSE3	S3	SW5	SSW4	WSW3	SW2	WSW5	SW3	S8	SSW7	S6	SSE5	NE0	N4	W3	WSW3	WSW3	WNW1	SW2.3	S8
22-Jul	WNW2	SW3	NW2	W2	SW2	SW2	N1	NNE3	N4	NNE6	NNE6	N10	N12	NNE10	NNE9	NNE9	N11	NNW4	NW4	NNW5	NNW5	NNW7	NNW7	NW5	N4.6	N12
23-Jul	NNW3	WNW2	WNW2	W1	WSW2	WSW2	WSW2	NNE1	SE6	SE5	SE5	SE6	E6	S5	SSE8	S10	SE11	SE11	SSE11	SE5	SSW4	S4	WSW2	SW4	SSE3.5	SE11
24-Jul	SW0	SW4	SW2	SW3	SSW3	SW3	SSE5	SSE4	ENE3	ENE4	NE4	E3	ESE4	SE4	SE3	NNE3	SE6	SSE8	SE3	NNW5	NW4	NW4	NNW5	NW2	SE0.9	SSE8
25-Jul	NW3	NNW5	WSW6	WSW7	W1	NNE6	NNE3	N1	NW2	WSW3	NNW4	NW5	WNW2	NNW4	N4	NE2	N4	N5	NW3	NW5	WSW7	SW10	SW9	SSW8	WNW2.3	SW10
26-Jul	SSW8	S8	S9	S7	S7	S8	SSE4	SE3	SE8	SE7	SE8	SE6	NNE7	N10	N9	N16	N16	N16	N17	N12	NE7	NE6	NNE6	NE8	NE3.0	N17
27-Jul	NNE7	NNE7	N7	N6	NNW4	N7	N8	NNW7	NNW7	NNW8	N9	N15	N15	N12	N15	N10	SSW6	WSW6	W4	W4	SSW3	SSW4	WSW3	NW2	N5.3	N15
28-Jul	SW2	SW2	SW4	WSW2	WSW3	WNW1	WSW3	SSW2	SE2	NE4	ESE3	NE1	ESE4	SW3	SSE8	SSE10	S11	S12	S11	S9	SSW7	SSW6	SW5	ESE0	S3.7	S12
29-Jul	SSW1	SW2	SW3	SSW3	SSW3	S6	SSE6	SSE8	S8	SSW7	SW6	SSW10	SSW12	SSW12	S12	S13	S13	S12	S10	S5	SSW4	SW5	SSW8	SSW8	SSW7.1	S13
30-Jul	SSW6	SE4	SSE3	SW1	WSW3	SSW2	SSE5	SE6	SE8	SE9	SSE12	SSE15	SSE18	S16	S16	S16	S11	SSW9	SSW4	SSW10	SSW12	SSE7	S4	SW4	S7.6	SSE18
31-Jul	SW4	SW2	NW4	SSW2	S5	S5	S3	SSW6	S9	SSE10	S11	SSW5	WSW8	W7	WNW6	WSW4	NNW6	NNW7	W4	SSW3	SW1	SW4	SW4	SW6	SW3.2	S11

W2.4	W2.3	W2.2	WSW2.3	WSW2.0	WSW1.4	WNW0.6	N0.4	NE0.7	NNE1.7	NNE2.6	NNE2.3	NNE2.3	NNE1.5	NE0.8	NE0.5	N0.8	NNW1.3	N2.0	NW2.1	W2.5	WSW2.5	W2.3	W2.0	Diurnal Average	
S8	WSW9	S9	NNW13	N17	NNW20	N25	N20	NNW18	NNW23	N25	N20	N22	NNW24	N21	N18	N16	N16	N19	NNW16	NNW13	SW10	SW9	SSW8	Diurnal Maximum	

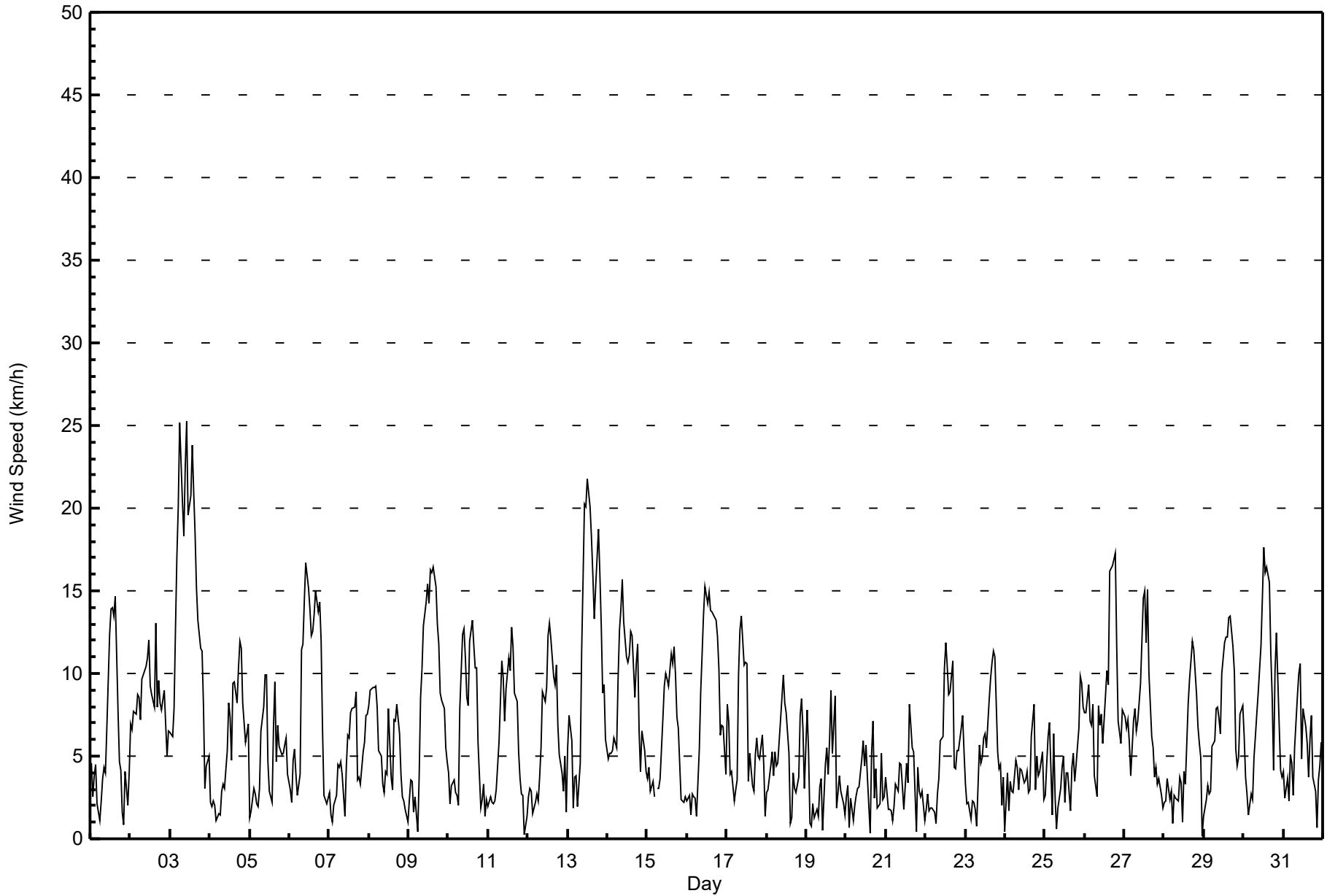
UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Fort McKay South - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Jul 3 07:00 Minimum Value: 1 km/h on Jul 15 23:00 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 Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	1	1	1	2	1	1	1	1	1	1	2	3	3	3	3	5	3	3	2	1	2	2	2	2	5	
2-Jul	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	4	3	4	2	2	3	2	2	2	4	
3-Jul	2	1	3	5	5	6	8	8	6	6	7	6	6	6	6	5	5	3	3	3	3	1	1	1	8	
4-Jul	1	1	1	1	1	1	1	1	2	2	2	3	3	3	4	3	3	3	2	2	2	2	1	1	2	4
5-Jul	1	1	1	1	1	1	1	2	2	4	4	3	3	3	2	3	2	2	2	2	1	1	1	1	4	
6-Jul	1	1	1	1	1	1	1	3	3	4	4	4	4	4	4	4	4	4	4	3	3	1	2	1	4	
7-Jul	1	1	1	1	1	1	1	2	2	1	2	2	2	3	3	4	3	2	1	1	1	2	2	2	4	
8-Jul	3	3	2	3	3	3	2	2	2	2	2	3	3	2	2	3	3	2	1	1	1	1	1	1	3	
9-Jul	1	1	1	1	2	1	2	2	2	3	4	4	4	4	4	4	4	4	3	2	2	2	1	1	4	
10-Jul	1	1	1	1	1	1	1	4	3	3	3	3	4	4	4	3	3	3	2	1	1	1	1	1	4	
11-Jul	1	1	1	1	1	1	1	2	2	3	3	3	3	3	4	4	3	2	1	1	1	1	1	1	4	
12-Jul	1	2	1	1	1	1	1	2	2	2	3	3	3	4	3	2	2	3	2	1	1	1	2	1	4	
13-Jul	3	2	2	1	1	1	2	3	4	6	5	6	5	6	5	5	3	5	5	4	3	2	2	1	6	
14-Jul	1	1	1	2	2	1	4	4	4	5	4	3	3	3	4	3	3	3	4	2	1	2	1	1	5	
15-Jul	2	1	2	1	1	UO	1	1	1	2	3	3	4	3	4	4	4	3	2	2	2	1	1	1	4	
16-Jul	1	1	1	1	1	1	1	2	2	3	4	4	4	4	4	3	3	3	3	3	1	1	1	1	4	
17-Jul	3	2	1	1	1	1	2	4	3	4	3	5	5	2	2	1	1	1	1	2	1	1	2	1	5	
18-Jul	1	1	1	2	2	1	1	2	2	2	2	2	3	3	2	1	1	1	1	1	2	2	3	2	3	
19-Jul	2	3	1	1	1	1	1	1	1	2	2	2	2	2	3	4	6	3	1	2	1	1	2	1	6	
20-Jul	2	2	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	2	1	1	1	2	1	1	3	
21-Jul	1	1	2	1	1	1	1	1	2	2	1	2	3	3	3	3	2	2	1	2	1	1	1	1	3	
22-Jul	1	1	1	1	1	1	1	1	1	2	2	3	3	3	2	2	3	1	1	1	1	1	1	1	3	
23-Jul	2	1	1	1	1	1	1	1	2	1	1	2	2	3	4	4	3	5	3	1	1	1	1	2	5	
24-Jul	1	2	2	1	1	1	1	1	1	2	1	1	2	2	2	2	2	2	2	1	1	1	1	1	2	
25-Jul	1	1	3	2	2	3	2	2	1	2	2	3	2	2	2	1	1	1	1	1	3	3	3	3	3	
26-Jul	2	2	2	2	2	2	2	2	3	2	3	2	4	3	3	5	4	4	4	4	3	3	2	3	5	
27-Jul	3	2	2	1	1	1	2	1	2	2	3	4	4	4	5	6	2	2	2	1	2	1	2	2	6	
28-Jul	1	2	1	1	1	1	1	1	1	1	2	2	2	3	3	4	3	3	3	2	1	1	2	1	4	
29-Jul	1	1	1	1	1	1	1	1	2	2	3	4	5	4	4	5	4	3	3	2	1	1	1	2	5	
30-Jul	2	1	1	1	1	1	1	2	2	3	3	4	5	4	5	5	4	3	2	4	5	2	1	2	5	
31-Jul	3	3	2	1	1	1	2	2	3	3	4	2	3	3	2	2	6	4	2	1	1	1	1	2	6	
Diurnal Maximum																										
UO - Unstable Operation																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay South - July 2023

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	381	51.28	51.28
6 - 11	250	33.65	84.93
12 - 19	99	13.32	98.25
20 - 28	13	1.75	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay South - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	13	8	13	6	4	9	13	22	22	33	61	46	25	37	41	28	381
6 - 11	29	28	5	1	1	2	18	29	32	19	11	19	11	14	11	20	250
12 - 19	38	13	0	0	0	0	13	12	10	4	0	0	0	0	2	7	99
20 - 28	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	13
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	89	49	18	7	5	11	44	63	64	56	72	65	36	51	54	59	743

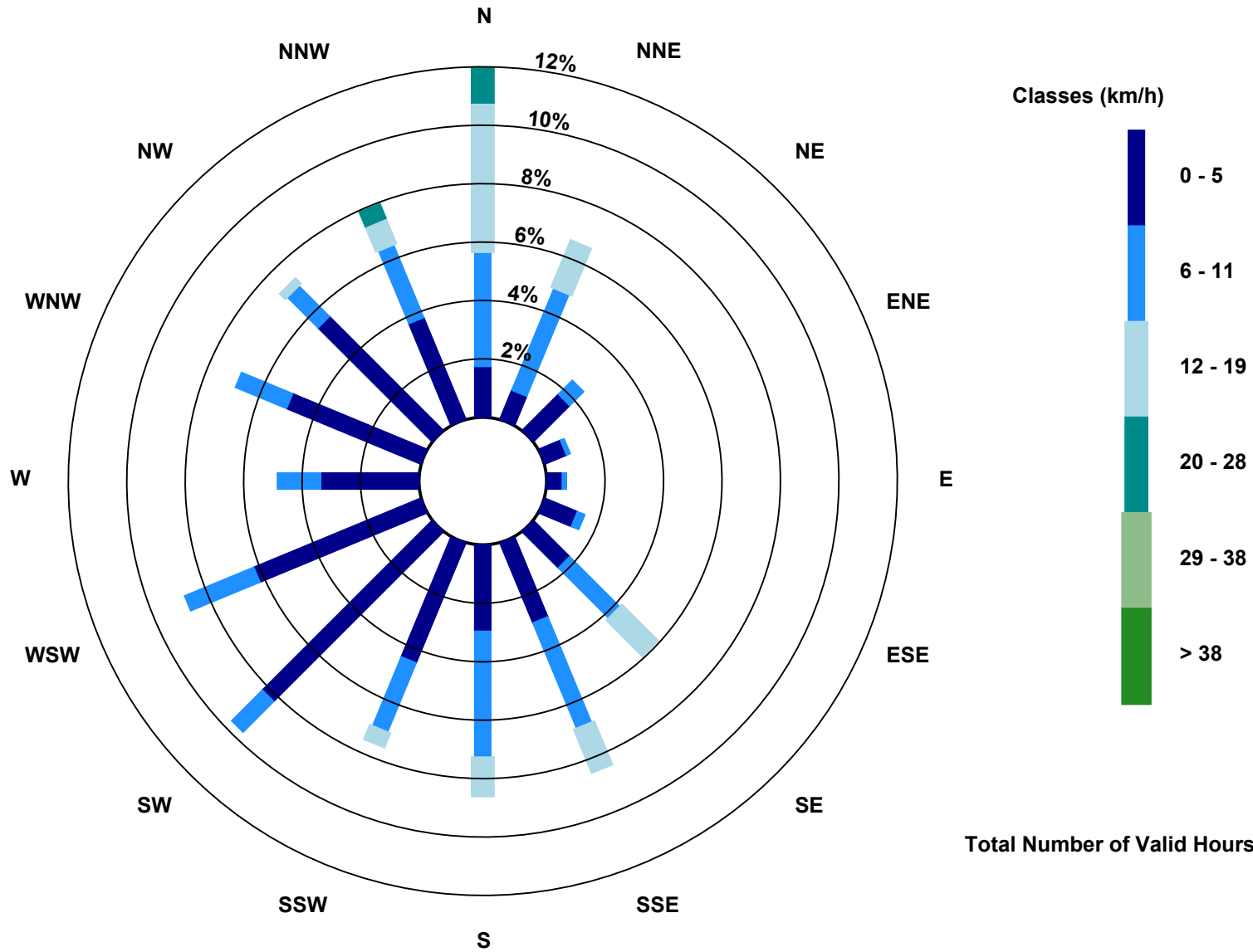
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Fort McKay South



Total Number of Valid Hours: 743



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort McKay South - July 2023

Direction of Maximum Speed: 354 deg on Jul 3 11:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 345.5 deg on Jul 3	Hours of Data: 743
Direction of Minimum Speed: 116 deg on Jul 29 00:00	Direction of Minimum Daily Speed Average: 0.9 deg on Jul 24
Direction of Minimum Speed: 116 deg on Jul 29 00:00	Hours of Missing Data: 1
Monthly Average Direction: 309.0 deg	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	264	209	183	226	153	206	286	216	196	143	139	145	140	145	153	197	240	278	291	244	270	217	286	249	184.5
2-Jul	268	278	257	253	251	257	285	309	327	308	314	315	290	264	275	316	314	295	285	265	260	284	291	283	287.6
3-Jul	298	297	302	334	354	346	356	0	348	348	354	349	345	348	351	349	357	353	348	346	337	272	289	313	345.5
4-Jul	302	271	221	222	275	159	243	69	62	123	48	39	20	96	169	177	174	158	156	163	186	189	165	161	154.9
5-Jul	224	242	199	208	226	225	170	163	195	236	232	206	258	248	221	187	237	266	301	315	316	322	315	324	240.1
6-Jul	347	306	303	328	291	325	15	6	13	7	6	6	7	14	12	15	8	4	2	355	344	305	231	209	0.6
7-Jul	235	352	151	198	184	176	156	230	257	56	82	113	183	186	188	222	221	234	217	231	241	223	223	243	206.8
8-Jul	260	238	238	242	247	251	240	248	240	258	262	299	118	159	333	348	358	2	11	341	299	284	252	251	271.4
9-Jul	337	324	331	233	256	294	12	1	358	8	15	5	20	17	9	13	25	23	15	7	359	348	327	334	6.5
10-Jul	321	276	313	316	306	285	283	141	138	145	154	156	152	159	154	150	155	153	130	117	259	182	194	255	157.2
11-Jul	263	302	304	217	167	171	177	156	161	185	189	193	201	193	184	184	196	187	189	236	237	201	126	245	190.0
12-Jul	226	253	201	256	256	168	49	41	30	23	23	16	7	12	16	20	18	359	6	348	297	299	296	308	4.7
13-Jul	310	305	325	194	164	193	192	306	338	355	2	358	356	353	348	351	7	6	359	348	339	323	315	343	347.5
14-Jul	319	305	307	292	303	314	343	339	350	360	1	14	5	3	9	5	19	7	350	334	304	329	327	294	347.5
15-Jul	307	300	300	261	296	UO	261	266	285	15	17	16	25	27	20	32	11	1	15	24	1	255	237	244	0.8
16-Jul	227	228	301	217	237	227	178	114	133	147	141	144	139	139	144	143	154	149	144	148	153	155	151	158	148.7
17-Jul	170	177	164	175	216	162	138	143	158	144	150	145	156	134	102	161	291	16	344	321	331	342	338	274	151.7
18-Jul	297	313	322	354	327	334	350	342	1	359	7	0	355	340	38	60	295	326	331	279	259	254	269	280	328.3
19-Jul	250	224	280	152	213	223	218	175	95	116	189	216	298	213	187	168	216	247	289	213	273	233	360	164	219.8
20-Jul	221	226	190	240	171	202	157	39	49	16	35	42	61	71	322	302	299	306	8	308	242	235	304	253	334.1
21-Jul	313	230	249	224	251	190	162	189	234	206	245	220	250	226	180	200	175	162	34	352	274	241	238	293	216.6
22-Jul	284	228	322	272	218	222	6	13	357	23	20	3	4	18	13	19	9	332	317	335	335	337	340	325	354.6
23-Jul	327	296	288	264	243	253	254	13	140	144	124	133	88	183	165	180	146	145	158	146	192	190	240	222	163.3
24-Jul	221	235	236	227	195	220	160	160	76	68	53	101	104	139	142	17	137	147	125	338	316	311	333	304	137.0
25-Jul	321	334	253	243	265	16	19	354	310	258	338	314	290	341	0	54	355	1	326	321	237	233	221	194	289.9
26-Jul	197	181	180	177	179	173	162	140	143	135	125	124	31	7	353	358	7	4	2	3	44	34	27	36	39.9
27-Jul	31	13	7	355	327	354	350	333	346	343	3	3	2	1	6	2	200	239	263	264	199	212	244	316	349.4
28-Jul	220	231	220	240	241	296	250	207	127	35	111	44	106	231	151	159	185	174	178	184	197	203	221	116	183.3
29-Jul	209	232	226	210	206	180	158	157	173	203	219	204	202	196	190	178	176	188	185	189	211	221	209	209	192.6
30-Jul	197	139	154	236	242	194	167	142	135	136	151	157	168	170	179	169	188	198	198	212	210	164	171	222	174.3
31-Jul	236	223	307	198	181	183	185	208	185	167	183	204	240	275	302	244	343	347	264	209	217	228	235	222	223.8

268.1 262.1 265.9 255.2 253.1 254.1 303.3 11.2 56.1 32.4 30.3 31.2 26.1 22.7 56.2 35.1 351.7 347.3 349.3 318.2 276.2 258.5 270.4 258.9
 Diurnal Average

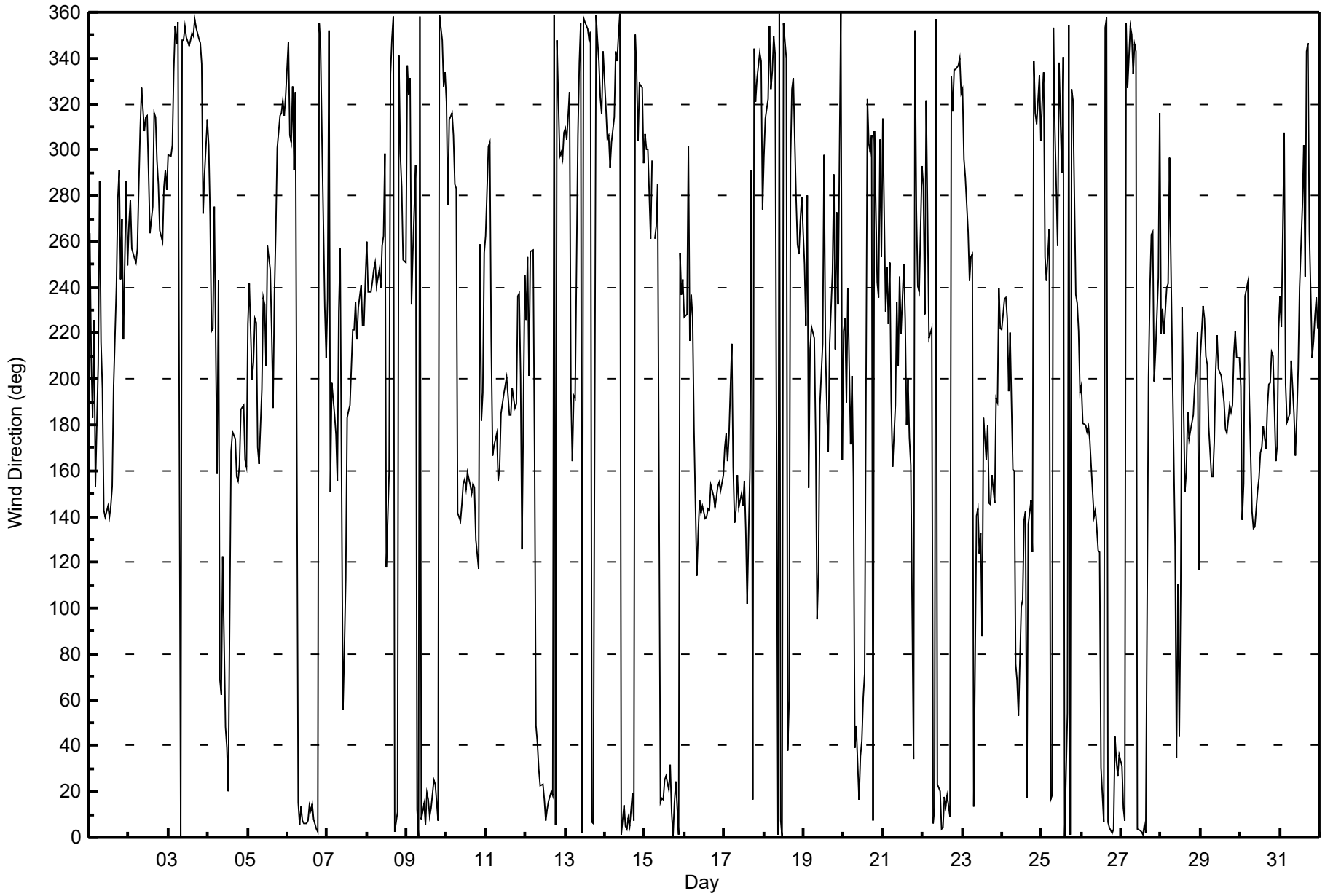
UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Fort McKay South - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																			Hours in Service: 744						
Maximum Value: 107 deg on Jul 28 12:00																			Hours of Data: 743						
Minimum Value: 8 deg on Jul 7 21:00																			Hours of Missing Data: 1						
Percentiles: P ₁ = 11 P ₁₀ = 16 Q ₁ = 20 Median = 26 Q ₃ = 45 P ₉₀ = 66 P ₉₉ = 97																			Hours of Calibration: 0						
																			Percent Operational Time: 99.9						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	19	49	17	42	56	73	24	43	24	24	29	19	16	17	13	26	36	72	59	86	88	40	78	31	88
2-Jul	26	27	23	24	18	22	26	22	17	22	20	20	23	26	26	21	21	26	25	24	25	28	25	23	28
3-Jul	20	18	23	21	20	18	20	20	19	20	21	21	19	19	20	20	20	18	18	17	18	15	18	20	23
4-Jul	60	48	39	27	64	60	90	45	64	73	69	31	41	68	40	31	36	21	14	11	11	9	9	19	90
5-Jul	62	41	22	25	19	32	19	26	33	36	37	72	80	82	28	22	46	29	28	21	18	13	15	20	82
6-Jul	29	25	16	18	21	23	24	20	23	20	20	22	26	25	30	27	21	20	17	18	26	41	51	52	52
7-Jul	63	79	86	36	25	15	19	43	54	87	35	46	56	40	39	50	37	55	28	15	8	13	18	17	87
8-Jul	31	22	18	16	23	37	52	52	63	78	58	92	40	79	84	39	22	17	19	29	12	21	50	61	92
9-Jul	50	24	26	32	37	79	31	20	18	19	23	23	25	22	23	23	22	21	20	17	17	16	16	14	79
10-Jul	24	58	29	31	33	19	45	59	20	19	20	34	46	25	22	19	26	15	17	48	20	32	74	32	74
11-Jul	41	37	38	33	31	28	13	15	21	26	50	37	28	23	22	25	30	22	14	25	27	25	88	64	88
12-Jul	53	39	33	66	40	24	50	49	25	21	29	34	24	21	21	24	19	18	16	22	24	42	24	72	72
13-Jul	32	22	25	62	14	27	72	57	23	25	21	22	23	21	22	22	19	17	18	17	15	17	16	15	72
14-Jul	23	15	17	28	25	19	20	19	22	21	21	22	22	22	21	19	23	20	19	16	19	15	14	20	28
15-Jul	26	21	22	25	48	UO	25	30	45	33	25	26	32	35	26	30	24	20	22	22	59	11	14	23	59
16-Jul	31	41	49	29	22	29	66	26	20	20	22	19	22	22	21	23	18	15	14	13	13	11	12	23	66
17-Jul	12	14	34	17	25	42	42	17	16	14	17	17	17	42	35	43	53	24	20	22	20	12	17	49	53
18-Jul	18	20	21	29	21	18	21	25	25	20	22	26	31	54	99	91	40	56	36	14	17	16	35	70	99
19-Jul	17	46	95	74	45	58	67	92	47	43	98	63	51	79	54	52	72	55	77	47	25	55	87	70	98
20-Jul	33	40	98	40	92	42	46	41	52	46	37	69	47	64	95	51	25	78	27	25	42	26	39	31	98
21-Jul	23	51	52	41	68	42	22	54	44	47	73	90	63	78	45	43	50	33	97	29	24	26	12	57	97
22-Jul	45	13	65	63	26	61	68	50	48	27	22	21	19	20	20	21	20	34	16	11	11	11	9	13	68
23-Jul	20	37	33	69	38	33	50	96	32	40	39	42	33	65	39	32	33	32	14	19	14	26	58	33	96
24-Jul	99	36	79	27	33	37	20	34	51	44	48	65	51	48	77	81	35	19	66	23	14	15	16	61	99
25-Jul	63	18	28	33	100	40	83	103	76	59	34	50	75	52	52	54	22	20	31	30	42	21	27	27	103
26-Jul	24	14	12	17	13	14	81	84	27	39	41	54	53	21	24	19	18	19	18	16	44	27	29	24	84
27-Jul	24	20	17	19	22	14	15	18	26	22	25	23	20	25	20	37	37	37	51	19	43	48	62	69	69
28-Jul	56	46	33	57	57	73	51	65	76	50	72	107	68	90	34	36	23	19	12	11	11	17	38	96	107
29-Jul	60	39	17	19	17	10	10	15	29	36	59	32	34	34	29	25	21	25	16	10	13	11	13	16	60
30-Jul	23	19	33	37	17	22	14	21	20	26	24	22	22	21	24	23	26	25	16	24	27	26	27	35	37
31-Jul	77	81	36	61	27	26	77	22	22	22	25	48	39	55	46	51	58	29	47	33	87	49	18	20	87
																			99 81 98 74 100 79 90 103 76 87 98 107 80 90 99 91 72 78 97 86 88 55 88 96						
																			Diurnal Maximum						
UO - Unstable Operation																									





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS14
ANZAC
JULY 2023**

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS14)
 JULY 2023

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	17.8	0	2.1	0
TRS(ppb) Average	669	34	75	94.49	0.8	0	0.4	0
THC(ppm) Average	703	34	41	99.06	2.6	-	2.2	-
NMHC(ppm) Average	703	34	41	99.06	0.26	-	0.07	-
CH4(ppm) Average	703	34	41	99.06	2.5	-	2.2	-
NO2(ppb) Average	703	36	41	99.33	11.9	0	4.2	-
NO(ppb) Average	703	36	41	99.33	12.7	-	0.9	-
NOX(ppb) Average	703	36	41	99.33	17.3	-	4.4	-
O3(ppb) Average	704	34	40	99.19	62.4	0	35.2	-
PM2.5(ug/m3) Average	728	1	16	97.98	362.3	119	199.6	12
AT 2m(C) Average	744	0	0	100	28.5	-	22.4	-
RH(%) Average	727	0	17	97.72	100	-	98.1	-
WS(km/h) Average	742	0	2	99.73	28	-	18	-
WD(deg) Average	742	0	2	99.73	-	-	-	-
Leaf Wetness (% of range) Average	744	0	0	100	71.9	-	21.1	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS14)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

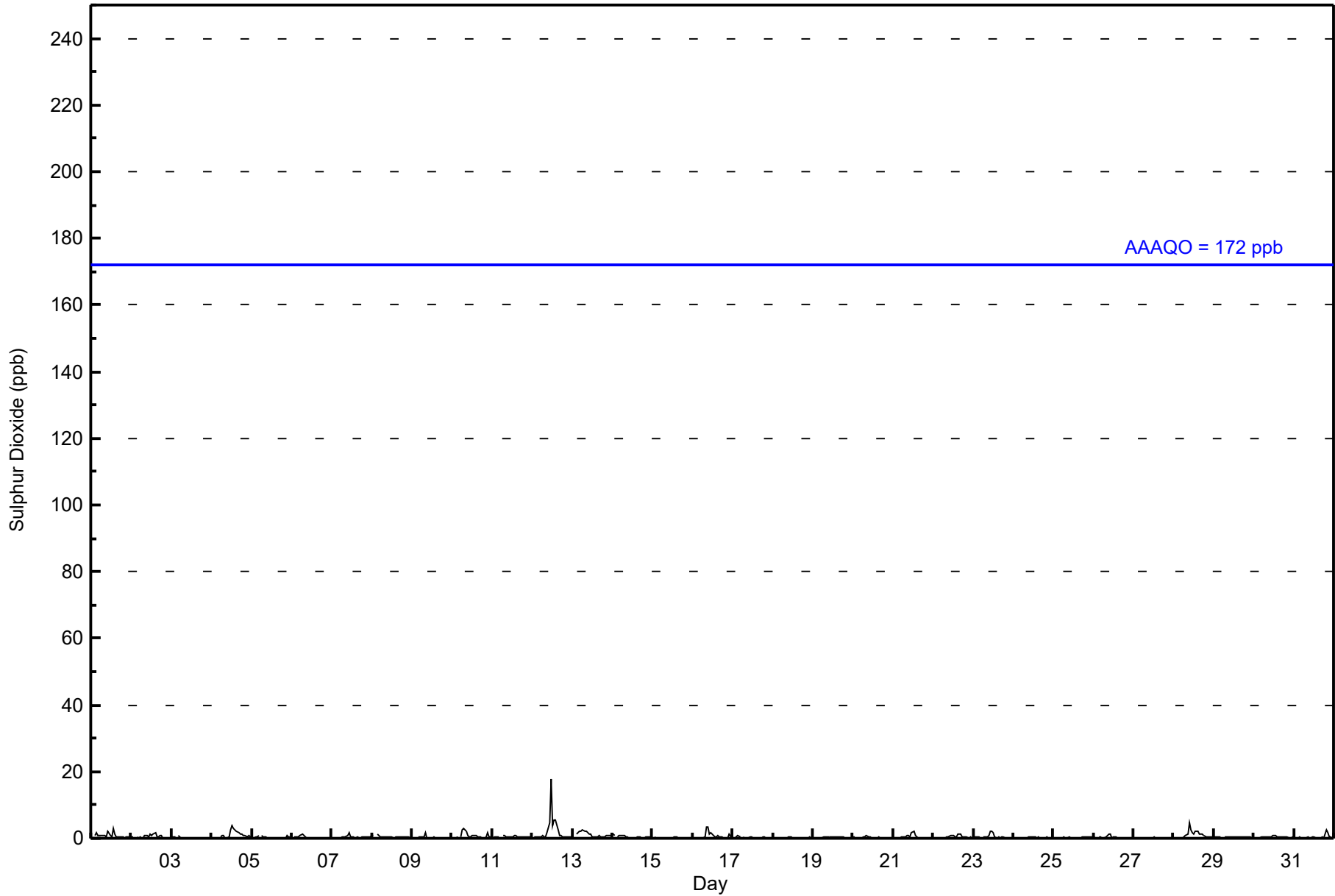
Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	705	0.47	0.9	-	0	0	0.1	0.2	0.5	1	17.8
TRS(ppb) Average	669	0.21	0.1	-	0	0.1	0.1	0.2	0.2	0.4	0.8
THC(ppm) Average	703	2.09	0.1	-	1.9	2	2	2.1	2.1	2.2	2.6
NMHC (ppm) Average	703	0.009	0.036	-	0	0	0	0	0	0	0.26
CH4(ppm) Average	703	2.08	0.1	-	1.9	2	2	2.1	2.1	2.2	2.5
NO2(ppb) Average	703	1.39	1.5	-	0	0.4	0.6	0.9	1.5	2.7	11.9
NO(ppb) Average	703	0.23	0.6	-	0	0	0.1	0.1	0.2	0.4	12.7
NOX(ppb) Average	703	1.62	1.8	-	0	0.5	0.7	1.1	1.6	3.2	17.3
O3(ppb) Average	704	25.92	11	-	0.1	10.8	18.7	25.4	34.3	39.6	62.4
PM2.5(ug/m3) Average	728	41.11	58.2	-	1.5	3.5	5.5	19.3	47.9	108.1	362.3
Temperature 2 m (C) Average	744	17.06	5.1	-	4.8	11	13.2	16.7	21	24.3	28.5
Relative Humidity (%) Average	727	69.4	20.5	-	31.2	41.4	50.9	70.1	87.9	97.3	100
Wind Speed 20 m (km/h) Average	742	10	5	-	0	5	7	9	12	16	28
Wind Direction 20 m (deg) Average	742	235.7	-	-	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	744	5.08	11.1	-	0	0	0	0	3.5	19.2	71.9

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS14)
JULY 2023

Parameter	OPERATIONAL NOTES			
	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	25 Jul 2023 12:00	25 Jul 2023 16:00	5	Station power failure
TRS	01 Jul 2023 01:00	02 Jul 2023 11:00	35	Analyzer Failure - lamp failure
TRS	02 Jul 2023 12:00	02 Jul 2023 12:00	1	Maintenance - analyzer replaced
THC/NMHC/CH4	28 Jul 2023 11:00	28 Jul 2023 12:00	2	Maintenance - replaced support gas cylinder
O3	30 Jul 2023 07:00	30 Jul 2023 07:00	1	Maintenance - reinitiated daily QA check
PM2.5	25 Jul 2023 06:00	25 Jul 2023 11:00	6	Unstable Operations - inconsistent response
PM2.5	25 Jul 2023 17:00	25 Jul 2023 19:00	3	Unstable Operations - inconsistent response
Relative Humidity	03 Jul 2023 04:00	03 Jul 2023 05:00	2	Sensor operated out of range
Relative Humidity	04 Jul 2023 03:00	04 Jul 2023 04:00	2	Sensor operated out of range
Relative Humidity	09 Jul 2023 04:00	09 Jul 2023 04:00	1	Sensor operated out of range
Relative Humidity	27 Jul 2023 23:00	28 Jul 2023 07:00	9	Sensor operated out of range
Relative Humidity	31 Jul 2023 06:00	31 Jul 2023 08:00	3	Sensor operated out of range
Wind Speed, Wind Direction	11 Jul 2023 19:00	11 Jul 2023 19:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	15 Jul 2023 22:00	15 Jul 2023 22:00	1	Flat line in sensor output signal



Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0																		Hours in Service:	744																											
Maximum Value: 17.8 ppb on Jul 12 12:00		Maximum Daily Average: 2.1 ppb on Jul 12																	Hours of Data:	705																													
Minimum Value: 0.0 ppb on Jul 3 23:00		Minimum Daily Average: 0.1 ppb on Jul 27																	Hours of Missing Data:	39																													
Maximum Diurnal Average: 1.2 ppb at hour 12		Minimum Diurnal Average: 0.2 ppb at hour 24																	Hours of Calibration:	34																													
Monthly Average: 0.47 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.2 Q ₃ = 0.5 P ₉₀ = 1.0 P ₉₉ = 3.5																	Percent Operational Time:	99.3																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	0.7	Z	0.9	1.6	0.8	0.9	0.9	0.8	0.7	0.5	1.9	0.8	0.6	3.0	1.1	0.4	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.8	3.0																							
2-Jul	0.3	0.3	Z	0.2	0.2	0.2	0.2	0.2	0.7	1.0	0.5	1.2	0.9	1.3	1.5	0.4	0.2	0.7	0.8	0.2	0.1	0.1	0.1	0.2	0.5	1.5																							
3-Jul	0.3	0.5	0.6	Z	0.8	0.5	0.1	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.8																								
4-Jul	0.0	0.0	0.1	0.2	Z	0.4	0.8	0.8	0.2	0.1	0.3	2.7	3.9	2.8	2.4	2.0	1.6	1.3	1.1	1.0	0.7	0.5	0.7	0.6	1.0	3.9																							
5-Jul	0.4	0.2	0.3	0.5	0.7	Z	0.8	0.5	0.4	0.2	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.6	0.6	0.4	0.3	0.8																						
6-Jul	Z	0.4	0.4	0.4	0.5	0.8	1.2	1.0	0.6	0.2	C	C	C	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.2																							
7-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.4	0.6	0.4	0.9	1.7	0.5	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.3	0.5	0.4	0.3	1.7																							
8-Jul	0.7	1.0	Z	1.1	0.8	0.5	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.2	0.1	0.4	1.1																							
9-Jul	0.2	0.1	0.1	Z	0.3	0.3	0.5	0.3	1.8	0.2	0.2	0.1	0.0	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.2	1.8																							
10-Jul	0.1	0.1	0.2	0.6	Z	0.4	2.5	3.1	2.1	0.7	0.4	0.3	0.7	1.0	0.7	0.6	0.3	0.2	0.2	0.2	0.3	1.5	0.3	0.2	0.7	3.1																							
11-Jul	0.2	0.3	0.3	0.3	0.5	Z	0.9	0.9	0.5	0.5	0.4	0.3	0.5	0.7	0.8	0.4	0.5	0.5	0.5	0.6	0.5	0.4	0.4	0.3	0.5	0.9																							
12-Jul	Z	0.3	0.3	0.3	0.3	0.4	0.6	0.6	0.4	1.9	4.5	17.8	4.0	5.6	5.4	2.6	0.6	0.8	0.5	0.4	0.5	0.5	0.5	0.5	2.1	17.8																							
13-Jul	0.5	Z	1.3	1.8	2.2	2.3	2.4	2.2	2.3	1.8	1.4	1.1	0.4	0.3	0.3	0.9	0.6	0.4	0.4	0.7	0.9	0.8	1.0	1.1	2.4																								
14-Jul	1.1	0.8	Z	0.4	0.9	0.8	0.9	0.8	0.2	0.4	0.2	0.0	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.1	0.3	0.3	0.2	0.2	0.4	1.1																							
15-Jul	0.2	0.2	0.2	Z	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.2	0.3	0.2	0.2	0.2	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.3																							
16-Jul	0.1	0.0	0.0	0.0	Z	0.0	0.0	0.5	3.5	3.3	1.4	1.5	1.0	0.4	0.5	1.0	0.6	0.3	0.1	0.1	0.1	0.2	1.2	0.2	0.7	3.5																							
17-Jul	0.0	0.1	0.5	1.0	0.4	Z	0.3	0.2	0.1	0.0	0.2	0.4	0.2	0.1	0.1	0.0	0.1	0.1	0.2	0.3	0.2	0.1	0.1	0.2	0.2	1.0																							
18-Jul	Z	0.0	0.1	0.1	0.1	0.0	0.1	0.2	0.2	0.2	0.3	0.3	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.3																							
19-Jul	0.2	Z	0.2	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.3	0.5	0.6	0.3	0.3	0.4	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.3	0.6																							
20-Jul	0.2	0.4	Z	0.1	0.2	0.2	0.4	0.5	0.7	0.5	0.3	0.2	0.1	0.0	0.1	0.3	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.2	0.7																							
21-Jul	0.0	0.0	0.0	Z	0.2	0.3	0.3	0.4	0.7	0.7	0.5	1.7	2.1	0.8	0.3	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.4	2.1																							
22-Jul	0.0	0.0	0.0	0.0	Z	0.1	0.2	0.2	0.4	0.6	0.7	0.7	0.7	0.6	0.5	1.4	1.2	0.6	0.4	0.4	0.3	0.2	0.2	0.2	0.4	1.4																							
23-Jul	0.2	0.3	0.2	0.2	0.2	Z	0.3	0.3	0.4	0.9	2.0	2.2	1.5	0.2	0.2	0.5	0.1	0.3	0.3	0.0	0.1	0.1	0.0	0.0	0.5	2.2																							
24-Jul	Z	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.2	0.3	0.2	0.2	0.2	0.1	0.3	0.1	0.1	0.0	0.2	0.5																							
25-Jul	0.1	Z	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	PF	PF	PF	PF	PF	0.2	0.4	0.3	0.2	0.3	0.3	0.2	0.4	0.2	0.4																							
26-Jul	0.2	0.3	Z	0.2	0.2	0.2	0.2	0.5	0.9	1.4	1.4	0.2	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.4																							
27-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.3																							
28-Jul	0.1	0.0	0.0	0.1	Z	0.2	0.4	0.8	1.1	4.5	2.6	1.6	1.1	2.1	2.0	1.2	1.4	1.3	0.7	0.4	0.3	0.4	0.3	0.3	1.0	4.5																							
29-Jul	0.3	0.3	0.3	0.4	0.3	Z	0.5	0.4	0.5	0.4	0.4	0.5	0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.5	0.3	0.3	0.3	0.2	0.4	0.5																							
30-Jul	Z	0.2	0.1	0.2	0.3	0.3	0.2	0.3	0.3	0.4	0.3	0.6	0.9	0.8	0.5	0.2	0.3	0.5	0.5	0.6	0.6	0.2	0.1	0.2	0.4	0.9																							
31-Jul	0.2	Z	0.2	0.4	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.1	0.2	0.1	0.1	0.2	0.1	2.6	1.5	0.5	0.3	0.1	0.4	2.6																							
																								0.2	0.2	0.2	0.4	0.4	0.4	0.5	0.6	0.7	0.7	0.8	1.2	0.7	0.8	0.6	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.2	Diurnal Average		
																								1.1	1.0	1.3	1.8	2.2	2.3	2.5	3.1	3.5	4.5	4.5	17.8	4.0	5.6	5.4	2.6	1.6	1.3	1.1	2.6	1.5	1.5	1.2	1.0	Diurnal Maximum	
Z - zerospan C - Calibration PF - Power Failure																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	704	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: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	22	15	18	18	33	44	62	42	25	26	41	68	124	58	55	51	702
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	22	15	18	18	33	44	62	42	25	26	41	68	124	59	55	51	703

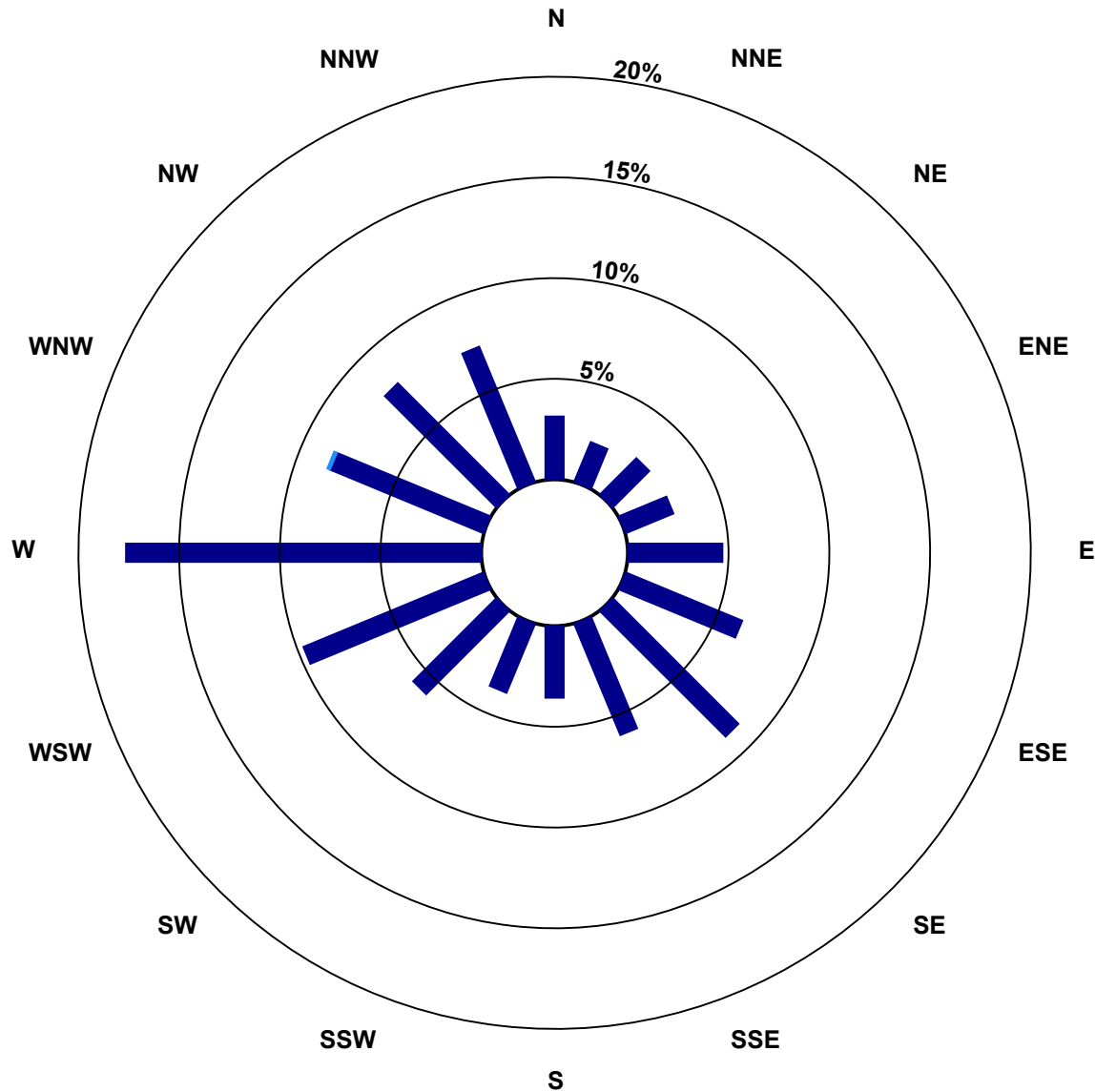
Total Number of Valid Hours: 703

Total Number of Hours: 744

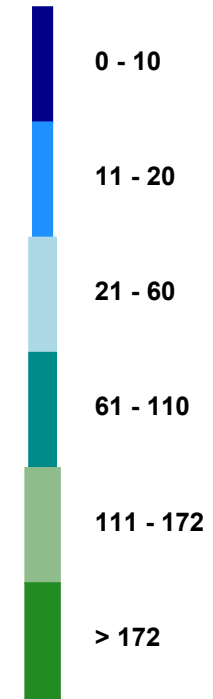


Wood Buffalo Environmental Association
Wind Rose Jul 2023

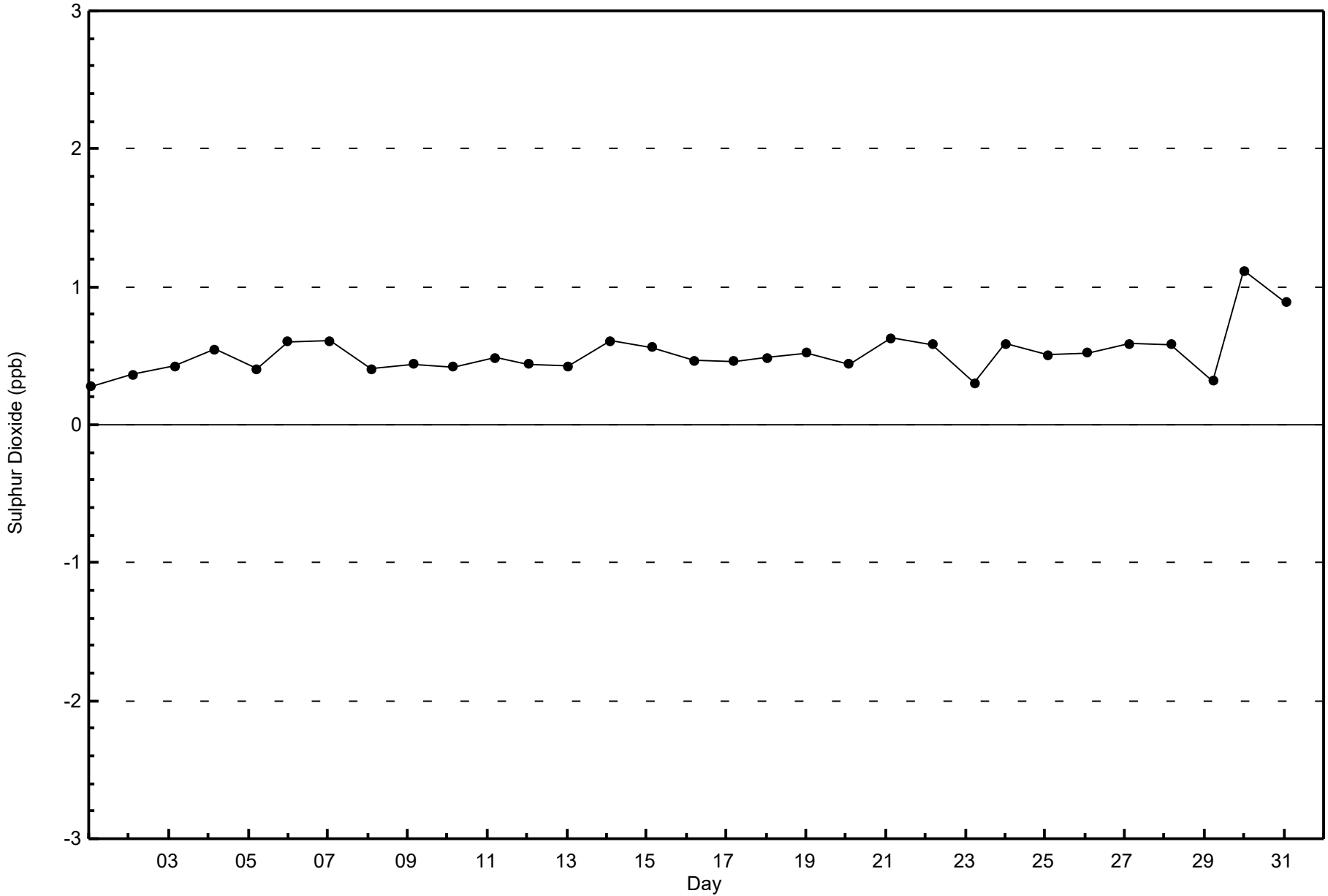
Sulphur Dioxide (SO₂) - ppb
Anzac

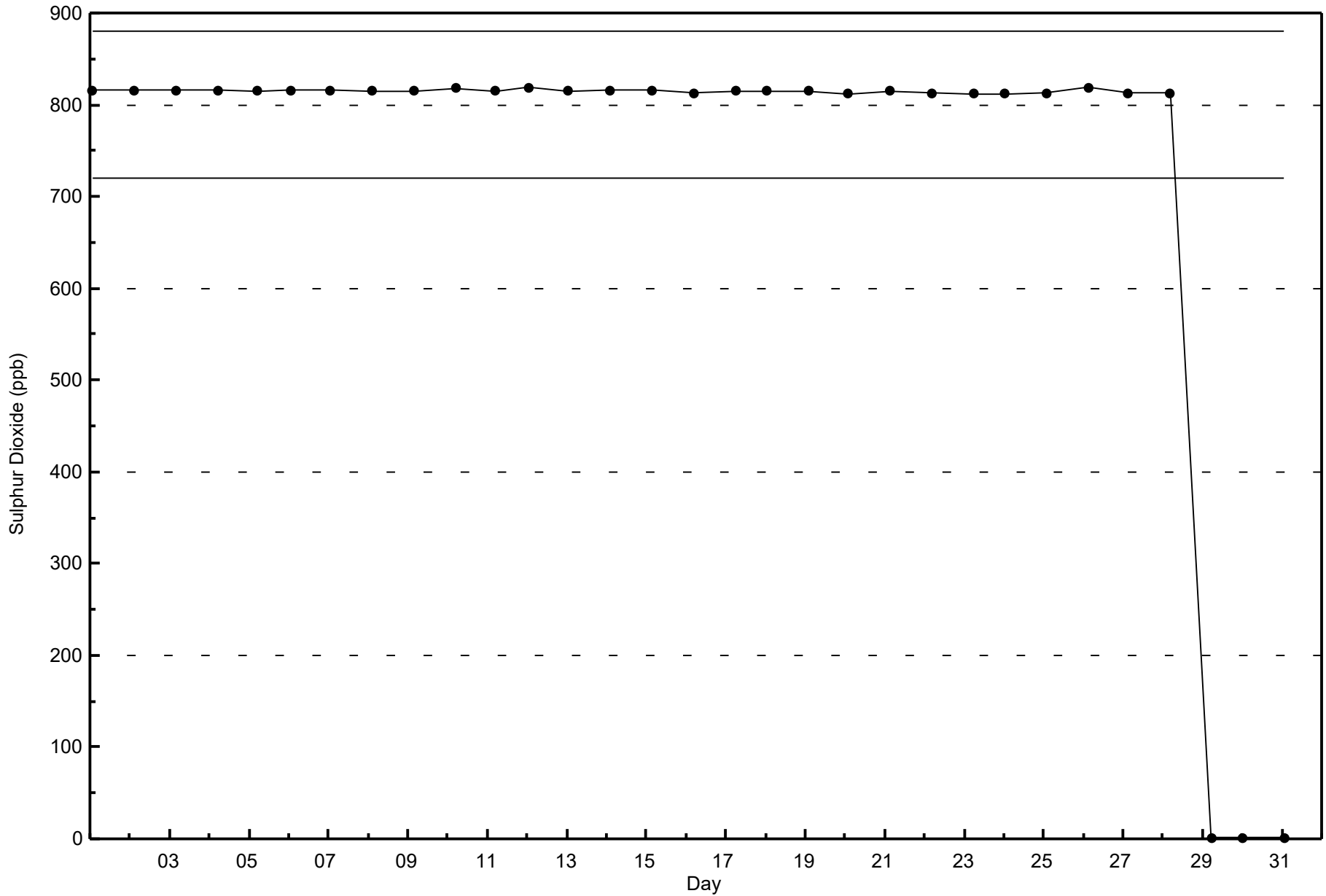


Classes (ppb)



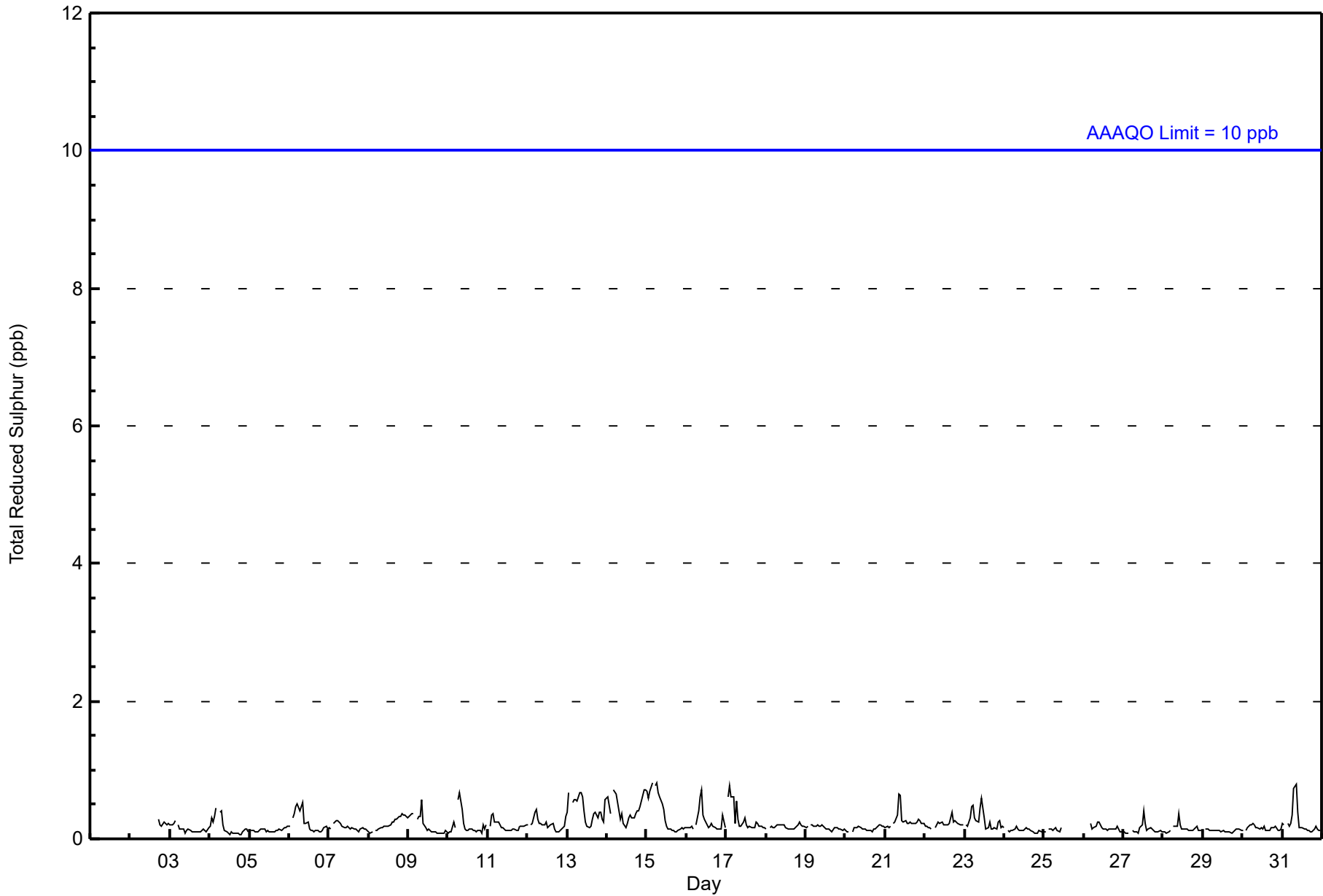
Total Number of Valid Hours: 703







Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744														744						
Maximum Value: 0.8 ppb on Jul 15 04:00		Maximum Daily Average: 0.4 ppb on Jul 14		Hours of Data: 669														669								
Minimum Value: 0.0 ppb on Jul 25 17:00		Minimum Daily Average: 0.1 ppb on Jul 25		Hours of Missing Data: 75														75								
Maximum Diurnal Average: 0.3 ppb at hour 9		Minimum Diurnal Average: 0.2 ppb at hour 9		Hours of Calibration: 34														34								
Monthly Average: 0.21 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.1 Q ₁ = 0.1 Median = 0.2 Q ₃ = 0.2 P ₉₀ = 0.4 P ₉₉ = 0.7		Percent Operational Time: 94.5														94.5								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
2-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	C	C	C	C	C	0.3	0.2	0.2	0.3	0.2	0.2	0.2	--	0.3
3-Jul	0.2	0.2	0.2	0.3	Z	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3
4-Jul	0.2	0.3	0.2	0.3	0.5	Z	0.4	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.5
5-Jul	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	0.2	0.2	0.1	0.2
6-Jul	0.2	Z	0.3	0.4	0.5	0.5	0.4	0.5	0.5	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.5
7-Jul	0.2	0.1	Z	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.3
8-Jul	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.2	0.4	0.4
9-Jul	0.3	0.3	0.4	0.4	Z	0.3	0.3	0.3	0.6	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.6
10-Jul	0.1	0.1	0.1	0.2	0.2	Z	0.6	0.7	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.7	
11-Jul	Z	0.2	0.3	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.4	0.4
12-Jul	0.2	Z	0.2	0.2	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.4
13-Jul	0.4	0.7	Z	0.5	0.6	0.6	0.6	0.7	0.7	0.6	0.4	0.3	0.2	0.2	0.3	0.4	0.4	0.3	0.4	0.4	0.4	0.3	0.2	0.6	0.7	0.7
14-Jul	0.6	0.5	0.4	Z	0.7	0.6	0.5	0.4	0.3	0.4	0.2	0.2	0.2	0.3	0.4	0.3	0.3	0.4	0.4	0.4	0.5	0.6	0.7	0.7	0.7	0.7
15-Jul	0.7	0.6	0.7	0.8	Z	0.8	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.4	0.8
16-Jul	0.2	0.2	0.2	0.2	0.1	Z	0.2	0.4	0.6	0.7	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.4	0.2	0.2	0.7
17-Jul	Z	0.6	0.8	0.6	0.6	0.2	0.6	0.3	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	0.3	0.8
18-Jul	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
19-Jul	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.2	0.2
20-Jul	0.1	0.1	0.1	Z	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2
21-Jul	0.2	0.2	0.2	0.2	Z	0.2	0.3	0.3	0.7	0.6	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.7
22-Jul	0.2	0.2	0.2	0.2	0.1	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4
23-Jul	Z	0.2	0.2	0.3	0.5	0.5	0.3	0.3	0.2	0.4	0.6	0.4	0.3	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.2	0.3	0.2	0.2	0.3	0.6
24-Jul	0.2	Z	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
25-Jul	0.1	0.1	Z	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.2	PF	PF	PF	PF	PF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
26-Jul	0.0	0.0	0.0	Z	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2
27-Jul	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4
28-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.2	0.2	0.2	0.4	0.2	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	0.4
29-Jul	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
30-Jul	0.1	Z	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2
31-Jul	0.2	0.2	Z	0.2	0.2	0.2	0.4	0.7	0.8	0.4	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.8
																								Diurnal Average		
																								Diurnal Maximum		
																								0.2		
																								0.7		
Z - zerospan																										
C - Calibration																										
M - Maintenance																										
AF - Analyzer Failure																										
PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb																										
24-hr 3 ppb																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	669	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: 669

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	22	14	19	18	34	45	56	40	25	23	42	62	111	50	56	50	667
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	22	14	19	18	34	45	56	40	25	23	42	62	111	50	56	50	667

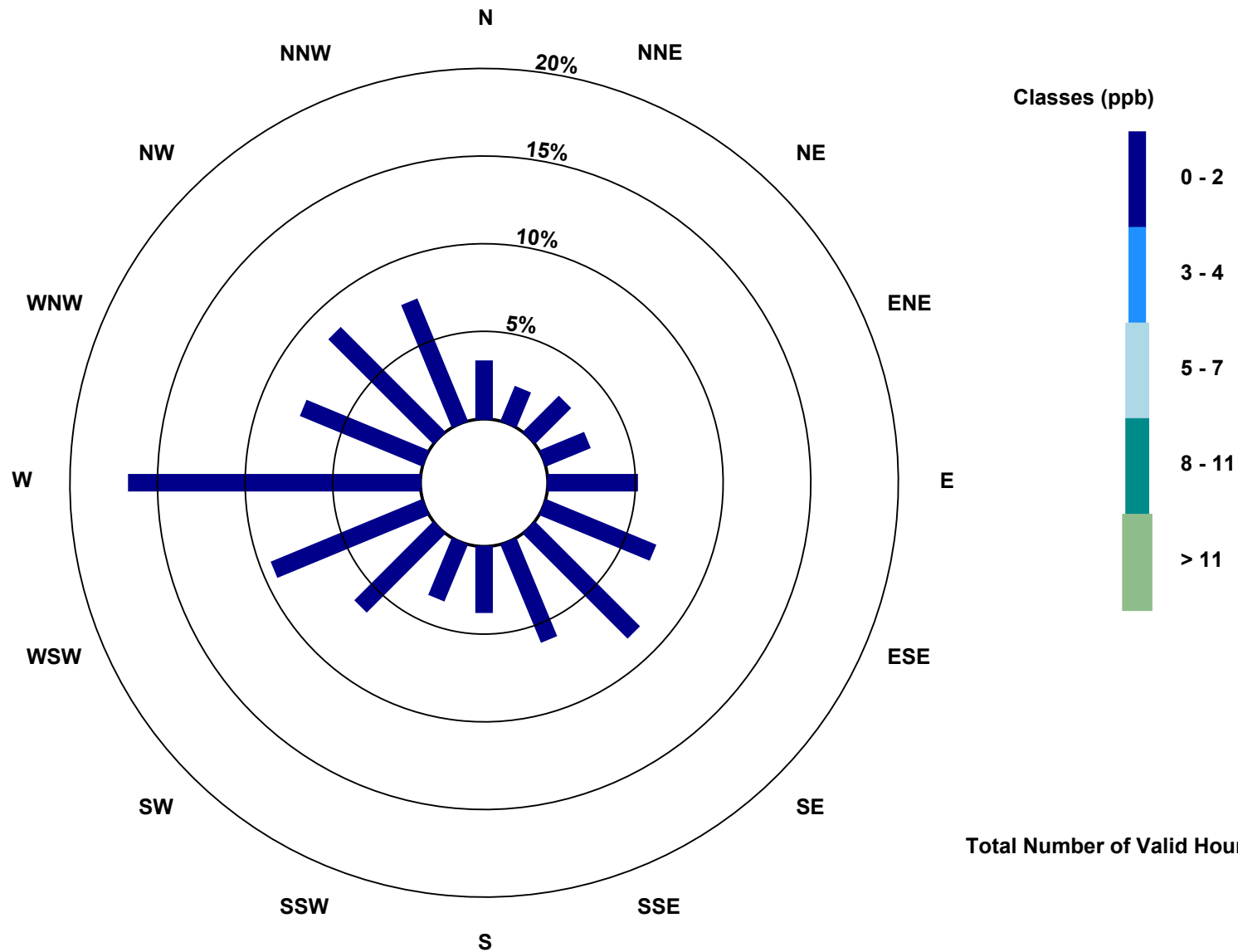
Total Number of Valid Hours: 667

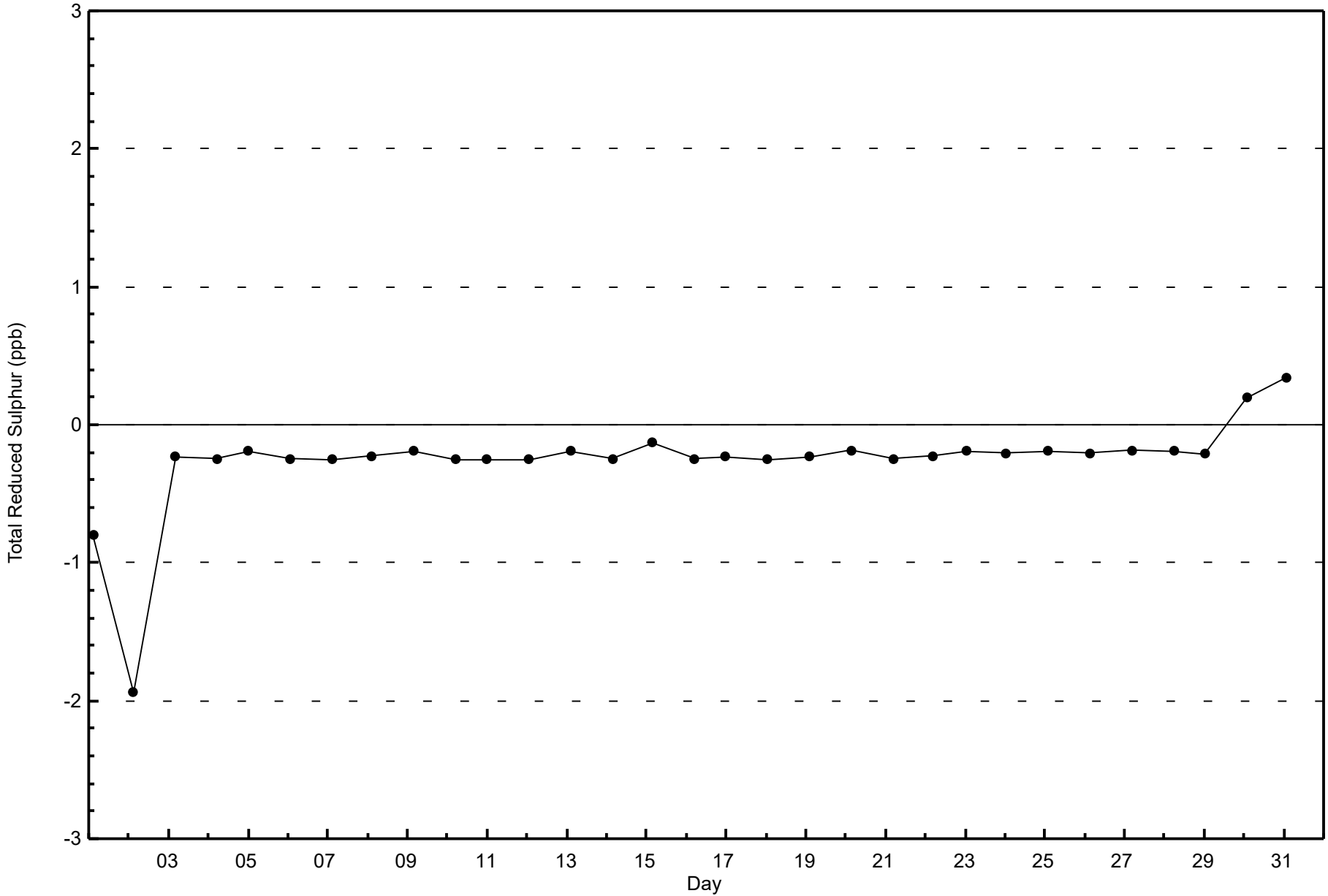
Total Number of Hours: 744

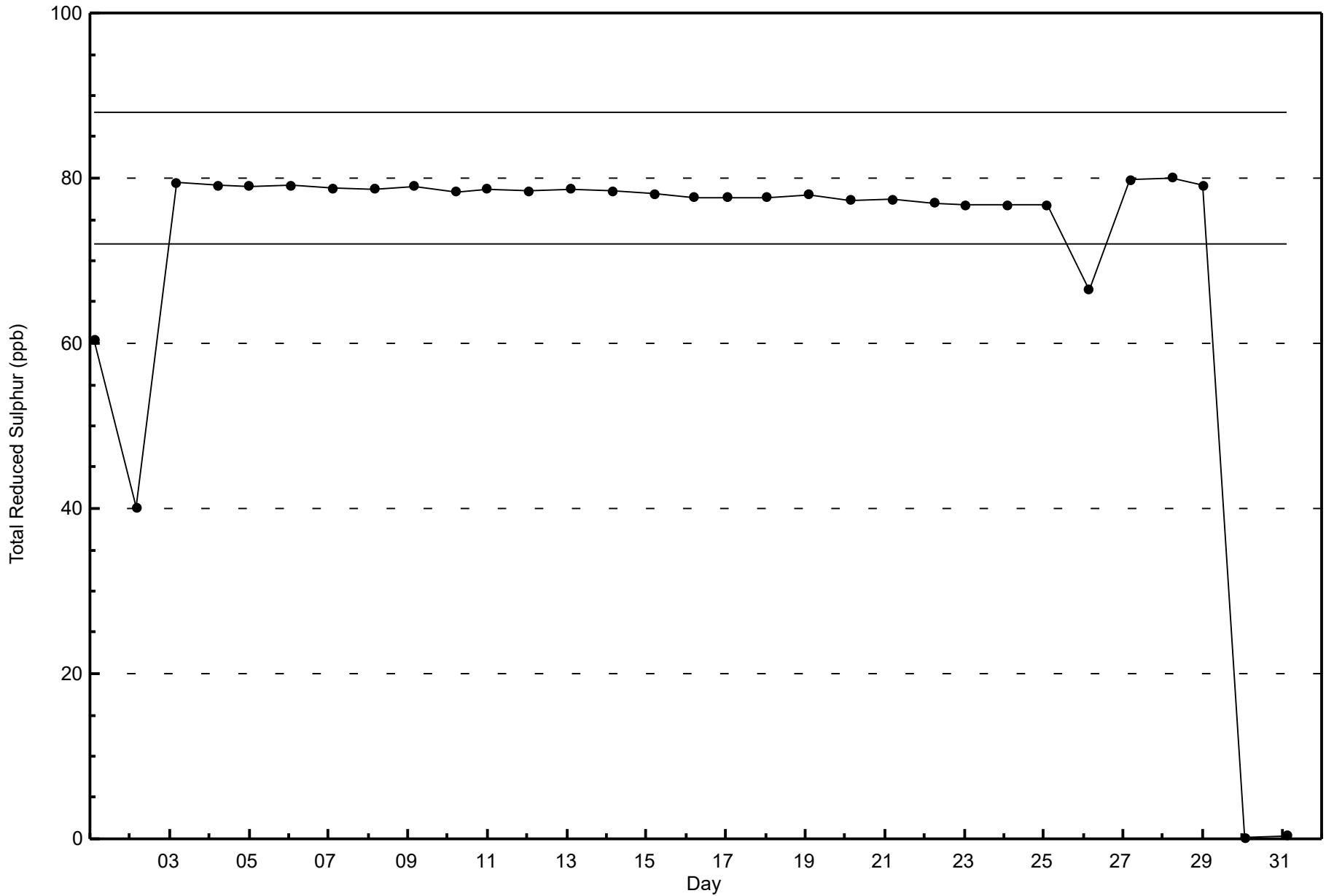


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Reduced Sulphur (TRS) - ppb
Anzac





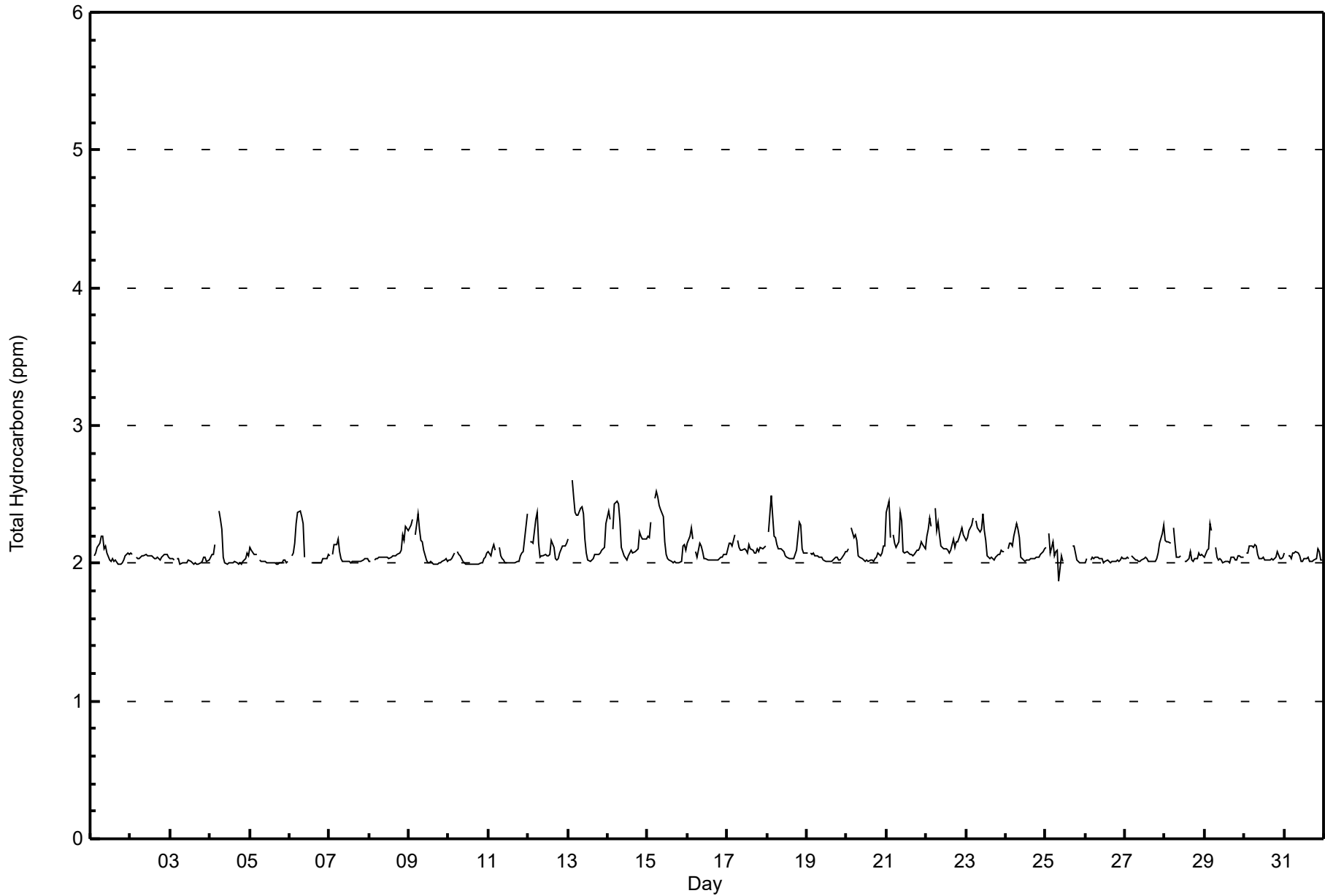




Wood Buffalo Environmental Association
Summary of Hour Averages

Total Hydrocarbons (THC) - ppm
Anzac - July 2023

Maximum Value: 2.6 ppm on Jul 13 03:00		Maximum Daily Average: 2.2 ppm on Jul 13		Hours in Service:	744																																																							
Minimum Value: 1.9 ppm on Jul 25 09:00		Minimum Daily Average: 2.0 ppm on Jul 3		Hours of Data:	703																																																							
Maximum Diurnal Average: 2.2 ppm at hour 6		Minimum Diurnal Average: 2.0 ppm at hour 16		Hours of Missing Data:	41																																																							
Monthly Average: 2.09 ppm		Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.1 P ₉₀ = 2.2 P ₉₉ = 2.4		Hours of Calibration:	34																																																							
				Percent Operational Time:	99.1																																																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																																				
1-Jul	2.0	Z	2.0	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	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-Jul	2.1	2.1	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	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	2.1	2.1																										
3-Jul	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																										
4-Jul	2.0	2.1	2.1	2.1	Z	2.4	2.3	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4																										
5-Jul	2.1	2.1	2.1	2.1	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																										
6-Jul	Z	2.1	2.1	2.1	2.3	2.4	2.4	2.3	2.3	2.0	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4																											
7-Jul	2.1	Z	2.1	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2																											
8-Jul	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	2.1	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	2.3																											
9-Jul	2.3	2.3	2.3	Z	2.2	2.4	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.4																											
10-Jul	2.0	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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																										
11-Jul	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.4	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4																											
12-Jul	Z	2.2	2.2	2.1	2.3	2.4	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4																											
13-Jul	2.2	Z	2.6	2.5	2.4	2.4	2.3	2.4	2.4	2.4	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.6																											
14-Jul	2.4	2.3	Z	2.2	2.4	2.4	2.4	2.3	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4																											
15-Jul	2.2	2.2	2.3	Z	2.5	2.5	2.5	2.4	2.4	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5																											
16-Jul	2.1	2.2	2.3	2.2	Z	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3																											
17-Jul	2.1	2.1	2.1	2.1	2.2	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	2.1	2.1	2.1	2.1	2.2																											
18-Jul	Z	2.2	2.5	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5																											
19-Jul	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																											
20-Jul	2.1	2.1	Z	2.3	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3																											
21-Jul	2.4	2.5	2.2	Z	2.2	2.1	2.1	2.2	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5																											
22-Jul	2.2	2.3	2.3	2.3	Z	2.4	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	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																											
23-Jul	2.2	2.2	2.2	2.3	2.3	Z	2.3	2.3	2.2	2.2	2.4	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4																											
24-Jul	Z	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																											
25-Jul	2.1	Z	2.2	2.1	2.2	2.1	2.1	2.1	1.9	2.0	2.0	PF	PF	PF	PF	PF	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	2.2																											
26-Jul	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																											
27-Jul	2.0	2.0	2.0	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3																											
28-Jul	2.2	2.2	2.2	2.1	Z	2.3	2.1	2.0	2.0	2.1	M	M	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3																											
29-Jul	2.0	2.1	2.1	2.3	2.2	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.3																											
30-Jul	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																											
31-Jul	2.1	Z	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																											
																												2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	Diurnal Average	
																												2.4	2.5	2.6	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.2	2.2	2.1	2.2	2.1	2.2	2.1	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																																																												





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	344	48.93	48.93
2.1 - 3.0	359	51.07	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - July 2023

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	11	8	10	10	22	25	31	14	12	9	16	40	58	24	23	30	343
2.1 - 3.0	11	7	8	8	11	19	31	28	13	17	25	27	65	35	32	21	358
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	22	15	18	18	33	44	62	42	25	26	41	67	123	59	55	51	701

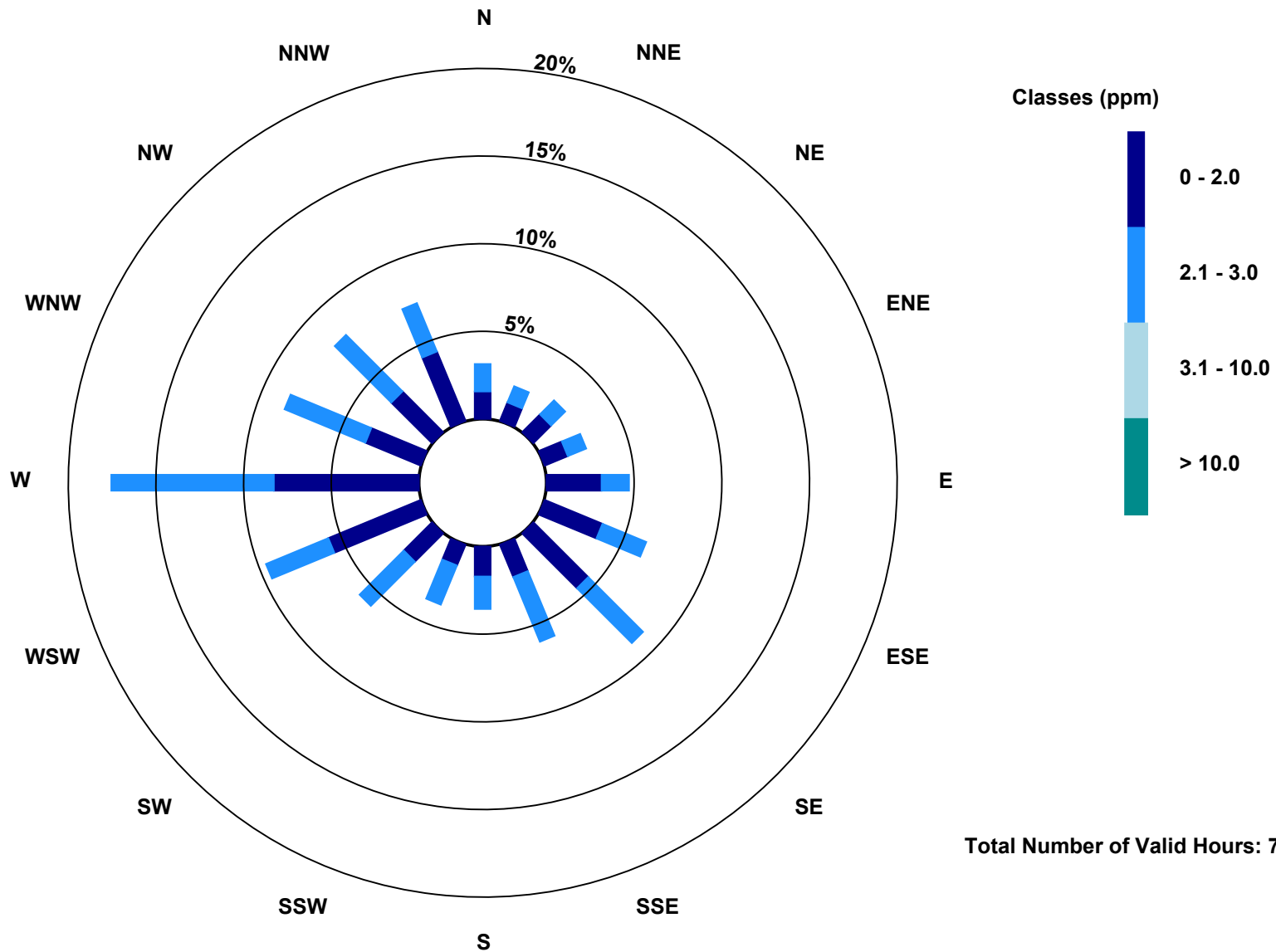
Total Number of Valid Hours: 701

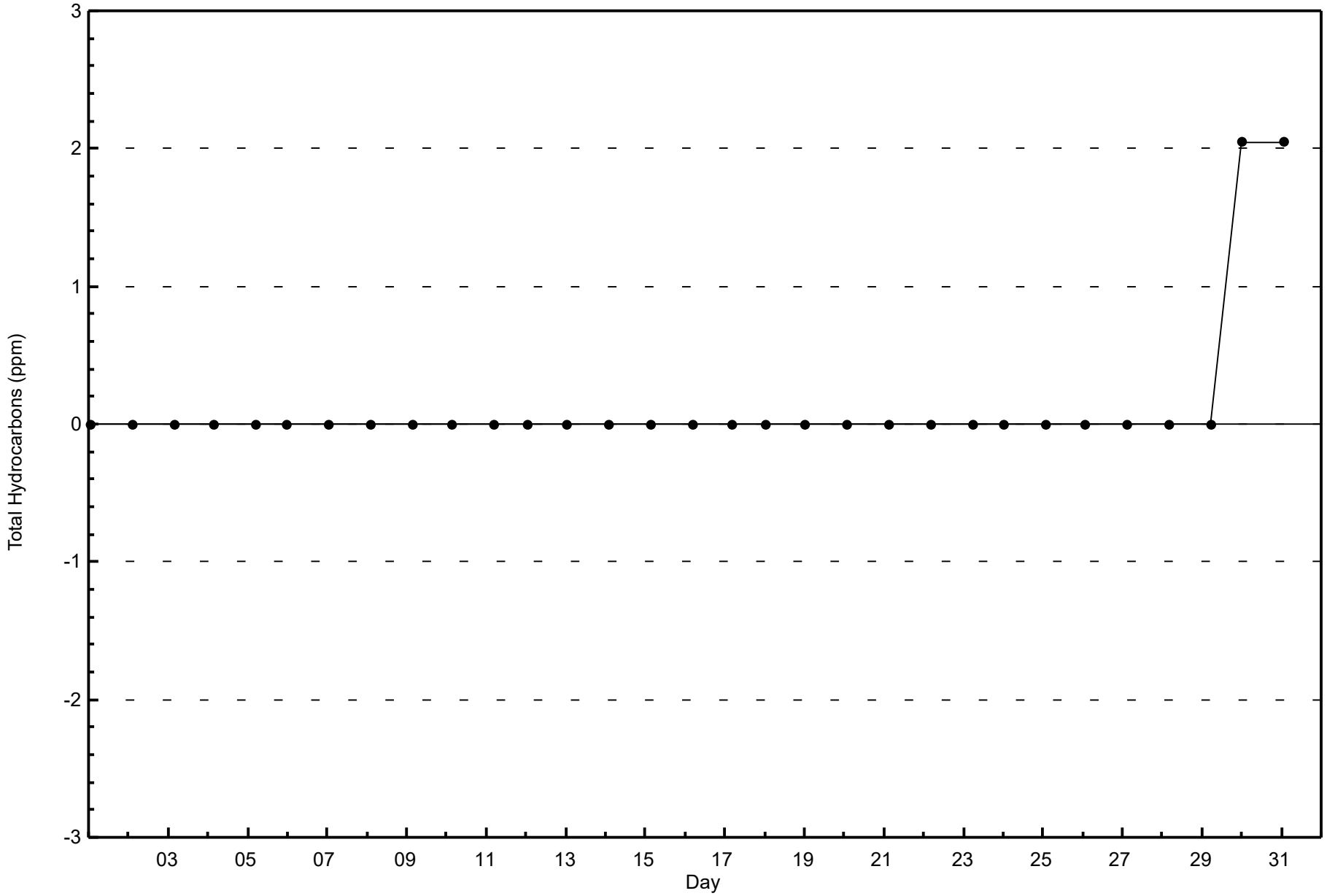
Total Number of Hours: 744

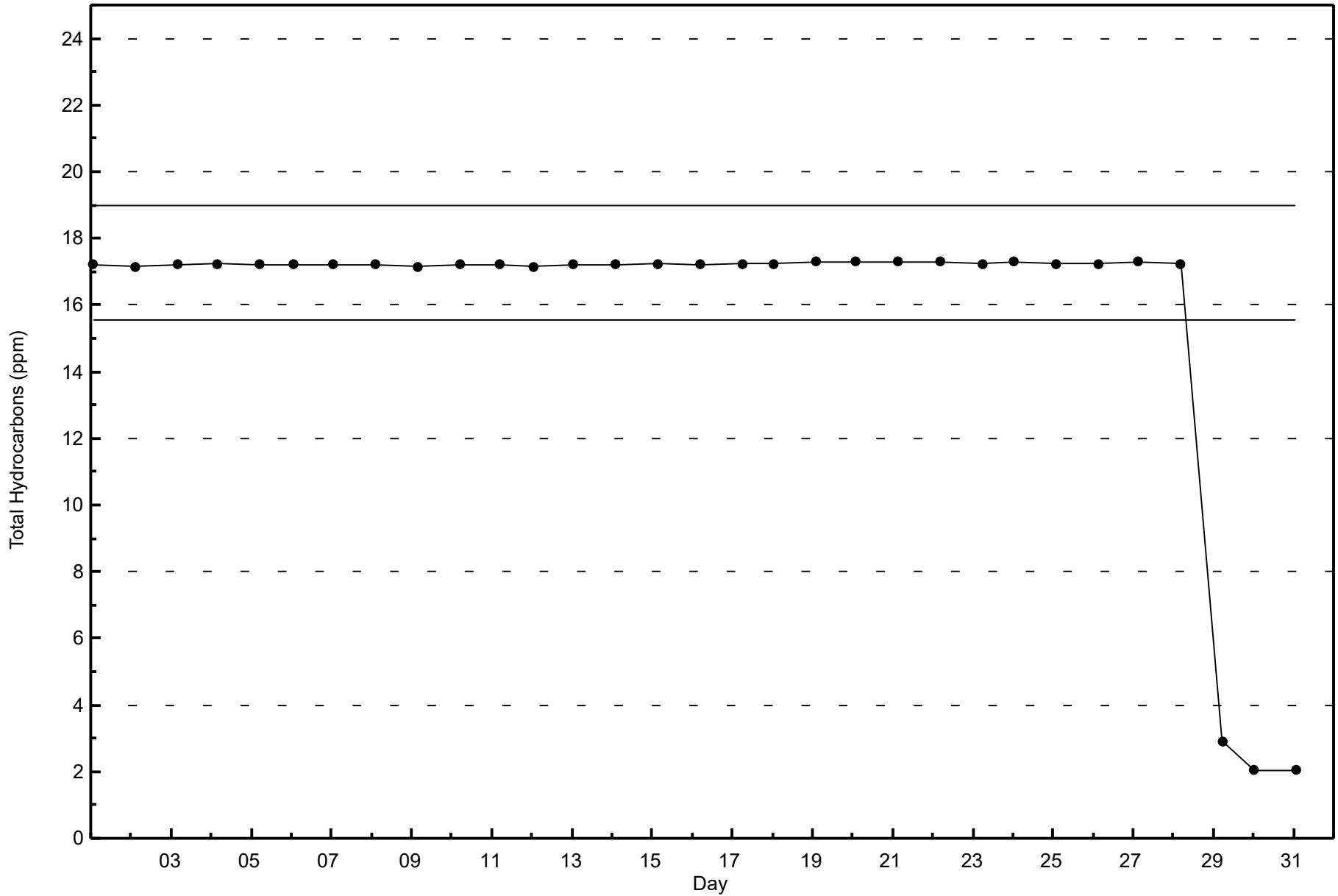


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Anzac





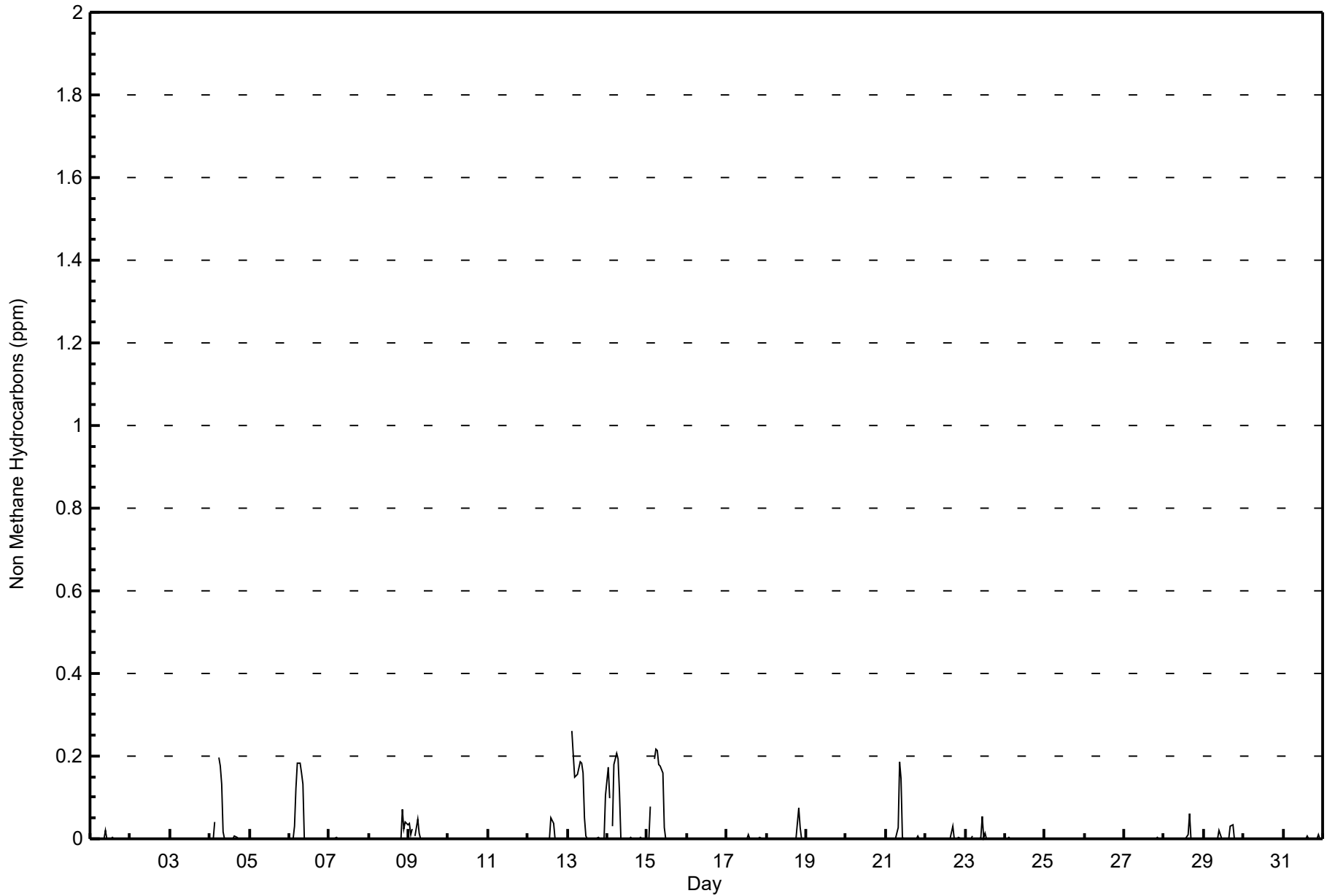




Summary of Hour Averages

Anzac - July 2023

Maximum Value: 0.260 ppm on Jul 13 03:00		Maximum Daily Average: 0.070 ppm on Jul 13		Hours in Service: 744																																											
Minimum Value: 0.000 ppm on Jul 1 01:00		Minimum Daily Average: 0.000 ppm on Jul 3		Hours of Data: 703																																											
Maximum Diurnal Average: 0.039 ppm at hour 6		Minimum Diurnal Average: 0.000 ppm at hour 19		Hours of Missing Data: 41																																											
Monthly Average: 0.009 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.2		Hours of Calibration: 34																																											
				Percent Operational Time: 99.1																																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020	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	0.001	0.020																					
2-Jul	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
3-Jul	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
4-Jul	0.000	0.000	0.000	0.040	Z	0.197	0.175	0.133	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025	0.197																					
5-Jul	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-Jul	Z	0.000	0.000	0.030	0.122	0.184	0.182	0.158	0.133	0.000	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	0.040	0.184																					
7-Jul	0.000	Z	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003																					
8-Jul	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	0.070	0.022	0.042	0.035	0.070																					
9-Jul	0.037	0.009	0.025	Z	0.006	0.046	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.046																					
10-Jul	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																					
11-Jul	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																					
12-Jul	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	0.051	0.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.051																					
13-Jul	0.000	Z	0.260	0.203	0.150	0.152	0.155	0.186	0.184	0.159	0.049	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.107	0.070	0.260																					
14-Jul	0.173	0.099	Z	0.030	0.181	0.205	0.194	0.113	0.001	0.000	0.002	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.002	0.044	0.205																					
15-Jul	0.000	0.000	0.077	Z	0.193	0.217	0.214	0.178	0.178	0.160	0.028	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.054	0.217	0.217																					
16-Jul	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-Jul	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	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.001	0.011	0.011																					
18-Jul	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	0.073	0.026	0.000	0.000	0.004	0.073	0.073																					
19-Jul	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-Jul	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																					
21-Jul	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.028	0.186	0.146	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.016	0.186	0.186																					
22-Jul	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	0.029	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.001	0.029	0.029																					
23-Jul	0.000	0.000	0.000	0.000	0.008	Z	0.000	0.000	0.000	0.003	0.053	0.002	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.053	0.053																					
24-Jul	Z	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003																					
25-Jul	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	PF	PF	PF	PF	PF	0.000	0.000	0.000	0.000	0.000	0.000	0.000																					
26-Jul	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																					
27-Jul	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	0.000	0.000	0.002																					
28-Jul	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.002	0.000	M	M	0.000	0.000	0.012	0.062	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.062	0.062																					
29-Jul	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.022	0.010	0.000	0.000	0.000	0.000	0.000	0.029	0.032	0.000	0.000	0.000	0.000	0.004	0.032	0.032																					
30-Jul	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																					
31-Jul	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	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.001	0.010	0.010																					
																								Diurnal Average																							
																								Diurnal Maximum																							
0.008		0.004		0.014		0.012		0.026		0.039		0.030		0.026		0.023		0.016		0.005		0.000		0.000		0.002		0.004		0.002		0.001		0.000		0.003		0.003		0.001		0.001		0.005			
0.173		0.099		0.260		0.203		0.193		0.217		0.214		0.186		0.186		0.160		0.053		0.007		0.013		0.011		0.051		0.062		0.029		0.032		0.003		0.073		0.070		0.022		0.042		0.107	
Z - zerospan			C - Calibration			M - Maintenance			PF - Power Failure																																						





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Anzac - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	633	90.04	90.04
0.006 - 0.05	35	4.98	95.02
0.06 - 0.1	12	1.71	96.73
> 0.1	23	3.27	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - July 2023

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	21	14	18	17	31	44	61	40	23	26	39	62	103	39	45	48	631
0.006 - 0.05	1	1	0	1	2	0	1	2	2	0	2	4	10	2	6	1	35
0.06 - 0.1	0	0	0	0	0	0	0	0	0	0	0	1	5	3	2	1	12
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	5	15	2	1	23
Totals	22	15	18	18	33	44	62	42	25	26	41	67	123	59	55	51	701

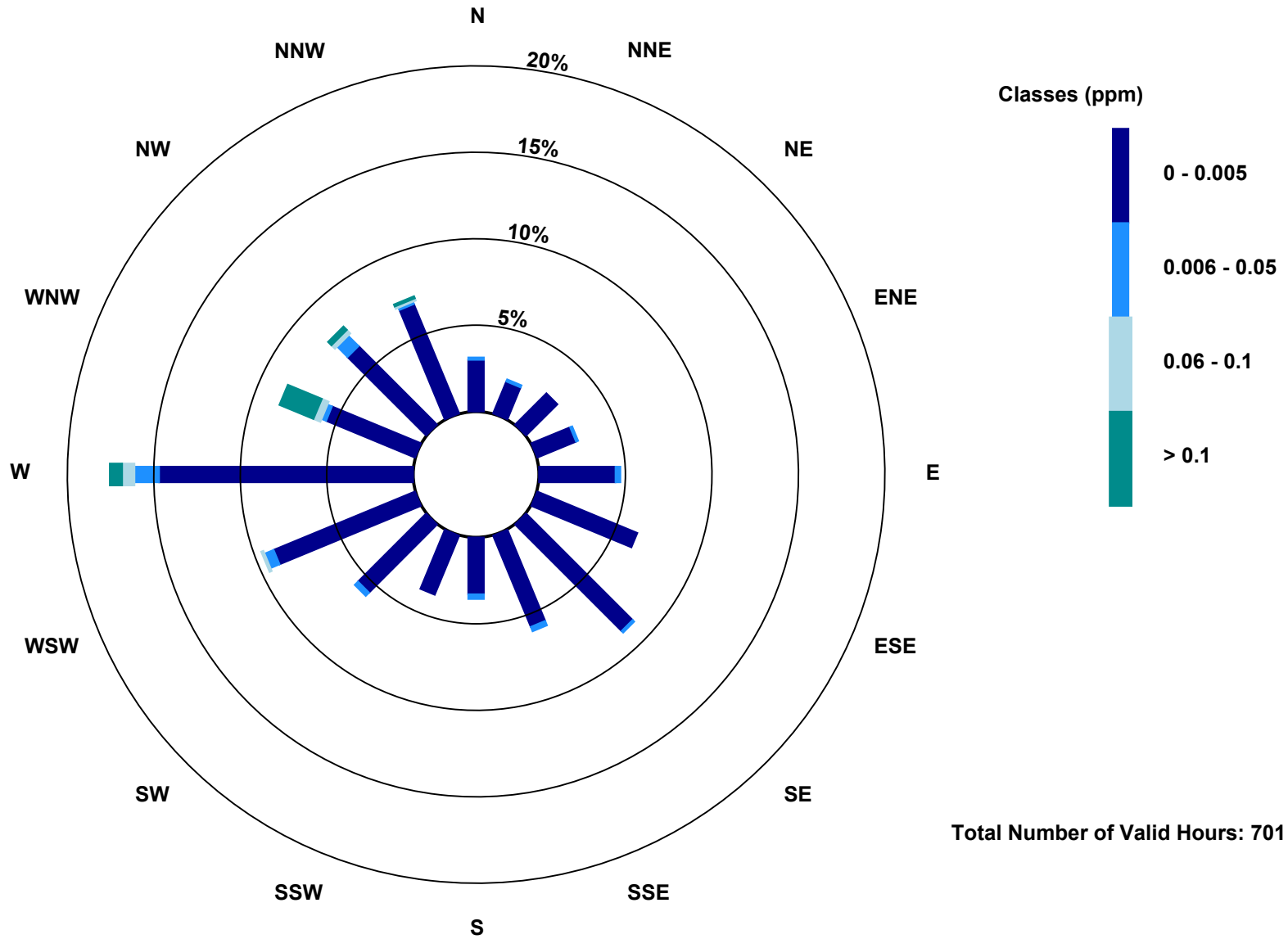
Total Number of Valid Hours: 701

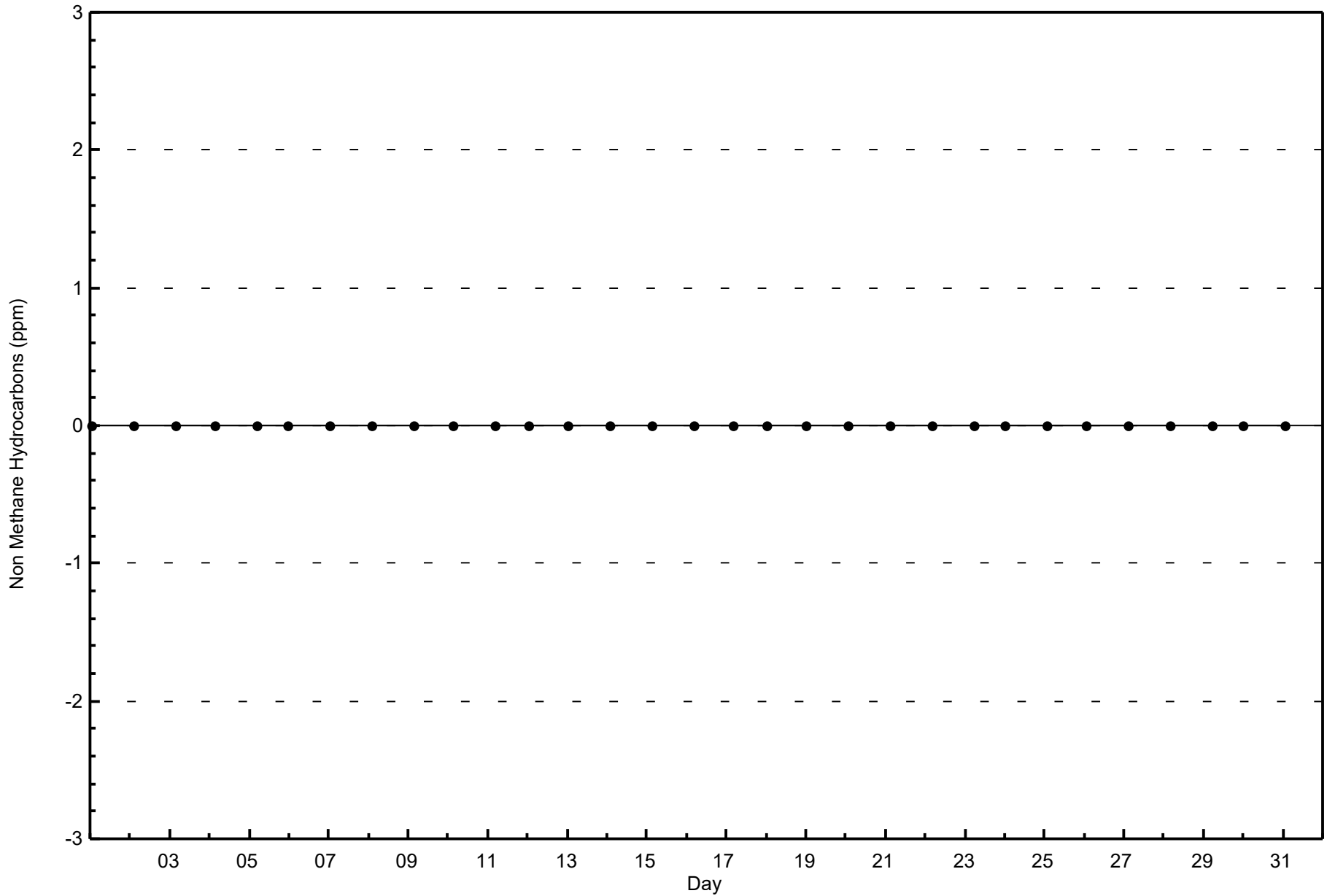
Total Number of Hours: 744

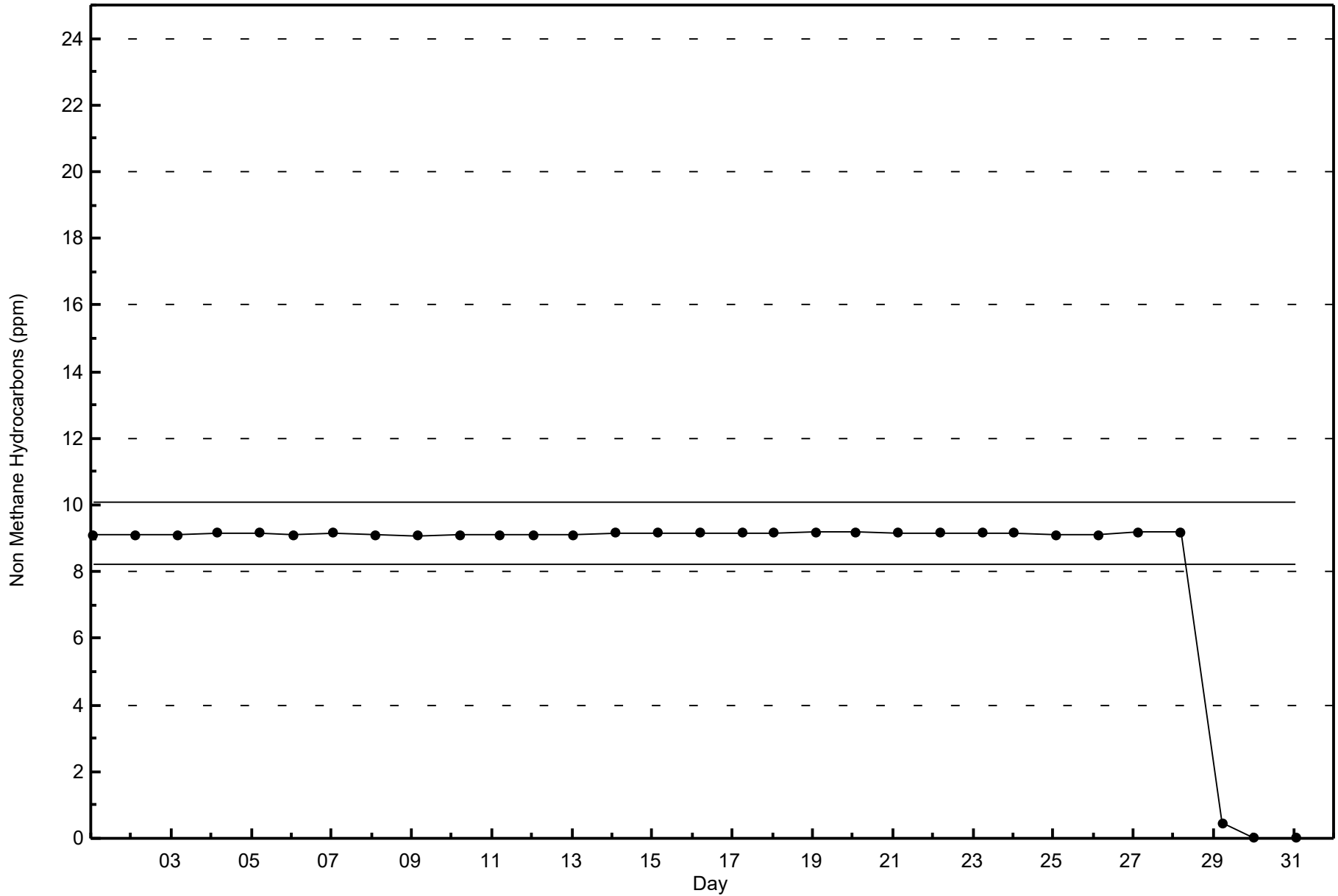


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Non Methane Hydrocarbons (NMHC) - ppm
Anzac



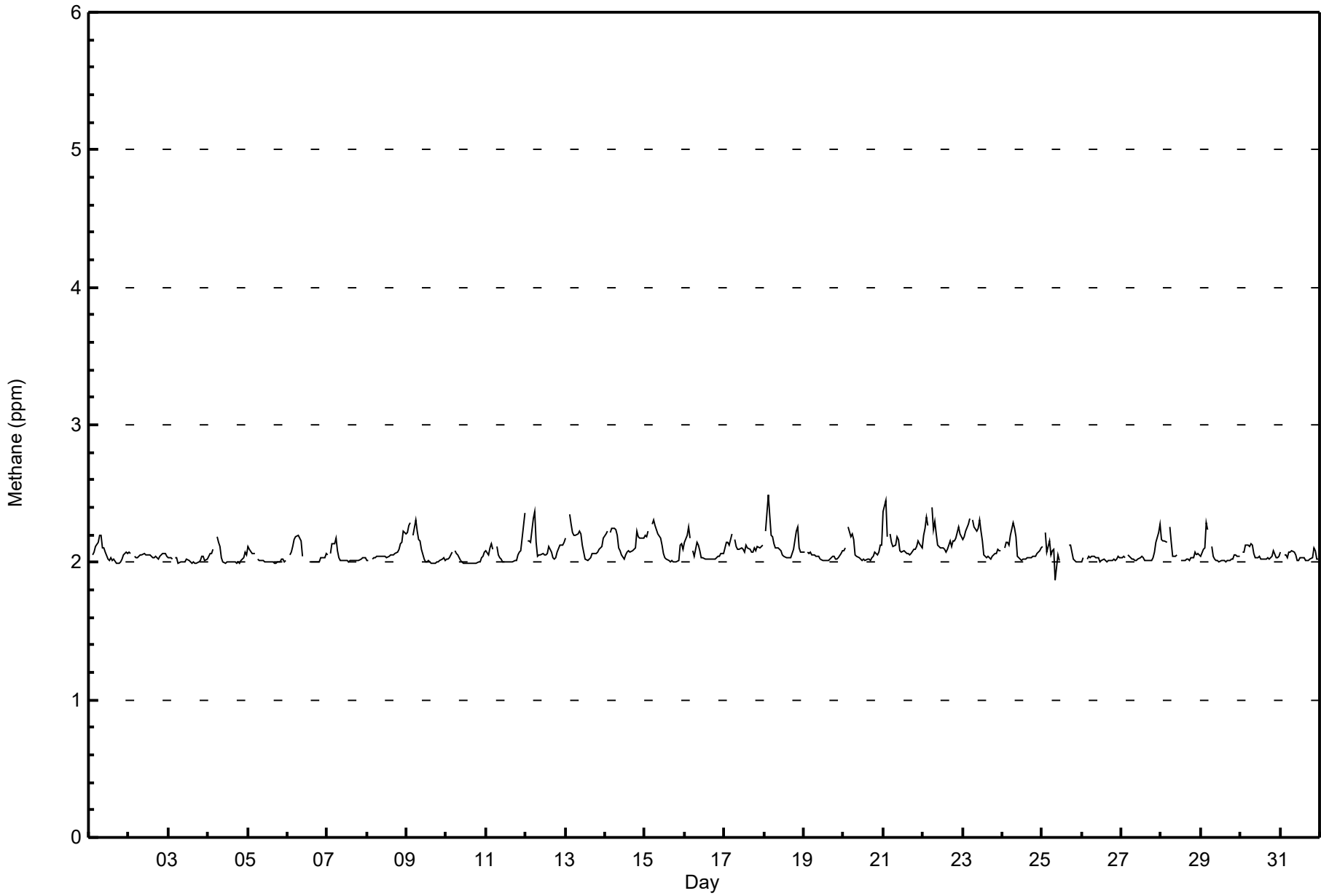






Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Anzac - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Anzac - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	346	49.22	49.22
2.1 - 3.0	357	50.78	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Methane (CH₄) - ppm
Anzac - July 2023

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	11	8	10	10	22	25	31	14	12	9	16	40	58	25	24	30	345
2.1 - 3.0	11	7	8	8	11	19	31	28	13	17	25	27	65	34	31	21	356
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	22	15	18	18	33	44	62	42	25	26	41	67	123	59	55	51	701

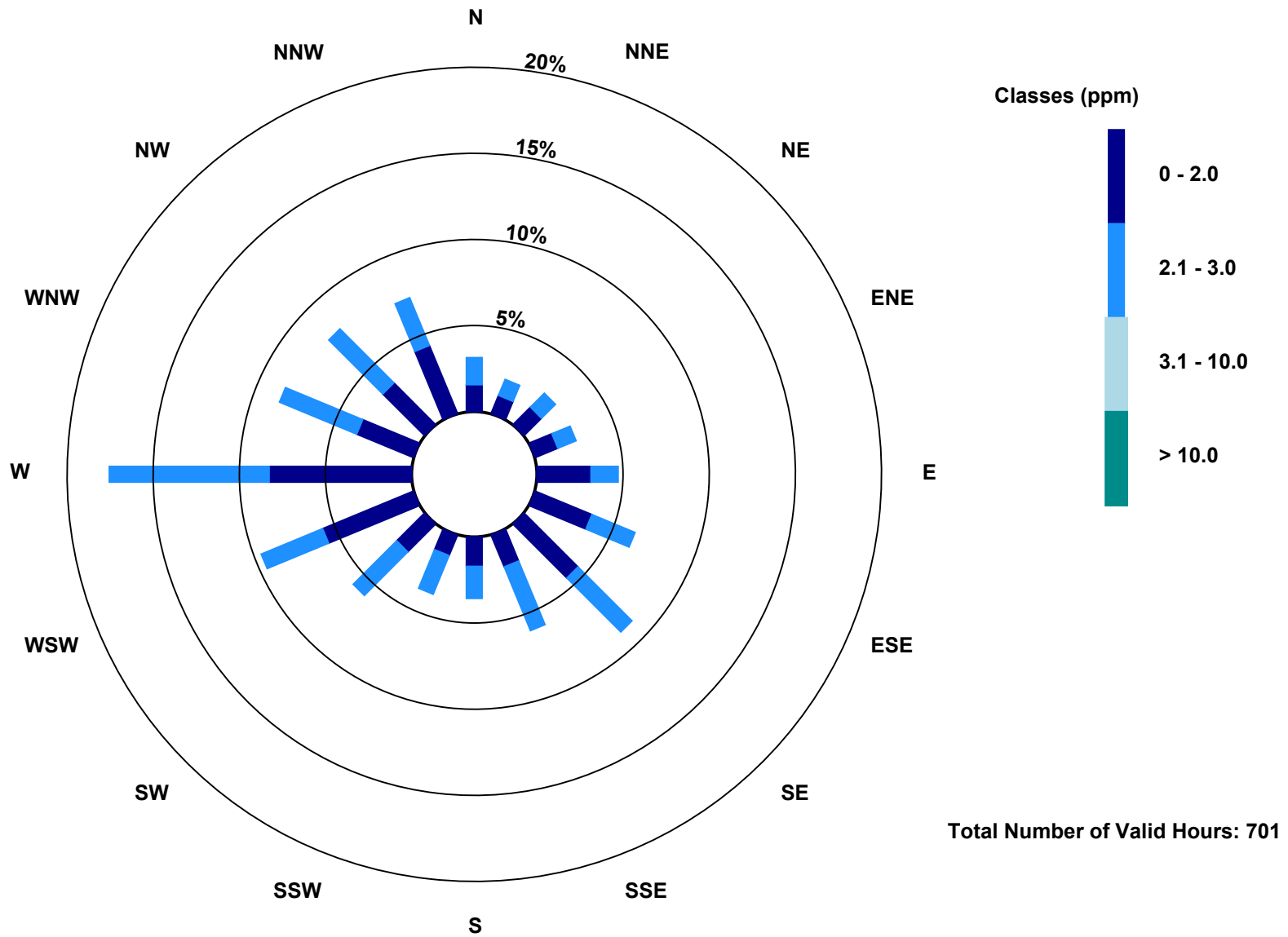
Total Number of Valid Hours: 701

Total Number of Hours: 744

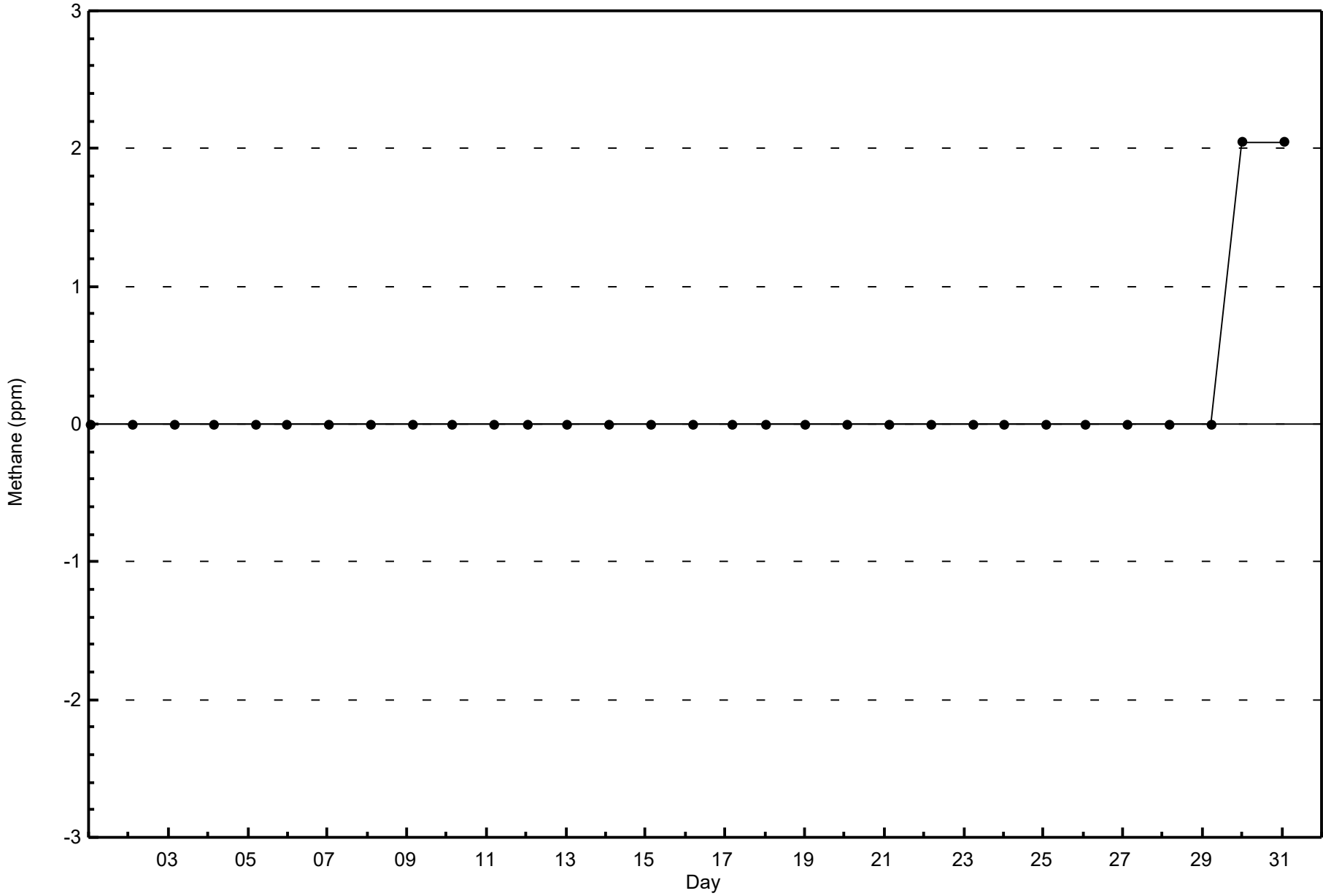


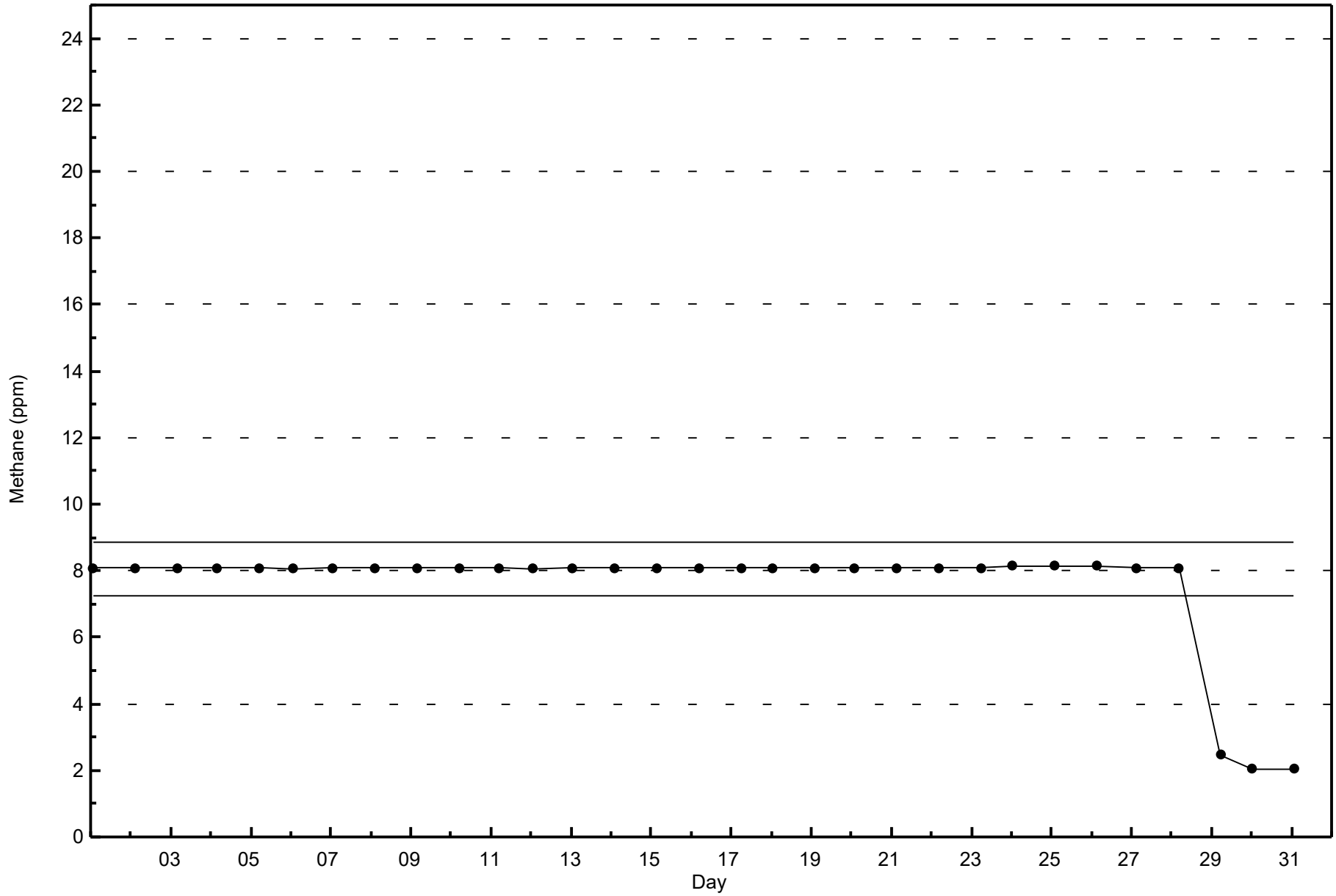
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Methane (CH₄) - ppm
Anzac



Total Number of Valid Hours: 701

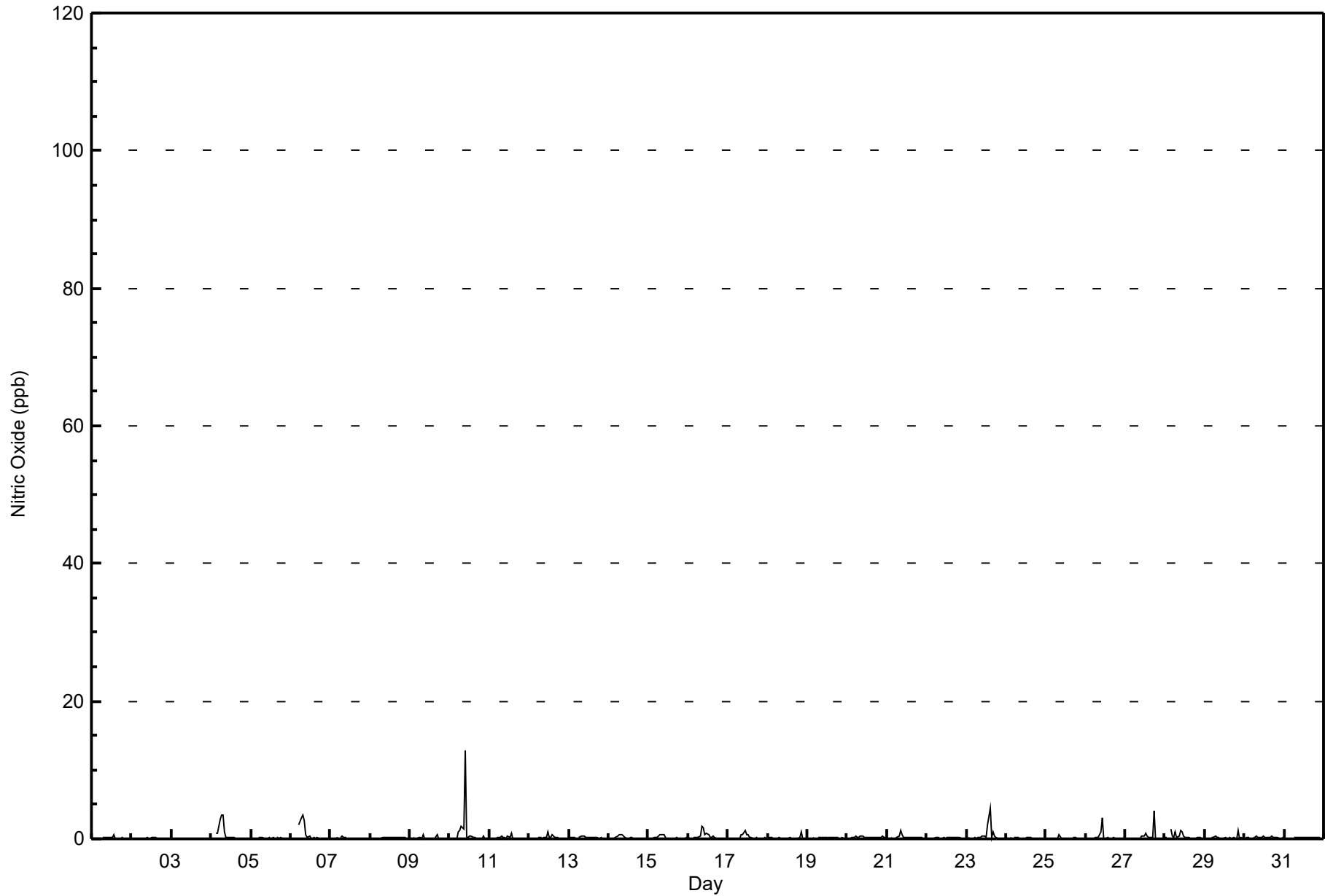






Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Anzac - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Anzac - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Anzac - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	15	18	17	32	45	63	41	28	27	38	62	124	61	58	50	701
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	15	18	17	32	45	63	41	28	27	38	62	124	61	58	50	701

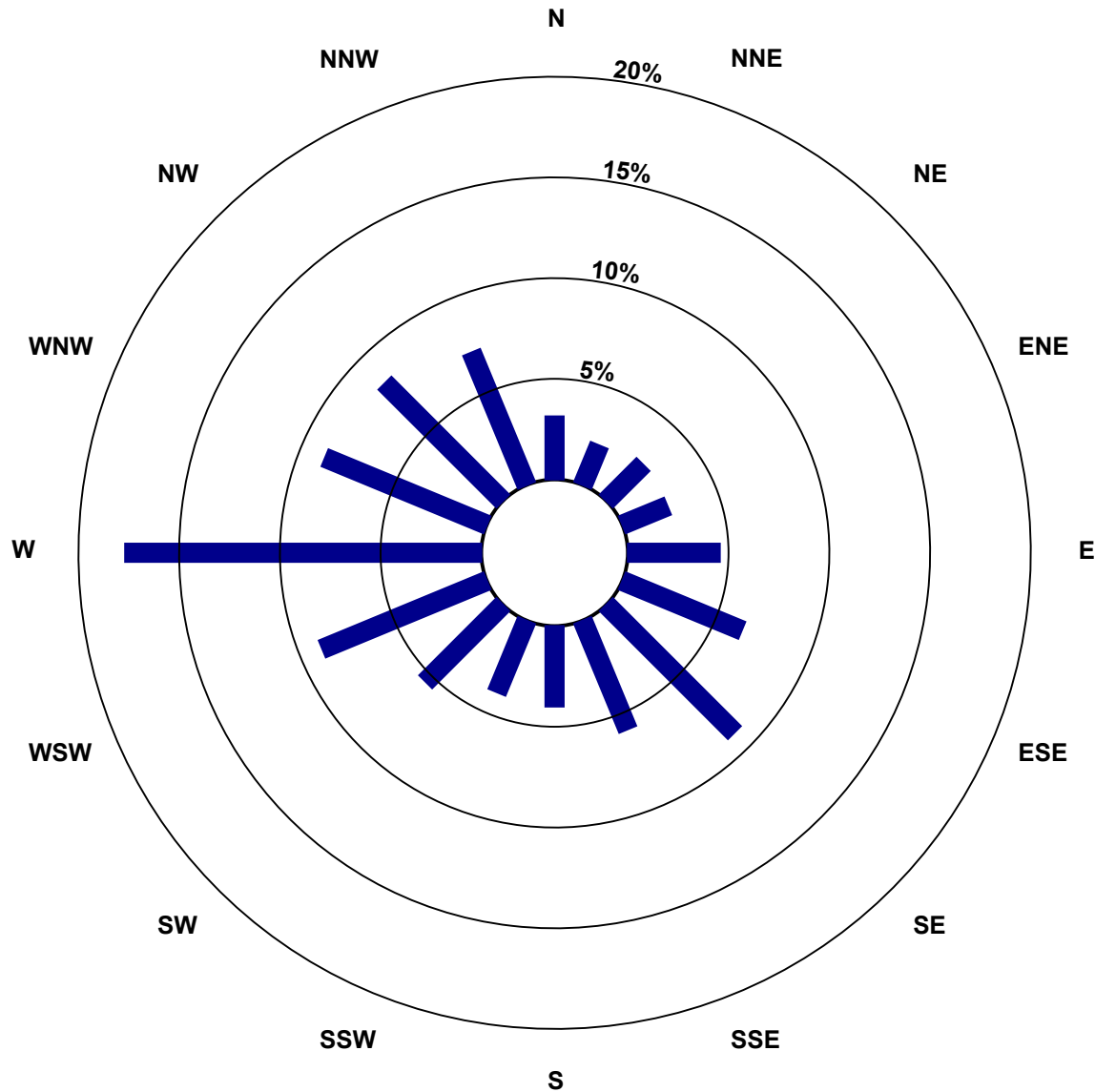
Total Number of Valid Hours: 701

Total Number of Hours: 744

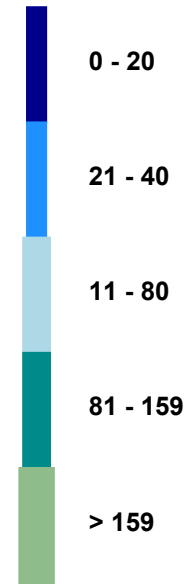


Wood Buffalo Environmental Association
Wind Rose Jul 2023

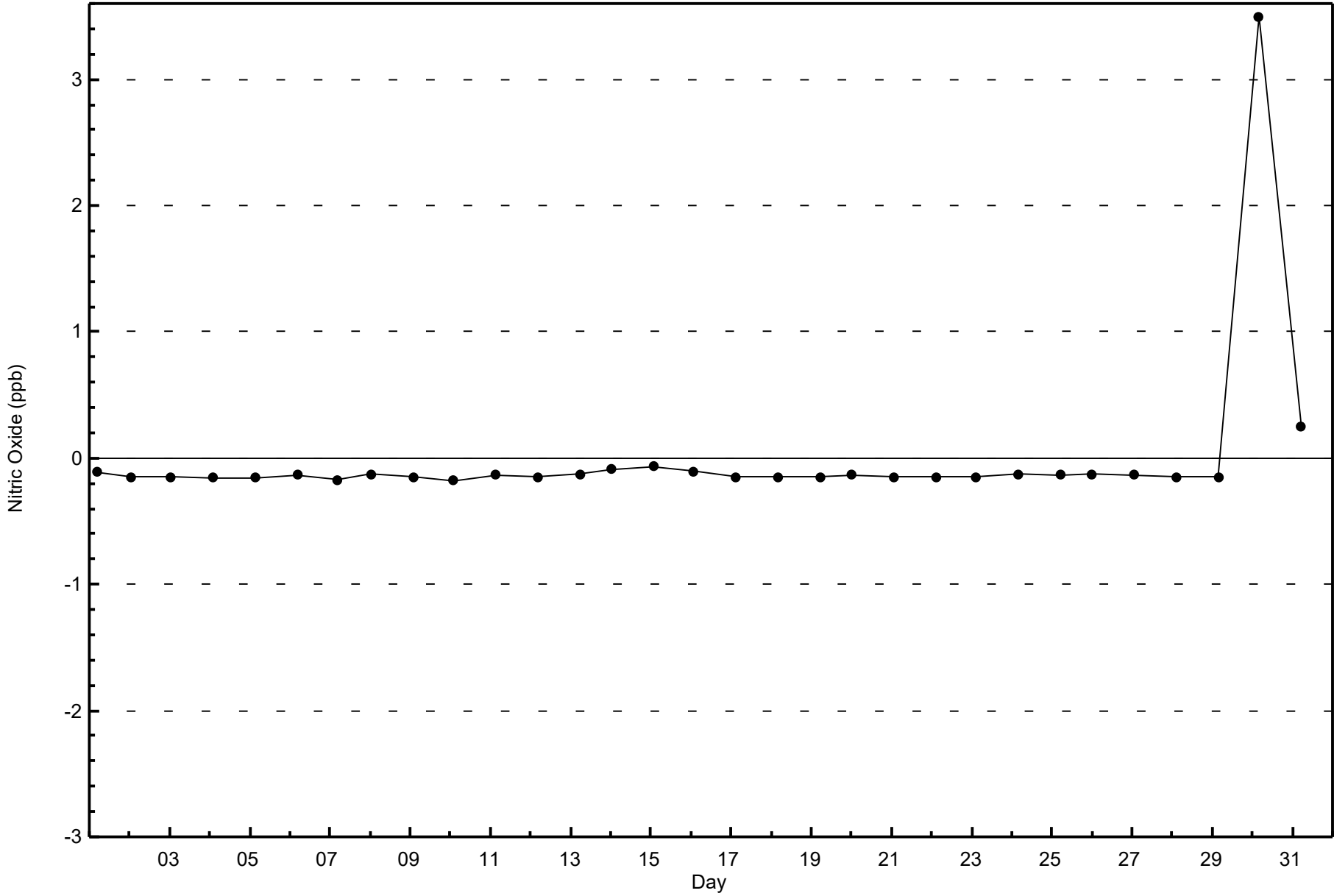
Nitric Oxide (NO) - ppb
Anzac

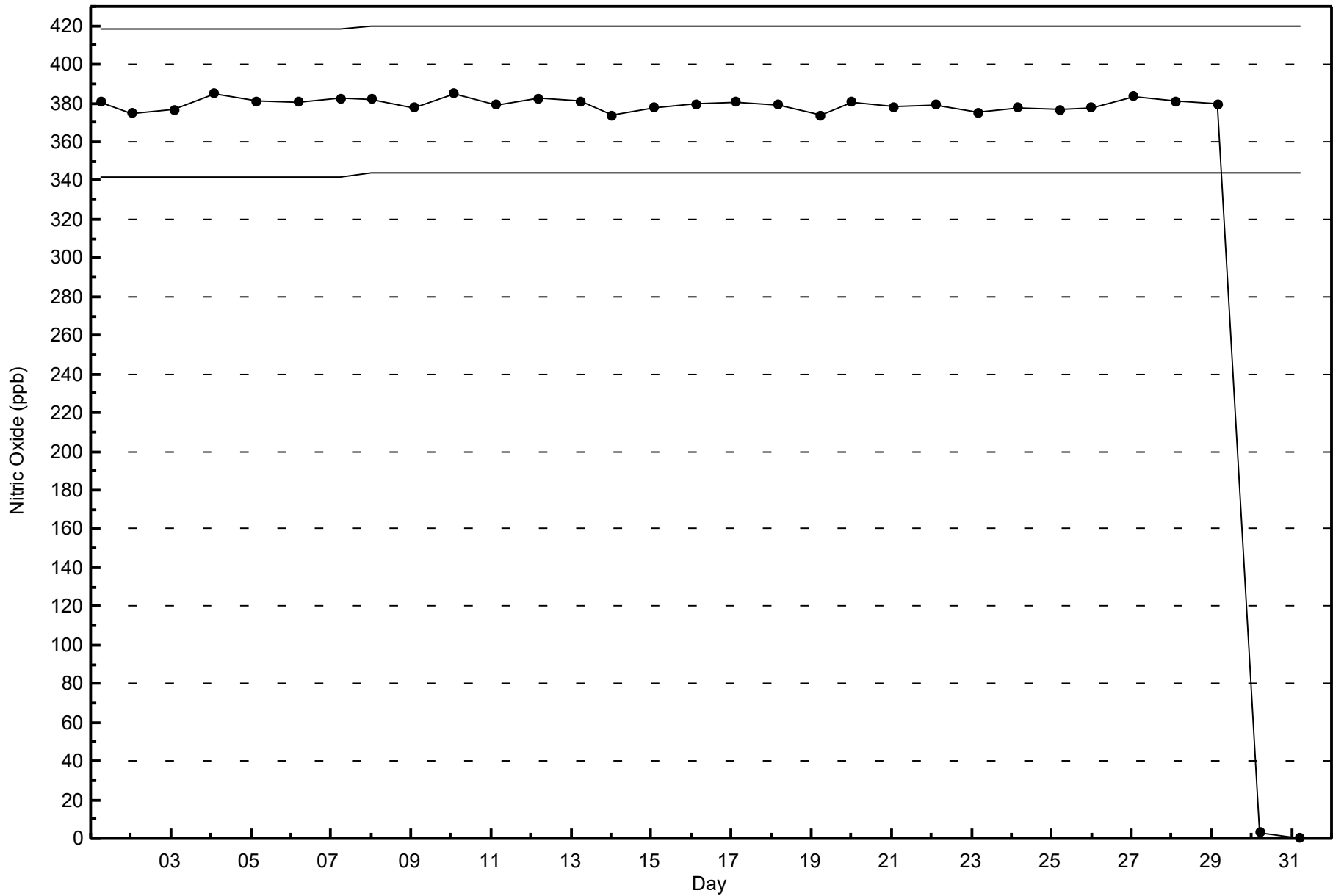


Classes (ppb)



Total Number of Valid Hours: 701





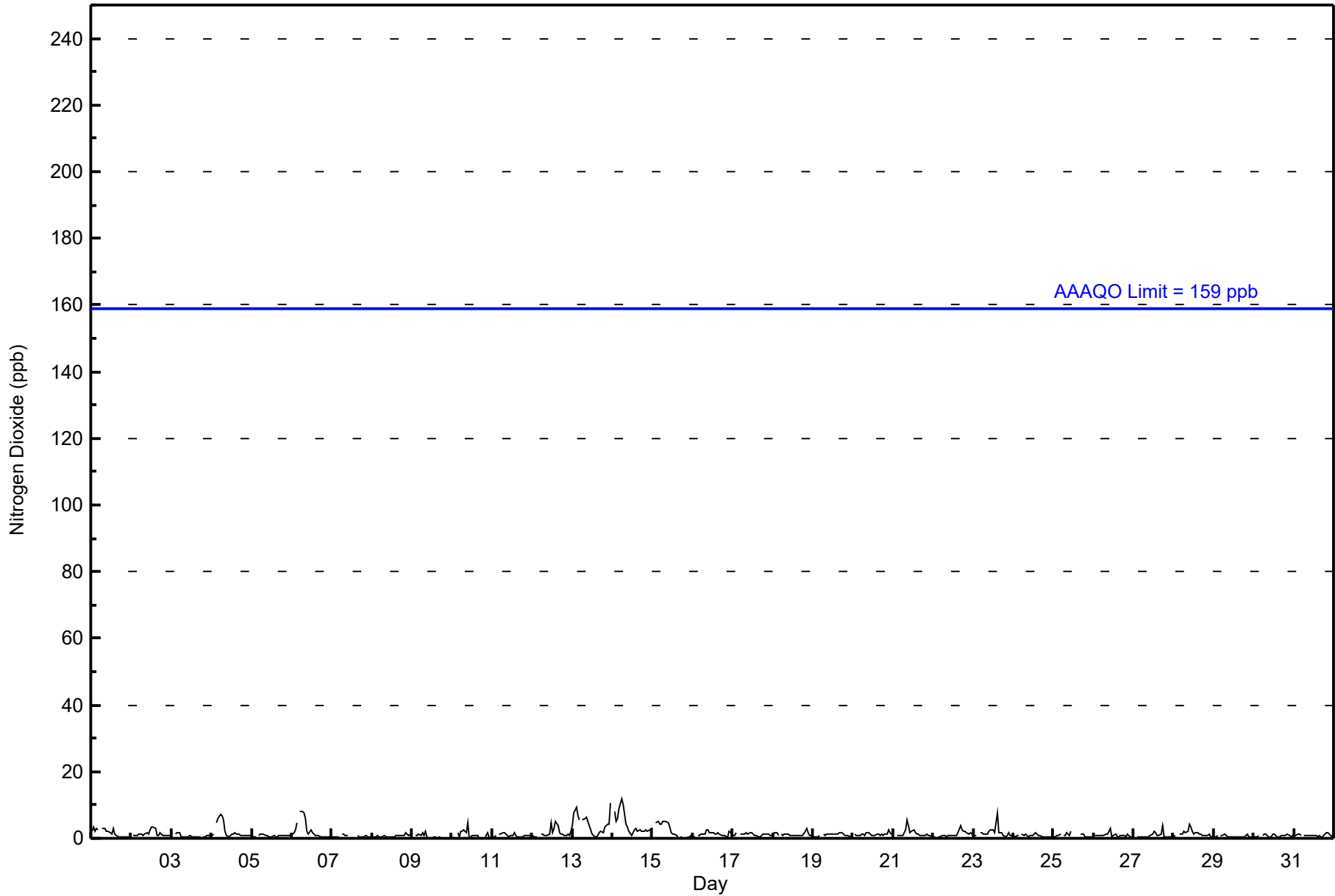


Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0	Hours in Service: 744																	744																												
Maximum Value: 11.9 ppb on Jul 14 06:00		Maximum Daily Average: 4.2 ppb on Jul 13																	Hours of Data: 703																														
Minimum Value: 0.0 ppb on Jul 9 18:00		Minimum Daily Average: 0.5 ppb on Jul 9																	Hours of Missing Data: 41																														
Maximum Diurnal Average: 2.2 ppb at hour 7		Minimum Diurnal Average: 0.8 ppb at hour 19																	Hours of Calibration: 36																														
Monthly Average: 1.39 ppb		Percentiles: P ₁ = 0.1 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 0.9 Q ₃ = 1.5 P ₉₀ = 2.7 P ₉₉ = 8.0																	Percent Operational Time: 99.3																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	2.2	3.2	2.2	3.1	2.4	Z	3.1	2.9	3.0	2.3	2.0	1.7	1.2	3.1	1.4	0.9	0.4	0.6	0.5	0.6	0.4	0.6	0.6	0.6	1.7	3.2																							
2-Jul	Z	1.0	0.9	1.0	1.1	1.1	1.1	1.0	1.4	1.8	1.3	2.7	3.2	3.5	2.8	0.9	0.7	1.7	1.2	0.8	0.8	0.7	0.7	0.8	1.4	3.5																							
3-Jul	0.8	Z	1.2	1.8	1.5	1.5	0.5	0.4	0.4	0.4	0.6	0.7	0.4	0.4	0.3	0.4	0.4	0.4	0.2	0.4	0.4	0.7	1.0	0.7	0.7	1.8																							
4-Jul	0.8	1.4	Z	4.5	5.8	7.4	6.8	5.7	2.2	0.9	0.6	1.0	1.2	1.3	1.5	1.3	1.1	0.9	0.9	0.8	0.8	1.0	1.0	0.9	2.2	7.4																							
5-Jul	0.7	0.6	0.6	Z	1.0	1.2	1.1	1.2	0.8	0.8	0.6	0.6	0.6	0.7	0.5	0.4	0.9	0.9	1.0	1.0	0.8	1.0	1.0	1.0	0.8	1.2																							
6-Jul	1.2	1.8	2.5	4.5	Z	8.2	8.0	7.6	6.1	2.2	1.4	2.4	1.5	1.1	1.0	0.7	0.9	0.5	0.3	0.4	0.4	0.5	0.6	0.4	2.4	8.2																							
7-Jul	0.3	0.3	0.3	0.5	0.6	Z	1.3	1.4	0.7	0.8	C	C	C	C	C	0.7	0.6	0.4	0.5	0.5	0.7	0.6	0.5	0.5	0.6	1.4																							
8-Jul	Z	0.6	0.6	0.7	0.6	0.5	0.6	0.8	0.6	0.6	0.6	0.5	0.5	0.5	0.8	0.7	0.9	0.9	1.0	0.9	1.6	1.3	0.9	1.4	0.8	1.6																							
9-Jul	1.3	Z	0.9	0.8	1.2	1.0	1.6	0.9	2.0	0.3	0.2	0.1	0.1	0.3	0.4	0.2	0.3	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.5	2.0																							
10-Jul	0.1	0.5	Z	1.5	0.6	2.1	2.2	2.4	1.6	4.6	0.2	0.3	0.9	0.9	0.7	0.7	0.2	0.0	0.1	0.1	0.8	1.8	0.3	0.2	1.0	4.6																							
11-Jul	0.3	0.5	0.7	Z	1.2	1.2	1.7	1.9	1.2	0.9	0.6	0.9	0.7	1.8	0.8	0.6	0.5	0.5	0.5	0.8	0.8	0.9	0.9	0.9	0.9	1.9																							
12-Jul	0.8	0.6	0.6	0.6	Z	1.3	1.2	1.0	0.7	0.9	1.4	4.6	1.8	2.9	5.2	3.8	1.5	1.4	1.2	0.8	0.9	1.1	1.0	2.0	1.6	5.2																							
13-Jul	4.0	7.8	9.2	6.7	5.3	Z	5.6	6.0	6.2	5.0	3.9	2.6	1.1	0.6	0.5	0.9	1.8	2.1	1.7	3.3	3.7	4.4	4.4	10.7	4.2	10.7																							
14-Jul	Z	8.1	5.0	5.9	9.0	11.9	10.3	7.1	4.4	3.2	2.2	0.8	1.9	2.5	2.8	2.0	2.5	2.3	2.1	2.0	2.6	2.2	2.5	2.8	4.2	11.9																							
15-Jul	3.1	Z	4.8	4.9	4.1	4.2	4.9	5.0	5.0	4.8	3.2	1.7	1.1	1.1	0.7	0.2	0.1	0.4	0.1	0.1	0.2	0.3	0.5	0.8	2.2	5.0																							
16-Jul	0.6	0.6	Z	0.9	0.8	1.1	1.4	1.2	2.6	2.5	1.5	1.8	1.7	1.1	1.2	1.8	1.3	0.9	0.9	0.7	0.6	0.6	2.2	1.1	1.3	2.6																							
17-Jul	1.0	1.0	1.5	Z	1.3	1.1	1.3	1.1	1.5	1.1	1.5	1.7	1.2	1.0	0.8	0.5	0.6	0.8	1.2	1.4	1.4	1.1	0.9	0.8	1.1	1.7																							
18-Jul	0.7	1.5	1.5	1.0	Z	1.1	1.0	1.2	1.1	1.1	1.0	0.9	0.8	1.0	0.7	0.7	0.8	0.9	0.8	2.0	3.1	1.6	0.9	0.7	1.1	3.1																							
19-Jul	0.6	0.6	0.6	0.6	0.8	Z	1.1	1.0	1.3	1.3	1.1	1.1	1.1	1.2	1.1	1.1	1.7	1.5	1.2	0.7	0.9	0.9	0.6	0.8	1.0	1.7																							
20-Jul	Z	1.3	0.9	1.0	0.9	1.2	1.2	0.9	1.8	1.6	1.4	0.8	1.0	0.7	1.1	1.3	0.9	1.1	0.8	1.2	1.1	2.4	1.5	1.1	1.2	2.4																							
21-Jul	0.9	Z	1.0	0.9	0.9	0.9	1.0	2.5	5.4	3.7	1.8	2.1	2.6	1.8	1.2	1.1	1.0	0.9	0.7	0.9	1.2	1.0	0.7	0.6	1.5	5.4																							
22-Jul	0.5	0.5	Z	0.6	0.6	0.8	0.9	0.8	0.6	0.9	1.0	0.9	1.0	1.0	1.0	1.8	3.7	2.7	2.3	2.0	1.7	1.4	1.5	1.2	1.3	3.7																							
23-Jul	0.9	1.0	0.8	Z	1.6	1.5	1.1	1.1	1.3	2.1	2.6	2.7	2.7	1.7	7.5	1.7	1.9	1.7	0.9	0.5	0.9	1.5	0.7	0.7	1.7	7.5																							
24-Jul	0.8	0.6	0.7	0.7	Z	1.1	0.9	1.3	0.7	0.6	0.8	0.9	1.1	1.8	1.1	1.0	0.7	0.6	0.6	0.6	0.5	0.6	0.5	0.5	0.8	1.8																							
25-Jul	0.5	0.5	0.8	1.0	1.1	Z	0.9	1.0	1.5	1.0	2.1	PF	PF	PF	PF	PF	1.1	1.3	1.1	0.6	0.5	0.4	0.4	0.5	0.9	2.1																							
26-Jul	Z	0.8	0.7	0.7	0.9	0.8	1.0	1.2	1.3	2.0	3.1	0.6	0.7	1.1	0.5	0.6	0.7	0.7	0.7	0.6	1.3	0.7	0.3	0.3	0.9	3.1																							
27-Jul	0.2	Z	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.9	1.3	2.2	1.8	0.7	0.8	1.1	3.9	0.4	0.5	0.6	0.6	0.6	0.8	0.8	3.9																							
28-Jul	0.7	0.4	Z	1.4	1.3	1.2	2.2	1.5	2.0	4.2	3.2	2.1	1.2	1.8	1.8	1.2	1.3	1.0	1.0	0.9	1.0	1.1	0.6	0.5	1.5	4.2																							
29-Jul	0.6	0.6	0.7	Z	0.9	0.8	1.4	0.7	0.6	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.6	0.7	1.1	0.6	0.5	0.4	0.6	1.4																							
30-Jul	0.4	0.4	0.4	0.8	Z	1.0	1.1	1.3	0.9	0.6	0.5	1.1	1.1	0.9	0.6	0.5	0.9	0.8	0.8	1.0	1.4	0.7	0.6	0.7	0.8	1.4																							
31-Jul	0.8	0.7	1.1	1.4	0.7	Z	1.0	0.9	1.0	0.9	0.8	0.8	0.8	0.7	0.6	0.7	0.6	0.6	0.7	1.9	1.8	1.3	0.7	0.6	0.9	1.9																							
																								1.0	1.4	1.6	1.8	1.8	2.2	2.2	2.0	1.9	1.7	1.4	1.4	1.2	1.3	1.4	1.0	1.0	1.1	0.8	0.9	1.1	1.1	0.9	1.1	Diurnal Average	
																								4.0	8.1	9.2	6.7	9.0	11.9	10.3	7.6	6.2	5.0	3.9	4.6	3.2	3.5	7.5	3.8	3.7	3.9	2.3	3.3	3.7	4.4	4.4	10.7	Diurnal Maximum	
Z - zerospan C - Calibration PF - Power Failure																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Anzac - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Anzac - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	15	18	17	32	45	63	41	28	27	38	62	124	61	58	50	701
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	15	18	17	32	45	63	41	28	27	38	62	124	61	58	50	701

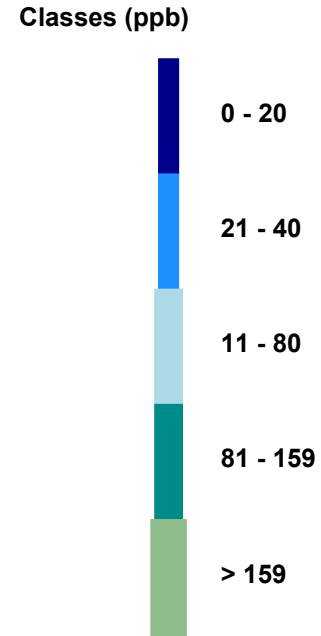
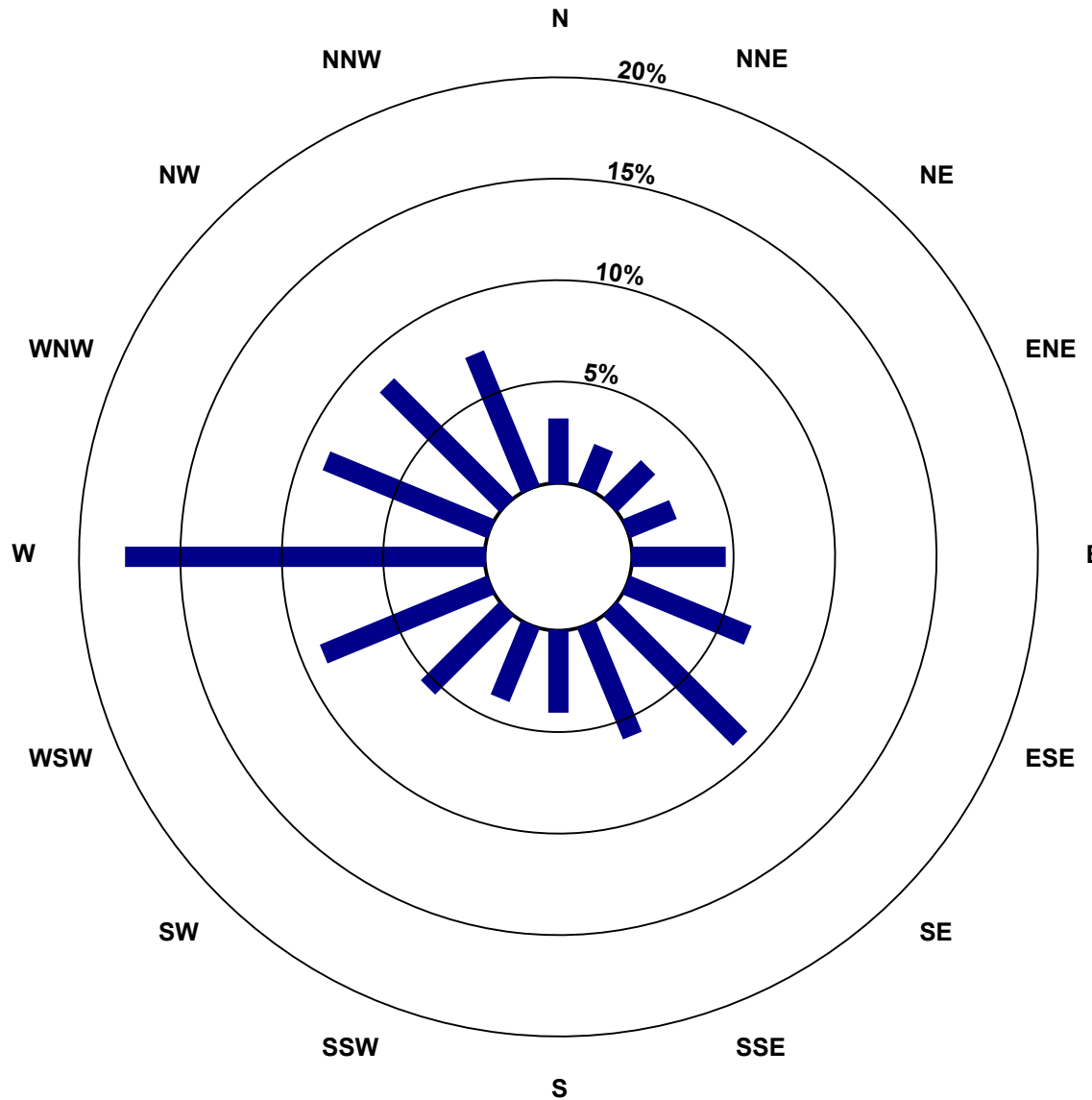
Total Number of Valid Hours: 701

Total Number of Hours: 744

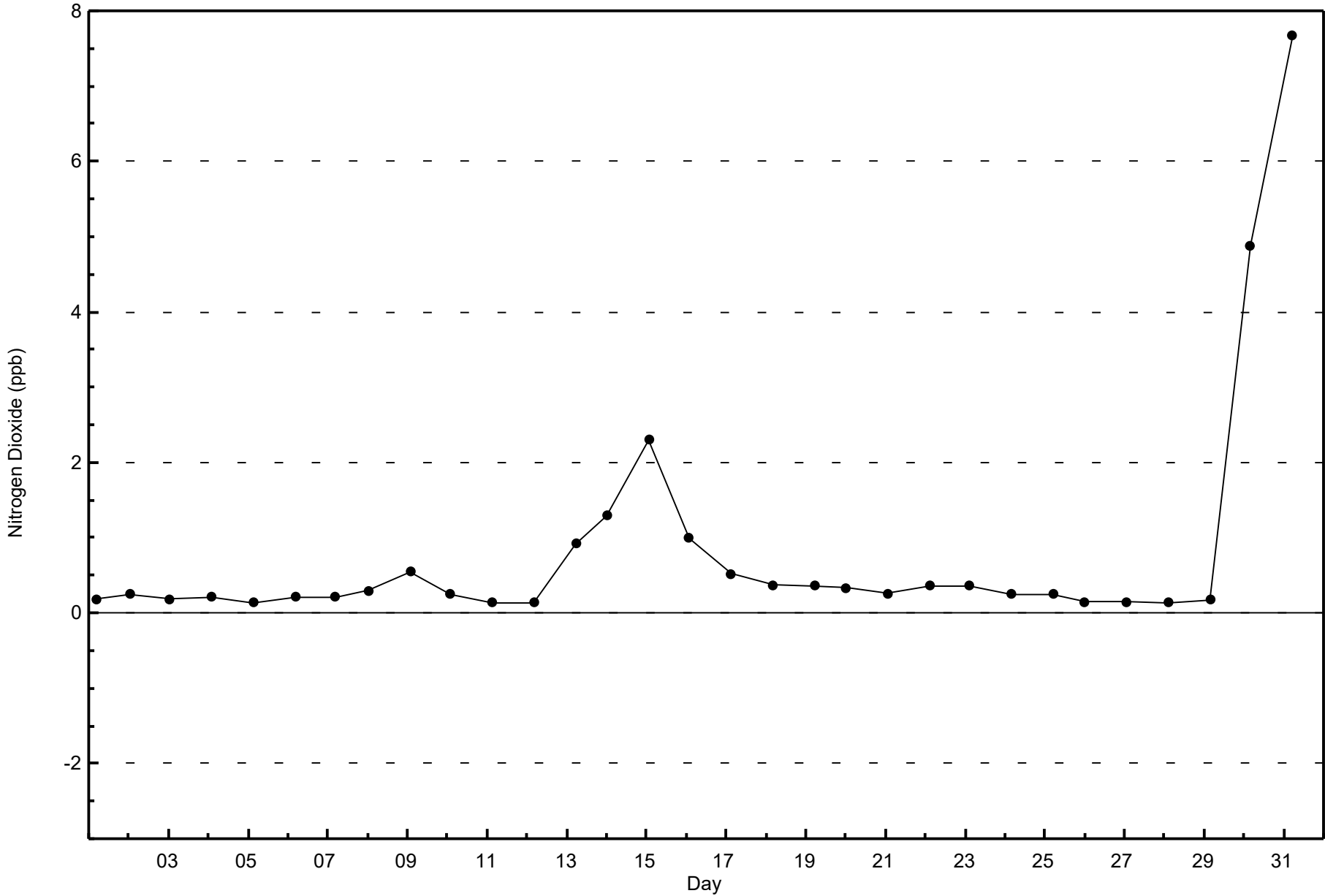


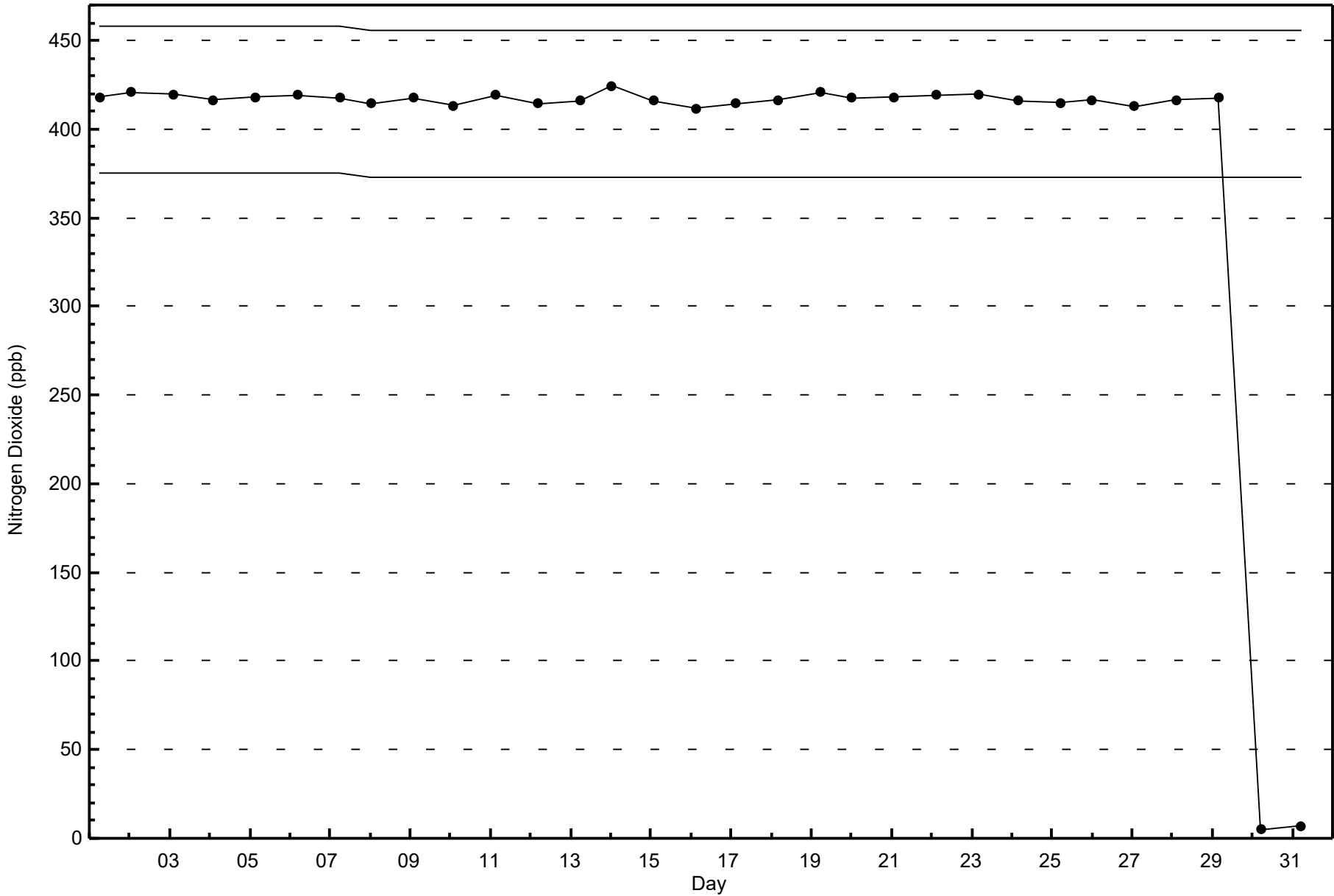
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Anzac



Total Number of Valid Hours: 701







Wood Buffalo Environmental Association
Summary of Hour Averages

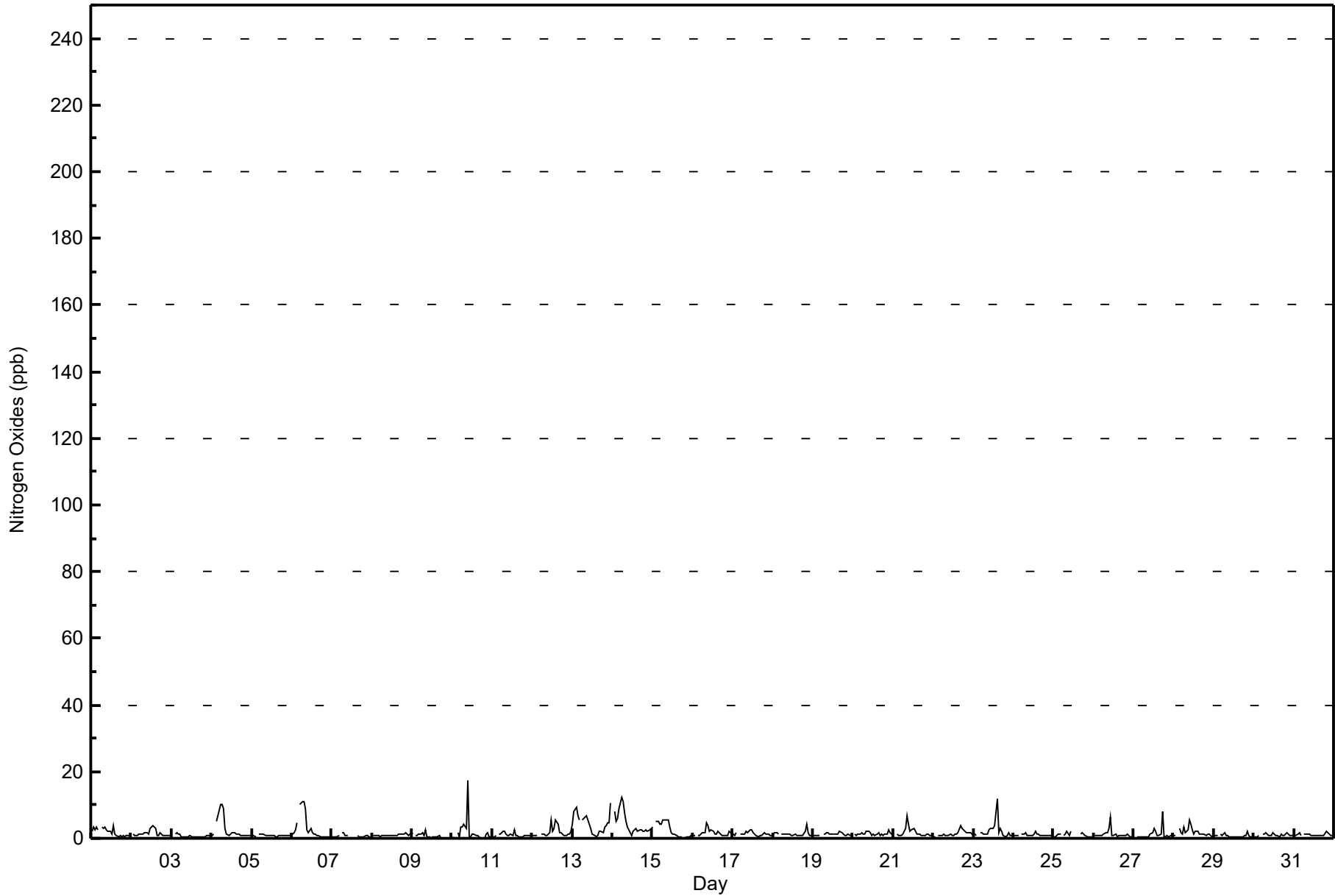
Nitrogen Oxides (NO_x) - ppb
Anzac - July 2023

Maximum Value: 17.3 ppb on Jul 10 10:00		Maximum Daily Average: 4.4 ppb on Jul 13		Hours in Service: 744																							
Minimum Value: 0.0 ppb on Jul 9 18:00		Minimum Daily Average: 0.6 ppb on Jul 9		Hours of Data: 703																							
Maximum Diurnal Average: 2.6 ppb at hour 7		Minimum Diurnal Average: 0.9 ppb at hour 19		Hours of Missing Data: 41																							
Monthly Average: 1.62 ppb		Percentiles: P ₁ = 0.1 P ₁₀ = 0.5 Q ₁ = 0.7 Median = 1.1 Q ₃ = 1.6 P ₉₀ = 3.2 P ₉₉ = 10.3		Hours of Calibration: 36																							
				Percent Operational Time: 99.3																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	2.3	3.3	2.3	3.2	2.5	Z	3.3	3.1	3.2	2.5	2.2	1.9	1.4	3.8	1.5	1.0	0.5	0.7	0.6	0.7	0.5	0.7	0.7	0.7	1.9	3.8	
2-Jul	Z	1.1	1.0	1.0	1.1	1.1	1.2	1.1	1.5	1.9	1.4	2.8	3.3	3.8	3.0	0.9	0.7	1.8	1.3	0.9	0.8	0.8	0.7	0.8	1.5	3.8	
3-Jul	0.8	Z	1.2	1.8	1.5	1.5	0.5	0.4	0.4	0.4	0.6	0.7	0.5	0.4	0.3	0.5	0.5	0.4	0.2	0.4	0.4	0.7	1.0	0.7	0.7	1.8	
4-Jul	0.8	1.4	Z	5.2	6.6	10.1	10.3	9.1	3.1	1.2	0.7	1.2	1.5	1.5	1.6	1.4	1.2	1.0	0.9	0.8	0.9	1.0	1.0	0.9	2.8	10.3	
5-Jul	0.7	0.6	0.6	Z	1.1	1.4	1.2	1.4	0.9	0.9	0.7	0.7	0.7	0.8	0.6	0.5	1.0	1.0	1.1	1.1	0.8	1.0	1.0	1.0	0.9	1.4	
6-Jul	1.2	1.8	2.5	4.6	Z	10.1	11.1	11.1	8.8	2.7	1.6	2.8	1.6	1.2	1.1	0.8	1.0	0.5	0.3	0.4	0.4	0.5	0.6	0.4	2.9	11.1	
7-Jul	0.3	0.3	0.4	0.5	0.7	Z	1.5	1.7	0.9	1.0	C	C	C	C	C	0.7	0.6	0.4	0.5	0.5	0.8	0.6	0.5	0.5	0.7	1.7	
8-Jul	Z	0.7	0.7	0.8	0.7	0.6	0.7	0.9	0.7	0.7	0.7	0.7	0.7	0.7	1.0	0.9	1.1	1.1	1.2	1.1	1.8	1.4	1.0	1.5	0.9	1.8	
9-Jul	1.4	Z	1.0	0.9	1.3	1.1	1.8	1.0	2.5	0.4	0.3	0.2	0.2	0.4	0.5	0.3	0.9	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.6	2.5	
10-Jul	0.1	0.5	Z	1.6	0.6	3.2	3.3	4.3	3.1	17.3	0.4	0.4	1.3	1.3	1.0	0.9	0.3	0.1	0.1	0.1	1.1	1.8	0.3	0.2	1.9	17.3	
11-Jul	0.3	0.5	0.7	Z	1.3	1.4	2.0	2.3	1.4	1.0	0.7	1.2	0.8	2.6	0.9	0.7	0.6	0.6	0.6	0.9	0.9	1.0	1.0	1.0	1.1	2.6	
12-Jul	0.9	0.7	0.7	0.7	Z	1.5	1.3	1.1	0.8	1.0	1.6	5.6	2.0	3.2	5.7	4.1	1.6	1.5	1.3	0.9	1.0	1.2	1.1	2.1	1.8	5.7	
13-Jul	4.1	7.9	9.3	6.8	5.4	Z	5.7	6.3	6.6	5.4	4.1	2.8	1.2	0.7	0.6	1.0	1.9	2.2	1.8	3.4	3.8	4.5	4.5	10.8	4.4	10.8	
14-Jul	Z	8.2	5.1	6.0	9.1	12.3	10.9	7.8	4.9	3.6	2.4	0.9	2.0	2.6	2.9	2.1	2.6	2.4	2.2	2.1	2.7	2.3	2.6	2.9	4.4	12.3	
15-Jul	3.2	Z	4.9	5.0	4.2	4.4	5.3	5.6	5.5	5.3	3.4	1.8	1.2	1.2	0.8	0.3	0.2	0.5	0.1	0.1	0.3	0.4	0.6	1.0	2.4	5.6	
16-Jul	0.7	0.7	Z	1.0	1.0	1.2	1.6	1.6	4.5	4.0	2.2	2.5	2.2	1.3	1.4	2.2	1.5	1.0	1.0	0.8	0.7	0.7	2.2	1.1	1.6	4.5	
17-Jul	1.1	1.0	1.6	Z	1.4	1.1	1.4	1.2	2.0	1.7	2.7	2.4	1.7	1.1	0.9	0.6	0.7	1.0	1.3	1.5	1.5	1.2	1.0	0.8	1.3	2.7	
18-Jul	0.8	1.6	1.6	1.1	Z	1.2	1.1	1.3	1.2	1.2	1.1	1.0	0.9	1.2	0.8	0.8	0.9	1.0	0.9	2.2	4.1	1.7	1.0	0.8	1.3	4.1	
19-Jul	0.7	0.7	0.7	0.7	0.9	Z	1.2	1.2	1.6	1.6	1.2	1.2	1.3	1.4	1.3	1.3	1.9	1.7	1.3	0.8	1.0	1.1	0.7	0.9	1.2	1.9	
20-Jul	Z	1.4	1.0	1.2	1.1	1.6	1.4	1.1	2.2	2.0	1.6	0.9	1.2	0.8	1.3	1.6	1.0	1.3	0.9	1.3	1.2	2.8	1.6	1.3	1.4	2.8	
21-Jul	1.1	Z	1.1	1.0	1.0	1.0	1.1	2.9	6.7	4.2	2.0	2.3	2.8	2.0	1.4	1.3	1.1	1.0	0.8	1.0	1.4	1.2	0.8	0.7	1.7	6.7	
22-Jul	0.6	0.6	Z	0.7	0.7	0.9	1.1	0.9	0.7	1.0	1.1	1.0	1.1	1.1	1.1	1.9	3.8	2.8	2.4	2.1	1.9	1.5	1.6	1.3	1.4	3.8	
23-Jul	1.0	1.1	1.0	Z	1.7	1.6	1.2	1.2	1.4	2.4	3.1	3.1	3.0	3.7	12.0	1.9	2.9	2.1	1.0	0.6	1.0	1.6	0.7	0.8	2.2	12.0	
24-Jul	0.9	0.6	0.8	0.9	Z	1.3	1.1	1.6	0.8	0.7	0.9	1.0	1.2	2.1	1.2	1.1	0.8	0.7	0.7	0.7	0.6	0.7	0.6	0.6	0.9	2.1	
25-Jul	0.6	0.6	0.9	1.1	1.2	Z	1.0	1.1	2.0	1.0	2.1	PF	PF	PF	PF	PF	1.3	1.5	1.3	0.7	0.6	0.5	0.4	0.5	1.0	2.1	
26-Jul	Z	0.8	0.7	0.7	0.9	0.9	1.1	1.5	1.8	3.0	6.2	0.7	0.8	1.2	0.5	0.7	0.8	0.8	0.8	0.6	1.3	0.7	0.3	0.3	1.2	6.2	
27-Jul	0.2	Z	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	1.3	1.7	3.1	2.1	0.8	1.0	1.3	8.0	0.5	0.6	0.7	0.6	0.7	1.2	1.2	8.0	
28-Jul	0.8	0.6	Z	2.9	1.6	1.4	3.3	1.7	2.4	5.4	4.2	2.5	1.4	2.1	2.0	1.3	1.4	1.1	1.1	1.0	1.2	1.2	0.7	0.6	1.8	5.4	
29-Jul	0.6	0.7	0.7	Z	1.1	0.9	1.8	0.9	0.7	0.6	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.6	0.7	0.8	2.3	0.7	0.6	0.5	0.8	2.3	
30-Jul	0.5	0.5	0.5	0.9	Z	1.1	1.3	1.7	1.1	0.7	0.6	1.5	1.2	1.0	0.7	0.6	1.4	0.9	0.9	1.1	1.5	0.8	0.7	0.8	1.0	1.7	
31-Jul	0.9	0.8	1.2	1.5	0.8	Z	1.3	1.1	1.2	1.1	0.9	0.9	0.9	0.8	0.8	0.9	0.7	0.7	0.8	2.0	1.9	1.4	0.8	0.7	1.0	2.0	
		1.0	1.5	1.7	2.0	1.9	2.5	2.6	2.5	2.4	2.5	1.8	1.6	1.4	1.6	1.7	1.1	1.2	1.3	0.9	1.0	1.3	1.2	1.0	1.2	Diurnal Average	
		4.1	8.2	9.3	6.8	9.1	12.3	11.1	11.1	8.8	17.3	6.2	5.6	3.3	3.8	12.0	4.1	3.8	8.0	2.4	3.4	4.1	4.5	4.5	10.8	Diurnal Maximum	
Z - zerospan		C - Calibration				PF - Power Failure																					



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Anzac - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Anzac - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Anzac - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	15	18	17	32	45	63	41	28	27	38	62	124	61	58	50	701
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	15	18	17	32	45	63	41	28	27	38	62	124	61	58	50	701

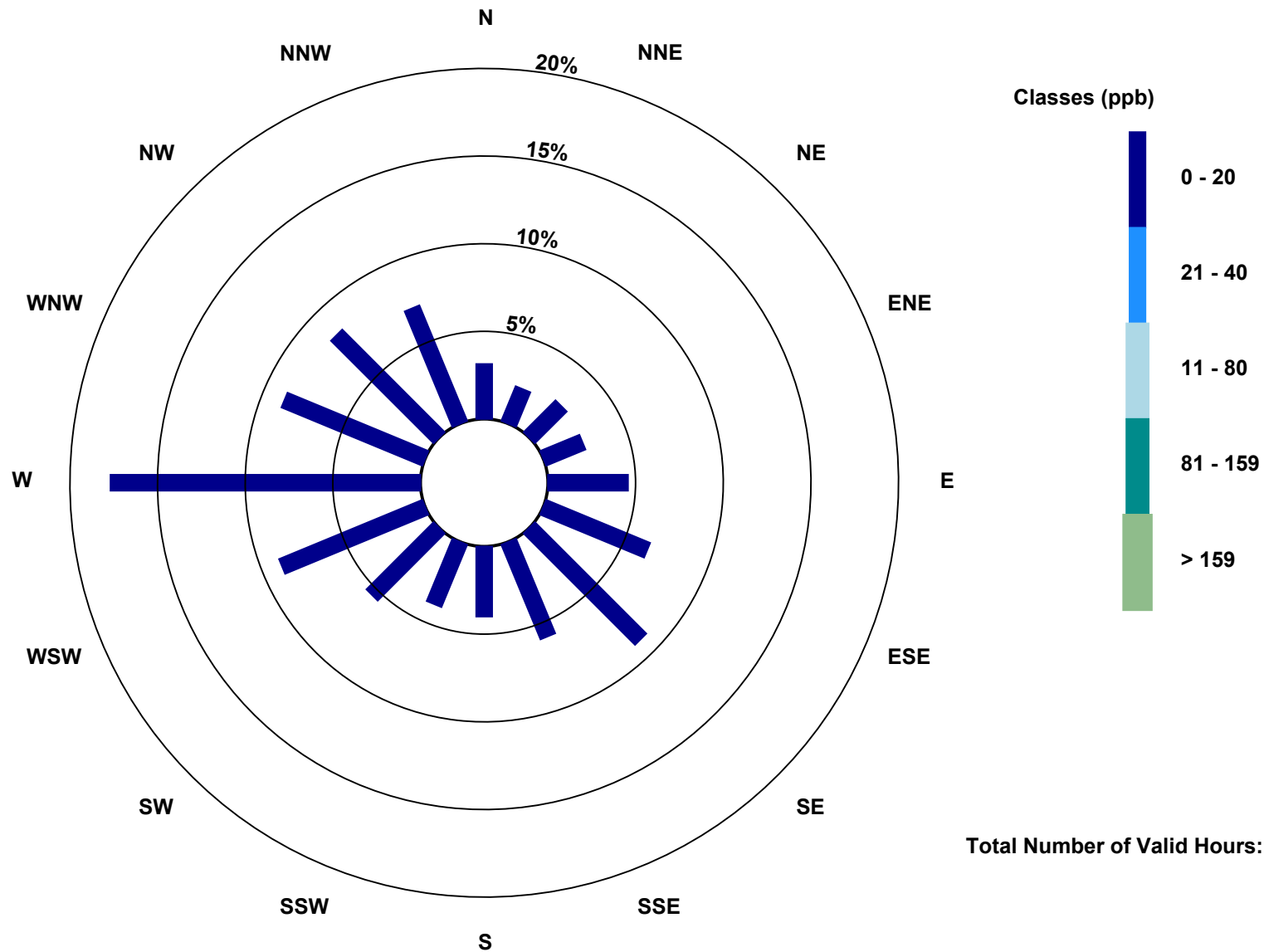
Total Number of Valid Hours: 701

Total Number of Hours: 744

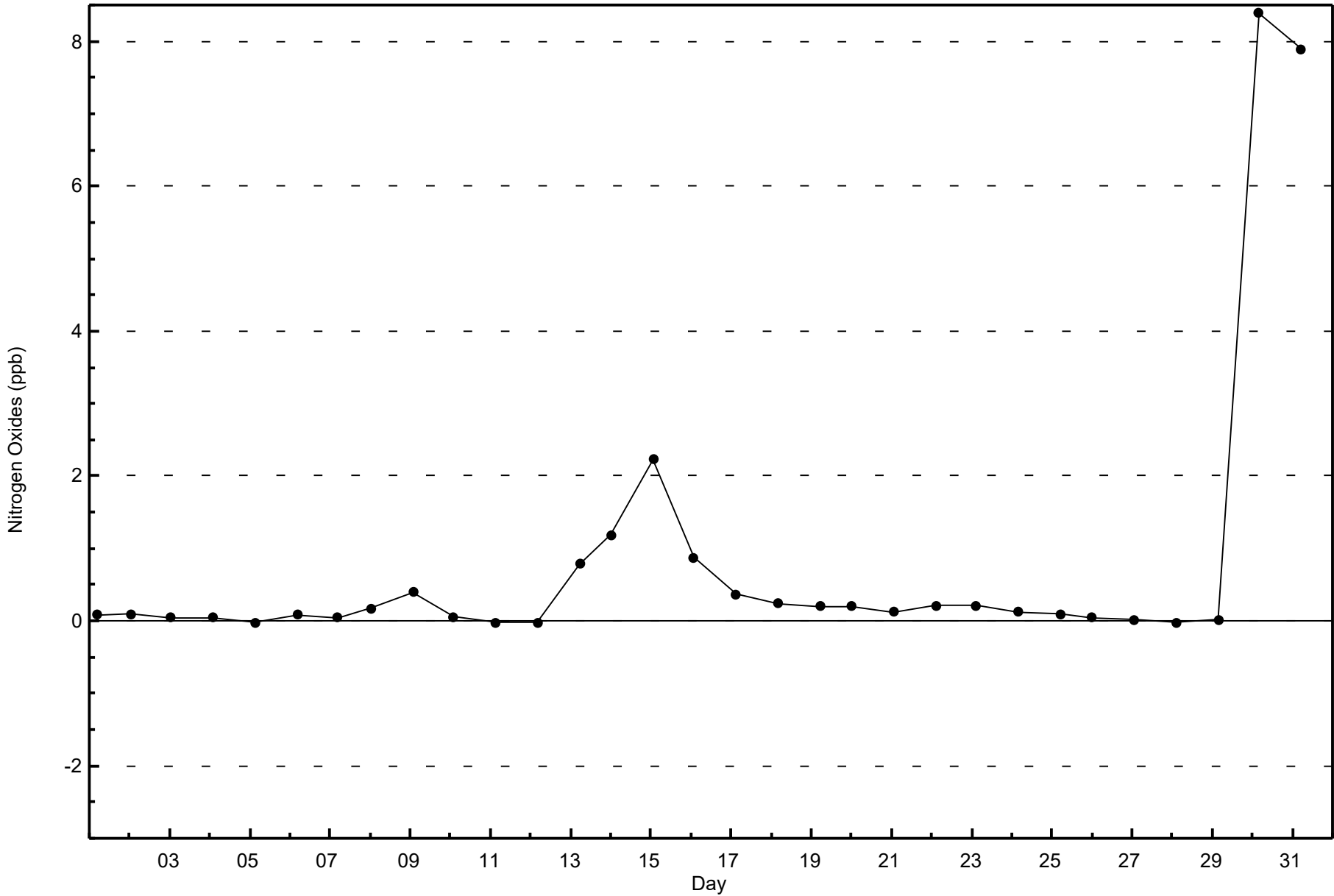


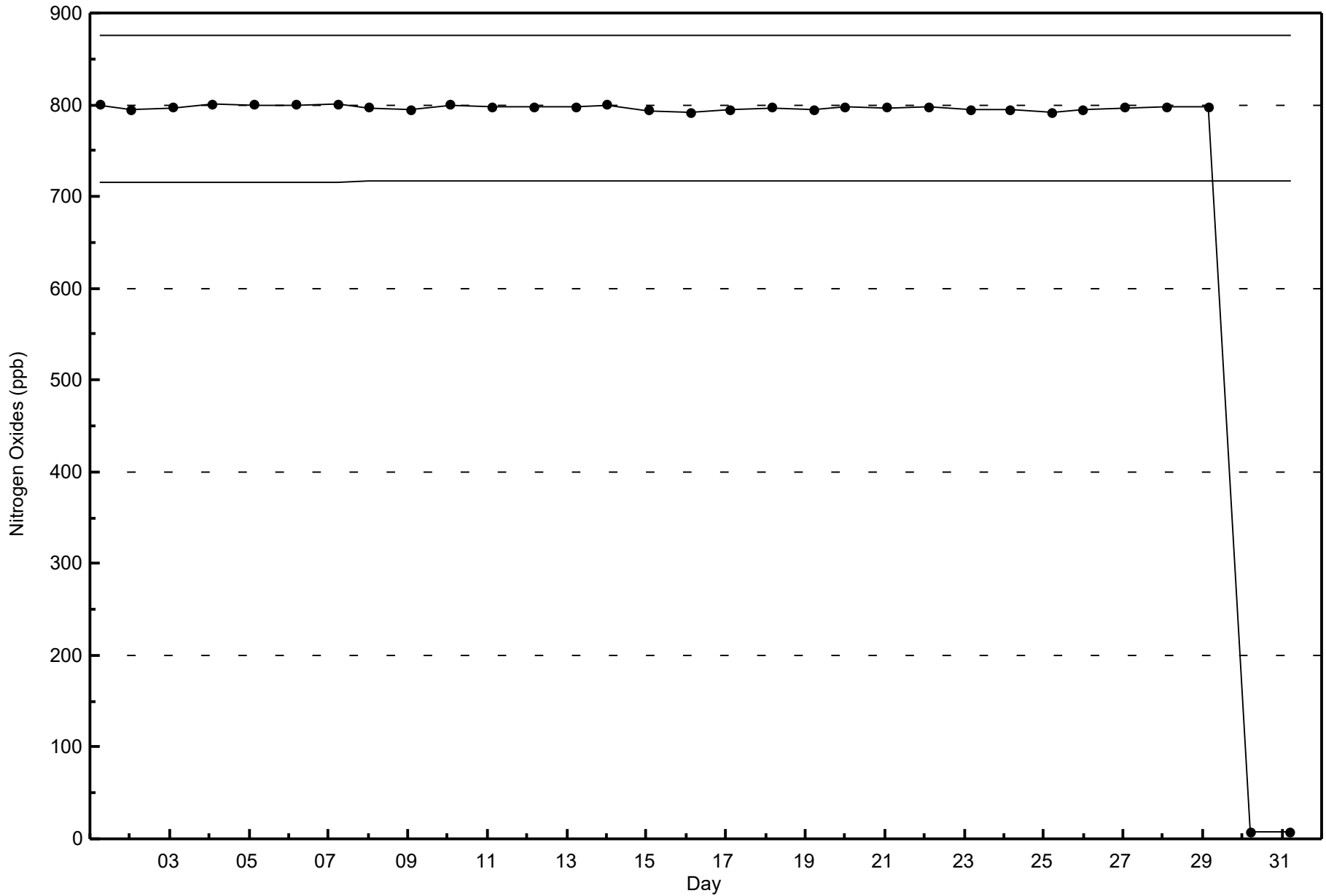
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Anzac



Total Number of Valid Hours: 701







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

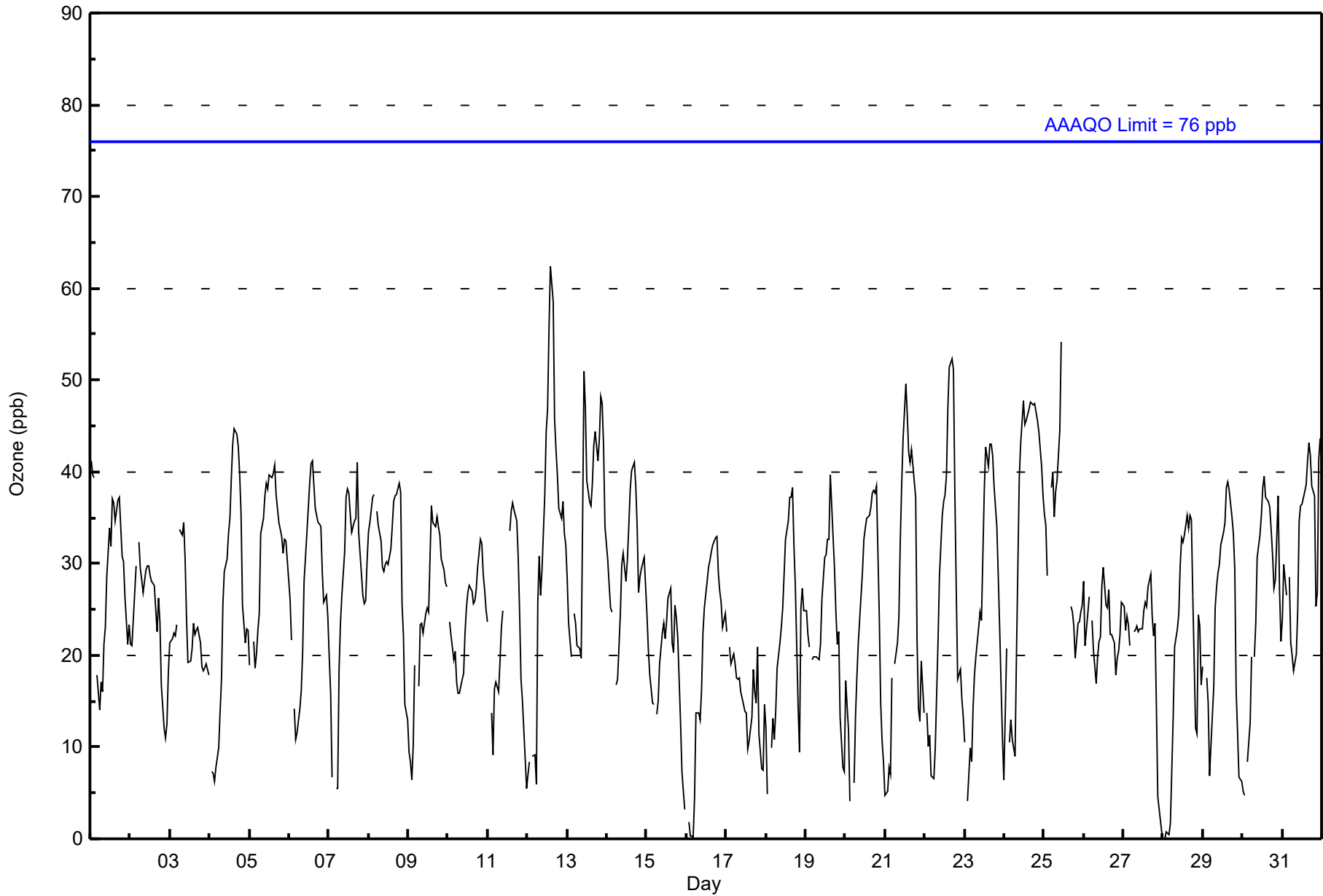
Anzac - July 2023

Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0	Hours in Service: 744																	Daily Average		Daily Maximum						
Maximum Value: 62.4 ppb on Jul 12 15:00		Maximum Daily Average: 35.2 ppb on Jul 13		Hours of Data: 704																	Hours of Missing Data: 40		Hours of Calibration: 34		Percent Operational Time: 99.2				
Minimum Value: 0.1 ppb on Jul 28 02:00		Minimum Daily Average: 15.5 ppb on Jul 17		Hours of Missing Data: 40																	Hours of Calibration: 34		Percent Operational Time: 99.2						
Maximum Diurnal Average: 35.9 ppb at hour 16		Minimum Diurnal Average: 14.4 ppb at hour 4		Hours of Missing Data: 40																	Hours of Calibration: 34		Percent Operational Time: 99.2						
Monthly Average: 25.92 ppb		Percentiles: P ₁ = 1.7 P ₁₀ = 10.8 Q ₁ = 18.7 Median = 25.4 Q ₃ = 34.3 P ₉₀ = 39.6 P ₉₉ = 50.9		Hours of Missing Data: 40																	Hours of Calibration: 34		Percent Operational Time: 99.2						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Jul	41.2	39.6	39.3	Z	17.8	14.1	17.0	16.0	21.3	23.0	28.5	33.9	31.9	37.1	36.7	34.6	36.9	37.3	34.1	30.9	30.2	26.4	21.2	23.4	29.2	41.2			
2-Jul	21.1	21.1	23.9	29.7	Z	32.3	29.4	28.1	26.9	29.3	29.7	29.7	28.7	28.1	27.6	25.0	22.5	26.3	23.6	16.7	12.1	11.0	12.5	17.9	24.1	32.3			
3-Jul	21.4	21.8	22.5	22.1	23.4	Z	33.8	33.0	34.5	30.4	24.2	19.2	19.4	20.7	23.5	22.2	22.8	23.0	21.4	18.8	18.2	18.7	19.0	17.8	23.1	34.5			
4-Jul	Z	7.2	7.2	6.2	7.7	9.8	13.8	17.4	25.6	29.1	30.6	33.2	35.0	39.2	43.0	44.7	44.1	42.7	39.7	35.2	25.5	21.4	22.9	22.7	26.3	44.7			
5-Jul	18.9	Z	21.5	18.6	20.1	22.8	24.6	33.3	34.9	37.4	38.8	38.1	39.7	39.4	39.9	40.7	37.5	36.0	34.4	33.0	31.1	32.6	32.4	30.3	32.0	40.7			
6-Jul	26.1	21.7	Z	14.1	10.8	11.6	14.2	16.1	20.4	28.1	30.6	36.0	38.8	40.9	41.2	38.6	36.0	34.5	34.3	34.1	29.2	25.8	26.5	24.2	27.6	41.2			
7-Jul	19.7	15.9	6.7	Z	5.5	5.4	18.4	23.5	26.5	31.3	37.2	38.1	37.7	35.4	33.4	34.7	35.0	41.0	33.5	31.1	26.6	25.7	25.9	30.2	26.9	41.0			
8-Jul	33.4	34.4	37.3	37.5	Z	35.7	34.1	32.6	29.7	29.1	29.9	30.2	29.9	31.6	34.0	36.7	37.3	37.5	38.7	37.9	25.6	22.1	14.6	13.0	31.4	38.7			
9-Jul	9.5	8.4	6.3	10.2	18.8	Z	16.6	23.3	23.5	22.4	24.6	25.2	24.8	30.7	36.3	34.5	34.0	35.0	34.0	33.1	30.5	29.3	27.9	27.4	24.6	36.3			
10-Jul	Z	23.6	22.0	19.5	20.4	17.1	15.9	15.8	17.3	18.0	22.4	25.2	26.9	27.6	27.0	25.7	26.0	27.1	29.6	32.6	32.2	28.9	27.1	25.0	24.0	32.6			
11-Jul	23.7	Z	13.8	9.1	16.4	17.0	16.0	19.4	23.0	24.9	C	C	C	33.5	35.8	36.7	35.9	34.6	30.6	24.7	17.4	15.0	12.0	5.4	22.2	36.7			
12-Jul	7.0	8.4	Z	9.0	9.2	6.0	25.7	30.9	26.6	29.3	37.5	44.4	46.9	55.5	62.4	58.6	45.7	42.4	39.7	36.0	35.0	36.8	33.2	32.0	33.0	62.4			
13-Jul	28.4	23.5	19.9	Z	24.6	23.5	21.1	20.8	19.7	34.3	50.9	47.0	39.1	36.7	36.3	38.7	42.8	44.4	41.2	43.6	48.2	47.4	42.7	34.0	35.2	50.9			
14-Jul	30.4	27.7	25.1	24.8	Z	16.7	17.4	20.9	24.5	29.9	31.1	28.1	30.4	34.0	38.0	40.1	41.0	38.4	34.0	26.8	28.6	29.5	30.6	27.7	29.4	41.0			
15-Jul	24.4	20.6	17.8	14.7	14.7	Z	13.5	15.0	19.1	22.5	23.6	21.9	23.7	26.2	27.3	21.4	20.3	25.5	24.1	21.9	12.6	7.3	5.1	3.2	18.5	27.3			
16-Jul	Z	1.9	0.3	0.4	0.1	4.5	13.7	13.7	12.9	16.2	22.4	25.1	28.1	29.6	30.4	31.3	32.1	32.8	32.9	29.1	27.1	25.7	23.0	24.6	19.9	32.9			
17-Jul	22.6	Z	21.0	19.1	20.1	19.1	17.5	17.4	17.6	16.0	14.7	13.8	13.7	9.7	10.6	13.3	18.4	16.0	14.8	20.9	11.5	7.6	7.4	14.6	15.5	22.6			
18-Jul	12.0	4.9	Z	9.9	13.1	10.8	13.9	18.7	21.3	23.1	25.1	28.9	32.7	34.6	37.2	37.2	38.3	32.0	27.7	14.5	9.4	25.2	27.3	24.8	22.7	38.3			
19-Jul	24.9	22.2	20.9	Z	19.6	19.9	19.8	19.7	19.5	21.3	26.1	30.7	31.0	32.7	32.6	39.6	36.3	29.4	24.8	21.3	22.5	13.3	7.9	7.4	23.6	39.6			
20-Jul	17.2	14.4	11.9	4.1	Z	6.1	13.2	17.7	21.4	26.5	29.1	32.6	33.9	35.0	35.3	36.2	37.6	38.0	37.7	38.4	24.2	14.8	10.6	8.4	23.7	38.4			
21-Jul	4.7	5.2	7.9	6.9	17.5	Z	19.1	21.4	24.1	32.5	38.6	43.6	49.5	46.2	42.1	41.1	42.5	40.7	37.2	21.5	14.1	12.9	19.4	13.7	26.2	49.5			
22-Jul	Z	13.7	10.1	11.3	6.9	6.6	9.9	15.8	21.6	28.6	35.2	36.8	37.6	39.7	46.9	51.3	52.3	51.1	37.7	27.1	17.3	18.4	15.2	13.3	26.3	52.3			
23-Jul	10.5	Z	4.1	9.9	8.4	14.1	17.8	19.9	23.1	24.7	23.8	30.8	37.8	42.7	40.6	43.1	43.1	41.9	38.4	34.0	28.7	23.0	16.9	11.0	25.6	43.1			
24-Jul	6.5	20.7	Z	10.6	12.9	10.8	9.0	19.8	29.5	39.2	43.0	47.8	45.1	45.7	46.3	46.9	47.6	47.2	47.4	46.5	45.5	44.4	40.6	37.4	34.4	47.8			
25-Jul	35.4	34.2	28.7	Z	38.3	39.9	35.1	37.9	39.0	44.5	54.1	PF	PF	PF	PF	PF	25.3	24.8	23.1	19.7	23.5	23.6	24.7	25.5	32.1	54.1			
26-Jul	28.0	21.0	24.5	26.4	Z	23.8	20.6	17.0	19.9	21.6	21.9	27.4	29.5	25.4	25.2	27.2	22.3	22.3	21.4	17.8	19.6	20.5	22.2	25.8	23.1	29.5			
27-Jul	25.4	22.8	24.3	23.4	21.1	Z	22.6	22.8	23.1	22.6	22.9	22.9	24.9	25.8	25.3	27.5	28.8	24.3	22.1	23.6	14.5	4.6	1.8	0.4	20.8	28.8			
28-Jul	Z	0.1	0.8	0.5	1.7	7.5	13.3	20.9	22.8	24.6	29.7	32.7	32.4	33.1	35.2	33.9	35.3	34.8	26.5	12.1	11.5	24.4	23.2	16.7	20.6	35.3			
29-Jul	18.7	Z	17.5	14.8	6.9	10.2	16.6	25.1	27.5	29.0	30.0	32.1	33.4	34.5	38.3	38.8	38.0	35.1	33.2	29.4	16.0	11.5	6.7	6.2	23.9	38.8			
30-Jul	5.3	4.7	Z	8.4	12.7	19.9	M	19.9	23.5	30.7	33.1	35.2	38.4	39.4	37.3	36.7	36.2	33.8	31.0	27.4	28.2	37.3	26.9	21.5	26.7	39.4			
31-Jul	23.9	30.0	26.5	Z	28.5	21.4	20.0	18.4	20.2	25.0	34.7	36.3	36.5	37.8	38.7	41.1	43.2	41.8	38.4	37.3	25.3	26.8	41.3	43.6	32.0	43.6			
		20.8	18.1	17.8	14.4	15.3	16.4	19.1	21.7	23.9	27.3	30.8	32.0	33.0	34.3	35.5	35.9	35.3	34.6	31.8	28.3	23.9	23.0	21.6	20.3	Diurnal Average			
		41.2	39.6	39.3	37.5	38.3	39.9	35.1	37.9	39.0	44.5	54.1	47.8	49.5	55.5	62.4	58.6	52.3	51.1	47.4	46.5	48.2	47.4	42.7	43.6	Diurnal Maximum			
Z - zerospan		C - Calibration					M - Maintenance					PF - Power Failure																	
Alberta Ambient Air Quality Objectives (AAAQO):		1-hr		76 ppb																									



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Anzac - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Anzac - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	213	30.26	30.26
21 - 50	483	68.61	98.86
51 - 82	8	1.14	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Anzac - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	2	6	7	3	6	16	22	18	14	14	19	19	37	17	6	6	212
21 - 50	19	8	13	14	27	29	38	20	12	12	22	48	86	43	46	45	482
51 - 82	1	0	0	1	0	1	0	1	0	0	0	0	0	0	4	0	8
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	14	20	18	33	46	60	39	26	26	41	67	123	60	56	51	702

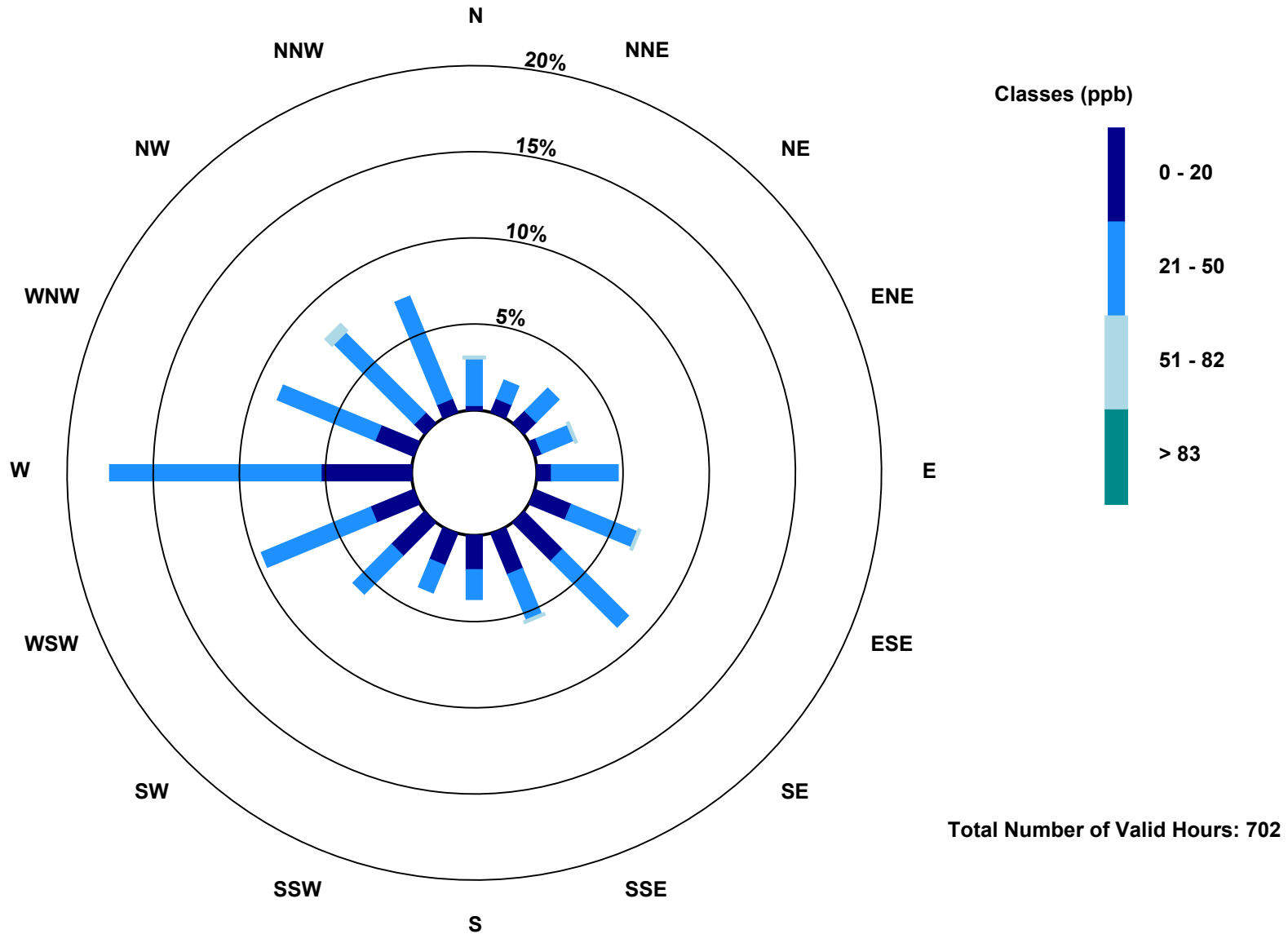
Total Number of Valid Hours: 702

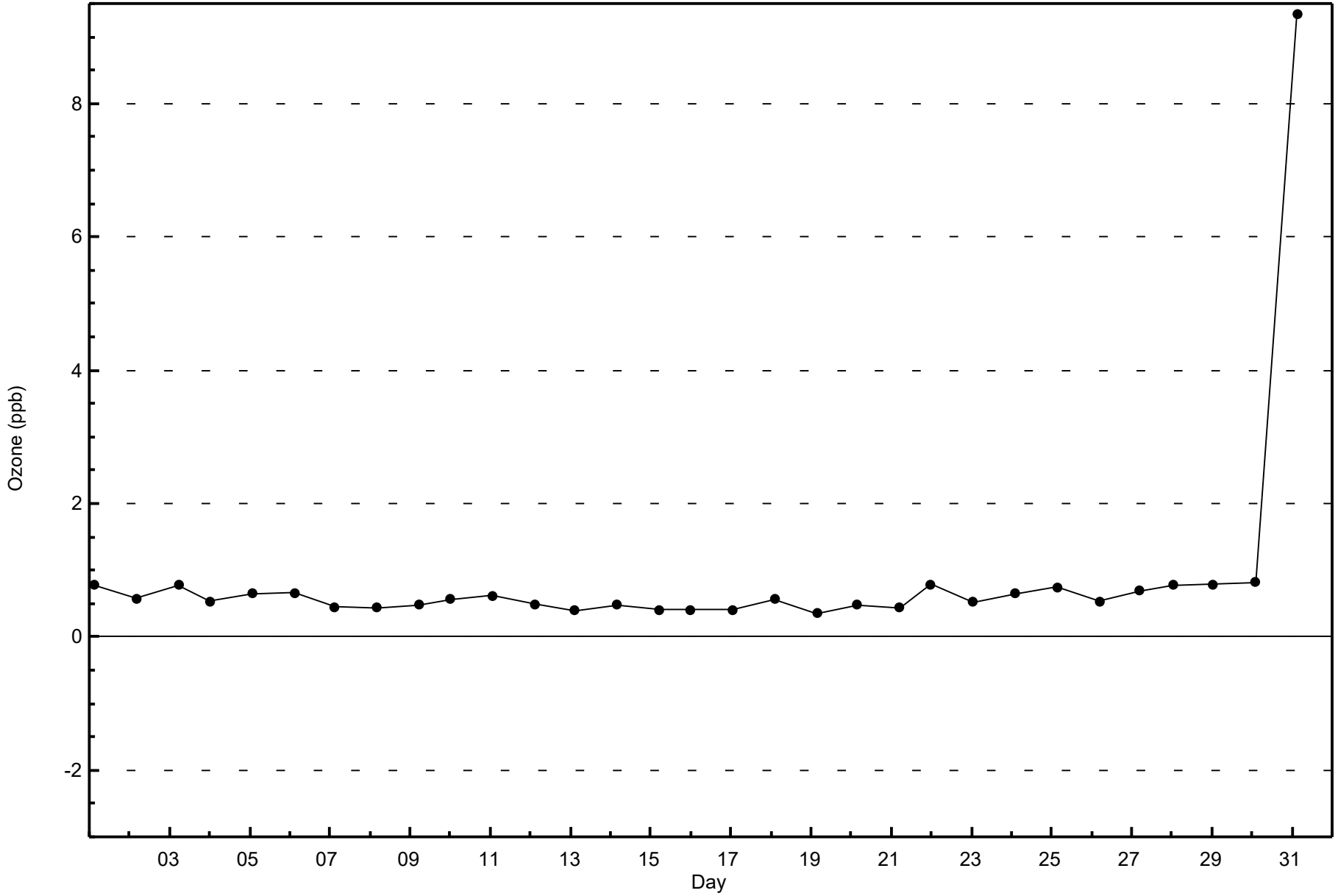
Total Number of Hours: 744

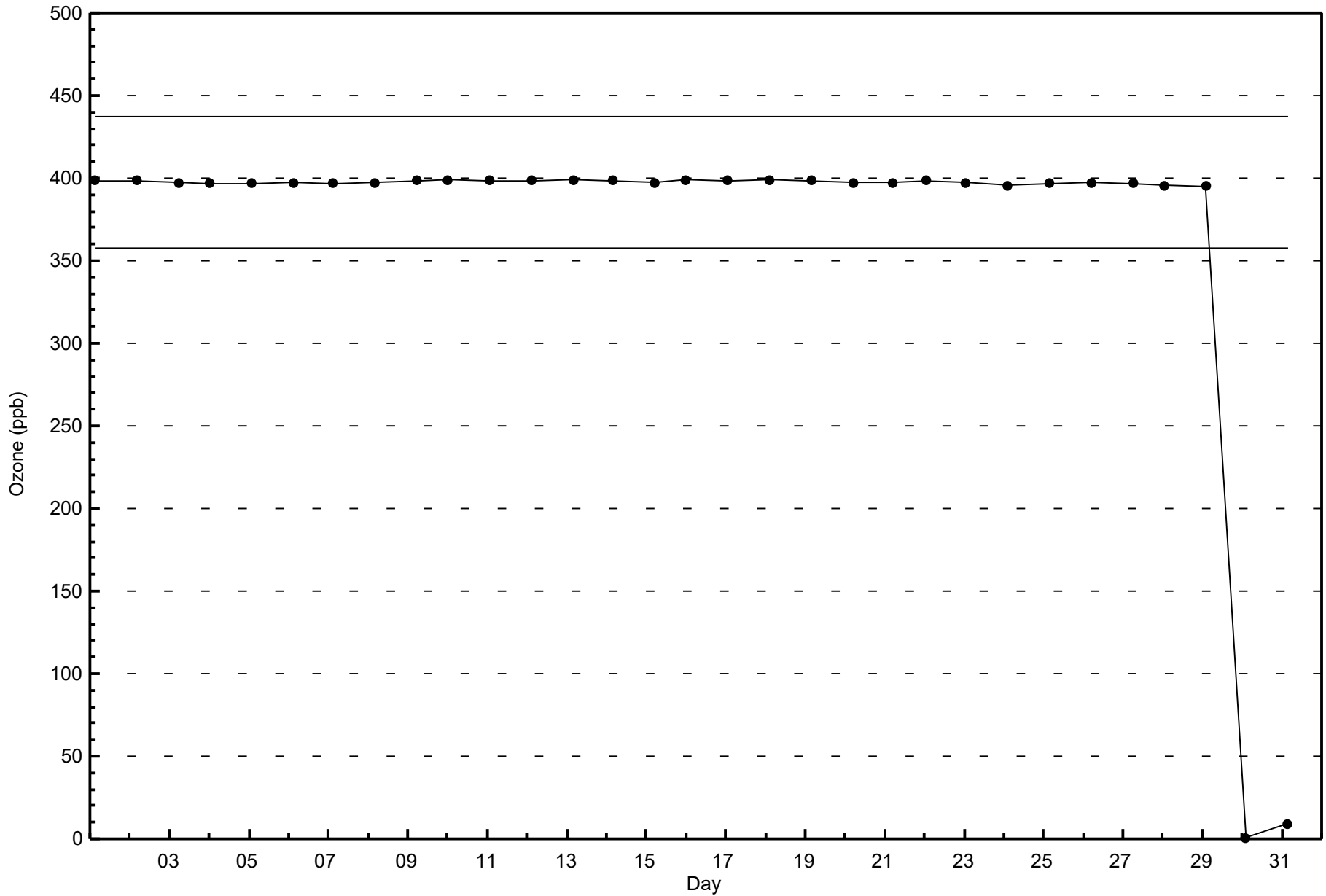


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Ozone (O₃) - ppb
Anzac









Summary of Hour Averages

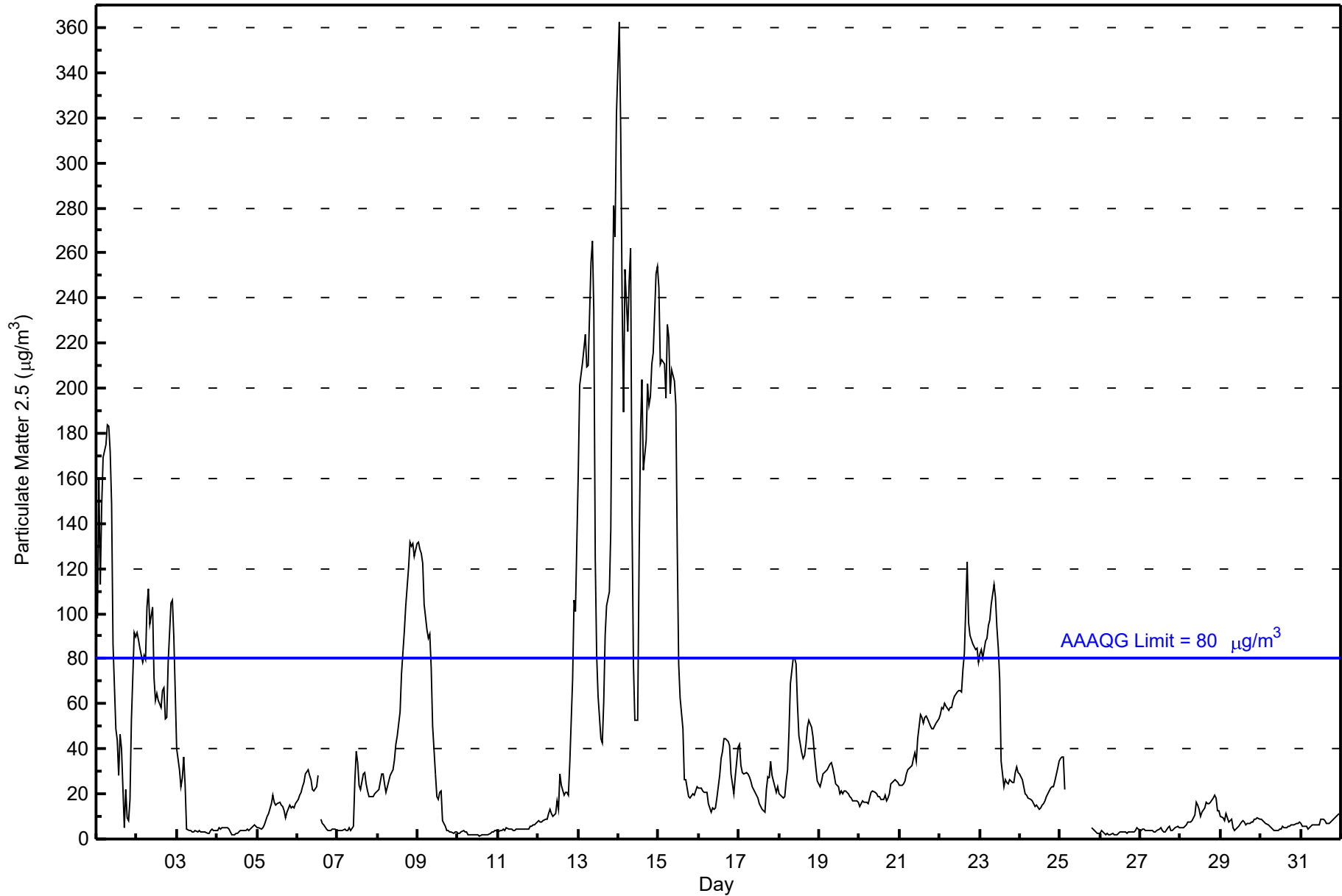
Anzac - July 2023

Number of Exceedences (AAAQO):	1-hr: 119	24-hr: 12	Hours in Service:	744
Maximum Value: 362.3 µg/m ³ on Jul 14 01:00	Maximum Daily Average: 199.6 µg/m ³ on Jul 14		Hours of Data:	728
Minimum Value: 1.5 µg/m ³ on Jul 10 14:00	Minimum Daily Average: 2.4 µg/m ³ on Jul 10		Hours of Missing Data:	16
Maximum Diurnal Average: 53.5 µg/m ³ at hour 8	Minimum Diurnal Average: 29.5 µg/m ³ at hour 16		Hours of Calibration:	1
Monthly Average: 41.11 µg/m ³	Percentiles: P ₁ = 1.8 P ₁₀ = 3.5 Q ₁ = 5.5 Median = 19.3 Q ₃ = 47.9 P ₉₀ = 108.1 P ₉₉ = 255.3		Percent Operational Time:	98.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	98.0	160.3	112.9	147.9	169.4	175.0	183.7	183.4	171.5	148.4	86.7	48.9	44.0	28.1	46.6	40.2	4.7	21.8	9.1	8.0	17.5	52.6	91.7	89.4	89.2	183.7	
2-Jul	91.4	88.6	84.8	78.5	81.7	79.4	102.6	110.9	95.3	103.1	71.8	61.6	64.6	61.4	58.6	65.6	67.2	53.1	53.7	78.7	104.5	106.2	89.7	65.2	79.9	110.9	
3-Jul	39.9	30.5	23.0	27.1	36.6	23.7	4.3	4.0	3.6	3.3	3.4	3.7	3.3	3.5	3.3	3.2	2.9	2.9	2.3	2.3	3.5	4.1	3.5	3.5	10.0	39.9	
4-Jul	4.0	4.9	4.6	5.1	5.3	5.0	4.7	4.3	3.0	2.2	2.1	2.6	2.6	3.2	4.0	4.1	4.0	3.9	4.1	4.1	4.4	5.6	6.3	5.9	4.2	6.3	
5-Jul	5.1	5.0	4.6	5.3	6.5	7.9	10.2	11.1	15.8	19.2	16.1	14.9	15.8	16.1	14.8	14.6	12.6	9.6	11.6	15.1	14.0	14.4	13.5	16.0	12.1	19.2	
6-Jul	17.5	19.2	20.8	23.1	25.2	29.0	31.0	28.2	26.1	21.8	21.1	23.0	28.2	C	9.0	6.7	6.2	4.4	3.5	3.7	3.9	4.2	4.1	3.9	15.8	31.0	
7-Jul	3.8	3.6	3.7	3.6	4.2	3.7	3.6	4.9	3.8	5.6	25.7	38.8	33.8	24.1	21.9	28.6	29.2	24.2	21.5	18.8	18.6	18.9	19.9	20.5	16.0	38.8	
8-Jul	21.0	22.1	28.8	28.7	24.2	20.9	22.9	28.3	29.6	31.0	34.9	42.0	45.5	56.4	73.6	83.0	92.4	103.6	120.5	131.6	129.8	131.2	125.6	130.9	64.9	131.6	
9-Jul	131.4	128.3	126.4	122.3	104.2	92.9	89.0	91.1	76.2	50.2	29.1	19.1	17.5	20.4	21.0	8.3	5.5	3.9	3.5	3.2	3.0	2.5	3.0	2.9	48.1	131.4	
10-Jul	2.3	2.5	3.1	3.6	3.2	3.2	2.1	1.9	1.6	2.0	1.7	1.6	2.0	1.5	1.8	1.8	1.6	1.7	1.8	2.4	3.1	3.1	3.5	3.6	2.4	3.6	
11-Jul	3.3	3.8	4.0	4.3	3.9	4.9	4.3	4.3	4.1	3.9	3.7	4.5	4.1	4.2	4.5	4.3	4.2	4.3	4.7	5.7	5.7	6.0	6.5	7.4	4.6	7.4	
12-Jul	7.9	7.7	7.8	8.3	9.0	8.6	11.4	13.3	11.0	9.7	11.4	16.7	13.4	29.0	23.5	19.2	20.9	20.4	19.8	34.1	70.6	106.0	101.0	132.3	29.7	132.3	
13-Jul	163.2	201.1	211.5	217.5	223.6	209.5	209.8	255.8	265.5	234.1	124.7	81.6	63.1	44.7	42.4	61.0	90.4	103.7	109.6	137.5	224.7	280.9	267.1	321.4	172.7	321.4	
14-Jul	362.3	315.1	239.8	189.3	252.8	225.3	247.6	262.2	142.6	78.0	52.4	53.0	123.7	180.7	203.6	163.4	177.1	201.9	192.7	196.6	210.6	215.5	250.8	253.7	199.6	362.3	
15-Jul	244.5	210.5	212.6	210.9	195.9	228.4	222.4	197.3	208.5	203.3	192.5	128.5	77.8	62.9	48.9	26.5	26.5	22.3	18.7	18.2	19.9	19.4	21.1	23.5	118.4	244.5	
16-Jul	22.4	22.5	21.5	20.6	20.9	20.7	15.4	12.1	13.9	13.1	13.9	18.5	28.3	35.5	38.7	44.7	44.6	43.3	41.2	29.1	24.5	19.9	27.3	40.7	26.4	44.7	
17-Jul	41.8	32.9	29.6	28.7	29.6	28.6	27.7	25.8	23.4	21.8	19.7	18.2	15.8	14.5	13.0	11.8	21.7	27.5	27.2	34.5	28.2	23.1	20.9	23.3	24.5	41.8	
18-Jul	19.8	19.5	18.0	19.1	25.9	30.7	47.7	68.7	80.1	80.5	77.6	59.8	45.7	38.3	35.8	37.1	41.8	49.8	52.9	49.3	45.0	37.5	31.4	25.4	43.2	80.5	
19-Jul	23.1	25.9	28.7	29.6	29.9	31.0	33.1	33.8	31.5	28.5	24.4	23.2	20.1	21.4	20.2	21.3	21.4	19.8	19.0	18.3	16.9	16.7	16.7	16.6	23.8	33.8	
20-Jul	14.3	15.8	16.7	16.4	16.5	15.9	18.0	20.6	21.3	20.7	20.1	18.7	18.6	17.5	17.9	19.3	17.1	17.9	19.9	24.5	25.5	26.2	25.7	25.0	19.6	26.2	
21-Jul	24.0	24.0	24.2	25.5	28.7	30.7	31.1	32.6	35.8	38.1	34.4	44.7	54.9	53.9	51.2	53.7	54.4	53.2	50.5	48.6	49.0	50.3	51.5	53.1	41.6	54.9	
22-Jul	55.3	58.2	57.5	60.3	58.7	57.3	58.2	58.5	61.5	63.6	65.2	66.1	66.1	65.4	75.2	82.0	123.1	96.1	90.3	88.4	86.4	83.7	84.7	78.2	72.5	123.1	
23-Jul	81.9	84.1	80.2	88.0	88.9	95.0	97.2	104.0	112.6	107.5	93.9	84.7	71.1	34.5	23.1	26.4	25.1	24.6	26.0	25.2	25.2	29.2	31.7	29.3	62.1	112.6	
24-Jul	29.0	26.6	23.3	20.4	19.2	18.4	17.7	17.2	15.5	14.5	14.9	13.5	13.9	14.8	15.7	16.8	18.9	21.5	22.6	23.5	23.5	25.5	31.4	34.5	20.5	34.5	
25-Jul	35.5	36.5	36.2	22.1	PF	UO	UO	UO	UO	UO	UO	UO	PF	PF	PF	PF	PF	UO	UO	UO	5.3	3.6	3.1	2.7	2.3	--	36.5
26-Jul	2.4	3.6	2.7	2.2	2.5	1.8	1.9	2.4	2.0	1.8	2.1	2.7	3.3	2.9	2.8	2.9	2.8	3.0	2.9	3.3	3.3	4.0	4.8	4.2	2.8	4.8	
27-Jul	3.9	4.2	4.1	4.0	3.9	3.7	3.6	3.5	3.4	3.4	3.9	4.6	4.9	4.1	2.9	3.1	5.0	5.7	3.8	3.6	4.3	5.1	5.5	5.3	4.1	5.7	
28-Jul	5.0	4.9	5.2	6.1	7.4	7.4	7.4	8.0	10.9	16.1	15.3	13.0	9.7	11.8	13.9	16.3	15.7	15.8	16.5	18.2	19.4	18.4	12.7	12.6	12.0	19.4	
29-Jul	9.8	9.2	8.2	11.3	9.6	7.4	8.6	5.0	4.0	4.1	4.7	5.9	7.7	8.5	7.5	6.4	6.7	6.8	7.3	7.8	8.5	9.0	9.1	9.1	7.6	11.3	
30-Jul	8.7	8.1	7.4	7.2	6.2	5.5	5.2	4.2	3.8	3.7	3.9	4.5	4.6	5.7	5.0	5.2	5.6	5.6	6.0	6.3	6.6	6.6	6.7	7.5	5.8	8.7	
31-Jul	7.1	5.7	5.5	5.7	4.6	4.8	5.6	6.2	6.2	6.6	6.2	6.5	8.5	8.6	8.3	7.1	6.8	6.9	7.2	8.9	9.4	9.8	10.5	11.5	7.3	11.5	

51.0	51.1	47.0	46.5	49.9	49.2	50.9	53.5	49.5	44.7	35.9	30.8	30.4	30.1	30.3	29.5	31.9	32.6	32.3	34.0	39.1	43.2	44.5	47.1	Diurnal Average
362.3	315.1	239.8	217.5	252.8	228.4	247.6	262.2	265.5	234.1	192.5	128.5	123.7	180.7	203.6	163.4	177.1	201.9	192.7	196.6	224.7	280.9	267.1	321.4	Diurnal Maximum

C - Calibration UO - Unstable Operation PF - Power Failure
 Alberta Ambient Air Quality Guideline/Objectives: 1-hr 80 µg/m³ 24-hr 29 µg/m³





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - July 2023

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
0 - 5	181	24.86	24.86
6 - 15	126	17.31	42.17
16 - 25	140	19.23	61.40
26 - 80	165	22.66	84.07
> 81.0	116	15.93	100.00

Total Number of Valid Hours: 728

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - µg/m³
Anzac - July 2023

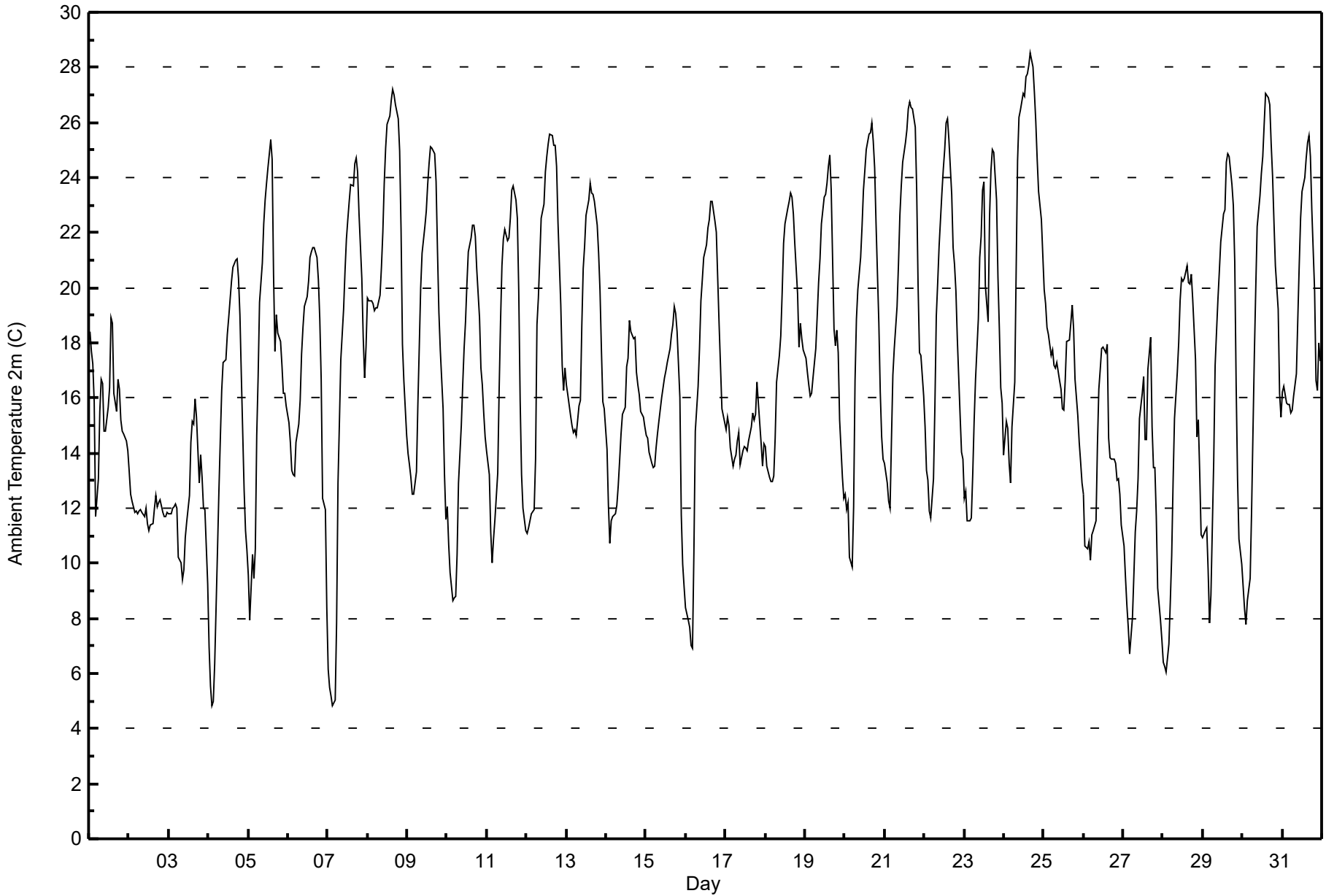
Concentration Ranges (µg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	7	10	6	9	16	29	7	6	6	8	9	26	6	14	15	180
6 - 15	1	1	3	0	3	4	10	17	13	8	16	16	20	4	6	4	126
16 - 25	2	1	2	4	9	5	9	6	7	7	12	19	34	5	6	11	139
26 - 80	9	6	5	4	7	18	9	7	1	5	7	21	27	21	10	8	165
> 81.0	4	0	0	1	3	3	7	6	1	2	1	2	24	26	22	14	116
Totals	22	15	20	15	31	46	64	43	28	28	44	67	131	62	58	52	726

Total Number of Valid Hours: 726

Total Number of Hours: 744



Maximum Value: 28.5 C on Jul 24 17:00 Maximum Daily Average: 22.4 C on Jul 24																						Hours in Service: 744 Hours of Data: 744																										
Minimum Value: 4.8 C on Jul 4 03:00 Minimum Daily Average: 11.9 C on Jul 2 Maximum Diurnal Average: 21.8 C at hour 16 Minimum Diurnal Average: 11.6 C at hour 5 Monthly Average: 17.06 C Percentiles: P ₁ = 6.1 P ₁₀ = 11.0 Q ₁ = 13.2 Median = 16.7 Q ₃ = 21.0 P ₉₀ = 24.3 P ₉₉ = 27.0																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	18.4	17.7	17.2	15.8	11.7	13.1	15.5	16.7	16.5	14.8	14.8	15.7	16.4	18.9	18.7	16.2	15.5	16.7	16.3	15.2	14.8	14.7	14.4	14.1	15.8	18.9																						
2-Jul	13.3	12.5	12.2	11.9	11.9	11.8	11.9	11.9	11.8	11.7	12.0	11.5	11.2	11.4	11.4	12.0	12.5	12.1	12.2	12.3	11.9	11.7	11.7	11.8	11.9	13.3																						
3-Jul	11.8	11.8	12.0	12.0	12.2	12.0	10.2	10.0	9.4	9.8	10.9	11.5	12.5	14.4	15.1	15.0	16.0	15.3	12.9	13.9	13.1	12.0	12.0	9.2	12.3	16.0																						
4-Jul	7.0	5.5	4.8	5.0	6.3	10.5	10.5	12.6	14.5	16.3	17.3	17.4	18.3	18.9	19.6	20.2	20.7	21.0	21.0	20.3	19.0	16.8	12.6	11.2	10.5	14.5	21.0																					
5-Jul	9.6	8.0	10.3	9.5	10.5	14.7	16.8	19.5	20.9	22.3	23.2	23.8	24.4	25.4	24.7	20.5	17.7	19.0	18.4	18.0	17.2	16.2	16.2	15.7	17.6	25.4																						
6-Jul	15.1	14.4	13.4	13.2	13.2	14.4	15.0	15.9	17.6	18.6	19.3	20.2	21.1	21.3	21.5	21.4	21.1	20.3	18.9	16.7	12.4	11.9	8.4	16.9	21.5																							
7-Jul	6.1	5.5	5.2	4.8	5.0	7.8	12.9	15.1	17.4	19.2	20.6	21.8	22.5	23.1	23.7	23.7	24.5	24.7	24.2	22.7	20.3	18.2	16.7	17.8	16.8	24.7																						
8-Jul	19.6	19.5	19.6	19.4	19.2	19.3	19.3	19.7	20.7	22.0	23.8	25.1	25.9	26.2	26.8	27.2	27.0	26.6	26.2	25.0	22.1	17.9	16.6	14.6	22.1	27.2																						
9-Jul	14.0	13.6	13.1	12.5	12.5	13.3	15.8	17.8	20.0	21.2	22.2	22.8	23.8	24.5	25.1	25.1	24.8	23.8	21.3	19.1	17.7	15.6	13.2	11.6	18.5	25.1																						
10-Jul	12.0	10.7	9.7	8.7	8.7	8.8	10.3	12.9	15.0	16.5	17.8	18.8	20.1	21.3	21.8	22.3	22.3	21.9	20.7	18.9	17.1	16.5	15.5	14.6	15.9	22.3																						
11-Jul	14.1	13.2	11.1	10.0	10.9	11.6	13.3	16.3	18.8	20.8	21.8	22.1	21.7	21.8	22.5	23.6	23.7	23.2	22.5	19.9	15.9	13.2	12.0	11.2	17.3	23.7																						
12-Jul	11.1	11.3	11.5	11.8	11.9	13.8	18.7	19.6	21.0	22.5	23.1	24.2	24.8	25.2	25.6	25.5	25.2	25.2	24.4	22.4	19.4	17.2	16.3	17.1	19.5	25.6																						
13-Jul	16.5	16.1	15.3	15.0	14.7	14.9	14.7	15.7	15.9	18.6	20.7	21.5	22.6	23.2	23.8	23.4	23.4	23.1	22.3	21.3	19.9	17.7	15.9	15.6	18.8	23.8																						
14-Jul	14.1	12.1	10.7	11.5	11.7	11.8	12.1	12.8	13.7	14.7	15.4	15.7	17.1	17.5	18.8	18.4	18.1	18.2	17.0	16.5	16.1	15.5	15.3	14.9	15.0	18.8																						
15-Jul	14.6	14.5	14.0	13.6	13.5	13.5	14.2	14.7	15.2	16.0	16.4	16.7	17.0	17.3	17.8	18.3	18.7	19.3	19.1	18.4	16.0	11.7	10.0	9.2	15.4	19.3																						
16-Jul	8.4	8.0	7.7	7.0	6.9	10.4	14.8	16.4	17.8	19.5	20.3	21.1	21.6	22.2	22.5	23.1	23.1	22.4	22.0	20.3	18.6	17.2	15.6	15.1	16.8	23.1																						
17-Jul	14.9	15.3	15.0	14.2	13.5	13.8	13.9	14.4	14.7	13.6	14.1	14.2	14.2	14.1	14.5	14.9	15.4	15.2	15.4	16.6	15.8	14.3	13.5	14.3	14.6	16.6																						
18-Jul	14.3	13.5	13.1	13.0	13.0	13.2	14.5	16.6	17.6	18.2	19.8	21.6	22.3	22.9	23.1	23.5	23.3	22.7	21.6	19.8	17.9	18.7	18.2	17.8	18.3	23.5																						
19-Jul	17.4	16.9	16.5	16.1	16.2	16.7	17.8	18.9	20.2	21.1	22.3	23.3	23.4	23.8	24.4	24.8	23.6	18.5	17.9	18.5	17.7	15.2	13.1	12.4	19.0	24.8																						
20-Jul	12.5	11.9	12.2	10.2	9.9	12.1	16.7	18.9	19.9	21.1	22.2	23.5	24.3	25.0	25.6	25.6	26.0	25.3	24.4	22.3	18.7	16.2	14.6	13.8	18.9	26.0																						
21-Jul	13.6	12.9	12.3	12.0	14.5	16.8	17.8	19.3	20.9	22.6	23.7	24.6	25.3	25.7	26.5	26.7	26.6	26.5	25.8	23.5	20.1	17.6	17.6	16.1	20.4	26.7																						
22-Jul	14.9	13.4	13.0	11.9	11.6	13.1	15.7	19.0	20.2	21.5	23.4	24.3	25.0	26.0	26.1	25.4	23.4	21.5	20.9	19.9	18.2	15.4	14.0	13.8	18.8	26.1																						
23-Jul	12.4	12.6	11.5	11.5	11.6	13.2	15.2	16.7	18.9	21.1	21.9	23.5	23.8	20.1	18.8	22.6	24.2	25.0	24.9	23.2	20.4	18.5	16.4	15.8	18.5	25.0																						
24-Jul	13.9	15.1	14.9	13.6	12.9	14.9	16.6	20.7	24.6	26.2	26.5	27.0	27.0	27.6	27.8	28.0	28.5	28.0	27.1	26.0	24.7	23.5	22.5	21.2	22.4	28.5																						
25-Jul	19.9	19.4	18.6	18.3	17.6	17.7	17.2	17.1	17.3	16.6	16.3	15.6	16.6	16.6	18.0	18.1	18.7	19.4	18.5	16.7	15.4	14.4	13.7	12.9	17.1	19.9																						
26-Jul	12.5	10.7	10.5	10.8	10.1	11.0	11.2	11.5	14.3	16.3	17.0	17.8	17.9	17.6	18.0	14.6	13.8	13.8	13.8	13.6	13.0	13.1	12.5	11.4	13.6	18.0																						
27-Jul	10.6	9.5	8.5	7.7	6.7	8.0	9.5	11.1	11.9	13.1	15.2	16.2	16.8	14.5	14.5	17.0	18.2	15.0	13.5	13.5	11.7	9.1	7.9	7.2	12.0	18.2																						
28-Jul	6.4	6.2	6.0	7.1	8.6	10.3	12.9	15.3	16.9	18.0	19.6	20.4	20.2	20.4	20.8	20.2	20.1	20.5	19.6	17.4	14.6	15.2	13.3	11.0	15.0	20.8																						
29-Jul	10.9	11.2	11.3	9.8	7.8	8.9	13.7	17.2	18.4	19.6	20.6	21.7	22.7	22.8	24.6	24.9	24.7	23.7	23.0	20.9	16.5	13.1	10.9	10.0	17.0	24.9																						
30-Jul	9.2	8.3	7.8	8.7	9.5	11.9	14.8	17.6	20.0	22.2	23.4	24.1	24.8	25.9	27.0	26.9	26.7	25.2	24.1	22.4	20.8	19.2	16.2	15.3	18.8	27.0																						
31-Jul	16.2	16.4	15.8	15.8	15.8	15.4	15.6	16.1	16.9	18.9	20.8	22.5	23.5	24.0	24.7	25.3	25.5	24.8	22.9	19.9	16.6	16.3	18.0	17.3	19.4	25.5																						
																								13.1	12.5	12.1	11.7	11.6	12.9	14.5	16.1	17.4	18.6	19.6	20.3	20.9	21.3	21.8	21.8	21.7	21.2	20.4	19.2	17.3	15.5	14.4	13.6	Diurnal Average
																								19.9	19.5	19.6	19.4	19.2	19.3	19.3	20.7	24.6	26.2	26.5	27.0	27.0	27.6	27.8	28.0	28.5	28.0	27.1	26.0	24.7	23.5	22.5	21.2	Diurnal Maximum





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Anzac - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	53	7.12	7.12
10 - 20	469	63.04	70.16
> 20	222	29.84	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



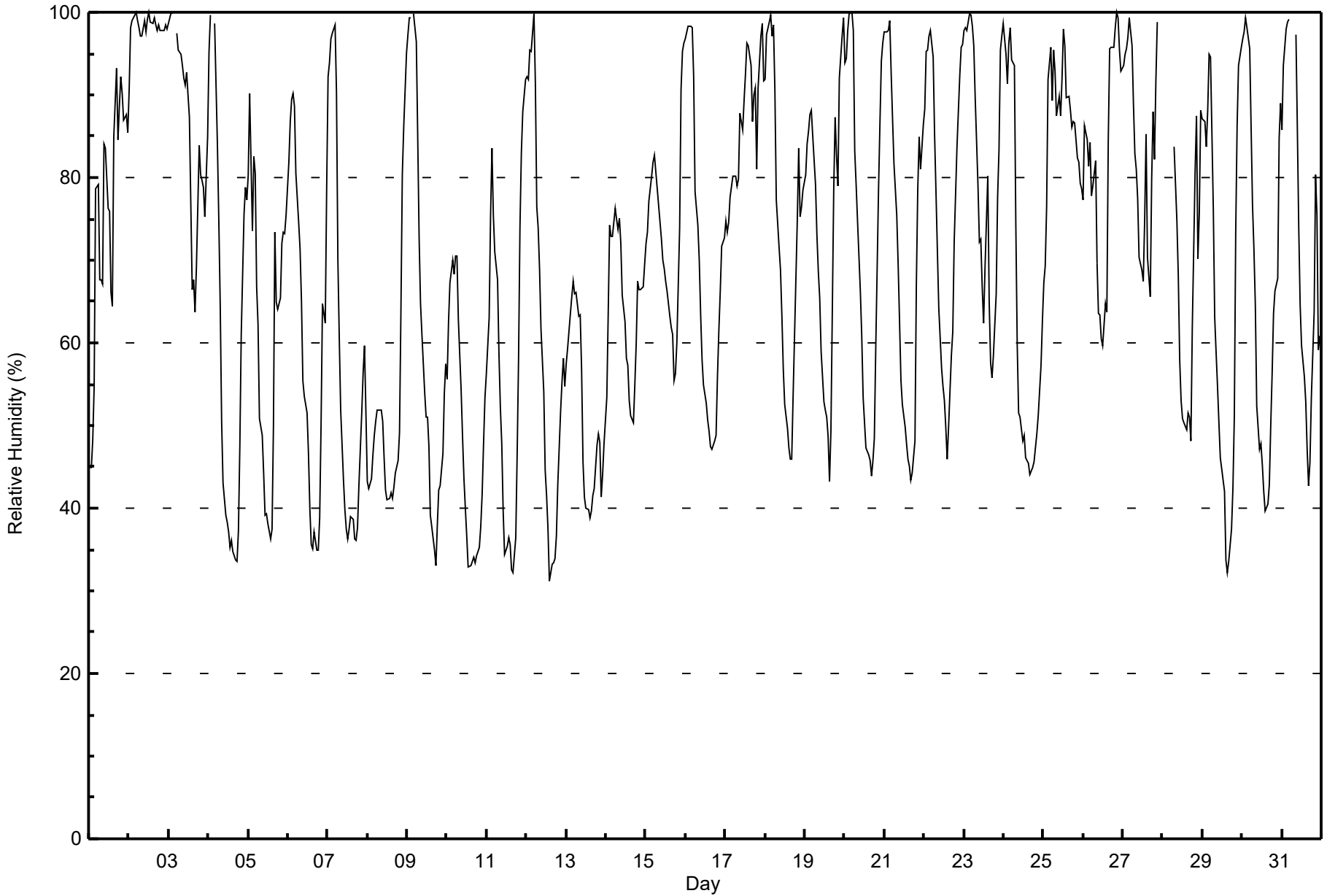
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Anzac - July 2023

Maximum Value: 100.0 % on Jul 3 02:00 Maximum Daily Average: 98.1 % on Jul 2																						Hours in Service:	744																							
Minimum Value: 31.2 % on Jul 12 15:00 Minimum Daily Average: 48.7 % on Jul 10																						Hours of Data:	727																							
Maximum Diurnal Average: 89.0 % at hour 5 Minimum Diurnal Average: 52.7 % at hour 15																						Hours of Missing Data:	17																							
Monthly Average: 69.40 % Percentiles: P ₁ = 33.2 P ₁₀ = 41.4 Q ₁ = 50.9 Median = 70.1 Q ₃ = 87.9 P ₉₀ = 97.3 P ₉₉ = 99.8																						Hours of Calibration:	0																							
																						Percent Operational Time:	97.7																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																						
1-Jul	44.9	44.8	48.3	54.7	78.6	79.2	67.6	67.7	67.1	84.0	83.6	76.2	75.9	66.2	64.4	84.9	93.2	84.5	88.6	92.2	90.3	87.0	87.7	85.4	74.9	93.2																				
2-Jul	90.8	98.1	98.9	99.6	99.9	98.9	98.1	97.1	97.1	98.9	97.6	99.1	100.0	98.9	98.6	99.3	98.5	97.8	98.5	97.7	97.8	97.8	98.4	98.0	98.1	100.0																				
3-Jul	98.6	100.0	99.9	OR	OR	97.4	95.4	94.9	93.6	92.0	91.1	92.7	87.2	76.8	66.5	67.6	63.8	69.1	83.9	80.3	79.7	78.8	75.3	84.9	85.0	100.0																				
4-Jul	95.3	99.7	OR	OR	98.6	83.9	74.8	64.6	50.5	43.1	39.2	38.2	37.1	35.3	36.1	34.8	33.7	33.6	37.2	47.4	61.0	75.7	78.8	77.3	58.0	99.7																				
5-Jul	80.4	90.1	73.5	82.6	80.4	66.7	62.2	50.8	48.7	44.3	39.2	39.3	38.1	36.3	37.5	50.1	73.5	65.0	64.1	65.4	72.1	73.3	73.3	75.5	61.8	90.1																				
6-Jul	81.8	86.8	89.5	90.2	88.7	80.4	74.6	71.4	65.1	55.5	53.6	51.5	46.6	39.8	35.5	35.0	37.1	34.9	35.0	38.8	50.2	64.7	62.4	78.8	60.3	90.2																				
7-Jul	92.2	93.9	96.8	97.5	98.5	90.3	70.0	60.6	51.8	43.4	39.8	37.5	36.3	37.5	38.9	38.7	36.2	36.2	37.7	42.7	51.3	56.2	59.6	51.8	58.1	98.5																				
8-Jul	43.3	42.4	43.6	46.5	48.9	50.5	51.9	51.9	51.9	50.6	46.1	42.1	41.0	41.1	41.9	41.2	42.5	44.3	45.7	49.2	63.7	80.3	86.0	95.1	51.7	95.1																				
9-Jul	97.4	99.3	99.3	OR	99.8	96.5	84.8	72.8	64.7	61.0	54.0	51.0	51.1	47.5	39.1	37.8	34.9	33.1	38.0	42.1	42.7	46.6	54.0	57.5	61.1	99.8																				
10-Jul	55.7	62.5	67.4	70.0	68.2	70.5	70.5	62.9	54.2	48.7	43.6	40.0	36.5	32.8	33.0	33.6	34.0	33.4	34.3	35.2	37.8	41.6	47.8	53.5	48.7	70.5																				
11-Jul	56.2	63.1	75.3	83.5	75.4	71.0	67.7	58.7	52.3	47.8	39.7	34.5	35.5	36.5	35.6	32.5	32.1	36.5	46.6	58.2	74.0	83.1	88.0	91.9	57.3	91.9																				
12-Jul	92.3	91.9	95.5	95.2	99.8	91.3	76.5	74.0	68.8	61.7	54.0	44.6	41.5	37.5	31.2	33.2	33.3	33.9	36.6	42.8	51.7	55.2	58.1	54.8	60.6	99.8																				
13-Jul	57.4	59.4	63.6	65.6	67.5	65.9	66.1	63.3	63.5	56.7	45.5	41.4	40.0	39.8	38.9	39.7	41.5	42.4	47.6	48.9	48.0	41.4	44.1	47.8	51.5	67.5																				
14-Jul	53.4	63.6	74.2	72.9	72.9	76.3	74.9	73.7	75.0	72.1	65.8	62.5	58.1	57.2	53.1	51.1	50.4	55.0	59.9	67.5	66.5	66.4	66.8	69.5	65.0	76.3																				
15-Jul	72.0	73.5	77.1	80.3	81.9	82.8	80.7	78.6	76.6	72.6	70.1	69.1	67.5	66.2	63.3	61.8	61.0	55.4	56.3	60.0	73.8	90.6	95.3	96.3	73.4	96.3																				
16-Jul	96.8	98.3	98.3	98.3	98.1	92.3	78.2	74.2	70.0	63.4	57.9	55.0	52.6	50.8	49.3	47.5	47.1	48.1	48.9	56.0	61.6	66.2	71.8	72.7	68.9	98.3																				
17-Jul	74.7	73.3	74.5	77.7	80.2	80.1	80.2	79.0	79.8	87.8	85.8	89.3	92.6	96.3	96.0	93.6	86.8	89.9	90.9	81.0	90.9	97.1	98.7	91.7	86.2	98.7																				
18-Jul	91.9	97.3	98.9	99.6	97.1	98.5	90.5	77.3	71.5	68.8	63.2	56.8	52.5	49.7	47.3	45.9	45.9	53.6	60.7	75.0	83.5	75.2	76.5	78.5	73.2	99.6																				
19-Jul	80.4	84.1	85.7	87.7	88.1	85.0	79.2	73.1	68.7	65.5	59.1	52.9	51.9	51.0	48.7	43.3	49.4	78.5	87.4	82.7	79.0	92.0	97.2	99.3	73.7	99.3																				
20-Jul	93.9	94.5	97.9	99.9	100.0	97.9	83.3	79.1	74.7	66.3	60.8	53.4	50.3	47.2	46.5	45.8	43.8	45.8	48.5	59.4	78.7	86.7	94.0	96.3	72.7	100.0																				
21-Jul	97.7	97.7	97.8	98.9	92.6	87.1	81.7	75.4	69.5	62.6	55.3	52.6	49.9	47.8	46.0	45.0	43.4	44.2	48.1	67.2	78.7	84.9	81.1	86.5	70.5	98.9																				
22-Jul	88.3	95.2	95.5	97.2	97.8	94.6	85.2	78.2	71.1	64.2	56.9	54.7	53.1	49.8	45.9	49.8	58.5	61.3	72.2	78.0	83.8	92.4	95.8	96.1	75.6	97.8																				
23-Jul	97.9	98.2	97.8	99.8	99.7	98.3	95.9	89.7	79.0	72.2	72.6	66.7	62.3	68.9	80.1	64.9	57.7	55.8	58.5	65.9	77.7	83.5	95.4	97.1	80.6	99.8																				
24-Jul	98.7	94.9	91.4	96.2	98.1	94.2	93.6	74.3	59.8	51.6	51.0	48.2	48.8	46.1	45.7	45.4	44.1	45.0	45.5	47.3	49.0	51.1	57.2	62.8	64.2	98.7																				
25-Jul	67.3	69.3	76.5	91.8	95.8	89.4	95.5	92.9	87.5	89.8	87.5	92.0	98.0	95.9	89.7	89.9	88.2	86.1	86.8	86.6	82.3	81.9	79.3	78.6	86.6	98.0																				
26-Jul	77.3	86.4	84.5	81.4	84.2	77.8	79.1	82.1	69.6	63.5	63.4	60.6	59.6	64.7	63.7	84.4	95.6	95.8	95.7	98.1	100.0	99.4	95.5	92.9	81.5	100.0																				
27-Jul	93.6	94.9	95.6	96.9	99.3	96.0	88.8	82.9	81.0	77.4	70.3	68.8	67.5	75.0	85.3	70.3	65.6	79.8	88.0	82.3	91.7	98.8	OR	OR	84.1	99.3																				
28-Jul	OR	OR	OR	OR	OR	OR	OR	83.7	74.8	68.2	57.9	53.1	50.9	50.4	49.6	51.6	51.0	48.2	61.8	80.7	87.4	70.1	75.7	88.2	--	88.2																				
29-Jul	87.2	86.8	83.7	88.2	94.9	94.7	76.4	63.1	58.8	54.8	50.3	46.0	43.3	42.1	33.7	32.2	33.6	37.4	42.4	51.1	73.4	86.3	93.6	95.7	64.6	95.7																				
30-Jul	96.7	97.7	99.3	98.2	95.7	85.9	76.6	71.4	64.6	52.3	47.1	47.8	45.2	42.0	39.7	40.5	42.9	50.0	56.2	63.6	66.3	67.8	84.8	89.0	67.6	99.3																				
31-Jul	85.7	93.5	97.9	98.8	99.2	OR	OR	OR	97.3	85.9	73.9	64.6	59.6	55.9	52.8	47.1	42.7	45.6	53.5	63.7	80.3	75.4	59.1	60.9	71.1	99.2																				
																						81.3	84.4	85.4	87.0	89.0	85.3	79.3	74.0	69.6	65.4	60.5	57.5	55.8	54.3	52.7	52.9	53.6	55.5	59.8	64.7	71.8	75.7	77.7	80.1	Diurnal Average
																						98.7	100.0	99.9	99.9	100.0	98.9	98.1	97.1	97.3	98.9	97.6	99.1	100.0	98.9	98.6	99.3	98.5	97.8	98.5	98.1	100.0	99.4	98.7	99.3	Diurnal Maximum
OR - Out of Range																																														





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Anzac - July 2023

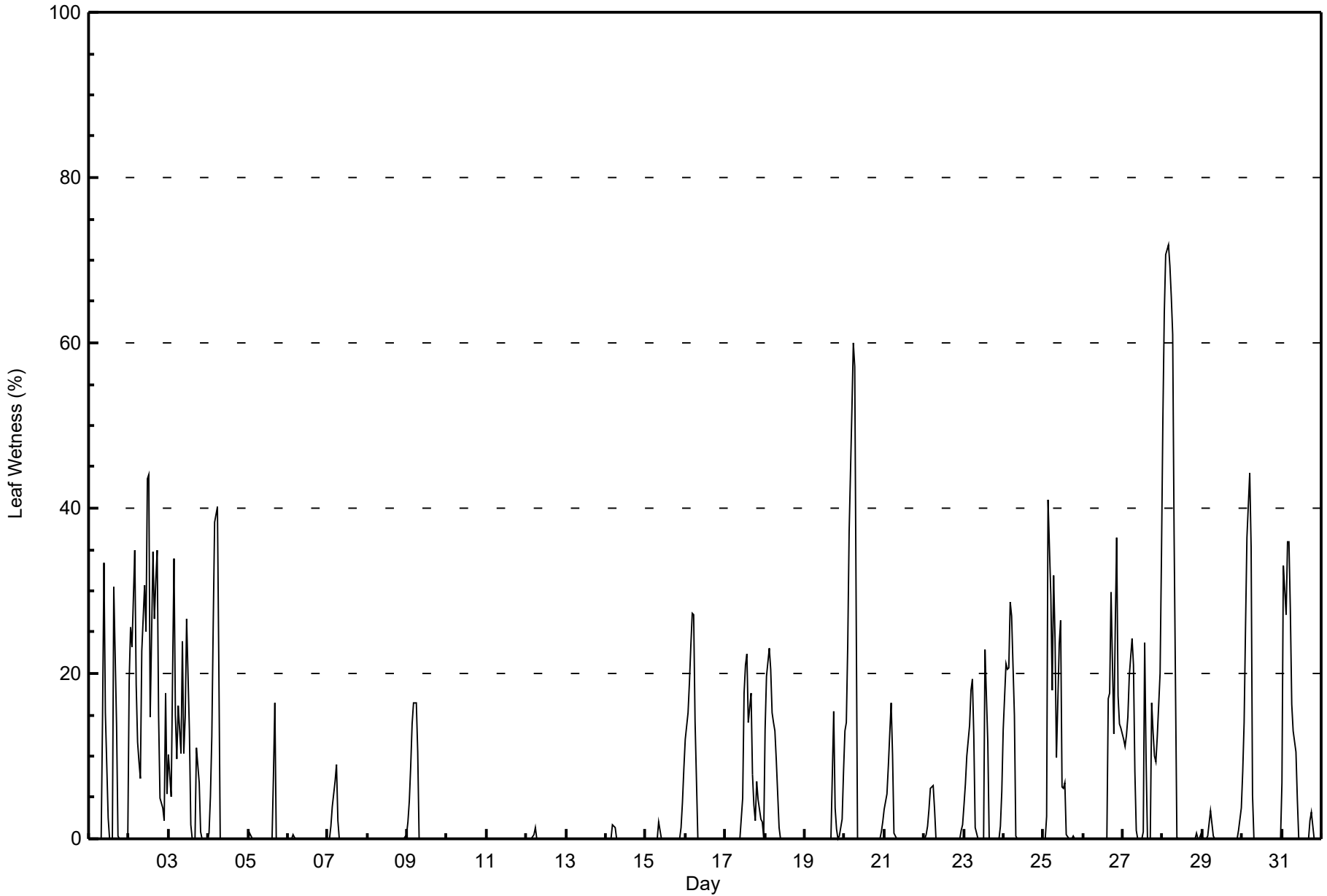
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	67	9.22	9.22
40 - 60	199	27.37	36.59
60 - 80	197	27.10	63.69
80 - 100	261	35.90	99.59

Total Number of Valid Hours: 727

Total Number of Hours: 744



Maximum Value: 71.9 % on Jul 28 04:00																				Maximum Daily Average: 21.1 % on Jul 2					Hours in Service: 744		
Minimum Value: 0.0 % on Jul 1 01:00																				Minimum Daily Average: 0.0 % on Jul 10					Hours of Data: 744		
Maximum Diurnal Average: 14.9 % at hour 5																				Minimum Diurnal Average: 1.2 % at hour 22					Hours of Missing Data: 0		
Monthly Average: 5.08 %																				Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 3.5 P ₉₀ = 19.2 P ₉₉ = 54.9					Hours of Calibration: 0		
																									Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	33.4	15.3	2.5	0.0	0.0	0.0	30.6	13.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	4.6	33.4	
2-Jul	19.1	25.6	23.2	34.9	18.6	11.8	9.3	7.3	22.8	30.6	25.1	43.6	44.1	14.8	34.8	26.5	31.2	35.0	15.0	5.0	3.7	2.1	17.7	5.5	21.1	44.1	
3-Jul	10.1	5.0	20.0	34.0	14.9	9.6	16.1	10.4	23.9	10.3	14.7	26.7	13.1	1.7	0.0	0.0	0.0	11.0	6.8	0.8	0.0	0.0	0.0	0.0	9.5	34.0	
4-Jul	0.7	5.0	12.4	26.0	38.4	40.2	21.1	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	6.0	40.2	
5-Jul	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	16.5	0.0	0.0	0.0	0.0	0.0	0.0	1.0	16.5	
6-Jul	0.0	0.0	0.0	0.5	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	0.5	0.0
7-Jul	0.0	0.0	1.5	3.9	7.0	9.0	2.2	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	1.0	9.0	
8-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.6	0.0
9-Jul	2.0	4.5	8.8	13.9	16.5	16.5	10.6	0.0	0.0	0.0	0.0	0.0	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	16.5	
10-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.6	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.3	0.0
13-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	1.7	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.7	0.0
15-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	4.5	8.4	0.7	8.4
16-Jul	12.0	15.3	18.9	23.3	27.3	27.1	14.3	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	5.8	27.3	0.0
17-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	17.7	21.1	22.3	14.0	17.6	7.9	4.0	2.2	7.0	4.7	2.4	2.0	0.2	5.3	22.3	0.0
18-Jul	13.2	19.6	23.0	20.5	15.2	14.1	13.1	9.5	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	23.0	0.0
19-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.5	3.6	1.2	0.0	0.3	2.4	8.1	1.3	15.5	0.0
20-Jul	13.0	14.0	23.5	37.2	52.0	60.1	57.1	28.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	2.0	12.0	60.1	0.0
21-Jul	3.5	5.4	8.7	12.8	16.5	10.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	16.5	0.0
22-Jul	0.0	0.5	1.5	3.5	6.0	6.5	3.5	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	0.1	1.0	1.8	1.0	6.5	0.0
23-Jul	4.1	6.6	9.9	13.7	17.9	19.2	12.5	1.4	0.0	0.0	0.0	0.0	0.0	23.0	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	5.8	5.3	23.0
24-Jul	13.2	21.2	20.4	20.7	28.6	26.9	15.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	28.6	0.0
25-Jul	0.0	0.0	2.8	41.1	29.4	18.0	31.8	24.2	9.8	23.6	26.4	6.3	6.0	6.9	0.6	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	9.5	41.1	0.0
26-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0	17.7	29.9	12.7	25.5	36.4	17.3	13.9	13.4	7.7	36.4	0.0	
27-Jul	12.1	11.3	12.5	14.7	19.7	24.2	21.1	8.2	1.0	0.0	0.0	0.0	0.9	23.7	9.7	0.0	0.0	16.4	12.9	10.0	9.4	12.4	19.9	34.4	11.4	34.4	0.0
28-Jul	50.9	63.5	70.7	71.9	69.3	65.6	61.0	36.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.6	20.5	71.9	0.0
29-Jul	0.1	0.0	0.0	0.3	1.8	3.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	3.8	0.5	3.8	0.0
30-Jul	8.1	14.1	25.5	36.4	44.2	35.3	5.3	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	7.0	44.2	0.0
31-Jul	6.7	33.1	27.2	35.9	36.0	27.6	16.2	13.0	10.5	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	3.2	0.0	0.0	0.0	0.0	9.0	36.0	0.0	
5.4 7.9 10.0 14.4 14.9 13.8 10.0 4.5 2.8 3.3 2.8 3.1 2.7 3.0 2.3 3.2 2.8 3.7 1.8 1.6 1.8 1.2 2.1 2.7																								Diurnal Average			
50.9 63.5 70.7 71.9 69.3 65.6 61.0 36.9 23.9 33.4 26.4 43.6 44.1 23.7 34.8 30.6 31.2 35.0 15.0 25.5 36.4 17.3 19.9 34.4																								Diurnal Maximum			





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (LW) - %
Anzac - July 2023

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	511	68.68	68.68
0.4 - 0.5	4	0.54	69.22
0.6 - 0.7	8	1.08	70.30
0.8 - 1.4	12	1.61	71.91
1.5 - 10	68	9.14	81.05
> 10	139	18.68	99.73

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 28 km/h on Jul 13 14:00	Maximum Daily Speed Average: 17.2 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 12 06:00	Minimum Daily Speed Average: 0.6 km/h on Jul 22	Hours of Data: 742
Maximum Diurnal Speed Average: 4.4 km/h at hour 4	Minimum Diurnal Speed Average: 1.9 km/h at hour 20	Hours of Missing Data: 2
Monthly Average Velocity: 2.6 km/h 275.0 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 7 Median = 9 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 25	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Jul	WSW8	W9	W12	W10	WSW5	SW4	SSE4	SSW5	SSW7	SSE7	ESE8	SE9	SSE8	SE7	ESE7	WSW7	NNW8	NNW6	W12WNNW11	W11	W10	W15	W14	WSW4.5	W15						
2-Jul	W14WNNW15	WNNW14	WNNW13	W12WNNW13	W14	W14WNNW12	W10	W12WNNW15	NW23	NW23WNNW18	WNNW16	WNNW19	NW19WNNW19	WNNW22	W22	W21WNNW20	WNNW20	WNNW16.2	NW23												
3-Jul	WNNW18	WNNW16	WNNW17	WNNW16	WNNW18	NW25	NW25	NNW25	NNW28	NW21	NW22	NNW22	NNW21	NNW23	N24	NNW22	NNW21	N16	NNW11	WNNW7	WNNW8	WNNW10	NW10	NW10	NW17.2	NNW28					
4-Jul	NW8	W7	W7	W7	W10	W8	W8	W6	WSW6	W7	NW7	W7	W9	W8	W9	WSW8	WNNW5	SSW4	NW5	NE3	SE6	SSE8	SSE9	SSE9	W4.7	W10					
5-Jul	S7	SSW7	SW9	SW8	SW8	SW8	SW7	WSW10	WSW13	WSW14	WSW15	WSW16	W13	WSW14	W10	NNW15	S10	SSW11	SW10	SW7	W9	W10	W13	WNNW10	WSW8.7	WSW16					
6-Jul	W11	W11	W10	W10	W11	WNNW10	WNNW10	NW9	WNNW7	N12	NNW10	NW13	NW16	WNNW15	NW15	NW17	NW17	NNW17	NNW17	NNW12	NW8	NNW10	NNW11	N7	NW10.6	NNW17					
7-Jul	NNE5	NE6	SSW3	SW4	SW5	WSW4	WNNW8	W7	W8	W9	WSW11	WSW11	WSW10	W8	WSW10	WSW11	WSW8	WSW8	SW8	SSW9	SSW9	SW8	SW10	WSW6.4	WSW11						
8-Jul	SW13	SW12	WSW14	WSW12	WSW13	W15	W16	WSW16	WSW15	W13	W14	W14	WNNW14	WNNW15	W13	W14	W13	W11	WNNW10	WNNW9	W6	NW7	W5	W6	W11.4	W16					
9-Jul	W6	W6	W6	NW7	NW6	WNNW4	N5	E5	SE3	NE7	N11	N11	NNW11	NNW12	NNW13	N14	N14	NNE15	NE14	NE10	ENE11	ENE9	E9	E10	NNE5.9	NNE15					
10-Jul	E13	ESE11	ESE11	ESE10	ESE10	SE10	SE11	SE16	SE16	ESE16	ESE16	ESE15	ESE15	ESE14	ESE15	ESE13	E13	E14	E13	E12	ESE10	SE10	SE12	SE12	ESE12.4	ESE16					
11-Jul	SE10	SE7	ESE5	SE7	SE10	SE9	SE9	SE9	SE7	SE9	SSE11	SE14	SE14	SE11	SE8	SSE4	S1	N3	UO	SSE6	SSE2	SSW3	S5	SSW6	SE6.7	SE14					
12-Jul	S6	SSW6	SW6	SW5	NE4	SSE0	W10	W13	W12	WNNW12	NW13	WNNW12	NW15	NW16	NW18	NW18	NNW17	NNW15	NNW12	NNW9	N10	NNW10	NW10	NW11	NW8.8	NW18					
13-Jul	NW11	WNNW10	W10	W11	W13	WNNW13	WNNW14	WNNW13	WNNW14	WNNW15	NW22	NW25	NW28	NNW28	NW28	NNW27	NW21	NW19	NNW13	NNW17	NNW16	NNW13	NW12	NW15	NW16.1	NNW28					
14-Jul	NW12	NW9	WNNW8	WNNW9	WNNW11	WNNW11	WNNW11	WNNW11	WNNW11	WNNW11	NW15	NW19	NW21	NNW20	NNW22	NNW18	NW17	NW17	NNW16	NNW14	N8	NNW4	WNNW6	NW8	NW10	NNW9	NW12.3	NNW28			
15-Jul	NW9	NW9	NW8	NW7	WNNW7	NW6	WNNW5	WNNW5	WNNW5	WNNW6	NW15	NW19	NW21	NNW20	NNW22	NNW18	N8	N10	N10	N10	NNE8	NNE9	NNE4	NE6	E5	E3	UO	WSW4	SSW2	NNW4.8	N10
16-Jul	S3	S3	SSE4	SSE5	SSE6	SE7	SE9	ESE9	ESE11	ESE13	ESE14	SE14	ESE14	ESE16	ESE14	ESE13	ESE13	ESE12	ESE12	E12	E11	ESE11	ESE10	SE11	ESE9.8	ESE16					
17-Jul	SE11	ESE13	ESE13	ESE13	ESE13	ESE13	SE14	SE15	SE15	SE15	SE14	ESE12	ESE11	NNE3	NE8	NE10	ENE10	ESE6	E14	SSE6	SW4	ESE3	ENE6	ENE8	ESE9.0	SE15					
18-Jul	E6	NE2	NNW5	NNW7	NNW8	NNW7	N6	NNE7	NE9	NE8	ENE8	E8	E9	ENE9	ENE8	NE5	ENE5	NNE5	N4	W3	WSW6	W12	W13	W14	NNE3.0	W14					
19-Jul	W12	W10	W12	W13	W12	W13	W12	W12	W11	W12	W13	W12	W12	W11	W10	W8	W10	WSW13	W10	W12	SW8	SSW6	SSE6	SSW6	W9.9	W13					
20-Jul	SW8	WSW7	W5	WSW6	SSW5	WSW7	WSW1	W7	W8	W10	W9	SW8	W7	WSW5	WSW10	WSW9	W9	W11	WNNW10	NW7	NNW5	WSW3	SW5	SW6	WSW6.3	W11					
21-Jul	SW6	WSW5	W7	W8	W10	W8	W10	W8	W8	WSW7	WSW8	WSW9	WSW11	W9	WSW10	WSW9	WNNW7	W7	WNNW6	SW3	SSW5	SSW5	SW6	WSW5	WSW6.9	WSW11					
22-Jul	WNNW5	W4	WSW3	SW2	SW6	SW5	SSW4	NE4	NNE7	N6	NNE5	N5	NNW4	W5	N6	N10	ENE5	SSE7	S2	WNNW1	SSE3	SE5	SSE5	SSE6	NW0.6	N10					
23-Jul	SE4	SSE6	SSE4	E5	SE6	SE8	SE9	SE10	SE8	SE6	E4	ESE6	SSE7	S11	SSE8	SE9	SE9	SE8	SE8	SSE9	SE8	SE8	SSE7	SSE7	SE7.0	S11					
24-Jul	SSW5	SSW8	SW7	SW7	SSW6	S6	S5	S4	SE4	SE6	SE6	SE9	SE10	SE9	ESE10	E10	E11	E12	ENE12	E11	E12	E13	E11	E10	ESE5.9	E13					
25-Jul	ESE10	ESE8	SW5	W16	ENE12	ENE20	ENE14	E23	E26	E26	ESE17	SSE11	SSE2	SSE3	ENE8	E4	NW1	WSW6	WSW12	WSW19	WSW17	WSW17	WSW18	SW12	SE3.5	E26					
26-Jul	SW10	S7	SSW11	S9	S9	SSW11	SE8	E9	ESE8	ESE10	ESE13	SE14	SE10	ENE10	NE14	S8	SW8	SSW5	SW4	NNE6	NNE7	NE10	ENE12	ENE12	SE4.4	NE14					
27-Jul	ENE12	NE8	NE10	NE8	NNE8	NNE11	NE10	NNE6	NW8	NW11	NW12	NNW12	NW14	N13	W10	W12	W10	NNW13	NW8	W6	WSW5	W4	WSW4	W5	NNW6.0	NW14					
28-Jul	W5	WSW6	W6	W6	W7	W7	W7	W8	W9	W8	W8	WSW6	W5	NNW2	E2	WNNW5	W3	NW1	WSW2	S3	S5	SW9	SW6	SW7	WSW4.8	SW9					
29-Jul	WSW8	WSW8	WSW8	SW8	SW7	SW6	WSW7	W10	W11	W11	W8	W5	W6	WNNW7	S8	S10	S10	S9	SSE9	SSE10	S6	S6	S5	SSW6	SW5.7	W11					
30-Jul	S6	S7	SSE8	SSE9	SSE10	SSE10	SE9	SE9	SE10	SSE14	SSE16	SE18	SE21	SE20	SSE15	SSE14	SSE12	SE10	SE9	SSE10	SSW4	NNW10	E5	SSE7	SSE9.7	SE21					
31-Jul	SSW11	S10	SE12	SSE6	WNNW6	E3	E7	SSE7	SSE8	SSW6	SW10	SW11	WSW14	WSW16	WSW15	WSW16	WSW18	WSW14	W12	NNW9	WNNW3	SW10	WSW15	WSW14	SW7.4	WSW18					

WSW3.1	WSW3.4	WSW3.9	WSW4.4	WSW3.5	WSW2.8	W2.4	W2.1	W2.2	W1.9	NNW2.3	NNW2.2	NNW3.7	NW4.0	NW3.6	NW4.0	NW3.5	NW2.7	NW2.8	NNW1.9	W1.9	W2.7	WSW2.9	WSW2.6	Diurnal Average
WNNW18	WNNW16	WNNW17	WNNW16	WNNW18	NW25	NW25	NNW25	NNW28	E26	NW22	NW25	NW28	NNW28	NW28	NNW27	NNW21	NW19	WNNW19	WNNW22	W22	W21	WNNW20	WNNW20	Diurnal Maximum

UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

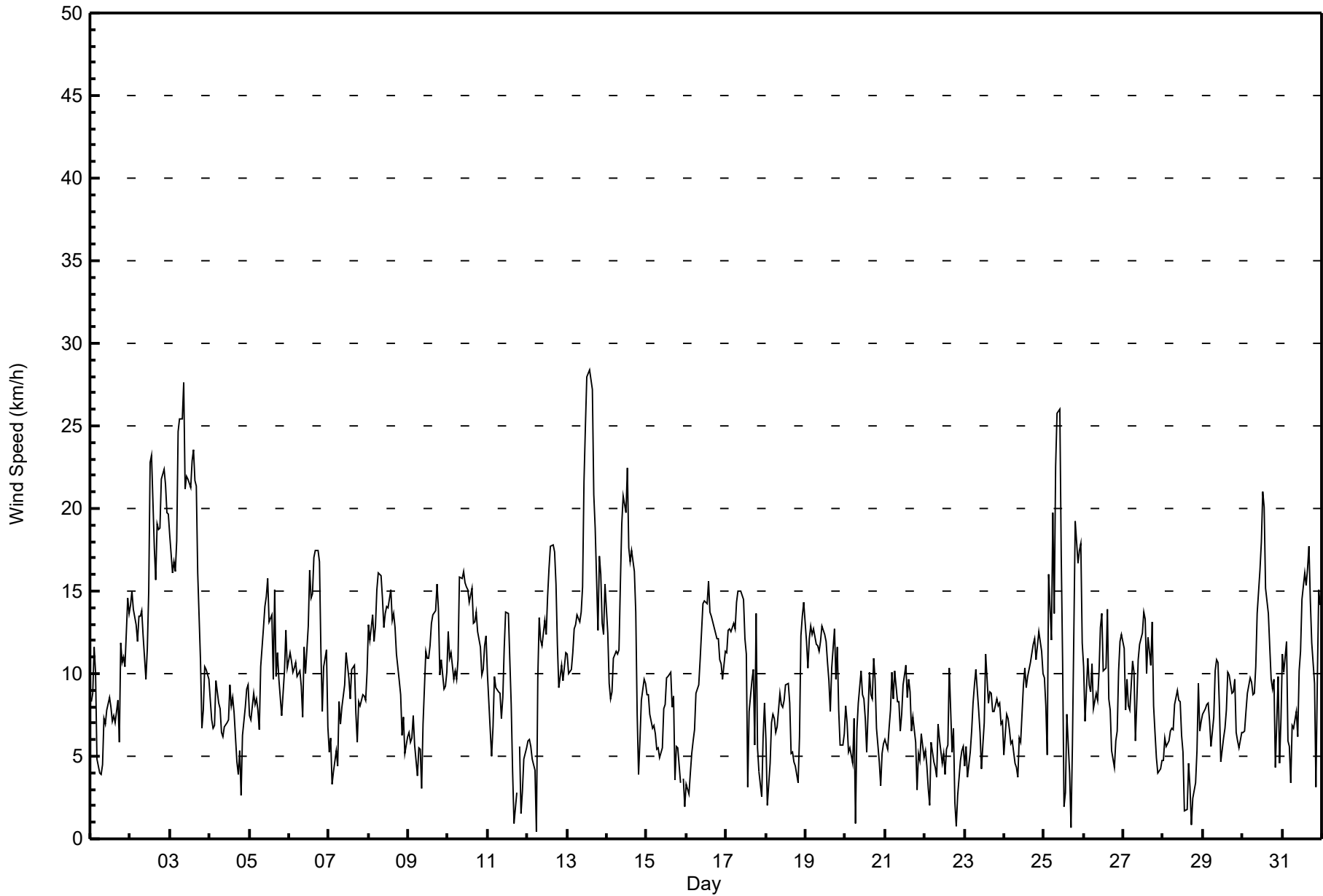
Wind Speed (WS) - km/h
Anzac - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Jul 25 09:00 Minimum Value: 0 km/h on Jul 20 21:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7																	Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7									
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	2	2	3	2	1	1	1	2	3	1	2	2	2	2	2	4	2	2	3	2	3	3	4	4	4	4
2-Jul	4	3	4	3	4	3	4	4	4	3	4	4	6	5	4	4	6	4	5	6	7	6	5	5	7	
3-Jul	4	4	4	4	5	6	6	7	7	5	5	5	5	7	6	5	5	6	6	1	2	2	1	1	7	
4-Jul	1	1	1	1	1	1	2	1	2	2	3	3	3	3	3	3	3	2	2	2	1	1	1	1	3	
5-Jul	3	2	1	1	1	1	2	4	4	4	4	4	3	4	3	7	4	3	3	2	2	2	2	2	7	
6-Jul	2	2	2	2	2	2	2	2	3	3	4	4	5	5	5	5	5	4	4	3	1	1	2	1	5	
7-Jul	1	2	1	1	1	1	2	2	2	2	3	3	3	3	3	3	2	2	3	2	2	2	2	3	3	
8-Jul	3	3	4	3	4	4	4	4	3	3	3	3	4	5	3	4	3	3	2	2	1	1	1	1	5	
9-Jul	1	1	1	1	1	1	1	1	1	2	4	4	3	4	5	4	4	5	4	2	2	2	2	2	5	
10-Jul	3	2	2	2	2	2	3	4	4	4	4	4	4	4	4	4	4	4	3	3	2	2	2	2	4	
11-Jul	2	2	1	1	1	1	1	2	2	3	3	4	3	3	3	2	2	1	UO	2	1	1	2	1	4	
12-Jul	1	1	1	2	1	1	4	3	3	4	4	4	4	5	5	5	4	4	3	2	2	2	2	2	5	
13-Jul	1	2	2	2	2	3	3	3	4	4	5	7	7	7	7	7	6	5	3	4	3	3	2	3	7	
14-Jul	2	2	2	1	2	2	3	3	4	4	5	6	5	5	6	4	4	4	3	1	1	1	2	2	6	
15-Jul	2	2	1	1	1	1	1	2	1	2	2	2	3	3	3	2	3	2	2	1	1	UO	1	2	3	
16-Jul	1	1	1	1	1	1	2	2	3	3	3	4	4	4	4	4	4	3	3	3	2	2	2	2	4	
17-Jul	2	2	2	2	2	3	3	3	3	3	3	3	3	2	2	2	2	2	7	5	2	2	2	1	7	
18-Jul	1	1	1	1	2	2	1	2	3	2	2	3	3	3	4	3	3	2	1	1	2	4	3	4	4	
19-Jul	3	2	3	3	2	3	2	3	3	3	3	3	4	3	4	3	7	5	2	3	2	1	1	1	7	
20-Jul	1	2	3	2	1	1	2	2	2	2	3	2	2	3	3	3	3	3	2	2	0	1	1	1	3	
21-Jul	1	1	1	1	2	2	2	2	1	1	2	2	3	3	2	2	2	2	2	1	1	1	1	2	3	
22-Jul	1	2	1	2	1	1	2	1	2	1	2	2	2	2	2	4	3	3	1	1	1	1	2	2	4	
23-Jul	1	1	1	4	1	2	2	2	2	1	1	2	5	4	3	2	2	2	2	1	1	2	1	1	5	
24-Jul	2	1	1	1	1	1	3	3	1	2	3	3	3	3	3	3	3	3	3	3	3	3	2	2	3	
25-Jul	2	2	4	5	9	6	7	8	9	9	8	6	2	2	3	2	2	2	6	5	5	5	4	4	9	
26-Jul	3	2	3	3	2	3	2	2	2	3	4	4	4	5	4	5	2	2	2	3	2	4	3	3	5	
27-Jul	3	3	2	2	1	2	2	2	2	2	3	3	4	6	3	3	4	4	2	1	2	1	1	1	6	
28-Jul	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	2	1	1	1	3	2	2	2	3	
29-Jul	1	1	1	1	1	1	1	4	3	3	2	3	3	2	4	4	4	3	2	2	1	1	1	1	4	
30-Jul	1	1	1	1	1	1	1	2	2	4	5	4	5	5	5	4	3	2	2	1	5	6	2	1	6	
31-Jul	7	3	3	4	4	3	2	2	2	2	3	4	4	4	4	5	6	4	6	5	2	4	5	4	7	
Diurnal Maximum																										
UO - Unstable Operation																										



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Anzac - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Anzac - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	115	15.50	15.50
6 - 11	393	52.96	68.46
12 - 19	199	26.82	95.28
20 - 28	35	4.72	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Anzac - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	5	5	2	9	2	4	11	10	12	10	13	11	9	3	5	115
6 - 11	12	9	13	10	13	20	44	30	18	16	31	32	78	26	24	17	393
12 - 19	5	1	2	6	10	25	14	5	0	0	3	24	40	25	20	19	199
20 - 28	1	0	0	1	3	0	2	0	0	0	0	0	2	3	12	11	35
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	22	15	20	19	35	47	64	46	28	28	44	69	131	63	59	52	742

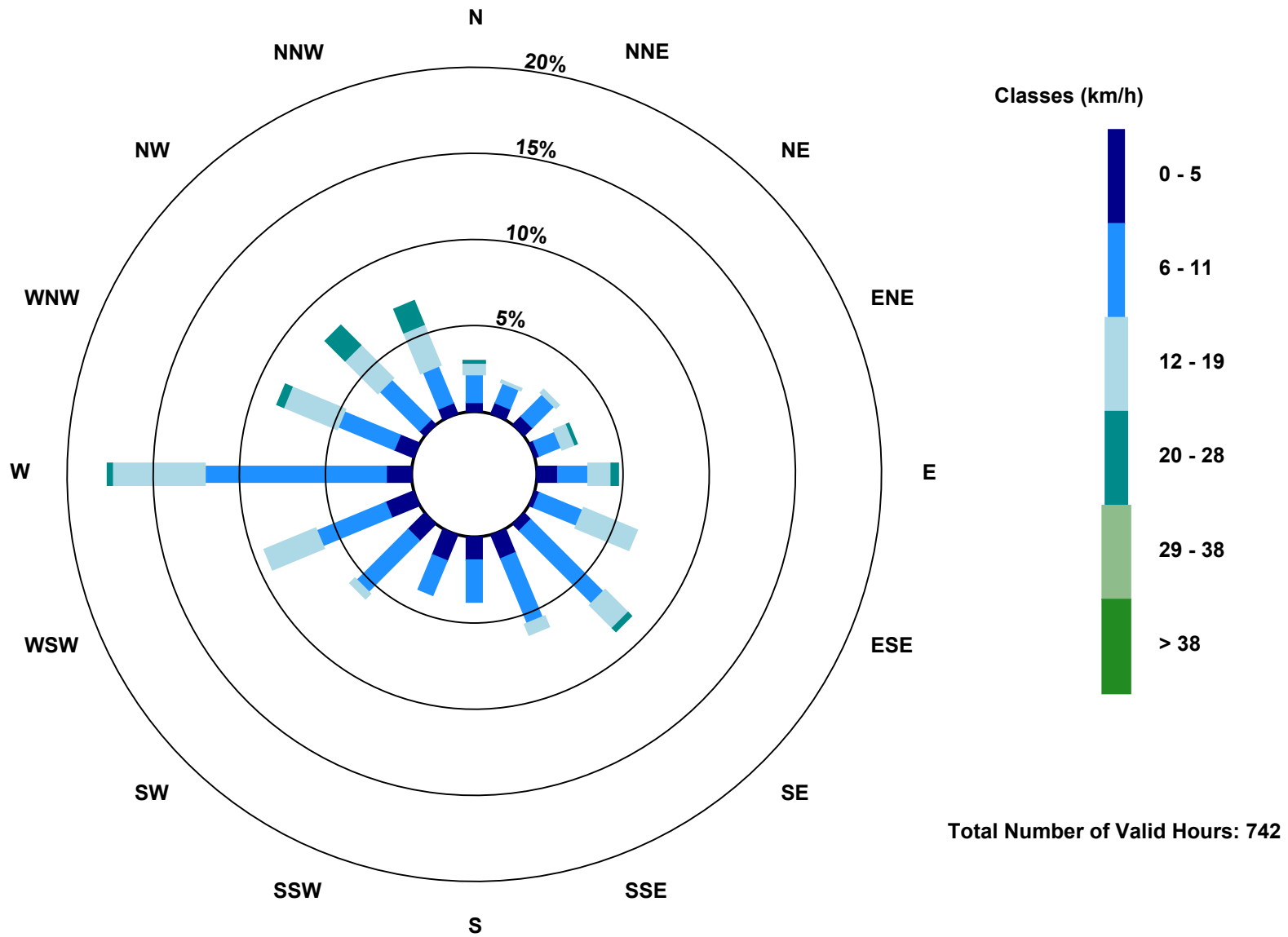
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Anzac





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Anzac - July 2023

Direction of Maximum Speed: 332 deg on Jul 13 14:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 322.7 deg on Jul 3	Hours of Data: 742
Direction of Minimum Speed: 155 deg on Jul 12 06:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 0.6 deg on Jul 22	Percent Operational Time: 99.7
Monthly Average Direction: 275.0 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	248	261	273	272	248	220	166	210	193	160	120	131	154	127	117	254	337	336	273	285	263	270	270	274	248.2
2-Jul	277	285	282	283	274	282	273	263	284	267	271	296	313	311	290	286	295	305	284	282	279	275	284	300	286.8
3-Jul	298	302	294	292	291	315	326	327	334	323	322	332	333	334	349	339	334	2	345	291	286	301	318	320	322.7
4-Jul	309	279	269	271	279	281	280	264	252	261	306	264	260	273	277	254	288	207	326	44	129	157	167	164	261.5
5-Jul	172	208	215	223	227	227	234	241	257	248	252	251	259	255	278	340	180	192	233	235	276	272	273	285	246.9
6-Jul	267	267	277	272	277	289	289	309	295	354	346	325	314	302	307	321	326	337	346	340	323	332	342	7	315.1
7-Jul	25	50	207	215	232	254	286	273	265	263	249	255	250	266	256	244	244	254	243	222	206	207	218	223	245.7
8-Jul	227	230	239	242	257	263	262	258	258	265	269	273	283	285	265	267	273	276	286	285	276	324	261	263	264.4
9-Jul	263	263	274	304	313	293	3	89	134	45	0	353	338	341	346	3	0	22	35	46	69	73	91	98	11.5
10-Jul	97	114	109	120	118	135	134	130	126	105	115	106	108	116	102	107	92	95	88	95	110	125	133	127	112.2
11-Jul	125	133	110	136	139	142	143	144	135	139	152	145	142	133	137	162	171	3	UO	153	158	199	188	198	143.4
12-Jul	191	203	214	228	47	155	271	274	273	301	311	295	313	306	316	325	340	329	328	341	354	336	314	322	309.8
13-Jul	307	292	275	275	277	284	282	291	289	290	313	324	321	332	322	330	325	321	331	337	330	331	321	317	313.7
14-Jul	328	317	295	287	297	296	299	290	312	310	325	334	329	330	317	324	327	347	7	330	291	315	319	327	318.9
15-Jul	307	307	326	312	299	305	294	300	300	287	344	2	349	358	351	28	22	32	41	86	97	UO	253	208	337.2
16-Jul	190	169	168	150	147	146	131	117	114	118	116	125	117	107	122	121	112	109	105	96	95	104	121	130	118.8
17-Jul	127	120	121	117	123	119	124	125	131	128	125	114	107	12	37	51	72	114	96	160	234	119	71	68	111.8
18-Jul	87	50	346	329	340	347	3	29	52	49	64	79	86	67	57	49	59	26	357	271	244	261	262	263	13.8
19-Jul	265	267	273	270	270	268	271	270	271	274	275	273	272	272	261	270	266	249	268	260	235	213	161	193	263.4
20-Jul	217	247	266	247	210	245	241	278	264	270	268	234	261	253	248	257	261	276	287	319	329	244	229	229	258.6
21-Jul	222	254	269	265	277	272	272	273	268	258	245	257	254	271	252	245	284	276	289	231	199	213	222	254	258.3
22-Jul	288	273	246	236	222	220	196	37	18	360	16	5	344	266	359	357	60	159	185	302	160	143	150	148	325.6
23-Jul	138	156	154	88	139	133	134	134	136	124	92	106	152	175	147	141	139	134	146	149	133	141	154	161	140.0
24-Jul	198	208	219	219	207	181	185	170	144	144	144	139	127	126	121	86	95	80	65	80	80	86	95	98	119.5
25-Jul	103	114	236	262	64	76	71	83	98	100	110	150	168	166	71	87	323	249	252	244	240	248	238	236	138.3
26-Jul	236	179	194	180	180	192	144	89	104	107	106	138	145	59	43	178	232	204	218	17	26	46	58	65	125.3
27-Jul	62	40	40	35	20	30	42	14	318	307	313	341	315	351	277	269	280	339	311	279	245	265	255	269	333.8
28-Jul	263	255	267	264	260	269	261	268	266	273	262	246	277	343	79	290	277	312	244	173	175	214	235	234	254.9
29-Jul	237	244	242	231	234	222	239	270	271	274	281	272	266	287	185	174	182	180	160	150	169	176	174	196	221.8
30-Jul	188	176	166	154	156	151	145	141	144	155	153	144	141	141	167	166	151	136	142	153	193	319	90	150	151.8
31-Jul	196	181	125	166	294	88	93	157	162	194	225	223	253	250	246	242	239	244	274	329	292	231	254	238	230.5

243.2 242.9 247.8 251.4 254.3 257.5 262.9 260.0 260.5 271.1 289.5 282.9 294.5 309.4 307.9 305.2 310.8 317.9 312.8 289.4 259.5 263.0 250.9 246.1
 Diurnal Average

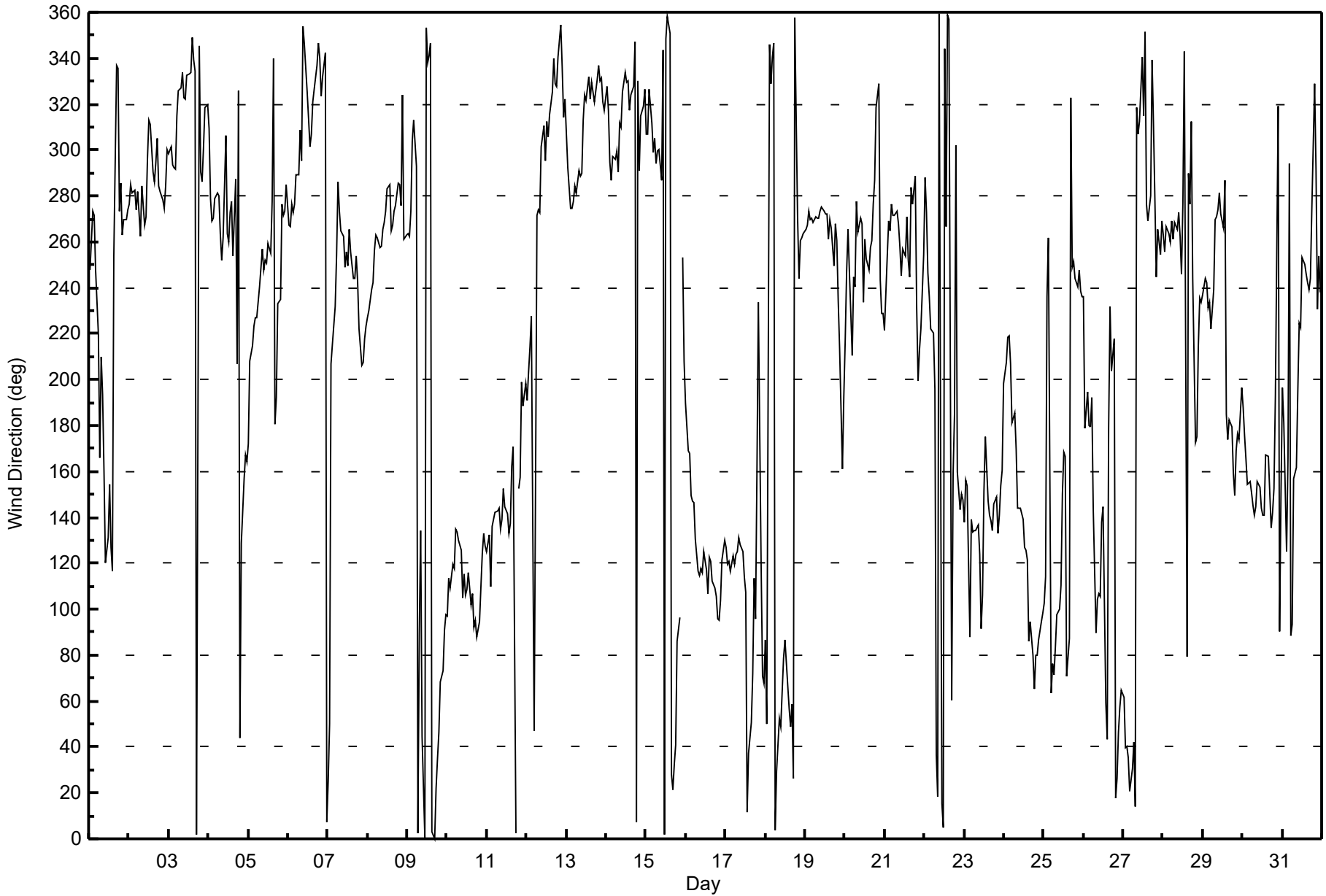
UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Anzac - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 108 deg on Jul 11 17:00 Minimum Value: 5 deg on Jul 16 04:00 Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 14 Median = 18 Q ₃ = 25 P ₉₀ = 38 P ₉₉ = 77																			Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	16	22	16	12	16	29	17	28	27	24	19	26	23	30	24	55	18	41	16	16	19	19	16	19	55
2-Jul	17	15	18	17	22	19	18	18	18	24	25	17	15	13	15	18	17	14	17	18	19	19	17	16	25
3-Jul	15	15	15	15	15	14	13	14	14	14	14	15	15	15	17	15	15	29	25	16	10	12	9	8	29
4-Jul	12	12	10	12	9	13	15	21	29	42	52	55	29	40	40	48	67	57	38	51	15	9	9	8	67
5-Jul	13	15	11	9	10	11	16	20	18	22	22	22	22	22	24	32	39	24	18	22	15	13	15	23	39
6-Jul	12	12	11	12	13	15	16	22	43	23	30	23	21	26	25	24	22	17	16	11	10	8	8	16	43
7-Jul	8	17	47	30	11	29	17	17	16	20	22	24	27	38	27	18	28	28	23	19	12	15	14	17	47
8-Jul	17	17	15	17	18	16	16	15	15	17	17	18	23	23	16	17	18	16	17	13	12	12	28	12	28
9-Jul	9	11	16	16	14	34	22	29	55	30	27	32	29	27	24	25	22	17	13	12	13	13	13	13	55
10-Jul	16	14	15	13	15	12	16	15	18	19	20	24	26	23	22	26	20	17	16	15	12	14	10	11	26
11-Jul	14	12	19	12	8	7	10	14	17	18	20	19	17	18	25	64	108	53	UO	13	71	14	18	13	108
12-Jul	13	10	9	48	17	96	17	17	19	27	24	27	23	20	22	21	17	18	15	10	12	15	14	9	96
13-Jul	9	14	12	12	13	14	13	17	17	18	17	19	18	18	19	16	16	14	13	14	12	11	13	12	19
14-Jul	10	19	12	13	12	13	15	17	19	15	16	16	16	20	24	18	16	24	15	21	19	11	11	11	24
15-Jul	13	13	12	14	11	14	16	18	42	35	30	24	21	27	24	21	29	70	30	24	35	UO	25	65	70
16-Jul	13	26	11	5	8	10	13	18	23	21	20	22	23	21	21	25	22	16	15	14	13	14	11	11	26
17-Jul	12	12	13	14	13	14	13	14	14	14	15	17	18	77	15	13	14	27	17	64	28	60	10	9	77
18-Jul	15	48	19	12	9	13	16	23	23	18	30	33	36	30	43	57	54	19	16	44	15	14	17	16	57
19-Jul	17	15	13	13	13	14	14	15	17	16	18	18	16	19	36	40	33	21	19	17	21	20	15	12	40
20-Jul	12	26	75	22	33	9	85	34	22	22	24	33	35	69	24	18	23	21	18	11	9	44	8	9	85
21-Jul	6	17	11	11	12	14	15	16	13	24	27	20	20	37	20	23	38	25	16	39	9	10	9	36	39
22-Jul	37	28	31	62	10	23	12	25	26	27	38	47	59	45	46	19	59	22	34	75	50	14	11	14	75
23-Jul	15	14	25	33	12	11	15	13	20	21	39	34	55	30	24	15	16	17	13	8	12	10	9	7	55
24-Jul	26	10	9	7	13	11	41	38	29	28	60	29	24	24	21	23	22	22	15	14	14	13	13	12	60
25-Jul	11	21	68	25	81	17	23	22	25	27	41	27	83	55	24	47	86	30	18	19	17	17	16	19	86
26-Jul	23	14	15	20	18	17	32	18	24	25	22	17	22	38	17	52	27	35	37	51	31	24	15	14	52
27-Jul	14	16	11	13	11	13	14	31	21	17	27	26	24	31	20	16	32	28	13	22	36	21	32	17	36
28-Jul	16	11	10	12	10	16	14	15	20	21	26	33	27	75	78	20	29	71	41	14	13	22	28	15	78
29-Jul	11	10	13	8	8	18	17	17	20	18	31	67	59	32	48	29	28	23	20	10	12	10	14	11	67
30-Jul	11	9	14	6	6	7	9	12	15	20	18	17	16	15	23	18	20	12	10	10	64	19	32	8	64
31-Jul	29	28	16	75	57	43	27	21	16	29	24	32	21	20	22	22	19	25	29	20	54	21	18	18	75
Diurnal Maximum																									
UO - Unstable Operation																									





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS17
WAPASU
JULY 2023**

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS17)
 JULY 2023

MONTHLY SUMMARY

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	13.1	0	2.7	0
H2S (ppb) Average	707	37	37	100	1.6	0	0.5	0
THC (ppm) Average	708	36	36	100	3	-	2.5	-
O3 (ppb) Average	708	36	36	100	79.1	2	43.4	-
NO2 (ppb) Average	705	39	39	100	20	0	6.1	-
NO (ppb) Average	705	39	39	100	15.3	-	1	-
NOX (ppb) Average	705	39	39	100	28.9	-	6.3	-
PM2.5 (ug/m3) Average	742	2	2	100	311.1	125	189.3	19
Temperature 2 m (C) Average	744	0	0	100	28.5	-	22.8	-
Relative Humidity (%) Average	744	0	0	100	100	-	97.7	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	28	-	13	-
Wind Direction 10 m (deg) Average	743	0	1	99.87	-	-	-	-
Precipitation (mm) Total	744	0	0	100	5.5	-	27	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS17)
JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.42	1.3	-	0	0	0	0	0.2	0.9	13.1
H2S (ppb) Average	707	0.18	0.2	-	0	0	0	0.1	0.3	0.4	1.6
THC (ppm) Average	708	2.28	0.2	-	2	2.1	2.2	2.2	2.4	2.5	3
O3 (ppb) Average	708	30.43	13.8	-	3	10.3	21.4	30.6	39.6	47	79.1
NO2 (ppb) Average	705	2.2	2.6	-	0	0.2	0.6	1.3	2.8	5.4	20
NO (ppb) Average	705	0.28	1	-	0	0	0	0	0.2	0.6	15.3
NOX (ppb) Average	705	2.49	3.3	-	0	0.2	0.6	1.4	2.9	6	28.9
PM2.5 (ug/m3) Average	742	43.16	52.7	-	1.2	3.3	6.7	25.2	54.7	111.2	311.1
Temperature 2 m (C) Average	744	17.04	5.1	-	0.9	10.6	13.1	16.9	21.3	23.9	28.5
Relative Humidity (%) Average	744	65.77	21.7	-	25.6	36.2	47.3	64.1	86.6	95.8	100
Wind Speed 10 m (km/h) Average	743	7.9	4	-	0	3	5	7	10	13	28
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	66.98	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS17)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	22 Jul 2023 20:00	22 Jul 2023 20:00	1	Flat line in sensor output signal



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 13.1 ppb on Jul 29 08:00	Maximum Daily Average: 2.7 ppb on Jul 29		Hours of Data:	708
Minimum Value: 0.0 ppb on Jul 1 02:00	Minimum Daily Average: 0.0 ppb on Jul 2		Hours of Missing Data:	36
Maximum Diurnal Average: 1.1 ppb at hour 8	Minimum Diurnal Average: 0.1 ppb at hour 1		Hours of Calibration:	36
Monthly Average: 0.42 ppb	Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.2 P ₉₀ = 0.9 P ₉₉ = 7.2		Percent Operational Time:	100.0

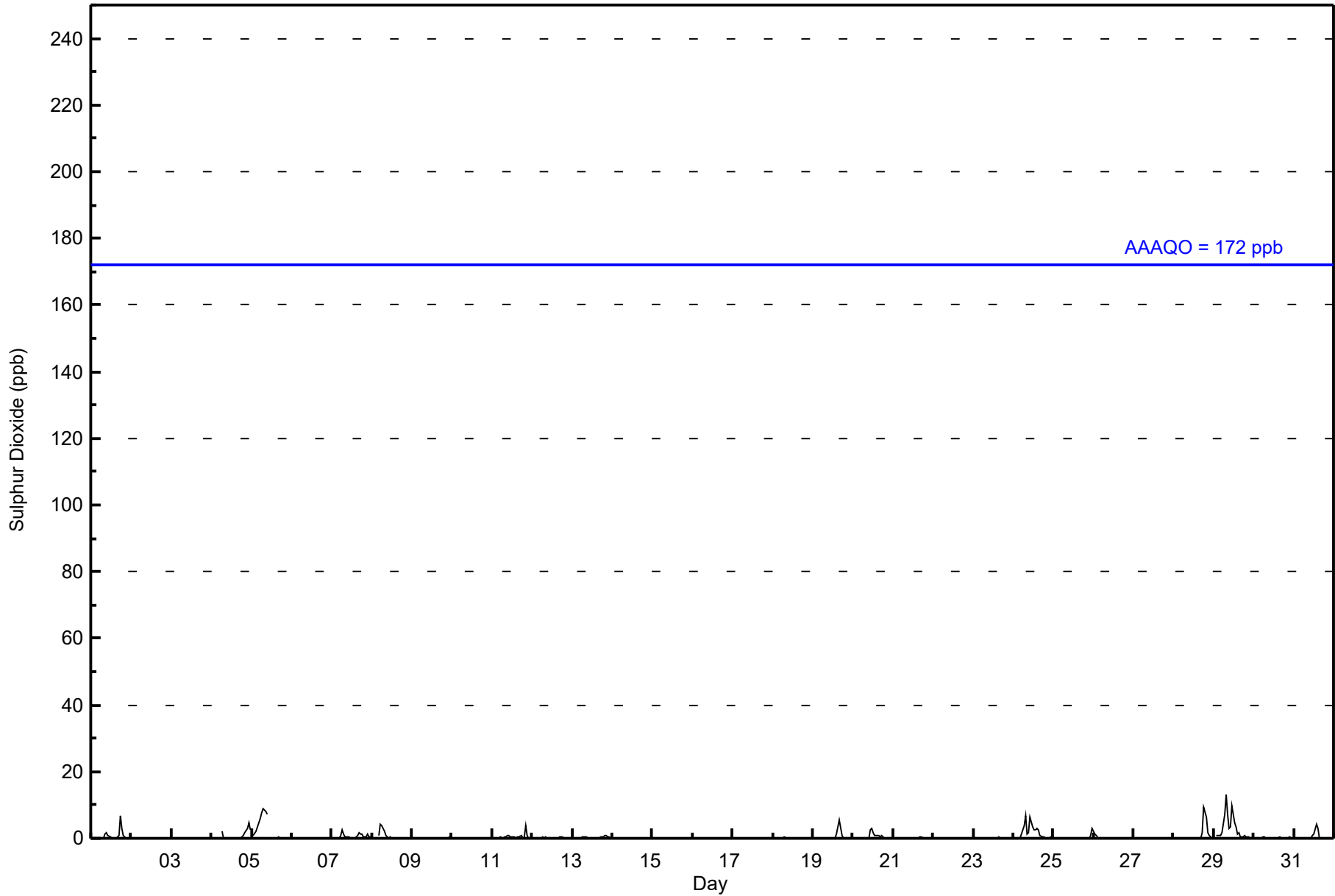
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	1.1	1.7	1.0	0.6	0.0	0.0	0.0	0.0	0.8	6.7	2.9	0.9	0.4	0.2	0.0	0.0	0.7	6.7																							
2-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.1	0.1	0.1	0.2	Z	1.9	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.7	1.5	3.1	4.5	2.6	0.7	4.5																							
5-Jul	Z	0.9	2.1	3.2	4.6	5.8	7.5	8.9	8.1	7.1	C	C	C	C	C	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	8.9																							
6-Jul	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0																						
7-Jul	0.0	0.0	Z	0.0	0.0	0.7	2.4	1.1	0.5	0.3	0.3	0.1	0.2	0.2	0.1	0.7	1.7	1.2	1.3	0.3	0.6	1.4	0.4	0.5	0.6	2.4																							
8-Jul	0.4	0.2	0.1	Z	1.0	4.3	3.7	2.2	0.9	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	4.3																							
9-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.0	0.4																							
10-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	Z	0.0	0.0	0.0	0.1	0.2	0.1	0.2	0.4	0.7	0.7	0.4	0.3	0.3	0.2	0.5	0.6	0.9	0.2	0.5	3.9	0.9	0.0	0.0	0.5	3.9																							
12-Jul	0.0	Z	0.0	0.0	0.0	0.2	0.3	0.2	0.4	0.2	0.1	0.1	0.0	0.0	0.2	0.3	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.4																							
13-Jul	0.0	0.0	Z	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.4	0.6	0.7	0.7	0.5	0.2	0.0	0.2	0.7																							
14-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
18-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2																						
19-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	3.4	5.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.5	5.6																							
20-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.2	0.1	0.1	2.5	3.0	1.7	0.7	0.9	0.7	0.4	0.8	0.5	0.1	0.0	0.0	0.0	0.0	0.5	3.0																							
21-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3																						
22-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.1	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	0.2																						
23-Jul	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	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4																						
24-Jul	0.0	Z	0.0	0.0	0.0	0.0	1.1	3.7	6.8	1.1	1.6	6.5	3.6	2.3	2.5	2.9	2.3	0.7	0.4	0.3	0.1	0.0	0.0	0.6	1.6	6.8																							
25-Jul	0.1	0.0	Z	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.9	3.1	0.2	3.1																							
26-Jul	2.2	1.4	0.4	Z	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.2	2.2																							
27-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	1.6	9.3	6.5	1.7	0.7	0.4	0.2	0.9	9.3																							
29-Jul	Z	0.7	0.8	1.0	1.0	1.7	7.2	13.1	7.3	3.0	3.4	9.8	4.7	3.2	1.4	1.6	0.5	0.5	0.7	0.3	0.3	0.2	0.2	0.2	2.7	13.1																							
30-Jul	0.2	Z	0.1	0.1	0.2	0.4	0.5	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.2	0.3	0.0	0.1	0.0	0.1	0.1	0.2	0.0	0.0	0.1	0.5	0.5																						
31-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	1.1	4.3	2.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	4.3																							
																								0.1	0.1	0.1	0.2	0.3	0.6	0.9	1.1	0.7	0.5	0.5	0.6	0.4	0.4	0.3	0.3	0.4	0.4	0.5	0.3	0.3	0.2	0.3	0.3	Diurnal Average	
																								2.2	1.4	2.1	3.2	4.6	5.8	7.5	13.1	8.1	7.1	6.5	9.8	4.7	4.3	2.9	3.4	5.6	6.7	9.3	6.5	3.9	3.1	4.5	3.1	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Wapasu - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	99.86	99.86
11 - 20	1	0.14	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



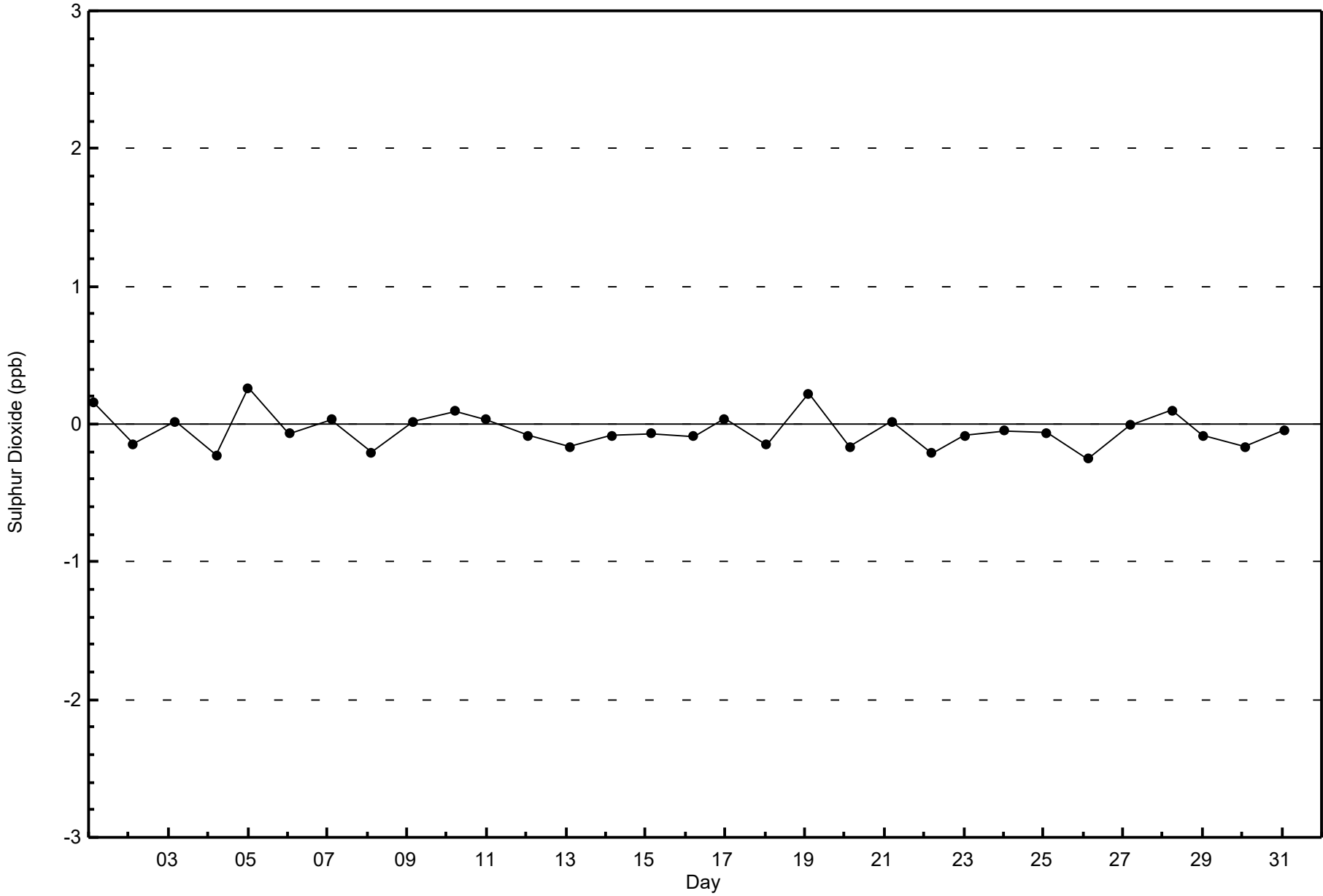
Wood Buffalo Environmental Association
Frequency Distribution

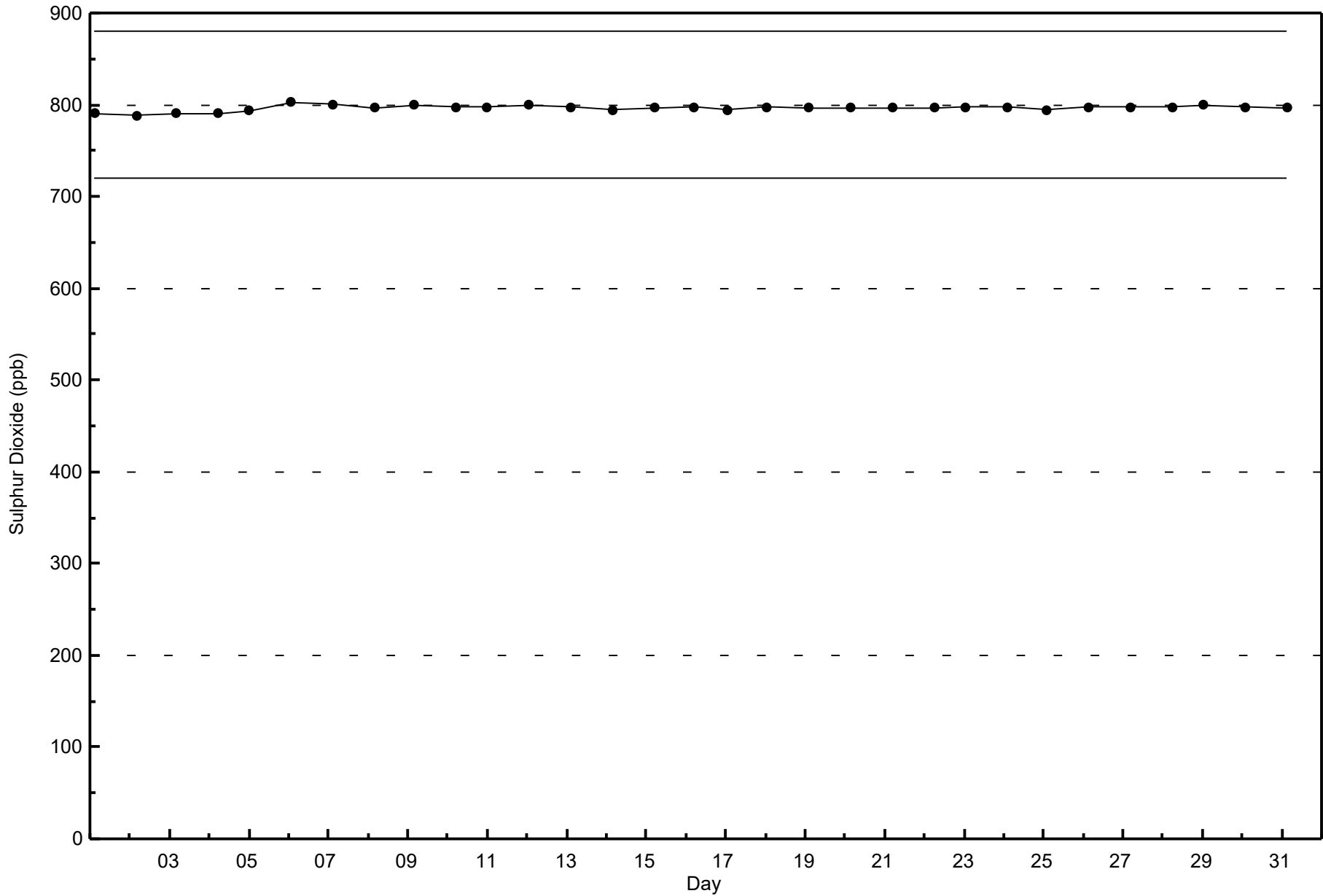
Sulphur Dioxide (SO₂) - ppb
Wapasu - July 2023

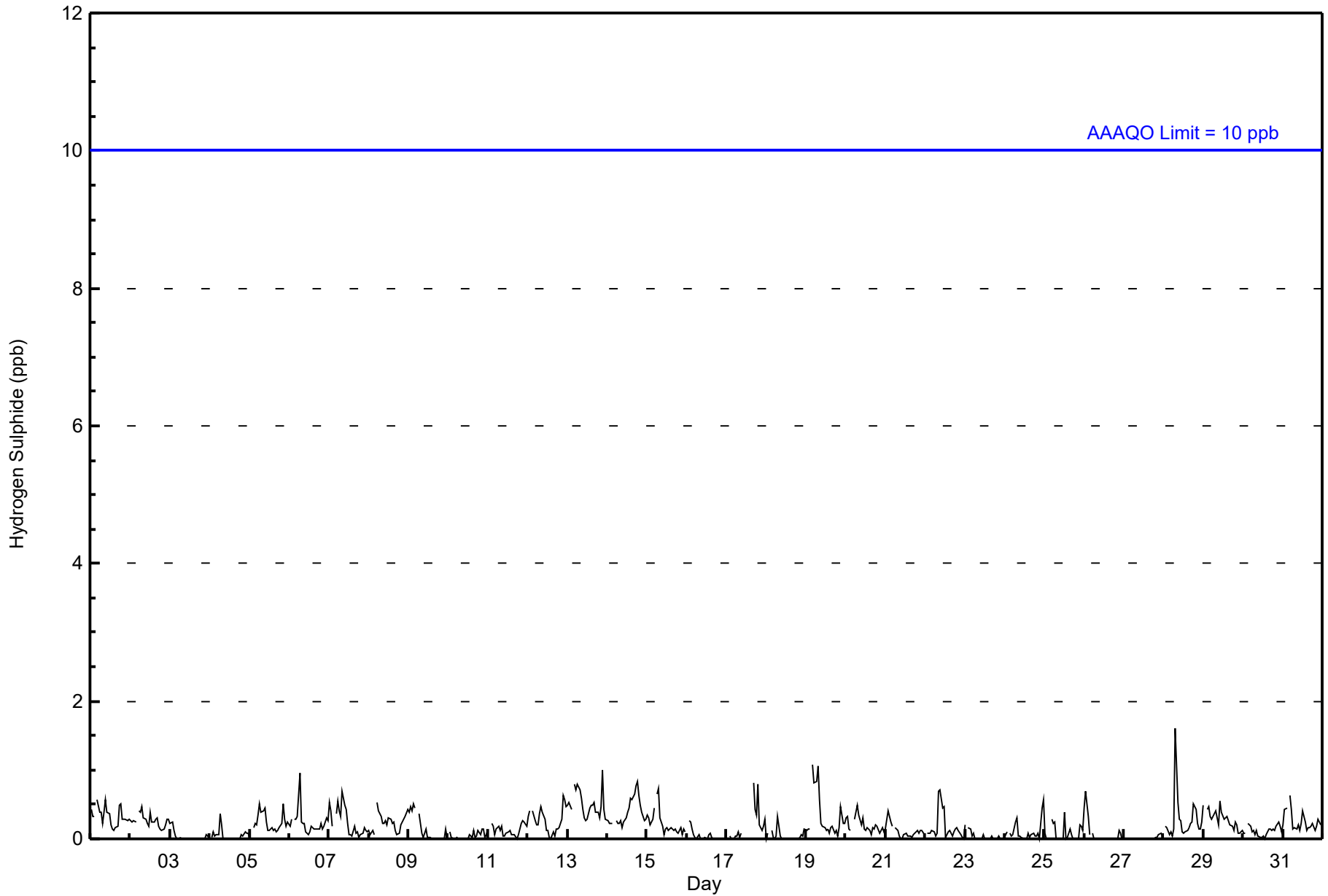
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	83	25	20	20	29	63	113	75	48	37	38	20	22	32	29	52	706
11 - 20	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	83	25	20	20	29	63	113	75	49	37	38	20	22	32	29	52	707

Total Number of Valid Hours: 707

Total Number of Hours: 744









Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Wapasu - July 2023

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

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Wapasu - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	82	25	20	21	28	60	113	75	49	35	42	21	22	32	29	52	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	82	25	20	21	28	60	113	75	49	35	42	21	22	32	29	52	706

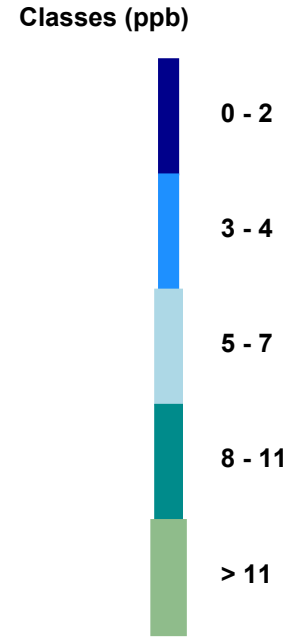
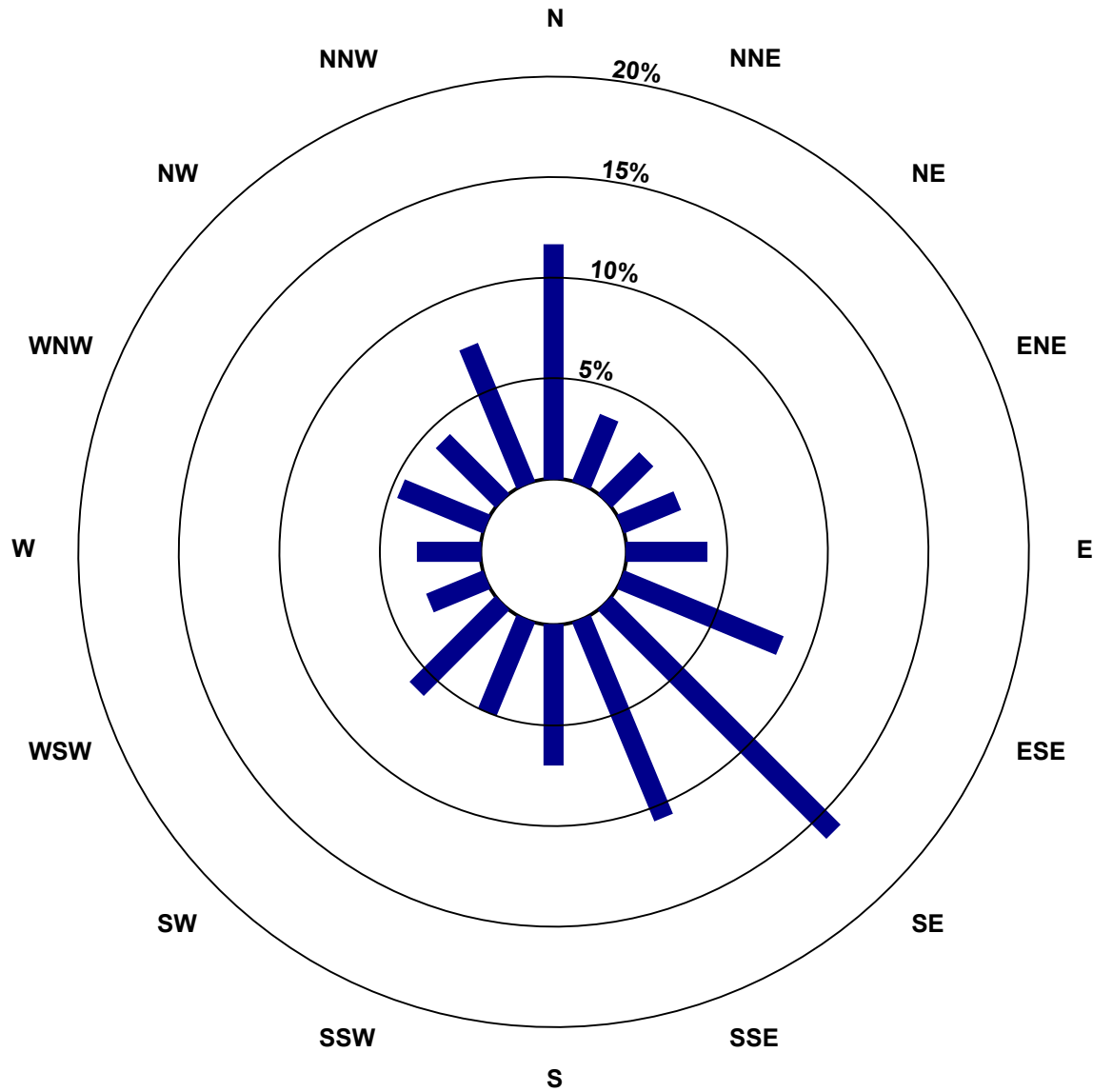
Total Number of Valid Hours: 706

Total Number of Hours: 744

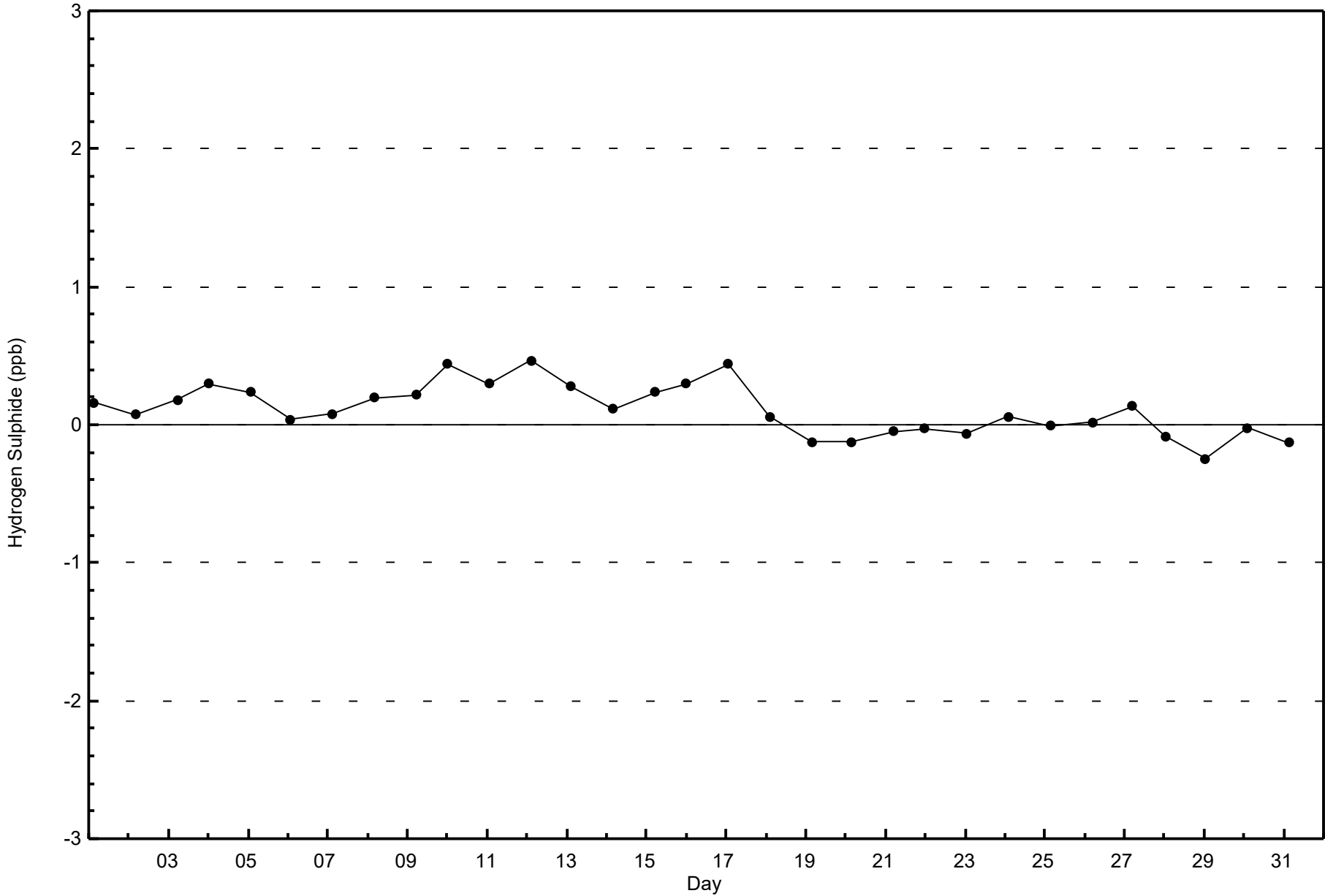


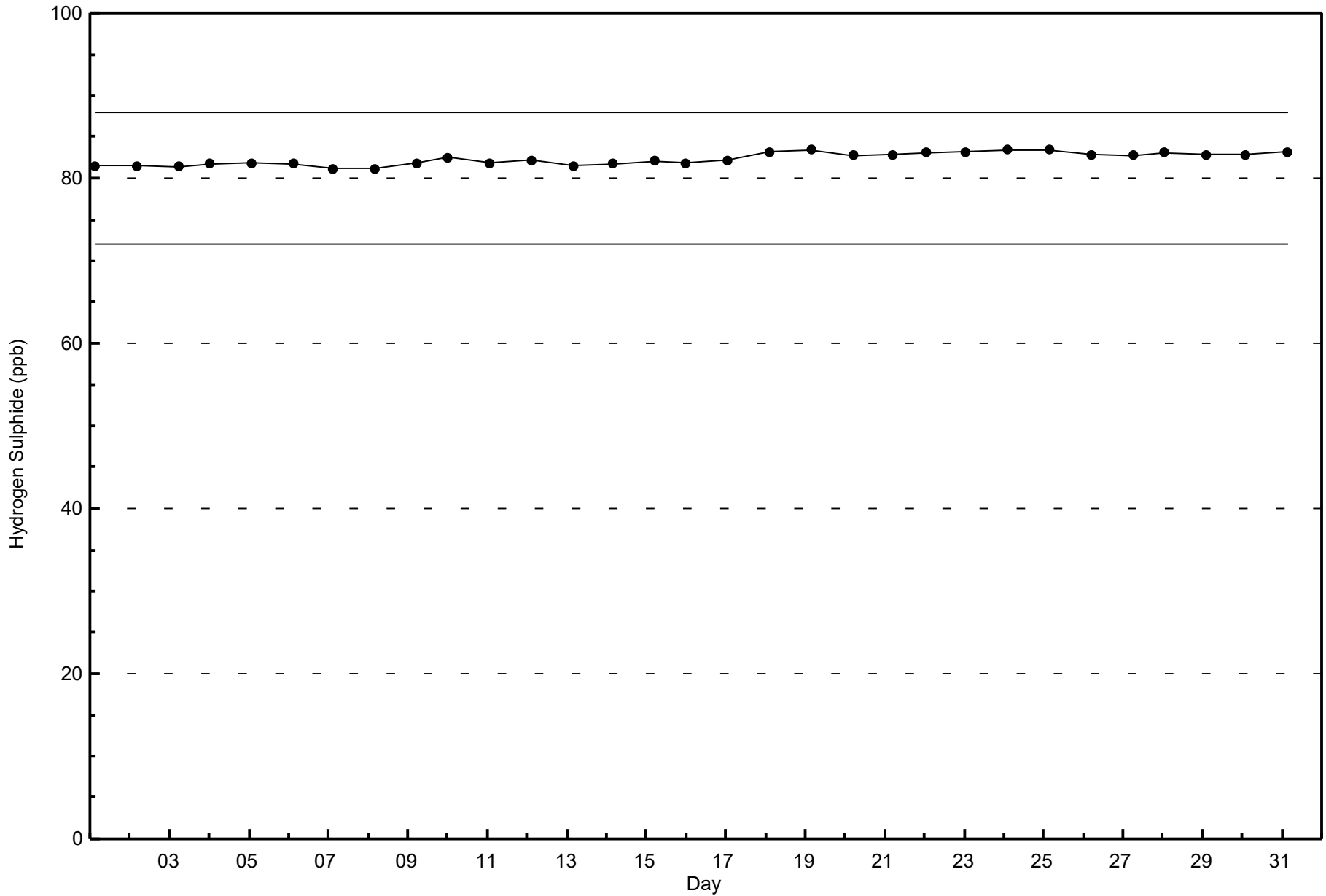
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Hydrogen Sulphide (H₂S) - ppb
Wapasu



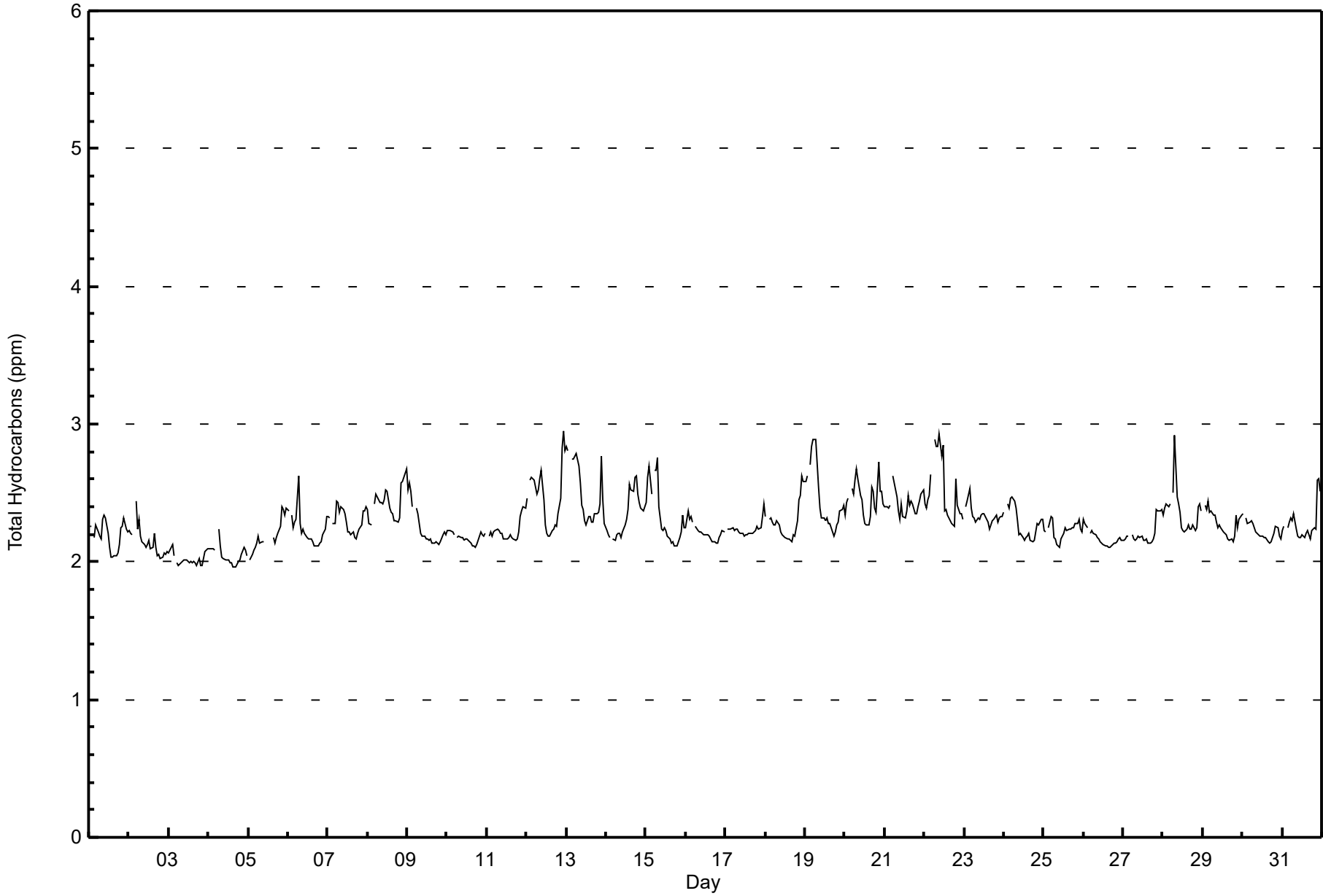
Total Number of Valid Hours: 706







Maximum Value: 3.0 ppm on Jul 12 23:00																				Maximum Daily Average: 2.5 ppm on Jul 22					Hours in Service: 744						
Minimum Value: 2.0 ppm on Jul 4 16:00																				Minimum Daily Average: 2.0 ppm on Jul 3					Hours of Data: 708						
Maximum Diurnal Average: 2.4 ppm at hour 7																				Minimum Diurnal Average: 2.2 ppm at hour 17					Hours of Missing Data: 36						
Monthly Average: 2.28 ppm																				Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.2 Q ₃ = 2.4 P ₉₀ = 2.5 P ₉₉ = 2.8					Hours of Calibration: 36						
																									Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Jul	2.3	2.3	Z	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.3					
2-Jul	2.2	2.2	2.2	Z	2.4	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.1	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.4					
3-Jul	2.1	2.1	2.1	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1					
4-Jul	2.1	2.1	2.1	2.1	2.1	Z	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.2					
5-Jul	Z	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	C	C	C	C	C	2.2	2.1	2.2	2.2	2.3	2.4	2.4	2.3	2.4	2.2	2.4					
6-Jul	2.4	Z	2.3	2.2	2.3	2.3	2.6	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.2	2.6					
7-Jul	2.3	2.3	Z	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.3	2.4					
8-Jul	2.4	2.3	2.3	Z	2.4	2.5	2.5	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	2.6	2.6	2.6	2.7	2.4	2.7					
9-Jul	2.5	2.6	2.5	2.4	Z	2.4	2.4	2.3	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	2.6					
10-Jul	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2					
11-Jul	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	2.4	2.4	2.4	2.2	2.4					
12-Jul	2.5	Z	2.6	2.6	2.6	2.5	2.5	2.5	2.6	2.7	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.5	2.8	3.0	2.8	2.5	3.0					
13-Jul	2.8	2.8	Z	2.7	2.7	2.8	2.8	2.7	2.6	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.8	2.4	2.3	2.5	2.8					
14-Jul	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.6	2.5	2.5	2.6	2.6	2.5	2.4	2.4	2.4	2.4	2.3	2.6					
15-Jul	2.4	2.6	2.7	2.5	Z	2.7	2.7	2.8	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.8					
16-Jul	2.2	2.4	2.3	2.3	2.3	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.4					
17-Jul	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.4	2.2	2.4					
18-Jul	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.3	2.5	2.5	2.6	2.6	2.3	2.6					
19-Jul	2.6	2.6	Z	2.7	2.8	2.9	2.9	2.7	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.5	2.9					
20-Jul	2.3	2.4	2.5	Z	2.5	2.5	2.6	2.7	2.6	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.5	2.5	2.4	2.4	2.7	2.5	2.5	2.4	2.5	2.7					
21-Jul	2.4	2.4	2.4	2.4	Z	2.6	2.6	2.5	2.4	2.3	2.4	2.3	2.3	2.4	2.5	2.4	2.4	2.4	2.4	2.3	2.4	2.4	2.5	2.5	2.4	2.6					
22-Jul	2.4	2.4	2.5	2.5	2.6	Z	2.9	2.8	2.8	2.9	2.8	2.8	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.6	2.4	2.3	2.4	2.3	2.5	2.9				
23-Jul	Z	2.4	2.4	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.4	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	2.3	2.5					
24-Jul	2.4	Z	2.4	2.4	2.5	2.5	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.5					
25-Jul	2.2	2.2	Z	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.3					
26-Jul	2.3	2.3	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3					
27-Jul	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.4	2.4	2.4	2.4	2.2	2.4					
28-Jul	2.3	2.4	2.4	2.4	2.4	Z	2.5	2.9	2.5	2.4	2.4	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.2	2.4	2.4	2.4	2.4	2.9					
29-Jul	Z	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.3	2.3	2.3	2.3	2.4					
30-Jul	2.3	Z	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	2.1	2.1	2.1	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3					
31-Jul	2.2	2.3	Z	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.6	2.6	2.5	2.3	2.6					
																								Diurnal Average				Diurnal Maximum			
2.3 2.3 2.3 2.3 2.4 2.4 2.4 2.4 2.3 2.3 2.3 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.3 2.3 2.3 2.3																								2.8 2.8 2.7 2.7 2.8 2.9 2.9 2.9 2.8 2.9 2.8 2.8 2.5 2.4 2.6 2.5 2.5 2.6 2.6 2.6 2.7 2.8 3.0 2.8							
Z - zerospan C - Calibration																															





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	39	5.51	5.51
2.1 - 3.0	669	94.49	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - July 2023

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	15	1	1	0	0	0	2	1	3	1	1	1	2	4	3	4	39
2.1 - 3.0	68	24	19	20	29	63	111	74	46	36	37	19	20	28	26	48	668
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	83	25	20	20	29	63	113	75	49	37	38	20	22	32	29	52	707

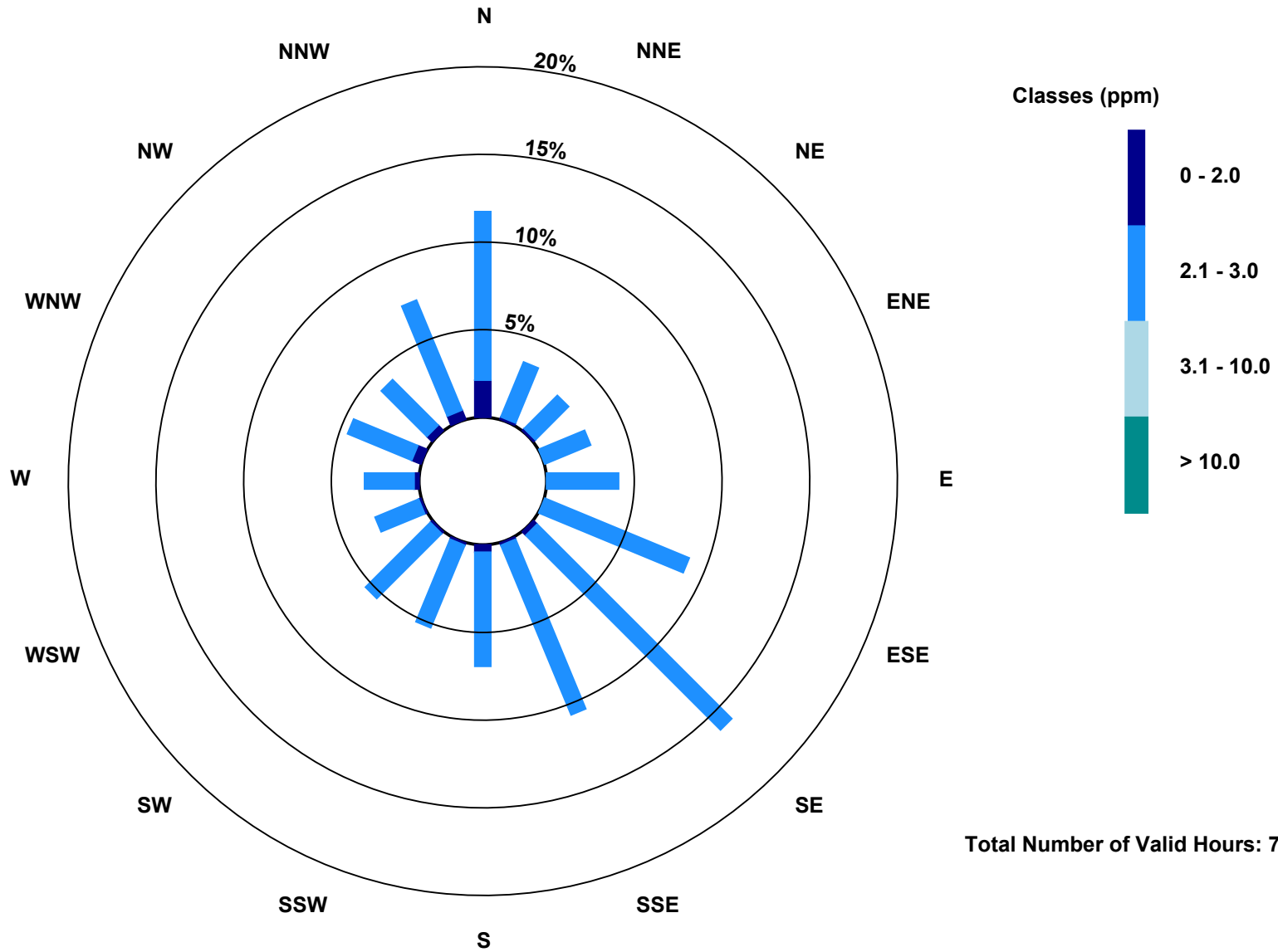
Total Number of Valid Hours: 707

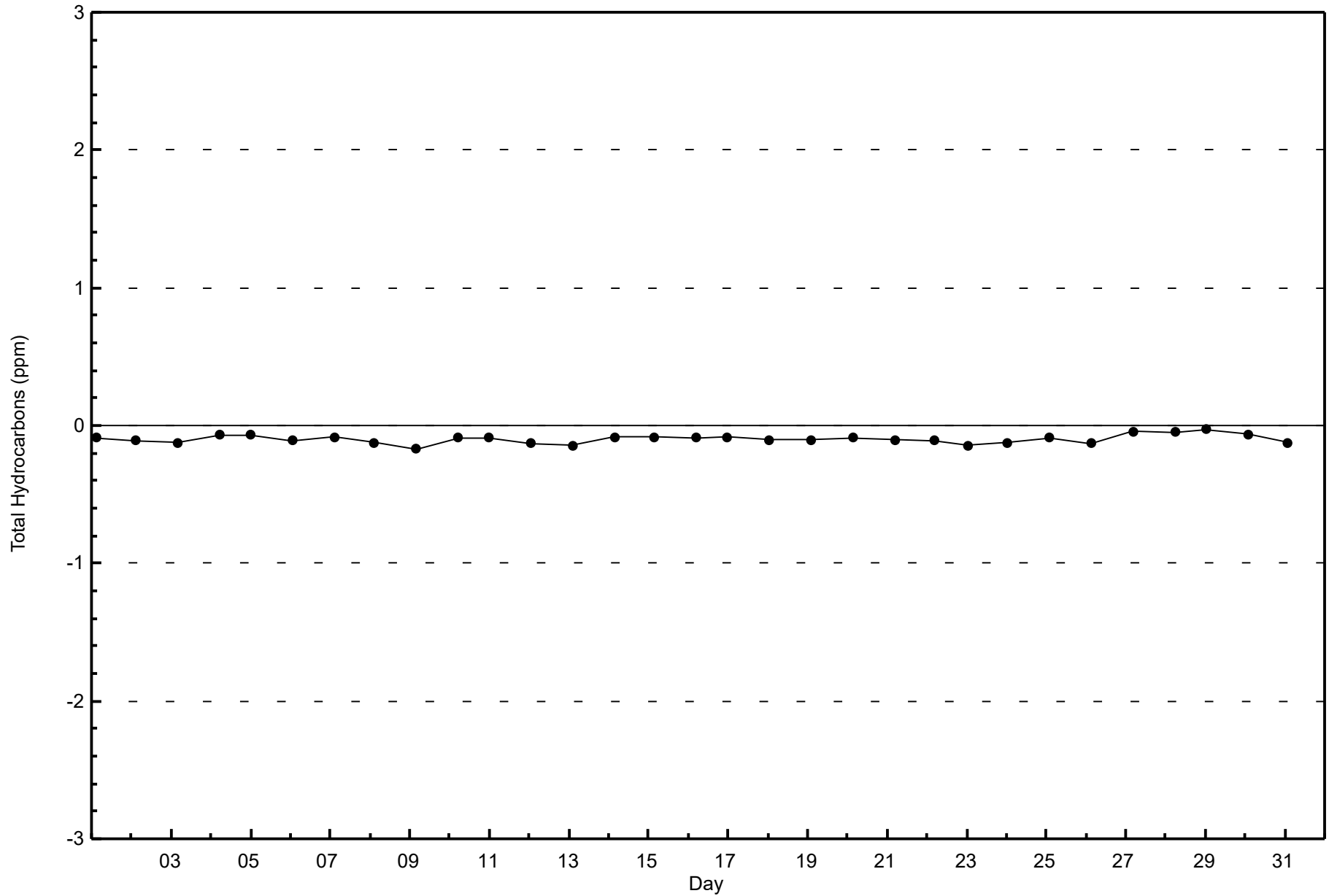
Total Number of Hours: 744

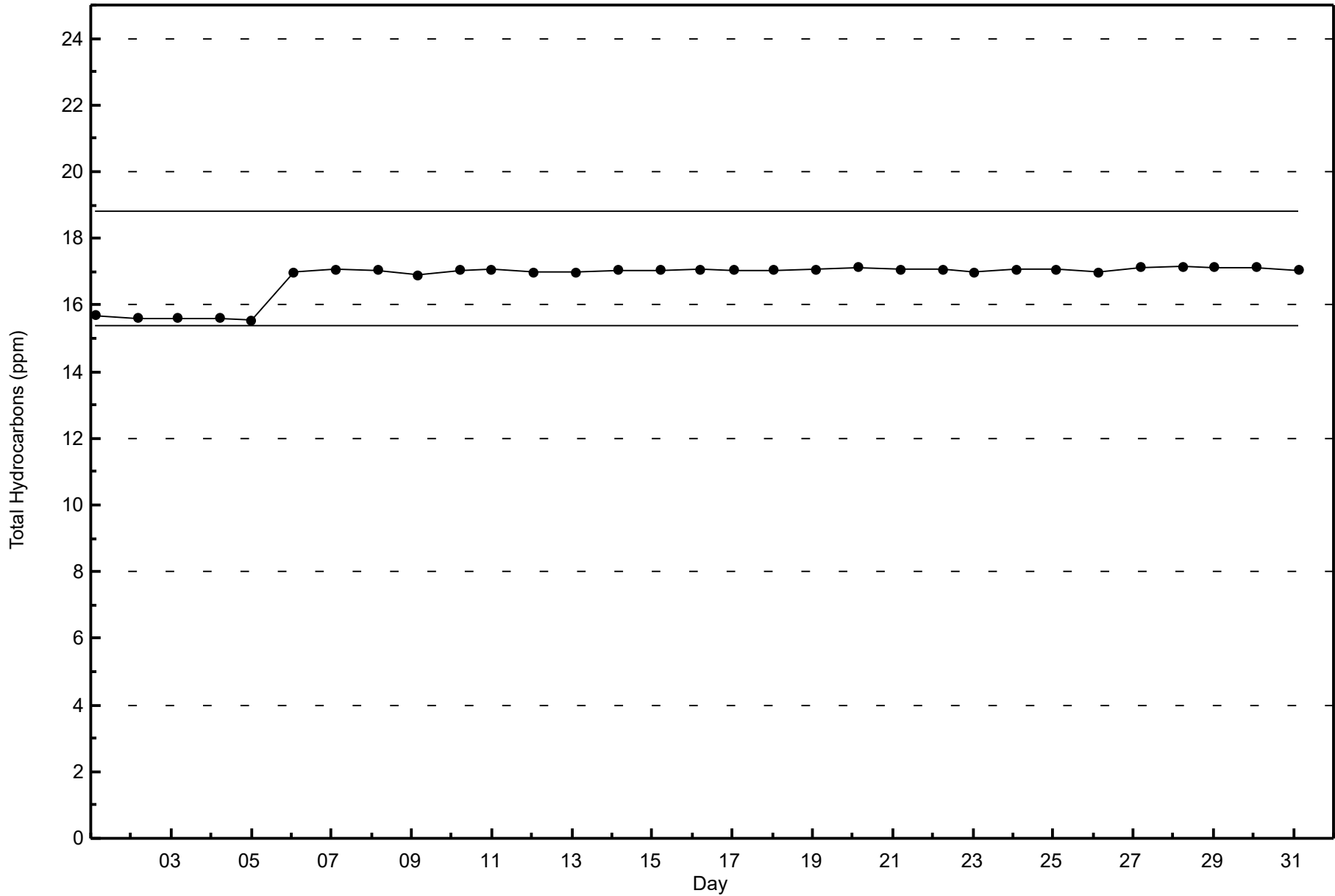


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Wapasu









Wood Buffalo Environmental Association
Summary of Hour Averages

Ozone (O₃) - ppb
Wapasu - July 2023

Number of Exceedences (AAAQO):	1-hr: 2	24-hr: 0	Hours in Service:	744
Maximum Value: 79.1 ppb on Jul 21 17:00	Maximum Daily Average: 43.4 ppb on Jul 24		Hours of Data:	708
Minimum Value: 3.0 ppb on Jul 28 05:00	Minimum Daily Average: 14.6 ppb on Jul 15		Hours of Missing Data:	36
Maximum Diurnal Average: 44.2 ppb at hour 16	Minimum Diurnal Average: 17.7 ppb at hour 3		Hours of Calibration:	36
Monthly Average: 30.43 ppb	Percentiles: P ₁ = 4.0 P ₁₀ = 10.3 Q ₁ = 21.4 Median = 30.6 Q ₃ = 39.6 P ₉₀ = 47.0 P ₉₉ = 67.4		Percent Operational Time:	100.0

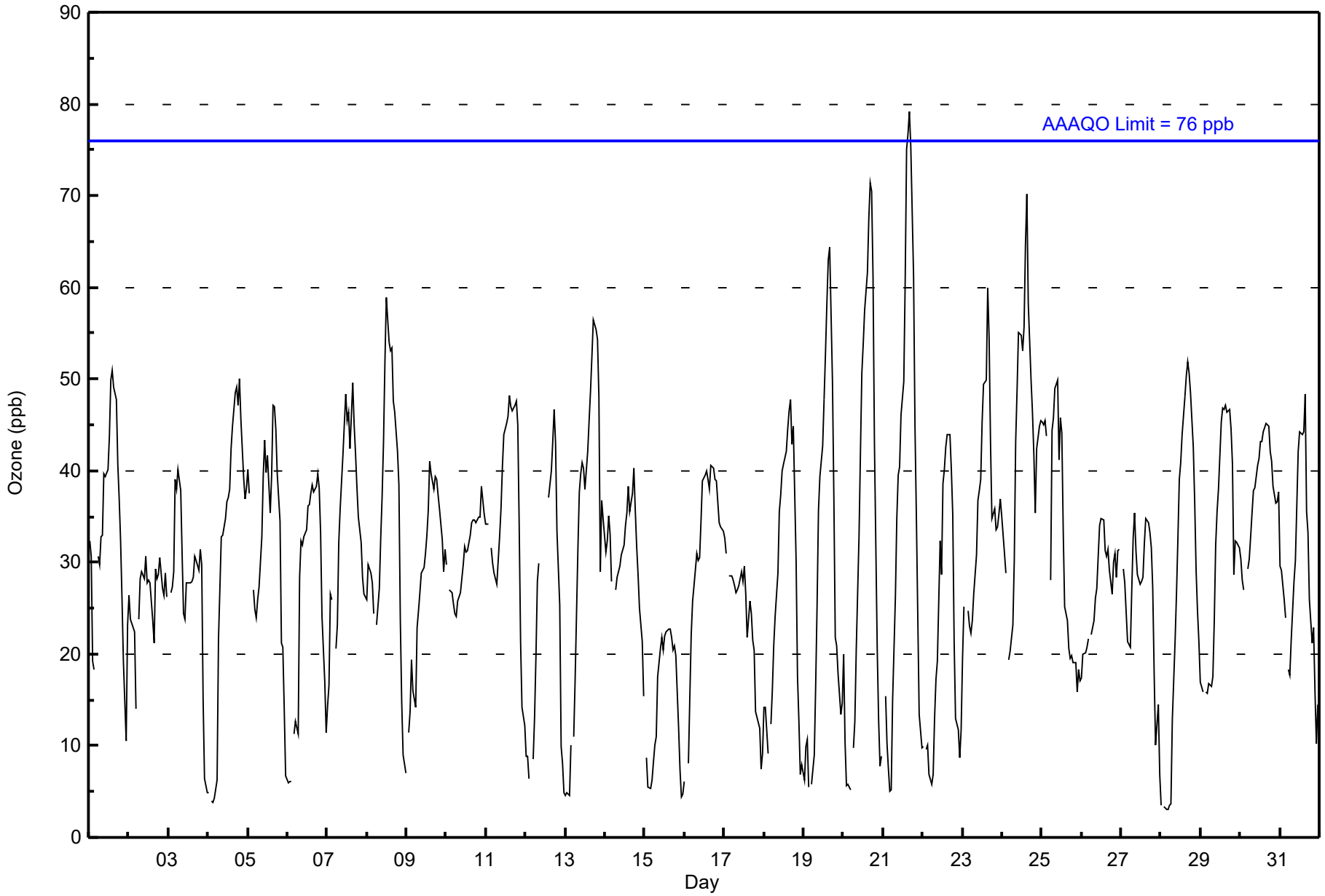
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	32.4	30.6	19.2	18.4	Z	30.6	29.7	32.9	33.0	39.7	39.3	40.1	43.7	49.8	51.0	49.1	47.7	40.7	36.8	32.3	26.1	19.2	10.6	23.1	33.7	51.0																							
2-Jul	26.3	23.8	23.4	22.4	14.0	Z	23.9	28.2	29.0	28.2	30.7	27.7	28.0	27.7	23.7	21.2	29.3	28.2	28.7	30.5	27.1	26.4	28.9	26.3	26.2	30.7																							
3-Jul	Z	26.7	27.3	28.9	39.0	38.0	40.1	37.9	30.9	24.5	23.7	27.7	27.8	28.0	28.4	30.7	30.1	29.1	31.4	29.7	15.1	6.4	4.9	27.6	40.1																								
4-Jul	4.9	Z	4.0	3.8	4.2	6.2	21.7	27.1	32.9	33.0	34.8	36.6	37.1	37.9	42.5	44.9	48.5	49.1	47.2	50.0	45.6	39.2	37.0	38.2	31.6	50.0																							
5-Jul	40.1	37.5	Z	26.9	24.8	23.9	25.9	27.3	32.8	39.5	43.4	39.8	41.7	35.5	39.5	47.1	47.0	44.5	39.7	34.4	21.3	20.8	14.1	6.7	32.8	47.1																							
6-Jul	6.0	6.1	6.1	Z	11.2	12.7	11.2	28.4	32.4	31.9	32.7	33.6	36.2	36.4	37.6	38.4	37.7	38.3	39.7	38.1	33.2	24.1	16.9	11.5	26.1	39.7																							
7-Jul	14.4	16.7	26.6	26.0	Z	20.6	23.1	32.2	35.9	41.7	45.1	48.4	45.4	46.4	42.5	49.6	44.9	41.7	38.1	35.0	32.2	28.4	26.6	26.2	34.3	49.6																							
8-Jul	25.9	29.8	28.9	27.7	24.4	Z	23.2	27.2	32.7	37.2	43.2	51.8	58.8	54.0	53.1	53.5	47.6	46.4	42.0	38.5	23.9	14.7	9.0	7.0	34.8	58.8																							
9-Jul	Z	11.5	13.7	19.4	16.0	14.2	22.9	24.6	26.7	28.8	29.4	30.9	33.0	35.7	41.0	39.6	38.0	39.4	39.1	37.3	35.9	32.5	29.1	31.4	29.1	41.0																							
10-Jul	29.7	Z	27.0	26.6	25.5	24.4	24.1	25.7	26.8	28.2	29.7	31.8	31.1	31.3	33.0	34.3	34.6	34.6	34.4	35.0	35.0	38.3	36.8	35.2	31.0	38.3																							
11-Jul	34.1	34.2	Z	31.5	29.9	28.8	27.7	30.1	32.9	35.8	40.5	44.0	45.2	45.9	48.2	47.0	46.5	47.1	47.7	45.0	34.0	21.4	14.3	12.2	35.8	48.2																							
12-Jul	8.8	8.9	6.5	Z	8.6	13.1	19.8	27.8	29.9	C	C	C	C	C	37.1	40.0	43.1	46.7	43.0	33.3	25.4	9.9	8.1	4.9	23.1	46.7																							
13-Jul	4.5	4.9	4.6	10.1	Z	11.1	17.2	31.6	37.7	39.6	41.0	40.3	38.0	42.1	45.4	48.7	52.4	56.5	55.4	54.3	48.0	29.0	36.7	34.8	34.1	56.5																							
14-Jul	31.2	32.3	35.0	33.1	27.9	Z	27.0	28.4	29.0	29.5	30.9	31.9	34.1	35.3	38.3	35.5	37.5	40.2	35.8	31.7	28.7	25.0	21.4	15.3	31.1	40.2																							
15-Jul	Z	8.6	5.5	5.3	6.2	8.3	10.1	10.9	17.5	20.6	21.8	20.4	22.0	22.5	22.8	22.7	21.9	20.5	20.9	19.8	11.9	7.3	4.5	4.7	14.6	22.8																							
16-Jul	6.2	Z	8.0	15.2	22.1	25.8	27.5	31.0	30.2	30.4	34.4	38.9	39.4	39.9	39.0	37.9	40.5	40.3	39.1	38.9	36.7	34.4	33.9	33.4	31.4	40.5																							
17-Jul	32.7	31.0	Z	28.5	28.6	28.1	27.4	26.6	27.0	27.4	29.0	28.0	29.6	26.5	21.8	25.8	24.4	21.5	20.4	13.7	13.1	11.9	7.4	9.2	23.5	32.7																							
18-Jul	14.2	14.2	9.2	Z	12.3	16.1	20.9	24.1	28.8	35.5	37.3	39.9	40.8	42.1	44.6	46.5	47.7	42.9	44.8	30.1	17.5	12.6	6.9	7.9	27.7	47.7																							
19-Jul	6.3	9.9	10.6	5.5	Z	5.8	9.1	16.7	25.4	35.7	39.4	42.7	47.8	52.7	58.3	63.0	64.3	49.7	37.1	21.8	20.8	17.8	13.4	14.6	29.1	64.3																							
20-Jul	20.0	10.4	5.6	5.8	5.2	Z	9.7	12.6	20.4	33.0	41.9	50.6	53.8	57.5	61.7	67.6	71.4	70.5	61.1	43.1	20.6	12.8	7.8	8.8	32.7	71.4																							
21-Jul	Z	15.4	10.3	7.5	5.0	5.2	14.9	26.3	34.7	39.4	40.4	46.0	49.7	60.6	75.1	76.7	79.1	75.4	61.2	44.8	35.0	24.2	13.4	9.7	37.0	79.1																							
22-Jul	10.0	Z	9.6	10.1	6.9	5.8	6.8	13.0	17.2	19.2	32.4	28.7	38.7	40.1	42.6	43.9	43.9	40.1	35.2	21.4	13.0	11.8	8.7	11.7	22.2	43.9																							
23-Jul	19.5	25.2	Z	24.7	23.1	22.2	23.6	26.6	30.8	36.7	37.9	39.1	45.3	49.5	49.8	59.9	54.4	43.1	34.8	35.8	33.6	33.8	35.2	36.9	35.7	59.9																							
24-Jul	35.0	30.9	28.9	Z	19.3	20.3	23.1	30.2	43.2	48.8	55.1	54.7	53.1	55.6	64.7	70.2	58.3	49.9	46.4	41.8	35.4	42.3	44.9	45.4	43.4	70.2																							
25-Jul	45.3	45.0	45.5	43.8	Z	28.0	44.4	45.7	49.0	49.9	41.2	45.8	44.1	33.4	25.1	23.6	20.6	19.5	19.8	19.1	19.0	15.9	18.3	17.0	33.0	49.9																							
26-Jul	17.3	19.9	20.1	20.7	21.7	Z	22.2	23.6	26.1	27.1	30.7	34.0	34.8	34.7	31.2	30.6	31.4	29.2	26.6	30.1	31.0	28.4	31.3	31.4	27.6	34.8																							
27-Jul	Z	29.3	27.7	24.6	21.4	20.8	27.0	32.6	35.4	31.3	28.7	27.7	27.9	28.4	32.1	34.8	34.4	33.3	31.6	27.1	18.0	10.1	14.5	6.9	26.3	35.4																							
28-Jul	3.6	Z	3.3	3.0	3.0	3.5	3.7	12.8	21.6	26.7	32.6	39.1	40.9	43.9	48.1	50.4	51.8	50.7	48.4	42.5	36.6	29.1	24.7	21.4	27.9	51.8																							
29-Jul	17.0	15.9	Z	15.9	15.7	16.7	16.5	17.6	23.7	31.8	35.6	38.0	45.2	46.8	46.7	47.1	46.4	46.7	44.5	40.8	28.7	32.4	32.2	31.6	31.9	47.1																							
30-Jul	30.4	28.0	27.0	Z	29.3	30.4	32.7	35.4	37.8	38.1	40.6	41.4	43.2	43.2	44.3	45.2	45.1	44.9	42.1	41.0	38.3	36.4	36.6	37.6	37.8	45.2																							
31-Jul	29.6	29.1	25.9	24.0	Z	18.3	17.7	21.5	28.0	30.2	36.1	42.1	44.2	43.9	44.3	48.4	35.6	33.3	25.9	21.2	22.9	16.1	10.2	14.4	28.8	48.4																							
																								21.0	22.1	17.7	19.6	17.8	18.4	21.8	26.3	30.3	33.3	36.0	38.1	40.0	40.9	42.4	44.2	43.8	41.8	38.6	34.2	28.3	23.3	20.6	20.0	Diurnal Average	
																								45.3	45.0	45.5	43.8	39.0	38.0	44.4	45.7	49.0	49.9	55.1	54.7	58.8	60.6	75.1	76.7	79.1	75.4	61.2	54.3	48.0	42.3	44.9	45.4	Diurnal Maximum	

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 76 ppb



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Wapasu - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Wapasu - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	162	22.88	22.88
21 - 50	507	71.61	94.49
51 - 82	39	5.51	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Wapasu - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	7	3	5	10	18	29	47	14	5	7	3	2	1	2	1	8	162
21 - 50	72	21	15	9	12	33	66	61	44	27	36	16	15	21	21	37	506
51 - 82	3	1	0	1	0	0	1	0	1	2	3	3	7	8	6	3	39
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	82	25	20	20	30	62	114	75	50	36	42	21	23	31	28	48	707

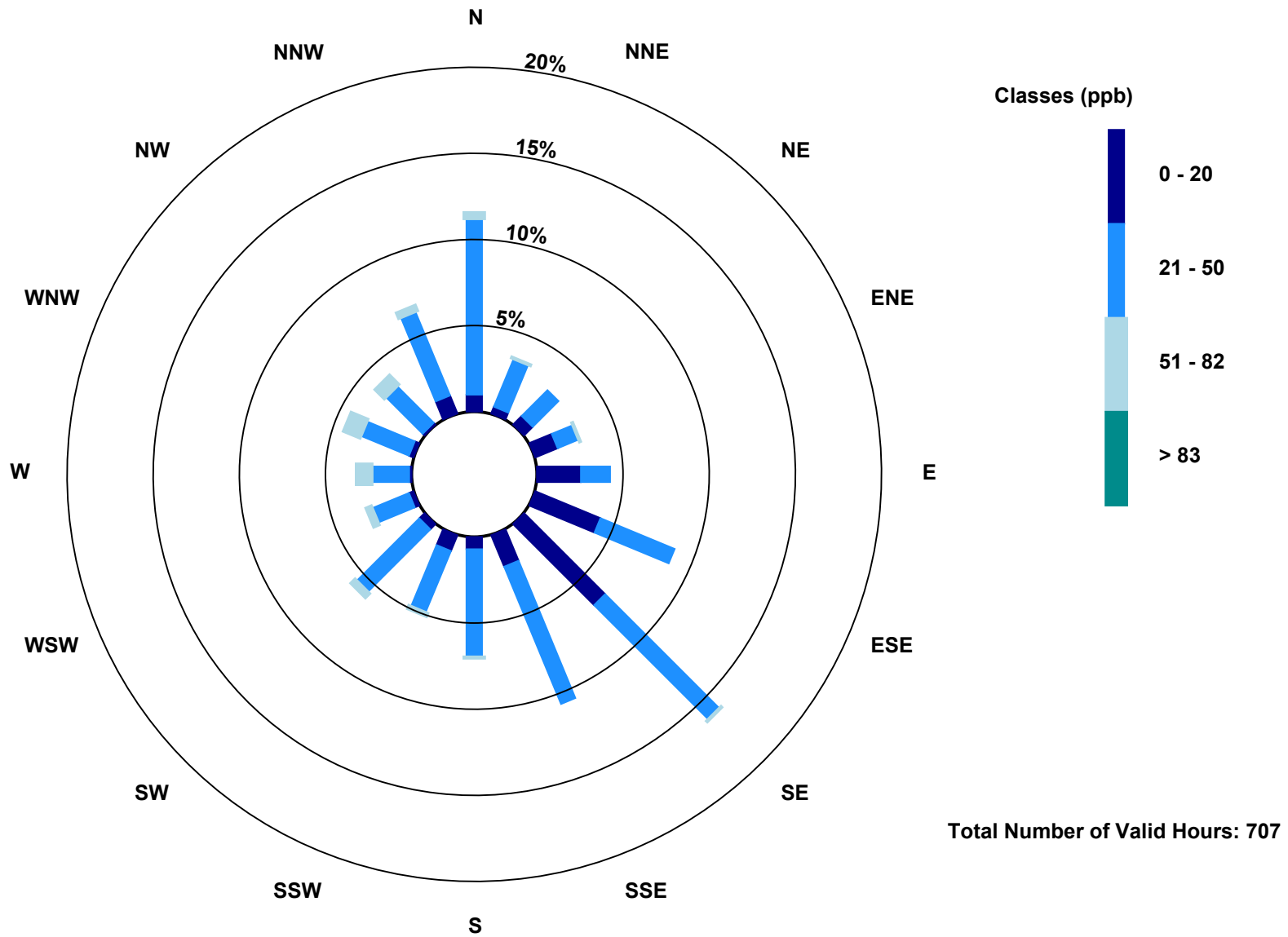
Total Number of Valid Hours: 707

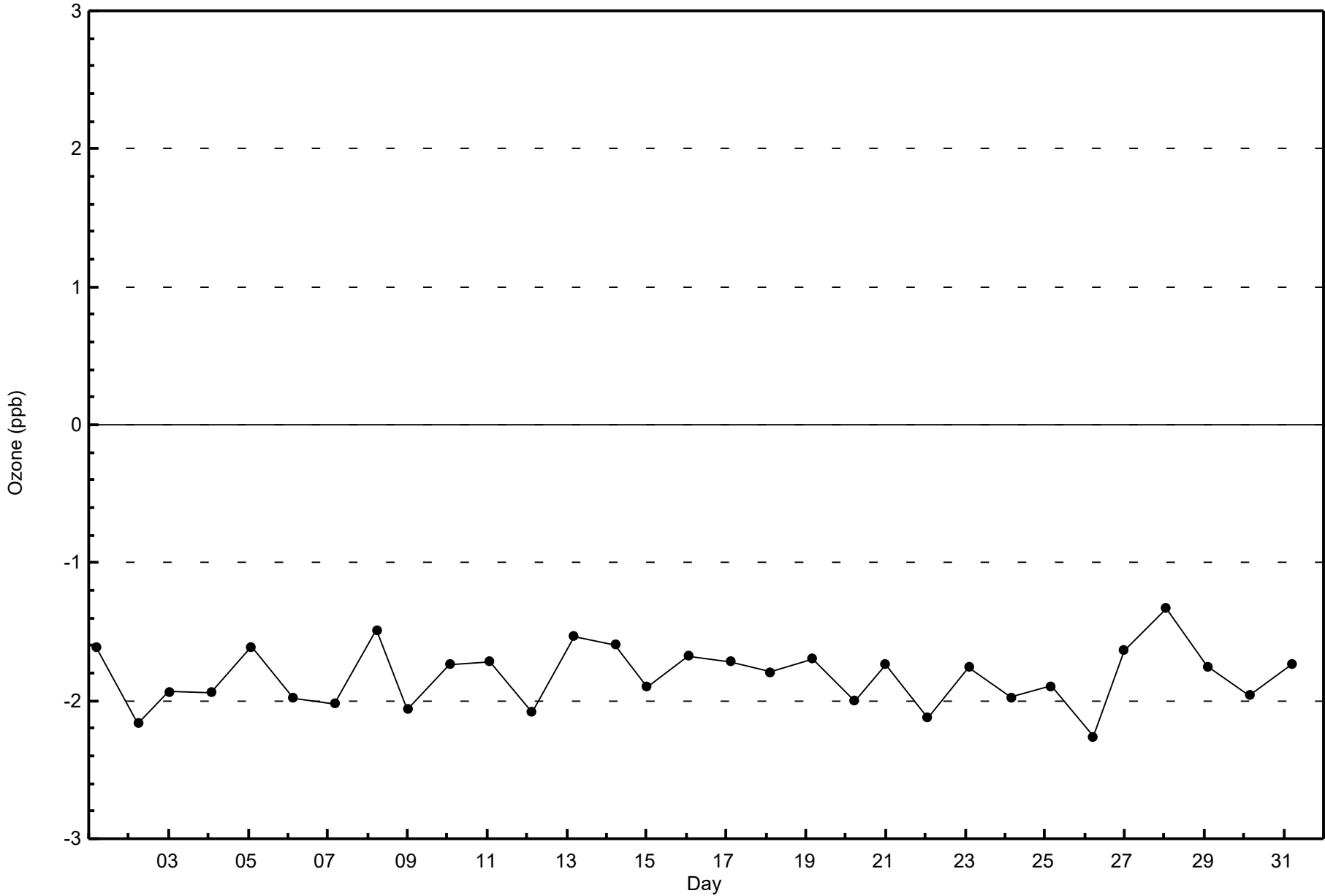
Total Number of Hours: 744

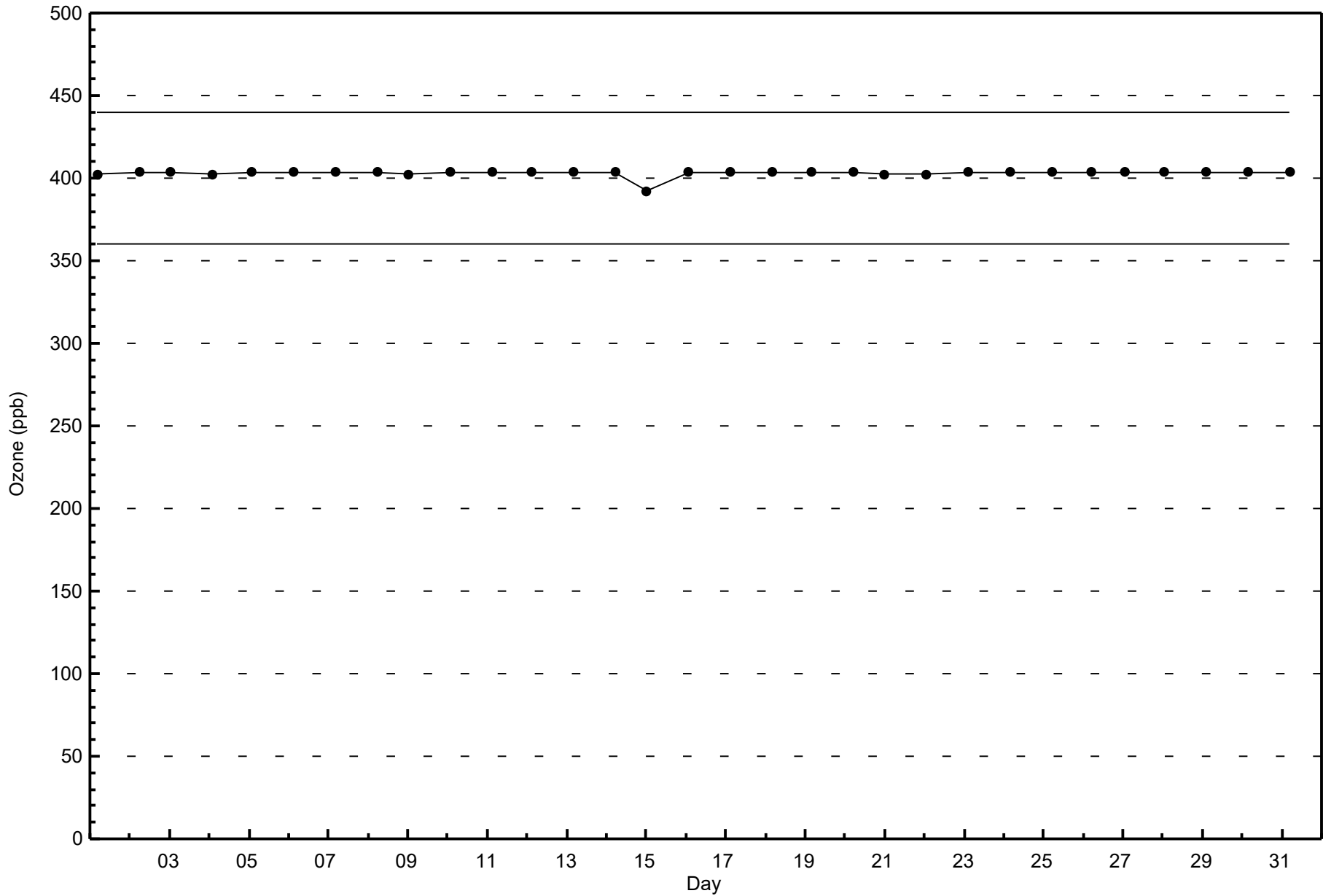


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Ozone (O₃) - ppb
Wapasu









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

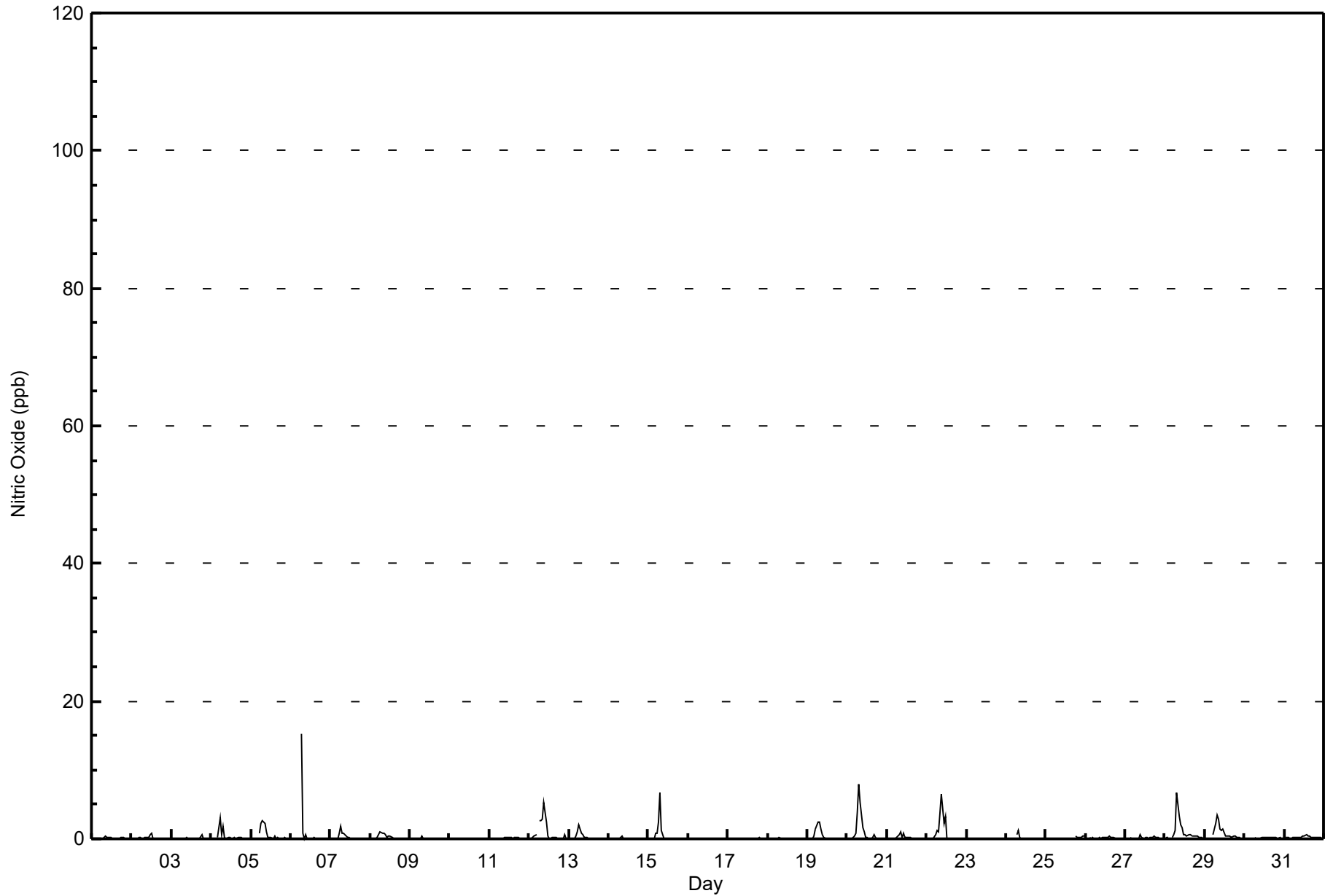
Wapasu - July 2023

Maximum Value: 15.3 ppb on Jul 6 07:00		Maximum Daily Average: 1.0 ppb on Jul 20		Hours in Service: 744																							
Minimum Value: 0.0 ppb on Jul 2 00:00		Minimum Daily Average: 0.0 ppb on Jul 16		Hours of Data: 705																							
Maximum Diurnal Average: 1.3 ppb at hour 8		Minimum Diurnal Average: 0.0 ppb at hour 2		Hours of Missing Data: 39																							
Monthly Average: 0.28 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.2 P ₉₀ = 0.6 P ₉₉ = 3.9		Hours of Calibration: 39																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.4	0.3	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.4	
2-Jul	0.0	Z	0.0	0.0	0.1	0.2	0.0	0.0	0.1	0.2	0.2	0.6	0.9	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9
3-Jul	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	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	0.5
4-Jul	0.0	0.0	0.0	Z	0.3	3.0	0.7	1.7	0.2	0.0	0.2	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
5-Jul	0.0	0.0	0.0	0.0	Z	0.8	2.2	2.6	2.3	1.0	0.3	0.1	0.2	0.1	0.4	0.0	0.1	0.1	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	2.6
6-Jul	0.0	0.0	0.0	0.0	0.0	Z	15.3	0.7	0.0	0.7	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.3
7-Jul	Z	0.0	0.0	0.0	0.0	0.8	1.8	0.8	0.8	0.4	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	0.0	0.0	1.8
8-Jul	0.0	Z	0.0	0.0	0.1	0.5	1.0	0.9	0.7	0.6	0.2	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.0
9-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
10-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.1	0.0	0.0	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.3
12-Jul	0.0	0.0	0.3	0.3	0.6	Z	2.7	2.7	2.9	5.3	2.5	0.4	0.1	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.6	0.1	0.1	0.1	0.0	5.3
13-Jul	Z	0.1	0.1	0.1	0.4	1.0	2.0	0.8	0.5	0.3	0.2	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	0.0	0.0	2.0
14-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.2	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	0.3
15-Jul	0.0	0.0	Z	0.0	0.8	0.8	2.5	6.7	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7
16-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2
18-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
19-Jul	Z	0.0	0.0	0.0	0.4	1.5	2.4	2.4	1.4	0.5	0.2	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4
20-Jul	0.0	Z	0.0	0.0	0.3	0.8	3.9	7.9	5.4	1.6	0.9	0.3	0.1	0.1	0.0	0.2	0.6	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9
21-Jul	0.0	0.0	Z	0.0	0.0	0.1	0.2	0.6	0.9	0.2	0.8	0.1	0.1	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	0.9
22-Jul	0.0	0.0	0.0	Z	0.0	0.6	1.3	1.1	3.6	6.5	2.2	3.3	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	6.5
23-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.7	1.2	0.3	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	1.2
25-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C	C	C	C	C	C	C	C	C	C	0.4	0.3	0.2	0.3	0.4	0.5	0.5
26-Jul	0.6	Z	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.6
27-Jul	0.1	0.0	Z	0.1	0.1	0.0	0.0	0.0	0.0	0.7	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.3	0.2	0.2	0.2	0.1	0.0	0.1	0.0	0.7
28-Jul	0.1	0.1	0.1	Z	0.3	0.6	1.2	6.6	3.2	2.0	1.5	0.6	0.6	0.4	0.5	0.7	0.4	0.4	0.5	0.4	0.2	0.1	0.1	0.0	0.0	6.6	
29-Jul	0.1	0.1	0.1	0.1	Z	0.6	2.3	3.4	2.8	1.4	1.3	1.4	0.5	0.5	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.1	0.0	0.0	3.4	
30-Jul	0.0	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	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.2
31-Jul	Z	0.2	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.1	0.2	0.4	0.4	0.5	0.5	0.3	0.3	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.5
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Wapasu - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Wapasu - July 2023**

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

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Wapasu - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	83	25	19	20	28	60	110	75	51	37	41	21	23	32	27	52	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	83	25	19	20	28	60	110	75	51	37	41	21	23	32	27	52	704

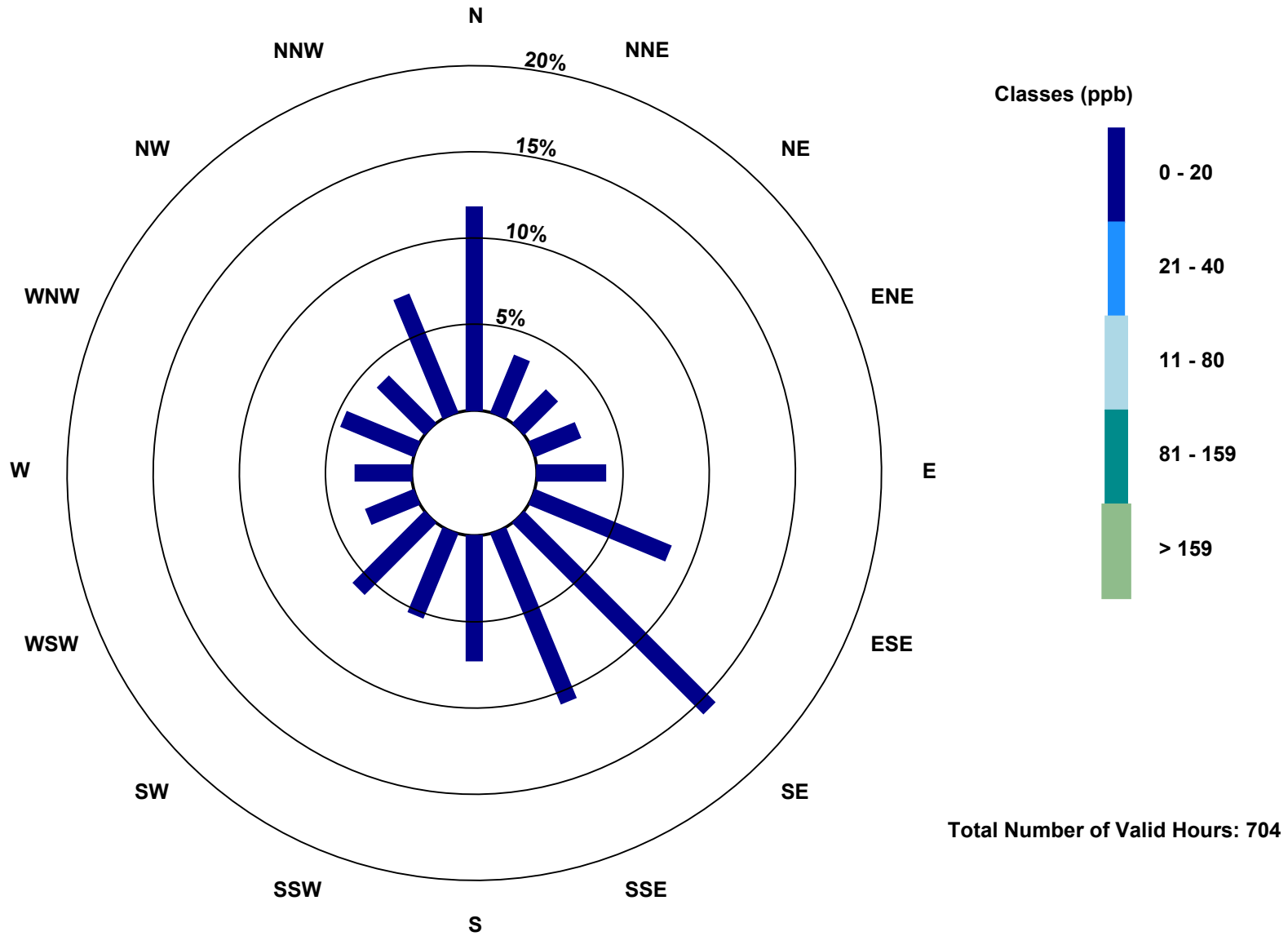
Total Number of Valid Hours: 704

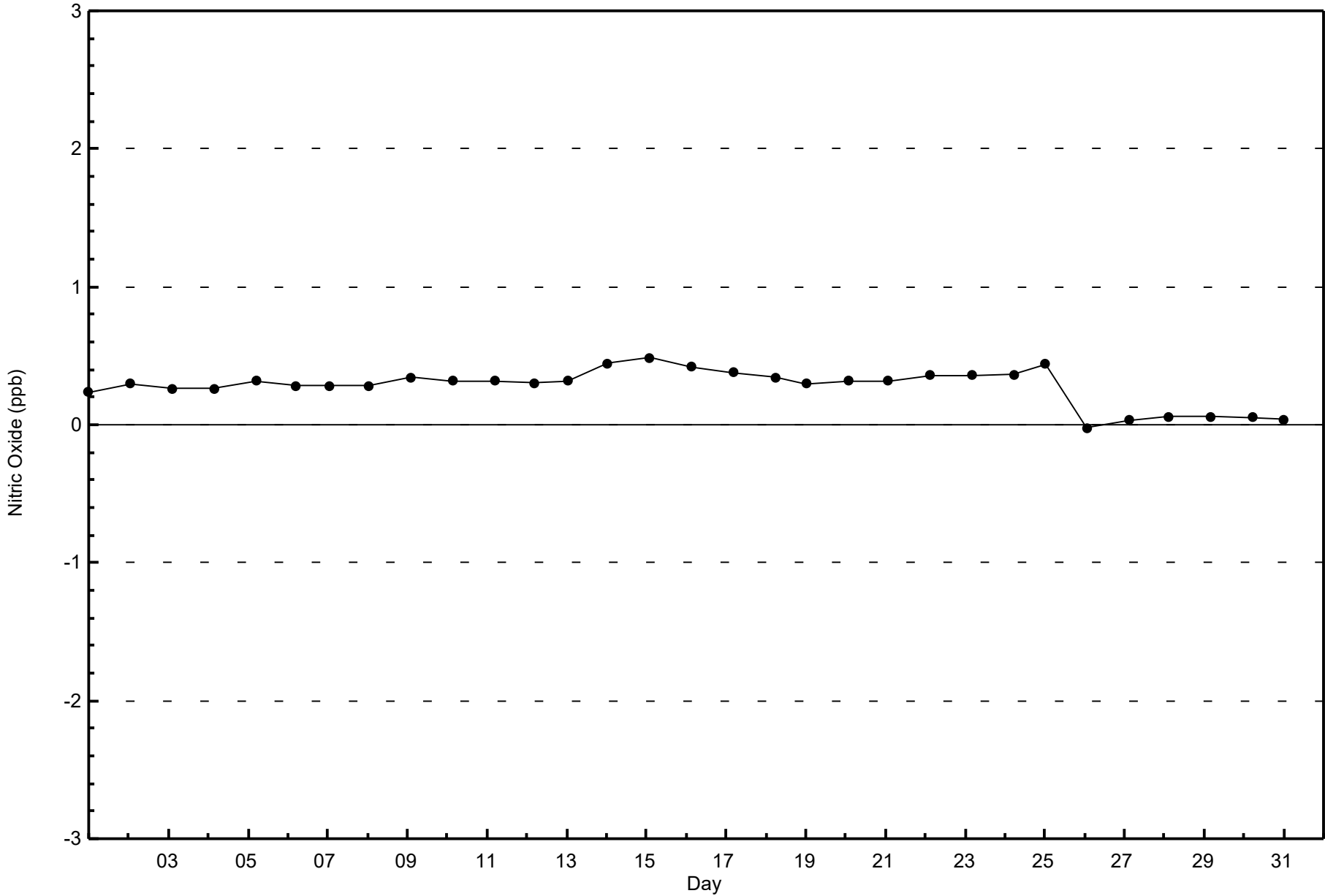
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Wapasu

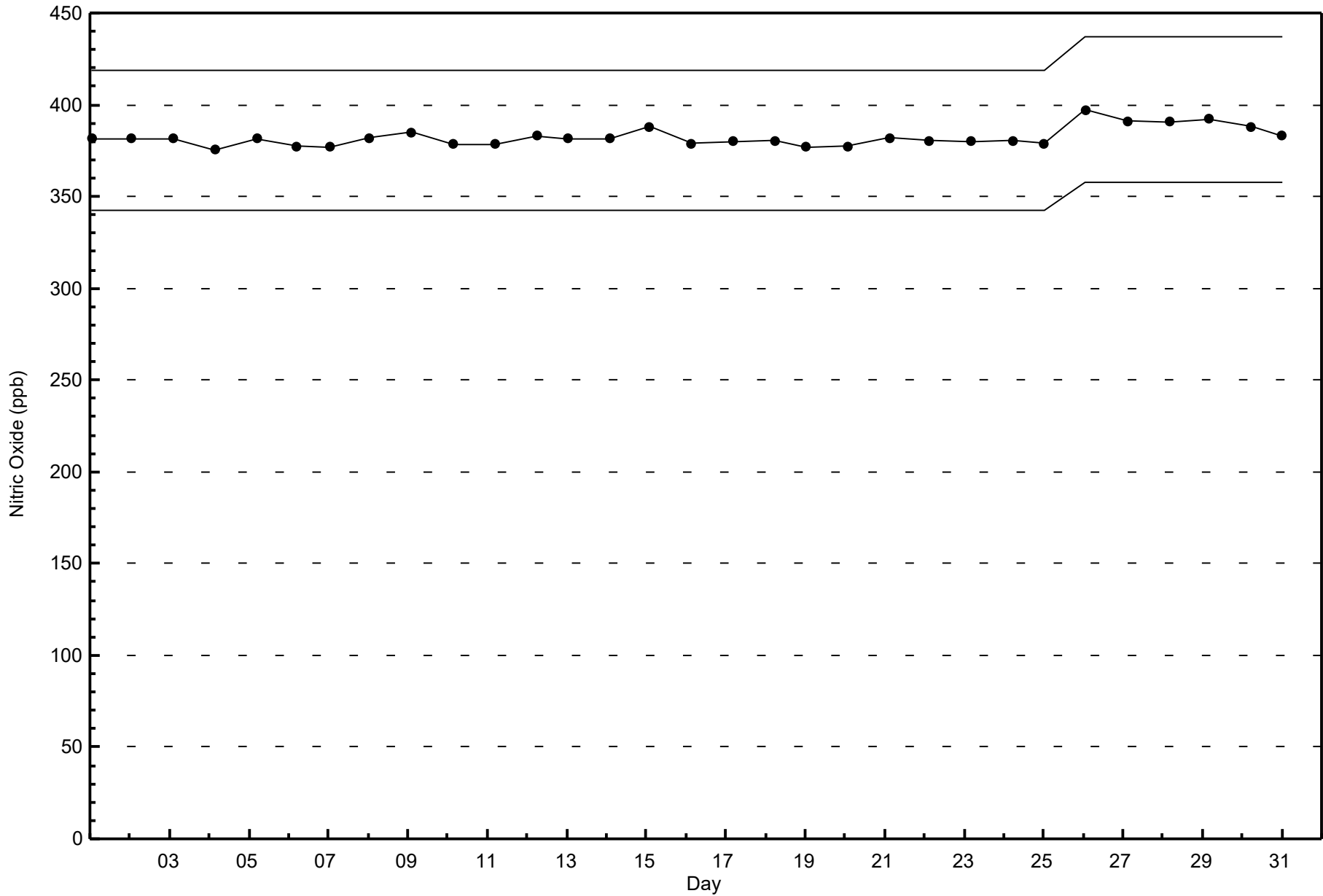






Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Wapasu - July 2023





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

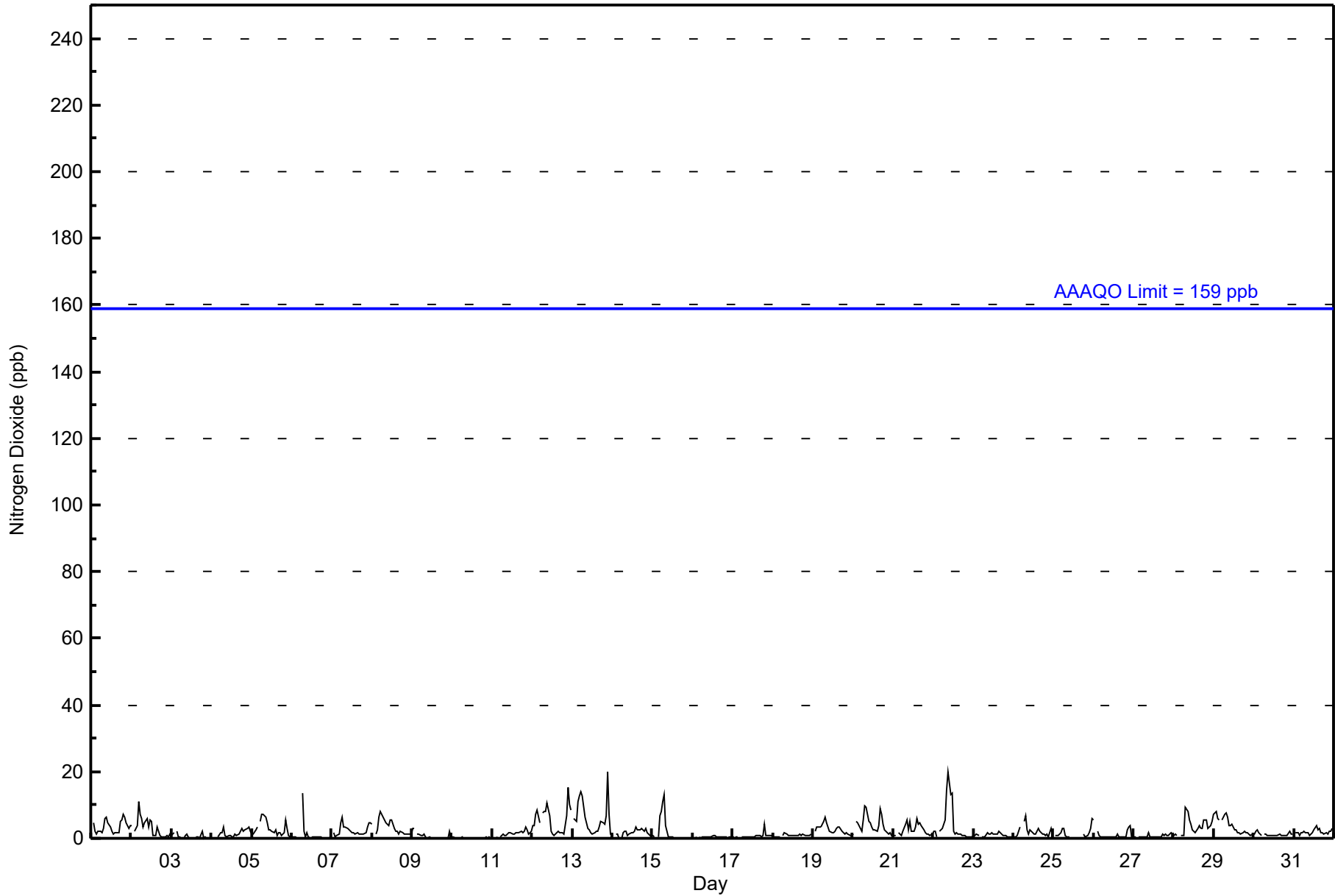
Wapasu - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		744																																								
Maximum Value: 20.0 ppb on Jul 22 10:00		Maximum Daily Average: 6.1 ppb on Jul 13		Minimum Value: 0.0 ppb on Jul 15 16:00		Minimum Daily Average: 0.2 ppb on Jul 10		Hours of Data: 705																																								
Maximum Diurnal Average: 3.8 ppb at hour 7		Minimum Diurnal Average: 1.3 ppb at hour 14		Hours of Missing Data: 39		Hours of Calibration: 39		Percent Operational Time: 100.0																																								
Monthly Average: 2.20 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.2 Q ₁ = 0.6 Median = 1.3 Q ₃ = 2.8 P ₉₀ = 5.4 P ₉₉ = 13.2																																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	Z	4.7	2.3	1.4	2.1	2.0	1.9	3.1	5.9	6.5	4.8	3.6	2.1	1.4	1.5	1.8	1.9	4.9	5.4	7.4	6.2	4.5	2.8	3.8	3.6	7.4																						
2-Jul	4.0	Z	2.3	3.8	11.0	7.2	5.9	3.4	4.8	6.0	3.6	5.7	5.2	0.8	0.8	3.2	2.2	0.9	0.6	0.5	0.6	1.0	0.6	1.1	3.3	11.0																						
3-Jul	1.0	1.9	Z	2.1	0.5	0.3	0.2	0.2	0.8	1.1	0.4	0.2	0.2	0.2	0.2	0.3	0.4	0.1	2.1	0.2	0.3	0.2	0.2	0.2	0.6	2.1																						
4-Jul	0.1	0.1	0.1	Z	0.4	1.9	1.6	3.6	0.9	0.3	0.7	0.8	0.5	0.5	1.2	1.0	1.4	2.0	2.8	2.2	2.4	2.8	3.2	2.1	1.4	3.6																						
5-Jul	1.3	1.2	2.6	3.4	Z	5.1	7.0	7.2	6.2	4.8	2.6	2.7	2.2	1.7	2.4	1.0	1.6	1.5	1.0	1.7	5.6	3.0	0.8	0.5	2.9	7.2																						
6-Jul	0.4	0.3	0.3	0.2	0.2	Z	13.6	2.2	0.4	1.8	0.3	0.2	0.4	0.5	0.6	0.5	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.9	1.1	13.6																						
7-Jul	Z	1.5	0.6	0.7	1.2	4.8	6.3	3.5	3.3	2.9	2.5	2.1	1.5	1.5	1.2	1.6	1.3	1.3	1.3	1.4	1.8	3.3	4.5	4.5	2.4	6.3																						
8-Jul	4.2	Z	1.4	2.4	6.5	8.0	7.2	5.5	4.8	4.4	3.8	5.3	5.4	2.8	2.2	2.0	1.4	2.0	1.6	1.3	1.3	1.3	1.2	1.4	3.4	8.0																						
9-Jul	2.8	3.0	Z	1.2	1.3	0.9	0.7	1.3	0.5	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.2	0.3	0.7	3.0																						
10-Jul	0.3	0.3	0.2	Z	0.1	0.1	0.4	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.4																					
11-Jul	0.2	0.2	0.2	0.3	Z	0.6	1.2	1.0	1.0	1.2	1.6	1.5	1.4	1.4	1.6	1.8	1.9	2.3	1.8	2.2	3.5	2.7	1.4	2.1	1.4	3.5																						
12-Jul	3.9	3.7	7.0	8.5	4.7	Z	7.8	8.0	7.9	10.8	6.6	2.0	1.1	0.7	1.1	2.2	1.9	1.8	1.5	1.2	6.9	15.4	10.3	8.4	5.4	15.4																						
13-Jul	Z	5.9	4.9	11.0	12.7	13.9	12.8	6.5	4.8	3.1	2.5	1.9	1.1	1.5	2.1	2.3	3.3	4.9	4.5	4.4	6.6	19.9	7.4	1.2	6.1	19.9																						
14-Jul	0.7	Z	1.1	1.2	0.2	0.1	1.9	2.2	2.1	0.9	1.3	1.5	1.7	2.1	3.4	2.7	2.6	2.9	2.4	2.2	2.8	1.7	0.9	0.8	1.7	3.4																						
15-Jul	0.8	0.5	Z	0.3	6.8	8.0	11.0	13.2	4.0	0.5	0.4	0.5	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	2.0	13.2																						
16-Jul	0.1	0.1	0.4	Z	0.3	0.2	0.3	0.3	0.5	0.3	0.3	0.6	0.7	0.8	0.6	0.5	0.6	0.5	0.4	0.3	0.3	0.2	0.3	0.3	0.4	0.8																						
17-Jul	0.3	0.2	0.3	0.3	Z	0.3	0.4	0.6	0.6	0.5	0.4	0.5	0.5	0.4	0.7	0.8	0.8	0.5	0.8	4.3	0.7	0.9	0.9	0.7	0.7	4.3																						
18-Jul	0.6	0.6	0.3	0.4	0.4	Z	0.7	1.6	1.2	0.8	0.7	0.7	0.7	0.7	0.8	0.8	1.2	1.0	1.3	0.9	0.8	0.7	0.8	1.1	0.8	1.6																						
19-Jul	Z	2.2	3.4	3.2	3.3	3.4	4.9	6.4	4.8	3.2	2.1	1.5	1.6	2.3	2.8	3.5	3.3	2.2	1.5	1.1	1.6	1.3	0.9	0.9	2.7	6.4																						
20-Jul	1.4	Z	4.9	4.5	2.9	2.0	5.7	9.6	9.4	5.0	4.6	3.2	2.4	2.4	2.3	3.7	8.8	7.3	4.4	2.4	1.7	1.4	1.5	1.0	4.0	9.6																						
21-Jul	0.9	1.0	Z	1.5	1.1	0.7	2.0	4.1	5.4	2.4	5.0	2.1	2.3	3.5	5.9	4.4	4.5	3.8	2.5	1.6	1.2	1.1	0.9	1.2	2.6	5.9																						
22-Jul	2.2	2.0	0.6	Z	2.1	3.0	4.1	5.5	14.6	20.0	13.2	13.6	2.0	1.4	1.5	1.3	1.1	1.0	0.8	0.7	0.6	0.5	0.5	0.4	4.0	20.0																						
23-Jul	0.7	0.8	1.1	0.8	Z	0.5	0.4	0.6	1.6	1.4	1.4	1.5	1.4	1.3	1.3	2.0	1.9	1.3	0.9	0.7	0.6	0.6	0.5	0.5	1.0	2.0																						
24-Jul	0.5	0.6	0.8	2.1	3.4	Z	4.9	6.9	2.7	1.4	2.7	1.9	1.1	1.4	2.2	2.9	2.0	1.2	1.4	0.9	1.2	0.6	2.9	0.9	2.0	6.9																						
25-Jul	Z	0.7	0.7	0.7	1.9	2.9	3.1	0.8	0.6	0.6	C	C	C	C	C	C	C	C	1.2	0.6	0.7	1.8	3.0	6.1	--	6.1																						
26-Jul	5.3	Z	2.0	0.8	0.5	0.4	0.4	0.5	0.6	0.3	0.5	0.5	0.6	0.6	1.1	0.4	0.4	0.4	0.5	2.5	3.2	4.0	0.3	1.1	5.3																							
27-Jul	0.3	0.4	Z	0.4	0.3	0.4	0.4	0.3	0.4	1.7	0.6	0.4	0.4	0.4	0.4	0.4	0.5	1.1	0.8	1.4	0.9	0.9	1.5	1.2	0.7	1.7																						
28-Jul	0.8	1.3	0.9	Z	0.9	0.8	0.8	9.5	8.2	5.4	4.3	2.4	2.3	1.8	3.0	3.8	3.0	3.1	5.7	5.3	3.1	3.2	4.0	5.2	3.4	9.5																						
29-Jul	7.4	7.9	6.1	5.6	Z	5.4	7.4	7.6	6.5	3.9	3.8	4.3	2.6	2.6	1.8	1.8	1.3	1.8	2.2	1.9	1.6	1.1	1.0	1.1	3.8	7.9																						
30-Jul	1.3	2.3	2.4	1.5	0.9	Z	1.4	1.1	1.0	0.9	1.0	0.9	0.9	0.9	0.9	1.1	0.9	0.8	0.8	0.7	0.9	2.1	1.4	1.2	1.2	2.4																						
31-Jul	Z	1.7	1.7	0.8	1.9	1.5	2.0	1.8	1.8	0.9	1.1	1.8	2.5	3.8	2.6	3.0	1.9	1.6	1.2	1.5	1.4	2.1	2.2	3.0	1.9	3.8																						
																								1.7	1.7	1.9	2.3	2.6	2.9	3.8	3.8	3.5	3.0	2.4	2.1	1.5	1.3	1.6	1.7	1.8	1.8	1.7	1.6	1.9	2.5	2.0	1.7	Diurnal Average
																								7.4	7.9	7.0	11.0	12.7	13.9	13.6	13.2	14.6	20.0	13.2	13.6	5.4	3.8	5.9	4.4	8.8	7.3	5.7	7.4	6.9	19.9	10.3	8.4	Diurnal Maximum
Z - zerospan C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																																																



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Wapasu - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Wapasu - July 2023

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

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Wapasu - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	83	25	19	20	28	60	110	75	51	37	41	21	23	32	27	52	704
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	83	25	19	20	28	60	110	75	51	37	41	21	23	32	27	52	704

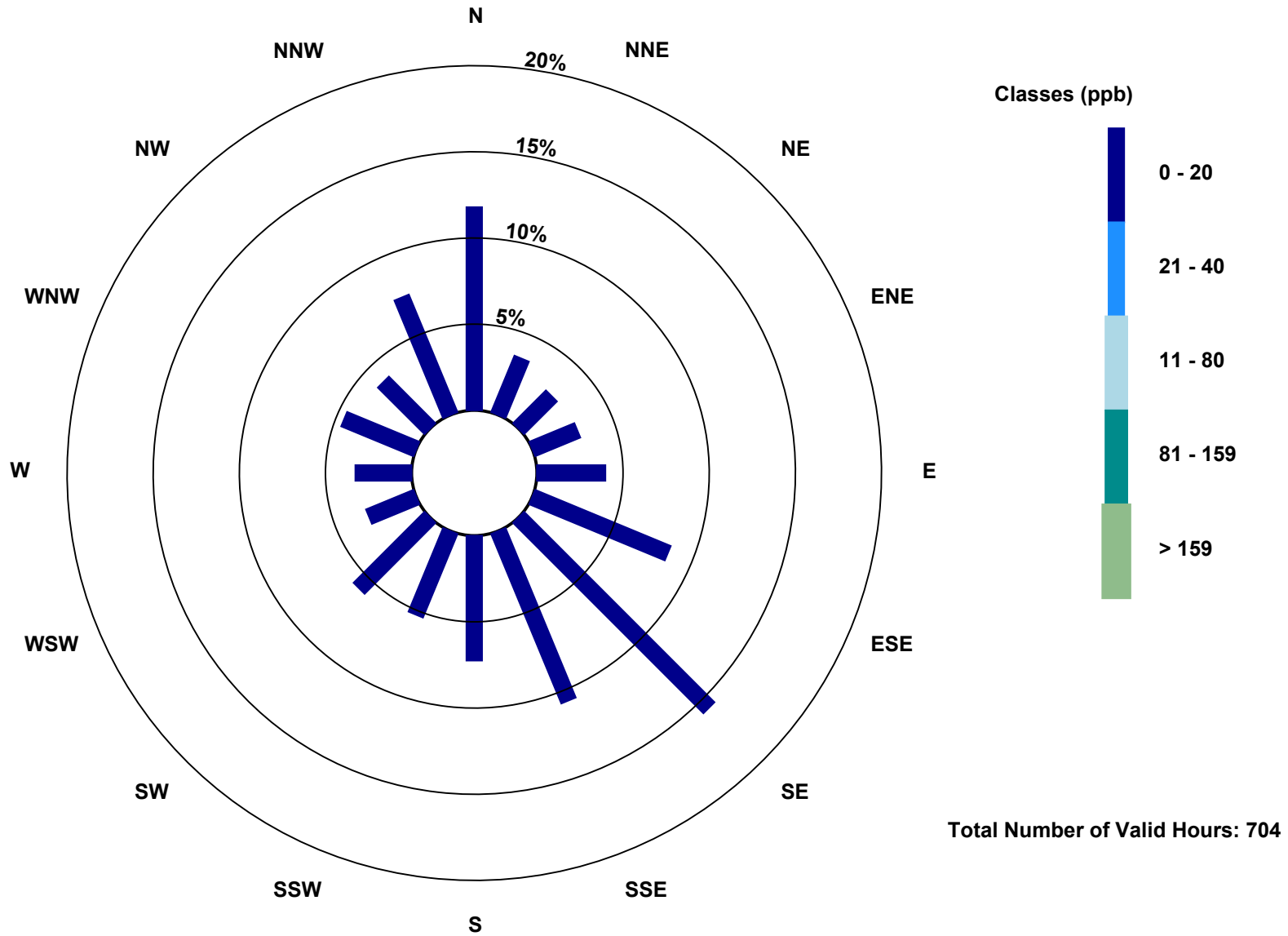
Total Number of Valid Hours: 704

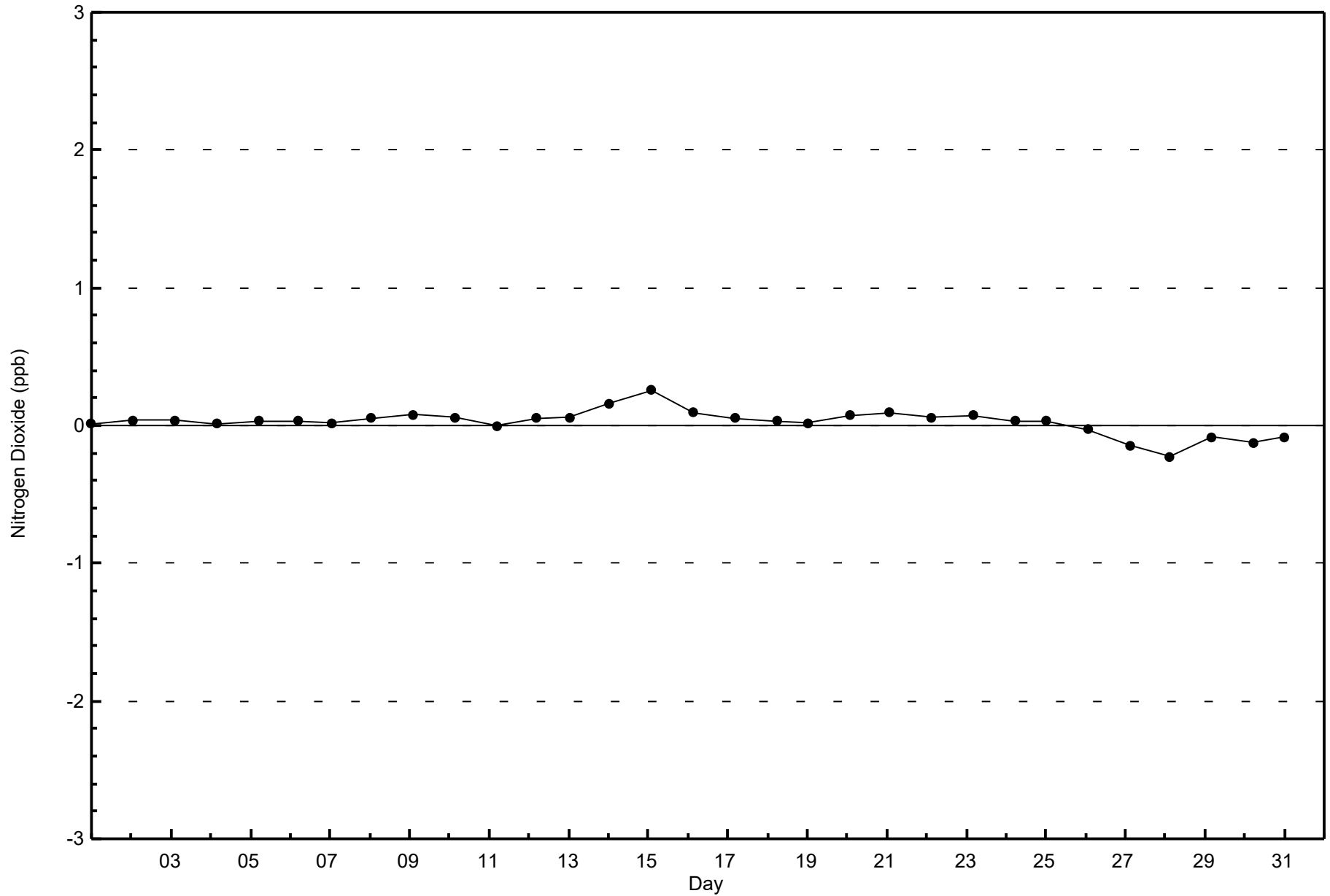
Total Number of Hours: 744

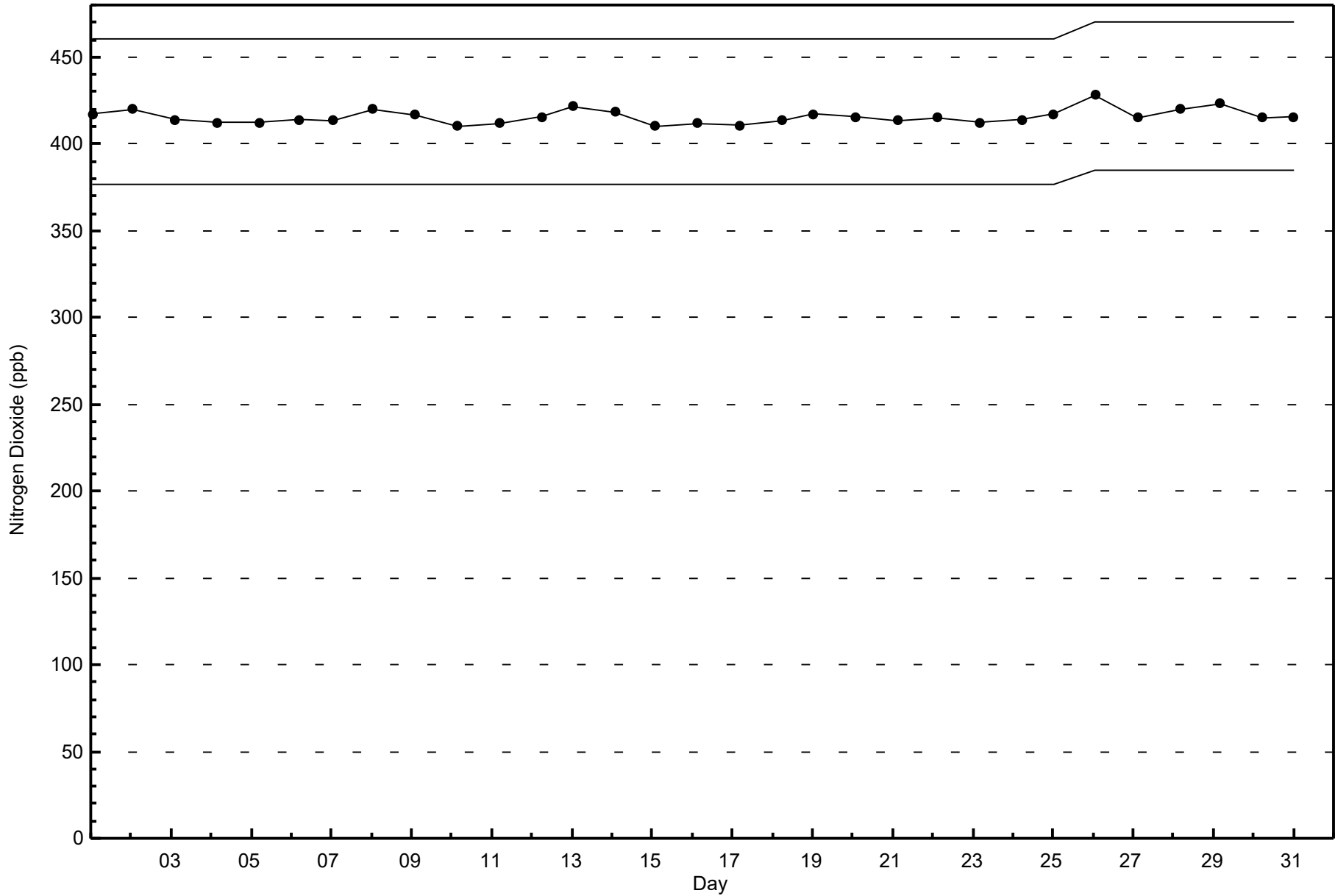


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Wapasu









Wood Buffalo Environmental Association
Summary of Hour Averages

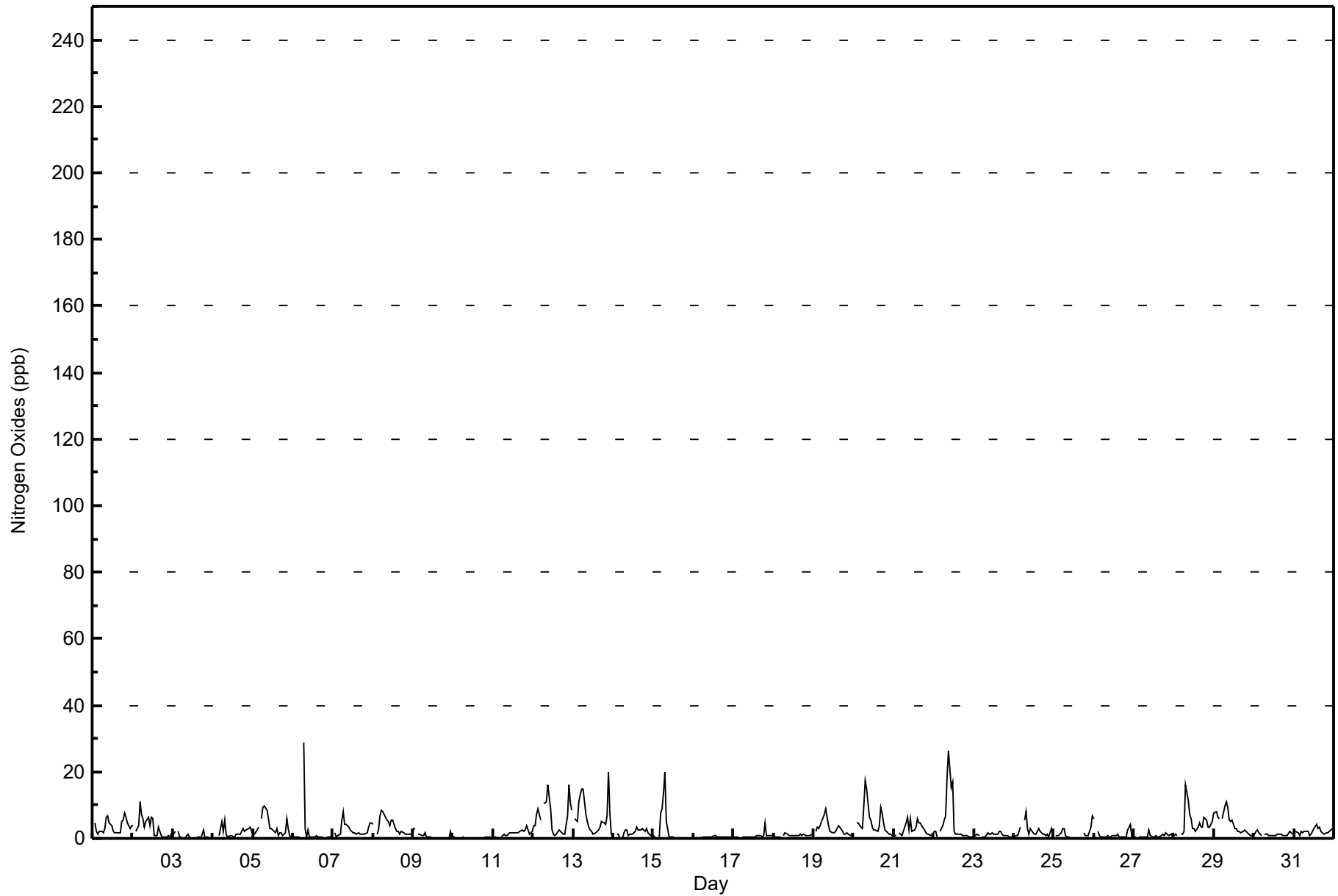
Nitrogen Oxides (NO_x) - ppb
Wapasu - July 2023

Maximum Value: 28.9 ppb on Jul 6 07:00																				Maximum Daily Average: 6.3 ppb on Jul 13					Hours in Service: 744				
Minimum Value: 0.0 ppb on Jul 16 00:00																				Minimum Daily Average: 0.2 ppb on Jul 10					Hours of Data: 705				
Maximum Diurnal Average: 5.1 ppb at hour 8																				Minimum Diurnal Average: 1.4 ppb at hour 14					Hours of Missing Data: 39				
Monthly Average: 2.49 ppb																				Percentiles: P ₁ = 0.0 P ₁₀ = 0.2 Q ₁ = 0.6 Median = 1.4 Q ₃ = 2.9 P ₉₀ = 6.0 P ₉₉ = 16.1					Hours of Calibration: 39				
																				Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Jul	Z	4.7	2.3	1.4	2.2	2.1	1.9	3.2	6.3	6.8	4.9	3.7	2.2	1.5	1.5	1.8	1.9	5.1	5.6	7.5	6.2	4.5	2.8	3.8	3.6	7.5			
2-Jul	4.0	Z	2.3	3.8	11.1	7.4	5.9	3.4	4.9	6.2	3.8	6.3	6.1	0.8	0.8	3.3	2.3	0.9	0.6	0.5	0.6	1.0	0.6	1.1	3.4	11.1			
3-Jul	1.0	1.9	Z	2.1	0.5	0.3	0.2	0.2	0.8	1.3	0.4	0.2	0.2	0.2	0.2	0.3	0.4	0.1	2.6	0.2	0.3	0.2	0.2	0.2	0.6	2.6			
4-Jul	0.1	0.1	0.1	Z	0.7	4.9	2.3	5.3	1.1	0.3	0.9	0.9	0.5	0.5	1.3	1.1	1.5	2.2	3.0	2.2	2.4	2.8	3.2	2.1	1.7	5.3			
5-Jul	1.3	1.2	2.6	3.4	Z	5.9	9.2	9.8	8.5	5.8	2.9	2.8	2.4	1.8	2.8	1.0	1.7	1.6	1.0	1.7	5.8	3.0	0.8	0.5	3.4	9.8			
6-Jul	0.4	0.3	0.3	0.2	0.2	Z	28.9	2.9	0.4	2.5	0.3	0.2	0.5	0.6	0.7	0.6	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.9	1.8	28.9			
7-Jul	Z	1.5	0.6	0.7	1.2	5.6	8.1	4.3	4.1	3.3	2.6	2.2	1.6	1.6	1.3	1.7	1.4	1.4	1.4	1.4	1.8	3.3	4.5	4.5	2.6	8.1			
8-Jul	4.2	Z	1.4	2.4	6.6	8.5	8.2	6.4	5.5	5.0	4.0	5.6	5.7	2.9	2.3	2.1	1.5	2.1	1.7	1.3	1.3	1.3	1.2	1.4	3.6	8.5			
9-Jul	2.8	3.0	Z	1.2	1.3	0.9	0.7	1.6	0.5	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.2	0.3	0.7	3.0			
10-Jul	0.3	0.3	0.2	Z	0.1	0.1	0.4	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.4		
11-Jul	0.2	0.2	0.2	0.3	Z	0.6	1.3	1.0	1.0	1.4	1.9	1.6	1.5	1.5	1.7	1.9	2.0	2.5	1.9	2.3	3.6	2.7	1.4	2.1	1.5	3.6			
12-Jul	3.9	3.7	7.3	8.8	5.3	Z	10.5	10.7	10.8	16.1	9.1	2.4	1.2	0.8	1.2	2.4	2.0	1.8	1.5	1.2	6.9	16.0	10.4	8.5	6.2	16.1			
13-Jul	Z	6.0	5.0	11.1	13.1	14.9	14.8	7.3	5.3	3.4	2.7	2.1	1.2	1.6	2.2	2.4	3.4	4.9	4.5	4.4	6.6	19.9	7.4	1.2	6.3	19.9			
14-Jul	0.7	Z	1.1	1.2	0.2	0.1	1.9	2.4	2.4	0.9	1.3	1.5	1.7	2.1	3.4	2.7	2.6	2.9	2.4	2.2	2.8	1.7	0.9	0.8	1.7	3.4			
15-Jul	0.8	0.5	Z	0.3	7.6	8.8	13.5	19.9	5.3	0.5	0.4	0.5	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	2.6	19.9			
16-Jul	0.1	0.1	0.4	Z	0.3	0.2	0.3	0.3	0.5	0.3	0.3	0.6	0.7	0.8	0.6	0.5	0.6	0.5	0.4	0.3	0.3	0.2	0.3	0.3	0.4	0.8			
17-Jul	0.3	0.2	0.3	0.3	Z	0.3	0.4	0.6	0.6	0.5	0.4	0.5	0.5	0.4	0.7	0.8	0.8	0.5	0.8	4.5	0.7	0.9	0.9	0.7	0.7	4.5			
18-Jul	0.6	0.6	0.3	0.4	0.4	Z	0.7	1.7	1.2	0.8	0.7	0.7	0.7	0.7	0.8	0.8	1.2	1.0	1.3	0.9	0.8	0.7	0.8	1.1	0.8	1.7			
19-Jul	Z	2.2	3.4	3.2	3.7	4.9	7.3	8.8	6.2	3.7	2.3	1.5	1.6	2.3	2.9	3.6	3.4	2.2	1.5	1.1	1.6	1.3	0.9	0.9	3.1	8.8			
20-Jul	1.4	Z	4.9	4.5	3.2	2.8	9.6	17.5	14.8	6.6	5.5	3.5	2.5	2.5	2.3	3.9	9.4	7.6	4.5	2.4	1.7	1.4	1.5	1.0	5.0	17.5			
21-Jul	0.9	1.0	Z	1.5	1.1	0.8	2.2	4.7	6.3	2.6	5.8	2.2	2.4	3.6	6.1	4.5	4.5	3.8	2.5	1.6	1.2	1.1	0.9	1.2	2.7	6.3			
22-Jul	2.2	2.0	0.6	Z	2.1	3.6	5.4	6.6	18.2	26.5	15.4	16.9	2.0	1.4	1.5	1.3	1.1	1.0	0.8	0.7	0.6	0.5	0.5	0.4	4.8	26.5			
23-Jul	0.7	0.8	1.1	0.8	Z	0.5	0.4	0.6	1.6	1.4	1.4	1.5	1.4	1.3	1.3	2.0	1.9	1.3	0.9	0.7	0.6	0.6	0.5	0.5	1.0	2.0			
24-Jul	0.5	0.6	0.8	2.1	3.4	Z	5.6	8.1	3.0	1.4	2.8	1.9	1.1	1.4	2.2	2.9	2.0	1.2	1.4	0.9	1.2	0.6	2.9	0.9	2.1	8.1			
25-Jul	Z	0.7	0.7	0.7	1.9	2.9	3.1	0.8	0.6	0.6	C	C	C	C	C	C	C	C	C	1.6	0.9	0.9	2.1	3.4	6.6	6.6			
26-Jul	5.9	Z	2.1	0.9	0.6	0.4	0.5	0.6	0.8	0.4	0.6	0.6	0.7	0.8	1.4	0.6	0.5	0.6	0.6	0.6	2.6	3.2	4.1	0.3	1.3	5.9			
27-Jul	0.4	0.4	Z	0.5	0.4	0.4	0.4	0.3	0.4	2.4	0.7	0.5	0.5	0.6	0.5	0.5	0.7	1.4	1.0	1.6	1.1	1.0	1.5	1.3	0.8	2.4			
28-Jul	0.9	1.4	1.0	Z	1.2	1.4	2.0	16.1	11.4	7.4	5.8	3.0	2.9	2.2	3.5	4.5	3.4	3.5	6.2	5.7	3.3	3.3	4.1	5.2	4.3	16.1			
29-Jul	7.5	8.0	6.2	5.7	Z	6.0	9.7	11.0	9.3	5.3	5.1	5.7	3.1	3.1	2.1	2.2	1.6	2.1	2.5	2.2	1.8	1.2	1.0	1.1	4.5	11.0			
30-Jul	1.3	2.3	2.4	1.5	0.9	Z	1.5	1.2	1.1	1.0	1.1	1.0	1.0	1.0	1.1	1.3	1.1	1.0	1.0	0.9	1.0	2.2	1.5	1.2	1.3	2.4			
31-Jul	Z	1.9	1.8	0.9	2.0	1.6	2.2	2.1	2.1	1.0	1.3	2.2	2.9	4.3	3.1	3.3	2.2	1.8	1.3	1.7	1.6	2.3	2.3	3.1	2.1	4.3			
																								Diurnal Average					
																								Diurnal Maximum					
1.7 1.8 1.9 2.3 2.7 3.3 5.1 5.1 4.4 3.7 2.8 2.4 1.7 1.4 1.7 1.8 1.9 1.8 1.8 1.7 1.9 2.6 2.0 1.7																													
7.5 8.0 7.3 11.1 13.1 14.9 28.9 19.9 18.2 26.5 15.4 16.9 6.1 4.3 6.1 4.5 9.4 7.6 6.2 7.5 6.9 19.9 10.4 8.5																													
Z - zerospan C - Calibration																													



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Wapasu - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Wapasu - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	99.72	99.72
21 - 40	2	0.28	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Wapasu - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	83	24	19	20	28	60	110	75	51	37	41	21	23	32	26	52	702
21 - 40	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	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	83	25	19	20	28	60	110	75	51	37	41	21	23	32	27	52	704

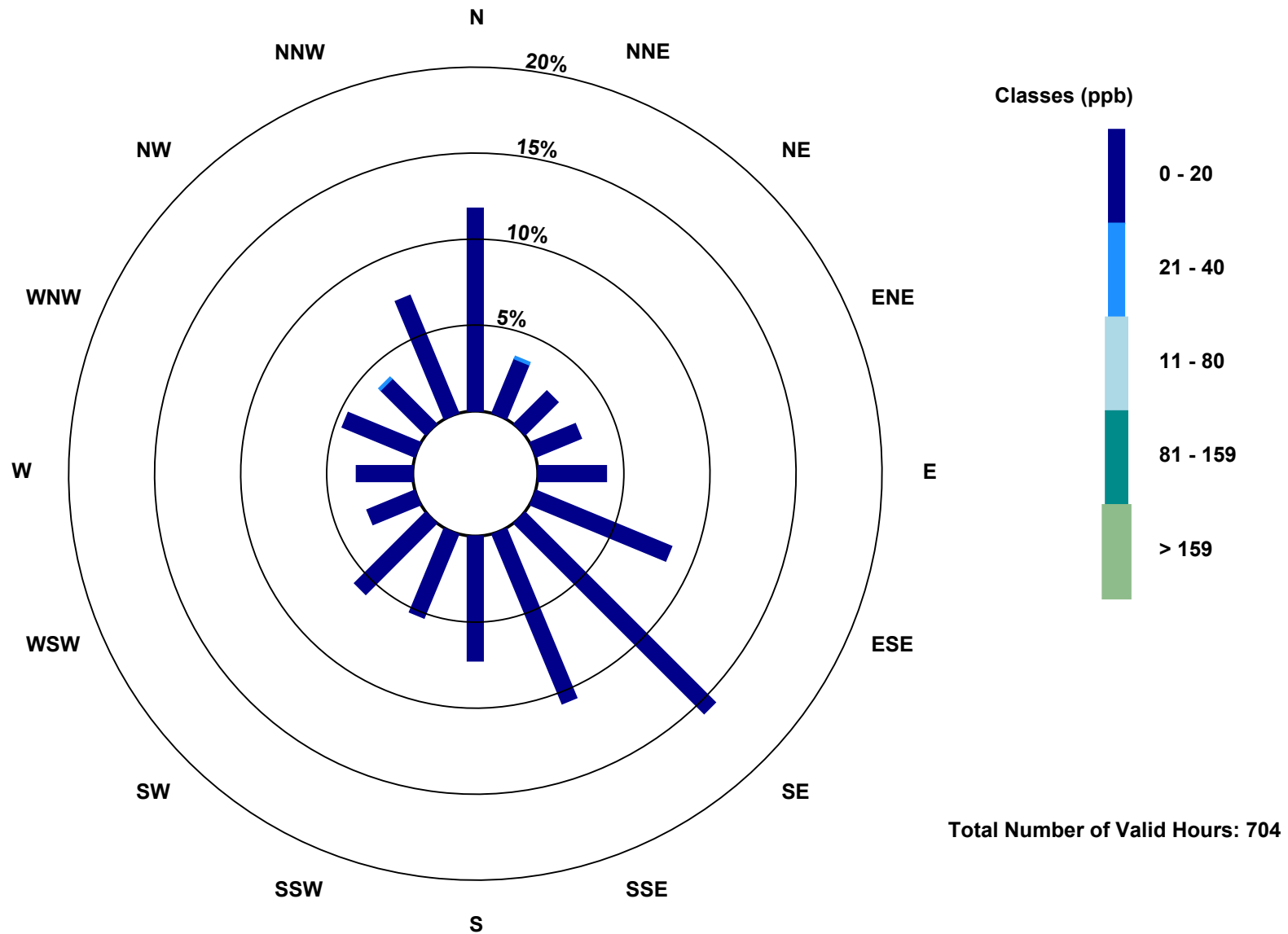
Total Number of Valid Hours: 704

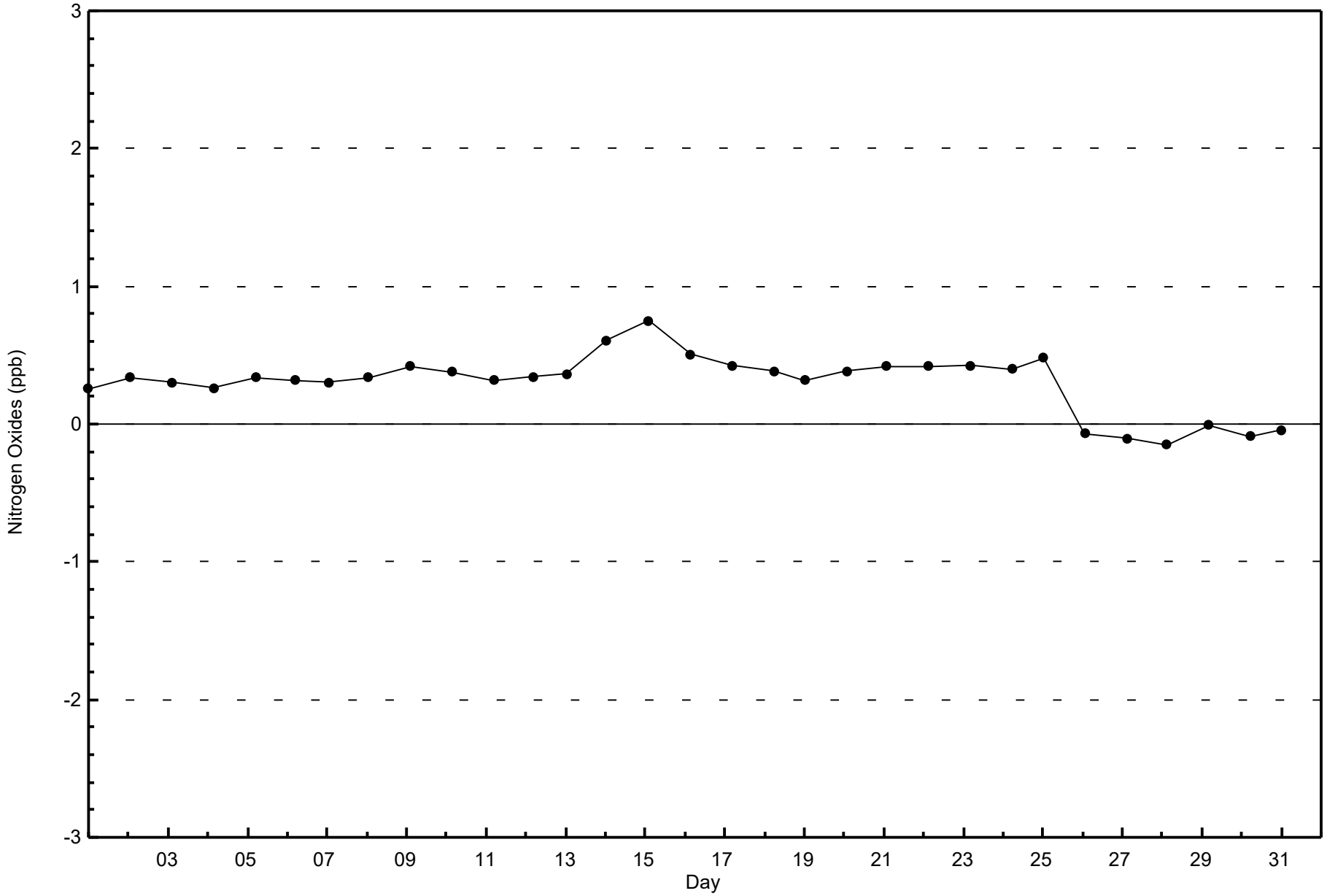
Total Number of Hours: 744

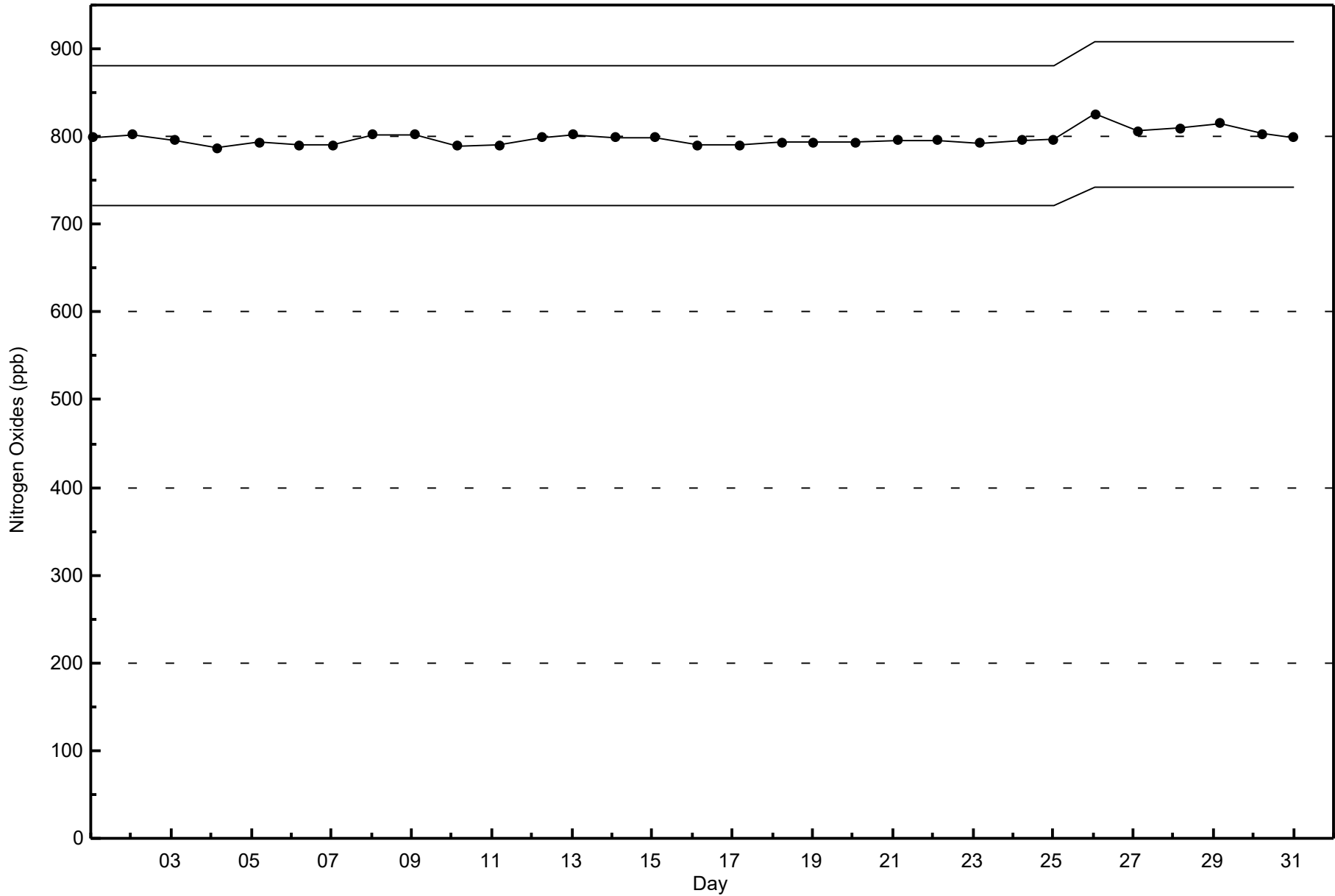


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Wapasu









Summary of Hour Averages

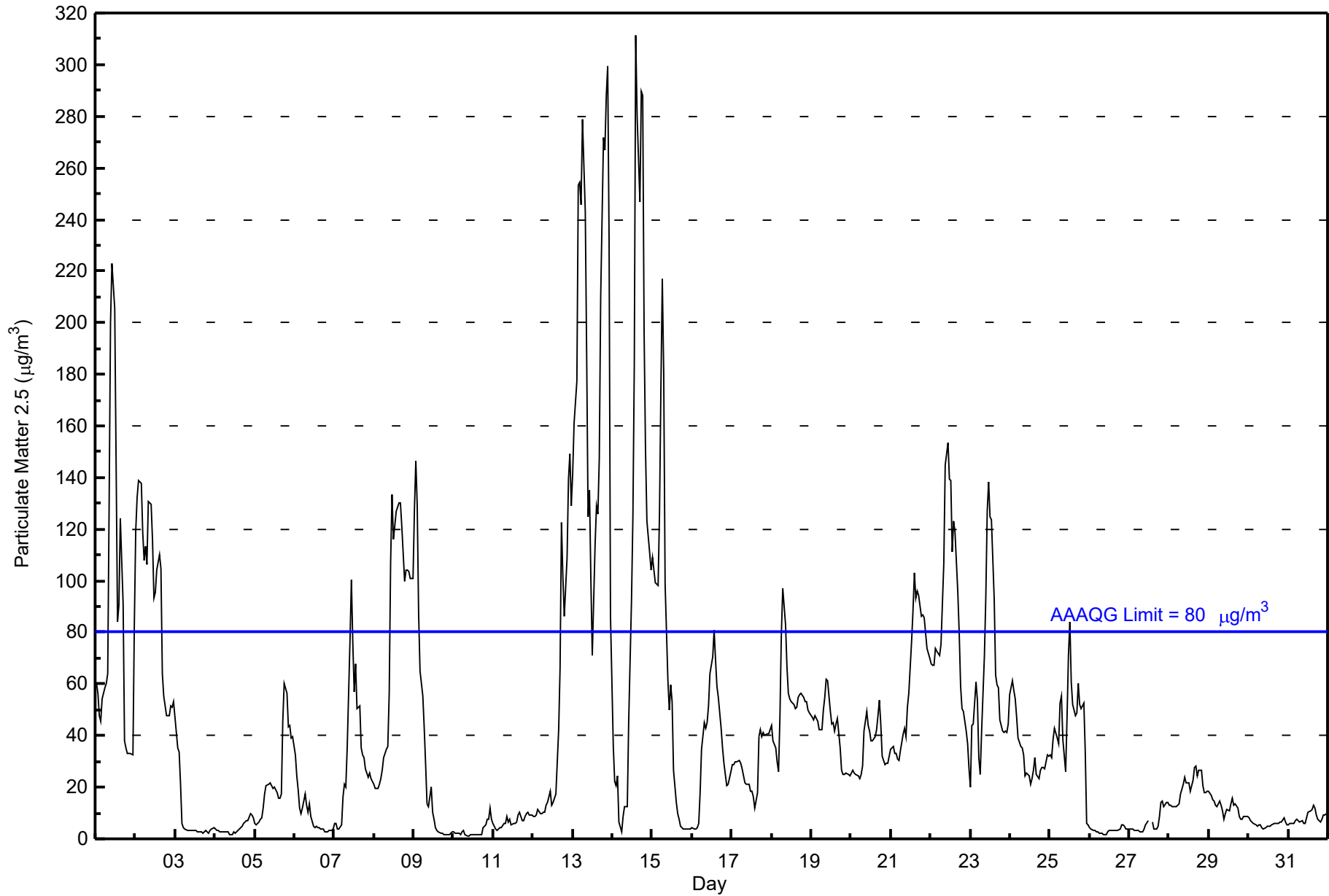
Wapasu - July 2023

Number of Exceedences (AAAQO):	1-hr: 125	24-hr: 19	Hours in Service:	744
Maximum Value: 311.1 µg/m ³ on Jul 14 15:00	Maximum Daily Average: 189.3 µg/m ³ on Jul 13		Hours of Data:	742
Minimum Value: 1.2 µg/m ³ on Jul 10 09:00	Minimum Daily Average: 3.3 µg/m ³ on Jul 26		Hours of Missing Data:	2
Maximum Diurnal Average: 50.5 µg/m ³ at hour 15	Minimum Diurnal Average: 34.6 µg/m ³ at hour 24		Hours of Calibration:	2
Monthly Average: 43.16 µg/m ³	Percentiles: P ₁ = 1.6 P ₁₀ = 3.3 Q ₁ = 6.7 Median = 25.2 Q ₃ = 54.7 P ₉₀ = 111.2 P ₉₉ = 269.9		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	60.2	56.6	48.0	45.4	54.3	58.5	60.1	63.8	129.2	200.1	223.1	205.8	145.1	84.0	90.8	124.3	91.4	38.2	35.2	33.2	32.9	33.3	32.7	83.1	84.6	223.1
2-Jul	119.3	132.5	138.9	137.6	118.7	108.2	113.5	106.6	130.5	129.6	115.6	93.5	95.7	104.1	110.1	104.7	64.2	55.4	51.7	47.8	47.9	51.4	51.2	52.9	95.1	138.9
3-Jul	47.3	35.1	33.8	20.9	5.9	4.3	3.9	3.5	3.3	3.4	3.4	3.2	3.0	2.9	2.7	2.6	2.5	2.0	3.1	2.6	2.4	3.0	4.0	4.3	8.5	47.3
4-Jul	3.7	3.5	3.3	2.8	2.5	2.5	2.5	2.6	2.5	1.9	1.9	2.5	2.4	2.6	3.5	3.9	4.8	6.0	6.6	6.8	7.1	10.0	9.0	8.4	4.3	10.0
5-Jul	5.8	5.6	6.4	7.7	8.3	11.7	17.6	20.8	21.3	21.5	20.7	19.5	20.2	17.8	15.6	15.8	17.2	45.5	60.0	56.2	43.6	44.1	39.0	39.5	24.2	60.0
6-Jul	32.4	24.5	19.1	11.9	9.8	11.9	17.1	12.9	10.6	13.7	8.5	5.0	4.5	4.7	4.5	4.3	4.0	3.6	2.7	2.8	2.7	3.3	3.4	3.7	9.2	32.4
7-Jul	5.8	5.7	3.8	3.9	5.4	16.2	21.3	20.3	35.3	76.8	100.1	76.1	57.2	67.5	50.2	51.6	35.5	32.6	31.6	27.4	24.0	25.3	23.3	22.1	34.1	100.1
8-Jul	20.9	19.7	19.3	21.3	23.3	26.8	31.7	34.5	35.7	56.2	106.8	133.5	116.2	126.8	128.8	130.2	130.1	120.8	100.0	103.9	104.3	103.4	100.7	100.8	79.0	133.5
9-Jul	127.6	146.4	129.3	87.5	65.4	55.1	42.6	28.5	13.3	12.7	19.9	10.5	7.4	4.4	3.1	3.0	2.3	2.2	1.8	1.6	1.4	1.7	2.2	2.7	32.2	146.4
10-Jul	2.9	2.0	2.3	2.0	1.9	2.8	3.0	1.6	1.2	1.3	1.5	1.8	1.7	1.6	1.6	1.4	1.5	1.7	4.4	5.5	7.5	7.3	12.0	7.8	3.3	12.0
11-Jul	5.9	4.0	3.3	4.0	4.1	4.5	5.8	5.8	8.6	6.5	7.7	5.3	5.8	6.0	6.7	9.0	10.3	7.3	7.2	8.9	9.7	10.1	9.2	9.3	6.9	10.3
12-Jul	8.5	8.6	9.3	11.5	9.9	9.7	10.4	10.1	13.0	14.2	18.6	12.8	14.3	15.8	17.6	42.3	66.3	122.6	101.3	86.2	109.3	139.6	149.0	128.9	47.1	149.0
13-Jul	141.4	161.3	177.4	253.5	254.5	245.4	278.9	242.8	186.6	124.8	134.8	100.5	71.2	114.0	128.9	125.8	147.5	209.7	271.8	267.1	287.9	299.6	231.7	86.2	189.3	299.6
14-Jul	35.7	22.2	20.6	24.6	6.5	3.0	8.7	12.4	12.3	12.3	45.6	92.4	124.8	183.7	311.1	280.2	246.9	289.8	288.1	196.5	150.9	123.2	110.8	104.2	112.8	311.1
15-Jul	109.0	104.0	99.2	98.4	126.5	174.9	216.9	180.7	98.5	61.5	50.1	59.6	52.9	26.3	14.2	9.7	7.5	5.0	4.4	3.9	3.7	3.8	3.8	3.9	63.3	216.9
16-Jul	4.2	3.8	3.9	4.3	6.0	17.7	34.8	45.2	43.0	45.2	51.6	64.0	70.8	80.9	69.2	58.9	54.9	42.7	35.3	29.5	24.8	20.4	21.4	26.2	35.8	80.9
17-Jul	28.9	28.8	30.0	30.0	30.3	29.5	26.8	24.4	21.7	21.1	21.0	18.4	18.7	16.3	11.9	17.8	39.7	42.3	39.5	41.4	39.9	40.6	40.6	42.5	29.3	42.5
18-Jul	44.1	37.9	35.1	29.9	25.9	47.7	79.0	97.0	82.9	66.5	56.6	54.0	53.3	52.1	50.4	51.0	55.0	55.9	56.7	54.8	53.0	53.2	50.1	49.0	53.8	97.0
19-Jul	47.1	46.3	47.5	46.5	45.7	42.5	42.5	49.6	55.0	61.9	61.1	49.3	44.7	45.1	41.6	44.7	46.6	35.4	26.7	25.2	25.2	25.6	24.9	24.6	41.9	61.9
20-Jul	25.7	26.7	25.4	24.8	24.2	23.4	25.1	28.4	41.5	49.1	44.1	41.8	37.9	38.2	39.4	42.3	47.6	53.9	44.3	31.8	28.6	29.1	29.5	32.2	34.8	53.9
21-Jul	34.8	35.8	33.0	33.3	30.8	30.5	34.2	40.4	42.7	39.5	50.8	56.6	76.3	88.4	103.3	93.2	96.2	94.1	86.3	86.6	85.8	79.9	74.0	69.9	62.4	103.3
22-Jul	67.7	67.4	67.2	73.7	72.9	71.1	75.6	91.1	107.0	144.8	153.6	139.7	138.7	111.2	123.1	118.8	95.7	79.7	58.9	50.4	49.4	41.8	37.0	27.0	86.0	153.6
23-Jul	20.2	44.1	44.7	61.0	53.7	31.5	25.2	41.8	70.8	93.9	127.2	138.5	124.6	123.9	93.0	63.4	59.6	58.5	46.1	41.9	41.3	41.6	41.0	44.6	63.8	138.5
24-Jul	55.9	61.1	57.6	54.4	47.2	39.1	35.7	35.1	32.8	24.2	25.4	24.4	21.1	23.3	26.5	31.5	25.2	23.6	26.5	27.5	27.9	27.2	32.3	32.0	34.1	61.1
25-Jul	32.6	31.3	38.7	42.8	38.9	37.0	52.7	55.1	38.3	26.0	47.0	70.9	84.3	60.7	51.9	47.6	48.8	60.2	52.2	50.3	52.9	33.8	5.7	5.2	44.4	84.3
26-Jul	4.1	3.5	3.3	3.1	2.9	2.7	2.3	1.9	1.7	1.5	1.5	2.9	3.4	3.5	3.1	3.0	3.2	3.3	3.9	5.7	5.3	4.8	3.8	3.7	3.3	5.7
27-Jul	3.8	3.6	3.5	3.4	3.2	3.1	2.9	2.8	2.8	4.0	5.2	6.9	C	C	6.5	3.8	3.9	4.6	8.6	14.3	14.6	12.7	13.9	14.1	6.5	14.6
28-Jul	13.3	13.0	12.3	12.4	12.2	13.3	13.5	17.3	21.2	23.6	21.5	21.7	21.6	18.2	22.7	27.9	28.0	24.2	26.5	26.3	20.4	17.9	17.9	18.2	19.4	28.0
29-Jul	18.5	16.7	14.9	14.7	13.1	12.5	14.6	12.8	10.7	7.7	9.5	11.5	10.9	13.5	15.5	13.3	13.5	11.7	8.8	7.8	7.7	8.9	8.5	8.5	11.9	18.5
30-Jul	8.0	7.3	6.5	6.0	5.4	5.1	5.5	5.2	4.6	4.1	4.2	4.6	4.9	5.1	5.4	6.2	6.1	6.1	5.8	6.5	6.5	8.0	6.6	5.6	5.8	8.0
31-Jul	5.2	5.9	6.1	6.1	7.1	7.4	7.3	6.7	6.8	6.1	5.8	7.9	10.4	11.1	11.4	13.1	12.1	9.4	7.8	6.7	7.6	9.2	9.1	10.0	8.2	13.1

36.8	37.6	36.9	38.0	36.0	37.1	42.3	42.0	41.5	43.7	49.8	49.5	48.1	48.5	50.5	49.8	47.3	49.9	48.5	43.8	42.8	42.4	38.7	34.6	Diurnal Average	
141.4	161.3	177.4	253.5	254.5	245.4	278.9	242.8	186.6	200.1	223.1	205.8	145.1	183.7	311.1	280.2	246.9	289.8	288.1	267.1	287.9	299.6	231.7	128.9	Diurnal Maximum	

C - Calibration
 Alberta Ambient Air Quality Guideline/Objectives: 1-hr 80 µg/m³ 24-hr 29 µg/m³





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - July 2023

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
0 - 5	151	20.35	20.35
6 - 15	145	19.54	39.89
16 - 25	80	10.78	50.67
26 - 80	241	32.48	83.15
> 81.0	125	16.85	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Wapasu - July 2023

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	28	9	9	7	10	14	26	14	13	6	2	0	3	3	1	6	151
6 - 15	12	3	3	3	0	5	27	24	20	13	16	6	1	2	1	9	145
16 - 25	6	2	0	1	2	4	13	10	3	8	16	4	2	6	2	1	80
26 - 80	11	2	6	6	19	36	47	31	9	6	8	11	12	13	13	10	240
> 81.0	28	9	1	5	1	7	8	3	6	5	0	0	5	8	12	27	125
Totals	85	25	19	22	32	66	121	82	51	38	42	21	23	32	29	53	741

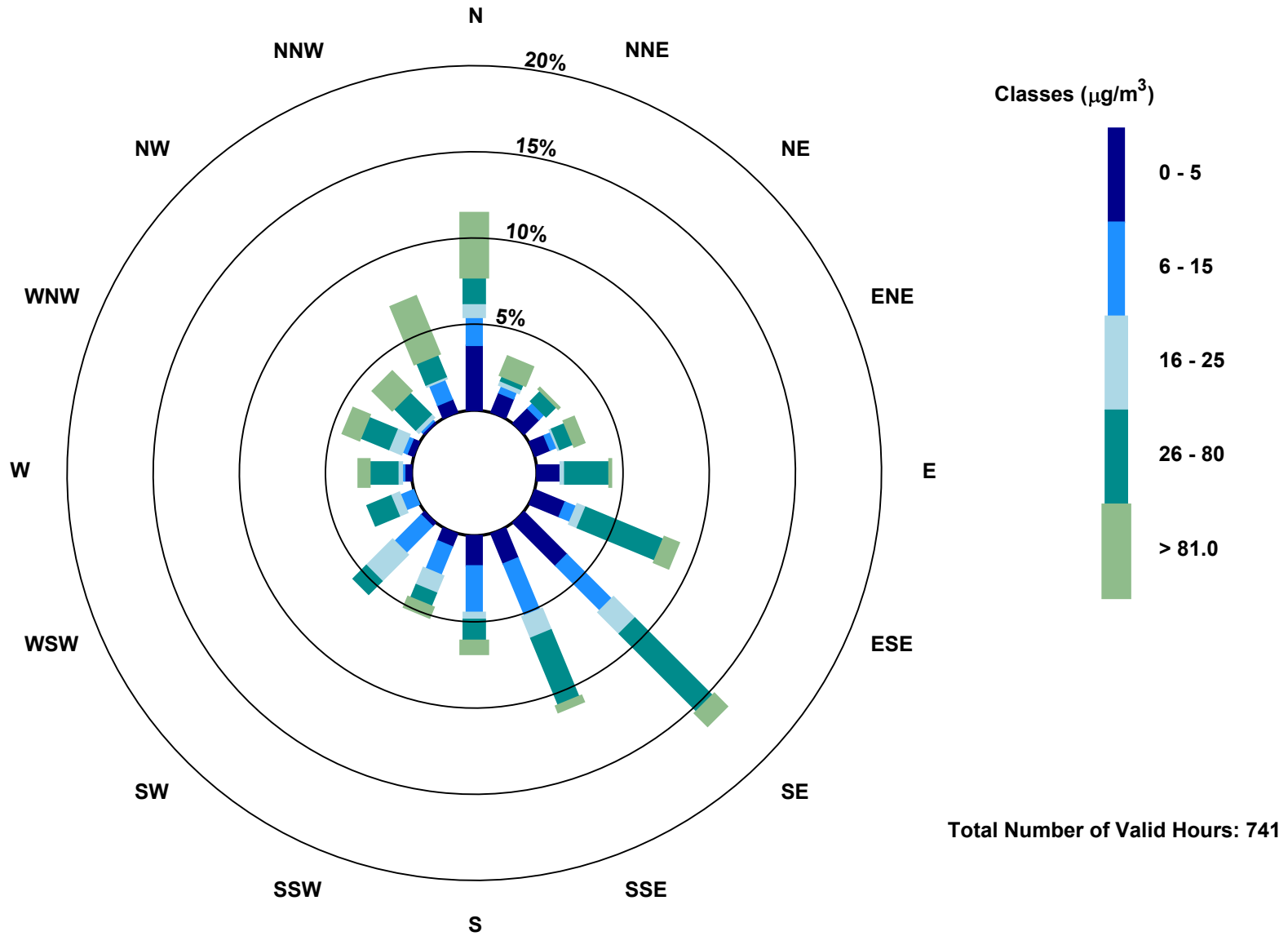
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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





Wood Buffalo Environmental Association
Summary of Hour Averages

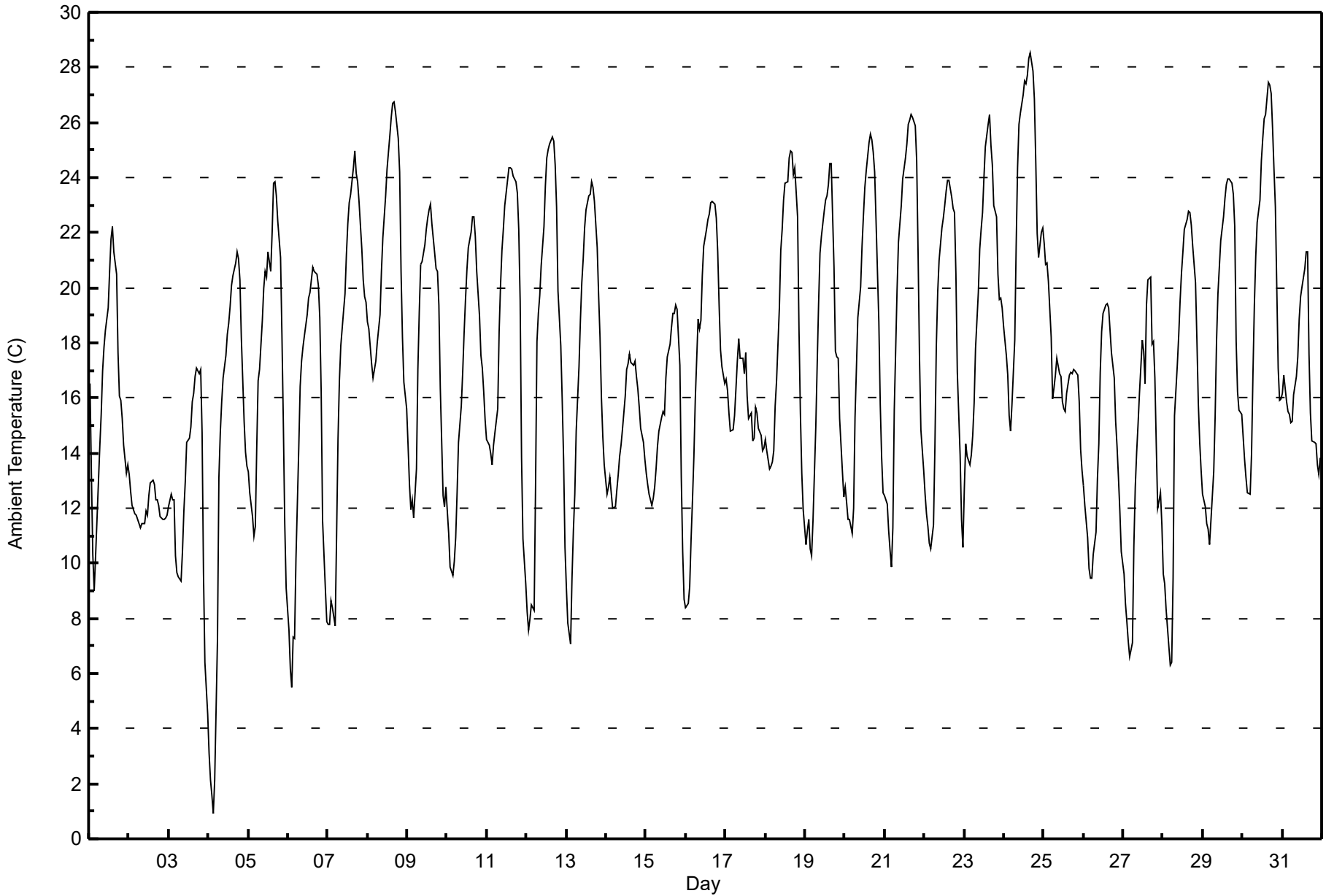
Ambient Temperature (AT) - C
Wapasu - July 2023

Maximum Value: 28.5 C on Jul 24 17:00 Minimum Value: 0.9 C on Jul 4 04:00 Maximum Diurnal Average: 22.3 C at hour 16 Monthly Average: 17.04 C		Maximum Daily Average: 22.8 C on Jul 24 Minimum Daily Average: 12.0 C on Jul 2 Minimum Diurnal Average: 11.2 C at hour 5 Percentiles: P ₁ = 6.2 P ₁₀ = 10.6 Q ₁ = 13.1 Median = 16.9 Q ₃ = 21.3 P ₉₀ = 23.9 P ₉₉ = 27.2		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 Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	16.5	13.3	10.3	9.0	10.3	12.9	14.2	15.4	17.0	17.9	18.4	19.3	20.6	21.8	22.2	21.3	20.5	17.7	16.1	15.9	15.3	14.3	13.3	13.6	16.1	22.2
2-Jul	13.2	12.6	12.1	11.8	11.8	11.6	11.4	11.3	11.5	11.4	11.9	11.8	12.5	12.9	13.0	12.8	12.3	12.3	12.1	11.7	11.6	11.6	11.7	11.7	12.0	13.2
3-Jul	12.0	12.5	12.3	12.3	10.3	9.6	9.5	9.3	10.4	11.9	13.0	14.4	14.5	14.9	15.8	16.2	16.8	17.1	16.9	17.0	14.7	9.6	6.4	4.5	12.6	17.1
4-Jul	3.1	2.2	1.6	0.9	2.1	7.3	13.1	14.8	15.8	16.7	17.5	18.3	18.7	19.3	20.1	20.5	20.9	21.3	21.0	20.3	18.2	15.2	14.0	13.5	14.0	21.3
5-Jul	13.3	12.6	11.7	11.0	11.4	14.2	16.6	17.0	18.8	20.0	20.6	20.4	21.3	20.6	22.0	23.8	23.8	23.3	22.4	21.1	18.2	15.0	11.4	9.1	17.5	23.8
6-Jul	7.6	6.2	5.5	7.3	7.3	10.2	14.2	16.4	17.4	17.9	18.3	19.0	19.6	19.9	20.3	20.7	20.6	20.5	20.1	18.9	16.2	11.5	9.0	7.9	14.7	20.7
7-Jul	7.8	7.8	8.7	8.4	7.7	11.0	14.5	16.6	17.9	19.2	19.8	21.2	22.3	23.1	23.4	24.4	25.0	24.2	23.9	23.1	21.4	20.3	19.7	19.5	17.9	25.0
8-Jul	18.8	18.5	17.2	16.7	17.0	17.4	18.0	19.0	20.6	21.8	22.6	23.4	24.3	25.5	26.2	26.7	26.7	26.4	25.4	24.2	20.6	18.2	16.6	15.6	21.1	26.7
9-Jul	14.3	12.9	11.9	12.3	11.6	13.4	17.0	19.1	20.8	20.9	21.5	22.1	22.5	22.8	23.0	22.3	21.3	20.7	20.6	19.4	16.4	12.5	12.0	12.7	17.7	23.0
10-Jul	11.9	11.1	9.9	9.6	10.1	10.9	12.5	14.4	15.7	17.0	18.3	19.6	20.6	21.5	22.0	22.6	22.6	21.9	20.6	19.0	17.6	17.1	16.2	15.2	16.6	22.6
11-Jul	14.5	14.3	14.0	13.6	14.3	14.8	15.6	18.4	20.1	21.3	22.1	23.0	23.9	24.4	24.4	24.3	24.0	23.8	23.4	22.1	19.5	13.8	10.9	9.3	18.7	24.4
12-Jul	8.2	7.6	8.0	8.5	8.3	12.8	18.1	19.1	19.7	20.8	22.2	23.7	24.7	25.0	25.2	25.5	25.3	24.5	22.9	19.9	17.9	15.9	13.8	10.6	17.8	25.5
13-Jul	9.1	7.8	7.1	9.5	11.2	12.5	14.8	17.2	18.8	20.2	21.1	22.2	22.9	23.3	23.4	23.9	23.7	23.1	21.5	19.7	18.2	16.0	14.6	13.6	17.3	23.9
14-Jul	12.5	12.8	13.1	12.5	12.0	12.0	12.7	13.2	13.9	14.3	14.8	16.1	17.0	17.2	17.6	17.3	17.2	17.3	16.8	16.3	15.7	14.9	14.4	13.8	14.8	17.6
15-Jul	13.2	12.9	12.5	12.1	12.3	12.7	13.4	14.3	14.8	15.3	15.5	15.4	16.8	17.5	18.0	18.6	19.1	19.0	19.4	19.2	17.2	13.1	10.4	8.7	15.1	19.4
16-Jul	8.4	8.6	9.1	10.9	12.3	13.9	15.9	18.9	18.5	18.8	20.5	21.5	22.1	22.5	22.7	23.1	23.1	23.0	22.5	21.3	19.4	17.7	17.1	16.5	17.8	23.1
17-Jul	16.7	16.3	15.4	14.8	14.9	15.3	16.3	17.3	18.2	17.4	17.4	16.9	17.6	16.1	15.3	15.5	14.4	14.5	15.7	15.4	14.9	14.7	14.1	14.2	15.8	18.2
18-Jul	14.5	14.1	13.4	13.5	13.7	14.1	15.7	16.6	19.3	21.4	22.1	23.2	23.8	23.9	24.7	25.0	24.9	24.1	24.4	22.6	18.5	15.4	13.3	12.0	18.9	25.0
19-Jul	10.7	11.2	11.6	10.5	10.3	11.5	15.0	17.2	19.4	21.3	21.9	22.8	23.2	23.3	23.8	24.5	24.5	20.8	17.7	17.5	17.4	15.2	13.3	12.4	17.4	24.5
20-Jul	12.8	12.2	11.6	11.6	11.1	12.0	15.3	17.1	18.9	20.0	21.5	22.6	23.7	24.2	25.3	25.6	25.4	24.9	24.2	22.4	18.8	15.7	13.8	12.5	18.5	25.6
21-Jul	12.5	12.2	11.2	10.5	9.8	11.3	15.6	19.9	21.7	22.3	23.0	24.0	24.7	25.2	26.0	26.1	26.3	26.2	25.9	24.6	21.3	17.5	14.8	13.4	19.4	26.3
22-Jul	12.5	11.8	11.3	10.7	10.5	11.4	14.2	17.9	19.8	21.0	22.2	22.5	23.0	23.5	23.9	23.9	23.3	22.9	22.7	20.5	16.9	13.9	11.6	10.6	17.6	23.9
23-Jul	12.7	14.3	13.9	13.6	14.0	14.6	15.8	17.8	19.8	21.4	22.1	22.8	24.0	25.1	25.9	26.3	25.2	24.5	23.0	22.6	20.5	19.6	19.6	19.3	19.9	26.3
24-Jul	18.6	17.5	16.8	15.3	14.8	15.7	18.1	21.5	24.4	25.9	26.3	27.0	27.5	27.4	27.7	28.3	28.5	27.8	26.8	24.6	21.9	21.1	22.0	22.2	22.8	28.5
25-Jul	21.6	20.9	20.9	20.2	18.2	16.0	16.4	16.8	17.5	16.9	16.8	15.9	15.6	15.5	16.2	16.8	16.9	16.9	17.0	17.0	16.8	15.8	14.2	13.4	17.1	21.6
26-Jul	12.8	12.1	10.9	9.8	9.4	9.5	10.3	11.1	13.1	14.3	16.9	18.4	19.1	19.4	19.4	19.3	18.5	17.6	16.7	15.2	14.2	13.1	11.9	10.4	14.3	19.4
27-Jul	9.6	8.6	7.9	7.2	6.6	7.1	10.6	12.8	14.1	15.0	16.2	18.1	17.7	16.5	19.4	20.3	20.4	18.0	18.1	16.7	14.3	12.0	12.6	11.4	13.8	20.4
28-Jul	9.6	9.2	8.3	6.9	6.3	6.4	9.5	15.4	17.2	18.3	19.5	20.5	21.3	22.1	22.5	22.8	22.7	22.3	21.5	20.2	18.1	15.8	14.4	13.4	16.0	22.8
29-Jul	12.5	12.0	11.4	11.3	10.7	11.5	13.3	15.3	18.1	19.8	20.8	21.7	22.6	23.2	23.7	23.9	23.9	23.8	23.4	22.2	18.0	16.2	15.6	15.4	17.9	23.9
30-Jul	14.6	13.8	13.1	12.6	12.5	14.0	16.9	19.4	21.1	22.4	23.2	24.6	25.4	26.1	26.3	27.5	27.3	27.1	25.8	24.3	22.9	17.1	15.9	16.0	20.4	27.5
31-Jul	16.1	16.8	15.9	15.5	15.4	15.1	15.2	16.1	16.8	17.5	18.9	19.7	20.0	20.7	21.3	21.3	17.6	15.5	14.4	14.4	14.4	13.6	13.2	13.8	16.6	21.3
	12.7	12.1	11.6	11.3	11.2	12.3	14.5	16.3	17.8	18.7	19.6	20.4	21.1	21.4	22.0	22.3	22.0	21.4	20.7	19.7	17.6	15.3	13.9	13.1	Diurnal Average	
	21.6	20.9	20.9	20.2	18.2	17.4	18.1	21.5	24.4	25.9	26.3	27.0	27.5	27.4	27.7	28.3	28.5	27.8	26.8	24.6	22.9	21.1	22.0	22.2	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Wapasu - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Wapasu - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	59	7.93	7.93
10 - 20	449	60.35	68.28
> 20	236	31.72	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

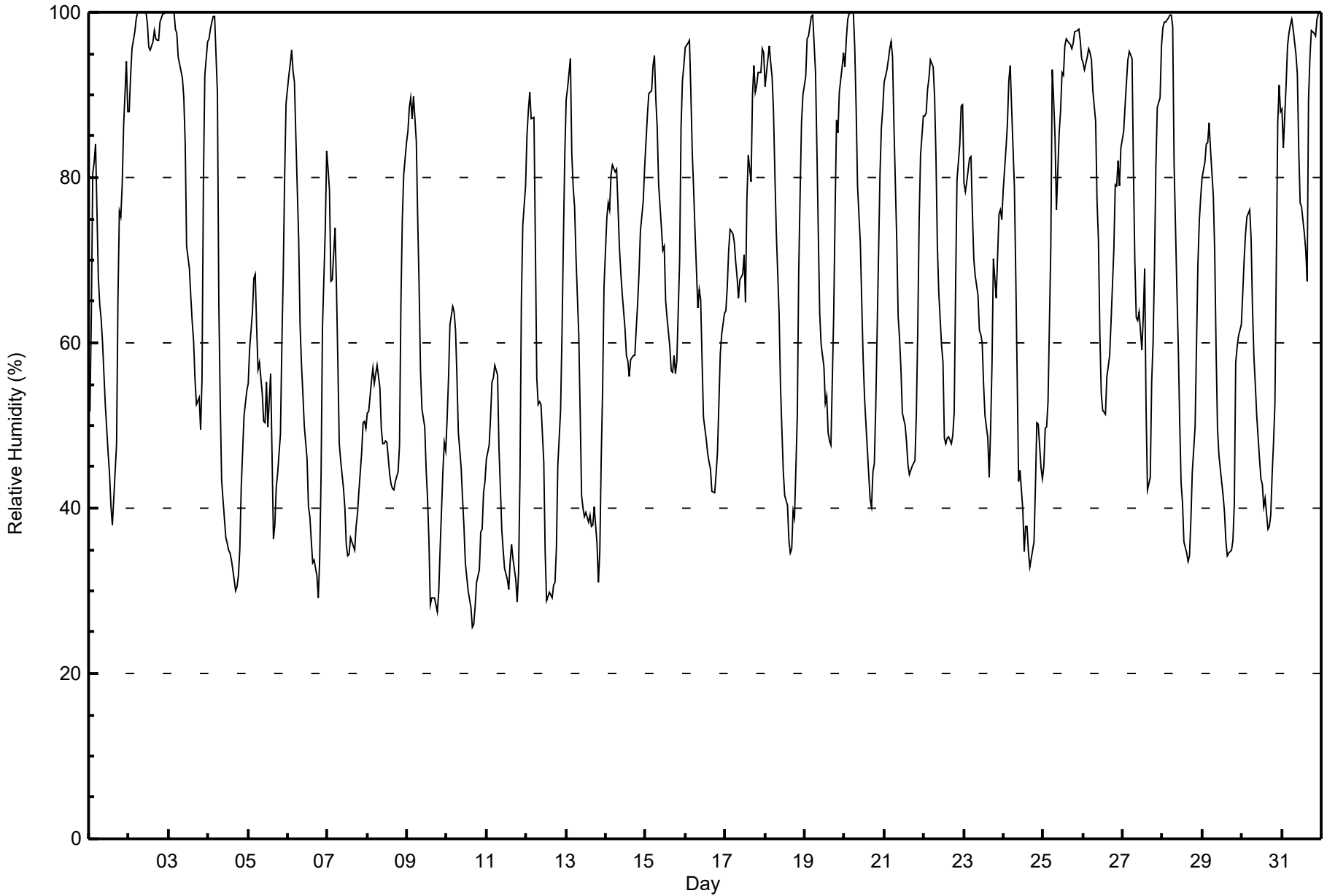
Relative Humidity (RH) - %
Wapasu - July 2023

Maximum Value: 100.0 % on Jul 2 07:00																						Maximum Daily Average: 97.7 % on Jul 2																						Hours in Service: 744			
Minimum Value: 25.6 % on Jul 10 16:00																						Minimum Daily Average: 42.2 % on Jul 10																						Hours of Data: 744			
Maximum Diurnal Average: 85.7 % at hour 5																						Minimum Diurnal Average: 46.4 % at hour 16																						Hours of Missing Data: 0			
Monthly Average: 65.77 %																						Percentiles: P ₁ = 28.7 P ₁₀ = 36.2 Q ₁ = 47.3 Median = 64.1 Q ₃ = 86.6 P ₉₀ = 95.8 P ₉₉ = 100.0																						Hours of Calibration: 0			
																																												Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	51.8	63.6	80.6	81.8	84.0	67.8	64.6	62.9	60.1	56.0	52.3	46.6	44.1	40.2	37.9	41.2	47.9	65.4	75.9	75.3	79.0	86.1	94.0	88.0	64.5	94.0																					
2-Jul	88.0	92.1	95.5	97.6	99.2	99.9	100.0	100.0	100.0	100.0	100.0	98.6	95.8	95.4	96.4	97.9	96.7	96.5	96.7	98.8	99.8	99.8	100.0	100.0	97.7	100.0																					
3-Jul	100.0	100.0	100.0	100.0	98.0	97.5	94.6	92.9	92.1	89.6	84.0	71.7	69.0	65.5	62.5	60.2	55.6	52.6	53.3	49.4	55.6	79.2	92.4	96.4	79.7	100.0																					
4-Jul	96.7	98.0	98.9	99.4	99.5	90.1	64.7	52.8	43.3	41.1	36.4	35.8	34.9	34.6	33.7	32.6	30.0	30.5	31.9	35.1	42.5	51.1	52.7	54.2	55.0	99.5																					
5-Jul	55.2	59.4	63.8	67.7	68.3	61.9	56.9	57.7	53.9	50.5	50.4	55.3	49.8	56.2	46.4	36.3	38.0	42.5	44.3	48.9	59.9	68.5	80.1	89.0	56.7	89.0																					
6-Jul	92.3	93.8	95.5	92.8	91.6	85.0	72.5	62.3	57.5	53.9	50.0	46.0	40.2	39.0	36.1	33.5	33.6	31.9	29.1	33.8	43.8	61.9	73.7	83.3	59.7	95.5																					
7-Jul	81.0	78.4	67.4	67.6	73.9	66.7	57.5	47.8	45.7	42.4	40.1	35.7	34.3	34.4	36.4	35.4	34.9	37.9	39.3	42.0	46.8	50.4	50.5	49.7	49.8	81.0																					
8-Jul	51.6	51.7	55.5	56.9	55.2	56.3	57.3	54.5	49.7	47.7	47.7	48.2	48.0	44.1	42.9	42.3	42.2	43.2	44.4	47.7	64.7	75.0	80.4	84.3	53.8	84.3																					
9-Jul	85.6	88.4	89.6	87.1	89.8	84.5	74.9	66.7	56.6	52.0	49.8	44.8	41.2	36.1	28.4	29.2	29.1	28.3	27.4	29.8	35.1	44.7	47.9	47.0	53.9	89.8																					
10-Jul	50.8	55.7	62.1	64.4	63.8	61.6	56.0	49.1	45.0	41.2	37.9	33.3	31.7	30.0	28.0	25.6	25.9	28.2	30.9	32.5	37.2	37.5	41.9	43.2	42.2	64.4																					
11-Jul	45.9	47.6	51.0	55.3	55.8	57.4	56.1	47.3	42.5	37.4	34.8	32.8	31.4	30.2	33.6	35.7	34.0	31.3	28.6	32.2	43.7	65.0	74.2	79.0	45.1	79.0																					
12-Jul	85.1	88.2	90.4	87.1	87.4	71.9	55.8	52.6	52.8	52.6	45.5	34.7	28.8	29.3	29.9	29.2	30.7	31.1	35.1	45.0	51.8	61.0	72.3	82.8	55.5	90.4																					
13-Jul	89.6	90.8	94.4	82.8	78.8	76.5	70.4	60.8	51.4	41.6	40.0	39.0	39.5	38.3	39.1	37.8	38.0	40.1	35.8	31.0	34.7	45.9	54.3	66.7	54.9	94.4																					
14-Jul	75.1	77.0	76.1	80.3	81.5	80.7	81.1	76.5	71.5	68.5	65.9	61.7	58.6	57.9	56.0	58.0	58.5	58.5	61.7	64.8	68.5	73.6	77.1	81.2	69.6	81.5																					
15-Jul	84.5	87.6	90.1	90.5	93.6	94.8	89.4	86.0	79.2	73.9	71.2	71.7	65.2	63.0	59.5	56.6	56.4	58.5	56.3	57.8	70.1	86.1	91.7	93.6	76.1	94.8																					
16-Jul	95.7	96.3	96.6	90.3	83.1	78.5	73.4	64.2	66.4	65.3	58.0	51.0	48.3	46.6	45.6	44.8	42.1	41.9	44.1	46.8	52.5	58.7	61.0	63.6	63.1	96.6																					
17-Jul	63.9	66.8	71.1	73.7	73.2	72.3	69.9	67.9	65.4	67.7	68.4	70.7	64.9	77.3	82.7	79.5	90.1	93.5	90.4	91.3	92.7	92.8	95.7	95.0	78.2	95.7																					
18-Jul	91.0	92.7	95.9	94.0	92.2	88.0	80.3	73.4	63.5	54.8	49.4	44.5	41.5	40.3	36.0	34.6	35.1	39.7	38.7	51.2	68.5	78.0	86.6	90.1	65.0	95.9																					
19-Jul	92.3	96.8	97.2	98.4	99.5	99.7	92.7	83.4	73.3	63.6	59.7	57.1	52.8	53.6	49.2	48.1	47.6	63.6	76.0	87.0	85.5	90.4	93.4	95.0	77.3	99.7																					
20-Jul	93.3	96.8	99.1	99.9	100.0	100.0	95.8	88.5	79.1	72.0	64.8	58.2	53.3	50.1	44.0	41.1	40.2	44.4	45.4	52.4	70.7	80.1	86.0	88.3	72.6	100.0																					
21-Jul	91.6	93.0	94.3	95.5	96.5	94.6	86.2	72.3	63.2	60.5	56.8	51.5	49.9	48.0	45.2	44.0	44.5	45.2	45.8	51.5	61.7	74.9	82.7	87.4	68.2	96.5																					
22-Jul	87.4	87.8	90.8	92.0	94.2	93.3	89.9	82.6	71.8	66.2	59.6	57.6	48.5	47.8	48.5	48.6	47.8	48.8	51.5	66.4	79.7	84.2	88.6	88.8	71.8	94.2																					
23-Jul	79.2	78.2	79.5	82.4	82.5	75.8	70.2	68.1	65.8	61.5	61.1	60.1	54.9	51.1	48.4	43.7	49.4	57.5	70.2	65.5	70.5	75.6	76.1	74.8	66.8	82.5																					
24-Jul	78.5	83.6	86.5	91.8	93.6	88.4	78.7	67.8	55.8	43.2	44.6	39.8	34.8	37.9	37.8	34.8	32.9	34.9	36.0	42.5	50.3	50.1	45.0	43.6	55.5	93.6																					
25-Jul	45.1	49.7	49.9	52.9	71.8	93.1	89.5	85.0	76.2	85.5	88.2	92.8	92.4	95.9	96.7	96.3	96.2	95.6	96.4	97.6	97.8	98.1	96.7	94.4	84.7	98.1																					
26-Jul	93.9	93.0	94.6	95.6	95.1	94.2	90.5	86.7	77.1	72.3	61.2	53.9	51.8	51.3	56.0	57.2	58.4	62.6	71.4	79.1	78.9	82.1	79.0	83.5	75.8	95.6																					
27-Jul	85.6	88.7	91.6	94.3	95.2	94.4	80.7	69.7	63.1	62.7	63.7	59.1	63.2	68.9	52.1	42.3	43.7	55.2	60.0	69.3	81.4	88.5	89.7	95.9	73.3	95.9																					
28-Jul	98.1	98.9	98.7	99.3	99.6	99.7	98.3	81.7	66.5	59.4	50.5	43.1	40.7	36.0	34.6	33.6	34.3	38.6	44.4	49.9	59.7	69.6	74.8	77.6	66.1	99.7																					
29-Jul	80.0	81.9	84.0	84.3	86.6	83.4	77.8	71.1	58.9	49.7	46.4	44.7	41.5	39.5	35.9	34.3	34.6	35.0	36.1	40.5	57.6	59.5	60.8	62.3	57.8	86.6																					
30-Jul	65.9	70.0	73.2	75.3	76.2	72.5	64.1	58.3	54.9	51.2	46.0	43.6	42.8	40.2	41.1	37.4	37.8	39.1	44.1	48.0	52.7	86.6	91.2	88.0	58.3	91.2																					
31-Jul	88.4	83.5	91.4	95.9	97.5	98.5	99.1	97.9	95.0	92.5	83.3	76.9	76.5	73.2	71.2	67.5	89.5	94.5	97.9	97.4	97.1	99.1	99.9	100.0	90.1	100.0																					
																						79.4	81.6	84.0	84.7	85.7	83.2	77.1	70.6	64.4	60.5	57.0	53.6	50.6	50.1	48.1	46.4	47.6	50.5	52.9	56.8	64.2	72.7	77.1	79.6	Diurnal Average	
																						100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.6	95.8	95.9	96.7	97.9	96.7	96.5	97.9	98.8	99.8	99.8	100.0	100.0	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Wapasu - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Wapasu - July 2023

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	104	13.98	13.98
40 - 60	229	30.78	44.76
60 - 80	170	22.85	67.61
80 - 100	228	30.65	98.25

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

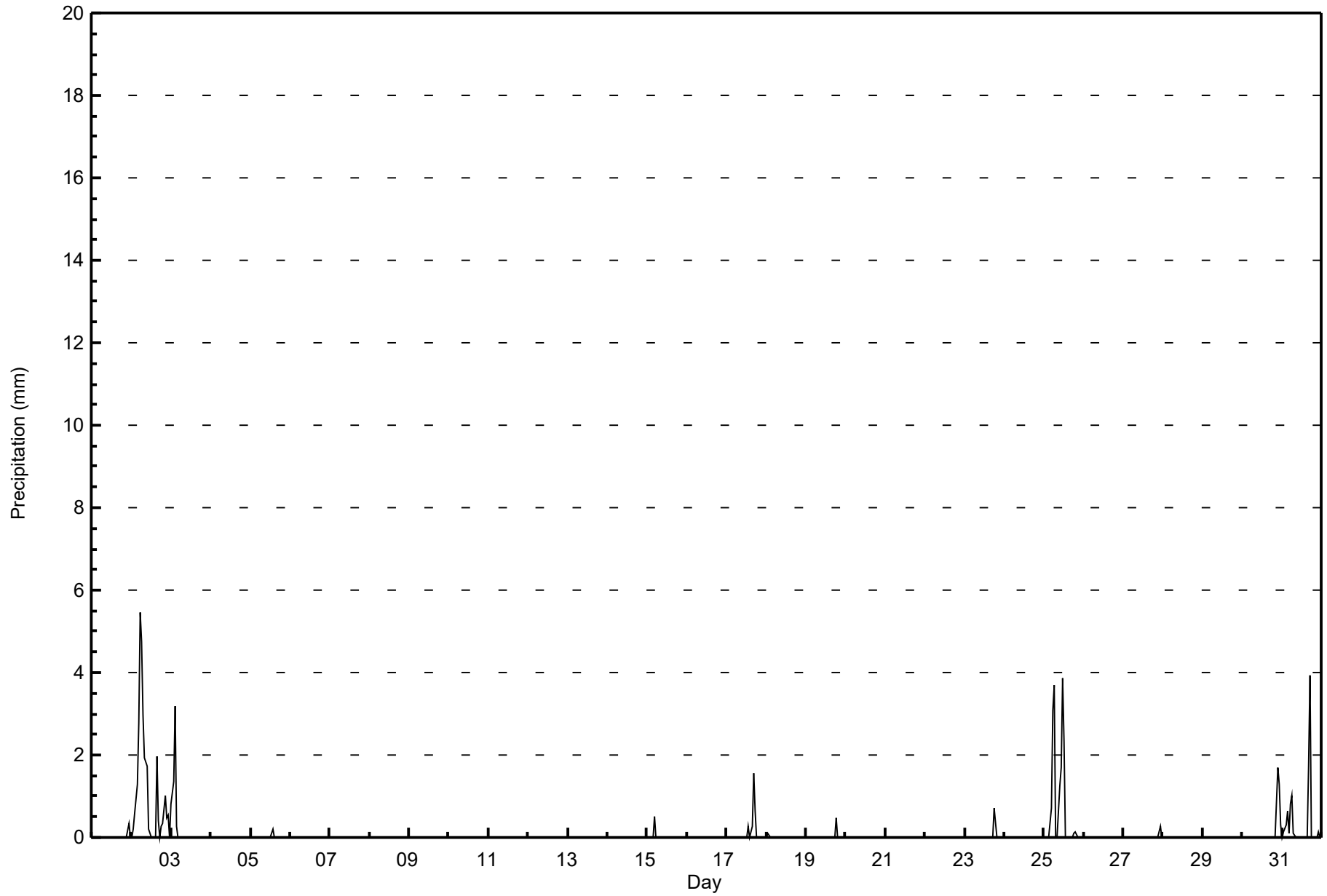
Wapasu - July 2023

Maximum Value: 5.5 mm on Jul 2 06:00		Maximum Daily Total: 27.0 mm on Jul 2		Hours in Service: 744																							
Minimum Value: 0.0 mm on Jul 1 01:00		Minimum Daily Total: 0.0 mm on Jul 4		Hours of Data: 744																							
Maximum Diurnal Total: 9.4 mm at hour 7		Minimum Diurnal Total: 0.0 mm at hour 15		Hours of Missing Data: 0																							
Monthly Total: 66.98 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 = 2.9		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.3	
2-Jul	0.0	0.2	0.6	1.3	2.8	5.5	4.7	3.0	1.9	1.7	0.2	0.1	0.0	0.0	0.0	2.0	0.4	0.0	0.3	0.3	1.0	0.5	0.6	0.0	27.0	5.5	
3-Jul	0.8	1.3	3.2	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	5.6	3.2	
4-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	
6-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	
16-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	1.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	2.8	1.6	
18-Jul	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	
19-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	
20-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.7	0.7	
24-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.7	3.1	3.7	0.0	0.0	1.2	1.7	3.9	2.3	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	16.8	3.9	
26-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3
28-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.3	0.3	3.3
31-Jul	0.0	0.1	0.3	0.6	0.1	0.8	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	3.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	8.8	3.9	
		0.8	1.8	4.1	2.2	4.1	9.4	9.4	3.1	1.9	3.0	1.9	4.0	2.3	0.5	2.3	3.7	4.6	1.6	0.5	1.0	2.1	2.6	0.3	Diurnal Average		
		0.8	1.3	3.2	1.3	2.8	5.5	4.7	3.0	1.9	1.7	1.7	3.9	2.3	0.3	0.0	2.0	1.7	3.9	0.7	0.3	1.0	1.7	1.3	0.3	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Wapasu - July 2023





Maximum Speed: 28 km/h on Jul 25 10:00	Maximum Daily Speed Average: 12.1 km/h on Jul 13	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 15 04:00	Minimum Daily Speed Average: 1.3 km/h on Jul 21	Hours of Data: 743
Maximum Diurnal Speed Average: 4.2 km/h at hour 3	Minimum Diurnal Speed Average: 0.6 km/h at hour 9	Hours of Missing Data: 1
Monthly Average Velocity: 1.1 km/h 136.0 deg	Percentiles: P ₁ = 2 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 10 P ₉₀ = 13 P ₉₉ = 22	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NW3	NE4	E4	ESE4	SE5	SSE6	SSE5	S4	S4	SSW6	S8	SSE10	SE8	SE10	SE10	SSE7	SSW7	WSW8	WSW6	SW5	SSW1	SE4	ENE2	NNW6	SSE3.3	SE10
2-Jul	NW5	NW3	NW4	W5	W7	WNW8	NW9	NNW11	NNW15	NNW14	N11	NNW9	NNW9	NW9	NW6	N4	NNW10	WNW9	NW13	NW10	NW8	NW12	NNW14	NNW13	NW8.5	NNW15
3-Jul	NNW13	NNW15	NNW12	N12	N17	N13	N17	N15	N16	N17	N17	N15	N16	N17	N14	N12	NNE9	NNW11	N9	N6	NE3	ESE3	ESE3	N11.9	N17	
4-Jul	ESE3	SE4	SE4	SE3	SE4	SSW2	W5	WNW7	NW8	NNW8	NNW5	NNW7	W6	WNW5	W4	WNW7	WSW4	SW5	SW6	SW6	SSE7	SSE8	S7	SW1.6	NNW8	
5-Jul	S8	S8	SSE7	SSE7	SSE7	S6	SSW10	SW12	SW11	SW13	SW15	WSW8	SW11	SW6	SW11	WSW14	WNW9	NW15	NW10	NW5	NW3	NE4	E3	SE3	SW5.2	NW15
6-Jul	ESE3	E3	E4	ENE5	N2	NE4	NNE4	N8	N11	N11	N12	N12	N13	N12	N10	N11	NNW13	N10	N7	NE4	E4	ESE4	SE6	N6.1	NNW13	
7-Jul	SE6	SE6	SSE6	SSW6	SSE6	S5	S5	SW9	WSW7	W7	WNW8	WNW7	WNW7	WSW9	W8	WSW11	WSW11	WSW10	SW9	SW8	SW7	SSW8	SW9	SW10	SW5.8	WSW11
8-Jul	SW11	SW12	SW10	SSW9	SSW9	SSW6	SSW6	SW6	WSW6	W7	WNW8	WNW8	WNW8	NW8	WNW9	NW7	NW10	N9	N7	N3	ESE1	SE3	SE2	ESE3	W3.9	SW12
9-Jul	ENE4	E4	ESE4	ESE4	E3	E5	ESE8	ESE5	NE8	NNE12	NNE11	N13	N14	NNE12	NNE12	NNE13	NNE11	NE12	NE10	ENE9	ENE7	E6	ESE10	ESE13	NE6.7	N14
10-Jul	ESE15	SE13	SE13	SE14	SE14	SE14	SE15	SE16	SE16	SE15	SE11	SE10	ESE10	ESE11	SE9	SE9	SE8	SE8	SSE7	SE6	SE8	SE11	SE12	SE11	SE11.4	SE16
11-Jul	SE12	SE12	SSE11	SSE9	SSE8	S8	SSE9	S9	S10	SSW11	SW11	SW9	SSW8	WSW11	WSW10	SW12	SW11	SW10	SW9	WSW8	SW4	SE3	SE4	SE4	SSW7.0	SE12
12-Jul	SE4	SE5	SE7	SE6	SE5	SE4	NNW1	NNW6	NNW8	NNW9	NNW10	NNW11	NNW12	N13	N11	NNW12	N13	N10	NNE4	N4	N4	NNW5	ENE0	ENE1	N4.3	N13
13-Jul	N3	ESE2	ENE2	N5	N5	N6	NNW9	NNW13	NNW14	NNW18	NNW20	NNW24	NNW25	NNW24	NNW21	NNW22	NNW22	NNW19	N11	N8	NNW9	NNW8	NNE6	NNE6	NNW12.1	NNW25
14-Jul	N4	N6	N9	N7	N8	N8	NNW12	NNW14	NNW13	N13	N13	N13	N12	N11	N11	NNE8	N8	N9	N9	N7	NNW6	NNE4	N3	WNW2	N8.7	NNW14
15-Jul	NW2	SE1	ESE2	NE0	NNW4	NNW3	NNW5	NNW5	N6	N8	N9	N8	N9	NE8	NNE7	NNE6	N7	NNE7	NNE6	NNE4	N3	ENE4	SE3	E4	NNE4.2	N9
16-Jul	E5	ESE4	ESE5	SE7	SE9	SE11	SE12	SSE10	SE12	SE14	SSE13	SSE12	SSE12	SSE13	SE13	SSE11	SE11	SSE10	SE11	SE10	SE12	SE13	SE13	SE10.2	SE14	
17-Jul	SSE16	SSE15	SE13	SE13	SE14	SE14	SE14	SE13	SE15	SSE15	SE14	SE16	SE13	SSE9	SE9	ESE13	ESE13	SE10	ESE9	E6	E6	E4	E3	SE5	SE10.9	SE16
18-Jul	ESE5	ESE5	E4	E4	ENE4	E4	E5	ESE7	SE9	SE10	ESE13	ESE11	SE8	ESE6	SE4	S2	N4	ESE3	W2	N2	ENE2	SE4	SE4	SE5	ESE4.5	ESE13
19-Jul	SE5	SSE6	SSE5	SE6	SE5	SE5	S4	WSW4	WNW3	NNW4	NW6	W7	W8	W7	SW5	S2	SW3	SE5	S5	SE3	SE4	SSE6	SE4	SSE5	S2.3	W8
20-Jul	SE6	SSE4	SSE4	SE5	SE5	SSE4	SSW3	WSW4	WNW4	WNW5	WNW5	WNW5	W4	WSW8	NW9	WNW8	WNW9	NW9	NW6	NNW3	NE2	ESE3	ESE3	E4	W1.7	NW9
21-Jul	ESE4	ESE4	ESE3	SE3	SE3	SE4	SE5	S2	W5	W7	W7	WNW8	WNW8	WNW6	W6	W7	W6	NW5	NNW6	NNE4	ENE3	ESE3	SE4	SE5	W1.3	WNW8
22-Jul	ESE4	E4	ESE4	E4	SE3	SE4	SE3	SSW1	NNW4	NW4	N7	N9	NNE9	NNE9	N10	N8	N6	N4	NNE3	UO	NE4	NE3	E4	ENE5	NNE3.2	N10
23-Jul	ESE6	ESE7	ESE7	SE9	SE10	SE11	SE10	SSE9	S7	S7	S8	S7	SSW8	S7	SSW7	SW8	SSW7	SSE9	SSE5	SSE6	SE7	SSE9	SSE10	SSE10	SSE6.9	SE11
24-Jul	SSE7	SSE6	SSE6	SE6	SE6	SSE7	SSE6	SSE6	S6	SW4	W4	WSW3	SSW6	WNW4	N6	NNE4	ENE7	ESE6	ESE7	E5	E6	E9	ESE10	ESE12	SE3.7	ESE12
25-Jul	ESE12	ESE12	ESE13	SSE10	S7	SE13	ESE26	ESE21	SE22	ESE28	SE19	ESE21	SE10	SSE4	ESE4	E3	ENE4	ENE5	ESE6	ESE6	SSE5	SSW11	SW14	SW13	SE10.1	ESE28
26-Jul	SSW12	SSW10	S9	S9	S9	SSE7	SSE8	SE9	SSE7	SSE9	SSE7	S6	S3	S3	E9	ENE10	NE10	NE8	NE10	ENE14	ESE17	ESE15	E12	E8	SE5.9	ESE17
27-Jul	E8	ENE6	E5	E5	ENE5	ENE5	NE5	NNE7	N10	N12	N12	N11	NE6	ESE3	NE5	NE9	N3	NNW11	NW10	WNW3	S3	ENE2	SSW2	SE3	NNE4.2	N12
28-Jul	ESE3	E3	SE3	ESE3	SE4	ESE3	SE4	SW2	W4	WNW6	WNW7	WNW7	WNW5	NW5	NW7	WNW7	W6	WSW7	SW9	SSW7	S6	S6	SSE6	SSE5	SW2.3	SW9
29-Jul	SSE6	SSE6	SSE6	SSE6	SSE7	SSE7	S8	S7	SSW8	SW11	WSW11	SW11	SW11	SW13	SSW12	SSW12	SSW11	SSW10	SSW9	S6	SSE4	SSE7	SSE8	SSE7	SSW7.5	SW13
30-Jul	SSE7	SSE7	SSE8	SSE7	SSE8	SSE8	SSE9	S9	S10	S12	SSW14	S13	S13	SSW13	S12	S12	S11	S10	SSE9	SSE9	S9	S12	SE12	SE13	S10.0	SSW14
31-Jul	SE8	SSW10	SSE7	SSW5	SSW5	SE5	ESE5	SE5	S8	S10	SSW11	SW11	SW10	SW11	W6	WNW5	SSE3	WSW2	SE4	S5	SW4	SSW3	SE4	SSE4	S4.9	SW11

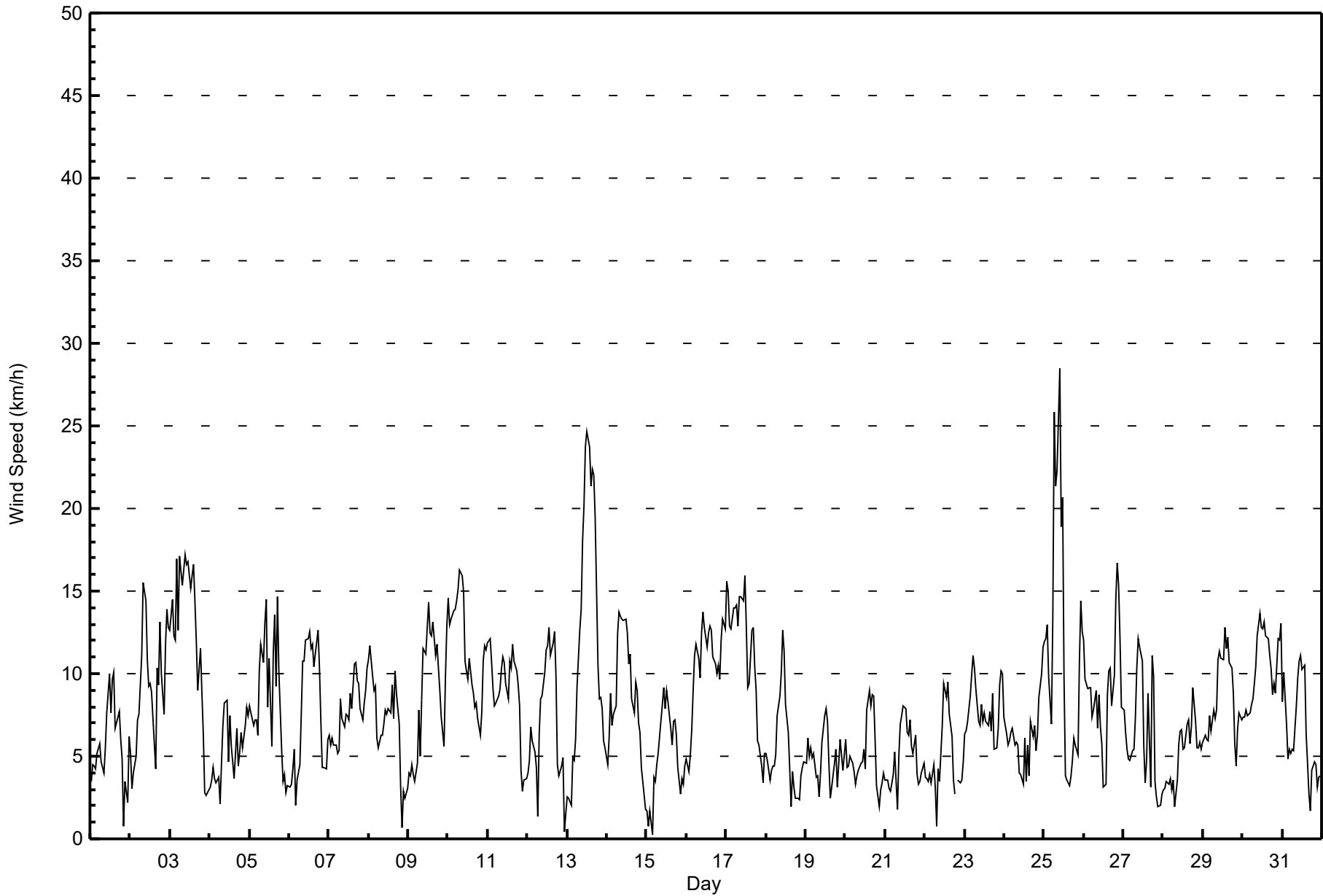
SE3.8 SE3.9 SE4.2 SE3.9 SE3.6 SE4.1 SE3.4 SSE1.8 SW0.0	NNW0.9 NNW1.7 NW1.7 NW1.9 NNW1.8 NW2.0 NW1.8 NNW2.2 NNW2.0 NNW1.2	E0.9 ESE1.7 SE3.1 SE3.9 SE4.0	Diurnal Average
SSE16 SSE15 SE13 SE14 N17 SE14 ESE26 ESE21 SE22 ESE28	NNW20 NNW24 NNW25 NNW24 NNW21 NNW22 NNW22 NNW19	NW13 ENE14 ESE17 ESE15 SW14 SE13	Diurnal Maximum

UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Wapasu - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Wapasu - July 2023

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	242	32.57	32.57
6 - 11	362	48.72	81.29
12 - 19	127	17.09	98.39
20 - 28	12	1.62	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Wapasu - July 2023

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	15	7	11	16	23	36	47	14	12	9	8	5	8	11	10	10	242
6 - 11	41	14	8	5	8	16	41	60	33	24	26	15	15	21	16	19	362
12 - 19	29	4	1	1	1	11	32	8	6	5	8	1	0	0	3	17	127
20 - 28	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	7	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	85	25	20	22	32	67	121	82	51	38	42	21	23	32	29	53	743

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Wapasu - July 2023

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



Wood Buffalo Environmental Association
Summary of Hour Averages

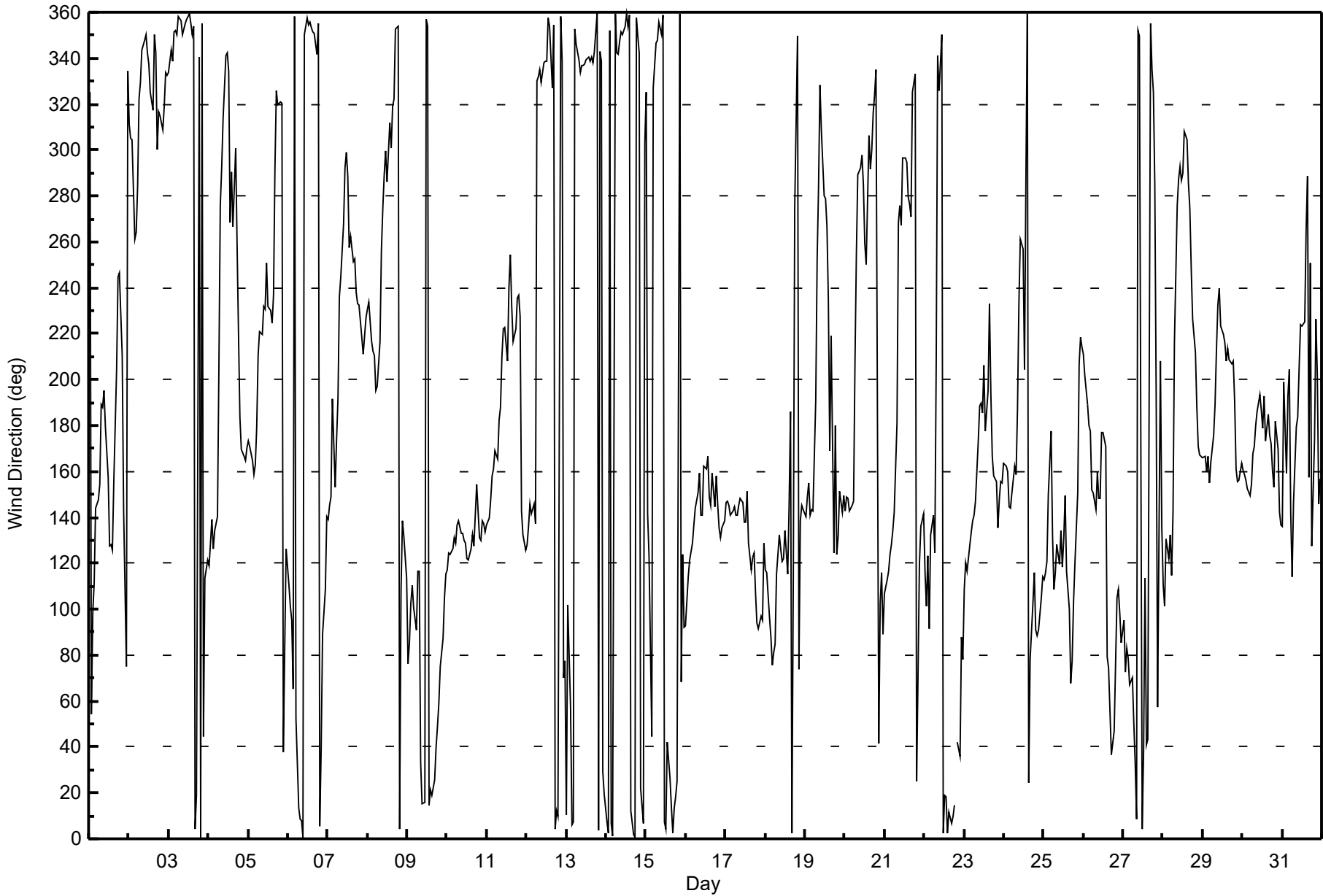
Wind Direction (WD) - deg
Wapasu - July 2023

Direction of Maximum Speed: 120 deg on Jul 25 10:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 344.4 deg on Jul 13	Hours of Data: 743
Direction of Minimum Speed: 45 deg on Jul 15 04:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 1.3 deg on Jul 21	Percent Operational Time: 99.9
Monthly Average Direction: 136.0 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	325	54	98	112	144	148	154	189	188	195	180	157	128	128	126	155	204	245	246	228	210	143	75	334	161.2
2-Jul	311	305	305	261	264	284	322	329	343	348	351	342	338	325	318	350	342	300	317	315	309	319	334	333	324.4
3-Jul	334	344	339	351	352	350	358	356	350	353	355	357	359	355	350	354	4	19	340	1	355	45	113	122	354.2
4-Jul	119	129	139	126	134	140	205	276	293	314	341	342	334	269	290	267	301	258	221	184	169	166	165	170	234.0
5-Jul	173	171	165	159	163	179	210	221	220	232	230	251	232	230	225	237	292	326	319	321	320	38	84	126	228.6
6-Jul	111	101	95	66	358	52	14	9	8	0	350	358	355	356	353	351	351	342	355	6	39	89	109	140	9.1
7-Jul	139	145	149	192	153	174	191	236	245	268	292	299	289	258	262	252	253	238	233	233	219	211	219	227	231.8
8-Jul	230	234	217	212	211	195	197	216	256	274	289	300	286	312	301	319	322	353	354	4	108	138	132	113	264.5
9-Jul	76	86	103	110	101	91	117	116	34	15	16	357	354	15	22	19	26	40	49	59	75	87	105	116	47.2
10-Jul	117	124	124	126	131	129	137	138	133	133	130	129	122	121	126	132	127	141	154	131	130	139	137	134	130.8
11-Jul	136	140	148	158	161	169	165	183	188	210	222	223	208	240	254	232	217	222	236	237	227	143	132	126	195.6
12-Jul	128	136	146	142	146	138	330	332	335	329	338	338	339	357	354	327	355	5	12	10	358	339	70	77	353.8
13-Jul	10	102	58	6	7	352	346	339	334	337	337	338	339	340	338	341	338	343	360	4	343	339	29	20	344.4
14-Jul	8	2	352	7	1	360	343	342	347	351	350	354	359	354	358	12	2	0	358	350	342	22	7	303	354.9
15-Jul	325	142	123	45	327	337	346	348	356	350	359	7	4	42	26	14	2	13	18	25	359	68	124	92	12.1
16-Jul	93	114	121	125	129	137	144	151	159	141	141	162	161	166	149	145	159	145	158	146	135	131	136	138	144.2
17-Jul	147	147	145	141	143	144	141	141	145	148	146	138	138	151	129	117	123	125	108	94	92	97	95	129	135.6
18-Jul	117	116	97	88	75	81	85	115	133	126	121	122	134	115	146	186	2	116	275	350	74	138	145	143	116.5
19-Jul	140	149	155	141	143	143	191	253	284	328	309	280	279	267	235	169	219	124	180	124	132	151	142	149	185.7
20-Jul	142	149	148	143	145	147	207	254	289	293	298	285	259	250	307	292	300	316	324	335	42	103	116	89	272.8
21-Jul	107	113	117	124	128	134	142	181	268	276	267	297	296	295	279	277	271	325	333	25	71	119	136	142	274.1
22-Jul	116	101	123	92	132	141	124	210	341	326	350	2	19	18	2	11	6	10	15	UO	42	36	88	78	32.0
23-Jul	109	120	117	128	134	139	141	147	173	188	190	185	206	178	195	233	194	167	158	156	136	148	156	155	158.8
24-Jul	163	162	160	144	144	151	162	159	187	233	261	257	205	287	360	25	78	102	116	91	88	91	105	114	132.9
25-Jul	113	116	121	150	177	132	109	116	128	120	134	118	131	150	117	100	68	78	103	120	151	207	218	214	131.1
26-Jul	211	202	189	180	177	152	151	144	160	149	148	177	177	171	79	74	55	37	47	77	105	109	98	85	125.1
27-Jul	95	72	83	79	67	70	50	33	8	352	350	5	38	113	41	43	355	335	325	285	191	57	208	135	26.0
28-Jul	110	101	130	122	132	115	142	216	276	287	293	287	290	308	304	285	274	248	226	212	188	171	167	166	234.5
29-Jul	166	167	160	167	155	164	176	189	213	232	240	223	220	216	208	213	209	207	208	191	161	155	156	164	196.6
30-Jul	161	159	156	152	150	154	168	171	180	186	193	187	179	193	173	185	175	172	160	153	182	169	142	137	169.9
31-Jul	136	199	159	193	204	142	114	146	179	184	205	224	223	225	265	289	157	251	127	174	226	201	146	157	191.2

135.2	138.5	136.9	137.8	142.8	136.2	133.9	156.1	216.1	282.4	295.4	314.4	307.3	296.9	325.1	316.1	331.0	340.3	334.9	80.4	113.7	129.9	134.6	136.1
Diurnal Average																							

UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Wapasu - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Jul 31 18:00 Minimum Value: 4 deg on Jul 12 03:00 Percentiles: P ₁ = 6 P ₁₀ = 13 Q ₁ = 19 Median = 26 Q ₃ = 34 P ₉₀ = 45 P ₉₉ = 84																			Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	44	30	7	21	12	8	13	25	30	30	28	26	26	32	30	36	35	29	29	29	82	31	37	42	82
2-Jul	23	26	36	28	25	30	27	21	21	25	25	19	21	18	22	58	27	26	24	25	35	26	18	17	58
3-Jul	18	21	21	28	25	23	28	27	24	26	26	29	29	27	25	28	33	35	23	34	26	24	13	8	35
4-Jul	6	11	7	7	11	8	39	44	34	38	48	82	74	65	84	88	48	53	41	25	17	15	16	21	88
5-Jul	22	21	15	12	14	27	25	20	25	20	19	41	21	29	24	25	33	23	20	27	25	25	17	17	41
6-Jul	15	14	9	17	63	28	31	31	31	36	30	33	30	35	35	42	37	25	29	31	19	10	12	7	63
7-Jul	4	6	8	38	8	17	31	22	34	36	38	49	43	42	37	36	31	23	19	17	15	19	17	16	49
8-Jul	17	19	17	18	16	28	25	26	36	34	33	38	38	54	32	43	26	32	29	27	71	24	24	33	71
9-Jul	10	20	12	13	16	32	22	56	39	35	35	36	32	35	37	34	33	26	26	23	19	15	18	20	56
10-Jul	19	19	17	18	19	18	19	20	22	25	33	39	41	29	36	29	35	27	21	17	14	16	15	17	41
11-Jul	16	16	16	23	23	23	24	29	30	27	31	42	43	42	34	32	29	23	22	20	16	26	6	22	43
12-Jul	14	13	4	4	5	6	89	35	28	31	34	32	32	31	33	27	30	30	33	22	23	18	82	47	89
13-Jul	45	38	52	21	22	26	22	20	22	21	22	21	23	22	23	24	21	23	33	34	21	20	23	24	52
14-Jul	24	29	25	30	30	28	23	22	27	27	31	33	31	30	34	31	30	28	24	19	28	27	70	70	
15-Jul	43	77	37	69	24	25	24	31	29	26	30	35	34	35	49	64	41	35	37	37	21	14	15	7	77
16-Jul	7	14	7	10	13	17	19	27	27	24	24	31	34	29	27	26	32	28	25	19	15	17	18	17	34
17-Jul	19	18	17	16	18	18	19	20	20	20	21	18	22	20	18	19	18	18	19	16	17	23	15	13	23
18-Jul	15	18	14	11	16	19	25	19	21	25	27	31	42	45	61	97	60	43	69	19	19	18	8	11	97
19-Jul	5	8	7	6	9	9	28	35	63	66	42	49	37	55	62	73	69	68	32	28	22	12	17	18	73
20-Jul	10	16	10	20	26	14	37	47	53	56	60	58	82	34	40	53	31	22	21	21	32	10	15	7	82
21-Jul	13	15	11	14	15	9	6	48	36	31	33	38	44	58	48	45	46	36	20	27	26	13	19	8	58
22-Jul	20	16	23	17	33	16	39	81	37	50	34	29	35	36	31	34	30	35	31	UO	24	24	9	12	81
23-Jul	16	13	14	17	15	16	16	18	28	34	30	35	32	38	43	35	36	27	26	15	12	18	19	19	43
24-Jul	21	16	15	12	9	13	29	23	37	65	65	77	43	68	52	64	33	26	19	15	12	17	17	19	77
25-Jul	18	19	19	33	24	23	21	20	20	21	35	21	59	33	24	26	23	19	24	20	35	35	20	20	59
26-Jul	21	24	29	28	26	22	22	19	33	24	44	64	93	66	35	27	26	29	30	26	24	23	26	23	93
27-Jul	25	19	20	19	16	16	24	32	31	27	28	37	61	69	75	41	96	23	20	52	56	76	90	37	96
28-Jul	24	35	21	22	13	16	15	57	41	33	34	47	61	62	42	44	45	40	19	23	21	12	12	12	62
29-Jul	12	13	10	15	10	16	25	26	26	25	26	32	33	26	31	27	30	29	28	28	14	9	12	14	33
30-Jul	12	12	12	12	12	15	24	27	30	32	31	33	32	34	32	36	33	30	24	17	30	27	22	17	36
31-Jul	12	42	23	42	28	23	17	29	28	30	25	24	27	23	43	35	73	103	62	28	28	34	30	19	103
45 77 52 69 63 32 89 81 63 66 65 82 93 69 84 97 96 103 69 52 82 76 90 70																									
Diurnal Maximum																									
UO - Unstable Operation																									



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS18 STONY MOUNTAIN JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS18)
 JULY 2023

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	4.4	0	1.6	0
TRS(ppb) Average	707	37	37	100	0.8	0	0.5	0
THC(ppm) Average	709	35	35	100	3.6	-	2.2	-
NMHC(ppm) Average	709	35	35	100	1.502	-	0.073	-
CH4(ppm) Average	709	35	35	100	2.3	-	2.1	-
O3 (ppb) Average	707	37	37	100	61.1	0	39	-
NO2 (ppb) Average	706	38	38	100	7.7	0	4	-
NO (ppb) Average	706	38	38	100	0.7	-	0.2	-
NOX (ppb) Average	706	38	38	100	7.8	-	4.1	-
PM2.5 (ug/m3) Average	741	3	3	100	390.3	62	230.6	12
CO(ppm) Average	709	35	35	100	1.4	0	1	0
CO2(ppm) Average	708	36	36	100	470.4	0	434.2	0
Temperature 2 m (C) Average	744	0	0	100	29.4	-	22.8	-
Relative Humidity (%) Average	744	0	0	100	100	-	93.4	-
Wind Speed 20 m (km/h) Average	744	0	0	100	20	-	14	-
Wind Direction 20 m (deg) Average	744	0	0	100	-	-	-	-
Precipitation (mm) Total	744	0	0	100	15.5	-	50	-
Leaf Wetness (% of range) Average	744	0	0	100	58	-	20.6	-
Global Solar Radiation (W/m2) Average	744	0	0	100	968.1	-	284.8	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS18)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	0.31	0.5	-	0	0	0.1	0.2	0.3	0.6	4.4
TRS (ppb) Average	707	0.23	0.1	-	0.1	0.1	0.2	0.2	0.3	0.3	0.8
THC (ppm) Average	709	2.05	0.1	-	2	2	2	2	2.1	2.1	3.6
NMHC(ppm) Average	709	0.002	0.057	-	0	0	0	0	0	0	1.502
CH4(ppm) Average	709	2.04	0	-	2	2	2	2	2.1	2.1	2.3
O3 (ppb) Average	707	29.32	8.7	-	9.1	17.8	23.2	29	35.2	40.5	61.1
NO2 (ppb) Average	706	0.89	0.9	-	0	0.3	0.4	0.6	0.9	1.7	7.7
NO (ppb) Average	706	0.15	0.1	-	0.1	0.1	0.1	0.1	0.2	0.2	0.7
NOX (ppb) Average	706	1.05	1	-	0.1	0.4	0.6	0.8	1.1	1.9	7.8
PM2.5 (ug/m3) Average	741	35.84	54.7	-	1.3	4	5.8	18.7	38.6	71.2	390.3
CO(ppm) Average	709	0.35	0.2	-	0.1	0.2	0.2	0.3	0.4	0.6	1.4
CO2(ppm) Average	708	410.86	16.7	-	375.5	392.3	396.4	408.9	422.1	434.3	470.4
Temperature 2 m (C) Average	744	16.9	4.9	-	6.7	10.6	13	16.5	20.6	23.8	29.4
Relative Humidity (%) Average	744	69.92	19.1	-	31.5	43.6	54.6	69.3	86.9	96.3	100
Wind Speed 10 m (km/h) Average	744	9.3	3	-	1	5	7	9	11	14	20
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	113.34	-	-	-	-	-	-	-
Surface Wetness (% of range) Average	744	5.37	9	-	0	0.5	1	1.4	3.6	19.4	58
Global Solar Radiation (W/m2) Average	744	182.03	227.1	-	0	0	0.3	61.6	320	552.7	968.1

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS18)
JULY 2023

MONTHLY SUMMARY

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

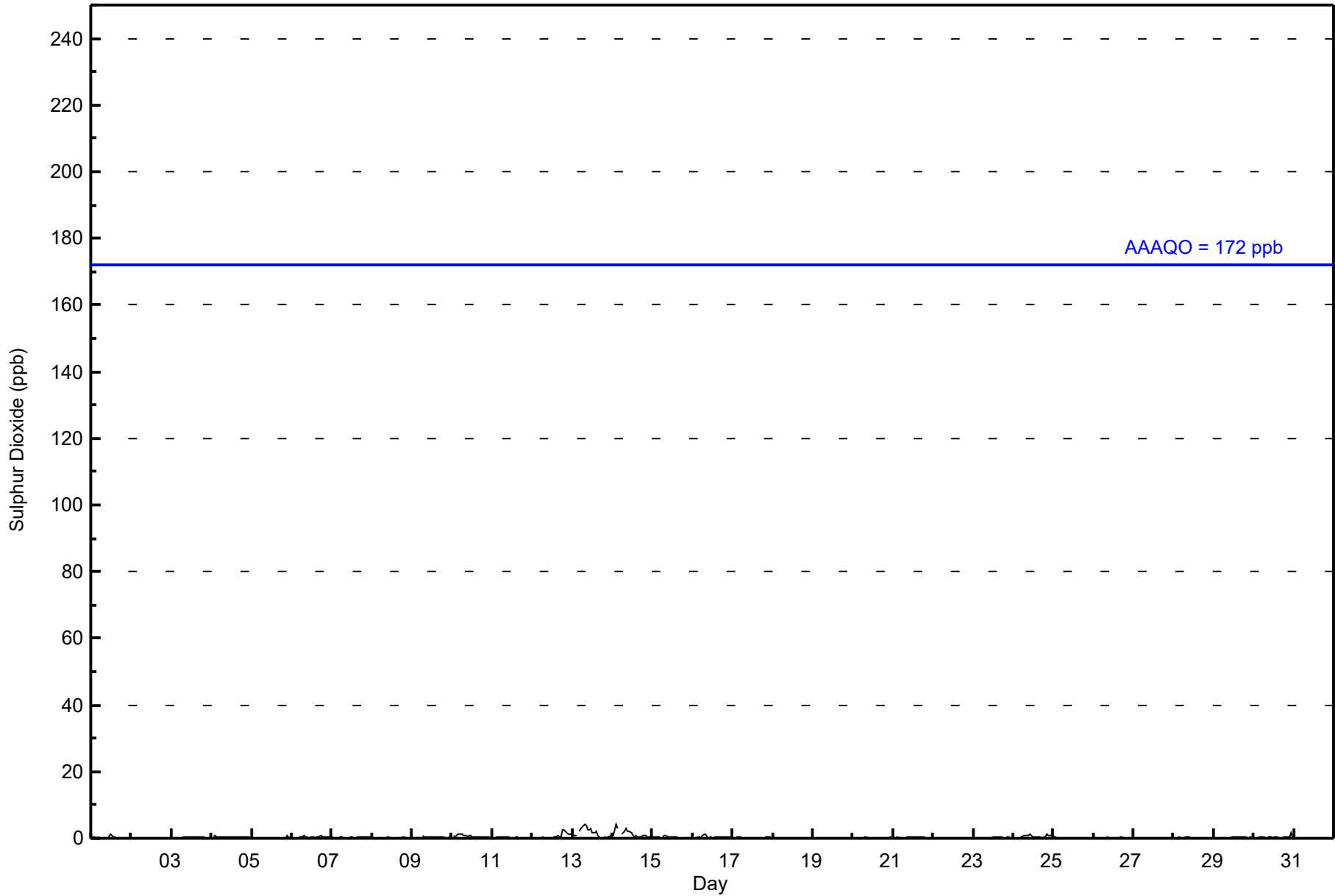


Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744														744																													
Maximum Value: 4.4 ppb on Jul 14 03:00		Maximum Daily Average: 1.6 ppb on Jul 13														Hours of Data: 709																																	
Minimum Value: 0.0 ppb on Jul 2 00:00		Minimum Daily Average: 0.0 ppb on Jul 27														Hours of Missing Data: 35																																	
Maximum Diurnal Average: 0.5 ppb at hour 9		Minimum Diurnal Average: 0.2 ppb at hour 1														Hours of Calibration: 35																																	
Monthly Average: 0.31 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.2 Q ₃ = 0.3 P ₉₀ = 0.6 P ₉₉ = 3.0														Percent Operational Time: 100.0																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	0.2	0.2	0.2	Z	0.3	0.2	0.2	0.1	0.1	0.1	0.2	1.3	1.0	0.4	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.3																							
2-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1																						
3-Jul	0.0	0.0	0.0	0.1	0.1	Z	0.1	0.2	0.5	0.4	0.2	0.3	0.3	0.3	0.4	0.6	0.5	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.6																						
4-Jul	Z	0.4	0.7	0.6	0.4	0.3	0.5	0.5	0.3	0.3	0.2	0.2	0.2	0.2	0.4	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.2	0.1	0.4	0.7																							
5-Jul	0.1	Z	0.1	0.1	0.0	0.1	0.2	0.1	0.2	0.1	0.2	0.2	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.8	0.3	0.1	0.2	0.8																							
6-Jul	0.1	0.1	Z	0.2	0.1	0.3	0.5	0.6	0.6	0.5	0.2	0.2	0.3	0.3	0.1	0.3	0.6	0.7	0.6	0.4	0.3	0.2	0.3	0.1	0.3	0.7																							
7-Jul	0.2	0.2	0.2	Z	0.3	0.3	0.3	0.2	0.1	0.1	0.0	0.2	0.2	0.2	0.2	0.3	0.5	0.5	0.5	0.3	0.3	0.3	0.2	0.2	0.3	0.5																							
8-Jul	0.1	0.1	0.1	0.2	Z	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2																							
9-Jul	0.2	0.2	0.2	0.2	0.2	Z	0.7	0.4	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.3	0.5	0.3	0.1	0.1	0.3	0.7	0.3	0.7																							
10-Jul	Z	0.7	0.5	1.1	1.4	1.3	1.2	0.9	0.9	0.6	0.9	0.9	0.5	0.4	0.4	0.3	0.6	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.6	1.4																							
11-Jul	0.5	Z	0.4	0.3	0.5	0.5	0.4	0.3	0.3	0.5	0.3	0.2	0.2	0.2	0.5	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.5																							
12-Jul	0.1	0.0	Z	0.1	0.0	0.1	0.2	0.1	0.1	0.2	0.2	0.1	0.2	0.3	0.5	0.7	0.4	0.3	2.6	2.5	1.8	1.5	1.3	1.2	0.6	2.6																							
13-Jul	1.0	0.9	0.8	Z	1.9	3.1	3.5	4.2	3.8	2.5	2.6	3.0	1.8	1.7	2.0	0.7	0.3	0.2	0.1	0.3	0.2	0.3	0.5	0.8	1.6	4.2																							
14-Jul	0.7	2.5	4.4	3.0	Z	1.4	1.5	2.1	3.2	2.2	2.3	1.5	0.9	0.5	0.6	0.6	0.4	0.6	0.7	0.7	0.6	0.6	0.5	1.4	4.4																								
15-Jul	0.4	0.4	0.4	0.4	0.3	Z	0.6	1.0	0.9	0.4	0.4	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.0	0.1	0.3	1.0																							
16-Jul	Z	0.0	0.1	0.3	0.3	0.1	0.7	1.2	0.9	0.2	0.1	0.3	0.2	0.3	0.2	0.3	0.3	0.4	0.4	0.4	0.3	0.2	0.3	0.2	0.3	1.2																							
17-Jul	0.1	Z	0.4	0.4	0.5	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.3	0.5	0.3	0.2	0.2	0.5																							
18-Jul	0.1	0.1	Z	0.0	0.0	0.0	0.0	0.1	0.0	0.0	C	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1																							
19-Jul	0.1	0.2	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2																							
20-Jul	0.1	0.1	0.1	0.1	Z	0.0	0.0	0.2	0.2	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2																							
21-Jul	0.1	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.6	0.6	0.5	0.5	0.5	0.6	0.6	0.4	0.2	0.3	0.3	0.1	0.1	0.1	0.1	0.0	0.3	0.6																							
22-Jul	Z	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	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.2																							
23-Jul	0.0	Z	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.3	0.6	0.5	0.4	0.3	0.3	0.2	0.2	0.3	0.3	0.1	0.0	0.2	0.6																							
24-Jul	0.0	0.1	Z	0.1	0.0	0.6	0.8	0.7	0.8	0.6	1.1	0.5	0.3	0.3	0.4	0.5	0.4	0.2	0.4	0.5	1.1	0.8	1.0	1.7	0.6	1.7																							
25-Jul	0.6	0.4	0.1	Z	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.0	0.1	0.6																							
26-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.1	0.0	0.5	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.3	0.5	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.5																							
27-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1																							
28-Jul	Z	0.1	0.1	0.2	0.1	0.0	0.2	0.3	0.4	0.2	0.1	0.2	0.1	0.2	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.4																							
29-Jul	0.1	Z	0.0	0.2	0.1	0.1	0.0	0.2	0.1	0.2	0.2	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.4																							
30-Jul	0.2	0.2	Z	0.4	0.3	0.3	0.2	0.2	0.1	0.4	0.2	0.1	0.2	0.3	0.3	0.2	0.1	0.1	0.3	0.4	0.3	0.3	1.6	0.1	0.3	1.6																							
31-Jul	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	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1																							
																								0.2	0.3	0.4	0.3	0.3	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	Diurnal Average		
																								1.0	2.5	4.4	3.0	1.9	3.1	3.5	4.2	3.8	2.5	2.6	3.0	1.8	1.7	2.0	0.7	0.6	0.7	2.6	2.5	1.8	1.5	1.6	1.7	Diurnal Maximum	
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Stony Mountain - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Stony Mountain - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	709	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: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Stony Mountain - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	55	37	52	21	27	27	25	28	29	38	35	42	68	76	81	68	709
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	55	37	52	21	27	27	25	28	29	38	35	42	68	76	81	68	709

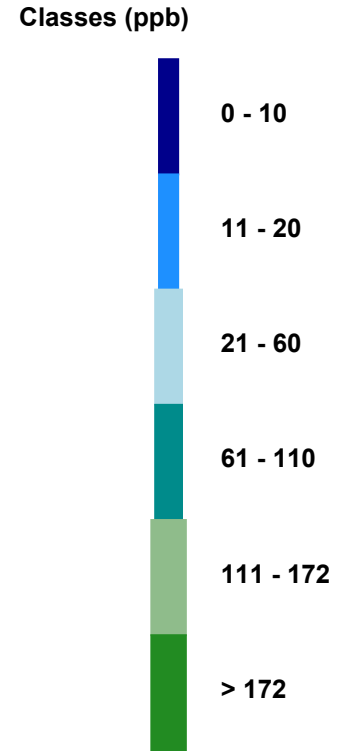
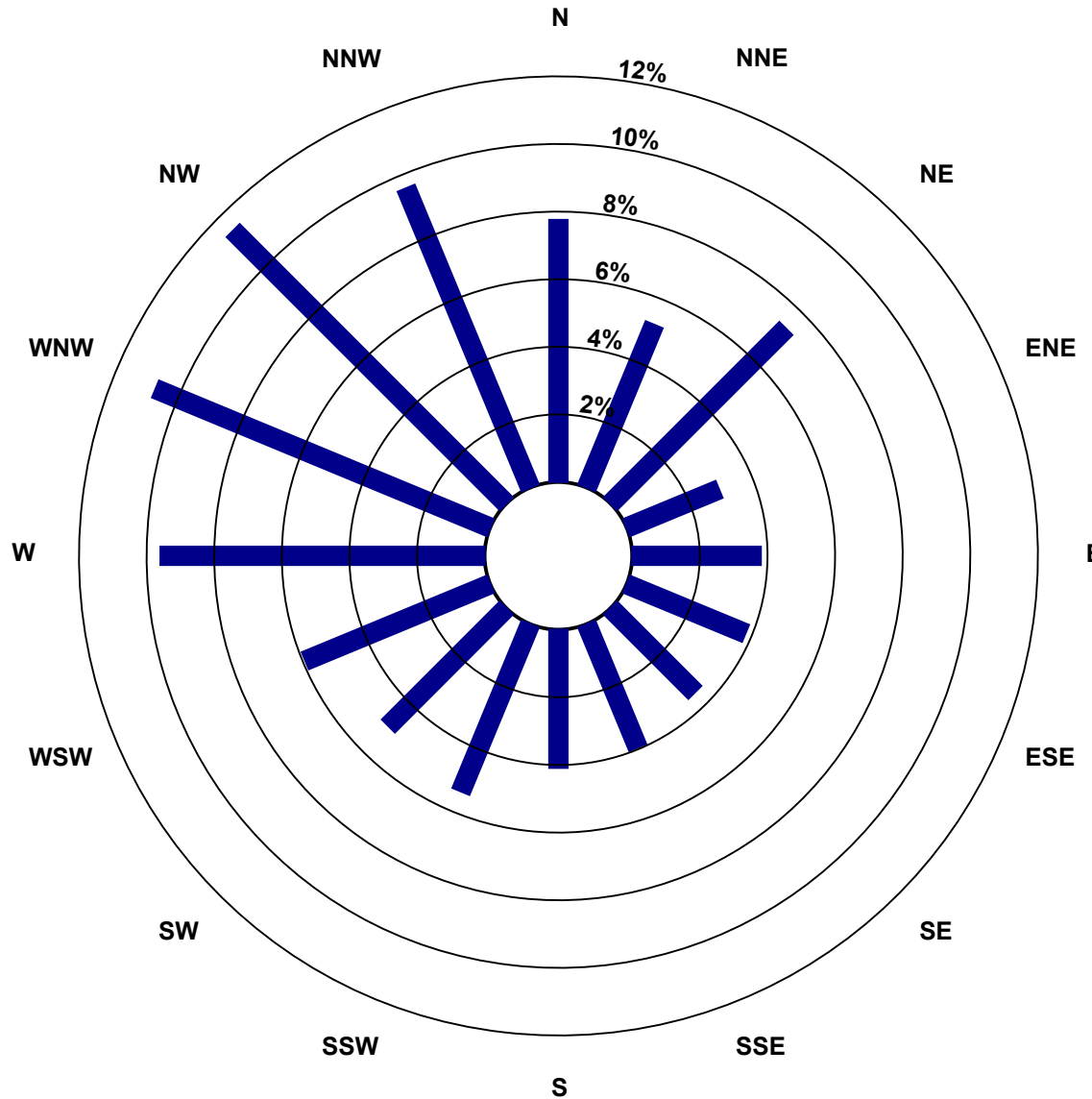
Total Number of Valid Hours: 709

Total Number of Hours: 744

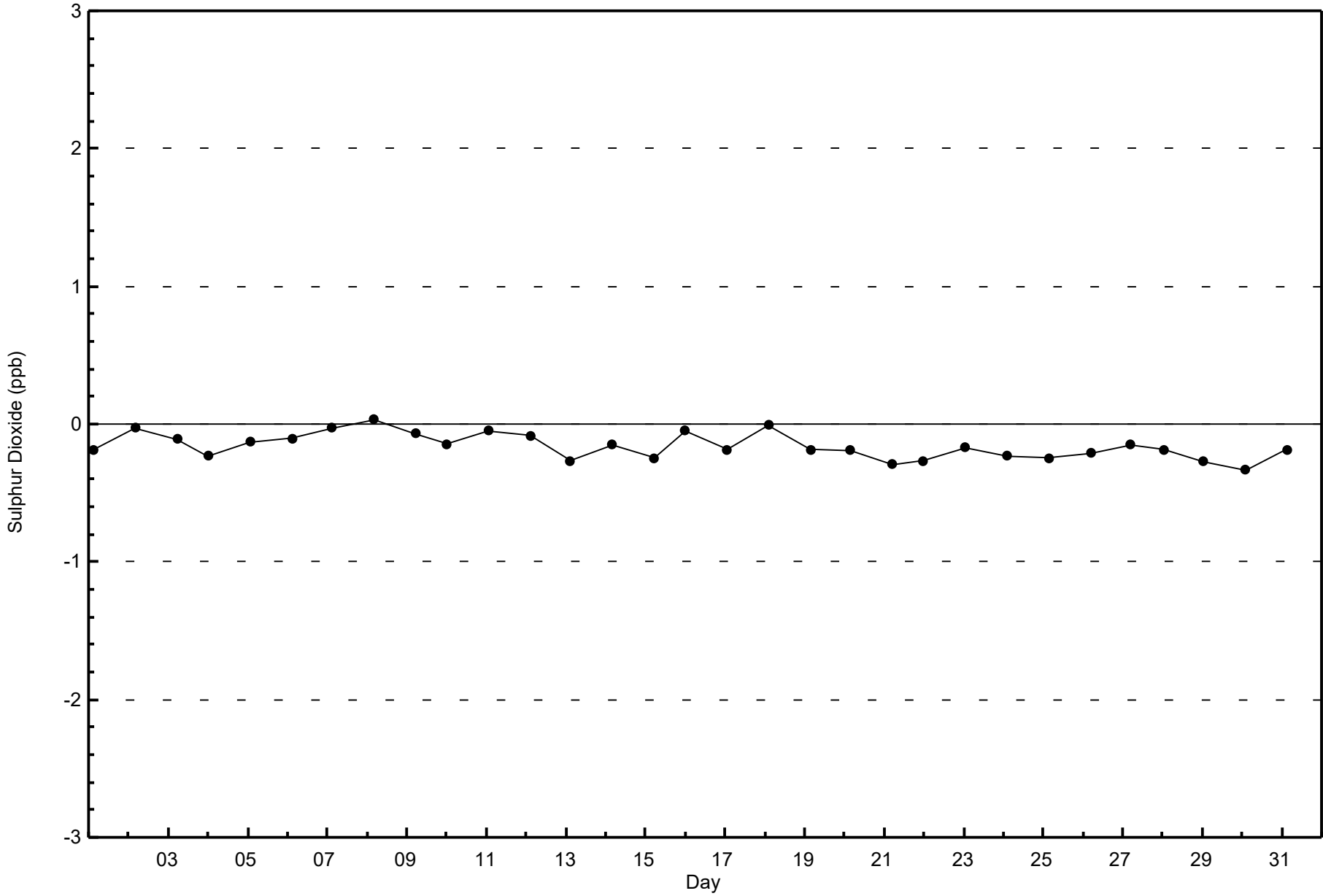


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Stony Mountain



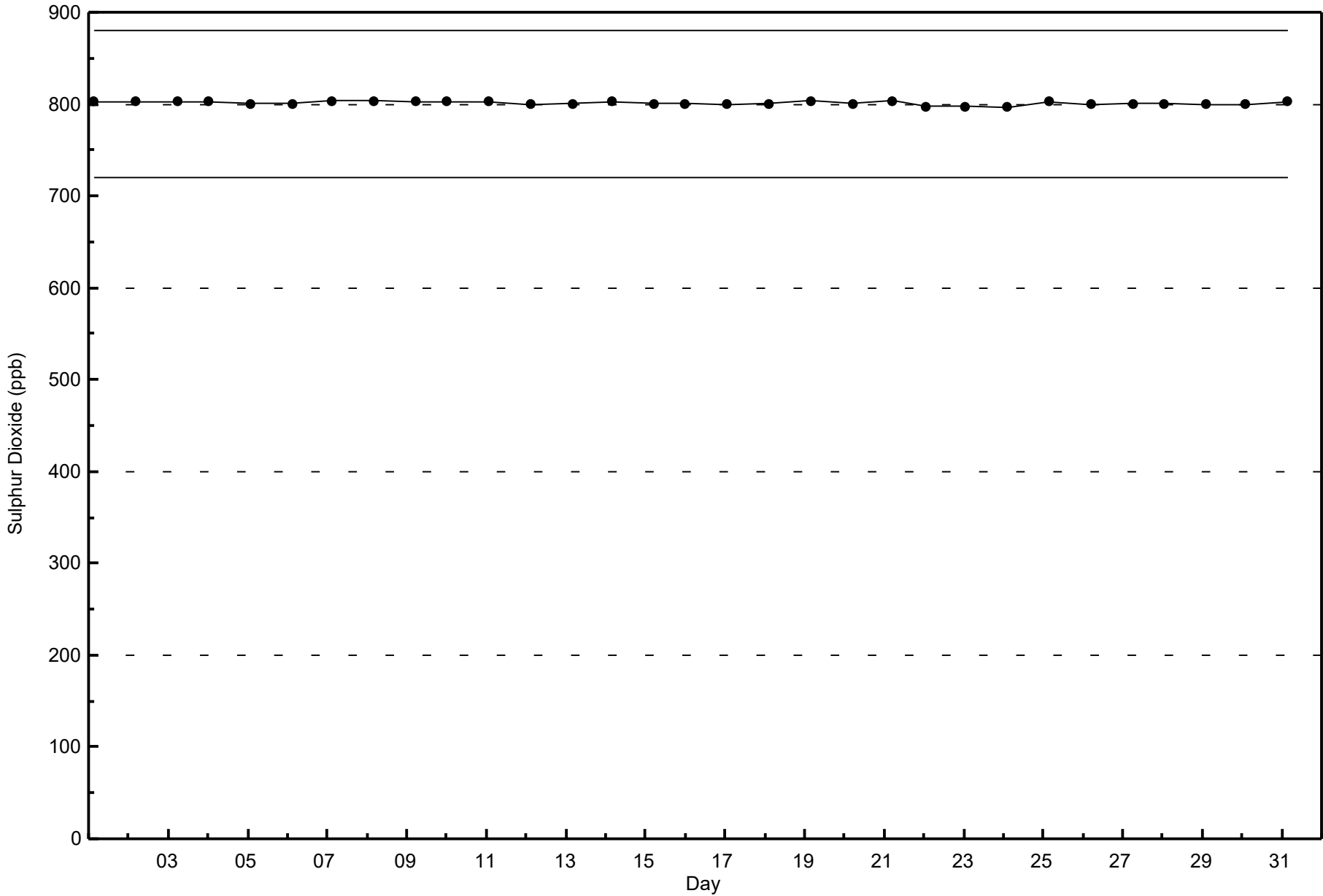
Total Number of Valid Hours: 709

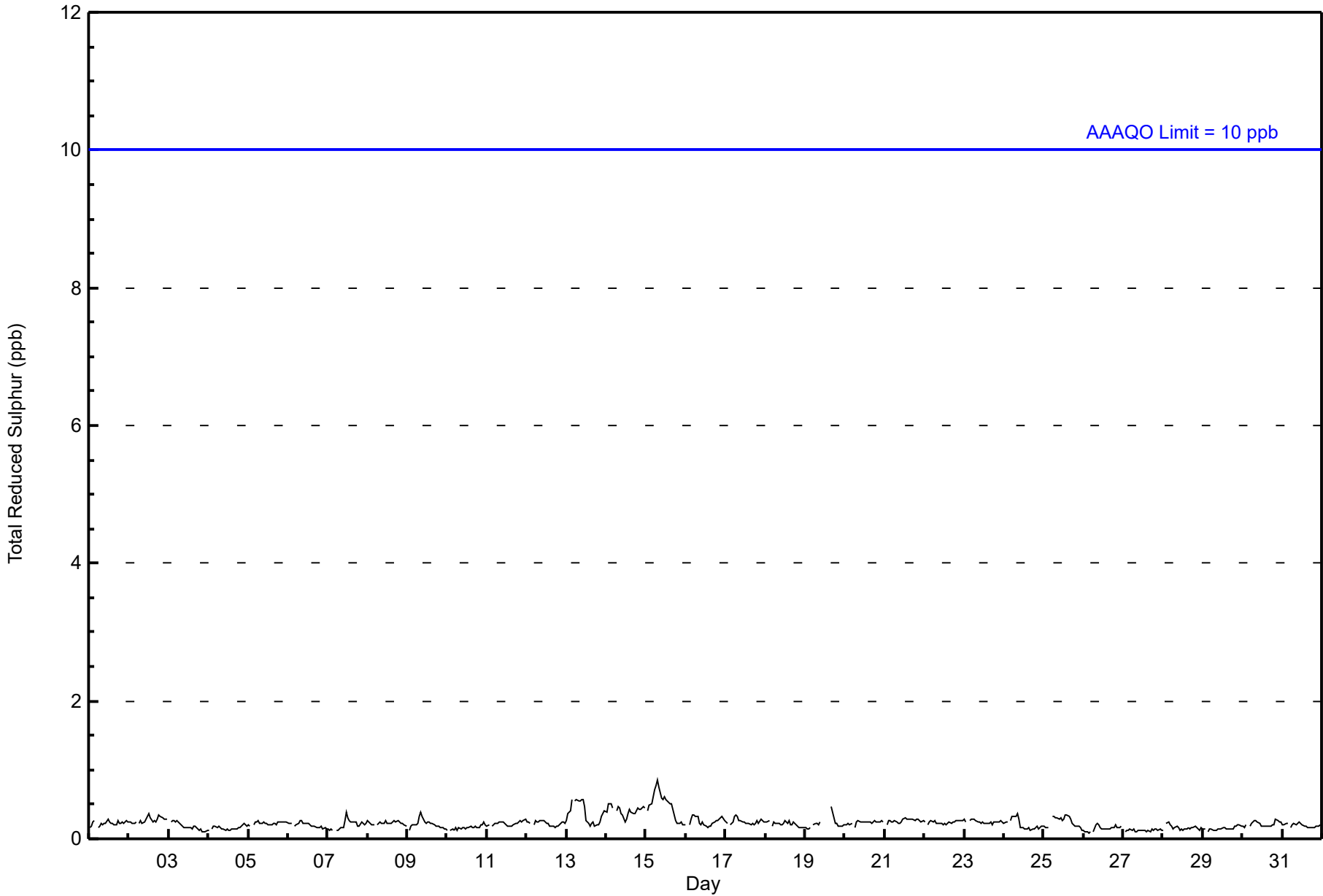




Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Stony Mountain - July 2023







Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Stony Mountain - July 2023

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
Stony Mountain - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	58	36	53	21	26	28	24	27	30	38	34	41	65	74	82	70	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	58	36	53	21	26	28	24	27	30	38	34	41	65	74	82	70	707

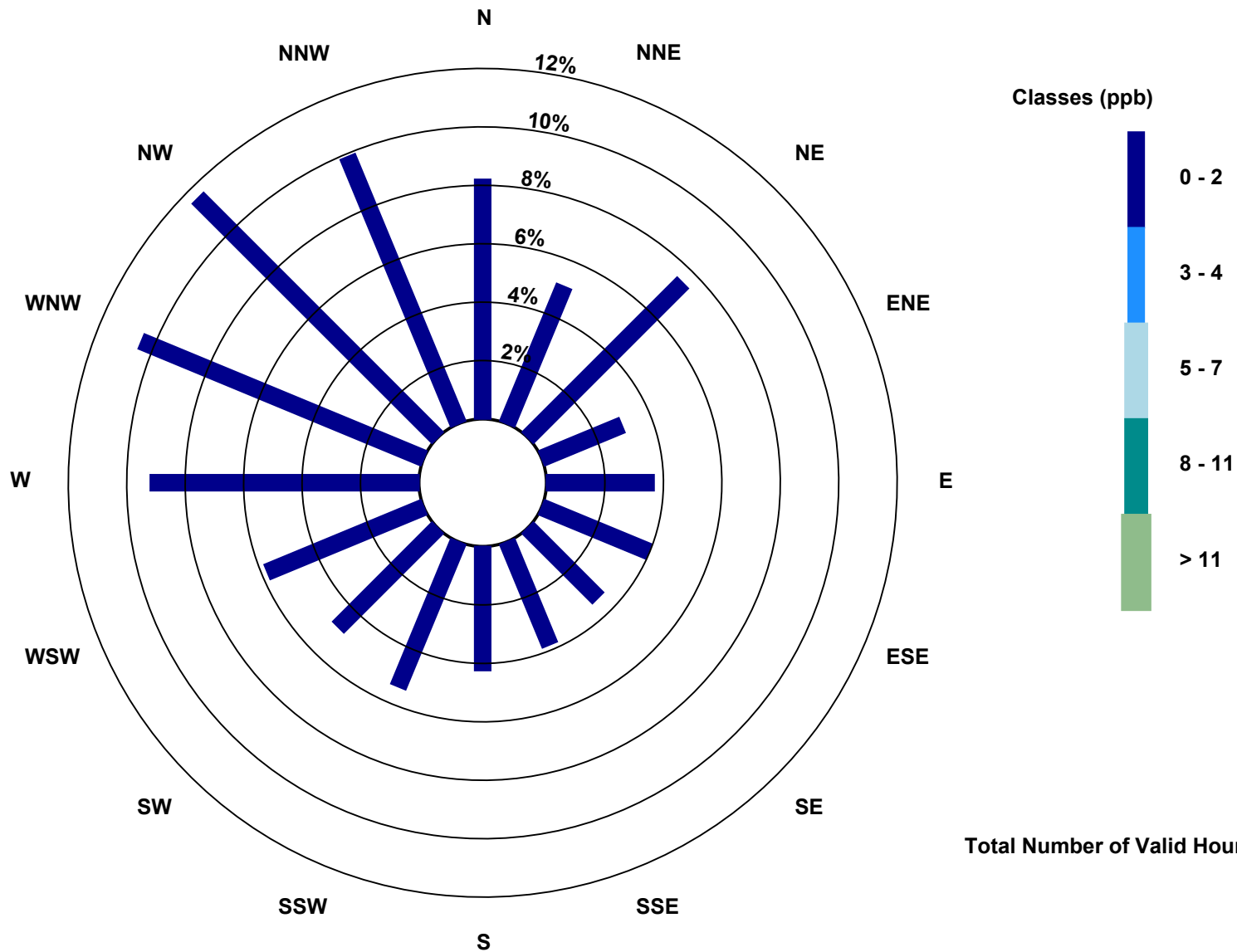
Total Number of Valid Hours: 707

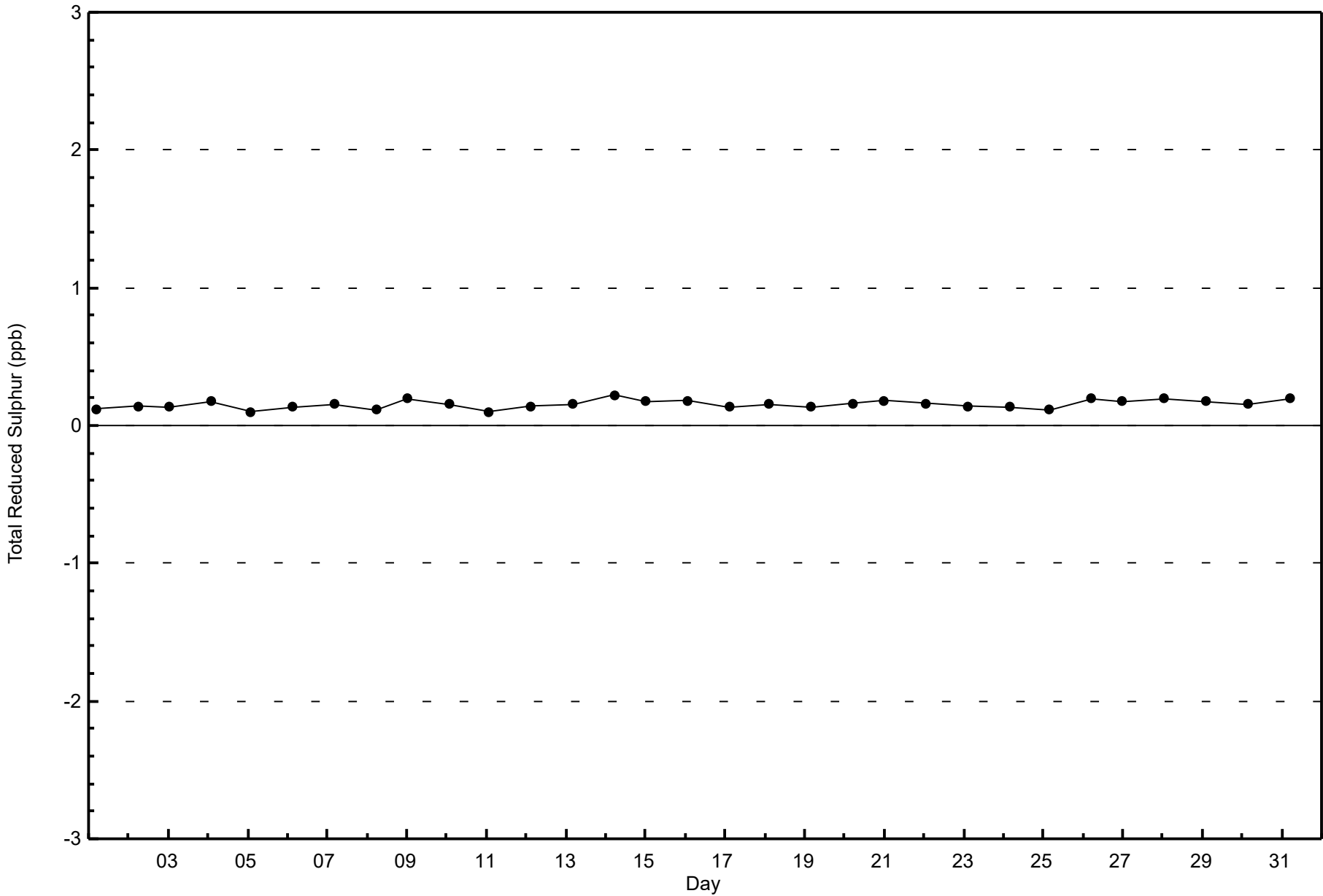
Total Number of Hours: 744

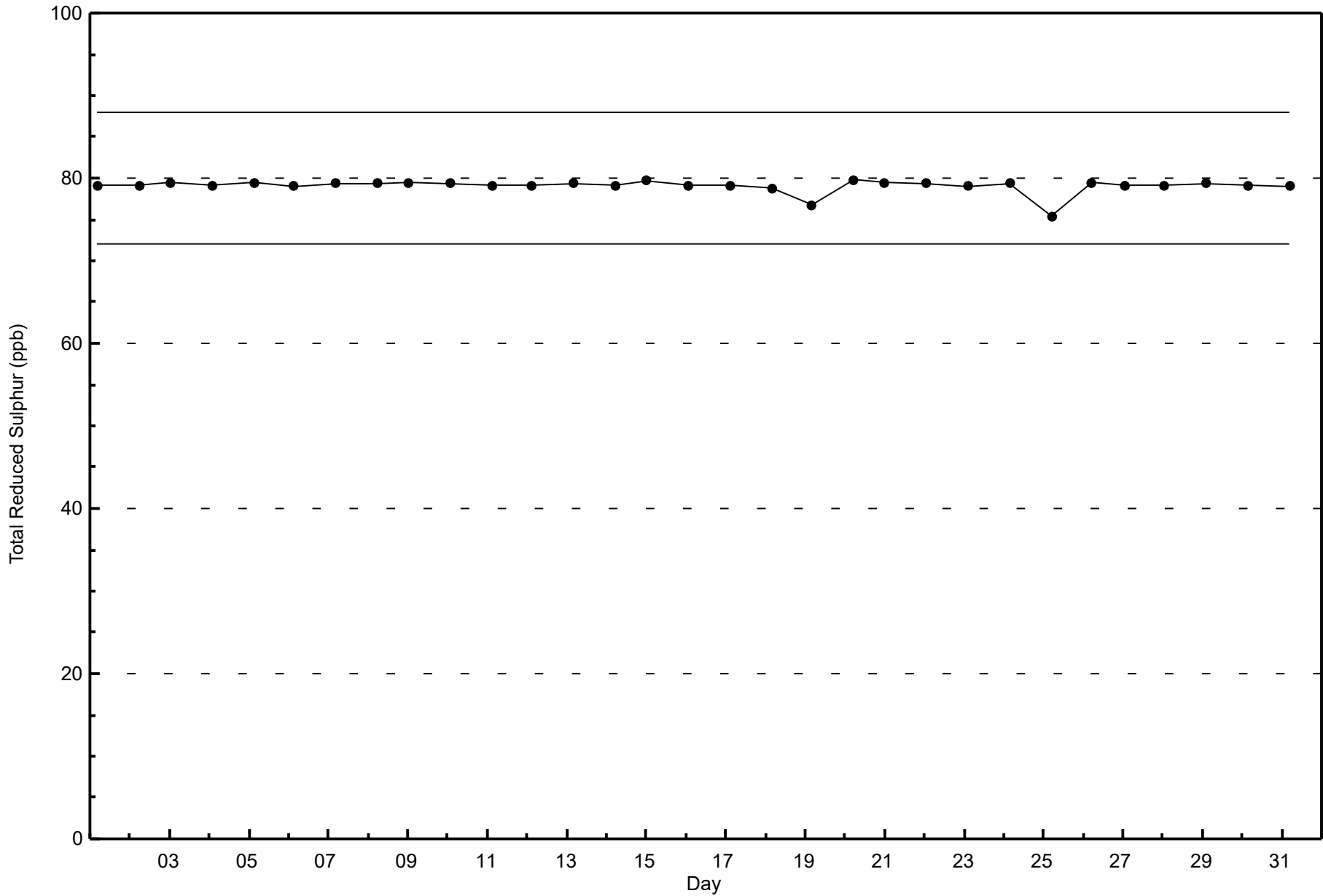


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Reduced Sulphur (TRS) - ppb
Stony Mountain



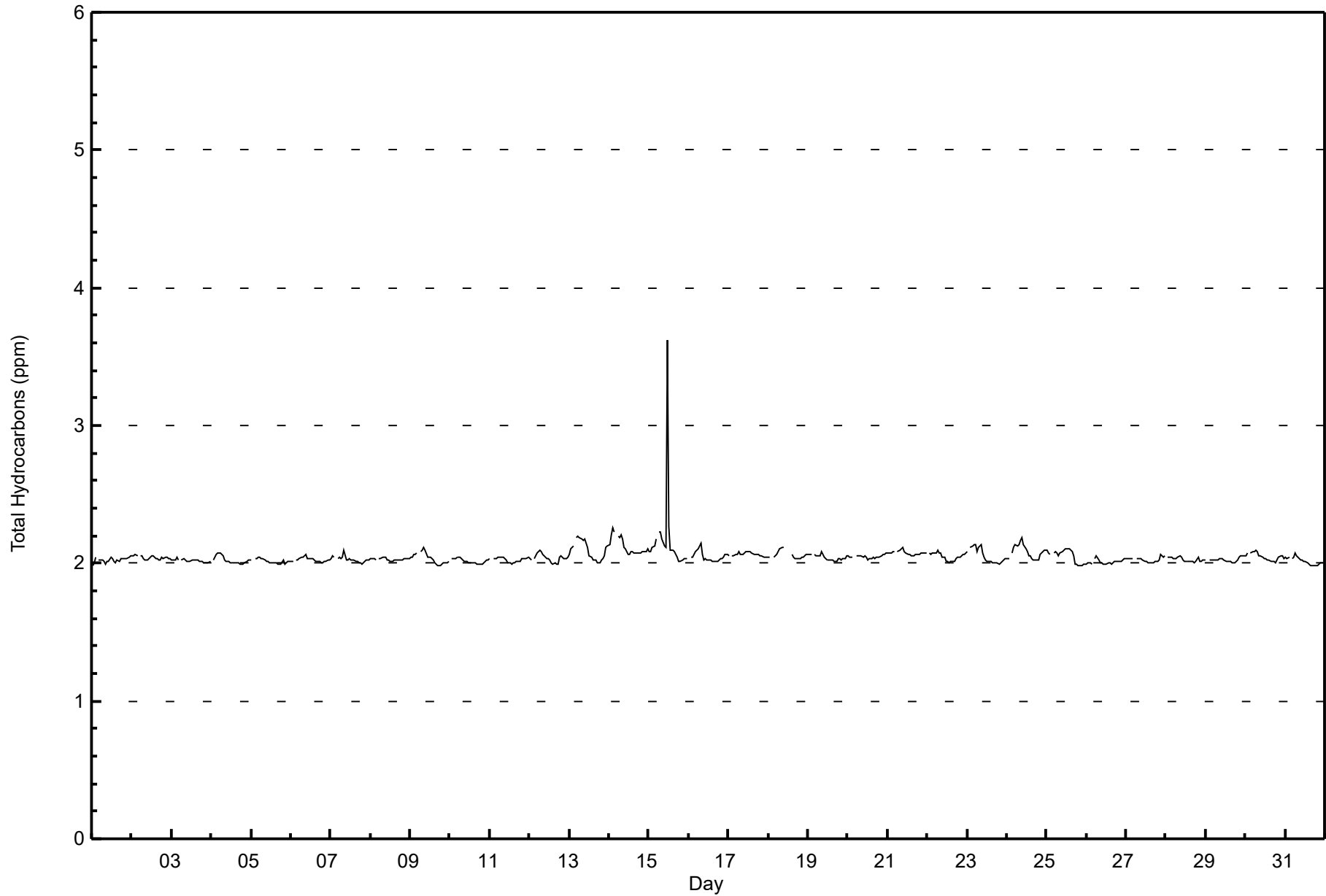






Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Stony Mountain - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Stony Mountain - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	479	67.56	67.56
2.1 - 3.0	229	32.30	99.86
3.1 - 10.0	1	0.14	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
Stony Mountain - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	32	20	41	10	22	18	8	19	23	26	27	40	59	49	49	36	479
2.1 - 3.0	22	17	11	11	5	9	17	9	6	12	8	2	9	27	32	32	229
3.1 - 10.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	37	52	21	27	27	25	28	29	38	35	42	68	76	81	68	709

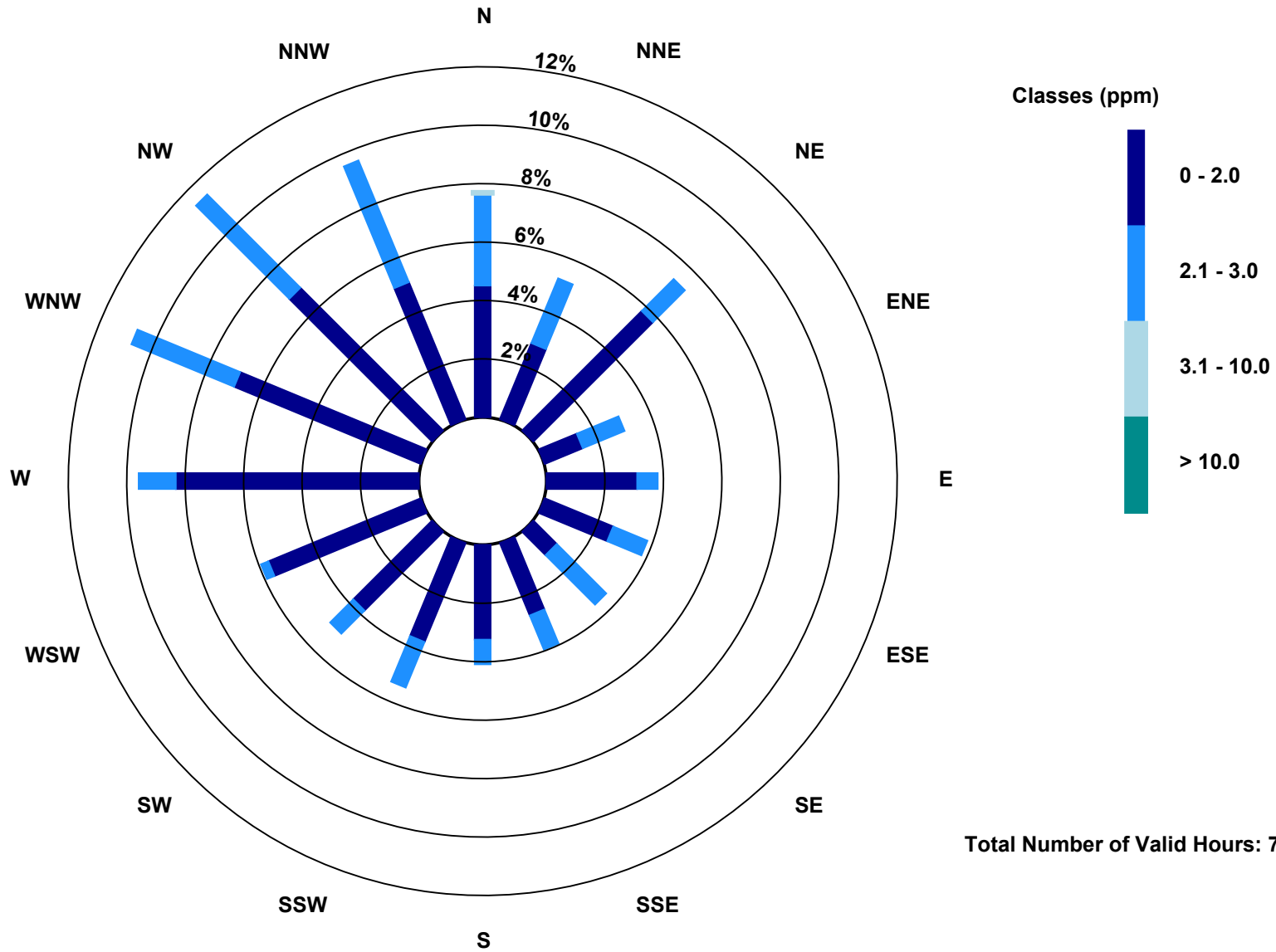
Total Number of Valid Hours: 709

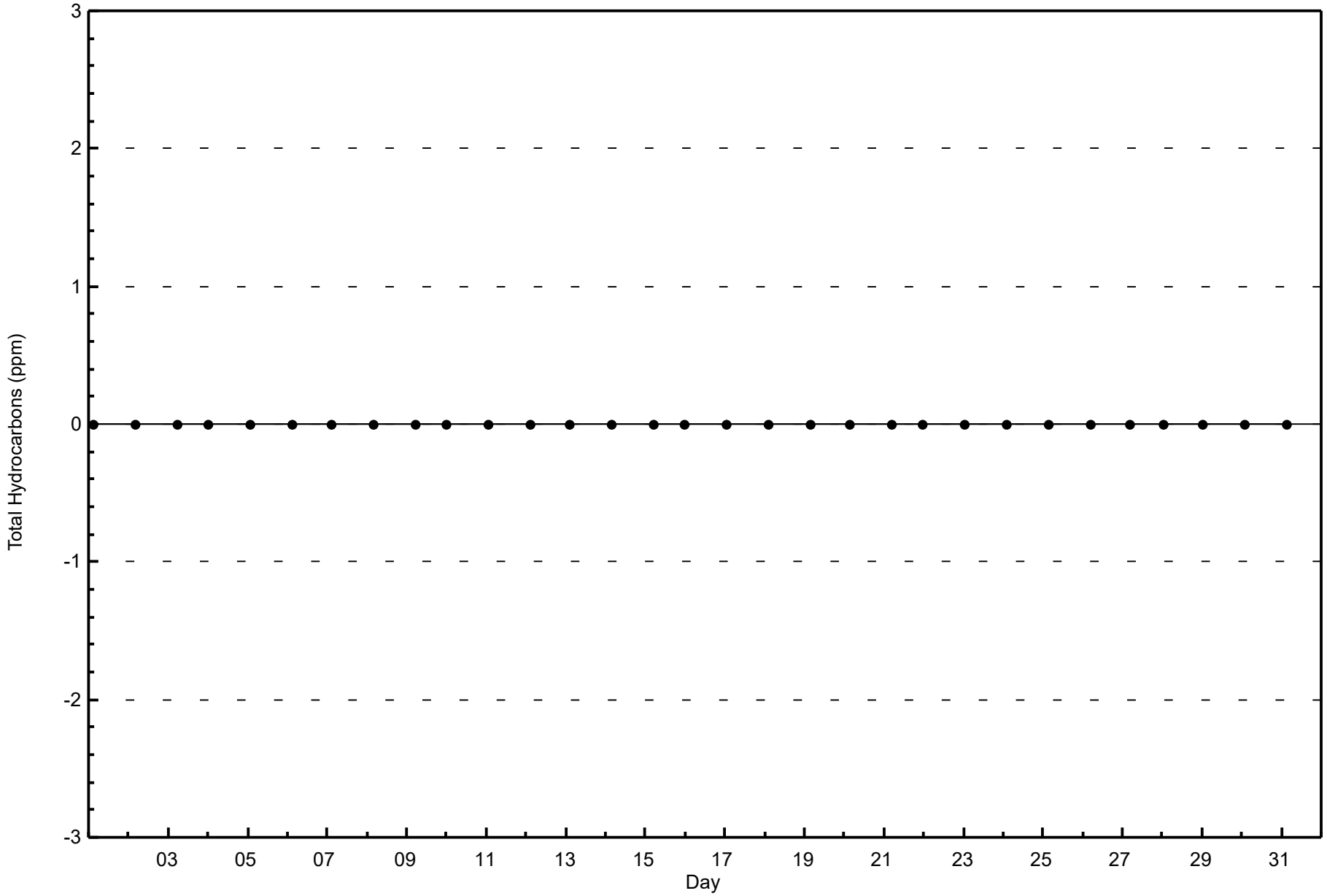
Total Number of Hours: 744

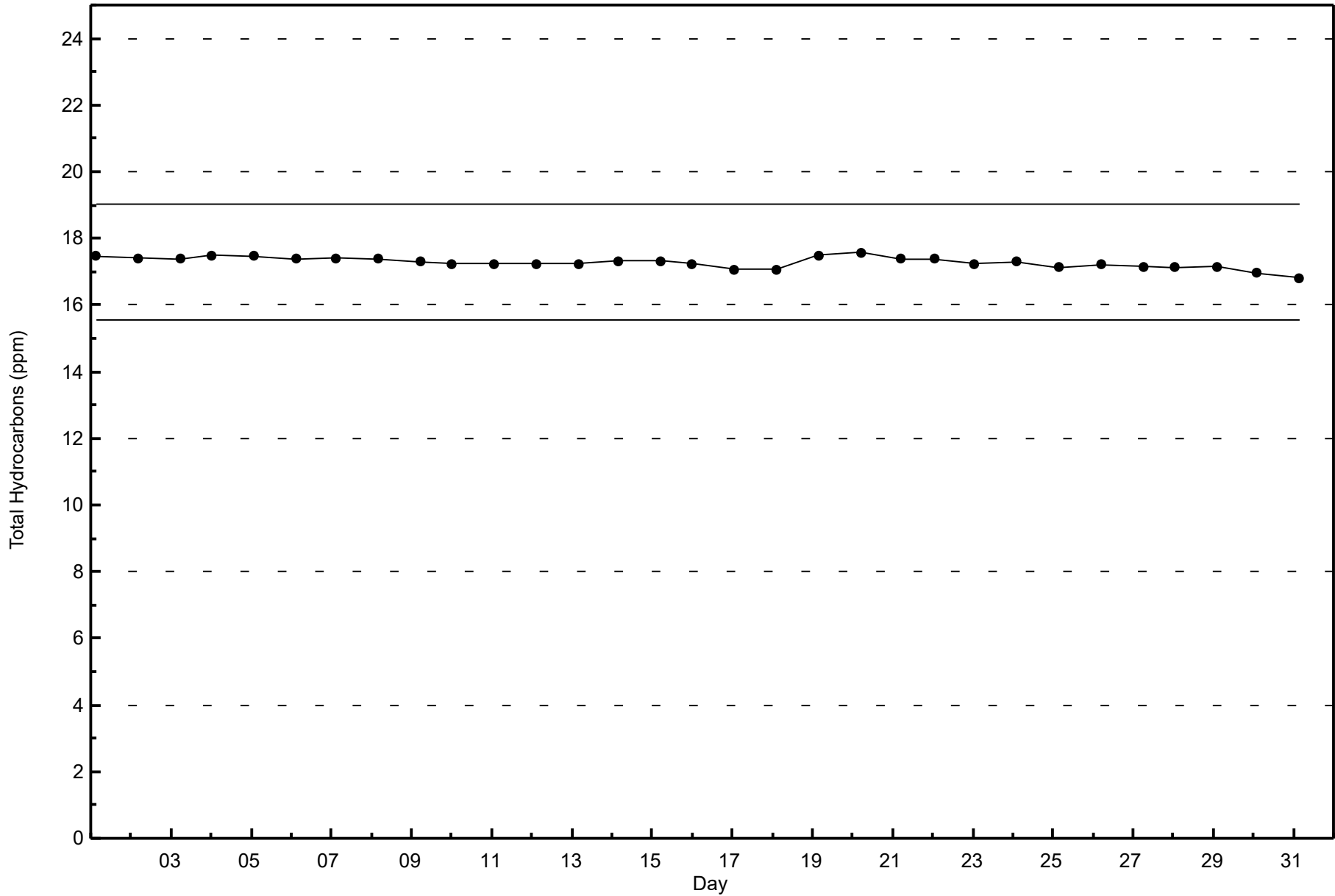


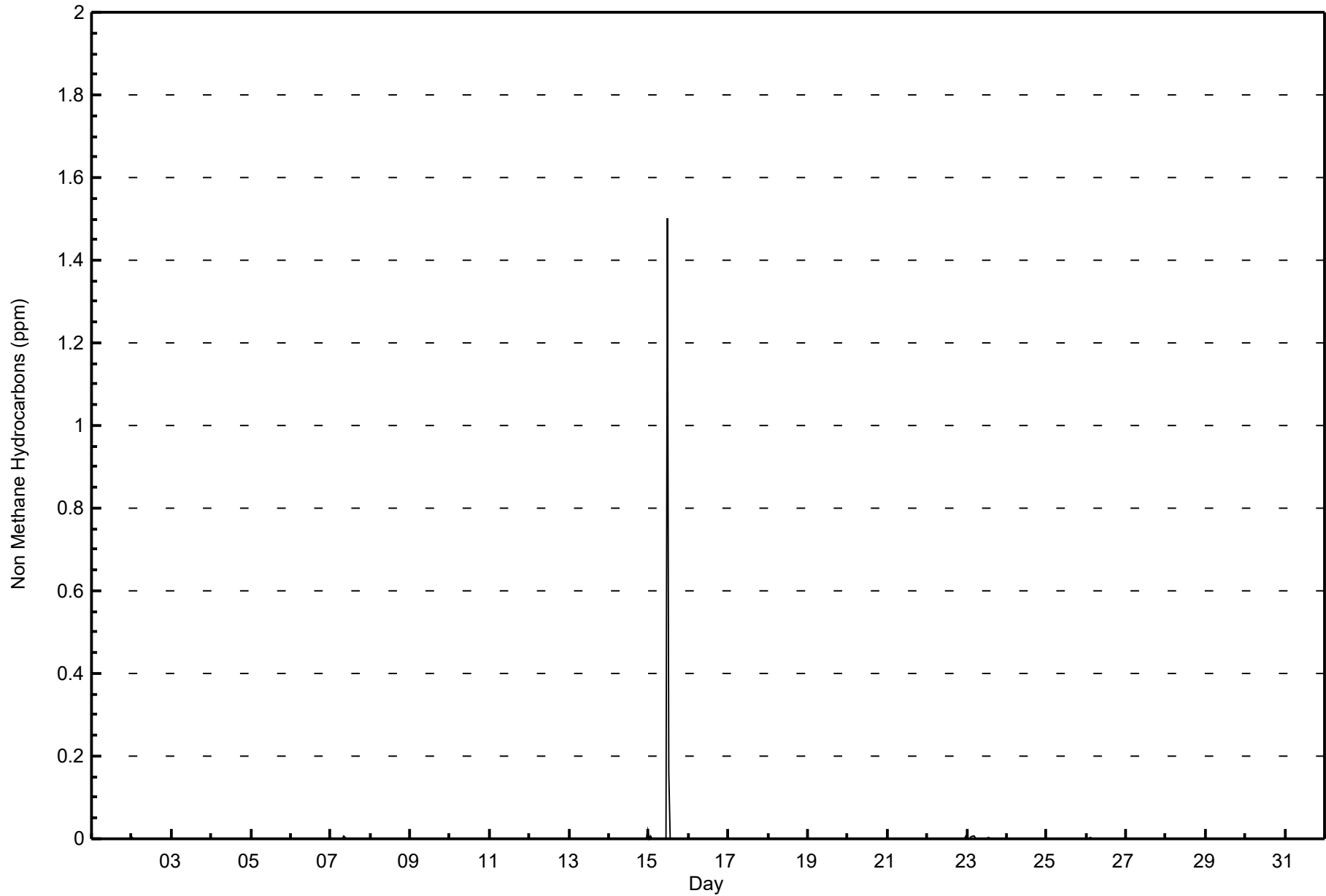
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Stony Mountain











**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	702	99.01	99.01
0.006 - 0.05	5	0.71	99.72
0.06 - 0.1	0	0.00	99.72
> 0.1	2	0.28	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	53	35	52	20	26	27	25	28	29	38	35	42	68	76	81	67	702
0.006 - 0.05	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	5
0.06 - 0.1	0	0	0	0	0	0	0	0	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	0	0	2
Totals	55	37	52	21	27	27	25	28	29	38	35	42	68	76	81	68	709

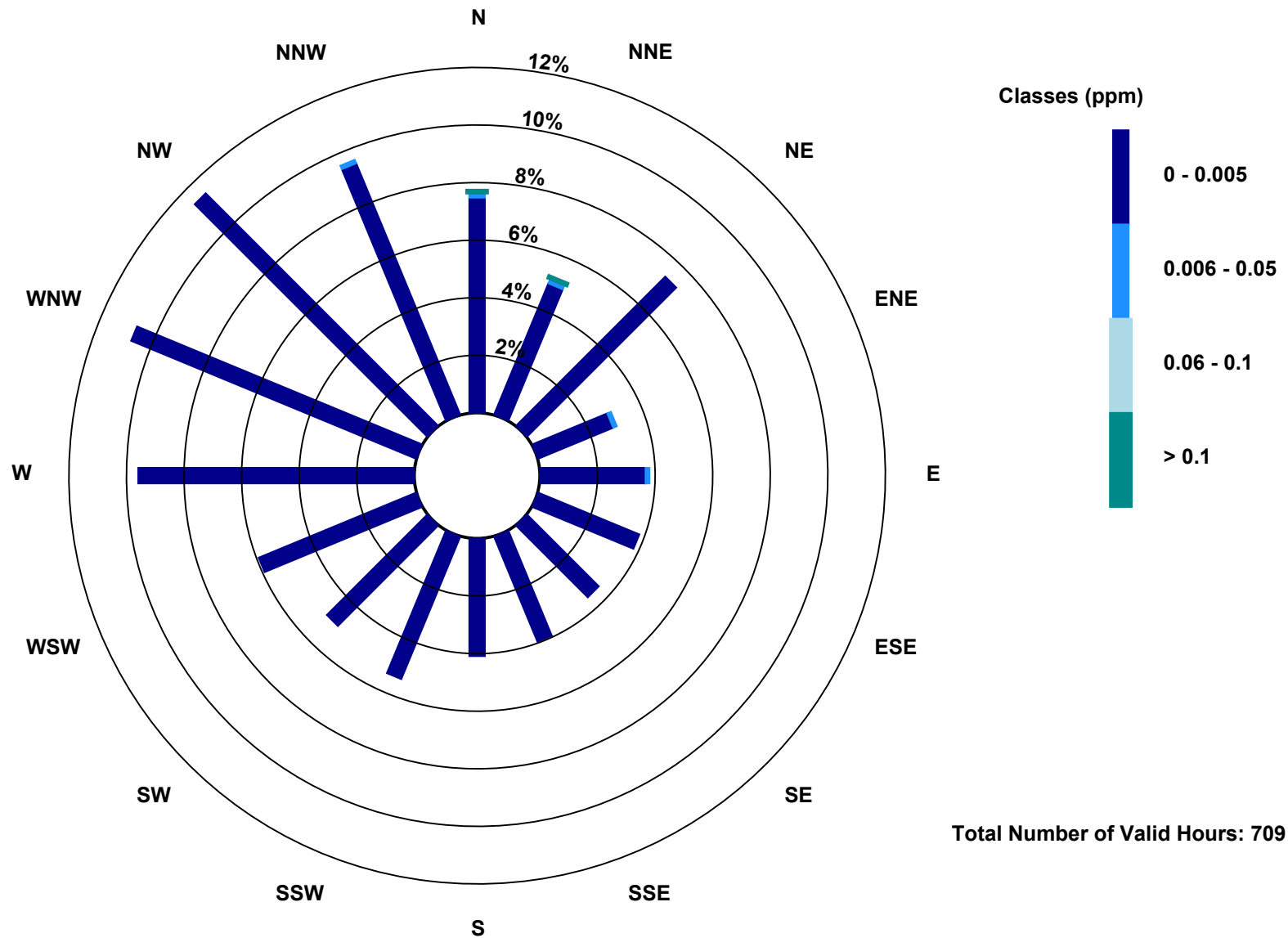
Total Number of Valid Hours: 709

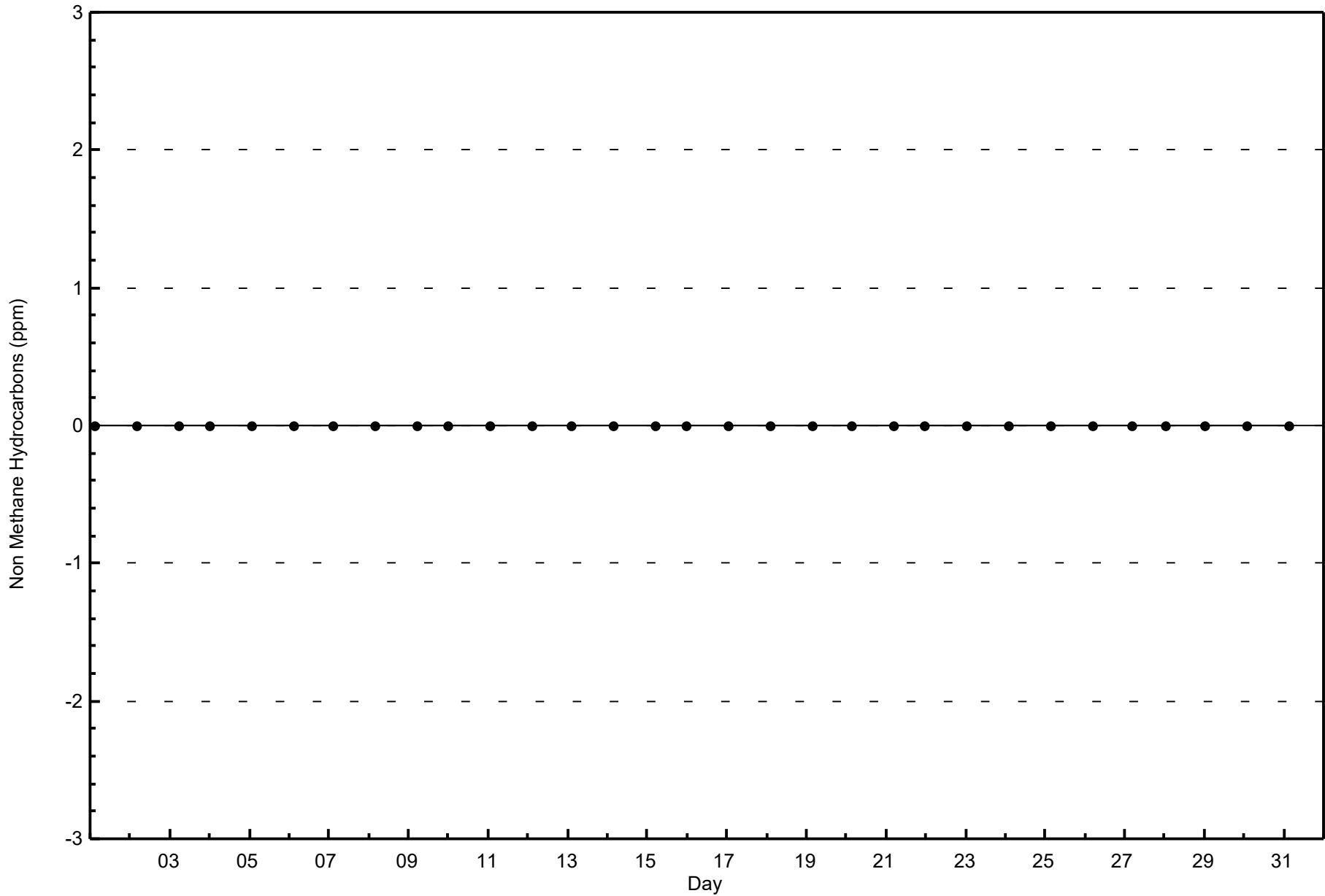
Total Number of Hours: 744

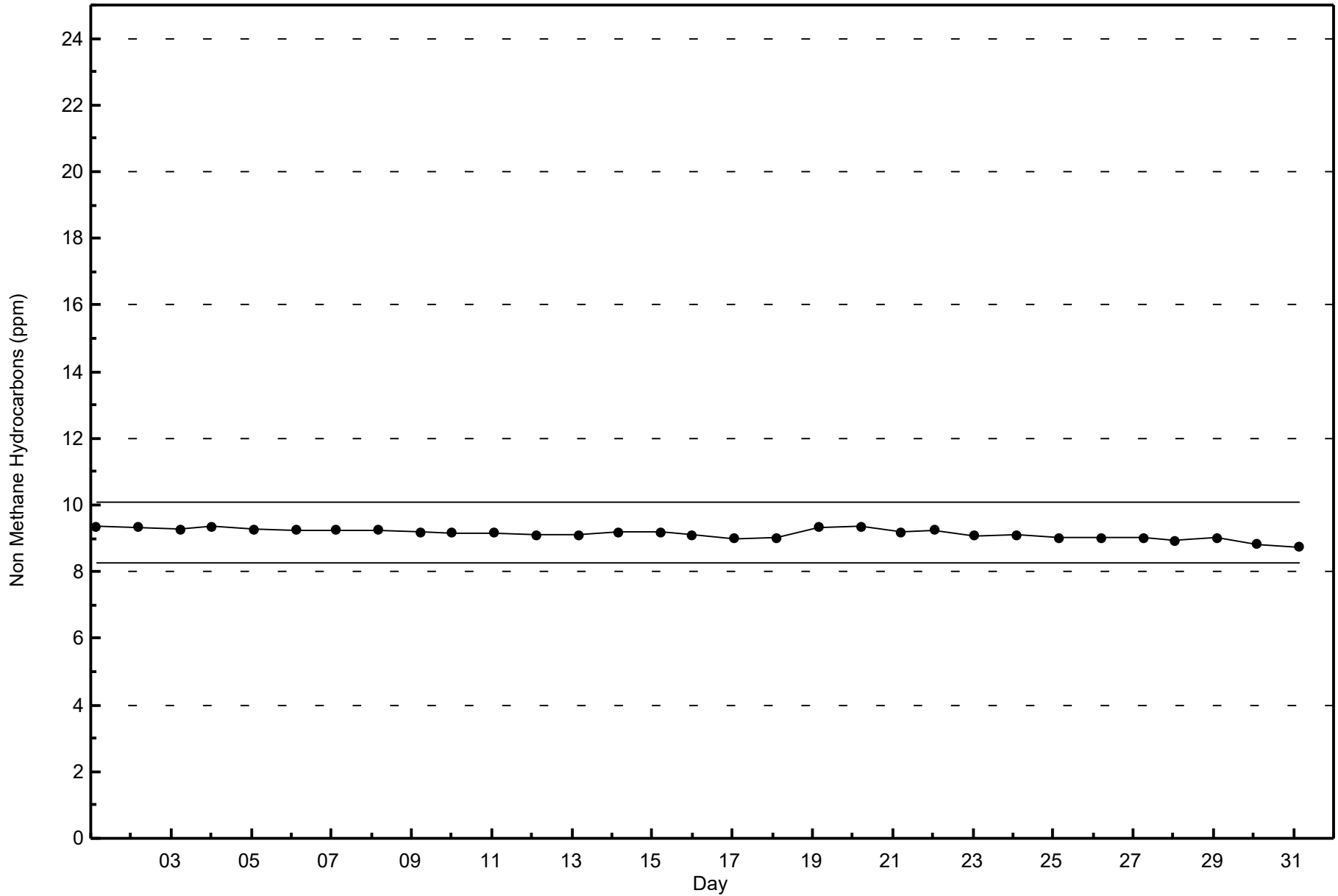


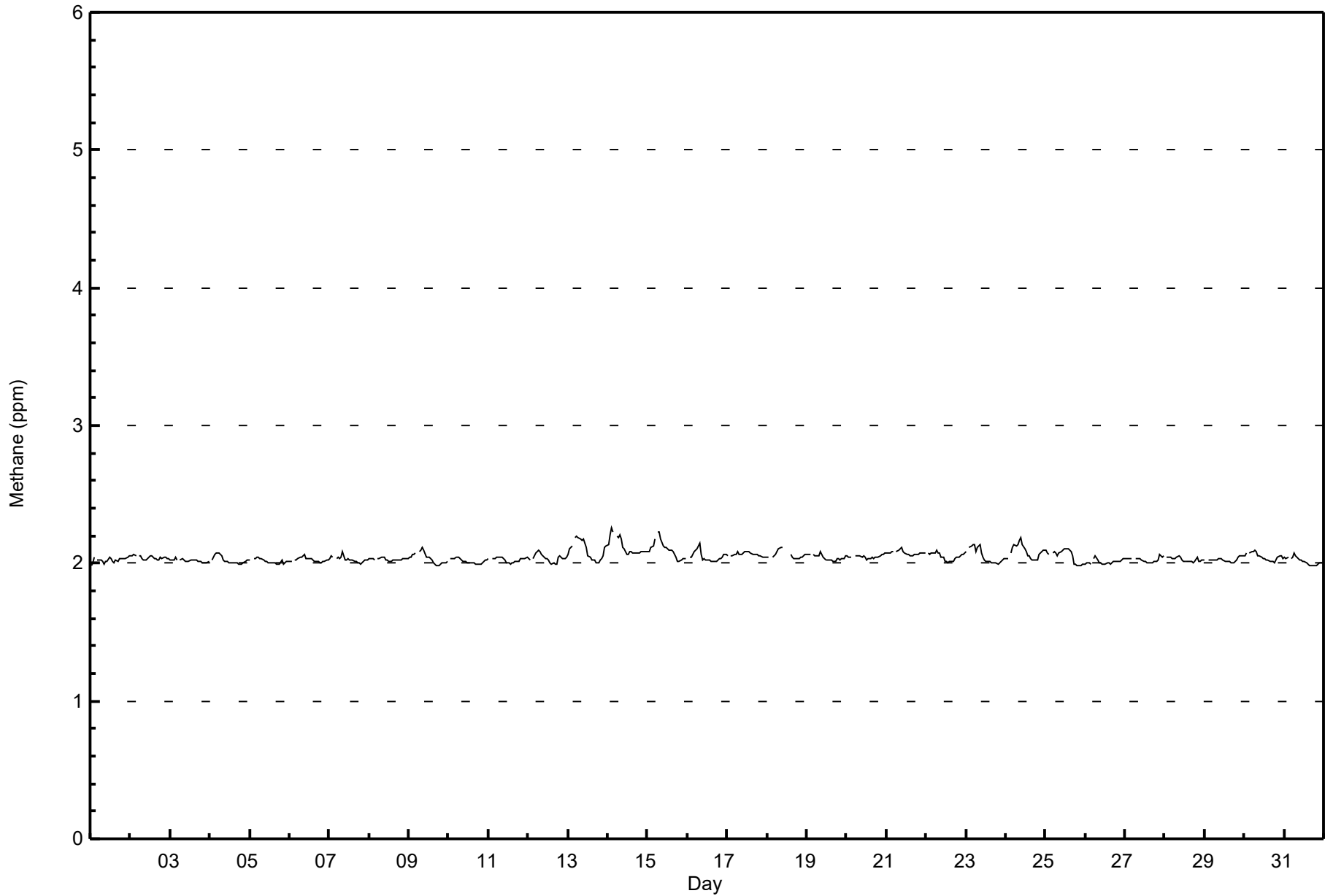
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain











**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Stony Mountain - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	479	67.56	67.56
2.1 - 3.0	230	32.44	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



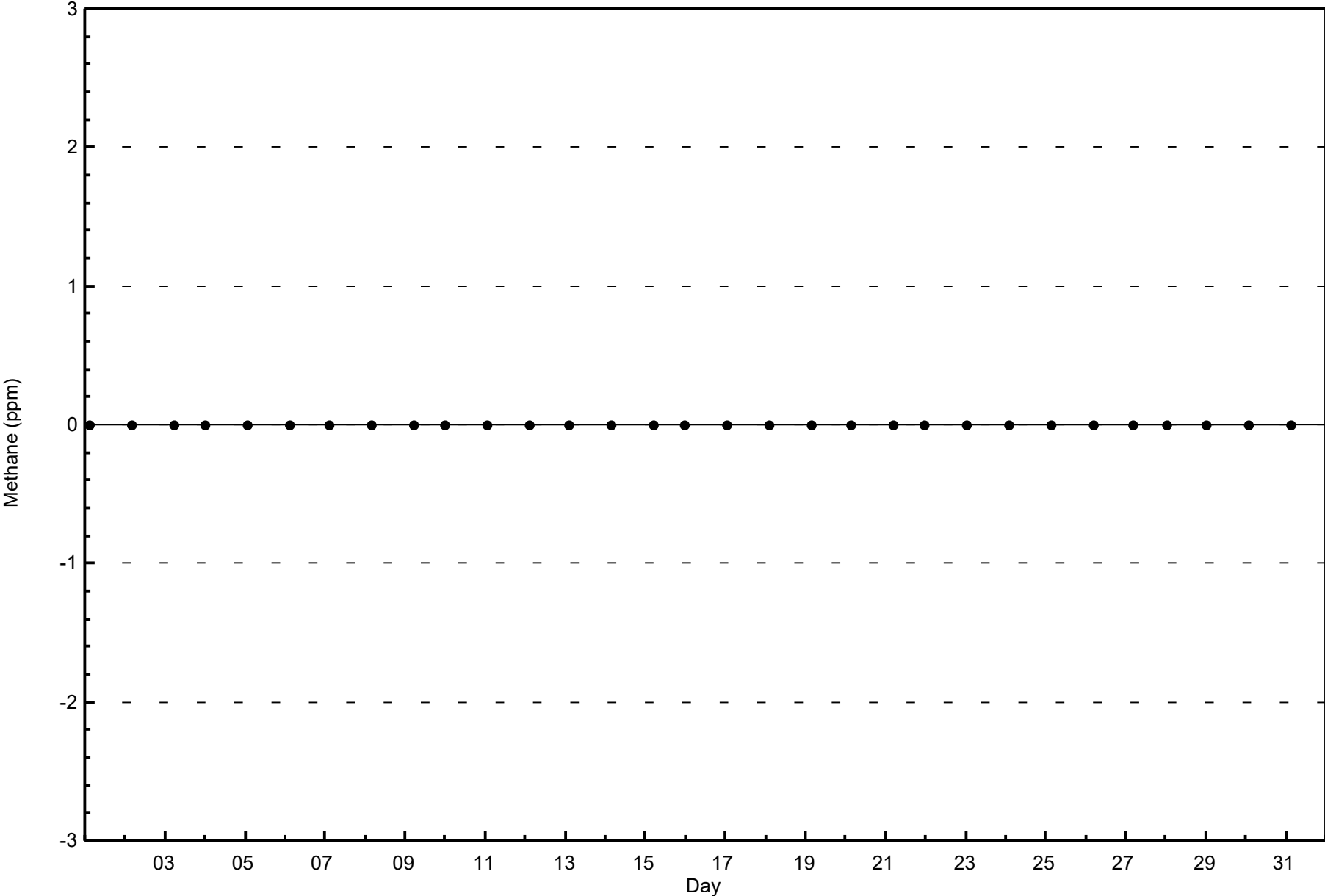
**Wood Buffalo Environmental Association
Frequency Distribution**

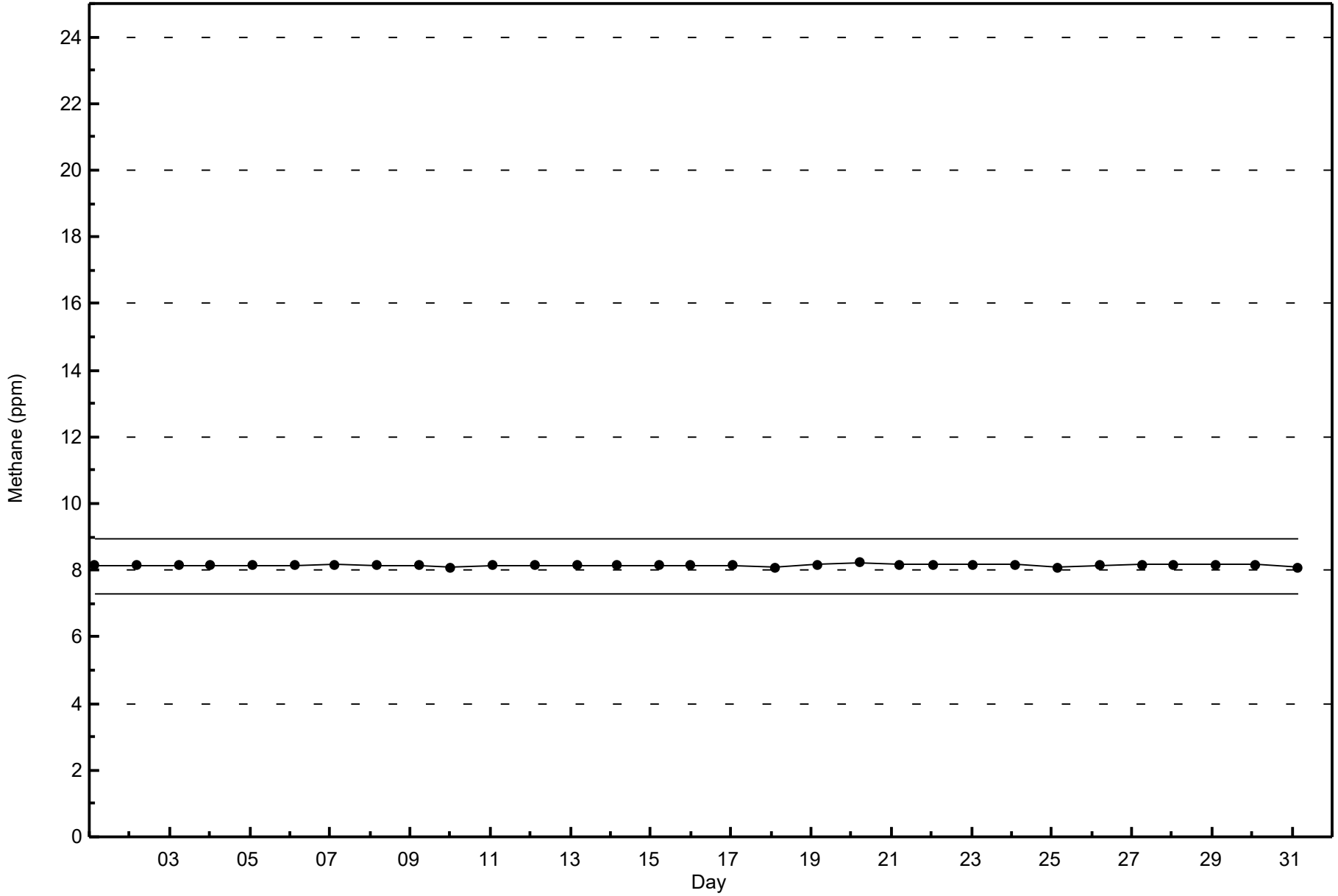
**Methane (CH₄) - ppm
Stony Mountain - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	32	20	41	10	22	18	8	19	23	26	27	40	59	49	49	36	479
2.1 - 3.0	23	17	11	11	5	9	17	9	6	12	8	2	9	27	32	32	230
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	55	37	52	21	27	27	25	28	29	38	35	42	68	76	81	68	709

Total Number of Valid Hours: 709

Total Number of Hours: 744

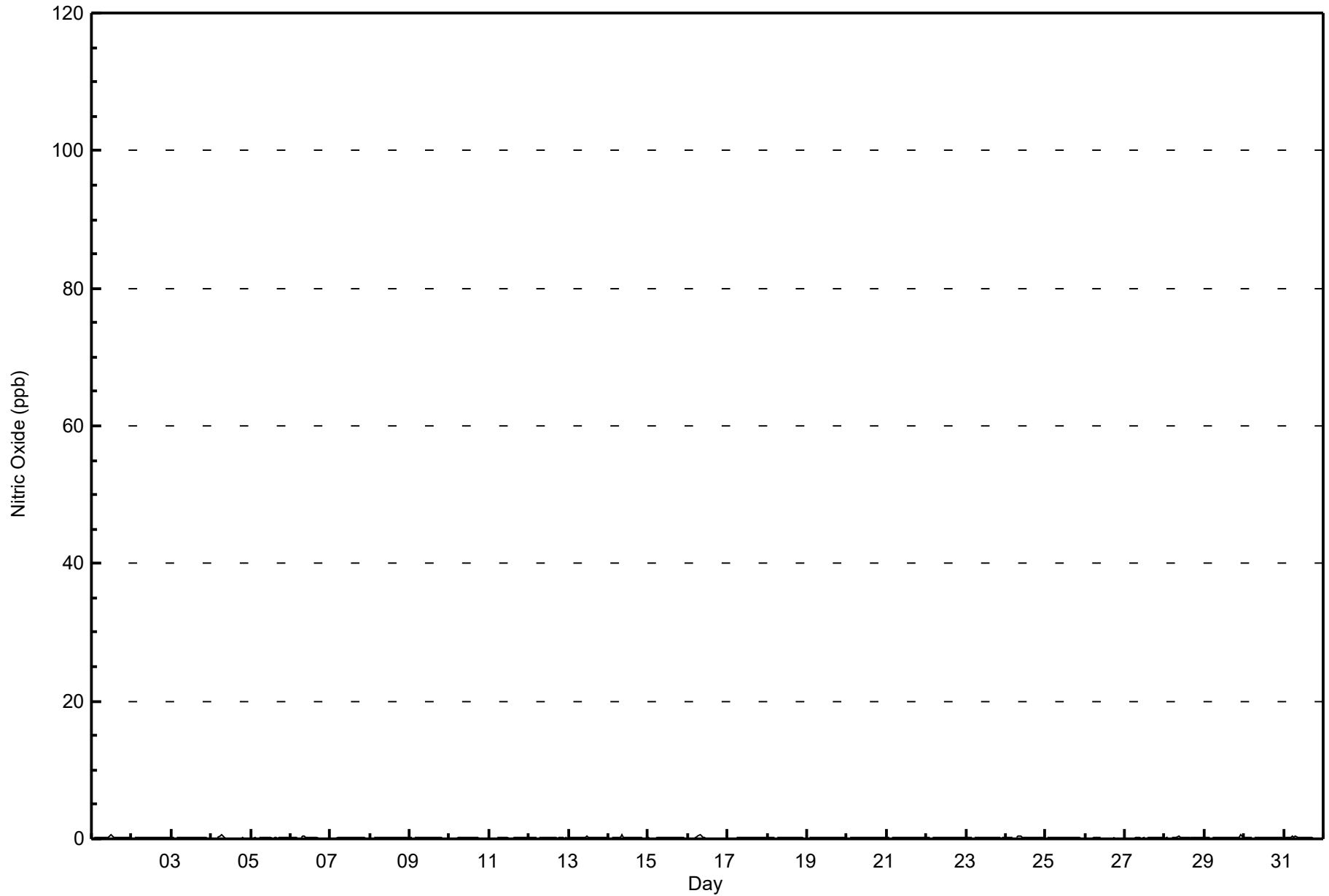






Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Stony Mountain - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Stony Mountain - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Stony Mountain - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	57	37	53	21	27	26	22	25	26	40	33	43	71	75	80	70	706
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	57	37	53	21	27	26	22	25	26	40	33	43	71	75	80	70	706

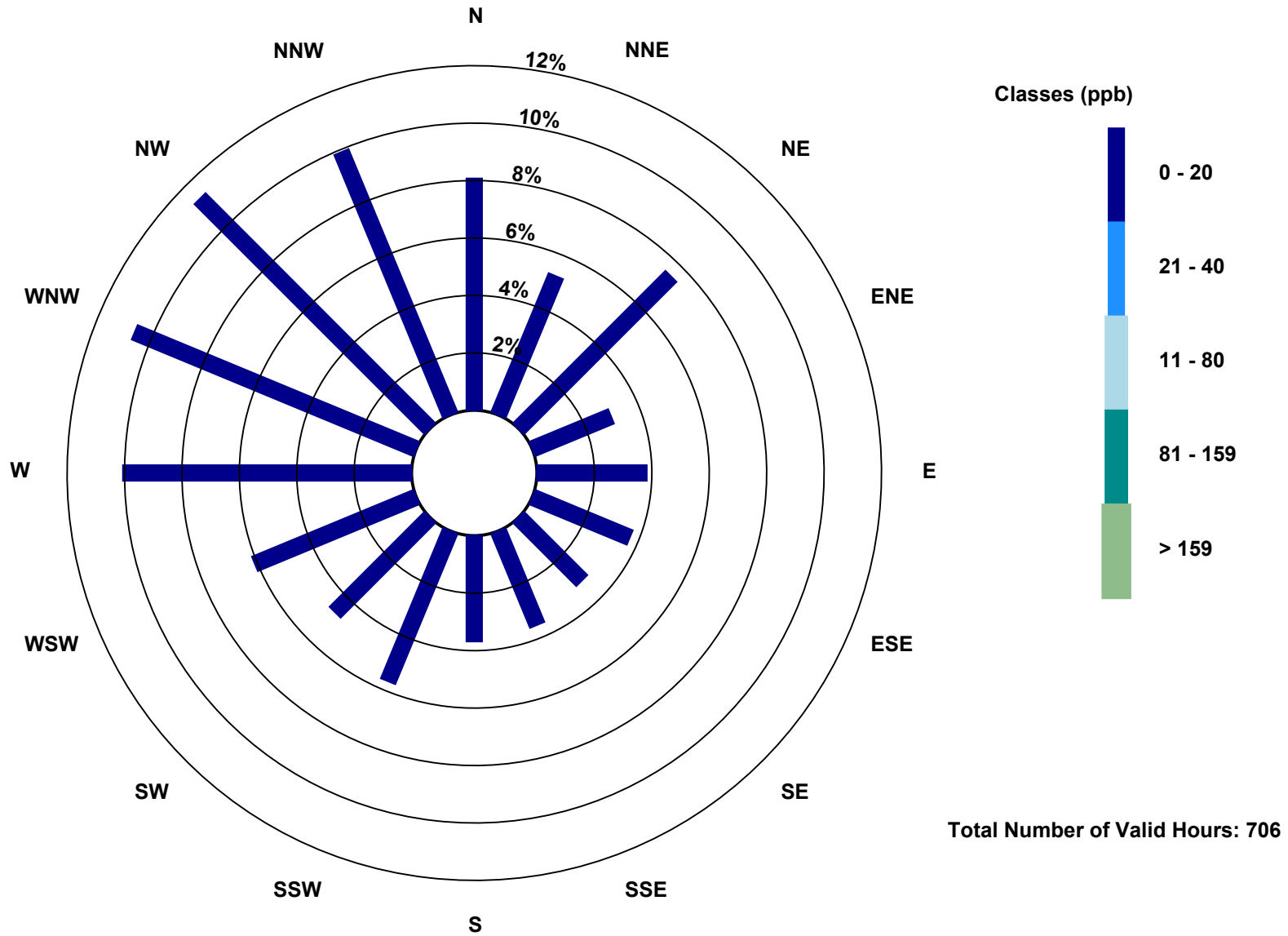
Total Number of Valid Hours: 706

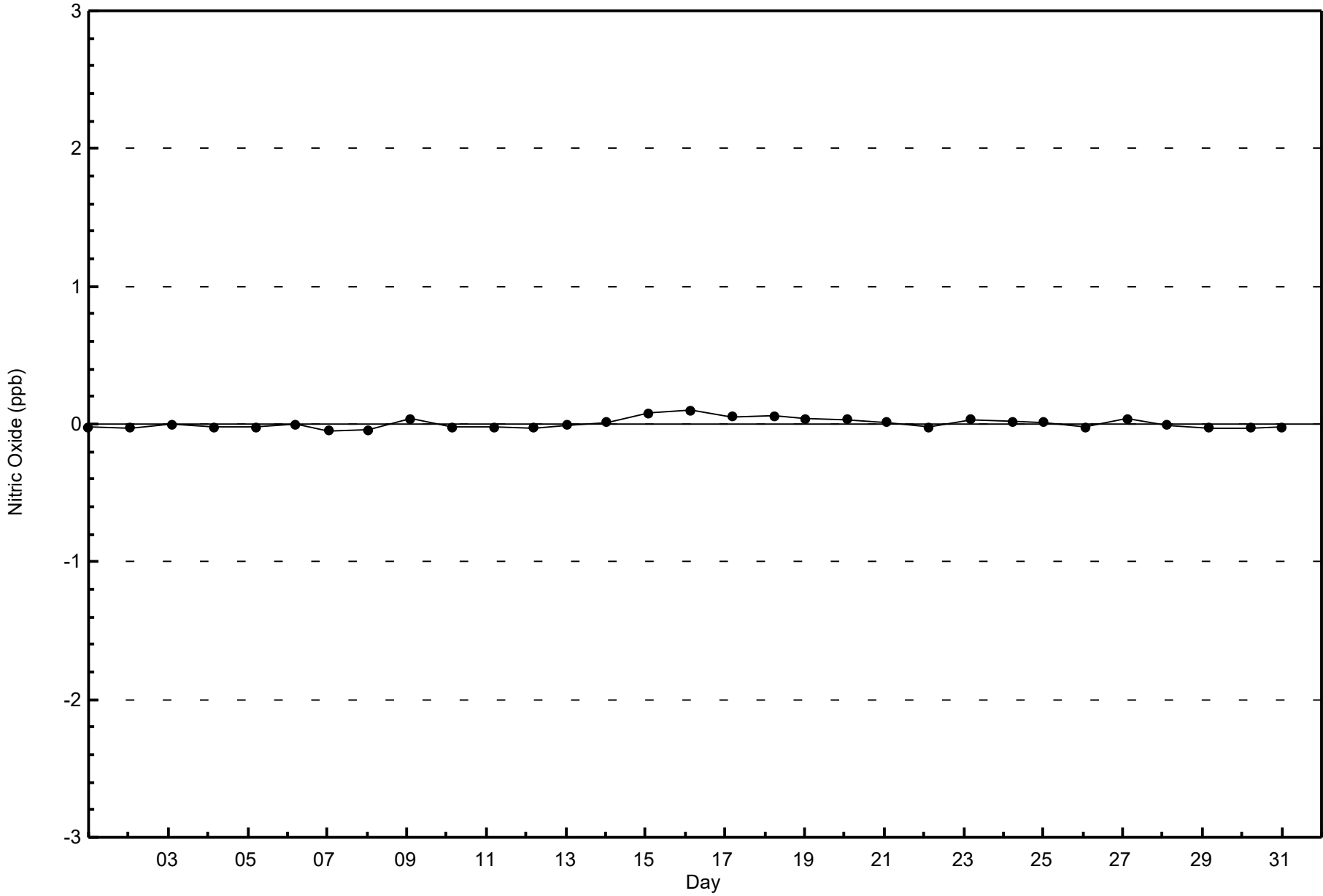
Total Number of Hours: 744

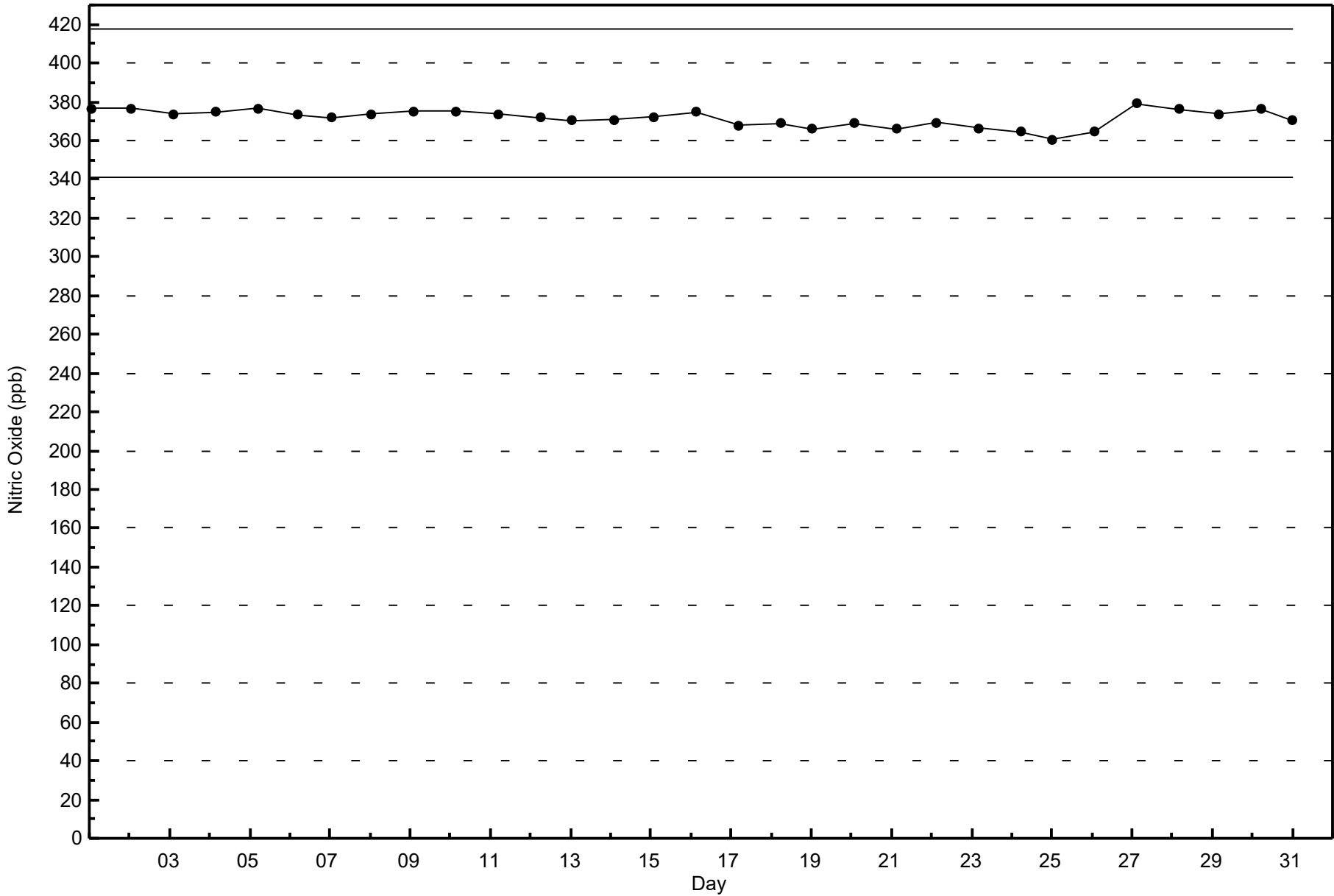


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Stony Mountain









Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - July 2023

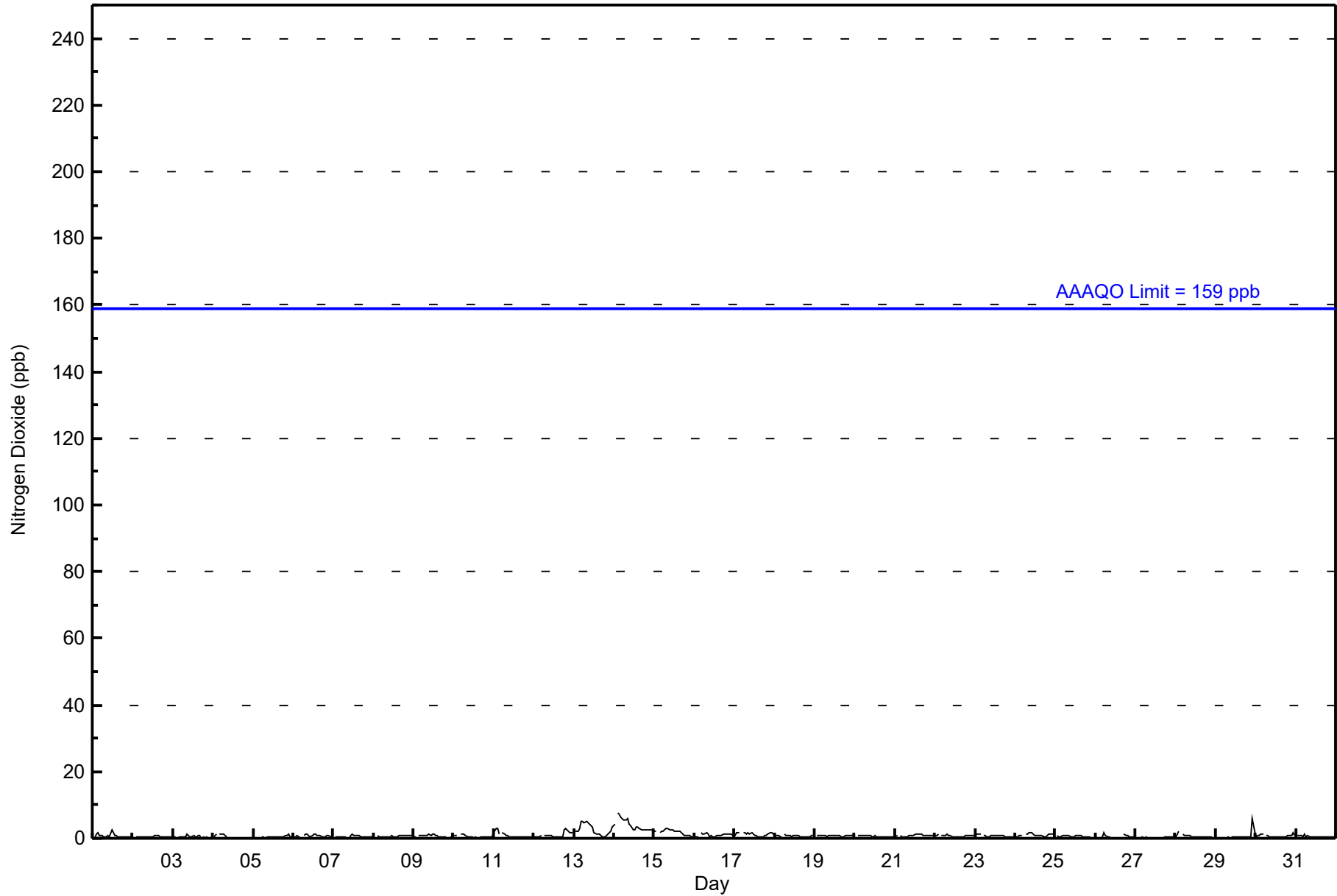
Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744														Daily Average		Daily Maximum					
Maximum Value: 7.7 ppb on Jul 14 03:00		Maximum Daily Average: 4.0 ppb on Jul 14		Hours of Data: 706														0.7		2.7							
Minimum Value: 0.0 ppb on Jul 4 13:00		Minimum Daily Average: 0.2 ppb on Jul 27		Hours of Missing Data: 38														0.5		0.7							
Maximum Diurnal Average: 1.3 ppb at hour 6		Minimum Diurnal Average: 0.6 ppb at hour 18		Hours of Calibration: 38														0.5		1.3							
Monthly Average: 0.89 ppb		Percentiles: P ₁ = 0.1 P ₁₀ = 0.3 Q ₁ = 0.4 Median = 0.6 Q ₃ = 0.9 P ₉₀ = 1.7 P ₉₉ = 5.4		Percent Operational Time: 100.0														0.4		1.2							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	0.5	1.3	1.8	1.0	0.7	0.6	0.5	0.4	0.7	0.5	2.7	1.9	0.9	0.7	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.7	2.7	
2-Jul	0.5	Z	0.5	0.6	0.6	0.5	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.7	
3-Jul	0.4	0.4	Z	0.5	0.6	0.5	0.5	0.6	1.3	0.7	0.3	0.5	0.8	0.5	0.4	0.8	0.7	0.2	0.3	0.1	0.3	0.2	0.2	0.3	0.5	1.3	
4-Jul	0.3	0.9	1.3	Z	1.1	1.1	1.2	0.9	0.3	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.4	1.3	
5-Jul	0.2	0.2	0.2	0.2	Z	0.3	0.3	0.2	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.5	1.0	0.7	1.2	0.6	0.5	0.4	1.2		
6-Jul	0.5	0.6	0.8	0.6	0.4	0.4	Z	1.0	1.3	1.2	0.8	0.5	0.8	1.1	1.2	0.8	0.8	0.9	0.6	0.5	0.5	0.8	0.8	0.5	0.3	1.3	
7-Jul	Z	0.5	0.4	0.5	0.5	0.6	0.4	0.3	0.1	0.2	0.8	1.4	1.0	0.9	0.7	0.7	0.6	0.5	0.4	0.3	0.4	0.3	0.3	0.5	0.5	1.4	
8-Jul	0.7	Z	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.6	0.5	0.7	0.5	0.5	0.6	0.7	0.8	0.9	0.9	1.0	0.9	0.8	0.7	0.7	0.7	1.0	
9-Jul	0.6	0.6	Z	0.7	0.7	1.0	1.0	0.9	1.0	1.1	1.0	1.1	1.1	1.0	0.8	0.4	0.3	0.4	0.4	0.3	0.2	0.1	0.4	0.7	0.7	1.1	
10-Jul	0.8	0.8	0.7	Z	1.4	1.3	1.1	0.8	0.6	0.4	0.5	0.6	0.2	0.3	0.2	0.2	0.4	0.3	0.3	0.5	0.3	0.3	0.4	0.6	0.6	1.4	
11-Jul	1.8	3.1	3.1	1.4	Z	1.6	1.2	0.9	0.7	0.6	0.5	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.9	3.1	
12-Jul	0.5	0.4	0.5	0.6	0.8	Z	0.7	0.8	0.9	0.8	0.7	0.6	0.5	0.5	0.5	0.4	0.5	2.6	2.9	2.0	1.7	1.6	1.7	1.0	2.9		
13-Jul	Z	2.0	2.2	2.9	5.0	5.2	4.8	5.1	4.8	4.2	4.0	3.5	1.8	1.4	1.4	1.2	0.8	0.4	0.4	0.7	1.1	1.7	2.1	3.6	5.2		
14-Jul	4.1	Z	7.7	7.3	6.2	5.4	5.5	5.7	6.0	4.1	3.8	2.5	2.7	3.3	3.3	3.0	2.7	2.5	2.6	2.7	2.7	2.4	2.4	2.4	4.0	7.7	
15-Jul	2.0	2.0	Z	1.8	2.1	2.2	2.5	3.0	3.0	2.5	2.6	2.5	2.3	2.2	2.2	2.3	1.8	1.4	0.9	0.7	0.7	1.0	0.5	0.3	1.8	3.0	
16-Jul	0.4	0.5	0.6	Z	1.6	1.3	1.4	1.7	1.1	0.4	0.7	0.6	0.5	0.7	0.8	0.8	1.0	1.2	1.3	1.2	1.3	1.2	1.1	0.9	1.0	1.7	
17-Jul	0.9	1.7	1.7	1.5	Z	1.6	1.7	1.3	1.6	1.3	1.7	1.2	0.8	0.8	0.6	0.5	0.5	0.5	0.8	0.9	1.1	1.9	1.5	1.3	1.2	1.9	
18-Jul	0.8	1.0	1.0	0.6	0.6	Z	1.3	0.9	0.7	0.7	0.6	0.7	0.9	0.8	0.7	0.6	0.6	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.7	1.3	
19-Jul	Z	0.7	0.7	0.8	0.8	0.8	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.7	0.6	0.6	0.7	0.8	0.7	0.7	0.9	0.7	0.9	
20-Jul	0.8	Z	0.9	0.8	0.8	0.7	0.7	0.9	0.8	0.7	0.6	0.6	0.7	0.6	0.5	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.7	0.9	
21-Jul	0.6	0.7	Z	0.7	0.6	0.6	0.6	0.5	0.7	0.7	0.8	0.9	1.2	1.4	1.3	1.2	1.1	1.0	1.0	0.9	1.0	0.9	0.8	0.8	0.9	1.4	
22-Jul	0.8	0.8	1.1	Z	0.9	0.7	0.9	1.3	0.9	0.7	0.6	0.5	0.5	0.6	0.5	0.4	0.4	0.6	0.7	0.7	0.7	0.8	0.8	1.0	0.7	1.3	
23-Jul	0.9	1.1	1.3	1.1	Z	0.8	0.9	0.6	0.6	0.7	0.7	0.7	0.9	0.8	0.7	0.8	0.8	0.6	0.5	0.6	0.6	0.5	0.6	0.8	1.3		
24-Jul	0.6	0.6	0.7	0.8	0.8	Z	1.3	1.4	1.8	1.6	1.5	1.0	0.9	0.9	0.8	0.8	0.9	0.5	0.6	0.9	1.4	1.1	1.3	1.8	1.0	1.8	
25-Jul	Z	0.9	0.6	0.6	0.7	0.8	0.8	0.9	0.7	0.5	0.5	0.5	0.7	0.9	0.9	0.9	0.6	0.3	0.4	0.3	0.3	0.2	0.2	0.2	0.6	0.9	
26-Jul	0.2	Z	0.2	0.2	0.3	1.6	0.7	0.4	0.6	0.2	C	C	C	C	C	C	C	1.1	0.8	0.8	0.6	0.4	0.3	0.4	--	1.6	
27-Jul	0.2	0.2	Z	0.1	0.3	0.2	0.4	0.2	0.2	0.2	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.3	0.4	0.3	0.3	0.4	0.4	0.5	0.2	0.5	
28-Jul	0.6	1.1	2.3	Z	1.4	0.9	0.8	0.8	0.9	0.6	0.3	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.3	0.2	0.2	0.6	2.3	
29-Jul	0.3	0.2	0.2	0.2	Z	0.2	0.2	0.4	0.2	0.2	0.3	0.4	0.4	0.3	0.3	0.4	0.5	0.5	0.4	0.5	0.4	0.4	5.8	1.5	0.6	5.8	
30-Jul	0.6	0.7	0.8	1.1	1.1	Z	1.0	0.9	0.6	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.4	0.6	0.8	1.0	0.7	1.7	0.8	0.7	1.7	
31-Jul	Z	0.7	0.8	0.8	0.6	1.3	0.6	0.8	0.5	0.6	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.5	0.5	0.5	0.5	0.5	1.3
																								Diurnal Average		Diurnal Maximum	
																								0.89		4.1	
																								0.89		4.1	

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	57	37	53	21	27	26	22	25	26	40	33	43	71	75	80	70	706
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	57	37	53	21	27	26	22	25	26	40	33	43	71	75	80	70	706

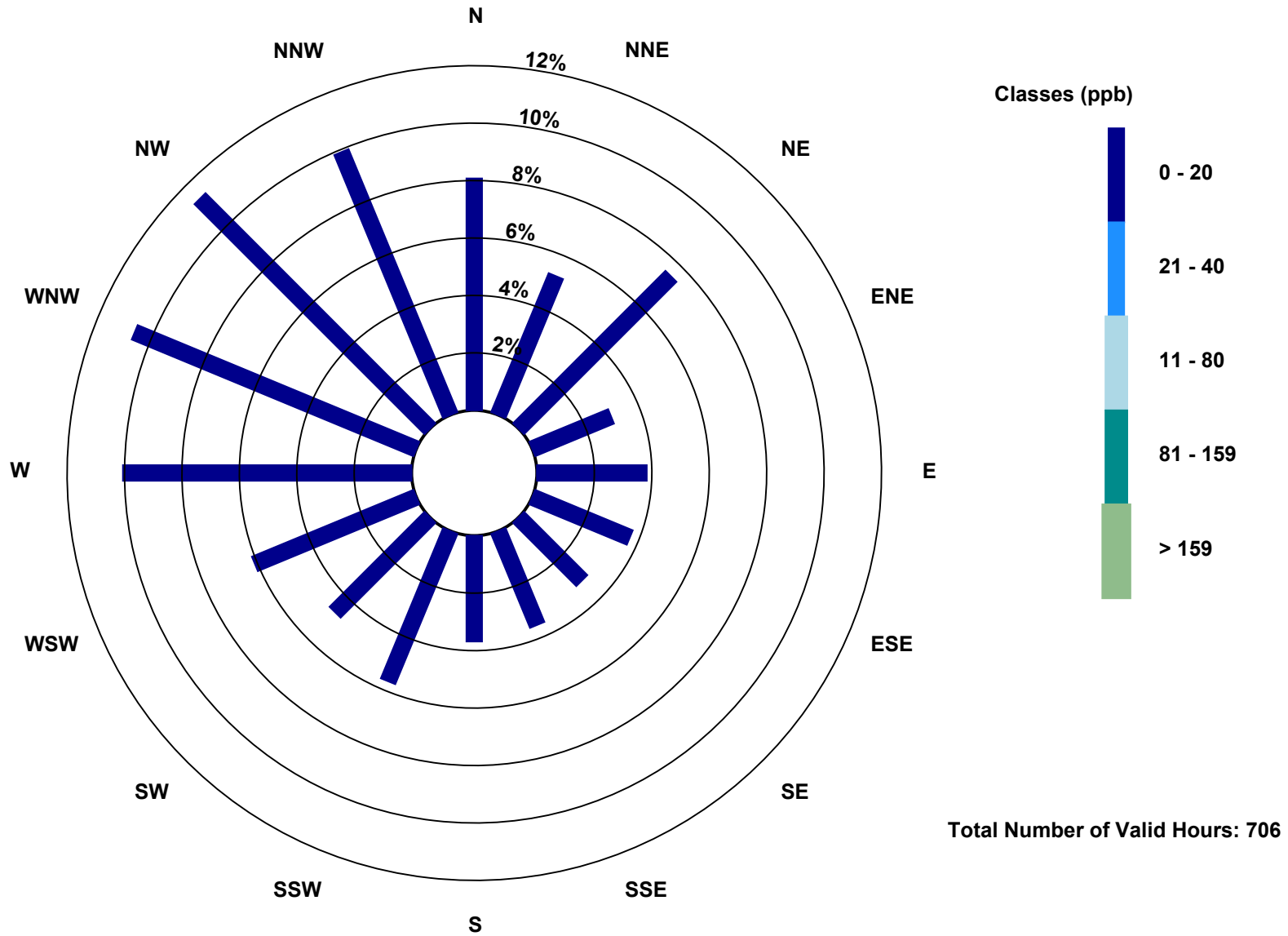
Total Number of Valid Hours: 706

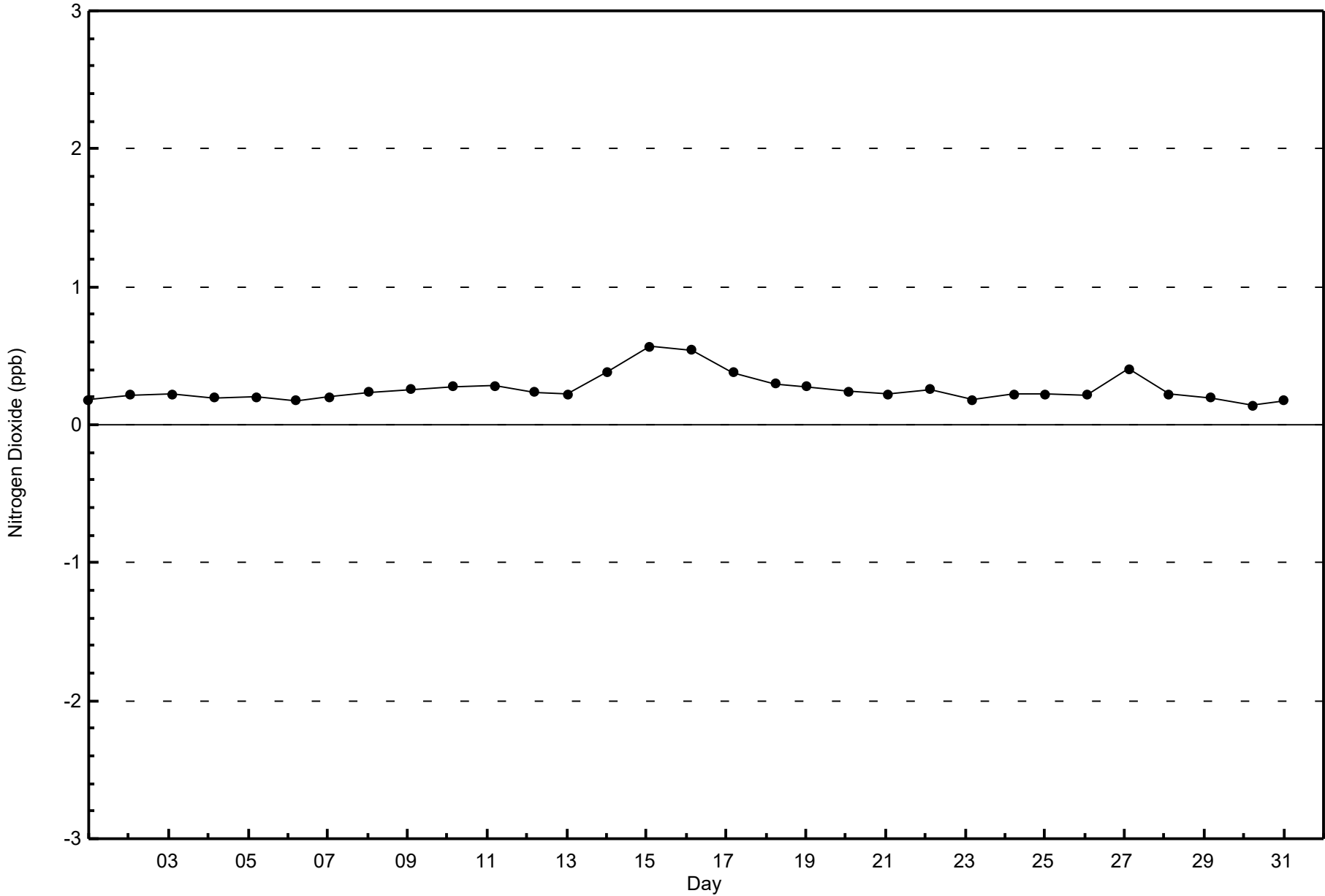
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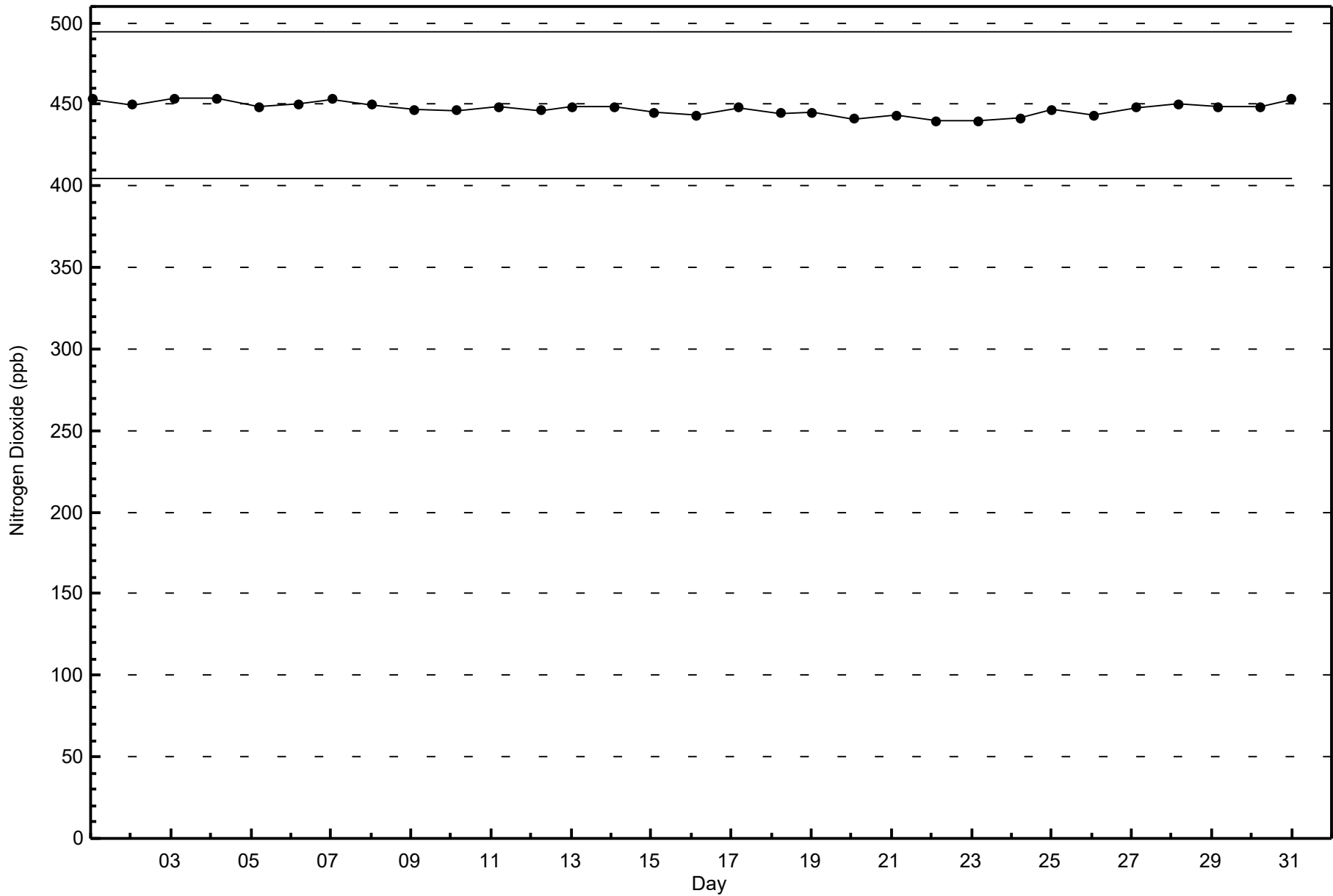


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Stony Mountain



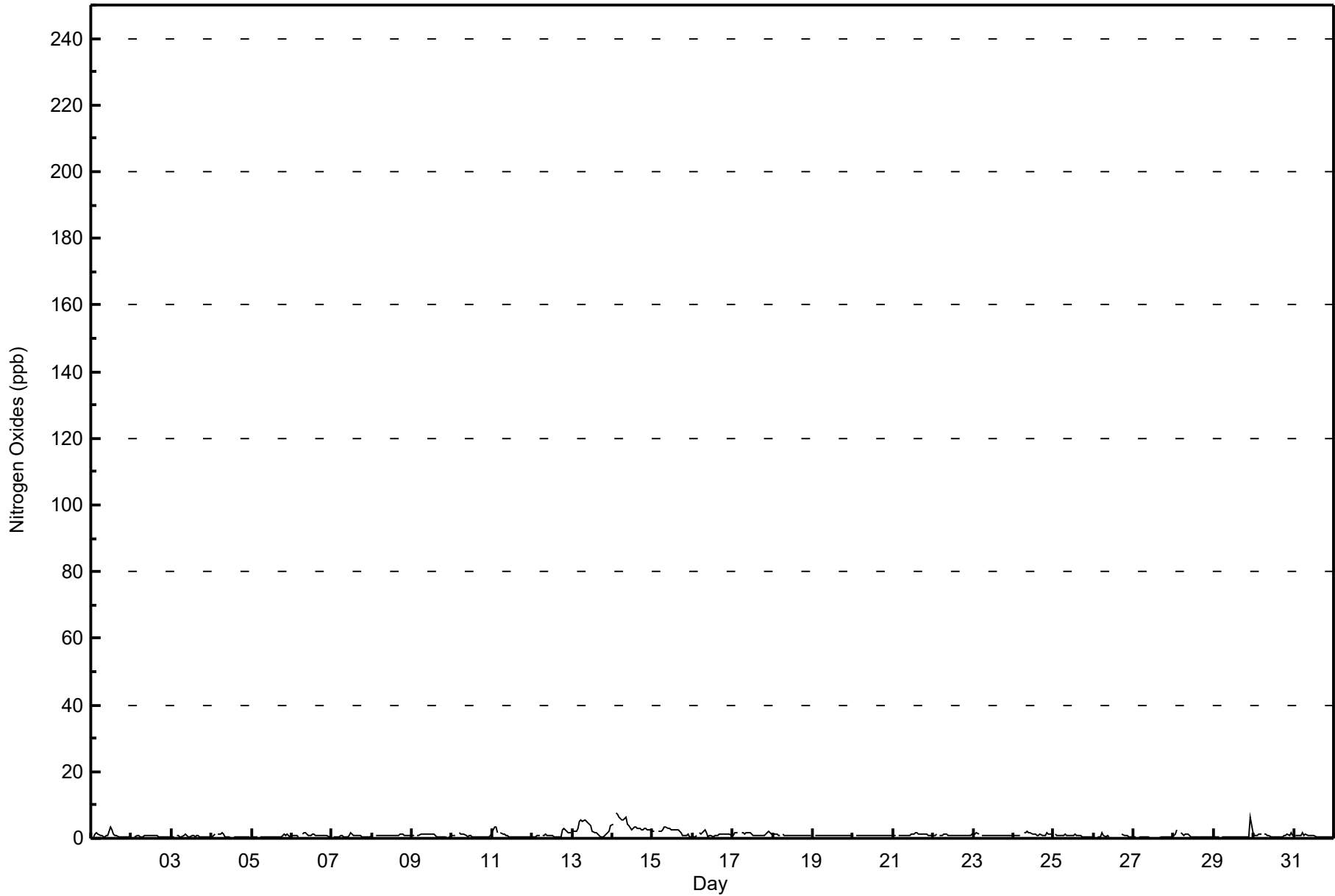






Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Stony Mountain - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Stony Mountain - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Stony Mountain - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	57	37	53	21	27	26	22	25	26	40	33	43	71	75	80	70	706
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	57	37	53	21	27	26	22	25	26	40	33	43	71	75	80	70	706

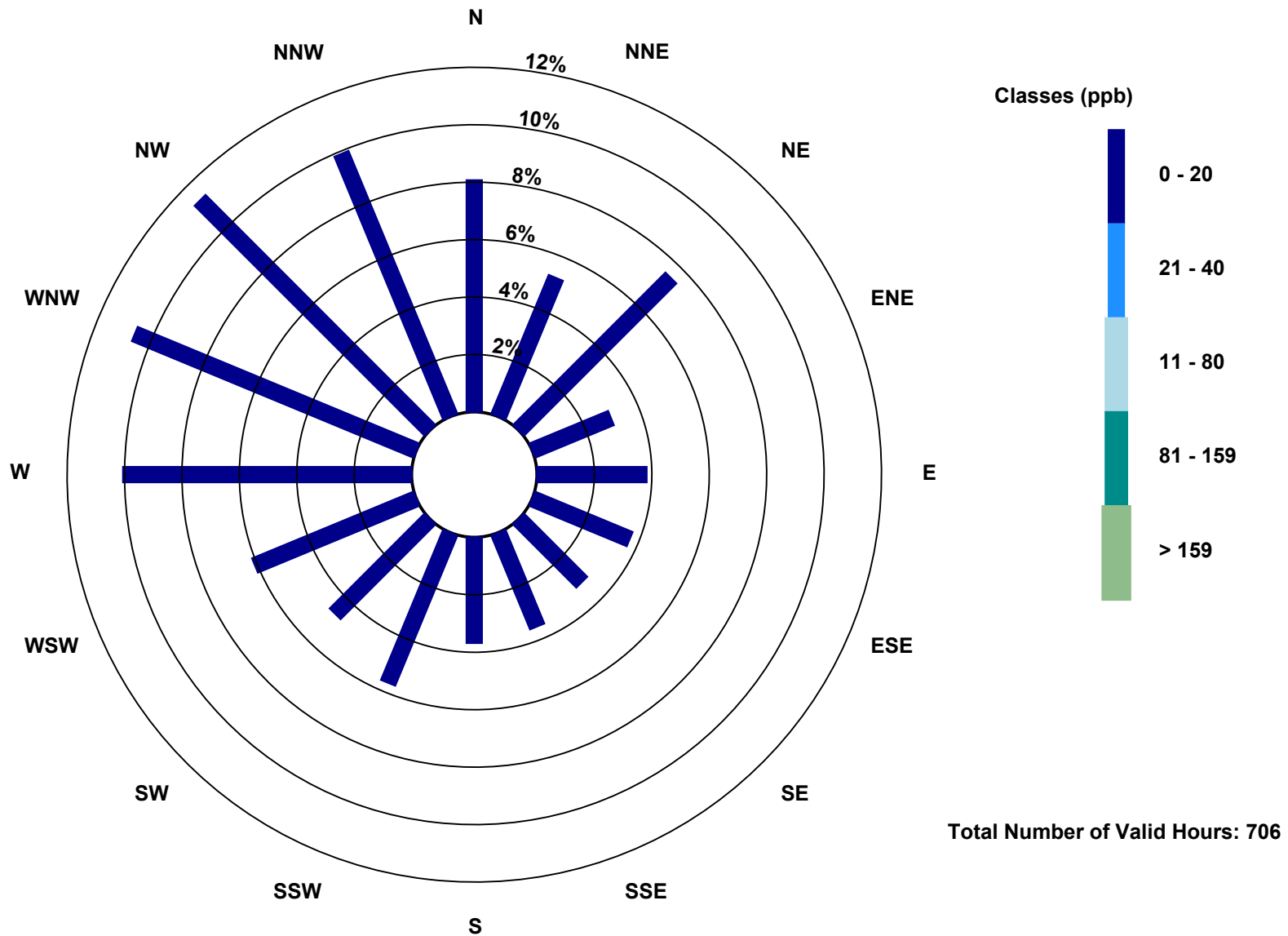
Total Number of Valid Hours: 706

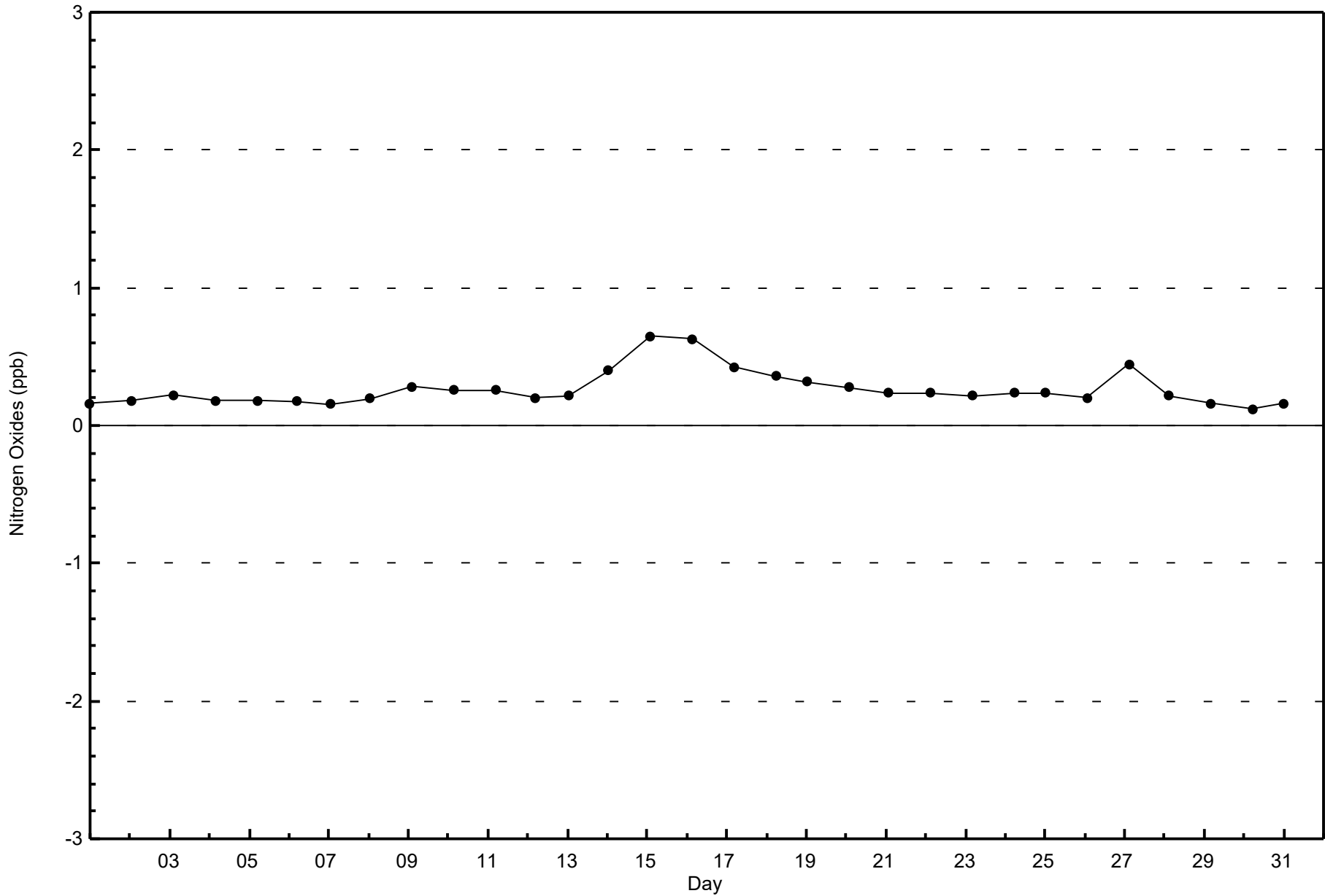
Total Number of Hours: 744

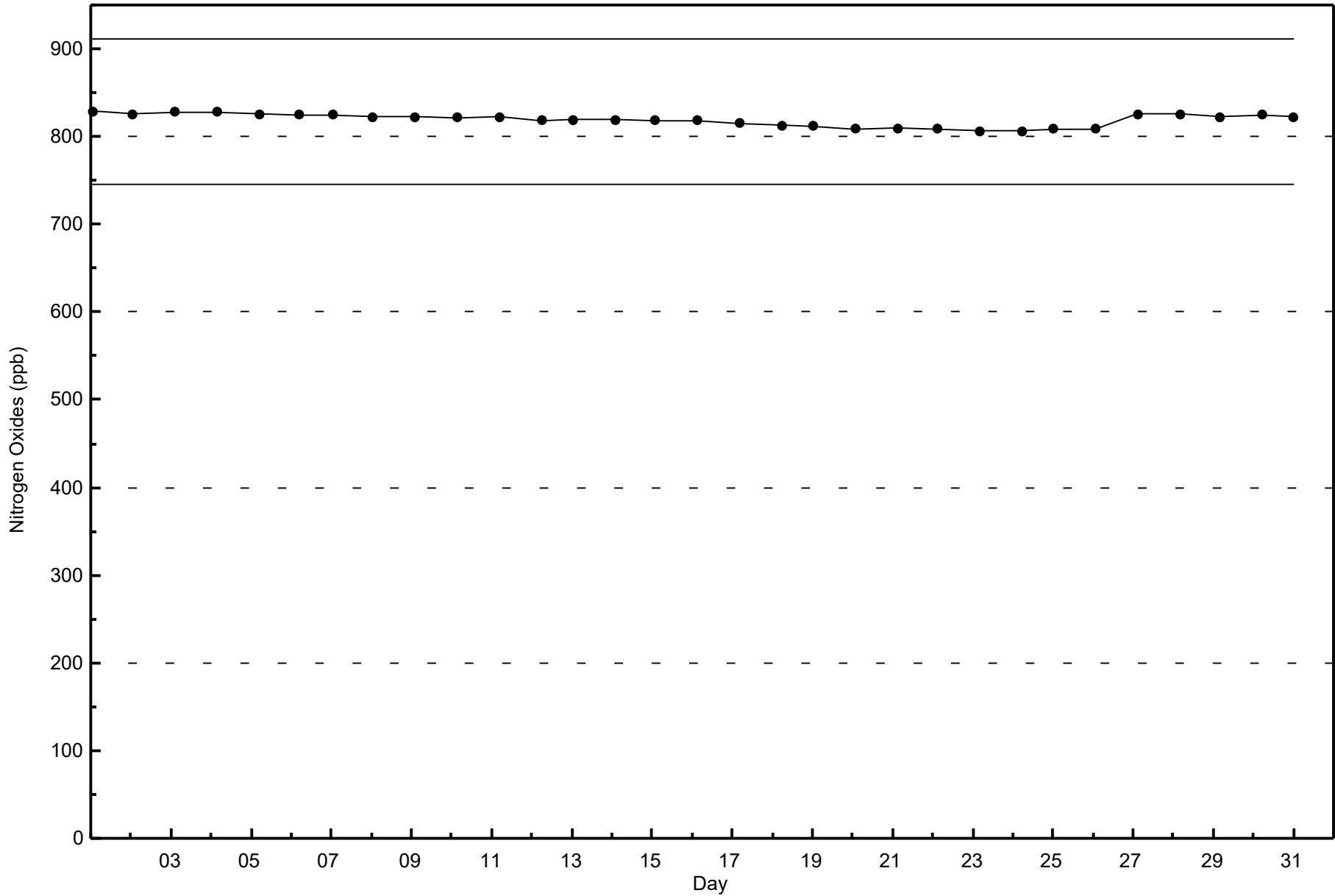


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Stony Mountain









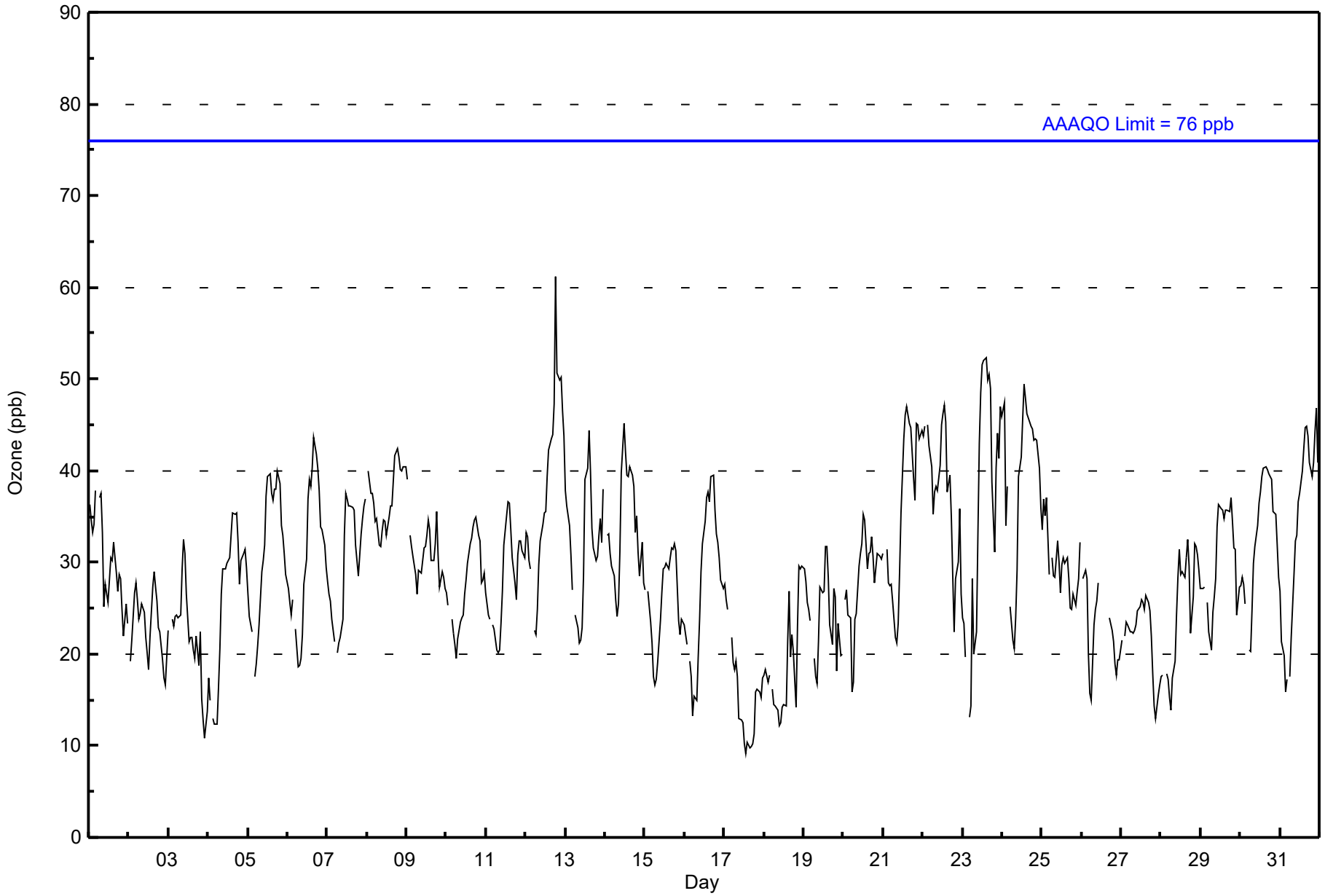
Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Stony Mountain - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		744																																									
Maximum Value: 61.1 ppb on Jul 12 19:00		Maximum Daily Average: 39.0 ppb on Jul 24				Hours of Data:		707																																									
Minimum Value: 9.1 ppb on Jul 17 14:00		Minimum Daily Average: 15.8 ppb on Jul 17				Hours of Missing Data:		37																																									
Maximum Diurnal Average: 34.7 ppb at hour 15		Minimum Diurnal Average: 21.9 ppb at hour 6				Hours of Calibration:		37																																									
Monthly Average: 29.32 ppb		Percentiles: P ₁ = 11.4 P ₁₀ = 17.8 Q ₁ = 23.2 Median = 29.0 Q ₃ = 35.2 P ₉₀ = 40.5 P ₉₉ = 49.9				Percent Operational Time:		100.0																																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	36.3	34.6	33.3	34.2	37.9	Z	37.0	37.5	33.3	25.2	27.6	25.6	28.1	30.6	30.2	32.2	28.8	26.9	28.7	28.2	24.9	21.9	25.5	23.4	30.1	37.9																							
2-Jul	Z	19.3	21.5	26.8	27.8	25.9	23.7	24.5	25.5	24.5	21.8	20.2	18.3	21.8	27.3	29.0	27.3	25.8	22.9	22.4	19.3	17.4	16.6	19.7	23.0	29.0																							
3-Jul	22.6	Z	23.8	23.1	24.0	24.2	23.9	24.2	29.3	32.5	31.0	26.6	21.3	21.8	21.8	20.4	19.5	21.9	18.8	22.5	15.0	12.8	10.8	13.8	22.0	32.5																							
4-Jul	17.4	15.0	Z	13.0	12.4	12.4	16.4	20.6	26.6	29.3	29.3	30.0	30.1	30.5	32.9	35.3	35.3	35.4	32.1	27.6	30.1	31.0	31.5	29.4	26.2	35.4																							
5-Jul	26.7	24.1	22.4	Z	17.5	18.9	20.8	23.1	29.0	30.2	31.9	37.2	39.3	39.6	37.5	36.8	38.0	37.9	39.9	38.6	34.0	33.0	31.0	28.7	31.1	39.9																							
6-Jul	27.1	25.6	24.3	25.9	Z	22.7	18.7	18.8	19.6	22.0	27.5	30.3	36.9	39.1	38.3	40.2	43.7	41.8	40.3	37.8	33.9	33.5	31.9	29.5	30.9	43.7																							
7-Jul	27.9	26.5	25.9	23.9	21.4	Z	20.2	21.2	21.8	23.9	33.0	37.5	36.9	36.1	36.2	36.0	35.6	31.8	30.2	28.5	33.1	34.8	36.2	36.9	30.2	37.5																							
8-Jul	Z	40.0	37.5	37.5	36.5	34.5	34.8	31.9	31.8	33.4	34.6	34.4	32.9	34.9	36.1	36.1	38.9	41.6	42.4	41.5	40.0	40.0	40.5	40.4	37.1	42.4																							
9-Jul	39.1	Z	33.0	31.7	30.7	28.6	26.5	29.1	29.0	28.8	31.5	31.7	32.9	34.6	33.6	30.2	30.1	32.1	35.5	30.9	27.3	29.1	28.4	27.1	30.9	39.1																							
10-Jul	26.6	25.3	Z	23.8	22.3	21.0	19.5	21.6	23.5	24.0	24.2	26.6	28.1	29.9	32.0	32.6	33.8	34.6	34.9	32.9	32.3	27.8	28.1	28.9	27.6	34.9																							
11-Jul	26.7	24.3	23.8	Z	23.2	22.7	20.5	20.2	20.4	23.4	26.8	31.9	35.1	36.5	36.5	33.5	30.5	27.8	25.9	30.8	32.3	32.4	31.2	30.5	28.1	36.5																							
12-Jul	33.3	32.8	30.2	29.3	Z	22.5	22.2	24.8	29.7	32.3	34.2	35.3	35.5	39.3	42.2	43.4	44.0	47.3	61.1	50.6	49.8	50.2	46.6	43.7	38.3	61.1																							
13-Jul	37.9	36.2	34.0	30.8	27.1	Z	24.2	22.9	21.1	21.5	22.9	28.6	39.0	40.3	44.4	39.8	33.7	31.5	30.2	30.6	33.0	34.8	32.1	38.0	31.9	44.4																							
14-Jul	Z	32.9	33.1	31.0	29.5	28.6	25.9	24.1	25.4	31.1	39.9	45.1	42.1	39.5	39.3	40.5	39.5	38.3	33.3	35.1	31.0	28.5	32.2	27.8	33.6	45.1																							
15-Jul	26.9	Z	26.8	23.4	21.1	17.5	16.7	17.3	19.1	23.6	26.8	29.2	29.4	29.9	29.2	30.6	31.7	31.4	32.1	31.3	23.7	22.1	23.8	23.5	25.5	32.1																							
16-Jul	23.2	21.1	Z	19.3	17.6	13.2	15.4	15.0	19.7	23.8	29.0	32.0	34.4	37.0	37.7	36.6	39.3	39.5	35.6	33.0	32.2	30.5	28.1	27.1	27.8	39.5																							
17-Jul	27.6	26.0	24.9	Z	21.9	19.1	18.3	19.3	17.5	13.0	12.8	12.5	10.2	9.1	10.3	9.7	10.0	10.2	11.4	15.9	16.2	15.8	15.3	17.3	15.8	27.6																							
18-Jul	17.6	18.2	16.9	17.7	Z	16.1	14.5	14.4	13.9	12.2	12.5	14.2	14.5	14.3	21.5	26.8	19.6	22.2	20.3	14.3	23.1	29.6	29.2	29.5	18.8	29.6																							
19-Jul	29.2	28.0	25.7	24.9	23.6	Z	19.5	17.5	16.7	21.3	27.4	26.7	26.8	31.7	31.7	28.3	23.2	21.1	27.2	26.3	18.2	23.3	19.8	20.0	24.3	31.7																							
20-Jul	Z	25.9	27.0	24.3	23.9	15.9	16.9	23.8	24.4	29.6	30.9	32.1	35.3	34.7	29.3	31.0	31.2	32.8	30.7	27.7	31.0	30.8	30.7	30.3	28.3	35.3																							
21-Jul	30.9	Z	31.4	27.7	27.4	27.6	25.8	21.9	21.1	23.4	29.0	35.4	43.5	46.1	47.0	46.1	45.2	44.6	39.2	36.8	45.2	45.1	43.5	44.3	36.0	47.0																							
22-Jul	43.8	44.9	Z	45.0	42.7	40.5	35.3	37.7	38.3	37.8	40.6	45.0	46.3	47.1	45.3	37.7	39.6	35.0	28.5	22.5	28.2	30.0	35.8	26.5	38.0	47.1																							
23-Jul	24.0	23.3	19.7	Z	13.2	14.3	28.1	20.0	22.5	33.1	43.1	48.5	51.5	52.0	52.4	49.9	50.4	49.0	38.8	31.2	40.2	44.0	41.3	47.0	36.4	52.4																							
24-Jul	45.9	47.4	34.1	38.2	Z	25.2	21.5	20.6	23.9	29.2	39.3	41.5	45.6	49.4	48.0	46.2	45.7	44.9	44.5	43.3	43.5	43.3	40.3	36.0	39.0	49.4																							
25-Jul	33.6	36.9	35.0	37.0	28.7	Z	30.6	28.6	28.4	32.4	30.1	26.6	29.7	30.5	29.8	30.5	28.2	25.1	24.8	26.6	25.3	26.8	28.2	32.2	29.8	37.0																							
26-Jul	Z	28.2	29.2	28.3	20.0	15.7	14.9	23.1	24.8	25.7	27.8	C	C	C	C	C	C	23.9	22.6	21.3	18.9	17.8	19.3	19.4	--	29.2																							
27-Jul	21.5	Z	21.9	23.5	23.2	22.5	22.5	22.3	22.5	23.2	24.7	25.1	25.9	25.6	24.8	26.4	25.6	24.7	22.0	17.9	14.3	12.9	15.6	16.6	22.0	26.4																							
28-Jul	17.5	17.8	Z	17.8	17.2	15.3	13.9	17.3	19.1	24.3	28.4	31.5	28.7	29.0	28.3	30.5	32.5	29.5	22.3	26.2	32.0	31.8	30.8	29.1	24.8	32.5																							
29-Jul	27.2	27.2	27.2	Z	25.7	22.4	20.4	24.6	26.2	28.3	33.9	36.3	35.9	35.7	34.7	35.7	35.7	35.5	37.0	34.4	31.6	31.4	24.3	27.3	30.4	37.0																							
30-Jul	27.5	28.4	27.5	25.5	Z	20.4	20.2	24.8	29.9	31.7	34.0	36.4	37.7	39.4	40.3	40.4	40.1	39.7	39.4	39.0	35.5	35.2	31.9	28.4	32.8	40.4																							
31-Jul	26.9	21.4	19.9	15.9	17.2	Z	17.6	21.9	28.7	32.4	32.9	36.6	37.5	39.9	42.4	44.7	44.8	43.8	40.8	39.4	40.9	44.3	46.8	40.9	33.8	46.8																							
																								28.6	28.1	27.3	26.9	24.4	21.9	22.1	23.0	24.6	26.7	29.7	31.7	33.0	34.2	34.7	34.6	34.1	33.1	32.1	30.5	30.2	30.4	29.9	29.5	Diurnal Average	
																								45.9	47.4	37.5	45.0	42.7	40.5	37.0	37.7	38.3	37.8	43.1	48.5	51.5	52.0	52.4	49.9	50.4	49.0	61.1	50.6	49.8	50.2	46.8	47.0	Diurnal Maximum	
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 76 ppb																																																	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Stony Mountain - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	114	16.12	16.12
21 - 50	588	83.17	99.29
51 - 82	5	0.71	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 (O₃) - ppb
Stony Mountain - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	21	10	6	4	4	3	10	4	4	4	9	1	5	7	11	11	114
21 - 50	37	25	45	16	23	24	14	22	23	32	27	37	67	66	71	59	588
51 - 82	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	1	5
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	58	36	52	20	27	27	24	26	27	36	37	39	72	73	82	71	707

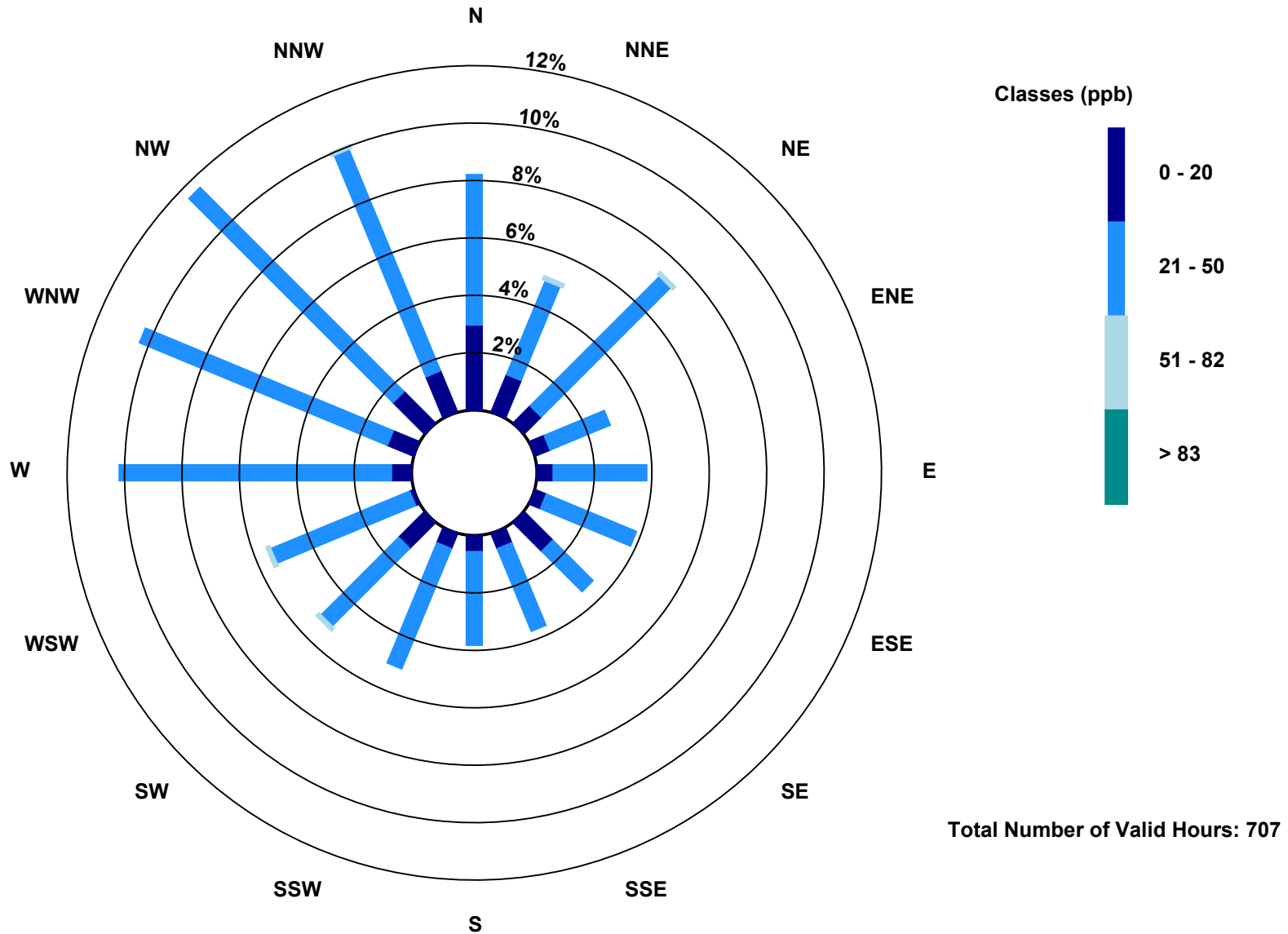
Total Number of Valid Hours: 707

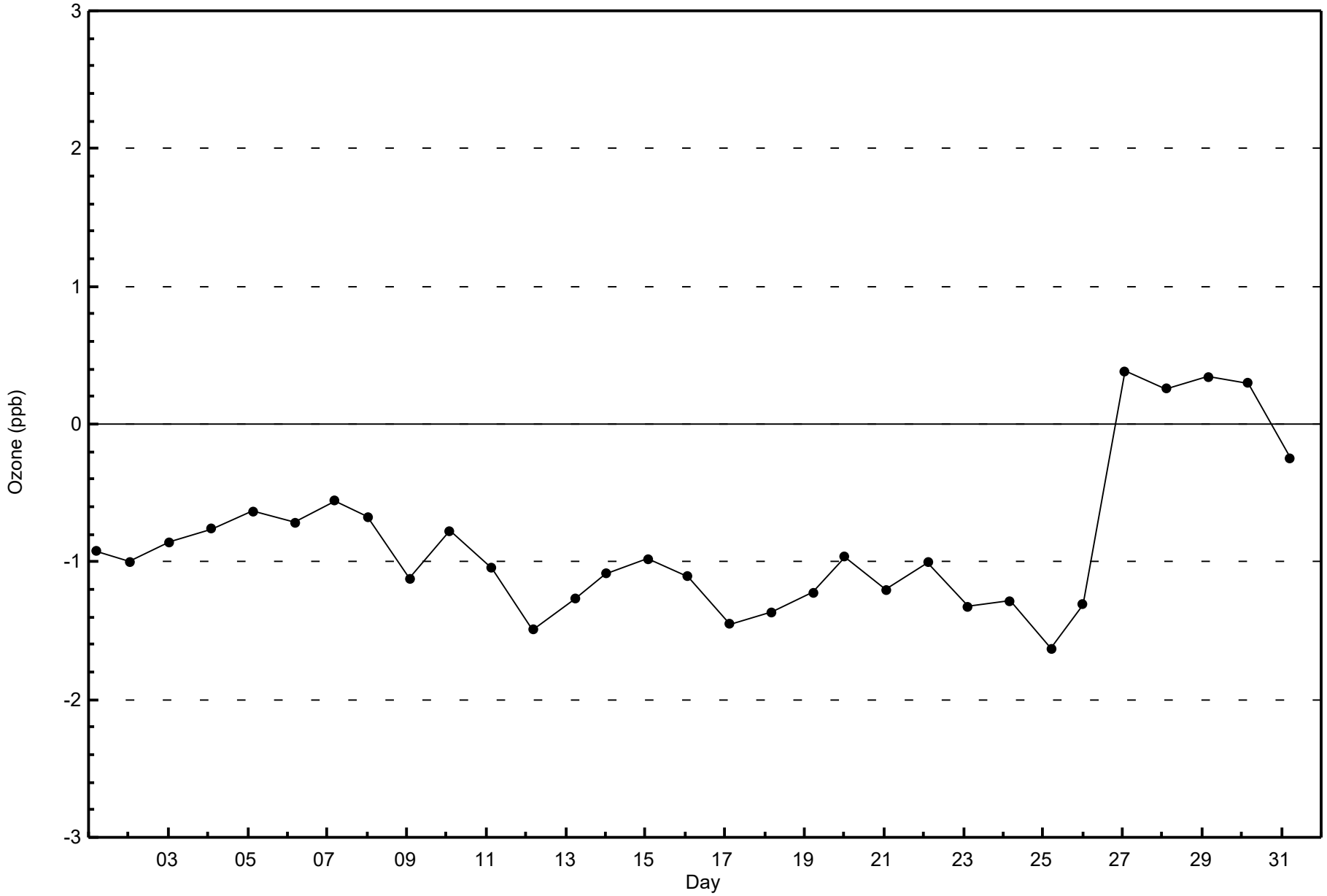
Total Number of Hours: 744

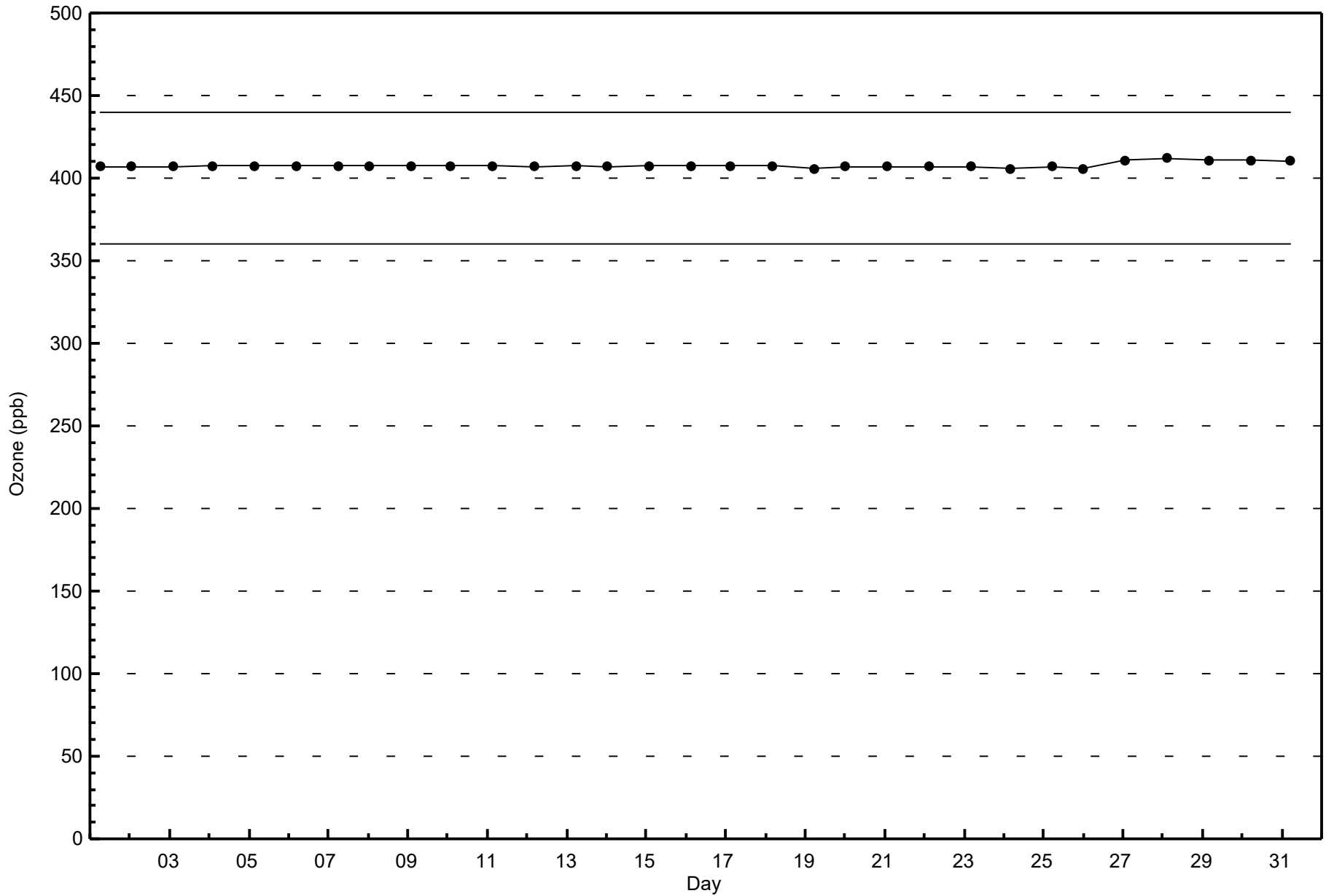


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Ozone (O₃) - ppb
Stony Mountain





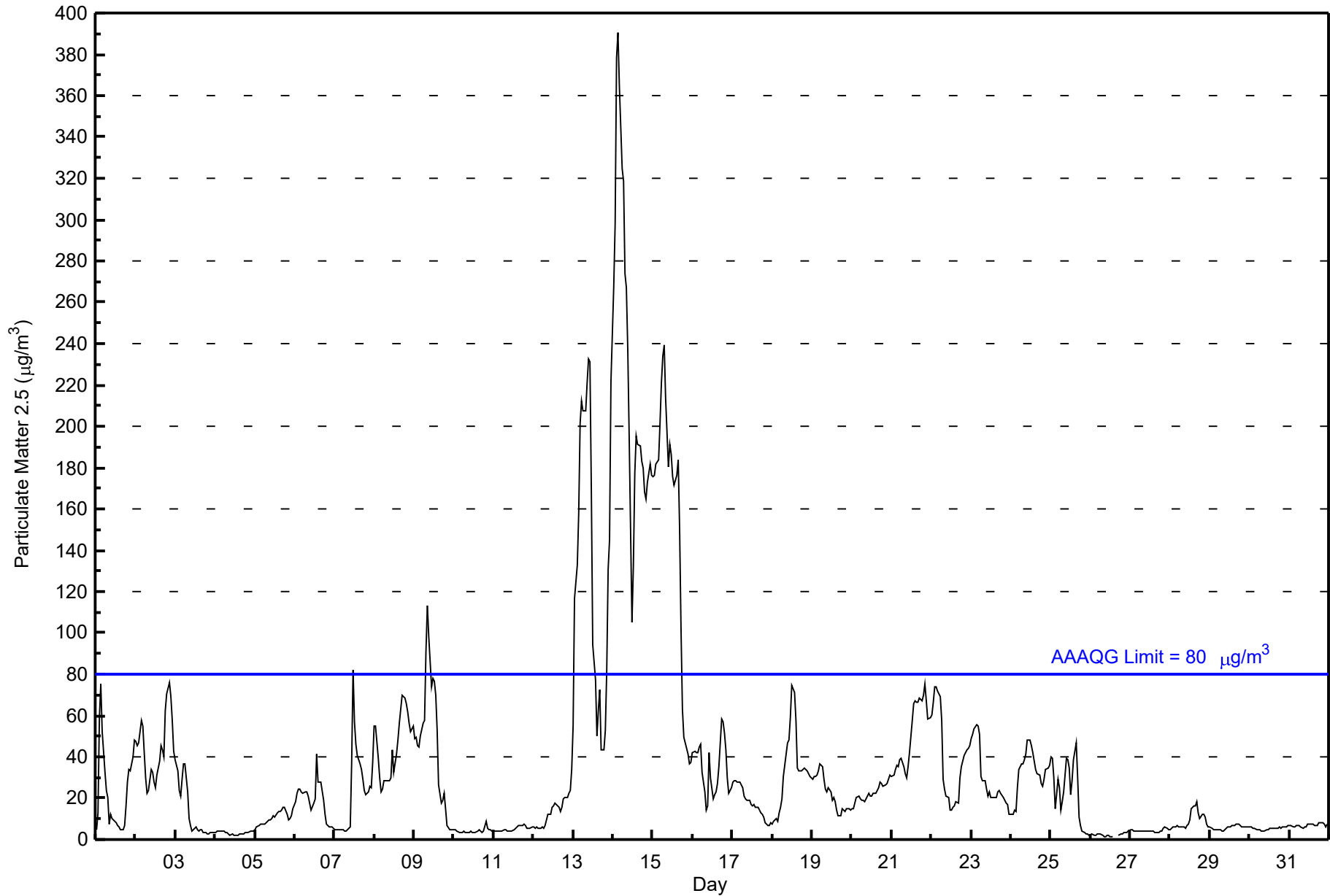




Summary of Hour Averages

Stony Mountain - July 2023

Number of Exceedences (AAAQO):		1-hr: 62		24-hr: 12		Hours in Service:		744																		
Maximum Value: 390.3 µg/m ³ on Jul 14 04:00		Maximum Daily Average: 230.6 µg/m ³ on Jul 14				Hours of Data:		741																		
Minimum Value: 1.3 µg/m ³ on Jul 26 10:00		Minimum Daily Average: 2.5 µg/m ³ on Jul 26				Hours of Missing Data:		3																		
Maximum Diurnal Average: 45.7 µg/m ³ at hour 5		Minimum Diurnal Average: 28.0 µg/m ³ at hour 20				Hours of Calibration:		3																		
Monthly Average: 35.84 µg/m ³		Percentiles: P ₁ = 2.1 P ₁₀ = 4.0 Q ₁ = 5.8 Median = 18.7 Q ₃ = 38.6 P ₉₀ = 71.2 P ₉₉ = 267.4				Percent Operational Time:		100.0																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	4.5	12.6	58.7	75.4	52.3	32.6	23.5	20.5	7.3	12.0	10.5	9.1	7.8	7.1	6.1	4.8	5.0	7.0	16.4	28.1	34.0	33.3	39.7	48.4	23.2	75.4
2-Jul	47.3	45.3	46.7	57.8	54.8	42.0	29.9	22.3	23.9	34.2	32.5	27.6	25.4	31.0	38.2	45.8	43.4	39.7	62.3	70.6	76.2	69.5	57.8	42.4	44.4	76.2
3-Jul	38.4	33.0	23.5	21.2	29.5	36.9	36.7	23.2	10.1	6.8	3.8	4.9	6.4	4.7	4.1	5.0	4.5	3.6	3.4	2.7	3.0	3.2	3.4	3.3	13.1	38.4
4-Jul	3.1	4.0	4.3	4.3	4.2	4.1	3.7	3.2	2.6	2.3	2.4	2.1	2.1	2.1	2.2	2.6	2.8	3.0	3.2	3.4	3.6	3.9	4.1	4.4	3.2	4.4
5-Jul	5.0	6.0	6.8	7.5	7.3	7.2	7.5	8.0	9.3	9.6	10.1	11.5	11.2	12.6	13.2	13.4	14.5	15.8	15.8	12.1	9.6	10.4	11.5	15.0	10.5	15.8
6-Jul	18.2	22.6	24.1	24.3	23.0	22.1	23.2	23.1	21.2	17.6	14.5	17.7	19.4	41.1	27.8	27.5	27.7	19.2	12.2	7.1	6.8	6.1	5.9	5.3	19.1	41.1
7-Jul	4.7	4.7	4.6	4.8	4.7	4.4	4.3	4.4	4.7	6.1	37.0	82.3	56.9	46.0	40.7	36.5	34.0	28.9	23.6	21.5	23.0	25.7	25.4	37.0	23.6	82.3
8-Jul	54.6	55.0	39.6	29.5	23.1	24.2	28.7	28.3	28.4	28.3	30.1	43.7	32.8	41.2	48.1	56.2	63.0	70.0	68.4	65.4	61.4	56.5	52.1	54.7	45.1	70.0
9-Jul	48.9	49.5	45.3	45.0	50.3	56.2	57.7	91.0	113.3	98.2	73.7	77.7	76.7	69.6	52.6	26.4	17.6	18.9	22.2	15.1	7.0	5.0	4.5	4.5	46.9	113.3
10-Jul	4.6	4.5	4.4	3.7	3.6	3.6	3.8	3.7	3.4	3.4	4.1	3.5	3.3	3.5	4.3	4.7	4.0	3.7	3.9	8.5	5.2	5.0	4.9	4.4	4.2	8.5
11-Jul	4.2	4.1	3.9	4.1	4.1	4.1	4.5	4.8	4.1	3.9	3.9	3.8	4.5	5.1	5.8	6.8	6.5	7.0	7.4	6.8	5.7	5.4	5.5	5.8	5.1	7.4
12-Jul	6.1	5.7	5.8	5.6	5.7	5.8	5.7	7.0	9.4	12.2	12.1	15.9	16.0	17.9	16.9	15.8	13.9	15.6	19.8	20.5	20.3	22.6	23.4	33.8	13.9	33.8
13-Jul	54.8	116.6	132.9	158.3	201.3	212.5	207.3	207.5	220.7	232.6	231.3	169.5	94.4	77.1	49.9	62.0	72.8	43.3	43.3	52.8	81.8	130.7	145.1	221.8	134.2	232.6
14-Jul	267.5	298.2	378.4	390.3	364.6	324.7	318.5	273.9	267.2	237.0	195.1	105.1	132.1	176.9	195.6	191.4	190.7	183.2	179.8	168.3	165.0	172.8	181.9	176.2	230.6	390.3
15-Jul	175.9	176.6	181.5	184.0	201.1	221.3	233.8	239.4	213.8	180.3	191.2	186.7	175.8	171.7	176.3	183.7	149.8	101.8	63.3	49.4	43.9	41.5	36.8	37.6	150.7	239.4
16-Jul	41.8	42.7	42.0	42.1	45.0	45.8	32.6	22.8	14.5	16.5	41.8	29.6	19.6	21.9	23.2	27.4	35.4	58.4	57.1	51.3	43.6	30.1	22.4	25.4	34.7	58.4
17-Jul	27.8	28.2	28.5	27.6	27.5	26.3	24.8	21.2	19.5	18.7	19.3	17.1	16.5	16.7	15.7	15.7	14.2	13.0	12.5	10.7	8.1	6.7	6.7	8.1	18.0	28.5
18-Jul	7.8	8.6	10.1	9.1	12.8	15.7	19.8	30.8	41.3	46.5	47.9	59.3	74.3	71.2	57.5	34.5	33.5	33.3	33.2	34.5	34.0	32.9	31.8	30.6	33.8	74.3
19-Jul	29.5	30.4	30.5	31.2	33.3	36.3	35.5	29.3	24.7	22.9	25.4	22.9	18.7	20.1	18.5	14.1	11.3	11.6	15.2	14.4	13.9	15.0	15.2	14.4	22.3	36.3
20-Jul	14.7	15.1	17.7	20.1	21.2	19.9	18.9	18.7	18.4	21.3	22.2	21.0	20.9	22.6	22.5	24.0	25.4	27.6	26.9	26.0	26.5	27.3	29.2	31.1	22.5	31.1
21-Jul	30.8	30.9	33.7	36.1	35.1	38.4	39.0	35.1	31.9	30.0	35.0	42.0	57.9	66.1	67.4	66.4	66.7	68.3	67.2	69.8	75.1	67.3	58.6	58.7	50.3	75.1
22-Jul	60.2	66.4	74.1	74.0	72.0	69.2	57.3	28.8	24.6	20.8	20.3	14.2	14.3	15.7	16.6	18.4	17.7	29.6	35.2	38.2	40.9	43.6	44.3	45.4	39.2	74.1
23-Jul	49.0	51.0	53.4	55.3	55.2	50.8	30.8	28.7	28.5	24.2	21.0	23.2	20.4	20.6	20.4	20.3	23.2	23.5	22.4	20.5	19.1	17.5	16.6	12.5	29.5	55.3
24-Jul	12.2	12.2	14.0	13.7	24.8	34.1	36.9	36.5	38.7	41.3	48.2	48.3	45.6	42.1	38.3	33.8	31.7	31.0	27.3	26.1	29.4	33.9	34.5	36.0	32.1	48.3
25-Jul	40.3	39.4	30.2	14.8	29.0	25.2	14.1	18.4	23.0	39.6	38.7	34.7	25.4	28.8	38.6	46.7	29.9	10.7	7.1	3.9	3.2	2.8	2.6	2.2	22.7	46.7
26-Jul	2.1	2.8	2.4	2.2	2.7	2.9	2.7	1.8	1.5	1.3	2.3	2.0	1.5	1.5	C	C	C	2.3	2.5	2.9	3.5	3.4	3.7	4.3	2.5	4.3
27-Jul	4.6	4.5	4.3	3.8	4.2	4.3	4.2	4.2	4.1	3.8	3.8	3.9	4.1	4.2	4.0	3.7	3.7	3.7	4.0	4.2	5.3	6.3	5.6	5.0	4.3	6.3
28-Jul	4.6	5.2	6.2	6.4	6.6	6.4	6.3	6.0	6.0	5.4	6.8	7.5	9.6	14.6	16.1	16.4	18.0	12.7	9.9	12.4	12.4	11.0	7.2	6.4	9.2	18.0
29-Jul	5.8	5.3	5.0	4.9	4.7	4.5	4.7	4.2	4.0	5.0	5.2	6.4	6.4	6.5	6.7	7.0	7.2	7.6	6.7	6.0	6.3	6.0	6.2	6.2	5.8	7.6
30-Jul	6.0	5.8	5.6	5.1	5.0	4.7	4.6	4.4	4.3	4.4	4.6	4.9	5.1	5.5	5.6	5.7	5.7	5.6	5.8	5.7	5.9	5.8	6.1	6.5	5.3	6.5
31-Jul	6.5	6.6	6.4	6.4	6.7	6.8	6.5	5.9	5.6	5.8	6.1	7.4	7.7	7.7	7.2	6.9	6.7	6.8	7.8	8.1	7.9	7.2	6.4	7.3	6.9	8.1
34.9 38.5 42.7 44.2 45.7 44.9 42.8 40.5 39.7 38.5 38.7 35.7 32.5 34.6 34.7 34.1 32.7 29.2 28.6 28.0 28.4 29.3 29.0 32.1																								Diurnal Average		
267.5 298.2 378.4 390.3 364.6 324.7 318.5 273.9 267.2 237.0 231.3 186.7 175.8 176.9 195.6 191.4 190.7 183.2 179.8 168.3 165.0 172.8 181.9 221.8																								Diurnal Maximum		
C - Calibration																										
Alberta Ambient Air Quality Guideline/Objectives: 1-hr 80 µg/m ³ 24-hr 29 µg/m ³																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Stony Mountain - July 2023

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
0 - 5	164	22.13	22.13
6 - 15	171	23.08	45.21
16 - 25	114	15.38	60.59
26 - 80	230	31.04	91.63
> 81.0	62	8.37	100.00

Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Stony Mountain - July 2023

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	18	7	21	2	13	7	2	12	16	12	8	8	7	8	11	12	164
6 - 15	8	8	9	4	6	5	4	4	7	19	17	23	34	7	5	11	171
16 - 25	10	6	7	4	1	1	4	4	2	4	7	7	13	13	19	12	114
26 - 80	12	10	9	8	7	13	14	9	5	5	5	6	18	49	43	17	230
> 81.0	11	7	8	3	1	1	0	0	0	0	0	0	0	2	9	20	62
Totals	59	38	54	21	28	27	24	29	30	40	37	44	72	79	87	72	741

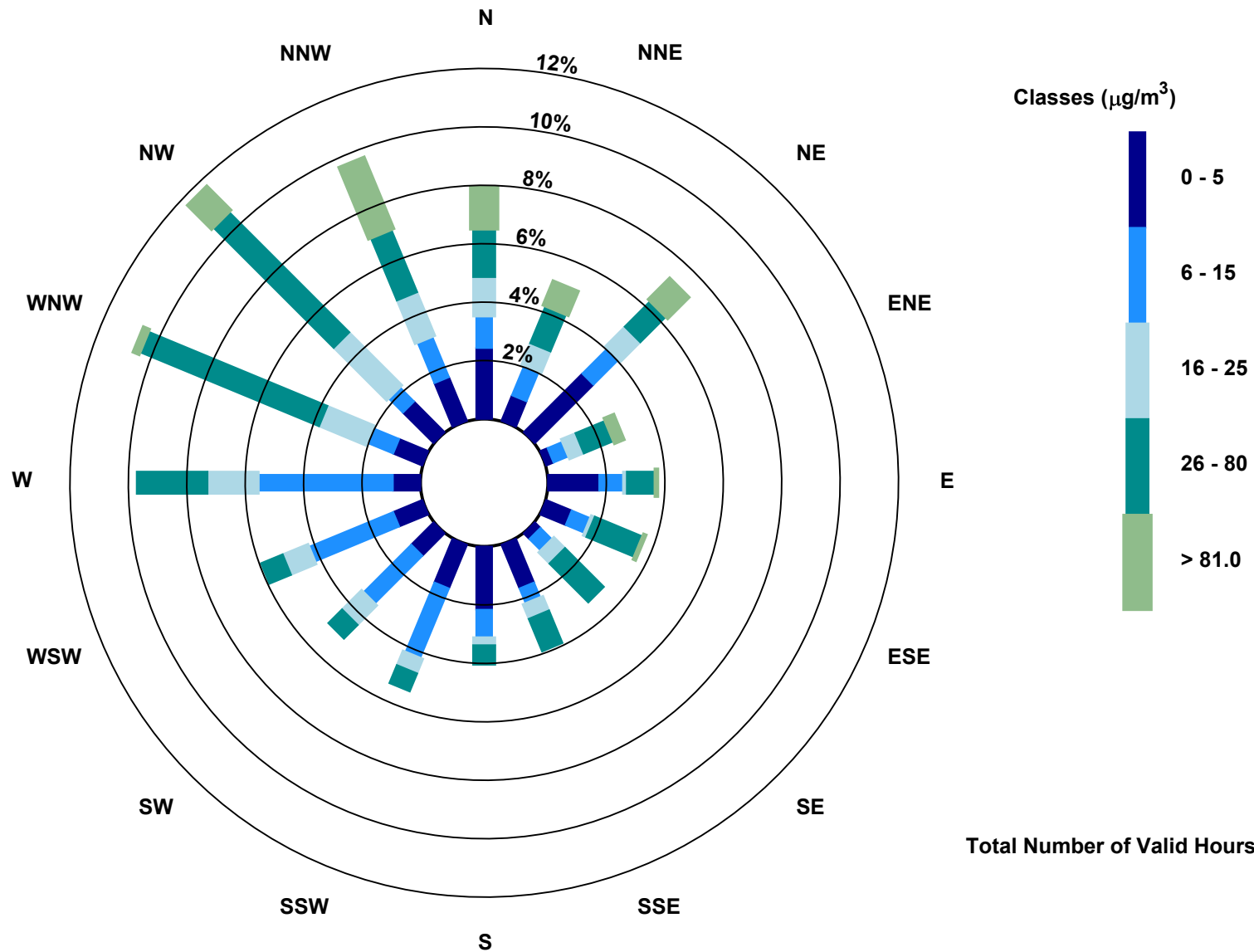
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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



Total Number of Valid Hours: 741



Wood Buffalo Environmental Association
Summary of Hour Averages

Carbon Monoxide (CO) - ppm
Stony Mountain - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 1.4 ppm on Jul 15 08:00	Maximum Daily Average: 1.0 ppm on Jul 14		Hours of Data:	709
Minimum Value: 0.1 ppm on Jul 4 16:00	Minimum Daily Average: 0.1 ppm on Jul 4		Hours of Missing Data:	35
Maximum Diurnal Average: 0.4 ppm at hour 6	Minimum Diurnal Average: 0.3 ppm at hour 21		Hours of Calibration:	35
Monthly Average: 0.35 ppm	Percentiles: P ₁ = 0.1 P ₁₀ = 0.2 Q ₁ = 0.2 Median = 0.3 Q ₃ = 0.4 P ₉₀ = 0.6 P ₉₉ = 1.2		Percent Operational Time:	100.0

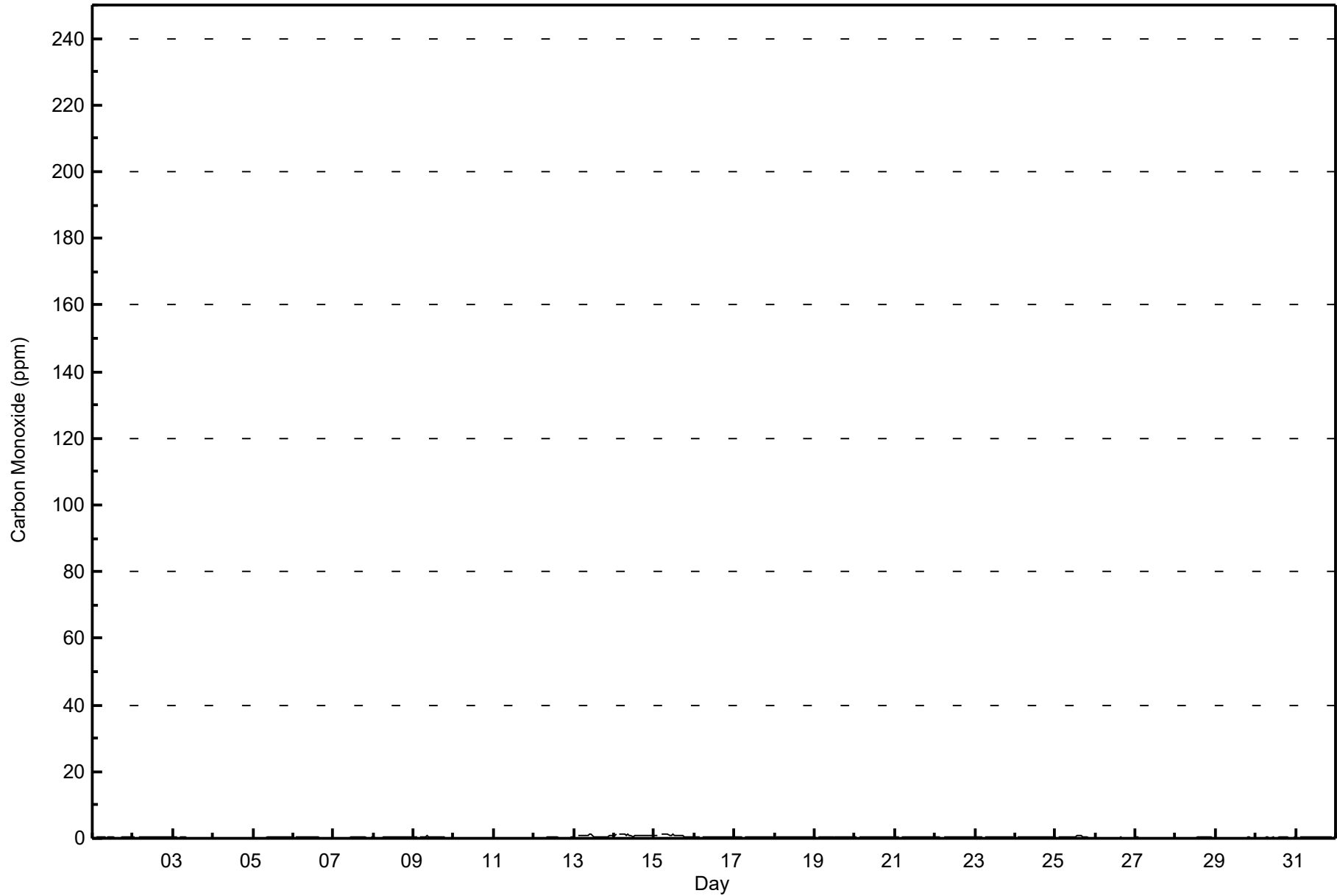
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Jul	0.2	Z	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.4																								
2-Jul	0.4	0.4	Z	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.6																							
3-Jul	0.4	0.4	0.4	Z	0.3	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.4																							
4-Jul	0.1	0.1	0.2	0.2	Z	0.1	0.1	0.1	0.1	0.1	0.1	C	C	C	C	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2																							
5-Jul	0.2	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.3																								
6-Jul	Z	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.3																							
7-Jul	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4																							
8-Jul	0.3	0.3	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4																							
9-Jul	0.3	0.4	0.4	Z	0.4	0.4	0.5	0.6	0.7	0.6	0.4	0.5	0.5	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.7																							
10-Jul	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2																							
11-Jul	0.1	0.1	0.1	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2																							
12-Jul	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3																							
13-Jul	0.4	Z	0.7	0.8	0.9	1.0	0.9	0.9	1.0	1.2	1.2	0.9	0.5	0.5	0.3	0.4	0.5	0.4	0.4	0.5	0.6	0.7	0.8	0.9	0.7	1.2																								
14-Jul	1.0	1.1	Z	1.3	1.3	1.2	1.2	1.1	1.1	1.0	0.9	0.6	0.7	0.8	0.9	1.0	1.0	1.0	1.0	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.3																							
15-Jul	1.0	1.0	1.0	Z	1.2	1.3	1.3	1.4	1.2	1.0	1.0	1.1	1.0	1.0	1.1	1.1	0.9	0.7	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.9	1.4																							
16-Jul	0.4	0.4	0.4	0.4	Z	0.4	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.5																							
17-Jul	0.3	0.3	0.3	0.4	0.3	Z	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4																							
18-Jul	Z	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.6																							
19-Jul	0.3	Z	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4																							
20-Jul	0.4	0.3	Z	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5																							
21-Jul	0.5	0.5	0.5	Z	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6																							
22-Jul	0.6	0.6	0.6	0.6	Z	0.6	0.6	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6																							
23-Jul	0.5	0.6	0.6	0.6	0.6	Z	0.4	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	0.3	0.3	0.3	0.4	0.6																							
24-Jul	Z	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5																							
25-Jul	0.5	Z	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.6	0.8	0.8	0.8	0.8	0.6	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.8																							
26-Jul	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2																							
27-Jul	0.2	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2																							
28-Jul	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2																							
29-Jul	0.2	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2																							
30-Jul	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2																							
31-Jul	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2																							
																								0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	Diurnal Average
																								1.0	1.1	1.0	1.3	1.3	1.3	1.3	1.4	1.2	1.2	1.2	1.1	1.0	1.0	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9	1.0	1.0	1.0	1.0	Diurnal Maximum

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 13 ppm



Wood Buffalo Environmental Association
Hourly Averages

Carbon Monoxide (CO) - ppm
Stony Mountain - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Carbon Monoxide (CO) - ppm
Stony Mountain - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	440	62.06	62.06
0.4 - 0.5	182	25.67	87.73
0.6 - 0.7	36	5.08	92.81
0.8 - 1.4	51	7.19	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Carbon Monoxide (CO) - ppm
Stony Mountain - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.3	32	22	35	8	20	13	13	25	24	35	29	37	49	32	35	31	440
0.4 - 0.5	11	4	11	8	6	12	8	4	5	4	6	5	14	35	31	18	182
0.6 - 0.7	5	2	3	1	1	0	1	0	0	0	0	0	6	6	9	2	36
0.8 - 1.4	8	9	5	3	1	1	0	0	0	0	0	0	0	2	5	17	51
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	56	37	54	20	28	26	22	29	29	39	35	42	69	75	80	68	709

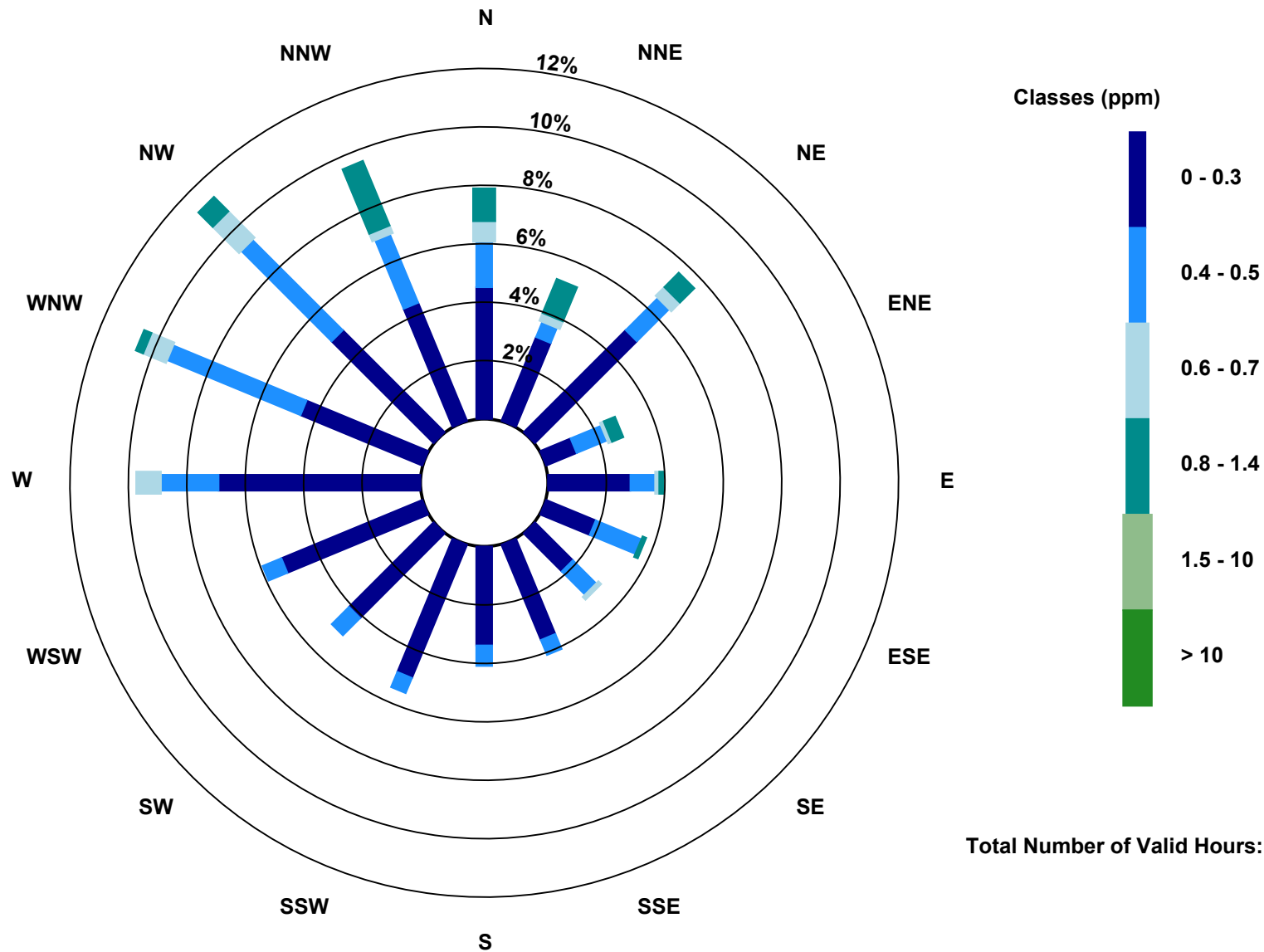
Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Carbon Monoxide (CO) - ppm
Stony Mountain



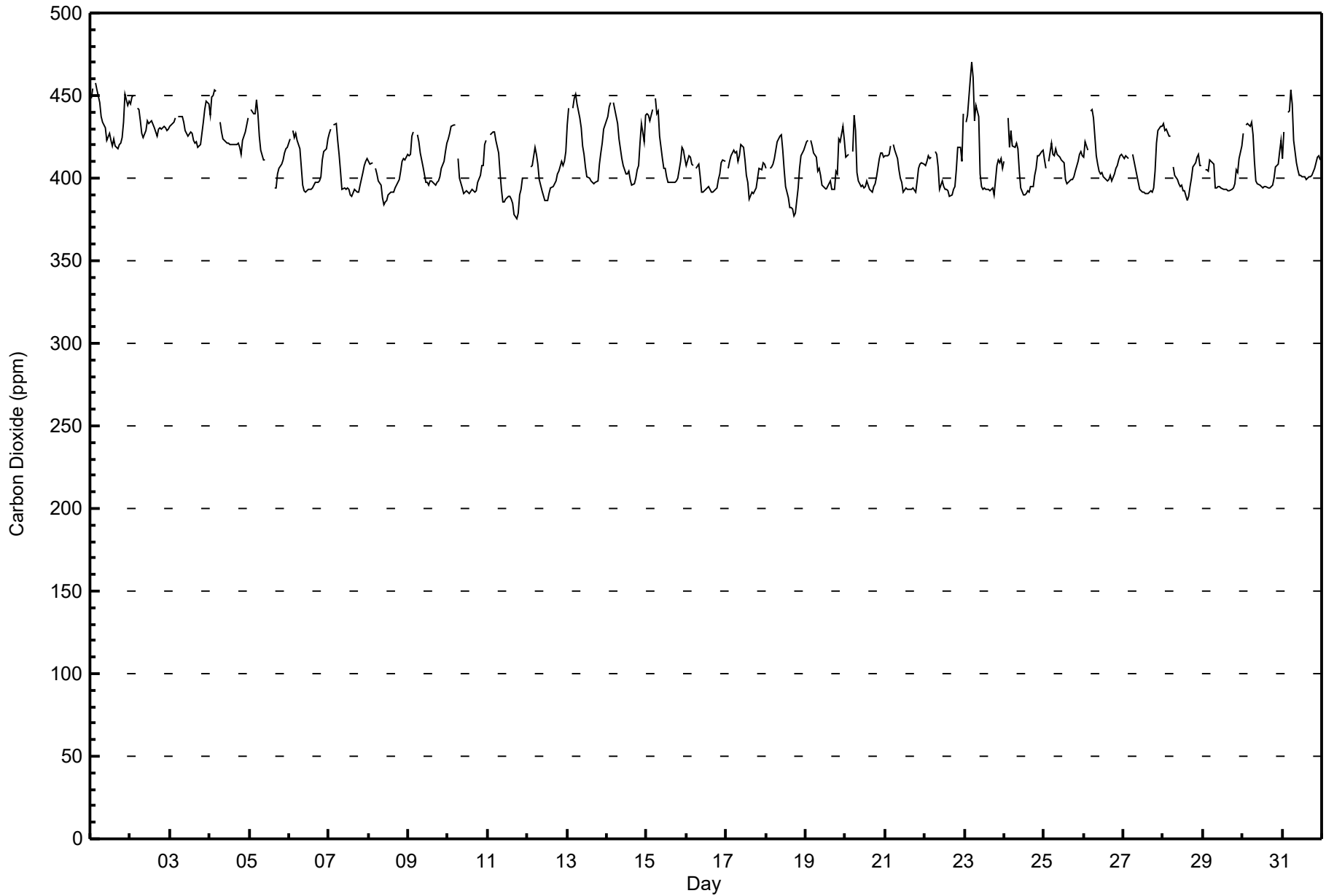


Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0	Hours in Service:																	744						
Maximum Value: 470.4 ppm on Jul 23 05:00		Maximum Daily Average: 434.2 ppm on Jul 1																	Hours of Data:	708							
Minimum Value: 375.5 ppm on Jul 11 18:00		Minimum Daily Average: 398.6 ppm on Jul 11																	Hours of Missing Data:	36							
Maximum Diurnal Average: 430.2 ppm at hour 5		Minimum Diurnal Average: 397.1 ppm at hour 16																	Hours of Calibration:	36							
Monthly Average: 410.86 ppm		Percentiles: P ₁ = 382.7 P ₁₀ = 392.3 Q ₁ = 396.4 Median = 408.9 Q ₃ = 422.1 P ₉₀ = 434.3 P ₉₉ = 453.4																	Percent Operational Time:	100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	448.0	454.1	Z	457.4	453.6	445.7	437.5	433.5	432.3	430.4	422.8	427.5	423.1	419.3	423.6	419.1	418.0	420.3	421.3	424.4	434.2	450.9	443.7	446.3	434.2	457.4	
2-Jul	445.1	449.3	449.9	Z	442.2	441.6	435.1	427.3	424.4	428.6	434.8	432.8	434.2	434.5	430.6	428.3	425.5	429.4	430.6	429.3	431.5	430.4	428.6	429.5	433.6	449.9	
3-Jul	431.2	433.2	434.3	436.7	Z	437.1	436.9	436.9	433.6	429.0	427.0	425.8	427.7	427.5	423.2	420.9	421.8	418.7	420.0	427.5	433.7	441.3	447.0	445.2	431.1	447.0	
4-Jul	438.5	448.9	450.4	453.6	452.4	Z	434.0	428.2	423.5	422.9	421.3	421.4	420.1	420.4	420.4	420.2	420.9	418.2	414.5	423.2	427.6	432.6	436.6	429.1	453.6		
5-Jul	Z	441.1	438.6	438.6	447.3	438.8	425.0	417.2	411.2	410.6	C	C	C	C	C	394.3	394.4	402.4	405.9	408.3	410.9	415.3	417.4	418.7	447.3		
6-Jul	424.0	Z	429.1	424.3	426.7	422.5	418.1	406.5	395.7	392.1	391.8	393.3	393.6	393.0	393.7	395.7	397.2	397.0	398.4	400.9	411.2	415.8	417.8	423.5	407.0	429.1	
7-Jul	427.5	429.7	Z	432.6	432.9	422.7	414.0	404.0	393.2	394.3	392.9	393.7	392.9	389.7	389.3	393.6	392.1	391.9	391.5	396.1	403.7	407.4	410.5	411.8	404.7	432.9	
8-Jul	410.5	408.4	409.4	Z	406.2	402.7	398.4	396.1	387.8	384.1	385.3	386.4	390.1	391.6	391.6	391.7	394.4	396.0	399.0	403.9	410.2	411.5	411.2	414.6	399.2	414.6	
9-Jul	413.4	414.7	425.5	428.3	Z	426.4	421.9	415.6	411.4	407.0	397.4	397.2	396.1	397.9	398.0	397.3	395.6	397.2	398.5	401.0	406.3	409.9	416.2	421.3	408.4	428.3	
10-Jul	424.1	427.4	431.0	432.2	432.0	Z	412.1	400.0	394.0	390.4	391.5	392.5	391.1	391.0	393.4	392.5	391.7	392.1	397.5	401.6	407.7	408.0	420.3	422.7	405.9	432.2	
11-Jul	Z	426.4	426.8	427.7	428.1	422.6	414.9	403.2	393.2	385.9	385.8	387.6	388.9	389.2	387.6	384.6	377.8	375.5	378.8	390.1	392.9	400.0	400.2	399.9	398.6	428.1	
12-Jul	400.3	Z	406.9	407.7	418.6	414.2	408.8	399.1	395.6	392.3	386.7	386.1	386.6	390.5	393.8	394.6	396.4	398.0	402.2	404.1	409.8	407.4	410.5	416.4	401.2	418.6	
13-Jul	431.9	442.7	Z	442.3	448.0	450.7	445.2	436.5	430.3	419.3	414.7	406.8	401.3	400.1	398.6	397.3	396.8	397.4	398.0	408.5	415.5	420.9	430.1	432.6	420.2	450.7	
14-Jul	437.6	443.0	445.9	Z	446.2	437.2	432.9	424.1	417.6	411.5	407.8	402.4	402.5	404.1	399.1	395.7	396.3	400.3	405.1	407.6	421.4	432.7	422.3	438.0	418.7	446.2	
15-Jul	438.7	437.8	434.5	441.2	Z	447.9	439.1	440.6	425.6	411.6	405.9	406.0	400.8	397.8	397.6	397.6	397.6	397.8	398.1	400.3	410.0	418.3	417.1	412.0	416.3	447.9	
16-Jul	407.5	413.2	412.6	408.7	407.5	Z	406.1	408.5	400.5	391.7	391.9	392.4	394.0	394.7	393.0	391.5	391.2	393.5	394.0	399.5	402.9	409.0	411.2	409.8	401.1	413.2	
17-Jul	Z	406.3	410.5	413.6	417.0	415.5	416.0	410.2	413.3	420.3	418.7	411.4	402.1	397.2	387.2	391.5	390.9	392.4	394.1	399.7	405.8	404.8	409.6	408.5	405.9	420.3	
18-Jul	405.7	Z	405.6	407.2	408.5	412.1	416.9	422.1	425.5	426.6	417.1	405.4	394.7	388.4	382.4	382.5	380.9	377.2	379.2	394.2	406.3	413.9	415.0	417.0	403.7	426.6	
19-Jul	422.0	422.9	Z	423.1	419.3	415.0	412.4	404.0	405.6	401.4	395.8	394.1	393.4	394.5	396.3	398.0	393.1	393.1	404.3	402.2	423.4	422.4	431.0	422.9	408.3	431.0	
20-Jul	412.8	413.6	414.1	Z	416.2	437.7	428.9	403.4	398.0	395.0	395.4	393.7	395.3	398.1	392.8	392.5	391.8	395.3	396.9	401.1	411.9	415.4	415.3	413.1	405.6	437.7	
21-Jul	413.4	413.4	414.3	419.4	Z	420.4	416.9	411.9	404.7	399.8	397.0	391.8	394.0	392.9	392.9	393.3	393.2	393.8	391.8	398.4	406.1	408.2	409.4	408.3	403.7	420.4	
22-Jul	407.8	410.5	413.8	412.3	412.4	Z	416.3	414.1	406.9	393.4	398.6	394.7	393.6	392.9	392.6	388.9	390.0	393.2	394.6	405.2	418.7	419.1	409.8	439.0	405.1	439.0	
23-Jul	Z	433.7	438.1	459.9	470.4	461.4	434.4	444.2	437.2	402.2	394.9	392.9	393.7	393.1	393.6	392.6	393.1	394.4	390.2	407.9	411.1	409.3	411.5	406.3	415.9	470.4	
24-Jul	409.9	Z	436.9	418.4	428.4	419.8	418.3	420.8	417.6	404.6	394.1	389.9	389.9	390.7	392.2	391.8	395.1	395.3	401.4	405.7	413.3	413.5	415.8	417.2	407.9	436.9	
25-Jul	411.1	406.1	Z	410.5	421.4	414.2	413.7	418.2	414.8	412.9	410.7	410.2	409.2	399.4	397.0	398.1	399.4	399.2	400.5	404.2	409.9	414.6	416.1	413.5	408.9	421.4	
26-Jul	412.5	421.7	417.0	Z	440.3	441.5	436.6	413.9	408.6	403.9	402.8	403.0	400.5	399.0	397.9	399.1	402.1	398.0	402.9	406.1	407.9	410.9	413.2	414.1	411.0	441.5	
27-Jul	411.5	413.4	412.9	411.9	Z	414.1	409.8	405.7	401.5	397.4	393.5	391.5	391.4	391.0	390.4	390.3	392.0	391.2	393.7	404.4	421.4	429.2	431.6	431.5	405.3	431.6	
28-Jul	432.9	429.0	429.6	425.3	425.6	Z	406.9	401.5	398.9	396.6	394.6	396.0	392.3	392.2	386.6	389.1	395.1	400.0	406.4	409.0	412.4	414.7	407.6	408.0	406.5	432.9	
29-Jul	Z	405.5	404.7	404.1	411.0	410.0	408.9	393.7	393.7	395.0	394.9	393.8	393.4	393.5	393.3	392.7	392.7	393.6	394.3	396.7	404.9	403.6	412.0	419.5	400.2	419.5	
30-Jul	427.2	Z	432.2	432.7	431.6	434.3	426.0	410.3	398.2	396.7	395.7	394.9	394.3	395.0	395.0	394.4	394.4	394.7	395.7	399.8	406.5	408.5	416.5	422.8	408.6	434.3	
31-Jul	411.7	427.7	Z	439.8	440.3	453.5	444.6	422.9	409.5	404.7	401.6	401.7	400.5	400.6	399.2	399.8	400.5	400.9	402.1	405.7	409.3	412.7	413.3	410.9	413.6	453.5	
		421.4	425.9	425.0	427.3	430.2	429.2	422.1	415.3	409.8	404.9	402.1	400.6	399.4	398.7	397.4	397.1	397.2	398.1	400.2	405.1	412.7	416.4	418.2	420.4	Diurnal Average	
		448.0	454.1	450.4	459.9	470.4	461.4	445.2	444.2	437.2	430.4	434.8	432.8	434.2	434.5	430.6	428.3	425.5	429.4	430.6	429.3	434.2	450.9	447.0	446.3	Diurnal Maximum	
Z - zerospan		C - Calibration																									



Wood Buffalo Environmental Association
Hourly Averages

Carbon Dioxide (CO₂) - ppm
Stony Mountain - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Carbon Dioxide (CO₂) - ppm
Stony Mountain - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
400 - 420	278	39.27	39.27
420 - 440	153	21.61	60.88
440 - 460	38	5.37	66.24
460 - 480	2	0.28	66.53
480 - 500	0	0.00	66.53
> 500	0	0.00	66.53

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Carbon Dioxide (CO₂) - ppm
Stony Mountain - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
400 - 420	17	17	25	12	6	10	16	14	7	11	11	27	31	33	23	18	278
420 - 440	23	8	3	1	10	4	1	1	7	12	11	3	9	10	32	18	153
440 - 460	1	0	0	1	0	0	0	1	0	3	2	3	1	11	9	6	38
460 - 480	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2
480 - 500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	41	25	28	14	16	14	18	16	14	26	25	33	41	54	64	42	471

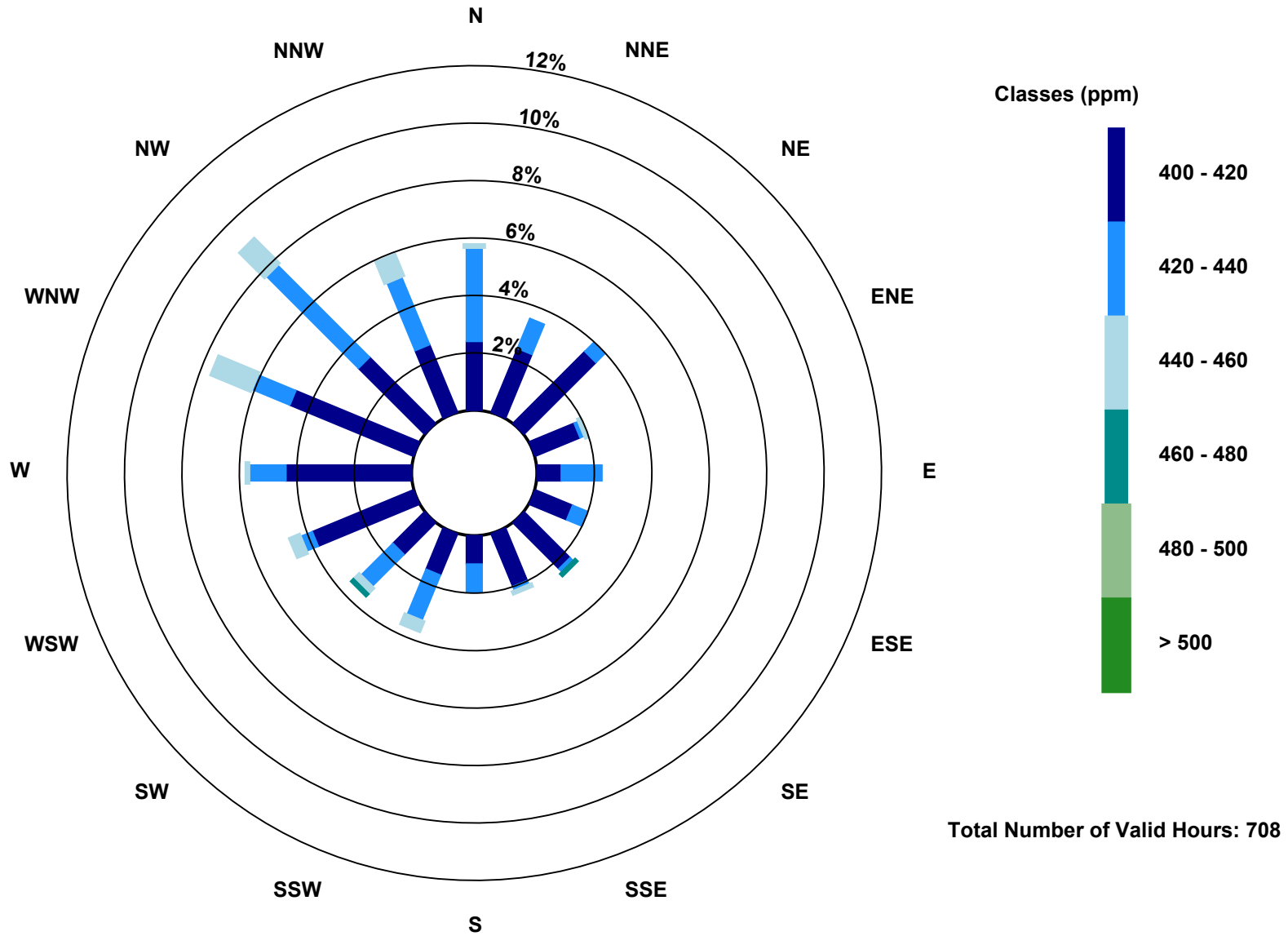
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Carbon Dioxide (CO₂) - ppm
Stony Mountain





Wood Buffalo Environmental Association
Summary of Hour Averages

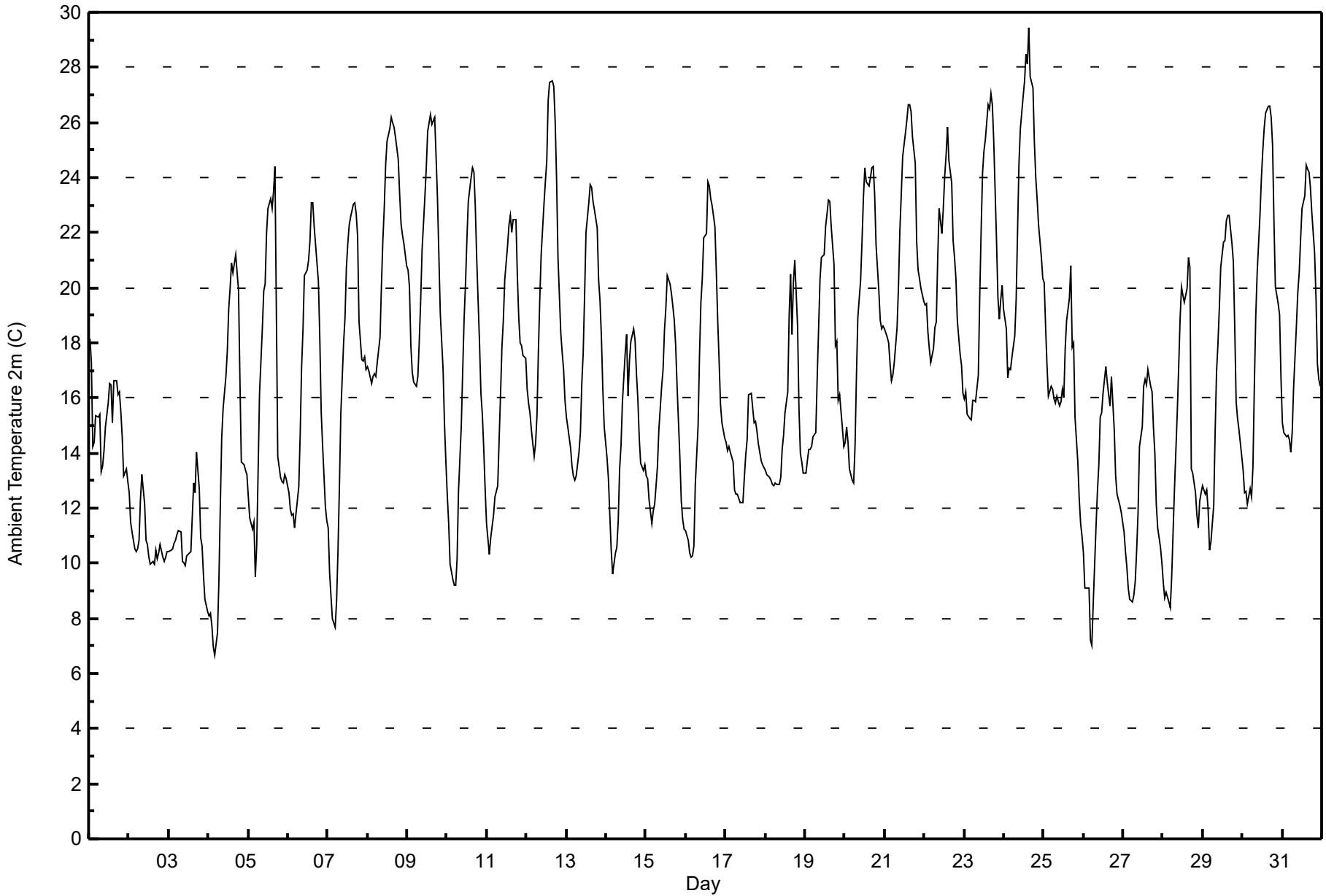
Ambient Temperature 2m (AT 2m) - C
Stony Mountain - July 2023

Maximum Value: 29.4 C on Jul 24 16:00 Maximum Daily Average: 22.8 C on Jul 24																						Hours in Service: 744 Hours of Data: 744				
Minimum Value: 6.7 C on Jul 4 05:00 Minimum Daily Average: 10.8 C on Jul 3 Maximum Diurnal Average: 21.9 C at hour 16 Minimum Diurnal Average: 12.4 C at hour 5 Monthly Average: 16.90 C Percentiles: P ₁ = 8.0 P ₁₀ = 10.6 Q ₁ = 13.0 Median = 16.5 Q ₃ = 20.6 P ₉₀ = 23.8 P ₉₉ = 27.3																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	18.2	17.3	14.2	14.4	15.4	15.3	15.4	13.3	13.5	14.1	14.9	15.8	16.5	16.5	15.1	16.6	16.6	16.1	16.2	15.5	14.6	13.1	13.4	13.0	15.2	18.2
2-Jul	12.6	11.5	11.1	10.5	10.4	10.5	10.8	12.3	13.2	12.1	10.9	10.7	10.2	10.0	10.0	9.9	10.5	10.2	10.4	10.7	10.2	10.1	10.2	10.4	10.8	13.2
3-Jul	10.4	10.5	10.5	10.7	10.8	11.0	11.2	11.1	10.1	10.0	9.9	10.3	10.4	10.4	11.7	12.9	12.6	14.0	12.7	10.9	10.7	9.5	8.7	8.2	10.8	14.0
4-Jul	8.1	8.2	7.7	7.0	6.7	7.5	9.4	12.1	14.6	15.6	16.8	17.7	19.2	20.0	20.9	20.5	21.2	20.6	19.9	16.7	13.7	13.6	13.4	13.2	14.3	21.2
5-Jul	12.4	11.6	11.3	11.5	9.5	10.7	13.4	16.2	18.5	19.9	20.2	22.0	22.9	23.2	22.9	23.5	24.4	19.2	13.9	13.1	13.0	12.9	13.2	13.1	16.3	24.4
6-Jul	12.6	12.0	11.7	11.8	11.3	11.8	12.7	14.6	17.1	18.5	20.4	20.7	21.0	21.7	23.1	23.1	22.2	20.9	20.3	18.2	15.5	14.3	12.1	11.5	16.6	23.1
7-Jul	11.3	9.7	8.8	8.0	7.7	8.7	10.5	12.8	15.4	18.0	18.9	20.8	21.6	22.3	22.6	23.0	23.1	22.7	21.8	18.8	17.4	17.4	17.5	17.1	16.5	23.1
8-Jul	17.1	17.0	16.5	16.8	16.9	16.8	17.3	18.2	20.1	21.7	22.9	24.4	25.3	25.8	26.2	26.0	25.8	25.5	24.7	23.4	22.3	21.9	21.6	20.8	21.5	26.2
9-Jul	20.6	20.0	17.9	16.9	16.6	16.4	16.8	18.1	19.5	21.4	23.3	24.4	25.7	26.0	26.3	26.0	26.2	24.7	23.2	21.2	19.1	17.0	15.0	13.7	20.7	26.3
10-Jul	12.5	11.4	9.9	9.4	9.2	9.2	10.2	12.6	15.0	17.0	18.9	20.2	21.8	23.1	24.0	24.4	24.2	22.9	21.1	18.0	16.2	15.4	14.2	12.7	16.4	24.4
11-Jul	11.4	10.3	10.9	11.3	11.8	12.4	12.8	14.5	16.1	17.9	18.8	20.3	21.5	22.2	22.6	22.0	22.5	22.5	20.4	18.9	18.0	17.9	17.5	17.5	17.2	22.6
12-Jul	16.3	15.8	15.5	14.9	13.9	14.4	15.4	17.6	19.6	21.2	23.0	23.8	24.6	26.8	27.5	27.5	27.3	26.0	23.9	21.1	18.4	17.6	17.1	15.9	20.2	27.5
13-Jul	15.3	14.9	14.2	13.5	13.2	13.0	13.2	14.0	14.8	16.5	17.7	19.7	22.0	23.1	23.7	23.6	23.1	22.8	22.2	20.3	19.5	18.2	16.3	14.9	17.9	23.7
14-Jul	13.8	13.1	11.8	10.5	9.6	10.4	10.6	11.5	13.4	14.3	15.8	17.7	18.3	16.1	17.3	18.1	18.5	18.1	16.9	16.0	14.5	13.6	13.4	13.6	14.5	18.5
15-Jul	13.1	13.1	12.3	11.5	11.9	12.2	12.8	13.5	14.8	16.4	17.1	18.5	19.3	20.4	20.2	19.8	19.3	18.8	17.9	16.4	13.8	12.2	11.6	11.2	15.3	20.4
16-Jul	11.2	10.8	10.4	10.2	10.3	10.6	12.8	15.0	17.5	19.5	20.3	21.8	22.0	23.8	23.7	23.2	23.0	22.2	20.6	18.8	17.3	15.8	15.1	14.5	17.1	23.8
17-Jul	14.4	14.1	14.2	14.1	13.7	12.7	12.5	12.5	12.4	12.2	12.2	13.1	13.9	14.5	16.1	16.2	15.6	15.1	15.1	14.8	14.3	13.7	13.6	13.5	13.9	16.2
18-Jul	13.4	13.2	13.1	13.0	12.9	12.8	12.9	12.9	12.9	13.1	14.1	14.6	15.5	16.2	19.0	20.5	18.3	20.2	21.0	18.6	15.6	14.0	13.7	13.3	15.2	21.0
19-Jul	13.3	13.7	14.1	14.2	14.3	14.6	14.8	16.8	18.5	20.3	21.1	21.2	22.2	22.7	23.2	23.1	22.2	20.9	17.9	18.0	15.9	16.1	14.9	14.2	17.8	23.2
20-Jul	14.4	14.9	14.4	13.4	13.0	12.9	14.3	16.8	18.9	20.3	21.7	23.3	24.3	23.9	23.7	24.0	24.3	24.4	23.4	21.6	19.9	18.8	18.5	18.6	19.3	24.4
21-Jul	18.5	18.2	18.0	17.2	16.6	16.8	17.3	18.5	20.0	22.1	23.4	24.8	25.6	26.1	26.6	26.6	26.4	25.5	24.5	21.6	20.7	20.4	20.0	19.5	21.5	26.6
22-Jul	19.4	19.4	18.4	17.8	17.3	17.8	18.5	18.8	21.0	22.9	21.9	22.9	24.0	24.8	25.8	24.6	23.8	21.7	21.1	20.4	18.8	17.6	17.2	16.2	20.5	25.8
23-Jul	16.0	16.2	15.4	15.2	15.2	15.9	15.9	15.9	16.8	19.7	22.1	24.1	25.0	25.4	26.6	26.5	27.0	26.6	25.3	21.6	19.6	18.9	19.6	20.1	20.4	27.0
24-Jul	19.2	18.5	16.7	17.1	17.0	17.5	18.3	19.6	22.1	24.5	25.8	27.0	27.5	28.5	28.1	29.4	27.7	27.3	25.3	24.0	23.2	22.2	21.1	20.4	22.8	29.4
25-Jul	20.2	18.6	17.2	16.1	16.4	16.3	16.0	15.8	16.1	15.7	15.9	16.3	16.0	17.8	18.8	19.6	20.8	17.9	18.0	15.3	13.7	12.4	11.4	11.0	16.4	20.8
26-Jul	10.4	9.1	9.1	9.1	7.2	7.0	8.6	11.3	12.6	13.6	15.3	15.5	16.2	17.1	16.6	16.1	15.7	16.8	14.8	13.1	12.5	12.3	12.1	11.8	12.7	17.1
27-Jul	11.1	10.4	9.8	9.1	8.7	8.6	8.8	9.3	10.5	11.8	14.2	15.0	16.4	16.7	16.5	17.1	16.4	16.2	14.9	14.0	12.2	11.3	10.6	10.0	12.5	17.1
28-Jul	9.3	8.8	9.0	8.6	8.4	9.5	11.1	12.7	15.5	17.1	18.9	20.0	19.7	19.5	20.0	21.1	20.8	13.4	13.3	12.6	11.8	11.3	12.2	12.6	14.0	21.1
29-Jul	12.8	12.5	12.6	11.9	10.5	10.8	12.1	14.7	17.0	17.9	19.3	20.8	21.7	21.7	22.4	22.6	22.6	21.6	20.9	18.5	15.9	15.2	14.9	13.9	16.9	22.6
30-Jul	13.4	12.6	12.6	12.2	12.7	12.4	13.5	16.5	19.0	20.6	22.6	24.0	25.0	25.8	26.4	26.6	26.6	26.2	25.2	22.4	20.0	19.4	19.0	16.8	19.6	26.6
31-Jul	15.1	14.7	14.6	14.7	14.5	14.0	14.7	16.4	18.6	19.8	20.5	21.7	22.9	23.3	24.5	24.3	24.2	23.6	22.7	21.2	19.6	17.2	16.7	16.4	19.0	24.5
14.1 13.6 13.0 12.7 12.4 12.6 13.4 14.7 16.3 17.6 18.7 19.8 20.6 21.1 21.7 21.9 21.7 20.8 19.7 17.9 16.4 15.5 15.0 14.5																								Diurnal Average		
20.6 20.0 18.4 17.8 17.3 17.8 18.5 19.6 22.1 24.5 25.8 27.0 27.5 28.5 28.1 29.4 27.7 27.3 25.3 24.0 23.2 22.2 21.6 20.8																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Stony Mountain - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Stony Mountain - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	43	5.78	5.78
10 - 20	486	65.32	71.10
> 20	215	28.90	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

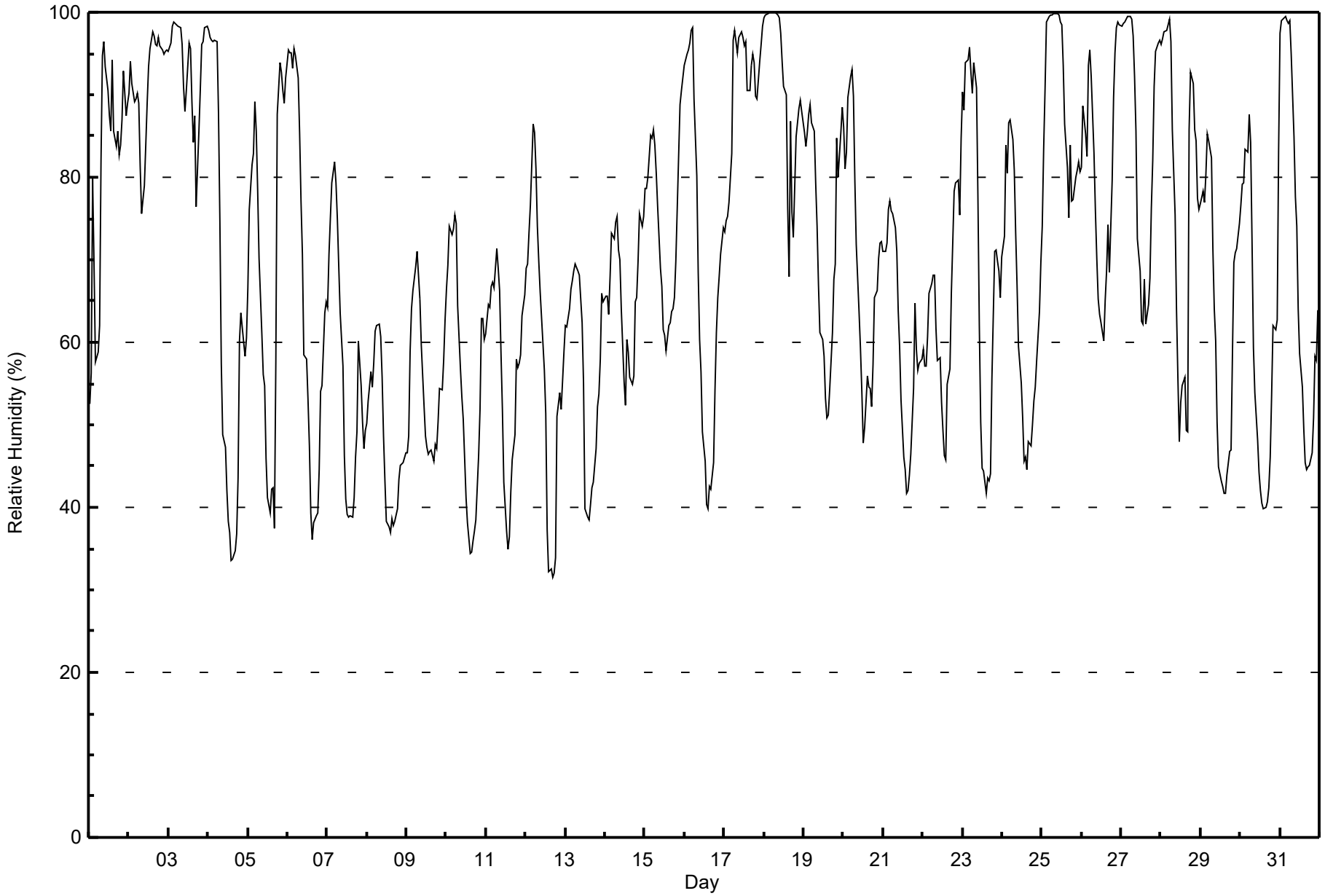
Relative Humidity (RH) - %
Stony Mountain - July 2023

Maximum Value: 100.0 % on Jul 18 04:00																						Maximum Daily Average: 93.4 % on Jul 3																						Hours in Service: 744			
Minimum Value: 31.5 % on Jul 12 17:00																						Minimum Daily Average: 48.3 % on Jul 8																						Hours of Data: 744			
Maximum Diurnal Average: 85.5 % at hour 6																						Minimum Diurnal Average: 53.3 % at hour 16																						Hours of Missing Data: 0			
Monthly Average: 69.92 %																						Percentiles: P ₁ = 34.5 P ₁₀ = 43.6 Q ₁ = 54.6 Median = 69.3 Q ₃ = 86.9 P ₉₀ = 96.3 P ₉₉ = 99.8																						Hours of Calibration: 0			
																																												Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	52.5	56.2	79.8	69.4	57.7	58.7	62.1	82.1	94.8	96.5	93.3	90.5	87.4	85.7	94.2	85.6	83.7	85.6	82.8	83.9	87.0	92.8	87.5	89.0	80.8	96.5																					
2-Jul	90.2	94.1	91.4	89.1	89.5	90.2	89.0	81.3	75.6	79.0	83.8	89.0	93.5	95.6	97.6	97.1	96.2	95.9	96.9	96.0	95.4	94.9	95.3	95.4	91.3	97.6																					
3-Jul	95.2	96.3	98.3	98.9	98.7	98.6	98.4	98.1	96.2	91.1	88.0	90.5	96.3	95.6	89.2	84.2	87.4	76.5	85.6	90.6	96.1	96.4	98.2	98.3	93.4	98.9																					
4-Jul	97.8	97.0	96.7	96.5	96.7	96.5	87.7	74.5	57.4	48.8	47.3	42.0	38.3	36.9	33.6	33.8	34.7	36.8	43.6	60.1	63.6	60.0	58.2	60.4	62.4	97.8																					
5-Jul	66.6	76.0	81.6	82.8	89.2	85.5	78.4	70.1	61.0	56.0	54.8	45.9	41.1	39.3	42.2	42.4	37.5	57.7	87.6	93.9	92.7	90.5	89.0	92.1	68.9	93.9																					
6-Jul	95.4	95.0	95.1	93.2	95.6	94.8	92.1	85.4	77.1	70.7	58.5	58.0	53.1	47.4	39.3	36.1	38.1	39.0	39.3	44.6	54.1	54.8	63.6	65.0	66.0	95.6																					
7-Jul	64.2	70.6	75.1	79.3	81.8	79.3	75.0	69.2	63.6	57.0	46.2	41.0	39.1	38.8	39.1	38.8	41.2	46.0	49.1	60.2	54.7	50.3	47.2	49.3	56.5	81.8																					
8-Jul	50.2	52.8	56.5	54.6	57.4	61.4	62.1	62.3	60.7	55.7	48.7	43.2	38.3	37.6	36.9	38.6	37.8	38.3	39.9	43.4	45.1	45.3	45.5	46.6	48.3	62.3																					
9-Jul	46.6	48.7	58.8	64.0	66.3	69.1	71.1	68.1	65.2	59.7	52.3	48.6	47.3	46.5	46.7	47.0	45.6	47.7	47.1	50.3	54.3	54.2	57.9	62.7	55.2	71.1																					
10-Jul	66.4	69.4	74.0	73.1	73.7	75.5	74.3	64.3	56.8	53.3	50.7	46.0	41.2	38.1	34.4	34.6	36.0	37.2	38.5	46.2	51.9	62.9	62.8	60.4	55.1	75.5																					
11-Jul	61.1	64.5	64.3	66.7	67.4	66.7	71.4	69.0	66.2	58.7	51.9	43.0	37.1	35.0	36.4	41.9	45.8	48.9	57.9	57.0	57.5	58.5	63.2	65.8	56.5	71.4																					
12-Jul	68.9	69.4	73.3	76.6	86.5	85.3	81.1	74.1	69.8	66.2	59.8	56.7	51.3	37.3	32.2	32.6	31.5	31.9	33.9	51.1	53.9	51.9	55.2	58.7	57.9	86.5																					
13-Jul	62.1	61.8	64.0	66.4	67.5	68.6	69.4	68.6	68.1	65.2	62.4	55.1	39.8	38.9	38.4	40.3	42.5	43.1	47.0	52.2	53.8	57.9	66.0	64.9	56.8	69.4																					
14-Jul	65.6	65.6	63.3	68.0	73.3	72.6	74.5	75.2	71.2	70.0	64.1	55.2	52.3	60.4	58.8	55.8	54.9	56.0	65.0	65.5	69.9	75.7	74.1	75.3	65.9	75.7																					
15-Jul	78.7	78.7	80.0	85.1	84.7	85.8	83.9	80.5	76.4	69.0	66.8	61.6	60.9	59.0	62.1	62.4	63.7	64.1	65.4	69.8	82.6	88.9	90.5	92.1	74.7	92.1																					
16-Jul	93.6	94.9	95.4	96.2	97.8	98.2	89.6	80.2	68.4	60.4	56.4	49.1	45.5	40.4	39.9	42.5	42.3	45.5	54.2	61.2	65.4	68.0	70.6	74.0	67.9	98.2																					
17-Jul	73.3	74.8	75.3	77.0	82.9	96.7	97.9	96.4	95.1	96.9	97.6	97.0	95.9	96.5	90.6	90.5	93.5	95.0	93.9	89.9	89.5	94.0	96.1	98.3	91.0	98.3																					
18-Jul	99.3	99.7	99.9	100.0	100.0	100.0	100.0	100.0	99.7	99.3	97.5	94.0	91.1	90.0	76.2	68.0	86.7	75.8	72.7	85.0	86.6	88.4	89.3	87.9	91.1	100.0																					
19-Jul	85.4	83.7	85.5	87.6	88.8	86.6	85.6	79.3	74.1	67.0	61.2	60.4	58.3	53.2	50.9	51.2	54.3	61.1	67.7	69.4	84.7	79.9	85.4	88.5	72.9	88.8																					
20-Jul	86.1	81.0	83.1	89.6	92.3	93.0	89.9	79.7	71.9	63.7	59.4	54.1	47.7	49.6	56.0	54.6	54.5	52.2	57.3	65.4	66.3	70.2	72.0	72.2	69.2	93.0																					
21-Jul	71.1	71.0	72.1	76.1	77.1	76.0	75.7	74.0	71.1	63.9	59.4	53.0	46.1	44.6	41.7	42.0	43.9	46.5	54.4	64.7	59.1	56.5	57.4	58.0	60.6	77.1																					
22-Jul	59.2	57.1	57.1	60.6	65.9	67.1	68.2	68.1	61.7	57.8	58.1	52.6	49.4	46.2	45.7	54.9	56.9	66.0	72.0	78.3	79.4	79.6	75.5	84.7	63.4	84.7																					
23-Jul	90.3	88.2	93.9	94.2	95.7	92.7	90.2	93.8	90.8	77.6	62.1	50.4	44.8	44.4	41.6	43.6	43.2	44.1	55.6	71.1	71.2	69.8	68.6	65.4	70.1	95.7																					
24-Jul	70.4	73.0	83.9	80.4	86.7	86.9	84.7	80.9	73.3	66.8	59.6	55.1	50.8	45.5	46.1	44.6	47.9	47.5	50.0	52.9	54.5	57.9	63.7	69.7	63.9	86.9																					
25-Jul	74.1	83.3	90.7	98.7	99.6	99.6	99.6	99.8	99.9	99.9	99.6	98.8	98.5	93.6	86.4	81.2	75.0	84.0	77.1	77.3	80.0	80.8	81.8	80.6	89.2	99.9																					
26-Jul	81.2	88.7	85.3	82.5	93.6	95.4	92.3	82.9	75.9	70.1	65.3	63.4	62.3	60.2	65.0	68.6	74.2	68.5	79.6	89.7	95.0	98.1	98.8	98.5	80.6	98.8																					
27-Jul	98.4	98.7	98.9	99.2	99.5	99.5	99.2	97.2	92.2	85.7	72.6	68.6	62.5	62.2	67.7	62.2	64.6	67.7	76.4	82.0	91.0	95.3	96.3	96.6	84.7	99.5																					
28-Jul	96.1	96.8	97.6	97.7	98.5	99.1	96.5	85.8	75.5	63.9	55.5	48.0	52.7	54.7	55.8	49.4	49.1	85.8	92.7	91.3	85.8	84.4	77.5	76.2	77.8	99.1																					
29-Jul	76.7	78.3	77.0	80.3	85.2	84.4	82.3	71.4	64.0	60.2	50.3	44.9	43.3	42.6	41.7	41.6	43.9	46.8	47.0	58.7	69.6	70.9	71.3	74.5	62.8	85.2																					
30-Jul	76.5	79.1	79.4	83.4	83.1	87.6	84.3	72.1	59.3	53.8	48.1	44.2	42.0	40.5	39.8	40.1	40.7	42.3	46.1	53.6	62.0	61.6	62.7	83.2	61.1	87.6																					
31-Jul	97.5	98.9	99.3	99.5	99.0	98.6	99.0	94.9	85.0	77.7	74.2	64.1	58.6	54.6	49.5	45.4	44.6	45.0	45.2	46.6	50.9	58.3	57.8	64.0	71.2	99.5																					
																						77.1	78.8	81.5	82.8	84.9	85.5	84.0	80.0	74.8	69.7	64.7	60.1	57.0	55.2	54.1	53.3	54.6	57.4	62.0	67.8	71.1	72.5	73.5	75.7	Diurnal Average	
																						99.3	99.7	99.9	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.6	98.8	98.5	96.5	97.6	97.1	96.2	95.9	96.9	96.0	96.1	98.1	98.8	98.5	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Stony Mountain - July 2023





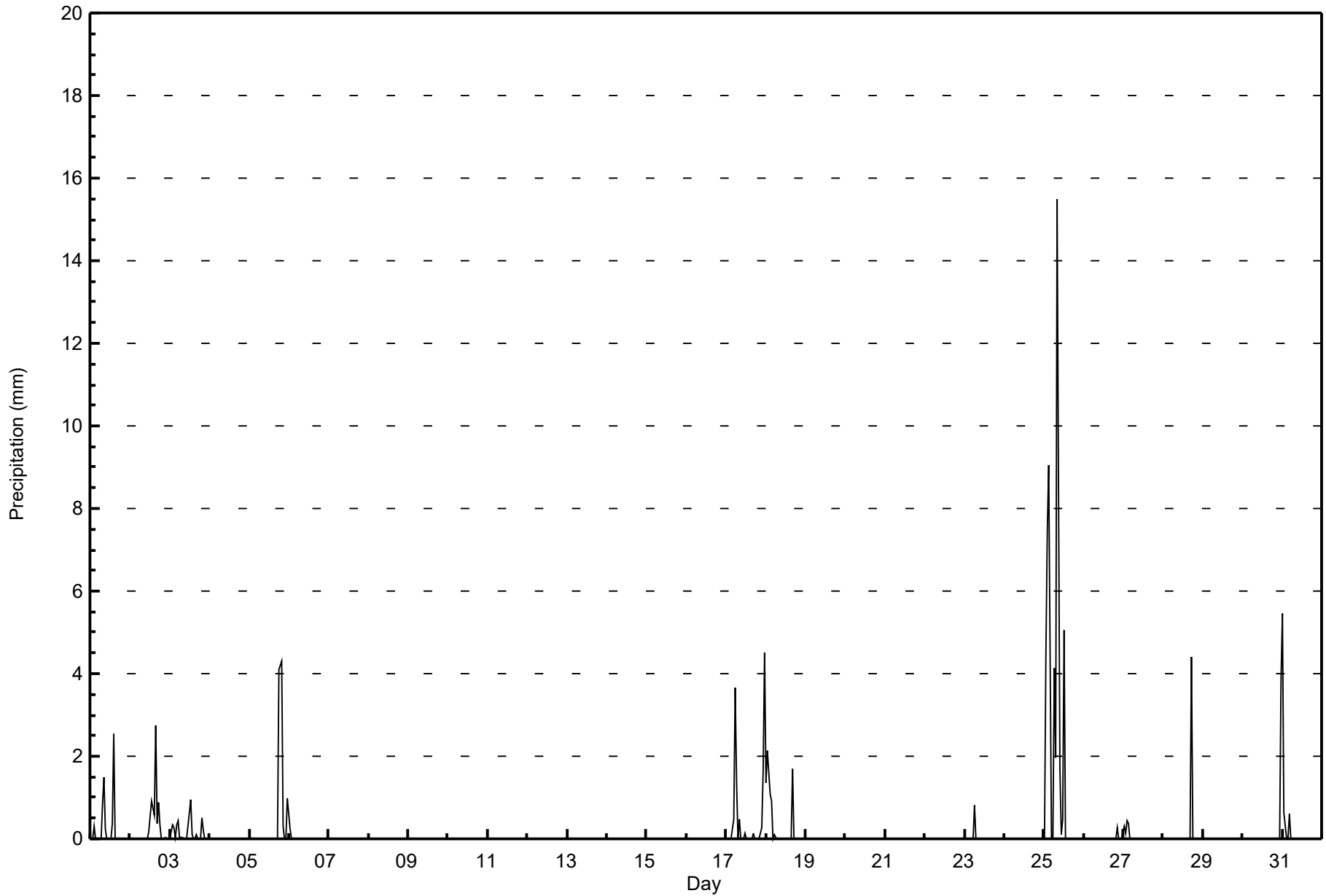
Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

Stony Mountain - July 2023

Maximum Value: 15.5 mm on Jul 25 09:00		Maximum Daily Total: 50.0 mm on Jul 25		Hours in Service: 744																																												
Minimum Value: 0.0 mm on Jul 1 01:00		Minimum Daily Total: 0.0 mm on Jul 4		Hours of Data: 744																																												
Maximum Diurnal Total: 17.4 mm at hour 9		Minimum Diurnal Total: 0.1 mm at hour 11		Hours of Missing Data: 0																																												
Monthly Total: 113.34 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 = 4.4		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.9	1.5	0.2	0.0	0.0	0.0	0.4	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	2.5																						
2-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.9	0.6	2.7	0.4	0.9	0.3	0.0	0.0	0.1	0.0	0.0	6.6	2.7																						
3-Jul	0.0	0.3	0.3	0.1	0.4	0.5	0.1	0.1	0.0	0.0	0.0	0.3	1.0	0.1	0.0	0.0	0.1	0.0	0.0	0.5	0.2	0.0	0.0	0.0	3.7	1.0																						
4-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	4.3	0.3	0.0	0.0	1.0	9.7	4.3																					
6-Jul	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																						
7-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.5	3.7	1.4	0.0	0.5	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3	1.7	4.5	12.7	4.5																						
18-Jul	1.4	2.1	1.1	0.9	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4	2.1																						
19-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8																						
24-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	4.5	7.5	9.1	0.0	0.1	4.2	2.0	15.5	1.7	0.1	0.5	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	15.5																						
26-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.3																						
27-Jul	0.3	0.1	0.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.5																						
28-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0	4.4	4.4																						
29-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	3.9	3.9																						
31-Jul	5.5	0.6	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8	5.5																						
																								7.4	7.7	9.6	10.5	1.4	4.3	6.4	2.9	17.4	2.0	0.1	1.1	6.5	1.4	3.1	2.7	2.3	5.3	4.4	4.8	0.8	0.3	1.7	9.4	Diurnal Average
																								5.5	4.5	7.5	9.1	0.6	3.7	4.2	2.0	15.5	1.7	0.1	0.5	5.0	0.9	2.5	2.7	1.7	4.4	4.1	4.3	0.3	0.3	1.7	4.5	Diurnal Maximum





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Precipitation (PC) - mm
Stony Mountain - July 2023**

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	700	94.09	94.09
0.4 - 0.5	10	1.34	95.43
0.6 - 0.7	3	0.40	95.83
0.8 - 1.4	10	1.34	97.18
1.5 - 10	19	2.55	99.73
> 10	1	0.13	99.87

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Leaf Wetness (LW) - %

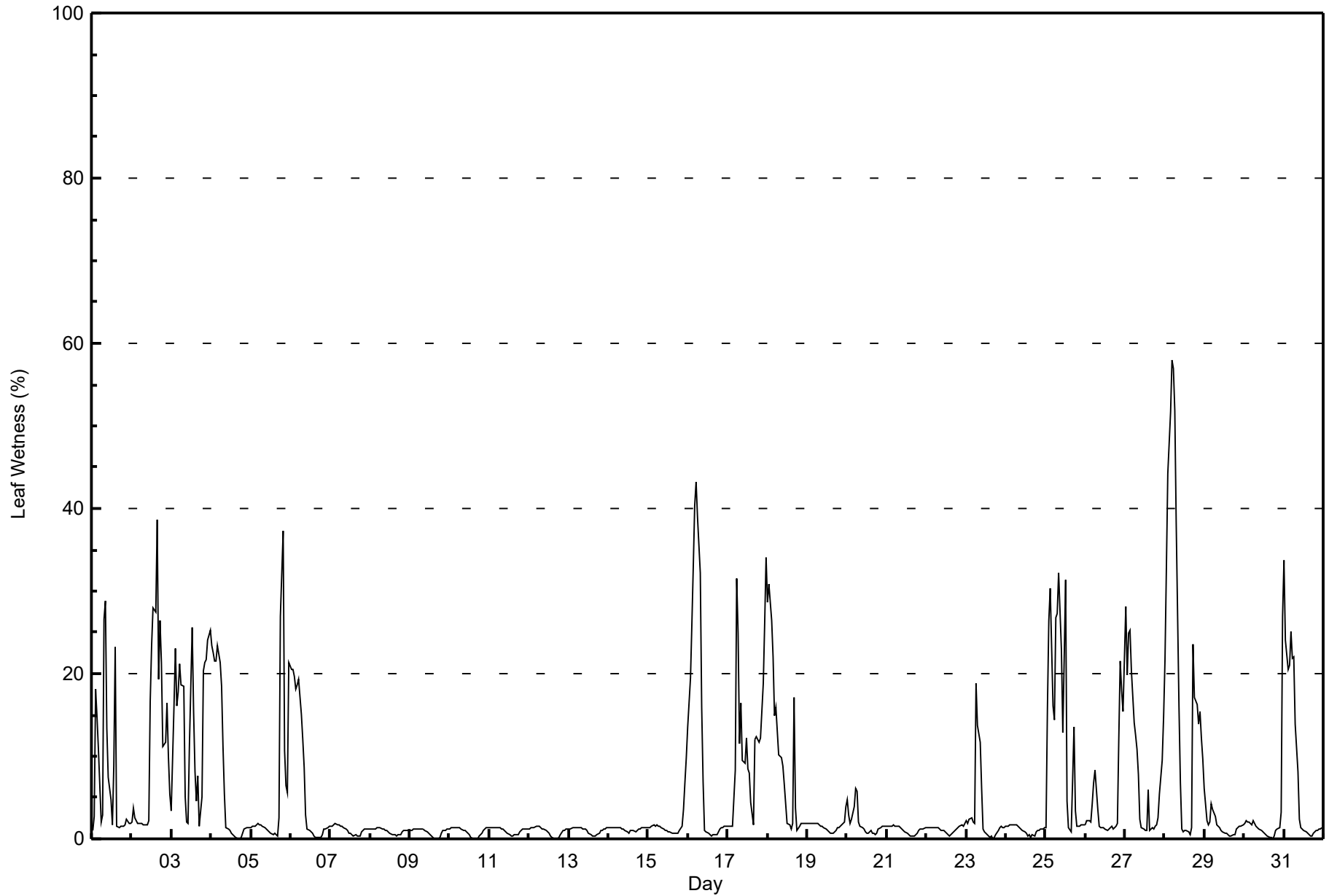
Stony Mountain - July 2023

Maximum Value: 58.0 % on Jul 28 05:00																				Maximum Daily Average: 20.6 % on Jul 28					Hours in Service: 744	
Minimum Value: 0.0 % on Jul 9 17:00																				Minimum Daily Average: 0.8 % on Jul 9					Hours of Data: 744	
Maximum Diurnal Average: 9.9 % at hour 6																				Minimum Diurnal Average: 2.0 % at hour 16					Hours of Missing Data: 0	
Monthly Average: 5.37 %																				Percentiles: P₁ = 0.0 P₁₀ = 0.5 Q₁ = 1.0 Median = 1.4 Q₃ = 3.6 P₉₀ = 19.4 P₉₉ = 38.9					Hours of Calibration: 0	
																				Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	1.1	2.6	18.2	14.7	10.9	2.1	2.8	26.7	28.8	13.3	7.4	4.8	1.6	8.9	23.2	1.6	1.4	1.5	1.4	1.5	1.7	2.3	1.8	1.9	7.6	28.8
2-Jul	2.1	3.7	2.5	1.9	1.9	1.9	1.9	1.7	1.6	1.7	2.2	16.6	23.3	27.9	27.4	38.7	19.3	26.4	21.4	11.2	11.8	16.4	10.1	5.5	11.6	38.7
3-Jul	3.4	16.0	23.0	16.0	17.8	21.2	18.6	18.5	5.1	2.1	1.9	11.1	25.6	15.4	8.2	4.6	7.6	1.6	5.0	20.4	21.3	21.8	24.1	25.3	14.0	25.6
4-Jul	23.3	22.5	21.5	21.5	23.3	21.4	18.5	11.2	5.4	1.3	1.2	0.9	0.7	0.5	0.3	0.2	0.0	0.1	0.2	0.6	1.2	1.3	1.4	1.4	7.5	23.3
5-Jul	1.4	1.5	1.6	1.7	1.9	1.8	1.6	1.5	1.3	1.2	1.1	0.9	0.7	0.6	0.7	0.6	0.3	2.6	27.0	37.3	10.6	6.5	5.6	21.3	5.5	37.3
6-Jul	20.5	20.5	19.6	18.1	18.6	19.4	15.0	12.0	8.6	2.8	1.2	1.1	0.9	0.7	0.4	0.2	0.2	0.2	0.2	0.5	1.1	1.2	1.4	1.5	6.9	20.5
7-Jul	1.5	1.6	1.7	1.8	1.7	1.6	1.5	1.5	1.3	1.2	1.0	0.7	0.6	0.5	0.4	0.4	0.4	0.3	0.3	0.8	1.2	1.2	1.2	1.2	1.1	1.8
8-Jul	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.1	1.0	0.8	0.7	0.5	0.5	0.4	0.4	0.5	0.6	0.8	1.0	1.0	1.0	1.0	0.9	1.3
9-Jul	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.2	1.1	1.0	0.9	0.7	0.5	0.4	0.2	0.1	0.0	0.0	0.3	0.6	1.0	1.0	1.1	1.2	0.8	1.3
10-Jul	1.2	1.3	1.3	1.4	1.4	1.4	1.3	1.2	1.1	1.0	0.8	0.7	0.4	0.2	0.0	0.0	0.0	0.0	0.3	0.7	1.0	1.2	1.3	1.3	0.9	1.4
11-Jul	1.3	1.4	1.4	1.4	1.4	1.3	1.4	1.3	1.2	1.0	0.9	0.7	0.6	0.4	0.4	0.6	0.6	0.6	0.9	1.1	1.1	1.1	1.2	1.2	1.0	1.4
12-Jul	1.2	1.3	1.3	1.4	1.5	1.5	1.5	1.4	1.3	1.1	1.0	0.9	0.8	0.3	0.2	0.0	0.0	0.0	0.2	0.6	1.0	1.1	1.1	1.2	0.9	1.5
13-Jul	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.1	1.0	0.7	0.6	0.4	0.4	0.4	0.5	0.6	1.0	1.1	1.1	1.3	1.3	1.0	1.3
14-Jul	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.3	1.3	1.2	1.1	0.9	0.8	1.1	1.0	0.9	0.9	1.0	1.2	1.3	1.3	1.4	1.4	1.4	1.2	1.4
15-Jul	1.4	1.4	1.6	1.7	1.6	1.6	1.5	1.5	1.3	1.2	1.0	1.0	0.9	0.8	0.7	0.6	0.6	0.7	0.7	1.0	1.5	3.6	6.8	9.8	1.9	9.8
16-Jul	13.6	19.5	26.1	33.1	40.3	43.2	39.0	32.2	16.0	7.0	1.1	0.9	0.8	0.4	0.3	0.5	0.5	0.6	0.9	1.1	1.3	1.4	1.5	1.5	11.8	43.2
17-Jul	1.5	1.5	1.5	1.5	8.4	31.5	24.8	11.5	16.5	9.5	9.1	12.2	8.5	8.0	4.3	1.7	12.0	12.4	12.1	11.6	12.2	18.9	26.1	34.1	12.1	34.1
18-Jul	28.7	30.8	26.4	22.0	14.9	15.9	13.1	10.2	9.7	8.8	6.7	4.3	1.9	1.7	1.2	1.9	17.1	3.7	1.1	1.6	1.9	1.8	1.9	1.9	9.5	30.8
19-Jul	1.8	1.9	1.8	1.8	1.9	1.8	1.8	1.7	1.6	1.5	1.3	1.2	1.1	0.9	0.7	0.7	0.7	1.1	1.3	1.4	1.6	1.7	2.1	4.0	1.6	4.0
20-Jul	4.7	2.8	1.9	2.5	3.9	6.1	5.8	2.0	1.5	1.3	1.1	0.9	0.7	0.7	1.0	0.8	0.7	0.5	0.7	1.2	1.4	1.5	1.5	1.5	2.0	6.1
21-Jul	1.5	1.5	1.6	1.6	1.6	1.6	1.5	1.5	1.4	1.3	1.1	0.9	0.6	0.5	0.4	0.3	0.3	0.4	0.7	1.1	1.2	1.2	1.3	1.3	1.1	1.6
22-Jul	1.3	1.3	1.3	1.3	1.4	1.4	1.3	1.3	1.1	1.0	1.0	0.9	0.7	0.6	0.4	0.5	0.8	1.1	1.1	1.4	1.5	1.6	1.6	1.9	1.2	1.9
23-Jul	2.3	1.9	2.3	2.5	2.1	1.9	18.8	13.7	11.7	6.1	1.2	0.8	0.7	0.6	0.2	0.3	0.0	0.2	0.5	1.1	1.3	1.4	1.4	1.4	3.1	18.8
24-Jul	1.5	1.5	1.8	1.7	1.7	1.7	1.6	1.5	1.4	1.2	1.0	0.8	0.6	0.4	0.5	0.1	0.5	0.4	0.9	1.0	1.1	1.2	1.2	1.3	1.1	1.8
25-Jul	1.4	15.7	26.4	30.3	16.0	14.4	26.8	27.4	32.2	22.9	12.8	22.1	31.3	4.6	1.3	0.9	7.2	13.5	3.5	1.5	1.6	1.7	1.7	1.7	13.3	32.2
26-Jul	1.7	2.2	2.2	2.1	4.3	6.8	8.3	3.5	1.5	1.4	1.3	1.3	1.2	1.0	1.2	1.3	1.4	1.2	1.5	1.8	12.1	21.5	18.0	15.4	4.8	21.5
27-Jul	28.2	19.8	25.0	25.3	20.3	14.1	12.5	10.9	7.8	2.4	1.3	1.3	1.0	1.1	5.9	1.1	1.3	1.2	1.5	1.6	2.5	5.4	9.5	14.7	9.0	28.2
28-Jul	21.8	32.8	44.3	51.6	58.0	57.0	51.9	38.3	16.0	6.7	1.2	0.9	0.9	1.0	0.9	0.5	1.3	23.6	17.2	16.3	13.9	15.5	12.3	9.6	20.6	58.0
29-Jul	6.1	2.2	1.7	2.0	4.2	3.6	2.7	1.6	1.5	1.3	1.1	0.9	0.7	0.6	0.5	0.3	0.3	0.4	0.5	1.1	1.4	1.5	1.6	1.7	1.7	6.1
30-Jul	1.8	2.2	2.0	2.0	1.8	2.3	1.9	1.6	1.3	1.2	1.0	0.8	0.7	0.5	0.3	0.2	0.1	0.1	0.4	1.0	1.3	1.3	3.2	27.0	2.3	27.0
31-Jul	33.7	24.0	20.4	21.1	25.1	21.8	22.1	13.9	8.1	2.3	1.4	1.2	1.0	0.8	0.6	0.5	0.4	0.4	0.6	1.0	1.1	1.2	1.2	1.3	8.5	33.7
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (LW) - %
Stony Mountain - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (LW) - %
Stony Mountain - July 2023

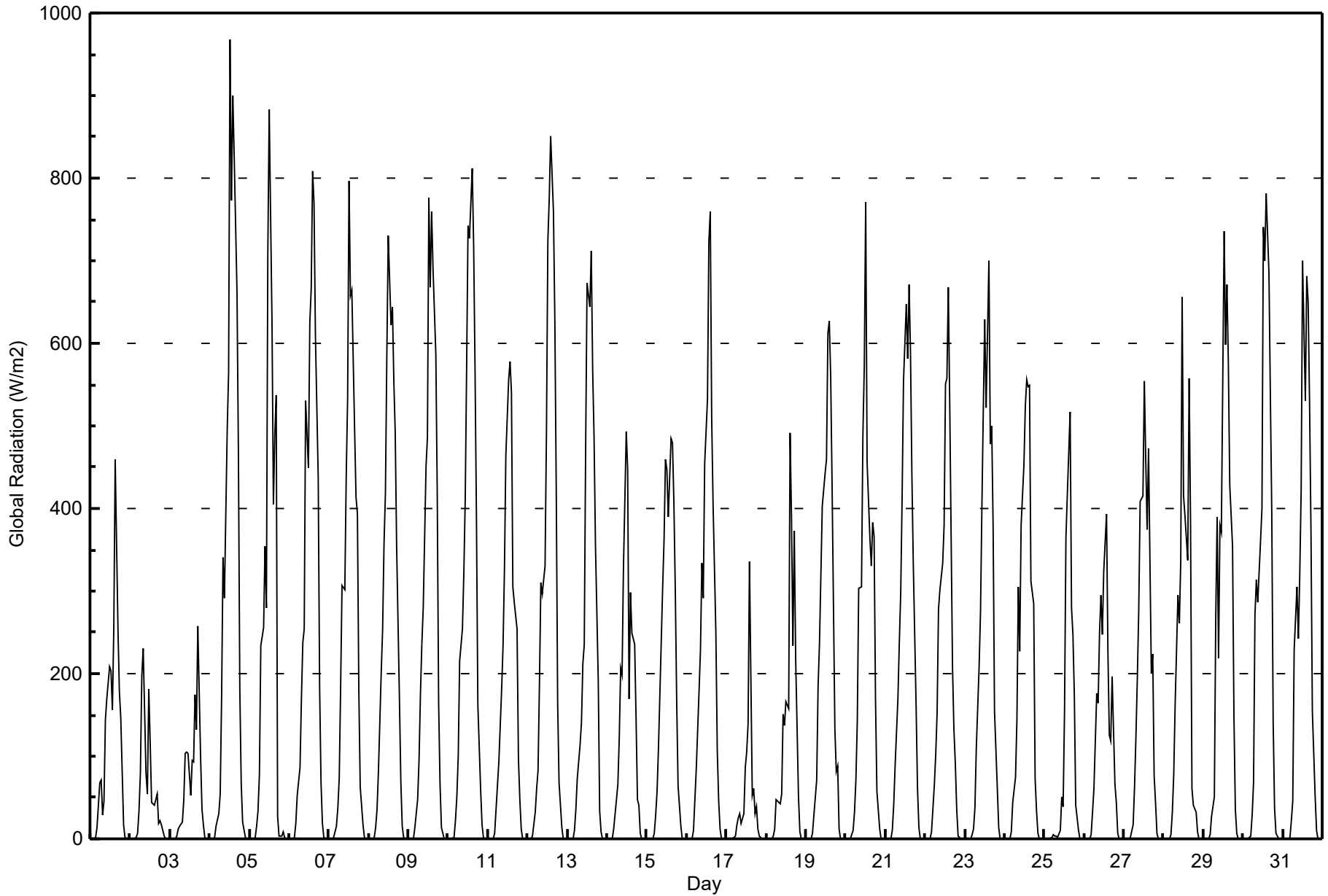
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	43	5.78	5.78
0.4 - 0.5	44	5.91	11.69
0.6 - 0.7	49	6.59	18.28
0.8 - 1.4	268	36.02	54.30
1.5 - 10	186	25.00	79.30
> 10	138	18.55	97.85

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 968.1 W/m2 on Jul 4 13:00 Maximum Daily Average: 284.8 W/m2 on Jul 4																							Hours in Service:	744		
Minimum Value: 0.0 W/m2 on Jul 1 01:00 Minimum Daily Average: 41.2 W/m2 on Jul 17																							Hours of Data:	744		
Maximum Diurnal Average: 545.8 W/m2 at hour 15 Minimum Diurnal Average: 0.0 W/m2 at hour 3																							Hours of Missing Data:	0		
Monthly Average: 182.03 W/m2 Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.3 Median = 61.6 Q ₃ = 320.0 P ₉₀ = 552.7 P ₉₉ = 790.6																							Hours of Calibration:	0		
																							Percent Operational Time:	100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.0	0.0	0.0	1.3	13.0	67.8	70.4	29.0	45.1	144.5	169.1	208.4	203.7	155.7	254.5	459.0	252.7	178.1	145.6	81.8	16.8	0.9	0.0	0.0	104.1	459.0
2-Jul	0.0	0.0	0.0	1.5	7.2	34.1	80.4	196.5	230.5	79.7	54.6	182.0	115.7	44.3	41.2	47.3	54.6	19.2	22.5	17.5	2.6	0.4	0.0	0.0	51.3	230.5
3-Jul	0.0	0.0	0.0	0.3	3.1	11.1	15.5	19.7	47.2	104.2	105.8	104.2	53.2	94.9	92.9	174.9	132.3	258.0	98.0	36.1	16.4	1.9	0.3	0.3	57.1	258.0
4-Jul	0.2	0.1	0.1	2.0	16.1	31.2	53.4	171.9	340.8	291.6	494.7	564.7	968.1	772.8	899.2	826.1	661.4	468.0	181.9	67.2	19.9	2.3	0.2	0.2	284.8	968.1
5-Jul	0.0	0.0	0.0	1.6	14.9	33.6	77.4	233.3	255.6	353.9	279.7	708.6	883.9	624.2	405.4	489.3	536.8	27.9	3.4	2.5	9.2	1.5	0.0	0.0	206.0	883.9
6-Jul	0.0	0.0	0.0	1.5	19.3	52.6	86.6	169.5	236.9	254.6	530.7	450.0	626.0	665.6	808.5	768.8	610.7	438.0	182.8	67.1	18.6	1.5	0.0	0.0	249.6	808.5
7-Jul	0.0	0.0	0.0	1.3	14.7	37.7	72.7	182.4	306.4	301.8	439.5	534.5	797.0	657.7	663.9	494.6	413.3	393.0	180.4	62.8	16.8	1.2	0.0	0.0	232.2	797.0
8-Jul	0.0	0.0	0.0	0.9	14.1	36.3	81.5	200.9	254.0	357.8	419.3	584.3	729.8	621.4	644.5	554.6	490.9	354.5	170.2	70.1	15.1	1.1	0.0	0.0	233.4	729.8
9-Jul	0.0	0.0	0.0	0.8	13.3	47.5	94.4	175.3	235.3	280.4	451.0	486.9	775.6	668.6	759.2	689.5	586.9	418.9	164.0	66.6	12.8	0.6	0.0	0.0	247.0	775.6
10-Jul	0.0	0.0	0.0	2.0	22.8	50.9	99.9	214.5	253.4	322.0	411.8	572.2	742.8	727.7	811.6	718.2	568.2	389.9	162.7	58.6	17.1	0.9	0.1	0.0	256.1	811.6
11-Jul	0.0	0.0	0.0	0.4	6.8	35.4	93.4	136.8	180.7	234.7	325.9	464.7	556.1	578.4	540.0	305.6	287.0	253.8	97.4	47.2	12.0	0.2	0.0	0.0	173.2	578.4
12-Jul	0.0	0.0	0.0	2.7	31.8	60.3	82.7	188.1	310.3	296.2	329.7	492.1	724.5	776.2	850.2	759.4	627.3	422.5	164.3	68.0	14.1	0.4	0.0	0.0	258.4	850.2
13-Jul	0.0	0.0	0.0	0.1	10.2	35.6	72.1	114.0	141.4	211.2	235.6	474.1	673.5	643.2	711.6	568.2	486.7	355.4	191.2	34.6	8.6	0.6	0.0	0.0	207.0	711.6
14-Jul	0.0	0.0	0.0	0.3	12.3	48.2	65.4	121.9	207.0	198.4	329.2	494.0	447.6	169.2	297.8	249.4	236.0	145.9	47.6	39.9	6.7	0.1	0.0	0.0	129.9	494.0
15-Jul	0.0	0.0	0.0	0.2	6.0	29.5	57.5	109.4	173.8	304.8	362.1	459.2	446.9	390.2	484.1	480.5	409.3	303.8	167.4	64.9	15.4	0.7	0.0	0.1	177.7	484.1
16-Jul	0.1	0.4	0.2	0.7	9.3	47.8	84.7	179.3	228.2	333.1	291.5	453.4	532.4	723.7	759.5	509.9	405.3	249.0	107.3	46.5	12.6	0.3	0.0	0.0	207.3	759.5
17-Jul	0.0	0.0	0.0	0.0	1.3	2.7	16.5	25.4	30.4	19.0	30.6	85.8	105.0	138.2	335.0	53.2	61.5	30.0	39.5	12.1	2.7	0.0	0.0	0.0	41.2	335.0
18-Jul	0.0	0.0	0.0	0.1	3.1	11.0	46.9	46.6	41.6	53.9	151.6	137.6	166.0	157.7	491.4	390.5	233.9	373.0	216.6	50.6	8.1	0.3	0.0	0.0	107.5	491.4
19-Jul	0.0	0.0	0.0	0.1	7.4	28.6	71.4	184.0	238.1	320.2	402.6	443.0	458.7	611.3	627.6	558.7	427.3	132.8	81.0	88.9	11.2	0.1	0.0	0.2	195.5	627.6
20-Jul	0.2	0.1	0.0	0.3	9.4	32.0	71.3	142.2	303.8	304.4	488.3	572.2	771.1	455.9	364.7	330.2	382.9	366.8	170.2	57.6	12.0	0.4	0.0	0.0	201.5	771.1
21-Jul	0.0	0.0	0.0	0.1	9.3	41.1	87.9	170.1	236.8	296.3	411.6	553.5	647.0	581.5	671.7	587.8	439.4	332.4	161.6	60.9	13.9	0.3	0.0	0.0	221.0	671.7
22-Jul	0.0	0.0	0.0	0.3	9.3	63.9	101.6	151.7	277.5	301.7	334.4	379.6	550.8	557.2	668.2	528.9	207.8	132.8	92.2	35.6	3.7	0.2	0.0	0.0	183.2	668.2
23-Jul	0.0	0.0	0.0	0.1	4.8	11.8	36.6	110.4	208.0	274.2	403.0	520.1	628.0	522.5	700.5	478.1	500.4	377.4	154.9	60.7	13.0	0.3	0.1	0.0	208.5	700.5
24-Jul	0.0	0.0	0.0	0.3	8.0	43.3	75.2	144.8	304.5	227.1	378.9	452.8	524.4	555.6	546.8	548.7	311.6	284.4	73.0	34.6	6.8	0.1	0.0	0.0	188.4	555.6
25-Jul	0.0	0.0	0.0	0.0	1.2	5.4	3.4	3.5	2.0	9.1	50.6	39.2	155.0	363.9	417.2	517.3	279.3	248.2	174.6	40.7	10.2	0.3	0.2	0.2	96.7	517.3
26-Jul	0.2	0.3	0.4	0.2	5.1	32.7	61.7	176.8	165.0	248.7	294.3	247.1	324.1	393.8	226.2	124.7	119.2	196.2	66.2	43.7	6.4	0.0	0.0	0.0	113.9	393.8
27-Jul	0.0	0.0	0.0	0.0	2.5	16.8	63.1	123.5	195.3	276.3	408.6	416.0	554.0	458.6	374.0	472.1	200.2	223.5	76.2	44.1	6.8	0.1	0.0	0.1	163.0	554.0
28-Jul	0.0	0.0	0.0	0.1	5.6	31.8	78.2	162.5	294.2	260.3	335.5	656.5	414.8	391.0	337.3	557.0	383.5	61.0	40.1	32.7	8.0	0.3	0.3	0.2	168.8	656.5
29-Jul	0.0	0.0	0.0	0.0	5.3	27.1	51.5	268.5	390.6	217.9	379.0	371.6	735.9	599.1	670.9	576.1	428.5	354.4	147.9	35.3	6.8	0.2	0.0	0.0	219.4	735.9
30-Jul	0.1	0.1	0.0	0.0	3.7	28.5	67.5	271.5	314.3	285.7	360.8	399.3	740.5	699.6	782.1	685.0	538.1	395.8	142.7	37.5	6.0	0.0	0.0	0.0	239.9	782.1
31-Jul	0.0	0.0	0.0	0.0	2.3	21.9	46.5	228.2	305.2	242.7	320.0	421.9	699.6	530.4	681.2	650.0	527.8	374.3	154.3	50.7	9.9	0.0	0.0	0.0	219.5	699.6
																							Diurnal Average			
																							Diurnal Maximum			





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Global Radiation (GR) - W/m2
Stony Mountain - July 2023**

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	296	39.78	39.78
21 - 100	119	15.99	55.78
101 - 300	129	17.34	73.12
301 - 600	145	19.49	92.61
601 - 900	54	7.26	99.87
> 900	1	0.13	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 20 km/h on Jul 3 10:00		Maximum Daily Speed Average: 13.2 km/h on Jul 2		Hours in Service: 744																							
Minimum Speed Value: 1 km/h on Jul 28 17:00		Minimum Daily Speed Average: 2.5 km/h on Jul 25		Hours of Data: 744																							
Maximum Diurnal Speed Average: 4.8 km/h at hour 3		Minimum Diurnal Speed Average: 1.8 km/h at hour 9		Hours of Missing Data: 0																							
Monthly Average Velocity: 2.8 km/h 306.0 deg		Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 7 Median = 9 Q ₃ = 11 P ₉₀ = 14 P ₉₉ = 17		Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	NW11	NNW11	NNW9	NW8	WNW9	WSW11	WNW11	W13	SSW2	E8	ESE6	E8	E8	S5	W3	NW7	NW7	NNW10	NW9	NW8	W6	WNW6	WNW9	WNW9	WNW4.7	W13	
2-Jul	WNW9	WNW9	WNW12	WNW12	WNW13	W12	W12	WNW13	WNW12	WNW12	WNW13	W13	W12	WNW13	NNW15	NNW18	NW15	NW16	NW16	NW16	NW16	WNW18	NW17	NW17	WNW13.2	NNW18	
3-Jul	NW16	NW15	NW15	NW13	NW16	NW16	NW15	NNW16	NNW20	N20	N18	N17	N14	N15	N14	N15	N14	N15	NNE9	N10	NW4	WNW6	WSW3	SW7	NNW12.1	N20	
4-Jul	W8	WNW10	NW9	NW8	NW8	NNW7	NNW6	N5	NNE5	NNE6	NNE4	N3	NW4	NNW7	NW7	WNW6	NNW5	NW3	WNW5	WNW3	SSW6	SW9	SW11	SW12	NW4.3	SW12	
5-Jul	SW13	WSW13	WSW13	WSW13	SW12	SW13	SW11	SW9	WSW9	W10	WSW9	W11	W12	W10	W8	W8	W10	N14	NE14	NW11	SSW14	SW12	W10	WNW11	WSW8.6	NE14	
6-Jul	WNW9	NW9	WNW11	NW11	NW11	NW11	NW9	NW8	NNW6	NNW6	N7	N8	NNE9	NNE10	N9	NNW11	N12	NNE12	NNE11	NE9	NE8	NNE8	N7	N8	NNW7.9	NNE12	
7-Jul	N8	N7	NNW6	NNW7	NNW9	NNW9	NNW8	NNW7	NNW8	NNE6	NNE8	NE6	NW4	NW5	N2	NW4	WNW2	SW1	WNW4	W6	WSW9	WSW10	WSW11	WSW13	NW4.4	WSW13	
8-Jul	WSW15	WSW15	W15	W14	W16	W15	WNW17	WNW14	WNW13	W13	WNW14	WNW13	NW14	WNW13	WNW13	WNW13	WNW13	W13	W11	W10	W11	WNW13	WNW14	WNW13	W13.1	WNW17	
9-Jul	WNW14	WNW15	NW10	NW11	NW11	NW10	NNW7	N7	NNE6	NE7	NE10	NE7	NE7	NE7	NE9	ENE11	ENE11	NE13	NE12	NE10	ENE11	ENE11	E11	E10	NNE6.2	WNW15	
10-Jul	E10	E10	E11	E10	ESE10	E10	ESE10	ESE12	ESE12	ESE13	E14	E14	E14	E10	SE6	ESE9	E10	E11	ESE9	ESE7	SSW7	SSW9	SSW10	SSW10	ESE8.5	E14	
11-Jul	SSW9	S10	SSW10	S11	S12	S12	S10	S9	SSE7	SSE5	SSE8	SSE9	SSE10	S7	SSW7	WSW5	W3	W3	W7	W8	W9	WSW10	WSW10	WSW11	SSW6.5	S12	
12-Jul	WSW12	SW10	WSW12	SW12	SSW10	SW12	SW10	W6	WNW6	NW6	NW7	NW10	NW10	NNW13	NNW14	NNW14	NNW15	N13	NNE10	NE5	NE6	NNE7	N5	NNW5	NW5.2	NNW15	
13-Jul	NNW7	NNW8	NW9	NW9	NW10	WNW11	NW11	NW11	NNW11	NNW11	NNW11	NNW12	NNW16	NNW17	N18	NNW16	NNW16	NNW15	NNW12	NW10	NW12	NW11	NNW9	NNW9	NNW11.4	N18	
14-Jul	NNW9	NNW10	NNW9	NNW8	NNW8	NNW9	NNW10	NNW10	NNW11	NNW11	N14	N17	N16	N12	N9	N10	N9	NNE7	NE5	ENE6	ENE5	NE4	ESE4	E3	N7.9	N17	
15-Jul	NNE4	N4	WNW6	NW6	NNW6	NNW5	NNW5	N4	NNE3	NNE6	NNE8	N6	NNE5	NE5	ENE10	NE11	NE11	NE10	NE10	NE8	ENE6	ENE6	ENE7	E7	NNE5.4	NE11	
16-Jul	ESE7	SE7	SSE7	SE7	SE7	SE7	SE7	SE7	SE10	SE8	ESE6	SE7	SE8	SSW9	SSW11	SSW8	SSW8	S7	S8	S7	SSE8	SSE9	SSE11	SSE11	SSE7.2	SSE11	
17-Jul	SSE12	SSE11	SSE11	S11	SSE10	SE12	SSE11	SSE12	SE11	N4	NNE9	ENE13	NE9	N9	N10	N8	N9	NNE10	ENE11	E13	ESE12	ESE11	E9	E9	E5.4	ENE13	
18-Jul	ENE8	NE10	NE13	NNE12	NNE11	NNE10	N10	NNE11	N8	N6	N9	N10	NNE9	N7	NNE8	ESE4	SW1	S4	SSW3	NW6	NW11	NW11	NW12	NW11	N6.5	NE13	
19-Jul	NW11	NW11	NW10	NW11	NW11	NW11	WNW9	WNW7	WNW6	WNW7	W9	W10	WNW8	W9	WSW9	WSW10	WSW12	WNW8	NW9	WNW7	W2	W6	SW6	SW9	WNW7.7	WSW12	
20-Jul	WSW8	W8	WNW10	WNW9	NW9	NW7	NW5	NW4	NW2	W6	NW4	NNW7	WNW5	NW6	NNW4	NNW5	NNW7	NW7	WNW7	WNW7	WNW9	WNW9	WNW9	W10	WNW6.3	WNW10	
21-Jul	WNW10	WNW10	WNW10	WNW12	WNW10	WNW10	NW9	NW8	NNW7	NNW7	N6	NNW6	NNW8	NNW8	NW8	NW9	NW8	NW8	WNW6	W7	W8	W9	WNW9	WNW9	NW7.9	WNW12	
22-Jul	W9	W8	WNW8	NW8	NW8	WNW8	W13	WNW14	NW9	WNW6	W8	W8	W8	W6	SW8	SW10	W7	N4	ESE1	N3	NNE7	ENE7	SE7	NNE5	WNW4.9	WNW14	
23-Jul	ENE7	NE6	E5	ENE3	SE2	SW7	WSW11	SSW8	SSW9	SW6	WSW7	W3	SW6	WSW4	NNW4	NNW4	ESE3	S5	SW4	WSW6	SW6	SSW7	WSW10	W8	SW3.2	WSW11	
24-Jul	W8	W7	SW9	SW10	SSW10	SW9	SW4	SSE6	SE5	E6	ESE7	ESE8	ESE8	SE9	ESE10	E10	E12	E12	ESE10	SE9	SE11	ESE12	ESE12	ESE13	SE6.0	ESE13	
25-Jul	ESE14	SE17	WNW13	NNW13	NE6	NE8	NE8	ENE9	ENE11	ENE13	E7	SSE5	N8	NNE7	NNE7	NNE5	WNW7	NW14	WNW13	WNW13	W9	WSW10	WSW12	WSW14	N2.5	SE17	
26-Jul	WSW12	SW10	WSW10	WSW9	SSW7	SSE7	SE7	SSW13	S12	SSE13	SSE15	S12	SSE10	SSE10	ESE6	SE6	NE3	ENE6	NNE7	NNE7	NNE10	NE12	NE11	NE11	SSE3.3	SSE15	
27-Jul	NE15	NE11	NE13	NE15	NE13	NE13	NE10	NE11	NE9	NE10	NE10	NE11	NE11	NE10	N10	NE11	NE9	NE6	N5	NNW5	NNW7	N7	N7	NE9.5	NE15		
28-Jul	N7	N6	NNE7	N6	N5	NNE4	NNW5	NNW5	NNW5	NNW3	NE5	NE5	NNW5	NE8	E5	SW2	S1	W9	NNW7	WNW8	W9	WSW11	WSW11	W10	NW3.3	WSW11	
29-Jul	W9	W10	W10	WNW9	WNW9	W8	W7	W5	SW4	SSW6	SW7	S8	SSW9	SSW8	S8	SSW7	SSE7	SSW8	SW10	SSW8	SSW8	SW8	SSW9	SSW10	SW6.4	W10	
30-Jul	SSW10	SSW10	SSW11	SSW11	SSW10	S9	S12	S13	S15	S15	SSE14	SSE16	S14	S14	S15	S13	S12	SSE13	SSE10	SSE10	SE11	SE11	SE9	S15	S11.5	SSE16	
31-Jul	S6	ESE6	ENE3	SW4	SW8	SSW8	SSW10	SSW9	WSW8	W8	WSW12	W12	W11	W13	W11	WSW12	W13	W12	WSW13	WSW14	WSW14	WSW14	WSW14	WSW16	W17	WSW9.1	W17
W3.6WNW3.3WNW4.8WNW4.7WNW4.1WNW3.7WNW3.5WNW2.8 NW1.8NNW2.1 N2.0NNW2.2NNW2.8NNW3.1NNW2.9NNW3.4NNW3.6NNW3.8NNW2.9 NW2.9 W2.3 W2.8 W3.4 W3.8																								Diurnal Average			
NW16 SE17 W15 NE15 W16 NW16NNW17NNW16NNW20 N20 N18 N17 NNW16 NNW17 N18 NNW18 NNW16 NW16 NW16 NW16 NW16WNW18 NW17 W17																								Diurnal Maximum			
All monthly, daily, and diurnal averages have been calculated using vector methods																											



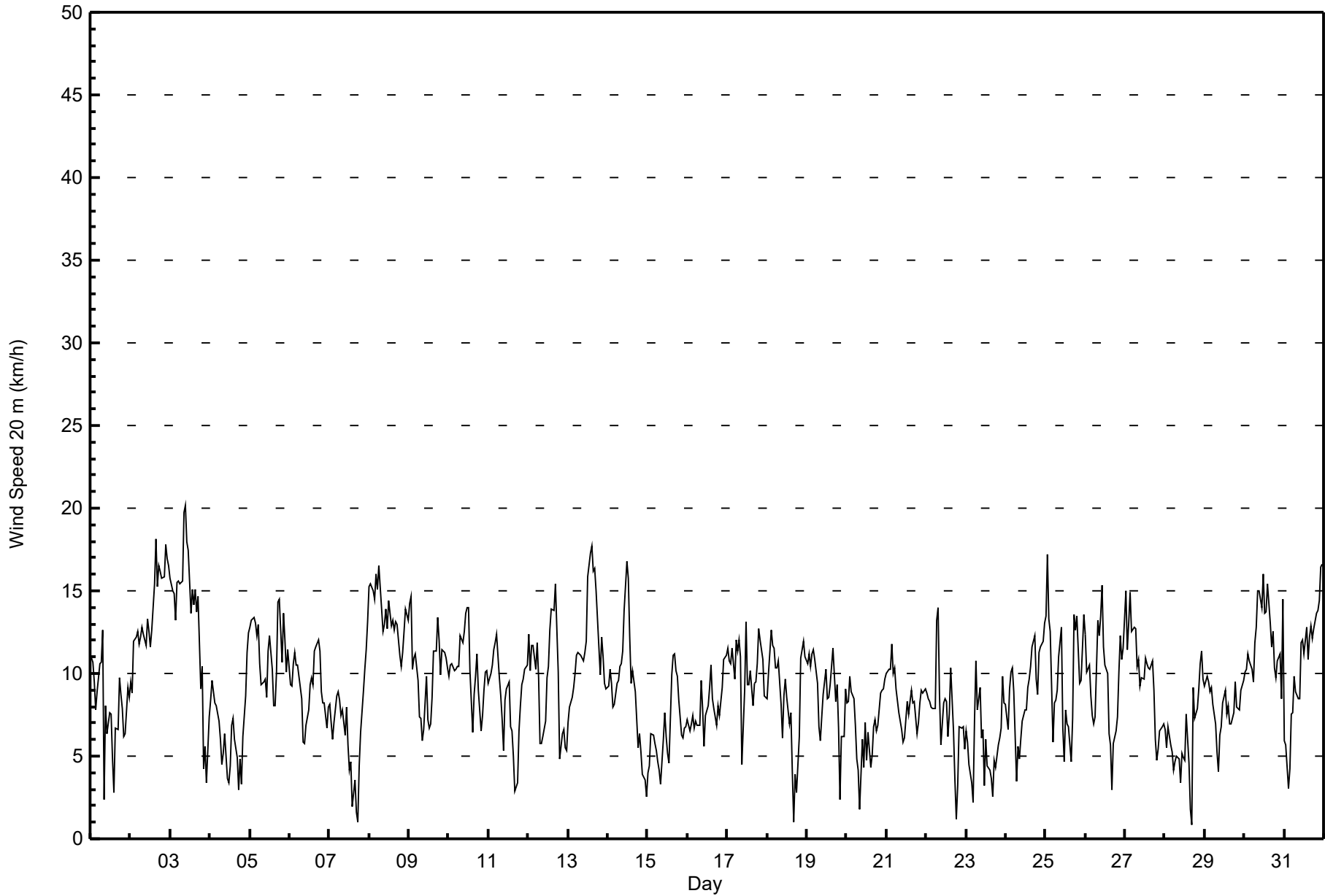
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed 20 m (WS20m) - km/h

Stony Mountain - July 2023

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed 20 m (WS20m) - km/h
Stony Mountain - July 2023

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	91	12.23	12.23
6 - 11	476	63.98	76.21
12 - 19	175	23.52	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: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed 20 m (WS20m) - km/h
Stony Mountain - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	11	8	7	3	3	4	2	2	3	3	7	3	5	6	10	14	91
6 - 11	31	28	37	16	19	16	21	20	13	35	23	22	49	45	59	42	476
12 - 19	16	2	11	2	6	8	2	7	14	2	7	19	18	28	18	15	175
20 - 28	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	59	38	55	21	28	28	25	29	30	40	37	44	72	79	87	72	744

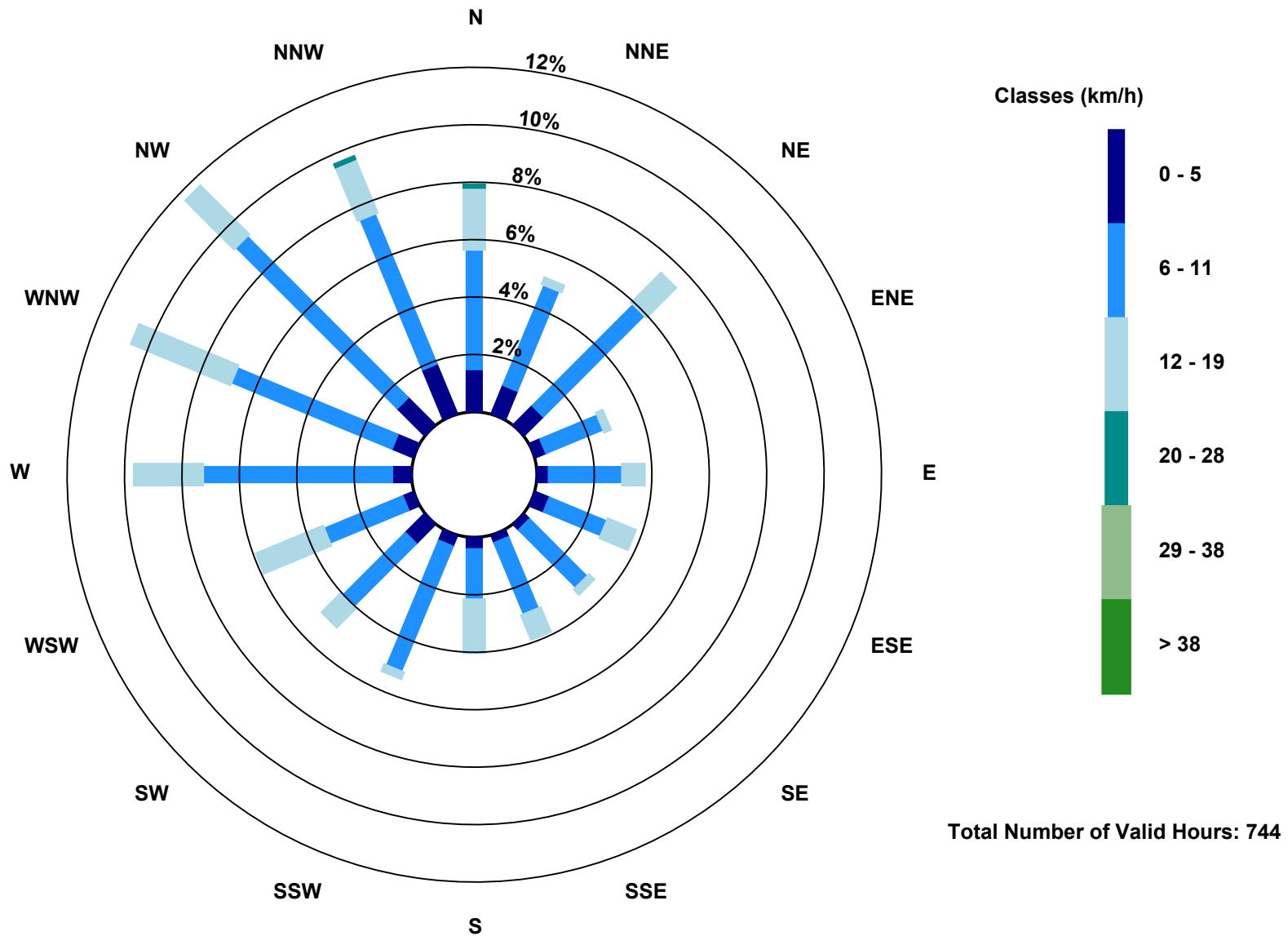
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed 20 m (WS20m) - km/h
Stony Mountain





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 20 m (WD20m) - deg
Stony Mountain - July 2023

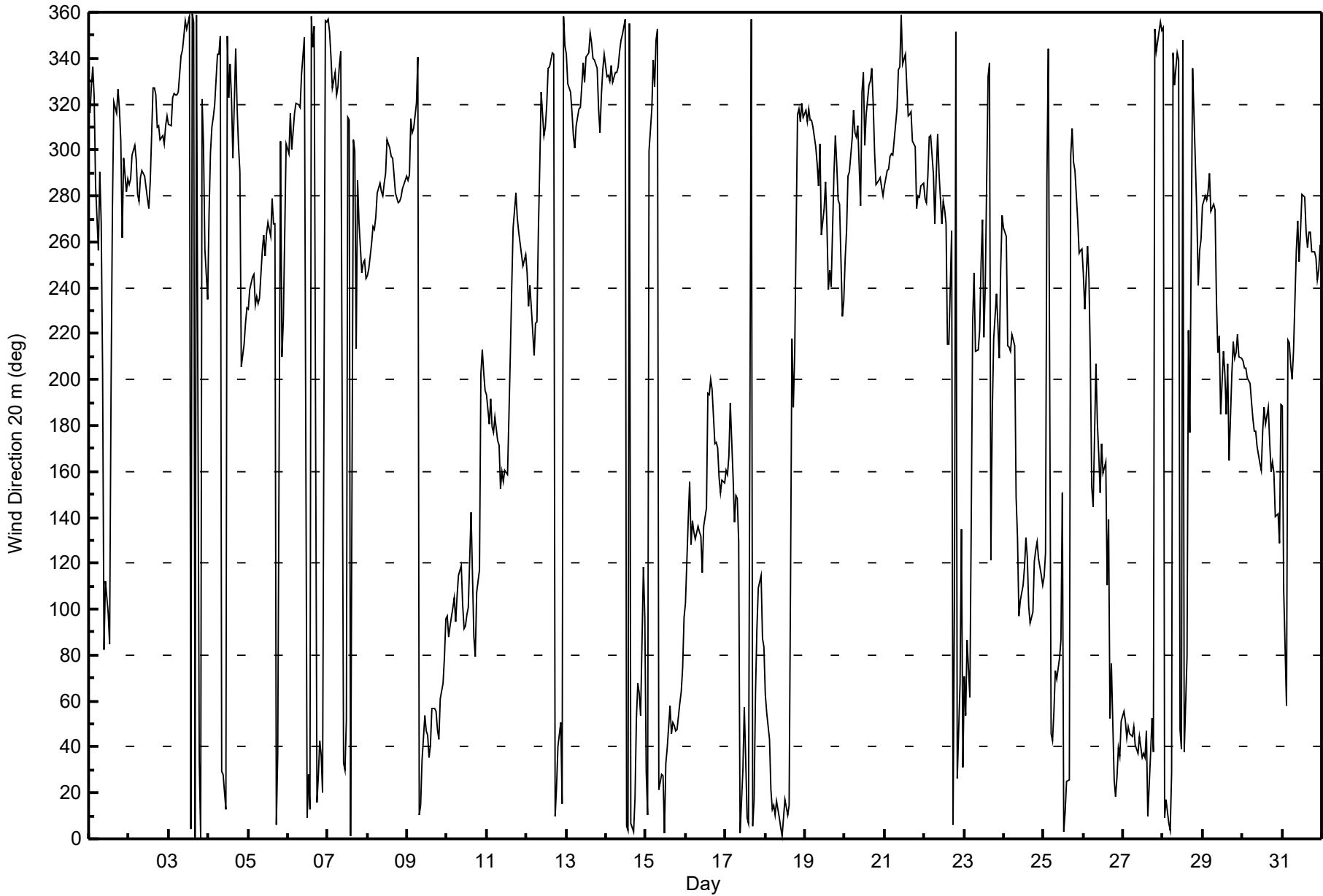
Direction of Maximum Speed: 349 deg on Jul 3 10:00 Direction of Maximum Daily Speed Average: 300.3 deg on Jul 2																						Hours in Service: 744			
Direction of Minimum Speed: 177 deg on Jul 28 17:00 Direction of Minimum Daily Speed Average: 2.5 deg on Jul 25																						Hours of Data: 744			
Monthly Average Direction: 306.0 deg																						Hours of Missing Data: 0			
																						Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	316	328	336	323	284	256	290	268	204	82	112	98	85	191	273	321	316	327	318	304	262	296	282	287	303.1
2-Jul	285	288	298	302	296	281	278	288	291	289	284	279	274	286	327	327	324	310	311	305	307	303	310	315	300.3
3-Jul	311	311	323	325	324	324	325	341	344	349	356	353	358	4	360	356	0	359	33	1	322	302	257	235	340.6
4-Jul	272	299	310	314	320	342	342	350	29	28	13	350	323	337	322	297	344	319	302	290	206	215	225	231	303.9
5-Jul	231	239	244	246	232	236	233	235	256	263	254	264	269	262	279	268	268	6	36	304	210	226	264	303	257.8
6-Jul	298	316	300	308	316	321	320	318	333	341	349	9	28	13	358	345	354	16	27	43	37	20	356	355	347.9
7-Jul	357	351	341	327	334	324	328	337	343	33	30	52	314	313	1	304	300	214	287	268	246	251	252	244	313.8
8-Jul	245	249	259	266	266	271	282	285	282	280	286	290	304	301	297	297	289	281	277	277	280	283	285	289	279.5
9-Jul	287	289	314	307	309	320	341	10	14	34	54	47	45	35	41	57	57	56	48	43	61	67	79	96	24.0
10-Jul	97	88	93	101	105	94	105	115	119	102	92	92	98	101	142	115	88	79	108	117	203	213	203	196	111.1
11-Jul	193	180	192	179	177	184	173	171	152	160	156	161	159	184	211	240	266	281	270	264	259	255	250	254	200.3
12-Jul	247	232	241	231	210	224	225	264	293	325	307	310	320	336	336	342	341	10	23	40	51	15	358	346	307.2
13-Jul	341	329	325	317	306	301	310	318	319	327	338	330	341	342	351	347	340	339	336	318	307	324	335	342	330.1
14-Jul	332	333	330	337	329	334	334	336	343	348	350	357	6	3	355	7	3	18	52	68	63	54	118	96	356.1
15-Jul	30	11	299	318	339	328	348	353	21	28	28	3	33	39	58	46	51	49	47	48	59	64	74	97	32.7
16-Jul	103	139	155	128	139	134	131	136	134	132	116	136	144	194	193	200	196	172	173	170	158	151	156	155	153.5
17-Jul	160	159	167	190	158	138	149	148	130	2	30	57	35	9	7	357	5	17	63	91	109	115	87	84	97.7
18-Jul	63	55	43	21	13	15	10	16	9	5	1	9	17	11	15	112	218	188	212	316	318	313	320	314	5.0
19-Jul	317	313	318	313	313	310	302	294	284	303	263	275	286	267	239	247	240	290	306	294	278	276	228	234	285.1
20-Jul	253	265	289	290	305	317	307	306	310	276	325	334	302	315	329	330	336	320	299	285	287	288	284	280	297.9
21-Jul	284	291	292	297	299	298	304	318	335	336	359	338	342	328	315	315	317	304	302	275	280	279	285	286	304.8
22-Jul	279	277	289	305	307	289	268	289	307	290	268	277	274	268	215	215	265	6	104	351	26	68	135	31	284.2
23-Jul	70	54	87	62	139	225	246	212	213	222	250	270	219	241	332	338	121	185	218	237	224	209	248	272	229.5
24-Jul	266	262	214	214	212	220	215	149	131	97	103	111	118	131	123	101	94	99	121	126	130	122	115	110	135.2
25-Jul	114	124	288	344	46	43	56	73	70	78	86	151	3	12	25	26	298	309	295	291	269	255	256	257	351.0
26-Jul	246	231	258	244	208	153	145	207	182	167	151	172	159	164	110	139	53	76	25	19	27	40	36	51	158.1
27-Jul	56	51	44	49	46	44	49	41	39	37	44	35	37	35	47	10	37	52	38	353	343	347	356	352	36.4
28-Jul	353	9	17	7	3	29	342	328	342	339	47	39	348	38	80	222	177	260	335	293	272	241	256	261	324.8
29-Jul	276	280	278	282	290	273	276	274	234	212	219	185	213	203	185	207	165	203	216	210	212	220	210	209	230.7
30-Jul	208	205	205	201	198	190	183	178	177	171	163	161	178	188	180	188	173	160	164	159	140	142	129	189	176.5
31-Jul	188	108	58	217	216	206	200	213	256	269	252	265	280	279	264	258	264	264	255	256	253	243	247	259	250.1
279.7 286.2 292.7 295.0 289.9 286.3 288.8 290.9 315.4 345.3 354.5 347.8 340.6 327.0 337.5 327.3 336.2 347.8 345.1 310.0 273.1 269.6 264.5 267.7																									
Diurnal Average																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 20 m (WD20m) - deg
Stony Mountain - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 98 deg on Jul 28 17:00 Minimum Value: 7 deg on Jul 16 00:00 Percentiles: P ₁ = 10 P ₁₀ = 16 Q ₁ = 19 Median = 25 Q ₃ = 33 P ₉₀ = 45 P ₉₉ = 83		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	18	19	16	21	36	28	30	35	85	30	25	27	21	66	80	42	33	25	27	24	26	28	28	27	85
2-Jul	26	26	26	25	26	29	28	29	33	28	28	31	30	34	26	26	24	25	27	28	25	26	25	24	34
3-Jul	26	25	26	25	23	24	25	25	23	27	25	25	26	23	25	25	24	25	27	21	36	13	31	17	36
4-Jul	16	16	17	20	17	17	17	28	38	58	93	86	75	47	50	49	73	81	27	30	9	13	13	17	93
5-Jul	18	18	20	20	17	20	21	25	36	41	37	38	40	45	42	33	37	45	25	55	21	20	39	28	55
6-Jul	17	17	19	20	16	17	19	18	26	30	38	43	44	31	32	31	28	24	23	16	15	17	13	15	44
7-Jul	15	13	17	15	13	14	17	17	18	36	31	60	63	58	91	66	84	86	36	14	13	15	19	19	91
8-Jul	22	22	26	28	28	31	27	28	28	29	30	32	30	32	32	30	30	30	28	26	24	24	24	25	32
9-Jul	26	25	21	21	18	14	25	18	22	29	25	63	45	51	36	29	22	20	18	16	18	16	16	15	63
10-Jul	15	14	16	15	13	14	15	18	22	22	21	25	23	34	62	34	27	25	17	36	29	18	14	15	62
11-Jul	15	16	15	16	18	19	17	21	22	29	30	34	29	48	47	41	55	32	16	18	24	21	21	25	55
12-Jul	24	19	22	21	19	20	23	37	44	43	43	35	36	29	28	30	25	25	19	19	9	10	19	22	44
13-Jul	15	19	16	16	19	20	20	21	22	25	23	28	26	25	29	29	25	24	24	23	22	24	18	18	29
14-Jul	19	20	19	16	17	21	23	23	26	27	26	26	27	26	28	29	26	21	28	14	13	28	17	53	53
15-Jul	13	17	22	16	19	20	18	23	39	33	30	41	49	48	25	21	20	20	17	16	11	12	10	7	49
16-Jul	12	16	15	10	9	15	19	30	23	35	47	59	48	50	38	44	36	31	25	21	17	14	19	23	59
17-Jul	26	24	24	30	21	23	23	22	23	52	19	13	22	17	18	18	16	20	21	19	18	17	18	21	52
18-Jul	17	16	17	18	17	16	17	17	19	18	19	17	16	18	31	64	78	37	45	22	19	20	19	20	78
19-Jul	19	18	19	19	19	20	19	29	37	35	39	37	35	43	37	39	27	41	33	32	61	18	34	14	61
20-Jul	18	21	20	19	19	19	29	35	92	44	71	43	62	51	40	43	32	28	24	18	22	17	19	21	92
21-Jul	21	20	23	23	19	20	21	21	25	26	30	45	32	39	36	35	29	24	22	15	16	19	17	17	45
22-Jul	19	20	18	14	16	18	31	26	29	46	39	32	34	38	56	35	36	77	81	16	14	22	21	41	81
23-Jul	23	23	22	38	49	23	23	20	22	35	37	71	50	55	61	44	76	43	30	9	9	12	25	21	76
24-Jul	18	25	12	14	17	16	71	30	39	30	39	37	39	39	29	27	21	20	19	15	19	18	17	16	71
25-Jul	20	29	41	35	52	39	49	31	34	22	32	64	29	25	27	49	36	26	29	27	28	22	22	26	64
26-Jul	23	18	22	36	28	23	30	28	29	32	27	31	34	39	40	47	35	25	26	19	18	20	20	19	47
27-Jul	19	21	18	18	20	17	17	20	18	24	30	26	27	29	25	24	31	23	23	18	12	14	11	13	31
28-Jul	12	18	12	11	17	12	36	21	20	43	43	76	61	43	44	62	98	52	22	33	20	17	21	23	98
29-Jul	25	21	21	17	15	18	19	31	71	42	48	43	41	51	46	48	42	40	26	14	14	14	15	14	71
30-Jul	16	15	15	15	16	16	17	25	28	30	35	32	37	39	34	38	34	31	28	22	19	16	28	36	39
31-Jul	76	39	57	61	27	23	23	32	36	36	31	34	33	32	40	35	34	32	29	28	27	25	25	29	76
Diurnal Maximum																									





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS19 FIREBAG JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS19)
 JULY 2023

MONTHLY SUMMARY

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	18.5	0	2.7	0
H2S (ppb) Average	709	35	35	100	5.7	0	0.7	0
THC (ppm) Average	677	35	67	95.7	2.9	-	2.5	-
NO2 (ppb) Average	708	36	36	100	15.2	0	4.3	-
NO (ppb) Average	708	36	36	100	12.3	-	1.2	-
NOX (ppb) Average	708	36	36	100	23.3	-	4.8	-
Temperature 2 m (C) Average	744	0	0	100	27.5	-	22.8	-
Relative Humidity (%) Average	736	0	8	98.92	100	-	97.8	-
Wind Speed 10 m (km/h) Average	740	0	4	99.46	37	-	20	-
Wind Direction 10 m (deg) Average	740	0	4	99.46	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS19)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.52	1.4	-	0	0	0	0.1	0.3	1.2	18.5
H2S (ppb) Average	709	0.26	0.5	-	0	0	0.1	0.1	0.3	0.5	5.7
THC (ppm) Average	677	2.32	0.2	-	2	2.2	2.2	2.3	2.4	2.6	2.9
NO2 (ppb) Average	708	2.03	2	-	0	0.3	0.7	1.4	2.6	4.7	15.2
NO (ppb) Average	708	0.23	0.7	-	0	0	0.1	0.1	0.2	0.4	12.3
NOX (ppb) Average	708	2.26	2.3	-	0	0.4	0.8	1.5	2.8	5.2	23.3
Temperature 2 m (C) Average	744	16.88	4.3	-	4.2	11.4	13.6	16.6	20.3	22.8	27.5
Relative Humidity (%) Average	736	64.29	19.8	-	24.2	37.5	47.8	62.9	82.1	91.7	100
Wind Speed 10 m (km/h) Average	740	11.2	6	-	0	4	7	11	15	18	37
Wind Direction 10 m (deg) Average	740	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS19)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	17 Jul 2023 08:00	18 Jul 2023 10:00	27	Analyzer Failure - inconsistent response
THC	18 Jul 2023 11:00	18 Jul 2023 11:00	1	Maintenance - analyzer rebooted
THC	24 Jul 2023 11:00	24 Jul 2023 14:00	4	Maintenance - multi-point verification check
Relative Humidity	02 Jul 2023 23:00	03 Jul 2023 03:00	5	Sensor operated out of range
Relative Humidity	31 Jul 2023 22:00	01 Aug 2023 00:00	3	Sensor operated out of range
Wind Speed, Wind Direction	04 Jul 2023 04:00	04 Jul 2023 06:00	3	Flat line in sensor output signal
Wind Speed, Wind Direction	28 Jul 2023 05:00	28 Jul 2023 05:00	1	Flat line in sensor output signal



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

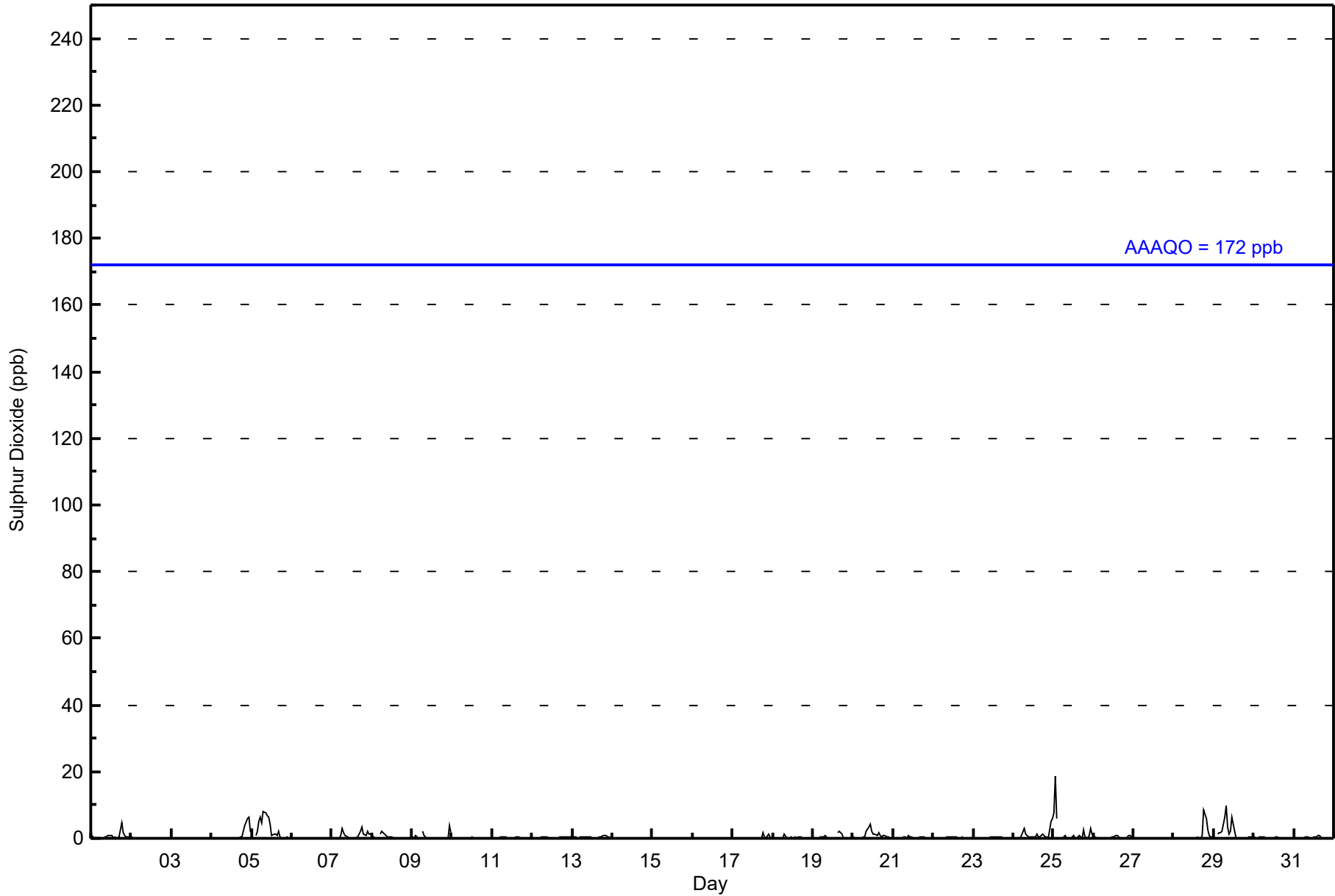
Firebag - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:																744					
Maximum Value: 18.5 ppb on Jul 25 02:00		Maximum Daily Average: 2.7 ppb on Jul 5																Hours of Data:		708							
Minimum Value: 0.0 ppb on Jul 2 23:00		Minimum Daily Average: 0.0 ppb on Jul 27																Hours of Missing Data:		36							
Maximum Diurnal Average: 1.0 ppb at hour 8		Minimum Diurnal Average: 0.2 ppb at hour 4																Hours of Calibration:		36							
Monthly Average: 0.52 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 1.2 P ₉₉ = 6.5																Percent Operational Time:		100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0.8	0.2	0.2	Z	0.1	0.1	0.0	0.2	0.2	0.3	0.8	0.7	0.8	0.2	0.4	0.2	0.2	2.4	4.6	1.9	0.9	0.6	0.4	0.4	0.7	4.6	
2-Jul	0.3	0.2	0.1	0.2	Z	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	
3-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	
4-Jul	Z	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	0.2	0.4	0.4	2.2	3.7	5.9	6.2	2.0	1.0	6.2		
5-Jul	1.6	Z	0.9	2.1	5.2	6.3	4.5	8.0	7.6	6.8	6.2	4.4	1.0	1.4	1.2	0.8	2.1	0.2	0.2	0.2	0.2	0.2	0.1	2.7	8.0		
6-Jul	0.1	0.1	Z	0.1	0.0	0.1	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	0.0	0.1	0.0	0.0	0.1	0.1	
7-Jul	0.0	0.0	0.0	Z	0.0	0.8	3.0	1.8	0.9	0.5	0.2	0.2	0.1	0.1	0.2	0.5	1.1	1.9	3.3	1.4	0.8	2.0	1.2	1.3	0.9	3.3	
8-Jul	1.1	0.3	0.1	0.1	Z	1.3	2.3	1.4	0.9	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.5	2.3	
9-Jul	0.2	0.2	1.0	0.3	0.2	Z	2.3	0.8	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	1.5	0.5	4.0	
10-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	
11-Jul	0.0	Z	0.0	0.0	0.1	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.3	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.4	
12-Jul	0.1	0.0	Z	0.2	0.2	0.4	0.5	0.3	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.4	0.4	0.3	0.3	0.4	0.3	0.3	0.2	0.5	
13-Jul	0.4	0.4	0.4	Z	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.3	0.4	0.7	0.8	0.7	0.6	0.3	0.1	0.3	0.8	
14-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	
15-Jul	0.0	0.0	0.0	0.0	0.1	Z	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.1	
16-Jul	Z	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	
17-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	1.5	0.6	0.2	1.3	0.6	0.2	0.2	1.5	
18-Jul	0.1	0.0	Z	0.1	0.1	0.1	0.1	1.4	0.2	0.1	0.1	0.3	0.2	0.3	0.1	0.2	0.3	0.3	0.0	0.0	0.1	0.1	0.1	0.2	0.2	1.4	
19-Jul	0.1	0.1	0.2	Z	0.3	0.2	0.3	0.9	0.6	0.2	C	C	C	C	C	1.7	2.3	1.3	0.2	0.0	0.1	0.1	0.0	0.2	0.5	2.3	
20-Jul	0.3	0.1	0.1	0.1	Z	0.1	0.3	0.6	2.0	3.2	4.4	2.3	1.4	1.1	1.0	1.6	1.0	0.6	1.0	0.7	0.5	0.2	0.2	0.2	1.0	4.4	
21-Jul	0.2	0.1	0.1	0.1	0.1	Z	0.2	0.3	0.1	0.8	0.6	0.5	0.2	0.1	0.2	0.2	0.2	0.4	0.3	0.1	0.1	0.1	0.0	0.0	0.2	0.8	
22-Jul	Z	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.3	0.4	0.3	0.4	0.4	0.2	0.3	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.4	
23-Jul	0.8	Z	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.8	
24-Jul	0.1	0.1	Z	0.2	0.1	1.0	3.0	1.4	0.7	0.3	0.2	0.3	0.4	0.5	1.3	0.4	0.5	1.2	0.9	0.4	0.3	0.2	4.9	6.1	1.1	6.1	
25-Jul	7.8	18.5	6.0	Z	0.2	0.1	0.4	0.7	0.2	0.1	0.1	0.2	0.8	0.1	0.1	0.8	0.5	0.2	2.5	0.5	0.2	0.9	2.9	1.3	2.0	18.5	
26-Jul	0.5	0.4	0.2	0.1	Z	0.1	0.1	0.1	0.2	0.1	0.1	0.3	0.6	0.8	0.6	0.4	0.1	0.0	0.0	0.1	0.6	0.9	0.7	0.2	0.3	0.9	
27-Jul	0.2	0.1	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	
28-Jul	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	0.2	0.1	0.2	0.9	8.4	5.9	2.4	1.0	0.6	0.4	0.9	8.4	
29-Jul	0.6	Z	1.2	1.6	1.5	2.2	6.3	9.7	3.4	1.1	2.1	6.5	2.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	1.7	9.7	
30-Jul	0.2	0.2	Z	0.3	0.3	0.4	0.4	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.0	0.0	0.2	0.4
31-Jul	0.0	0.0	0.0	Z	0.0	0.1	0.0	0.4	0.4	0.1	0.1	0.1	0.2	0.6	1.0	0.8	0.2	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.2	1.0	
																								Diurnal Average			
																								Diurnal Maximum			
																								7.8 18.5 6.0 2.1 5.2 6.3 6.3 9.7 7.6 6.8 6.2 6.5 2.1 1.4 1.3 1.7 2.3 2.4 8.4 5.9 3.7 5.9 6.2 6.1			
Z - zerospan C - Calibration																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Firebag - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	99.86	99.86
11 - 20	1	0.14	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	91	47	19	16	19	38	46	50	52	49	63	45	24	29	38	77	703
11 - 20	0	0	0	0	0	1	0	0	0	0	0	0	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	47	19	16	19	39	46	50	52	49	63	45	24	29	38	77	704

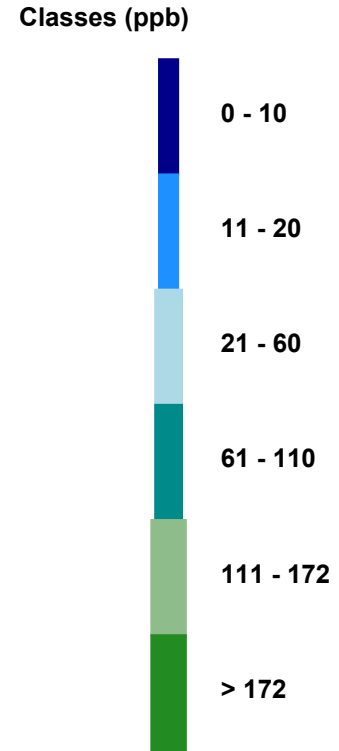
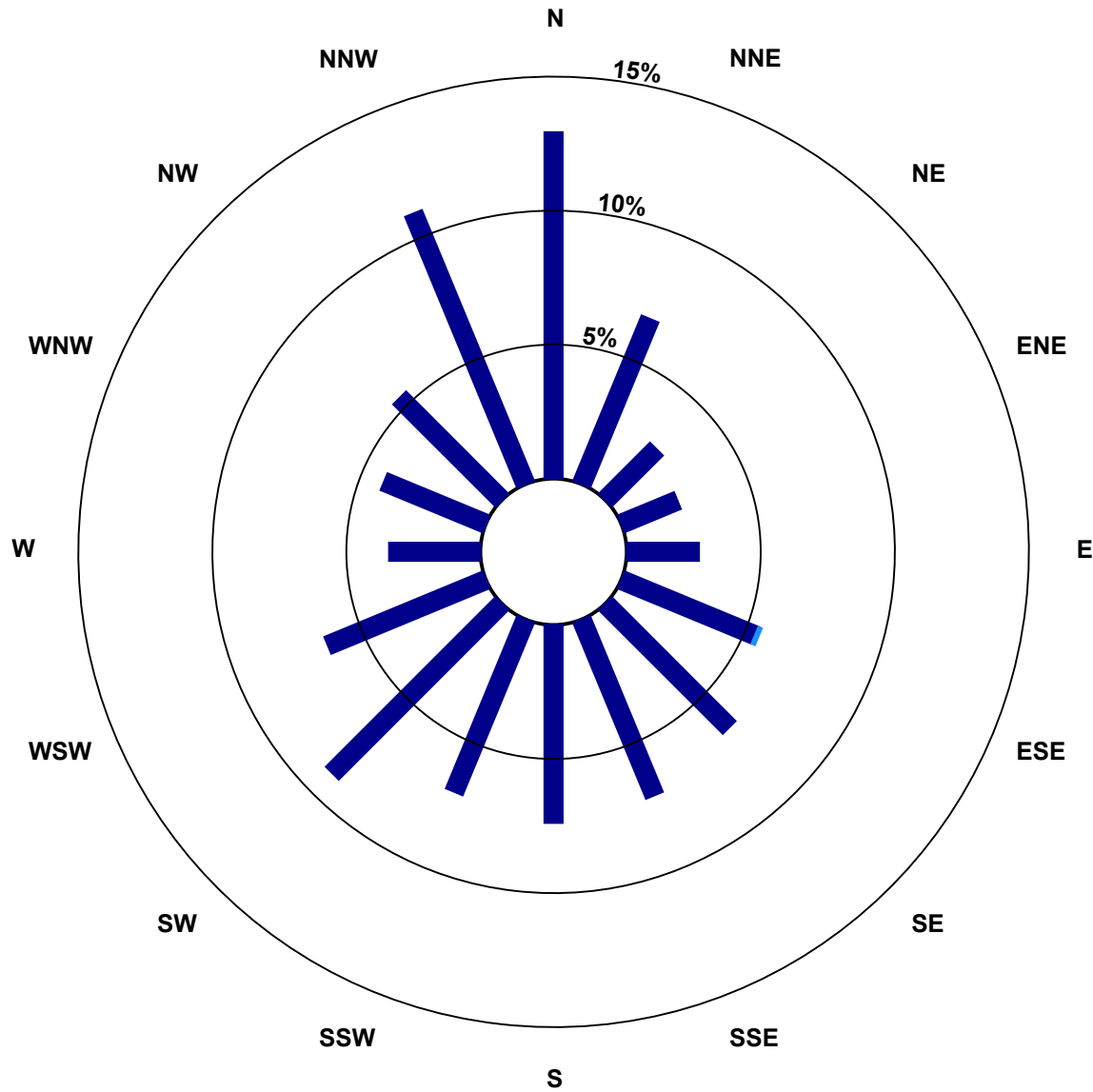
Total Number of Valid Hours: 704

Total Number of Hours: 744

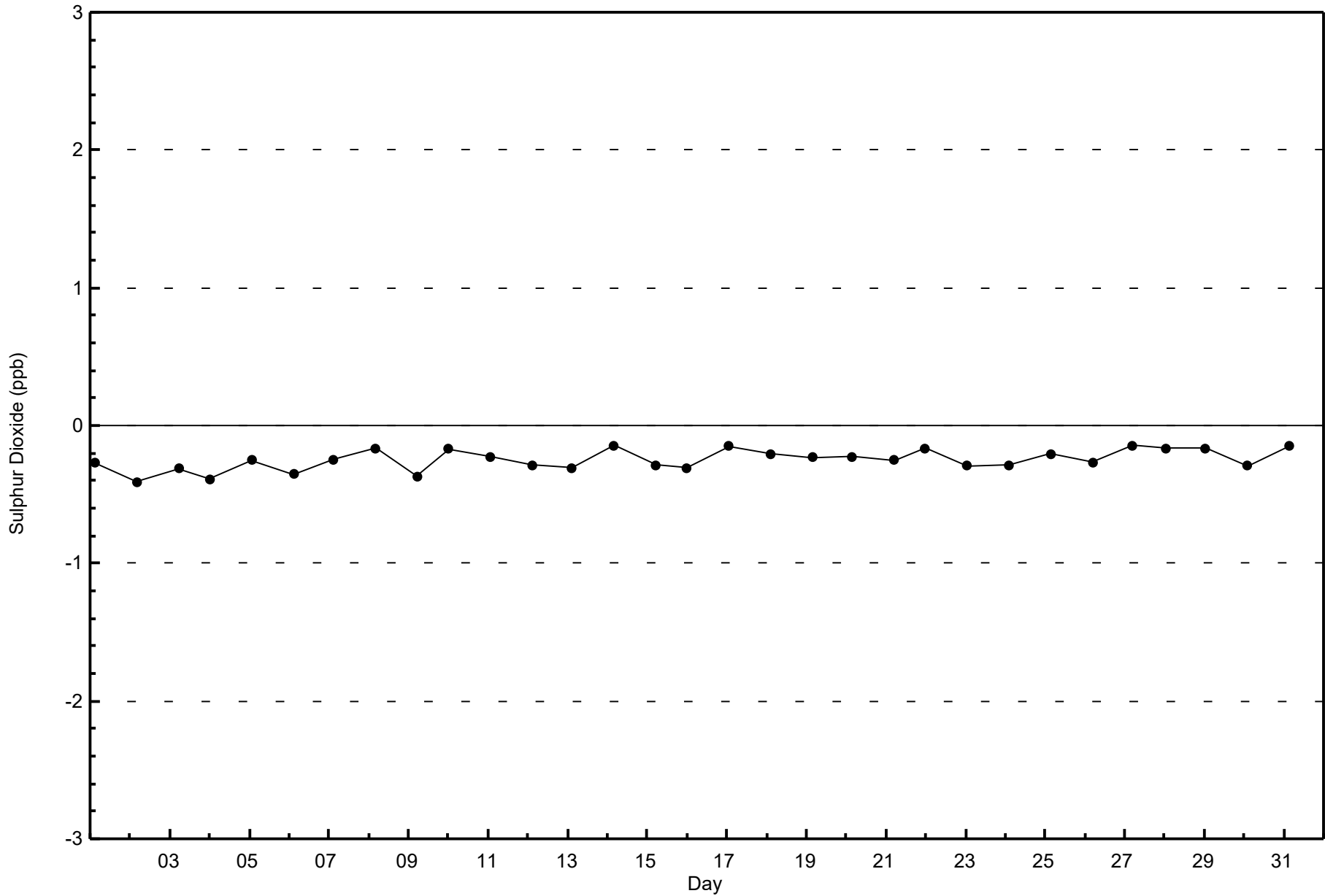


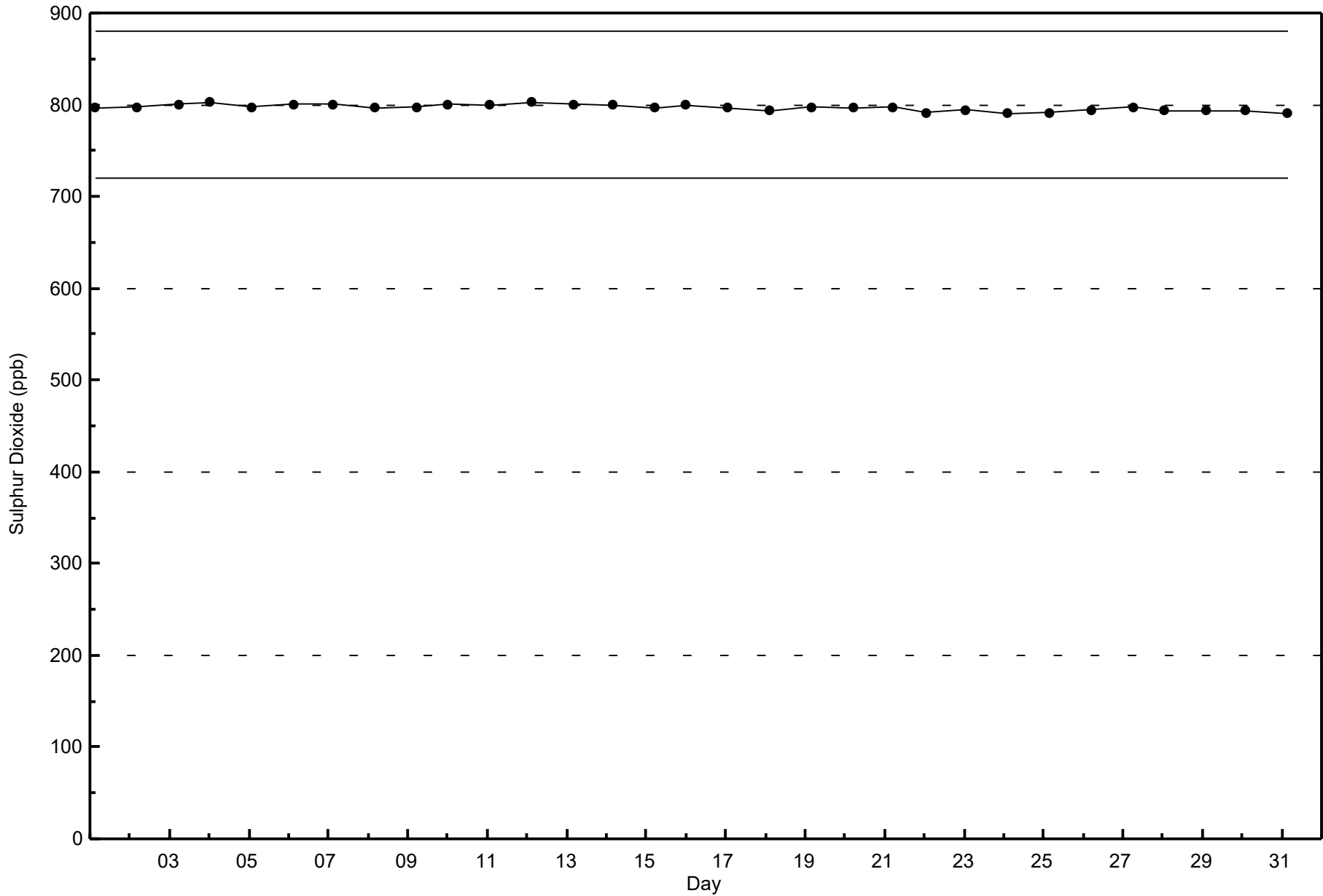
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Firebag



Total Number of Valid Hours: 704

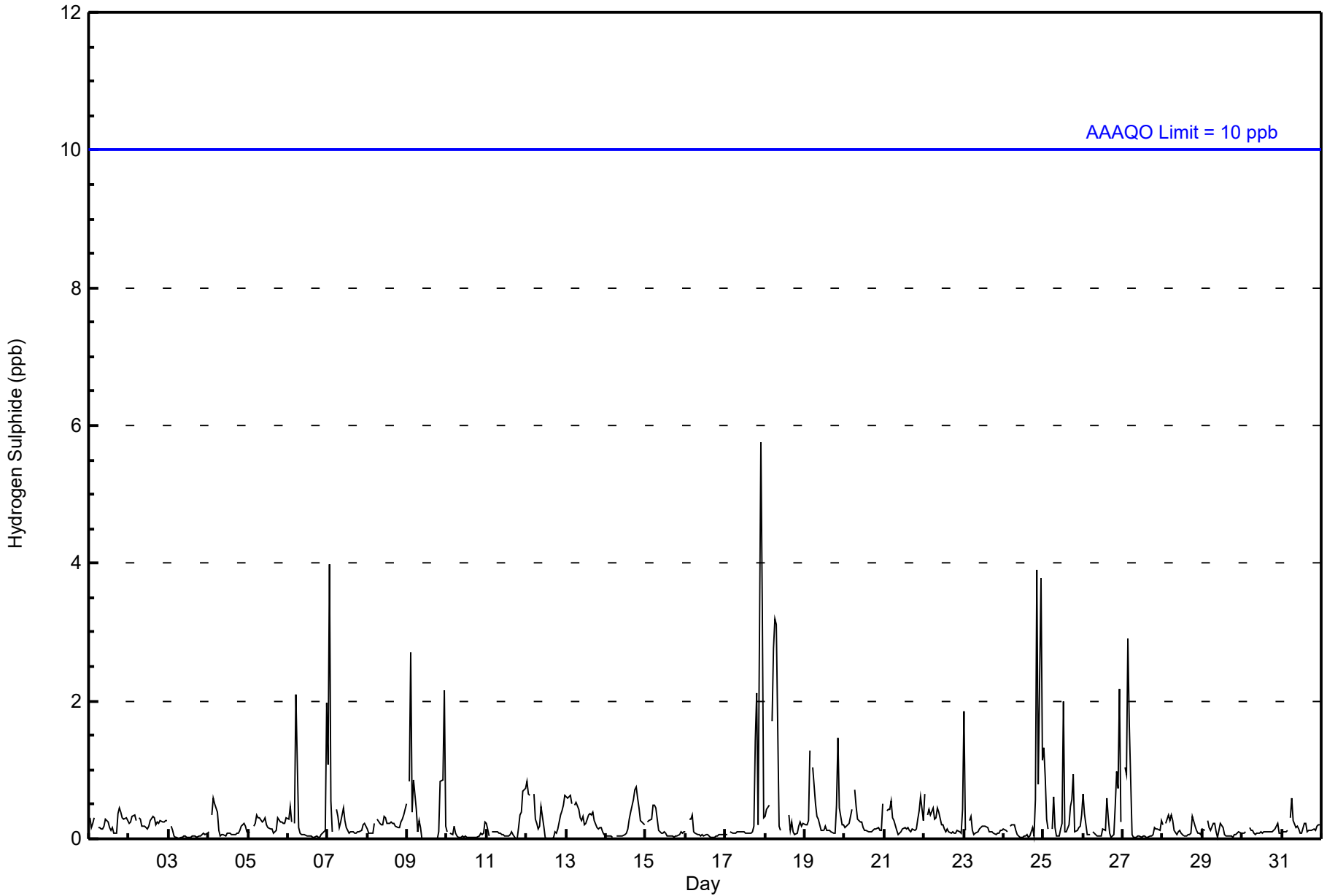






Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744														Daily Average		Daily Maximum					
Maximum Value: 5.7 ppb on Jul 17 22:00		Maximum Daily Average: 0.7 ppb on Jul 18		Hours of Data: 709														Hours of Missing Data: 35		Hours of Calibration: 35							
Minimum Value: 0.0 ppb on Jul 9 10:00		Minimum Daily Average: 0.0 ppb on Jul 3		Hours of Missing Data: 35														Hours of Calibration: 35		Percent Operational Time: 100.0							
Maximum Diurnal Average: 0.5 ppb at hour 23		Minimum Diurnal Average: 0.1 ppb at hour 14		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 0.5 P ₉₉ = 2.9																							
Monthly Average: 0.26 ppb																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0.3	0.2	0.2	0.3	Z	0.2	0.2	0.2	0.1	0.2	0.3	0.3	0.2	0.1	0.2	0.1	0.1	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.2	0.2	
2-Jul	0.2	0.2	0.3	0.3	0.3	Z	0.3	0.3	0.2	0.2	0.2	0.1	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.2	0.3	0.3	0.2	0.2	
3-Jul	Z	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	0.1	0.1	0.1	0.1	0.1	0.1	
4-Jul	0.1	Z	0.3	0.6	0.5	0.4	0.1	0.0	0.1	0.1	0.0	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	
5-Jul	0.1	0.1	Z	0.2	0.2	0.4	0.3	0.3	0.2	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.2	
6-Jul	0.3	0.5	0.2	Z	0.2	2.1	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	2.0	0.3	2.1	
7-Jul	1.1	4.0	0.6	0.1	Z	0.4	0.3	0.2	0.3	0.5	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.4	4.0	
8-Jul	0.1	0.1	0.1	0.1	0.2	Z	0.3	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	0.3	0.3	0.5	0.2	0.5	
9-Jul	Z	0.8	2.7	0.4	0.9	0.4	0.1	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8	0.8	2.2	0.2	0.4	2.7	
10-Jul	0.1	Z	0.1	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	0.1	0.1	0.1	0.2	0.1	0.2	
11-Jul	0.2	0.0	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.2	0.3	0.4	0.7	0.7	0.2	0.7	
12-Jul	0.8	0.7	0.6	Z	0.7	0.3	0.2	0.1	0.2	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.4	0.5	0.6	0.3	0.8	
13-Jul	0.6	0.6	0.6	0.5	Z	0.5	0.5	0.4	0.3	0.3	0.3	0.2	0.2	0.3	0.4	0.3	0.4	0.3	0.2	0.1	0.2	0.2	0.1	0.1	0.3	0.6	
14-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.4	0.6	0.7	0.7	0.6	0.4	0.3	0.2	0.2	0.2	0.7	
15-Jul	Z	0.2	0.3	0.3	0.5	0.5	0.4	0.3	0.1	0.1	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	0.5	
16-Jul	0.1	Z	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.3	
17-Jul	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	1.4	2.1	0.2	5.7	3.4	0.3	0.6	5.7	
18-Jul	0.3	0.4	0.5	Z	1.7	2.8	3.2	3.1	0.2	0.1	C	C	C	C	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.7	3.2	
19-Jul	0.2	0.2	0.3	1.3	Z	1.0	0.5	0.3	0.3	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.5	1.5	0.5	0.2	0.2	0.4	1.5	
20-Jul	0.2	0.2	0.2	0.2	0.4	Z	0.7	0.5	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.5	0.2	0.7	
21-Jul	Z	0.4	0.4	0.4	0.6	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.4	0.6	0.3	0.2	0.6	
22-Jul	0.7	Z	0.3	0.4	0.3	0.5	0.3	0.3	0.4	0.4	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.2	0.7	
23-Jul	1.8	0.1	Z	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	1.8	
24-Jul	0.1	0.1	0.1	Z	0.2	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.6	3.9	0.8	3.8	1.1	0.5	3.9		
25-Jul	1.3	0.9	0.3	0.1	Z	0.1	0.6	0.2	0.0	0.0	0.1	0.2	2.0	0.1	0.1	0.2	0.5	0.6	0.9	0.1	0.1	0.2	0.2	0.3	0.4	2.0	
26-Jul	0.7	0.4	0.1	0.1	0.1	Z	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.6	0.3	0.1	0.0	0.1	0.5	1.0	0.7	2.2	0.2	0.3	2.2	
27-Jul	Z	1.0	0.9	2.9	1.7	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	0.1	0.2	0.2	0.1	0.1	0.3	0.3	2.9	
28-Jul	0.2	Z	0.2	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.3	
29-Jul	0.1	0.1	Z	0.3	0.2	0.1	0.2	0.2	0.1	0.0	0.1	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.3	
30-Jul	0.1	0.1	0.1	Z	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
31-Jul	0.1	0.1	0.1	0.1	Z	0.3	0.6	0.3	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.6	
																								Diurnal Average		Diurnal Maximum	
																								0.4		1.8	
																								0.5		4.0	
																								0.4		2.7	
																								0.4		2.9	
																								0.4		1.7	
																								0.4		2.8	
																								0.3		3.2	
																								0.3		3.1	
																								0.1		0.4	
																								0.1		0.5	
																								0.1		0.3	
																								0.1		0.3	
																								0.1		2.0	
																								0.1		0.3	
																								0.1		0.6	
																								0.1		0.4	
																								0.1		0.6	
																								0.1		0.7	
																								0.2		1.4	
																								0.2		2.1	
																								0.4		3.9	
																								0.4		5.7	
																								0.5		3.8	
																								0.3		2.0	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Firebag - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	699	98.59	98.59
3 - 4	9	1.27	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**

**Hydrogen Sulphide (H₂S) - ppb
Firebag - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	91	47	21	16	13	35	43	49	49	54	61	45	24	35	37	75	695
3 - 4	0	0	0	2	4	2	0	0	1	0	0	0	0	0	0	0	9
5 - 7	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	47	21	18	18	37	43	49	50	54	61	45	24	35	37	75	705

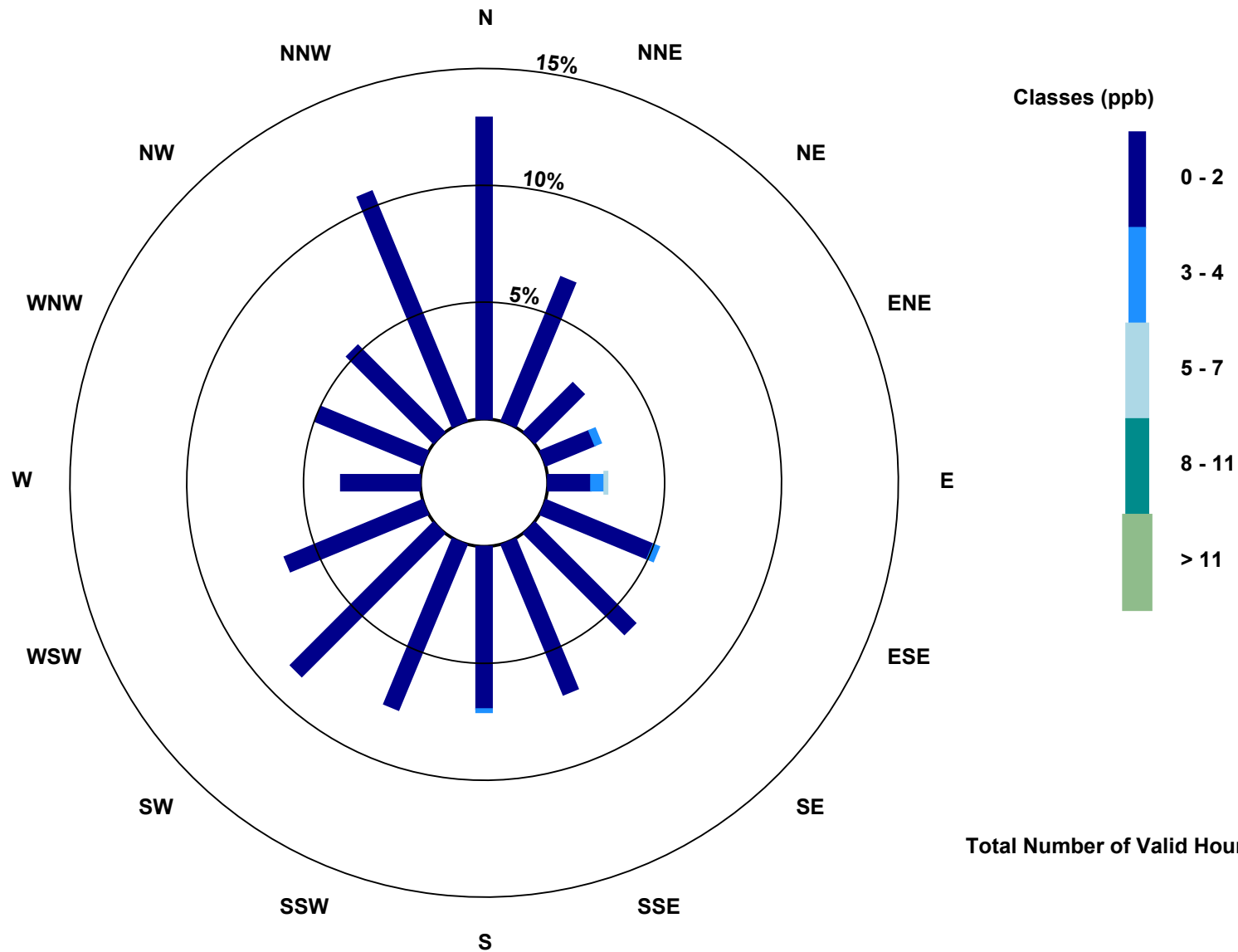
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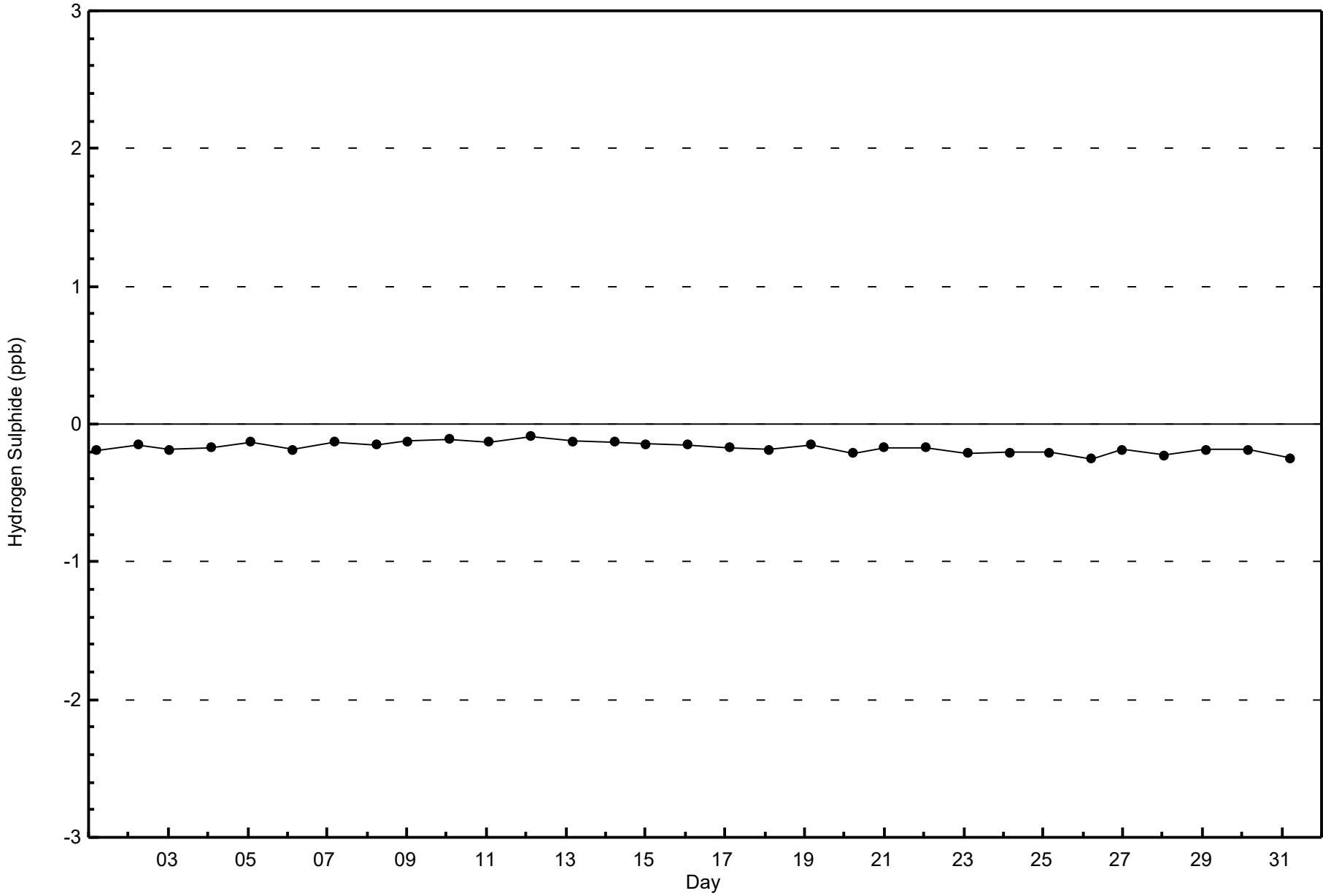
Total Number of Hours: 744

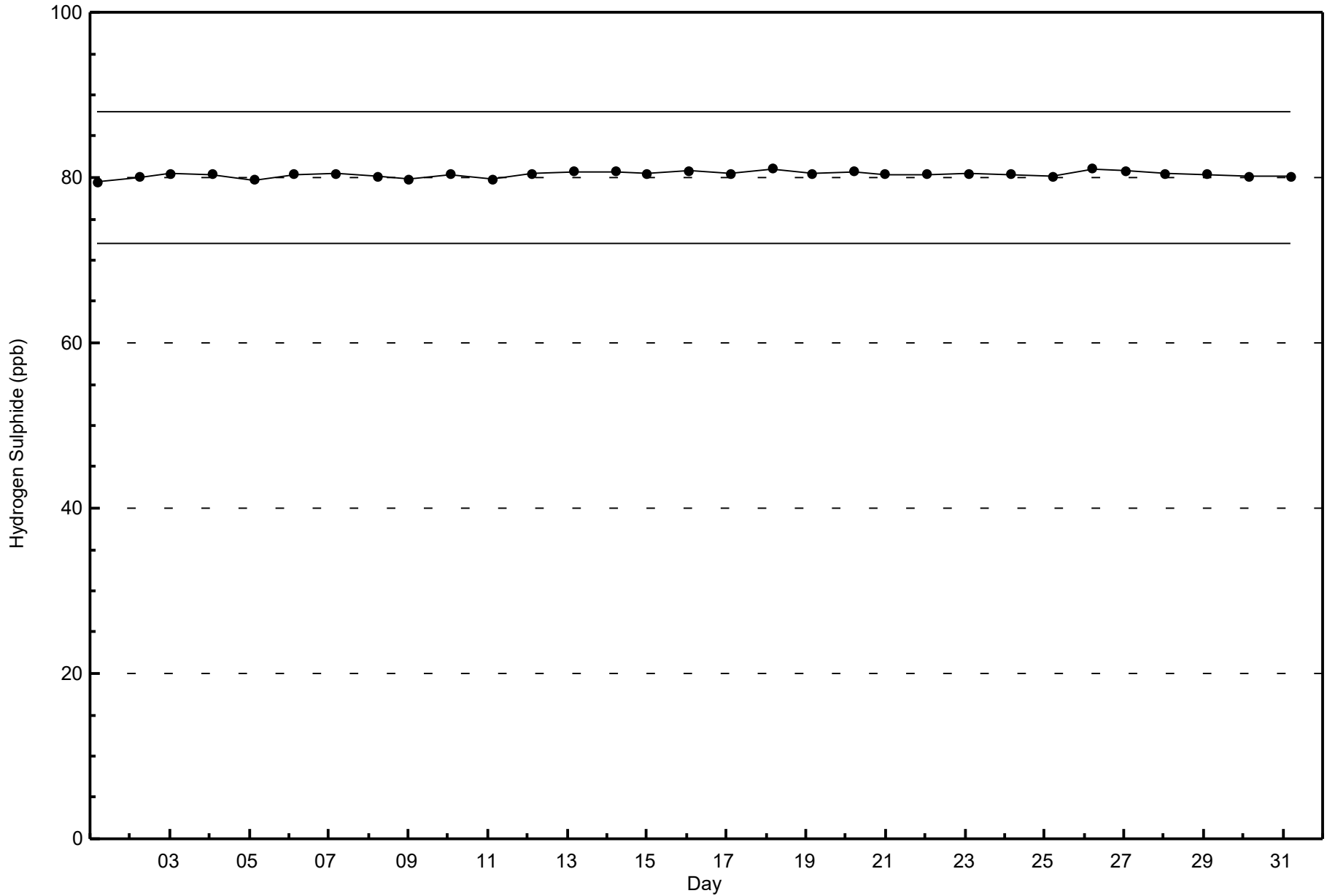


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Hydrogen Sulphide (H₂S) - ppb
Firebag









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

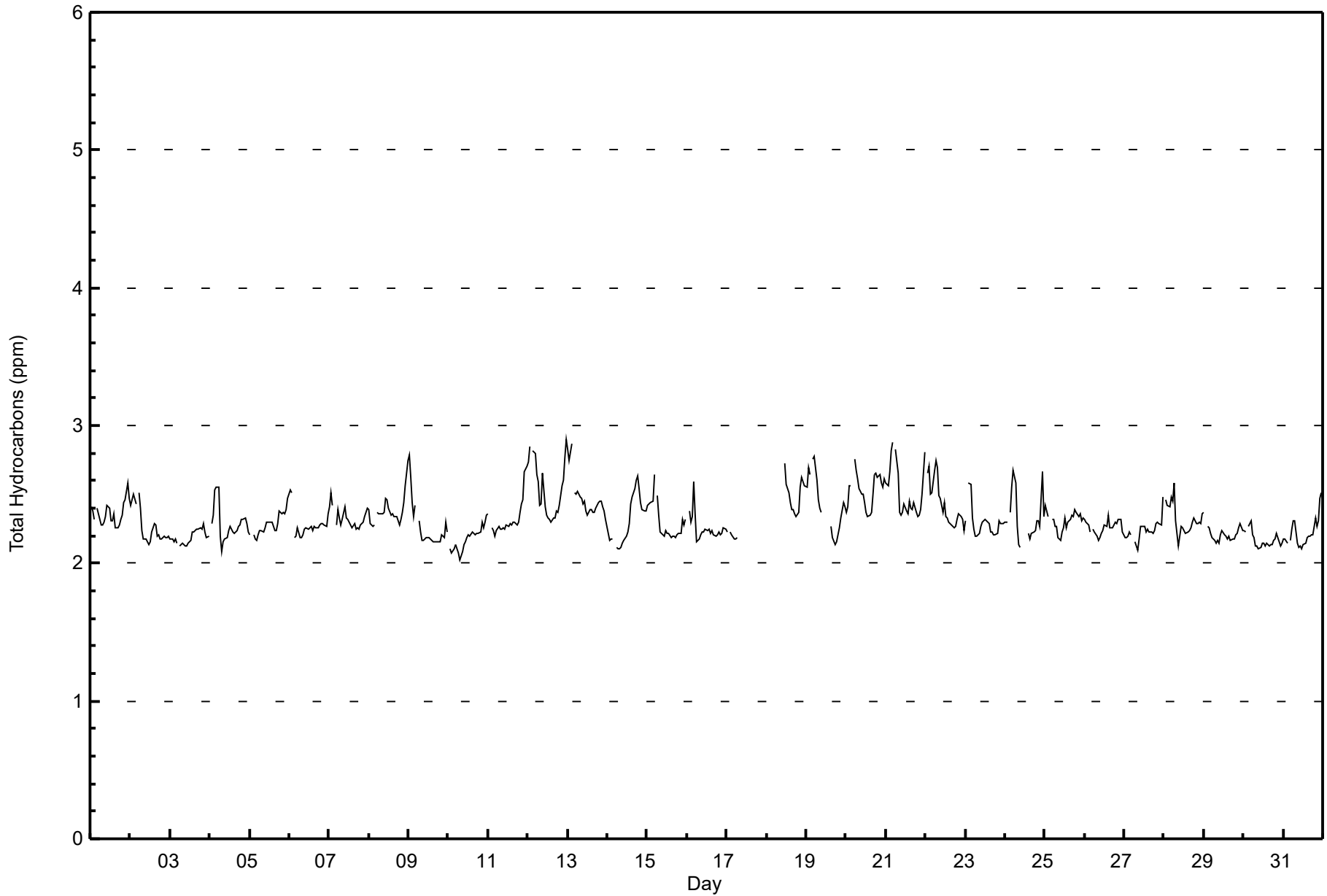
Firebag - July 2023

Maximum Value: 2.9 ppm on Jul 13 00:00																				Maximum Daily Average: 2.5 ppm on Jul 12					Hours in Service: 744	
Minimum Value: 2.0 ppm on Jul 10 08:00																				Minimum Daily Average: 2.2 ppm on Jul 30					Hours of Data: 677	
Maximum Diurnal Average: 2.4 ppm at hour 2																				Minimum Diurnal Average: 2.2 ppm at hour 9					Hours of Missing Data: 67	
Monthly Average: 2.32 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 = 2.8					Hours of Calibration: 35	
																									Percent Operational Time: 95.7	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	2.4	2.4	2.3	Z	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.6	2.5	2.4	2.6
2-Jul	2.4	2.5	2.5	2.4	Z	2.5	2.4	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5
3-Jul	2.2	2.2	2.2	2.2	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.3
4-Jul	Z	2.3	2.4	2.5	2.6	2.6	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.6
5-Jul	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.4	2.5	2.3	2.5
6-Jul	2.5	2.5	Z	2.2	2.2	2.3	2.2	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	2.3	2.3	2.4	2.3	2.5
7-Jul	2.4	2.5	2.4	Z	2.3	2.4	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.5
8-Jul	2.4	2.3	2.3	2.3	Z	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.6	2.7	2.4	2.7
9-Jul	2.8	2.6	2.4	2.3	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	2.3	2.2	2.3	2.8
10-Jul	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3
11-Jul	2.4	Z	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.7	2.7	2.3	2.7
12-Jul	2.7	2.9	Z	2.8	2.8	2.6	2.6	2.4	2.4	2.7	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.6	2.6	2.8	2.9	2.5	2.9
13-Jul	2.8	2.7	2.9	Z	2.5	2.5	2.5	2.5	2.5	2.4	2.5	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.4	2.3	2.5	2.9
14-Jul	2.2	2.2	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.4	2.5	2.5	2.6	2.6	2.5	2.4	2.4	2.4	2.4	2.3	2.6
15-Jul	2.4	2.4	2.4	2.5	2.6	Z	2.5	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.6
16-Jul	Z	2.4	2.3	2.3	2.6	2.4	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	2.3	2.2	2.3	2.6
17-Jul	2.2	Z	2.2	2.2	2.2	2.2	2.2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.2
18-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	2.7	2.6	2.5	2.4	2.4	2.4	2.4	2.3	2.4	2.6	2.6	2.6	2.6	2.6	2.7
19-Jul	2.6	2.7	2.6	Z	2.8	2.8	2.6	2.5	2.4	2.4	C	C	C	C	C	2.3	2.2	2.1	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.8
20-Jul	2.4	2.4	2.6	2.6	Z	2.8	2.7	2.6	2.5	2.5	2.5	2.4	2.4	2.3	2.4	2.4	2.5	2.6	2.7	2.6	2.6	2.6	2.5	2.6	2.5	2.8
21-Jul	2.6	2.6	2.7	2.8	2.9	Z	2.8	2.7	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.4	2.5	2.8	2.5	2.9
22-Jul	Z	2.7	2.7	2.5	2.5	2.7	2.7	2.7	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.2	2.4	2.7
23-Jul	2.3	Z	2.6	2.6	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.6
24-Jul	2.3	2.3	Z	2.4	2.6	2.7	2.6	2.3	2.1	2.1	M	M	M	M	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.7	2.3	2.3	2.7
25-Jul	2.4	2.4	2.3	Z	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.4	2.3	2.4	2.3	2.3	2.4
26-Jul	2.3	2.3	2.3	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3
27-Jul	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.1	2.1	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	2.5	2.2	2.5
28-Jul	Z	2.5	2.4	2.4	2.5	2.5	2.6	2.3	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.6
29-Jul	2.4	Z	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.4
30-Jul	2.2	2.2	Z	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.3
31-Jul	2.2	2.2	2.1	Z	2.2	2.2	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.5	2.5	2.2	2.5
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Firebag - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	1	0.15	0.15
2.1 - 3.0	676	99.85	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 677

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Firebag - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2.1 - 3.0	91	47	18	13	16	34	38	42	51	49	62	45	24	28	37	77	672
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	47	18	13	16	34	38	43	51	49	62	45	24	28	37	77	673

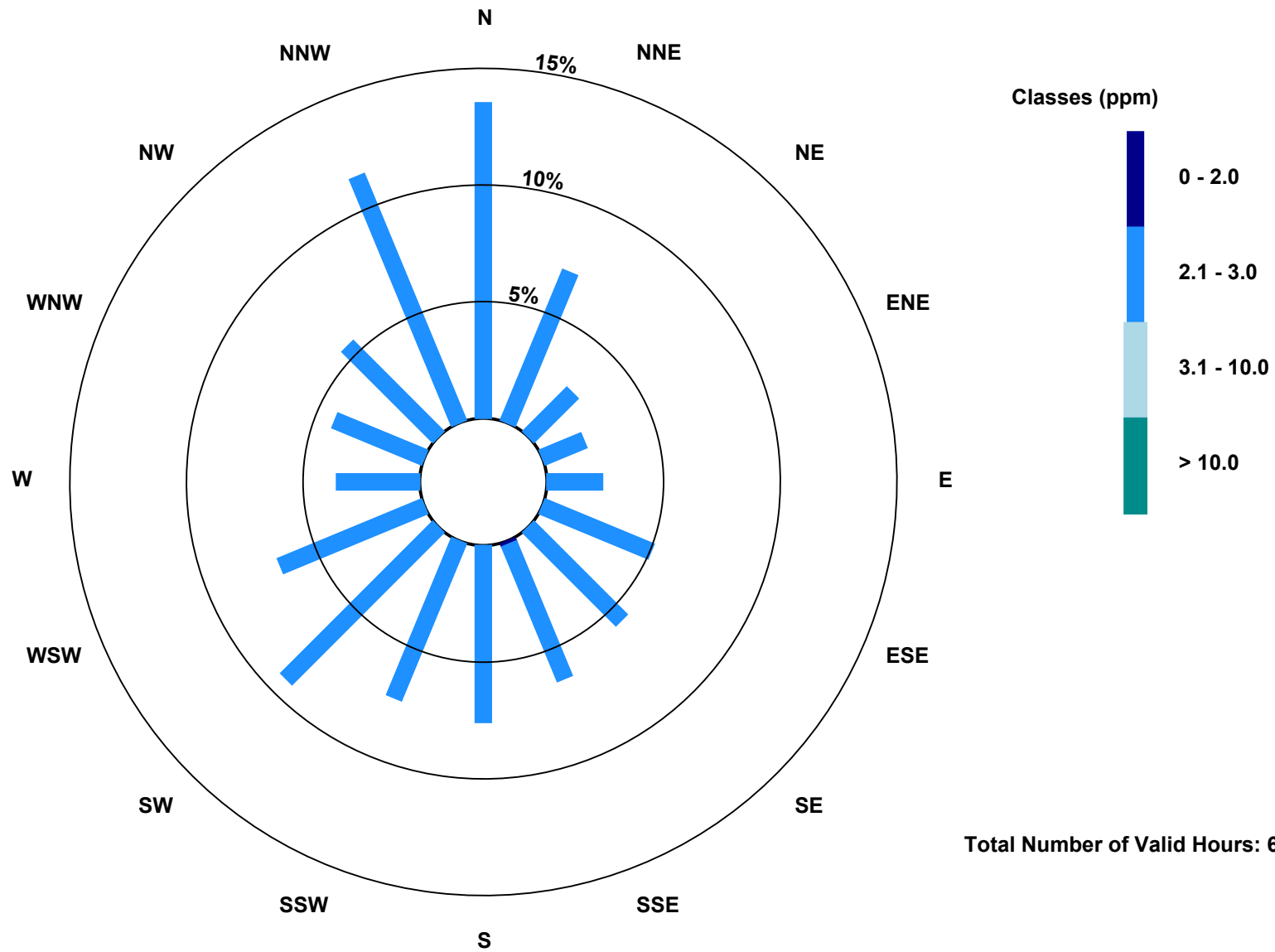
Total Number of Valid Hours: 673

Total Number of Hours: 744

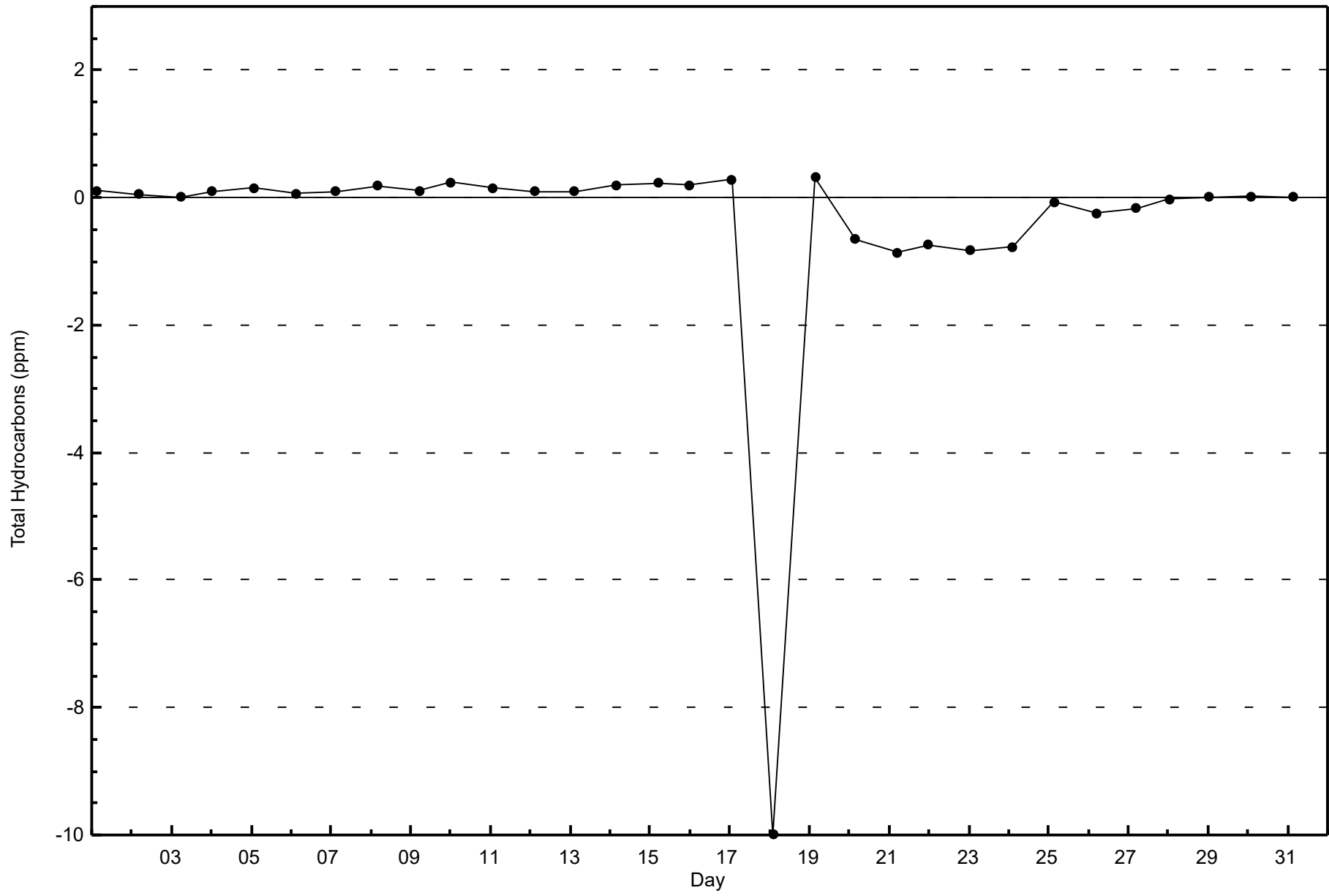


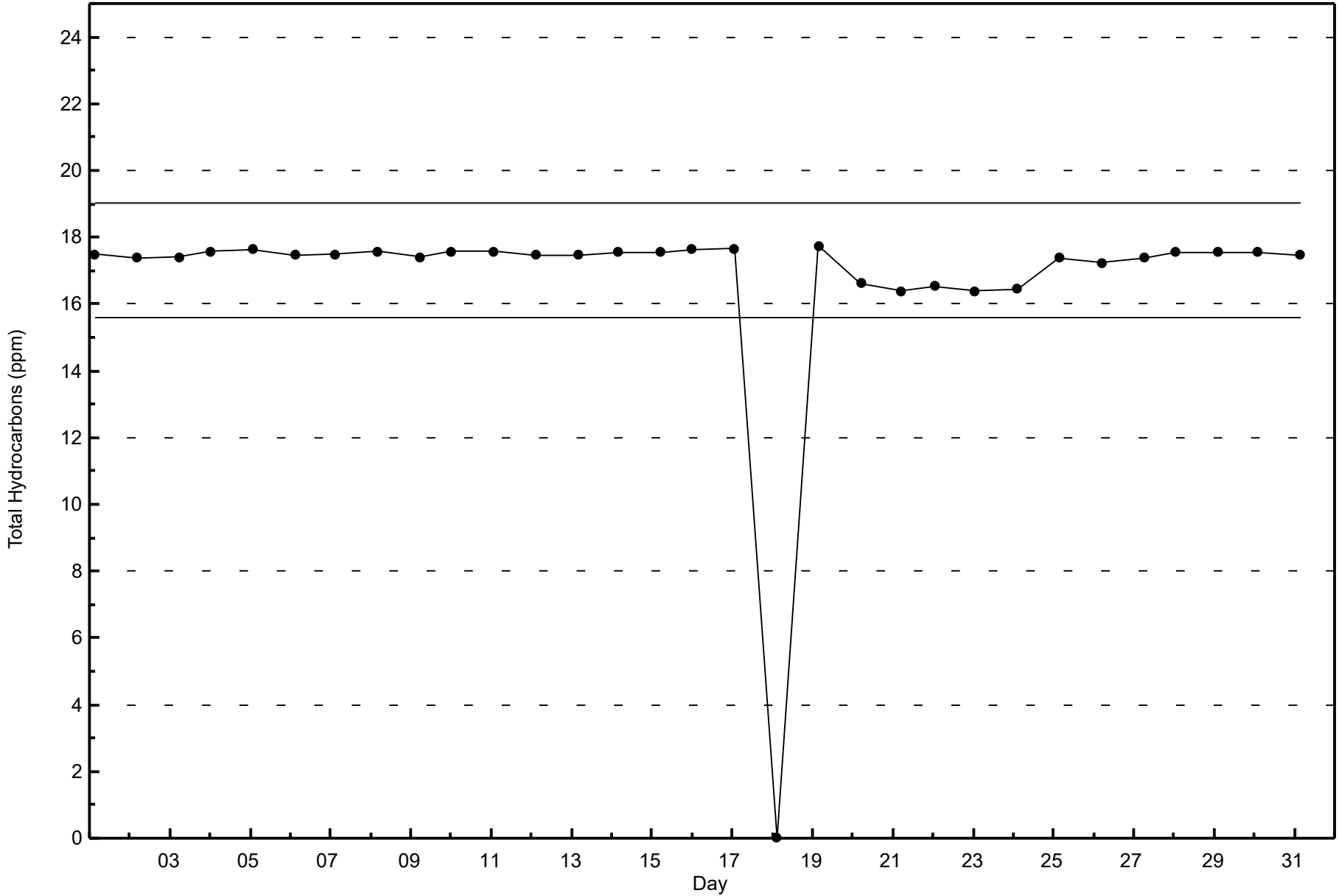
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Firebag



Total Number of Valid Hours: 673







Wood Buffalo Environmental Association
Summary of Hour Averages

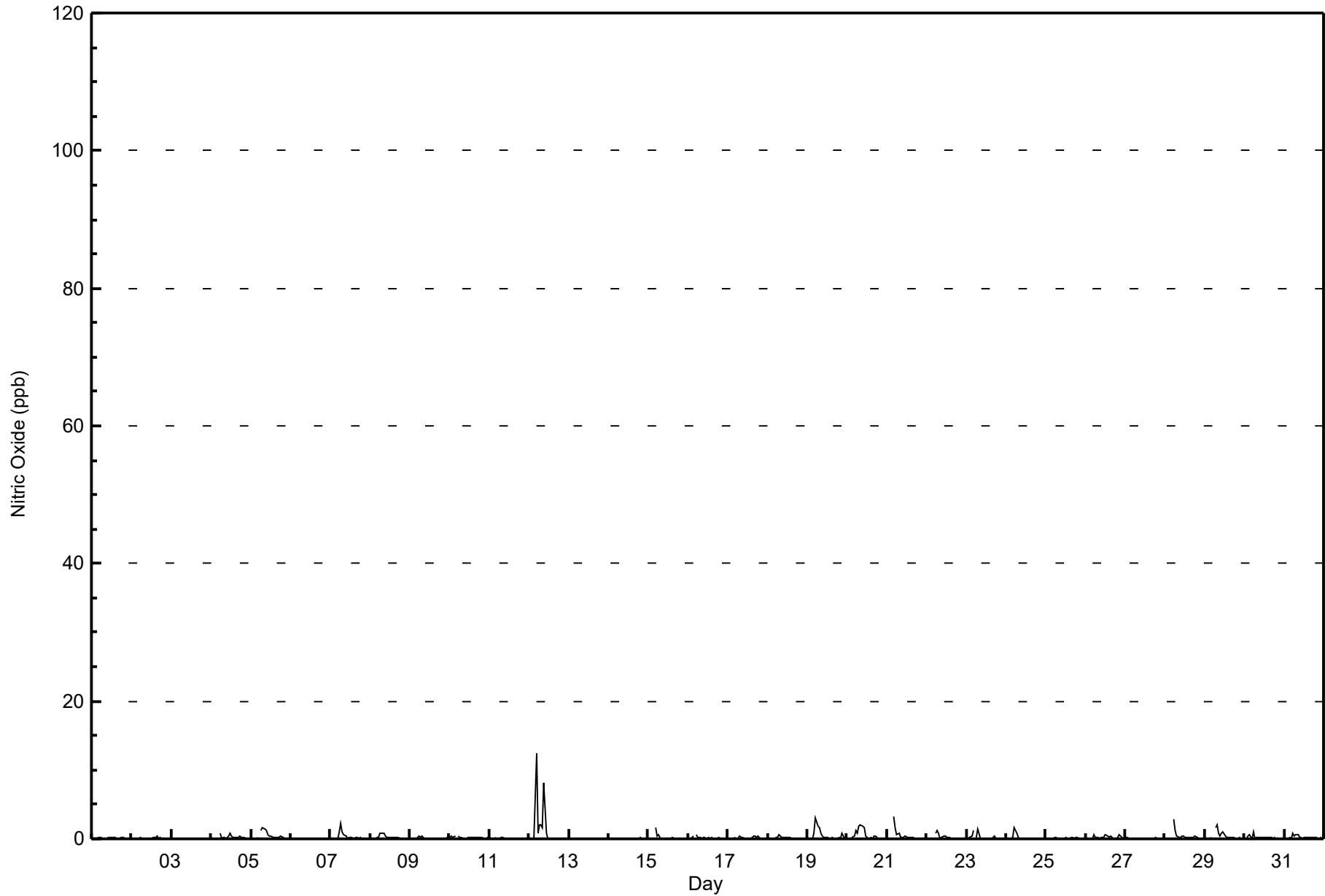
Nitric Oxide (NO) - ppb
Firebag - July 2023

Maximum Value: 12.3 ppb on Jul 12 05:00		Maximum Daily Average: 1.2 ppb on Jul 12		Hours in Service: 744																						
Minimum Value: 0.0 ppb on Jul 6 02:00		Minimum Daily Average: 0.0 ppb on Jul 6		Hours of Data: 708																						
Maximum Diurnal Average: 0.8 ppb at hour 5		Minimum Diurnal Average: 0.1 ppb at hour 24		Hours of Missing Data: 36																						
Monthly Average: 0.23 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.1 Q ₃ = 0.2 P ₉₀ = 0.4 P ₉₉ = 2.0		Hours of Calibration: 36																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.1	Z	0.0	0.0	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	0.2	0.2	0.1	0.1	0.0	0.1	0.1	0.2
2-Jul	0.1	0.0	Z	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.4
3-Jul	0.1	0.1	0.1	Z	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	0.1	0.1	0.1	0.1	0.0	0.1	0.1
4-Jul	0.0	0.0	0.1	0.1	Z	0.9	0.1	0.1	0.2	0.1	0.3	0.8	0.3	0.2	0.1	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.9
5-Jul	0.1	0.1	0.1	0.1	0.3	Z	1.3	1.6	1.4	1.2	0.7	0.3	0.3	0.1	0.2	0.2	0.2	0.2	0.4	0.1	0.1	0.1	0.0	0.0	0.4	1.6
6-Jul	Z	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
7-Jul	0.0	Z	0.0	0.0	0.0	1.0	2.2	1.0	0.6	0.3	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	0.1	0.3	2.2
8-Jul	0.0	0.0	Z	0.0	0.1	0.2	0.9	0.8	0.8	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.2	0.9
9-Jul	0.1	0.1	0.1	Z	0.1	0.3	0.2	0.5	0.2	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	0.2	0.1	0.1	0.5
10-Jul	0.1	0.5	0.2	0.4	Z	0.4	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.5
11-Jul	0.1	0.0	0.0	0.1	0.3	Z	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.3
12-Jul	Z	0.0	0.0	0.0	12.3	0.9	2.1	2.0	1.7	8.1	0.7	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	1.2	12.3
13-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
14-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
15-Jul	0.1	0.1	0.0	Z	1.6	0.5	0.5	0.3	0.1	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	1.6
16-Jul	0.1	0.1	0.2	0.5	Z	0.6	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.6
17-Jul	0.0	0.0	0.0	0.1	0.2	Z	0.1	0.3	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.4	0.3	0.4	0.2	0.0	0.1	0.1	0.1	0.1	0.4
18-Jul	Z	0.1	0.0	0.0	0.0	0.1	0.2	0.6	0.2	0.2	0.1	0.2	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	0.6
19-Jul	0.1	Z	0.1	0.1	0.7	3.0	1.8	1.7	0.9	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.7	0.1	0.0	0.5	3.0
20-Jul	0.0	0.1	Z	0.1	0.4	1.2	0.8	1.7	1.9	1.9	1.7	0.4	0.2	0.1	0.1	0.1	0.3	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.5	1.9
21-Jul	0.0	0.0	0.0	Z	3.2	1.7	0.5	0.9	0.2	0.2	0.3	0.4	0.1	0.1	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	3.2
22-Jul	0.1	0.1	0.1	0.1	Z	0.9	1.3	0.7	0.1	0.1	0.4	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.2	1.3
23-Jul	0.1	0.1	0.1	0.4	1.2	Z	0.2	1.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.1	0.1	0.1	0.0	0.0	0.0	0.2	1.3
24-Jul	Z	0.0	0.0	0.0	0.3	1.5	0.7	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.2	1.5
25-Jul	0.0	Z	0.0	0.1	0.0	0.2	0.2	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.2
26-Jul	0.1	0.0	Z	0.0	0.0	0.6	0.2	0.1	0.1	0.1	0.1	0.1	0.6	0.4	0.3	0.4	0.1	0.1	0.1	0.3	0.6	0.4	0.2	0.1	0.2	0.6
27-Jul	0.2	0.2	0.1	Z	0.0	0.0	0.0	0.0	0.0	C	C	C	C	C	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.2
28-Jul	0.0	0.0	0.0	0.0	Z	2.9	1.3	0.4	0.2	0.2	0.5	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.3	2.9
29-Jul	0.1	0.1	0.1	0.1	0.1	Z	1.7	2.1	0.8	0.4	0.8	1.0	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.4	2.1
30-Jul	Z	0.1	0.3	0.7	0.1	0.9	0.1	0.2	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	0.0	0.2	0.9
31-Jul	0.0	Z	0.1	0.1	0.0	0.7	0.4	0.6	0.6	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.7
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Firebag - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Firebag - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Firebag - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	90	44	21	18	19	41	42	50	51	53	60	46	24	35	38	74	706
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	90	44	21	18	19	41	42	50	51	53	60	46	24	35	38	74	706

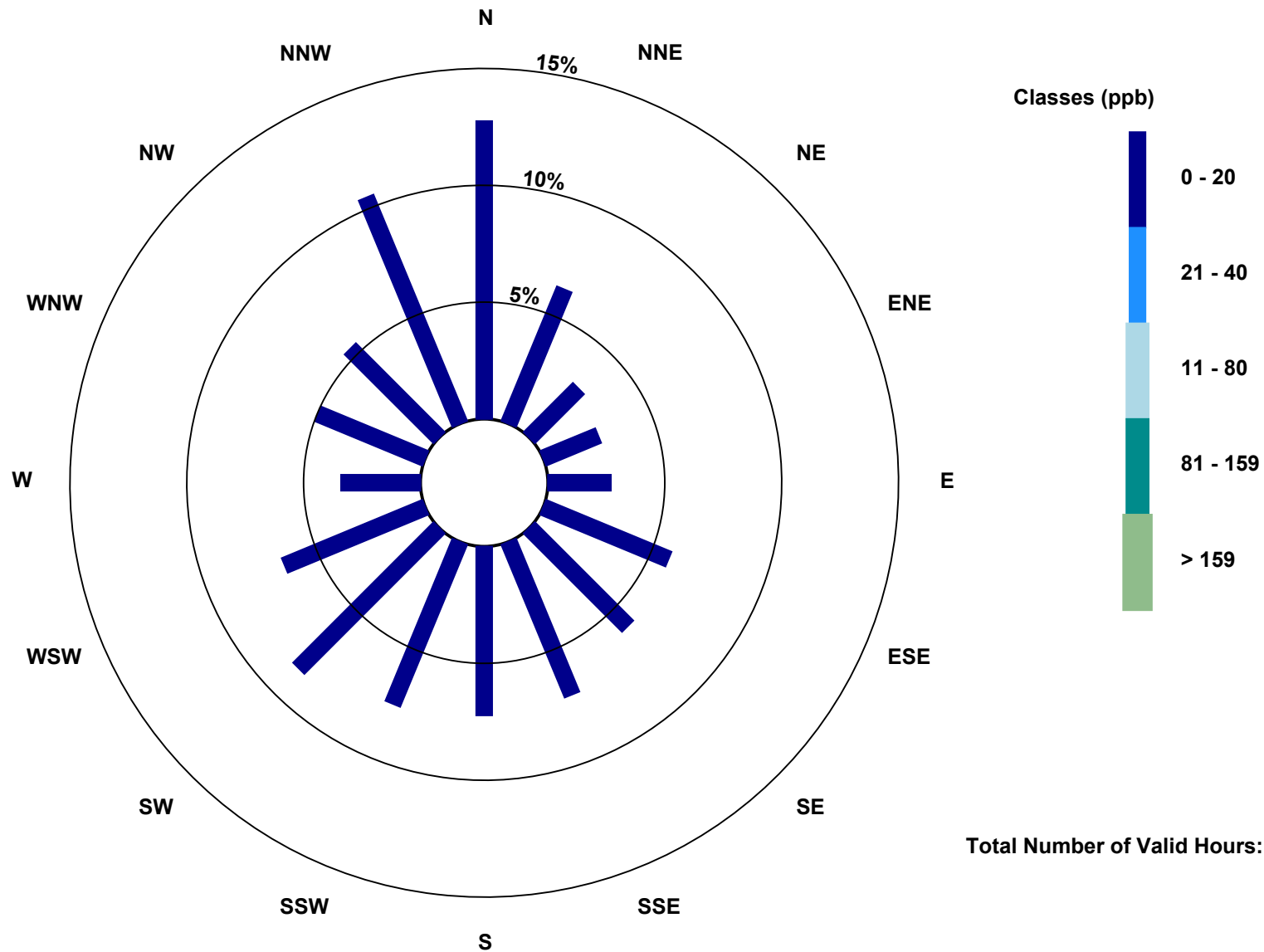
Total Number of Valid Hours: 706

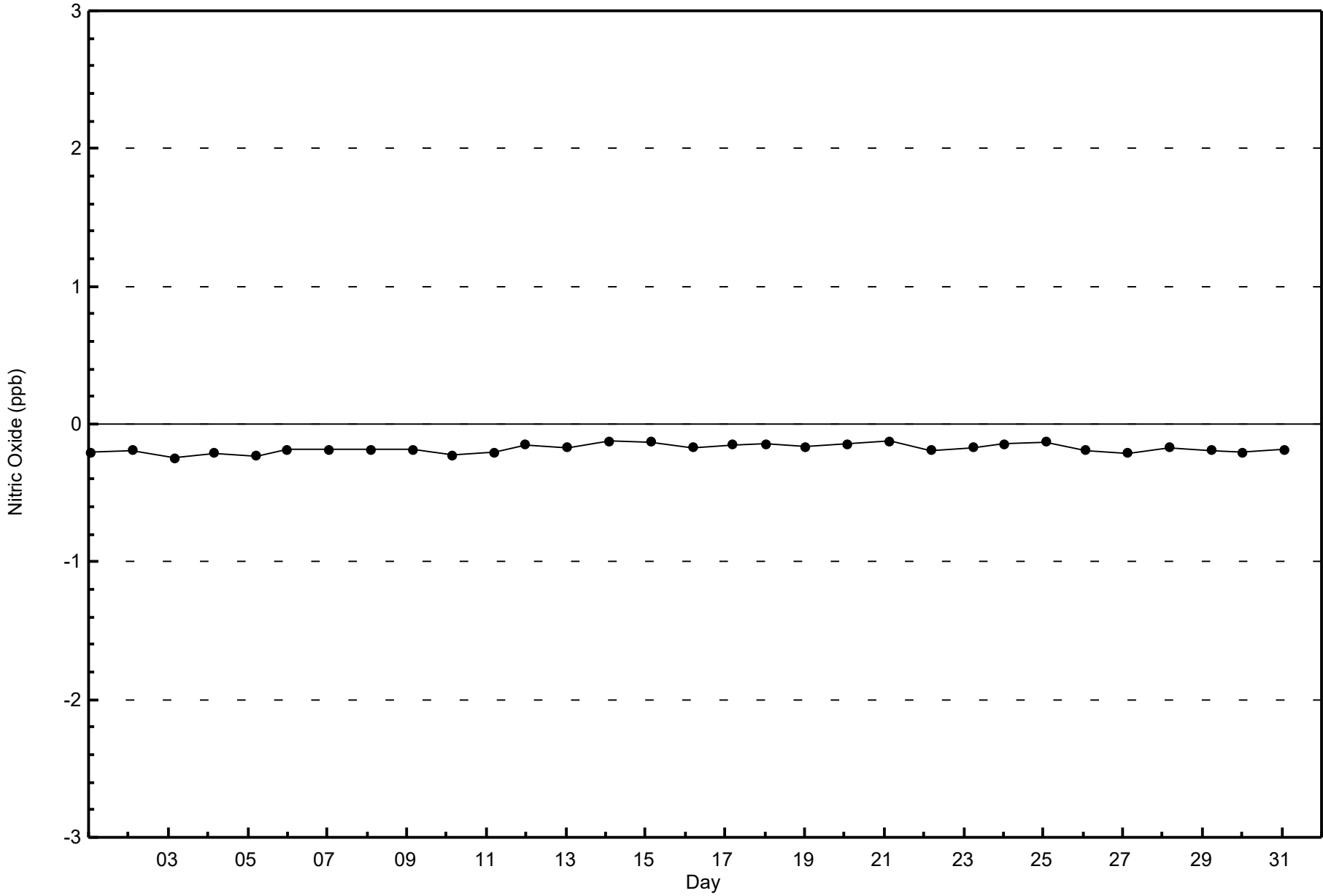
Total Number of Hours: 744

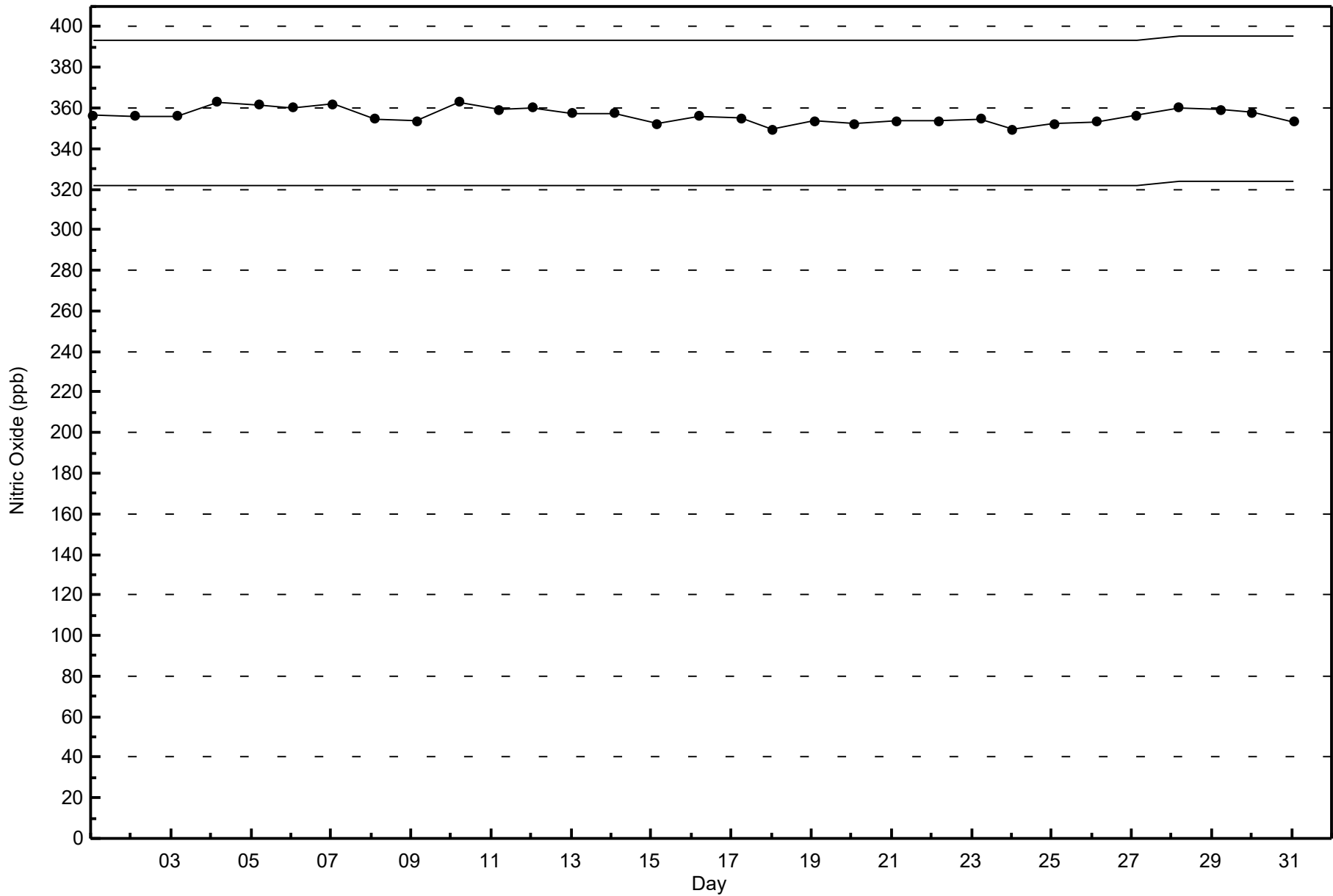


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Firebag









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Firebag - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 15.2 ppb on Jul 12 10:00	Maximum Daily Average: 4.3 ppb on Jul 20		Hours of Data:	708
Minimum Value: 0.0 ppb on Jul 9 12:00	Minimum Daily Average: 0.3 ppb on Jul 3		Hours of Missing Data:	36
Maximum Diurnal Average: 3.4 ppb at hour 6	Minimum Diurnal Average: 1.2 ppb at hour 14		Hours of Calibration:	36
Monthly Average: 2.03 ppb	Percentiles: P ₁ = 0.0 P ₁₀ = 0.3 Q ₁ = 0.7 Median = 1.4 Q ₃ = 2.6 P ₉₀ = 4.7 P ₉₉ = 9.7		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	5.4	Z	2.6	2.2	4.6	3.3	1.8	2.0	1.7	1.9	4.4	3.2	2.2	1.8	2.6	1.4	1.2	2.5	4.6	4.3	6.4	7.0	5.7	3.3	3.3	7.0
2-Jul	4.2	4.7	Z	5.0	8.0	8.6	5.5	2.1	1.1	1.1	0.9	0.7	0.8	1.8	2.3	2.6	0.6	2.1	2.0	3.1	2.3	1.8	0.8	0.6	2.7	8.6
3-Jul	0.8	0.7	0.7	Z	0.3	0.3	0.3	0.2	0.3	0.4	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.8
4-Jul	0.3	0.5	0.6	1.0	Z	1.3	0.4	0.6	0.8	0.3	0.8	1.9	1.2	1.0	0.8	1.0	1.3	2.6	2.5	2.7	3.4	4.0	4.0	1.4	1.5	4.0
5-Jul	1.4	1.2	1.5	2.4	4.3	Z	4.5	5.1	4.4	4.9	4.0	3.4	2.5	1.9	2.1	1.3	1.8	1.9	4.2	2.0	0.7	0.5	0.5	0.6	2.5	5.1
6-Jul	Z	0.5	0.4	0.3	0.3	0.8	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.7	0.4	1.7
7-Jul	1.6	Z	1.2	1.3	1.0	5.6	7.6	3.5	2.8	2.5	1.3	1.4	1.5	1.4	1.3	1.6	1.3	1.4	2.0	1.3	1.5	2.0	3.6	3.1	2.3	7.6
8-Jul	4.3	1.7	Z	2.3	5.1	3.3	6.1	4.8	4.9	3.2	3.4	3.7	3.2	2.0	1.7	1.4	1.8	1.2	0.7	0.7	0.8	1.0	2.3	9.7	3.0	9.7
9-Jul	8.0	3.9	3.2	Z	1.3	1.5	0.5	1.0	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.9	0.4	4.7	0.8	1.2	8.0
10-Jul	0.4	1.2	0.7	0.9	Z	1.1	0.5	0.4	0.3	0.3	0.3	0.3	0.4	0.5	0.3	0.4	0.3	0.5	0.6	1.2	0.7	0.5	0.9	1.2	0.6	1.2
11-Jul	1.0	0.4	0.5	0.7	1.2	Z	1.5	1.1	0.9	0.5	0.5	0.4	0.5	0.4	0.6	1.3	1.4	0.8	1.1	2.5	3.6	3.8	3.1	2.9	1.3	3.8
12-Jul	Z	2.5	2.8	3.8	7.6	4.4	6.4	5.8	5.1	15.2	2.9	0.7	0.6	0.4	0.5	0.5	0.9	1.7	1.2	1.2	1.6	1.7	3.0	8.1	3.4	15.2
13-Jul	11.7	Z	12.9	9.5	4.0	2.9	2.7	2.2	1.7	1.4	1.9	1.3	0.8	1.1	1.4	1.7	2.3	3.2	4.2	4.9	4.7	4.0	2.2	0.9	3.6	12.9
14-Jul	0.4	0.3	Z	0.9	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.5	1.1	2.1	2.3	2.4	2.8	2.8	2.3	1.6	1.1	0.8	0.7	1.0	2.8
15-Jul	0.7	0.9	1.2	Z	10.1	7.7	5.4	2.5	0.5	0.2	0.2	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	1.3	10.1
16-Jul	0.1	1.2	0.8	1.2	Z	1.7	0.7	0.7	0.6	0.8	0.8	0.9	1.1	1.0	0.8	0.8	0.8	0.8	0.8	0.9	0.8	1.0	0.8	0.8	0.9	1.7
17-Jul	0.7	0.7	0.9	0.7	0.9	Z	0.9	1.2	1.0	1.0	0.8	0.7	0.7	0.7	0.7	1.3	1.1	1.4	3.0	2.4	0.8	2.7	1.7	0.9	1.2	3.0
18-Jul	Z	1.2	0.9	0.9	0.8	1.9	2.1	3.3	1.2	1.3	1.0	1.2	1.1	1.0	0.8	1.1	1.2	1.1	0.7	0.7	0.7	1.2	2.7	2.9	1.3	3.3
19-Jul	4.0	Z	6.1	8.4	10.0	10.3	5.3	5.6	3.6	2.2	1.9	1.9	2.0	2.0	2.0	2.4	2.2	2.1	1.4	2.2	2.4	3.1	2.2	2.3	3.7	10.3
20-Jul	1.5	6.0	Z	7.5	5.2	3.7	2.7	5.1	6.1	6.3	6.3	3.4	2.4	2.0	2.6	2.6	5.9	8.7	7.4	5.2	3.4	2.0	1.5	2.2	4.3	8.7
21-Jul	1.9	1.5	1.3	Z	4.4	4.6	3.3	5.0	1.8	2.1	2.3	3.5	1.7	2.2	4.8	4.1	3.4	3.8	2.7	1.2	1.0	0.9	1.4	1.4	2.6	5.0
22-Jul	2.4	3.6	2.7	2.0	Z	4.3	6.2	5.2	2.6	3.0	4.4	4.9	2.7	1.7	1.7	1.5	1.1	0.9	0.7	0.6	0.5	0.4	0.4	0.4	2.3	6.2
23-Jul	1.5	0.6	0.7	1.5	2.8	Z	1.0	2.2	1.1	1.4	1.7	1.6	1.6	1.6	1.4	1.3	1.4	2.4	0.9	1.1	1.3	1.1	0.8	0.8	1.4	2.8
24-Jul	Z	1.1	1.3	2.2	5.4	8.1	5.1	2.7	1.2	0.8	0.8	0.9	1.0	1.1	2.1	1.0	1.2	1.4	1.8	1.7	1.8	2.7	4.2	2.3	2.3	8.1
25-Jul	2.5	Z	2.0	1.6	1.3	2.2	4.5	1.2	1.1	0.8	0.9	1.6	4.0	1.4	1.5	2.8	2.4	1.4	2.1	1.4	1.2	2.4	2.9	2.3	2.0	4.5
26-Jul	1.4	1.6	Z	0.7	0.7	1.6	0.8	0.8	0.5	0.6	0.6	0.7	1.5	1.3	1.2	1.4	0.6	0.4	0.4	2.6	5.4	5.6	3.3	0.9	1.5	5.6
27-Jul	4.8	4.0	2.7	Z	0.9	0.4	0.3	0.3	0.3	C	C	C	C	C	0.5	0.2	0.5	0.3	1.3	2.2	1.7	2.0	1.1	2.3	1.4	4.8
28-Jul	2.4	2.9	3.2	2.5	Z	2.8	1.5	1.8	1.1	1.1	2.1	1.6	1.3	1.7	2.1	2.2	2.6	3.2	5.3	4.3	3.7	3.8	3.3	7.0	2.8	7.0
29-Jul	10.5	6.9	5.7	6.0	5.8	Z	6.1	5.6	2.7	1.4	2.4	3.1	2.1	1.2	1.1	1.0	1.2	1.2	0.8	1.1	1.1	3.0	1.6	1.0	3.2	10.5
30-Jul	Z	1.6	3.2	4.4	0.9	2.7	0.7	1.2	0.9	0.7	0.7	0.7	0.7	0.8	0.8	0.9	0.8	0.6	1.2	1.4	1.2	1.5	1.9	1.2	1.3	4.4
31-Jul	0.9	Z	0.9	1.4	1.0	3.7	3.6	3.0	2.2	1.0	0.8	0.7	1.2	1.7	1.6	1.9	3.6	2.1	2.4	2.3	1.0	2.0	5.6	5.2	2.2	5.6

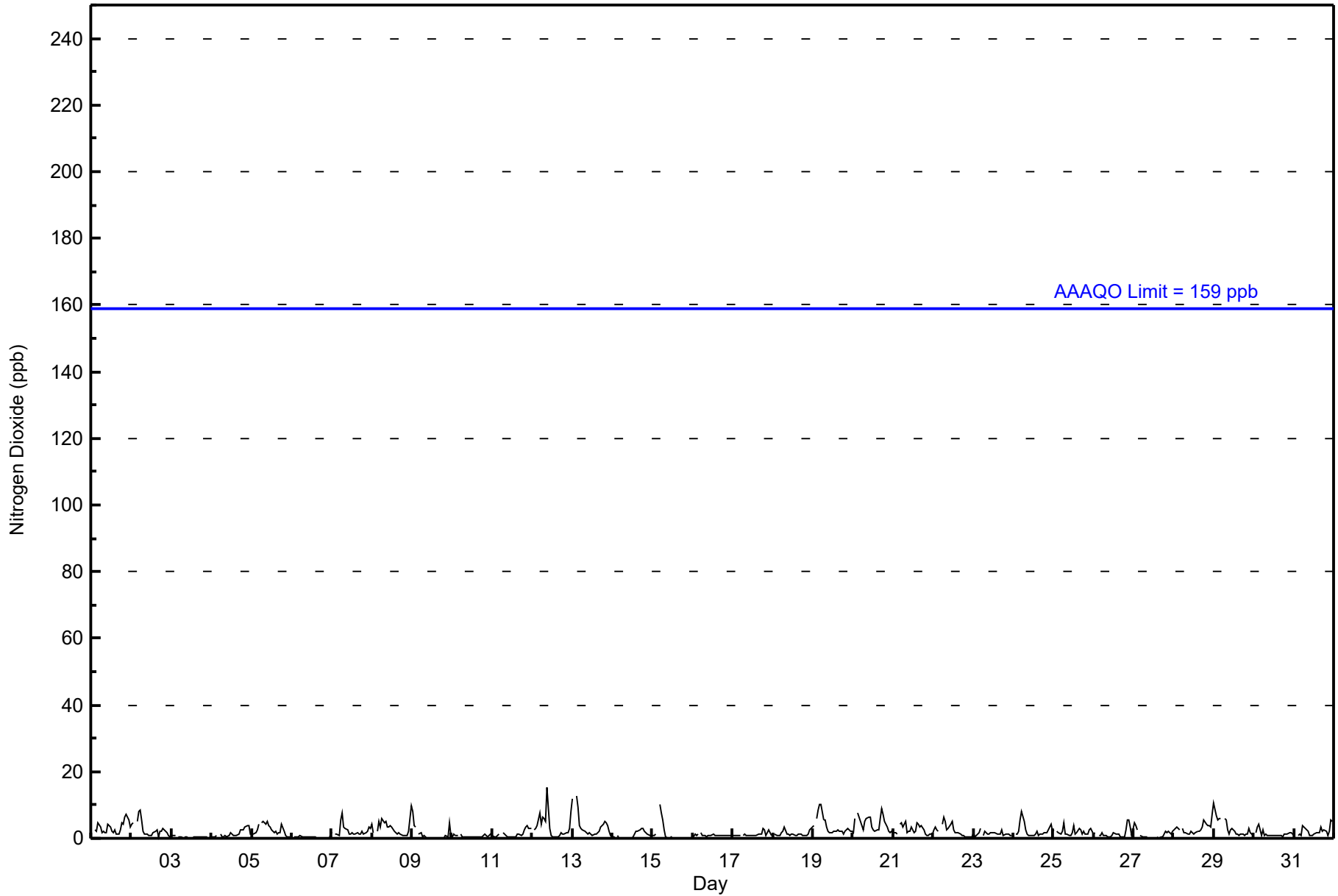
2.9	2.1	2.3	2.7	3.4	3.4	2.9	2.5	1.7	1.9	1.6	1.5	1.3	1.2	1.4	1.4	1.5	1.7	1.9	1.9	1.8	2.1	2.2	2.2	Diurnal Average	
11.7	6.9	12.9	9.5	10.1	10.3	7.6	5.8	6.1	15.2	6.3	4.9	4.0	2.2	4.8	4.1	5.9	8.7	7.4	5.2	6.4	7.0	5.7	9.7	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Firebag - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Firebag - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Firebag - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	90	44	21	18	19	41	42	50	51	53	60	46	24	35	38	74	706
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	90	44	21	18	19	41	42	50	51	53	60	46	24	35	38	74	706

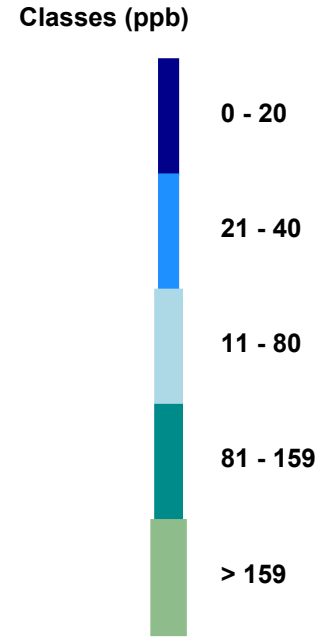
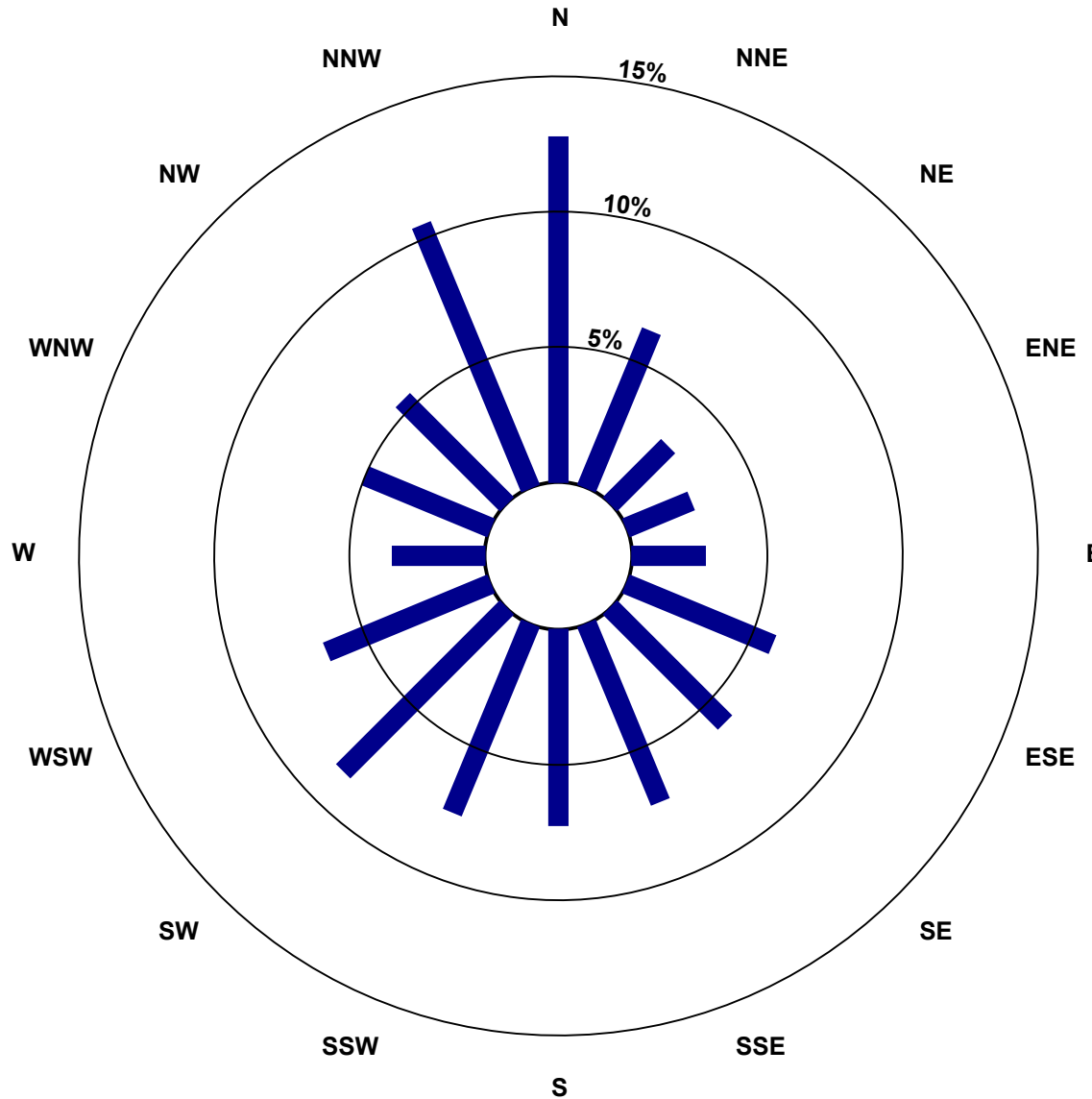
Total Number of Valid Hours: 706

Total Number of Hours: 744

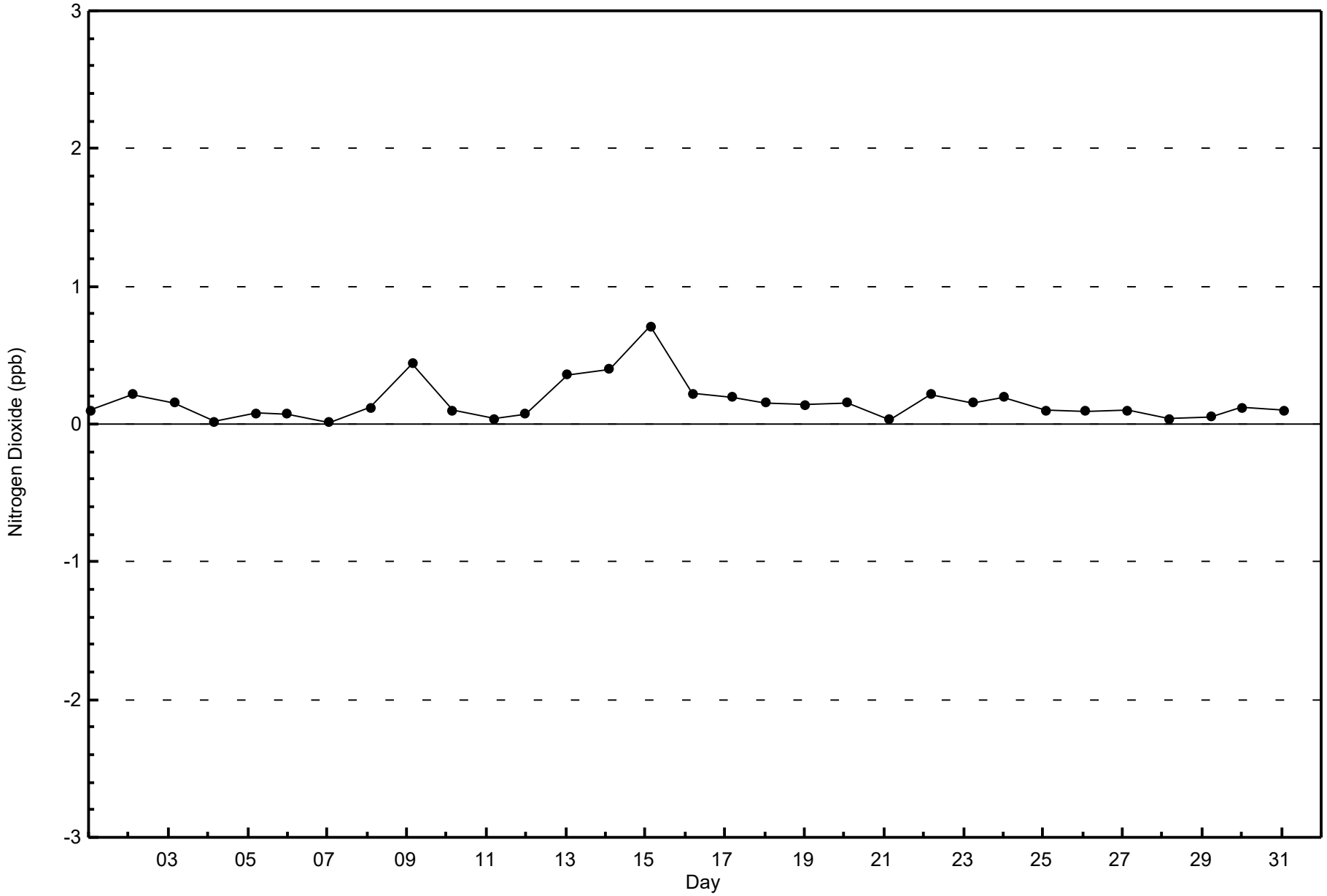


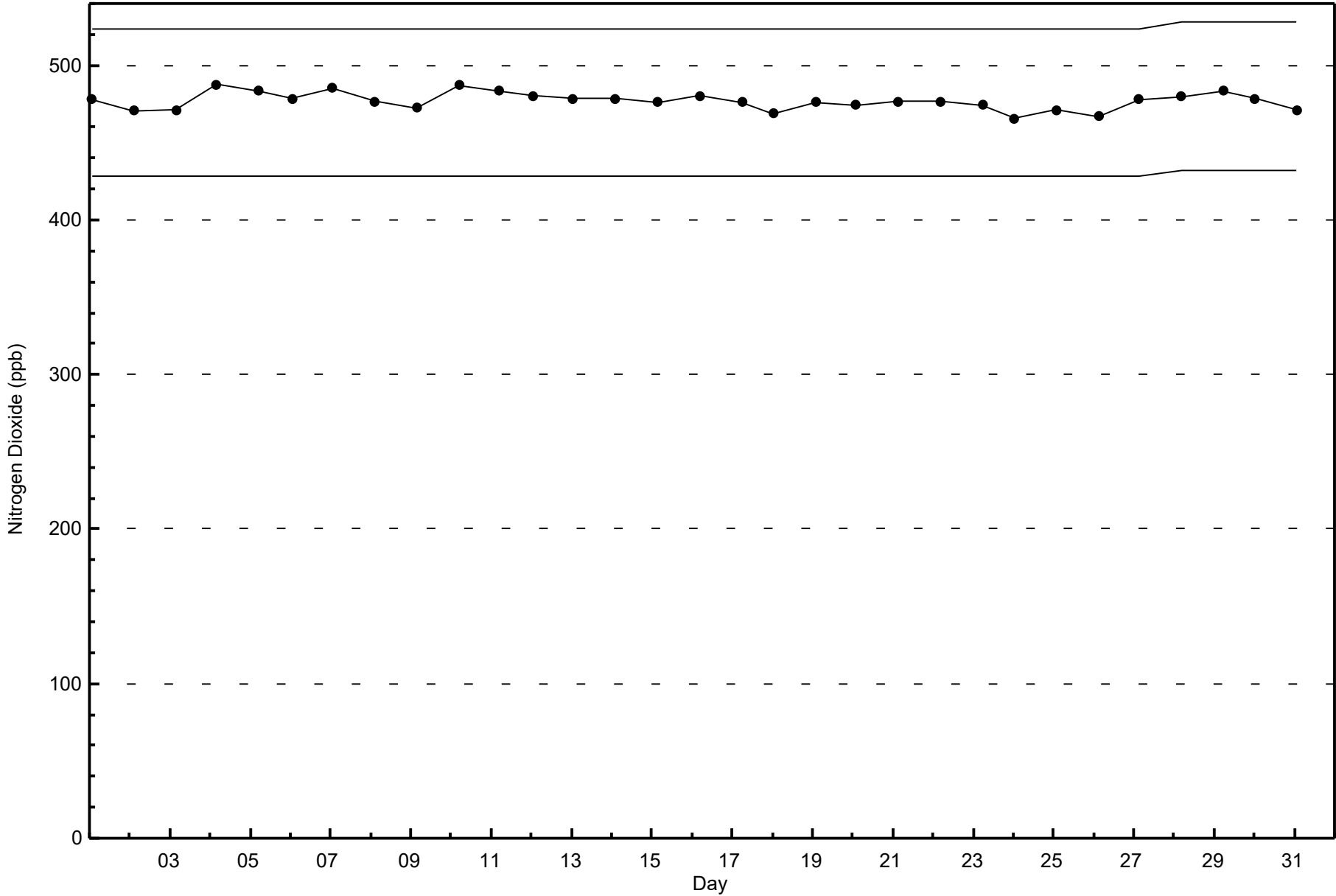
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Firebag



Total Number of Valid Hours: 706







Wood Buffalo Environmental Association
Summary of Hour Averages

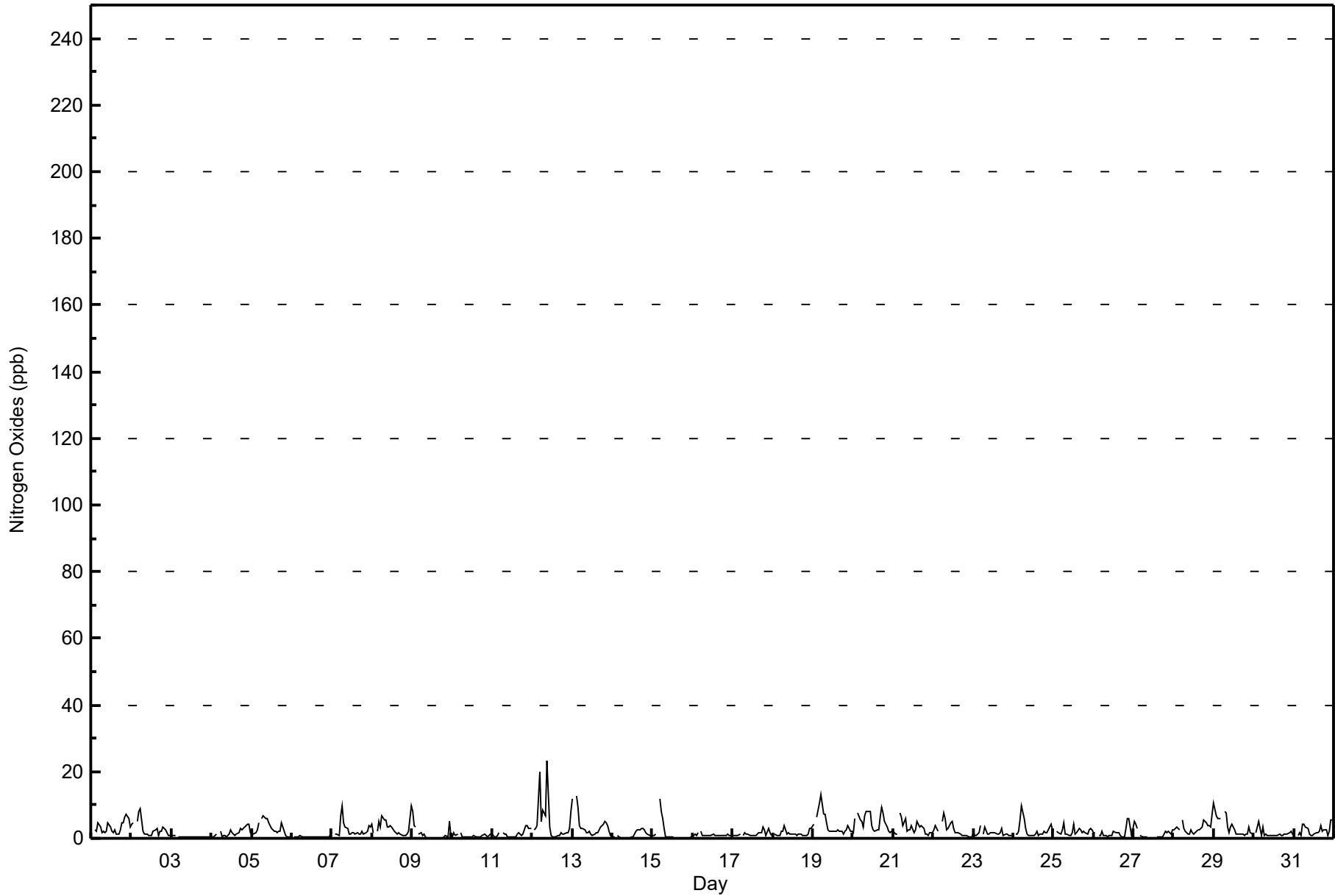
Nitrogen Oxides (NO_x) - ppb
Firebag - July 2023

Maximum Value: 23.3 ppb on Jul 12 10:00		Maximum Daily Average: 4.8 ppb on Jul 20		Hours in Service: 744																						
Minimum Value: 0.0 ppb on Jul 14 07:00		Minimum Daily Average: 0.4 ppb on Jul 6		Hours of Data: 708																						
Maximum Diurnal Average: 4.2 ppb at hour 5		Minimum Diurnal Average: 1.3 ppb at hour 14		Hours of Missing Data: 36																						
Monthly Average: 2.26 ppb		Percentiles: P ₁ = 0.1 P ₁₀ = 0.4 Q ₁ = 0.8 Median = 1.5 Q ₃ = 2.8 P ₉₀ = 5.2 P ₉₉ = 10.5		Hours of Calibration: 36																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	5.5	Z	2.6	2.2	4.7	3.4	1.9	2.1	1.8	2.0	4.6	3.3	2.3	1.9	2.7	1.5	1.3	2.6	4.8	4.5	6.5	7.1	5.7	3.4	3.4	7.1
2-Jul	4.3	4.7	Z	5.0	8.1	8.7	5.6	2.1	1.1	1.1	0.9	0.7	0.8	2.0	2.6	3.0	0.7	2.3	2.1	3.2	2.4	1.9	0.8	0.7	2.8	8.7
3-Jul	0.9	0.8	0.8	Z	0.4	0.4	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.9
4-Jul	0.3	0.5	0.7	1.1	Z	2.2	0.5	0.7	1.0	0.4	1.1	2.7	1.5	1.2	1.0	1.1	1.5	2.9	2.7	2.9	3.5	4.1	4.1	1.5	1.7	4.1
5-Jul	1.5	1.3	1.6	2.5	4.6	Z	5.8	6.7	5.8	6.1	4.7	3.7	2.8	2.0	2.3	1.5	2.0	2.1	4.6	2.1	0.8	0.6	0.5	0.6	2.9	6.7
6-Jul	Z	0.5	0.4	0.3	0.3	0.9	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.8	0.4	1.8
7-Jul	1.6	Z	1.2	1.3	1.0	6.6	9.8	4.5	3.4	2.8	1.4	1.5	1.6	1.5	1.4	1.7	1.4	1.5	2.1	1.4	1.6	2.0	3.6	3.2	2.5	9.8
8-Jul	4.3	1.7	Z	2.3	5.2	3.5	7.0	5.6	5.7	3.5	3.6	3.9	3.4	2.1	1.8	1.5	1.9	1.3	0.8	0.8	0.9	1.1	2.3	9.8	3.2	9.8
9-Jul	8.1	4.0	3.3	Z	1.4	1.8	0.7	1.5	0.6	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	1.0	0.5	4.9	0.9	1.3	8.1
10-Jul	0.5	1.7	0.9	1.3	Z	1.5	0.6	0.5	0.4	0.4	0.4	0.5	0.5	0.8	0.5	0.5	0.4	0.6	0.7	1.3	0.8	0.6	1.0	1.3	0.8	1.7
11-Jul	1.1	0.4	0.5	0.8	1.5	Z	1.7	1.3	1.1	0.6	0.6	0.5	0.5	0.5	0.6	1.4	1.5	0.9	1.1	2.6	3.7	3.8	3.1	2.9	1.4	3.8
12-Jul	Z	2.5	2.8	3.8	19.9	5.3	8.5	7.8	6.8	23.3	3.6	0.7	0.6	0.4	0.5	0.6	0.9	1.7	1.2	1.2	1.6	1.7	3.0	8.1	4.6	23.3
13-Jul	11.7	Z	12.9	9.5	4.0	2.9	2.8	2.3	1.8	1.5	2.0	1.4	0.9	1.2	1.5	1.8	2.4	3.3	4.2	4.9	4.7	4.0	2.2	0.9	3.7	12.9
14-Jul	0.4	0.3	Z	0.9	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.5	1.1	2.1	2.4	2.5	2.9	2.9	2.4	1.7	1.2	0.9	0.8	1.0	2.9
15-Jul	0.8	1.0	1.2	Z	11.7	8.2	5.9	2.8	0.6	0.3	0.3	0.5	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	1.5	11.7
16-Jul	0.2	1.3	1.0	1.7	Z	2.3	0.9	0.8	0.7	0.9	0.9	1.0	1.2	1.1	0.9	0.9	0.9	0.9	0.9	1.0	0.9	1.1	0.8	0.8	1.0	2.3
17-Jul	0.7	0.7	0.9	0.8	1.1	Z	1.0	1.5	1.1	1.2	0.9	0.8	0.8	0.8	0.8	1.6	1.5	1.7	3.4	2.6	0.8	2.8	1.8	1.0	1.3	3.4
18-Jul	Z	1.3	0.9	0.9	0.8	2.0	2.3	3.9	1.4	1.5	1.1	1.4	1.2	1.1	0.9	1.2	1.3	1.2	0.8	0.7	0.8	1.3	2.8	3.0	1.5	3.9
19-Jul	4.1	Z	6.2	8.5	10.7	13.3	7.1	7.3	4.5	2.5	2.2	2.1	2.2	2.1	2.1	2.5	2.3	2.2	1.4	2.3	2.5	3.8	2.3	2.3	4.2	13.3
20-Jul	1.5	6.1	Z	7.6	5.6	4.9	3.5	6.8	8.0	8.2	8.0	3.8	2.6	2.1	2.7	2.7	6.2	9.1	7.6	5.3	3.5	2.0	1.5	2.2	4.8	9.1
21-Jul	1.9	1.5	1.3	Z	7.6	6.3	3.8	5.9	2.0	2.3	2.6	3.9	1.8	2.3	5.1	4.3	3.5	3.9	2.8	1.3	1.1	1.0	1.5	1.5	3.0	7.6
22-Jul	2.5	3.7	2.8	2.1	Z	5.2	7.5	5.9	2.7	3.1	4.8	5.3	2.8	1.8	1.8	1.6	1.2	1.0	0.8	0.7	0.6	0.5	0.4	0.4	2.6	7.5
23-Jul	1.6	0.7	0.8	1.9	4.0	Z	1.2	3.5	1.2	1.5	1.8	1.7	1.7	1.7	1.5	1.4	1.5	2.8	1.0	1.2	1.4	1.1	0.8	0.8	1.6	4.0
24-Jul	Z	1.1	1.3	2.2	5.7	9.6	5.8	3.0	1.3	0.8	0.8	0.9	1.0	1.1	2.2	1.0	1.3	1.5	1.9	1.8	1.8	2.7	4.2	2.4	2.4	9.6
25-Jul	2.5	Z	2.0	1.7	1.3	2.4	4.7	1.3	1.2	0.8	1.0	1.7	4.1	1.4	1.6	2.9	2.5	1.5	2.3	1.6	1.3	2.5	3.0	2.4	2.1	4.7
26-Jul	1.5	1.6	Z	0.7	0.7	2.2	1.0	0.9	0.6	0.7	0.7	0.8	2.1	1.7	1.5	1.8	0.7	0.5	0.5	2.9	6.0	6.0	3.5	1.0	1.7	6.0
27-Jul	5.0	4.2	2.8	Z	0.9	0.4	0.3	0.3	0.3	C	C	C	C	C	0.5	0.2	0.5	0.3	1.5	2.3	1.7	2.0	1.1	2.3	1.5	5.0
28-Jul	2.4	2.9	3.2	2.5	Z	5.7	2.8	2.2	1.3	1.3	2.6	1.9	1.5	1.9	2.4	2.4	2.8	3.4	5.6	4.5	3.8	3.9	3.4	7.1	3.1	7.1
29-Jul	10.6	7.0	5.8	6.1	5.9	Z	7.8	7.7	3.5	1.8	3.2	4.1	2.6	1.3	1.2	1.1	1.3	1.3	0.9	1.2	1.2	3.2	1.7	1.1	3.6	10.6
30-Jul	Z	1.7	3.5	5.1	1.0	3.6	0.8	1.4	1.0	0.8	0.8	0.8	0.8	0.8	0.9	0.9	1.1	0.9	0.7	1.3	1.5	1.3	1.6	2.0	1.5	5.1
31-Jul	0.9	Z	1.0	1.5	1.0	4.4	4.0	3.6	2.8	1.1	0.9	0.8	1.3	1.9	1.8	2.1	3.7	2.2	2.5	2.4	1.0	2.1	5.7	5.3	2.4	5.7
																								Diurnal Average		
																								Diurnal Maximum		
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Firebag - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Firebag - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	99.86	99.86
21 - 40	1	0.14	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Firebag - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	90	44	21	18	19	41	42	50	51	53	60	46	24	35	38	73	705
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	90	44	21	18	19	41	42	50	51	53	60	46	24	35	38	74	706

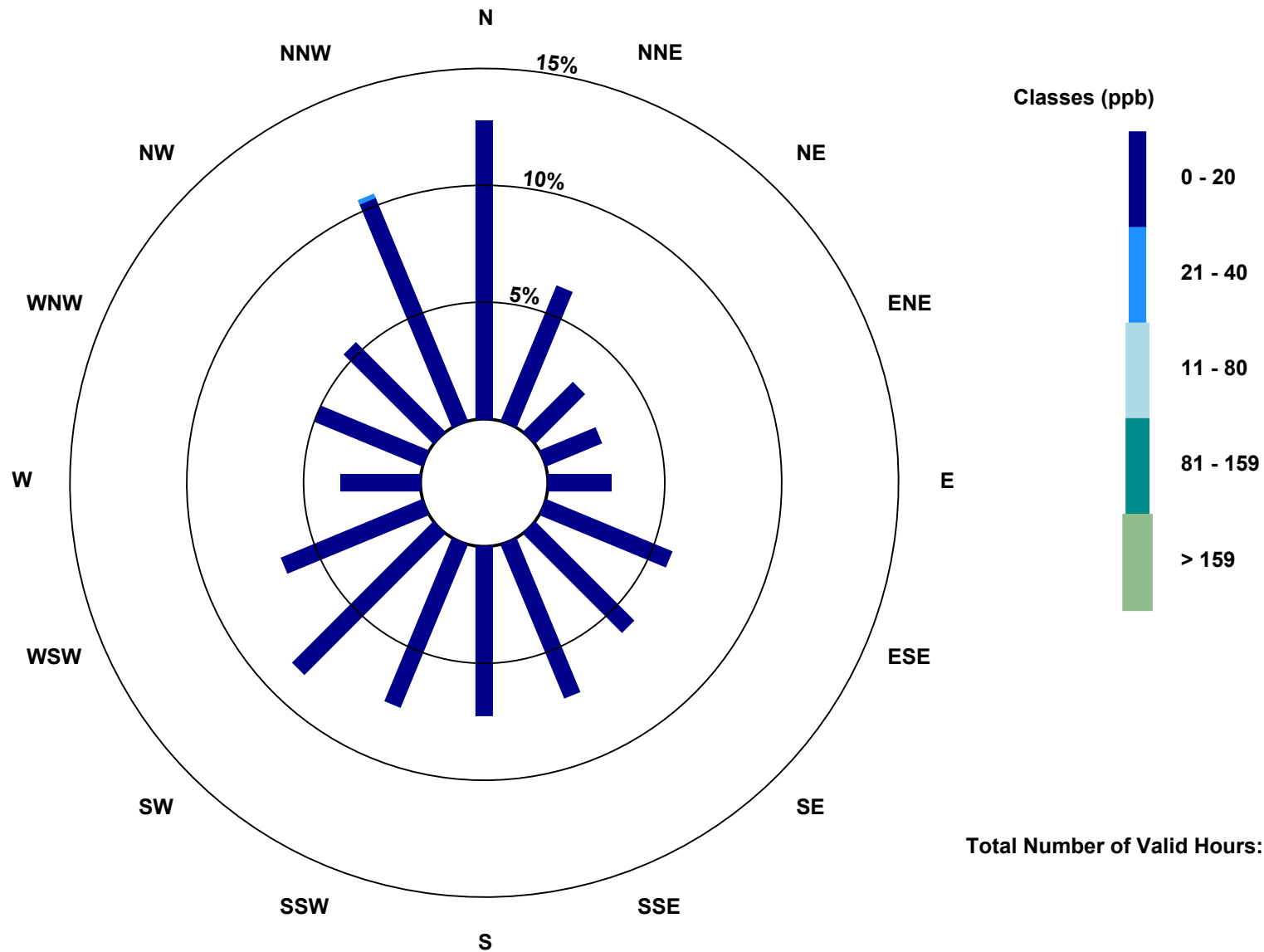
Total Number of Valid Hours: 706

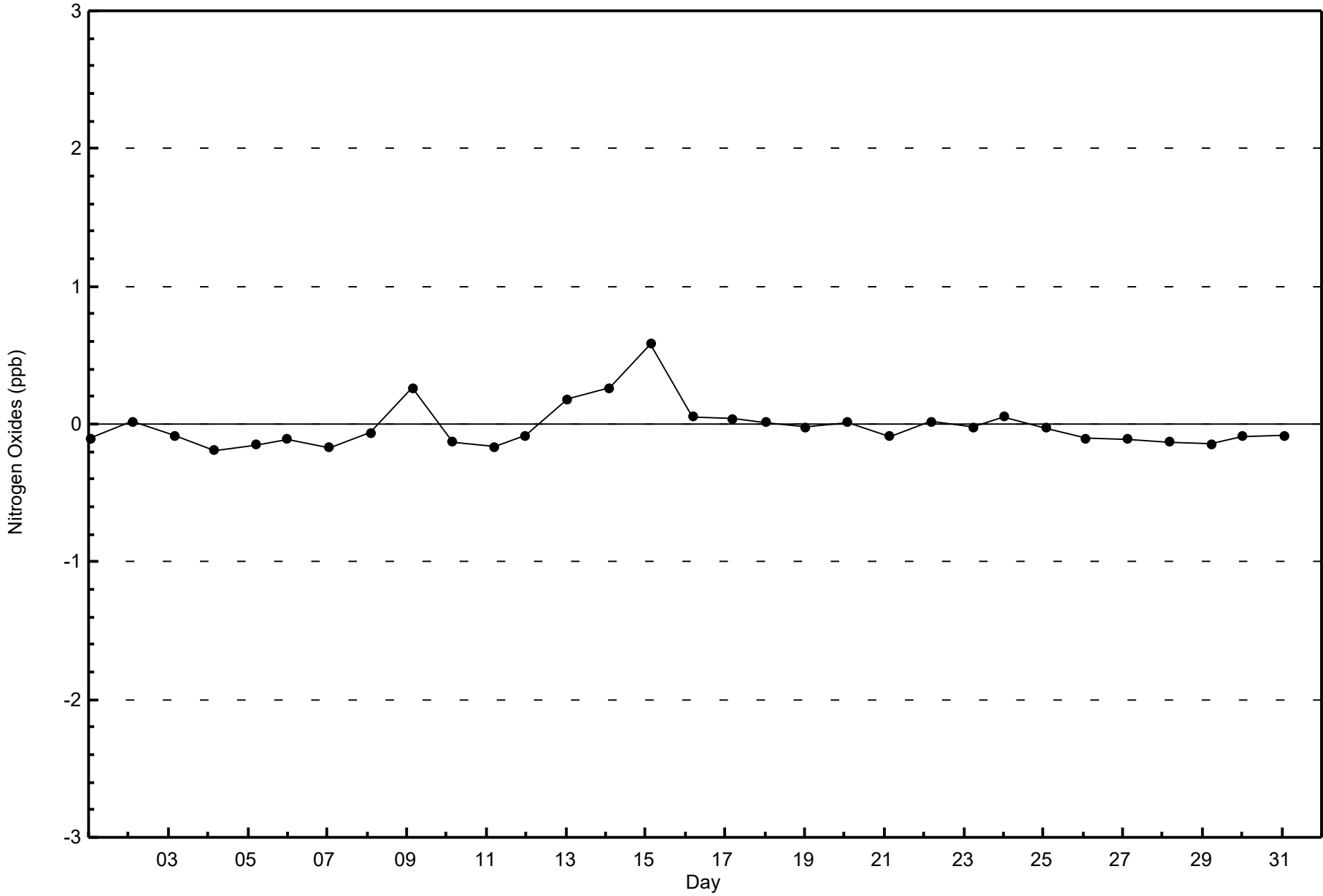
Total Number of Hours: 744

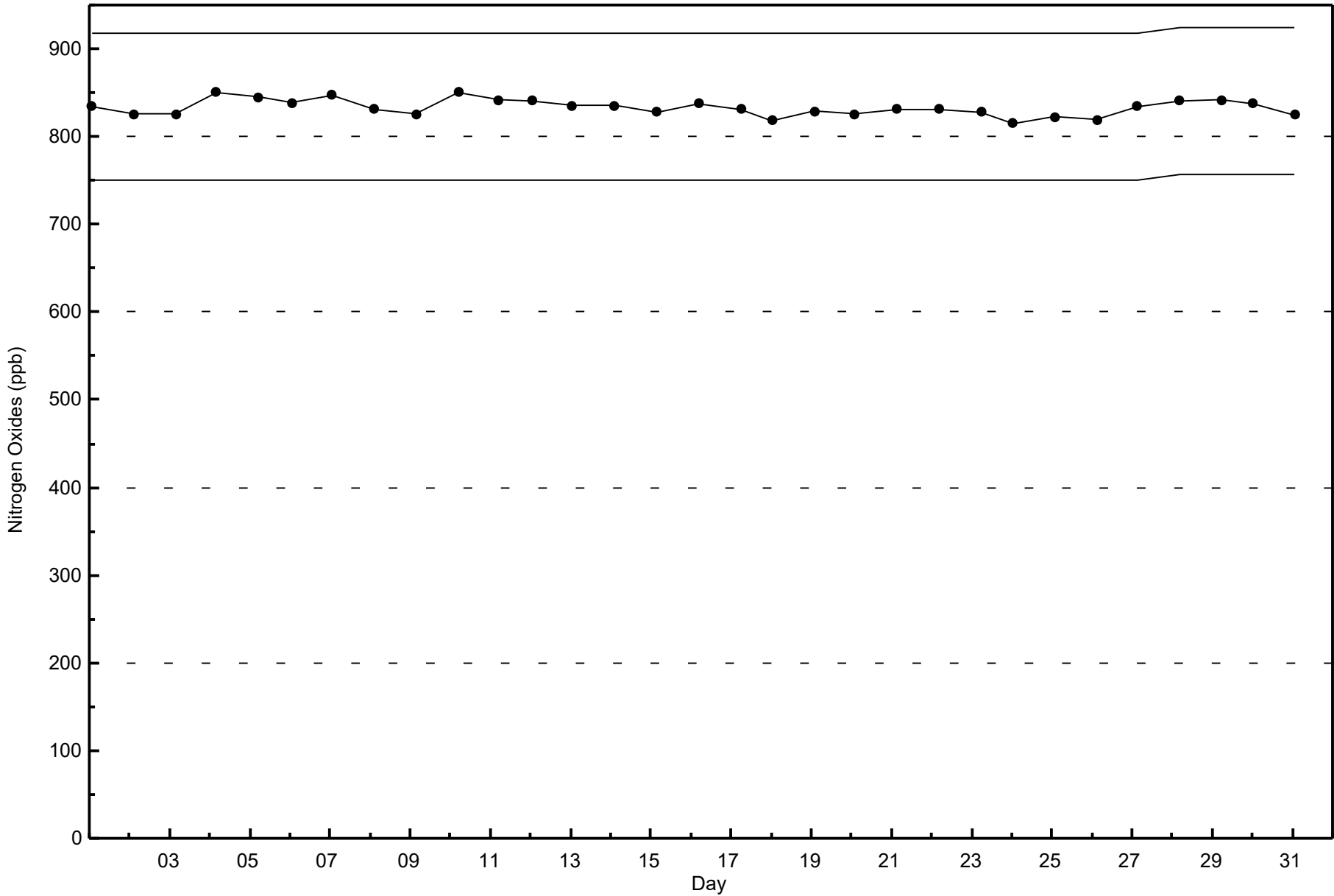


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Firebag









Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

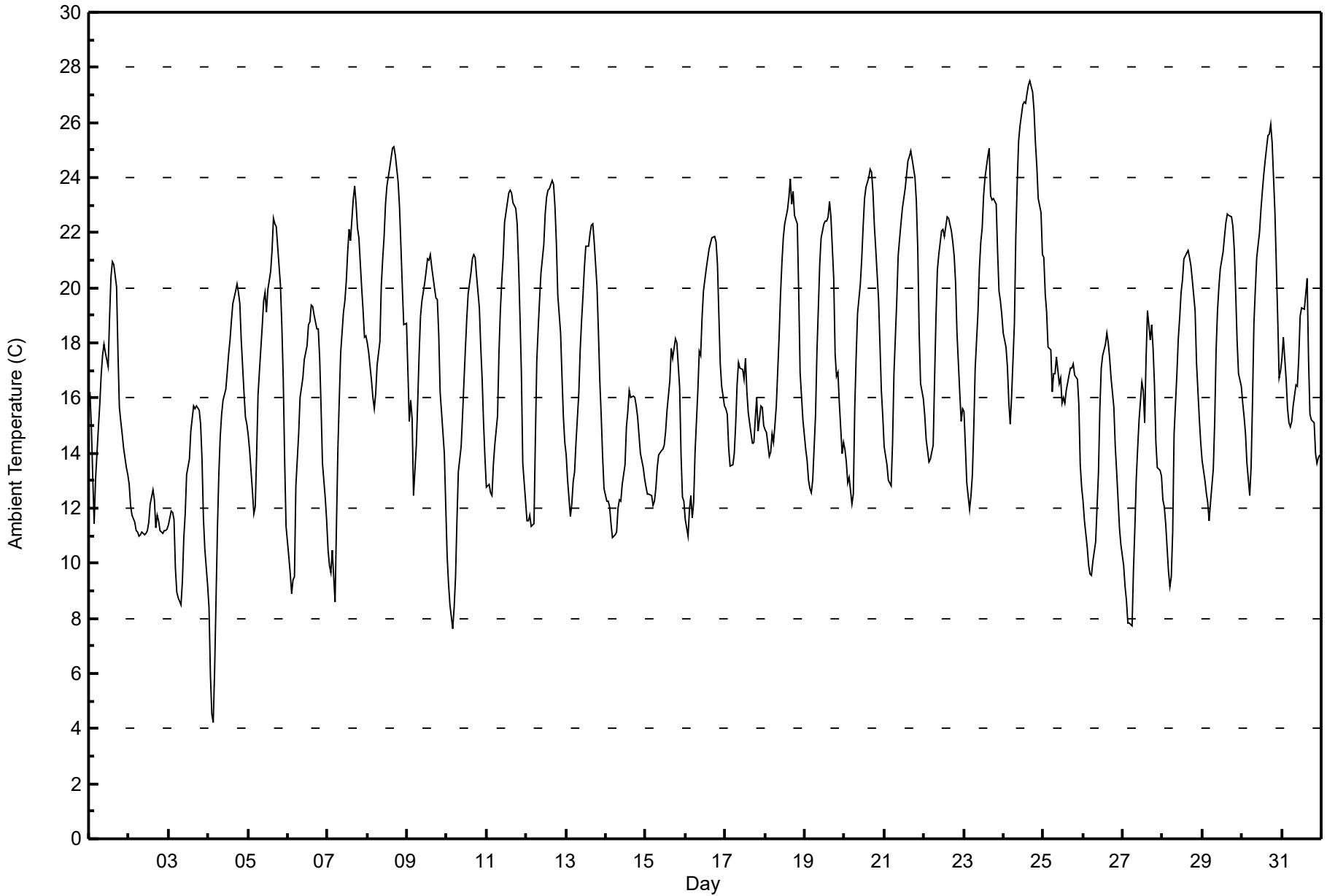
Firebag - July 2023

Maximum Value: 27.5 C on Jul 24 17:00 Maximum Daily Average: 22.8 C on Jul 24																						Hours in Service: 744																									
Minimum Value: 4.2 C on Jul 4 04:00 Minimum Daily Average: 11.5 C on Jul 2																						Hours of Data: 744																									
Maximum Diurnal Average: 21.1 C at hour 16 Minimum Diurnal Average: 11.9 C at hour 5																						Hours of Missing Data: 0																									
Monthly Average: 16.88 C Percentiles: P₁ = 8.1 P₁₀ = 11.4 Q₁ = 13.6 Median = 16.6 Q₃ = 20.3 P₉₀ = 22.8 P₉₉ = 26.2																						Hours of Calibration: 0																									
																						Percent Operational Time: 100.0																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	16.2	15.0	13.1	11.4	13.0	14.9	15.8	16.9	17.6	18.0	17.6	17.1	18.9	20.4	20.9	20.8	20.0	17.6	15.7	15.2	14.7	14.2	13.5	13.2	16.3	20.9																					
2-Jul	12.9	12.1	11.8	11.5	11.2	11.1	11.0	11.1	11.1	11.0	11.1	11.2	11.5	12.1	12.7	12.3	11.3	11.8	11.5	11.2	11.1	11.2	11.2	11.2	11.5	12.9																					
3-Jul	11.4	11.9	11.9	11.6	9.8	8.9	8.8	8.5	9.3	10.9	11.8	13.2	13.8	14.8	15.2	15.7	15.6	15.7	15.6	15.0	13.8	11.6	10.5	9.2	12.3	15.7																					
4-Jul	8.4	5.9	4.5	4.2	6.1	11.3	13.2	14.6	15.4	15.9	16.3	16.9	17.6	18.1	18.8	19.4	19.9	20.1	19.8	19.4	18.1	16.1	15.3	15.1	14.6	20.1																					
5-Jul	14.6	14.1	12.6	11.8	12.0	14.0	16.1	17.0	18.6	19.5	19.9	19.1	20.0	20.6	21.4	22.5	22.3	22.2	21.5	20.1	18.6	16.7	13.7	11.3	17.5	22.5																					
6-Jul	10.2	9.6	8.9	9.4	9.5	12.8	14.7	16.0	16.4	16.7	17.4	17.9	18.7	18.8	19.4	19.3	19.0	18.5	18.5	17.4	15.6	13.6	12.3	11.5	15.1	19.4																					
7-Jul	10.5	9.9	9.7	10.5	8.6	11.5	14.1	16.0	17.7	19.1	19.5	20.2	21.3	22.1	21.7	23.2	23.7	23.0	22.2	21.8	20.0	19.2	18.2	18.2	17.6	23.7																					
8-Jul	18.0	17.7	16.6	16.0	15.6	16.2	17.2	18.1	20.1	21.0	21.9	23.0	23.7	24.3	24.7	25.0	25.1	24.8	23.8	22.9	21.5	20.0	18.7	18.7	20.6	25.1																					
9-Jul	16.9	15.1	15.9	15.3	12.4	14.3	15.8	17.6	19.0	19.5	20.2	20.6	21.1	21.0	21.2	20.7	20.0	19.6	19.6	18.3	16.2	14.7	14.0	12.1	17.6	21.2																					
10-Jul	10.3	9.2	8.5	7.6	8.4	9.5	11.6	13.3	14.2	15.4	16.6	17.7	18.8	19.8	20.6	21.1	21.2	21.1	20.4	19.3	17.9	16.7	15.1	13.8	15.3	21.2																					
11-Jul	12.8	12.9	12.6	12.4	13.6	14.3	15.4	17.6	19.2	20.2	21.1	22.4	23.1	23.4	23.5	23.4	23.1	22.9	22.3	20.8	19.0	16.9	13.6	12.3	18.3	23.5																					
12-Jul	11.5	11.5	11.7	11.4	11.4	14.5	17.4	18.5	19.6	20.6	21.5	22.7	23.3	23.5	23.6	23.9	23.7	22.9	21.6	19.7	18.4	16.8	15.3	14.4	18.3	23.9																					
13-Jul	14.0	13.0	11.7	12.2	13.0	13.3	14.4	16.2	17.8	18.8	19.7	20.8	21.5	21.5	22.0	22.3	22.3	21.6	20.0	18.4	16.6	15.3	13.9	12.7	17.2	22.3																					
14-Jul	12.2	12.2	12.1	11.4	10.9	11.0	11.1	12.0	12.3	12.3	12.9	13.6	14.9	15.5	16.2	16.0	16.1	16.0	15.7	15.3	14.6	14.0	13.5	13.1	13.5	16.2																					
15-Jul	12.8	12.5	12.5	12.4	12.1	12.3	12.7	13.5	13.9	14.1	14.1	14.3	14.8	15.6	16.6	17.8	17.4	17.8	18.1	18.0	16.4	13.9	12.4	12.3	14.5	18.1																					
16-Jul	11.6	11.0	12.0	12.5	11.6	12.2	14.1	16.3	17.7	17.5	18.9	19.9	20.7	21.1	21.4	21.6	21.8	21.9	21.6	20.9	19.0	17.2	16.4	15.7	17.3	21.9																					
17-Jul	15.6	15.4	14.2	13.5	13.6	14.0	15.0	16.5	17.3	17.1	17.0	16.7	17.4	16.2	15.5	14.7	14.3	14.4	15.2	16.0	14.8	15.7	15.6	15.0	15.5	17.4																					
18-Jul	14.8	14.8	13.9	14.0	14.7	14.4	15.0	15.7	18.2	19.7	20.9	21.8	22.3	22.8	23.3	24.0	23.0	23.5	22.6	22.3	19.8	17.0	16.1	15.2	18.7	24.0																					
19-Jul	14.1	13.7	13.0	12.7	12.5	13.0	15.3	17.7	19.2	20.8	21.8	22.3	22.4	22.4	22.6	23.1	22.6	20.4	17.6	16.8	16.9	15.8	14.0	14.4	17.7	23.1																					
20-Jul	14.1	13.7	12.9	13.1	12.2	12.5	15.6	17.5	19.1	20.1	21.1	22.2	23.2	23.7	24.0	24.3	24.2	23.5	22.3	21.4	19.6	17.9	16.3	15.4	18.7	24.3																					
21-Jul	14.2	13.6	13.0	12.9	12.8	14.4	16.9	19.5	21.2	21.8	22.3	22.9	23.6	24.1	24.6	24.7	25.0	24.7	24.0	23.1	21.4	18.3	16.5	16.0	19.6	25.0																					
22-Jul	15.4	14.5	14.1	13.7	13.8	14.3	16.7	18.9	20.7	21.2	22.1	22.1	21.8	22.2	22.6	22.5	22.1	21.7	21.1	20.2	18.3	16.2	15.1	15.6	18.6	22.6																					
23-Jul	15.5	14.2	12.9	11.9	12.5	13.2	15.0	17.1	19.1	20.7	21.7	22.1	23.3	24.0	24.8	25.1	23.4	23.2	23.2	23.0	21.3	19.9	19.5	19.0	19.4	25.1																					
24-Jul	18.3	17.8	17.1	15.9	15.0	16.1	18.7	21.9	23.8	25.3	25.9	26.7	26.8	26.7	27.0	27.4	27.5	27.1	26.5	25.3	24.4	23.2	22.7	21.2	22.8	27.5																					
25-Jul	21.1	19.8	19.1	17.8	17.8	16.2	16.9	16.9	17.5	16.5	16.7	15.8	16.0	15.8	16.3	16.8	17.1	17.1	17.2	16.9	16.7	15.7	13.6	12.7	16.8	21.1																					
26-Jul	12.3	11.5	10.6	9.9	9.6	9.6	10.0	10.8	12.1	13.2	15.6	17.1	17.6	18.0	18.4	18.0	17.5	16.8	15.7	14.2	13.3	12.3	11.3	10.7	13.6	18.4																					
27-Jul	9.9	9.1	8.6	7.9	7.8	7.7	9.8	11.3	13.1	14.2	15.2	16.6	16.3	15.1	17.5	19.2	18.1	18.7	17.8	16.5	14.4	13.5	13.4	13.2	13.5	19.2																					
28-Jul	12.3	12.0	11.4	9.7	9.2	9.5	11.1	14.7	16.9	18.2	18.9	19.9	20.3	21.0	21.3	21.4	21.1	20.8	20.3	19.2	17.3	16.3	15.2	14.4	16.3	21.4																					
29-Jul	13.7	13.0	12.6	12.2	11.5	12.2	13.4	15.2	17.7	19.2	20.0	20.7	21.3	21.9	22.4	22.7	22.6	22.6	22.2	21.3	19.8	18.1	16.9	16.4	17.9	22.7																					
30-Jul	15.8	15.3	14.7	13.6	12.4	13.5	15.9	18.7	19.9	21.1	22.0	22.8	23.5	24.1	24.6	25.5	25.6	25.9	25.3	24.0	22.7	18.9	16.7	17.0	20.0	25.9																					
31-Jul	17.4	18.2	16.7	15.6	15.1	15.0	15.1	15.7	16.5	16.4	17.5	19.0	19.3	19.2	19.8	20.3	17.4	15.4	15.2	15.1	14.0	13.6	13.9	14.0	16.5	20.3																					
																						13.8	13.2	12.6	12.1	11.9	12.8	14.3	15.8	17.2	17.9	18.7	19.3	20.0	20.3	20.8	21.1	20.8	20.4	19.8	19.0	17.6	16.2	15.0	14.4	Diurnal Average	
																						21.1	19.8	19.1	17.8	17.8	16.2	18.7	21.9	23.8	25.3	25.9	26.7	26.8	26.7	27.0	27.4	27.5	27.1	26.5	25.3	24.4	23.2	22.7	21.2	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Firebag - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Firebag - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	36	4.84	4.84
10 - 20	510	68.55	73.39
> 20	198	26.61	100.00

Total Number of Valid Hours: 744

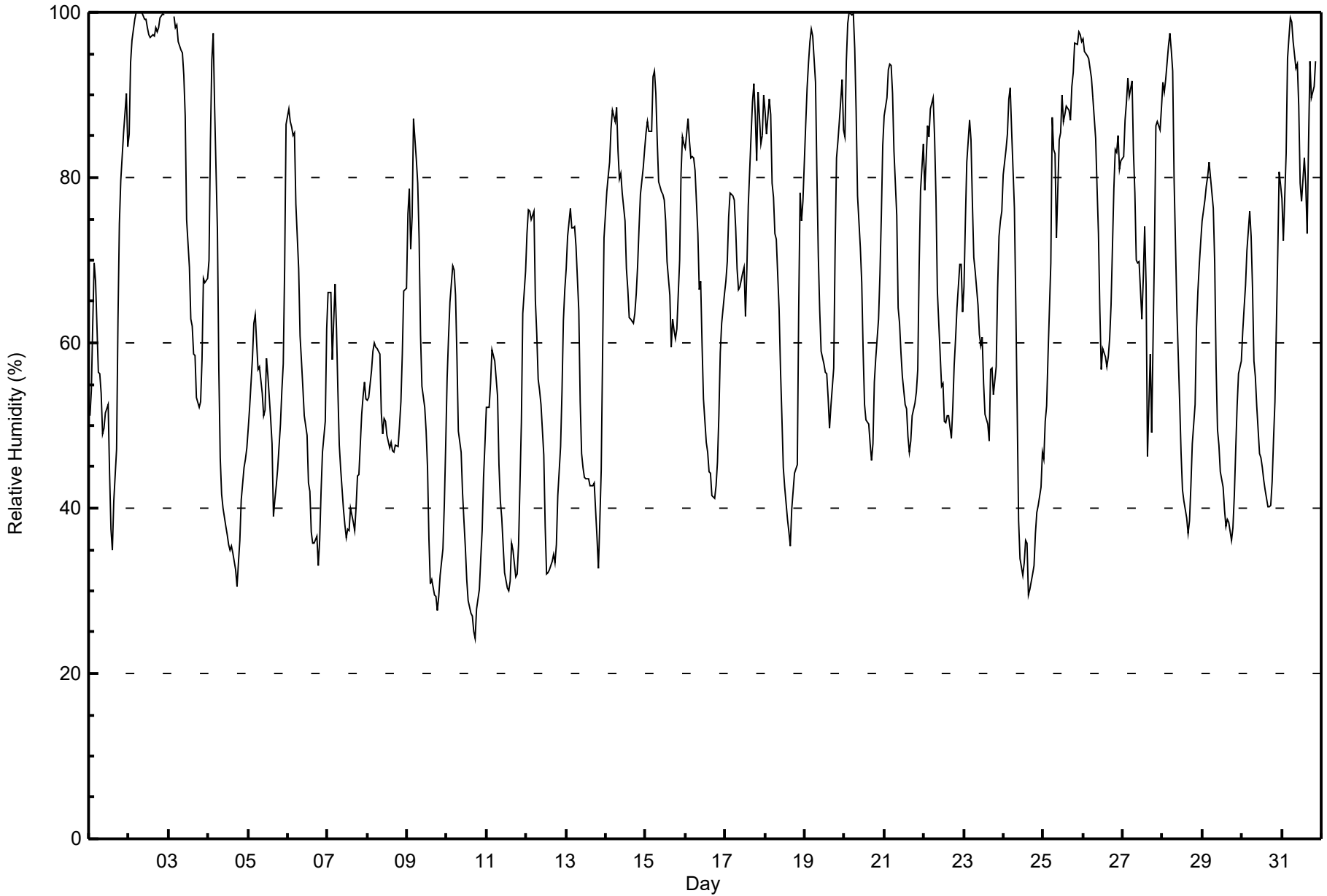
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Relative Humidity (RH) - %
Firebag - July 2023

Maximum Value: 100.0 % on Jul 2 05:00 Maximum Daily Average: 97.8 % on Jul 2																						Hours in Service:	744			
Minimum Value: 24.2 % on Jul 10 18:00 Minimum Daily Average: 43.3 % on Jul 10																						Hours of Data:	736			
Maximum Diurnal Average: 83.0 % at hour 5 Minimum Diurnal Average: 48.5 % at hour 16																						Hours of Missing Data:	8			
Monthly Average: 64.29 % Percentiles: P ₁ = 29.3 P ₁₀ = 37.5 Q ₁ = 47.8 Median = 62.9 Q ₃ = 82.1 P ₉₀ = 91.7 P ₉₉ = 99.7																						Hours of Calibration:	0			
																						Percent Operational Time:	98.9			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	51.2	54.2	62.5	69.7	67.4	56.4	56.3	54.0	49.0	49.7	51.5	52.5	44.2	37.5	35.0	40.9	47.2	62.8	74.5	79.7	82.5	85.5	90.1	83.8	59.9	90.1
2-Jul	85.3	93.9	96.6	99.1	100.0	100.0	100.0	100.0	100.0	99.2	99.1	98.1	97.2	96.9	97.4	97.2	98.1	97.7	98.1	99.3	99.8	99.6	OR	OR	97.8	100.0
3-Jul	OR	OR	OR	99.5	98.1	98.4	96.4	95.4	95.1	92.4	87.5	74.9	69.1	62.9	62.1	58.7	58.4	53.4	52.2	53.0	58.0	67.8	67.3	67.8	74.7	99.5
4-Jul	70.0	84.4	94.3	97.4	88.4	73.5	56.8	46.1	41.7	40.0	37.7	36.7	35.7	34.9	35.4	34.6	32.6	30.6	33.5	36.1	41.0	44.9	46.0	47.3	50.8	97.4
5-Jul	49.6	52.3	58.1	62.4	63.3	59.9	56.9	57.2	53.9	51.2	51.8	58.2	56.0	50.9	47.8	39.0	41.0	42.8	44.8	50.2	54.3	57.5	69.1	86.5	54.8	86.5
6-Jul	88.3	86.8	86.1	85.1	85.4	76.7	69.0	60.8	57.7	54.6	51.1	48.7	43.0	42.0	37.1	35.8	35.7	36.6	33.0	36.1	42.0	46.7	50.5	61.7	56.3	88.3
7-Jul	66.1	66.2	66.1	57.9	67.0	61.7	54.2	47.6	44.7	39.9	38.0	36.5	37.5	37.3	40.0	38.4	37.3	40.2	43.8	44.1	51.3	53.5	55.3	53.1	49.1	67.0
8-Jul	53.0	53.3	56.5	59.0	60.0	59.6	59.4	58.7	51.5	48.9	50.8	50.4	48.9	47.4	47.9	47.0	46.7	47.6	47.4	50.0	52.9	58.6	66.3	66.7	53.7	66.7
9-Jul	75.6	78.7	71.3	75.2	87.2	82.2	79.4	72.6	61.1	54.8	52.2	49.4	44.9	36.3	30.9	31.4	29.4	29.4	27.6	29.3	31.9	35.1	40.6	47.8	52.3	87.2
10-Jul	55.7	60.6	65.0	69.3	68.7	65.7	58.4	49.3	46.8	41.9	38.4	35.2	31.4	28.8	27.3	26.9	25.1	24.2	27.8	30.2	33.9	37.3	43.7	47.7	43.3	69.3
11-Jul	52.1	52.3	55.1	59.1	58.4	57.8	53.6	45.3	40.9	38.8	35.5	32.3	30.4	29.9	31.2	35.7	35.0	31.7	32.0	35.6	42.9	50.4	63.6	68.7	44.5	68.7
12-Jul	73.2	76.0	76.0	74.9	76.0	65.1	61.1	55.5	54.2	52.5	46.5	37.7	32.0	32.3	32.6	33.5	34.4	33.4	35.6	41.6	47.5	54.1	62.6	66.5	52.3	76.0
13-Jul	69.1	72.9	76.3	73.9	73.9	74.1	71.6	64.0	52.8	46.6	44.9	43.7	43.6	43.6	42.7	42.7	42.7	43.1	36.4	32.6	38.2	44.6	58.8	72.8	54.4	76.3
14-Jul	78.3	80.1	81.9	85.9	88.1	86.9	88.4	83.3	79.8	80.5	78.1	74.7	69.0	66.4	63.0	62.9	62.3	63.5	65.9	69.3	73.8	78.0	81.1	83.4	76.0	88.4
15-Jul	85.5	86.8	85.6	85.6	92.2	92.8	90.2	84.4	79.4	78.3	77.9	77.2	74.7	69.9	65.8	59.6	62.8	61.5	60.5	61.7	70.1	80.6	85.0	84.1	77.2	92.8
16-Jul	83.6	87.1	84.5	82.3	82.6	82.4	80.9	73.2	66.4	67.4	59.8	53.2	48.0	46.7	44.3	44.3	41.6	41.2	42.7	45.6	51.2	58.8	62.4	65.9	62.3	87.1
17-Jul	67.4	69.8	75.3	78.1	77.8	77.2	73.8	69.0	66.4	66.8	68.5	69.1	63.2	68.9	76.6	85.1	89.2	91.3	87.5	82.0	90.3	84.1	85.2	90.0	77.2	91.3
18-Jul	87.9	85.3	89.5	87.6	79.4	77.7	73.3	72.6	64.0	56.7	51.1	45.0	42.5	38.6	37.1	35.3	39.9	42.0	44.3	45.3	64.0	78.1	74.7	77.1	62.0	89.5
19-Jul	86.4	90.8	93.9	96.5	97.9	97.1	91.5	80.4	70.4	64.0	59.0	57.4	56.4	56.2	53.3	49.6	52.4	57.0	71.3	82.4	84.4	86.8	91.9	85.7	75.5	97.9
20-Jul	84.9	94.1	98.7	100.0	99.7	99.8	95.7	87.9	77.7	71.6	67.4	59.0	52.5	50.8	50.2	47.7	45.8	47.8	55.2	58.1	62.9	68.4	75.5	83.9	72.3	100.0
21-Jul	87.4	89.7	93.1	93.7	93.5	90.1	83.2	75.5	64.2	62.4	58.8	55.9	52.5	52.1	48.7	46.8	48.1	51.2	52.7	54.1	56.9	69.4	78.5	84.2	68.4	93.7
22-Jul	78.5	82.2	86.2	84.9	88.3	89.6	85.0	77.7	66.2	62.4	54.7	55.0	50.5	50.3	51.1	51.1	48.4	52.3	57.3	60.5	64.3	69.4	69.5	63.8	66.6	89.6
23-Jul	66.8	74.7	81.9	86.9	84.6	77.0	70.4	68.6	64.6	61.0	59.7	60.8	55.2	51.3	50.1	48.1	56.7	57.0	53.8	57.0	66.6	72.9	74.8	76.0	65.7	86.9
24-Jul	80.4	83.4	85.2	89.5	90.9	85.8	76.3	64.4	51.7	38.4	33.9	31.9	33.4	36.0	35.8	29.5	30.2	32.1	33.1	36.9	39.4	40.3	42.6	46.9	52.0	90.9
25-Jul	46.0	50.4	52.4	58.6	69.6	87.3	83.5	82.8	72.7	84.6	85.4	90.1	86.9	87.7	88.7	88.2	87.0	91.0	92.8	96.4	96.0	97.7	97.4	96.5	82.1	97.7
26-Jul	96.9	95.2	94.8	94.5	93.1	92.1	89.6	84.8	78.7	73.2	63.8	56.8	59.3	58.4	57.2	58.3	60.4	64.6	78.7	83.4	83.0	85.0	81.0	82.0	77.7	96.9
27-Jul	82.6	87.0	89.2	92.0	89.8	91.8	83.1	78.1	70.0	69.6	69.9	63.0	67.7	74.1	67.1	46.2	58.7	49.1	60.5	71.5	86.2	86.7	85.8	88.5	75.4	92.0
28-Jul	91.6	90.4	91.9	96.0	97.4	95.4	92.9	79.8	64.1	58.3	52.8	46.5	42.2	40.9	38.8	37.0	38.5	42.6	47.8	52.5	61.9	66.2	69.5	72.2	65.3	97.4
29-Jul	74.8	77.3	79.1	80.1	81.9	80.1	76.3	69.6	57.2	49.6	47.7	44.5	42.5	39.8	37.7	38.6	38.3	36.1	37.6	41.6	47.2	52.5	56.2	57.8	56.0	81.9
30-Jul	61.3	64.2	67.0	71.3	75.9	72.9	66.6	57.7	55.9	52.4	46.6	46.1	44.9	43.3	42.2	40.2	40.1	40.3	43.2	48.3	52.9	70.7	80.7	79.1	56.8	80.7
31-Jul	77.5	72.4	82.9	94.5	97.0	99.3	98.8	96.5	93.2	93.8	88.7	79.3	77.1	82.4	79.1	73.3	84.0	94.0	89.7	91.0	94.1	OR	OR	OR	87.5	99.3
																						Diurnal Average				
																						Diurnal Maximum				
73.6 76.4 79.2 82.0 83.0 80.8 76.5 70.7 64.3 61.3 58.3 55.5 52.7 51.4 50.1 48.5 49.9 51.2 53.6 56.6 62.0 66.0 69.2 72.0 87.5 99.3																										
96.9 95.2 98.7 100.0 100.0 100.0 100.0 100.0 100.0 100.0 99.2 99.1 98.1 97.2 96.9 97.4 97.2 98.1 97.7 98.1 99.3 99.8 99.6 97.4 96.5 87.5 99.3																										
OR - Out of Range																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Firebag - July 2023

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	95	12.91	12.91
40 - 60	244	33.15	46.06
60 - 80	197	26.77	72.83
80 - 100	194	26.36	99.18

Total Number of Valid Hours: 736

Total Number of Hours: 744



Maximum Speed: 37 km/h on Jul 25 11:00	Maximum Daily Speed Average: 20.2 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 22 06:00	Minimum Daily Speed Average: 3.2 km/h on Jul 1	Hours of Data: 740
Maximum Diurnal Speed Average: 3.6 km/h at hour 18	Minimum Diurnal Speed Average: 0.8 km/h at hour 9	Hours of Missing Data: 4
Monthly Average Velocity: 0.3 km/h 280.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 7 Median = 11 Q ₃ = 15 P ₉₀ = 18 P ₉₉ = 28	Percent Operational Time: 99.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NW8	N8	NE4	ENE4	SE5	S5	SSW6	SW4	SW8	SW9	SSW14	SSE15	SE12	SE14	SE15	SSW10	SW10	W11	W9	W7	W3	N1	NNW7	NNW9	SSW3.2	SSE15
2-Jul	NNW9	NW8	NNW9	NW7	WNW12	NW14	NW13	NNW15	N23	N24	N17	N14	NNW13	NNW12	NNW11	NNW15	NNW17	NW16	NW18	NNW24	NNW17	NNW17	NNW18	NNW16	NNW14.1	NNW24
3-Jul	NNW19	NNW21	NNW17	N22	N27	N26	N29	N25	N24	N27	N26	N27	N27	N25	N23	N24	N21	NNE18	NNE17	NNE13	N10	N8	N8	NNE7	N20.2	N29
4-Jul	NNE7	NNE3	NNW2	UO	UO	UO	WNW5	WNW7	NW9	NNW11	NNW11	NNW9	NNW6	NW6	NNW7	NW7	WNW5	WSW6	W7	SW9	SSW9	SSW11	SSW14	SSW16	W4.3	SSW19
5-Jul	SSW17	SSW16	SW12	SW11	SW11	SW10	SW14	SW16	WSW15	WSW17	WSW18	W13	WSW15	WSW11	WSW14	WSW19	WNW12	NNW20	NNW15	NNW9	N8	NNE7	N4	N3	WSW9.2	NNW20
6-Jul	NNW5	NNW4	NE6	NE9	NE7	NNE3	NNE8	NNE13	NNE16	NNE15	N14	N14	N15	N14	NNW15	N14	N15	N13	N14	N12	NNE9	NE6	ENE7	SE5	N9.4	NNE16
7-Jul	S6	S6	S6	SSW7	SW8	SW9	WSW10	WSW14	W10	WNW10	NW11	NW10	WNW10	NW11	WNW11	W12	W14	W13	WSW11	WSW12	SW8	SW11	WSW11	WSW14	W8.2	WSW14
8-Jul	WSW14	WSW16	WSW12	WSW11	WSW10	WSW9	WSW9	W9	WNW10	NW12	NW11	NW11	NW13	NW13	WNW12	NW13	NNW13	NNW13	N12	NNW5	NW7	NW7	NW5	NNW6	WNW8.5	WSW16
9-Jul	N3	ENE5	E6	SE4	ENE2	ESE8	ESE11	SE5	NE10	NE14	NNE16	N15	N17	NNE18	NNE17	NNE17	NE16	NE16	NE14	ENE16	E11	E13	ESE16	ESE16	NE9.5	NNE18
10-Jul	ESE15	ESE13	SE13	ESE13	SE14	SE16	SSE17	SSE22	SE21	SE18	SE14	ESE15	ESE15	ESE14	ESE14	SE15	SE12	SSE12	S14	SSE11	SE10	SSE14	SE13	SE12	SE14.0	SSE22
11-Jul	SE11	SSE13	SSE10	S10	S11	S11	S14	SSW17	SW17	SW17	S13	SW12	SW11	SW10	SW12	WSW11	WSW13	WSW13	WSW11	WSW10	WSW6	WSW6	S2	SSE3	SSW9.2	SSW17
12-Jul	SSE3	S4	S4	S4	S4	SW2	NNW6	NNW10	NNW9	NNW10	N12	NNW14	N14	N17	N15	N15	NNW17	N17	NNE11	N9	N9	NNW8	NNW8	NNW8	NNW7.8	N17
13-Jul	NNW8	NW6	NNW9	NNW11	NNW10	NNW13	NNW15	NNW17	NNW18	NNW24	NNW27	NNW29	NNW31	NNW29	N28	NNW27	NNW28	N22	N17	N14	NNW12	N12	NNE9	NNE9	NNW17.4	NNW31
14-Jul	N9	N11	N12	N13	N11	N13	N12	N18	N17	N14	N15	N15	N14	N13	N14	N16	N15	N15	N14	N11	N8	N7	N6	N5	N12.4	N18
15-Jul	NNW5	NNW5	NNW5	NNW5	NNW6	NW6	NNW8	N9	NNE9	NNE11	N11	N11	N10	NNE11	NNE9	NNE6	NNE10	NE9	NNE9	NNE9	N8	N4	NNE5	ENE1	N7.0	NNE11
16-Jul	NE6	SE3	SE8	SE11	SE10	SSE12	SSE16	SE16	SSE18	SSE18	SSE18	SSE18	SSE18	SSE18	SSE17	SSE18	SSE17	S17	SSE16	SSE14	SE14	SE14	SE14	SE13	SSE13.8	SSE18
17-Jul	SSE17	SSE17	SSE15	SSE13	SSE16	SSE17	SSE19	SE19	SSE21	SSE22	SSE21	SSE20	SE18	SSE17	SSE15	ESE13	ESE15	SE10	ESE10	E12	NE5	E8	ESE8	SSE7	SE13.7	SSE22
18-Jul	SE8	SE5	NE3	ENE6	ENE8	ENE10	E9	ESE8	SE13	SE15	SE16	SE16	ESE11	ESE10	SSE8	S4	ENE5	NW3	NE6	N4	NNW4	WNW2	SW4	SW5	ESE5.1	SE16
19-Jul	WSW5	SW5	SW7	WSW5	WSW6	WSW5	W5	WNW6	WNW6	NW7	WNW9	WNW10	WNW10	WNW7	ENE1	NNE4	WSW5	W11	SSW12	SW0	SE2	SSW6	SSE2	SW8	WSW4.4	SSW12
20-Jul	SSW6	SSW5	SW3	SSW4	SW3	SW3	W3	WNW5	NW5	WNW6	NW6	NW6	SW5	WNW4	W7	W10	NW10	NW12	NNW7	NNW6	NNW6	N6	NE4	ESE4	WNW3.6	NW12
21-Jul	ESE3	SSE2	S2	WSW1	NNW2	WSW2	SW3	WNW4	WNW7	WNW8	WNW9	WNW9	WNW9	WNW9	NNW8	NW9	WNW10	NW8	NNW8	NNE7	NE5	ENE3	SE2	SSW4	WNW3.7	WNW10
22-Jul	S2	SSE2	W1	NNE4	NE3	W0	S2	NE3	NNE6	N6	N7	NNE12	NNE12	NNE14	NNE12	NNE10	NNE9	NNE7	N6	NNW6	NNW6	NNE5	NE5	ENE7	NNE5.3	NNE14
23-Jul	ESE9	ESE12	ESE13	SE11	SE12	SE13	SSE13	S13	S15	S14	SSW15	SSW11	SSW11	SSW10	SW8	SSW9	S20	S15	S12	S10	SSE9	S11	S13	S13	S10.7	S20
24-Jul	SSW11	SSW9	SSW9	S5	S5	S4	S4	SSW7	SW8	SW5	S4	SW1	WNW3	NW4	N3	SSE8	SE9	ESE11	ESE10	ESE8	E12	E15	E15	ESE14	SE4.5	E15
25-Jul	ESE16	ESE14	ESE14	SE12	SSW14	S14	ESE23	ESE24	SE31	SE35	ESE37	ESE24	ESE16	SSW9	SSW5	SE3	E11	E13	ESE14	ESE10	ESE11	SSW7	SW18	SW17	SE12.7	ESE37
26-Jul	SW16	SW17	SW17	SSW15	SSW16	S11	SSE12	SSE12	S11	SSE12	SE10	SSE8	ESE11	ESE11	ESE13	E17	ENE16	NE16	ENE17	ENE19	E21	E21	E18	E19	SE8.6	E21
27-Jul	E15	E15	E12	ENE9	ENE10	NE9	NE9	NNE13	NNE17	NNE17	NNE14	NNE13	NNE11	NNW5	NW5	NNE12	SW8	N13	N10	SW5	W7	N6	WSW4	SW4	NNE6.7	NNE17
28-Jul	WNW3	NW3	NNW4	N3	UO	N1	NNW3	NW6	NNW7	NW10	NW8	WNW7	NNW7	W5	W9	WNW8	WNW7	W6	WSW10	SW10	SW9	SSW10	SW9	SW9	W5.0	SW10
29-Jul	SW10	SW10	SW9	SW9	SW10	SW8	SW11	SW12	WSW12	WSW14	WSW13	WSW14	WSW14	SW17	SW16	SW14	SW15	SW16	SW14	SW9	SSW8	S9	S10	SSW10	SW11.3	SW17
30-Jul	SSW9	SSW9	SSW11	S9	S9	S10	S13	SSW16	SSW18	SSW22	SSW22	SSW20	SSW21	SSW20	S21	SSW20	SSW19	S17	S15	S11	S13	SSW23	S18	SSE17	S15.6	SSW23
31-Jul	SSE10	S15	SSW12	SSW7	WSW11	S5	ESE7	SSE10	S16	SSW16	SSW15	SW16	SW15	WSW14	W7	W8	SSW9	NNW4	SSW3	S7	WSW9	WSW8	WSW4	SW6	SSW8.0	S16

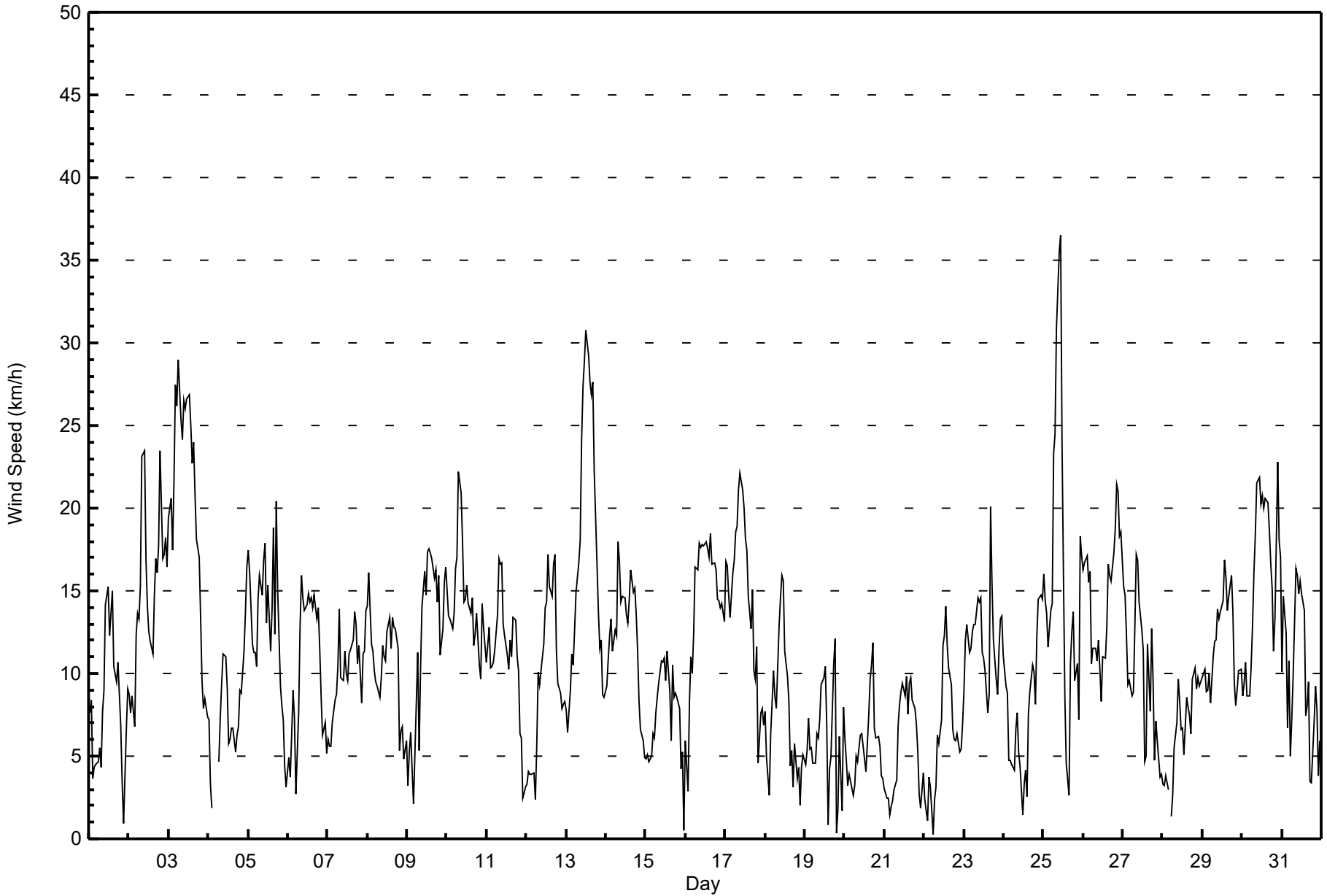
S1.9 S2.4 S2.1 SSE1.9 S2.1 S2.3 SSE1.8 SSW1.0 WSW0.8 WNW1.0 NW1.2 NW2.1 NNW2.3 NW2.4 NW2.3 NW3.0 NW2.8 NNW3.6 N2.2 N1.5 NNE1.0 SE1.1 SSE1.7 SSE2.6	Diurnal Average
NNW19 NNW21 NNW17 N22 N27 N26 N29 N25 SE31 SE35 ESE37 NNW29 NNW31 NNW29 N28 NNW27 NNW28 N22 NW18 NNW24 E21 SSW23 SW18 E19	Diurnal Maximum

UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Firebag - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Firebag - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	125	16.89	16.89
6 - 11	290	39.19	56.08
12 - 19	274	37.03	93.11
20 - 28	44	5.95	99.05
29 - 38	7	0.95	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
Firebag - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	10	6	8	7	0	2	9	5	16	5	15	8	6	8	7	13	125
6 - 11	25	22	9	8	5	16	10	9	17	26	30	19	14	24	22	34	290
12 - 19	40	20	5	4	12	20	25	33	19	17	20	21	4	3	10	21	274
20 - 28	17	0	0	0	2	3	1	5	2	7	0	0	0	0	0	7	44
29 - 38	1	0	0	0	0	1	2	0	0	0	0	0	0	0	0	3	7
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	93	48	22	19	19	42	47	52	54	55	65	48	24	35	39	78	740

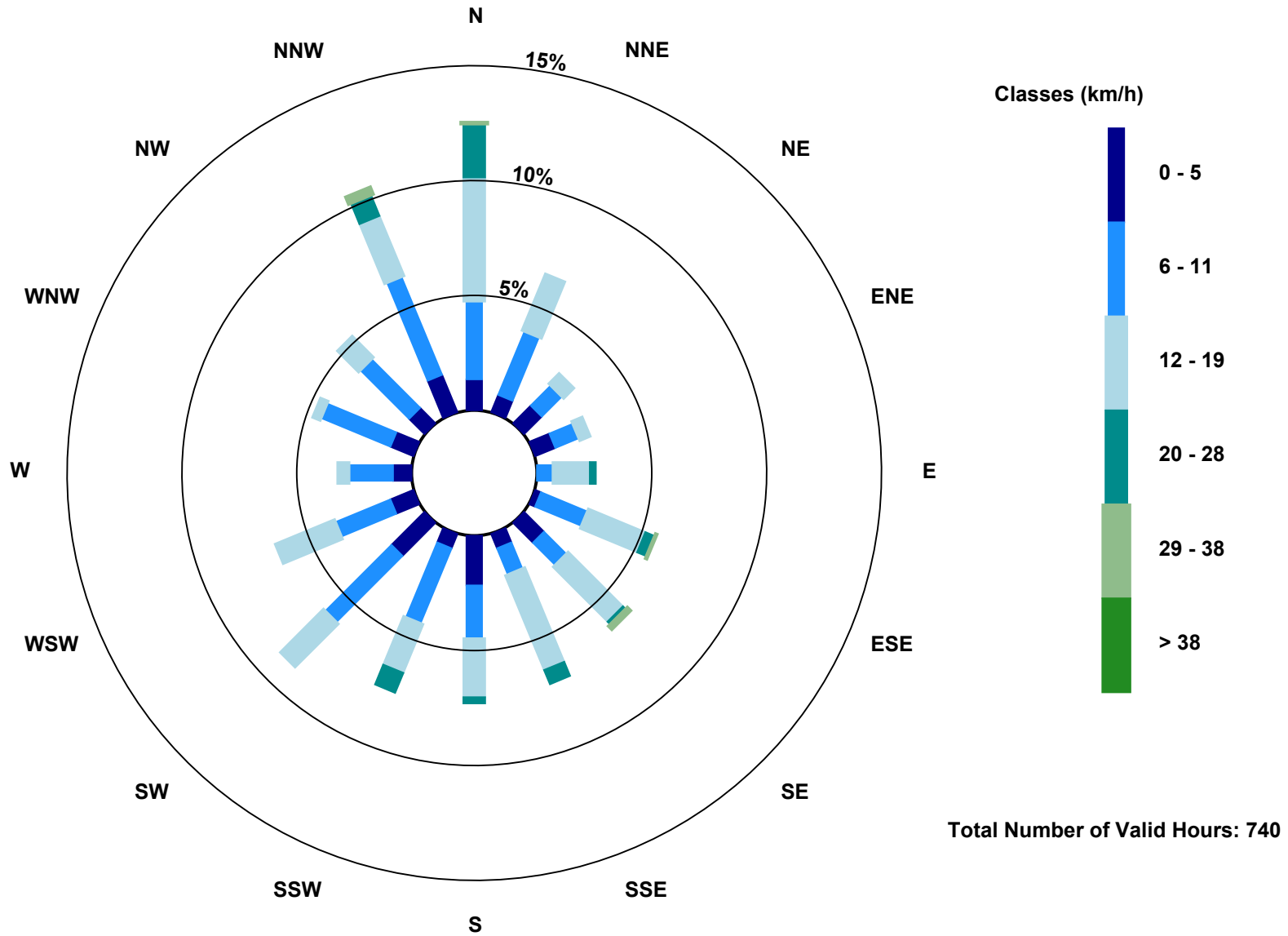
Total Number of Valid Hours: 740

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Firebag





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Firebag - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Jul 25 09:00 Minimum Value: 0 km/h on Jul 21 03:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7																	Hours in Service: 744 Hours of Data: 740 Hours of Missing Data: 4 Hours of Calibration: 0 Percent Operational Time: 99.5								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	2	1	2	1	2	1	1	1	2	3	3	3	3	3	3	3	3	3	3	3	2	1	1	1	3
2-Jul	2	2	2	2	3	3	4	5	5	6	5	3	3	3	2	4	4	4	4	6	5	5	4	4	6
3-Jul	5	5	4	5	6	6	7	6	5	6	6	6	7	7	6	5	6	5	5	3	2	1	1	1	7
4-Jul	1	1	0	UO	UO	UO	2	2	3	4	4	3	3	3	3	3	3	3	2	2	1	2	2	2	4
5-Jul	2	3	1	1	1	2	3	3	3	4	4	4	4	4	4	4	4	5	4	2	1	1	1	1	6
6-Jul	1	0	1	1	1	1	1	4	4	4	5	5	5	5	5	5	5	5	4	3	2	1	1	1	5
7-Jul	1	1	1	1	1	1	2	3	3	3	4	3	4	4	4	5	5	4	2	3	1	2	2	2	5
8-Jul	3	3	2	2	2	2	2	2	3	3	3	3	4	4	3	4	4	3	3	1	1	1	1	1	4
9-Jul	1	2	1	3	2	3	3	2	4	4	4	4	5	4	5	5	4	3	3	3	2	3	3	3	5
10-Jul	3	2	2	2	3	3	4	4	4	4	4	5	4	4	4	4	3	3	3	2	2	2	2	2	5
11-Jul	2	2	2	1	1	1	2	2	3	3	3	4	4	4	4	4	4	3	3	2	1	1	1	1	4
12-Jul	1	1	1	2	1	2	4	2	2	3	4	5	5	5	5	5	4	4	3	1	1	1	1	1	5
13-Jul	2	1	2	1	2	2	4	4	5	5	7	7	8	7	7	6	7	6	4	3	2	2	2	1	8
14-Jul	2	2	3	3	2	3	3	4	4	4	3	3	4	3	4	4	4	3	3	2	2	1	1	1	4
15-Jul	1	1	1	1	1	1	2	2	2	2	3	2	2	3	3	3	3	2	2	2	1	1	1	1	3
16-Jul	1	1	2	2	2	2	3	3	3	3	3	4	4	4	4	4	3	3	3	3	3	2	3	2	4
17-Jul	3	3	2	2	3	3	3	3	4	4	4	5	5	4	3	2	4	2	2	4	2	1	2	1	5
18-Jul	2	3	1	2	2	3	2	2	2	3	4	5	3	3	3	2	2	1	1	1	1	2	2	1	5
19-Jul	1	1	1	1	1	1	1	2	2	2	3	3	3	2	3	2	3	6	8	3	1	2	1	2	8
20-Jul	2	2	2	2	1	1	1	1	2	2	2	2	3	3	3	3	3	4	2	1	1	1	1	1	4
21-Jul	1	0	0	1	1	1	1	1	2	2	2	3	3	3	2	4	3	2	2	1	1	1	1	1	4
22-Jul	1	1	2	3	2	2	1	2	3	2	2	3	3	3	4	2	2	2	1	1	1	1	1	2	4
23-Jul	3	2	2	2	2	2	2	2	2	2	3	2	2	3	4	3	4	3	2	2	1	1	2	2	4
24-Jul	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	2	2	2	2	4	3	3	4
25-Jul	3	3	2	3	3	2	6	6	8	7	7	5	6	4	2	2	5	2	3	2	2	5	4	4	8
26-Jul	3	3	3	2	3	2	2	2	2	2	3	4	4	4	3	3	4	3	4	5	5	4	4	3	5
27-Jul	3	4	2	2	2	2	1	3	4	4	4	5	6	7	3	4	4	5	5	2	2	3	1	1	7
28-Jul	1	2	2	0	UO	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	1	1	1	1	3
29-Jul	2	1	1	1	1	2	2	2	3	3	3	4	4	4	4	4	4	4	3	3	1	1	1	1	4
30-Jul	1	1	1	2	2	2	2	3	3	4	5	5	5	6	6	5	4	4	3	1	6	6	4	4	6
31-Jul	2	4	3	2	3	2	1	3	2	3	4	4	4	3	2	3	6	5	2	3	2	1	1	2	6
Diurnal Maximum																									
UO - Unstable Operation																									



Wood Buffalo Environmental Association
Summary of Hour Averages

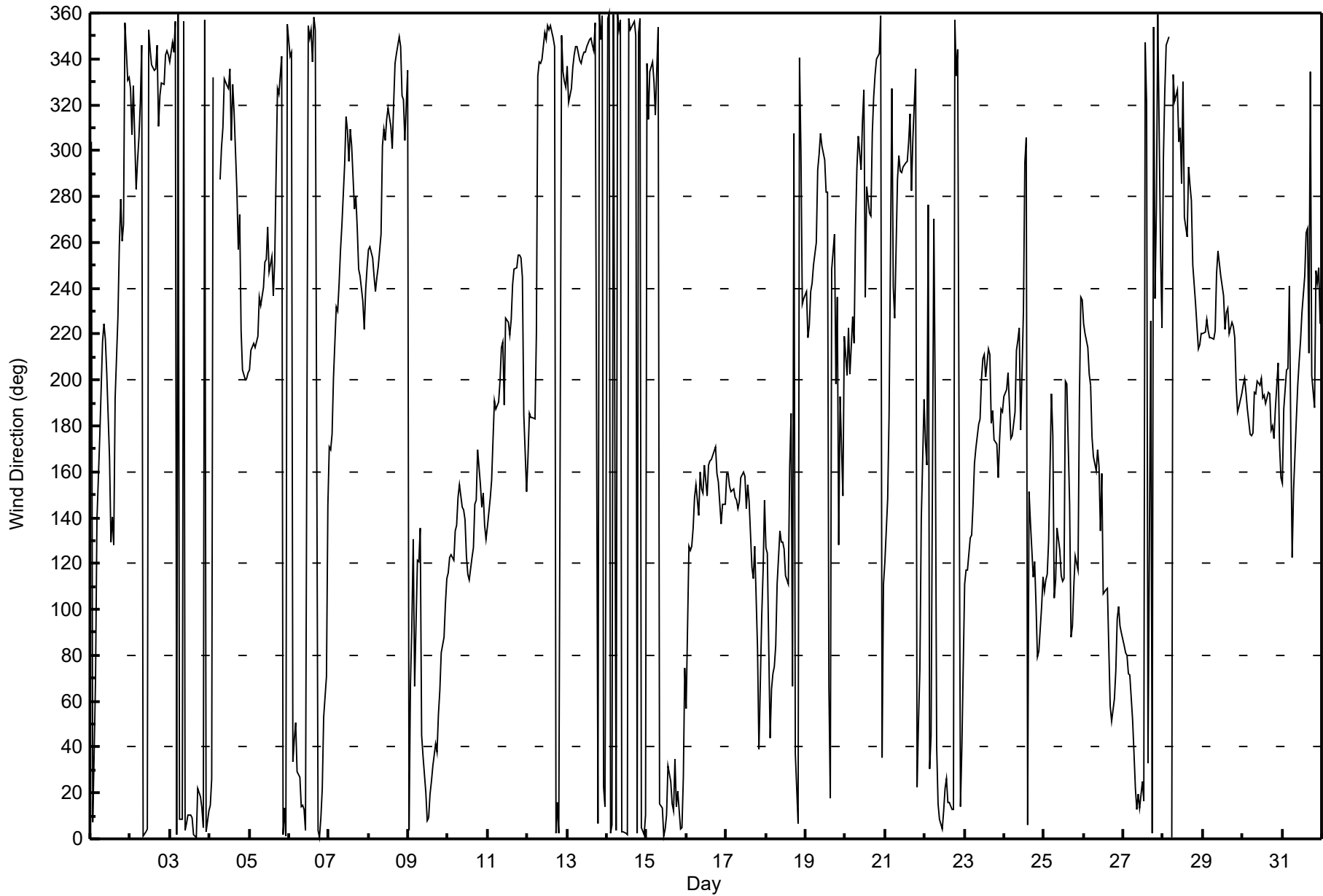
Wind Direction (WD) - deg
Firebag - July 2023

Direction of Maximum Speed: 115 deg on Jul 25 11:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 3.1 deg on Jul 3	Hours of Data: 740
Direction of Minimum Speed: 271 deg on Jul 22 06:00	Hours of Missing Data: 4
Direction of Minimum Daily Speed Average: 3.2 deg on Jul 1	Percent Operational Time: 99.5
Monthly Average Direction: 280.0 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	304	7	37	70	139	175	196	217	224	218	203	166	129	140	128	192	228	259	279	261	268	356	331	332	201.7
2-Jul	327	307	328	283	296	306	321	346	1	3	4	353	344	337	335	335	346	311	324	330	329	342	343	342	336.1
3-Jul	338	347	343	356	2	360	8	9	356	4	7	10	11	9	2	1	1	22	18	14	5	357	3	13	3.1
4-Jul	14	27	332	UO	UO	UO	288	302	310	331	328	327	336	304	329	317	282	257	272	222	204	200	201	203	279.8
5-Jul	205	213	216	214	217	219	236	232	240	251	253	267	247	254	237	251	290	327	325	341	2	13	1	355	254.3
6-Jul	341	343	34	44	50	29	27	14	15	13	4	354	349	353	339	358	353	4	1	9	22	53	71	145	9.1
7-Jul	171	170	176	201	232	230	242	256	267	294	315	309	296	309	302	274	280	266	249	245	234	222	239	249	258.9
8-Jul	257	258	254	245	239	245	250	264	302	310	305	313	318	311	301	321	338	342	350	345	324	322	305	335	296.6
9-Jul	4	67	93	131	66	121	121	135	45	36	20	8	9	19	25	32	41	38	54	65	81	88	103	113	54.2
10-Jul	116	122	124	122	134	137	149	154	144	143	139	123	115	113	123	127	146	148	169	154	145	151	137	131	136.4
11-Jul	136	149	156	174	191	187	190	199	214	217	189	227	225	220	226	242	248	249	254	255	253	245	185	151	210.0
12-Jul	166	186	184	184	183	220	333	338	338	340	352	348	355	353	354	349	345	2	16	2	350	334	330	328	347.3
13-Jul	337	321	327	336	342	345	346	340	338	341	343	343	345	348	349	346	343	356	7	360	348	359	23	14	347.0
14-Jul	358	360	2	6	359	3	360	353	357	3	3	3	2	357	353	354	356	350	3	352	358	5	2	10	358.9
15-Jul	338	314	334	339	330	315	335	354	15	13	1	5	10	32	25	15	12	35	14	21	4	5	27	74	4.8
16-Jul	56	127	126	128	135	149	155	141	160	152	151	163	149	163	165	166	167	171	159	155	146	137	146	146	152.0
17-Jul	159	159	154	151	152	149	147	144	147	157	160	158	144	154	147	119	114	127	105	83	39	97	117	148	142.8
18-Jul	127	125	44	65	72	75	84	111	134	129	129	126	114	111	162	186	66	307	37	7	341	300	233	235	111.9
19-Jul	239	219	224	238	242	250	260	291	298	308	302	296	282	282	67	18	248	264	199	236	128	193	149	219	257.9
20-Jul	211	202	223	202	227	216	266	292	306	292	313	326	236	284	273	271	308	324	333	340	343	359	35	111	294.2
21-Jul	121	148	185	254	327	240	227	287	298	291	291	293	295	295	304	316	282	305	336	22	51	74	139	192	299.9
22-Jul	172	163	276	30	45	271	189	40	15	9	4	12	22	26	16	16	13	13	357	333	344	14	40	76	17.3
23-Jul	111	117	117	131	132	146	164	170	181	183	200	209	211	201	214	211	181	187	174	172	158	174	187	186	172.7
24-Jul	193	196	203	189	175	176	186	213	218	223	178	230	295	306	6	151	138	114	121	102	79	82	101	114	145.1
25-Jul	108	113	115	130	194	176	105	113	135	126	115	113	113	199	198	146	88	93	110	123	117	192	236	235	130.3
26-Jul	225	220	214	203	198	175	167	161	170	162	134	159	107	109	109	83	58	51	61	73	96	101	93	90	126.0
27-Jul	84	81	80	72	71	52	37	22	13	19	13	25	17	347	321	33	226	2	354	236	275	360	256	223	28.8
28-Jul	297	326	346	350	UO	1	333	321	327	304	310	285	330	271	262	293	285	279	250	233	224	213	216	220	274.5
29-Jul	220	221	226	222	218	219	218	222	247	256	251	245	237	222	229	231	221	225	223	218	198	186	189	194	224.5
30-Jul	198	201	195	187	176	176	177	194	194	199	198	201	192	193	190	195	194	178	180	175	187	207	171	157	189.3
31-Jul	155	187	204	205	241	180	123	152	183	198	208	217	230	245	264	266	212	334	202	188	247	243	249	224	210.6

171.1 178.2 174.0 162.0 189.2 174.9 161.8 198.0 247.4 299.8 324.2 324.7 342.2 322.7 315.5 324.8 321.0 336.8 356.4 10.9 31.2 131.7 147.0 168.5
 Diurnal Average

UO - Unstable Operation
 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
Firebag - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 104 deg on Jul 19 15:00	Hours of Data: 740
Minimum Value: 4 deg on Jul 6 04:00	Hours of Missing Data: 4
Percentiles: P ₁ = 6 P ₁₀ = 9 Q ₁ = 12 Median = 16 Q ₃ = 23 P ₉₀ = 34 P ₉₉ = 77	Hours of Calibration: 0
	Percent Operational Time: 99.5

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	32	12	26	10	28	15	13	18	12	12	12	20	18	18	22	27	13	20	23	31	58	70	12	9	70
2-Jul	14	23	15	21	18	16	16	18	17	17	16	14	14	13	17	26	24	15	14	13	14	17	14	14	26
3-Jul	14	15	16	17	18	18	17	17	18	18	18	17	16	18	18	19	21	19	13	13	14	10	11	8	21
4-Jul	7	11	42	UO	UO	UO	18	21	26	30	32	46	62	62	66	58	53	37	31	19	10	6	7	7	66
5-Jul	8	9	8	9	9	10	12	13	17	17	15	28	14	16	15	15	30	15	13	15	11	8	9	18	30
6-Jul	11	15	7	4	8	44	17	19	18	24	25	27	27	26	24	29	20	22	18	15	13	8	12	24	44
7-Jul	6	6	7	19	17	8	12	14	26	28	26	31	37	31	22	32	25	19	11	10	7	9	9	11	37
8-Jul	13	13	12	10	10	13	13	20	19	18	19	25	23	21	21	23	24	19	13	14	7	10	14	26	26
9-Jul	22	23	16	31	65	20	15	42	32	21	23	24	24	23	22	19	18	16	14	14	11	12	12	11	65
10-Jul	12	13	13	13	13	12	13	15	17	18	25	25	23	21	22	24	27	25	18	16	13	10	12	13	27
11-Jul	14	10	15	11	7	9	8	8	14	14	19	27	28	40	31	34	26	16	18	10	4	8	22	28	40
12-Jul	16	11	11	19	16	18	25	15	21	23	28	25	26	19	20	23	19	18	13	14	10	11	5	6	28
13-Jul	9	6	6	7	11	12	14	15	16	17	16	17	17	17	18	17	16	19	15	16	11	18	11	11	19
14-Jul	13	16	16	15	15	14	18	16	17	17	18	19	21	20	18	18	18	17	16	14	14	13	10	20	21
15-Jul	16	8	11	13	9	15	14	17	19	17	17	17	23	21	30	49	18	25	21	16	9	15	49	96	96
16-Jul	11	34	9	11	12	11	11	15	15	15	19	18	20	21	23	16	19	16	16	12	12	11	13	12	34
17-Jul	11	11	10	11	10	11	12	13	15	14	12	12	14	13	16	13	12	16	15	24	36	10	20	15	36
18-Jul	15	25	20	15	10	12	13	17	18	17	22	20	31	32	41	63	44	39	12	24	11	55	11	13	63
19-Jul	10	12	7	8	10	12	22	21	28	26	28	25	26	32	104	60	46	29	27	92	80	17	67	12	104
20-Jul	14	18	33	27	43	44	29	22	30	32	41	42	67	78	48	29	25	14	17	7	17	22	29	14	78
21-Jul	10	22	9	43	28	16	15	23	20	25	24	29	31	27	38	33	29	20	28	8	13	6	36	12	43
22-Jul	19	53	61	59	34	86	54	32	17	31	24	21	18	18	20	21	14	11	15	10	10	9	22	11	86
23-Jul	11	11	11	15	13	12	11	9	11	11	12	15	21	22	33	35	12	12	12	15	10	8	7	8	35
24-Jul	6	7	10	23	7	7	20	14	16	36	46	88	57	33	78	31	27	18	12	22	8	13	12	11	88
25-Jul	11	11	12	21	14	16	19	15	16	15	13	13	54	43	27	54	23	11	12	16	14	61	11	12	61
26-Jul	11	11	9	11	9	21	15	16	17	22	28	43	25	30	20	16	15	11	13	16	13	12	12	11	43
27-Jul	14	15	14	10	10	12	11	13	16	18	19	25	32	71	41	25	49	38	73	47	14	33	36	27	73
28-Jul	25	54	8	11	UO	15	16	15	16	18	30	41	61	69	40	32	29	22	17	11	8	9	9	7	69
29-Jul	8	9	7	9	9	10	10	11	15	18	21	23	24	21	19	23	21	17	13	10	7	8	6	6	24
30-Jul	7	8	7	9	7	8	9	12	11	14	15	15	14	16	15	17	17	21	10	9	20	27	19	14	27
31-Jul	14	24	15	28	11	34	13	25	12	11	13	16	24	15	44	23	31	75	43	21	19	19	43	18	75
	32	54	61	59	65	86	54	42	32	36	46	88	67	78	104	63	53	75	73	92	80	70	67	96	
	Diurnal Maximum																								

UO - Unstable Operation



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS20 MACKAY RIVER JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MACKAY RIVER (AMS20)

JULY 2023

MONTHLY SUMMARY

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	15.3	0	3.3	0
H2S (ppb) Average	709	35	35	100	4.5	0	0.9	0
THC (ppm) Average	710	34	34	100	3.2	-	2.7	-
NO2 (ppb) Average	709	35	35	100	17	0	5.4	-
NO (ppb) Average	709	35	35	100	17.3	-	2.2	-
NOX (ppb) Average	709	35	35	100	24.2	-	6.6	-
Temperature 2 m (C) Average	744	0	0	100	28.3	-	21.2	-
Relative Humidity (%) Average	744	0	0	100	100	-	98	-
Wind Speed 10 m (km/h) Average	740	0	4	99.46	17	-	11	-
Wind Direction 10 m (deg) Average	740	0	4	99.46	-	-	-	-
Precipitation (mm) Total	744	0	0	100	8.7	-	36.8	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MACKAY RIVER (AMS20)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	710	0.62	1.7	-	0	0	0	0.1	0.4	1.4	15.3
H2S (ppb) Average	709	0.25	0.4	-	0	0.1	0.1	0.1	0.3	0.5	4.5
THC (ppm) Average	710	2.34	0.2	-	2.1	2.2	2.2	2.3	2.4	2.6	3.2
NO2 (ppb) Average	709	1.6	2.2	-	0	0.3	0.5	0.8	1.5	3.9	17
NO (ppb) Average	709	0.24	1.1	-	0	0	0	0	0.1	0.2	17.3
NOX (ppb) Average	709	1.84	2.9	-	0	0.3	0.5	0.8	1.6	4.2	24.2
Temperature 2 m (C) Average	744	16.85	5.5	-	2.1	10.2	12.5	16.6	21.3	24.3	28.3
Relative Humidity (%) Average	744	68.32	21.8	-	25.6	38.8	48	68.1	90	97	100
Wind Speed 10 m (km/h) Average	740	5.8	3	-	0	2	3	5	8	10	17
Wind Direction 10 m (deg) Average	740	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	112.5	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -MACKAY RIVER (AMS20)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	09 Jul 2023 03:00	09 Jul 2023 05:00	3	Flat line in sensor output signal
Wind Speed, Wind Direction	22 Jul 2023 00:00	22 Jul 2023 00:00	1	Flat line in sensor output signal



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Mackay River - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 15.3 ppb on Jul 22 15:00	Maximum Daily Average: 3.3 ppb on Jul 22		Hours of Data:	710
Minimum Value: 0.0 ppb on Jul 1 15:00	Minimum Daily Average: 0.0 ppb on Jul 29		Hours of Missing Data:	34
Maximum Diurnal Average: 1.8 ppb at hour 10	Minimum Diurnal Average: 0.1 ppb at hour 3		Hours of Calibration:	34
Monthly Average: 0.62 ppb	Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.4 P ₉₀ = 1.4 P ₉₉ = 9.5		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.6	0.4	Z	0.1	0.2	0.2	0.1	0.2	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	1.8	0.1	0.7	0.5	0.0	0.0	0.0	0.0	0.2	1.8
2-Jul	0.0	0.2	0.2	Z	0.0	0.5	1.4	2.4	0.8	0.1	0.0	0.2	1.8	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.4
3-Jul	0.0	0.1	0.0	0.0	Z	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
4-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.3	2.0	4.4	1.9	2.0	1.2	0.8	0.8	0.6	0.3	0.1	0.1	0.0	0.0	0.0	0.2	0.2	0.2	0.7	4.4
5-Jul	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	0.1	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
6-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.0	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
7-Jul	0.0	0.0	Z	0.1	0.1	0.1	0.2	0.7	1.2	1.3	1.2	2.0	0.9	0.7	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.4	2.0
8-Jul	0.1	0.1	0.1	Z	0.1	0.2	0.0	0.1	0.2	0.2	0.1	0.1	0.6	0.3	0.4	0.2	0.3	0.7	0.3	1.1	0.2	0.1	0.0	0.0	0.3	1.1
9-Jul	0.1	0.0	0.0	0.0	Z	0.1	0.3	0.4	10.0	6.7	4.2	0.3	0.3	0.2	0.3	0.2	0.6	6.9	9.2	0.9	0.3	0.2	0.8	0.5	1.8	10.0
10-Jul	0.2	0.1	0.2	0.5	0.7	Z	0.3	0.4	0.4	0.3	0.2	0.5	0.3	0.2	0.3	0.3	0.3	0.2	0.2	0.1	0.0	0.1	0.2	0.3	0.3	0.7
11-Jul	Z	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.4
12-Jul	0.0	Z	0.0	0.0	0.0	0.0	1.0	0.2	0.3	1.3	0.6	0.6	0.4	0.7	0.0	0.0	0.1	0.2	0.3	0.3	0.2	0.1	0.1	0.1	0.3	1.3
13-Jul	0.5	1.2	Z	0.5	0.2	0.4	0.7	0.7	6.2	0.8	0.4	0.7	1.2	0.1	0.0	0.5	1.3	7.0	0.5	0.4	1.5	1.9	1.5	1.5	1.3	7.0
14-Jul	1.5	1.1	0.8	Z	0.4	0.5	5.2	0.4	0.2	3.1	1.3	2.1	2.6	1.3	0.3	0.2	0.4	0.3	0.3	1.2	1.4	0.3	0.2	0.1	1.1	5.2
15-Jul	0.1	0.1	0.0	0.1	Z	0.0	0.0	0.1	4.7	4.2	4.2	1.8	0.0	1.1	2.6	2.7	3.1	4.1	5.0	2.9	1.5	0.4	0.1	0.0	1.7	5.0
16-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.2	0.1	0.3	0.5	0.3	0.2	0.2	0.3	0.3	0.3	0.4	0.3	0.4	0.5	0.5	0.6	0.6	0.3	0.6
17-Jul	Z	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.0	0.0	0.1	0.1	0.0	0.3	0.6
18-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.1	0.2	0.8	13.6	13.6	6.7	0.6	0.2	0.1	0.0	0.2	0.4	0.3	0.2	0.1	0.0	0.1	0.0	1.6	13.6
19-Jul	0.1	0.0	Z	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.2
20-Jul	0.2	0.3	0.2	Z	0.2	0.3	0.2	0.2	0.2	0.9	2.1	1.7	3.9	0.9	1.4	1.4	0.3	1.6	0.6	0.6	0.1	0.0	0.0	0.0	0.7	3.9
21-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	2.4	1.4	0.8	1.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	2.4
22-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.1	0.2	0.5	2.1	9.9	4.9	5.2	11.2	15.3	14.4	6.7	2.8	1.8	0.5	0.3	0.1	0.1	0.1	3.3	15.3
23-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.5	0.6	0.3	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	0.1	0.6
24-Jul	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	0.3	0.5	0.2	0.3	0.3	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.5
25-Jul	0.2	0.1	Z	0.6	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6
26-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	4.2	0.6	0.4	0.6	0.2	0.2	0.0	0.0	0.3	4.2
27-Jul	0.0	0.0	0.0	0.7	Z	1.1	1.6	4.5	3.1	6.0	6.7	0.3	0.9	1.1	1.0	0.4	0.7	1.6	0.3	0.4	0.3	0.3	0.2	0.2	1.4	6.7
28-Jul	0.1	0.1	0.1	0.2	0.2	Z	0.2	0.2	9.6	7.8	3.9	1.2	2.8	2.6	1.3	1.2	1.7	1.1	0.5	0.3	0.2	0.0	0.0	0.0	1.5	9.6
29-Jul	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	0.0	0.0	0.0	0.0	0.0	0.0
30-Jul	0.0	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	0.1	0.1	1.1	0.2	0.0	0.0	0.0	0.0	0.1	1.1
31-Jul	0.0	0.0	Z	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.4	2.7	0.8	0.2	0.1	0.1	0.1	0.1	0.3	2.7

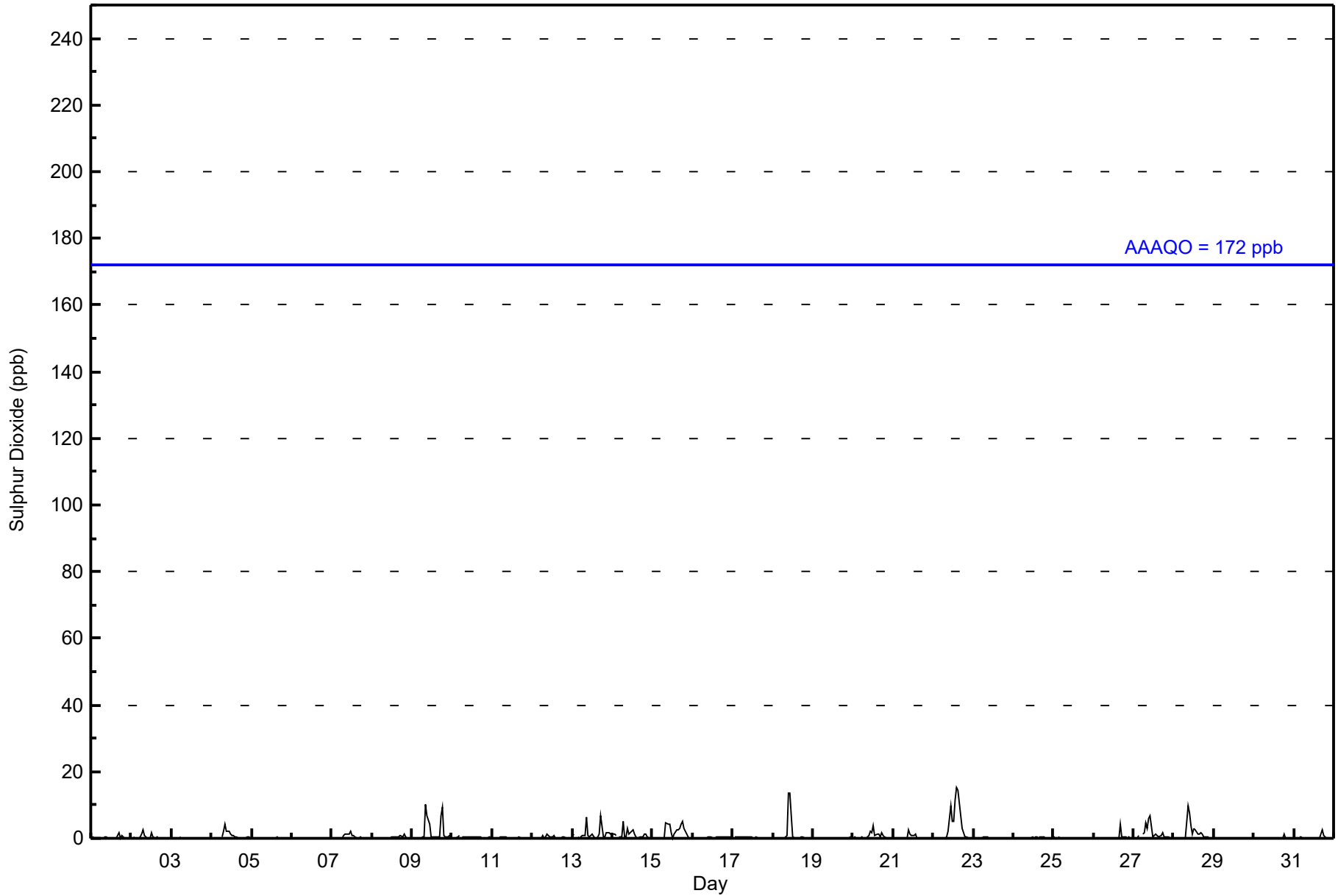
0.1	0.2	0.1	0.1	0.1	0.2	0.4	0.5	1.5	1.8	1.7	0.9	0.8	0.8	0.8	0.8	0.8	1.0	0.8	0.4	0.2	0.2	0.2	0.1	Diurnal Average	
1.5	1.2	0.8	0.7	0.7	1.1	5.2	4.5	10.0	13.6	13.6	6.7	5.2	11.2	15.3	14.4	6.7	7.0	9.2	2.9	1.5	1.9	1.5	1.5	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Mackay River - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mackay River - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	705	99.30	99.30
11 - 20	5	0.70	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: 710

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mackay River - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	28	60	38	13	25	69	60	58	58	41	55	48	45	30	45	29	702
11 - 20	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	29	63	39	13	25	69	60	58	58	41	55	48	45	30	45	29	707

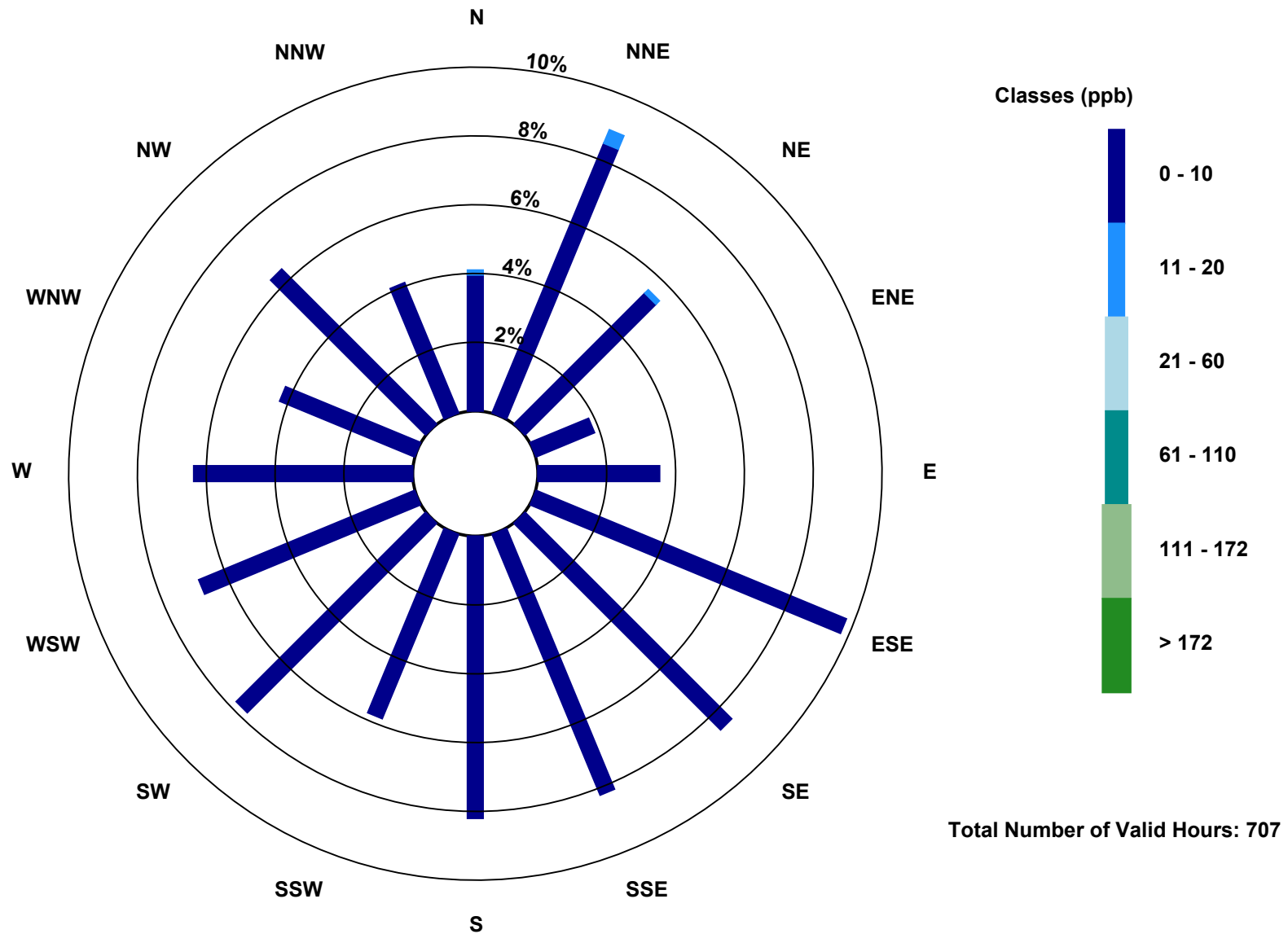
Total Number of Valid Hours: 707

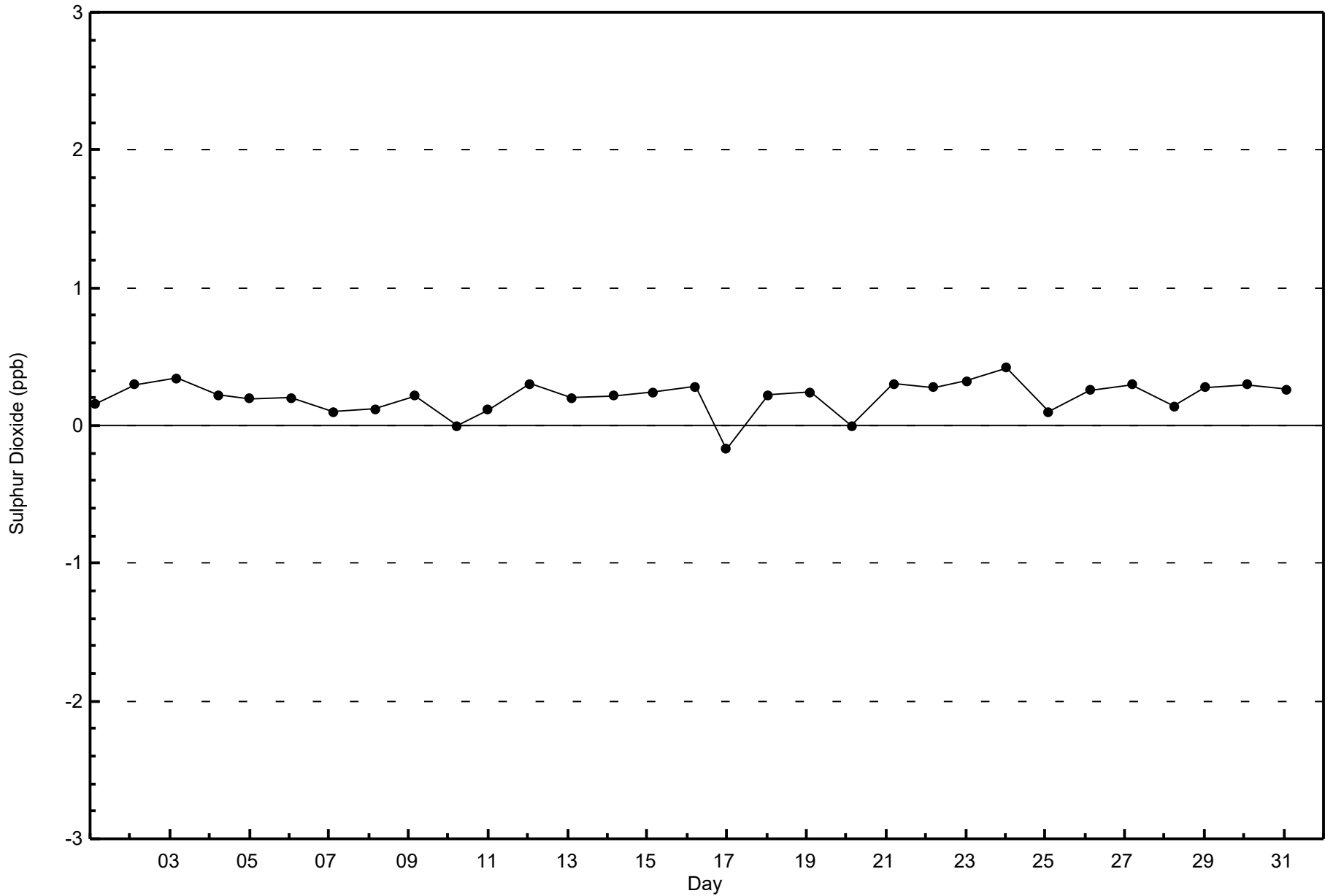
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Mackay River

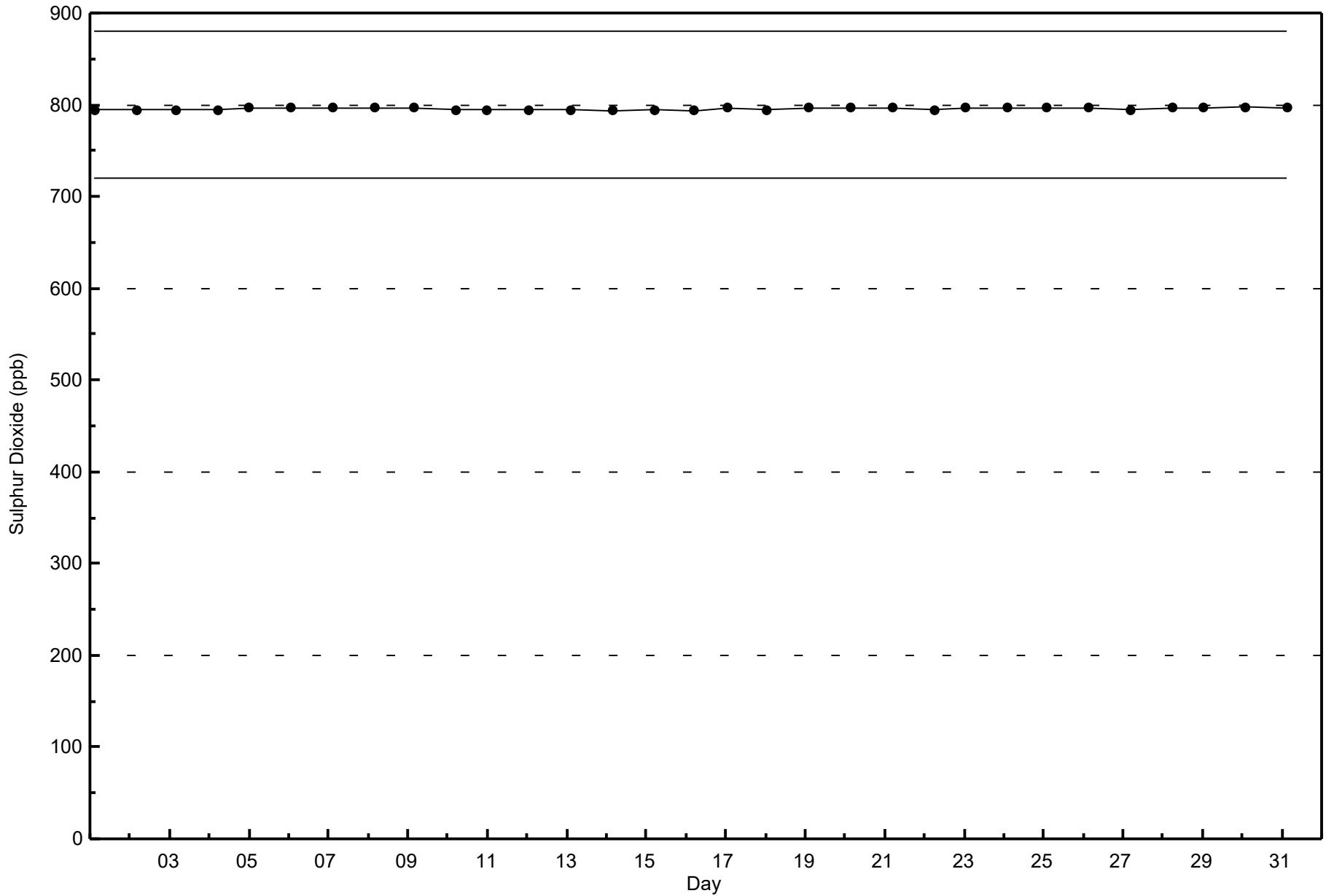






Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Mackay River - July 2023





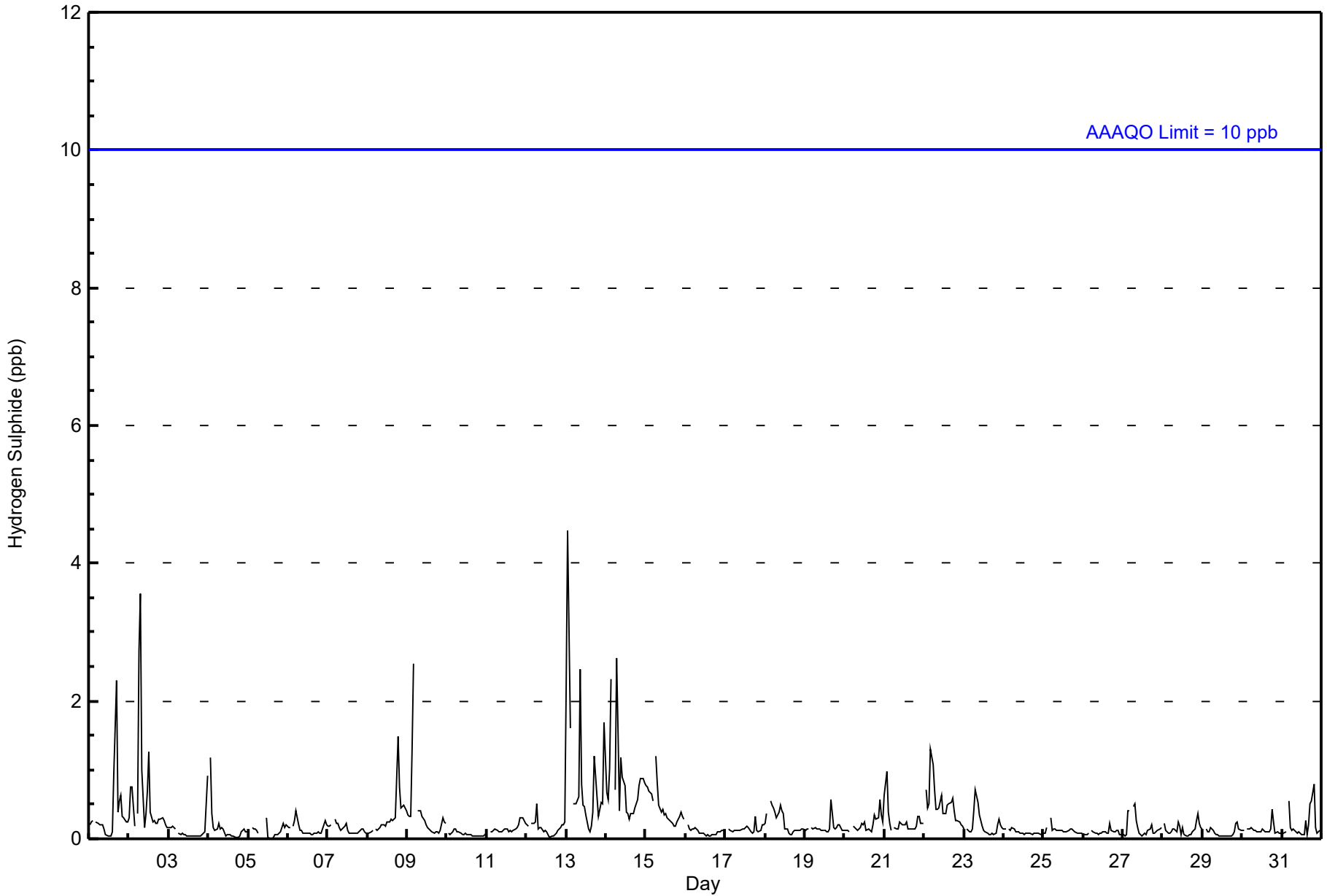
Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

Mackay River - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:																744																											
Maximum Value: 4.5 ppb on Jul 13 02:00		Maximum Daily Average: 0.9 ppb on Jul 13																Hours of Data:		709																													
Minimum Value: 0.0 ppb on Jul 5 14:00		Minimum Daily Average: 0.1 ppb on Jul 10																Hours of Missing Data:		35																													
Maximum Diurnal Average: 0.5 ppb at hour 2		Minimum Diurnal Average: 0.1 ppb at hour 15																Hours of Calibration:		35																													
Monthly Average: 0.25 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.1 Q ₁ = 0.1 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 0.5 P ₉₉ = 2.3																Percent Operational Time:		100.0																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	0.2	0.2	0.3	Z	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.9	2.3	0.4	0.5	0.6	0.3	0.3	0.2	0.2	0.4	2.3																							
2-Jul	0.3	0.8	0.8	0.2	Z	0.4	2.7	3.6	1.0	0.2	0.4	0.7	1.3	0.4	0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.7	3.6																							
3-Jul	0.2	0.2	0.2	0.2	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.9	0.1	0.9																							
4-Jul	Z	1.2	0.4	0.2	0.1	0.1	0.2	0.1	0.2	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	1.2																							
5-Jul	0.1	Z	0.2	0.1	0.1	0.1	0.1	C	C	C	C	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.3																							
6-Jul	0.2	0.2	Z	0.2	0.3	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.1	0.4																							
7-Jul	0.2	0.2	0.2	Z	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3																							
8-Jul	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	1.5	0.7	0.5	0.5	0.5	0.4	0.3	1.5																								
9-Jul	0.4	0.3	0.3	1.3	2.5	Z	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.2	0.4	2.5																							
10-Jul	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1																							
11-Jul	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	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.3																							
12-Jul	0.2	0.2	Z	0.2	0.2	0.2	0.5	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.5																							
13-Jul	2.2	4.5	1.6	Z	0.5	0.5	0.5	0.6	2.5	0.8	0.5	0.5	0.4	0.1	0.1	0.2	0.4	1.2	0.6	0.3	0.4	0.5	0.5	1.7	0.9	4.5																							
14-Jul	0.7	0.6	1.0	2.3	Z	0.7	2.6	1.6	0.4	1.2	0.9	0.8	0.4	0.4	0.3	0.4	0.4	0.5	0.6	0.8	0.9	0.9	0.8	0.8	0.8	2.6																							
15-Jul	0.8	0.7	0.7	0.7	0.6	Z	1.2	0.8	0.5	0.4	0.4	0.3	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.4	0.3	0.3	0.5	1.2	0.5																							
16-Jul	Z	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2																							
17-Jul	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	0.2	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.2	0.1	0.3																							
18-Jul	0.2	0.4	Z	0.6	0.5	0.4	0.4	0.3	0.4	0.5	0.4	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.6																							
19-Jul	0.1	0.1	0.2	Z	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.6	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.6																							
20-Jul	0.1	0.1	0.1	0.1	Z	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.4	0.3	0.3	0.6	0.3	0.2	0.2	0.6																							
21-Jul	0.6	1.0	0.4	0.2	0.1	Z	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.2	0.2	0.3	1.0																							
22-Jul	Z	0.7	0.5	0.5	1.3	1.1	0.7	0.4	0.4	0.4	0.6	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.4	0.3	0.3	0.2	0.2	0.2	0.5	1.3																							
23-Jul	0.1	Z	0.1	0.1	0.1	0.1	0.4	0.7	0.5	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.2	0.2	0.7																							
24-Jul	0.1	0.1	Z	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	0.1	0.1	0.1	0.1	0.2																							
25-Jul	0.1	0.1	0.2	Z	0.3	0.1	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	0.3																							
26-Jul	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																							
27-Jul	0.1	0.0	0.1	0.4	0.4	Z	0.5	0.5	0.3	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.5																							
28-Jul	Z	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.3	0.4	0.2	0.2	0.1	0.4																							
29-Jul	0.1	Z	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.2																							
30-Jul	0.1	0.1	Z	0.2	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	0.4	0.2	0.1	0.1	0.1	0.1	0.4																							
31-Jul	0.1	0.1	0.1	Z	0.5	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.2	0.5	0.6	0.8	0.2	0.1	0.1	0.1	0.2	0.8																							
																								Diurnal Average		0.3		0.5		0.3		0.3		0.4		0.3		0.4		0.4		0.3		0.2		0.2		0.3	
																								Diurnal Maximum		2.2		4.5		1.6		2.3		2.5		1.1		2.7		3.6		2.5		1.2		0.9		0.8	
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Mackay River - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	704	99.29	99.29
3 - 4	5	0.71	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Mackay River - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	27	65	39	14	23	71	60	58	57	39	55	47	47	30	40	29	701
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	4
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	27	65	39	14	23	71	60	58	57	39	55	47	47	31	43	29	705

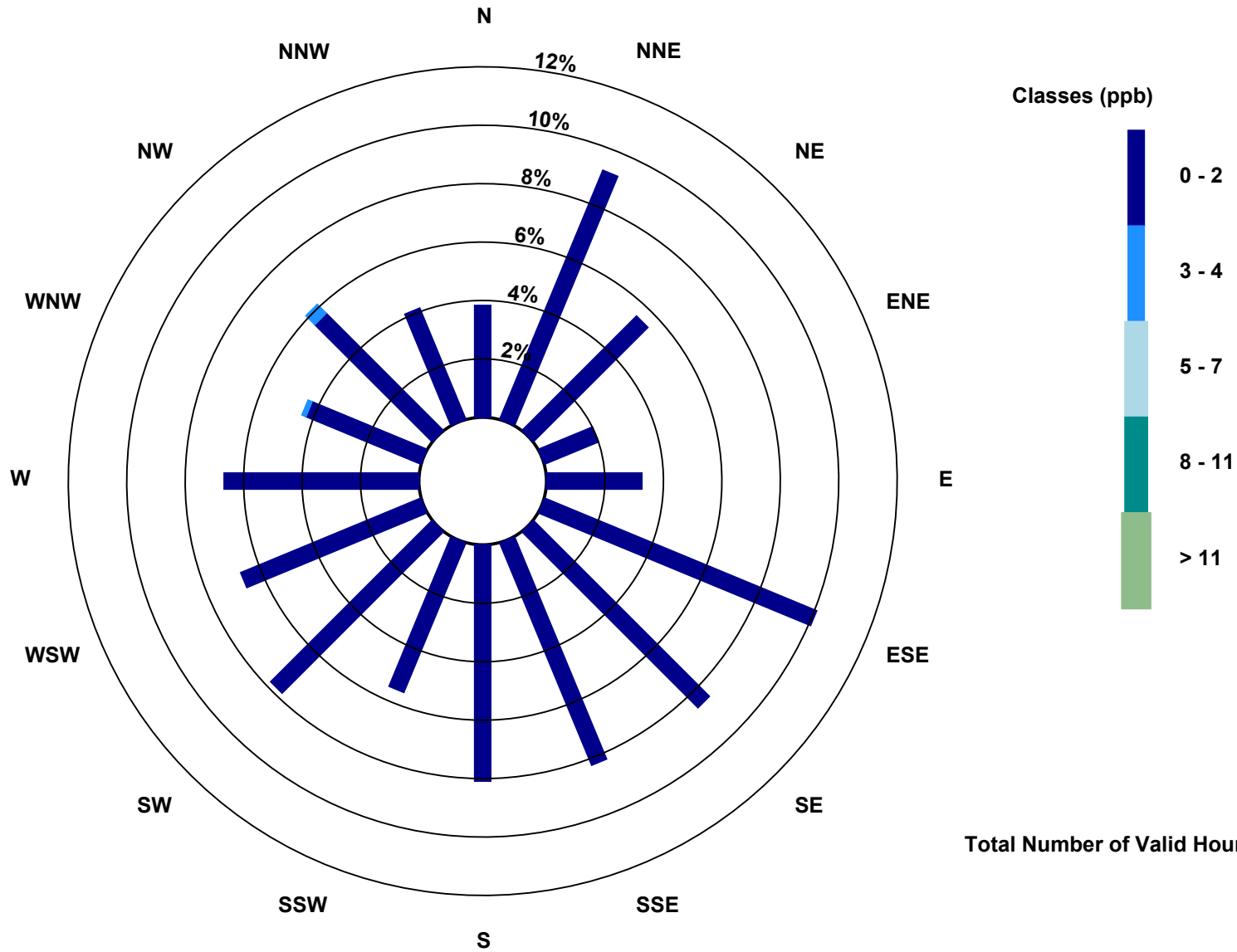
Total Number of Valid Hours: 705

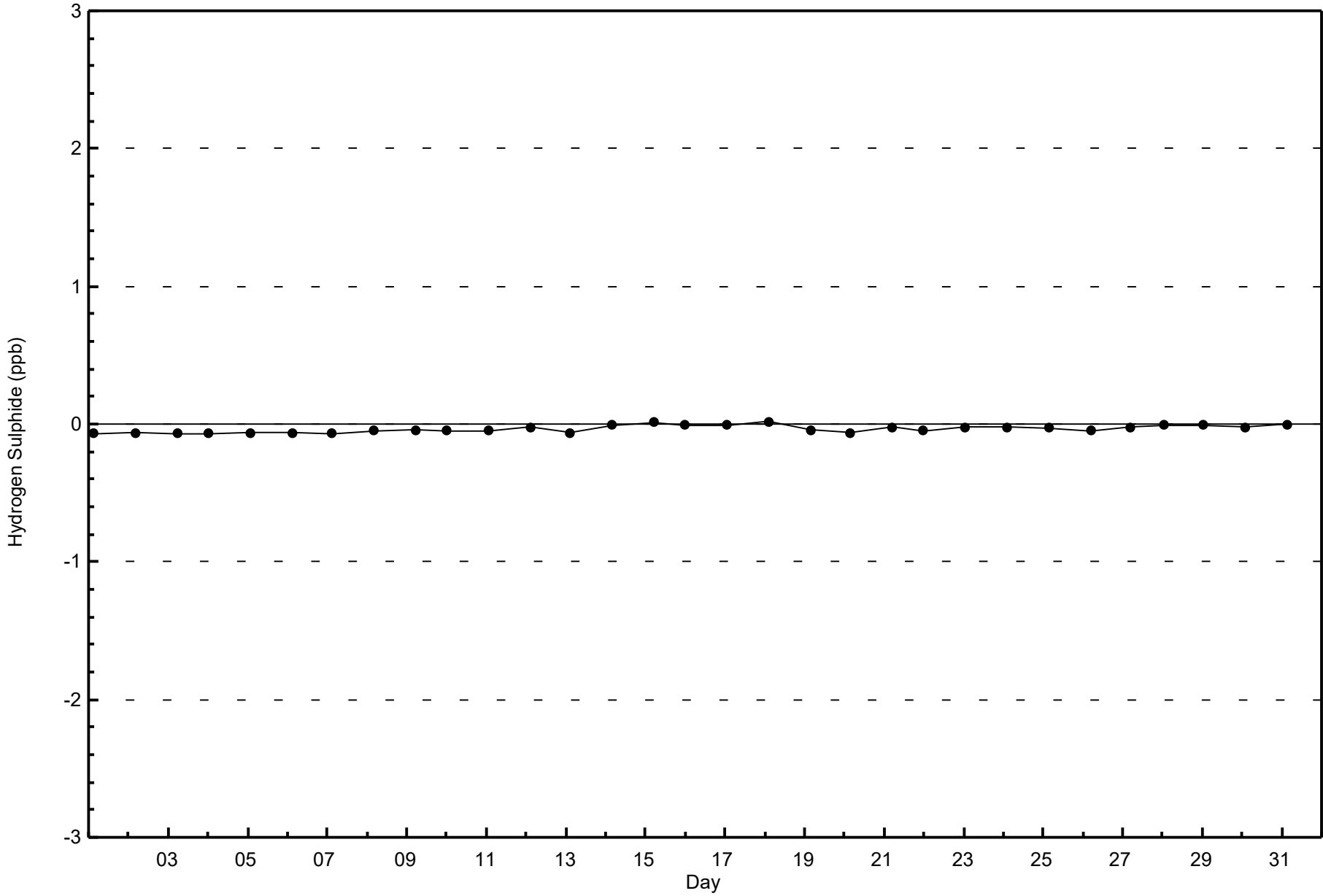
Total Number of Hours: 744

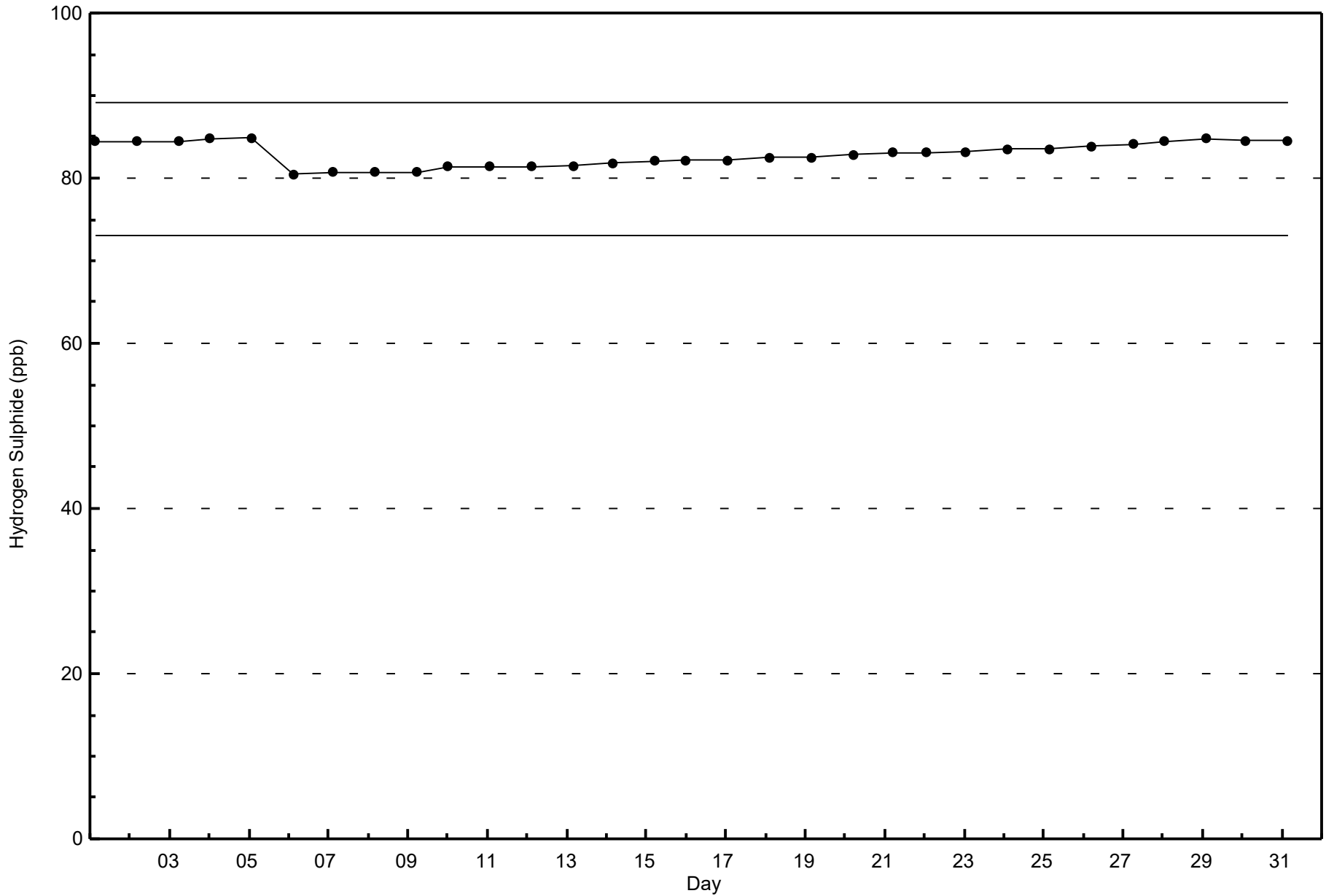


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Hydrogen Sulphide (H₂S) - ppb
Mackay River



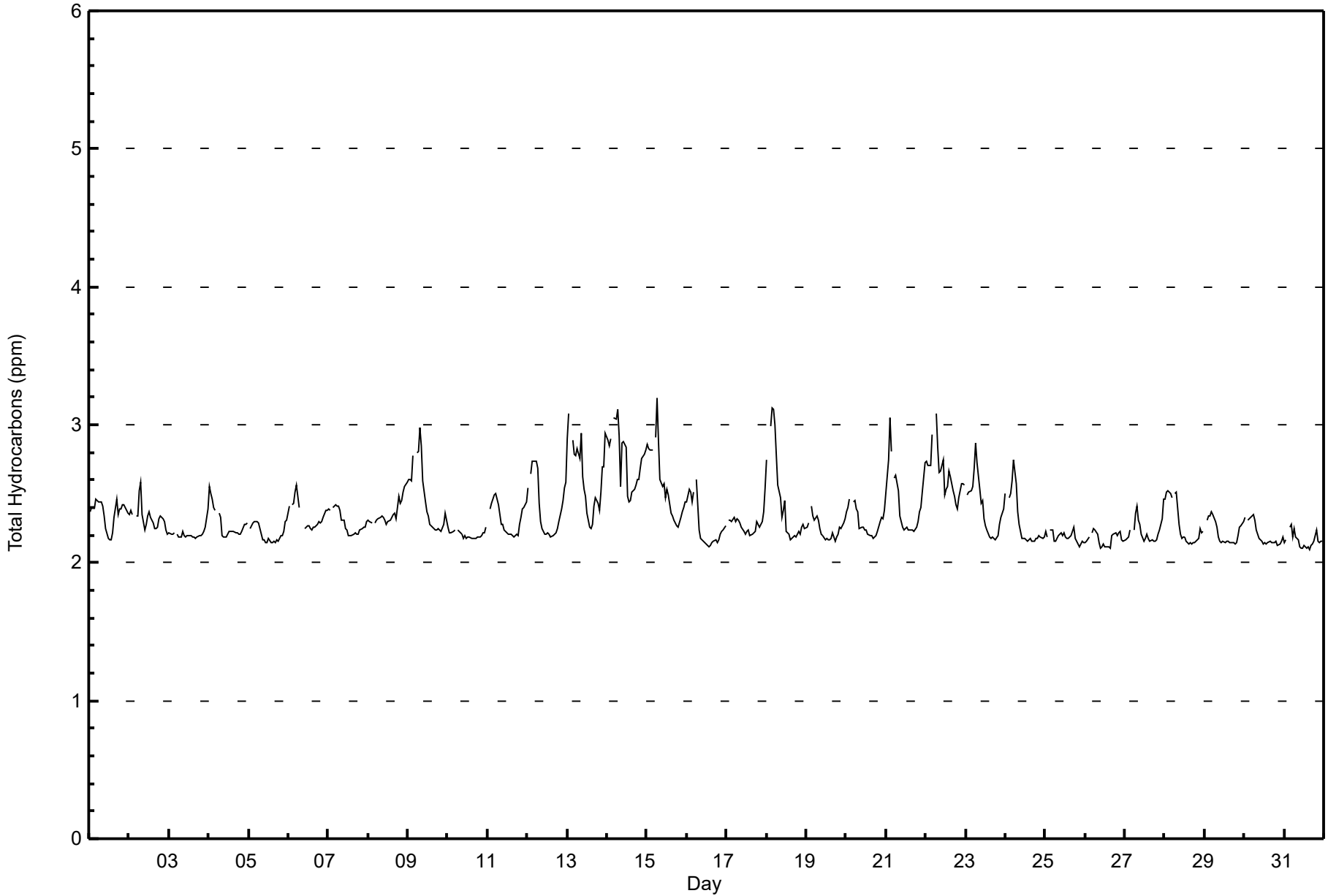






Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Mackay River - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mackay River - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	704	99.15	99.15
3.1 - 10.0	6	0.85	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
Mackay River - July 2023

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	29	62	39	12	25	68	60	58	58	41	55	48	45	29	44	28	701
3.1 - 10.0	0	1	0	1	0	1	0	0	0	0	0	0	0	1	1	1	6
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	29	63	39	13	25	69	60	58	58	41	55	48	45	30	45	29	707

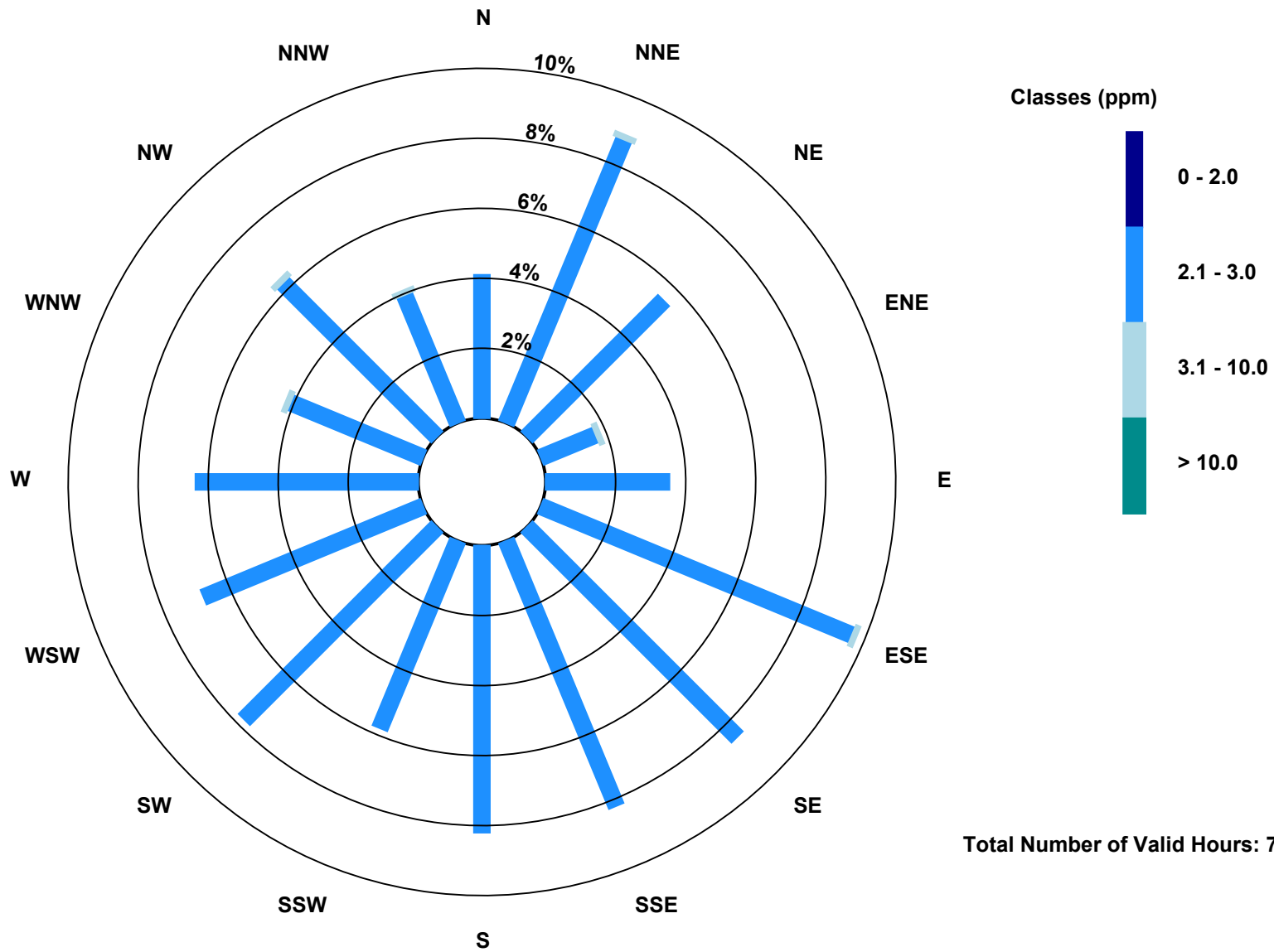
Total Number of Valid Hours: 707

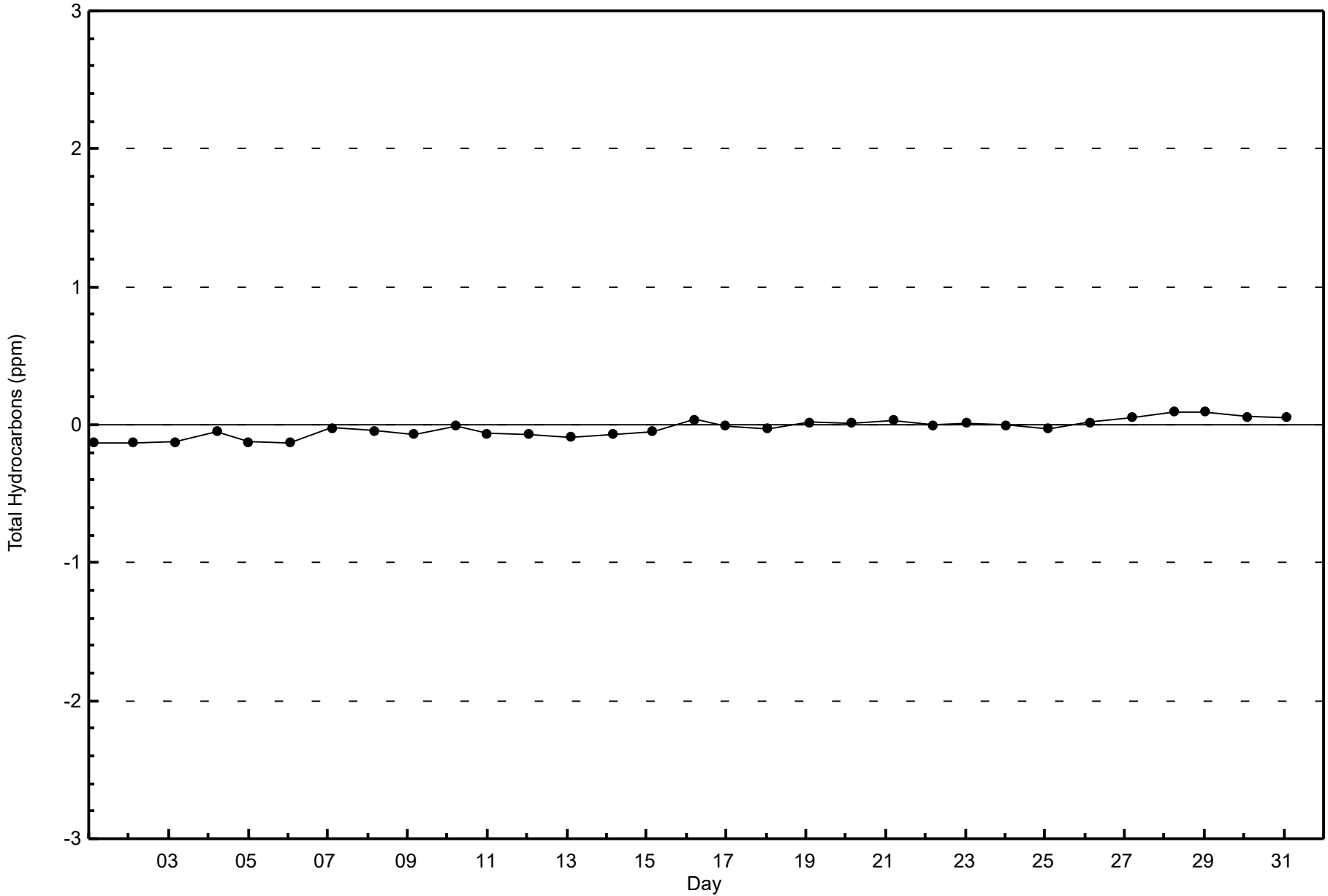
Total Number of Hours: 744

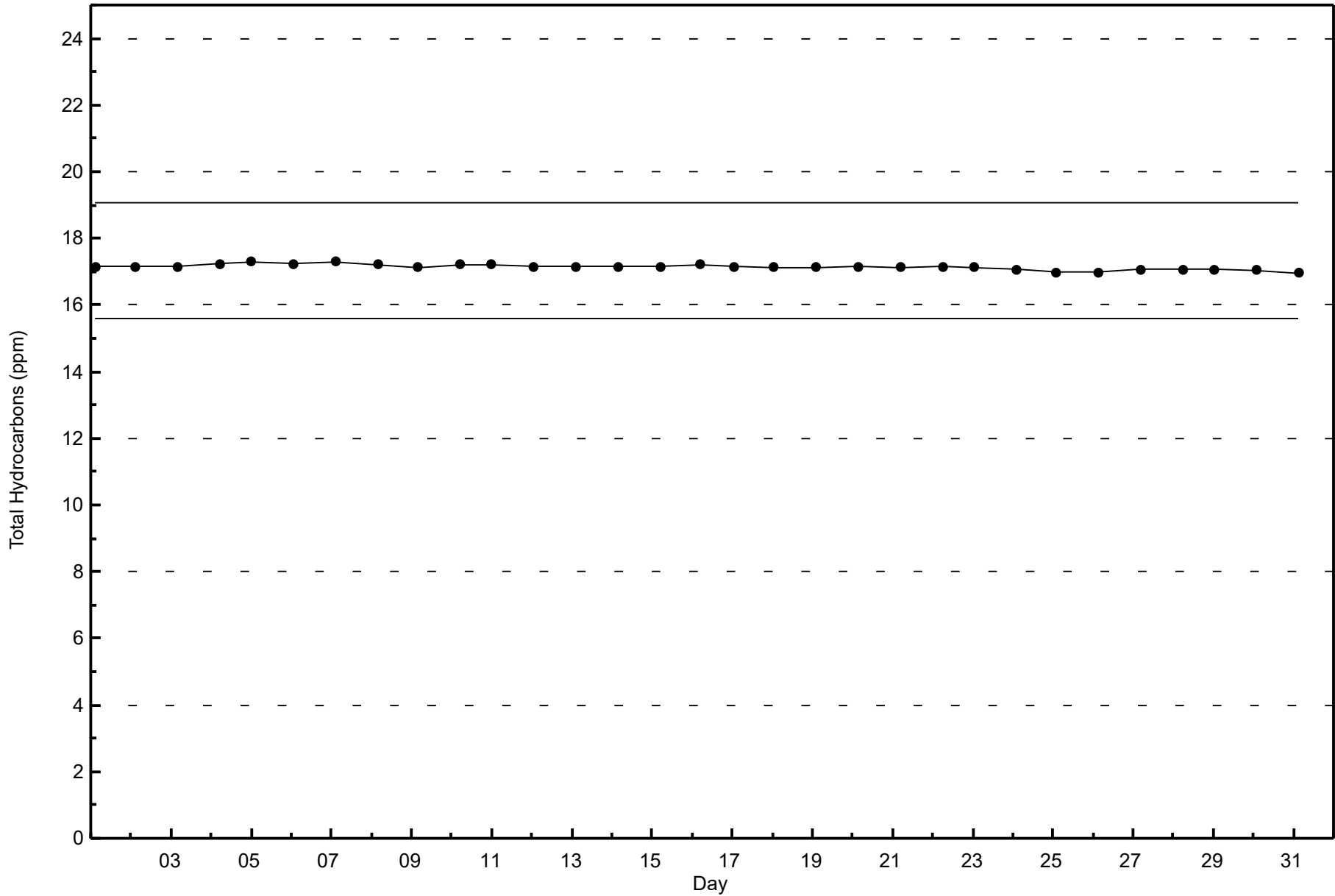


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Mackay River









Wood Buffalo Environmental Association
Summary of Hour Averages

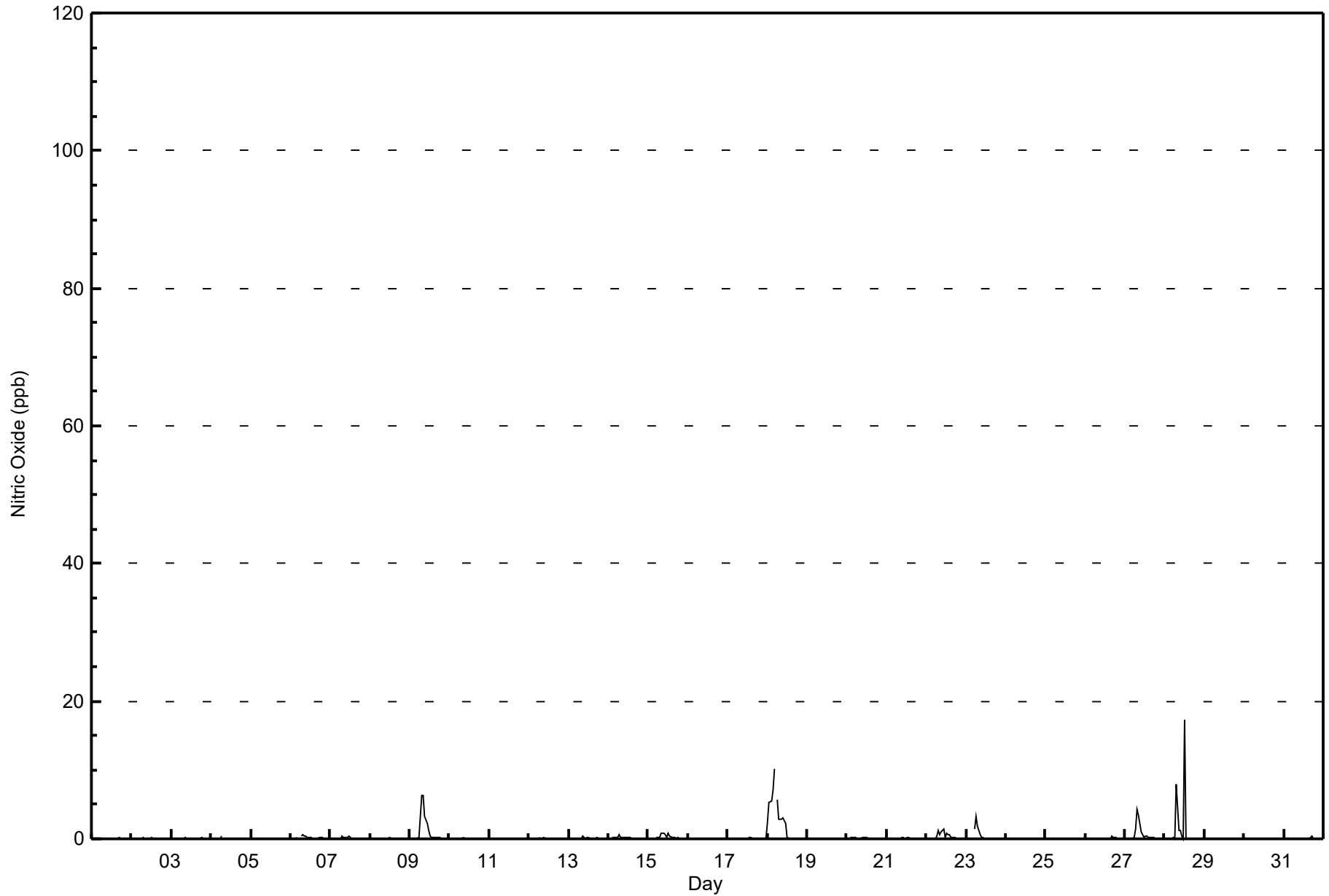
Nitric Oxide (NO) - ppb
Mackay River - July 2023

Maximum Value: 17.3 ppb on Jul 28 13:00		Maximum Daily Average: 2.2 ppb on Jul 18		Hours in Service: 744																							
Minimum Value: 0.0 ppb on Jul 4 13:00		Minimum Daily Average: 0.0 ppb on Jul 5		Hours of Data: 709																							
Maximum Diurnal Average: 0.9 ppb at hour 8		Minimum Diurnal Average: 0.0 ppb at hour 22		Hours of Missing Data: 35																							
Monthly Average: 0.24 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.1 P ₉₀ = 0.2 P ₉₉ = 5.4		Hours of Calibration: 35																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.2	
2-Jul	0.1	Z	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.3	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3
3-Jul	0.0	0.0	Z	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	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
4-Jul	0.0	0.0	0.1	Z	0.1	0.1	0.5	C	C	C	C	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	0.5
5-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
6-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.4	0.6	0.5	0.4	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.2	0.6
7-Jul	Z	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.3	0.1	0.2	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	0.1	0.4
8-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
9-Jul	0.0	0.0	Z	0.0	0.1	0.3	3.2	6.4	6.3	3.3	2.2	1.2	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.0	0.0	0.0	0.0	1.1	6.4
10-Jul	0.0	0.0	0.0	Z	0.0	0.1	0.0	0.1	0.1	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	0.1
11-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
12-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.3
13-Jul	Z	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.5	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.5
14-Jul	0.1	Z	0.1	0.1	0.2	0.3	0.6	0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.6
15-Jul	0.0	0.0	Z	0.0	0.1	0.1	0.2	0.2	0.7	0.8	0.7	0.2	0.8	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.8
16-Jul	0.0	0.0	0.0	Z	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
17-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.2
18-Jul	2.5	5.3	5.4	7.1	10.2	Z	5.8	2.9	2.9	3.1	2.7	2.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	10.2
19-Jul	Z	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
20-Jul	0.1	Z	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.3
21-Jul	0.0	0.0	Z	0.1	0.1	0.1	0.1	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
22-Jul	0.0	0.0	0.1	Z	0.1	0.1	0.4	1.1	0.6	1.0	1.4	0.3	0.8	0.7	0.6	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.3	1.4	
23-Jul	0.1	0.1	0.0	0.1	Z	1.4	3.2	1.8	0.7	0.3	0.2	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	0.4	3.2	
24-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
25-Jul	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	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
26-Jul	0.0	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	0.4	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4
27-Jul	0.0	0.0	Z	0.0	0.1	0.3	1.3	4.2	3.4	2.2	1.0	0.3	0.5	0.4	0.2	0.3	0.3	0.2	0.1	0.1	0.0	0.0	0.1	0.0	0.6	4.2	
28-Jul	0.0	0.1	0.1	Z	0.1	0.1	0.1	8.0	1.2	1.2	0.4	0.1	17.3	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.3	17.3	
29-Jul	0.0	0.1	0.0	0.0	Z	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
30-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.1	0.0	0.1	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	0.1	0.1
31-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.2	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.4	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Mackay River - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Mackay River - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	709	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Mackay River - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	29	67	39	13	25	68	58	61	56	40	56	48	46	30	43	27	706
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	67	39	13	25	68	58	61	56	40	56	48	46	30	43	27	706

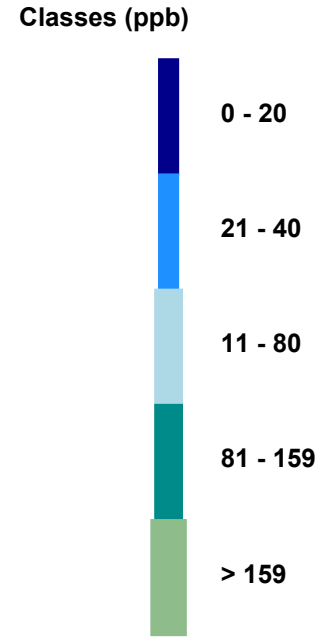
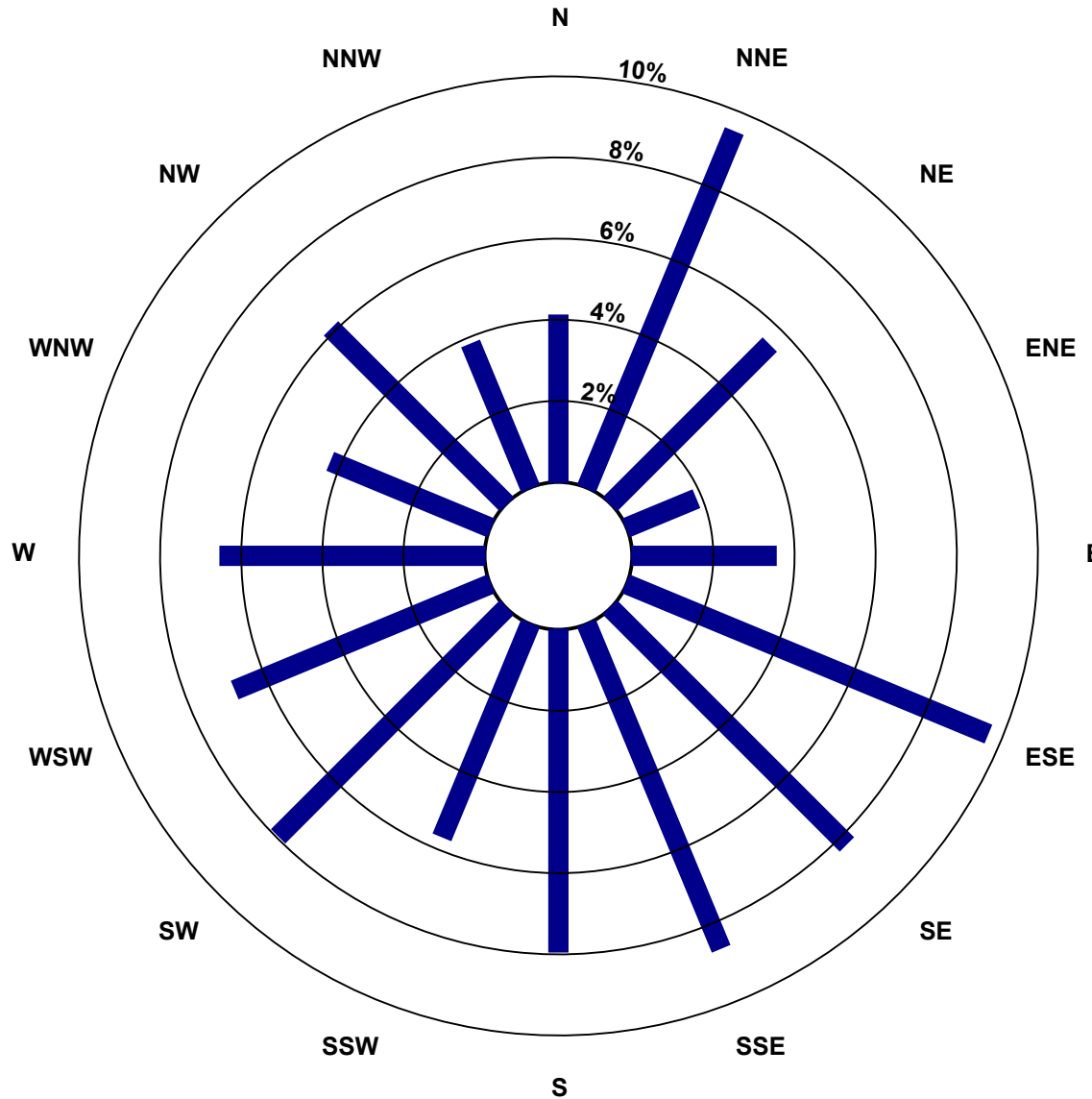
Total Number of Valid Hours: 706

Total Number of Hours: 744

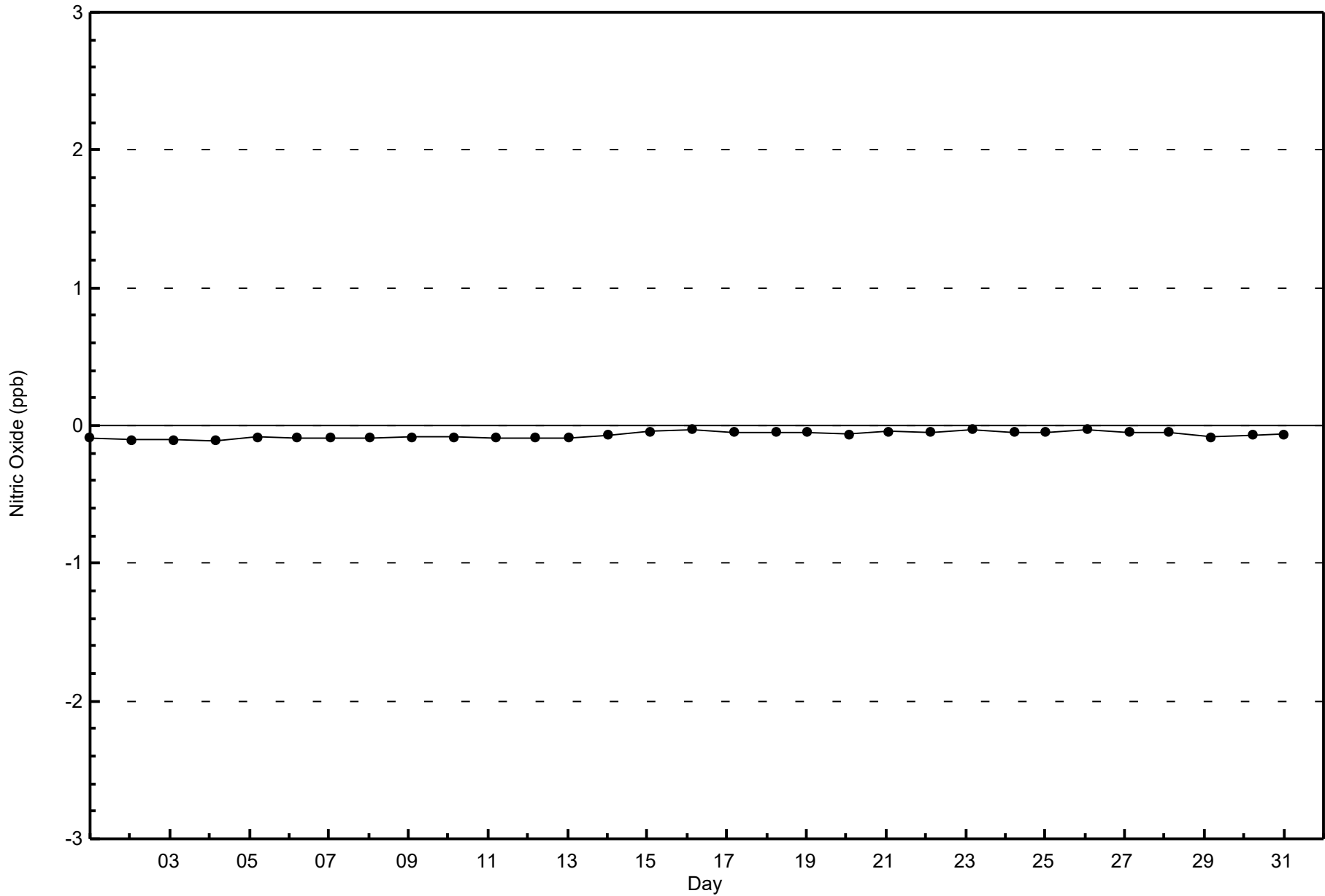


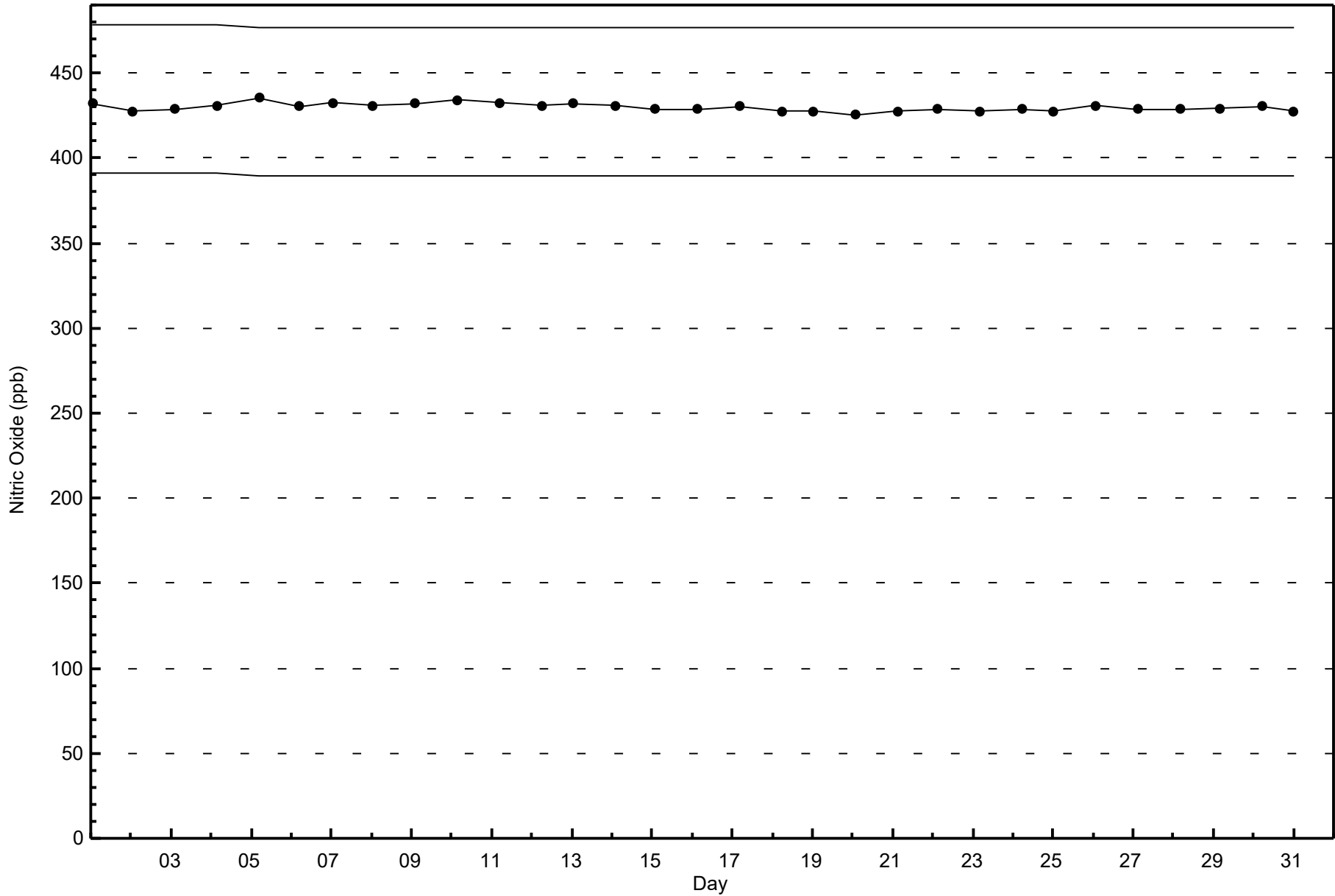
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Mackay River



Total Number of Valid Hours: 706







Wood Buffalo Environmental Association
Summary of Hour Averages

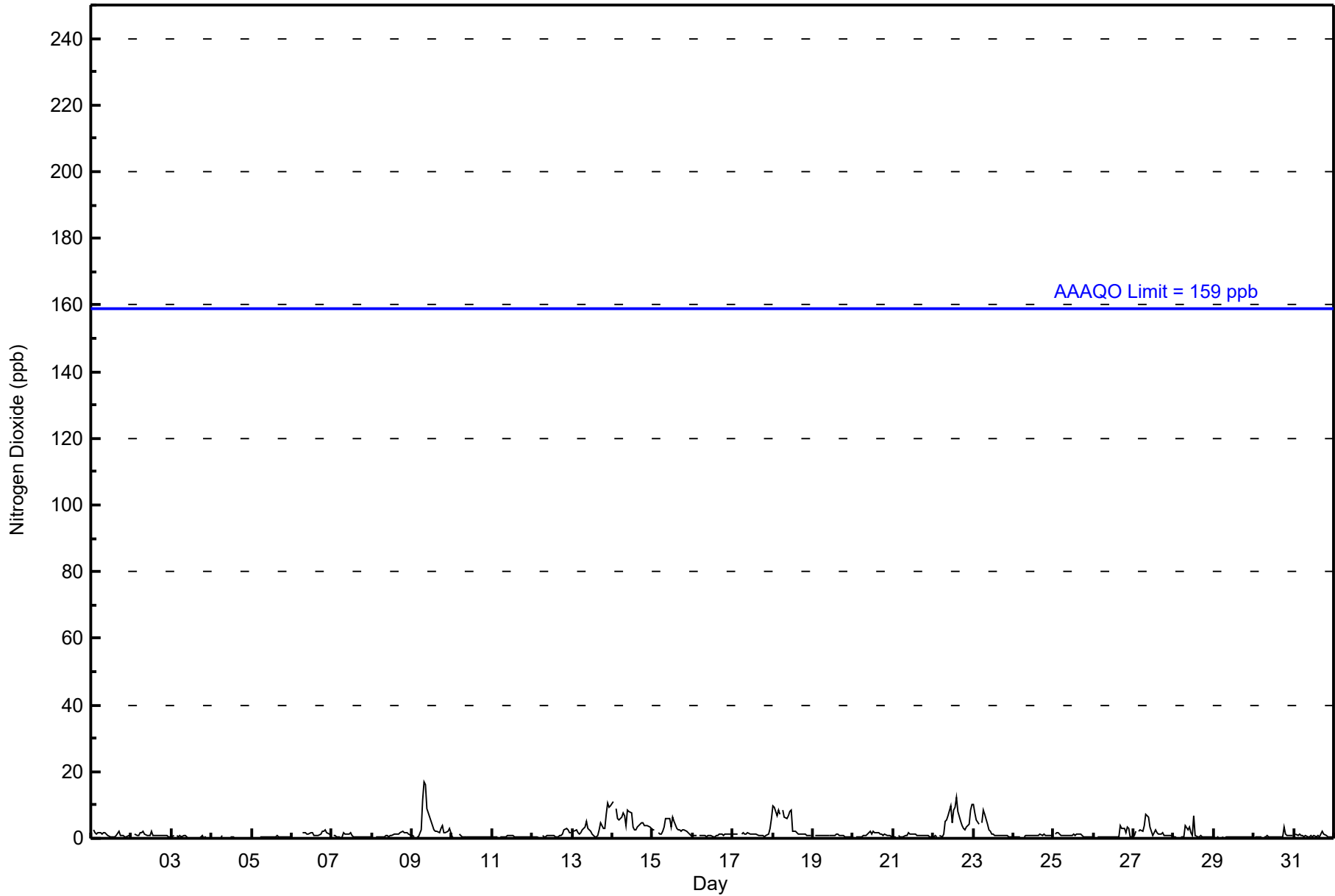
Nitrogen Dioxide (NO₂) - ppb
Mackay River - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744														Daily Average		Daily Maximum					
Maximum Value: 17.0 ppb on Jul 9 08:00		Maximum Daily Average: 5.4 ppb on Jul 14		Hours of Data: 709														Hours of Missing Data: 35		Hours of Calibration: 35							
Minimum Value: 0.0 ppb on Jul 4 03:00		Minimum Daily Average: 0.2 ppb on Jul 4		Hours of Calibration: 35														Percent Operational Time: 100.0									
Maximum Diurnal Average: 2.6 ppb at hour 8		Minimum Diurnal Average: 1.2 ppb at hour 5		Percentiles: P ₁ = 0.1 P ₁₀ = 0.3 Q ₁ = 0.5 Median = 0.8 Q ₃ = 1.5 P ₉₀ = 3.9 P ₉₉ = 10.0																							
Monthly Average: 1.60 ppb																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	2.6	1.6	1.1	1.6	1.6	1.1	1.6	1.8	1.2	0.8	0.5	0.5	0.5	0.6	0.7	2.1	0.7	0.9	0.7	0.6	0.6	0.7	0.8	1.1	2.6	
2-Jul	0.7	Z	1.2	0.9	0.9	1.5	1.9	2.1	1.3	0.9	0.9	1.0	2.0	1.0	0.8	0.9	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	1.0	2.1	
3-Jul	0.5	0.7	Z	0.7	0.6	0.7	0.3	0.7	1.0	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.7	0.2	0.4	0.2	0.2	0.2	0.4	1.0	
4-Jul	0.2	0.2	0.0	Z	0.1	0.0	0.7	C	C	C	C	0.5	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.2	0.7	
5-Jul	0.1	0.1	0.1	0.1	Z	0.3	0.3	0.5	0.5	0.5	0.6	0.6	0.5	0.4	0.5	0.9	0.6	0.6	0.6	0.5	0.4	0.3	0.3	0.3	0.4	0.9	
6-Jul	0.2	0.1	0.1	0.1	0.1	Z	1.6	1.9	1.5	1.3	1.4	1.5	1.5	1.0	0.9	0.9	0.9	1.4	2.2	2.3	2.4	1.7	1.3	0.9	1.2	2.4	
7-Jul	Z	1.0	0.9	0.5	0.4	0.2	0.3	1.5	1.4	1.3	1.4	1.6	0.8	0.6	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.7	1.6	
8-Jul	0.4	Z	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.7	0.6	0.7	1.0	1.1	1.1	1.2	1.4	1.7	2.0	1.9	1.8	1.5	1.2	1.0	1.0	2.0	
9-Jul	0.7	0.5	Z	0.5	0.4	2.7	11.5	17.0	16.0	8.8	6.5	5.1	3.7	2.5	2.3	2.0	1.8	3.1	4.0	1.6	1.6	2.3	2.9	1.5	4.3	17.0	
10-Jul	0.6	0.2	0.2	Z	1.2	0.8	0.5	0.5	0.5	0.3	0.3	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.6	0.5	1.2	
11-Jul	0.6	0.6	0.5	0.4	Z	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.6	0.7	
12-Jul	0.4	0.3	0.3	0.3	0.2	Z	1.0	0.5	0.5	0.9	0.9	1.0	0.9	0.7	0.4	0.5	0.7	0.8	1.4	2.4	2.9	2.5	1.9	1.7	1.0	2.9	
13-Jul	Z	2.1	2.5	1.5	1.3	1.5	2.7	3.2	5.2	2.9	2.6	2.0	1.2	0.5	0.4	0.9	2.7	4.8	2.9	2.8	7.0	10.5	9.5	9.9	3.5	10.5	
14-Jul	11.0	Z	8.7	6.1	5.4	6.4	7.7	6.6	3.9	8.3	7.9	7.7	3.6	2.7	2.4	3.5	4.3	4.6	4.5	3.8	3.9	3.8	3.5	2.9	5.4	11.0	
15-Jul	2.4	2.7	Z	1.6	1.1	1.2	2.3	3.5	5.9	6.1	5.9	3.6	6.3	5.0	2.9	2.6	2.4	2.2	2.6	2.5	2.1	1.6	1.1	0.9	3.0	6.3	
16-Jul	0.7	0.8	0.7	Z	0.7	0.7	0.9	0.7	0.6	0.9	0.8	0.8	0.6	0.6	0.7	0.9	1.2	1.2	1.0	1.1	1.3	1.2	1.1	1.1	0.9	1.3	
17-Jul	1.3	1.3	1.3	1.4	Z	1.4	1.5	1.3	1.3	1.5	1.3	1.2	1.1	1.4	1.2	0.8	0.7	0.8	0.9	0.6	0.7	1.3	2.8	6.0	1.4	6.0	
18-Jul	9.6	9.5	6.9	8.5	7.3	Z	8.5	6.2	5.8	6.8	7.9	8.3	2.1	2.0	1.5	1.4	1.4	1.4	1.3	1.1	1.0	1.0	0.9	0.8	4.4	9.6	
19-Jul	Z	0.8	0.8	0.7	0.7	0.7	0.7	0.8	0.8	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.0	0.8	0.7	0.5	0.5	0.5	0.5	0.5	0.8	1.1	
20-Jul	0.5	Z	0.5	0.5	0.5	0.6	0.7	0.7	0.7	1.5	2.3	1.4	2.0	1.5	1.6	1.5	1.2	1.4	1.0	1.1	0.8	0.7	0.7	0.6	1.0	2.3	
21-Jul	0.6	0.6	Z	0.7	0.5	0.5	0.5	0.7	0.8	1.7	1.4	1.2	1.3	1.4	1.0	1.0	1.0	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.9	1.7	
22-Jul	0.6	0.7	0.5	Z	0.8	0.6	1.1	5.0	5.3	6.7	9.9	4.8	8.6	9.4	12.2	8.0	5.2	3.7	3.1	2.6	3.6	4.2	8.3	10.2	5.0	12.2	
23-Jul	10.0	7.6	5.6	4.1	Z	4.6	8.5	7.2	4.2	2.4	2.0	1.3	1.1	1.0	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.6	0.6	0.5	2.9	10.0	
24-Jul	0.5	0.5	0.5	0.5	0.4	Z	0.6	0.7	0.7	0.8	0.8	0.7	0.7	0.8	0.8	0.8	1.1	0.8	1.1	0.8	0.8	0.7	0.8	0.9	0.7	1.1	
25-Jul	Z	1.4	1.5	1.8	1.0	0.8	0.7	0.7	0.7	0.7	1.0	0.9	1.2	1.0	1.1	1.2	1.1	1.0	0.6	0.5	0.5	0.5	0.5	0.4	0.9	1.8	
26-Jul	0.4	Z	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	3.8	3.1	2.8	1.7	3.6	2.9	0.5	0.3	1.1	3.8	
27-Jul	0.8	2.0	Z	2.2	2.5	2.1	3.9	7.2	6.7	6.5	3.2	1.0	1.6	2.5	1.7	1.3	1.3	1.5	0.9	0.7	0.7	0.9	0.8	0.8	2.3	7.2	
28-Jul	0.5	0.3	0.2	Z	0.3	0.3	0.3	4.0	2.7	3.2	1.6	0.8	6.9	0.8	0.5	0.6	0.7	0.5	0.5	0.5	0.4	0.4	0.4	0.3	1.2	6.9	
29-Jul	0.3	0.2	0.3	0.2	Z	0.3	0.2	0.3	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4
30-Jul	0.2	0.3	0.3	0.3	0.3	Z	0.5	0.6	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.6	3.2	1.4	0.9	0.8	0.7	0.8	0.7	3.2	
31-Jul	Z	1.2	0.9	1.1	0.9	0.7	0.6	0.7	0.6	0.6	0.7	0.6	0.7	0.6	0.7	0.5	1.4	2.3	1.3	0.8	0.6	0.6	0.5	0.5	0.8	2.3	
		1.8	1.5	1.4	1.4	1.2	1.2	2.0	2.6	2.4	2.3	2.2	1.7	1.7	1.4	1.3	1.2	1.4	1.4	1.4	1.2	1.4	1.4	1.4	1.5	Diurnal Average	
		11.0	9.5	8.7	8.5	7.3	6.4	11.5	17.0	16.0	8.8	9.9	8.3	8.6	9.4	12.2	8.0	5.2	4.8	4.5	3.8	7.0	10.5	9.5	10.2	Diurnal Maximum	
Z - zerospan		C - Calibration																									
Alberta Ambient Air Quality Objectives (AAAQO):		1-hr 159 ppb																									



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Mackay River - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Mackay River - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	709	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Mackay River - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	29	67	39	13	25	68	58	61	56	40	56	48	46	30	43	27	706
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	29	67	39	13	25	68	58	61	56	40	56	48	46	30	43	27	706

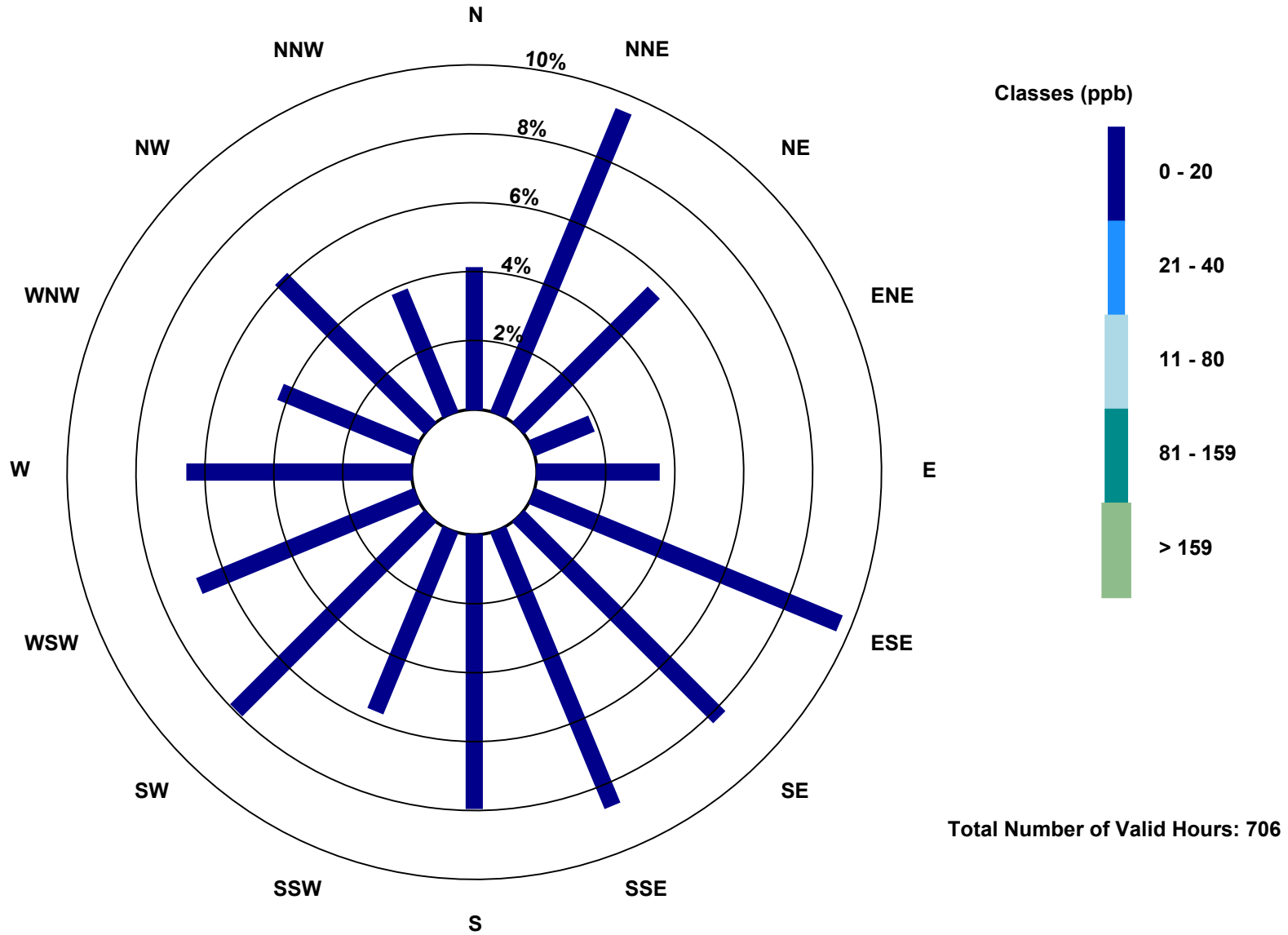
Total Number of Valid Hours: 706

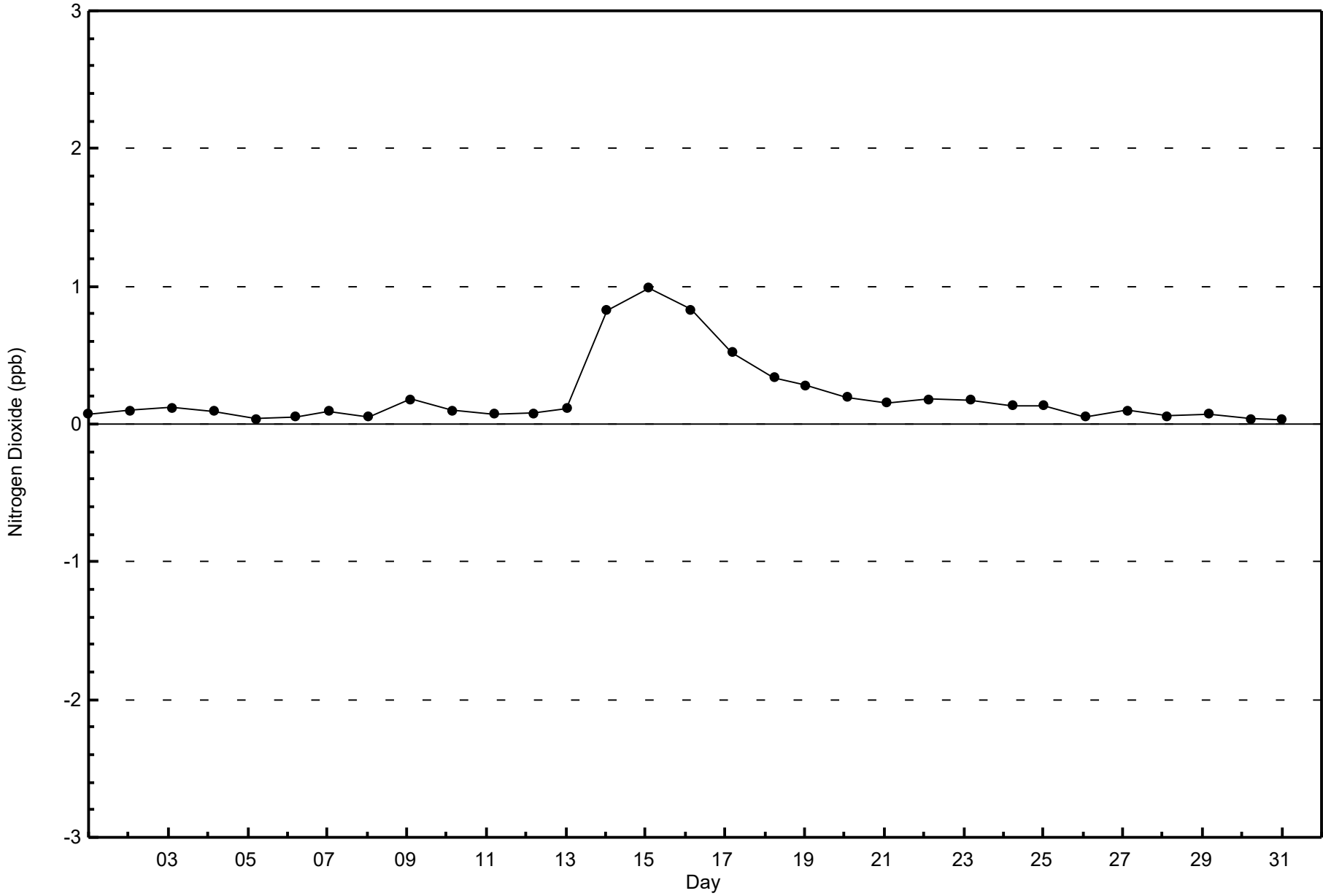
Total Number of Hours: 744

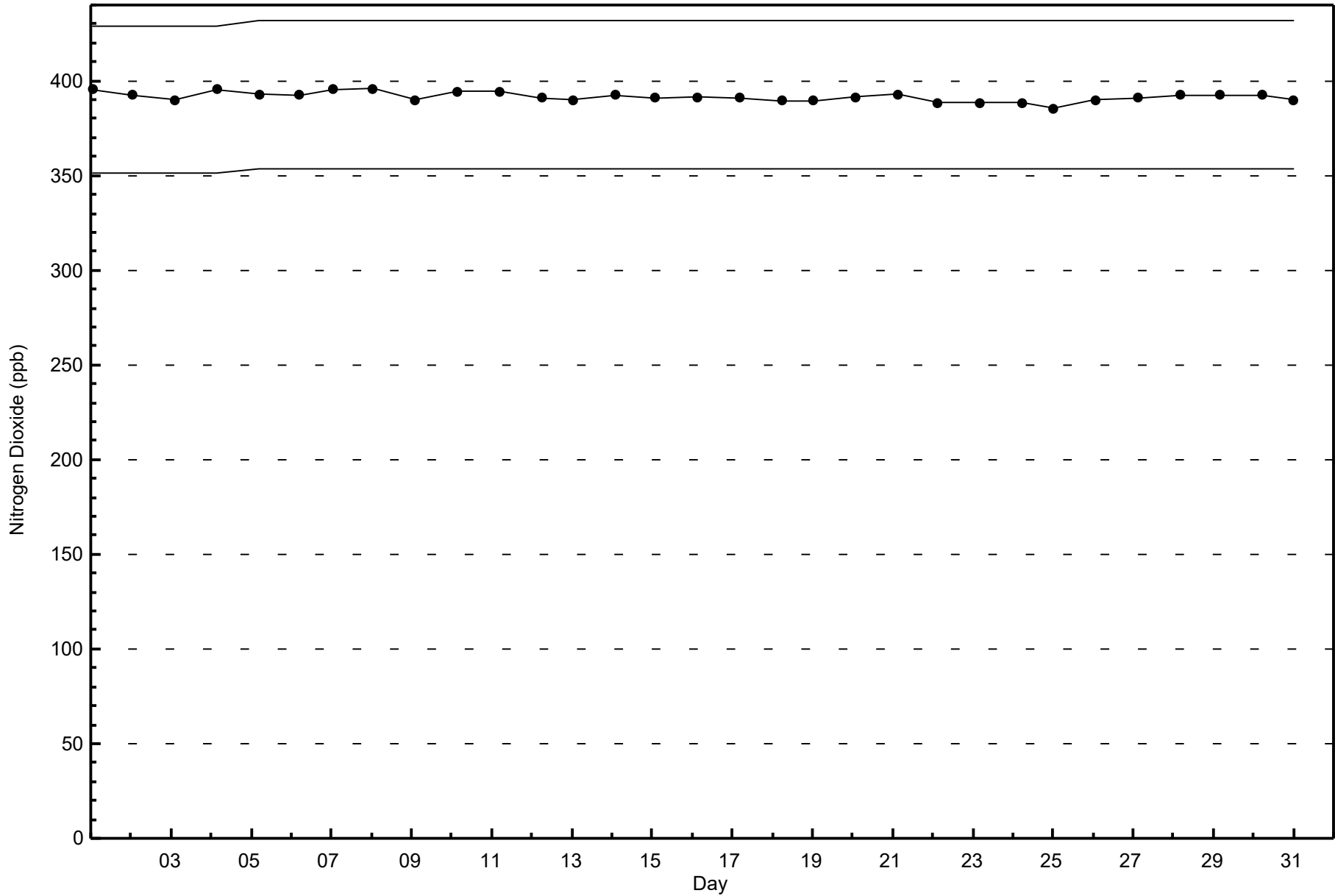


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Mackay River









Wood Buffalo Environmental Association
Summary of Hour Averages

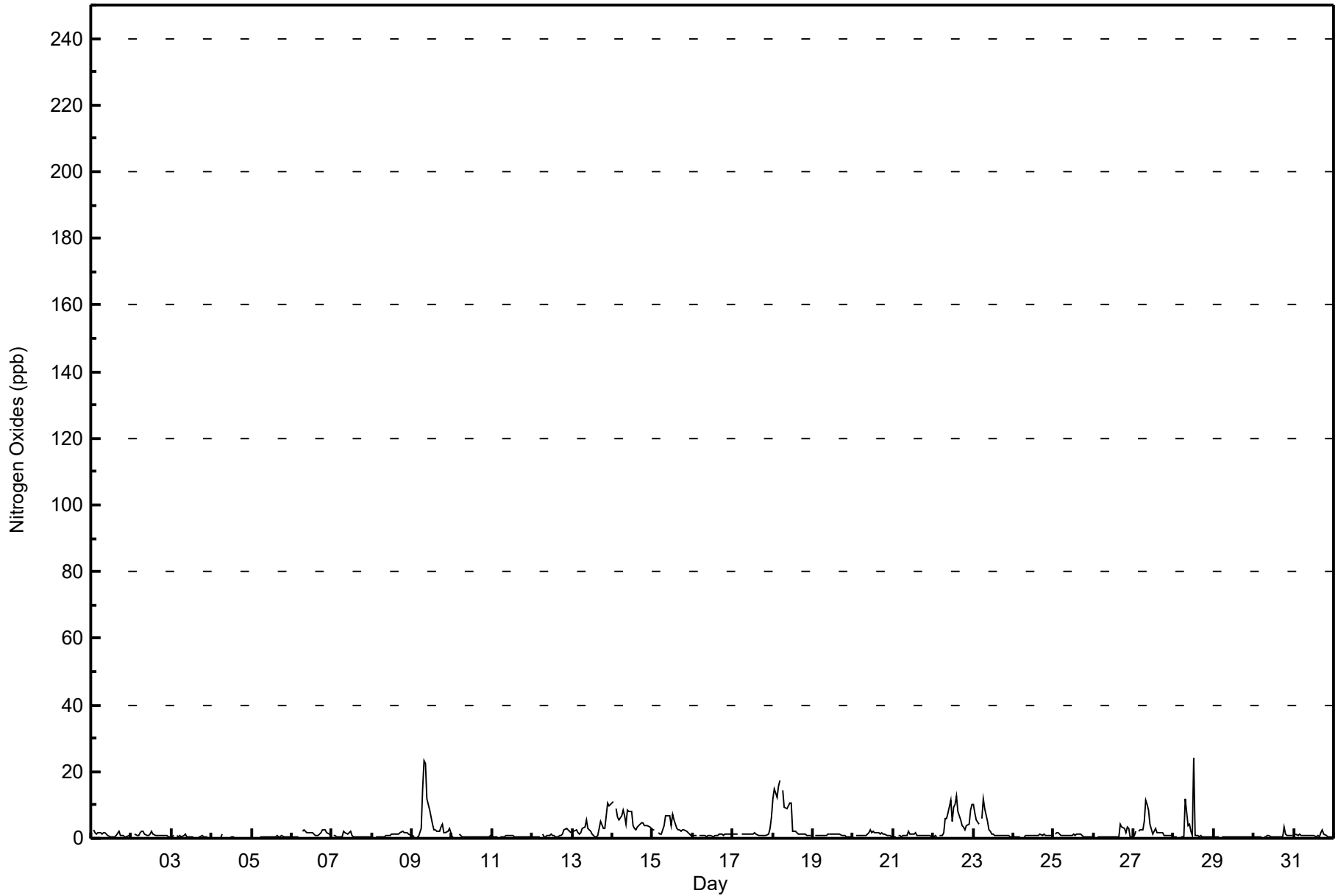
Nitrogen Oxides (NO_x) - ppb
Mackay River - July 2023

Maximum Value: 24.2 ppb on Jul 28 13:00		Maximum Daily Average: 6.6 ppb on Jul 18		Hours in Service: 744																							
Minimum Value: 0.0 ppb on Jul 4 18:00		Minimum Daily Average: 0.2 ppb on Jul 4		Hours of Data: 709																							
Maximum Diurnal Average: 3.5 ppb at hour 8		Minimum Diurnal Average: 1.2 ppb at hour 20		Hours of Missing Data: 35																							
Monthly Average: 1.84 ppb		Percentiles: P ₁ = 0.1 P ₁₀ = 0.3 Q ₁ = 0.5 Median = 0.8 Q ₃ = 1.6 P ₉₀ = 4.2 P ₉₉ = 14.1		Hours of Calibration: 35																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	2.6	1.6	1.1	1.6	1.6	1.2	1.6	1.9	1.3	0.8	0.5	0.5	0.5	0.6	0.8	2.3	0.8	1.0	0.8	0.6	0.6	0.7	0.8	1.1	2.6	
2-Jul	0.8	Z	1.2	0.9	0.9	1.5	2.0	2.2	1.4	0.9	0.9	1.1	2.3	1.1	0.9	1.0	0.7	0.7	0.8	0.7	0.7	0.7	0.6	0.6	1.1	2.3	
3-Jul	0.5	0.7	Z	0.7	0.6	0.8	0.3	0.7	1.1	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.8	0.2	0.4	0.2	0.2	0.2	0.4	1.1	
4-Jul	0.2	0.2	0.1	Z	0.2	0.1	1.2	C	C	C	C	0.6	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.2	1.2	
5-Jul	0.1	0.1	0.1	0.1	Z	0.3	0.3	0.5	0.5	0.5	0.6	0.6	0.5	0.4	0.5	1.0	0.6	0.6	0.6	0.5	0.4	0.3	0.3	0.3	0.4	1.0	
6-Jul	0.3	0.2	0.2	0.2	0.2	Z	2.0	2.5	2.0	1.7	1.6	1.7	1.7	1.1	1.0	1.0	1.0	1.6	2.5	2.5	2.5	1.7	1.3	0.9	1.4	2.5	
7-Jul	Z	1.0	0.9	0.5	0.4	0.3	0.4	1.9	1.7	1.4	1.6	2.0	0.9	0.6	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.8	2.0	
8-Jul	0.4	Z	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.7	0.7	0.8	1.1	1.2	1.2	1.3	1.5	1.8	2.0	1.9	1.8	1.5	1.2	1.0	1.0	2.0	
9-Jul	0.7	0.5	Z	0.5	0.5	3.0	14.7	23.4	22.3	12.1	8.7	6.3	4.2	2.7	2.5	2.2	2.0	3.3	4.2	1.7	1.6	2.3	2.9	1.5	5.4	23.4	
10-Jul	0.6	0.2	0.2	Z	1.2	0.9	0.5	0.6	0.6	0.4	0.3	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.6	0.5	1.2	
11-Jul	0.6	0.6	0.5	0.4	Z	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.6	0.8	
12-Jul	0.4	0.3	0.3	0.3	0.2	Z	1.3	0.6	0.6	1.0	1.0	1.1	1.0	0.8	0.4	0.5	0.8	0.9	1.5	2.5	2.9	2.5	1.9	1.7	1.1	2.9	
13-Jul	Z	2.1	2.5	1.5	1.3	1.6	2.8	3.3	5.7	3.0	2.7	2.1	1.3	0.5	0.4	1.0	2.8	4.9	2.9	2.8	7.0	10.6	9.6	10.0	3.6	10.6	
14-Jul	11.1	Z	8.8	6.2	5.6	6.7	8.3	6.8	4.0	8.5	8.0	7.9	3.8	2.9	2.5	3.6	4.4	4.7	4.6	3.8	3.9	3.8	3.5	2.9	5.5	11.1	
15-Jul	2.4	2.7	Z	1.6	1.2	1.3	2.5	3.7	6.6	6.9	6.6	3.8	7.1	5.4	3.1	2.7	2.5	2.3	2.7	2.6	2.1	1.6	1.1	0.9	3.2	7.1	
16-Jul	0.7	0.8	0.7	Z	0.7	0.8	0.9	0.8	0.6	0.9	0.8	0.8	0.6	0.6	0.7	0.9	1.2	1.2	1.0	1.1	1.3	1.2	1.1	1.1	0.9	1.3	
17-Jul	1.3	1.3	1.3	1.4	Z	1.4	1.5	1.3	1.4	1.5	1.3	1.2	1.2	1.5	1.4	0.9	0.8	0.8	1.0	0.7	0.7	1.3	2.8	6.2	1.5	6.2	
18-Jul	12.1	14.8	12.3	15.6	17.5	Z	14.3	9.1	8.7	9.9	10.6	10.5	2.2	2.1	1.6	1.4	1.4	1.4	1.3	1.1	1.0	1.0	0.9	0.8	6.6	17.5	
19-Jul	Z	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.9	0.8	0.6	0.6	0.6	0.6	0.6	0.9	1.1	
20-Jul	0.6	Z	0.7	0.7	0.6	0.7	0.8	0.8	0.8	1.7	2.5	1.6	2.3	1.6	1.7	1.6	1.2	1.5	1.1	1.1	0.8	0.7	0.7	0.6	1.2	2.5	
21-Jul	0.6	0.6	Z	0.8	0.6	0.6	0.6	0.7	0.9	1.9	1.5	1.3	1.4	1.5	1.0	1.0	1.0	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.9	1.9	
22-Jul	0.6	0.7	0.6	Z	0.9	0.7	1.5	6.1	5.9	7.7	11.3	5.1	9.4	10.1	12.8	8.2	5.3	3.8	3.2	2.7	3.6	4.2	8.3	10.3	5.3	12.8	
23-Jul	10.1	7.7	5.6	4.2	Z	6.0	11.7	9.0	4.9	2.7	2.2	1.4	1.2	1.0	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.6	0.6	0.5	3.3	11.7	
24-Jul	0.5	0.5	0.5	0.5	0.4	Z	0.6	0.7	0.7	0.8	0.8	0.7	0.7	0.8	0.8	0.9	1.1	0.9	1.1	0.8	0.8	0.7	0.8	0.9	0.7	1.1	
25-Jul	Z	1.4	1.5	1.8	1.0	0.8	0.7	0.7	0.7	0.7	1.0	0.9	1.3	1.1	1.2	1.2	1.1	1.0	0.6	0.5	0.5	0.5	0.5	0.4	0.9	1.8	
26-Jul	0.4	Z	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	4.2	3.3	3.0	1.8	3.6	2.9	0.5	0.3	1.1	4.2	
27-Jul	0.8	2.0	Z	2.2	2.6	2.4	5.2	11.4	10.1	8.7	4.2	1.3	2.1	2.9	1.9	1.6	1.6	1.7	1.0	0.8	0.7	0.9	0.9	0.8	3.0	11.4	
28-Jul	0.5	0.4	0.3	Z	0.4	0.4	0.4	12.0	3.9	4.4	2.0	0.9	24.2	0.9	0.6	0.6	0.7	0.6	0.5	0.5	0.4	0.4	0.4	0.3	2.4	24.2	
29-Jul	0.3	0.3	0.3	0.2	Z	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4
30-Jul	0.2	0.3	0.3	0.3	0.3	Z	0.5	0.6	0.8	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.6	3.3	1.4	0.9	0.8	0.7	0.8	0.7	3.3	
31-Jul	Z	1.2	0.9	1.1	0.9	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.8	0.6	1.6	2.7	1.4	0.8	0.6	0.6	0.5	0.5	0.9	2.7	
		1.9	1.7	1.7	1.7	1.6	1.4	2.6	3.5	3.1	2.8	2.5	1.9	2.4	1.5	1.4	1.3	1.4	1.5	1.5	1.2	1.4	1.4	1.4	1.5	Diurnal Average	
		12.1	14.8	12.3	15.6	17.5	6.7	14.7	23.4	22.3	12.1	11.3	10.5	24.2	10.1	12.8	8.2	5.3	4.9	4.6	3.8	7.0	10.6	9.6	10.3	Diurnal Maximum	
Z - zerospan		C - Calibration																									



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Mackay River - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Mackay River - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	99.58	99.58
21 - 40	3	0.42	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Mackay River - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	27	67	39	13	25	68	58	61	55	40	56	48	46	30	43	27	703
21 - 40	2	0	0	0	0	0	0	0	1	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	29	67	39	13	25	68	58	61	56	40	56	48	46	30	43	27	706

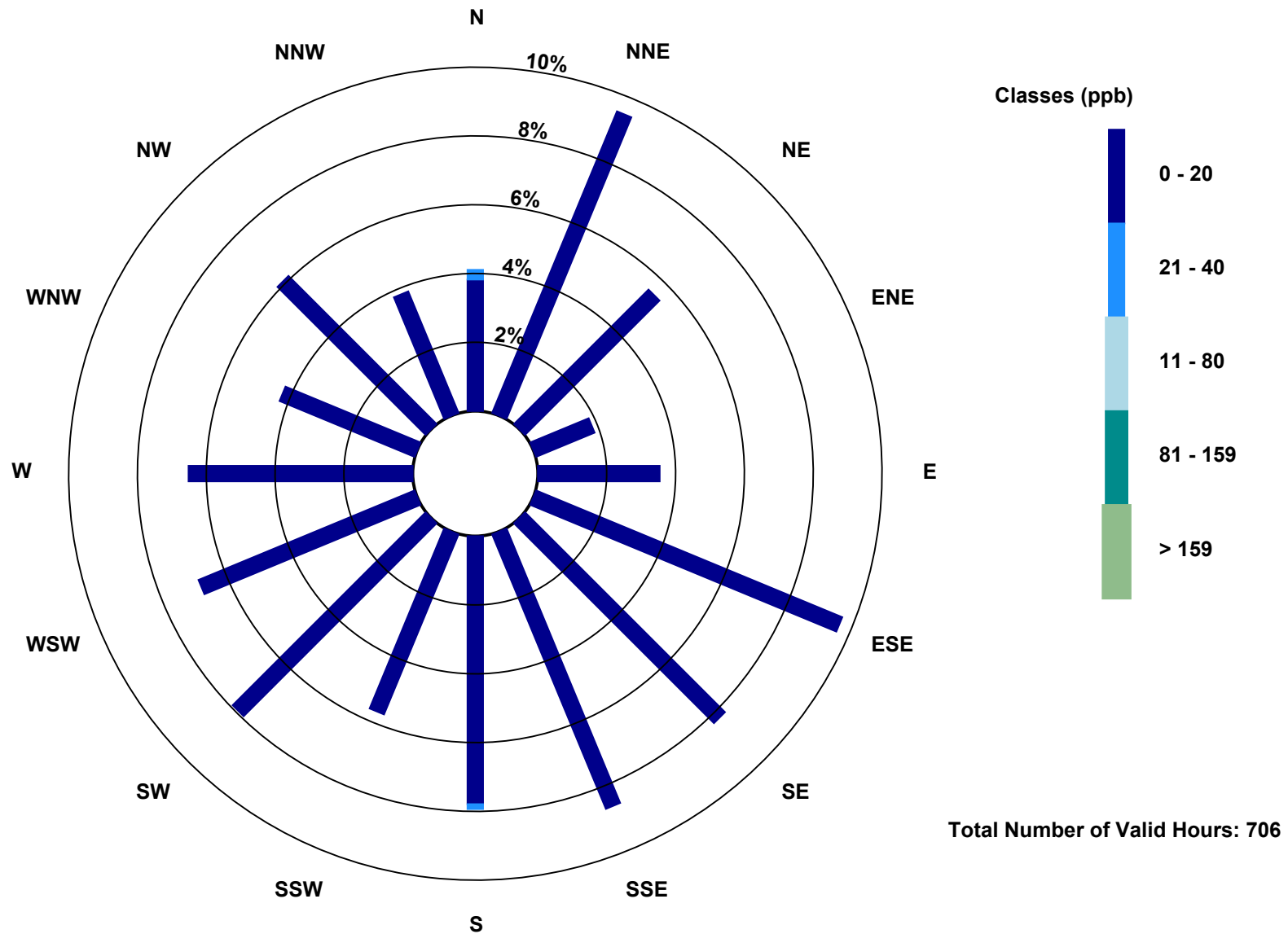
Total Number of Valid Hours: 706

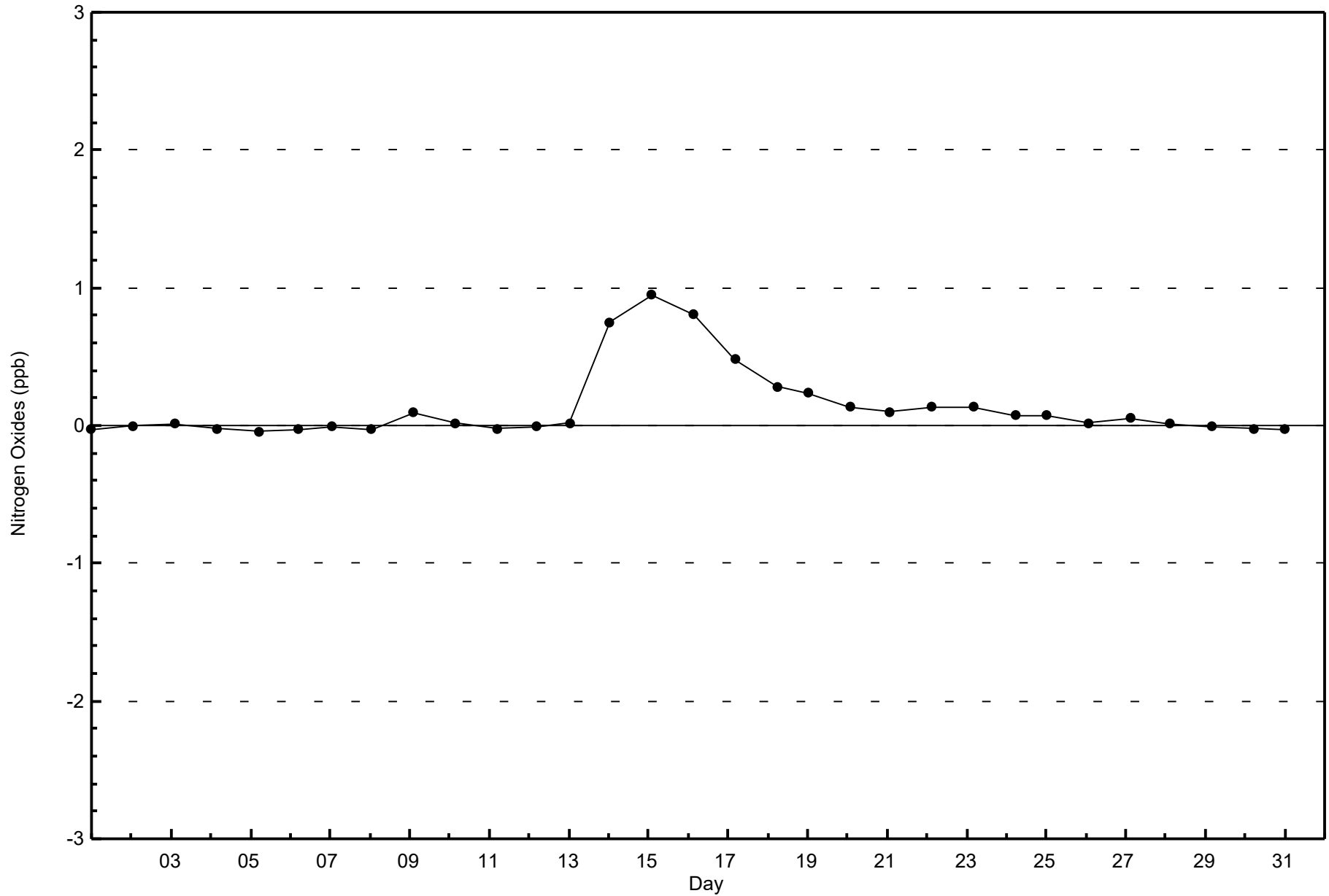
Total Number of Hours: 744

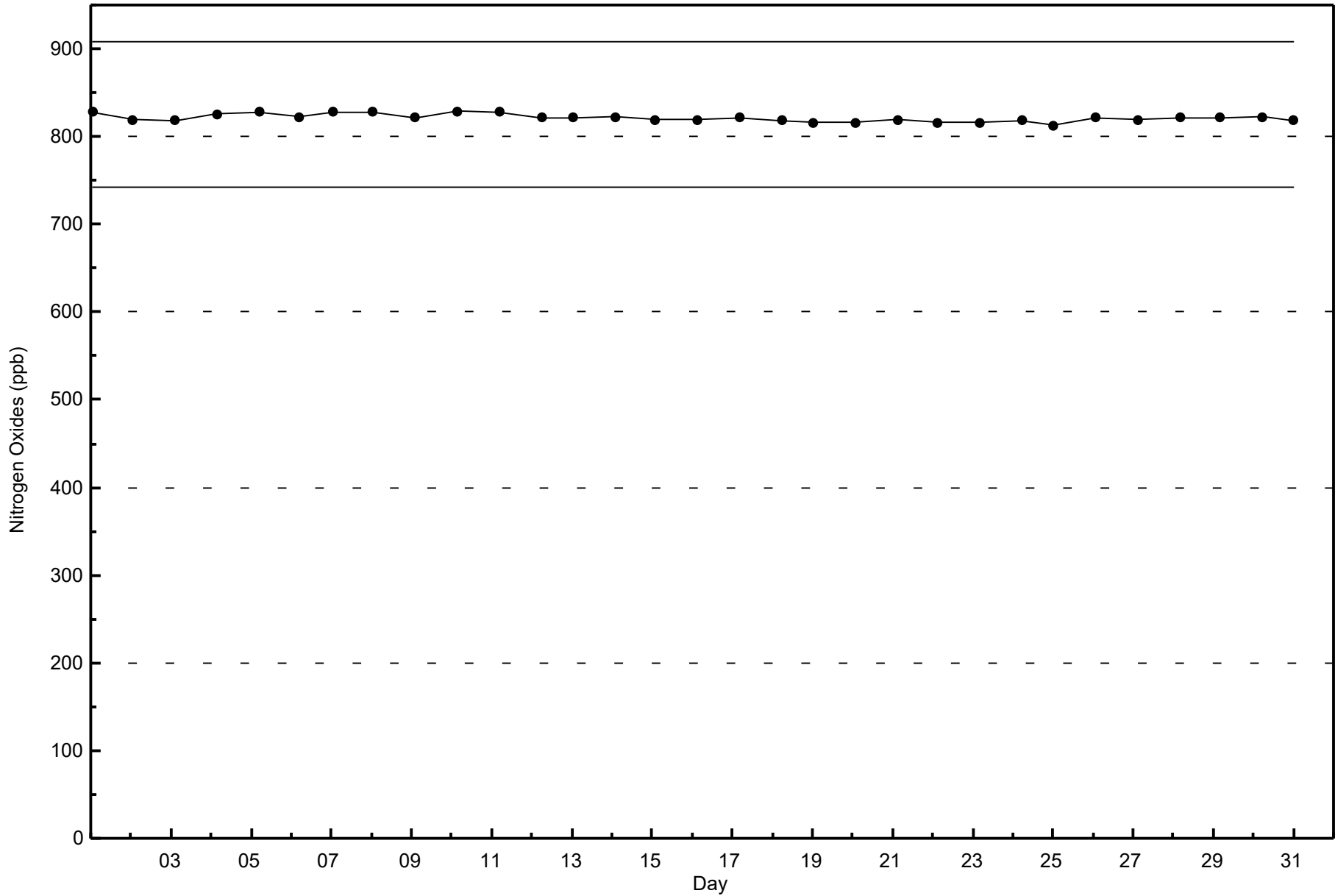


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Mackay River







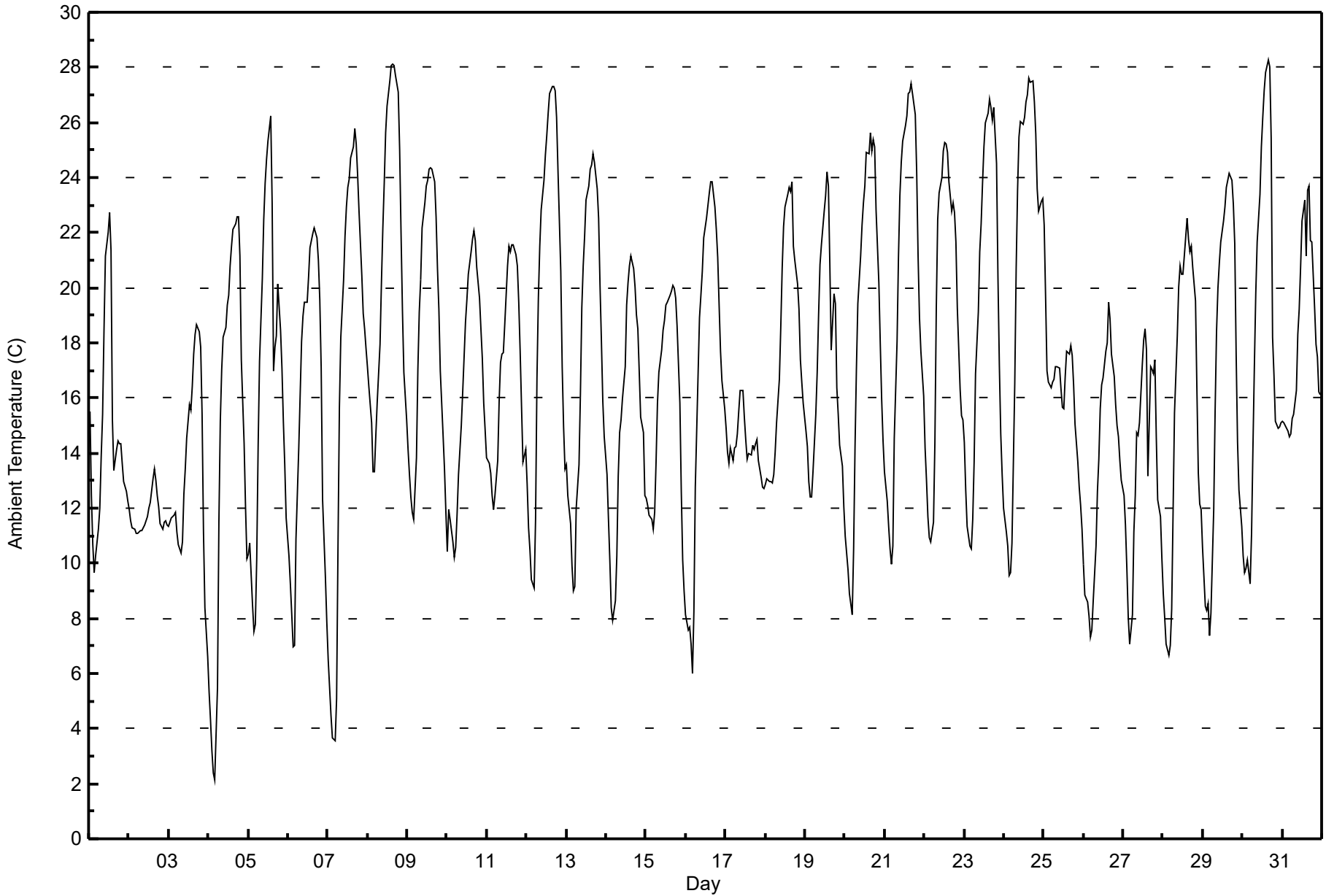


Maximum Value: 28.3 C on Jul 30 16:00 Maximum Daily Average: 21.2 C on Jul 24																						Hours in Service: 744 Hours of Data: 744				
Minimum Value: 2.1 C on Jul 4 05:00 Minimum Daily Average: 11.7 C on Jul 2 Maximum Diurnal Average: 22.1 C at hour 15 Minimum Diurnal Average: 9.7 C at hour 5 Monthly Average: 16.85 C Percentiles: P ₁ = 5.2 P ₁₀ = 10.2 Q ₁ = 12.5 Median = 16.6 Q ₃ = 21.3 P ₉₀ = 24.3 P ₉₉ = 27.6																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	15.5	12.4	10.7	9.7	10.3	11.2	12.0	13.9	15.4	18.4	21.2	22.0	22.8	21.4	15.2	13.4	14.1	14.5	14.3	14.3	13.6	13.0	12.6	12.3	14.8	22.8
2-Jul	12.0	11.5	11.3	11.2	11.1	11.1	11.1	11.2	11.2	11.4	11.6	11.7	12.0	12.2	13.1	13.4	13.0	12.5	12.0	11.5	11.2	11.5	11.6	11.4	11.7	13.4
3-Jul	11.4	11.7	11.7	11.7	11.8	11.1	10.7	10.4	10.8	12.5	13.4	14.5	15.8	15.6	16.4	17.6	18.3	18.7	18.4	17.8	15.4	11.1	8.4	6.6	13.4	18.7
4-Jul	5.4	4.3	3.2	2.4	2.1	5.5	11.5	15.1	17.0	18.2	18.6	19.4	19.7	20.8	21.5	22.1	22.3	22.6	21.1	17.4	14.3	12.1	10.2	14.6	22.6	
5-Jul	10.3	10.7	8.5	7.5	7.8	10.1	14.2	17.3	20.3	22.5	23.8	24.7	25.3	26.3	23.1	17.0	17.8	18.3	20.1	18.5	17.1	15.1	13.6	11.7	16.7	26.3
6-Jul	10.3	9.2	8.1	7.0	7.0	10.9	14.2	16.1	18.1	19.0	19.5	19.5	20.4	21.5	21.7	22.0	22.2	21.8	21.0	19.6	17.1	12.3	9.5	7.9	15.7	22.2
7-Jul	6.5	5.5	4.5	3.7	3.6	5.1	10.6	15.7	18.2	20.3	21.9	22.9	23.6	24.0	24.7	25.1	25.8	25.2	24.1	22.8	20.5	19.1	18.5	17.8	17.1	25.8
8-Jul	17.1	16.4	15.1	13.3	13.3	14.6	15.9	17.9	20.2	22.2	23.8	25.6	26.6	27.5	28.0	28.1	28.1	27.7	27.1	25.0	22.0	19.2	16.9	15.2	21.1	28.1
9-Jul	14.1	13.2	12.4	11.8	11.6	13.8	17.0	19.1	20.3	22.2	23.1	23.7	23.9	24.3	24.4	24.3	23.9	22.6	20.7	19.2	17.0	14.6	13.4	11.8	18.4	24.4
10-Jul	10.4	11.9	11.6	10.8	10.2	10.6	11.8	13.2	15.0	16.2	17.5	18.8	19.6	20.5	21.3	21.8	22.1	21.7	20.8	19.6	18.5	17.5	15.8	14.9	16.3	22.1
11-Jul	13.8	13.6	13.3	12.4	12.0	12.5	13.7	15.8	17.3	17.6	17.6	18.7	20.8	21.5	21.3	21.5	21.5	21.2	20.8	19.5	17.7	15.7	13.7	14.2	17.0	21.5
12-Jul	12.8	11.3	10.5	9.4	9.1	11.6	16.8	19.6	21.5	22.8	23.9	24.8	25.5	26.4	27.0	27.3	27.3	27.1	26.2	24.3	20.6	17.1	15.0	13.4	19.6	27.3
13-Jul	13.6	12.4	11.4	9.9	9.0	9.1	12.0	13.6	16.1	19.3	20.8	21.8	23.2	23.7	24.3	24.5	24.9	24.5	23.6	22.5	20.1	18.0	15.9	14.6	17.9	24.9
14-Jul	13.2	11.6	10.1	8.4	7.9	8.6	10.3	13.1	14.7	15.2	16.0	17.1	19.4	20.2	20.8	21.2	20.7	20.0	19.0	18.5	16.9	15.3	14.7	12.5	15.2	21.2
15-Jul	12.3	12.1	11.8	11.6	11.2	11.8	13.7	15.8	16.9	17.8	18.4	18.8	19.4	19.5	19.7	19.9	20.1	20.0	19.6	18.6	15.8	12.6	10.1	9.0	15.7	20.1
16-Jul	8.1	7.6	7.7	7.1	6.0	8.2	12.8	16.9	18.9	19.7	20.6	21.8	22.5	23.0	23.4	23.9	23.8	22.9	22.1	21.1	19.4	17.7	16.6	15.6	17.0	23.9
17-Jul	14.9	14.1	13.6	14.2	13.7	14.2	14.2	14.7	15.5	16.3	16.3	15.3	14.5	13.8	14.0	13.9	14.3	14.1	14.4	14.5	13.7	13.1	12.8	12.7	14.3	16.3
18-Jul	12.9	13.1	13.0	13.0	12.9	13.2	14.0	15.1	16.7	18.6	20.7	22.2	22.9	23.4	23.7	23.5	23.8	21.5	21.0	20.1	19.2	17.4	16.6	15.8	18.1	23.8
19-Jul	14.8	14.2	13.0	12.4	12.4	13.3	15.4	16.9	19.0	20.8	21.6	22.8	23.3	24.2	23.7	20.9	17.8	19.8	19.4	16.4	15.4	14.3	13.5	12.1	17.4	24.2
20-Jul	11.0	10.4	9.8	8.9	8.2	10.5	14.3	17.1	19.4	21.2	22.3	23.1	23.7	24.9	24.9	25.6	25.0	25.4	25.1	22.8	20.2	18.0	16.0	14.5	18.4	25.6
21-Jul	13.3	12.3	11.3	10.5	10.0	10.6	14.6	18.0	21.1	23.3	24.6	25.3	25.9	26.2	27.1	27.1	27.4	27.0	26.3	24.2	21.1	18.9	17.7	16.1	20.0	27.4
22-Jul	14.2	13.0	11.7	10.9	10.8	11.5	14.4	19.3	22.5	23.4	24.0	25.0	25.3	25.2	24.9	23.9	22.8	23.1	22.7	21.6	19.3	16.3	15.3	15.2	19.0	25.3
23-Jul	14.4	12.7	11.4	10.6	10.5	11.6	13.7	16.9	19.1	21.3	22.3	23.8	25.1	26.0	26.3	26.9	26.5	26.1	26.6	24.5	20.4	17.2	14.7	13.2	19.2	26.9
24-Jul	12.0	11.1	10.6	9.5	9.7	10.7	16.5	20.7	23.5	25.5	26.0	25.9	26.2	26.7	27.0	27.6	27.5	27.5	26.8	25.6	23.6	22.8	23.1	23.2	21.2	27.6
25-Jul	22.3	19.7	17.0	16.6	16.3	16.6	16.7	17.1	17.1	16.3	15.7	15.6	16.8	17.7	17.6	17.9	17.5	16.5	15.0	13.7	12.8	12.1	11.2	16.4	22.3	
26-Jul	10.0	8.9	8.6	8.1	7.3	7.6	8.6	10.6	12.6	13.8	15.6	16.5	16.7	17.7	18.0	19.5	18.9	17.6	16.8	15.7	15.0	14.6	13.7	13.0	13.6	19.5
27-Jul	12.4	11.4	9.8	8.0	7.1	8.1	11.1	12.5	14.7	14.6	15.1	17.2	18.1	18.5	17.7	13.2	17.1	17.0	16.9	17.4	14.6	12.3	11.7	10.2	13.6	18.5
28-Jul	8.9	8.1	7.1	6.6	7.0	8.3	11.9	15.5	18.2	20.0	20.8	20.5	20.5	21.2	22.5	21.7	21.3	21.5	20.7	19.5	16.3	13.3	12.1	11.9	15.7	22.5
29-Jul	10.6	8.4	8.3	8.6	7.4	8.2	11.9	15.6	18.4	20.0	20.9	21.7	22.4	23.0	23.6	23.9	24.2	23.9	23.1	21.6	17.6	14.4	12.7	11.3	16.7	24.2
30-Jul	10.3	9.7	9.8	10.1	9.3	11.1	14.2	17.2	19.8	21.7	23.4	25.1	26.2	27.1	27.8	28.3	28.0	25.4	18.2	16.8	15.1	14.9	15.0	15.1	18.3	28.3
31-Jul	15.1	15.1	14.9	14.8	14.6	14.7	15.3	15.4	16.3	18.3	19.2	20.8	22.4	23.2	21.1	23.5	23.7	21.7	21.7	19.3	18.0	17.5	16.2	16.1	18.3	23.7
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Mackay River - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Mackay River - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	70	9.41	9.41
10 - 20	438	58.87	68.28
> 20	236	31.72	100.00

Total Number of Valid Hours: 744

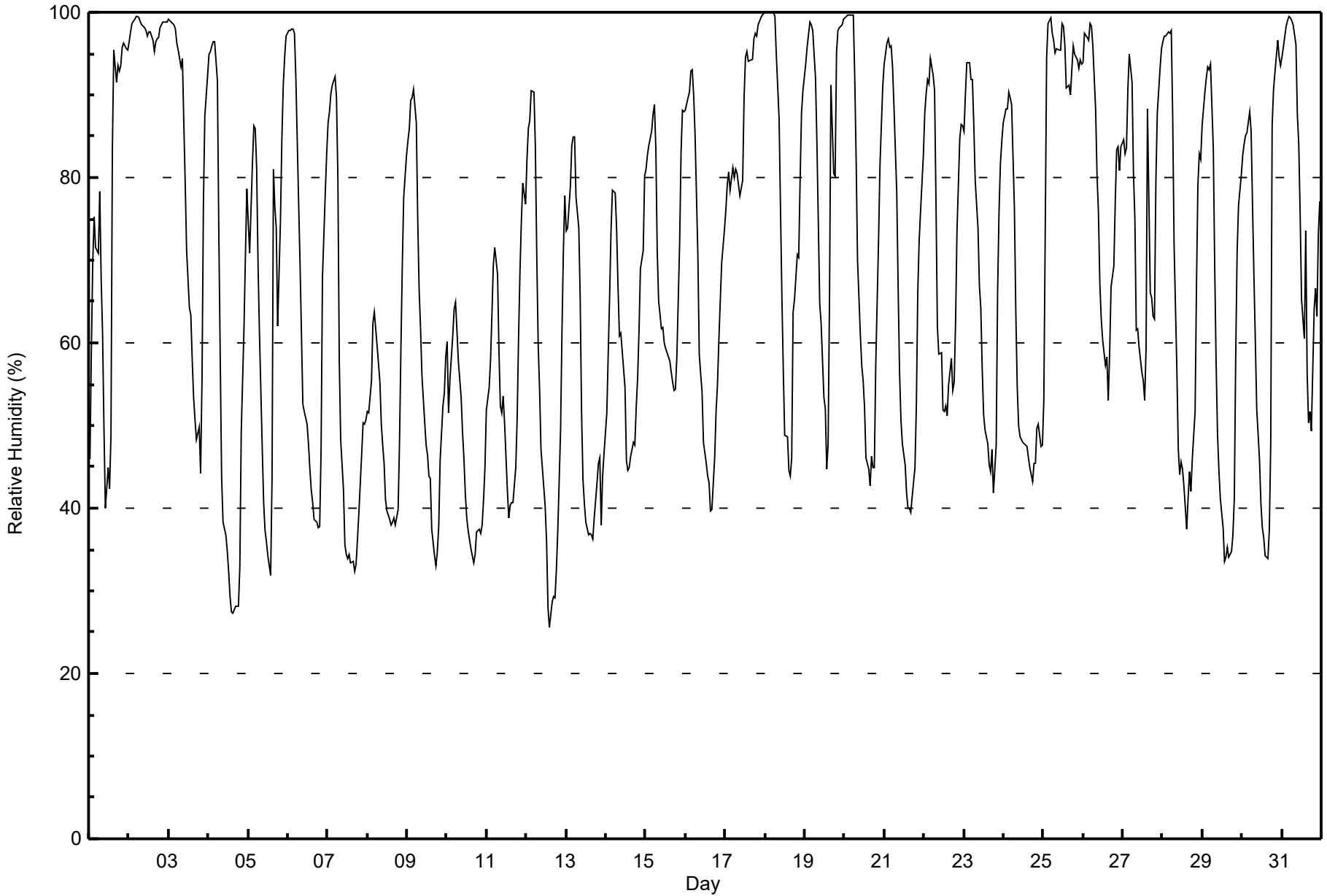
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Relative Humidity (RH) - %
Mackay River - July 2023

Maximum Value: 100.0 % on Jul 18 02:00 Maximum Daily Average: 98.0 % on Jul 2 Minimum Value: 25.6 % on Jul 12 15:00 Minimum Daily Average: 46.5 % on Jul 10 Maximum Diurnal Average: 89.8 % at hour 5 Minimum Diurnal Average: 49.2 % at hour 14 Monthly Average: 68.32 % Percentiles: P ₁ = 28.9 P ₁₀ = 38.8 Q ₁ = 48.0 Median = 68.1 Q ₃ = 90.0 P ₉₀ = 97.0 P ₉₉ = 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 Average	Daily Maximum																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																						
1-Jul	46.0	59.1	69.8	75.3	71.5	70.8	78.3	67.9	61.2	49.6	40.0	44.9	42.3	48.8	83.4	95.4	91.6	93.5	92.9	93.6	95.8	96.2	95.6	95.5	73.3	96.2																				
2-Jul	96.5	97.6	98.6	99.2	99.4	99.5	99.4	98.8	98.5	98.1	97.7	97.2	97.6	97.7	96.6	95.2	96.5	96.7	97.0	98.1	98.8	98.8	98.9	98.9	98.0	99.5																				
3-Jul	99.2	98.9	98.7	98.5	98.0	96.3	95.4	93.3	94.4	86.7	79.4	71.2	64.2	63.4	58.0	53.4	50.7	48.3	49.8	44.2	55.7	76.7	87.4	92.3	77.2	99.2																				
4-Jul	94.9	95.3	96.0	96.4	96.4	91.7	73.3	58.4	43.8	38.2	36.8	34.9	32.3	29.4	27.5	27.3	28.2	28.2	28.1	32.8	49.2	62.0	70.6	78.6	56.3	96.4																				
5-Jul	74.5	70.8	81.6	86.3	85.9	81.2	69.5	61.2	47.3	40.7	37.4	37.4	34.3	31.8	43.7	81.0	76.4	73.9	62.0	74.8	84.6	91.2	94.6	97.1	67.4	97.1																				
6-Jul	97.8	97.7	97.9	98.0	97.5	92.1	76.8	69.5	61.1	52.5	51.6	50.2	47.8	44.7	42.1	40.6	38.7	38.3	37.6	37.8	46.9	68.0	78.2	82.9	64.4	98.0																				
7-Jul	86.7	88.0	90.2	91.2	92.1	89.7	80.1	57.9	48.3	42.1	35.6	34.4	33.9	34.4	33.5	33.5	32.4	33.3	36.4	39.5	46.7	50.4	50.2	50.7	54.6	92.1																				
8-Jul	51.7	51.5	55.4	62.4	63.7	61.7	59.7	55.3	50.2	47.6	45.4	41.0	39.7	38.7	38.0	38.3	38.7	38.0	39.7	48.0	59.4	69.4	77.7	82.7	52.2	82.7																				
9-Jul	84.5	85.9	89.3	89.7	90.7	86.6	75.2	66.5	61.9	56.0	50.4	47.6	46.4	43.9	43.6	37.4	34.3	33.1	34.7	37.8	45.7	52.4	53.9	58.3	58.6	90.7																				
10-Jul	60.2	51.5	55.6	60.9	64.1	64.9	61.5	57.7	53.3	49.2	45.9	41.8	38.8	37.3	35.1	34.2	33.5	34.5	37.2	37.5	37.0	38.0	41.1	45.0	46.5	64.9																				
11-Jul	51.9	54.6	58.0	63.6	69.6	71.6	68.3	58.9	52.4	51.5	53.5	50.3	42.2	38.8	40.4	40.7	40.7	44.9	50.9	60.6	68.7	74.7	79.3	76.8	56.8	79.3																				
12-Jul	82.3	85.9	86.9	90.4	90.3	83.6	70.5	59.8	54.4	47.2	42.5	40.2	35.9	28.0	25.6	28.6	29.4	29.2	32.5	37.4	49.4	61.5	71.1	77.8	55.8	90.4																				
13-Jul	73.5	74.0	79.0	83.9	84.9	84.9	77.7	73.8	65.2	51.3	43.4	40.5	38.4	36.7	37.0	36.9	36.3	38.7	43.0	45.3	46.2	38.0	43.8	46.6	55.0	84.9																				
14-Jul	51.6	58.6	65.5	73.5	78.5	78.1	73.7	66.8	60.9	61.2	59.0	54.5	45.7	44.6	44.9	46.2	47.9	47.7	52.3	55.8	61.5	69.0	71.3	80.1	60.4	80.1																				
15-Jul	81.0	82.8	83.9	85.5	87.7	88.9	83.5	71.1	65.0	61.7	61.8	59.9	59.3	58.7	57.7	56.5	55.2	54.3	54.3	58.4	72.1	83.0	88.1	87.9	70.8	88.9																				
16-Jul	88.1	89.6	90.4	92.8	93.0	90.0	85.3	70.7	58.6	56.2	54.1	48.0	45.4	43.9	43.1	39.6	39.9	46.0	51.7	54.9	60.3	65.1	69.6	73.7	64.6	93.0																				
17-Jul	76.2	79.2	80.6	78.5	81.2	80.0	81.0	80.5	79.2	77.8	79.7	89.7	94.5	95.2	94.0	94.2	94.2	96.8	97.4	97.2	98.5	99.3	99.7	99.9	88.5	99.9																				
18-Jul	100.0	100.0	100.0	100.0	100.0	100.0	99.5	94.8	87.1	76.2	65.5	56.7	48.9	48.6	44.5	43.9	46.1	63.8	65.2	70.6	70.4	79.7	87.8	90.6	76.7	100.0																				
19-Jul	93.7	95.8	97.2	98.9	98.5	97.7	92.1	84.2	74.6	64.7	62.4	53.3	52.0	44.8	47.8	65.6	91.2	80.5	80.2	95.2	97.8	98.1	98.5	99.1	81.8	99.1																				
20-Jul	99.3	99.5	99.6	99.6	99.6	99.6	92.1	82.2	69.9	61.0	57.3	55.5	52.2	46.0	44.8	42.8	46.3	44.8	44.8	57.3	72.4	81.4	86.3	91.0	71.9	99.6																				
21-Jul	93.8	96.3	96.8	95.8	96.0	93.5	88.7	78.1	66.6	56.4	50.7	47.8	45.2	41.8	40.0	40.1	39.5	41.3	44.8	52.3	66.1	72.4	75.9	82.7	66.8	96.8																				
22-Jul	87.7	90.1	91.8	91.3	94.4	92.4	90.4	77.3	62.0	58.6	58.8	51.9	51.6	52.4	51.1	54.9	58.1	54.3	55.2	62.5	73.6	84.7	86.4	86.2	71.6	94.4																				
23-Jul	85.6	90.1	93.9	93.9	91.9	91.9	86.5	79.6	73.9	66.9	64.3	57.0	51.3	49.5	47.8	45.2	44.4	47.1	41.9	47.6	66.0	75.7	81.7	84.5	69.1	93.9																				
24-Jul	86.6	88.3	88.3	90.3	89.7	88.7	76.3	63.7	54.8	49.9	48.6	48.0	47.7	47.7	47.5	46.0	44.9	43.3	45.4	45.4	49.7	50.1	47.4	47.5	59.8	90.3																				
25-Jul	53.0	73.5	94.7	98.7	99.2	97.4	96.7	95.1	95.7	95.4	95.4	98.6	98.3	96.1	90.8	91.3	90.1	93.0	95.9	94.9	94.2	93.2	94.3	93.8	92.5	99.2																				
26-Jul	93.8	97.5	96.9	96.7	98.6	98.3	96.0	88.1	80.2	75.8	67.1	63.0	60.3	57.3	58.3	53.1	58.8	66.7	69.4	77.1	83.4	83.7	80.9	83.8	78.5	98.6																				
27-Jul	84.6	82.8	83.6	90.7	94.9	91.6	80.4	75.0	61.6	61.6	59.5	56.5	55.5	53.0	59.3	88.3	66.1	65.4	63.2	62.8	79.5	87.8	93.2	95.5	74.7	95.5																				
28-Jul	96.5	97.1	97.0	97.6	97.5	97.8	87.5	71.9	56.6	47.2	44.1	45.5	44.7	42.7	37.4	41.1	44.4	42.0	46.0	51.6	67.1	79.2	82.9	82.2	66.6	97.8																				
29-Jul	86.3	90.4	92.1	93.4	93.1	93.7	83.5	69.1	57.6	48.9	44.6	41.2	37.6	33.6	34.1	35.2	34.1	34.8	36.8	41.2	58.5	71.0	76.5	80.3	61.2	93.7																				
30-Jul	82.7	84.0	85.2	85.4	88.0	85.6	76.5	68.2	60.1	52.1	45.7	40.5	37.6	36.4	34.2	34.0	37.4	47.9	86.3	90.7	92.6	96.6	94.6	93.6	68.2	96.6																				
31-Jul	94.6	95.8	98.4	99.1	99.5	99.3	98.9	98.5	96.0	87.7	84.0	75.6	65.3	60.4	73.5	56.3	50.3	51.7	49.3	64.1	66.7	63.2	73.2	77.2	78.3	99.5																				
																						81.8	83.9	86.9	88.9	89.8	88.4	82.4	74.0	66.2	60.3	56.8	54.0	51.2	49.2	50.2	52.2	52.1	53.3	55.6	60.2	68.2	74.5	78.4	81.1	Diurnal Average
																						100.0	100.0	100.0	100.0	100.0	100.0	99.5	98.8	98.5	98.1	97.7	98.6	98.3	97.7	96.6	95.4	96.5	96.8	97.4	98.1	98.8	99.3	99.7	99.9	Diurnal Maximum





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Mackay River - July 2023

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	85	11.42	11.42
40 - 60	222	29.84	41.26
60 - 80	154	20.70	61.96
80 - 100	278	37.37	99.33

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

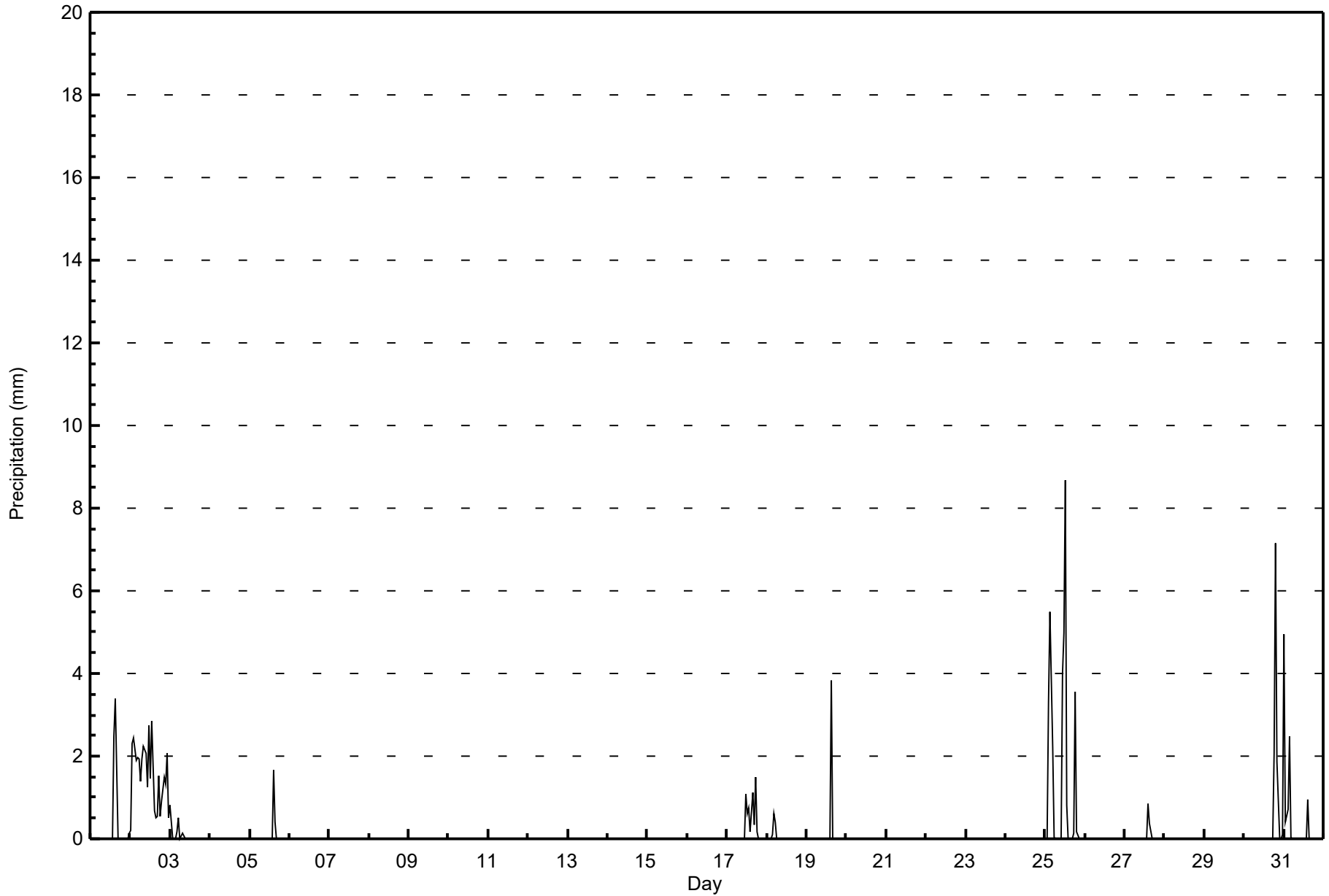
Precipitation (PC) - mm
Mackay River - July 2023

Maximum Value: 8.7 mm on Jul 25 13:00		Maximum Daily Total: 36.8 mm on Jul 2		Hours in Service: 744																																												
Minimum Value: 0.0 mm on Jul 1 01:00		Minimum Daily Total: 0.0 mm on Jul 4		Hours of Data: 744																																												
Maximum Diurnal Total: 10.7 mm at hour 13		Minimum Diurnal Total: 0.8 mm at hour 24		Hours of Missing Data: 0																																												
Monthly Total: 112.50 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 = 3.5		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	6.0	3.4																							
2-Jul	0.2	2.3	2.4	1.9	2.0	1.9	1.4	1.9	2.3	2.1	1.3	2.8	1.5	2.9	0.7	0.5	0.5	1.5	0.6	0.9	1.5	1.3	2.1	0.5	36.8	2.9																						
3-Jul	0.8	0.0	0.0	0.0	0.2	0.5	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	1.7	0.8																						
4-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	1.7																						
6-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.6	0.7	0.2	1.1	0.3	1.5	0.2	0.0	0.0	0.0	0.0	0.0	5.7	1.5																						
18-Jul	0.0	0.0	0.0	0.1	0.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.6	0.6																						
19-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	3.8	3.8																						
20-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	3.3	5.5	2.2	0.0	0.0	0.0	0.0	0.0	4.0	5.0	8.7	0.8	0.0	0.0	0.0	0.1	3.6	0.2	0.0	0.0	0.0	33.4	8.7	8.7																						
26-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.9	0.9																						
28-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	7.2	1.9	0.0	0.0	11.2	7.2	7.2																						
31-Jul	4.9	0.4	0.7	2.5	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	9.5	4.9	4.9																						
																								6.0	2.7	6.4	10.0	4.9	2.9	1.4	2.1	2.3	2.1	5.3	8.9	10.7	4.4	6.8	9.6	0.9	3.2	6.3	8.2	3.3	1.3	2.1	0.8	Diurnal Average
																								4.9	2.3	3.3	5.5	2.2	1.9	1.4	1.9	2.3	2.1	4.0	5.0	8.7	2.9	2.5	3.8	0.5	1.5	3.6	7.2	1.9	1.3	2.1	0.5	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Mackay River - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Precipitation (PC) - mm
Mackay River - July 2023**

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	689	92.61	92.61
0.4 - 0.5	8	1.08	93.68
0.6 - 0.7	6	0.81	94.49
0.8 - 1.4	10	1.34	95.83
1.5 - 10	29	3.90	99.73
> 10	0	0.00	99.73

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Mackay River - July 2023

Maximum Speed: 17 km/h on Jul 3 13:00	Maximum Daily Speed Average: 10.3 km/h on Jul 10	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 6 04:00	Minimum Daily Speed Average: 1.3 km/h on Jul 4	Hours of Data: 740
Maximum Diurnal Speed Average: 1.7 km/h at hour 24	Minimum Diurnal Speed Average: 0.2 km/h at hour 7	Hours of Missing Data: 4
Monthly Average Velocity: 0.2 km/h 113.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 8 P ₉₀ = 10 P ₉₉ = 15	Percent Operational Time: 99.5

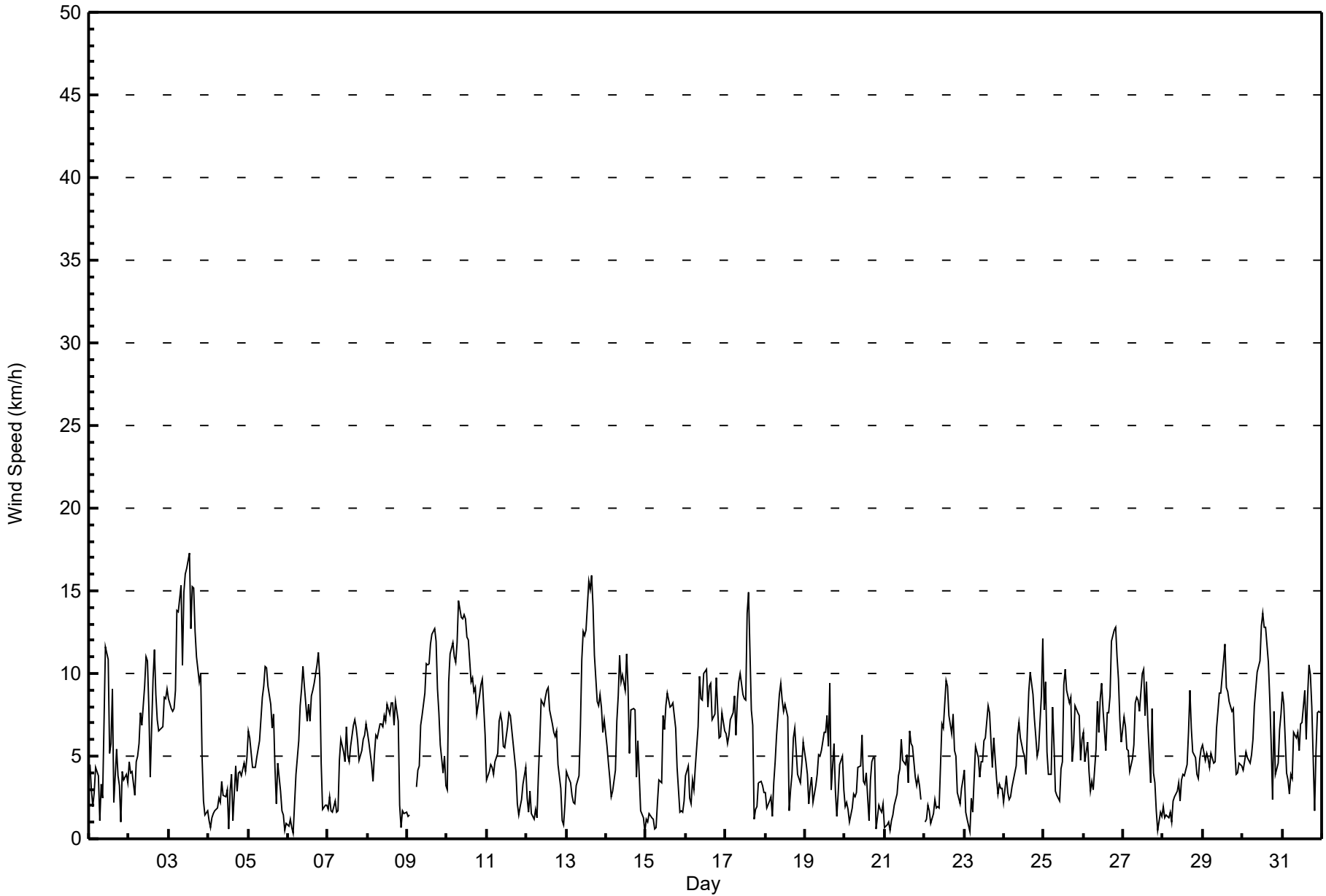
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	W4	W3	SSE2	SE3	SSE4	SSE4	ESE1	SSE3	SE2	SSE7	SSE12	SSE11	SE5	ESE6	SSW9	W2	WNW5	W4	WNW3	WSW1	SSW4	WSW4	WSW4	WSW3	S2.6	SSE12
2-Jul	WNW5	W4	WNW4	WSW3	WNW5	WNW5	NW6	NW8	NW7	NNW9	NW11	NW11	WNW8	WNW4	WNW10	WNW11	W9	W7	W7	W7	W7	W9	W9	W9	WNW6.7	WNW11
3-Jul	WNW8	WNW8	WNW8	WNW8	WNW9	N14	N14	N15	NNW11	NNW15	NNW16	NNW16	NNW17	N13	NNW15	N15	NNE13	N11	NNE10	N10	N5	NNW2	SSE1	SSE2	NNW9.4	NNW17
4-Jul	SSE1	S1	S1	S2	SSE2	W2	W2	SW2	WSW3	ENE3	WNW3	WNW3	E1	N3	NW4	W1	SW4	SSW3	WSW4	SW4	S4	SE5	SSE4	S5	SW1.3	S5
5-Jul	S6	S6	S4	S4	SSW4	SSW5	SW5	SW6	SW9	WSW9	WSW10	WSW10	WSW9	WSW8	NNW7	ESE8	S4	SW2	SSW5	SSE3	S2	SW1	SSW1	SW1	SW4.0	WSW10
6-Jul	SSW1	WSW1	SSW1	S0	NW2	NW4	N6	NNE8	NNE9	NNE10	NNE9	NNE7	NNE8	NNE7	NNE9	NNE9	NNE9	NE11	NNE11	NNE10	NNE5	SSE2	SSE2	SSE2	NNE5.1	NNE11
7-Jul	SSE2	SE3	SSE2	SSE2	SSE2	SE2	SW2	W5	W6	W5	NNW5	NNW7	NNW5	WSW5	SW6	SW7	W7	WSW7	SW6	SW5	SSW5	SSW6	SW6	SW7	WSW3.1	W7
8-Jul	SW6	SW6	SW4	SW3	SW5	SW6	SW6	WSW7	WSW7	WSW7	WSW7	W7	W8	WSW8	W8	WNW8	WSW7	NW8	NW7	W2	NW1	SSE2	SE2	SE2	WSW4.7	NW8
9-Jul	SE1	SE1	UO	UO	UO	NNE3	NNE4	N4	N7	NNE7	NNE9	NE11	NE11	NNE11	NE12	NNE12	NNE13	NE12	NE9	NNE8	NNE6	NE4	NE5	E3	NNE7.0	NNE13
10-Jul	E3	ESE9	ESE11	ESE12	ESE11	ESE11	ESE12	ESE14	ESE13	ESE13	ESE14	E13	ESE12	ESE12	ESE9	ESE10	E9	E9	E8	E9	ESE9	ESE10	ESE8	ESE6	ESE10.3	ESE14
11-Jul	SE4	SE4	SE5	SE4	SE4	SE5	SE5	SSE7	S8	S7	S6	SSE6	SSE7	S8	S7	S7	S6	S4	SE2	ESE1	SE2	SE2	SSE3	SSE4	SSE4.6	S8
12-Jul	SE2	SE2	SE3	SSE1	SE1	W2	SW1	WSW4	WNW6	NNW8	N8	NW9	NNW9	NW9	N8	NNE7	NNE6	N6	NE7	NNE4	NNE3	N1	NW1	NW2	NNW3.1	NW9
13-Jul	NW4	NW4	WNW3	W3	W2	W2	W3	WNW4	NW7	NW11	NNW13	NW12	NW13	NNW16	NNW15	NW16	NW14	NW11	NW8	N8	NNE9	NNW8	NW6	NW7	NW7.8	NW16
14-Jul	NW6	NNW5	NW4	W3	W3	W4	WNW7	NNW9	NNW11	NW10	NW10	NW9	NNW11	NW9	NNE5	NNE8	NE8	NNE8	NE4	NE6	NE4	NNE2	NNE1	NNE0	NNW4.7	NNW11
15-Jul	SSE1	SSE1	SE1	SE1	ESE1	SW1	ENE1	NE2	NNE4	NE3	NNE7	NNE7	NE8	NE9	NE8	ENE8	NE8	NE7	NE7	ENE4	SE2	SE2	ESE2	SE2	NE3.5	NE9
16-Jul	E4	ESE4	SE2	SE2	ESE4	SE3	ESE4	SE7	SE10	SSE8	SSE8	SE10	ESE10	SE8	SE9	SSE9	SE7	ESE8	ESE10	ESE8	ESE6	ESE6	ESE8	ESE7	SE6.5	ESE10
17-Jul	ESE6	ESE6	ESE6	ESE7	ESE8	ESE9	ESE6	ESE8	ESE9	SE10	SE9	ESE8	ESE8	ESE14	ESE15	ESE8	ESE7	E1	NW2	NNE2	N3	N3	NE3	NNE3	ESE5.9	ESE15
18-Jul	NNE3	ENE2	N2	NNE3	NNW1	NNW3	NNW5	N6	N9	N9	NNE8	NE8	E8	ENE7	ENE2	ENE3	SW4	WSW6	WSW7	W4	WSW4	WSW3	WSW5	SSW6	N1.6	N9
19-Jul	SW5	WSW4	WSW2	WSW3	SW4	SW2	SW3	WSW4	WSW5	SW5	SW5	SW6	SSW6	SSW7	SSW6	WSW9	SW3	SW6	SW3	SSE1	SSE3	S5	S5	S3	SW4.0	WSW9
20-Jul	SSE2	WSW2	WSW2	SW1	SSE2	SW3	SW3	WSW3	WNW4	WNW4	NNW6	NW3	WNW3	NW4	N1	W4	NNW5	NW5	NW5	WSW1	SE2	SE2	SSW2	W2	WNW1.8	NNW6
21-Jul	WNW1	WSW1	WSW1	WSW1	SW1	WSW1	WSW2	WSW3	W4	WNW4	WNW6	NW5	NW4	NNW5	W3	W7	WSW6	W6	WSW4	SSW3	SSW4	SW3	W2	UO	W2.8	W7
22-Jul	SSW1	SSE1	ESE2	SE2	WNW1	ESE2	ESE2	ESE2	E2	WNW2	N7	NNE7	NNE8	NNE10	NNE9	NE7	NNE6	NE8	NE5	NNE5	NNE3	NE2	NNE3	NE4	NE3.4	NNE10
23-Jul	NNE4	NE2	N1	E0	ESE2	SE2	S4	SE6	S5	SW4	W5	SW5	SW6	SSW6	S8	SSW8	SW6	SSW4	SSW6	SSW4	SSE3	SE3	SE3	SE3	S2.8	S8
24-Jul	SE2	SSE4	SSE3	SE2	SE3	SE3	SSE4	SSE4	SSE6	SSE7	SE6	SE5	SE5	ESE4	E7	E9	E10	E9	ENE7	ENE6	ENE5	E5	E9	ESE12	ESE4.8	ESE12
25-Jul	ESE8	W9	W5	NW4	NNE4	ENE8	ENE6	E3	S3	SSW2	SE4	E5	ESE9	SSE10	SE9	ESE8	ESE9	SE5	WSW6	SW8	SW8	SW7	SW5	SSW6	SSE2.7	SSE10
26-Jul	SSW6	S5	S6	SSE4	ESE3	ESE3	ESE3	ESE5	SE8	ESE6	SE9	ESE9	ESE8	E5	NE8	NE8	NE9	NNE12	N13	NNE13	NNE11	NE10	E7	NE6	ENE4.3	NNE13
27-Jul	NE7	NE7	NE5	NNE5	NE4	NNE5	NNE6	NNE8	NE9	NNE8	N8	NNE10	NNE10	NE7	E9	SSE7	S3	N8	N4	NNE3	E2	ESE0	NNW2	SE1	NE4.6	NNE10
28-Jul	SSE2	SSW1	S1	ESE1	S2	SW1	WSW2	W3	SW3	NW3	NNE2	NE4	S4	SSE4	S4	S6	SSE9	S7	SSE5	S5	S4	SSE4	S5	S5	S2.7	SSE9
29-Jul	S6	S5	S5	S5	S4	S5	SSW5	SW5	SW7	SW8	SW9	SSW9	S11	S12	SSW9	S9	SSW8	SSW8	SSW8	SSW6	S4	S4	S5	S4	SSW6.3	S12
30-Jul	S4	SSE5	S5	S5	SSE5	SSE5	SSE6	SSE8	SSE9	SSE10	SSE11	SSE13	S14	SSW13	SSW13	SSW11	SSW9	SSW6	W2	W8	NE4	ESE5	SE7	SSE8	S6.3	S14
31-Jul	S9	SE8	W4	NW4	ESE3	ESE4	S4	S6	S6	SSW6	SW5	SW7	WSW7	SW9	W6	W9	WNW11	NW10	NW8	W2	SW5	WSW8	WSW8	WSW8	SW4.0	WNW11
S1.2 S1.2 S1.1 SSE1.1 SSE1.3 SE0.8 SE0.2 ESE0.3 SW0.6 NW0.7NNW1.2NNE1.1NNE0.8 E0.5 NE0.8 ENE0.4 NNE0.5 N1.6 N1.4 NNE1.0 E0.7 SSE1.0 SSE1.5 SSE1.7																								Diurnal Average		
S9 ESE9 ESE11 ESE12 ESE11 N14 N14 N15 ESE13NNW15NNW16NNW16NNW17NNW16NNW15 NW16 NW14 NNE12 N13 NNE13 NNE11 ESE10 E9 ESE12																								Diurnal Maximum		

UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Mackay River - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Mackay River - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	380	51.35	51.35
6 - 11	317	42.84	94.19
12 - 19	43	5.81	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: 740

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Mackay River - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	9	24	14	8	12	22	48	42	39	18	36	30	31	18	19	10	380
6 - 11	14	37	25	6	12	40	15	19	19	21	23	21	18	14	22	11	317
12 - 19	6	6	1	0	1	11	0	2	2	2	0	0	0	0	4	8	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	29	67	40	14	25	73	63	63	60	41	59	51	49	32	45	29	740

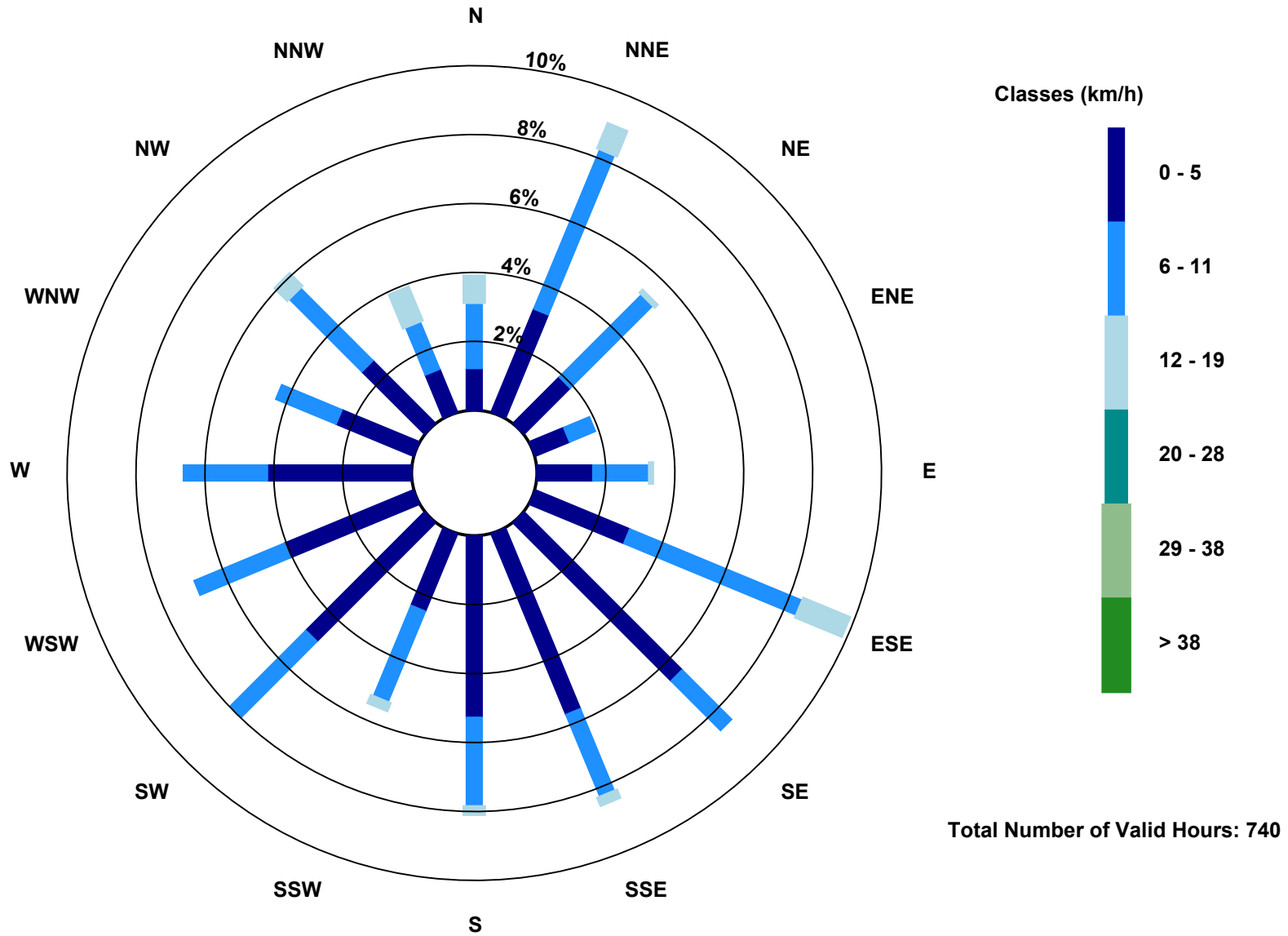
Total Number of Valid Hours: 740

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Mackay River





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Mackay River - July 2023

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



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Mackay River - July 2023

Direction of Maximum Speed: 345 deg on Jul 3 13:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 105.9 deg on Jul 10	Hours of Data: 740
Direction of Minimum Speed: 179 deg on Jul 6 04:00	Direction of Minimum Daily Speed Average: 1.3 deg on Jul 4
Direction of Minimum Daily Speed Average: 1.3 deg on Jul 4	Hours of Missing Data: 4
Monthly Average Direction: 113.8 deg	Percent Operational Time: 99.5

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	266	280	153	141	152	162	107	168	127	151	152	153	146	119	202	268	303	266	294	241	213	243	239	242	185.2
2-Jul	292	269	296	258	288	295	311	316	322	330	317	320	302	290	285	293	280	277	276	263	269	279	274	279	293.2
3-Jul	286	293	287	292	293	358	352	1	339	343	337	342	345	351	346	359	15	352	16	5	358	340	167	152	343.2
4-Jul	167	178	179	172	159	267	279	235	251	59	303	286	98	4	314	277	219	205	242	215	178	130	158	172	214.7
5-Jul	183	181	178	185	201	195	215	221	227	254	251	255	252	237	327	113	170	220	197	152	178	223	194	225	218.8
6-Jul	206	244	212	179	307	319	5	12	15	20	16	19	13	33	14	12	31	37	32	32	31	147	156	152	21.1
7-Jul	150	139	147	155	148	129	234	269	275	273	345	327	329	242	231	224	263	241	234	220	207	207	215	219	240.1
8-Jul	222	223	214	226	224	235	230	244	256	258	258	269	276	257	279	283	252	313	318	270	320	158	141	127	256.3
9-Jul	129	125	UO	UO	UO	26	21	8	5	28	24	35	36	29	34	30	30	36	35	21	33	53	56	83	32.4
10-Jul	93	107	109	107	110	113	108	107	110	108	108	101	105	107	102	106	99	90	93	99	106	109	114	120	105.9
11-Jul	134	139	136	142	139	136	128	149	171	177	173	161	166	181	185	183	181	170	143	122	126	138	149	147	159.0
12-Jul	137	125	137	148	143	279	218	245	291	336	358	322	335	319	0	25	12	355	34	30	23	11	309	307	348.0
13-Jul	314	314	291	278	260	270	278	283	305	324	329	320	324	329	337	325	321	313	319	359	13	342	324	317	323.6
14-Jul	321	339	316	268	266	279	303	334	335	312	324	321	332	321	25	30	47	32	46	39	50	17	25	18	342.2
15-Jul	149	163	124	139	102	233	62	38	33	41	25	31	48	41	51	60	43	43	52	72	129	131	113	125	53.4
16-Jul	100	103	145	141	120	125	121	129	142	147	162	135	111	124	126	153	140	117	111	113	113	114	109	113	126.4
17-Jul	113	110	112	119	114	118	112	107	121	133	134	118	102	112	111	122	111	91	326	13	360	357	35	24	109.6
18-Jul	24	78	360	18	346	330	339	4	1	3	19	52	93	73	62	76	235	242	244	262	252	242	237	209	356.7
19-Jul	222	237	258	248	227	233	235	254	251	216	224	220	208	203	209	240	230	223	219	159	150	174	178	169	218.4
20-Jul	153	245	241	222	165	231	227	243	285	283	340	323	301	318	11	268	331	322	308	250	146	138	195	263	285.8
21-Jul	300	247	248	251	229	255	254	253	273	295	294	306	313	330	265	265	258	264	240	212	204	228	262	UO	268.7
22-Jul	192	160	117	145	296	103	122	106	82	303	11	24	16	24	32	36	24	42	48	28	21	49	32	38	35.0
23-Jul	30	47	10	100	116	144	169	126	173	231	274	222	226	203	187	199	218	196	205	213	158	143	140	137	188.8
24-Jul	131	149	156	128	126	146	160	160	167	158	145	141	144	116	82	81	89	79	66	70	78	85	99	104	111.3
25-Jul	111	270	279	304	29	74	70	90	188	196	133	79	115	162	135	122	119	139	239	224	221	217	216	212	159.0
26-Jul	201	173	174	149	121	104	104	112	143	123	134	109	121	100	53	47	34	13	10	18	23	51	86	38	75.6
27-Jul	41	46	52	32	37	23	28	26	34	23	7	22	13	38	87	154	183	354	2	28	84	117	332	146	34.1
28-Jul	164	200	172	123	178	230	246	270	222	315	28	55	180	153	177	180	160	179	161	185	185	166	182	184	178.2
29-Jul	178	171	186	190	171	181	213	219	230	214	215	198	183	188	197	187	193	201	208	196	173	173	173	172	193.8
30-Jul	169	162	171	169	150	148	159	166	166	168	168	157	182	195	205	193	196	208	280	281	56	113	130	153	174.8
31-Jul	178	129	275	315	121	123	191	183	173	192	214	230	245	228	276	262	283	313	319	276	229	244	241	237	235.5

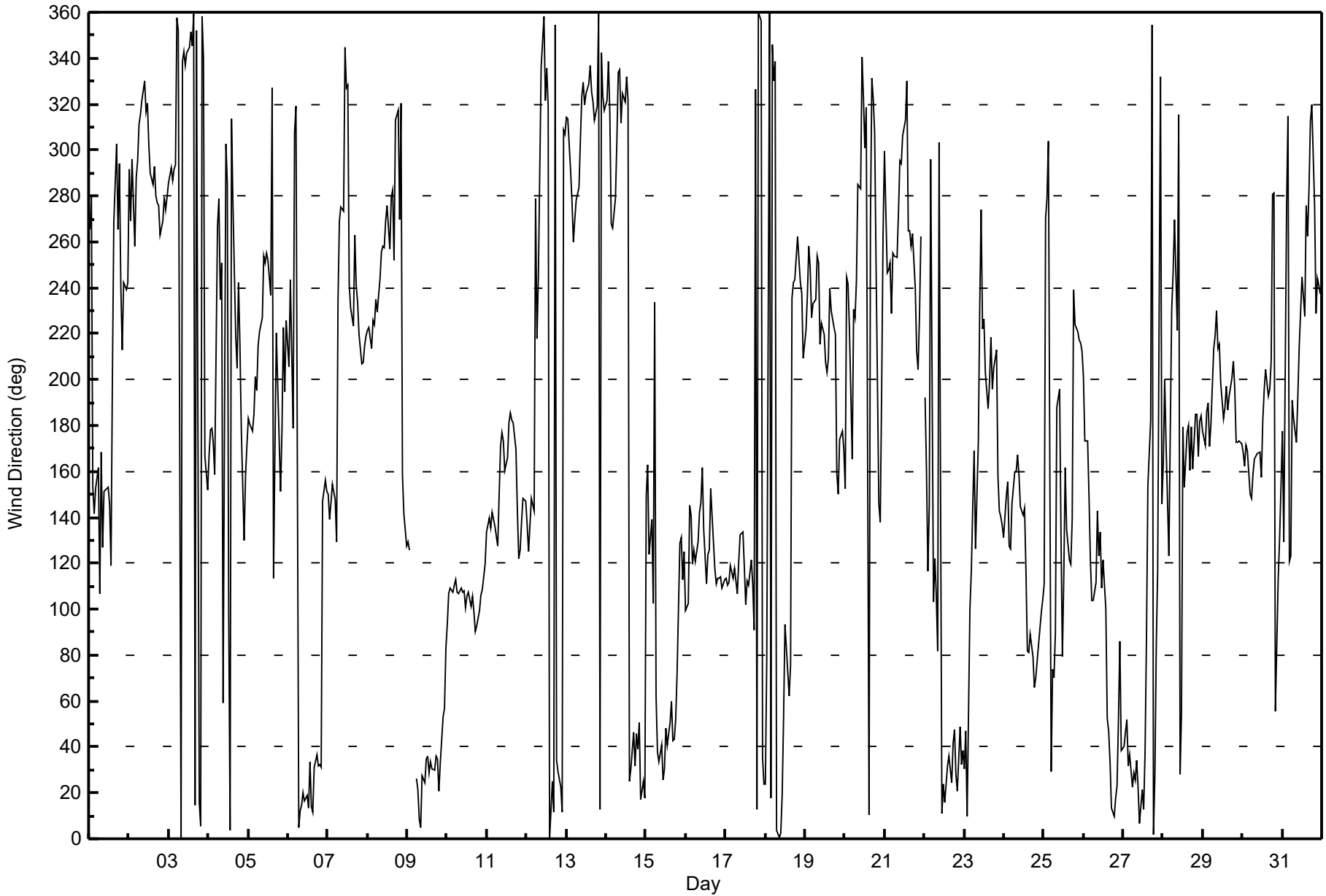
172.9 171.4 177.5 165.3 154.5 130.1 142.8 116.0 235.7 306.4 339.8 13.2 26.7 89.5 50.2 67.9 17.9 350.5 352.0 22.4 94.5 149.3 159.1 168.0
 Diurnal Average

UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Mackay River - July 2023





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Mackay River - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 111 deg on Jul 4 16:00	Hours of Data: 740
Minimum Value: 8 deg on Jul 23 23:00	Hours of Missing Data: 4
Percentiles: P ₁ = 11 P ₁₀ = 18 Q ₁ = 25 Median = 33 Q ₃ = 46 P ₉₀ = 62 P ₉₉ = 94	Hours of Calibration: 0
	Percent Operational Time: 99.5

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	52	27	33	16	21	20	33	25	29	32	30	31	67	27	38	68	32	48	73	77	47	41	43	43	77
2-Jul	26	47	30	70	30	26	23	21	31	24	20	23	27	58	29	26	34	39	38	45	44	31	34	34	70
3-Jul	30	26	26	25	26	34	27	27	25	25	24	26	27	27	25	29	27	38	31	27	23	52	54	19	54
4-Jul	51	76	57	17	33	30	56	71	65	83	90	96	104	88	70	111	64	67	63	41	28	19	16	9	111
5-Jul	13	15	16	20	21	20	29	36	37	48	45	47	52	51	82	38	58	81	36	41	74	56	81	45	82
6-Jul	62	49	68	79	32	17	30	29	29	34	39	49	37	50	49	47	37	31	28	26	37	34	25	19	79
7-Jul	46	13	40	41	29	41	63	51	41	55	80	62	77	65	66	53	51	54	46	31	17	20	22	23	80
8-Jul	27	36	21	28	29	44	41	44	54	49	48	54	49	47	46	48	51	27	18	43	96	33	20	24	96
9-Jul	18	20	UO	UO	UO	26	30	33	32	43	36	34	38	38	33	32	32	32	27	27	22	43	30	36	43
10-Jul	45	19	18	18	20	20	19	20	23	23	25	26	28	29	32	29	29	31	29	25	19	18	18	17	45
11-Jul	24	22	14	15	21	23	23	28	29	26	26	34	38	34	29	29	29	28	31	39	14	11	10	12	39
12-Jul	22	28	16	35	65	26	89	54	43	36	42	47	39	41	46	46	67	48	27	21	17	61	63	26	89
13-Jul	19	26	21	18	42	70	29	32	27	24	26	26	24	29	25	25	25	20	39	26	25	17	16	70	70
14-Jul	16	20	17	34	24	27	22	26	27	26	25	31	32	32	56	44	27	26	28	30	33	28	31	86	86
15-Jul	24	37	18	28	17	68	44	56	61	81	37	47	44	34	38	40	36	34	39	30	18	38	34	24	81
16-Jul	14	14	54	32	16	17	19	25	33	36	38	34	27	31	31	30	37	24	19	19	17	15	18	17	54
17-Jul	17	16	15	20	18	21	21	18	23	24	25	25	25	20	21	23	25	90	82	62	33	34	29	23	90
18-Jul	37	32	29	26	35	20	21	27	27	29	38	39	46	45	106	69	53	47	45	59	44	36	44	24	106
19-Jul	30	44	35	44	30	61	62	48	46	59	46	49	64	51	47	46	54	39	32	69	13	17	16	31	69
20-Jul	47	32	28	54	41	29	58	56	54	59	53	70	79	79	91	68	50	55	36	82	20	37	52	24	91
21-Jul	49	44	36	43	45	18	37	63	57	56	43	59	65	66	81	53	53	51	61	24	16	27	27	UO	81
22-Jul	65	30	14	42	72	45	26	50	65	95	36	39	48	33	26	30	28	27	27	25	20	22	28	20	95
23-Jul	18	39	53	95	60	56	36	28	35	65	54	68	55	51	37	49	46	31	37	29	20	9	8	10	95
24-Jul	28	12	26	34	11	17	26	32	31	37	45	43	46	63	38	36	31	34	32	36	38	36	26	19	63
25-Jul	38	48	44	43	57	37	34	75	57	59	55	39	22	29	26	24	23	35	43	35	30	31	28	27	75
26-Jul	24	19	21	33	41	31	37	24	28	41	35	28	27	48	32	43	31	29	27	27	24	29	34	28	48
27-Jul	24	26	28	22	22	24	29	29	35	36	31	35	38	41	52	33	68	33	38	24	37	96	46	31	96
28-Jul	33	33	41	46	41	54	60	70	61	66	89	49	43	62	68	41	30	33	24	21	23	13	15	16	89
29-Jul	15	17	17	21	20	19	26	36	38	48	41	44	38	32	47	43	42	41	35	20	13	10	11	11	48
30-Jul	13	11	14	17	16	18	26	26	32	31	32	32	36	37	37	37	39	38	93	88	60	29	17	34	93
31-Jul	36	30	32	45	26	46	26	22	31	39	41	43	53	38	48	52	46	27	20	67	45	49	45	38	67
	65	76	68	95	72	70	89	75	65	95	90	96	104	88	106	111	68	90	93	88	96	96	81	86	
	Diurnal Maximum																								

UO - Unstable Operation



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS21
CONKLIN
JULY 2023**

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS21)
 JULY 2023

MONTHLY SUMMARY

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	3.5	0	1	0
TRS(ppb) Average	709	35	35	100	1	0	0.7	0
THC(ppm) Average	708	34	36	99.73	3.5	-	2.3	-
NMHC(ppm) Average	708	34	36	99.73	0.067	-	0.003	-
CH4(ppm) Average	708	34	36	99.73	3.5	-	2.3	-
O3 (ppb) Average	710	34	34	100	65.8	0	36.9	-
NO2 (ppb) Average	708	36	36	100	9	0	4.4	-
NO (ppb) Average	708	36	36	100	20.1	-	2.4	-
NOX (ppb) Average	708	36	36	100	24.7	-	4.6	-
PM2.5 (ug/m3) Average	742	2	2	100	350.2	64	214.7	13
Temperature 2 m (C) Average	744	0	0	100	28.8	-	21.7	-
Relative Humidity (%) Average	744	0	0	100	99	-	92.1	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	20	-	8	-
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 - CONKLIN (AMS21)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	710	0.22	0.4	-	0	0	0	0.1	0.2	0.5	3.5
TRS (ppb) Average	709	0.44	0.1	-	0.2	0.3	0.4	0.4	0.5	0.5	1
THC (ppm) Average	708	2.14	0.2	-	2	2	2	2.1	2.2	2.4	3.5
NMHC(ppm) Average	708	0	0.003	-	0	0	0	0	0	0	0.067
CH4(ppm) Average	708	2.14	0.2	-	2	2	2	2.1	2.2	2.4	3.5
O3 (ppb) Average	710	26.4	13.2	-	2.3	7.1	16.5	26.9	36.2	42.7	65.8
NO2 (ppb) Average	708	1.29	1.2	-	0	0.4	0.6	0.9	1.5	2.7	9
NO (ppb) Average	708	0.35	1.3	-	0	0	0	0.1	0.2	0.6	20.1
NOX (ppb) Average	708	1.63	2.1	-	0.1	0.4	0.7	1	1.8	3.2	24.7
PM2.5 (ug/m3) Average	742	36.94	50.6	-	1.6	4.4	8.7	21.1	41	72.1	350.2
Temperature 2 m (C) Average	744	16.35	5.7	-	1.8	9.5	12.2	15.8	21.1	24.3	28.8
Relative Humidity (%) Average	744	72.1	21.5	-	26.8	39.9	53	77.4	92.4	96.9	99
Wind Speed 10 m (km/h) Average	743	5.3	3	-	0	1	3	5	7	9	20
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS 21)
JULY 2023

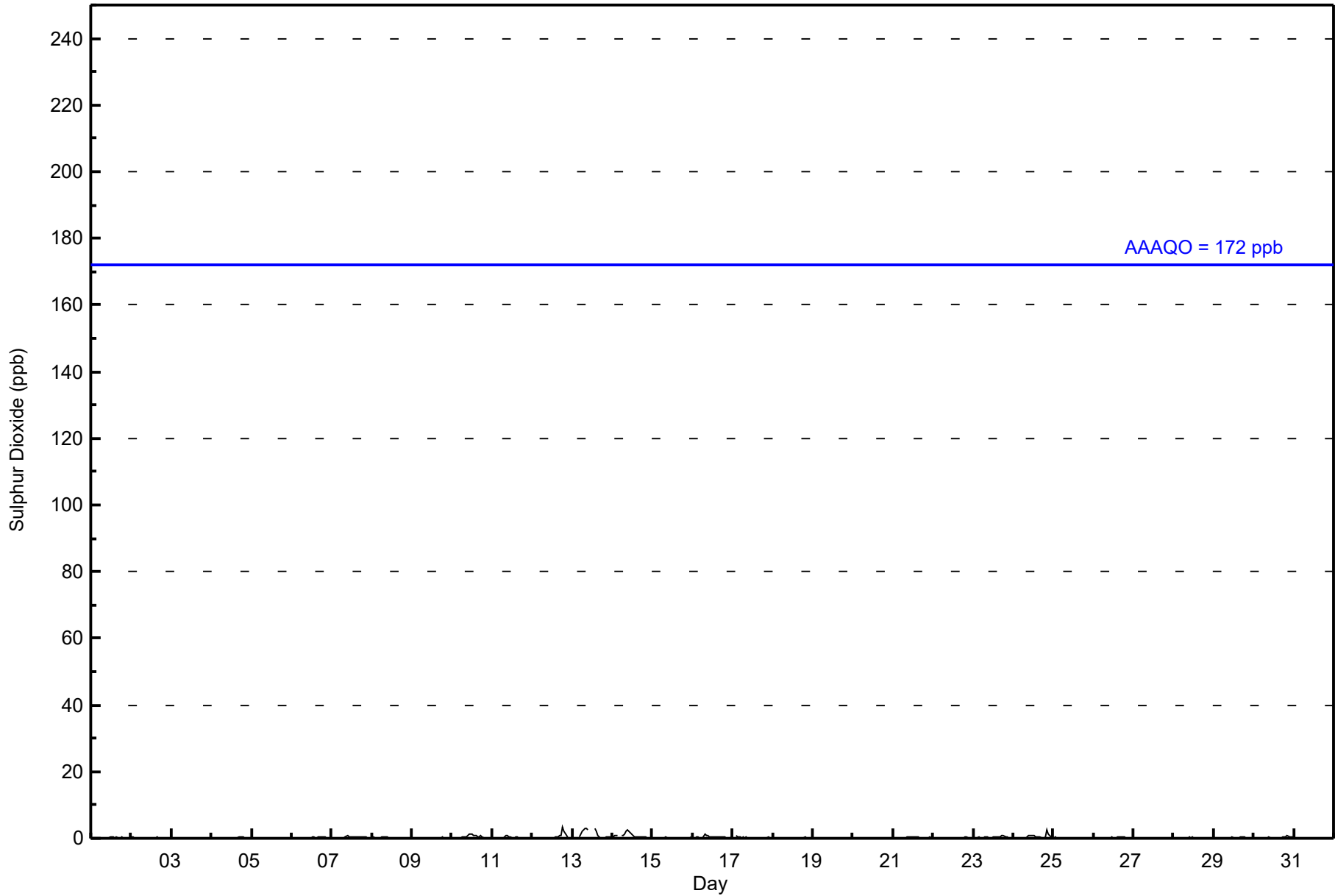
OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC/NMHC/CH4	18 Jul 2023 10:00	18 Jul 2023 11:00	2	Maintenance - replaced support gas cylinder
Wind Speed, Wind Direction	12 Jul 2023 21:00	12 Jul 2023 21:00	1	Flat line in sensor output signal



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Conklin - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Conklin - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	710	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: 710

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Conklin - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	74	48	14	14	16	45	34	63	72	45	46	42	40	42	47	67	709
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	74	48	14	14	16	45	34	63	72	45	46	42	40	42	47	67	709

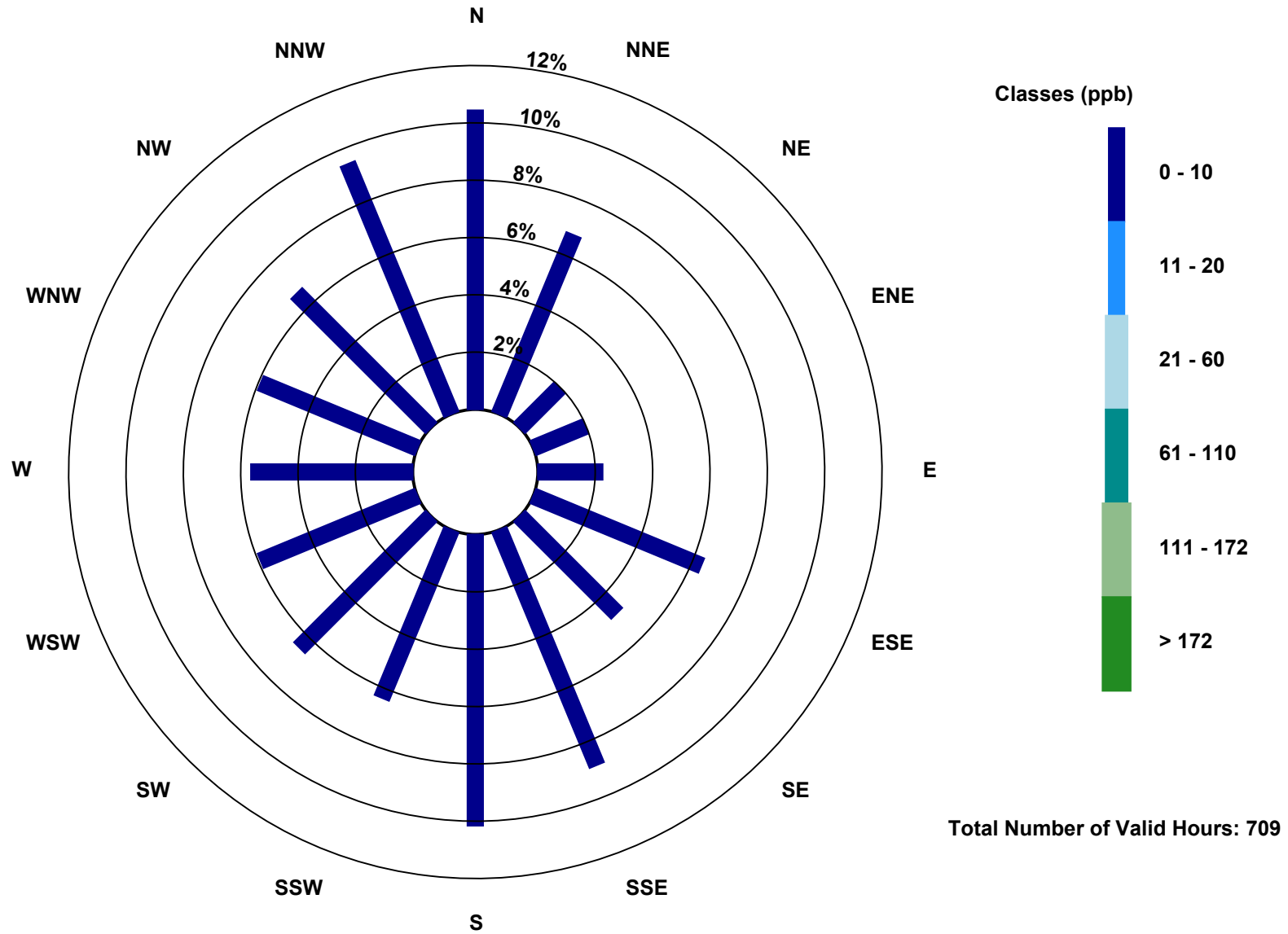
Total Number of Valid Hours: 709

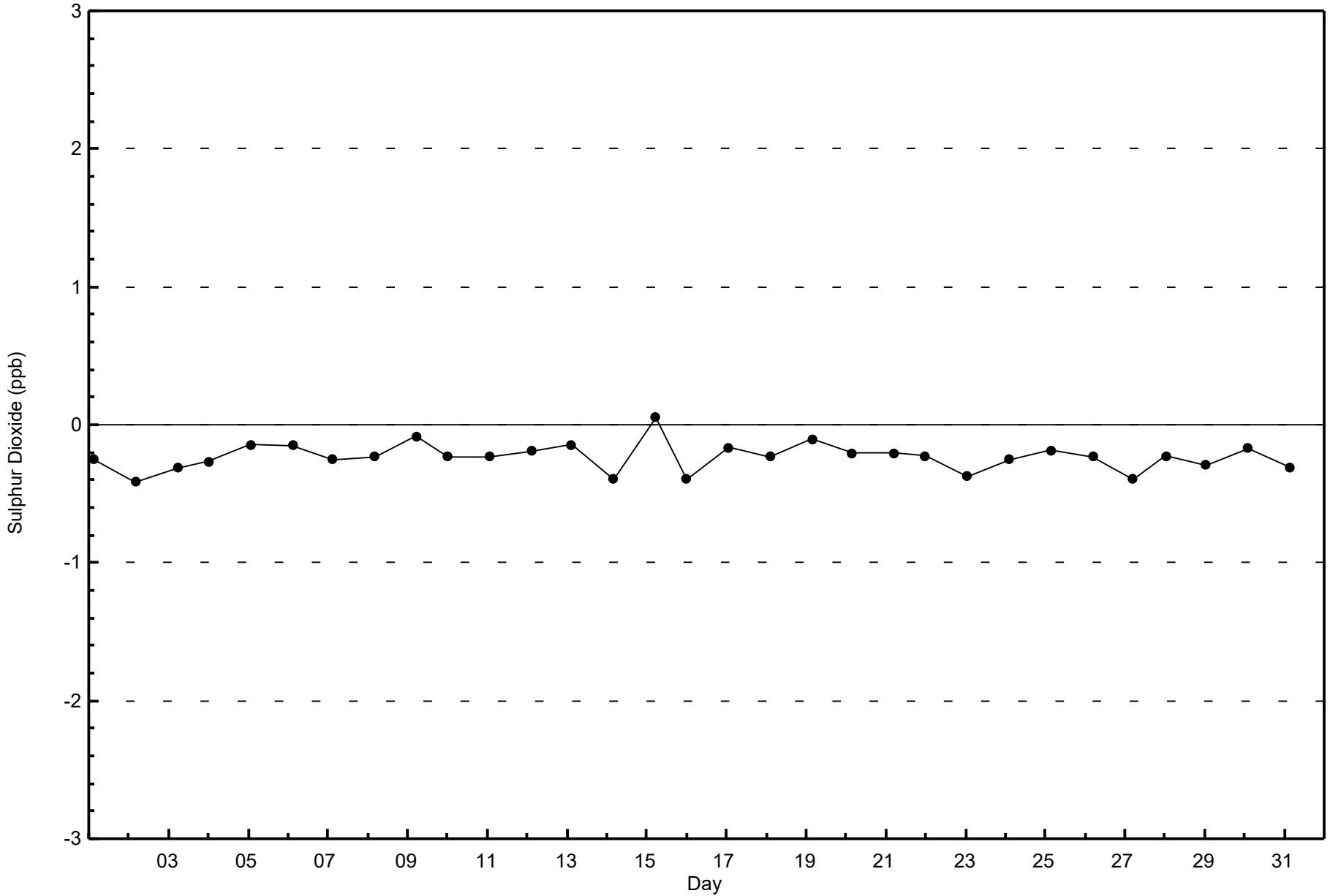
Total Number of Hours: 744

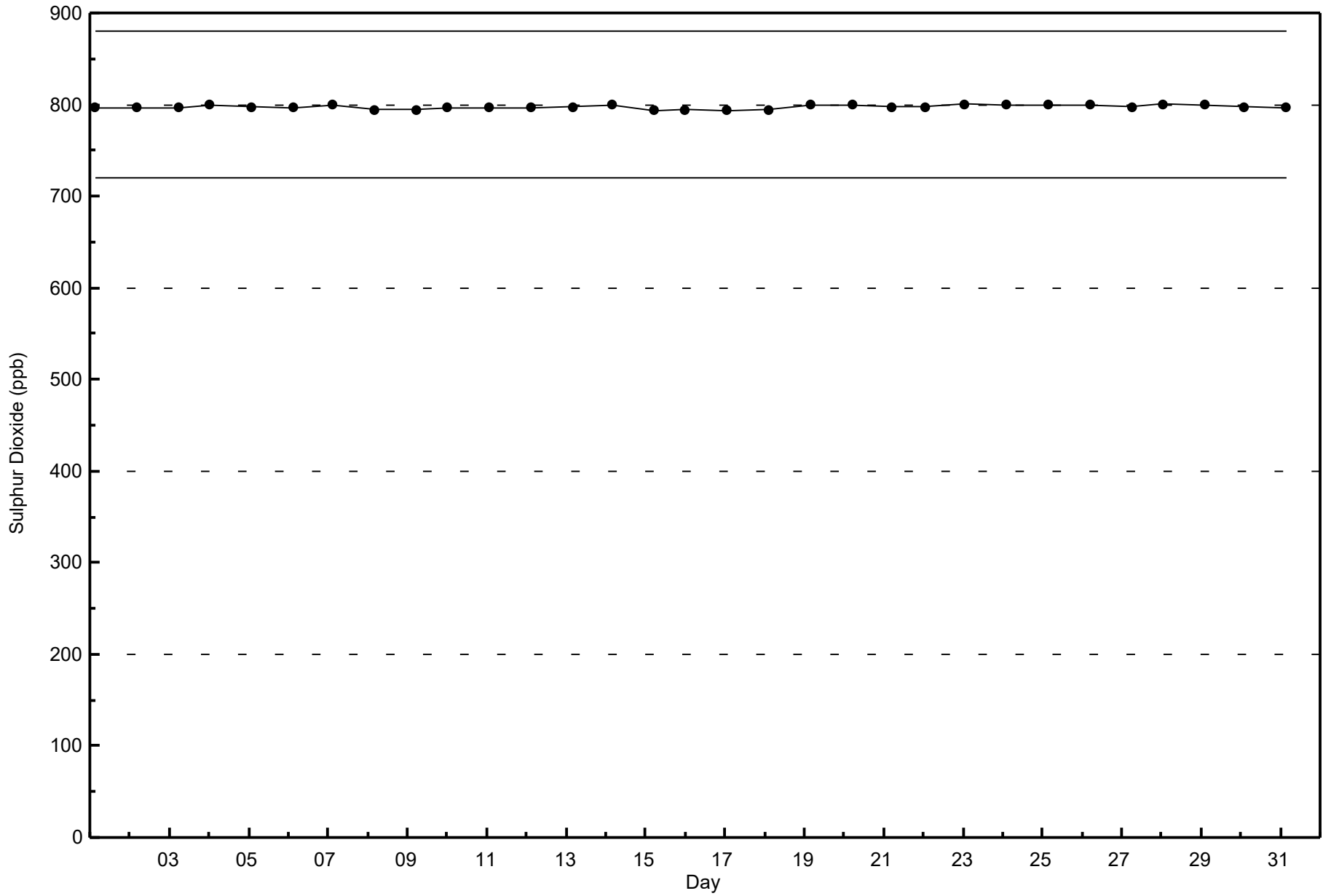


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Conklin

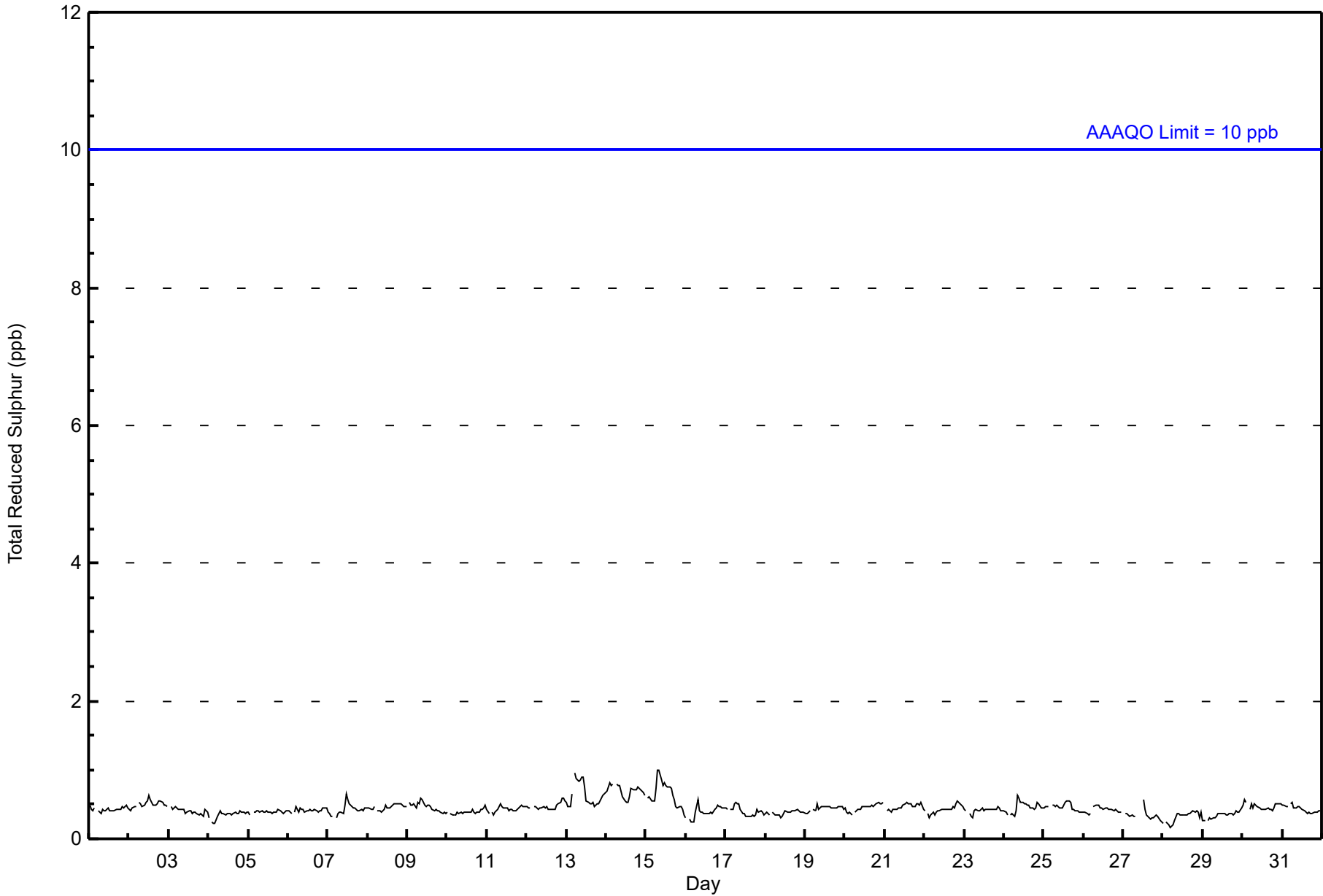








Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744														744																													
Maximum Value: 1.0 ppb on Jul 15 09:00		Maximum Daily Average: 0.7 ppb on Jul 14														Hours of Data: 709																																	
Minimum Value: 0.2 ppb on Jul 28 05:00		Minimum Daily Average: 0.3 ppb on Jul 28														Hours of Missing Data: 35																																	
Maximum Diurnal Average: 0.5 ppb at hour 9		Minimum Diurnal Average: 0.4 ppb at hour 5														Hours of Calibration: 35																																	
Monthly Average: 0.44 ppb		Percentiles: P ₁ = 0.2 P ₁₀ = 0.3 Q ₁ = 0.4 Median = 0.4 Q ₃ = 0.5 P ₉₀ = 0.5 P ₉₉ = 0.9														Percent Operational Time: 100.0																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	0.5	0.4	0.4	0.4	Z	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.5																							
2-Jul	0.4	0.4	0.4	0.5	0.5	Z	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5																						
3-Jul	Z	0.5	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.5																						
4-Jul	0.3	Z	0.3	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4																						
5-Jul	0.4	0.4	Z	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4																						
6-Jul	0.4	0.4	0.4	Z	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5																						
7-Jul	0.4	0.4	0.3	0.3	Z	0.3	0.4	0.4	0.4	0.4	0.5	0.7	0.6	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.7																						
8-Jul	0.5	0.5	0.4	0.4	0.5	Z	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5																						
9-Jul	Z	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.6	0.6	0.5	0.5	0.5	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	0.6																						
10-Jul	0.4	Z	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5																						
11-Jul	0.4	0.4	Z	0.4	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5																						
12-Jul	0.5	0.5	0.4	Z	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6																						
13-Jul	0.5	0.5	0.5	0.7	Z	1.0	0.9	0.8	0.9	0.9	0.9	0.9	0.8	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.6	1.0																						
14-Jul	0.7	0.8	0.8	0.8	0.8	Z	0.8	0.8	0.8	0.7	0.6	0.5	0.5	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.8																						
15-Jul	Z	0.6	0.6	0.6	0.5	0.6	0.7	1.0	1.0	0.9	0.8	0.8	0.8	0.8	0.8	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	1.0																							
16-Jul	0.3	Z	0.3	0.2	0.2	0.2	0.4	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.5	0.4	0.6																							
17-Jul	0.4	0.4	Z	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5																						
18-Jul	0.4	0.4	0.4	Z	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4																						
19-Jul	0.4	0.4	0.4	0.4	Z	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.5																							
20-Jul	0.4	0.4	0.4	0.4	0.3	Z	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5																							
21-Jul	Z	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5																							
22-Jul	0.4	Z	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.6																							
23-Jul	0.4	0.4	Z	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.5																							
24-Jul	0.4	0.4	0.3	Z	0.3	0.4	0.3	0.4	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.6																							
25-Jul	0.4	0.5	0.5	0.5	Z	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6																							
26-Jul	0.4	0.4	0.4	0.3	0.4	Z	0.5	0.5	0.5	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	0.4	0.4	0.4	0.5																							
27-Jul	Z	0.4	0.4	0.4	0.3	0.4	0.3	0.3	C	C	C	C	0.6	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.2	0.2	0.2	0.6																							
28-Jul	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4																							
29-Jul	0.3	0.3	Z	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4																							
30-Jul	0.5	0.6	0.5	Z	0.4	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.6																							
31-Jul	0.5	0.5	0.5	0.5	Z	0.5	0.5	0.5	0.4	0.5	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	0.4	0.4	0.5																							
																								0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	Diurnal Average	
																								0.7	0.8	0.8	0.8	0.8	1.0	0.9	1.0	1.0	0.9	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	Diurnal Maximum
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Conklin - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	709	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Conklin - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	75	46	12	13	15	45	32	65	71	44	47	41	40	42	50	70	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	75	46	12	13	15	45	32	65	71	44	47	41	40	42	50	70	708

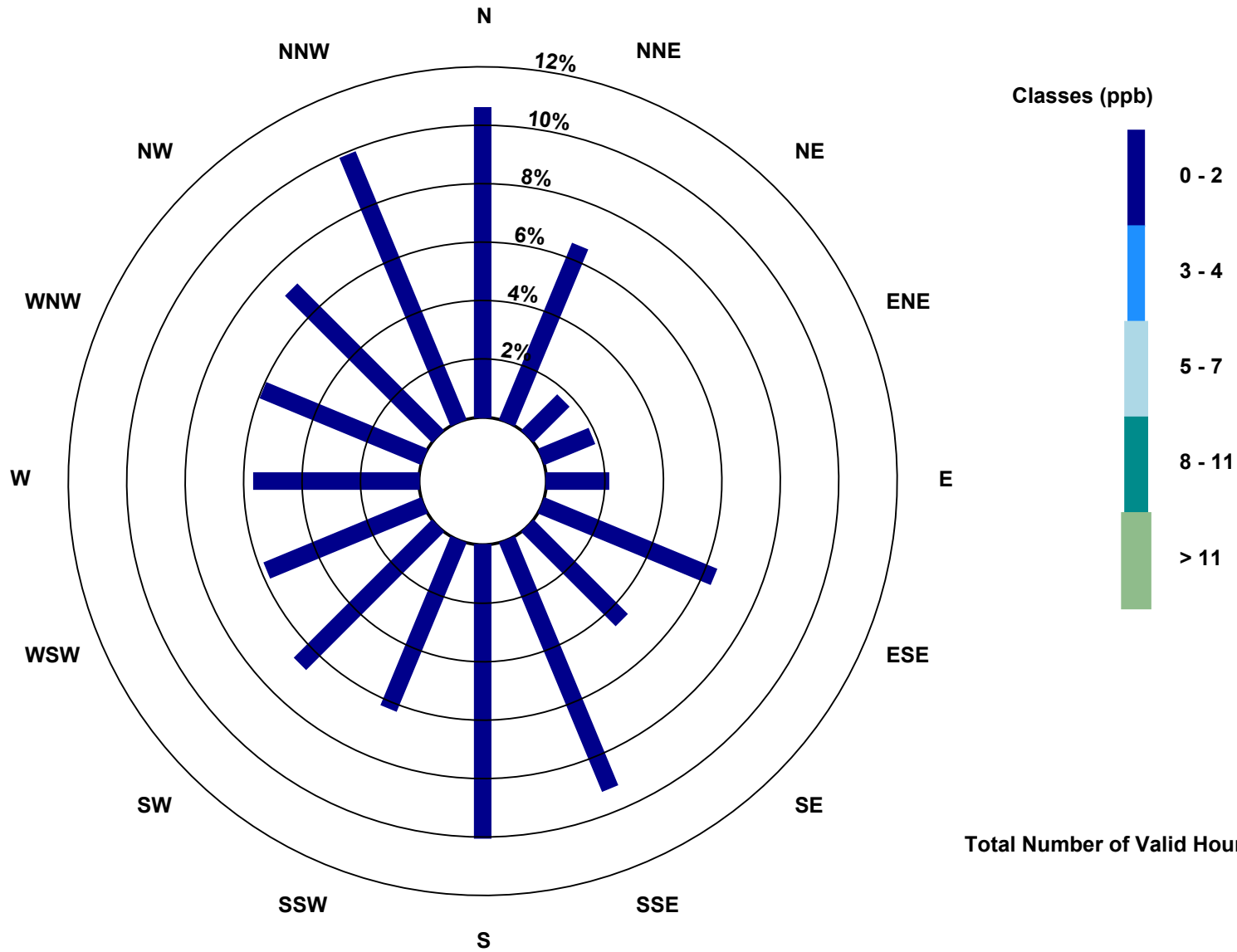
Total Number of Valid Hours: 708

Total Number of Hours: 744

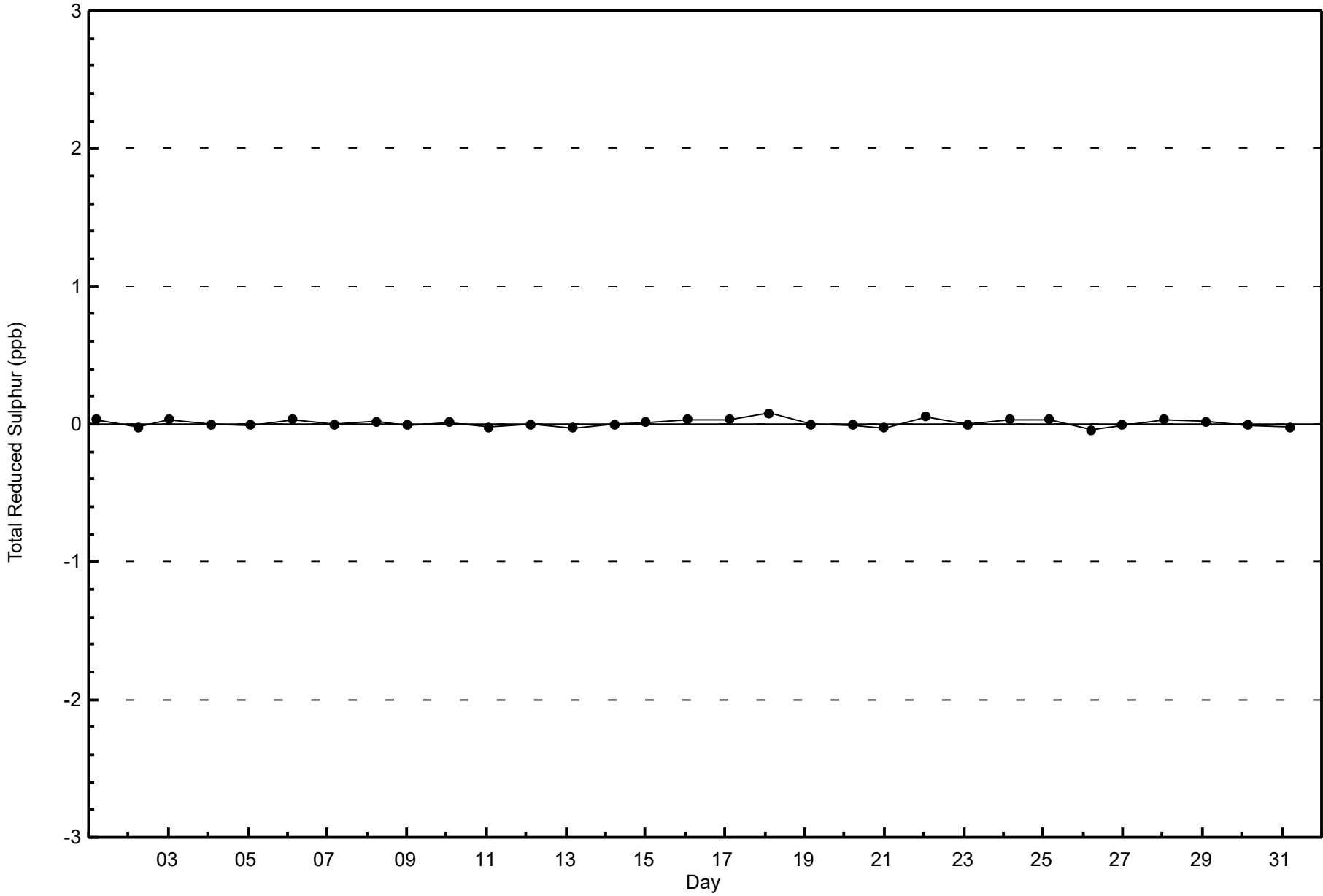


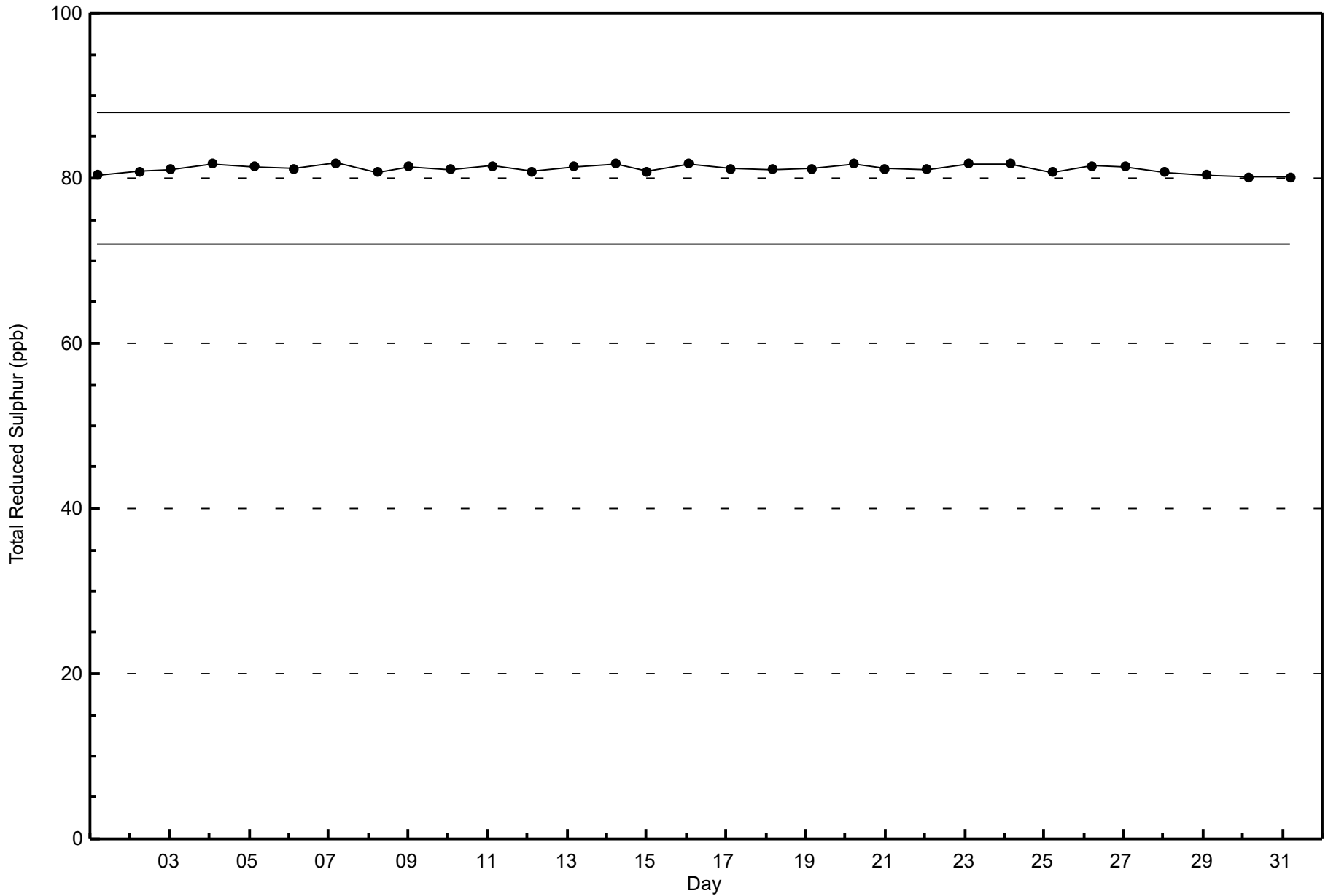
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Reduced Sulphur (TRS) - ppb
Conklin



Total Number of Valid Hours: 708



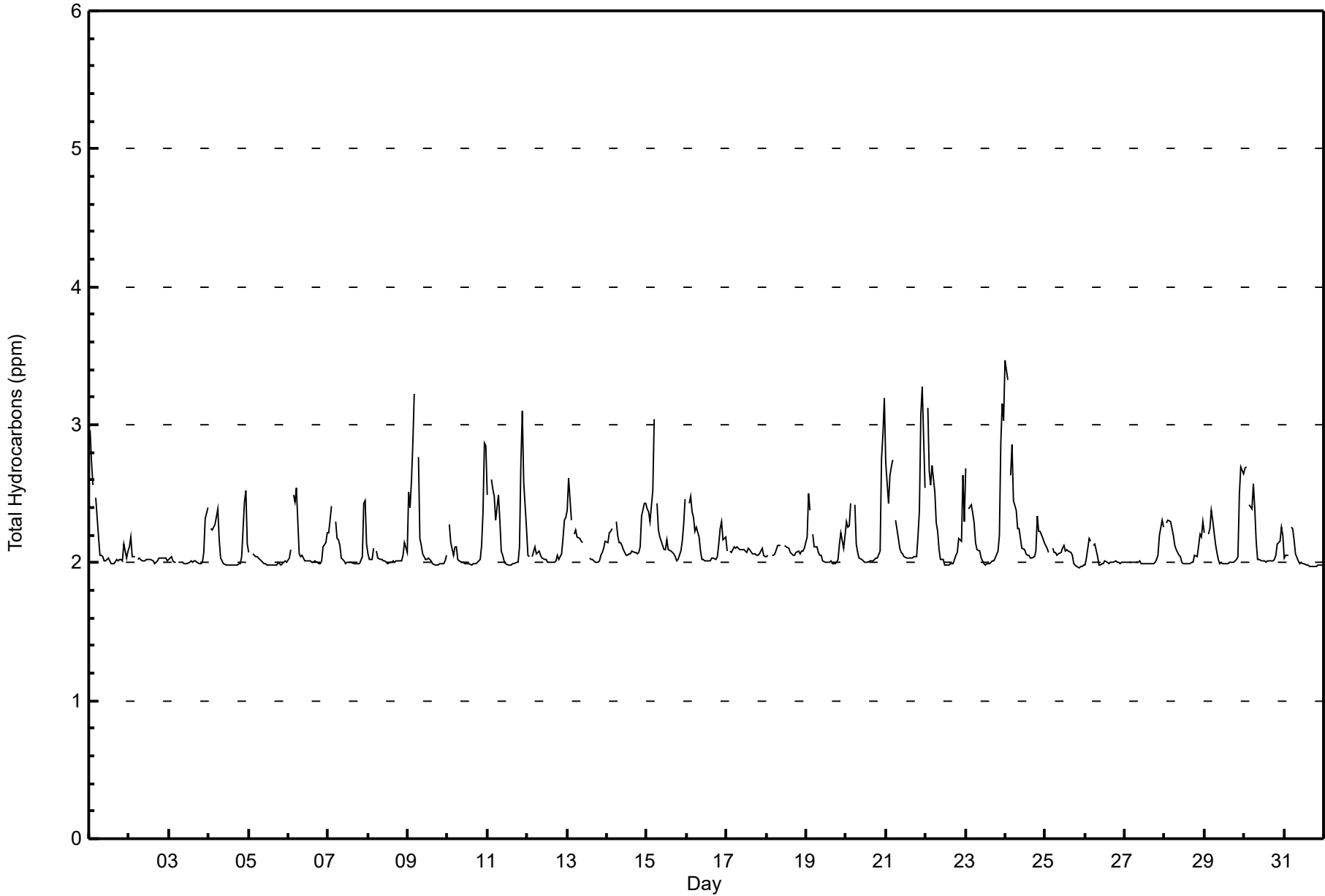




Wood Buffalo Environmental Association
Summary of Hour Averages

Total Hydrocarbons (THC) - ppm
Conklin - July 2023

Maximum Value: 3.5 ppm on Jul 24 01:00		Maximum Daily Average: 2.3 ppm on Jul 21		Hours in Service: 744																																													
Minimum Value: 2.0 ppm on Jul 25 21:00		Minimum Daily Average: 2.0 ppm on Jul 5		Hours of Data: 708																																													
Maximum Diurnal Average: 2.4 ppm at hour 5		Minimum Diurnal Average: 2.0 ppm at hour 18		Hours of Missing Data: 36																																													
Monthly Average: 2.14 ppm		Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.4 P ₉₉ = 3.1		Hours of Calibration: 34																																													
				Percent Operational Time: 99.7																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	3.0	2.7	2.6	Z	2.5	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.2	2.2	3.0																						
2-Jul	2.1	2.2	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	2.2	2.2																					
3-Jul	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	2.1	2.3	2.4	2.0	2.4	2.4																						
4-Jul	Z	2.3	2.2	2.3	2.3	2.4	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.4	2.5	2.1	2.1	2.5	2.5																						
5-Jul	2.1	Z	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	2.0	2.0	2.0	2.0	2.1	2.1																					
6-Jul	2.0	2.1	Z	2.5	2.4	2.5	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.1	2.5	2.5																						
7-Jul	2.2	2.3	2.4	Z	2.3	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.4	2.4	2.1	2.1	2.4	2.4																						
8-Jul	2.1	2.0	2.0	2.1	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.1																						
9-Jul	2.5	2.4	2.6	2.9	3.2	Z	2.8	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	3.2	3.2																						
10-Jul	Z	2.3	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	2.4	2.9	2.8	2.1	2.9	2.9																						
11-Jul	2.5	Z	2.6	2.5	2.5	2.3	2.5	2.3	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.7	3.1	2.6	2.2	2.3	3.1	3.1																						
12-Jul	2.0	2.0	Z	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	2.1	2.0	2.1	2.2	2.3	2.3	2.1	2.3	2.3																						
13-Jul	2.4	2.6	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.1	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.6	2.6																						
14-Jul	2.2	2.2	2.2	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	2.1	2.1	2.1	2.1	2.3	2.4	2.4	2.2	2.4	2.4																						
15-Jul	2.4	2.4	2.3	2.5	3.0	Z	2.4	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.2	2.3	2.5	2.2	3.0	3.0																						
16-Jul	Z	2.4	2.5	2.4	2.3	2.2	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.2	2.2	2.2	2.5	2.5																						
17-Jul	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	2.0	2.1	2.1	2.1																						
18-Jul	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	M	M	2.1	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																						
19-Jul	2.2	2.5	2.4	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.2	2.1	2.5	2.5																						
20-Jul	2.3	2.3	2.3	2.4	Z	2.4	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	2.8	2.9	3.2	2.2	3.2	3.2																						
21-Jul	2.7	2.4	2.6	2.7	2.7	Z	2.3	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.4	3.1	3.3	2.5	2.3	3.3	3.3																						
22-Jul	Z	3.1	2.7	2.6	2.7	2.5	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.6	2.3	2.2	3.1	3.1																						
23-Jul	2.7	Z	2.4	2.4	2.4	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	2.0	2.1	2.2	2.9	3.2	3.0	2.3	3.2	3.2																						
24-Jul	3.5	3.3	Z	2.6	2.9	2.5	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.2	2.2	2.1	2.3	3.5	3.5																						
25-Jul	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	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1																						
26-Jul	2.0	2.0	2.2	2.2	Z	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	2.2	2.2																						
27-Jul	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.3	2.0	2.3	2.3																						
28-Jul	Z	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.2	2.2	2.3	2.1	2.3																						
29-Jul	2.2	Z	2.2	2.2	2.4	2.3	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.7	2.6	2.2	2.7	2.7																						
30-Jul	2.7	2.7	Z	2.4	2.4	2.6	2.4	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.3	2.2	2.2	2.7	2.7																						
31-Jul	2.0	2.1	2.1	Z	2.3	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.3																					
																								2.3	2.3	2.3	2.3	2.4	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	2.1	2.3	2.3	2.3	Diurnal Average		
																								3.5	3.3	2.7	2.9	3.2	2.6	2.8	2.3	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.7	3.1	3.3	3.2	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance																																																	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Conklin - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	353	49.86	49.86
2.1 - 3.0	346	48.87	98.73
3.1 - 10.0	9	1.27	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 - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	35	31	9	4	6	21	8	10	21	22	28	38	31	38	27	24	353
2.1 - 3.0	38	17	5	10	10	24	25	46	50	23	18	4	9	4	20	42	345
3.1 - 10.0	0	0	0	0	0	0	1	7	1	0	0	0	0	0	0	0	9
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	73	48	14	14	16	45	34	63	72	45	46	42	40	42	47	66	707

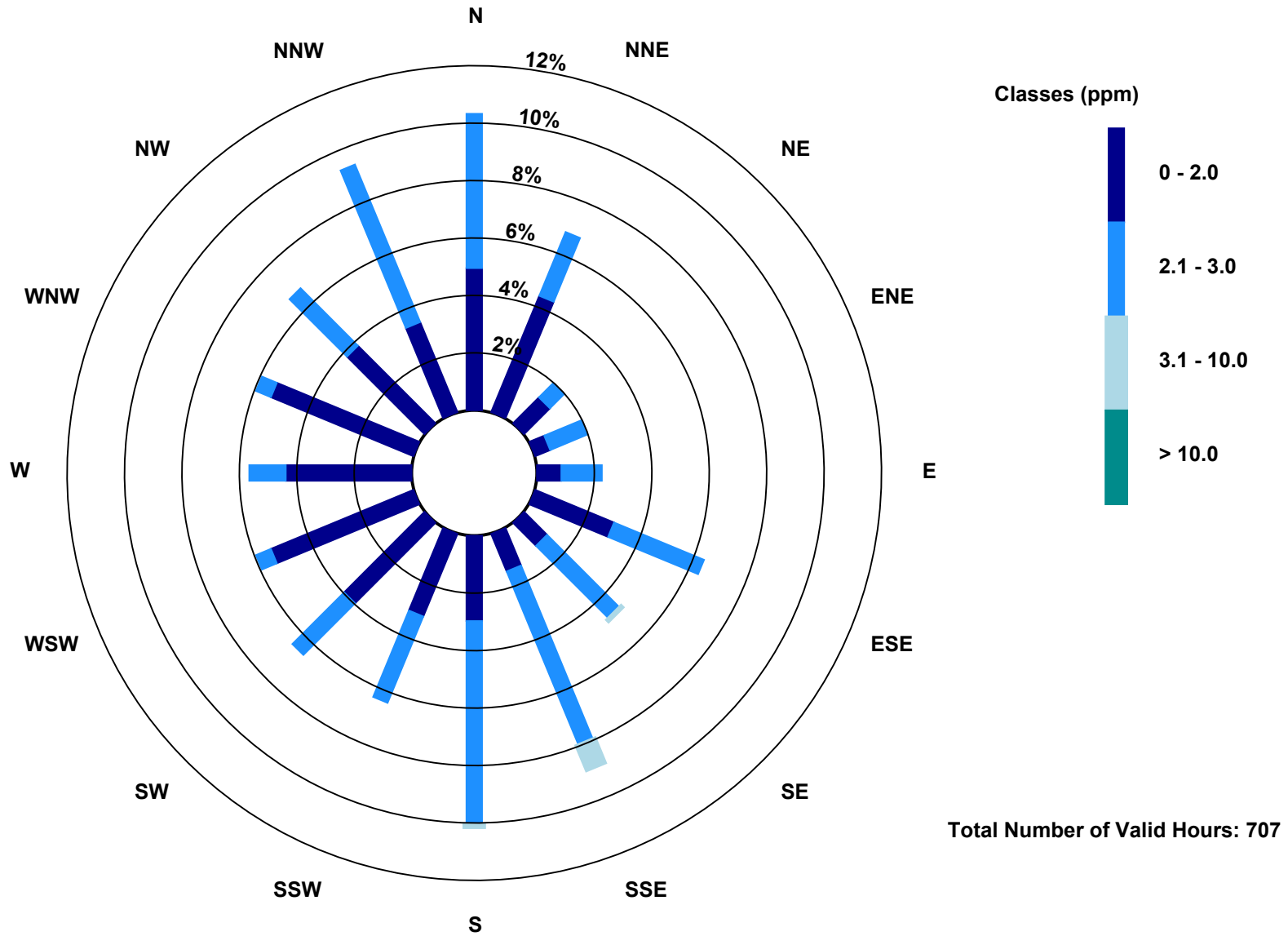
Total Number of Valid Hours: 707

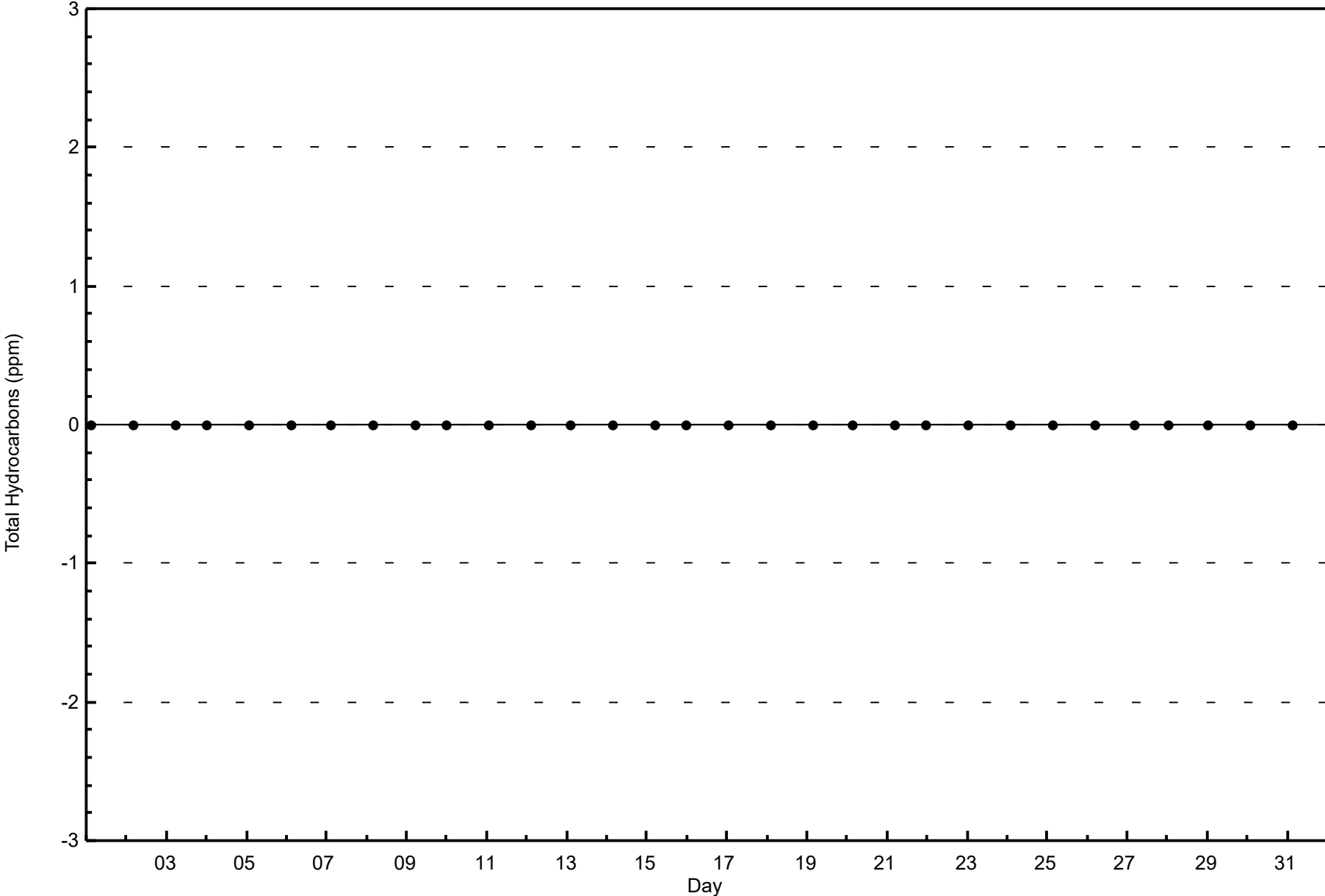
Total Number of Hours: 744

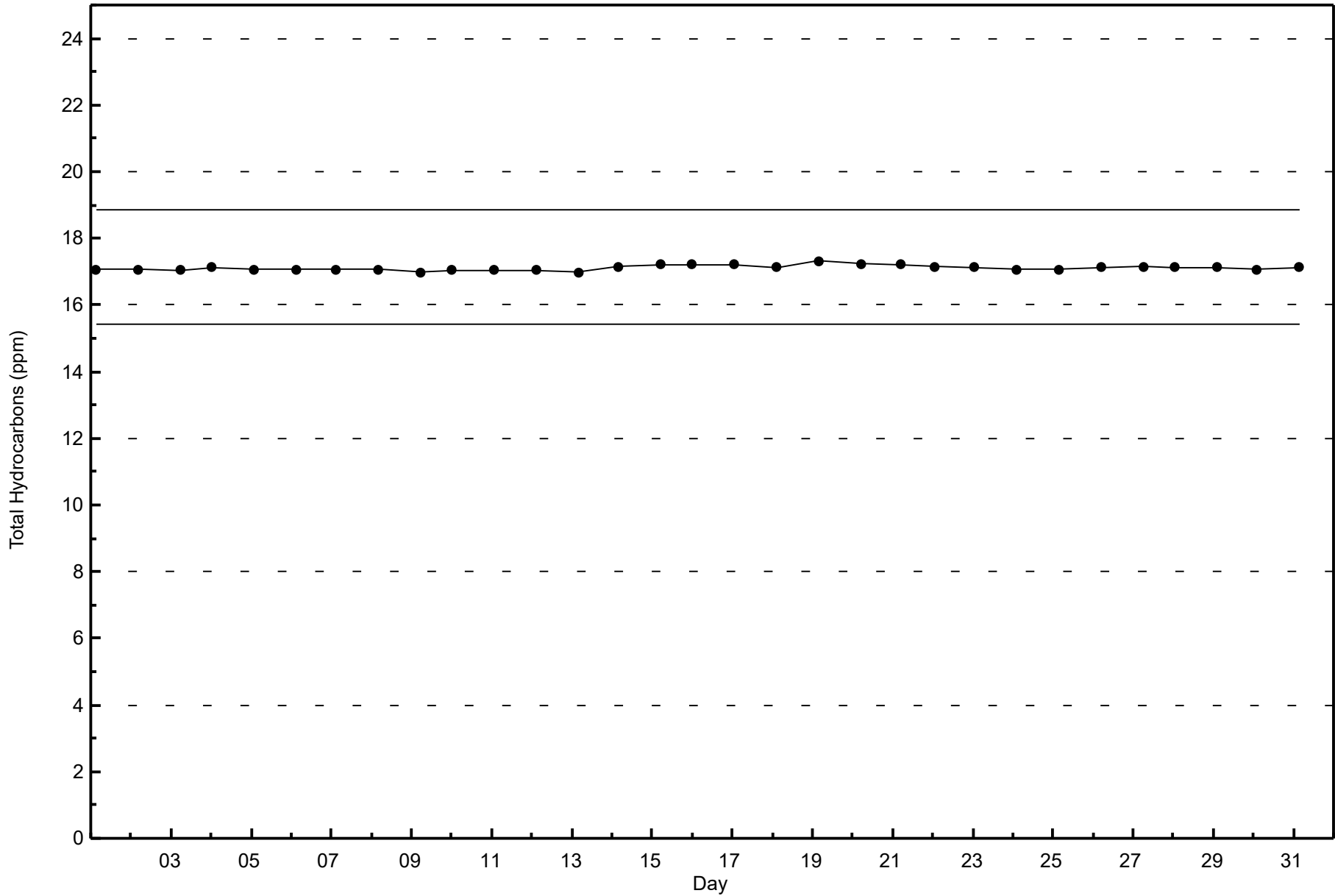


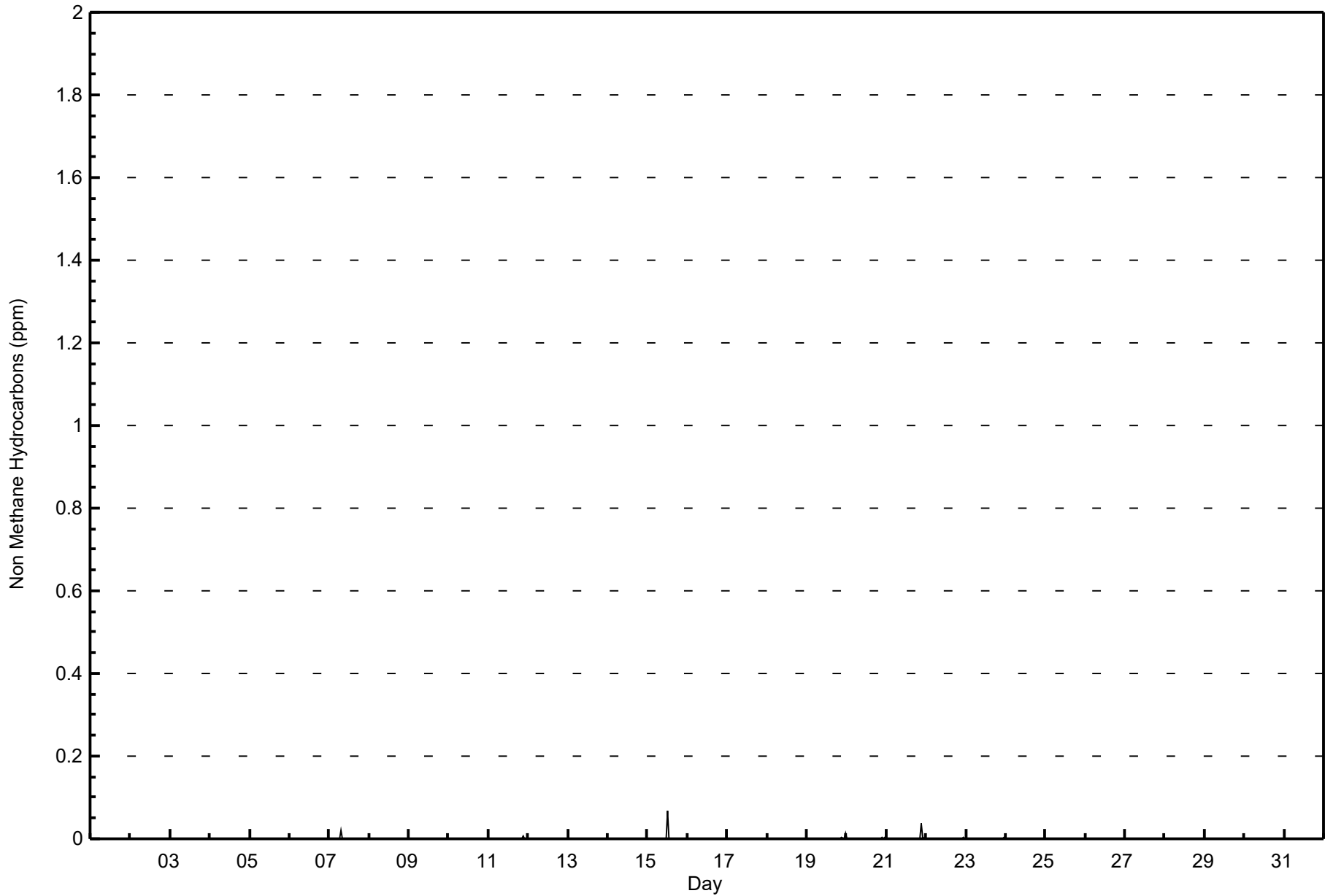
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Conklin











Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Conklin - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	703	99.29	99.29
0.006 - 0.05	4	0.56	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



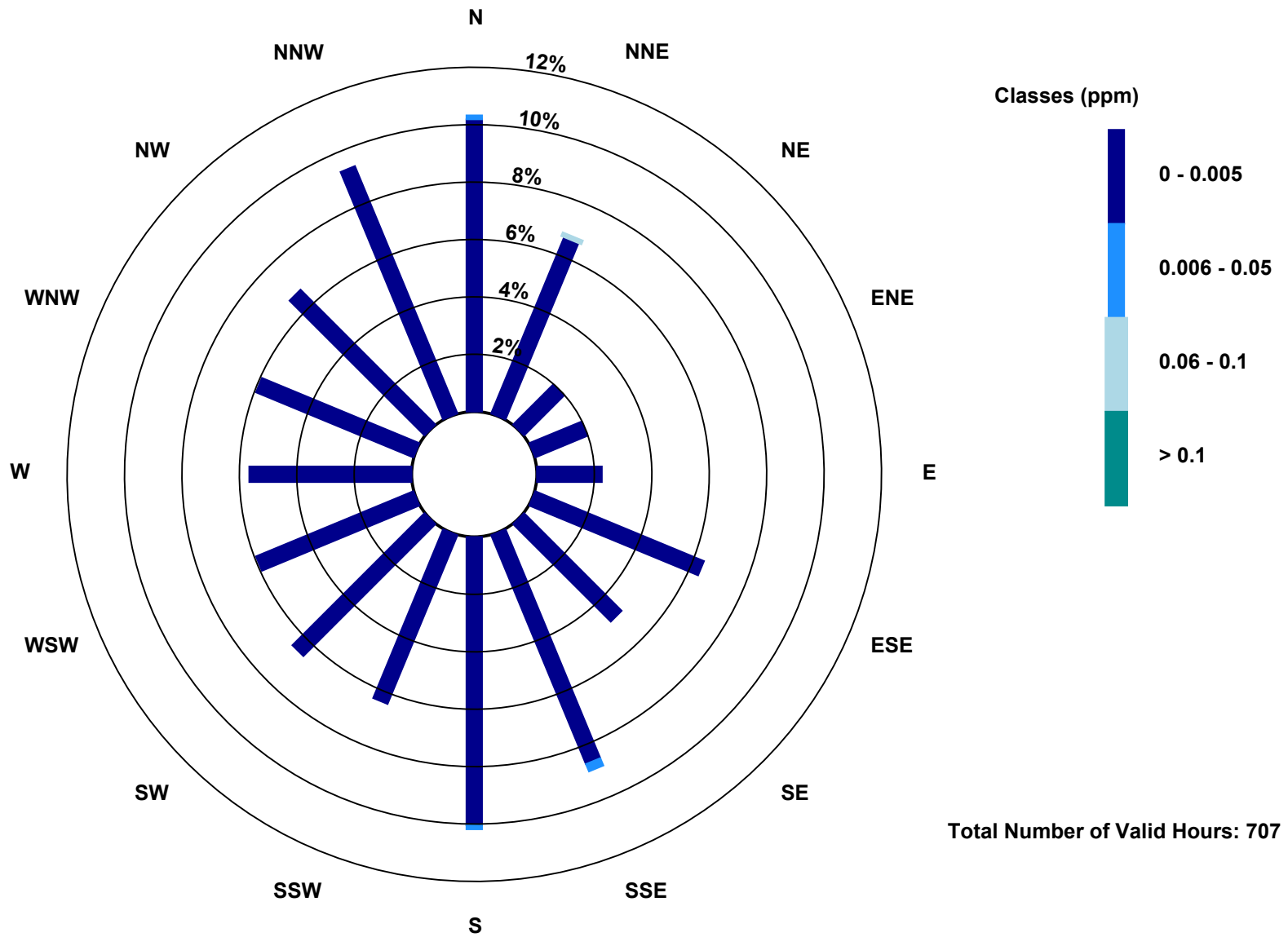
Wood Buffalo Environmental Association
Frequency Distribution

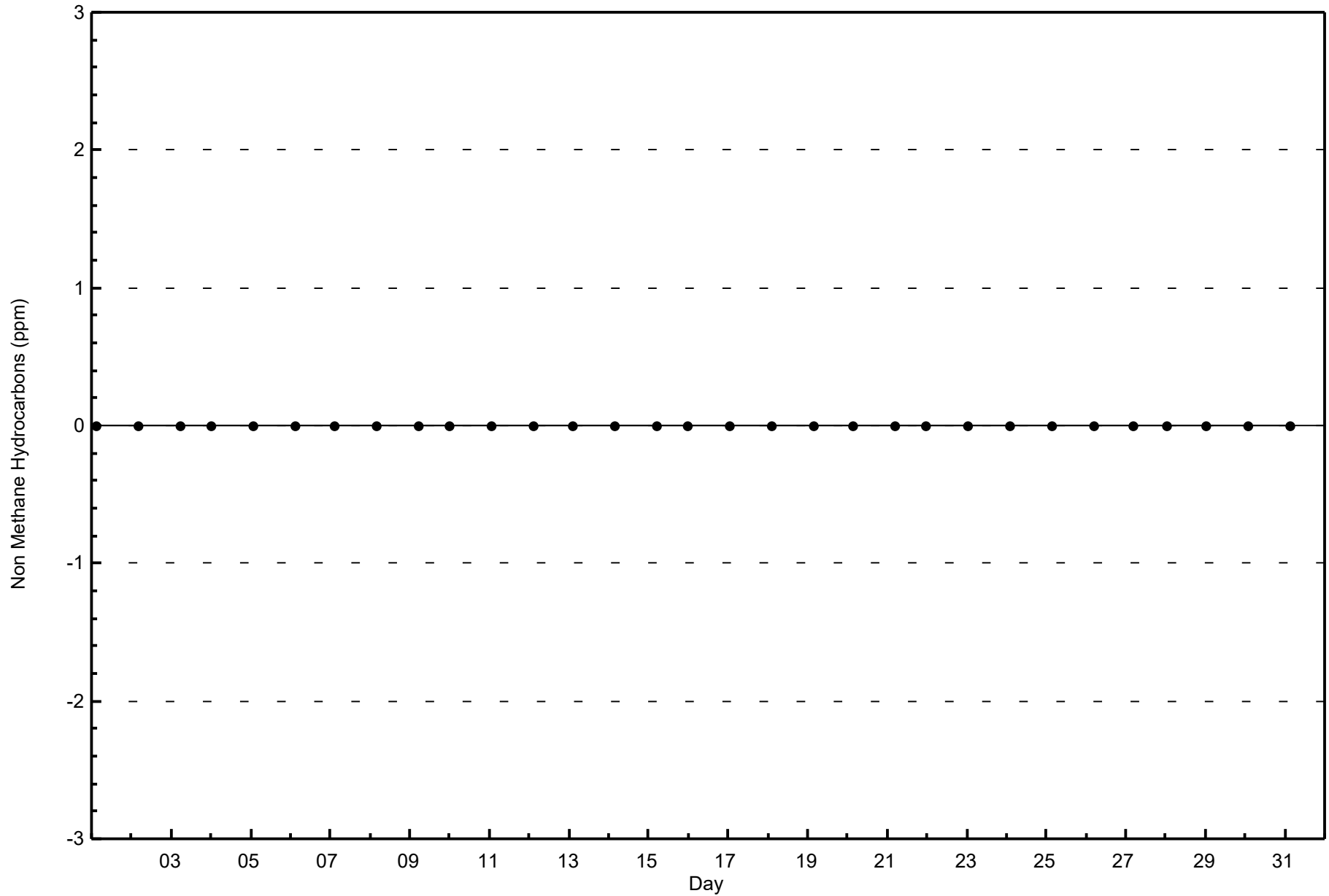
Non Methane Hydrocarbons (NMHC) - ppm
Conklin - July 2023

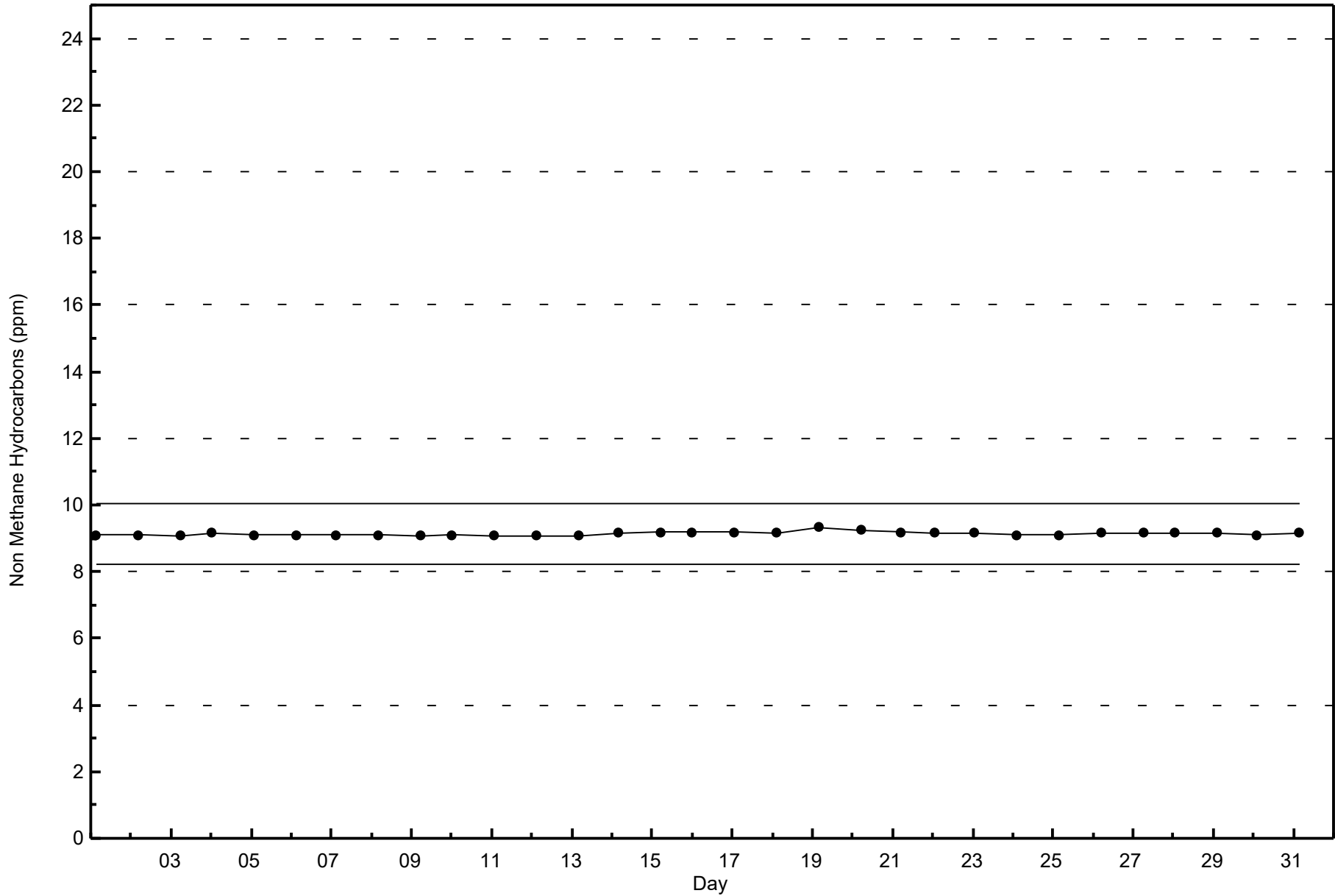
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	72	47	14	14	16	45	34	61	71	45	46	42	40	42	47	66	702
0.006 - 0.05	1	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	4
0.06 - 0.1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	73	48	14	14	16	45	34	63	72	45	46	42	40	42	47	66	707

Total Number of Valid Hours: 707

Total Number of Hours: 744









Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

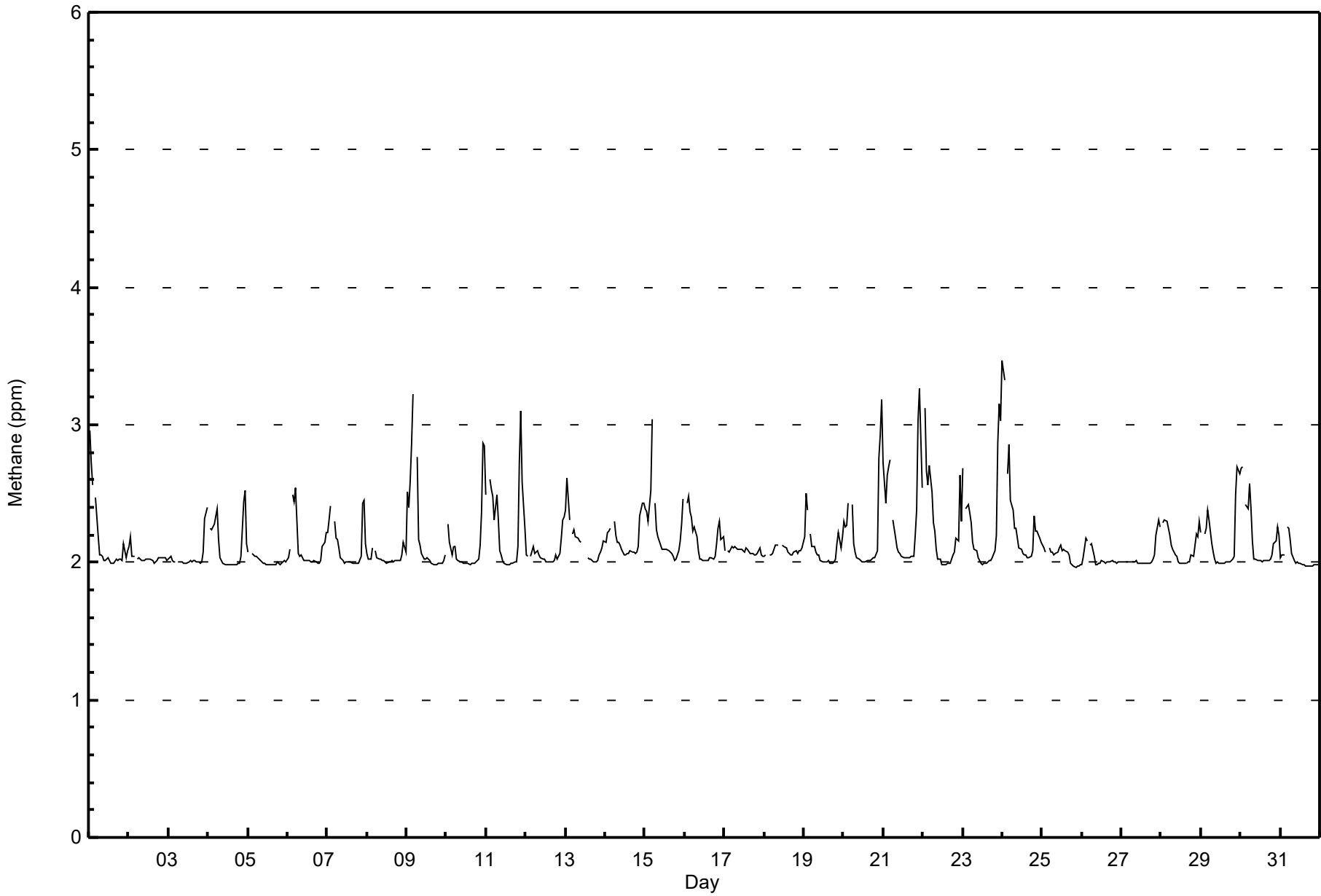
Conklin - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744														Daily Average		Daily Maximum																											
Maximum Value: 3.5 ppm on Jul 24 01:00		Maximum Daily Average: 2.3 ppm on Jul 21		Hours of Data: 708														Daily Average		Daily Maximum																													
Minimum Value: 2.0 ppm on Jul 25 21:00		Minimum Daily Average: 2.0 ppm on Jul 5		Hours of Missing Data: 36														Daily Average		Daily Maximum																													
Maximum Diurnal Average: 2.4 ppm at hour 5		Minimum Diurnal Average: 2.0 ppm at hour 18		Hours of Calibration: 34														Daily Average		Daily Maximum																													
Monthly Average: 2.14 ppm		Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.4 P ₉₉ = 3.1		Percent Operational Time: 99.7														Daily Average		Daily Maximum																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	3.0	2.7	2.6	Z	2.5	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.2	2.2	3.0																						
2-Jul	2.1	2.2	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	2.2	2.2																					
3-Jul	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	2.1	2.3	2.4	2.0	2.4																						
4-Jul	Z	2.3	2.2	2.3	2.3	2.4	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.4	2.5	2.1	2.1	2.5																						
5-Jul	2.1	Z	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	2.0	2.0	2.0	2.0	2.1																						
6-Jul	2.0	2.1	Z	2.5	2.4	2.5	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.1	2.5																							
7-Jul	2.2	2.3	2.4	Z	2.3	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.4	2.4	2.1	2.1	2.4																							
8-Jul	2.1	2.0	2.0	2.1	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1																							
9-Jul	2.5	2.4	2.6	2.9	3.2	Z	2.8	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	3.2																							
10-Jul	Z	2.3	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	2.4	2.9	2.8	2.1	2.9																							
11-Jul	2.5	Z	2.6	2.5	2.5	2.3	2.5	2.3	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.7	3.1	2.6	2.2	2.3	3.1																							
12-Jul	2.0	2.0	Z	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	2.1	2.0	2.1	2.2	2.3	2.3	2.1	2.3																							
13-Jul	2.4	2.6	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.1	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.6																							
14-Jul	2.2	2.2	2.2	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	2.1	2.1	2.1	2.1	2.3	2.4	2.4	2.2	2.4																							
15-Jul	2.4	2.4	2.3	2.5	3.0	Z	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.2	2.3	2.5	2.2	3.0																							
16-Jul	Z	2.4	2.5	2.4	2.3	2.2	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.2	2.2	2.2	2.5																							
17-Jul	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	2.0	2.1	2.1																							
18-Jul	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	M	M	2.1	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																							
19-Jul	2.2	2.5	2.4	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.2	2.1	2.5																							
20-Jul	2.3	2.3	2.3	2.4	Z	2.4	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	2.8	2.9	3.2	2.2	3.2																							
21-Jul	2.7	2.4	2.6	2.7	2.7	Z	2.3	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.4	3.0	3.3	2.5	2.3	3.3																							
22-Jul	Z	3.1	2.7	2.6	2.7	2.5	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.6	2.3	2.2	3.1																							
23-Jul	2.7	Z	2.4	2.4	2.4	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	2.0	2.1	2.2	2.9	3.2	3.0	2.3	3.2																							
24-Jul	3.5	3.3	Z	2.6	2.9	2.5	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.2	2.2	2.1	2.3	3.5																							
25-Jul	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	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1																							
26-Jul	2.0	2.0	2.2	2.2	Z	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	2.2	2.2																						
27-Jul	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.3	2.0	2.3																							
28-Jul	Z	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.2	2.2	2.3	2.1	2.3																						
29-Jul	2.2	Z	2.2	2.2	2.4	2.3	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.7	2.6	2.2	2.7																							
30-Jul	2.7	2.7	Z	2.4	2.4	2.6	2.4	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.3	2.2	2.2	2.7																							
31-Jul	2.0	2.1	2.1	Z	2.3	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3																						
																								2.3	2.3	2.3	2.3	2.4	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	2.1	2.3	2.3	2.3	Diurnal Average		
																								3.5	3.3	2.7	2.9	3.2	2.6	2.8	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.7	3.1	3.3	3.2	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance																																																	



Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Conklin - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Conklin - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	353	49.86	49.86
2.1 - 3.0	347	49.01	98.87
3.1 - 10.0	8	1.13	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Conklin - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	35	31	9	4	6	21	8	10	21	22	28	38	31	38	27	24	353
2.1 - 3.0	38	17	5	10	10	24	25	47	50	23	18	4	9	4	20	42	346
3.1 - 10.0	0	0	0	0	0	0	1	6	1	0	0	0	0	0	0	0	8
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	73	48	14	14	16	45	34	63	72	45	46	42	40	42	47	66	707

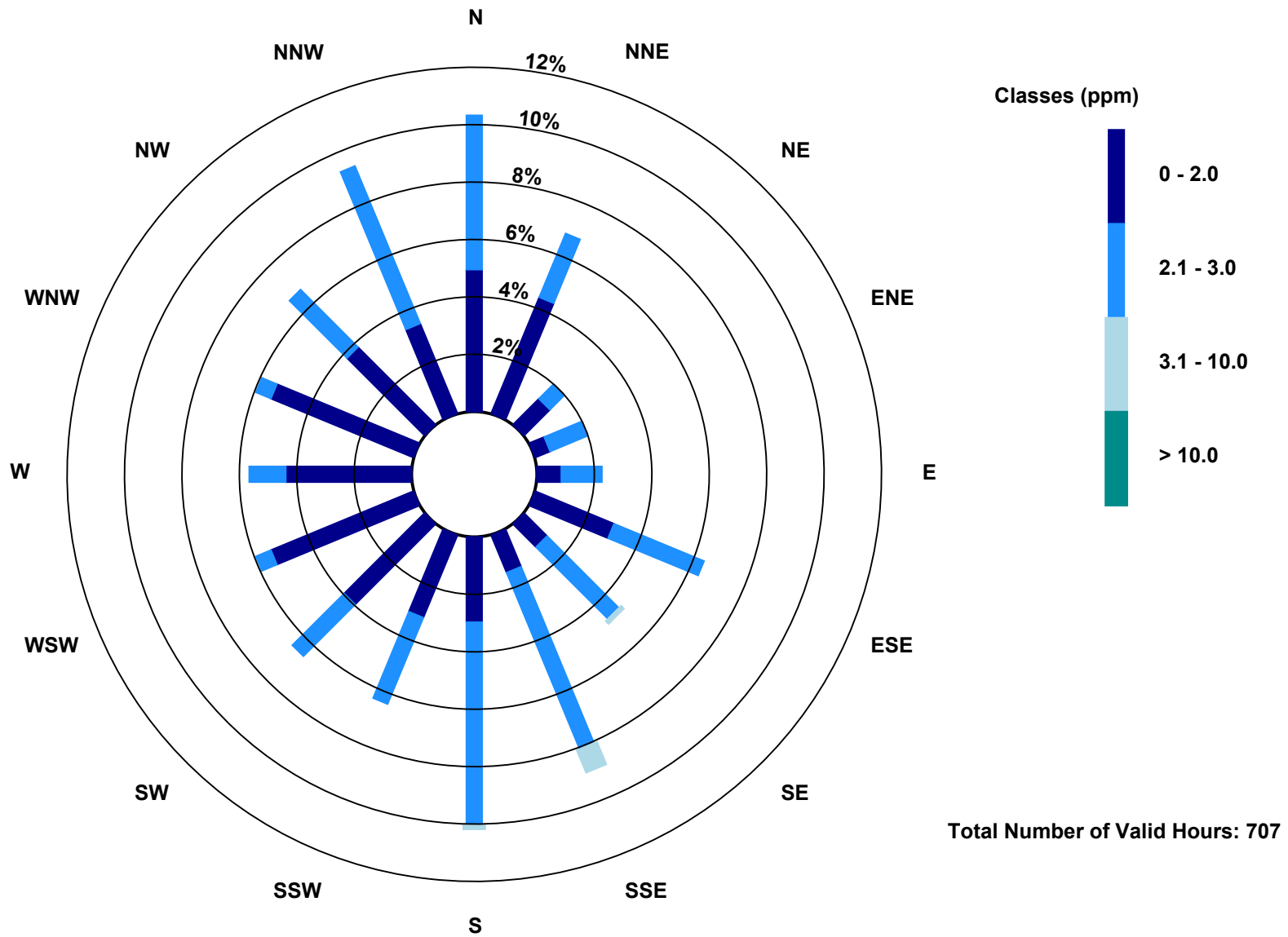
Total Number of Valid Hours: 707

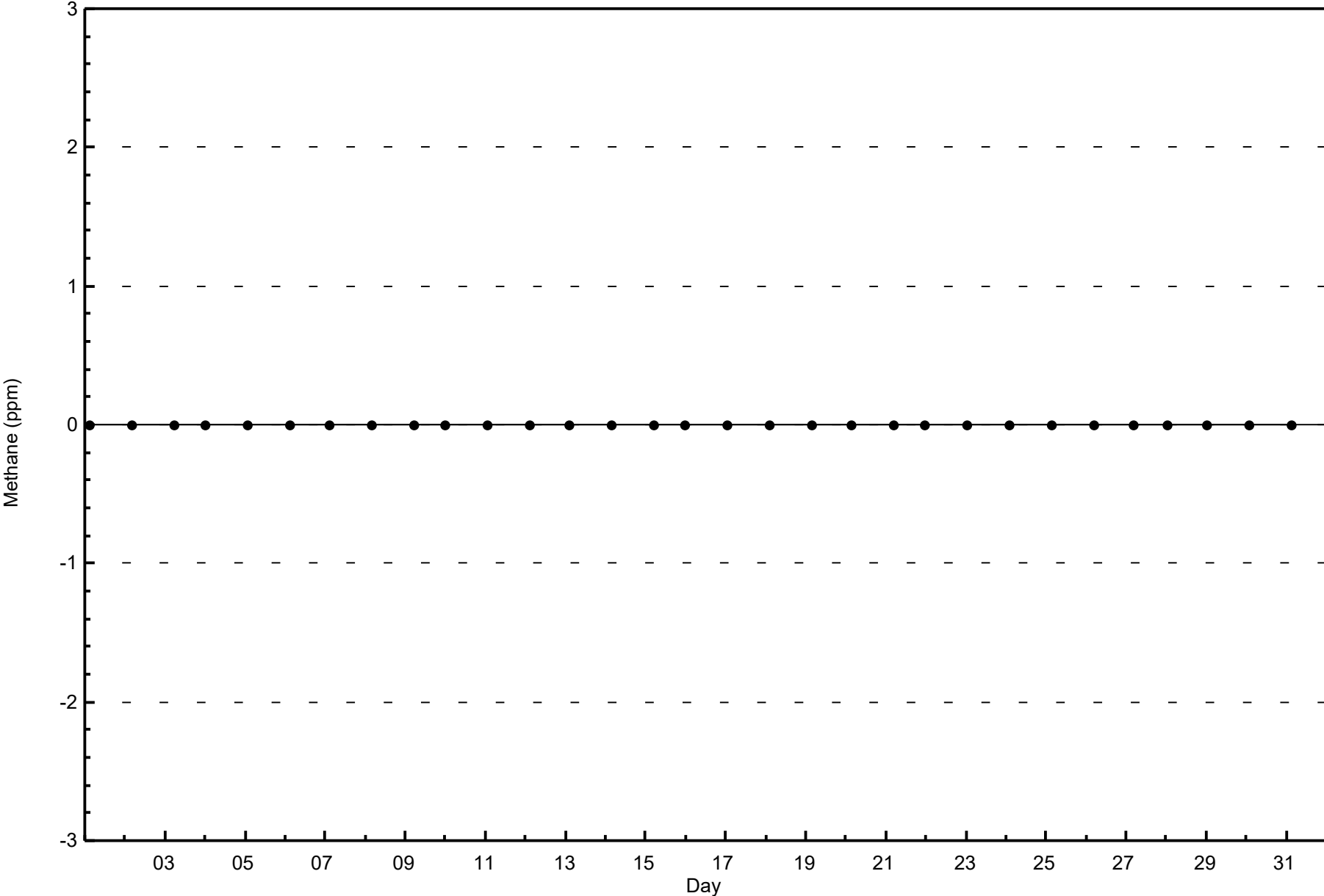
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Methane (CH₄) - ppm
Conklin

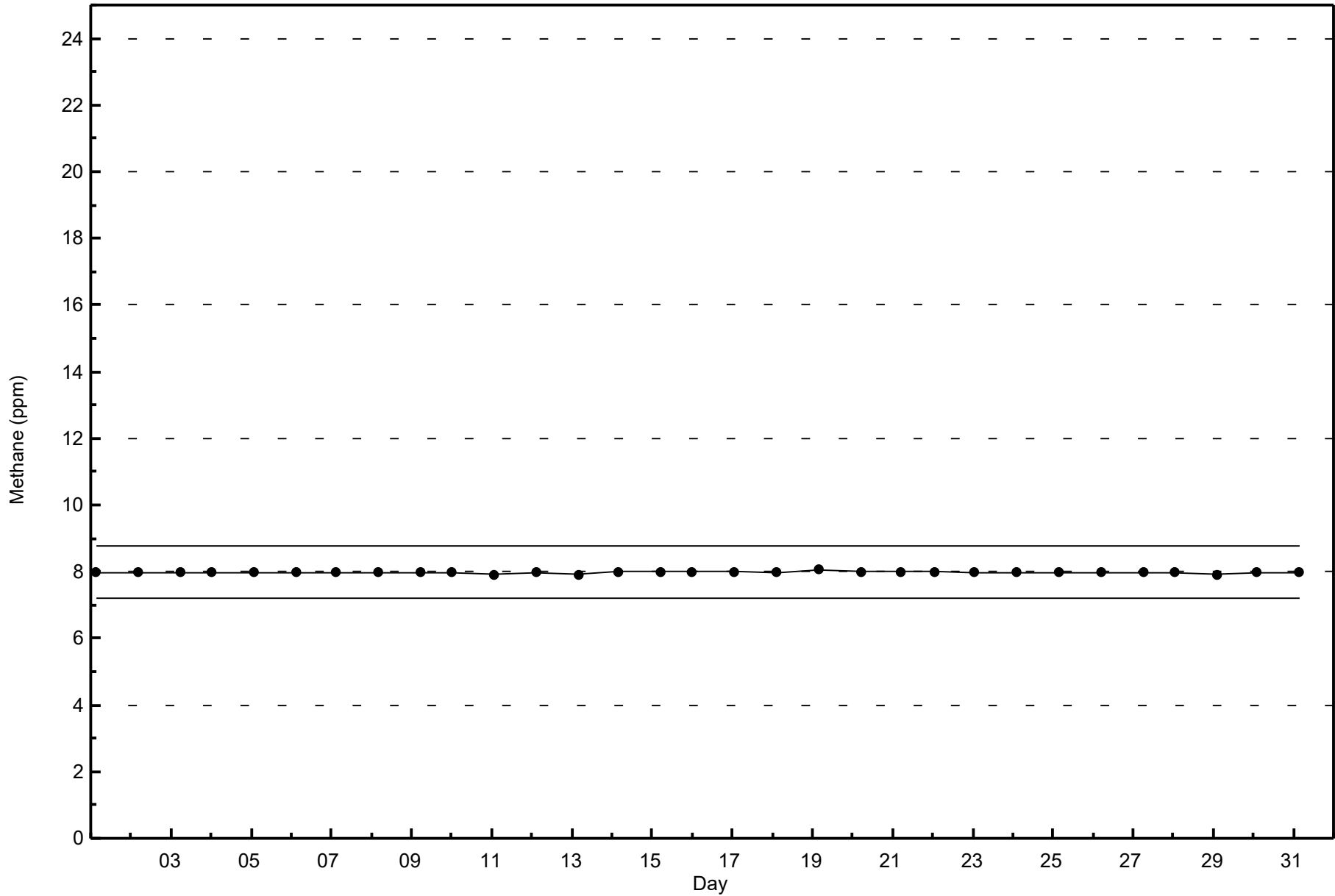






Wood Buffalo Environmental Association
Span Responses

Methane (CH₄) - ppm
Conklin - July 2023





Wood Buffalo Environmental Association
Summary of Hour Averages

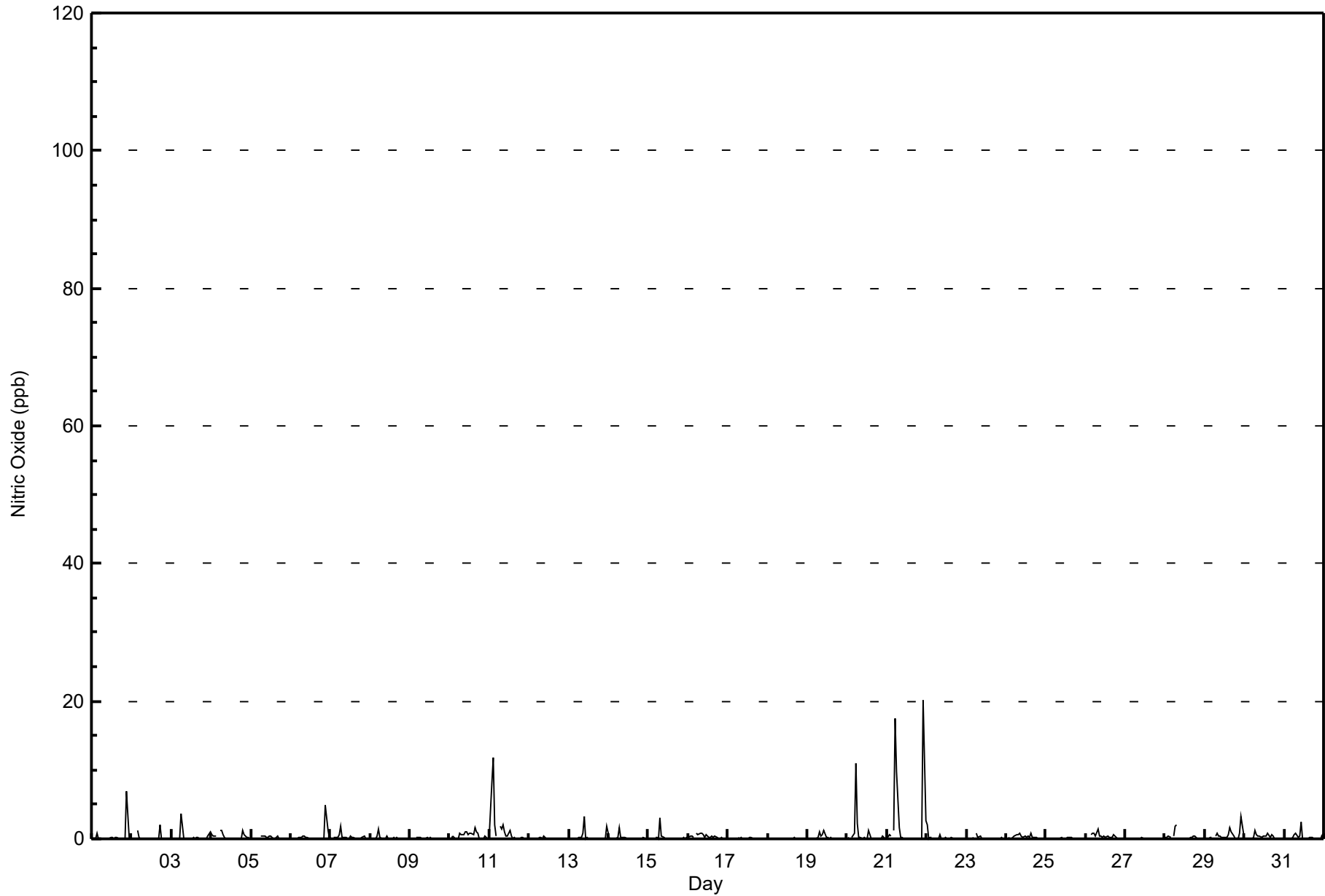
Nitric Oxide (NO) - ppb
Conklin - July 2023

Maximum Value: 20.1 ppb on Jul 21 23:00		Maximum Daily Average: 2.4 ppb on Jul 21		Hours in Service: 744																						
Minimum Value: 0.0 ppb on Jul 1 06:00		Minimum Daily Average: 0.0 ppb on Jul 18		Hours of Data: 708																						
Maximum Diurnal Average: 1.4 ppb at hour 6		Minimum Diurnal Average: 0.0 ppb at hour 19		Hours of Missing Data: 36																						
Monthly Average: 0.35 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.2 P ₉₀ = 0.6 P ₉₉ = 4.8		Hours of Calibration: 36																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.1	Z	0.0	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.1	0.0	0.4	6.9
2-Jul	0.0	0.0	Z	1.2	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	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.1
3-Jul	0.0	0.0	0.0	Z	0.0	0.0	3.6	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.3	0.2	0.1	0.0	0.0	0.0	0.1	0.4	0.9	0.3	3.6
4-Jul	0.5	0.5	0.4	0.4	Z	1.3	1.1	0.7	0.3	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	1.3	0.6	0.2	0.3	0.0	0.4	1.3
5-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.4	0.3	0.3	0.1	0.1	0.4	0.3	0.0	0.1	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4
6-Jul	Z	0.0	0.0	0.0	0.1	0.2	0.1	0.3	0.5	0.3	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	4.9	1.3	0.2	0.4	4.9
7-Jul	0.1	Z	0.1	0.1	0.1	0.5	1.9	0.2	0.1	0.3	0.0	0.0	0.3	0.2	0.1	0.0	0.1	0.0	0.0	0.2	0.4	0.1	0.0	0.0	0.2	1.9
8-Jul	0.0	0.0	Z	0.0	0.5	1.3	0.2	0.0	0.1	0.1	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.3
9-Jul	0.0	0.0	0.0	Z	0.1	0.2	0.3	0.1	0.1	0.0	0.2	0.0	0.2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3
10-Jul	0.0	0.0	0.4	0.0	Z	0.0	0.9	0.6	0.6	1.1	1.1	0.7	0.8	0.7	0.6	1.6	1.0	0.7	0.1	0.0	0.0	0.5	0.2	0.1	0.5	1.6
11-Jul	0.1	8.1	11.7	2.1	0.3	Z	1.8	1.4	2.0	1.1	0.4	0.3	1.2	0.5	0.1	0.2	0.0	0.0	0.0	0.2	0.3	0.1	0.0	0.0	1.4	11.7
12-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.4	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	0.1	0.4
13-Jul	0.0	Z	0.0	0.0	0.0	0.1	0.2	0.1	0.8	3.3	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	1.9	0.3	3.3
14-Jul	0.0	0.0	Z	0.0	0.0	0.2	1.6	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.1	1.6
15-Jul	0.0	0.0	0.0	Z	0.1	0.2	0.1	3.1	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.2	3.1
16-Jul	0.2	0.3	0.3	0.3	Z	0.9	0.6	0.8	0.7	0.6	0.2	0.6	0.2	0.1	0.3	0.2	0.3	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.3	0.9
17-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2
18-Jul	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	0.3	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.3
19-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.1	1.0	0.4	0.6	1.2	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	1.2
20-Jul	0.1	0.2	Z	0.3	0.8	11.0	2.1	0.2	0.1	0.1	0.2	0.1	0.0	1.3	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.4	0.3	0.0	0.8	11.0
21-Jul	0.1	0.5	0.4	Z	1.3	17.5	9.8	1.6	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.1	2.6	2.4	20.1
22-Jul	1.9	0.1	0.1	0.2	Z	0.0	0.1	0.1	0.6	0.0	0.0	0.1	0.1	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.9
23-Jul	0.0	0.0	0.0	0.1	0.2	Z	0.8	0.2	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.8
24-Jul	Z	0.1	0.0	0.0	0.1	0.5	0.5	0.6	0.8	0.4	0.2	0.4	0.3	0.3	0.2	0.9	0.3	0.3	0.1	0.1	0.1	0.0	0.1	0.0	0.3	0.9
25-Jul	0.0	Z	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.2	0.3	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.3
26-Jul	0.0	0.0	Z	0.5	0.8	0.8	0.5	1.3	0.5	0.4	0.2	0.4	0.3	0.4	0.3	0.2	0.2	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.3	1.3
27-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.2
28-Jul	0.3	0.2	0.3	0.3	Z	0.5	1.9	2.0	C	C	C	C	C	0.0	0.0	0.2	0.2	0.4	0.3	0.1	0.0	0.0	0.0	0.0	0.4	2.0
29-Jul	0.1	0.1	0.0	0.1	0.2	Z	0.4	0.8	0.4	0.4	0.1	0.1	0.2	0.3	0.6	1.5	0.9	0.3	0.0	0.0	0.1	0.8	3.3	0.6	0.5	3.3
30-Jul	Z	0.0	0.0	0.0	0.1	0.1	1.2	0.5	0.4	0.3	0.3	0.4	0.4	0.4	0.8	0.2	0.6	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.3	1.2
31-Jul	0.0	Z	0.0	0.0	0.0	0.3	0.6	0.9	0.2	0.5	2.4	0.1	0.1	0.0	0.0	0.1	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.7	0.3	2.4
																								Diurnal Average		
																								Diurnal Maximum		
																								0.1 1.9 0.4 8.1 0.5 11.7 0.3 2.1 0.2 1.3 1.4 17.5 1.0 9.8 0.6 3.1 0.3 2.0 0.3 3.3 0.4 2.4 0.3 0.2 0.2 0.2 0.2 0.2 0.0 0.1 0.1 0.5 0.8 0.2 2.6		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Conklin - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Conklin - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Conklin - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	74	46	13	13	15	43	31	69	74	45	44	42	39	43	48	68	707
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	74	46	13	13	15	43	31	69	74	45	44	42	39	43	48	68	707

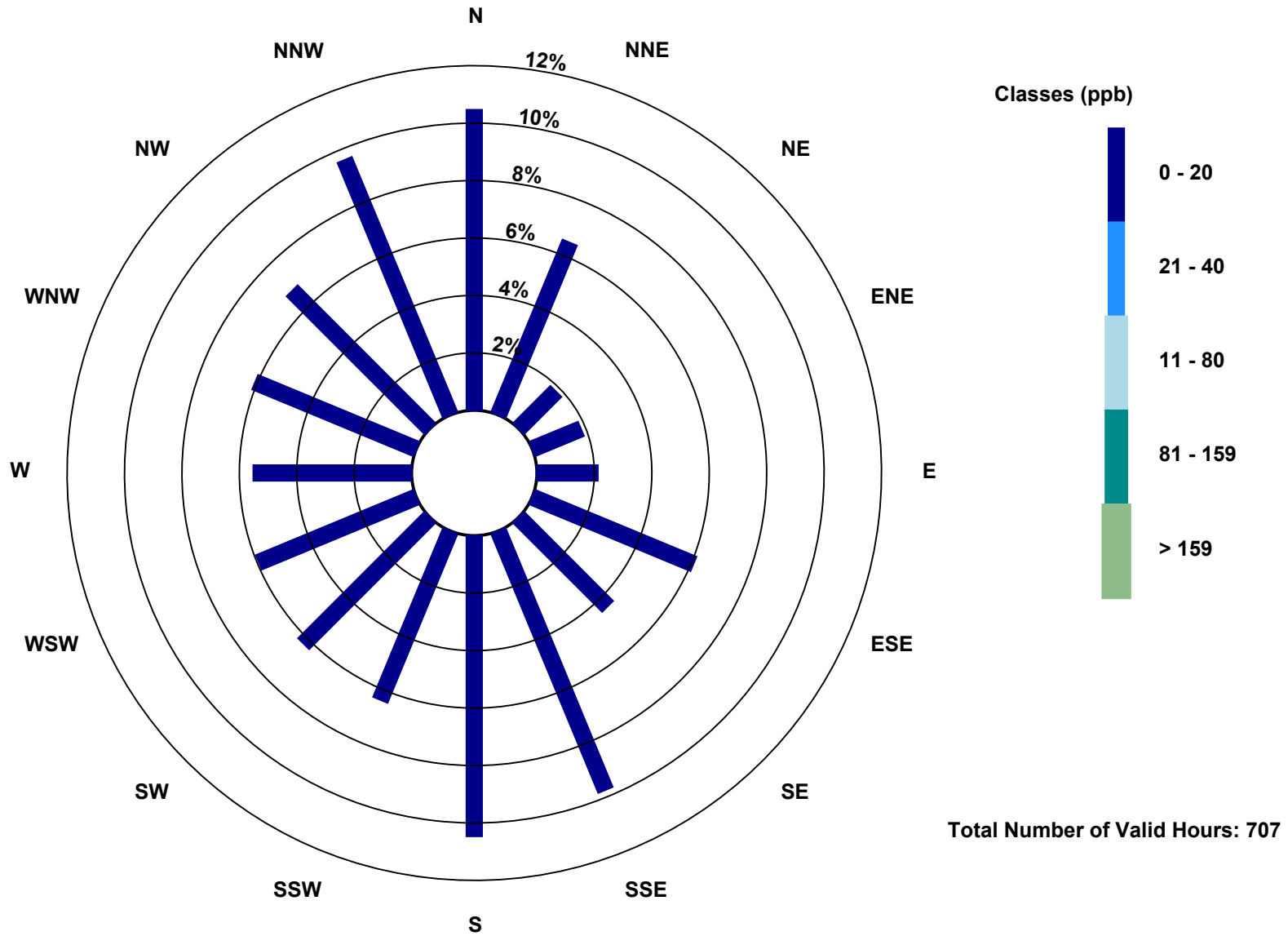
Total Number of Valid Hours: 707

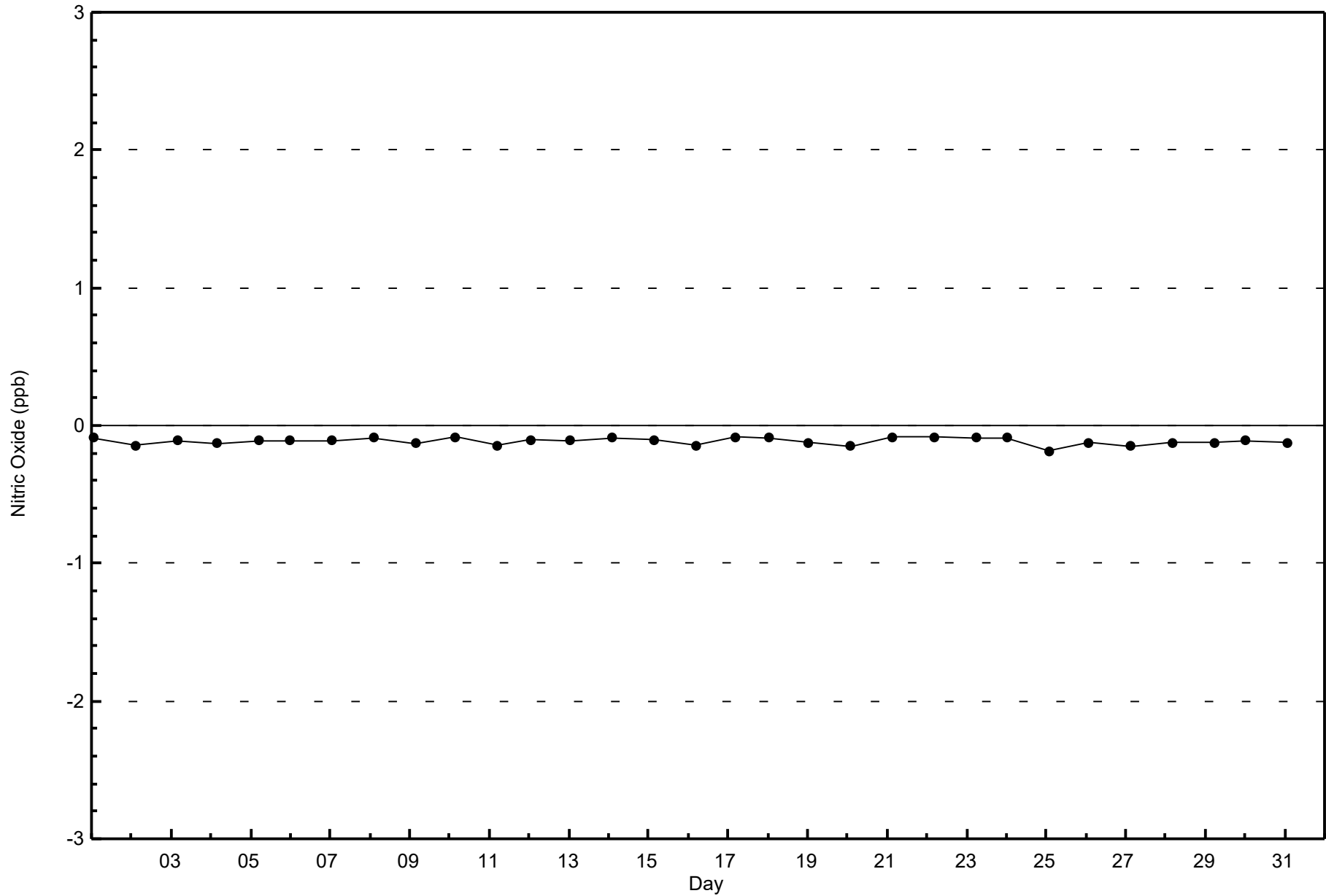
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Conklin

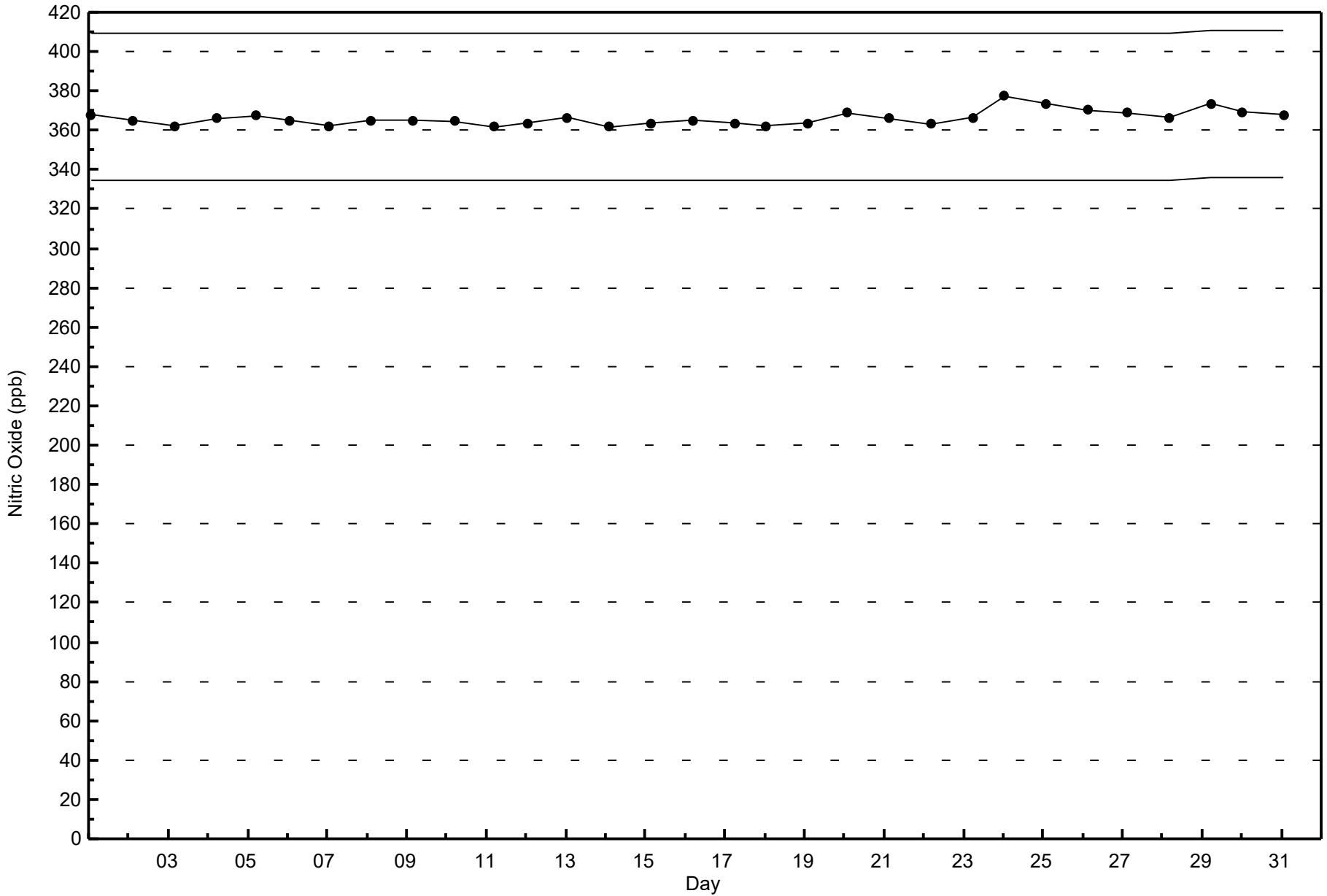






Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Conklin - July 2023





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

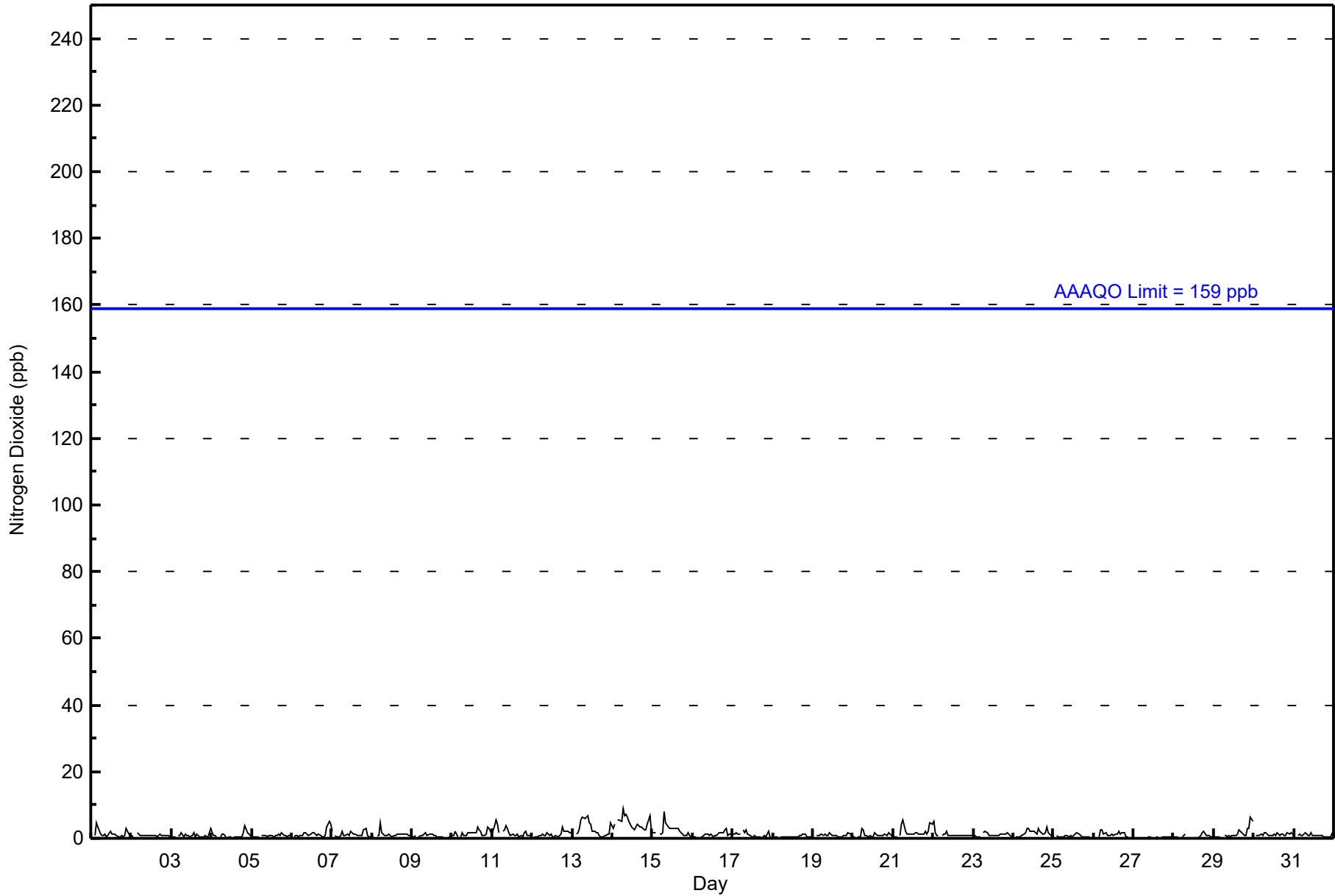
Conklin - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744														744																													
Maximum Value: 9.0 ppb on Jul 14 07:00		Maximum Daily Average: 4.4 ppb on Jul 14		Hours of Data: 708														708																															
Minimum Value: 0.0 ppb on Jul 16 04:00		Minimum Daily Average: 0.3 ppb on Jul 27		Hours of Missing Data: 36														36																															
Maximum Diurnal Average: 1.8 ppb at hour 7		Minimum Diurnal Average: 0.9 ppb at hour 2		Hours of Calibration: 36														36																															
Monthly Average: 1.29 ppb		Percentiles: P ₁ = 0.1 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 0.9 Q ₃ = 1.5 P ₉₀ = 2.7 P ₉₉ = 6.3		Percent Operational Time: 100.0														100.0																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	1.0	Z	1.0	4.6	3.2	1.1	0.8	0.7	1.1	0.5	1.0	2.2	1.4	1.3	1.2	1.0	0.5	0.6	0.7	0.6	0.7	3.0	1.4	0.7	1.3	4.6																							
2-Jul	0.7	0.6	Z	1.7	1.4	0.8	0.7	0.7	0.7	0.9	0.8	0.8	0.8	1.0	0.9	0.6	0.9	1.1	0.8	0.8	0.8	0.8	0.8	0.5	0.9	1.7																							
3-Jul	0.6	0.6	0.5	Z	0.8	1.0	1.6	0.6	1.2	0.7	0.8	0.5	0.7	1.5	0.6	1.4	0.9	0.5	0.4	0.6	0.8	0.6	0.5	3.0	0.9	3.0																							
4-Jul	1.7	0.7	0.7	0.4	Z	0.4	1.3	1.4	0.7	0.2	0.3	0.4	0.2	0.2	0.3	0.3	0.5	0.5	0.5	1.8	3.8	1.9	1.3	0.8	0.9	3.8																							
5-Jul	0.6	0.3	0.3	0.4	0.4	Z	0.8	0.9	0.9	0.6	0.7	0.9	0.9	0.6	0.7	0.8	1.1	0.7	1.8	1.0	0.8	0.6	0.8	0.7	0.8	1.8																							
6-Jul	Z	0.5	0.7	0.7	0.5	0.7	1.0	1.5	1.5	1.2	1.0	1.1	1.5	1.6	1.1	1.0	1.4	0.8	0.6	0.6	0.9	3.5	5.0	4.1	1.4	5.0																							
7-Jul	2.2	Z	0.8	0.5	0.4	0.7	2.0	0.7	0.9	1.1	1.0	2.0	1.6	1.3	1.2	0.8	0.9	0.8	0.8	2.5	2.8	0.9	0.5	0.4	1.2	2.8																							
8-Jul	0.5	0.7	Z	0.7	0.9	4.8	1.7	0.9	0.8	0.9	1.2	1.0	0.6	0.7	1.0	1.1	1.3	1.2	1.1	1.1	1.2	1.1	1.0	0.8	1.1	4.8																							
9-Jul	0.6	0.6	0.9	Z	0.6	0.7	0.8	1.2	1.5	1.0	1.3	1.3	1.3	1.0	0.8	0.5	0.5	0.5	0.5	0.2	0.1	0.1	0.6	0.8	0.8	1.5																							
10-Jul	0.9	0.9	2.2	0.3	Z	0.4	1.6	1.0	0.9	1.8	1.7	1.5	1.7	1.7	1.7	3.3	2.6	2.3	0.7	0.7	1.3	3.5	2.9	2.1	1.6	3.5																							
11-Jul	1.3	4.0	5.6	4.1	1.8	Z	2.0	2.6	3.9	2.8	1.7	1.0	1.2	0.9	0.8	1.3	0.6	0.7	0.6	1.8	2.3	1.0	0.7	0.8	1.9	5.6																							
12-Jul	Z	0.5	0.4	0.5	0.8	1.0	1.1	0.9	1.0	1.9	1.0	1.1	0.6	0.6	0.7	0.6	0.8	1.1	3.6	2.2	2.1	2.0	1.8	1.7	1.2	3.6																							
13-Jul	1.5	Z	1.3	1.9	3.1	5.7	6.3	6.0	6.3	6.9	4.6	4.1	2.0	2.0	1.9	1.5	0.8	0.4	0.4	0.7	1.0	1.3	1.3	4.5	2.8	6.9																							
14-Jul	2.9	4.3	Z	5.3	5.7	5.2	9.0	6.9	7.3	6.2	5.0	3.3	2.9	2.6	3.2	4.1	3.6	3.3	2.9	2.7	2.5	4.2	6.6	2.2	4.4	9.0																							
15-Jul	1.9	1.8	1.8	Z	1.2	1.3	1.7	7.9	4.8	3.4	3.1	2.9	2.9	2.9	2.9	3.0	2.2	1.7	1.1	0.8	0.8	1.8	0.7	0.6	2.3	7.9																							
16-Jul	0.6	0.4	0.2	0.0	Z	0.3	0.6	1.3	1.3	1.1	1.0	1.3	0.5	0.7	0.9	1.2	1.5	1.9	1.7	2.5	3.1	1.0	1.1	1.4	1.1	3.1																							
17-Jul	1.4	1.3	1.5	1.3	1.3	Z	2.6	1.7	2.7	1.4	0.9	0.5	0.3	0.7	0.5	0.4	0.4	0.2	0.3	0.8	0.3	2.1	0.5	0.2	1.0	2.7																							
18-Jul	Z	0.6	0.3	0.2	0.2	0.3	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.5	0.4	0.5	1.0	0.7	1.2	1.4	0.5	0.4	0.5	0.5	0.5	1.4																							
19-Jul	0.6	Z	0.9	0.9	0.8	1.1	0.9	1.1	0.8	1.0	1.5	0.7	1.0	0.7	0.8	0.5	0.4	0.5	0.7	0.7	0.8	1.6	1.1	0.8	0.9	1.6																							
20-Jul	0.4	0.3	Z	0.3	0.5	2.8	2.7	0.9	0.8	0.6	0.8	0.6	0.6	1.5	0.9	0.7	0.7	0.7	0.8	1.1	0.8	1.7	1.2	0.9	1.0	2.8																							
21-Jul	0.5	0.5	0.4	Z	0.8	4.2	5.7	2.3	1.2	1.1	1.4	1.1	1.4	1.5	1.5	1.4	1.3	1.3	1.3	2.2	1.4	2.1	4.6	4.4	1.9	5.7																							
22-Jul	4.9	1.7	0.9	0.9	Z	1.0	1.1	1.1	2.1	0.9	0.9	1.0	1.0	0.8	0.7	0.9	0.8	0.7	0.8	0.8	0.8	1.0	1.0	0.8	1.2	4.9																							
23-Jul	0.8	0.7	0.6	0.5	0.5	Z	1.7	2.1	1.5	0.9	0.8	0.7	0.8	1.0	0.8	0.9	1.4	1.2	1.1	1.1	1.5	1.2	0.7	0.6	1.0	2.1																							
24-Jul	Z	0.4	0.4	0.5	0.5	0.7	1.3	1.7	2.8	2.2	2.2	2.1	1.6	1.3	2.8	2.0	1.4	1.1	1.5	3.4	1.7	1.0	1.3	1.6	3.4																								
25-Jul	0.8	Z	0.7	0.6	0.6	0.6	0.6	0.9	0.7	0.6	0.8	0.5	1.0	1.2	1.7	1.1	0.9	0.4	0.6	0.5	0.3	0.6	0.2	0.2	0.7	1.7																							
26-Jul	0.2	0.1	Z	0.4	2.6	2.5	1.2	1.9	0.9	0.7	0.7	1.4	0.8	1.4	1.2	2.0	1.2	1.9	1.8	0.5	0.3	0.2	0.2	0.1	1.1	2.6																							
27-Jul	0.1	0.1	0.1	Z	0.2	0.2	0.1	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.4	0.4	0.3	0.5																							
28-Jul	0.4	0.5	0.3	0.1	Z	0.4	0.9	1.3	C	C	C	C	C	0.1	0.2	0.6	0.9	1.5	2.3	0.8	0.8	0.7	0.5	0.4	0.7	2.3																							
29-Jul	0.3	0.3	0.3	0.3	0.2	Z	0.7	0.9	0.6	0.8	0.6	0.8	0.7	0.7	1.2	2.4	2.2	1.2	0.7	1.0	2.8	2.9	6.4	5.1	1.4	6.4																							
30-Jul	Z	1.0	0.8	1.0	1.1	0.9	1.7	1.5	1.3	1.0	0.9	0.9	1.2	1.0	1.6	0.8	1.1	1.1	0.8	0.8	1.6	1.4	1.6	1.3	1.1	1.7																							
31-Jul	0.9	Z	0.9	1.1	0.9	1.0	1.4	1.5	1.0	1.0	1.7	0.8	0.8	0.7	0.7	0.9	0.8	0.9	0.5	0.5	0.5	0.6	0.6	1.5	0.9	1.7																							
																								1.1	0.9	0.9	1.1	1.2	1.5	1.8	1.8	1.7	1.5	1.3	1.2	1.1	1.1	1.2	1.1	1.0	1.0	1.1	1.3	1.5	1.5	1.4	Diurnal Average		
																								4.9	4.3	5.6	5.3	5.7	5.7	9.0	7.9	7.3	6.9	5.0	4.1	2.9	2.9	3.2	4.1	3.6	3.3	3.6	2.7	3.8	4.2	6.6	5.1	Diurnal Maximum	
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Conklin - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Conklin - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Conklin - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	74	46	13	13	15	43	31	69	74	45	44	42	39	43	48	68	707
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	74	46	13	13	15	43	31	69	74	45	44	42	39	43	48	68	707

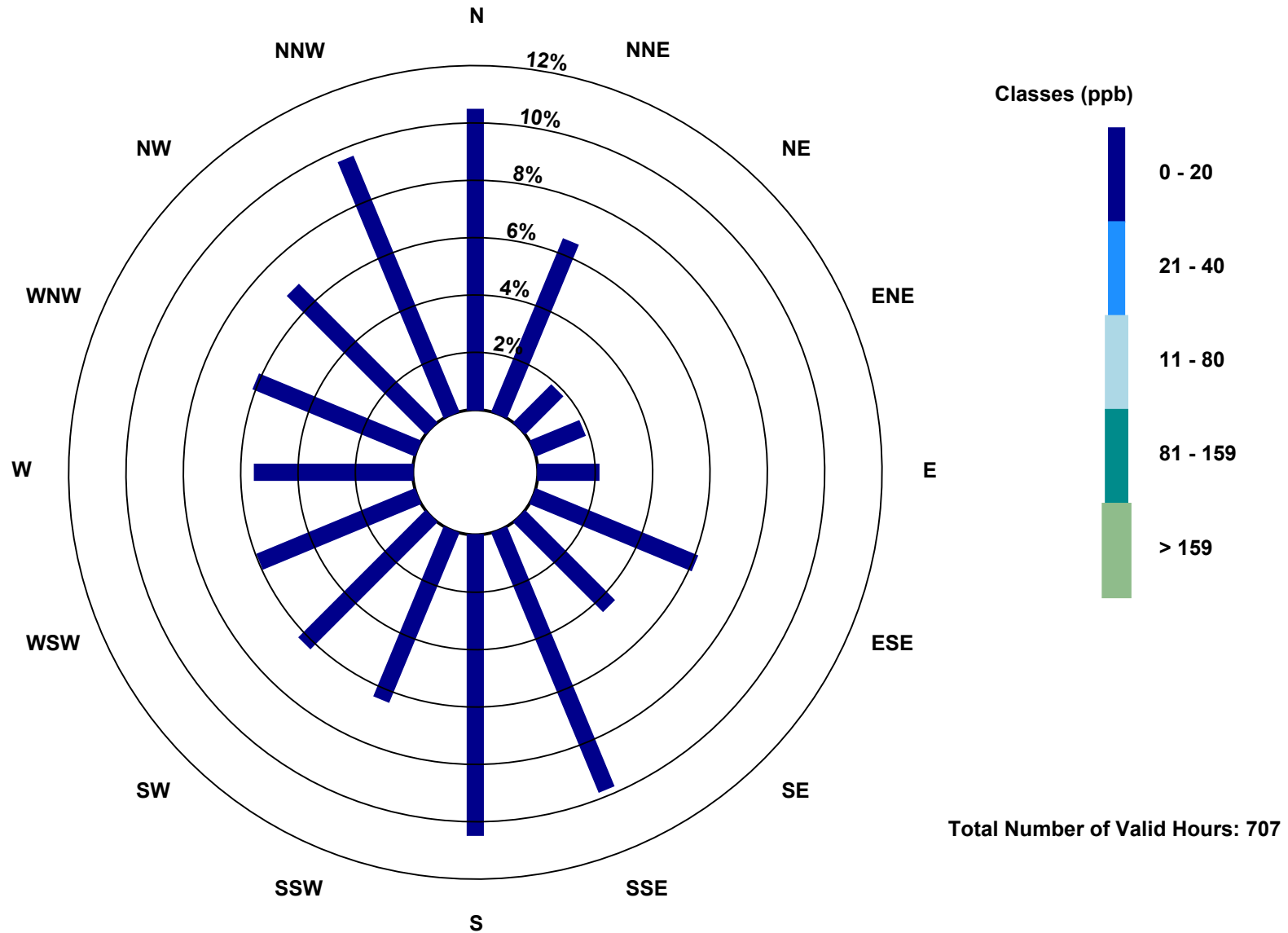
Total Number of Valid Hours: 707

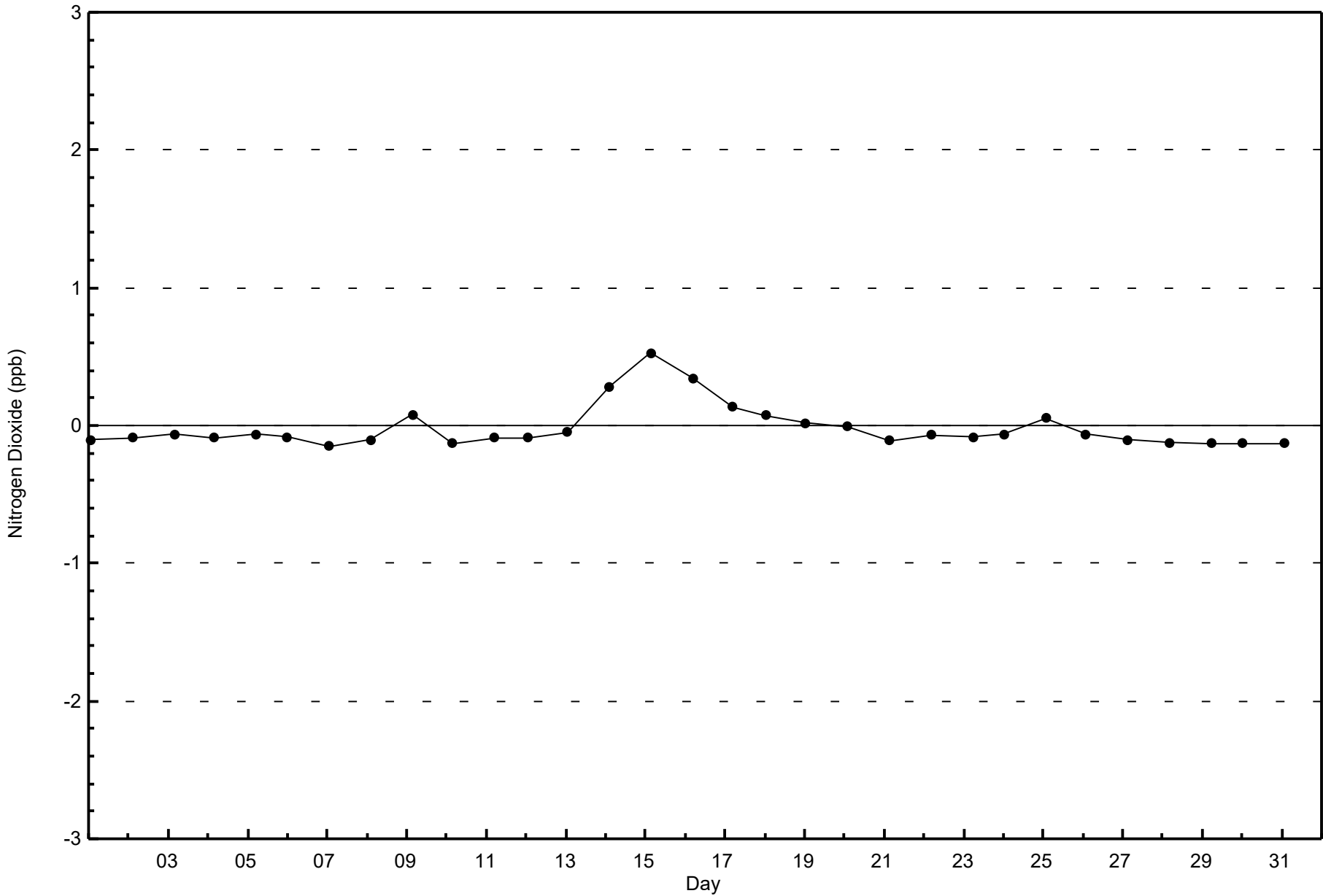
Total Number of Hours: 744

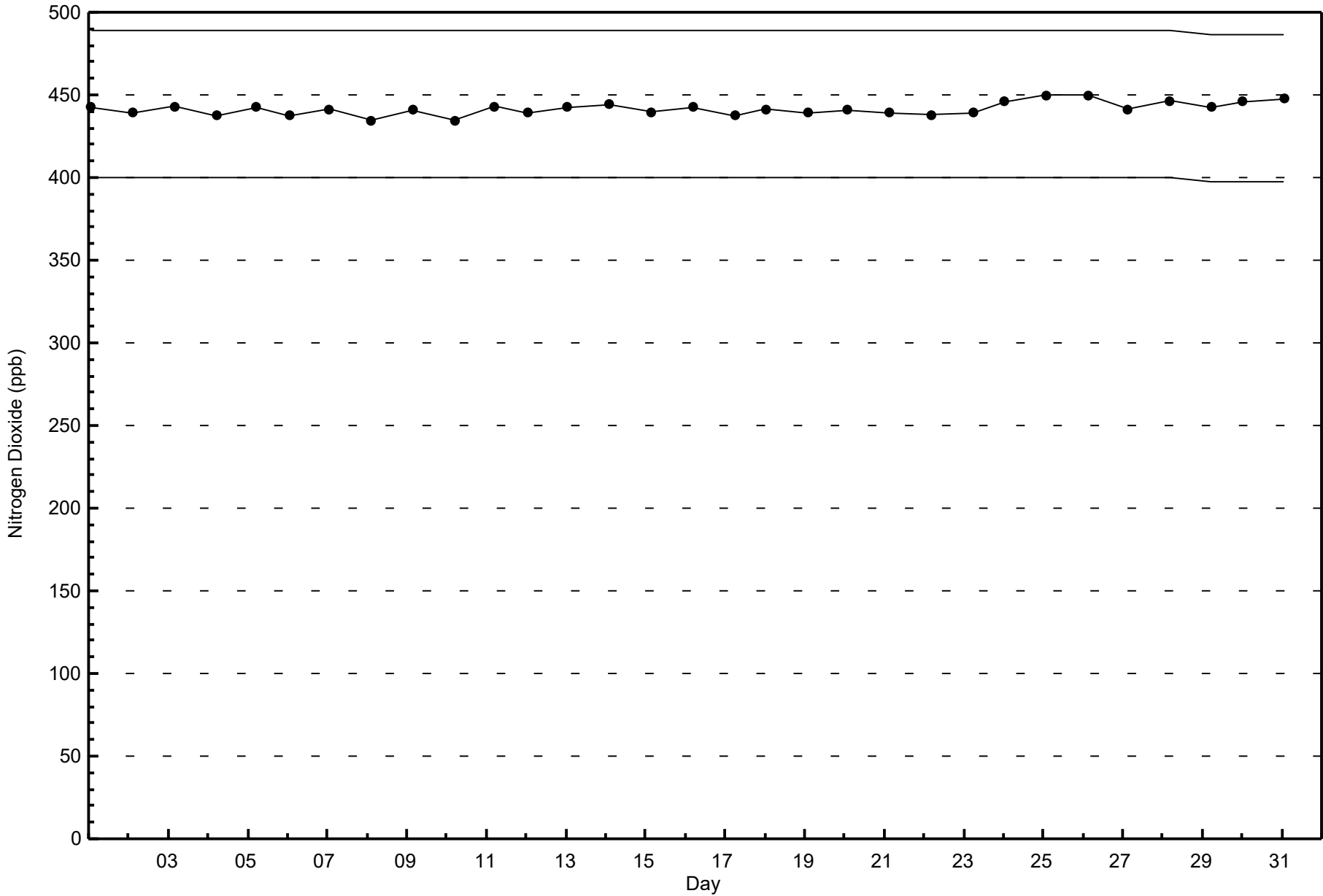


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Conklin







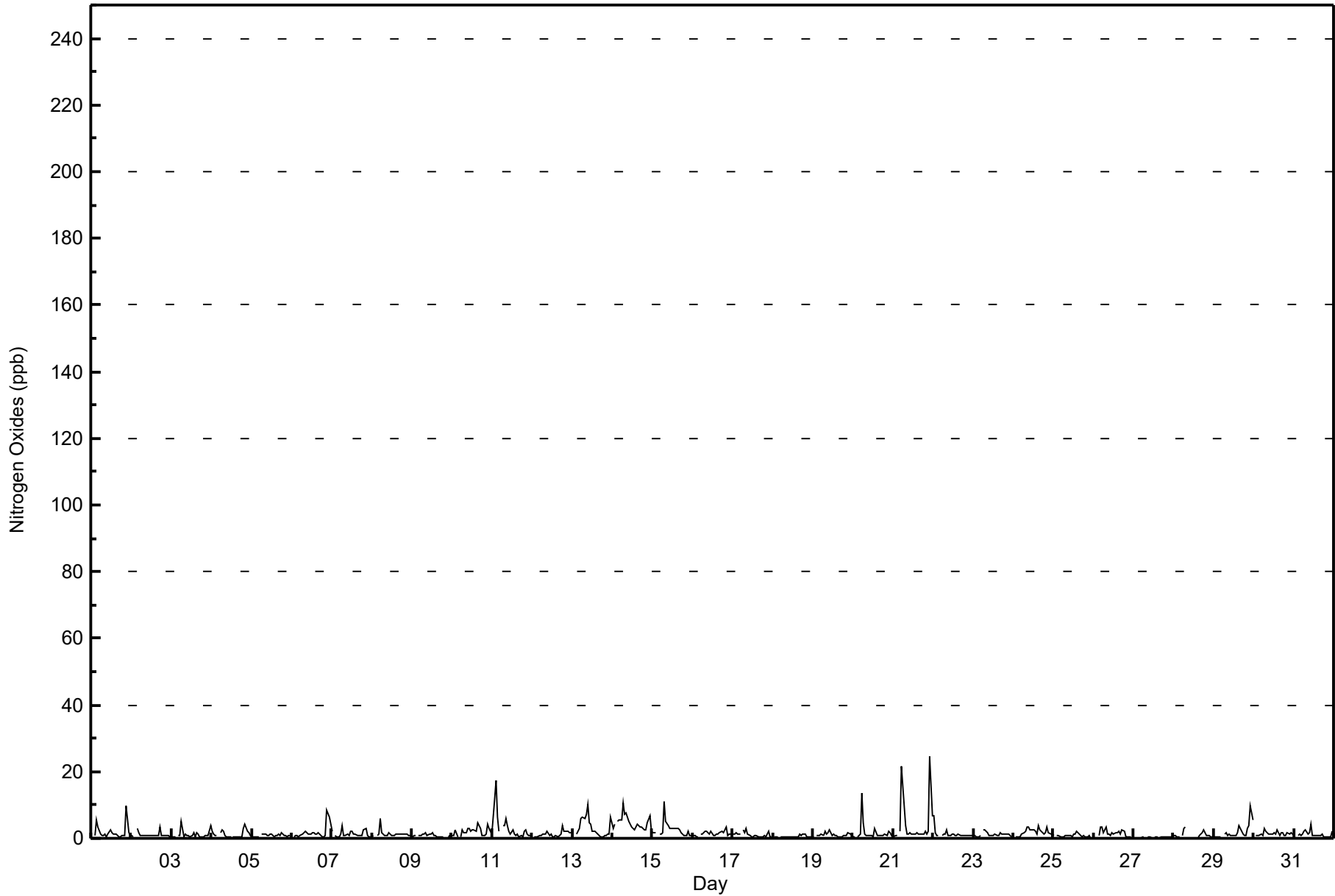


Maximum Value: 24.7 ppb on Jul 21 23:00																				Maximum Daily Average: 4.6 ppb on Jul 14					Hours in Service: 744	
Minimum Value: 0.1 ppb on Jul 9 21:00																				Minimum Daily Average: 0.3 ppb on Jul 27					Hours of Data: 708	
Maximum Diurnal Average: 2.9 ppb at hour 6																				Minimum Diurnal Average: 1.1 ppb at hour 19					Hours of Missing Data: 36	
Monthly Average: 1.63 ppb																				Percentiles: P ₁ = 0.1 P ₁₀ = 0.4 Q ₁ = 0.7 Median = 1.0 Q ₃ = 1.8 P ₉₀ = 3.2 P ₉₉ = 10.6					Hours of Calibration: 36	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	1.1	Z	1.0	5.5	3.3	1.1	0.8	0.7	1.1	0.5	1.1	2.5	1.5	1.4	1.3	1.1	0.5	0.6	0.7	0.6	0.7	9.9	1.5	0.7	1.7	9.9
2-Jul	0.7	0.6	Z	2.9	1.6	0.8	0.7	0.7	0.7	0.9	0.8	0.8	0.8	1.0	0.9	0.6	0.9	3.2	0.8	0.8	0.8	0.8	0.8	0.5	1.0	3.2
3-Jul	0.6	0.6	0.5	Z	0.8	1.0	5.2	0.6	1.2	0.7	0.9	0.5	0.7	1.6	0.6	1.7	1.1	0.6	0.4	0.6	0.8	0.7	0.9	3.9	1.1	5.2
4-Jul	2.2	1.2	1.1	0.8	Z	1.7	2.4	2.1	1.0	0.2	0.4	0.4	0.2	0.3	0.4	0.3	0.6	0.6	0.5	3.1	4.4	2.1	1.6	0.8	1.2	4.4
5-Jul	0.6	0.3	0.3	0.4	0.4	Z	1.2	1.2	1.2	0.7	0.8	1.3	1.2	0.6	0.8	0.9	1.5	0.7	1.8	1.0	0.8	0.6	0.8	0.7	0.9	1.8
6-Jul	Z	0.5	0.7	0.7	0.6	0.9	1.1	1.8	2.0	1.5	1.1	1.1	1.6	1.6	1.2	1.1	1.5	0.8	0.6	0.6	0.9	8.4	6.3	4.3	1.8	8.4
7-Jul	2.3	Z	0.9	0.6	0.5	1.2	3.9	0.9	1.0	1.4	1.0	2.0	1.9	1.5	1.3	0.8	1.0	0.8	0.8	2.7	3.2	1.0	0.5	0.4	1.4	3.9
8-Jul	0.5	0.7	Z	0.7	1.4	6.1	1.9	0.9	0.9	1.0	1.6	1.1	0.7	0.8	1.1	1.2	1.4	1.3	1.1	1.1	1.2	1.1	1.0	0.8	1.3	6.1
9-Jul	0.6	0.6	0.9	Z	0.7	0.9	1.1	1.3	1.6	1.0	1.5	1.3	1.5	1.0	0.8	0.6	0.6	0.5	0.5	0.2	0.1	0.1	0.6	0.8	0.8	1.6
10-Jul	0.9	0.9	2.6	0.3	Z	0.4	2.5	1.6	1.5	2.9	2.8	2.2	2.5	2.4	2.3	4.9	3.6	3.0	0.8	0.7	1.3	4.0	3.1	2.2	2.1	4.9
11-Jul	1.4	12.1	17.3	6.2	2.1	Z	3.8	4.0	5.9	3.9	2.1	1.3	2.4	1.4	0.9	1.5	0.6	0.7	0.6	2.0	2.6	1.1	0.7	0.8	3.3	17.3
12-Jul	Z	0.5	0.4	0.5	0.8	1.0	1.2	1.2	1.1	2.3	1.0	1.2	0.6	0.6	0.7	0.6	0.8	1.1	3.6	2.2	2.1	2.0	1.8	1.7	1.3	3.6
13-Jul	1.5	Z	1.3	1.9	3.1	5.8	6.5	6.1	7.1	10.2	4.6	4.2	2.0	2.0	1.9	1.5	0.8	0.4	0.4	0.7	1.0	1.3	1.3	6.4	3.1	10.2
14-Jul	2.9	4.3	Z	5.3	5.7	5.4	10.6	7.1	7.6	6.4	5.1	3.4	3.0	2.7	3.2	4.2	3.6	3.3	2.9	2.7	2.5	4.5	6.7	2.2	4.6	10.6
15-Jul	1.9	1.8	1.8	Z	1.3	1.5	1.8	11.0	5.2	3.6	3.2	3.0	3.0	3.0	3.0	3.1	2.3	1.7	1.1	0.8	0.8	2.0	0.8	0.7	2.5	11.0
16-Jul	0.8	0.7	0.5	0.3	Z	1.2	1.2	2.1	2.0	1.7	1.2	1.9	0.7	0.8	1.2	1.4	1.8	2.1	1.8	2.6	3.2	1.0	1.1	1.4	1.4	3.2
17-Jul	1.4	1.3	1.5	1.3	1.3	Z	2.7	1.7	2.8	1.4	0.9	0.6	0.3	0.9	0.7	0.4	0.4	0.2	0.3	0.9	0.3	2.1	0.5	0.2	1.1	2.8
18-Jul	Z	0.6	0.3	0.2	0.2	0.3	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.5	0.4	0.5	1.3	0.7	1.3	1.5	0.5	0.4	0.5	0.5	0.6	1.5
19-Jul	0.6	Z	0.9	0.9	0.8	1.1	1.0	2.1	1.2	1.6	2.7	0.8	1.2	0.8	0.9	0.6	0.5	0.5	0.8	0.7	0.8	1.7	1.1	0.8	1.0	2.7
20-Jul	0.5	0.5	Z	0.6	1.3	13.8	4.8	1.1	0.9	0.7	1.0	0.7	0.6	2.8	1.0	0.8	0.7	0.7	0.8	1.2	0.8	2.1	1.5	0.9	1.7	13.8
21-Jul	0.6	1.0	0.8	Z	2.1	21.7	15.5	3.9	1.3	1.2	1.5	1.1	1.4	1.5	1.5	1.4	1.3	1.3	1.3	2.2	1.4	2.1	24.7	7.0	4.2	24.7
22-Jul	6.8	1.8	1.0	1.1	Z	1.0	1.2	1.2	2.7	0.9	0.9	1.1	1.1	0.9	0.7	1.1	0.8	0.7	0.8	0.8	0.8	1.0	1.0	0.8	1.3	6.8
23-Jul	0.8	0.7	0.6	0.6	0.7	Z	2.5	2.3	1.8	1.0	0.8	0.7	0.8	1.1	0.8	0.9	1.5	1.2	1.1	1.1	1.5	1.4	0.7	0.6	1.1	2.5
24-Jul	Z	0.5	0.4	0.5	0.6	1.2	1.8	2.3	3.6	3.2	2.4	2.6	2.4	1.9	1.5	3.7	2.3	1.7	1.2	1.6	3.5	1.7	1.1	1.3	1.9	3.7
25-Jul	0.8	Z	0.8	0.7	0.6	0.6	0.6	0.9	0.7	0.7	0.9	0.5	1.1	1.4	2.0	1.2	1.0	0.5	0.7	0.5	0.3	0.7	0.2	0.2	0.8	2.0
26-Jul	0.2	0.1	Z	0.9	3.4	3.3	1.7	3.2	1.4	1.1	0.9	1.8	1.1	1.8	1.5	2.2	1.4	2.4	2.1	0.5	0.3	0.2	0.2	0.1	1.4	3.4
27-Jul	0.1	0.1	0.1	Z	0.2	0.2	0.1	0.2	0.2	0.3	0.4	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.3	0.4	0.4	0.6	0.5	0.6	0.3	0.6
28-Jul	0.7	0.7	0.6	0.4	Z	0.9	2.8	3.3	C	C	C	C	C	0.1	0.2	0.8	1.1	1.9	2.6	0.9	0.8	0.7	0.5	0.4	1.1	3.3
29-Jul	0.4	0.4	0.3	0.4	0.4	Z	1.1	1.7	1.0	1.2	0.7	0.9	0.9	1.0	1.8	3.9	3.1	1.5	0.7	1.0	2.9	3.7	9.7	5.7	1.9	9.7
30-Jul	Z	1.0	0.8	1.0	1.2	1.0	2.9	2.0	1.7	1.3	1.2	1.3	1.6	1.4	2.4	1.0	1.7	1.5	0.8	0.9	1.6	1.4	1.6	1.3	1.4	2.9
31-Jul	0.9	Z	0.9	1.1	0.9	1.3	2.0	2.4	1.2	1.5	4.1	0.9	0.9	0.7	0.7	1.0	1.0	1.1	0.5	0.5	0.5	0.6	0.6	2.2	1.2	4.1
																								Diurnal Average		
																								Diurnal Maximum		
1.2 1.3 1.5 1.4 1.4 2.9 2.8 2.3 2.1 1.9 1.6 1.4 1.3 1.3 1.2 1.5 1.3 1.2 1.1 1.2 1.4 2.0 2.4 1.6																										
6.8 12.1 17.3 6.2 5.7 21.7 15.5 11.0 7.6 10.2 5.1 4.2 3.0 3.0 3.2 4.9 3.6 3.3 3.6 3.1 4.4 9.9 24.7 7.0																										
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Conklin - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Conklin - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	99.72	99.72
21 - 40	2	0.28	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Conklin - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	74	46	13	13	15	43	31	68	74	44	44	42	39	43	48	68	705
21 - 40	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	74	46	13	13	15	43	31	69	74	45	44	42	39	43	48	68	707

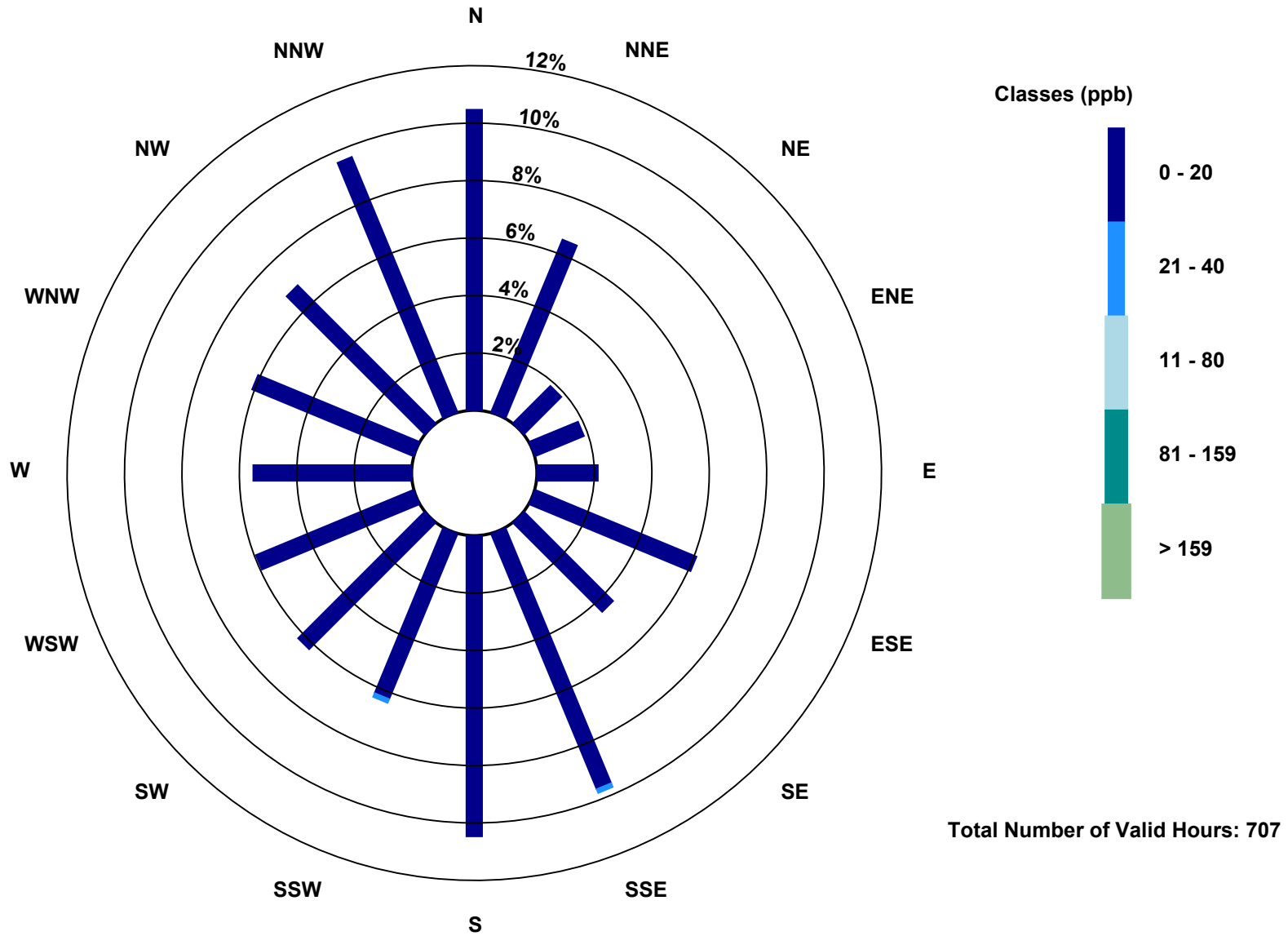
Total Number of Valid Hours: 707

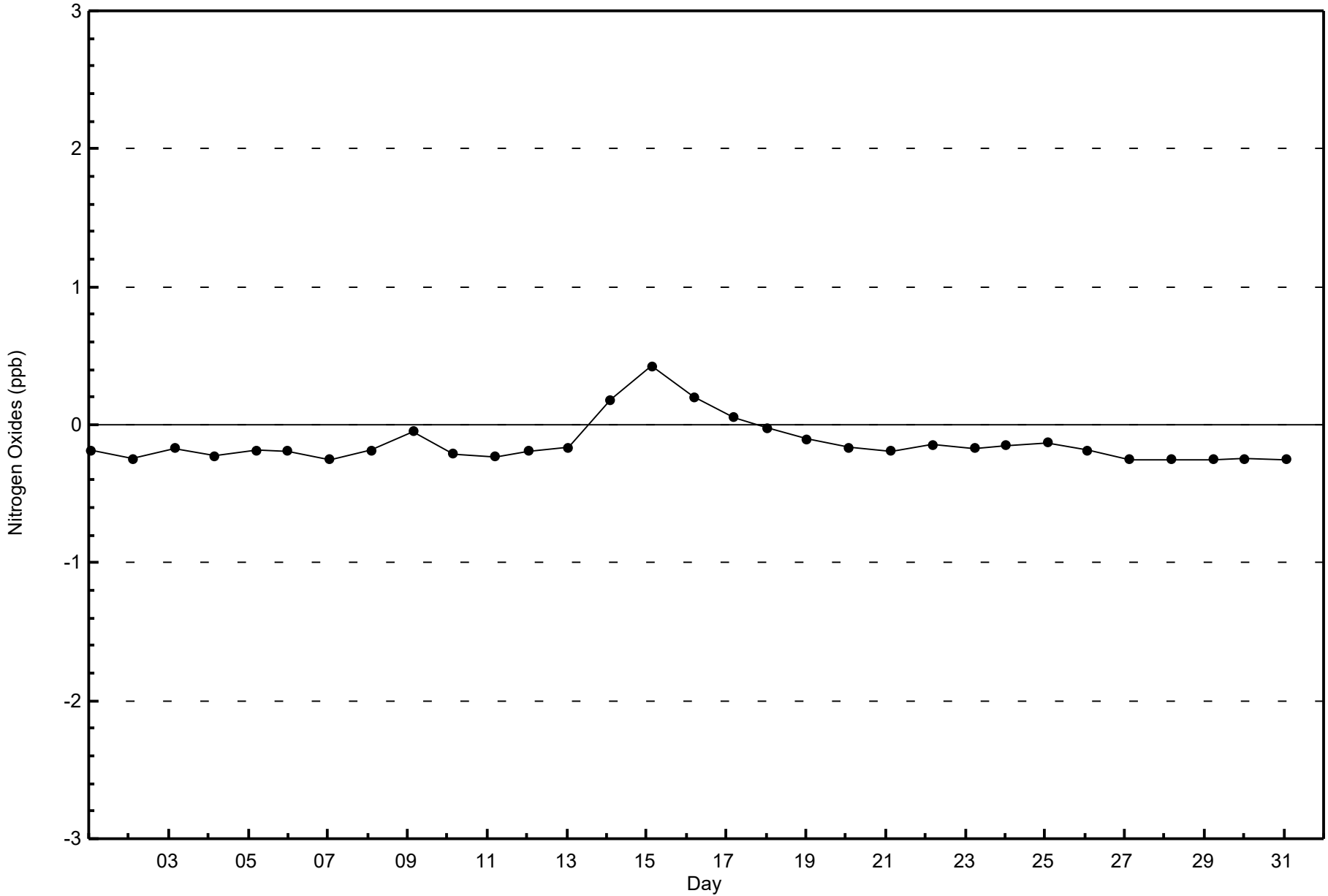
Total Number of Hours: 744

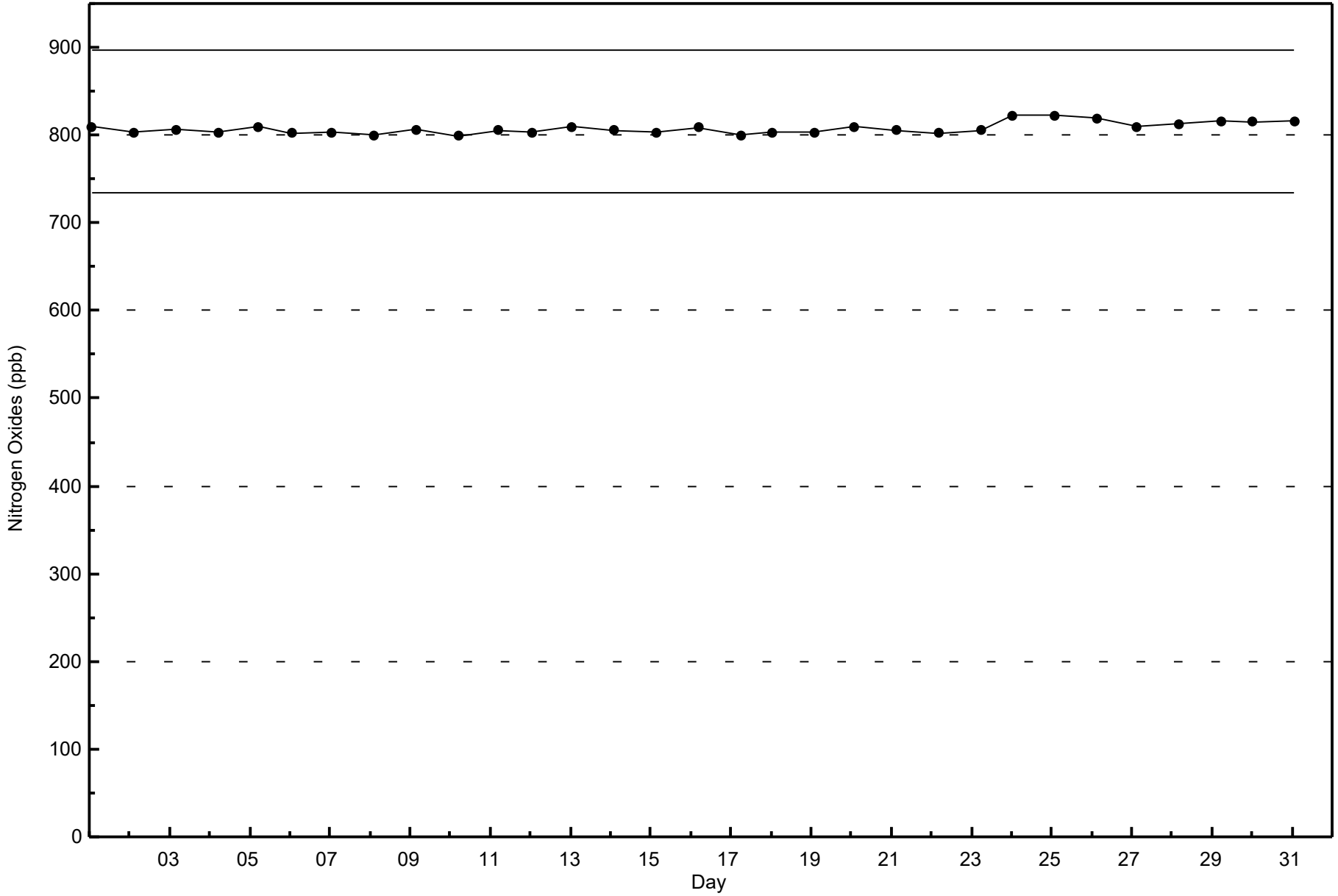


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Conklin









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Conklin - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 65.8 ppb on Jul 12 19:00	Maximum Daily Average: 36.9 ppb on Jul 8		Hours of Data:	710
Minimum Value: 2.3 ppb on Jul 4 05:00	Minimum Daily Average: 17.6 ppb on Jul 17		Hours of Missing Data:	34
Maximum Diurnal Average: 37.8 ppb at hour 16	Minimum Diurnal Average: 12.9 ppb at hour 6		Hours of Calibration:	34
Monthly Average: 26.40 ppb	Percentiles: P ₁ = 2.9 P ₁₀ = 7.1 Q ₁ = 16.5 Median = 26.9 Q ₃ = 36.2 P ₉₀ = 42.7 P ₉₉ = 55.1		Percent Operational Time:	100.0

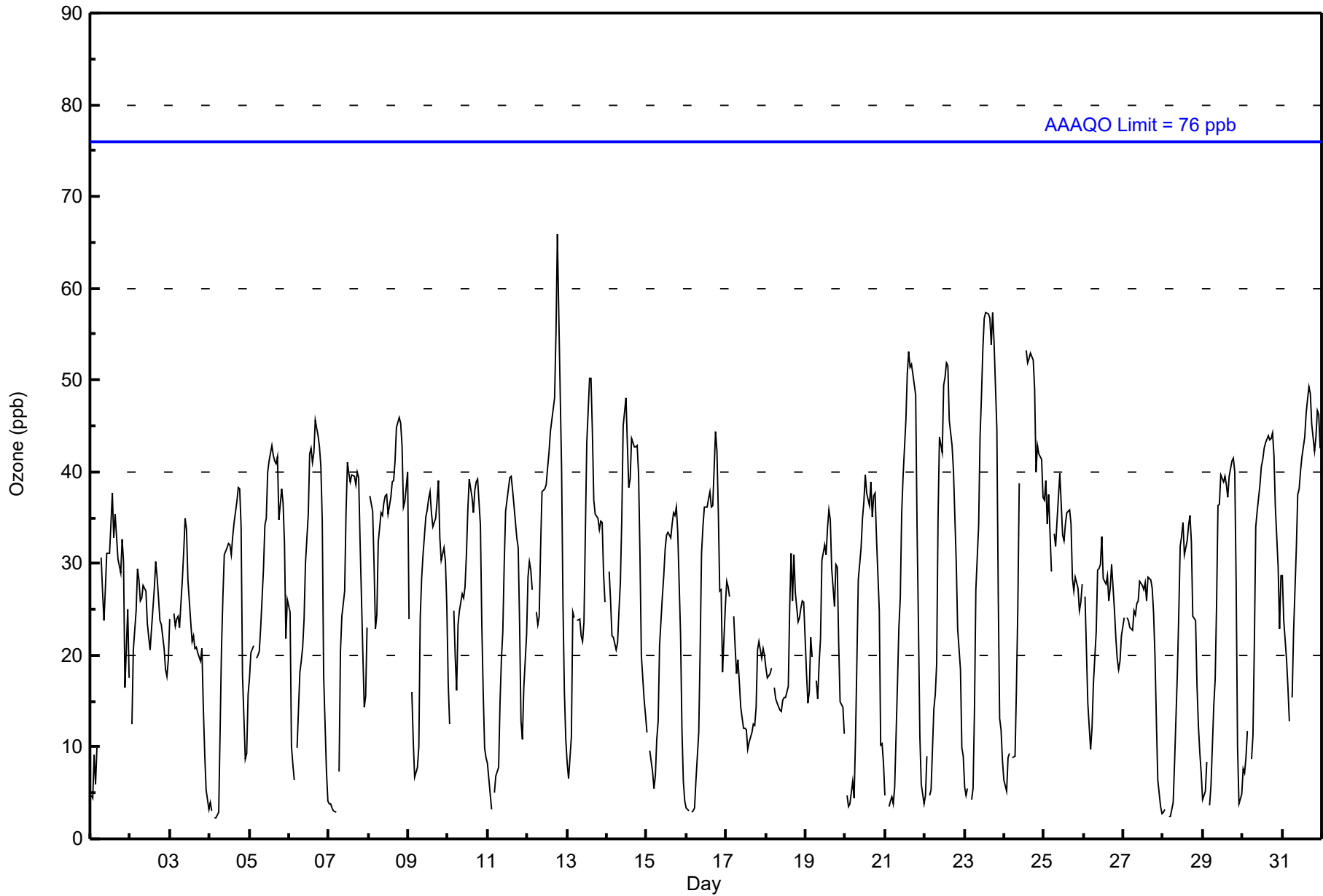
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	4.7	4.5	9.2	5.9	9.9	Z	30.6	27.0	23.7	27.1	31.2	31.1	34.3	37.6	32.8	35.4	30.4	29.8	28.9	32.6	30.2	16.5	25.0	17.6	24.2	37.6																							
2-Jul	Z	12.5	20.6	24.9	29.4	28.2	25.9	26.2	27.6	27.0	23.5	22.0	20.6	22.9	27.3	30.3	28.5	26.2	23.8	23.4	20.8	18.5	17.7	19.5	23.8	30.3																							
3-Jul	23.9	Z	24.6	23.2	24.0	24.3	23.0	28.3	31.3	34.9	33.8	28.3	23.6	21.6	22.1	20.7	20.9	20.3	19.4	20.7	14.3	9.4	5.3	3.3	21.8	34.9																							
4-Jul	4.0	3.1	Z	2.3	2.3	2.9	11.8	20.8	26.3	31.0	31.8	32.1	32.1	31.0	32.9	34.5	36.7	38.2	38.1	34.0	17.9	8.6	9.4	15.7	21.6	38.2																							
5-Jul	17.5	20.4	21.1	Z	19.6	20.0	20.5	23.0	29.4	34.1	35.0	32.9	41.2	42.8	41.7	41.1	40.9	41.6	34.8	38.2	36.6	32.2	21.9	26.0	31.3	42.8																							
6-Jul	24.8	10.1	8.1	6.4	Z	9.9	18.2	19.3	20.9	24.0	30.0	35.4	42.0	42.6	41.1	42.2	45.7	44.0	42.8	40.6	34.7	17.7	7.3	4.1	26.6	45.7																							
7-Jul	3.8	3.8	3.3	3.0	2.8	Z	7.3	20.4	24.3	27.0	35.7	41.0	39.8	38.8	39.7	39.6	38.6	40.0	39.4	32.4	20.1	14.3	15.6	23.0	24.1	41.0																							
8-Jul	Z	37.3	35.8	29.9	22.9	24.5	32.3	35.6	35.3	36.6	37.3	37.5	35.3	37.3	38.9	39.0	41.1	44.9	45.9	45.4	42.8	36.2	36.8	40.0	36.9	45.9																							
9-Jul	24.0	Z	16.1	10.6	6.7	7.8	10.1	24.1	28.4	31.0	35.1	35.9	37.0	37.8	35.6	34.0	35.0	36.8	39.0	32.8	30.4	31.8	30.3	25.3	27.6	39.0																							
10-Jul	17.0	12.5	Z	24.9	19.9	16.2	23.3	24.8	26.7	26.2	27.5	31.0	35.9	39.2	37.2	35.6	38.0	38.9	39.3	34.1	23.3	15.9	9.9	8.9	26.3	39.3																							
11-Jul	8.2	4.8	3.2	Z	5.0	6.8	7.7	14.8	19.6	22.6	29.9	35.7	38.2	39.4	39.6	38.0	36.3	32.9	31.7	23.4	12.8	10.8	16.5	22.3	21.8	39.6																							
12-Jul	28.5	30.2	29.3	27.2	Z	24.7	23.3	24.3	31.7	37.8	38.1	38.7	40.5	42.1	44.4	46.9	48.0	55.2	65.8	57.1	40.3	25.5	16.0	10.8	35.9	65.8																							
13-Jul	8.3	6.5	11.2	24.7	24.2	Z	23.9	24.0	22.1	21.4	23.7	33.6	43.2	50.1	50.1	44.4	36.9	35.3	35.0	33.7	34.7	34.5	28.8	25.7	29.4	50.1																							
14-Jul	Z	29.2	26.0	22.1	22.0	20.6	21.4	24.9	28.0	34.8	45.0	48.1	43.0	38.2	39.2	43.6	42.8	42.7	42.9	39.8	31.0	20.0	15.1	13.5	31.9	48.1																							
15-Jul	11.5	Z	9.6	7.4	5.5	6.9	10.8	12.8	21.0	26.4	28.7	31.6	33.2	33.4	32.8	34.3	35.6	35.2	36.1	33.4	22.3	11.9	6.2	4.1	21.3	36.1																							
16-Jul	3.4	3.1	Z	2.9	3.0	3.4	6.3	11.6	20.5	31.2	34.0	36.2	36.2	37.1	37.9	36.2	36.3	44.3	42.2	35.5	27.1	27.2	18.1	25.4	24.3	44.3																							
17-Jul	28.1	27.5	26.4	Z	24.2	20.9	18.1	19.5	17.1	14.3	12.1	12.1	11.9	9.8	10.5	11.5	12.5	12.4	14.3	20.5	21.5	19.6	20.8	20.0	17.6	28.1																							
18-Jul	18.6	17.5	17.9	18.5	Z	16.5	15.3	14.8	14.0	13.9	15.1	15.4	15.4	16.7	25.3	31.1	25.9	31.0	26.8	23.6	24.1	25.2	25.9	25.8	20.6	31.1																							
19-Jul	18.0	14.8	16.0	21.9	19.8	Z	17.3	15.2	19.1	21.8	30.3	32.0	30.9	33.8	35.9	34.8	29.5	25.3	29.9	29.5	21.2	14.9	14.3	11.4	23.4	35.9																							
20-Jul	Z	4.7	3.5	3.8	6.2	4.5	10.8	19.4	28.3	31.8	34.9	36.7	39.7	37.6	36.2	38.9	35.1	37.4	37.7	32.8	24.9	10.2	10.4	8.2	23.2	39.7																							
21-Jul	4.8	Z	3.6	4.1	4.6	3.8	5.6	16.9	23.1	26.3	35.3	39.5	45.7	50.7	53.1	51.4	51.8	50.6	48.4	33.9	23.2	11.2	5.9	3.8	26.0	53.1																							
22-Jul	4.8	8.9	Z	4.8	5.4	14.3	15.8	19.0	35.1	43.8	42.2	49.4	50.4	51.9	51.6	45.5	42.8	40.2	35.0	30.1	22.9	18.5	10.0	9.0	28.3	51.9																							
23-Jul	5.7	4.7	5.4	Z	4.3	5.5	13.9	27.2	34.1	43.9	48.3	53.4	56.8	57.3	57.3	56.7	53.8	57.4	54.1	44.6	26.7	13.1	11.9	8.5	32.4	57.4																							
24-Jul	6.4	5.2	8.9	9.3	Z	8.8	8.9	16.4	25.3	38.8	C	C	C	53.3	51.8	52.4	52.9	52.2	49.0	40.0	42.8	42.0	41.3	37.2	32.1	53.3																							
25-Jul	36.9	39.1	34.3	37.5	29.2	Z	33.3	31.9	34.7	39.8	36.4	33.0	32.4	34.4	35.6	35.8	34.3	28.4	27.1	28.6	27.3	24.9	25.7	27.8	32.5	39.8																							
26-Jul	Z	26.5	14.9	12.2	9.8	12.0	17.0	22.5	29.3	29.4	29.8	32.9	28.4	27.7	28.7	25.9	27.2	29.9	25.0	22.0	19.7	18.4	19.4	22.1	23.1	32.9																							
27-Jul	24.1	Z	24.1	23.8	23.1	22.8	24.8	24.3	25.7	25.9	28.0	27.6	27.1	27.8	26.0	28.6	28.2	27.3	24.5	19.8	12.8	6.4	3.4	2.7	22.1	28.6																							
28-Jul	2.9	3.2	Z	2.5	2.5	3.2	4.0	8.4	18.2	24.5	31.9	32.9	34.5	30.9	32.6	34.2	35.2	32.4	24.3	23.7	16.8	12.4	9.4	7.2	18.6	35.2																							
29-Jul	4.2	5.2	8.5	Z	3.7	5.8	14.5	17.4	25.5	36.3	36.5	39.7	38.8	39.5	38.6	37.3	39.5	41.1	41.5	40.0	27.7	9.9	3.8	4.9	24.3	41.5																							
30-Jul	7.6	7.2	8.9	11.8	Z	8.8	11.3	21.2	34.0	35.8	38.6	40.6	41.4	42.6	43.2	43.9	43.4	43.6	44.3	41.8	36.2	29.6	23.0	28.7	29.9	44.3																							
31-Jul	28.7	23.8	19.5	16.5	12.8	Z	15.5	22.4	31.7	37.5	38.1	40.1	41.7	43.8	46.4	47.8	49.2	48.6	45.1	42.2	43.8	46.7	46.1	42.5	36.1	49.2																							
																								14.2	14.1	15.8	14.7	13.2	12.9	16.9	21.2	26.2	30.2	32.6	34.8	35.7	37.1	37.6	37.8	37.2	37.6	36.5	33.2	26.8	20.5	17.8	17.6	Diurnal Average	
																								36.9	39.1	35.8	37.5	29.4	28.2	33.3	35.6	35.3	43.9	48.3	53.4	56.8	57.3	57.3	56.7	53.8	57.4	65.8	57.1	43.8	46.7	46.1	42.5	Diurnal Maximum	

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 76 ppb



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Conklin - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Conklin - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	229	32.25	32.25
21 - 50	458	64.51	96.76
51 - 82	23	3.24	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Conklin - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	27	7	4	4	3	7	17	49	44	19	9	2	5	4	5	23	229
21 - 50	48	39	8	8	13	28	15	18	26	27	32	39	31	36	43	46	457
51 - 82	1	2	0	1	0	5	2	1	2	0	3	0	4	2	0	0	23
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	76	48	12	13	16	40	34	68	72	46	44	41	40	42	48	69	709

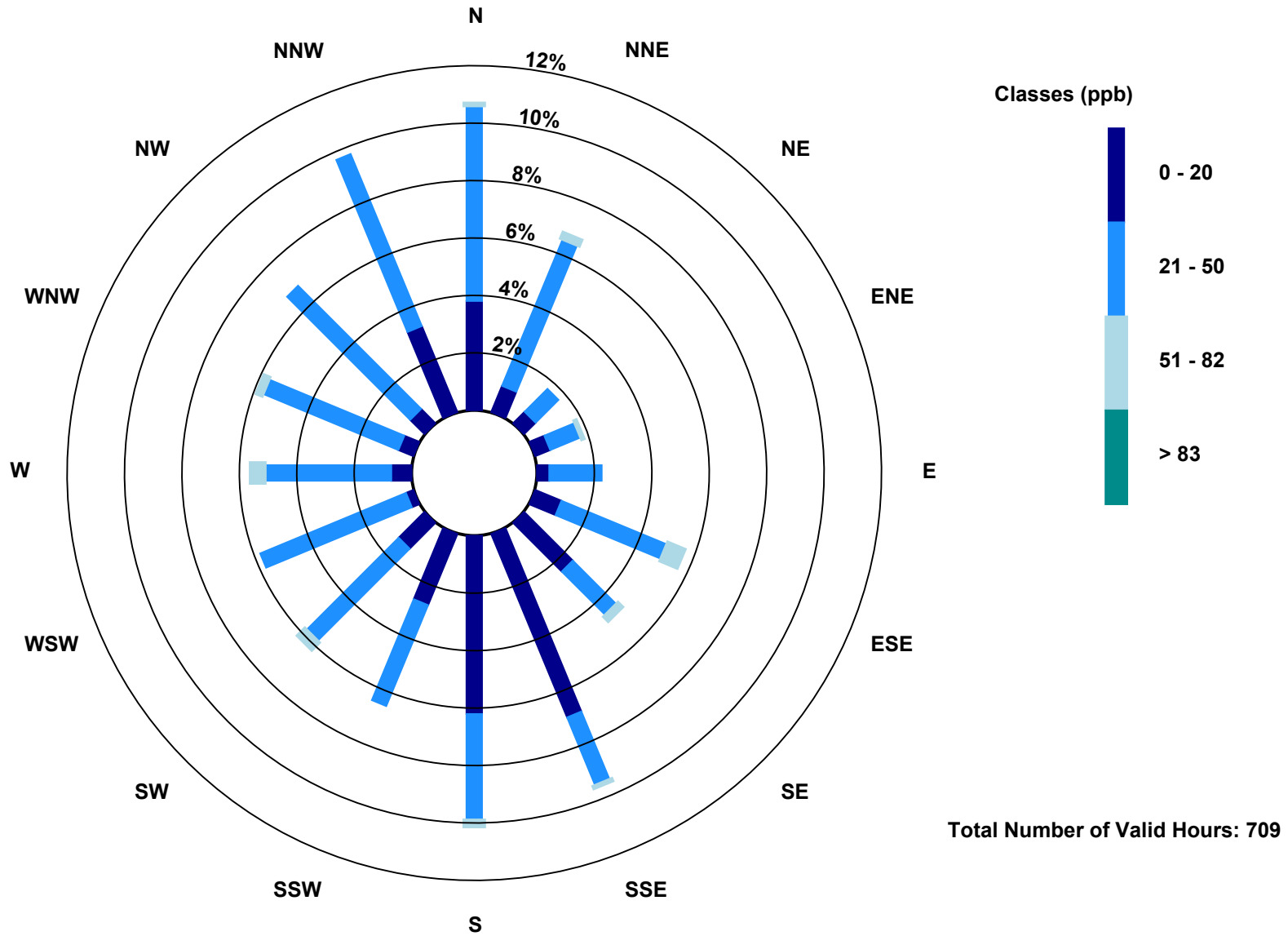
Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

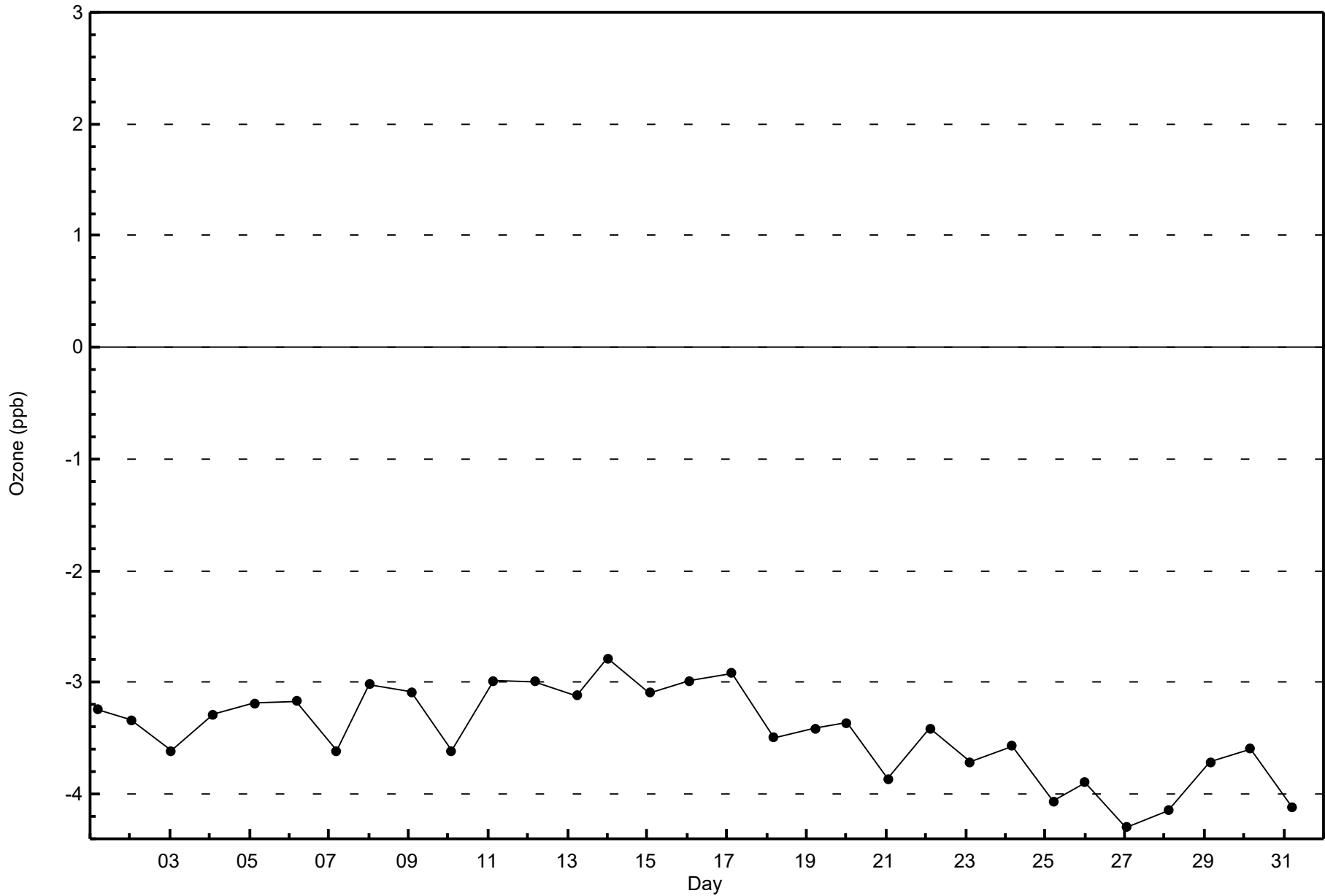
Ozone (O₃) - ppb
Conklin





Wood Buffalo Environmental Association
Zero Responses

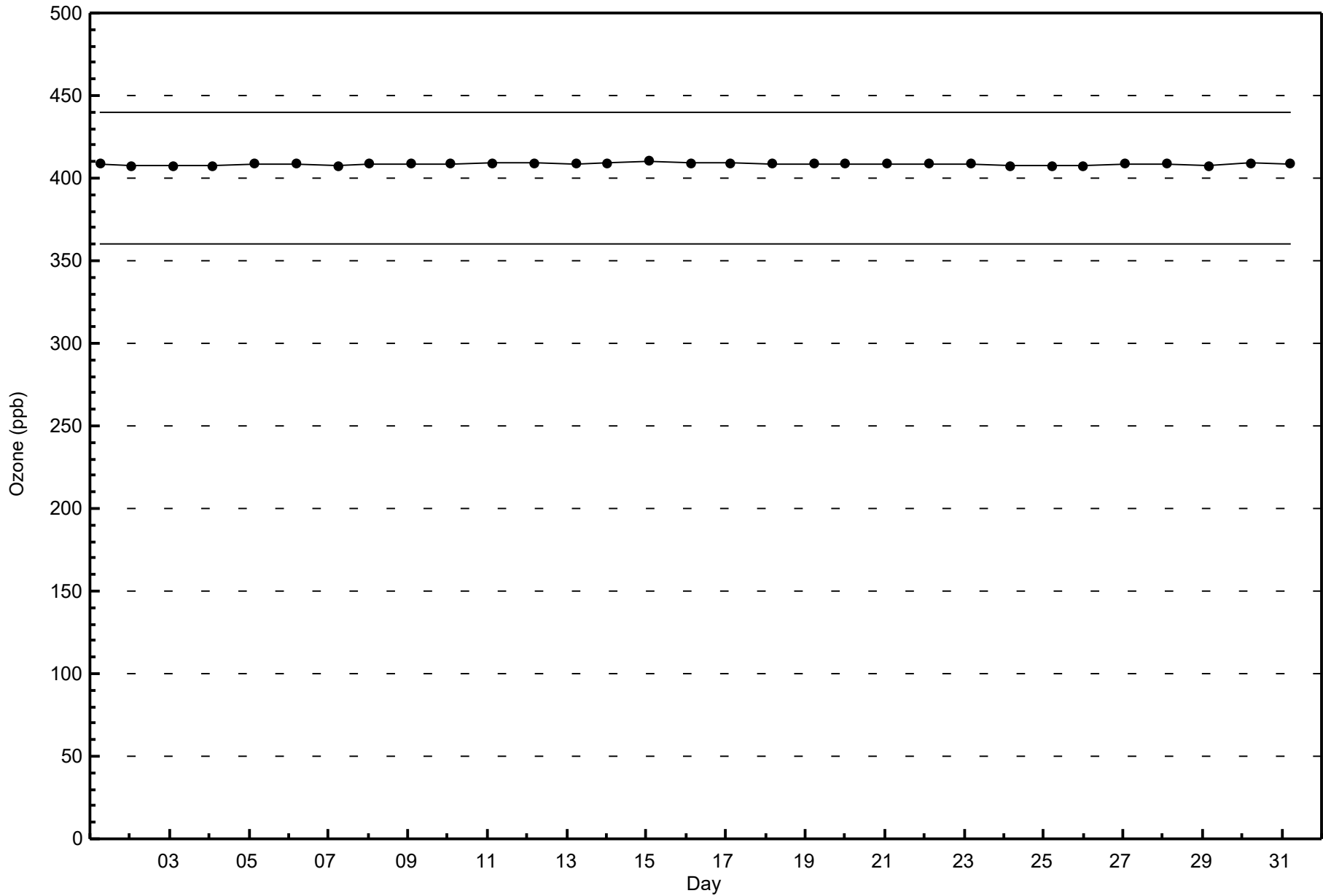
Ozone (O₃) - ppb
Conklin - July 2023





Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Conklin - July 2023





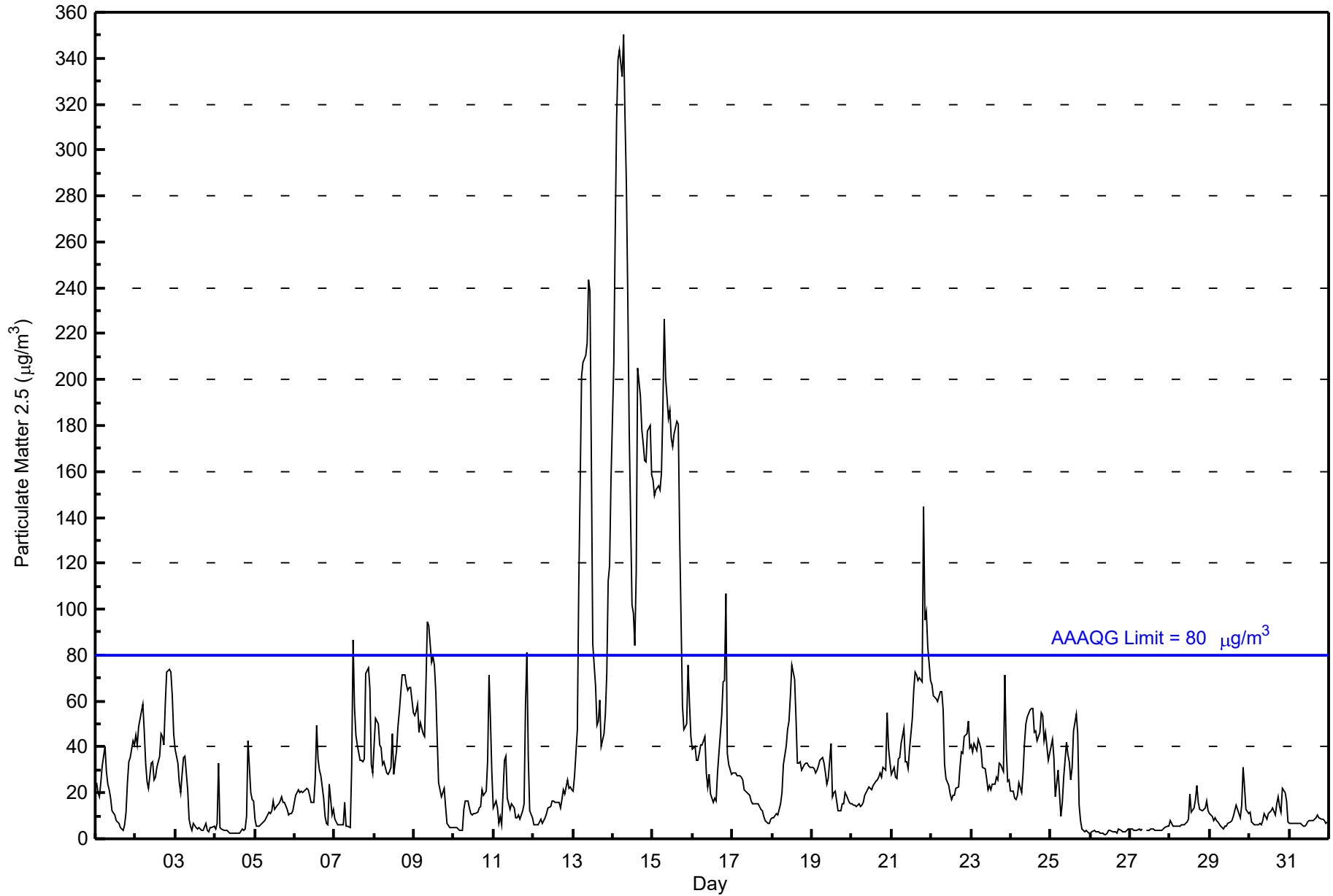
Summary of Hour Averages

Conklin - July 2023

Number of Exceedences (AAAQO):	1-hr: 64	24-hr: 13	Hours in Service:	744
Maximum Value: 350.2 µg/m ³ on Jul 14 07:00	Maximum Daily Average: 214.7 µg/m ³ on Jul 14		Hours of Data:	742
Minimum Value: 1.6 µg/m ³ on Jul 26 09:00	Minimum Daily Average: 3.0 µg/m ³ on Jul 26		Hours of Missing Data:	2
Maximum Diurnal Average: 44.4 µg/m ³ at hour 8	Minimum Diurnal Average: 31.4 µg/m ³ at hour 19		Hours of Calibration:	2
Monthly Average: 36.94 µg/m ³	Percentiles: P ₁ = 2.4 P ₁₀ = 4.4 Q ₁ = 8.7 Median = 21.1 Q ₃ = 41.0 P ₉₀ = 72.1 P ₉₉ = 255.0		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	24.5	20.0	18.3	24.5	31.6	40.3	29.3	24.0	21.1	17.4	12.3	10.1	8.0	7.6	6.6	5.1	3.7	6.1	11.6	24.1	33.7	35.2	42.5	40.7	20.8	42.5
2-Jul	45.0	40.9	48.8	55.6	58.8	46.8	33.1	25.1	22.2	32.7	33.7	25.5	26.8	31.0	35.8	45.9	44.3	40.8	58.8	72.6	73.6	72.6	62.2	45.5	44.9	73.6
3-Jul	39.1	33.2	24.2	20.4	28.2	35.4	36.1	21.1	8.8	5.8	3.7	6.4	5.0	4.3	4.6	4.1	3.9	3.9	6.5	3.5	3.2	4.9	4.9	5.6	13.2	39.1
4-Jul	4.2	6.9	33.0	4.6	4.4	3.4	3.5	3.5	2.9	2.3	2.4	2.3	2.3	2.5	2.7	2.4	4.0	3.5	4.4	9.6	42.5	20.1	17.4	16.6	8.4	42.5
5-Jul	8.3	5.3	5.5	6.2	6.6	7.2	7.8	9.1	11.9	11.1	11.9	16.7	12.9	14.8	15.4	16.2	18.2	15.8	15.6	13.0	10.6	11.3	10.7	12.3	11.4	18.2
6-Jul	18.6	20.0	21.3	19.9	20.7	19.9	21.3	22.1	21.3	19.0	15.8	15.9	26.2	49.5	35.0	30.0	27.2	17.5	10.0	6.5	6.3	23.6	10.2	12.8	20.4	49.5
7-Jul	8.5	7.1	6.4	6.0	6.1	6.1	16.0	5.4	5.4	5.0	31.9	86.9	57.5	45.2	40.8	34.1	33.9	33.8	34.5	71.9	74.7	65.4	32.1	28.6	31.0	86.9
8-Jul	40.9	52.6	50.1	41.1	39.7	32.5	33.9	28.6	28.3	29.3	31.1	45.5	28.1	38.6	49.0	55.7	63.7	71.4	71.4	67.1	64.9	65.8	65.8	55.0	47.9	71.4
9-Jul	53.6	55.3	58.5	46.5	50.8	45.5	44.4	68.0	94.5	92.6	77.0	79.3	75.6	64.3	43.7	24.3	18.3	19.9	22.0	14.0	6.8	4.6	4.6	4.9	44.5	94.5
10-Jul	4.9	5.0	5.0	3.9	3.7	3.6	13.1	16.2	16.6	13.4	11.3	10.4	10.7	11.1	11.8	13.6	13.7	21.5	18.6	21.0	34.2	71.1	51.6	28.5	17.3	71.1
11-Jul	13.2	16.6	13.4	6.9	9.9	6.1	34.3	36.3	17.7	15.4	12.8	15.1	13.7	9.3	8.9	10.3	8.7	12.2	15.5	58.3	81.0	35.3	12.1	9.4	19.7	81.0
12-Jul	6.2	6.2	6.1	5.9	8.5	6.6	7.7	9.1	10.9	13.6	14.1	16.2	16.7	16.0	15.9	16.1	13.4	17.3	21.3	19.6	25.5	22.0	22.7	21.4	14.1	25.5
13-Jul	20.9	27.3	47.6	109.9	153.7	201.2	207.2	210.6	215.9	243.7	238.5	165.4	84.9	66.6	49.5	51.3	60.5	40.1	45.8	54.4	72.1	112.3	119.3	156.0	114.8	243.7
14-Jul	206.7	262.8	313.0	339.0	343.4	332.0	350.2	314.4	284.6	234.9	178.4	102.0	98.5	84.1	116.1	204.8	192.6	178.0	171.9	164.7	164.4	177.8	180.0	158.4	214.7	350.2
15-Jul	156.4	149.5	151.8	153.7	152.1	159.3	186.4	226.3	200.7	183.2	187.0	174.2	170.9	176.6	181.8	180.9	132.4	95.3	57.7	47.6	50.1	75.7	59.0	44.7	139.7	226.3
16-Jul	39.2	40.0	34.1	33.9	37.5	40.7	41.0	44.3	28.8	22.3	28.1	19.4	15.8	17.4	16.6	28.8	37.4	53.8	68.1	68.7	106.9	37.3	32.2	28.2	38.4	106.9
17-Jul	28.6	28.7	28.6	27.2	27.7	26.9	25.5	21.6	21.0	20.1	19.1	16.6	15.4	15.4	15.5	15.2	13.9	13.0	12.4	10.0	7.7	6.6	6.8	8.3	18.0	28.7
18-Jul	9.0	9.3	10.8	10.6	13.0	15.3	19.9	32.4	40.3	47.6	51.2	62.2	75.6	69.4	52.6	32.9	33.2	33.7	30.0	32.5	33.0	33.2	32.0	31.0	33.8	75.6
19-Jul	31.3	30.4	28.9	29.9	31.5	34.1	35.3	33.1	28.4	24.1	26.2	41.3	18.3	20.0	20.6	16.2	12.3	12.5	15.5	15.6	20.0	18.8	15.6	15.4	24.0	41.3
20-Jul	15.2	14.5	14.6	14.2	15.3	13.9	14.6	16.1	18.9	21.4	22.3	21.8	21.4	23.1	25.0	25.6	26.9	28.5	27.0	31.1	29.7	55.2	39.5	33.5	23.7	55.2
21-Jul	28.3	31.1	27.1	26.5	35.0	35.5	41.6	48.1	33.7	33.7	30.7	39.1	52.3	64.5	72.8	71.2	69.1	70.4	68.6	144.6	95.0	99.1	83.9	69.2	57.1	144.6
22-Jul	67.0	62.5	61.7	61.1	59.7	63.8	63.9	56.0	32.2	26.3	23.4	19.2	16.9	18.8	18.8	22.2	22.7	30.8	37.7	37.5	44.4	46.0	51.5	39.9	41.0	67.0
23-Jul	40.7	37.7	41.2	38.2	43.4	41.3	38.9	31.3	30.5	26.3	21.2	23.1	21.1	23.7	23.8	26.7	25.8	33.2	32.5	29.4	71.5	39.2	24.9	25.8	33.0	71.5
24-Jul	20.9	20.5	17.7	17.3	19.0	24.4	20.4	28.5	41.2	49.8	53.2	56.1	56.9	56.9	46.7	47.3	42.7	46.4	55.0	53.5	43.0	46.1	34.0	37.3	38.9	56.9
25-Jul	40.5	43.3	35.7	18.6	29.7	19.2	9.9	15.7	26.9	42.0	36.4	33.6	25.8	30.9	47.2	54.3	45.7	14.9	8.2	4.2	3.2	3.5	3.2	2.6	24.8	54.3
26-Jul	2.6	2.9	3.4	3.3	3.2	3.0	2.6	2.2	1.6	1.7	2.7	3.5	3.8	2.8	3.1	3.0	2.3	4.0	3.6	2.9	3.3	3.3	3.6	4.3	3.0	4.3
27-Jul	4.2	4.3	3.9	3.7	4.0	4.0	3.9	4.0	C	C	3.7	4.0	4.3	4.1	4.1	3.7	3.7	3.6	3.7	3.7	4.2	4.7	5.4	5.7	4.1	5.7
28-Jul	8.1	6.6	5.8	5.3	5.2	5.2	5.7	6.2	6.4	6.7	7.0	8.7	19.7	11.7	13.2	17.3	23.1	15.6	12.7	12.4	13.0	13.6	16.6	12.0	10.7	23.1
29-Jul	10.7	10.0	8.0	9.3	7.8	7.1	5.7	5.1	4.5	5.4	5.6	7.0	7.4	7.9	9.9	12.5	14.7	11.1	9.3	14.8	31.1	22.6	12.6	11.3	10.5	31.1
30-Jul	11.8	7.2	6.7	6.3	6.3	5.9	6.8	6.2	7.9	11.0	8.5	11.1	11.4	12.1	13.5	10.3	15.1	18.3	14.2	11.8	21.9	19.8	16.5	7.2	11.2	21.9
31-Jul	6.7	7.0	6.5	6.4	6.9	6.8	6.5	6.4	5.6	5.4	6.1	7.0	7.8	7.7	8.1	8.3	8.9	10.5	8.9	8.6	8.3	7.7	7.0	7.2	7.4	10.5
32.8 34.3 36.7 37.3 40.8 41.7 44.1 44.4 43.0 42.1 38.9 37.0 32.6 32.5 32.6 35.2 33.4 31.5 31.4 36.4 41.3 40.5 34.8 31.6																								Diurnal Average		
206.7 262.8 313.0 339.0 343.4 332.0 350.2 314.4 284.6 243.7 238.5 174.2 170.9 176.6 181.8 204.8 192.6 178.0 171.9 164.7 164.4 177.8 180.0 158.4																								Diurnal Maximum		

C - Calibration
 Alberta Ambient Air Quality Guideline/Objectives: 1-hr 80 µg/m³ 24-hr 29 µg/m³





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin - July 2023

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
0 - 5	101	13.61	13.61
6 - 15	192	25.88	39.49
16 - 25	123	16.58	56.06
26 - 80	262	35.31	91.37
> 81.0	64	8.63	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Conklin - July 2023

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	17	16	7	4	1	1	1	11	8	7	7	2	1	5	4	9	101
6 - 15	15	4	3	2	7	13	3	22	37	21	14	18	9	6	5	13	192
16 - 25	12	9	1	4	1	10	8	10	10	3	10	10	8	8	7	11	122
26 - 80	20	9	2	4	6	20	21	26	19	17	16	12	22	24	25	19	262
> 81.0	14	9	1	0	1	1	2	3	5	0	0	0	0	0	9	19	64
Totals	78	47	14	14	16	45	35	72	79	48	47	42	40	43	50	71	741

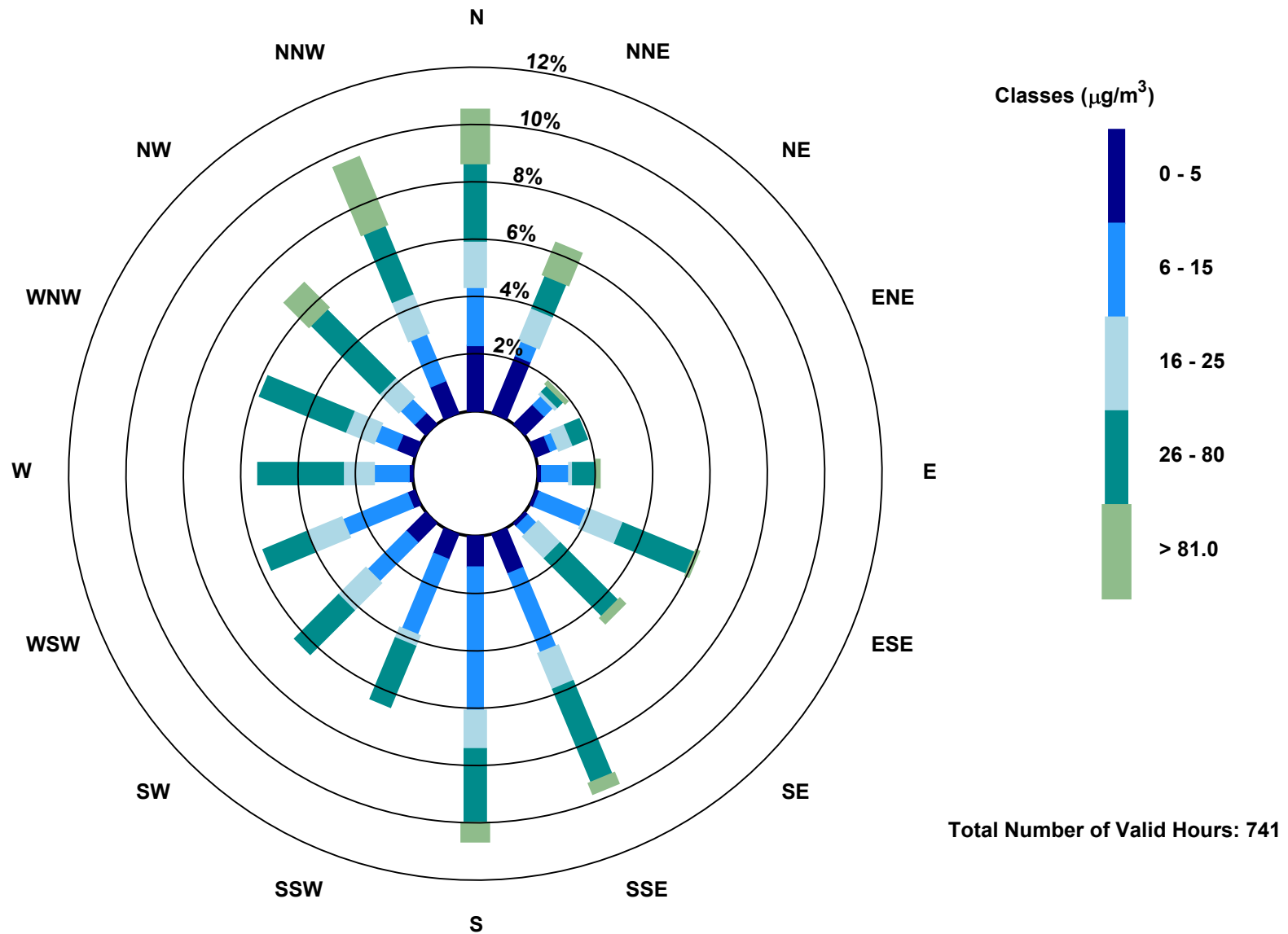
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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



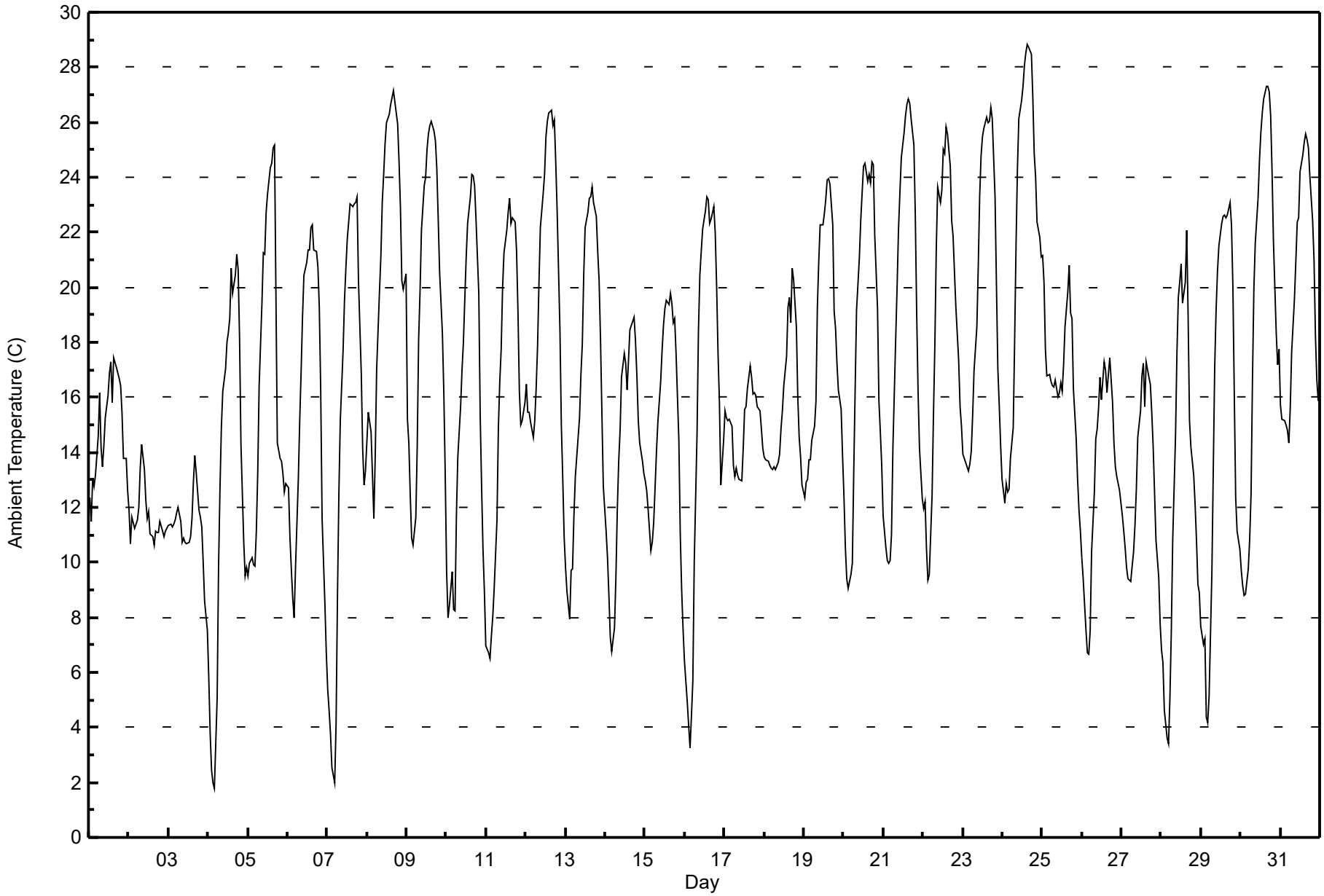


Maximum Value: 28.8 C on Jul 24 16:00 Maximum Daily Average: 21.7 C on Jul 24																				Hours in Service: 744 Hours of Data: 744						
Minimum Value: 1.8 C on Jul 4 05:00 Minimum Daily Average: 11.2 C on Jul 3 Maximum Diurnal Average: 22.0 C at hour 16 Minimum Diurnal Average: 9.8 C at hour 5 Monthly Average: 16.35 C Percentiles: P ₁ = 3.7 P ₁₀ = 9.5 Q ₁ = 12.2 Median = 15.8 Q ₃ = 21.1 P ₉₀ = 24.3 P ₉₉ = 27.2																				Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	12.4	11.5	13.1	12.8	13.2	14.6	16.2	14.2	13.5	14.3	15.3	16.1	16.9	17.3	15.8	17.4	17.1	16.9	16.7	16.4	15.4	13.8	13.8	12.6	14.9	17.4
2-Jul	11.9	10.7	11.7	11.2	11.4	11.6	12.0	13.4	14.3	13.4	12.2	11.6	11.8	11.0	10.9	10.6	11.1	11.1	11.1	11.5	11.1	11.0	11.1	11.3	11.6	14.3
3-Jul	11.3	11.4	11.3	11.4	11.6	11.8	12.0	11.5	10.7	10.9	10.7	10.7	10.9	11.6	12.9	13.9	13.3	11.9	11.7	11.3	10.0	8.6	7.5	11.2	13.9	13.9
4-Jul	5.8	3.7	2.4	2.0	1.8	5.1	9.9	12.7	14.9	16.2	17.0	18.0	18.3	18.9	20.7	19.8	20.4	21.2	20.7	18.2	14.3	10.7	9.5	9.8	13.0	21.2
5-Jul	9.5	10.0	10.1	9.9	9.8	11.1	13.3	16.4	19.4	21.2	21.2	22.8	23.4	24.3	24.5	25.1	25.2	19.8	14.4	13.8	13.7	13.2	12.6	12.9	16.6	25.2
6-Jul	12.7	11.0	9.8	8.7	8.0	9.8	13.0	15.1	16.9	18.9	20.4	20.9	21.4	21.4	22.1	22.3	21.3	21.3	20.8	19.3	16.3	11.6	8.5	6.7	15.8	22.3
7-Jul	5.4	4.6	3.8	2.5	2.0	4.2	8.8	12.5	15.2	17.7	19.5	20.7	21.8	22.4	23.0	22.9	23.0	23.1	23.3	20.3	16.9	14.1	12.8	13.3	14.7	23.3
8-Jul	14.4	15.5	14.7	13.2	11.6	13.9	17.0	19.8	21.1	23.1	24.1	25.2	26.0	26.3	26.7	26.9	27.2	26.7	25.9	24.6	22.9	20.2	19.9	20.5	21.1	27.2
9-Jul	15.2	14.3	12.5	10.9	10.6	11.6	14.3	18.1	19.8	22.1	23.7	24.0	25.0	25.6	25.9	26.0	25.7	25.3	24.3	22.5	20.5	18.3	16.2	13.2	19.4	26.0
10-Jul	9.7	8.0	8.4	9.7	8.3	8.3	11.7	13.8	15.7	17.0	18.0	19.6	21.1	22.3	23.3	24.1	24.1	23.7	22.5	19.8	15.3	12.8	10.5	8.9	15.7	24.1
11-Jul	6.9	6.7	6.5	7.3	8.0	9.0	11.6	14.9	16.6	17.8	20.0	21.2	22.1	22.7	23.2	22.3	22.5	22.4	21.3	19.1	16.2	15.0	15.2	15.8	16.0	23.2
12-Jul	16.5	15.5	15.5	15.1	14.5	15.1	16.3	17.8	20.1	22.2	23.4	24.1	25.5	26.1	26.3	26.4	25.9	26.1	24.6	22.8	18.5	15.0	13.1	11.0	19.9	26.4
13-Jul	9.8	9.0	7.9	9.7	9.8	11.7	13.1	14.6	15.3	16.8	18.0	20.4	22.2	22.7	23.2	23.3	23.7	23.1	22.6	21.3	20.3	18.1	15.4	12.8	16.9	23.7
14-Jul	11.1	10.2	8.8	7.3	6.8	7.6	9.5	11.9	13.7	14.8	16.7	17.6	17.2	16.3	17.3	18.4	18.7	18.9	18.0	16.8	15.1	14.4	13.7	13.2	13.9	18.9
15-Jul	13.0	12.6	11.9	10.4	10.7	11.4	12.7	14.1	15.1	16.6	17.7	18.6	19.2	19.5	19.4	19.8	19.4	18.7	18.8	17.6	14.5	11.0	9.0	7.6	15.0	19.8
16-Jul	6.4	4.9	4.1	3.3	4.4	5.7	10.0	14.7	18.4	20.4	21.3	22.1	22.8	23.3	23.2	22.3	22.5	22.9	22.0	20.0	17.6	15.8	12.8	14.5	15.6	23.3
17-Jul	15.5	15.3	15.1	15.2	14.9	13.5	13.1	13.4	13.2	13.0	13.0	14.1	15.6	15.7	16.3	17.2	16.7	16.1	16.2	16.1	15.7	15.5	14.9	14.1	15.0	17.2
18-Jul	13.8	13.7	13.7	13.5	13.4	13.4	13.5	13.4	13.7	13.9	14.8	15.5	16.4	17.5	19.3	19.6	18.7	20.7	20.3	18.6	16.0	14.6	13.8	12.8	15.6	20.7
19-Jul	12.4	12.9	13.0	13.7	13.7	14.4	14.9	15.9	19.3	20.9	22.2	22.3	22.7	23.2	23.9	23.9	23.7	22.3	19.1	18.5	17.2	16.3	15.5	13.9	18.2	23.9
20-Jul	12.4	10.6	9.4	9.0	9.6	10.0	13.3	16.3	19.1	21.1	22.4	23.5	24.4	24.5	23.9	24.1	23.8	24.6	24.4	21.9	19.2	15.9	14.8	13.5	18.0	24.6
21-Jul	11.7	10.5	10.1	10.0	10.1	11.0	14.2	18.1	20.0	22.1	23.4	24.7	25.6	26.2	26.7	26.9	26.7	26.1	25.2	22.6	19.0	16.2	14.2	12.3	18.9	26.9
22-Jul	12.0	12.2	10.5	9.3	9.6	12.5	15.4	17.9	21.4	23.6	23.1	23.5	25.0	24.8	25.8	25.6	24.4	22.4	21.9	20.5	19.3	17.4	15.7	14.9	18.7	25.8
23-Jul	13.9	13.8	13.7	13.3	13.6	14.0	15.3	17.0	18.6	20.7	23.3	24.7	25.5	25.8	26.2	26.0	26.1	26.6	26.1	23.3	20.1	17.0	15.7	14.2	19.8	26.6
24-Jul	13.0	12.2	12.8	12.6	12.7	13.8	14.9	18.0	21.5	24.3	26.1	26.8	27.3	28.1	28.5	28.8	28.7	28.5	26.9	24.9	24.0	22.4	21.8	21.1	21.7	28.8
25-Jul	21.1	20.2	17.7	16.8	16.8	16.6	16.4	16.4	16.6	16.0	16.2	16.5	16.2	17.2	18.5	19.8	20.8	19.1	18.9	16.3	14.5	13.0	11.9	11.1	16.9	21.1
26-Jul	10.1	9.4	7.5	6.7	6.7	7.5	10.4	12.6	14.5	14.9	15.6	16.7	15.9	17.3	17.0	16.2	16.8	17.4	15.8	14.3	13.5	13.1	12.8	12.6	13.1	17.4
27-Jul	11.7	11.1	10.5	9.8	9.4	9.3	9.9	10.4	11.3	12.7	14.5	15.5	16.8	17.2	15.7	17.3	16.7	16.5	15.5	14.2	12.6	10.8	9.4	7.8	12.8	17.3
28-Jul	6.8	6.4	4.6	3.6	3.4	5.1	7.5	10.8	14.6	17.6	19.6	20.2	20.8	19.4	20.2	22.1	19.0	15.1	14.2	13.1	12.1	10.8	9.2	8.9	12.7	22.1
29-Jul	7.7	7.0	7.2	4.4	4.2	5.1	9.7	13.4	17.1	19.2	20.6	21.5	22.3	22.6	22.6	22.5	22.6	23.1	22.3	20.0	16.1	12.3	11.2	10.5	15.2	23.1
30-Jul	9.7	9.2	8.8	8.8	9.7	10.8	12.5	16.6	19.9	21.6	23.2	24.6	25.6	26.4	26.8	27.3	27.3	27.1	26.2	24.2	21.7	18.3	17.2	17.8	19.2	27.3
31-Jul	15.7	15.2	15.1	15.0	14.8	14.3	15.6	17.7	19.6	21.0	22.4	22.5	24.2	24.8	25.3	25.6	25.4	25.1	24.0	22.4	21.0	18.2	16.6	15.9	19.9	25.6
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Conklin - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Conklin - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	99	13.31	13.31
10 - 20	425	57.12	70.43
> 20	220	29.57	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

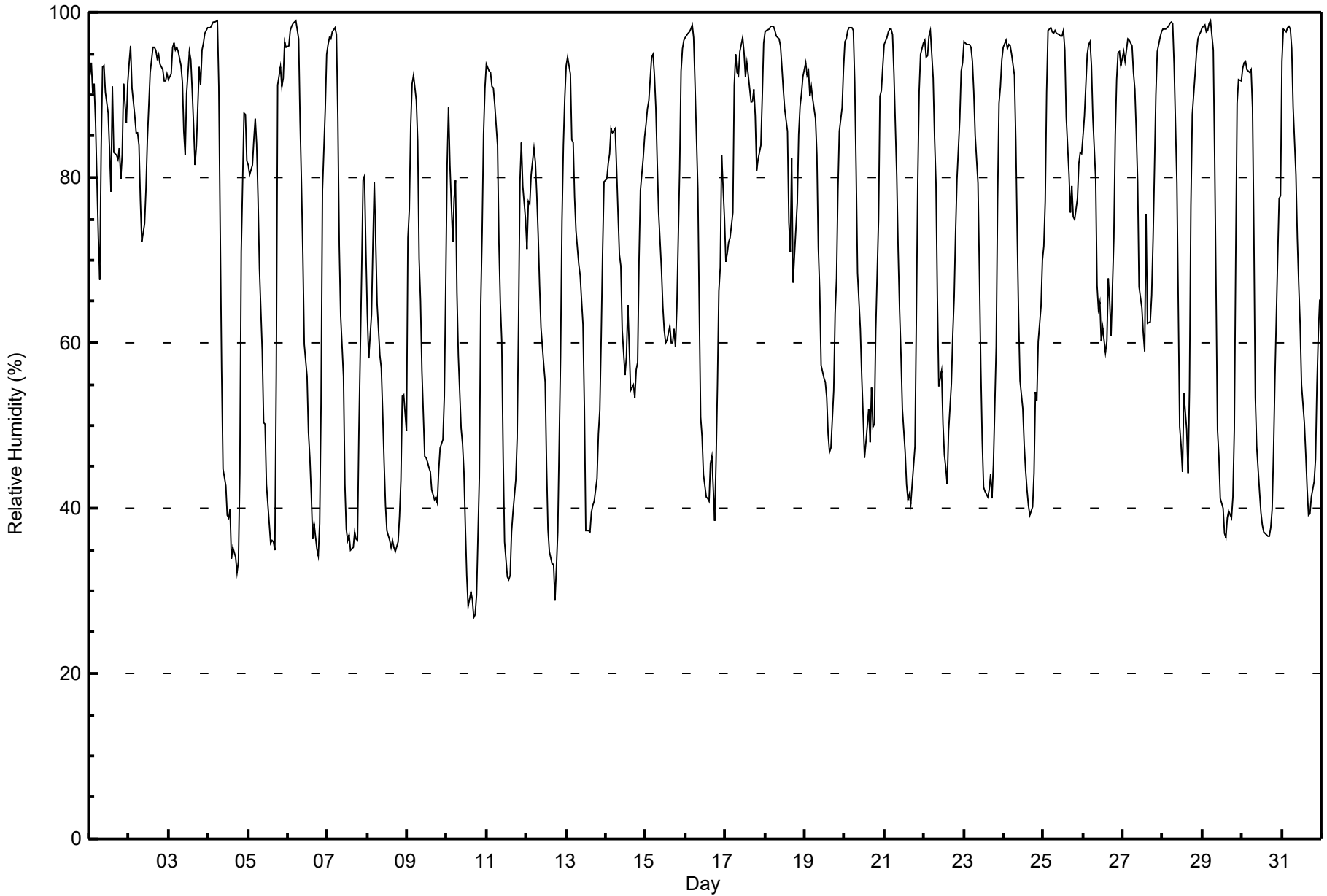
Conklin - July 2023

Maximum Value: 99.0 % on Jul 29 06:00																						Maximum Daily Average: 92.1 % on Jul 3																						Hours in Service: 744			
Minimum Value: 26.8 % on Jul 10 17:00																						Minimum Daily Average: 50.7 % on Jul 8																						Hours of Data: 744			
Maximum Diurnal Average: 92.5 % at hour 5																						Minimum Diurnal Average: 51.1 % at hour 16																						Hours of Missing Data: 0			
Monthly Average: 72.10 %																						Percentiles: P ₁ = 31.6 P ₁₀ = 39.9 Q ₁ = 53.0 Median = 77.4 Q ₃ = 92.4 P ₉₀ = 96.9 P ₉₉ = 98.7																						Hours of Calibration: 0			
																						Percent Operational Time: 100.0																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	92.4	93.8	90.1	91.3	86.7	72.7	67.7	83.4	93.4	93.5	90.3	87.7	83.5	78.3	90.9	83.1	82.7	82.3	83.5	79.8	82.8	91.3	86.7	91.6	85.8	93.8																					
2-Jul	93.8	96.0	90.9	87.5	85.5	85.4	83.9	77.2	72.2	74.5	78.7	84.5	88.7	92.6	95.7	95.7	95.4	94.4	94.9	93.7	93.1	91.8	91.7	92.5	88.8	96.0																					
3-Jul	91.8	92.6	95.8	96.2	95.5	95.8	95.3	93.6	91.6	85.6	82.7	90.1	95.2	94.3	90.4	86.4	81.6	84.0	93.5	91.2	95.4	96.3	97.5	98.1	92.1	98.1																					
4-Jul	98.2	98.1	98.5	98.7	98.8	98.9	91.0	73.6	57.0	44.7	42.8	39.1	38.7	39.9	33.8	35.2	34.1	32.3	33.6	44.2	71.0	87.8	87.6	82.0	65.0	98.9																					
5-Jul	81.5	80.3	81.6	84.5	87.1	84.1	77.5	68.9	59.0	50.4	50.2	42.9	40.5	35.7	36.0	35.9	34.9	55.9	91.2	93.4	91.1	92.1	96.4	95.8	68.6	96.4																					
6-Jul	96.0	97.8	98.3	98.6	98.8	98.9	96.7	86.9	79.4	70.7	59.8	55.9	49.2	46.2	41.7	36.3	38.1	35.1	34.2	38.2	52.7	78.4	88.3	95.0	69.6	98.9																					
7-Jul	96.1	97.0	96.8	97.6	98.1	97.3	87.2	71.7	63.2	55.9	42.9	37.4	36.1	36.8	34.9	35.3	37.2	36.3	36.0	49.1	68.8	79.7	80.2	71.1	64.3	98.1																					
8-Jul	63.5	58.1	63.4	71.8	79.5	72.3	64.7	58.5	56.9	51.6	45.6	40.3	37.3	36.0	35.2	36.1	35.3	34.7	36.0	38.9	43.4	53.6	53.8	49.3	50.7	79.5																					
9-Jul	72.8	76.2	86.3	91.3	92.3	89.3	84.4	70.2	65.1	56.7	46.3	46.1	45.6	44.9	44.5	42.2	41.0	41.4	40.7	44.5	47.2	48.4	53.6	67.0	59.9	92.3																					
10-Jul	81.6	88.6	81.6	72.1	77.4	79.6	66.1	58.5	49.7	47.9	44.4	37.8	31.8	28.1	29.8	29.0	26.8	27.1	29.4	43.7	64.7	73.4	85.3	90.8	56.0	90.8																					
11-Jul	93.7	92.8	92.7	91.1	90.8	88.8	83.8	72.0	64.7	60.2	46.3	35.8	31.7	31.4	31.9	37.2	39.4	43.4	48.5	62.6	79.5	84.2	78.9	74.9	64.8	93.7																					
12-Jul	71.3	77.1	76.9	80.4	83.5	81.9	78.0	73.1	66.9	61.9	57.2	55.3	45.1	37.4	34.7	33.2	33.2	28.9	32.6	37.2	58.4	74.7	84.0	89.6	60.5	89.6																					
13-Jul	93.6	94.6	92.6	84.6	84.2	77.6	73.6	69.6	68.1	65.0	62.3	52.1	37.4	37.3	37.0	39.5	40.3	40.9	43.6	48.9	51.9	60.7	71.0	79.4	62.7	94.6																					
14-Jul	79.9	81.8	82.9	85.9	85.4	85.9	81.0	75.7	70.7	69.3	61.5	56.1	58.3	64.6	59.7	54.3	55.0	53.4	56.7	57.6	70.0	78.5	82.3	85.0	70.5	85.9																					
15-Jul	86.4	88.3	89.3	94.6	95.0	92.4	88.5	81.9	75.7	69.0	64.4	61.5	60.0	60.3	62.1	60.0	60.0	61.8	59.5	64.3	81.0	92.8	95.7	96.6	76.7	96.6																					
16-Jul	97.0	97.4	97.7	98.0	98.5	96.9	91.3	78.7	64.3	51.1	48.7	44.0	41.4	41.2	40.9	45.4	46.3	38.5	45.8	54.9	66.2	69.1	82.7	75.1	67.1	98.5																					
17-Jul	69.8	70.9	72.2	72.7	75.8	91.2	94.9	92.8	92.4	95.3	96.9	95.1	92.1	93.9	92.4	89.1	89.2	90.6	87.4	80.8	82.2	83.9	89.9	96.2	87.0	96.9																					
18-Jul	97.6	97.8	97.9	98.2	98.3	98.2	97.8	97.1	96.7	96.0	93.4	90.7	88.3	85.6	74.6	71.0	82.4	67.4	70.7	77.0	85.2	88.7	90.2	92.2	88.9	98.3																					
19-Jul	93.8	92.4	92.8	89.8	91.1	89.5	87.1	82.7	71.5	66.3	57.3	55.7	55.2	53.3	48.9	46.8	47.2	54.2	63.5	67.9	78.6	85.6	88.4	93.2	73.0	93.8																					
20-Jul	96.5	96.8	97.8	98.1	98.1	97.7	91.6	80.8	68.5	61.7	56.0	51.3	46.0	48.0	52.1	48.0	54.5	49.9	50.1	61.6	74.9	89.8	90.6	93.4	73.1	98.1																					
21-Jul	96.1	97.0	97.6	98.0	97.9	97.4	92.5	80.1	71.2	64.1	58.7	52.1	46.8	42.9	41.0	41.7	40.5	42.9	47.5	63.2	79.7	90.5	94.9	96.3	72.1	98.0																					
22-Jul	96.6	94.6	94.8	97.2	97.9	92.0	84.8	79.3	65.4	54.8	56.7	50.2	46.5	45.0	42.9	49.3	55.1	61.1	65.7	73.4	79.8	87.2	92.8	93.9	73.2	97.9																					
23-Jul	96.4	96.3	96.1	96.1	95.7	94.0	90.3	85.1	79.4	68.6	57.2	48.2	42.5	42.0	41.3	42.1	44.1	41.2	45.3	59.5	77.2	89.0	91.0	94.2	71.4	96.4																					
24-Jul	95.7	96.6	95.7	96.1	96.0	94.8	92.3	84.3	73.2	63.1	55.4	52.1	47.7	44.5	42.3	40.4	39.1	40.1	44.2	54.0	53.1	60.1	64.3	70.0	66.5	96.6																					
25-Jul	71.7	77.1	90.4	97.9	98.1	97.7	97.4	97.7	97.5	97.3	97.1	97.7	95.3	87.2	80.3	75.8	79.0	75.2	75.0	77.5	81.8	83.0	82.9	87.8	87.8	98.1																					
26-Jul	85.1	87.5	94.9	96.0	96.5	93.6	87.4	79.9	66.9	64.1	64.9	60.2	61.9	58.8	60.1	67.7	65.1	60.8	72.8	85.1	91.9	95.1	95.2	93.5	78.5	96.5																					
27-Jul	95.3	94.1	95.5	96.7	96.6	96.0	92.7	90.6	85.6	79.4	66.8	64.2	61.1	58.9	75.6	62.4	62.6	65.8	72.6	81.1	90.1	95.3	96.9	97.6	82.2	97.6																					
28-Jul	98.0	98.0	98.1	98.4	98.7	98.9	98.6	93.7	79.3	64.6	49.9	47.7	44.4	54.0	49.4	44.2	54.4	76.6	87.7	92.6	95.0	96.8	97.4	97.6	79.7	98.9																					
29-Jul	98.2	98.5	97.7	97.9	98.6	99.0	95.4	82.1	65.9	49.4	46.3	41.1	40.0	36.9	36.5	38.8	39.6	38.8	41.3	49.5	70.0	89.0	91.8	91.7	68.1	99.0																					
30-Jul	93.2	94.0	94.0	93.1	92.8	93.1	88.5	72.8	53.3	47.4	42.0	39.4	38.0	37.1	37.0	36.6	36.6	37.7	39.9	46.8	55.6	70.6	77.4	77.7	62.3	94.0																					
31-Jul	94.0	97.9	97.7	98.1	98.3	98.0	95.6	88.5	80.4	72.7	67.1	62.2	55.0	50.4	46.6	42.3	39.1	39.4	41.3	43.3	46.0	54.8	61.3	65.3	68.1	98.3																					
																						89.3	90.3	91.2	91.9	92.5	91.3	87.0	80.0	72.4	66.2	61.0	57.2	54.3	53.3	52.5	51.1	51.8	52.8	56.9	63.0	72.7	81.0	84.5	86.1	Diurnal Average	
																						98.2	98.5	98.5	98.7	98.8	99.0	98.6	97.7	97.5	97.3	97.1	97.1	97.7	95.3	95.7	95.7	95.4	94.4	94.9	93.7	95.4	96.8	97.5	98.1	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Conklin - July 2023





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Conklin - July 2023

Maximum Speed: 20 km/h on Jul 13 15:00	Maximum Daily Speed Average: 7.8 km/h on Jul 30	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 16 04:00	Minimum Daily Speed Average: 0.2 km/h on Jul 7	Hours of Data: 743
Maximum Diurnal Speed Average: 2.4 km/h at hour 14	Minimum Diurnal Speed Average: 0.5 km/h at hour 4	Hours of Missing Data: 1
Monthly Average Velocity: 0.9 km/h 287.9 deg	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 3 Median = 5 Q ₃ = 7 P ₉₀ = 9 P ₉₉ = 14	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	SSE1	N0	SSE2	S1	S2	WSW1	NW3	SW1	ENE3	E5	ESE4	ESE3	E4	S4	WSW2	WNW3	NW5	NW6	NW4	W6	WSW5	WSW2	WSW4	SW2	WSW0.7	NW6
2-Jul	SW3	SW3	NW4	WNW5	WNW6	WSW8	WSW8	W8	WNW8	W7	W7	W9	WSW9	W8	NW7	NW9	NW7	WNW7	WNW6	WNW6	WNW6	WNW8	WNW7	NW7	WNW6.4	WSW9
3-Jul	WNW7	WNW6	NW6	NW5	NW6	NW7	NW7	NNW15	NNW14	NNW19	NNW19	NNW13	NNW11	NNW10	N8	N11	NNW11	NNE5	N6	N7	WSW2	SW2	SSE2	SSE3	NNW7.4	NNW19
4-Jul	SSE2	S2	SSE1	SSE1	SSW1	SSE2	NNW2	N4	NNE4	NE5	NNE5	N3	NW3	NW4	WNW6	NW5	WNW3	W5	WNW4	WSW3	SSW3	S4	S5	S6	WNW1.0	S6
5-Jul	S6	S7	SSW6	SSW6	SSW9	SW10	WSW2	WSW8	SW8	WSW8	WSW8	SW11	W8	WSW8	W7	W7	WSW8	N14	N4	W5	S5	SSW4	NW2	W5	WSW5.5	N14
6-Jul	W0	ENE1	S2	SSE1	NE0	N1	NNW3	NW4	NNW4	NNW3	N4	NNE7	N8	N8	N8	NNW12	NNW13	N13	N11	NNE7	N4	WNW1	NNW1	ENE0	N4.4	NNW13
7-Jul	E0	SSE1	SSE1	SE1	SSE2	S2	ESE1	N5	NNW5	N6	NNE7	N3	NW2	N3	E4	NE4	WNW4	N2	SW2	SSW3	SSW4	SSW6	S6	S6	N0.2	NNE7
8-Jul	SSW7	SW9	SW8	SSW5	S6	SSW6	WSW7	WNW7	W8	W10	W10	WNW9	WNW9	W9	W9	WNW8	W8	W8	W8	WSW8	WSW6	SW6	W4	NW3	WSW6.5	W10
9-Jul	SE4	ESE2	SW0	S0	SSE2	SSE2	ENE0	NNW4	NNW5	N6	NNE7	NNE7	NNE7	N9	N8	NNE8	NNE9	NNE10	NNE9	NNE7	NE7	NE5	ENE4	NNE2	NNE4.3	NNE10
10-Jul	N4	N3	ENE3	ENE4	NE4	NNE4	ESE7	ESE10	ESE12	ESE10	ESE12	ESE12	ESE11	ESE10	E9	ESE9	ESE9	ESE9	ESE7	ESE2	SSW1	SSW4	SE2	SSE1	ESE5.6	ESE12
11-Jul	N1	SSE2	SSE3	SSE3	SSE3	ESE1	SE2	SE3	ESE5	E4	SSE5	SSE9	S8	SSW5	SSW5	WSW5	W3	WNW3	WSW2	SW1	S3	SSE3	S4	SSW5	S2.5	SSE9
12-Jul	SW5	SSW5	SW6	SSW7	S4	SW6	WSW5	SSW6	SW5	WNW5	WNW6	NW6	NNW10	NNW10	NNW13	N13	NNW13	N13	NNE8	NNE4	UO	NW0	N0	WNW0	NW3.3	N13
13-Jul	S1	NNE0	NNW3	NNW4	N3	NNW4	NW5	NW5	NW5	NW6	NW7	NW9	NNW14	NNW18	NNW20	NNW16	NNW14	NNW14	NW11	NW4	NW4	NNW4	NNW2	NNW2	NNW7.1	NNW20
14-Jul	NNW3	NNW3	NNW3	N4	NNW4	NNW4	NNW6	NNW7	NNW9	NNW13	N17	N13	NNE7	N7	N9	N7	N6	NNE5	NNE3	N0	S2	SSE1	NNW2	NNW2	N5.2	N17
15-Jul	S1	N1	NW1	ESE1	SE1	N1	NNW2	NNW3	NNW3	N5	N6	NNE6	NNE5	NNE7	NE7	NNE8	NNE7	NNE6	NNE6	N3	SW1	NE0	SE1	SE1	NNE3.1	NNE8
16-Jul	SSE1	SSE1	SE1	N0	S1	S2	E1	ESE3	ESE6	SE8	E8	ESE7	SE8	ESE7	SSW9	SE8	SE7	S7	S7	S5	SE3	SSE4	S3	SSE5	SE4.3	SSE9
17-Jul	SSE9	SSE6	SSE5	S6	SSE5	SE8	SE4	SE7	SE6	NNE2	NNW5	NNW5	N6	NNW7	NNW8	NNW7	N8	N7	NE5	ESE8	ESE8	SE7	E4	NE4	E2.1	SSE9
18-Jul	NNE4	NNE5	N7	N9	N8	N5	N8	N8	NNW5	NNW5	N8	N8	N6	N6	N6	SSE4	WSW4	S4	SSE4	W2	NW4	NNW3	NW5	NNW3	N4.0	N9
19-Jul	NW1	SE2	NNE1	N1	E1	NW2	SSW3	SSW5	SW2	W5	W7	W9	WSW7	WSW6	WSW7	SW9	SW12	WSW6	WNW6	WNW2	ENE0	SSW3	SSW4	S3	WSW3.4	SW12
20-Jul	S3	N1	ENE1	SSE2	S3	S3	SSW5	SW4	SSW4	SW5	NW4	WNW5	W3	NW4	WNW5	WNW4	NW5	WNW5	WNW3	WSW3	WNW1	SE2	S3	SSE2	WSW1.9	NW5
21-Jul	SE1	ESE1	SSE1	S2	SSE2	SSW3	S1	NNW3	NNW4	NW4	NNW5	NW5	W5	W6	W6	WNW6	W6	W6	WNW3	S1	E1	SSE2	SSE1	ESE1	WNW1.8	W6
22-Jul	SSE2	SSE3	S2	S1	SSE2	S4	W1	N2	NW4	NW5	WSW10	WSW7	WSW5	SW7	SW5	SW9	WSW7	NNW4	WNW2	NNW2	N3	W1	W0	NW1	WSW2.2	WSW10
23-Jul	S1	N1	SSW1	SW1	SSE0	SSW3	SSW2	SW4	SW7	SW6	WSW5	WNW3	SW5	S4	S3	SSE2	ENE2	SE5	ESE4	SE1	S1	SSE2	S3	SSE2	SSW1.8	SW7
24-Jul	SE2	SSE2	SSE3	SSE3	SSE4	SE2	NNW2	SE3	ESE4	ESE6	ESE7	ESE8	ESE7	ESE9	ESE9	ESE8	ESE8	SE10	SE6	SE4	SE7	ESE5	ESE6	ESE6	ESE5.2	SE10
25-Jul	ESE8	SE11	W7	NNW7	ENE1	NNE4	E5	N3	E5	E9	ESE4	ENE2	NW3	NNW7	N6	NNE3	SW2	WNW8	WNW7	WNW7	W6	SW5	SW7	SW8	NW0.7	SE11
26-Jul	SW7	SSW5	SSW4	S4	SSW5	S4	SSE3	S5	S12	S13	SSE9	SSE10	SSE7	SSE6	SSE6	ENE4	E3	SE6	NE4	N6	N8	N8	N7	NNE8	SSE2.5	S13
27-Jul	NE9	NE7	NNE8	NNE9	N7	NNE8	NNE8	NNE8	NNE8	NNE8	NE7	NNE9	NNE8	N8	NNE7	N10	NNE9	NNE7	N5	NNW3	NNW1	NNW0	ESE1	SSE0	NNE6.2	N10
28-Jul	SSE1	S2	S1	SSE0	S1	SSW2	NNW1	NNW1	NNW4	NNW2	N2	N4	N5	N8	NW2	SW2	SE6	W3	SW1	SSW1	S2	S2	W0	SSE1	NW0.4	N8
29-Jul	W1	SSE2	S3	NW1	SSE2	SSE3	S4	S4	SSW5	SW5	SW6	SSW8	SSW7	SSW7	S8	SSW6	SSW6	SW9	SSW7	SSW5	SSW2	S3	S4	S4	SSW4.4	SW9
30-Jul	S4	SSE4	S5	S4	S4	SSE3	SSE3	S4	S12	S14	S14	S14	S13	S13	S13	SSW12	S11	SSE11	S10	SSE8	SE6	ESE2	ENE2	S8	S7.8	S14
31-Jul	S3	E2	NNW2	SSW2	SE3	SSE3	SSE4	SSW5	WSW7	SW9	WSW9	W10	W8	W8	WSW10	WSW9	WSW13	WSW11	WSW10	WSW10	WSW12	SW10	SW10	SW10	WSW6.6	WSW13

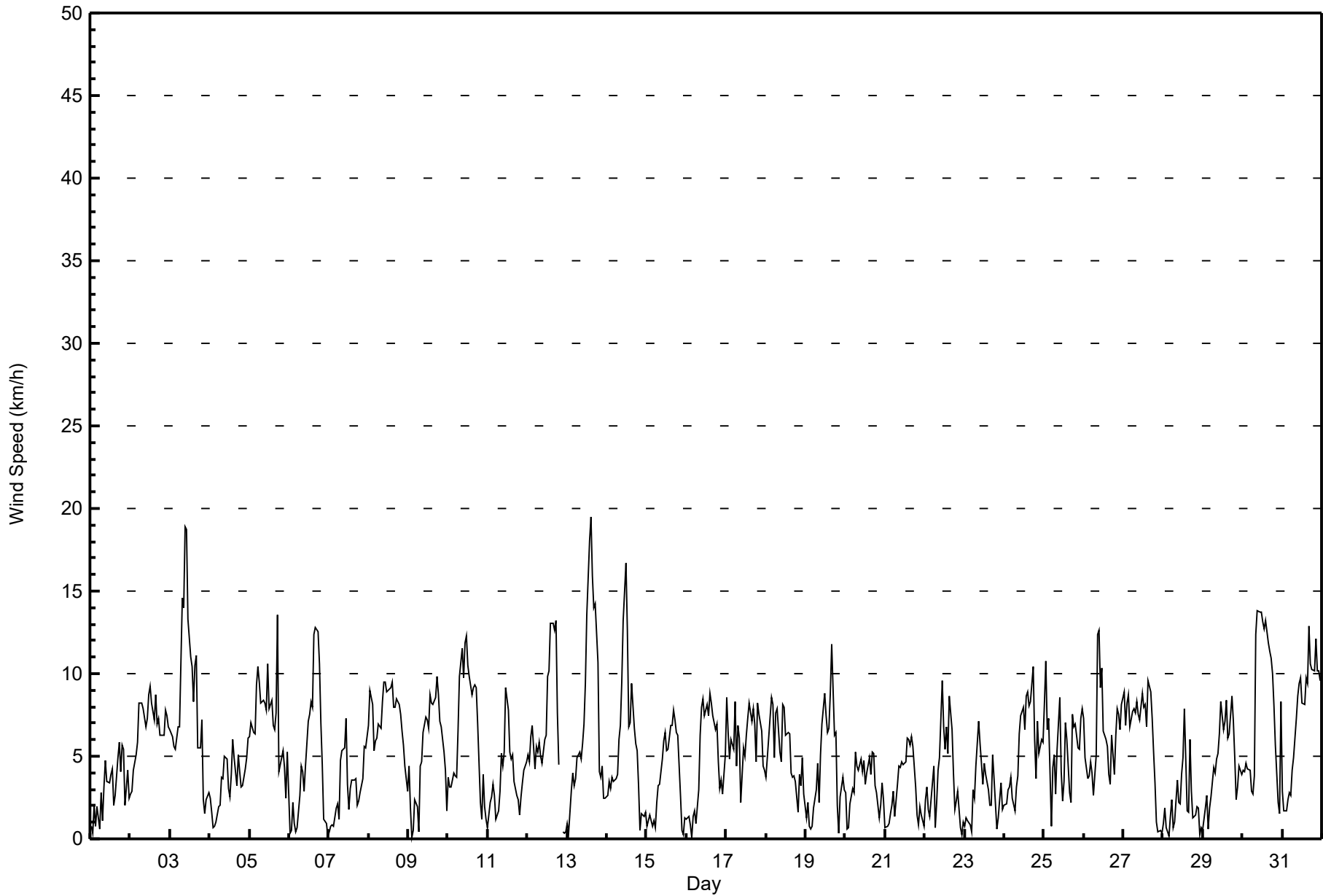
S1.2 SSE1.1 SW0.7 SW0.5 S0.9SSW1.0WSW0.8WNW1.1 W1.0WNW1.4 NW1.5 NW1.6 NW1.9 NW2.4 NW2.1 NW2.4 NW2.3NNW2.4 NW1.0WNW1.2 SW0.9SSW1.4SSW1.2SSW1.3 NE9 SE11 NNE8 NNE9 SSW9 SW10 SW10NNW15NNW14NNW19NNW19 N17 NNW14 NNW18 NNW20 NNW16 NNW14 NNW14 NW11 WSW10WSW12 SW10 SW10 SW10	Diurnal Average
	Diurnal Maximum

UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Conklin - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Conklin - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	423	56.93	56.93
6 - 11	282	37.95	94.89
12 - 19	37	4.98	99.87
20 - 28	1	0.13	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
Conklin - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	33	17	9	14	13	17	20	61	57	32	23	14	15	20	35	43	423
6 - 11	39	32	5	0	3	25	15	11	13	15	23	26	25	23	15	12	282
12 - 19	6	0	0	0	0	3	0	0	9	1	1	2	0	0	0	15	37
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	78	49	14	14	16	45	35	72	79	48	47	42	40	43	50	71	743

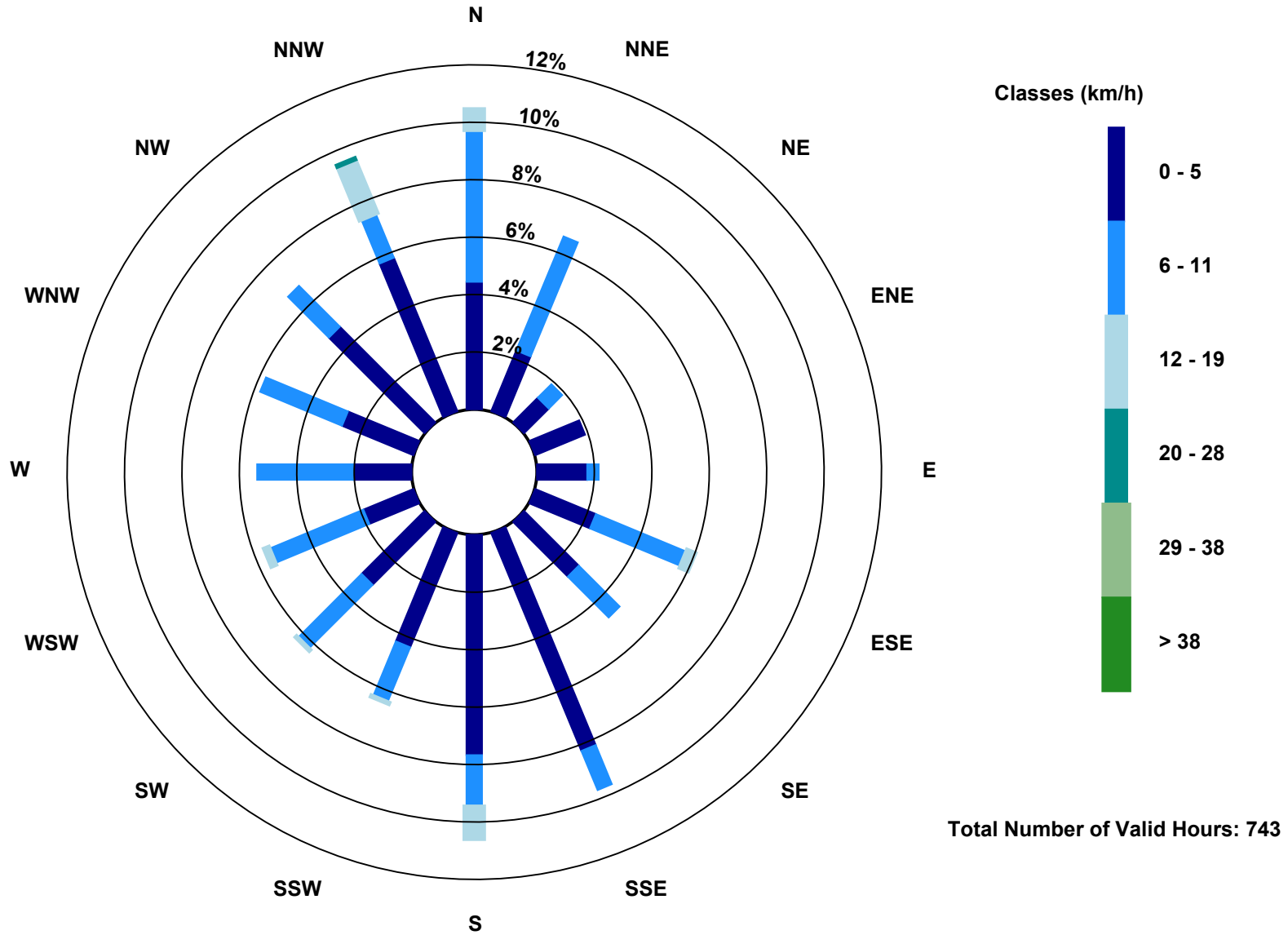
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Conklin





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Conklin - July 2023

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



Wood Buffalo Environmental Association
Summary of Hour Averages

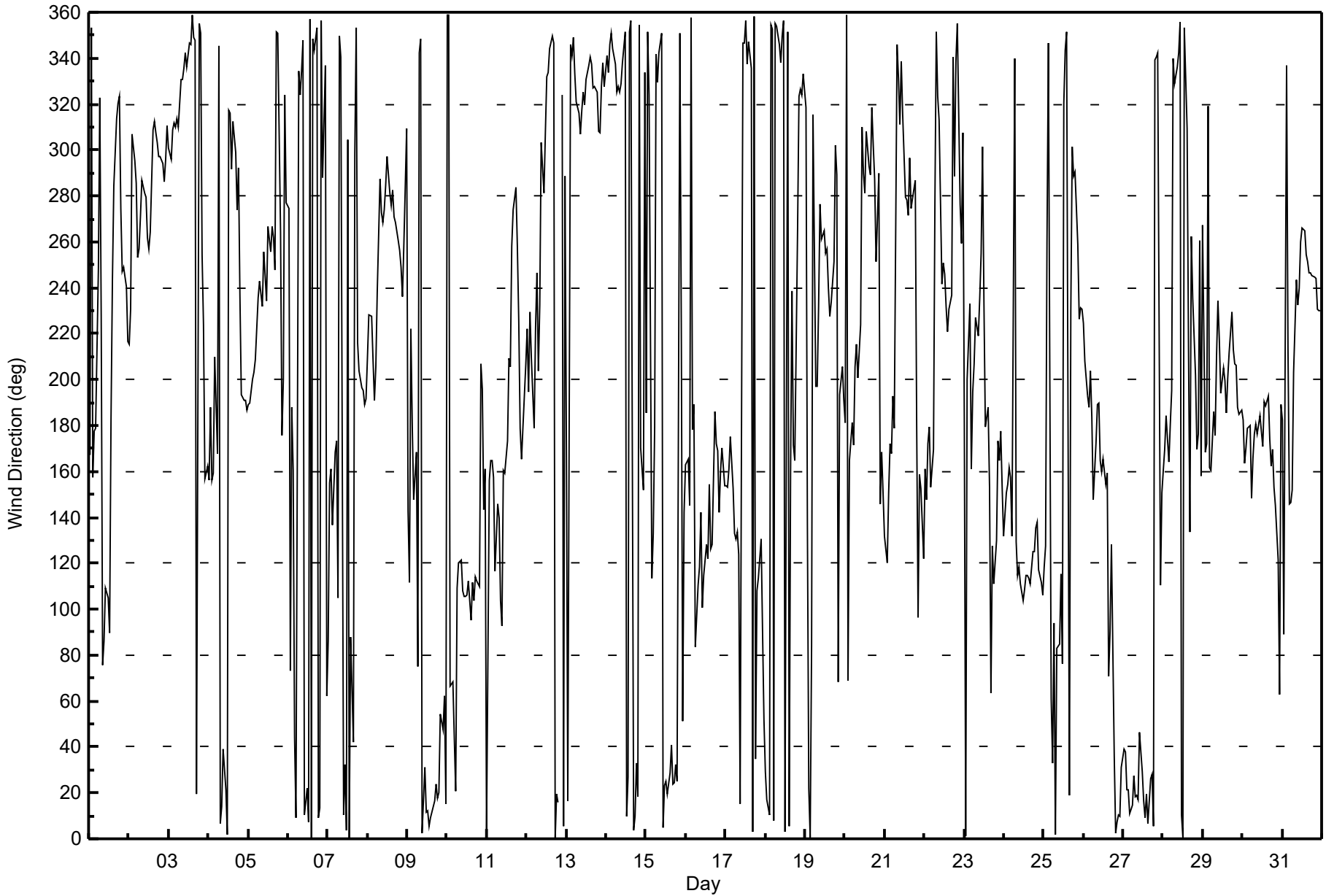
Wind Direction (WD) - deg
Conklin - July 2023

Direction of Maximum Speed: 340 deg on Jul 13 15:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 175.4 deg on Jul 30	Hours of Data: 743
Direction of Minimum Speed: 357 deg on Jul 16 04:00	Direction of Minimum Daily Speed Average: 0.2 deg on Jul 7
Direction of Minimum Daily Speed Average: 0.2 deg on Jul 7	Hours of Missing Data: 1
Monthly Average Direction: 287.9 deg	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	167	353	157	177	179	248	323	228	75	86	109	105	90	182	243	284	314	321	323	275	247	249	240	217	254.5
2-Jul	215	231	307	296	286	253	257	271	287	281	279	262	257	264	309	313	308	303	297	297	294	286	296	311	283.4
3-Jul	301	296	309	312	310	313	310	331	331	335	343	336	347	346	359	349	348	20	355	351	255	224	157	162	333.9
4-Jul	156	188	156	159	210	168	345	7	14	39	21	2	317	316	292	312	299	274	292	237	194	191	191	187	285.6
5-Jul	189	190	200	203	208	222	235	243	232	256	245	234	267	256	267	262	248	352	351	264	176	200	324	277	241.3
6-Jul	274	74	188	160	45	9	334	324	334	348	10	22	8	357	0	348	344	353	9	13	356	288	337	62	355.9
7-Jul	86	155	161	137	168	173	105	349	340	11	32	4	305	0	88	42	298	354	216	204	197	195	189	191	356.6
8-Jul	209	228	227	209	191	206	238	288	273	268	274	284	297	281	276	282	271	268	261	256	249	236	259	309	258.5
9-Jul	143	112	222	180	148	168	75	342	348	2	31	12	13	5	9	12	17	24	17	20	54	48	62	15	22.8
10-Jul	359	359	67	68	44	21	109	120	122	108	106	106	106	112	95	112	104	114	112	110	207	196	143	161	104.9
11-Jul	2	156	165	165	158	116	146	140	104	93	160	159	173	209	205	258	274	284	258	226	179	165	179	206	177.5
12-Jul	222	195	229	209	179	223	247	204	232	303	282	308	332	334	344	349	346	0	19	16	UO	324	6	289	312.0
13-Jul	171	17	346	341	349	333	321	316	307	317	325	320	331	337	340	337	327	328	325	308	307	328	338	328	329.4
14-Jul	341	334	346	351	344	337	325	328	326	329	338	352	10	27	351	356	4	10	33	18	354	170	152	334	351.4
15-Jul	185	352	324	114	133	179	342	330	342	351	5	23	25	19	29	41	24	24	32	25	351	224	52	142	18.2
16-Jul	163	165	145	357	178	189	84	110	119	142	100	115	128	122	155	126	128	186	172	169	142	160	170	154	139.9
17-Jul	154	153	161	175	152	133	131	134	124	16	346	346	356	338	347	336	3	358	35	108	114	130	90	52	83.9
18-Jul	29	17	10	355	353	8	355	354	346	338	349	357	3	352	6	160	238	171	165	265	323	327	324	333	352.2
19-Jul	318	137	22	0	84	315	197	197	232	277	261	265	255	257	240	227	234	251	302	289	69	194	206	191	245.7
20-Jul	181	359	69	165	181	172	206	216	201	224	310	290	281	308	293	289	318	302	288	252	290	146	169	151	250.7
21-Jul	132	120	150	172	168	193	179	346	332	311	339	315	279	278	271	297	275	279	287	180	97	159	152	122	282.8
22-Jul	161	148	172	180	153	170	277	352	324	313	242	251	246	232	221	231	237	341	289	338	355	276	259	307	245.9
23-Jul	180	1	200	233	161	195	207	227	219	235	255	301	234	180	188	153	64	127	111	130	173	165	177	153	198.8
24-Jul	132	151	154	162	157	132	340	129	115	119	111	104	109	115	115	113	111	125	125	135	138	117	111	106	120.3
25-Jul	118	128	260	347	61	33	94	2	83	85	116	76	320	344	352	19	230	302	289	290	259	226	231	231	319.8
26-Jul	225	208	193	188	204	184	148	173	189	190	165	160	165	154	159	71	90	128	36	3	8	11	10	31	159.3
27-Jul	39	38	21	22	11	15	27	18	19	17	46	29	17	9	20	7	26	28	5	339	341	342	110	151	21.1
28-Jul	160	170	184	164	181	196	340	329	336	342	356	11	1	353	309	214	134	262	236	202	170	177	261	158	324.9
29-Jul	267	168	172	319	161	161	186	176	210	234	217	194	205	200	186	201	212	229	213	207	206	188	185	187	201.1
30-Jul	182	164	170	179	180	148	166	176	181	177	184	177	171	190	188	193	174	162	170	153	145	122	63	189	175.4
31-Jul	182	89	337	213	146	147	152	203	243	232	240	260	266	265	254	251	247	247	245	244	244	230	230	230	239.6

175.3 166.1 225.4 235.4 187.6 202.7 252.8 292.8 273.4 303.7 319.6 319.4 320.0 315.3 316.7 321.9 313.9 329.3 325.6 296.0 232.5 203.2 207.0 206.0
 Diurnal Average

UO - Unstable Operation
 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
Conklin - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 110 deg on Jul 19 04:00																			Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9						
Minimum Value: 9 deg on Jul 7 22:00																									
Percentiles: P ₁ = 14 P ₁₀ = 21 Q ₁ = 26 Median = 40 Q ₃ = 56 P ₉₀ = 77 P ₉₉ = 97																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Jul	66	92	61	79	76	104	70	79	46	48	61	70	39	46	82	88	40	44	44	40	22	63	43	66	104
2-Jul	74	70	57	53	52	31	33	46	49	52	49	39	35	42	50	49	50	49	58	56	51	52	50	51	74
3-Jul	56	56	57	46	49	45	46	28	26	24	21	22	26	23	26	25	20	60	28	28	43	73	37	45	73
4-Jul	41	46	57	48	64	31	85	39	69	65	73	89	82	73	66	41	68	63	52	31	14	9	11	12	89
5-Jul	16	20	25	25	20	21	23	24	30	50	42	32	52	49	46	50	46	44	81	70	49	67	67	50	81
6-Jul	105	88	49	84	84	86	49	34	54	71	62	51	52	44	47	30	21	26	29	25	21	70	95	71	105
7-Jul	81	84	81	75	30	29	41	26	33	53	40	79	104	90	75	75	56	73	73	18	14	9	13	17	104
8-Jul	23	20	19	23	15	21	47	56	45	43	48	53	49	50	48	49	53	48	36	27	23	23	58	86	86
9-Jul	33	83	84	83	22	25	95	28	38	34	46	63	57	54	43	52	45	34	28	22	40	36	48	63	95
10-Jul	22	20	49	38	39	43	26	24	21	28	24	28	32	37	38	29	30	22	21	45	49	15	34	79	79
11-Jul	87	20	19	18	19	50	26	23	21	35	56	30	37	59	61	52	54	44	40	63	31	18	17	26	87
12-Jul	28	29	24	23	31	34	43	27	53	54	51	50	40	42	30	35	25	27	25	26	UO	71	85	65	85
13-Jul	29	89	20	27	20	39	39	48	49	46	34	35	30	25	25	27	28	26	29	50	52	35	25	51	89
14-Jul	23	23	26	22	19	18	33	34	35	26	30	28	28	34	35	28	31	38	31	28	51	51	52	61	61
15-Jul	72	80	47	48	28	61	43	24	38	43	49	55	52	54	40	45	37	32	36	26	23	71	93	36	93
16-Jul	21	38	64	83	70	54	73	42	32	35	35	38	33	41	28	20	29	28	19	16	22	25	56	21	83
17-Jul	18	28	29	39	24	25	53	22	37	74	25	31	28	20	21	26	22	25	41	27	20	23	38	40	74
18-Jul	28	26	22	20	21	33	22	21	32	29	22	21	24	24	33	76	36	35	27	69	46	43	31	45	76
19-Jul	60	34	85	110	89	57	60	25	73	60	47	43	48	49	52	36	26	42	46	79	87	39	32	24	110
20-Jul	36	98	88	41	42	36	19	28	45	62	78	51	79	62	48	52	42	43	51	36	75	17	25	17	98
21-Jul	21	63	62	35	37	19	36	60	50	50	55	59	64	55	56	48	46	45	55	38	46	25	49	50	64
22-Jul	28	18	43	61	24	21	85	50	40	42	27	46	62	63	66	45	26	56	57	71	65	88	92	65	92
23-Jul	83	47	94	70	84	31	73	53	26	32	59	79	63	76	82	95	73	52	23	70	62	33	55	33	95
24-Jul	33	55	23	25	21	25	86	59	43	32	34	37	36	33	30	36	29	20	19	18	15	21	24	25	86
25-Jul	25	34	58	50	98	55	64	80	77	47	52	79	55	31	37	78	75	56	59	52	36	17	17	22	98
26-Jul	19	25	31	32	37	33	48	61	22	22	24	26	30	45	44	31	42	26	49	28	23	24	25	29	61
27-Jul	34	33	24	26	24	24	28	30	24	36	42	44	42	48	40	28	32	27	21	14	35	84	59	92	92
28-Jul	83	25	72	91	69	51	68	92	44	78	93	78	72	27	80	97	63	77	87	96	57	55	98	87	98
29-Jul	64	54	27	89	26	50	24	29	32	45	42	33	64	49	33	45	26	27	23	18	19	17	15	14	89
30-Jul	18	14	18	21	22	16	21	64	23	23	23	27	26	30	32	30	26	25	22	17	16	39	70	46	70
31-Jul	90	73	76	48	56	51	32	40	33	29	43	39	50	56	43	39	29	27	26	23	23	21	20	19	90
105 98 94 110 98 104 95 92 77 78 93 89 104 90 82 97 75 77 87 96 87 88 98 92																								Diurnal Maximum	
UO - Unstable Operation																									



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS22
JANVIER
JULY 2023**

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS22)
 JULY 2023

MONTHLY SUMMARY

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	3.6	0	0.7	0
TRS(ppb) Average	705	36	39	99.6	0.7	0	0.3	0
THC(ppm) Average	707	35	37	99.73	2.4	-	2.1	-
NMHC(ppm) Average	707	35	37	99.73	0.141	-	0.012	-
CH4(ppm) Average	707	35	37	99.73	2.4	-	2.1	-
O3 (ppb) Average	709	35	35	100	67.2	0	36.2	-
NO2 (ppb) Average	638	35	106	90.46	5.1	0	2.7	-
NO (ppb) Average	638	35	106	90.46	2	-	0.4	-
NOX (ppb) Average	638	35	106	90.46	6.1	-	3	-
PM2.5 (ug/m3) Average	743	1	1	100	295.4	69	152.5	13
Temperature 2 m (C) Average	744	0	0	100	30.4	-	23	-
Relative Humidity (%) Average	744	0	0	100	99.8	-	90.6	-
Wind Speed 20 m (km/h) Average	743	0	1	99.87	19	-	11	-
Wind Direction 20 m (deg) Average	743	0	1	99.87	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS22)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	0.15	0.3	-	0	0	0	0.1	0.2	0.3	3.6
TRS (ppb) Average	705	0.13	0.1	-	0	0	0.1	0.1	0.2	0.2	0.7
THC (ppm) Average	707	2.02	0.1	-	1.9	2	2	2	2	2.1	2.4
NMHC(ppm) Average	707	0.001	0.01	-	0	0	0	0	0	0	0.141
CH4(ppm) Average	707	2.02	0.1	-	1.9	2	2	2	2	2.1	2.4
O3 (ppb) Average	709	25.48	11	-	2.1	11.5	17.4	25	32.6	40.1	67.2
NO2 (ppb) Average	638	0.91	0.7	-	0	0.3	0.5	0.7	1.1	1.6	5.1
NO (ppb) Average	638	0.16	0.2	-	0	0	0	0.1	0.2	0.4	2
NOX (ppb) Average	638	1.07	0.8	-	0	0.4	0.6	0.8	1.3	1.9	6.1
PM2.5 (ug/m3) Average	743	33.65	43.8	-	1.8	3.6	5.7	21.2	40.2	75.8	295.4
Temperature 2 m (C) Average	744	17.21	5.3	-	5	10.7	13.4	16.4	21.6	24.9	30.4
Relative Humidity (%) Average	744	73.02	20.8	-	26.6	40.7	56.1	78.4	91.9	97.8	99.8
Wind Speed 20 m (km/h) Average	743	6.7	3	-	0	2	4	7	9	11	19
Wind Direction 20 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS22)
JULY 2023

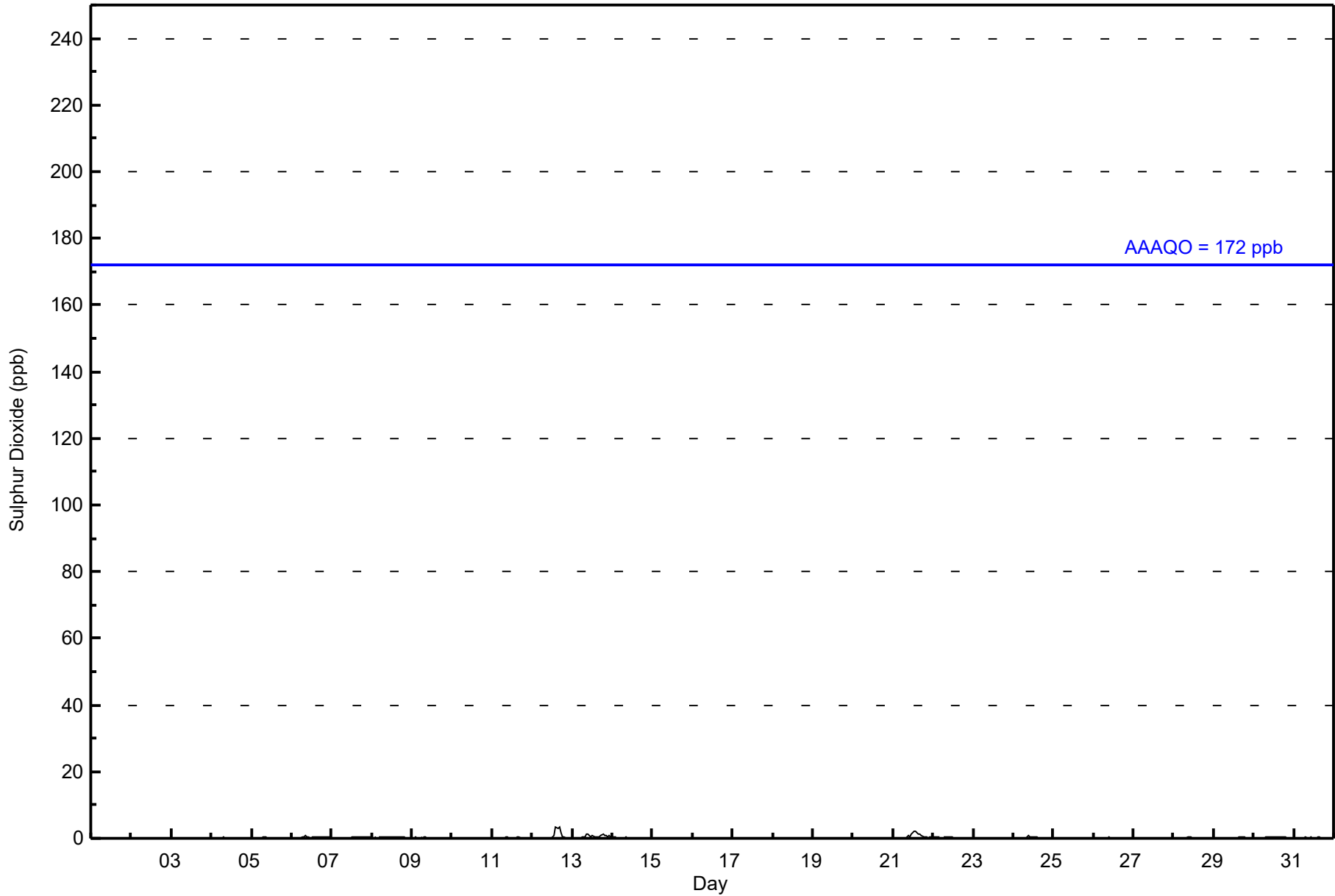
OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	21 Jul 2023 09:00	21 Jul 2023 09:00	1	Maintenance - verify daily QA response
TRS	24 Jul 2023 08:00	24 Jul 2023 09:00	2	Maintenance - verify daily QA response
THC/NMHC/CH4	26 Jul 2023 10:00	26 Jul 2023 11:00	2	Maintenance - replaced support gas cylinder
NO2	11 Jul 2023 21:00	12 Jul 2023 05:00	9	Unstable Operation - excessive baseline noise
NO2	14 Jul 2023 05:00	14 Jul 2023 09:00	5	Unstable Operation - excessive baseline noise
NO2	16 Jul 2023 01:00	16 Jul 2023 03:00	3	Unstable Operation - excessive baseline noise
NO2	16 Jul 2023 05:00	16 Jul 2023 09:00	5	Unstable Operation - excessive baseline noise
NO2	16 Jul 2023 10:00	16 Jul 2023 10:00	1	Maintenance - verify daily QA response
NO2	16 Jul 2023 11:00	17 Jul 2023 04:00	18	Unstable Operation - excessive baseline noise
NO2	17 Jul 2023 08:00	17 Jul 2023 09:00	2	Unstable Operation - excessive baseline noise
NO2	18 Jul 2023 07:00	18 Jul 2023 10:00	4	Unstable Operation - excessive baseline noise
NO2	18 Jul 2023 11:00	19 Jul 2023 10:00	24	Maintenance - analyzer removed and replaced
Wind Speed, Wind Direction	07 Jul 2023 03:00	07 Jul 2023 03:00	1	Flat line in sensor output signal



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Janvier - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Janvier - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	709	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: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Janvier - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	61	72	42	31	35	24	19	31	46	96	89	44	46	30	16	27	709
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	61	72	42	31	35	24	19	31	46	96	89	44	46	30	16	27	709

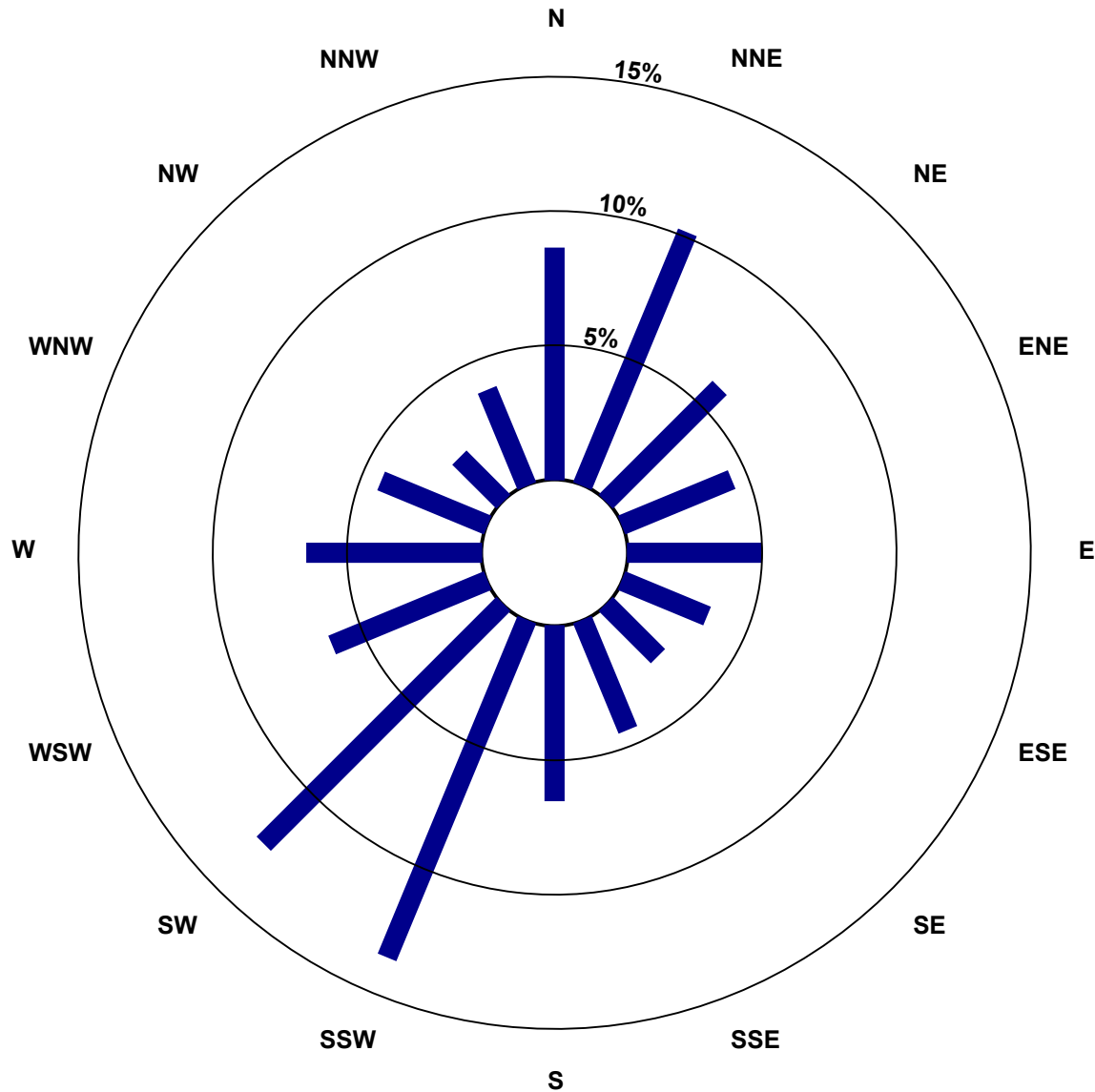
Total Number of Valid Hours: 709

Total Number of Hours: 744

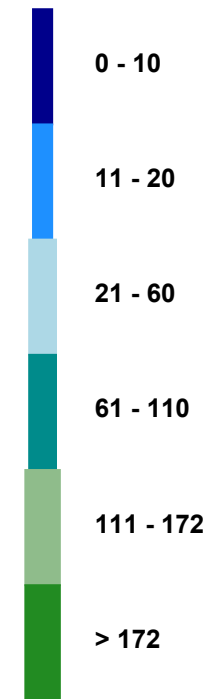


Wood Buffalo Environmental Association
Wind Rose Jul 2023

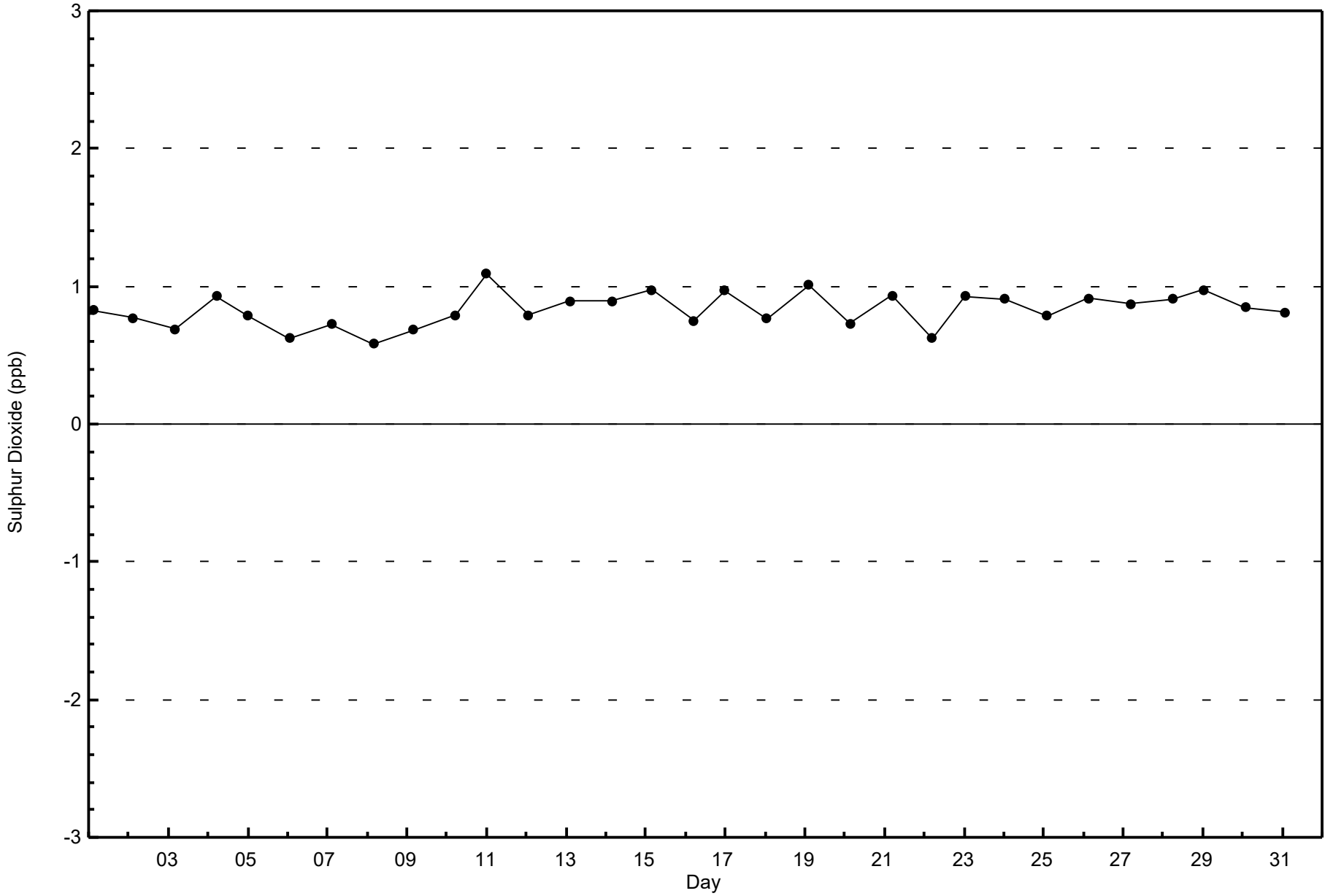
Sulphur Dioxide (SO₂) - ppb
Janvier

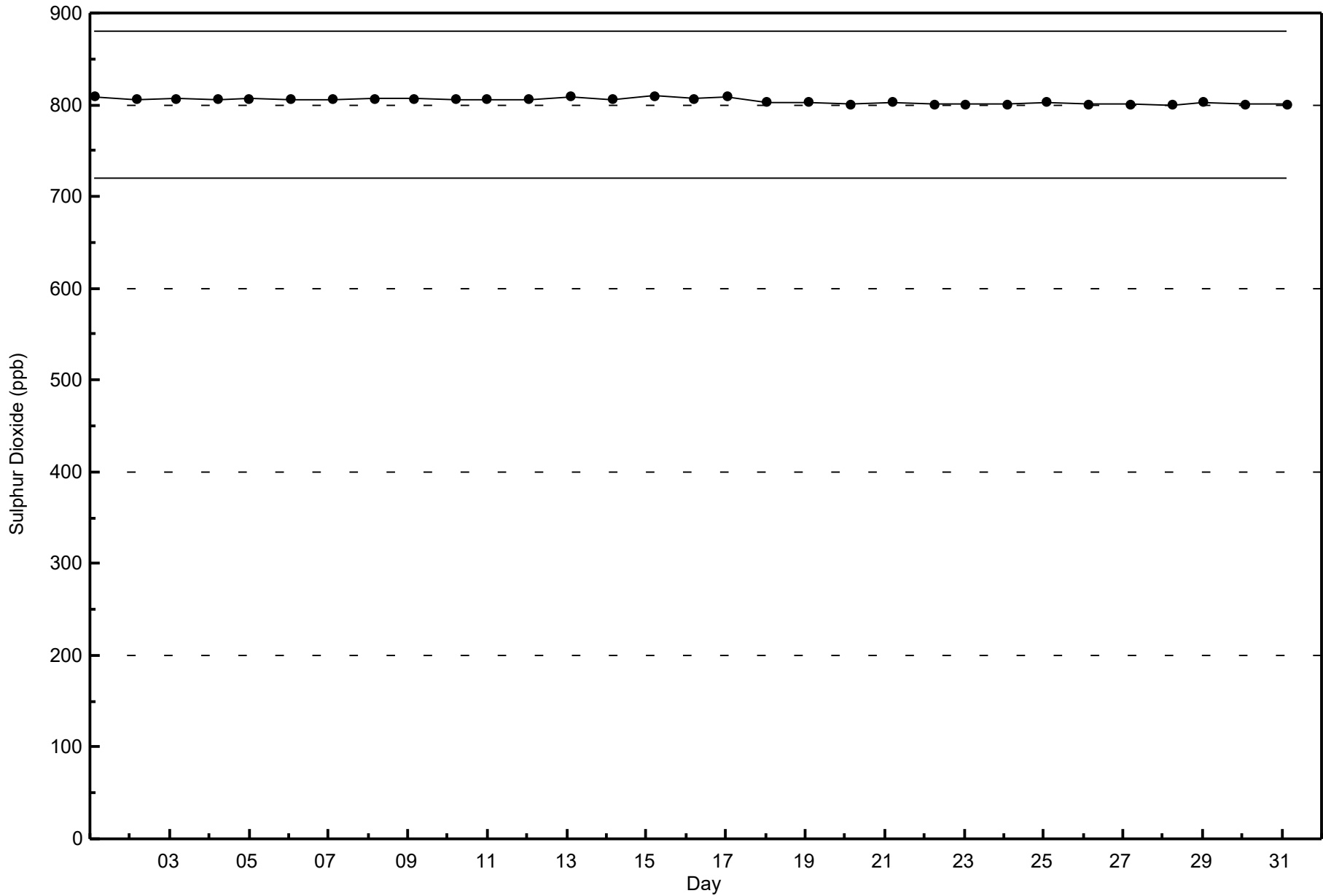


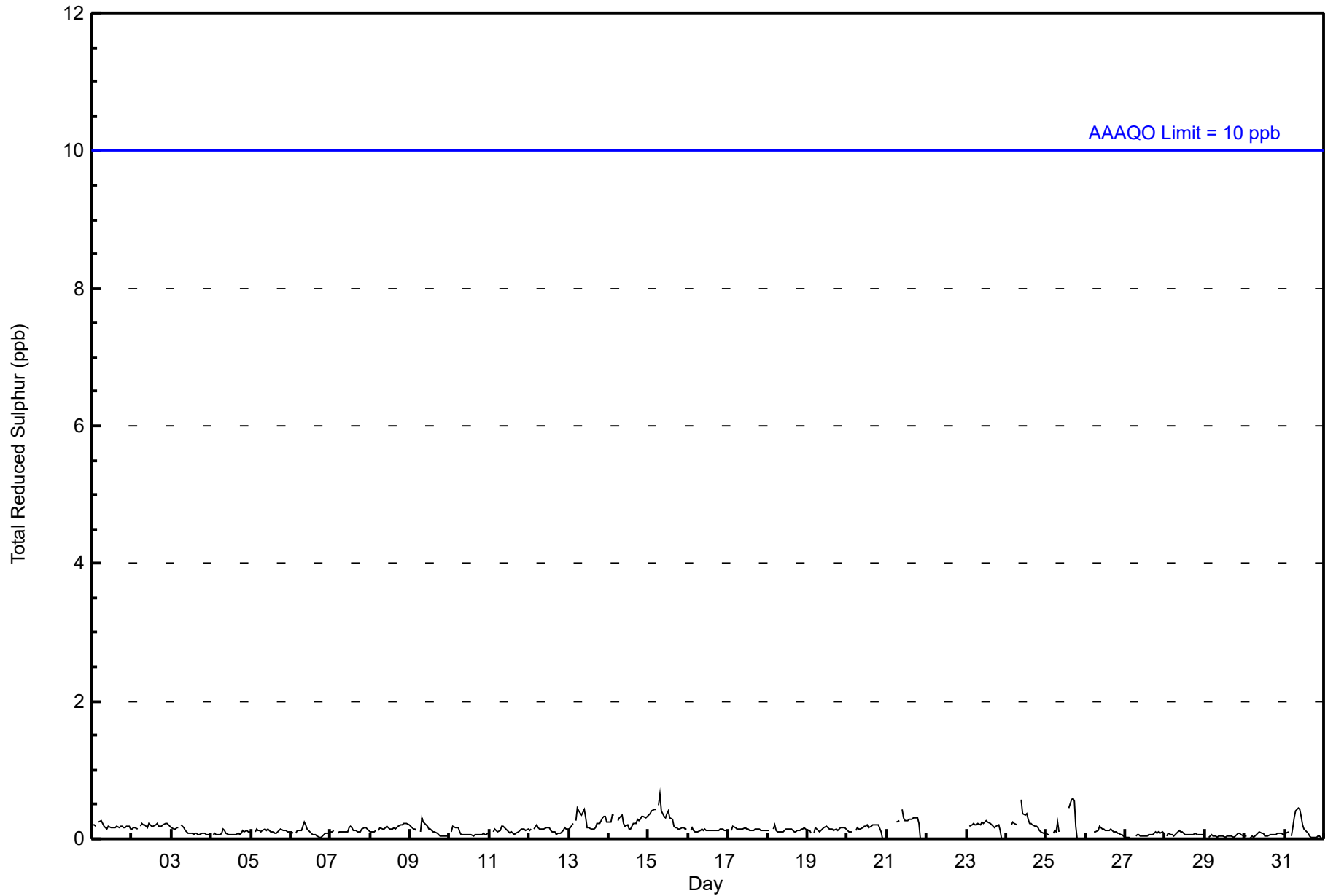
Classes (ppb)



Total Number of Valid Hours: 709









**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Janvier - July 2023**

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
Janvier - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	60	75	39	31	34	24	18	31	48	98	85	44	45	30	16	26	704
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	60	75	39	31	34	24	18	31	48	98	85	44	45	30	16	26	704

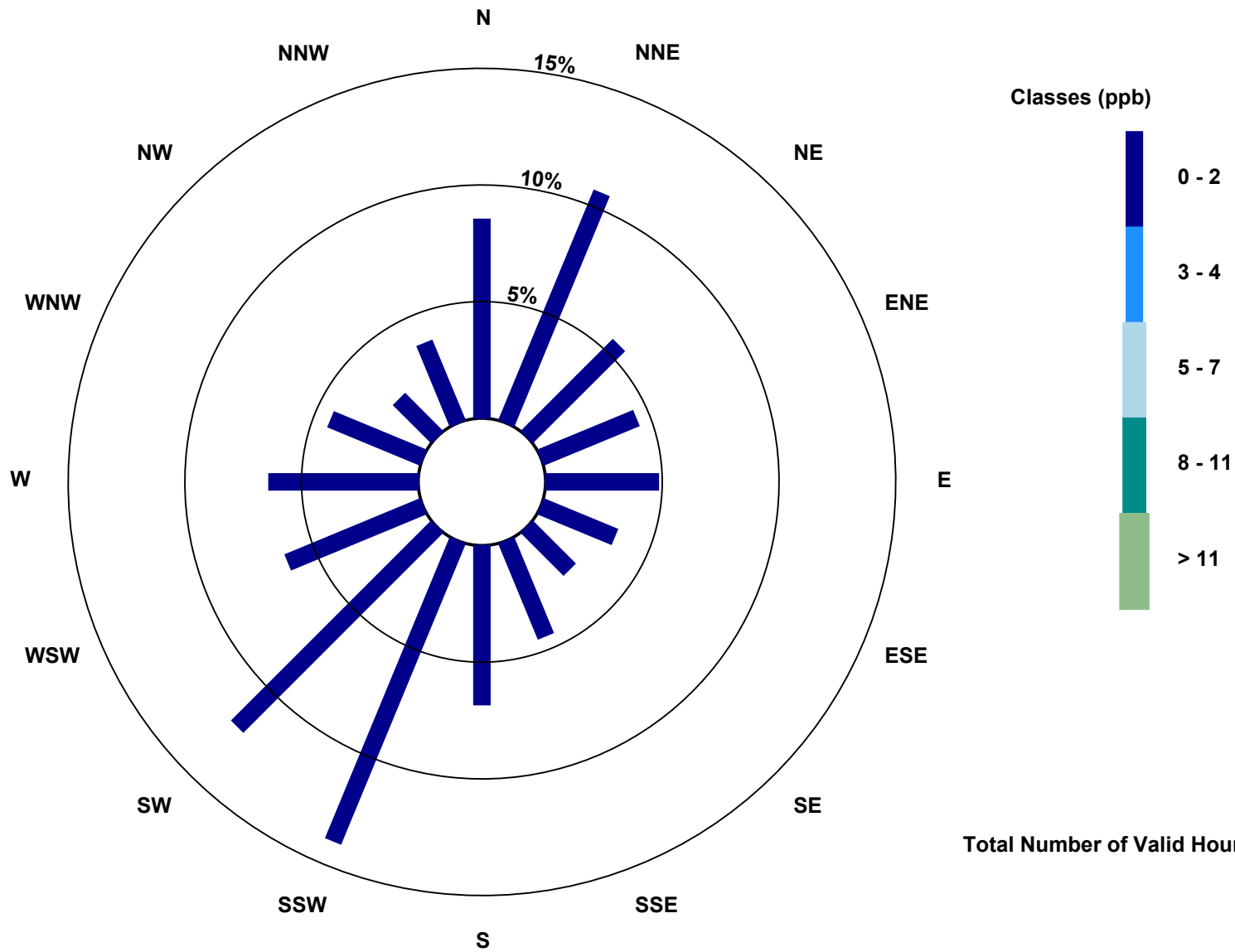
Total Number of Valid Hours: 704

Total Number of Hours: 744

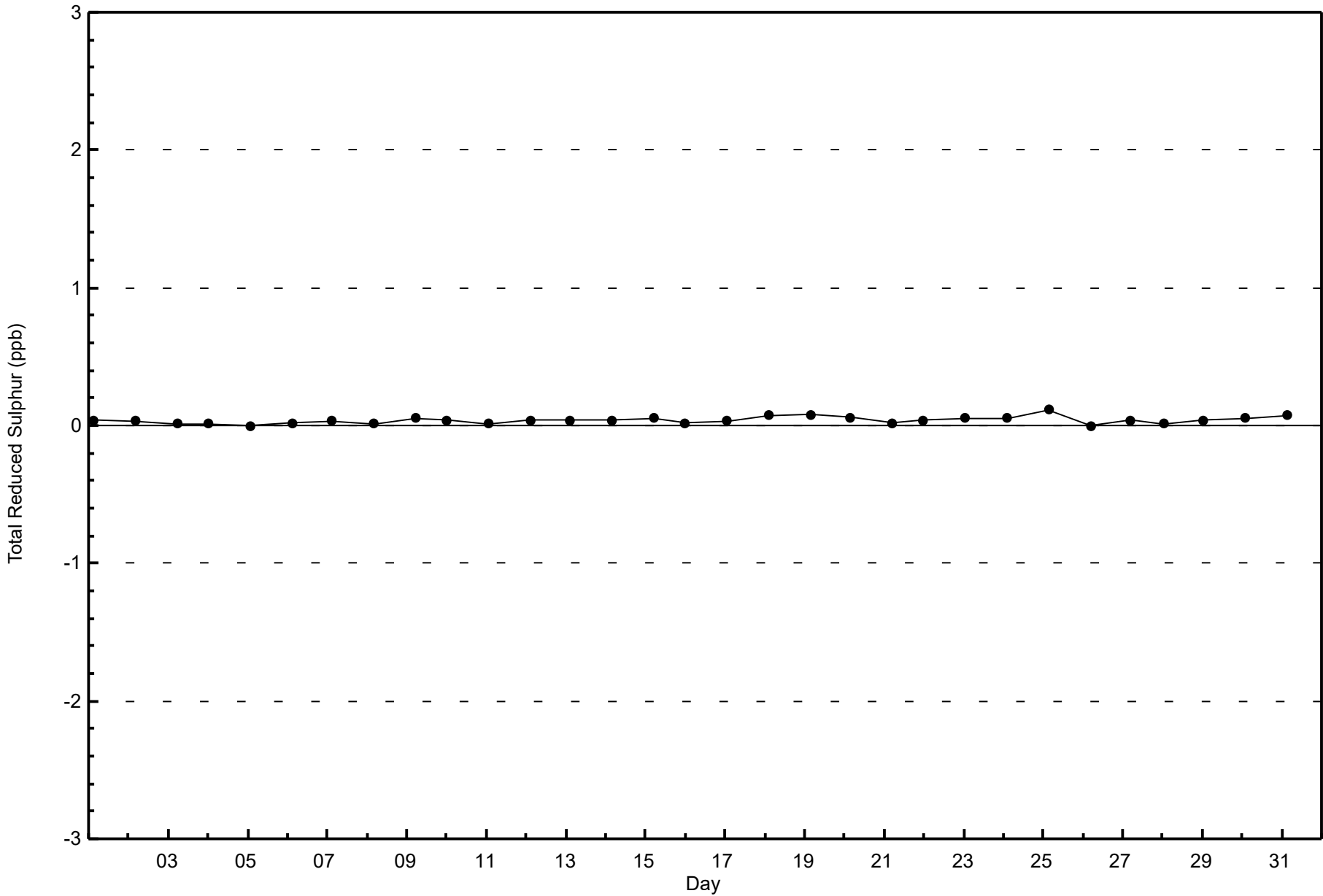


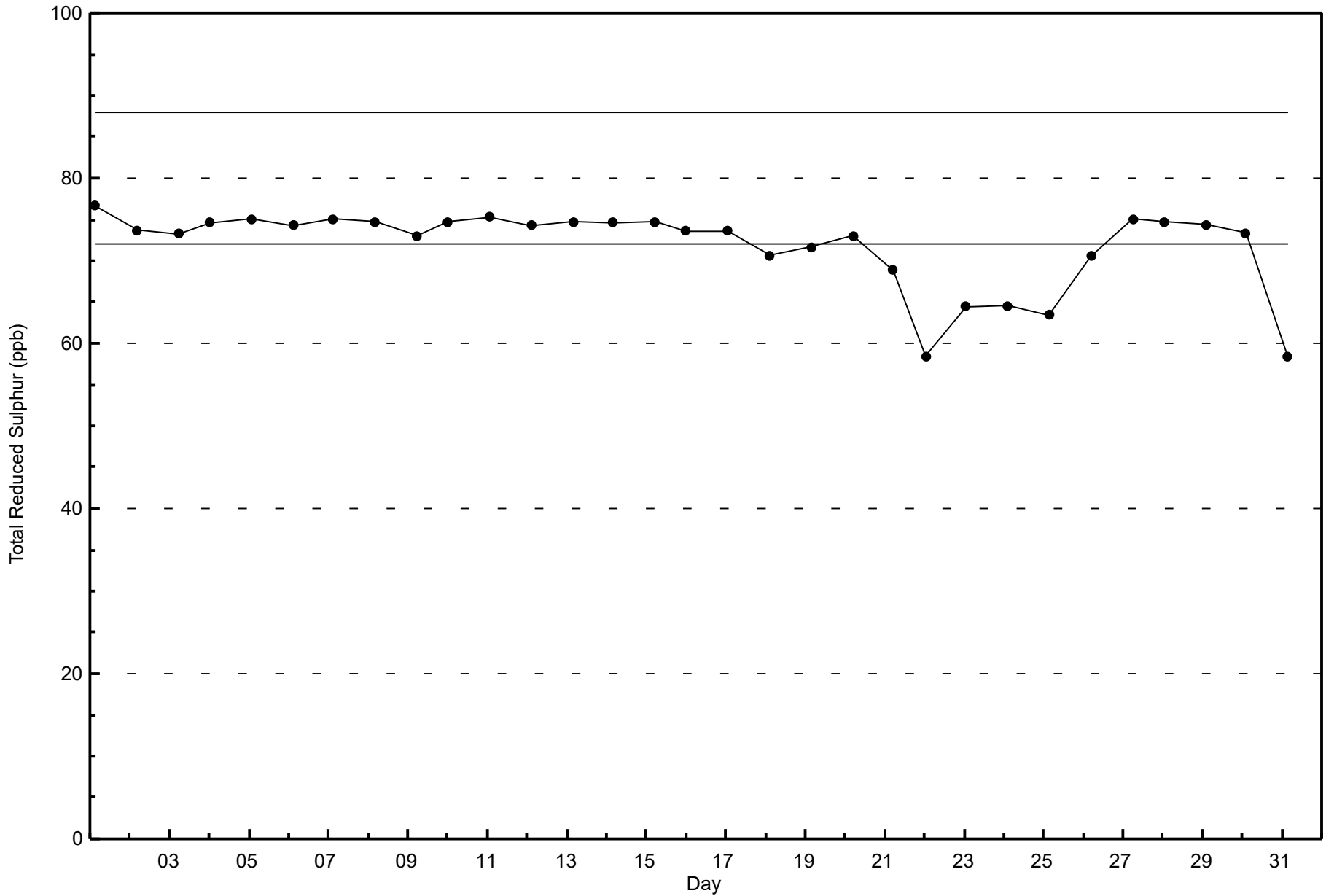
Wood Buffalo Environmental Association
Wind Rose Jul 2023

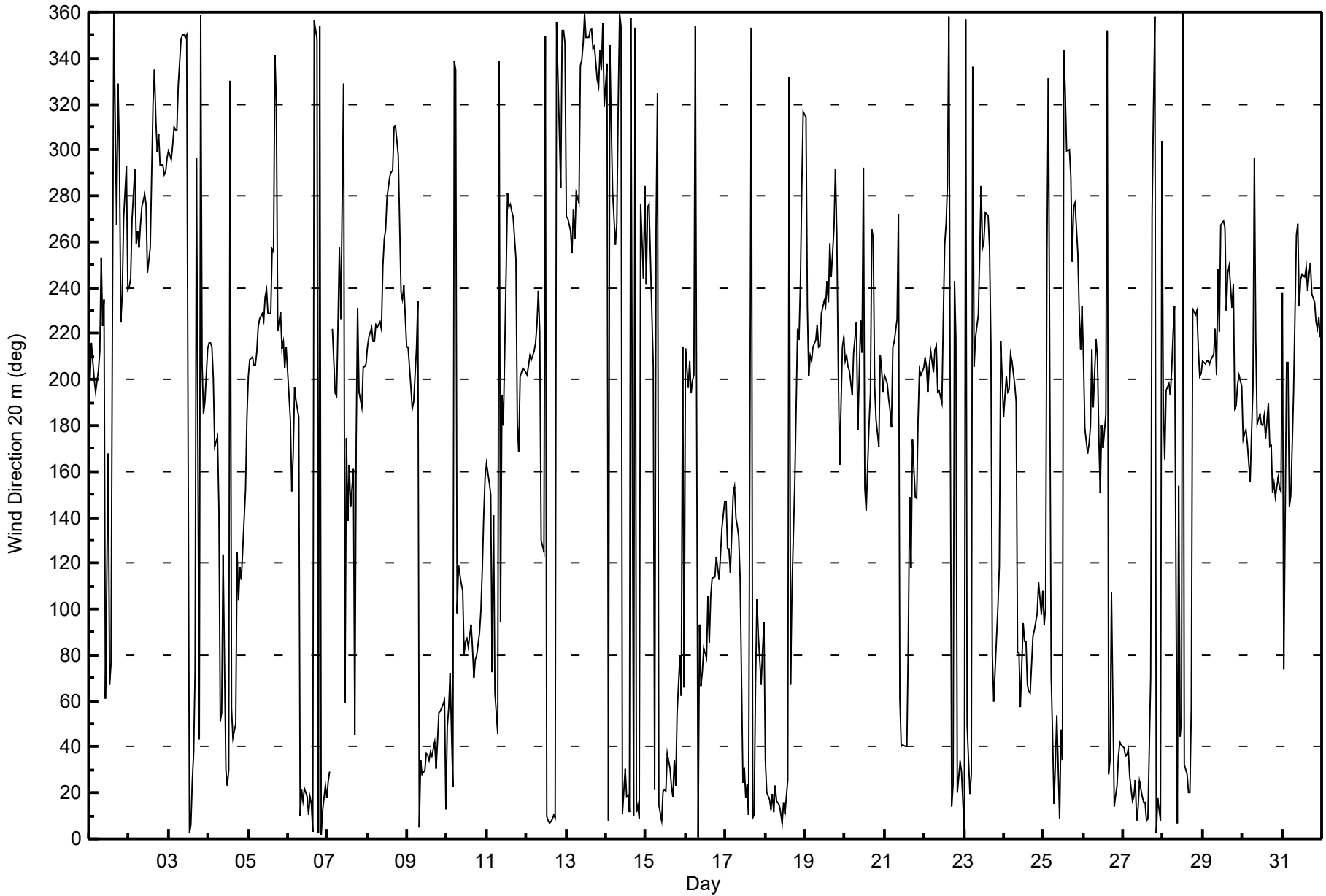
Total Reduced Sulphur (TRS) - ppb
Janvier



Total Number of Valid Hours: 704









Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Janvier - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	560	79.21	79.21
2.1 - 3.0	147	20.79	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Janvier - July 2023

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	51	54	35	25	24	22	17	22	36	69	71	38	36	26	14	20	560
2.1 - 3.0	10	18	7	6	11	2	2	8	9	27	18	6	10	4	2	7	147
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	61	72	42	31	35	24	19	30	45	96	89	44	46	30	16	27	707

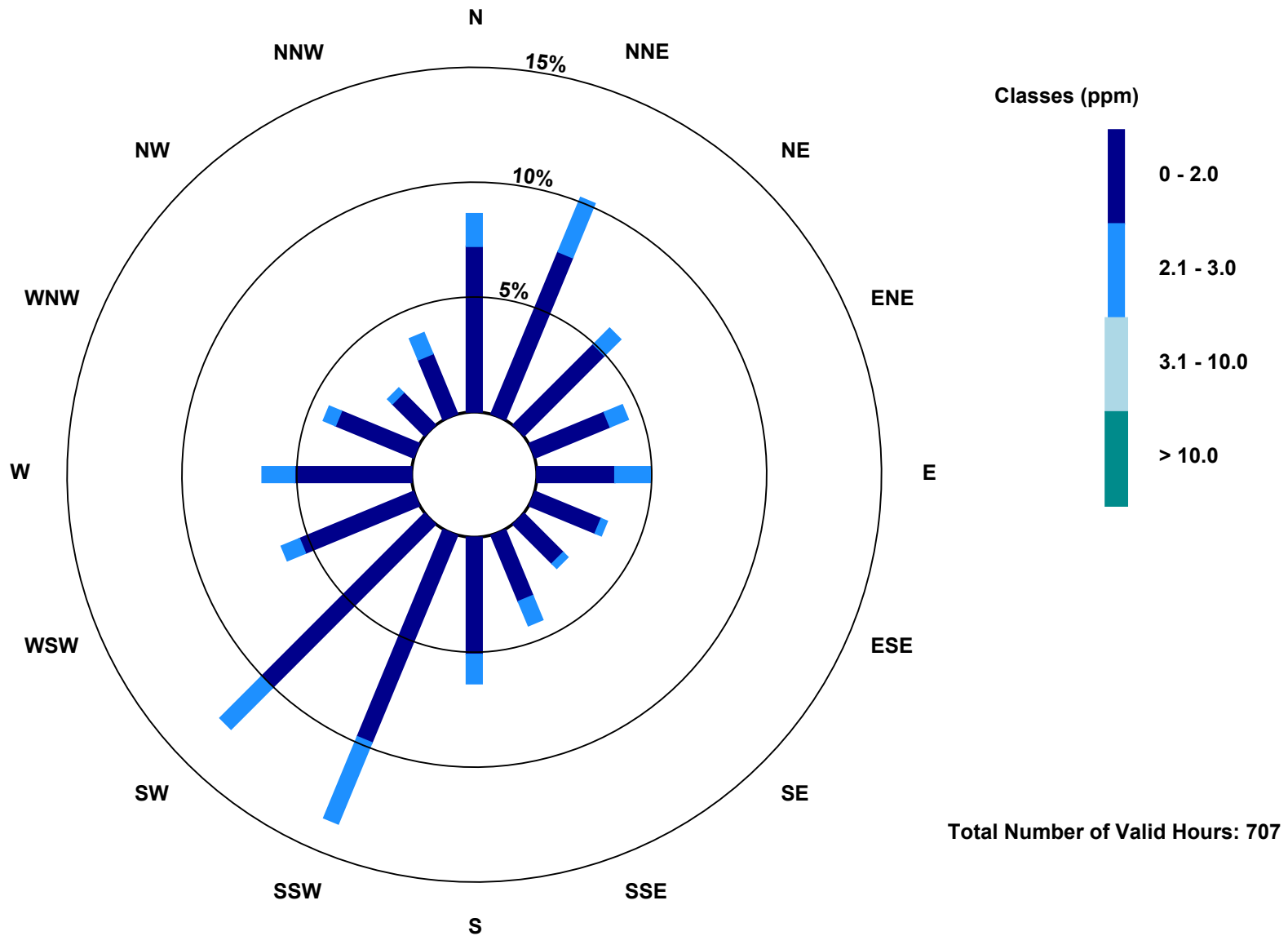
Total Number of Valid Hours: 707

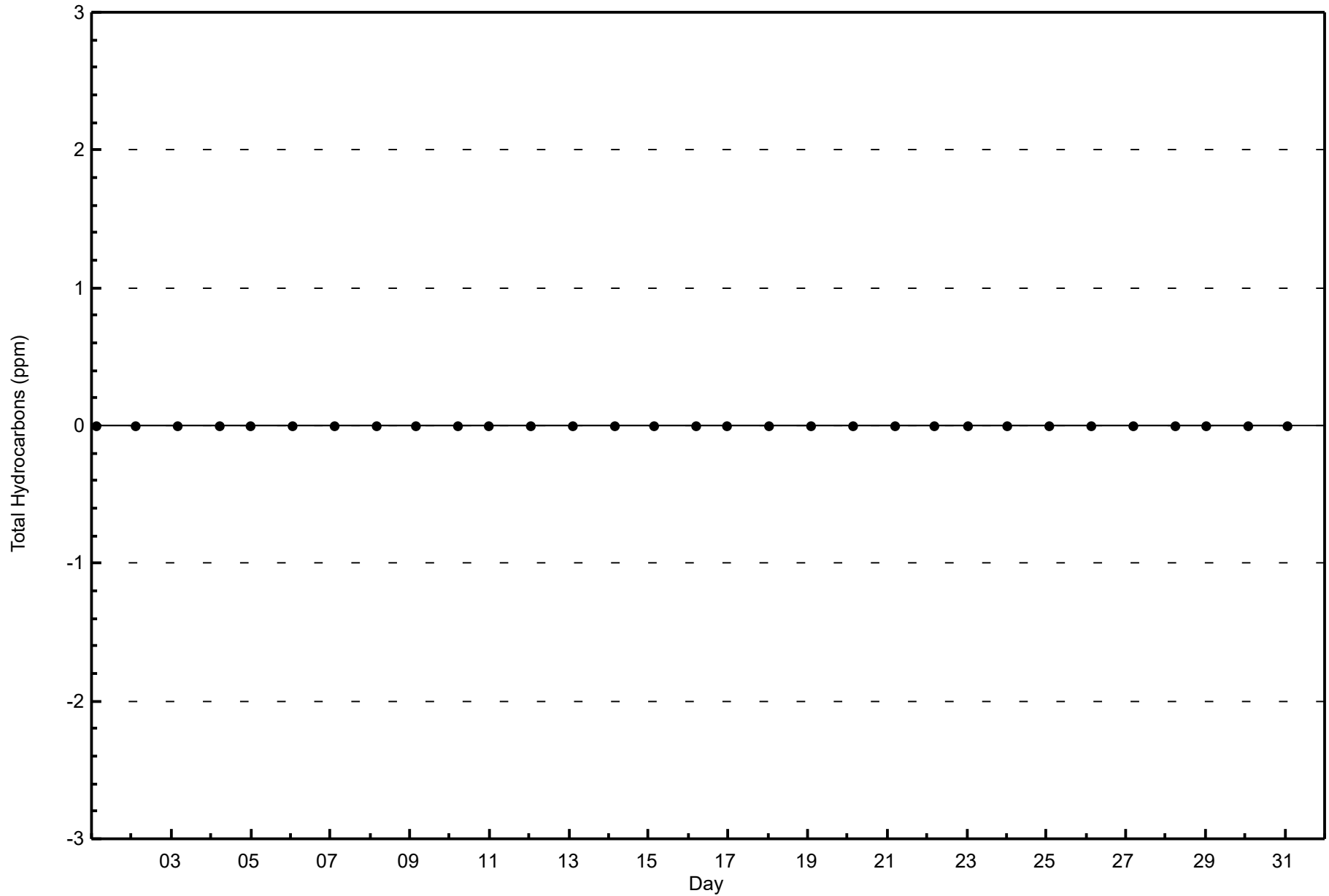
Total Number of Hours: 744

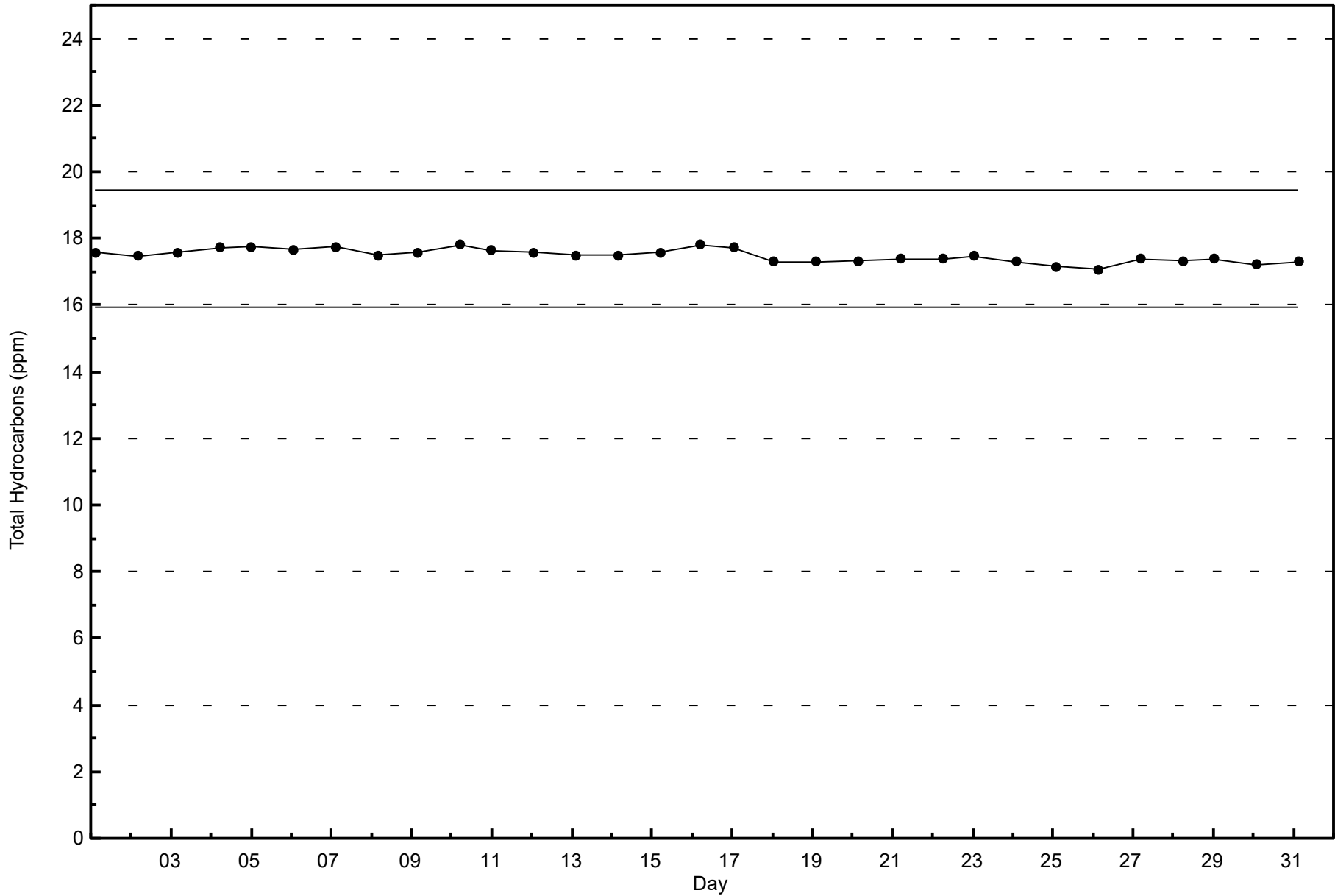


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Janvier







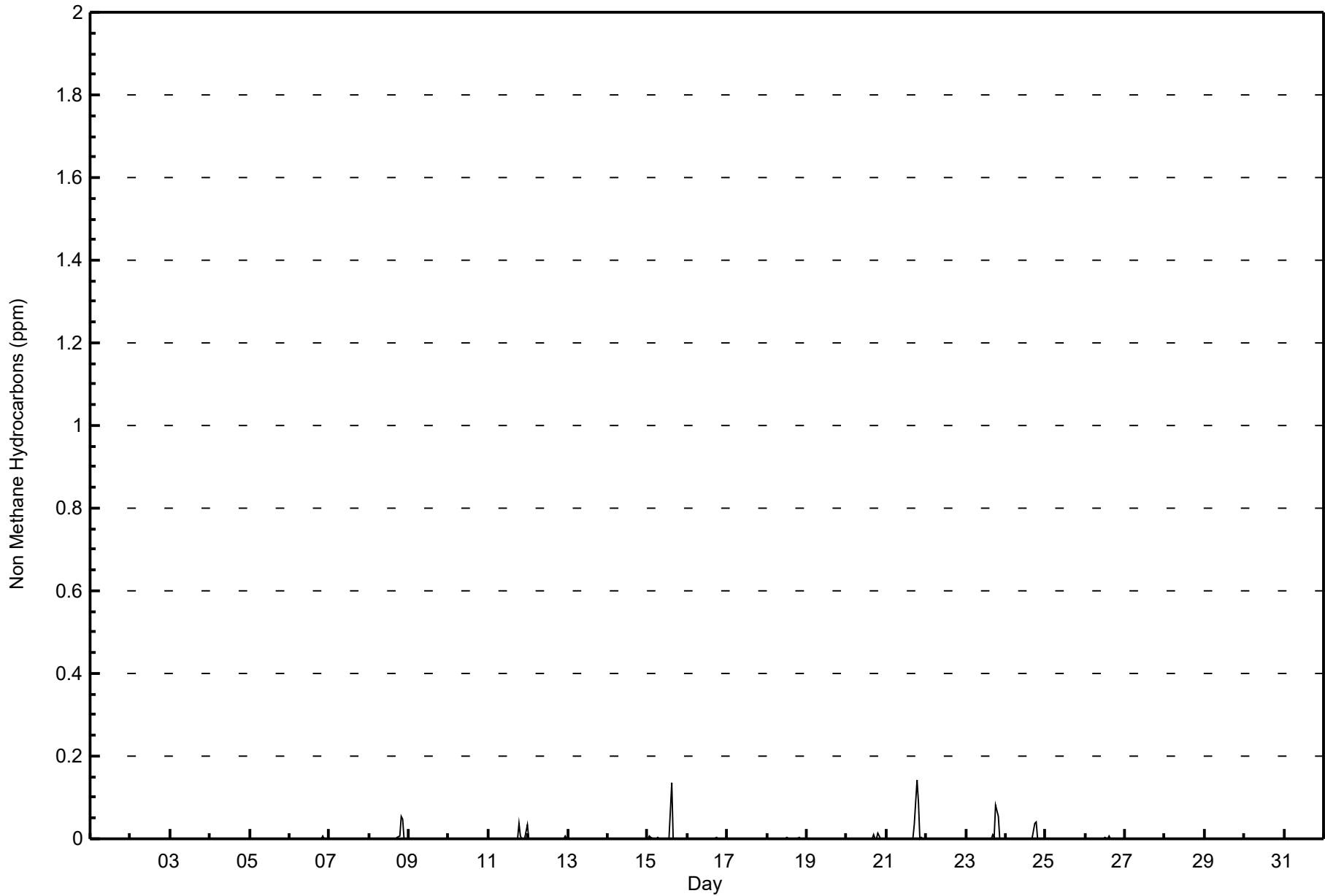


Maximum Value: 0.141 ppm on Jul 21 19:00	Maximum Daily Average: 0.012 ppm on Jul 21	Hours in Service: 744
Minimum Value: 0.000 ppm on Jul 1 01:00	Minimum Daily Average: 0.000 ppm on Jul 1	Hours of Data: 707
Maximum Diurnal Average: 0.010 ppm at hour 19	Minimum Diurnal Average: 0.000 ppm at hour 1	Hours of Missing Data: 37
Monthly Average: 0.001 ppm	Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.0	Hours of Calibration: 35
		Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Jul	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
2-Jul	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
3-Jul	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
4-Jul	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
5-Jul	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	0.000	0.000		
6-Jul	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	0.008	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000		
7-Jul	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	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
8-Jul	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	0.007	0.054	0.048	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-Jul	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
10-Jul	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
11-Jul	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	0.038	0.006	0.000	0.000	0.000	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
12-Jul	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	0.000	0.000	
13-Jul	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
14-Jul	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15-Jul	0.000	0.008	0.002	0.000	Z	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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-Jul	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	0.002	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	
17-Jul	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
19-Jul	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
20-Jul	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	0.009	0.000	0.000	0.014	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	
21-Jul	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	0.001	0.035	0.141	0.090	0.001	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
22-Jul	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
23-Jul	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	0.010	0.003	0.081	0.056	0.000	0.000	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-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.002	0.000	0.000	0.000	0.000	0.001	0.036	0.041	0.000	0.000	0.000	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-Jul	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26-Jul	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	M	M	0.000	0.002	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
27-Jul	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
28-Jul	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
29-Jul	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	0.000	0.000	0.000	0.000
30-Jul	0.000	Z	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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-Jul	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.001	0.003	0.010	0.007	0.002	0.000	0.000	0.001						Diurnal Average		
0.000	0.008	0.002	0.000	0.000	0.001	0.005	0.000	0.000	0.000	0.000	0.001	0.000	0.003	0.000	0.137	0.000	0.010	0.036	0.141	0.090	0.048	0.003	0.006	0.033						Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Janvier - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	686	97.03	97.03
0.006 - 0.05	16	2.26	99.29
0.06 - 0.1	5	0.71	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Janvier - July 2023

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	58	71	42	30	32	24	19	27	42	95	88	43	43	29	16	27	686
0.006 - 0.05	3	0	0	0	2	0	0	1	3	1	1	1	3	1	0	0	16
0.06 - 0.1	0	1	0	1	1	0	0	2	0	0	0	0	0	0	0	0	5
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	72	42	31	35	24	19	30	45	96	89	44	46	30	16	27	707

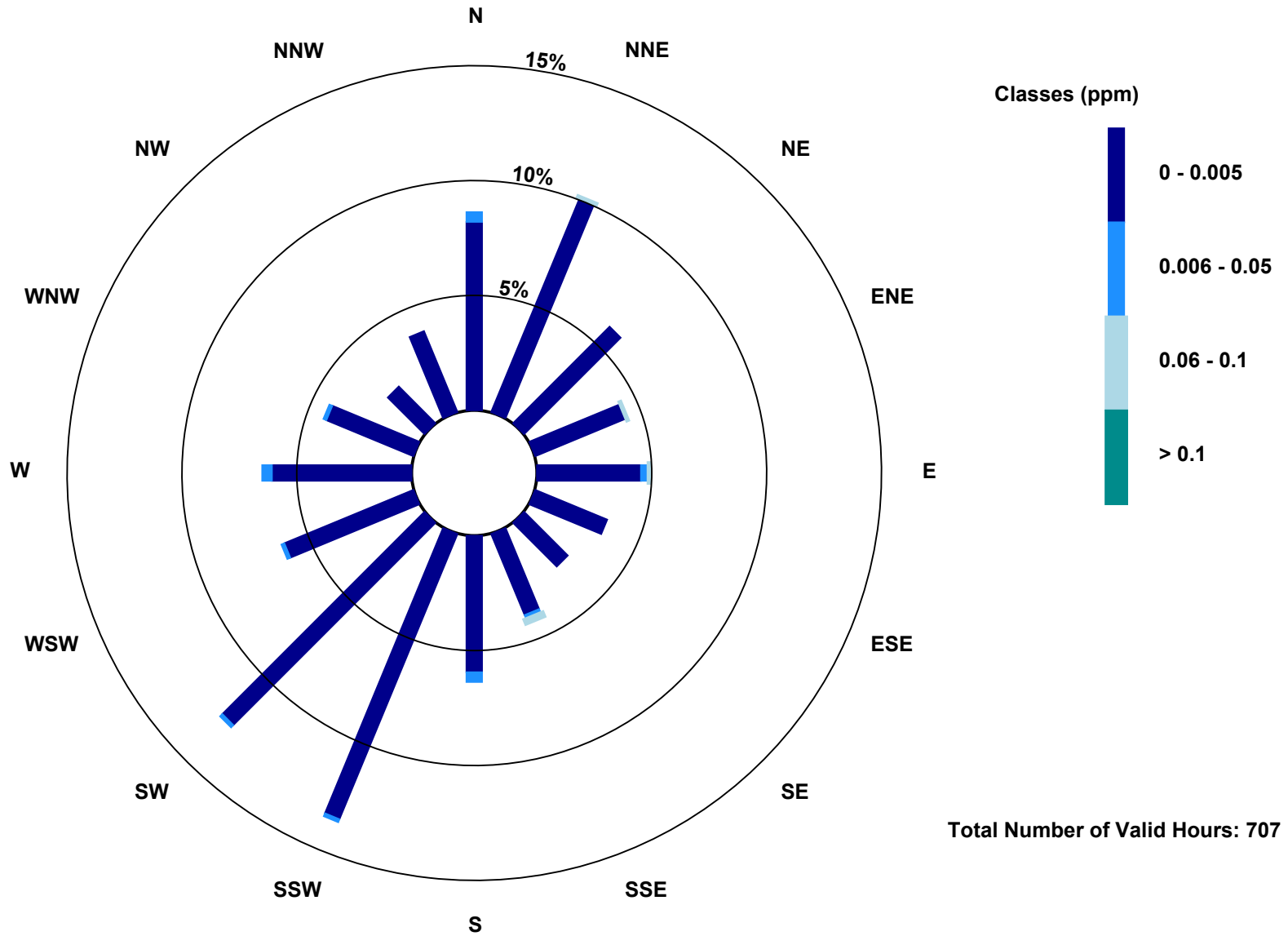
Total Number of Valid Hours: 707

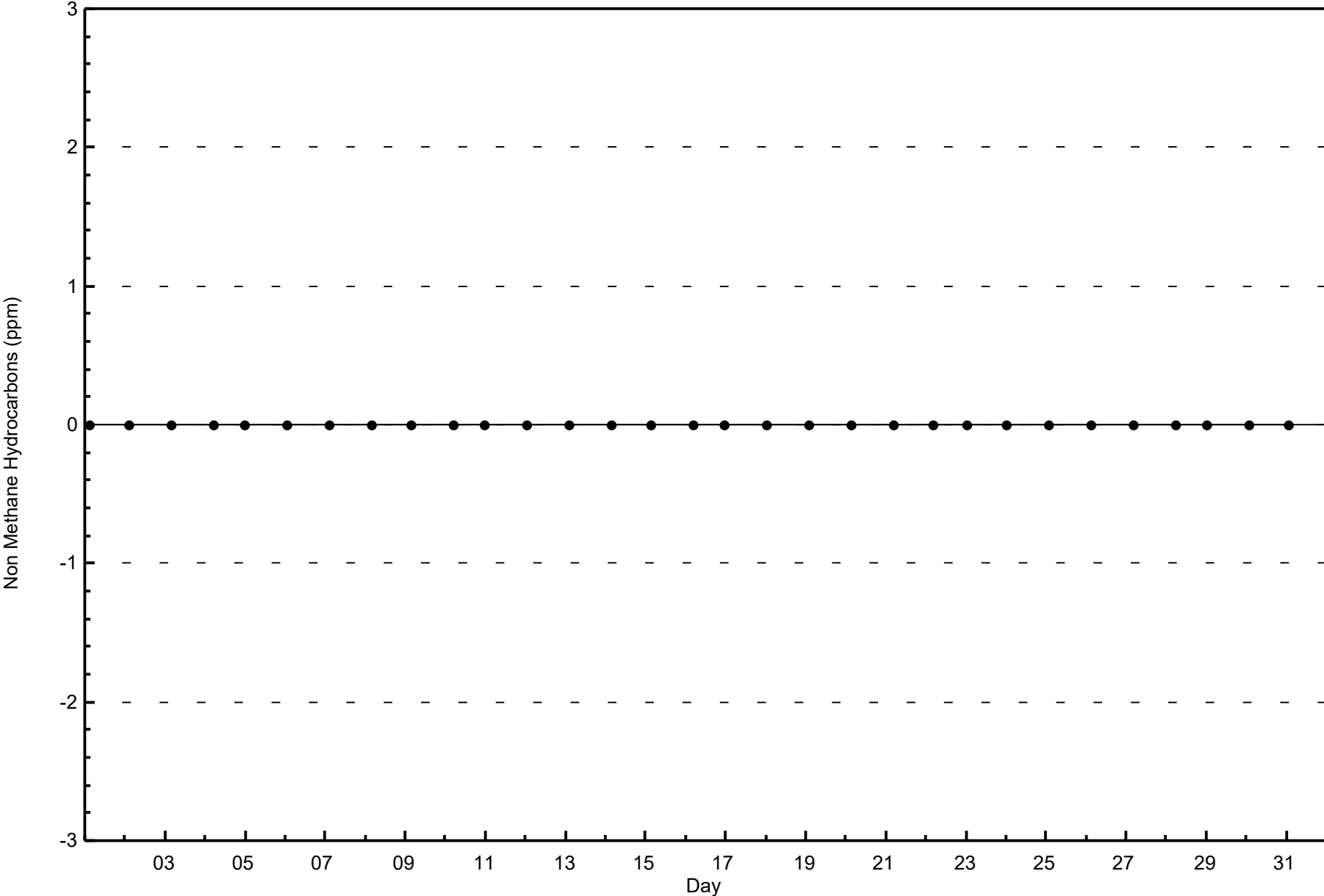
Total Number of Hours: 744

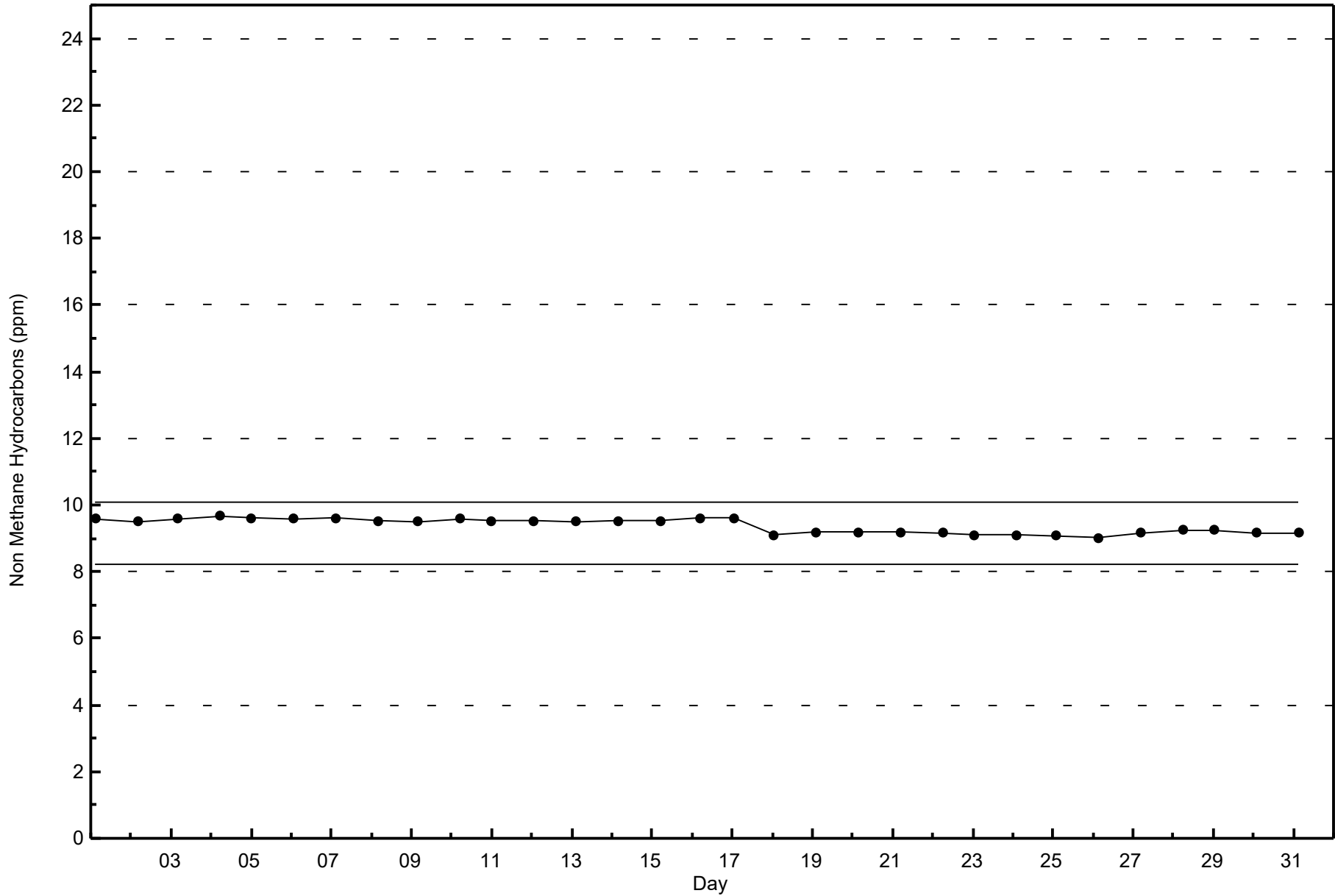


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Non Methane Hydrocarbons (NMHC) - ppm
Janvier



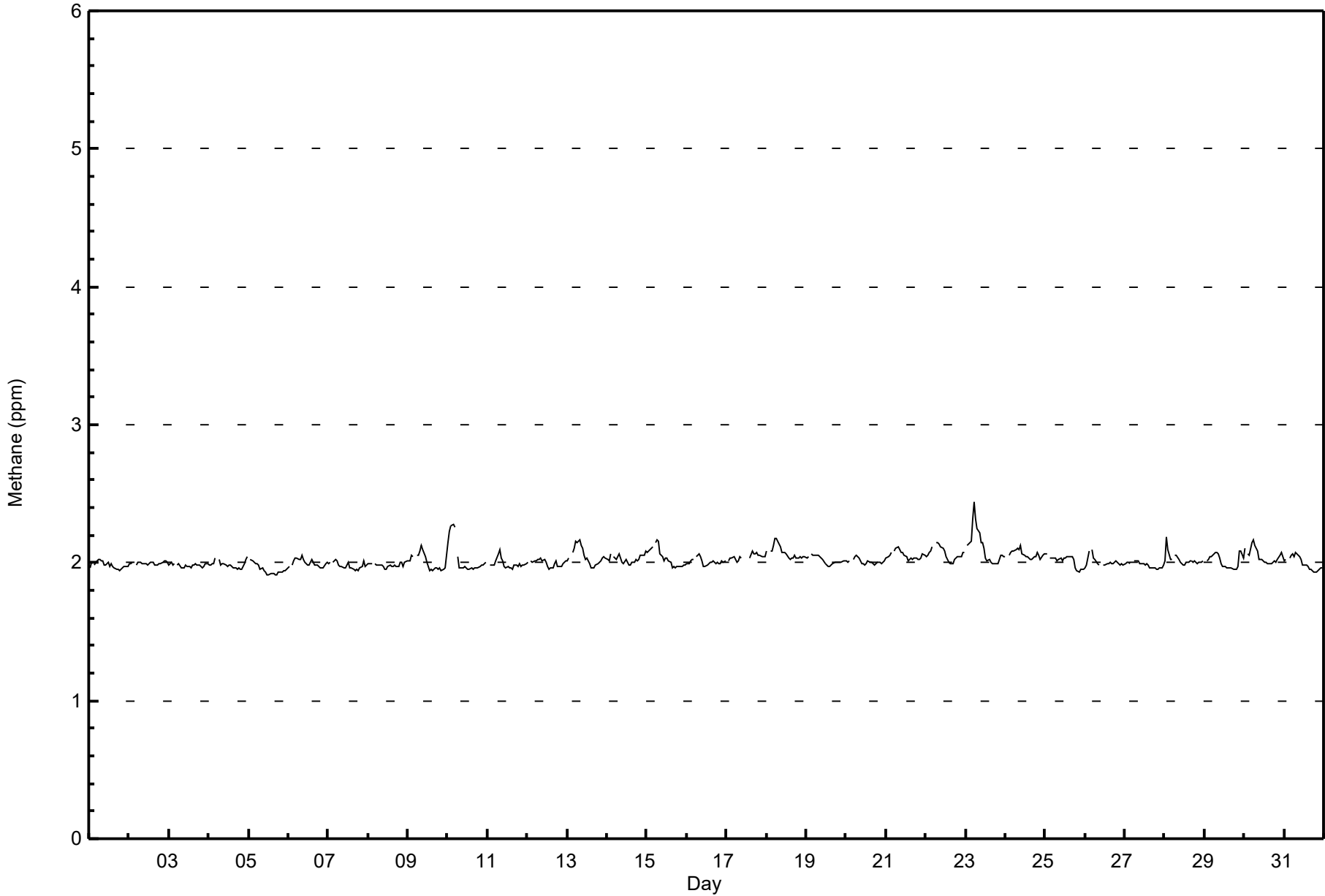






Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Janvier - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Janvier - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	569	80.48	80.48
2.1 - 3.0	138	19.52	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Janvier - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	51	55	35	26	26	22	17	24	37	69	71	39	37	26	14	20	569
2.1 - 3.0	10	17	7	5	9	2	2	6	8	27	18	5	9	4	2	7	138
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	61	72	42	31	35	24	19	30	45	96	89	44	46	30	16	27	707

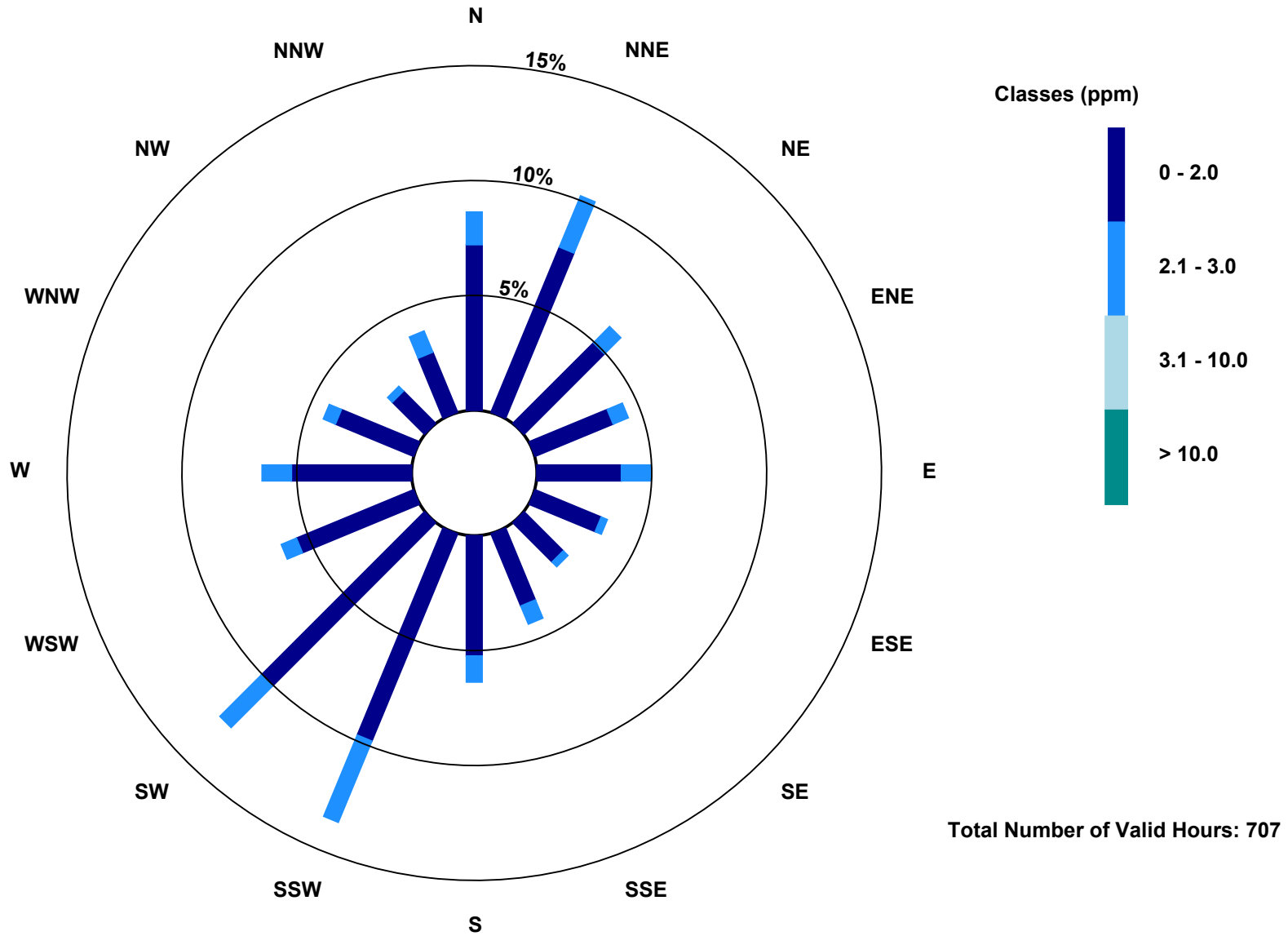
Total Number of Valid Hours: 707

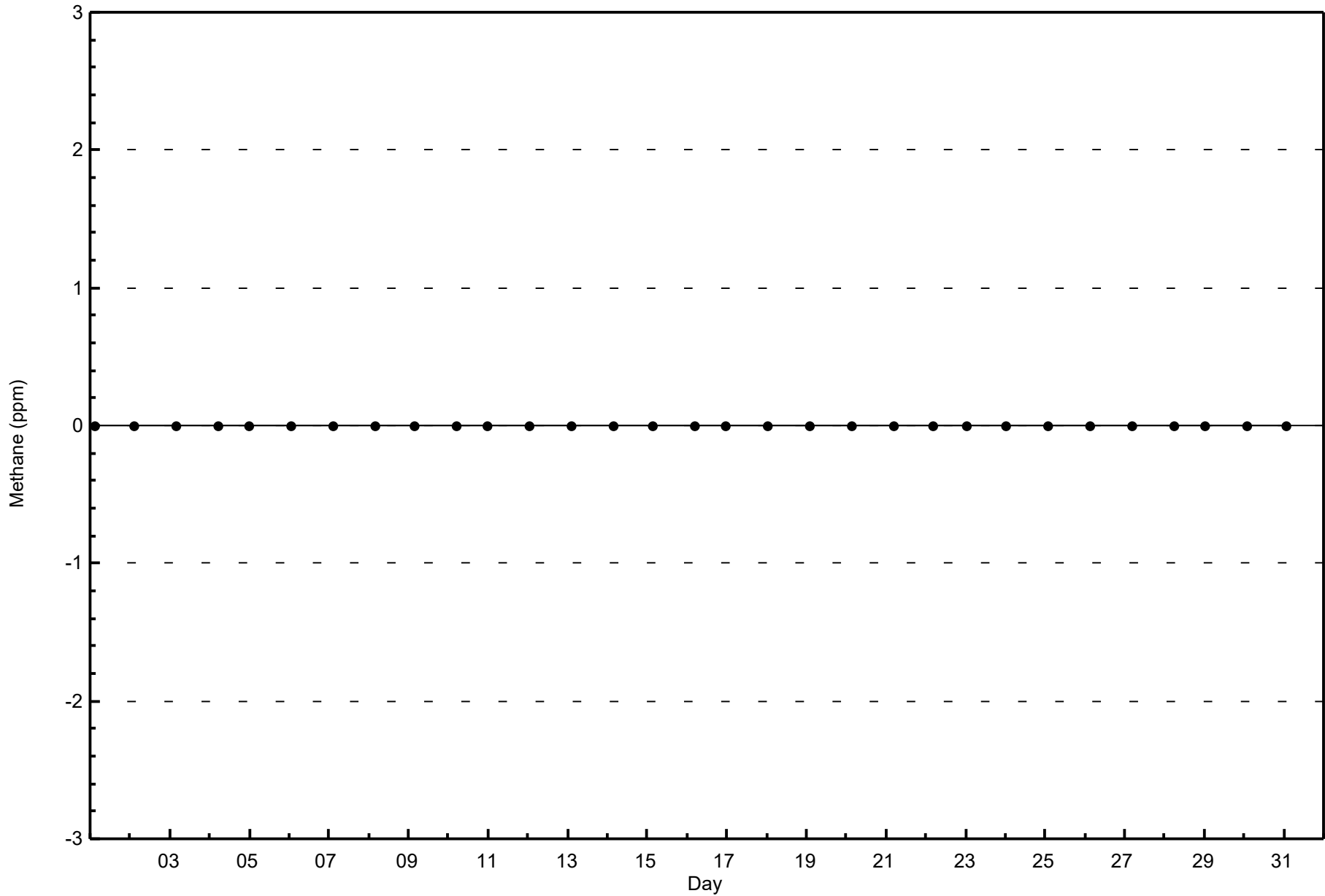
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Methane (CH₄) - ppm
Janvier

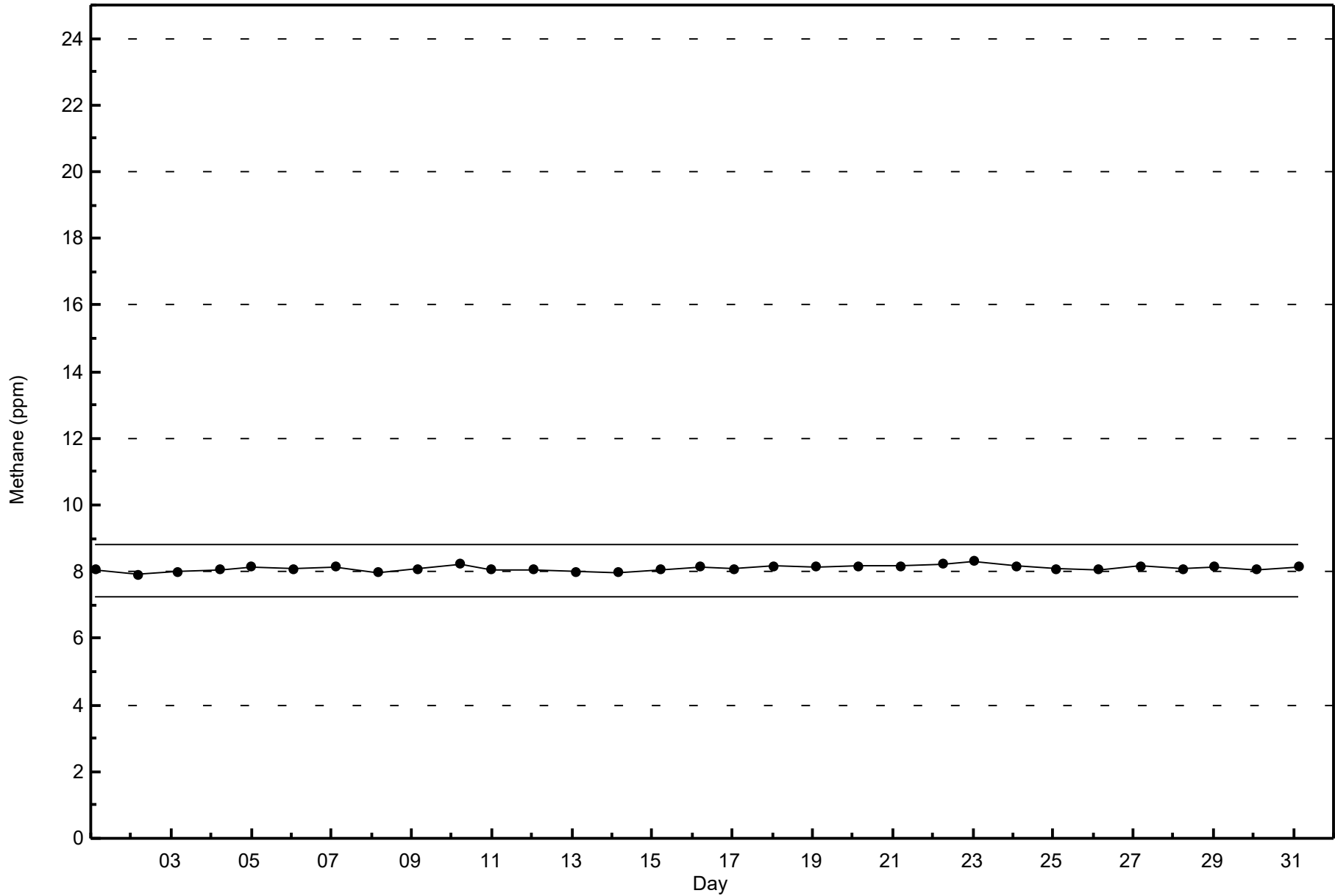






Wood Buffalo Environmental Association
Span Responses

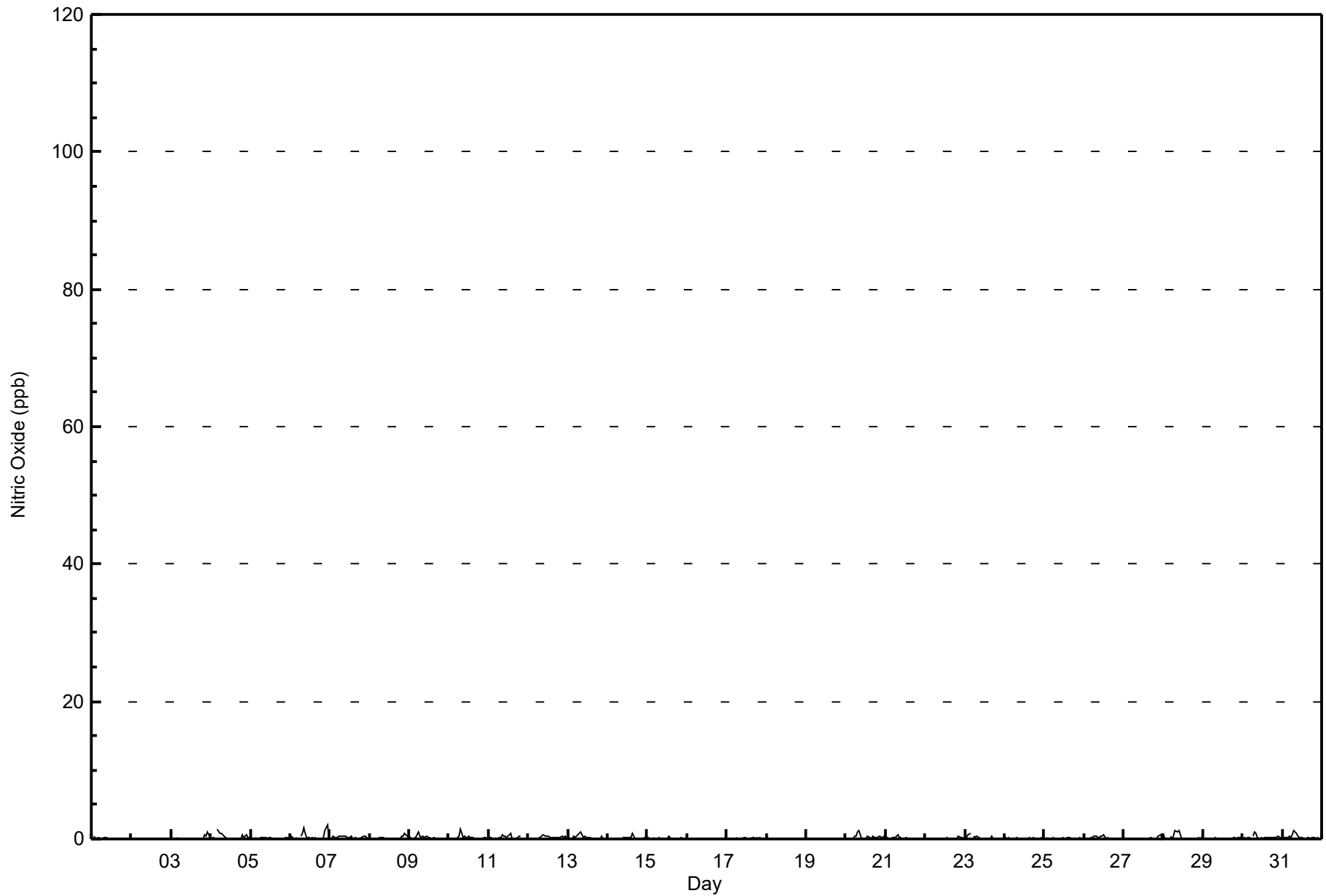
Methane (CH₄) - ppm
Janvier - July 2023





Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Janvier - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Janvier - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	638	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Janvier - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	55	69	41	28	30	15	11	29	49	80	76	40	44	28	15	27	637
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	55	69	41	28	30	15	11	29	49	80	76	40	44	28	15	27	637

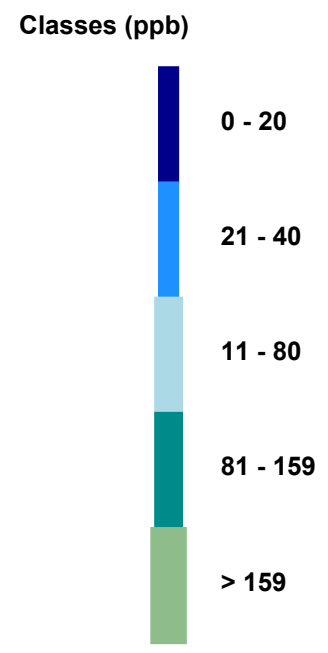
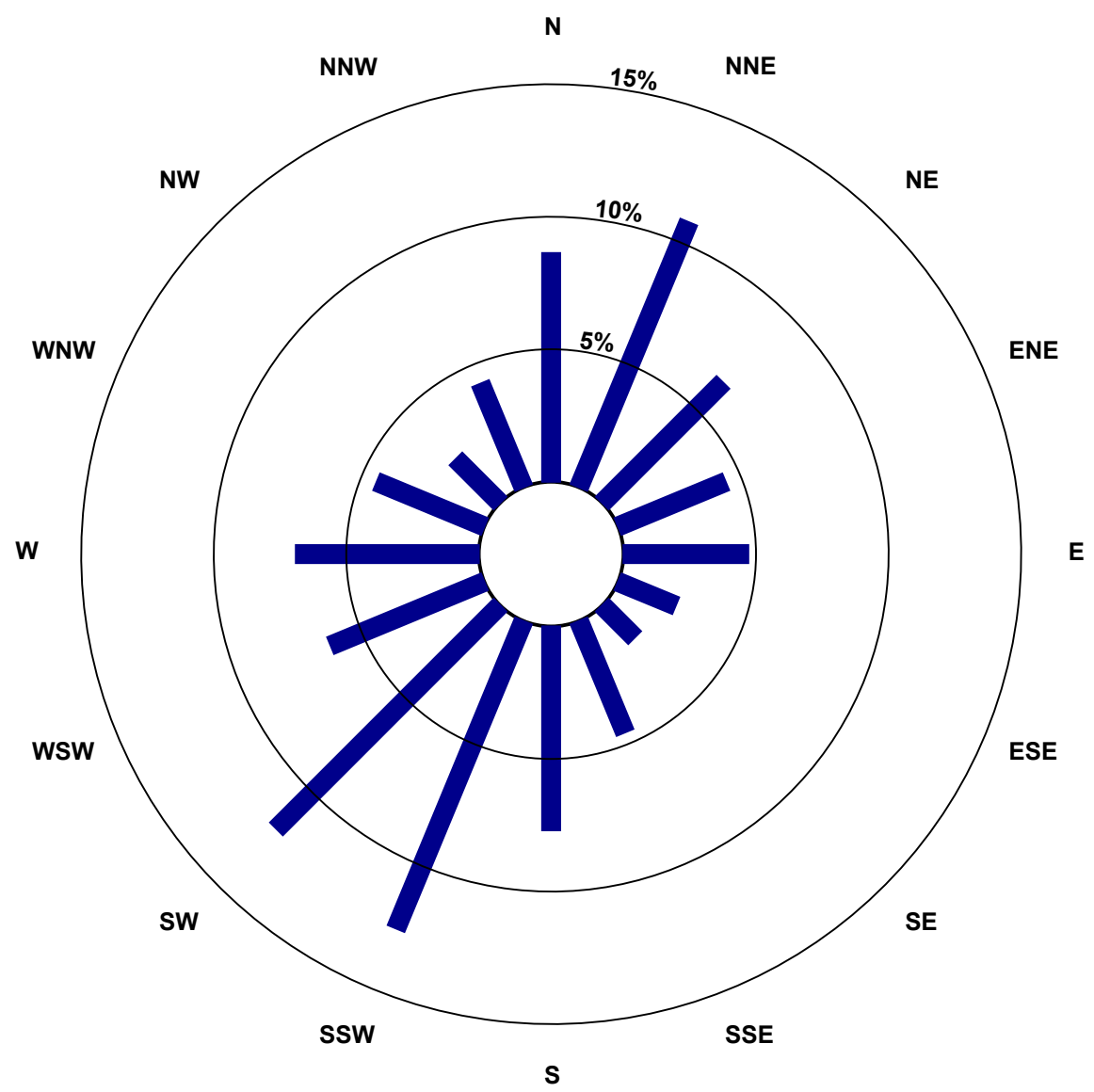
Total Number of Valid Hours: 637

Total Number of Hours: 744

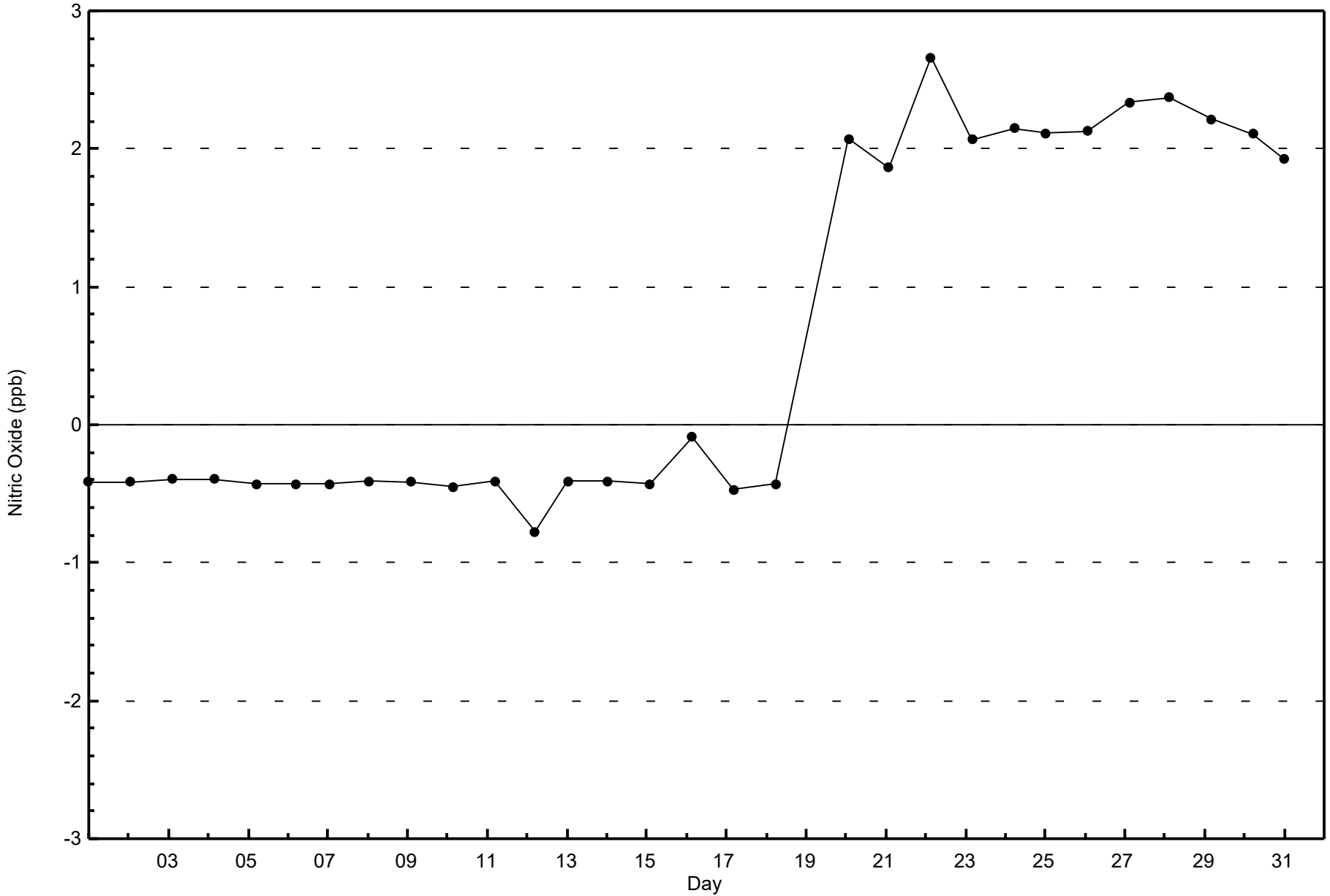


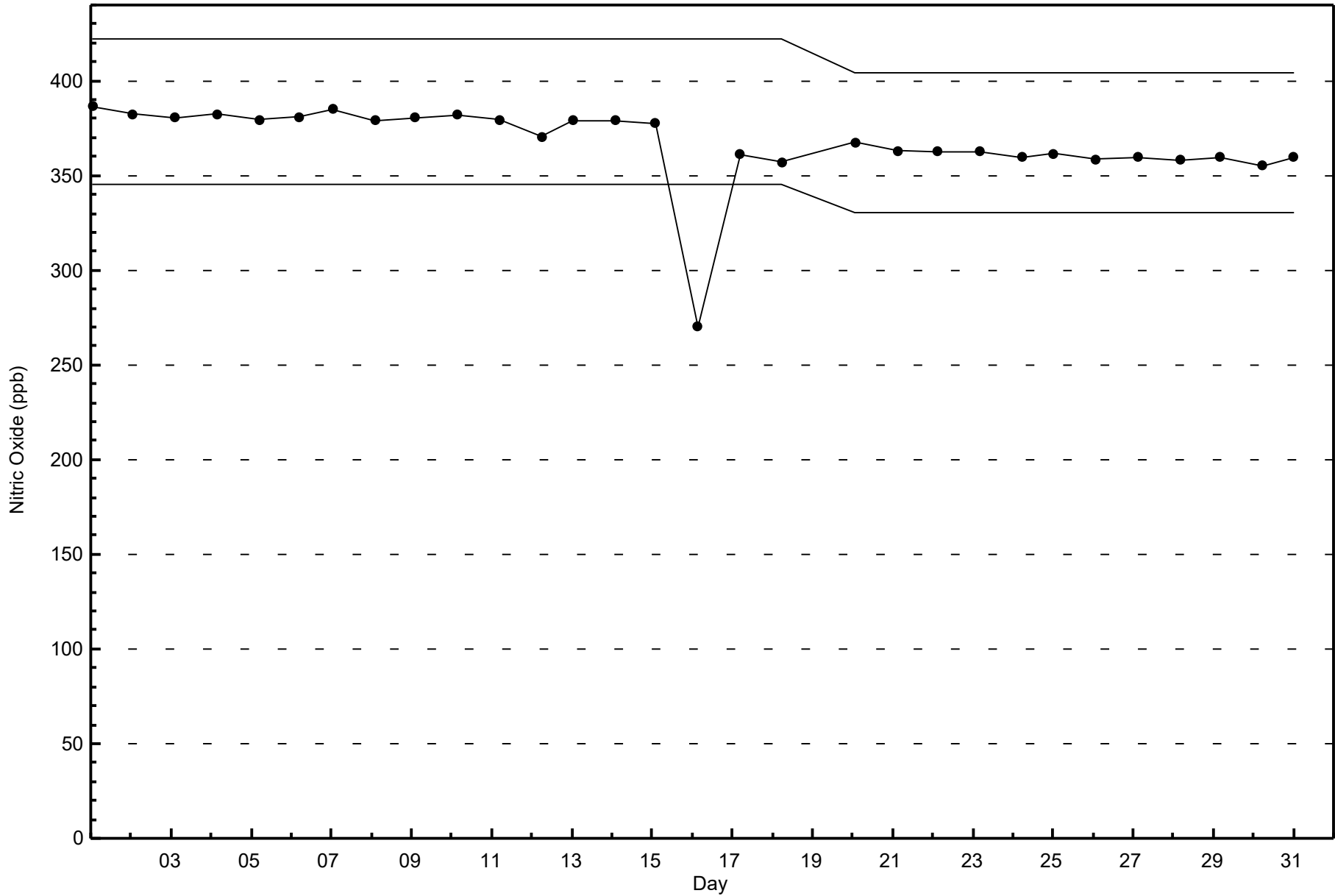
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Janvier



Total Number of Valid Hours: 637

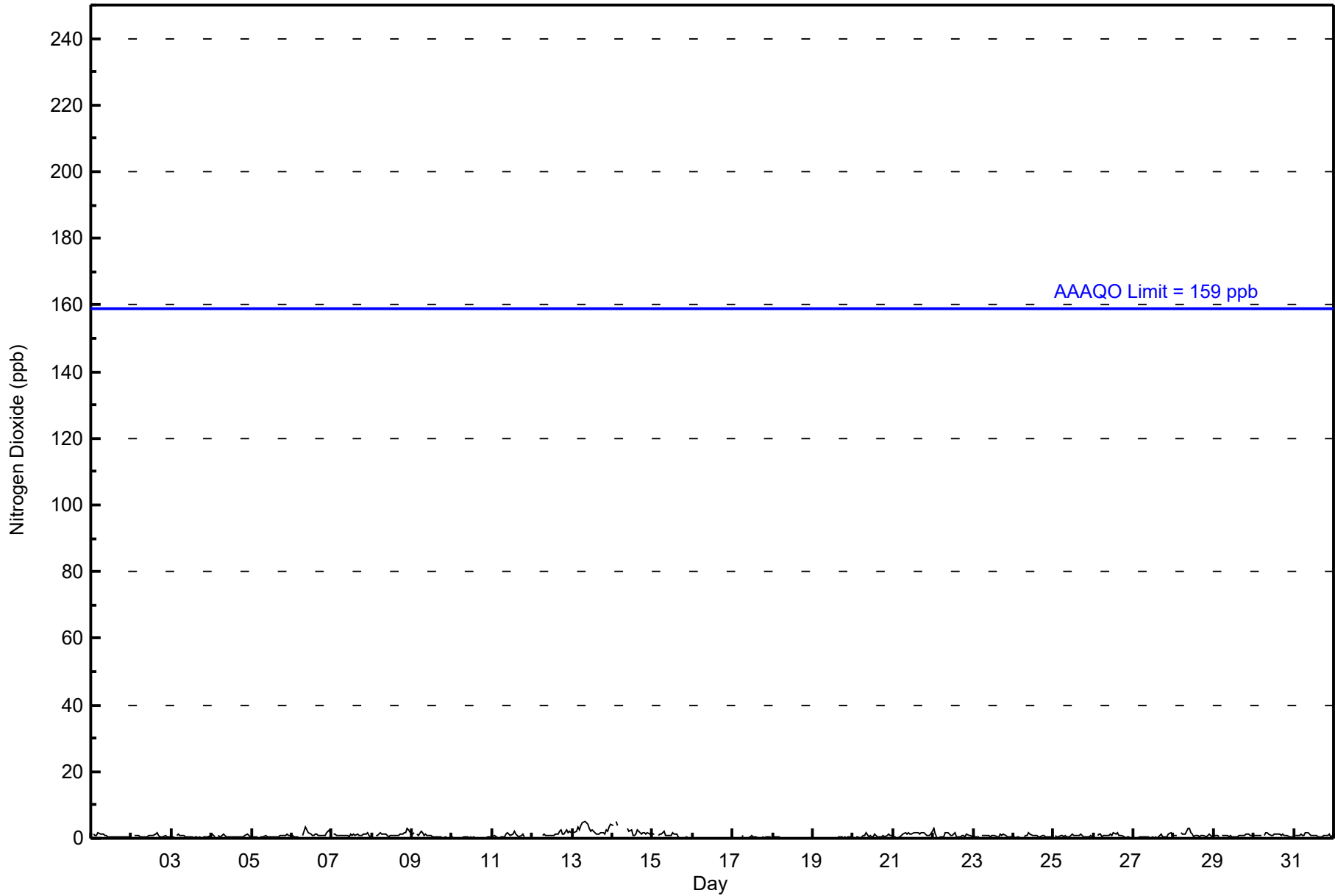






Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Janvier - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Janvier - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	638	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Janvier - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	55	69	41	28	30	15	11	29	49	80	76	40	44	28	15	27	637
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	55	69	41	28	30	15	11	29	49	80	76	40	44	28	15	27	637

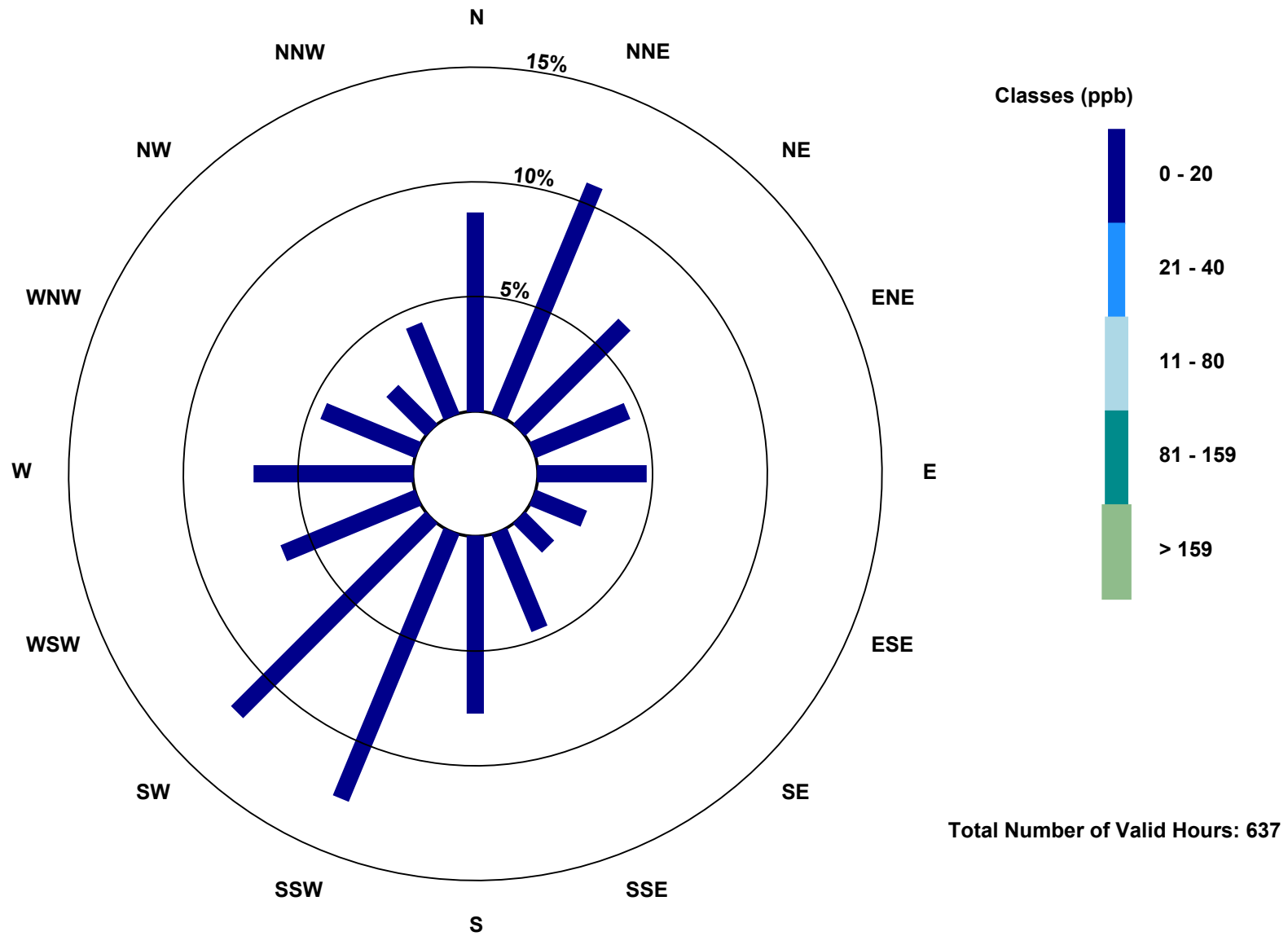
Total Number of Valid Hours: 637

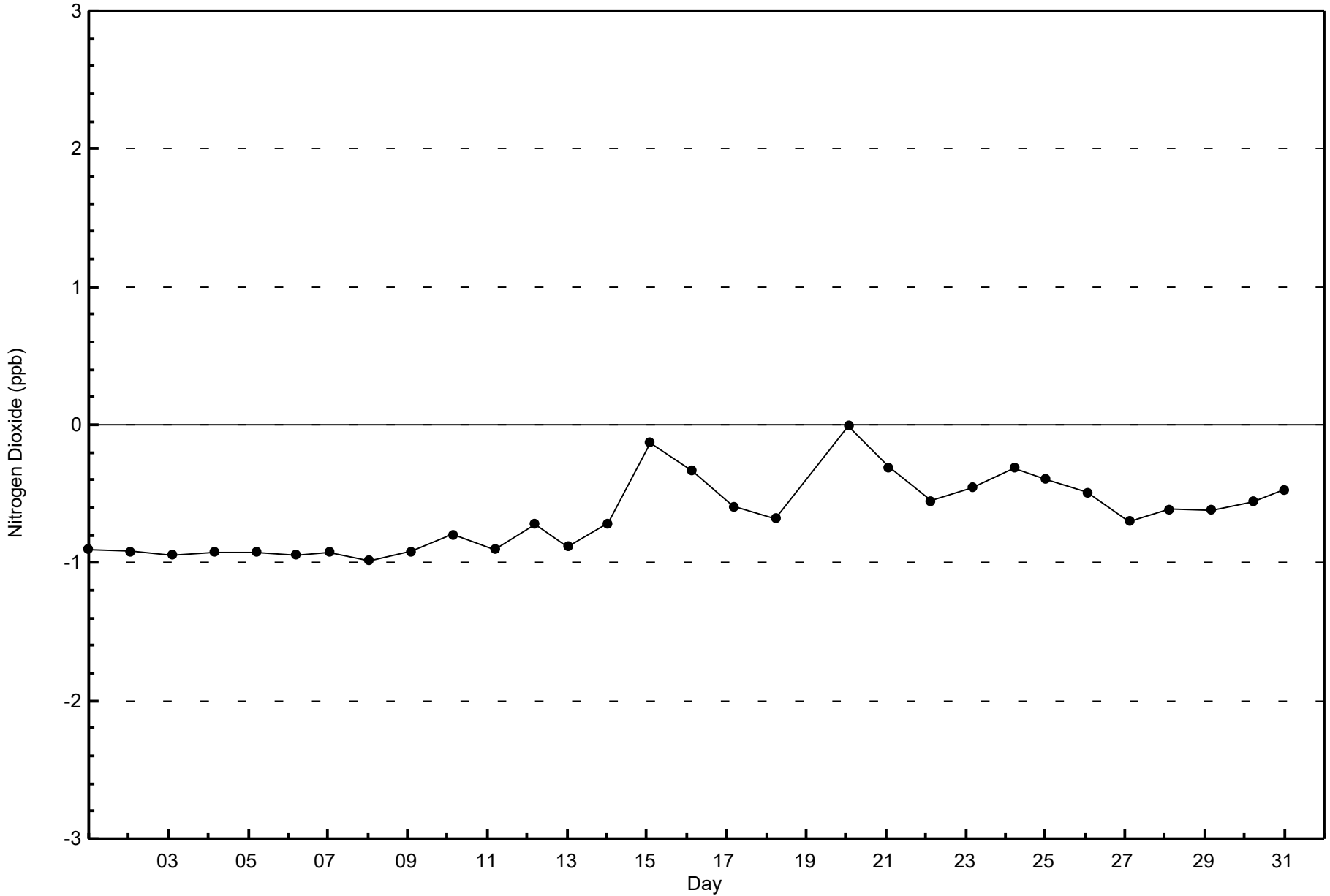
Total Number of Hours: 744

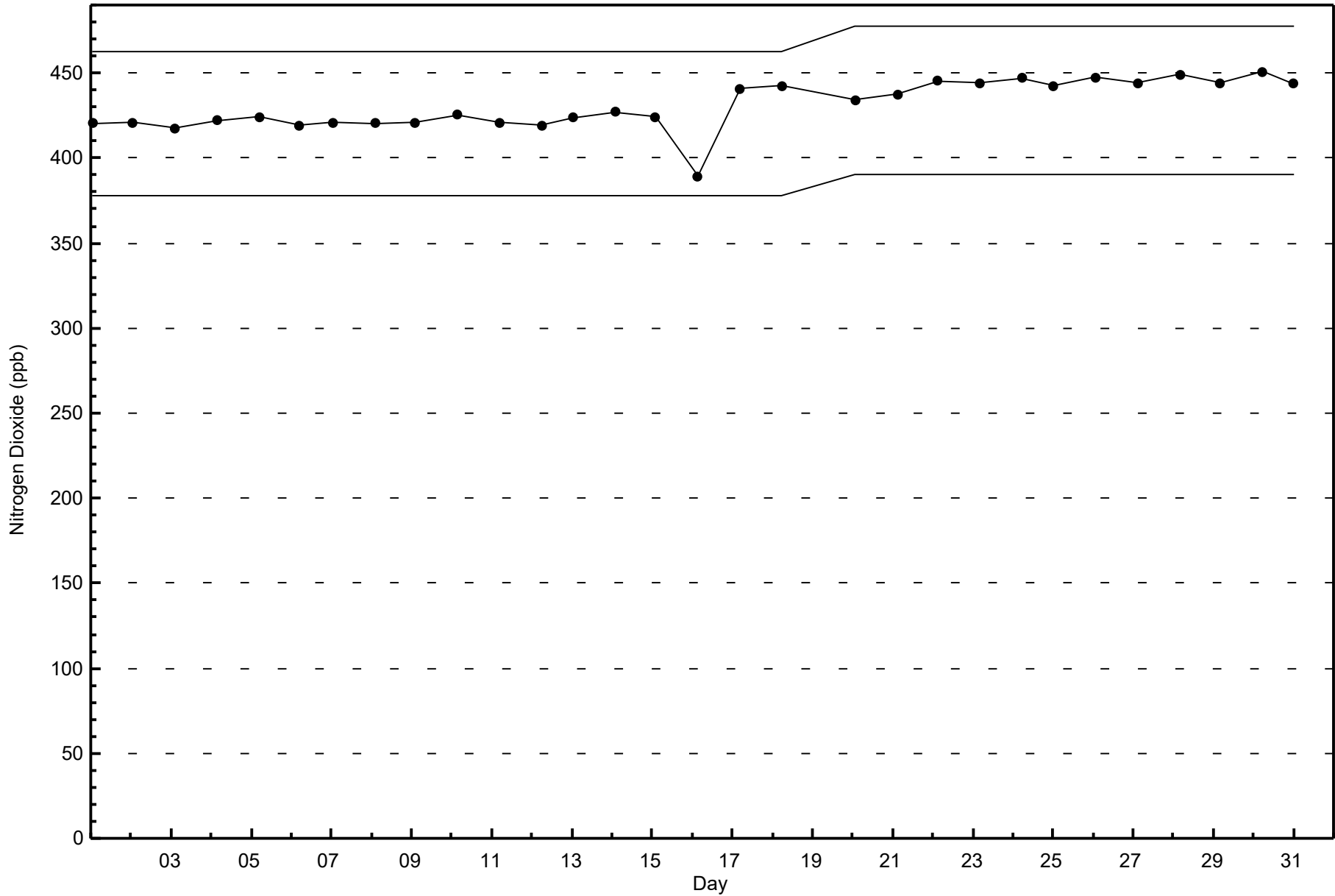


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Janvier









Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
Janvier - July 2023

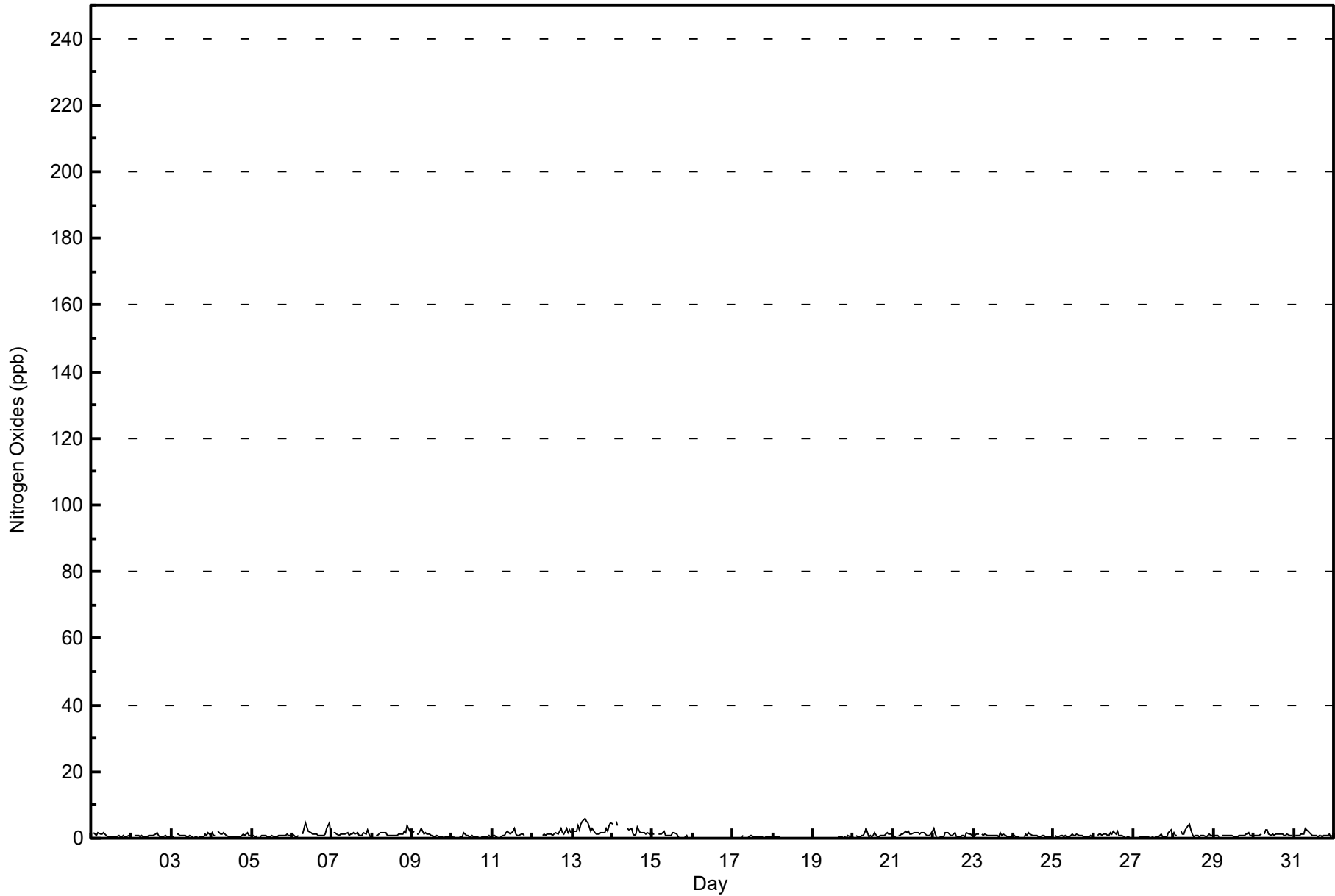
Maximum Value: 6.1 ppb on Jul 13 08:00		Maximum Daily Average: 3.0 ppb on Jul 13		Hours in Service: 744																							
Minimum Value: 0.0 ppb on Jul 15 19:00		Minimum Daily Average: 0.5 ppb on Jul 10		Hours of Data: 638																							
Maximum Diurnal Average: 1.7 ppb at hour 8		Minimum Diurnal Average: 0.8 ppb at hour 19		Hours of Missing Data: 106																							
Monthly Average: 1.07 ppb		Percentiles: P ₁ = 0.1 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 0.8 Q ₃ = 1.3 P ₉₀ = 1.9 P ₉₉ = 4.5		Hours of Calibration: 35																							
				Percent Operational Time: 90.5																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	1.6	1.1	1.0	1.6	1.3	1.2	1.5	1.1	0.9	0.6	0.6	0.5	0.5	0.6	0.7	0.6	0.6	0.7	0.5	0.5	0.6	0.6	0.9	1.6		
2-Jul	0.7	Z	0.8	0.9	0.8	0.6	0.7	0.6	0.6	0.6	0.8	0.8	0.9	0.8	1.4	1.6	0.9	0.6	0.6	0.6	0.7	0.6	0.6	0.5	0.8	1.6	
3-Jul	0.5	0.5	Z	1.1	1.4	1.0	0.9	0.7	0.6	0.5	0.6	0.7	0.4	0.2	0.3	0.4	0.2	0.3	0.2	0.3	1.3	0.8	1.5	0.9	0.7	1.5	
4-Jul	1.5	0.9	0.6	Z	2.2	1.4	1.4	1.7	1.1	0.7	0.3	0.4	0.6	0.5	0.5	0.5	0.5	0.5	0.7	1.2	1.0	1.9	0.9	0.9	1.0	2.2	
5-Jul	0.7	0.7	0.5	0.8	Z	0.6	0.6	0.8	1.0	0.6	0.5	0.6	0.7	0.6	0.5	0.5	0.7	0.7	0.8	0.7	0.7	1.5	0.9	0.7	0.7	1.5	
6-Jul	1.3	0.6	0.5	0.5	0.8	Z	1.2	2.9	4.8	3.3	2.0	1.6	1.1	1.1	1.4	1.3	0.8	0.8	0.7	0.7	1.2	2.9	4.5	0.9	1.6	4.8	
7-Jul	Z	1.5	1.5	1.3	0.8	1.1	1.2	1.2	1.2	1.5	0.8	1.3	1.2	1.6	1.1	1.5	0.9	0.8	0.8	1.5	1.5	2.4	1.1	0.6	1.2	2.4	
8-Jul	0.7	Z	0.8	0.9	1.1	1.6	1.7	1.7	1.6	0.9	0.7	0.7	0.7	0.8	0.9	1.1	1.2	1.3	2.1	1.8	3.7	3.1	1.4	1.4	3.7		
9-Jul	1.5	2.0	Z	1.3	1.2	3.0	2.0	1.2	1.6	1.2	1.2	0.9	0.8	0.5	0.5	0.7	0.4	0.4	0.2	0.2	0.5	0.2	0.2	0.9	1.0	3.0	
10-Jul	0.4	0.3	0.2	Z	0.3	0.3	0.6	1.8	0.7	0.8	0.3	0.6	0.7	0.5	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.6	0.8	0.4	0.5	1.8	
11-Jul	0.7	0.9	0.5	0.3	Z	0.6	0.7	0.8	1.9	2.0	1.6	1.2	2.0	2.8	1.3	0.7	0.7	1.1	1.4	0.9	UO	UO	UO	UO	1.2	2.8	
12-Jul	UO	UO	UO	UO	UO	Z	0.8	1.4	1.0	1.4	1.1	1.1	1.0	1.2	1.6	1.5	2.2	2.9	1.5	1.3	3.0	1.8	2.5	1.6	1.6	3.0	
13-Jul	Z	2.0	2.2	3.6	2.7	4.1	5.2	6.1	5.2	4.5	3.3	2.2	2.8	1.9	1.4	1.2	1.3	1.6	1.6	1.5	2.9	2.2	3.7	4.5	3.0	6.1	
14-Jul	4.1	Z	5.1	3.8	UO	UO	UO	UO	UO	3.1	2.5	2.9	1.2	0.8	1.2	3.2	1.8	1.5	1.6	1.8	1.3	1.6	1.5	2.0	2.3	5.1	
15-Jul	1.3	1.2	Z	1.3	1.3	1.3	1.5	2.2	0.8	0.7	0.9	0.7	1.6	1.6	1.2	0.5	0.1	0.1	0.0	0.0	0.7	0.1	0.0	0.2	0.8	2.2	
16-Jul	UO	UO	UO	Z	UO	UO	UO	UO	UO	M	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--
17-Jul	UO	UO	UO	UO	Z	0.6	0.9	UO	UO	UO	0.2	0.9	0.9	0.3	0.4	0.4	0.3	0.3	0.4	0.2	0.4	0.3	0.4	0.3	--	0.9	
18-Jul	0.5	0.3	0.3	0.4	0.4	Z	UO	UO	UO	UO	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--	0.5	
19-Jul	M	M	M	M	M	M	M	M	M	M	C	C	C	C	C	C	0.4	0.4	0.3	0.2	0.4	0.2	0.6	0.3	0.7	--	0.7
20-Jul	0.5	Z	0.7	0.5	0.2	0.9	1.0	1.9	2.8	0.5	0.7	0.6	0.7	1.7	0.6	0.6	0.9	0.7	0.9	0.7	1.5	1.3	1.1	1.3	1.0	2.8	
21-Jul	0.8	0.5	Z	0.7	0.7	1.3	1.3	2.2	1.6	2.0	1.4	1.1	1.7	1.7	1.5	1.5	1.1	1.6	1.7	1.1	1.0	0.8	0.9	2.0	1.3	2.2	
22-Jul	2.9	1.2	0.5	Z	0.5	0.6	0.3	1.7	1.7	1.8	0.7	0.8	1.2	1.9	0.6	0.5	0.5	0.8	0.7	0.6	1.8	1.1	1.1	0.7	1.0	2.9	
23-Jul	1.1	0.7	1.2	1.2	Z	1.3	1.0	1.3	1.0	0.9	0.6	0.7	0.8	0.7	0.7	0.6	1.6	0.7	1.1	1.0	0.5	0.5	0.6	0.6	0.9	1.6	
24-Jul	1.1	0.2	0.6	0.4	0.1	Z	0.6	1.2	1.0	1.9	1.3	0.7	0.8	0.9	0.7	0.6	0.6	0.9	0.7	0.6	0.3	0.4	0.6	0.4	0.7	1.9	
25-Jul	Z	0.9	0.5	0.5	0.7	0.8	0.6	0.7	0.4	0.6	1.0	1.3	0.9	0.9	1.2	1.0	1.1	0.8	0.4	0.4	0.4	0.6	0.8	0.3	0.7	1.3	
26-Jul	0.3	Z	0.8	1.2	1.4	0.7	1.2	1.2	1.0	0.9	1.5	1.3	2.2	1.2	1.9	0.8	0.8	0.9	0.4	0.2	0.5	0.4	0.2	0.2	0.9	2.2	
27-Jul	0.1	0.2	Z	0.5	0.4	0.4	0.4	0.5	0.3	0.3	0.2	0.4	0.1	0.3	0.2	0.4	1.4	0.5	0.6	0.5	0.6	1.7	2.5	0.9	0.6	2.5	
28-Jul	1.5	1.0	0.8	Z	2.1	1.1	1.4	2.5	3.8	4.3	2.6	1.1	0.3	0.7	0.8	0.6	0.7	0.8	0.8	0.6	1.0	1.3	0.8	0.8	1.4	4.3	
29-Jul	0.8	0.7	0.8	0.5	Z	0.7	0.8	0.9	0.8	0.6	0.9	0.7	0.5	0.5	0.6	0.7	0.7	0.8	1.0	1.3	1.4	1.6	0.8	0.8	0.8	1.6	
30-Jul	0.7	0.8	0.8	0.9	1.2	Z	1.4	2.6	2.5	1.3	1.0	1.3	1.1	1.2	1.4	1.4	1.2	1.3	1.0	1.0	1.1	0.8	0.7	0.8	1.2	2.6	
31-Jul	Z	1.1	1.0	0.9	1.5	1.2	1.5	2.9	2.3	1.5	1.1	1.0	1.0	0.9	0.6	0.7	0.8	0.5	1.0	1.0	0.8	1.4	0.6	0.8	1.1	2.9	
																								Diurnal Average			
																								Diurnal Maximum			
																								1.1 4.1			
																								0.9 2.0			
																								1.0 5.1			
																								1.1 3.8			
																								1.1 2.7			
																								1.2 4.1			
																								1.2 5.2			
																								1.7 6.1			
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																								0.8 4.5			
																								1.0 4.5			

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Janvier - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Janvier - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	638	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Janvier - July 2023**

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Totals
0 - 20	55	69	41	28	30	15	11	29	49	80	76	40	44	28	15	27	637
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	55	69	41	28	30	15	11	29	49	80	76	40	44	28	15	27	637

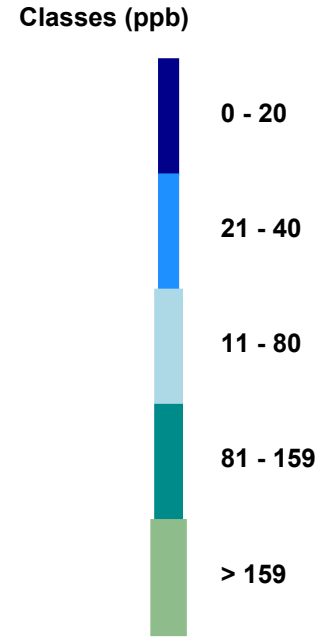
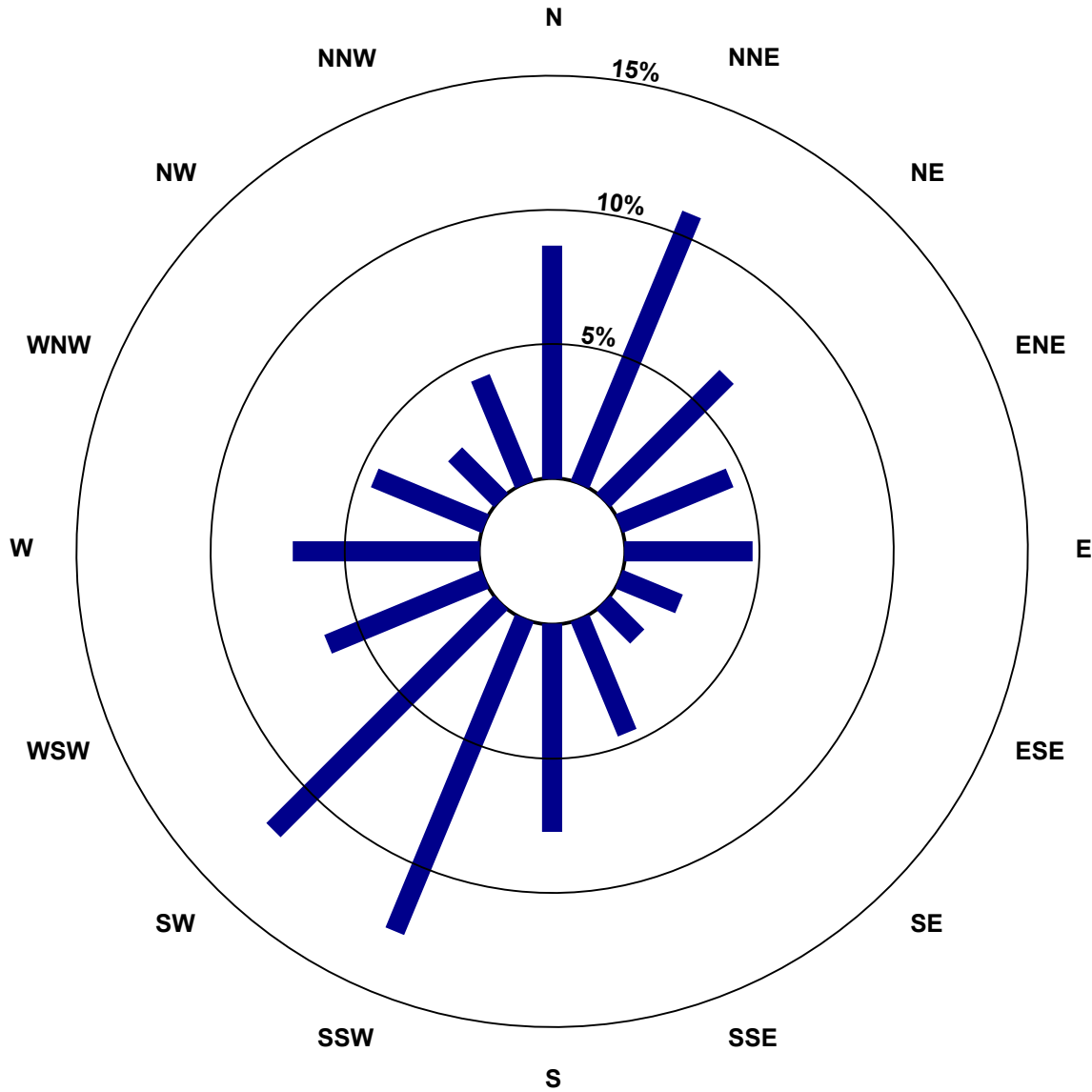
Total Number of Valid Hours: 637

Total Number of Hours: 744

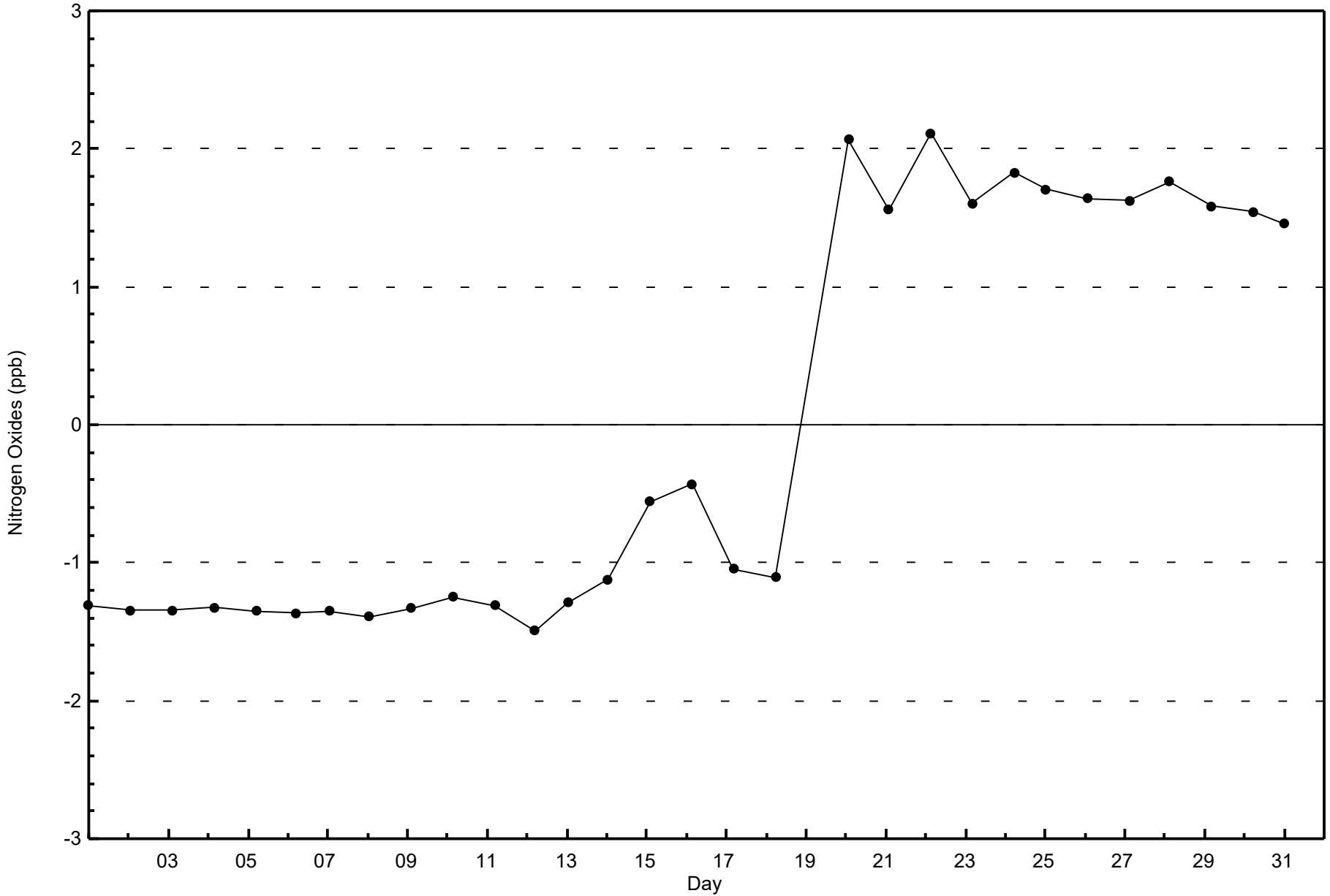


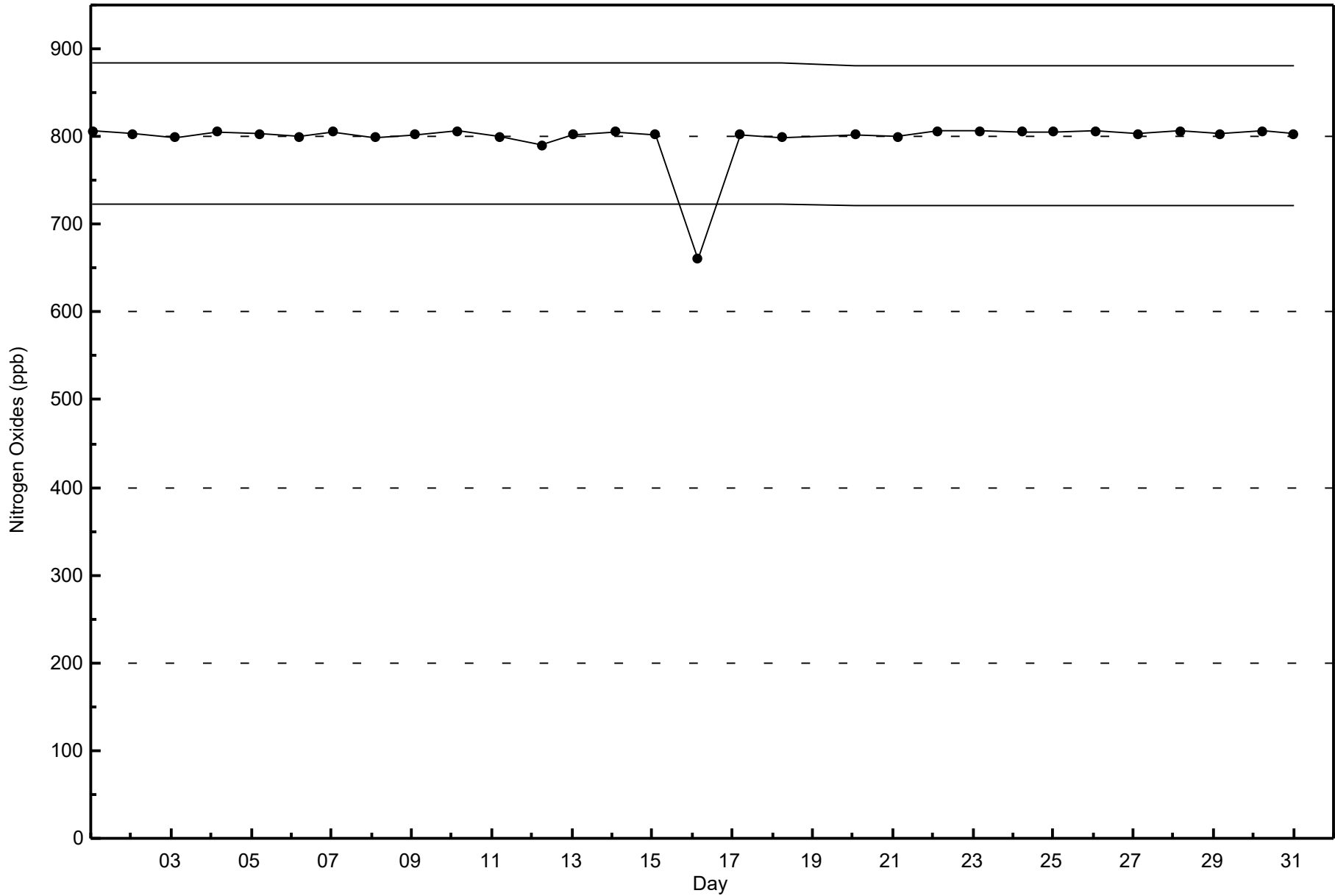
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Janvier



Total Number of Valid Hours: 637







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

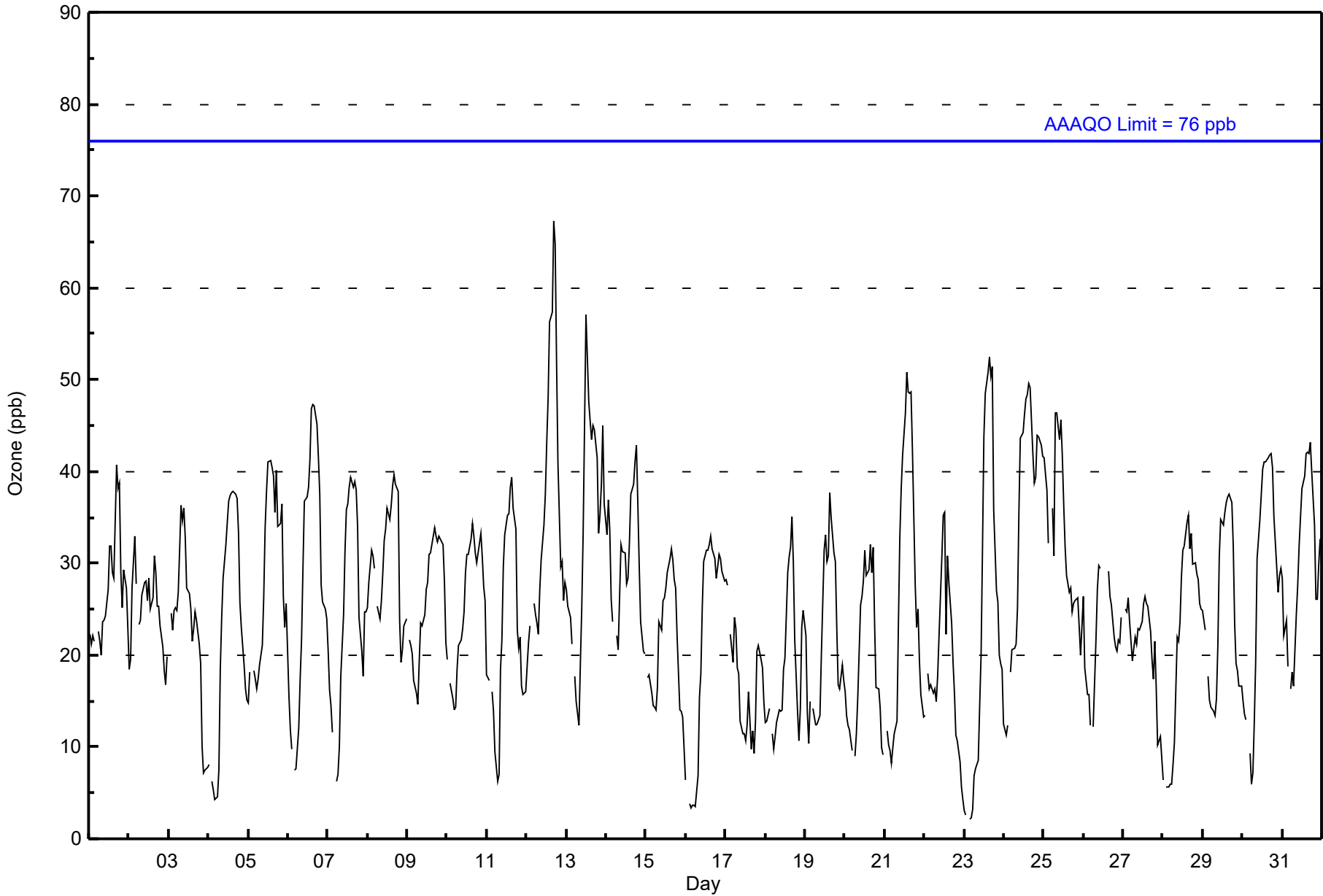
Janvier - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		744																			
Maximum Value: 67.2 ppb on Jul 12 17:00		Maximum Daily Average: 36.2 ppb on Jul 12				Hours of Data:		709																			
Minimum Value: 2.1 ppb on Jul 23 04:00		Minimum Daily Average: 17.1 ppb on Jul 17				Hours of Missing Data:		35																			
Maximum Diurnal Average: 36.1 ppb at hour 17		Minimum Diurnal Average: 14.5 ppb at hour 6				Hours of Calibration:		35																			
Monthly Average: 25.48 ppb		Percentiles: P ₁ = 3.6 P ₁₀ = 11.5 Q ₁ = 17.4 Median = 25.0 Q ₃ = 32.6 P ₉₀ = 40.1 P ₉₉ = 51.3				Percent Operational Time:		100.0																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	22.3	21.2	22.1	21.5	Z	22.5	21.5	20.0	23.7	23.7	24.2	27.2	31.9	31.9	28.9	28.4	40.7	38.2	38.8	29.1	25.1	29.2	27.3	23.0	27.1	40.7	
2-Jul	18.4	19.5	27.3	33.0	27.8	Z	23.4	23.8	26.6	27.9	28.0	25.9	28.3	25.0	26.3	30.8	29.0	25.3	25.3	23.2	20.9	18.4	16.7	19.9	24.8	33.0	
3-Jul	Z	24.5	22.7	24.9	25.2	24.9	26.8	36.2	34.7	36.0	32.7	27.4	26.6	24.9	21.5	22.9	24.7	23.8	21.1	19.1	10.1	7.1	7.4	7.7	23.2	36.2	
4-Jul	8.0	Z	6.2	5.3	4.2	4.6	7.5	18.4	24.0	28.4	32.0	34.5	36.8	37.4	37.6	37.8	37.6	37.0	33.4	25.7	23.1	18.9	16.4	15.1	23.0	37.8	
5-Jul	14.8	18.2	Z	18.3	17.4	16.4	17.4	18.9	21.1	26.2	33.9	37.8	41.0	41.2	40.4	39.5	35.6	40.1	34.0	34.3	36.5	26.4	23.0	25.7	28.6	41.2	
6-Jul	15.5	11.9	9.8	Z	7.4	7.7	12.0	17.4	21.7	29.5	36.7	37.2	38.2	41.4	46.8	47.3	47.1	45.1	41.6	37.6	27.7	25.8	25.0	23.9	28.4	47.3	
7-Jul	20.5	16.2	14.5	11.6	Z	6.3	7.1	10.1	17.7	24.4	31.3	35.8	36.5	38.2	39.3	38.3	38.8	38.0	34.0	24.2	20.4	17.7	24.7	24.7	24.8	39.3	
8-Jul	25.2	27.9	31.4	30.8	29.4	Z	25.3	24.0	25.9	29.0	32.4	33.7	36.1	34.7	36.4	38.4	39.7	38.6	37.8	23.8	19.2	20.5	23.1	23.9	29.9	39.7	
9-Jul	Z	21.6	21.0	20.1	17.3	15.9	14.7	19.4	23.5	23.2	24.4	27.2	27.9	31.0	31.0	32.1	33.8	32.9	32.4	32.9	32.7	32.0	28.0	21.4	25.9	33.8	
10-Jul	19.5	Z	17.0	15.2	14.0	14.3	18.5	21.0	21.7	22.9	24.7	28.9	30.9	31.0	32.6	34.4	32.9	31.1	30.0	32.1	33.3	30.6	27.5	25.9	25.7	34.4	
11-Jul	17.8	17.2	Z	16.0	13.8	9.5	6.3	7.1	18.4	21.7	29.6	33.0	35.2	35.4	38.2	39.3	36.0	33.7	22.7	20.8	22.0	16.7	15.7	16.0	22.7	39.3	
12-Jul	18.8	21.3	23.2	Z	25.6	24.3	23.5	22.3	27.0	30.4	34.2	37.6	43.1	48.0	56.3	57.4	67.2	64.8	51.9	40.9	29.6	30.2	25.9	28.0	36.2	67.2	
13-Jul	27.1	25.4	24.2	21.2	Z	17.8	15.0	12.3	19.0	25.2	33.3	45.1	57.1	47.6	45.4	43.5	45.0	44.6	41.5	33.2	35.2	38.6	45.1	36.5	33.9	57.1	
14-Jul	33.2	36.9	33.6	26.0	23.6	Z	22.2	20.7	26.4	32.0	31.3	31.1	27.7	28.4	32.2	37.5	38.5	41.0	42.9	36.6	29.8	23.6	20.4	20.1	30.2	42.9	
15-Jul	Z	17.5	17.9	15.8	14.5	14.4	14.0	16.5	23.6	22.8	26.0	26.2	27.3	29.0	30.5	31.6	30.3	28.2	27.3	22.3	14.0	13.9	13.3	9.8	21.2	31.6	
16-Jul	6.4	Z	3.8	3.4	3.7	3.6	3.4	6.8	15.4	18.0	25.2	30.2	31.5	31.4	32.0	32.9	31.6	30.5	28.4	29.6	31.0	30.4	29.1	28.1	21.1	32.9	
17-Jul	28.2	27.6	Z	22.2	19.2	24.1	22.9	18.6	18.0	12.9	11.5	11.5	10.7	12.3	15.9	9.8	11.7	9.3	12.9	20.5	21.1	19.6	18.6	14.8	17.1	28.2	
18-Jul	12.6	12.9	14.3	Z	11.5	9.8	11.2	12.6	14.1	13.9	14.1	18.5	19.7	29.0	30.7	31.7	35.1	30.2	21.6	13.8	10.6	14.1	23.1	24.9	18.7	35.1	
19-Jul	22.0	13.7	10.3	14.9	Z	14.2	12.3	12.4	12.9	13.5	20.0	31.5	33.1	30.2	30.8	37.6	35.0	31.1	30.2	23.1	16.7	16.3	18.9	17.3	21.7	37.6	
20-Jul	15.9	13.4	12.3	11.9	9.6	Z	9.0	11.5	15.4	25.4	26.5	28.0	31.4	28.8	29.3	32.1	29.0	31.7	23.5	16.4	16.3	14.3	9.9	9.2	19.6	32.1	
21-Jul	Z	11.8	10.2	9.6	8.2	10.0	11.5	12.9	23.4	32.7	38.2	41.8	46.4	50.8	48.7	48.5	48.7	42.5	27.6	23.1	25.0	19.4	15.7	13.2	26.9	50.8	
22-Jul	13.5	Z	18.0	16.4	16.8	15.9	16.4	14.9	17.8	22.1	30.7	35.3	35.6	22.2	30.8	28.0	23.5	19.2	15.8	11.3	10.6	8.4	5.6	4.3	18.8	35.6	
23-Jul	3.0	2.5	Z	2.1	2.3	3.3	6.9	7.6	8.6	14.5	20.0	31.4	43.8	48.5	50.8	52.5	50.3	51.4	35.8	26.9	25.9	20.0	19.1	18.4	23.7	52.5	
24-Jul	12.5	11.2	12.4	Z	18.1	20.6	20.7	21.2	25.1	35.5	43.6	44.2	46.3	47.9	48.3	49.5	49.1	41.9	38.7	39.3	43.9	43.8	42.9	41.6	34.7	49.5	
25-Jul	41.5	39.7	38.0	32.2	Z	36.0	30.9	46.4	46.3	43.5	45.6	41.7	36.3	31.7	28.6	26.8	27.3	24.7	25.6	25.9	26.2	23.2	20.0	23.1	33.1	46.4	
26-Jul	26.3	18.6	15.8	15.7	12.3	Z	12.3	21.7	27.2	29.7	29.4	C	C	C	C	29.1	26.4	25.5	21.9	20.9	20.5	21.7	21.4	24.1	22.1	29.7	
27-Jul	Z	25.0	24.7	26.2	23.6	19.4	20.8	22.0	21.3	22.9	22.8	23.6	25.6	26.3	25.6	25.4	22.6	19.6	17.3	21.5	16.4	10.2	11.1	8.7	21.0	26.3	
28-Jul	6.4	Z	5.7	5.7	5.9	5.9	8.1	10.6	22.0	21.5	23.6	28.5	31.4	31.9	34.5	35.3	31.6	33.2	29.9	30.1	28.8	28.2	25.6	25.1	22.2	35.3	
29-Jul	24.8	22.7	Z	17.8	15.1	14.3	13.9	13.5	15.3	21.0	30.7	34.8	34.2	35.5	36.6	37.3	37.5	36.7	31.9	23.3	19.0	18.2	16.6	16.6	24.7	37.5	
30-Jul	15.0	13.6	12.9	Z	9.3	5.9	7.2	12.7	19.3	30.5	34.8	37.4	40.2	41.1	41.0	41.6	41.9	41.9	40.5	35.1	32.4	26.9	28.7	29.4	27.8	41.9	
31-Jul	28.4	22.1	23.8	18.8	Z	16.4	18.1	16.6	24.3	27.6	31.9	35.1	38.1	39.6	42.0	42.0	41.9	43.2	40.0	34.2	26.0	26.0	29.8	32.7	30.4	43.2	
		19.2	19.8	18.2	17.6	15.0	14.5	15.5	17.7	22.0	25.4	29.1	32.1	34.3	34.4	35.6	36.1	36.1	34.7	30.9	26.8	24.2	22.3	21.8	21.1	Diurnal Average	
		41.5	39.7	38.0	33.0	29.4	36.0	30.9	46.4	46.3	43.5	45.6	45.1	57.1	50.8	56.3	57.4	67.2	64.8	51.9	40.9	43.9	43.8	45.1	41.6	Diurnal Maximum	
Z - zerospan		C - Calibration																									
Alberta Ambient Air Quality Objectives (AAAQO):		1-hr 76 ppb																									



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Janvier - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Janvier - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	238	33.57	33.57
21 - 50	461	65.02	98.59
51 - 82	10	1.41	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Janvier - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	16	26	4	8	6	3	5	9	28	65	37	9	6	7	3	5	237
21 - 50	39	51	35	21	28	21	12	21	20	31	50	33	38	23	15	23	461
51 - 82	6	0	1	0	1	0	0	0	0	0	0	1	1	0	0	0	10
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	77	40	29	35	24	17	30	48	96	87	43	45	30	18	28	708

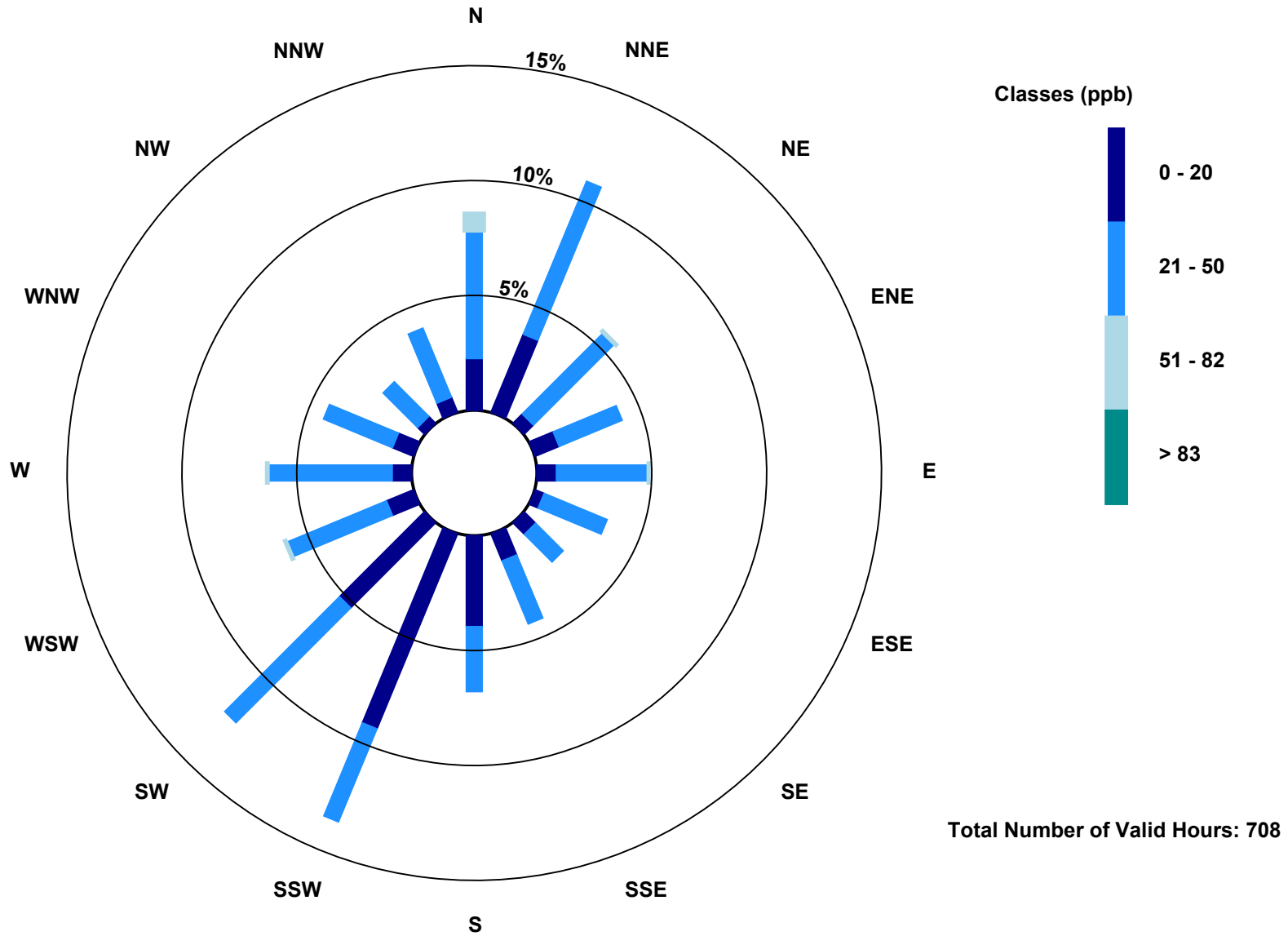
Total Number of Valid Hours: 708

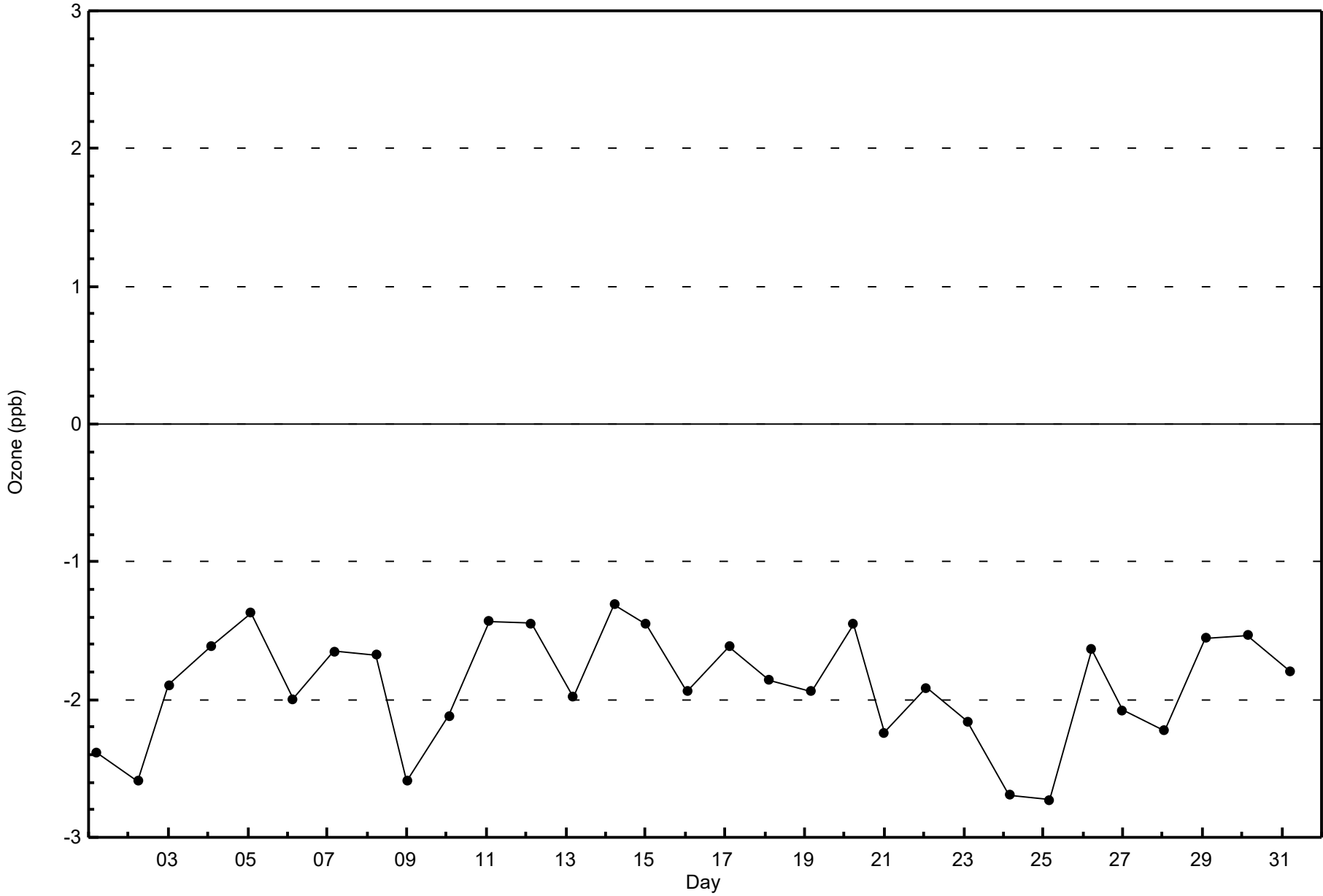
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Ozone (O₃) - ppb
Janvier

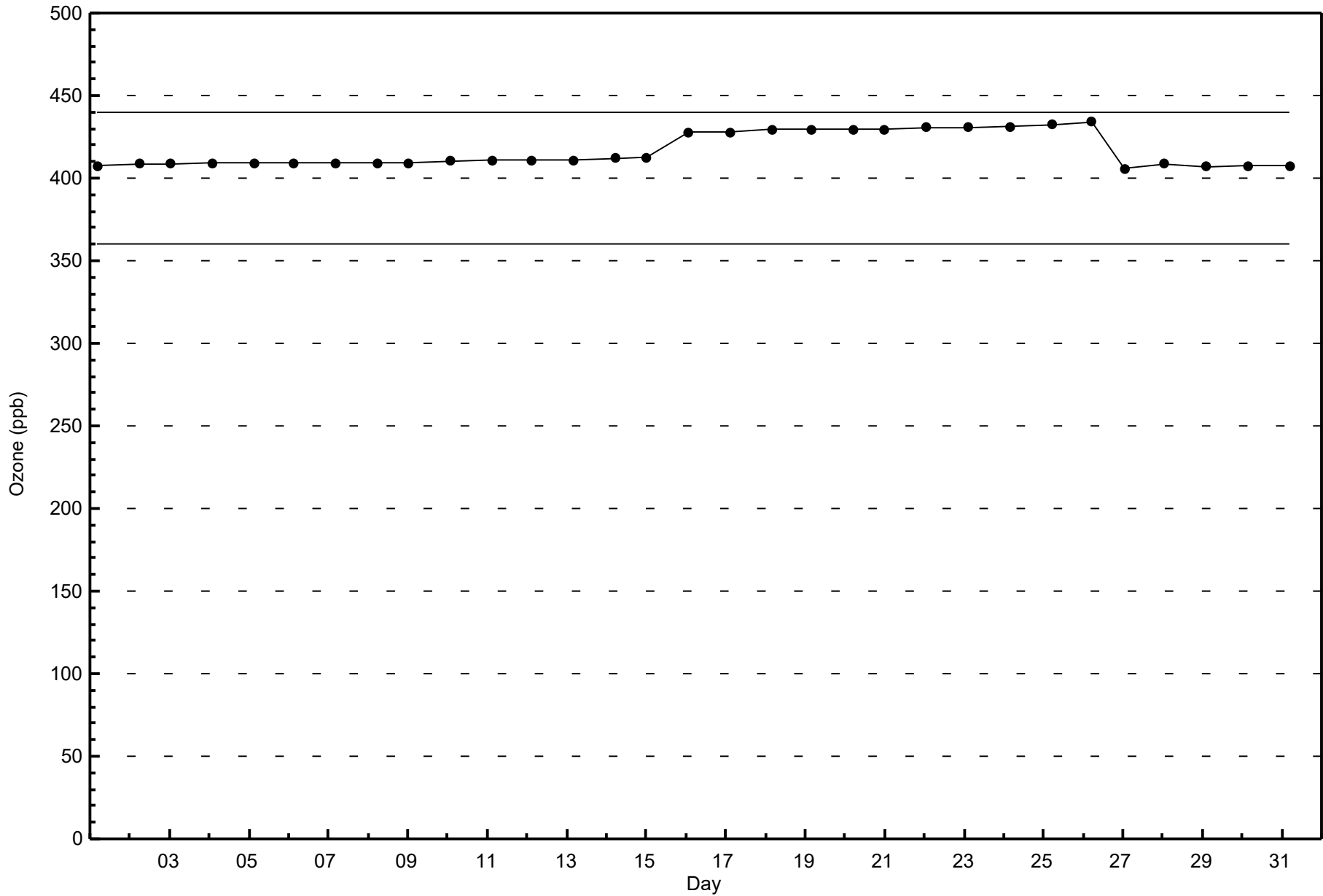






Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Janvier - July 2023

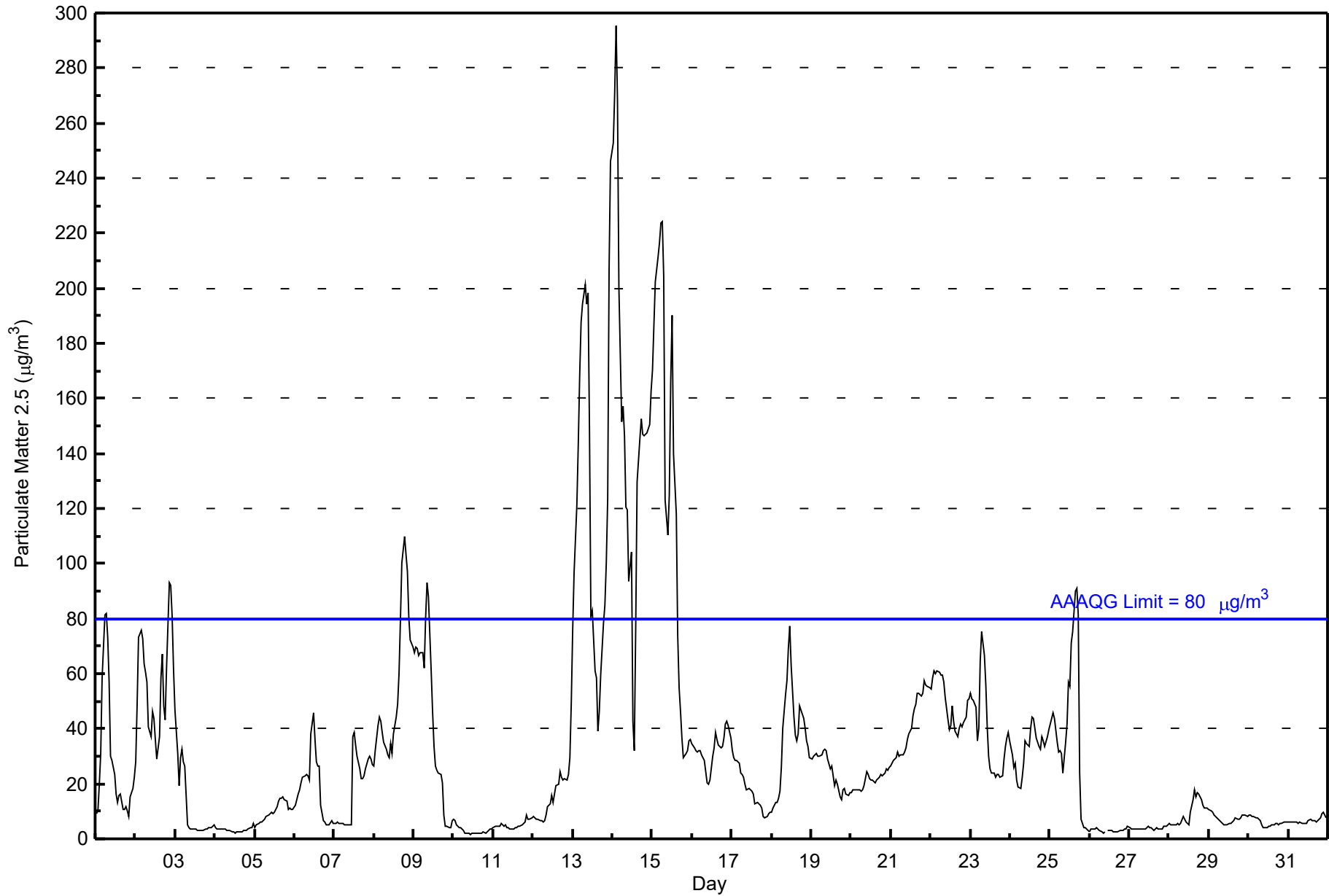




Summary of Hour Averages

Janvier - July 2023

Number of Exceedences (AAAQO):		1-hr: 69		24-hr: 13		Hours in Service:		744																		
Maximum Value: 295.4 µg/m ³ on Jul 14 03:00		Maximum Daily Average: 152.5 µg/m ³ on Jul 14				Hours of Data:		743																		
Minimum Value: 1.8 µg/m ³ on Jul 10 11:00		Minimum Daily Average: 3.0 µg/m ³ on Jul 10				Hours of Missing Data:		1																		
Maximum Diurnal Average: 41.4 µg/m ³ at hour 4		Minimum Diurnal Average: 27.5 µg/m ³ at hour 14				Hours of Calibration:		1																		
Monthly Average: 33.65 µg/m ³		Percentiles: P ₁ = 2.1 P ₁₀ = 3.6 Q ₁ = 5.7 Median = 21.2 Q ₃ = 40.2 P ₉₀ = 75.8 P ₉₉ = 214.6				Percent Operational Time:		100.0																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	9.3	9.9	20.1	31.2	58.4	81.5	82.0	73.0	57.0	30.2	28.3	23.3	16.2	13.0	15.9	16.3	10.5	10.9	11.6	10.1	8.1	15.3	18.6	22.6	28.1	82.0
2-Jul	28.2	48.9	73.3	75.9	72.6	63.5	60.7	57.2	40.6	37.2	46.2	43.9	36.0	28.9	36.9	58.6	67.0	48.3	43.0	62.1	92.8	92.1	80.7	61.3	56.5	92.8
3-Jul	46.7	31.1	19.1	29.3	32.7	28.0	26.5	5.2	4.0	3.4	3.6	3.7	3.4	3.2	3.2	3.1	3.0	3.3	3.5	3.8	4.2	4.0	4.9	11.5	46.7	
4-Jul	4.0	3.6	3.4	3.7	3.6	3.6	3.4	3.3	3.1	3.0	2.5	2.3	2.1	2.3	2.6	2.7	2.7	2.9	2.8	3.2	3.6	4.0	4.2	5.6	3.2	5.6
5-Jul	4.3	4.9	5.4	6.2	6.2	6.6	7.3	8.1	8.6	9.1	9.6	9.1	9.8	11.8	13.8	14.5	14.6	15.1	14.4	13.6	10.6	11.0	10.5	10.9	9.8	15.1
6-Jul	12.0	14.2	16.3	17.6	20.1	22.3	22.8	23.3	23.0	21.2	38.1	45.6	36.2	28.0	26.2	26.6	12.1	6.9	6.1	4.9	4.8	5.0	6.5	5.5	18.6	45.6
7-Jul	5.6	5.5	6.1	5.7	5.5	5.5	5.3	5.0	5.1	5.2	5.1	37.1	38.6	33.8	29.8	25.4	21.9	21.7	22.9	25.4	29.1	29.9	29.1	27.1	18.0	38.6
8-Jul	26.7	32.1	41.1	44.1	42.7	38.9	34.9	32.4	30.3	29.4	34.6	30.9	37.9	44.2	49.0	60.1	79.2	100.1	109.9	103.4	97.1	80.5	72.1	69.5	55.0	109.9
9-Jul	67.4	69.7	68.9	66.8	67.4	67.4	62.0	80.3	93.2	87.8	60.4	45.8	33.5	26.3	24.9	23.7	23.2	20.1	8.5	4.8	4.3	3.9	3.9	6.8	42.5	93.2
10-Jul	6.9	6.5	4.9	4.0	4.3	3.6	2.8	2.1	1.9	2.1	1.8	2.1	2.0	2.0	2.0	2.1	2.2	2.1	2.4	2.2	2.3	3.1	3.3	3.6	3.0	6.9
11-Jul	4.1	4.7	4.7	4.6	4.7	5.5	4.5	5.0	4.1	3.9	3.8	3.3	3.6	3.9	4.0	4.6	4.7	4.9	5.4	6.3	8.6	7.2	7.2	7.8	5.0	8.6
12-Jul	8.3	7.6	7.3	6.9	6.5	6.4	6.3	6.8	8.8	11.8	12.8	15.9	13.5	16.3	19.1	19.9	24.5	22.3	21.4	21.8	21.5	23.5	29.5	49.6	16.2	49.6
13-Jul	76.0	96.6	121.7	143.2	168.5	187.7	194.3	201.2	194.3	198.2	148.7	81.1	82.8	61.1	58.4	39.3	46.0	59.7	78.1	84.7	100.1	123.6	207.0	246.0	124.9	246.0
14-Jul	252.9	270.8	295.4	267.8	200.2	151.6	157.3	146.5	120.5	119.7	93.4	104.4	42.9	32.3	76.3	129.8	145.4	152.5	146.8	146.4	146.7	147.4	150.6	162.5	152.5	295.4
15-Jul	170.4	186.4	202.3	211.5	216.8	223.9	224.5	204.5	122.8	110.2	125.1	166.4	190.0	140.1	117.8	73.9	54.9	46.1	36.7	29.6	31.1	32.1	35.6	36.1	124.5	224.5
16-Jul	34.6	33.1	32.2	31.7	31.9	31.8	30.5	28.7	24.7	20.4	20.0	21.3	29.9	33.2	38.8	36.2	34.3	33.3	33.8	36.5	41.6	42.8	41.4	36.8	32.5	42.8
17-Jul	31.9	29.6	28.6	28.6	27.4	23.7	23.2	22.6	19.7	17.9	18.2	17.9	17.3	16.1	13.0	13.3	12.6	12.3	11.3	8.3	7.5	8.1	9.3	9.6	17.8	31.9
18-Jul	9.8	11.3	13.0	13.2	14.8	17.2	26.1	40.3	52.4	57.6	68.9	77.4	63.2	44.1	37.7	35.5	38.2	48.4	46.9	44.0	40.3	35.4	33.7	29.4	37.5	77.4
19-Jul	29.2	29.9	30.6	31.1	30.2	30.0	30.5	31.9	32.5	32.1	29.0	25.4	26.6	23.0	19.2	21.2	19.9	15.3	14.4	18.0	18.1	16.5	15.8	16.8	24.5	32.5
20-Jul	16.8	17.6	17.6	17.6	18.0	17.8	17.0	17.9	19.6	24.4	23.6	21.8	21.1	21.4	20.5	21.1	22.0	22.6	23.3	22.6	23.9	25.2	24.7	25.8	21.0	25.8
21-Jul	26.6	28.5	29.1	29.4	31.4	30.1	30.5	30.6	31.5	32.9	35.9	38.0	40.2	44.5	47.2	48.6	53.1	52.8	52.1	52.7	57.3	55.8	55.2	54.8	41.2	57.3
22-Jul	54.4	58.7	60.9	60.1	61.2	60.3	59.4	59.4	57.1	51.2	43.1	39.5	41.0	48.4	42.8	39.2	37.4	40.0	41.6	40.5	42.4	44.3	50.2	50.8	49.3	61.2
23-Jul	52.7	51.0	50.4	48.0	35.6	39.9	64.6	75.5	66.8	56.1	40.5	30.1	25.4	23.9	23.7	22.5	23.2	23.2	22.2	23.0	28.8	33.7	36.4	38.9	39.0	75.5
24-Jul	35.5	30.7	25.9	27.3	21.5	19.0	18.3	22.4	27.6	35.5	34.4	33.5	40.1	44.3	43.8	40.0	36.7	33.7	32.6	37.4	35.5	33.7	37.2	39.5	32.8	44.3
25-Jul	41.8	43.9	45.8	44.0	34.8	31.5	32.2	31.0	23.9	35.0	41.7	56.8	55.7	71.2	75.3	89.8	91.1	81.3	24.1	7.1	4.2	3.9	3.6	3.3	40.5	91.1
26-Jul	2.5	3.4	3.7	3.3	3.9	3.8	3.2	2.8	2.3	2.7	C	2.8	3.2	3.0	2.7	2.5	2.7	2.6	3.0	2.9	3.2	3.6	3.8	4.3	3.1	4.3
27-Jul	4.3	3.7	3.7	3.5	3.7	3.8	3.5	3.5	3.6	3.6	3.8	4.4	4.1	3.9	3.7	3.1	3.8	3.5	3.7	3.4	3.8	4.5	4.7	4.9	3.8	4.9
28-Jul	5.5	5.1	5.0	5.3	5.2	5.4	5.3	5.5	8.2	7.2	6.2	5.4	5.3	9.6	14.2	17.9	15.5	16.7	16.1	14.2	12.4	11.1	11.1	11.1	9.4	17.9
29-Jul	10.9	10.1	9.5	8.8	8.2	7.4	6.6	6.0	5.6	5.2	5.1	5.3	5.4	6.3	6.8	7.7	7.3	6.9	7.6	8.7	8.8	8.5	8.3	7.4	10.9	
30-Jul	8.6	8.4	8.4	8.0	7.9	7.5	7.1	6.6	5.2	4.1	3.9	4.1	4.4	4.8	5.0	5.2	5.6	5.4	5.2	5.4	5.5	5.9	5.9	6.0	6.0	8.6
31-Jul	5.9	6.3	5.9	6.0	6.1	5.9	5.8	6.0	5.6	5.4	5.5	5.7	6.7	7.1	6.8	6.6	6.6	6.2	6.4	7.8	8.9	9.7	8.8	7.4	6.6	9.7
35.3 37.6 40.7 41.4 40.4 39.7 40.6 40.1 35.6 34.3 33.1 32.4 30.3 27.5 28.4 29.4 29.8 29.7 27.6 27.5 29.3 29.9 32.7 34.4																								Diurnal Average		
252.9 270.8 295.4 267.8 216.8 223.9 224.5 204.5 194.3 198.2 148.7 166.4 190.0 140.1 117.8 129.8 145.4 152.5 146.8 146.4 146.7 147.4 207.0 246.0																								Diurnal Maximum		
C - Calibration																										
Alberta Ambient Air Quality Guideline/Objectives: 1-hr 80 µg/m ³ 24-hr 29 µg/m ³																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Janvier - July 2023**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
0 - 5	176	23.69	23.69
6 - 15	147	19.78	43.47
16 - 25	99	13.32	56.80
26 - 80	253	34.05	90.85
> 81.0	68	9.15	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Janvier - July 2023

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	17	21	18	11	11	9	5	9	23	17	12	4	9	2	2	6	176
6 - 15	8	11	4	5	3	1	3	8	11	33	30	17	5	3	1	3	146
16 - 25	10	9	5	5	4	1	4	7	8	18	11	4	8	4	0	1	99
26 - 80	16	26	13	10	17	13	7	8	10	37	35	14	14	13	10	10	253
> 81.0	11	11	2	0	0	0	0	0	0	3	2	6	11	9	5	8	68
Totals	62	78	42	31	35	24	19	32	52	108	90	45	47	31	18	28	742

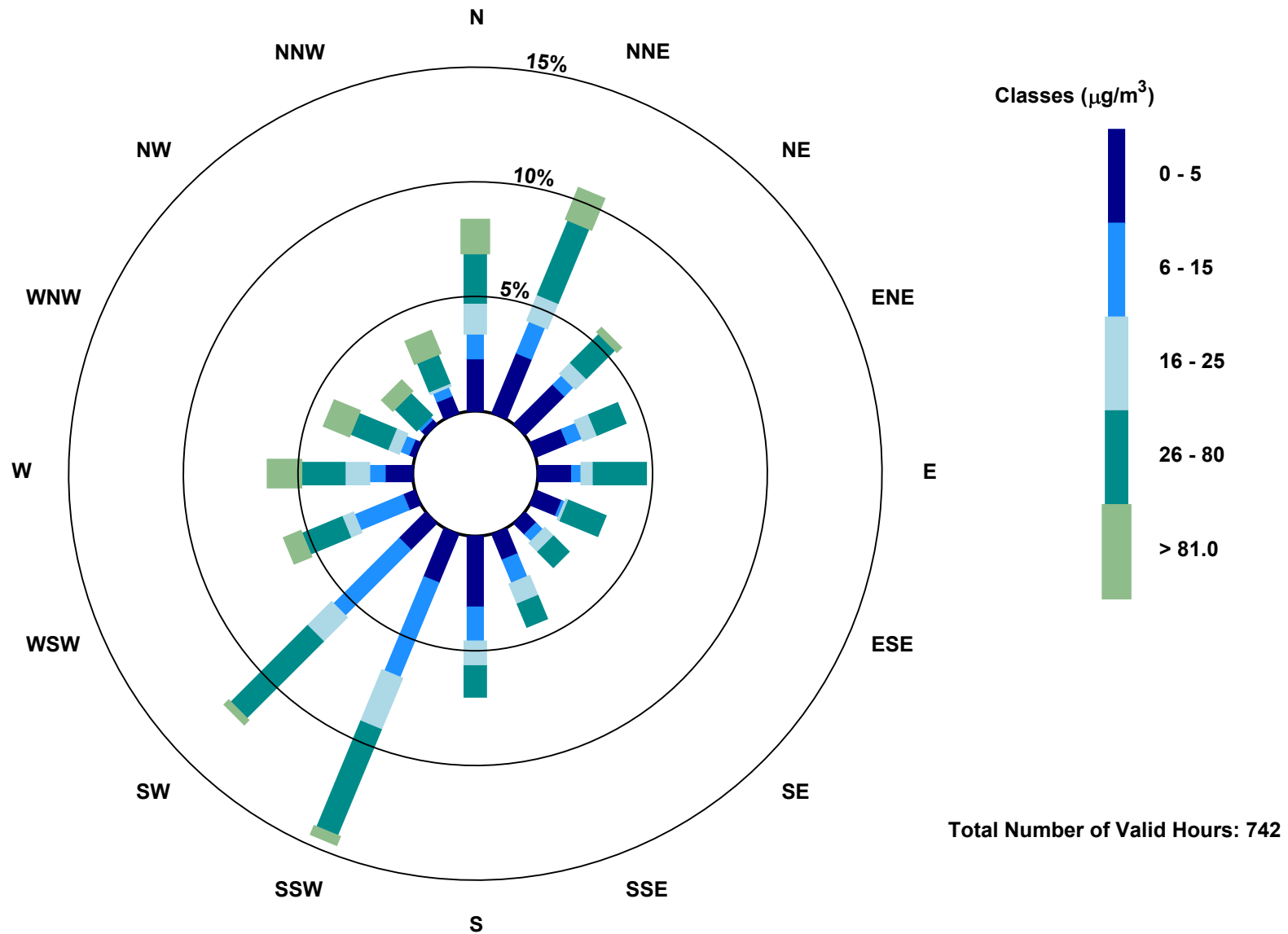
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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





Wood Buffalo Environmental Association
Summary of Hour Averages

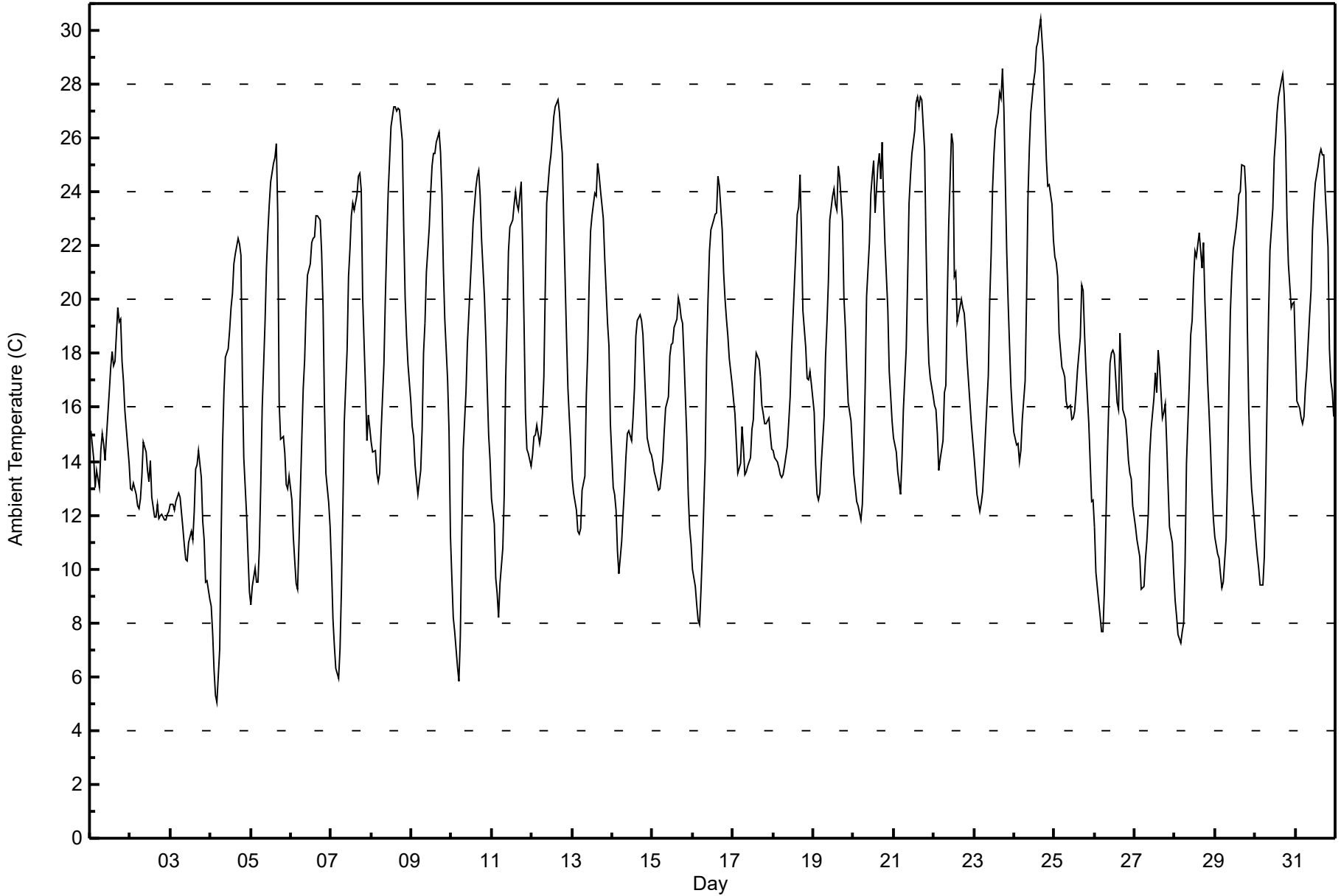
Ambient Temperature (AT) - C
Janvier - July 2023

Maximum Value: 30.4 C on Jul 24 17:00 Maximum Daily Average: 23.0 C on Jul 24																						Hours in Service:	744																								
Minimum Value: 5.0 C on Jul 4 05:00 Minimum Daily Average: 11.8 C on Jul 3																						Hours of Data:	744																								
Maximum Diurnal Average: 22.8 C at hour 16 Minimum Diurnal Average: 11.2 C at hour 5																						Hours of Missing Data:	0																								
Monthly Average: 17.21 C Percentiles: P ₁ = 7.1 P ₁₀ = 10.7 Q ₁ = 13.4 Median = 16.4 Q ₃ = 21.6 P ₉₀ = 24.9 P ₉₉ = 28.2																						Hours of Calibration:	0																								
																						Percent Operational Time:	100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	15.1	14.6	14.1	13.0	13.6	13.0	14.4	15.0	14.7	14.0	14.9	16.6	17.5	18.1	17.6	17.7	19.7	19.2	19.3	17.7	17.0	15.9	14.6	13.9	15.9	19.7																					
2-Jul	13.0	12.9	13.2	12.8	12.3	12.2	12.6	13.5	14.7	14.3	13.6	13.2	14.0	12.7	11.9	11.9	12.4	11.9	12.0	12.0	11.8	11.8	12.0	12.2	12.7	14.7																					
3-Jul	12.4	12.4	12.2	12.5	12.6	12.8	12.6	11.5	10.9	10.3	10.3	11.0	11.4	11.1	12.2	13.7	13.9	14.4	13.4	11.8	11.1	9.5	9.6	8.9	11.8	14.4																					
4-Jul	8.6	7.6	6.3	5.3	5.0	7.0	11.2	14.6	16.6	17.9	18.2	18.9	19.7	20.2	21.4	21.7	22.3	22.1	21.7	17.1	14.1	12.0	10.5	9.2	14.5	22.3																					
5-Jul	8.7	9.3	10.0	9.5	9.5	10.8	13.1	16.0	19.1	21.2	22.5	23.5	24.4	25.1	25.3	25.8	23.2	16.2	14.8	14.9	14.3	13.1	13.0	13.4	16.5	25.8																					
6-Jul	12.6	11.2	10.3	9.5	9.2	11.0	14.9	16.7	17.8	19.6	20.9	21.3	22.1	22.3	23.1	23.1	22.9	21.8	19.7	16.1	13.6	12.4	11.5	16.9	23.1																						
7-Jul	10.1	8.1	7.1	6.3	6.0	7.1	9.2	12.2	15.5	18.1	20.8	21.9	23.1	23.6	23.3	23.9	24.6	24.7	24.1	20.1	16.7	14.8	15.7	15.2	16.3	24.7																					
8-Jul	14.7	14.3	14.4	13.6	13.2	13.6	15.1	17.6	20.0	22.1	24.0	25.2	26.4	27.2	27.2	27.0	27.1	27.0	25.9	22.6	20.0	18.6	17.6	16.3	20.4	27.2																					
9-Jul	15.3	14.9	13.9	13.3	12.8	13.7	15.2	18.0	19.1	21.0	22.6	23.9	25.0	25.4	25.4	25.9	26.2	25.5	23.9	21.2	19.3	17.0	15.1	11.3	19.4	26.2																					
10-Jul	9.7	8.2	7.7	6.4	5.8	7.5	11.3	14.4	16.6	18.4	19.5	20.6	21.6	22.9	24.2	24.6	24.8	23.8	22.2	20.1	18.6	16.7	15.0	14.0	16.4	24.8																					
11-Jul	12.6	11.7	9.7	9.1	8.2	9.4	10.8	12.8	17.0	19.2	21.8	22.7	22.9	23.5	24.0	23.5	23.3	24.4	22.1	19.1	15.8	14.5	14.3	13.8	16.9	24.4																					
12-Jul	14.3	14.9	15.0	15.4	14.6	15.0	15.7	17.1	20.4	23.6	25.0	25.4	26.1	26.8	27.2	27.4	26.9	26.1	25.4	22.9	18.7	16.7	15.6	14.6	20.5	27.4																					
13-Jul	13.3	12.8	12.2	11.4	11.3	11.5	12.9	13.4	16.4	18.1	20.7	22.5	23.1	23.9	23.9	25.0	24.7	24.1	23.0	21.5	20.4	19.1	18.3	15.4	18.3	25.0																					
14-Jul	13.0	12.8	12.2	10.6	9.8	11.1	12.1	13.0	14.2	15.0	15.1	14.8	15.6	16.7	18.7	19.2	19.4	19.2	18.7	17.5	16.2	14.9	14.3	14.2	14.9	19.4																					
15-Jul	14.0	13.6	13.4	12.9	13.0	13.5	14.0	15.1	16.0	16.4	17.9	18.3	18.4	19.0	19.3	20.1	19.8	19.3	19.1	17.9	14.9	12.7	11.5	10.9	15.9	20.1																					
16-Jul	10.0	9.4	8.7	8.1	7.9	9.2	10.7	14.1	17.9	20.1	21.8	22.6	23.0	23.2	23.2	24.6	24.2	22.6	21.0	20.0	19.3	18.7	17.8	16.9	17.3	24.6																					
17-Jul	16.3	15.7	14.6	13.6	13.9	15.3	14.5	13.5	13.6	13.8	14.2	15.2	15.6	17.2	18.0	17.7	17.1	16.1	15.7	15.4	15.4	15.6	15.0	14.5	15.3	18.0																					
18-Jul	14.4	14.1	14.0	13.8	13.5	13.4	13.5	13.8	14.6	15.4	16.4	18.1	19.4	21.8	23.2	23.5	24.6	22.4	19.6	18.3	17.1	17.0	17.4	16.8	17.3	24.6																					
19-Jul	15.8	13.9	12.8	12.6	12.8	13.9	15.7	17.9	19.1	20.6	23.0	23.8	24.1	23.6	23.3	25.0	24.6	22.9	20.1	19.0	17.5	16.2	15.5	14.5	18.7	25.0																					
20-Jul	13.5	13.0	12.5	12.3	11.8	12.4	14.2	16.7	20.1	22.1	23.9	24.6	25.1	23.2	25.0	25.4	24.5	25.8	23.7	22.0	19.6	17.3	16.5	15.5	19.2	25.8																					
21-Jul	14.9	14.3	13.6	13.2	12.8	14.1	15.9	18.2	20.8	23.6	24.6	25.4	26.3	27.3	27.5	27.2	27.5	27.4	25.6	22.0	19.2	17.6	17.1	16.4	20.5	27.5																					
22-Jul	16.1	15.9	15.0	13.7	14.1	14.8	16.5	16.8	20.0	22.8	26.2	25.8	20.9	21.0	19.2	19.4	20.0	19.7	19.5	18.7	17.8	16.2	15.4	14.8	18.3	26.2																					
23-Jul	14.1	13.5	12.8	12.2	12.4	12.9	13.9	15.0	17.2	20.0	21.7	24.1	25.4	26.3	27.0	27.7	27.5	28.6	27.1	21.8	19.9	18.3	16.8	15.8	19.7	28.6																					
24-Jul	15.1	14.6	14.7	14.0	14.4	15.6	17.0	20.0	23.7	25.7	27.0	28.1	28.5	29.4	29.6	30.1	30.4	28.8	26.9	25.2	24.2	24.3	23.5	22.2	23.0	30.4																					
25-Jul	21.6	21.4	20.9	18.7	17.5	17.4	17.1	16.2	16.0	16.1	15.5	15.6	15.9	16.6	17.4	18.6	20.5	20.3	18.7	17.4	15.4	13.9	12.5	12.6	17.2	21.6																					
26-Jul	11.6	9.9	8.8	8.2	7.7	7.7	9.2	14.0	15.9	17.7	18.0	18.1	18.0	16.2	15.9	18.8	17.4	15.9	15.6	14.9	14.0	13.5	13.4	12.3	13.9	18.8																					
27-Jul	11.6	11.1	10.8	10.4	9.3	9.3	10.3	11.0	12.0	14.2	15.2	16.4	17.3	16.5	18.1	17.5	15.6	15.8	16.1	14.7	13.1	11.6	11.0	9.8	13.3	18.1																					
28-Jul	8.8	8.2	7.6	7.2	7.7	8.0	10.2	13.9	16.9	18.7	19.2	20.8	21.8	21.6	22.5	21.9	21.2	22.1	20.0	16.9	15.7	14.5	12.9	11.9	15.4	22.5																					
29-Jul	11.2	10.6	10.4	9.8	9.3	9.5	11.1	13.5	16.8	19.6	20.9	21.9	22.6	23.2	23.9	24.0	25.0	24.9	24.0	19.0	16.0	14.1	13.0	11.8	16.9	25.0																					
30-Jul	11.1	10.5	10.0	9.4	9.4	10.4	13.1	16.5	19.4	21.9	23.4	25.3	26.0	27.0	27.5	28.1	28.4	27.7	26.1	23.0	21.3	19.7	19.9	19.9	19.8	28.4																					
31-Jul	18.0	16.2	16.0	15.6	15.4	15.6	16.7	17.4	19.4	20.3	22.5	23.6	24.3	24.9	25.4	25.6	25.4	25.4	24.0	21.9	18.2	17.0	16.6	15.6	20.1	25.6																					
																						13.3	12.6	12.1	11.4	11.2	11.9	13.4	15.1	17.2	18.8	20.0	20.9	21.5	21.9	22.3	22.8	22.8	22.2	21.0	18.9	17.1	15.7	15.0	14.1	Diurnal Average	
																						21.6	21.4	20.9	18.7	17.5	17.4	17.1	20.0	23.7	25.7	27.0	28.1	28.5	29.4	29.6	30.1	30.4	28.8	27.1	25.2	24.2	24.3	23.5	22.2	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Janvier - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Janvier - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	59	7.93	7.93
10 - 20	460	61.83	69.76
> 20	225	30.24	100.00

Total Number of Valid Hours: 744

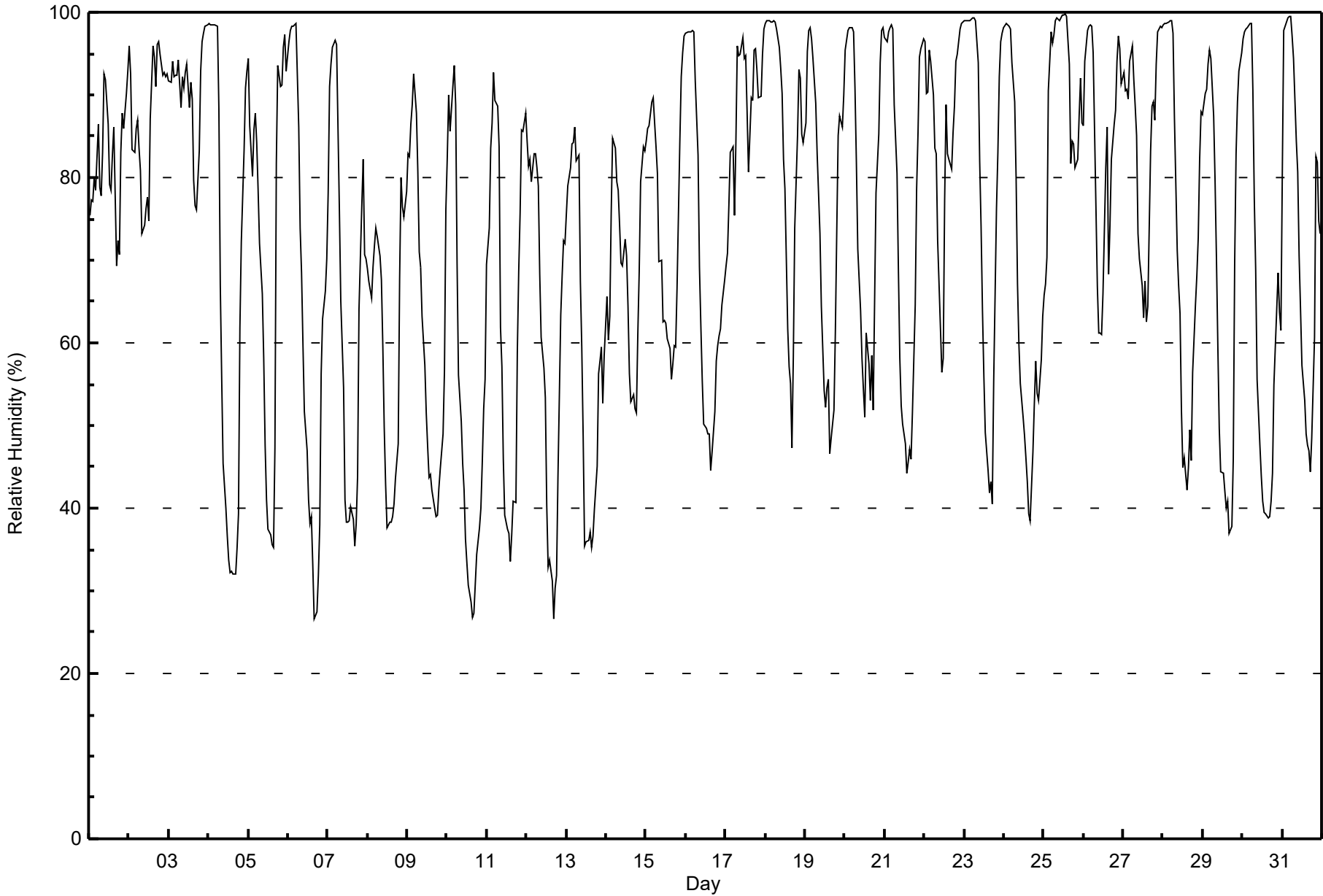
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Relative Humidity (RH) - %
Janvier - July 2023

Maximum Value: 99.8 % on Jul 25 14:00 Maximum Daily Average: 90.6 % on Jul 3																						Hours in Service:	744			
Minimum Value: 26.6 % on Jul 12 17:00 Minimum Daily Average: 53.1 % on Jul 10																						Hours of Data:	744			
Maximum Diurnal Average: 92.8 % at hour 5 Minimum Diurnal Average: 52.0 % at hour 17																						Hours of Missing Data:	0			
Monthly Average: 73.02 % Percentiles: $P_1 = 30.8$ $P_{10} = 40.7$ $Q_1 = 56.1$ Median = 78.4 $Q_3 = 91.9$ $P_{90} = 97.8$ $P_{99} = 99.3$																						Hours of Calibration:	0			
																						Percent Operational Time:	100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	75.4	77.3	77.1	79.9	78.5	86.4	78.8	77.9	83.0	92.6	91.9	86.5	79.2	78.5	82.7	86.1	69.2	72.5	70.6	83.1	87.8	86.0	90.2	92.8	81.8	92.8
2-Jul	95.9	92.5	83.3	83.1	86.0	87.0	83.5	80.9	73.3	74.3	76.2	77.6	74.8	87.1	95.9	94.5	91.1	96.0	96.4	95.0	92.3	92.7	92.1	92.6	87.3	96.4
3-Jul	91.7	91.6	94.0	92.2	92.4	92.3	94.3	88.5	92.1	90.8	92.8	93.7	88.5	91.6	89.5	79.7	76.5	76.1	83.2	93.0	96.4	97.5	98.3	98.5	90.6	98.5
4-Jul	98.6	98.6	98.5	98.4	98.5	98.3	88.3	67.0	55.8	45.4	39.9	36.5	33.8	32.2	32.4	32.0	32.0	35.3	39.4	61.9	72.2	83.4	90.9	92.9	65.1	98.6
5-Jul	94.4	86.3	80.1	85.8	87.7	84.2	78.5	72.0	65.9	58.1	47.6	41.0	37.5	36.8	35.6	35.2	47.3	81.7	93.5	90.9	91.2	95.7	97.3	93.0	71.6	97.3
6-Jul	96.5	97.8	98.2	98.4	98.5	98.6	86.1	73.9	68.5	59.8	51.6	47.0	41.1	38.1	39.0	33.2	26.7	27.5	31.9	38.0	56.3	62.9	66.3	70.2	62.8	98.6
7-Jul	78.2	91.1	93.7	95.8	96.7	96.0	86.2	76.2	65.1	54.6	41.0	38.3	38.3	38.5	40.2	38.6	35.5	38.2	43.8	64.0	76.5	82.2	70.6	70.1	64.6	96.7
8-Jul	69.0	67.4	65.4	69.1	71.7	73.9	72.9	70.5	67.6	59.6	49.8	42.8	37.7	38.3	38.3	38.9	40.5	43.6	47.8	67.8	80.0	76.4	75.2	78.3	60.1	80.0
9-Jul	82.9	82.5	86.4	88.8	92.5	87.8	80.6	71.0	69.1	63.3	57.2	51.5	47.5	43.8	44.0	42.2	40.0	39.1	39.1	42.3	44.7	49.0	56.6	76.1	61.6	92.5
10-Jul	82.4	90.0	85.5	91.0	93.6	88.9	69.7	56.1	50.5	45.5	42.3	36.3	33.4	30.7	28.6	26.7	27.2	30.9	34.5	37.7	40.0	45.6	52.1	55.7	53.1	93.6
11-Jul	69.4	73.9	83.6	86.5	92.7	89.3	88.6	83.8	61.9	57.1	46.0	39.1	37.4	36.9	33.5	36.7	40.8	40.6	58.8	68.7	75.7	85.8	85.6	87.8	65.0	92.7
12-Jul	84.4	81.3	82.2	79.4	82.9	82.8	81.2	79.0	68.3	60.7	56.9	53.4	40.3	32.9	33.7	31.2	26.6	30.4	31.8	43.8	63.3	68.1	72.4	72.1	60.0	84.4
13-Jul	75.6	78.9	81.2	84.1	84.3	86.1	82.1	82.7	67.4	59.6	48.7	35.5	36.0	36.1	37.1	35.3	36.5	39.9	45.2	56.3	57.8	59.5	52.8	58.5	59.0	86.1
14-Jul	65.7	60.3	63.2	75.6	84.7	83.6	79.4	78.5	74.3	69.7	69.4	72.6	70.5	64.5	56.3	52.9	53.7	52.1	51.4	61.0	68.7	79.4	83.8	83.2	68.9	84.7
15-Jul	84.5	86.0	86.3	89.1	89.7	86.7	83.8	80.5	69.8	70.0	62.5	62.8	62.4	60.5	59.3	55.5	57.4	59.7	59.5	66.6	84.5	92.3	95.1	97.1	75.1	97.1
16-Jul	97.4	97.7	97.6	97.7	97.9	97.6	91.7	82.7	69.2	62.0	55.4	50.2	49.6	49.0	44.6	46.9	51.7	57.8	59.7	60.8	61.7	64.6	67.6	69.2	97.9	97.9
17-Jul	69.3	70.9	76.6	83.1	83.7	75.4	84.2	96.0	94.8	94.8	96.9	94.3	94.8	87.9	80.6	89.6	89.3	95.4	95.6	93.0	89.7	89.8	94.9	97.9	88.3	97.9
18-Jul	98.7	98.9	99.0	98.8	98.8	98.9	98.8	98.0	95.7	93.3	90.2	82.2	78.6	61.8	57.1	55.1	47.4	58.3	74.0	85.1	93.0	92.0	85.3	84.2	84.3	99.0
19-Jul	86.7	95.3	97.8	98.1	96.8	94.3	89.0	82.9	78.1	73.3	64.4	54.2	52.3	54.5	55.6	46.6	48.5	51.8	61.3	73.5	85.1	87.4	86.2	89.9	75.1	98.1
20-Jul	95.5	96.7	97.8	98.1	98.1	97.6	90.8	81.9	71.3	63.8	58.1	54.4	51.0	61.1	57.5	53.0	58.5	51.9	64.9	78.1	85.2	93.9	97.8	98.1	77.3	98.1
21-Jul	96.9	96.4	97.6	98.1	98.5	98.0	88.9	80.6	68.9	58.1	52.4	50.2	47.8	44.3	45.6	47.2	45.9	51.5	64.6	78.6	85.4	94.6	95.6	96.8	74.3	98.5
22-Jul	96.5	90.2	90.3	95.4	94.1	90.0	83.5	82.9	72.3	67.1	56.4	58.1	77.3	88.8	82.9	82.1	80.9	85.4	88.6	94.1	95.0	97.9	98.6	98.9	85.3	98.9
23-Jul	99.0	99.1	99.0	99.0	99.2	99.3	99.3	98.9	93.9	82.0	74.1	63.8	56.0	49.1	44.5	41.9	43.2	40.5	55.3	76.4	83.1	92.2	96.4	97.4	78.4	99.3
24-Jul	98.1	98.7	98.5	98.4	97.9	94.0	89.2	80.1	67.1	59.9	55.1	51.0	48.7	46.1	43.2	39.3	38.5	46.7	52.5	57.8	53.9	53.1	58.0	63.2	66.2	98.7
25-Jul	65.7	67.0	70.3	90.6	97.7	96.3	97.3	99.1	99.3	98.9	99.3	99.6	99.7	99.8	99.5	93.8	81.8	84.4	84.1	81.3	82.2	87.4	92.0	86.7	89.7	99.8
26-Jul	86.3	94.2	97.8	98.2	98.4	98.4	95.1	76.2	66.9	61.2	61.2	61.0	65.9	81.2	86.1	68.2	74.3	82.2	86.4	88.2	94.0	97.1	95.5	91.4	83.6	98.4
27-Jul	92.7	90.5	90.7	89.5	94.1	95.9	91.9	88.6	85.1	73.2	70.2	66.9	63.1	67.4	62.6	64.5	83.3	88.7	89.2	86.9	93.8	97.6	98.4	98.1	84.3	98.4
28-Jul	98.4	98.6	98.7	98.8	99.0	99.0	97.4	87.3	71.2	67.0	63.5	51.9	45.0	46.2	42.3	44.9	49.6	45.8	56.5	64.6	68.1	72.6	82.2	87.9	72.4	99.0
29-Jul	87.6	90.2	90.8	93.7	95.5	94.5	87.5	79.6	70.2	59.5	49.7	44.4	44.3	42.0	40.0	40.9	37.0	37.8	45.9	69.7	82.9	89.1	92.8	95.2	69.2	95.5
30-Jul	96.7	97.7	98.0	98.2	98.7	98.6	90.5	77.5	68.9	55.6	47.7	43.9	40.8	39.5	39.3	38.8	39.0	40.9	44.2	54.9	59.5	68.5	63.8	61.6	65.1	98.7
31-Jul	80.4	97.8	98.8	99.3	99.4	99.5	97.2	94.5	84.5	80.7	70.5	64.1	57.3	53.0	48.9	47.7	47.0	44.4	48.5	60.7	82.6	81.8	74.8	73.3	74.4	99.5
																								Diurnal Average		
																								Diurnal Maximum		





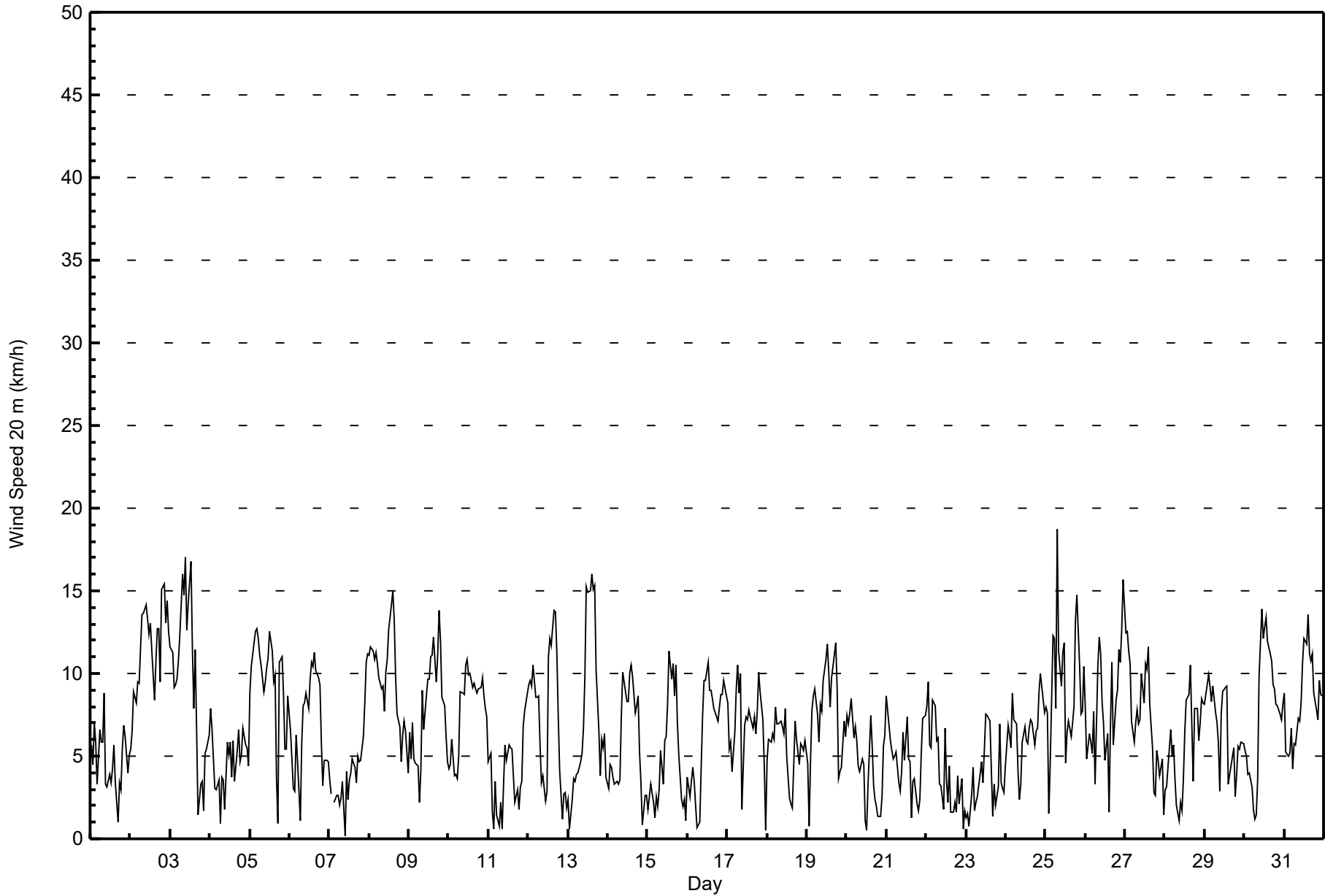
Maximum Speed: 19 km/h on Jul 25 08:00		Maximum Daily Speed Average: 10.6 km/h on Jul 2		Hours in Service: 744																						
Minimum Speed Value: 0 km/h on Jul 7 10:00		Minimum Daily Speed Average: 1.2 km/h on Jul 28		Hours of Data: 743																						
Maximum Diurnal Speed Average: 3.3 km/h at hour 16		Minimum Diurnal Speed Average: 0.4 km/h at hour 20		Hours of Missing Data: 1																						
Monthly Average Velocity: 0.8 km/h 255.1 deg		Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 9 P ₉₀ = 11 P ₉₉ = 15		Percent Operational Time: 99.9																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	SSW6	SW4	SSW7	SSW6	SSW3	SSW7	SSW6	WSW6	SW9	SW3	ENE3	SSE4	ENE3	ENE4	SW6	N3	W1	NNW3	WNW3	SW5	WSW7	W6	WNW4	WSW5	SW3.0	SW9
2-Jul	WSW5	WSW7	W9	WNW8	W10	W9	WSW12	W14	W14	W14	W13	WSW12	WSW13	WSW11	NW8	NNW11	NW13	WNW13	NW10	WNW15	WNW15	WNW13	WNW14	WNW13	W10.6	WNW15
3-Jul	WNW12	WNW11	WNW9	WNW9	NW10	NW11	NNW12	N16	N15	N17	N13	N14	N17	N12	NNE8	NE11	ENE7	WNW1	NE3	N4	SSW2	S5	S5	SW6	NNW6.8	N17
4-Jul	SW8	SW7	SW5	SSW3	S3	S4	SE1	NE4	NE4	SE2	NNE6	NNE5	NNE6	NNW4	ENE6	NE3	NE5	SE7	ESE5	ESE5	ESE7	SE6	SSE6	S4	ESE1.9	SW8
5-Jul	SSW9	SSW10	SSW12	SSW13	SSW13	SSW12	SW11	SW11	SW9	SW9	SW10	WSW11	SW13	SW11	WSW9	WSW10	NNW4	NW1	SW11	SSW9	SW5	SSW5	SW9	SW8.9	SSW13	
6-Jul	SSW6	S5	SSE3	SSE3	SSW6	S5	S1	N6	NNE8	NNE8	NNE9	NNE8	N10	NNE11	NNE10	N11	N10	NNW10	N9	N6	N3	NNE5	NNE5	NNE5	N4.3	N11
7-Jul	NNE4	NNE3	UO	SW2	SSW3	SSW3	SW2	WSW2	SW3	NNW0	ENE4	S2	SE4	SSE4	SE5	SSE4	NE3	S5	SW5	SSW5	S6	SSW8	SSW11	SSW11	S2.8	SSW11
8-Jul	SW11	SW12	SW11	SW11	SW11	SW11	SW10	SW9	SW9	WSW8	W10	W11	W13	WNW14	WNW15	WNW13	NW10	NW8	WNW7	W5	WSW6	SW7	WSW7	SW4	WSW8.1	WNW15
9-Jul	SW6	SSW5	SSW7	S5	S5	SW4	SW2	N4	NE9	NNE7	NNE9	NE10	NE10	NE11	NE11	NE12	NE9	NNE11	NE14	NE12	NE9	ENE8	ENE6	NNE5	NE5.0	NE14
10-Jul	NE4	ENE5	ENE6	NNE4	NNW4	NNW4	E5	ESE9	ESE9	ESE9	E11	E11	E10	E10	E9	E9	ENE9	ENE9	E9	E9	E10	ESE9	SE8	SSE7	E6.7	E11
11-Jul	SSE5	SSE5	SSE2	ENE1	SE3	ENE1	NE1	NNW2	E1	SSW3	S6	SSW5	W6	W6	W5	W4	W2	WSW3	S2	SSE3	SSW3	SSW7	SSW8	SSW9	SSW2.4	SSW9
12-Jul	SSW9	SSW10	SSW9	SSW11	SSW9	SW9	SW9	WSW6	SW3	SE4	SE2	N3	N11	N12	N12	N14	N14	N11	N7	NNW4	WNW1	N3	N3	NNW2	NW1.8	N14
13-Jul	W2	W1	W2	WSW4	W4	W4	WNW4	W5	NNW5	NNW7	NNW10	N15	N15	N15	N16	N15	NNW15	NNW10	NNW7	NNW4	NNW6	NNW6	N6	NW4	NNW6.7	N16
14-Jul	NNW3	N4	NNW4	NW4	WNW3	W3	W3	NW4	N7	N10	N9	NNE8	NNE8	NNE10	NNE11	N10	N8	N8	N9	NNE5	N3	W1	WSW3	WNW3	N5.0	NNE11
15-Jul	WSW2	W3	W3	SW2	SSW1	NNE3	W2	NW3	NNE5	N3	NNE6	NNE6	NNE8	NE11	NNE10	NNE11	NNE9	NE11	NNE7	NE5	E2	ENE2	SW2	ENE1	NNE3.7	NE11
16-Jul	SW4	SSW3	SSW4	SSW4	SSW3	SSW2	N1	N1	E4	ENE7	ENE10	E10	E11	ESE9	E9	ESE9	ESE8	ESE7	ESE7	ESE8	ESE9	SE9	SE10	SSE9	ESE5.1	E11
17-Jul	SSE8	SE5	SE6	ESE4	SSE6	SSE9	SE11	SE9	SE10	ESE2	NNE7	NNE7	NNE7	NNE8	N7	N7	N7	N6	ENE8	ESE10	E9	ENE7	E4	E0	E4.1	SE11
18-Jul	NE5	NNE6	NNE6	NNE6	NNE6	NNE8	NNE7	NNE7	NNE7	N7	N6	NNE8	N5	NNE2	NNW2	ENE2	ESE4	SE7	SSE6	SW4	SW6	WSW6	WNW5	NW6	NNE2.9	NNE8
19-Jul	NW5	SW1	SSW5	SSW8	SSW9	SW9	SW8	SW6	SW8	SW8	SW10	SW11	SW12	WSW10	SW8	W10	WSW10	W12	WNW9	W4	SSW4	SSE4	SW7	SW6	SW6.7	W12
20-Jul	SSW7	SSW7	SSW8	SSW8	SSW6	SSW7	SW6	SW4	S4	SW5	SSW4	WNW1	SSE0	SE3	S7	SSW6	W3	W2	SSW2	S1	S1	SSW3	SSW6	SSW6	SSW4.2	SSW8
21-Jul	SSW9	SSW7	SSW6	S5	S5	SW5	SW5	SW3	W3	ENE4	NE6	NE5	NE7	NE5	E5	SSE1	ESE3	S4	SSE2	SSE2	S2	SSW5	SSW7	SSW7	S2.1	SSW9
22-Jul	SSW8	SSW10	SSW6	SSW5	SSW8	SSW8	SSW6	SW6	SSW3	SSW3	S2	SW7	W4	W2	WNW4	N2	NNE2	NNE2	WSW2	SW4	NNE2	NNE4	NNE1	NNE2	SW2.9	SSW10
23-Jul	N1	N2	NE1	NNE3	NNE4	NNW2	SSW2	SW3	SW4	WSW5	WNW3	WSW5	W8	W7	W7	WSW4	SW1	E3	ENE2	E3	E7	ESE3	SW3	SSW3	WSW1.2	W8
24-Jul	S4	SSW7	SSW6	SSW6	SSW9	SSW7	SSW7	S4	E2	E3	ENE6	E7	E6	E6	ENE7	ENE7	ENE7	E6	E7	E7	E9	ESE10	E8	ESE8	ESE3.9	ESE10
25-Jul	E8	E8	WSW2	NNW5	ENE12	NE12	NNE8	NNE19	NE11	N9	NE11	NE12	NNW5	NW6	WNW7	WNW6	WNW7	WSW8	W13	W15	WSW10	SW8	SSW8	SW10	NNW3.0	NNE19
26-Jul	SSW8	S5	SSE6	S6	S5	SSW8	S3	SW10	SSW12	S11	SSE8	S7	S5	S6	N2	NNE7	NE11	ESE6	NNE8	NNE9	NNE11	NE11	NE13	NE16	ESE1.7	NE16
27-Jul	NE12	NE13	NE11	NE11	NNE7	NNE6	NNE7	NNE8	N7	NNE7	NNE10	NNE8	NNE11	NNE10	N12	N8	ENE5	W3	NW3	N5	N5	NNE4	N5	NW1	NNE7.0	NE13
28-Jul	S3	SSE3	SSW4	SSW7	SSW5	SSW6	SW4	SW2	N1	SSE2	NE2	NE4	N6	NNE8	NNE9	NNE11	NNE7	ENE3	SW8	SW8	SW6	SW7	SSW8	SSW8	SSW1.2	NNE11
29-Jul	SSW8	SSW9	SSW10	SSW9	SSW8	SSW9	SSW8	SW7	SSW6	WSW3	SW8	W9	W9	W9	SW3	WSW4	WSW4	SW6	WSW3	S4	S6	SSW5	SSW6	SSW6	SW6.0	SSW10
30-Jul	S5	S5	S4	S4	SSE3	S2	SSW1	WNW1	SW4	S10	S14	S12	S13	S13	S12	S11	S11	S9	SSE9	SSE8	SSE8	SSE8	SSE7	SSE8	S7.3	S14
31-Jul	WSW9	ENE5	SSW5	SSW5	SE7	SSE4	S6	SSW6	W7	W7	SW8	WSW11	WSW12	WSW12	WSW14	WSW11	WSW11	WSW11	WSW9	SW8	SW7	SW10	SW9	SW9	SW7.1	WSW14
SSW3.2SSW2.6SSW3.2 SW3.0SSW3.1 SW3.2 SW2.6 W1.6 W0.7 NW1.0NNE1.6NNW1.5NNW2.6NNW2.5 N2.8 N3.3 N3.0 N1.4NNW1.1WSW0.4 SSE1.0 S1.6SSW2.2SSW2.7																								Diurnal Average		
NE12 NE13 SSW12 SSW13 SSW13 NE12 NNW12 NNE19 N15 N17 S14 N15 N17 N15 N16 N15 NNW15WNW13 NE14WNW15WNW15WNW13WNW14 NE16																								Diurnal Maximum		
UO - Unstable Operation																										
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
Janvier - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Jul 25 08:00 Minimum Value: 0 km/h on Jul 11 19:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6																	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	1	2	1	1	2	3	2	2	3	3	2	2	2	1	2	1	2	1	1	2	2	2	1	2	3
2-Jul	2	2	2	3	3	3	4	4	5	5	5	4	4	4	4	5	5	4	3	6	5	4	4	4	6
3-Jul	3	3	3	3	3	4	6	6	6	7	5	6	6	5	3	3	3	2	5	2	1	1	1	2	7
4-Jul	2	1	1	1	1	1	1	2	1	1	3	3	3	3	3	4	3	2	1	1	1	1	2	2	4
5-Jul	1	2	2	2	2	3	3	3	3	3	4	4	4	4	4	4	7	5	3	4	2	2	2	2	7
6-Jul	1	1	1	1	1	2	1	2	2	3	3	3	4	4	4	4	4	3	3	2	1	1	1	1	4
7-Jul	1	1	UO	1	1	1	2	1	1	1	1	2	2	2	2	2	2	2	1	1	1	2	2	2	2
8-Jul	2	3	3	2	2	2	2	2	2	3	3	5	4	5	5	4	4	3	2	1	1	1	1	1	5
9-Jul	1	1	1	1	1	1	1	1	2	2	3	3	3	4	4	3	3	3	4	4	3	2	2	1	4
10-Jul	2	2	2	2	1	1	3	3	3	3	3	4	3	4	3	3	3	3	3	3	3	2	2	2	4
11-Jul	1	1	2	1	1	1	1	1	1	3	2	3	3	2	2	2	1	1	0	0	1	1	1	1	3
12-Jul	1	1	1	2	2	2	3	2	2	2	2	3	4	5	4	5	5	4	3	2	1	1	1	1	5
13-Jul	1	1	1	1	1	2	1	1	2	3	5	5	6	7	6	6	6	5	3	1	3	2	2	1	7
14-Jul	1	1	1	1	1	1	1	1	4	4	3	3	3	3	4	4	3	3	3	2	1	1	1	1	4
15-Jul	1	1	1	1	1	1	1	1	2	1	3	2	2	3	3	3	3	3	2	1	1	1	1	1	3
16-Jul	1	1	1	1	2	1	1	2	1	3	3	3	3	3	3	3	2	2	2	2	2	3	3	2	3
17-Jul	3	2	2	2	3	3	3	3	3	3	2	3	2	2	3	2	2	2	2	3	3	2	2	1	3
18-Jul	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	3	2	3
19-Jul	2	1	2	2	2	2	2	2	2	2	3	3	3	4	3	3	3	4	4	2	2	1	1	1	4
20-Jul	1	1	1	2	2	2	2	1	1	2	3	2	2	2	2	2	2	1	0	1	1	1	1	1	3
21-Jul	1	1	1	1	1	2	2	1	1	1	2	2	2	2	2	2	1	1	1	1	2	1	1	1	2
22-Jul	2	1	3	2	1	2	3	3	1	1	1	4	4	2	2	2	1	2	2	1	2	1	1	1	4
23-Jul	1	2	2	1	1	1	1	1	2	2	1	3	3	3	2	2	1	1	1	3	1	2	1	1	3
24-Jul	2	2	2	2	1	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3
25-Jul	3	2	5	4	3	4	5	8	8	6	5	5	2	2	2	2	3	3	4	5	3	2	2	3	8
26-Jul	3	1	1	1	1	2	2	5	4	4	3	4	2	3	2	3	3	3	3	4	4	3	4	4	5
27-Jul	3	3	3	3	3	2	2	2	2	3	3	3	3	4	5	3	3	1	1	2	1	1	1	1	5
28-Jul	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	1	5	3	1	2	2	2	5
29-Jul	2	2	2	2	1	2	2	2	1	2	3	3	3	3	3	2	2	2	2	1	1	1	1	1	3
30-Jul	1	1	1	1	1	1	1	1	4	3	4	4	5	5	4	4	4	3	3	2	2	2	2	3	5
31-Jul	5	4	3	2	2	2	2	2	2	2	3	5	4	4	4	4	4	4	3	4	2	3	2	2	5
Diurnal Maximum																									
UO - Unstable Operation																									





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed 20 m (WS20m) - km/h
Janvier - July 2023

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	294	39.57	39.57
6 - 11	381	51.28	90.85
12 - 19	68	9.15	100.00
20 - 28	0	0.00	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed 20 m (WS20m) - km/h
Janvier - July 2023

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	21	21	15	15	11	8	8	18	34	35	31	17	23	12	8	17	294
6 - 11	25	56	18	15	24	16	11	15	13	68	56	22	16	9	9	8	381
12 - 19	16	1	9	1	0	0	0	0	5	5	3	6	8	10	1	3	68
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	62	78	42	31	35	24	19	33	52	108	90	45	47	31	18	28	743

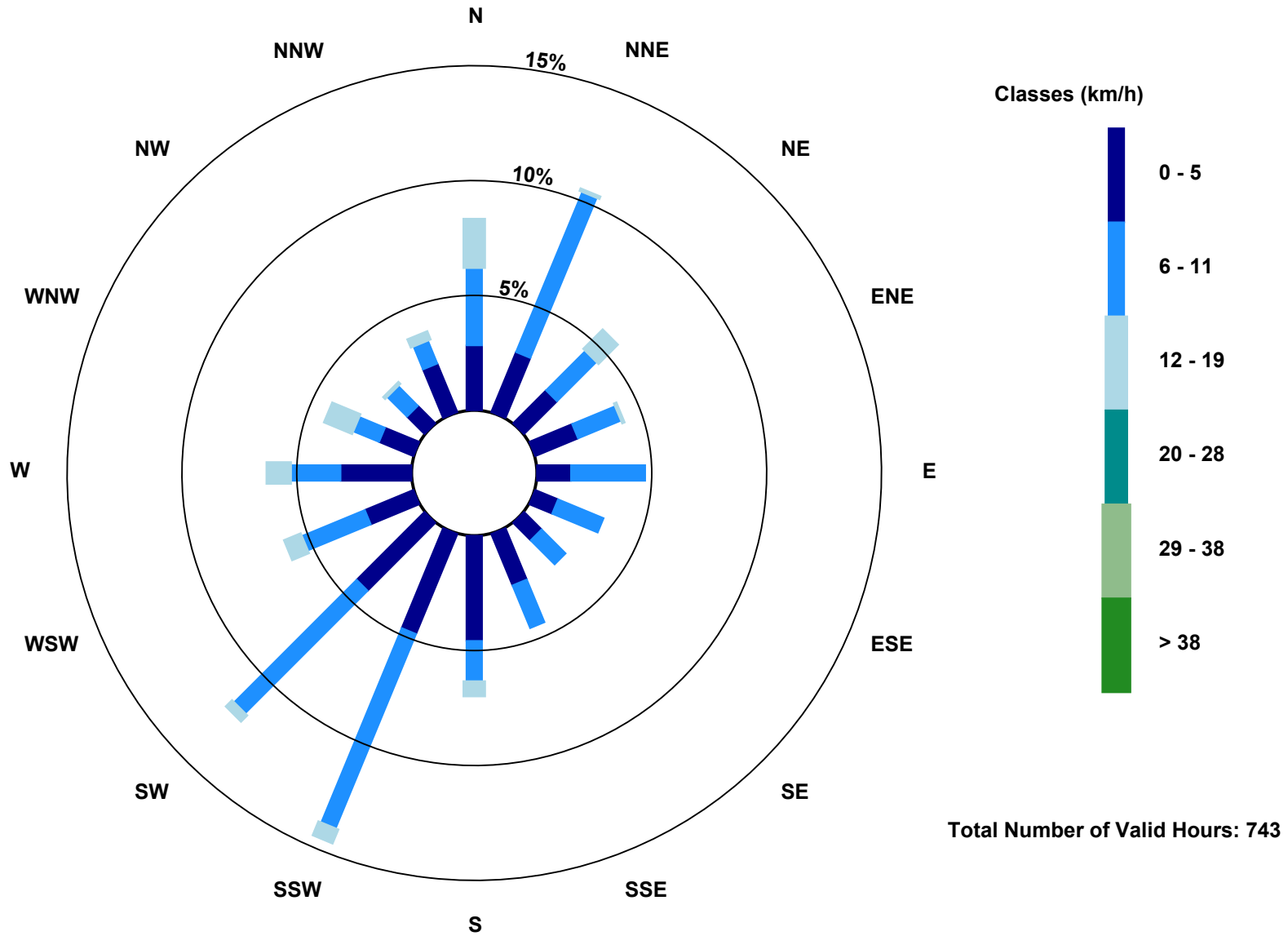
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed 20 m (WS20m) - km/h
Janvier





Direction of Maximum Speed: 33 deg on Jul 25 08:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 281.2 deg on Jul 2	Hours of Data: 743
Direction of Minimum Speed: 329 deg on Jul 7 10:00	Direction of Minimum Daily Speed Average: 1.2 deg on Jul 28
Direction of Minimum Speed: 329 deg on Jul 7 10:00	Hours of Missing Data: 1
Monthly Average Direction: 255.1 deg	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	199	216	208	200	195	204	213	253	224	235	61	168	67	76	226	359	267	329	297	225	237	270	293	239	227.1
2-Jul	241	244	269	292	260	265	257	267	275	281	276	246	252	258	320	335	313	299	307	294	294	289	290	297	281.2
3-Jul	299	296	302	310	309	309	328	349	350	349	350	3	6	25	38	74	296	43	359	207	185	190	214	339.7	
4-Jul	216	216	214	201	171	175	144	51	55	124	30	23	30	330	57	44	50	125	104	118	113	139	152	183	114.9
5-Jul	202	209	210	206	206	212	223	227	229	226	236	239	229	257	256	341	320	221	230	213	217	205	214	223.6	
6-Jul	193	183	151	167	197	191	184	10	21	17	22	18	11	18	16	3	356	348	2	354	2	12	23	18	11.1
7-Jul	25	29	UO	222	194	193	224	258	227	329	59	175	138	163	145	161	45	175	231	195	188	206	206	207	189.8
8-Jul	214	218	223	217	217	224	223	225	222	249	261	266	279	289	291	291	310	310	298	268	238	235	241	214	251.8
9-Jul	214	205	197	187	190	214	234	5	34	28	30	37	37	34	38	36	42	30	42	55	56	59	60	13	43.2
10-Jul	49	57	72	22	339	335	98	119	111	108	81	86	87	83	93	83	70	78	80	90	99	117	140	157	90.1
11-Jul	164	155	150	73	141	64	45	338	94	193	180	212	281	275	276	273	271	253	181	168	201	203	205	203	210.7
12-Jul	202	206	210	208	213	216	224	238	221	130	125	349	10	8	7	8	10	9	356	332	284	352	352	346	315.6
13-Jul	271	270	265	255	274	261	282	277	337	339	347	360	349	349	352	352	344	345	331	327	344	335	355	319	338.0
14-Jul	338	8	346	312	282	259	268	320	360	354	11	31	18	19	12	357	10	354	11	15	9	276	244	284	357.2
15-Jul	241	275	276	229	206	21	265	325	15	8	21	21	21	37	31	23	18	34	23	54	80	62	214	66	21.0
16-Jul	214	196	208	194	200	202	354	1	93	67	72	83	79	105	85	105	113	114	122	118	113	124	135	147	112.8
17-Jul	147	126	126	116	150	153	140	136	131	113	24	31	18	24	10	353	9	10	67	104	89	67	82	95	85.7
18-Jul	34	20	17	13	19	12	23	17	15	11	6	16	11	26	332	67	109	132	155	222	217	242	284	316	13.4
19-Jul	314	231	202	211	208	214	218	224	214	215	229	234	232	243	234	259	245	266	292	264	207	163	214	219	232.5
20-Jul	208	210	205	204	193	212	219	225	178	226	212	293	152	143	180	194	265	262	197	182	171	211	204	195	204.9
21-Jul	202	199	192	187	179	214	216	226	272	61	40	41	40	40	85	149	118	174	149	148	182	204	202	205	176.8
22-Jul	209	206	195	205	212	203	213	215	195	195	190	227	259	268	285	358	14	24	243	218	20	33	29	16	217.8
23-Jul	2	357	49	19	28	336	206	219	228	254	284	258	261	273	271	257	214	80	60	88	101	119	217	201	257.8
24-Jul	184	201	195	196	211	208	198	190	81	81	58	94	86	86	67	64	89	91	95	98	112	98	108	108	117.0
25-Jul	94	100	258	331	71	45	15	33	54	9	47	34	344	326	300	300	288	251	275	277	255	230	213	232	346.3
26-Jul	211	179	168	172	180	213	188	218	210	175	151	180	170	185	352	28	34	108	14	19	23	36	42	41	121.9
27-Jul	39	36	37	39	27	16	19	25	8	13	25	18	16	16	8	9	70	272	319	358	3	18	8	304	20.5
28-Jul	190	165	195	198	193	204	220	232	7	154	44	53	360	32	28	20	20	57	230	228	230	214	201	203	211.2
29-Jul	208	207	208	208	207	209	211	222	202	249	221	267	269	266	230	246	250	231	241	187	189	198	202	197	221.1
30-Jul	174	176	178	172	156	177	197	296	217	181	185	181	180	184	174	190	171	172	151	155	149	157	152	152	173.0
31-Jul	238	74	207	207	145	150	171	194	263	268	232	243	246	245	249	238	246	251	237	234	225	222	227	219	231.3

208.1 199.5 209.1 213.9 202.5 218.7 225.0 264.7 274.6 316.4 12.2 348.2 344.1 346.3 350.2 354.6 7.1 350.2 342.9 240.1 167.6 183.6 199.9 209.2
Diurnal Average

UO - Unstable Operation

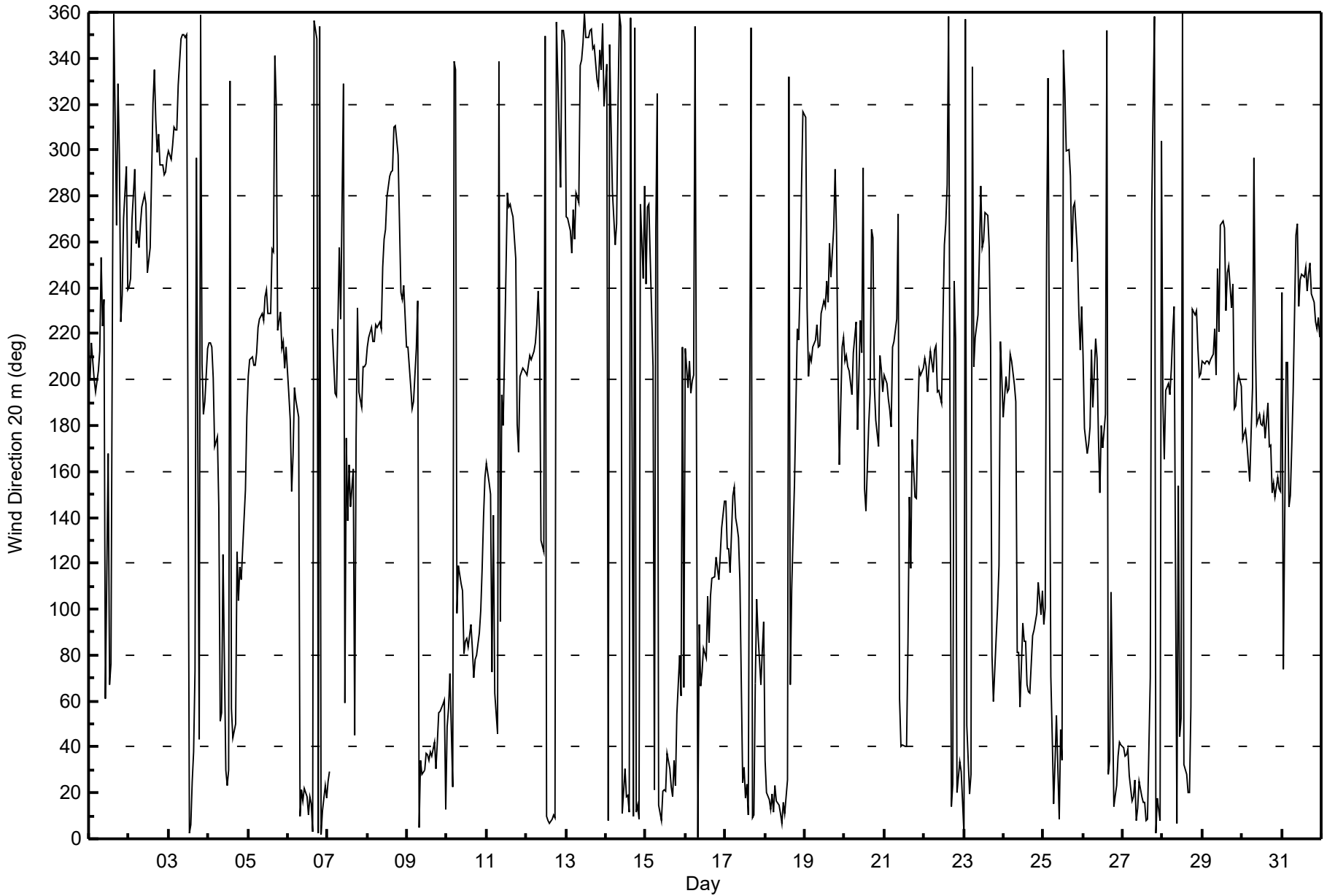
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 20 m (WD20m) - deg
Janvier - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Jul 7 10:00 Minimum Value: 7 deg on Jul 28 04:00 Percentiles: P ₁ = 9 P ₁₀ = 15 Q ₁ = 20 Median = 27 Q ₃ = 37 P ₉₀ = 63 P ₉₉ = 95																	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	20	34	13	22	59	46	23	31	28	84	68	55	55	37	51	60	91	48	56	25	22	29	45	27	91
2-Jul	23	30	20	29	25	23	25	22	24	22	28	24	28	27	47	35	29	21	26	19	20	19	17	20	47
3-Jul	20	20	20	24	22	24	33	37	33	32	33	35	29	26	19	19	28	84	95	51	62	13	26	23	95
4-Jul	15	12	16	30	31	19	63	43	33	77	56	71	55	76	68	96	49	24	24	12	8	11	26	12	96
5-Jul	9	10	14	13	15	19	22	24	26	28	32	36	35	34	37	36	75	98	29	31	21	27	23	19	98
6-Jul	15	13	23	21	10	28	87	36	20	32	28	42	38	28	30	32	34	36	30	29	25	15	15	14	87
7-Jul	12	19	UO	13	10	30	51	36	47	103	42	90	72	66	53	44	74	29	26	15	8	8	12	13	103
8-Jul	16	18	18	16	17	19	19	21	21	30	25	27	25	28	24	23	26	24	18	29	16	15	14	41	41
9-Jul	12	16	11	18	16	21	66	31	13	29	23	22	29	25	24	17	21	17	21	17	17	17	24	13	66
10-Jul	35	32	32	50	19	28	61	26	25	33	31	32	30	31	33	29	25	22	21	19	20	21	19	22	61
11-Jul	25	25	80	92	17	40	57	41	99	86	37	69	43	53	39	69	41	26	41	16	15	10	10	9	99
12-Jul	10	12	13	16	17	19	23	29	57	54	84	87	30	32	30	28	26	27	32	36	71	36	37	46	87
13-Jul	42	85	78	27	26	27	25	22	37	40	36	33	35	40	32	37	37	35	34	39	29	31	30	34	85
14-Jul	32	19	26	26	24	31	30	28	31	34	24	23	34	24	33	34	31	32	22	19	24	75	27	34	75
15-Jul	43	32	32	50	84	35	36	40	32	46	42	39	27	18	22	23	30	20	21	15	33	17	37	51	84
16-Jul	20	12	15	23	35	26	66	73	48	26	29	31	23	31	24	28	22	18	17	15	15	18	21	20	73
17-Jul	23	26	26	52	42	22	20	30	21	89	23	22	20	17	27	33	23	25	28	21	21	24	29	102	102
18-Jul	12	16	28	19	22	22	24	20	20	22	30	22	23	75	77	63	39	21	19	22	16	29	28	27	77
19-Jul	30	81	43	18	12	15	20	27	24	28	25	29	28	29	28	27	25	24	23	64	25	36	17	16	81
20-Jul	13	16	12	13	14	22	24	41	39	42	73	102	101	62	31	31	39	46	35	55	39	53	11	9	102
21-Jul	10	10	11	13	14	17	24	35	49	36	25	50	32	53	49	83	46	18	25	27	52	11	9	10	83
22-Jul	12	11	51	49	14	12	22	25	44	34	80	56	90	92	45	94	75	76	87	45	52	22	93	63	94
23-Jul	43	44	88	56	15	45	54	64	43	35	58	50	38	31	29	58	78	37	59	82	11	47	23	36	88
24-Jul	29	14	15	33	14	16	17	21	48	52	39	33	32	34	27	21	22	24	16	16	18	20	22	23	52
25-Jul	24	27	95	76	20	19	54	27	78	68	34	32	36	37	22	41	31	31	24	23	24	23	19	22	95
26-Jul	27	20	20	21	19	16	27	28	29	31	32	31	25	33	87	31	23	45	21	20	21	16	15	14	87
27-Jul	15	16	17	15	24	25	24	21	32	37	24	31	24	28	31	31	57	37	35	23	19	14	19	66	66
28-Jul	28	26	10	7	13	11	30	55	87	61	70	59	44	23	32	25	26	42	46	21	17	17	17	14	87
29-Jul	13	13	15	15	14	14	21	27	31	85	31	38	32	34	89	61	50	37	72	21	9	20	13	12	89
30-Jul	12	14	16	15	15	64	84	85	66	23	21	25	33	25	28	30	33	24	24	18	17	16	20	25	85
31-Jul	40	67	60	28	27	36	32	38	30	37	47	39	34	32	28	29	29	25	22	30	17	21	19	17	67
43 85 95 92 84 64 87 85 99 103 84 102 101 92 89 96 91 98 95 82 71 75 93 102																									
Diurnal Maximum																									
UO - Unstable Operation																									





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS23
FORT HILLS
JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT HILLS (AMS23)
 JULY 2023

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	32	36	99.46	20.8	0	3.2	0
TRS(ppb) Average	706	35	38	99.6	1.6	0	0.5	0
THC(ppm) Average	702	33	42	98.79	10.3	-	2.7	-
NMHC(ppm) Average	702	33	42	98.79	1.809	-	0.317	-
CH4(ppm) Average	702	33	42	98.79	8.5	-	2.4	-
NO2 (ppb) Average	700	37	44	99.06	40.6	0	15	-
NO (ppb) Average	700	37	44	99.06	106.4	-	11.3	-
NOX (ppb) Average	700	37	44	99.06	130.2	-	20.2	-
PM2.5 (ug/m3) Average	738	1	6	99.33	453.3	152	289.9	19
Temperature 2 m (C) Average	742	0	2	99.73	30	-	23.2	-
Relative Humidity (%) Average	742	0	2	99.73	97.4	-	89.9	-
Wind Speed 10 m (km/h) Average	742	0	2	99.73	36	-	20	-
Wind Direction 10 m (deg) Average	742	0	2	99.73	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT HILLS (AMS23)
JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.57	1.9	-	0	0	0	0.1	0.3	1.1	20.8
TRS (ppb) Average	706	0.22	0.2	-	0	0.1	0.1	0.2	0.3	0.4	1.6
THC (ppm) Average	702	2.28	0.5	-	1.9	1.9	2	2.1	2.4	2.8	10.3
NMHC(ppm) Average	702	0.164	0.181	-	0.001	0	0	0.1	0.2	0.4	1.809
CH4(ppm) Average	702	2.12	0.4	-	1.9	1.9	2	2	2.2	2.4	8.5
NO2 (ppb) Average	700	6.9	7	-	0	0.7	1.7	4.1	10.2	18.3	40.6
NO (ppb) Average	700	3.2	8.7	-	0	0	0	0.4	2.7	8.1	106.4
NOX (ppb) Average	700	10.09	13.5	-	0	0.7	1.9	4.6	13.2	25.9	130.2
PM2.5 (ug/m3) Average	738	57.18	79.3	-	2.4	5.7	9.8	29.2	61.2	139.1	453.3
Temperature 2 m (C) Average	742	18.95	4.4	-	8.7	13.5	15.6	18.4	22.4	25.1	30
Relative Humidity (%) Average	742	62.62	19.7	-	24.3	35.4	46	62.5	79.1	90.2	97.4
Wind Speed 10 m (km/h) Average	742	9.8	5	-	1	4	6	9	13	17	36
Wind Direction 10 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT HILLS (AMS23)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	09 Jul 2023 05:00	09 Jul 2023 05:00	1	DAS Failure - data not recorded
SO2, THC/NMHC/CH4	26 Jul 2023 15:00	26 Jul 2023 16:00	2	DAS Failure - data not recorded
TRS, WS/WD, Temperature, Relative Humidity	26 Jul 2023 15:00	26 Jul 2023 15:00	1	DAS Failure - data not recorded
NO2,TRS	10 Jul 2023 13:00	10 Jul 2023 13:00	1	Maintenance - sample manifold cleaned
NO2, THC/NMHC/CH4, PM2.5	26 Jul 2023 12:00	26 Jul 2023 12:00	1	Maintenance - station logger/modem reset
THC/NMHC/CH4	09 Jul 2023 09:00	09 Jul 2023 09:00	1	Maintenance - verify daily QA response
THC/NMHC/CH4	21 Jul 2023 11:00	21 Jul 2023 13:00	3	Maintenance - replaced support gas cylinder
THC/NMHC/CH4	26 Jul 2023 13:00	26 Jul 2023 13:00	1	DAS Failure - data not recorded
SO2	08 Jul 2023 04:00	08 Jul 2023 04:00	1	DAS Failure - data not recorded
NO2	26 Jul 2023 13:00	26 Jul 2023 16:00	4	DAS Failure - data not recorded
PM2.5	26 Jul 2023 13:00	26 Jul 2023 15:00	3	DAS Failure - data not recorded



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 20.8 ppb on Jul 23 10:00	Maximum Daily Average: 3.2 ppb on Jul 23		Hours of Data:	708
Minimum Value: 0.0 ppb on Jul 2 19:00	Minimum Daily Average: 0.0 ppb on Jul 27		Hours of Missing Data:	36
Maximum Diurnal Average: 1.5 ppb at hour 14	Minimum Diurnal Average: 0.1 ppb at hour 4		Hours of Calibration:	32
Monthly Average: 0.57 ppb	Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 1.1 P ₉₉ = 9.4		Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.4	0.2	Z	0.2	0.3	0.2	0.2	0.2	0.3	0.3	0.9	4.8	6.1	7.2	2.6	3.0	0.5	0.6	0.4	0.2	0.3	0.2	0.2	0.2	1.3	7.2
2-Jul	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.2
3-Jul	0.0	0.1	0.1	0.1	Z	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
4-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.3	0.2	0.2	0.1	0.1	0.0	0.2	0.9	1.0	0.6	0.2	0.1	0.3	4.5	2.8	1.3	1.0	0.5	0.6	4.5
5-Jul	Z	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4
6-Jul	0.0	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	0.0	0.0	0.0	0.0	0.0
7-Jul	0.0	0.1	Z	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.7	3.0	0.7	0.3	0.2	0.5	0.3	0.4	0.3	0.3	0.2	0.3	0.3	0.4	0.4	3.0
8-Jul	0.5	0.4	0.3	DF	0.3	0.2	0.2	0.2	0.3	0.3	0.7	1.5	0.6	1.2	0.7	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.1	0.1	0.4	1.5
9-Jul	0.1	0.1	0.2	0.2	DF	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
10-Jul	0.1	0.0	0.0	0.0	0.1	Z	0.0	0.1	0.2	0.2	C	C	C	0.1	0.0	0.0	0.2	0.9	1.4	0.8	0.0	0.1	0.1	0.1	0.2	1.4
11-Jul	Z	0.0	0.0	0.1	0.2	0.6	2.0	3.7	9.0	2.5	0.6	0.4	0.4	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.5	0.2	1.0	9.0
12-Jul	0.3	Z	0.1	0.1	0.1	0.2	0.5	0.7	0.4	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.1	0.4	0.4	0.4	0.6	0.3	0.7
13-Jul	0.5	0.4	Z	0.6	0.5	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.1	0.1	0.2	0.3	0.3	0.6	1.4	1.7	1.2	1.2	1.1	0.8	0.6	1.7
14-Jul	0.7	0.5	0.4	Z	0.3	0.2	0.2	0.1	0.2	0.2	0.2	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.2	0.7
15-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2
16-Jul	0.1	0.0	0.0	0.0	0.0	Z	0.1	1.1	11.2	7.0	3.7	0.4	0.0	0.1	0.4	1.3	1.6	2.0	2.5	0.5	0.0	0.1	0.0	0.0	1.4	11.2
17-Jul	Z	0.0	0.0	0.0	0.0	0.1	0.0	0.1	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	0.2	0.0	0.2
18-Jul	0.0	Z	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.2
19-Jul	0.0	0.1	Z	0.0	0.1	0.1	0.0	0.1	0.3	0.2	3.9	1.7	0.2	0.1	0.1	0.0	0.8	0.7	0.2	0.0	0.2	0.2	0.1	0.1	0.4	3.9
20-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.4	0.5	0.1	0.1	0.2	0.3	1.2	0.5	0.7	0.3	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.2	1.2
21-Jul	0.1	0.1	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.1	0.5	2.1	1.4	1.4	0.8	0.2	0.3	0.5	0.2	0.1	0.2	0.2	0.2	0.0	0.4	2.1
22-Jul	0.1	0.2	0.1	0.1	0.1	Z	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.2
23-Jul	Z	0.1	0.1	0.1	0.2	0.1	0.1	0.2	3.5	20.8	14.9	13.8	8.5	5.0	1.9	0.7	0.6	0.5	0.4	0.3	0.3	0.4	0.3	0.2	3.2	20.8
24-Jul	0.1	Z	0.2	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.2	2.8	5.0	18.9	19.5	10.4	3.9	2.5	1.2	0.6	0.4	0.4	0.3	0.3	2.9	19.5
25-Jul	0.3	0.2	Z	0.1	0.2	0.1	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.3
26-Jul	0.0	0.0	0.0	Z	0.1	0.1	0.3	1.2	2.9	4.0	9.5	2.3	0.3	1.9	DF	DF	0.2	0.7	0.2	0.0	0.0	0.0	0.0	0.0	1.1	9.5
27-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.2	1.2	1.5	0.4	2.8	1.9	0.4	0.1	0.0	0.9	0.9	2.1	1.5	0.9	0.5	0.2	0.7	2.8
29-Jul	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	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1
30-Jul	0.0	Z	0.0	0.0	0.3	0.8	1.6	2.3	2.4	4.2	3.5	6.8	6.1	5.3	3.5	0.5	0.8	0.2	0.2	0.2	0.2	0.2	0.2	1.4	1.8	6.8
31-Jul	0.8	0.4	Z	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.5	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.8

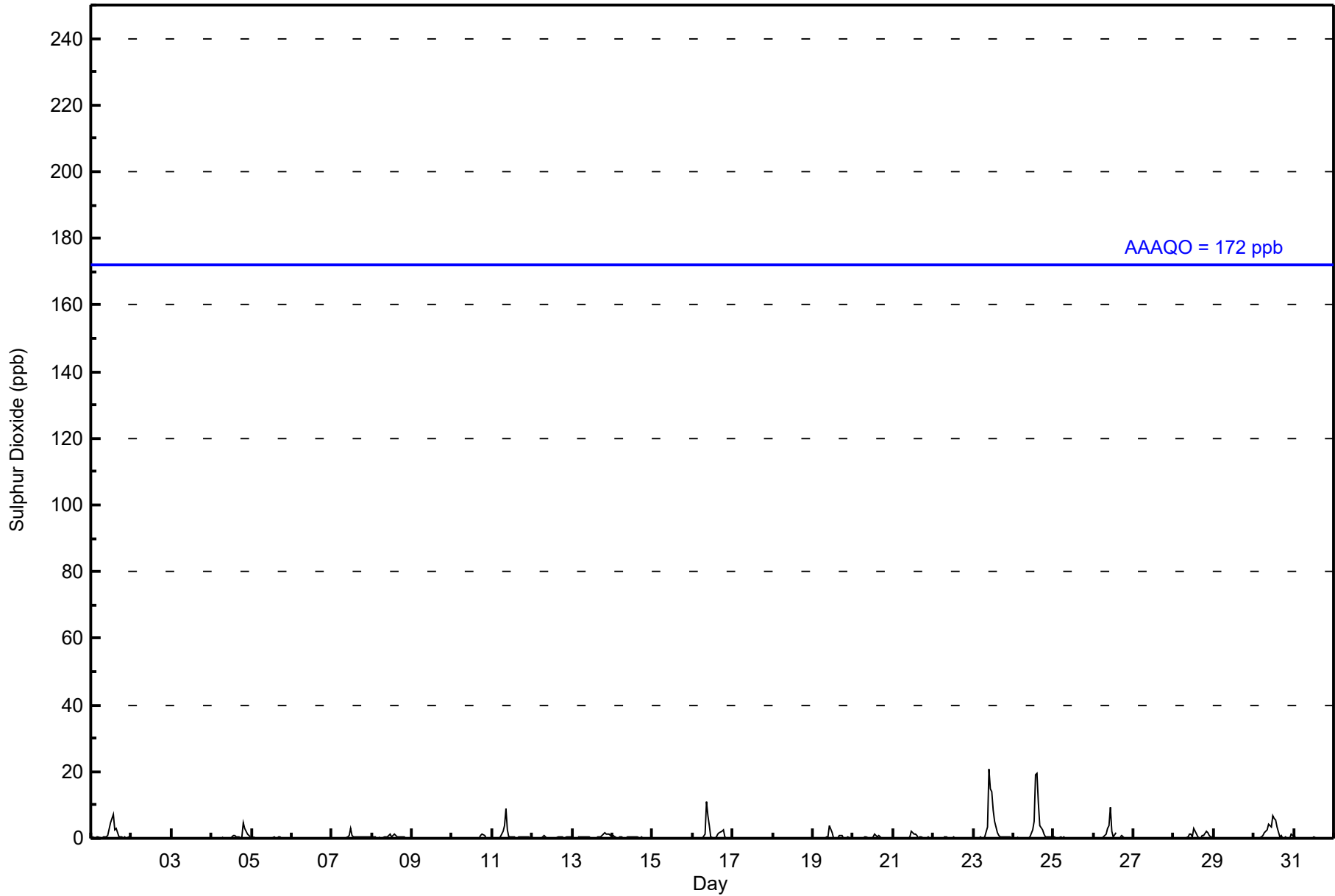
0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.4	1.1	1.4	1.4	1.4	1.1	1.5	1.1	0.7	0.4	0.4	0.3	0.4	0.3	0.2	0.2	0.2	Diurnal Average	
0.8	0.5	0.4	0.6	0.5	0.8	2.0	3.7	11.2	20.8	14.9	13.8	8.5	18.9	19.5	10.4	3.9	2.5	2.5	4.5	2.8	1.3	1.4	0.8	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort Hills - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Hills - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	702	99.15	99.15
11 - 20	5	0.71	99.86
21 - 60	1	0.14	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Hills - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	136	70	24	12	3	10	30	61	72	79	46	14	20	18	34	73	702
11 - 20	0	0	0	0	0	0	0	2	0	1	0	0	1	1	0	0	5
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	136	70	24	12	3	10	30	63	72	80	47	14	21	19	34	73	708

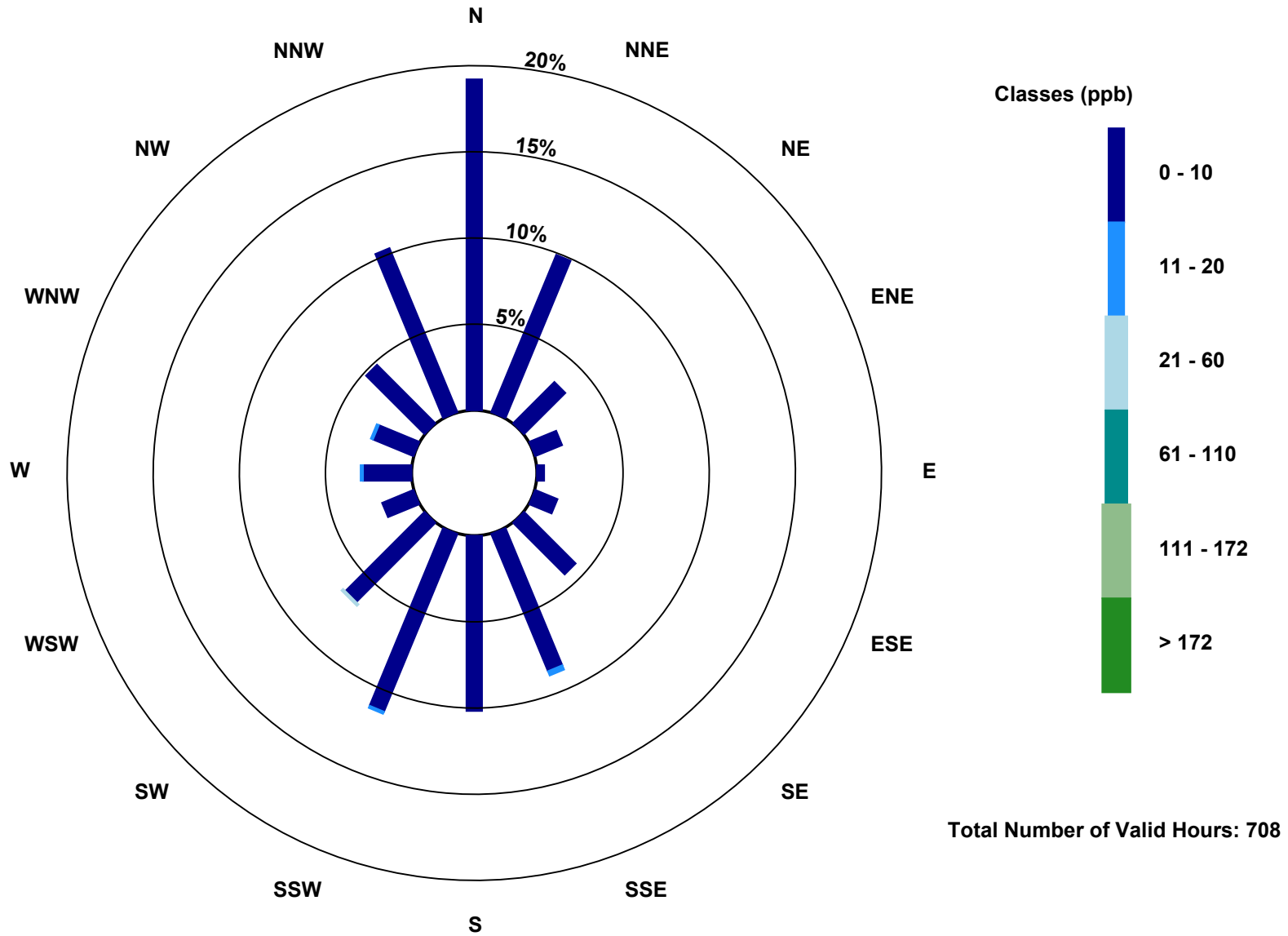
Total Number of Valid Hours: 708

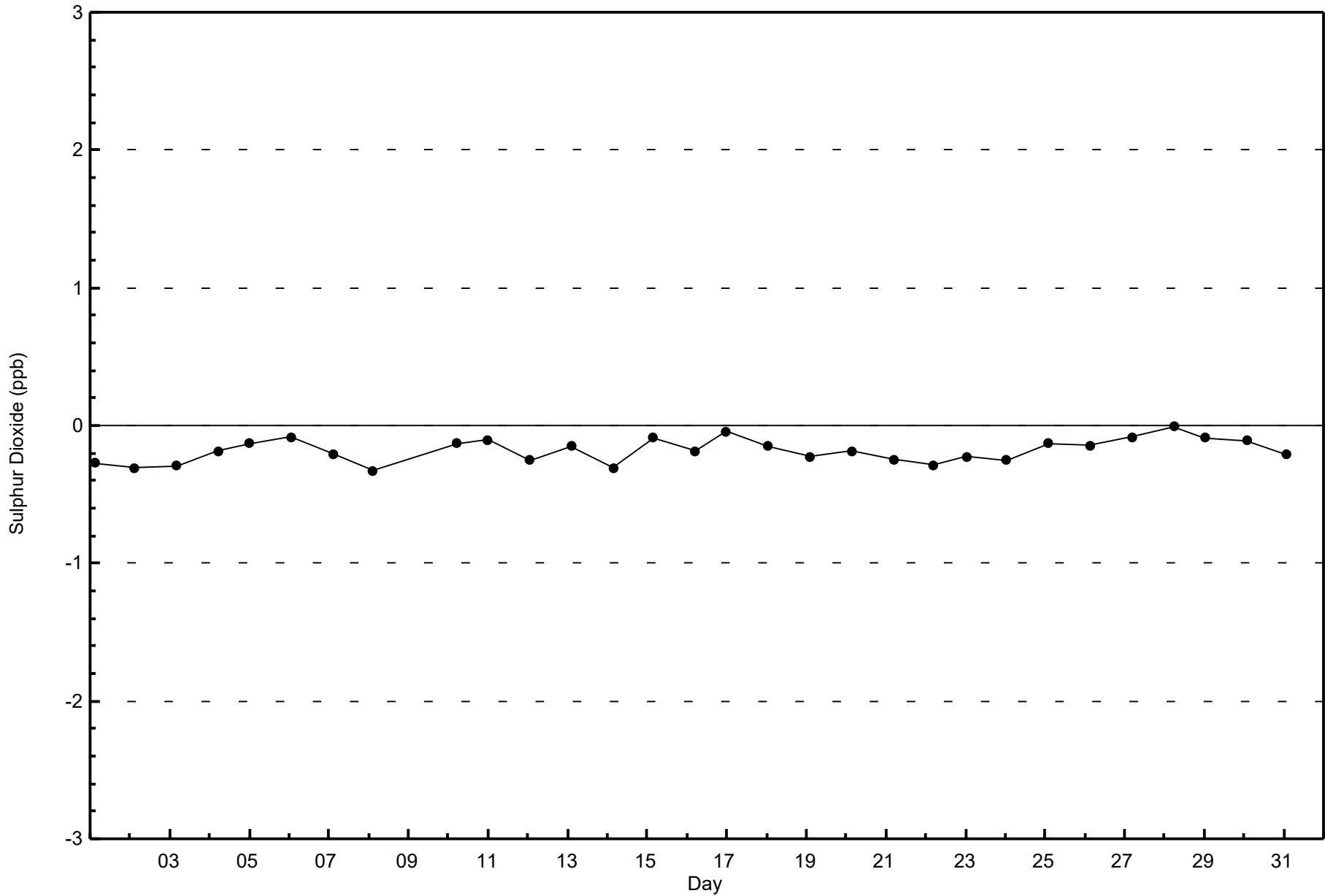
Total Number of Hours: 744

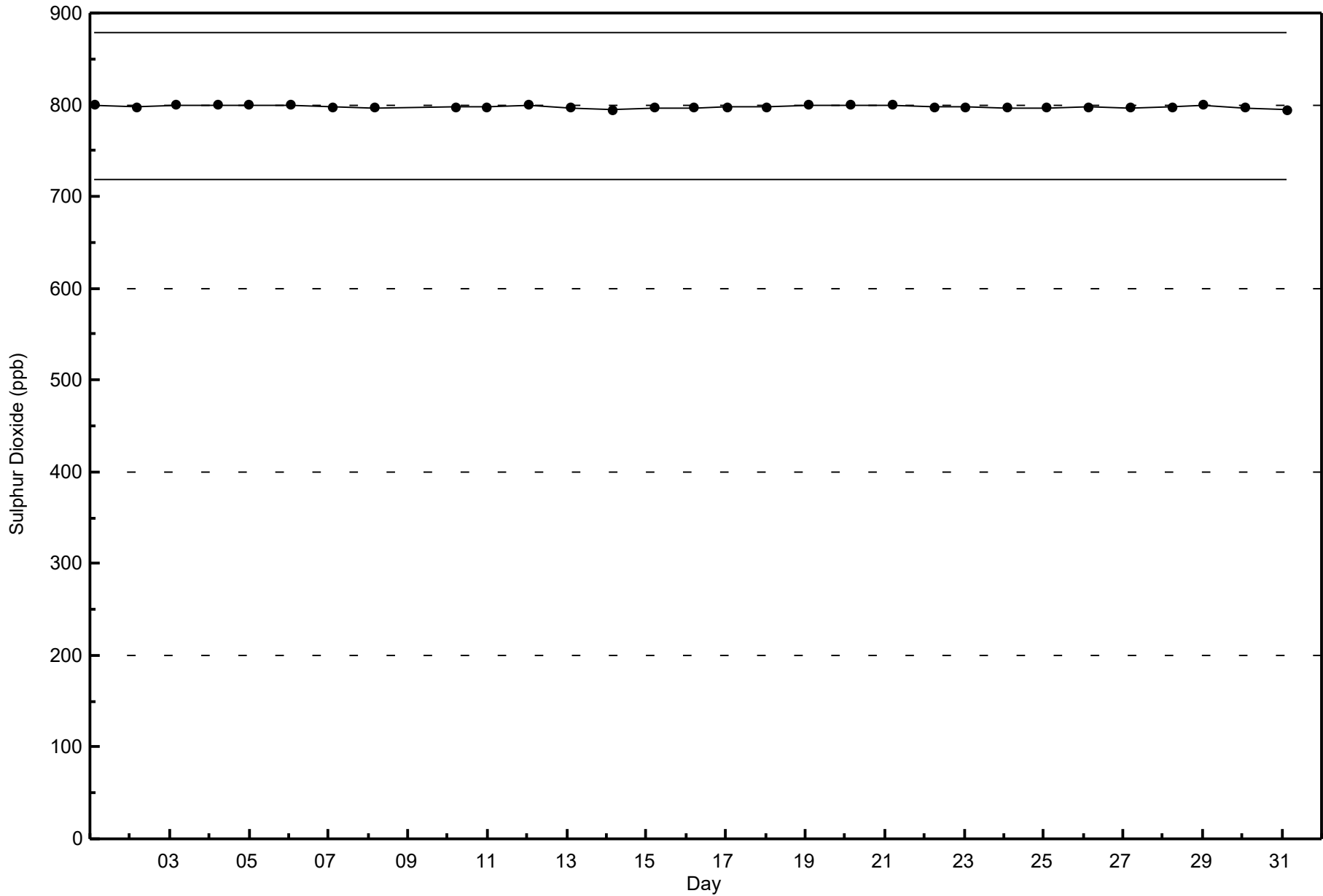


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Fort Hills









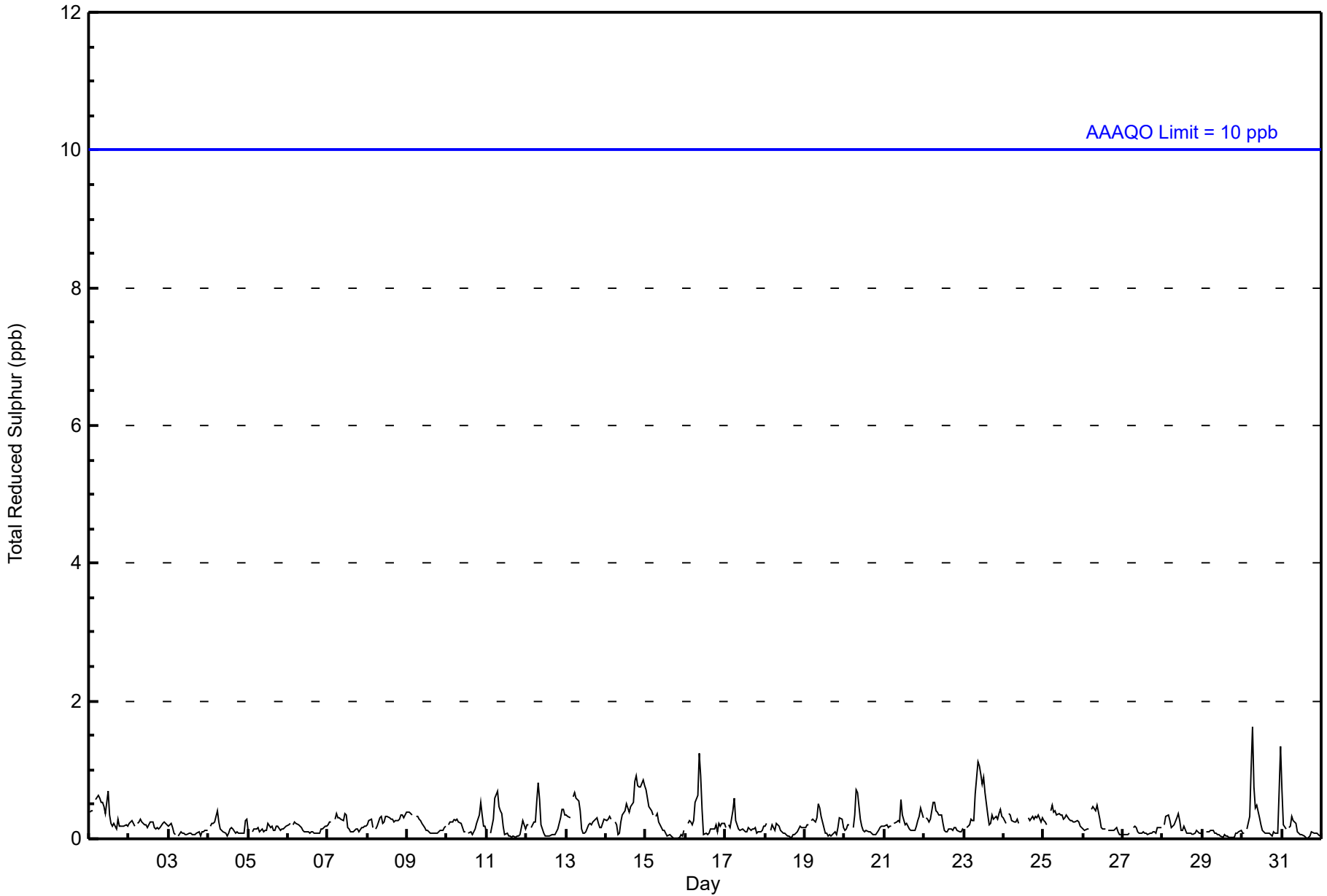
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Fort Hills - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:														744																													
Maximum Value: 1.6 ppb on Jul 30 07:00		Maximum Daily Average: 0.5 ppb on Jul 14														Hours of Data:		706																															
Minimum Value: 0.0 ppb on Jul 15 18:00		Minimum Daily Average: 0.1 ppb on Jul 29														Hours of Missing Data:		38																															
Maximum Diurnal Average: 0.4 ppb at hour 7		Minimum Diurnal Average: 0.1 ppb at hour 17														Hours of Calibration:		35																															
Monthly Average: 0.22 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.1 Q ₁ = 0.1 Median = 0.2 Q ₃ = 0.3 P ₉₀ = 0.4 P ₉₉ = 0.9														Percent Operational Time:		99.6																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	0.4	0.4	0.4	Z	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.7	0.3	0.2	0.2	0.2	0.1	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.7																							
2-Jul	0.2	0.3	0.3	0.2	Z	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	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3																							
3-Jul	0.2	0.2	0.2	0.1	0.1	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	0.0	0.1	0.1	0.1	0.1	0.2	0.2																							
4-Jul	Z	0.2	0.2	0.2	0.2	0.4	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.2	0.4																							
5-Jul	0.1	Z	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.2																							
6-Jul	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2																							
7-Jul	0.2	0.3	0.3	Z	0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.4																							
8-Jul	0.2	0.3	0.3	0.2	Z	0.1	0.2	0.3	0.3	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	0.4	0.3	0.4																							
9-Jul	0.4	0.4	0.4	0.3	DF	0.3	0.3	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.4																							
10-Jul	Z	0.2	0.3	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.1	M	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.5	0.3	0.2	0.2	0.2	0.5																							
11-Jul	0.1	Z	0.1	0.2	0.3	0.6	0.7	0.5	0.4	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.1	0.2	0.7																							
12-Jul	0.2	0.2	Z	0.2	0.3	0.3	0.5	0.8	0.6	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.3	0.4	0.4	0.4	0.2	0.8																							
13-Jul	0.4	0.3	0.3	Z	0.6	0.7	0.6	0.5	0.4	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.7																							
14-Jul	0.3	0.3	0.3	0.3	Z	0.2	0.2	0.1	0.1	0.2	0.3	0.4	0.5	0.5	0.4	0.5	0.5	0.8	0.9	0.8	0.7	0.8	0.8	0.8	0.8	0.9																							
15-Jul	0.7	0.6	0.5	0.4	0.3	Z	0.3	0.4	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.7																							
16-Jul	Z	0.2	0.3	0.3	0.2	0.3	0.5	0.6	1.2	0.9	0.4	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.3	1.2																							
17-Jul	0.2	Z	0.2	0.2	0.4	0.6	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.6																							
18-Jul	0.2	0.2	Z	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2																							
19-Jul	0.2	0.2	0.2	Z	0.3	0.3	0.2	0.3	0.5	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.3	0.3	0.2	0.2	0.5																							
20-Jul	0.1	0.1	0.2	0.2	Z	0.2	0.4	0.7	0.7	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.7																							
21-Jul	0.2	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.3	0.2	0.6	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.4	0.3	0.2	0.6																							
22-Jul	Z	0.3	0.3	0.3	0.3	0.5	0.5	0.4	0.4	0.4	0.4	0.2	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	0.5																							
23-Jul	0.1	Z	0.2	0.2	0.3	0.3	0.3	0.7	1.1	1.0	0.9	0.8	0.9	0.7	0.4	0.2	0.2	0.4	0.3	0.3	0.3	0.4	0.4	0.3	0.5	1.1																							
24-Jul	0.3	0.2	Z	0.4	0.3	0.3	0.2	0.2	0.3	0.2	C	C	C	C	C	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.4																							
25-Jul	0.3	0.2	0.2	Z	0.4	0.5	0.4	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.5																							
26-Jul	0.1	0.1	0.1	0.2	Z	0.4	0.5	0.4	0.5	0.4	0.3	0.2	0.1	0.2	DF	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.5																							
27-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2																							
28-Jul	Z	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.4	0.3	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	0.2	0.4																							
29-Jul	0.1	Z	0.1	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	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1																							
30-Jul	0.1	0.1	Z	0.1	0.3	1.0	1.6	0.8	0.4	0.5	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.7	1.3	1.6																							
31-Jul	0.7	0.2	0.1	Z	0.2	0.2	0.3	0.3	0.2	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	0.0	0.1	0.7																							
																								Diurnal Average		0.2		0.3		0.4		0.3		0.2		0.2		0.1		0.1		0.2		0.2		0.2		0.2	
																								Diurnal Maximum		0.7		1.0		1.6		1.2		1.0		0.9		0.8		0.9		0.8		0.7		0.8		1.3	
Z - zerospan C - Calibration M - Maintenance DF - DAS Failure																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort Hills - July 2023

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
Fort Hills - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	134	71	24	12	3	12	30	63	71	77	46	17	20	20	34	72	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	134	71	24	12	3	12	30	63	71	77	46	17	20	20	34	72	706

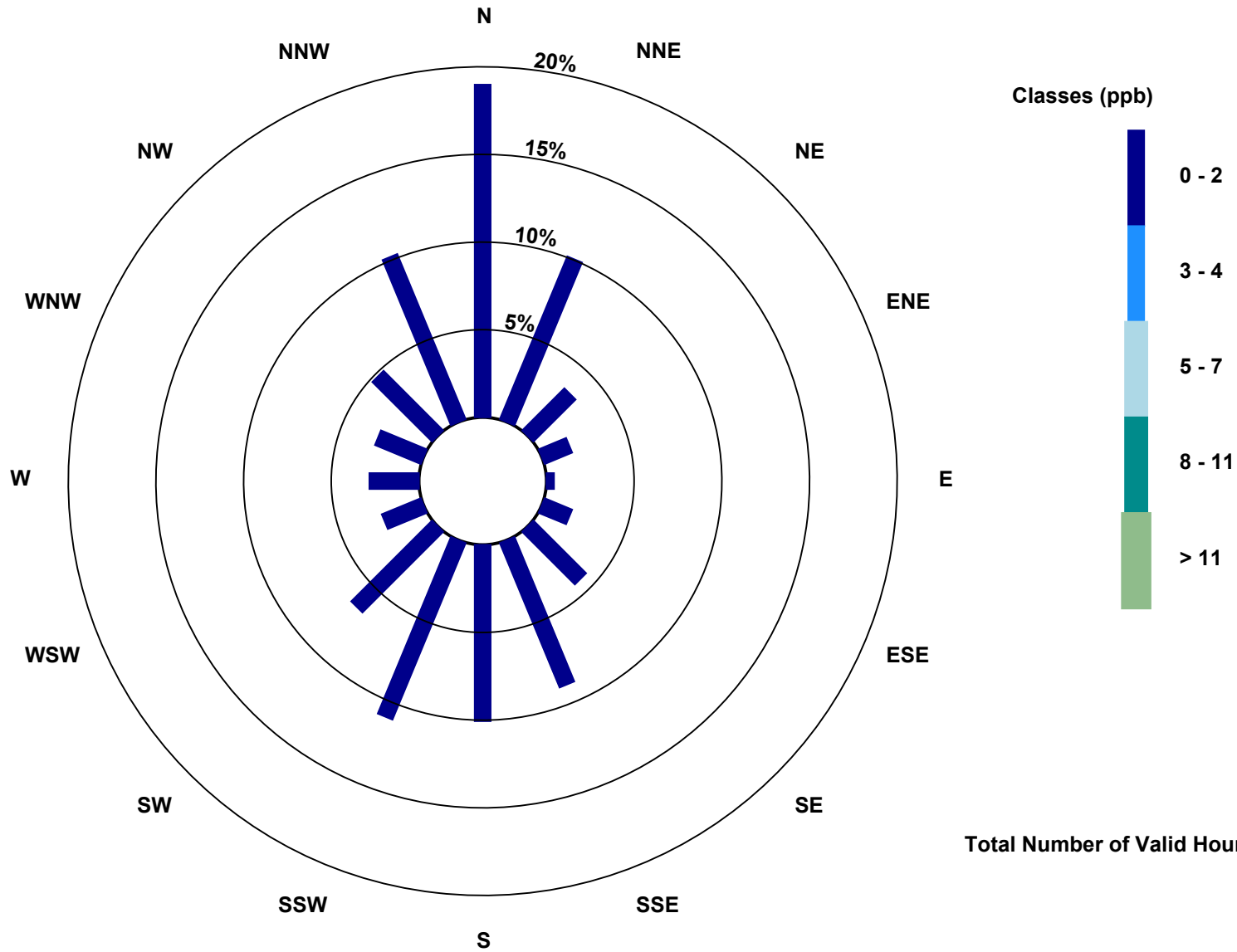
Total Number of Valid Hours: 706

Total Number of Hours: 744

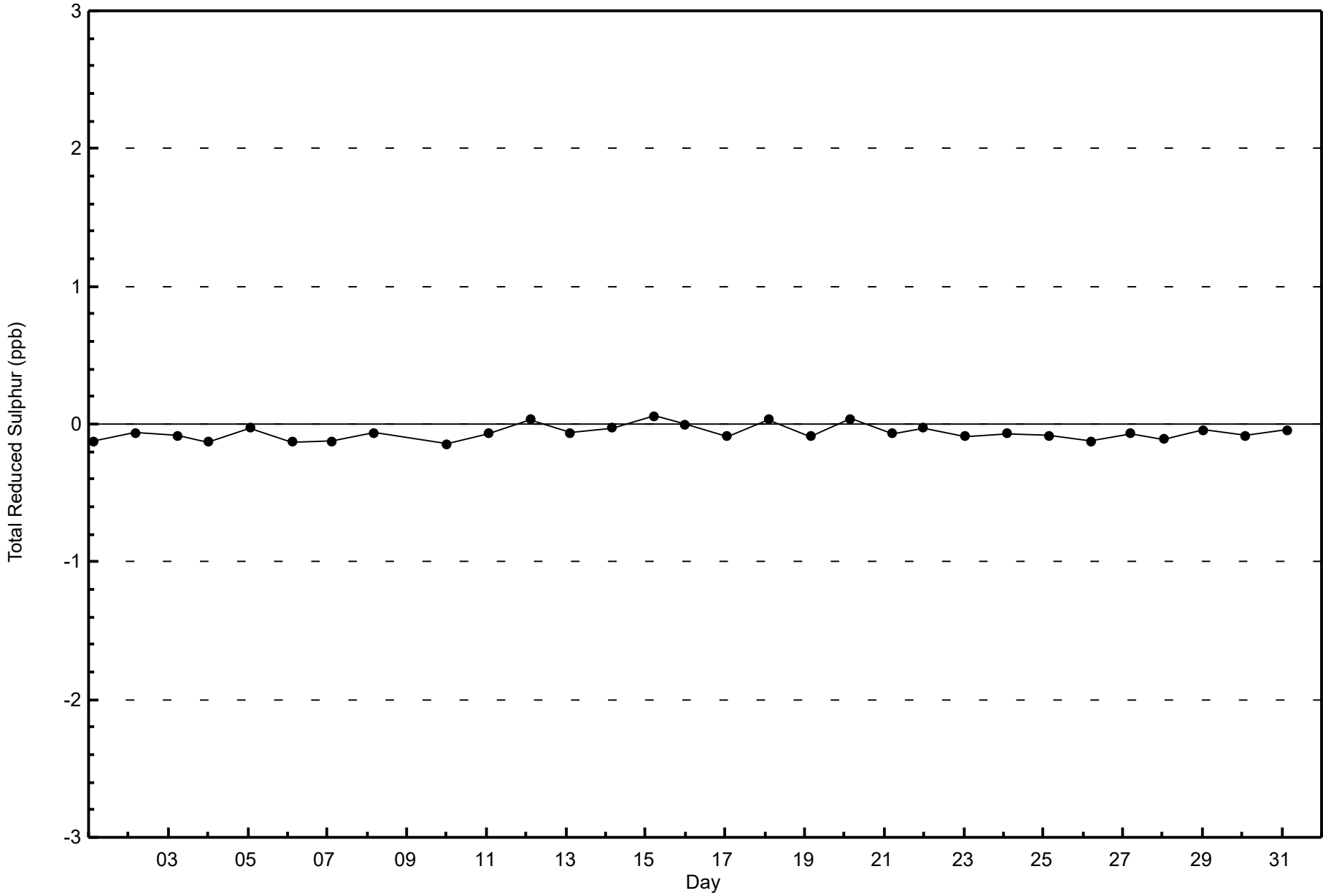


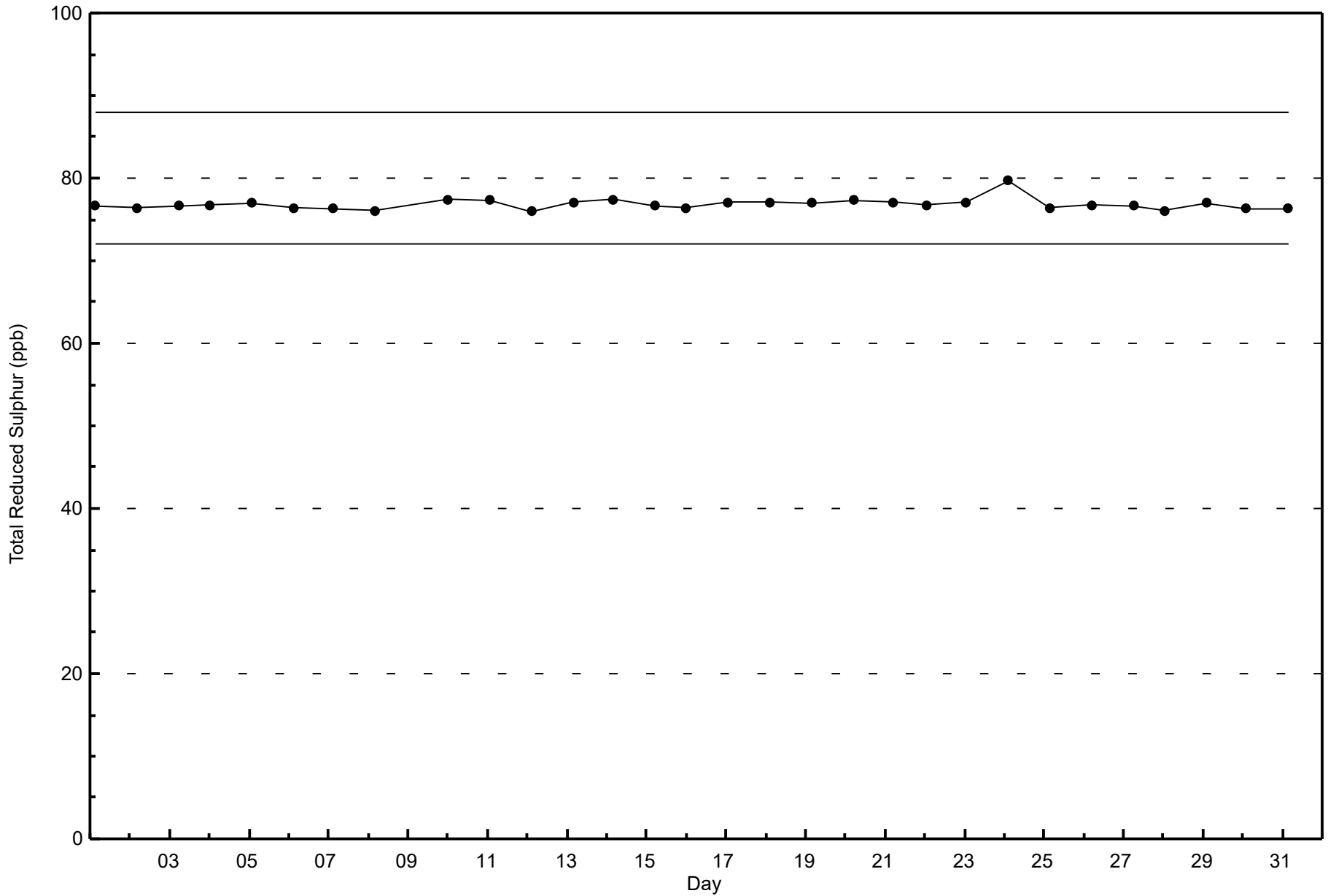
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Reduced Sulphur (TRS) - ppb
Fort Hills



Total Number of Valid Hours: 706







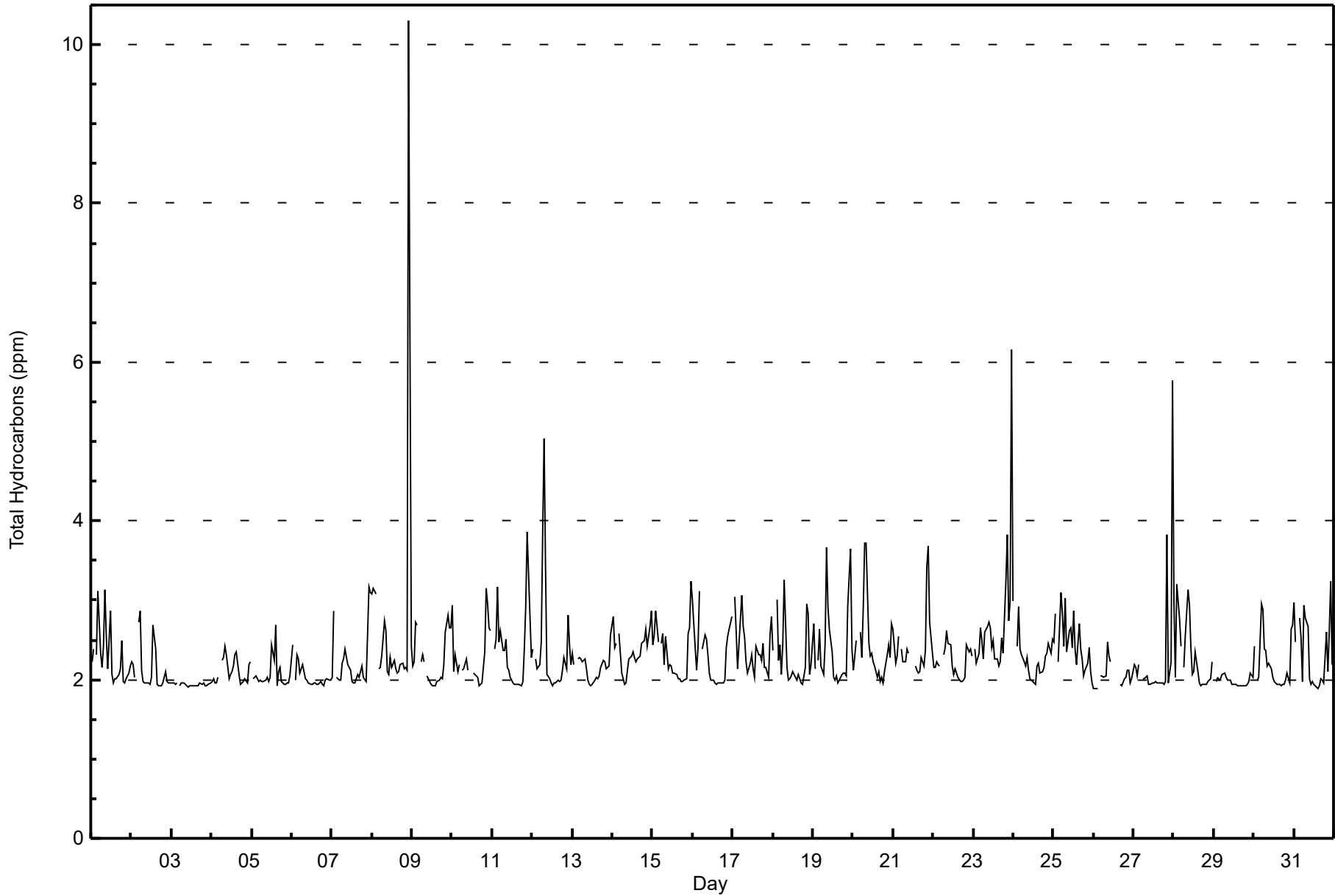
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Fort Hills - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744														744																													
Maximum Value: 10.3 ppm on Jul 8 23:00		Maximum Daily Average: 2.7 ppm on Jul 23		Hours of Data: 702														702																															
Minimum Value: 1.9 ppm on Jul 31 15:00		Minimum Daily Average: 1.9 ppm on Jul 3		Hours of Missing Data: 42														42																															
Maximum Diurnal Average: 2.7 ppm at hour 23		Minimum Diurnal Average: 2.0 ppm at hour 17		Hours of Calibration: 33														33																															
Monthly Average: 2.28 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.4 P ₉₀ = 2.8 P ₉₉ = 3.8		Percent Operational Time: 98.8														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-Jul	2.2	2.4	Z	2.3	3.1	2.3	2.1	2.4	3.1	2.5	2.1	2.9	2.1	2.0	2.0	2.1	2.1	2.5	2.0	2.0	2.0	2.1	2.2	2.3	2.3	2.3																							
2-Jul	2.2	2.2	2.0	Z	2.7	2.9	2.1	2.0	2.0	2.0	2.0	1.9	2.0	2.7	2.4	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.0	2.0	2.0	2.0																							
3-Jul	2.0	2.0	1.9	2.0	Z	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0																							
4-Jul	2.0	2.0	2.0	2.0	2.0	Z	2.2	2.3	2.4	2.3	2.0	2.1	2.1	2.2	2.3	2.3	2.1	1.9	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2																							
5-Jul	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.4	2.3	2.7	1.9	2.1	2.2	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0																							
6-Jul	2.4	Z	2.0	2.3	2.3	2.1	2.2	2.1	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0																							
7-Jul	2.0	2.9	Z	2.0	2.0	2.0	2.2	2.3	2.4	2.2	2.2	2.1	2.0	2.0	2.0	2.1	2.0	2.1	2.2	2.0	2.0	2.6	3.2	3.1	2.2	3.2																							
8-Jul	3.1	3.1	3.1	Z	2.1	2.2	2.3	2.7	2.6	2.1	2.1	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.1	10.3	2.4	2.7	10.3																							
9-Jul	2.2	2.2	2.7	2.7	DF	2.2	2.3	2.2	M	2.1	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.2	2.6	2.8	2.7	2.7	2.2	2.8																							
10-Jul	2.9	2.1	2.3	2.1	2.2	Z	2.1	2.1	2.3	2.1	C	C	C	2.1	2.1	2.0	1.9	1.9	2.0	2.4	3.2	3.0	2.7	2.6	2.3	3.2																							
11-Jul	Z	2.4	2.5	3.2	2.5	2.6	2.4	2.4	2.5	2.2	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.4	2.9	3.9	3.3	2.3	2.4	3.9																							
12-Jul	2.4	Z	2.3	2.1	2.2	2.5	3.9	5.0	3.4	2.1	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.1	2.8	2.4	2.2	2.4	5.0																							
13-Jul	2.3	2.2	Z	2.3	2.3	2.3	2.2	2.3	2.1	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.1	2.2	2.2	2.6	2.2	2.6																							
14-Jul	2.8	2.4	2.5	Z	2.6	2.1	2.0	1.9	1.9	2.1	2.3	2.3	2.4	2.3	2.2	2.3	2.3	2.5	2.5	2.5	2.6	2.4	2.7	2.9	2.4	2.9																							
15-Jul	2.4	2.6	2.9	2.5	Z	2.5	2.6	2.2	2.5	2.1	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.6	2.7	3.2	2.3	3.2																							
16-Jul	3.0	2.4	2.1	2.4	3.1	Z	2.4	2.6	2.5	2.3	2.1	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.4	2.5	2.6	2.8	2.3	3.1																							
17-Jul	Z	3.0	2.6	2.1	2.8	3.1	2.7	2.5	2.2	2.1	2.2	2.3	2.1	2.0	2.4	2.3	2.3	2.2	2.5	2.2	2.1	2.0	2.6	2.8	2.4	3.1																							
18-Jul	2.4	Z	3.0	2.2	2.4	2.1	2.4	3.3	2.2	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.0	2.0	1.9	2.1	3.0	2.8	2.1	2.2	2.3	3.3																							
19-Jul	2.7	2.1	Z	2.2	2.6	2.2	2.1	2.5	3.7	2.9	2.6	2.4	2.0	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.9	3.6	2.4	2.4	3.7																							
20-Jul	2.1	2.3	2.5	Z	2.6	2.3	2.9	3.7	3.7	2.5	2.3	2.3	2.2	2.2	2.0	2.1	2.0	2.0	2.0	2.1	2.3	2.4	2.3	2.7	2.4	3.7																							
21-Jul	2.6	2.2	2.3	2.5	Z	2.4	2.2	2.2	2.4	2.3	M	M	M	2.2	2.1	2.1	2.1	2.3	2.2	2.4	3.4	3.7	2.7	2.3	2.4	3.7																							
22-Jul	2.2	2.2	2.2	2.2	2.2	Z	2.3	2.4	2.6	2.5	2.4	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.4	2.4	2.4	2.3	2.2	2.6																							
23-Jul	Z	2.4	2.2	2.3	2.7	2.5	2.3	2.6	2.7	2.7	2.6	2.4	2.5	2.3	2.3	2.2	2.2	2.5	2.3	3.2	3.8	2.7	3.0	6.2	2.7	6.2																							
24-Jul	3.0	Z	2.4	2.9	2.4	2.3	2.2	2.2	2.3	2.1	2.0	2.0	1.9	2.2	2.2	2.1	2.1	2.2	2.3	2.3	2.4	2.3	2.5	2.5	2.3	3.0																							
25-Jul	2.5	2.8	Z	2.2	3.1	2.8	2.4	3.0	2.4	2.6	2.6	2.4	2.9	2.4	2.2	2.7	2.4	2.3	2.0	2.1	2.2	2.4	2.1	2.0	2.5	3.1																							
26-Jul	1.9	1.9	1.9	Z	2.1	2.1	2.0	2.0	2.5	2.3	2.2	M	DF	2.0	DF	DF	1.9	1.9	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.5																							
27-Jul	2.2	2.2	2.0	2.2	Z	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	1.9	2.0	3.8	2.0	2.2	5.8	2.3	5.8																							
28-Jul	3.0	2.0	3.2	2.8	2.4	Z	2.1	2.5	3.1	2.9	2.4	2.1	2.1	2.4	2.1	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.2	2.3	3.2																							
29-Jul	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.0	2.1																							
30-Jul	2.4	Z	2.0	2.0	2.9	2.9	2.4	2.4	2.2	2.2	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.6	2.7	2.2	2.9																							
31-Jul	3.0	2.5	Z	2.8	2.5	2.0	2.9	2.8	2.7	2.0	1.9	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.6	2.1	2.6	3.2	2.2	2.2	2.3	3.2																							
																								2.5	2.3	2.3	2.3	2.5	2.3	2.3	2.5	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.2	2.4	2.4	2.7	2.6	Diurnal Average	
																								3.1	3.1	3.2	3.2	3.1	3.1	3.9	5.0	3.7	2.9	2.6	2.9	2.9	2.7	2.7	2.7	2.4	2.5	2.5	3.2	3.8	3.9	10.3	6.2	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance				DF - DAS Failure																																							





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort Hills - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	264	37.61	37.61
2.1 - 3.0	404	57.55	95.16
3.1 - 10.0	33	4.70	99.86
> 10.0	1	0.14	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Fort Hills - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	65	22	7	5	1	0	3	19	30	42	14	4	12	5	9	26	264
2.1 - 3.0	68	45	16	6	1	10	26	41	38	33	30	8	7	12	21	42	404
3.1 - 10.0	2	3	1	0	0	0	1	3	2	4	3	2	2	2	3	5	33
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Totals	135	70	24	11	2	10	30	63	70	79	47	14	21	19	34	73	702

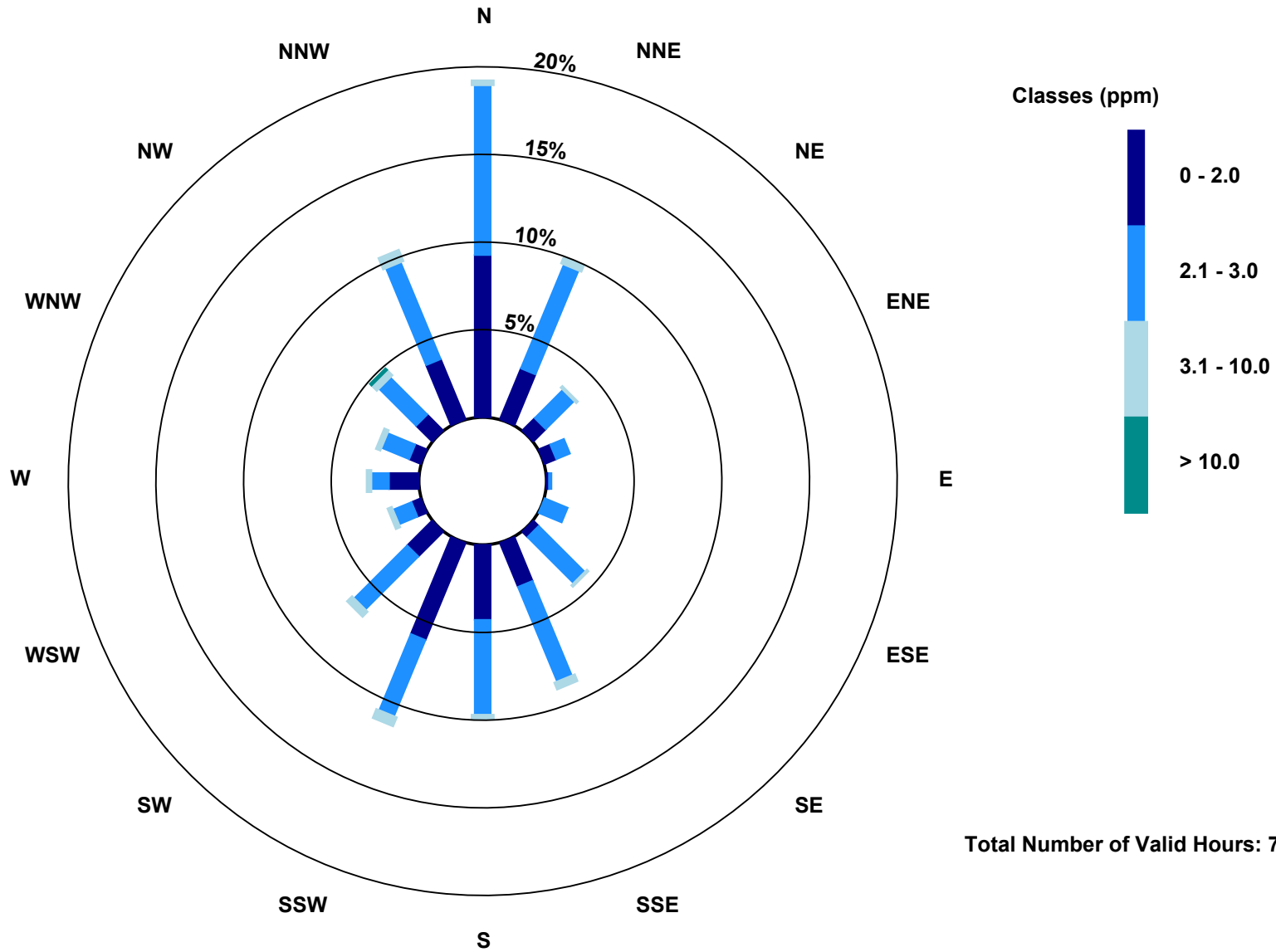
Total Number of Valid Hours: 702

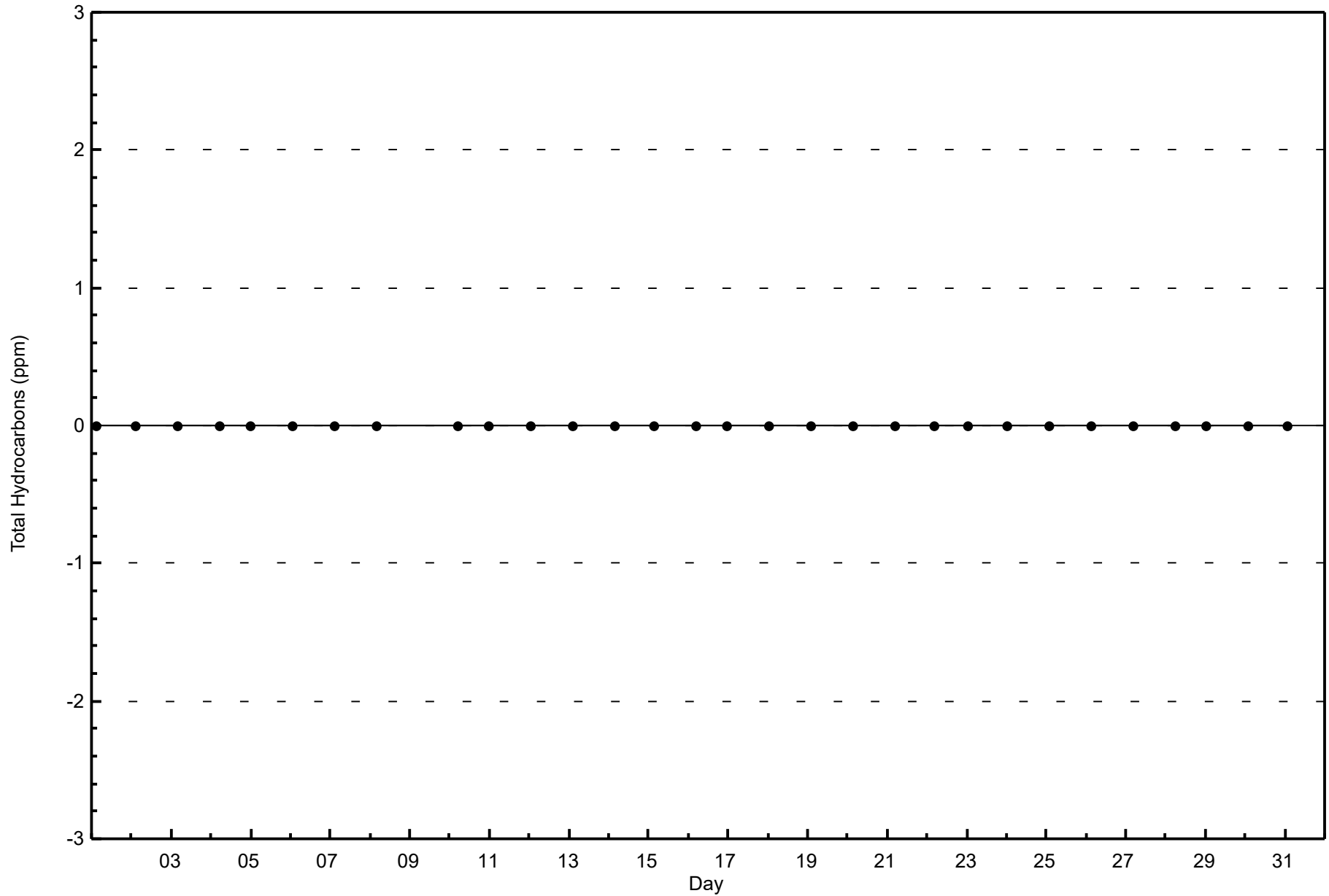
Total Number of Hours: 744

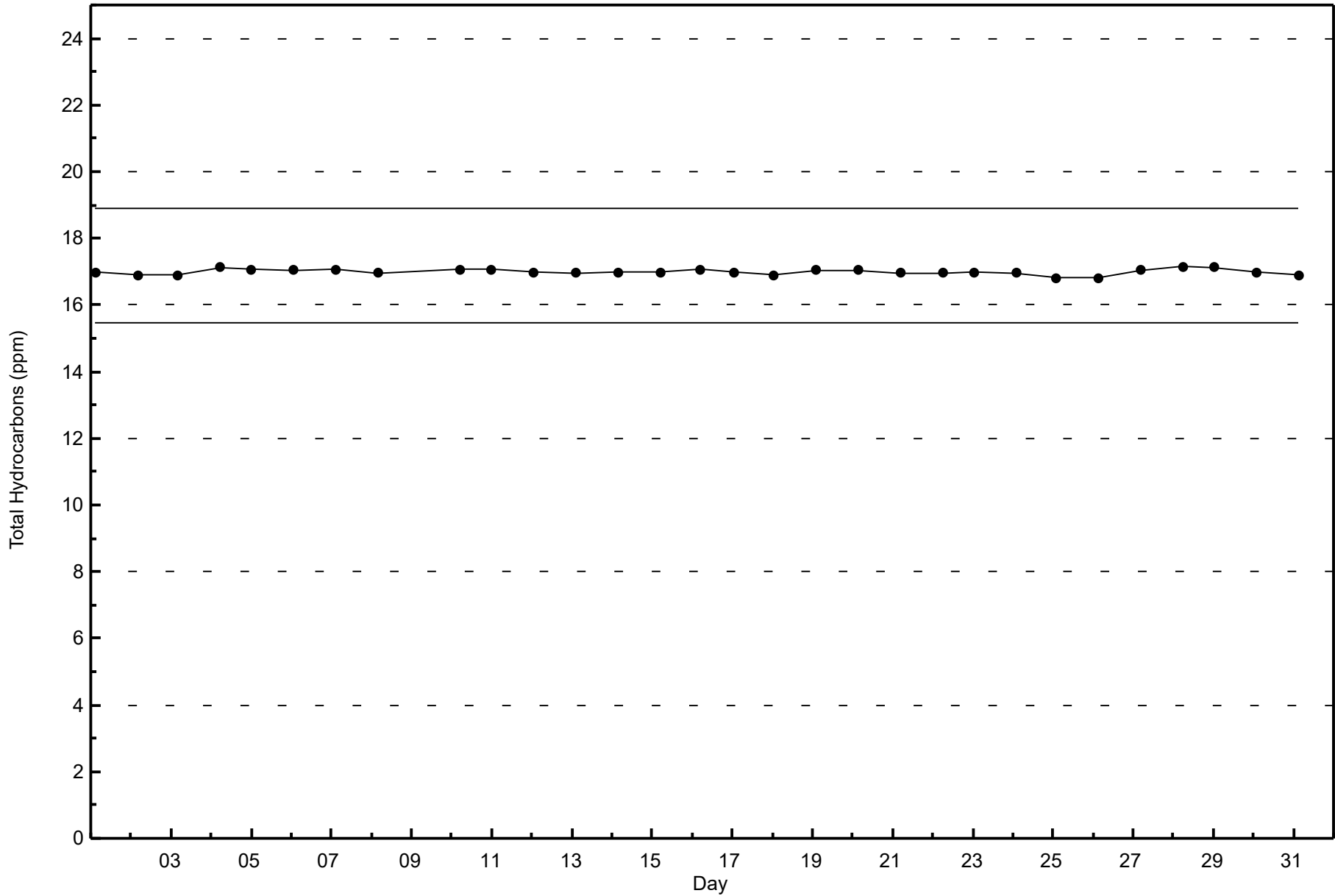


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Fort Hills





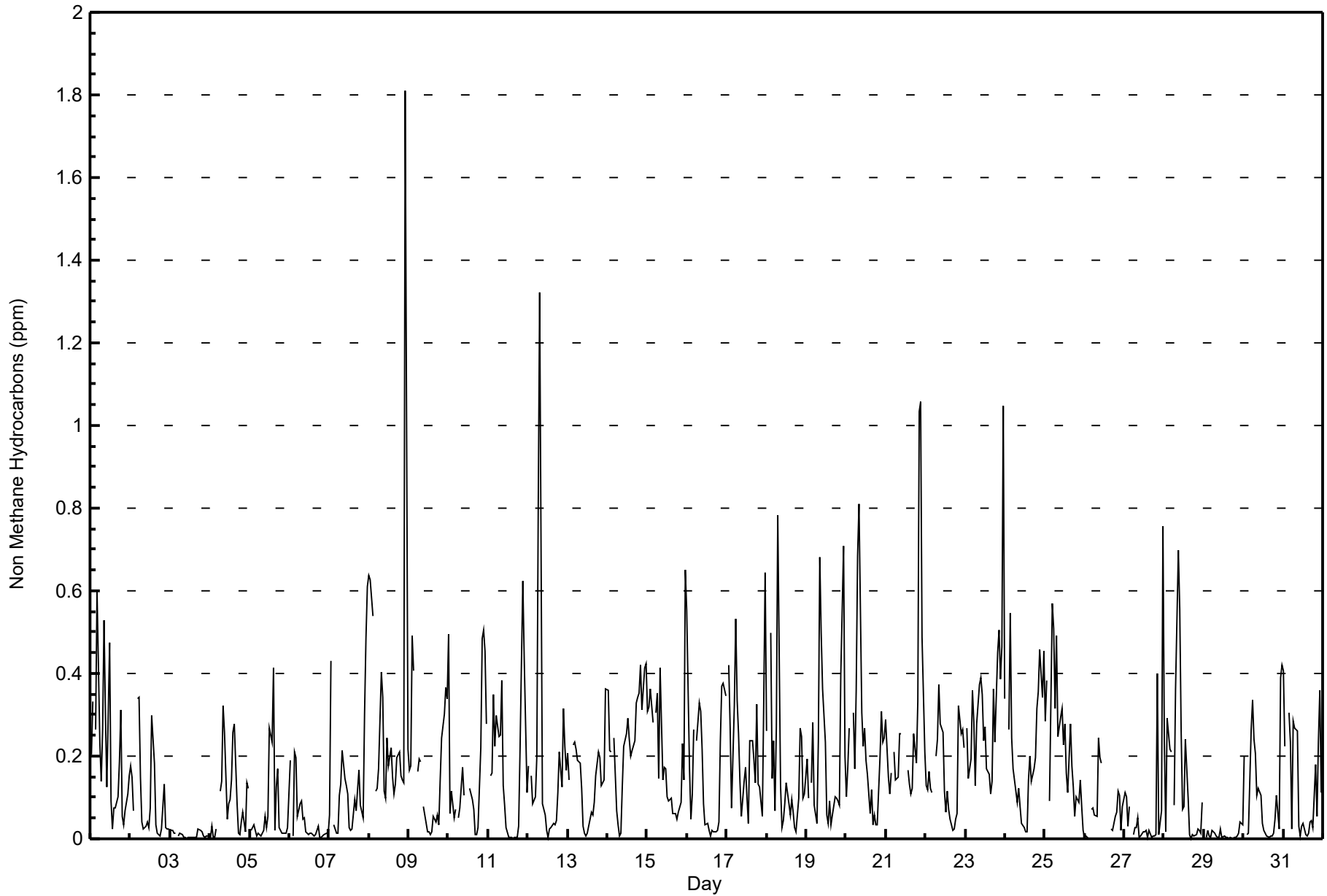




Summary of Hour Averages

Fort Hills - July 2023

Maximum Value: 1.809 ppm on Jul 8 23:00																				Maximum Daily Average: 0.317 ppm on Jul 23					Hours in Service: 744	
Minimum Value: 0.001 ppm on Jul 11 16:00																				Minimum Daily Average: 0.009 ppm on Jul 3					Hours of Data: 702	
Maximum Diurnal Average: 0.292 ppm at hour 23																				Minimum Diurnal Average: 0.066 ppm at hour 17					Hours of Missing Data: 42	
Monthly Average: 0.164 ppm																				Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.2 P ₉₀ = 0.4 P ₉₉ = 0.8					Hours of Calibration: 33	
																									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-Jul	0.205	0.332	Z	0.263	0.601	0.236	0.139	0.264	0.530	0.301	0.127	0.476	0.090	0.024	0.073	0.074	0.102	0.185	0.312	0.056	0.032	0.069	0.109	0.154	0.207	0.601
2-Jul	0.177	0.149	0.069	Z	0.340	0.342	0.149	0.042	0.025	0.031	0.040	0.027	0.075	0.299	0.184	0.035	0.014	0.012	0.008	0.024	0.133	0.026	0.023	0.025	0.098	0.342
3-Jul	0.021	0.022	0.013	0.012	Z	0.008	0.014	0.011	0.004	0.003	0.002	0.004	0.004	0.004	0.003	0.004	0.023	0.020	0.017	0.008	0.005	0.006	0.007	0.009	0.023	0.023
4-Jul	0.003	0.030	0.002	0.004	0.023	Z	0.116	0.137	0.322	0.256	0.046	0.084	0.096	0.141	0.256	0.278	0.086	0.014	0.012	0.040	0.065	0.016	0.135	0.122	0.099	0.322
5-Jul	Z	0.021	0.032	0.021	0.008	0.013	0.010	0.008	0.019	0.053	0.026	0.056	0.268	0.234	0.413	0.019	0.125	0.168	0.028	0.012	0.013	0.015	0.015	0.029	0.070	0.413
6-Jul	0.190	Z	0.007	0.209	0.196	0.056	0.083	0.091	0.048	0.050	0.016	0.009	0.014	0.014	0.010	0.008	0.011	0.032	0.005	0.002	0.007	0.011	0.014	0.011	0.048	0.209
7-Jul	0.056	0.429	Z	0.033	0.013	0.013	0.105	0.132	0.215	0.146	0.127	0.107	0.026	0.019	0.025	0.095	0.069	0.118	0.165	0.082	0.052	0.300	0.483	0.612	0.149	0.612
8-Jul	0.639	0.627	0.537	Z	0.115	0.122	0.170	0.404	0.342	0.115	0.099	0.244	0.175	0.221	0.150	0.109	0.133	0.197	0.209	0.152	0.144	0.137	1.809	0.218	0.307	1.809
9-Jul	0.167	0.177	0.493	0.408	DF	0.162	0.193	0.185	M	0.077	0.037	0.017	0.016	0.012	0.015	0.054	0.042	0.056	0.034	0.141	0.243	0.302	0.365	0.339	0.161	0.493
10-Jul	0.495	0.060	0.116	0.050	0.071	Z	0.051	0.075	0.174	0.106	C	C	C	0.124	0.093	0.071	0.009	0.010	0.027	0.222	0.485	0.504	0.453	0.277	0.174	0.504
11-Jul	Z	0.153	0.159	0.349	0.222	0.299	0.247	0.249	0.383	0.130	0.082	0.028	0.005	0.003	0.003	0.001	0.004	0.004	0.029	0.212	0.422	0.622	0.433	0.111	0.180	0.622
12-Jul	0.176	Z	0.152	0.086	0.100	0.198	0.799	1.322	0.709	0.083	0.057	0.021	0.005	0.024	0.028	0.037	0.035	0.045	0.112	0.210	0.126	0.314	0.224	0.167	0.219	1.322
13-Jul	0.208	0.141	Z	0.226	0.233	0.216	0.189	0.183	0.122	0.031	0.015	0.006	0.015	0.048	0.063	0.059	0.089	0.152	0.212	0.197	0.130	0.137	0.143	0.362	0.138	0.362
14-Jul	0.359	0.213	0.211	Z	0.245	0.067	0.034	0.008	0.012	0.125	0.225	0.255	0.290	0.240	0.200	0.212	0.236	0.328	0.343	0.353	0.422	0.311	0.415	0.424	0.240	0.424
15-Jul	0.309	0.320	0.362	0.280	Z	0.306	0.354	0.144	0.414	0.143	0.172	0.168	0.103	0.092	0.099	0.062	0.060	0.060	0.047	0.063	0.090	0.231	0.141	0.651	0.203	0.651
16-Jul	0.553	0.171	0.049	0.110	0.263	Z	0.238	0.327	0.307	0.217	0.084	0.034	0.039	0.019	0.006	0.020	0.016	0.016	0.021	0.041	0.234	0.368	0.377	0.346	0.168	0.553
17-Jul	Z	0.420	0.271	0.075	0.323	0.532	0.335	0.255	0.138	0.054	0.138	0.173	0.102	0.036	0.238	0.236	0.189	0.135	0.324	0.134	0.125	0.053	0.331	0.643	0.229	0.643
18-Jul	0.261	Z	0.499	0.145	0.237	0.069	0.272	0.784	0.129	0.027	0.043	0.084	0.136	0.085	0.056	0.095	0.064	0.026	0.017	0.098	0.269	0.247	0.100	0.107	0.167	0.784
19-Jul	0.192	0.098	Z	0.136	0.282	0.080	0.037	0.242	0.683	0.498	0.364	0.233	0.056	0.039	0.093	0.033	0.057	0.101	0.099	0.091	0.081	0.397	0.709	0.201	0.209	0.709
20-Jul	0.100	0.173	0.266	Z	0.305	0.168	0.359	0.684	0.811	0.307	0.222	0.266	0.190	0.155	0.061	0.120	0.035	0.058	0.033	0.035	0.197	0.307	0.233	0.244	0.232	0.811
21-Jul	0.287	0.149	0.108	0.161	Z	0.211	0.143	0.149	0.255	0.255	M	M	M	0.166	0.134	0.107	0.123	0.256	0.182	0.333	1.034	1.058	0.489	0.209	0.290	1.058
22-Jul	0.128	0.119	0.162	0.122	0.112	Z	0.198	0.242	0.372	0.278	0.259	0.117	0.066	0.116	0.073	0.049	0.019	0.025	0.046	0.059	0.322	0.255	0.266	0.219	0.157	0.372
23-Jul	Z	0.267	0.145	0.194	0.361	0.281	0.129	0.277	0.374	0.389	0.350	0.237	0.272	0.168	0.157	0.107	0.139	0.364	0.234	0.451	0.504	0.388	0.463	1.048	0.317	1.048
24-Jul	0.340	Z	0.263	0.545	0.244	0.170	0.116	0.090	0.121	0.079	0.039	0.028	0.018	0.017	0.143	0.199	0.138	0.169	0.198	0.317	0.355	0.459	0.343	0.453	0.211	0.545
25-Jul	0.285	0.383	Z	0.091	0.568	0.508	0.316	0.490	0.247	0.295	0.314	0.226	0.277	0.160	0.112	0.278	0.177	0.127	0.055	0.102	0.087	0.142	0.077	0.021	0.232	0.568
26-Jul	0.004	0.006	0.001	Z	0.070	0.075	0.057	0.054	0.244	0.196	0.184	M	DF	0.068	DF	DF	0.025	0.019	0.056	0.064	0.116	0.105	0.019	0.077	0.076	0.244
27-Jul	0.112	0.103	0.030	0.078	Z	0.009	0.026	0.028	0.052	0.002	0.006	0.016	0.017	0.020	0.004	0.020	0.003	0.005	0.006	0.010	0.399	0.012	0.067	0.757	0.077	0.757
28-Jul	0.238	0.015	0.293	0.218	0.210	Z	0.080	0.363	0.699	0.556	0.259	0.070	0.078	0.242	0.097	0.011	0.001	0.010	0.008	0.010	0.024	0.020	0.014	0.087	0.157	0.699
29-Jul	Z	0.004	0.021	0.006	0.004	0.020	0.015	0.007	0.005	0.004	0.023	0.003	0.006	0.002	0.003	0.001	0.004	0.001	0.003	0.003	0.007	0.013	0.042	0.032	0.010	0.042
30-Jul	0.201	Z	0.010	0.013	0.266	0.335	0.242	0.208	0.105	0.122	0.104	0.038	0.020	0.014	0.006	0.005	0.007	0.008	0.014	0.046	0.105	0.022	0.391	0.420	0.117	0.420
31-Jul	0.405	0.223	Z	0.305	0.234	0.022	0.286	0.266	0.260	0.030	0.007	0.031	0.036	0.009	0.006	0.015	0.042	0.045	0.028	0.178	0.054	0.238	0.358	0.112	0.139	0.405
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance DF - DAS Failure																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Fort Hills - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	43	6.13	6.13
0.006 - 0.05	195	27.78	33.90
0.06 - 0.1	180	25.64	59.54
> 0.1	284	40.46	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 Hills - July 2023

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	16	0	0	0	0	0	0	1	2	15	4	0	1	0	1	3	43
0.006 - 0.05	42	21	4	1	1	0	2	18	27	25	8	5	7	6	7	21	195
0.06 - 0.1	33	15	10	4	0	3	6	16	21	13	16	5	6	5	10	17	180
> 0.1	44	34	10	6	1	7	22	28	20	26	19	4	7	8	16	32	284
Totals	135	70	24	11	2	10	30	63	70	79	47	14	21	19	34	73	702

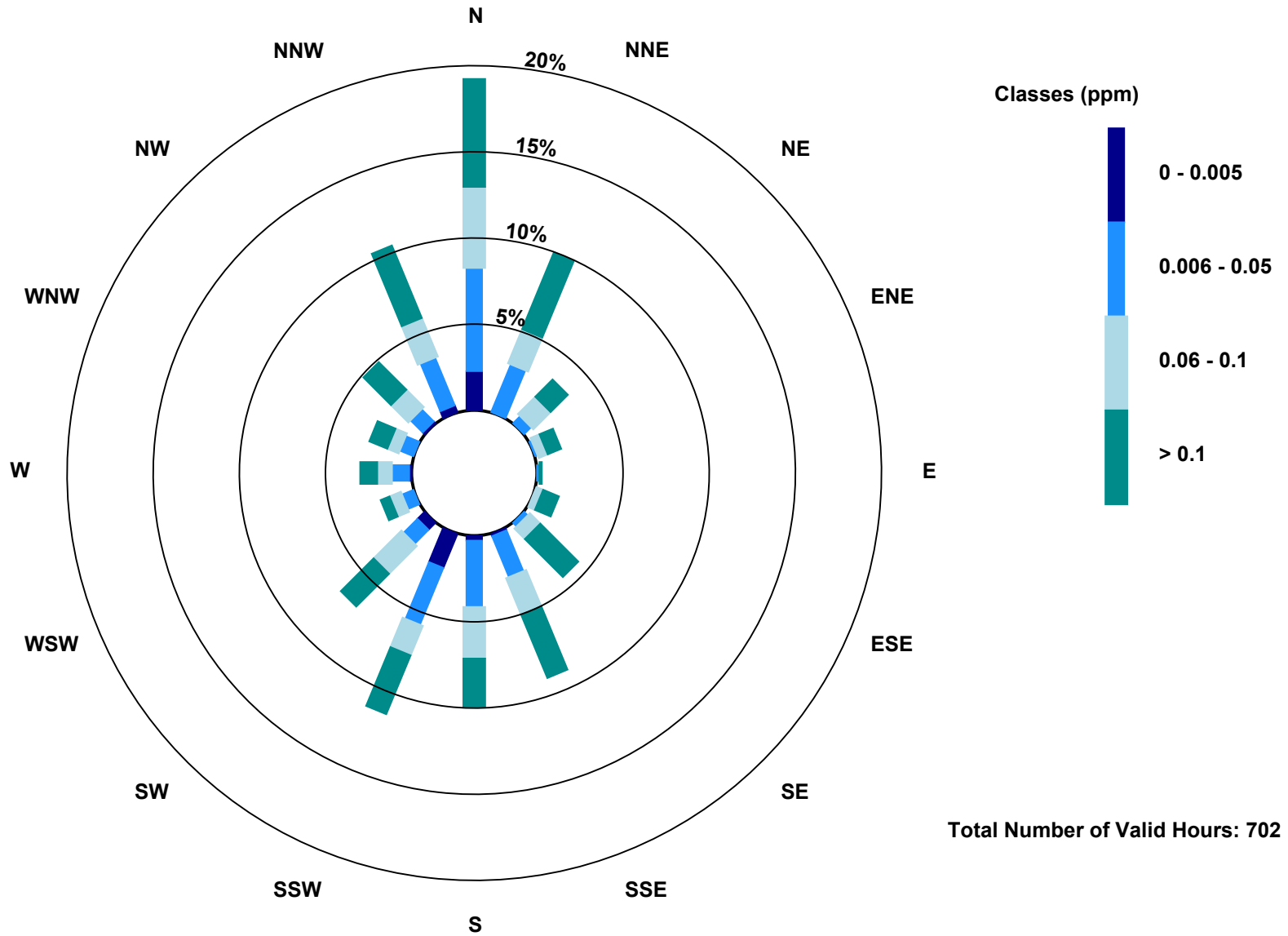
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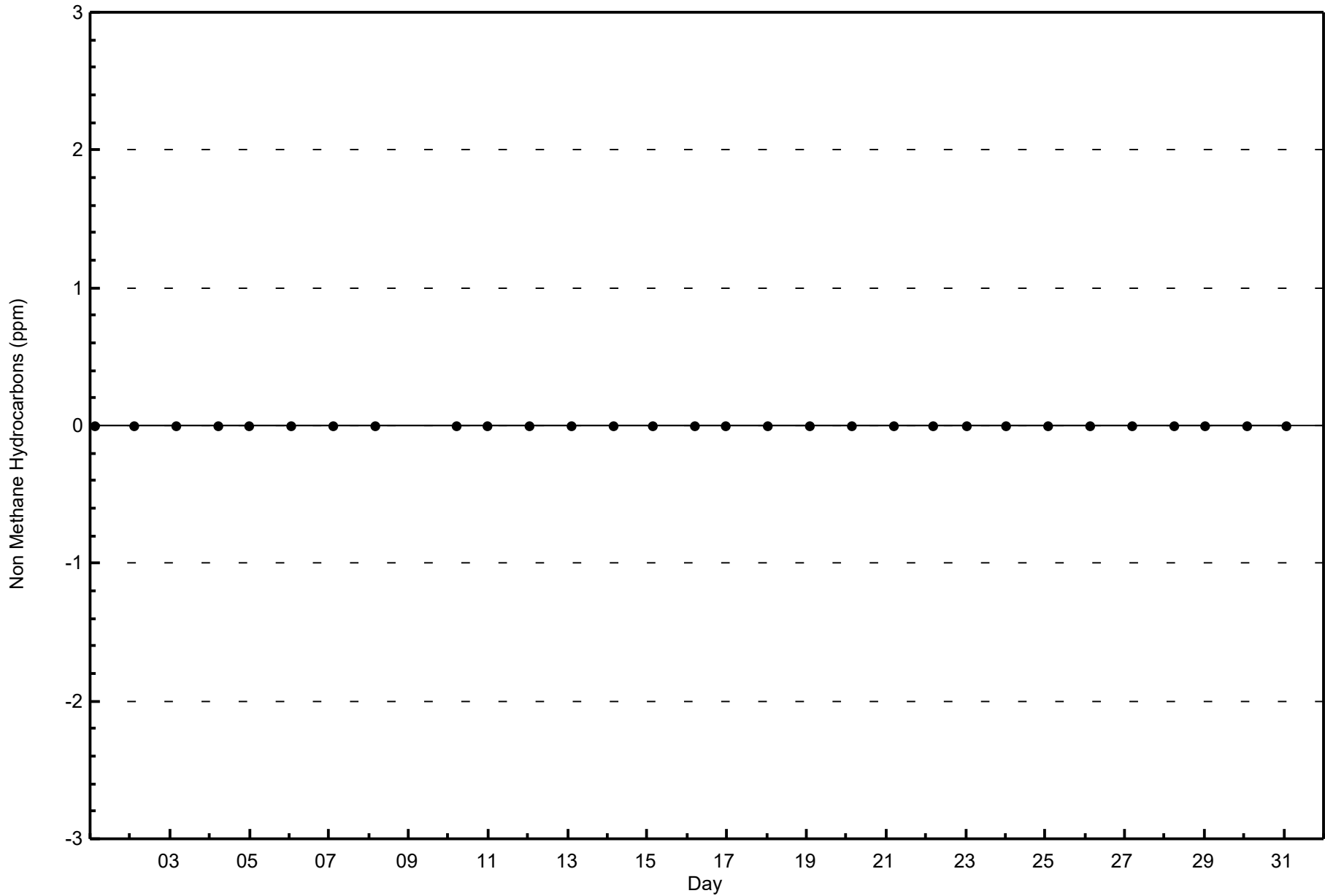
Total Number of Hours: 744

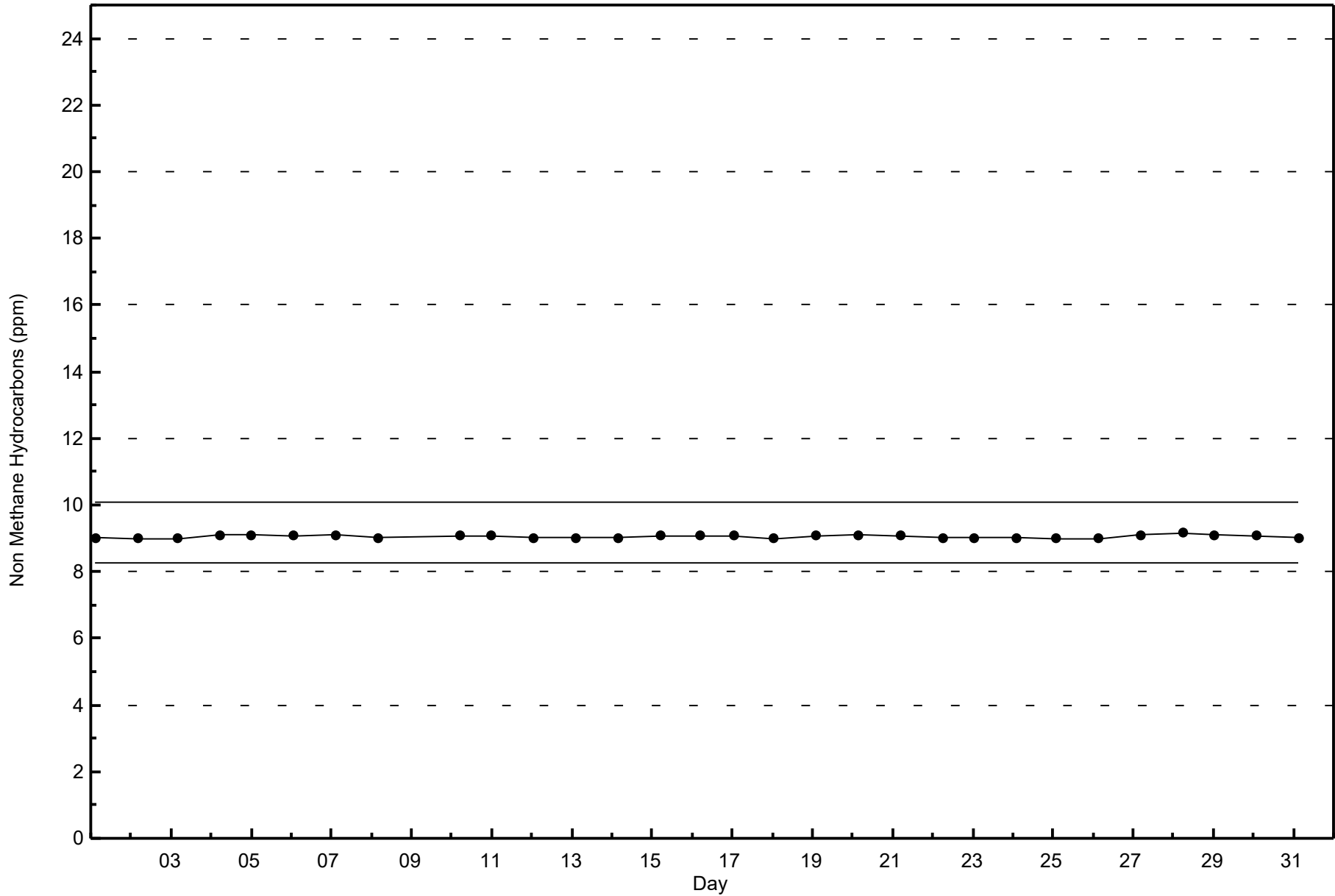


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Non Methane Hydrocarbons (NMHC) - ppm
Fort Hills



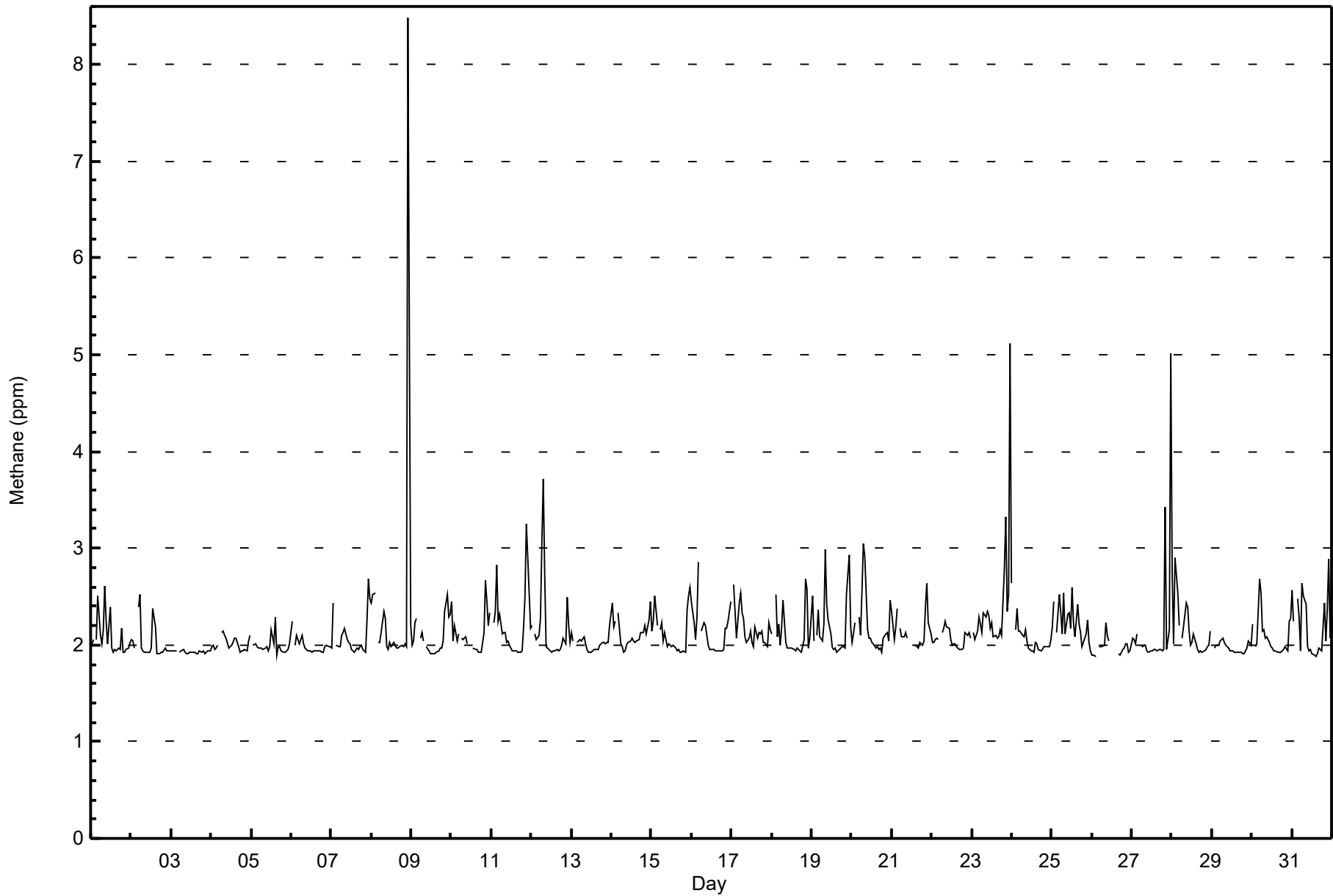






Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Fort Hills - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Fort Hills - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	409	58.26	58.26
2.1 - 3.0	285	40.60	98.86
3.1 - 10.0	8	1.14	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Methane (CH₄) - ppm
Fort Hills - July 2023

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	91	41	18	9	1	4	10	30	41	48	27	9	13	8	14	45	409
2.1 - 3.0	42	29	6	2	1	6	20	33	29	31	20	4	7	11	19	25	285
3.1 - 10.0	2	0	0	0	0	0	0	0	0	0	0	1	1	0	1	3	8
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	135	70	24	11	2	10	30	63	70	79	47	14	21	19	34	73	702

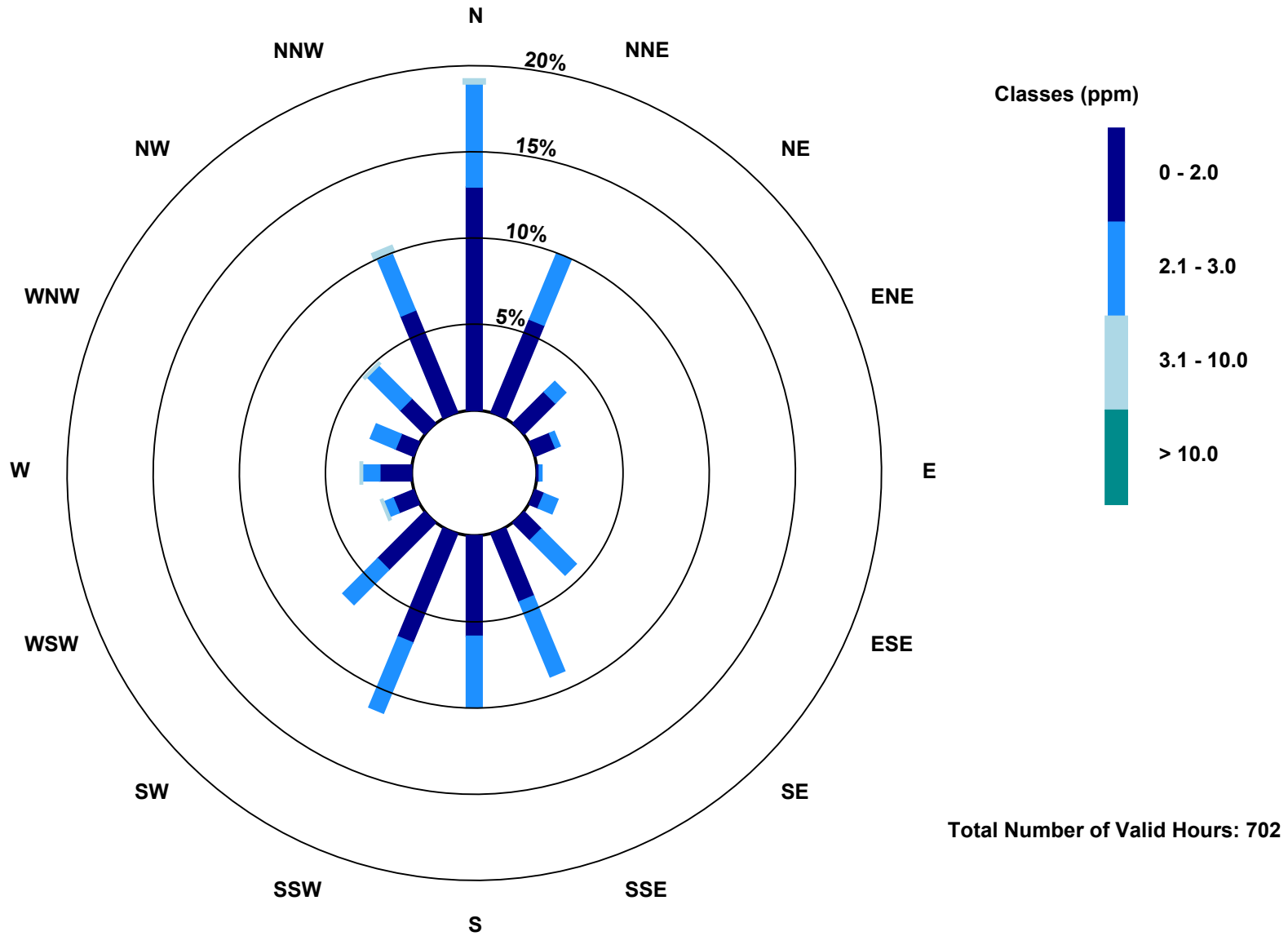
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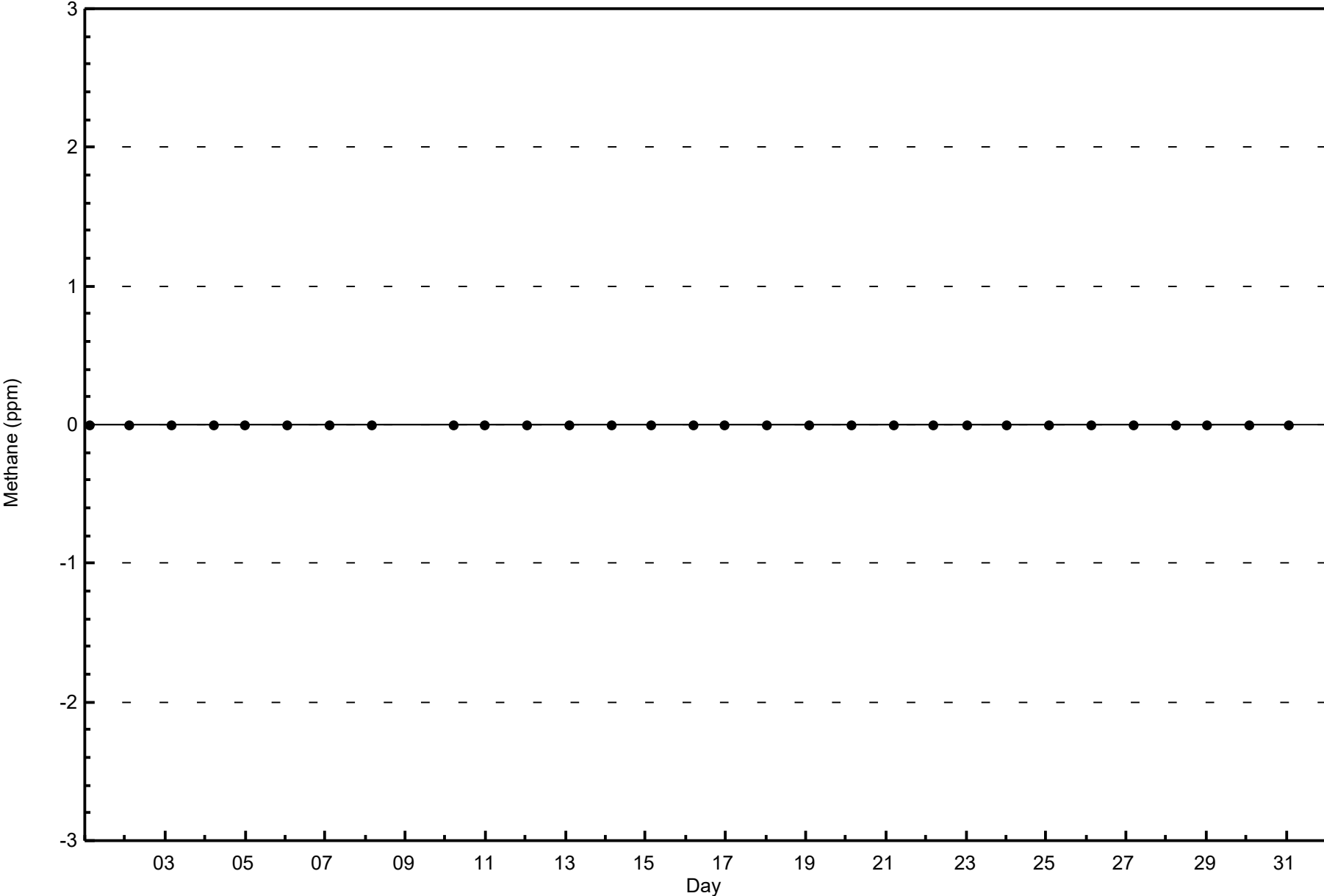
Total Number of Hours: 744

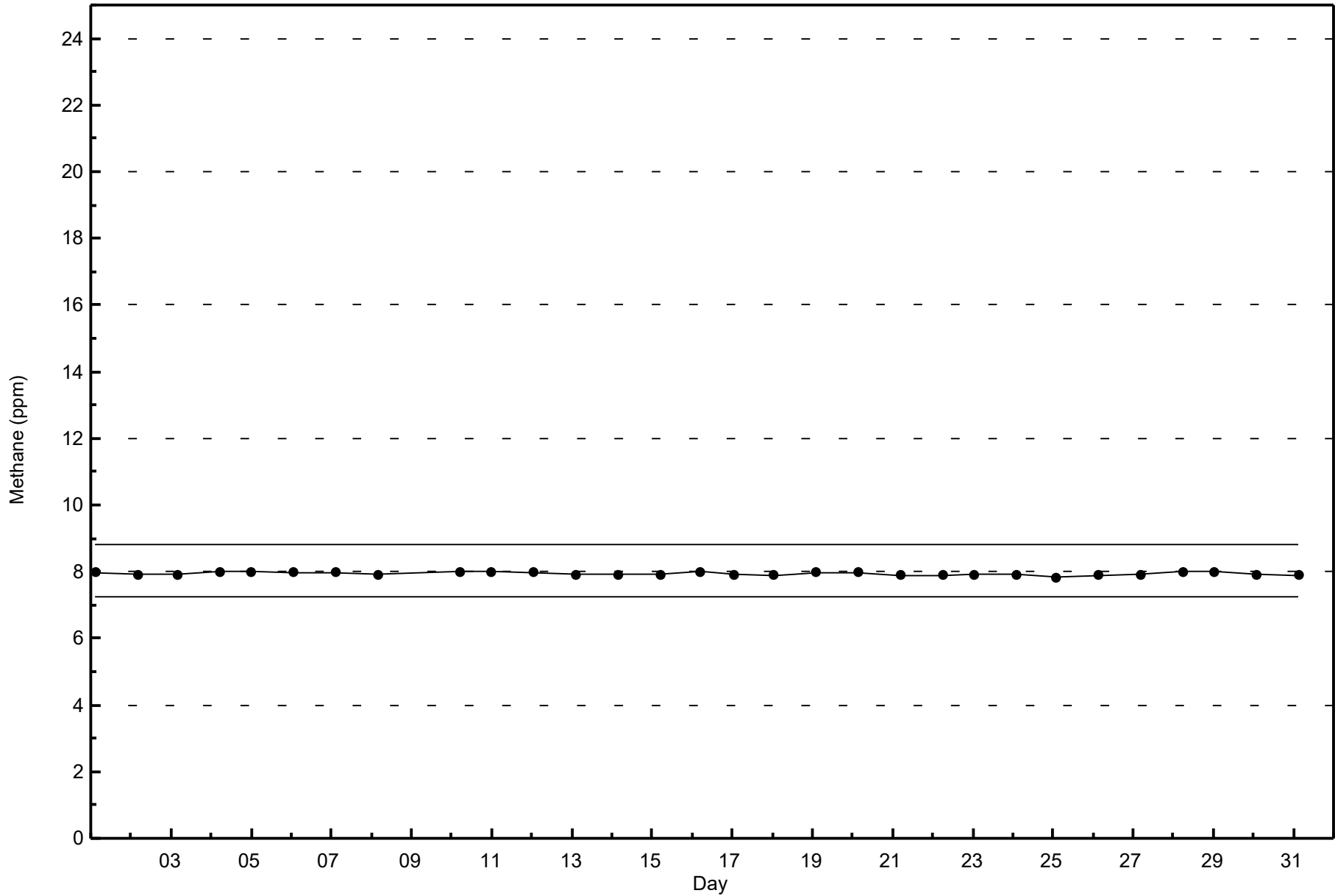


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Methane (CH₄) - ppm
Fort Hills









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

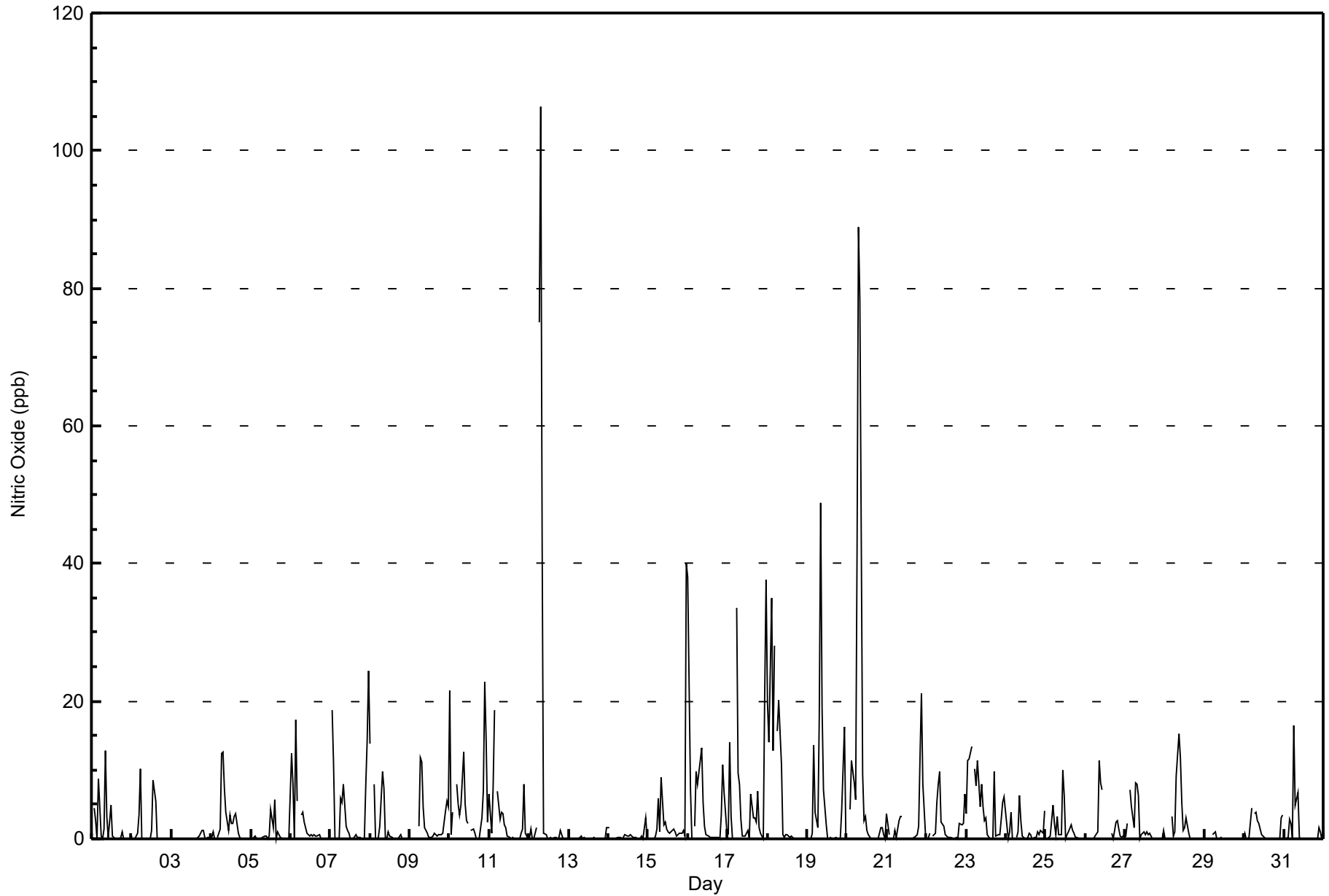
Fort Hills - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744																																											
Maximum Value: 106.4 ppb on Jul 12 08:00		Maximum Daily Average: 11.3 ppb on Jul 20		Hours of Data: 700																																													
Minimum Value: 0.0 ppb on Jul 1 04:00		Minimum Daily Average: 0.1 ppb on Jul 29		Hours of Missing Data: 44																																													
Maximum Diurnal Average: 11.6 ppb at hour 8		Minimum Diurnal Average: 0.3 ppb at hour 17		Hours of Calibration: 37																																													
Monthly Average: 3.20 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.4 Q ₃ = 2.7 P ₉₀ = 8.1 P ₉₉ = 40.1		Percent Operational Time: 99.1																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	Z	4.5	2.6	0.0	8.8	0.4	0.0	1.5	12.8	3.2	0.3	4.9	0.3	0.1	0.0	0.0	0.0	0.2	1.1	0.0	0.0	0.0	0.0	0.0	1.8	12.8																							
2-Jul	0.3	Z	0.0	0.7	3.4	10.2	0.0	0.0	0.0	0.0	0.0	0.0	1.2	8.5	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	1.3	10.2																							
3-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	1.1	1.1	0.1	0.0	0.1	0.1	0.2	1.1	0.0																							
4-Jul	0.1	1.0	0.0	Z	0.1	1.4	12.5	12.7	7.3	3.9	1.3	3.6	2.3	2.1	3.2	3.8	0.8	0.1	0.1	0.0	0.0	0.0	0.0	0.1	2.5	12.7																							
5-Jul	0.1	0.0	0.4	0.0	Z	0.0	0.0	0.1	0.4	0.5	0.1	0.5	4.2	1.6	5.7	0.0	0.9	0.7	0.2	0.0	0.0	0.0	0.1	0.0	0.7	5.7																							
6-Jul	12.5	8.0	0.0	17.2	5.5	Z	3.5	3.8	2.4	1.7	0.7	0.5	0.5	0.4	0.5	0.5	0.3	0.6	0.1	0.0	0.0	0.0	0.0	2.6	17.2																								
7-Jul	Z	18.8	10.8	0.0	0.0	0.0	5.9	5.3	7.9	1.8	1.2	0.7	0.0	0.0	0.0	0.6	0.2	0.2	0.3	0.0	0.0	7.7	14.3	24.3	4.4	24.3																							
8-Jul	13.9	Z	7.9	0.0	0.0	0.1	1.9	9.7	7.4	0.3	0.0	0.9	0.4	0.2	0.0	0.0	0.0	0.1	0.6	0.0	0.0	0.0	0.0	1.9	13.9	0.0																							
9-Jul	0.0	0.0	Z	16.9	DF	1.8	11.9	11.3	4.6	1.7	0.8	0.2	0.3	0.2	0.4	0.7	0.4	0.7	0.6	0.7	0.9	4.2	5.4	4.7	3.1	16.9																							
10-Jul	21.5	0.7	3.8	Z	7.9	5.1	3.4	4.8	12.7	5.1	2.7	2.3	M	1.1	1.4	0.9	0.1	0.0	0.0	3.0	6.9	22.8	14.4	2.4	5.6	22.8																							
11-Jul	6.6	0.8	7.4	18.8	Z	6.9	2.9	3.9	3.7	2.0	1.6	0.4	0.1	0.1	0.2	0.0	0.0	0.0	0.1	0.7	1.5	7.8	0.8	0.0	2.9	18.8																							
12-Jul	0.3	1.3	0.1	0.0	1.6	Z	75.0	106.4	44.0	0.8	0.7	0.1	0.0	0.2	0.1	0.1	0.1	0.0	0.3	1.3	0.0	0.0	0.0	10.1	106.4	0.0																							
13-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.7	0.1	1.7	0.0																							
14-Jul	1.5	Z	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.2	0.6	0.5	0.4	0.6	0.5	0.3	0.1	0.0	0.0	0.1	0.3	0.0	3.0	0.3	0.4	3.0	0.0																						
15-Jul	0.0	0.0	Z	0.0	0.4	1.4	6.0	1.0	8.9	2.1	2.4	1.4	0.9	0.8	1.1	1.5	0.9	0.5	0.6	0.8	0.8	1.2	0.4	40.1	3.2	40.1	0.0																						
16-Jul	38.0	7.1	0.0	Z	1.9	9.8	8.0	11.5	13.3	5.3	1.9	0.6	0.4	0.1	0.1	0.1	0.2	0.2	0.1	0.1	3.4	10.9	6.8	1.0	5.3	38.0	0.0																						
17-Jul	0.8	14.0	3.3	0.1	Z	33.5	9.6	7.9	2.9	0.5	0.5	0.7	1.1	0.0	6.5	3.0	3.0	2.5	6.8	1.7	0.7	0.1	20.8	37.6	6.9	37.6	0.0																						
18-Jul	19.8	14.0	35.0	12.8	28.0	Z	15.7	20.0	10.7	0.5	0.3	0.6	0.7	0.2	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	6.9	35.0	0.0																							
19-Jul	Z	0.0	0.0	0.9	13.6	3.8	1.7	17.7	48.7	19.2	7.2	2.0	0.0	0.0	0.3	0.0	0.0	0.2	0.1	0.0	0.1	4.0	16.3	0.0	5.9	48.7	0.0																						
20-Jul	0.0	Z	4.2	11.3	8.1	5.6	41.9	88.8	78.4	9.4	2.7	3.2	1.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.6	0.5	0.0	11.3	88.8	0.0																						
21-Jul	3.7	0.6	Z	0.0	0.0	1.2	0.3	2.6	3.3	3.2	C	C	C	C	C	C	0.1	0.2	0.5	1.8	12.0	21.1	7.9	0.2	--	21.1	0.0																						
22-Jul	0.0	0.2	0.7	Z	0.4	0.9	5.4	7.9	9.9	2.4	1.8	0.6	0.4	0.3	0.1	0.1	0.0	0.0	0.2	0.0	2.3	1.9	2.3	6.6	1.9	9.9	0.0																						
23-Jul	3.7	11.4	11.7	13.3	Z	10.2	7.7	11.4	4.7	7.9	4.6	2.6	3.0	0.5	0.1	0.0	0.0	9.7	0.5	0.6	0.6	2.8	5.2	6.2	5.1	13.3	0.0																						
24-Jul	4.0	0.0	1.0	3.9	0.1	Z	0.1	1.1	6.3	2.7	0.4	0.1	0.0	0.2	0.7	0.6	0.0	0.1	0.3	1.0	0.6	1.2	0.7	4.1	1.3	6.3	0.0																						
25-Jul	Z	0.0	0.1	0.4	4.9	2.3	0.5	3.2	0.5	0.7	9.9	6.2	0.0	0.6	0.9	2.1	1.1	0.8	0.2	0.1	0.0	0.0	0.0	0.0	1.5	9.9	0.0																						
26-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.4	0.9	11.4	8.1	7.0	M	DF	DF	DF	DF	0.7	0.0	2.4	2.6	1.4	0.3	0.3	0.4	2.0	11.4	0.0																						
27-Jul	0.4	2.2	Z	7.0	4.7	1.6	8.1	7.9	6.3	0.0	0.7	1.0	0.7	1.0	0.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.9	8.1	0.0																						
28-Jul	0.0	0.0	0.0	Z	3.2	0.4	1.0	9.1	15.3	11.7	5.3	1.1	1.7	3.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	15.3	0.0	0.0																						
29-Jul	0.0	0.0	0.0	0.0	Z	0.6	1.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.1	0.0	0.0																						
30-Jul	0.7	0.0	0.0	0.2	4.6	Z	3.6	3.9	2.6	2.2	0.7	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	3.4	1.1	4.6	0.0																						
31-Jul	Z	0.0	0.1	2.8	2.2	0.0	16.5	4.9	6.7	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.0	0.0	1.6	16.5	0.0																						
																								5.1	3.3	3.4	4.1	4.0	3.7	7.9	11.6	10.8	3.1	1.8	1.2	0.7	0.8	1.0	0.5	0.3	0.6	0.5	0.5	1.1	2.9	3.3	4.3	Diurnal Average	
																								38.0	18.8	35.0	18.8	28.0	33.5	75.0	106.4	78.4	19.2	9.9	6.2	4.2	8.5	6.5	3.8	3.0	9.7	6.8	3.0	12.0	22.8	20.8	40.1	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance				DF - DAS Failure																																							



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Fort Hills - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort Hills - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	682	97.43	97.43
21 - 40	11	1.57	99.00
41 - 80	5	0.71	99.71
81 - 159	2	0.29	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
Fort Hills - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	132	64	24	11	2	11	29	61	70	77	45	16	20	19	34	67	682
21 - 40	3	4	0	0	0	0	2	0	0	0	1	0	0	0	0	1	11
41 - 80	1	0	0	0	0	0	0	0	2	0	0	0	1	0	0	1	5
81 - 159	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	2
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	136	68	24	11	2	11	31	61	72	78	46	17	21	19	34	69	700

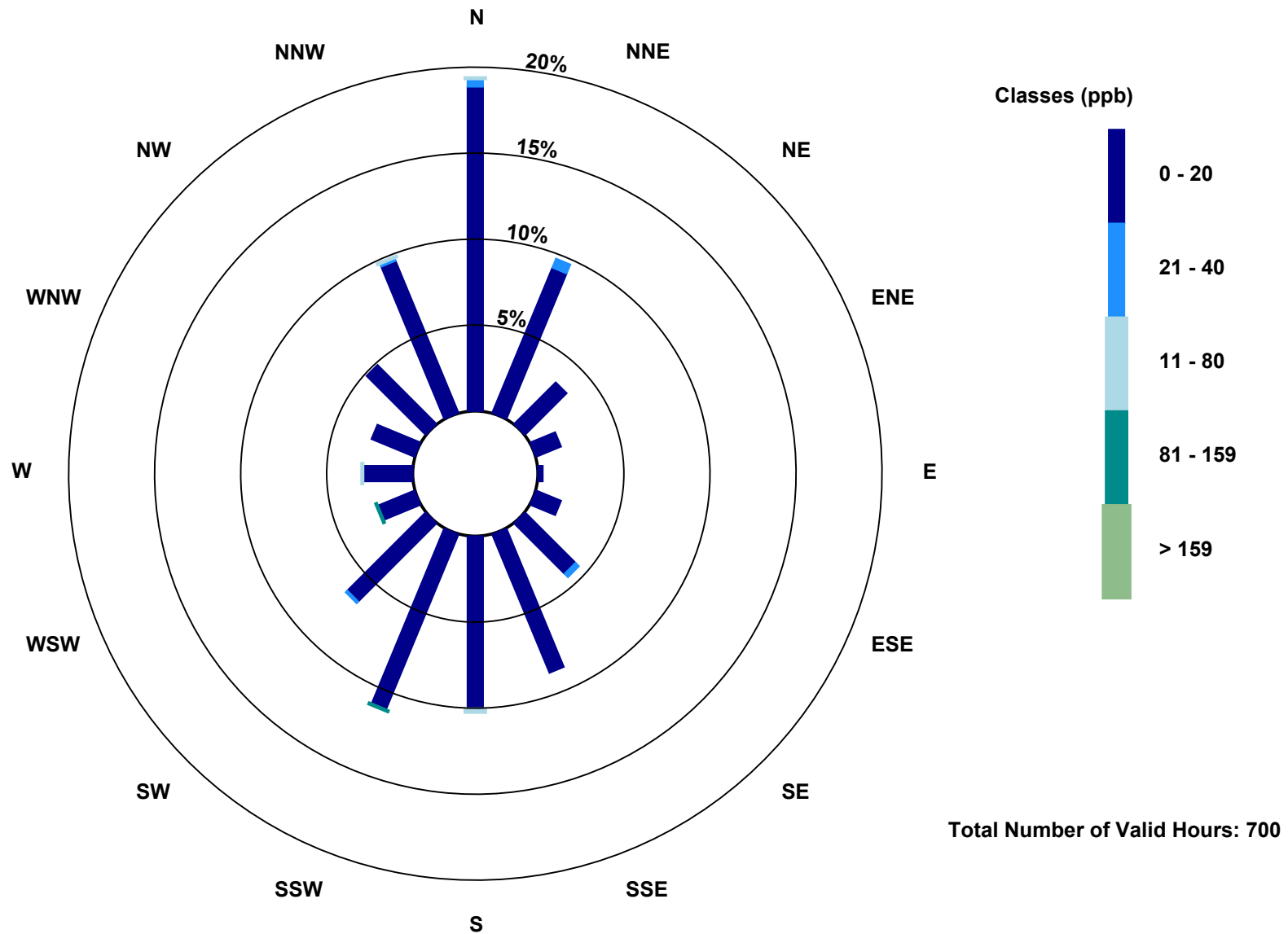
Total Number of Valid Hours: 700

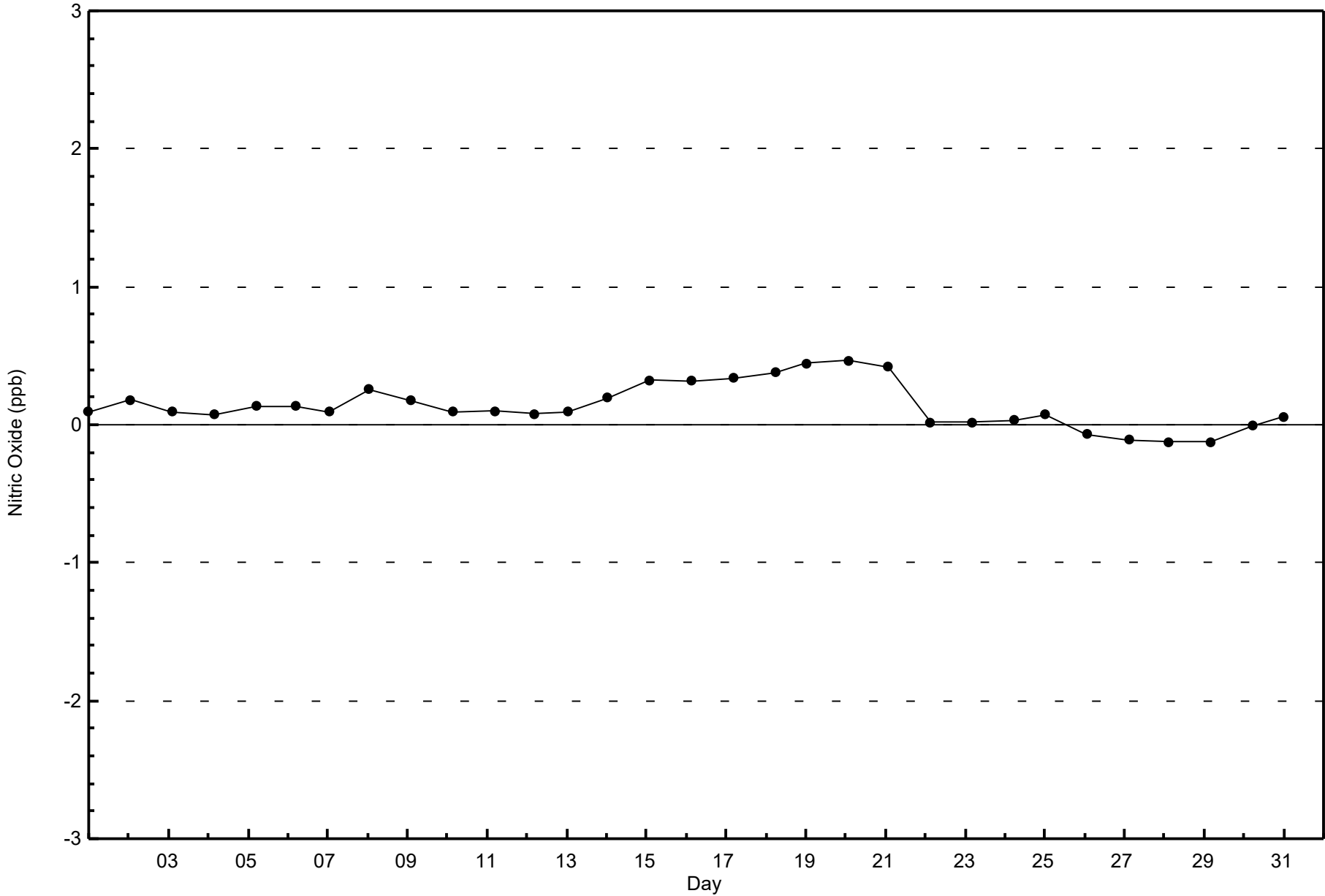
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Fort Hills

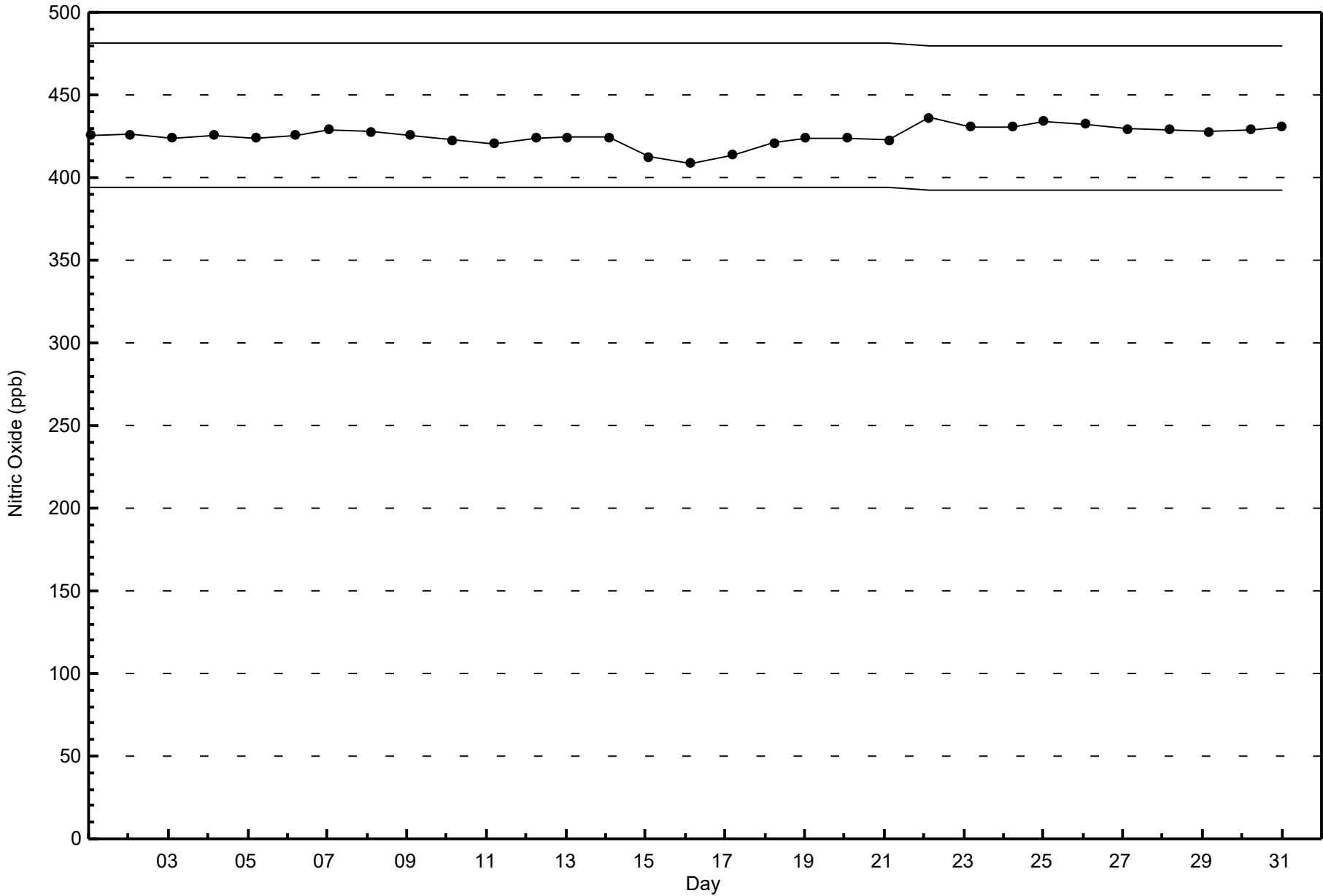






Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Fort Hills - July 2023





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Fort Hills - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 40.6 ppb on Jul 21 21:00	Maximum Daily Average: 15.0 ppb on Jul 23		Hours of Data:	700
Minimum Value: 0.0 ppb on Jul 13 13:00	Minimum Daily Average: 1.1 ppb on Jul 3		Hours of Missing Data:	44
Maximum Diurnal Average: 11.3 ppb at hour 23	Minimum Diurnal Average: 2.7 ppb at hour 17		Hours of Calibration:	37
Monthly Average: 6.90 ppb	Percentiles: P ₁ = 0.2 P ₁₀ = 0.7 Q ₁ = 1.7 Median = 4.1 Q ₃ = 10.2 P ₉₀ = 18.3 P ₉₉ = 26.8		Percent Operational Time:	99.1

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	Z	22.4	20.6	5.5	20.2	5.7	2.5	8.3	22.2	9.8	4.0	21.4	4.8	4.1	4.6	4.5	4.0	4.3	12.6	1.8	2.4	2.7	2.9	6.3	8.6	22.4
2-Jul	8.2	Z	1.7	11.0	17.5	22.3	1.2	0.9	0.8	0.6	0.9	1.0	3.1	17.5	7.5	0.5	0.6	0.5	0.8	1.2	1.7	0.8	0.3	0.3	4.4	22.3
3-Jul	0.3	0.3	Z	1.3	0.8	0.7	2.6	1.5	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.4	0.6	2.4	4.1	4.9	1.5	0.4	0.9	1.4	1.1	4.9
4-Jul	1.4	7.0	0.4	Z	1.8	2.5	8.7	10.6	9.2	6.2	2.7	6.5	5.6	6.4	8.7	10.5	4.3	1.9	1.5	2.1	2.1	2.0	5.0	11.2	5.1	11.2
5-Jul	7.3	6.0	8.0	3.2	Z	1.0	1.1	1.0	1.5	2.0	1.4	2.4	13.4	6.8	14.0	0.9	4.7	5.1	1.6	1.3	0.9	1.5	2.6	1.5	3.9	14.0
6-Jul	10.6	16.5	2.6	19.7	14.8	Z	8.0	6.5	4.0	3.0	1.6	1.2	1.5	1.2	1.5	1.6	1.3	2.2	0.6	0.4	1.5	5.1	2.0	1.0	4.7	19.7
7-Jul	Z	14.2	8.6	1.5	0.5	0.7	6.2	7.2	10.2	6.6	6.3	6.4	2.0	1.0	1.0	2.9	2.4	3.5	4.2	2.0	0.4	11.3	23.4	25.0	6.4	25.0
8-Jul	24.2	Z	18.6	3.3	4.1	4.2	7.7	14.8	11.2	2.9	1.6	7.5	4.9	5.5	2.3	1.2	1.8	3.8	9.3	3.8	2.0	1.0	1.0	0.8	6.0	24.2
9-Jul	2.5	8.2	Z	23.8	DF	8.9	13.9	11.1	6.6	2.8	1.4	0.9	0.7	0.7	1.3	2.0	1.6	3.7	4.2	7.8	13.3	21.4	25.3	21.8	8.4	25.3
10-Jul	23.1	10.9	12.4	Z	12.5	10.4	6.1	6.3	11.0	6.7	4.3	3.9	M	3.1	3.8	3.3	1.1	1.7	2.1	14.2	23.4	26.8	30.4	24.0	11.0	30.4
11-Jul	25.3	20.0	21.0	25.6	Z	14.9	10.1	9.8	7.9	5.4	4.7	2.7	2.0	1.4	1.7	1.1	0.9	0.7	2.4	9.2	17.8	25.0	7.9	1.0	9.5	25.6
12-Jul	7.3	10.1	5.9	2.4	5.5	Z	15.0	23.8	20.9	1.8	1.7	0.5	0.1	0.8	1.0	2.1	2.1	1.7	6.9	19.0	3.5	2.8	2.2	3.5	6.1	23.8
13-Jul	Z	2.7	2.6	4.6	3.8	3.4	3.2	2.8	1.5	1.1	0.3	0.2	0.0	0.3	0.7	1.4	1.9	4.0	8.3	8.3	6.0	6.1	6.0	26.2	4.1	26.2
14-Jul	15.5	Z	4.2	3.3	3.4	3.3	1.6	0.2	0.2	3.2	6.0	5.9	6.0	5.2	4.0	3.6	4.0	3.5	4.7	8.3	14.3	5.6	13.0	5.5	5.4	15.5
15-Jul	1.6	1.2	Z	4.9	7.0	11.0	15.9	5.0	13.6	5.4	4.2	2.7	1.7	1.3	1.3	2.0	1.2	0.2	1.0	2.2	4.9	5.3	2.5	12.3	4.7	15.9
16-Jul	10.8	5.7	0.6	Z	1.7	3.2	4.5	6.1	10.1	7.9	4.0	1.7	1.1	0.8	1.0	1.4	1.6	1.7	1.9	1.8	15.0	25.0	25.5	20.5	6.7	25.5
17-Jul	10.6	21.4	16.2	4.0	Z	21.8	15.8	13.8	7.0	3.6	7.3	9.3	6.4	1.3	11.6	7.9	10.1	8.3	16.5	9.7	9.3	3.8	20.4	21.4	11.2	21.8
18-Jul	19.0	10.5	18.4	10.8	12.6	Z	15.6	17.0	9.2	1.9	1.6	3.0	4.5	2.9	3.1	3.3	2.6	1.2	1.2	1.1	3.7	2.5	1.2	1.3	6.4	19.0
19-Jul	Z	2.8	1.7	6.2	11.9	5.5	2.8	8.1	19.2	15.6	14.2	8.9	2.1	1.5	2.7	1.1	2.6	3.4	2.9	3.8	4.6	13.0	18.7	3.5	6.8	19.2
20-Jul	1.0	Z	10.0	10.2	6.4	6.1	10.1	15.5	23.3	14.8	8.2	11.5	8.4	6.2	2.0	2.7	0.9	0.6	0.7	1.1	7.2	12.9	7.2	3.2	7.4	23.3
21-Jul	10.1	5.6	Z	2.8	1.5	5.6	2.0	4.0	6.5	7.9	C	C	C	C	C	C	2.2	5.5	6.7	19.6	40.6	37.8	19.4	5.8	--	40.6
22-Jul	2.1	2.2	8.9	Z	5.4	5.7	8.1	14.1	20.2	10.7	9.1	5.2	3.1	3.1	2.7	2.7	1.4	1.4	1.8	2.3	15.2	13.8	18.0	19.5	7.7	20.2
23-Jul	20.5	23.6	23.3	23.5	Z	18.0	13.4	13.8	12.3	15.6	12.4	9.7	11.8	6.4	5.2	3.2	4.1	27.3	9.7	10.6	10.9	29.1	23.6	17.1	15.0	29.1
24-Jul	7.5	2.1	7.7	12.9	3.3	Z	1.9	3.9	11.0	7.2	4.1	3.1	3.2	4.9	9.3	10.6	4.0	7.3	9.9	21.4	25.9	19.9	26.6	31.0	10.4	31.0
25-Jul	Z	20.0	7.4	5.0	23.2	21.5	11.1	16.4	14.0	9.0	18.3	24.8	5.1	5.6	7.3	18.7	14.8	7.6	3.1	13.1	2.9	2.7	2.7	1.7	11.1	24.8
26-Jul	1.7	Z	0.7	5.5	4.8	2.6	3.7	3.7	13.4	10.3	9.3	M	DF	DF	DF	DF	4.3	2.2	10.6	10.2	10.7	9.8	10.3	12.7	7.0	13.4
27-Jul	14.4	18.1	Z	20.8	15.4	6.7	12.3	12.3	9.3	0.7	2.0	2.5	1.9	2.5	1.5	2.4	0.7	0.8	0.4	0.4	0.2	0.9	3.5	4.4	5.8	20.8
28-Jul	0.7	0.3	2.5	Z	8.7	2.3	2.0	7.1	12.2	13.2	10.6	4.0	5.8	9.9	3.7	1.1	0.5	1.1	0.7	1.3	1.7	3.5	2.4	7.7	4.5	13.2
29-Jul	3.1	0.5	1.3	0.8	Z	4.0	3.7	0.7	0.7	0.4	1.2	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.4	2.9	10.7	5.3	1.7	10.7
30-Jul	13.9	2.6	1.7	4.7	12.7	Z	9.1	8.0	5.9	5.7	3.9	3.3	2.5	2.1	1.8	0.8	0.6	0.3	0.4	0.6	2.5	2.0	23.5	29.0	6.0	29.0
31-Jul	Z	14.7	20.0	21.7	19.6	2.1	17.0	13.9	11.4	1.6	0.7	2.2	1.2	0.6	0.4	0.4	0.6	4.7	2.1	1.0	0.7	13.7	10.3	4.0	7.2	21.7

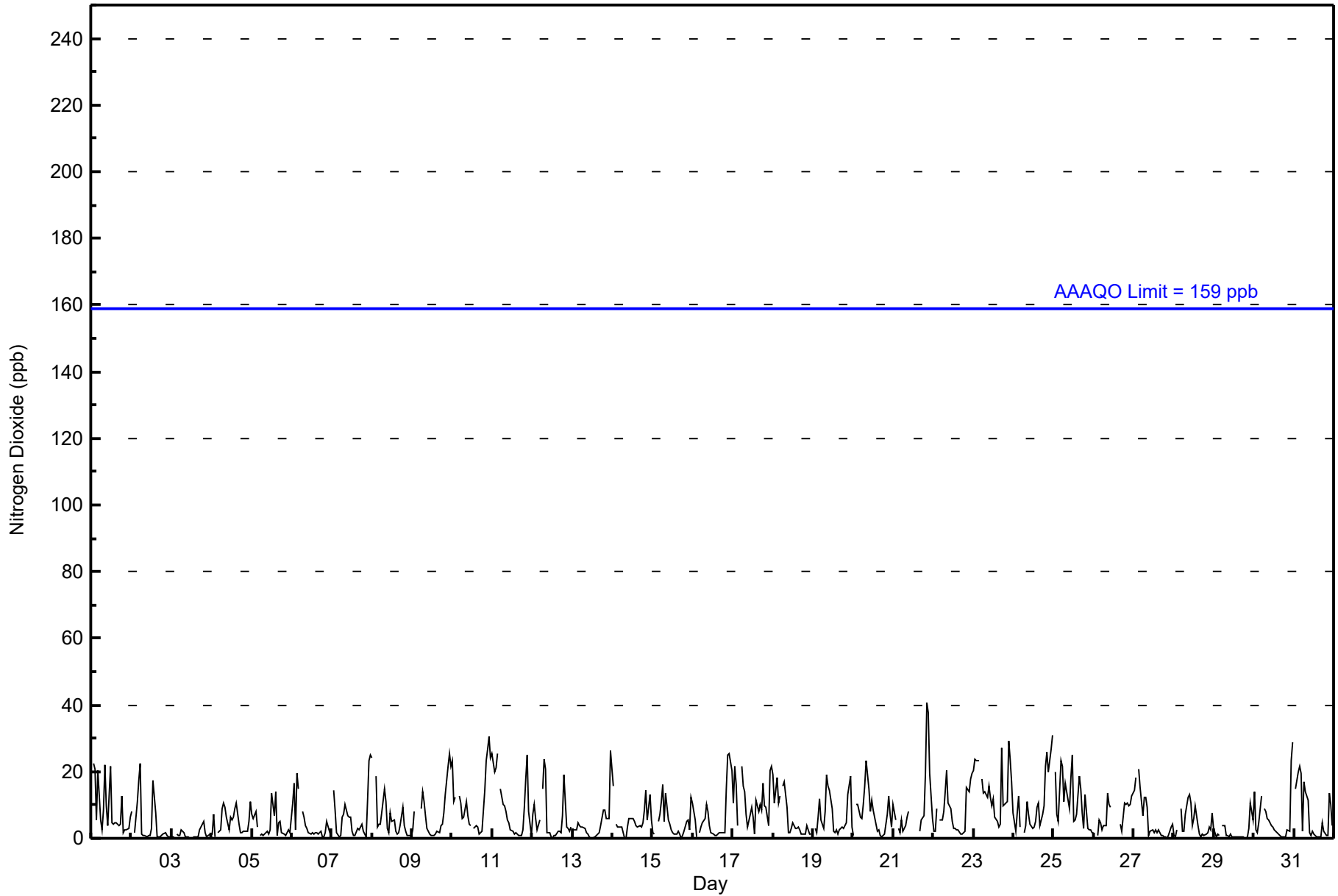
9.7	9.6	8.7	9.2	8.8	7.5	7.6	8.7	9.9	5.9	4.9	5.3	3.7	3.6	3.7	3.3	2.7	3.6	4.3	6.0	8.0	10.0	11.3	10.6	Diurnal Average	
25.3	23.6	23.3	25.6	23.2	22.3	17.0	23.8	23.3	15.6	18.3	24.8	13.4	17.5	14.0	18.7	14.8	27.3	16.5	21.4	40.6	37.8	30.4	31.0	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort Hills - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Hills - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	649	92.71	92.71
21 - 40	50	7.14	99.86
41 - 80	1	0.14	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 700

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Hills - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	128	60	20	8	2	11	20	56	71	76	43	15	18	19	34	68	649
21 - 40	8	8	3	3	0	0	11	5	1	2	3	2	3	0	0	1	50
11 - 80	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	136	68	24	11	2	11	31	61	72	78	46	17	21	19	34	69	700

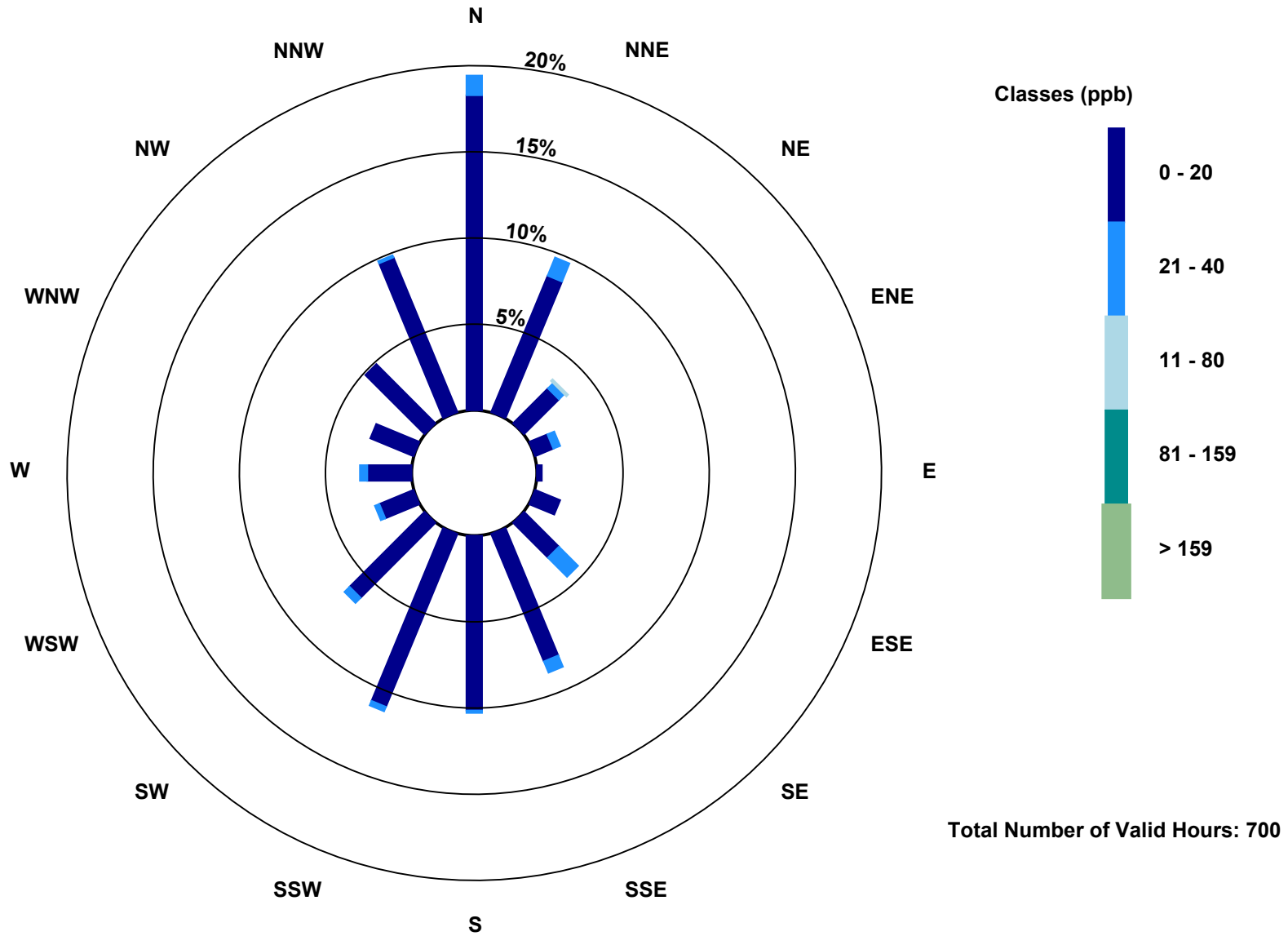
Total Number of Valid Hours: 700

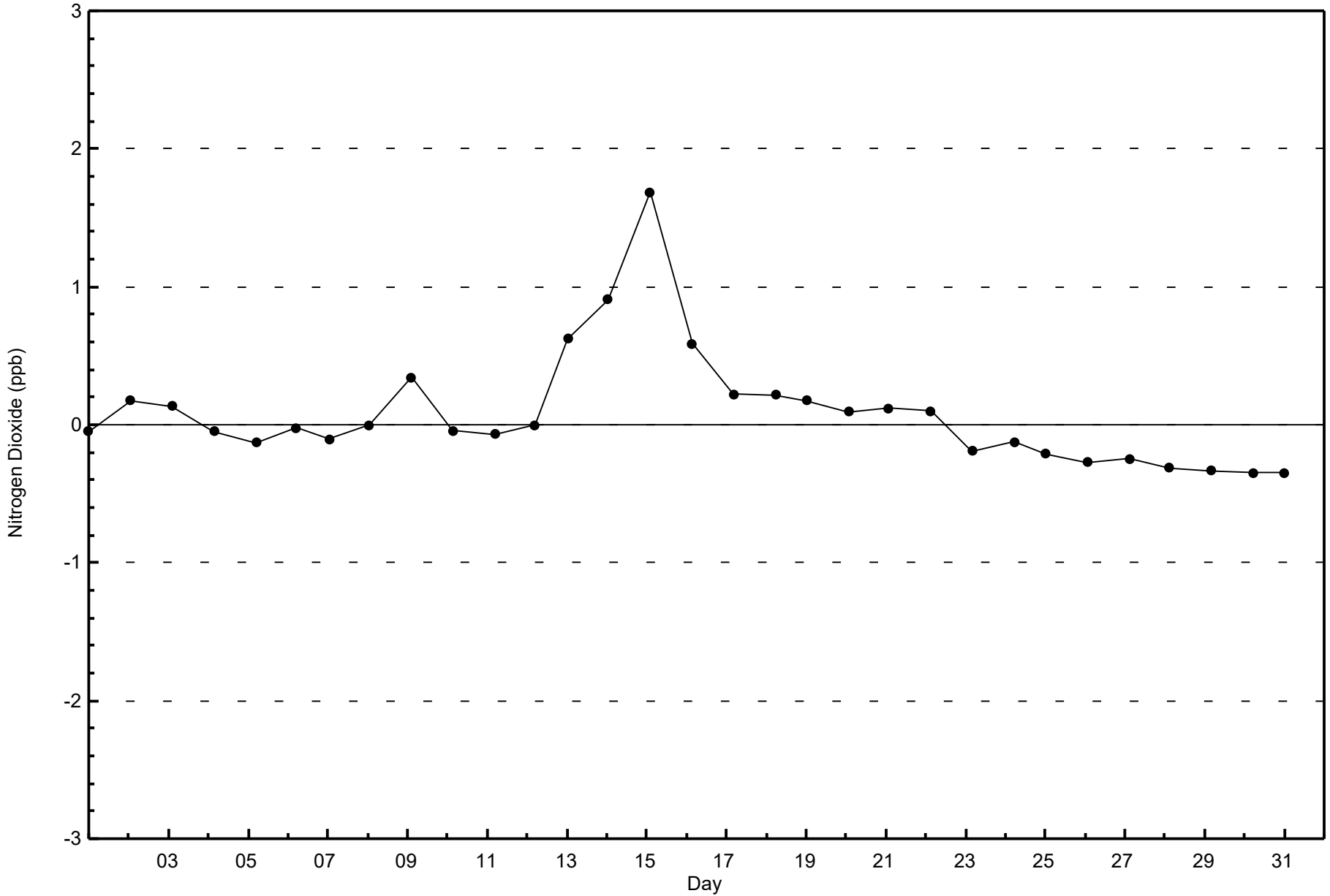
Total Number of Hours: 744

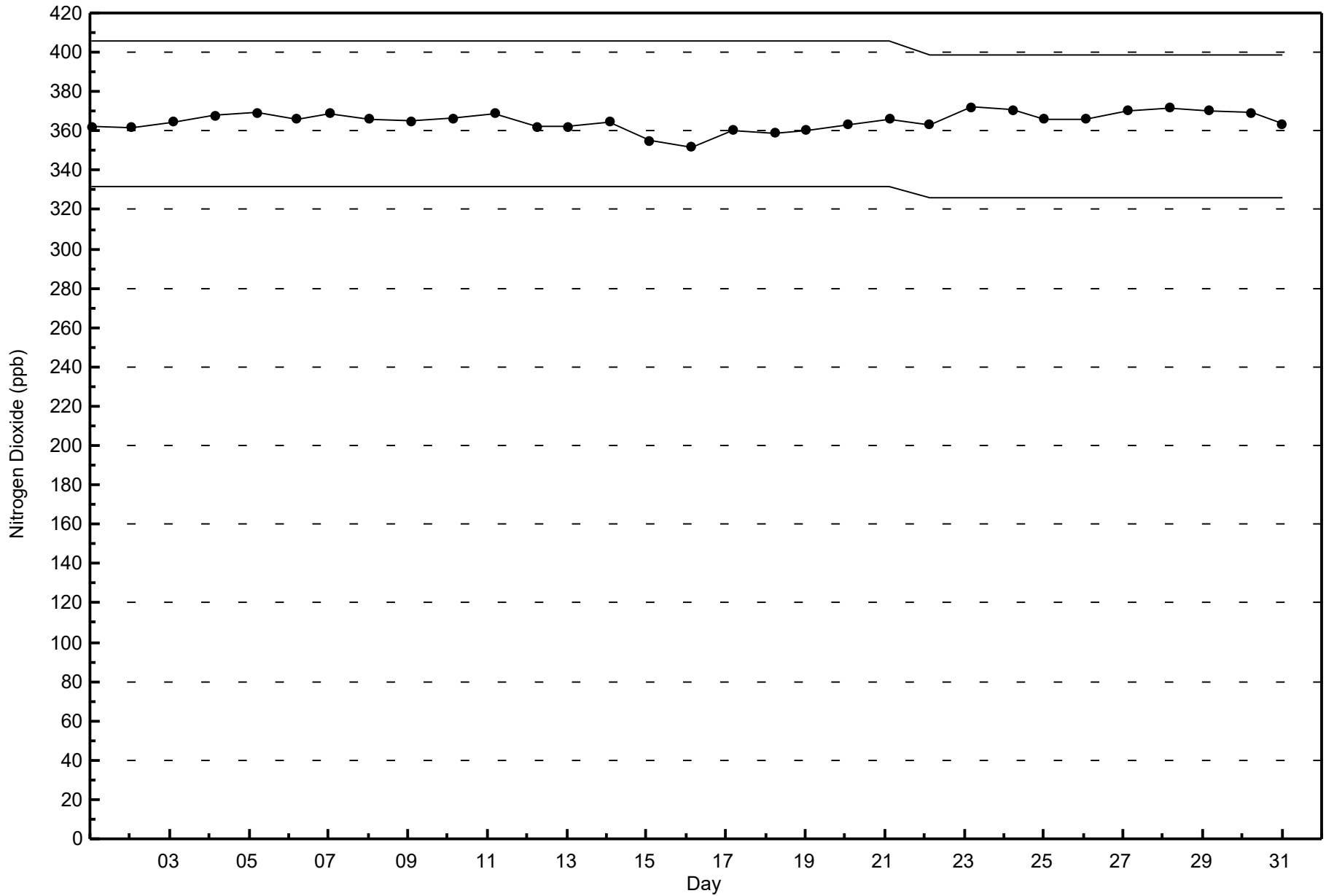


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Fort Hills









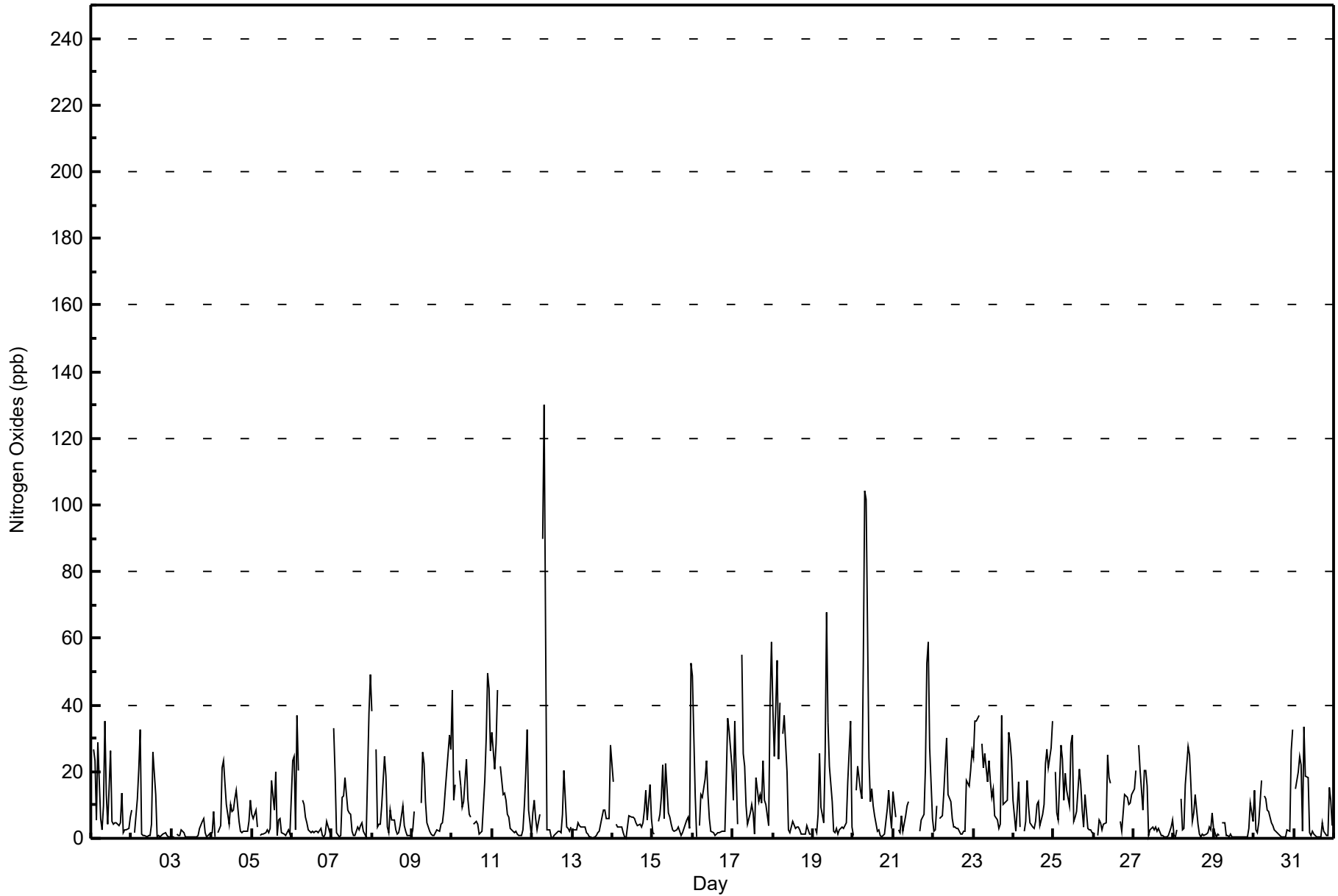
Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

Fort Hills - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:																744					
Maximum Value: 130.2 ppb on Jul 12 08:00				Maximum Daily Average: 20.2 ppb on Jul 23		Hours of Data:																700					
Minimum Value: 0.0 ppb on Jul 13 13:00				Minimum Daily Average: 1.3 ppb on Jul 3		Hours of Missing Data:																44					
Maximum Diurnal Average: 20.7 ppb at hour 9				Minimum Diurnal Average: 3.0 ppb at hour 17		Hours of Calibration:																37					
Monthly Average: 10.09 ppb				Percentiles: P ₁ = 0.2 P ₁₀ = 0.7 Q ₁ = 1.9 Median = 4.6 Q ₃ = 13.2 P ₉₀ = 25.9 P ₉₉ = 58.9		Percent Operational Time:																99.1					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	26.9	23.2	5.5	29.0	6.1	2.5	9.8	35.0	13.0	4.3	26.3	5.1	4.2	4.6	4.5	4.0	4.5	13.7	1.8	2.4	2.7	2.9	6.3	10.4	35.0	
2-Jul	8.5	Z	1.7	11.7	20.9	32.5	1.2	0.9	0.8	0.6	0.9	1.0	4.3	26.0	13.0	0.5	0.6	0.5	0.8	1.2	1.7	0.9	0.3	0.3	5.7	32.5	
3-Jul	0.3	0.3	Z	1.3	0.8	0.7	2.7	1.5	0.4	0.3	0.3	0.2	0.2	0.3	0.3	0.5	0.7	2.8	5.2	6.0	1.6	0.4	1.0	1.5	1.3	6.0	
4-Jul	1.5	8.0	0.4	Z	1.9	3.9	21.2	23.3	16.5	10.1	4.0	10.1	7.9	8.5	11.9	14.3	5.1	2.0	1.6	2.1	2.1	2.0	5.0	11.3	7.6	23.3	
5-Jul	7.4	6.0	8.4	3.2	Z	1.0	1.1	1.1	1.9	2.5	1.5	2.9	17.6	8.4	19.7	0.9	5.6	5.8	1.8	1.3	0.9	1.5	2.7	1.5	4.6	19.7	
6-Jul	23.1	24.5	2.6	36.9	20.3	Z	11.5	10.3	6.4	4.7	2.3	1.7	2.0	1.6	2.0	2.1	1.6	2.8	0.7	0.4	1.5	5.1	2.0	1.0	7.3	36.9	
7-Jul	Z	33.0	19.4	1.5	0.5	0.7	12.1	12.5	18.1	8.4	7.5	7.1	2.0	1.0	1.0	3.5	2.6	3.7	4.5	2.0	0.4	19.0	37.7	49.3	10.8	49.3	
8-Jul	38.1	Z	26.5	3.3	4.1	4.3	9.6	24.5	18.6	3.2	1.6	8.4	5.3	5.7	2.3	1.2	1.8	3.9	9.9	3.8	2.0	1.0	1.0	0.8	7.9	38.1	
9-Jul	2.5	8.2	Z	40.7	DF	10.7	25.8	22.4	11.2	4.5	2.2	1.1	1.0	0.9	1.7	2.7	2.0	4.4	4.8	8.5	14.2	25.6	30.7	26.5	11.5	40.7	
10-Jul	44.6	11.6	16.2	Z	20.4	15.5	9.5	11.1	23.7	11.8	7.0	6.2	M	4.2	5.2	4.2	1.2	1.7	2.1	17.2	30.3	49.6	44.8	26.4	16.6	49.6	
11-Jul	31.9	20.8	28.4	44.4	Z	21.8	13.0	13.7	11.6	7.4	6.3	3.1	2.1	1.5	1.9	1.1	0.9	0.7	2.5	9.9	19.3	32.8	8.7	1.0	12.4	44.4	
12-Jul	7.6	11.4	6.0	2.4	7.1	Z	90.0	130.2	64.9	2.6	2.4	0.6	0.1	1.0	1.1	2.2	2.2	1.7	7.2	20.3	3.5	2.8	2.2	3.5	16.2	130.2	
13-Jul	Z	2.7	2.6	4.6	3.8	3.4	3.2	3.2	1.6	1.3	0.3	0.2	0.0	0.3	0.7	1.6	1.9	4.1	8.3	8.3	6.0	6.1	6.0	27.9	4.3	27.9	
14-Jul	17.0	Z	4.2	3.4	3.4	3.5	1.7	0.3	0.2	3.4	6.6	6.4	6.4	5.8	4.5	3.9	4.1	3.5	4.7	8.4	14.6	5.6	16.0	5.8	5.8	17.0	
15-Jul	1.6	1.2	Z	4.9	7.4	12.4	21.9	6.0	22.5	7.5	6.6	4.1	2.6	2.1	2.4	3.5	2.1	0.7	1.6	3.0	5.7	6.5	2.9	52.4	7.9	52.4	
16-Jul	48.8	12.8	0.6	Z	3.6	13.0	12.5	17.6	23.4	13.2	5.9	2.3	1.5	0.9	1.1	1.5	1.8	1.9	2.0	1.9	18.4	35.9	32.3	21.5	11.9	48.8	
17-Jul	11.4	35.4	19.5	4.1	Z	55.3	25.4	21.7	9.9	4.1	7.8	10.0	7.5	1.3	18.1	10.9	13.1	10.8	23.3	11.4	10.0	3.9	41.2	59.0	18.0	59.0	
18-Jul	38.8	24.5	53.4	23.6	40.6	Z	31.3	37.0	19.9	2.4	1.9	3.6	5.2	3.1	3.5	3.5	2.7	1.2	1.2	1.1	3.7	2.5	1.2	1.4	13.4	53.4	
19-Jul	Z	2.8	1.7	7.1	25.5	9.3	4.5	25.8	67.9	34.8	21.4	10.9	2.1	1.5	3.0	1.1	2.6	3.6	3.0	3.8	4.7	17.0	35.0	3.5	12.7	67.9	
20-Jul	1.0	Z	14.2	21.5	14.5	11.7	52.0	104.3	101.7	24.2	10.9	14.7	9.7	6.9	2.0	2.7	0.9	0.6	0.7	1.1	8.8	14.5	7.7	3.2	18.7	104.3	
21-Jul	13.8	6.2	Z	2.8	1.5	6.8	2.3	6.6	9.8	11.1	C	C	C	C	C	C	2.3	5.7	7.2	21.4	52.6	58.9	27.3	6.0	--	58.9	
22-Jul	2.1	2.4	9.6	Z	5.8	6.6	13.5	22.0	30.1	13.1	10.9	5.8	3.5	3.4	2.8	2.8	1.4	1.4	2.0	2.3	17.5	15.7	20.3	26.1	9.6	30.1	
23-Jul	24.2	35.0	35.0	36.8	Z	28.2	21.1	25.2	17.0	23.5	17.0	12.3	14.8	6.9	5.3	3.2	4.1	37.0	10.2	11.2	11.5	31.9	28.8	23.3	20.2	37.0	
24-Jul	11.5	2.1	8.7	16.8	3.4	Z	2.0	5.0	17.3	9.9	4.5	3.2	3.2	5.1	10.0	11.2	4.0	7.4	10.2	22.4	26.5	21.1	27.3	35.1	11.6	35.1	
25-Jul	Z	20.0	7.5	5.4	28.1	Z	23.8	11.6	19.6	14.5	9.7	28.2	31.0	5.1	6.2	8.2	20.8	15.9	8.4	3.3	13.2	2.9	2.7	2.7	1.7	12.6	31.0
26-Jul	1.7	Z	0.7	5.5	4.8	2.6	4.1	4.6	24.8	18.4	16.3	M	DF	DF	DF	DF	5.0	2.2	13.0	12.8	12.1	10.1	10.6	13.1	9.0	24.8	
27-Jul	14.8	20.3	Z	27.8	20.1	8.3	20.4	20.2	15.6	0.7	2.7	3.5	2.6	3.5	2.1	3.2	0.7	0.8	0.4	0.4	0.2	0.9	3.5	5.6	7.7	27.8	
28-Jul	0.7	0.3	2.5	Z	11.9	2.7	3.0	16.2	27.5	24.9	15.9	5.1	7.5	13.0	4.4	1.1	0.5	1.1	0.7	1.3	1.7	3.5	2.4	7.7	6.7	27.5	
29-Jul	3.1	0.5	1.3	0.8	Z	4.6	4.8	0.7	0.7	0.4	1.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.4	2.9	10.7	5.3	1.8	10.7	
30-Jul	14.6	2.6	1.7	4.9	17.3	Z	12.7	11.9	8.5	7.9	4.6	3.7	2.6	2.1	1.8	0.8	0.6	0.3	0.4	0.6	2.5	2.0	26.5	32.4	7.1	32.4	
31-Jul	Z	14.7	20.1	24.5	21.8	2.1	33.5	18.8	18.1	1.7	0.7	2.3	1.2	0.6	0.4	0.4	0.6	4.7	2.1	1.0	0.7	15.3	11.3	4.0	8.7	33.5	
																								Diurnal Average			
																								Diurnal Maximum			
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan																											
C - Calibration																											
M - Maintenance																											
DF - DAS Failure																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort Hills - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	588	84.00	84.00
21 - 40	90	12.86	96.86
41 - 80	18	2.57	99.43
81 - 159	4	0.57	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
Fort Hills - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	114	51	18	8	1	9	17	51	63	72	39	14	17	19	30	65	588
21 - 40	17	13	5	3	1	2	11	9	7	5	6	2	3	0	4	2	90
11 - 80	4	4	1	0	0	0	3	1	2	0	1	0	0	0	0	2	18
81 - 159	1	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	4
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	136	68	24	11	2	11	31	61	72	78	46	17	21	19	34	69	700

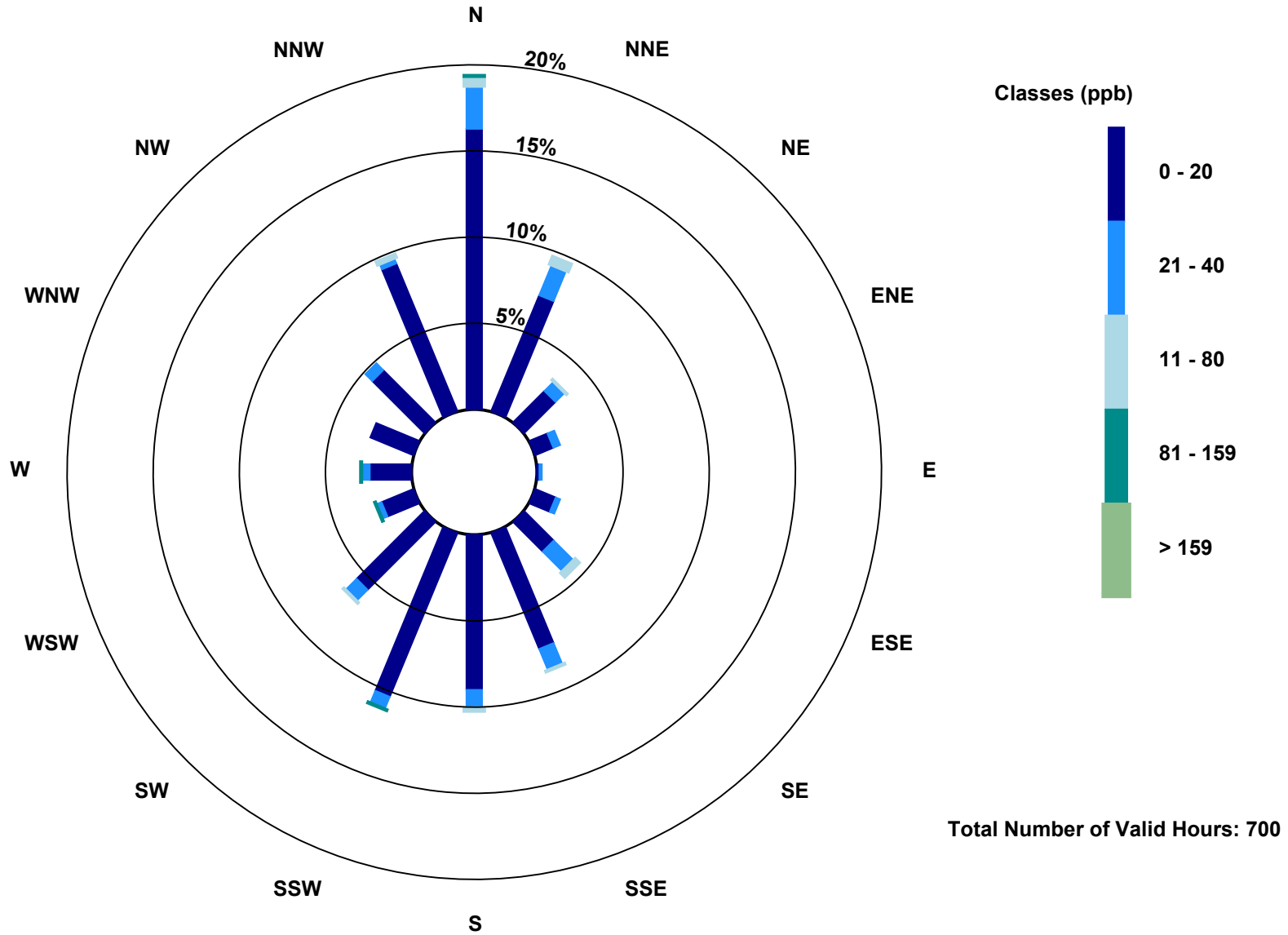
Total Number of Valid Hours: 700

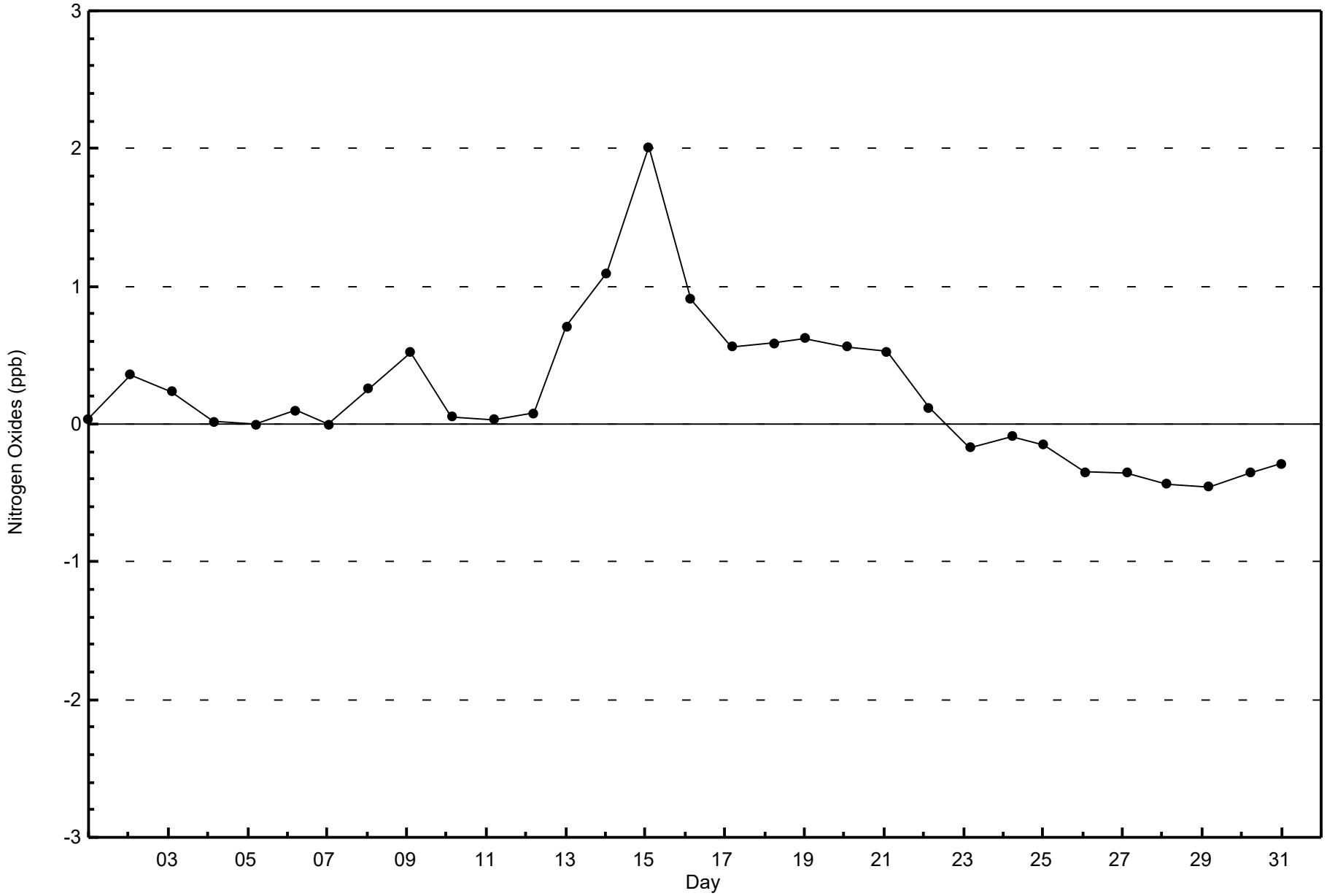
Total Number of Hours: 744

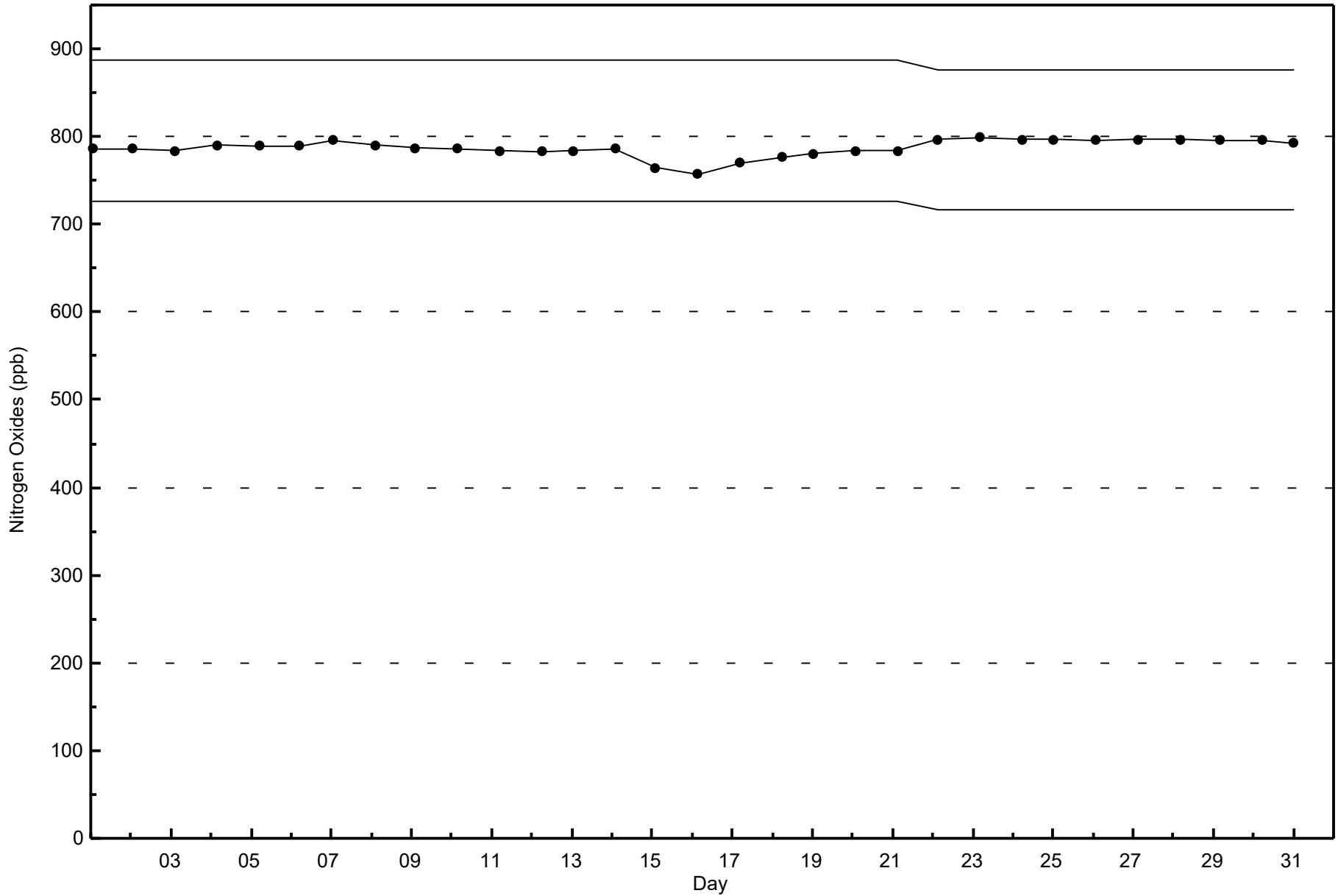


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Fort Hills









Wood Buffalo Environmental Association

Summary of Hour Averages

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

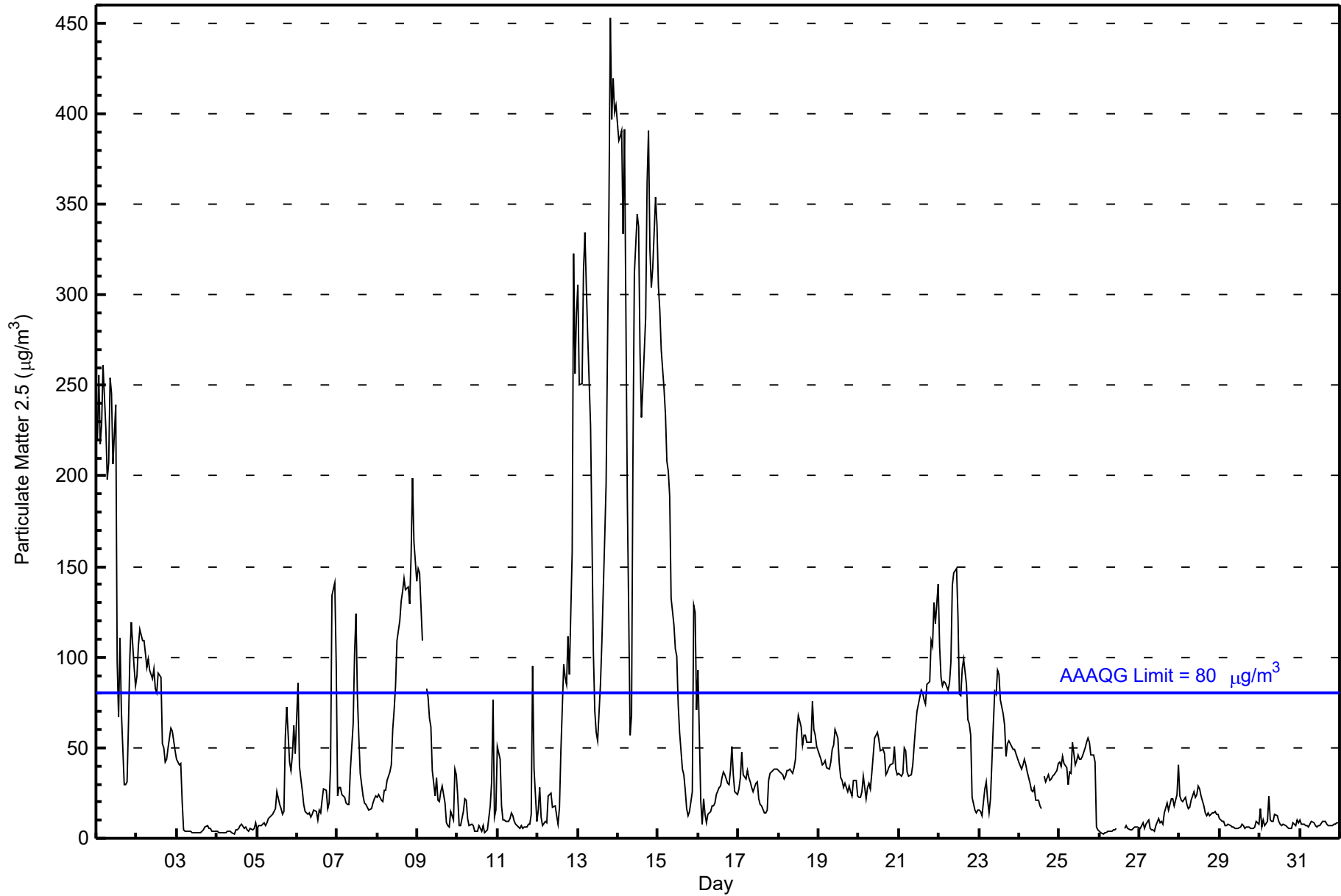
Fort Hills - July 2023

Number of Exceedences (AAAQO):	1-hr: 152	24-hr: 19	Hours in Service:	744
Maximum Value: 453.3 µg/m ³ on Jul 13 20:00	Maximum Daily Average: 289.9 µg/m ³ on Jul 14		Hours of Data:	738
Minimum Value: 2.4 µg/m ³ on Jul 26 03:00	Minimum Daily Average: 4.6 µg/m ³ on Jul 26		Hours of Missing Data:	6
Maximum Diurnal Average: 80.7 µg/m ³ at hour 22	Minimum Diurnal Average: 45.2 µg/m ³ at hour 8		Hours of Calibration:	1
Monthly Average: 57.18 µg/m ³	Percentiles: P ₁ = 3.1 P ₁₀ = 5.7 Q ₁ = 9.8 Median = 29.2 Q ₃ = 61.2 P ₉₀ = 139.1 P ₉₉ = 389.5		Percent Operational Time:	99.3

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	220.2	255.7	217.7	228.3	261.1	226.2	197.8	207.8	254.2	245.4	206.6	239.6	97.3	67.3	111.1	69.5	29.4	29.4	31.1	62.8	100.6	119.6	94.6	84.1	152.4	261.1
2-Jul	89.9	106.3	115.2	108.8	108.9	101.8	94.0	99.0	92.7	87.9	93.6	82.9	80.2	91.5	88.6	52.3	49.9	41.8	43.4	49.7	60.9	58.9	53.6	48.5	79.2	115.2
3-Jul	44.0	40.5	41.4	20.3	4.9	4.0	3.6	3.8	3.5	3.3	3.3	3.2	3.0	3.0	3.1	3.7	4.6	6.2	7.3	5.6	5.7	4.3	3.8	4.2	9.6	44.0
4-Jul	3.8	3.4	3.2	3.1	3.1	3.3	3.6	3.5	3.6	3.4	2.7	4.5	5.0	5.8	6.7	7.9	5.4	5.9	4.6	4.2	5.1	5.0	5.8	8.5	4.6	8.5
5-Jul	4.9	6.6	7.3	8.0	8.5	7.0	8.4	10.7	12.2	13.2	14.7	16.5	25.6	18.7	16.1	13.1	14.7	56.1	72.2	42.3	37.1	45.9	62.6	46.7	23.7	72.2
6-Jul	85.7	39.6	32.7	26.5	18.4	14.7	13.0	14.0	12.0	13.0	15.2	14.6	10.3	15.6	14.1	20.8	27.1	26.6	16.7	19.6	39.8	134.2	140.7	96.9	35.9	140.7
7-Jul	23.6	28.4	28.2	24.5	22.5	19.7	18.8	19.1	37.4	63.2	101.9	123.9	78.4	56.3	35.6	23.6	19.9	18.9	16.9	15.6	16.5	19.3	21.5	23.3	35.7	123.9
8-Jul	23.0	24.1	21.1	20.3	26.2	26.2	32.2	36.3	40.2	59.7	70.7	84.2	109.4	119.9	131.2	136.6	143.7	137.3	138.9	129.1	155.6	198.9	163.6	142.0	90.4	198.9
9-Jul	148.6	146.8	127.5	109.2	DF	82.9	78.0	66.5	61.4	37.1	23.4	33.8	20.8	20.5	25.6	28.7	19.4	8.3	6.8	6.3	15.1	10.2	38.4	35.1	50.0	148.6
10-Jul	23.2	7.2	6.8	14.5	22.1	21.3	10.9	6.9	8.1	6.8	3.7	3.9	4.2	6.7	4.0	6.9	3.2	4.2	4.7	17.9	31.5	76.7	12.0	15.2	13.4	76.7
11-Jul	50.5	43.8	18.0	10.5	10.0	9.3	9.7	11.3	14.3	12.5	9.2	7.8	6.4	5.7	7.0	5.8	5.9	6.1	7.6	7.9	13.2	94.8	38.1	9.0	17.3	94.8
12-Jul	15.4	28.3	11.9	7.3	9.2	8.5	23.4	24.4	24.7	17.4	18.2	12.7	8.1	17.2	48.3	95.6	89.0	84.6	111.6	90.6	158.4	322.8	256.6	289.6	73.9	322.8
13-Jul	305.6	250.3	250.8	313.8	334.7	304.7	276.5	227.8	166.1	102.0	70.1	58.6	54.1	85.2	108.4	137.5	164.9	195.9	348.3	453.3	396.8	419.4	401.1	404.8	242.9	453.3
14-Jul	385.4	387.6	390.6	333.7	391.5	188.8	124.2	56.8	67.6	212.3	312.2	344.3	337.3	268.1	232.7	249.4	287.3	361.9	391.0	325.4	304.1	314.6	353.8	338.4	289.9	391.5
15-Jul	304.9	291.8	270.0	248.1	233.8	208.3	202.9	188.8	132.3	118.1	104.6	100.7	73.9	58.4	38.5	35.1	26.2	16.3	12.2	14.5	26.1	128.9	124.4	70.9	126.2	304.9
16-Jul	93.0	20.3	7.4	21.6	12.9	8.9	13.6	14.4	17.9	17.6	19.8	23.8	28.4	29.0	33.9	36.5	35.0	30.6	29.3	37.3	50.6	35.0	25.5	24.6	27.8	93.0
17-Jul	27.6	33.6	47.6	35.0	32.6	37.4	33.3	30.9	28.2	25.6	30.6	31.1	21.7	18.8	17.8	14.2	14.0	15.3	32.2	36.0	36.4	38.3	38.2	37.9	29.8	47.6
18-Jul	37.1	36.5	35.0	32.7	34.0	37.5	37.5	37.9	36.2	38.6	43.4	58.7	67.8	61.4	51.2	56.9	57.0	53.4	53.1	53.1	75.4	59.9	56.7	50.9	48.4	75.4
19-Jul	46.0	44.0	40.5	41.0	42.6	38.7	38.0	41.8	49.2	51.2	60.4	55.6	41.6	33.6	31.7	28.1	30.0	25.5	28.6	25.4	23.3	31.6	31.7	23.7	37.7	60.4
20-Jul	22.7	22.8	25.8	34.1	21.9	28.1	30.7	27.4	35.5	55.0	56.7	58.1	54.7	48.6	48.8	47.0	35.0	36.4	39.1	40.6	41.2	51.1	38.4	34.7	38.9	58.1
21-Jul	35.8	34.5	35.5	49.9	48.4	36.9	34.6	35.2	40.4	51.2	61.4	70.0	77.8	81.8	80.5	76.6	74.3	84.6	86.9	109.0	106.4	130.3	118.7	140.5	70.9	140.5
22-Jul	106.2	89.1	84.4	86.2	85.4	82.1	85.4	97.2	139.6	146.6	149.2	122.6	79.6	79.1	93.5	98.7	85.3	65.6	63.0	57.1	22.8	15.9	14.2	15.9	81.9	149.2
23-Jul	15.3	15.1	12.2	27.3	30.8	20.8	13.9	22.1	62.1	81.4	79.6	93.1	90.4	76.3	68.4	62.1	45.4	52.2	53.6	50.7	49.0	49.2	47.1	44.8	48.5	93.1
24-Jul	41.7	38.4	40.6	43.7	40.6	36.7	30.8	26.9	26.0	28.2	21.2	21.1	18.2	16.7	C	34.1	31.2	35.1	31.8	32.8	34.1	35.1	37.1	41.4	32.3	43.7
25-Jul	41.9	39.5	45.4	41.5	38.7	29.4	36.5	36.0	52.8	40.3	42.5	45.8	43.5	43.4	45.3	50.0	53.2	55.3	53.2	45.9	45.9	42.1	6.3	4.4	40.8	55.3
26-Jul	3.8	3.1	2.4	3.0	3.4	3.9	4.0	3.8	4.5	4.5	5.5	M	DF	DF	DF	5.6	6.9	5.3	4.3	4.4	5.2	6.4	6.2	6.0	4.6	6.9
27-Jul	5.6	7.4	8.9	5.8	8.0	10.0	5.7	4.8	4.6	3.9	6.9	10.7	8.3	9.0	8.1	14.3	19.5	15.4	18.9	21.7	21.4	17.8	24.3	40.4	12.6	40.4
28-Jul	23.4	21.0	20.7	22.3	19.0	16.7	16.8	21.1	25.7	22.7	23.9	29.0	27.6	23.1	17.9	13.8	12.3	14.3	12.8	13.7	14.1	14.9	13.6	13.0	18.9	29.0
29-Jul	11.0	9.4	9.1	7.4	7.1	8.1	7.3	6.5	6.2	5.6	5.6	5.5	6.5	8.1	7.3	5.5	6.1	5.9	5.3	5.1	5.2	6.2	9.2	7.7	7.0	11.0
30-Jul	16.7	6.6	10.4	7.4	9.4	23.1	10.2	9.6	9.7	13.5	12.5	9.5	7.5	7.3	7.9	6.7	6.2	5.1	5.2	5.5	8.2	7.2	10.1	8.7	9.3	23.1
31-Jul	10.5	7.8	7.6	7.1	6.7	6.6	7.7	9.0	8.3	6.8	6.2	6.7	7.1	9.1	9.0	9.0	7.8	7.1	7.0	7.1	7.7	8.0	8.5	8.3	7.8	10.5

73.1	67.4	63.7	62.7	63.2	53.3	48.5	45.2	47.7	51.2	54.0	59.1	49.8	46.2	48.0	46.6	45.5	48.6	56.1	57.8	61.7	80.7	72.8	68.4	Diurnal Average	
385.4	387.6	390.6	333.7	391.5	304.7	276.5	227.8	254.2	245.4	312.2	344.3	337.3	268.1	232.7	249.4	287.3	361.9	391.0	453.3	396.8	419.4	401.1	404.8	Diurnal Maximum	

C - Calibration M - Maintenance DF - DAS Failure
 Alberta Ambient Air Quality Guideline/Objectives: 1-hr 80 µg/m³ 24-hr 29 µg/m³





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Hills - July 2023

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
0 - 5	67	9.08	9.08
6 - 15	181	24.53	33.60
16 - 25	89	12.06	45.66
26 - 80	251	34.01	79.67
> 81.0	150	20.33	100.00

Total Number of Valid Hours: 738

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort Hills - July 2023

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	17	3	0	0	1	3	5	6	11	11	1	1	1	1	1	5	67
6 - 15	22	16	10	2	1	4	7	18	26	34	22	4	4	4	6	1	181
16 - 25	13	6	1	1	0	1	4	7	9	11	15	7	2	2	3	7	89
26 - 80	46	25	10	8	0	5	13	24	26	22	7	3	9	11	14	28	251
> 81.0	43	21	3	0	0	0	3	11	5	4	4	2	6	2	12	34	150
Totals	141	71	24	11	2	13	32	66	77	82	49	17	22	20	36	75	738

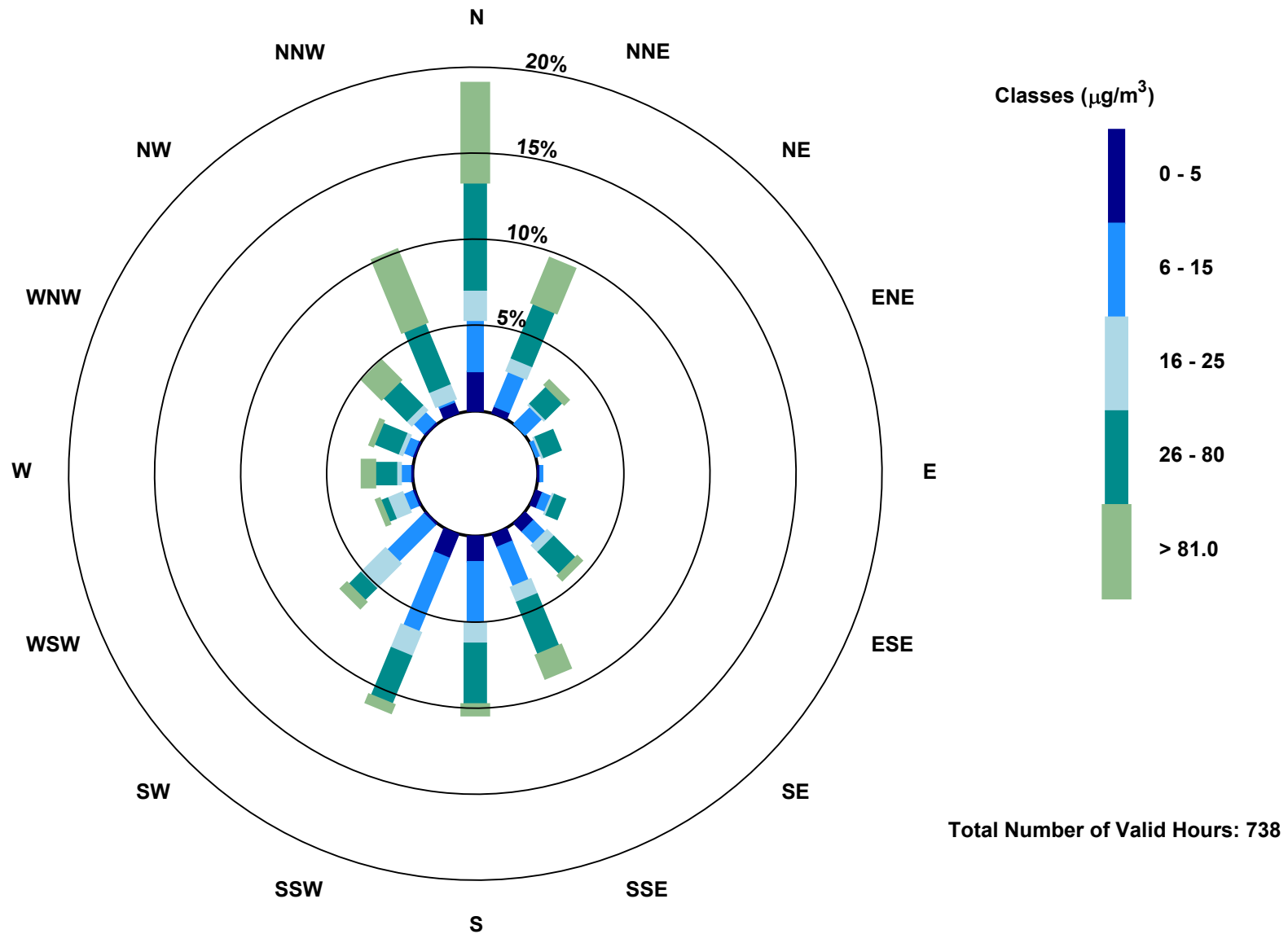
Total Number of Valid Hours: 738

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

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





Wood Buffalo Environmental Association
Summary of Hour Averages

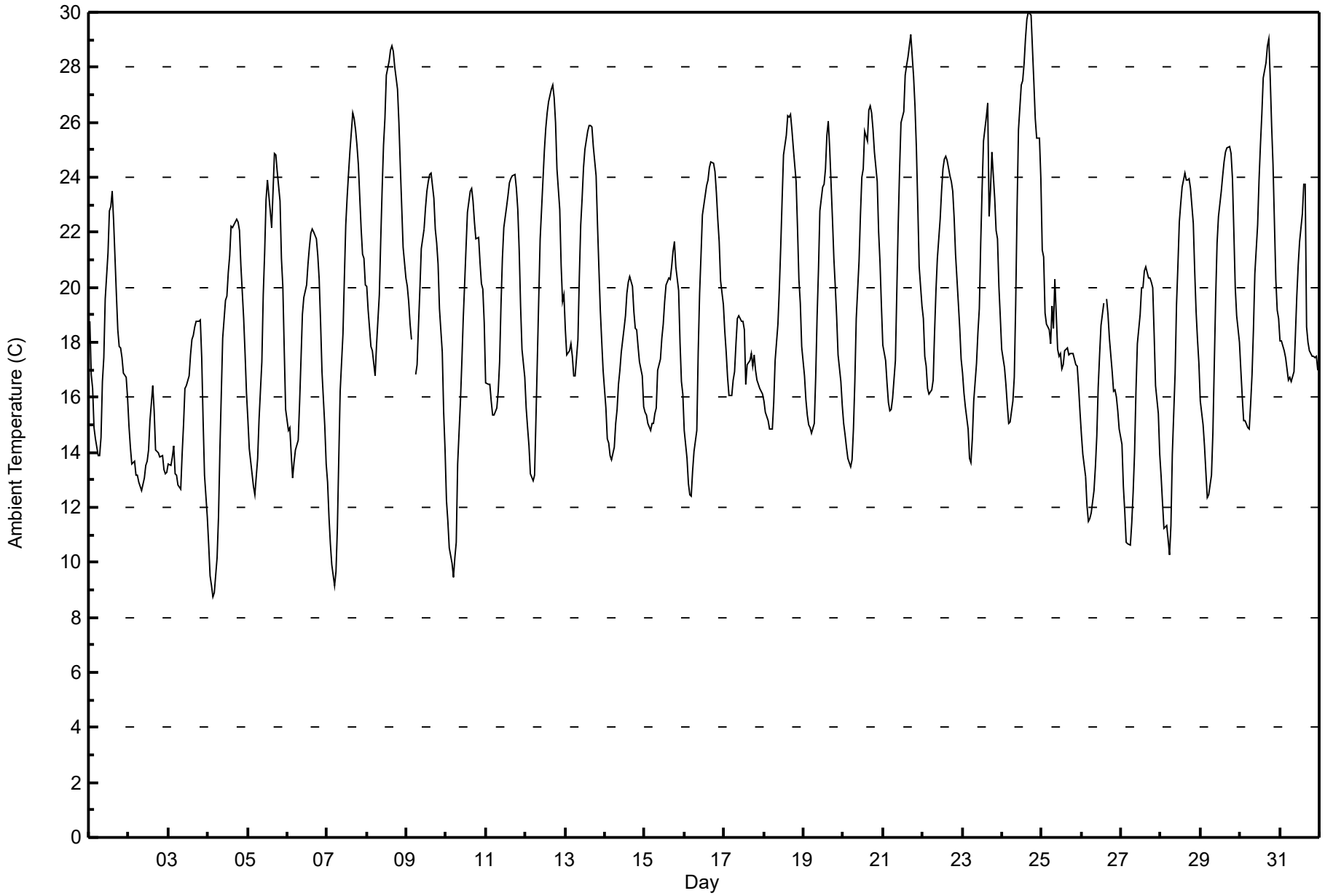
Ambient Temperature (AT) - C
Fort Hills - July 2023

Maximum Value: 30.0 C on Jul 24 17:00 Maximum Daily Average: 23.2 C on Jul 24																						Hours in Service: 744 Hours of Data: 742																										
Minimum Value: 8.7 C on Jul 4 04:00 Minimum Daily Average: 13.8 C on Jul 2 Maximum Diurnal Average: 23.7 C at hour 16 Minimum Diurnal Average: 13.8 C at hour 5 Monthly Average: 18.95 C Percentiles: P ₁ = 9.9 P ₁₀ = 13.5 Q ₁ = 15.6 Median = 18.4 Q ₃ = 22.4 P ₉₀ = 25.1 P ₉₉ = 28.8																						Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	18.7	16.9	16.3	14.9	14.5	13.9	13.9	14.6	16.6	17.4	19.6	21.3	22.8	22.9	23.5	22.4	19.7	18.5	17.9	17.8	17.5	16.9	16.7	15.9	18.0	23.5																						
2-Jul	14.9	14.2	13.6	13.7	13.2	13.2	12.9	12.8	12.6	13.1	13.5	13.7	14.1	15.1	16.4	15.5	14.1	14.0	14.0	13.8	13.9	13.4	13.2	13.3	13.8	16.4																						
3-Jul	13.6	13.5	13.8	14.2	13.2	13.2	12.8	12.7	13.9	15.0	16.3	16.4	16.8	17.5	18.1	18.2	18.6	18.7	18.8	18.8	17.4	15.2	13.2	11.6	15.5	18.8																						
4-Jul	10.6	9.5	9.2	8.7	8.9	10.2	11.7	14.1	16.1	18.1	19.5	19.7	20.6	21.1	22.2	22.2	22.4	22.5	22.4	22.1	20.8	18.9	17.6	16.2	16.9	22.5																						
5-Jul	15.2	14.1	13.2	12.8	12.4	13.1	13.8	15.2	17.3	19.7	21.3	23.2	23.9	22.8	22.2	23.5	24.9	24.8	24.2	23.2	21.0	20.0	17.7	15.6	19.0	24.9																						
6-Jul	14.8	14.9	14.0	13.0	13.6	14.1	14.4	15.8	17.4	19.0	19.6	20.1	20.9	21.4	21.9	22.1	22.0	21.8	21.1	20.3	18.7	16.9	14.9	13.6	17.8	22.1																						
7-Jul	12.9	11.6	10.7	9.9	9.2	9.7	11.2	13.8	16.2	18.3	20.3	22.3	23.3	24.2	25.0	26.3	26.1	25.7	25.2	24.4	22.1	21.2	21.0	20.1	18.8	26.3																						
8-Jul	20.0	19.2	17.8	17.7	17.2	16.8	17.9	19.7	21.7	23.5	25.1	26.1	27.7	28.2	28.6	28.8	28.6	28.0	27.2	26.0	24.4	22.9	21.4	20.3	23.1	28.8																						
9-Jul	20.0	19.5	18.7	18.1	DF	16.8	17.2	18.6	19.9	21.4	22.1	22.9	23.5	23.8	24.1	24.1	23.2	22.1	21.6	20.9	19.2	17.7	15.4	14.1	20.2	24.1																						
10-Jul	12.2	11.5	10.5	10.0	9.4	10.2	10.8	13.6	15.9	17.3	18.9	20.2	21.4	22.7	23.5	23.6	23.1	22.4	21.8	21.8	20.9	20.1	19.9	18.7	17.5	23.6																						
11-Jul	16.5	16.5	16.5	15.9	15.3	15.4	15.6	16.2	17.3	19.4	21.0	22.2	22.9	23.3	23.8	23.9	24.0	24.1	23.6	22.8	21.4	19.3	17.7	16.7	19.6	24.1																						
12-Jul	15.6	14.9	14.2	13.2	12.9	13.2	15.3	17.5	19.6	21.8	23.9	25.0	25.8	26.3	26.7	27.2	27.3	26.9	26.0	24.3	22.8	20.8	19.5	19.8	20.9	27.3																						
13-Jul	18.4	17.6	17.7	18.0	17.5	16.8	16.8	18.1	20.4	22.3	23.2	24.4	25.0	25.7	25.9	25.9	25.8	25.1	24.0	22.3	20.7	19.2	18.1	17.0	21.1	25.9																						
14-Jul	15.6	14.5	14.3	13.9	13.7	14.2	15.1	15.6	16.4	17.0	17.6	18.5	19.0	19.8	20.2	20.4	20.1	19.1	18.5	18.4	17.8	17.3	16.8	15.7	17.1	20.4																						
15-Jul	15.4	15.4	15.0	14.8	15.1	15.1	15.4	15.6	17.0	17.4	18.1	18.7	19.5	20.1	20.3	20.3	20.8	21.3	21.7	20.8	19.9	18.0	16.6	16.1	17.8	21.7																						
16-Jul	14.8	13.8	12.9	12.5	12.4	13.3	14.0	14.8	17.7	19.8	21.1	22.6	23.3	23.7	23.9	24.3	24.5	24.5	24.2	23.5	22.5	21.7	20.3	19.4	19.4	24.5																						
17-Jul	18.4	17.6	16.7	16.1	16.1	16.6	16.9	17.9	18.9	19.0	18.8	18.8	18.4	16.5	17.2	17.3	17.6	17.1	17.5	17.0	16.6	16.3	16.2	16.1	17.3	19.0																						
18-Jul	15.9	15.5	15.2	14.8	14.8	14.9	15.8	17.4	18.7	19.9	21.4	23.2	24.8	25.5	26.2	26.2	26.3	25.7	25.1	23.8	22.2	20.3	19.4	17.8	20.5	26.3																						
19-Jul	16.8	15.9	15.4	15.0	14.9	14.7	15.1	16.7	18.9	20.7	22.8	23.6	23.7	24.3	25.5	26.0	25.1	22.5	21.0	20.0	18.9	17.5	16.6	15.7	19.5	26.0																						
20-Jul	15.1	14.6	14.2	13.8	13.5	13.7	14.9	16.6	18.8	20.9	22.6	24.0	24.3	25.7	25.3	26.4	26.6	26.3	25.7	24.9	23.8	22.0	20.9	19.3	20.6	26.6																						
21-Jul	17.9	17.3	16.5	15.8	15.5	15.6	16.0	17.4	19.8	22.3	24.3	26.0	26.4	27.7	28.1	28.4	28.8	29.2	27.7	26.6	25.1	23.0	20.7	19.3	22.3	29.2																						
22-Jul	18.9	17.5	17.1	16.3	16.1	16.3	16.6	18.4	19.9	21.0	22.5	23.5	24.3	24.6	24.8	24.6	24.1	23.9	23.5	22.5	21.2	19.4	18.5	17.4	20.5	24.8																						
23-Jul	16.9	16.2	15.7	14.9	13.8	13.6	14.5	15.9	17.2	18.3	19.2	21.6	23.6	25.3	26.2	26.7	22.6	23.5	24.9	23.3	22.1	21.8	20.0	18.9	19.9	26.7																						
24-Jul	17.8	17.1	16.5	15.7	15.0	15.1	15.9	16.7	19.4	22.9	25.7	27.4	27.5	28.1	29.0	29.7	30.0	29.9	28.7	27.5	26.2	25.4	25.4	24.0	23.2	30.0																						
25-Jul	21.3	21.1	19.1	18.6	18.4	17.9	19.3	18.5	20.3	17.7	17.5	17.6	17.0	17.2	17.7	17.8	17.6	17.6	17.6	17.2	17.1	16.4	15.5	15.5	18.1	21.3																						
26-Jul	14.7	13.9	13.1	12.0	11.5	11.6	11.8	12.6	13.5	14.6	16.4	17.5	18.6	19.4	DF	19.6	19.0	18.2	16.9	16.2	16.3	16.0	15.5	14.9	15.4	19.6																						
27-Jul	14.3	12.8	11.8	10.7	10.7	10.6	11.4	12.6	14.0	16.2	17.9	19.0	20.0	20.0	20.6	20.8	20.3	20.3	20.2	20.0	18.3	16.4	15.4	13.9	16.2	20.8																						
28-Jul	13.1	12.2	11.2	11.3	10.9	10.3	11.3	14.0	16.9	19.4	20.8	22.4	23.0	23.6	24.1	23.9	23.9	23.9	23.6	22.3	20.6	19.1	18.1	17.2	18.2	24.1																						
29-Jul	15.9	15.0	14.2	13.3	12.3	12.5	13.2	14.7	17.2	19.6	21.6	22.6	23.5	24.0	24.6	24.9	25.1	25.1	24.8	24.0	22.0	20.0	19.0	18.0	19.5	25.1																						
30-Jul	17.0	16.0	15.1	15.1	14.9	14.8	15.8	16.8	18.4	20.5	22.3	23.9	25.2	26.3	27.6	28.2	28.8	29.0	27.6	25.9	24.5	20.3	19.2	18.9	21.3	29.0																						
31-Jul	18.1	18.1	17.7	17.4	17.0	16.6	16.7	16.6	16.9	18.2	19.7	20.8	21.7	22.7	23.8	23.8	18.6	18.0	17.7	17.5	17.5	17.4	17.5	17.0	18.6	23.8																						
																								16.2	15.4	14.8	14.3	13.8	14.0	14.6	15.8	17.6	19.1	20.5	21.6	22.3	22.9	23.6	23.7	23.2	22.9	22.4	21.6	20.4	19.1	18.0	17.0	Diurnal Average
																								21.3	21.1	19.1	18.6	18.4	17.9	19.3	19.7	21.7	23.5	25.7	27.4	27.7	28.2	29.0	29.7	30.0	29.9	28.7	27.5	26.2	25.4	25.4	24.0	Diurnal Maximum
DF - DAS Failure																																																



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Fort Hills - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Fort Hills - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	9	1.21	1.21
10 - 20	446	60.11	61.32
> 20	287	38.68	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

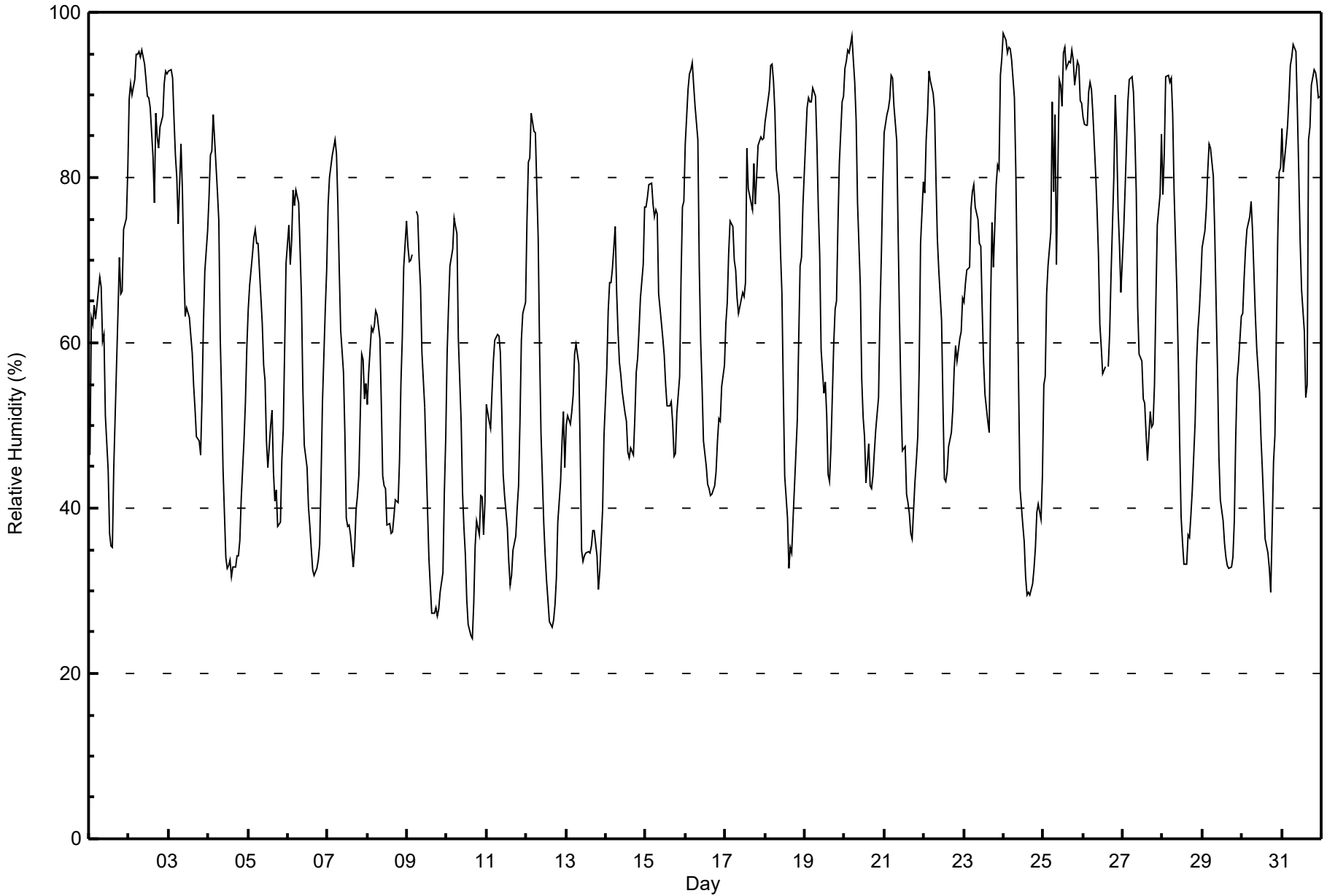
Fort Hills - July 2023

Maximum Value: 97.4 % on Jul 24 01:00 Maximum Daily Average: 89.9 % on Jul 2																						Hours in Service:	744			
Minimum Value: 24.3 % on Jul 10 16:00 Minimum Daily Average: 42.4 % on Jul 13																						Hours of Data:	742			
Maximum Diurnal Average: 81.7 % at hour 6 Minimum Diurnal Average: 44.0 % at hour 16																						Hours of Missing Data:	2			
Monthly Average: 62.62 % Percentiles: P ₁ = 27.3 P ₁₀ = 35.4 Q ₁ = 46.0 Median = 62.5 Q ₃ = 79.1 P ₉₀ = 90.2 P ₉₉ = 95.5																						Hours of Calibration:	0			
																						Percent Operational Time:	99.7			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	46.5	63.1	62.2	64.6	62.9	66.4	68.0	66.8	60.1	60.9	51.2	44.5	36.9	35.4	35.3	44.9	57.5	63.6	70.3	65.9	66.2	73.8	75.1	80.9	59.3	80.9
2-Jul	89.4	91.4	90.1	91.8	94.9	94.9	95.3	94.6	95.4	93.8	91.9	89.9	89.7	88.4	82.6	77.0	87.7	84.9	83.5	86.2	87.5	91.3	92.8	92.5	89.9	95.4
3-Jul	92.9	93.0	92.1	87.1	82.8	80.0	74.4	84.2	78.6	69.2	63.2	64.2	63.0	60.9	58.7	55.0	52.1	48.7	48.1	46.5	53.3	62.2	68.7	73.6	68.8	93.0
4-Jul	77.6	82.8	83.2	87.6	84.6	78.2	74.8	60.7	53.6	44.8	34.1	32.7	33.0	33.7	31.7	32.9	32.9	34.3	34.3	36.1	41.3	48.3	52.9	59.6	52.7	87.6
5-Jul	64.0	67.0	70.7	72.7	73.7	72.0	72.0	68.7	62.4	57.3	55.4	48.1	44.9	50.0	51.9	44.4	40.9	42.2	37.8	38.2	46.0	49.6	59.4	69.7	56.6	73.7
6-Jul	74.2	69.5	72.4	78.5	76.7	78.5	77.0	71.4	65.4	54.3	47.6	44.9	40.1	37.8	35.0	32.6	31.9	32.8	33.6	35.7	43.7	52.8	64.1	68.9	55.0	78.5
7-Jul	76.6	79.9	81.4	82.7	84.6	82.9	76.8	68.6	61.6	56.4	48.9	38.9	37.9	38.0	36.8	32.9	35.3	39.8	41.5	44.1	58.6	58.0	53.2	55.1	57.1	84.6
8-Jul	52.6	56.4	61.9	61.3	62.0	63.9	63.4	60.5	52.8	44.0	42.7	42.3	38.0	38.1	37.0	37.1	38.9	41.0	40.7	45.7	55.0	60.7	69.1	74.7	51.7	74.7
9-Jul	71.7	69.8	70.0	70.7	DF	76.0	75.5	70.1	66.7	58.7	52.1	46.0	39.8	33.8	30.5	27.3	27.3	28.0	26.9	27.7	29.8	32.3	41.9	48.5	48.7	76.0
10-Jul	58.9	64.4	69.3	71.4	75.0	74.1	73.2	60.5	50.5	41.9	37.7	34.5	29.1	25.9	24.6	24.3	28.5	35.4	38.4	36.7	41.5	41.4	36.9	40.7	46.4	75.0
11-Jul	52.6	50.5	49.6	53.9	57.9	60.4	61.0	60.9	58.9	51.7	44.0	41.5	37.6	33.6	30.7	31.9	34.9	36.6	39.9	42.7	50.6	60.3	63.6	64.9	48.8	64.9
12-Jul	74.8	81.9	82.4	87.8	85.6	85.5	79.0	72.7	59.2	49.2	38.1	34.2	31.2	28.9	26.2	25.6	26.4	28.2	31.5	38.4	43.2	48.0	51.7	45.0	52.3	87.8
13-Jul	50.0	51.2	50.1	51.6	53.7	58.7	59.8	57.4	46.9	34.9	33.5	34.3	34.6	34.7	34.6	35.4	37.3	37.4	34.2	30.1	32.3	36.0	39.8	48.8	42.4	59.8
14-Jul	57.0	63.9	67.3	67.4	69.0	74.1	66.3	61.4	57.7	56.2	54.0	51.5	50.6	46.7	46.1	47.3	46.4	50.9	56.5	58.1	61.5	65.5	69.4	76.4	59.2	76.4
15-Jul	76.4	77.6	79.1	79.3	76.8	75.2	76.0	75.6	66.0	62.4	60.6	58.5	58.9	52.4	52.4	52.9	50.3	46.2	46.6	51.5	55.9	67.8	76.4	77.2	64.5	79.3
16-Jul	84.1	90.6	92.6	93.0	93.9	91.1	88.6	84.5	69.4	60.4	54.8	48.1	45.0	42.9	42.4	41.6	41.8	42.7	44.3	48.1	50.9	50.5	54.7	57.3	63.0	93.9
17-Jul	62.3	64.8	70.8	74.7	74.0	70.0	68.8	65.5	63.6	64.3	66.1	65.5	67.3	83.6	78.7	77.0	76.1	81.7	76.9	80.3	83.9	85.0	84.6	84.7	73.8	85.0
18-Jul	86.8	88.0	90.5	93.6	93.7	91.8	88.0	81.1	77.8	71.0	66.1	54.5	43.8	38.8	32.8	35.3	34.6	38.8	42.6	50.7	60.3	69.3	70.4	76.6	65.7	93.7
19-Jul	84.6	88.4	89.6	89.2	89.2	90.8	89.8	84.1	76.2	70.5	59.1	54.0	55.3	51.2	44.0	43.2	47.3	59.9	64.1	65.1	74.2	81.7	89.2	89.8	72.1	90.8
20-Jul	93.2	94.0	95.4	95.1	97.1	94.2	91.6	87.0	76.9	66.9	55.5	51.1	48.6	43.0	47.8	42.7	42.4	43.9	46.8	49.5	53.4	63.6	70.5	79.2	67.9	97.1
21-Jul	85.5	87.6	88.3	89.4	92.4	92.0	88.6	84.5	73.0	62.5	53.7	46.9	47.5	41.6	40.8	39.4	37.0	36.3	43.3	45.8	48.7	56.9	72.0	79.6	63.9	92.4
22-Jul	78.2	84.6	87.8	92.9	91.7	90.2	88.2	79.8	72.6	68.8	62.7	52.5	43.5	43.2	44.5	47.5	49.2	51.9	56.7	59.6	57.8	60.6	61.4	65.5	66.3	92.9
23-Jul	64.9	67.1	68.8	69.1	76.3	78.2	79.2	76.4	75.0	72.1	71.7	64.0	57.7	53.7	50.4	49.1	64.8	74.6	69.2	79.1	81.5	80.9	92.3	94.4	71.3	94.4
24-Jul	97.4	96.7	95.0	95.7	95.5	94.3	89.7	80.9	67.9	54.8	42.4	38.0	36.0	31.8	29.5	29.7	29.5	30.9	32.8	35.3	39.4	40.6	38.7	44.0	56.9	97.4
25-Jul	54.9	55.9	66.0	69.3	73.4	89.2	78.3	87.7	69.6	91.9	91.2	88.6	95.2	95.7	93.2	94.0	93.9	95.5	94.3	91.2	94.1	93.6	89.3	88.9	84.8	95.7
26-Jul	87.3	86.4	86.3	90.4	91.4	90.8	87.8	80.5	76.1	70.6	62.3	59.5	56.2	57.1	DF	57.2	61.2	68.3	80.2	90.1	84.9	76.3	71.9	66.0	75.6	91.4
27-Jul	73.6	78.5	84.0	89.2	91.8	92.3	90.4	85.2	78.1	64.4	58.6	57.8	53.2	52.8	49.0	45.7	51.7	49.8	50.2	54.9	65.1	74.2	77.9	85.3	68.9	92.3
28-Jul	78.0	82.9	92.2	92.3	91.4	92.1	87.6	78.4	66.3	58.0	47.9	39.0	35.9	33.2	33.2	36.7	36.5	39.1	42.2	50.3	57.4	61.5	63.9	67.3	61.0	92.3
29-Jul	71.6	73.5	76.3	80.7	84.1	83.5	80.1	73.6	65.0	56.8	46.3	41.1	38.4	35.8	34.1	33.0	32.8	32.8	34.0	38.5	48.6	55.7	57.7	63.2	55.7	84.1
30-Jul	63.5	67.8	71.3	73.8	75.3	77.1	73.5	68.5	63.3	59.3	54.1	48.6	44.8	40.4	36.2	34.6	32.7	29.8	37.5	45.6	48.8	72.7	80.6	81.2	57.5	81.2
31-Jul	85.9	80.7	84.3	86.2	89.6	93.6	94.6	96.1	95.2	88.3	80.7	72.4	66.4	61.3	53.4	55.0	84.5	86.1	91.2	93.0	92.7	91.4	89.6	89.8	83.4	96.1
																						Diurnal Average				
																						Diurnal Maximum				
73.1 75.8 78.1 80.1 81.4 81.7 79.3 75.1 67.8 61.8 55.8 51.2 48.3 46.6 44.1 44.0 46.6 48.8 50.7 53.6 58.3 63.3 67.1 70.6																										
97.4 96.7 95.4 95.7 97.1 94.9 95.3 96.1 95.4 93.8 91.9 89.9 95.2 95.7 93.2 94.0 93.9 95.5 94.3 93.0 94.1 93.6 92.8 94.4																										
DF - DAS Failure																										



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Fort Hills - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Fort Hills - July 2023**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	125	16.85	16.85
40 - 60	215	28.98	45.82
60 - 80	225	30.32	76.15
80 - 100	177	23.85	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



Maximum Speed: 36 km/h on Jul 3 07:00	Maximum Daily Speed Average: 19.2 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jul 16 06:00	Minimum Daily Speed Average: 0.2 km/h on Jul 21	Hours of Data: 742
Maximum Diurnal Speed Average: 4.6 km/h at hour 19	Minimum Diurnal Speed Average: 0.4 km/h at hour 4	Hours of Missing Data: 2
Monthly Average Velocity: 1.6 km/h 355.5 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 13 P ₉₀ = 17 P ₉₉ = 26	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NNW7	SSE3	SSE5	SSW8	SSW4	SSE8	S8	SSW8	S4	S10	SE11	SSE14	SSE18	S15	SSE10	SSW17	SW18	WSW13	W9	W7	SW2	W4	SSW2	SSE6	SSW6.5	SW18
2-Jul	NNW7	NW9	W10	SW11	SW10	W8	NW11	NNW13	NNW11	NNW12	NNW12	NNW8	W9	WSW9	NW9	NNW20	NW11	WNW15	WNW11	W9	WNW8	NNW6	NW7	NW7	WNW8.3	NNW20
3-Jul	NNW10	NW9	NNW12	N24	N24	N30	NNE36	N20	N25	N30	N29	N25	N26	N26	N25	N23	N17	N16	N14	N18	N10	NNW6	NNW8	NNW7	N19.2	NNE36
4-Jul	NNW6	NNW6	NW5	W3	WSW3	WNW2	S2	SSE3	SE4	SSE3	E5	SSE6	SE2	NNE3	ESE5	SSE10	SSE12	SSE16	SSE19	S16	S15	S14	SSW13	SW7	S4.9	SSE19
5-Jul	S13	SSE8	SE8	SSE11	SSE10	S12	S12	SSW14	SSW13	SSW14	S7	SE8	SE9	SW8	SW13	SW14	WSW5	NNE12	N15	N12	NNW8	N10	NNW6	NNW7	SSW3.8	N15
6-Jul	N7	N9	N10	NNE10	NW5	NNE15	NNE17	N13	N13	NNE17	NNE18	NNE17	NNE18	NNE19	NNE17	NNE18	NNE18	NNE17	N17	N14	N9	N6	NW4	WNW3	N12.5	NNE19
7-Jul	SW4	S3	SSE5	S6	S8	S6	SSW6	S5	S4	SSE4	SSE4	S8	SSW13	SSW15	SSW15	SW13	SW9	WSW5	SW5	SSW6	SSW8	SW10	SW13	SW10	SSW7.1	SSW15
8-Jul	WSW12	SW7	SSW8	SSW11	SE7	SSE6	SE5	ESE6	SSE3	WNW5	S2	SE3	SE2	SSE4	NNW3	N9	N11	NNE13	NNE13	NNW6	N4	NW5	NW6	NNW5	NW0.5	NNE13
9-Jul	N9	N12	N10	N13	DF	N17	N15	NNE14	N15	NNE16	NNE20	N20	N21	N22	NNE21	NNE21	NE20	NE17	NE16	NE16	NE18	NE17	NNE10	NNE8	NNE15.3	N22
10-Jul	N9	N7	N7	N8	N8	NNW7	NW7	W3	E2	SE10	ESE10	ESE10	ESE9	ESE10	SE9	SSE10	SSW11	SSW10	SSW5	SSE8	SSE4	SE8	SE12	SE9	ESE3.0	SE12
11-Jul	SE2	SSE8	SE9	SSE11	SSE8	S8	SSW10	SSW12	SSW11	SW10	SW9	SW11	SSW13	SSW16	SSW17	SW14	SSW12	SW11	SSW10	SW8	SW6	W3	NW7	NW3	SSW8.1	SSW17
12-Jul	SSE2	SE2	SSW4	S4	SSW2	S2	N4	WSW3	NNW7	N14	N16	NNW12	N13	NNE14	N15	N12	NNE12	N13	NNE12	NNE11	N10	NNW7	NNW10	NNW11	N7.1	N16
13-Jul	NNW9	NNW12	NNW13	N13	NNW12	NNW10	NNW10	NNW7	NNW10	N18	N21	N28	N27	N25	N22	N21	N27	N25	N17	NNW15	NNW14	N11	NNE11	N16.3	N28	
14-Jul	NNW8	NNW6	WNW6	NW6	NW6	N11	N20	N19	N19	NNE20	NNE21	NNE17	NNE14	NNE18	NNE16	NNE17	N18	N14	NNE14	N12	N10	N7	NNW6	N12.9	NNE21	
15-Jul	NNW6	NNW5	NNW5	NNW5	N5	N7	N6	N7	NNE9	NNE10	NE12	NNE14	NE14	NE14	NE16	NE12	NE11	ENE10	NE8	NE10	ENE7	N5	N4	NNE6	NNE7.7	NE16
16-Jul	N4	WNW4	WNW4	NNW1	NW2	WSW1	S6	S5	SSE11	SSE13	S12	SSE15	SSE17	SSE18	S18	SSE19	SSE17	S15	S15	SSE16	SSE13	SE17	SE16	SE16	SSE9.8	SSE19
17-Jul	SSE10	SE10	SSE6	S7	SSE8	SE10	SE11	SSE13	SSE14	SSE17	SSE17	SE18	SSE21	SSE11	ESE12	ESE11	SSE7	N4	NE9	N10	N9	N11	NNE11	NNE5	SE6.7	SSE21
18-Jul	N7	N8	NNW8	N7	N10	N10	NNE9	NNE6	N10	N12	NNW12	NNW9	NE4	NNW5	NNE4	NNW9	NNW10	NNW11	NNW9	NNW6	NNW4	NW7	NNW9	NNW6	N7.7	NNW12
19-Jul	WNW3	SSW4	S7	S2	ESE4	SW5	S5	S4	S6	SW6	S4	SSW4	SSW9	SSW7	S3	SE7	S12	SW13	NNW10	NNW6	SW5	WNW3	NW3	N4	SSW3.2	SW13
20-Jul	WSW4	SSW4	SSW1	W1	SSW2	SSW3	S3	SSW3	W1	N8	N5	W3	W7	NW3	NW7	NW5	W6	NW8	N7	NNE8	NNE8	N7	N9	NNW6	NW3.0	N9
21-Jul	NNW5	NW5	WNW4	WNW3	WSW2	S4	S5	SSW5	SSW4	SSW3	S3	S3	S7	S5	ESE4	SSE6	S4	NE5	N13	NNE11	NE8	NNE5	NW3	NW5	NNE0.2	N13
22-Jul	NNW5	NNW5	NW4	NW2	W4	WSW3	W2	NNW5	N8	NNW7	N11	N16	NNE16	N18	N18	N15	N11	NNW8	NNW7	N8	NNE12	NNE11	N13	N11	N8.6	N18
23-Jul	N12	N11	N12	N8	N5	NW4	NW4	SW3	SW7	SW5	SSW7	SSE6	SSE8	S8	SSW11	SSE7	N17	N4	N3	NNW6	N5	NNE5	N4	NNW5	NNW2.0	N17
24-Jul	NW4	WNW3	SSW4	SSE4	SSE5	S8	S8	S10	SSW4	SSW4	S3	SW3	W4	W4	WNW5	NE3	ESE9	ENE9	ENE12	NE12	ENE8	NE10	ENE9	ENE6	ESE2.1	ENE12
25-Jul	N9	N4	NW6	SW3	SSW8	NE7	ENE8	N4	ESE6	NNW9	NNE9	NNE9	NW7	N6	NNE7	N6	NNE9	NNE10	N10	N8	WNW7	WSW8	SW17	SW18	NNW3.0	SW18
26-Jul	SSW20	SW20	SSW16	S14	S9	S11	S7	SSE8	SE10	SE11	ESE10	E6	ENE4	N13	DF	NNE21	NNE22	N23	NNE17	N17	NNE13	NE14	ENE15	ENE13	ENE3.5	N23
27-Jul	NE10	NNE11	NNE12	NNE11	N10	N10	N9	N8	N9	N10	N14	NNE15	NNE13	NNE19	N16	N17	N20	N16	N14	NNW9	NNW7	WSW5	WSW3	NNW4	N10.5	N20
28-Jul	NW6	WSW4	WNW3	SSW1	S5	S6	S5	SSE4	SSE3	SSW2	SSW3	SW2	SW4	SSW6	SW6	SSW11	SSW11	SSW12	SSW11	S14	S11	SSW10	SSW11	SSW10	SSW5.9	S14
29-Jul	SSW8	S9	S8	S9	SSE10	SSE10	S11	SSW11	SSW12	SSW14	SW17	SW17	SW15	SW17	SW16	SSW15	SSW17	SSW17	SSW15	SSW11	S9	S10	SSW9	SW10	SSW11.8	SSW17
30-Jul	SW6	S8	SSE9	SSE13	SE11	SE12	SSE14	S11	SSE9	SSE11	S11	S14	S20	S19	S16	S17	S14	SSW11	S9	SSW9	SW19	SSW14	SE12	SSW5	S11.3	S20
31-Jul	SW6	SW16	SW4	SW11	S5	SSE9	SE7	SW7	SSW8	SSW11	SW12	WSW11	W14	NW10	W12	NW4	WNW7	NE6	W5	WNW5	WSW3	S2	WNW6	SW3	WSW5.2	SW16

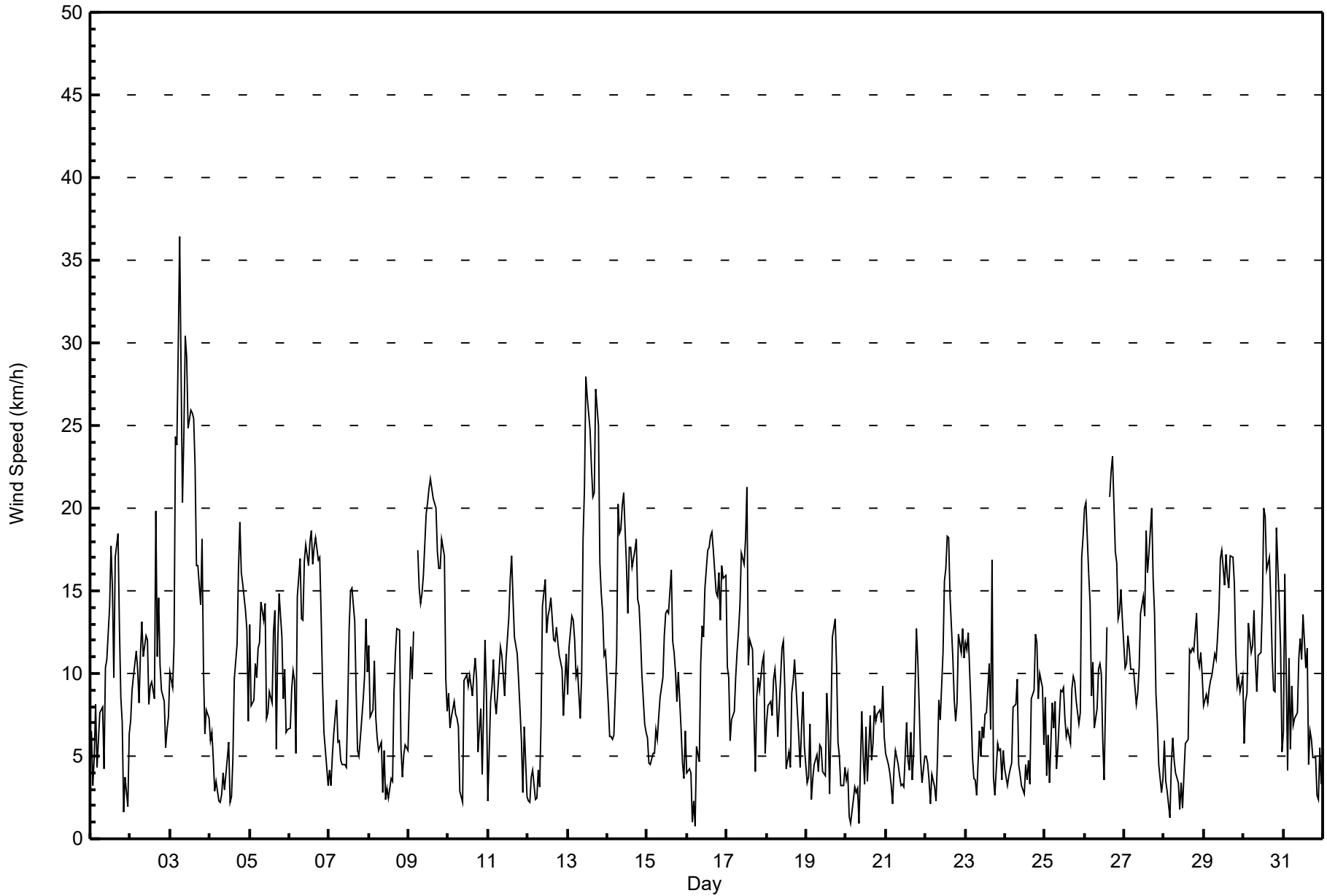
NW2.7	NNW1.9	NNW1.5	SW0.4	S0.7	NE0.7	NE1.1	WSW0.5	N0.4	N1.5	NNE2.5	NNE2.2	NNE0.8	N1.9	N2.1	N2.2	N2.6	N4.2	N4.6	N3.9	N2.3	N1.9	NNW1.6	NW1.7		Diurnal Average
SSW20	SSW20	SSW16	N24	N24	N30	NNE36	N20	N25	N30	N29	N28	N27	N26	N25	N23	NNE22	N27	N25	N18	SW19	NE17	SW17	SW18		Diurnal Maximum

DF - DAS Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Fort Hills - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Hills - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	182	24.53	24.53
6 - 11	322	43.40	67.92
12 - 19	197	26.55	94.47
20 - 28	37	4.99	99.46
29 - 38	4	0.54	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Hills - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	15	5	3	1	2	3	7	15	26	23	12	12	12	13	18	15	182
6 - 11	55	22	9	7	1	9	18	31	31	33	22	3	8	7	18	48	322
12 - 19	45	36	11	4	0	1	7	19	19	24	15	2	2	1	0	11	197
20 - 28	24	7	1	0	0	0	0	1	1	2	0	0	0	0	0	1	37
29 - 38	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	142	71	24	12	3	13	32	66	77	82	49	17	22	21	36	75	742

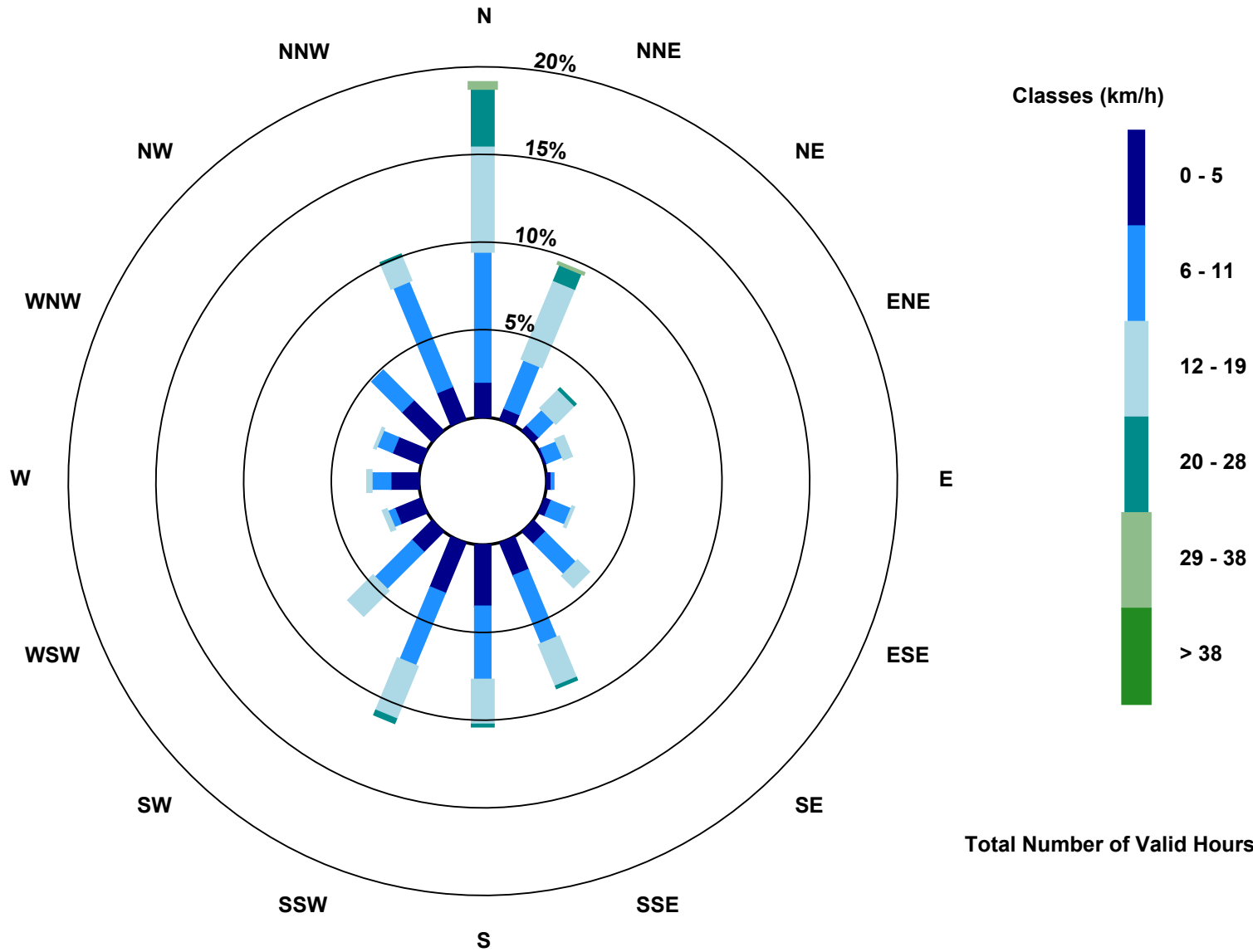
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Fort Hills



Total Number of Valid Hours: 742



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Fort Hills - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Jul 3 04:00 Minimum Value: 0 km/h on Jul 4 02:00 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: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	4	1	2	2	1	2	2	1	1	2	2	4	3	3	3	5	7	2	2	2	2	1	2	2	7
2-Jul	2	3	2	2	1	2	2	2	2	2	3	3	3	2	6	5	3	3	2	1	2	2	1	1	6
3-Jul	2	1	3	9	5	6	8	6	6	8	7	6	6	5	6	6	5	4	4	3	4	1	1	2	9
4-Jul	1	0	1	1	1	1	1	1	1	1	3	2	2	2	3	4	3	3	2	2	2	2	2	3	4
5-Jul	2	2	2	1	2	2	2	2	2	3	2	2	2	3	3	3	2	6	4	3	2	2	1	2	6
6-Jul	1	2	1	2	2	5	4	3	3	4	4	4	4	4	5	5	4	4	4	3	2	1	1	1	5
7-Jul	1	1	1	1	2	1	1	1	1	1	2	3	3	3	3	3	4	1	1	2	1	1	3	2	4
8-Jul	3	2	1	1	1	1	1	1	1	2	1	2	2	2	3	2	3	2	3	1	1	1	1	1	3
9-Jul	2	2	1	3	DF	3	3	3	3	3	4	5	5	5	5	4	4	4	4	3	3	4	2	3	5
10-Jul	2	1	2	1	1	1	2	1	2	4	3	3	4	4	3	3	3	3	2	3	3	4	2	2	4
11-Jul	2	2	1	1	1	1	2	2	2	2	2	3	3	3	3	2	2	2	2	1	2	2	1	2	3
12-Jul	2	2	1	2	1	2	2	1	2	3	3	3	4	4	4	4	4	3	2	2	3	1	1	2	4
13-Jul	2	2	2	2	2	2	2	1	2	5	6	6	6	6	5	5	5	6	6	3	3	2	2	2	6
14-Jul	2	1	1	1	1	5	4	4	4	4	4	4	3	4	4	4	4	3	3	3	2	2	2	1	5
15-Jul	1	1	1	1	1	2	1	1	2	2	2	3	4	4	4	4	3	3	3	2	2	1	1	2	4
16-Jul	2	1	1	1	1	1	1	1	3	2	3	4	4	5	4	4	3	4	3	3	2	4	3	3	5
17-Jul	2	2	1	1	2	4	3	2	2	2	3	3	4	4	4	4	3	2	2	2	2	3	2	2	4
18-Jul	1	1	1	1	2	2	2	2	2	2	2	3	3	4	2	3	3	2	2	1	1	4	2	2	4
19-Jul	1	2	2	2	1	2	1	1	1	1	2	2	2	3	2	3	6	4	2	3	2	2	2	2	6
20-Jul	3	1	2	3	1	1	2	1	2	2	2	2	3	3	2	3	2	1	1	1	1	1	1	2	3
21-Jul	1	1	1	1	2	1	1	1	1	1	1	2	3	2	2	2	2	3	3	2	1	2	1	1	3
22-Jul	1	1	1	2	2	1	1	1	3	2	3	4	3	4	3	4	3	2	1	3	2	2	2	2	4
23-Jul	3	3	2	2	1	1	1	2	2	2	1	2	2	3	3	3	6	4	3	1	1	3	2	1	6
24-Jul	2	1	1	1	2	2	1	1	2	1	1	1	1	1	2	2	3	3	2	2	2	2	3	3	3
25-Jul	3	2	2	3	3	5	6	3	3	2	2	4	2	2	2	2	2	2	2	2	2	6	3	3	6
26-Jul	3	3	3	3	3	2	1	2	2	2	3	3	2	4	DF	4	4	4	4	3	3	3	3	3	4
27-Jul	2	1	1	1	2	2	2	2	2	3	4	3	4	4	4	4	4	3	4	2	1	2	2	2	4
28-Jul	2	1	1	1	1	1	1	1	1	1	1	1	2	3	4	4	3	2	2	2	1	1	1	1	4
29-Jul	1	2	2	1	1	1	1	1	2	3	3	3	4	4	4	4	5	3	3	2	1	1	2	2	5
30-Jul	2	1	2	1	1	2	1	2	2	3	3	4	5	5	4	5	4	4	1	1	7	3	3	2	7
31-Jul	4	5	2	2	2	2	2	2	2	3	3	3	3	4	3	6	4	4	2	1	1	1	2	2	6
Diurnal Maximum																									
DF - DAS Failure																									



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort Hills - July 2023

Direction of Maximum Speed: 13 deg on Jul 3 07:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 358.0 deg on Jul 3	Hours of Data: 742
Direction of Minimum Speed: 240 deg on Jul 16 06:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 0.2 deg on Jul 21	Percent Operational Time: 99.7
Monthly Average Direction: 355.5 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	342	163	163	204	199	159	180	204	191	170	141	156	166	175	165	195	232	258	259	274	223	278	203	151	192.0
2-Jul	327	313	278	218	231	267	305	343	327	327	337	333	265	245	311	342	314	300	296	266	284	330	304	316	303.0
3-Jul	335	312	332	6	3	5	13	2	357	357	1	355	355	355	355	1	357	4	10	11	358	342	330	328	358.0
4-Jul	343	328	324	265	244	285	181	149	125	148	96	151	127	29	112	150	158	157	166	170	176	182	195	227	170.1
5-Jul	188	167	141	147	167	184	191	196	201	208	185	141	133	235	222	218	243	14	357	353	344	356	339	329	200.0
6-Jul	0	357	353	19	319	13	18	6	5	21	18	18	16	16	19	20	22	19	355	356	11	7	323	288	10.5
7-Jul	226	176	166	169	173	169	192	174	189	149	168	175	195	198	203	233	235	244	223	210	202	218	235	234	203.2
8-Jul	239	219	213	199	142	151	146	122	152	287	184	135	126	168	341	358	1	23	26	347	354	325	308	334	321.9
9-Jul	353	1	359	4	DF	7	9	12	7	22	12	10	8	11	21	29	49	49	51	46	46	41	28	24	22.1
10-Jul	11	355	351	354	354	348	326	270	99	144	119	116	116	102	124	157	211	207	200	147	154	130	126	136	121.9
11-Jul	133	161	143	148	151	172	193	196	212	217	215	223	206	209	210	217	209	214	208	228	230	269	308	311	203.4
12-Jul	167	141	195	191	203	187	7	246	339	10	11	342	350	14	0	4	18	5	22	21	360	332	337	348	0.3
13-Jul	336	329	337	350	345	347	347	328	333	352	357	1	1	358	356	360	5	10	5	350	346	342	349	13	354.2
14-Jul	345	329	302	312	319	6	5	359	1	14	18	20	23	19	16	18	20	5	6	12	11	6	9	333	6.4
15-Jul	340	332	343	347	1	354	350	353	21	27	37	33	38	41	43	56	42	64	56	54	65	352	1	13	29.0
16-Jul	355	303	298	343	305	240	170	180	149	164	171	154	163	160	173	165	159	186	186	165	152	134	135	138	162.0
17-Jul	154	136	156	169	161	138	138	150	160	160	155	142	151	166	119	122	148	1	37	358	355	5	17	23	134.8
18-Jul	0	352	348	5	359	359	12	29	2	350	348	343	38	347	22	333	341	343	347	338	336	307	341	327	350.8
19-Jul	303	207	180	188	121	233	190	179	174	227	190	199	199	202	181	139	179	233	332	342	236	293	310	349	211.5
20-Jul	253	204	197	268	199	207	176	209	270	4	351	275	274	315	320	309	280	312	355	17	12	0	354	346	323.7
21-Jul	348	307	289	300	240	183	177	196	193	194	176	171	191	169	102	154	182	41	9	28	34	22	309	325	29.0
22-Jul	331	328	304	310	280	252	276	344	1	348	1	11	12	8	3	358	352	345	332	357	14	15	3	351	356.0
23-Jul	4	6	10	8	1	324	313	218	223	221	201	157	167	179	196	158	350	7	1	340	356	16	1	336	345.0
24-Jul	317	297	208	161	158	176	179	176	194	195	184	214	274	278	295	41	115	76	58	53	67	51	73	60	105.6
25-Jul	7	0	311	214	197	55	66	2	117	346	19	18	318	350	18	11	20	16	5	7	289	244	222	216	346.7
26-Jul	212	214	196	179	176	187	172	156	141	145	123	100	69	8	DF	13	15	9	22	10	32	55	64	74	75.4
27-Jul	37	24	16	27	11	8	5	2	359	354	6	29	14	14	6	4	0	357	357	339	330	247	255	332	5.6
28-Jul	319	253	287	204	186	176	169	151	154	200	207	228	224	197	218	209	207	200	207	190	189	201	201	206	202.2
29-Jul	197	177	171	171	162	166	191	200	194	198	220	214	226	219	215	203	198	194	199	193	177	179	203	223	198.5
30-Jul	215	171	160	158	135	143	158	184	155	155	179	186	173	174	171	182	178	211	190	199	219	202	125	199	175.8
31-Jul	220	231	225	228	176	161	143	236	204	200	214	254	281	304	272	315	292	40	273	301	238	189	291	217	240.1

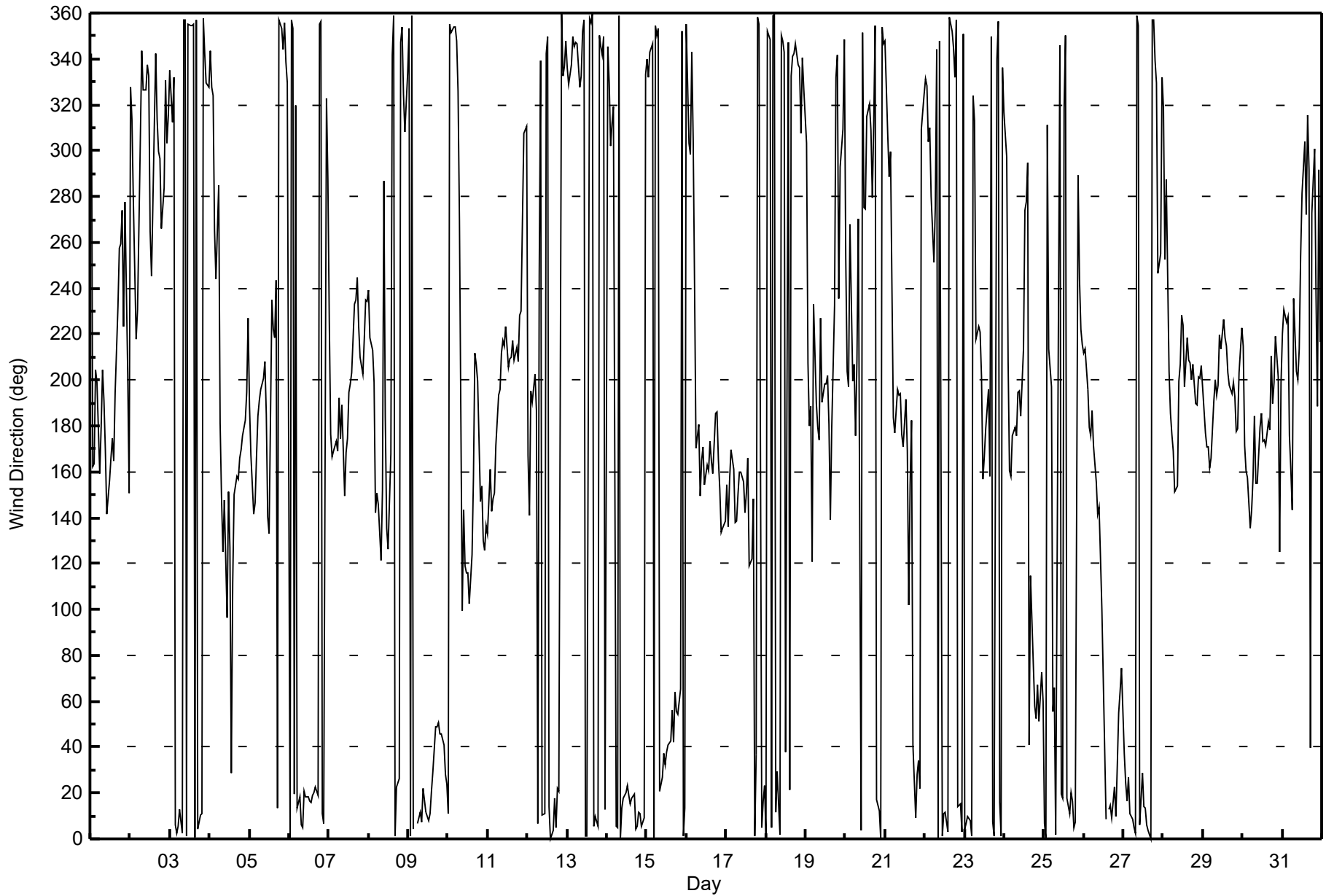
317.3 288.7 295.4 216.0 184.4 51.0 40.1 256.6 4.2 3.0 24.8 33.3 16.8 357.9 357.9 10.3 357.1 357.7 2.4 4.3 360.0 358.7 338.8 323.0
 Diurnal Average

DF - DAS Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Fort Hills - July 2023





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Fort Hills - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 93 deg on Jul 10 09:00 Minimum Value: 4 deg on Jul 4 01:00 Percentiles: P ₁ = 6 P ₁₀ = 10 Q ₁ = 13 Median = 17 Q ₃ = 27 P ₉₀ = 48 P ₉₉ = 84																	Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	66	35	28	18	41	15	16	11	41	9	16	16	17	12	17	25	21	12	16	14	90	23	79	39	90
2-Jul	13	24	25	14	8	19	15	12	24	17	14	25	18	11	50	12	22	12	16	11	19	16	14	15	50
3-Jul	13	13	12	17	15	15	12	15	17	17	17	16	17	17	18	16	15	15	14	13	15	5	5	12	18
4-Jul	4	9	7	47	24	33	37	27	33	41	51	46	75	88	76	30	23	17	10	8	8	8	8	32	88
5-Jul	10	15	12	8	19	10	11	11	15	12	16	23	17	37	13	17	41	53	16	13	11	13	18	12	53
6-Jul	12	14	13	9	31	20	13	14	16	15	19	17	17	18	19	17	16	17	16	15	11	9	16	29	31
7-Jul	21	30	18	18	14	20	15	18	31	24	40	29	20	18	13	18	30	24	16	16	7	10	9	11	40
8-Jul	10	15	10	8	19	14	17	25	61	25	60	39	71	64	67	21	18	14	12	15	12	10	19	14	71
9-Jul	13	13	10	11	DF	11	14	13	14	17	15	15	16	15	17	17	13	15	12	10	9	11	12	25	25
10-Jul	20	11	13	12	13	17	16	74	93	31	32	29	34	34	39	40	17	9	23	11	70	56	10	10	93
11-Jul	57	15	10	7	9	15	12	12	10	14	22	18	23	15	16	15	16	13	9	8	18	36	13	39	57
12-Jul	48	68	25	21	57	77	51	41	37	17	15	25	23	19	18	25	24	19	15	16	14	11	11	10	77
13-Jul	17	8	8	13	10	12	14	14	17	18	18	16	17	19	20	16	15	14	15	14	13	11	13	10	20
14-Jul	15	9	19	15	13	14	14	16	17	14	13	17	18	15	16	17	14	15	15	13	13	13	25	6	25
15-Jul	8	14	16	9	20	15	17	14	17	16	17	16	21	23	19	26	25	26	22	17	12	26	13	15	26
16-Jul	18	28	28	66	28	75	21	26	16	21	23	22	21	14	17	20	16	22	12	10	10	9	9	9	75
17-Jul	10	11	22	12	15	13	10	12	13	13	9	10	15	9	21	22	49	57	19	15	20	15	11	25	57
18-Jul	15	18	15	19	12	14	15	19	19	17	18	32	66	77	77	25	21	12	11	7	11	27	7	20	77
19-Jul	30	46	14	66	28	27	15	27	17	31	51	64	18	33	57	38	34	24	18	40	40	55	62	44	66
20-Jul	43	40	75	92	47	40	53	18	80	26	44	72	28	86	29	73	46	17	14	10	4	10	10	16	92
21-Jul	15	16	30	29	55	13	16	16	20	26	25	64	32	48	56	39	47	47	14	11	10	60	45	8	64
22-Jul	21	25	41	45	36	27	55	24	33	25	15	15	15	14	15	16	14	13	18	20	10	10	16	14	55
23-Jul	14	13	11	15	30	18	22	54	29	28	20	25	26	41	28	29	27	69	89	9	14	45	72	12	89
24-Jul	32	48	29	25	42	15	16	11	28	24	39	55	27	43	44	70	29	23	13	9	12	12	19	47	70
25-Jul	23	60	32	80	41	64	46	62	54	23	11	30	32	23	16	25	14	12	14	19	29	54	9	8	80
26-Jul	9	9	10	9	20	10	18	22	16	15	26	57	69	23	DF	14	13	12	11	13	18	12	11	14	69
27-Jul	12	13	7	7	13	14	14	18	16	20	18	19	24	13	21	21	16	17	16	14	9	48	37	26	48
28-Jul	12	29	28	90	27	16	13	23	37	65	33	86	57	47	65	33	19	13	9	8	7	10	8	6	90
29-Jul	10	19	18	12	13	10	12	10	12	13	15	16	24	16	19	20	20	17	10	8	5	6	22	11	24
30-Jul	27	15	10	5	8	9	7	15	19	26	24	22	21	21	27	23	26	19	8	7	8	28	15	46	46
31-Jul	25	16	33	22	44	14	30	16	18	15	17	34	15	35	24	61	74	45	44	27	63	82	32	58	82
Diurnal Maximum																									
DF - DAS Failure																									



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS25 WASKŌW OHCI PIMÂTISIWIN JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WASKŌW OHCI PIMĀTISIWIN (AMS25)
 JULY 2023

MONTHLY SUMMARY

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	15.7	0	2.9	0
H2S(ppb) Average	706	37	38	99.87	2	0	0.5	0
Temperature 2 m (C) Average	744	0	0	100	30.1	0	22.6	0
Relative Humidity (%) Average	744	0	0	100	100	-	95.6	-
Wind Speed 10 m (km/h) Average	740	0	4	99.46	20	0	12	0
Wind Direction 10 m (deg) Average	740	0	4	99.46	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WASKŌW OHCI PIMĀTISIWIN (AMS25)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	0.57	1.6	-	0	0	0	0.1	0.3	1.1	15.7
H2S (ppb) Average	706	0.27	0.2	-	0	0.1	0.1	0.2	0.3	0.5	2
Temperature 2 m (C) Average	744	18.29	5.1	-	5.5	12.1	14.4	17.8	22.3	25.4	30.1
Relative Humidity (%) Average	744	67.72	20.9	-	28.3	38.4	49.6	67.7	86.7	96.6	100
Wind Speed 10 m (km/h) Average	740	4.5	3	-	0	1	2	4	6	8	20
Wind Direction 10 m (deg) Average	740	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WASKŌW OHCI PIMĀTISIWIN (AMS25)

JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	24 Jul 2023 11:00	24 Jul 2023 11:00	1	Maintenance - sample manifold cleaned
Wind Speed, Wind Direction	19 Jul 2023 04:00	19 Jul 2023 04:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	23 Jul 2023 06:00	23 Jul 2023 06:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	24 Jul 2023 03:00	24 Jul 2023 03:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	30 Jul 2023 06:00	30 Jul 2023 06:00	1	Flat line in sensor output signal

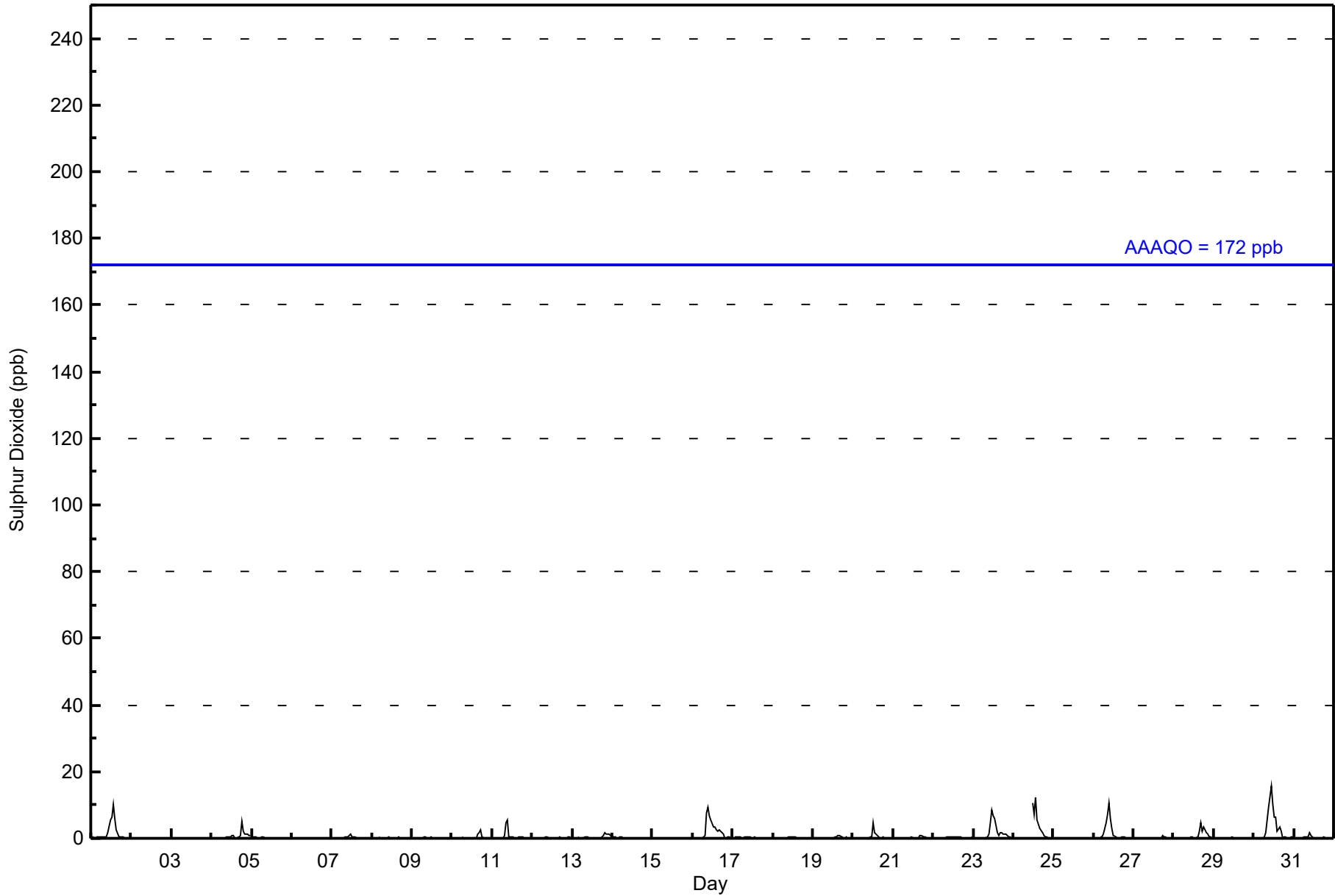


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 15.7 ppb on Jul 30 11:00	Maximum Daily Average: 2.9 ppb on Jul 30		Hours of Data:	709
Minimum Value: 0.0 ppb on Jul 2 06:00	Minimum Daily Average: 0.0 ppb on Jul 3		Hours of Missing Data:	35
Maximum Diurnal Average: 1.6 ppb at hour 12	Minimum Diurnal Average: 0.1 ppb at hour 4		Hours of Calibration:	35
Monthly Average: 0.57 ppb	Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 1.1 P ₉₉ = 9.1		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	0.3	0.2	Z	0.4	0.4	0.2	0.3	0.4	0.4	0.3	1.6	5.6	6.2	10.2	5.9	2.5	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	1.6	10.2																						
2-Jul	0.1	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1																					
3-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.1	0.0	Z	0.1	0.1	0.1	0.2	0.3	0.5	1.0	0.8	0.2	0.2	0.2	0.8	5.1	2.2	1.5	1.3	0.8	0.7	0.7	5.1																						
5-Jul	Z	0.3	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.3																						
6-Jul	0.1	Z	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1																					
7-Jul	0.0	0.0	Z	0.0	0.0	0.1	0.1	0.1	0.3	0.4	1.0	1.3	0.5	0.3	0.3	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.3	1.3																						
8-Jul	0.1	0.2	0.2	Z	0.2	0.2	0.1	0.1	0.1	0.1	0.5	0.1	0.2	0.2	0.1	0.2	0.4	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.2	0.5																						
9-Jul	0.0	0.0	0.1	0.0	Z	0.1	0.1	0.2	0.3	0.2	0.1	0.2	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.3																						
10-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	1.4	1.7	2.6	0.3	0.0	0.0	0.0	0.0	0.0	0.3	2.6																						
11-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.2	0.8	4.7	5.6	0.6	0.3	0.3	0.1	0.1	0.2	0.2	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.6	5.6																						
12-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.5	0.2	0.1	0.1	0.1	0.0	0.0	0.2	0.2	0.1	0.1	0.1	0.3	0.3	0.2	0.1	0.5																						
13-Jul	0.2	0.3	Z	0.2	0.1	0.1	0.1	0.3	0.4	0.3	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.7	1.5	1.2	1.2	1.1	0.9	1.5																						
14-Jul	0.5	0.5	0.4	Z	0.3	0.2	0.1	0.1	0.0	0.0	0.2	0.1	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5																						
15-Jul	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	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1																					
16-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	1.1	7.7	9.2	6.9	5.4	3.3	3.3	2.3	1.9	2.4	1.8	1.3	0.2	0.2	0.2	0.2	0.1	2.1	9.2																						
17-Jul	Z	0.4	0.3	0.2	0.2	0.1	0.2	0.3	0.5	0.4	0.6	0.2	0.1	0.2	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.6																						
18-Jul	0.1	Z	0.1	0.0	0.1	0.1	0.0	0.1	0.2	0.3	0.3	0.3	0.3	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.3																						
19-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.0	0.2	0.2	0.7	1.0	0.3	0.2	0.2	0.5	0.1	0.1	0.1	0.2	1.0																						
20-Jul	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.5	4.8	1.7	1.0	0.6	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.5	4.8																						
21-Jul	0.1	0.0	0.0	0.0	Z	0.0	0.1	0.0	0.0	0.1	0.1	0.4	0.1	0.1	0.1	0.1	1.0	0.7	0.4	0.3	0.2	0.1	0.1	0.1	0.2	1.0																						
22-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.2	0.1	0.3	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.2	0.2	0.5																						
23-Jul	Z	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.3	1.4	4.5	8.5	6.7	6.1	1.5	0.9	1.9	1.5	1.1	1.1	1.0	0.6	0.3	0.2	1.7	8.5																						
24-Jul	0.1	Z	0.1	0.1	0.0	0.0	0.1	0.0	0.1	C	C	C	C	10.5	7.2	12.3	5.3	4.3	2.9	1.8	0.8	0.5	0.3	0.2	0.1	2.5	12.3																					
25-Jul	0.2	0.1	Z	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.2																						
26-Jul	0.1	0.0	0.0	Z	0.3	0.4	1.4	4.7	7.0	10.6	6.1	3.0	1.0	0.4	0.2	0.2	0.1	0.5	0.4	0.1	0.0	0.0	0.0	0.0	1.6	10.6																						
27-Jul	0.0	0.0	0.0	0.0	Z	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.6	0.3	0.1	0.0	0.0	0.0	0.1	0.9																						
28-Jul	0.0	0.1	0.0	0.0	0.0	Z	0.0	0.1	0.0	0.1	0.2	0.3	0.1	0.1	0.3	2.3	4.6	2.2	3.3	1.7	1.1	0.6	0.4	0.2	0.8	4.6																						
29-Jul	Z	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2																						
30-Jul	0.1	Z	0.1	0.1	0.1	0.1	0.5	1.7	5.6	9.5	15.7	10.3	6.4	6.4	2.3	3.5	2.1	0.2	0.3	0.3	0.2	0.1	0.4	0.2	2.9	15.7																						
31-Jul	0.2	0.1	Z	0.1	0.0	0.0	0.5	0.5	0.2	1.8	0.7	0.2	0.1	0.1	0.0	0.1	0.0	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.3	1.8																						
																								0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.4	1.0	1.4	1.4	1.6	1.3	1.4	0.7	0.7	0.7	0.5	0.5	0.3	0.3	0.2	0.2	0.1	Diurnal Average
																								0.5	0.5	0.4	0.4	0.4	0.4	1.4	4.7	7.7	10.6	15.7	10.5	7.2	12.3	5.9	4.3	4.6	2.6	5.1	2.2	1.5	1.3	1.1	0.9	Diurnal Maximum

Z - zerospan C - Calibration

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Waskow ohci Pimatisiwin - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	706	99.58	99.58
11 - 20	3	0.42	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Waskow ohci Pimatisiwin - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	63	36	19	5	21	27	69	77	48	29	21	33	48	56	64	86	702
11 - 20	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	3
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	63	36	19	5	21	28	70	77	49	29	21	33	48	56	64	86	705

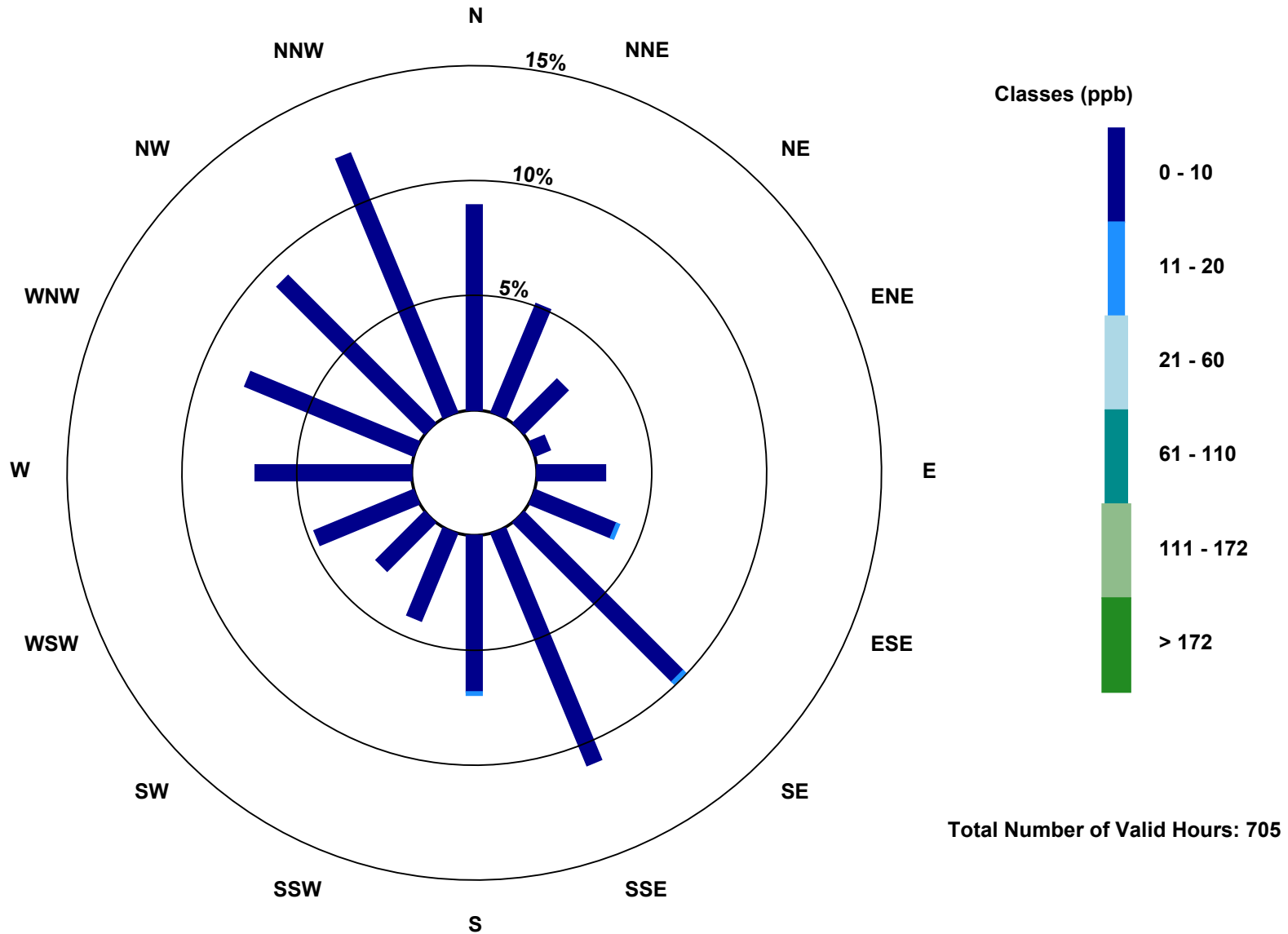
Total Number of Valid Hours: 705

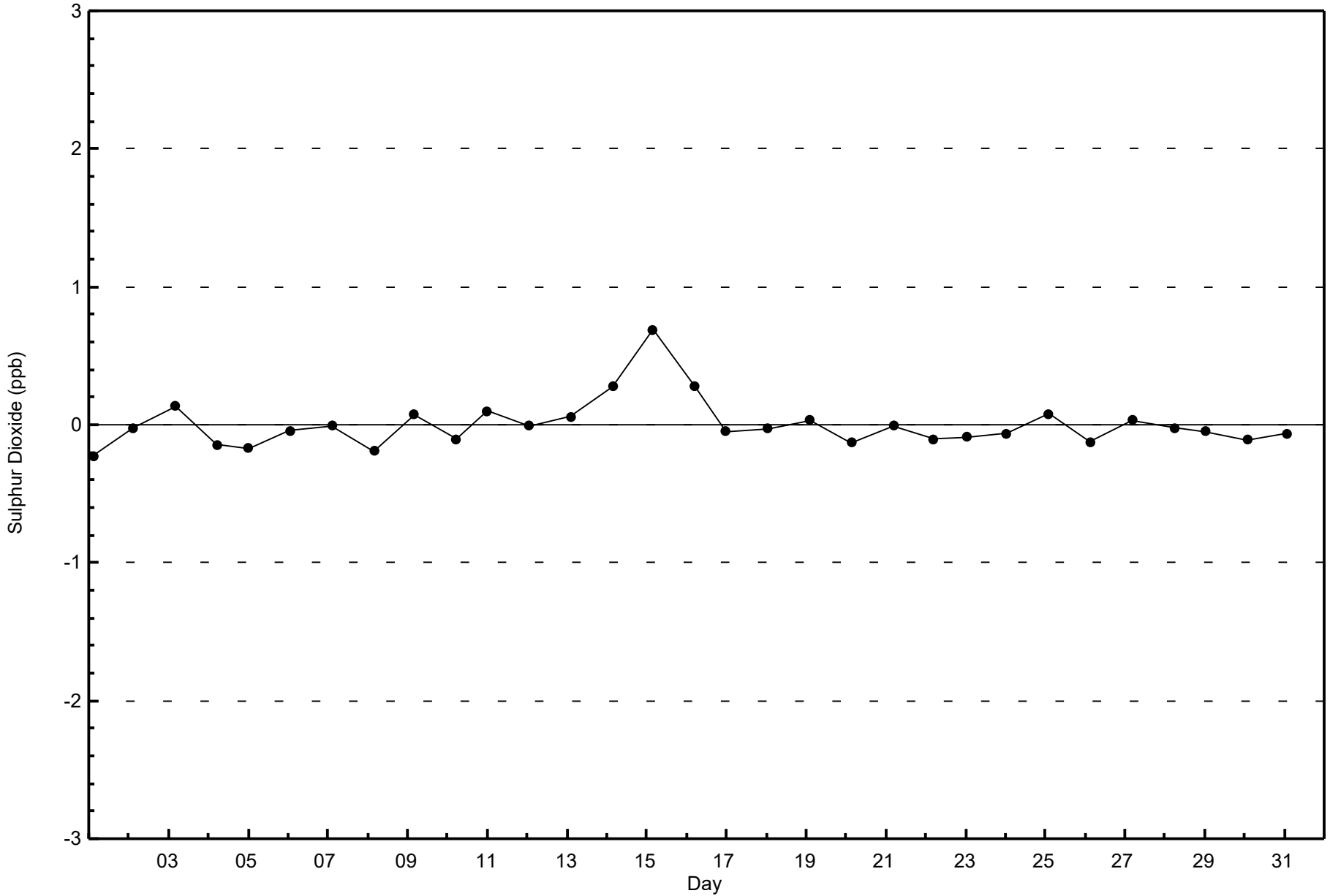
Total Number of Hours: 744

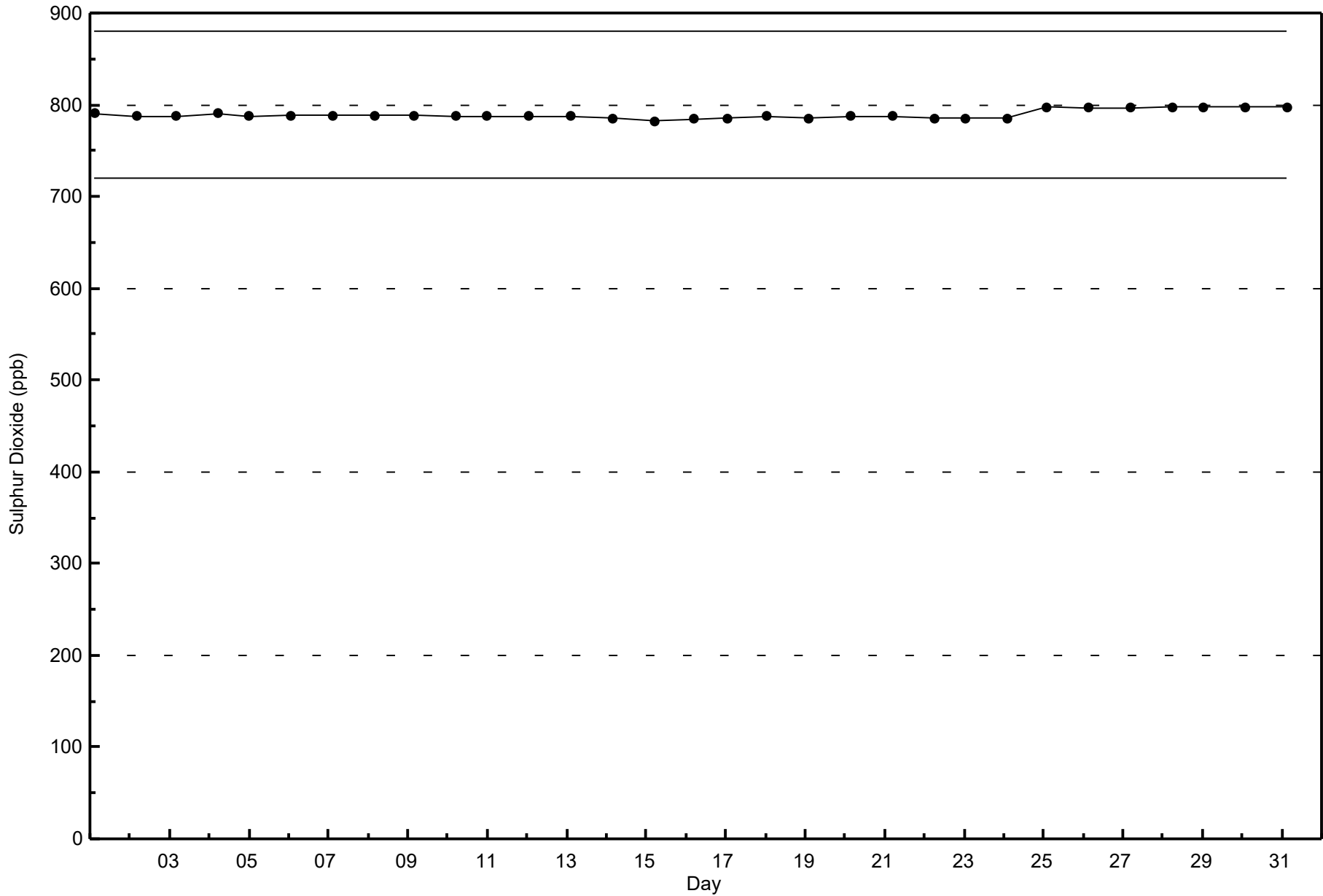


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Waskow ohci Pimatisiwin







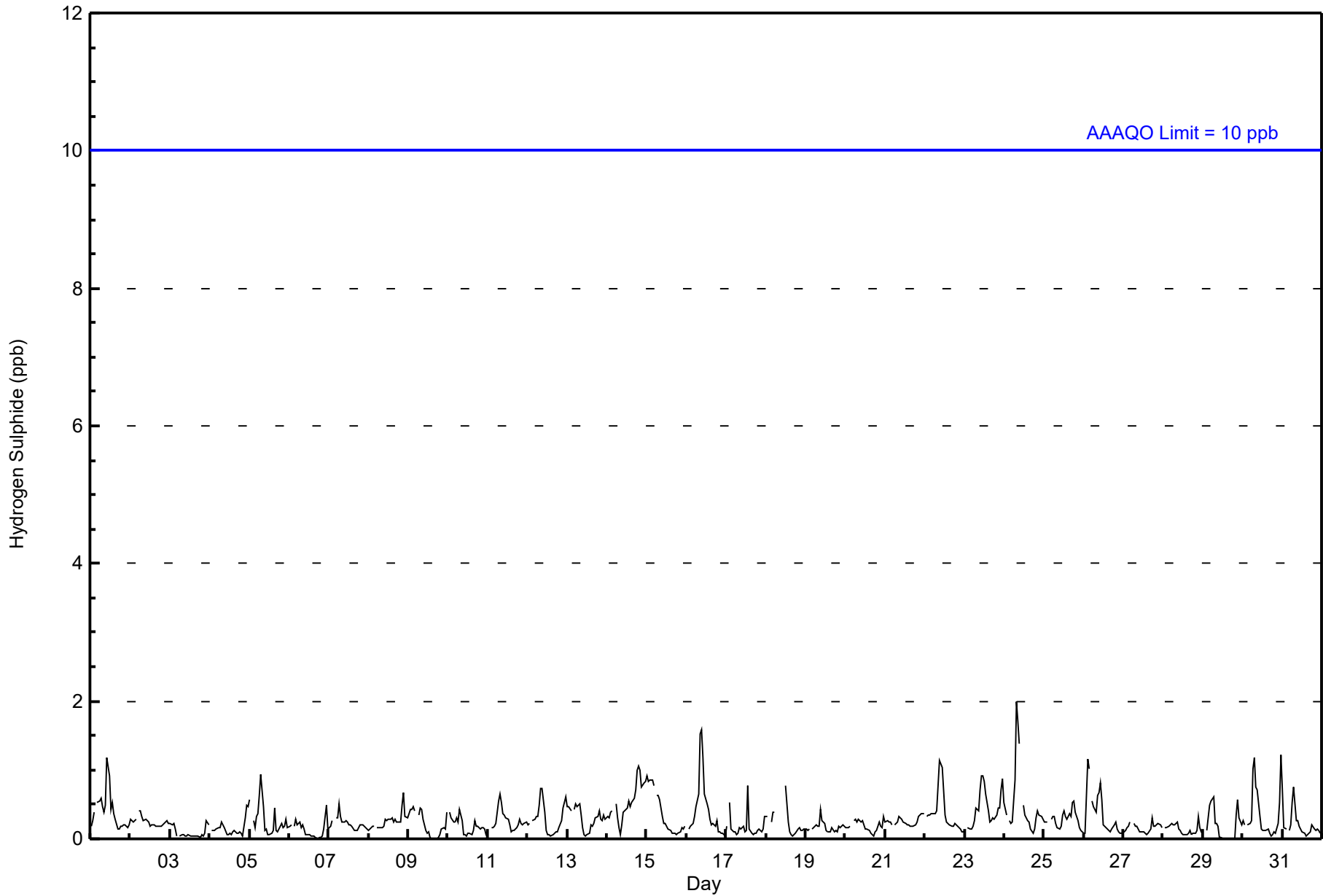


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 2.0 ppb on Jul 24 08:00										Maximum Daily Average: 0.5 ppb on Jul 14										Hours of Data: 706						
Minimum Value: 0.0 ppb on Jul 9 17:00										Minimum Daily Average: 0.1 ppb on Jul 3										Hours of Missing Data: 38						
Maximum Diurnal Average: 0.4 ppb at hour 8										Minimum Diurnal Average: 0.1 ppb at hour 17										Hours of Calibration: 37						
Monthly Average: 0.27 ppb										Percentiles: P ₁ = 0.0 P ₁₀ = 0.1 Q ₁ = 0.1 Median = 0.2 Q ₃ = 0.3 P ₉₀ = 0.5 P ₉₉ = 1.2										Percent Operational Time: 99.9						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.2	0.3	0.4	Z	0.5	0.5	0.6	0.5	0.4	0.5	1.2	0.9	0.4	0.5	0.4	0.3	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.4	1.2
2-Jul	0.3	0.3	0.2	0.3	Z	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.4
3-Jul	0.2	0.2	0.2	0.1	0.0	Z	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.2	0.1	0.3
4-Jul	Z	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.5	0.5	0.2	0.5
5-Jul	0.6	Z	0.3	0.2	0.3	0.4	0.6	0.9	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.3	0.9
6-Jul	0.2	0.2	Z	0.2	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.2	0.1	0.5
7-Jul	0.2	0.2	0.3	Z	0.3	0.3	0.5	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.5
8-Jul	0.1	0.1	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.5	0.7	0.3	0.3	0.7
9-Jul	0.4	0.4	0.4	0.5	0.4	Z	0.3	0.5	0.4	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.4	0.2	0.5
10-Jul	Z	0.4	0.3	0.2	0.3	0.3	0.2	0.4	0.3	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.4
11-Jul	0.1	Z	0.2	0.2	0.2	0.2	0.6	0.6	0.5	0.4	0.3	0.3	0.3	0.2	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.6
12-Jul	0.2	0.2	Z	0.3	0.3	0.3	0.3	0.5	0.7	0.7	0.4	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.3	0.4	0.5	0.6	0.3	0.7
13-Jul	0.5	0.5	0.4	Z	0.4	0.5	0.5	0.5	0.4	0.2	0.1	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.5
14-Jul	0.3	0.3	0.4	0.4	Z	0.5	0.3	0.2	0.1	0.2	0.4	0.4	0.5	0.5	0.5	0.6	0.7	1.0	1.1	1.0	0.7	0.8	0.8	0.8	0.5	1.1
15-Jul	0.9	0.8	0.9	0.8	0.8	Z	0.6	0.6	0.6	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.4	0.9
16-Jul	Z	0.1	0.2	0.2	0.2	0.3	0.5	0.7	1.5	1.6	1.2	0.7	0.5	0.4	0.3	0.2	0.2	0.2	0.3	0.1	0.1	0.1	0.1	0.0	0.4	1.6
17-Jul	0.2	Z	0.5	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.8
18-Jul	0.3	0.3	Z	0.2	0.4	0.4	C	C	C	C	C	C	0.8	0.2	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.1	--	0.8
19-Jul	0.1	0.1	0.1	Z	0.1	0.2	0.2	0.2	0.2	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.4
20-Jul	0.2	0.2	0.2	0.2	Z	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.3
21-Jul	0.3	0.3	0.3	0.2	0.2	Z	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.3	0.4
22-Jul	Z	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.8	1.1	1.0	0.7	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.4	1.1
23-Jul	0.1	Z	0.2	0.1	0.1	0.2	0.3	0.5	0.4	0.7	0.9	0.9	0.8	0.7	0.4	0.2	0.3	0.3	0.3	0.3	0.4	0.5	0.7	0.9	0.4	0.9
24-Jul	0.5	0.3	Z	0.3	0.2	0.2	0.9	2.0	1.7	1.4	M	0.5	0.3	0.3	0.2	0.1	0.1	0.1	0.3	0.4	0.3	0.3	0.3	0.3	0.5	2.0
25-Jul	0.2	0.2	0.2	Z	0.3	0.3	0.3	0.2	0.2	0.1	0.2	0.4	0.4	0.3	0.3	0.4	0.3	0.5	0.6	0.4	0.3	0.2	0.1	0.1	0.3	0.6
26-Jul	0.1	0.1	1.2	1.0	Z	0.5	0.5	0.4	0.6	0.7	0.8	0.6	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.4	1.2
27-Jul	0.1	0.1	0.2	0.2	0.2	Z	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
28-Jul	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.1	0.1	0.3
29-Jul	0.1	Z	0.1	0.3	0.5	0.6	0.6	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.6	0.3	0.2	0.2	0.6
30-Jul	0.3	0.2	Z	0.2	0.2	0.3	1.0	1.2	0.7	0.7	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.5	1.2	0.4	1.2
31-Jul	0.7	0.2	0.1	Z	0.1	0.2	0.5	0.7	0.3	0.3	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.7
																								Diurnal Average		
																								Diurnal Maximum		
																								0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.3 0.3 0.2 0.2 0.2 0.2 0.1 0.2 0.2 0.2 0.2 0.3 0.3 0.3 0.3		
																								0.9 0.8 1.2 1.0 0.8 0.6 1.0 2.0 1.7 1.6 1.2 0.9 0.8 0.8 0.5 0.5 0.6 0.7 1.0 1.1 1.0 0.7 0.8 1.2		
Z - zerospan C - Calibration M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Waskow ohci Pimatisiwin - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Waskow ohci Pimatisiwin - July 2023**

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**

**Hydrogen Sulphide (H₂S) - ppb
Waskow ohci Pimatisiwin - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	61	36	20	6	22	29	70	77	48	28	19	37	49	56	65	81	704
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	36	20	6	22	29	70	77	48	28	19	37	49	56	65	81	704

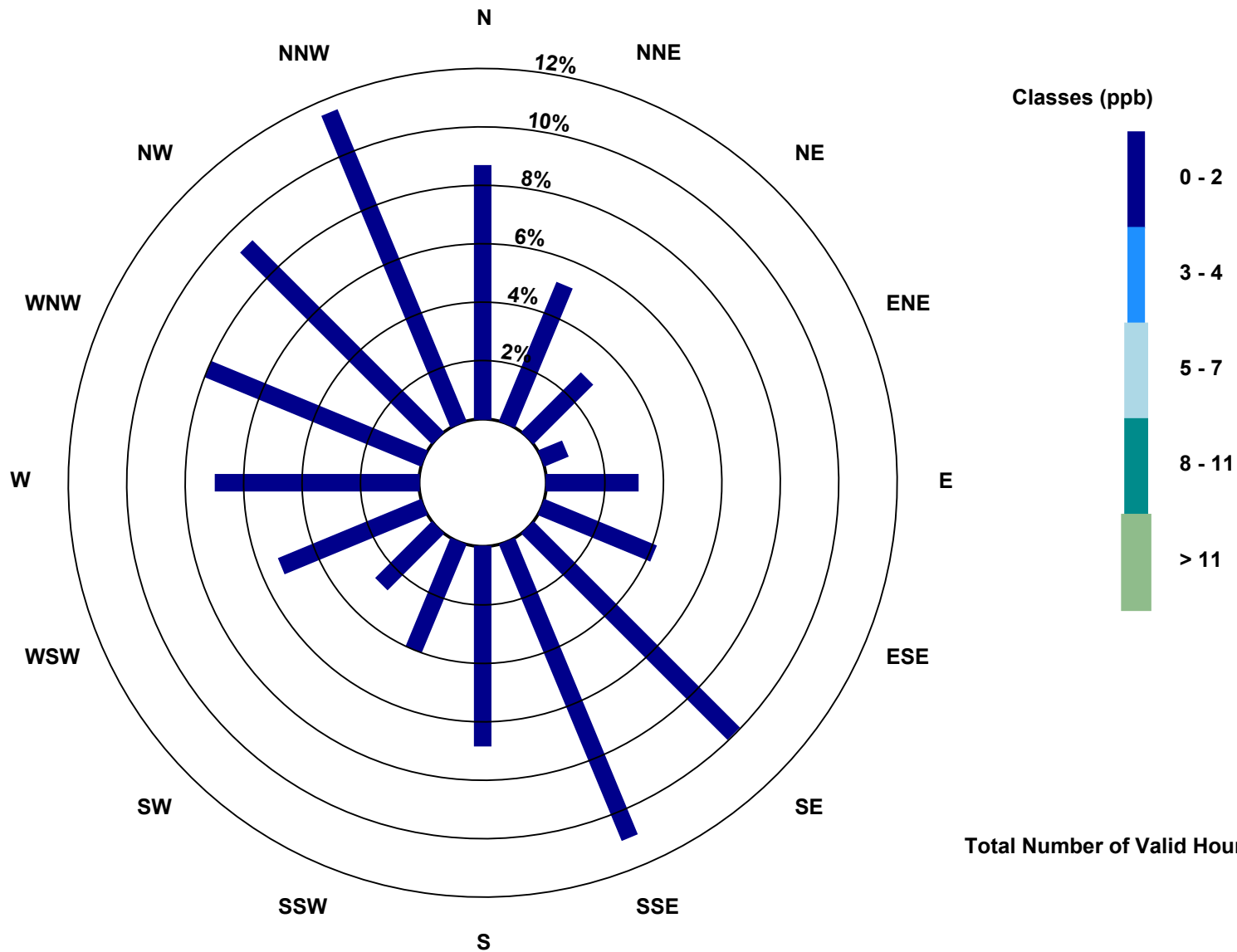
Total Number of Valid Hours: 704

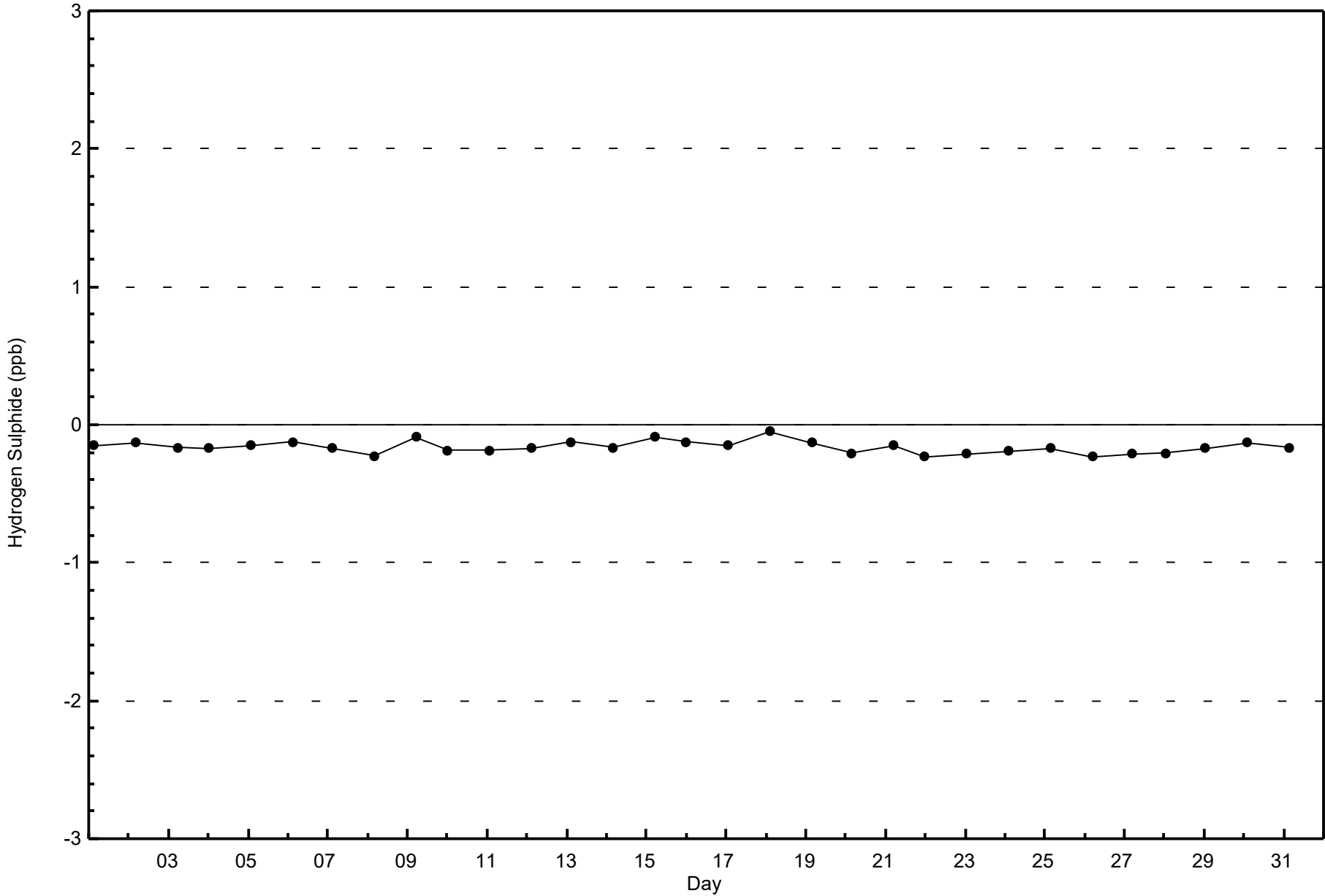
Total Number of Hours: 744

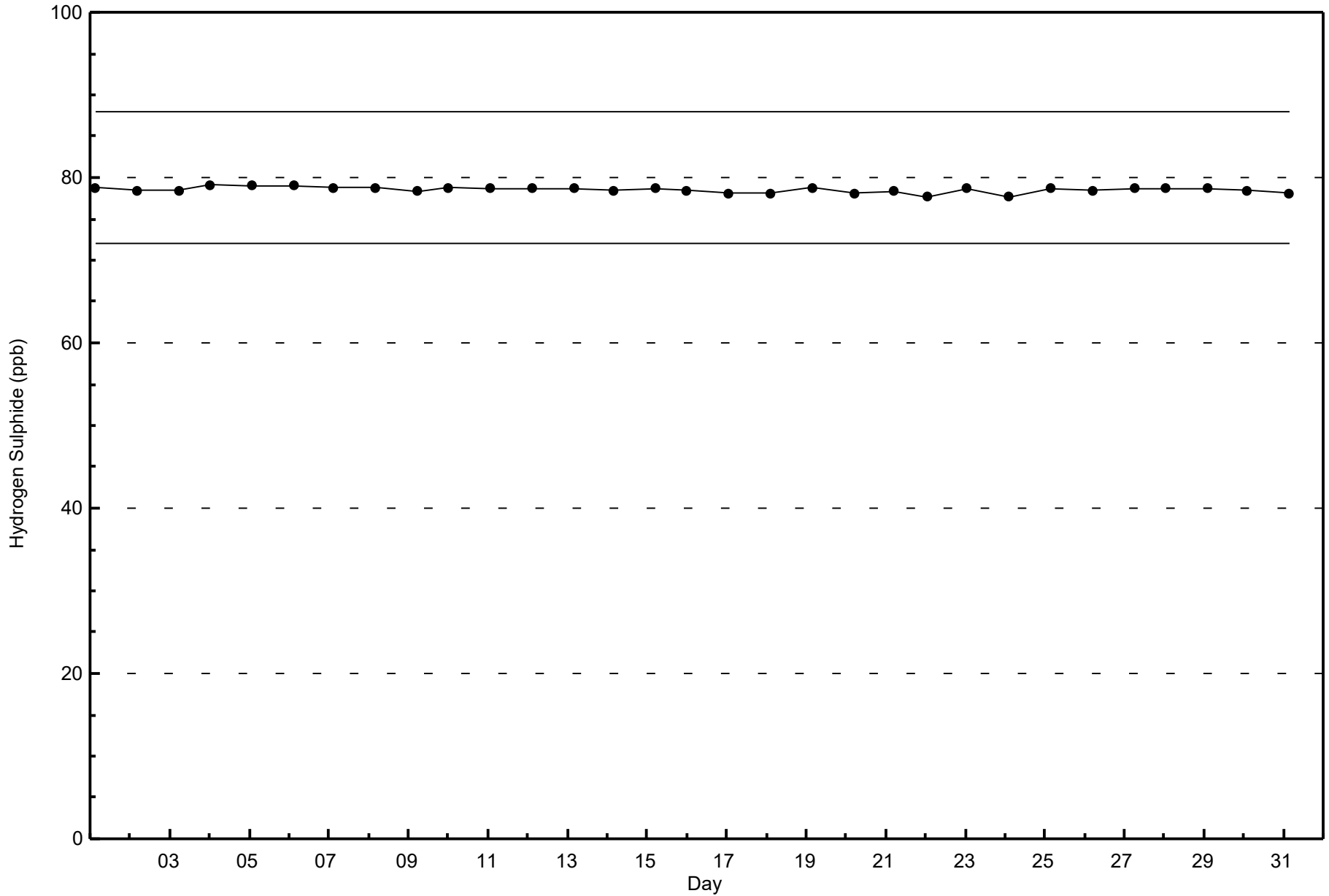


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Hydrogen Sulphide (H₂S) - ppb
Waskow ohci Pimatisiwin





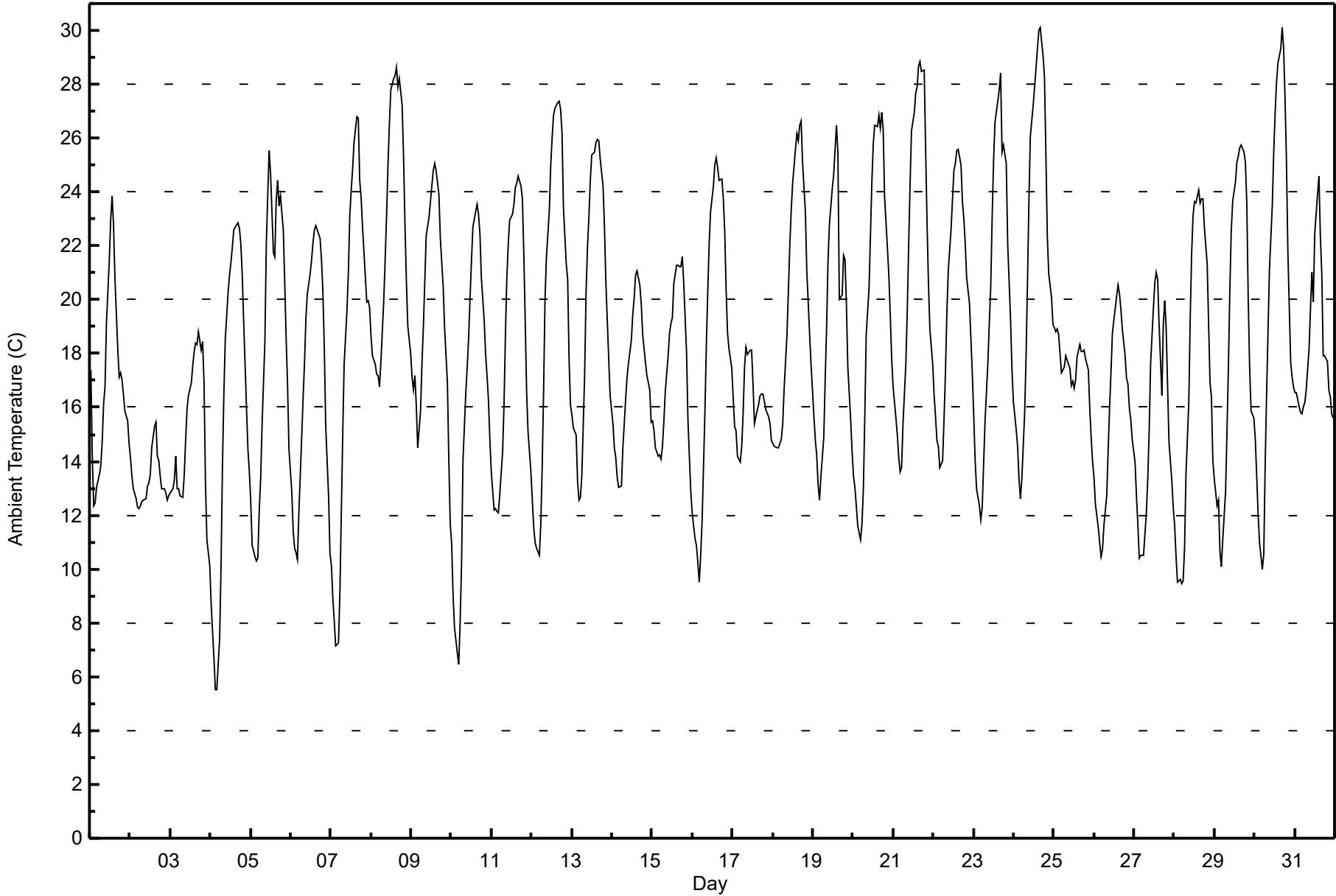




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Waskow ohci Pimatisiwin - July 2023

Maximum Value: 30.1 C on Jul 24 17:00 Maximum Daily Average: 22.6 C on Jul 8																						Hours in Service:	744			
Minimum Value: 5.5 C on Jul 4 04:00 Minimum Daily Average: 13.3 C on Jul 2																						Hours of Data:	744			
Maximum Diurnal Average: 23.8 C at hour 16 Minimum Diurnal Average: 11.9 C at hour 5																						Hours of Missing Data:	0			
Monthly Average: 18.29 C Percentiles: P ₁ = 7.5 P ₁₀ = 12.1 Q ₁ = 14.4 Median = 17.8 Q ₃ = 22.3 P ₉₀ = 25.4 P ₉₉ = 28.8																						Hours of Calibration:	0			
																						Percent Operational Time:	100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	17.4	14.2	12.3	12.5	13.1	13.5	13.8	14.7	16.1	16.7	19.1	21.4	23.0	23.8	22.8	20.8	18.2	17.1	17.3	17.0	16.5	15.9	15.5	14.7	17.0	23.8
2-Jul	14.2	13.5	13.0	12.6	12.3	12.2	12.3	12.5	12.5	12.6	13.1	13.2	13.5	14.5	15.3	15.5	14.2	14.0	13.5	13.0	13.0	12.8	12.6	12.7	13.3	15.5
3-Jul	12.8	13.0	13.3	14.2	13.0	13.0	12.7	12.6	13.5	14.8	16.0	16.4	16.9	17.5	18.1	18.4	18.4	18.8	18.1	18.5	16.9	13.2	11.1	10.1	15.1	18.8
4-Jul	8.7	7.7	6.6	5.5	5.5	7.4	10.1	13.8	16.5	18.6	20.3	20.9	21.4	22.0	22.6	22.7	22.9	22.7	22.1	20.9	19.2	16.0	14.4	13.6	15.9	22.9
5-Jul	12.5	10.9	10.5	10.3	10.4	12.2	13.3	15.3	18.5	22.1	23.9	25.5	24.7	21.7	21.6	23.7	24.5	23.5	23.8	22.6	20.7	18.6	16.9	14.4	18.4	25.5
6-Jul	12.9	11.4	10.8	10.6	10.3	12.1	14.9	16.4	17.6	19.3	20.2	21.0	21.5	22.1	22.6	22.7	22.6	22.3	21.5	20.3	18.2	15.3	12.7	10.5	17.1	22.7
7-Jul	10.1	9.0	8.1	7.2	7.2	9.1	12.0	15.0	17.6	19.6	21.0	23.1	24.1	24.8	25.9	26.8	26.7	24.5	23.8	22.7	20.9	19.9	20.0	19.7	18.3	26.8
8-Jul	18.7	17.9	17.6	17.2	17.2	16.8	17.7	20.0	21.5	23.1	25.0	26.5	27.8	28.2	28.3	28.6	27.9	28.2	27.2	25.3	22.8	20.7	19.0	18.0	22.6	28.6
9-Jul	17.1	16.6	17.2	16.1	14.5	15.9	17.6	19.0	20.7	22.4	23.1	23.6	24.2	24.8	25.1	24.8	23.9	22.3	21.4	20.5	19.0	16.9	14.0	11.7	19.7	25.1
10-Jul	10.9	9.1	7.8	6.9	6.4	8.0	10.2	14.0	16.5	17.5	18.6	20.1	21.4	22.7	23.3	23.5	23.2	22.4	20.8	19.2	18.0	17.2	16.3	14.8	16.2	23.5
11-Jul	13.6	12.2	12.3	12.1	12.1	12.7	14.4	16.1	18.7	20.8	22.1	23.0	23.2	23.5	24.2	24.3	24.6	24.2	23.7	21.7	19.2	16.6	15.1	13.6	18.5	24.6
12-Jul	12.5	11.6	11.0	10.8	10.5	11.7	13.8	16.7	20.1	21.6	23.3	24.9	26.0	26.9	27.1	27.3	27.4	27.0	26.2	23.5	21.3	20.8	17.8	16.1	19.8	27.4
13-Jul	15.7	15.3	15.0	13.2	12.6	12.7	13.4	17.2	20.3	22.0	23.1	24.4	25.4	25.5	25.8	26.0	25.9	25.2	24.2	22.7	20.6	19.2	17.8	16.4	20.0	26.0
14-Jul	15.4	14.5	14.1	13.4	13.0	13.1	14.5	15.4	16.3	17.1	17.6	18.5	19.4	20.1	20.9	21.0	20.6	19.9	18.7	18.2	17.6	17.2	16.7	15.5	17.0	21.0
15-Jul	15.5	15.1	14.5	14.2	14.3	14.1	14.6	15.5	16.6	17.9	18.7	19.1	19.4	20.6	21.3	21.3	21.2	21.2	21.6	20.6	18.1	15.5	14.2	12.9	17.4	21.6
16-Jul	12.1	11.1	10.9	10.2	9.5	10.5	11.8	15.8	18.3	20.3	22.1	23.3	24.2	25.0	25.3	24.9	24.5	24.5	23.8	22.6	20.3	18.7	18.2	17.4	18.6	25.3
17-Jul	16.4	15.3	15.1	14.2	14.0	14.6	15.8	17.5	18.2	18.0	18.1	18.1	16.8	15.4	15.7	16.1	16.4	16.5	16.5	16.2	15.9	15.7	15.4	14.7	16.1	18.2
18-Jul	14.6	14.6	14.5	14.5	14.6	14.8	15.4	16.7	18.7	20.3	22.0	23.3	24.3	25.6	26.2	25.9	26.5	26.6	25.1	23.3	21.1	19.9	18.7	17.6	20.2	26.6
19-Jul	15.7	14.8	14.2	13.1	12.5	13.5	14.9	17.0	19.0	21.4	22.8	24.1	24.6	25.6	26.5	25.5	20.0	20.2	21.6	21.5	19.9	17.5	15.6	14.4	19.0	26.5
20-Jul	13.4	13.0	12.3	11.6	11.1	11.7	13.0	15.6	18.7	20.5	22.4	24.4	25.8	26.5	26.4	26.8	26.4	27.0	26.3	23.8	21.9	20.9	19.5	17.8	19.9	27.0
21-Jul	16.7	15.6	15.0	14.1	13.6	13.8	15.4	17.6	19.5	22.0	24.3	26.3	26.9	27.7	27.9	28.7	28.8	28.5	28.5	25.6	22.8	20.6	18.9	17.6	21.5	28.8
22-Jul	16.4	15.7	14.8	14.6	13.8	14.0	15.5	17.3	19.5	21.1	22.6	23.7	24.8	25.1	25.5	25.6	25.0	23.6	23.0	22.1	20.8	19.9	18.5	17.2	20.0	25.6
23-Jul	15.7	14.0	13.0	12.3	11.8	12.3	13.9	15.5	17.6	19.1	20.4	23.0	25.1	26.6	27.4	27.8	28.4	25.5	25.8	25.0	22.1	20.7	19.3	17.4	20.0	28.4
24-Jul	16.2	15.2	14.6	13.3	12.6	13.4	15.8	17.9	20.7	23.6	26.0	27.2	27.9	28.6	29.3	30.0	30.1	29.0	28.2	25.4	22.4	21.0	20.1	19.1	22.0	30.1
25-Jul	19.0	18.8	18.9	18.7	17.3	17.4	17.5	17.9	17.8	17.4	16.8	17.0	16.7	17.0	17.8	18.3	18.1	18.1	18.1	17.8	17.4	16.0	14.9	14.0	17.4	19.0
26-Jul	13.4	12.4	11.6	11.0	10.4	10.7	11.6	12.7	14.4	15.9	17.3	18.8	19.3	20.1	20.5	20.2	19.6	18.9	17.9	17.1	16.9	16.0	15.5	14.8	15.7	20.5
27-Jul	14.0	12.7	11.7	10.4	10.5	10.5	11.3	12.1	13.3	15.1	17.6	19.7	20.7	21.0	20.8	19.1	16.5	19.1	19.9	19.0	16.8	14.7	13.3	12.3	15.5	21.0
28-Jul	11.6	10.5	9.5	9.6	9.5	9.6	10.8	13.5	16.2	19.3	21.7	23.1	23.6	23.6	24.0	23.6	23.7	23.8	22.7	21.3	19.1	16.9	16.4	14.0	17.4	24.0
29-Jul	13.3	12.3	12.6	10.7	10.1	11.1	12.9	15.1	17.5	20.3	22.6	23.7	24.4	25.1	25.3	25.6	25.8	25.5	25.1	23.6	20.0	17.5	15.9	15.6	18.8	25.8
30-Jul	14.8	13.4	12.1	11.0	10.0	10.6	13.9	16.5	18.8	21.1	23.5	25.4	26.9	28.1	28.8	29.3	30.1	29.4	27.5	25.2	21.8	17.7	17.1	16.8	20.4	30.1
31-Jul	16.5	16.6	16.0	15.8	15.8	16.0	16.2	16.6	18.2	19.7	21.0	19.9	22.4	23.9	24.6	22.3	21.0	17.9	17.9	17.7	16.7	16.4	15.8	15.6	18.4	24.6
																						Diurnal Average				
																						Diurnal Maximum				





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Waskow ohci Pimatisiwin - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	22	2.96	2.96
10 - 20	445	59.81	62.77
> 20	277	37.23	100.00

Total Number of Valid Hours: 744

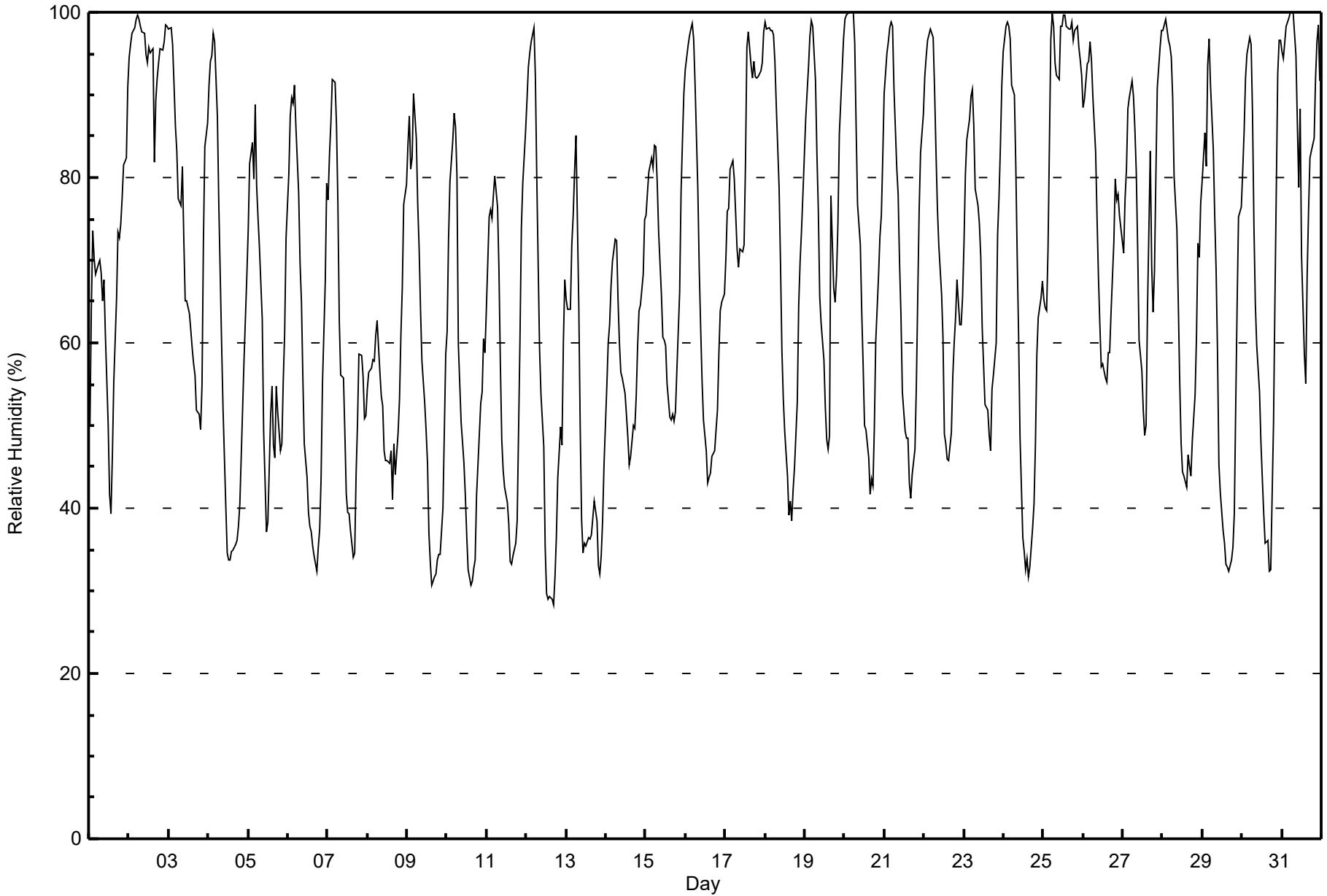
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Relative Humidity (RH) - %
Waskow ohci Pimatisiwin - July 2023

Maximum Value: 100.0 % on Jul 20 06:00																								Hours in Service: 744		
Maximum Daily Average: 95.6 % on Jul 2																								Hours of Data: 744		
Minimum Value: 28.3 % on Jul 12 17:00																								Hours of Missing Data: 0		
Minimum Daily Average: 49.0 % on Jul 13																								Hours of Calibration: 0		
Maximum Diurnal Average: 90.1 % at hour 5																								Percent Operational Time: 100.0		
Minimum Diurnal Average: 48.0 % at hour 16																										
Monthly Average: 67.72 %																										
Percentiles: P ₁ = 31.4 P ₁₀ = 38.4 Q ₁ = 49.6 Median = 67.7 Q ₃ = 86.7 P ₉₀ = 96.6 P ₉₉ = 99.8																										
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-Jul	50.1	64.2	73.6	70.1	68.2	69.6	70.0	68.4	65.1	67.6	61.0	50.2	41.6	39.3	46.2	55.3	65.5	73.4	72.7	74.4	77.6	81.6	82.4	91.0	65.8	91.0
2-Jul	94.6	96.1	97.5	98.2	99.2	99.6	99.2	98.3	97.6	97.4	95.0	93.9	95.7	95.2	95.5	81.9	89.3	92.1	93.9	95.6	95.4	96.4	98.5	98.3	95.6	99.6
3-Jul	98.0	98.1	96.1	91.4	86.2	83.3	77.5	76.5	81.4	72.5	65.2	65.1	63.6	61.6	59.2	57.5	56.1	51.8	51.4	49.4	54.9	72.2	83.7	86.7	72.5	98.1
4-Jul	91.3	94.0	94.7	97.4	96.5	87.3	76.6	68.3	59.9	52.1	40.3	34.6	33.7	33.8	34.7	34.9	35.5	36.1	37.7	40.5	46.3	58.0	63.0	68.1	59.0	97.4
5-Jul	73.8	81.7	84.3	79.8	88.8	78.9	75.0	71.6	62.8	49.3	43.3	37.1	38.2	51.3	54.7	47.7	46.2	54.7	51.7	47.0	47.8	55.4	61.3	72.8	60.6	88.8
6-Jul	80.6	87.5	89.6	89.0	91.1	86.3	78.2	69.7	64.9	55.7	47.8	43.8	39.5	37.8	37.1	35.4	34.3	32.3	35.3	37.5	43.6	55.0	67.4	79.3	59.1	91.1
7-Jul	77.3	82.7	86.7	91.9	91.6	86.4	76.9	62.7	56.1	55.8	48.9	41.6	39.5	39.3	37.3	34.1	34.6	44.0	50.1	58.7	58.5	55.9	50.8	51.1	58.9	91.9
8-Jul	54.4	56.5	57.0	57.9	57.9	60.9	62.7	56.4	53.6	52.3	46.9	45.8	45.8	45.5	46.9	41.0	47.9	44.0	49.2	53.2	61.0	66.7	76.7	79.2	55.0	79.2
9-Jul	84.0	87.5	81.0	82.3	90.2	84.7	76.8	71.5	64.1	57.9	52.8	49.4	45.4	37.0	33.4	30.7	31.7	32.1	33.8	34.5	34.3	40.0	49.4	58.7	56.0	90.2
10-Jul	61.4	72.5	79.6	84.5	87.8	86.1	80.4	59.9	50.3	48.0	45.5	41.5	36.7	32.5	30.6	31.2	32.8	33.7	41.6	49.0	52.8	54.0	60.5	58.8	54.6	87.8
11-Jul	64.1	75.2	76.1	75.1	77.9	80.2	76.4	68.9	57.5	48.3	44.6	42.5	40.6	38.1	33.5	33.2	34.2	35.7	38.5	49.4	60.3	73.9	79.2	85.5	57.9	85.5
12-Jul	89.4	93.4	95.0	96.5	98.2	92.2	80.0	69.5	59.2	53.7	47.5	35.2	29.6	29.0	29.4	29.0	28.3	31.7	36.6	43.7	49.9	47.6	60.1	67.6	58.0	98.2
13-Jul	65.2	64.1	64.1	71.9	75.4	80.9	85.1	64.4	49.8	38.7	34.6	35.8	35.4	36.4	36.3	36.8	38.9	40.8	38.4	33.0	32.0	34.3	38.5	45.3	49.0	85.1
14-Jul	54.7	60.0	62.2	66.8	69.9	72.5	72.4	65.3	60.0	56.5	55.7	53.8	51.4	48.7	45.2	46.3	50.0	49.6	53.6	59.6	63.9	64.6	68.2	75.0	59.4	75.0
15-Jul	75.4	78.1	80.7	82.3	81.2	83.9	83.8	79.3	73.4	65.8	60.7	60.3	59.6	55.0	51.1	50.7	51.4	50.5	51.7	56.6	66.2	78.2	84.4	90.1	68.8	90.1
16-Jul	93.0	96.0	97.1	98.0	98.6	96.8	91.4	78.5	68.8	61.8	55.4	50.6	47.0	43.1	43.7	44.2	46.2	46.9	49.6	51.9	58.7	64.0	64.9	66.0	67.2	98.6
17-Jul	70.2	76.0	76.2	81.0	82.1	79.8	75.6	71.4	69.2	71.4	71.1	71.8	81.6	95.7	97.7	93.5	92.1	94.1	92.2	92.0	92.3	92.9	93.9	97.6	83.8	97.7
18-Jul	98.9	98.0	98.1	97.9	97.9	97.3	94.0	88.6	78.9	69.7	59.2	53.3	49.3	43.8	39.2	40.8	38.5	42.2	45.0	52.9	64.6	69.9	73.6	78.0	69.6	98.9
19-Jul	87.0	90.3	93.3	97.1	99.0	98.3	91.6	82.8	76.1	65.7	62.4	58.0	52.1	48.4	47.1	48.9	77.8	66.6	64.9	68.1	74.5	85.2	92.9	96.8	76.0	99.0
20-Jul	99.1	99.7	99.8	100.0	100.0	100.0	96.2	86.2	76.7	71.9	63.7	57.2	49.9	49.5	46.0	41.8	43.6	42.7	49.7	60.2	68.1	72.8	75.4	82.3	72.2	100.0
21-Jul	90.2	95.0	96.5	98.1	98.8	98.3	90.9	81.2	78.0	69.7	63.4	54.1	49.3	48.5	48.5	43.0	41.3	44.1	47.1	54.9	65.8	76.1	83.0	87.6	71.0	98.8
22-Jul	92.1	94.6	96.7	97.2	97.9	97.0	90.6	83.1	76.5	71.9	65.9	60.8	49.0	47.8	46.0	45.7	49.1	56.0	60.1	63.0	67.7	62.2	62.3	65.5	70.8	97.9
23-Jul	72.1	80.3	84.6	87.2	89.9	90.7	86.3	78.6	76.5	74.4	70.4	61.8	57.3	52.6	51.8	48.8	47.0	54.3	56.2	60.0	73.0	77.7	83.7	91.1	71.1	91.1
24-Jul	95.2	98.3	98.9	98.4	96.7	91.2	90.0	81.4	70.4	60.9	48.7	36.4	34.7	32.5	33.9	31.6	32.8	37.7	40.5	47.7	58.5	63.0	65.4	67.4	63.0	98.9
25-Jul	65.2	64.3	63.9	71.3	96.8	99.9	98.2	93.9	92.3	91.8	98.4	98.3	99.6	99.7	98.3	98.0	97.9	98.7	96.7	97.8	98.3	95.8	94.2	92.4	91.7	99.9
26-Jul	88.5	89.6	93.7	94.1	96.5	94.2	89.8	83.1	75.1	68.0	62.2	57.0	57.5	55.8	55.3	58.8	58.7	63.7	72.2	79.9	77.2	78.0	75.4	73.9	74.9	96.5
27-Jul	70.8	77.5	81.0	88.3	89.7	91.7	89.9	85.9	80.8	71.4	60.3	56.7	51.9	48.8	49.9	63.9	83.2	69.3	63.8	68.7	80.2	90.8	95.8	97.8	75.3	97.8
28-Jul	97.8	98.5	99.1	96.6	95.9	94.6	89.7	80.2	73.7	64.9	55.4	48.0	44.4	43.9	42.5	46.4	45.0	43.9	48.2	53.6	60.8	72.1	70.4	77.0	68.4	99.1
29-Jul	79.5	85.4	81.4	93.6	96.7	91.2	83.4	75.4	68.8	58.7	45.2	41.9	37.3	35.8	33.2	32.8	32.3	33.7	35.3	39.4	52.4	64.6	75.3	76.5	60.4	96.7
30-Jul	80.9	85.6	92.1	95.0	96.9	96.2	87.6	74.2	64.7	59.6	54.1	48.0	43.5	39.3	35.7	36.2	32.4	32.6	41.5	50.4	65.3	92.6	96.5	96.5	66.6	96.9
31-Jul	95.3	94.4	98.3	98.8	99.4	99.9	100.0	100.0	94.8	86.7	78.7	88.3	70.5	58.6	55.0	68.1	75.9	82.4	83.2	84.8	92.1	96.5	98.5	91.7	87.2	100.0
	80.3	84.4	86.1	88.0	90.1	88.7	84.4	76.6	70.2	64.2	58.2	54.0	50.7	49.2	48.2	48.0	50.7	52.0	54.3	58.3	64.3	70.6	75.0	78.9		Diurnal Average
	99.1	99.7	99.8	100.0	100.0	100.0	100.0	100.0	97.6	97.4	98.4	98.3	99.6	99.7	98.3	98.0	97.9	98.7	96.7	97.8	98.3	96.5	98.5	98.3		Diurnal Maximum





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Waskow ohci Pimatisiwin - July 2023**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	88	11.83	11.83
40 - 60	207	27.82	39.65
60 - 80	201	27.02	66.67
80 - 100	245	32.93	99.60

Total Number of Valid Hours: 744

Total Number of Hours: 744

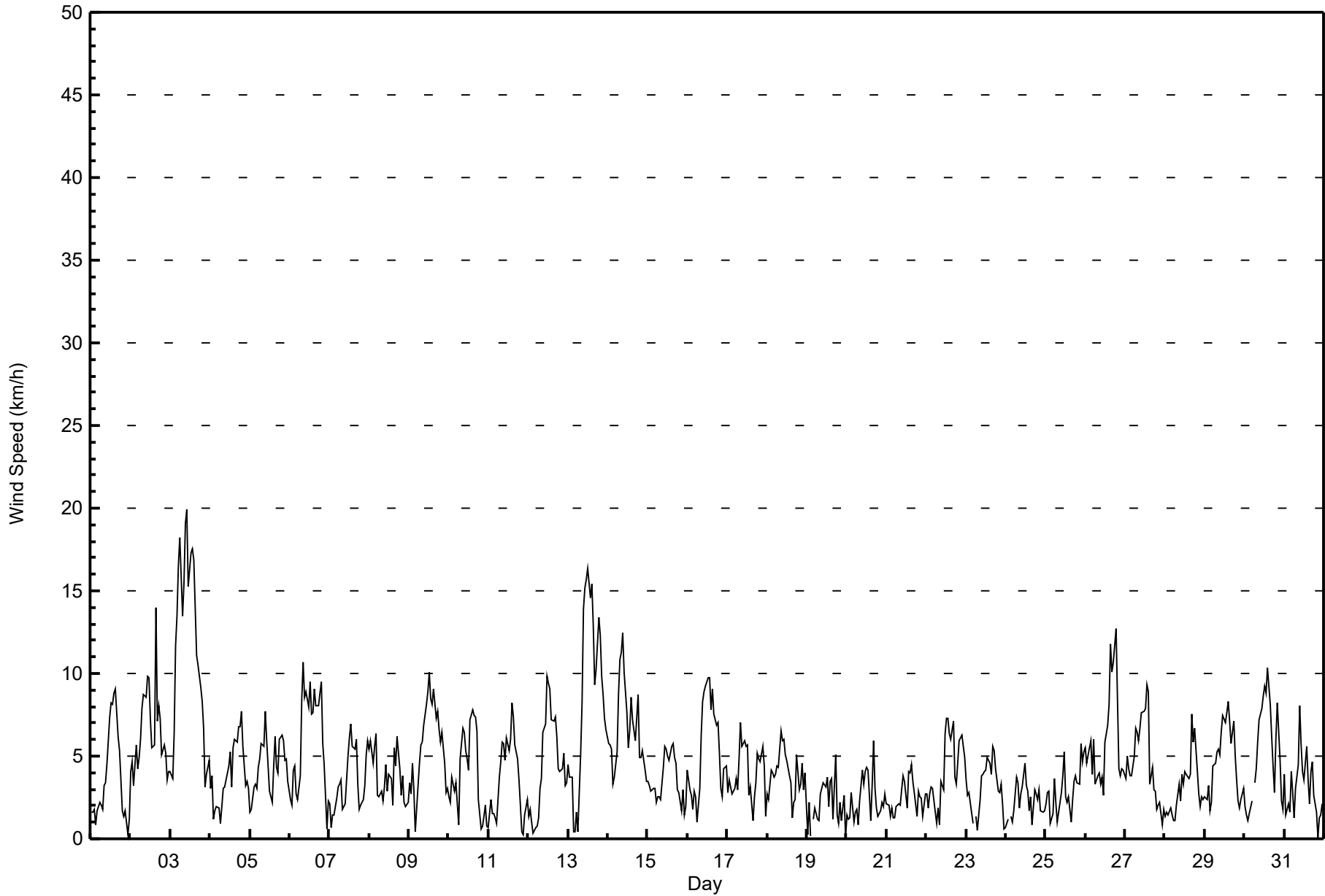


Maximum Speed: 20 km/h on Jul 3 11:00	Maximum Daily Speed Average: 11.4 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 31 21:00	Minimum Daily Speed Average: 0.6 km/h on Jul 19	Hours of Data: 740
Maximum Diurnal Speed Average: 2.1 km/h at hour 19	Minimum Diurnal Speed Average: 0.4 km/h at hour 8	Hours of Missing Data: 4
Monthly Average Velocity: 0.9 km/h 334.8 deg	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 6 P ₉₀ = 8 P ₉₉ = 16	Percent Operational Time: 99.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	WNW2	S2	SW2	W1	SE2	SSE2	SSW2	S2	SE3	SSE3	SE4	SSE7	SE8	SSE8	SSE9	S9	SW6	WNW5	WNW4	SSW2	NW1	SW2	ENE0	WSW1	S2.4	S9
2-Jul	WNW4	W5	WSW3	WSW6	SW4	W5	WNW6	NW8	NW9	WNW9	NW10	NW10	WNW7	W6	WNW6	NW14	NW7	WNW8	WNW7	W5	WNW6	WNW5	WNW4	WNW4	WNW6.1	NW14
3-Jul	WNW4	WNW4	WNW6	NNW12	NNW14	NNW17	N18	N13	NNW15	NNW19	NNW20	NNW15	NNW17	NNW18	NNW17	NNW14	NNW11	NNW10	NNW9	NNW8	NNW7	NW3	WNW4	WNW5	NNW11.4	NNW20
4-Jul	WNW3	WNW4	WSW1	W2	W2	W2	NNW1	ESE2	E3	ESE3	E4	E4	SE5	SE3	ESE5	SE6	SE6	SE7	SE7	SSE8	SSE6	SSE3	SSE3	S3	SE2.6	SSE8
5-Jul	SSW2	SSE2	SSE3	SSE3	SE3	SSE4	SSE5	SSE6	SSE6	SW8	W6	SSW4	WSW3	SW2	SSW4	S6	SSW4	WSW4	NW6	NW6	NNW5	WNW5	WNW3	SW2.0	SW8	
6-Jul	NW2	WNW2	WNW4	WNW4	WSW3	NW2	N4	N8	NNW11	N9	NNE9	N8	N9	N8	N8	NNE9	NNE8	NNE8	N9	NNW10	NNW6	NW4	WSW1	WSW2	N5.3	NNW11
7-Jul	SW2	WSW1	SSE1	S1	SSE2	SSE3	SSE3	SSW4	S2	E2	SE4	SE5	SE6	SSE7	S6	SSW5	SSW6	S3	S2	SSE2	SW2	SW3	WSW5	W6	S2.7	SSE7
8-Jul	W5	WSW6	W5	WSW6	WSW6	SW3	SE3	SSW3	SSW2	SW3	WNW5	N3	ESE4	SSE4	E2	NNW6	N4	N6	NNE4	N3	NW4	NW2	W2	NW2	WNW1.6	WSW6
9-Jul	WNW3	NW3	NNW5	NNW3	WNW0	NNW3	N5	N6	N6	N7	NNE8	N9	N10	NNE9	NNE8	NNE9	NE7	NNE8	NNE7	NNE6	NNE6	NNE5	N3	NW3	N5.3	N10
10-Jul	NNW3	WNW2	NW4	WNW3	WNW3	NNW2	NNW1	SE5	SE7	SE6	SE5	SSE5	S4	SSE7	SSE8	SSE7	SSE7	SSE7	ESE2	ENE1	SW1	ESE1	E2	NE1	SSE2.3	SSE8
11-Jul	ENE1	W2	NW2	WSW2	W1	S1	SSE4	SE5	SE6	S6	SSE5	S6	S5	S6	S8	S7	S6	SSE5	S4	SSW2	SW0	WSW0	NW1	W2	S2.9	S8
12-Jul	SSW1	W2	SW1	NNE0	W1	SW1	NNW1	N3	N4	NNW6	N7	NNW10	NNW9	N9	N7	NNW7	NNW7	N6	N4	NNW4	NW4	NNW5	NW3	WNW3	NNW4.1	NNW10
13-Jul	WNW4	WNW4	NW4	SSW0	WNW0	SE2	NE0	NW5	NNW8	NNW14	NNW15	NNW16	NNW16	NNW15	NNW15	NNW13	N9	N10	N13	NNW12	NW10	NW9	NW7	NNW7	NNW8.3	NNW16
14-Jul	NW6	NW6	NW5	NW3	NW4	NW5	NNW9	NNW11	NNW11	NNW12	NNW10	N8	N6	N7	N9	NNE7	NNE6	N7	NNW9	NW5	NW5	NW5	NW4	WNW3	NNW6.3	NNW12
15-Jul	NW3	WNW3	W3	WNW3	WNW3	NW2	W3	WNW3	NNW2	NNE4	NNE6	NNE5	NNE5	NE5	NE6	NNE6	NE5	NNE5	NE3	NE3	N2	W3	W1	W2	N2.2	NNE6
16-Jul	W4	WSW3	W3	W2	W3	WSW3	WNW1	SE3	SE6	SSE8	SSE9	SSE9	SSE10	SE10	SE8	SE9	SE8	SE7	SSE7	SE5	ESE3	ESE3	ESE4	SE4	SSE4.3	SE10
17-Jul	SE3	SE4	ESE3	ESE3	SE3	SE4	ESE3	SE5	SSE7	ESE6	SE6	ESE6	SE6	SE3	E3	SSE1	W3	N3	NNW5	NW5	NNW6	NNW6	NNW4	NW1	ESE1.6	SSE7
18-Jul	WNW3	NW2	NW4	NNW4	NW4	NW4	NNW4	NNW4	NNW7	N6	N6	NNW5	NNW5	NW4	W3	W1	W2	N2	NNW5	NW3	W3	W5	NW3	WNW4	NW3.4	NNW7
19-Jul	NNW0	SSE2	NE0	UO	SW1	S2	S1	SE1	SE3	SSE3	E3	SE3	SW4	NE2	E3	SE4	WSW1	W5	NW1	E1	WNW2	WNW1	NW3	E0	SSE0.6	W5
20-Jul	WSW1	W1	WSW1	W3	S1	SSW2	SSE2	NNE1	ENE2	N4	NE3	E4	E4	E4	N1	WNW3	NW6	N3	NE2	N1	NW2	SW2	NW2	NW3	N0.7	NW6
21-Jul	W2	W2	WNW1	W2	NW1	S1	SSE2	SSE2	SSE2	SE3	ESE4	E3	S2	E4	ESE4	SSE4	SSW4	SSE3	NE1	N3	NNW3	W2	W1	WNW3	SSE0.7	SSE4
22-Jul	WNW3	WSW2	WNW3	W3	W3	W2	WNW1	NNW2	NNW1	N3	N3	N6	NNE7	N7	N6	NNE6	N7	NNW4	NW3	NNW5	NNW6	NNW6	NNW6	NW5	NNW3.5	NNE7
23-Jul	WNW4	WNW3	WNW3	W2	WSW1	UO	WNW1	SSE1	ESE2	SE4	SE4	SSE4	E4	SSE5	SE5	SE4	SE6	N5	SE4	SE3	SSE3	SSE3	SSW2	WSW1	SSE1.5	SE6
24-Jul	W1	WSW1	UO	SSW1	SSW1	S2	SE4	SSE3	ESE2	E3	SE3	SSE5	SSE3	S3	ESE2	NW3	ESE1	SE3	NE3	N2	NW3	NNW2	NNW2	WSW2	SE0.8	SSE5
25-Jul	NW2	NW3	WSW3	SW1	ESE2	NNE4	ENE2	WSW1	NW2	WNW3	NNW4	NNW5	WNW3	NNW2	NNE3	NE1	NNE2	NNW3	NNW4	NW3	W3	SW6	S5	SSE5	NW1.3	SW6
26-Jul	S6	SSE5	SSE6	SSE6	SSE4	SSE6	SE3	SE4	ESE4	ESE3	ESE4	NE3	N6	N7	N8	N12	N10	N11	N13	N8	NE4	NE4	NE4	NE4	NE2.6	N13
27-Jul	NE4	NNE5	NNE4	N4	NNW4	NNW5	NNW7	NNW6	NNW6	NNW7	NNW8	NNE8	NNE8	N9	N9	NNE3	S4	SW3	WNW3	SW2	SSW2	S2	W1	WNW2	N3.4	N9
28-Jul	NW1	W2	WSW1	WSW2	WSW1	W1	W1	S2	SE3	E2	ESE4	E3	E4	ESE4	E4	ESE4	SE8	SSE6	SSE7	SSE4	SE3	SSE2	S3	SSE2	SE2.1	SE8
29-Jul	S3	SSE2	S3	SSE2	S2	SSE4	SSE5	SSE5	SSE5	SSE5	SW6	SSW7	S7	S8	S8	S7	S6	S7	S5	S4	SSE2	SE2	SE2	SSE3	S4.5	S8
30-Jul	ESE2	S1	W1	W1	WSW2	UO	SE3	SE4	SE6	SE7	SE8	SE9	SE9	SE9	SSE10	SSE8	S6	SSW4	SSW3	SSW6	SSW8	SE5	SE2	WSW2	SSE4.4	SSE10
31-Jul	WSW4	WSW1	NW2	SSW2	SSE4	SSE3	SE1	SSW3	S5	SE8	SSE6	S4	SW4	WSW6	NW4	NNW2	NNW4	NNW5	WSW3	S2	S0	WSW1	S1	SSW2	SSW1.4	SE8

WNW1.7	W1.5	WNW1.6	W1.5	W1.1	W0.7	NNW0.6	NNW0.4	NE0.9	NNE1.3	NNE1.8	NNE1.5	NNE1.2	NE1.2	NE1.5	NNE1.0	N0.6	N1.7	NNW2.1	NNW1.6	NW1.7	WNW1.3	WNW1.1	NNW1.5	Diurnal Average
NW6	WSW6	NW6	NNW12	NNW14	NNW17	N18	N13	NNW15	NNW19	NNW20	NNW16	NNW17	NNW18	NNW17	NNW14	NNW11	N11	N13	NNW12	NW10	NW9	NW7	NNW7	Diurnal Maximum

UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Waskow ohci Pimatisiwin - July 2023

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	513	69.32	69.32
6 - 11	201	27.16	96.49
12 - 19	25	3.38	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: 740

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Waskow ohci Pimatisiwin - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	22	14	18	6	22	28	45	53	34	26	18	33	50	53	53	38	513
6 - 11	36	22	2	0	0	2	26	27	17	4	4	5	3	7	15	31	201
12 - 19	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1	19	25
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	63	36	20	6	22	30	71	80	51	30	22	38	53	60	69	89	740

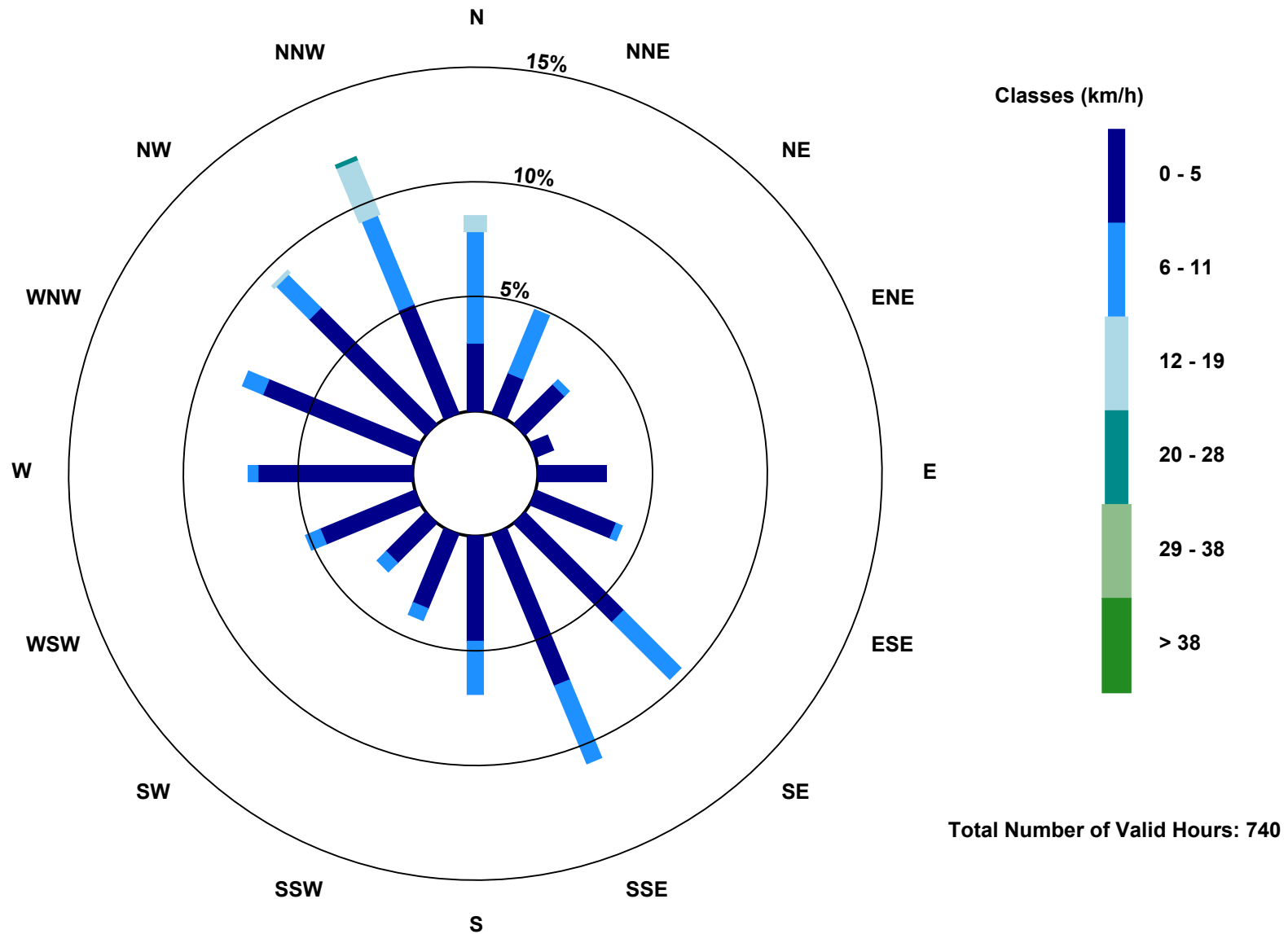
Total Number of Valid Hours: 740

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Waskow ohci Pimatisiwin





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Waskow ohci Pimatisiwin - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Jul 3 07:00														Hours in Service: 744 Hours of Data: 740 Hours of Missing Data: 4 Hours of Calibration: 0 Percent Operational Time: 99.5											
Minimum Value: 0 km/h on Jul 24 21:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 5																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Jul	2	1	1	1	1	1	1	1	1	1	2	2	3	3	3	4	3	3	2	1	1	1	1	1	4
2-Jul	2	1	2	2	2	2	2	2	2	3	3	4	3	2	2	4	4	3	3	2	2	2	1	1	4
3-Jul	1	1	4	4	5	5	7	5	5	6	6	5	5	5	6	5	4	3	3	2	2	1	1	1	7
4-Jul	1	1	1	1	1	1	1	1	1	2	1	2	2	2	2	3	2	2	2	2	3	1	1	1	3
5-Jul	2	1	1	1	1	1	1	2	2	3	3	2	2	2	2	2	2	3	2	2	1	1	1	1	3
6-Jul	1	1	1	1	1	1	3	3	3	4	3	4	4	4	3	4	3	3	3	3	2	1	2	1	4
7-Jul	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3	3	3	2	1	1	1	2	2	3	3
8-Jul	2	3	2	2	3	2	1	2	1	2	2	2	2	2	2	4	2	2	1	1	1	1	1	2	4
9-Jul	1	2	1	2	1	1	1	2	2	3	3	4	4	4	3	4	3	3	3	2	2	2	1	1	4
10-Jul	1	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	2	2	1	1	1	1	1	3
11-Jul	1	1	1	1	1	1	2	2	2	2	2	3	3	2	3	2	2	2	1	1	1	1	1	1	3
12-Jul	1	1	1	1	1	1	1	2	2	2	3	3	3	4	3	3	3	2	1	1	1	2	1	1	4
13-Jul	1	1	1	1	1	1	1	2	3	5	5	5	5	5	6	5	3	4	5	4	3	2	2	2	6
14-Jul	1	1	1	1	1	1	3	4	4	4	4	4	4	2	3	3	3	3	3	1	2	1	1	1	4
15-Jul	1	1	1	1	1	1	0	1	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2
16-Jul	1	1	1	1	1	1	1	1	2	3	3	4	4	4	3	3	3	3	3	2	1	1	2	2	4
17-Jul	1	1	1	1	1	2	1	2	3	2	2	3	3	1	1	1	1	1	2	2	1	2	2	1	3
18-Jul	1	1	1	2	1	1	1	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	1	2
19-Jul	1	1	1	UO	1	1	1	1	1	1	1	2	2	1	1	3	3	3	1	1	1	1	1	1	3
20-Jul	1	1	2	1	1	1	1	1	1	2	2	1	1	1	2	3	2	2	1	2	1	1	1	1	3
21-Jul	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	2	1	1	1	0	1	1	2	2
22-Jul	1	1	1	1	1	1	1	2	1	2	1	2	2	3	2	2	2	2	1	1	1	1	2	1	3
23-Jul	1	1	1	1	1	UO	1	1	1	1	1	2	2	2	2	2	2	3	2	1	1	1	1	1	3
24-Jul	1	1	UO	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	0	1	1	1	2
25-Jul	1	1	2	1	1	2	2	1	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2
26-Jul	2	2	2	2	1	2	2	2	2	2	2	2	3	3	3	4	4	4	4	3	2	1	2	2	4
27-Jul	1	2	1	1	1	1	2	2	2	2	3	3	3	4	5	3	2	2	2	1	1	1	1	2	5
28-Jul	1	1	1	1	1	1	1	1	1	1	1	2	2	1	2	2	3	2	3	1	1	1	1	1	3
29-Jul	1	1	2	1	1	1	1	2	2	2	3	3	4	3	3	3	3	3	2	1	1	1	1	1	4
30-Jul	1	1	1	1	1	UO	2	2	2	2	3	3	4	4	4	3	3	2	1	3	5	2	1	1	5
31-Jul	3	2	1	1	1	1	1	1	2	3	3	2	3	3	3	2	6	2	1	1	1	2	1	1	6
														Diurnal Maximum											
UO - Unstable Operation																									



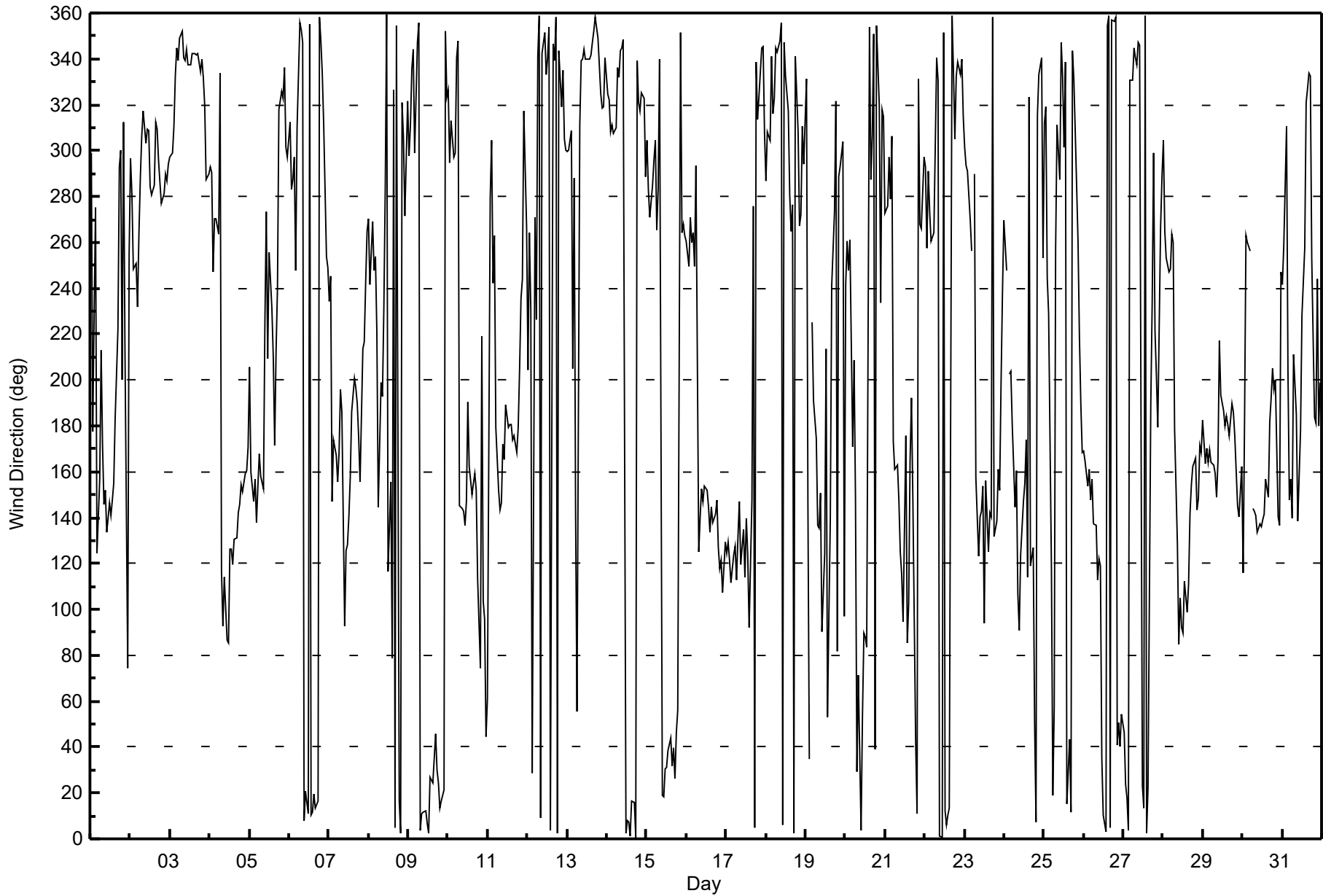
Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Waskow ohci Pimatisiwin - July 2023

Direction of Maximum Speed: 344 deg on Jul 3 11:00																							Hours in Service:	744	
Direction of Maximum Daily Speed Average: 337.8 deg on Jul 3																							Hours of Data:	740	
Direction of Minimum Speed: 181 deg on Jul 31 21:00											Direction of Minimum Daily Speed Average: 0.6 deg on Jul 19												Hours of Missing Data:	4	
Monthly Average Direction: 334.8 deg																							Percent Operational Time:	99.5	
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	299	178	229	275	125	157	213	172	146	152	133	147	141	148	155	183	222	293	300	200	313	215	74	255	174.4
2-Jul	297	281	248	251	232	264	288	307	317	303	309	309	285	281	285	312	309	296	286	277	282	290	287	294	292.6
3-Jul	297	299	311	333	345	340	349	352	340	339	344	338	337	343	342	342	343	334	340	332	320	287	290	337.8	
4-Jul	293	291	247	271	271	263	334	117	93	114	87	85	126	126	119	130	131	142	146	155	151	159	161	171	139.4
5-Jul	206	160	147	157	138	154	168	158	153	225	274	209	255	231	210	171	213	240	318	326	323	336	301	297	224.0
6-Jul	312	283	288	297	248	310	356	353	347	8	21	11	355	11	11	20	14	16	358	348	334	312	254	249	353.0
7-Jul	234	245	147	174	167	156	168	196	186	93	126	128	140	157	186	201	196	190	175	156	214	216	242	265	181.7
8-Jul	270	242	269	248	254	221	145	199	193	231	284	360	116	155	79	327	5	354	17	3	321	306	271	322	284.1
9-Jul	298	311	335	344	299	347	356	4	11	11	12	6	2	27	26	24	46	30	24	13	16	22	352	323	10.0
10-Jul	327	295	313	297	299	340	348	145	144	143	137	147	190	162	150	155	159	152	114	75	219	104	96	45	153.6
11-Jul	61	279	304	242	263	180	152	143	146	172	165	189	180	181	181	174	176	168	179	205	236	244	317	267	179.6
12-Jul	204	264	231	29	271	227	341	359	9	343	352	333	341	354	4	347	339	358	3	344	319	335	305	300	341.4
13-Jul	300	300	309	205	288	143	56	311	339	340	344	340	340	340	342	347	352	358	349	337	324	319	319	341	337.7
14-Jul	325	322	308	311	308	310	336	332	343	344	348	2	8	7	1	17	16	1	339	321	317	325	323	289	340.6
15-Jul	305	283	271	285	296	304	265	283	340	19	18	30	31	38	44	32	40	27	46	56	351	264	268	263	359.0
16-Jul	261	250	271	260	264	250	294	125	141	152	147	154	152	145	134	144	138	142	148	127	118	121	107	130	149.3
17-Jul	124	129	121	112	124	127	113	131	147	120	135	114	140	124	92	147	276	5	339	313	323	345	345	308	106.7
18-Jul	287	308	304	341	316	323	345	343	348	356	6	347	333	317	280	265	277	2	341	308	267	272	310	294	324.0
19-Jul	331	147	35	UO	225	191	174	137	135	151	90	124	214	53	98	139	241	273	321	82	288	293	304	97	163.6
20-Jul	241	260	248	261	171	208	148	29	71	4	54	90	88	84	354	287	307	351	39	354	320	234	318	315	355.4
21-Jul	273	276	297	279	306	173	161	163	148	125	115	94	176	85	103	165	192	148	42	11	331	268	266	297	151.4
22-Jul	293	257	291	273	260	264	302	340	331	1	1	351	12	6	10	14	359	334	305	333	339	333	340	315	339.8
23-Jul	301	293	291	270	256	UO	290	157	123	141	143	154	94	156	125	142	141	358	132	138	161	152	198	237	147.5
24-Jul	269	248	UO	203	204	181	145	160	107	91	124	147	155	174	114	323	119	127	50	7	316	333	341	253	139.4
25-Jul	312	319	245	229	118	19	58	258	311	288	347	332	302	339	15	43	12	344	331	308	261	219	190	168	307.9
26-Jul	169	165	154	161	148	157	137	137	113	122	119	36	10	3	355	359	5	357	357	358	41	51	40	54	38.9
27-Jul	46	24	18	3	331	331	345	341	338	347	346	23	13	359	2	22	190	234	299	221	202	180	267	289	351.9
28-Jul	304	265	253	247	248	263	260	179	128	85	105	92	90	112	99	111	142	155	162	166	143	148	171	168	142.0
29-Jul	182	163	170	164	169	164	163	159	149	164	217	194	187	180	184	180	175	190	186	175	160	145	140	162	176.4
30-Jul	116	183	263	260	256	UO	144	143	141	133	137	136	139	142	157	149	182	192	205	196	200	140	137	247	158.2
31-Jul	242	258	311	204	148	157	140	211	185	139	158	178	228	257	321	327	334	333	253	183	181	244	180	199	210.7
282.5	273.5	282.1	276.5	266.7	273.9	344.5	346.4	43.3	21.3	24.4	32.5	25.9	40.2	41.5	22.7	0.7	350.4	346.4	335.5	311.3	300.8	299.0	281.3		
Diurnal Average																									
UO - Unstable Operation																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Waskow ohci Pimatisiwin - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 110 deg on Jul 20 15:00	Hours of Data: 740
Minimum Value: 10 deg on Jul 8 21:00	Hours of Missing Data: 4
Percentiles: P ₁ = 13 P ₁₀ = 22 Q ₁ = 28 Median = 38 Q ₃ = 56 P ₉₀ = 75 P ₉₉ = 96	Hours of Calibration: 0
	Percent Operational Time: 99.5

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	76	59	65	101	53	26	53	57	31	32	36	27	32	29	25	45	51	42	43	85	79	64	93	87	101
2-Jul	59	37	59	43	51	45	38	27	21	26	23	25	39	52	41	20	23	34	32	50	42	36	46	42	59
3-Jul	25	30	29	26	23	21	23	27	23	23	23	22	23	23	25	26	23	22	19	23	18	14	14	11	30
4-Jul	16	12	53	29	53	67	75	51	46	62	41	36	44	76	42	35	40	35	27	21	31	22	25	29	76
5-Jul	84	63	22	23	19	19	26	25	38	55	65	68	69	88	51	38	56	57	37	18	13	18	20	25	88
6-Jul	31	39	30	12	21	30	58	31	24	35	38	40	36	46	43	37	39	34	28	26	21	11	94	23	94
7-Jul	65	100	61	71	19	17	32	50	81	52	48	38	39	45	54	61	49	70	70	23	45	46	45	49	100
8-Jul	45	49	65	56	55	79	42	74	84	64	48	72	43	51	80	73	31	26	29	33	10	30	48	34	84
9-Jul	47	32	20	38	90	21	25	29	40	40	38	39	37	41	39	40	36	34	32	27	28	31	41	30	90
10-Jul	30	54	27	35	30	39	81	35	35	37	44	49	72	38	36	33	29	24	50	63	71	43	35	33	81
11-Jul	69	50	55	46	38	63	23	31	37	47	46	51	52	44	37	34	35	33	29	31	85	92	62	33	92
12-Jul	81	63	95	82	83	84	78	41	46	34	38	29	28	37	43	43	37	30	34	20	22	20	20	16	95
13-Jul	15	17	25	92	92	56	67	24	27	25	24	28	26	25	24	24	27	29	25	22	20	18	16	16	92
14-Jul	17	13	18	36	37	20	22	23	28	27	27	37	38	36	35	38	34	32	22	20	19	17	21	18	38
15-Jul	22	25	21	33	28	23	25	40	65	48	42	48	48	52	46	45	48	41	45	37	59	12	35	36	65
16-Jul	11	32	32	32	21	41	75	41	28	33	32	35	35	32	37	30	36	38	31	40	35	33	41	39	75
17-Jul	36	29	35	33	27	41	43	39	30	38	37	34	36	48	32	86	44	38	26	24	18	18	31	47	86
18-Jul	27	35	20	45	22	21	31	29	26	31	36	49	57	70	63	88	77	54	17	32	36	33	58	30	88
19-Jul	91	33	92	UO	66	51	88	84	53	55	42	63	56	74	46	62	100	60	92	88	66	88	41	88	100
20-Jul	70	99	82	28	50	52	62	84	57	48	61	38	34	40	110	90	37	72	25	28	43	51	68	26	110
21-Jul	53	18	74	60	63	59	26	58	83	58	38	41	89	28	39	63	52	40	29	25	23	22	71	31	89
22-Jul	31	37	31	22	16	62	73	62	95	58	66	27	32	29	33	28	28	29	25	19	16	19	18	18	95
23-Jul	22	26	25	67	76	UO	79	97	49	39	44	49	37	51	45	66	46	48	45	32	22	29	52	87	97
24-Jul	75	75	UO	81	82	58	32	40	72	50	41	32	44	39	70	93	98	45	50	50	15	47	71	65	98
25-Jul	57	26	69	102	70	53	71	94	75	74	45	40	76	76	48	56	34	29	22	45	56	46	52	34	102
26-Jul	34	30	24	26	27	23	52	39	40	72	61	78	59	34	30	27	29	26	24	26	45	32	32	33	78
27-Jul	37	30	22	20	34	19	19	19	24	26	32	44	43	37	37	87	37	69	82	66	47	66	84	76	87
28-Jul	89	76	76	66	63	72	91	73	44	54	36	60	40	46	42	44	35	34	26	26	27	37	35	19	91
29-Jul	50	42	34	29	28	26	24	26	36	54	58	47	58	51	43	49	60	43	45	25	30	29	32	43	60
30-Jul	26	57	51	30	15	UO	25	36	32	30	33	35	34	38	39	45	49	39	32	44	53	33	58	67	67
31-Jul	57	88	55	69	21	52	68	56	46	32	54	42	71	64	92	82	72	58	48	55	82	72	77	73	92
	91	100	95	102	92	84	91	97	95	74	66	78	89	88	110	93	100	72	92	88	85	92	94	88	
	Diurnal Maximum																								

UO - Unstable Operation



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS26 CHRISTINA LAKE JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CHRISTINA LAKE (AMS26)
 JULY 2023

MONTHLY SUMMARY

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	99.6	27.9	0	4.1	0
H2S (ppb) Average	705	36	39	99.6	3.8	0	0.7	0
NO2 (ppb) Average	681	39	63	96.77	16.9	0	5.4	-
NO (ppb) Average	681	39	63	96.77	11.7	-	1.9	-
NOX (ppb) Average	681	39	63	96.77	26.3	-	6.6	-
Temperature 2 m (C) Average	744	0	0	100	28.8	-	22.4	-
Relative Humidity (%) Average	744	0	0	100	98.2	-	88.1	-
Wind Speed 10 m (km/h) Average	744	0	0	100	29	-	17	-
Wind Direction 10 m (deg) Average	744	0	0	100	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CHRISTINA LAKE (AMS26)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	706	0.91	2.2	-	0	0	0.1	0.3	0.7	2.1	27.9
H2S (ppb) Average	705	0.27	0.3	-	0	0	0.1	0.2	0.4	0.6	3.8
NO2 (ppb) Average	681	1.95	1.7	-	0.1	0.6	0.9	1.5	2.3	3.7	16.9
NO (ppb) Average	681	0.62	1.2	-	0	0	0.1	0.2	0.6	1.5	11.7
NOX (ppb) Average	681	2.57	2.7	-	0.1	0.7	1.1	1.7	2.9	5.5	26.3
Temperature 2 m (C) Average	744	17.24	4.9	-	5.5	11.3	13.7	16.7	21.1	24.2	28.8
Relative Humidity (%) Average	744	66.69	19.5	-	25.7	39.6	48.9	68	84.1	92.4	98.2
Wind Speed 10 m (km/h) Average	744	9.6	5	-	0	4	6	9	13	16	29
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CHRISTINA LAKE (AMS26)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S, SO2	20 Jul 2023 14:00	20 Jul 2023 16:00	3	Maintenance - WBEA internal audit
NO2	20 Jul 2023 13:00	20 Jul 2023 16:00	4	Maintenance - WBEA internal audit
NO2	12 Jul 2023 17:00	13 Jul 2023 12:00	20	Maintenance - stabilization post maintenance



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Christina Lake - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 27.9 ppb on Jul 14 06:00	Maximum Daily Average: 4.1 ppb on Jul 14		Hours of Data:	706
Minimum Value: 0.0 ppb on Jul 7 01:00	Minimum Daily Average: 0.1 ppb on Jul 10		Hours of Missing Data:	38
Maximum Diurnal Average: 1.7 ppb at hour 6	Minimum Diurnal Average: 0.4 ppb at hour 24		Hours of Calibration:	35
Monthly Average: 0.91 ppb	Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.3 Q ₃ = 0.7 P ₉₀ = 2.1 P ₉₉ = 10.7		Percent Operational Time:	99.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.4	0.9	Z	0.2	0.6	0.4	1.9	1.7	0.2	0.5	0.6	0.2	0.2	0.2	0.5	0.9	0.3	6.1	2.8	0.6	0.1	0.3	0.5	0.4	0.9	6.1
2-Jul	0.2	0.1	0.4	Z	0.9	0.6	0.1	0.2	0.2	0.1	0.4	0.4	0.2	0.2	4.3	12.3	18.8	8.9	5.8	6.4	4.4	5.2	5.5	5.7	3.5	18.8
3-Jul	3.5	2.6	2.2	14.2	Z	4.5	4.5	10.0	3.2	2.5	0.5	1.0	0.6	0.2	0.3	0.1	0.1	0.2	12.3	1.2	0.3	0.5	0.2	0.2	2.8	14.2
4-Jul	0.2	0.2	0.2	0.4	0.5	Z	2.1	1.0	0.3	0.1	0.2	0.2	2.6	1.3	3.1	0.7	1.4	0.6	0.6	0.5	0.2	0.1	0.3	0.1	0.7	3.1
5-Jul	Z	0.5	0.8	0.4	0.8	1.1	0.6	0.3	0.1	0.0	0.1	0.2	0.1	0.4	0.7	0.2	0.4	0.6	0.0	1.2	0.2	0.1	0.5	1.2	0.4	1.2
6-Jul	0.2	Z	0.1	0.1	0.1	0.6	1.7	3.0	1.5	1.2	0.4	0.2	0.1	0.1	0.1	0.3	0.1	0.4	0.4	0.3	0.1	0.1	0.1	0.2	0.5	3.0
7-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.7	2.1	1.0	2.6	1.1	0.3	0.2	0.2	0.1	0.3	1.0	0.5	0.6	0.4	0.3	0.2	0.1	0.3	0.5	2.6
8-Jul	2.1	1.0	0.2	Z	0.1	0.1	0.1	0.6	1.1	1.2	1.0	2.4	14.6	10.0	3.0	3.0	3.5	1.4	1.1	1.7	0.3	0.1	0.5	0.4	2.2	14.6
9-Jul	0.7	2.0	0.3	0.5	Z	0.3	0.7	1.5	0.4	0.3	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.4	2.0
10-Jul	0.1	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.1	0.1	0.3
11-Jul	Z	0.2	0.3	1.2	1.7	1.6	2.2	1.6	0.8	1.3	0.6	0.6	0.7	0.4	0.4	0.7	0.7	0.5	0.4	0.2	0.2	0.2	0.2	0.3	0.7	2.2
12-Jul	0.3	Z	0.9	0.5	1.2	1.1	1.5	1.5	1.2	3.1	1.5	4.1	5.1	1.0	1.0	2.5	1.4	2.3	2.1	1.9	1.8	1.5	0.9	0.9	1.7	5.1
13-Jul	0.5	2.0	Z	0.3	0.2	0.9	2.1	10.7	C	C	C	C	7.2	3.8	2.7	3.6	3.6	3.6	1.9	1.2	2.6	3.1	7.0	1.9	3.1	10.7
14-Jul	8.6	2.3	3.8	Z	10.1	27.9	19.3	6.9	2.1	2.5	3.8	0.8	0.6	0.4	0.3	0.4	0.5	0.4	0.5	0.4	0.6	0.5	0.2	0.2	4.1	27.9
15-Jul	0.3	0.5	0.5	2.4	Z	1.1	1.2	0.8	0.7	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.5	2.4
16-Jul	0.1	0.1	0.2	0.2	0.2	Z	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.1	0.1	0.0	0.1	0.3
17-Jul	Z	0.1	0.1	0.3	0.4	0.2	0.1	0.2	0.1	0.1	0.2	0.2	0.1	0.0	0.0	0.3	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6
18-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.2	1.4	0.5	1.2	0.6	0.2	1.4
19-Jul	0.4	0.7	Z	0.4	0.3	0.5	0.4	0.5	0.9	1.3	0.2	0.0	0.0	0.0	0.2	0.1	0.0	0.0	6.8	0.7	0.4	0.0	0.0	0.0	0.6	6.8
20-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.5	0.9	2.0	1.9	1.5	0.0	M	M	M	6.2	3.1	0.8	0.0	0.0	0.0	0.0	0.0	0.8	6.2
21-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.1	1.3	1.2	1.8	1.2	2.8	3.3	1.5	1.8	1.1	1.8	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.8	3.3
22-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	1.5	2.2	1.5	0.0	0.7	0.3	0.0	0.1	0.2	0.7	0.8	0.3	0.2	0.0	0.0	0.0	0.0	0.4	2.2
23-Jul	Z	0.0	0.0	0.1	0.0	0.1	0.3	0.3	0.7	0.7	1.2	1.5	1.1	0.6	0.7	0.5	0.2	0.4	0.9	0.3	0.1	0.0	0.1	0.1	0.4	1.5
24-Jul	0.1	Z	0.1	0.0	0.0	0.2	0.1	0.3	1.9	0.5	0.4	0.4	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.3	1.9
25-Jul	0.1	0.1	Z	0.5	0.1	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.4	0.5	0.5	0.4	1.1	1.4	0.3	0.3	0.1	0.1	0.1	0.3	1.4
26-Jul	0.0	0.1	0.2	Z	0.2	0.1	0.3	0.5	0.7	0.6	0.3	0.3	0.3	0.4	0.4	0.3	0.2	0.3	0.3	0.2	0.2	0.1	0.2	0.2	0.3	0.7
27-Jul	0.2	0.2	0.2	0.3	Z	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.1	0.2	0.3	0.2	0.2	0.3	0.2	0.3
28-Jul	0.3	0.2	0.2	0.2	0.1	Z	0.3	0.6	1.2	5.2	0.4	0.4	0.4	0.4	0.5	0.2	0.3	0.5	0.4	0.7	0.3	0.1	0.2	0.2	0.6	5.2
29-Jul	Z	0.1	0.1	0.0	0.0	0.1	0.2	0.3	0.5	0.6	0.9	0.3	0.2	0.3	0.2	0.2	0.4	0.2	0.3	0.2	0.1	0.1	0.2	0.1	0.2	0.9
30-Jul	0.2	Z	0.7	0.8	3.0	2.7	2.1	2.8	3.0	1.5	0.5	0.8	0.6	0.5	0.5	0.5	0.5	0.3	0.3	0.4	0.3	0.2	0.1	0.0	1.0	3.0
31-Jul	0.0	0.1	Z	0.1	0.0	0.0	0.1	0.2	0.4	0.6	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.9	1.7	0.1	0.2	1.7

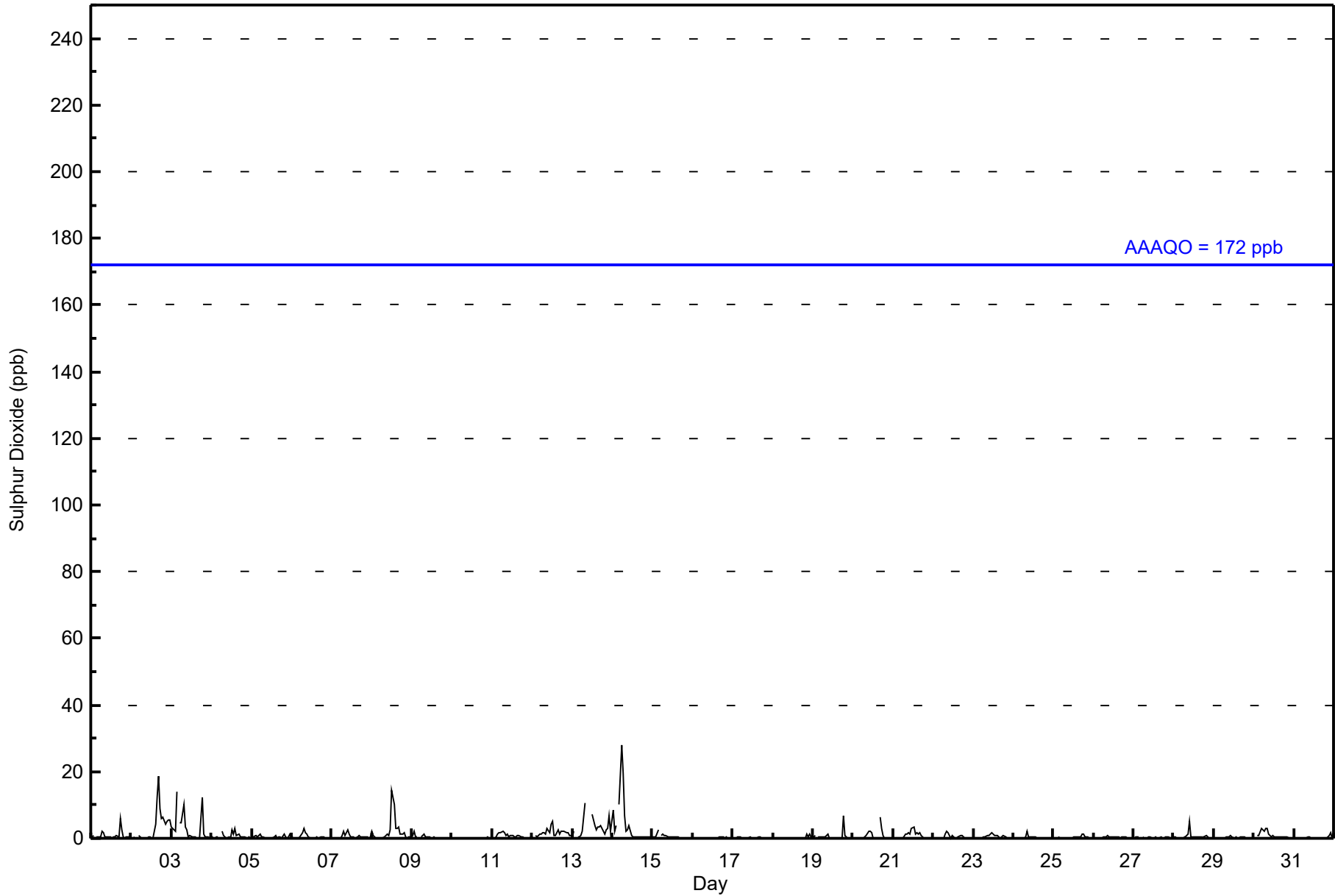
0.7	0.5	0.5	0.9	0.8	1.7	1.4	1.7	0.9	1.1	0.6	0.7	1.3	0.8	0.7	1.0	1.4	1.1	1.3	0.6	0.5	0.5	0.7	0.4	Diurnal Average	
8.6	2.6	3.8	14.2	10.1	27.9	19.3	10.7	3.2	5.2	3.8	4.1	14.6	10.0	4.3	12.3	18.8	8.9	12.3	6.4	4.4	5.2	7.0	5.7	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Christina Lake - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Christina Lake - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	698	98.87	98.87
11 - 20	7	0.99	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: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Christina Lake - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	22	62	55	30	18	25	46	31	47	79	71	89	59	24	20	20	698
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	0	7
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	22	62	55	30	18	25	46	31	47	79	71	89	59	27	25	20	706

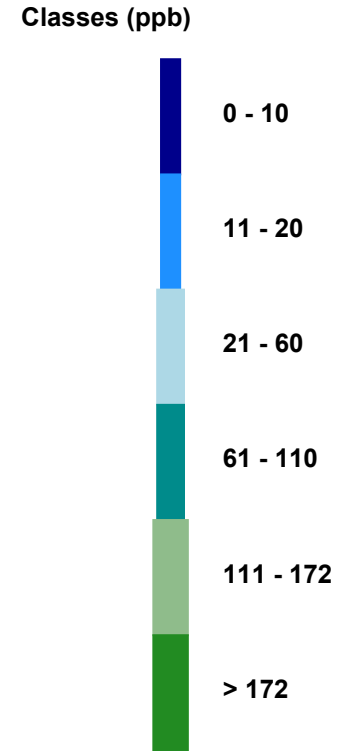
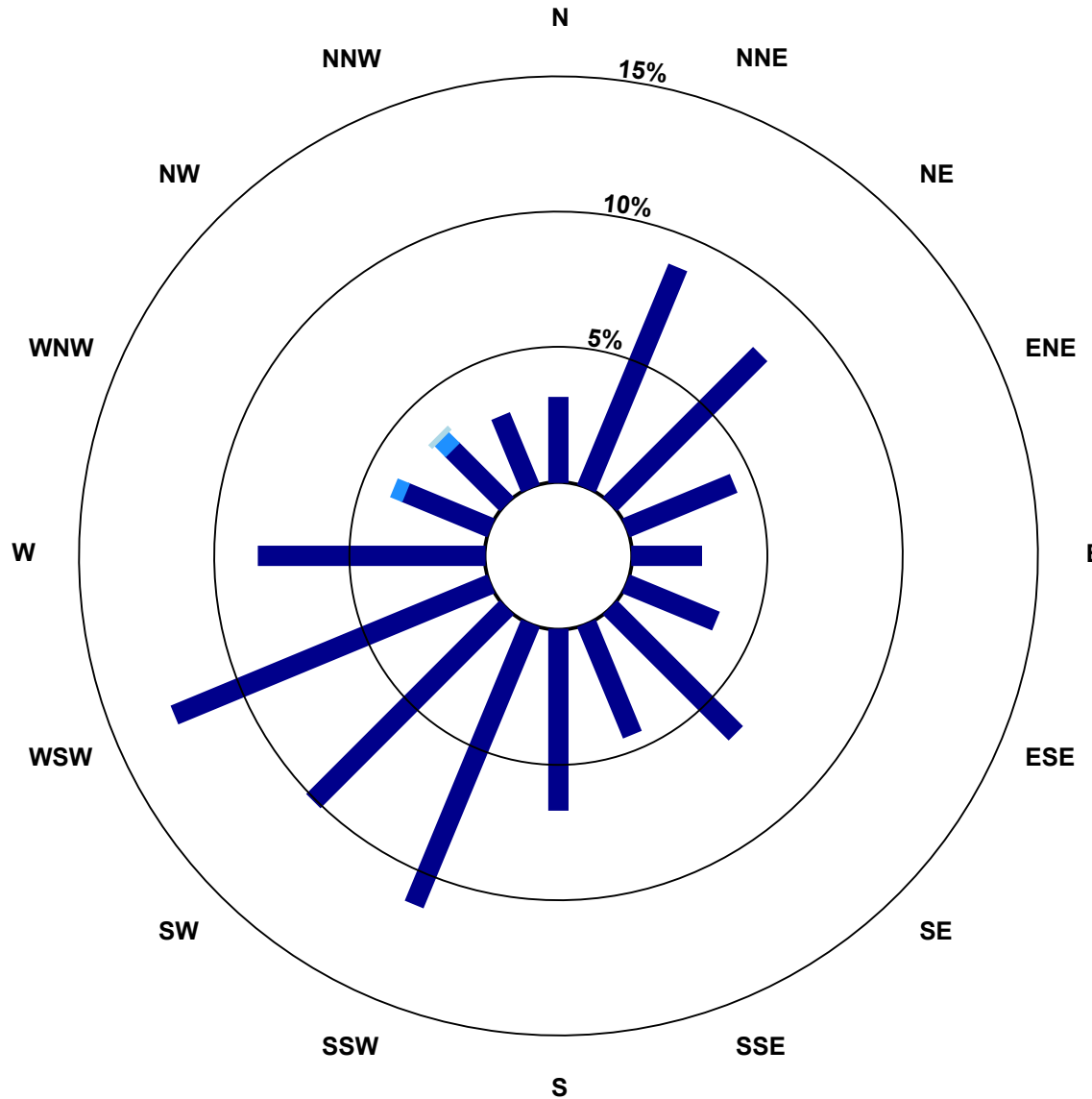
Total Number of Valid Hours: 706

Total Number of Hours: 744

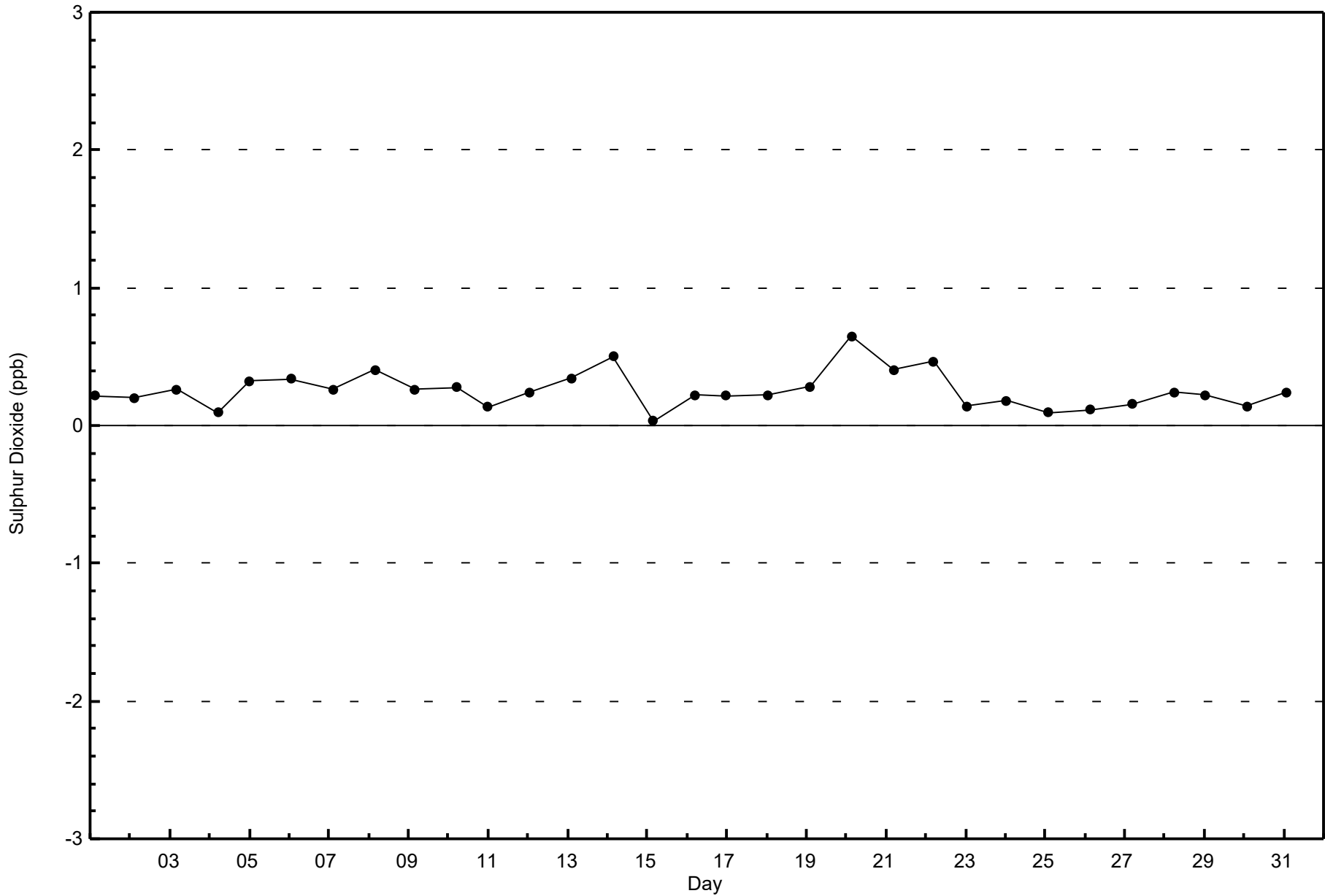


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Christina Lake



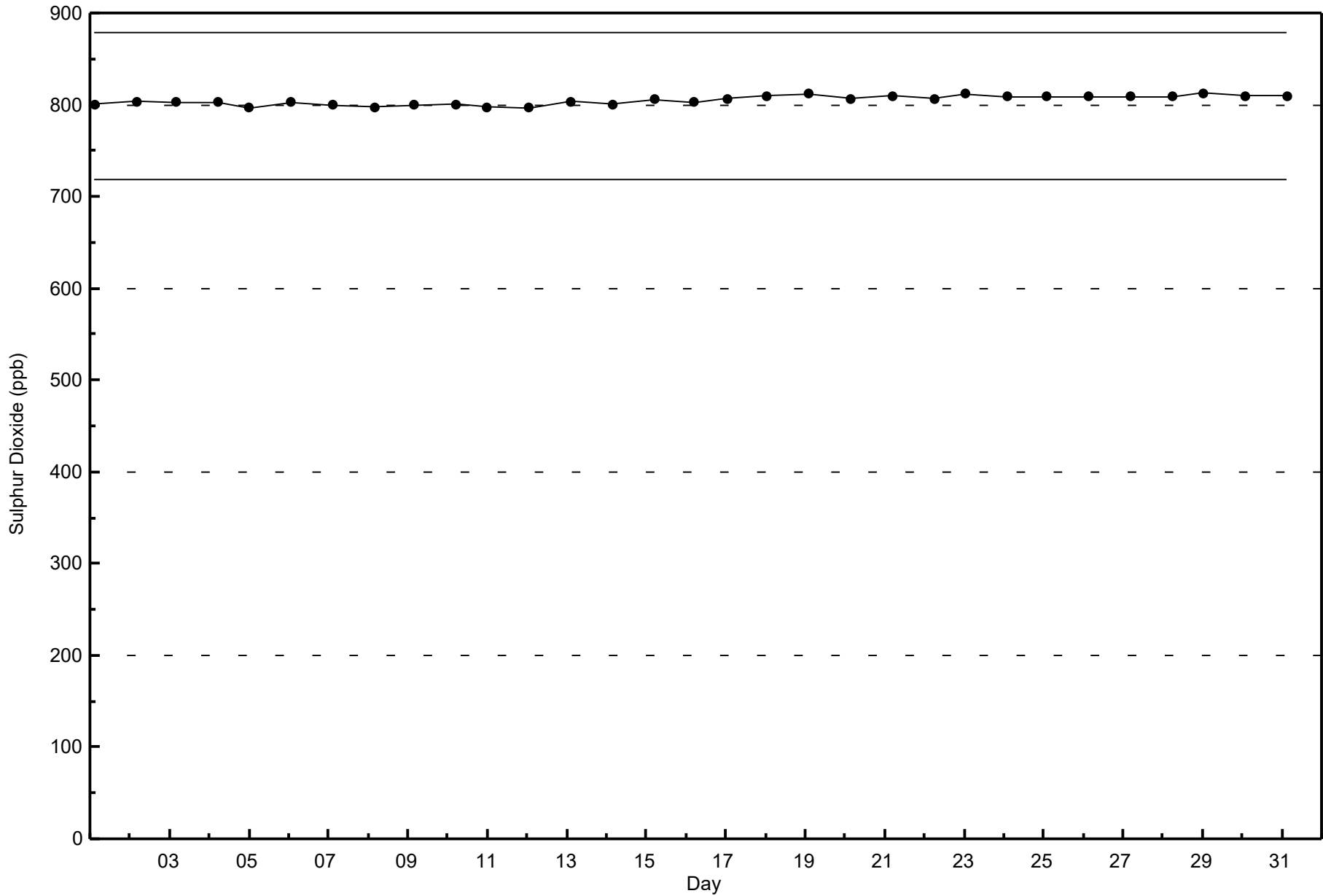
Total Number of Valid Hours: 706

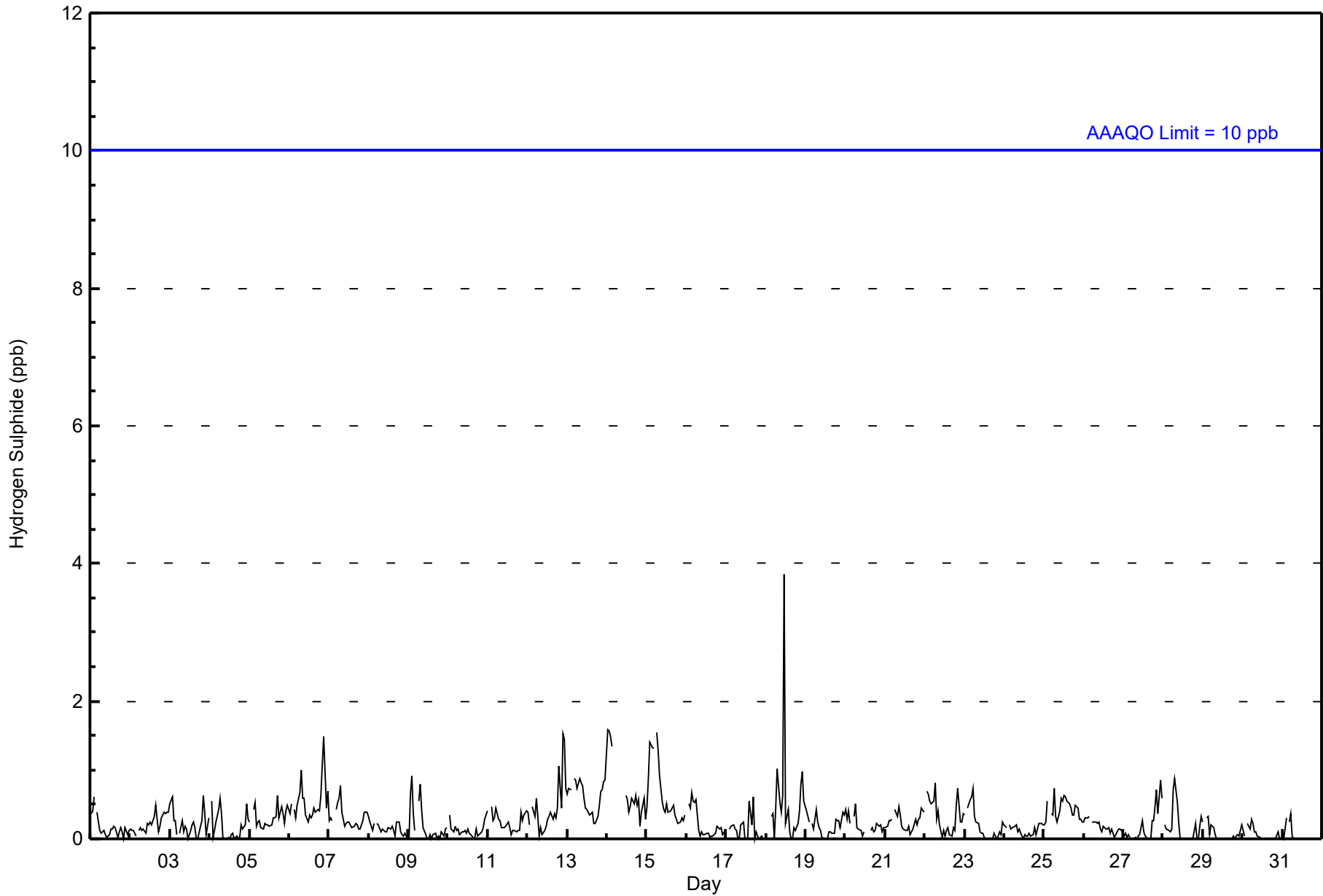




Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Christina Lake - July 2023







**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Christina Lake - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	704	99.86	99.86
3 - 4	1	0.14	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Christina Lake - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	20	61	54	32	18	26	46	31	48	78	69	91	58	27	27	18	704
3 - 4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	62	54	32	18	26	46	31	48	78	69	91	58	27	27	18	705

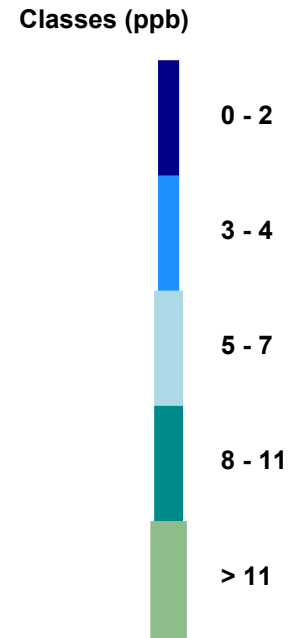
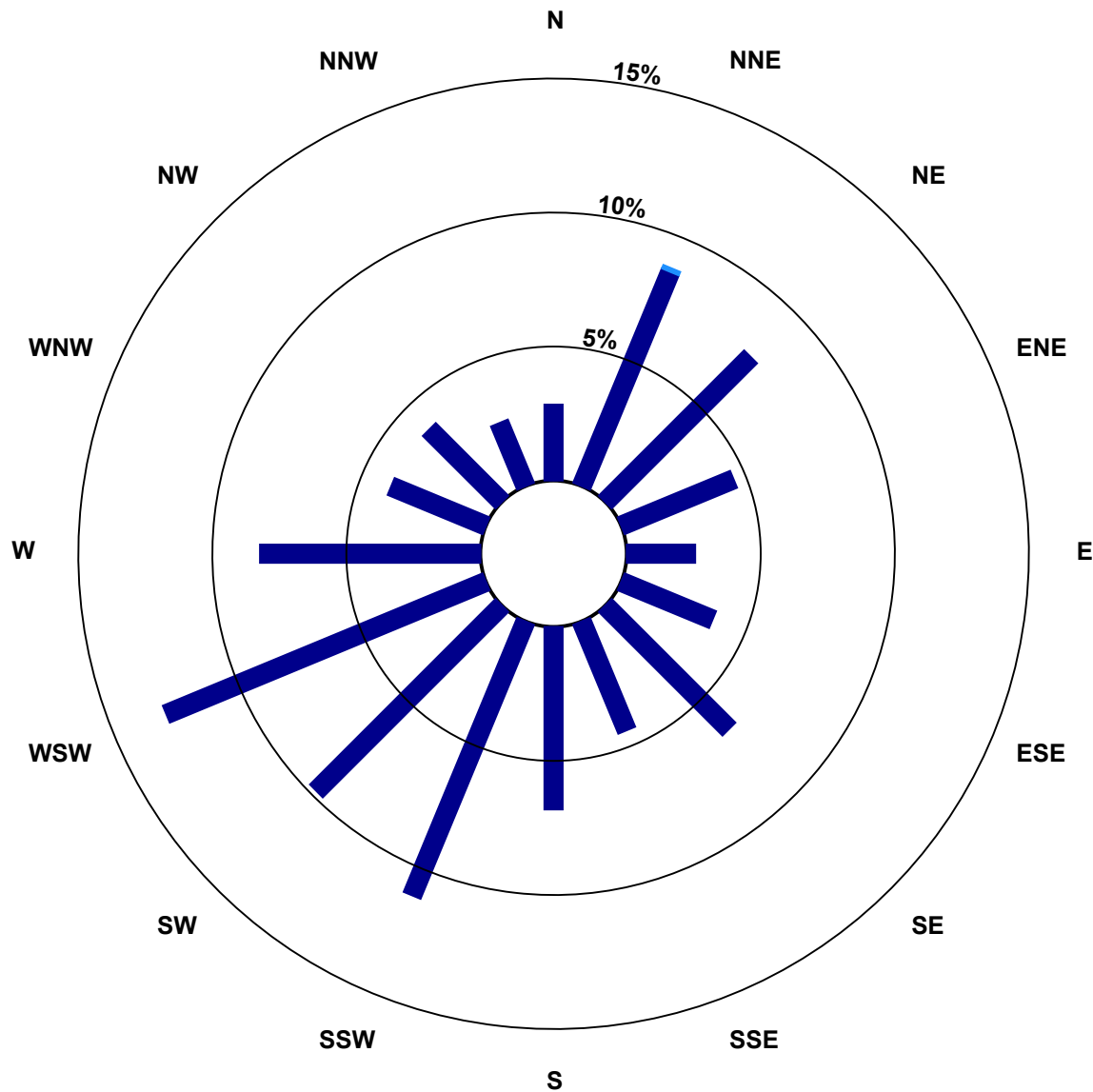
Total Number of Valid Hours: 705

Total Number of Hours: 744

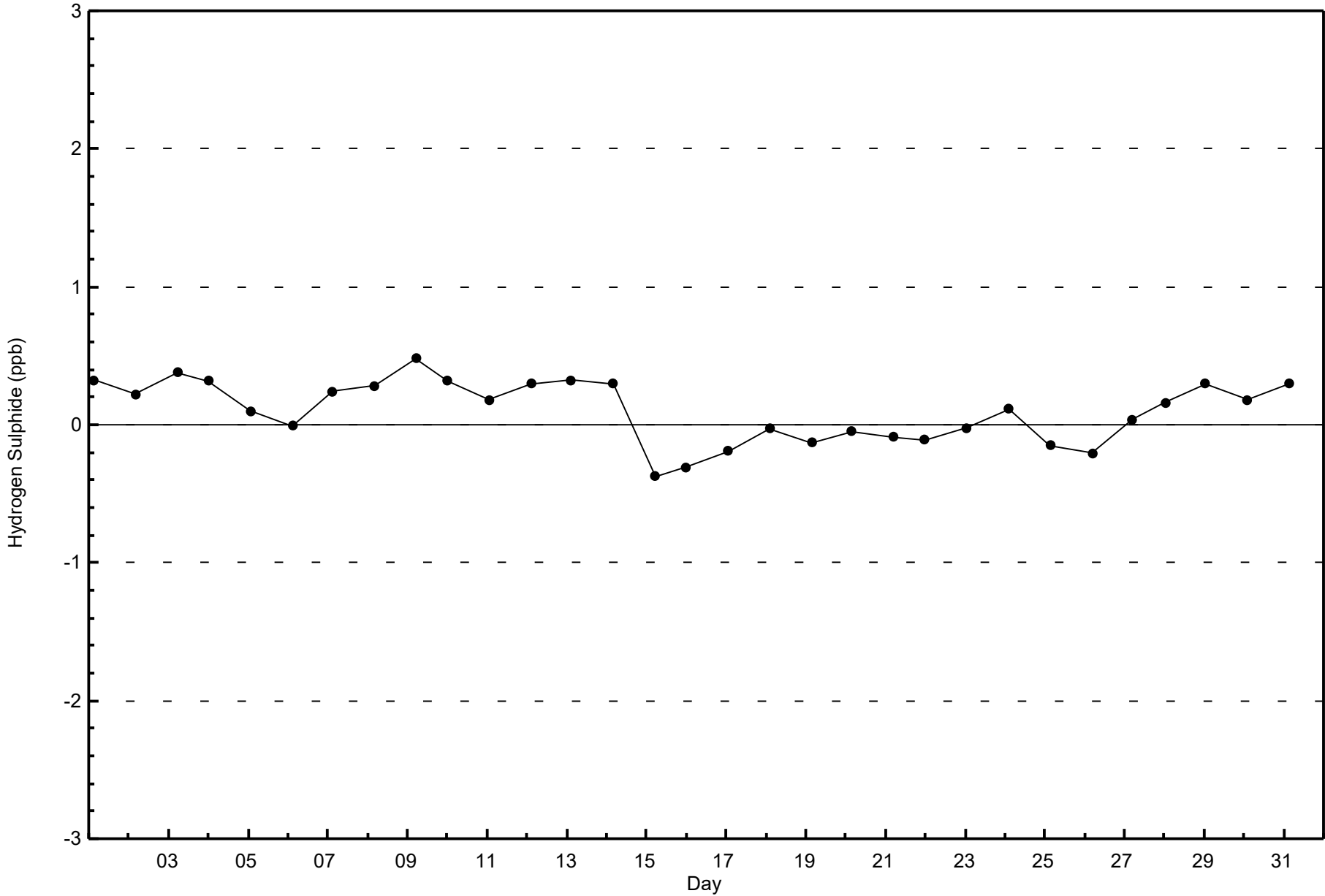


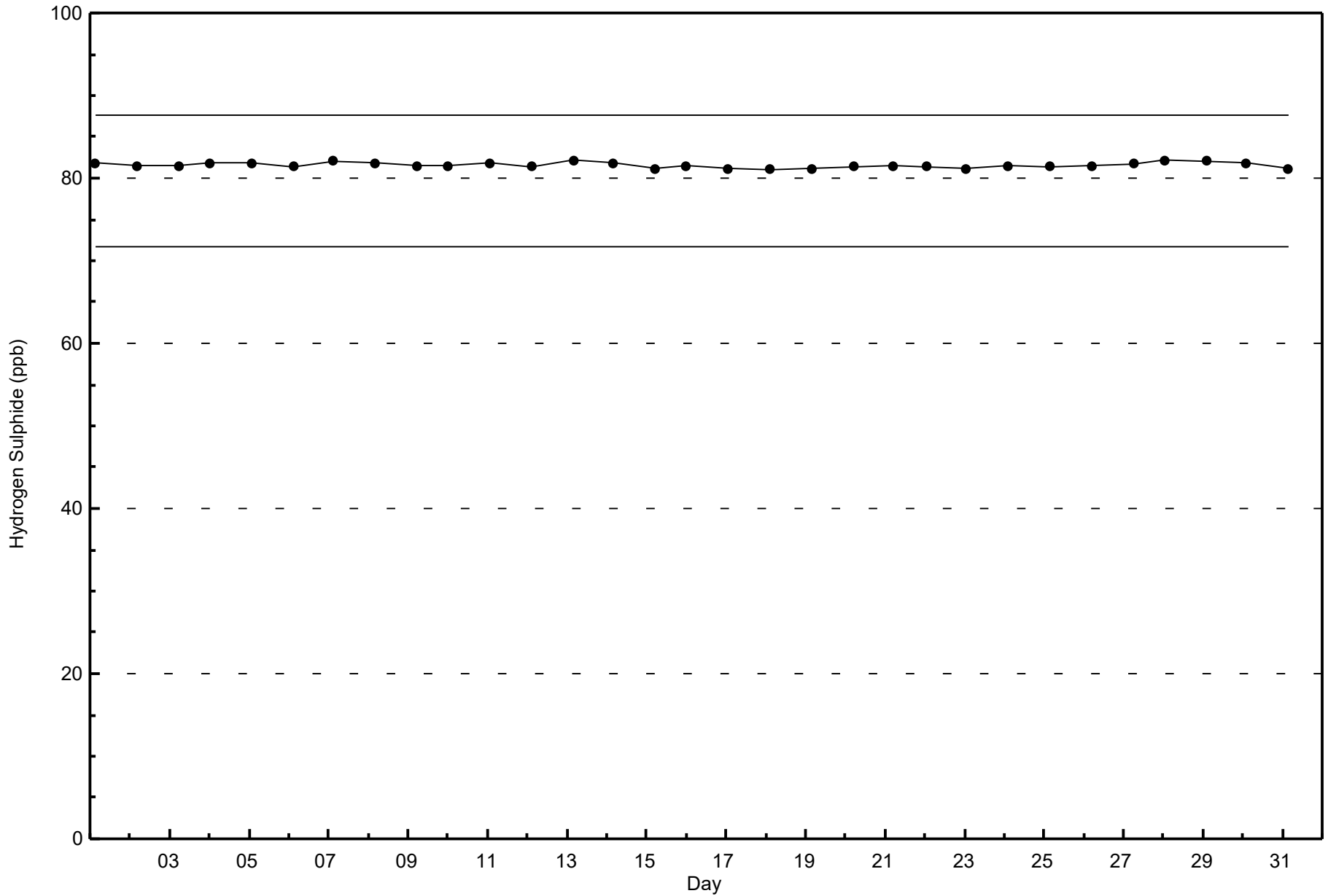
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Hydrogen Sulphide (H₂S) - ppb
Christina Lake



Total Number of Valid Hours: 705





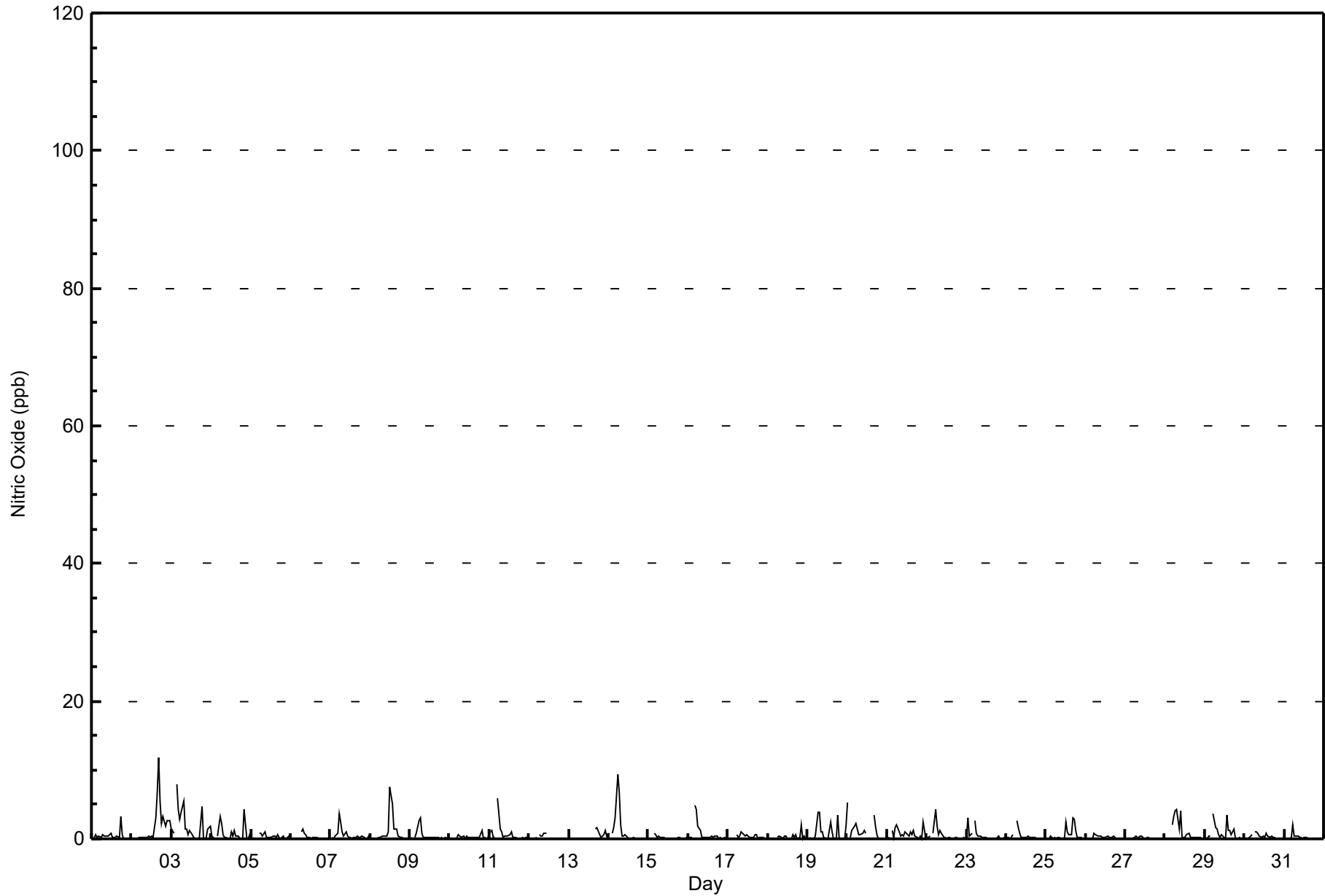


Maximum Value: 11.7 ppb on Jul 2 17:00																				Maximum Daily Average: 1.9 ppb on Jul 2					Hours in Service: 744				
Minimum Value: 0.0 ppb on Jul 4 11:00																				Minimum Daily Average: 0.1 ppb on Jul 27					Hours of Data: 681				
Maximum Diurnal Average: 2.2 ppb at hour 6																				Minimum Diurnal Average: 0.2 ppb at hour 3					Hours of Missing Data: 63				
Monthly Average: 0.62 ppb																				Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.2 Q ₃ = 0.6 P ₉₀ = 1.5 P ₉₉ = 5.6					Hours of Calibration: 39				
																				Percent Operational Time: 96.8									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Jul	Z	0.2	0.6	0.1	0.3	0.2	0.5	0.4	0.4	0.5	0.3	0.7	0.1	0.3	0.3	0.4	0.3	3.2	0.6	0.1	0.1	0.1	0.1	0.1	0.4	3.2			
2-Jul	0.1	Z	0.1	0.0	0.2	0.2	0.2	0.2	0.1	0.1	0.3	0.2	0.3	0.2	3.1	6.7	11.7	5.5	2.3	3.3	1.8	2.7	2.7	2.6	1.9	11.7			
3-Jul	1.5	0.9	Z	7.9	4.2	2.8	3.8	5.4	1.3	1.4	0.6	1.1	0.6	0.1	0.1	0.0	0.1	0.0	4.7	0.3	0.0	0.2	1.4	1.8	1.8	7.9			
4-Jul	0.4	0.2	0.1	Z	0.4	3.3	2.2	0.6	0.1	0.2	0.0	0.0	1.0	0.4	1.3	0.4	0.4	0.1	0.1	0.0	4.3	0.1	0.0	0.6	0.7	4.3			
5-Jul	0.0	0.0	0.0	0.1	Z	0.7	0.8	0.4	1.1	0.2	0.2	0.1	0.2	0.4	0.4	0.2	0.7	0.2	0.1	0.3	0.1	0.0	0.2	0.4	0.3	1.1			
6-Jul	0.1	0.0	0.0	0.0	0.1	Z	0.9	1.5	0.9	0.6	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.2	1.5			
7-Jul	Z	0.2	0.1	0.4	0.8	3.6	2.4	1.1	0.4	1.1	0.4	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.2	0.3	0.1	0.1	0.1	0.4	0.6	3.6			
8-Jul	0.1	Z	0.1	0.1	0.1	0.2	0.3	0.4	0.4	0.4	0.4	1.0	7.4	5.2	1.4	1.4	1.4	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.9	7.4			
9-Jul	0.1	0.1	Z	0.1	0.8	2.7	3.0	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.4	3.0			
10-Jul	0.0	0.0	0.0	Z	0.3	0.6	0.4	0.3	0.5	0.1	0.3	0.2	0.2	0.1	0.2	0.2	0.3	0.2	0.3	1.3	0.0	0.1	0.1	0.0	0.3	1.3			
11-Jul	0.8	1.3	0.1	0.2	Z	5.9	1.3	1.0	0.3	0.3	0.3	0.4	0.6	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.6	5.9			
12-Jul	0.1	0.1	0.0	0.1	0.2	Z	0.7	0.4	0.4	0.9	0.7	C	C	C	C	C	M	M	M	M	M	M	M	M	--	0.9			
13-Jul	M	M	M	M	M	M	M	M	M	M	M	M	C	C	C	C	C	1.4	1.6	0.6	0.3	0.4	0.6	1.3	0.3	1.6			
14-Jul	0.9	Z	0.9	1.5	3.0	9.4	6.7	1.9	0.4	0.3	0.6	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.1	9.4			
15-Jul	0.0	0.0	Z	0.8	0.7	0.3	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.2	0.1	0.0	0.1	0.2	0.2	0.8			
16-Jul	0.2	0.2	0.3	Z	4.9	4.4	1.9	1.2	0.2	0.1	0.2	0.2	0.2	0.2	0.4	0.1	0.3	0.3	0.0	0.2	0.0	0.0	0.2	0.1	0.7	4.9			
17-Jul	0.0	0.1	0.0	0.0	Z	0.7	0.2	0.4	1.0	0.8	0.4	0.6	0.4	0.3	0.3	0.3	0.7	0.7	0.1	0.2	0.1	0.1	0.0	0.0	0.3	1.0			
18-Jul	0.1	0.0	0.0	0.0	0.0	Z	0.2	0.3	0.2	0.1	0.5	0.4	0.1	0.1	0.0	0.6	0.1	0.5	0.1	0.1	2.0	0.1	0.3	0.0	0.2	2.0			
19-Jul	Z	0.2	0.0	0.0	0.1	0.3	4.0	3.9	1.1	1.0	0.1	0.1	0.0	1.2	2.4	1.1	0.1	0.1	3.5	0.2	0.1	0.0	0.1	2.0	0.9	4.0			
20-Jul	5.2	Z	0.1	1.3	1.9	2.2	1.5	0.7	0.5	0.9	1.2	0.9	M	M	M	M	3.6	1.8	0.5	0.1	0.1	0.0	0.0	0.0	1.2	5.2			
21-Jul	0.0	0.3	Z	1.2	0.2	1.7	2.0	1.0	0.5	0.5	0.5	1.1	0.7	0.4	1.0	0.6	1.1	0.5	0.1	0.1	0.5	0.1	2.5	0.1	0.7	2.5			
22-Jul	0.1	0.3	0.3	Z	0.9	4.3	1.9	0.6	1.2	0.8	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.1	0.1	0.5	4.3			
23-Jul	0.2	3.0	0.5	0.9	Z	2.6	0.9	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.3	0.0	0.0	0.0	0.1	0.4	3.0			
24-Jul	0.1	0.1	0.0	0.3	0.7	Z	2.6	1.7	0.8	0.2	0.1	0.1	0.1	0.3	0.1	0.1	0.2	0.2	0.1	0.1	0.0	0.0	0.1	0.0	0.4	2.6			
25-Jul	Z	0.0	0.0	0.5	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.2	2.4	0.9	0.6	0.6	3.0	2.8	1.2	0.2	0.1	0.1	0.1	0.1	0.6	3.0			
26-Jul	0.0	Z	0.0	0.0	0.0	0.8	0.5	0.4	0.4	0.3	0.2	0.3	0.2	0.5	0.1	0.3	0.2	0.4	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.8			
27-Jul	0.0	0.0	Z	0.1	0.0	0.2	0.3	0.2	0.2	0.4	0.3	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4			
28-Jul	0.0	0.0	0.1	Z	2.1	3.3	4.2	4.2	1.5	4.0	0.1	0.2	0.2	0.6	0.7	0.1	0.3	0.1	0.2	0.1	0.3	0.1	0.0	0.1	1.0	4.2			
29-Jul	0.2	0.1	0.3	0.3	Z	3.6	1.6	1.4	0.5	0.3	0.6	0.3	0.1	3.5	1.2	1.3	0.6	1.4	0.2	0.0	0.0	0.1	0.0	0.0	0.8	3.6			
30-Jul	0.0	0.0	0.1	0.1	0.6	Z	1.0	1.1	0.8	0.5	0.2	0.3	0.2	0.7	0.3	0.2	0.4	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.3	1.1			
31-Jul	Z	0.0	0.0	0.0	0.1	2.1	0.4	0.4	0.4	0.2	0.1	0.1	0.2	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.1			
																								Diurnal Average			Diurnal Maximum		
0.4 0.3 0.2 0.6 0.9 2.2 1.6 1.1 0.5 0.6 0.3 0.3 0.6 0.6 0.5 0.6 0.9 0.7 0.5 0.3 0.4 0.2 0.3 0.3																								Diurnal Average			Diurnal Maximum		
5.2 3.0 0.9 7.9 4.9 9.4 6.7 5.4 1.5 4.0 1.2 1.1 7.4 5.2 3.1 6.7 11.7 5.5 4.7 3.3 4.3 2.7 2.7 2.6																								Diurnal Average			Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																													



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Christina Lake - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Christina Lake - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	681	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Christina Lake - July 2023**

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Totals
0 - 20	16	57	54	31	18	24	44	32	49	78	66	88	59	26	23	16	681
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	16	57	54	31	18	24	44	32	49	78	66	88	59	26	23	16	681

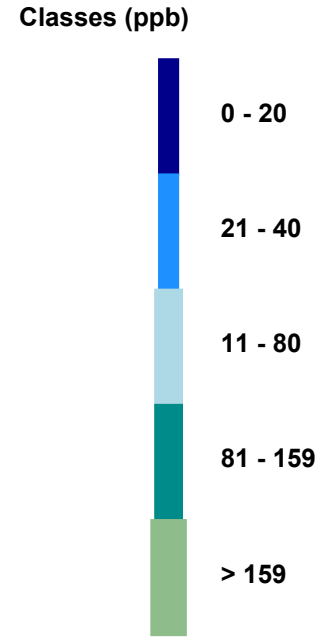
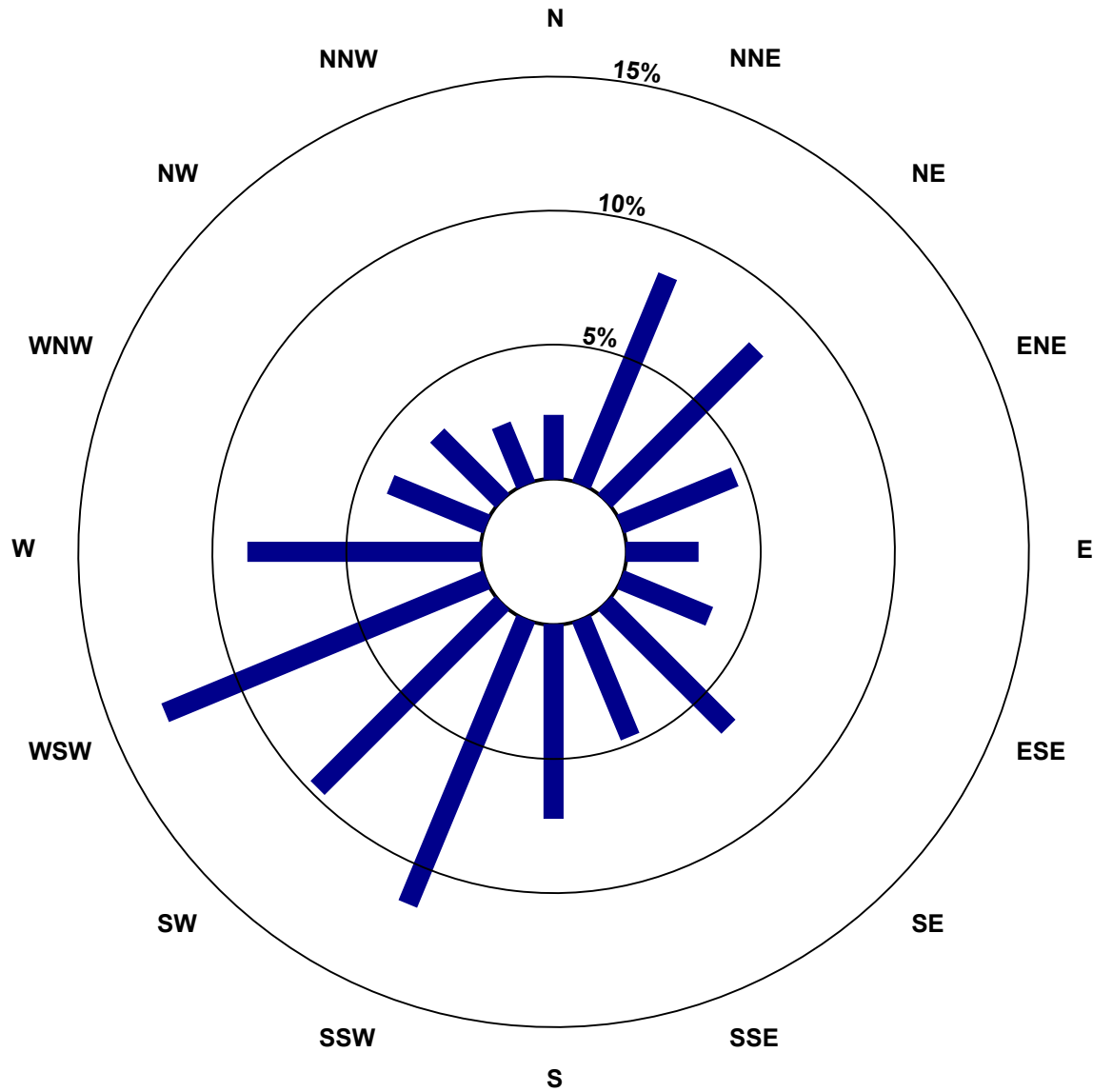
Total Number of Valid Hours: 681

Total Number of Hours: 744

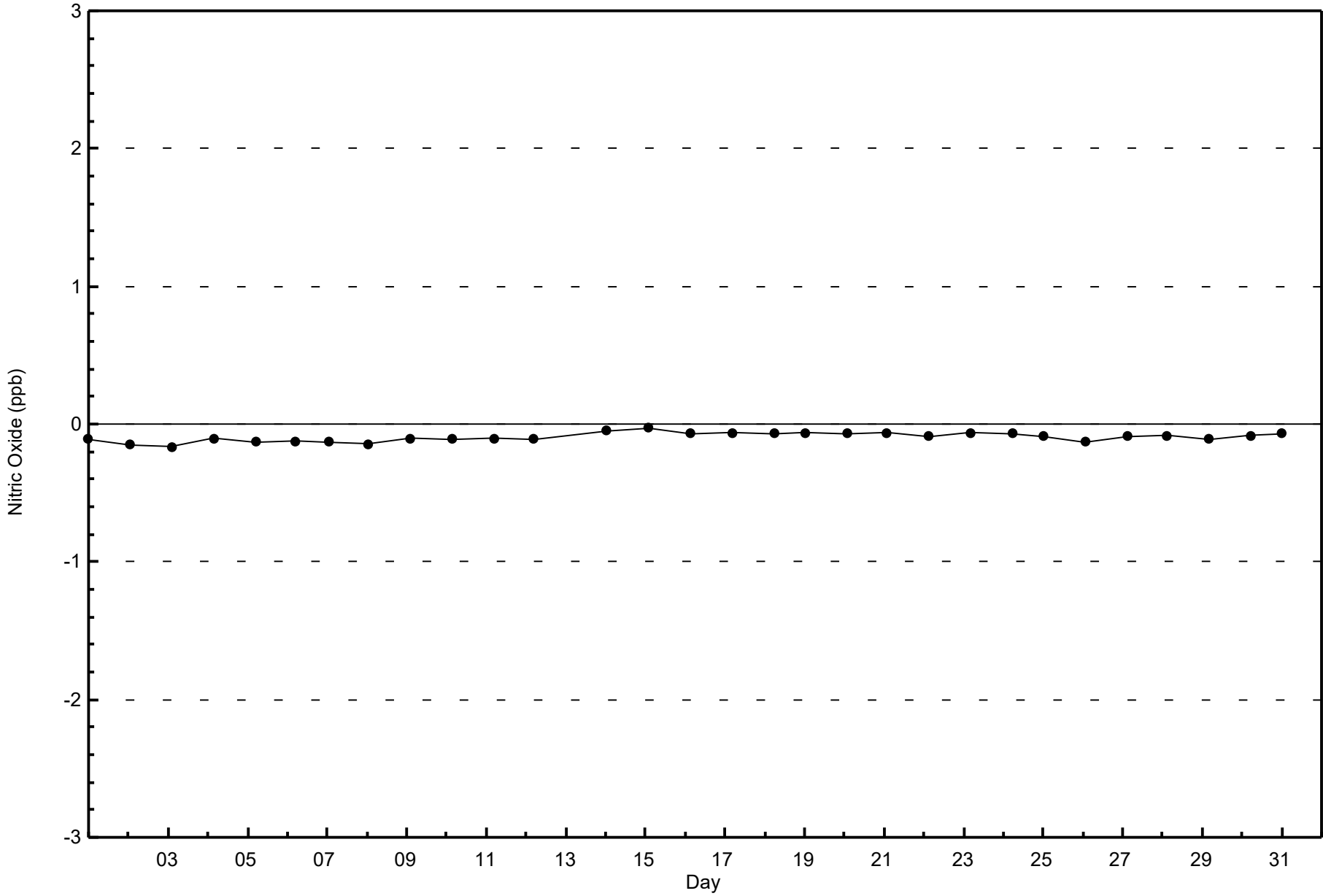


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Christina Lake



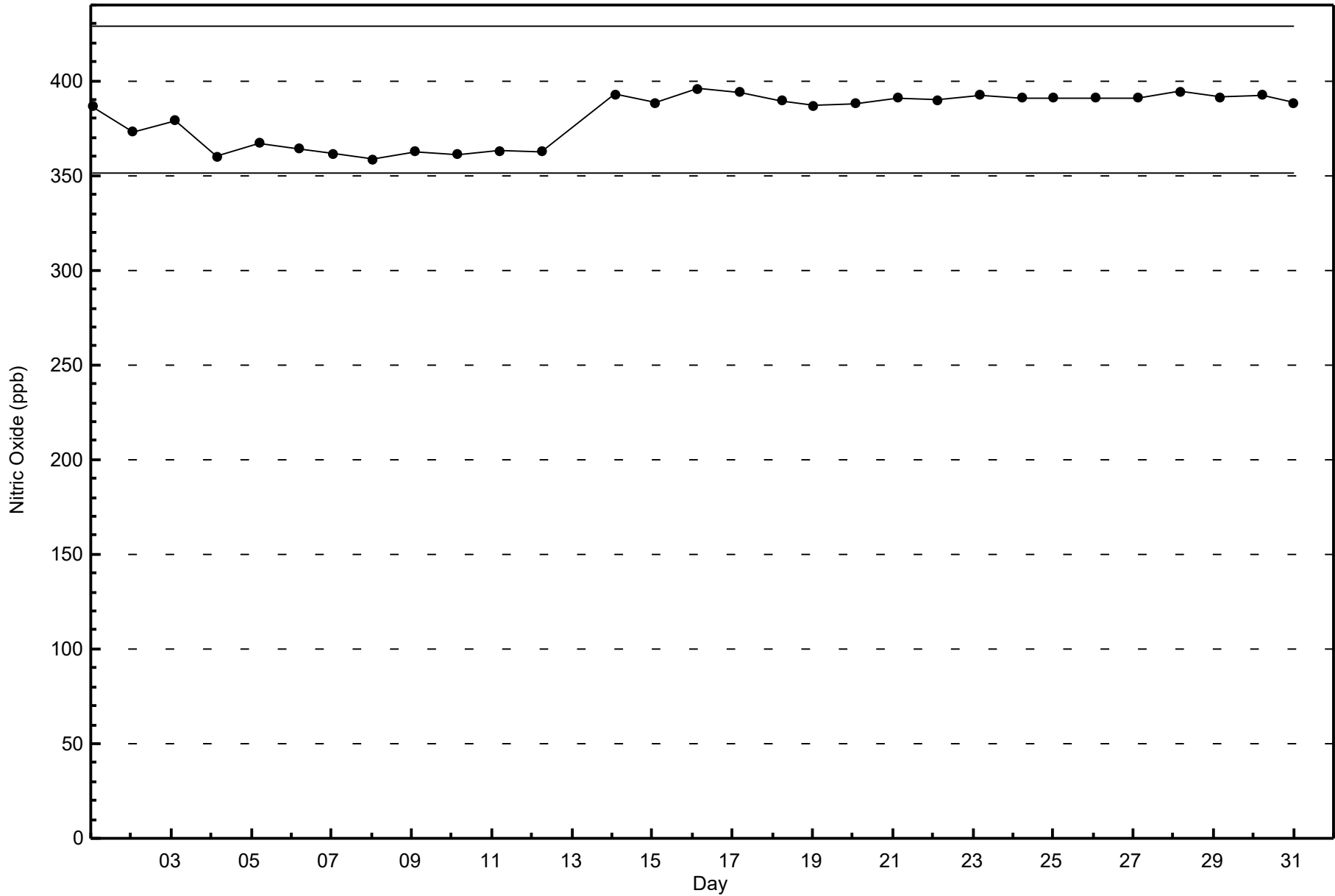
Total Number of Valid Hours: 681





Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Christina Lake - July 2023





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Christina Lake - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 16.9 ppb on Jul 14 06:00	Maximum Daily Average: 5.4 ppb on Jul 14		Hours of Data:	681
Minimum Value: 0.1 ppb on Jul 10 03:00	Minimum Daily Average: 0.8 ppb on Jul 27		Hours of Missing Data:	63
Maximum Diurnal Average: 3.4 ppb at hour 7	Minimum Diurnal Average: 1.4 ppb at hour 11		Hours of Calibration:	39
Monthly Average: 1.95 ppb	Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 0.9 Median = 1.5 Q ₃ = 2.3 P ₉₀ = 3.7 P ₉₉ = 9.1		Percent Operational Time:	96.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	Z	2.2	5.0	5.8	6.8	2.4	3.3	3.1	2.9	2.1	2.3	2.5	1.1	1.9	2.3	1.6	1.2	4.1	2.2	0.8	0.8	1.0	1.3	1.6	2.5	6.8
2-Jul	0.7	Z	1.4	1.3	2.1	2.3	1.5	0.9	0.9	0.9	2.0	1.8	1.3	1.2	5.4	9.1	13.3	7.2	4.7	5.0	3.7	3.9	3.6	3.9	3.4	13.3
3-Jul	2.9	2.7	Z	9.2	5.2	3.7	4.8	5.7	2.6	2.7	0.8	2.1	1.1	0.5	0.4	0.2	0.4	0.3	7.7	0.9	0.3	1.8	1.4	3.0	2.6	9.2
4-Jul	2.7	2.7	1.9	Z	2.3	4.0	3.0	1.3	0.6	0.6	0.2	0.3	1.7	0.9	1.9	0.8	1.1	0.6	0.8	0.8	3.6	0.6	1.0	1.5	1.5	4.0
5-Jul	0.8	1.3	1.6	1.7	Z	3.5	2.6	1.3	1.6	0.8	0.8	0.8	0.9	1.3	1.3	1.0	1.5	1.2	1.0	2.9	1.3	0.6	2.2	2.9	1.5	3.5
6-Jul	1.0	0.9	1.0	1.8	1.4	Z	3.3	3.6	2.1	1.8	1.2	1.1	1.3	1.5	1.3	1.5	1.1	0.7	0.7	0.8	1.0	0.8	0.8	1.4	1.4	3.6
7-Jul	Z	1.1	0.9	1.7	1.5	2.2	4.3	2.7	1.3	2.7	1.7	1.6	1.6	0.9	0.9	0.9	1.5	0.9	1.0	1.9	1.1	1.5	1.6	2.2	1.6	4.3
8-Jul	2.8	Z	1.2	0.9	1.1	1.3	1.6	1.8	1.8	1.8	1.4	2.5	8.4	6.8	3.1	3.3	4.3	2.4	2.1	2.5	1.2	1.0	1.1	1.9	2.4	8.4
9-Jul	1.4	2.9	Z	2.6	3.9	7.1	6.9	3.7	1.3	1.2	1.2	1.2	1.1	0.9	0.6	0.4	0.6	0.4	0.4	0.9	0.2	0.6	0.2	0.5	1.7	7.1
10-Jul	3.2	0.9	0.1	Z	0.9	2.2	0.9	0.3	0.3	0.1	0.4	0.4	0.4	0.2	0.2	0.3	0.4	0.7	0.7	2.3	0.6	0.8	1.2	0.9	0.8	3.2
11-Jul	3.2	3.0	2.8	5.1	Z	8.3	4.3	2.8	1.1	1.5	1.1	1.0	1.4	1.5	0.8	1.1	1.2	1.0	1.1	1.1	1.9	1.5	1.7	1.6	2.2	8.3
12-Jul	1.0	1.1	1.5	1.4	2.2	Z	3.7	1.9	1.7	2.8	2.3	C	C	C	C	C	M	M	M	M	M	M	M	M	--	3.7
13-Jul	M	M	M	M	M	M	M	M	M	M	M	M	C	C	C	C	2.5	2.9	1.7	1.0	3.7	3.2	7.0	5.4	--	7.0
14-Jul	9.7	Z	8.4	10.8	10.5	16.9	13.5	7.7	4.9	5.3	5.9	3.3	2.0	2.0	1.8	2.2	2.4	2.4	2.2	1.7	1.7	2.7	3.5	3.1	5.4	16.9
15-Jul	2.4	2.7	Z	3.7	3.8	3.4	3.6	2.5	1.9	2.0	2.0	1.8	2.0	1.8	1.7	1.7	1.2	0.8	0.8	0.7	0.8	2.8	1.3	1.9	2.1	3.8
16-Jul	0.9	0.6	0.6	Z	1.6	1.2	1.0	1.1	0.3	0.2	0.3	0.4	0.7	0.6	1.0	0.8	1.2	1.7	1.4	1.3	1.0	0.8	0.8	0.7	0.9	1.7
17-Jul	0.6	0.8	0.8	1.4	Z	2.1	1.8	1.3	2.7	2.3	0.9	1.3	2.1	1.7	1.3	1.4	1.5	1.5	0.4	0.5	0.8	2.5	0.4	0.5	1.3	2.7
18-Jul	0.5	0.5	1.2	0.4	0.4	Z	0.9	2.2	1.6	0.7	0.8	1.0	0.6	0.6	1.0	3.0	1.6	3.5	1.7	2.2	4.2	1.8	3.2	1.8	1.5	4.2
19-Jul	Z	2.7	1.8	2.1	1.8	2.1	4.3	3.4	2.2	2.2	0.9	0.9	1.0	1.7	2.8	2.2	0.9	0.8	5.4	2.2	1.9	1.4	1.6	3.9	2.2	5.4
20-Jul	3.2	Z	1.5	1.4	2.3	2.3	2.9	2.2	2.1	2.9	3.1	2.5	M	M	M	M	7.4	4.8	2.5	1.4	1.7	2.0	1.4	1.7	2.6	7.4
21-Jul	2.2	3.3	Z	2.0	1.6	2.5	4.1	2.9	1.6	2.1	1.4	3.6	3.2	2.4	4.0	3.4	5.5	3.6	2.2	1.4	5.2	2.4	3.9	1.8	2.9	5.5
22-Jul	1.8	2.1	2.6	Z	2.0	3.3	6.4	3.6	4.2	3.4	1.1	1.9	1.0	1.0	1.0	0.8	0.9	1.5	1.4	1.2	1.1	1.0	1.6	2.1	2.0	6.4
23-Jul	2.2	3.0	2.0	1.8	Z	3.4	4.2	2.8	2.3	1.5	1.6	1.8	1.5	1.2	1.2	1.0	0.9	1.1	1.5	3.0	1.5	0.9	1.1	1.6	1.9	4.2
24-Jul	1.4	1.6	1.0	1.5	1.9	Z	4.5	4.0	3.4	1.5	1.3	1.1	1.4	0.9	1.0	0.9	1.1	0.6	1.0	0.7	0.7	0.8	0.6	0.6	1.5	4.5
25-Jul	Z	0.5	1.7	3.4	1.3	1.8	1.8	2.1	1.6	1.6	0.7	1.5	5.5	3.2	2.6	1.7	3.3	2.7	1.9	1.1	1.7	1.2	0.8	1.0	1.9	5.5
26-Jul	0.5	Z	1.0	1.1	0.7	1.4	1.2	1.0	1.1	0.8	0.8	1.2	0.9	1.5	1.1	1.2	0.8	1.1	0.9	0.9	0.6	0.8	1.1	0.9	1.0	1.5
27-Jul	0.6	0.8	Z	1.1	1.4	1.1	1.6	1.2	0.7	1.3	1.0	0.4	0.4	0.5	0.4	0.4	0.4	0.2	0.2	0.5	0.8	0.8	0.8	1.5	0.8	1.6
28-Jul	1.4	1.2	0.7	Z	1.5	2.2	4.3	3.9	2.3	4.5	0.5	0.8	1.2	1.7	1.5	1.0	1.4	1.6	2.2	2.5	2.7	1.3	1.3	1.3	1.9	4.5
29-Jul	0.7	0.9	0.8	0.9	Z	2.3	1.7	2.7	1.5	1.1	1.6	1.2	0.7	1.8	1.7	1.6	1.9	3.0	1.4	1.1	1.0	1.2	0.9	0.7	1.4	3.0
30-Jul	1.0	1.7	2.8	3.4	7.6	Z	4.0	3.4	2.8	1.6	0.9	1.3	0.9	1.4	1.2	1.2	1.4	0.9	1.0	1.0	1.0	1.1	0.7	0.6	1.9	7.6
31-Jul	Z	1.6	2.7	2.4	1.6	2.8	1.1	1.2	1.6	1.2	1.0	0.9	1.1	1.0	0.8	0.8	0.7	0.7	0.8	1.0	1.1	1.2	1.6	0.8	1.3	2.8

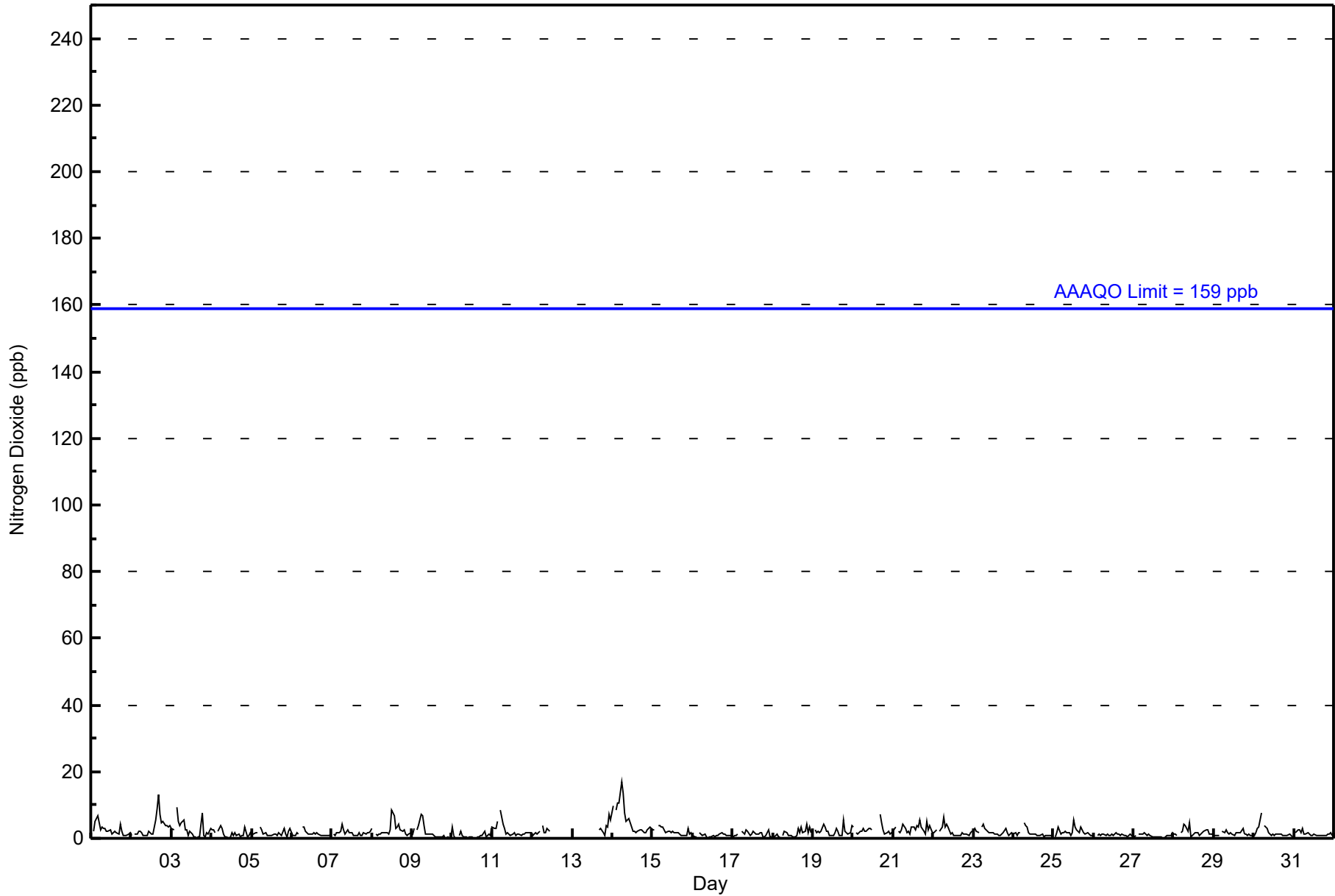
2.0	1.7	1.9	2.8	2.7	3.4	3.4	2.6	1.9	1.8	1.4	1.5	1.7	1.5	1.6	1.6	2.1	1.8	1.8	1.5	1.6	1.5	1.7	1.8	Diurnal Average	
9.7	3.3	8.4	10.8	10.5	16.9	13.5	7.7	4.9	5.3	5.9	3.6	8.4	6.8	5.4	9.1	13.3	7.2	7.7	5.0	5.2	3.9	7.0	5.4	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Christina Lake - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Christina Lake - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	681	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Christina Lake - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	16	57	54	31	18	24	44	32	49	78	66	88	59	26	23	16	681
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	16	57	54	31	18	24	44	32	49	78	66	88	59	26	23	16	681

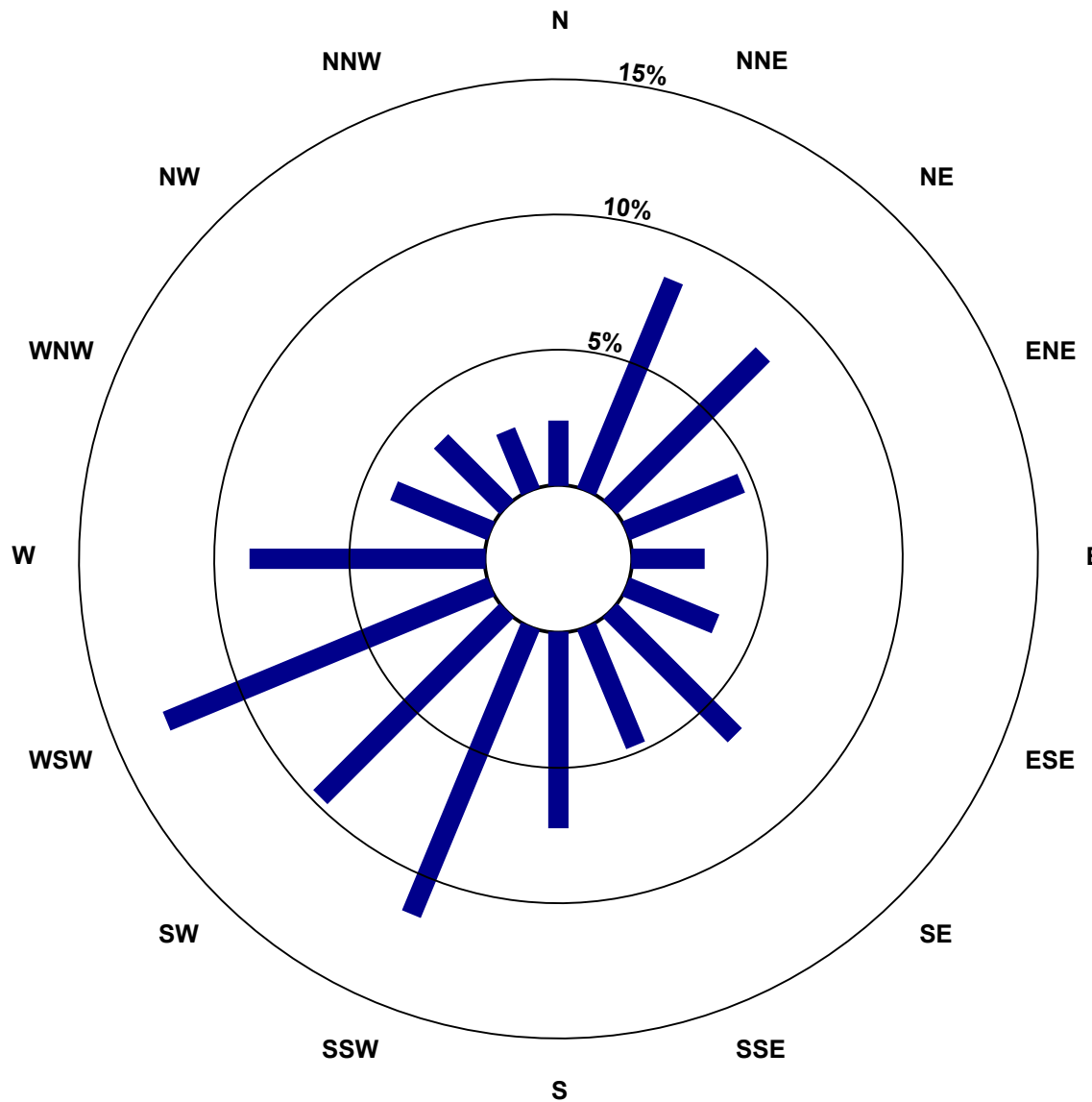
Total Number of Valid Hours: 681

Total Number of Hours: 744

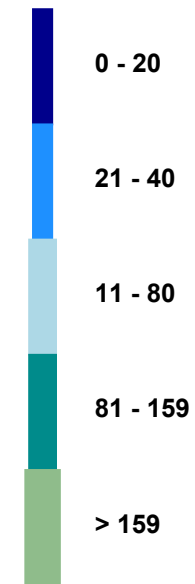


Wood Buffalo Environmental Association
Wind Rose Jul 2023

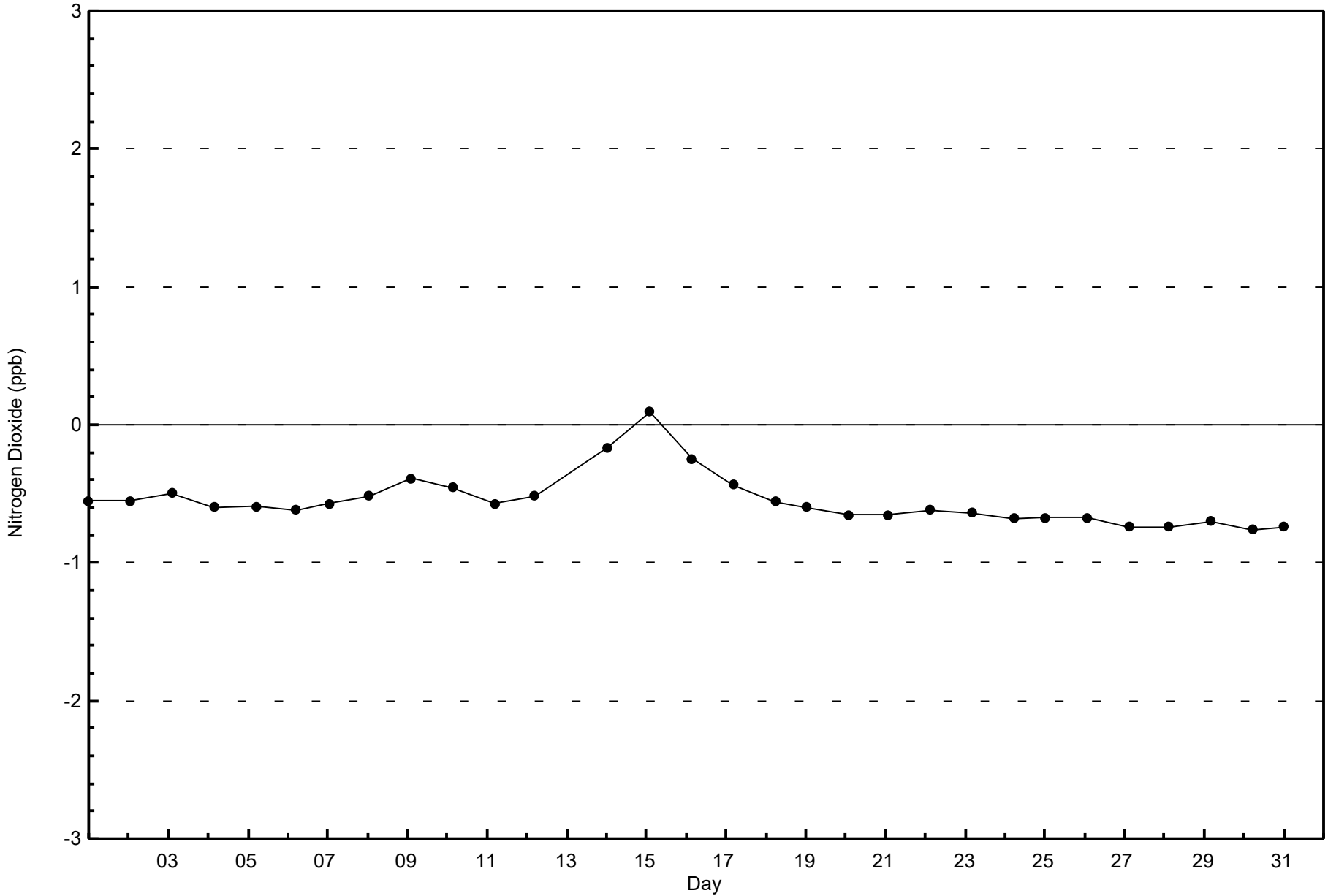
Nitrogen Dioxide (NO₂) - ppb
Christina Lake

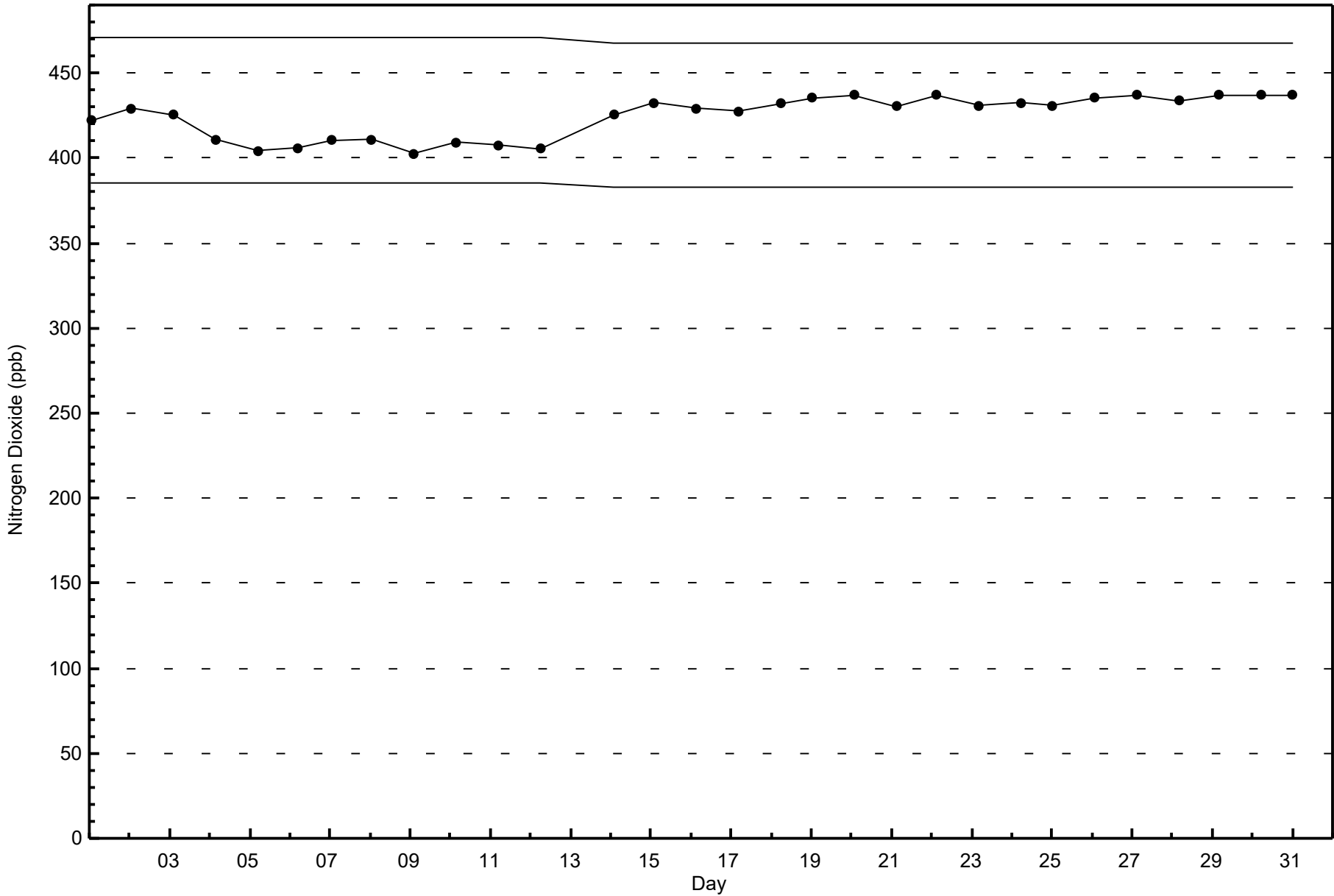


Classes (ppb)



Total Number of Valid Hours: 681







Wood Buffalo Environmental Association
Summary of Hour Averages

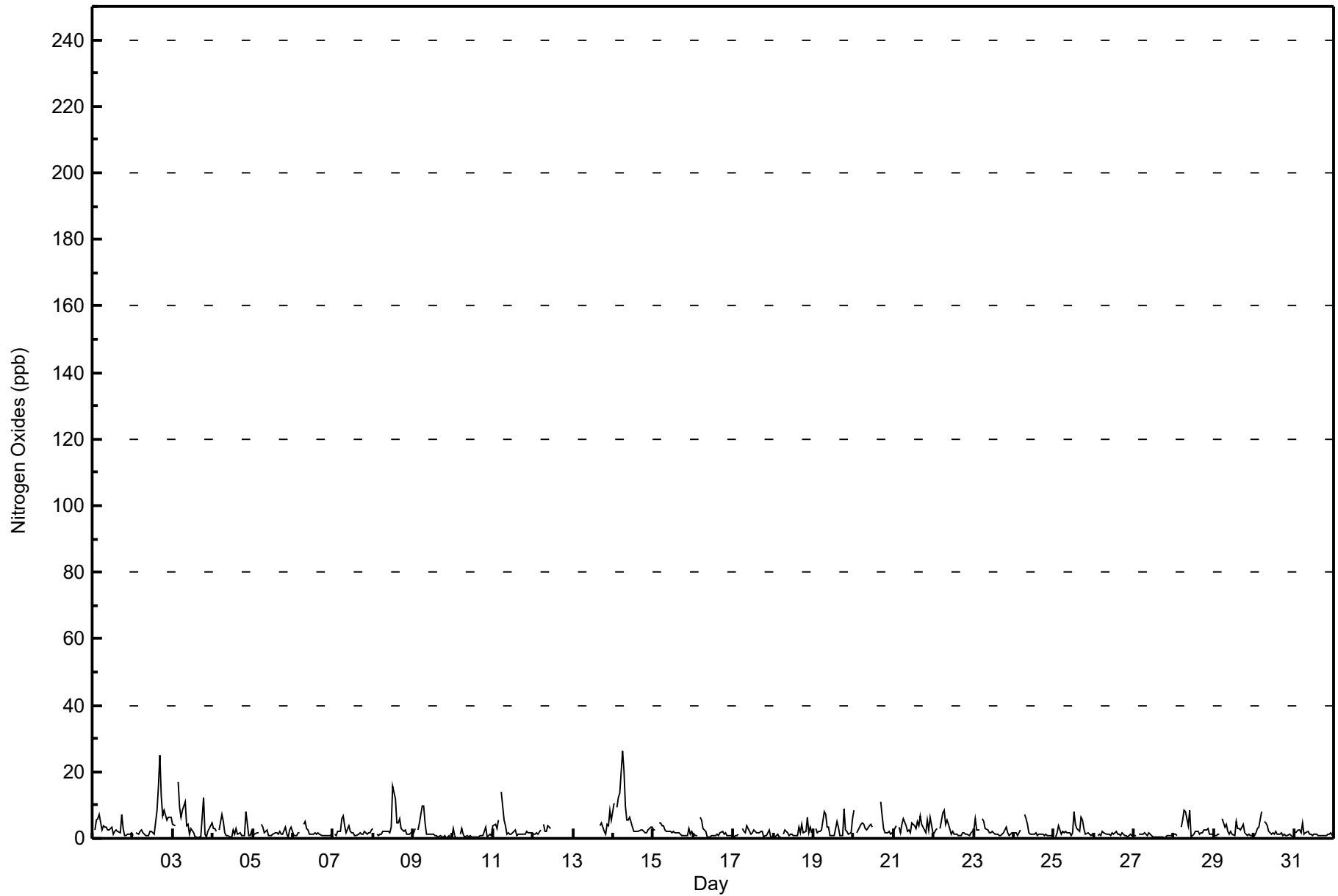
Nitrogen Oxides (NO_x) - ppb
Christina Lake - July 2023

Maximum Value: 26.3 ppb on Jul 14 06:00		Maximum Daily Average: 6.6 ppb on Jul 14		Hours in Service: 744																							
Minimum Value: 0.1 ppb on Jul 10 03:00		Minimum Daily Average: 0.9 ppb on Jul 27		Hours of Data: 681																							
Maximum Diurnal Average: 5.7 ppb at hour 6		Minimum Diurnal Average: 1.6 ppb at hour 22		Hours of Missing Data: 63																							
Monthly Average: 2.57 ppb		Percentiles: P ₁ = 0.2 P ₁₀ = 0.7 Q ₁ = 1.1 Median = 1.7 Q ₃ = 2.9 P ₉₀ = 5.5 P ₉₉ = 13.6		Hours of Calibration: 39																							
				Percent Operational Time: 96.8																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	2.4	5.6	5.9	7.1	2.6	3.8	3.5	3.3	2.6	2.6	3.2	1.2	2.2	2.6	2.0	1.5	7.3	2.8	0.9	0.9	1.1	1.4	1.7	3.0	7.3	
2-Jul	0.8	Z	1.5	1.3	2.3	2.5	1.7	1.1	1.0	1.0	2.3	2.0	1.6	1.4	8.5	15.8	25.0	12.7	7.0	8.3	5.5	6.6	6.3	6.5	5.3	25.0	
3-Jul	4.4	3.6	Z	17.1	9.4	6.5	8.6	11.1	3.9	4.1	1.4	3.2	1.7	0.6	0.5	0.2	0.5	0.3	12.4	1.2	0.3	2.0	2.8	4.8	4.4	17.1	
4-Jul	3.1	2.9	2.0	Z	2.7	7.3	5.2	1.9	0.7	0.8	0.2	0.3	2.7	1.3	3.2	1.2	1.5	0.7	0.9	0.8	7.9	0.7	1.0	2.1	2.2	7.9	
5-Jul	0.8	1.3	1.6	1.8	Z	4.2	3.4	1.7	2.7	1.0	1.0	0.9	1.1	1.7	1.7	1.2	2.2	1.4	1.1	3.2	1.4	0.6	2.4	3.3	1.8	4.2	
6-Jul	1.1	0.9	1.0	1.8	1.5	Z	4.2	5.1	3.0	2.4	1.4	1.2	1.4	1.6	1.4	1.7	1.2	0.8	0.7	0.8	1.0	0.9	0.8	1.5	1.6	5.1	
7-Jul	Z	1.3	1.0	2.1	2.3	5.8	6.7	3.8	1.7	3.8	2.1	1.7	1.7	1.0	1.0	1.1	1.8	1.1	1.2	2.2	1.2	1.6	1.7	2.6	2.2	6.7	
8-Jul	2.9	Z	1.3	1.0	1.2	1.5	1.9	2.2	2.2	2.2	1.8	3.5	15.8	12.0	4.5	4.7	5.7	2.8	2.3	2.6	1.3	1.1	1.2	2.0	3.4	15.8	
9-Jul	1.5	3.0	Z	2.7	4.7	9.8	9.9	4.5	1.4	1.3	1.3	1.3	1.2	1.0	0.8	0.6	0.8	0.5	0.5	1.0	0.2	0.7	0.2	0.6	2.2	9.9	
10-Jul	3.2	0.9	0.1	Z	1.2	2.8	1.3	0.6	0.8	0.2	0.7	0.6	0.6	0.3	0.4	0.5	0.7	0.9	1.0	3.6	0.6	0.9	1.3	0.9	1.1	3.6	
11-Jul	4.0	4.3	2.9	5.3	Z	14.2	5.6	3.8	1.4	1.8	1.4	1.4	2.0	2.5	0.9	1.2	1.3	1.1	1.2	1.2	2.1	1.6	1.8	1.8	2.8	14.2	
12-Jul	1.1	1.2	1.5	1.5	2.4	Z	4.4	2.3	2.1	3.7	3.0	C	C	C	C	C	M	M	M	M	M	M	M	M	--	4.4	
13-Jul	M	M	M	M	M	M	M	M	M	M	M	M	C	C	C	C	C	3.9	4.5	2.3	1.3	4.1	3.8	8.3	5.7	--	8.3
14-Jul	10.6	Z	9.3	12.3	13.5	26.3	20.2	9.6	5.3	5.6	6.5	3.4	2.1	2.1	1.9	2.3	2.4	2.4	2.2	1.7	1.7	2.7	3.5	3.2	6.6	26.3	
15-Jul	2.4	2.7	Z	4.5	4.5	3.7	4.0	2.6	2.0	2.1	2.1	1.9	2.1	1.9	1.8	1.8	1.2	0.8	0.9	0.9	0.9	2.8	1.4	2.1	2.2	4.5	
16-Jul	1.1	0.8	0.9	Z	6.5	5.6	2.9	2.3	0.5	0.3	0.5	0.6	0.9	0.8	1.4	0.9	1.5	2.0	1.4	1.5	1.0	0.8	1.0	0.8	1.6	6.5	
17-Jul	0.6	0.9	0.8	1.4	Z	2.8	2.0	1.7	3.7	3.1	1.3	1.9	2.5	2.0	1.6	1.7	2.2	2.2	0.5	0.7	0.9	2.6	0.4	0.5	1.6	3.7	
18-Jul	0.6	0.5	1.2	0.4	0.4	Z	1.1	2.5	1.8	0.8	1.3	1.4	0.7	0.7	1.0	3.6	1.7	4.0	1.8	2.3	6.2	1.9	3.5	1.8	1.8	6.2	
19-Jul	Z	2.9	1.8	2.1	1.9	2.4	8.3	7.3	3.3	3.2	1.0	1.0	1.0	2.9	5.2	3.3	1.0	0.9	8.9	2.4	2.0	1.4	1.7	5.9	3.1	8.9	
20-Jul	8.4	Z	1.6	2.7	4.2	4.5	4.4	2.9	2.6	3.8	4.3	3.4	M	M	M	M	11.0	6.6	3.0	1.5	1.8	2.0	1.4	1.7	3.8	11.0	
21-Jul	2.2	3.6	Z	3.2	1.8	4.2	6.1	3.9	2.1	2.6	1.9	4.7	3.9	2.8	5.0	4.0	6.6	4.1	2.3	1.5	5.7	2.5	6.4	1.9	3.6	6.6	
22-Jul	1.9	2.4	2.9	Z	2.9	7.6	8.3	4.2	5.4	4.2	1.2	2.2	1.1	1.1	1.1	0.9	1.0	1.6	1.6	1.2	1.1	1.0	1.7	2.2	2.6	8.3	
23-Jul	2.4	6.0	2.5	2.7	Z	6.0	5.1	3.2	2.6	1.7	1.8	2.0	1.6	1.3	1.3	1.0	0.9	1.2	1.6	3.3	1.5	0.9	1.1	1.7	2.3	6.0	
24-Jul	1.5	1.7	1.0	1.8	2.6	Z	7.1	5.7	4.2	1.7	1.4	1.4	1.2	1.7	1.0	1.1	1.1	1.3	0.7	1.1	0.7	0.7	0.9	0.6	1.8	7.1	
25-Jul	Z	0.5	1.7	3.9	1.4	2.0	1.9	2.3	1.7	1.7	0.8	1.7	7.9	4.1	3.2	2.3	6.3	5.5	3.1	1.3	1.8	1.3	0.9	1.1	2.5	7.9	
26-Jul	0.5	Z	1.0	1.1	0.7	2.2	1.7	1.4	1.5	1.1	1.0	1.5	1.1	2.0	1.2	1.5	1.0	1.5	1.0	0.9	0.6	0.8	1.1	1.0	1.2	2.2	
27-Jul	0.6	0.8	Z	1.2	1.4	1.3	1.9	1.4	0.9	1.7	1.3	0.4	0.4	0.6	0.5	0.5	0.4	0.2	0.2	0.5	0.8	0.8	0.8	1.5	0.9	1.9	
28-Jul	1.4	1.2	0.8	Z	3.6	5.5	8.5	8.1	3.8	8.5	0.6	1.0	1.4	2.3	2.2	1.1	1.7	1.7	2.4	2.6	3.0	1.4	1.3	1.4	2.8	8.5	
29-Jul	0.9	1.0	1.1	1.2	Z	5.9	3.3	4.1	2.0	1.4	2.2	1.5	0.8	5.3	2.9	2.9	2.5	4.4	1.6	1.1	1.0	1.3	0.9	0.7	2.2	5.9	
30-Jul	1.0	1.7	2.9	3.5	8.2	Z	5.0	4.5	3.6	2.1	1.1	1.6	1.1	2.1	1.5	1.4	1.8	1.0	1.2	1.0	1.0	1.1	0.7	0.6	2.2	8.2	
31-Jul	Z	1.6	2.7	2.4	1.7	4.9	1.5	1.6	2.0	1.4	1.1	1.0	1.3	1.2	0.8	0.9	0.8	0.7	0.8	1.0	1.1	1.2	1.6	0.8	1.5	4.9	
																								Diurnal Average			
																								Diurnal Maximum			
																								2.4 2.0 2.0 3.4 3.6 5.7 5.0 3.7 2.4 2.4 1.7 1.8 2.2 2.2 2.1 2.2 3.0 2.5 2.3 1.8 2.0 1.6 2.0 2.1			
																								10.6 6.0 9.3 17.1 13.5 26.3 20.2 11.1 5.4 8.5 6.5 4.7 15.8 12.0 8.5 15.8 25.0 12.7 12.4 8.3 7.9 6.6 8.3 6.5			
Z - zerospan C - Calibration M - Maintenance																											



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Christina Lake - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Christina Lake - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	679	99.71	99.71
21 - 40	2	0.29	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Christina Lake - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	16	57	54	31	18	24	44	32	49	78	66	88	59	25	22	16	679
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	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	16	57	54	31	18	24	44	32	49	78	66	88	59	26	23	16	681

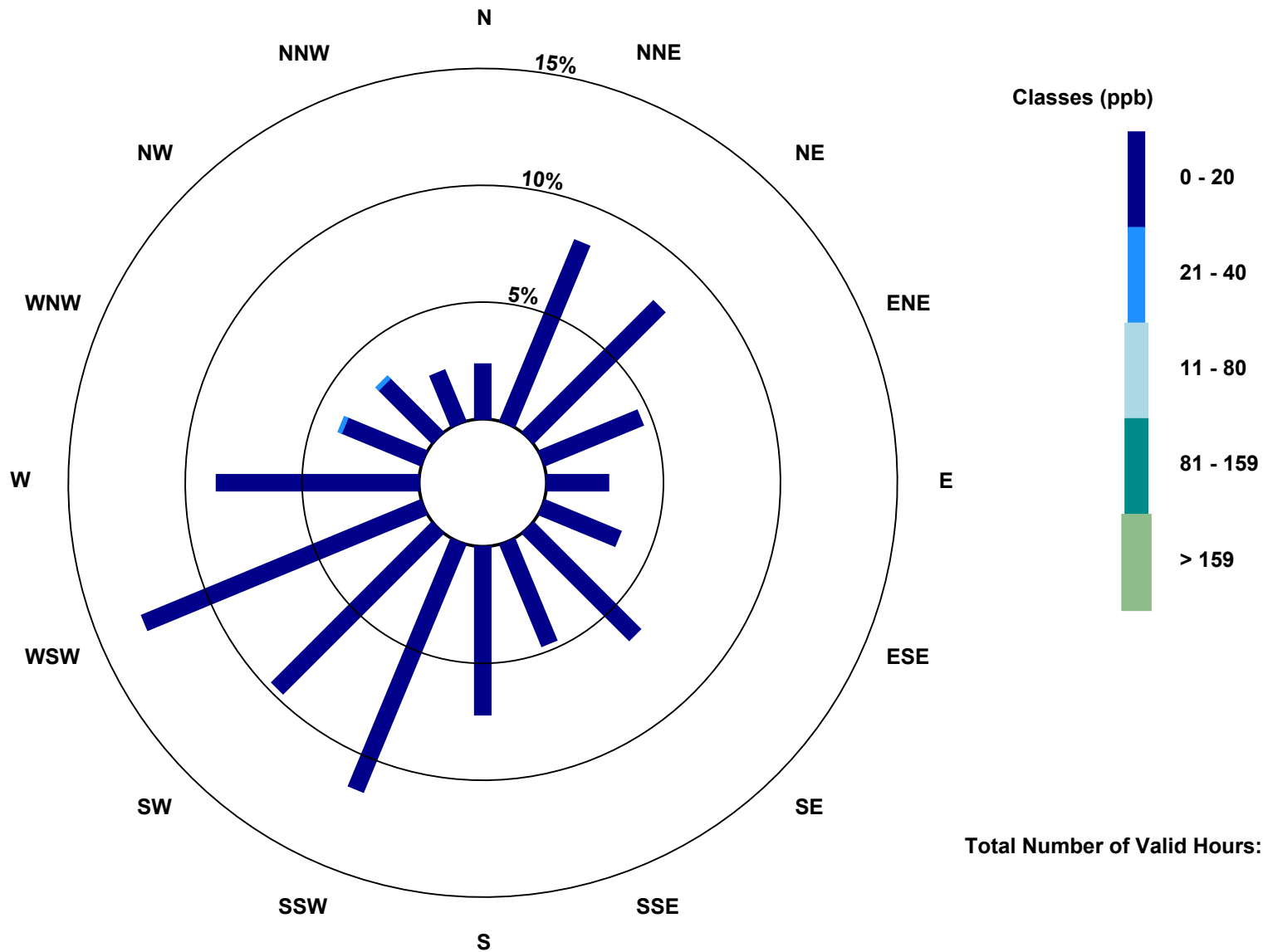
Total Number of Valid Hours: 681

Total Number of Hours: 744

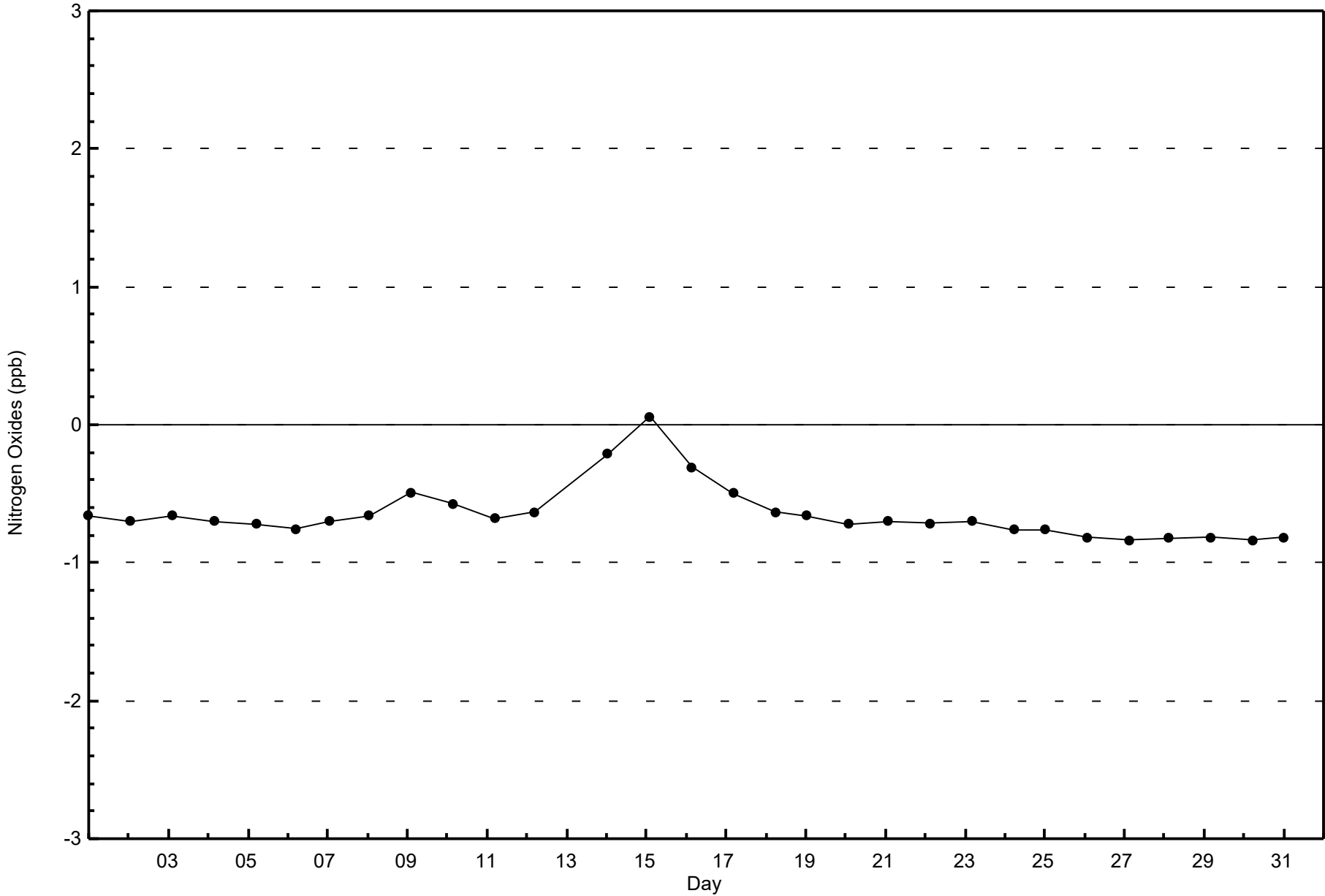


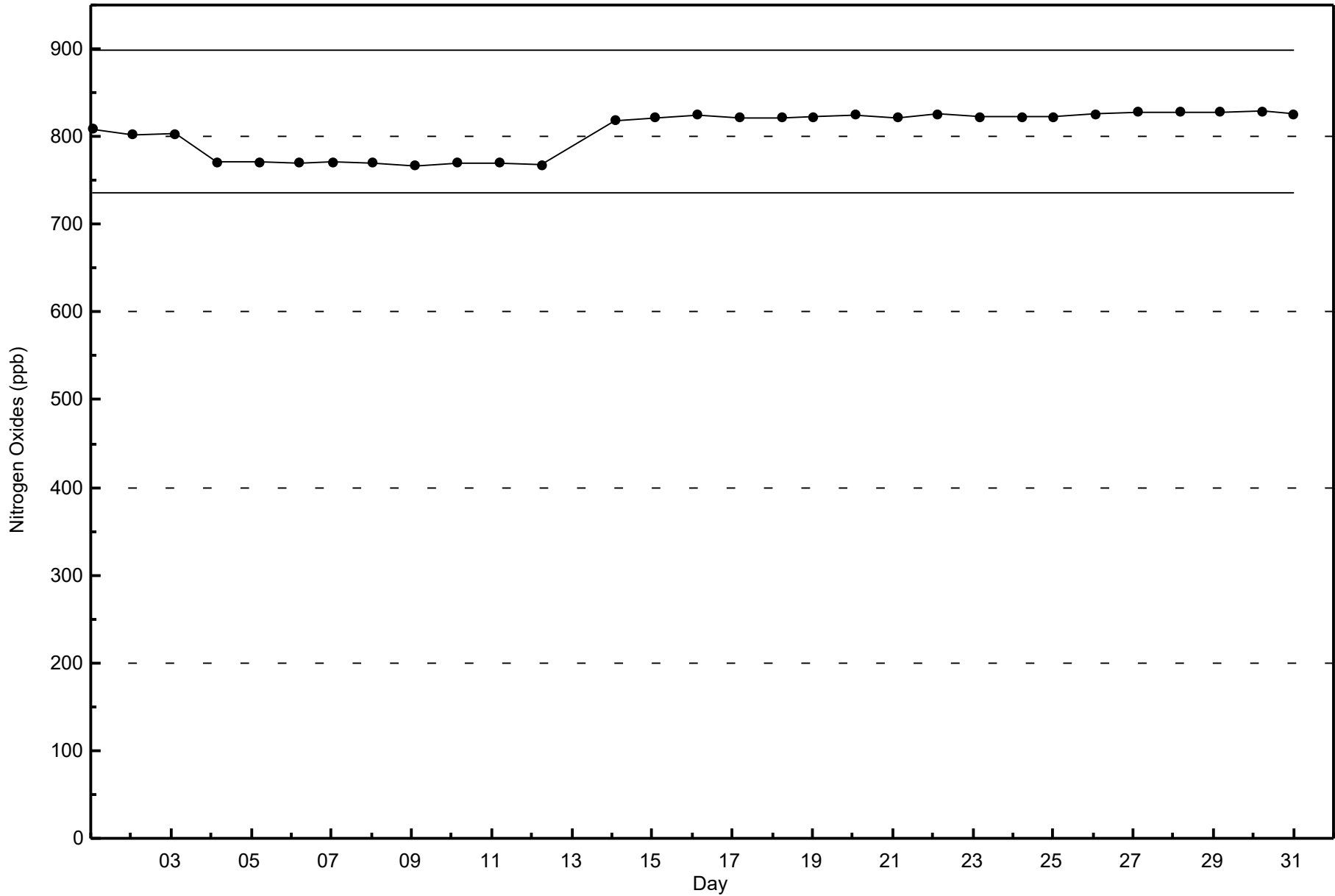
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Christina Lake



Total Number of Valid Hours: 681







Wood Buffalo Environmental Association
Summary of Hour Averages

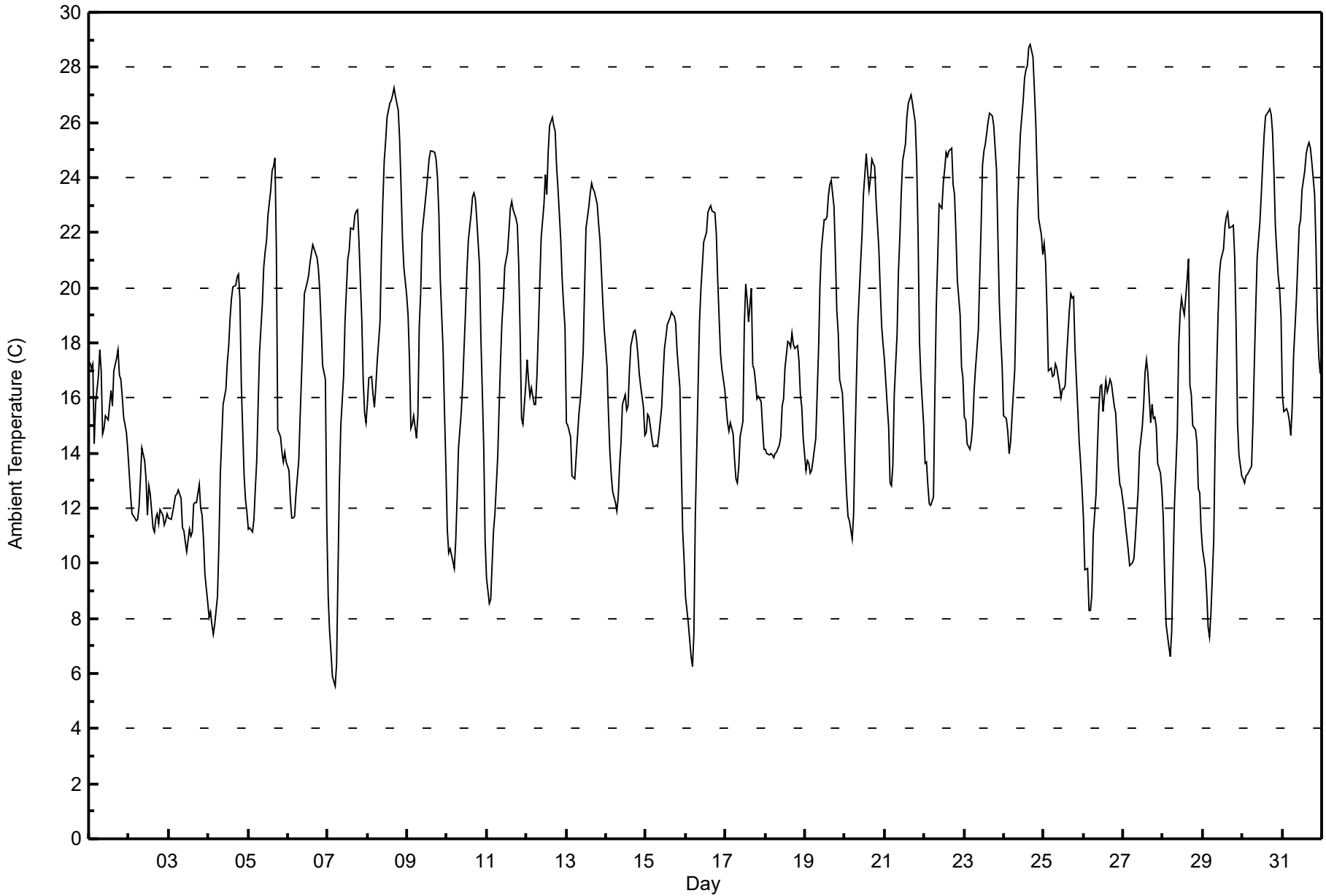
Ambient Temperature (AT) - C
Christina Lake - July 2023

Maximum Value: 28.8 C on Jul 24 17:00 Maximum Daily Average: 22.4 C on Jul 24																						Hours in Service: 744 Hours of Data: 744																										
Minimum Value: 5.5 C on Jul 7 05:00 Minimum Daily Average: 11.5 C on Jul 3 Maximum Diurnal Average: 21.8 C at hour 16 Minimum Diurnal Average: 12.1 C at hour 4 Monthly Average: 17.24 C Percentiles: P ₁ = 7.1 P ₁₀ = 11.3 Q ₁ = 13.7 Median = 16.7 Q ₃ = 21.1 P ₉₀ = 24.2 P ₉₉ = 27.1																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	17.3	17.1	17.2	14.3	15.8	16.8	17.8	17.0	14.7	14.9	15.3	15.2	15.7	16.3	15.7	17.0	17.4	17.7	16.9	16.7	16.1	15.3	14.7	14.1	16.1	17.8																						
2-Jul	13.3	12.5	11.8	11.6	11.6	11.6	12.1	13.0	14.2	13.7	13.1	11.7	12.8	12.5	11.3	11.1	11.6	11.8	11.5	11.9	11.7	11.4	11.5	11.8	12.1	14.2																						
3-Jul	11.7	11.6	11.8	12.2	12.5	12.5	12.7	12.3	11.3	11.2	10.8	10.4	11.2	11.0	11.2	12.1	12.2	12.2	12.9	12.0	11.7	10.9	9.6	8.6	11.5	12.9																						
4-Jul	8.1	8.2	7.8	7.4	7.8	8.8	10.7	13.2	14.5	15.7	16.3	17.3	17.9	18.9	19.6	20.1	20.1	20.4	20.5	19.6	16.5	13.2	12.3	11.8	14.4	20.5																						
5-Jul	11.2	11.3	11.2	11.6	12.7	13.7	15.8	17.6	19.4	20.7	21.3	21.7	22.6	23.6	24.2	24.4	24.7	21.5	14.9	14.6	14.0	13.7	14.0	13.7	17.3	24.7																						
6-Jul	13.4	12.3	11.6	11.7	11.7	12.5	13.7	15.4	16.8	18.3	19.8	20.2	20.4	20.9	21.3	21.6	21.4	21.1	20.7	19.9	18.6	17.2	16.7	11.5	17.0	21.6																						
7-Jul	8.8	7.5	6.8	5.9	5.5	6.3	9.7	12.9	15.0	16.8	18.8	19.9	21.0	21.4	22.2	22.1	22.6	22.8	22.9	21.6	18.8	16.6	15.4	15.1	15.7	22.9																						
8-Jul	15.8	16.7	16.8	16.1	15.6	16.4	17.4	18.8	21.3	23.1	24.6	25.3	26.2	26.7	26.8	27.0	27.3	27.0	26.4	25.4	23.6	21.8	20.7	19.7	21.9	27.3																						
9-Jul	19.0	17.4	14.9	15.1	15.4	14.5	15.4	18.6	19.8	21.9	23.0	23.5	24.1	24.7	25.0	25.0	24.9	24.7	24.0	22.7	20.3	17.8	15.5	13.5	20.0	25.0																						
10-Jul	11.2	10.4	10.5	10.1	9.8	10.8	12.3	14.2	15.5	16.5	17.8	19.1	20.6	21.7	22.7	23.3	23.4	23.2	22.5	20.8	18.1	16.2	14.3	10.8	16.5	23.4																						
11-Jul	9.5	8.5	8.7	10.0	11.2	11.8	13.9	15.7	17.3	18.8	19.6	20.8	21.3	22.1	22.9	23.1	22.8	22.5	22.3	20.8	18.3	15.2	15.1	16.5	17.0	23.1																						
12-Jul	17.4	16.6	16.1	16.4	15.8	15.8	16.8	18.5	20.2	21.8	23.0	24.1	23.4	24.9	25.9	26.2	25.9	25.7	24.4	23.6	21.7	20.3	19.3	18.5	20.9	26.2																						
13-Jul	15.1	15.0	14.6	13.2	13.1	13.1	13.9	15.5	15.9	16.7	17.7	20.0	22.2	22.9	23.5	23.8	23.6	23.5	23.0	22.3	21.7	20.6	19.5	18.5	18.7	23.8																						
14-Jul	17.1	15.5	14.1	13.2	12.6	12.2	11.9	12.4	13.6	14.4	15.8	16.1	15.6	15.7	17.0	17.9	18.4	18.5	18.2	17.6	16.9	16.4	15.7	14.7	15.5	18.5																						
15-Jul	14.7	15.4	15.3	14.6	14.3	14.2	14.3	14.3	14.6	15.7	16.8	17.8	18.2	18.7	18.9	19.1	19.0	18.9	18.7	17.7	16.4	13.6	11.2	10.1	15.9	19.1																						
16-Jul	8.8	7.8	7.2	6.6	6.2	7.4	11.6	16.4	18.7	20.0	20.8	21.7	22.0	22.7	22.9	23.0	22.8	22.8	22.0	20.3	18.9	17.6	17.0	16.3	16.7	23.0																						
17-Jul	15.7	15.1	14.8	15.1	14.7	13.8	13.1	12.9	13.5	14.6	15.1	18.7	20.1	19.6	18.8	20.0	17.2	17.0	16.6	16.0	16.1	15.9	15.0	14.2	16.0	20.1																						
18-Jul	14.1	14.0	13.9	14.0	13.9	13.9	14.0	14.0	14.3	14.6	15.7	16.0	17.1	18.1	18.0	17.9	18.3	18.0	17.8	17.9	17.3	16.1	15.7	14.5	15.8	18.3																						
19-Jul	13.4	13.7	13.6	13.2	13.4	13.8	14.6	16.2	17.8	20.1	21.4	22.5	22.5	22.6	23.3	23.8	23.9	22.9	21.2	19.2	18.4	16.7	16.2	15.0	18.3	23.9																						
20-Jul	13.6	12.5	11.7	11.6	10.9	11.8	14.5	16.6	18.7	20.9	21.9	23.4	24.1	24.8	23.6	23.9	24.7	24.5	24.4	23.2	21.4	19.9	18.6	18.0	19.1	24.8																						
21-Jul	17.4	15.7	15.0	12.9	12.8	13.6	16.1	18.3	20.6	21.8	23.4	24.6	25.2	26.2	26.7	26.8	27.0	26.7	26.0	24.5	21.9	18.0	16.7	15.0	20.5	27.0																						
22-Jul	13.6	13.7	12.8	12.1	12.1	12.4	16.2	19.3	21.1	23.0	22.9	23.8	24.3	24.9	24.8	25.0	25.1	23.7	23.4	22.0	20.3	19.0	17.1	16.7	19.6	25.1																						
23-Jul	15.3	15.2	14.4	14.1	14.4	15.0	16.3	17.1	18.5	20.4	22.3	24.4	25.0	25.2	26.0	26.4	26.3	26.2	25.9	24.3	21.8	19.4	18.2	17.2	20.4	26.4																						
24-Jul	15.4	15.3	14.8	14.0	14.4	15.3	17.0	19.5	22.8	24.4	25.6	26.8	27.6	27.9	28.1	28.8	28.8	28.4	27.2	26.0	24.2	22.5	21.9	21.2	22.4	28.8																						
25-Jul	21.6	21.0	19.2	17.0	17.1	16.8	16.8	17.2	17.1	16.4	16.0	16.3	16.3	16.5	17.5	19.2	19.8	19.6	19.7	17.8	15.5	14.4	13.6	12.7	17.3	21.6																						
26-Jul	11.7	9.8	9.8	8.3	8.3	8.9	11.0	12.5	14.2	15.6	16.4	16.5	15.5	16.6	16.2	16.4	16.7	16.5	15.7	15.5	14.5	13.5	12.8	12.7	13.6	16.7																						
27-Jul	11.9	11.4	10.9	10.5	9.9	10.0	10.2	10.9	11.8	12.6	14.0	14.9	15.8	16.9	17.4	16.9	15.1	15.7	15.3	15.3	14.9	13.6	13.3	12.6	13.4	17.4																						
28-Jul	11.7	9.4	7.8	7.0	6.6	7.5	9.9	12.1	14.8	17.9	19.1	19.6	19.3	19.0	20.3	21.1	16.5	16.1	15.0	14.9	14.4	12.7	12.6	11.2	14.0	21.1																						
29-Jul	10.5	9.8	8.9	7.7	7.3	8.2	10.9	14.3	16.8	18.8	20.4	21.0	21.4	22.2	22.6	22.7	22.2	22.2	22.3	21.1	18.5	15.1	13.9	13.2	16.3	22.7																						
30-Jul	13.1	12.9	13.2	13.2	13.4	13.5	15.1	17.3	19.3	21.1	22.4	23.4	24.5	25.6	26.3	26.4	26.5	26.3	25.6	24.2	22.2	20.4	20.0	19.0	20.2	26.5																						
31-Jul	16.1	15.5	15.6	15.5	15.1	14.6	15.6	17.5	19.6	20.9	22.2	22.5	23.5	24.2	24.9	25.1	25.3	25.1	24.6	23.4	21.5	18.9	17.5	16.9	20.1	25.3																						
																								13.8	13.2	12.7	12.1	12.1	12.5	13.9	15.5	16.9	18.2	19.1	20.0	20.6	21.1	21.5	21.8	21.7	21.4	20.7	19.8	18.3	16.6	15.7	14.7	Diurnal Average
																								21.6	21.0	19.2	17.0	17.1	16.8	17.8	19.5	22.8	24.4	25.6	26.8	27.6	27.9	28.1	28.8	28.8	28.4	27.2	26.0	24.2	22.5	21.9	21.2	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Christina Lake - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Christina Lake - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	43	5.78	5.78
10 - 20	477	64.11	69.89
> 20	224	30.11	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

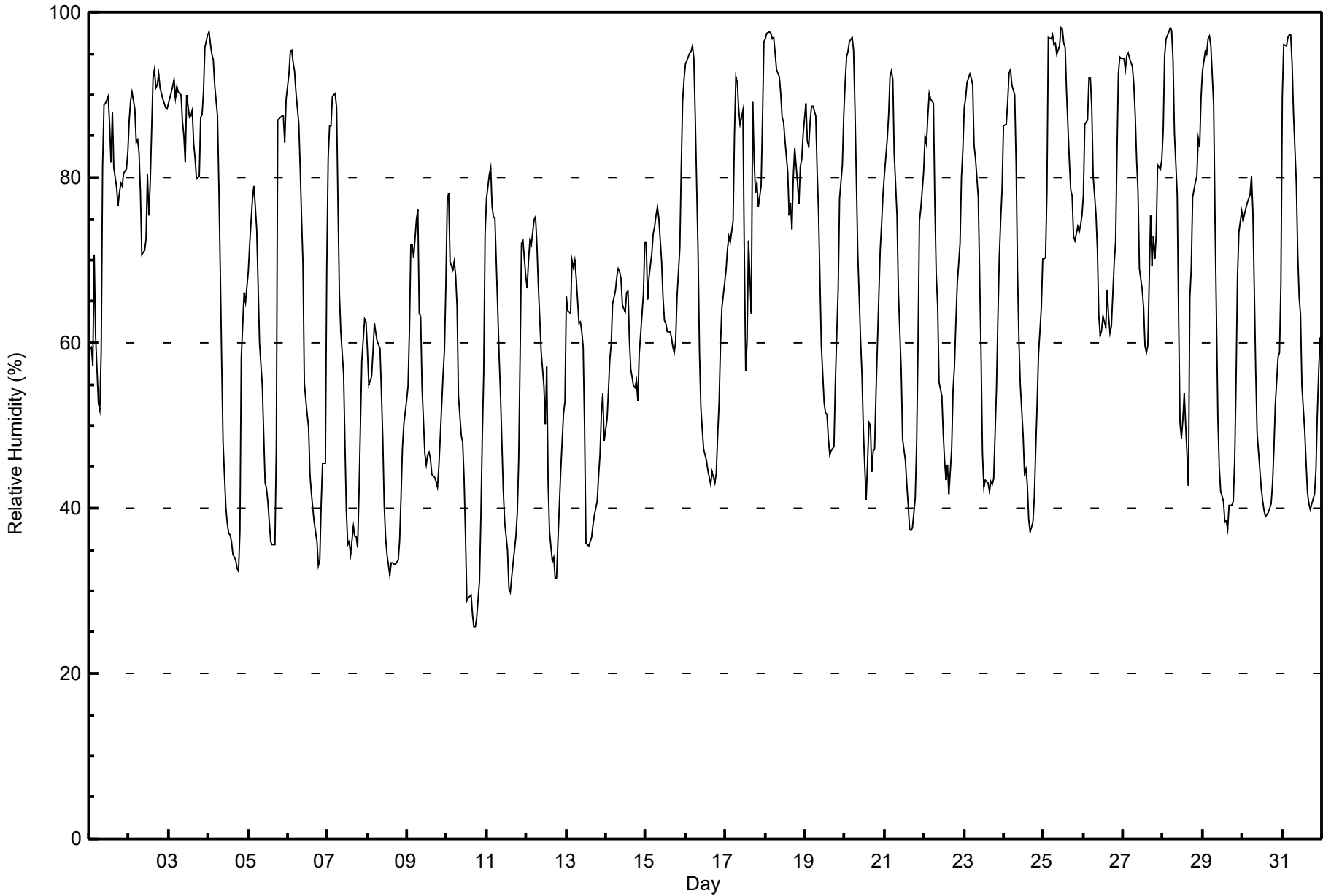
Relative Humidity (RH) - %
Christina Lake - July 2023

Maximum Value: 98.2 % on Jul 25 11:00 Maximum Daily Average: 88.1 % on Jul 3																						Hours in Service:	744																								
Minimum Value: 25.7 % on Jul 10 18:00 Minimum Daily Average: 46.3 % on Jul 8																						Hours of Data:	744																								
Maximum Diurnal Average: 84.7 % at hour 4 Minimum Diurnal Average: 49.5 % at hour 16																						Hours of Missing Data:	0																								
Monthly Average: 66.69 % Percentiles: P₁ = 30.1 P₁₀ = 39.6 Q₁ = 48.9 Median = 68.0 Q₃ = 84.1 P₉₀ = 92.4 P₉₉ = 97.5																						Hours of Calibration:	0																								
																						Percent Operational Time:	100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	59.4	59.6	57.3	70.7	60.9	52.7	51.8	59.0	81.4	88.8	89.0	89.9	86.4	81.9	87.9	81.1	78.8	76.6	78.1	79.3	78.9	80.5	81.0	83.1	74.7	89.9																					
2-Jul	87.0	89.3	90.3	88.3	84.2	84.5	83.0	78.1	70.6	71.2	72.6	80.3	75.5	79.4	92.1	93.1	90.9	91.2	92.5	90.8	89.6	88.9	88.5	88.4	85.0	93.1																					
3-Jul	89.1	90.4	91.1	91.9	89.6	91.0	90.4	90.1	86.7	85.1	81.9	90.0	87.3	87.5	88.1	84.0	82.4	79.8	80.1	87.2	87.6	90.3	95.8	97.3	88.1	97.3																					
4-Jul	97.7	96.1	95.0	94.2	91.3	87.4	78.7	68.6	57.6	47.7	40.0	38.1	37.0	36.7	35.9	34.5	33.7	32.6	32.4	37.1	58.3	66.1	64.8	66.8	59.5	97.7																					
5-Jul	68.7	72.0	77.5	79.0	76.4	73.7	66.9	60.1	54.8	48.9	43.1	42.3	40.6	35.9	35.7	35.5	35.6	47.5	86.9	87.2	87.5	87.5	84.3	89.5	63.2	89.5																					
6-Jul	92.6	95.2	95.5	93.8	93.0	90.4	86.6	81.3	75.0	69.6	55.2	51.4	49.8	44.1	41.9	39.9	38.2	36.0	33.1	33.8	40.5	45.5	45.4	69.1	62.4	95.5																					
7-Jul	82.3	86.3	86.3	89.8	90.2	88.5	76.8	66.2	61.3	56.3	47.6	39.5	35.6	35.9	34.5	37.8	36.6	36.6	35.3	41.8	57.9	60.3	62.8	62.5	58.7	90.2																					
8-Jul	59.2	54.9	55.9	58.9	62.4	61.2	60.1	59.3	54.1	48.4	40.3	36.4	34.3	31.9	33.3	33.3	33.2	33.3	33.8	36.2	41.4	47.2	50.2	53.0	46.3	62.4																					
9-Jul	54.8	61.5	71.9	71.8	70.3	75.0	76.1	63.6	63.1	54.5	46.6	45.3	46.5	46.7	45.9	44.0	43.7	43.2	42.6	45.2	48.7	56.0	59.2	67.0	56.0	76.1																					
10-Jul	77.1	78.1	69.8	68.7	69.9	68.2	64.4	53.6	48.8	48.0	43.6	36.8	28.8	29.2	29.5	27.1	25.7	25.7	26.8	31.3	39.0	48.7	56.1	73.0	48.7	78.1																					
11-Jul	77.4	80.3	81.2	76.5	75.3	75.0	64.3	58.5	53.7	47.7	42.1	38.2	34.9	30.3	29.9	31.7	33.4	36.7	39.5	45.9	58.4	72.0	72.3	68.1	55.1	81.2																					
12-Jul	66.6	70.1	72.4	71.9	74.9	75.2	71.8	67.0	63.1	58.9	54.7	50.1	57.2	43.1	37.1	33.6	34.0	31.6	31.5	36.1	44.6	48.1	51.5	52.9	54.1	75.2																					
13-Jul	65.6	63.8	63.6	69.9	69.1	70.0	68.0	62.4	62.5	61.4	59.4	49.6	35.8	35.5	36.0	36.4	37.9	39.2	40.8	43.8	46.4	51.3	53.8	48.1	52.9	70.0																					
14-Jul	50.7	54.1	58.0	59.8	64.8	66.3	68.0	68.9	68.7	67.9	64.6	63.7	66.1	66.2	60.4	56.8	54.8	54.7	55.4	53.0	58.7	61.0	65.9	72.2	61.7	72.2																					
15-Jul	72.2	65.2	67.9	70.9	73.3	74.0	75.5	76.4	75.1	69.9	65.4	62.7	62.4	61.4	61.3	60.7	59.5	58.7	60.2	65.6	71.5	81.2	89.4	91.9	69.7	91.9																					
16-Jul	93.7	94.5	95.1	95.3	96.0	94.5	87.3	71.1	59.1	52.2	49.4	47.1	45.8	44.5	43.8	42.9	44.5	43.0	44.2	48.8	52.7	59.7	64.3	67.2	64.0	96.0																					
17-Jul	68.9	71.4	72.9	72.2	74.7	85.2	92.2	91.5	88.3	86.5	88.1	71.0	56.5	60.4	72.4	63.6	89.2	82.3	78.1	79.4	76.5	79.0	87.2	96.5	78.5	96.5																					
18-Jul	96.7	97.4	97.6	97.5	96.8	96.9	95.1	93.1	92.1	90.2	87.2	86.7	84.6	80.7	75.3	77.0	73.8	80.2	83.6	79.4	76.8	81.3	82.2	85.2	87.0	97.6																					
19-Jul	88.9	84.3	83.8	86.8	88.7	88.6	87.5	80.9	75.8	67.6	59.7	52.7	51.6	51.4	48.4	46.5	47.0	47.4	55.3	60.9	66.4	77.5	81.5	87.6	69.5	88.9																					
20-Jul	91.5	94.6	95.3	96.4	96.9	95.5	88.2	79.7	70.8	60.3	56.2	49.3	45.0	41.0	50.3	49.9	44.4	47.0	47.1	54.0	65.6	71.1	74.5	77.9	68.4	96.9																					
21-Jul	80.3	84.6	87.5	92.3	92.9	91.9	82.9	75.4	66.2	61.4	56.6	48.3	45.7	42.9	40.3	37.4	37.3	37.7	41.2	47.9	59.6	74.7	76.2	80.7	64.2	92.9																					
22-Jul	84.9	84.0	87.5	90.2	89.5	88.9	76.9	68.3	64.6	55.3	53.5	49.0	45.7	43.3	45.3	41.6	47.1	54.2	57.1	62.3	67.2	72.1	80.0	83.4	66.3	90.2																					
23-Jul	88.5	89.6	91.5	92.5	92.1	91.2	83.9	82.4	77.6	68.0	58.5	46.7	42.6	43.3	43.0	42.0	43.1	43.0	43.6	54.4	63.0	70.4	75.0	78.7	66.9	92.5																					
24-Jul	86.3	86.4	89.2	92.7	93.0	91.3	90.0	81.8	68.8	60.4	54.9	48.8	44.3	44.7	42.9	38.6	37.2	38.3	41.4	47.1	52.5	58.7	64.2	70.2	63.5	93.0																					
25-Jul	70.1	70.4	78.3	97.0	96.7	97.3	96.2	96.3	94.9	95.9	98.2	97.9	96.3	95.8	90.4	82.1	78.5	77.7	72.9	72.5	74.1	73.4	74.2	75.5	85.5	98.2																					
26-Jul	77.8	86.5	87.0	92.0	92.1	88.6	80.2	75.6	71.3	63.4	60.9	61.5	63.2	61.8	66.5	63.2	61.1	62.1	69.6	72.1	82.8	92.6	94.7	94.5	75.9	94.7																					
27-Jul	94.5	93.0	94.7	95.1	94.5	93.4	91.4	87.7	82.3	78.3	68.9	66.5	64.2	59.7	58.8	59.7	75.4	69.3	72.9	70.2	73.1	81.4	81.0	82.1	78.7	95.1																					
28-Jul	85.7	94.8	96.8	97.7	98.1	97.8	94.2	85.4	78.0	63.1	50.3	48.5	50.7	53.9	46.4	42.7	65.5	68.9	77.6	79.5	80.2	84.8	83.7	89.6	75.6	98.1																					
29-Jul	92.9	95.3	95.0	96.7	97.2	96.0	88.9	74.6	62.8	51.0	44.9	42.1	40.9	38.4	38.5	37.5	40.3	40.4	40.9	45.8	55.5	68.0	73.3	75.9	63.9	97.2																					
30-Jul	74.7	75.6	76.2	77.0	77.9	80.2	76.0	66.5	56.8	49.1	44.6	42.3	40.8	39.6	39.0	39.6	40.0	40.6	42.9	47.0	52.6	58.3	58.9	67.1	56.8	80.2																					
31-Jul	89.9	96.1	95.9	96.9	97.3	97.4	93.7	87.6	79.4	70.9	65.6	63.4	54.8	49.4	45.5	41.8	40.6	39.8	40.5	41.7	44.5	51.3	56.5	60.6	66.7	97.4																					
																						79.5	81.1	82.5	84.7	84.5	84.1	80.2	74.5	69.8	64.4	59.5	56.0	53.3	51.5	51.5	49.5	51.1	51.4	54.1	57.3	63.0	69.0	71.9	76.0	Diurnal Average	
																						97.7	97.4	97.6	97.7	98.1	97.8	96.2	96.3	94.9	95.9	98.2	97.9	96.3	95.8	92.1	93.1	90.9	91.2	92.5	90.8	89.6	92.6	95.8	97.3	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Christina Lake - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Christina Lake - July 2023**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	79	10.62	10.62
40 - 60	206	27.69	38.31
60 - 80	229	30.78	69.09
80 - 100	230	30.91	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Christina Lake - July 2023

Maximum Speed: 29 km/h on Jul 3 10:00	Maximum Daily Speed Average: 15.3 km/h on Jul 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 7 00:00	Minimum Daily Speed Average: 0.7 km/h on Jul 7	Hours of Data: 744
Maximum Diurnal Speed Average: 3.6 km/h at hour 1	Minimum Diurnal Speed Average: 1.3 km/h at hour 9	Hours of Missing Data: 0
Monthly Average Velocity: 1.7 km/h 266.0 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 13 P ₉₀ = 16 P ₉₉ = 24	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	SW4	SW6	WSW3	S5	WSW7	WSW9	W9	W10	S3	E10	SE6	E6	NE10	SE3	SW7	WSW7	WSW3	WNW15	WNW12	WSW10	WSW9	WSW9	WSW11	WSW11	WSW4.5	WNW15	
2-Jul	WSW10	WSW11	WSW11	WSW12	W13	WSW12	W13	W14	W17	WSW16	W16	W14	W16	W19	WNW15	NW24	WNW21	WNW20	WNW19	WNW18	WNW18	W18	WNW19	WNW19	W15.3	NW24	
3-Jul	W18	W17	WNW17	WNW16	WNW19	WNW20	WNW20	NW26	NNW24	NNW29	NNW27	NNW22	N25	NNE23	NNE16	NNE16	NE14	NE9	WN9	NE9	NNE6	SW3	SSW7	SSW6	NNW12.1	NNW29	
4-Jul	SW8	SW8	SW11	SW10	WSW5	W4	W3	NE3	NE8	NE9	NE9	NNE10	N5	N5	NW7	NNE3	NNW4	NW3	WSW9	SW5	SSW7	S8	SSW6	SSW8	WSW1.7	SW11	
5-Jul	SSW9	SSW10	SSW8	SW8	SW13	SW14	WSW14	WSW14	WSW12	WSW14	WSW15	WSW14	WSW15	WSW15	W13	W12	WSW10	NNW12	ENE6	W14	SSW12	SSW9	W5	W16	WSW10.2	W16	
6-Jul	SW6	SSW4	SSW5	WSW9	WSW9	WSW8	W6	NW6	NNE3	NE4	NE10	NE10	NE13	NNE12	NNE14	N14	N17	NNE18	NNE17	NNE14	NNE12	NNE11	N12	SSE0	NNE6.0	NNE18	
7-Jul	SW5	SW5	SSW6	SSW5	SSW5	SSW5	WSW3	NNW4	N5	NE7	NNE7	NE9	ENE6	NE9	ENE5	NE8	N4	NNE5	WSW8	SW6	SW7	SSW10	SW9	SW8	SW0.7	SSW10	
8-Jul	SW10	SW12	WSW10	WSW12	WSW9	W9	W10	WSW10	W12	W16	W17	W18	WNW18	WNW20	W17	WNW18	WNW18	W15	W13	W11	WSW9	WSW9	WSW9	WSW10	W12.4	WNW20	
9-Jul	WSW9	W3	SSW3	SW7	WSW4	SW3	SW1	N2	NNE5	NNE6	NE12	NE12	NE11	NE14	NE16	NNE15	NE16	NE16	NE14	ENE11	ENE14	ENE8	E9	E5	NE6.3	NE16	
10-Jul	E5	E6	E8	E8	ESE6	E5	ESE8	SE16	SE16	ESE14	E17	ESE16	ESE15	ESE12	SE10	ESE11	SE13	ESE13	SE9	SE8	SSE9	S9	SE8	SE5	ESE9.6	ESE17	
11-Jul	ESE4	SSE3	ESE3	SSW4	N1	SSE2	S5	SSE7	SSE8	S9	S12	S9	S9	SW8	SSW6	SW5	WSW6	SW6	WSW7	WSW9	SW6	S4	SSW6	SW7	SSW4.9	S12	
12-Jul	WSW9	SW6	SW6	SW8	SSW7	SW6	SW5	WSW8	WSW8	W6	W7	NW12	WNW9	N14	N16	N17	NNE18	NNE19	NNE16	NNE9	NE7	NNE9	N9	NNW4	NNW4.7	NNE19	
13-Jul	SSW4	WSW5	SW4	SW4	SW6	WSW4	WSW6	NW15	NW16	NW17	NW17	NNW19	NW22	NNW23	NNW25	NNW25	NNW24	NNW22	NNW18	NW13	W13	NNW13	NW14	N12	NW12.3	NNW25	
14-Jul	NW13	NW14	NW13	NW14	NNW13	NW15	NW16	NW13	NW12	NNW15	NNW16	NNE17	NNE16	NNE13	NNE14	N14	NNE13	NNE12	NNE12	NE9	NE7	NE1	ESE2	SE2	N10.0	NNE17	
15-Jul	SSW3	WNW6	N8	NW13	NW12	N10	N8	NNE8	NNE7	NE9	NE7	NE8	NE10	NE12	NE12	NE13	NNE14	NE13	NE13	NE12	ENE7	SE3	SSW5	SSW5	NNE6.5	NNE14	
16-Jul	SSW4	SSW4	SW5	SSE3	SSW4	S3	SE2	SE6	SSE9	SSE9	SE9	SE10	SE9	SE12	SSE9	SSE12	SSE12	SSE9	S10	S10	SSE9	SSE9	SSE11	SSE13	SSE7.5	SSE13	
17-Jul	SSE12	SSE10	SSE9	S9	SSE7	SSE9	SE12	SE11	SE10	NE4	NNE13	E11	ESE15	SE10	NNE4	E5	N5	ENE9	ENE12	E13	ESE14	ESE14	E10	ENE9	ESE7.6	ESE15	
18-Jul	ENE8	ENE11	NE14	NNE13	NNE14	NE10	NNE13	NE10	NNE7	N8	NNE14	NNE14	NNE13	NNE11	ENE6	S4	SW6	SW6	SW5	SW5	W5	W9	W11	W6	NNE5.0	NNE14	
19-Jul	SE2	SSW4	SW10	SW9	WSW11	SSW5	SW9	WSW9	SW7	WSW10	WSW12	WSW12	WSW12	WSW13	WSW11	WSW15	W14	W12	WNW12	W9	W5	S3	SW8	SW7	WSW8.5	WSW15	
20-Jul	SW3	SSW4	S4	SSW8	SSE4	S4	SSW5	SW7	SSW6	SW5	W4	W6	W5	W9	NNW12	NNW8	WNW13	WNW11	W10	WSW9	WSW9	WSW11	WSW10	WSW10	WSW5.3	WNW13	
21-Jul	WSW10	SW6	SSW3	SSW6	SSW6	SW7	SW9	N1	NNE2	S2	N8	NW9	NW5	W6	WNW9	W10	W10	W11	W10	WSW9	SW8	SW6	SSW5	SW5	W5.1	W11	
22-Jul	SSW6	S3	SSW5	S3	SSW5	SSE3	WSW2	W9	SW2	NW8	WSW15	W10	W10	WSW9	SW12	SW11	WSW9	W4	SE2	NNE5	NNE7	SE1	SSW4	ENE2	WSW4.2	WSW15	
23-Jul	SSW4	S2	SSW5	S3	S3	SW7	SSW7	SW7	SW10	SW8	SW5	ESE2	SE1	SSW3	ENE2	E6	E7	ESE6	S5	SE4	S6	SSW6	SSW8	SSW6	SSW3.5	SW10	
24-Jul	SSW5	S5	SSW4	S4	S4	SE3	ENE4	SE3	SE6	SE7	SE10	SE9	SSE11	ESE11	ESE11	ESE13	ESE15	SE15	SE11	SE9	SE9	ESE9	ESE9	ESE8	SE7.3	ESE15	
25-Jul	ESE14	SE17	SSW13	NNW12	ENE13	ENE10	NNE5	NE12	ENE14	NNE8	NNE9	NNE7	NW9	WNW14	NW11	NW9	WSW7	W14	WNW14	W17	W13	WSW11	WSW11	WSW13	NW3.4	SE17	
26-Jul	SW9	SSW7	SSW8	S6	SSW9	S7	SSW11	SSW11	SSW12	S17	SSE17	S13	SW9	ENE4	NE8	SSW5	SSE8	SE7	SE9	E6	NE11	NE14	NE12	ENE15	SSE4.9	S17	
27-Jul	ENE18	ENE16	ENE15	NE16	ENE17	NE15	NE15	ENE15	ENE14	NE12	NE9	NNE14	NNE12	NE14	NE16	NE12	NE10	NNE13	NE9	NNE11	NNE11	ENE4	NNE6	NNE6	NE12.1	ENE18	
28-Jul	N2	SW5	SSW3	SSW4	SSW4	SSW4	WSW2	WNW2	ENE2	E3	NE7	ENE6	ENE8	SE6	NNE8	E7	S13	SE2	SW6	SW3	SW8	SSW8	SW5	SSE3	S1.7	S13	
29-Jul	SSE3	SSW6	S4	SSW5	SSW6	SSW5	SSW5	SW7	SW6	SSW5	S4	SSW8	SSW11	SW10	SSW10	SSW11	SSW9	SW10	SW10	SSW8	SSW7	SSW6	SSW7	S7	SSW6.9	SSW11	
30-Jul	SSW10	S10	S11	SSW12	S8	ESE4	SE3	S10	S15	S17	S18	S17	S18	S16	S16	S16	S13	SSE16	SSE13	SSE12	SE10	SE8	SE10	SSE15	S11.9	S18	
31-Jul	SSW10	E4	NE4	WSW4	SSE4	S5	S8	SSW7	SW8	WSW11	W13	WSW15	W16	WSW16	WSW16	WSW16	WSW16	WSW18	WSW17	WSW16	WSW15	WSW17	WSW16	WSW14	WSW16	WSW10.5	WSW18

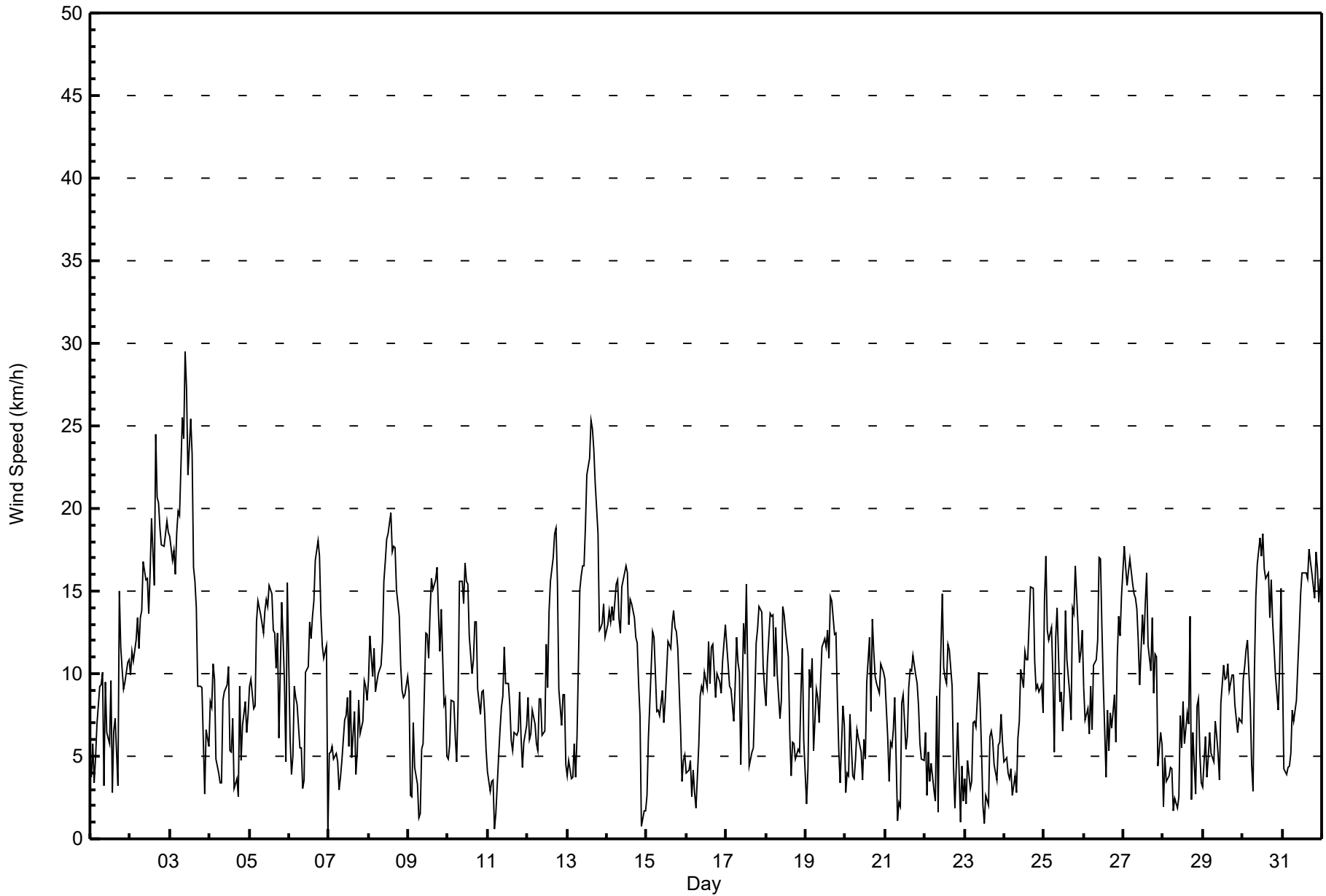
SSW3.6SSW3.1 SW3.1WSW3.5WSW3.0WSW2.5WSW2.9 W2.5WSW1.3WNW1.5NNW1.8NNW2.2 NW2.2NNW2.4NNW3.5NNW2.8 NW2.3NNW2.9NNW2.5 W2.1 SW1.9 SW2.6 SW2.9 SW3.4 W18 SE17WNW17 NE16WNW19WNW20WNW20 NW26 NNW24 NNW29 NNW27 NNW22 N25 NNE23 NNW25 NNW25 NNW24 NNW22WNW19WNW18WNW18 W18WNW19WNW19	Diurnal Average
	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Christina Lake - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Christina Lake - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	169	22.72	22.72
6 - 11	326	43.82	66.53
12 - 19	230	30.91	97.45
20 - 28	18	2.42	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
Christina Lake - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	8	5	7	6	5	14	9	22	39	19	11	9	1	2	4	169
6 - 11	6	21	26	14	12	9	25	16	16	44	51	51	22	4	8	1	326
12 - 19	7	32	25	11	1	12	7	9	13	3	5	31	30	18	17	9	230
20 - 28	1	1	0	0	0	0	0	0	0	0	0	0	0	5	3	8	18
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	22	62	56	32	19	26	46	34	51	86	75	93	61	28	30	23	744

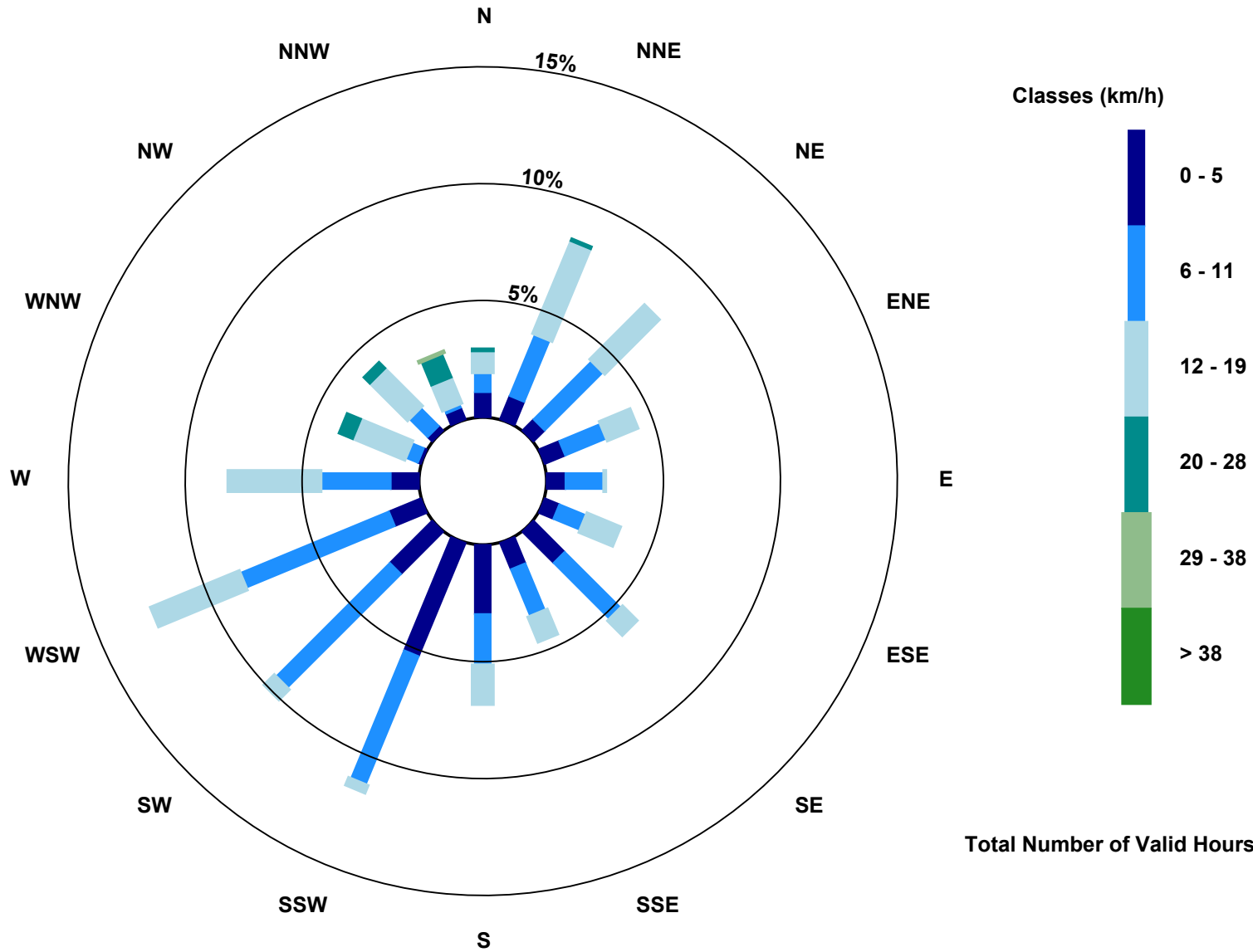
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Christina Lake





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Christina Lake - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Jul 25 03:00 Minimum Value: 1 km/h on Jul 11 23:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 4 P ₉₉ = 7																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	2	2	2	1	3	3	2	4	2	3	2	3	2	2	3	2	3	5	4	2	2	3	2	2	5
2-Jul	2	2	2	2	4	3	3	4	4	4	4	4	5	5	5	5	6	5	4	4	4	4	5	5	6
3-Jul	5	4	5	4	5	4	5	7	6	7	6	5	7	6	4	4	3	2	3	3	1	1	2	7	
4-Jul	1	2	1	2	2	3	1	1	2	3	4	4	4	4	4	3	3	3	2	3	1	1	1	4	
5-Jul	1	1	2	2	2	2	3	3	3	4	4	5	5	5	4	4	4	10	4	7	3	2	3	10	
6-Jul	3	2	3	2	2	2	2	2	2	3	4	4	4	4	6	5	4	4	4	3	2	2	3	6	
7-Jul	1	1	1	1	1	1	1	2	2	2	3	3	3	3	3	2	3	3	2	2	1	1	1	3	
8-Jul	2	2	2	3	2	2	3	2	3	4	5	5	5	5	5	5	5	4	4	3	2	2	2	5	
9-Jul	2	3	2	4	2	1	1	1	2	3	3	3	4	4	3	4	4	3	3	3	3	2	2	4	
10-Jul	1	1	2	2	1	2	3	3	4	3	3	3	4	4	4	3	4	3	3	1	1	1	2	4	
11-Jul	1	1	3	1	1	1	1	2	2	2	3	3	3	3	3	3	2	2	1	1	2	1	1	3	
12-Jul	2	2	1	2	2	2	2	2	2	2	3	4	4	5	5	4	4	5	5	2	1	3	2	5	
13-Jul	1	2	1	2	2	2	3	4	4	4	3	5	5	6	7	7	6	5	5	4	4	3	4	7	
14-Jul	2	4	3	3	3	3	3	3	3	3	4	4	4	3	3	4	4	2	3	3	1	2	2	4	
15-Jul	1	3	2	2	2	3	2	2	2	2	3	4	4	3	3	3	3	2	2	4	1	1	1	4	
16-Jul	1	1	1	1	1	1	1	2	2	3	3	4	3	4	3	3	3	3	2	2	1	1	2	4	
17-Jul	2	2	2	3	2	2	4	2	2	4	3	3	4	3	2	4	3	2	3	3	3	3	3	4	
18-Jul	1	2	2	2	2	2	2	2	2	2	3	3	2	3	2	1	1	1	1	3	3	3	3	3	
19-Jul	1	2	1	2	2	1	1	2	2	3	3	3	4	3	3	4	4	5	6	4	2	3	3	6	
20-Jul	2	2	2	1	1	2	1	1	1	2	3	3	4	4	5	3	3	3	3	2	1	1	1	5	
21-Jul	1	2	2	2	3	2	3	2	2	2	3	3	4	3	4	4	3	3	3	2	1	2	2	4	
22-Jul	1	1	1	1	2	1	2	2	2	3	4	3	2	2	3	2	3	3	2	2	1	1	2	4	
23-Jul	2	1	2	2	1	2	2	2	2	2	2	2	2	3	2	3	3	3	1	1	1	1	2	3	
24-Jul	2	2	2	1	1	1	2	1	2	2	3	4	4	4	4	4	4	3	3	2	2	1	2	4	
25-Jul	4	6	11	6	4	4	2	4	6	7	3	5	3	3	3	2	2	7	4	4	3	2	3	11	
26-Jul	3	2	2	2	2	2	2	3	3	4	4	4	4	3	3	1	2	2	2	2	4	3	2	4	
27-Jul	3	3	3	4	3	3	4	3	3	3	4	4	4	4	4	4	3	3	2	2	3	1	2	4	
28-Jul	2	1	1	1	1	1	2	1	1	2	3	3	3	2	4	4	4	3	3	3	1	1	2	4	
29-Jul	1	2	1	2	1	1	1	2	2	2	3	4	3	5	3	4	2	3	2	1	1	1	1	5	
30-Jul	1	1	2	2	2	2	1	4	4	5	5	4	5	5	4	5	5	4	3	3	1	1	2	7	
31-Jul	5	5	2	3	2	2	2	1	2	3	3	4	4	4	4	4	5	5	5	4	5	3	3	5	
Diurnal Maximum																									



Wood Buffalo Environmental Association
Summary of Hour Averages

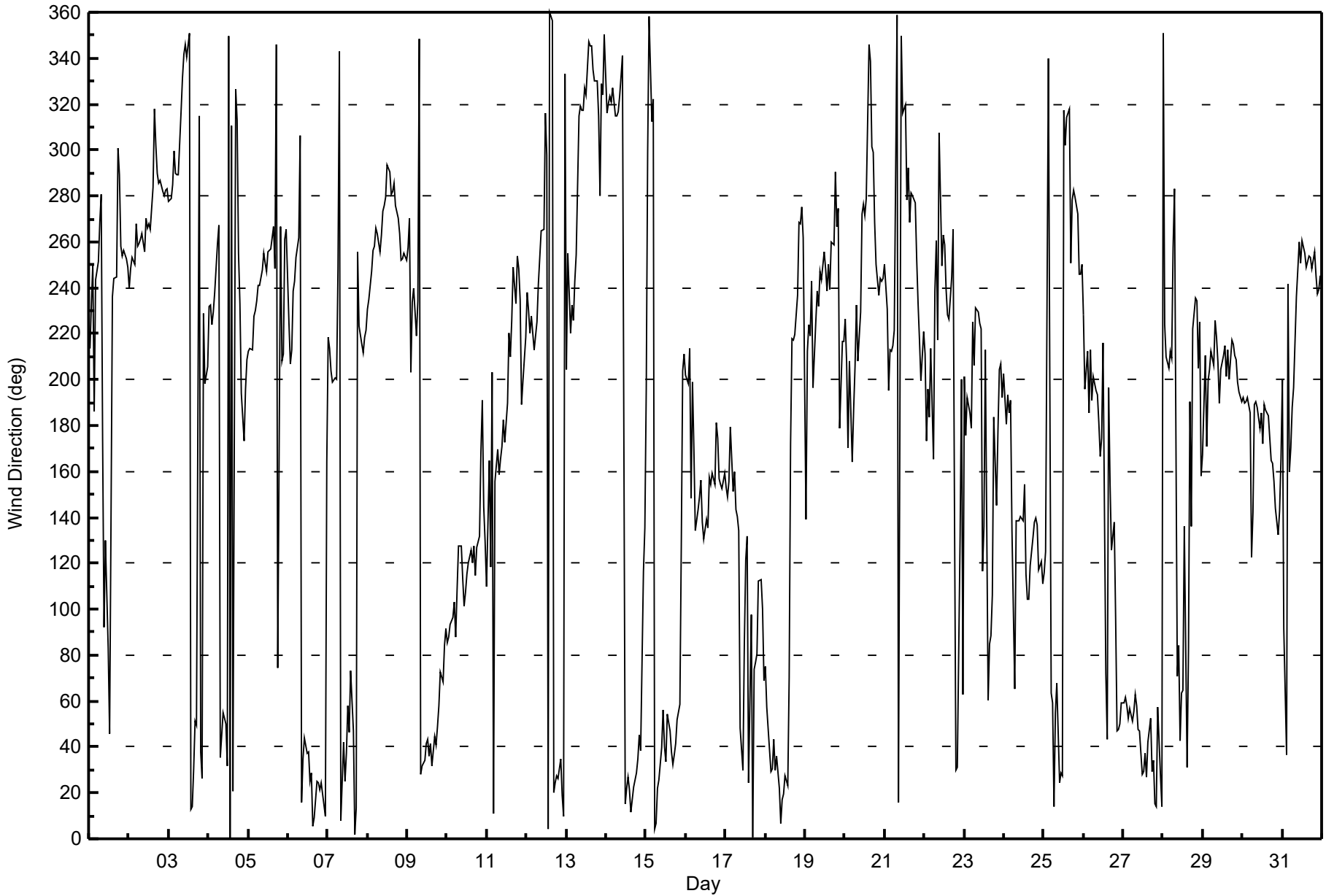
Wind Direction (WD) - deg
Christina Lake - July 2023

Direction of Maximum Speed: 342 deg on Jul 3 10:00																						Hours in Service: 744			
Direction of Maximum Daily Speed Average: 275.1 deg on Jul 2																						Hours of Data: 744			
Direction of Minimum Speed: 164 deg on Jul 7 00:00											Direction of Minimum Daily Speed Average: 0.7 deg on Jul 7											Hours of Missing Data: 0			
Monthly Average Direction: 266.0 deg																						Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	214	233	250	186	243	251	268	281	175	92	130	83	46	138	236	244	244	301	289	258	254	257	252	249	253.5
2-Jul	240	249	253	250	268	258	259	261	264	256	270	266	268	266	283	318	302	290	285	287	282	280	283	283	275.1
3-Jul	278	279	285	300	290	289	289	316	331	342	346	340	351	13	14	30	51	50	315	38	26	229	199	206	329.6
4-Jul	232	233	224	229	238	259	267	36	45	55	50	32	350	0	311	21	327	313	255	233	194	173	196	209	257.4
5-Jul	212	213	213	228	230	234	241	241	248	255	251	247	256	257	262	267	248	346	74	266	208	211	261	266	246.4
6-Jul	224	207	213	238	243	253	262	306	16	35	44	37	38	25	29	5	9	25	25	22	24	19	10	164	11.3
7-Jul	218	214	204	199	201	200	248	343	8	42	25	37	58	46	73	47	2	14	256	223	215	211	219	222	232.2
8-Jul	231	235	247	256	258	266	263	255	263	274	276	279	294	291	280	282	285	276	270	264	252	253	255	252	268.8
9-Jul	257	271	203	234	240	219	234	349	28	32	34	42	43	36	41	32	45	41	49	58	73	68	84	92	44.6
10-Jul	85	88	93	97	103	88	109	128	127	114	101	108	115	120	126	120	127	115	127	132	168	191	145	130	119.3
11-Jul	110	165	118	203	11	156	170	159	165	171	182	173	190	220	210	226	249	233	254	248	235	189	199	219	198.0
12-Jul	238	230	220	227	213	219	225	242	253	265	265	316	298	4	360	356	20	24	28	26	35	19	10	333	335.6
13-Jul	205	255	220	232	226	243	254	315	319	317	317	327	324	347	346	345	335	330	330	315	280	329	324	350	323.1
14-Jul	316	320	324	321	327	315	315	317	324	332	341	15	22	27	21	11	23	26	29	35	45	38	117	136	350.9
15-Jul	196	299	358	312	322	5	7	22	26	40	56	40	34	54	47	38	32	37	42	52	58	128	204	211	26.5
16-Jul	202	198	214	148	199	170	134	143	149	156	138	130	139	136	158	154	159	154	181	175	157	154	153	159	157.1
17-Jul	153	149	156	180	151	160	144	140	134	48	30	85	121	132	25	98	1	74	77	81	112	113	100	69	112.5
18-Jul	75	57	38	29	30	43	30	36	22	6	17	20	28	23	70	172	218	217	220	236	269	268	275	262	19.7
19-Jul	139	212	224	219	243	196	225	239	232	247	243	256	249	239	250	239	260	259	290	267	274	179	217	217	242.3
20-Jul	226	207	170	208	164	187	205	233	208	229	272	276	272	279	346	338	302	299	269	250	237	244	243	244	257.1
21-Jul	250	230	195	213	213	215	222	359	16	179	349	316	319	278	292	268	281	280	277	252	233	217	200	221	259.0
22-Jul	211	173	196	184	213	166	239	260	217	307	250	263	259	239	228	227	245	265	141	30	31	132	200	63	240.1
23-Jul	202	176	192	185	179	225	206	231	229	225	222	117	136	213	60	85	89	106	184	145	178	204	207	192	191.4
24-Jul	203	181	193	186	191	134	66	138	139	138	140	139	155	115	105	104	119	131	138	140	136	117	121	111	132.6
25-Jul	116	125	230	340	63	59	14	55	68	24	29	27	317	302	314	318	251	278	283	279	272	246	246	250	314.0
26-Jul	228	196	212	185	213	191	201	195	194	181	167	175	216	72	43	197	155	126	138	96	47	47	50	59	161.2
27-Jul	59	61	58	53	57	51	56	63	58	48	47	28	29	37	27	42	53	29	34	16	14	58	27	14	44.4
28-Jul	351	224	210	205	212	209	257	283	71	84	43	63	65	136	31	83	190	136	222	235	234	205	225	158	178.1
29-Jul	167	210	171	200	205	213	206	226	218	207	190	204	210	215	201	213	200	218	215	210	209	199	195	190	206.5
30-Jul	192	190	190	192	185	123	142	189	191	188	179	185	172	189	187	184	175	165	164	156	144	133	143	165	175.8
31-Jul	200	91	37	242	160	170	188	197	236	247	260	251	261	255	249	252	254	253	249	255	245	237	239	245	242.8
213.7 211.6 221.5 238.5 238.5 238.5 246.5 262.5 251.4 293.1 331.2 342.7 326.2 332.7 340.4 333.5 313.7 334.7 295.2 278.9 230.4 215.4 224.6 225.3																									
Diurnal Average																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Christina Lake - July 2023





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Christina Lake - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 99 deg on Jul 23 13:00 Minimum Value: 4 deg on Jul 7 22:00 Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 14 Median = 20 Q ₃ = 33 P ₉₀ = 56 P ₉₉ = 91																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	63	46	69	21	34	18	27	32	59	21	34	68	20	69	67	29	95	20	27	16	18	27	14	13	95
2-Jul	13	11	13	13	16	17	18	19	21	20	17	18	19	18	24	12	17	14	14	15	14	15	14	14	24
3-Jul	14	15	15	18	15	13	14	13	18	17	18	15	21	15	14	15	15	14	26	21	21	53	18	21	53
4-Jul	10	13	9	19	28	48	38	62	20	29	39	34	73	79	61	90	75	77	20	61	20	10	8	9	90
5-Jul	7	7	12	13	9	10	11	13	18	20	24	26	22	25	28	20	31	60	65	45	16	15	61	20	65
6-Jul	56	31	31	14	13	20	23	23	53	92	28	31	21	32	33	28	21	14	13	11	10	10	16	98	98
7-Jul	17	12	11	19	12	18	56	50	45	22	28	35	56	32	64	36	77	60	22	20	8	4	6	8	77
8-Jul	9	9	15	18	19	17	18	17	18	17	18	18	19	17	19	19	17	17	17	17	14	14	14	13	19
9-Jul	15	88	59	44	32	37	77	74	21	30	19	21	24	19	18	19	18	15	15	11	12	11	14	23	88
10-Jul	23	6	10	11	16	38	21	15	16	19	16	19	18	29	35	30	19	15	16	12	14	11	11	18	38
11-Jul	26	37	38	36	79	66	15	14	19	16	19	27	21	28	46	46	28	19	17	10	19	27	9	13	79
12-Jul	19	27	12	12	14	20	21	19	24	41	53	28	43	32	32	30	15	17	12	11	7	13	18	63	63
13-Jul	36	45	38	58	31	50	42	20	13	13	20	20	26	22	23	21	18	17	18	18	25	14	27	58	58
14-Jul	14	14	14	13	25	12	11	16	26	17	21	22	15	16	18	26	18	13	13	11	9	95	70	73	95
15-Jul	37	51	23	12	14	21	27	15	17	19	35	26	23	24	21	19	16	15	15	10	7	40	18	11	51
16-Jul	12	8	7	52	21	24	53	37	27	33	29	29	31	24	31	27	21	22	15	10	8	9	10	11	53
17-Jul	12	15	12	33	20	14	13	12	17	56	12	43	13	23	34	82	51	19	14	12	11	12	17	11	82
18-Jul	12	12	12	11	12	12	11	10	15	16	13	14	14	16	42	33	14	10	18	52	72	23	18	47	72
19-Jul	55	33	7	12	11	31	7	13	30	21	17	20	21	17	27	21	20	18	30	22	45	50	17	11	55
20-Jul	63	66	39	12	28	42	26	22	25	55	76	62	70	40	46	52	23	22	21	17	12	10	9	8	76
21-Jul	11	45	45	21	47	15	22	93	76	69	41	40	65	57	42	32	28	22	21	13	14	18	24	19	93
22-Jul	7	35	21	45	15	45	77	18	90	36	16	20	18	27	18	19	24	76	60	75	12	76	33	69	90
23-Jul	34	47	24	42	37	13	24	24	15	21	47	91	99	90	89	45	33	39	32	13	21	11	10	23	99
24-Jul	21	24	37	48	24	34	19	40	24	40	22	40	26	26	33	23	26	14	12	11	10	9	14	16	48
25-Jul	14	23	45	51	22	21	59	11	35	63	20	75	40	27	31	29	39	26	19	14	17	13	12	13	75
26-Jul	24	15	16	21	12	22	11	15	20	23	16	19	37	79	19	43	22	27	14	17	28	11	11	11	79
27-Jul	11	11	12	14	12	13	13	14	15	17	28	20	22	22	20	43	46	13	13	12	11	22	18	29	46
28-Jul	79	19	27	19	14	11	65	58	81	61	43	57	38	34	51	49	37	92	39	71	13	9	40	60	92
29-Jul	44	9	23	20	12	13	21	12	24	47	88	43	32	41	31	19	16	16	14	9	5	6	5	9	88
30-Jul	7	6	9	9	13	33	37	17	16	19	20	19	19	26	25	20	21	17	14	11	13	14	12	30	37
31-Jul	33	85	58	55	54	39	17	25	23	22	22	19	22	23	19	21	19	20	16	17	16	10	11	12	85
79 88 69 58 79 66 77 93 90 92 88 91 99 90 89 90 95 92 65 75 72 95 70 98																									
Diurnal Maximum																									



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS27
JACKFISH 2/3
JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JACKFISH 2/3 (AMS27)
 JULY 2023

MONTHLY SUMMARY

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	35	36	99.87	6.8	0	1.7	0
H2S (ppb) Average	708	35	36	99.87	1.3	0	0.4	0
NO2 (ppb) Average	705	38	39	99.87	8.3	0	3.1	-
NO (ppb) Average	705	38	39	99.87	2.4	-	0.5	-
NOX (ppb) Average	705	38	39	99.87	9	-	3.3	-
Temperature 2 m (C) Average	743	0	1	99.87	28.4	-	22.4	-
Relative Humidity (%) Average	743	0	1	99.87	100	-	96.3	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	14	-	9	-
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 - JACKFISH 2/3 (AMS27)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.59	0.8	-	0	0	0.2	0.3	0.7	1.3	6.8
H2S (ppb) Average	708	0.24	0.1	-	0	0.1	0.1	0.2	0.3	0.4	1.3
NO2 (ppb) Average	705	0.63	1	-	0	0	0	0.2	0.8	1.7	8.3
NO (ppb) Average	705	0.15	0.2	-	0	0	0	0.1	0.2	0.4	2.4
NOX (ppb) Average	705	0.78	1.2	-	0	0	0.1	0.4	1	1.9	9
Temperature 2 m (C) Average	743	16.58	4.7	-	6.3	10.6	13	16	20.2	23.2	28.4
Relative Humidity (%) Average	743	69.87	20.1	-	26.4	41.6	54.1	69.1	89.3	96.8	100
Wind Speed 10 m (km/h) Average	743	5.7	3	-	0	2	4	5	8	9	14
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JACKFISH 2/3 (AMS27)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	14 Jul 2023 08:00	14 Jul 2023 08:00	1	Maintenance - station logger/modem reset



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

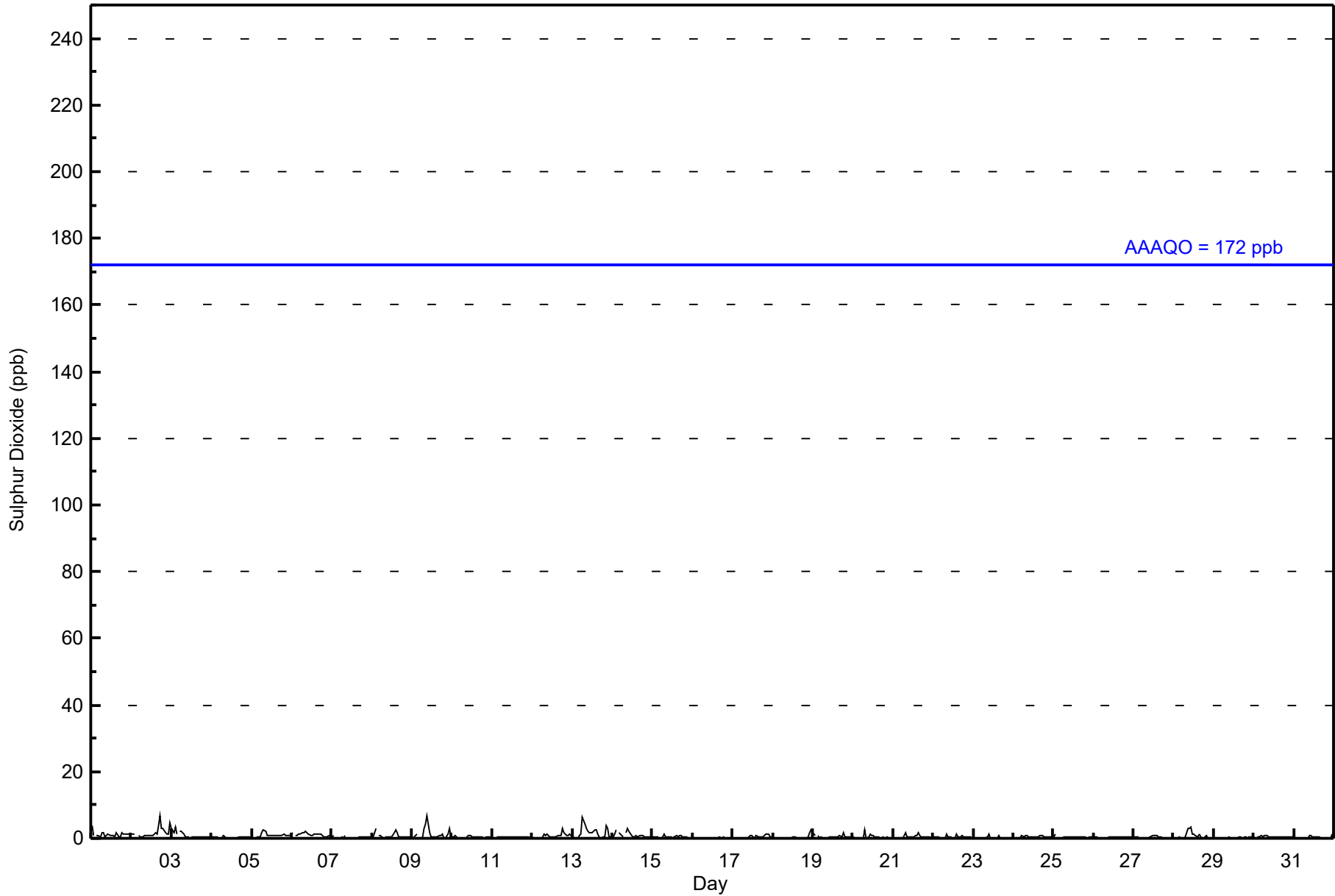
Jackfish 2/3 - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		744																																									
Maximum Value: 6.8 ppb on Jul 9 10:00		Maximum Daily Average: 1.7 ppb on Jul 2		Minimum Value: 0.0 ppb on Jul 5 02:00		Minimum Daily Average: 0.1 ppb on Jul 16		Hours of Data: 708																																									
Maximum Diurnal Average: 0.9 ppb at hour 10		Minimum Diurnal Average: 0.3 ppb at hour 4		Hours of Missing Data: 36		Hours of Calibration: 35		Percent Operational Time: 99.9																																									
Monthly Average: 0.59 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.2 Median = 0.3 Q ₃ = 0.7 P ₉₀ = 1.3 P ₉₉ = 3.8																																															
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-Jul	3.8	0.7	Z	0.7	0.9	0.5	1.5	1.6	0.3	0.9	1.2	0.7	0.8	0.9	0.6	1.5	0.5	0.5	1.7	1.1	1.2	1.2	1.1	1.2	1.1	1.1	1.1	3.8	1.1	3.8																			
2-Jul	1.2	1.2	1.2	Z	0.6	0.5	0.4	0.4	0.6	0.9	0.9	0.7	1.0	1.1	1.8	1.4	3.8	6.7	3.0	3.0	1.8	1.5	1.3	4.9	1.7	6.7	1.7	6.7																					
3-Jul	3.2	1.5	3.4	1.5	Z	2.1	2.0	1.2	0.6	0.3	0.2	0.1	0.3	0.3	0.3	0.3	0.6	0.3	0.5	0.4	0.5	0.3	0.3	0.3	0.3	0.3	0.9	3.4	0.9	3.4																			
4-Jul	0.2	0.3	0.3	0.4	0.5	Z	0.6	0.7	0.4	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.3	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.7	0.3	0.7																			
5-Jul	Z	0.0	0.1	0.3	0.2	0.3	1.5	2.5	2.1	1.0	0.9	1.0	1.0	0.8	0.8	0.9	0.9	0.9	0.9	1.1	0.8	0.7	0.8	0.8	0.8	0.9	2.5	0.9	2.5																				
6-Jul	1.6	Z	0.7	0.8	1.3	1.4	1.6	1.7	2.1	1.6	1.3	1.0	1.0	1.1	1.4	1.1	1.2	1.2	0.9	0.6	0.5	0.4	0.7	0.6	1.1	2.1	1.1	2.1																					
7-Jul	0.5	0.6	Z	0.0	0.0	0.2	0.5	0.2	1.0	C	C	C	C	0.0	0.0	0.2	0.5	0.4	0.3	0.5	0.4	0.4	0.4	0.3	0.3	1.0	1.0	0.3	1.0																				
8-Jul	0.2	0.2	2.9	Z	0.8	0.7	0.3	0.1	0.3	0.3	0.3	0.3	0.4	1.7	2.7	1.7	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.7	2.9	0.7	2.9																				
9-Jul	0.2	0.3	0.7	1.2	Z	0.2	0.3	3.1	4.2	6.8	1.6	0.6	0.4	0.3	0.3	0.5	0.8	1.0	1.1	0.1	0.1	1.2	2.9	0.7	1.2	6.8	1.2	6.8																					
10-Jul	0.3	0.3	0.9	0.1	0.1	Z	0.0	0.0	0.0	0.7	0.7	0.7	0.5	0.5	0.3	0.5	0.3	0.5	0.2	0.2	0.2	0.3	0.3	0.4	0.3	0.9	0.9	0.3	0.9																				
11-Jul	Z	0.0	0.1	0.3	0.5	0.6	0.6	0.5	0.4	0.3	0.3	0.2	0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.2	0.2	0.3	0.2	0.2	0.3	0.6	0.6	0.3	0.6																				
12-Jul	0.5	Z	0.0	0.0	0.0	0.2	0.3	1.1	0.8	1.1	0.5	0.4	0.3	0.3	0.3	0.6	1.0	0.9	3.0	1.5	0.9	1.0	1.2	1.0	0.7	3.0	0.7	3.0																					
13-Jul	0.7	0.6	Z	0.1	0.8	1.4	6.4	4.3	3.2	2.3	1.6	1.8	1.6	2.4	2.4	1.3	0.4	0.2	0.3	0.4	3.8	2.9	0.4	0.5	1.7	6.4	1.7	6.4																					
14-Jul	0.6	1.1	2.7	Z	1.7	1.0	0.6	M	1.9	2.8	2.1	0.9	0.6	0.5	0.8	0.6	0.7	0.9	0.7	0.4	0.4	0.4	0.4	0.4	1.0	2.8	1.0	2.8																					
15-Jul	0.4	0.4	0.4	0.4	Z	0.2	0.5	1.3	0.5	0.3	0.4	0.3	0.2	0.4	0.8	0.6	0.7	0.8	0.6	0.4	0.4	0.2	0.1	0.2	0.4	1.3	0.4	1.3																					
16-Jul	0.2	0.2	0.2	0.1	0.1	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.0	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.3	0.1	0.3																					
17-Jul	Z	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.6	0.9	0.2	0.2	0.7	0.4	0.3	0.2	0.4	0.8	1.2	1.3	0.5	0.3	0.4	1.3	0.4	1.3																					
18-Jul	0.2	Z	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.2	0.1	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.6	1.8	2.5	0.3	2.5	0.3	2.5																					
19-Jul	1.4	0.9	Z	0.9	0.1	0.4	0.2	0.1	0.0	0.0	0.2	0.4	0.6	0.6	0.3	0.3	0.7	0.4	1.5	0.3	0.3	0.3	0.3	0.3	0.5	1.5	0.5	1.5																					
20-Jul	0.2	0.2	0.2	Z	0.0	0.0	0.0	2.4	0.2	0.6	1.1	1.0	0.9	0.4	0.5	0.3	0.0	0.2	0.3	0.1	0.2	0.1	0.1	0.1	0.4	2.4	0.4	2.4																					
21-Jul	0.2	0.1	0.2	0.2	Z	0.0	0.0	1.8	0.2	0.4	0.3	0.4	0.4	0.7	0.8	1.5	1.0	0.6	0.3	0.4	0.3	0.2	0.2	0.2	0.5	1.8	0.5	1.8																					
22-Jul	0.2	0.4	0.3	0.3	0.3	Z	0.2	0.0	1.4	0.3	0.3	0.1	0.1	0.1	1.3	0.6	0.4	0.7	0.3	0.3	0.4	0.2	0.2	0.2	0.4	1.4	0.4	1.4																					
23-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	1.1	0.0	0.1	0.0	0.1	0.0	0.8	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	1.1	0.1	1.1																					
24-Jul	0.0	Z	0.0	0.0	0.1	0.7	0.5	0.8	0.9	0.6	0.5	0.4	0.3	0.4	0.6	1.0	0.7	0.4	0.3	0.3	0.4	0.4	0.5	0.5	0.4	1.0	0.4	1.0																					
25-Jul	0.4	1.1	Z	0.1	0.1	0.2	0.2	0.4	0.4	0.3	0.4	0.4	0.4	0.3	0.4	0.3	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	1.1	0.3	1.1																					
26-Jul	0.4	0.3	0.3	Z	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.4	0.4	0.3	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.4	0.2	0.4	0.2	0.4																			
27-Jul	0.3	0.2	0.3	0.3	Z	0.0	0.0	0.0	0.0	0.1	0.5	0.7	1.0	0.9	0.8	0.3	0.3	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.3	1.0	0.3	1.0																					
28-Jul	0.1	0.1	0.2	0.2	0.2	Z	0.0	0.4	2.9	3.0	3.2	1.2	1.2	0.7	0.4	1.2	0.4	0.2	0.2	0.7	0.0	0.0	0.0	0.0	0.7	3.2	0.7	3.2																					
29-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.1	0.3	0.1	0.3																					
30-Jul	0.3	Z	0.4	0.4	0.7	0.6	0.7	0.7	0.6	0.4	0.4	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.5	0.5	0.7	0.5	0.7																			
31-Jul	0.3	0.3	Z	0.0	0.0	0.0	0.1	0.0	0.1	0.9	0.8	0.6	0.5	0.4	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.1	0.3	1.1	0.3	1.1																					
																								0.7	0.4	0.6	0.3	0.4	0.4	0.6	0.9	0.8	0.9	0.7	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.6	Diurnal Average	
																								3.8	1.5	3.4	1.5	1.7	2.1	6.4	4.3	4.2	6.8	3.2	1.8	1.6	2.4	2.7	1.7	3.8	6.7	3.0	3.0	3.8	2.9	2.9	4.9	Diurnal Maximum	
Z - zerospan																								C - Calibration		M - Maintenance																							
Alberta Ambient Air Quality Objectives (AAAQO):																								1-hr 172 ppb		24-hr 48 ppb																							



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Jackfish 2/3 - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Jackfish 2/3 - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	708	100.00	100.00
11 - 20	0	0.00	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Jackfish 2/3 - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	22	61	53	29	18	25	46	31	47	79	71	89	60	27	27	23	708
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	61	53	29	18	25	46	31	47	79	71	89	60	27	27	23	708

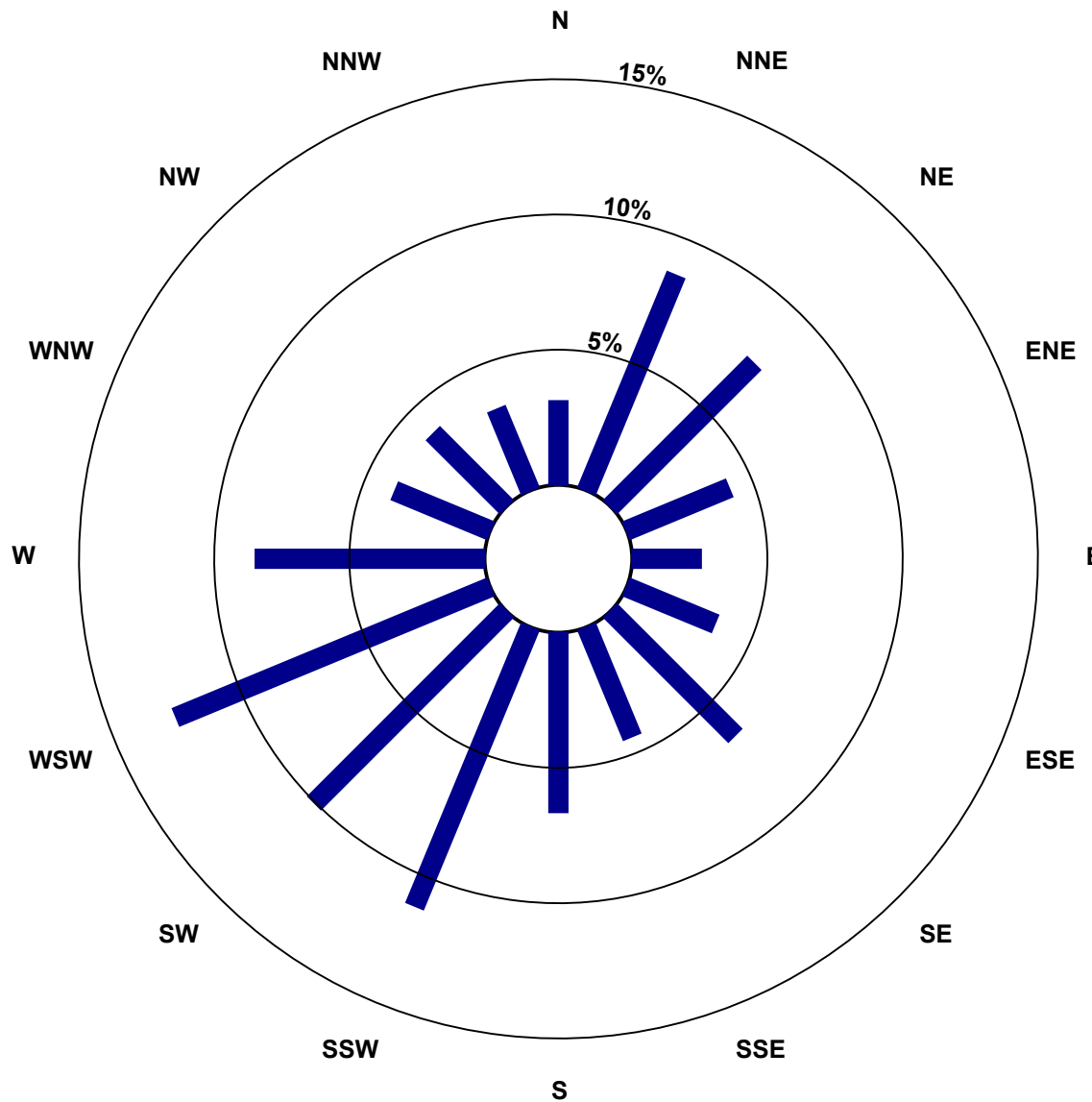
Total Number of Valid Hours: 708

Total Number of Hours: 744

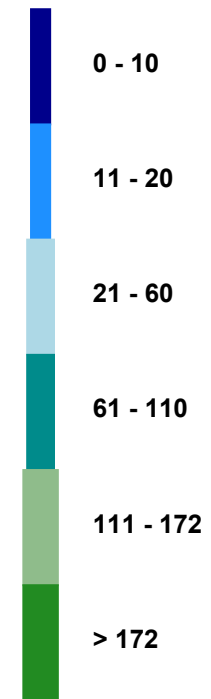


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Jackfish 2/3



Classes (ppb)

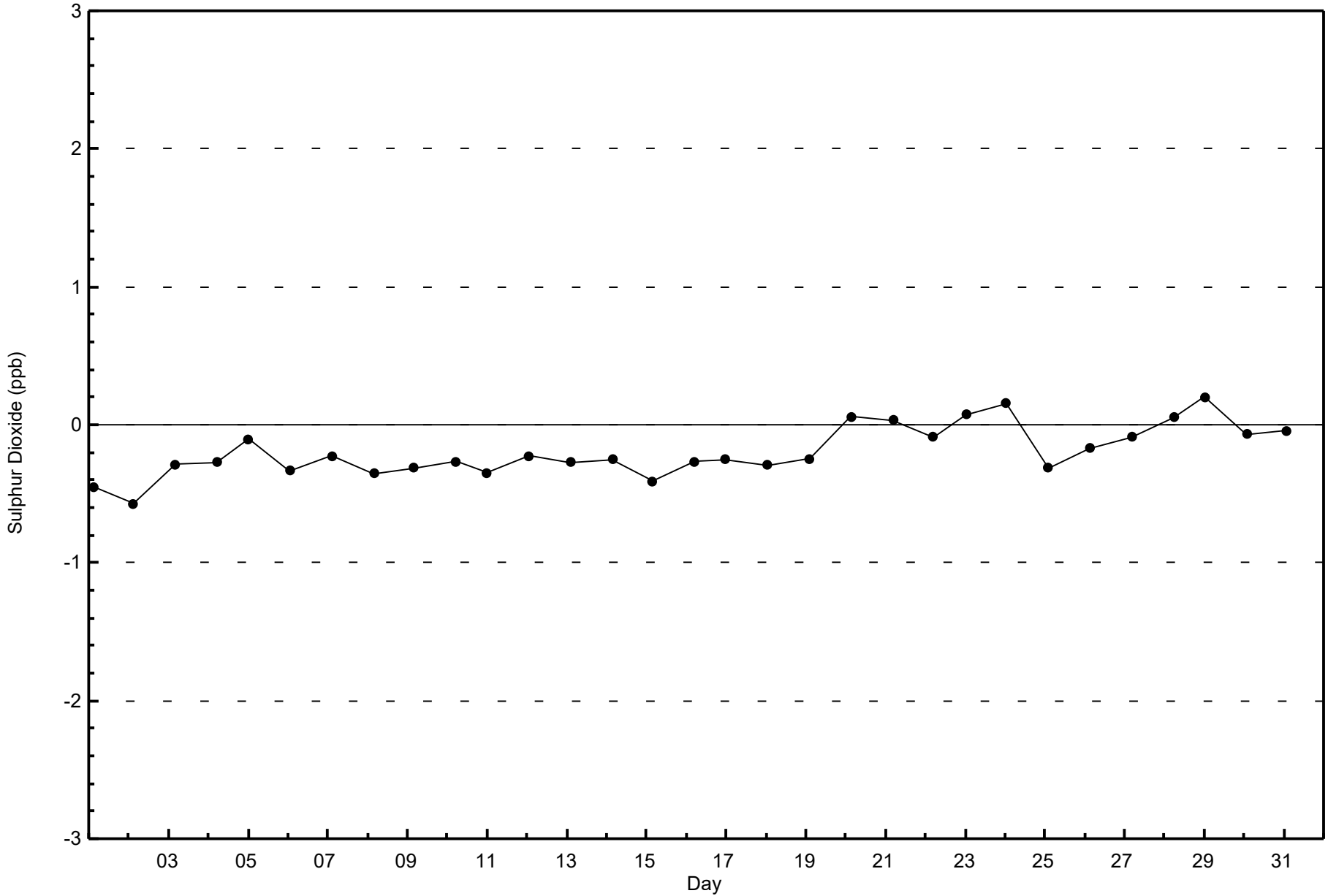


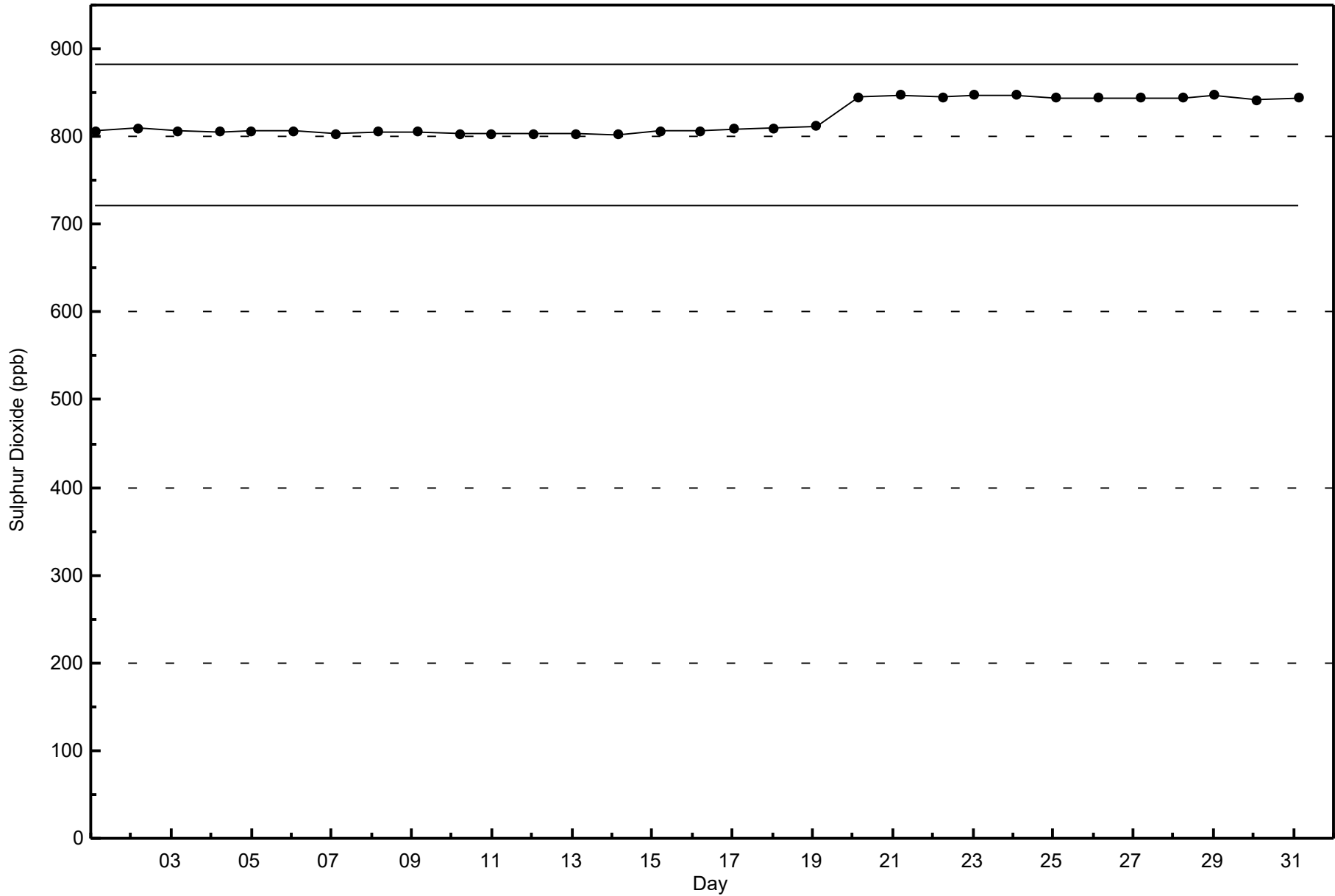
Total Number of Valid Hours: 708



Wood Buffalo Environmental Association
Zero Responses

Sulphur Dioxide (SO₂) - ppb
Jackfish 2/3 - July 2023





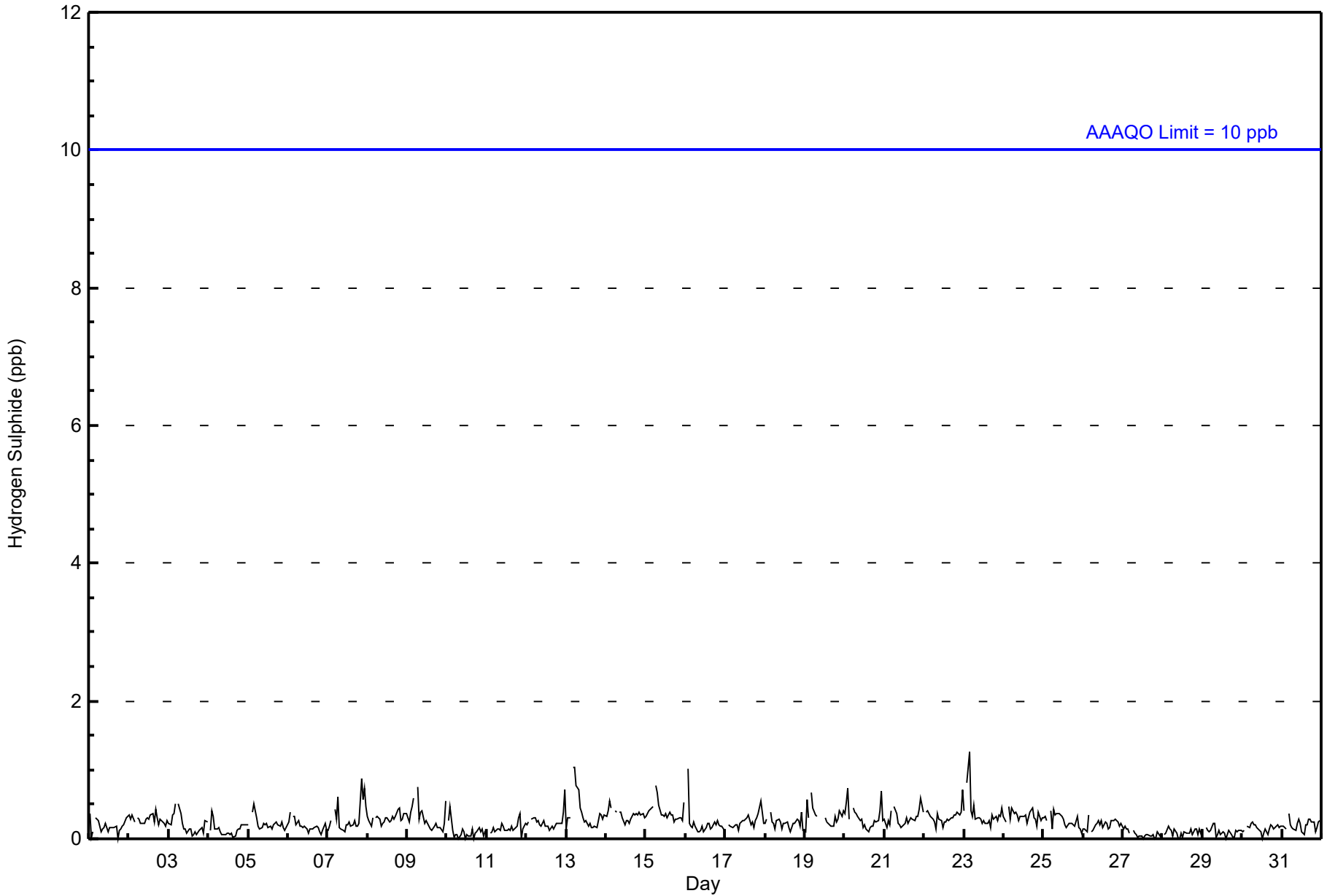


Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:														744																													
Maximum Value: 1.3 ppb on Jul 23 04:00		Maximum Daily Average: 0.4 ppb on Jul 15														Hours of Data:		708																															
Minimum Value: 0.0 ppb on Jul 1 18:00		Minimum Daily Average: 0.1 ppb on Jul 27														Hours of Missing Data:		36																															
Maximum Diurnal Average: 0.3 ppb at hour 5		Minimum Diurnal Average: 0.2 ppb at hour 15														Hours of Calibration:		35																															
Monthly Average: 0.24 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.1 Q ₁ = 0.1 Median = 0.2 Q ₃ = 0.3 P ₉₀ = 0.4 P ₉₉ = 0.8														Percent Operational Time:		99.9																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	0.4	0.0	0.1	Z	0.3	0.3	0.2	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.0	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.4																							
2-Jul	0.3	0.3	0.3	0.3	Z	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.2	0.4	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.3	0.4																							
3-Jul	0.2	0.2	0.3	0.4	0.5	Z	0.5	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.2	0.5																							
4-Jul	Z	0.1	0.4	0.3	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.4																							
5-Jul	0.2	Z	0.4	0.5	0.4	0.3	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.5																							
6-Jul	0.3	0.4	Z	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.4																							
7-Jul	0.1	0.2	0.3	Z	0.4	0.3	0.6	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.9	0.6	0.7	0.5	0.3	0.9																							
8-Jul	0.3	0.3	0.2	0.3	Z	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.4	0.4	0.4																							
9-Jul	0.3	0.3	0.4	0.5	0.6	Z	0.7	0.3	0.4	0.4	0.2	0.3	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.6	0.3	0.7																							
10-Jul	Z	0.3	0.5	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.1	0.5																							
11-Jul	0.1	Z	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.3	0.4	0.0	0.1	0.2	0.1	0.4																							
12-Jul	0.2	0.2	Z	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.4	0.7	0.2	0.7																							
13-Jul	0.1	0.3	0.3	Z	1.0	1.0	0.8	0.7	0.5	0.4	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.3	0.3	0.4	1.0																							
14-Jul	0.3	0.4	0.5	0.4	Z	0.4	0.4	M	0.4	0.4	0.3	0.2	0.3	0.3	0.2	0.3	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.5																							
15-Jul	0.3	0.4	0.4	0.5	0.5	Z	0.8	0.7	0.5	0.4	0.3	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.4	0.8																							
16-Jul	Z	1.0	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.1	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.1	0.2	1.0																							
17-Jul	0.1	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.3	0.3	0.4	0.6	0.4	0.2	0.2	0.6																							
18-Jul	0.2	0.3	Z	0.4	0.2	0.2	0.1	0.3	0.3	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.3	0.3	0.2	0.4	0.1	0.2	0.4																							
19-Jul	0.1	0.6	0.3	Z	0.7	0.5	0.4	0.3	C	C	C	C	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.4	0.3	0.4	0.3	0.7																							
20-Jul	0.4	0.5	0.7	0.3	Z	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.7	0.3	0.3	0.7																							
21-Jul	0.3	0.2	0.3	0.2	0.4	Z	0.5	0.4	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.6	0.4	0.3	0.6																							
22-Jul	Z	0.4	0.4	0.4	0.3	0.3	0.2	0.1	0.4	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.7	0.3	0.7																							
23-Jul	0.4	Z	0.8	1.3	0.4	0.3	0.5	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	1.3																							
24-Jul	0.3	0.2	Z	0.5	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.2	0.3	0.4	0.5	0.3	0.3	0.2	0.4	0.3	0.3	0.5																							
25-Jul	0.3	0.3	0.3	Z	0.4	0.1	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.1	0.1	0.3	0.4																							
26-Jul	0.1	0.1	0.1	0.3	Z	0.1	0.1	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3																							
27-Jul	0.1	0.2	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.2																							
28-Jul	Z	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	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	0.2																							
29-Jul	0.1	Z	0.2	0.1	0.1	0.1	0.2	0.2	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2																							
30-Jul	0.1	0.1	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2																							
31-Jul	0.2	0.2	0.1	Z	0.4	0.2	0.2	0.1	0.1	0.2	0.3	0.2	0.1	0.1	0.2	0.2	0.3	0.3	0.2	0.2	0.1	0.2	0.2	0.3	0.2	0.4																							
																								Diurnal Average		0.2		0.3		0.3		0.3		0.3		0.3		0.3		0.3		0.3		0.3		0.3		0.3	
																								Diurnal Maximum		0.4		1.0		0.8		1.3		1.0		1.0		0.8		0.7		0.5		0.4		0.3		0.3	
Z - zerospan C - Calibration M - Maintenance																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Jackfish 2/3 - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Jackfish 2/3 - July 2023

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 (H₂S) - ppb
Jackfish 2/3 - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	35	50	55	17	23	42	23	22	60	54	83	115	50	24	32	23	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	35	50	55	17	23	42	23	22	60	54	83	115	50	24	32	23	708

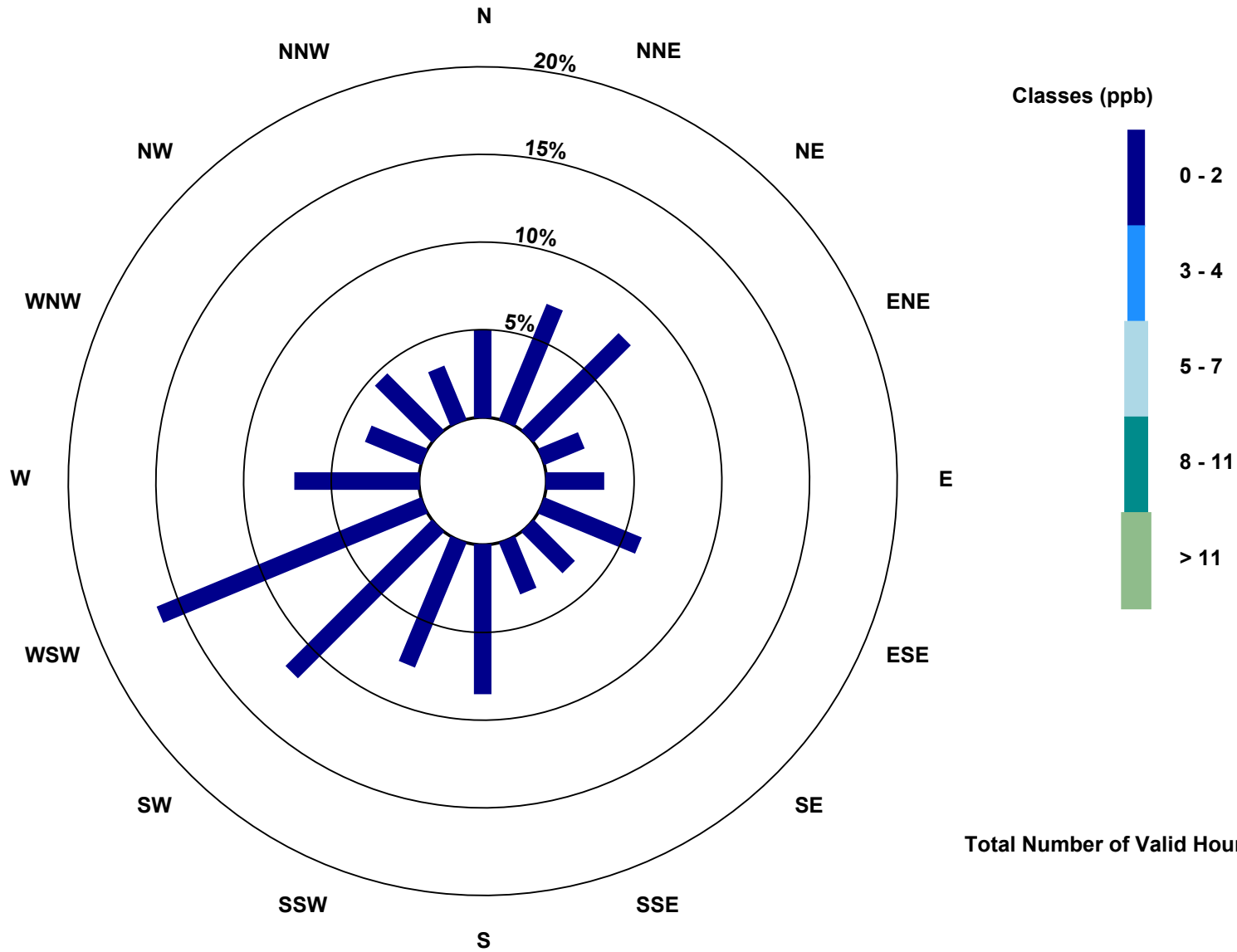
Total Number of Valid Hours: 708

Total Number of Hours: 744

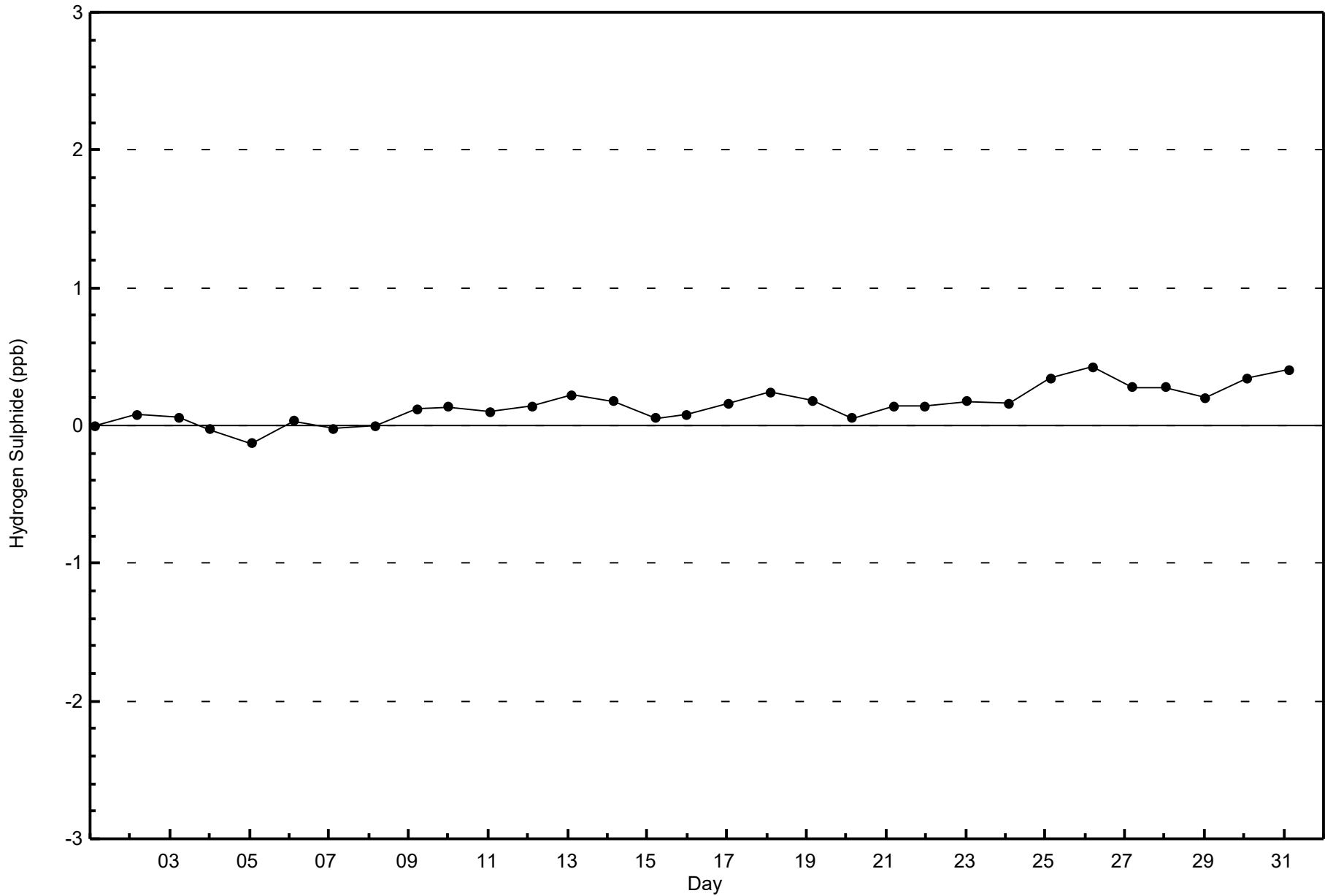


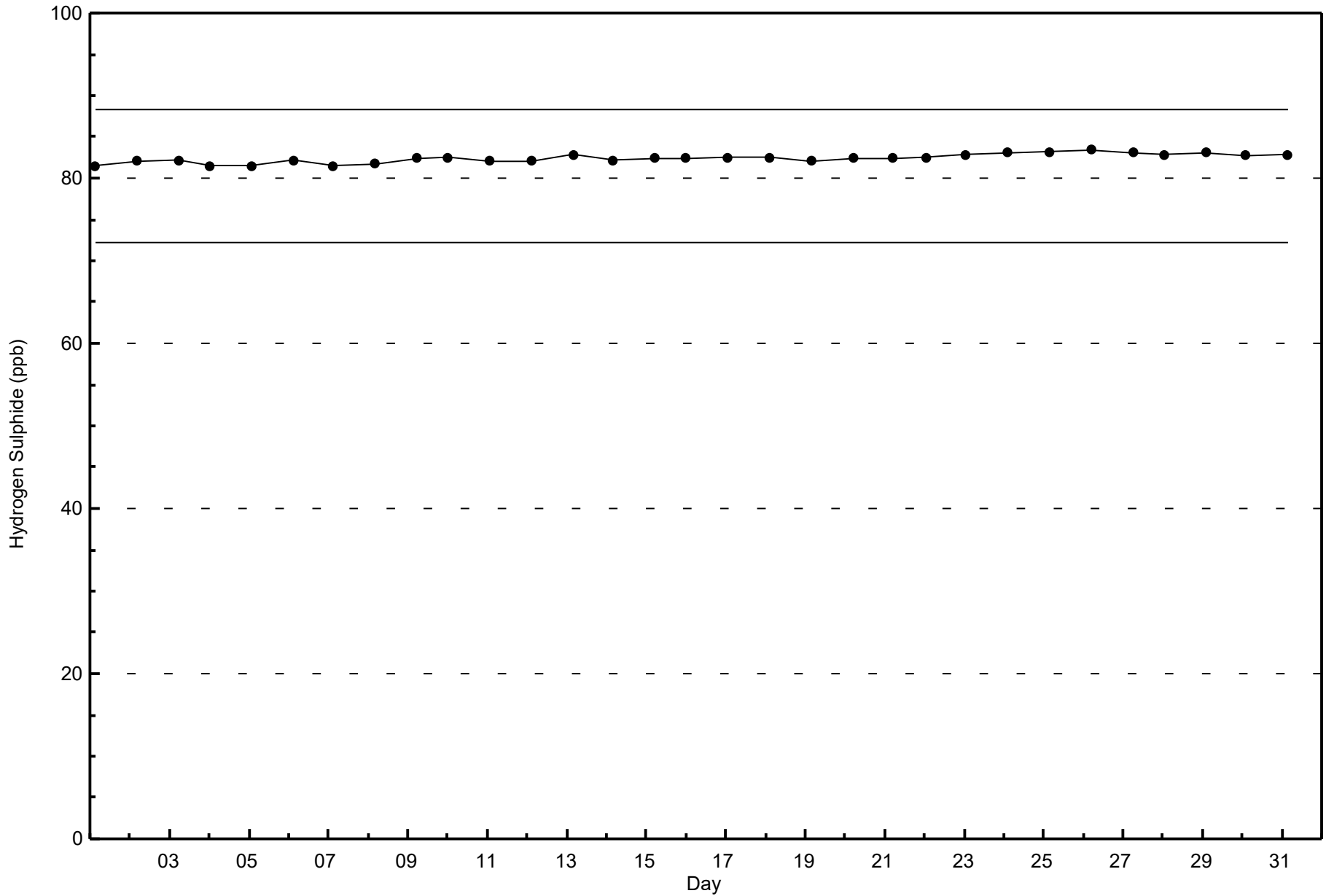
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Hydrogen Sulphide (H₂S) - ppb
Jackfish 2/3



Total Number of Valid Hours: 708







Wood Buffalo Environmental Association
Summary of Hour Averages

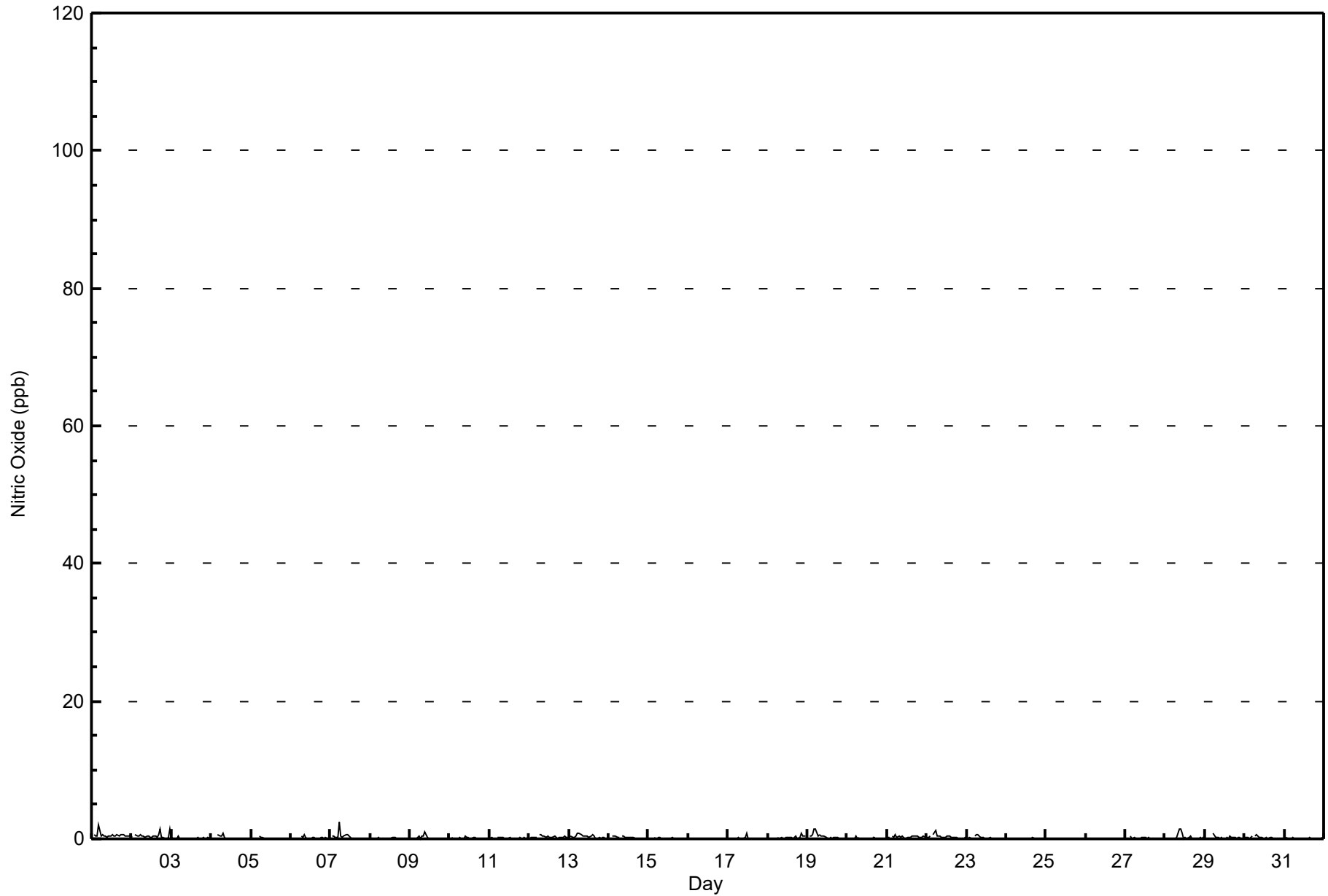
Nitric Oxide (NO) - ppb
Jackfish 2/3 - July 2023

Maximum Value: 2.4 ppb on Jul 7 06:00		Maximum Daily Average: 0.5 ppb on Jul 1		Hours in Service: 744																						
Minimum Value: 0.0 ppb on Jul 2 21:00		Minimum Daily Average: 0.0 ppb on Jul 25		Hours of Data: 705																						
Maximum Diurnal Average: 0.4 ppb at hour 6		Minimum Diurnal Average: 0.1 ppb at hour 23		Hours of Missing Data: 39																						
Monthly Average: 0.15 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.2 P ₉₀ = 0.4 P ₉₉ = 1.3		Hours of Calibration: 38																						
				Percent Operational Time: 99.9																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	Z	0.6	0.4	0.4	2.1	0.4	0.5	0.5	0.4	0.3	0.3	0.4	0.6	0.4	0.4	0.7	0.3	0.6	0.6	0.6	0.4	0.4	0.4	0.5	0.5	2.1
2-Jul	0.2	Z	0.6	0.5	0.3	0.5	0.4	0.4	0.3	0.4	0.4	0.2	0.1	0.3	0.3	0.1	0.7	1.3	0.2	0.3	0.0	0.0	0.2	1.4	0.4	1.4
3-Jul	0.3	0.0	Z	0.1	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.1	0.2	0.0	0.0	0.1	0.1	0.1	0.1	0.4
4-Jul	0.0	0.0	0.0	Z	0.5	0.3	0.5	0.8	0.1	0.1	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	0.1	0.8
5-Jul	0.0	0.1	0.0	0.0	Z	0.3	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	0.3
6-Jul	0.0	0.0	0.0	0.0	0.1	Z	0.4	0.3	0.6	0.2	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.0	0.2	0.2	0.1	0.2	0.0	0.0	0.1	0.6
7-Jul	Z	0.4	0.4	0.2	0.1	2.4	0.4	0.2	0.4	0.5	0.5	0.4	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	2.4
8-Jul	0.0	Z	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
9-Jul	0.0	0.0	Z	0.0	0.0	0.5	0.0	0.4	0.4	1.0	0.3	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	1.0
10-Jul	0.0	0.0	0.2	Z	0.1	0.0	0.2	0.1	0.0	0.4	0.2	0.2	0.1	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.4
11-Jul	0.0	0.1	0.1	0.0	Z	0.2	0.2	0.2	0.1	0.0	0.0	0.0	0.2	0.1	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.2	0.1	0.2
12-Jul	0.0	0.3	0.2	0.2	0.3	Z	0.6	0.6	0.4	0.4	0.3	0.4	0.2	0.3	0.2	0.4	0.3	0.1	0.2	0.2	0.2	0.4	0.2	0.3	0.3	0.6
13-Jul	Z	0.4	0.3	0.2	0.4	0.7	0.7	0.6	0.3	0.3	0.3	0.3	0.2	0.4	0.5	0.4	0.0	0.0	0.2	0.0	0.3	0.2	0.1	0.0	0.3	0.7
14-Jul	0.0	Z	0.5	0.4	0.4	0.2	0.2	M	0.4	0.4	0.2	0.2	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.5
15-Jul	0.1	0.1	Z	0.2	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
16-Jul	0.0	0.0	0.0	Z	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	0.1	0.0	0.1
17-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.2	0.0	0.0	0.0	0.2	0.8	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	0.8
18-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.1	0.1	0.2	0.0	0.1	0.2	0.2	0.2	0.1	0.0	0.2	0.4	0.0	0.1	0.7	0.3	0.4	0.4	0.2	0.7
19-Jul	Z	0.5	0.5	0.6	1.3	1.4	0.4	0.6	0.3	0.4	0.4	0.3	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.3	1.4
20-Jul	0.0	Z	0.1	0.0	0.0	0.4	0.0	0.2	C	C	C	C	C	C	C	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	--	0.4
21-Jul	0.2	0.2	Z	0.4	0.3	0.6	0.2	0.5	0.2	0.3	0.3	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.2	0.2	0.2	0.4	0.2	0.3	0.6
22-Jul	0.3	0.3	0.4	Z	0.6	1.3	0.3	0.3	0.5	0.2	0.3	0.2	0.3	0.3	0.5	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.3	1.3
23-Jul	0.2	0.0	0.2	0.0	Z	0.3	0.6	0.7	0.1	0.2	0.2	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.7
24-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
25-Jul	Z	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
26-Jul	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	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
27-Jul	0.0	0.1	Z	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4
28-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.3	1.5	1.4	0.9	0.1	0.1	0.0	0.2	0.4	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	1.5
29-Jul	0.0	0.0	0.1	0.0	Z	0.8	0.2	0.1	0.1	0.1	0.2	0.1	0.0	0.2	0.0	0.4	0.3	0.2	0.2	0.0	0.2	0.1	0.0	0.1	0.1	0.8
30-Jul	0.1	0.3	0.3	0.1	0.3	Z	0.5	0.5	0.4	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	0.0	0.1	0.5
31-Jul	Z	0.1	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.2
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Jackfish 2/3 - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Jackfish 2/3 - July 2023**

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

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Jackfish 2/3 - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	35	50	55	18	23	42	22	22	59	53	86	117	46	23	30	24	705
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	35	50	55	18	23	42	22	22	59	53	86	117	46	23	30	24	705

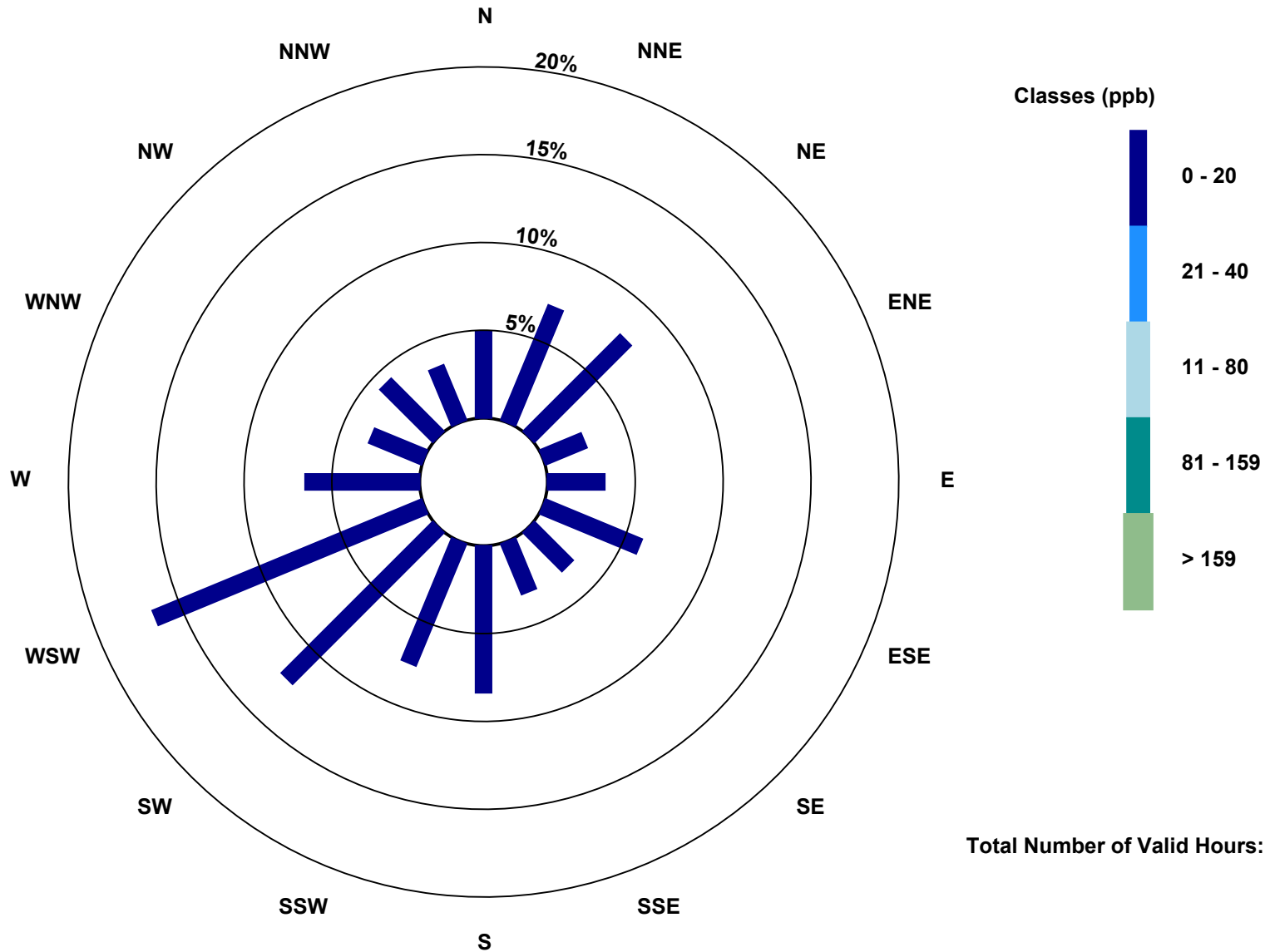
Total Number of Valid Hours: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Jackfish 2/3

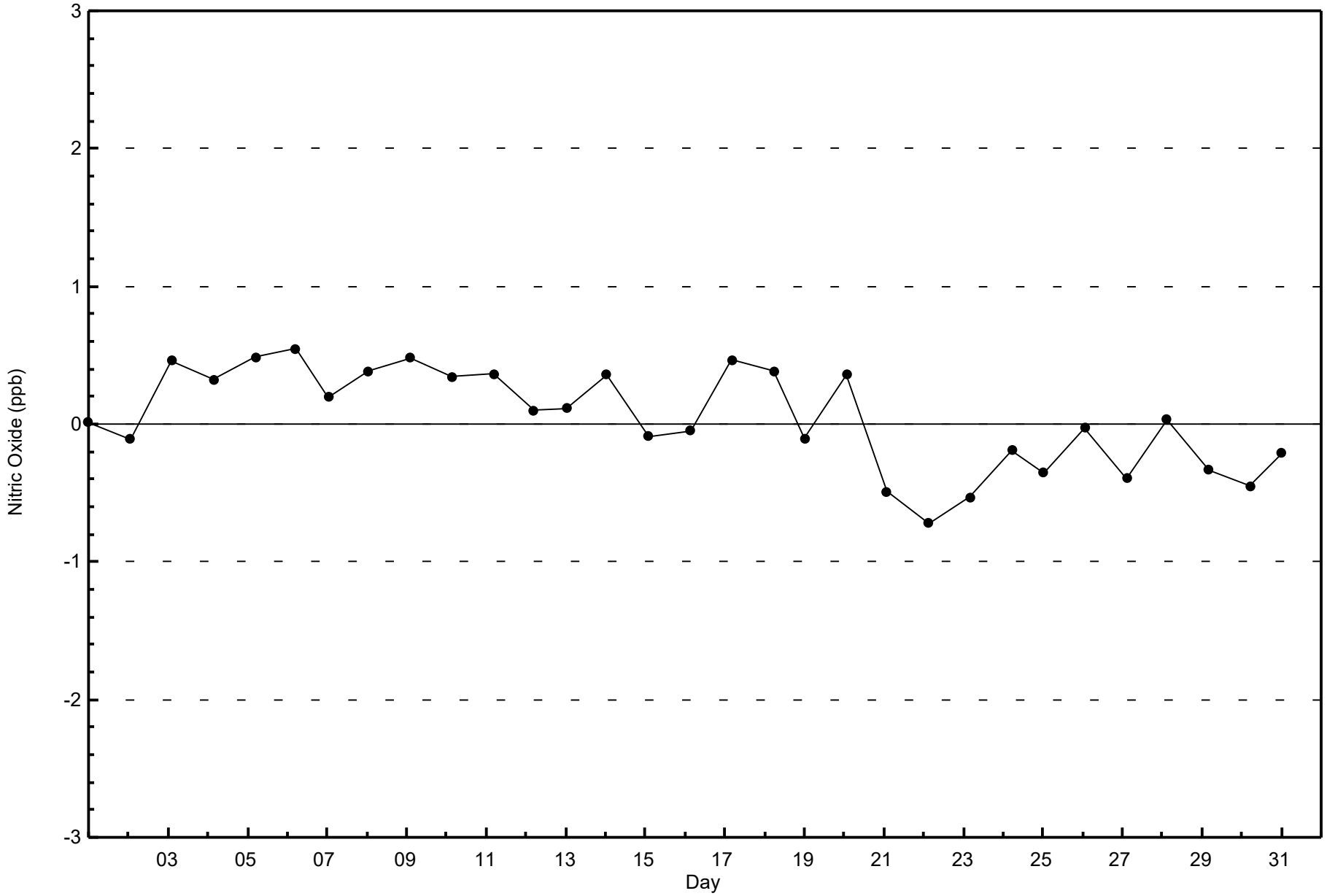


Total Number of Valid Hours: 705



Wood Buffalo Environmental Association
Zero Responses

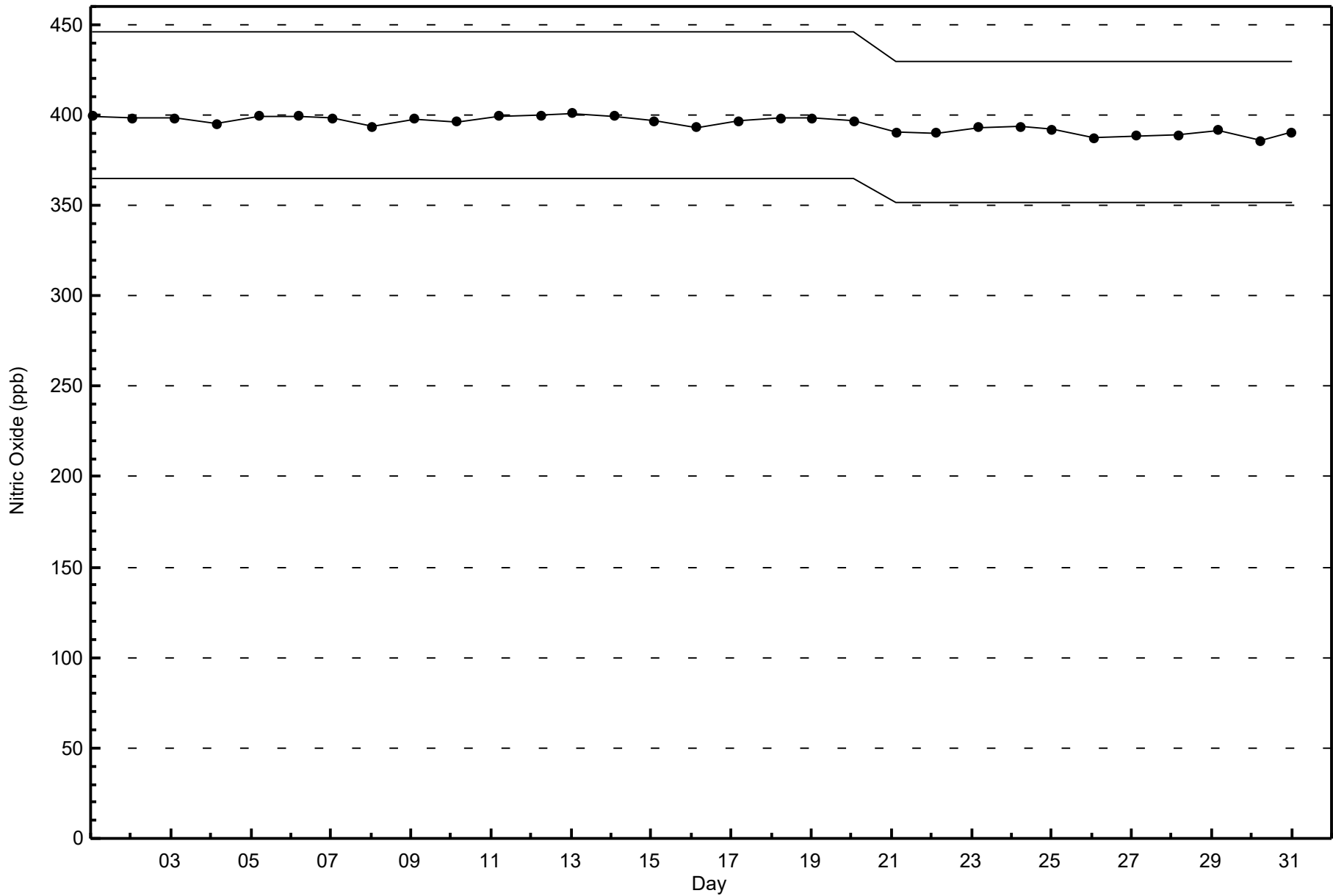
Nitric Oxide (NO) - ppb
Jackfish 2/3 - July 2023





Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Jackfish 2/3 - July 2023





Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb
Jackfish 2/3 - July 2023

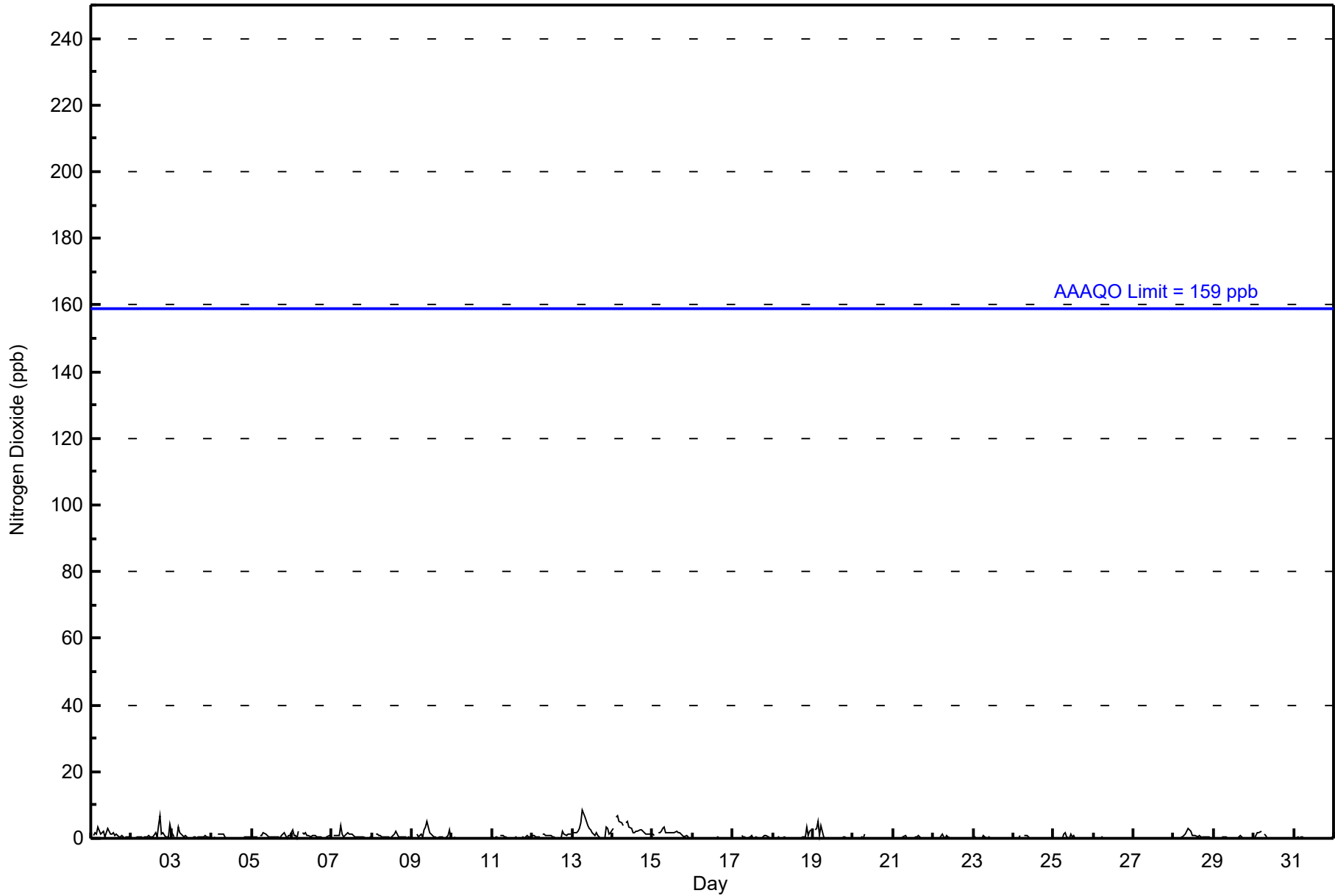
Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744																					
Maximum Value: 8.3 ppb on Jul 13 07:00		Maximum Daily Average: 3.1 ppb on Jul 14		Hours of Data: 705																							
Minimum Value: 0.0 ppb on Jul 3 11:00		Minimum Daily Average: 0.0 ppb on Jul 27		Hours of Missing Data: 39																							
Maximum Diurnal Average: 1.2 ppb at hour 6		Minimum Diurnal Average: 0.4 ppb at hour 20		Hours of Calibration: 38																							
Monthly Average: 0.63 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.2 Q ₃ = 0.8 P ₉₀ = 1.7 P ₉₉ = 5.1		Percent Operational Time: 99.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	0.8	1.6	1.3	3.4	1.4	1.7	2.2	0.6	1.6	2.8	1.2	1.3	1.5	0.8	1.1	0.6	0.4	0.8	0.3	0.2	0.5	0.4	0.3	1.2	3.4	
2-Jul	0.3	Z	0.2	0.4	0.4	0.6	0.4	0.2	0.3	0.3	0.7	0.5	0.5	0.5	1.8	0.4	3.8	6.6	1.4	1.6	0.4	0.3	0.4	4.2	1.1	6.6	
3-Jul	2.0	0.4	Z	0.4	3.4	1.6	1.1	0.4	0.7	0.4	0.0	0.0	0.1	0.3	0.3	0.0	0.4	0.3	0.6	0.4	0.8	0.4	0.3	0.1	0.6	3.4	
4-Jul	0.0	0.0	0.4	Z	1.2	1.2	1.3	1.1	0.6	0.1	0.0	0.1	0.1	0.2	0.1	0.0	0.1	0.0	0.2	0.2	0.5	0.3	0.4	0.5	0.4	1.3	
5-Jul	0.4	0.3	0.4	0.3	Z	1.0	1.0	1.6	1.1	0.7	0.3	0.5	0.3	0.3	0.4	0.4	0.4	0.2	0.8	1.5	0.7	0.2	1.0	0.8	0.6	1.6	
6-Jul	2.4	1.0	0.8	0.1	2.1	Z	1.9	1.1	1.7	0.9	0.8	0.6	0.7	0.9	1.0	0.6	0.6	0.6	0.2	0.2	0.2	0.3	0.7	0.7	0.9	2.4	
7-Jul	Z	0.8	0.8	0.8	0.7	3.8	1.3	0.5	0.8	1.9	1.3	1.1	1.1	0.8	0.3	0.5	0.6	0.4	0.3	0.5	0.2	0.2	0.2	0.4	0.8	3.8	
8-Jul	0.4	Z	1.4	1.1	0.8	1.0	0.5	0.3	0.4	0.3	0.3	0.2	0.3	1.3	2.1	1.4	0.5	0.6	0.6	0.5	0.4	0.2	0.3	0.2	0.7	2.1	
9-Jul	0.1	0.0	Z	1.1	0.4	1.4	0.5	2.7	3.6	5.1	1.6	1.1	0.9	0.5	0.5	0.0	0.4	0.5	0.5	0.0	0.1	0.8	2.7	0.1	1.1	5.1	
10-Jul	0.0	0.0	0.5	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.1	0.5	
11-Jul	0.6	0.2	0.6	0.3	Z	1.0	1.0	0.5	0.3	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.1	0.4	0.1	0.3	0.8	0.6	0.5	0.3	1.0	
12-Jul	0.8	0.9	0.5	0.4	0.5	Z	1.1	1.3	1.0	1.0	0.7	0.7	0.6	0.3	0.1	0.1	0.1	0.1	2.2	1.4	1.0	1.1	1.3	1.4	0.8	2.2	
13-Jul	Z	1.5	1.6	2.0	2.8	4.5	8.3	6.5	5.0	3.8	2.8	2.6	1.9	1.0	1.7	0.7	0.4	0.2	0.0	0.2	3.5	3.0	1.1	1.6	2.5	8.3	
14-Jul	3.0	Z	6.5	6.9	5.2	4.7	3.9	M	4.7	5.1	3.5	2.8	1.7	1.6	2.1	2.0	2.4	2.6	2.2	1.7	1.4	1.3	1.3	1.3	3.1	6.9	
15-Jul	1.1	1.0	Z	1.7	1.7	2.3	2.8	3.2	1.8	1.6	1.9	1.8	1.5	1.8	2.1	1.9	1.6	1.1	0.8	0.5	1.0	0.6	0.0	0.0	1.5	3.2	
16-Jul	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	0.0	0.2	0.3	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.8
17-Jul	0.0	0.0	0.0	0.1	Z	0.8	0.5	0.5	0.0	0.0	0.6	0.7	0.0	0.0	0.3	0.1	0.0	0.0	0.4	0.8	0.7	0.5	0.0	0.0	0.3	0.8	
18-Jul	0.0	0.0	0.0	0.3	0.0	Z	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.4	3.5	0.7	2.0	2.6	0.5	3.5	
19-Jul	Z	2.4	3.1	5.0	1.0	3.9	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.3	0.0	0.0	0.0	0.0	0.7	5.0	
20-Jul	0.0	Z	0.0	0.0	0.0	0.4	0.0	1.4	C	C	C	C	C	C	C	0.2	0.0	0.2	0.0	0.0	0.0	0.2	0.2	0.0	--	1.4	
21-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.3	0.9	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.9	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.9	
22-Jul	0.0	0.1	0.0	Z	0.0	1.1	0.5	0.2	0.7	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	0.1	1.1	
23-Jul	0.0	0.5	0.0	0.0	Z	0.0	0.7	0.5	0.2	0.6	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	
24-Jul	0.0	0.0	0.0	0.0	1.0	Z	1.0	0.8	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.0	
25-Jul	Z	0.1	0.0	0.2	0.0	0.0	1.1	1.5	0.4	0.0	1.2	0.4	0.8	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	1.5	
26-Jul	0.0	Z	0.0	0.0	0.0	0.4	0.0	0.0	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	0.1	0.0	0.0	0.0	0.4	
27-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	
28-Jul	0.2	0.0	0.1	Z	0.5	0.3	0.7	1.1	2.8	2.7	2.3	0.8	0.8	0.9	0.4	1.0	0.6	0.5	0.4	0.6	0.6	0.5	0.0	0.0	0.8	2.8	
29-Jul	0.0	0.0	0.0	0.0	Z	0.5	0.3	0.3	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.3	0.8	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.8	
30-Jul	0.0	0.7	1.6	1.5	2.0	Z	1.3	0.8	0.1	0.0	0.0	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	0.4	2.0	
31-Jul	Z	0.1	0.3	0.1	0.6	0.4	0.0	0.0	0.1	0.2	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	0.3	0.1	0.6	
																								Diurnal Average			
																								Diurnal Maximum			
																								0.5 3.0			
																								0.4 2.4			
																								0.8 6.5			
																								0.9 6.9			
																								1.1 5.2			
																								1.2 4.7			
																								1.1 8.3			
																								1.0 6.5			
																								0.9 5.0			
																								0.9 5.1			
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																								0.4 2.7			
																								0.5 4.2			

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Jackfish 2/3 - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Jackfish 2/3 - July 2023

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

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Jackfish 2/3 - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	35	50	55	18	23	42	22	22	59	53	86	117	46	23	30	24	705
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	35	50	55	18	23	42	22	22	59	53	86	117	46	23	30	24	705

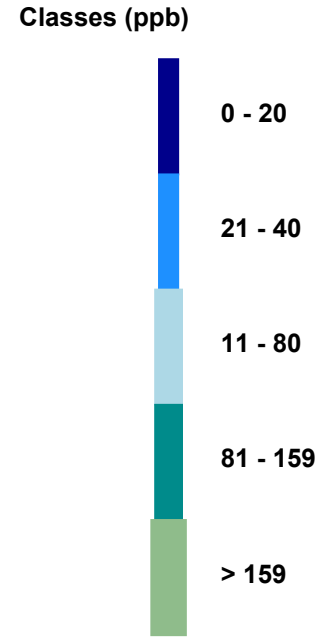
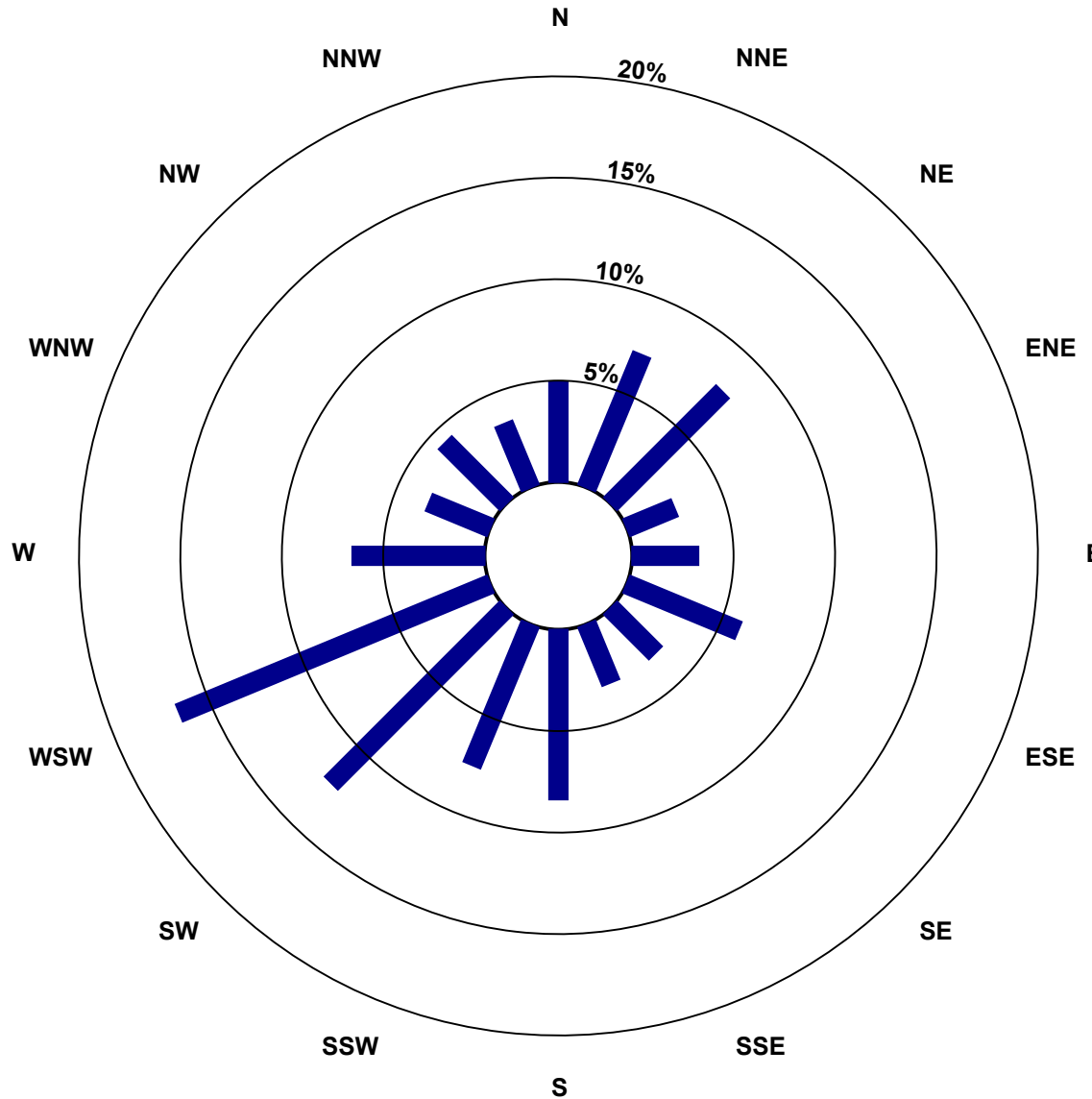
Total Number of Valid Hours: 705

Total Number of Hours: 744

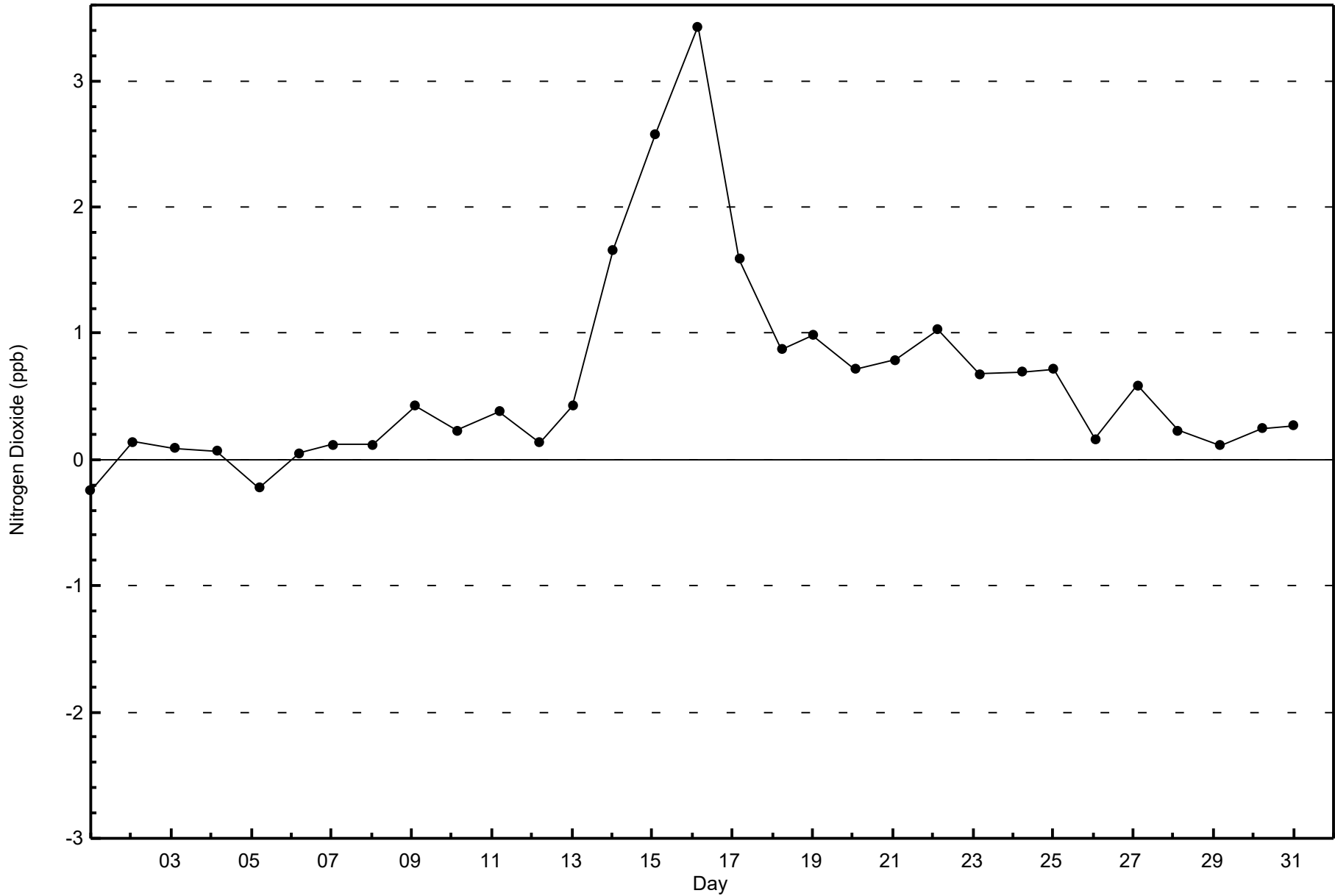


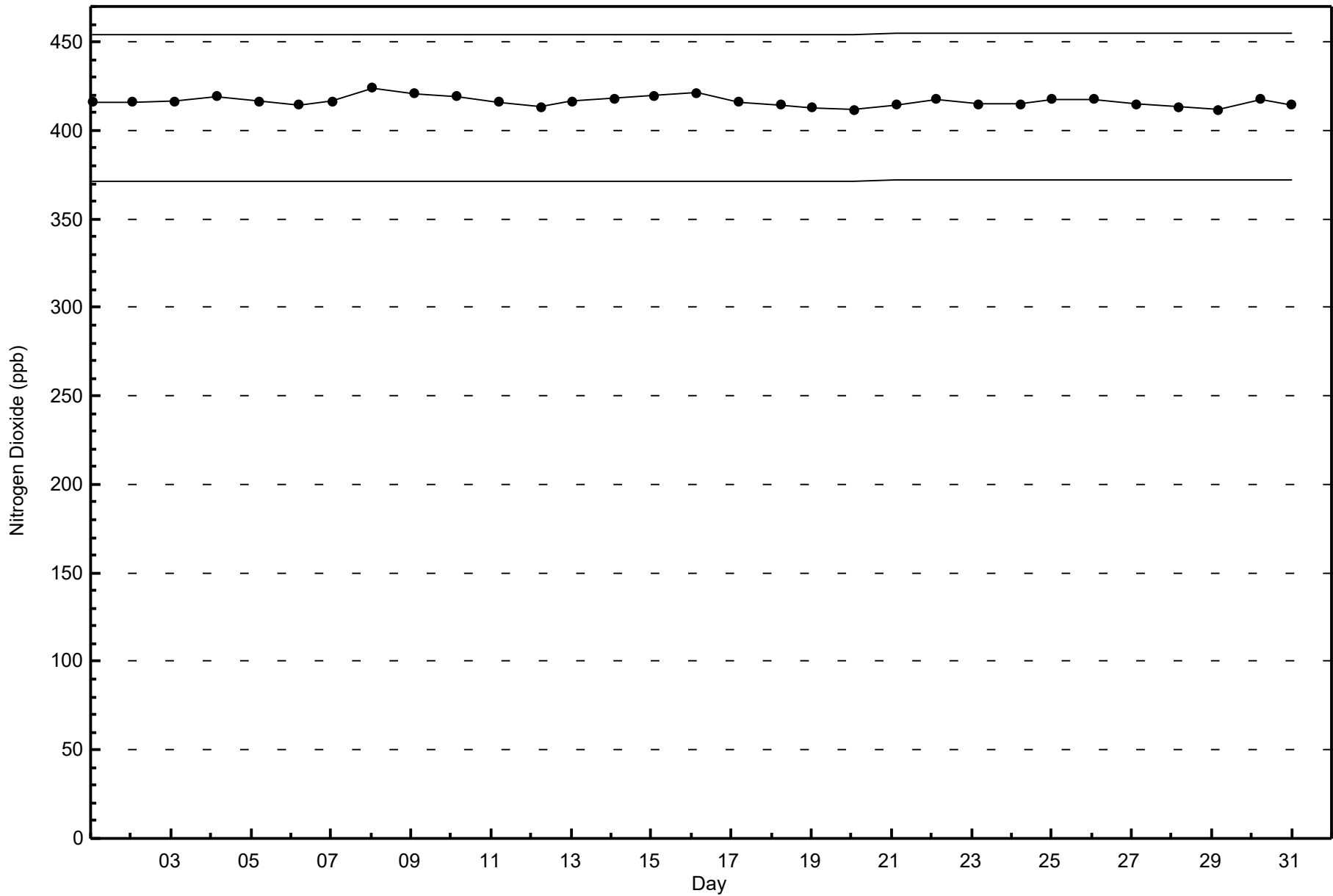
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Jackfish 2/3



Total Number of Valid Hours: 705







Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
Jackfish 2/3 - July 2023

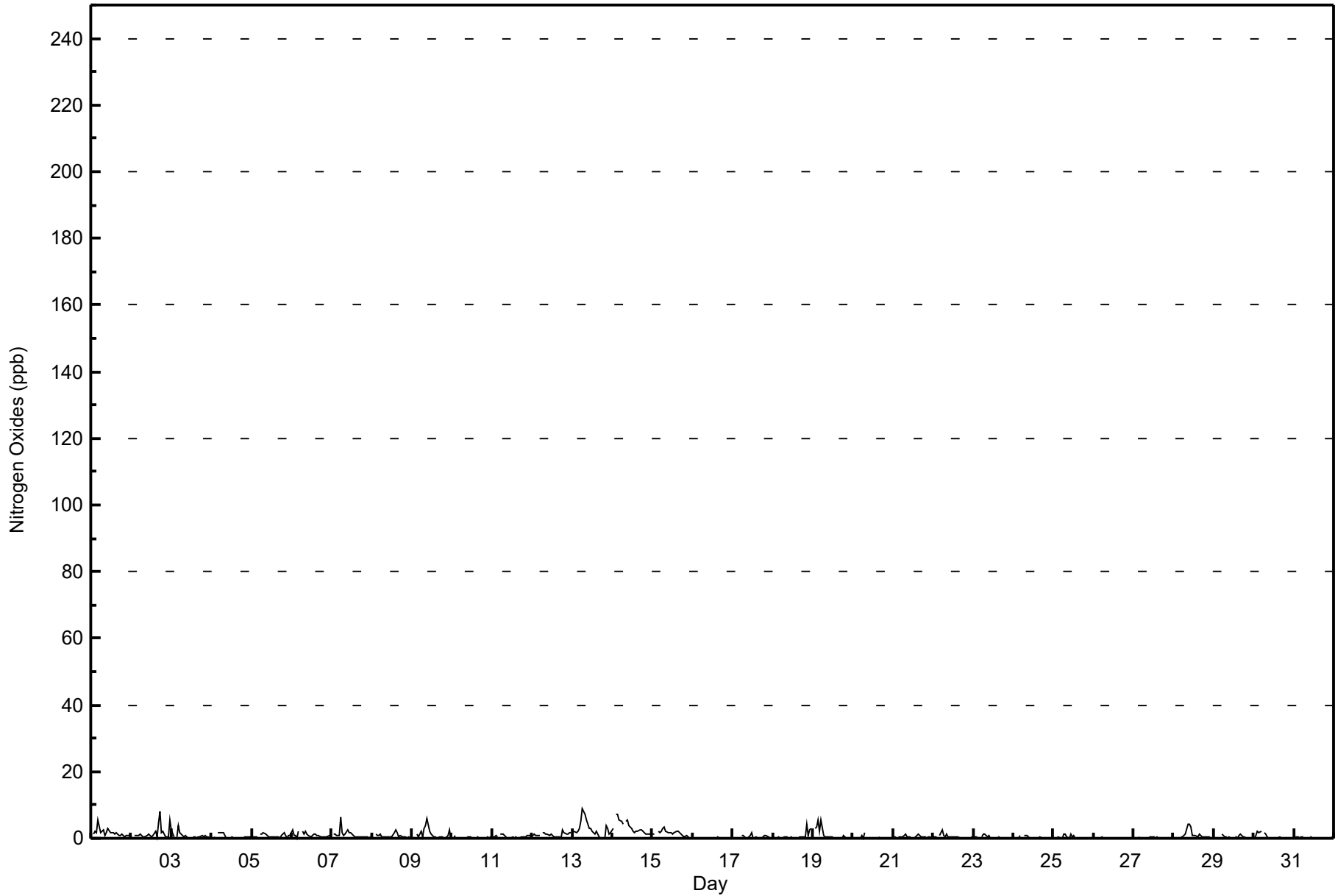
Maximum Value: 9.0 ppb on Jul 13 07:00		Maximum Daily Average: 3.3 ppb on Jul 14		Hours in Service: 744																						
Minimum Value: 0.0 ppb on Jul 3 12:00		Minimum Daily Average: 0.0 ppb on Jul 26		Hours of Data: 705																						
Maximum Diurnal Average: 1.7 ppb at hour 6		Minimum Diurnal Average: 0.5 ppb at hour 20		Hours of Missing Data: 39																						
Monthly Average: 0.78 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.4 Q ₃ = 1.0 P ₉₀ = 1.9 P ₉₉ = 5.6		Hours of Calibration: 38																						
				Percent Operational Time: 99.9																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	Z	1.4	2.0	1.7	5.5	1.8	2.2	2.7	1.0	1.9	3.1	1.6	1.9	1.9	1.2	1.8	0.9	1.0	1.4	0.9	0.6	0.9	0.8	0.8	1.7	5.5
2-Jul	0.5	Z	0.8	0.9	0.7	1.1	0.8	0.6	0.6	0.7	1.1	0.7	0.6	0.8	2.1	0.5	4.5	7.9	1.6	1.9	0.4	0.3	0.6	5.6	1.5	7.9
3-Jul	2.3	0.4	Z	0.5	3.8	1.6	1.2	0.4	0.7	0.4	0.0	0.0	0.1	0.4	0.3	0.0	0.6	0.3	0.7	0.6	0.8	0.4	0.4	0.2	0.7	3.8
4-Jul	0.0	0.0	0.4	Z	1.7	1.5	1.8	1.9	0.7	0.2	0.0	0.1	0.2	0.2	0.1	0.0	0.2	0.0	0.2	0.2	0.5	0.3	0.4	0.5	0.5	1.9
5-Jul	0.4	0.4	0.4	0.3	Z	1.3	1.1	1.8	1.1	0.7	0.3	0.5	0.3	0.3	0.4	0.4	0.4	0.2	0.8	1.5	0.7	0.2	1.0	0.8	0.7	1.8
6-Jul	2.4	1.0	0.8	0.1	2.2	Z	2.3	1.4	2.3	1.1	0.8	0.6	0.7	1.1	1.1	0.7	0.7	0.6	0.4	0.4	0.3	0.5	0.7	0.7	1.0	2.4
7-Jul	Z	1.2	1.2	1.0	0.8	6.2	1.7	0.7	1.2	2.4	1.8	1.5	1.3	0.8	0.3	0.6	0.6	0.4	0.3	0.5	0.2	0.3	0.2	0.4	1.1	6.2
8-Jul	0.4	Z	1.4	1.1	0.8	1.1	0.5	0.3	0.4	0.3	0.3	0.2	0.3	1.5	2.3	1.5	0.5	0.7	0.6	0.5	0.4	0.2	0.3	0.2	0.7	2.3
9-Jul	0.1	0.0	Z	1.1	0.4	1.9	0.5	3.1	4.0	6.1	1.9	1.1	0.9	0.5	0.6	0.0	0.4	0.5	0.5	0.0	0.1	0.8	2.7	0.1	1.2	6.1
10-Jul	0.0	0.0	0.7	Z	0.1	0.0	0.2	0.1	0.0	0.5	0.3	0.3	0.1	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.2	0.2	0.7
11-Jul	0.6	0.3	0.7	0.3	Z	1.2	1.2	0.7	0.4	0.0	0.1	0.0	0.2	0.1	0.3	0.1	0.1	0.2	0.6	0.2	0.4	1.0	0.7	0.7	0.5	1.2
12-Jul	0.8	1.2	0.7	0.6	0.8	Z	1.7	1.9	1.4	1.4	1.0	1.1	0.8	0.6	0.3	0.5	0.4	0.2	2.4	1.6	1.2	1.5	1.5	1.7	1.1	2.4
13-Jul	Z	1.9	1.9	2.2	3.2	5.2	9.0	7.1	5.3	4.1	3.1	2.9	2.1	1.4	2.2	1.1	0.4	0.2	0.2	0.2	3.8	3.2	1.2	1.6	2.8	9.0
14-Jul	3.0	Z	7.0	7.3	5.6	4.9	4.1	M	5.1	5.5	3.7	3.0	2.0	1.8	2.2	2.1	2.4	2.6	2.2	1.8	1.4	1.3	1.3	1.3	3.3	7.3
15-Jul	1.2	1.1	Z	1.9	1.7	2.3	2.9	3.4	1.9	1.6	1.9	1.8	1.5	1.8	2.3	1.9	1.6	1.1	0.8	0.5	1.0	0.6	0.0	0.0	1.5	3.4
16-Jul	0.1	0.0	0.0	Z	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.3
17-Jul	0.0	0.0	0.0	0.1	Z	0.8	0.7	0.5	0.0	0.0	0.8	1.5	0.0	0.0	0.3	0.1	0.0	0.0	0.4	0.8	0.8	0.5	0.0	0.0	0.3	1.5
18-Jul	0.0	0.0	0.0	0.3	0.0	Z	0.1	0.5	0.3	0.0	0.1	0.2	0.2	0.2	0.1	0.0	0.2	0.5	0.3	0.5	4.2	1.0	2.4	3.0	0.6	4.2
19-Jul	Z	2.9	3.6	5.6	2.3	5.3	0.7	0.6	0.4	0.4	0.4	0.3	0.1	0.1	0.2	0.1	0.1	0.1	0.8	0.3	0.0	0.0	0.0	0.0	1.0	5.6
20-Jul	0.0	Z	0.1	0.0	0.0	0.8	0.0	1.6	C	C	C	C	C	C	C	0.4	0.2	0.2	0.0	0.0	0.0	0.2	0.2	0.1	--	1.6
21-Jul	0.2	0.2	Z	0.4	0.3	0.6	0.5	1.4	0.2	0.3	0.3	0.1	0.2	0.6	0.8	1.2	1.0	0.6	0.4	0.2	0.2	0.2	0.4	0.2	0.5	1.4
22-Jul	0.3	0.4	0.4	Z	0.6	2.4	0.8	0.5	1.2	0.5	0.3	0.2	0.3	0.3	0.5	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.4	2.4
23-Jul	0.2	0.5	0.2	0.0	Z	0.3	1.3	1.2	0.3	0.8	0.2	0.0	0.0	0.1	0.2	0.3	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	1.3
24-Jul	0.0	0.0	0.0	0.0	1.0	Z	1.0	0.8	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.0
25-Jul	Z	0.1	0.1	0.2	0.0	0.0	1.1	1.5	0.4	0.0	1.2	0.4	0.8	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	1.5
26-Jul	0.0	Z	0.1	0.0	0.0	0.4	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	0.2	0.0	0.1	0.0	0.1	0.0	0.4
27-Jul	0.0	0.1	Z	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.4	0.3	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4
28-Jul	0.2	0.0	0.1	Z	0.5	0.3	0.7	1.4	4.3	4.1	3.2	0.9	0.9	0.9	0.6	1.4	0.7	0.5	0.4	0.6	0.6	0.6	0.0	0.1	1.0	4.3
29-Jul	0.0	0.0	0.1	0.0	Z	1.3	0.5	0.4	0.1	0.2	0.2	0.2	0.0	0.3	0.0	0.7	1.1	0.3	0.4	0.1	0.2	0.1	0.0	0.1	0.3	1.3
30-Jul	0.1	1.0	1.9	1.6	2.3	Z	1.8	1.3	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.5	2.3
31-Jul	Z	0.2	0.3	0.1	0.6	0.6	0.1	0.1	0.1	0.2	0.3	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.4	0.2	0.6
																								Diurnal Average		
																								Diurnal Maximum		
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																								Diurnal Maximum		
																								Diurnal Average		
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Z - zerospan C - Calibration M - Maintenance



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Jackfish 2/3 - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Jackfish 2/3 - July 2023**

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

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Jackfish 2/3 - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	35	50	55	18	23	42	22	22	59	53	86	117	46	23	30	24	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	35	50	55	18	23	42	22	22	59	53	86	117	46	23	30	24	705

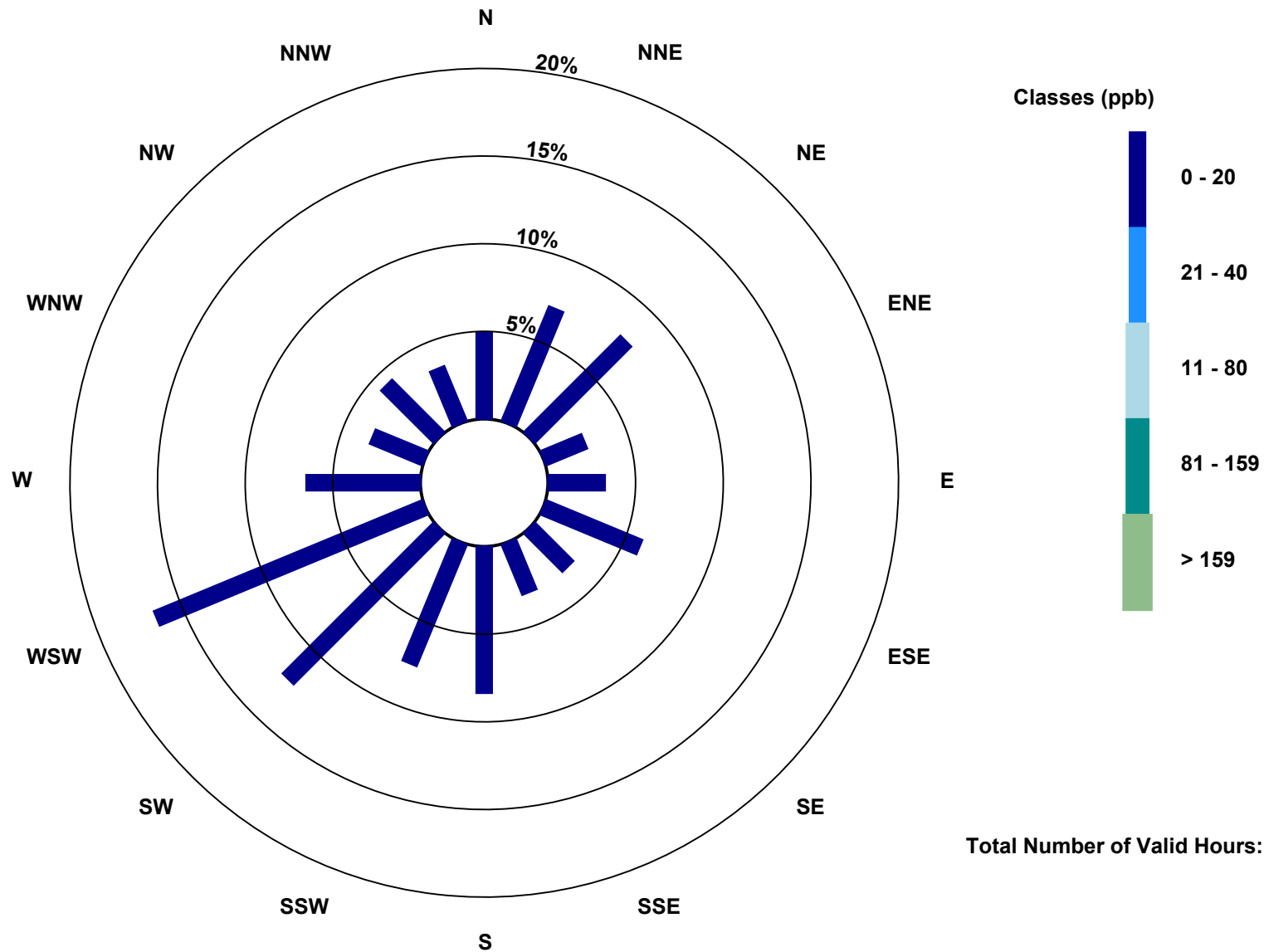
Total Number of Valid Hours: 705

Total Number of Hours: 744

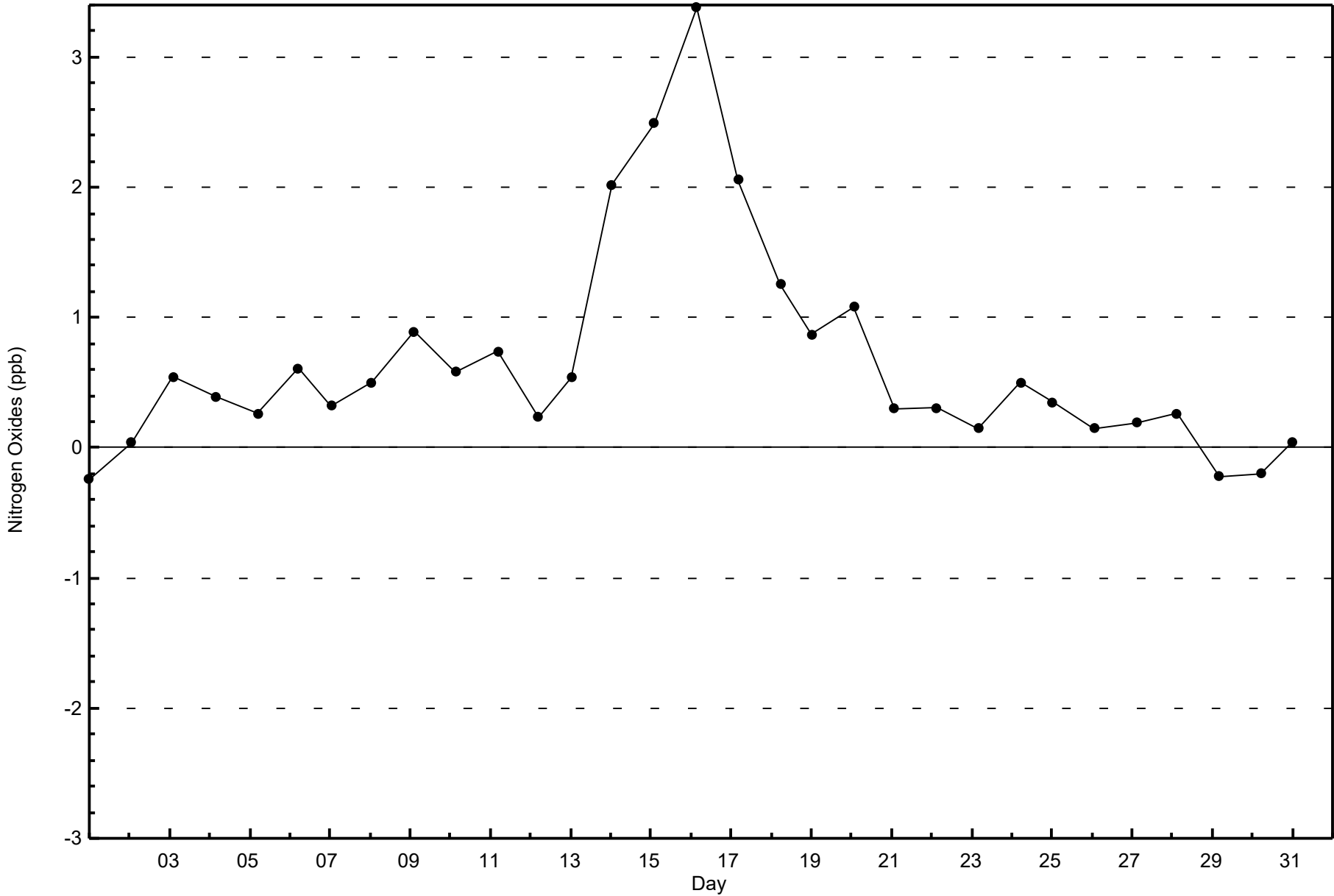


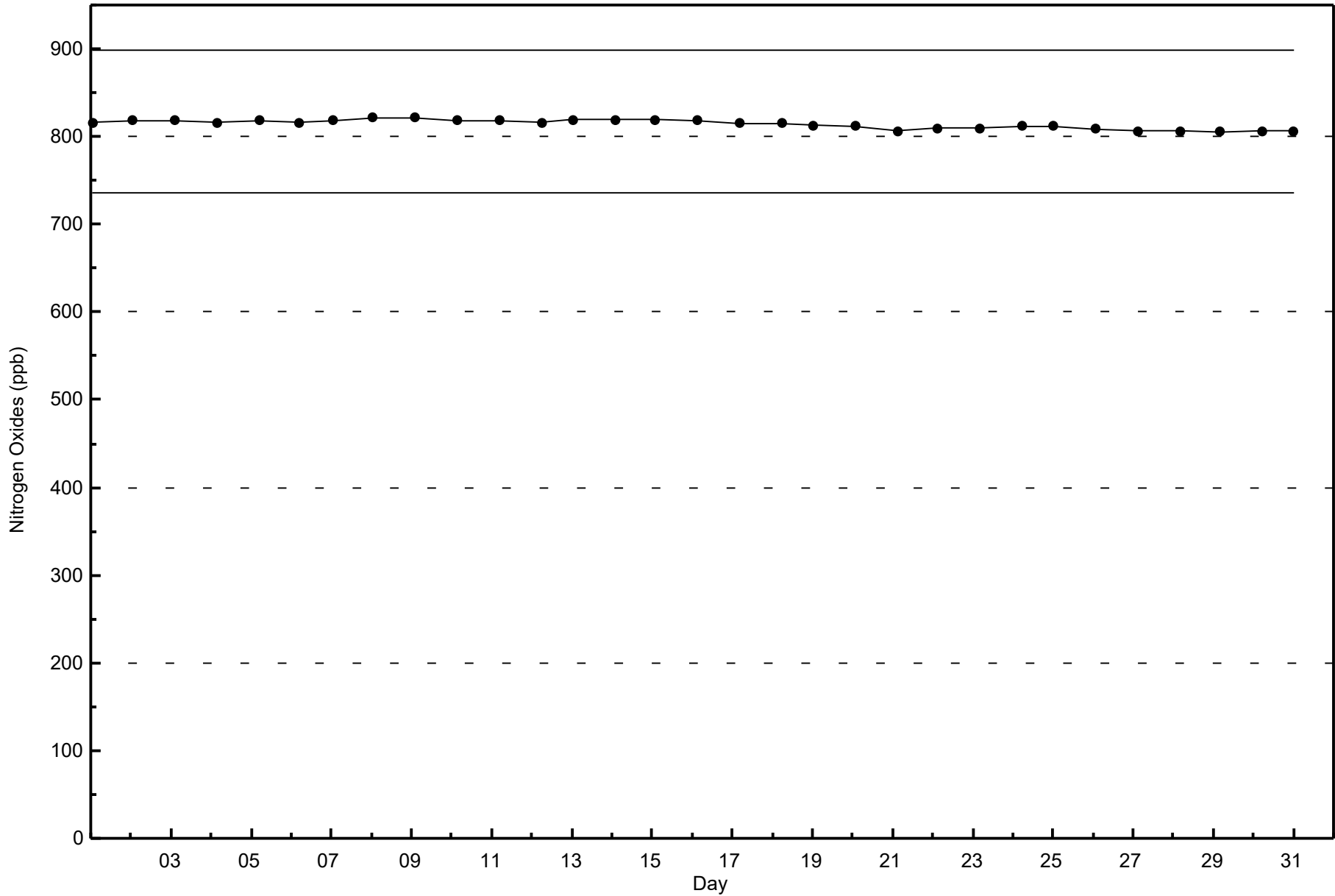
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Jackfish 2/3



Total Number of Valid Hours: 705







Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

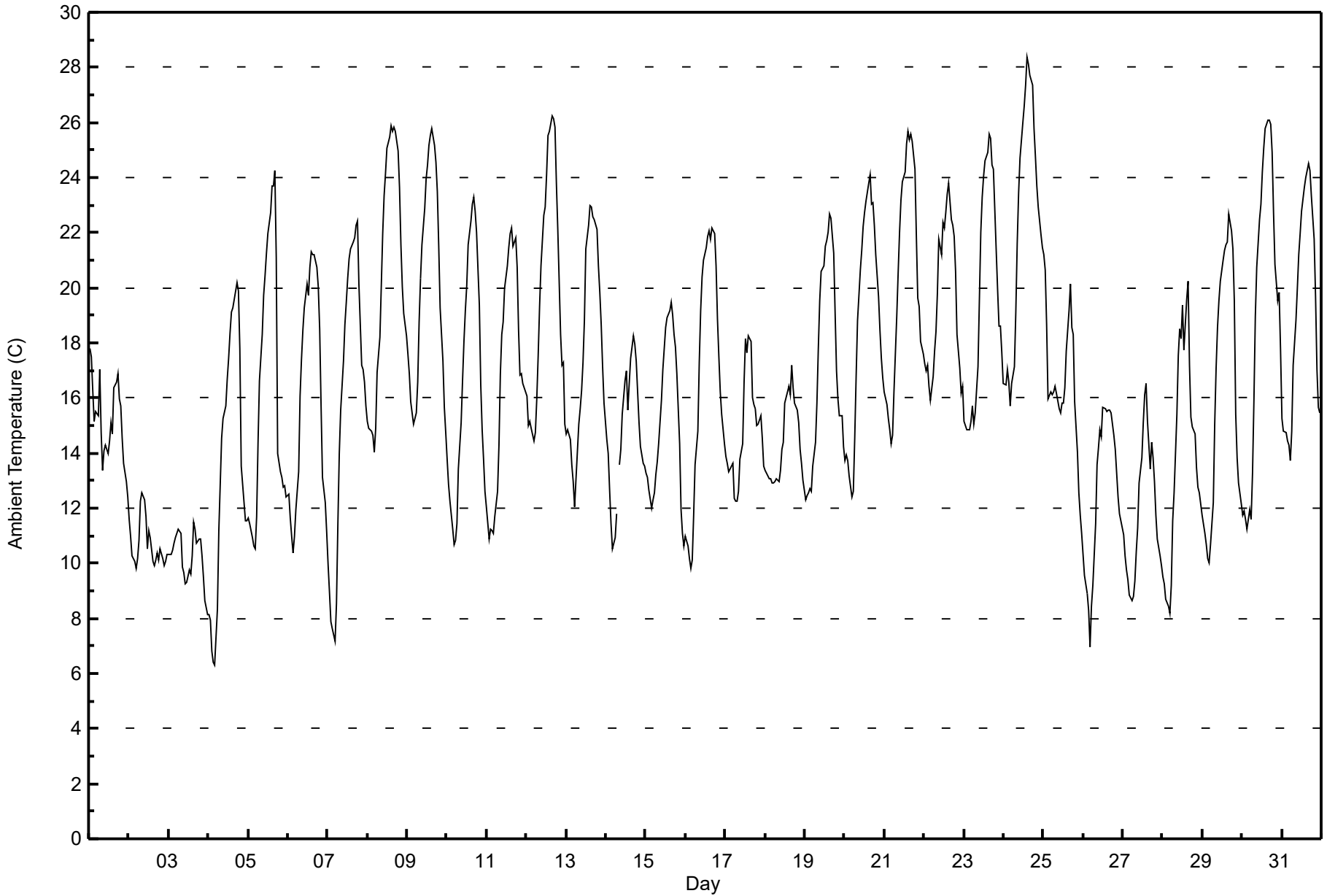
Jackfish 2/3 - July 2023

Maximum Value: 28.4 C on Jul 24 15:00		Maximum Daily Average: 22.4 C on Jul 24		Hours in Service: 744																							
Minimum Value: 6.3 C on Jul 4 05:00		Minimum Daily Average: 10.2 C on Jul 3		Hours of Data: 743																							
Maximum Diurnal Average: 21.1 C at hour 16		Minimum Diurnal Average: 12.0 C at hour 5		Hours of Missing Data: 1																							
Monthly Average: 16.58 C		Percentiles: P ₁ = 8.0 P ₁₀ = 10.6 Q ₁ = 13.0 Median = 16.0 Q ₃ = 20.2 P ₉₀ = 23.2 P ₉₉ = 26.1		Hours of Calibration: 0																							
				Percent Operational Time: 99.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	17.8	17.5	16.3	15.1	15.5	15.4	17.0	14.7	13.4	14.1	14.3	14.0	14.4	15.1	14.7	16.4	16.6	16.9	16.0	15.7	14.5	13.6	13.0	12.4	15.2	17.8	
2-Jul	11.6	11.0	10.3	10.1	9.8	10.2	10.8	12.3	12.5	12.3	11.7	10.5	11.2	10.9	10.1	9.9	10.1	10.4	10.1	10.5	10.2	9.9	10.1	10.3	10.7	12.5	
3-Jul	10.3	10.3	10.5	10.7	10.9	11.1	11.2	11.1	9.8	9.7	9.2	9.3	9.8	9.6	10.3	11.5	11.2	10.7	10.9	10.9	10.3	9.5	8.6	8.1	10.2	11.5	
4-Jul	8.1	7.9	6.8	6.4	6.3	8.3	11.2	12.9	14.6	15.2	15.7	16.7	17.4	18.4	19.1	19.3	19.9	20.2	19.9	17.8	13.5	12.2	11.6	11.6	13.8	20.2	
5-Jul	11.6	11.4	11.0	10.6	10.5	11.7	14.4	16.6	18.3	19.7	20.5	21.2	22.0	22.7	23.7	23.7	24.2	21.1	14.0	13.3	13.1	12.7	12.8	12.4	16.4	24.2	
6-Jul	12.5	11.7	11.0	10.4	11.0	12.0	13.3	16.1	17.4	18.4	19.3	20.1	19.7	20.8	21.3	21.2	21.2	20.7	20.0	18.5	15.7	13.1	12.2	11.2	16.2	21.3	
7-Jul	10.0	8.9	7.9	7.6	7.2	8.5	11.4	14.0	15.6	17.3	18.6	19.5	20.3	21.1	21.4	21.7	21.8	22.2	22.4	20.1	17.2	17.0	16.6	15.7	16.0	22.4	
8-Jul	15.2	14.9	14.8	14.7	14.0	14.9	16.9	18.2	20.1	21.9	23.3	24.1	25.1	25.5	25.9	25.7	25.8	25.7	25.0	23.6	21.5	20.1	19.1	18.3	20.6	25.9	
9-Jul	17.6	16.9	15.8	15.5	15.0	15.5	16.6	18.8	20.3	21.5	22.9	23.9	24.5	25.2	25.5	25.8	25.2	24.6	23.5	21.5	19.3	17.3	15.7	14.8	20.1	25.8	
10-Jul	13.8	12.9	12.3	11.2	10.7	10.8	11.4	13.4	15.1	16.6	18.0	19.2	20.1	21.6	22.4	23.1	23.3	22.8	22.0	19.3	16.5	14.8	13.8	12.6	16.6	23.3	
11-Jul	12.1	10.9	11.3	11.2	11.1	11.7	12.6	14.3	16.9	18.3	18.8	20.0	20.8	21.5	22.0	22.1	21.5	21.8	20.7	18.5	16.8	16.9	16.5	16.2	16.8	22.1	
12-Jul	16.1	15.0	15.1	14.9	14.5	14.7	16.0	17.6	19.3	20.8	22.6	22.9	24.1	25.5	25.7	26.2	26.1	25.8	23.8	22.1	18.3	17.2	17.3	15.1	19.9	26.2	
13-Jul	14.7	14.9	14.5	13.6	13.0	12.0	13.1	15.0	15.6	16.3	17.3	18.8	21.4	22.3	23.0	23.0	22.6	22.5	22.1	20.8	19.9	18.6	17.2	15.8	17.8	23.0	
14-Jul	14.5	14.0	12.6	11.4	10.5	10.9	11.8	M	13.6	14.1	15.4	16.7	17.0	15.5	16.5	17.4	18.2	18.0	17.4	16.2	15.1	14.2	13.6	13.5	14.7	18.2	
15-Jul	13.3	13.1	12.6	12.0	12.3	12.6	13.2	13.7	14.3	15.9	17.0	17.8	18.6	18.9	19.2	19.5	19.0	18.3	17.9	16.9	14.3	11.9	11.1	10.6	15.2	19.5	
16-Jul	11.0	10.6	10.2	9.8	10.1	11.7	13.6	14.8	17.3	19.2	20.4	21.0	21.5	21.8	22.1	21.8	22.2	22.0	20.8	18.8	17.5	16.2	15.4	14.4	16.8	22.2	
17-Jul	13.9	13.6	13.3	13.4	13.6	12.4	12.3	12.3	12.6	13.8	14.4	16.6	18.2	17.6	18.3	18.0	16.0	15.7	15.6	15.0	15.1	15.4	14.5	13.5	14.8	18.3	
18-Jul	13.4	13.3	13.1	13.1	12.9	12.9	13.0	13.1	13.0	13.4	14.1	14.4	15.8	16.2	16.4	16.1	17.2	16.4	15.8	15.6	15.1	14.1	13.6	13.0	14.4	17.2	
19-Jul	12.3	12.5	12.5	12.7	12.6	13.5	14.4	15.8	17.8	19.5	20.6	20.8	21.5	21.7	22.0	22.7	22.5	21.3	19.1	17.0	16.0	15.4	15.3	14.2	17.2	22.7	
20-Jul	13.7	13.9	13.7	13.2	12.4	12.6	14.5	16.8	18.8	20.6	21.3	22.2	22.7	23.1	23.8	24.1	23.0	23.1	22.3	21.2	19.7	18.4	17.4	16.7	18.7	24.1	
21-Jul	16.2	15.8	15.2	14.9	14.4	14.7	16.2	19.0	20.5	22.0	23.2	23.9	24.2	25.2	25.7	25.4	25.6	25.3	24.3	21.9	19.6	19.3	18.0	17.6	20.3	25.7	
22-Jul	17.2	17.0	17.2	16.4	15.9	16.8	17.7	18.4	19.8	21.8	21.2	22.4	22.2	22.7	23.4	23.8	22.5	22.3	21.9	20.6	18.3	17.1	16.2	16.4	19.6	23.8	
23-Jul	15.1	15.0	14.8	14.9	15.1	15.7	15.1	15.5	17.1	19.6	22.0	23.3	24.1	24.6	24.9	25.6	25.4	24.4	24.3	21.3	19.9	18.6	18.6	17.7	19.7	25.6	
24-Jul	16.5	16.5	17.0	16.6	15.7	16.5	17.1	19.1	21.6	23.4	24.7	26.0	26.6	27.4	28.4	28.1	27.7	27.4	25.8	24.7	23.7	22.9	21.9	21.4	22.4	28.4	
25-Jul	21.2	20.7	18.7	16.0	16.2	16.1	16.2	16.4	16.2	15.6	15.5	15.8	15.8	16.4	17.7	19.2	20.1	18.5	18.3	15.9	14.0	12.6	11.7	11.1	16.5	21.2	
26-Jul	10.3	9.6	8.9	8.3	7.0	8.4	9.2	11.4	13.6	14.2	14.9	14.6	15.6	15.6	15.5	15.6	15.6	15.5	14.6	14.1	13.3	12.4	11.8	11.6	12.6	15.6	
27-Jul	11.0	10.3	9.8	9.4	8.8	8.6	8.8	9.3	10.4	11.3	12.9	13.9	15.1	16.1	16.5	15.2	13.4	14.4	13.8	13.0	11.7	10.9	10.3	9.9	11.9	16.5	
28-Jul	9.5	9.3	8.7	8.4	8.2	9.2	11.5	12.5	15.4	17.5	18.5	18.2	19.4	17.7	19.6	20.2	17.2	15.3	14.9	14.7	13.5	12.8	12.6	12.1	14.0	20.2	
29-Jul	11.7	11.1	10.7	10.2	10.0	10.7	12.2	15.1	17.1	18.6	19.5	20.2	21.0	21.3	21.6	21.7	22.7	22.1	21.4	19.5	15.4	13.8	12.9	12.1	16.4	22.7	
30-Jul	11.7	11.9	11.6	11.2	12.0	11.6	13.3	15.9	19.0	20.8	22.5	23.0	24.2	25.1	25.8	26.1	26.1	25.9	24.9	22.8	20.8	19.5	19.8	17.7	19.3	26.1	
31-Jul	15.3	14.8	14.7	14.5	14.3	13.8	14.8	17.2	18.8	20.0	21.2	21.9	22.8	23.7	24.0	24.3	24.5	24.2	23.4	21.8	19.7	17.0	15.6	15.5	19.1	24.5	
		13.5	13.1	12.7	12.2	12.0	12.4	13.6	15.0	16.3	17.5	18.4	19.1	19.9	20.4	20.9	21.1	20.9	20.5	19.6	18.2	16.4	15.3	14.7	14.0	Diurnal Average	
		21.2	20.7	18.7	16.6	16.2	16.8	17.7	19.1	21.6	23.4	24.7	26.0	26.6	27.4	28.4	28.1	27.7	27.4	25.8	24.7	23.7	22.9	21.9	21.4	Diurnal Maximum	
M - Maintenance																											



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Jackfish 2/3 - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Jackfish 2/3 - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	44	5.92	5.92
10 - 20	504	67.83	73.76
> 20	195	26.24	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

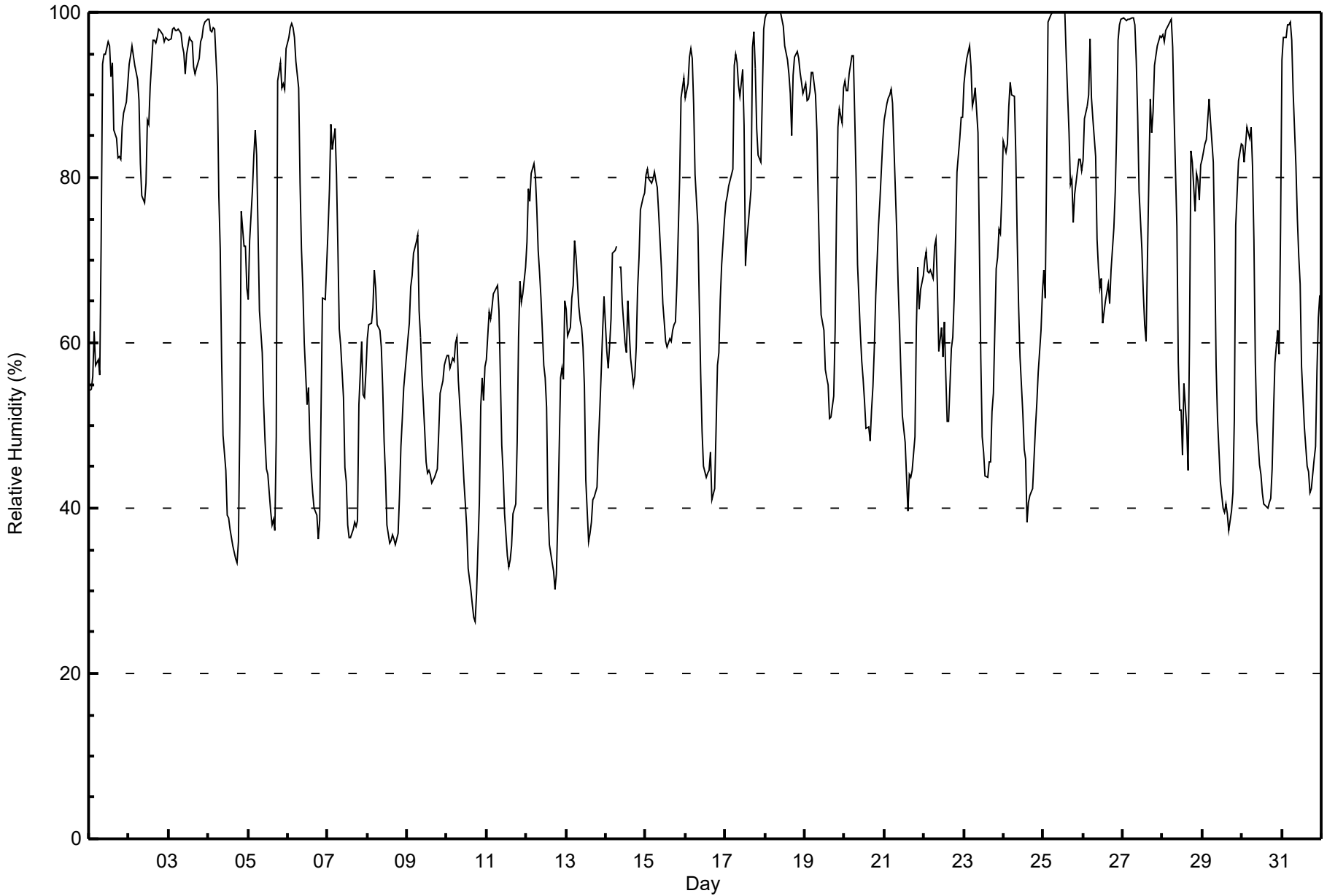
Jackfish 2/3 - July 2023

Maximum Value: 100.0 % on Jul 18 04:00 Maximum Daily Average: 96.3 % on Jul 3																						Hours in Service: 744 Hours of Data: 743				
Minimum Value: 26.4 % on Jul 10 18:00 Minimum Daily Average: 46.5 % on Jul 10 Maximum Diurnal Average: 85.5 % at hour 5 Minimum Diurnal Average: 53.2 % at hour 16 Monthly Average: 69.87 % Percentiles: P ₁ = 32.5 P ₁₀ = 41.6 Q ₁ = 54.1 Median = 69.1 Q ₃ = 89.3 P ₉₀ = 96.8 P ₉₉ = 100.0																						Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	54.3	54.3	56.0	61.3	57.2	58.0	56.1	72.4	93.8	94.9	95.0	96.5	95.9	92.2	93.9	85.8	84.7	82.4	82.6	82.3	86.1	87.8	89.2	91.4	79.3	96.5
2-Jul	93.8	94.8	95.9	93.6	92.7	91.9	89.3	81.6	77.7	77.0	79.4	87.0	86.4	91.0	96.7	96.6	96.3	97.0	97.9	97.8	97.3	96.4	96.9	96.8	91.7	97.9
3-Jul	96.5	96.8	98.0	98.2	97.7	97.8	97.9	97.5	95.9	95.0	92.6	94.8	96.9	96.6	96.4	93.3	92.5	93.2	94.5	96.4	96.9	98.2	98.8	99.2	96.3	99.2
4-Jul	99.1	97.8	97.6	98.2	97.9	90.8	77.8	71.3	57.9	48.8	44.6	39.1	38.8	37.5	36.4	35.4	33.9	33.4	35.9	50.5	75.9	71.7	71.7	66.6	62.9	99.1
5-Jul	65.2	72.4	78.4	82.7	85.8	82.8	73.6	63.9	58.8	52.5	48.1	44.8	44.0	39.6	37.9	38.7	37.3	48.7	91.7	93.9	90.9	91.3	90.7	95.6	67.1	95.6
6-Jul	97.0	98.1	98.6	98.2	96.9	94.0	90.8	79.3	71.3	66.5	60.0	52.5	54.5	48.3	44.4	41.9	40.0	39.2	36.3	38.4	52.0	65.4	65.2	69.4	66.6	98.6
7-Jul	73.8	78.7	86.5	83.4	85.9	80.4	71.6	61.7	59.6	53.4	44.9	43.2	38.0	36.4	36.4	37.4	38.4	37.8	38.4	52.6	60.2	53.7	53.3	56.5	56.8	86.5
8-Jul	60.5	62.1	62.5	64.3	68.9	66.6	62.2	61.5	59.6	54.6	48.1	44.0	38.0	35.8	36.1	36.7	36.2	35.6	37.0	41.6	47.4	50.9	54.6	58.5	51.0	68.9
9-Jul	60.5	62.4	66.8	68.2	70.9	72.2	73.0	63.9	60.7	56.2	49.2	45.7	44.3	44.5	44.0	43.1	43.8	44.3	44.7	49.2	53.8	55.5	57.3	58.0	55.5	73.0
10-Jul	58.4	58.5	56.9	58.2	57.8	60.0	60.6	55.5	49.8	46.5	43.2	40.5	37.7	32.7	30.1	28.4	26.7	26.4	29.7	40.6	52.5	55.8	53.1	57.0	46.5	60.6
11-Jul	57.9	63.7	62.8	64.2	65.9	66.3	66.9	63.8	55.9	47.6	44.2	39.3	34.2	32.9	33.7	35.5	39.4	40.6	48.0	60.7	67.4	64.8	65.9	69.1	53.8	69.1
12-Jul	72.2	78.6	77.1	80.6	81.7	80.1	76.4	71.1	68.5	65.5	57.3	55.8	52.2	40.0	35.6	33.4	32.4	30.2	32.0	38.5	55.7	57.0	55.5	65.1	58.0	81.7
13-Jul	64.1	60.9	61.9	65.4	66.9	72.4	70.5	64.4	62.7	61.9	59.4	54.8	43.4	35.9	36.9	38.3	40.9	41.4	42.5	47.9	51.8	56.4	61.3	65.7	55.3	72.4
14-Jul	58.9	57.0	59.7	62.9	70.8	71.1	71.7	M	69.1	69.1	65.0	60.1	58.8	65.1	61.3	58.1	54.9	55.9	59.4	66.6	70.3	76.2	77.6	78.2	65.1	78.2
15-Jul	80.4	81.0	79.8	79.3	79.8	80.6	79.6	78.8	75.8	68.9	64.8	62.5	60.2	59.4	60.5	60.2	61.5	62.1	62.5	66.9	79.8	89.6	90.9	92.0	73.2	92.0
16-Jul	89.7	91.3	94.6	95.7	94.5	88.9	80.3	74.2	64.9	56.3	49.4	45.1	43.7	44.3	44.6	46.7	41.1	42.4	49.4	57.2	58.8	65.2	69.4	75.0	65.1	95.7
17-Jul	76.9	77.7	79.0	79.6	81.0	93.6	94.9	93.9	91.2	89.8	93.0	86.2	69.4	72.5	74.4	78.6	95.7	97.6	93.2	86.0	82.7	81.9	89.6	98.0	85.7	98.0
18-Jul	99.4	99.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.2	98.2	96.0	94.2	92.5	90.2	85.0	92.3	94.5	95.2	94.4	92.8	91.5	90.2	96.1	100.0
19-Jul	91.4	89.3	89.5	90.4	92.8	92.7	90.0	85.5	76.4	68.8	63.4	61.6	56.8	55.7	54.9	50.8	51.0	53.6	61.5	75.7	86.1	88.3	86.6	90.8	75.1	92.8
20-Jul	91.6	90.5	90.5	92.6	94.7	94.8	87.4	79.8	69.4	61.1	57.8	55.6	52.8	49.6	49.8	48.1	51.9	54.7	59.4	65.8	74.3	77.2	80.8	84.4	71.5	94.8
21-Jul	87.0	89.1	89.7	89.9	90.7	88.9	83.7	73.5	67.0	61.8	56.2	51.2	48.0	43.7	39.6	44.0	43.7	44.6	48.6	61.9	69.2	64.1	66.5	68.1	65.5	90.7
22-Jul	69.9	71.0	68.6	68.4	68.9	67.8	71.7	72.6	67.0	59.0	61.8	58.4	62.5	56.1	50.5	50.6	59.4	60.6	65.4	72.5	80.6	84.8	87.3	87.2	67.6	87.3
23-Jul	91.3	93.0	94.3	95.9	93.3	88.7	89.6	90.8	85.4	71.6	58.1	48.6	46.7	44.0	43.7	45.6	45.6	51.7	53.9	68.9	70.3	73.7	73.3	77.8	70.7	95.9
24-Jul	84.3	83.0	84.1	88.6	91.6	90.0	89.8	82.6	72.6	64.3	58.3	51.6	47.1	45.9	38.3	40.6	41.4	42.5	46.0	49.7	52.6	56.4	61.5	66.1	63.7	91.6
25-Jul	68.8	65.4	81.1	98.8	99.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.5	85.5	79.1	79.8	74.6	78.0	80.9	82.2	82.2	80.9	88.8	100.0
26-Jul	82.1	87.1	88.6	90.0	96.7	89.6	87.1	82.5	72.5	69.0	66.5	67.8	62.4	65.1	66.1	67.2	64.7	68.9	73.9	78.2	85.6	96.6	98.5	99.2	79.4	99.2
27-Jul	99.3	99.2	99.0	99.1	99.2	99.4	99.4	98.5	94.0	87.4	78.2	71.4	66.1	62.2	60.2	70.3	89.4	85.5	87.9	93.5	94.7	96.0	97.2	96.9	88.5	99.4
28-Jul	97.2	96.4	97.8	98.5	98.8	99.1	95.7	87.6	74.0	57.7	51.9	51.9	46.4	55.1	49.8	44.5	60.1	83.3	81.8	76.0	80.5	79.6	77.2	81.5	75.9	99.1
29-Jul	82.3	84.1	84.5	87.0	89.5	86.8	81.8	71.2	57.3	50.8	47.1	43.2	39.9	39.5	40.5	39.2	37.3	39.7	41.9	50.7	74.3	78.1	82.0	84.1	63.0	89.5
30-Jul	84.0	81.8	84.0	86.2	84.8	86.1	81.3	72.4	57.6	50.6	45.2	44.0	41.9	40.5	40.4	40.0	40.7	41.2	44.7	51.7	57.6	61.5	58.7	73.6	60.4	86.2
31-Jul	94.3	97.0	96.9	98.5	98.5	98.8	96.5	90.3	81.4	75.1	70.6	67.1	57.2	49.8	47.5	45.1	44.4	41.8	42.4	45.9	47.5	56.6	63.1	65.8	69.7	98.8
80.1 81.1 82.6 84.4 85.5 84.8 82.2 78.1 72.5 67.2 63.0 60.1 56.8 55.0 53.8 53.2 54.5 56.4 59.8 65.5 71.9 74.4 75.7 78.7																						Diurnal Average				
99.4 99.8 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 100.0 96.7 96.6 96.3 97.6 97.9 97.8 97.3 98.2 98.8 99.2																						Diurnal Maximum				
M - Maintenance																										



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Jackfish 2/3 - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Jackfish 2/3 - July 2023

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	58	7.81	7.81
40 - 60	202	27.19	34.99
60 - 80	206	27.73	62.72
80 - 100	262	35.26	97.98

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Jackfish 2/3 - July 2023

Maximum Speed: 14 km/h on Jul 31 21:00	Maximum Daily Speed Average: 9.0 km/h on Jul 8	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 3 21:00	Minimum Daily Speed Average: 0.3 km/h on Jul 28	Hours of Data: 743
Maximum Diurnal Speed Average: 2.8 km/h at hour 3	Minimum Diurnal Speed Average: 1.1 km/h at hour 11	Hours of Missing Data: 1
Monthly Average Velocity: 1.5 km/h 241.3 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 5 Q ₃ = 8 P ₉₀ = 9 P ₉₉ = 12	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	W4	W3	W1	SSW2	WSW6	WSW6	W5	WSW6	S3	ENE5	ESE3	NE2	NNE4	SW2	SW5	W6	WNW3	NW5	WNW5	W6	WSW6	W4	WSW5	WSW5	WSW2.8	WSW6
2-Jul	WSW5	WSW6	WSW7	WSW7	WSW7	WSW9	WSW11	WSW10	WSW13	WSW13	WSW9	W9	WSW11	WSW12	W8	WNW11	WNW10	W9	W10	W10	W9	W10	W10	W9	W9.0	WSW13
3-Jul	W9	W10	W9	WNW9	WNW8	WNW8	WNW8	NW9	NW9	NW9	NNW9	NW8	NNW9	N9	NNE8	NNE9	NE8	NNE3	NNW3	NE5	NNW0	SW3	S3	SW4	NW5.0	W10
4-Jul	SW7	SW8	WSW4	WSW4	WSW4	WSW2	NNW2	N3	N4	NNW4	N3	NE3	N4	N3	NW5	N4	NW4	NNW3	NW3	SSW1	S3	S4	S5	S6	W1.4	SW8
5-Jul	SSW7	SW8	SW8	SW8	SW9	SW10	SW10	WSW11	SW10	WSW11	WSW11	WSW12	WSW12	WSW11	WSW11	WSW11	WSW11	NW5	NE4	W7	SSW9	S6	SSW7	W6	SW7.9	WSW12
6-Jul	WSW4	SW3	WSW4	WSW4	WSW4	WSW4	W3	NW3	N4	N4	N5	N4	NNE5	NNE7	N6	N7	NNE8	NNE8	NNE7	NNE6	NNE3	NE2	NNE1	SSE1	N2.7	NNE8
7-Jul	WNW1	SW1	SSW3	SW3	WSW1	WSW2	W2	NW3	N5	NNE6	NE7	NE5	NE6	NNE5	NE3	NNE4	N2	NNW4	WNW3	SSW2	SSW5	SW7	SW7	SW8	NW0.7	SW8
8-Jul	SW9	SW10	SW10	WSW11	SW9	WSW10	WSW10	WSW11	WSW11	WSW10	W11	WSW12	WSW12	W11	W10	W10	W10	W10	WSW8	W6	WSW5	WSW5	WSW7	WSW7	WSW9.0	WSW12
9-Jul	WSW8	WSW8	W4	WSW4	WSW4	WSW4	W1	N4	NNE5	NE5	NE7	NNE6	N6	NNE6	NNE7	NNE8	NE9	NE10	NE8	ENE4	ENE7	ENE7	ENE6	E7	NNE3.2	NE10
10-Jul	E7	E8	E11	E9	ESE8	E8	ESE8	ESE8	ESE9	ESE10	E10	E10	E9	ESE6	E6	ESE7	SE6	ESE7	E6	ESE3	S2	SSW3	SSW3	SSW3	ESE6.3	E11
11-Jul	SSW3	S4	S5	S5	S5	S5	S3	S4	S5	SSE5	S6	SSW6	SSE6	SSW5	SSW4	SW4	SW4	WSW3	SW3	SW3	SW5	SW6	SW6	SW6	SSW4.2	SW6
12-Jul	SW9	SW7	SW7	SW8	SSW7	SW8	SW7	SW8	WSW6	WSW6	WNW5	W6	WNW6	NW8	NNW9	NNW8	N8	N8	NNE8	NE2	S2	SW1	SW2	SW3	W3.3	NNW9
13-Jul	SW3	SW3	SW3	WSW3	WSW4	WSW5	W5	WNW6	WNW6	NW6	NW7	NW7	NW7	NNW9	NNW9	NNW10	NW8	NW9	NW7	WNW6	W5	WNW5	W3	WSW2	WNW5.0	NNW10
14-Jul	W3	WNW4	WNW3	NW4	NNW3	WNW4	WNW5	M	NNW6	NNW7	NW8	N8	N9	NNE8	NNW5	N6	N5	N5	NNE4	NNE2	NE1	SSW2	SSE1	S0	NNW3.6	N9
15-Jul	S1	S1	SSW1	WSW2	WSW1	W2	NNW2	N3	NNE4	NNE5	NNE6	NNE7	NNE6	NNE6	NE7	NNE6	NNE7	NE8	NE7	NE6	ESE1	SSE1	E2	ESE3	NE2.9	NE8
16-Jul	E5	ESE3	S3	SE3	ESE3	ESE4	SE4	SSE5	S5	ESE5	ESE5	SE4	ESE7	ESE6	SE5	S5	S4	S4	SE2	ESE4	SE4	SE4	ESE5	SE3.9	ESE7	
17-Jul	SE5	SE6	SSE5	SSW6	SE4	SE5	SE7	ESE7	ENE3	NNE7	NE7	E7	E6	ENE5	NNE2	NNE5	NE4	ENE6	ENE8	E9	E11	E9	NE6	E4.6	E11	
18-Jul	NE6	NE7	NE8	NE6	NNE7	NE7	NNE6	NNE6	NNE4	N4	N5	N5	NNE5	NW3	N3	ENE1	S1	SSW2	S2	SW2	WSW3	W4	W5	W5	NNE2.6	NE8
19-Jul	WSW4	WSW4	WSW4	WSW4	WSW4	WSW4	WSW6	WSW5	SW6	WSW7	WSW8	WSW8	SW9	WSW9	WSW8	WSW9	WSW11	WSW8	W7	WSW3	SW2	SSW4	SW5	SSW3	WSW5.8	WSW11
20-Jul	SSW5	SSW6	SW7	SW6	SW4	SSW4	SW5	WSW3	SW4	W5	WSW4	W3	NW1	N4	NW5	NNW4	NW3	WSW4	WSW4	SW5	SW6	SW7	WSW6	WSW6	WSW3.7	SW7
21-Jul	WSW7	WSW5	WSW6	WSW5	WSW6	WSW6	WSW5	WNW3	NW4	NNW4	WNW5	NW4	NW3	NW5	WNW5	W6	WNW5	WNW5	NW3	SSW2	SSW5	SW6	WSW4	WSW3	W3.8	WSW7
22-Jul	SW5	SW6	SW6	SW4	SW4	SW6	WSW9	WSW8	W4	W5	WSW11	WSW7	WSW6	SW8	WSW8	SW7	SW7	SW6	WSW2	SW2	NE3	NE2	ESE2	ESE1	WSW4.6	WSW11
23-Jul	ENE1	ENE2	ESE2	ESE2	SSW2	SSW5	SSW7	SW7	SW7	SW6	W2	SE5	SSW4	S4	S3	ESE5	ESE5	SE2	SE2	SSE2	SSE2	SSW4	SSW5	SSW5	S2.8	SW7
24-Jul	S6	S6	S6	S6	S5	S4	S4	S4	SSE4	ESE5	SE6	ESE7	ESE8	SE6	ESE6	E9	E8	E9	ESE5	ESE6	E8	E7	E9	SE5.0	E9	
25-Jul	E10	ESE9	WSW9	N5	NE6	NE6	NE3	ENE10	NE7	NE10	NNE5	NNE3	NW4	NW5	N5	N4	W2	W9	W9	W9	WSW7	WSW6	SW9	WSW11	NNW1.2	WSW11
26-Jul	SW9	S6	SSW6	SSW4	SSE4	S5	SSE3	S3	SSW8	SSE7	SSE7	SSW6	SSW9	S5	S5	S3	SE5	SE4	ESE5	ENE4	NE4	NE7	NE8	NE8	SSE3.0	SW9
27-Jul	NE11	NE9	NE9	NE9	NE10	NE8	NE9	NE8	NE8	NE8	NE7	NE7	NE8	NE8	NNE8	NE4	ESE2	NNE5	NNE3	S1	ENE2	NE1	N1	NNE2	NE6.0	NE11
28-Jul	NNE2	NNE2	NNW2	NNE3	NE1	NNE1	N1	NNW2	NNE3	ENE2	N4	ENE3	SE1	ENE6	NW3	ESE1	SSE6	SSW3	NNW2	WSW4	SW5	SSW6	SW7	SW7	WSW0.3	SW7
29-Jul	SW7	SW7	SW7	SW6	SW5	SW8	SW7	WSW5	SW5	SW5	SSW4	SSW5	SSW6	SSW6	SW8	SW8	S5	S6	SSW6	SSW5	SSW3	S3	SSE2	SSE3	SSW5.1	SW8
30-Jul	SSW2	S2	S3	S4	S4	S4	S4	S5	S9	S8	SSE8	S9	S9	S8	SSW9	SSW9	S7	S7	SE6	SE4	ESE5	ESE5	ESE7	S6	S5.6	SSW9
31-Jul	SSE3	SSW3	SSE1	SW4	S4	SSE3	S5	SSW6	SW9	SW9	SW11	WSW10	WSW12	WSW12	WSW11	WSW11	WSW12	WSW11	WSW13	WSW11	SW14	SW9	SW9	SW11	SW8.1	SW14

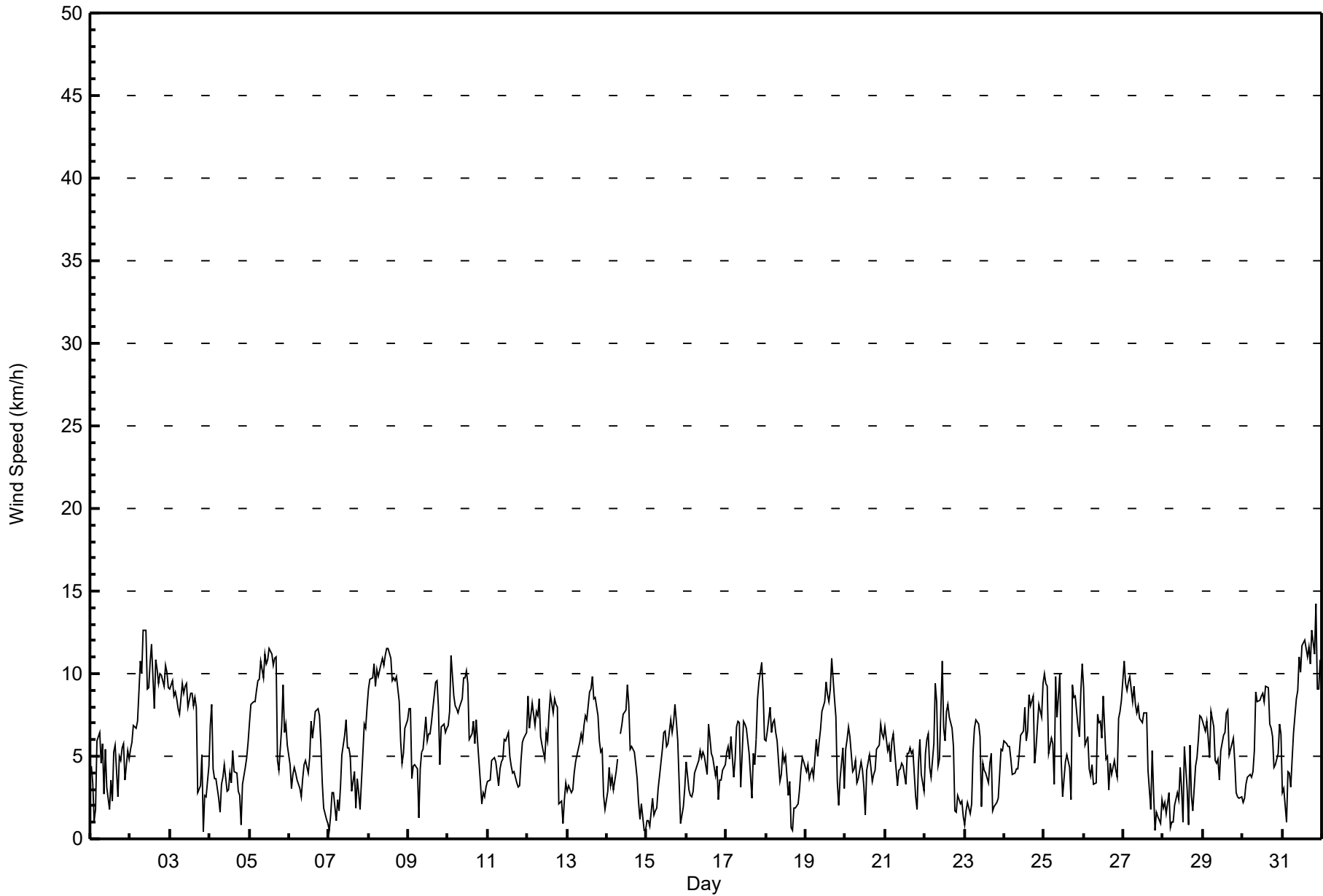
SW2.6 SW2.6 SW2.8 SW2.5 SW2.2 SW2.6 SW2.6WSW2.0WSW1.6 W1.1WNW1.1WNW1.1 W1.1WNW1.3WNW1.9WNW1.6WNW1.1WNW1.4WNW1.1WSW1.1SSW1.8SSW2.0SSW2.4 SW2.5	Diurnal Average
NE11 SW10 E11 WSW11 NE10 WSW10WSW11WSW11WSW13WSW13 W11WSW12WSW12WSW12WSW11WSW11WSW12WSW11WSW13WSW11 SW14 E11 W10 SW11	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Jackfish 2/3 - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Jackfish 2/3 - July 2023

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	377	50.74	50.74
6 - 11	355	47.78	98.52
12 - 19	11	1.48	100.00
20 - 28	0	0.00	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Jackfish 2/3 - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	27	26	18	11	2	24	17	18	46	36	31	49	23	15	20	14	377
6 - 11	9	25	39	7	23	18	7	5	17	20	60	65	28	10	12	10	355
12 - 19	0	0	0	0	0	0	0	0	0	0	1	10	0	0	0	0	11
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	36	51	57	18	25	42	24	23	63	56	92	124	51	25	32	24	743

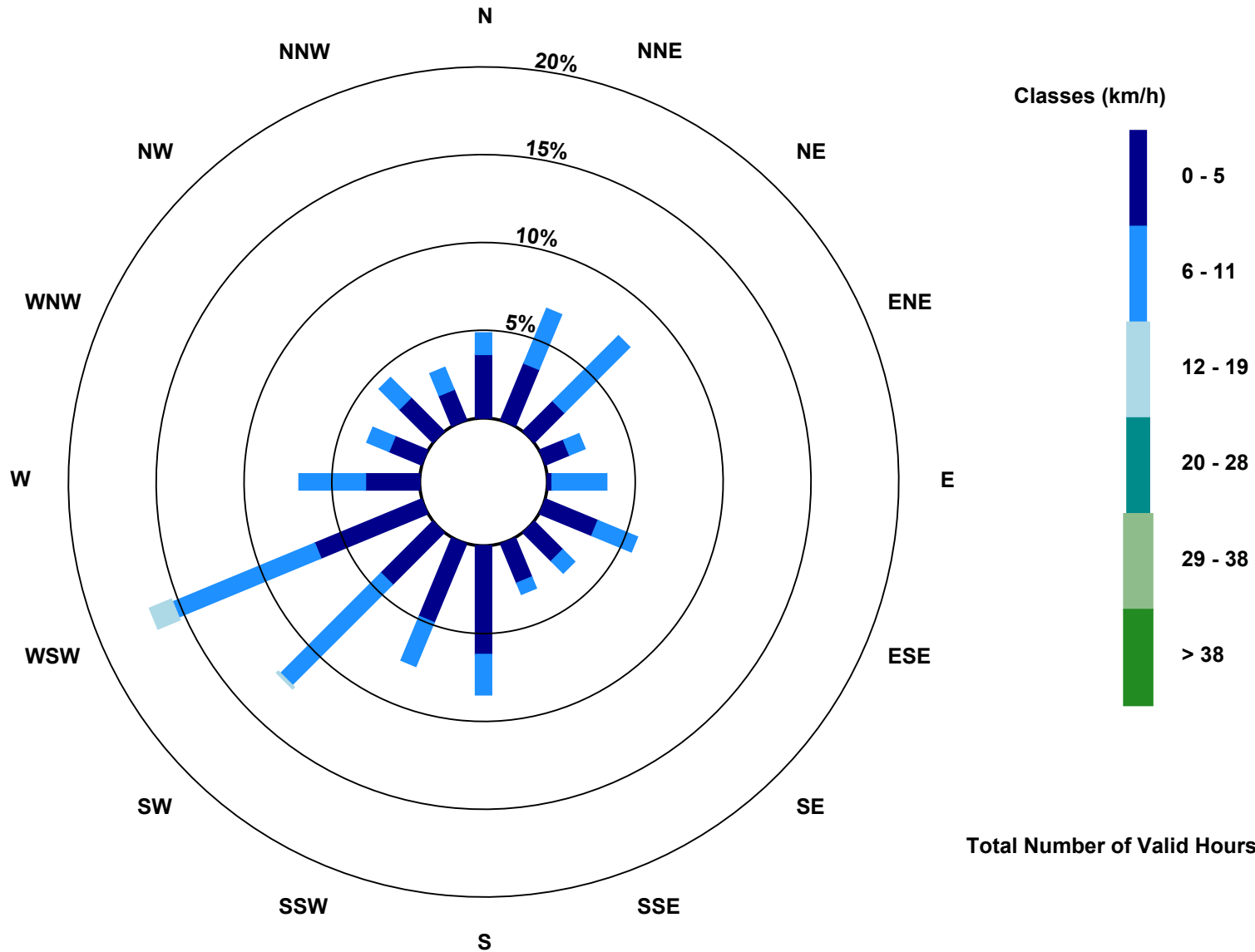
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Jackfish 2/3





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Jackfish 2/3 - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Jul 25 03:00 Minimum Value: 0 km/h on Jul 29 21:00 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: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9									
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	2	1	1	0	4	2	2	2	2	2	2	2	3	3	2	2	2	2	2	2	2	2	2	2	4	
2-Jul	2	2	2	2	2	3	4	4	4	4	4	3	4	4	4	5	4	4	4	4	4	4	4	4	5	
3-Jul	4	4	4	4	4	4	3	4	4	5	4	4	5	4	3	3	3	2	2	3	1	1	1	1	5	
4-Jul	2	2	2	1	1	1	1	1	2	3	3	3	2	3	3	2	2	2	2	1	1	1	1	1	3	
5-Jul	2	2	2	2	2	2	3	3	3	4	4	4	5	5	4	4	4	5	3	4	3	1	2	2	5	
6-Jul	2	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	4	3	3	2	1	1	1	1	4	
7-Jul	1	1	0	1	1	1	1	1	2	2	3	3	3	3	3	2	1	2	1	1	1	1	1	2	3	
8-Jul	2	2	2	2	2	2	3	3	4	4	4	5	5	5	4	4	4	4	3	2	1	1	1	2	5	
9-Jul	2	2	1	1	1	1	2	2	2	2	3	3	3	3	3	3	3	4	3	2	3	2	2	3	4	
10-Jul	2	2	4	3	3	3	3	4	4	4	4	4	4	3	3	3	3	3	2	2	1	1	1	1	4	
11-Jul	1	2	2	2	2	2	1	2	2	2	2	3	3	2	3	3	2	2	1	1	1	1	1	1	3	
12-Jul	2	2	2	2	2	2	2	2	2	2	3	3	3	3	4	4	4	4	4	2	0	1	1	1	4	
13-Jul	1	1	1	1	1	1	2	2	3	3	3	3	4	4	4	5	4	4	4	3	2	3	1	1	5	
14-Jul	1	2	2	2	2	2	2	M	3	3	4	3	4	3	2	2	3	2	2	1	1	1	1	1	4	
15-Jul	1	1	1	1	1	1	1	1	1	2	3	3	3	3	3	3	3	3	2	2	1	1	1	1	3	
16-Jul	1	1	1	1	1	1	2	2	2	2	3	3	2	3	3	3	3	2	2	1	1	1	2	2	3	
17-Jul	2	2	2	4	2	3	3	3	3	2	2	3	3	3	2	2	2	1	2	3	3	3	3	2	4	
18-Jul	1	2	2	2	3	2	2	2	1	2	2	2	2	2	1	1	1	1	1	1	1	1	2	1	3	
19-Jul	1	1	1	1	1	1	2	2	2	2	3	3	4	3	3	3	4	3	3	1	1	2	1	1	4	
20-Jul	1	1	2	2	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	
21-Jul	1	1	1	1	1	1	1	1	2	1	2	2	2	2	3	3	2	3	2	1	1	1	2	1	3	
22-Jul	2	1	1	1	1	1	3	3	2	4	3	2	2	3	3	2	2	2	1	1	1	1	1	1	4	
23-Jul	1	2	1	1	2	2	1	2	2	2	2	2	2	2	2	2	3	1	1	1	1	1	1	1	3	
24-Jul	1	1	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	3	2	2	3	3	2	3	3	
25-Jul	4	5	7	3	3	3	3	4	4	4	2	1	2	2	2	2	2	5	4	4	2	2	3	3	7	
26-Jul	3	1	2	2	1	2	1	1	3	3	3	2	3	3	2	2	2	2	1	2	2	3	3	3	3	
27-Jul	4	3	3	3	4	3	3	3	3	3	3	3	3	3	3	3	2	2	2	1	1	1	1	1	4	
28-Jul	1	1	1	1	1	1	1	1	1	2	2	2	2	4	2	3	3	1	2	2	2	1	2	1	4	
29-Jul	1	1	1	1	2	2	1	1	2	2	2	3	3	3	3	4	2	3	2	1	0	1	0	1	4	
30-Jul	1	1	1	1	1	1	1	2	4	3	4	4	4	4	4	4	3	3	3	2	2	2	4	4	4	
31-Jul	2	2	1	2	2	1	1	2	3	3	4	4	4	4	4	4	4	4	4	3	4	2	2	3	4	
																	Diurnal Maximum									
M - Maintenance																										



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Jackfish 2/3 - July 2023

Direction of Maximum Speed: 236 deg on Jul 31 21:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 250.6 deg on Jul 8	Hours of Data: 743
Direction of Minimum Speed: 344 deg on Jul 3 21:00	Direction of Minimum Daily Speed Average: 0.3 deg on Jul 28
Direction of Minimum Speed: 344 deg on Jul 3 21:00	Hours of Missing Data: 1
Monthly Average Direction: 241.3 deg	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	260	265	261	201	239	244	264	244	176	74	121	55	30	218	233	263	287	307	299	259	240	261	245	244	253.4
2-Jul	238	245	247	249	247	243	246	253	242	238	255	259	250	253	278	303	284	277	275	273	272	272	274	278	261.0
3-Jul	272	271	280	297	290	294	291	307	316	317	342	317	341	359	13	26	44	31	331	34	344	220	190	217	318.0
4-Jul	220	228	247	237	243	240	334	356	359	347	0	46	355	5	307	356	316	327	317	194	176	183	181	189	275.4
5-Jul	202	215	222	224	222	229	235	239	236	237	237	242	237	247	252	241	241	312	51	272	202	190	198	265	233.9
6-Jul	238	219	238	243	249	257	277	319	5	356	357	352	20	14	356	8	18	19	23	18	27	37	26	163	352.3
7-Jul	302	217	208	234	254	237	275	311	9	19	42	47	49	22	51	27	354	330	292	201	208	215	215	221	316.6
8-Jul	228	229	234	239	232	237	245	248	250	255	259	254	258	265	278	263	263	261	258	260	254	250	247	247	250.6
9-Jul	246	245	261	253	243	239	272	11	22	42	38	22	11	19	14	23	49	43	42	62	60	69	74	85	29.5
10-Jul	90	92	91	97	103	95	104	105	113	102	94	90	83	118	100	114	132	103	99	116	177	205	212	204	104.4
11-Jul	192	180	179	177	176	178	183	176	175	167	178	198	152	196	197	224	236	247	232	224	228	226	223	226	197.4
12-Jul	235	223	225	224	204	220	225	236	248	248	294	264	288	313	339	340	8	8	25	39	182	226	220	227	265.7
13-Jul	231	228	236	249	252	257	270	290	301	312	313	310	322	335	328	327	319	313	311	293	267	289	276	243	299.8
14-Jul	261	288	297	304	333	298	296	M	329	332	326	354	11	20	332	0	351	357	19	20	41	207	157	171	338.2
15-Jul	172	190	200	237	246	271	327	351	12	20	22	32	16	28	47	25	31	48	45	52	113	158	101	113	34.1
16-Jul	92	122	177	130	120	118	135	148	157	170	117	121	146	103	105	126	179	171	184	136	118	130	135	122	134.1
17-Jul	137	145	161	204	146	141	142	130	118	71	32	52	96	99	64	23	29	40	63	73	82	90	92	50	93.3
18-Jul	48	46	49	35	28	35	25	33	14	9	0	4	20	325	8	68	183	195	190	225	244	260	267	260	15.5
19-Jul	255	255	251	250	250	250	238	238	233	246	244	247	233	241	237	238	244	247	274	254	216	205	215	207	241.9
20-Jul	206	212	219	219	214	210	234	246	225	273	258	278	325	1	306	333	323	258	257	227	226	234	237	243	244.2
21-Jul	242	245	245	247	244	242	245	292	310	329	302	318	305	324	290	263	297	299	308	202	209	231	244	249	268.3
22-Jul	235	232	231	236	233	223	240	251	278	272	239	253	241	231	238	221	229	233	258	223	38	49	110	111	238.1
23-Jul	69	71	112	113	196	195	207	222	214	222	263	129	209	187	189	106	106	136	145	156	155	192	202	206	184.2
24-Jul	187	190	187	189	188	184	171	174	159	114	125	117	107	126	116	82	100	94	116	116	110	99	98	95	126.2
25-Jul	99	103	237	353	39	41	43	76	56	50	32	18	304	322	4	7	268	266	263	265	253	238	233	240	328.2
26-Jul	230	190	207	205	167	178	166	169	195	164	153	204	198	184	187	169	126	128	108	75	46	41	42	48	162.2
27-Jul	50	50	50	54	46	49	51	52	47	42	48	35	36	38	29	37	102	32	28	172	66	38	11	18	44.9
28-Jul	23	28	346	24	48	32	357	345	26	65	8	65	127	63	317	122	168	201	340	245	236	210	220	223	249.3
29-Jul	224	232	229	229	234	221	229	239	227	227	198	196	192	207	219	224	187	189	204	211	192	171	165	165	213.5
30-Jul	192	191	178	181	176	181	177	185	183	178	168	174	191	183	201	201	172	183	146	141	117	112	123	189	174.3
31-Jul	168	207	167	231	187	167	191	213	230	230	233	243	248	247	245	246	248	250	240	243	236	234	233	234	235.0

215.4 214.9 222.3 230.7 222.4 222.9 232.4 240.8 243.8 273.8 296.1 285.6 277.6 295.8 294.9 302.8 283.8 301.2 303.6 246.8 209.3 207.3 206.7 218.1
 Diurnal Average

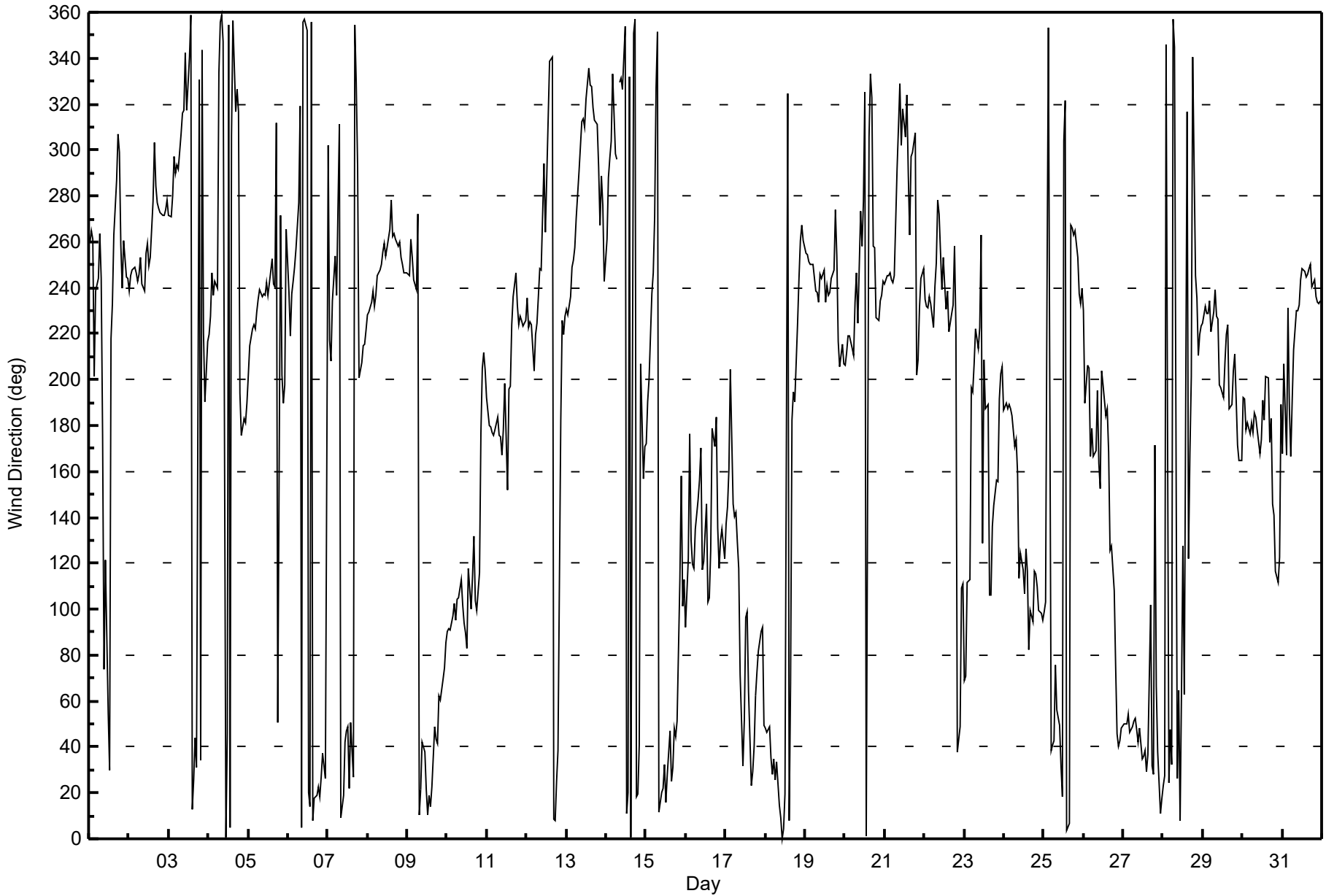
M - Maintenance

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Jackfish 2/3 - July 2023





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Jackfish 2/3 - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 107 deg on Jul 1 03:00 Minimum Value: 10 deg on Jul 21 06:00 Percentiles: P ₁ = 12 P ₁₀ = 18 Q ₁ = 27 Median = 43 Q ₃ = 60 P ₉₀ = 73 P ₉₉ = 97																			Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	39	63	107	57	26	21	48	33	65	38	54	96	41	93	60	54	83	56	55	45	24	58	23	31	107
2-Jul	20	21	27	27	21	21	27	36	26	24	36	39	35	35	49	52	48	43	42	40	41	45	45	46	52
3-Jul	39	39	48	48	43	51	51	57	61	66	64	65	62	59	50	43	34	63	61	46	99	25	24	19	99
4-Jul	15	15	20	18	19	68	79	56	69	73	94	95	75	94	67	73	70	77	85	97	18	15	13	16	97
5-Jul	20	19	19	18	18	19	21	22	29	35	37	35	37	37	38	36	35	64	76	54	23	16	25	39	76
6-Jul	38	24	21	18	40	38	41	61	41	56	71	79	68	60	61	61	59	49	48	42	46	86	103	100	103
7-Jul	95	64	16	26	78	32	51	65	52	43	47	76	72	69	93	65	89	67	68	61	18	16	17	17	95
8-Jul	17	16	16	15	15	16	26	30	33	39	40	38	41	44	48	48	45	41	36	35	22	15	14	15	48
9-Jul	15	16	33	19	16	11	86	38	39	54	45	64	67	62	56	57	40	36	32	26	25	23	23	26	86
10-Jul	23	27	28	31	36	30	33	40	44	41	42	41	38	60	57	51	56	41	35	49	63	49	78	68	78
11-Jul	59	56	39	53	52	46	34	37	43	54	51	61	50	66	61	67	53	63	53	24	15	16	18	17	67
12-Jul	18	20	18	18	20	20	22	24	46	49	73	61	63	59	59	64	59	60	39	92	22	93	68	19	93
13-Jul	27	53	62	52	26	25	36	44	45	55	60	57	67	68	64	64	59	59	59	58	35	52	83	95	95
14-Jul	85	70	94	71	78	60	55	M	56	67	63	61	56	50	62	59	64	58	54	54	73	30	87	94	94
15-Jul	79	65	85	63	96	82	84	54	54	55	55	55	64	61	51	51	44	31	35	30	79	52	40	26	96
16-Jul	15	30	25	41	46	45	49	60	52	53	67	67	75	48	51	61	50	56	53	78	61	64	58	67	78
17-Jul	61	65	75	58	61	65	52	48	43	81	27	34	43	49	39	75	36	24	24	24	27	31	31	23	81
18-Jul	21	24	28	33	40	32	40	37	44	55	53	50	50	78	63	97	77	46	31	45	32	26	40	27	97
19-Jul	20	24	23	20	18	31	22	30	32	40	41	34	31	33	31	32	31	30	44	49	50	15	19	45	50
20-Jul	15	17	16	17	18	21	22	45	49	59	83	75	99	61	65	63	66	64	41	24	19	13	12	11	99
21-Jul	12	14	15	15	11	10	23	51	58	60	60	78	80	61	59	56	59	57	83	48	16	16	13	17	83
22-Jul	16	12	14	11	14	17	21	32	52	54	28	42	39	31	31	36	27	37	50	57	30	38	29	60	60
23-Jul	55	47	43	68	36	24	20	21	23	28	90	54	62	67	72	61	50	73	50	15	29	16	18	19	90
24-Jul	12	14	17	16	18	20	19	27	46	54	51	59	46	63	52	35	39	35	49	42	38	32	34	30	63
25-Jul	35	49	43	63	49	43	78	25	47	34	42	63	63	60	53	55	89	44	44	43	36	22	18	17	89
26-Jul	19	23	26	35	18	35	49	61	48	54	54	40	42	59	57	71	49	54	40	30	30	29	28	27	71
27-Jul	30	29	31	31	29	31	28	29	32	34	37	42	35	44	45	71	72	41	35	85	71	77	91	41	91
28-Jul	64	36	42	19	61	82	85	67	70	74	64	78	104	59	87	102	59	66	76	41	38	22	17	16	104
29-Jul	15	16	16	15	15	17	17	35	48	55	78	59	58	55	51	34	55	49	33	22	20	23	19	28	78
30-Jul	67	83	39	38	37	31	40	49	41	47	55	50	54	53	53	43	54	53	60	63	54	45	46	63	83
31-Jul	63	65	93	63	39	53	25	27	25	31	32	34	37	37	33	34	33	35	21	22	23	18	19	20	93
95 83 107 71 96 82 86 67 70 81 94 96 104 94 93 102 89 77 85 97 99 93 103 100																									
Diurnal Maximum																									
M - Maintenance																									



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS29
SURMONT 2
JULY 2023**

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SURMONT2 (AMS29)
JULY 2023

MONTHLY SUMMARY

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	35	36	99.87	5.4	0	1.1	0
H2S (ppb) Average	707	36	37	99.87	0.9	0	0.3	0
THC(ppm) Average	708	35	36	99.87	2.8	-	2.5	-
NO2 (ppb) Average	707	37	37	100	8.8	0	4	-
NO (ppb) Average	707	37	37	100	3.6	-	0.6	-
NOX (ppb) Average	707	37	37	100	10.4	-	4.2	-
PM2.5 (ug/m3) Average	718	2	26	96.77	326.1	98	153.8	11
Temperature 2 m (C) Average	744	0	0	100	29.5	-	21.9	-
Relative Humidity (%) Average	724	0	20	97.31	100.7	-	92.5	-
Wind Speed 10 m (km/h) Average	727	0	17	97.72	13	-	8	-
Wind Direction 10 m (deg) Average	727	0	17	97.72	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SURMONT 2 (AMS29)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.3	0.5	-	0	0	0	0.2	0.3	0.7	5.4
H2S (ppb) Average	707	0.16	0.1	-	0	0.1	0.1	0.1	0.2	0.3	0.9
THC (ppm) Average	708	2.34	0.1	-	2.2	2.2	2.3	2.3	2.4	2.5	2.8
NO2 (ppb) Average	707	1.14	1.1	-	0.1	0.4	0.6	0.8	1.2	2.2	8.8
NO (ppb) Average	707	0.31	0.2	-	0.1	0.2	0.2	0.3	0.3	0.4	3.6
NOX (ppb) Average	707	1.46	1.2	-	0.3	0.6	0.9	1.1	1.6	2.5	10.4
PM2.5 (ug/m3) Average	718	35.63	47.1	-	1.1	3.3	5.6	18.3	42	95	326.1
Temperature 2 m (C) Average	744	16.42	5.2	-	3	9.9	12.6	15.8	20.5	23.6	29.5
Relative Humidity (%) Average	724	72.23	21.6	-	24.7	39.6	53.6	75.2	92.6	98.6	100.7
Wind Speed 10 m (km/h) Average	727	4.1	3	-	0	1	2	4	6	8	13
Wind Direction 10 m (deg) Average	727	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SURMONT 2 (AMS29)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S, SO2, THC	21 Jul 2023 13:00	21 Jul 2023 13:00	1	Maintenance - sample manifold cleaned
PM2.5	25 Jul 2023 11:00	26 Jul 2023 09:00	23	Unstable Operation - flatline in analyzer output signal
PM2.5	26 Jul 2023 10:00	26 Jul 2023 10:00	1	Maintenance - analyzer rebooted
Relative Humidity	17 Jul 2023 22:00	18 Jul 2023 04:00	7	Sensor operated out of range
Relative Humidity	25 Jul 2023 06:00	25 Jul 2023 06:00	1	Sensor operated out of range
Relative Humidity	25 Jul 2023 13:00	25 Jul 2023 14:00	2	Sensor operated out of range
Relative Humidity	26 Jul 2023 22:00	26 Jul 2023 22:00	1	Sensor operated out of range
Relative Humidity	27 Jul 2023 05:00	27 Jul 2023 06:00	2	Sensor operated out of range
Relative Humidity	28 Jul 2023 03:00	28 Jul 2023 07:00	5	Sensor operated out of range
Relative Humidity	31 Jul 2023 06:00	31 Jul 2023 07:00	2	Sensor operated out of range
Wind Speed, Wind Direction	04 Jul 2023 01:00	04 Jul 2023 01:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	04 Jul 2023 05:00	04 Jul 2023 07:00	3	Flat line in sensor output signal
Wind Speed, Wind Direction	07 Jul 2023 03:00	07 Jul 2023 06:00	4	Flat line in sensor output signal
Wind Speed, Wind Direction	09 Jul 2023 02:00	09 Jul 2023 02:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	09 Jul 2023 04:00	09 Jul 2023 04:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	21 Jul 2023 02:00	21 Jul 2023 02:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	22 Jul 2023 07:00	22 Jul 2023 07:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	28 Jul 2023 02:00	28 Jul 2023 04:00	3	Flat line in sensor output signal
Wind Speed, Wind Direction	29 Jul 2023 06:00	29 Jul 2023 06:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	30 Jul 2023 04:00	30 Jul 2023 04:00	1	Flat line in sensor output signal



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

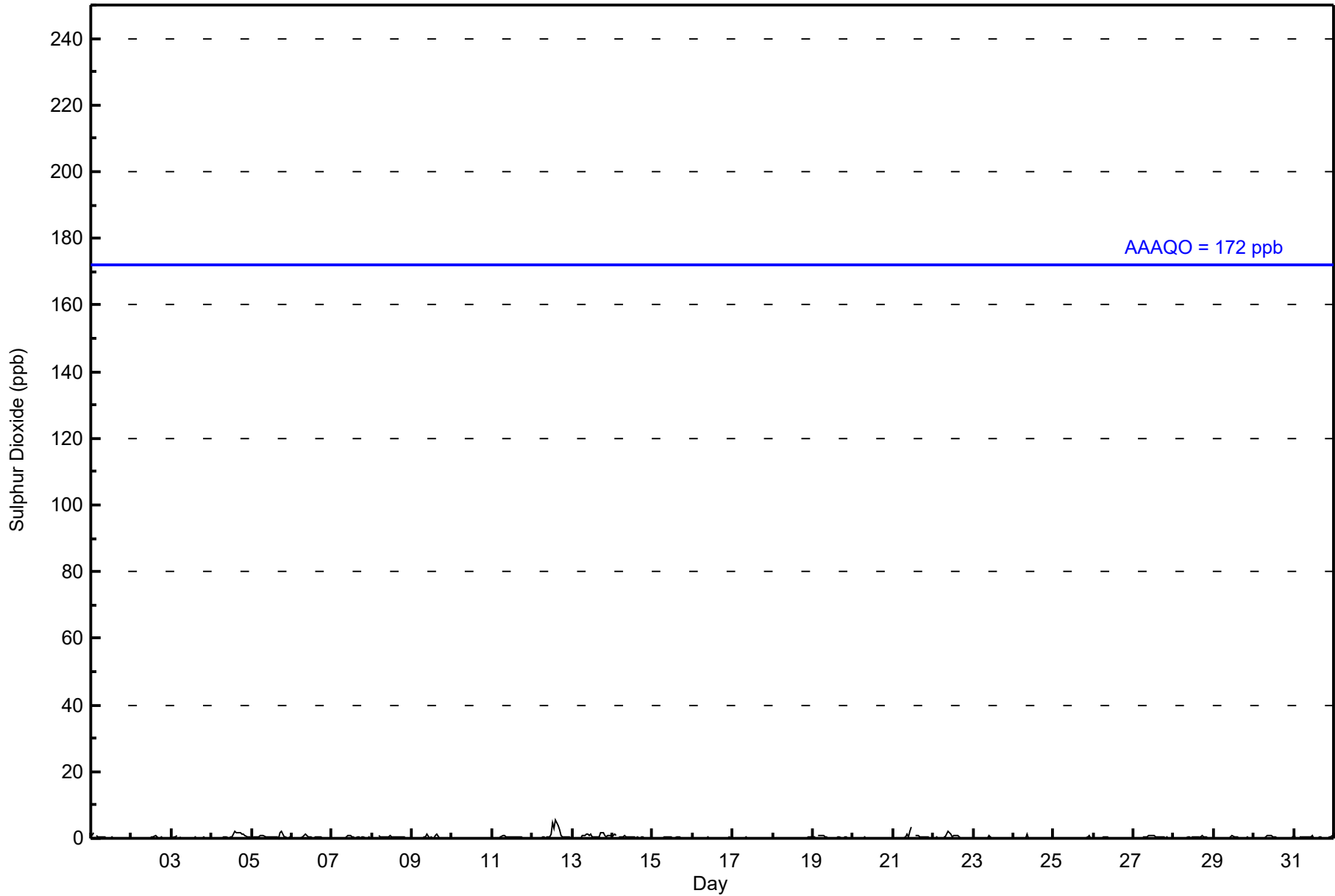
Surmont 2 - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		744																																								
Maximum Value: 5.4 ppb on Jul 12 15:00		Maximum Daily Average: 1.1 ppb on Jul 12		Minimum Value: 0.0 ppb on Jul 9 22:00		Minimum Daily Average: 0.0 ppb on Jul 10		Hours of Data: 708																																								
Maximum Diurnal Average: 0.5 ppb at hour 12		Minimum Diurnal Average: 0.1 ppb at hour 3		Hours of Missing Data: 36		Hours of Calibration: 35		Percent Operational Time: 99.9																																								
Monthly Average: 0.30 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.2 Q ₃ = 0.3 P ₉₀ = 0.7 P ₉₉ = 2.0																																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	0.8	1.7	Z	1.0	0.5	0.4	0.4	0.6	0.5	0.2	0.1	0.2	0.5	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.4	1.7																						
2-Jul	0.1	0.1	0.0	Z	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.2	0.3	0.8	0.5	0.1	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.2	0.8																						
3-Jul	0.2	0.3	0.5	0.7	Z	0.4	0.2	0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.1	0.1	0.1	0.1	0.2	0.7																						
4-Jul	0.0	0.0	0.1	0.0	0.0	Z	0.1	0.4	0.4	0.3	0.2	0.3	0.4	1.4	2.0	1.5	1.8	1.6	1.3	1.3	0.8	0.5	0.4	0.4	0.7	2.0																						
5-Jul	Z	0.3	0.3	0.3	0.4	0.8	0.9	0.6	0.5	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	1.5	2.0	0.3	0.2	0.2	0.1	0.4	0.5	2.0																						
6-Jul	0.3	Z	0.2	0.1	0.1	0.1	0.3	0.9	1.2	0.8	0.2	0.3	0.2	0.2	0.3	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.3	1.2																						
7-Jul	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.2	1.0	0.9	0.8	0.6	0.4	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	1.0																						
8-Jul	0.2	0.2	0.2	Z	0.9	0.4	0.2	0.2	0.3	0.3	0.4	0.7	0.5	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.9																						
9-Jul	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.2	0.3	1.3	0.2	0.3	0.2	0.1	0.7	1.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.2	1.3																						
10-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1																						
11-Jul	Z	0.0	0.0	0.1	0.0	0.5	0.7	0.8	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.6	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.0	0.3	0.8																						
12-Jul	0.0	Z	0.1	0.1	0.0	0.1	0.3	0.2	0.2	0.3	0.2	1.2	4.7	2.8	5.4	3.8	2.7	0.7	0.6	0.6	0.4	0.6	0.4	0.2	1.1	5.4																						
13-Jul	0.1	0.1	Z	0.2	0.2	0.2	0.7	0.9	1.2	1.5	0.9	1.4	0.6	0.3	0.3	0.4	0.6	1.9	1.7	0.9	0.3	1.0	0.8	0.7	0.7	1.9																						
14-Jul	1.0	1.3	1.0	Z	0.4	0.3	0.5	0.7	0.5	0.3	0.6	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.4	1.3																						
15-Jul	0.1	0.1	0.1	0.1	Z	0.2	0.2	0.3	0.3	0.3	0.5	0.4	0.2	0.2	0.3	0.4	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5																						
16-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.0	0.2	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.3	0.1	0.1	0.3																						
17-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.0	C	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3																						
18-Jul	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	0.1	0.0	0.1	0.1	0.0	0.1	0.2	0.2	0.3	0.4	0.3	0.1	0.4																						
19-Jul	0.2	0.3	Z	0.9	1.0	0.8	0.9	0.5	0.2	0.1	0.2	0.2	0.1	0.1	0.0	0.2	0.5	0.0	0.1	0.2	0.4	0.0	0.0	0.0	0.3	1.0																						
20-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.2																						
21-Jul	0.0	0.0	0.0	0.1	Z	0.1	0.1	0.3	1.1	0.6	2.3	3.6	M	0.8	0.9	0.7	0.5	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.6	3.6																						
22-Jul	0.2	0.2	0.4	0.2	0.2	Z	0.2	0.3	1.1	2.0	1.3	0.5	0.6	0.7	0.7	1.0	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.5	2.0																						
23-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.7	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.1	0.7																						
24-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.1	1.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.2																						
25-Jul	0.1	0.1	Z	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.1	0.0	0.0	0.1	0.3	0.7	0.2	0.0	0.1	0.7																						
26-Jul	0.0	0.0	0.2	Z	0.0	0.0	0.4	0.3	0.6	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	0.1	0.6																						
27-Jul	0.0	0.0	0.0	0.0	Z	0.3	0.3	0.3	0.5	0.7	0.8	0.7	0.7	0.5	0.5	0.6	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.8																						
28-Jul	0.1	0.1	0.2	0.1	0.1	Z	0.1	0.1	0.4	0.2	0.2	0.2	0.5	0.5	0.5	0.3	0.4	0.7	0.4	0.4	0.1	0.0	0.0	0.0	0.2	0.7																						
29-Jul	Z	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.6	0.9	0.3	0.3	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.9																						
30-Jul	0.1	Z	0.2	0.1	0.1	0.1	0.2	0.4	0.7	0.8	0.8	0.6	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.2	0.8																						
31-Jul	0.7	0.4	Z	0.6	0.3	0.2	0.3	0.3	0.4	0.3	0.6	0.7	0.2	0.0	0.0	0.5	0.4	0.0	0.0	0.0	0.0	0.6	0.6	0.8	0.3	0.8																						
																								0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	Diurnal Average
																								1.0	1.7	1.0	1.0	1.0	0.8	0.9	0.9	1.2	2.0	2.3	3.6	4.7	2.8	5.4	3.8	2.7	1.9	2.0	1.3	0.8	1.0	0.8	0.8	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Surmont 2 - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Surmont 2 - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	708	100.00	100.00
11 - 20	0	0.00	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Surmont 2 - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	27	17	6	10	17	36	46	31	19	28	54	138	123	59	35	47	693
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	27	17	6	10	17	36	46	31	19	28	54	138	123	59	35	47	693

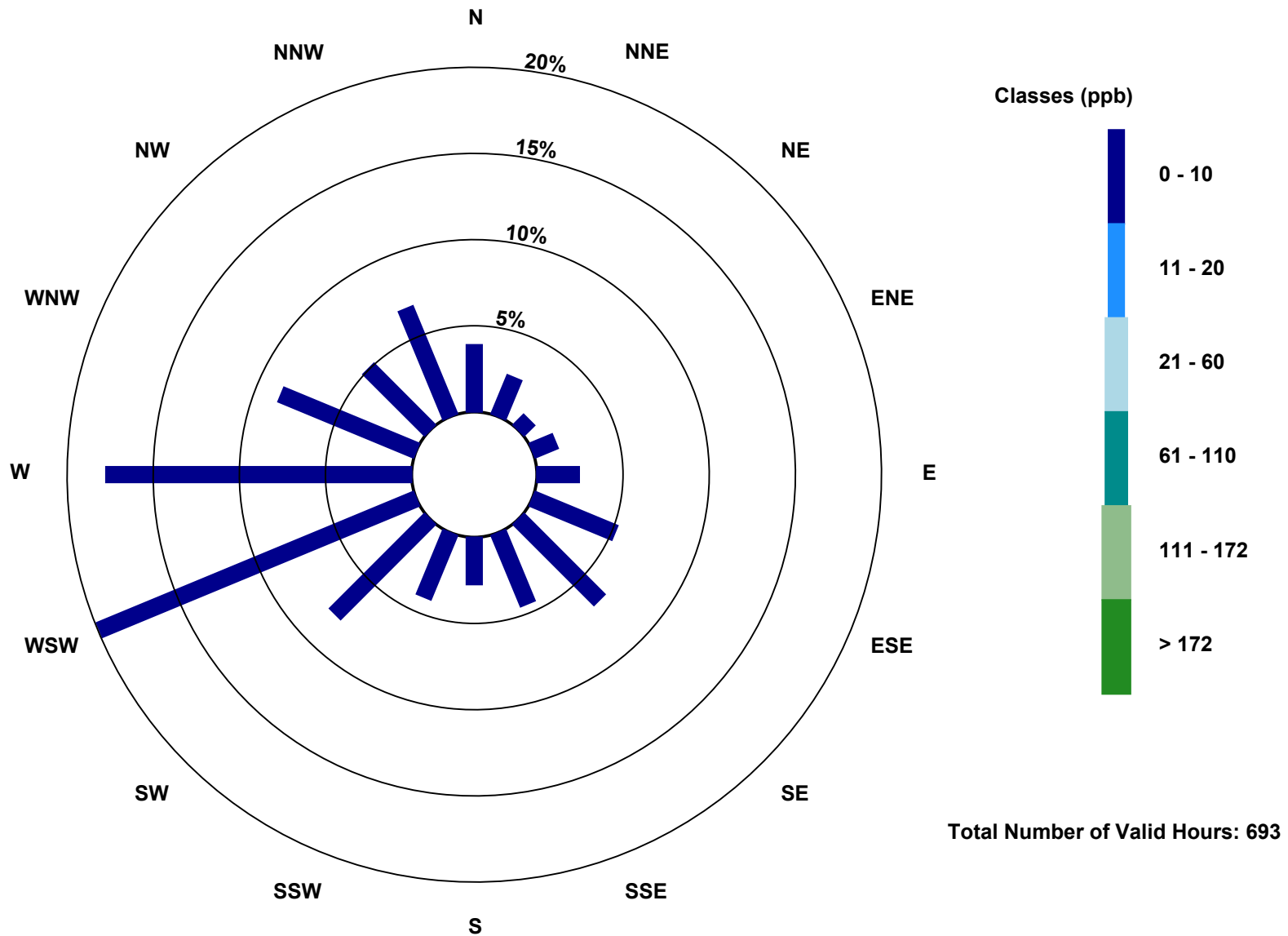
Total Number of Valid Hours: 693

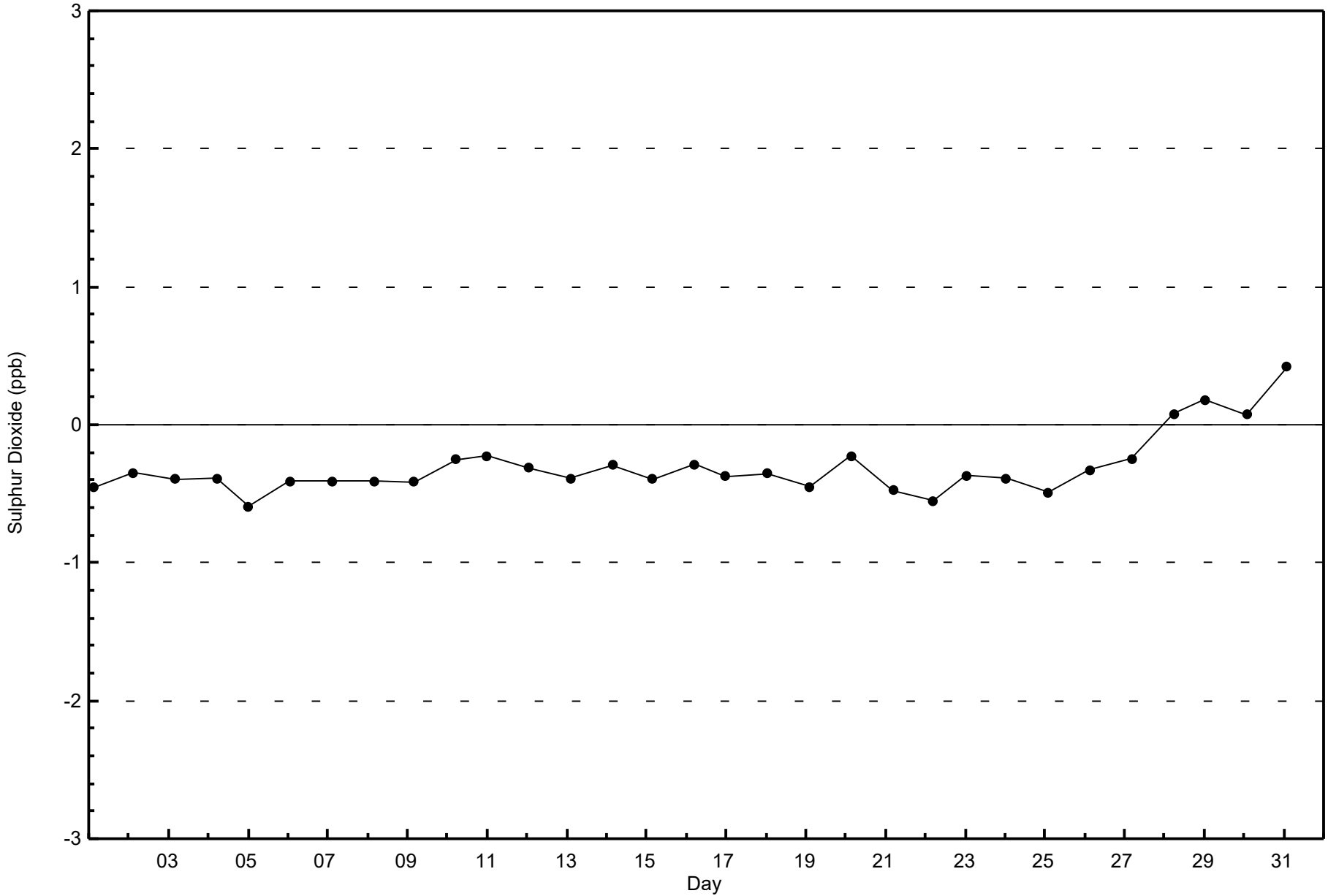
Total Number of Hours: 744

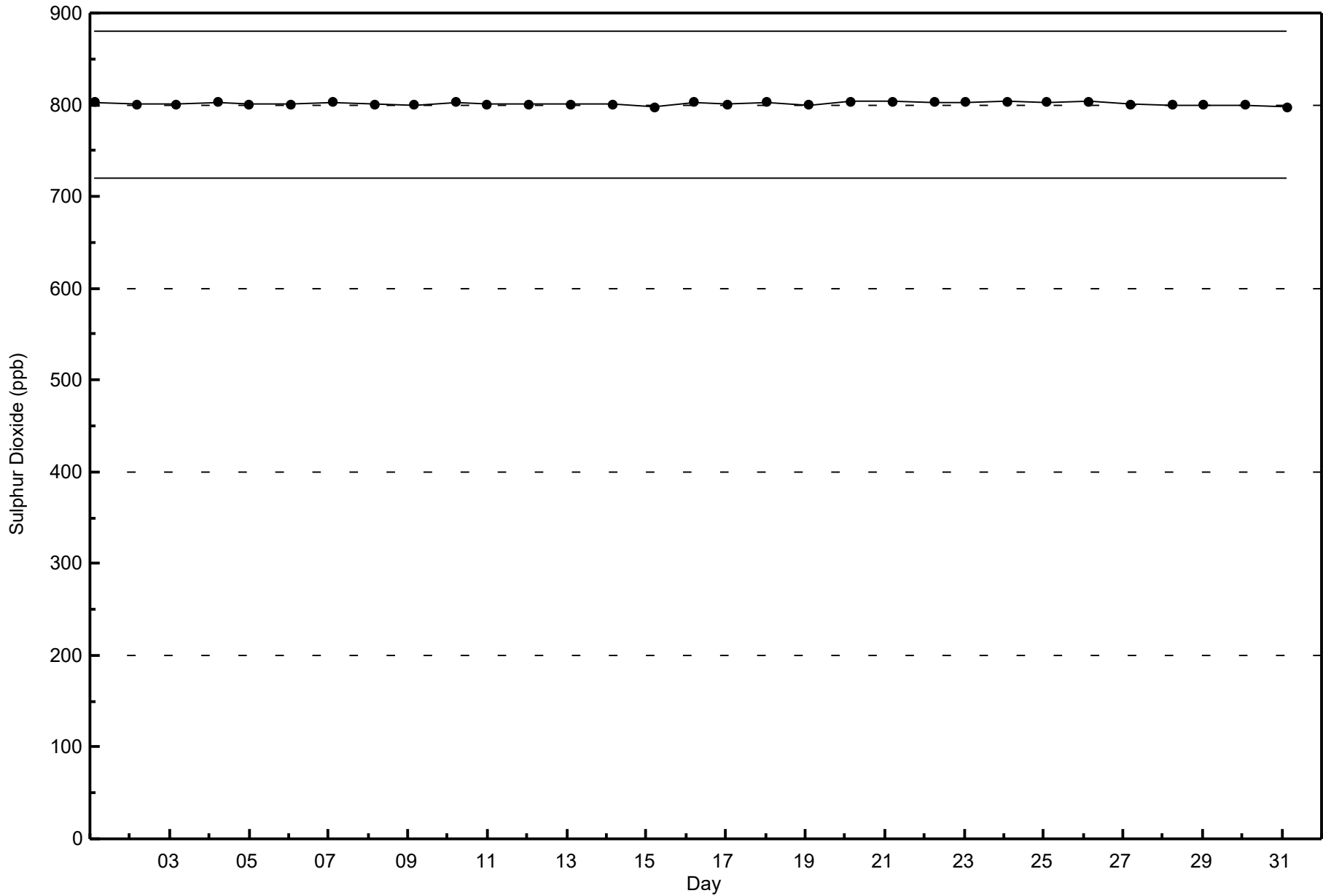


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Surmont 2



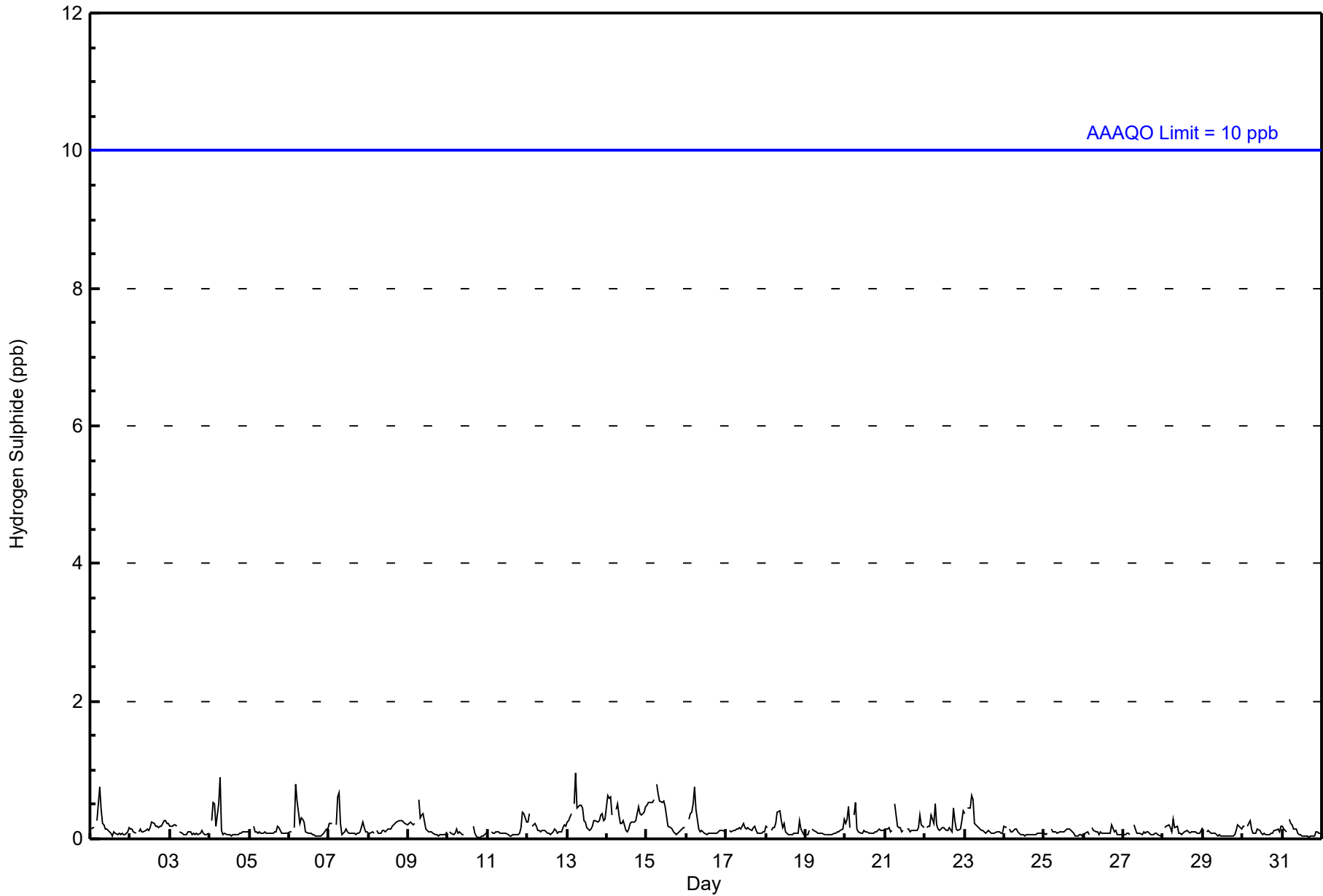






Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Surmont 2 - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Surmont 2 - July 2023**

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

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Surmont 2 - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	27	17	6	10	16	34	47	33	19	28	53	139	123	59	34	47	692
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	27	17	6	10	16	34	47	33	19	28	53	139	123	59	34	47	692

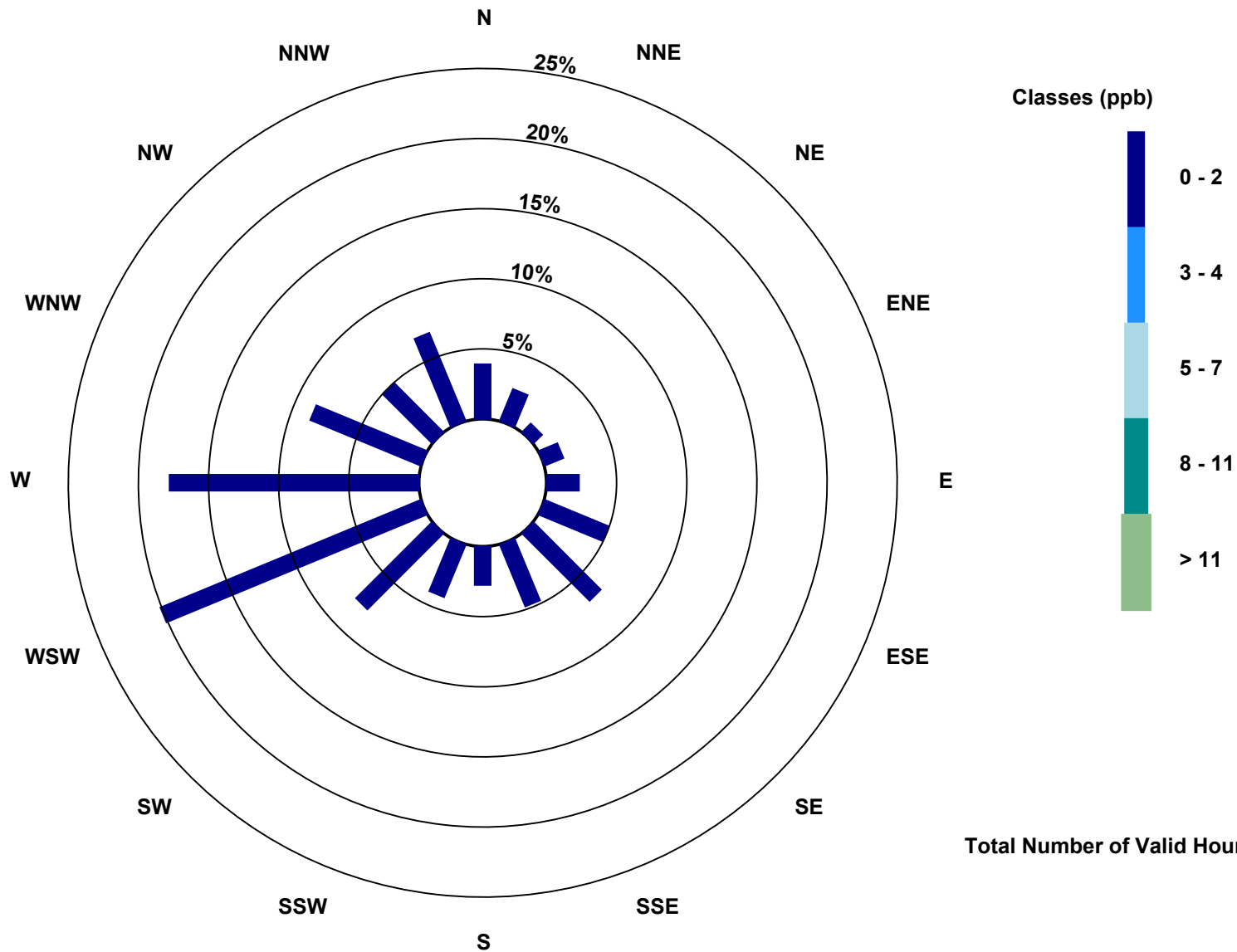
Total Number of Valid Hours: 692

Total Number of Hours: 744

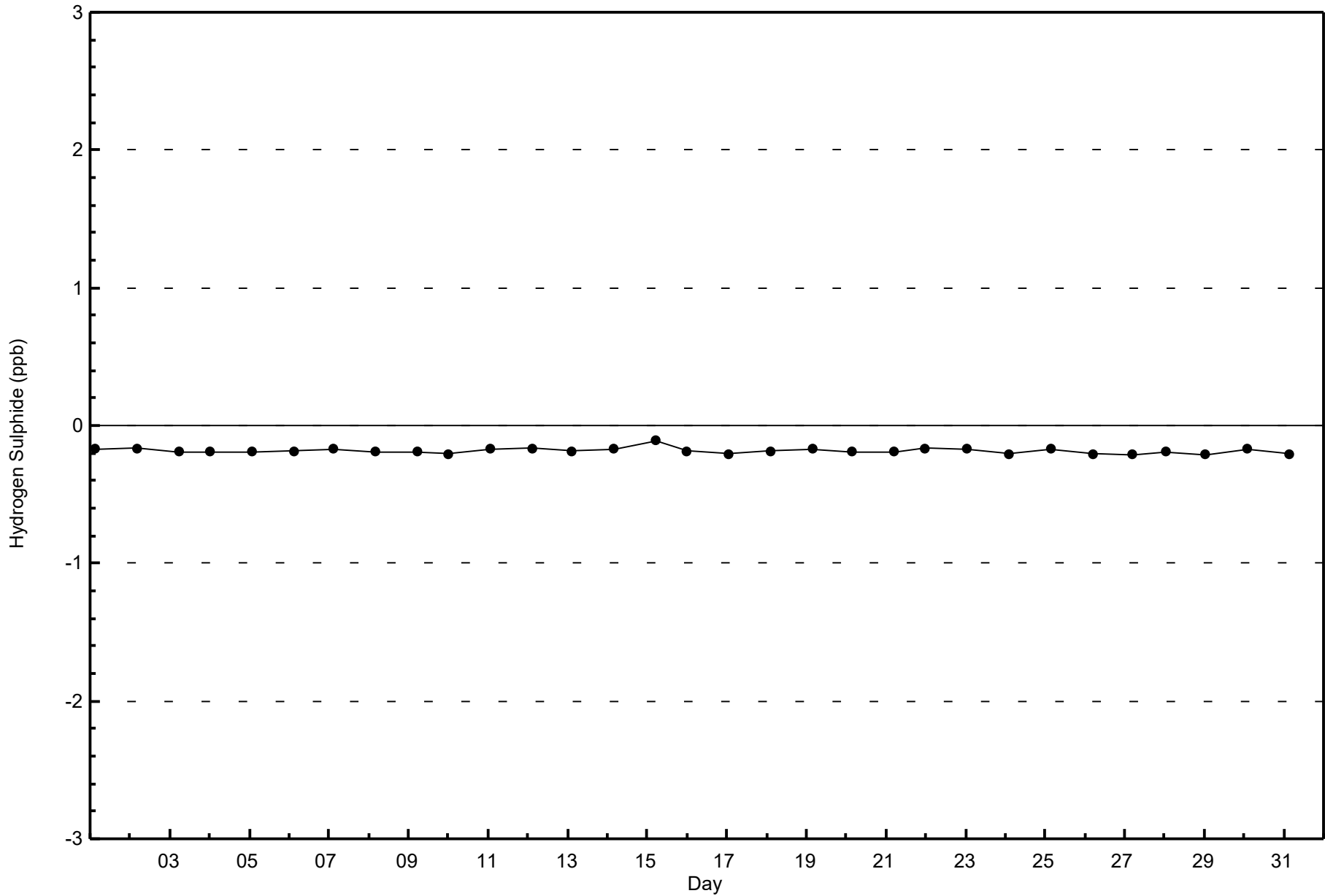


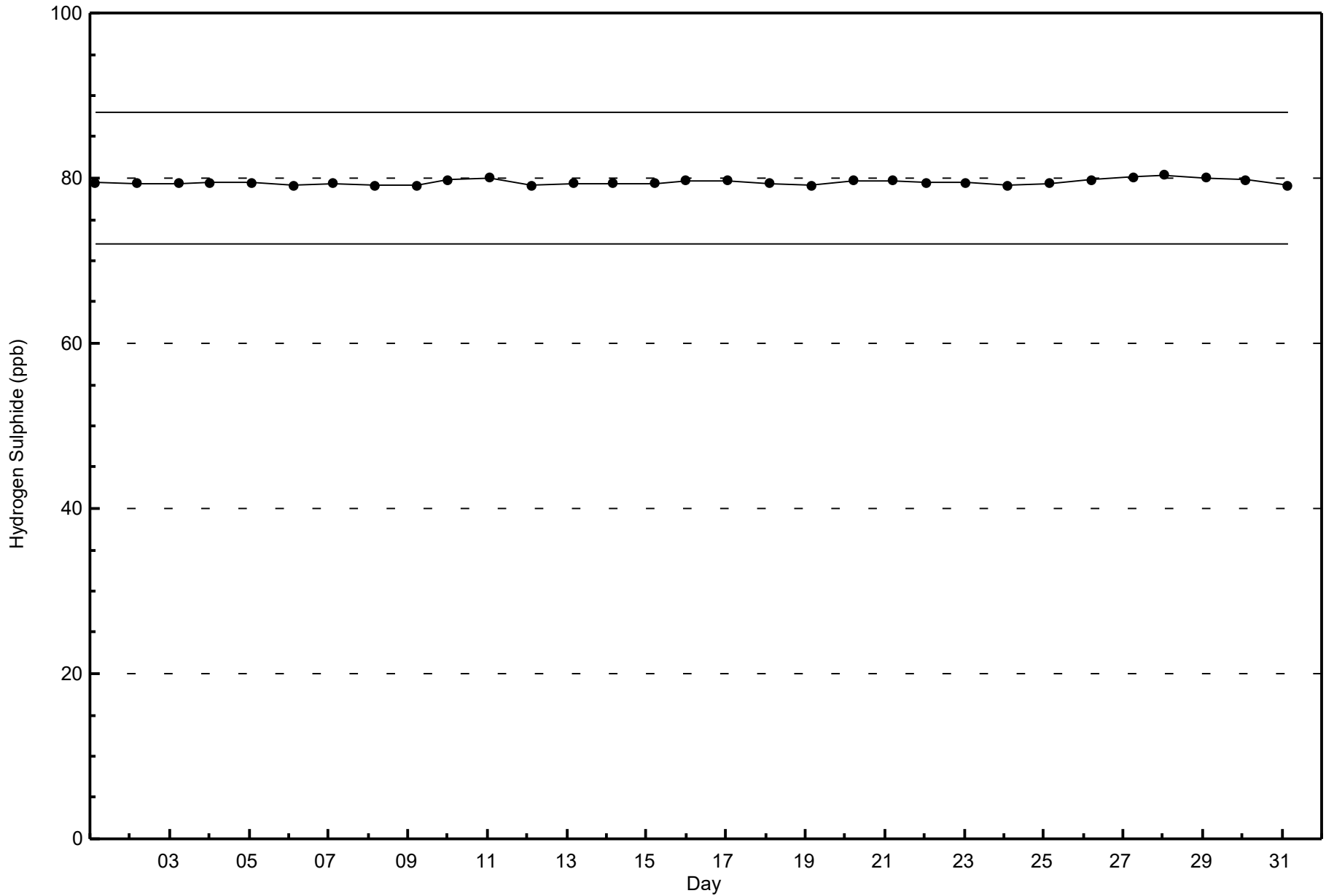
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Hydrogen Sulphide (H₂S) - ppb
Surmont 2



Total Number of Valid Hours: 692

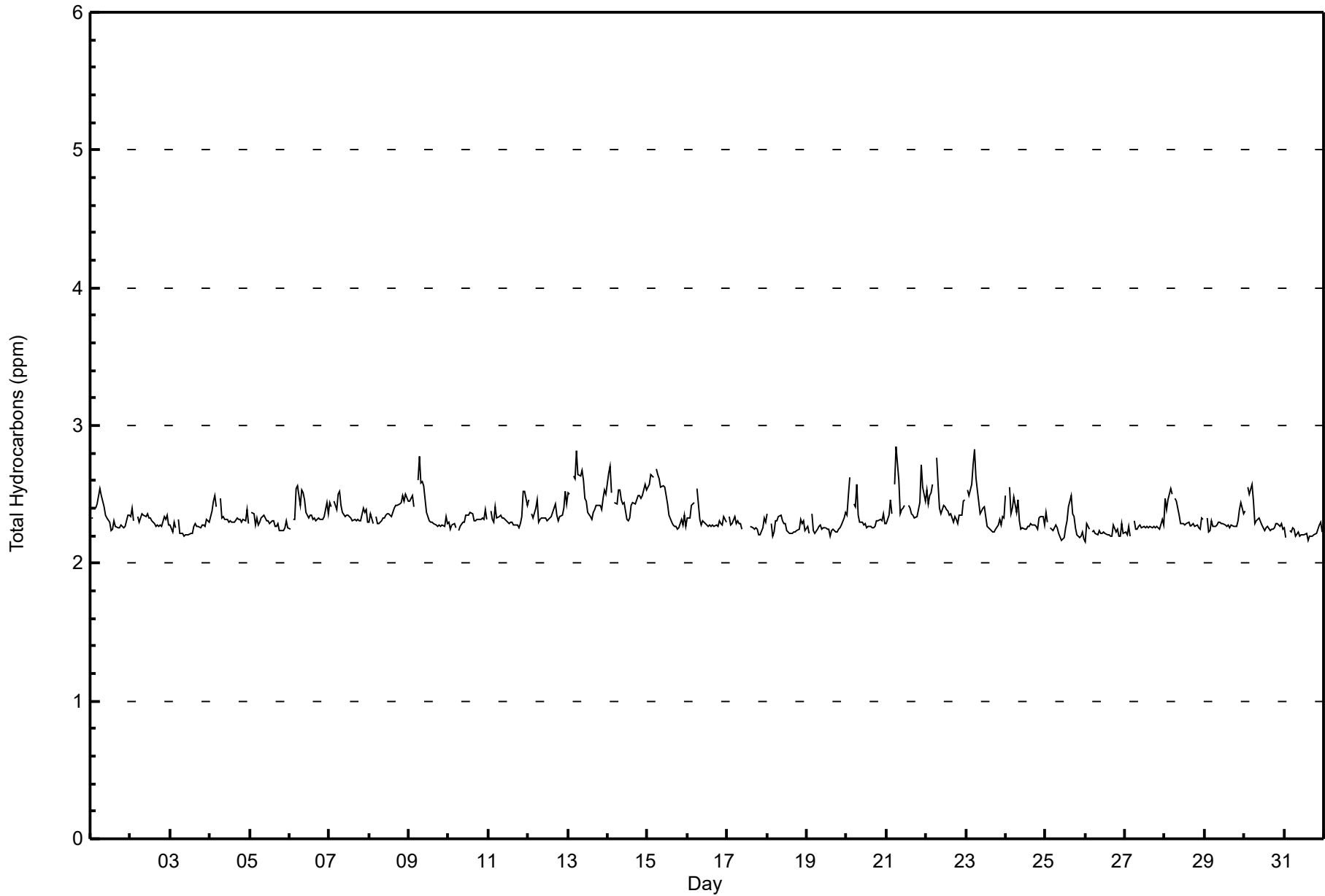






Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Surmont 2 - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Surmont 2 - July 2023

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
Surmont 2 - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	27	17	6	10	17	36	46	31	19	28	54	138	123	59	35	47	693
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	27	17	6	10	17	36	46	31	19	28	54	138	123	59	35	47	693

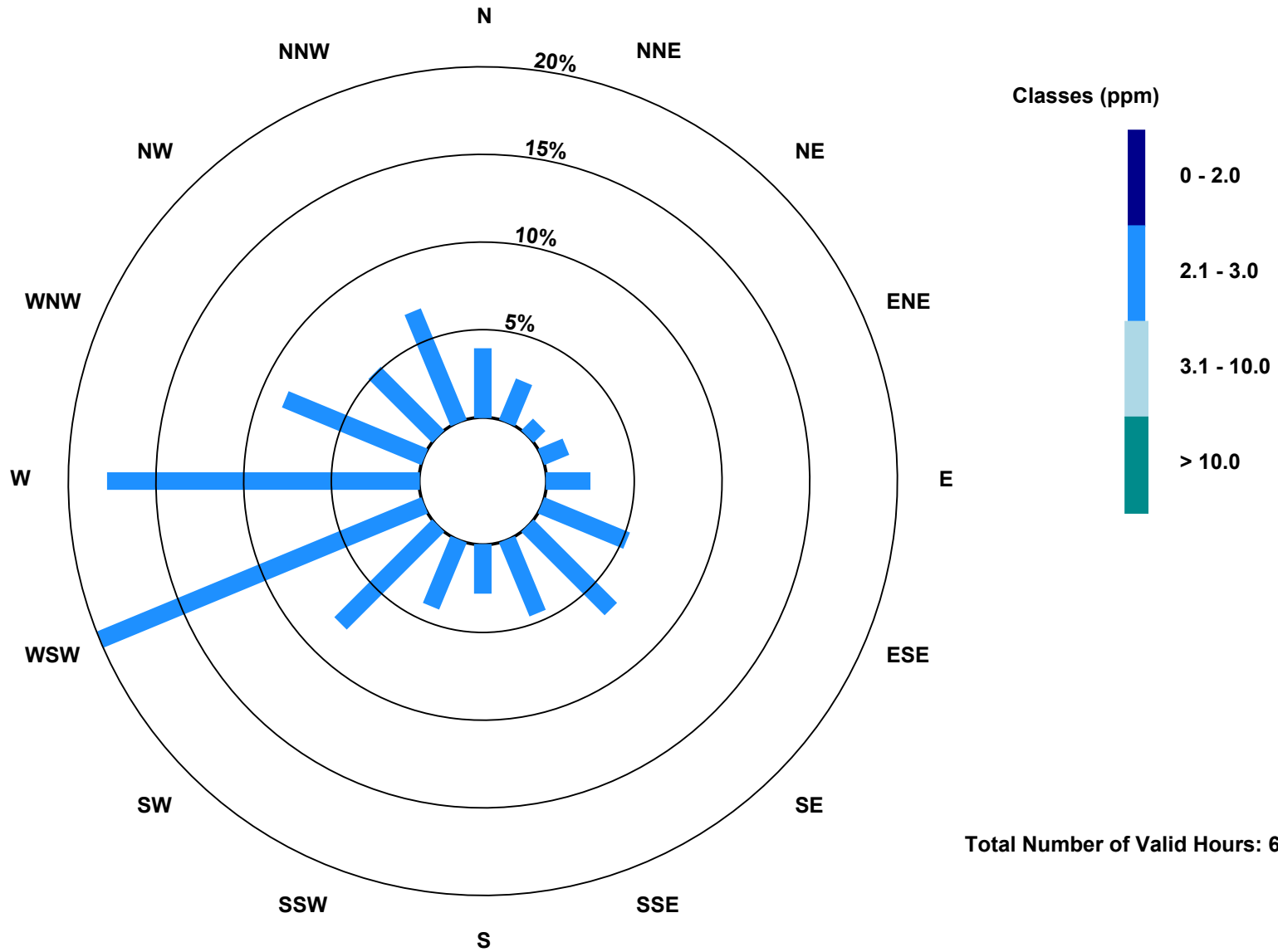
Total Number of Valid Hours: 693

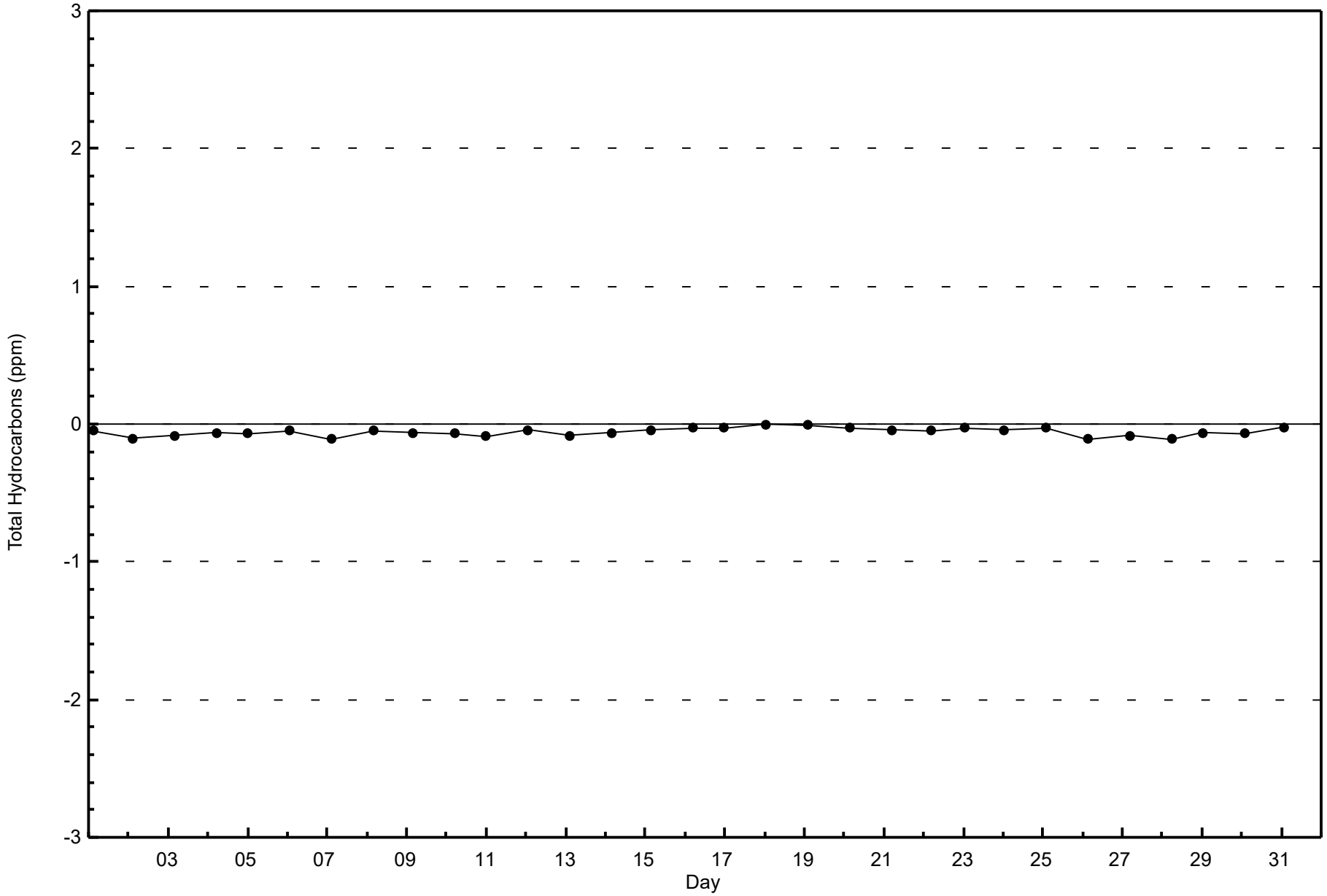
Total Number of Hours: 744

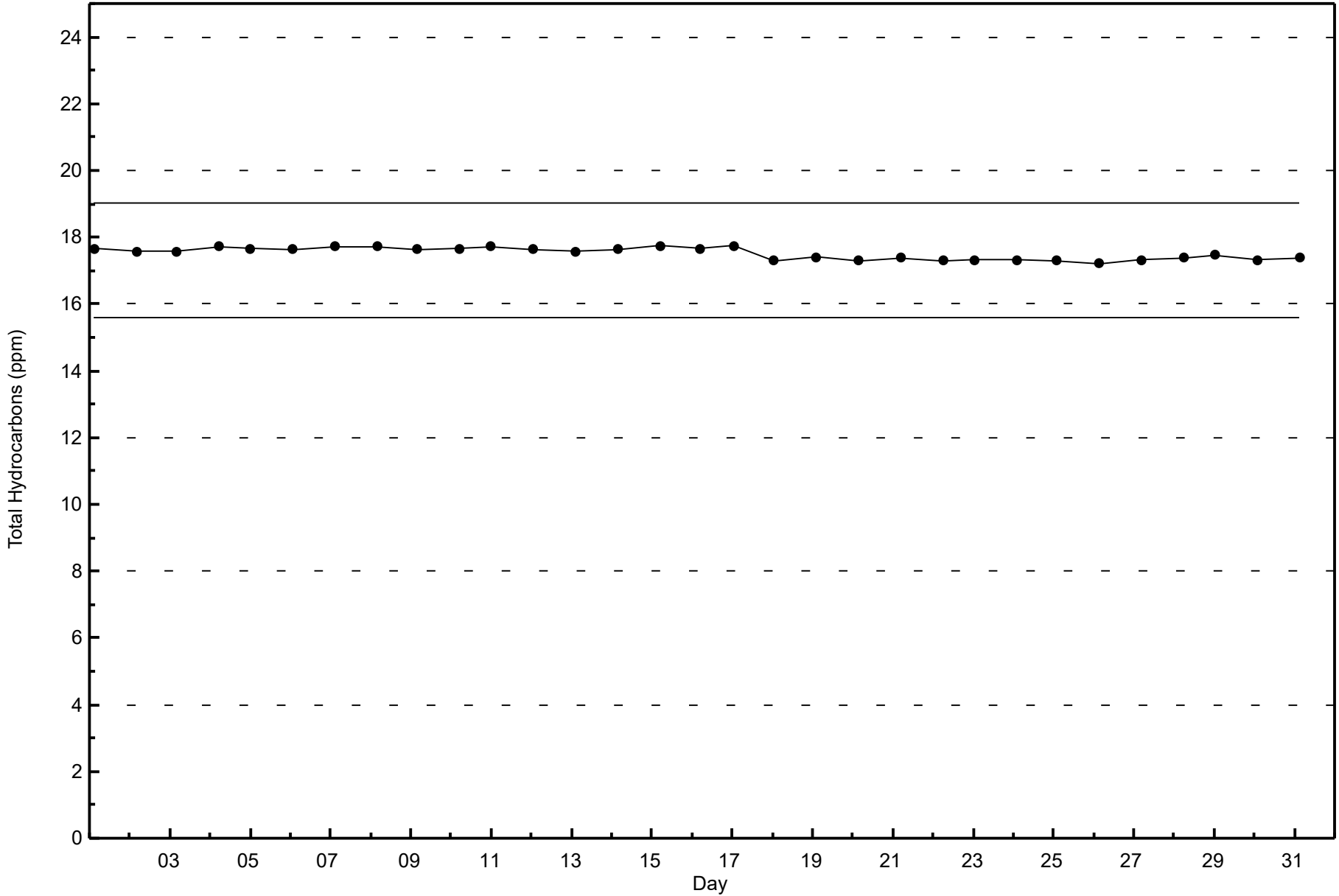


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Surmont 2









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

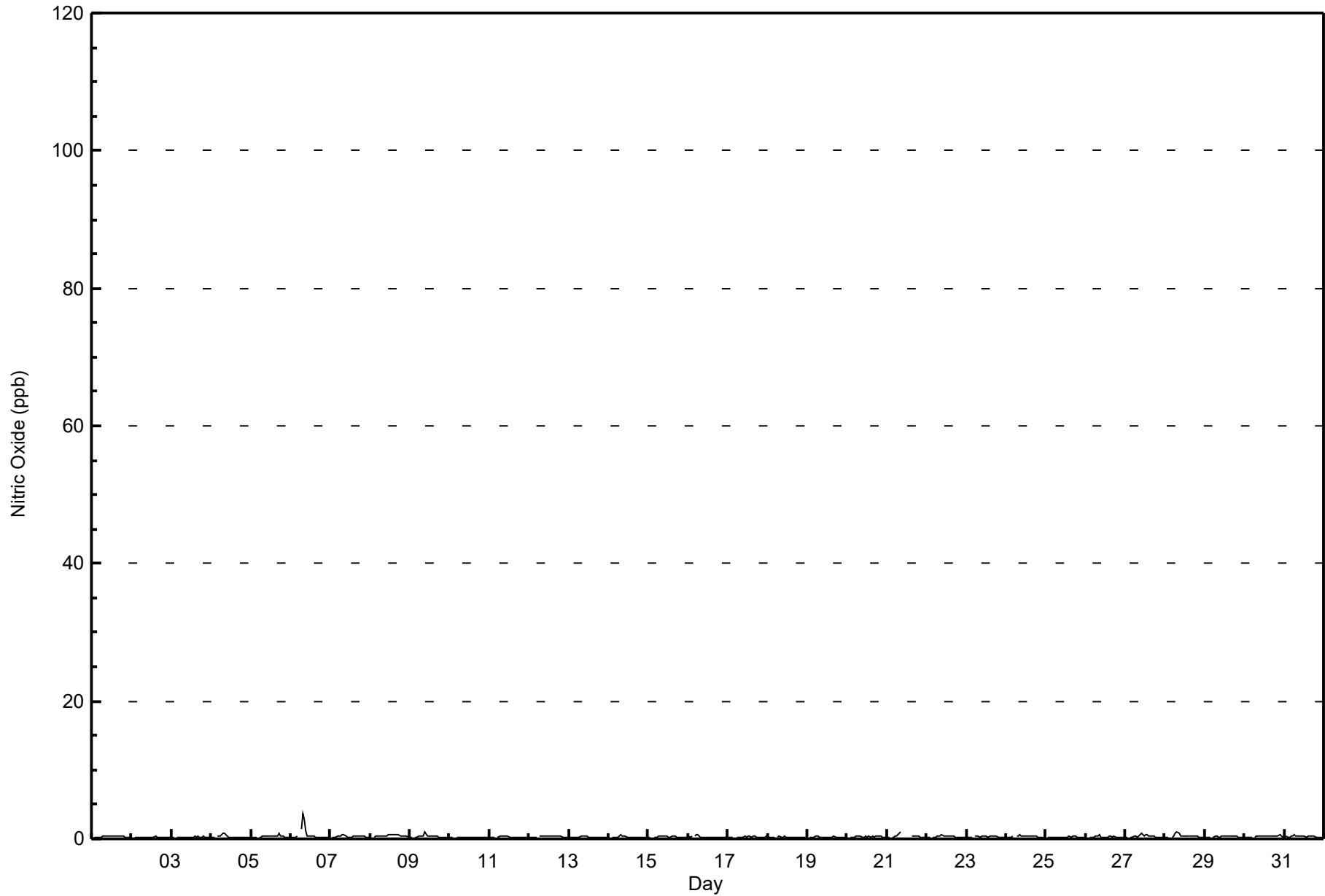
Surmont 2 - July 2023

Number of Exceedences (AAAQO):		1-hr: 0 24-hr: 0		Hours in Service:		744																						
Maximum Value: 3.6 ppb on Jul 6 08:00		Maximum Daily Average: 0.6 ppb on Jul 6		Hours of Data:		707																						
Minimum Value: 0.1 ppb on Jul 14 22:00		Minimum Daily Average: 0.2 ppb on Jul 10		Hours of Missing Data:		37																						
Maximum Diurnal Average: 0.5 ppb at hour 8		Minimum Diurnal Average: 0.2 ppb at hour 4		Hours of Calibration:		37																						
Monthly Average: 0.31 ppb		Percentiles: P ₁ = 0.1 P ₁₀ = 0.2 Q ₁ = 0.2 Median = 0.3 Q ₃ = 0.3 P ₉₀ = 0.4 P ₉₉ = 0.9		Percent Operational Time:		100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Jul	Z	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.3	0.3	0.4	0.3	0.3	0.2	0.2	0.2	0.3	0.4		
2-Jul	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4
3-Jul	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.4	0.2	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
4-Jul	0.3	0.3	0.3	Z	0.3	0.4	0.6	0.9	0.8	0.6	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.9
5-Jul	0.2	0.2	0.2	0.2	Z	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.9	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.9
6-Jul	0.3	0.3	0.3	0.3	0.4	Z	1.5	3.6	2.9	1.2	0.5	0.4	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.6	3.6
7-Jul	Z	0.2	0.2	0.2	0.3	0.4	0.4	0.6	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.6
8-Jul	0.3	Z	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.6
9-Jul	0.3	0.3	Z	0.3	0.3	0.3	0.4	0.4	0.4	1.0	0.3	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	1.0
10-Jul	0.1	0.1	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
11-Jul	0.2	0.2	0.2	0.2	Z	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
12-Jul	0.3	0.3	0.3	0.3	0.3	Z	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.5
13-Jul	Z	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.5	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.3	0.5
14-Jul	0.1	Z	0.1	0.1	0.1	0.3	0.4	0.6	0.4	0.4	0.4	0.2	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.6
15-Jul	0.1	0.1	Z	0.2	0.2	0.3	0.5	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.5
16-Jul	0.3	0.3	0.3	Z	0.4	0.6	0.6	0.3	0.2	0.3	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	0.3	0.6
17-Jul	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.5	0.3	0.3	0.4	0.3	0.4	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.5
18-Jul	0.5	0.3	0.3	0.2	0.2	Z	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.5
19-Jul	Z	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3
20-Jul	0.2	Z	0.3	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	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
21-Jul	0.3	0.3	Z	0.3	0.2	0.3	0.5	0.7	1.0	C	C	C	C	C	C	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	--	1.0	
22-Jul	0.2	0.2	0.2	Z	0.2	0.2	0.4	0.5	0.4	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.6	
23-Jul	0.2	0.2	0.2	0.2	Z	0.4	0.4	0.3	0.3	0.5	0.4	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.5	
24-Jul	0.2	0.2	0.2	0.2	0.3	Z	0.5	0.4	0.6	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.6
25-Jul	Z	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.4	
26-Jul	0.2	Z	0.2	0.2	0.1	0.2	0.3	0.4	0.6	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.6	
27-Jul	0.2	0.2	Z	0.1	0.2	0.4	0.4	0.3	0.3	0.7	0.7	0.4	0.6	0.5	0.4	0.4	0.4	0.4	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.7	
28-Jul	0.2	0.2	0.2	Z	0.3	0.3	0.8	0.9	0.8	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.4	0.9	
29-Jul	0.2	0.2	0.2	0.2	Z	0.3	0.5	0.5	0.3	0.3	0.4	0.5	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	0.5	
30-Jul	0.2	0.2	0.3	0.3	0.3	Z	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.3	0.3	0.3	0.5	
31-Jul	Z	0.3	0.3	0.3	0.3	0.4	0.5	0.4	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	0.2	0.3	0.2	0.3	0.3	0.5	
																								Diurnal Average				
																								Diurnal Maximum				
Z - zerospan C - Calibration																												



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Surmont 2 - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Surmont 2 - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Surmont 2 - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	26	17	6	10	17	37	46	34	18	29	52	141	121	60	35	42	691
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	17	6	10	17	37	46	34	18	29	52	141	121	60	35	42	691

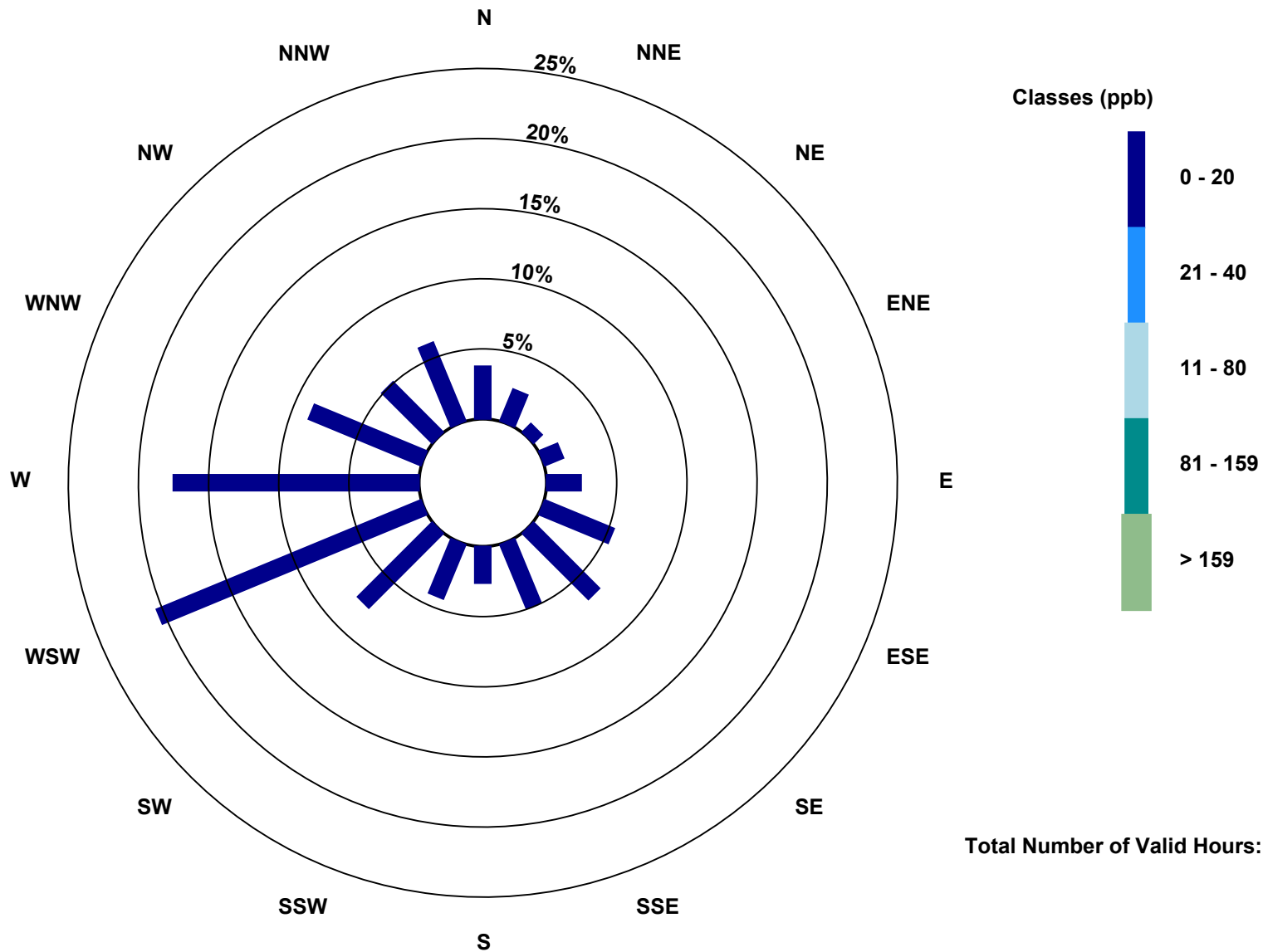
Total Number of Valid Hours: 691

Total Number of Hours: 744

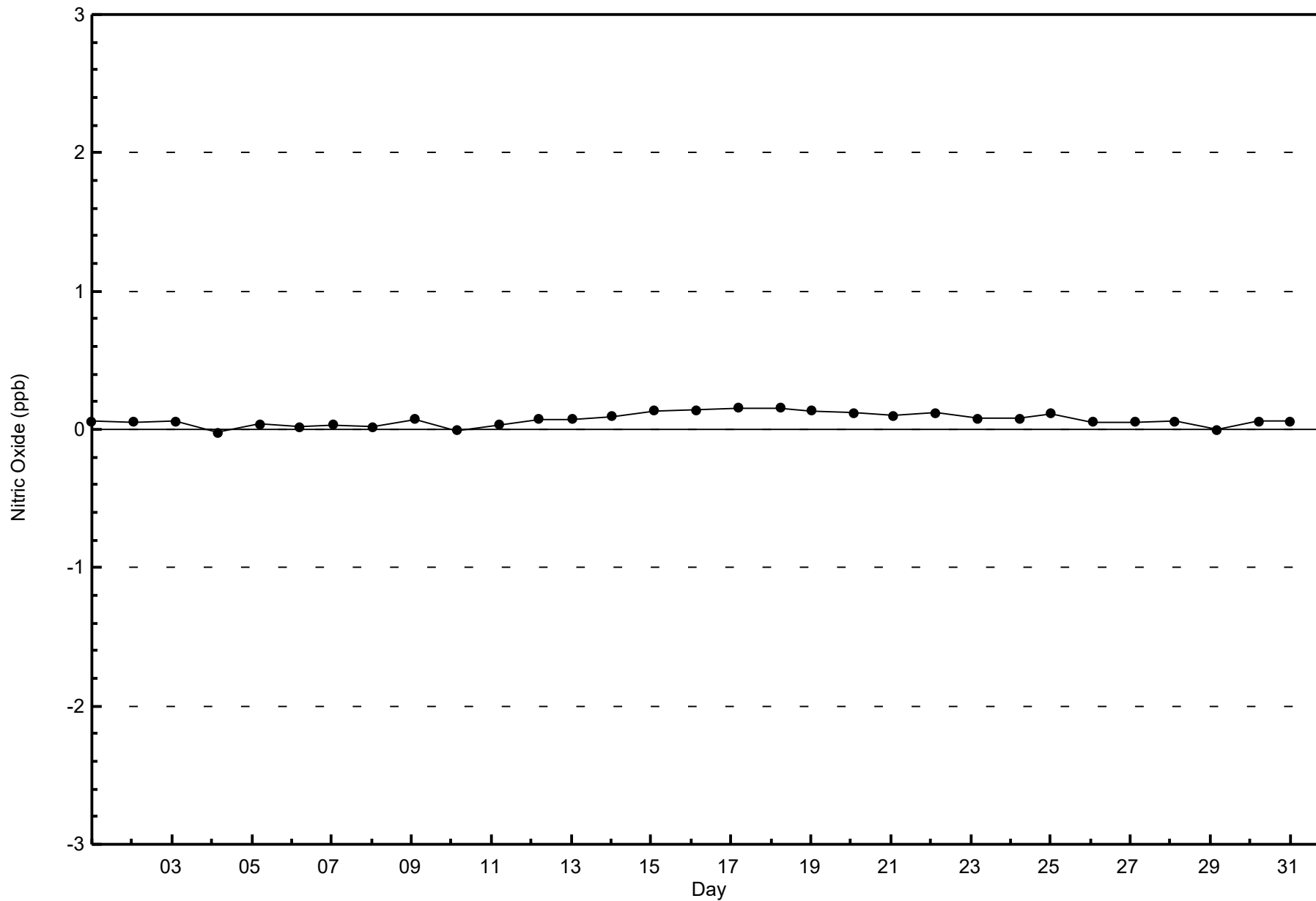


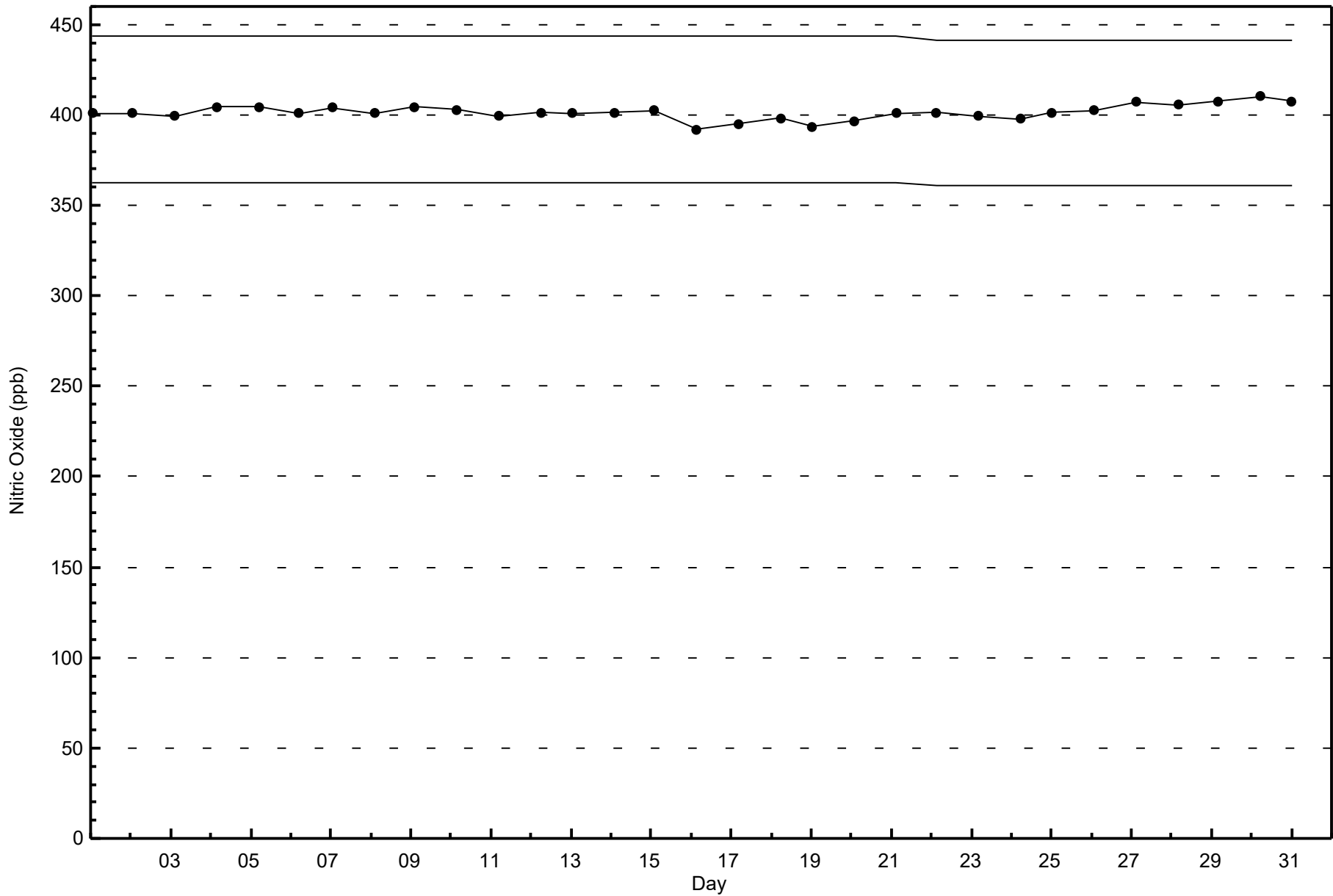
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Surmont 2



Total Number of Valid Hours: 691







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

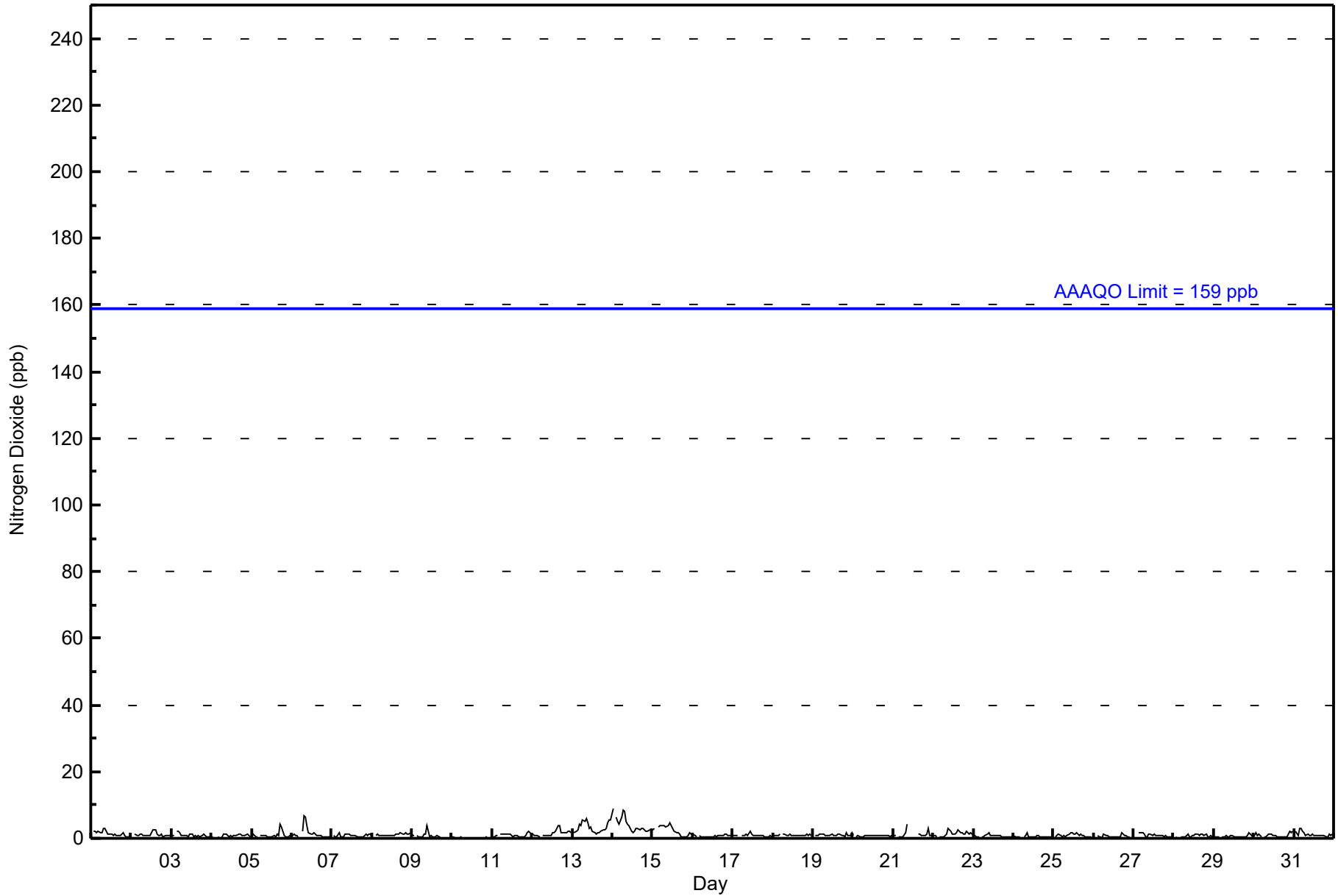
Surmont 2 - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744														744																												
Maximum Value: 8.8 ppb on Jul 14 01:00		Maximum Daily Average: 4.0 ppb on Jul 14		Hours of Data: 707														707																														
Minimum Value: 0.1 ppb on Jul 9 21:00		Minimum Daily Average: 0.2 ppb on Jul 10		Hours of Missing Data: 37														37																														
Maximum Diurnal Average: 1.7 ppb at hour 9		Minimum Diurnal Average: 0.9 ppb at hour 20		Hours of Calibration: 37														37																														
Monthly Average: 1.14 ppb		Percentiles: P ₁ = 0.1 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 0.8 Q ₃ = 1.2 P ₉₀ = 2.2 P ₉₉ = 6.1		Percent Operational Time: 100.0														100.0																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	Z	2.3	2.3	1.8	2.2	1.6	1.8	3.0	2.9	2.1	1.4	1.1	1.3	0.9	1.1	0.7	0.7	1.0	1.1	1.6	0.8	0.5	0.5	0.9	1.5	3.0																						
2-Jul	0.7	Z	1.1	0.9	1.0	1.2	1.3	0.7	1.0	1.0	0.9	1.0	1.6	2.6	2.6	1.4	0.8	0.8	1.1	0.6	0.8	0.8	0.7	0.7	1.1	2.6																						
3-Jul	0.7	1.0	Z	2.1	2.1	1.6	0.8	0.8	0.9	0.7	0.6	1.3	1.1	0.5	0.7	0.4	0.8	0.6	0.8	1.4	0.8	0.3	0.3	0.4	0.9	2.1																						
4-Jul	0.3	0.2	0.2	Z	0.3	0.2	0.3	1.3	1.4	1.2	0.5	0.7	0.6	0.8	0.9	1.2	1.2	1.0	1.0	0.9	1.1	1.0	0.6	0.8	1.4	0.8																						
5-Jul	0.5	1.1	0.5	0.6	Z	0.7	0.7	0.7	0.7	0.6	0.5	0.5	0.6	0.8	0.6	1.2	0.8	4.4	3.2	0.9	0.6	0.5	0.5	0.7	1.0	4.4																						
6-Jul	1.0	1.1	0.9	0.7	0.2	Z	2.3	6.8	6.3	3.7	1.6	1.1	1.4	1.8	1.2	0.9	0.8	0.9	0.6	0.5	0.5	0.5	0.5	0.7	1.6	6.8																						
7-Jul	Z	0.7	0.5	0.5	1.6	0.6	0.3	0.5	1.3	1.3	1.2	1.0	0.7	0.8	0.8	0.6	0.6	0.6	0.5	0.5	1.3	0.7	1.1	1.4	0.8	1.6																						
8-Jul	0.4	Z	0.9	1.2	0.9	0.9	0.8	0.9	0.9	0.7	0.7	0.9	0.9	1.0	1.1	1.1	1.3	1.6	1.2	1.3	1.5	1.4	1.1	1.5	1.1	1.6																						
9-Jul	0.9	0.7	Z	0.8	0.6	0.6	0.6	1.1	1.3	3.7	0.6	0.7	0.5	0.5	0.5	0.8	0.4	0.2	0.2	0.2	0.1	0.1	0.1	0.6	0.7	3.7																						
10-Jul	0.4	0.5	0.1	Z	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.2	0.2	0.2	0.5																						
11-Jul	0.3	0.4	0.7	0.9	Z	1.2	1.3	1.4	1.4	1.1	1.2	1.1	0.6	0.8	0.8	0.8	0.6	0.6	0.5	0.5	0.7	1.9	2.1	1.2	1.0	2.1																						
12-Jul	1.2	0.7	0.8	0.8	0.6	Z	1.0	0.9	0.9	0.9	0.8	1.0	1.8	1.6	2.3	3.7	3.8	1.9	1.6	1.7	1.7	2.0	2.2	1.9	1.6	3.8																						
13-Jul	Z	1.7	2.3	2.7	4.3	3.8	5.3	5.2	6.1	4.8	3.0	3.6	2.1	1.7	1.4	1.6	1.9	2.3	2.4	2.4	3.1	4.8	5.6	5.6	3.4	6.1																						
14-Jul	8.8	Z	6.4	4.9	4.4	6.3	8.3	8.1	5.0	4.2	4.0	2.2	1.5	2.1	2.8	2.9	2.4	2.8	2.9	2.5	2.1	2.2	2.5	2.5	4.0	8.8																						
15-Jul	2.6	2.8	Z	3.6	3.9	3.8	4.0	3.8	3.6	3.8	4.6	3.9	2.8	2.0	1.8	1.5	1.3	0.5	0.4	0.4	0.5	1.0	1.6	1.1	2.4	4.6																						
16-Jul	1.2	0.8	0.6	Z	0.8	0.6	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.7	0.6	0.7	0.8	0.8	0.9	1.2	1.2	1.0	1.0	0.8	0.8	1.2																						
17-Jul	0.7	0.7	0.7	0.7	Z	0.8	0.9	1.0	1.2	0.8	2.0	1.1	1.0	1.0	0.8	0.9	0.9	1.0	0.9	0.6	0.5	0.5	0.7	0.6	0.9	2.0																						
18-Jul	0.7	0.7	0.7	0.7	1.2	Z	1.1	1.3	0.9	0.9	1.2	1.0	0.8	0.7	0.8	0.8	0.8	0.7	0.8	0.7	1.3	0.8	1.1	0.7	0.9	1.3																						
19-Jul	Z	1.0	0.9	0.7	1.1	1.1	1.1	0.8	0.8	0.8	0.9	1.1	1.0	0.9	0.9	1.1	1.3	1.0	0.8	0.6	1.5	0.8	0.9	1.8	1.0	1.8																						
20-Jul	1.0	Z	0.6	0.7	0.4	0.4	0.5	0.8	0.8	0.7	0.7	0.9	0.8	0.8	0.8	0.7	0.7	0.9	0.8	0.9	0.8	0.7	0.6	0.8	0.7	1.0																						
21-Jul	0.7	0.8	Z	0.6	0.5	0.5	0.6	1.7	4.1	C	C	C	C	C	C	1.3	1.3	0.8	0.8	0.8	1.2	3.0	1.0	0.9	--	4.1																						
22-Jul	0.7	0.7	0.6	Z	0.5	0.4	0.4	0.9	1.4	2.8	2.0	1.1	1.1	1.1	1.8	2.5	1.9	1.9	1.3	1.1	2.1	1.1	1.5	1.2	1.3	2.8																						
23-Jul	0.8	0.7	0.6	0.5	Z	0.5	0.6	0.7	1.1	1.6	0.8	0.7	0.7	0.8	0.9	0.7	0.7	0.5	0.6	0.5	0.4	0.3	0.5	0.5	0.7	1.6																						
24-Jul	0.9	0.6	0.4	0.4	0.4	Z	0.5	0.7	1.9	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.6	0.6	0.6	0.6	0.4	0.5	0.5	0.5	0.6	1.9																						
25-Jul	Z	0.6	0.7	1.3	0.7	0.5	0.7	0.6	0.7	1.3	1.9	1.6	1.1	1.1	1.5	0.9	1.1	0.7	0.8	0.4	0.4	0.5	0.4	0.2	0.9	1.9																						
26-Jul	0.2	Z	1.0	0.3	0.3	0.2	1.2	0.9	1.0	0.4	0.4	0.6	0.5	0.4	0.5	0.6	0.3	1.5	0.7	0.8	0.3	0.3	0.2	0.2	0.6	1.5																						
27-Jul	0.1	0.1	Z	1.5	1.5	1.8	1.2	0.6	0.5	1.1	1.1	0.7	1.1	1.0	0.8	0.8	0.8	1.0	0.6	0.7	0.6	0.5	0.3	0.3	0.8	1.8																						
28-Jul	0.2	0.2	0.3	Z	0.3	0.3	0.4	0.4	1.4	0.6	0.5	0.8	1.0	1.1	1.2	1.0	1.2	1.3	1.0	1.1	0.5	0.5	0.9	0.4	0.7	1.4																						
29-Jul	0.4	0.3	0.4	0.3	Z	0.3	0.5	0.7	0.3	0.4	0.8	0.9	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.8	1.9	1.3	0.6	0.6	1.9																						
30-Jul	0.8	1.5	1.0	1.1	0.6	Z	0.6	0.6	0.8	1.2	1.2	0.9	0.8	0.7	0.5	0.5	0.5	0.5	0.6	0.6	0.6	2.3	1.5	2.0	0.9	2.3																						
31-Jul	Z	2.3	0.8	3.0	2.9	2.0	1.5	0.7	1.1	0.8	1.0	1.1	0.8	0.7	0.8	0.7	0.7	0.8	0.7	0.5	0.5	1.4	0.7	1.1	1.2	3.0																						
																								1.0	0.9	1.0	1.3	1.3	1.2	1.3	1.6	1.7	1.5	1.2	1.1	1.0	1.1	1.1	1.0	1.1	1.0	0.9	0.9	1.1	1.1	1.1	1.1	Diurnal Average
																								8.8	2.8	6.4	4.9	4.4	6.3	8.3	8.1	6.3	4.8	4.6	3.9	2.8	2.6	2.8	3.7	3.8	4.4	3.2	2.5	3.1	4.8	5.6	5.6	Diurnal Maximum
Z - zerospan C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																																																



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Surmont 2 - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Surmont 2 - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Surmont 2 - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	26	17	6	10	17	37	46	34	18	29	52	141	121	60	35	42	691
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	17	6	10	17	37	46	34	18	29	52	141	121	60	35	42	691

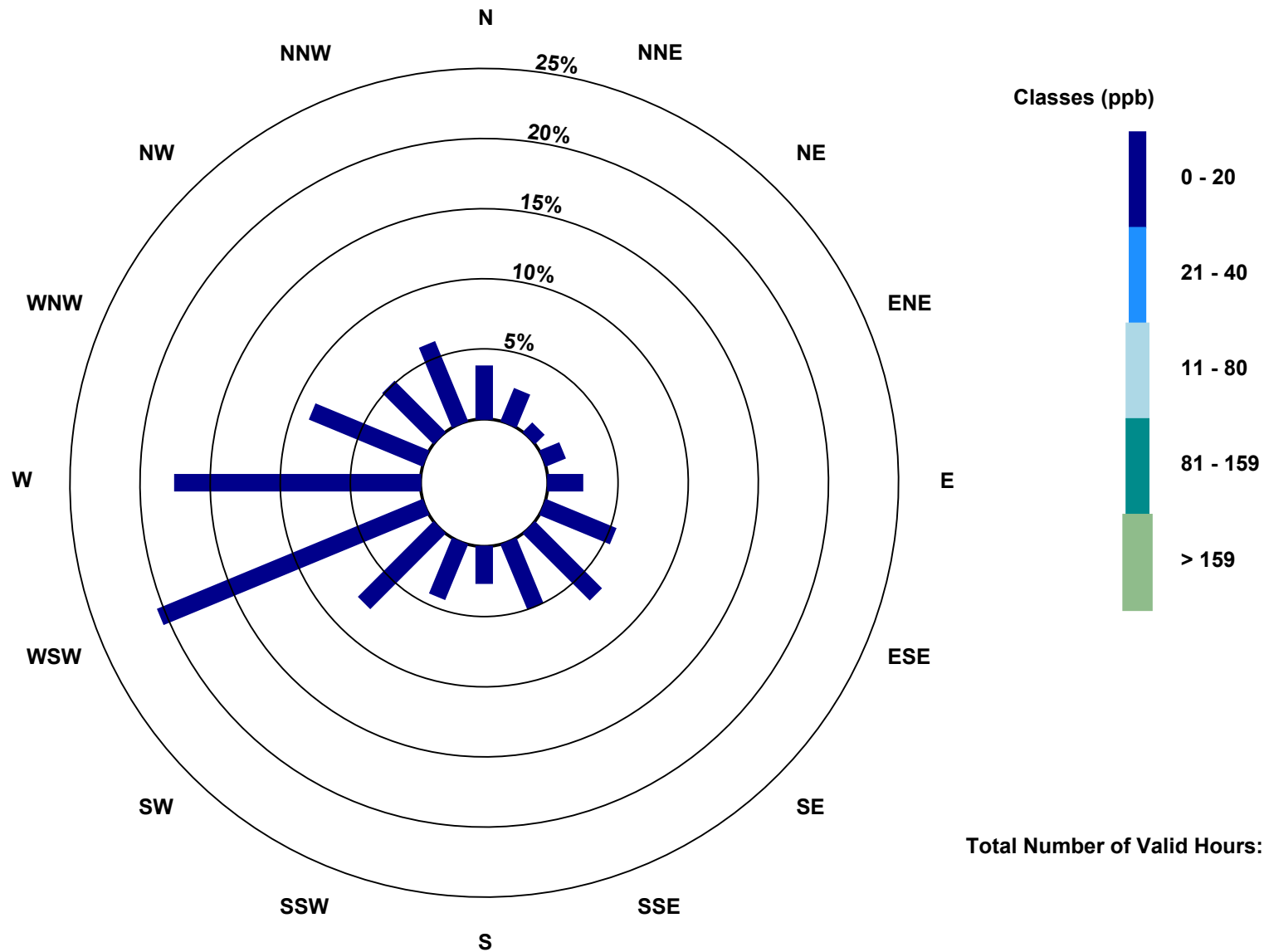
Total Number of Valid Hours: 691

Total Number of Hours: 744

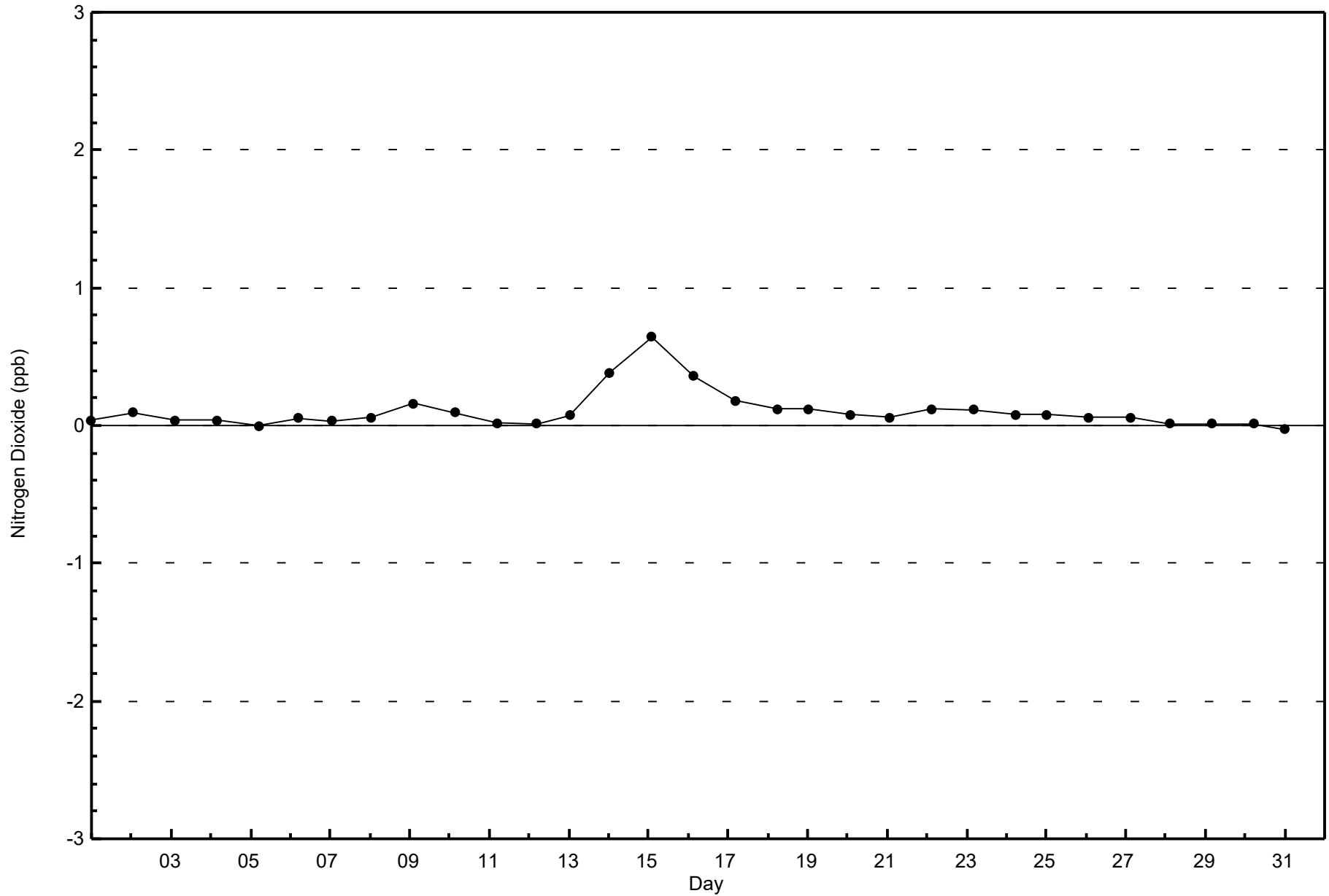


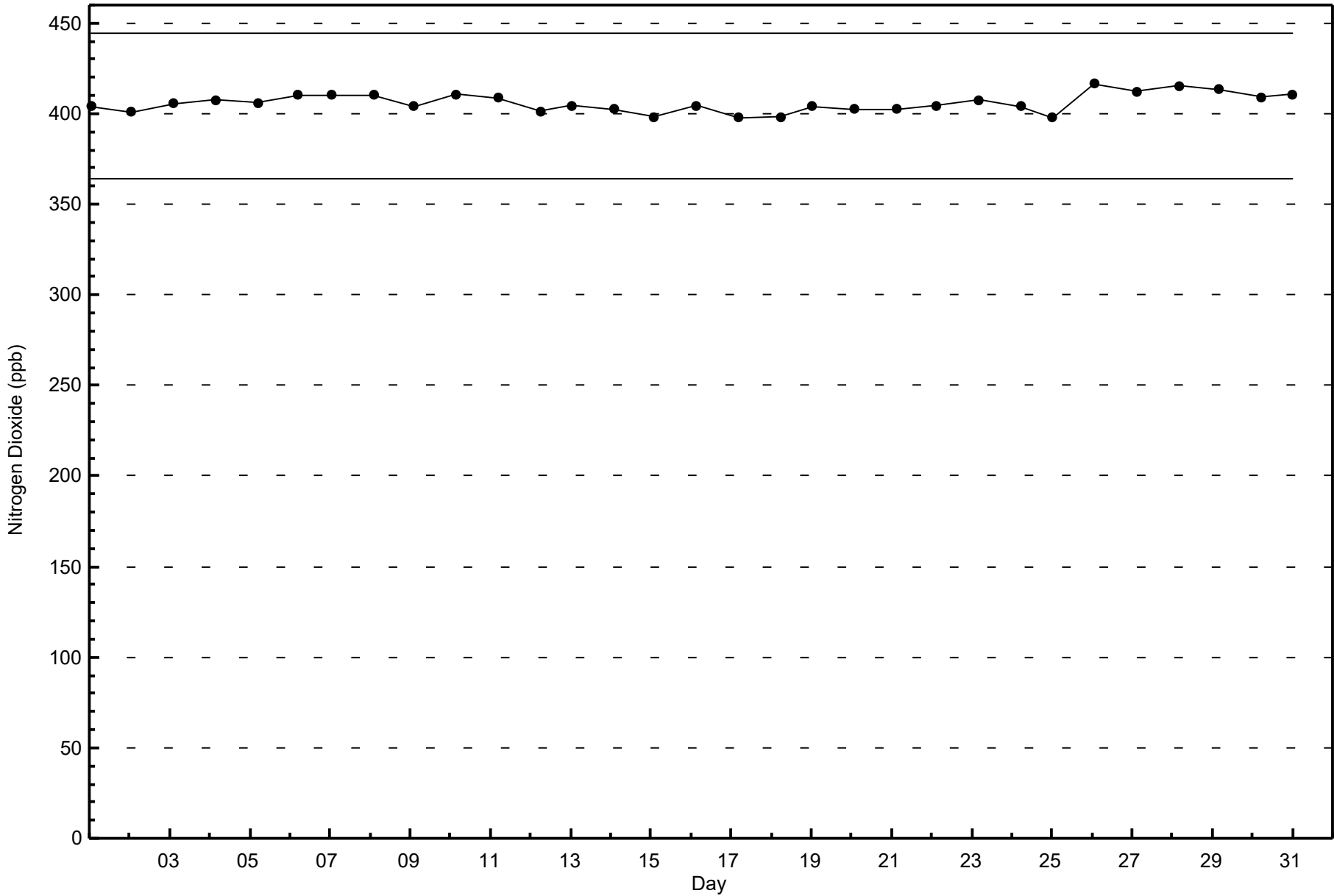
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Surmont 2



Total Number of Valid Hours: 691







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

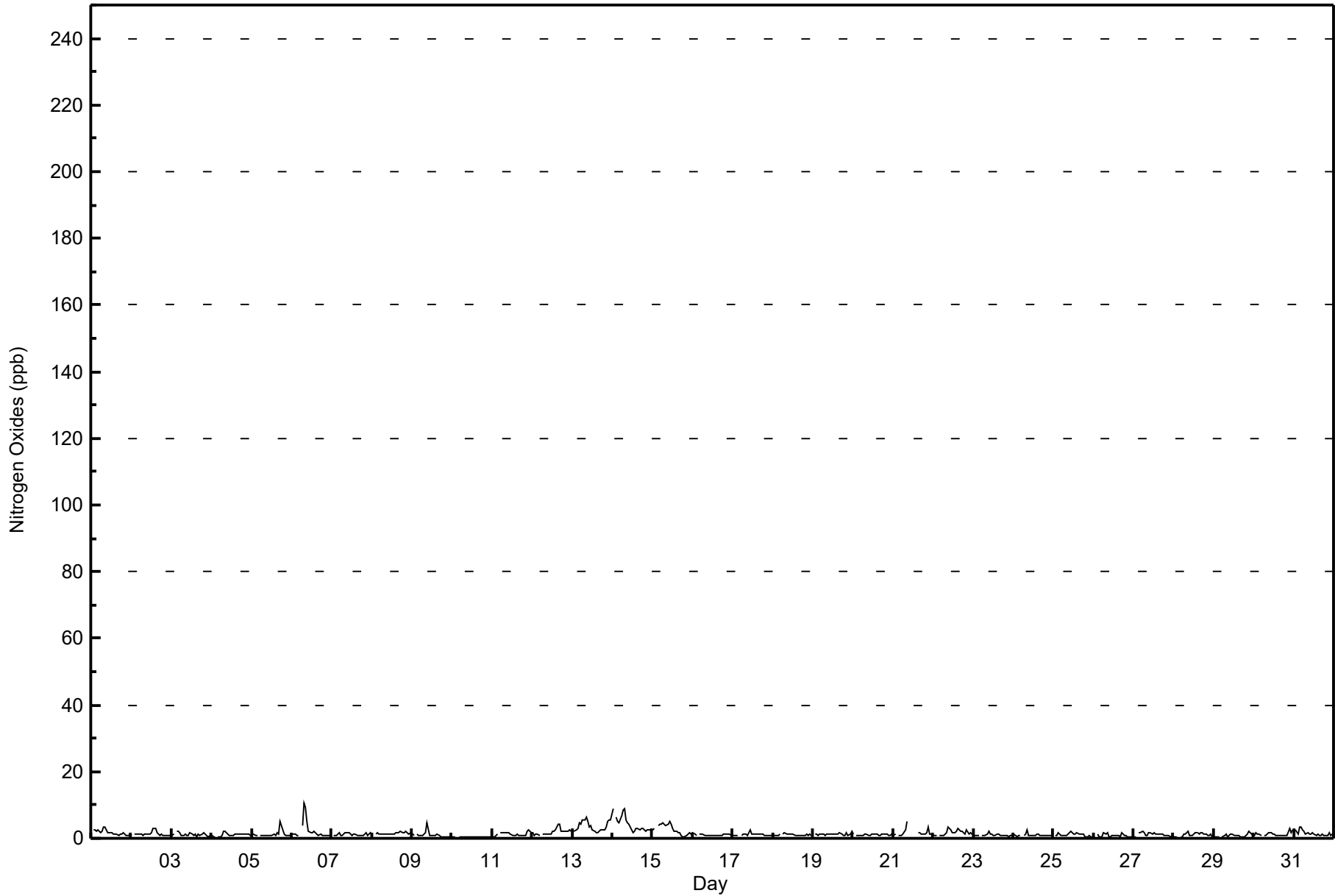
Surmont 2 - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744																				
Maximum Value: 10.4 ppb on Jul 6 08:00		Maximum Daily Average: 4.2 ppb on Jul 14														Hours of Data: 707										
Minimum Value: 0.3 ppb on Jul 10 11:00		Minimum Daily Average: 0.4 ppb on Jul 10														Hours of Missing Data: 37										
Maximum Diurnal Average: 2.2 ppb at hour 9		Minimum Diurnal Average: 1.2 ppb at hour 20														Hours of Calibration: 37										
Monthly Average: 1.46 ppb		Percentiles: P ₁ = 0.3 P ₁₀ = 0.6 Q ₁ = 0.9 Median = 1.1 Q ₃ = 1.6 P ₉₀ = 2.5 P ₉₉ = 6.3														Percent Operational Time: 100.0										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	Z	2.5	2.5	2.0	2.4	1.9	2.1	3.4	3.3	2.5	1.8	1.5	1.7	1.2	1.4	1.1	1.0	1.3	1.5	1.9	1.1	0.7	0.7	1.1	1.8	3.4
2-Jul	0.9	Z	1.3	1.1	1.2	1.4	1.5	1.0	1.3	1.2	1.1	1.2	1.8	2.9	3.0	1.7	1.1	1.0	1.3	0.8	1.0	1.0	0.9	0.9	1.3	3.0
3-Jul	0.9	1.2	Z	2.3	2.3	1.8	1.0	1.0	1.1	0.9	0.8	1.6	1.3	0.8	1.1	0.6	1.2	0.9	1.1	1.8	1.1	0.6	0.6	0.7	1.2	2.3
4-Jul	0.6	0.5	0.5	Z	0.6	0.6	0.9	2.2	2.2	1.8	0.8	1.0	0.8	1.0	1.1	1.1	1.4	1.4	1.3	1.2	1.2	1.3	1.2	0.8	1.1	2.2
5-Jul	0.7	1.3	0.7	0.8	Z	1.0	1.0	1.0	1.0	0.9	0.8	0.8	1.0	1.2	1.0	1.6	1.2	5.3	3.7	1.2	0.9	0.8	0.8	1.0	1.3	5.3
6-Jul	1.3	1.4	1.2	1.0	0.6	Z	3.8	10.4	9.2	4.9	2.1	1.5	1.8	2.2	1.5	1.1	1.0	1.1	0.8	0.7	0.7	0.7	0.7	0.9	2.2	10.4
7-Jul	Z	0.9	0.7	0.7	1.9	1.0	0.7	1.1	1.9	1.6	1.5	1.3	1.0	1.1	1.1	0.9	0.9	0.9	0.8	0.9	1.6	1.0	1.4	1.7	1.2	1.9
8-Jul	0.7	Z	1.2	1.5	1.2	1.2	1.1	1.3	1.3	1.1	1.2	1.4	1.4	1.5	1.6	1.7	1.9	2.2	1.7	1.7	1.9	1.7	1.4	1.8	1.5	2.2
9-Jul	1.2	1.0	Z	1.1	0.9	0.9	1.0	1.5	1.7	4.7	0.9	1.1	0.8	0.8	0.9	1.1	0.7	0.5	0.4	0.4	0.3	0.3	0.3	0.8	1.0	4.7
10-Jul	0.5	0.6	0.3	Z	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.6
11-Jul	0.5	0.6	0.9	1.1	Z	1.5	1.6	1.8	1.8	1.5	1.5	1.4	0.9	1.0	1.0	1.1	0.9	0.9	0.8	0.8	1.0	2.2	2.4	1.5	1.2	2.4
12-Jul	1.5	1.0	1.1	1.1	0.9	Z	1.3	1.3	1.3	1.3	1.2	1.4	2.2	2.0	2.7	4.2	4.2	2.3	2.0	2.0	2.0	2.3	2.5	2.1	1.9	4.2
13-Jul	Z	1.9	2.5	2.9	4.5	4.1	5.6	5.5	6.4	5.3	3.3	3.9	2.4	2.0	1.6	1.8	2.2	2.6	2.6	2.6	3.3	5.0	5.7	5.7	3.6	6.4
14-Jul	8.9	Z	6.5	5.0	4.5	6.6	8.7	8.7	5.4	4.6	4.4	2.4	1.8	2.3	3.0	3.1	2.6	2.9	3.0	2.6	2.2	2.3	2.6	2.6	4.2	8.9
15-Jul	2.7	2.9	Z	3.8	4.1	4.1	4.5	4.2	3.9	4.1	5.0	4.2	3.1	2.3	2.2	1.8	1.6	0.8	0.6	0.6	0.8	1.2	1.9	1.4	2.7	5.0
16-Jul	1.5	1.1	0.9	Z	1.2	1.2	1.2	0.8	0.8	0.9	0.8	0.7	0.8	0.9	0.9	1.0	1.0	1.0	1.1	1.4	1.4	1.2	1.2	1.0	1.0	1.5
17-Jul	0.9	0.9	0.9	0.9	Z	1.0	1.1	1.2	1.4	1.0	2.5	1.4	1.3	1.4	1.1	1.3	1.2	1.3	1.2	0.8	0.7	0.8	1.0	0.9	1.1	2.5
18-Jul	1.2	1.0	1.0	0.9	1.4	Z	1.4	1.7	1.2	1.2	1.5	1.3	1.1	1.0	1.0	1.0	1.0	1.0	1.1	0.9	1.5	1.0	1.3	0.9	1.1	1.7
19-Jul	Z	1.2	1.1	0.9	1.3	1.4	1.4	1.1	1.1	1.1	1.2	1.4	1.3	1.2	1.1	1.4	1.6	1.3	1.0	0.9	1.7	1.0	1.1	2.0	1.3	2.0
20-Jul	1.2	Z	0.9	0.9	0.7	0.7	0.8	1.1	1.1	1.0	1.0	1.2	1.1	1.1	1.1	1.0	1.0	1.2	1.1	1.2	1.1	1.0	0.9	1.1	1.0	1.2
21-Jul	1.0	1.1	Z	0.9	0.7	0.8	1.1	2.4	5.1	C	C	C	C	C	C	1.7	1.7	1.2	1.1	1.1	1.5	3.3	1.2	1.1	--	5.1
22-Jul	0.9	0.9	0.8	Z	0.7	0.6	0.8	1.4	1.8	3.4	2.4	1.5	1.5	1.5	2.2	2.9	2.2	2.2	1.6	1.4	2.4	1.3	1.7	1.4	1.6	3.4
23-Jul	1.0	0.9	0.8	0.7	Z	0.9	1.0	1.0	1.4	2.1	1.2	1.1	1.0	1.1	1.3	1.1	1.0	0.8	0.9	0.8	0.7	0.6	0.7	0.7	1.0	2.1
24-Jul	1.1	0.8	0.6	0.6	0.7	Z	1.0	1.1	2.5	0.9	0.9	0.9	0.9	1.0	1.1	1.1	1.0	1.0	0.9	0.9	0.7	0.8	0.8	0.8	1.0	2.5
25-Jul	Z	0.9	1.0	1.6	1.0	0.8	1.0	0.8	0.9	1.5	2.1	1.8	1.3	1.4	1.8	1.2	1.5	1.1	1.1	0.6	0.6	0.7	0.6	0.4	1.1	2.1
26-Jul	0.4	Z	1.2	0.5	0.4	0.4	1.5	1.3	1.6	0.6	0.6	0.8	0.7	0.7	0.8	0.9	0.6	1.8	1.0	1.0	0.5	0.5	0.4	0.4	0.8	1.8
27-Jul	0.3	0.3	Z	1.6	1.7	2.2	1.6	0.9	0.8	1.8	1.8	1.1	1.7	1.5	1.2	1.2	1.2	1.4	0.8	1.0	0.8	0.7	0.5	0.5	1.1	2.2
28-Jul	0.4	0.4	0.5	Z	0.6	0.6	1.2	1.3	2.2	1.0	0.8	1.1	1.3	1.5	1.6	1.4	1.6	1.7	1.4	1.4	0.8	0.7	1.1	0.6	1.1	2.2
29-Jul	0.6	0.5	0.6	0.5	Z	0.6	1.0	1.2	0.6	0.7	1.2	1.4	0.9	0.8	0.8	0.6	0.6	0.6	0.6	0.6	1.1	2.2	1.6	0.9	0.9	2.2
30-Jul	1.0	1.7	1.3	1.4	0.9	Z	0.9	0.9	1.2	1.6	1.6	1.2	1.1	1.0	0.9	0.9	0.9	0.9	1.0	1.0	1.0	2.8	1.8	2.3	1.3	2.8
31-Jul	Z	2.6	1.1	3.3	3.2	2.4	2.0	1.1	1.5	1.2	1.4	1.5	1.2	1.0	1.1	1.0	1.0	1.1	1.0	0.8	0.8	1.6	1.0	1.3	1.5	3.3
																								Diurnal Average		
																								Diurnal Maximum		
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Surmont 2 - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Surmont 2 - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	707	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Surmont 2 - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	26	17	6	10	17	37	46	34	18	29	52	141	121	60	35	42	691
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	17	6	10	17	37	46	34	18	29	52	141	121	60	35	42	691

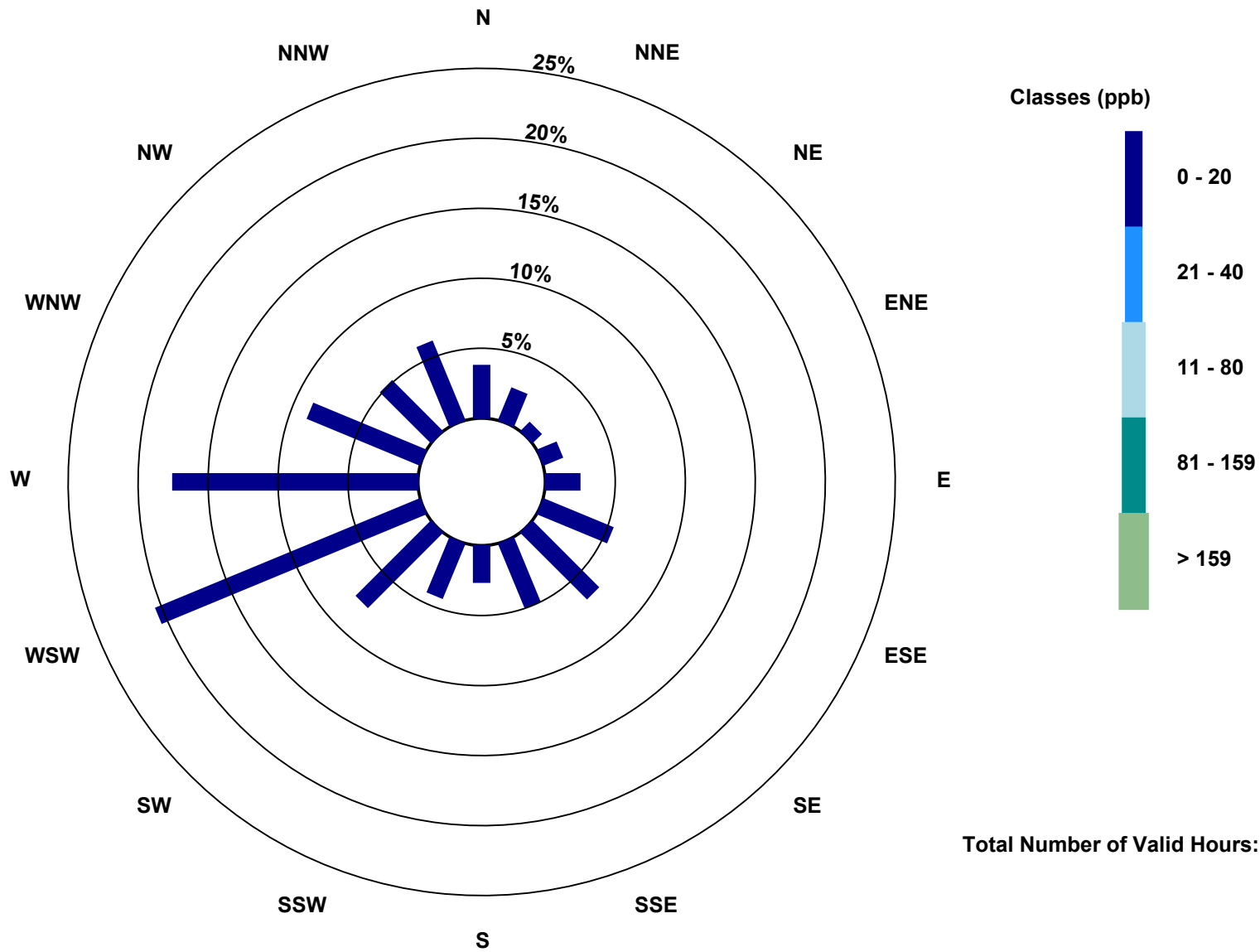
Total Number of Valid Hours: 691

Total Number of Hours: 744

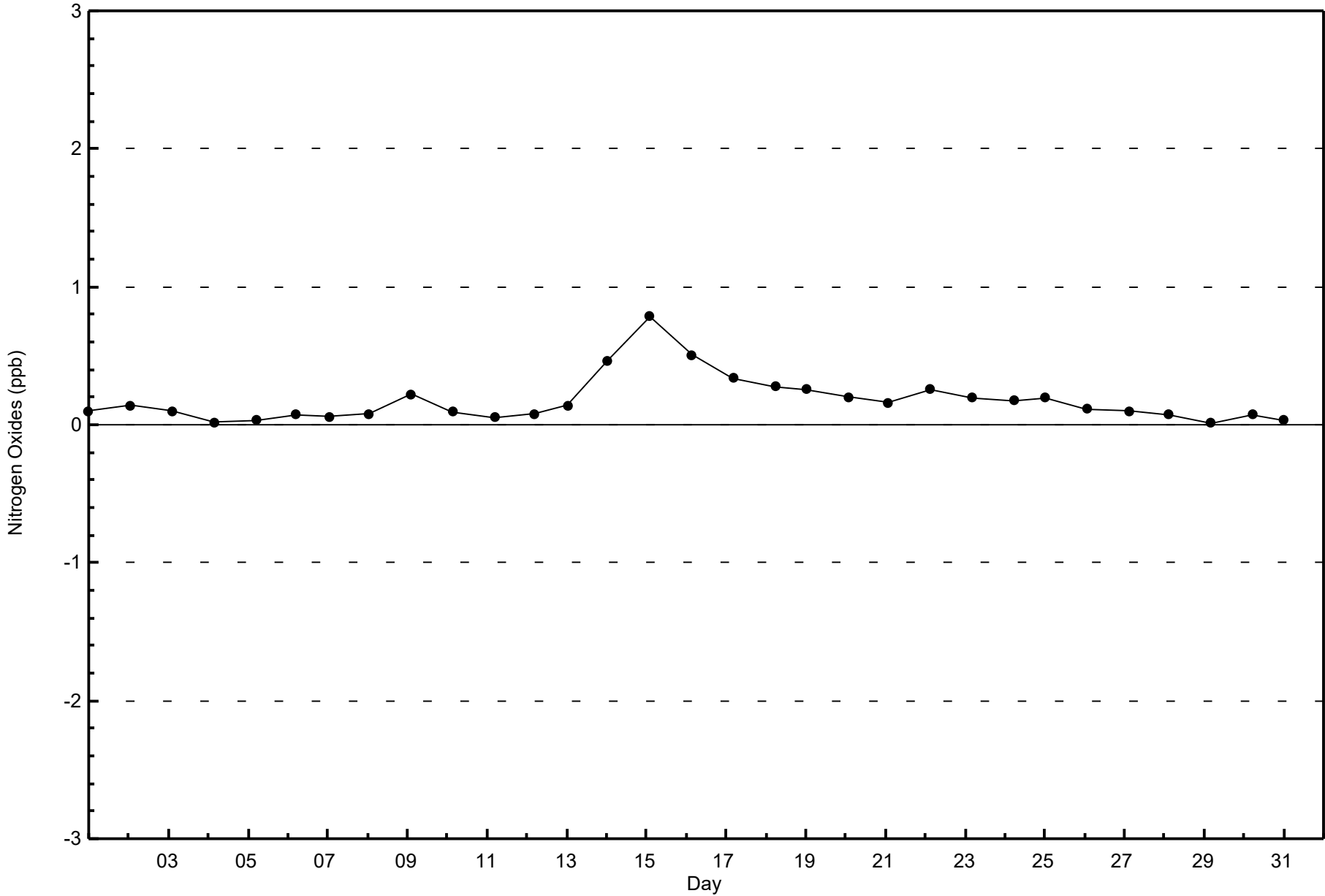


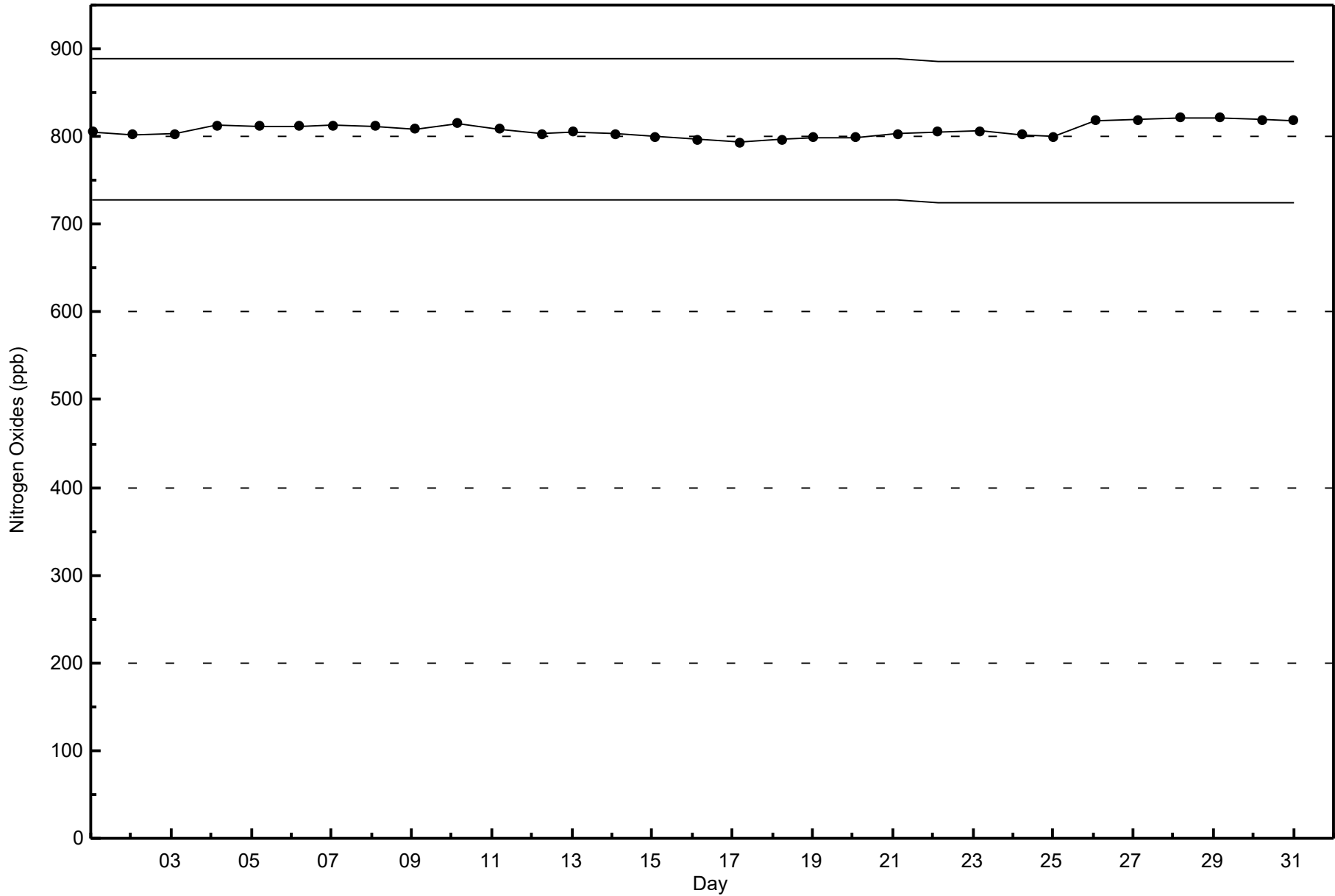
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Surmont 2



Total Number of Valid Hours: 691



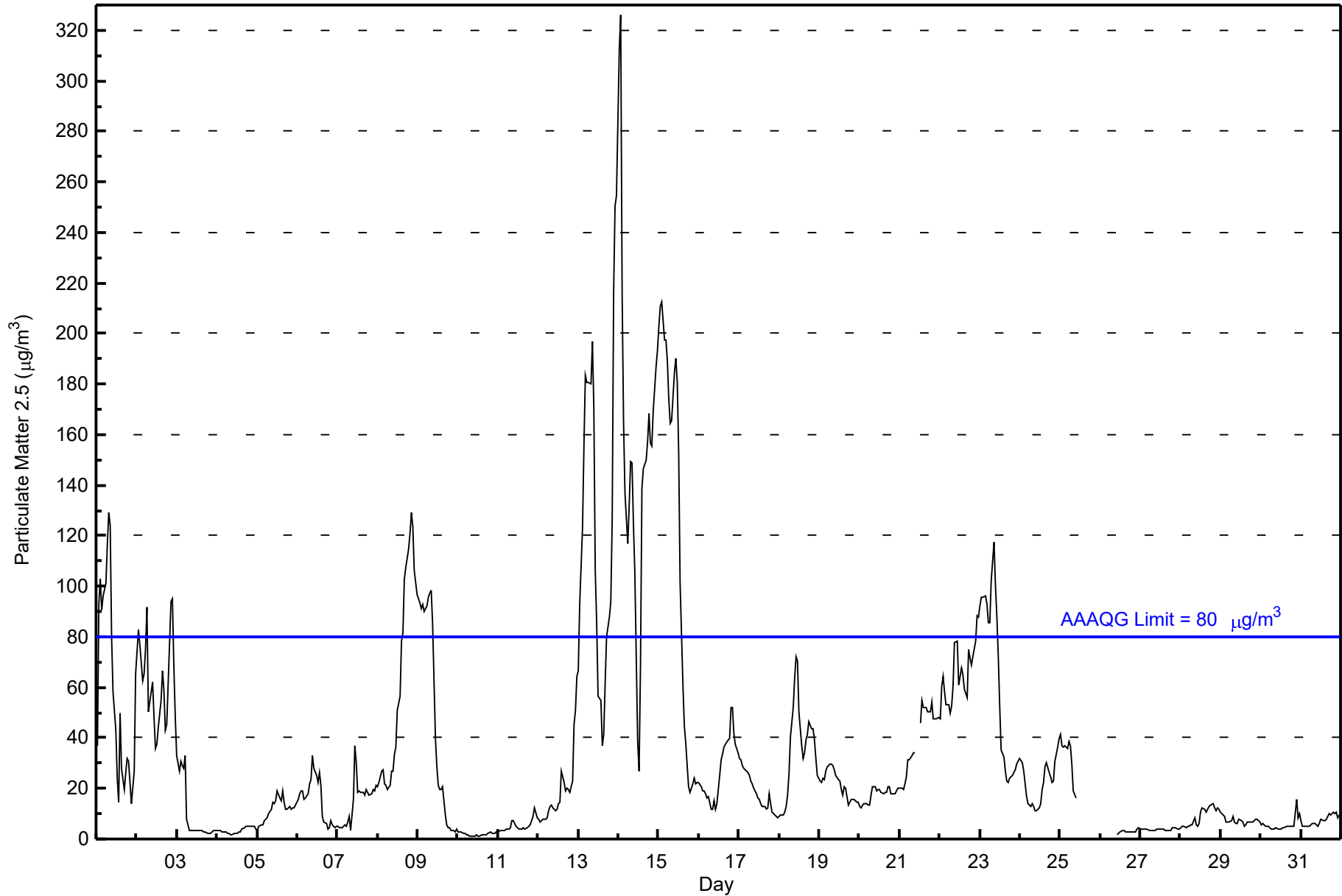




Summary of Hour Averages

Surmont 2 - July 2023

Number of Exceedences (AAAQO):		1-hr: 98		24-hr: 11		Hours in Service:		744																		
Maximum Value: 326.1 µg/m ³ on Jul 14 02:00		Maximum Daily Average: 153.8 µg/m ³ on Jul 14				Hours of Data:		718																		
Minimum Value: 1.1 µg/m ³ on Jul 10 10:00		Minimum Daily Average: 1.9 µg/m ³ on Jul 10				Hours of Missing Data:		26																		
Maximum Diurnal Average: 45.4 µg/m ³ at hour 2		Minimum Diurnal Average: 26.1 µg/m ³ at hour 14				Hours of Calibration:		2																		
Monthly Average: 35.63 µg/m ³		Percentiles: P ₁ = 1.5 P ₁₀ = 3.3 Q ₁ = 5.6 Median = 18.3 Q ₃ = 42.0 P ₉₀ = 95.0 P ₉₉ = 209.4				Percent Operational Time:		96.8																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	36.9	93.4	103.0	90.5	96.4	101.2	116.8	129.1	124.1	80.2	58.3	43.3	24.3	14.3	49.6	27.7	19.4	26.1	31.8	30.7	22.4	14.1	26.7	65.3	59.4	129.1
2-Jul	74.1	82.5	76.7	62.4	65.6	75.5	91.9	50.5	54.3	62.1	48.1	35.8	37.3	44.4	55.0	66.4	58.8	43.3	45.3	61.5	93.9	95.3	68.7	48.8	62.4	95.3
3-Jul	33.2	26.9	30.8	29.0	28.2	33.1	8.0	3.6	3.5	3.1	3.4	3.3	3.3	3.1	3.2	3.2	3.0	2.7	2.3	2.3	2.5	2.8	3.1	3.3	10.0	33.2
4-Jul	3.2	3.1	3.2	2.8	2.7	2.6	2.4	2.2	1.8	1.9	2.1	2.3	2.2	2.8	3.0	3.7	4.4	4.8	5.0	4.8	5.0	5.3	5.1	3.7	3.3	5.3
5-Jul	3.6	4.8	5.6	5.5	7.0	7.6	8.5	10.3	11.9	14.8	14.1	15.1	19.0	16.4	15.1	19.0	14.5	12.0	11.9	12.9	12.0	12.1	12.4	13.4	11.7	19.0
6-Jul	15.6	17.9	19.2	19.0	15.6	16.1	17.9	21.5	23.7	32.7	27.8	25.4	22.2	26.5	21.3	8.7	6.9	6.4	4.1	4.3	7.4	5.5	4.6	5.3	15.7	32.7
7-Jul	4.9	4.2	4.4	4.6	5.4	5.3	6.8	9.1	3.2	15.5	36.7	30.4	18.4	19.2	18.6	18.3	17.3	19.5	18.5	17.2	17.8	19.5	19.0	21.4	14.8	36.7
8-Jul	20.8	22.5	27.1	27.2	21.8	21.3	19.8	21.3	27.1	27.1	33.3	36.4	50.8	56.6	78.2	81.7	103.0	107.3	114.6	121.1	129.0	123.7	106.1	96.7	61.4	129.0
9-Jul	94.9	93.6	91.4	92.7	90.3	92.6	95.6	97.5	98.2	85.1	39.7	28.5	21.0	19.5	19.6	20.8	9.4	5.7	4.4	4.3	3.4	3.2	3.0	4.0	46.6	98.2
10-Jul	2.7	3.1	2.8	2.4	2.1	1.9	1.7	1.4	1.2	1.1	1.2	1.4	1.4	1.3	1.4	1.6	1.7	1.6	2.0	2.7	2.4	2.5	2.5	2.7	1.9	3.1
11-Jul	2.8	3.2	3.5	3.6	3.6	3.8	3.9	4.3	7.2	7.4	6.0	5.0	4.1	3.7	4.2	4.4	4.1	4.4	4.8	5.6	7.1	8.8	12.2	8.6	5.3	12.2
12-Jul	7.9	6.8	7.0	7.7	7.8	8.2	11.0	12.8	13.3	12.3	11.0	11.5	14.0	14.7	27.0	22.6	19.1	19.9	19.6	18.5	22.9	45.5	51.1	64.5	19.0	64.5
13-Jul	66.7	92.8	123.2	155.7	183.3	180.8	180.9	180.0	196.6	170.5	106.2	85.7	56.3	55.0	37.2	41.6	61.4	80.1	87.7	93.9	127.0	216.3	250.7	254.4	128.5	254.4
14-Jul	312.8	326.1	216.3	165.3	136.8	116.9	131.9	149.4	148.5	124.5	105.0	38.4	26.9	69.0	138.7	146.6	150.0	157.3	168.4	156.9	155.5	169.6	187.1	193.4	153.8	326.1
15-Jul	203.1	210.6	212.4	197.3	197.3	188.8	174.0	164.5	165.7	184.6	190.3	180.7	152.9	101.4	61.2	44.6	38.0	28.9	20.5	18.4	21.7	23.9	21.8	22.2	117.7	212.4
16-Jul	22.4	20.4	19.1	18.8	17.9	16.4	16.8	11.7	11.6	14.9	12.0	13.8	24.9	31.6	33.8	36.6	37.4	39.1	39.9	52.2	52.1	42.1	37.6	34.3	27.4	52.2
17-Jul	32.0	31.3	29.3	27.7	26.9	26.4	25.3	23.0	21.7	20.0	17.9	16.1	15.4	13.8	13.1	12.9	12.0	12.2	17.8	13.7	10.5	9.7	9.0	8.6	18.6	32.0
18-Jul	8.8	9.6	9.8	10.7	12.8	17.5	25.9	40.2	52.1	64.0	72.1	70.6	50.5	37.0	32.2	34.4	39.0	41.6	46.7	43.4	43.4	39.2	31.7	25.3	35.8	72.1
19-Jul	23.0	22.4	24.1	23.6	26.8	28.3	29.6	29.5	29.4	27.3	25.0	23.6	23.2	19.5	17.2	20.6	20.1	13.7	14.7	15.5	15.8	15.6	14.8	14.5	21.6	29.6
20-Jul	12.9	12.6	13.4	14.2	13.8	13.4	13.6	17.6	20.6	20.5	18.9	19.7	19.7	18.3	17.9	18.2	18.2	20.8	20.5	17.8	17.9	17.8	19.2	20.1	17.4	20.8
21-Jul	20.2	19.9	19.5	21.8	24.8	31.5	31.3	33.1	34.2	34.3	C	C	45.7	54.9	52.2	51.9	51.9	50.1	50.4	54.3	47.8	47.7	47.3	48.1	39.7	54.9
22-Jul	47.5	60.4	64.2	58.3	53.3	53.0	49.8	52.5	60.3	77.5	78.2	60.9	64.4	67.8	64.7	59.4	55.8	75.1	71.6	69.0	71.9	78.5	88.2	87.6	65.4	88.2
23-Jul	92.1	95.4	95.7	96.5	93.1	85.5	85.3	102.5	117.7	99.9	87.6	72.2	52.3	35.3	32.3	26.8	22.7	22.1	24.0	25.0	26.1	27.7	29.9	30.8	61.6	117.7
24-Jul	31.8	30.5	27.0	22.0	16.8	13.8	12.9	14.1	12.9	11.5	11.4	12.2	14.2	19.6	22.3	28.4	30.1	26.1	24.5	22.3	23.1	30.8	36.1	39.6	22.2	39.6
25-Jul	41.4	37.2	36.5	36.7	36.0	38.5	36.9	29.5	18.8	16.1	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	41.4
26-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	1.9	2.5	2.6	3.4	3.2	2.7	2.7	2.7	2.6	3.0	3.0	3.0	4.0	4.2	--	4.2
27-Jul	4.1	3.8	3.7	3.9	3.9	3.5	3.5	3.5	3.5	3.4	3.7	3.9	4.1	4.1	3.8	3.2	3.2	3.1	3.3	4.4	4.5	4.2	3.9	4.1	3.8	4.5
28-Jul	4.5	4.8	4.9	4.7	4.8	4.9	5.4	5.6	8.3	5.7	5.0	6.3	10.6	12.1	11.8	10.8	11.5	12.7	13.3	14.0	12.5	11.3	12.5	11.6	8.7	14.0
29-Jul	10.4	9.6	8.8	7.0	6.8	6.5	7.1	8.9	6.4	6.0	6.0	7.7	7.4	6.7	5.2	5.6	6.6	6.8	6.8	6.6	7.1	8.1	7.8	6.8	7.2	10.4
30-Jul	5.5	6.0	5.6	5.1	4.9	4.5	4.1	3.9	4.1	4.2	4.1	4.0	4.2	4.4	4.6	5.0	5.1	5.0	5.1	5.3	5.3	15.9	8.3	10.2	5.6	15.9
31-Jul	7.2	5.2	5.3	5.2	5.1	5.0	5.6	6.3	6.4	5.6	5.3	6.4	7.6	7.4	7.5	7.8	8.8	10.2	9.7	10.6	9.9	10.5	8.3	9.7	7.4	10.6
41.6 45.4 43.1 40.7 40.4 40.2 40.8 41.3 42.9 41.1 35.6 29.8 26.7 26.1 28.5 27.8 27.9 28.7 29.7 30.4 32.7 37.0 37.8 38.8																								Diurnal Average		
312.8 326.1 216.3 197.3 197.3 188.8 180.9 180.0 196.6 184.6 190.3 180.7 152.9 101.4 138.7 146.6 150.0 157.3 168.4 156.9 155.5 216.3 250.7 254.4																								Diurnal Maximum		
C - Calibration M - Maintenance UO - Unstable Operation																										
Alberta Ambient Air Quality Guideline/Objectives: 1-hr 80 µg/m ³ 24-hr 29 µg/m ³																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Surmont 2 - July 2023

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
0 - 5	172	23.96	23.96
6 - 15	156	21.73	45.68
16 - 25	118	16.43	62.12
26 - 80	176	24.51	86.63
> 81.0	96	13.37	100.00

Total Number of Valid Hours: 718

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Surmont 2 - July 2023

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	4	2	5	4	14	16	15	7	8	11	21	11	14	8	15	160
6 - 15	5	1	0	1	1	2	13	10	6	10	16	50	26	5	4	5	155
16 - 25	2	3	0	0	3	8	3	3	3	1	16	25	23	13	4	10	117
26 - 80	9	7	4	4	6	11	9	5	4	8	8	26	35	19	10	10	175
> 81.0	7	2	0	0	0	0	4	0	0	2	5	24	30	7	8	5	94
Totals	28	17	6	10	14	35	45	33	20	29	56	146	125	58	34	45	701

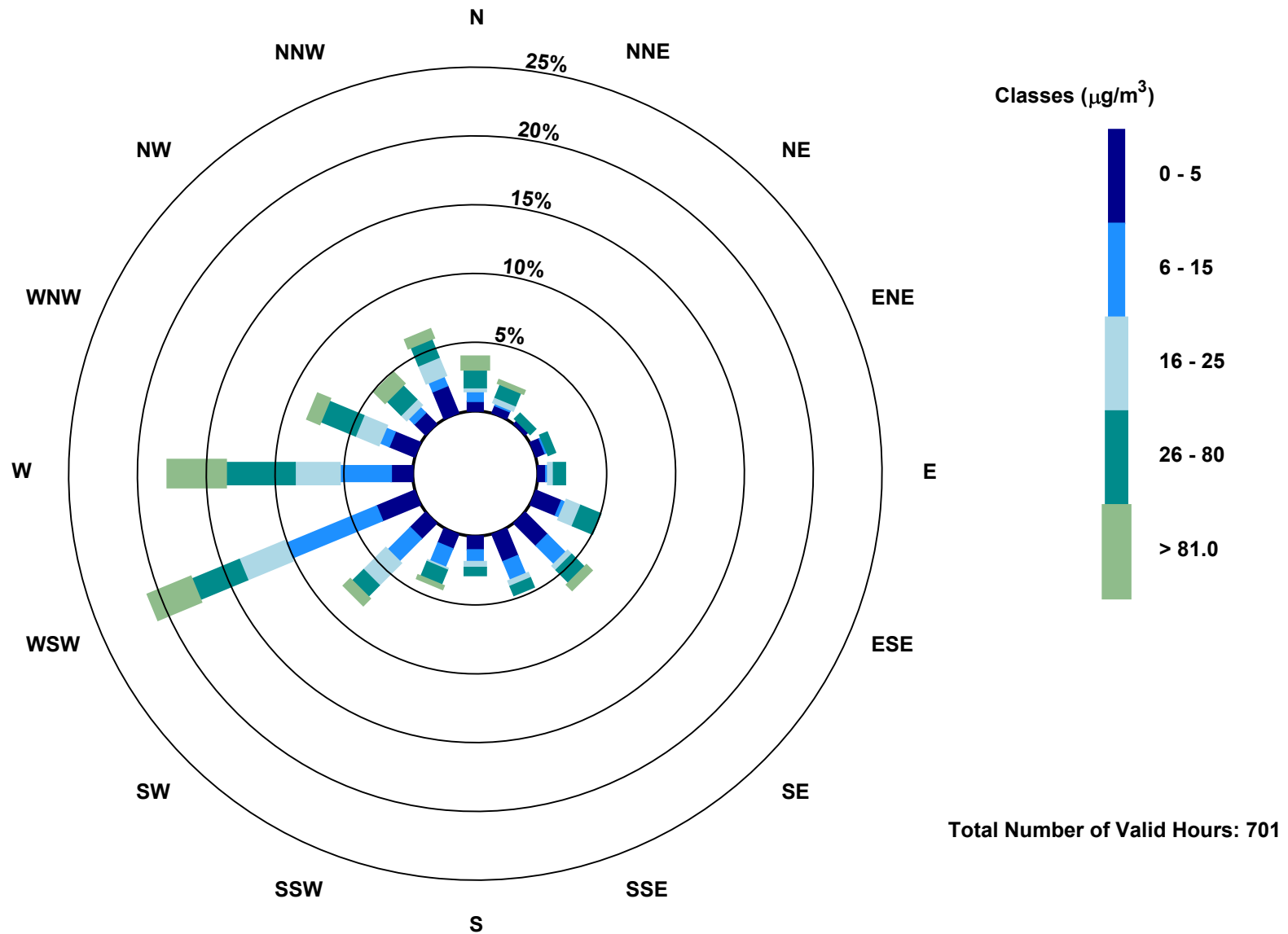
Total Number of Valid Hours: 701

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Surmont 2





Wood Buffalo Environmental Association
Summary of Hour Averages

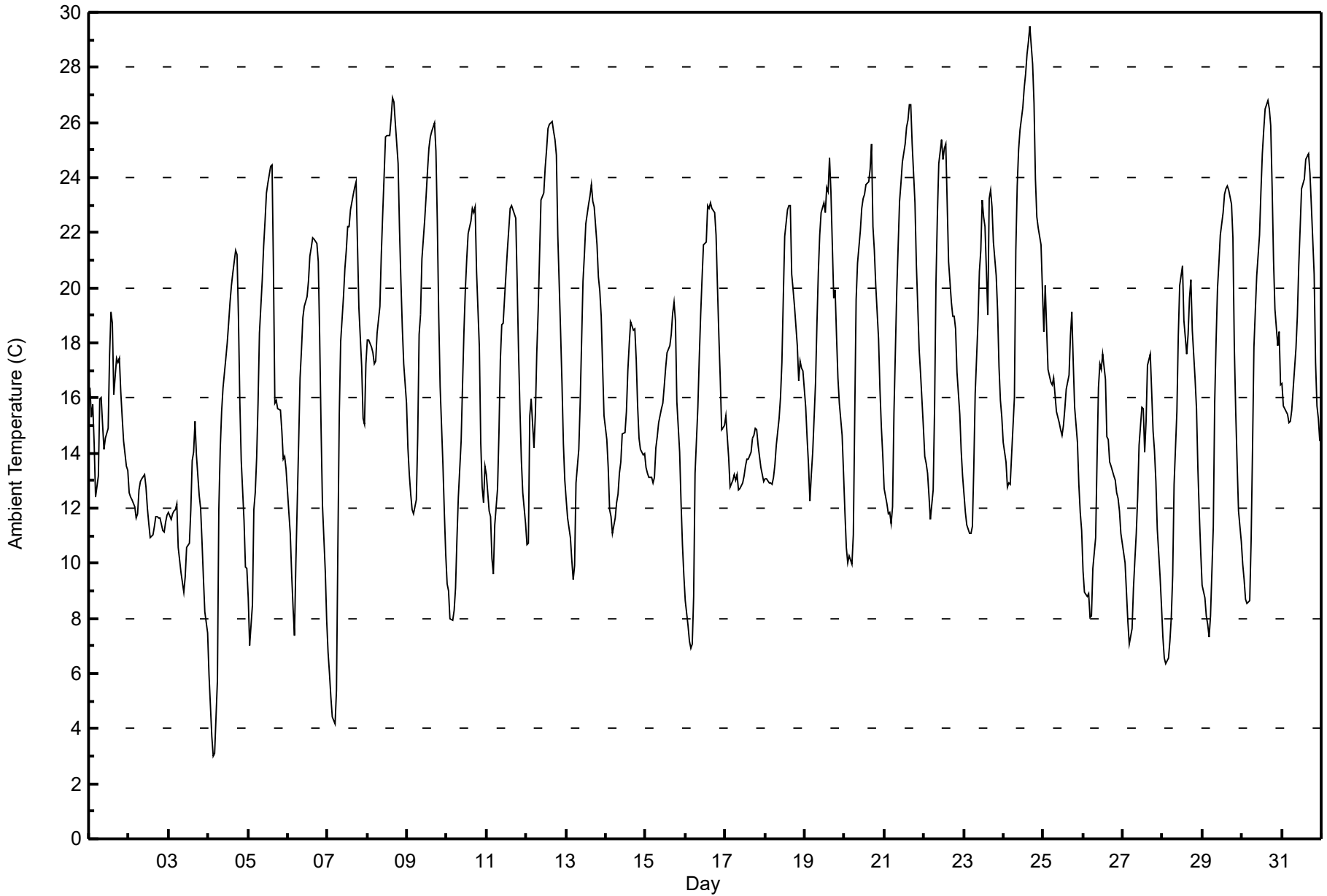
Ambient Temperature (AT) - C
Summont 2 - July 2023

Maximum Value: 29.5 C on Jul 24 17:00 Maximum Daily Average: 21.9 C on Jul 24																						Hours in Service: 744 Hours of Data: 744				
Minimum Value: 3.0 C on Jul 4 04:00 Minimum Daily Average: 11.2 C on Jul 3 Maximum Diurnal Average: 21.4 C at hour 16 Minimum Diurnal Average: 10.7 C at hour 5 Monthly Average: 16.42 C Percentiles: P ₁ = 5.6 P ₁₀ = 9.9 Q ₁ = 12.6 Median = 15.8 Q ₃ = 20.5 P ₉₀ = 23.6 P ₉₉ = 26.8																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	16.4	15.3	15.8	14.3	12.4	13.2	16.0	16.0	15.1	14.2	14.6	14.9	17.5	19.1	18.7	16.1	17.4	17.3	17.4	16.2	15.3	14.4	13.5	13.4	15.6	19.1
2-Jul	12.6	12.4	12.3	12.1	11.6	11.8	12.7	12.9	13.0	13.2	12.8	12.0	11.5	10.9	11.0	11.3	11.7	11.7	11.6	11.6	11.2	11.1	11.5	11.8	11.9	13.2
3-Jul	11.9	11.6	11.8	11.9	11.9	12.1	10.6	9.7	9.3	8.9	9.5	10.6	10.7	12.0	13.7	14.0	15.2	13.9	12.5	12.0	10.8	9.5	8.2	7.5	11.2	15.2
4-Jul	6.0	4.8	3.7	3.0	3.1	5.8	11.9	14.1	15.5	16.4	17.5	18.0	18.7	19.5	20.1	20.5	21.3	21.2	18.9	15.9	13.7	11.5	9.9	9.8	13.4	21.3
5-Jul	8.7	7.0	8.5	11.9	12.6	13.8	15.8	18.4	20.3	21.5	22.4	23.4	23.8	24.4	24.5	20.7	15.8	15.9	15.6	15.6	14.8	13.8	13.9	13.4	16.5	24.5
6-Jul	11.9	11.1	9.6	8.4	7.4	10.0	14.4	16.7	17.7	18.9	19.3	19.7	20.2	21.1	21.4	21.8	21.7	21.6	20.9	18.2	14.9	12.1	9.7	7.9	15.7	21.8
7-Jul	6.8	6.0	5.1	4.4	4.2	5.4	10.6	15.4	18.1	19.7	20.7	21.4	22.2	22.2	22.8	23.4	23.6	23.8	21.5	19.3	17.1	15.2	15.1	17.2	15.9	23.8
8-Jul	18.1	18.1	17.8	17.7	17.2	17.4	18.4	19.3	21.2	22.7	24.1	25.5	25.5	25.5	26.1	26.9	26.7	26.0	24.5	22.1	20.2	18.6	17.2	15.8	21.4	26.9
9-Jul	14.2	13.2	12.5	12.0	11.8	12.3	14.6	18.3	19.0	21.0	22.5	23.3	24.3	25.1	25.5	25.7	26.0	25.0	22.3	19.0	16.4	13.6	11.8	10.3	18.3	26.0
10-Jul	9.2	9.0	8.0	7.9	8.3	9.1	10.9	12.4	14.5	16.5	18.4	19.9	21.0	21.9	22.4	22.9	22.7	22.9	20.6	17.9	14.4	12.8	12.2	13.5	15.4	22.9
11-Jul	13.2	11.9	11.7	10.2	9.6	11.4	12.7	14.7	17.4	18.7	18.7	19.6	21.4	22.1	22.9	23.0	22.9	22.5	20.2	17.7	15.6	13.7	12.6	11.4	16.5	23.0
12-Jul	10.7	10.7	15.3	16.0	14.2	15.4	17.6	19.2	21.2	23.2	23.4	24.4	25.0	25.8	25.9	26.0	25.7	25.4	24.8	21.9	18.4	16.5	14.4	13.0	19.8	26.0
13-Jul	12.3	11.6	10.9	10.1	9.4	9.9	12.9	14.1	15.9	18.0	20.2	21.2	22.3	23.0	23.3	23.8	23.1	22.9	21.5	20.4	19.9	18.9	17.1	15.4	17.4	23.8
14-Jul	14.5	13.5	12.0	11.7	11.1	11.6	12.2	12.5	13.3	13.7	14.7	14.8	15.5	17.0	17.9	18.8	18.5	18.5	17.4	15.7	14.5	14.1	14.0	14.0	14.6	18.8
15-Jul	13.5	13.3	13.1	13.1	12.9	13.1	14.2	14.6	15.1	15.6	15.8	16.4	17.1	17.7	17.9	18.3	19.0	19.5	18.8	15.8	14.0	12.2	10.7	9.6	15.1	19.5
16-Jul	8.7	7.7	7.2	6.9	7.1	8.8	13.3	15.7	17.5	19.0	20.4	21.6	21.7	23.0	22.9	23.1	22.9	22.7	21.9	20.1	18.3	16.7	14.8	15.0	16.5	23.1
17-Jul	15.4	14.6	13.8	12.7	13.0	13.2	13.0	13.2	12.7	12.9	13.2	13.5	13.8	13.8	14.0	14.6	14.6	14.9	14.9	14.3	13.5	13.2	13.0	13.7	15.4	23.7
18-Jul	13.1	13.1	12.9	12.9	12.9	13.1	13.6	14.3	15.2	16.0	17.3	19.7	21.9	22.8	23.0	23.0	20.5	19.9	19.3	17.9	16.6	17.3	17.1	17.0	17.1	23.0
19-Jul	15.6	14.5	13.6	12.3	13.2	14.0	16.5	18.7	20.6	21.9	22.7	23.1	22.7	23.6	23.5	24.7	23.5	19.6	19.9	18.3	16.7	15.8	14.7	13.3	18.5	24.7
20-Jul	11.8	10.6	10.0	10.2	10.0	11.0	15.3	19.6	20.9	22.1	22.9	23.3	23.4	23.7	23.9	24.3	25.2	22.2	21.3	20.1	18.2	16.3	15.0	14.0	18.1	25.2
21-Jul	12.7	12.2	11.8	11.9	11.4	12.1	15.5	19.9	21.5	23.1	23.8	24.6	25.2	25.8	26.1	26.7	26.6	25.2	23.1	20.9	19.3	17.8	16.9	15.0	19.5	26.7
22-Jul	13.9	13.6	13.3	12.4	11.6	12.7	15.6	20.2	22.6	24.5	25.4	24.7	25.1	25.2	23.1	21.0	19.5	19.0	19.0	18.5	16.9	15.4	14.1	13.2	18.3	25.4
23-Jul	12.5	11.9	11.4	11.1	11.1	11.3	13.5	16.2	18.8	20.6	21.4	23.2	22.6	22.2	19.0	23.2	23.5	22.9	21.7	20.5	19.1	17.2	15.9	15.3	17.8	23.5
24-Jul	14.4	13.7	12.8	12.9	12.8	13.9	16.0	21.3	23.7	25.0	25.7	26.5	27.2	27.8	28.5	28.9	29.5	28.1	26.7	24.0	22.6	22.2	21.6	19.9	21.9	29.5
25-Jul	18.4	20.1	18.5	17.0	16.6	16.5	16.7	16.1	15.5	15.1	14.9	14.6	15.0	15.6	16.3	16.8	18.2	19.1	17.3	15.6	14.4	12.9	11.8	11.2	16.0	20.1
26-Jul	9.7	8.9	8.8	8.9	8.0	8.1	9.8	10.9	13.8	16.4	17.3	17.0	17.6	16.7	14.6	14.5	13.7	13.5	13.2	13.0	12.6	12.4	11.9	11.1	12.6	17.6
27-Jul	10.4	10.0	9.0	7.9	7.0	7.6	9.1	10.1	11.1	12.4	14.3	15.6	15.6	14.0	15.2	17.2	17.6	16.2	14.8	14.1	12.9	11.3	9.5	8.4	12.1	17.6
28-Jul	7.3	6.6	6.3	6.6	7.2	8.1	9.5	12.9	15.5	18.2	20.1	20.4	20.8	18.8	17.6	18.3	19.6	20.3	18.5	16.7	15.6	13.4	11.8	10.4	14.2	20.8
29-Jul	9.2	8.7	8.1	7.8	7.3	8.1	11.4	15.9	18.1	20.0	20.9	21.9	22.7	23.4	23.6	23.7	23.5	23.0	21.8	17.9	15.5	13.6	11.9	10.8	16.2	23.7
30-Jul	10.0	9.4	8.7	8.5	8.7	10.8	14.1	17.8	19.2	20.5	21.9	23.5	24.9	25.8	26.5	26.8	26.5	25.9	23.6	21.0	19.2	17.9	18.4	16.5	18.6	26.8
31-Jul	16.5	15.7	15.5	15.4	15.1	15.2	15.6	16.3	17.8	19.0	20.8	22.2	23.6	24.0	24.6	24.8	24.9	24.1	23.0	20.5	17.3	15.7	15.3	14.5	19.1	24.9
12.2 11.6 11.3 11.0 10.7 11.5 13.7 15.7 17.1 18.3 19.3 20.0 20.7 21.1 21.2 21.4 21.3 20.8 19.6 17.8 16.2 14.8 13.7 13.0																								Diurnal Average		
18.4 20.1 18.5 17.7 17.2 17.4 18.4 21.3 23.7 25.0 25.7 26.5 27.2 27.8 28.5 28.9 29.5 28.1 26.7 24.0 22.6 22.2 21.6 19.9																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Surmont 2 - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Surmont 2 - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	79	10.62	10.62
10 - 20	460	61.83	72.45
> 20	205	27.55	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

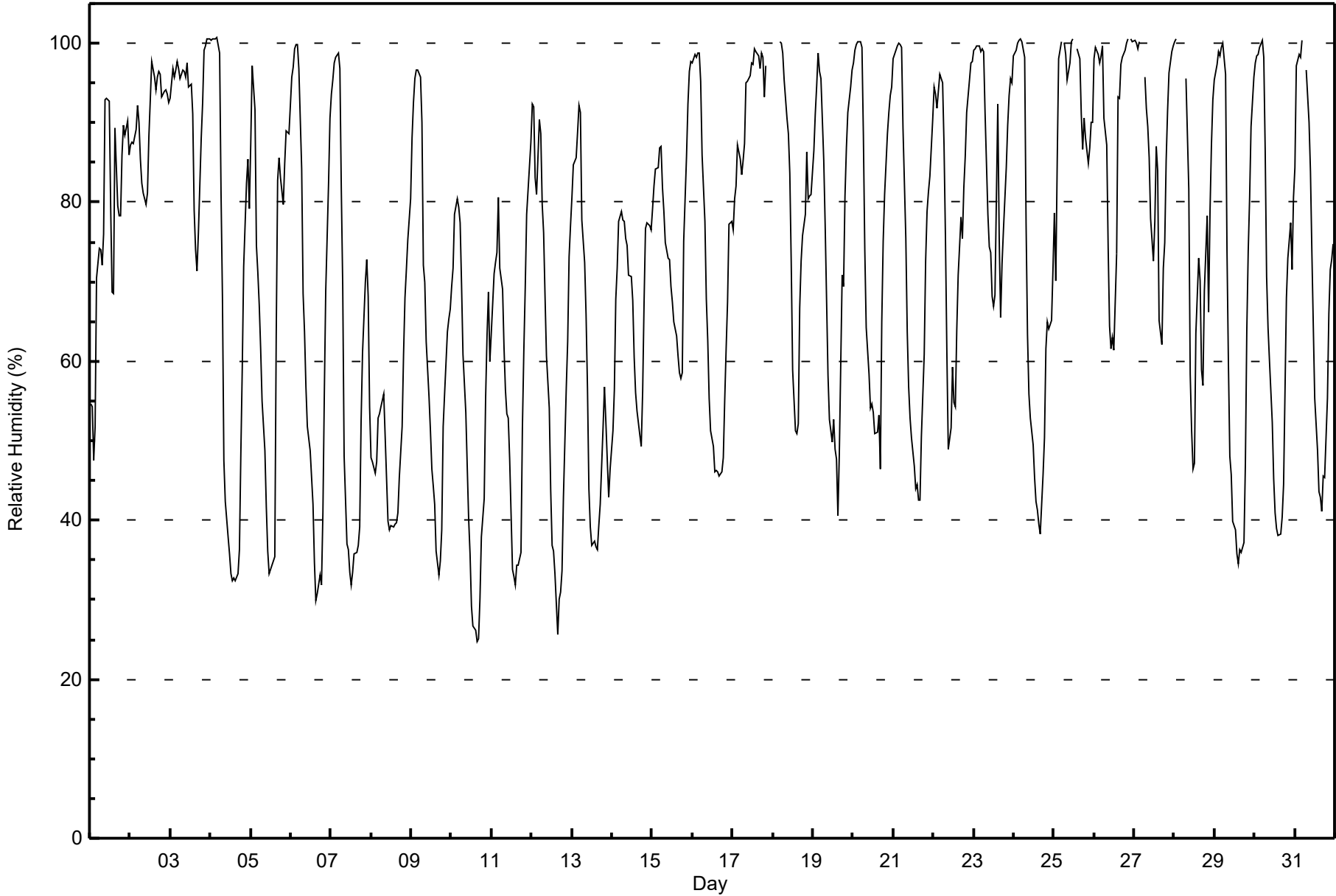
Relative Humidity (RH) - %
Surmont 2 - July 2023

Maximum Value: 100.7 % on Jul 4 05:00																								Maximum Daily Average: 92.5 % on Jul 3																								Hours in Service: 744	
Minimum Value: 24.7 % on Jul 10 16:00																								Minimum Daily Average: 51.3 % on Jul 8																								Hours of Data: 724	
Maximum Diurnal Average: 91.8 % at hour 5																								Minimum Diurnal Average: 53.2 % at hour 14																								Hours of Missing Data: 20	
Monthly Average: 72.23 %																								Percentiles: P ₁ = 30.1 P ₁₀ = 39.6 Q ₁ = 53.6 Median = 75.2 Q ₃ = 92.6 P ₉₀ = 98.6 P ₉₉ = 100.5																								Hours of Calibration: 0	
																																																Percent Operational Time: 97.3	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	54.6	54.3	47.5	51.9	70.5	74.2	74.0	72.0	76.0	92.9	93.1	92.7	79.4	68.7	68.5	89.4	79.5	78.4	78.3	86.0	89.7	88.5	90.2	85.9	76.5	93.1																							
2-Jul	87.2	87.5	87.3	89.1	92.3	90.0	85.4	82.4	81.2	79.7	81.2	88.3	93.0	97.8	95.7	94.1	95.8	96.5	96.2	93.3	93.9	94.1	93.7	92.5	90.3	97.8																							
3-Jul	93.1	96.8	95.7	96.7	97.7	96.9	95.6	96.6	96.4	95.8	97.5	94.6	94.9	91.1	79.0	74.1	71.4	76.2	88.0	92.6	99.1	99.6	100.5	100.6	92.5	100.6																							
4-Jul	100.3	100.5	100.5	100.6	100.7	98.7	81.2	67.9	47.6	42.4	37.9	35.7	33.3	32.4	32.7	32.3	33.3	36.3	48.4	59.0	71.9	82.4	85.4	79.3	64.2	100.7																							
5-Jul	87.3	97.1	91.6	74.6	71.3	67.1	61.6	55.0	48.7	41.6	36.2	33.3	33.9	34.8	35.3	63.2	82.8	85.5	83.2	79.7	84.9	88.9	88.7	88.5	67.3	97.1																							
6-Jul	95.7	97.0	99.3	99.9	99.8	96.7	84.2	68.4	63.8	56.7	51.8	48.8	45.4	41.9	34.8	29.8	30.7	33.2	31.9	40.9	55.9	68.9	82.3	90.5	64.5	99.9																							
7-Jul	93.6	95.4	97.6	98.3	98.8	96.7	81.8	69.5	48.0	37.1	36.3	33.5	31.9	33.5	35.7	36.0	36.8	39.1	52.6	61.0	69.9	72.8	68.2	54.3	61.6	98.8																							
8-Jul	47.8	47.3	45.9	47.4	52.9	53.4	54.3	55.9	50.6	45.2	39.9	38.8	39.3	39.1	39.5	39.7	40.9	45.4	51.8	60.8	67.9	71.6	75.3	80.4	51.3	80.4																							
9-Jul	88.1	92.6	95.6	96.6	96.6	95.7	90.0	72.1	70.0	62.5	55.5	51.2	46.4	44.3	42.1	36.2	33.2	34.9	38.8	51.8	55.9	63.8	65.3	66.6	64.4	96.6																							
10-Jul	69.4	71.8	78.6	80.4	79.4	77.4	69.6	60.9	53.6	46.8	40.1	35.8	29.2	26.7	26.2	24.7	25.0	30.2	37.9	42.7	55.4	63.2	68.7	60.0	52.2	80.4																							
11-Jul	63.6	71.0	72.5	73.8	80.6	71.8	69.0	61.8	56.4	53.4	52.9	47.6	33.8	32.9	31.8	34.3	34.4	36.0	51.7	61.1	69.1	78.5	81.5	87.6	58.6	87.6																							
12-Jul	92.4	91.9	83.1	81.1	90.4	88.7	79.6	76.1	68.2	60.7	54.1	43.7	36.8	36.1	33.3	25.7	30.1	31.0	33.6	42.9	56.6	62.5	73.1	77.0	60.4	92.4																							
13-Jul	80.6	84.7	85.6	88.8	92.2	91.2	77.8	72.5	65.8	56.6	43.9	39.1	36.8	37.3	36.7	36.4	39.4	42.1	51.6	56.8	52.4	47.6	43.0	46.5	58.6	92.2																							
14-Jul	51.3	56.4	67.9	71.7	77.7	78.8	77.8	77.5	75.4	74.5	70.9	70.6	67.6	60.6	56.1	53.7	50.6	49.3	56.3	67.4	76.8	77.4	77.1	76.4	67.5	78.8																							
15-Jul	79.2	82.1	84.2	84.3	86.9	87.1	81.8	78.9	74.9	73.0	72.7	69.5	67.5	65.0	63.2	60.6	58.5	57.9	58.6	75.1	85.8	92.4	96.5	97.7	76.4	97.7																							
16-Jul	97.5	98.6	98.3	98.8	98.7	95.2	85.9	77.5	67.9	62.7	55.3	51.2	49.3	46.1	46.3	46.1	45.6	46.2	47.9	55.1	61.5	67.5	77.2	77.6	68.9	98.8																							
17-Jul	76.6	80.4	82.1	87.3	85.4	83.5	85.3	87.4	95.0	95.2	96.0	97.5	97.3	99.2	98.9	98.5	96.8	98.7	98.3	93.2	97.2	OR	OR	OR	91.9	99.2																							
18-Jul	OR	OR	OR	OR	100.3	100.0	98.8	95.3	90.6	88.6	83.6	72.4	59.0	51.3	50.9	52.2	66.8	72.6	75.7	78.4	86.3	80.5	80.8	81.0	78.3	100.3																							
19-Jul	86.5	91.1	94.7	98.7	96.4	95.6	85.2	77.1	67.7	58.2	52.7	49.8	52.7	48.9	47.6	40.5	48.4	70.9	69.3	80.7	86.8	91.4	94.5	96.7	74.3	98.7																							
20-Jul	97.6	99.1	99.9	100.1	100.2	99.5	88.5	74.0	64.3	58.3	54.1	54.6	53.6	50.9	51.1	53.2	46.5	65.0	75.1	80.9	88.7	91.2	93.5	94.4	76.4	100.2																							
21-Jul	98.1	99.1	99.6	100.0	99.9	99.6	89.3	75.5	63.7	56.8	52.8	50.4	46.8	44.0	44.6	42.5	42.5	50.6	60.8	72.6	78.8	81.3	83.2	90.5	71.8	100.0																							
22-Jul	94.5	93.7	91.8	94.0	96.1	95.0	87.3	75.6	61.2	48.9	51.7	59.2	54.9	54.3	63.9	70.8	78.2	75.5	81.8	85.9	91.3	95.4	97.6	97.8	79.0	97.8																							
23-Jul	99.1	99.3	99.6	99.6	99.0	99.3	98.9	91.4	78.5	74.4	73.7	68.2	67.0	68.3	92.4	75.4	65.5	72.3	76.5	84.3	89.6	93.4	95.5	95.0	85.7	99.6																							
24-Jul	98.4	99.1	99.9	100.3	100.6	100.3	98.3	77.2	63.3	55.9	52.9	49.5	45.0	42.3	41.2	39.5	38.2	45.7	50.3	61.5	64.9	64.1	65.2	71.6	67.7	100.6																							
25-Jul	78.7	70.1	85.0	98.1	100.3	OR	100.1	98.5	95.5	97.5	100.3	100.6	OR	OR	99.2	98.0	91.2	86.6	90.5	88.2	84.9	86.8	90.1	90.0	91.9	100.6																							
26-Jul	98.1	99.5	98.5	97.6	98.4	99.6	90.6	87.2	74.4	64.4	61.5	63.0	61.4	73.6	93.2	93.1	97.3	98.2	99.1	100.0	100.6	OR	100.5	100.1	89.1	100.6																							
27-Jul	100.4	100.0	99.3	100.2	OR	OR	95.8	91.8	89.5	85.6	78.0	72.7	77.5	87.1	84.0	65.2	62.2	71.8	74.9	85.3	91.6	96.2	99.0	99.7	86.7	100.4																							
28-Jul	100.2	100.5	OR	OR	OR	OR	OR	95.6	81.6	58.4	51.3	46.5	47.1	63.5	73.0	70.1	58.8	56.9	68.9	78.3	66.3	78.8	87.2	92.9	72.4	100.5																							
29-Jul	95.3	97.4	98.9	98.4	99.6	100.0	96.1	73.8	59.8	48.0	45.8	39.9	38.8	35.8	34.5	36.3	36.0	37.2	47.2	63.9	73.8	80.7	89.5	95.8	67.6	100.0																							
30-Jul	97.6	98.4	98.7	99.4	100.3	98.2	86.5	70.6	64.3	60.1	52.3	45.2	40.9	39.0	38.0	38.2	40.5	44.6	56.2	68.0	72.9	77.5	71.5	80.5	68.3	100.3																							
31-Jul	84.4	97.2	98.7	98.2	100.4	OR	OR	96.7	90.1	83.9	73.6	64.5	55.3	48.7	43.6	42.9	41.1	45.6	45.4	55.3	65.9	71.6	72.8	74.8	70.5	100.4																							
																								86.2	88.3	88.9	89.9	91.8	90.0	84.5	77.8	70.5	65.0	61.3	58.3	53.9	53.2	55.3	54.6	54.8	58.4	63.8	71.1	77.0	79.6	82.9	84.1	Diurnal Average	
																								100.4	100.5	100.5	100.6	100.7	100.3	100.1	98.5	96.4	97.5	100.3	100.6	97.3	99.2	99.2	98.5	97.3	98.7	99.1	100.0	100.6	99.6	100.5	100.6	Diurnal Maximum	
OR - Out of Range																																																	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Surmont 2 - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Surmont 2 - July 2023**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	76	10.50	10.50
40 - 60	151	20.86	31.35
60 - 80	187	25.83	57.18
80 - 100	281	38.81	95.99

Total Number of Valid Hours: 724

Total Number of Hours: 744



Maximum Speed: 13 km/h on Jul 25 10:00	Maximum Daily Speed Average: 7.7 km/h on Jul 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 28 05:00	Minimum Daily Speed Average: 0.7 km/h on Jul 25	Hours of Data: 727
Maximum Diurnal Speed Average: 2.7 km/h at hour 21	Minimum Diurnal Speed Average: 0.7 km/h at hour 10	Hours of Missing Data: 17
Monthly Average Velocity: 1.4 km/h 268.1 deg	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 6 P ₉₀ = 8 P ₉₉ = 11	Percent Operational Time: 97.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	WSW6	WSW6	WSW6	WSW5	WSW1	SSW1	W1	WSW4	SW4	WSW0	ENE2	SSE2	SE4	SE4	SSE3	W3	WNNW5	NW3	NW3	W3	W4	W4	W4	W4	WSW2.2	WSW6
2-Jul	W4	W7	W8	W6	W5	WSW6	W7	W7	W7	W9	W8	W6	W7	NW8	NW11	WNNW9	W8	WNNW9	WNNW8	W11	W12	W10	W10	WNNW8	W7.7	W12
3-Jul	WNNW7	WNNW6	WNNW7	WNNW8	WNNW7	WNNW10	NW12	NW11	NW11	NW9	WNNW8	NW9	NW8	NW6	N8	NW5	NW8	NW7	WNNW3	WSW3	WSW4	WSW3	WSW2	SW2	NW6.0	NW12
4-Jul	UO	W1	WNNW1	W0	UO	UO	UO	WNNW3	NW4	NW4	NNE5	NW3	NW3	NW3	N4	NW4	E2	NW2	W2	WSW3	WSW3	WSW3	SW3	WSW5	NW1.7	NNE5
5-Jul	SW2	WSW1	WSW4	WSW6	WSW6	WSW8	WSW9	WSW7	W7	W9	W8	WSW7	W8	W8	WSW8	W3	SW1	SSW4	WSW6	W8	WNNW4	WSW5	WSW4	WSW4	WSW5.6	W9
6-Jul	WSW3	WSW2	W1	W1	W1	SE0	WNNW2	NW5	NW5	NNE7	N6	NW5	NW5	NW7	NW6	NW8	NW7	NW6	NW5	WNNW4	WSW3	WSW3	WSW1	WSW1	NW3.2	NW8
7-Jul	SW1	SW1	UO	UO	UO	UO	SSW1	N2	NNE3	N4	NNE4	N5	NW4	WNNW4	N4	WNNW5	WNNW3	WNNW2	SW3	SW3	SW3	WSW3	W3	W5	WNNW1.8	W5
8-Jul	W7	W8	W8	WSW9	WSW10	WSW9	W8	W7	W6	W7	W8	W9	W9	W9	WNNW7	NW5	WNNW6	W5	W5	WSW4	WSW4	WSW3	WSW2	WSW2	W6.3	WSW10
9-Jul	WSW1	UO	WSW1	UO	WSW1	WSW1	SW1	N1	N3	NNE5	NE5	NNE4	N5	NNE6	NNE6	NNE7	NNE6	ENE7	ENE5	ENE3	SSE1	WSW2	WSW3	W3	NNE2.3	NNE7
10-Jul	WSW2	SW2	SW2	S3	S3	ESE4	ESE8	ESE10	ESE9	ESE9	ESE10	E9	ESE10	ESE8	ESE9	SE7	SE5	ESE3	ESE5	ESE4	WSW3	WSW3	SW2	SSE4	ESE4.4	ESE10
11-Jul	SSW2	SW2	SSW1	WSW1	SSW1	SSE4	SE4	SSE4	SSE5	SE5	SE6	SE6	S6	S4	SSE6	SE5	SE6	SSE4	SSW3	SW3	WSW3	WSW2	WSW2	WSW1	SSE2.9	SE6
12-Jul	SW1	WSW3	WSW5	WSW4	SSE1	W1	WNNW3	W3	NW3	N6	NW6	NW7	NW8	N8	N9	NW8	NW7	NW5	NW4	W4	WSW4	WSW4	WSW2	WSW2	NW3.4	N9
13-Jul	SW1	SW1	SW1	WSW2	W1	WSW2	W4	W5	W6	NW7	NW11	NW11	NW11	NW11	NW12	NW11	NW9	NW6	W3	WNNW4	WNNW5	WNNW4	W5	W4	NW5.1	NW12
14-Jul	W5	W5	W4	W5	W3	W4	WNNW5	NW6	NW6	NW7	NW7	N6	N5	N6	N7	N6	NW7	NW6	N4	W3	WSW3	WSW3	W3	W3	NW3.8	NW7
15-Jul	W3	W3	W2	W3	W2	W2	WNNW3	WNNW3	NW2	NW3	NW3	N4	N3	NNE5	NW5	NNE7	NNE5	ENE4	NW2	W2	WSW3	WSW2	WSW1	WSW1	NW1.8	NNE7
16-Jul	SW1	SW1	SW1	WSW1	SW1	SSE0	S1	SE5	SE7	ESE7	ESE8	E8	ESE10	ESE9	SE8	SE8	ESE9	ESE8	ESE8	ESE6	SE4	SSE4	SSW1	S3	ESE4.3	ESE10
17-Jul	SE3	SSE2	S3	SSW2	ESE5	SE4	ESE5	ESE5	ESE4	SE3	ESE5	S1	SSE1	WNNW3	WNNW4	W4	W3	SSW2	ESE5	SE4	WSW2	W2	WSW2	WSW1	SSE1.4	ESE5
18-Jul	WSW1	W3	W3	W4	W4	W2	WNNW3	WNNW2	WNNW3	NW2	NW3	N2	ENE5	ENE6	NE4	NE4	SSW1	WSW3	SW3	SW3	WSW2	W6	W6	W6	WNNW1.8	W6
19-Jul	W4	W3	WSW3	SW2	W3	W3	W5	W5	WNNW5	W5	W5	WNNW4	WSW5	W7	WSW7	WSW4	WSW5	WNNW4	W5	W2	WSW1	SW2	SW3	W3	W3.8	W7
20-Jul	WSW2	SSW1	S0	WSW1	SW2	S1	SE2	WNNW1	WNNW3	NW2	WNNW3	NW4	WNNW3	WNNW3	WNNW3	NW2	W3	WSW3	SW2	WSW3	WSW2	WSW2	SW2	SW2	W1.6	NW4
21-Jul	SSW1	UO	SW1	SW1	W1	WNNW1	S0	WNNW1	NW4	NW4	NW4	NW3	N4	NW4	NW4	N2	NW3	NW2	WSW2	WSW4	WSW4	WSW4	WSW2	SSW1	WNNW1.7	WSW4
22-Jul	SSW1	WSW2	WSW2	W2	SW1	WSW1	UO	S1	SW3	SSW1	NE3	NNE5	NNE4	ESE2	SSW3	WSW3	WSW1	WNNW2	W2	WSW2	WSW2	WSW2	WSW2	WSW2	WSW0.9	NNE5
23-Jul	WSW2	WSW1	WSW2	W2	WSW2	S1	SW1	SE2	SE5	SE4	SE6	SE6	SE6	ESE1	NW2	SE4	S3	SW3	SW3	SW2	SW3	WSW3	WSW3	SW2	S1.8	SE6
24-Jul	WSW2	WSW1	SSW1	WSW2	WSW2	SW1	SSW1	S1	SSW3	SSE4	SSE5	SE6	SE6	SSE5	SSE4	E7	E5	E6	E6	ESE3	E5	ESE7	ESE5	SSE3	SE2.8	E7
25-Jul	SE2	ESE6	SW1	W2	E5	E6	W1	E10	ESE12	E13	E3	E5	SSW1	NW3	WNNW4	W4	WNNW4	WNNW3	W8	W10	W8	WSW8	SW4	WSW4	S0.7	E13
26-Jul	SSW1	SW3	SSE3	SE3	SE3	E2	ESE4	ESE3	SE4	ESE9	ESE9	SE6	S2	NW1	SSW1	WNNW2	WNNW2	SSW1	WNNW2	NNE4	NE4	ENE4	ENE4	E4	ESE2.0	ESE9
27-Jul	E3	ENE3	N1	WNNW2	W2	NW2	NNE2	NW4	WNNW5	WNNW6	NW6	WNNW6	WNNW3	SE2	W6	NW5	NW4	WNNW4	W3	W3	W3	WSW2	W2	W1	WNNW2.5	W6
28-Jul	WSW1	UO	UO	UO	N0	SSW1	SSE1	S1	W3	W4	NE2	N2	N2	SW0	SW4	W3	WSW3	W3	WSW2	SW4	WSW6	WSW2	SW1	SSW2	WSW1.5	WSW6
29-Jul	SSW1	SSW1	SW1	S1	SW1	UO	SW1	WSW3	W5	WSW4	SSW4	S3	SSE4	SE5	SE6	SSE6	SE7	SE6	SSE3	WSW3	WSW3	WSW2	WSW2	WSW2	S2.2	SE7
30-Jul	WSW1	SW1	SW1	UO	SW2	S3	SSE3	ESE4	SE6	SE9	SE9	SSE9	SE8	SE10	SE9	SSE7	SSE6	SSE5	S3	SSW3	SW2	W3	W3	WSW3	SSE3.9	SE10
31-Jul	WSW6	SE2	SSE4	S2	N1	SE0	SE4	SSE3	SSE1	WSW4	WSW5	WSW8	WSW9	WSW11	WSW10	W9	WSW9	WSW7	WSW8	W5	SW3	SW3	W4	W4	WSW4.2	WSW11

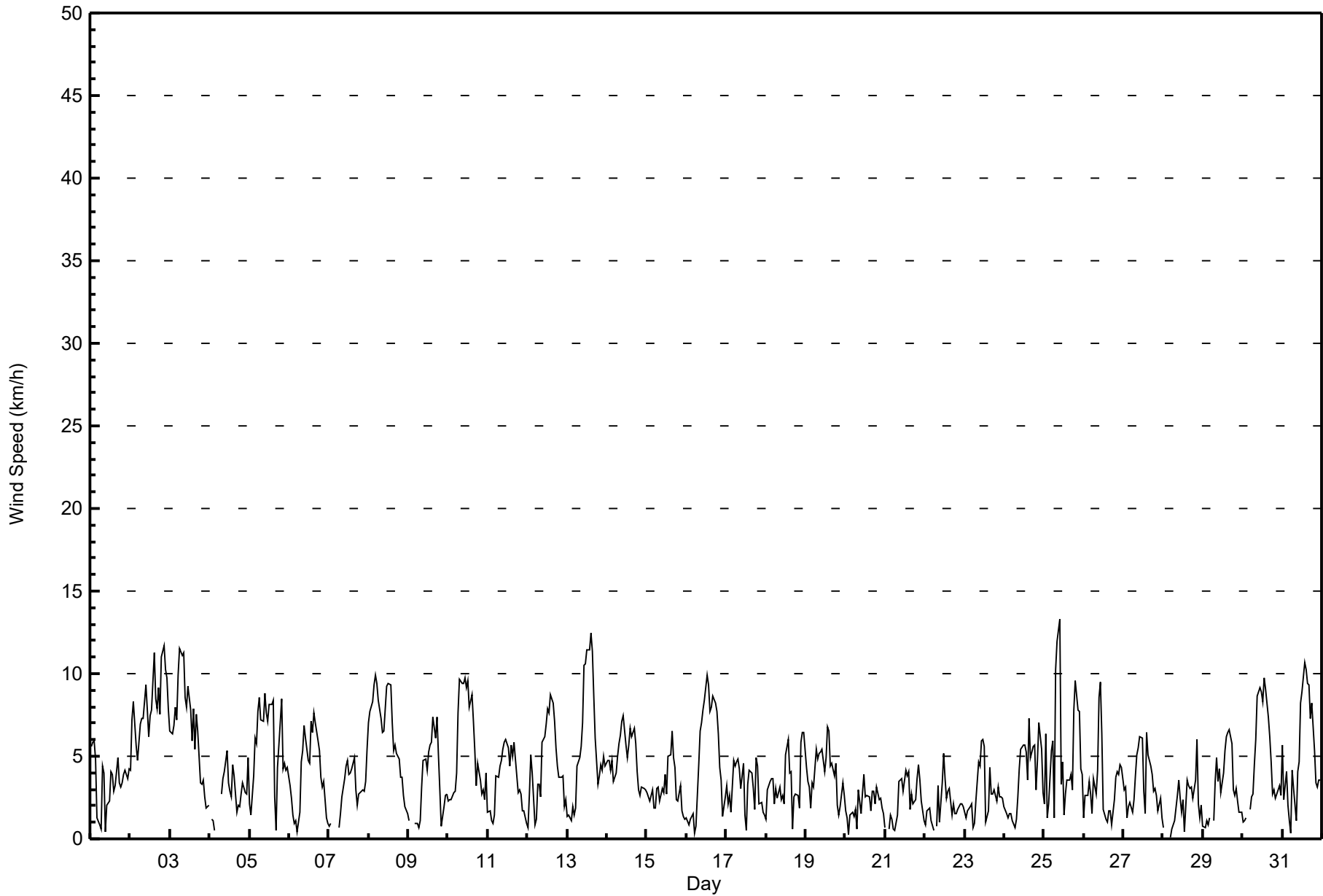
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Diurnal Average																																									
Diurnal Maximum																																									

UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Surmont 2 - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Surmont 2 - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	533	73.31	73.32
6 - 11	189	26.00	99.31
12 - 19	5	0.69	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: 727

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Surmont 2 - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	20	11	6	8	9	17	26	29	19	31	58	121	88	45	18	27	533
6 - 11	8	6	0	2	7	20	22	5	1	0	0	27	40	16	16	19	189
12 - 19	0	0	0	0	1	1	0	0	0	0	0	0	1	0	1	1	5
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	28	17	6	10	17	38	48	34	20	31	58	148	129	61	35	47	727

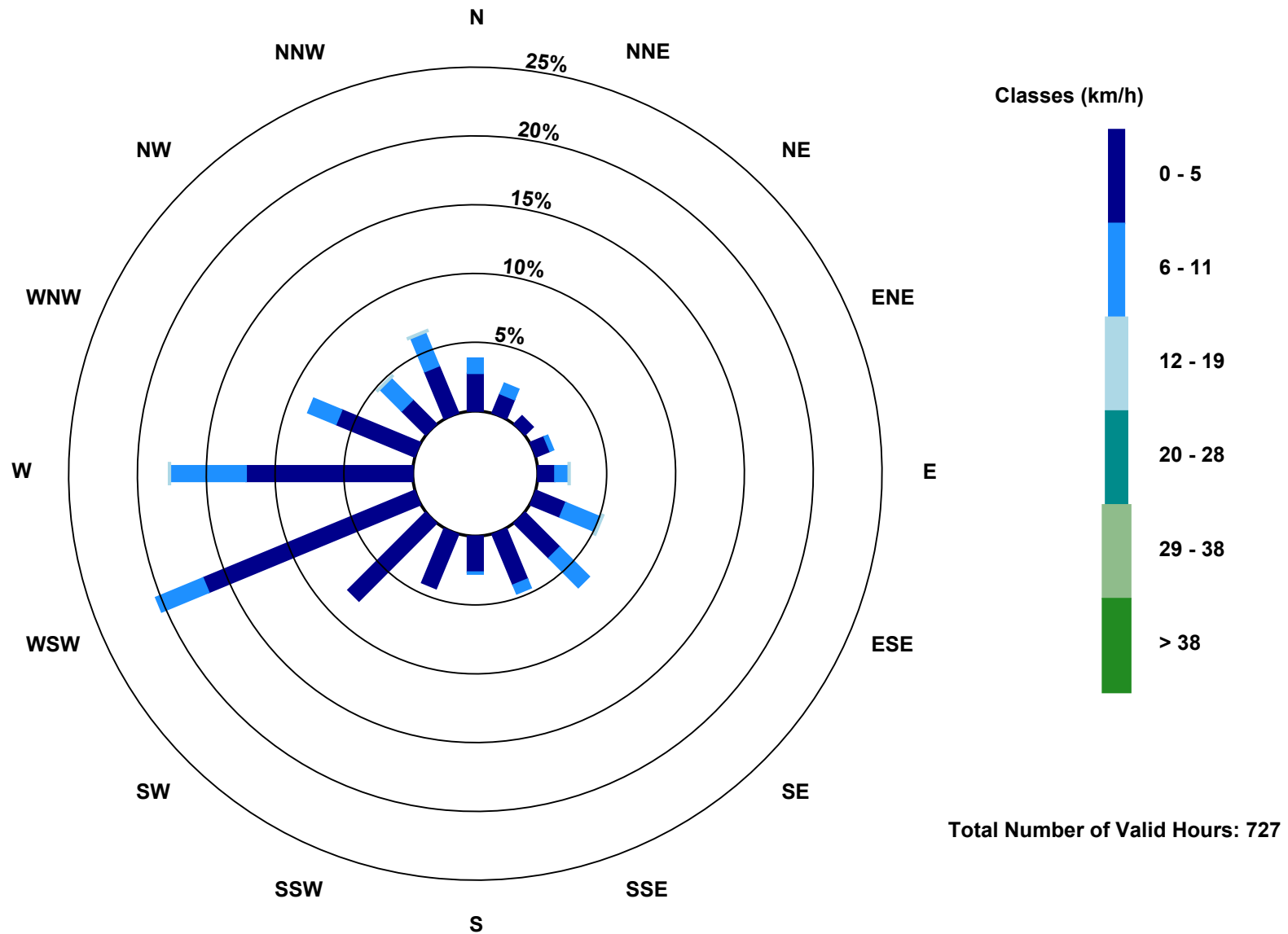
Total Number of Valid Hours: 727

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Surmont 2





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Surmont 2 - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 7 km/h on Jul 25 10:00	Hours of Data: 727
Minimum Value: 0 km/h on Jul 4 20:00	Hours of Missing Data: 17
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 5	Hours of Calibration: 0
	Percent Operational Time: 97.7

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

UO - Unstable Operation



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Surmont 2 - July 2023

Direction of Maximum Speed: 98 deg on Jul 25 10:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 276.3 deg on Jul 2	Hours of Data: 727
Direction of Minimum Speed: 9 deg on Jul 28 05:00	Hours of Missing Data: 17
Direction of Minimum Daily Speed Average: 0.7 deg on Jul 25	Percent Operational Time: 97.7
Monthly Average Direction: 268.1 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	245	247	256	251	249	199	259	243	232	240	72	166	128	125	149	279	294	315	325	279	270	272	273	276	254.9
2-Jul	264	261	268	276	270	258	270	269	268	267	267	259	268	318	304	290	278	294	283	277	265	272	278	286	276.3
3-Jul	289	285	285	291	286	301	312	323	327	311	301	330	328	346	356	332	312	332	287	254	241	247	240	234	308.6
4-Jul	UO	265	290	273	UO	UO	UO	302	339	333	25	318	348	336	357	341	93	341	280	239	246	237	230	241	311.3
5-Jul	235	253	244	255	256	249	248	249	265	261	260	246	273	269	255	264	236	210	253	261	284	254	252	254	255.8
6-Jul	248	254	267	261	262	133	282	325	348	22	0	346	337	340	341	329	321	324	341	289	254	257	255	251	324.4
7-Jul	235	232	UO	UO	UO	UO	197	354	20	5	17	358	330	296	5	295	290	289	225	215	230	241	264	268	302.7
8-Jul	265	259	261	258	249	254	272	270	274	268	276	277	277	273	292	327	282	276	261	248	245	253	248	253	268.4
9-Jul	243	UO	245	UO	250	247	221	356	355	19	35	13	8	18	18	25	19	65	65	72	147	248	255	259	20.7
10-Jul	245	229	225	186	179	119	108	107	112	112	103	100	114	121	115	130	125	119	104	106	241	250	231	147	123.0
11-Jul	200	229	209	250	202	154	134	158	152	140	138	135	170	183	149	146	135	166	213	226	244	242	243	247	165.2
12-Jul	228	240	255	256	156	266	297	271	342	349	323	335	345	354	350	337	326	339	314	274	249	255	253	243	314.5
13-Jul	231	235	218	255	265	258	262	262	281	308	317	322	329	329	331	324	332	315	278	284	284	303	275	268	306.5
14-Jul	268	268	262	273	264	277	288	309	320	321	328	10	351	11	358	356	332	344	350	263	257	256	267	267	313.5
15-Jul	261	264	264	260	262	261	282	293	345	316	325	356	6	14	343	28	12	61	342	277	248	244	238	237	322.7
16-Jul	236	231	235	238	236	166	172	138	129	123	121	101	105	108	131	128	110	104	108	109	133	153	197	189	122.7
17-Jul	144	159	182	198	116	129	113	116	121	136	108	188	163	297	289	275	268	213	110	137	239	262	238	251	155.1
18-Jul	255	261	272	271	276	267	282	287	303	309	318	351	67	74	35	37	201	243	233	234	242	260	270	269	285.7
19-Jul	273	269	249	235	268	266	279	279	283	279	275	287	247	261	251	249	239	289	270	265	240	217	232	267	264.1
20-Jul	244	211	173	242	231	189	135	299	286	320	282	325	300	295	297	342	267	253	233	249	242	239	232	232	265.4
21-Jul	202	UO	218	234	278	288	175	297	311	346	330	334	353	339	335	2	330	321	250	242	248	244	242	201	300.7
22-Jul	200	242	241	260	226	250	UO	169	223	211	42	14	20	104	210	258	258	288	264	246	238	247	247	244	257.5
23-Jul	243	247	241	264	239	191	223	131	138	135	134	143	139	107	304	135	183	225	227	222	222	254	239	236	181.4
24-Jul	240	239	211	244	242	226	208	171	201	160	148	128	140	156	155	101	99	84	90	110	100	103	113	147	129.4
25-Jul	130	105	215	270	81	97	267	92	110	98	90	92	208	310	284	269	287	288	261	260	268	254	234	237	173.5
26-Jul	202	226	168	126	126	80	116	122	132	115	122	134	169	316	210	290	295	194	293	27	51	63	77	82	113.4
27-Jul	83	58	11	285	275	315	16	346	296	297	304	298	296	131	279	313	327	298	272	274	265	252	271	276	302.1
28-Jul	244	UO	UO	UO	9	203	149	184	259	274	50	6	6	230	230	279	254	265	240	230	257	245	215	207	253.4
29-Jul	197	202	228	185	219	UO	235	253	271	243	213	187	165	138	138	152	146	140	168	242	237	240	247	254	188.1
30-Jul	245	235	231	UO	227	180	153	119	135	136	146	148	142	138	144	154	154	160	190	203	226	264	262	253	157.8
31-Jul	244	127	164	172	5	143	127	148	156	256	239	238	238	248	258	268	252	257	256	263	235	236	259	261	242.8

247.1 246.7 248.5 255.3 248.4 241.7 258.0 266.1 279.7 309.7 334.2 332.3 319.1 326.7 311.0 319.8 296.9 299.2 265.0 251.2 249.4 250.8 251.7 249.8
 Diurnal Average

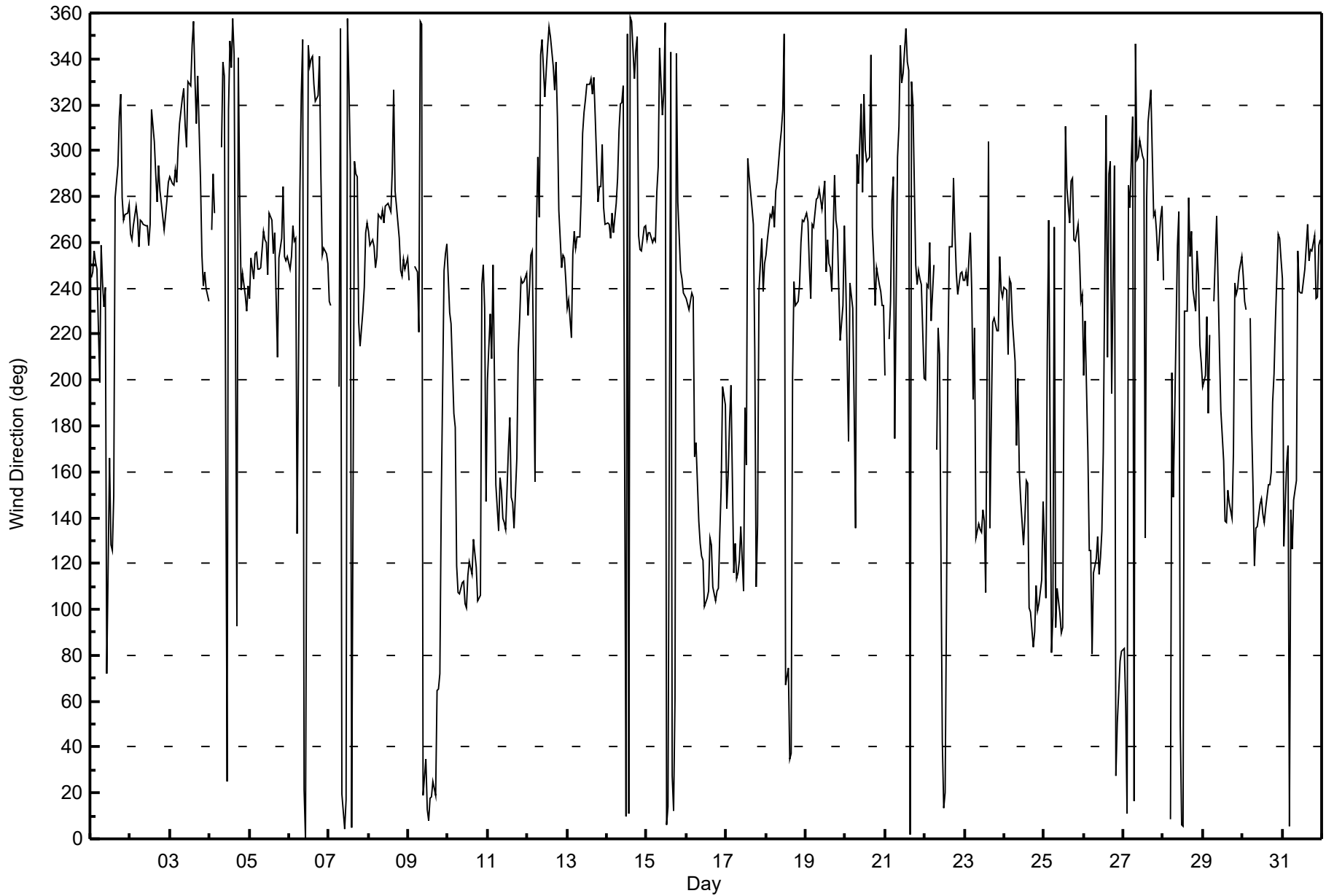
UO - Unstable Operation

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Surmont 2 - July 2023





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Surmont 2 - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 111 deg on Jul 4 14:00 Minimum Value: 9 deg on Jul 21 20:00 Percentiles: P ₁ = 11 P ₁₀ = 22 Q ₁ = 34 Median = 49 Q ₃ = 64 P ₉₀ = 78 P ₉₉ = 97																		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 Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	14	14	20	17	49	62	83	24	44	86	69	57	49	49	72	50	58	57	61	38	25	33	30	51	86
2-Jul	33	27	29	42	45	26	32	36	33	34	35	31	33	63	52	51	36	53	45	37	26	32	39	48	63
3-Jul	54	54	46	53	50	53	57	58	58	66	65	64	65	80	65	70	58	81	79	34	15	15	27	41	81
4-Jul	UO	52	37	53	UO	UO	UO	43	65	72	73	89	96	111	76	81	102	96	61	14	12	27	16	17	111
5-Jul	19	24	17	22	25	24	27	32	38	36	45	56	43	43	39	62	99	59	52	35	45	38	22	23	99
6-Jul	17	23	25	43	68	86	66	56	61	54	64	68	69	61	67	60	63	68	71	47	16	14	46	54	86
7-Jul	36	45	UO	UO	UO	UO	66	88	68	81	65	72	75	67	68	56	78	67	33	31	14	14	42	33	88
8-Jul	37	33	33	29	25	33	33	31	34	32	35	37	38	37	54	62	42	34	24	15	12	16	33	45	62
9-Jul	39	UO	17	UO	52	62	82	95	63	55	70	82	73	65	63	58	62	48	64	72	85	18	23	17	95
10-Jul	45	38	46	58	59	52	32	34	38	40	42	51	41	56	53	52	55	84	69	63	21	15	35	57	84
11-Jul	58	29	86	39	50	55	46	50	52	49	43	52	64	73	56	61	46	52	30	29	18	15	11	42	86
12-Jul	51	30	29	45	88	58	55	47	85	64	65	60	60	64	59	64	61	67	72	39	9	12	22	20	88
13-Jul	28	11	45	42	35	74	25	32	46	61	55	59	61	64	63	67	69	63	41	47	51	70	35	33	74
14-Jul	36	36	18	30	25	42	51	58	65	61	70	66	69	69	67	66	57	67	80	39	11	14	17	23	80
15-Jul	16	19	21	18	32	38	46	56	79	72	71	68	84	67	65	44	66	68	69	44	11	14	14	13	84
16-Jul	35	77	46	66	50	85	72	51	50	51	51	48	36	40	51	43	40	34	34	39	52	59	69	54	85
17-Jul	48	58	55	45	46	48	42	39	55	64	62	83	100	43	46	36	35	52	62	61	26	42	30	50	100
18-Jul	81	16	25	22	29	43	32	48	52	72	55	84	59	52	76	70	96	41	49	30	20	26	25	29	96
19-Jul	26	24	21	39	35	28	33	39	35	44	48	58	39	45	42	72	51	52	32	34	56	42	28	49	72
20-Jul	71	65	85	34	33	36	58	98	70	92	84	73	91	74	68	83	58	29	12	17	41	29	18	57	98
21-Jul	70	UO	42	50	59	78	75	68	52	66	72	90	81	77	69	102	81	70	32	9	11	14	14	47	102
22-Jul	64	22	49	32	49	47	UO	59	35	85	71	47	76	81	52	46	69	73	61	17	33	29	32	40	85
23-Jul	10	43	54	72	56	77	44	67	44	46	43	54	48	92	88	51	54	25	26	19	31	13	22	36	92
24-Jul	39	22	49	35	45	31	82	59	42	57	61	53	54	57	76	46	63	50	42	55	20	20	30	57	82
25-Jul	78	39	95	90	57	36	94	58	33	40	85	60	76	54	38	26	47	40	29	32	33	33	58	56	95
26-Jul	80	39	42	43	48	79	67	76	59	44	44	59	87	76	86	90	83	88	66	68	53	49	45	48	90
27-Jul	62	71	89	48	25	69	86	61	42	50	59	57	78	87	43	57	55	50	76	28	32	16	14	29	89
28-Jul	68	UO	UO	UO	81	57	54	41	37	56	84	93	82	102	31	28	29	30	27	23	34	42	46	51	102
29-Jul	31	62	48	67	31	UO	39	29	40	62	67	87	73	71	66	59	54	50	51	26	12	10	10	13	87
30-Jul	35	48	15	UO	17	38	43	49	57	46	54	59	63	52	53	59	54	52	51	50	45	26	63	37	63
31-Jul	39	84	65	85	84	106	58	62	84	54	58	49	52	38	41	37	44	41	32	31	12	16	39	24	106
																		81 84 95 90 88 106 94 98 85 92 85 93 100 111 88 102 102 96 80 72 85 70 69 57							
Diurnal Maximum																									
UO - Unstable Operation																									



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS30
ELLS RIVER
JULY 2023**

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ELLS RIVER (AMS30)
JULY 2023

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	28.7	0	3.4	0
TRS (ppb) Average	707	36	37	99.87	1.8	0	1.1	0
THC (ppm) Average	423	23	321	59.95	3.5	-	2.4	-
NMHC (ppm) Average	423	23	321	59.95	0.273	-	0.065	-
CH4 (ppm) Average	423	23	321	59.95	3.2	-	2.3	-
NO2 (ppb) Average	708	36	36	100	29	0	10	-
NO (ppb) Average	708	36	36	100	47	-	4.5	-
NOX (ppb) Average	708	36	36	100	68	-	13.5	-
PM2.5 (ug/m3) Average	743	1	1	100	451.3	124	296.4	16
Temperature 2 m (C) Average	744	0	0	100	30.1	-	22.9	-
Relative Humidity (%) Average	744	0	0	100	97.3	-	92.7	-
Wind Speed 10 m (km/h) Average	744	0	0	100	38	-	21	-
Wind Direction 10 m (deg) Average	744	0	0	100	-	-	-	-
Global Solar Radiation (W/m2) Average	744	0	0	100	864.8	-	344.5	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ELLS RIVER (AMS30)
JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	0.64	2	-	0	0	0.1	0.2	0.3	1.2	28.7
TRS (ppb) Average	707	0.56	0.3	-	0	0.4	0.4	0.5	0.6	0.9	1.8
THC (ppm) Average	423	2.09	0.2	-	1.9	1.9	2	2	2.1	2.3	3.5
NMHC(ppm) Average	423	0.011	0.04	-	0	0	0	0	0	0	0.273
CH4(ppm) Average	423	2.08	0.1	-	1.9	1.9	2	2	2.1	2.2	3.2
NO2 (ppb) Average	708	4.17	5	-	0.2	0.6	0.9	2.3	5.1	11.8	29
NO (ppb) Average	708	1.13	4	-	0	0	0	0.1	0.5	1.8	47
NOX (ppb) Average	708	5.29	7.8	-	0.2	0.6	0.9	2.5	6	14.6	68
PM2.5 (ug/m3) Average	743	52.27	80.4	-	2	4.6	6.9	22.4	54.2	123.9	451.3
Temperature 2 m (C) Average	744	18.48	4.9	-	5.9	12.4	14.8	18	22.3	25.1	30.1
Relative Humidity (%) Average	744	63.74	20.3	-	25	36	46.9	62.5	81.5	91.9	97.3
Wind Speed 10 m (km/h) Average	744	8.9	6	-	1	3	5	8	12	17	38
Wind Direction 10 m (deg) Average	744	288.8	-	-	-	-	-	-	-	-	-
Global Solar Radiation (W/m2) Average	744	216.25	248.3	-	0	0	0.6	92.5	398.4	615.3	864.8

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ELLS RIVER (AMS30)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC/NMHC/CH4	09 Jul 2023 06:00	21 Jul 2023 09:00	292	Unstable Operation - excessive baseline drift
THC/NMHC/CH4	21 Jul 2023 10:00	21 Jul 2023 15:00	6	Maintenance - replaced sample pump
TRS	22 Jul 2023 09:00	22 Jul 2023 09:00	1	Maintenance - verify daily QA response

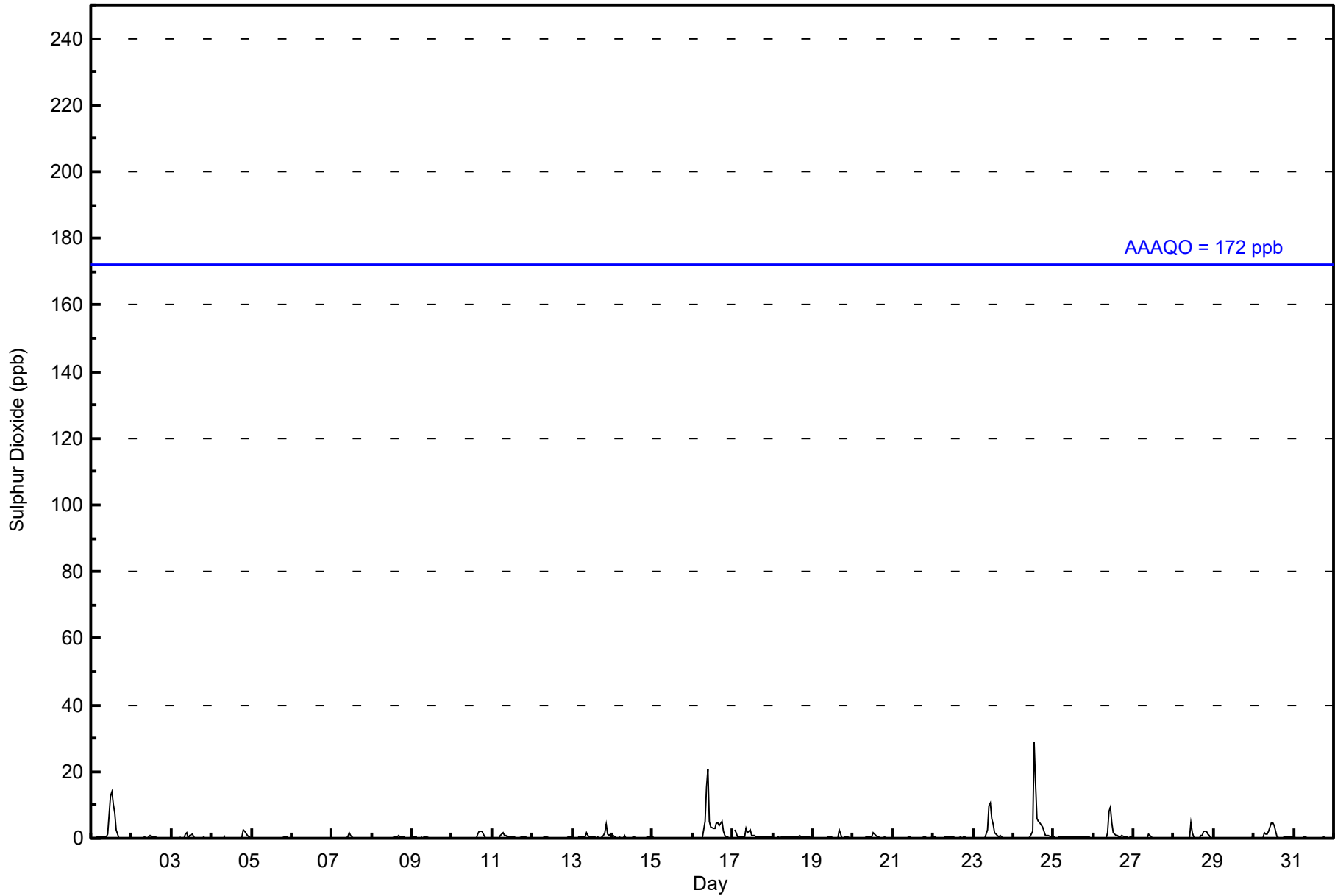


Number of Exceedences (AAAQO):		1-hr: 0	24-hr: 0																		Hours in Service:	744																											
Maximum Value: 28.7 ppb on Jul 24 13:00		Maximum Daily Average: 3.4 ppb on Jul 16																			Hours of Data:	709																											
Minimum Value: 0.0 ppb on Jul 3 18:00		Minimum Daily Average: 0.0 ppb on Jul 29																			Hours of Missing Data:	35																											
Maximum Diurnal Average: 2.1 ppb at hour 13		Minimum Diurnal Average: 0.1 ppb at hour 5																			Hours of Calibration:	35																											
Monthly Average: 0.64 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.2 Q ₃ = 0.3 P ₉₀ = 1.2 P ₉₉ = 10.1																			Percent Operational Time:	100.0																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	0.2	0.1	Z	0.2	0.2	0.2	0.2	0.3	0.3	0.3	1.4	12.5	13.9	10.1	7.5	2.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.2	13.9																							
2-Jul	0.1	0.2	0.1	Z	0.1	0.1	0.1	0.2	0.3	0.2	0.4	0.9	0.3	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.2	0.9																							
3-Jul	0.2	0.1	0.1	0.2	Z	0.3	0.1	0.1	1.2	1.6	0.2	1.0	1.2	0.6	0.1	0.0	0.0	0.0	0.0	0.6	0.1	0.1	0.1	0.1	0.3	1.6																							
4-Jul	0.0	0.0	0.0	0.1	0.0	Z	0.1	0.1	0.1	0.7	C	C	C	C	0.0	0.0	0.0	0.0	0.4	2.7	2.2	1.0	0.6	0.4	0.4	2.7																							
5-Jul	Z	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.3	0.3	0.2	0.1	0.1	0.3																							
6-Jul	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1																							
7-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.8	0.9	0.2	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.2	1.8																							
8-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.4	0.8	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.8																							
9-Jul	0.2	0.3	0.3	0.4	Z	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4																							
10-Jul	0.0	0.0	0.0	0.0	0.1	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	2.1	2.2	1.9	0.2	0.0	0.0	0.0	0.0	0.4	2.2																							
11-Jul	Z	0.0	0.0	0.0	0.0	1.0	1.5	0.8	0.8	0.5	0.3	0.3	0.4	0.2	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.1	0.2	0.2	0.3	1.5																							
12-Jul	0.1	Z	0.2	0.1	0.1	0.1	0.2	0.4	0.5	0.3	0.1	0.1	0.1	0.1	0.0	0.1	0.2	0.2	0.1	0.1	0.2	0.6	0.3	0.3	0.2	0.6																							
13-Jul	0.4	0.4	Z	0.5	0.5	0.4	0.3	0.3	1.9	0.8	0.6	0.3	0.3	0.5	0.0	0.2	0.1	0.2	0.7	1.6	4.2	1.1	0.9	1.1	0.8	4.2																							
14-Jul	0.8	0.4	0.3	Z	0.2	0.1	0.1	0.8	0.1	0.0	0.1	0.1	0.3	0.3	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.8																							
15-Jul	0.2	0.2	0.2	0.2	Z	0.1	0.1	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	0.1	0.2																							
16-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	4.9	15.2	20.8	5.1	3.4	2.9	3.0	4.7	4.5	3.9	5.1	2.0	0.9	0.3	0.2	0.2	0.2	3.4	20.8																							
17-Jul	Z	2.4	1.5	0.5	0.3	0.3	0.3	0.3	2.8	1.7	2.5	0.8	1.0	0.7	0.3	0.3	0.2	0.3	0.2	0.3	0.4	0.4	0.2	0.3	0.8	2.8																							
18-Jul	0.2	Z	0.4	0.5	0.2	0.3	0.5	0.4	0.6	0.6	0.4	0.4	0.3	0.3	0.3	0.3	0.7	0.4	0.4	0.4	0.4	0.3	0.2	0.1	0.4	0.7																							
19-Jul	0.1	0.1	Z	0.1	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.3	0.1	0.1	0.1	0.2	2.4	0.2	0.2	0.4	0.3	0.2	0.1	0.1	0.2	2.4																							
20-Jul	0.1	0.1	0.1	Z	0.1	0.0	0.1	0.2	0.2	0.2	0.2	0.6	1.6	1.1	0.5	0.2	0.1	0.1	0.1	0.3	0.1	0.1	0.2	0.1	0.3	1.6																							
21-Jul	0.1	0.1	0.0	0.0	Z	0.0	0.1	0.0	0.1	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.3																							
22-Jul	0.2	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.3	0.3	0.4	0.4	0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.1	0.0	0.0	0.1	0.2	0.4																							
23-Jul	Z	0.2	0.0	0.0	0.0	0.0	0.1	0.1	2.4	9.9	10.7	5.7	4.1	1.7	0.7	0.4	0.7	0.6	0.2	0.2	0.1	0.2	0.1	0.2	1.7	10.7																							
24-Jul	0.2	Z	0.1	0.1	0.1	0.0	0.0	0.1	0.2	0.2	0.2	2.2	28.7	16.4	5.8	5.1	4.7	3.5	2.2	0.9	0.8	0.7	0.6	0.5	3.2	28.7																							
25-Jul	0.5	0.5	Z	0.5	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.2	0.3	0.4	0.4	0.3	0.3	0.3	0.2	0.3	0.3	0.2	0.1	0.0	0.3	0.5																							
26-Jul	0.0	0.0	0.0	Z	0.1	0.0	0.0	0.1	1.9	8.1	9.5	4.7	1.9	0.7	1.0	0.4	0.3	0.7	0.5	0.3	0.3	0.2	0.2	0.3	1.4	9.5																							
27-Jul	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.2	0.2	1.4	0.7	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.2	1.4																							
28-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.1	4.6	1.9	0.3	0.0	0.0	0.0	0.7	1.0	2.1	2.1	1.2	0.6	0.2	0.0	0.6	4.6																							
29-Jul	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	0.1	0.0	0.1	0.0	0.0	0.2	0.0	0.2																							
30-Jul	0.1	Z	0.1	0.1	0.0	0.1	1.7	1.3	1.2	2.0	4.8	4.5	4.0	2.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.5	0.5	4.8																							
31-Jul	0.3	0.2	Z	0.1	0.1	0.1	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.3																							
																								Diurnal Average																									
																								Diurnal Maximum																									
																								0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.4	1.0	1.7	1.5	1.4	2.1	1.3	0.7	0.6	0.6	0.5	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2
																								0.8	2.4	1.5	0.5	0.5	1.0	1.7	4.9	15.2	20.8	10.7	12.5	28.7	16.4	7.5	5.1	4.7	5.1	2.2	2.7	4.2	1.1	0.9	1.1	0.8	4.8
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Ells River - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Ells River - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	702	99.01	99.01
11 - 20	5	0.71	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: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Ells River - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	88	106	31	13	17	4	19	40	54	62	49	39	45	64	37	34	702
11 - 20	0	0	0	0	0	0	1	4	0	0	0	0	0	0	0	0	5
21 - 60	0	0	0	0	0	0	1	1	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	88	106	31	13	17	4	21	45	54	62	49	39	45	64	37	34	709

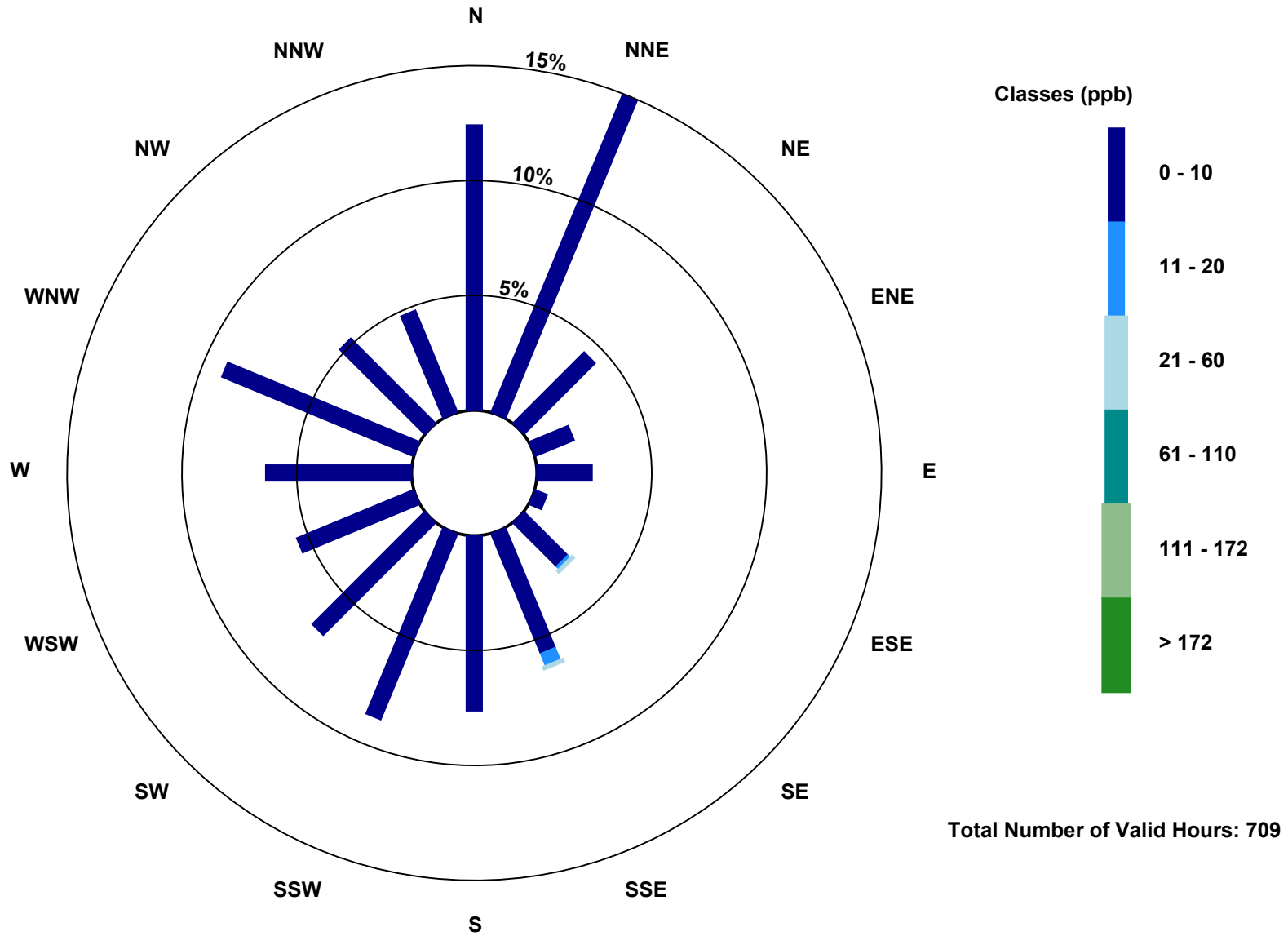
Total Number of Valid Hours: 709

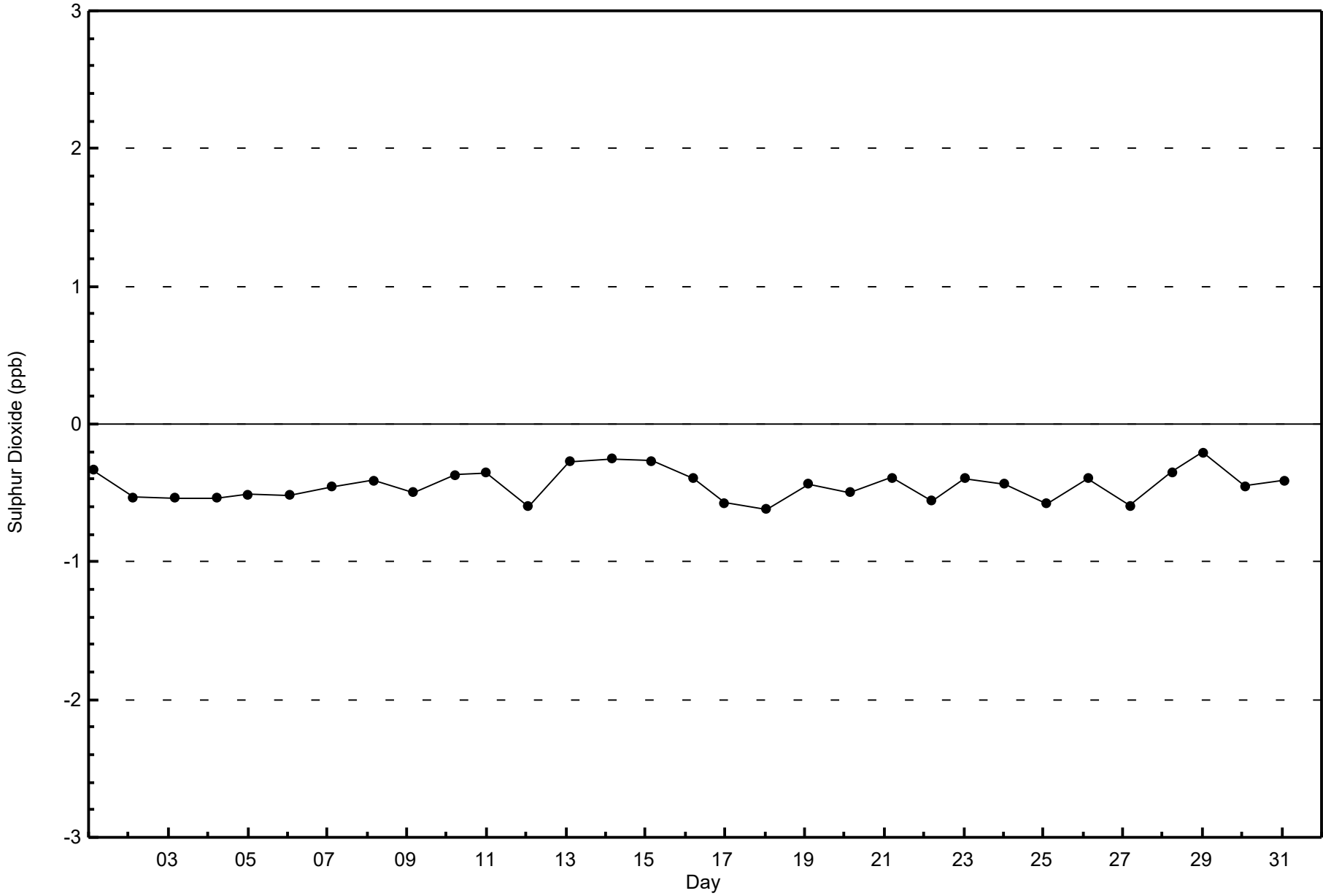
Total Number of Hours: 744

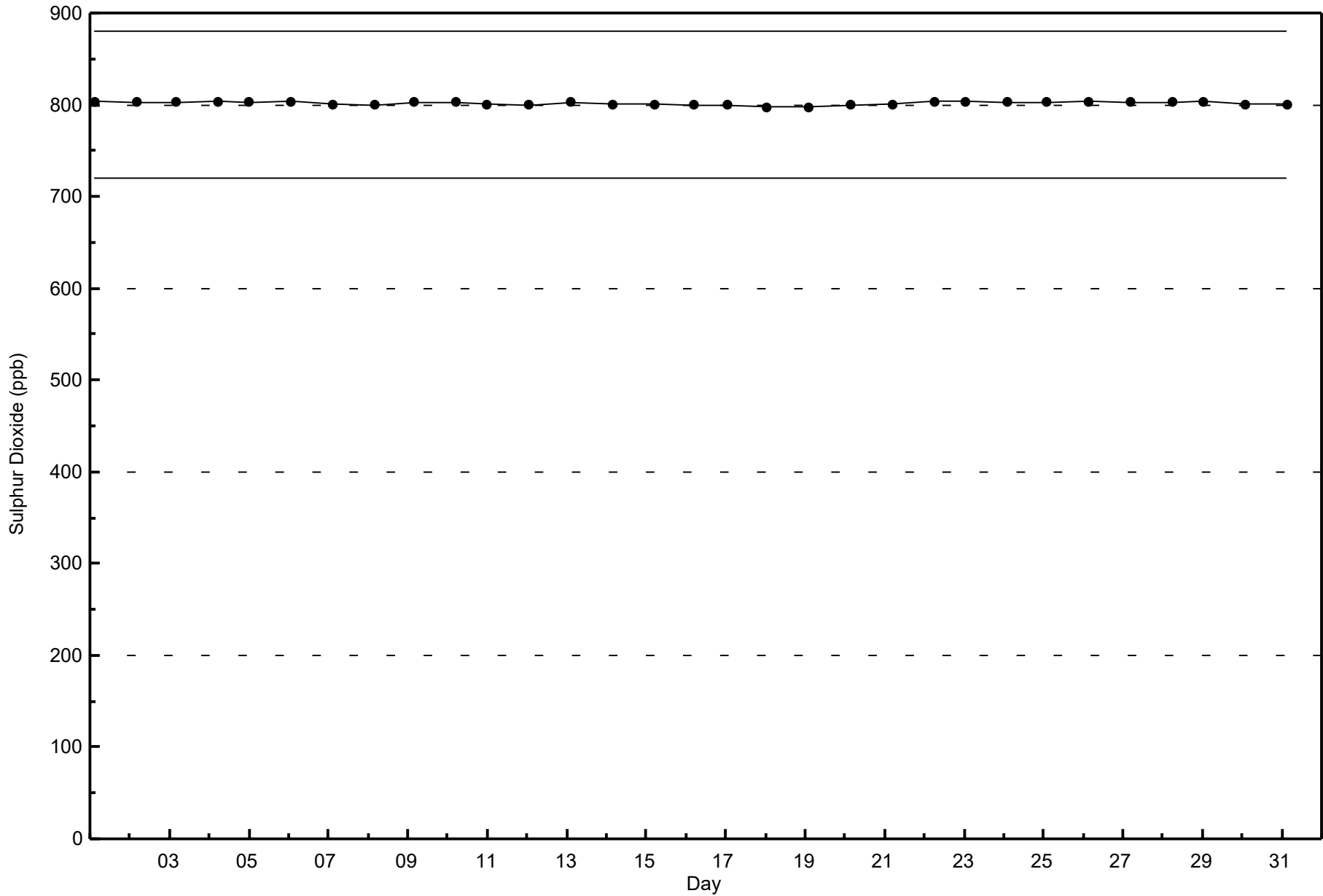


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Ells River









Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 1.8 ppb on Jul 14 19:00	Maximum Daily Average: 1.1 ppb on Jul 14		Hours of Data:	707
Minimum Value: 0.0 ppb on Jul 23 20:00	Minimum Daily Average: 0.3 ppb on Jul 25		Hours of Missing Data:	37
Maximum Diurnal Average: 0.7 ppb at hour 6	Minimum Diurnal Average: 0.5 ppb at hour 16		Hours of Calibration:	36
Monthly Average: 0.56 ppb	Percentiles: P ₁ = 0.1 P ₁₀ = 0.4 Q ₁ = 0.4 Median = 0.5 Q ₃ = 0.6 P ₉₀ = 0.9 P ₉₉ = 1.5		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.8	1.0	1.1	Z	1.1	1.1	1.0	1.0	1.0	0.8	0.8	1.3	0.8	0.8	0.7	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.8	1.3
2-Jul	0.6	0.6	0.6	0.6	Z	0.7	0.7	0.6	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7
3-Jul	0.6	0.6	0.6	0.5	0.4	Z	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	0.4	0.5	0.5	0.6	0.6
4-Jul	Z	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	1.1	0.5	0.4	1.1	
5-Jul	0.4	Z	0.5	0.6	0.5	0.5	0.5	0.4	0.4	C	C	C	C	C	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	
6-Jul	0.6	0.6	Z	0.6	0.5	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	0.4	0.4	0.5	0.5	0.5	0.5	0.6	
7-Jul	0.6	0.6	0.7	Z	0.7	0.6	0.6	0.5	0.5	0.6	0.7	0.6	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.7	
8-Jul	0.4	0.4	0.5	0.5	Z	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	
9-Jul	0.6	0.7	0.8	0.8	0.8	Z	0.6	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.7	0.8	
10-Jul	Z	0.7	0.9	0.9	1.1	1.4	1.0	0.9	0.7	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.7	0.6	0.6	0.5	0.4	0.4	1.4	
11-Jul	0.5	Z	0.6	0.7	0.7	0.7	0.8	1.1	1.2	0.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	1.2	
12-Jul	0.5	0.6	Z	0.6	0.6	0.6	0.6	0.8	0.7	0.6	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.5	0.7	1.1	1.0	1.1	1.1	
13-Jul	1.0	1.0	0.9	Z	1.3	1.2	1.1	1.0	0.9	0.6	0.5	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.9	0.8	0.8	0.8	0.8	1.3	
14-Jul	0.9	0.9	0.9	0.9	Z	0.9	0.7	0.6	0.5	0.8	0.9	1.0	1.1	1.1	1.0	1.2	1.3	1.8	1.7	1.5	1.6	1.7	1.6	1.6	1.8	
15-Jul	1.5	1.5	1.4	1.3	1.2	Z	1.1	1.0	0.9	0.7	0.6	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	1.5	
16-Jul	Z	0.6	0.6	0.6	0.6	0.6	0.6	1.5	1.1	1.2	1.3	0.8	0.8	0.7	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.4	0.4	1.5	
17-Jul	0.9	Z	1.2	1.1	1.3	1.2	0.9	0.4	1.0	0.7	0.7	0.5	0.9	1.2	0.5	0.4	0.3	0.3	0.4	0.6	0.7	0.6	0.4	0.4	1.3	
18-Jul	0.4	0.6	Z	0.7	0.6	0.6	0.8	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.8	
19-Jul	0.5	0.5	0.5	Z	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.5	0.4	0.4	0.6	
20-Jul	0.4	0.5	0.4	0.4	Z	0.5	0.5	0.5	0.6	0.5	0.5	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	
21-Jul	0.6	0.6	0.5	0.4	0.5	Z	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.6	
22-Jul	Z	0.6	0.6	0.6	0.5	0.5	0.6	0.6	M	0.7	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.7	
23-Jul	0.5	Z	0.4	0.4	0.4	0.5	0.7	0.9	1.1	1.1	1.2	1.0	0.9	0.6	0.3	0.3	0.5	0.4	0.0	0.0	0.0	0.0	0.1	0.1	1.2	
24-Jul	0.2	0.2	Z	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.6	
25-Jul	0.7	0.8	0.9	Z	0.6	0.3	0.3	0.2	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.9	
26-Jul	0.3	0.3	0.3	0.3	Z	1.5	1.0	0.8	0.8	0.9	1.0	0.9	0.6	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	1.5	
27-Jul	0.4	0.5	0.5	0.4	0.4	Z	0.6	0.5	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	0.5	0.5	0.5	0.6	
28-Jul	Z	0.4	0.4	0.4	0.5	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.6	
29-Jul	0.4	Z	0.4	0.5	0.5	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	0.4	0.4	0.4	0.4	0.5	0.5	0.5	
30-Jul	0.5	0.5	Z	0.4	0.5	0.7	1.3	1.6	1.1	0.9	0.7	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.6	0.6	1.6	
31-Jul	0.5	0.4	0.4	Z	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	

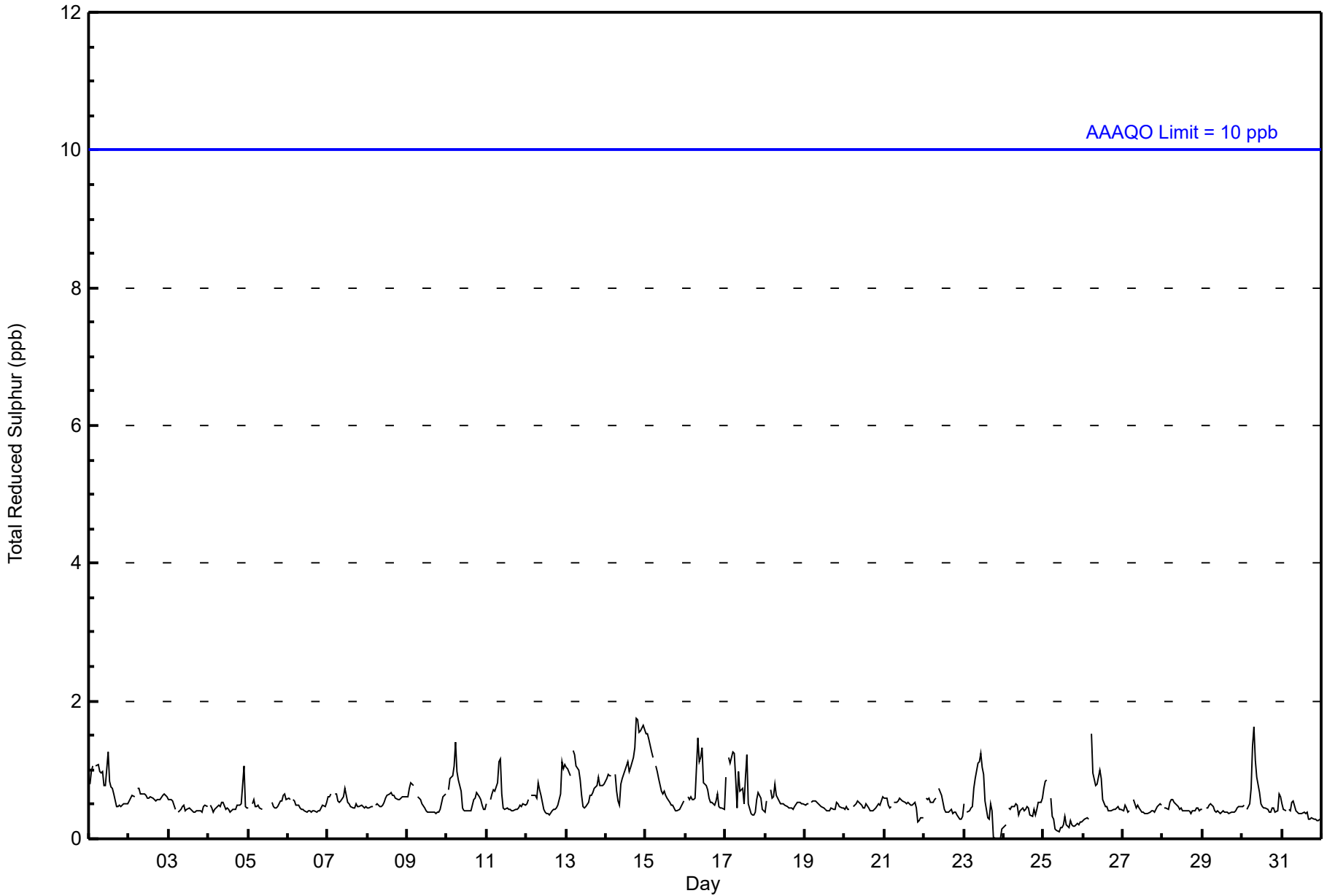
0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Diurnal Average
1.5	1.5	1.4	1.3	1.3	1.5	1.3	1.6	1.2	1.2	1.3	1.3	1.1	1.2	1.0	1.0	1.2	1.3	1.8	1.7	1.5	1.6	1.7	1.6	1.6	Diurnal Maximum	

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
Ells River - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Ells River - July 2023

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
Ells River - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	87	108	32	13	17	4	21	45	52	61	55	34	44	65	36	33	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	87	108	32	13	17	4	21	45	52	61	55	34	44	65	36	33	707

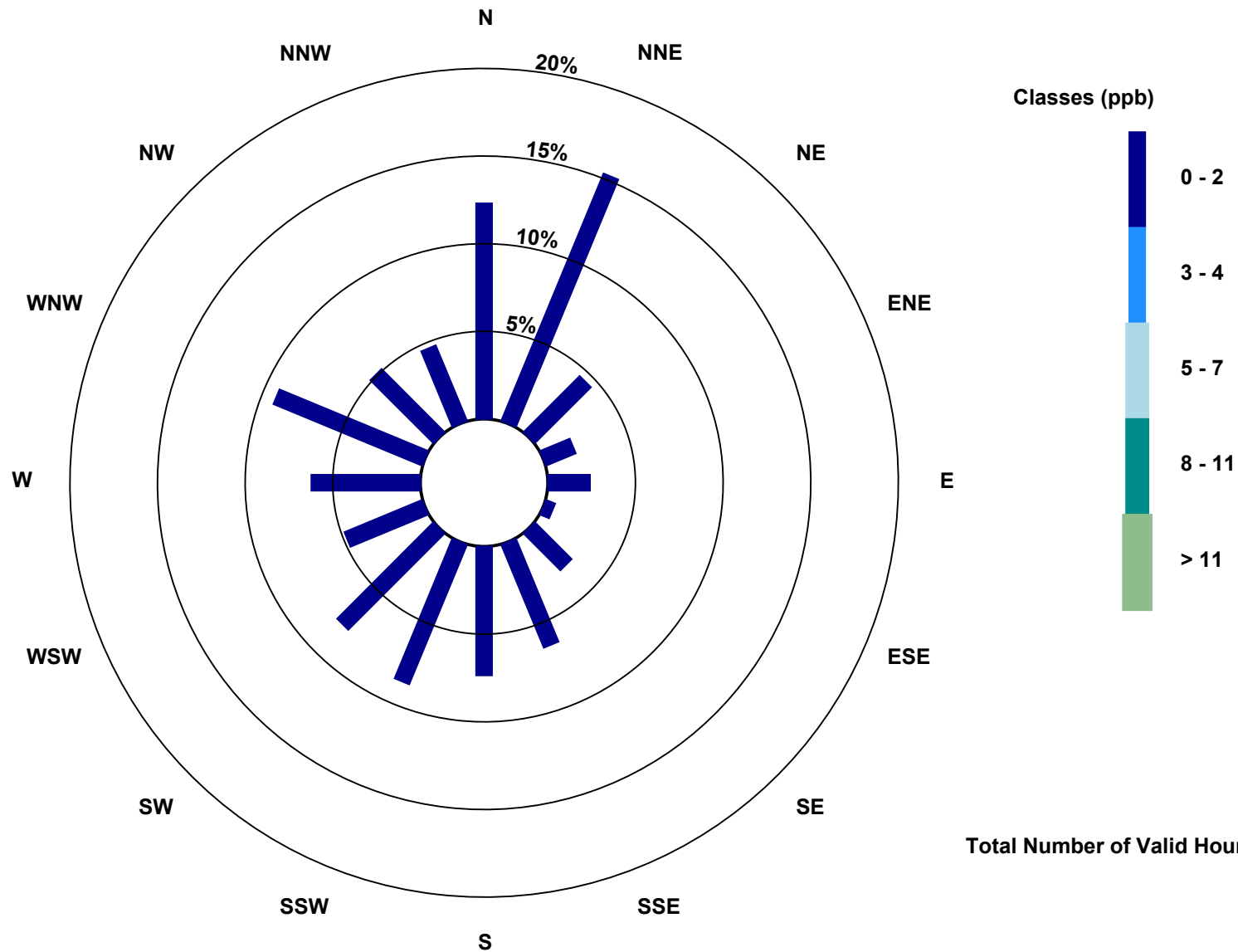
Total Number of Valid Hours: 707

Total Number of Hours: 744

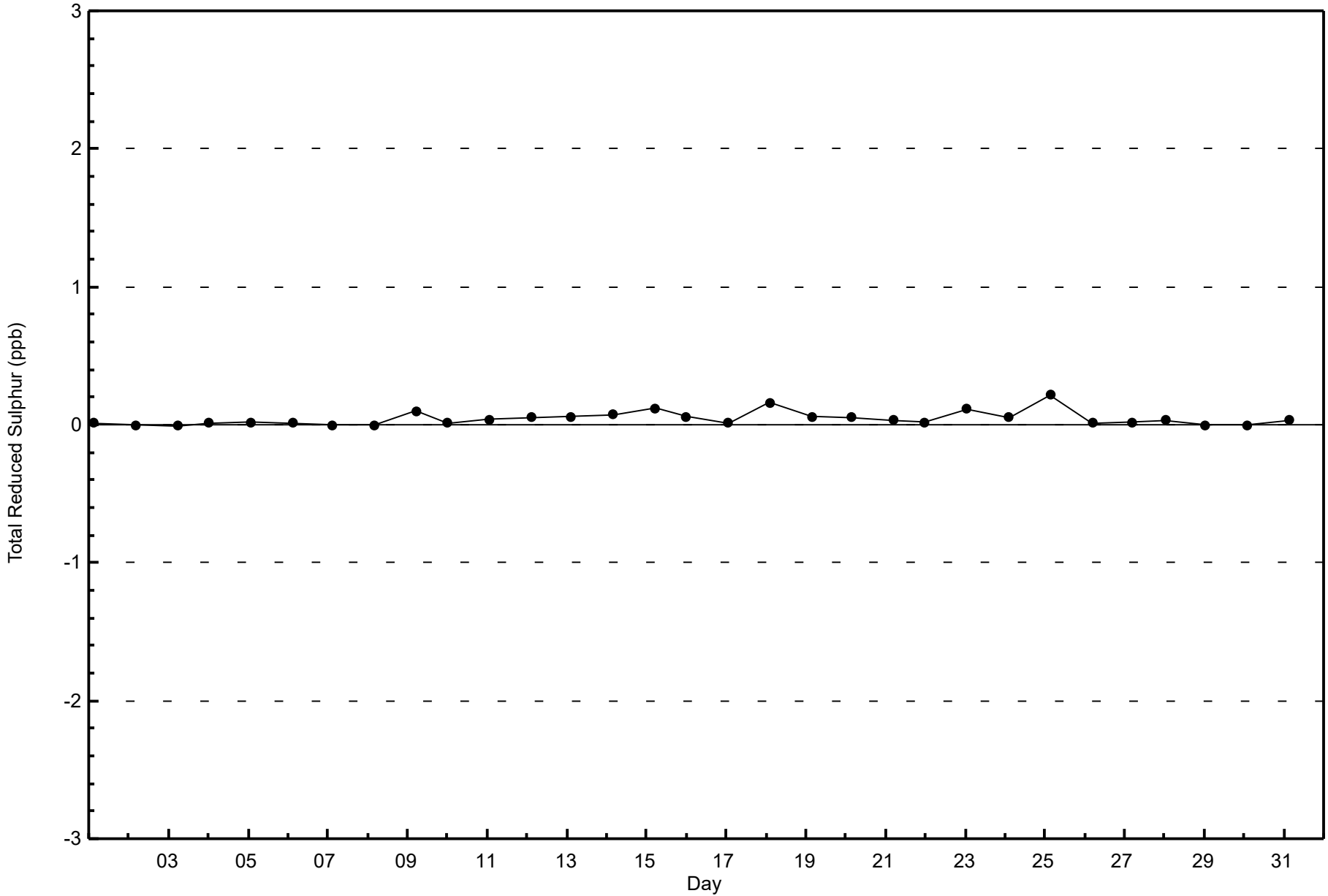


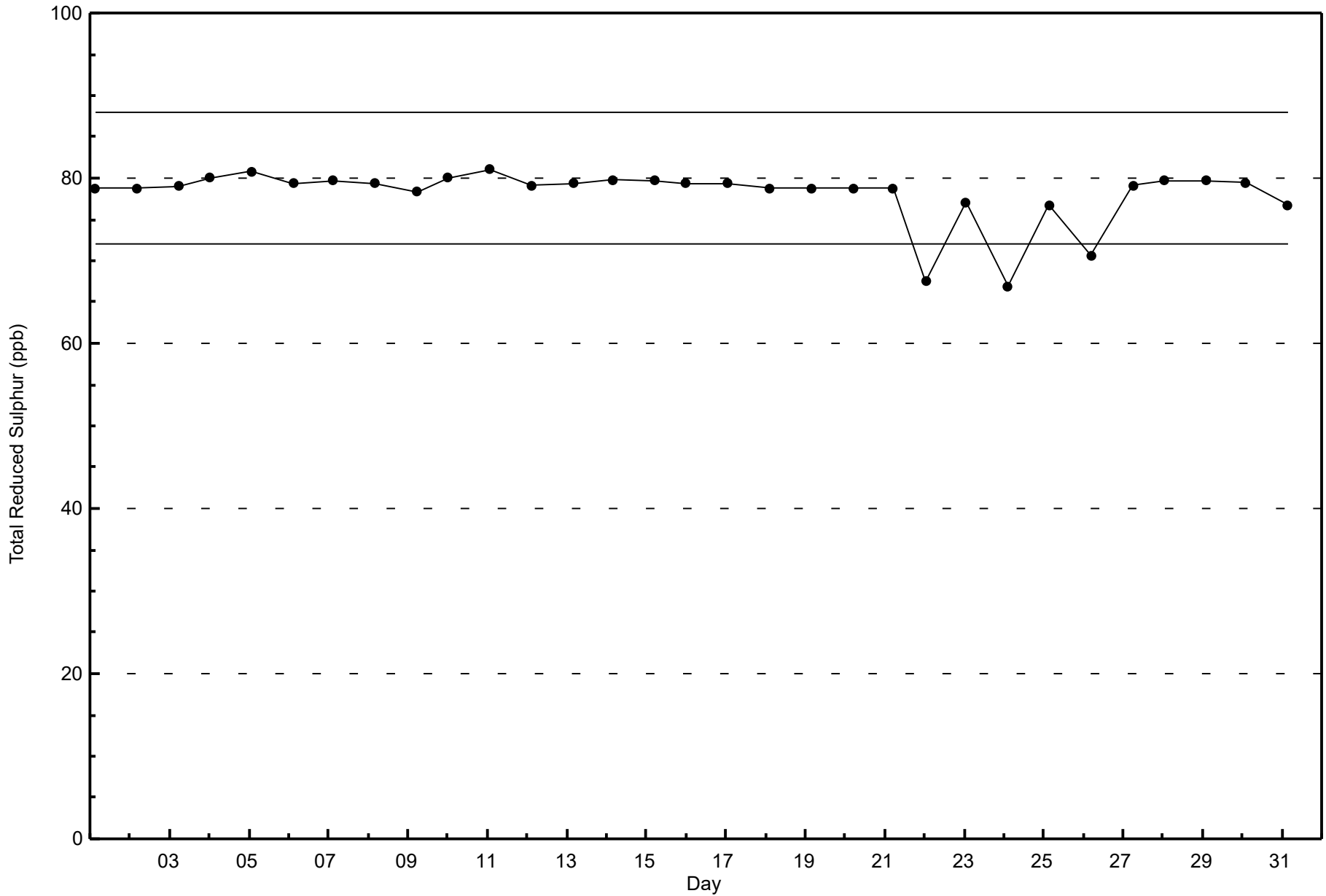
Wood Buffalo Environmental Association
Wind Rose Jul 2023

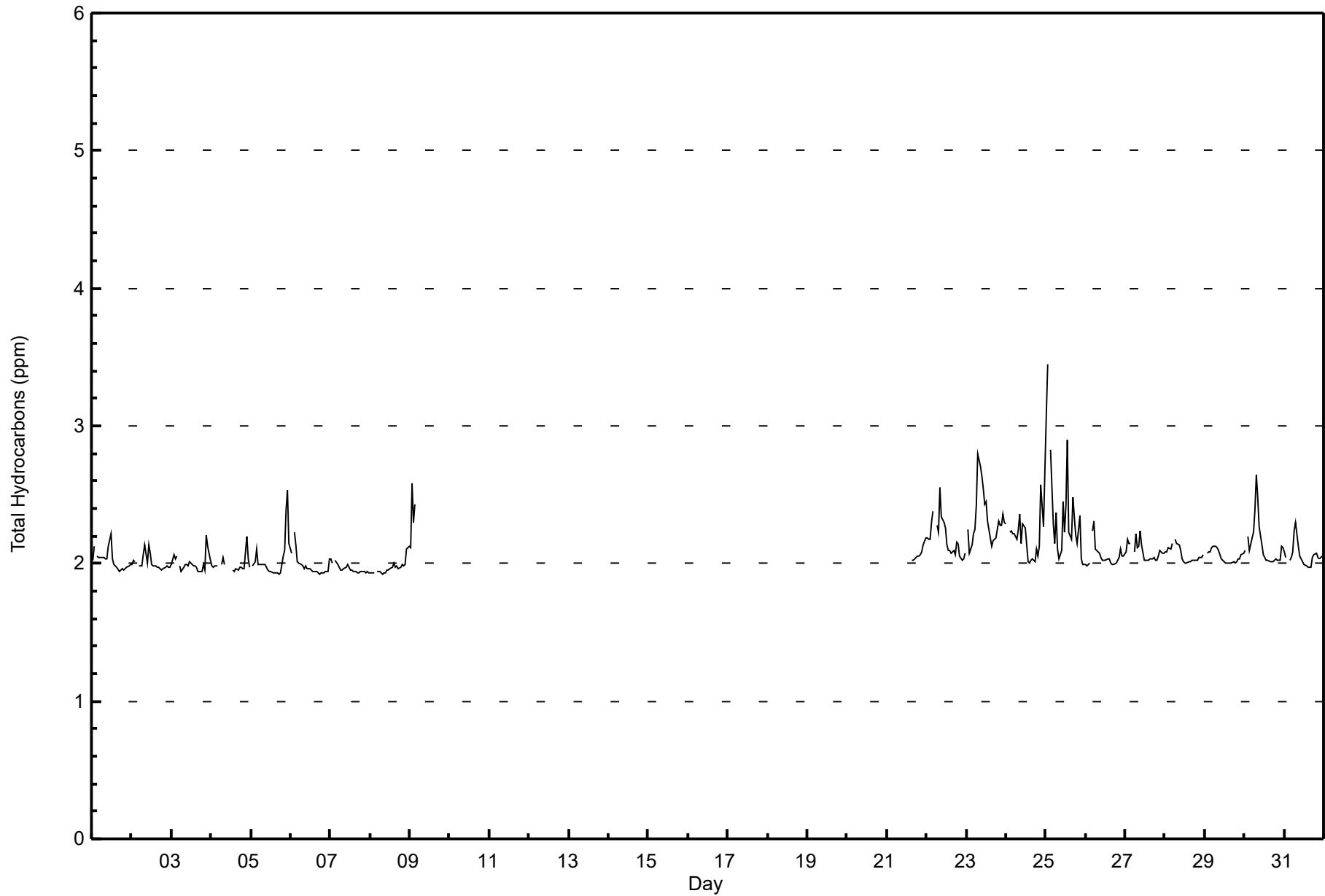
Total Reduced Sulphur (TRS) - ppb
Ells River



Total Number of Valid Hours: 707









Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Ells River - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	245	57.92	57.92
2.1 - 3.0	176	41.61	99.53
3.1 - 10.0	2	0.47	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 423

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Ells River - July 2023

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	15	46	5	5	4	3	4	3	21	30	34	24	20	16	8	7	245
2.1 - 3.0	28	15	9	6	4	1	2	14	17	19	7	6	7	21	6	14	176
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	43	61	14	11	8	4	6	17	38	49	41	30	27	37	16	21	423

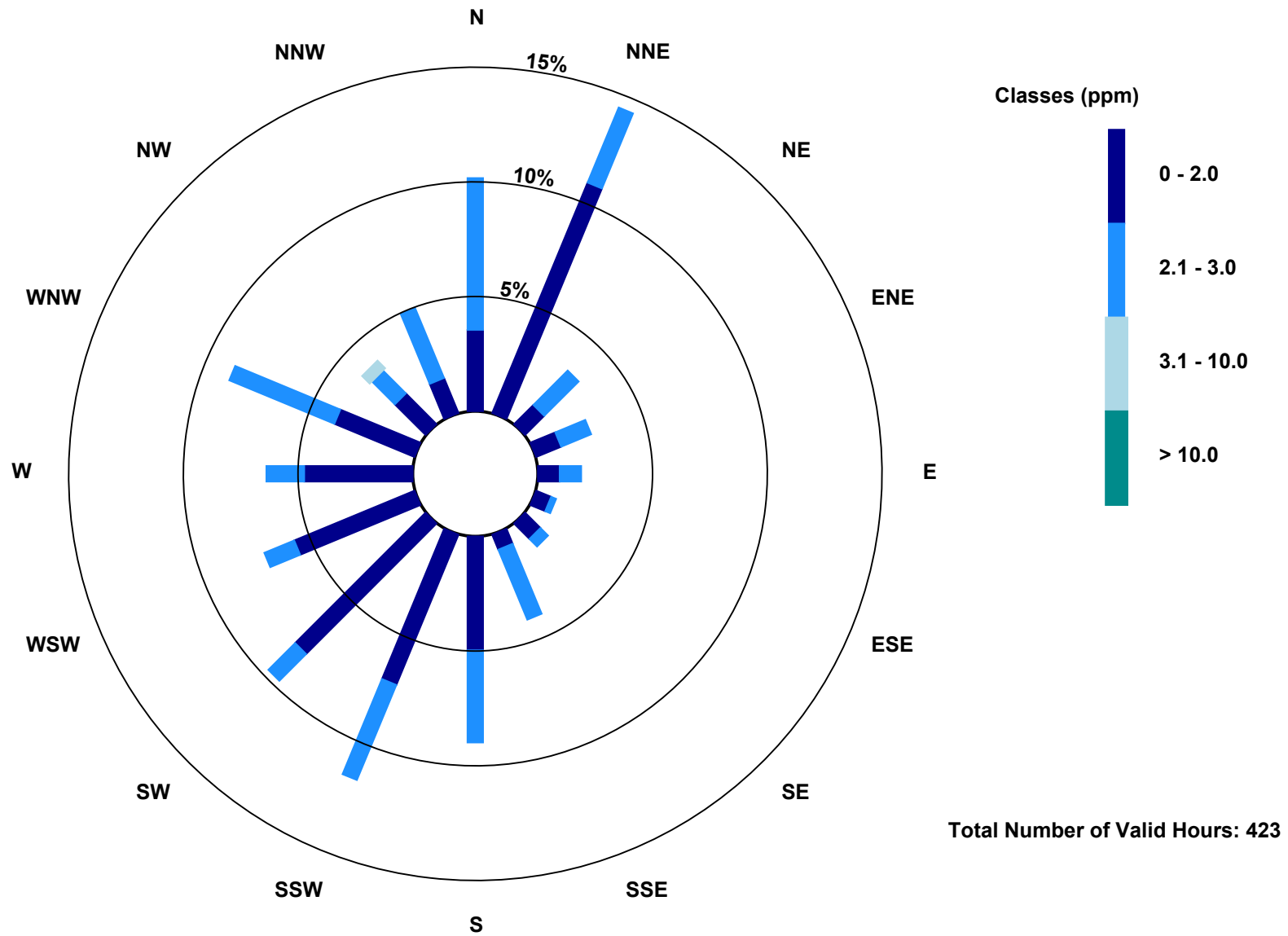
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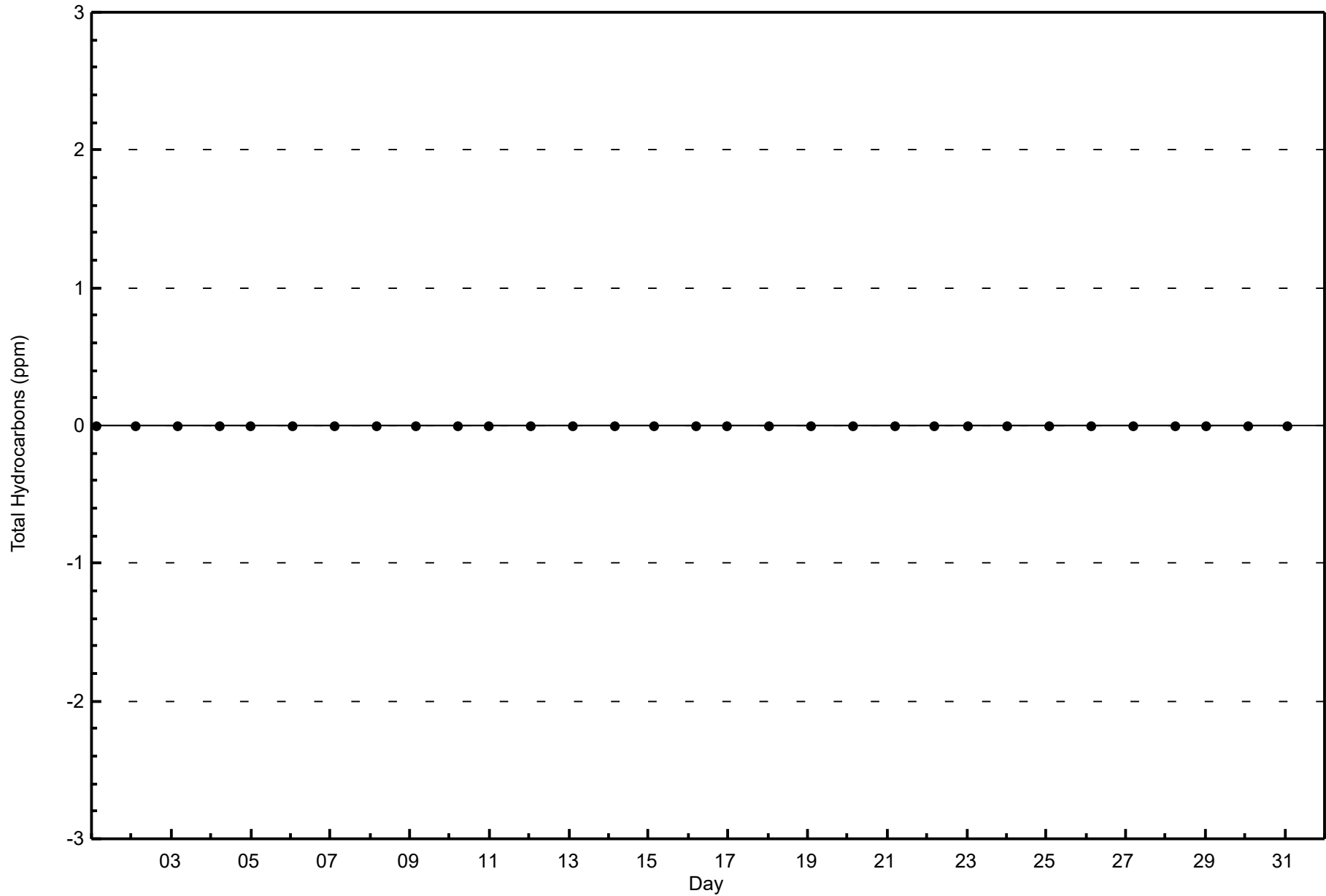
Total Number of Hours: 744

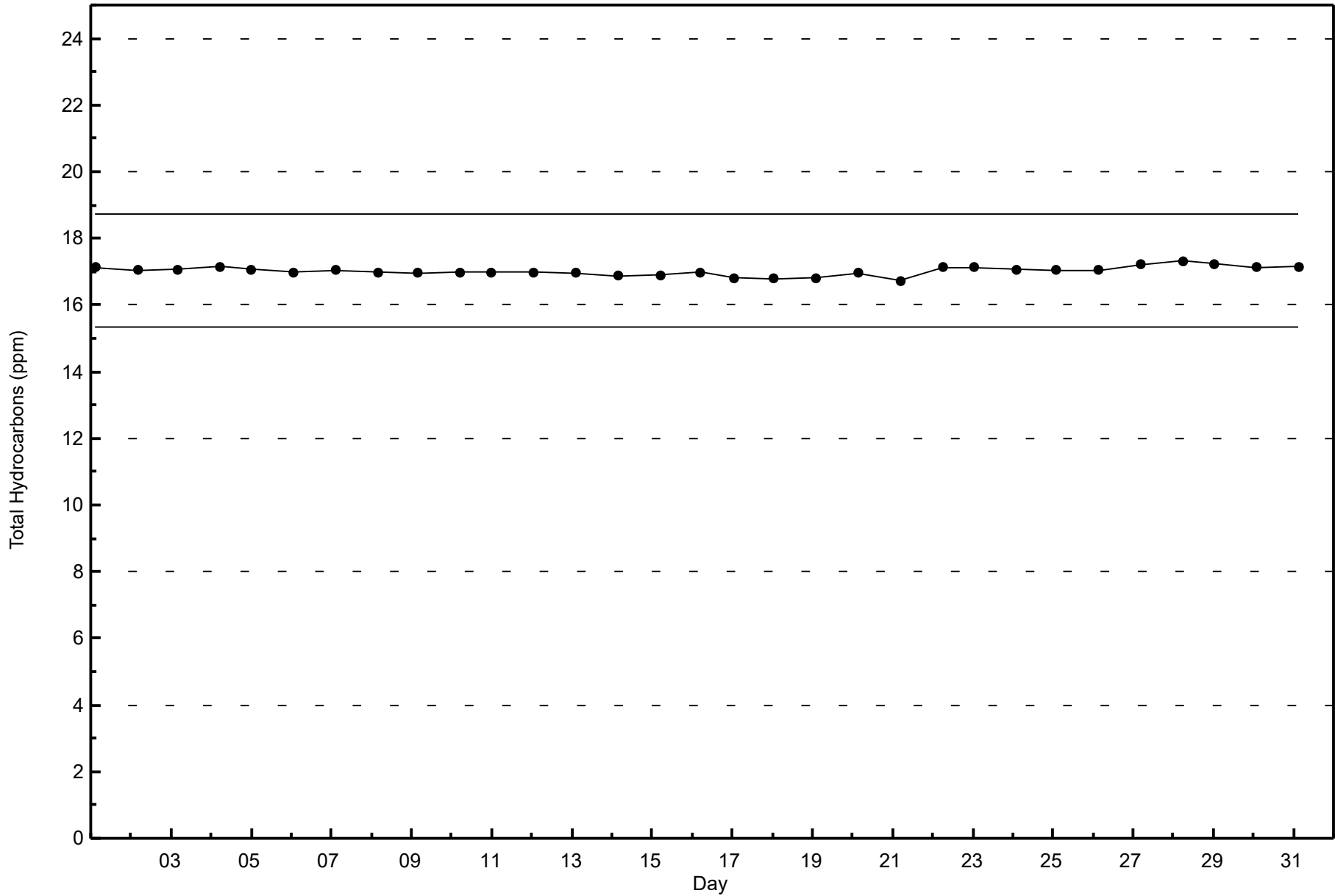


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Ells River





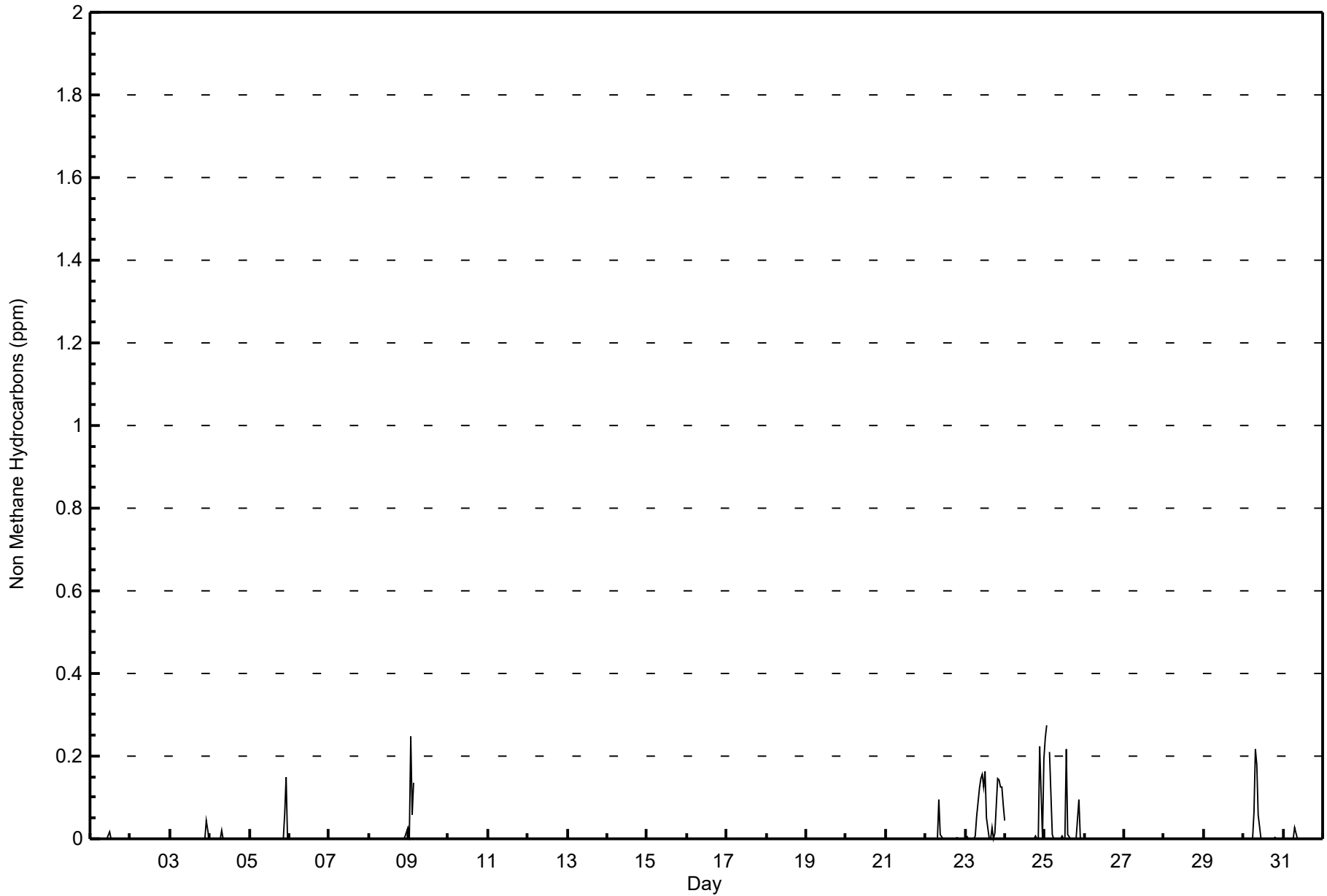




Summary of Hour Averages

Ells River - July 2023

Maximum Value: 0.273 ppm on Jul 25 02:00		Maximum Daily Average: 0.065 ppm on Jul 23		Hours in Service: 744																								
Minimum Value: 0.000 ppm on Jul 1 01:00		Minimum Daily Average: 0.000 ppm on Jul 2		Hours of Data: 423																								
Maximum Diurnal Average: 0.033 ppm at hour 2		Minimum Diurnal Average: 0.000 ppm at hour 6		Hours of Missing Data: 321																								
Monthly Average: 0.011 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.2		Hours of Calibration: 23																								
				Percent Operational Time: 60.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Jul	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.016		
2-Jul	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
3-Jul	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	0.043	0.000	0.002	0.043	
4-Jul	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.022	0.000	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.022	0.022	
5-Jul	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	0.009	0.151	0.151	
6-Jul	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	
7-Jul	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
8-Jul	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	0.006	0.028	0.001	0.028	
9-Jul	0.010	0.249	0.059	0.137	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0.249	0.249
10-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
11-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
12-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
13-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
14-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
15-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
16-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
17-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
18-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
19-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
20-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--
21-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	M	M	M	M	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	--
22-Jul	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.096	0.009	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	0.005	0.096	0.096	
23-Jul	Z	0.006	0.000	0.000	0.000	0.000	0.006	0.055	0.122	0.145	0.155	0.124	0.163	0.051	0.000	0.000	0.028	0.000	0.013	0.144	0.141	0.126	0.127	0.080	0.065	0.163	0.163	
24-Jul	0.046	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	0.007	0.000	0.000	0.000	0.224	0.004	0.194	0.021	0.224	
25-Jul	0.243	0.273	Z	0.212	0.011	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.000	0.217	0.009	0.000	0.000	0.000	0.000	0.095	0.004	0.000	0.000	0.047	0.273	0.273	
26-Jul	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
27-Jul	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
28-Jul	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
29-Jul	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	
30-Jul	0.000	Z	0.000	0.000	0.000	0.000	0.065	0.218	0.180	0.058	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	0.023	0.218	0.218	
31-Jul	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.029	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.029	0.029	
		0.019	0.033	0.004	0.022	0.001	0.000	0.004	0.018	0.022	0.012	0.010	0.008	0.010	0.015	0.000	0.000	0.001	0.000	0.001	0.008	0.012	0.022	0.017	0.016	Diurnal Average		
		0.243	0.273	0.059	0.212	0.011	0.000	0.065	0.218	0.180	0.145	0.155	0.124	0.163	0.217	0.009	0.000	0.028	0.000	0.013	0.144	0.141	0.224	0.151	0.194	Diurnal Maximum		
Z - zerospan			C - Calibration				M - Maintenance				UO - Unstable Operation																	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Ells River - July 2023**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	377	89.13	89.13
0.006 - 0.05	19	4.49	93.62
0.06 - 0.1	15	3.55	97.16
> 0.1	12	2.84	100.00

Total Number of Valid Hours: 423

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Ells River - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	38	60	9	11	7	3	5	11	36	46	39	28	24	31	11	18	377
0.006 - 0.05	1	1	4	0	1	1	0	1	0	1	1	1	1	4	2	0	19
0.06 - 0.1	2	0	0	0	0	0	1	2	1	2	1	0	2	2	0	2	15
> 0.1	2	0	1	0	0	0	0	3	1	0	0	1	0	0	3	1	12
Totals	43	61	14	11	8	4	6	17	38	49	41	30	27	37	16	21	423

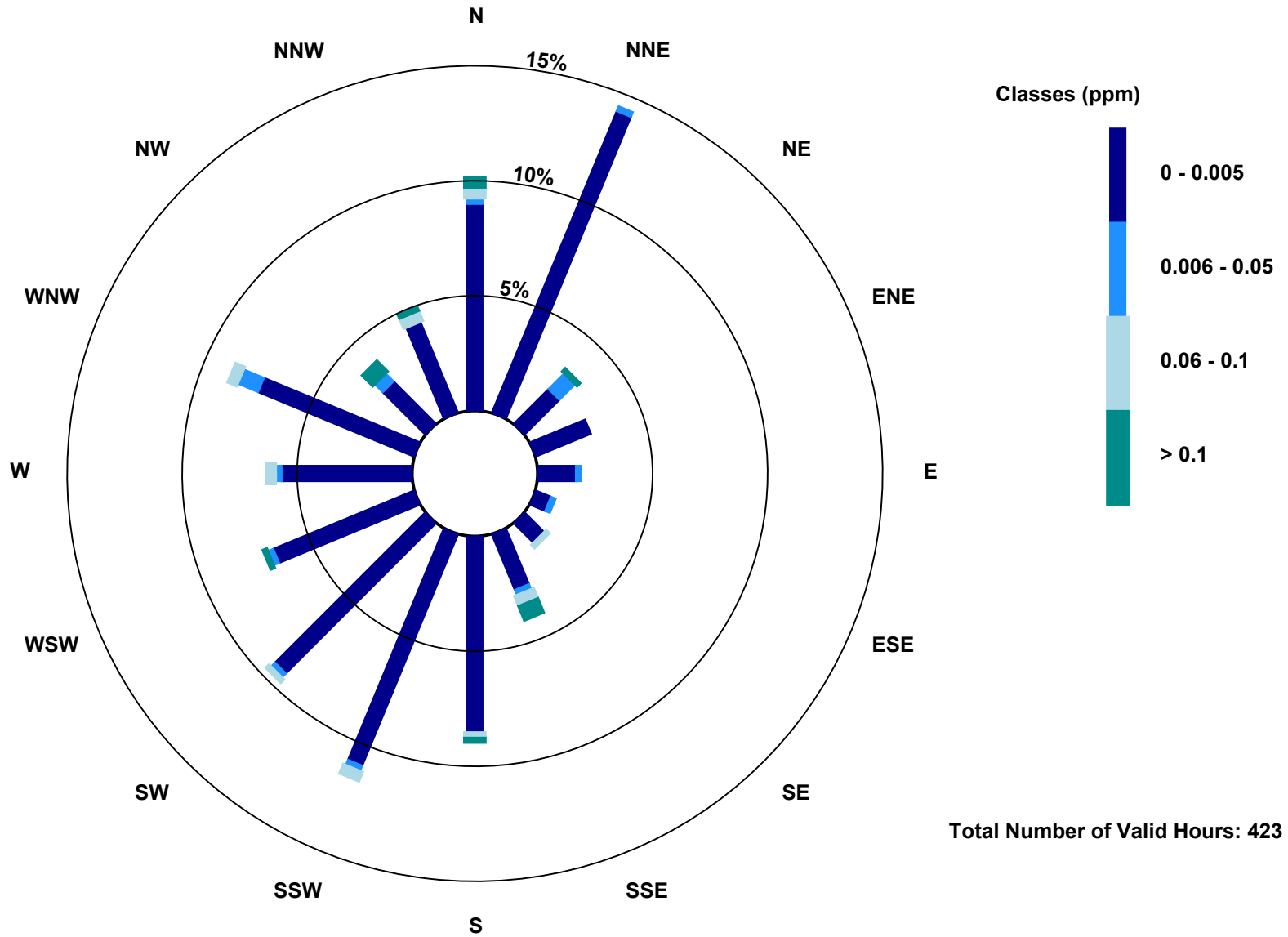
Total Number of Valid Hours: 423

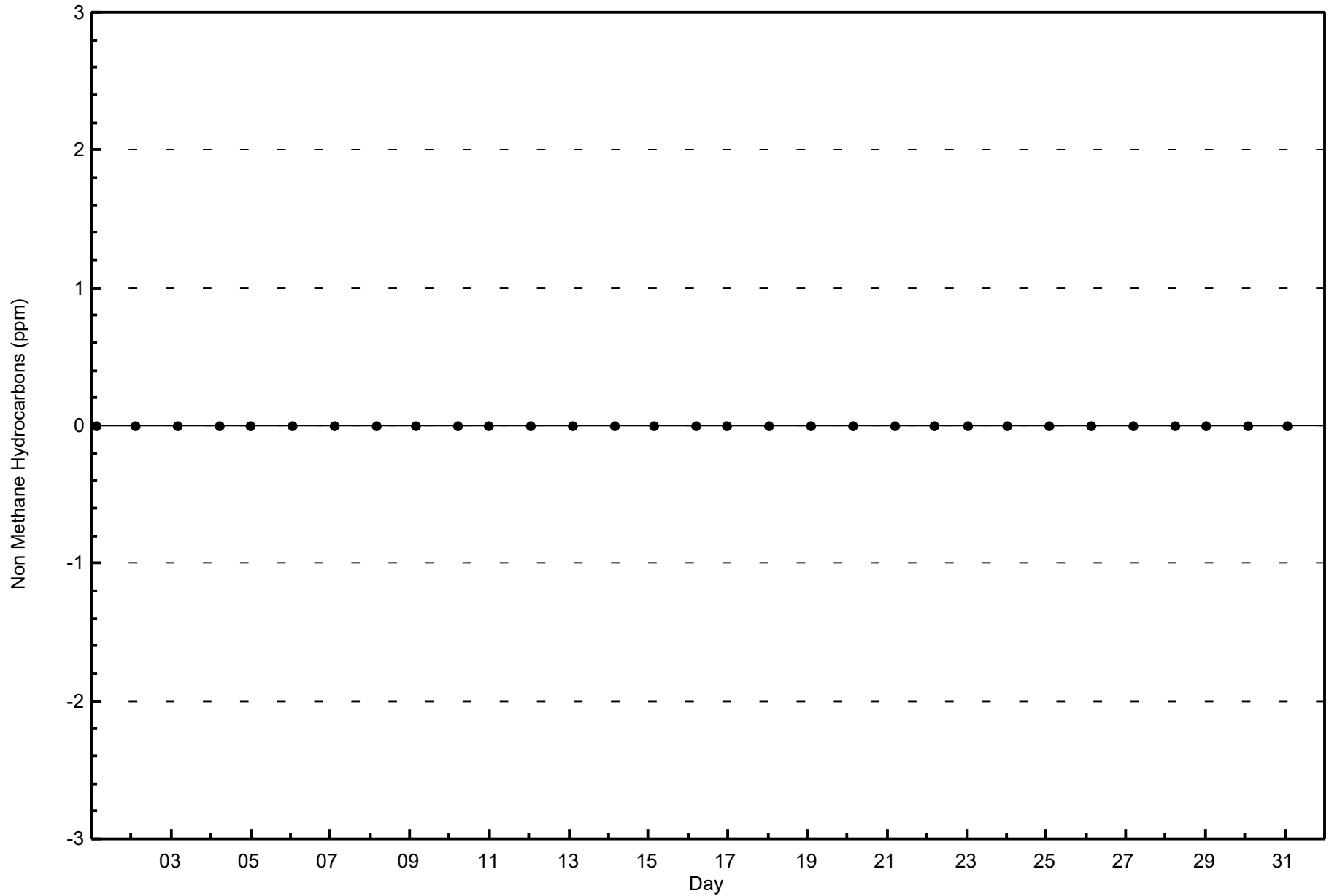
Total Number of Hours: 744

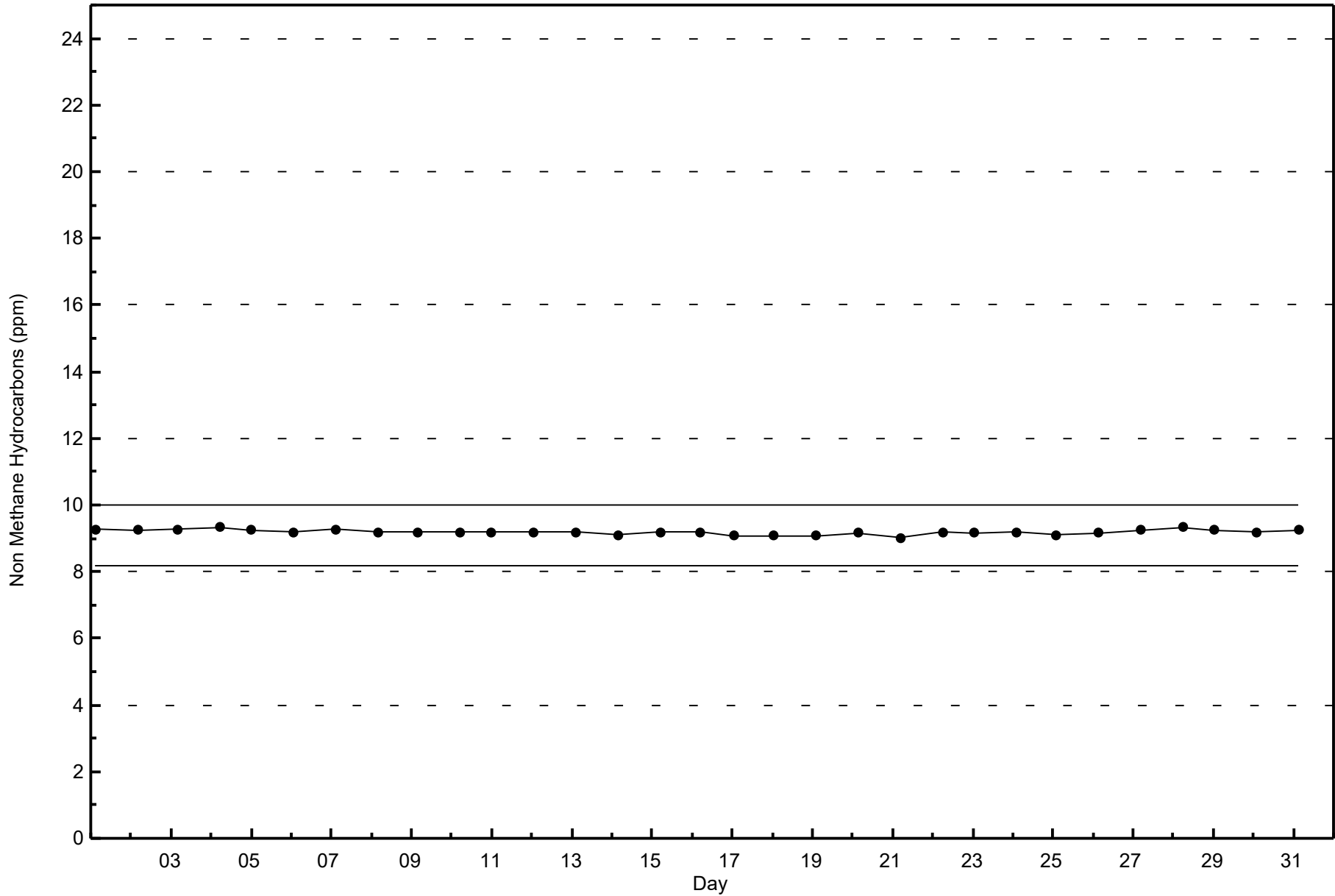


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Non Methane Hydrocarbons (NMHC) - ppm
Ells River









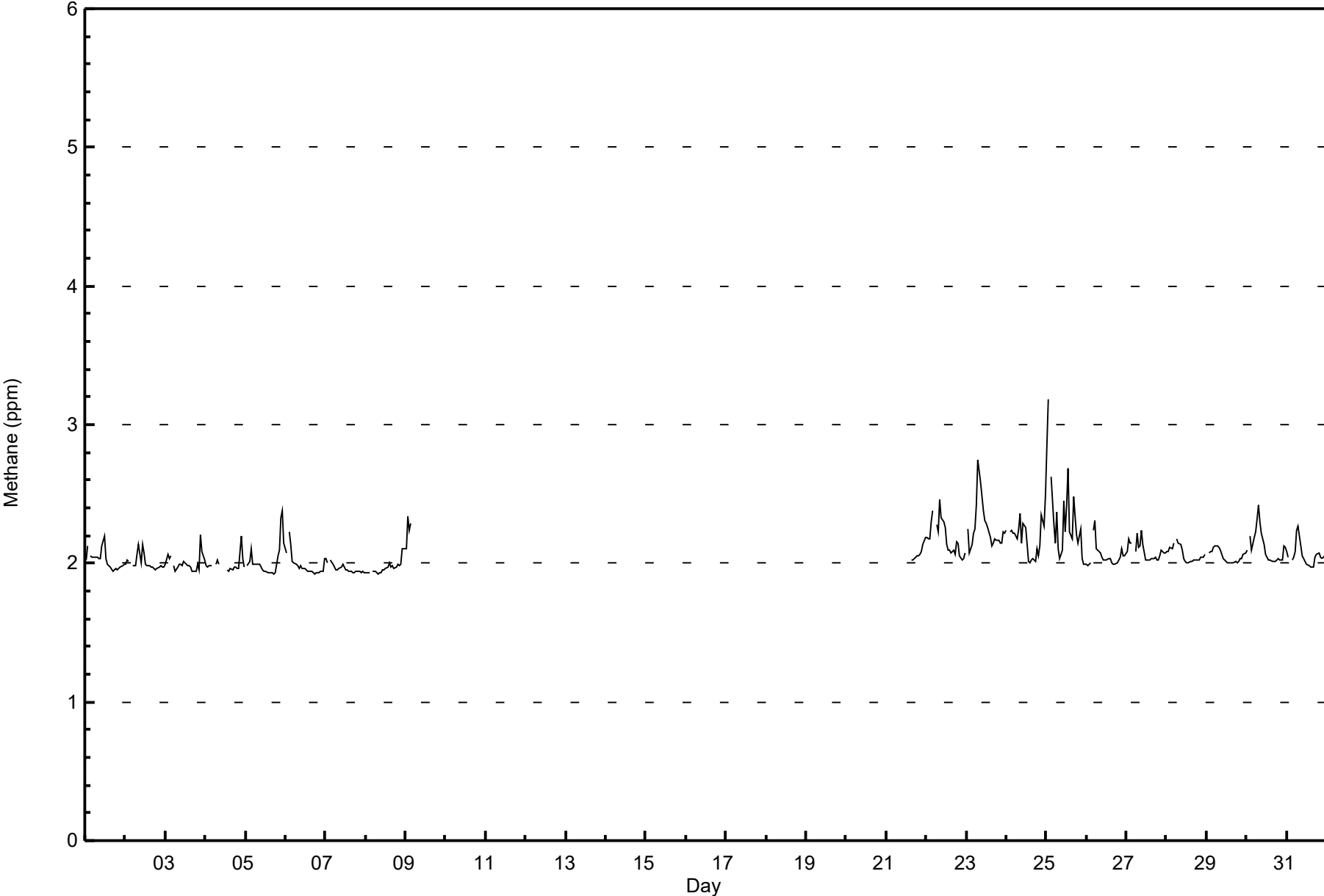
Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

Ells River - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		744																																										
Maximum Value: 3.2 ppm on Jul 25 02:00		Maximum Daily Average: 2.3 ppm on Jul 25		Hours of Data:		423		Hours of Missing Data: 321																																										
Minimum Value: 1.9 ppm on Jul 5 18:00		Minimum Daily Average: 2.0 ppm on Jul 7		Hours of Calibration: 23		Percent Operational Time: 60.0																																												
Maximum Diurnal Average: 2.1 ppm at hour 2		Minimum Diurnal Average: 2.0 ppm at hour 16		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.1 P ₉₀ = 2.2 P ₉₉ = 2.6																																														
Monthly Average: 2.08 ppm																																																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Jul	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2																					
2-Jul	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1																					
3-Jul	2.0	2.1	2.0	2.1	Z	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.2	2.1	2.0	2.0	2.2	2.2																						
4-Jul	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	C	C	C	C	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.2	2.0	2.0	2.0	2.0	2.2	2.2																						
5-Jul	Z	2.0	2.0	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	2.1	2.1	2.3	2.4	2.2	2.0	2.4																						
6-Jul	2.1	Z	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.2																					
7-Jul	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	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0																					
8-Jul	1.9	1.9	1.9	Z	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	2.1	2.1	2.0	2.1	2.1	2.1																					
9-Jul	2.1	2.3	2.2	2.3	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	2.3																					
10-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--																				
11-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--																				
12-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--																				
13-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--																				
14-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--																				
15-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--																				
16-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--																				
17-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--																				
18-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--																				
19-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--																				
20-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--																				
21-Jul	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	M	M	M	M	M	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	--	2.2																					
22-Jul	2.2	2.2	2.2	2.3	2.4	Z	2.3	2.2	2.5	2.3	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.0	2.0	2.1	2.2	2.2	2.5	2.5																					
23-Jul	Z	2.2	2.1	2.1	2.2	2.2	2.4	2.7	2.6	2.5	2.4	2.3	2.3	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.7	2.7																					
24-Jul	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.1	2.3	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.3	2.3	2.5	2.2	2.2	2.5	2.5																					
25-Jul	2.8	3.2	Z	2.6	2.3	2.1	2.4	2.1	2.0	2.1	2.4	2.2	2.4	2.7	2.2	2.2	2.5	2.3	2.2	2.1	2.2	2.0	2.0	2.0	2.0	2.3	3.2	3.2	3.2																					
26-Jul	2.0	2.0	2.0	Z	2.2	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	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.3																					
27-Jul	2.1	2.2	2.1	2.1	Z	2.1	2.2	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2																					
28-Jul	2.1	2.1	2.1	2.1	2.1	Z	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2																					
29-Jul	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1																					
30-Jul	2.1	Z	2.2	2.1	2.2	2.2	2.3	2.4	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.4	2.4																					
31-Jul	2.1	2.0	Z	2.0	2.0	2.1	2.2	2.3	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.3																					
																								2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	Diurnal Average	
																								2.8	3.2	2.2	2.6	2.4	2.3	2.4	2.7	2.6	2.5	2.4	2.3	2.4	2.7	2.2	2.2	2.5	2.3	2.2	2.2	2.2	2.3	2.4	2.5	Diurnal Maximum		
Z - zerospan			C - Calibration				M - Maintenance					UO - Unstable Operation																																						





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Ells River - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	245	57.92	57.92
2.1 - 3.0	177	41.84	99.76
3.1 - 10.0	1	0.24	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 423

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Ells River - July 2023**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	15	46	5	5	4	3	4	3	21	30	34	24	20	16	8	7	245
2.1 - 3.0	28	15	9	6	4	1	2	14	17	19	7	6	7	21	7	14	177
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	43	61	14	11	8	4	6	17	38	49	41	30	27	37	16	21	423

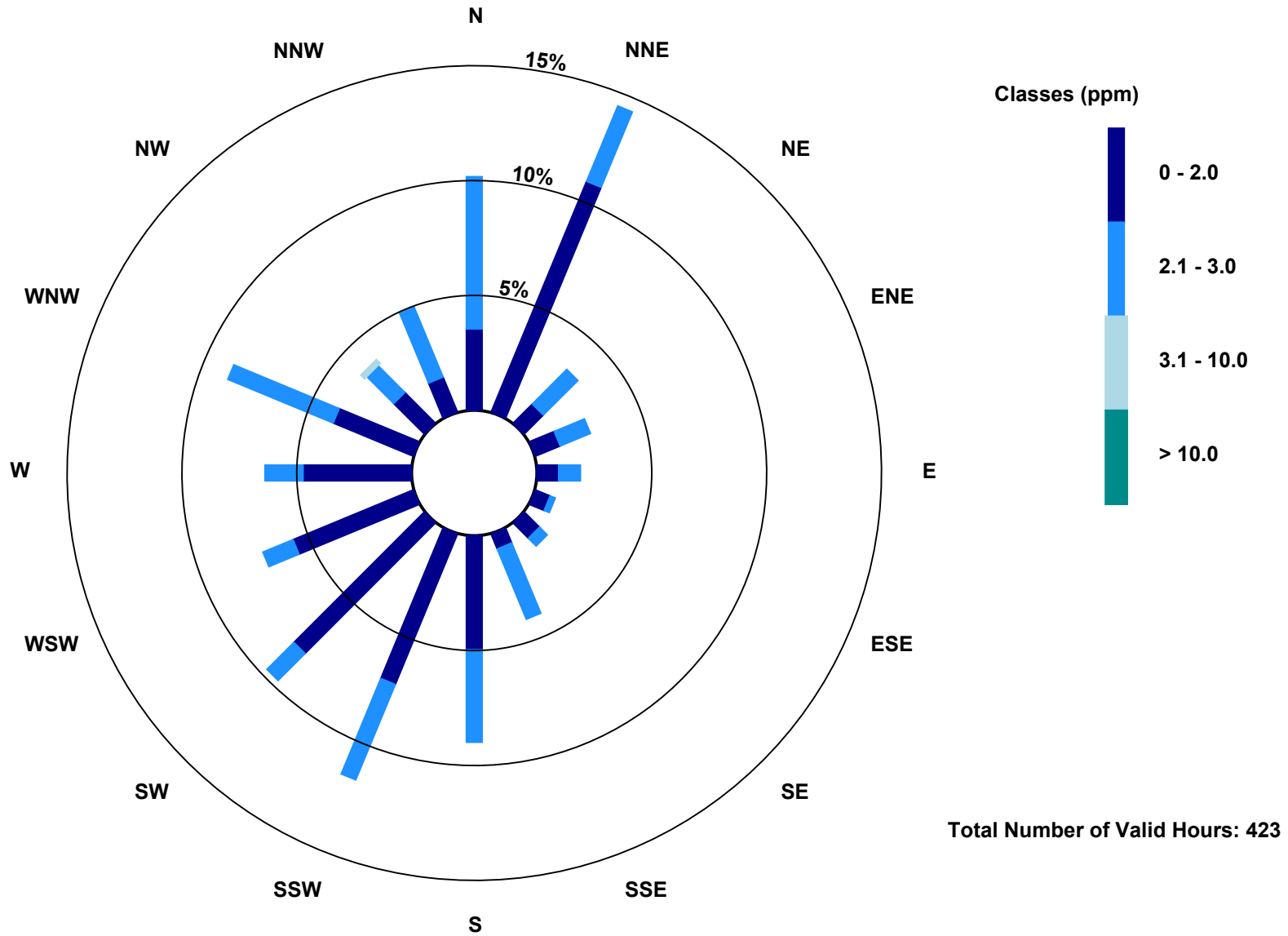
Total Number of Valid Hours: 423

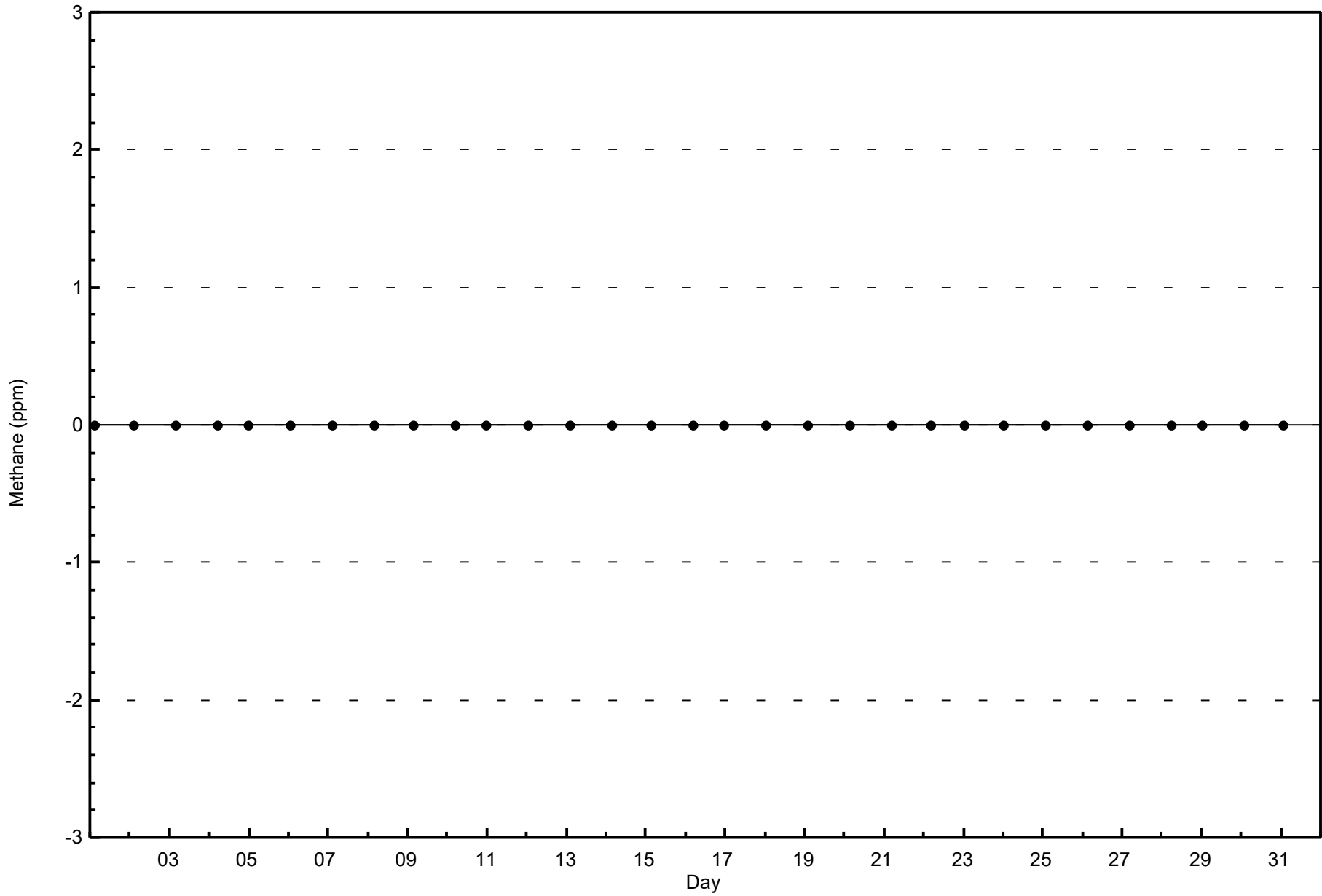
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Methane (CH₄) - ppm
Ells River

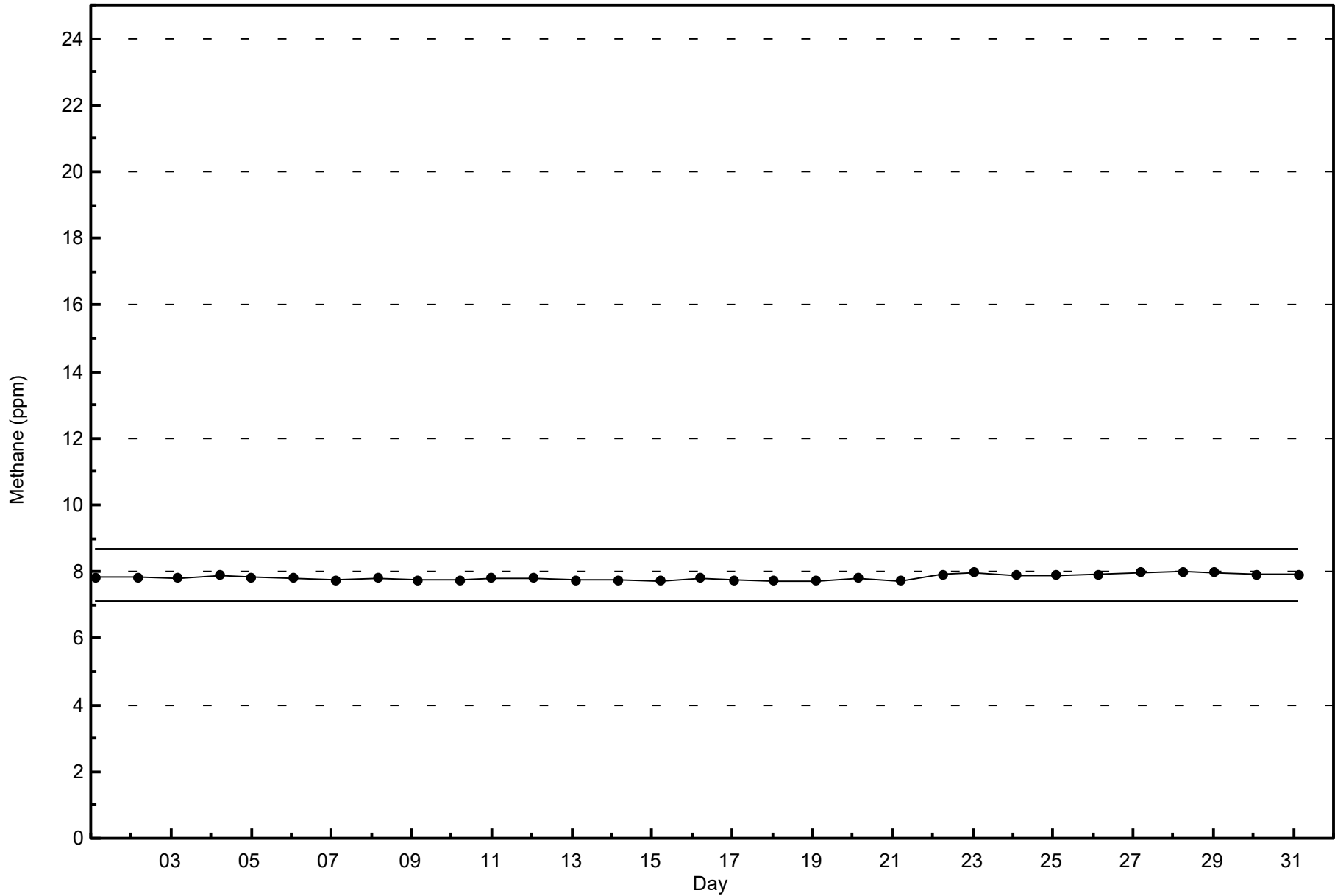






Wood Buffalo Environmental Association
Span Responses

Methane (CH₄) - ppm
Ells River - July 2023





Wood Buffalo Environmental Association
Summary of Hour Averages

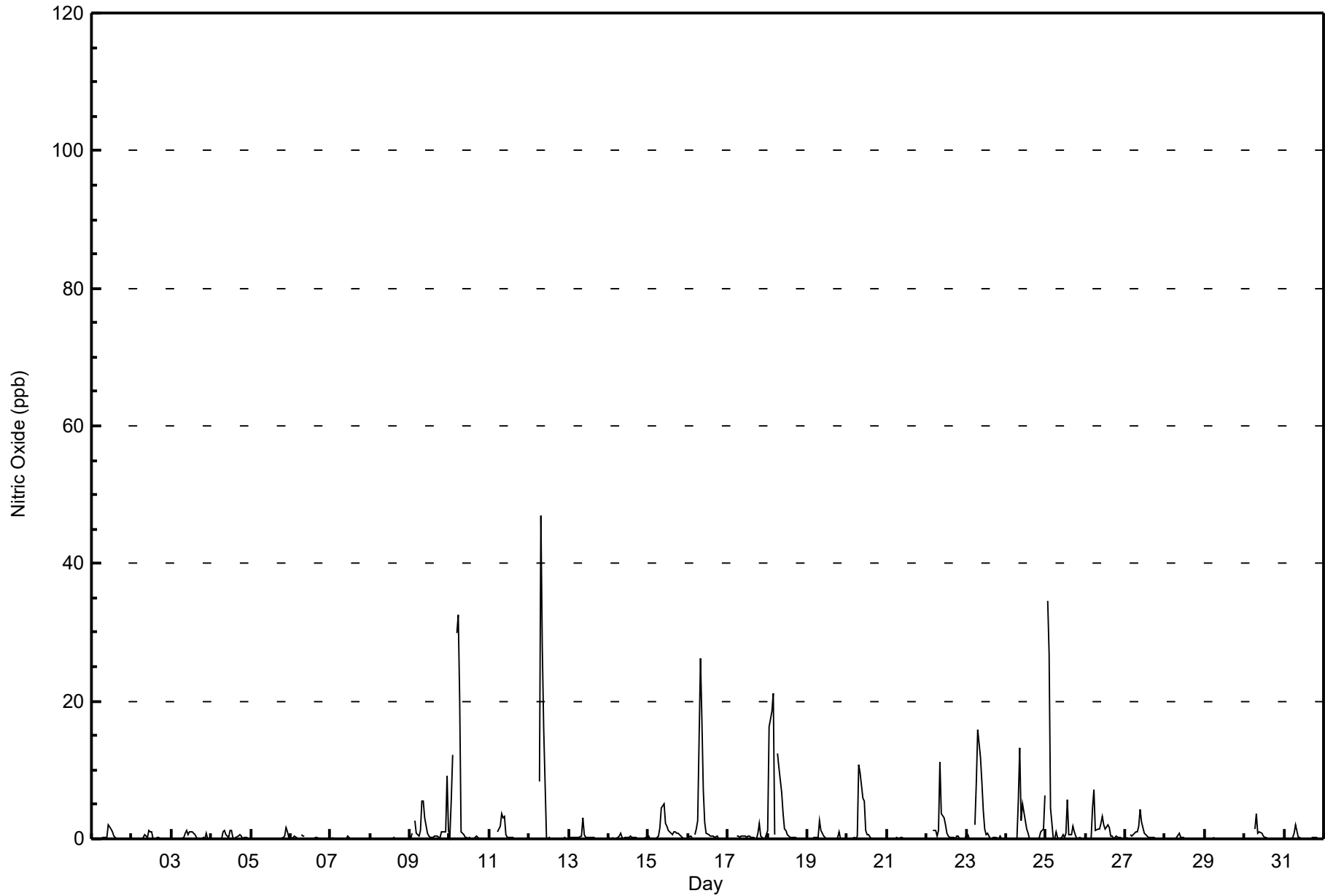
Nitric Oxide (NO) - ppb
Ells River - July 2023

Maximum Value: 47.0 ppb on Jul 12 08:00		Maximum Daily Average: 4.5 ppb on Jul 10		Hours in Service: 744																						
Minimum Value: 0.0 ppb on Jul 1 17:00		Minimum Daily Average: 0.0 ppb on Jul 29		Hours of Data: 708																						
Maximum Diurnal Average: 4.6 ppb at hour 8		Minimum Diurnal Average: 0.1 ppb at hour 21		Hours of Missing Data: 36																						
Monthly Average: 1.13 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.5 P ₉₀ = 1.8 P ₉₉ = 21.1		Hours of Calibration: 36																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.0	1.4	1.0	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.0
2-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.2	1.2	0.9	1.0	0.0	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.2
3-Jul	0.0	0.1	Z	0.1	0.0	0.0	0.1	0.2	0.9	1.2	0.5	0.9	1.0	0.8	0.6	0.3	0.0	0.0	0.0	0.3	0.0	0.8	0.0	0.0	0.3	1.2
4-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	1.0	1.3	0.7	0.2	1.2	1.3	0.2	0.1	0.2	0.4	0.6	0.5	0.1	0.1	0.1	0.1	0.0	0.3	1.3
5-Jul	0.0	0.0	0.0	0.0	Z	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.2	0.4	1.6	0.9	0.1	0.2	1.6
6-Jul	0.1	0.1	0.3	0.2	0.3	Z	0.5	0.4	0.4	C	C	C	C	C	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.5
7-Jul	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3
8-Jul	0.0	Z	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
9-Jul	0.1	0.8	Z	2.7	0.7	0.4	1.3	5.4	5.5	3.1	0.9	0.4	0.2	0.2	0.3	0.3	0.4	0.3	0.2	1.0	1.0	0.9	9.2	1.2	1.6	9.2
10-Jul	0.5	5.6	12.2	Z	29.9	32.5	20.4	1.0	0.6	0.2	0.1	0.0	0.1	0.0	0.2	0.3	0.2	0.1	0.1	0.1	0.0	0.1	0.0	4.5	32.5	
11-Jul	0.0	0.1	0.1	0.1	Z	1.0	1.8	3.7	3.0	3.2	0.5	0.2	0.1	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.6	3.7	
12-Jul	0.0	0.0	0.0	0.0	0.0	Z	8.4	47.0	27.8	16.0	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	4.4	47.0	
13-Jul	Z	0.1	0.1	0.1	0.2	0.2	0.1	0.5	3.1	0.7	0.2	0.3	0.2	0.3	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	3.1	
14-Jul	0.2	Z	0.1	0.0	0.1	0.2	0.3	0.7	0.3	0.1	0.1	0.2	0.3	0.5	0.2	0.2	0.2	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.2	0.7
15-Jul	0.4	0.1	Z	0.1	0.1	0.2	0.4	1.7	4.5	5.1	2.2	1.8	1.2	1.1	0.6	1.0	1.1	0.8	0.8	0.5	0.2	0.0	0.0	1.0	5.1	
16-Jul	0.3	0.3	0.1	Z	0.6	1.4	2.6	26.2	17.3	7.2	2.4	0.8	0.5	0.4	0.4	0.3	0.3	0.3	0.1	0.0	0.0	0.0	0.0	2.7	26.2	
17-Jul	0.0	0.0	0.1	0.0	Z	0.4	0.3	0.2	0.5	0.4	0.3	0.2	0.3	0.3	0.3	0.1	0.1	0.1	0.8	2.2	0.4	0.0	0.0	0.3	2.2	
18-Jul	1.1	16.3	18.4	21.1	0.5	Z	12.4	10.4	6.7	3.7	1.5	1.1	0.6	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.0	0.0	0.0	4.1	21.1	
19-Jul	Z	0.1	0.1	0.1	0.2	0.2	0.2	2.7	1.3	0.8	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.9	0.0	0.0	0.0	0.3	2.7	
20-Jul	0.0	Z	0.1	0.0	0.1	0.1	0.3	10.7	9.5	5.9	5.4	1.3	0.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	10.7	
21-Jul	0.0	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	
22-Jul	0.0	0.0	0.1	Z	1.3	1.3	0.5	1.1	11.1	3.6	3.1	2.0	0.8	0.3	0.1	0.1	0.2	0.1	0.4	0.3	0.0	0.0	0.0	1.1	11.1	
23-Jul	0.6	0.5	0.0	0.0	Z	2.1	8.2	15.8	11.8	8.0	4.0	1.5	0.6	0.8	0.1	0.0	0.3	0.2	0.2	0.1	0.3	0.0	0.1	2.4	15.8	
24-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	5.4	13.3	2.7	5.1	2.7	1.5	0.8	0.1	0.0	0.0	0.0	0.1	0.1	0.3	1.0	1.5	6.3	13.3	
25-Jul	Z	34.5	26.8	4.5	0.1	0.0	1.1	0.3	0.1	0.1	0.6	0.2	0.9	5.7	0.7	0.6	1.8	1.0	0.4	0.1	0.2	0.0	0.0	3.5	34.5	
26-Jul	0.0	Z	0.0	0.0	4.5	7.2	1.2	1.4	1.3	2.2	3.3	2.0	1.5	2.0	1.7	0.4	0.4	0.1	0.4	0.3	0.2	0.1	0.0	1.3	7.2	
27-Jul	0.1	0.2	Z	0.6	0.4	0.7	1.0	1.0	1.8	4.2	2.5	0.8	0.6	0.5	0.1	0.3	0.2	0.2	0.1	0.0	0.1	0.0	0.0	0.7	4.2	
28-Jul	0.0	0.0	0.0	Z	0.0	0.1	0.1	0.2	0.8	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8	
29-Jul	0.0	0.0	0.0	0.0	Z	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	
30-Jul	0.0	0.0	0.0	0.0	0.0	Z	1.4	3.6	0.9	0.9	0.8	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	3.6
31-Jul	Z	0.1	0.1	0.1	0.1	0.2	0.7	2.0	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.0	0.0	0.0	0.2	2.0	
		0.1	2.3	2.3	1.2	1.5	1.9	2.1	4.6	4.0	2.4	1.3	0.7	0.5	0.5	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.4	0.3	Diurnal Average
		1.1	34.5	26.8	21.1	29.9	32.5	20.4	47.0	27.8	16.0	5.4	2.7	1.5	5.7	1.7	1.0	1.8	1.0	0.8	2.2	1.0	1.6	9.2	6.3	Diurnal Maximum
Z - zerospan		C - Calibration																								



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Ells River - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Ells River - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	700	98.87	98.87
21 - 40	7	0.99	99.86
11 - 80	1	0.14	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Nitric Oxide (NO) - ppb
Ells River - July 2023

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	88	103	30	13	17	4	21	46	51	62	53	40	45	62	34	31	700
21 - 40	2	1	0	0	0	0	0	0	1	0	0	0	1	0	1	1	7
11 - 80	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	104	30	13	17	4	21	46	52	62	53	40	46	62	35	32	708

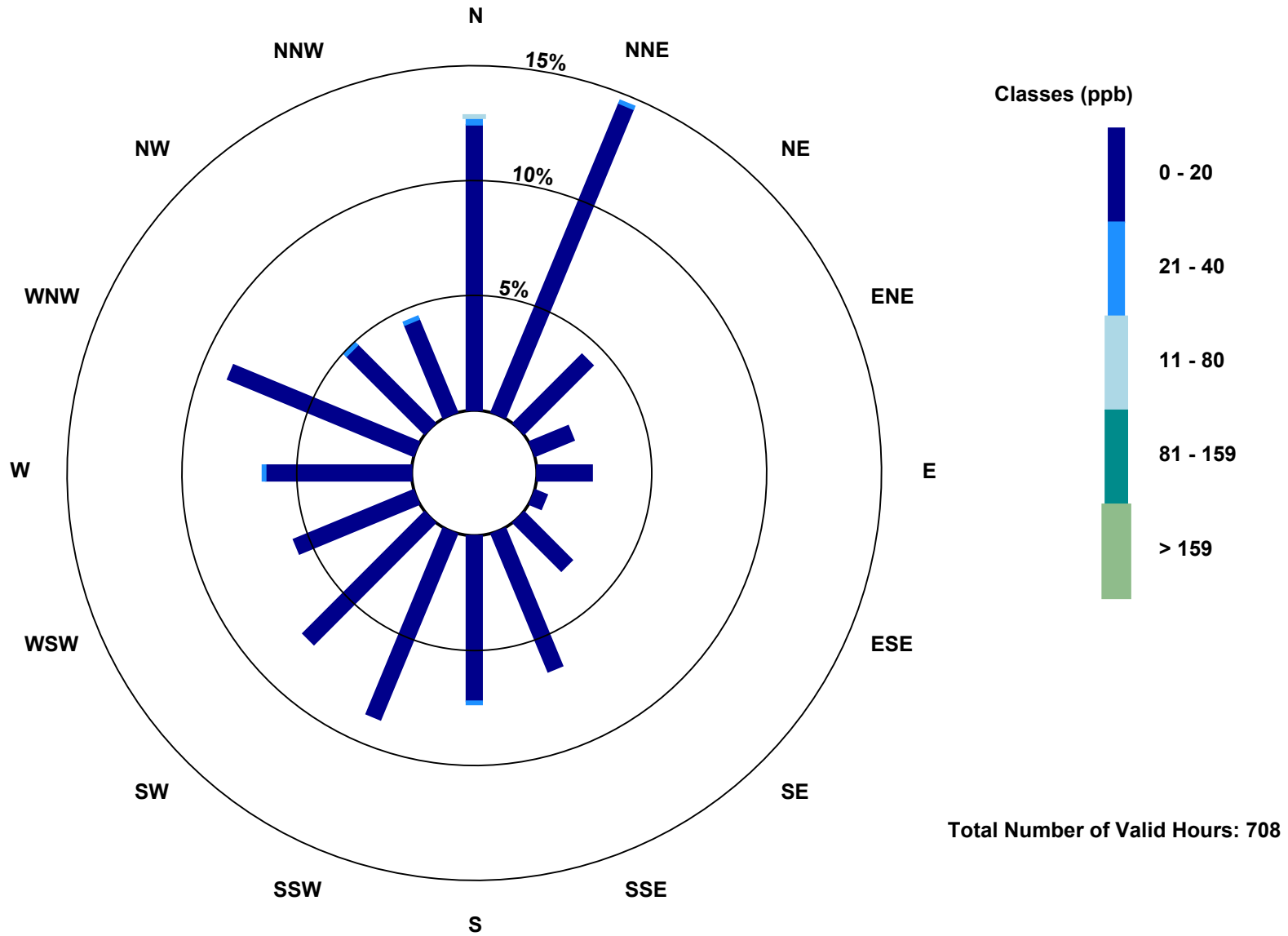
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

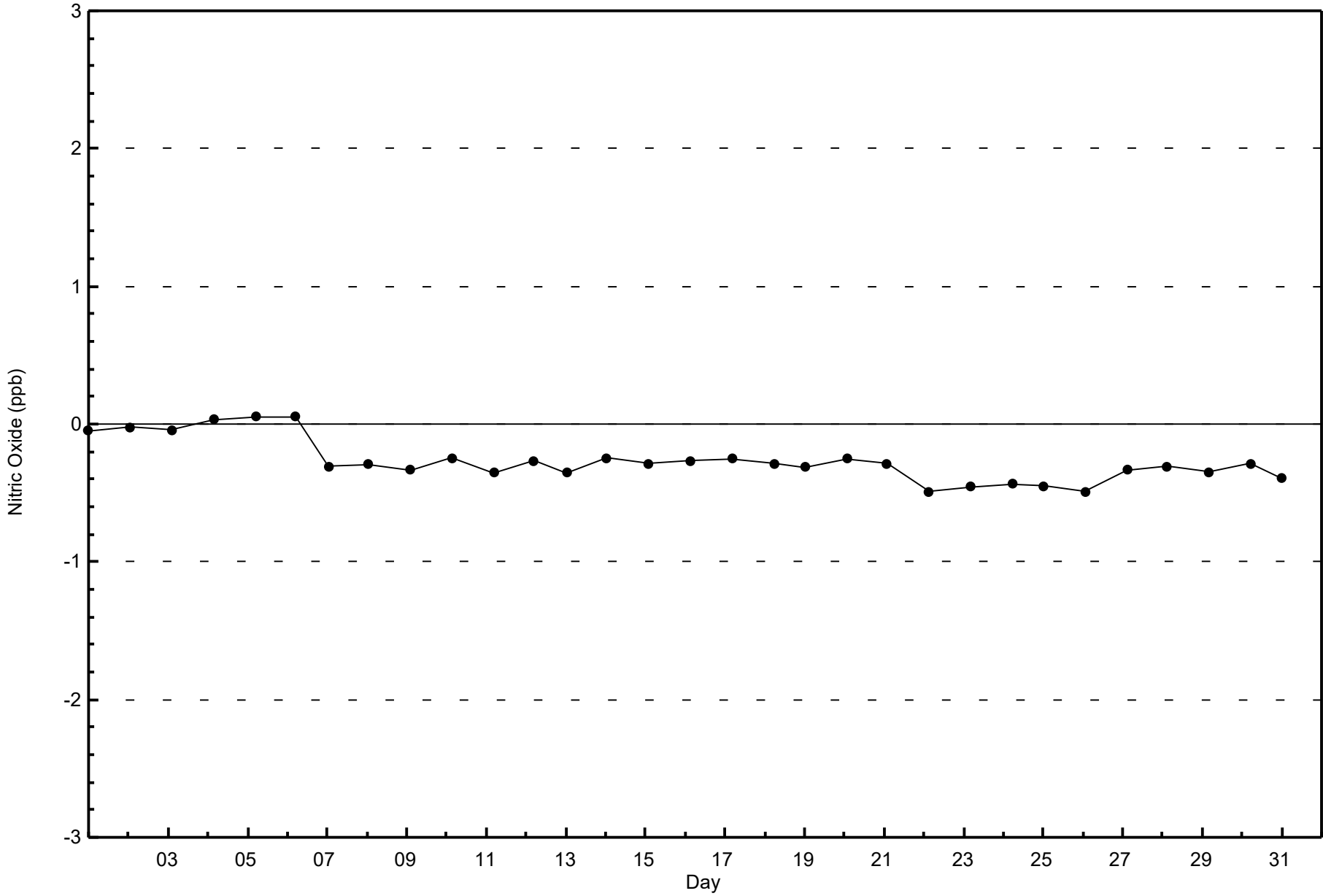
Nitric Oxide (NO) - ppb
Ells River

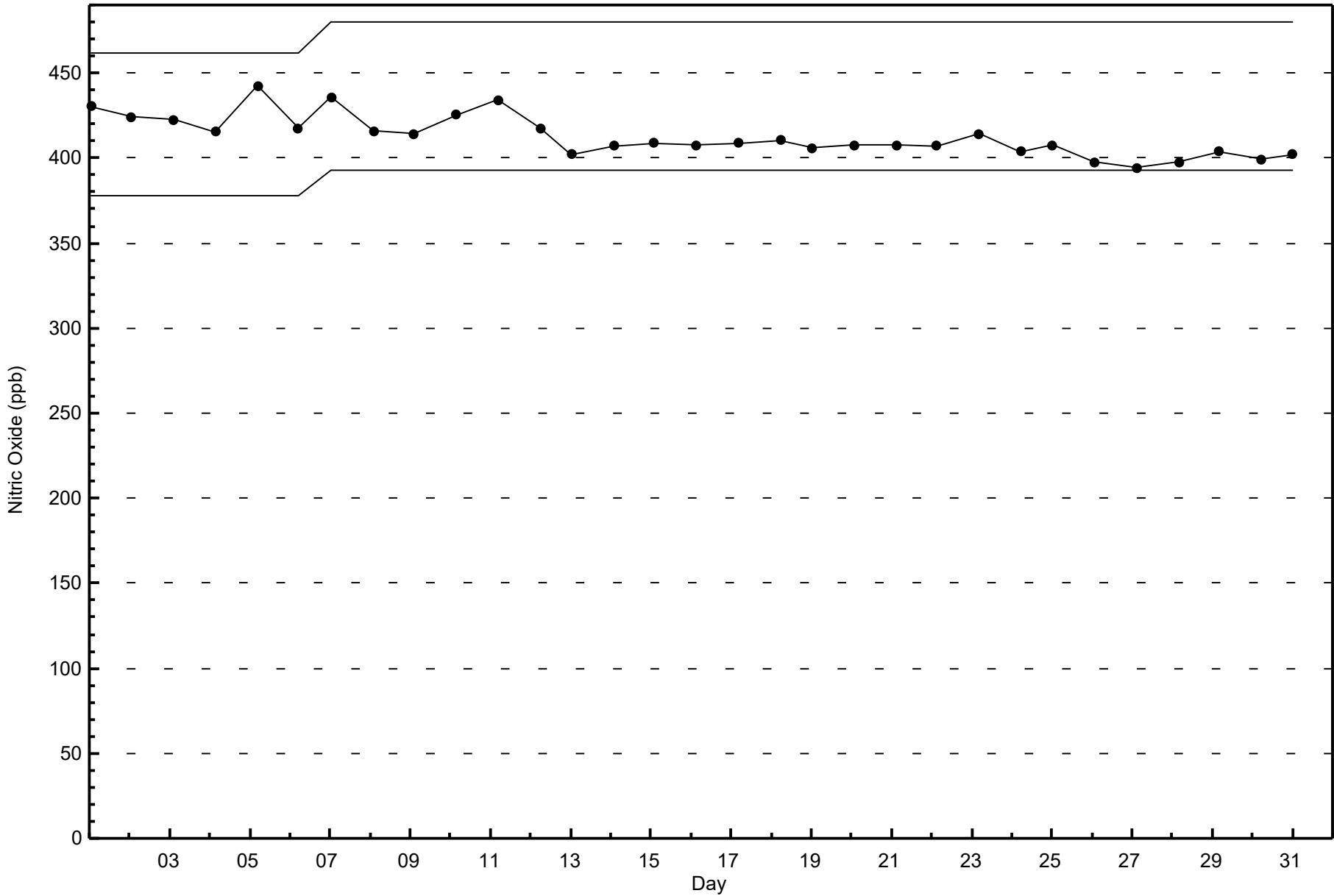




Wood Buffalo Environmental Association
Zero Responses

Nitric Oxide (NO) - ppb
Ells River - July 2023







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

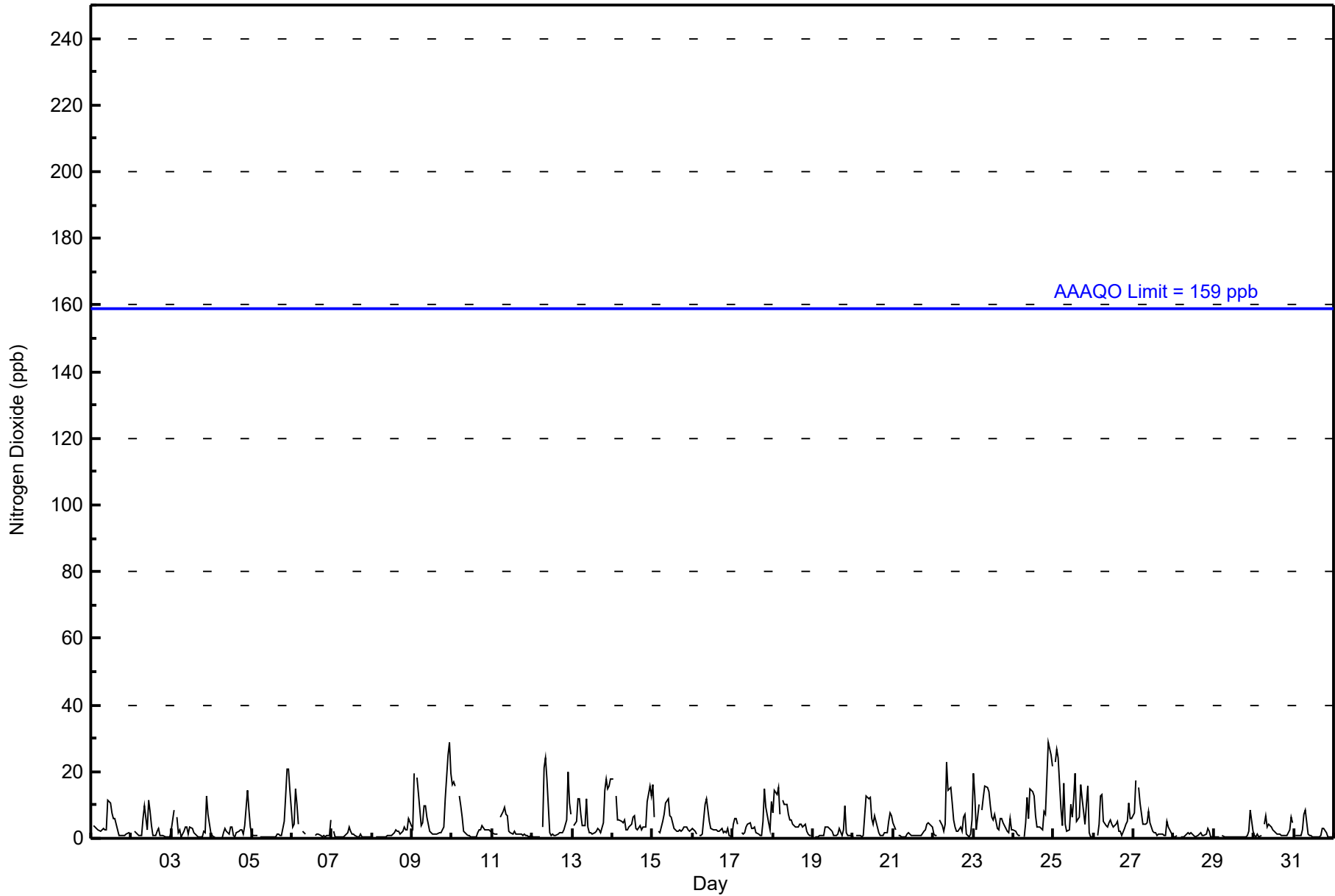
Ells River - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744																																											
Maximum Value: 29.0 ppb on Jul 24 22:00		Maximum Daily Average: 10.0 ppb on Jul 25		Hours of Data: 708																																													
Minimum Value: 0.2 ppb on Jul 4 05:00		Minimum Daily Average: 0.9 ppb on Jul 7		Hours of Missing Data: 36																																													
Maximum Diurnal Average: 6.6 ppb at hour 22		Minimum Diurnal Average: 1.9 ppb at hour 16		Hours of Calibration: 36																																													
Monthly Average: 4.17 ppb		Percentiles: P ₁ = 0.3 P ₁₀ = 0.6 Q ₁ = 0.9 Median = 2.3 Q ₃ = 5.1 P ₉₀ = 11.8 P ₉₉ = 22.9		Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	Z	3.7	3.5	2.9	2.6	2.3	2.4	3.1	2.7	2.6	11.3	10.7	7.6	5.9	6.0	4.2	0.9	0.8	0.8	0.9	1.0	1.2	1.8	1.2	3.5	11.3																							
2-Jul	1.3	Z	2.0	1.4	1.0	0.9	0.9	5.9	9.8	2.5	11.6	7.9	4.0	0.8	0.9	2.0	2.9	0.8	0.7	0.7	0.6	0.6	0.6	0.6	2.6	11.6																							
3-Jul	2.6	8.5	Z	6.4	1.8	2.4	0.5	2.3	3.5	3.5	1.3	3.4	3.0	1.7	1.3	1.0	0.3	0.3	0.3	2.1	1.5	12.9	7.0	1.8	3.0	12.9																							
4-Jul	0.7	0.5	0.4	Z	0.2	0.2	0.2	1.8	3.0	2.0	1.2	3.2	3.2	0.9	0.6	1.8	2.0	2.7	2.6	1.4	3.9	14.6	8.5	3.3	2.6	14.6																							
5-Jul	1.2	0.7	0.8	1.0	Z	0.4	0.4	0.5	0.4	0.6	0.6	0.5	0.5	0.6	1.1	1.2	0.8	0.9	5.2	12.9	20.8	20.9	14.3	3.8	20.9																								
6-Jul	3.4	4.3	14.7	10.2	4.4	Z	2.0	1.7	1.3	C	C	C	C	C	0.8	1.2	1.2	0.8	0.6	0.7	0.5	0.7	0.7	5.6	3.0	14.7																							
7-Jul	Z	2.0	0.6	0.4	0.3	0.3	0.3	0.4	0.8	1.9	3.5	2.2	1.3	1.2	0.7	0.5	0.4	1.1	0.5	0.6	0.5	0.4	0.4	0.3	0.9	3.5																							
8-Jul	0.4	Z	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.7	0.9	0.8	0.9	1.5	2.7	2.0	2.2	1.4	2.2	3.2	2.5	2.7	6.1	3.9	1.6	6.1																							
9-Jul	2.8	19.3	Z	18.4	13.5	3.9	4.8	9.9	9.8	6.2	2.3	1.7	1.1	1.1	1.1	1.4	1.6	1.6	2.4	3.6	12.0	24.9	28.8	19.4	8.3	28.8																							
10-Jul	16.1	16.9	15.5	Z	12.9	9.6	6.5	2.3	1.4	0.9	0.7	0.5	0.6	0.4	0.5	1.5	2.5	2.6	3.7	2.7	2.6	2.7	2.4	2.3	4.7	16.9																							
11-Jul	1.7	1.1	1.1	1.3	Z	6.2	7.9	9.2	7.3	6.9	2.3	1.9	1.4	2.1	1.4	1.2	1.4	1.2	1.0	1.2	0.8	0.7	0.6	0.7	2.6	9.2																							
12-Jul	0.6	0.6	0.5	0.5	0.5	Z	3.6	21.0	24.0	17.8	1.5	0.9	1.2	1.0	0.9	1.4	1.9	1.9	1.7	2.7	5.5	20.0	10.5	7.2	5.5	24.0																							
13-Jul	Z	4.0	4.9	11.8	11.9	7.3	3.8	3.8	11.7	3.6	1.5	1.6	1.4	1.6	2.0	3.0	2.7	1.9	4.6	14.5	18.0	14.7	15.8	17.9	7.1	18.0																							
14-Jul	17.7	Z	12.9	5.7	5.4	5.2	4.8	5.5	2.4	2.7	3.2	4.4	6.3	6.8	2.8	2.6	3.8	2.4	3.2	3.6	3.5	11.2	15.7	12.8	6.3	17.7																							
15-Jul	16.1	6.4	Z	2.2	1.7	3.2	4.9	7.1	10.6	11.9	6.7	6.5	4.8	3.1	2.2	2.1	2.4	2.2	2.7	3.2	3.2	2.5	2.3	2.5	4.8	16.1																							
16-Jul	3.0	2.1	1.4	Z	0.7	0.8	1.2	10.2	11.7	8.5	5.2	2.9	2.5	2.4	2.5	2.3	2.2	2.8	1.8	2.2	1.6	3.0	1.0	0.6	3.2	11.7																							
17-Jul	4.3	6.1	6.1	4.2	Z	1.7	1.4	1.5	3.6	4.1	4.6	3.1	3.1	3.3	1.8	1.2	0.7	0.8	5.1	14.9	9.4	4.5	2.4	10.9	4.3	14.9																							
18-Jul	7.7	14.4	13.0	15.2	7.1	Z	11.3	10.3	10.3	7.3	5.3	5.4	4.2	3.4	3.3	3.3	4.4	4.4	3.6	4.4	2.3	1.2	0.9	1.0	6.2	15.2																							
19-Jul	Z	0.6	0.6	0.5	0.8	0.7	0.8	3.3	3.4	3.6	3.0	2.2	0.9	0.7	0.8	1.4	2.9	0.9	2.6	9.7	1.5	0.7	0.7	0.7	1.9	9.7																							
20-Jul	0.6	Z	1.0	0.7	0.7	0.5	0.7	6.9	12.6	12.0	12.4	6.0	4.3	6.8	3.3	1.5	1.0	0.9	0.9	1.6	1.5	4.9	7.6	6.9	4.1	12.6																							
21-Jul	4.5	2.6	Z	0.8	0.7	0.6	0.6	0.6	1.2	1.8	1.3	1.0	1.0	1.0	0.9	0.9	0.8	0.8	2.1	2.4	4.2	4.5	4.2	3.5	1.8	4.5																							
22-Jul	1.4	1.0	0.9	Z	5.5	3.8	2.0	4.1	22.9	14.6	15.1	10.8	5.6	3.5	2.1	2.0	3.5	2.0	6.2	7.4	1.4	0.5	1.4	5.3	5.3	22.9																							
23-Jul	19.5	12.7	2.4	10.3	Z	8.4	12.2	15.7	15.2	13.9	9.7	6.4	5.5	7.1	3.1	2.5	5.9	5.9	4.5	2.8	2.2	1.7	5.8	2.7	7.7	19.5																							
24-Jul	2.6	2.2	1.3	1.0	0.7	Z	0.6	4.6	12.1	6.0	14.9	14.1	12.7	6.9	3.3	3.3	3.3	2.7	7.9	7.4	17.9	29.0	25.2	21.7	8.8	29.0																							
25-Jul	Z	22.9	26.8	24.0	9.1	3.9	16.6	4.2	2.3	2.4	10.2	6.3	11.8	19.7	5.1	6.3	16.0	11.9	7.9	4.1	15.5	1.7	0.5	0.5	10.0	26.8																							
26-Jul	0.5	Z	0.7	4.2	12.7	13.0	5.1	3.8	3.2	4.5	5.4	4.1	3.6	4.3	4.9	2.0	2.1	0.9	2.8	4.2	5.2	10.7	6.0	6.1	4.8	13.0																							
27-Jul	7.6	17.2	Z	15.1	10.6	4.1	4.2	4.1	4.5	7.9	4.5	2.3	1.7	1.5	0.9	1.4	1.3	1.2	0.9	0.7	5.2	3.4	1.8	0.8	4.5	17.2																							
28-Jul	0.6	0.6	0.8	Z	0.5	0.4	0.5	0.7	1.8	1.3	1.6	1.3	0.8	0.5	0.7	1.2	1.5	0.8	1.0	1.1	3.0	2.0	0.6	0.5	1.0	3.0																							
29-Jul	0.5	0.5	0.5	0.4	Z	1.0	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.6	0.7	2.1	8.5	2.3	1.0	8.5																						
30-Jul	0.9	0.6	1.4	0.6	1.0	Z	4.4	6.9	3.5	4.1	3.6	2.5	2.1	1.8	1.3	1.1	0.7	0.7	0.7	0.7	0.7	0.7	2.4	6.3	4.8	2.3	6.9																						
31-Jul	Z	1.0	0.8	0.8	0.8	2.7	7.0	8.5	1.3	0.8	0.9	0.6	0.6	0.6	0.6	0.5	0.7	3.0	3.1	1.8	0.6	0.6	0.4	0.5	1.7	8.5																							
																								4.7	5.9	4.4	5.4	4.1	3.2	3.6	5.2	6.4	5.2	4.9	3.9	3.3	3.1	1.9	1.9	2.4	2.0	2.6	3.6	4.6	6.6	6.3	5.2	Diurnal Average	
																								19.5	22.9	26.8	24.0	13.5	13.0	16.6	21.0	24.0	17.8	15.1	14.1	12.7	19.7	6.0	6.3	16.0	11.9	7.9	14.9	18.0	29.0	28.8	21.7	Diurnal Maximum	
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Ells River - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Ells River - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	695	98.16	98.16
21 - 40	13	1.84	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Ells River - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	86	102	28	13	17	4	21	46	52	62	53	39	45	62	33	32	695
21 - 40	5	2	2	0	0	0	0	0	0	0	0	1	1	0	2	0	13
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	104	30	13	17	4	21	46	52	62	53	40	46	62	35	32	708

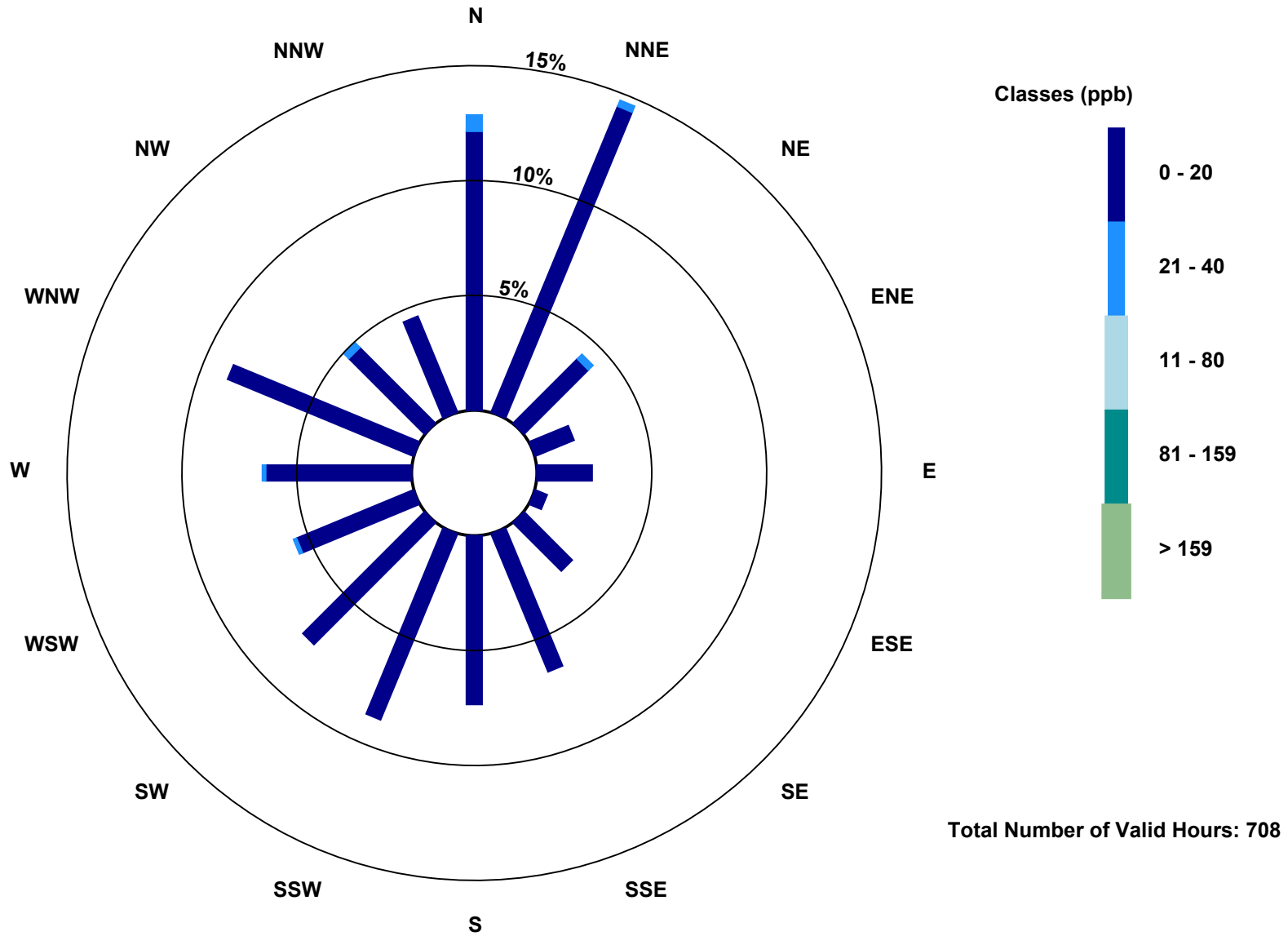
Total Number of Valid Hours: 708

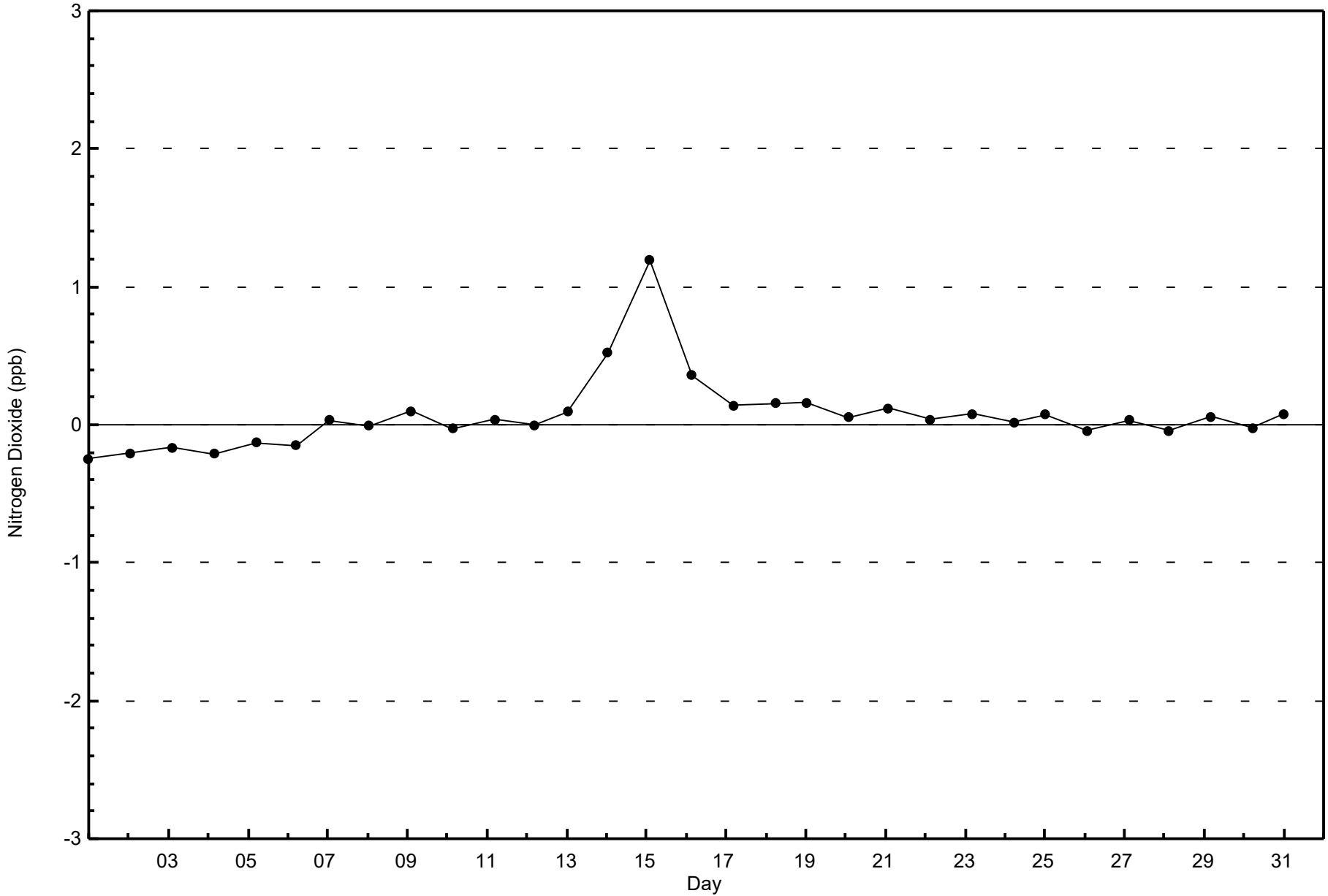
Total Number of Hours: 744

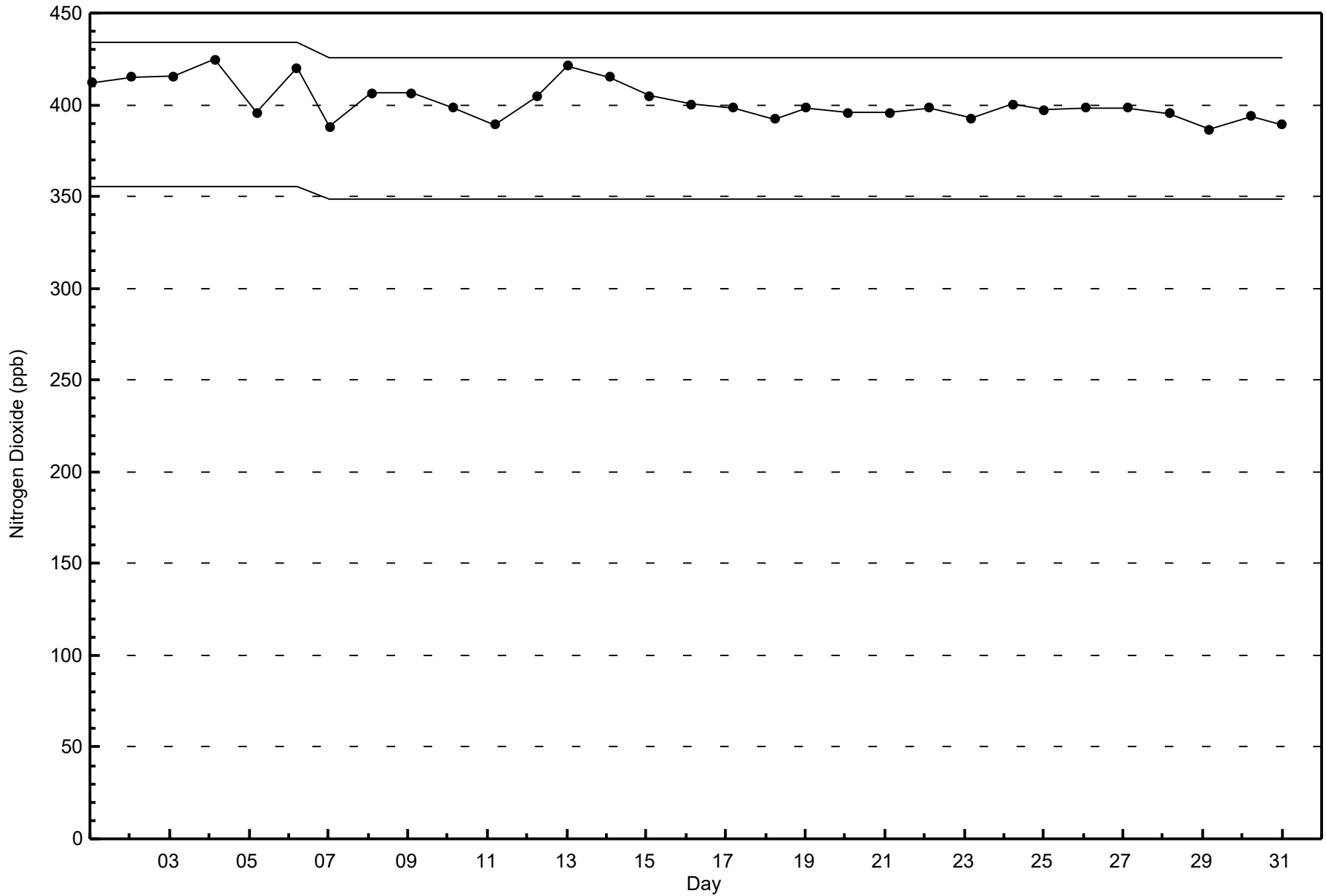


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Ells River









Wood Buffalo Environmental Association
Summary of Hour Averages

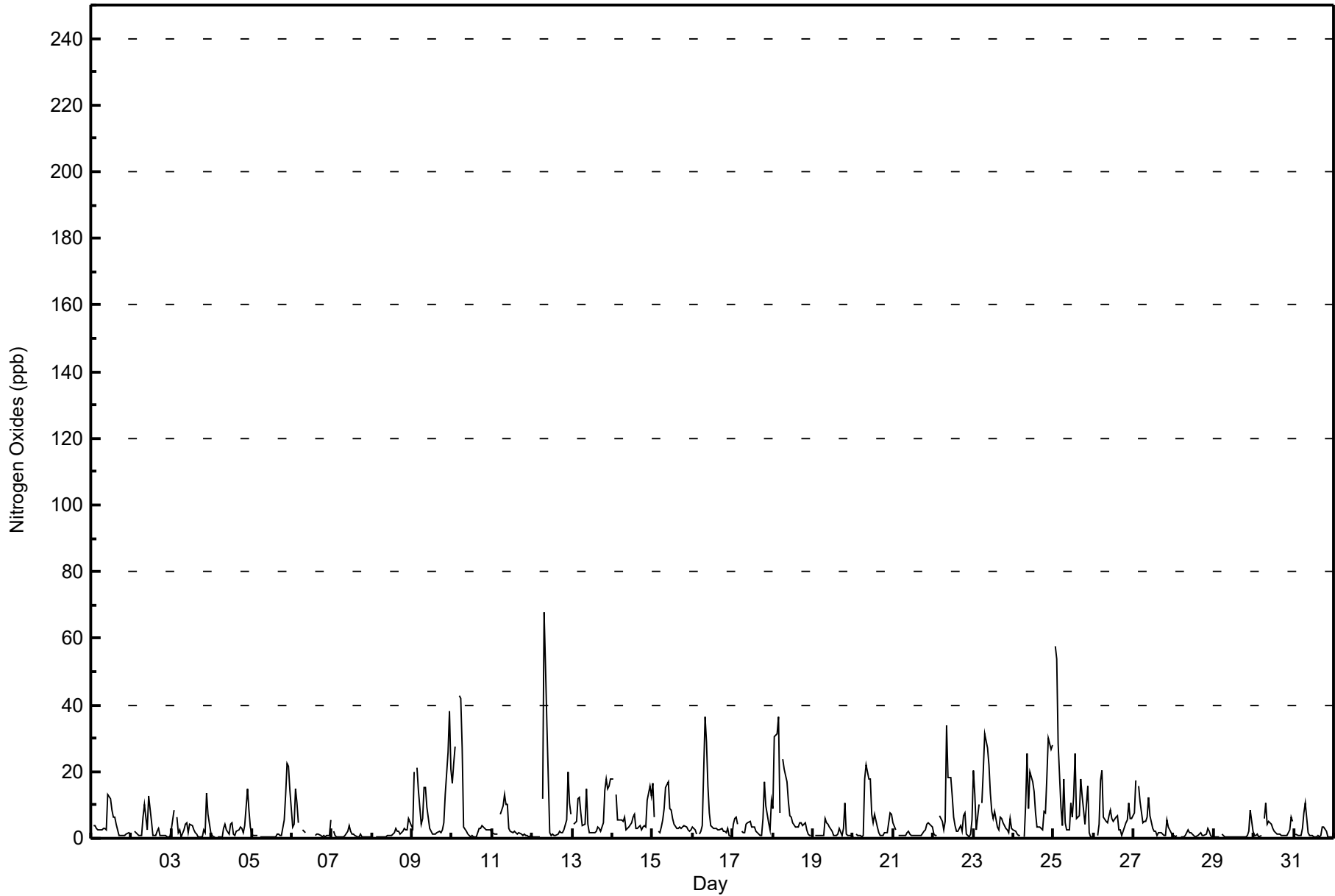
Nitrogen Oxides (NO_x) - ppb
Ells River - July 2023

Maximum Value: 68.0 ppb on Jul 12 08:00		Maximum Daily Average: 13.5 ppb on Jul 25		Hours in Service: 744																																													
Minimum Value: 0.2 ppb on Jul 4 07:00		Minimum Daily Average: 1.0 ppb on Jul 7		Hours of Data: 708																																													
Maximum Diurnal Average: 10.5 ppb at hour 9		Minimum Diurnal Average: 2.1 ppb at hour 16		Hours of Missing Data: 36																																													
Monthly Average: 5.29 ppb		Percentiles: P ₁ = 0.4 P ₁₀ = 0.6 Q ₁ = 0.9 Median = 2.5 Q ₃ = 6.0 P ₉₀ = 14.6 P ₉₉ = 36.4		Hours of Calibration: 36																																													
				Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jul	Z	3.8	3.6	3.0	2.7	2.4	2.5	3.2	2.8	2.7	13.3	12.1	8.6	6.4	6.2	4.3	0.9	0.8	0.8	0.9	1.0	1.2	1.8	1.2	3.7	13.3																							
2-Jul	1.3	Z	2.0	1.4	1.0	0.9	0.9	6.2	10.3	2.7	12.8	8.8	5.0	0.8	1.0	2.1	3.1	0.8	0.7	0.7	0.6	0.6	0.6	0.6	2.8	12.8																							
3-Jul	2.6	8.6	Z	6.5	1.8	2.4	0.6	2.5	4.4	4.7	1.8	4.3	4.0	2.5	1.9	1.3	0.3	0.3	0.3	2.4	1.5	13.7	7.0	1.8	3.4	13.7																							
4-Jul	0.7	0.5	0.4	Z	0.2	0.2	0.2	2.8	4.3	2.7	1.4	4.4	4.5	1.1	0.7	2.0	2.4	3.3	3.1	1.5	4.0	14.7	8.6	3.3	2.9	14.7																							
5-Jul	1.2	0.7	0.8	1.0	Z	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.6	1.2	1.3	0.8	0.9	5.4	13.3	22.4	21.8	14.4	3.9	22.4																							
6-Jul	3.5	4.4	15.0	10.4	4.7	Z	2.5	2.1	1.7	C	C	C	C	C	0.8	1.4	1.3	0.8	0.6	0.7	0.5	0.7	0.7	5.7	3.2	15.0																							
7-Jul	Z	2.1	0.7	0.5	0.4	0.4	0.4	0.5	0.9	2.0	3.8	2.3	1.4	1.2	0.7	0.5	0.4	1.2	0.5	0.6	0.5	0.4	0.4	0.3	1.0	3.8																							
8-Jul	0.4	Z	0.5	0.4	0.4	0.4	0.4	0.5	0.6	0.8	1.0	0.8	0.9	1.5	2.8	2.0	2.2	1.4	2.2	3.2	2.5	2.7	6.1	3.9	1.6	6.1																							
9-Jul	2.9	20.1	Z	21.1	14.2	4.3	6.1	15.3	15.3	9.3	3.2	2.1	1.3	1.3	1.4	1.7	2.0	1.9	2.6	4.6	13.0	25.8	38.0	20.6	9.9	38.0																							
10-Jul	16.6	22.5	27.7	Z	42.8	42.1	26.9	3.3	2.0	1.1	0.8	0.5	0.7	0.4	0.5	1.7	2.8	2.8	3.8	2.8	2.7	2.7	2.5	2.3	9.2	42.8																							
11-Jul	1.7	1.2	1.2	1.4	Z	7.2	9.7	12.9	10.3	10.1	2.8	2.1	1.5	2.3	1.6	1.3	1.5	1.2	1.0	1.2	0.8	0.7	0.6	0.7	3.3	12.9																							
12-Jul	0.6	0.6	0.5	0.5	0.5	Z	12.0	68.0	51.8	33.8	1.7	1.0	1.3	1.0	0.9	1.4	2.0	1.9	1.7	2.7	5.5	20.1	10.6	7.3	9.9	68.0																							
13-Jul	Z	4.1	5.0	11.9	12.1	7.5	3.9	4.3	14.8	4.3	1.7	1.9	1.6	1.9	2.2	3.2	2.8	1.9	4.6	14.5	18.0	14.7	15.8	17.9	7.4	18.0																							
14-Jul	17.9	Z	13.0	5.7	5.5	5.4	5.1	6.2	2.7	2.8	3.3	4.6	6.6	7.3	3.0	2.8	4.0	2.4	3.2	3.7	3.5	11.3	15.8	12.9	6.5	17.9																							
15-Jul	16.5	6.5	Z	2.3	1.8	3.4	5.3	8.8	15.1	17.0	8.9	8.3	6.0	4.2	2.8	3.1	3.5	3.0	3.5	3.7	3.4	2.5	2.3	2.5	5.8	17.0																							
16-Jul	3.3	2.4	1.5	Z	1.3	2.2	3.8	36.4	29.0	15.7	7.6	3.7	3.0	2.8	2.9	2.6	2.5	3.1	1.9	2.2	1.6	3.0	1.0	0.6	5.8	36.4																							
17-Jul	4.3	6.1	6.2	4.2	Z	2.1	1.7	1.7	4.1	4.5	4.9	3.3	3.4	3.6	2.1	1.3	0.8	0.9	5.9	17.1	9.8	4.5	2.4	11.6	4.6	17.1																							
18-Jul	8.8	30.7	31.4	36.3	7.6	Z	23.7	20.7	17.0	11.0	6.8	6.5	4.8	3.6	3.4	3.4	4.6	4.6	3.7	4.5	2.3	1.2	0.9	1.0	10.4	36.3																							
19-Jul	Z	0.7	0.7	0.6	1.0	0.9	1.0	6.0	4.7	4.4	3.3	2.3	0.9	0.7	0.8	1.4	2.9	0.9	2.8	10.6	1.5	0.7	0.7	0.7	2.2	10.6																							
20-Jul	0.6	Z	1.1	0.7	0.8	0.6	1.0	17.6	22.1	17.9	17.8	7.3	4.8	7.4	3.3	1.5	1.0	0.9	0.9	1.6	1.5	4.9	7.6	7.0	5.7	22.1																							
21-Jul	4.5	2.7	Z	0.9	0.8	0.7	0.7	0.7	1.5	2.1	1.4	1.0	1.0	1.0	0.9	0.9	0.8	0.8	2.1	2.4	4.2	4.5	4.2	3.5	1.9	4.5																							
22-Jul	1.4	1.0	1.0	Z	6.8	5.1	2.5	5.2	34.0	18.2	18.2	12.8	6.4	3.8	2.2	2.1	3.7	2.1	6.6	7.7	1.4	0.5	1.4	5.3	6.5	34.0																							
23-Jul	20.1	13.2	2.4	10.3	Z	10.5	20.4	31.5	27.0	21.9	13.7	7.9	6.1	7.9	3.2	2.5	6.2	6.1	4.7	2.9	2.5	1.7	5.8	2.8	10.1	31.5																							
24-Jul	2.6	2.2	1.3	1.0	0.7	Z	0.6	10.0	25.4	8.7	20.0	16.8	14.2	7.7	3.4	3.3	3.3	2.7	8.0	7.5	18.2	30.0	26.7	28.0	10.5	30.0																							
25-Jul	Z	57.4	53.6	28.5	9.2	3.9	17.7	4.5	2.4	2.5	10.8	6.5	12.7	25.4	5.8	6.9	17.8	12.9	8.3	4.2	15.7	1.7	0.5	0.5	13.5	57.4																							
26-Jul	0.5	Z	0.7	4.2	17.2	20.2	6.3	5.2	4.5	6.7	8.7	6.1	5.1	6.3	6.6	2.4	2.5	1.0	3.2	4.5	5.4	10.8	6.0	6.1	6.1	20.2																							
27-Jul	7.7	17.4	Z	15.7	11.0	4.8	5.2	5.1	6.3	12.1	7.0	3.1	2.3	2.0	1.0	1.7	1.5	1.4	1.0	0.7	5.3	3.4	1.8	0.8	5.1	17.4																							
28-Jul	0.6	0.6	0.8	Z	0.5	0.5	0.6	0.9	2.6	1.6	1.8	1.4	0.8	0.5	0.7	1.2	1.6	0.8	1.0	1.1	3.0	2.0	0.6	0.5	1.1	3.0																							
29-Jul	0.5	0.5	0.5	0.4	Z	1.1	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.6	0.7	2.1	8.5	2.3	1.1	8.5																							
30-Jul	0.9	0.6	1.4	0.6	1.0	Z	5.8	10.5	4.4	5.0	4.4	2.9	2.3	1.9	1.4	1.1	0.7	0.7	0.7	0.7	0.7	2.4	6.4	4.9	2.7	10.5																							
31-Jul	Z	1.1	0.9	0.9	0.9	2.9	7.7	10.5	1.6	0.9	1.0	0.7	0.6	0.6	0.6	0.5	0.7	3.2	3.3	2.0	0.6	0.6	0.4	0.5	1.9	10.5																							
																								4.9	8.1	6.7	6.6	5.7	5.1	5.7	9.8	10.5	7.6	6.2	4.5	3.8	3.6	2.1	2.1	2.6	2.2	2.7	3.8	4.7	6.7	6.7	5.5	Diurnal Average	
																								20.1	57.4	53.6	36.3	42.8	42.1	26.9	68.0	51.8	33.8	20.0	16.8	14.2	25.4	6.6	6.9	17.8	12.9	8.3	17.1	18.2	30.0	38.0	28.0	Diurnal Maximum	
Z - zerospan																								C - Calibration																									



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Ells River - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Ells River - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	674	95.20	95.20
21 - 40	28	3.95	99.15
41 - 80	6	0.85	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Ells River - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	79	99	27	13	16	4	21	45	51	60	53	39	45	62	32	28	674
21 - 40	9	5	3	0	1	0	0	1	1	2	0	1	0	0	2	3	28
11 - 80	3	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	6
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	104	30	13	17	4	21	46	52	62	53	40	46	62	35	32	708

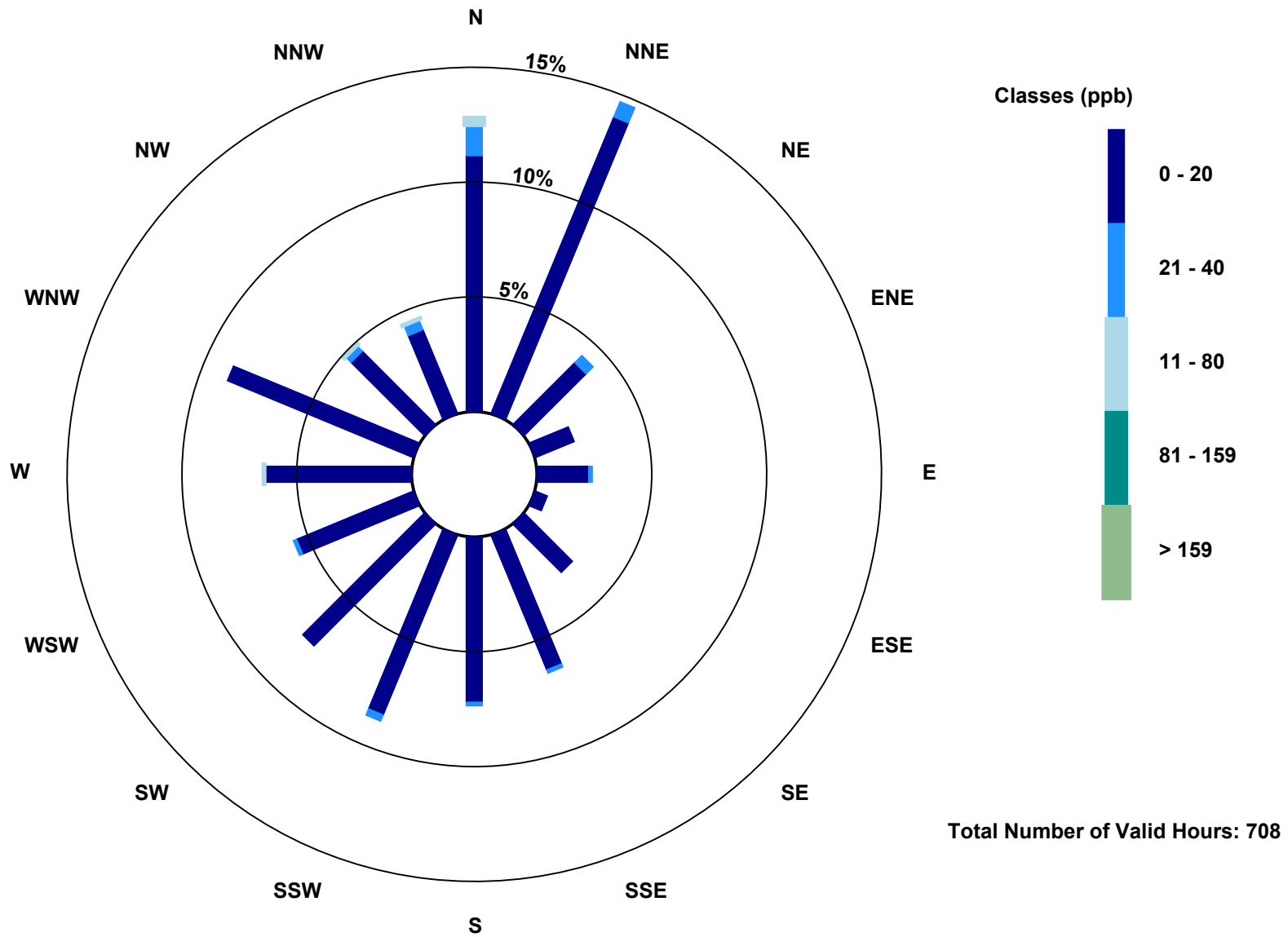
Total Number of Valid Hours: 708

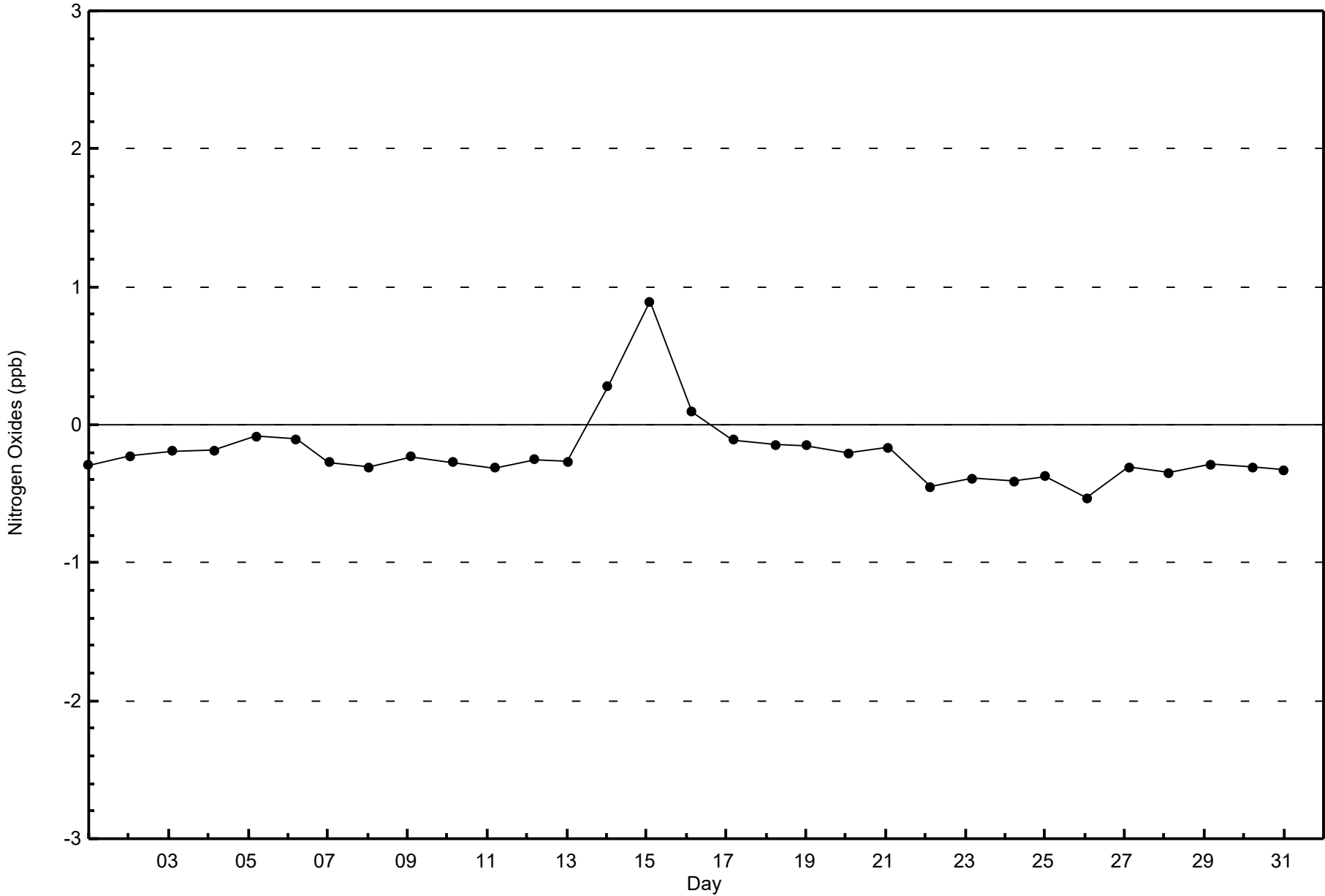
Total Number of Hours: 744

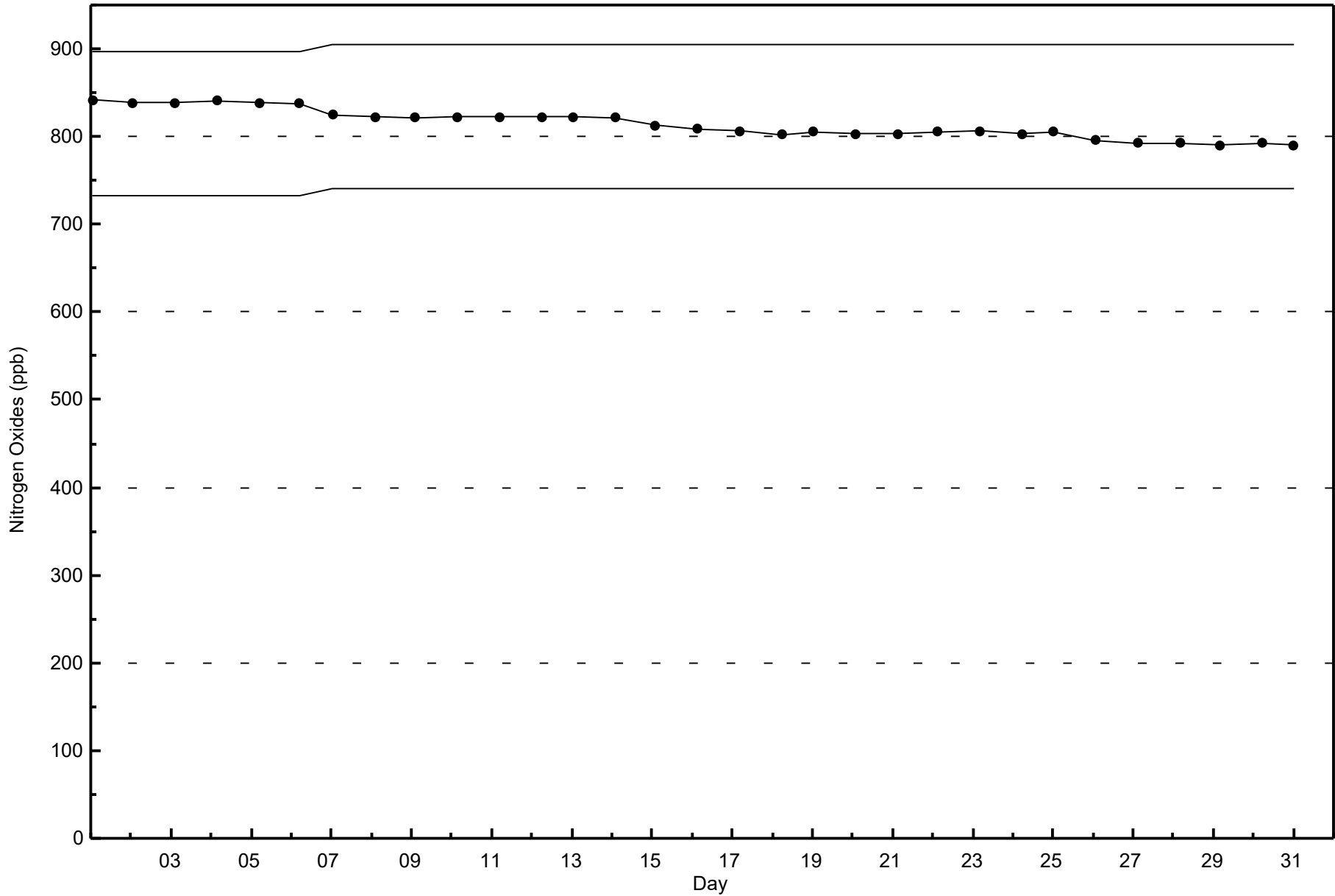


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Ells River









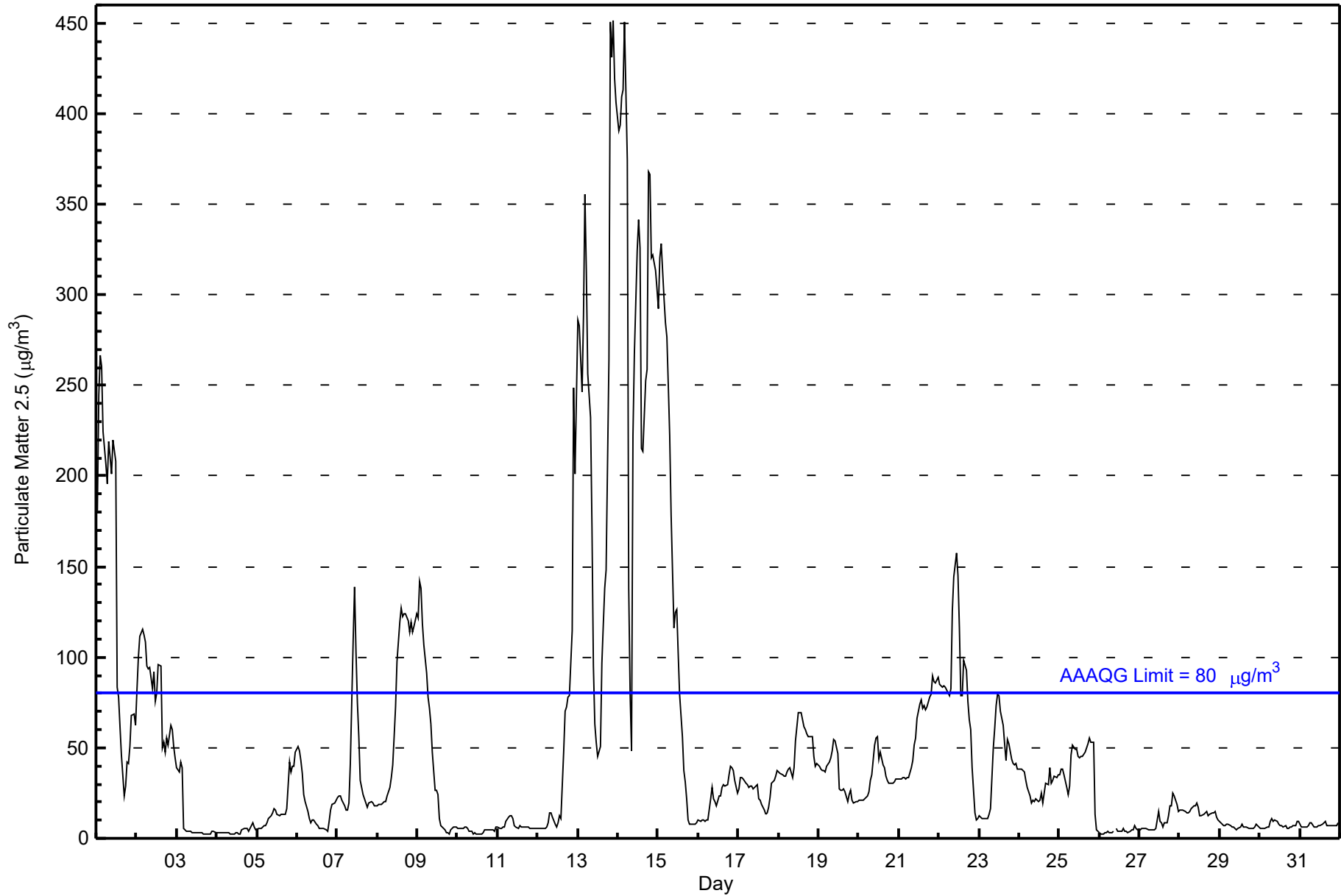
Summary of Hour Averages

Ells River - July 2023

Number of Exceedences (AAAQO):	1-hr: 124	24-hr: 16	Hours in Service:	744
Maximum Value: 451.3 µg/m ³ on Jul 13 22:00	Maximum Daily Average: 296.4 µg/m ³ on Jul 14		Hours of Data:	743
Minimum Value: 2.0 µg/m ³ on Jul 10 12:00	Minimum Daily Average: 3.9 µg/m ³ on Jul 4		Hours of Missing Data:	1
Maximum Diurnal Average: 65.8 µg/m ³ at hour 3	Minimum Diurnal Average: 39.3 µg/m ³ at hour 16		Hours of Calibration:	1
Monthly Average: 52.27 µg/m ³	Percentiles: P ₁ = 2.4 P ₁₀ = 4.6 Q ₁ = 6.9 Median = 22.4 Q ₃ = 54.2 P ₉₀ = 123.9 P ₉₉ = 400.7		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	181.0	245.2	266.9	260.3	224.7	206.9	195.9	219.3	210.6	201.0	220.0	208.3	83.5	78.0	61.6	45.6	23.2	28.6	42.3	41.4	50.7	67.5	68.4	62.2	137.2	266.9
2-Jul	81.6	100.2	111.9	115.2	112.2	108.2	94.9	93.4	94.2	82.4	91.9	75.3	80.7	95.6	94.9	49.8	52.7	47.5	55.0	51.3	62.2	60.1	50.6	44.2	79.4	115.2
3-Jul	38.7	36.3	42.5	38.6	5.8	4.4	3.8	3.5	3.8	3.5	3.2	3.4	3.1	3.0	3.1	2.8	2.4	2.2	2.1	2.7	2.5	3.7	4.1	3.5	9.3	42.5
4-Jul	3.4	3.3	3.2	3.1	3.1	3.1	2.9	3.1	2.6	2.4	2.2	2.9	3.3	2.6	2.3	4.5	5.2	5.4	5.2	3.8	5.7	8.5	6.5	4.8	3.9	8.5
5-Jul	4.6	5.2	5.7	6.5	6.9	7.2	8.9	10.7	12.7	14.1	16.2	15.8	13.5	12.6	13.0	13.1	13.4	13.4	16.7	42.4	36.6	39.7	39.7	47.4	17.3	47.4
6-Jul	50.8	48.6	43.1	35.8	24.3	20.3	14.6	10.6	8.5	10.2	9.9	7.5	6.6	5.1	5.1	5.5	5.1	4.7	3.7	9.0	15.7	19.0	19.7	20.7	16.8	50.8
7-Jul	22.6	23.4	23.7	21.0	17.9	15.7	15.6	19.7	41.5	109.3	139.1	103.2	74.5	56.0	32.0	23.9	21.9	19.5	17.1	19.3	20.1	19.6	17.6	17.7	37.2	139.1
8-Jul	18.1	18.8	18.8	19.4	20.1	20.3	23.1	28.2	33.7	40.8	56.2	72.3	97.3	119.4	127.0	122.2	123.6	124.2	120.3	114.1	119.4	114.1	117.3	124.0	74.7	127.0
9-Jul	121.8	141.6	138.0	118.3	107.0	91.5	77.6	72.1	63.4	47.3	26.6	26.7	24.3	10.9	7.3	5.9	4.9	3.4	2.9	2.5	4.4	6.4	6.4	6.2	46.6	141.6
10-Jul	5.7	5.8	5.7	5.4	6.6	6.4	5.6	3.8	3.5	2.3	2.9	2.0	2.2	2.3	2.7	3.3	5.0	5.0	4.9	4.3	4.7	4.7	4.0	6.0	4.4	6.6
11-Jul	6.0	5.4	5.5	6.1	6.5	9.5	12.0	12.7	12.8	10.7	6.9	6.2	5.1	7.0	6.3	5.9	6.5	6.6	5.9	5.7	5.4	5.3	5.4	5.4	7.1	12.8
12-Jul	5.5	5.7	5.4	5.6	5.6	6.1	8.2	14.4	14.0	11.6	7.7	6.2	8.8	12.2	11.2	48.4	70.0	72.4	77.7	78.8	114.9	248.4	201.0	243.7	53.5	248.4
13-Jul	286.3	283.1	246.7	288.8	355.2	313.3	256.8	232.3	171.3	95.3	62.9	52.8	44.9	51.0	96.8	117.9	138.0	148.1	264.1	451.0	430.8	451.3	419.7	405.9	236.0	451.3
14-Jul	390.5	393.5	409.6	413.2	450.9	374.1	138.0	79.2	48.3	222.3	267.7	324.6	341.6	326.2	214.9	213.8	253.0	258.7	367.8	366.3	320.8	321.7	313.2	303.2	296.4	450.9
15-Jul	292.1	320.4	328.5	297.9	284.9	277.0	250.1	222.5	178.8	116.4	124.7	126.5	102.5	79.2	55.9	37.5	31.3	21.9	10.5	8.2	7.6	7.9	8.1	8.8	133.3	328.5
16-Jul	10.4	9.6	9.9	10.2	9.2	10.0	10.1	21.9	28.1	21.5	20.2	18.3	23.5	23.3	27.7	29.9	28.8	30.0	34.9	39.7	38.8	37.1	32.0	25.2	22.9	39.7
17-Jul	27.6	33.7	33.8	32.5	30.8	30.0	28.4	28.8	28.6	27.2	28.8	29.7	22.1	20.8	18.6	15.2	13.5	14.3	16.9	22.9	30.1	32.2	34.0	37.6	26.6	37.6
18-Jul	36.5	36.0	35.3	34.7	34.2	36.5	38.3	38.8	33.7	38.9	53.5	61.9	69.7	69.1	65.8	61.6	59.7	57.4	56.0	55.9	56.0	44.9	39.5	41.4	48.1	69.7
19-Jul	39.5	37.9	37.7	37.2	36.9	39.7	42.2	44.5	48.2	54.8	53.8	46.9	27.7	26.3	26.2	27.3	26.1	20.4	24.5	26.6	21.1	19.8	20.3	20.6	33.6	54.8
20-Jul	21.1	21.2	21.2	21.3	22.4	23.2	26.1	32.2	35.0	51.7	55.4	56.1	43.8	47.5	40.8	38.8	34.1	31.7	30.3	30.6	30.7	30.8	32.9	32.6	33.8	56.1
21-Jul	32.6	33.0	33.8	33.7	32.7	33.4	33.2	38.6	43.2	51.5	55.7	66.2	74.3	76.3	71.4	73.2	71.0	72.7	78.1	79.5	89.3	86.7	85.8	88.8	59.8	89.3
22-Jul	84.6	84.2	83.4	83.9	83.4	80.0	78.6	82.9	125.2	144.0	157.8	145.2	116.5	78.6	78.9	98.3	92.8	75.4	65.7	59.9	39.2	13.8	10.0	10.5	82.2	157.8
23-Jul	12.6	11.9	10.5	11.1	11.1	11.1	13.2	16.7	50.1	60.7	72.9	79.3	78.8	70.5	62.2	52.2	43.0	54.6	52.2	43.7	41.4	40.3	41.5	38.3	40.8	79.3
24-Jul	38.0	38.0	37.5	36.9	31.8	28.3	23.5	19.8	21.0	20.1	21.6	20.6	20.8	24.6	19.7	25.0	30.5	29.9	38.7	30.1	32.1	34.1	33.6	35.3	28.8	38.7
25-Jul	34.9	37.8	38.1	35.3	28.3	24.1	28.9	46.0	51.3	48.8	49.4	44.9	44.8	45.5	44.9	47.4	50.0	52.2	55.1	52.9	53.0	13.3	4.4	3.9	39.0	55.1
26-Jul	3.3	2.6	2.5	2.9	3.1	3.6	3.4	3.3	3.6	C	5.4	3.6	3.9	4.3	5.6	4.2	3.9	3.5	3.7	4.3	4.8	7.0	5.7	4.6	4.0	7.0
27-Jul	4.6	5.3	5.3	5.6	5.1	4.8	4.6	4.4	4.5	4.6	5.5	14.7	9.4	8.2	6.3	8.2	8.4	12.6	18.2	18.1	25.1	23.2	18.6	14.8	10.0	25.1
28-Jul	15.9	15.6	15.4	15.2	13.8	13.9	15.0	16.5	18.2	17.6	19.8	16.8	12.5	12.5	12.9	13.7	15.1	12.8	13.2	14.0	14.0	14.7	12.0	10.4	14.6	19.8
29-Jul	9.5	7.9	7.3	7.3	7.5	7.4	7.2	6.6	6.1	5.8	5.0	5.1	6.6	7.8	6.1	6.0	6.5	5.7	5.5	5.2	5.3	6.3	8.1	6.2	6.6	9.5
30-Jul	5.6	5.4	5.3	5.5	6.1	6.2	9.4	11.0	9.1	9.9	9.5	8.0	7.2	6.9	6.4	6.6	5.6	5.5	5.9	5.9	6.6	6.7	9.0	9.0	7.2	11.0
31-Jul	7.5	6.5	6.5	6.4	6.1	6.7	8.8	8.6	6.4	6.1	5.9	6.8	6.9	7.4	9.0	9.3	7.0	6.9	7.3	7.0	7.1	7.3	7.3	8.6	7.2	9.3
61.1 65.3 65.8 65.0 64.3 58.8 47.7 46.6 45.6 51.1 53.5 53.5 47.1 44.9 39.9 39.3 40.4 40.2 48.5 54.7 54.7 57.9 54.1 54.6																								Diurnal Average		
390.5 393.5 409.6 413.2 450.9 374.1 256.8 232.3 210.6 222.3 267.7 324.6 341.6 326.2 214.9 213.8 253.0 258.7 367.8 451.0 430.8 451.3 419.7 405.9																								Diurnal Maximum		

C - Calibration
 Alberta Ambient Air Quality Guideline/Objectives: 1-hr 80 µg/m³ 24-hr 29 µg/m³





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Ells River - July 2023

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
0 - 5	116	15.61	15.61
6 - 15	192	25.84	41.45
16 - 25	84	11.31	52.76
26 - 80	227	30.55	83.31
> 81.0	124	16.69	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Ells River - July 2023

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	15	24	9	4	3	1	9	8	11	7	11	0	6	4	3	1	116
6 - 15	15	27	5	4	4	1	1	9	28	37	25	12	8	9	1	6	192
16 - 25	7	8	2	0	2	0	5	6	4	9	14	12	4	6	3	2	84
26 - 80	37	28	12	3	8	1	5	20	11	10	6	14	20	23	16	13	227
> 81.0	18	22	4	2	0	0	1	3	2	1	3	5	9	25	16	13	124
Totals	92	109	32	13	17	3	21	46	56	64	59	43	47	67	39	35	743

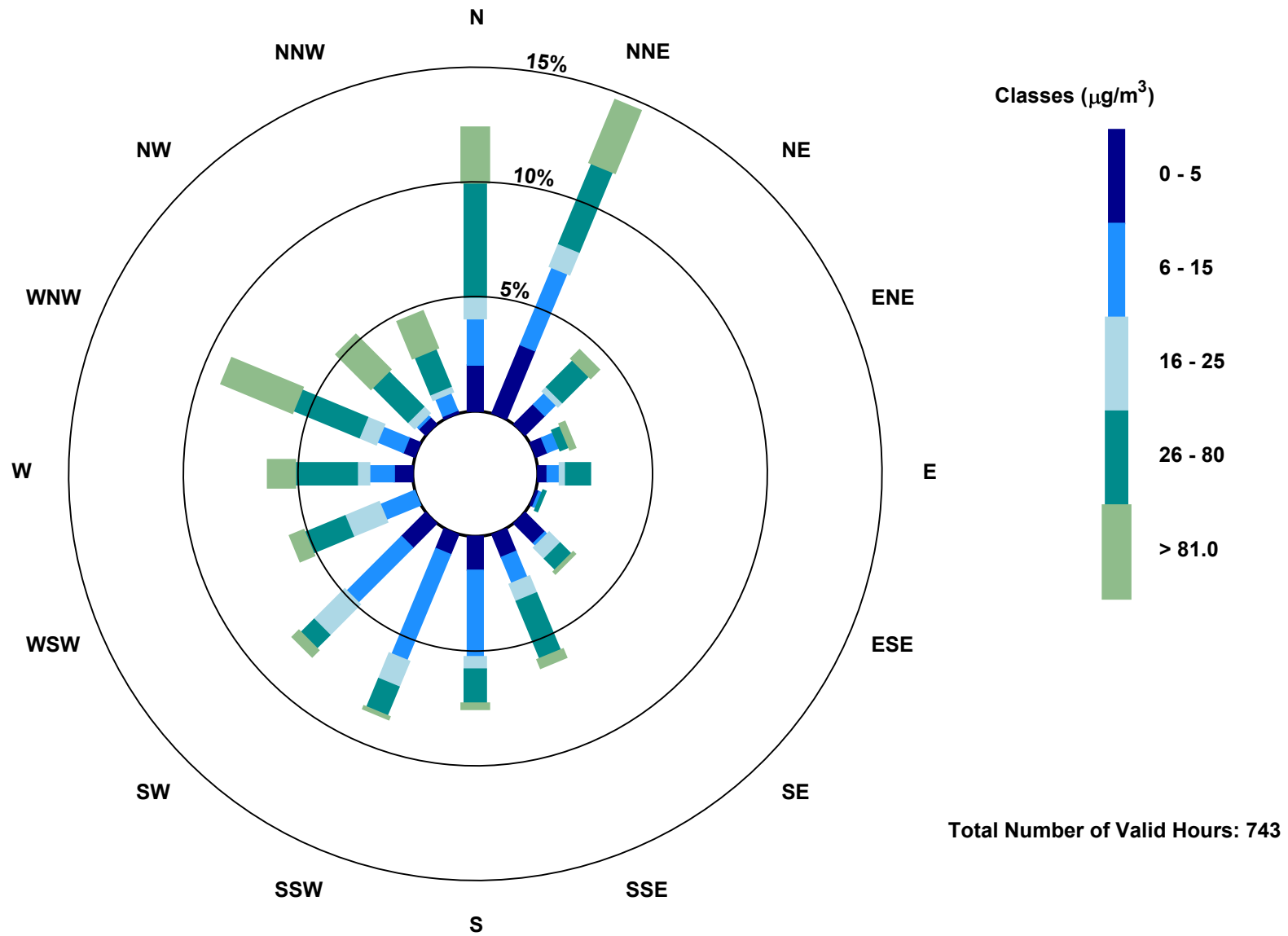
Total Number of Valid Hours: 743

Total Number of Hours: 744



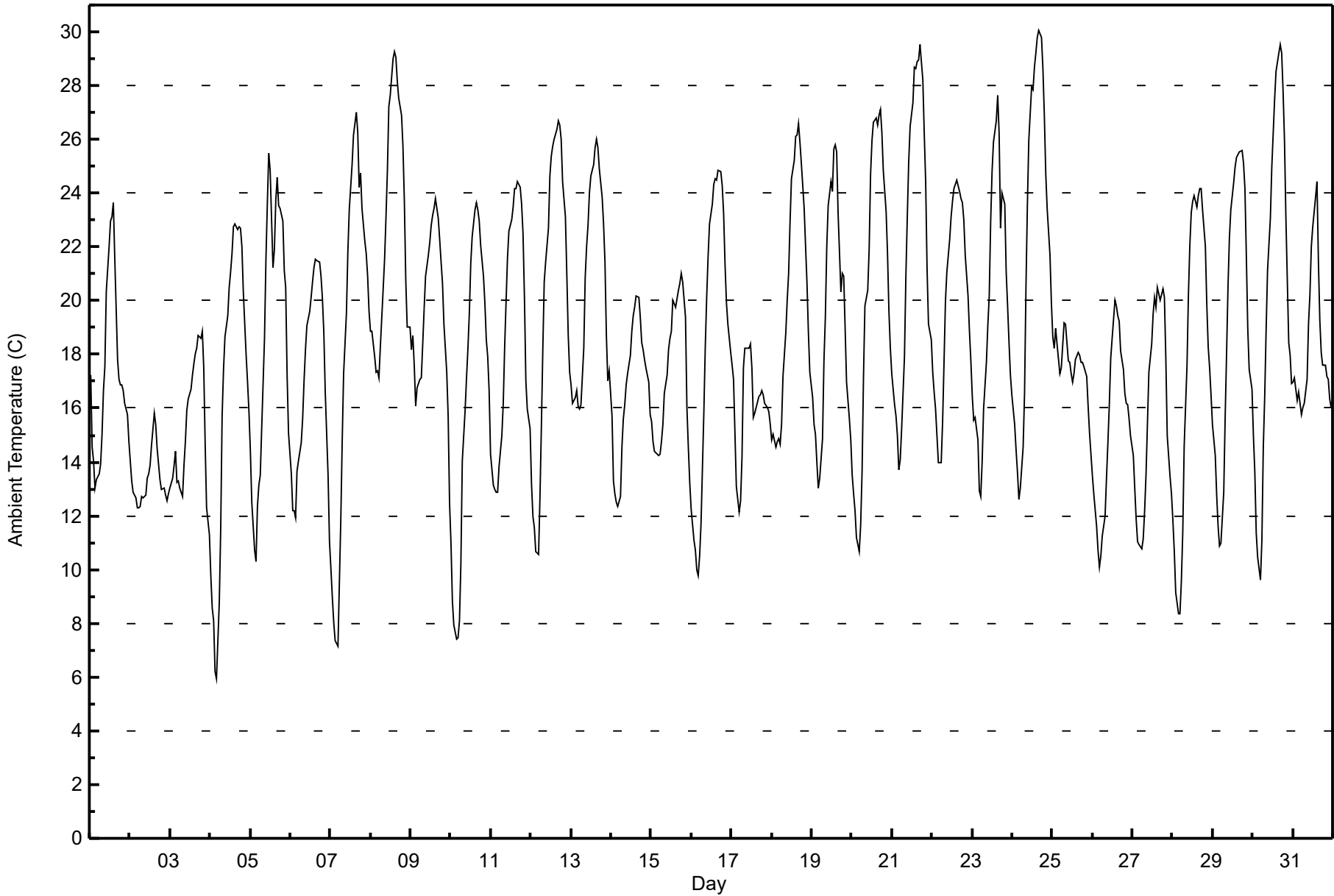
Wood Buffalo Environmental Association
Wind Rose Jul 2023

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





Maximum Value: 30.1 C on Jul 24 17:00 Maximum Daily Average: 22.9 C on Jul 8																						Hours in Service: 744 Hours of Data: 744																										
Minimum Value: 5.9 C on Jul 4 05:00 Minimum Daily Average: 13.4 C on Jul 2 Maximum Diurnal Average: 23.6 C at hour 16 Minimum Diurnal Average: 12.3 C at hour 5 Monthly Average: 18.48 C Percentiles: P ₁ = 8.1 P ₁₀ = 12.4 Q ₁ = 14.8 Median = 18.0 Q ₃ = 22.3 P ₉₀ = 25.1 P ₉₉ = 29.2																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	17.2	14.6	14.0	13.0	13.4	13.6	13.9	15.0	16.6	17.6	20.3	22.0	23.0	23.1	23.7	21.6	17.8	17.1	16.9	16.9	16.6	16.2	15.8	14.8	17.3	23.7																						
2-Jul	14.1	13.3	12.9	12.6	12.3	12.3	12.3	12.7	12.7	12.8	13.4	13.6	13.9	14.6	15.8	15.4	14.5	13.9	13.4	13.0	13.0	12.8	12.5	12.8	13.4	15.8																						
3-Jul	13.1	13.4	13.9	14.4	13.2	13.3	13.0	12.7	13.9	14.8	15.9	16.4	16.7	17.2	17.6	18.0	18.2	18.7	18.6	18.9	17.5	14.6	12.3	11.3	15.3	18.9																						
4-Jul	9.8	8.5	8.1	6.2	5.9	8.8	11.5	15.7	17.4	18.7	19.4	20.5	21.1	21.7	22.7	22.8	22.7	22.8	22.7	22.0	20.3	18.0	16.9	15.9	16.7	22.8																						
5-Jul	14.4	12.5	10.7	10.3	12.4	13.1	13.5	15.2	18.6	21.5	23.6	25.5	24.9	21.2	21.9	23.8	24.6	23.5	23.5	23.0	21.1	20.5	17.2	15.1	18.8	25.5																						
6-Jul	13.5	12.2	12.2	11.9	13.7	14.0	14.7	15.6	17.0	18.2	19.1	19.6	20.1	20.7	21.2	21.5	21.5	21.4	20.9	20.1	18.8	16.6	13.5	11.0	17.1	21.5																						
7-Jul	10.0	9.0	8.1	7.3	7.1	9.5	11.8	14.8	17.3	19.5	21.8	23.4	24.2	25.1	26.2	27.0	26.3	24.2	24.7	23.4	22.2	21.7	20.9	19.6	18.6	27.0																						
8-Jul	18.9	18.9	17.9	17.3	17.4	17.2	18.3	20.4	21.6	23.1	24.8	27.2	27.6	29.0	29.2	29.1	28.2	27.6	26.9	25.8	23.7	20.8	19.0	19.0	22.9	29.2																						
9-Jul	18.2	18.7	17.6	16.1	16.8	17.1	17.1	18.4	19.7	20.9	21.7	22.2	22.8	23.2	23.4	23.8	23.1	22.3	21.4	20.7	19.1	17.3	15.7	12.4	19.6	23.8																						
10-Jul	11.0	8.9	8.0	7.4	7.5	8.1	10.2	14.0	15.9	17.1	18.2	19.6	21.4	22.4	23.4	23.7	23.4	22.9	22.1	20.9	19.9	18.6	17.9	16.7	16.6	23.7																						
11-Jul	14.3	13.1	13.0	12.9	12.9	13.8	15.0	16.2	18.3	20.0	21.6	22.6	23.0	23.5	24.2	24.2	24.4	24.2	23.6	22.5	20.1	17.0	16.0	15.2	18.8	24.4																						
12-Jul	13.2	12.0	11.6	10.7	10.6	12.7	15.3	18.2	20.7	21.5	22.7	24.6	25.4	25.7	26.0	26.4	26.7	26.5	26.0	24.4	23.1	21.0	18.7	17.3	20.0	26.7																						
13-Jul	16.9	16.2	16.4	16.7	16.1	16.0	16.2	18.2	20.9	22.0	22.8	24.0	24.6	25.1	25.7	26.0	25.7	24.9	23.9	22.8	21.4	18.7	17.0	17.4	20.6	26.0																						
14-Jul	15.7	13.3	12.8	12.5	12.4	12.7	14.5	15.6	16.1	16.8	17.3	18.0	18.9	19.5	19.7	20.2	20.1	19.4	18.5	18.2	17.8	17.5	17.0	15.8	16.7	20.2																						
15-Jul	15.5	14.8	14.4	14.3	14.3	14.3	14.8	15.4	16.6	17.2	18.2	18.6	18.9	20.0	19.8	20.1	20.4	20.7	21.0	20.7	19.4	16.0	14.6	13.3	17.2	21.0																						
16-Jul	12.3	11.1	10.7	10.0	9.8	10.5	11.7	15.9	18.3	20.1	21.6	22.8	23.6	24.3	24.6	24.5	24.8	24.8	24.3	23.2	21.3	19.9	19.1	18.1	18.6	24.8																						
17-Jul	17.6	17.1	15.1	13.1	12.1	12.5	14.2	17.5	18.3	18.2	18.2	18.4	17.5	15.7	15.8	16.2	16.4	16.5	16.7	16.5	16.2	16.0	15.9	15.4	16.1	18.4																						
18-Jul	14.8	15.0	14.5	14.8	14.8	14.7	15.4	17.2	18.8	20.0	21.0	22.9	24.5	25.2	26.1	26.2	26.6	25.9	25.1	23.4	22.0	20.6	18.8	17.3	20.2	26.6																						
19-Jul	16.4	15.4	15.0	14.0	13.0	13.4	14.9	17.8	19.4	22.0	23.5	24.4	24.1	25.6	25.8	25.5	23.3	20.4	21.0	20.9	18.9	17.0	15.6	14.8	19.3	25.8																						
20-Jul	13.5	12.8	12.2	11.2	10.7	11.7	13.7	17.2	19.8	20.4	21.9	24.7	26.0	26.6	26.8	26.5	26.9	27.1	26.3	24.9	23.3	21.8	19.6	18.2	20.2	27.1																						
21-Jul	17.3	16.1	15.7	15.0	13.7	14.1	15.3	17.9	20.9	23.1	25.2	26.5	27.4	28.7	28.7	28.9	28.9	29.5	28.2	26.2	24.4	21.2	19.1	18.5	22.1	29.5																						
22-Jul	17.3	16.6	16.0	15.0	14.0	14.0	15.5	17.7	19.9	21.1	22.3	23.1	23.7	24.1	24.3	24.5	24.1	23.8	23.6	23.0	21.7	20.2	18.9	17.8	20.1	24.5																						
23-Jul	16.5	15.6	15.6	14.8	12.9	12.7	14.0	16.0	17.7	19.1	20.2	22.9	24.8	25.9	26.7	27.7	26.2	22.7	24.0	23.6	21.1	19.8	18.5	17.2	19.8	27.7																						
24-Jul	16.5	15.4	14.4	13.6	12.6	13.0	14.6	16.6	20.5	23.5	25.9	28.0	27.8	28.7	29.2	29.8	30.1	29.8	28.6	26.9	24.8	23.4	21.7	19.9	22.3	30.1																						
25-Jul	18.7	18.2	19.0	18.4	17.3	17.5	18.3	19.2	19.1	17.8	17.7	17.3	17.0	17.3	17.8	18.1	18.0	17.7	17.7	17.5	17.2	16.1	15.1	14.3	17.6	19.2																						
26-Jul	13.5	12.8	11.6	10.7	10.1	10.5	11.2	12.0	13.4	14.7	16.2	17.9	18.6	20.0	19.8	19.4	19.2	18.1	17.4	16.6	16.2	16.1	15.6	15.0	15.3	20.0																						
27-Jul	14.2	13.0	11.9	11.0	11.0	10.8	11.1	12.2	13.5	15.4	17.3	18.4	19.5	20.1	19.8	20.5	20.0	20.2	20.4	20.1	17.9	15.0	13.5	12.8	15.8	20.5																						
28-Jul	11.8	10.7	9.1	8.4	8.3	9.6	11.4	14.6	17.6	20.2	22.1	23.3	23.7	23.9	23.5	23.9	24.2	24.2	23.4	22.0	19.9	18.3	17.5	16.5	17.8	24.2																						
29-Jul	15.4	14.2	12.8	11.6	10.9	11.0	12.9	15.6	18.0	20.5	22.3	23.4	24.4	25.0	25.3	25.4	25.5	25.6	25.1	24.2	21.6	19.0	17.5	16.7	19.3	25.6																						
30-Jul	15.0	13.6	11.4	10.4	9.6	11.1	14.6	16.5	18.9	21.1	23.1	25.0	26.2	27.5	28.5	29.2	29.5	29.2	27.8	25.9	23.1	18.4	18.0	16.9	20.4	29.5																						
31-Jul	17.0	17.1	16.3	16.6	16.2	15.7	16.0	16.2	17.1	19.2	20.2	22.0	22.7	23.9	24.4	21.5	19.3	18.1	17.6	17.6	17.2	17.1	16.3	16.0	18.4	24.4																						
																								15.0	14.0	13.3	12.7	12.3	12.9	14.1	16.1	17.9	19.3	20.6	21.9	22.5	23.1	23.5	23.6	23.2	22.7	22.3	21.5	20.0	18.3	17.0	15.9	Diurnal Average
																								18.9	18.9	19.0	18.4	17.4	17.5	18.3	20.4	21.6	23.5	25.9	28.0	27.8	29.0	29.2	29.8	30.1	29.8	28.6	26.9	24.8	23.4	21.7	19.9	Diurnal Maximum





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Ells River - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	22	2.96	2.96
10 - 20	443	59.54	62.50
> 20	279	37.50	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



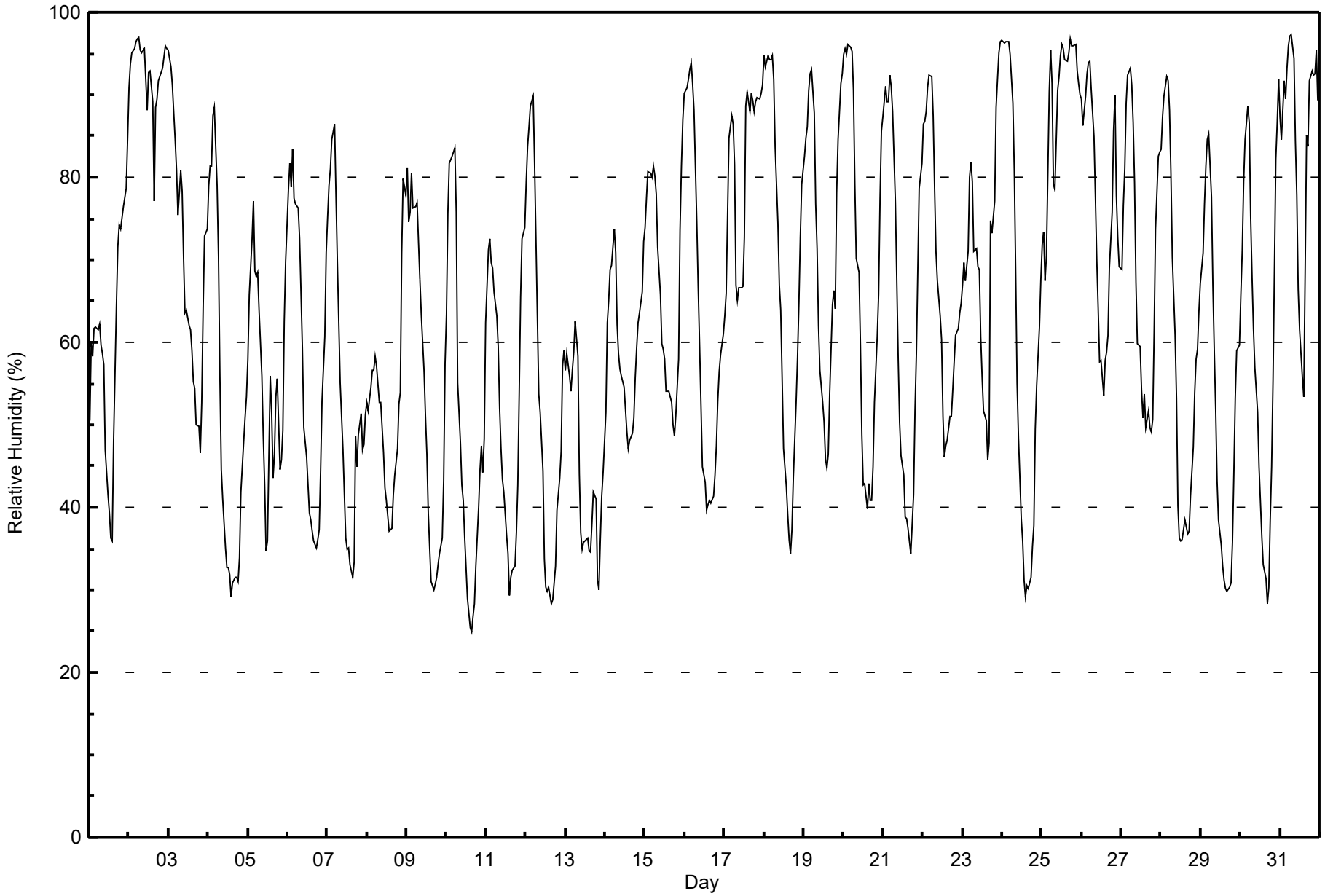
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Ells River - July 2023

Maximum Value: 97.3 % on Jul 31 08:00 Maximum Daily Average: 92.7 % on Jul 2																						Hours in Service:	744			
Minimum Value: 25.0 % on Jul 10 16:00 Minimum Daily Average: 44.1 % on Jul 13																						Hours of Data:	744			
Maximum Diurnal Average: 84.0 % at hour 5 Minimum Diurnal Average: 45.2 % at hour 16																						Hours of Missing Data:	0			
Monthly Average: 63.74 % Percentiles: P₁ = 29.0 P₁₀ = 36.0 Q₁ = 46.9 Median = 62.5 Q₃ = 81.5 P₉₀ = 91.9 P₉₉ = 96.5																						Hours of Calibration:	0			
																						Percent Operational Time:	100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	50.6	60.0	58.3	61.8	61.9	61.5	62.2	59.7	58.6	57.3	46.9	41.6	39.4	36.3	35.9	48.1	64.4	71.5	74.3	73.7	75.1	76.4	78.6	84.6	60.0	84.6
2-Jul	90.8	93.8	95.1	95.6	96.4	96.7	96.9	95.5	95.1	95.5	91.9	88.2	92.8	92.9	89.2	77.1	88.5	89.4	91.6	92.3	93.3	94.6	95.9	95.6	92.7	96.9
3-Jul	95.4	93.4	91.2	87.8	84.6	80.9	75.5	80.9	78.3	70.3	63.6	63.9	62.0	61.6	59.0	55.2	54.4	50.0	49.8	46.7	52.7	64.0	72.9	73.7	69.5	95.4
4-Jul	79.0	81.4	81.4	87.4	88.5	79.0	70.3	56.0	44.6	41.0	35.0	32.6	32.7	31.8	29.1	30.9	31.5	31.6	30.9	33.8	41.8	47.9	50.8	53.4	50.9	88.5
5-Jul	58.0	65.7	72.5	77.0	68.6	68.0	68.5	63.9	56.0	48.6	42.8	34.8	36.0	56.0	51.5	43.5	46.4	53.4	55.5	44.5	45.8	49.4	62.5	69.8	55.8	77.0
6-Jul	78.4	81.8	78.8	83.4	77.4	76.8	76.2	72.6	66.0	59.2	49.6	46.1	42.7	39.3	38.4	37.2	35.9	35.0	36.0	37.3	44.4	52.8	60.7	70.9	57.4	83.4
7-Jul	75.0	79.0	81.1	84.5	86.4	77.9	69.6	62.4	55.0	46.9	41.5	36.3	34.9	35.2	33.1	31.6	33.3	48.6	44.9	48.8	51.4	46.9	47.6	51.1	54.3	86.4
8-Jul	52.7	51.7	54.6	56.5	56.6	58.2	57.1	52.7	52.7	49.7	46.6	42.4	40.9	37.2	37.3	37.4	41.6	43.9	47.1	52.5	53.9	70.9	79.8	77.7	52.2	79.8
9-Jul	81.1	74.6	75.8	80.4	76.3	76.5	76.9	72.2	67.6	63.4	56.4	51.0	46.4	39.4	35.1	31.1	29.9	30.6	31.6	33.1	34.4	36.2	43.2	57.4	54.2	81.1
10-Jul	63.5	75.7	81.7	82.5	83.1	83.5	75.7	55.0	47.8	42.8	40.8	36.4	32.8	28.9	25.3	25.0	26.8	28.4	32.9	39.9	44.6	47.5	44.2	48.3	49.7	83.5
11-Jul	62.4	71.1	72.6	69.6	69.0	66.2	63.3	59.5	52.1	47.1	43.4	41.9	36.7	34.5	29.3	31.5	32.3	32.9	36.9	42.7	53.8	65.5	72.6	73.8	52.5	73.8
12-Jul	79.3	83.8	86.0	88.6	89.8	81.7	72.4	63.0	53.8	51.6	44.3	33.7	30.3	29.9	30.4	28.4	28.8	30.9	32.9	39.6	43.6	46.7	57.1	58.9	53.6	89.8
13-Jul	56.5	58.6	56.0	54.0	56.6	58.8	62.5	58.3	44.1	36.9	35.0	35.7	35.9	36.3	34.8	34.6	38.0	41.8	41.0	31.3	29.9	36.2	41.4	44.2	44.1	62.5
14-Jul	51.6	62.4	65.0	68.8	69.3	73.7	70.9	62.3	58.6	56.7	56.0	54.6	51.9	49.2	47.1	48.1	49.0	50.8	55.8	59.4	62.4	63.5	66.1	72.2	59.4	73.7
15-Jul	73.8	77.5	80.7	80.5	80.0	81.4	80.1	77.9	71.4	65.8	59.9	59.2	58.0	54.1	54.0	53.4	52.7	50.0	48.6	51.1	57.9	73.5	81.4	87.0	67.1	87.0
16-Jul	90.2	90.9	91.8	93.1	93.9	91.3	88.2	74.4	66.6	59.6	52.4	44.9	43.1	39.7	40.4	40.9	40.5	41.4	44.0	47.4	52.8	56.5	58.5	61.1	62.6	93.9
17-Jul	63.2	66.0	75.4	84.8	87.5	86.4	81.5	67.0	65.1	66.7	66.7	66.7	72.8	88.7	90.4	88.0	90.1	89.3	87.9	89.1	89.6	89.6	90.2	91.2	80.6	91.2
18-Jul	94.8	93.4	94.7	94.2	94.3	94.7	91.9	83.8	74.4	67.0	63.9	55.6	47.2	42.5	39.1	36.0	34.4	37.3	43.6	52.8	58.2	64.8	72.6	79.2	67.1	94.8
19-Jul	82.5	84.7	86.1	90.5	92.5	93.0	87.8	76.8	71.4	62.0	56.6	52.7	50.4	45.9	44.7	46.4	53.7	64.5	66.3	64.1	78.1	84.6	91.3	92.5	71.6	93.0
20-Jul	95.0	95.6	94.9	96.1	95.8	95.3	90.5	79.2	70.2	68.6	59.7	48.8	42.7	43.0	39.8	42.9	40.8	40.9	44.9	52.7	60.6	65.8	77.3	85.5	67.8	96.1
21-Jul	87.3	91.0	89.2	89.1	92.3	91.0	87.9	77.0	67.3	58.0	50.3	46.3	44.0	38.8	38.7	37.5	36.0	34.3	41.5	51.7	58.7	68.6	78.7	81.7	64.0	92.3
22-Jul	86.4	86.7	88.0	90.9	92.4	92.2	87.4	78.8	71.0	67.5	63.3	60.4	51.1	46.1	47.4	48.2	50.9	51.1	54.2	57.7	60.9	61.6	63.6	64.7	67.6	92.4
23-Jul	66.9	69.7	67.5	71.1	80.0	81.9	79.5	71.0	71.4	69.2	68.8	60.7	55.8	51.6	50.5	45.8	47.8	74.8	73.3	77.1	88.4	91.8	95.1	96.5	71.1	96.5
24-Jul	96.6	96.2	96.5	96.4	96.4	94.9	88.9	80.8	68.5	55.1	48.5	38.7	35.9	31.2	29.2	30.6	30.3	31.5	35.3	37.9	49.5	54.7	61.9	67.6	60.5	96.6
25-Jul	71.9	73.3	67.5	70.6	90.3	95.4	91.4	79.1	78.5	90.6	92.2	94.7	96.1	95.6	94.2	94.0	95.0	96.8	96.0	95.9	96.1	92.9	91.3	89.9	88.7	96.8
26-Jul	89.4	86.2	89.8	92.6	93.9	94.0	90.6	84.9	77.6	70.1	64.1	57.7	57.8	53.5	57.9	58.9	60.8	69.0	75.8	85.6	90.1	77.8	72.7	69.2	75.8	94.0
27-Jul	68.8	76.5	81.1	89.0	92.4	93.2	91.2	86.6	79.3	67.3	59.9	59.5	54.2	50.9	53.6	49.6	51.7	49.7	49.2	50.6	61.1	73.7	82.6	83.1	68.9	93.2
28-Jul	83.5	87.3	89.8	92.2	91.6	88.2	80.5	70.4	60.9	53.3	40.1	36.3	35.9	36.1	38.5	37.6	36.8	37.2	41.3	47.3	54.0	57.9	59.1	63.7	59.1	92.2
29-Jul	67.1	70.8	76.8	81.4	84.6	85.3	77.7	67.0	58.9	51.9	43.3	38.5	35.4	32.9	31.2	30.2	29.9	30.3	30.8	35.7	44.1	53.2	59.0	59.7	53.1	85.3
30-Jul	65.7	71.1	79.5	84.6	88.7	86.6	75.3	68.0	61.7	56.9	51.5	45.0	40.7	36.4	33.1	31.4	28.3	30.3	38.5	45.0	55.4	82.3	86.7	91.9	59.8	91.9
31-Jul	87.4	84.6	91.7	89.5	93.2	95.9	97.1	97.3	94.5	84.4	77.9	66.5	61.5	55.8	53.4	68.8	85.0	83.7	91.8	92.8	92.4	92.6	95.4	89.4	84.3	97.3
																						Diurnal Average				
																						Diurnal Maximum				





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Ells River - July 2023

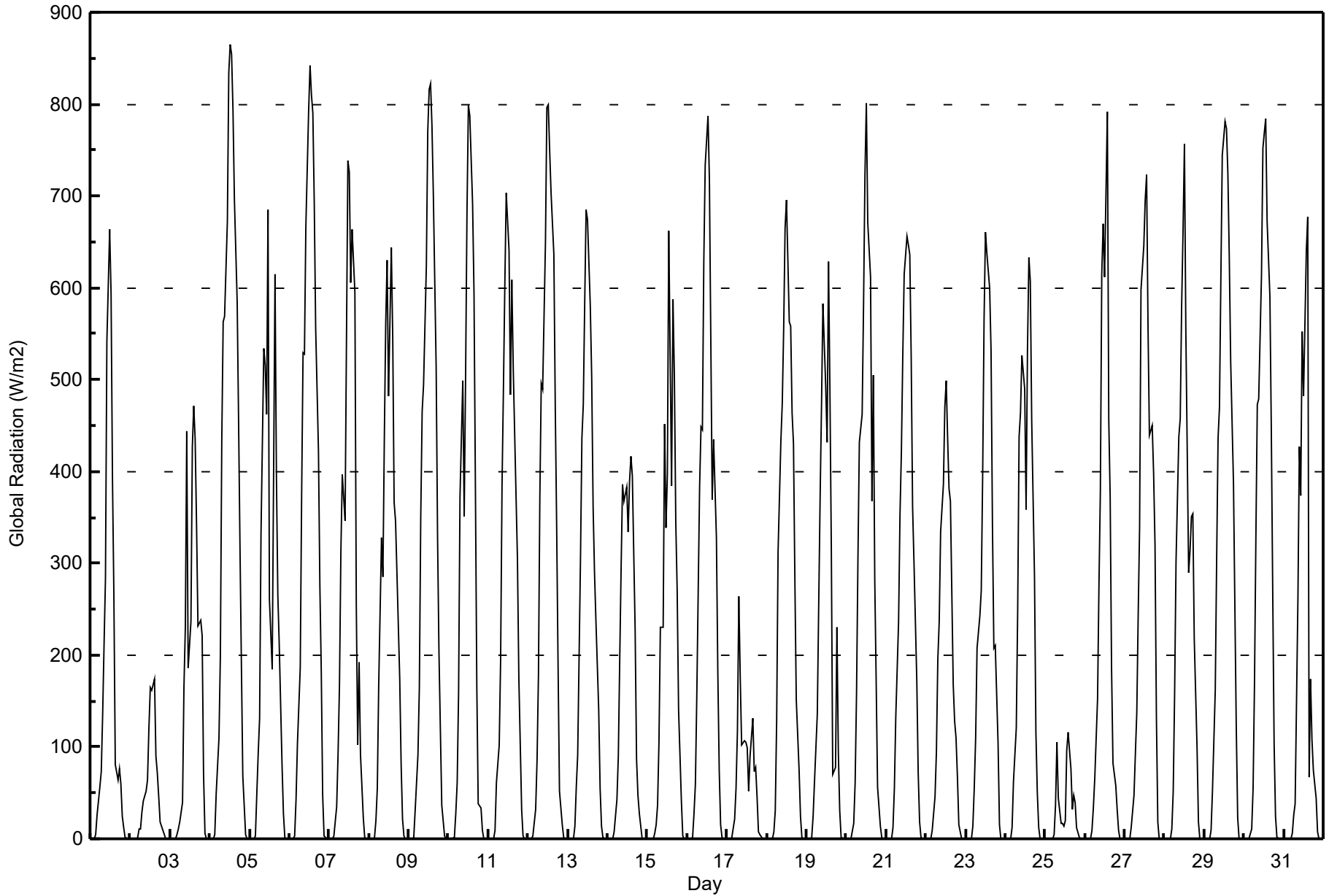
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	118	15.86	15.86
40 - 60	228	30.65	46.51
60 - 80	195	26.21	72.72
80 - 100	203	27.28	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 864.8 W/m2 on Jul 4 13:00 Maximum Daily Average: 344.5 W/m2 on Jul 4																								Hours in Service: 744 Hours of Data: 744		
Minimum Value: 0.0 W/m2 on Jul 1 01:00 Minimum Daily Average: 28.2 W/m2 on Jul 25 Maximum Diurnal Average: 577.6 W/m2 at hour 12 Minimum Diurnal Average: 0.0 W/m2 at hour 24 Monthly Average: 216.25 W/m2 Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.6 Median = 92.5 Q ₃ = 398.4 P ₉₀ = 615.3 P ₉₉ = 800.4																								Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.0	0.2	0.2	4.9	26.4	56.0	73.9	136.2	212.4	284.5	541.3	663.6	593.2	392.4	265.9	81.3	64.3	77.0	58.9	24.2	12.7	1.2	0.0	0.0	148.8	663.6
2-Jul	0.0	0.0	0.0	0.0	1.7	11.3	10.1	28.9	40.5	52.2	64.1	119.9	165.3	161.0	174.1	90.5	71.3	46.4	18.9	13.4	3.9	0.3	0.0	0.0	44.7	174.1
3-Jul	0.0	0.0	0.0	0.0	5.2	11.3	17.8	39.5	164.6	229.6	444.2	186.5	235.9	427.5	471.4	434.5	341.4	232.4	237.6	221.6	70.0	6.0	0.2	0.0	157.4	471.4
4-Jul	0.1	0.0	0.1	5.0	49.2	109.8	199.9	433.4	563.4	568.7	673.2	834.2	864.8	853.8	792.6	697.2	583.5	454.6	317.4	191.1	69.4	5.1	0.2	0.2	344.5	864.8
5-Jul	0.1	0.2	0.2	3.4	48.6	93.1	131.0	333.1	534.0	516.2	462.8	684.5	260.5	185.0	399.7	615.1	395.0	265.5	212.2	80.7	28.1	2.2	0.1	0.0	218.8	684.5
6-Jul	0.0	0.0	0.0	3.2	42.7	104.3	186.5	374.7	529.2	527.2	665.9	792.6	841.5	809.4	789.4	692.0	556.1	422.0	275.6	182.8	47.2	3.5	0.2	0.1	326.9	841.5
7-Jul	0.1	0.1	0.1	3.0	35.4	93.4	168.1	313.4	396.7	346.5	544.3	738.5	725.8	605.5	663.0	594.5	254.9	102.2	191.9	91.5	22.1	2.1	0.1	0.0	245.5	738.5
8-Jul	0.0	0.0	0.0	1.9	19.7	54.3	167.9	328.4	285.6	435.4	561.3	630.3	482.4	644.3	546.8	365.6	346.1	289.6	174.2	81.2	20.8	2.4	0.0	0.0	226.6	644.3
9-Jul	0.0	0.0	0.0	2.1	30.3	91.0	165.1	350.5	465.1	494.0	623.2	770.8	816.3	821.6	776.4	699.5	512.8	328.1	202.9	119.7	36.0	2.7	0.0	0.1	304.5	821.6
10-Jul	0.1	0.1	0.0	2.2	27.8	61.2	157.9	372.4	498.3	351.0	503.3	683.1	799.5	787.4	691.6	594.5	384.9	165.6	37.7	33.8	9.9	0.7	0.1	0.1	256.8	799.5
11-Jul	0.1	0.0	0.0	0.7	9.1	60.6	102.8	195.5	384.7	489.8	603.2	703.7	641.3	484.3	609.4	512.1	441.7	304.5	175.2	104.1	31.7	3.0	0.0	0.0	244.0	703.7
12-Jul	0.1	0.1	0.1	2.7	32.2	85.3	178.0	374.2	495.9	490.0	650.3	796.3	799.6	748.3	704.0	636.7	469.4	338.1	188.4	51.7	15.5	0.8	0.0	0.0	294.1	799.6
13-Jul	0.0	0.0	0.0	0.3	14.5	56.1	92.1	305.1	436.2	472.3	583.0	684.9	674.0	579.9	501.3	361.4	289.4	238.2	139.6	54.8	13.5	0.8	0.1	0.0	229.1	684.9
14-Jul	0.1	0.0	0.0	0.0	7.3	42.8	90.0	194.9	296.3	385.9	367.4	383.4	334.3	389.2	415.8	394.3	226.9	87.0	47.2	26.9	13.2	0.6	0.0	0.0	154.3	415.8
15-Jul	0.0	0.0	0.0	0.3	6.2	16.0	36.3	105.2	230.7	230.2	451.7	338.6	396.0	662.4	385.1	586.8	502.7	344.1	269.3	140.8	40.8	2.6	0.1	0.0	197.7	662.4
16-Jul	0.0	0.0	0.0	1.3	27.6	59.1	155.1	383.3	449.1	445.4	628.4	733.0	787.6	717.0	543.5	369.2	435.5	328.2	181.4	75.0	15.5	1.0	0.0	0.0	264.0	787.6
17-Jul	0.0	0.0	0.2	1.0	22.1	55.5	118.0	263.2	174.7	102.6	107.2	105.0	98.5	52.2	89.3	131.2	73.3	78.0	45.4	7.3	4.1	0.0	0.0	0.0	63.7	263.2
18-Jul	0.0	0.0	0.0	0.0	8.1	29.9	129.6	312.5	433.4	474.0	556.0	665.4	695.9	562.5	558.3	463.0	430.4	280.2	151.2	75.4	24.8	1.1	0.0	0.0	243.8	695.9
19-Jul	0.0	0.0	0.0	0.8	24.5	63.1	135.8	254.8	371.0	471.8	582.9	493.5	432.4	628.2	488.5	318.0	70.5	78.0	230.8	95.0	31.2	1.1	0.0	0.0	198.8	628.2
20-Jul	0.0	0.0	0.0	0.6	17.2	60.9	159.2	305.2	432.4	461.8	581.0	722.4	801.1	671.0	611.3	368.1	504.7	282.6	172.1	56.5	13.2	1.0	0.0	0.0	259.3	801.1
21-Jul	0.0	0.0	0.0	0.4	12.7	55.5	132.7	236.9	352.6	420.3	525.7	615.4	655.7	646.1	636.5	525.3	361.9	300.5	172.3	71.4	18.5	1.0	0.1	0.0	239.2	655.7
22-Jul	0.1	0.0	0.0	0.4	9.7	46.0	94.9	194.9	236.9	334.0	385.3	469.5	498.6	436.5	381.3	367.0	168.1	128.0	109.4	66.6	15.5	0.4	0.0	0.0	164.3	498.6
23-Jul	0.0	0.0	0.0	0.4	14.2	55.3	109.8	208.2	242.7	270.5	394.9	564.1	660.2	637.3	599.2	530.3	340.7	207.2	211.0	103.3	15.4	0.6	0.0	0.0	215.2	660.2
24-Jul	0.0	0.0	0.0	0.3	12.5	62.6	120.0	248.5	438.0	463.5	525.6	489.8	359.2	533.5	633.3	607.2	456.6	285.7	116.4	50.3	12.0	0.2	0.1	0.0	225.6	633.3
25-Jul	0.0	0.0	0.0	0.0	0.3	5.2	36.4	105.7	43.8	17.5	16.4	13.3	19.4	95.9	116.2	76.2	31.8	46.6	39.3	12.3	1.1	0.0	0.0	0.0	28.2	116.2
26-Jul	0.0	0.0	0.0	0.2	9.6	34.1	65.8	152.5	275.8	377.8	615.0	669.6	611.3	791.8	455.6	371.5	184.5	83.0	57.8	31.6	9.4	0.3	0.0	0.0	199.9	791.8
27-Jul	0.0	0.0	0.0	0.1	12.9	47.5	93.0	138.0	244.3	338.5	597.8	644.8	695.5	722.7	560.2	440.0	450.2	398.0	320.1	132.9	18.0	0.6	0.0	0.0	244.0	722.7
28-Jul	0.0	0.0	0.1	0.1	10.3	51.5	158.2	302.7	437.2	457.8	580.2	661.1	757.2	553.6	289.7	315.0	351.2	354.2	218.9	99.1	18.3	0.5	0.2	0.2	234.0	757.2
29-Jul	0.2	0.1	0.1	0.2	9.0	51.2	161.6	304.5	436.3	469.3	610.3	744.1	781.3	773.3	725.0	633.0	520.8	387.6	251.4	119.9	23.1	0.5	0.2	0.2	291.8	781.3
30-Jul	0.1	0.2	0.1	0.1	10.1	54.8	169.4	330.2	473.4	479.5	615.0	752.4	769.4	784.3	672.2	590.4	444.9	270.5	104.2	23.9	1.5	0.0	0.0	0.0	272.8	784.3
31-Jul	0.0	0.0	0.0	0.0	0.7	6.9	26.4	38.9	262.6	426.8	374.5	552.8	481.4	641.1	677.2	67.4	173.4	107.8	75.2	44.8	8.2	0.0	0.0	0.1	165.3	677.2
																								Diurnal Average		
																								Diurnal Maximum		





Maximum Speed: 38 km/h on Jul 3 07:00	Maximum Daily Speed Average: 20.3 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jul 26 12:00	Minimum Daily Speed Average: 0.7 km/h on Jul 23	Hours of Data: 744
Maximum Diurnal Speed Average: 4.5 km/h at hour 19	Minimum Diurnal Speed Average: 1.3 km/h at hour 8	Hours of Missing Data: 0
Monthly Average Velocity: 2.0 km/h 349.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 12 P ₉₀ = 17 P ₉₉ = 29	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	WNW7	S3	SSW9	WSW6	SW5	SW5	WSW6	WSW8	W5	S7	SSE8	SSE15	SSE16	SSE15	SSE12	SSW16	WSW13	WNW7	W6	W5	WSW3	WSW4	S2	S7	SSW5.3	SSW16
2-Jul	WNW5	WNW8	W7	SW9	WSW8	W7	WNW9	NNW13	NNW13	NW10	NNW12	NNW11	W7	W9	NW9	NNW19	NW9	NW13	WNW8	W8	WNW8	WNW7	W7	WNW7	WNW8.1	NNW19
3-Jul	NW8	NW9	NNW12	N18	N24	N29	NNE38	NNE24	N30	N33	N32	N27	N29	N29	N30	N27	NNE20	NNE19	NNE16	N20	N13	NW8	WNW8	WNW9	N20.3	NNE38
4-Jul	WNW7	W7	W7	SW3	SW2	SW3	W2	NE2	N3	NE3	NNE3	NNE3	SW4	ENE4	ENE4	ESE3	S12	S15	S15	S14	S13	S10	SSW12	SSW9	S3.6	S15
5-Jul	SSW8	SW3	S5	S6	SW8	SW7	SW8	SSW10	SW8	SW9	WSW7	SW6	SSW4	WSW5	SW9	SSW12	WNW6	W7	WNW5	N11	NNW9	N13	NW6	WNW9	WSW4.8	N13
6-Jul	WNW7	NW7	NNW5	N7	N12	NNE10	NNE11	NNE13	NNE17	NNE17	NE21	NNE18	NNE17	NNE17	NNE18	NNE18	NNE19	NNE19	NNE20	NNE22	NNE12	N5	NW3	SW3	NNE12.3	NNE22
7-Jul	WSW3	SW3	SW4	S6	SSW6	SW7	SW7	WSW5	WSW5	W4	NE2	SE4	SSW11	SSW10	SW8	SW7	SW9	SSW2	SSW7	SSW8	SW8	SW8	WSW11	WSW10	SW5.8	WSW11
8-Jul	WSW10	SW11	SW7	SW10	WSW10	WSW9	WSW9	W10	WNW8	W6	W7	NW3	ENE4	WNW6	NNW11	NNW10	NNE12	NNE13	NNE11	NNE6	NNW4	NW4	WNW5	WNW7	WNW4.5	NNE13
9-Jul	NW6	NNW9	NNW4	NNW6	N6	NNE13	NNE14	NNE12	NNE13	NNE16	NNE19	NNE21	NNE23	NNE26	NNE25	NE24	NE24	NE19	NE15	NE12	NE12	NE12	NNE8	N5	NNE13.5	NNE26
10-Jul	N4	NNW3	N4	NW3	N3	NNW3	E2	SSE11	SSE13	SE11	SE8	SE9	E6	SSE8	SSE9	SSE10	S13	S11	SSE6	SE5	SE3	SE6	SE6	SSE4	SSE4.8	SSE13
11-Jul	NW2	NW3	NNW1	S3	S6	S8	S9	S11	SSW9	SSW11	SSW6	S9	SSW11	SSW11	SSW15	S13	S11	SSW9	SW6	WSW6	W4	W4	WNW7	W6	SSW6.3	SSW15
12-Jul	SSW3	S6	SW4	SW3	W2	SW2	NNW4	N4	N5	NNE12	NNE13	NNE16	NNE15	NNE15	NNE16	NNE15	NNE13	NNE14	NNE14	NNE11	N10	NW8	NNW10	NW13	N7.0	NNE16
13-Jul	WNW10	WNW13	NNW13	NW13	NW13	NW12	WNW8	NW9	NNW12	N21	NNE22	N24	N29	N27	N28	N26	N20	NNE22	NNE23	N22	N18	NW12	NNW11	N12	N15.6	N29
14-Jul	NNW7	NW9	WNW10	WNW9	W6	NNW6	N14	N20	N20	NNE20	NNE19	NNE14	NE12	NNE11	NNE17	NNE17	NNE15	NNE16	NNE12	N9	N10	N9	N6	NW5	N10.7	NNE20
15-Jul	NW4	W4	W4	WNW6	WNW5	WN3	WNW4	WNW5	N5	NNE10	NE10	ENE13	NE11	NE12	NE15	NE16	NE14	NE11	E8	ENE9	E4	WNW3	WNW2	WNW4	NNE4.9	NE16
16-Jul	W3	W1	WNW2	SW1	SW2	SW2	SSE3	S6	SSE8	SE11	SE14	SSE17	SSE19	SE20	SSE18	SSE17	SE17	SSE17	SSE16	SSE13	SSE10	SSE11	SSE13	SSE13	SSE9.8	SE20
17-Jul	SSE13	SSE11	E1	N2	NNW2	WNW2	N2	SE6	SSE14	SSE12	SSE14	SE12	SSE16	SSE9	E10	SE5	W4	NNE8	N9	NNW8	N8	NNE12	NNE8	N4	ESE3.1	SSE16
18-Jul	NNW4	N5	NNW6	NNE6	N7	NW6	NNE5	NE6	N11	N11	N12	N8	NNE7	N8	NW6	N7	N5	NNE9	N8	WNW5	W7	WSW6	W9	WNW8	NNW5.8	N12
19-Jul	WSW5	SW6	WSW4	WSW2	S3	S4	WSW3	E1	SSE5	SE2	N2	W1	SW8	WSW3	E7	E5	SSE12	WSW10	NNW11	NNW4	W6	WNW4	WNW3	W3	SW1.9	SSE12
20-Jul	SSW4	WSW3	SSW1	SW2	S3	SSW2	S3	N1	N4	N9	N8	N2	NNE4	WNW5	N4	WNW8	NW5	NW6	NNE6	NE6	N2	NW6	W5	NW7	NW2.5	N9
21-Jul	WNW6	WNW5	WNW5	W4	W2	SSW3	S3	WSW4	W3	W5	W3	WNW5	NW7	WNW4	SSW6	SSW4	SW5	W5	NNE9	NNE10	NNE4	WNW3	WNW3	W5	WNW2.9	NNE10
22-Jul	WNW4	WNW3	WNW5	WNW3	WNW2	SW1	WNW3	NNW3	N5	NNE8	N7	NNE14	NNE18	N17	NNE18	NNE20	N16	N12	NNW7	N9	NNE15	N11	NNE12	N7	N8.5	NNE20
23-Jul	N6	N5	N7	N7	N2	S1	WNW4	NW2	SSW5	SSW3	SSE5	SE5	SSE6	SSW10	S10	S9	NE5	NNE6	ESE4	S2	SW2	WNW3	W3	W2	SSW0.7	S10
24-Jul	W5	WSW3	WSW3	SSW4	S6	S6	SSW5	N3	N2	NNE3	NNE1	SSE4	SE3	SE7	E8	E6	E9	E10	ENE8	NE7	NE8	NNE5	N4	E2.1	E10	
25-Jul	NW3	NW5	W7	WSW4	WSW4	NE9	NE6	E7	ENE2	WNW6	NE7	N6	NNW6	N5	NE7	ENE3	N5	NNE8	N7	NNW6	WNW5	SW11	SW12	SW11	NNW2.3	SW12
26-Jul	SSW12	SSW11	S10	S11	S11	SE4	E4	SSE7	E6	ESE8	SE8	NNE1	NNE10	ENE10	NNE19	NNE24	NNE23	NNE23	NNE25	NNE23	NNE14	ENE11	ENE13	ENE14	NE6.4	NNE25
27-Jul	ENE11	NE13	NE10	NNE10	NNE10	N10	N10	N8	N9	NNW10	N14	NNE17	NNE18	NNE19	NNE20	NNE15	NE8	NNE16	NNE16	NNE9	WNW4	SSW4	W5	WNW6	NNE9.9	NNE20
28-Jul	W5	WNW3	WSW3	SSW4	SSW5	WSW3	SW4	W3	NW2	N3	NNE3	N3	W5	ENE3	ESE6	E3	S2	SSW9	S12	SSW9	SSW9	SSW9	SW8	SW7	SSW3.0	S12
29-Jul	SW7	SSW8	SSW9	SSW9	S8	SSW8	SSW9	SSW8	SSW9	SW9	SW12	SW13	SW12	SSW12	SSW14	SSW15	SSW16	SSW12	SSW12	SSW7	S6	S8	SSW9	SSW9	SSW9.9	SSW16
30-Jul	SW6	SW4	S3	S6	S7	S7	SSE8	S8	SSE8	SSE10	S13	SSE14	S20	S18	S16	S18	SSW13	SSW10	SW4	SW9	SW16	S12	SSE6	WNW6	S9.2	S20
31-Jul	SW8	WSW6	WSW4	WSW7	S7	S6	SSE5	SW8	SSW8	SSW9	SSW8	W10	W10	WNW9	NNW10	NNE2	NNW7	NE1	WSW4	WSW4	WSW5	WSW3	WSW4	SW6	WSW4.3	NNW10

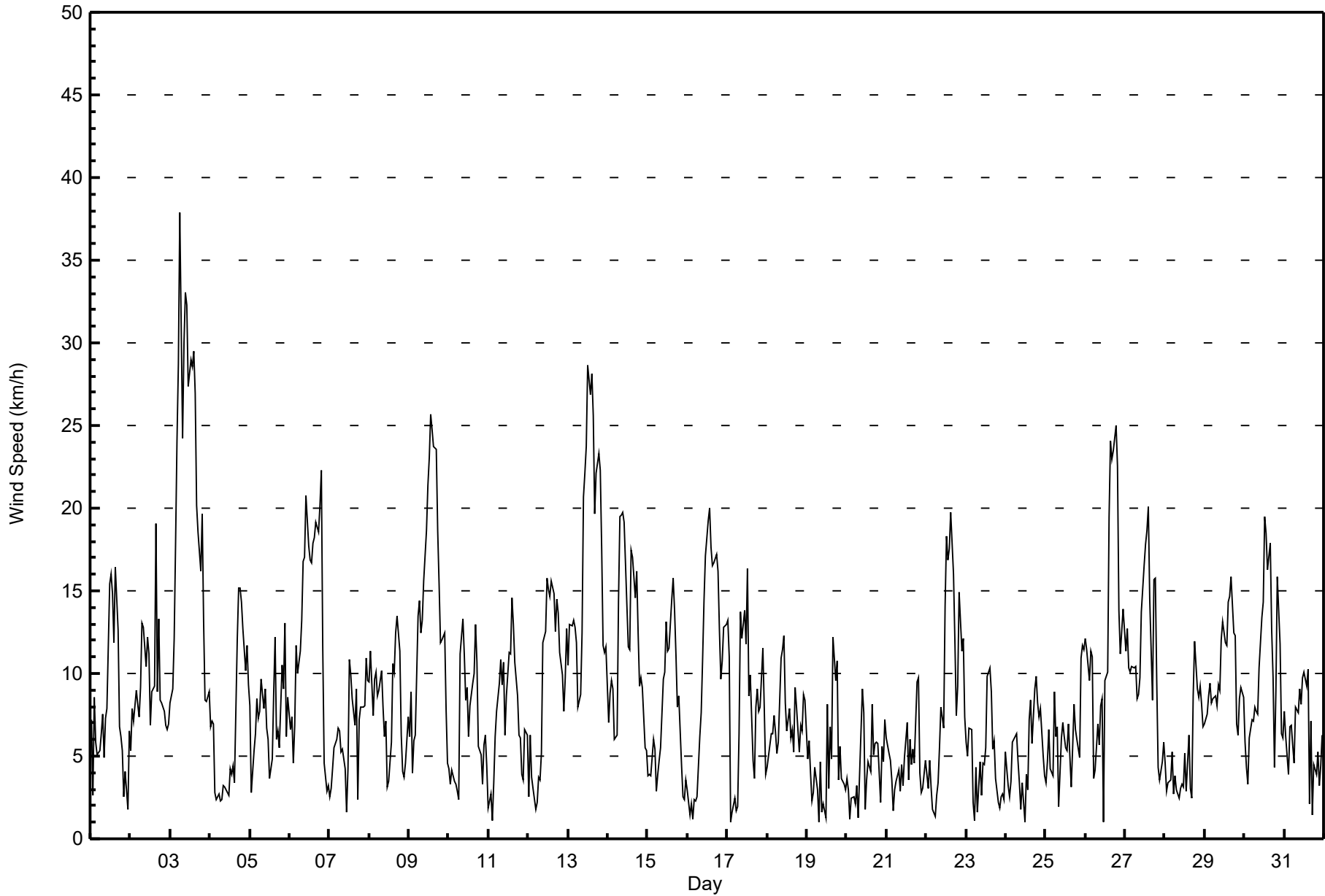
W3.4	W3.2	W3.0	W2.5	W1.8	NNW1.5	NNW1.8	NNW1.3	N2.3	N3.2	NNE4.0	NNE3.7	NE2.9	NNE2.9	NNE4.3	NNE3.9	NNE3.4	NNE4.5	NNE4.5	NNE3.9	NNW2.4	NW1.6	W2.3	W3.4	Diurnal Average
SSE13	WNW13	WNW13	N18	N24	N29	NNE38	NNE24	N30	N33	N32	N27	N29	N29	N30	N27	NE24	NNE23	NNE25	NNE23	N18	N13	SSE13	ENE14	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Ells River - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Ells River - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	237	31.85	31.85
6 - 11	314	42.20	74.06
12 - 19	147	19.76	93.82
20 - 28	37	4.97	98.79
29 - 38	9	1.21	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Ells River - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	29	13	5	5	7	2	8	6	13	15	23	26	28	32	14	11	237
6 - 11	31	23	13	5	10	2	9	18	30	37	31	16	19	33	19	18	314
12 - 19	12	52	11	3	0	0	3	22	12	12	5	1	0	2	6	6	147
20 - 28	12	20	3	0	0	0	1	0	1	0	0	0	0	0	0	0	37
29 - 38	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	92	109	32	13	17	4	21	46	56	64	59	43	47	67	39	35	744

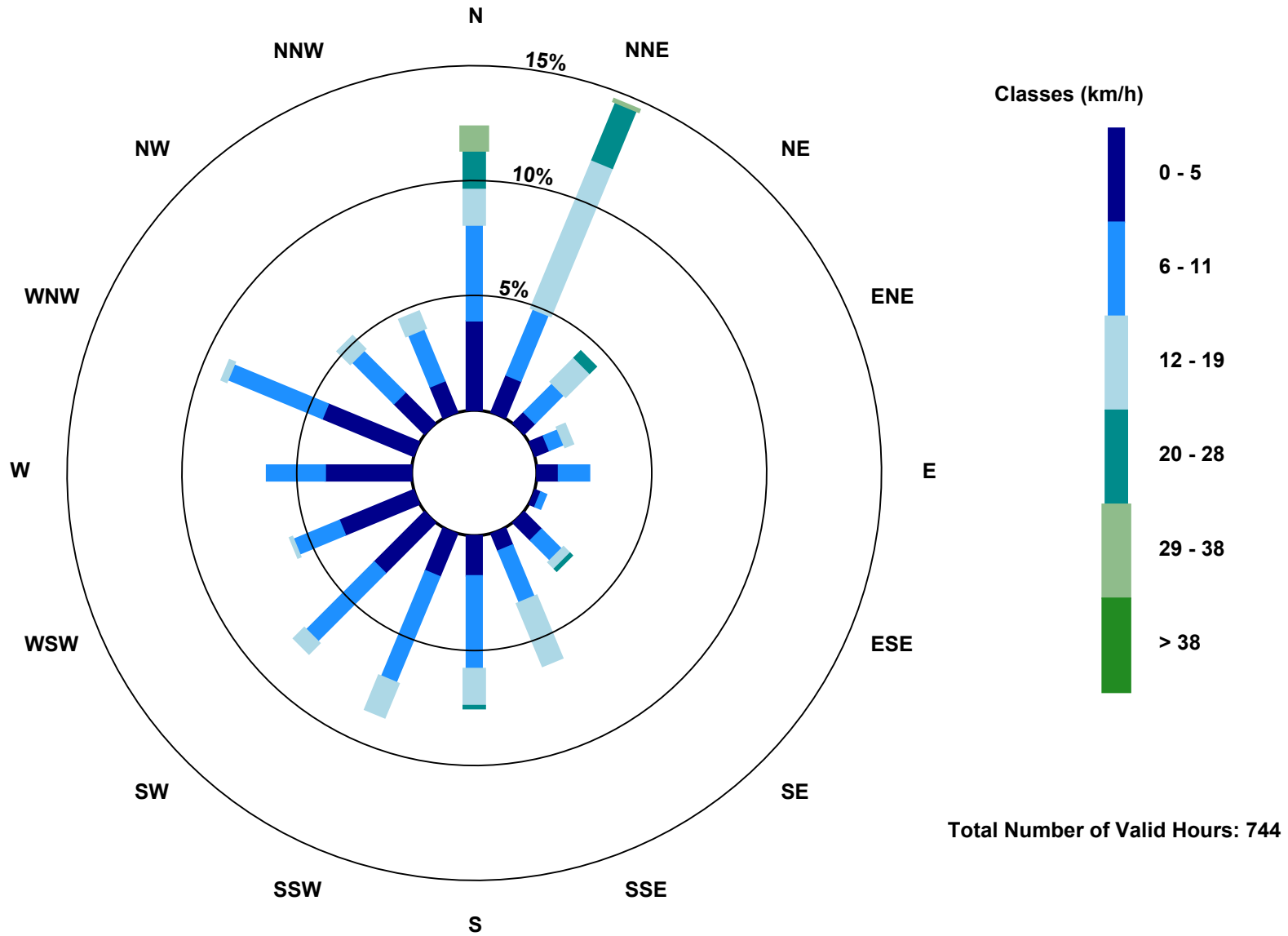
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Ells River





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Ells River - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Jul 3 04:00 Minimum Value: 0 km/h on Jul 17 05:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	2	1	2	2	2	2	2	2	2	3	2	3	3	3	3	5	5	2	2	2	1	2	1	3	5
2-Jul	2	2	2	2	2	2	2	3	2	2	2	4	2	2	6	4	3	5	2	3	3	2	1	1	6
3-Jul	1	1	3	10	5	6	8	6	6	6	6	5	5	6	5	4	4	3	3	4	3	1	2	2	10
4-Jul	1	1	2	1	1	1	1	1	1	2	2	2	3	2	2	4	4	3	3	2	2	1	2	3	4
5-Jul	2	2	2	1	3	3	2	2	3	3	2	2	3	3	2	4	3	2	3	2	1	3	2	1	4
6-Jul	2	2	3	2	1	1	4	3	2	4	4	4	5	5	4	5	4	3	3	4	3	1	1	1	5
7-Jul	1	1	1	1	1	3	2	1	1	1	1	3	4	4	3	4	3	1	2	1	1	2	3	2	4
8-Jul	3	3	2	2	3	2	2	3	2	2	2	2	2	3	3	3	2	1	2	1	1	1	1	3	3
9-Jul	2	1	3	1	2	2	2	2	2	3	4	4	5	4	4	4	4	3	3	2	2	2	2	1	5
10-Jul	1	1	1	1	1	1	2	3	3	4	3	4	3	5	4	5	3	2	2	1	1	2	1	1	5
11-Jul	2	2	1	2	1	1	2	2	2	3	3	3	3	3	3	3	3	2	1	1	1	2	2	2	3
12-Jul	2	2	2	2	2	1	2	1	2	3	3	4	4	4	3	4	3	2	2	1	2	1	2	2	4
13-Jul	1	1	1	2	1	3	2	2	2	5	4	6	6	6	6	5	5	4	4	4	6	2	1	2	6
14-Jul	1	1	1	1	3	5	3	4	4	3	3	3	3	3	3	3	3	2	2	2	2	1	1	1	5
15-Jul	2	2	1	1	2	1	1	1	2	2	3	4	3	4	3	4	4	3	3	2	2	1	2	2	4
16-Jul	2	1	2	2	2	1	1	2	3	3	3	4	4	4	4	4	3	3	3	2	1	1	2	2	4
17-Jul	2	2	1	1	0	1	1	4	3	3	3	2	4	2	2	2	1	2	2	1	2	1	2	1	4
18-Jul	1	1	1	2	1	1	2	1	2	2	2	3	4	3	3	3	3	2	2	1	1	1	2	1	4
19-Jul	3	2	1	1	2	1	1	1	1	2	2	2	2	3	3	3	4	5	3	3	2	1	1	2	5
20-Jul	2	2	1	2	2	2	1	1	2	2	3	1	2	2	3	3	2	2	1	2	1	2	1	1	3
21-Jul	2	2	2	2	1	1	1	1	2	1	2	3	3	3	3	3	2	1	5	2	2	1	1	1	5
22-Jul	1	2	2	2	1	1	1	1	3	2	2	4	3	2	2	3	3	3	1	2	2	2	1	3	4
23-Jul	1	1	2	2	1	1	1	1	2	2	2	2	3	4	3	3	5	2	2	2	2	2	2	1	5
24-Jul	1	1	1	2	2	2	1	1	1	1	1	1	1	2	3	3	3	2	2	1	1	2	1	1	3
25-Jul	2	1	3	2	3	7	3	3	2	2	2	4	2	3	2	2	1	1	2	1	2	3	3	3	7
26-Jul	3	3	1	1	1	2	2	1	2	2	3	3	4	3	5	4	3	3	3	4	2	2	2	3	5
27-Jul	2	2	1	2	1	1	1	1	2	2	4	4	4	5	5	5	6	3	3	3	2	1	4	2	6
28-Jul	4	2	1	1	2	1	1	1	1	1	1	3	3	2	2	2	3	4	2	2	1	1	2	2	4
29-Jul	2	2	3	1	1	1	2	2	2	3	4	4	5	5	4	5	4	4	3	2	1	1	1	1	5
30-Jul	1	2	2	1	1	1	1	1	2	3	3	5	5	5	6	4	5	3	1	3	6	3	3	2	6
31-Jul	4	3	2	2	3	1	2	2	2	2	3	3	3	3	4	5	9	2	2	1	2	2	2	1	9
Diurnal Maximum																									



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Ells River - July 2023

Direction of Maximum Speed: 18 deg on Jul 3 07:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 1.6 deg on Jul 3	Hours of Data: 744
Direction of Minimum Speed: 24 deg on Jul 26 12:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.7 deg on Jul 23	Percent Operational Time: 100.0
Monthly Average Direction: 349.0 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	283	172	209	243	235	221	241	252	259	169	157	149	152	147	156	192	257	282	274	265	249	252	189	186	202.9
2-Jul	294	284	270	233	239	267	300	342	333	316	333	334	273	259	307	332	318	310	291	267	283	290	274	285	299.8
3-Jul	309	318	328	3	8	4	18	12	4	359	5	357	1	0	2	7	19	20	19	8	6	325	300	291	1.6
4-Jul	289	280	278	226	232	236	273	35	11	52	24	26	218	61	14	106	169	170	170	170	177	182	197	208	189.6
5-Jul	208	227	179	191	233	228	214	213	224	235	250	235	206	253	225	210	286	269	296	352	327	355	323	291	249.6
6-Jul	298	309	335	354	11	13	13	21	20	16	35	23	26	17	17	24	14	21	17	28	19	9	322	233	15.7
7-Jul	241	232	222	190	203	222	224	239	242	275	39	124	195	209	234	233	226	204	204	200	215	228	237	242	220.5
8-Jul	241	236	231	225	244	245	252	270	284	271	259	314	61	294	328	339	24	16	23	26	338	315	291	288	293.1
9-Jul	309	347	339	328	2	17	16	13	14	14	21	16	15	17	20	42	45	49	51	40	44	43	32	4	23.5
10-Jul	349	345	352	325	360	344	93	157	162	141	143	135	87	162	148	161	169	169	149	130	131	145	144	148	146.3
11-Jul	304	311	332	185	171	173	179	173	197	205	196	188	196	194	202	184	186	201	220	237	264	270	289	277	202.3
12-Jul	209	187	226	227	264	230	342	353	349	20	17	31	29	18	18	21	21	19	16	18	9	313	297	306	6.0
13-Jul	293	299	300	314	311	315	298	305	338	5	14	1	8	4	354	352	8	25	21	5	352	325	316	3	349.8
14-Jul	338	314	289	284	281	343	4	3	11	15	24	28	39	32	18	23	33	22	16	360	0	3	360	316	6.8
15-Jul	308	267	276	284	288	321	302	302	2	23	50	61	54	53	38	34	39	50	81	72	82	290	284	286	29.4
16-Jul	272	279	299	231	231	226	164	183	150	143	142	148	147	144	149	148	144	151	151	154	149	150	149	157	151.9
17-Jul	166	167	80	351	334	299	349	139	159	147	151	143	155	151	101	130	268	23	11	348	353	23	20	356	122.4
18-Jul	331	349	330	12	2	325	12	38	354	3	3	10	32	349	319	352	5	16	6	299	262	251	281	283	345.2
19-Jul	253	230	241	254	173	186	237	89	156	134	5	276	217	244	98	89	166	254	334	341	281	282	295	276	235.4
20-Jul	209	253	207	226	185	192	171	11	350	3	4	355	27	294	356	289	326	313	17	49	352	305	278	308	325.5
21-Jul	289	282	282	263	263	211	188	243	269	268	274	293	321	296	203	210	232	281	13	19	16	293	282	280	284.7
22-Jul	295	291	302	285	291	233	291	345	356	13	6	12	14	11	14	13	9	8	348	3	19	11	16	358	4.2
23-Jul	352	7	2	351	6	191	292	321	207	195	157	144	148	195	176	180	40	17	123	176	216	289	259	267	192.8
24-Jul	277	244	239	205	190	189	184	204	9	356	26	28	162	130	130	89	88	85	79	60	54	49	33	10	94.7
25-Jul	326	321	268	243	248	44	45	85	58	302	38	4	337	352	40	61	6	18	3	337	283	228	227	220	334.7
26-Jul	199	207	184	182	184	134	91	147	97	111	127	24	20	61	20	13	19	15	22	16	26	66	63	72	48.2
27-Jul	60	45	39	26	13	7	7	5	357	348	6	15	33	18	16	31	49	22	16	17	297	202	263	285	17.2
28-Jul	273	303	250	209	196	246	232	264	320	10	20	9	277	76	122	98	176	202	190	197	201	205	219	231	213.5
29-Jul	219	212	192	204	191	194	211	207	201	227	235	217	224	211	195	193	195	203	205	204	187	189	200	208	205.3
30-Jul	220	234	177	169	174	180	162	170	158	155	169	168	171	180	182	179	202	193	228	220	223	179	150	286	184.0
31-Jul	228	250	246	249	170	176	164	231	203	198	209	266	280	303	334	17	327	40	237	254	239	254	238	228	243.9

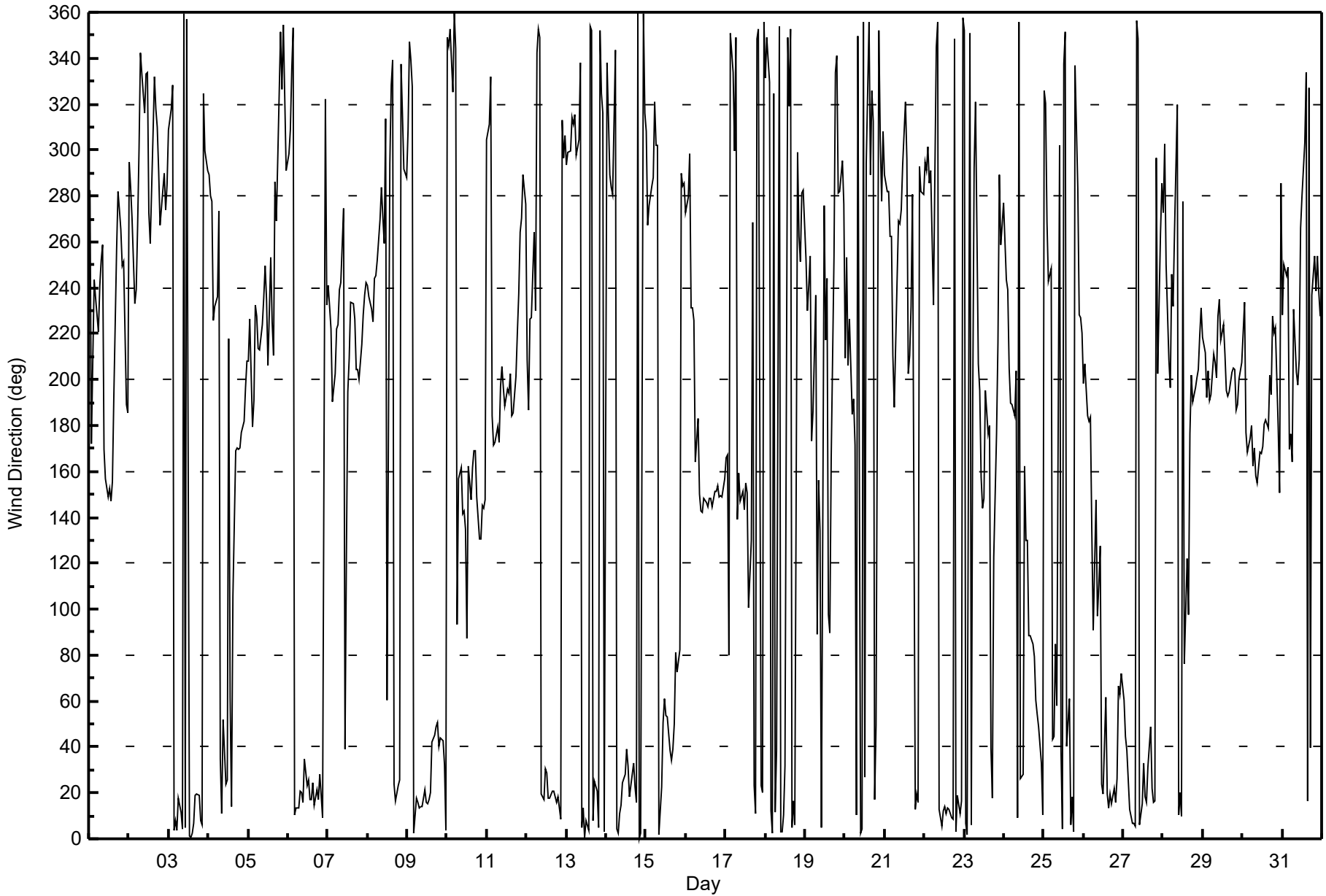
270.0 275.8 274.4 266.7 266.5 297.8 332.3 328.5 350.7 6.3 27.1 27.3 36.2 20.6 23.2 28.0 26.1 21.4 21.4 12.2 340.8 305.2 275.9 274.2
 Diurnal Average

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Ells River - July 2023





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Ells River - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 95 deg on Jul 19 14:00											Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0														
Minimum Value: 4 deg on Jul 29 22:00																									
Percentiles: P ₁ = 6 P ₁₀ = 10 Q ₁ = 14 Median = 21 Q ₃ = 35 P ₉₀ = 56 P ₉₉ = 88																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	37	56	15	23	33	25	25	19	31	27	30	14	14	12	17	24	35	38	28	24	61	35	53	23	61
2-Jul	52	13	29	18	17	23	14	24	14	16	12	19	22	20	32	11	21	18	19	21	25	18	14	12	52
3-Jul	17	11	12	25	13	14	13	15	13	14	15	15	13	16	14	15	10	11	10	12	12	22	11	10	25
4-Jul	11	10	18	36	40	35	51	44	34	59	80	79	85	65	48	82	27	15	13	10	10	7	9	22	85
5-Jul	17	48	23	16	22	26	19	18	33	24	27	48	79	54	24	23	48	31	36	15	11	12	28	8	79
6-Jul	14	13	70	25	6	7	18	12	10	14	14	20	19	15	18	19	12	11	10	10	7	12	27	40	70
7-Jul	56	46	30	21	11	21	20	24	23	20	74	57	38	32	40	54	26	75	19	5	17	15	19	20	75
8-Jul	20	17	23	20	24	20	20	21	21	28	30	78	67	53	20	37	11	7	10	16	15	12	11	23	78
9-Jul	16	14	53	19	15	7	8	10	12	18	15	14	12	10	14	14	11	10	9	9	8	7	13	19	53
10-Jul	23	25	25	34	24	31	72	15	15	20	35	32	56	51	36	36	19	13	24	16	15	8	10	13	72
11-Jul	78	26	87	24	14	12	11	12	21	28	62	43	24	24	20	20	26	24	17	9	22	18	10	19	87
12-Jul	40	21	36	49	51	51	31	28	22	16	13	15	19	19	15	14	14	11	6	8	15	15	8	8	51
13-Jul	8	7	7	8	7	8	12	15	14	22	15	19	16	18	16	17	23	8	8	13	20	9	12	15	23
14-Jul	18	13	9	10	39	30	12	15	14	14	10	15	19	19	14	13	16	9	14	15	14	13	21	20	39
15-Jul	42	36	21	7	16	33	14	15	39	20	25	21	24	25	17	15	20	26	23	15	46	20	42	33	46
16-Jul	26	41	35	72	51	34	36	32	23	20	17	18	14	14	18	15	15	11	9	9	5	6	6	10	72
17-Jul	7	10	87	57	29	43	53	39	12	12	12	10	13	23	17	34	46	17	24	19	21	8	11	24	87
18-Jul	9	22	12	22	14	10	23	16	16	20	16	32	59	28	65	46	55	19	24	20	18	16	14	9	65
19-Jul	38	25	35	46	68	30	35	73	21	95	79	90	29	95	44	69	25	49	18	54	17	42	36	44	95
20-Jul	56	54	65	27	53	64	25	71	23	15	22	72	56	63	74	25	42	30	32	12	32	24	34	12	74
21-Jul	10	16	26	45	54	46	23	23	58	43	72	68	41	85	68	75	31	32	26	6	16	35	32	15	85
22-Jul	19	36	22	19	34	56	43	48	26	18	17	11	9	11	10	9	10	13	10	13	6	10	7	18	56
23-Jul	14	14	17	13	51	72	16	64	43	64	41	52	52	34	27	33	80	47	60	64	56	72	81	40	81
24-Jul	18	41	51	34	13	16	14	27	39	69	47	82	37	80	43	29	66	20	12	8	7	11	12	32	82
25-Jul	53	19	22	50	77	42	43	35	78	37	36	37	44	54	18	58	29	11	20	40	44	18	19	21	78
26-Jul	13	13	11	7	6	55	31	15	33	26	36	94	41	31	18	10	8	8	7	7	11	16	11	11	94
27-Jul	13	10	10	7	8	10	9	15	17	19	20	20	14	14	13	34	55	11	13	12	27	38	39	27	55
28-Jul	55	70	34	38	24	37	21	45	54	29	46	58	59	72	28	52	93	39	15	11	8	10	15	19	93
29-Jul	21	21	19	9	16	10	15	21	19	30	27	31	42	40	28	27	19	28	19	12	4	4	7	10	42
30-Jul	23	24	48	9	14	9	10	16	24	24	21	31	23	23	29	22	27	23	29	19	20	15	56	22	56
31-Jul	29	47	50	28	15	25	35	18	19	25	25	33	28	34	32	91	88	94	52	39	20	70	47	15	94
Diurnal Maximum																									



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS505
SAWBONES BAY
JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SAWBONES BAY (AMS505)
 JULY 2023

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	35	39	99.46	12.5	0	4.7	0
H2S (ppb) Average	704	36	40	99.46	2.6	0	0.8	0
NO2 (ppb) Average	659	35	85	93.28	18.7	0	7.6	-
NO (ppb) Average	659	35	85	93.28	8	-	2.1	-
NOX (ppb) Average	659	35	85	93.28	25	-	9.7	-
Temperature 2 m (C) Average	744	0	0	100	29.2	-	22.6	-
Relative Humidity (%) Average	691	0	53	92.88	99.6	-	88	-
Wind Speed 10 m (km/h) Average	744	0	0	100	28	-	19	-
Wind Direction 10 m (deg) Average	744	0	0	100	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SAWBONES BAY (AMS505)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	705	0.88	1.7	-	0	0	0	0.2	0.8	2.7	12.5
H2S (ppb) Average	704	0.23	0.3	-	0	0.1	0.1	0.1	0.3	0.5	2.6
NO2 (ppb) Average	659	1.78	2.5	-	0	0	0	0.8	2.6	5.1	18.7
NO (ppb) Average	659	0.46	1.1	-	0	0	0	0	0.3	1.6	8
NOX (ppb) Average	659	2.24	3.4	-	0	0	0.1	0.9	3	6.4	25
Temperature 2 m (C) Average	744	17.11	5	-	5.4	10.9	13.4	16.6	21.1	24.1	29.2
Relative Humidity (%) Average	691	65.01	20.2	-	19.8	36.8	47.4	65.9	82.6	92.5	99.6
Wind Speed 10 m (km/h) Average	744	9.1	5	-	1	3	5	8	12	16	28
Wind Direction 10 m (deg) Average	744	253.6	0	-	0	-	-	-	-	-	0

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SAWBONES BAY (AMS505)
JULY 2023

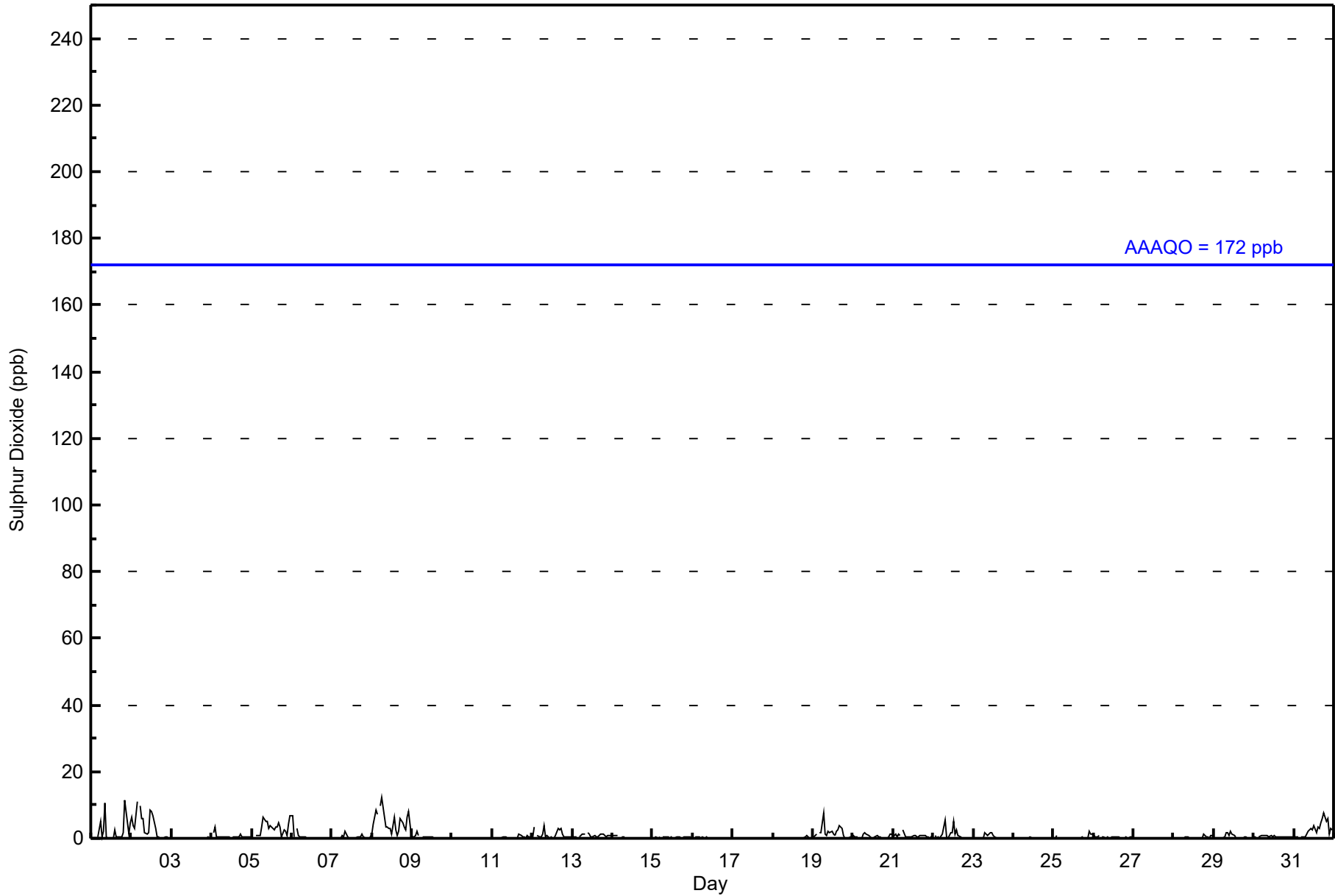
OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S, SO2	13 Jul 2023 09:00	13 Jul 2023 09:00	1	Maintenance - sample manifold cleaned
H2S, NO2, SO2	24 Jul 2023 06:00	24 Jul 2023 08:00	3	Station power failure
NO2	30 Jul 2023 02:00	31 Jul 2023 09:00	32	Analyzer Failure - sample pump failure
NO2	31 Jul 2023 10:00	31 Jul 2023 10:00	1	Maintenance - remote troubleshooting
NO2	31 Jul 2023 11:00	01 Aug 2023 00:00	14	Analyzer Failure - sample pump failure
Relative Humidity	02 Jul 2023 16:00	31 Jul 2023 07:00	53	Sensor operated out of range



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Sawbones Bay - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Sawbones Bay - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	701	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: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Sawbones Bay - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	74	44	21	11	22	37	38	56	59	39	36	32	71	71	41	49	701
11 - 20	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	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	74	44	21	11	22	37	38	56	59	39	36	35	72	71	41	49	705

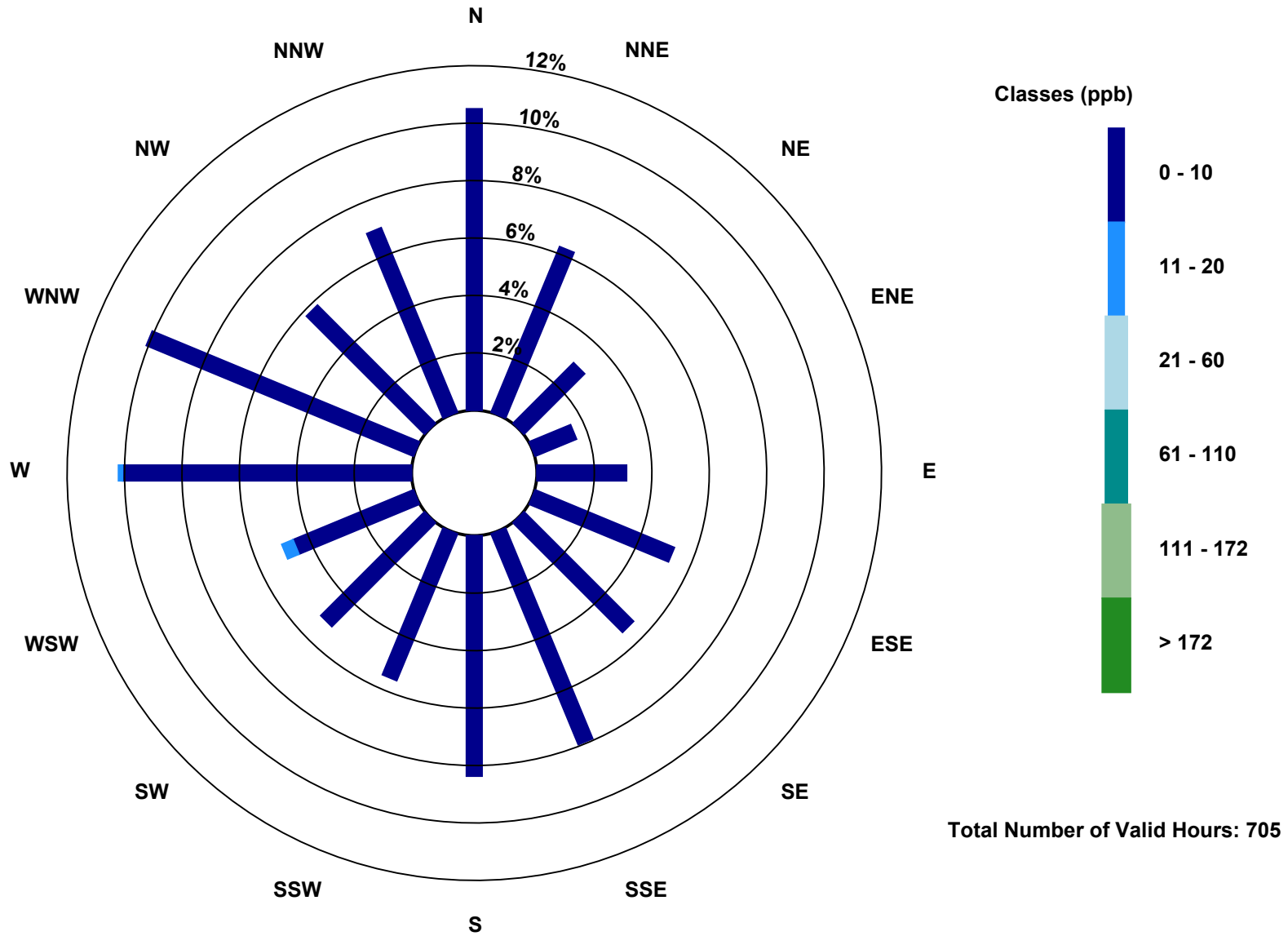
Total Number of Valid Hours: 705

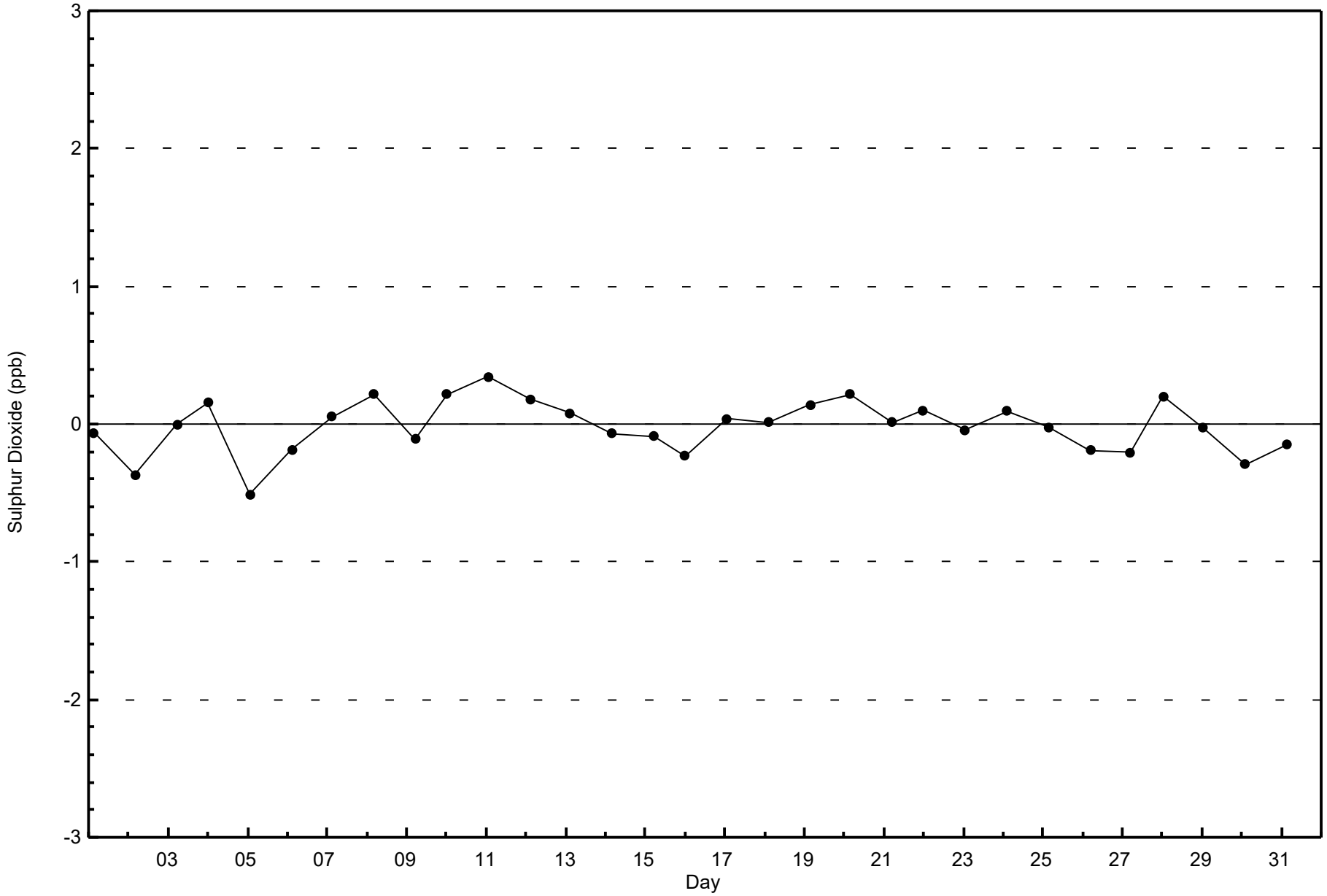
Total Number of Hours: 744

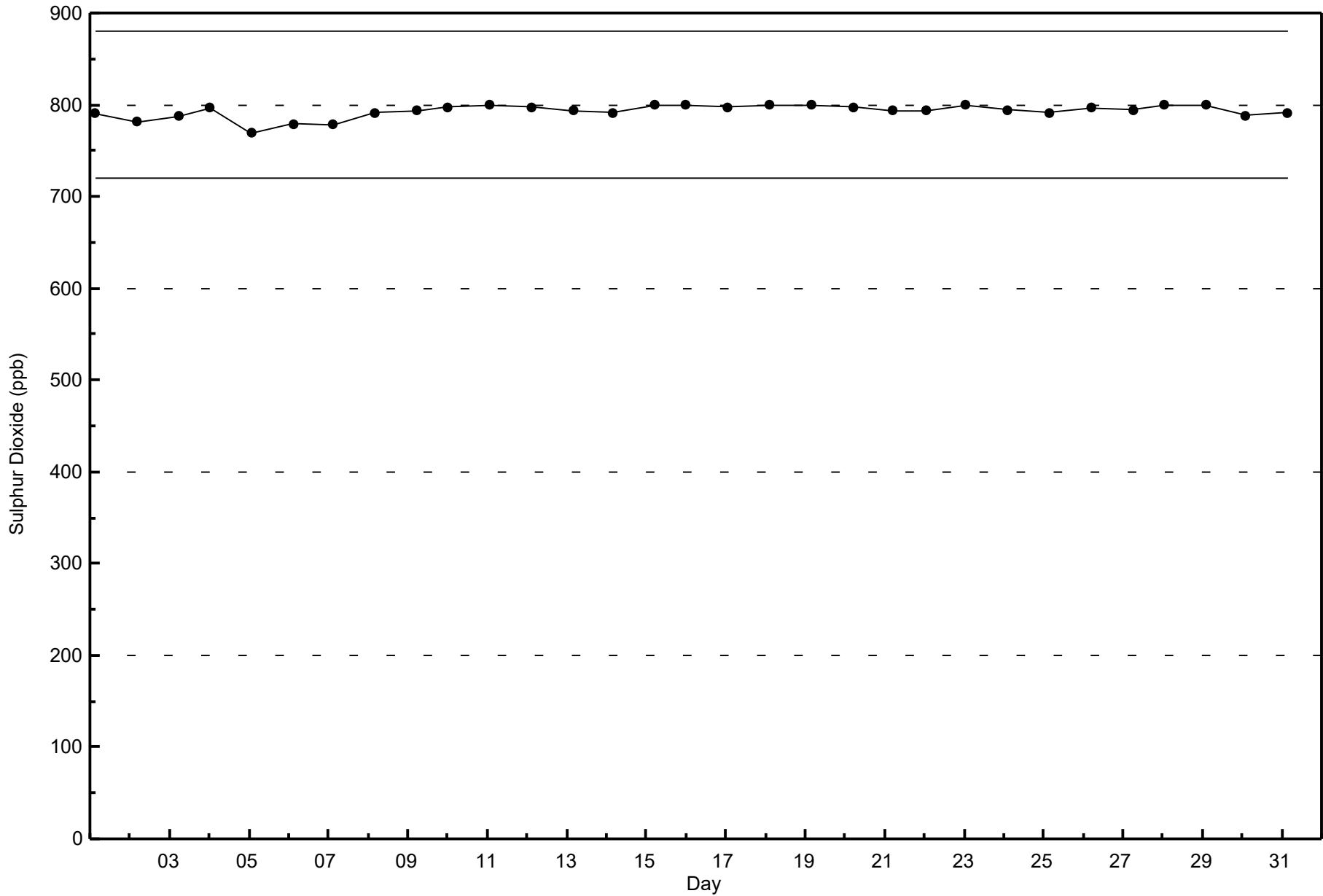


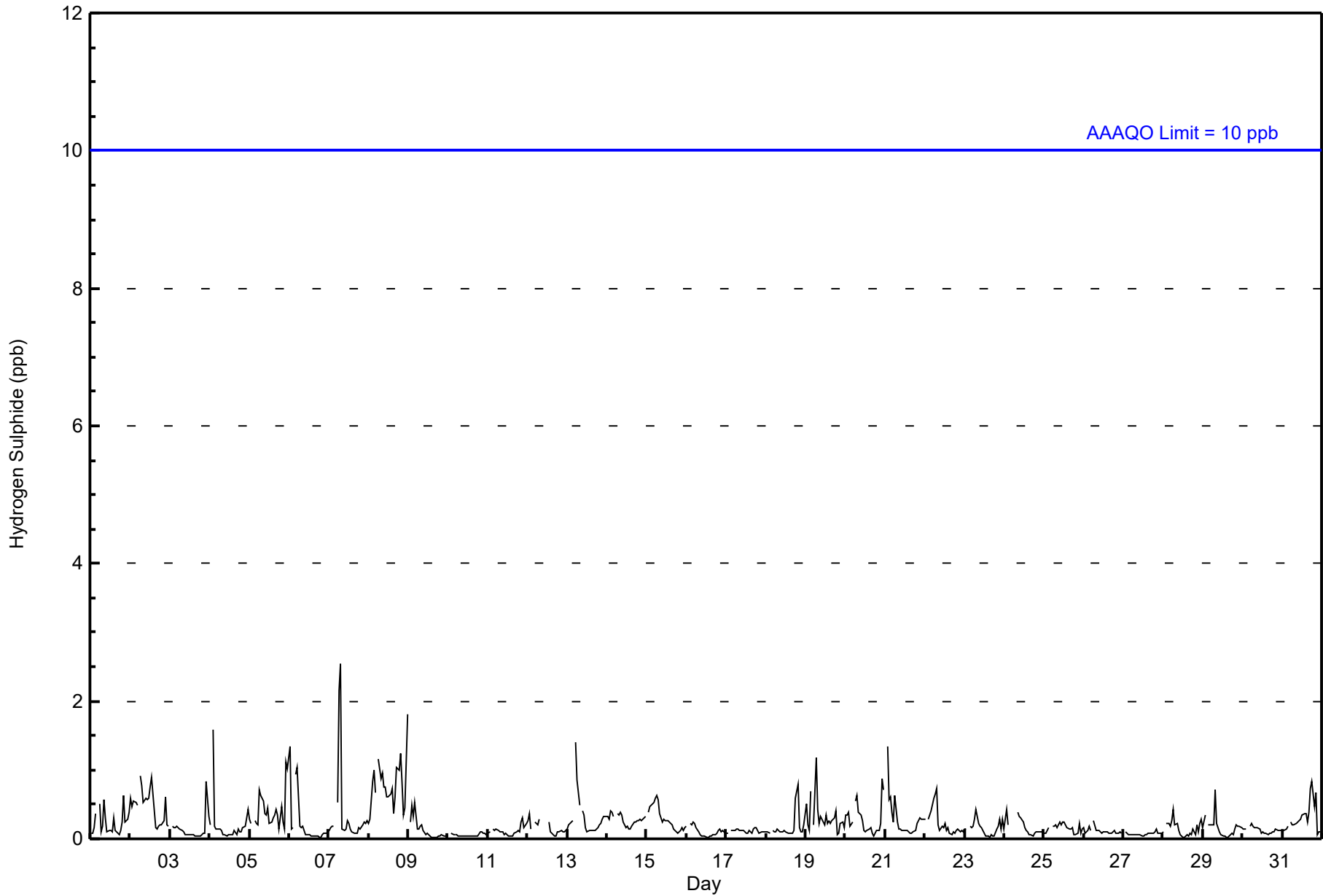
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Sawbones Bay











**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Sawbones Bay - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	703	99.86	99.86
3 - 4	1	0.14	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Sawbones Bay - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	77	45	19	11	23	37	38	55	55	43	39	33	70	66	42	50	703
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	77	45	19	11	23	37	38	55	55	43	39	33	70	67	42	50	704

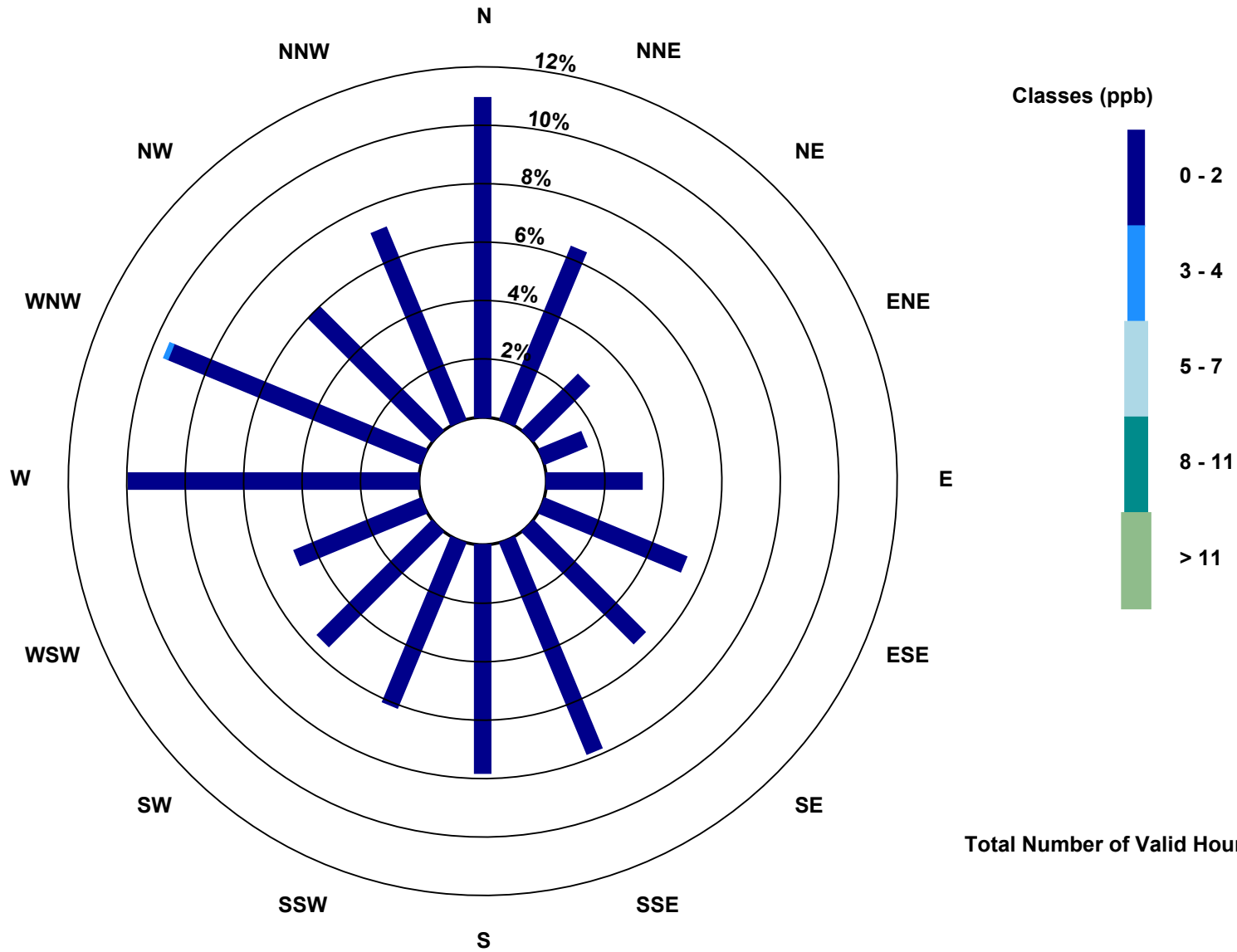
Total Number of Valid Hours: 704

Total Number of Hours: 744

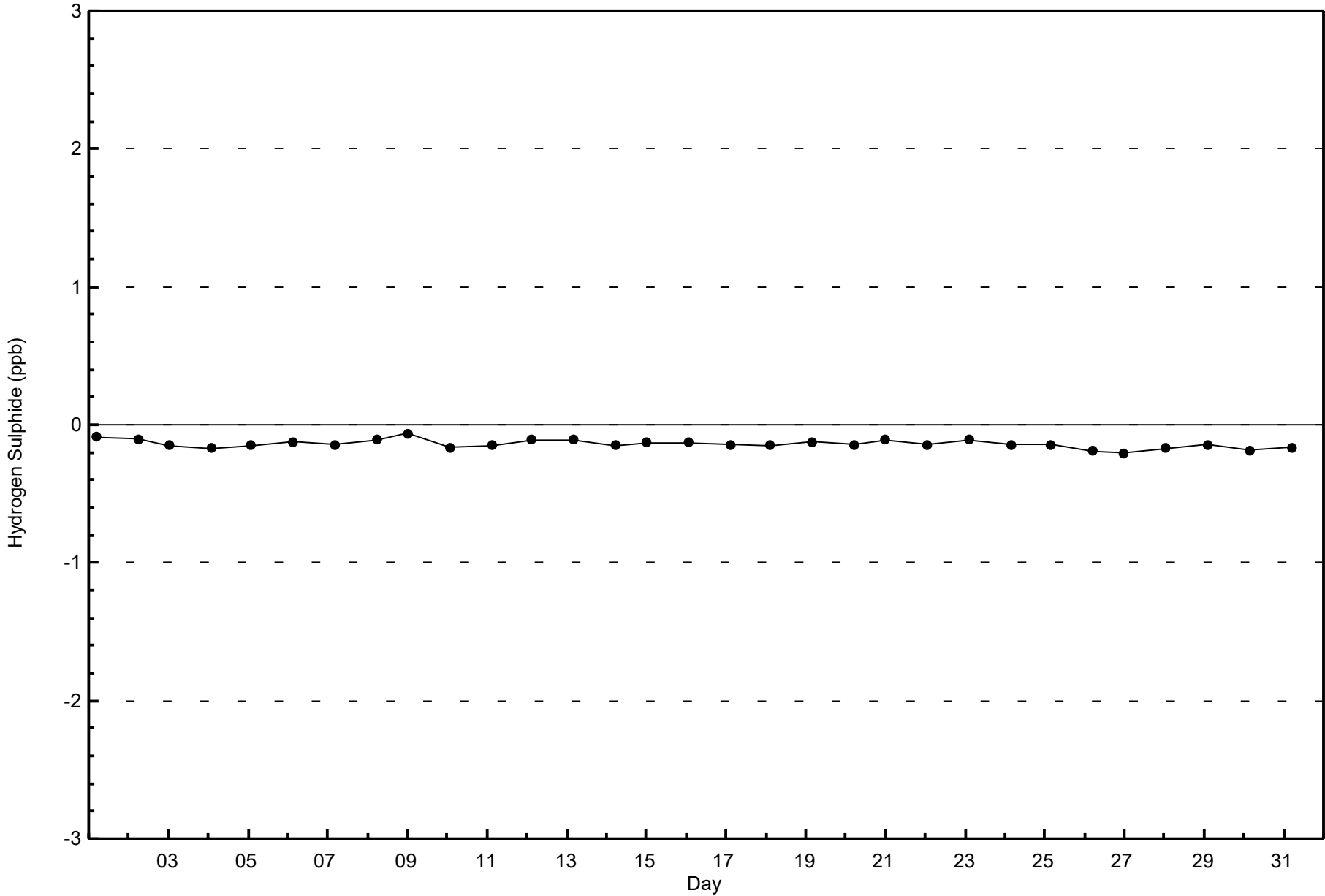


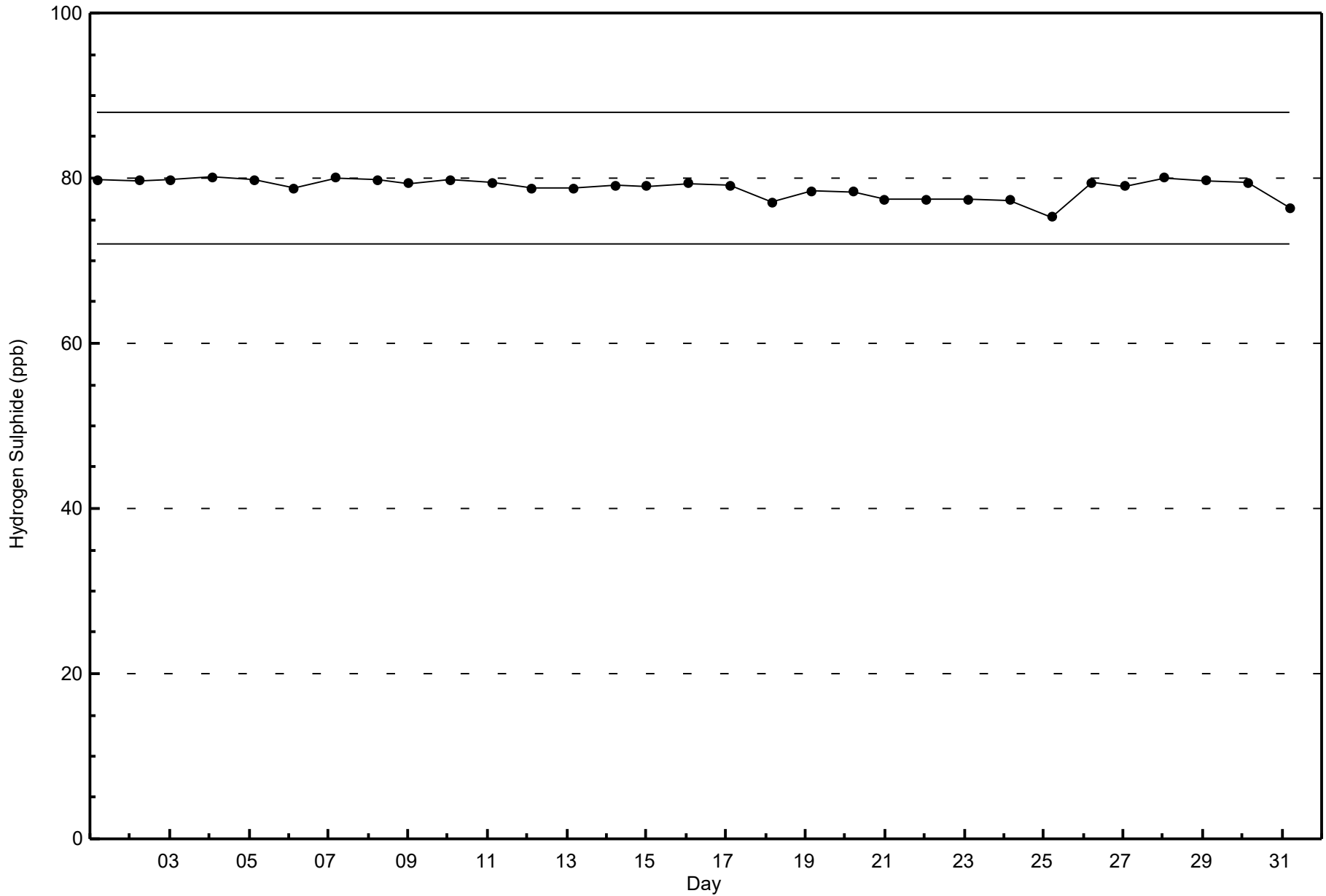
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Hydrogen Sulphide (H₂S) - ppb
Sawbones Bay



Total Number of Valid Hours: 704







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

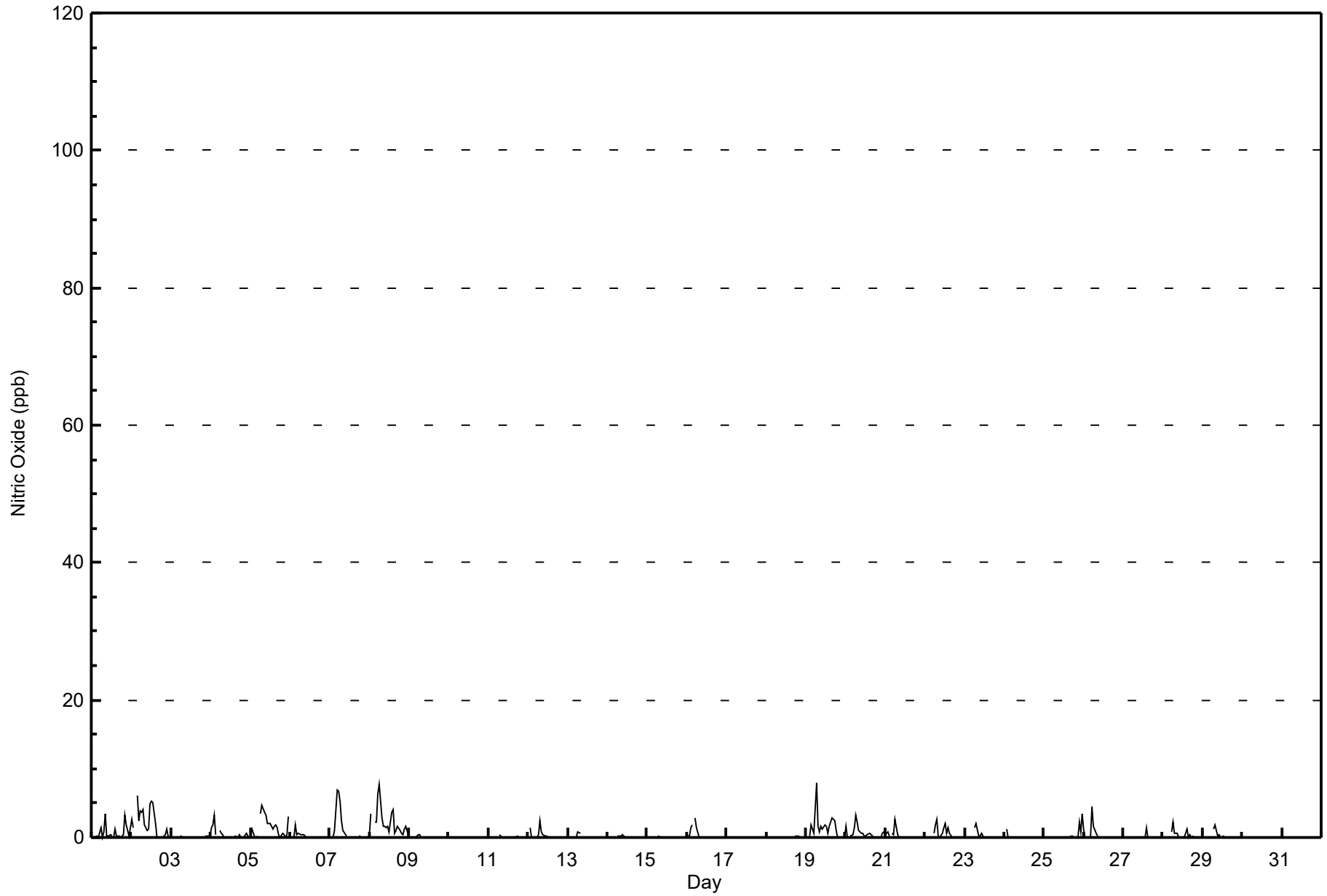
Sawbones Bay - July 2023

Maximum Value: 8.0 ppb on Jul 19 07:00		Maximum Daily Average: 2.1 ppb on Jul 8		Hours in Service: 744																						
Minimum Value: 0.0 ppb on Jul 1 01:00		Minimum Daily Average: 0.0 ppb on Jul 10		Hours of Data: 659																						
Maximum Diurnal Average: 1.7 ppb at hour 7		Minimum Diurnal Average: 0.1 ppb at hour 20		Hours of Missing Data: 85																						
Monthly Average: 0.46 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.3 P ₉₀ = 1.6 P ₉₉ = 5.3		Hours of Calibration: 35																						
				Percent Operational Time: 93.3																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.0	Z	0.0	0.2	0.0	1.5	0.1	0.9	3.5	0.2	0.1	0.3	0.0	0.0	1.3	0.2	0.1	0.1	0.3	0.3	3.2	1.7	0.2	1.5	0.7	3.5
2-Jul	2.6	1.5	Z	6.0	2.4	3.9	3.6	4.0	1.8	1.1	1.2	4.9	5.3	5.2	2.1	0.0	0.0	0.0	0.0	0.0	0.4	1.3	0.1	0.0	2.1	6.0
3-Jul	0.1	0.0	0.0	Z	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.2
4-Jul	1.5	1.9	3.2	0.4	Z	1.1	0.7	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.0	0.0	0.0	0.6	0.1	0.0	0.0	0.5	3.2
5-Jul	0.2	1.2	0.0	0.0	0.1	Z	3.4	4.6	3.6	3.2	2.0	2.0	2.0	1.2	1.7	1.8	1.5	0.4	0.0	0.5	0.4	0.0	0.3	3.0	1.4	4.6
6-Jul	Z	0.0	0.1	1.9	0.4	0.6	0.4	0.5	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	0.2	1.9
7-Jul	0.0	Z	0.1	1.0	6.9	6.7	5.3	2.3	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	1.0	6.9
8-Jul	0.3	3.4	Z	2.3	2.3	6.3	7.6	2.8	1.6	1.7	1.4	1.6	0.7	3.7	4.1	0.6	1.0	1.6	1.1	0.5	0.3	1.2	1.6	0.1	2.1	7.6
9-Jul	0.0	0.0	0.0	Z	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	0.4
10-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.3	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3
12-Jul	Z	1.5	0.0	0.0	0.0	0.1	0.5	2.4	0.8	0.5	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	0.3	2.4
13-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.8	0.7	C	C	C	C	C	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
14-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.2	0.1	0.2	0.4	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4
15-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2
16-Jul	0.2	0.3	1.5	1.8	Z	2.9	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.9
17-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18-Jul	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	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.2
19-Jul	0.0	Z	0.1	1.8	1.3	0.7	8.0	1.6	0.9	1.7	1.2	1.8	1.6	0.5	1.6	2.2	2.8	2.4	1.0	0.0	0.0	0.0	0.0	0.0	1.4	8.0
20-Jul	1.5	0.1	Z	0.2	0.5	1.5	3.3	2.3	1.1	0.6	0.5	0.1	0.2	0.5	0.6	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.7	0.8	0.7	3.3
21-Jul	0.4	0.9	0.2	Z	0.6	0.4	2.7	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	0.2	2.7
22-Jul	0.0	0.0	0.0	0.0	Z	0.7	1.9	2.7	0.3	0.0	0.5	1.3	2.1	0.6	1.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.7
23-Jul	0.0	0.0	0.0	0.0	0.0	Z	1.4	2.1	0.3	0.2	0.6	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	0.2	2.1
24-Jul	Z	1.2	0.0	0.0	0.0	PF	PF	PF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.2
25-Jul	0.0	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	0.1	0.3	0.0	0.0	0.0	2.3	0.7	3.4	0.3	3.4
26-Jul	1.3	0.0	Z	0.0	0.1	4.4	1.6	0.6	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	0.4	4.4
27-Jul	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	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.4
28-Jul	0.0	0.0	0.1	0.0	Z	0.8	2.1	0.6	0.6	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.4	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.3	2.1
29-Jul	0.0	0.0	0.0	0.0	0.0	Z	1.3	1.9	0.9	0.3	0.5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.9
30-Jul	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
31-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
																								Diurnal Average		
																								Diurnal Maximum		
																								Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure PF - Power Failure		



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Sawbones Bay - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Sawbones Bay - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	659	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 659

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Sawbones Bay - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	78	44	21	9	22	34	33	44	52	38	31	27	68	70	39	49	659
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	78	44	21	9	22	34	33	44	52	38	31	27	68	70	39	49	659

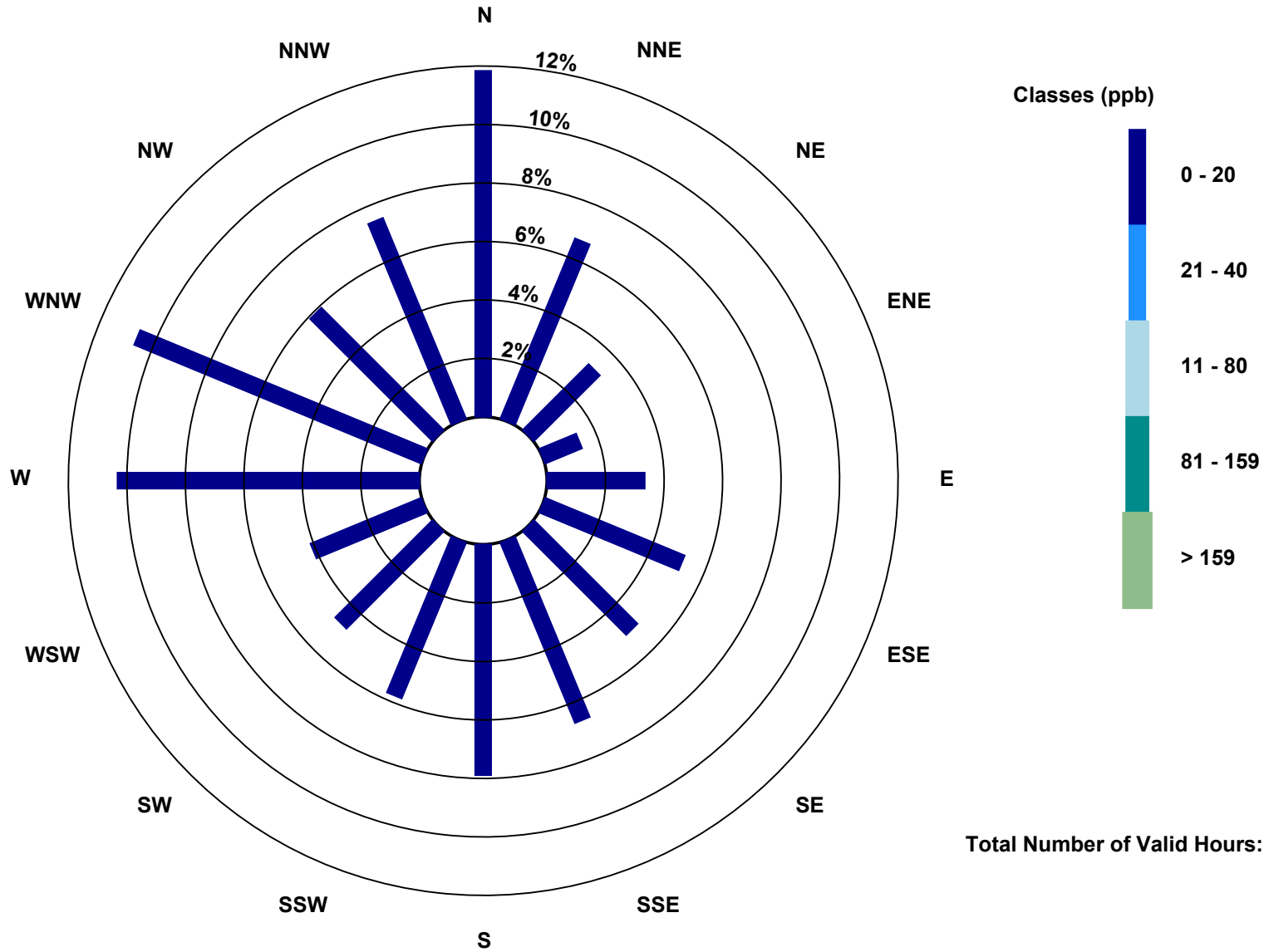
Total Number of Valid Hours: 659

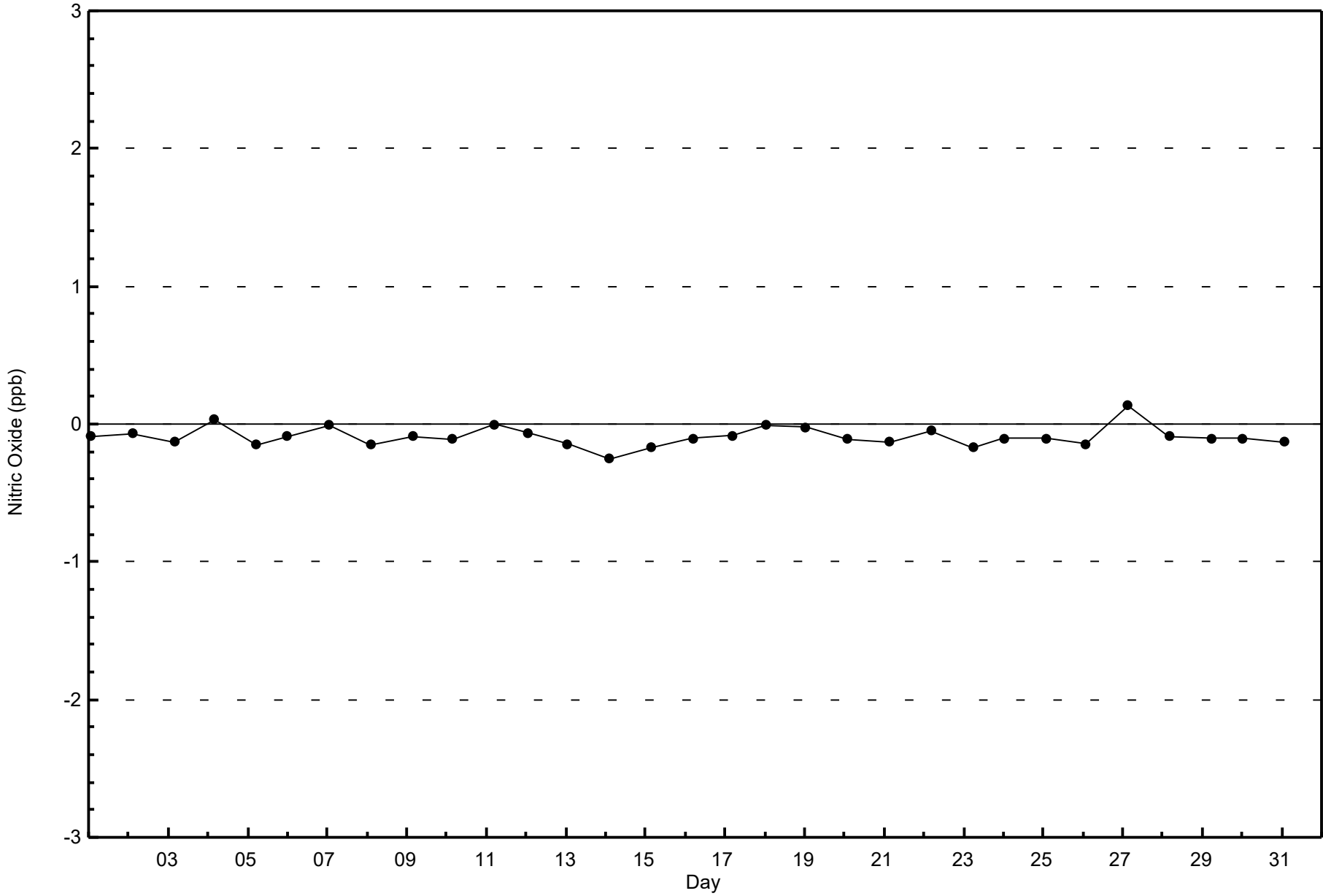
Total Number of Hours: 744

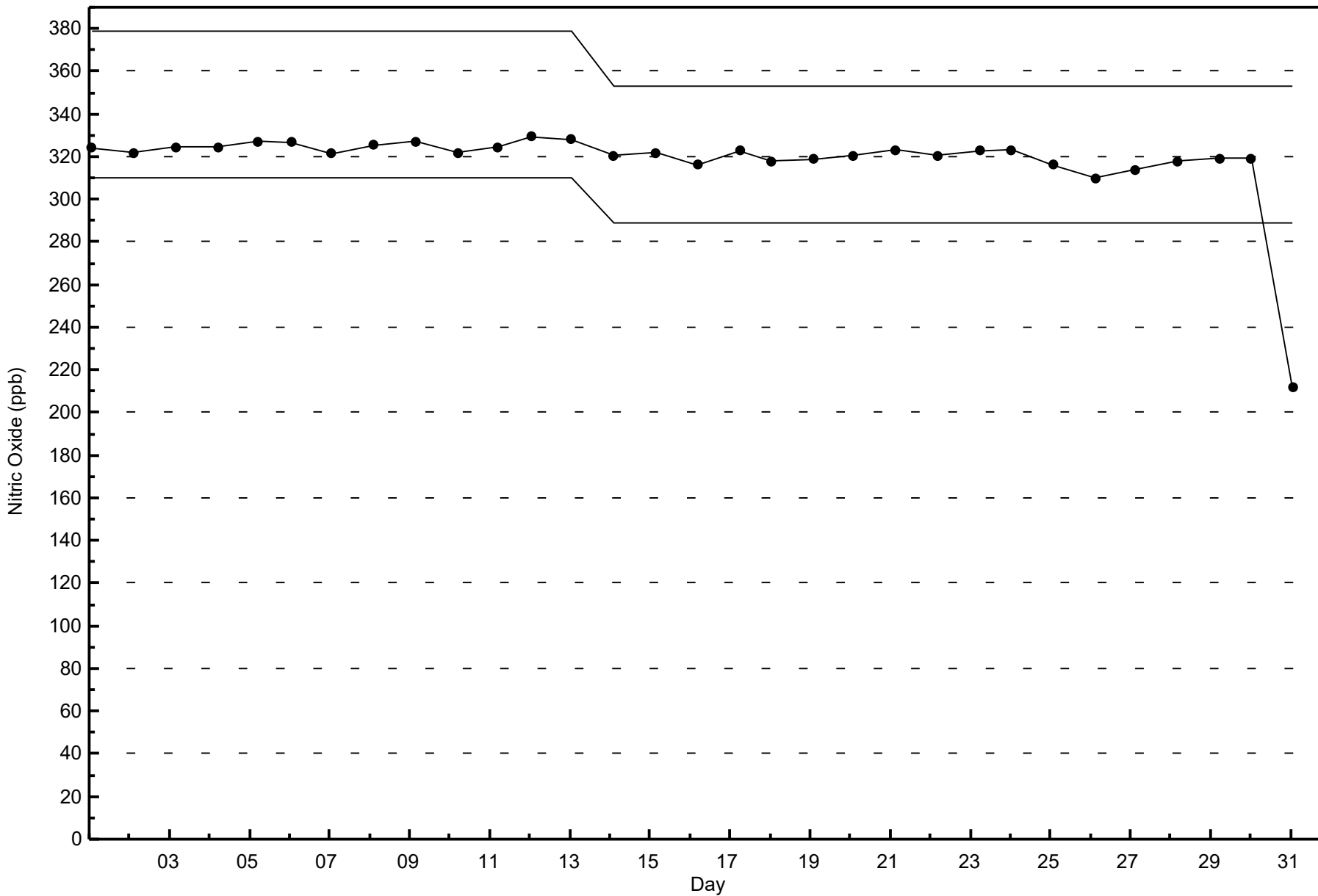


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Sawbones Bay









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Sawbones Bay - July 2023

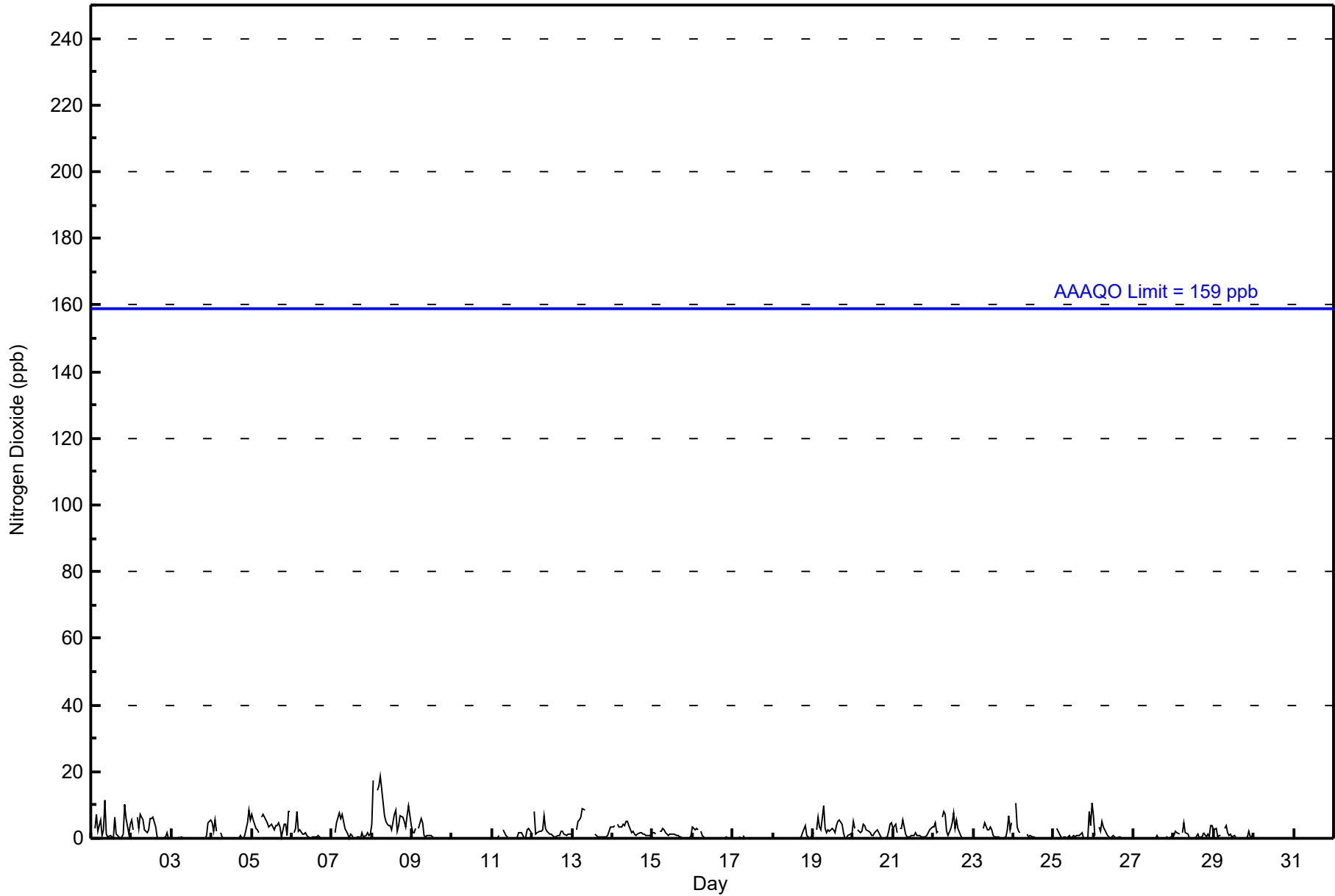
Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744																Daily Average		Daily Maximum			
Maximum Value: 18.7 ppb on Jul 8 06:00		Maximum Daily Average: 7.6 ppb on Jul 8		Hours of Data: 659																Hours of Missing Data: 85		Hours of Calibration: 35		Percent Operational Time: 93.3			
Minimum Value: 0.0 ppb on Jul 1 01:00		Minimum Daily Average: 0.0 ppb on Jul 10		Hours of Missing Data: 85																Hours of Calibration: 35		Percent Operational Time: 93.3					
Maximum Diurnal Average: 3.8 ppb at hour 7		Minimum Diurnal Average: 0.7 ppb at hour 20		Hours of Calibration: 35																Hours of Calibration: 35		Percent Operational Time: 93.3					
Monthly Average: 1.78 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.8 Q ₃ = 2.6 P ₉₀ = 5.1 P ₉₉ = 10.5		Hours of Calibration: 35																Hours of Calibration: 35		Percent Operational Time: 93.3					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0.0	Z	2.8	7.4	2.3	5.4	0.7	2.6	11.4	1.4	0.3	1.0	0.5	0.0	6.5	1.1	0.5	0.2	0.3	1.2	10.3	6.0	1.1	4.1	2.9	11.4	
2-Jul	5.4	2.7	Z	6.2	2.9	7.2	6.5	5.5	2.5	1.8	2.7	6.1	6.0	6.5	3.4	0.5	0.0	0.0	0.0	0.0	0.5	1.7	0.1	0.0	3.0	7.2	
3-Jul	0.0	0.0	0.0	Z	0.3	0.1	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	0.7	4.7	5.3	0.5	5.3	
4-Jul	4.5	2.1	5.6	2.1	Z	1.5	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.8	0.0	0.0	1.0	4.5	8.4	5.5	1.6	8.4		
5-Jul	7.2	5.7	2.9	2.4	1.9	Z	6.3	7.1	5.7	4.8	3.3	3.7	4.3	2.6	4.0	4.0	4.5	3.3	0.5	4.4	4.1	1.0	7.9	8.1	4.3	8.1	
6-Jul	Z	1.7	2.8	7.9	2.1	2.4	1.1	1.1	1.6	0.9	0.3	0.2	0.6	0.5	0.5	0.6	0.7	0.1	0.1	0.0	0.0	0.1	0.1	0.0	1.1	7.9	
7-Jul	0.0	Z	1.6	4.6	7.7	5.9	7.2	5.2	2.8	1.3	0.2	1.1	0.7	0.1	0.2	0.3	0.4	0.2	1.8	0.5	1.0	1.5	0.9	1.3	2.0	7.7	
8-Jul	4.2	17.3	Z	14.5	15.6	18.7	14.9	6.7	5.0	4.2	4.0	3.9	2.4	7.4	8.3	2.3	3.7	6.8	6.2	5.2	3.6	6.9	9.7	3.9	7.6	18.7	
9-Jul	1.9	1.9	2.9	Z	3.0	5.8	4.6	0.9	0.6	0.7	0.7	0.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	5.8	
10-Jul	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	
11-Jul	0.0	0.1	0.0	0.0	0.9	Z	2.6	1.5	1.0	0.5	0.1	0.1	0.2	0.2	0.1	0.3	1.7	1.7	1.0	0.2	0.3	2.5	2.9	1.6	0.8	2.9	
12-Jul	Z	7.9	1.1	1.6	2.2	2.3	2.7	6.8	2.8	2.3	1.3	1.1	0.8	0.4	0.5	0.9	0.9	2.0	2.3	1.2	1.0	1.2	1.1	1.2	2.0	7.9	
13-Jul	1.3	Z	2.7	5.2	5.3	6.4	8.8	8.4	C	C	C	C	C	1.1	0.7	0.5	0.4	0.4	0.5	0.3	0.4	0.8	2.1	3.5	2.7	8.8	
14-Jul	3.6	3.7	Z	4.4	3.2	3.6	4.3	3.9	5.0	5.1	3.7	1.8	2.1	1.1	0.9	1.2	1.7	1.6	1.2	1.1	1.0	0.9	0.9	1.1	2.5	5.1	
15-Jul	1.6	1.8	1.4	Z	2.1	2.1	2.8	2.7	1.5	0.9	1.1	1.3	1.1	1.2	1.0	0.8	0.4	0.3	0.1	0.0	0.0	0.0	0.0	0.9	1.1	2.8	
16-Jul	3.6	2.5	2.8	2.7	Z	2.1	1.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.7	3.6	
17-Jul	0.0	0.0	0.0	0.0	0.4	Z	1.0	0.2	0.0	0.2	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	0.1	1.0	
18-Jul	Z	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	0.1	0.3	1.6	3.8	0.9	0.3	0.0	0.6	0.3	3.8	
19-Jul	1.7	Z	2.4	6.3	3.6	2.6	9.9	3.0	1.9	2.7	2.3	3.1	2.7	1.8	3.9	5.0	5.7	4.2	1.9	0.0	0.2	0.7	1.3	1.4	3.0	9.9	
20-Jul	4.9	3.1	Z	2.4	1.6	2.0	4.2	3.7	2.6	2.0	1.7	0.7	0.9	1.8	2.5	1.8	0.9	0.0	0.0	0.0	0.3	2.0	4.3	4.5	2.1	4.9	
21-Jul	3.0	4.1	1.5	Z	3.0	2.9	5.5	1.1	0.4	0.4	0.4	0.7	0.9	1.7	1.0	0.7	0.8	0.6	0.6	0.5	0.7	1.9	2.4	3.6	1.7	5.5	
22-Jul	3.3	4.5	1.6	2.2	Z	6.2	7.9	7.2	2.0	0.9	2.8	4.7	7.8	2.8	5.7	2.9	0.8	0.1	0.1	0.1	0.0	0.1	0.0	0.0	2.8	7.9	
23-Jul	0.1	0.0	0.1	0.1	0.1	Z	3.1	4.6	2.4	2.7	3.3	2.7	0.9	0.6	0.3	0.3	0.1	0.1	0.2	0.6	2.7	6.6	2.6	4.8	1.7	6.6	
24-Jul	Z	10.6	3.6	2.0	1.8	PF	PF	PF	1.1	0.4	0.8	0.5	0.4	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	1.1	10.6	
25-Jul	0.0	Z	2.9	2.2	0.3	0.2	0.3	0.5	0.0	0.8	0.2	0.5	0.7	0.6	0.8	0.7	1.2	1.8	0.1	0.2	0.2	7.9	3.9	10.4	1.6	10.4	
26-Jul	6.6	1.0	Z	3.4	2.0	5.1	3.4	1.6	0.7	0.3	0.1	0.5	0.9	0.2	0.1	0.3	0.3	0.2	0.0	0.1	0.0	0.0	0.0	0.0	1.2	6.6	
27-Jul	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	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.5	0.2	0.5	0.5	0.1	0.8	
28-Jul	0.7	2.2	1.9	1.1	Z	1.7	4.6	1.6	1.3	0.1	0.0	0.0	0.0	0.0	1.2	0.0	0.5	0.3	1.7	0.3	1.1	0.5	4.0	3.7	1.2	4.6	
29-Jul	2.6	3.1	0.6	1.0	0.8	Z	2.8	3.8	1.8	0.7	1.3	0.5	0.9	0.1	0.2	0.0	0.1	0.1	0.1	0.1	0.3	2.1	0.4	1.0	1.1	3.8	
30-Jul	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
31-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
																								Diurnal Average		Diurnal Maximum	
																								2.2		7.2	
																								3.2		17.3	
																								1.7		5.6	
																								3.3		14.5	
																								2.6		15.6	
																								3.7		18.7	
																								3.8		14.9	
																								2.9		8.4	
																								1.9		11.4	
																								1.3		5.1	
																								1.1		4.0	
																								1.2		6.1	
																								1.3		7.8	
																								1.1		7.4	
																								1.5		8.3	
																								0.8		5.0	
																								0.9		5.7	
																								0.9		6.8	
																								0.7		6.2	
																								0.7		5.2	
																								1.0		10.3	
																								1.7		7.9	
																								2.0		9.7	
																								2.3		10.4	

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Sawbones Bay - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Sawbones Bay - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	659	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 659

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Sawbones Bay - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	78	44	21	9	22	34	33	44	52	38	31	27	68	70	39	49	659
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	78	44	21	9	22	34	33	44	52	38	31	27	68	70	39	49	659

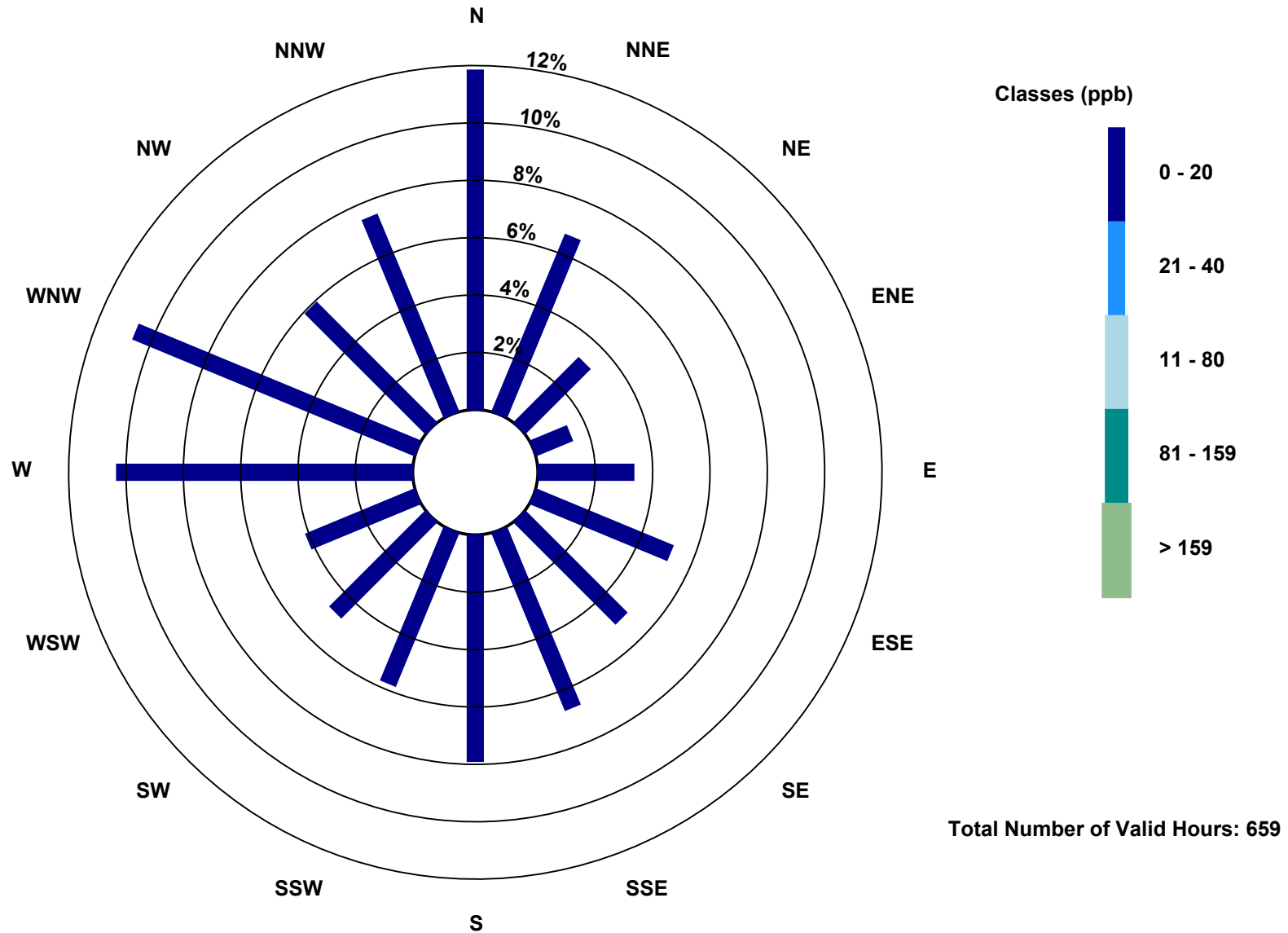
Total Number of Valid Hours: 659

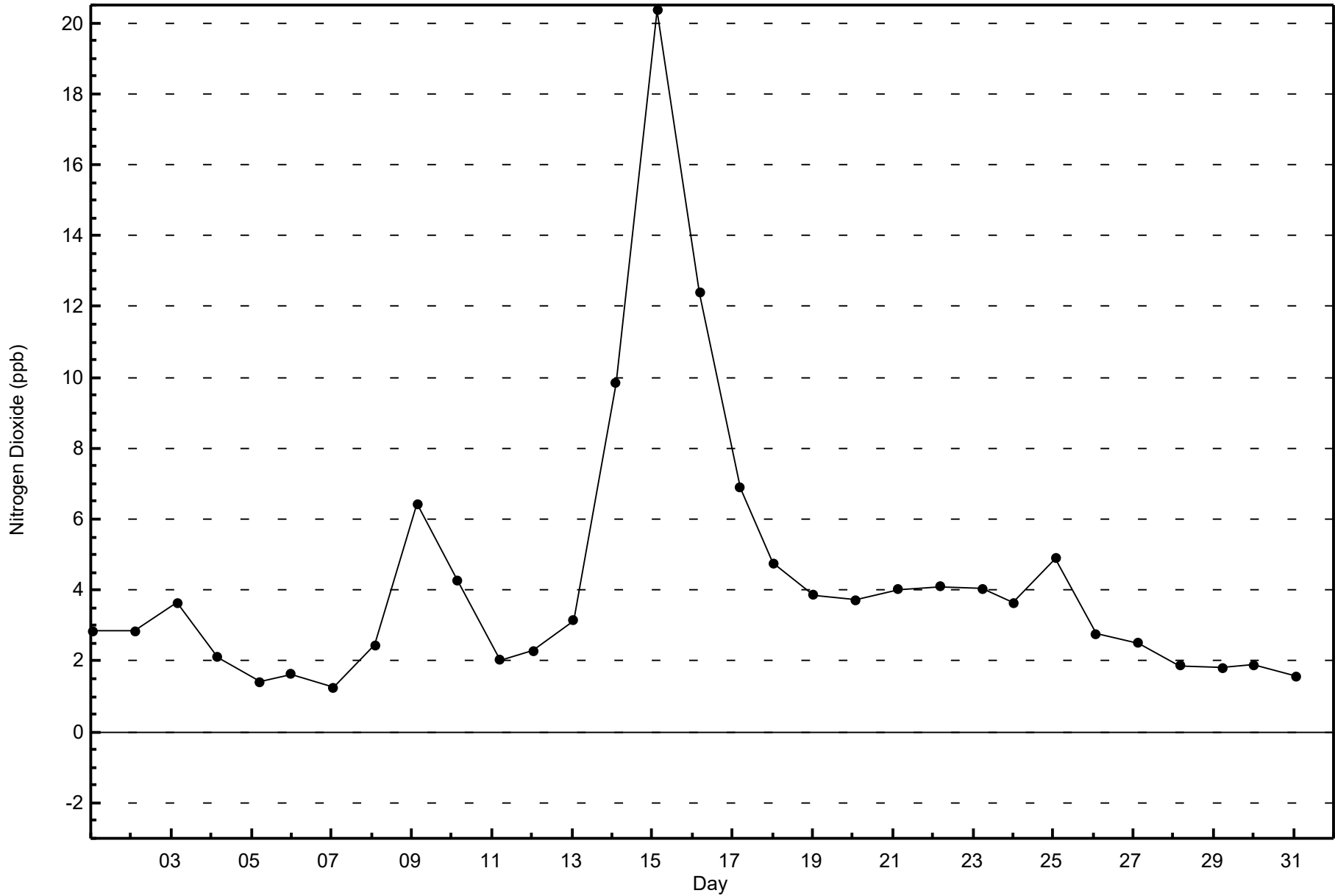
Total Number of Hours: 744

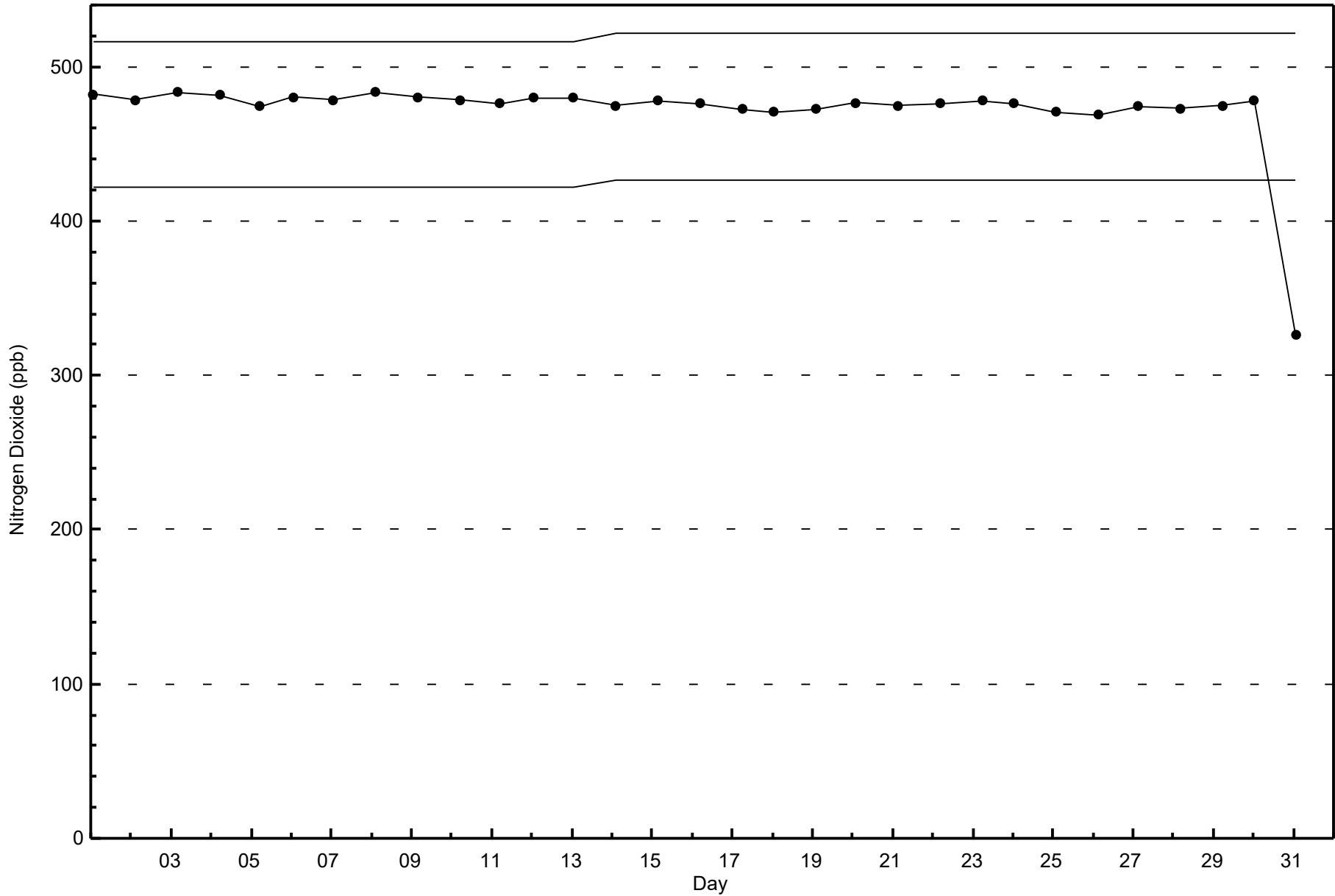


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Sawbones Bay









Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
Sawbones Bay - July 2023

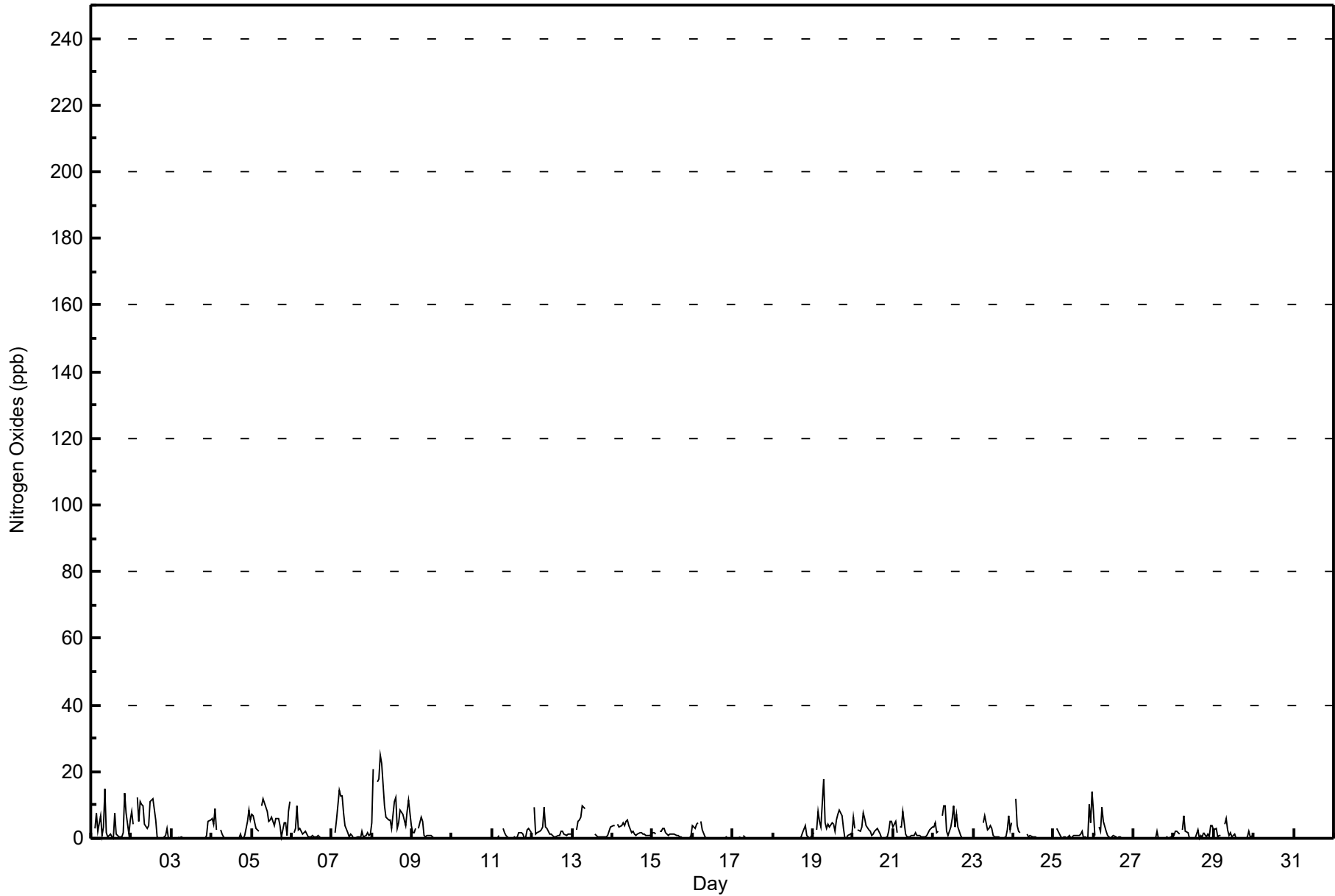
Maximum Value: 25.0 ppb on Jul 8 06:00		Maximum Daily Average: 9.7 ppb on Jul 8		Hours in Service: 744																							
Minimum Value: 0.0 ppb on Jul 1 01:00		Minimum Daily Average: 0.0 ppb on Jul 10		Hours of Data: 659																							
Maximum Diurnal Average: 5.5 ppb at hour 7		Minimum Diurnal Average: 0.7 ppb at hour 20		Hours of Missing Data: 85																							
Monthly Average: 2.24 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.9 Q ₃ = 3.0 P ₉₀ = 6.4 P ₉₉ = 14.7		Hours of Calibration: 35																							
				Percent Operational Time: 93.3																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	0.0	Z	2.8	7.6	2.3	6.9	0.8	3.5	14.9	1.6	0.4	1.3	0.5	0.0	7.8	1.3	0.6	0.3	0.6	1.5	13.5	7.7	1.3	5.6	3.6	14.9	
2-Jul	8.0	4.2	Z	12.2	5.3	11.1	10.1	9.5	4.3	2.9	3.9	11.0	11.3	11.7	5.5	0.5	0.0	0.0	0.0	0.0	0.9	3.0	0.2	0.0	5.0	12.2	
3-Jul	0.1	0.0	0.0	Z	0.3	0.1	0.6	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.8	4.9	5.4	0.5	5.4	
4-Jul	6.0	4.0	8.8	2.5	Z	2.6	1.3	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	1.3	0.0	0.0	1.0	5.1	8.5	5.5	2.1	8.8		
5-Jul	7.4	6.9	2.9	2.4	2.0	Z	9.7	11.7	9.3	8.0	5.3	5.7	6.3	3.8	5.7	5.8	6.0	3.7	0.5	4.9	4.5	1.0	8.2	11.1	5.8	11.7	
6-Jul	Z	1.7	2.9	9.8	2.5	3.0	1.5	1.6	2.0	1.2	0.3	0.2	0.6	0.5	0.5	0.6	0.7	0.1	0.1	0.0	0.0	0.1	0.1	0.0	1.3	9.8	
7-Jul	0.0	Z	1.7	5.6	14.6	12.6	12.5	7.5	3.8	1.8	0.2	1.1	0.7	0.1	0.2	0.3	0.4	0.2	2.0	0.5	1.0	1.5	0.9	1.3	3.1	14.6	
8-Jul	4.5	20.7	Z	16.8	17.9	25.0	22.5	9.5	6.6	5.9	5.4	5.5	3.1	11.1	12.4	2.9	4.7	8.4	7.3	5.7	3.9	8.1	11.3	4.0	9.7	25.0	
9-Jul	1.9	1.9	2.9	Z	3.0	6.2	4.9	0.9	0.6	0.7	0.7	0.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	6.2	
10-Jul	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	
11-Jul	0.0	0.1	0.0	0.0	0.9	Z	2.9	1.7	1.0	0.6	0.1	0.1	0.2	0.2	0.1	0.3	1.8	1.9	1.1	0.2	0.3	2.5	2.9	1.6	0.9	2.9	
12-Jul	Z	9.4	1.1	1.6	2.2	2.4	3.2	9.2	3.6	2.8	1.4	1.2	0.8	0.4	0.5	0.9	0.9	2.0	2.3	1.2	1.0	1.2	1.1	1.2	2.2	9.4	
13-Jul	1.3	Z	2.7	5.2	5.3	6.4	9.6	9.1	C	C	C	C	C	1.1	0.7	0.5	0.4	0.4	0.5	0.3	0.4	0.8	2.1	3.5	2.8	9.6	
14-Jul	3.6	3.7	Z	4.4	3.2	3.6	4.5	4.0	5.2	5.5	3.9	1.8	2.1	1.2	0.9	1.2	1.7	1.6	1.2	1.1	1.0	0.9	0.9	1.1	2.5	5.5	
15-Jul	1.6	1.8	1.4	Z	2.1	2.1	2.8	2.9	1.5	0.9	1.1	1.3	1.1	1.2	1.0	0.8	0.4	0.3	0.1	0.0	0.0	0.0	0.0	1.0	1.1	2.9	
16-Jul	3.8	2.8	4.3	4.5	Z	5.0	2.5	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	0.3	0.1	0.0	0.0	1.0	5.0	
17-Jul	0.0	0.0	0.0	0.0	0.4	Z	1.0	0.2	0.0	0.2	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	0.1	1.0	
18-Jul	Z	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	0.1	0.3	1.8	4.0	0.9	0.3	0.0	0.6	0.4	4.0	
19-Jul	1.7	Z	2.5	8.1	4.9	3.3	17.9	4.6	2.8	4.4	3.5	4.9	4.3	2.3	5.5	7.2	8.5	6.6	2.9	0.0	0.2	0.7	1.3	1.4	4.3	17.9	
20-Jul	6.4	3.2	Z	2.6	2.1	3.5	7.5	6.0	3.7	2.6	2.2	0.8	1.1	2.3	3.1	2.2	1.1	0.0	0.0	0.0	0.3	2.0	5.0	5.3	2.7	7.5	
21-Jul	3.4	5.0	1.7	Z	3.6	3.3	8.2	1.4	0.4	0.4	0.4	0.7	0.9	1.7	1.0	0.7	0.8	0.6	0.6	0.5	0.7	1.9	2.4	3.6	1.9	8.2	
22-Jul	3.3	4.5	1.6	2.2	Z	6.9	9.8	9.9	2.3	0.9	3.3	6.0	9.9	3.4	7.2	3.5	0.8	0.1	0.1	0.1	0.0	0.1	0.0	0.0	3.3	9.9	
23-Jul	0.1	0.0	0.1	0.1	0.1	Z	4.5	6.7	2.7	2.9	3.9	3.0	0.9	0.6	0.3	0.3	0.1	0.1	0.2	0.6	2.7	6.6	2.6	4.8	1.9	6.7	
24-Jul	Z	11.8	3.6	2.0	1.8	PF	PF	PF	1.1	0.4	0.8	0.5	0.4	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	1.2	11.8	
25-Jul	0.0	Z	2.9	2.2	0.3	0.2	0.3	0.5	0.0	0.8	0.2	0.5	0.7	0.6	0.8	0.7	1.3	2.1	0.1	0.2	0.2	10.2	4.6	13.8	1.9	13.8	
26-Jul	7.9	1.0	Z	3.4	2.1	9.5	5.0	2.2	0.9	0.3	0.1	0.5	0.9	0.2	0.1	0.3	0.3	0.2	0.0	0.1	0.0	0.0	0.0	0.0	1.5	9.5	
27-Jul	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	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.5	0.2	0.5	0.5	0.2	2.2	
28-Jul	0.7	2.2	2.0	1.1	Z	2.5	6.7	2.2	1.9	0.1	0.0	0.0	0.0	0.0	2.4	0.0	0.9	0.3	1.9	0.3	1.1	0.5	4.0	3.7	1.5	6.7	
29-Jul	2.6	3.1	0.6	1.0	0.8	Z	4.1	5.7	2.7	1.0	1.8	0.5	1.1	0.1	0.2	0.0	0.1	0.1	0.1	0.1	0.3	2.1	0.4	1.0	1.3	5.7	
30-Jul	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
31-Jul	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
																								Diurnal Average			
																								Diurnal Maximum			
																								2.6 8.0			
																								3.7 20.7			
																								1.9 8.8			
																								4.0 16.8			
																								3.2 17.9			
																								5.0 25.0			
																								5.5 22.5			
																								4.0 11.7			
																								2.5 14.9			
																								1.6 8.0			
																								1.4 5.4			
																								1.7 11.0			
																								1.7 11.3			
																								1.5 11.7			
																								2.0 12.4			
																								1.0 7.2			
																								1.1 8.5			
																								1.1 8.4			
																								0.8 7.3			
																								0.7 5.7			
																								1.2 13.5			
																								2.0 10.2			
																								2.2 11.3			
																								2.6 13.8			

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Sawbones Bay - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Sawbones Bay - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	656	99.54	99.54
21 - 40	3	0.46	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 659

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Sawbones Bay - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	78	44	21	9	22	34	33	44	52	38	30	25	68	70	39	49	656
21 - 40	0	0	0	0	0	0	0	0	0	0	1	2	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	78	44	21	9	22	34	33	44	52	38	31	27	68	70	39	49	659

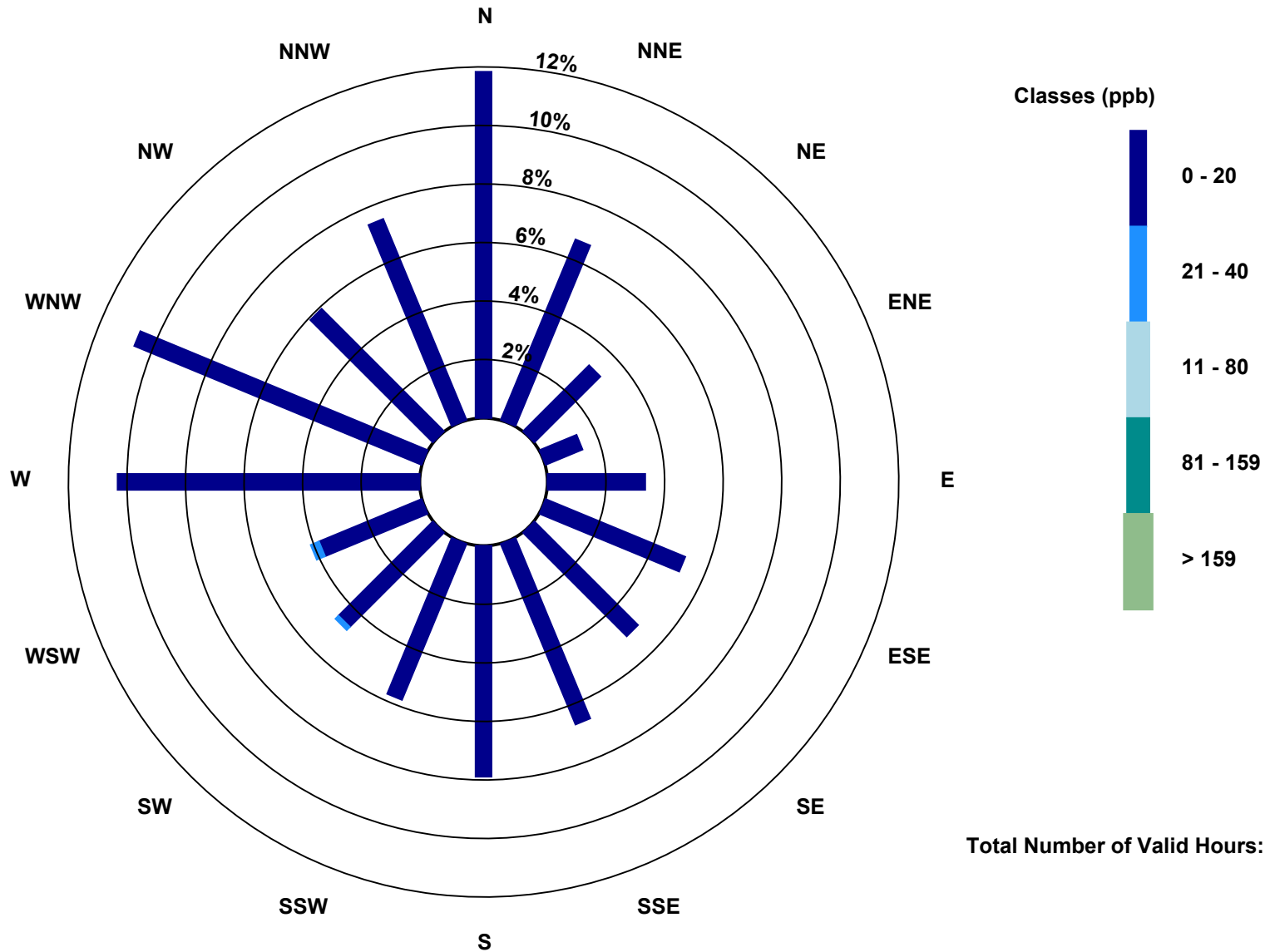
Total Number of Valid Hours: 659

Total Number of Hours: 744

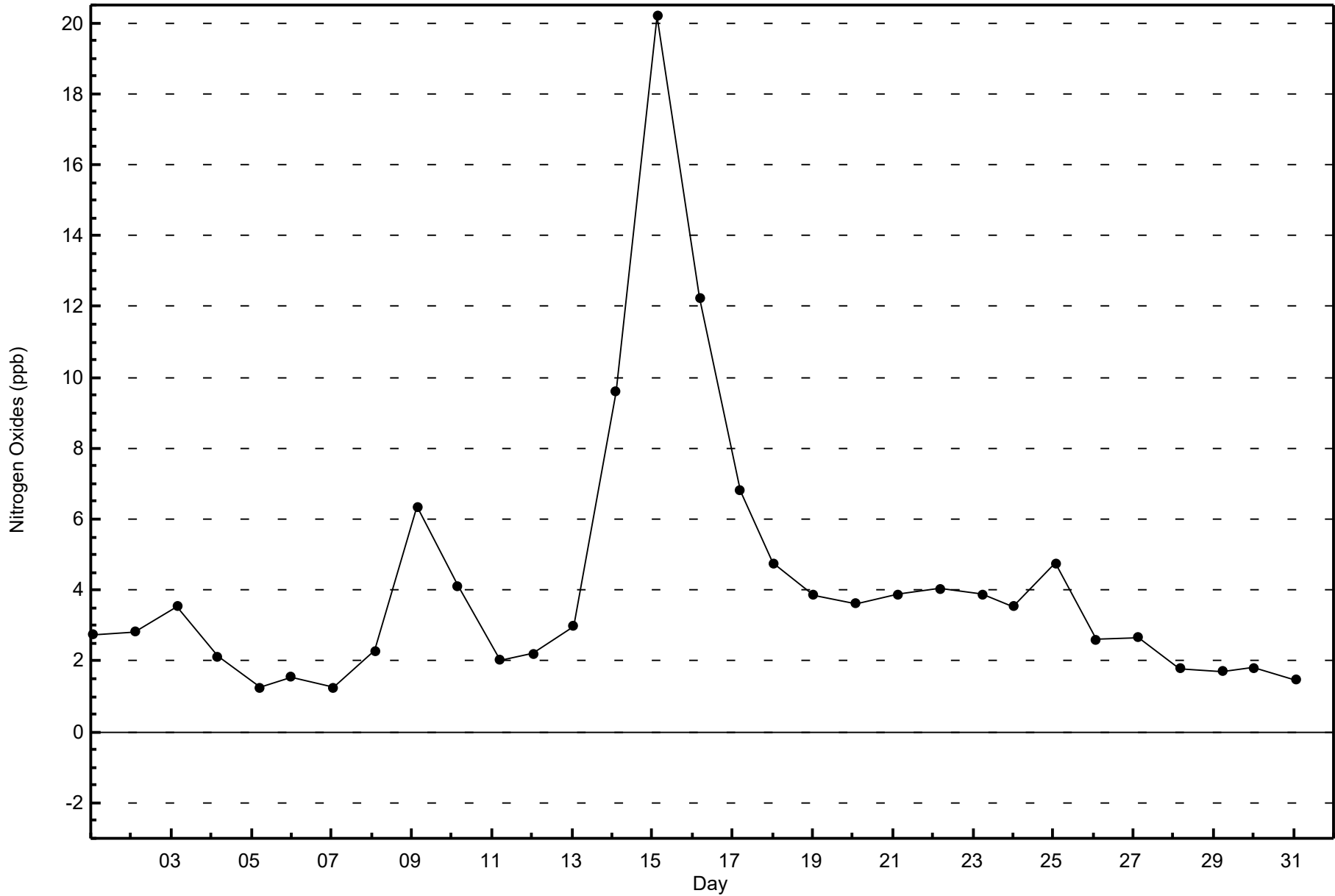


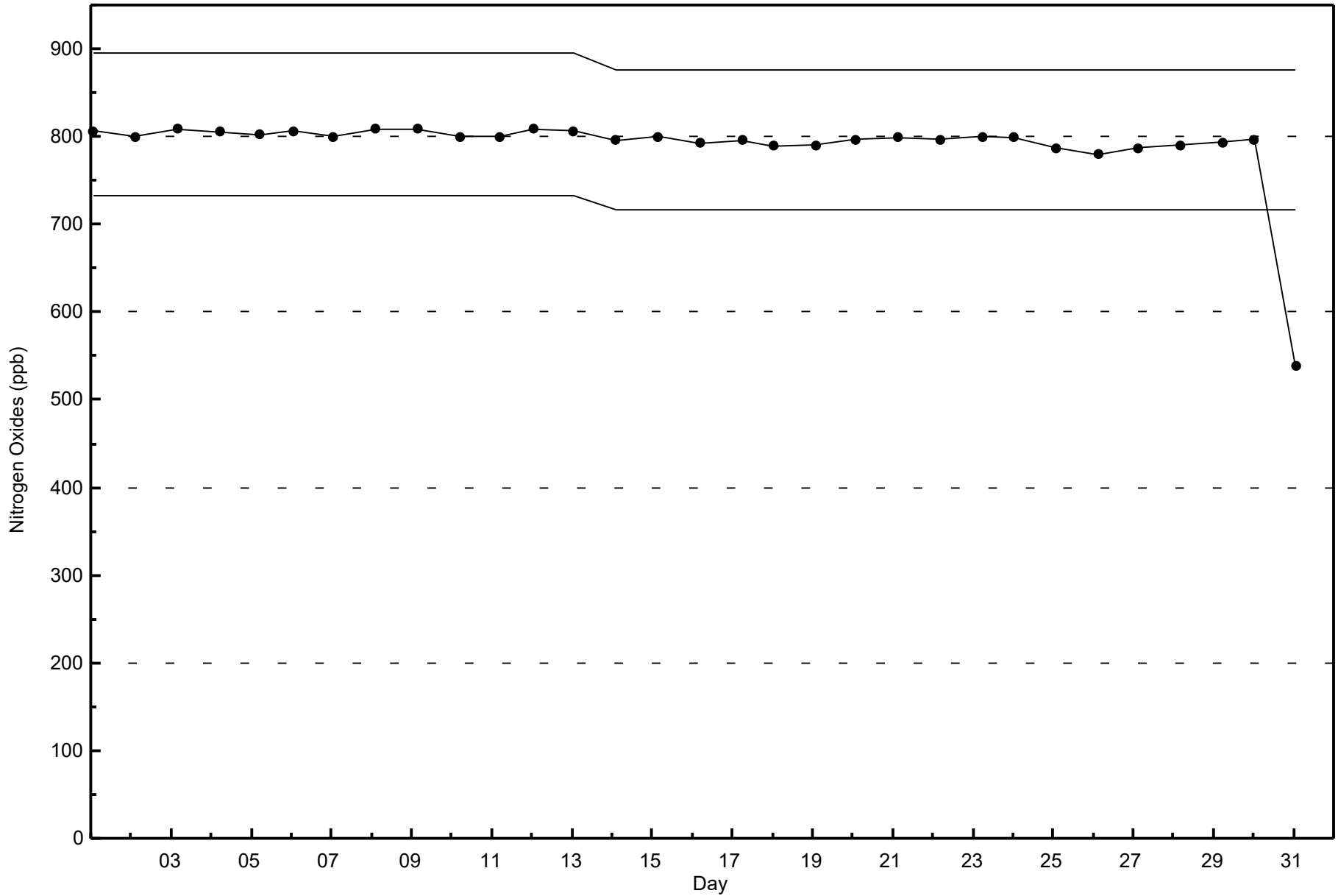
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Sawbones Bay



Total Number of Valid Hours: 659







Wood Buffalo Environmental Association
Summary of Hour Averages

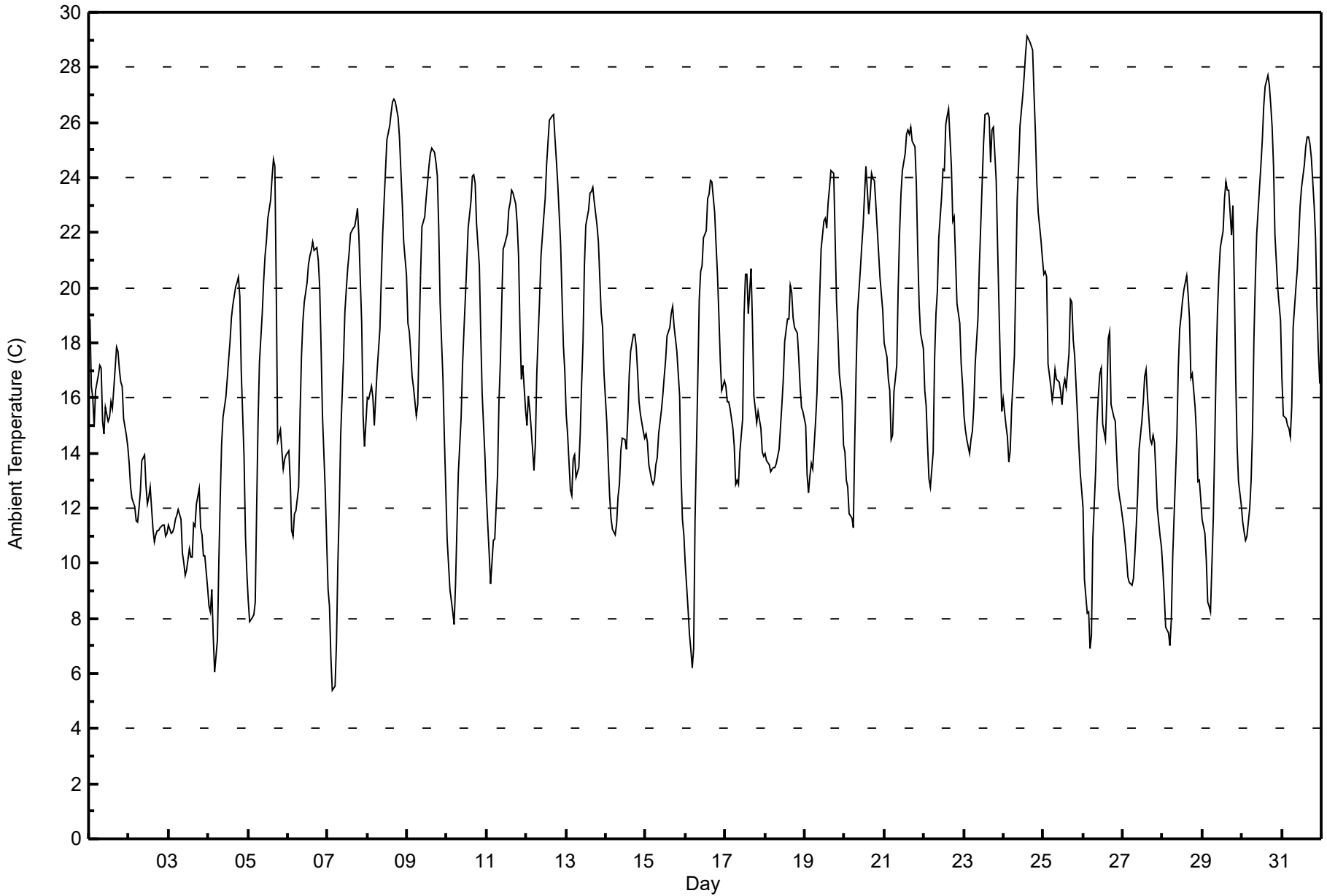
Ambient Temperature (AT) - C
Sawbones Bay - July 2023

Maximum Value: 29.2 C on Jul 24 15:00 Maximum Daily Average: 22.6 C on Jul 24																						Hours in Service:	744																								
Minimum Value: 5.4 C on Jul 7 04:00 Minimum Daily Average: 10.9 C on Jul 3																						Hours of Data:	744																								
Maximum Diurnal Average: 21.9 C at hour 16 Minimum Diurnal Average: 11.7 C at hour 5																						Hours of Missing Data:	0																								
Monthly Average: 17.11 C Percentiles: P ₁ = 7.0 P ₁₀ = 10.9 Q ₁ = 13.4 Median = 16.6 Q ₃ = 21.1 P ₉₀ = 24.1 P ₉₉ = 27.3																						Hours of Calibration:	0																								
																						Percent Operational Time:	100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	18.9	16.4	16.0	15.0	16.3	16.8	17.2	17.1	15.1	14.7	15.7	15.2	15.3	15.9	15.6	16.3	17.8	17.7	17.0	16.6	16.4	15.3	14.7	14.2	16.1	18.9																					
2-Jul	13.6	12.7	12.4	12.1	11.5	11.5	12.0	12.6	13.7	14.0	12.8	12.2	12.4	12.8	11.2	10.8	11.0	11.2	11.2	11.3	11.4	11.4	11.0	11.1	12.0	14.0																					
3-Jul	11.4	11.1	11.1	11.3	11.6	11.8	12.0	11.6	10.4	10.0	9.6	9.7	10.5	10.2	10.2	11.4	11.3	12.1	12.7	11.3	11.0	10.2	10.3	9.1	10.9	12.7																					
4-Jul	8.4	8.2	9.1	7.4	6.1	7.2	10.0	12.4	14.3	15.3	16.0	16.7	17.4	18.1	18.9	19.3	20.0	20.2	20.4	19.7	17.0	13.9	11.0	9.7	14.0	20.4																					
5-Jul	8.7	7.9	8.0	8.2	8.6	12.0	15.1	17.3	19.1	20.2	21.2	21.7	22.5	23.2	24.0	24.7	24.4	20.0	14.4	14.9	14.1	13.4	13.8	13.9	16.3	24.7																					
6-Jul	14.1	13.0	11.2	11.0	11.8	11.9	12.8	15.4	17.5	18.8	19.5	20.2	20.9	21.1	21.3	21.6	21.4	21.5	21.0	20.0	17.9	15.3	12.6	10.8	16.8	21.6																					
7-Jul	9.1	8.5	6.6	5.4	5.6	7.1	10.0	12.0	14.7	17.4	19.1	19.9	20.7	21.3	22.0	22.2	22.2	22.5	22.9	21.9	18.7	15.4	14.2	15.1	15.6	22.9																					
8-Jul	16.0	15.9	16.4	16.0	15.0	16.0	17.0	18.5	20.3	21.9	23.2	24.2	25.4	25.9	26.4	26.7	26.9	26.7	26.2	25.4	24.2	23.0	21.7	20.4	21.6	26.9																					
9-Jul	18.7	18.4	17.6	16.8	16.4	15.3	15.8	18.0	20.4	22.2	22.6	23.2	23.8	24.4	24.9	25.0	24.9	24.6	24.1	22.2	19.4	16.7	14.6	12.8	20.1	25.0																					
10-Jul	10.9	10.0	9.0	8.2	7.8	9.3	11.3	13.3	15.3	17.2	18.4	19.6	20.8	22.2	23.1	24.0	24.1	23.8	22.3	20.8	18.3	16.2	15.0	13.9	16.5	24.1																					
11-Jul	12.5	10.4	9.3	10.0	10.8	10.9	13.2	15.9	17.3	19.5	21.4	21.6	22.0	22.8	23.1	23.5	23.5	23.0	22.3	21.2	18.6	16.7	17.2	15.6	17.6	23.5																					
12-Jul	15.0	16.1	15.6	14.9	13.4	14.4	16.9	18.3	19.6	21.1	22.6	23.3	24.5	25.3	26.1	26.2	26.3	25.4	24.6	23.7	21.6	19.7	17.9	17.0	20.4	26.3																					
13-Jul	15.4	14.7	12.7	12.5	13.8	13.9	13.1	13.5	14.7	16.5	18.0	20.8	22.3	22.8	23.4	23.5	23.6	23.1	22.3	21.6	20.3	19.1	18.6	16.9	18.2	23.6																					
14-Jul	15.1	13.7	12.4	11.7	11.2	11.0	11.4	12.4	12.9	14.1	14.5	14.5	14.2	15.2	16.8	17.7	18.3	18.3	17.8	16.9	15.8	15.4	14.8	14.5	14.6	18.3																					
15-Jul	14.7	14.4	13.6	13.0	12.8	13.0	13.6	13.8	14.7	15.5	16.1	16.8	17.4	18.3	18.6	19.1	19.3	18.6	18.1	17.7	16.1	13.2	11.6	11.0	15.5	19.3																					
16-Jul	10.0	8.3	7.4	6.9	6.2	6.9	11.6	16.8	19.6	20.6	20.8	21.8	22.1	23.2	23.4	23.9	23.8	22.7	21.6	20.5	19.0	17.4	16.3	16.6	17.0	23.9																					
17-Jul	16.4	15.8	15.8	15.6	14.9	14.2	12.8	13.0	12.9	14.0	15.2	19.0	20.5	20.5	19.0	20.7	18.7	16.1	15.6	15.1	15.5	14.9	14.0	13.9	16.0	20.7																					
18-Jul	14.0	13.7	13.6	13.3	13.4	13.5	13.5	13.6	14.1	14.9	15.8	16.7	18.0	18.9	18.9	20.1	19.8	18.9	18.6	18.3	17.5	16.4	15.7	15.5	16.1	20.1																					
19-Jul	15.0	13.2	12.6	13.2	13.6	13.4	15.1	16.1	18.0	19.7	21.4	22.4	22.5	22.2	23.1	23.6	24.3	24.1	21.8	19.5	18.3	16.9	15.9	14.3	18.3	24.3																					
20-Jul	14.0	13.0	12.7	11.8	11.7	11.3	14.4	17.1	19.1	20.6	21.5	22.3	23.4	24.4	22.7	23.3	24.1	23.9	23.9	23.1	21.3	20.4	19.8	19.2	19.1	24.4																					
21-Jul	18.0	17.5	16.7	16.3	14.5	14.6	16.2	17.2	20.0	22.0	23.4	24.2	24.9	25.6	25.7	25.6	25.8	25.3	25.1	23.8	21.3	19.4	18.3	17.8	20.8	25.8																					
22-Jul	16.3	15.7	14.3	13.1	12.7	14.0	17.4	19.1	19.9	21.8	23.3	24.3	24.2	25.9	26.2	26.5	24.4	22.4	22.6	21.0	19.4	18.7	17.3	16.5	19.9	26.5																					
23-Jul	15.3	14.8	14.5	14.0	14.5	14.8	15.6	17.2	18.9	20.9	22.3	23.9	25.3	26.3	26.4	26.2	24.6	25.7	25.8	23.9	21.5	19.3	17.1	15.5	20.2	26.4																					
24-Jul	16.0	15.0	14.6	13.7	14.1	15.6	17.6	20.3	23.2	24.5	25.9	27.0	27.7	28.6	29.2	29.0	28.9	28.6	27.0	25.6	23.8	22.7	21.7	21.0	22.6	29.2																					
25-Jul	20.5	20.6	20.4	17.2	16.4	15.9	16.3	17.0	16.7	16.6	16.2	15.8	16.4	16.7	16.4	17.7	19.6	19.5	18.1	17.5	15.4	14.3	13.3	12.7	17.0	20.6																					
26-Jul	12.0	9.4	8.2	8.2	6.9	7.4	10.9	13.4	15.2	16.2	16.9	17.1	15.0	14.5	16.0	18.2	18.4	15.8	15.3	15.2	14.0	12.8	12.4	12.1	13.4	18.4																					
27-Jul	11.3	10.8	10.2	9.5	9.3	9.2	9.5	10.3	11.4	12.5	14.2	15.1	15.9	16.8	17.0	16.1	14.5	14.3	14.6	14.4	13.3	12.0	11.0	10.6	12.7	17.0																					
28-Jul	9.7	8.8	7.7	7.5	7.0	7.9	10.2	11.7	14.6	17.1	18.5	19.0	19.5	19.9	20.4	19.8	18.9	16.7	16.9	15.7	14.7	13.0	13.0	12.3	14.2	20.4																					
29-Jul	11.6	11.1	10.1	8.6	8.4	8.2	11.6	14.3	17.1	19.2	20.5	21.5	22.0	23.2	23.8	23.5	23.6	21.9	23.0	20.2	16.7	14.2	13.0	12.1	16.6	23.8																					
30-Jul	11.5	11.1	10.8	11.0	12.0	13.0	14.8	18.2	20.3	22.0	23.7	24.5	25.4	26.6	27.3	27.7	27.4	26.6	25.8	24.4	21.9	20.0	19.4	18.8	20.2	27.7																					
31-Jul	16.7	15.3	15.3	15.0	14.9	14.6	15.7	18.5	20.0	20.7	21.9	23.0	23.6	24.4	25.1	25.5	25.5	25.2	24.7	23.0	21.8	19.4	17.7	16.5	20.2	25.5																					
																						13.9	13.1	12.4	11.9	11.7	12.2	13.7	15.3	16.8	18.1	19.1	19.9	20.5	21.2	21.5	21.9	21.8	21.2	20.6	19.6	17.9	16.3	15.3	14.6	Diurnal Average	
																						20.5	20.6	20.4	17.2	16.4	16.8	17.6	20.3	23.2	24.5	25.9	27.0	27.7	28.6	29.2	29.0	28.9	28.6	27.0	25.6	24.2	23.0	21.7	21.0	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Sawbones Bay - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Sawbones Bay - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	51	6.85	6.85
10 - 20	467	62.77	69.62
> 20	226	30.38	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

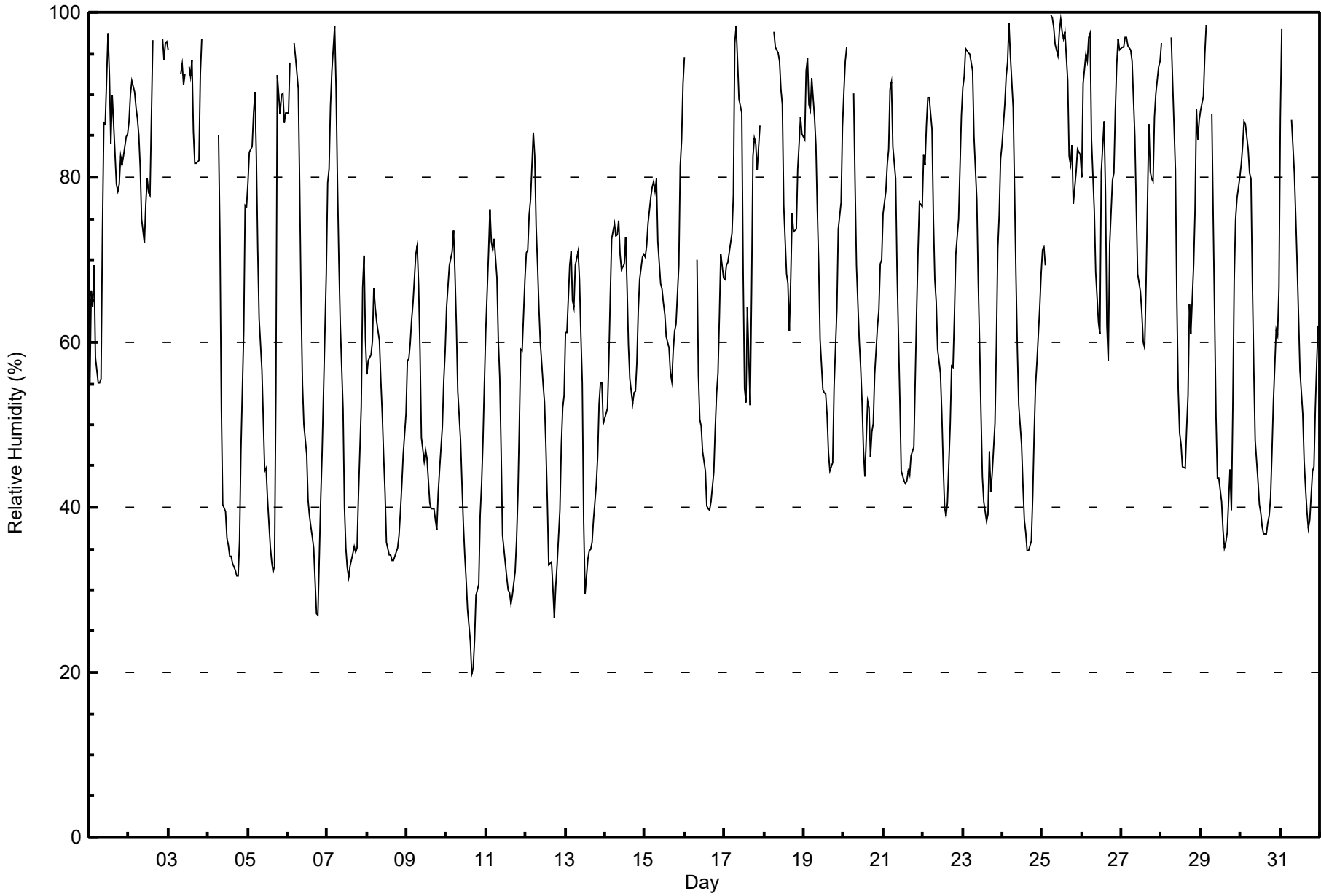
Relative Humidity (RH) - %
Sawbones Bay - July 2023

Maximum Value: 99.6 % on Jul 25 06:00																								Hours in Service: 744			
Maximum Daily Average: 88.0 % on Jul 25																								Hours of Data: 691			
Minimum Value: 19.8 % on Jul 10 16:00																								Hours of Missing Data: 53			
Minimum Daily Average: 45.1 % on Jul 10																								Hours of Calibration: 0			
Maximum Diurnal Average: 83.4 % at hour 5																								Percent Operational Time: 92.9			
Minimum Diurnal Average: 46.9 % at hour 16																											
Monthly Average: 65.01 %																											
Percentiles: P ₁ = 27.5 P ₁₀ = 36.8 Q ₁ = 47.4 Median = 65.9 Q ₃ = 82.6 P ₉₀ = 92.5 P ₉₉ = 98.3																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	54.8	66.3	64.2	69.3	58.1	55.1	55.0	55.7	73.4	86.6	86.5	97.5	92.4	84.0	90.1	86.4	79.1	78.2	79.1	82.6	81.5	82.6	84.9	85.3	76.2	97.5	
2-Jul	86.8	90.0	91.6	90.3	88.4	87.1	85.0	81.2	75.0	72.1	76.7	79.8	78.1	77.9	96.6	OR	OR	OR	OR	OR	96.7	94.2	96.3	96.5	86.3	96.7	
3-Jul	95.4	OR	OR	OR	OR	OR	OR	OR	92.5	93.7	91.3	92.5	OR	93.3	92.2	94.2	85.6	81.8	81.7	82.0	92.6	96.8	OR	OR	OR	--	96.8
4-Jul	OR	OR	OR	OR	OR	OR	OR	85.0	72.7	52.1	40.3	39.5	36.3	35.4	34.0	34.0	33.2	32.3	31.8	31.6	35.9	46.9	61.3	76.5	76.5	47.5	85.0
5-Jul	79.2	83.0	83.7	87.6	90.4	82.6	71.4	62.9	56.7	50.4	44.4	44.7	41.0	35.3	33.5	32.2	32.8	54.3	92.4	87.7	90.1	90.1	86.7	87.7	66.7	92.4	
6-Jul	87.9	94.0	OR	OR	96.2	94.7	90.6	78.8	64.9	54.9	50.1	46.5	40.9	39.0	37.6	36.4	35.0	27.1	26.9	33.9	40.9	46.4	60.9	68.3	56.9	96.2	
7-Jul	79.3	81.0	88.7	92.9	98.4	90.8	79.5	70.0	62.4	51.9	39.9	35.2	32.8	31.5	32.8	34.3	35.2	34.6	35.0	41.4	52.3	66.7	70.5	60.4	58.2	98.4	
8-Jul	56.0	57.8	58.5	60.1	66.5	64.3	62.5	60.1	55.5	51.4	46.2	41.9	35.7	34.2	34.3	33.6	33.5	34.1	35.1	36.7	39.6	42.6	46.5	51.4	47.4	66.5	
9-Jul	57.8	58.0	59.9	62.6	64.8	70.8	71.7	67.0	59.0	48.5	45.6	46.9	45.9	43.2	40.5	39.9	39.9	38.6	37.3	41.7	44.6	49.8	55.4	59.1	52.0	71.7	
10-Jul	64.2	66.7	69.3	71.0	73.6	68.3	61.9	54.1	48.1	42.8	37.9	34.2	31.1	27.6	23.7	19.8	20.5	23.9	29.3	30.7	39.0	42.7	47.9	54.9	45.1	73.6	
11-Jul	61.4	70.8	76.2	72.2	71.2	72.6	67.8	60.2	55.8	46.8	36.6	34.9	31.5	29.9	29.7	28.4	29.3	32.2	35.8	41.5	50.0	59.2	59.1	67.6	50.9	76.2	
12-Jul	70.9	71.2	75.4	77.3	85.4	82.6	74.0	69.5	64.3	60.0	54.9	52.7	47.3	40.8	33.0	33.4	30.2	26.5	30.4	33.1	39.7	47.4	52.1	53.6	54.4	85.4	
13-Jul	61.2	61.2	69.3	71.0	65.1	64.3	69.2	71.0	67.6	60.9	55.0	38.2	29.6	33.8	34.7	34.9	35.8	38.4	42.7	46.2	52.5	55.1	55.2	50.2	52.6	71.0	
14-Jul	51.3	52.0	57.9	65.6	72.6	74.4	73.0	73.1	74.7	70.7	68.8	69.6	72.6	66.8	59.6	55.7	52.5	53.9	54.0	57.4	63.7	67.6	70.3	70.6	64.5	74.7	
15-Jul	70.4	71.7	74.4	77.6	78.7	79.5	78.3	79.8	72.1	67.2	66.5	64.7	63.4	60.7	59.3	56.3	55.2	59.0	61.4	62.1	69.3	81.3	84.6	91.4	70.2	91.4	
16-Jul	94.6	OR	OR	OR	OR	OR	OR	70.0	56.1	50.7	49.8	46.8	44.5	40.2	39.8	39.7	40.7	44.2	49.6	53.7	56.3	63.1	70.7	67.8	54.3	94.6	
17-Jul	67.6	69.3	69.6	70.9	73.2	77.8	96.3	98.3	94.0	89.6	87.7	68.3	54.5	52.7	64.3	52.5	65.9	82.6	84.7	84.1	80.9	86.3	OR	OR	76.0	98.3	
18-Jul	OR	OR	OR	OR	OR	OR	97.7	95.7	95.1	94.1	90.6	88.7	76.6	68.4	67.1	61.4	67.6	75.6	73.3	73.8	81.0	84.0	87.3	85.2	81.3	97.7	
19-Jul	84.6	92.9	94.4	88.8	88.2	92.0	87.3	84.0	76.0	69.6	60.3	54.3	53.9	53.8	51.2	46.7	44.4	45.4	54.5	59.3	64.1	73.7	77.0	86.1	70.1	94.4	
20-Jul	90.4	94.0	95.8	OR	98.4	OR	90.2	79.2	69.4	60.1	56.9	52.7	47.0	43.8	53.0	52.1	46.1	49.1	50.1	56.0	61.9	63.9	69.4	70.0	65.9	98.4	
21-Jul	75.6	78.4	81.5	83.5	90.7	91.5	83.8	79.8	68.7	60.8	53.0	44.4	43.3	42.9	43.1	44.4	43.8	46.2	47.3	55.5	63.8	71.1	77.0	76.5	64.4	91.5	
22-Jul	82.7	81.5	86.4	89.7	89.7	85.8	74.9	67.7	64.9	59.2	56.2	51.3	45.1	40.1	39.0	40.5	50.1	57.1	56.9	63.3	70.7	74.9	81.3	87.4	66.5	89.7	
23-Jul	90.9	92.1	95.5	95.1	94.9	93.9	92.9	84.9	77.3	67.7	59.9	51.5	43.8	40.7	38.4	39.2	46.7	41.9	44.0	50.1	59.7	71.3	75.4	82.3	67.9	95.5	
24-Jul	83.9	88.8	92.2	94.0	98.6	94.8	88.5	78.5	68.2	59.2	52.4	47.7	42.6	38.5	37.0	34.7	34.8	35.9	41.4	48.8	54.7	57.7	64.2	68.3	62.7	98.6	
25-Jul	71.2	71.5	69.3	OR	OR	99.6	99.3	98.2	96.2	94.7	97.6	99.1	97.6	96.8	97.6	91.6	82.6	81.5	83.8	76.7	80.7	83.4	83.1	82.8	88.0	99.6	
26-Jul	80.0	91.4	94.9	94.0	96.9	97.4	84.5	75.9	68.5	65.4	62.4	61.0	80.6	86.8	78.2	62.0	57.9	71.9	79.6	80.5	88.0	93.6	96.7	95.4	81.0	97.4	
27-Jul	95.8	95.7	96.9	96.9	95.9	95.4	94.0	89.5	84.9	76.4	68.4	66.1	63.6	60.0	59.3	67.1	86.4	80.6	79.9	79.5	87.2	90.1	93.4	94.0	83.2	96.9	
28-Jul	96.4	OR	OR	OR	OR	OR	96.9	91.5	80.8	65.3	54.2	49.0	47.6	45.0	44.7	49.6	53.6	64.6	61.1	69.4	75.9	88.3	84.5	87.0	68.7	96.9	
29-Jul	88.2	89.8	95.0	98.5	OR	OR	87.6	75.0	63.4	51.1	43.5	43.6	40.7	37.3	35.0	35.8	37.0	44.7	39.7	51.9	67.4	74.8	77.4	80.1	61.7	98.5	
30-Jul	81.6	83.7	86.8	86.5	83.4	80.6	79.9	67.1	56.9	48.1	43.1	40.3	39.3	37.6	36.7	36.8	38.2	39.1	41.3	46.6	52.7	61.6	60.9	66.6	58.1	86.8	
31-Jul	87.2	98.0	OR	OR	OR	OR	OR	86.9	80.5	75.3	69.5	63.3	56.6	51.3	45.5	42.5	39.4	37.5	38.4	44.5	44.9	52.0	57.7	62.1	59.6	98.0	
77.5 78.9 80.3 81.6 83.4 82.4 81.4 76.5 70.2 64.0 59.6 55.0 53.2 50.5 50.4 46.9 47.6 50.4 53.3 57.2 64.3 69.2 72.5 74.6																								Diurnal Average			
96.4 98.0 96.9 98.5 98.6 99.6 99.3 98.3 96.2 94.7 97.6 99.1 97.6 96.8 97.6 91.6 86.4 82.6 92.4 92.6 96.8 94.2 96.7 96.5																								Diurnal Maximum			
OR - Out of Range																											



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Sawbones Bay - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Sawbones Bay - July 2023**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	1	0.14	0.14
20 - 40	100	14.47	14.62
40 - 60	187	27.06	41.68
60 - 80	203	29.38	71.06
80 - 100	200	28.94	100.00

Total Number of Valid Hours: 691

Total Number of Hours: 744



Maximum Speed: 28 km/h on Jul 3 10:00	Maximum Daily Speed Average: 18.7 km/h on Jul 2	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jul 29 00:00	Minimum Daily Speed Average: 1.2 km/h on Jul 7	Hours of Data: 744
Maximum Diurnal Speed Average: 4.1 km/h at hour 15	Minimum Diurnal Speed Average: 1.5 km/h at hour 23	Hours of Missing Data: 0
Monthly Average Velocity: 2.4 km/h 288.5 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 24	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	WNW9	WNW6	W3	S5	W7	W9	NW10	WNW12	WSW11	ENE4	ENE4	ESE7	NNE7	ESE2	WSW6	WNW3	SSW3	NW6	WNW15	W10	WSW15	WNW11	WNW13	W13	W5.7	WNW15
2-Jul	W12	W13	W16	W17	W18	W16	W17	W19	W21	W21	W21	W22	W21	W18	NW19	NW17	WNW22	WNW19	WNW19	WNW24	W24	WNW22	WNW21	W18.7	W24	
3-Jul	WNW22	WNW18	WNW16	WNW15	WNW17	WNW16	WNW18	NW23	NNW21	NNW28	NNW24	NNW19	NNW26	N22	N13	NNE15	NNE12	N7	NW5	N7	NW4	WNW5	W5	S2	NW12.9	NNW28
4-Jul	SSW4	SSW5	W10	WNW10	WNW5	NW4	NNW5	N7	N8	N9	NNW8	N7	NNW7	N8	NW4	N6	NNW7	NW5	NNW4	S1	SE5	SSE6	SSE7	S9	NW2.9	WNW10
5-Jul	S8	S6	SSE2	S3	S4	SSW7	SW13	WSW12	WSW12	W14	WSW13	WSW14	SW15	W15	W14	W15	WSW14	NNW15	S3	WSW11	SSW11	SSW8	WSW4	W17	WSW8.5	W17
6-Jul	W11	WNW7	SSW2	WSW5	W10	W8	WNW7	N5	N8	NNW12	N12	N13	NNW14	N13	N15	N15	N15	N17	NNW14	N10	N7	N7	N5	NE4	NNW8.1	N17
7-Jul	ENE3	ESE3	SE3	SSE4	S3	S3	WNW1	WNW3	WNW2	NE4	NNE7	N8	N8	NNE10	NNE7	N9	WNW11	NW8	WNW5	SSW7	S3	S6	SSW4	SSW9	NNW1.2	WNW11
8-Jul	SW13	SW10	WSW12	WSW12	SW9	WSW12	W15	W17	W18	W19	W19	W21	W21	W19	W21	WNW21	W21	W20	W19	W17	W17	W18	W15	W12	W16.1	W21
9-Jul	WNW10	WNW12	W11	W8	W8	WNW4	NNW3	N5	NNE5	NNE8	NNE12	N13	N16	N14	N15	NNE14	NNE13	NNE13	NE11	NE11	ENE7	ENE5	E5	E5	N6.5	N16
10-Jul	E4	E6	E7	E8	E8	ESE10	ESE14	ESE14	ESE14	ESE12	ESE13	ESE12	ESE12	SE11	SSE11	SSE11	SSE9	SSE9	SSE8	SE6	ESE8	SE9	SE7	SE8	ESE8.9	ESE14
11-Jul	ESE8	ESE5	ESE5	SE7	SE5	SE5	SSE6	SSE9	SSE7	S8	SSE10	SE11	S9	S7	S4	S5	SSW5	W5	NW6	NNW5	ESE2	SSW3	SW3	SSW1	SSE4.3	SE11
12-Jul	SW3	WSW8	SSW6	S6	S8	SSE4	SSW4	SW9	NW8	WNW7	WNW8	NW8	NNW12	NNW16	NNW16	NNW17	N18	N18	N13	N9	N8	NNW7	N8	NNW7	NNW6.0	N18
13-Jul	NW7	NW7	NW4	WNW8	WNW8	WNW10	WNW11	WNW8	WNW8	NW11	NW14	NNW22	NNW24	NNW24	NNW24	NNW25	NNW22	NNW18	NNW11	NW7	NW7	NNW10	NNW11	NNW9	NNW12.1	NNW25
14-Jul	NNW9	NNW8	NW8	NNW9	NW10	WNW9	WNW9	NNW10	NNW12	NNW16	N15	N11	N10	N13	N16	N14	NNW13	N11	N10	N8	N5	NW4	NNW3	NW5	NNW9.5	NNW16
15-Jul	WNW8	WNW7	NNW6	NW6	NW6	NW5	NW6	NW5	NNW8	N10	N9	N9	N9	NNE10	N11	N12	NNE12	NNE11	NNE10	NNE8	NE3	NE3	NE3	E3	N6.4	N12
16-Jul	SE3	SE1	S3	NNE1	SE2	ESE2	ESE4	SSE6	SSE9	SSE9	SE9	SSE10	SE10	SE12	SE12	SSE12	SSE12	SSE11	SSE10	SE9	SE8	SE7	SE10	SSE12	SSE7.5	SE12
17-Jul	SE12	SE11	SSE13	SSE12	S10	SSE10	SE11	ESE10	ESE11	E6	NNE8	E10	ESE14	SE13	ESE7	E13	ESE9	E6	ENE6	E9	ESE16	ESE17	E10	E6	ESE9.0	ESE17
18-Jul	E6	NNE7	N9	N9	NNE11	NNE10	NNE10	NNE10	NNE9	NNE11	N13	N11	NE8	NNE9	ESE2	ESE3	SSE5	SSW5	WSW4	W5	WNW10	WNW13	WNW11	WNW12	N5.0	N13
19-Jul	W7	SSW4	SW4	WSW6	WSW8	SW5	W8	WNW9	WNW9	W10	W11	W11	W14	WNW11	WSW11	WSW11	SW14	SW15	WNW16	NW10	NW4	S1	SW2	SSW3	W7.6	WNW16
20-Jul	S3	NNW1	SSW3	SSW3	SSW4	S4	SW3	SW3	WSW4	WNW5	WNW8	NW7	WNW8	W6	W10	SSW4	NW8	NW8	NW6	NNW3	WNW6	W5	W9	W13	W4.2	W13
21-Jul	W11	W12	WNW10	W9	SW5	SW3	W6	WNW7	NW2	NW5	NNW6	NNW9	NNW6	WNW7	NW9	NW6	N7	NNE5	N6	NE2	S3	S3	S5	SSW4	WNW4.0	W12
22-Jul	SSW6	S5	SSW4	SW2	WNW2	SW5	WSW5	WNW11	WNW10	WNW8	W8	SW13	W12	SW10	WSW9	SW9	NNE4	NNE5	NNE6	NNE3	N4	ENE2	NE4	NE3	WSW3.4	SW13
23-Jul	ENE3	E2	ESE4	E3	E3	ENE1	S5	SSW6	SSW10	SSW7	SW9	SSW5	SSW7	S7	S5	SE5	ESE6	E2	SSE4	SSE5	SSE6	SSE6	SE2	SSE4	S3.7	SSW10
24-Jul	SSW3	S5	SSE6	SSE4	S6	SSE4	SE3	SE3	SSE5	SE10	SSE10	SSE12	SE11	SE11	SSE9	SE11	ESE11	SE10	SE8	ESE7	ESE8	ESE9	E9	E10	SE7.1	SSE12
25-Jul	E10	ESE12	SSE7	NW4	NE9	NE8	NW3	N8	NE12	N13	N10	NNW13	N14	NW12	WNW12	NW10	WSW7	WSW11	WNW20	WNW22	WNW17	WSW10	SW8	SW9	NW5.2	WNW22
26-Jul	SW10	S6	ESE3	SSE5	ESE2	S6	S8	S9	SSW12	S12	SSE13	SSE10	SSE6	NNE4	NE5	S7	S9	E6	E6	NNE5	NNE12	NNE10	NE10	NE10	SE3.2	SSE13
27-Jul	NE10	ENE8	NE10	NNE13	NE11	NNE10	NNE11	NE12	NNE11	NNE10	N11	N12	NNE10	NNE12	N14	N13	N10	N9	N7	N8	N6	N6	N6	N8	NNE9.5	N14
28-Jul	N4	WNW1	W1	W2	WSW2	W2	W2	WNW4	NW4	WNW4	N3	NNE7	NE9	SE2	N7	N7	S5	S8	SW10	WNW8	SW4	S6	SW1	SSW1	WNW1.4	SW10
29-Jul	S4	SW2	S3	SSW4	SSW4	S3	SSW5	WSW4	SW4	SW6	SW8	SSW6	SSW8	SSW10	SSW9	S8	SSW7	S6	S8	S6	S6	S7	S8	SSE8	SSW5.7	SSW10
30-Jul	SSE8	SSE8	SSE8	SSE9	SSE9	SE7	SSE6	S10	S12	S18	SSE17	SSE16	SSE17	S15	S15	S15	SSE15	SSE15	SSE13	SSE11	SE8	ESE7	ESE8	SE10	SSE11.1	S18
31-Jul	S11	ENE5	SSW2	WNW2	SE5	SE4	SSE6	S7	SSW8	SW12	SW11	WSW14	WSW17	WSW16	WSW15	SW17	WSW17	W19	W17	SW12	WSW15	SW16	SW11	SW12	SW9.6	WSW19

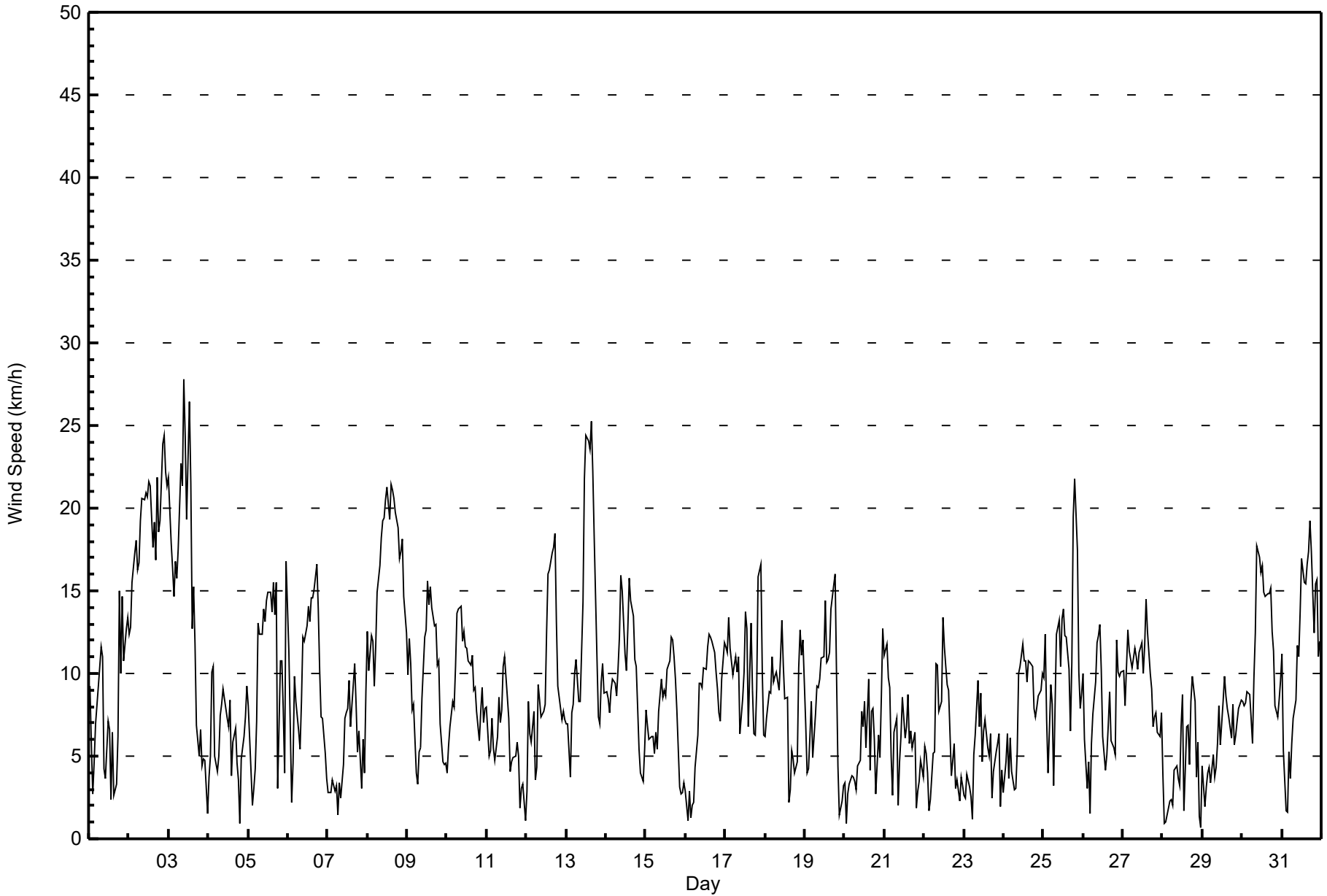
WSW2.6	WSW1.9	WSW2.1	WSW2.3	WSW2.2	WSW2.0	WSW2.8	W3.2	NNW2.9	NW3.3	NW3.3	NW3.0	NW3.7	NW3.5	NW4.1	NW3.1	NW2.6	NW3.5	NNW3.7	NNW2.7	W2.0	WSW1.7	W1.5	WSW2.2	Diurnal Average
WNW22	WNW18	WNW16	W17	W18	W16	WNW18	NW23	NNW21	NNW28	NNW24	NNW22	NNW26	NNW24	NNW24	NNW25	NNW22	WNW22	WNW20	WNW22	WNW24	W24	WNW22	WNW21	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
Sawbones Bay - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Sawbones Bay - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	196	26.34	26.34
6 - 11	348	46.77	73.12
12 - 19	168	22.58	95.70
20 - 28	32	4.30	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Sawbones Bay - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	7	8	9	8	8	12	14	12	25	25	15	7	9	14	16	7	196
6 - 11	45	27	10	3	15	16	24	35	30	18	13	12	21	37	23	19	348
12 - 19	25	10	2	0	1	11	4	13	6	1	11	17	31	17	4	15	168
20 - 28	1	0	0	0	0	0	0	0	0	0	0	0	12	8	1	10	32
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	78	45	21	11	24	39	42	60	61	44	39	36	73	76	44	51	744

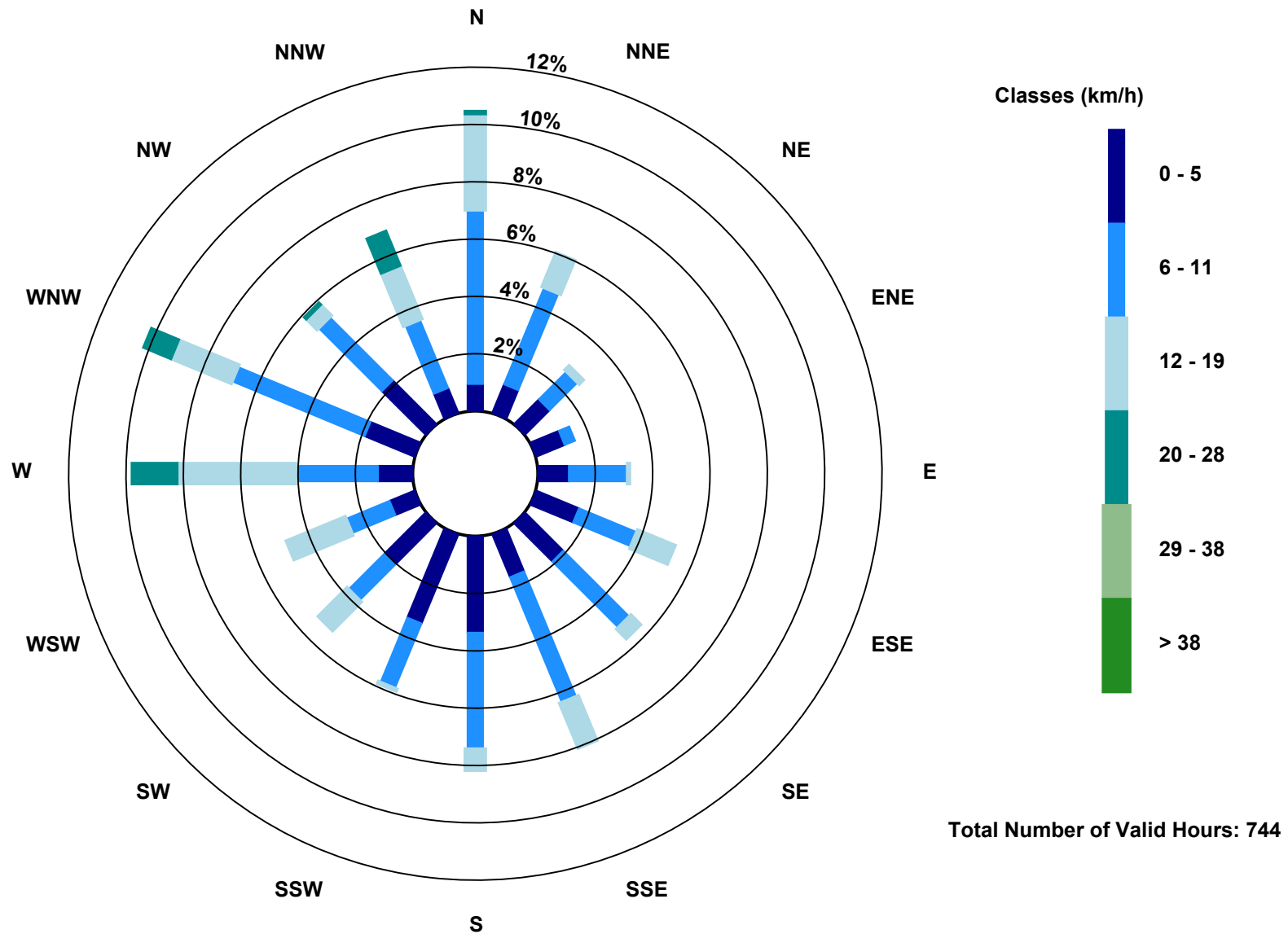
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Sawbones Bay





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Sawbones Bay - July 2023

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



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Sawbones Bay - July 2023

Direction of Maximum Speed: 337 deg on Jul 3 10:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 279.7 deg on Jul 2	Hours of Data: 744
Direction of Minimum Speed: 202 deg on Jul 29 00:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.2 deg on Jul 7	Percent Operational Time: 100.0
Monthly Average Direction: 288.5 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	293	293	271	190	276	266	308	290	251	58	76	120	16	110	239	299	209	317	284	281	255	287	282	280	279.9
2-Jul	276	280	279	269	276	268	264	264	278	277	281	264	264	267	281	316	305	292	291	288	283	281	284	284	279.7
3-Jul	283	286	289	289	290	292	297	318	336	337	339	333	343	354	349	15	27	349	325	351	306	295	269	180	322.7
4-Jul	202	213	276	287	298	315	339	355	6	3	342	351	332	354	326	350	328	315	332	183	138	152	168	171	321.8
5-Jul	169	176	163	175	178	212	227	243	251	265	249	253	233	280	262	264	255	334	169	241	202	201	256	262	245.0
6-Jul	262	288	213	246	278	274	293	355	350	348	360	4	338	360	355	354	4	349	347	355	354	353	10	38	341.0
7-Jul	75	111	145	163	177	176	286	282	296	34	21	1	2	17	15	9	303	308	293	197	176	176	200	205	333.3
8-Jul	214	226	247	245	236	245	259	266	267	270	271	269	274	270	275	284	277	265	266	264	263	261	264	274	263.9
9-Jul	289	284	280	271	270	289	335	356	21	27	21	6	359	11	6	16	27	28	38	43	65	74	79	88	4.4
10-Jul	79	91	92	97	98	106	109	116	122	113	110	116	111	129	150	159	157	163	160	131	111	131	145	128	122.6
11-Jul	121	122	123	146	144	139	159	166	166	174	165	145	170	190	177	176	213	264	308	339	102	203	220	198	164.9
12-Jul	219	237	198	190	183	167	203	234	305	294	301	308	333	348	347	342	0	0	356	351	351	342	350	345	329.3
13-Jul	310	306	307	294	285	285	287	289	301	319	325	337	342	341	345	342	346	336	334	312	313	337	336	342	327.7
14-Jul	327	327	316	333	322	299	296	331	342	343	352	3	11	354	357	350	346	357	357	6	3	324	337	310	342.2
15-Jul	291	300	329	323	316	316	313	325	344	6	1	357	6	20	11	11	18	19	25	29	34	44	39	98	358.2
16-Jul	140	132	171	22	130	123	122	147	159	152	134	150	136	146	146	163	167	155	151	145	146	138	143	153	148.0
17-Jul	143	144	153	157	169	163	142	117	115	90	23	81	118	127	102	101	104	87	68	88	106	110	99	96	117.0
18-Jul	94	33	10	7	12	18	26	25	16	14	3	360	38	27	109	102	154	205	241	277	300	287	285	283	357.5
19-Jul	276	211	216	253	258	218	260	282	293	280	260	263	266	282	252	239	235	230	288	312	310	183	218	192	260.9
20-Jul	185	332	212	213	206	176	219	226	238	303	291	304	297	279	273	192	313	323	322	332	301	272	272	276	276.9
21-Jul	281	272	283	272	224	228	263	295	320	312	340	338	339	296	318	313	355	26	6	54	176	169	175	206	297.6
22-Jul	195	190	196	217	301	221	237	283	290	303	263	222	259	233	242	216	16	19	22	28	352	59	45	43	258.1
23-Jul	76	87	119	86	99	75	181	204	208	210	214	211	193	183	185	131	103	81	158	156	166	166	129	162	169.1
24-Jul	201	177	165	151	174	147	137	137	159	137	153	160	135	143	157	128	117	138	137	118	108	102	100	101	136.9
25-Jul	96	114	168	311	46	54	323	5	37	3	8	343	349	316	294	306	255	252	288	286	285	241	232	236	314.7
26-Jul	233	183	109	165	119	176	191	190	196	183	148	153	159	19	45	177	171	80	99	27	22	32	39	44	141.0
27-Jul	44	59	35	31	34	30	32	34	22	30	11	11	14	17	8	8	357	356	351	349	360	358	1	5	17.8
28-Jul	352	292	273	278	257	262	277	301	313	297	2	16	34	130	356	10	182	188	230	300	214	180	220	202	295.2
29-Jul	185	218	186	202	192	188	204	256	232	216	215	199	201	193	201	170	199	183	191	185	174	172	171	167	192.9
30-Jul	165	161	161	157	150	141	147	174	172	177	168	162	162	174	175	175	166	159	159	167	131	113	108	144	160.9
31-Jul	190	75	208	300	145	128	149	174	199	227	232	243	238	249	244	234	242	259	259	234	253	222	224	222	231.3

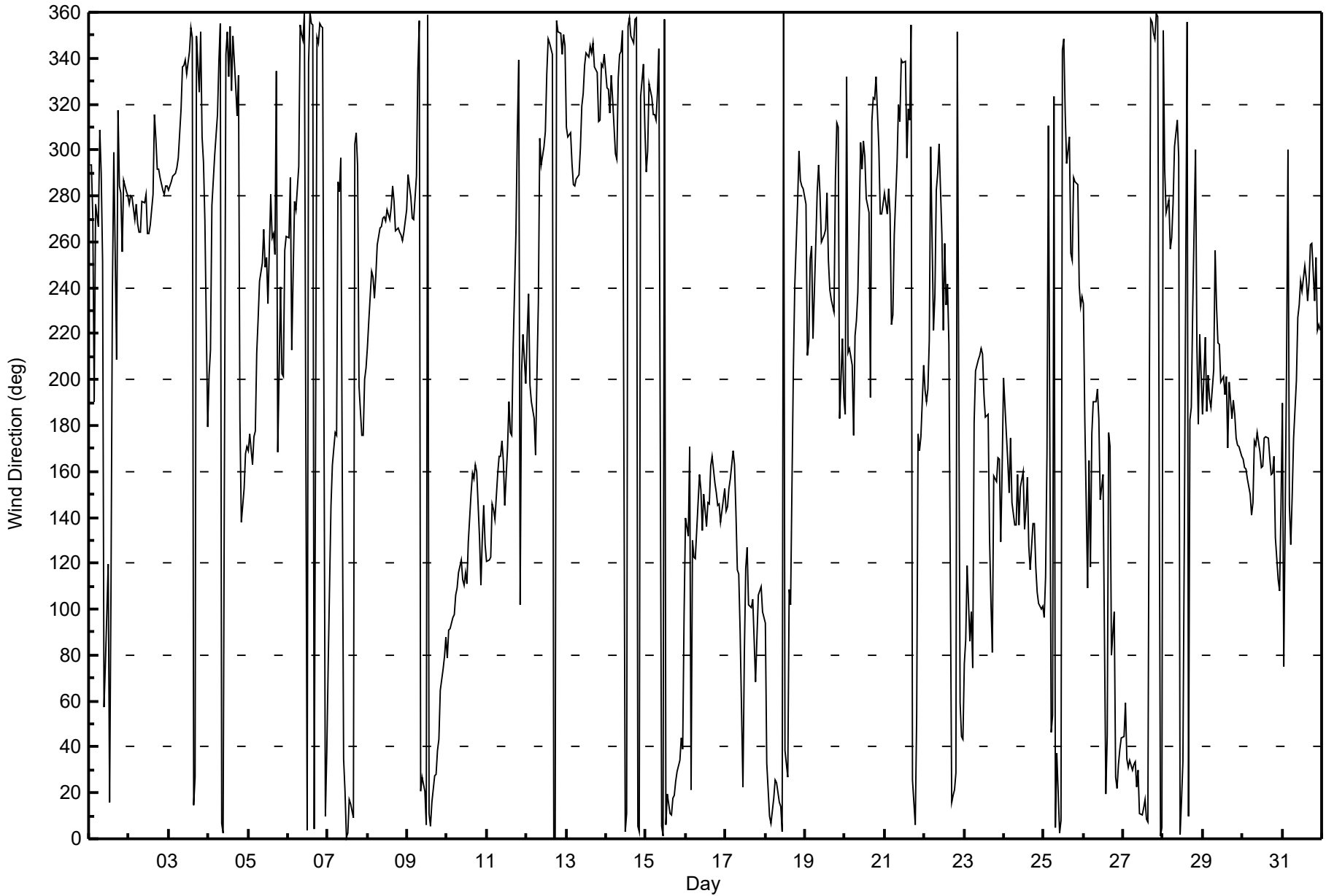
240.6 243.0 242.6 255.7 257.1 245.5 257.8 279.5 287.4 310.7 315.1 311.4 316.9 317.2 307.4 322.6 311.7 312.7 302.3 300.9 279.9 237.8 259.7 243.5
 Diurnal Average

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Sawbones Bay - July 2023





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Sawbones Bay - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																	
Maximum Value: 103 deg on Jul 29 00:00										Hours of Data: 744																	
Minimum Value: 4 deg on Jul 29 23:00										Hours of Missing Data: 0																	
Percentiles: P ₁ = 7 P ₁₀ = 12 Q ₁ = 16 Median = 23 Q ₃ = 35 P ₉₀ = 53 P ₉₉ = 86										Hours of Calibration: 0																	
										Percent Operational Time: 100.0																	
Day	Hourly Period Ending At (MST)																								Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	9	8	93	34	51	45	17	18	31	58	72	57	43	74	67	81	68	50	14	17	15	24	16	15	93		
2-Jul	17	17	13	15	15	16	14	14	15	18	15	12	14	16	19	14	14	12	12	10	10	11	9	9	19		
3-Jul	9	10	11	10	12	12	12	14	16	17	16	16	17	18	16	18	17	31	57	18	19	21	44	77	77		
4-Jul	35	34	12	8	11	16	17	20	28	36	52	60	59	61	96	64	52	55	74	82	20	13	6	6	96		
5-Jul	6	25	65	35	20	27	18	21	26	26	33	26	27	23	30	26	26	44	77	34	24	37	66	15	77		
6-Jul	18	9	52	27	12	13	15	34	27	24	24	25	29	32	27	28	21	22	19	15	12	12	10	35	52		
7-Jul	24	25	37	20	24	18	62	26	77	56	47	51	48	37	58	32	21	34	37	24	65	37	47	17	77		
8-Jul	16	19	15	15	17	18	17	13	15	16	16	16	17	18	18	17	17	13	14	12	11	11	12	12	19		
9-Jul	30	8	12	22	14	20	29	18	26	32	22	27	21	23	24	27	23	19	28	28	43	43	40	32	43		
10-Jul	36	29	28	20	19	15	15	17	19	27	29	29	33	39	42	32	39	30	17	16	12	20	15	14	42		
11-Jul	11	10	15	13	13	15	11	16	20	22	24	28	45	53	69	77	57	60	29	53	63	42	43	83	83		
12-Jul	49	27	25	39	20	41	37	21	30	40	39	43	35	25	27	23	21	20	18	14	11	8	13	15	49		
13-Jul	13	19	34	7	9	9	8	9	13	16	15	19	20	20	19	20	19	17	16	13	13	13	17	12	34		
14-Jul	8	10	8	12	11	13	11	20	19	17	18	20	20	20	25	26	22	20	19	15	9	21	52	23	52		
15-Jul	9	14	17	14	13	13	15	20	20	21	24	27	25	32	26	25	26	19	18	18	23	23	22	27	32		
16-Jul	50	73	29	40	32	35	23	30	25	34	31	33	30	36	27	28	24	21	19	15	13	15	18	16	73		
17-Jul	17	17	17	23	24	15	16	17	14	39	21	43	19	19	34	22	20	34	37	29	16	14	20	28	43		
18-Jul	27	29	16	14	15	15	17	14	15	14	16	17	27	23	74	64	34	20	29	49	12	10	9	9	74		
19-Jul	19	32	27	33	35	19	24	12	13	21	25	33	26	24	29	34	23	21	21	15	62	99	76	76	99		
20-Jul	60	102	54	41	32	35	46	40	36	72	36	47	51	64	49	58	35	21	31	43	17	32	21	12	102		
21-Jul	12	11	11	13	35	66	30	19	62	46	46	37	57	48	32	40	32	30	16	60	51	32	15	30	66		
22-Jul	16	22	27	80	60	26	37	21	14	16	33	21	21	35	42	30	88	31	37	33	16	37	23	28	88		
23-Jul	30	41	33	23	47	73	30	35	22	28	26	68	55	38	52	68	13	57	47	17	9	7	77	51	77		
24-Jul	53	28	13	47	18	18	49	44	43	26	27	30	33	36	35	26	28	24	17	12	13	20	19	17	53		
25-Jul	22	20	57	70	34	40	81	40	25	48	21	29	20	21	13	21	21	47	36	11	11	14	21	20	81		
26-Jul	27	21	52	52	92	21	20	22	24	22	25	23	41	28	30	50	33	44	28	43	14	22	26	27	92		
27-Jul	28	34	22	18	18	18	18	19	19	25	23	28	34	28	22	21	16	15	16	12	13	10	11	9	34		
28-Jul	13	44	52	34	50	60	36	18	29	58	79	41	29	82	49	33	75	24	36	16	38	37	90	103	103		
29-Jul	38	69	25	22	16	31	19	40	49	41	36	60	45	42	40	41	26	20	19	13	8	5	4	6	69		
30-Jul	8	7	7	10	12	14	20	18	18	19	21	25	23	25	27	23	22	19	18	15	15	14	18	23	27		
31-Jul	34	45	81	80	59	28	25	24	26	20	29	29	22	27	26	24	22	20	14	23	21	16	18	22	81		
	60	102	93	80	92	73	81	44	77	72	79	68	59	82	96	81	88	60	77	82	65	99	90	103			
Diurnal Maximum																											



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS506
JACKFISH 1
JULY 2023**

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JACKFISH 1 (AMS506)
 JULY 2023

MONTHLY SUMMARY

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	9.8	0	1.9	0
H2S (ppb) Average	708	36	36	100	3.5	0	0.8	0
NO2 (ppb) Average	708	36	36	100	13.8	0	4.9	-
NO (ppb) Average	708	36	36	100	10.4	-	1.9	-
NOX (ppb) Average	708	36	36	100	24.2	-	5.2	-
Temperature 2 m (C) Average	744	0	0	100	28.9	-	22.5	-
Relative Humidity (%) Average	744	0	0	100	98.4	-	93.4	-
Wind Speed 10 m (km/h) Average	740	0	4	99.46	17	-	8	-
Wind Direction 10 m (deg) Average	740	0	4	99.46	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JACKFISH 1 (AMS506)
 JULY 2023

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	710	0.58	1.1	-	0	0	0	0.2	0.6	1.5	9.8
H2S (ppb) Average	708	0.29	0.4	-	0	0	0.1	0.2	0.4	0.7	3.5
NO2 (ppb) Average	708	1.68	1.7	-	0.1	0.5	0.7	1.2	2	3.2	13.8
NO (ppb) Average	708	0.35	1	-	0	0	0	0.1	0.3	0.7	10.4
NOX (ppb) Average	708	2.03	2.4	-	0.1	0.5	0.8	1.3	2.4	4.1	24.2
Temperature 2 m (C) Average	744	16.75	4.9	-	6	10.6	12.9	16.1	20.8	23.6	28.9
Relative Humidity (%) Average	744	69.72	19.9	-	26.8	42.4	53.1	68.7	88.8	96.7	98.4
Wind Speed 10 m (km/h) Average	740	4.3	3	-	0	1	2	4	6	8	17
Wind Direction 10 m (deg) Average	740	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JACKFISH 1 (AMS506)
JULY 2023

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	18 Jul 2023 17:00	18 Jul 2023 17:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	23 Jul 2023 00:00	23 Jul 2023 00:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	23 Jul 2023 02:00	23 Jul 2023 02:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	28 Jul 2023 03:00	28 Jul 2023 03:00	1	Flat line in sensor output signal



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Jackfish 1 - July 2023

Number of Exceedences (AAAQO):		1-hr: 0 24-hr: 0		Hours in Service:		744																				
Maximum Value: 9.8 ppb on Jul 3 06:00		Maximum Daily Average: 1.9 ppb on Jul 13		Hours of Data:		710																				
Minimum Value: 0.0 ppb on Jul 1 10:00		Minimum Daily Average: 0.0 ppb on Jul 27		Hours of Missing Data:		34																				
Maximum Diurnal Average: 1.0 ppb at hour 10		Minimum Diurnal Average: 0.2 ppb at hour 5		Hours of Calibration:		34																				
Monthly Average: 0.58 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.2 Q ₃ = 0.6 P ₉₀ = 1.5 P ₉₉ = 5.5		Percent Operational Time:		100.0																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	0.1	0.5	Z	0.9	0.5	0.7	1.2	0.3	0.0	0.0	0.1	0.0	0.0	0.0	0.6	0.7	1.3	1.6	0.3	0.0	0.0	0.1	0.1	0.4	1.6	
2-Jul	0.3	0.3	0.3	Z	0.2	0.7	0.8	0.8	0.5	0.3	0.3	0.3	0.4	0.6	0.7	5.5	8.5	4.4	0.7	0.8	0.5	0.4	0.4	0.6	1.2	8.5
3-Jul	0.4	0.3	1.3	7.1	Z	9.8	7.7	4.6	0.6	0.4	1.3	0.5	1.3	0.4	0.2	0.1	0.2	0.3	1.3	0.3	0.2	0.2	0.2	0.1	1.7	9.8
4-Jul	0.0	0.0	0.0	0.1	0.1	Z	1.3	1.4	0.7	0.3	0.2	0.5	1.7	0.7	0.1	0.4	0.4	1.5	1.1	0.6	0.5	0.2	0.1	0.1	0.5	1.7
5-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.5	0.3	0.3	0.2	0.3	0.7	0.9	0.3	0.3	0.0	1.4	0.2	0.0	0.0	0.0	0.3	1.4
6-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.4	0.8	2.1	5.6	1.1	0.5	0.3	0.2	0.3	0.3	0.2	0.3	0.3	0.2	0.2	0.1	0.9	0.8	0.6	5.6
7-Jul	0.5	0.2	Z	0.3	0.2	0.4	0.8	0.8	3.1	3.3	2.3	0.7	0.3	0.3	0.6	1.0	0.8	0.7	1.3	0.7	0.6	0.3	0.3	0.1	0.9	3.3
8-Jul	0.1	0.1	0.2	Z	1.1	1.2	1.2	1.4	1.4	1.1	0.8	1.1	5.3	3.4	2.4	1.8	2.2	0.6	0.7	0.3	1.9	4.1	4.1	3.3	1.7	5.3
9-Jul	2.8	3.4	2.0	0.4	Z	0.4	0.9	1.4	1.3	1.0	0.8	0.3	0.3	0.3	0.2	0.2	0.1	0.2	0.1	0.0	0.1	0.1	0.0	0.0	0.7	3.4
10-Jul	0.2	0.2	0.1	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	0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.2	0.1	0.2
11-Jul	Z	0.0	0.2	0.2	0.2	0.3	0.5	0.4	0.3	0.3	0.3	0.2	0.2	0.1	0.1	0.3	0.3	0.3	0.5	0.3	0.2	0.1	0.0	0.0	0.2	0.5
12-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.3	1.8	2.6	1.6	2.5	0.6	0.3	0.4	1.0	1.2	1.8	1.8	1.5	1.5	1.3	1.5	1.3	1.0	2.6
13-Jul	1.1	1.3	Z	0.7	0.5	0.5	1.0	4.0	8.0	5.0	1.6	1.9	1.2	3.4	2.1	1.0	0.6	0.2	0.1	1.9	1.7	1.6	2.3	1.7	1.9	8.0
14-Jul	4.7	1.7	2.3	Z	2.4	5.2	7.5	1.8	1.3	1.9	2.5	0.9	0.4	0.2	0.5	0.6	0.2	0.3	0.2	0.1	0.1	0.0	0.0	0.0	1.5	7.5
15-Jul	0.1	0.2	0.2	0.3	Z	0.5	0.7	0.6	0.3	0.2	0.8	2.1	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.3	2.1
16-Jul	0.1	0.0	0.1	0.1	0.1	Z	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.2
17-Jul	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	0.0	0.0	0.0	0.0	0.0	0.0
18-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C	C	C	0.4	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.6	0.2	0.1	0.6
19-Jul	0.0	0.1	Z	0.1	0.1	0.1	0.1	0.7	1.3	2.0	1.5	0.7	0.6	0.5	0.5	0.1	0.4	0.8	4.2	1.1	0.5	0.2	0.1	0.0	0.7	4.2
20-Jul	0.1	0.0	0.1	Z	0.0	0.0	0.0	0.2	0.6	2.6	1.7	0.9	0.6	0.8	4.8	3.9	3.7	1.3	1.3	0.7	0.5	0.6	1.0	0.9	1.1	4.8
21-Jul	0.7	1.3	0.9	0.6	Z	0.5	0.5	1.0	1.4	1.5	0.7	1.0	1.6	2.4	1.5	3.2	2.6	1.1	0.5	0.7	0.2	0.1	0.1	0.2	1.1	3.2
22-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.1	1.3	0.7	0.7	0.8	0.9	1.2	0.7	0.4	0.2	0.1	0.4	0.6	0.2	0.1	0.0	0.0	0.0	0.4	1.3
23-Jul	Z	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.1	0.2	1.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	1.2
24-Jul	0.1	Z	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.2	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.3
25-Jul	0.1	0.1	Z	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	1.4	1.6	0.7	0.7	0.2	0.1	0.1	0.1	0.1	0.3	1.6
26-Jul	0.1	0.1	0.1	Z	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.3
27-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.3	1.3	0.4	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.3
29-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.0	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.2	2.0
30-Jul	0.1	Z	0.2	0.2	0.3	0.4	0.5	0.6	0.5	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.1	0.1	0.6
31-Jul	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	0.4	0.3	0.2	0.3	0.3	0.3	0.3	0.1	0.5	0.0	0.0	0.1	0.5
																								Diurnal Average		
																								Diurnal Maximum		
																								0.4 4.7		
																								0.4 3.4		
																								0.3 2.3		
																								0.5 7.1		
																								0.2 2.4		
																								0.8 9.8		
																								0.8 7.7		
																								0.8 4.6		
																								1.0 8.0		
																								1.0 5.6		
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																								0.6 5.3		
																								0.5 3.4		
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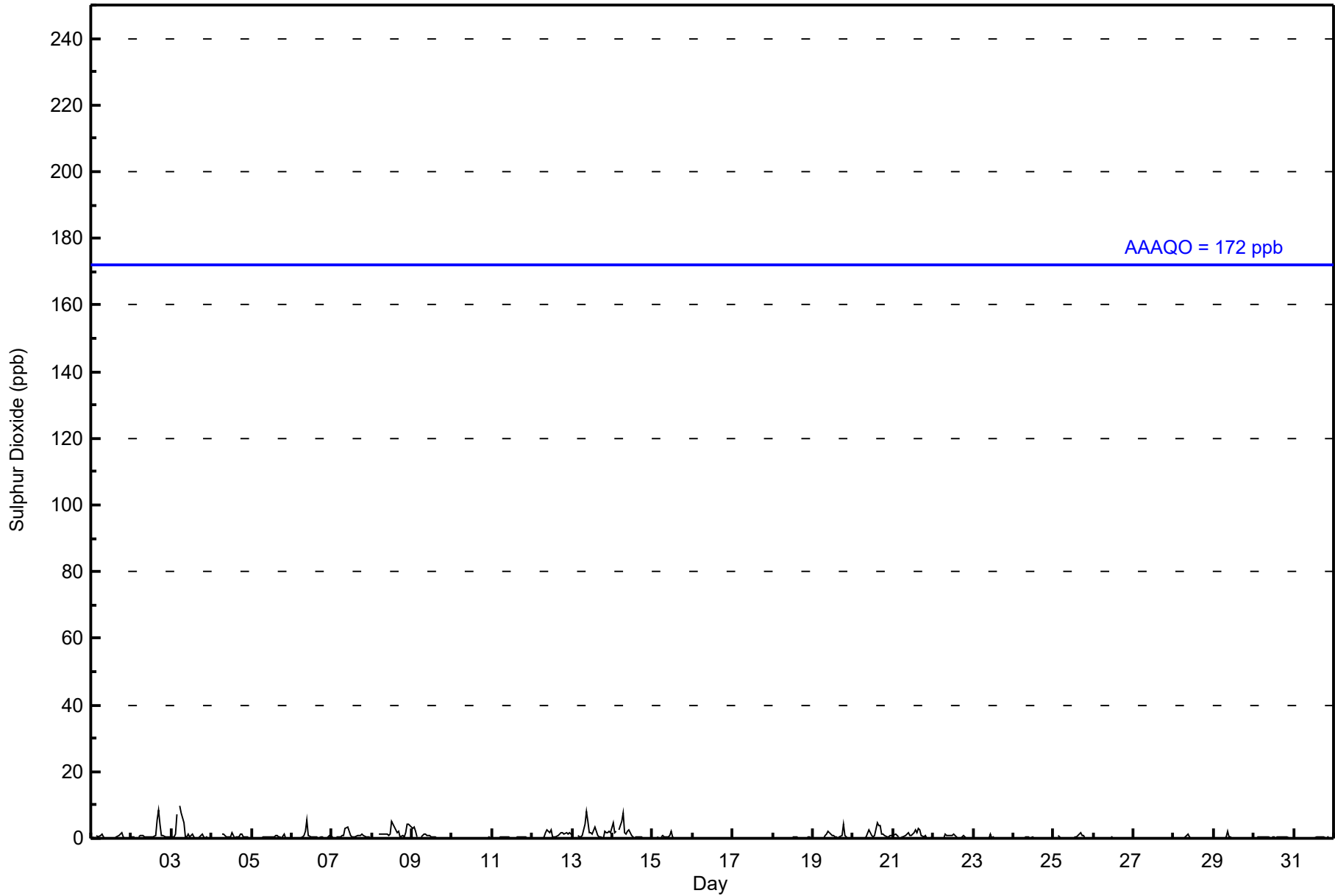
Z - zerospan C - Calibration

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Jackfish 1 - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Jackfish 1 - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	710	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: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Jackfish 1 - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	69	34	17	5	9	19	46	55	85	60	63	23	46	27	64	84	706
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	69	34	17	5	9	19	46	55	85	60	63	23	46	27	64	84	706

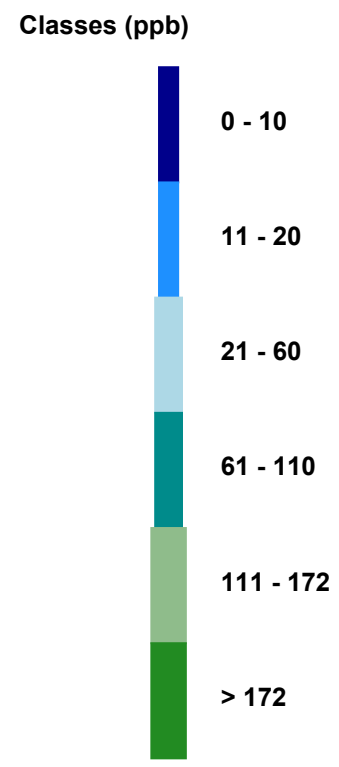
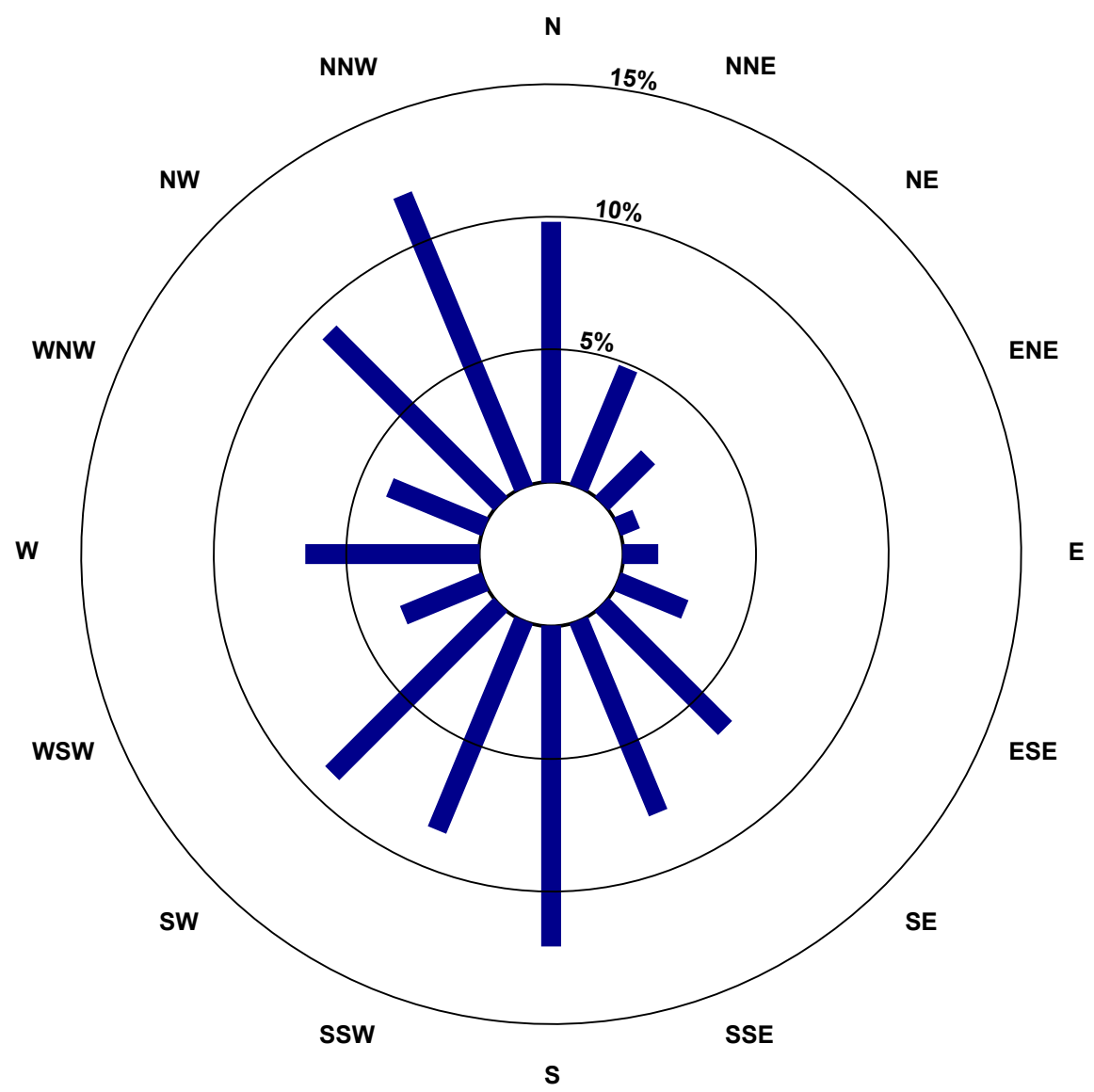
Total Number of Valid Hours: 706

Total Number of Hours: 744

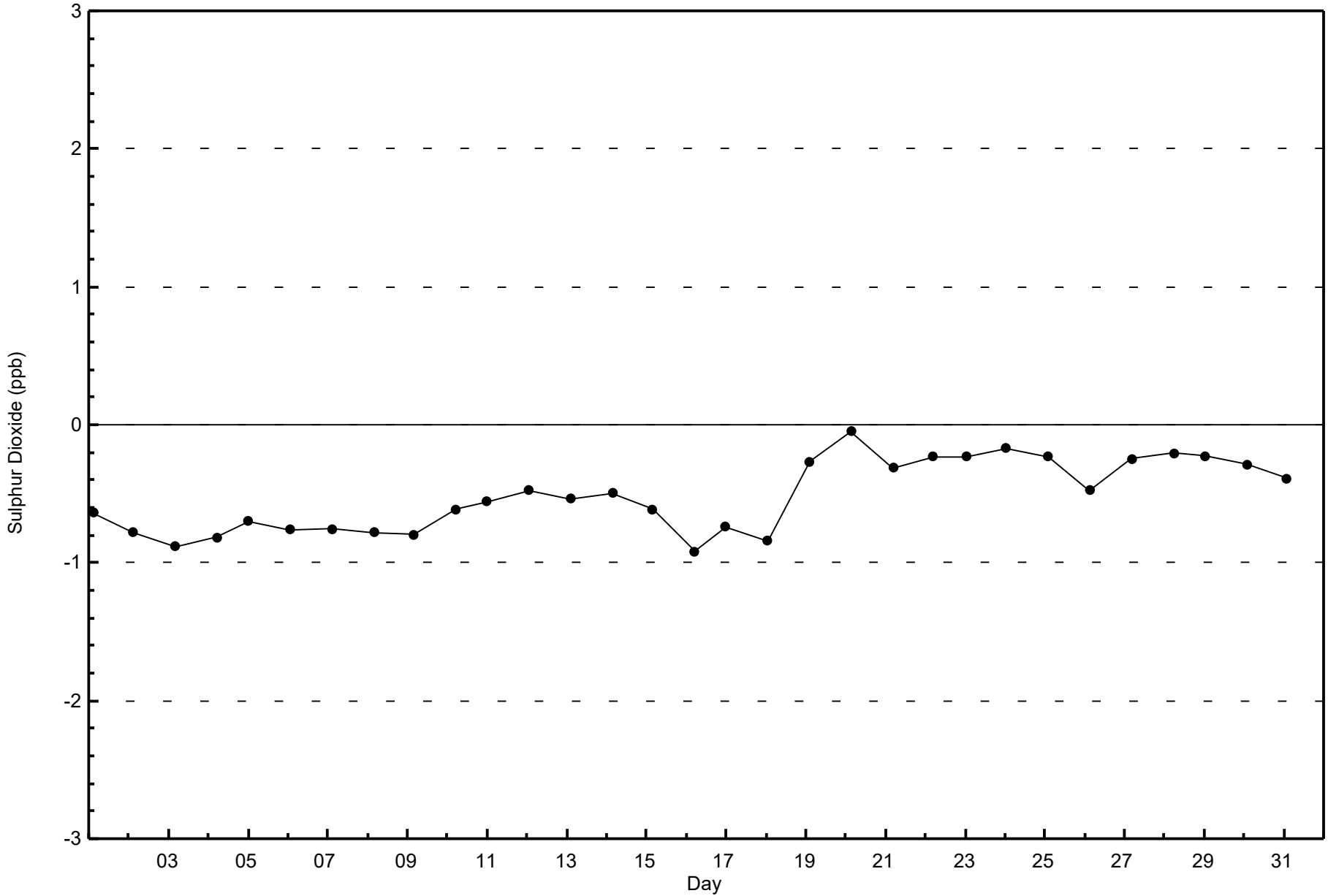


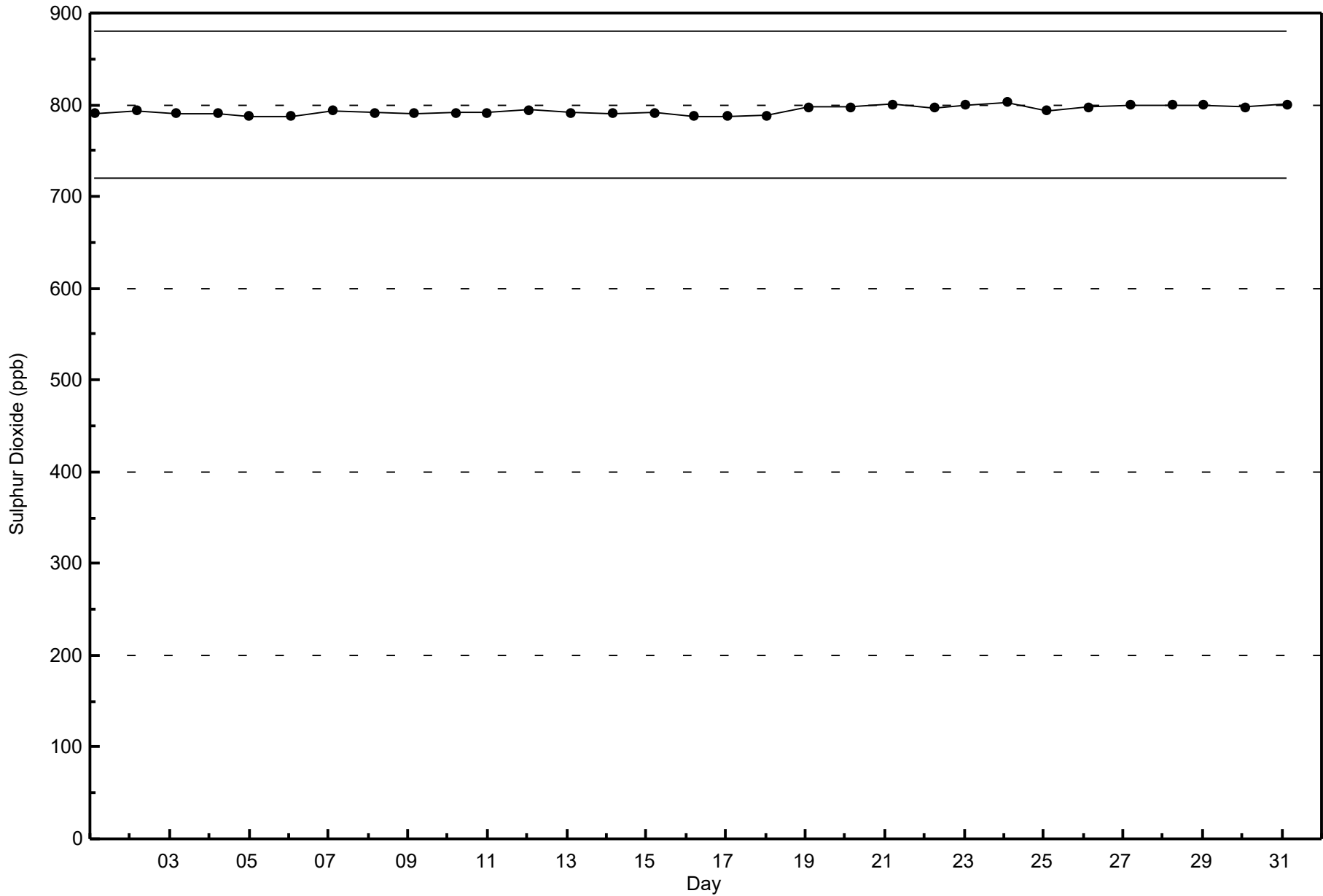
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Jackfish 1



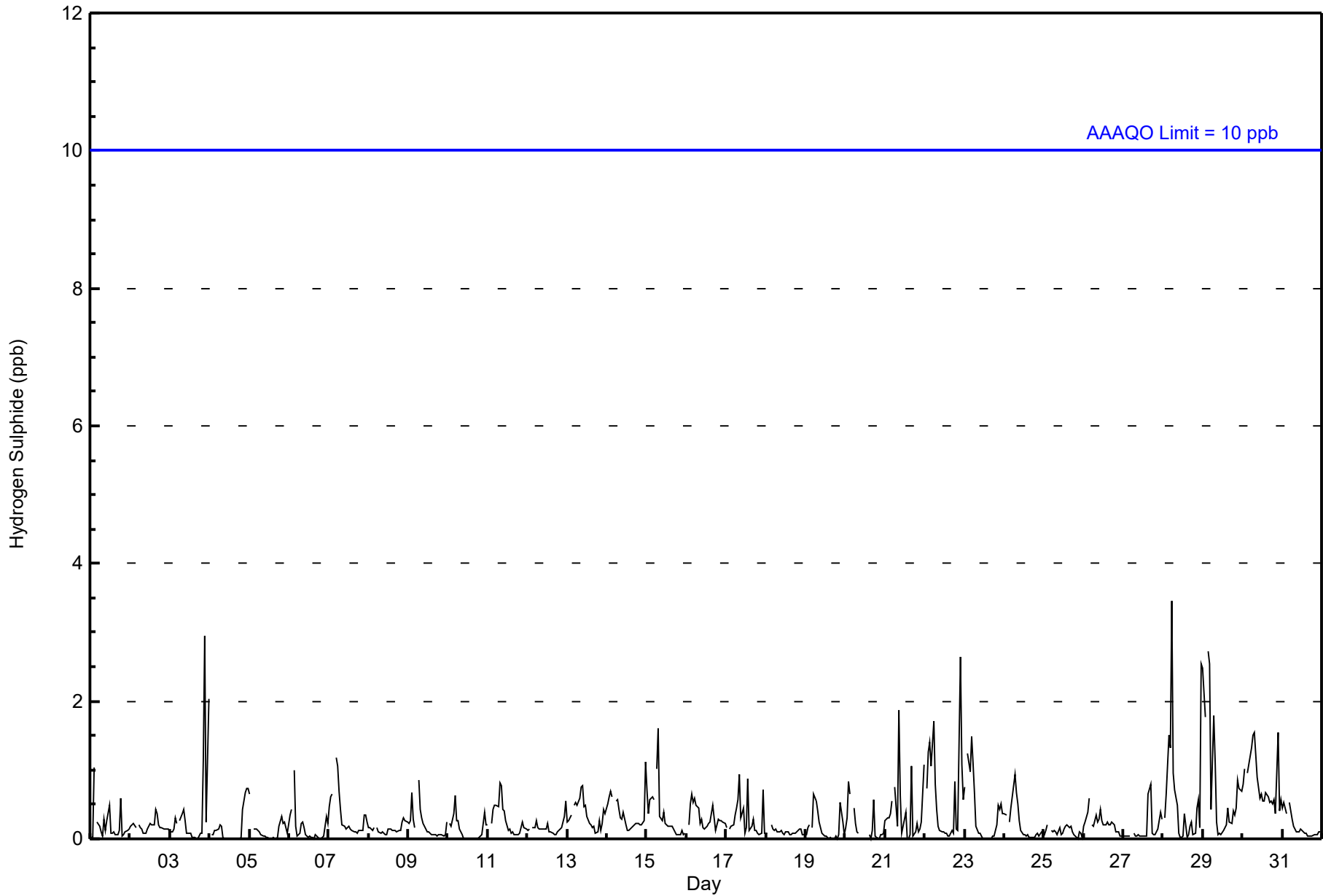
Total Number of Valid Hours: 706







Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		744																																								
Maximum Value: 3.5 ppb on Jul 28 06:00		Maximum Daily Average: 0.8 ppb on Jul 30				Hours of Data:		708																																								
Minimum Value: 0.0 ppb on Jul 3 17:00		Minimum Daily Average: 0.1 ppb on Jul 18				Hours of Missing Data:		36																																								
Maximum Diurnal Average: 0.6 ppb at hour 6		Minimum Diurnal Average: 0.1 ppb at hour 15				Hours of Calibration:		36																																								
Monthly Average: 0.29 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.1 Median = 0.2 Q ₃ = 0.4 P ₉₀ = 0.7 P ₉₉ = 2.0				Percent Operational Time:		100.0																																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	0.0	0.0	1.0	Z	0.2	0.2	0.1	0.0	0.3	0.1	0.3	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.6	0.0	0.1	0.1	0.1	0.1	0.2	1.0																						
2-Jul	0.2	0.2	0.2	0.2	Z	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.4																						
3-Jul	0.1	0.1	0.1	0.3	0.2	Z	0.3	0.4	0.4	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	1.1	2.9	0.3	2.0	0.4	2.9																						
4-Jul	Z	0.1	0.1	0.1	0.1	0.1	0.2	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	0.4	0.7	0.7	0.7	0.2	0.7																						
5-Jul	0.7	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.7																						
6-Jul	0.3	0.4	Z	1.0	0.2	0.0	0.1	0.2	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.2	1.0																						
7-Jul	0.5	0.6	0.7	Z	1.2	1.1	0.7	0.4	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.2	0.3	1.2																						
8-Jul	0.2	0.2	0.1	0.2	Z	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	0.2	0.3	0.3	0.2	0.1	0.3																						
9-Jul	0.2	0.3	0.7	0.3	0.2	Z	0.9	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.2	0.9																						
10-Jul	Z	0.2	0.2	0.4	0.6	0.3	0.3	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	0.1	0.2	0.4	0.2	0.1	0.6																						
11-Jul	0.2	Z	0.2	0.4	0.5	0.5	0.5	0.8	0.8	0.4	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.3	0.8																						
12-Jul	0.1	0.1	Z	0.2	0.2	0.3	0.2	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	0.2	0.2	0.3	0.6	0.2	0.6																						
13-Jul	0.3	0.3	0.3	Z	0.5	0.5	0.5	0.6	0.8	0.8	0.5	0.5	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.3	0.1	0.2	0.4	0.4	0.4	0.8																						
14-Jul	0.5	0.6	0.7	0.6	Z	0.6	0.6	0.4	0.3	0.3	0.4	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	1.1	1.1	0.4	1.1																						
15-Jul	0.7	0.4	0.6	0.6	0.6	Z	1.0	1.6	0.3	0.3	0.4	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	1.6																						
16-Jul	Z	0.2	0.5	0.7	0.5	0.6	0.5	0.4	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.4	0.5	0.1	0.2	0.3	0.3	0.3	0.2	0.2	0.3	0.7																						
17-Jul	0.2	Z	0.1	0.2	0.2	0.3	0.5	0.6	0.9	0.3	0.4	0.1	0.2	0.9	0.1	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.7	0.1	0.3	0.9																						
18-Jul	0.1	0.1	Z	0.2	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	0.1	0.1	0.1	0.2																						
19-Jul	0.1	0.2	0.2	Z	0.2	0.7	0.5	0.4	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.3	0.1	0.2	0.7																						
20-Jul	0.2	0.3	0.8	0.7	Z	0.4	0.2	0.1	0.1	C	C	C	C	C	0.1	0.0	0.1	0.6	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.8																						
21-Jul	0.3	0.3	0.3	0.4	0.5	Z	0.8	0.2	1.9	0.6	0.1	0.2	0.4	0.0	0.0	0.1	1.1	0.0	0.1	0.2	0.1	0.1	0.3	1.1	0.4	1.9																						
22-Jul	Z	0.7	1.3	1.4	1.1	1.7	0.8	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.8	0.1	0.1	2.7	1.1	0.6	0.6	2.7																						
23-Jul	0.7	Z	1.2	1.0	1.5	1.1	0.7	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.4	0.5	0.4	0.4	1.5																						
24-Jul	0.4	0.3	Z	0.2	0.5	0.6	0.9	0.7	0.5	0.3	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.2	0.9																						
25-Jul	0.1	0.1	0.2	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.2																						
26-Jul	0.2	0.3	0.4	0.6	Z	0.2	0.2	0.3	0.2	0.3	0.4	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.2	0.6																						
27-Jul	0.0	0.1	0.0	0.0	0.0	Z	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.6	0.8	0.1	0.1	0.1	0.1	0.1	0.4	0.3	0.1	0.8																						
28-Jul	Z	0.3	0.7	1.5	1.3	3.5	1.0	0.7	0.5	0.1	0.0	0.0	0.0	0.4	0.0	0.1	0.2	0.2	0.1	0.1	0.4	0.6	0.2	2.6	0.6	3.5																						
29-Jul	2.5	1.8	Z	2.7	2.5	0.4	1.8	1.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.5	0.3	0.2	0.4	0.4	0.4	0.9	0.7	0.7	0.8	2.7																					
30-Jul	0.8	1.0	Z	1.0	1.2	1.3	1.5	1.5	1.2	0.9	0.6	0.7	0.5	0.5	0.7	0.6	0.5	0.6	0.5	0.6	0.4	1.5	0.4	0.6	0.8	1.5																						
31-Jul	0.5	0.5	0.4	Z	0.5	0.4	0.3	0.2	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	0.1	0.1	0.1	0.2	0.5																						
																								0.4	0.4	0.4	0.6	0.6	0.6	0.5	0.4	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.4	0.3	0.4	Diurnal Average
																								2.5	1.8	1.3	2.7	2.5	3.5	1.8	1.6	1.9	0.9	0.6	0.7	0.5	0.9	0.7	0.6	1.1	0.6	0.8	0.6	1.1	2.9	1.1	2.6	Diurnal Maximum
Z - zerospan C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Jackfish 1 - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	702	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: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Jackfish 1 - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	67	34	17	5	9	19	46	56	85	59	62	21	47	28	60	84	699
3 - 4	0	0	0	0	0	0	0	0	2	1	0	1	1	0	0	1	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	67	34	17	5	9	19	46	56	87	60	62	22	48	28	60	85	705

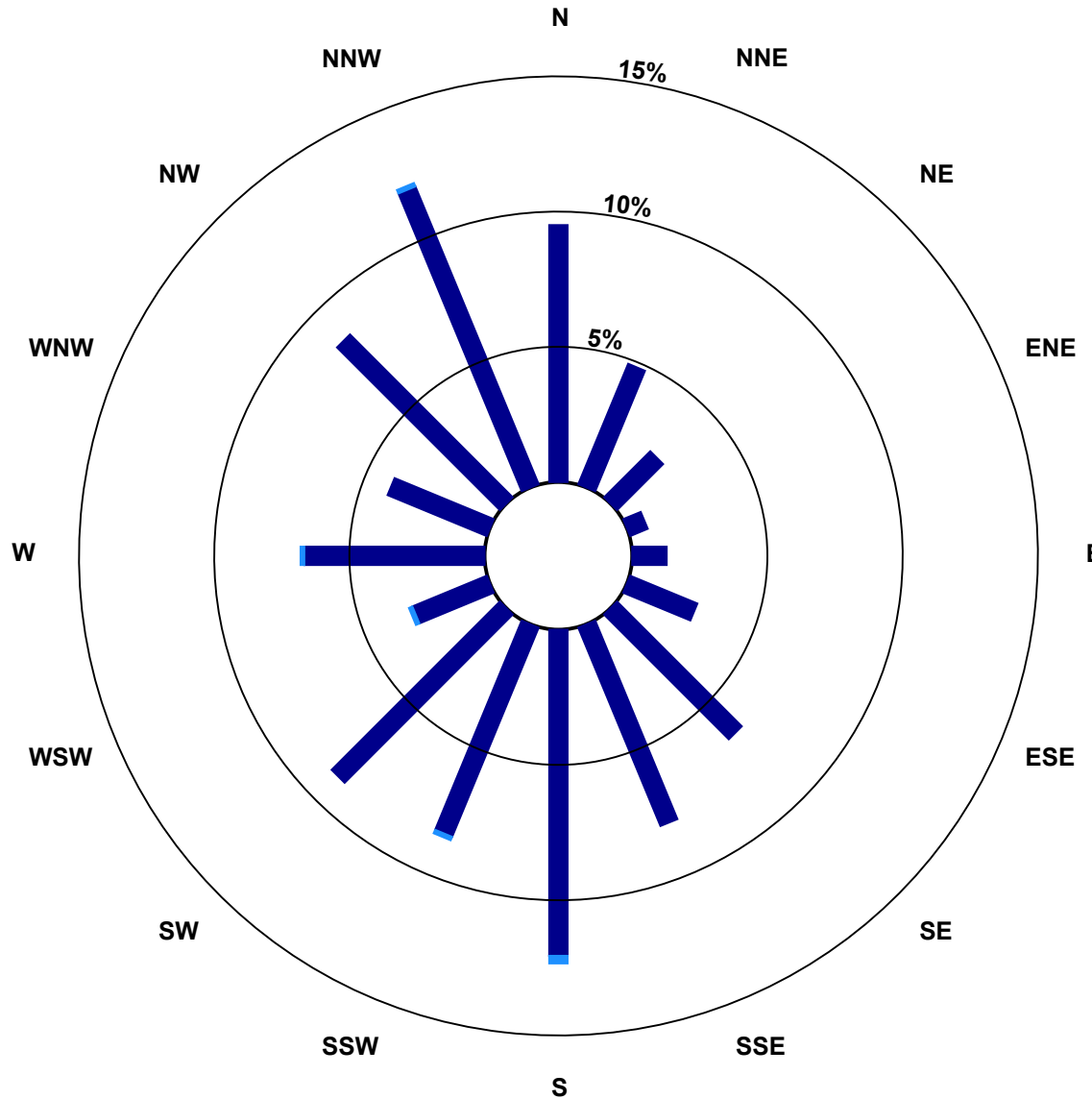
Total Number of Valid Hours: 705

Total Number of Hours: 744

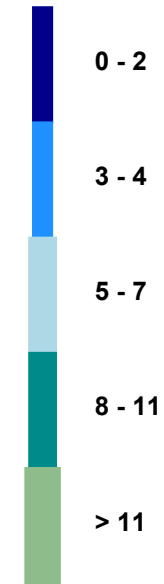


Wood Buffalo Environmental Association
Wind Rose Jul 2023

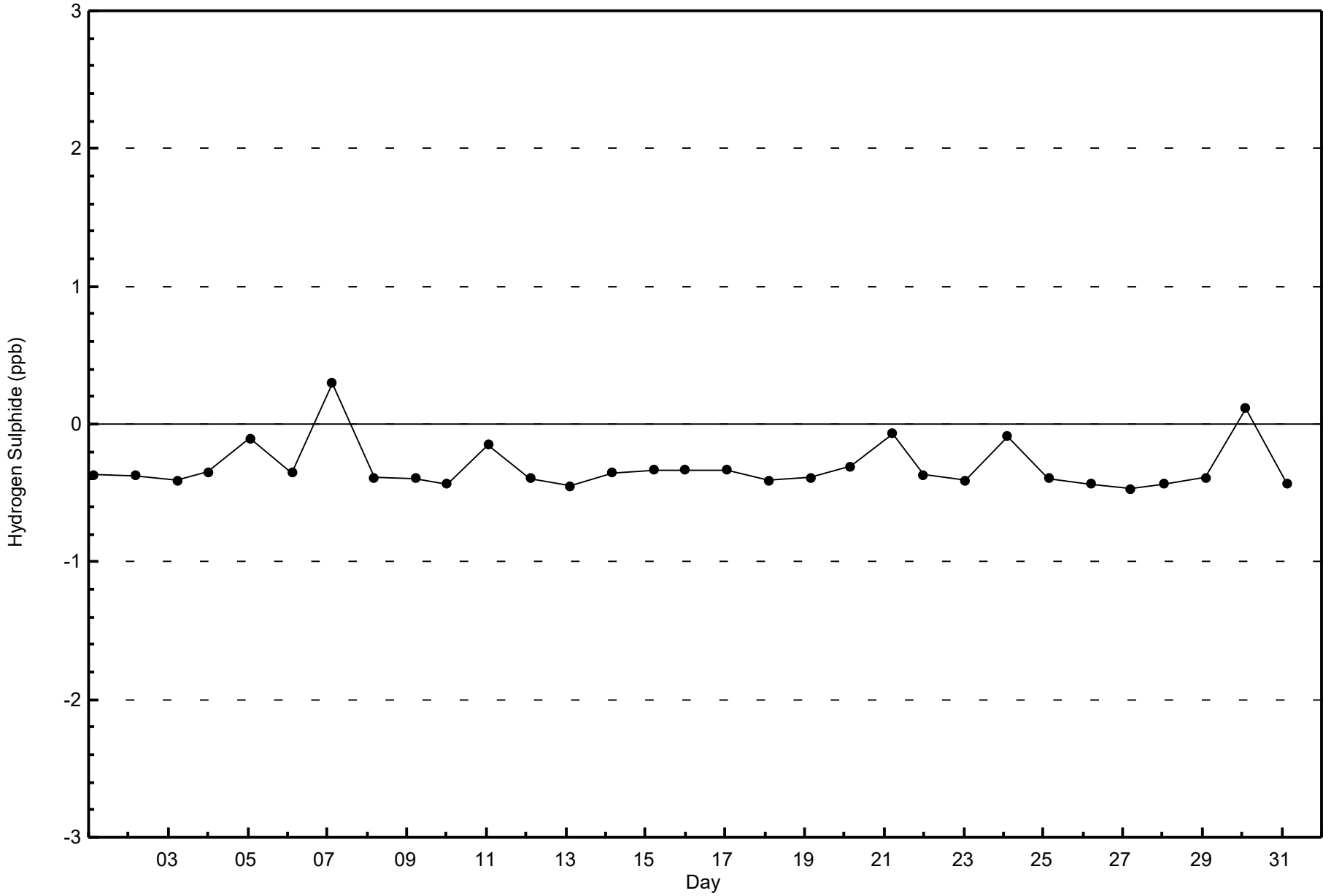
Hydrogen Sulphide (H₂S) - ppb
Jackfish 1

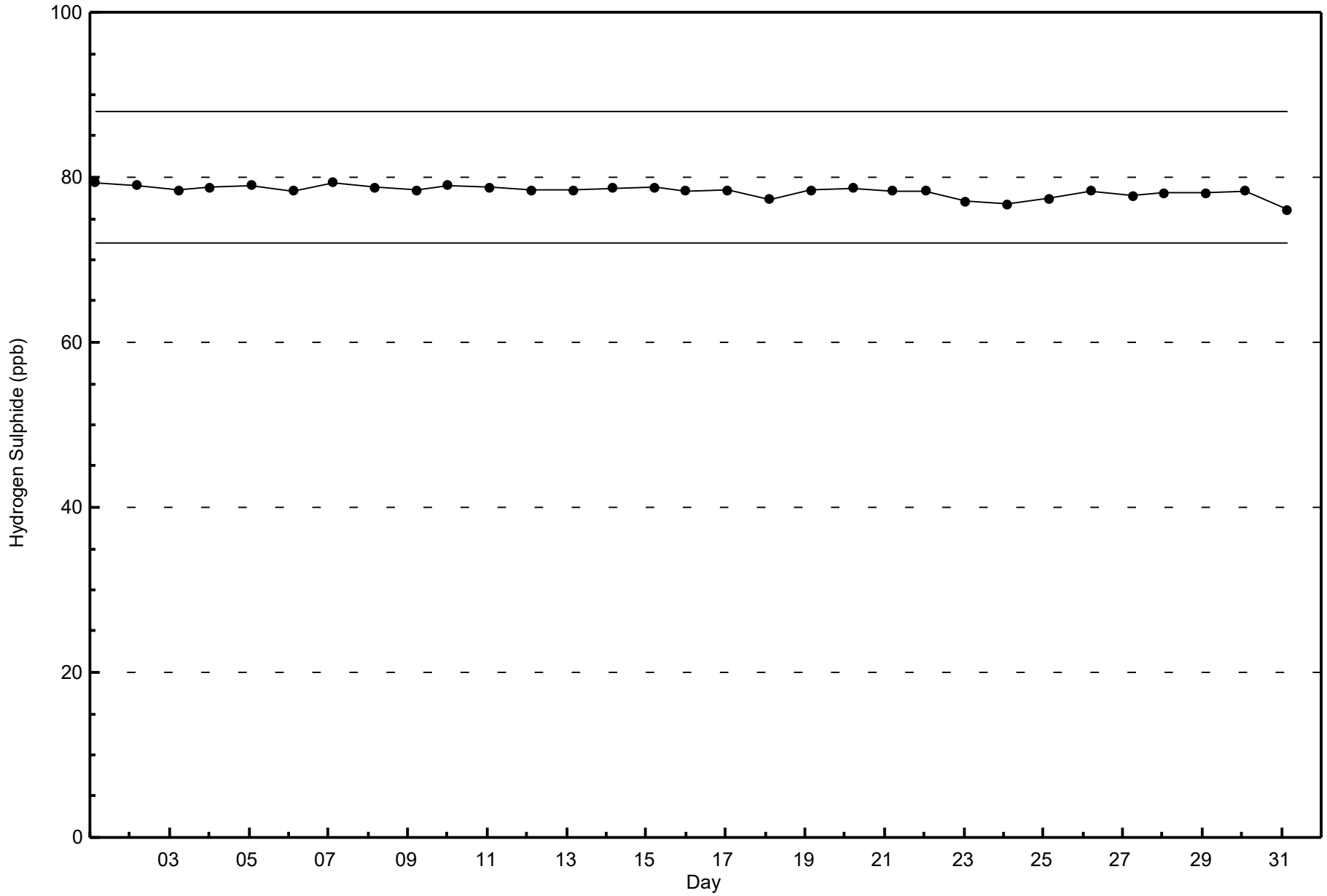


Classes (ppb)



Total Number of Valid Hours: 705







Wood Buffalo Environmental Association
Summary of Hour Averages

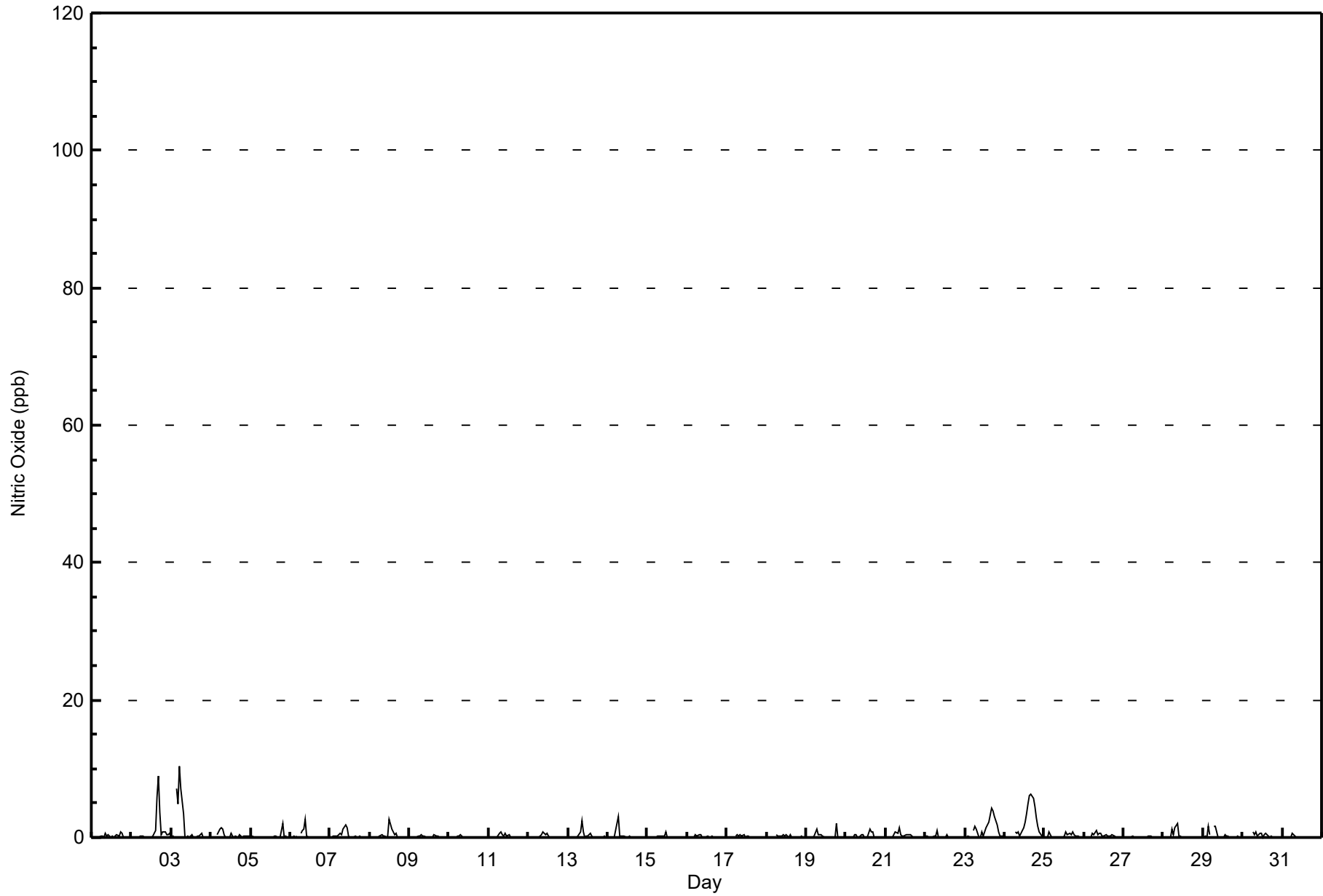
Nitric Oxide (NO) - ppb
Jackfish 1 - July 2023

Maximum Value: 10.4 ppb on Jul 3 06:00		Maximum Daily Average: 1.9 ppb on Jul 24		Hours in Service: 744																						
Minimum Value: 0.0 ppb on Jul 1 21:00		Minimum Daily Average: 0.0 ppb on Jul 27		Hours of Data: 708																						
Maximum Diurnal Average: 0.8 ppb at hour 7		Minimum Diurnal Average: 0.0 ppb at hour 3		Hours of Missing Data: 36																						
Monthly Average: 0.35 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 0.7 P ₉₉ = 5.7		Hours of Calibration: 36																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	Z	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.6	0.1	0.4	0.0	0.2	0.1	0.2	0.3	0.2	0.7	0.6	0.0	0.0	0.0	0.0	0.0	0.2	0.7
2-Jul	0.0	Z	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.2	1.0	6.0	8.9	3.7	0.4	0.8	0.7	0.3	0.4	0.6	1.0	8.9
3-Jul	0.2	0.2	Z	7.0	4.8	10.4	7.2	3.4	0.1	0.1	0.3	0.1	0.3	0.1	0.1	0.1	0.2	0.1	0.7	0.0	0.0	0.0	0.1	0.1	1.5	10.4
4-Jul	0.1	0.1	0.1	Z	0.3	1.1	1.4	1.2	0.4	0.1	0.0	0.1	0.6	0.2	0.0	0.2	0.1	0.4	0.2	0.0	0.1	0.2	0.2	0.2	0.3	1.4
5-Jul	0.2	0.1	0.1	0.0	Z	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	2.0	0.1	0.1	0.1	0.1	0.1	2.0
6-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.6	1.1	1.3	2.7	0.2	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.7
7-Jul	Z	0.1	0.1	0.2	0.2	0.4	0.6	0.5	1.2	1.9	1.4	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.3	1.9
8-Jul	0.0	Z	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.1	0.1	0.2	2.6	1.2	0.8	0.4	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.6
9-Jul	0.1	0.0	Z	0.0	0.1	0.1	0.2	0.4	0.3	0.2	0.1	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.4
10-Jul	0.1	0.1	0.1	Z	0.1	0.1	0.2	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.4
11-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.6	0.8	0.5	0.1	0.5	0.2	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8
12-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.1	0.1	0.3	0.8	0.4	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8
13-Jul	Z	0.0	0.0	0.0	0.0	0.1	0.2	0.8	2.5	0.7	0.0	0.3	0.1	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.0	0.3	2.5
14-Jul	0.3	Z	0.0	0.0	0.0	2.0	3.0	0.3	0.3	0.2	0.2	0.1	0.0	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	3.0
15-Jul	0.0	0.0	Z	0.0	0.0	0.1	0.2	0.2	0.1	0.3	0.2	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7
16-Jul	0.0	0.0	0.0	Z	0.0	0.5	0.3	0.3	0.3	0.0	0.0	0.0	0.2	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5
17-Jul	0.0	0.0	0.0	0.0	Z	0.1	0.3	0.3	0.4	0.1	0.5	0.0	0.1	0.2	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.5
18-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.4	0.2	0.1	0.2	0.3	0.1	0.4	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.1	0.4
19-Jul	Z	0.0	0.0	0.0	0.0	0.1	1.3	0.4	0.4	0.4	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.2	2.1
20-Jul	0.0	Z	0.0	0.0	0.0	0.3	0.4	0.1	0.1	0.5	0.4	0.0	0.0	0.0	1.2	0.8	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.2
21-Jul	0.0	0.0	Z	0.0	0.1	0.4	0.8	0.6	1.4	0.4	0.2	0.2	0.3	0.3	0.4	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.4
22-Jul	0.2	0.2	0.0	Z	0.0	0.3	0.3	0.9	0.1	0.1	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	0.1	0.9
23-Jul	0.0	0.0	0.2	0.0	Z	1.1	1.7	1.2	0.0	0.1	0.7	0.2	0.8	1.4	2.3	3.3	4.2	3.9	3.1	1.8	0.9	0.3	0.2	0.2	1.2	4.2
24-Jul	0.1	0.1	0.1	0.0	0.0	Z	0.9	0.7	0.8	0.1	0.5	1.4	2.3	3.5	5.0	6.1	6.2	5.8	4.5	2.8	1.6	0.7	0.3	0.1	1.9	6.2
25-Jul	Z	0.0	0.0	0.7	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.2	0.8	0.4	0.6	0.5	0.8	0.5	0.2	0.1	0.0	0.0	0.0	0.2	0.8
26-Jul	0.0	Z	0.0	0.0	0.0	0.6	0.3	1.0	0.4	0.6	0.6	0.3	0.3	0.5	0.2	0.2	0.3	0.3	0.2	0.1	0.1	0.1	0.0	0.0	0.3	1.0
27-Jul	0.0	0.0	Z	0.0	0.0	0.1	0.1	0.0	C	C	C	C	C	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
28-Jul	0.0	0.0	0.0	Z	0.0	1.3	0.4	1.4	2.1	0.3	0.1	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	0.3	2.1
29-Jul	0.0	0.1	0.0	1.7	0.4	Z	1.6	1.7	0.7	0.0	0.0	0.0	0.1	0.3	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	1.7
30-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.8	0.4	0.8	0.2	0.6	0.6	0.1	0.4	0.5	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.8
31-Jul	Z	0.0	0.0	0.0	0.0	0.1	0.7	0.3	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	0.1	0.7
																								Diurnal Average		
																								Diurnal Maximum		
																								0.1 0.0 0.0 0.4 0.2 0.8 0.8 0.6 0.5 0.3 0.3 0.2 0.3 0.3 0.4 0.6 0.7 0.5 0.4 0.3 0.1 0.1 0.1 0.0		
																								0.3 0.2 0.2 7.0 4.8 10.4 7.2 3.4 2.5 2.7 1.4 1.4 2.6 3.5 5.0 6.1 8.9 5.8 4.5 2.8 1.6 0.7 0.4 0.6		
Z - zerospan																								C - Calibration		



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Jackfish 1 - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Jackfish 1 - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Jackfish 1 - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	66	33	16	5	10	18	45	56	89	57	60	24	47	28	64	86	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	66	33	16	5	10	18	45	56	89	57	60	24	47	28	64	86	704

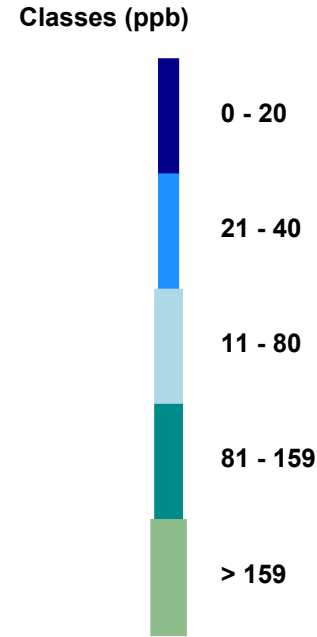
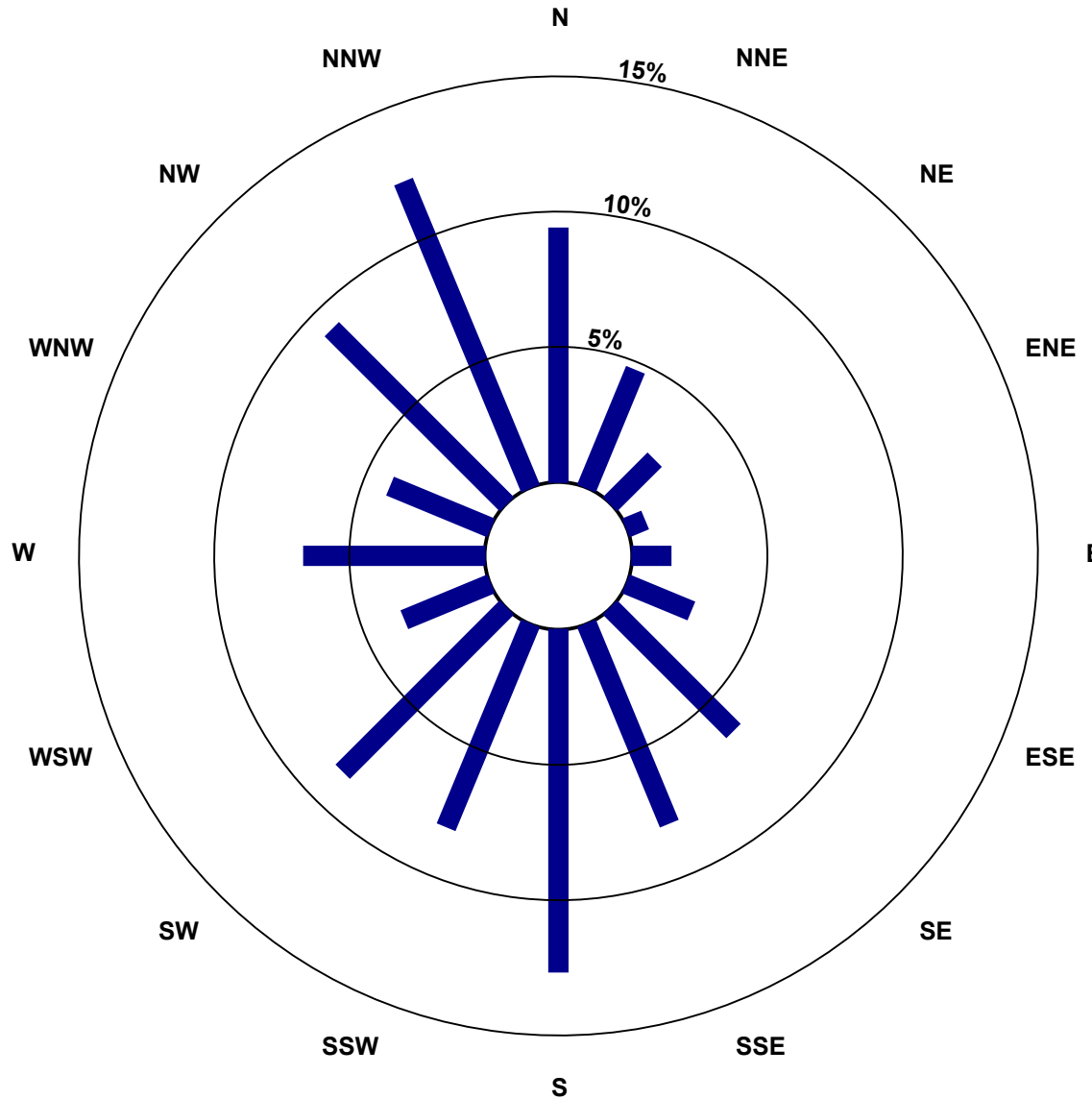
Total Number of Valid Hours: 704

Total Number of Hours: 744

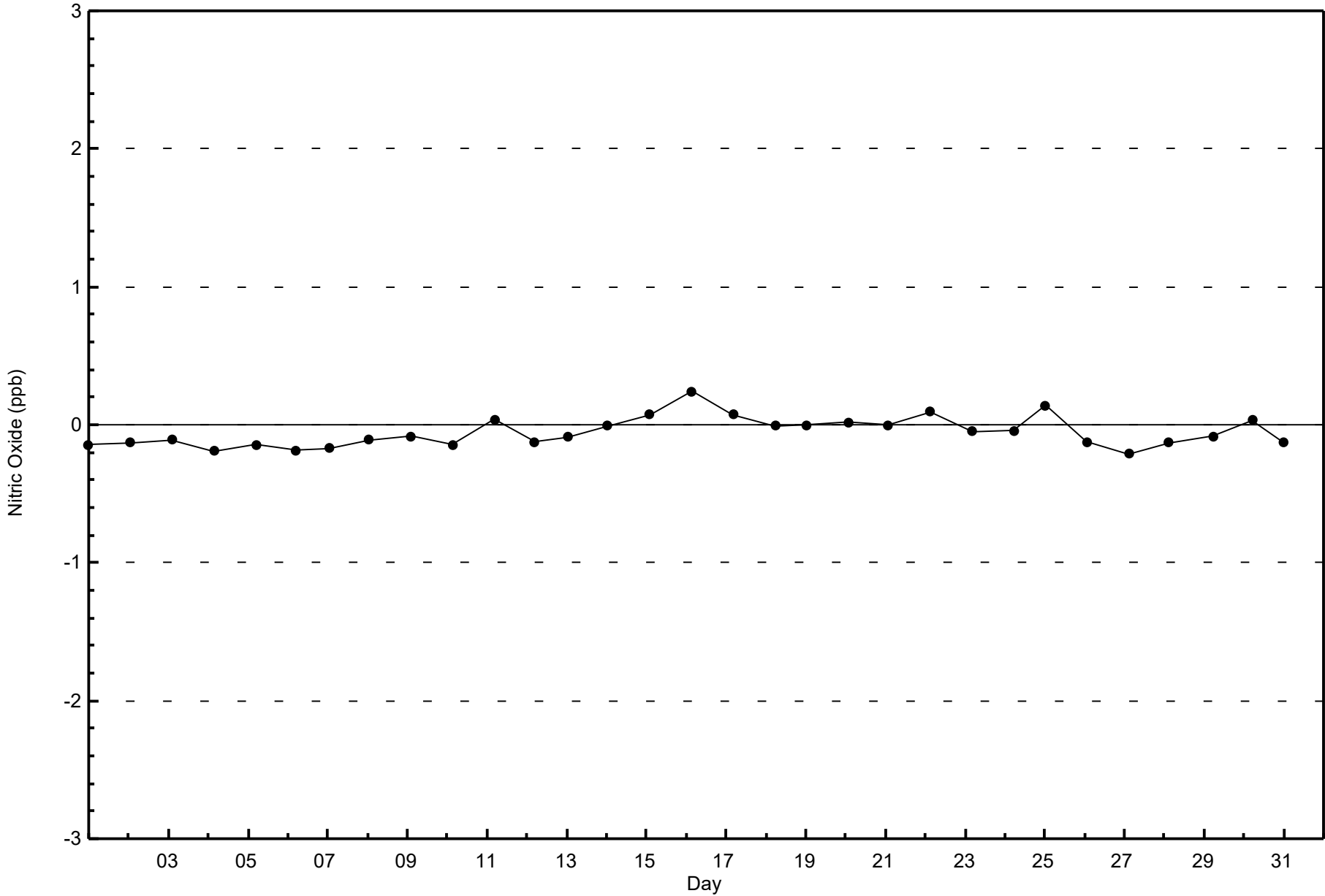


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Jackfish 1



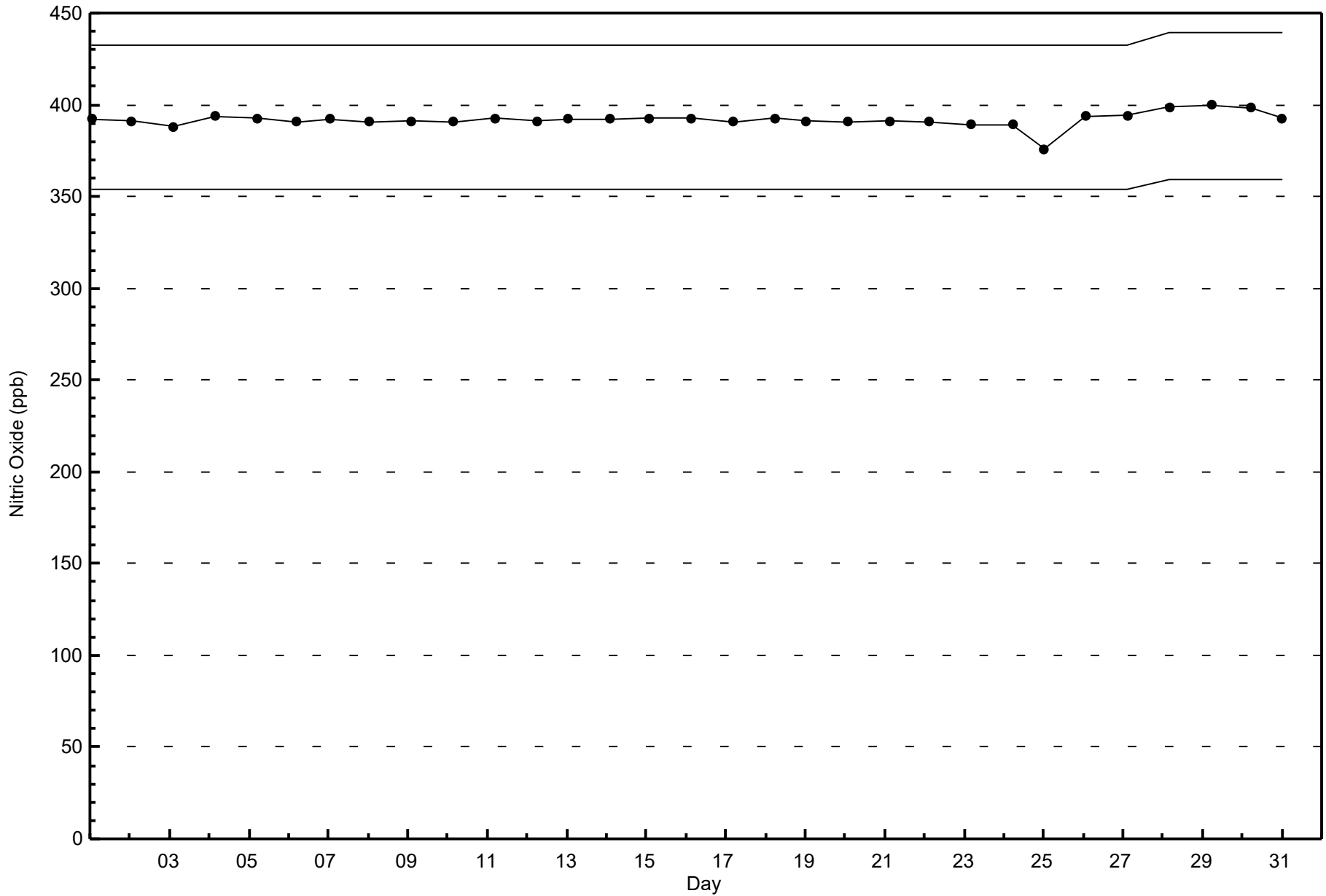
Total Number of Valid Hours: 704





Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Jackfish 1 - July 2023





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

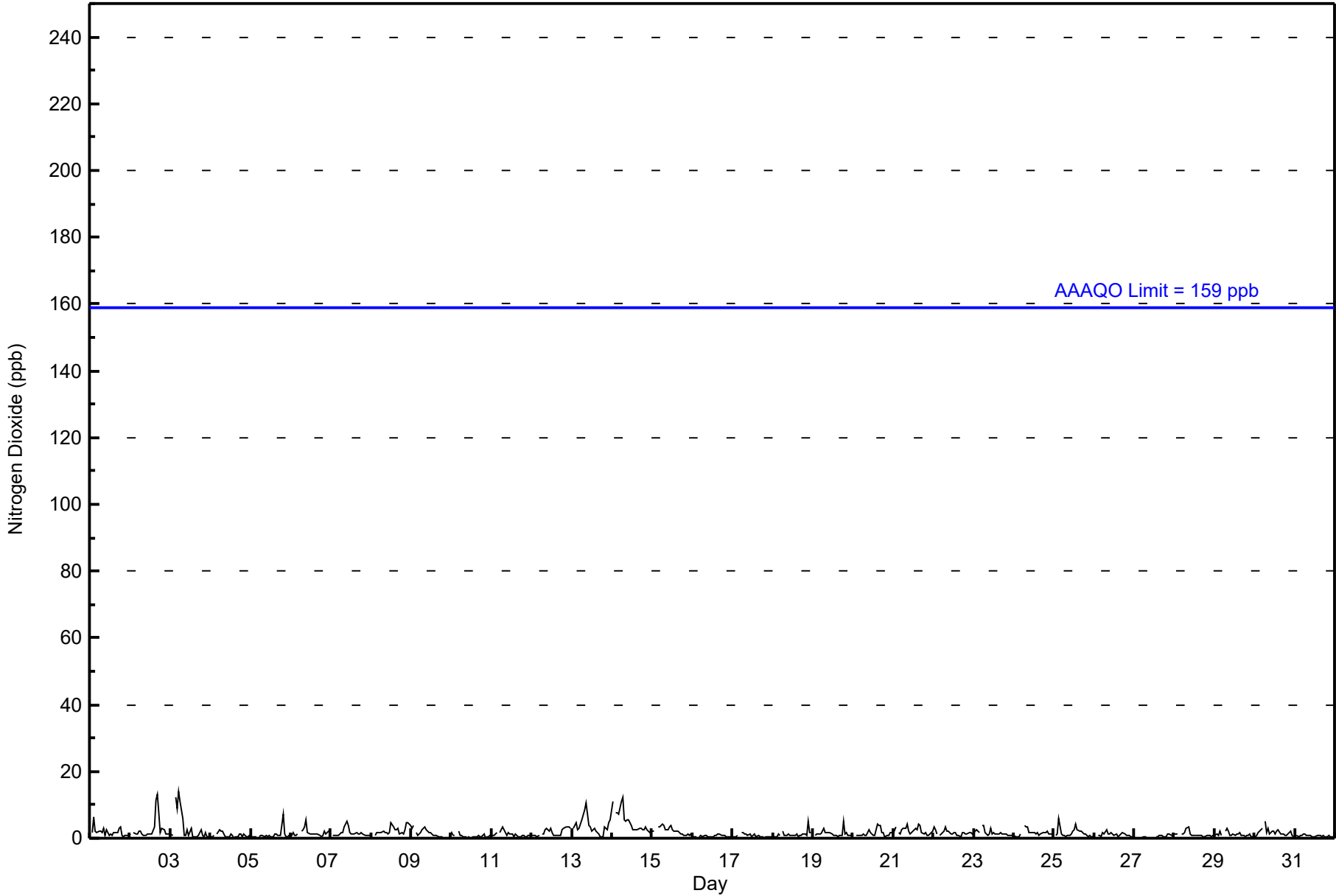
Jackfish 1 - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 744														Daily Average		Daily Maximum					
Maximum Value: 13.8 ppb on Jul 3 06:00		Maximum Daily Average: 4.9 ppb on Jul 14		Hours of Data: 708														Daily Average		Daily Maximum							
Minimum Value: 0.1 ppb on Jul 9 21:00		Minimum Daily Average: 0.5 ppb on Jul 27		Hours of Missing Data: 36														Daily Average		Daily Maximum							
Maximum Diurnal Average: 2.8 ppb at hour 7		Minimum Diurnal Average: 1.2 ppb at hour 23		Hours of Calibration: 36														Daily Average		Daily Maximum							
Monthly Average: 1.68 ppb		Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 0.7 Median = 1.2 Q ₃ = 2.0 P ₉₀ = 3.2 P ₉₉ = 10.9		Percent Operational Time: 100.0														Daily Average		Daily Maximum							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	1.5	6.3	2.1	1.6	2.1	2.0	1.7	3.0	0.9	2.5	0.7	1.3	0.8	1.5	1.5	1.5	2.9	3.4	0.7	0.5	0.9	1.0	1.0	1.8	6.3	
2-Jul	1.4	Z	1.8	1.1	1.1	2.0	2.1	1.3	0.9	0.7	1.2	1.2	1.4	1.4	3.2	11.4	13.1	7.5	1.9	2.8	2.4	1.4	1.3	1.4	2.8	13.1	
3-Jul	1.2	0.8	Z	12.2	8.7	13.8	11.0	6.0	0.8	1.0	2.4	0.7	3.1	0.5	0.4	0.3	0.6	0.8	2.7	0.8	0.4	1.6	0.6	0.4	3.1	13.8	
4-Jul	0.4	0.4	0.8	Z	1.4	2.5	2.2	2.1	1.1	0.4	0.4	0.5	1.4	0.8	0.2	0.4	0.5	1.4	1.2	0.5	1.4	0.6	0.5	0.8	1.0	2.5	
5-Jul	0.5	0.6	0.4	0.6	Z	0.6	0.7	0.7	0.6	0.7	0.6	0.7	0.6	0.6	1.1	1.4	0.8	0.8	0.8	7.2	1.4	0.5	0.5	1.0	1.0	7.2	
6-Jul	0.9	1.6	1.0	1.0	1.2	Z	2.2	2.5	3.3	5.4	1.5	1.1	1.3	1.3	1.4	1.2	1.2	0.8	0.6	0.7	2.3	1.4	2.2	2.0	1.7	5.4	
7-Jul	Z	0.8	0.8	1.0	0.9	1.3	1.7	1.6	3.2	5.1	4.0	1.7	1.4	1.2	1.1	1.5	1.3	1.1	1.8	1.1	0.9	0.7	0.7	0.7	1.5	5.1	
8-Jul	0.7	Z	0.9	1.6	1.5	1.6	1.5	2.1	1.8	1.6	1.1	1.5	4.7	3.3	2.7	2.5	3.1	1.4	1.6	1.2	2.7	4.5	4.8	4.0	2.3	4.8	
9-Jul	3.1	3.7	Z	1.7	1.0	1.9	2.4	3.1	3.2	2.7	1.9	1.5	1.4	1.0	0.8	0.7	0.5	0.6	0.4	0.2	0.1	0.1	0.1	0.7	1.4	3.7	
10-Jul	1.6	0.8	0.7	Z	2.0	0.7	0.7	0.6	0.3	0.2	0.3	0.1	0.2	0.3	0.3	0.4	0.7	0.5	0.3	1.3	0.2	0.3	0.5	0.7	0.6	2.0	
11-Jul	0.8	0.7	1.3	1.6	Z	1.5	3.2	2.7	1.9	1.0	1.9	1.1	1.2	0.4	1.1	0.8	0.6	0.6	0.8	0.7	0.6	0.6	0.7	0.8	1.2	3.2	
12-Jul	0.9	0.8	0.7	0.6	0.8	Z	1.2	1.4	2.4	3.1	2.3	3.1	1.5	0.7	0.7	0.9	0.8	1.0	2.7	3.1	3.4	3.3	3.5	3.0	1.8	3.5	
13-Jul	Z	3.0	4.6	2.7	3.0	4.2	5.6	8.3	10.8	7.1	3.9	3.6	2.2	2.9	2.2	1.6	1.1	0.6	0.6	3.2	2.8	2.7	4.6	5.3	3.8	10.8	
14-Jul	10.9	Z	7.6	7.6	7.2	11.1	12.3	5.7	5.2	5.5	5.4	3.8	2.5	2.5	2.6	2.7	2.8	2.9	2.7	2.7	3.4	2.5	1.9	2.3	4.9	12.3	
15-Jul	2.1	2.0	Z	3.4	3.2	3.8	4.1	3.8	2.6	2.6	3.3	3.9	2.6	2.3	2.3	2.1	1.7	1.3	1.1	0.8	0.7	1.2	0.7	1.3	2.3	4.1	
16-Jul	0.6	0.5	0.6	Z	0.4	0.7	0.6	0.8	0.8	0.6	0.5	0.5	0.5	0.7	0.7	1.3	1.4	0.8	0.8	0.8	0.6	0.5	0.4	0.5	0.7	1.4	
17-Jul	0.4	0.5	0.5	0.8	Z	1.5	1.8	1.3	1.4	0.7	1.1	0.5	0.7	1.1	0.6	1.0	0.6	0.3	0.3	0.2	0.3	0.4	0.6	0.3	0.7	1.8	
18-Jul	0.3	0.3	0.4	1.2	0.9	Z	2.1	0.7	0.8	1.4	1.0	0.9	1.0	0.8	1.2	0.6	0.7	0.7	1.3	1.1	1.0	5.0	1.7	1.5	1.2	5.0	
19-Jul	Z	0.8	1.1	1.1	1.1	1.2	2.8	1.5	1.7	1.9	1.6	1.1	1.0	0.9	1.0	0.6	0.8	1.0	5.0	1.4	1.5	1.0	0.9	0.7	1.4	5.0	
20-Jul	0.8	Z	0.8	0.9	0.9	0.9	1.4	0.8	1.0	2.4	1.8	1.3	0.8	1.0	4.3	3.8	3.8	1.7	1.5	0.6	0.7	0.9	1.7	1.8	1.5	4.3	
21-Jul	1.4	3.6	Z	1.8	1.3	2.6	2.8	2.8	4.1	2.2	1.1	1.6	2.6	3.0	2.5	4.3	4.0	1.9	1.3	1.8	1.0	1.0	1.1	2.2	2.3	4.3	
22-Jul	3.3	2.7	1.1	Z	1.0	1.6	2.0	3.5	2.1	2.1	1.4	1.4	1.5	1.5	0.8	0.9	0.6	1.5	1.9	1.1	1.2	1.6	1.8	1.3	1.6	3.5	
23-Jul	1.5	2.2	2.7	1.6	Z	3.7	3.8	1.9	0.9	1.2	2.9	1.4	1.5	1.4	1.3	1.2	1.8	1.3	1.3	1.1	1.0	0.9	0.9	0.7	1.7	3.8	
24-Jul	0.7	0.5	0.5	0.6	1.4	Z	3.8	3.2	3.5	1.6	1.6	1.9	1.5	1.2	1.5	1.0	1.2	1.5	1.7	1.5	2.2	1.4	1.4	1.2	1.6	3.8	
25-Jul	Z	1.0	1.1	6.0	1.2	0.9	1.0	0.6	0.9	0.7	1.1	2.1	2.4	4.1	2.6	2.2	2.2	1.7	1.3	1.1	0.6	0.9	0.5	0.6	1.6	6.0	
26-Jul	0.7	Z	0.9	0.9	0.6	1.6	1.3	2.4	1.1	1.4	1.8	1.4	0.7	1.2	0.6	0.8	1.1	1.6	1.2	1.0	0.9	0.8	0.4	0.3	1.1	2.4	
27-Jul	0.2	0.2	Z	0.2	0.2	0.4	0.3	0.3	C	C	C	C	C	0.5	0.5	0.9	0.8	0.3	0.3	0.5	1.1	1.3	0.8	0.9	0.5	1.3	
28-Jul	1.3	1.3	1.1	Z	1.3	1.3	1.9	2.8	3.3	1.2	0.8	0.7	0.8	0.9	1.0	0.8	0.8	0.6	0.6	0.7	0.8	0.8	0.5	0.7	1.1	3.3	
29-Jul	0.7	1.3	0.8	2.3	0.8	Z	2.3	3.0	2.2	0.7	0.7	1.1	0.7	1.3	1.2	1.8	0.9	0.7	0.6	0.8	0.7	1.2	0.5	0.4	1.2	3.0	
30-Jul	0.5	0.7	1.6	2.2	2.9	Z	4.9	1.9	3.1	1.1	2.0	2.3	1.1	2.0	2.7	1.2	1.1	1.1	0.8	0.9	1.1	2.0	0.9	0.6	1.7	4.9	
31-Jul	Z	0.7	0.5	0.8	0.7	1.2	1.3	0.9	0.7	1.0	0.6	0.6	0.6	0.7	0.7	0.7	0.6	0.8	0.6	0.5	1.0	0.5	0.5	0.5	0.7	1.3	
		1.5	1.3	1.6	2.2	1.8	2.6	2.8	2.3	2.3	1.9	1.8	1.5	1.5	1.4	1.4	1.7	1.7	1.3	1.4	1.4	1.3	1.4	1.2	1.3	Diurnal Average	
		10.9	3.7	7.6	12.2	8.7	13.8	12.3	8.3	10.8	7.1	5.4	3.9	4.7	4.1	4.3	11.4	13.1	7.5	5.0	7.2	3.4	5.0	4.8	5.3	Diurnal Maximum	
Z - zerospan		C - Calibration																									
Alberta Ambient Air Quality Objectives (AAAQO):		1-hr 159 ppb																									



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Jackfish 1 - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Jackfish 1 - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	708	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Jackfish 1 - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	66	33	16	5	10	18	45	56	89	57	60	24	47	28	64	86	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	66	33	16	5	10	18	45	56	89	57	60	24	47	28	64	86	704

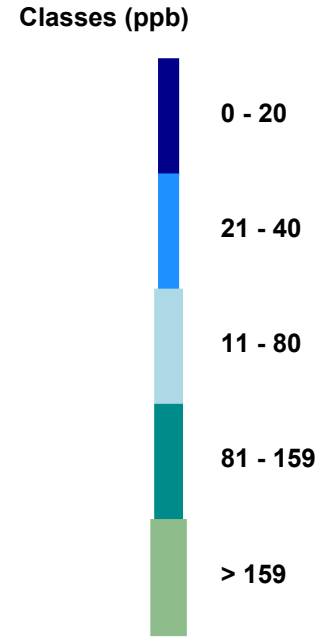
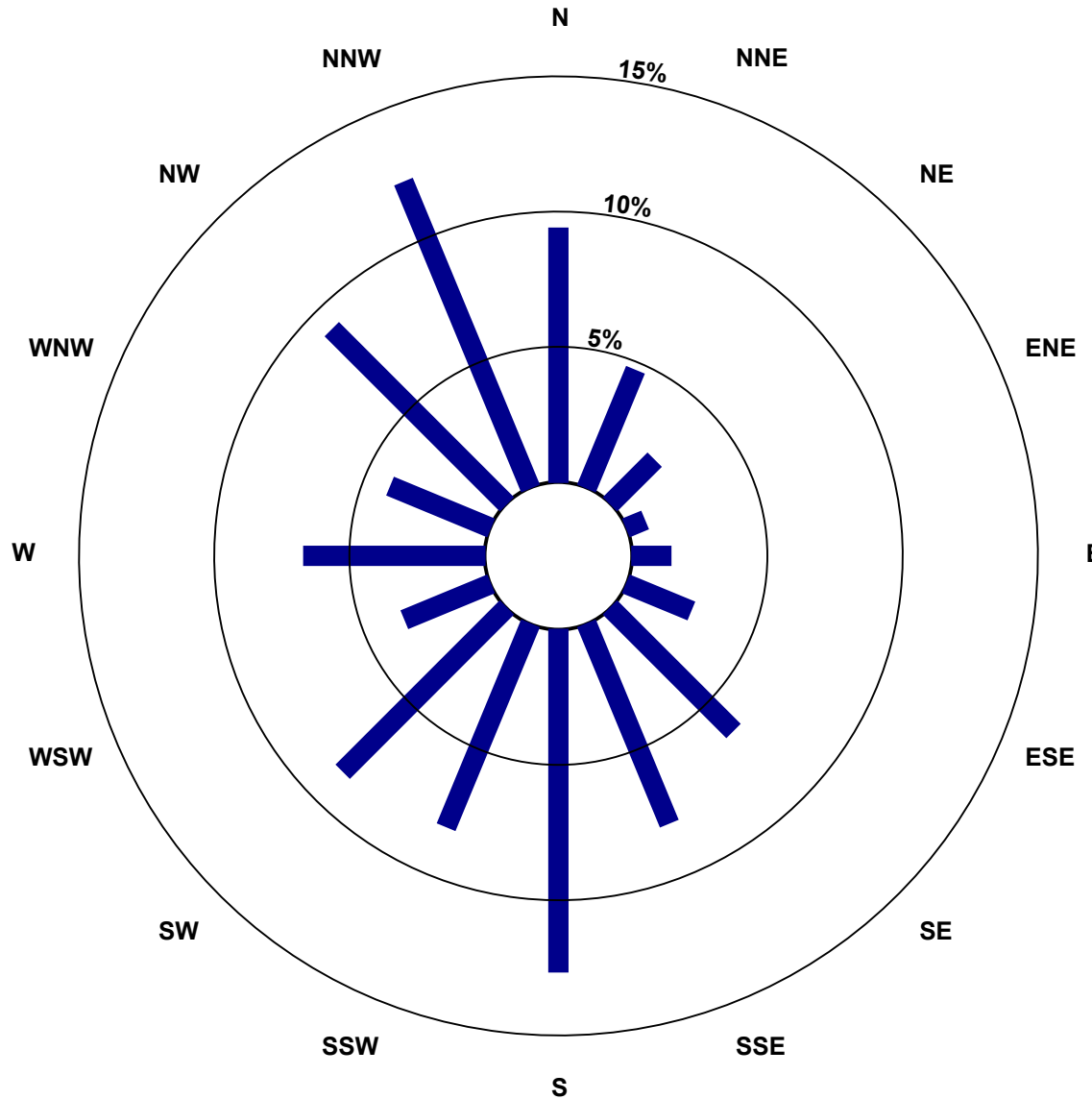
Total Number of Valid Hours: 704

Total Number of Hours: 744

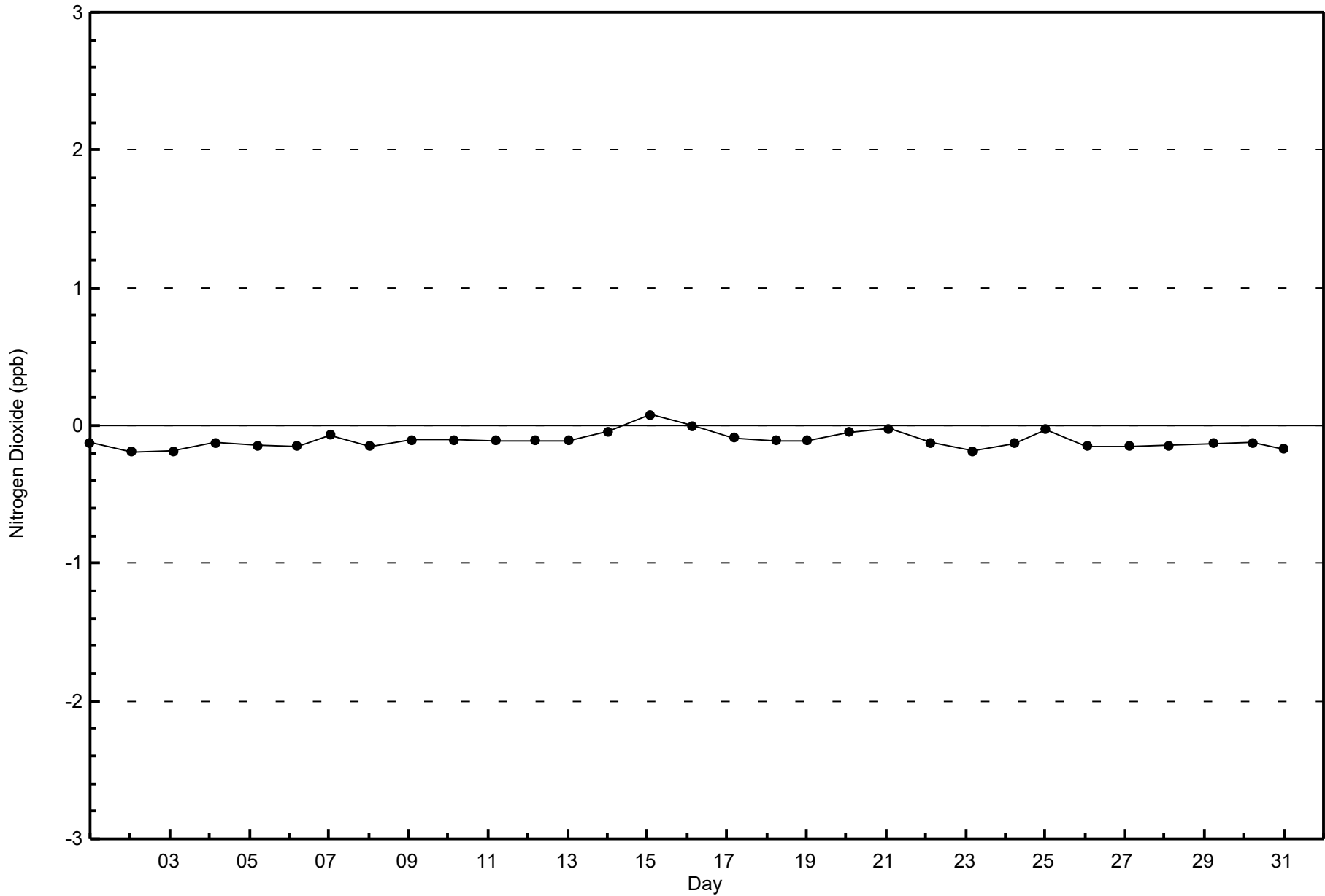


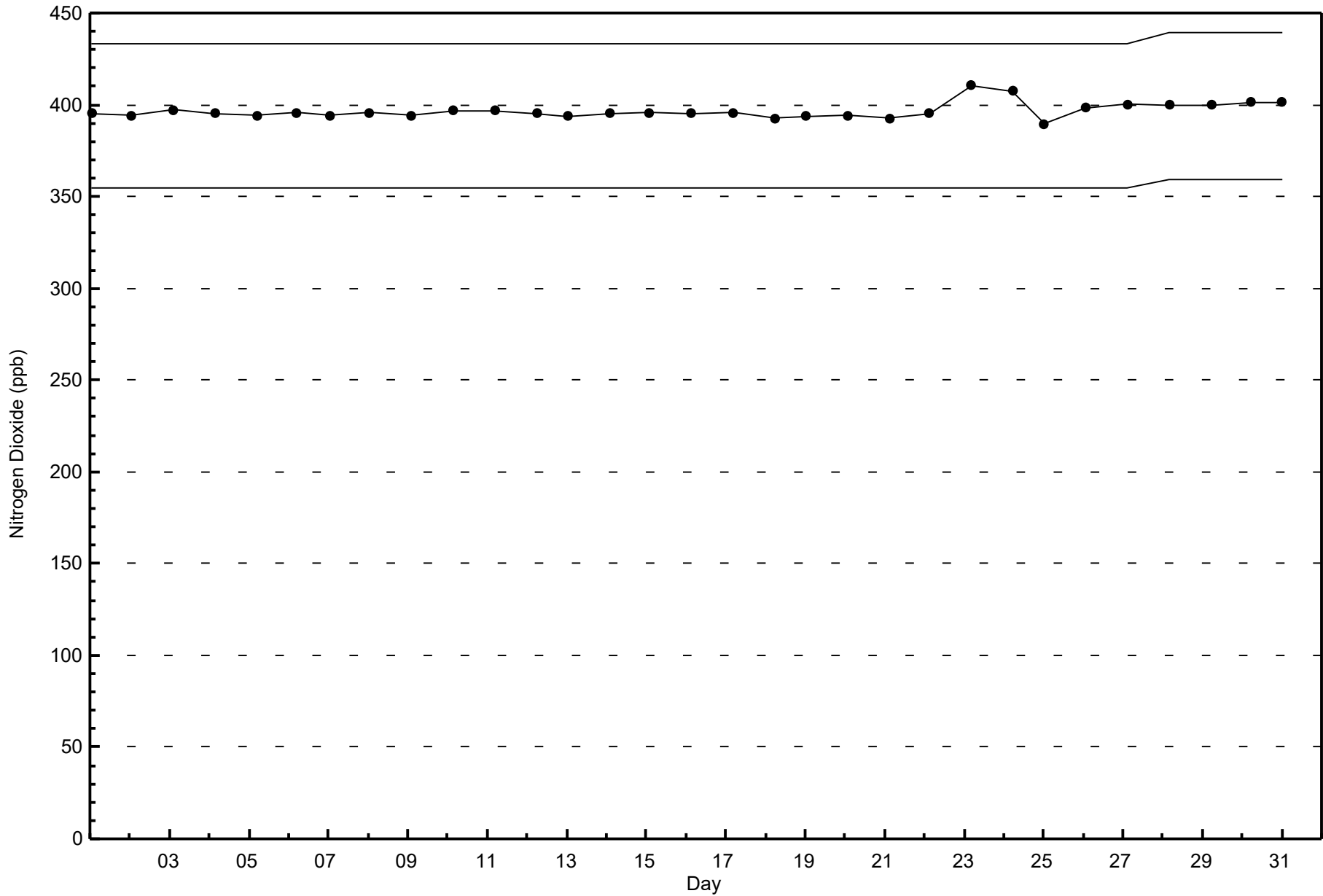
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Jackfish 1



Total Number of Valid Hours: 704







Wood Buffalo Environmental Association
Summary of Hour Averages

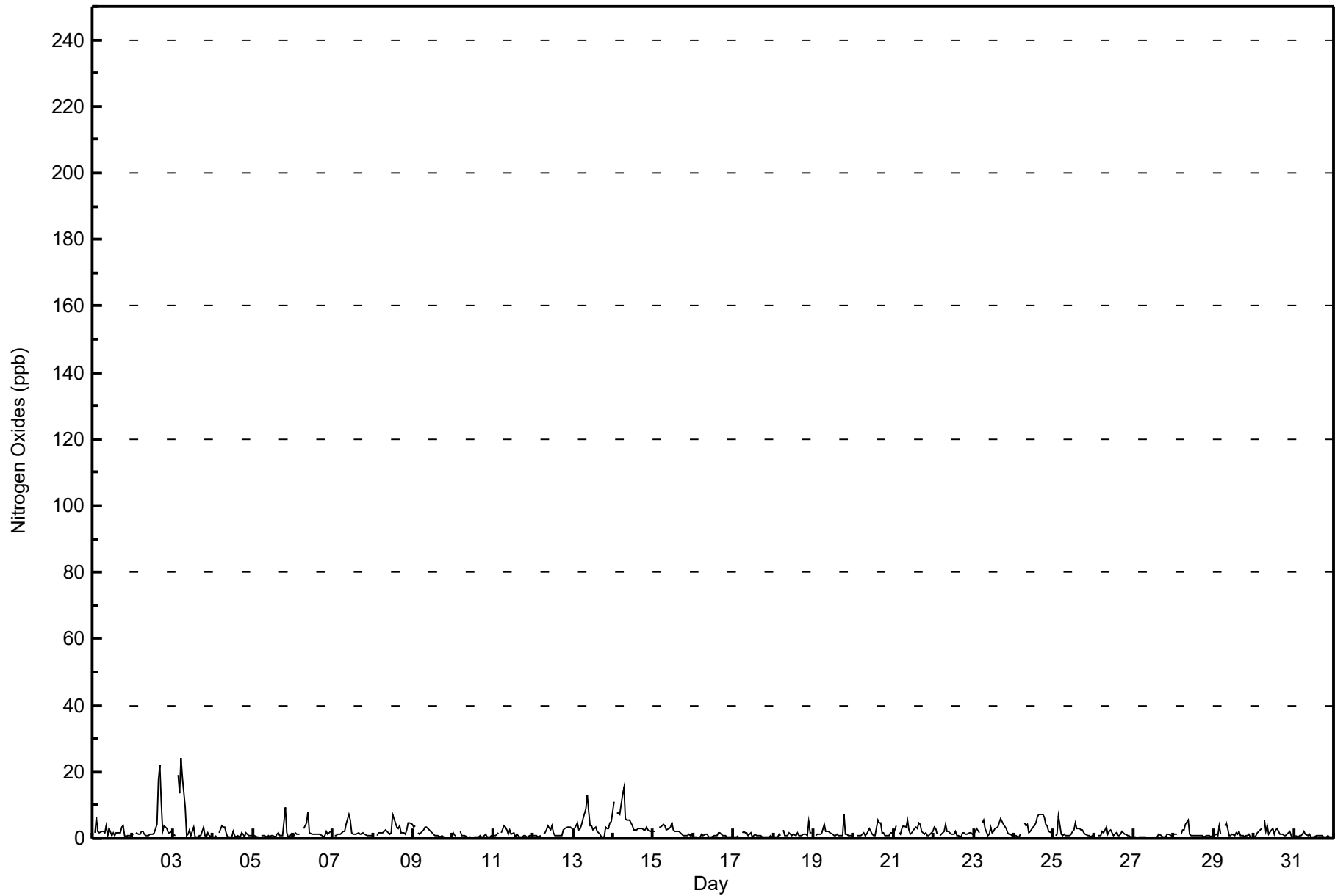
Nitrogen Oxides (NO_x) - ppb
Jackfish 1 - July 2023

Maximum Value: 24.2 ppb on Jul 3 06:00		Maximum Daily Average: 5.2 ppb on Jul 14		Hours in Service: 744																							
Minimum Value: 0.1 ppb on Jul 10 12:00		Minimum Daily Average: 0.6 ppb on Jul 27		Hours of Data: 708																							
Maximum Diurnal Average: 3.6 ppb at hour 7		Minimum Diurnal Average: 1.3 ppb at hour 23		Hours of Missing Data: 36																							
Monthly Average: 2.03 ppb		Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 0.8 Median = 1.3 Q ₃ = 2.4 P ₉₀ = 4.1 P ₉₉ = 13.3		Hours of Calibration: 36																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	Z	1.5	6.3	2.1	1.7	2.2	2.2	1.8	3.6	1.0	2.9	0.7	1.5	0.9	1.7	1.8	1.7	3.6	4.0	0.7	0.5	0.9	1.0	1.0	2.0	6.3	
2-Jul	1.4	Z	1.8	1.1	1.1	2.1	2.3	1.4	0.9	0.7	1.2	1.2	1.5	1.6	4.2	17.4	22.0	11.2	2.3	3.6	3.1	1.7	1.7	2.0	3.8	22.0	
3-Jul	1.4	1.0	Z	19.2	13.5	24.2	18.2	9.4	0.9	1.1	2.7	0.8	3.4	0.6	0.5	0.4	0.8	0.9	3.4	0.8	0.4	1.6	0.7	0.5	4.6	24.2	
4-Jul	0.5	0.5	0.9	Z	1.7	3.6	3.6	3.3	1.5	0.5	0.4	0.6	2.0	1.0	0.2	0.6	0.6	1.8	1.4	0.5	1.5	0.8	0.7	1.0	1.3	3.6	
5-Jul	0.7	0.7	0.5	0.6	Z	0.7	0.8	0.8	0.6	0.7	0.6	0.7	0.6	0.6	1.2	1.6	0.8	0.8	0.8	0.8	9.2	1.5	0.6	0.6	1.1	1.2	9.2
6-Jul	1.0	1.7	1.1	1.1	1.3	Z	2.8	3.6	4.6	8.1	1.7	1.2	1.4	1.3	1.5	1.3	1.3	0.8	0.6	0.7	2.3	1.4	2.2	2.0	2.0	8.1	
7-Jul	Z	0.9	0.9	1.2	1.1	1.7	2.3	2.1	4.4	7.0	5.4	1.8	1.4	1.2	1.2	1.6	1.4	1.2	1.9	1.1	0.9	0.8	0.8	0.7	1.9	7.0	
8-Jul	0.7	Z	0.9	1.6	1.5	1.7	1.6	2.4	2.1	1.7	1.2	1.7	7.3	4.5	3.5	2.9	3.7	1.5	1.6	1.2	2.7	4.5	4.8	4.0	2.6	7.3	
9-Jul	3.2	3.7	Z	1.7	1.1	2.0	2.6	3.5	3.5	2.9	2.0	1.5	1.4	1.1	0.9	1.0	0.6	0.7	0.5	0.3	0.2	0.1	0.1	0.8	1.5	3.7	
10-Jul	1.7	0.9	0.8	Z	2.1	0.8	0.9	1.0	0.4	0.2	0.3	0.1	0.2	0.3	0.3	0.4	0.8	0.5	0.3	1.3	0.2	0.4	0.6	0.7	0.7	2.1	
11-Jul	0.8	0.7	1.3	1.6	Z	1.5	3.8	3.5	2.4	1.1	2.4	1.3	1.6	0.4	1.2	0.8	0.6	0.6	0.8	0.7	0.6	0.6	0.7	0.8	1.3	3.8	
12-Jul	0.9	0.8	0.7	0.6	0.8	Z	1.3	1.5	2.7	3.9	2.7	3.6	1.7	0.7	0.7	0.9	0.8	1.0	2.7	3.1	3.4	3.3	3.5	3.0	1.9	3.9	
13-Jul	Z	3.0	4.6	2.7	3.0	4.3	5.8	9.1	13.3	7.8	3.9	3.9	2.3	3.4	2.3	1.6	1.1	0.6	0.6	3.3	2.8	2.8	4.8	5.3	4.0	13.3	
14-Jul	11.2	Z	7.6	7.6	7.2	13.1	15.3	6.0	5.5	5.7	5.6	3.9	2.5	2.7	2.7	2.8	2.8	2.9	2.7	2.7	3.4	2.5	1.9	2.3	5.2	15.3	
15-Jul	2.1	2.0	Z	3.4	3.2	3.9	4.3	4.0	2.7	2.9	3.5	4.6	2.7	2.3	2.3	2.1	1.7	1.3	1.1	0.8	0.7	1.2	0.7	1.3	2.4	4.6	
16-Jul	0.6	0.5	0.6	Z	0.4	1.2	0.9	1.1	1.1	0.6	0.5	0.5	0.7	0.8	0.8	1.5	1.5	0.8	0.8	0.8	0.6	0.5	0.4	0.5	0.8	1.5	
17-Jul	0.4	0.5	0.5	0.8	Z	1.6	2.1	1.6	1.8	0.8	1.6	0.5	0.8	1.3	0.7	1.0	0.7	0.3	0.3	0.2	0.3	0.4	0.7	0.3	0.8	2.1	
18-Jul	0.3	0.3	0.4	1.2	0.9	Z	2.5	0.9	0.9	1.6	1.3	1.0	1.4	0.9	1.6	0.6	0.7	0.7	1.3	1.1	1.0	5.2	1.8	1.5	1.3	5.2	
19-Jul	Z	0.8	1.1	1.1	1.1	1.3	4.1	1.9	2.1	2.3	1.8	1.1	1.0	0.9	1.1	0.6	0.8	1.0	7.1	1.4	1.5	1.0	0.9	0.7	1.6	7.1	
20-Jul	0.8	Z	0.8	0.9	0.9	1.2	1.8	0.9	1.1	2.9	2.2	1.3	0.8	1.0	5.5	4.6	4.5	1.8	1.5	0.6	0.7	0.9	1.7	1.8	1.8	5.5	
21-Jul	1.4	3.6	Z	1.8	1.4	3.0	3.6	3.4	5.5	2.6	1.3	1.8	2.9	3.3	2.9	4.7	4.3	1.9	1.3	1.8	1.0	1.0	1.1	2.2	2.5	5.5	
22-Jul	3.5	2.9	1.1	Z	1.0	1.9	2.3	4.4	2.2	2.2	1.4	1.4	1.5	2.0	0.8	0.9	0.6	1.5	1.9	1.1	1.2	1.6	1.8	1.3	1.8	4.4	
23-Jul	1.5	2.2	2.9	1.6	Z	4.8	5.5	3.1	0.9	1.3	3.6	1.6	2.3	2.8	3.6	4.5	6.0	5.2	4.4	2.9	1.9	1.2	1.1	0.9	2.9	6.0	
24-Jul	0.8	0.6	0.6	0.6	1.4	Z	4.7	3.9	4.3	1.7	2.1	3.3	3.8	4.7	6.5	7.1	7.4	7.3	6.2	4.3	3.8	2.1	1.7	1.3	3.5	7.4	
25-Jul	Z	1.0	1.1	6.7	1.2	0.9	1.1	0.6	1.0	0.7	1.1	2.2	2.6	4.9	3.0	2.8	2.7	2.5	1.8	1.3	0.7	0.9	0.5	0.6	1.8	6.7	
26-Jul	0.7	Z	0.9	0.9	0.6	2.2	1.6	3.4	1.5	2.0	2.4	1.7	1.0	1.7	0.8	1.0	1.4	1.9	1.4	1.1	1.0	0.9	0.4	0.3	1.3	3.4	
27-Jul	0.2	0.2	Z	0.2	0.2	0.5	0.4	0.3	C	C	C	C	C	0.5	0.5	1.1	1.0	0.3	0.3	0.5	1.1	1.3	0.8	0.9	0.6	1.3	
28-Jul	1.3	1.3	1.1	Z	1.3	2.6	2.3	4.2	5.4	1.5	0.9	0.7	0.8	0.9	1.0	0.8	0.8	0.7	0.6	0.7	0.8	0.8	0.5	0.7	1.4	5.4	
29-Jul	0.7	1.4	0.8	4.0	1.2	Z	3.9	4.7	2.9	0.7	0.7	1.1	0.8	1.6	1.4	2.1	0.9	0.7	0.6	0.8	0.7	1.3	0.5	0.4	1.5	4.7	
30-Jul	0.5	0.7	1.6	2.2	2.9	Z	5.7	2.3	3.9	1.3	2.6	2.9	1.2	2.4	3.2	1.3	1.2	1.2	0.8	0.9	1.1	2.0	0.9	0.6	1.9	5.7	
31-Jul	Z	0.7	0.5	0.8	0.7	1.3	2.0	1.2	0.8	1.1	0.6	0.6	0.6	0.7	0.7	0.7	0.6	0.8	0.6	0.5	1.0	0.5	0.5	0.5	0.8	2.0	
																								Diurnal Average			
																								Diurnal Maximum			
																								1.5 1.3 1.6 2.6 2.0 3.4 3.6 2.9 2.8 2.3 2.0 1.6 1.8 1.7 1.9 2.3 2.4 1.9 1.8 1.6 1.4 1.5 1.3 1.3			
																								11.2 3.7 7.6 19.2 13.5 24.2 18.2 9.4 13.3 8.1 5.6 4.6 7.3 4.9 6.5 17.4 22.0 11.2 7.1 9.2 3.8 5.2 4.8 5.3			
Z - zerospan C - Calibration																											



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Jackfish 1 - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Jackfish 1 - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	99.72	99.72
21 - 40	2	0.28	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Jackfish 1 - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	66	33	16	5	10	18	45	56	89	57	60	24	47	28	62	86	702
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	66	33	16	5	10	18	45	56	89	57	60	24	47	28	64	86	704

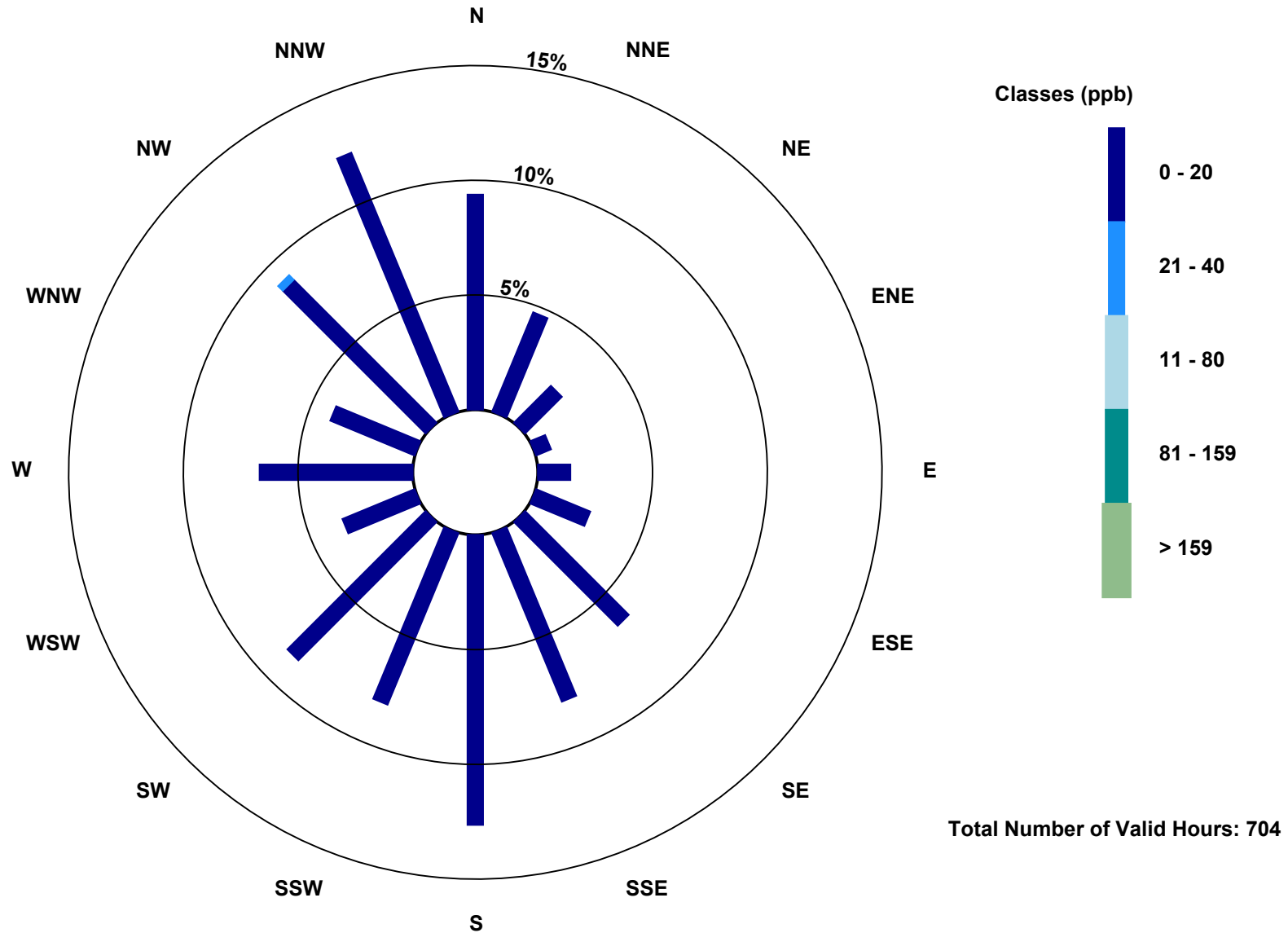
Total Number of Valid Hours: 704

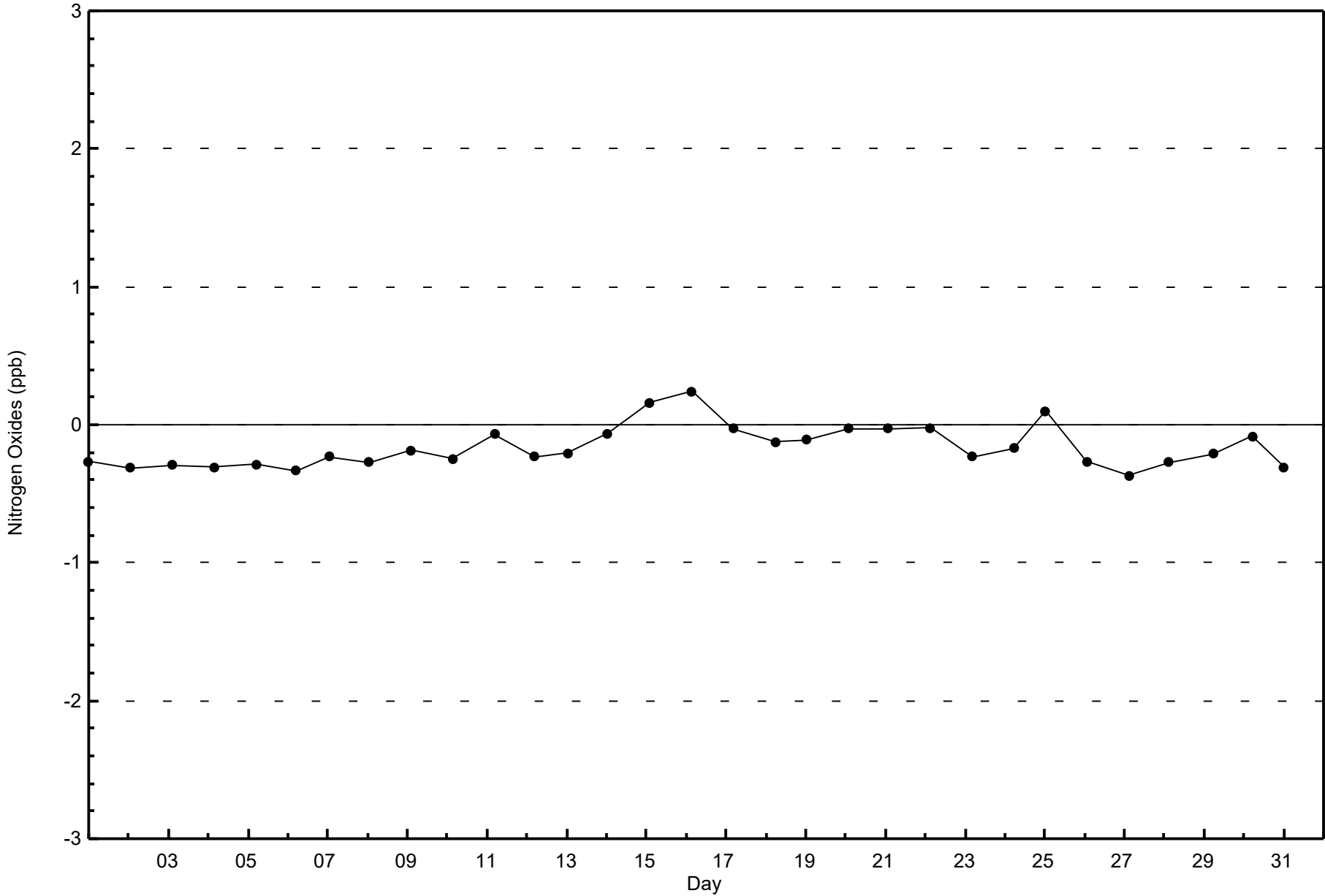
Total Number of Hours: 744

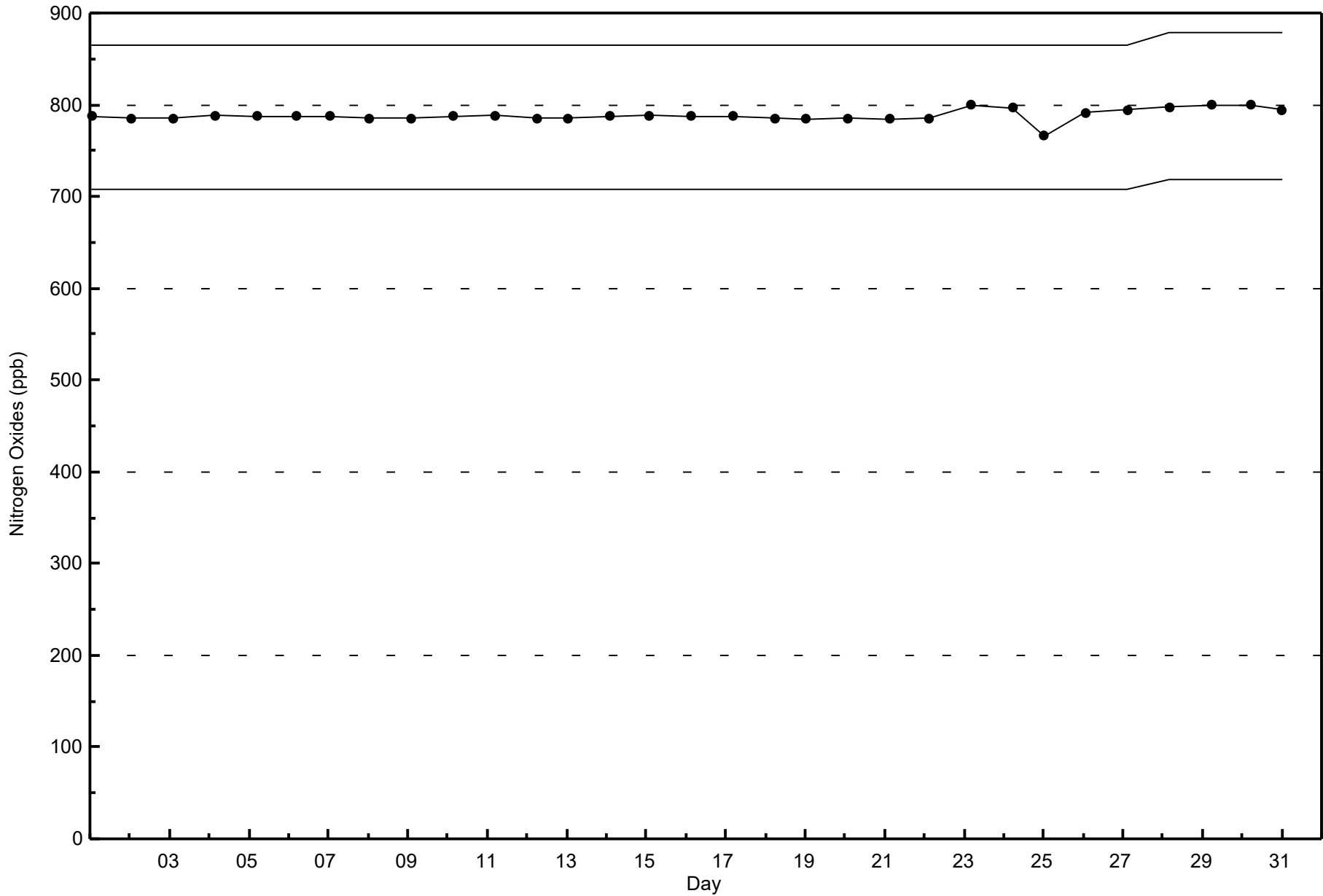


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Jackfish 1









Wood Buffalo Environmental Association
Summary of Hour Averages

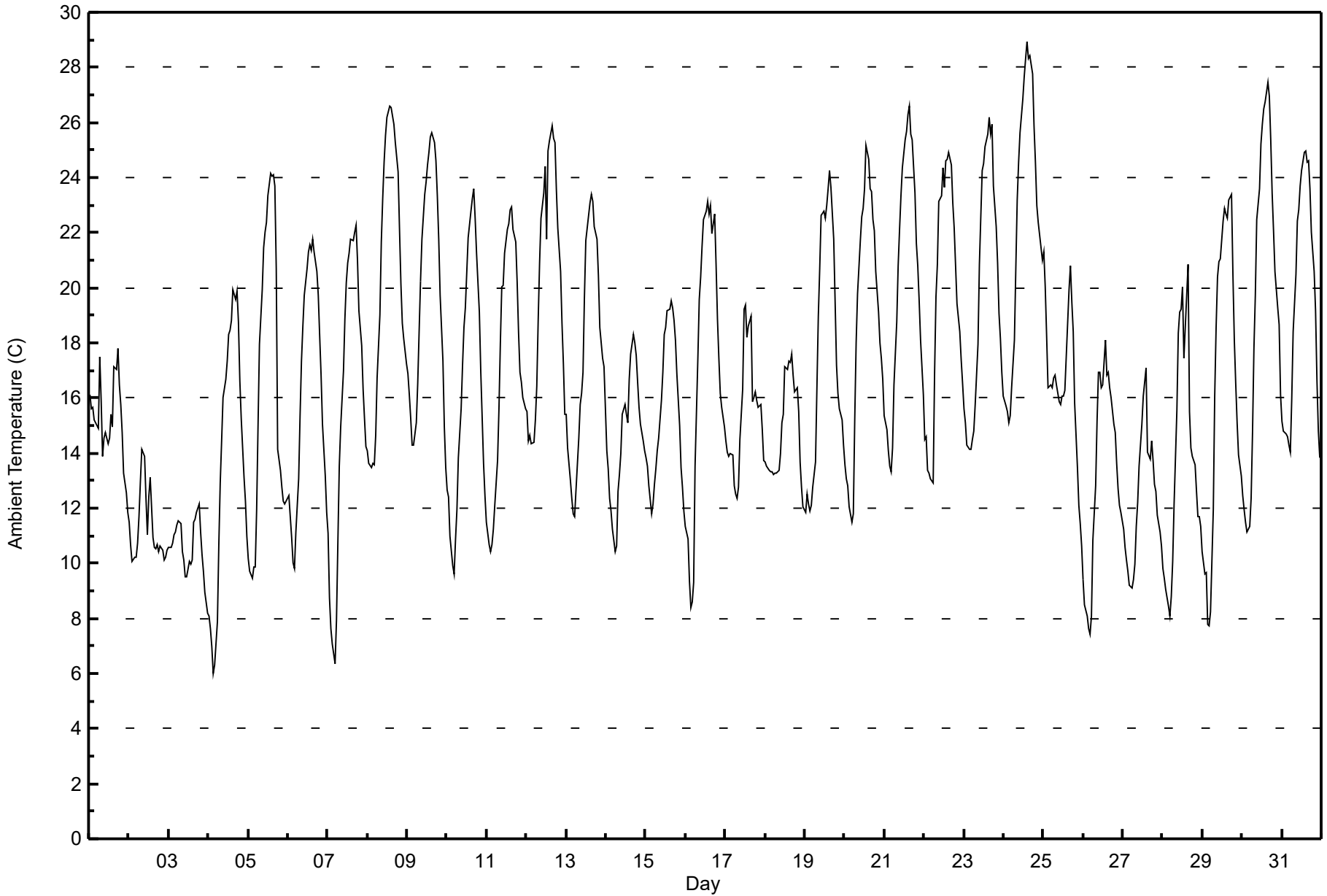
Ambient Temperature (AT) - C
Jackfish 1 - July 2023

Maximum Value: 28.9 C on Jul 24 15:00 Maximum Daily Average: 22.5 C on Jul 24																				Hours in Service: 744 Hours of Data: 744																												
Minimum Value: 6.0 C on Jul 4 04:00 Minimum Daily Average: 10.6 C on Jul 3 Maximum Diurnal Average: 21.6 C at hour 16 Minimum Diurnal Average: 11.5 C at hour 5 Monthly Average: 16.75 C Percentiles: P ₁ = 7.6 P ₁₀ = 10.6 Q ₁ = 12.9 Median = 16.1 Q ₃ = 20.8 P ₉₀ = 23.6 P ₉₉ = 26.9																				Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jul	16.1	15.6	15.6	15.2	15.1	14.9	17.5	15.9	13.9	14.6	14.8	14.3	14.5	15.4	14.9	17.1	17.0	17.8	16.5	15.8	14.7	13.3	12.6	11.8	15.2	17.8																						
2-Jul	11.5	10.7	10.1	10.2	10.2	10.7	11.7	13.0	14.1	13.9	12.4	11.1	12.4	13.1	10.9	10.6	10.5	10.7	10.4	10.7	10.5	10.1	10.2	10.5	11.3	14.1																						
3-Jul	10.6	10.6	10.7	11.1	11.1	11.4	11.6	11.5	10.4	10.1	9.5	9.5	10.1	10.0	10.1	11.5	11.6	11.8	12.2	11.2	10.3	9.7	9.0	8.2	10.6	12.2																						
4-Jul	8.1	7.6	7.0	6.0	6.3	7.9	10.7	12.9	14.5	16.0	16.7	17.3	18.3	18.5	18.8	19.9	19.6	19.9	18.7	16.6	15.3	13.1	12.2	11.0	13.9	19.9																						
5-Jul	10.2	9.7	9.5	9.8	9.9	11.9	15.0	17.9	20.0	21.5	22.0	22.4	23.3	24.1	24.1	24.1	23.7	20.7	14.2	13.4	12.8	12.3	12.2	12.3	16.5	24.1																						
6-Jul	12.4	11.7	10.9	10.0	9.8	11.1	13.0	15.4	17.3	18.6	19.7	20.7	21.3	21.6	21.4	21.8	21.3	20.6	19.7	18.3	16.8	15.0	13.2	11.9	16.4	21.8																						
7-Jul	11.1	8.8	7.6	7.1	6.4	7.9	10.8	13.5	15.0	17.0	18.9	20.2	20.9	21.2	21.8	21.7	22.0	22.2	21.0	19.2	17.9	16.3	15.3	14.3	15.7	22.2																						
8-Jul	14.1	13.6	13.5	13.6	13.6	14.6	16.7	19.0	21.6	23.3	24.5	25.5	26.2	26.6	26.5	26.2	26.0	25.2	24.2	22.1	20.1	18.7	18.2	17.3	20.5	26.6																						
9-Jul	16.9	16.1	15.2	14.3	14.3	15.1	16.5	18.4	20.2	21.8	23.4	23.8	24.4	24.9	25.5	25.6	25.3	24.6	23.4	21.8	19.7	17.4	14.9	13.5	19.9	25.6																						
10-Jul	12.7	12.4	11.0	9.9	9.6	10.9	12.0	13.8	15.6	17.2	18.6	19.3	20.5	21.8	22.8	23.3	23.6	22.5	21.2	19.1	17.0	15.3	13.6	12.5	16.5	23.6																						
11-Jul	11.5	10.7	10.4	10.7	11.3	12.1	13.7	15.6	18.0	20.0	20.1	21.3	22.1	22.3	22.8	22.9	22.1	21.7	20.2	18.3	16.9	16.6	16.0	15.6	17.2	22.9																						
12-Jul	15.5	14.4	14.6	14.4	14.4	15.2	16.4	18.8	20.9	22.5	23.5	24.4	21.8	24.9	25.3	25.9	25.4	25.3	23.5	22.1	20.6	18.7	17.2	15.4	20.0	25.9																						
13-Jul	15.4	14.2	13.0	12.4	11.8	11.7	12.7	14.5	15.8	16.2	16.9	19.6	21.7	22.6	23.1	23.4	23.1	22.2	21.8	20.4	18.6	18.0	17.4	17.1	17.7	23.4																						
14-Jul	14.1	13.4	12.3	11.9	11.2	10.4	10.7	12.6	13.2	14.0	15.4	15.7	15.4	15.1	16.7	17.6	18.3	18.0	17.5	16.6	15.6	15.1	14.5	14.1	14.6	18.3																						
15-Jul	13.8	13.5	12.8	11.8	12.2	12.9	13.4	14.1	14.5	15.9	16.9	18.3	18.6	19.2	19.2	19.5	19.3	18.8	18.1	16.9	15.0	13.5	12.8	11.9	15.5	19.5																						
16-Jul	11.3	10.9	9.3	8.4	8.6	9.3	13.5	17.4	19.6	20.4	21.5	22.5	22.8	23.1	22.7	23.0	21.9	22.7	20.9	18.9	17.4	16.2	15.6	15.0	17.2	23.1																						
17-Jul	14.4	14.0	13.9	14.0	13.9	12.8	12.5	12.4	12.8	14.5	16.3	19.2	19.4	18.2	18.6	18.9	15.9	16.0	16.2	15.9	15.7	15.8	14.9	13.7	15.4	19.4																						
18-Jul	13.7	13.5	13.4	13.3	13.3	13.2	13.3	13.3	13.4	14.0	15.1	15.4	17.1	17.0	17.3	17.3	17.6	16.8	16.2	16.3	15.5	13.7	12.8	12.0	14.8	17.6																						
19-Jul	11.8	12.5	12.2	11.9	12.1	12.8	13.7	16.4	19.0	20.7	22.6	22.8	22.5	23.0	23.6	24.2	23.6	21.8	19.5	17.2	16.2	15.6	15.2	14.3	17.7	24.2																						
20-Jul	13.6	13.1	12.8	12.0	11.5	11.8	15.2	18.0	19.8	21.7	22.6	22.9	23.6	25.2	24.7	23.6	23.5	22.5	22.0	20.6	19.1	18.0	17.4	16.7	18.8	25.2																						
21-Jul	15.4	14.8	14.1	13.5	13.3	14.2	16.5	18.8	20.8	22.1	23.3	24.3	25.4	25.7	26.3	26.6	25.6	25.4	23.4	21.6	20.8	19.5	18.1	16.1	20.2	26.6																						
22-Jul	14.5	14.6	13.4	13.3	13.1	12.9	16.9	19.7	20.9	23.1	23.4	24.3	23.7	24.6	24.6	24.9	24.4	23.1	22.2	20.8	19.4	18.4	17.4	16.5	19.6	24.9																						
23-Jul	15.6	15.1	14.3	14.1	14.1	14.5	14.8	15.8	18.0	20.8	22.6	24.2	24.5	25.1	25.6	26.2	25.6	25.9	23.7	22.2	20.9	19.1	18.1	16.9	19.9	26.2																						
24-Jul	16.1	15.7	15.5	15.1	15.3	16.4	18.1	20.7	23.2	24.5	25.6	26.9	27.7	28.3	28.9	28.3	28.4	27.8	25.9	24.5	23.0	22.4	21.5	21.0	22.5	28.9																						
25-Jul	21.3	20.0	18.2	16.4	16.5	16.4	16.7	16.8	16.5	15.9	15.8	16.1	16.1	16.3	17.5	19.9	20.8	19.5	18.4	15.8	13.5	12.1	11.4	10.6	16.6	21.3																						
26-Jul	9.4	8.5	8.1	7.6	7.4	8.1	10.9	12.8	15.2	16.9	16.9	16.4	16.5	18.1	16.8	16.9	16.4	16.0	15.0	14.7	13.6	12.7	12.1	11.9	13.3	18.1																						
27-Jul	11.2	10.6	10.1	9.7	9.2	9.1	9.4	10.0	11.3	12.2	13.5	15.1	16.0	16.6	17.1	14.0	13.8	14.4	13.7	12.9	12.6	11.8	11.1	10.6	12.3	17.1																						
28-Jul	9.8	9.5	9.0	8.4	8.1	8.8	10.1	12.1	15.5	18.4	19.1	19.2	20.0	17.4	19.8	20.9	15.5	14.2	13.9	13.6	12.6	11.7	11.7	11.3	13.8	20.9																						
29-Jul	10.4	9.6	9.6	7.8	7.7	8.2	12.0	16.1	18.5	20.4	21.0	21.0	22.4	22.9	22.7	22.5	23.2	23.4	20.5	18.1	16.5	15.1	13.9	13.1	16.5	23.4																						
30-Jul	12.5	12.0	11.5	11.1	11.3	12.4	14.7	17.8	19.7	22.5	23.6	25.2	25.9	26.5	26.7	27.5	27.0	25.4	23.5	22.1	20.6	19.3	18.7	16.1	19.7	27.5																						
31-Jul	15.2	14.8	14.7	14.6	14.3	14.0	16.0	18.4	20.5	22.4	22.9	23.7	24.3	24.9	24.9	24.5	24.6	23.6	22.0	20.6	19.2	16.6	14.8	13.8	19.4	24.9																						
																								13.2	12.7	12.1	11.6	11.5	12.1	13.8	15.6	17.1	18.5	19.3	20.1	20.6	21.1	21.3	21.6	21.2	20.7	19.3	18.0	16.7	15.5	14.6	13.8	Diurnal Average
																								21.3	20.0	18.2	16.4	16.5	16.4	18.1	20.7	23.2	24.5	25.6	26.9	27.7	28.3	28.9	28.3	28.4	27.8	25.9	24.5	23.0	22.4	21.5	21.0	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Jackfish 1 - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Jackfish 1 - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	50	6.72	6.72
10 - 20	484	65.05	71.77
> 20	210	28.23	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

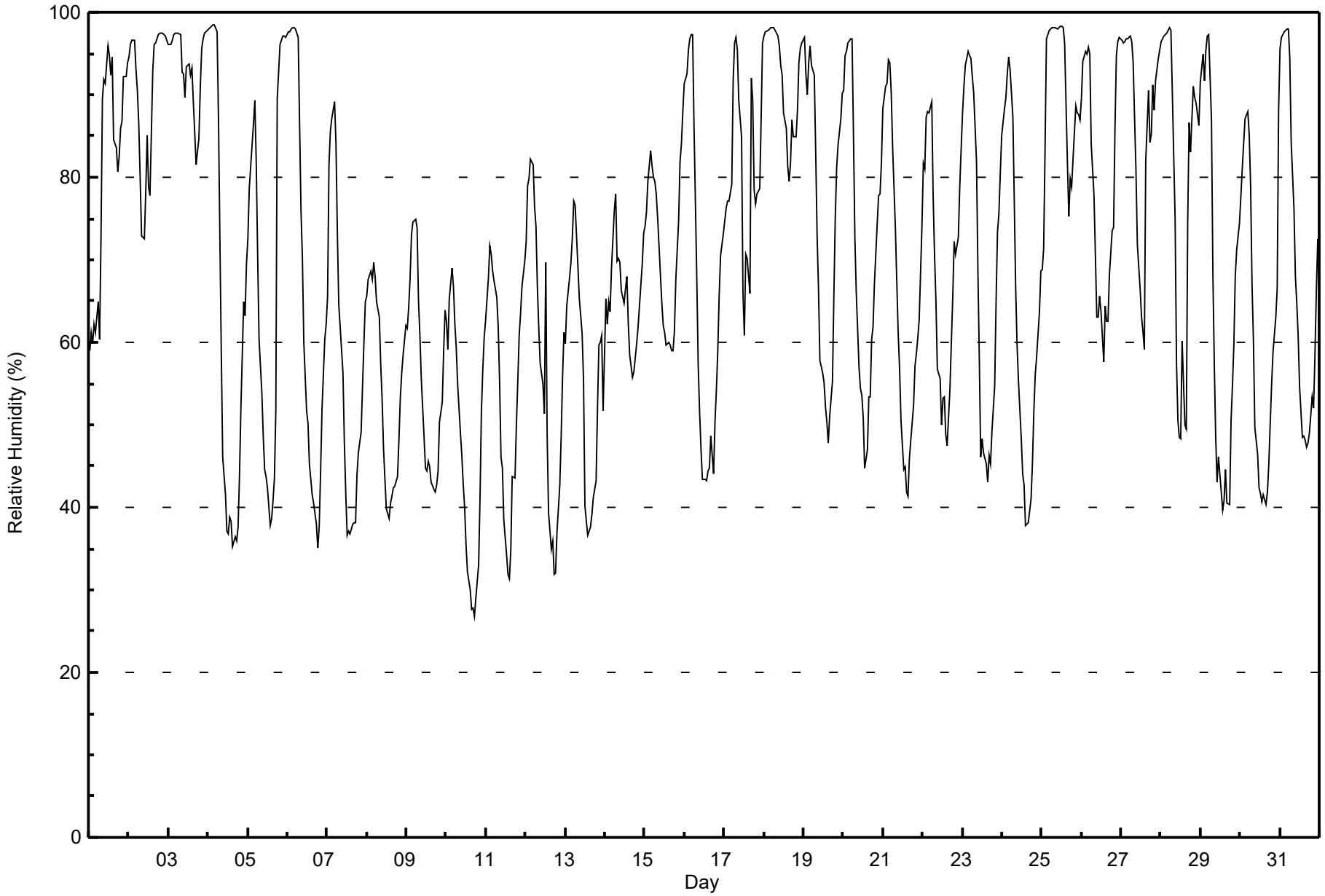
Jackfish 1 - July 2023

Maximum Value: 98.4 % on Jul 4 04:00 Maximum Daily Average: 93.4 % on Jul 3																						Hours in Service:	744																								
Minimum Value: 26.8 % on Jul 10 18:00 Minimum Daily Average: 47.0 % on Jul 10																						Hours of Data:	744																								
Maximum Diurnal Average: 87.7 % at hour 5 Minimum Diurnal Average: 52.7 % at hour 16																						Hours of Missing Data:	0																								
Monthly Average: 69.72 % Percentiles: P ₁ = 32.0 P ₁₀ = 42.4 Q ₁ = 53.1 Median = 68.7 Q ₃ = 88.8 P ₉₀ = 96.7 P ₉₉ = 98.2																						Hours of Calibration:	0																								
																						Percent Operational Time:	100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Jul	59.0	61.2	59.8	62.2	61.1	65.0	60.3	72.9	89.6	91.8	91.4	95.9	94.8	92.3	94.7	84.6	83.5	80.7	82.6	86.0	86.8	92.2	92.2	93.9	80.6	95.9																					
2-Jul	94.6	96.1	96.6	96.7	93.1	90.6	86.5	79.9	73.0	72.5	78.4	85.1	78.8	77.8	92.9	96.1	96.3	96.8	97.2	97.5	97.5	97.4	97.0	96.6	90.2	97.5																					
3-Jul	96.1	96.0	96.7	97.2	97.4	97.4	97.5	97.2	92.7	92.6	89.7	93.4	93.7	92.5	93.2	89.1	85.3	81.5	84.8	91.0	95.6	96.8	97.4	97.8	93.4	97.8																					
4-Jul	98.1	98.2	98.3	98.4	98.4	97.7	87.1	72.6	58.8	46.1	41.5	37.1	36.9	38.9	38.3	35.3	36.5	36.0	37.6	43.7	51.9	65.0	63.3	69.6	61.9	98.4																					
5-Jul	72.6	78.7	83.9	86.4	89.3	81.7	70.5	60.3	53.9	48.6	44.5	43.7	42.4	37.7	38.7	40.8	43.5	51.9	89.5	96.1	96.6	97.1	97.1	97.0	68.4	97.1																					
6-Jul	97.6	97.7	97.9	98.1	98.2	98.1	96.9	86.4	75.9	70.2	59.9	51.6	50.1	45.2	43.3	41.6	40.4	38.0	35.1	37.7	44.2	51.8	60.3	62.2	65.8	98.2																					
7-Jul	65.5	81.5	85.6	87.1	89.2	84.1	73.2	64.6	61.8	56.3	47.9	41.7	36.6	37.1	36.7	37.9	38.1	38.1	44.0	46.6	49.1	54.7	60.0	64.8	57.6	89.2																					
8-Jul	65.6	67.6	68.6	67.6	69.7	68.0	64.9	63.0	57.3	53.0	47.1	43.4	39.8	38.7	40.6	41.4	42.4	42.6	43.8	48.1	53.1	56.3	58.4	62.1	54.3	69.7																					
9-Jul	61.8	64.2	67.8	73.1	74.6	74.9	73.8	65.1	60.8	55.6	48.5	44.7	44.3	45.7	44.9	43.0	42.2	41.9	42.8	44.5	50.3	52.7	59.1	63.9	55.8	74.9																					
10-Jul	62.6	59.1	65.2	68.9	66.7	62.2	59.3	54.9	48.9	46.3	42.6	40.1	35.4	32.2	30.0	27.7	27.8	26.8	28.9	33.0	41.1	51.7	56.9	60.7	47.0	68.9																					
11-Jul	62.7	67.7	71.7	70.7	68.6	67.4	65.3	61.9	55.3	46.1	44.7	38.5	34.2	31.9	31.4	34.7	43.7	43.6	50.0	55.3	60.8	63.6	66.8	69.9	54.4	71.7																					
12-Jul	72.1	79.0	79.8	82.2	81.6	76.5	74.1	66.8	61.7	57.5	54.9	51.3	69.6	48.6	39.3	34.9	36.0	31.9	32.1	36.9	42.5	48.5	55.8	61.3	57.3	82.2																					
13-Jul	59.8	64.4	67.8	69.6	72.7	77.1	76.5	69.1	65.2	63.2	61.1	55.4	40.2	36.6	37.1	37.6	39.1	41.1	43.2	52.0	59.7	60.0	60.9	51.8	56.7	77.1																					
14-Jul	65.2	62.2	64.8	63.7	69.0	75.9	78.0	69.9	70.1	69.7	66.3	64.7	66.5	67.9	62.3	58.4	55.8	56.4	58.1	59.8	61.9	64.5	69.5	73.1	65.6	78.0																					
15-Jul	74.1	75.8	79.5	83.3	81.3	80.0	79.6	78.0	75.0	68.1	64.8	62.1	61.2	59.6	60.0	59.6	59.1	59.0	61.3	67.6	74.8	81.8	84.0	87.9	71.6	87.9																					
16-Jul	91.4	92.5	95.5	96.8	97.2	97.2	86.2	67.6	57.3	51.6	47.0	43.4	43.2	44.5	44.7	48.7	44.1	50.4	54.3	59.0	65.8	70.5	73.2	65.2	97.2																						
17-Jul	74.7	76.3	77.1	77.1	79.1	91.7	96.3	96.9	95.4	89.3	84.9	66.1	60.8	70.6	70.1	65.9	92.0	89.1	78.4	76.7	78.0	78.7	87.1	96.3	81.2	96.9																					
18-Jul	97.2	97.6	97.8	98.0	98.1	98.2	98.1	97.8	97.0	95.9	93.5	92.4	87.7	86.0	81.4	79.5	81.7	86.9	84.9	84.9	88.2	93.9	95.5	96.3	92.0	98.2																					
19-Jul	96.9	92.6	90.0	94.0	95.9	93.6	92.3	83.3	73.1	66.7	57.8	56.2	55.1	52.2	50.3	47.9	51.0	55.2	65.6	75.1	81.2	83.8	87.1	90.2	74.5	96.9																					
20-Jul	90.5	94.7	95.2	96.4	96.7	96.8	85.4	72.9	66.1	57.0	54.3	53.6	50.8	44.7	46.9	53.4	53.5	60.3	61.9	67.1	74.4	77.8	77.9	81.7	71.2	96.8																					
21-Jul	88.3	91.0	91.4	94.3	93.9	90.3	83.7	73.8	67.3	61.0	56.7	50.4	44.6	45.0	41.9	41.4	46.0	48.2	52.4	57.0	58.6	60.6	62.8	74.3	65.6	94.3																					
22-Jul	81.8	81.1	87.3	87.9	87.8	89.2	77.6	70.6	64.9	56.8	55.7	50.1	53.2	53.4	48.8	47.4	54.5	60.0	65.4	72.2	70.6	72.7	78.8	83.3	68.8	89.2																					
23-Jul	87.7	91.0	93.6	95.3	94.8	94.4	92.2	90.1	81.8	68.7	58.0	46.1	48.3	46.6	45.2	43.1	46.3	45.3	49.1	54.7	65.0	73.4	75.6	80.5	69.4	95.3																					
24-Jul	85.1	88.3	89.6	92.5	94.6	93.1	87.2	77.1	66.5	59.7	55.2	48.3	44.1	42.8	37.8	38.0	38.1	41.0	45.4	51.8	56.1	58.3	63.7	68.7	63.5	94.6																					
25-Jul	68.9	71.4	83.4	96.8	97.7	98.0	98.1	98.1	98.1	98.0	98.1	98.3	98.3	98.2	96.3	81.6	75.3	79.8	78.8	82.2	88.7	87.8	87.6	86.9	89.4	98.3																					
26-Jul	89.5	94.2	95.2	95.0	95.7	95.0	84.1	77.8	70.5	63.0	63.0	65.6	63.7	57.6	64.4	62.5	62.5	68.1	73.6	73.9	85.9	94.7	96.4	97.0	78.7	97.0																					
27-Jul	96.6	96.3	96.5	96.7	96.8	97.1	96.4	93.9	87.2	80.9	71.9	66.5	63.1	61.4	59.2	82.1	90.6	84.3	85.3	91.2	88.1	91.7	94.4	95.4	86.0	97.1																					
28-Jul	96.4	96.8	97.1	97.5	97.9	98.1	97.8	90.4	74.9	57.5	50.5	48.5	48.3	60.1	50.0	49.5	74.6	86.7	83.1	91.0	89.7	89.0	87.6	86.3	79.1	98.1																					
29-Jul	91.5	95.0	91.7	95.5	97.1	97.3	86.9	68.5	57.5	48.6	43.0	46.0	41.9	39.6	40.9	44.5	40.6	40.3	50.4	54.7	59.7	67.9	71.1	74.4	64.4	97.3																					
30-Jul	77.7	81.0	84.1	87.1	88.0	85.1	78.7	66.9	60.2	49.6	46.4	42.4	41.7	40.8	41.6	40.3	41.9	45.2	50.2	54.9	58.9	63.1	66.5	88.1	61.7	88.1																					
31-Jul	95.6	97.0	97.6	97.9	98.0	98.0	94.4	84.2	76.1	68.0	64.7	60.7	54.6	48.4	48.7	48.1	47.2	47.8	48.9	53.4	52.0	58.5	66.5	72.5	70.0	98.0																					
																						81.2	83.4	85.4	87.2	87.7	87.4	83.2	76.5	70.8	64.8	60.8	57.5	55.6	54.0	53.3	52.7	55.3	56.4	59.8	64.2	68.4	72.6	75.7	79.3	Diurnal Average	
																						98.1	98.2	98.3	98.4	98.4	98.2	98.1	98.1	98.1	98.0	98.1	98.3	98.3	98.2	96.3	96.1	96.3	96.8	97.2	97.5	97.5	97.4	97.4	97.8	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Jackfish 1 - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Jackfish 1 - July 2023

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	48	6.45	6.45
40 - 60	211	28.36	34.81
60 - 80	213	28.63	63.44
80 - 100	272	36.56	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

Jackfish 1 - July 2023

Maximum Speed: 17 km/h on Jul 3 11:00	Maximum Daily Speed Average: 7.0 km/h on Jul 3	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jul 4 04:00	Minimum Daily Speed Average: 0.7 km/h on Jul 28	Hours of Data: 740
Maximum Diurnal Speed Average: 2.4 km/h at hour 11	Minimum Diurnal Speed Average: 0.4 km/h at hour 21	Hours of Missing Data: 4
Monthly Average Velocity: 0.6 km/h 318.1 deg	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 6 P ₉₀ = 8 P ₉₉ = 14	Percent Operational Time: 99.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	SSW0	SW1	WNW2	SW2	SW3	SW1	W1	WNW1	SE2	E3	SSE2	SE4	N4	WNW1	W1	W3	NNW1	NW4	NW4	WSW3	SSW3	SW1	SW2	SW2	W0.8	NW4	
2-Jul	SW2	SW2	SW1	W2	NW3	W2	W4	W4	WSW5	WSW6	WNW4	NW4	W5	WNW6	NW5	NW9	NW8	NW6	NW5	NW5	NW4	NW5	NW5	NW5	WNW4.0	NW9	
3-Jul	NW5	NW5	NW5	NW5	NW5	NW5	NW5	NW10	NNW14	NNW16	NNW17	NNW13	NNW15	NNW15	NNW11	N10	NNE8	NNE4	NNW4	NNE4	NNW3	WSW2	SW2	WSW2	NNW7.0	NNW17	
4-Jul	WSW3	WSW4	SW3	SW0	W1	W2	NW2	N4	N5	NNE6	NNE6	NNE6	N4	N5	N6	N4	N5	N5	NNW4	W1	S2	S3	S3	SSE1	NNW1.9	NNE6	
5-Jul	S2	WSW3	SW3	SW4	SW4	SW4	SSW4	SW5	SW5	W5	W4	SW5	WSW4	W5	WNW4	WNW4	W3	NNW6	N2	WNW4	S3	S3	SSW3	W3	WSW2.8	NNW6	
6-Jul	SSW3	SW2	SW2	S2	WNW1	W2	WNW2	NW3	N4	N5	N6	NNE6	N7	N9	N8	N9	NNW9	N10	N9	NNW6	NNW6	NNW5	NNW5	WNW2	NNW4.2	N10	
7-Jul	W3	W2	WSW2	W1	SSW2	SSW2	NNW2	NNW4	N5	N6	NNE5	N6	N7	N5	NNE5	NNE5	NNE4	N5	NW2	W0	SW2	SSW2	SW3	SW4	NNW2.1	N7	
8-Jul	SW5	SW4	SW3	SSW3	SSW4	SSW4	SSW4	WSW3	WNW2	WNW4	WNW5	NW6	NW6	NW5	NW5	NW5	NW5	NW3	NNW2	N0	E2	SSE1	SSW2	SSW2	W2.3	NW6	
9-Jul	SSW3	SE1	NNW0	W1	SSE1	NW1	NW3	NNW4	N4	NNE5	N7	N9	N8	NNE8	N8	NNE8	N9	NNE8	NE7	NE4	ENE6	E5	E4	SE4	NNE3.7	N9	
10-Jul	SE6	SE8	ESE5	SE5	SE5	SE8	SE9	SE11	SE11	ESE9	ESE9	ESE10	ESE10	SE8	ESE5	ESE8	SSE7	SE7	SE7	SE5	S2	S2	S3	S2	SE6.6	SE11	
11-Jul	S2	S2	S3	S3	S3	S3	S3	S4	S4	S5	S5	S5	SSW5	SSE5	S4	S3	WSW1	SW2	SSW2	SW2	SW2	SSW3	SW3	SW3	S3.1	S5	
12-Jul	SW3	SW3	SW3	SSW3	SSW3	SSW3	SW4	SW3	W3	WNW3	NNW4	NW4	NNW5	NNW10	NNW11	NNW11	N11	N11	N9	NNW5	NNW4	NW3	NNW5	WNW2	NW3.6	NNW11	
13-Jul	WSW3	W2	WSW2	WSW2	W2	NW2	NW3	NW5	NW6	NNW7	NNW10	NNW8	NNW11	NNW13	NNW15	NNW15	NNW14	NNW14	NNW11	NW5	WNW2	NNW6	NNW7	NNW8	NW6.9	NNW15	
14-Jul	NW4	NW6	NW7	NNW7	NNW7	NW4	NW4	NNW8	NNW8	NNW8	NNW10	NNW9	N10	N8	N8	NNW8	N8	N7	N6	N4	NW2	NW1	NW1	NW1	NNW6.1	N10	
15-Jul	W1	W2	NNW4	NW2	NW4	NW4	NNW3	NNW4	N5	NNE6	N7	NNW5	N7	NNE7	NE6	N7	NNE7	N7	N6	NNE4	ENE2	ESE1	SW0	SSW1	N3.8	NNE7	
16-Jul	S3	S3	SSW2	SSW3	SSW2	S3	SSE3	SSE5	SSE6	SE7	SE6	SSE8	SE8	SE8	SE7	SSE7	SSE6	S4	S3	S2	SSE4	SSE5	SSE6	SSE6	SSE4.6	SE8	
17-Jul	SSE6	SSE6	SSE6	S5	S4	SSE4	SSE6	SSE7	SE8	ESE4	NNE6	ESE9	SE11	SE8	ESE7	ESE6	N1	E3	E7	E8	ESE10	SE11	SE8	NE3	SE5.4	SE11	
18-Jul	NE2	NE4	NNE6	N6	N7	N6	N7	NNE5	NNW4	NNW5	NNW8	NNW8	N7	N5	N3	NE1	UO	W2	W2	W3	W1	WNW1	NW2	N1	N3.6	NNW8	
19-Jul	ESE1	SSE1	SSW1	E0	SE1	S3	S2	SW2	W2	W3	WNW3	WNW3	WNW3	W4	W3	SW4	W4	WSW3	WNW3	WNW1	SSE1	SSE1	SW2	SSW2	WSW1.5	SW4	
20-Jul	SW2	SSW2	SE1	SSW2	SSE3	SSE2	S2	SSW1	SSW1	SW1	NNW3	N3	N4	NW3	NNW6	N6	NW4	NNW2	SSW1	SSW2	SSW2	SW3	SW3	SW3	W0.8	N6	
21-Jul	SSW2	S1	SSE2	SSE1	S3	S2	S1	NNW4	NNW4	NNW6	NNW7	NNW6	NNW4	NNW4	NW4	NW5	NNW4	NNW3	NW3	SSW1	SW3	SW3	SSW2	S1	NW1.5	NNW7	
22-Jul	S3	SSW2	SSW1	SW1	SSW2	S2	SSW2	NW2	W2	W2	W4	W3	SW4	WSW4	WSW4	SW3	SW3	SW2	NW1	NNW1	NNW4	NNW2	SW1	UO	WSW1.7	WSW4	
23-Jul	W0	UO	SSW1	SSW1	SW1	SSW2	SW2	WSW3	SW4	SW2	NE1	SSE4	SSE4	SE5	SSE5	SE3	SSE4	S3	SSE3	SSE3	S2	S2	S1	S1	S2.0	SSE5	
24-Jul	S2	SSE2	SSE2	S2	SSE3	SSE2	S3	SSE4	SE5	SE8	SE7	SE8	ESE8	SE7	ESE9	SE10	SE9	SE6	SSE6	SE7	SE9	SE9	SE9	SE9	SE5.6	SE10	
25-Jul	SE13	SE11	SW5	NNW7	NNE5	NNE3	NNW2	NE4	NE6	NNE6	NNW5	NNW3	NW5	NW5	NNW5	NNW4	WNW2	NW3	NW4	NW4	W2	SSW2	SSW3	SSW3	N1.4	SE13	
26-Jul	SSE2	SSE2	S1	S3	SSW2	SSE3	S3	S4	S5	S7	SSE6	S5	SSW4	SSW5	S3	S3	SSE4	SSE5	SE4	ESE3	N2	NNE6	NNE6	NE6	SSE2.2	S7	
27-Jul	NE8	NE7	NE7	NE7	NNE8	NE7	NE7	NE7	NE6	NNE6	NNE7	N6	N7	N8	N8	E3	N3	N6	N4	NNW4	NNW6	NW3	NW3	NNW4	NNE5.2	NNE8	
28-Jul	NW3	W2	UO	W1	W2	W0	NNW3	N2	NNE1	NNW3	NNE6	ENE3	NNE5	SE1	NNW5	SSE2	ESE3	WNW1	WNW1	SW1	SSW1	SSW2	SW3	SSW1	NNW0.7	NNE6	
29-Jul	S3	SW3	SW3	S2	S2	SSW3	S1	SSE2	ENE0	W1	SSE2	SW3	SSW3	SSW3	SSW4	S3	S4	S3	S2	SSW1	S1	SSE2	SSE3	S3	S2.2	SSW4	
30-Jul	S3	S4	S4	S4	SSE4	S4	S3	S5	S5	S6	S6	S7	S7	S6	S6	S6	S6	S6	S6	S5	SSE5	SSE5	SE6	SSE6	S6	S5.2	S7
31-Jul	SSW3	ESE1	E2	W2	SSE2	SSW1	S3	S3	SW3	SW4	WSW5	W5	WSW5	WSW5	WNW3	W4	WNW4	WSW4	WSW5	SW4	SW5	SSW3	S3	S4	SW2.6	WSW5	

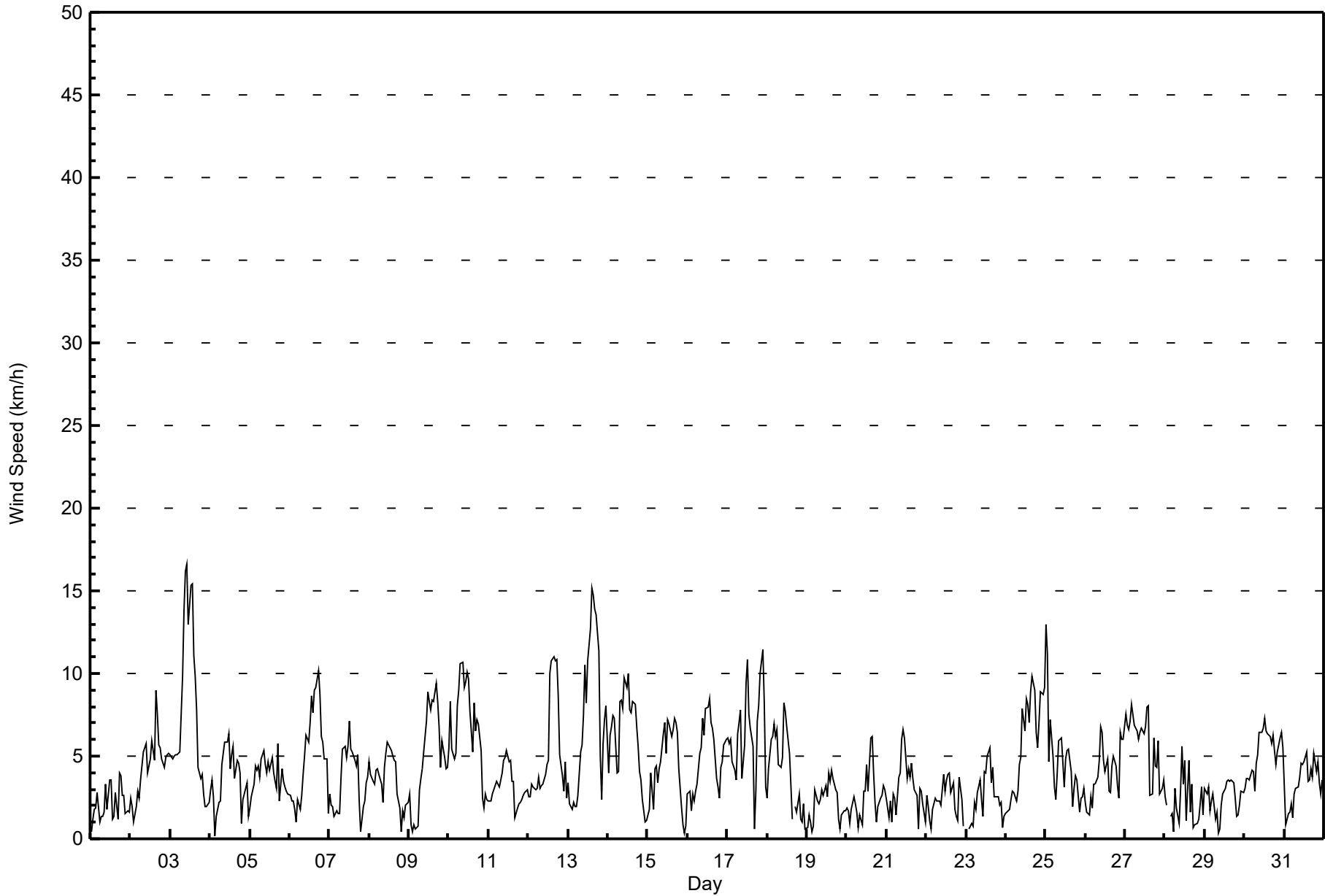
S1.4	S1.2	SW0.8	WSW0.7	SW0.6	SSW0.9	SW0.8	WNW0.6	NW0.8	NNW1.5	NNW2.4	NNW1.6	NNW1.9	NNW2.0	NNW2.4	NNW1.9	NNW1.8	NNW2.0	NNW1.4	NNW0.5	S0.4	S0.9	SSW1.0	SSW1.0			Diurnal Average
SE13	SE11	NW7	NNW7	NNE8	SE8	SE9	SE11	NNW14	NNW16	NNW17	NNW13	NNW15	NNW15	NNW15	NNW15	NNW15	NNW14	NNW14	NNW11	E8	ESE10	SE11	SE9	SE9		Diurnal Maximum

UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Jackfish 1 - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Jackfish 1 - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	539	72.84	72.84
6 - 11	189	25.54	98.38
12 - 19	12	1.62	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
Jackfish 1 - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	28	14	6	4	8	8	14	44	81	63	66	24	50	27	57	45	539
6 - 11	41	21	12	1	2	11	32	15	11	0	0	1	0	1	9	32	189
12 - 19	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	11	12
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	69	35	18	5	10	19	47	59	92	63	66	25	50	28	66	88	740

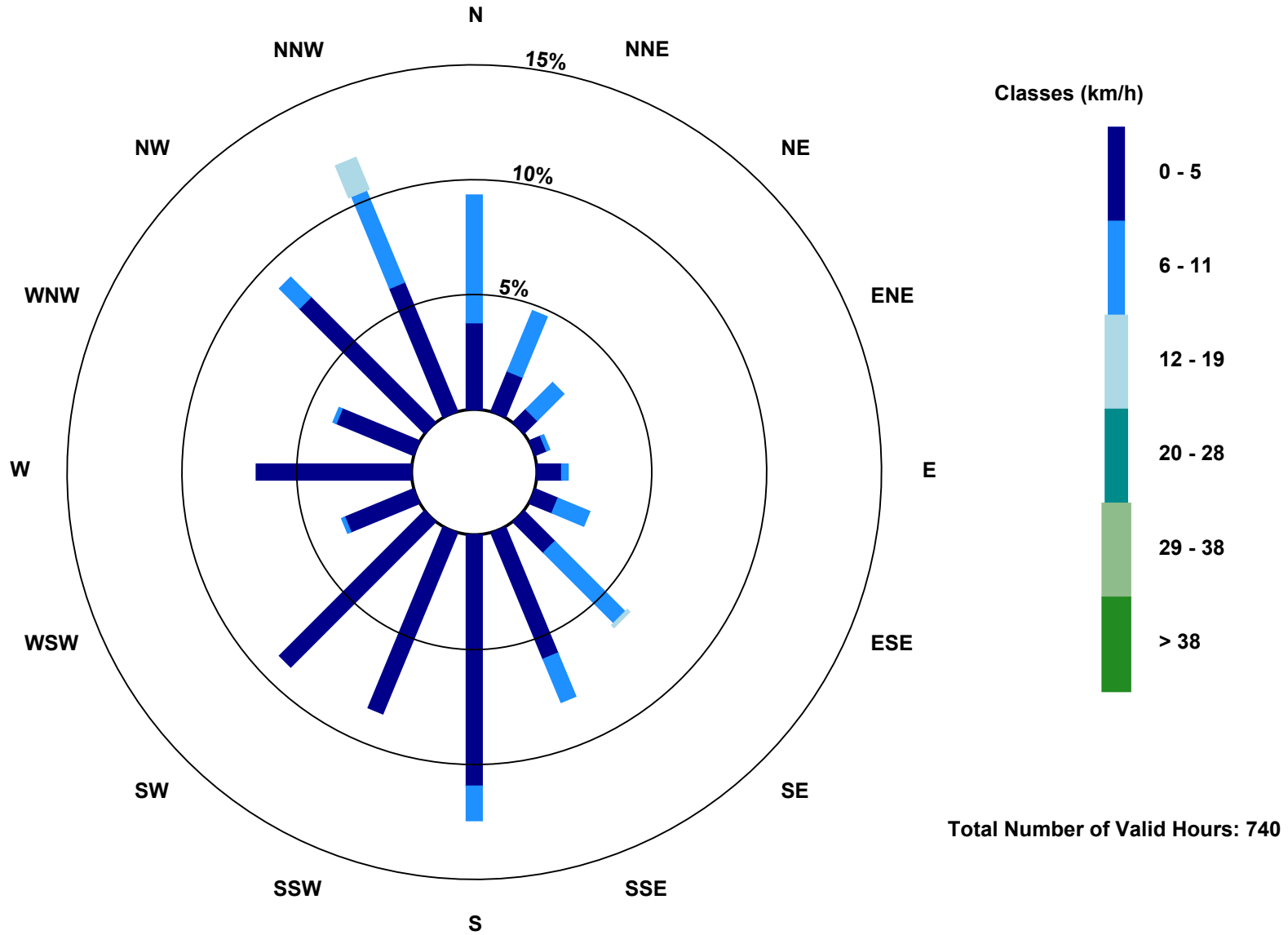
Total Number of Valid Hours: 740

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Jackfish 1





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Jackfish 1 - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Jul 5 18:00 Minimum Value: 0 km/h on Jul 29 23:00 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: 740 Hours of Missing Data: 4 Hours of Calibration: 0 Percent Operational Time: 99.5									
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	1	1	1	1	1	1	1	2	1	2	1	4	2	1	2	1	2	2	2	2	1	1	1	1	4	
2-Jul	1	1	1	1	2	2	3	2	3	2	2	2	3	3	2	3	2	2	2	2	2	2	2	2	3	
3-Jul	2	2	2	1	2	1	1	3	4	4	5	4	4	4	3	4	3	2	2	2	1	1	1	1	5	
4-Jul	1	1	1	1	1	1	1	1	2	3	3	3	3	2	2	2	2	2	2	1	1	0	1	1	3	
5-Jul	1	2	1	2	2	2	2	2	2	2	2	3	3	2	2	2	2	7	5	3	1	1	1	2	7	
6-Jul	1	1	1	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	3	2	1	1	1	1	3	
7-Jul	0	1	1	1	1	2	1	1	1	2	2	3	3	3	2	2	2	2	1	1	1	1	1	1	3	
8-Jul	2	2	2	1	2	2	1	2	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	
9-Jul	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	3	3	3	2	2	1	1	1	3	
10-Jul	2	3	2	2	1	3	3	4	4	3	4	4	4	4	3	4	3	3	2	2	1	1	1	0	4	
11-Jul	0	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	1	1	0	1	1	1	2	
12-Jul	1	1	1	1	2	1	1	1	2	1	2	2	3	3	3	4	3	4	3	1	1	1	1	1	4	
13-Jul	1	1	1	1	1	1	1	2	2	3	3	3	4	4	4	5	4	4	3	3	1	3	2	2	5	
14-Jul	2	1	2	2	2	2	1	2	2	2	3	3	3	2	2	3	3	2	2	1	1	1	1	1	3	
15-Jul	1	1	1	1	2	1	1	1	1	2	2	2	3	3	3	3	3	2	2	2	1	1	1	1	3	
16-Jul	1	1	1	1	1	1	1	2	2	3	3	3	3	3	3	3	2	2	1	1	1	1	2	2	3	
17-Jul	2	2	2	2	2	1	2	2	3	2	2	4	4	3	3	3	1	2	3	3	3	4	4	1	4	
18-Jul	1	2	2	2	2	2	2	2	1	2	2	2	2	2	1	1	UO	1	1	1	2	1	1	1	2	
19-Jul	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	
20-Jul	1	1	1	1	1	1	1	1	1	1	2	2	2	1	3	3	2	2	1	1	1	1	1	1	3	
21-Jul	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	
22-Jul	1	1	1	1	1	1	2	1	2	2	2	2	1	2	2	2	2	1	1	2	1	1	1	UO	2	
23-Jul	1	UO	1	1	1	2	2	1	1	1	2	2	3	2	2	2	2	2	1	1	1	1	1	1	3	
24-Jul	1	1	1	1	1	1	1	1	2	2	3	3	4	3	3	4	4	4	3	2	2	2	3	3	4	
25-Jul	4	5	4	3	2	2	1	2	4	4	2	2	2	3	3	2	1	2	2	2	2	1	1	1	5	
26-Jul	1	1	1	1	2	1	1	2	2	3	3	2	2	2	1	1	2	2	2	1	2	2	2	3	3	
27-Jul	3	3	3	3	3	3	3	3	2	2	2	3	3	3	3	3	3	2	1	2	1	1	1	1	3	
28-Jul	1	1	UO	1	1	1	1	1	1	2	2	2	3	2	2	2	3	2	1	1	1	1	1	2	3	
29-Jul	1	1	1	1	2	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	1	1	0	1	2	
30-Jul	1	1	1	1	1	1	1	2	2	3	3	3	3	3	3	3	3	3	2	2	1	2	2	3	3	
31-Jul	2	2	2	1	1	1	1	1	1	2	2	2	3	3	3	2	2	2	2	2	3	2	1	2	3	
																	Diurnal Maximum									
UO - Unstable Operation																										



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Jackfish 1 - July 2023

Direction of Maximum Speed: 336 deg on Jul 3 11:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 332.6 deg on Jul 3	Hours of Data: 740
Direction of Minimum Speed: 215 deg on Jul 4 04:00	Hours of Missing Data: 4
Direction of Minimum Daily Speed Average: 0.7 deg on Jul 28	Percent Operational Time: 99.5
Monthly Average Direction: 318.1 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	208	232	298	224	236	233	279	292	129	88	147	142	357	291	280	275	347	320	315	248	213	231	222	215	259.7
2-Jul	215	222	236	273	307	272	264	278	245	248	289	312	276	291	308	321	314	312	311	308	304	306	310	306	293.0
3-Jul	304	307	312	315	313	314	314	318	330	331	336	332	337	343	343	356	24	24	334	12	329	253	218	244	332.6
4-Jul	249	239	215	215	263	273	304	359	356	21	12	26	360	9	353	351	354	356	344	275	182	181	174	161	347.7
5-Jul	181	242	236	226	232	228	206	228	223	276	266	230	249	274	296	290	263	348	11	290	186	180	210	281	248.8
6-Jul	204	222	216	187	291	271	299	320	352	359	356	14	5	359	357	349	346	350	350	343	348	333	330	291	344.7
7-Jul	279	260	239	272	213	202	311	348	351	8	21	351	6	355	12	24	13	354	322	260	232	213	236	227	340.4
8-Jul	225	224	236	192	205	204	206	251	294	288	290	316	310	310	310	313	309	313	334	1	79	147	202	198	270.6
9-Jul	203	136	338	262	150	317	313	337	349	17	356	354	358	18	2	12	3	23	40	42	70	93	98	126	18.1
10-Jul	130	132	123	132	133	132	139	135	134	122	116	110	120	129	113	119	153	133	126	134	181	179	169	177	130.3
11-Jul	185	188	181	184	184	181	178	182	177	183	182	176	200	157	175	171	250	214	200	214	214	212	220	224	188.3
12-Jul	218	223	229	213	211	211	223	228	270	302	339	319	332	342	342	340	353	356	353	348	344	307	330	288	324.2
13-Jul	256	260	249	255	268	323	313	324	321	332	332	328	328	330	331	329	329	333	333	323	297	329	331	334	325.4
14-Jul	324	324	325	329	329	313	312	332	334	334	335	343	353	351	354	348	359	351	3	354	349	335	311	326	339.6
15-Jul	278	266	337	325	325	325	327	337	354	17	352	345	353	15	41	1	20	0	11	32	64	107	214	199	358.8
16-Jul	169	189	210	193	201	187	167	150	168	133	146	150	145	145	146	155	150	184	189	179	164	165	161	165	159.5
17-Jul	165	165	165	179	173	166	157	151	143	113	12	122	130	138	123	122	4	89	96	95	116	127	128	55	130.2
18-Jul	56	37	21	8	10	9	1	19	347	342	339	344	352	351	8	53	UO	260	268	278	273	288	308	1	355.5
19-Jul	113	157	196	80	145	175	180	219	280	269	295	296	289	278	271	232	267	258	288	300	160	161	217	213	250.3
20-Jul	235	198	131	201	163	168	181	207	200	229	330	2	11	317	333	356	318	329	211	208	213	216	220	214	278.8
21-Jul	202	185	159	168	169	171	189	347	342	347	346	343	339	332	314	316	331	330	322	193	220	221	213	174	315.1
22-Jul	176	206	195	219	210	176	213	317	261	270	262	267	230	239	250	230	219	230	311	340	343	334	231	UO	246.8
23-Jul	265	UO	206	192	215	197	223	239	219	217	36	156	158	132	155	137	163	183	160	157	188	174	185	183	172.9
24-Jul	183	154	155	171	168	167	162	170	156	144	138	145	136	123	146	112	125	138	144	150	141	132	135	132	139.6
25-Jul	132	133	231	337	30	26	343	55	43	18	341	329	320	326	338	332	301	305	305	315	268	208	211	212	351.5
26-Jul	166	148	188	182	197	166	170	181	182	185	167	188	206	196	190	180	148	148	134	121	10	12	18	34	161.5
27-Jul	44	50	38	39	33	38	41	45	39	27	14	11	2	2	11	85	3	359	354	333	337	326	324	332	19.1
28-Jul	315	265	UO	274	263	261	328	351	24	342	13	59	31	134	344	168	116	295	295	227	193	194	227	207	338.2
29-Jul	183	214	214	176	181	195	174	155	73	273	155	234	202	203	193	191	189	181	190	197	174	163	168	172	189.1
30-Jul	175	175	174	169	165	172	169	178	179	188	184	185	178	176	180	186	177	170	171	168	160	146	156	172	173.5
31-Jul	198	112	84	280	163	203	181	179	234	232	244	277	252	250	289	269	282	258	238	223	218	208	169	188	232.7

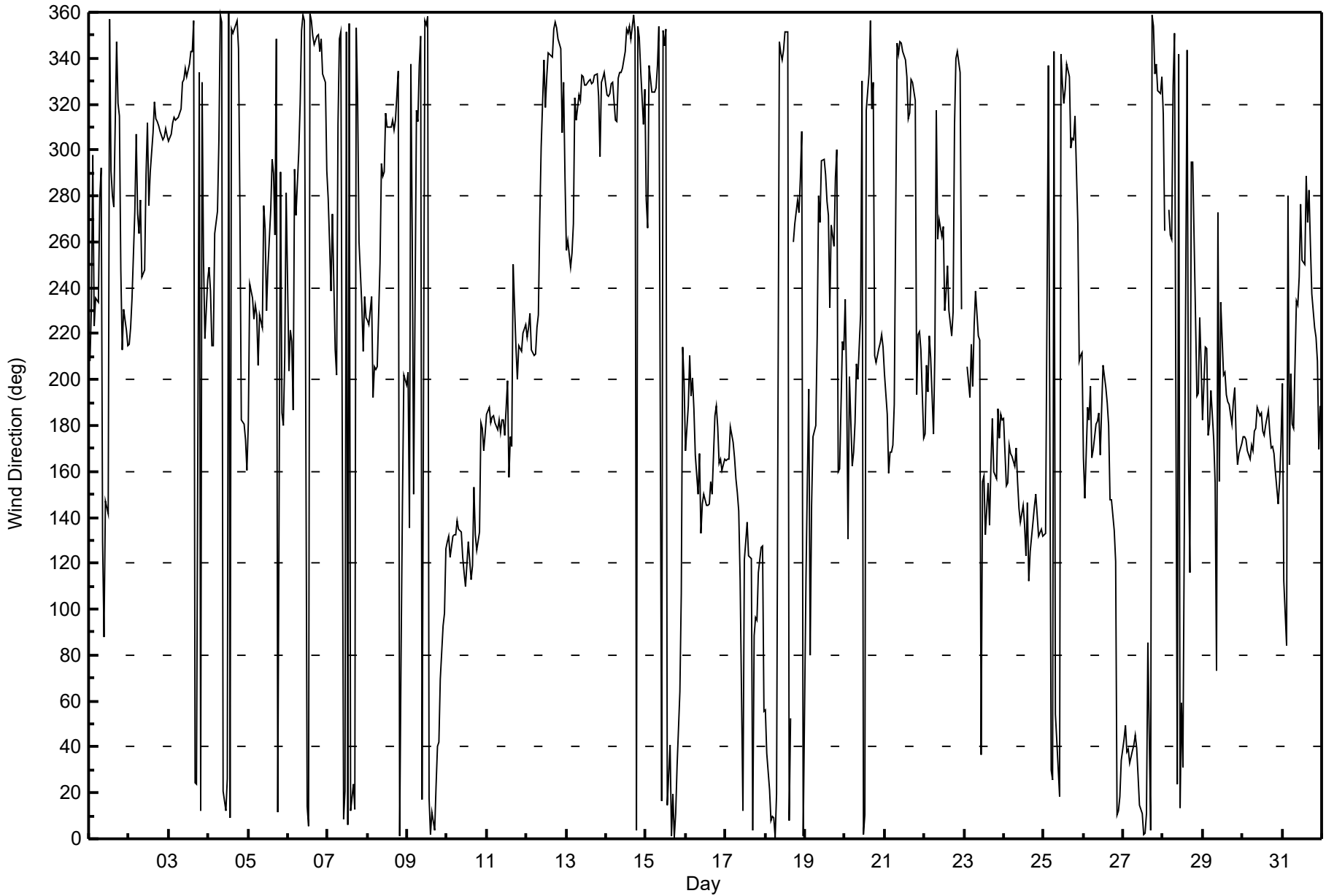
188.8 188.2 223.5 241.7 225.6 204.4 226.5 297.0 312.0 342.0 343.5 346.9 345.0 341.6 343.6 346.8 346.2 345.8 347.3 330.4 187.1 177.7 196.9 201.9
 Diurnal Average

UO - Unstable Operation
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Jackfish 1 - July 2023





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Jackfish 1 - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 122 deg on Jul 8 20:00	Hours of Data: 740
Minimum Value: 6 deg on Jul 29 23:00	Hours of Missing Data: 4
Percentiles: P ₁ = 11 P ₁₀ = 19 Q ₁ = 28 Median = 42 Q ₃ = 63 P ₉₀ = 80 P ₉₉ = 103	Hours of Calibration: 0
	Percent Operational Time: 99.5

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	78	59	68	28	30	81	66	91	63	72	69	90	56	87	89	73	102	47	51	56	53	61	66	60	102
2-Jul	27	50	98	61	75	96	90	77	74	70	88	72	84	72	59	25	25	36	43	40	50	46	47	42	98
3-Jul	45	44	35	28	34	28	29	22	18	18	19	18	19	20	19	26	34	41	43	34	48	22	29	45	48
4-Jul	20	25	59	101	38	38	48	31	39	50	49	54	66	56	42	81	51	47	39	78	16	10	10	22	101
5-Jul	38	68	40	38	45	49	51	63	59	76	83	79	86	83	86	93	96	104	94	62	37	25	45	58	104
6-Jul	54	32	45	60	89	28	43	38	37	42	41	53	40	32	41	31	27	30	28	19	14	11	8	47	89
7-Jul	15	38	37	65	32	47	36	34	30	39	54	52	42	47	60	55	51	36	79	90	19	23	27	38	90
8-Jul	35	47	64	43	43	41	51	83	101	78	77	67	57	61	63	67	65	96	110	122	69	87	65	48	122
9-Jul	31	75	87	73	97	71	28	26	32	45	33	31	41	46	36	46	34	41	46	45	43	25	26	24	97
10-Jul	18	22	22	22	20	24	29	28	27	32	39	38	38	46	81	51	40	36	25	22	16	21	17	10	81
11-Jul	12	14	11	13	18	22	31	42	54	55	54	53	51	56	72	63	87	60	48	22	16	27	30	29	87
12-Jul	54	42	39	35	41	43	38	59	70	74	83	58	51	25	27	24	30	31	27	18	13	23	12	35	83
13-Jul	15	34	42	24	42	40	40	26	26	24	18	23	22	20	20	19	19	18	16	48	63	34	16	14	63
14-Jul	41	14	15	14	14	42	35	19	19	19	23	26	30	28	35	27	30	26	29	26	16	23	46	83	83
15-Jul	47	34	18	68	24	14	16	19	32	36	31	40	38	47	47	48	39	34	34	39	27	50	95	74	95
16-Jul	15	14	22	15	14	14	36	40	42	31	44	40	44	42	38	41	35	50	41	37	18	18	24	30	50
17-Jul	29	28	28	47	37	22	26	29	26	65	37	34	26	29	33	42	87	34	27	32	25	25	35	39	87
18-Jul	38	38	37	28	34	32	26	32	20	27	18	22	27	30	37	65	UO	31	36	33	84	80	40	82	84
19-Jul	76	63	52	86	92	34	35	63	74	71	90	74	92	79	69	67	83	92	61	73	78	49	46	55	92
20-Jul	57	34	68	63	36	33	73	102	97	103	81	81	71	80	55	52	42	74	89	32	25	28	17	21	103
21-Jul	27	41	41	40	30	52	54	31	40	24	26	39	76	61	73	55	56	65	48	98	15	16	22	70	98
22-Jul	30	49	19	69	19	54	61	83	67	66	75	88	54	62	67	75	56	85	47	72	14	38	68	UO	88
23-Jul	64	UO	71	78	66	30	68	59	42	73	103	61	72	55	42	71	47	54	30	21	17	11	24	27	103
24-Jul	32	24	21	12	13	15	24	35	46	48	35	44	34	40	54	35	33	32	27	28	24	23	23	22	54
25-Jul	24	34	66	47	45	65	69	51	63	79	34	65	38	37	31	45	78	72	76	60	74	43	45	40	79
26-Jul	46	25	45	27	31	20	24	52	54	53	46	49	62	54	58	66	45	33	34	32	55	30	33	41	66
27-Jul	42	42	39	39	38	40	41	42	44	42	37	43	40	38	42	77	87	25	22	12	11	14	11	13	87
28-Jul	25	18	UO	36	39	37	29	52	92	53	45	64	61	97	38	103	68	87	83	77	56	28	27	63	103
29-Jul	21	27	32	53	44	24	86	66	104	112	105	75	84	72	73	59	52	59	46	27	11	7	6	9	112
30-Jul	11	12	13	13	13	17	23	50	52	53	51	54	53	57	56	50	54	43	41	28	22	25	26	46	57
31-Jul	52	98	76	69	42	67	37	66	64	69	72	69	82	76	90	84	88	91	69	80	84	71	61	70	98
	78	98	98	101	97	96	90	102	104	112	105	90	92	97	90	103	102	104	110	122	84	87	95	83	

Diurnal Maximum

UO - Unstable Operation



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS508
KIRBY SOUTH
JULY 2023

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

August 31, 2023

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - KIRBY SOUTH (AMS 507)
 JULY 2022

MONTHLY SUMMARY

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	560	27	50	96.23	6	0	1.6	0
H2S (ppb) Average	547	34	63	95.25	0.8	0	0.3	0
THC (ppm) Average	560	27	50	96.23	3.5	-	2.6	-
NO2 (ppb) Average	560	29	50	96.56	31.4	0	4.3	-
NO (ppb) Average	560	29	50	96.56	34.9	-	3.9	-
NOX (ppb) Average	560	29	50	96.56	66.3	-	8.2	-
Temperature 2 m (C) Average	610	0	0	100	28.1	-	22.2	-
Relative Humidity (%) Average	610	0	0	100	99.5	-	93	-
Wind Speed 10 m (km/h) Average	586	1	1	100	22	-	15	-
Wind Direction 10 m (deg) Average	586	1	1	100	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - KIRBY SOUTH(AMS507)
 JULY 2022

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	560	0.45	0.7	-	0	0	0	0.2	0.5	1.2	6
H2S (ppb) Average	547	0.14	0.1	-	0	0	0	0.1	0.2	0.3	0.8
THC (ppm) Average	560	2.38	0.2	-	2.1	2.2	2.2	2.3	2.5	2.6	3.5
NO2 (ppb) Average	560	1.26	1.9	-	0	0.3	0.5	0.8	1.5	2.5	31.4
NO (ppb) Average	560	0.28	2.1	-	0	0	0	0	0.1	0.3	34.9
NOX (ppb) Average	560	1.55	3.9	-	0	0.3	0.5	0.8	1.7	2.8	66.3
Temperature 2 m (C) Average	610	17.14	4.4	-	6.1	11.7	13.7	16.8	20.8	23.2	28.1
Relative Humidity (%) Average	610	65.23	19.3	-	29.2	39.3	50.1	64.1	82.7	91.7	99.5
Wind Speed 10 m (km/h) Average	586	9.8	4	-	0	5	7	10	12	16	22
Wind Direction 10 m (deg) Average	586	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - KIRBY SOUTH (AMS507)
JULY 2022

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS (except WSWD)	01 Jul 2023 01:00	06 Jul 2023 14:00	134	Air Monitoring Shelton Not in Service
ALL PARAMETERS	01 Jul 2023 01:00	07 Jul 2023 13:00	157	Air Monitoring Shelton Not in Service
SO2, THC	06 Jul 2023 18:00	07 Jul 2023 16:00	23	Maintenance - sample line disconnected
H2S, NO2	06 Jul 2023 15:00	07 Jul 2023 11:00	21	Maintenance - sample line disconnected
H2S	25 Jul 2023 12:00	25 Jul 2023 19:00	8	Maintenance - SO2 scrubber beads replaced



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

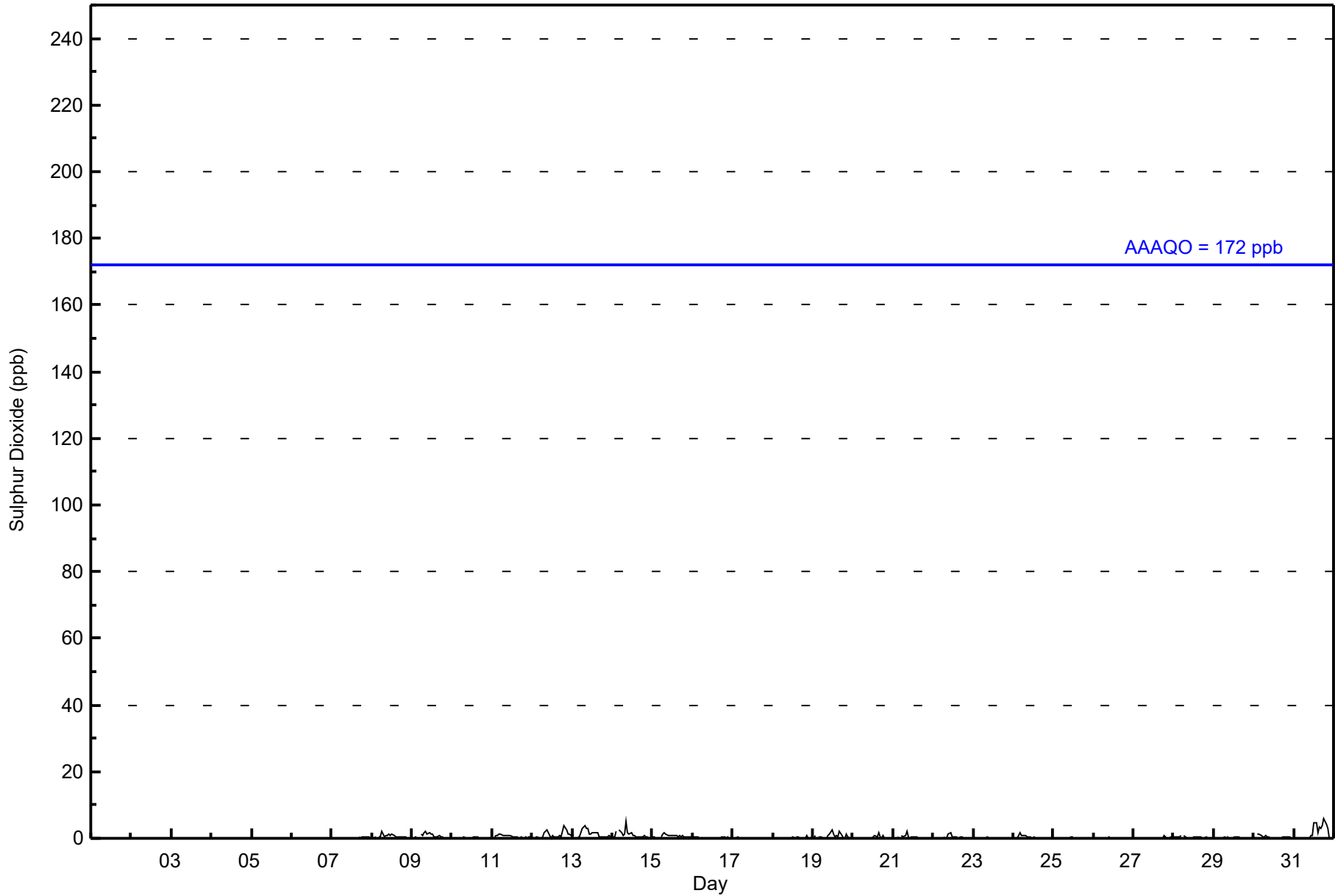
Kirby South - July 2023

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:														610							
Maximum Value: 6.0 ppb on Jul 31 19:00		Maximum Daily Average: 1.6 ppb on Jul 31														Hours of Data:		560									
Minimum Value: 0.0 ppb on Jul 16 05:00		Minimum Daily Average: 0.0 ppb on Jul 26														Hours of Missing Data:		50									
Maximum Diurnal Average: 0.8 ppb at hour 9		Minimum Diurnal Average: 0.2 ppb at hour 24														Hours of Calibration:		27									
Monthly Average: 0.45 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.2 Q ₃ = 0.5 P ₉₀ = 1.2 P ₉₉ = 4.0														Percent Operational Time:		96.2									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--	
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	C	C	C	M	M	M	M	M	M	M	M	--	--	
7-Jul	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	0.4	0.2	0.4	0.4	0.5	0.5	0.4	0.2	--	0.5	
8-Jul	0.2	0.2	0.3	Z	0.3	0.6	2.0	0.5	0.7	1.0	1.4	0.8	1.1	0.9	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.5	2.0	
9-Jul	0.2	0.2	0.3	0.2	Z	1.2	1.0	1.6	2.1	1.5	1.8	1.4	1.1	0.6	0.5	0.6	0.7	0.5	0.2	0.1	0.1	0.1	0.1	0.0	0.7	2.1	
10-Jul	0.1	0.0	0.0	0.1	0.1	Z	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.3	
11-Jul	Z	0.3	0.6	0.8	1.2	1.2	1.0	0.7	0.7	0.7	0.8	0.8	0.3	0.5	0.4	0.4	0.0	0.2	0.2	0.0	0.3	0.2	0.5	0.4	0.5	1.2	
12-Jul	0.5	Z	0.4	0.4	0.2	0.1	0.4	1.6	2.1	2.5	1.0	0.2	0.8	0.3	0.3	0.5	0.7	0.5	2.0	3.9	2.7	1.3	1.4	1.0	1.1	3.9	
13-Jul	1.2	0.8	Z	0.5	0.3	1.8	2.9	3.8	3.0	2.9	1.2	1.1	1.9	1.7	1.8	1.6	0.4	0.3	0.2	0.2	0.6	0.2	0.7	0.3	1.3	3.8	
14-Jul	0.3	0.6	2.2	Z	2.6	1.6	0.9	1.2	5.0	1.8	1.2	1.5	1.0	0.8	0.5	0.4	0.6	0.4	0.5	0.9	0.6	0.5	0.2	0.1	1.1	5.0	
15-Jul	0.3	0.3	0.1	0.0	Z	0.4	1.1	1.6	1.3	1.0	1.0	0.8	0.6	0.7	0.7	0.6	0.6	0.5	0.7	0.6	0.4	0.6	0.4	0.4	0.6	1.6	
16-Jul	0.4	0.5	0.5	0.3	0.0	Z	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.1	0.3	0.1	0.0	0.2	0.5	
17-Jul	Z	0.0	0.1	0.4	0.1	0.0	0.0	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	0.4	
18-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.4	0.0	0.3	0.4	0.1	0.0	0.1	0.2	0.8	0.2	0.2	0.1	0.1	0.8	
19-Jul	0.2	0.6	Z	0.2	0.4	0.4	0.1	0.0	0.0	0.7	1.2	2.4	1.1	0.2	0.7	0.6	2.0	1.0	0.1	0.0	1.4	0.2	0.0	0.0	0.6	2.4	
20-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.4	0.8	0.3	1.6	0.3	0.1	0.9	0.1	0.2	0.1	0.1	0.2	0.2	1.6	
21-Jul	0.1	0.1	0.2	0.2	Z	0.9	0.2	0.9	2.2	0.5	0.1	0.5	0.5	0.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.2	
22-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.4	0.1	0.1	1.3	1.6	0.5	0.2	0.5	0.3	0.0	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.6	
23-Jul	Z	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.3	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	
24-Jul	0.0	Z	0.1	0.8	1.6	0.9	0.8	0.7	0.6	0.6	0.3	0.2	0.3	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.3	1.6	
25-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	
26-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	
27-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.1	0.1	0.1	0.8	0.4	0.1	0.1	0.3	0.2	0.1	0.8	
28-Jul	0.4	0.4	0.5	0.5	0.8	Z	0.7	0.4	0.2	0.1	0.2	0.1	0.3	0.4	0.4	0.3	0.3	0.1	0.1	0.4	0.1	0.1	0.1	0.1	0.3	0.8	
29-Jul	Z	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.1	0.1	0.2	0.3	0.3	0.4	0.3	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.3	0.2	0.4	
30-Jul	0.6	Z	1.3	1.2	0.7	0.4	0.5	0.9	0.5	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.3	0.2	0.3	0.3	0.0	0.0	0.4	1.3	
31-Jul	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.0	4.6	4.5	1.5	3.3	3.0	4.0	6.0	4.0	3.0	0.0	0.1	0.2	1.6	6.0	
																								Diurnal Average		0.2	
																								Diurnal Maximum		1.2	
Z - zerospan		C - Calibration		M - Maintenance		NS - Not in Service																					
Alberta Ambient Air Quality Objectives (AAAQO):		1-hr 172 ppb		24-hr 48 ppb																							



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Kirby South - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Kirby South - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	560	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: 560

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Kirby South - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	25	40	37	22	19	23	30	20	53	34	32	44	60	54	34	33	560
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	25	40	37	22	19	23	30	20	53	34	32	44	60	54	34	33	560

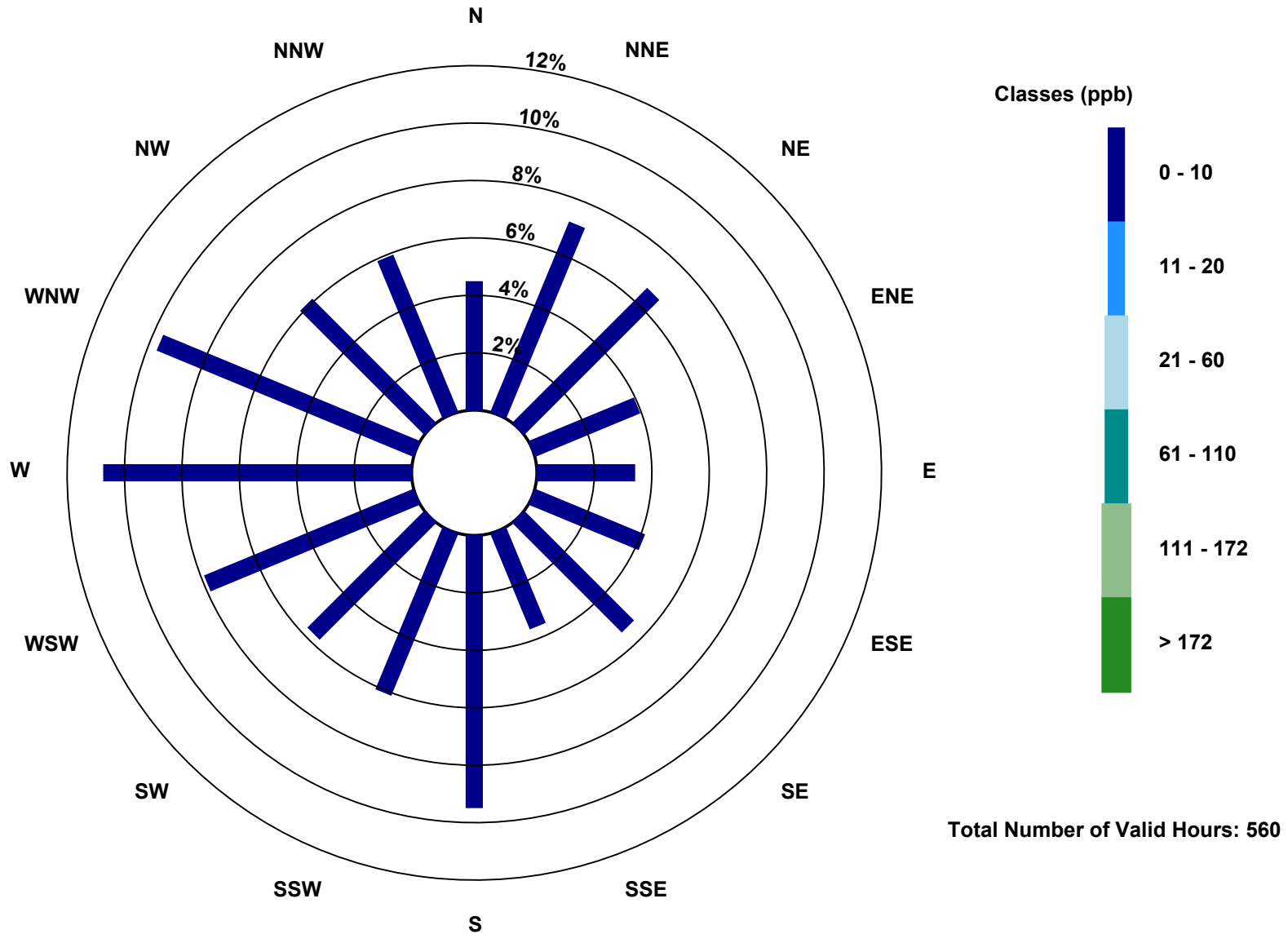
Total Number of Valid Hours: 560

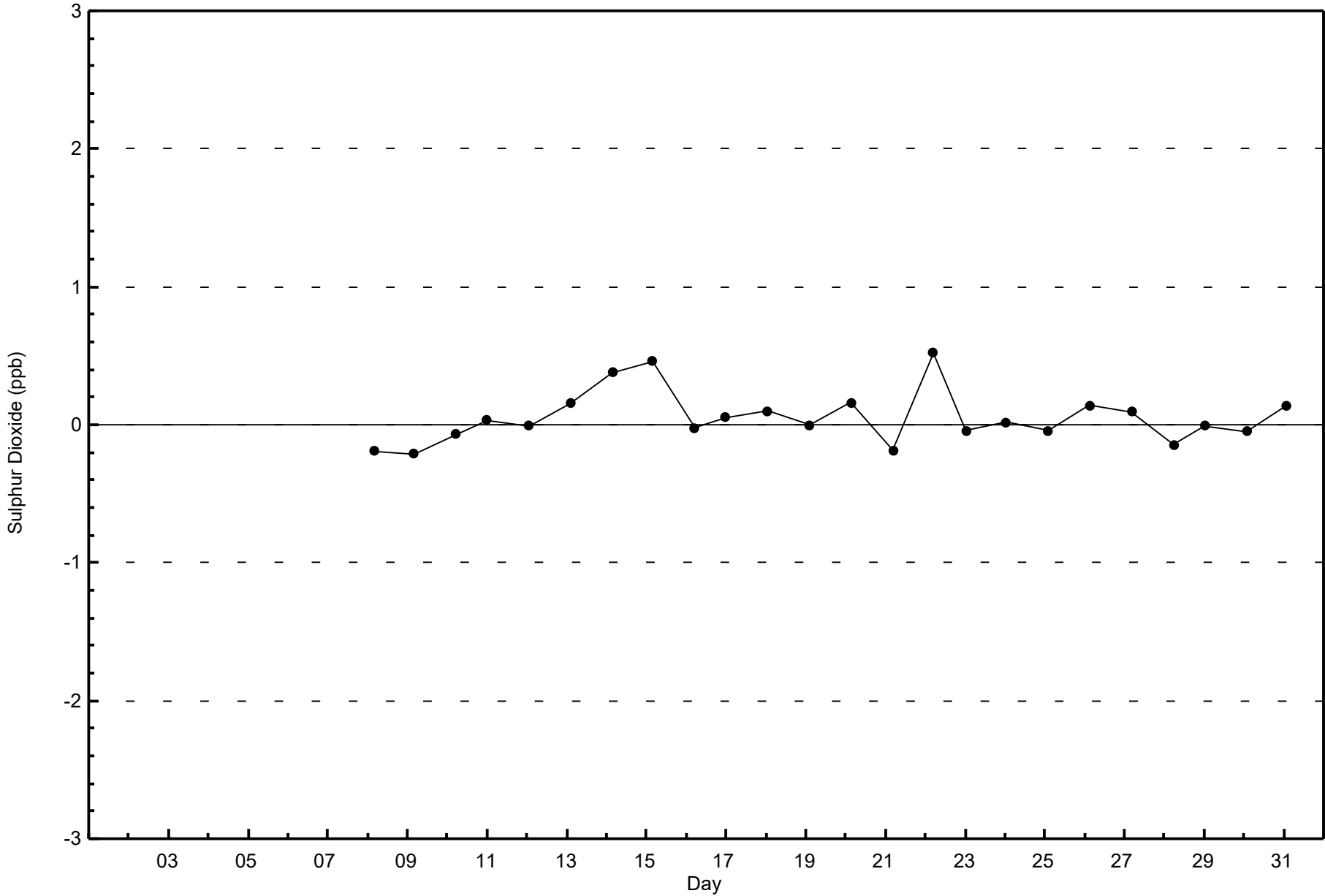
Total Number of Hours: 744

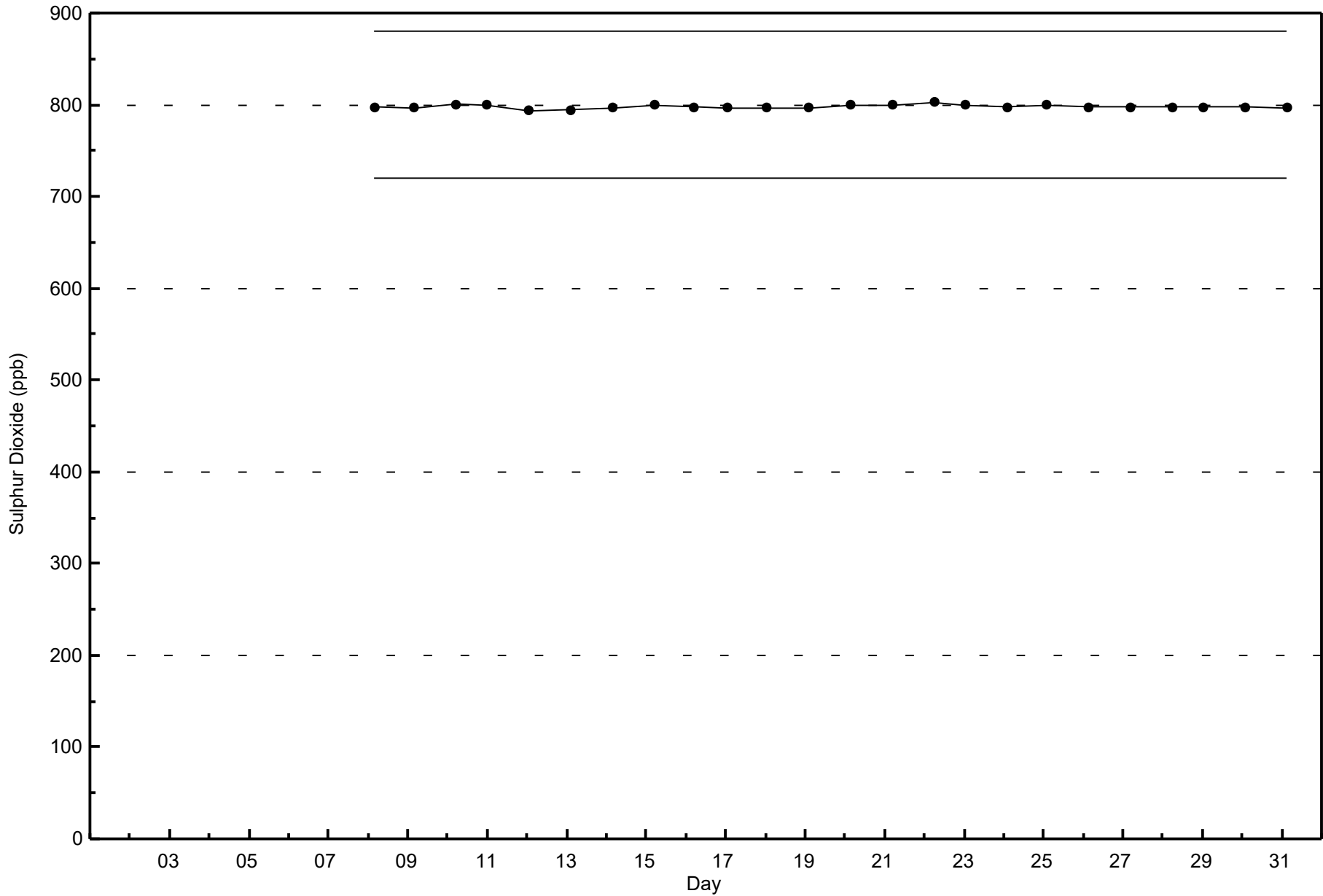


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Sulphur Dioxide (SO₂) - ppb
Kirby South









Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

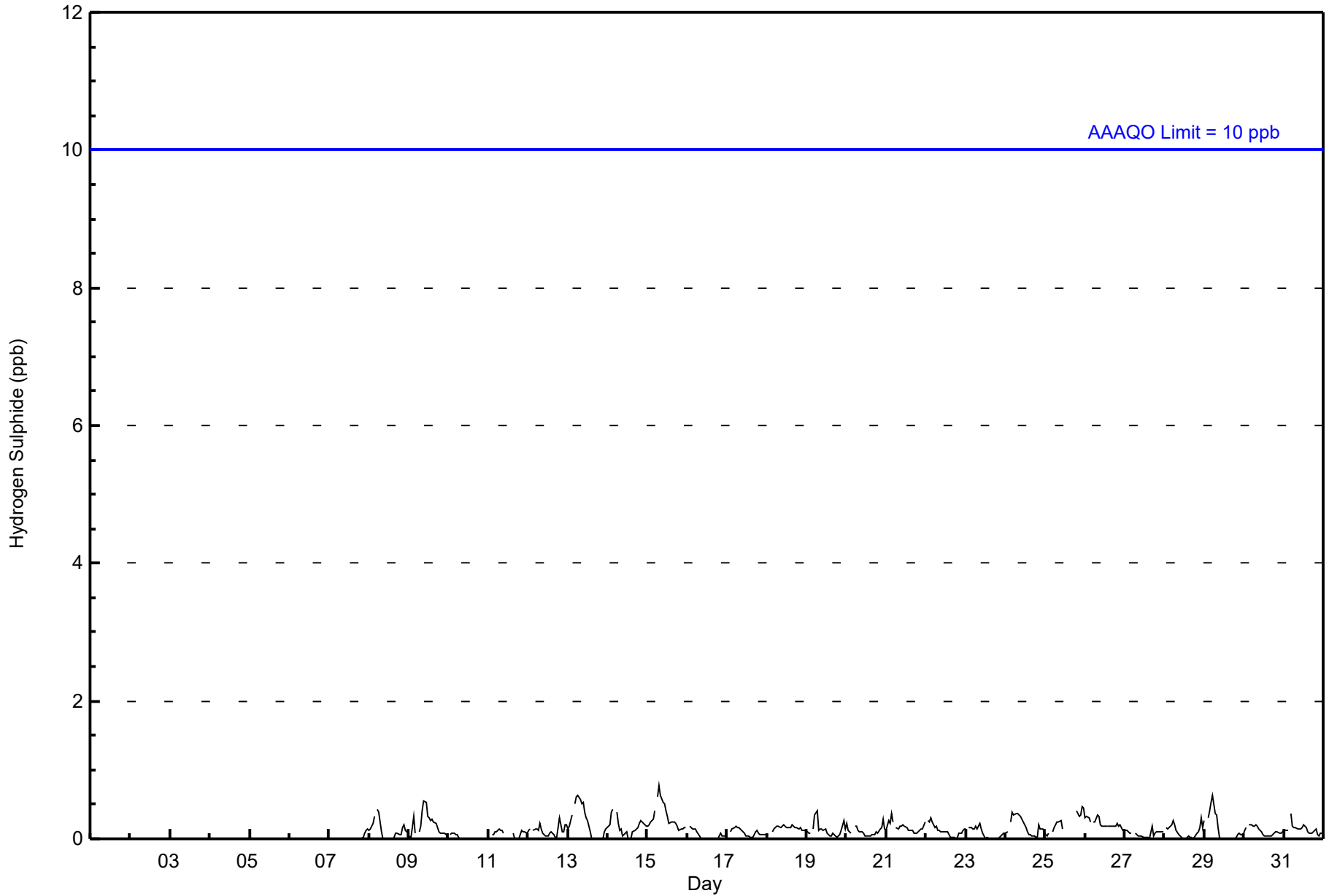
Kirby South - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	610
Maximum Value: 0.8 ppb on Jul 15 08:00	Maximum Daily Average: 0.3 ppb on Jul 15		Hours of Data:	547
Minimum Value: 0.0 ppb on Jul 7 17:00	Minimum Daily Average: 0.0 ppb on Jul 10		Hours of Missing Data:	63
Maximum Diurnal Average: 0.3 ppb at hour 6	Minimum Diurnal Average: 0.1 ppb at hour 18		Hours of Calibration:	34
Monthly Average: 0.14 ppb	Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.2 P ₉₀ = 0.3 P ₉₉ = 0.6		Percent Operational Time:	95.3

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	M	M	M	M	M	M	M	M	M	M	M	--	--
7-Jul	M	M	M	M	M	M	M	M	M	M	M	C	C	C	C	C	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	--	0.1
8-Jul	0.1	0.1	0.2	0.3	Z	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.4
9-Jul	0.0	0.0	0.2	0.3	0.1	Z	0.1	0.2	0.4	0.5	0.5	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.5
10-Jul	Z	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
11-Jul	0.0	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	C	C	C	C	C	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
12-Jul	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.2	0.3	0.1	0.1	0.2	0.2	0.1	0.3
13-Jul	0.1	0.2	0.3	Z	0.5	0.6	0.6	0.6	0.5	0.5	0.4	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.6
14-Jul	0.2	0.2	0.4	0.4	Z	0.4	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.4
15-Jul	0.2	0.2	0.2	0.3	0.4	Z	0.6	0.8	0.6	0.5	0.5	0.4	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.3	0.8
16-Jul	Z	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2
17-Jul	0.0	Z	0.1	0.1	0.2	0.2	0.2	0.2	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	0.1	0.1	0.1	0.1	0.2
18-Jul	0.1	0.1	Z	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.2
19-Jul	0.1	0.1	0.1	Z	0.1	0.3	0.4	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	0.1	0.1	0.3	0.1	0.1	0.4
20-Jul	0.2	0.1	0.1	0.1	Z	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.1	0.1	0.3
21-Jul	0.1	0.3	0.2	0.4	0.2	Z	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.4
22-Jul	Z	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.3
23-Jul	0.1	Z	0.2	0.2	0.1	0.2	0.2	0.2	0.2	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	0.1	0.1	0.1	0.2
24-Jul	0.1	0.1	Z	0.2	0.4	0.3	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.1	0.4
25-Jul	0.1	0.0	0.1	Z	0.1	0.2	0.2	0.3	0.2	0.3	0.2	M	M	M	M	M	M	M	M	M	M	M	M	M	--	0.5
26-Jul	0.3	0.3	0.3	0.2	Z	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	0.1	0.2	0.3
27-Jul	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
28-Jul	Z	0.2	0.1	0.2	0.2	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.2	0.1	0.3
29-Jul	0.3	Z	0.3	0.4	0.5	0.6	0.4	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.6
30-Jul	0.1	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	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	0.1	0.2
31-Jul	0.1	0.1	0.1	Z	0.4	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.4

0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Diurnal Average
0.3	0.3	0.4	0.4	0.5	0.6	0.6	0.8	0.6	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.4	0.3	0.4	0.5	0.4			Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance NS - Not in Service
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Kirby South - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	547	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: 547

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Kirby South - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	24	40	36	23	19	23	31	19	50	33	35	43	58	51	32	30	547
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	24	40	36	23	19	23	31	19	50	33	35	43	58	51	32	30	547

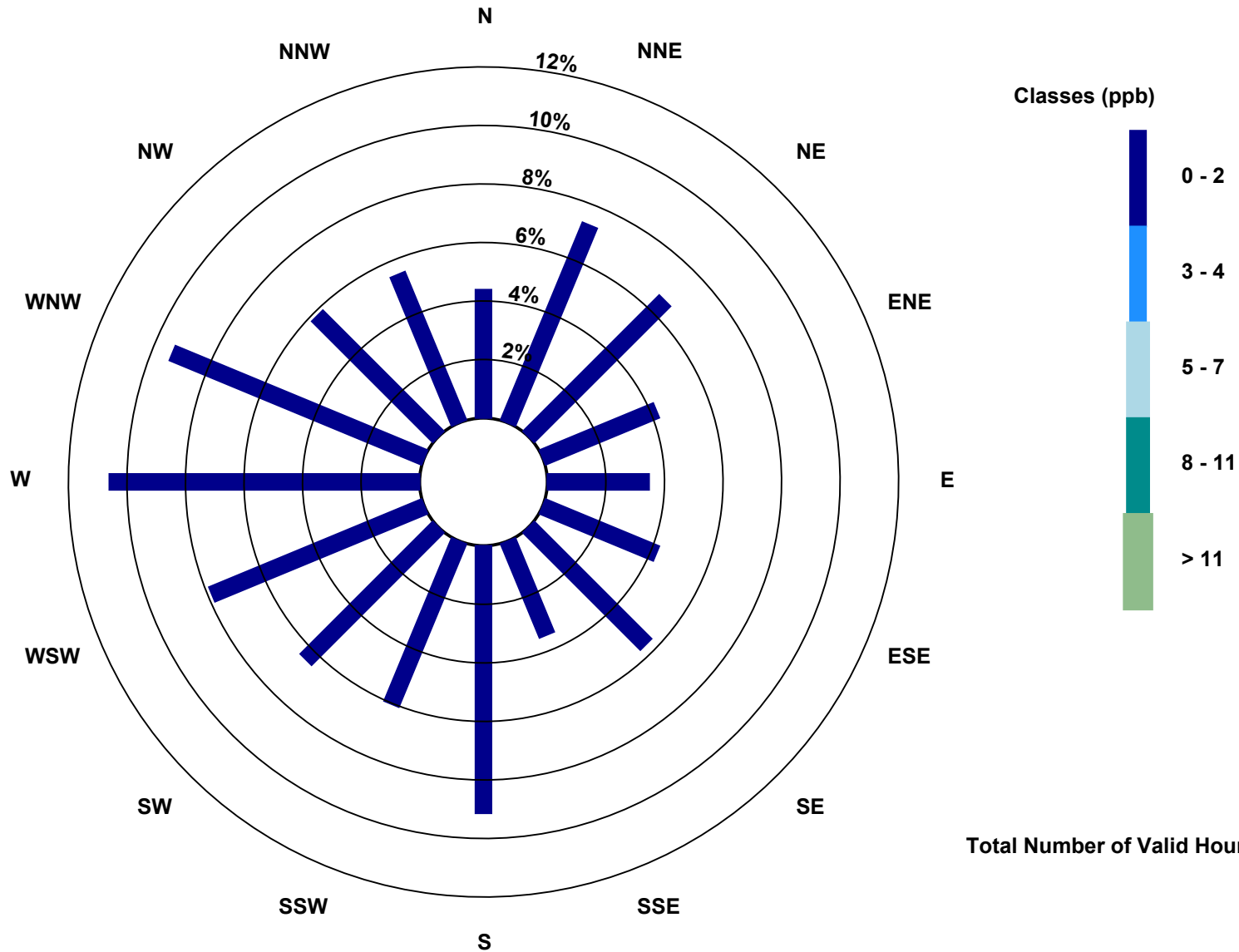
Total Number of Valid Hours: 547

Total Number of Hours: 744

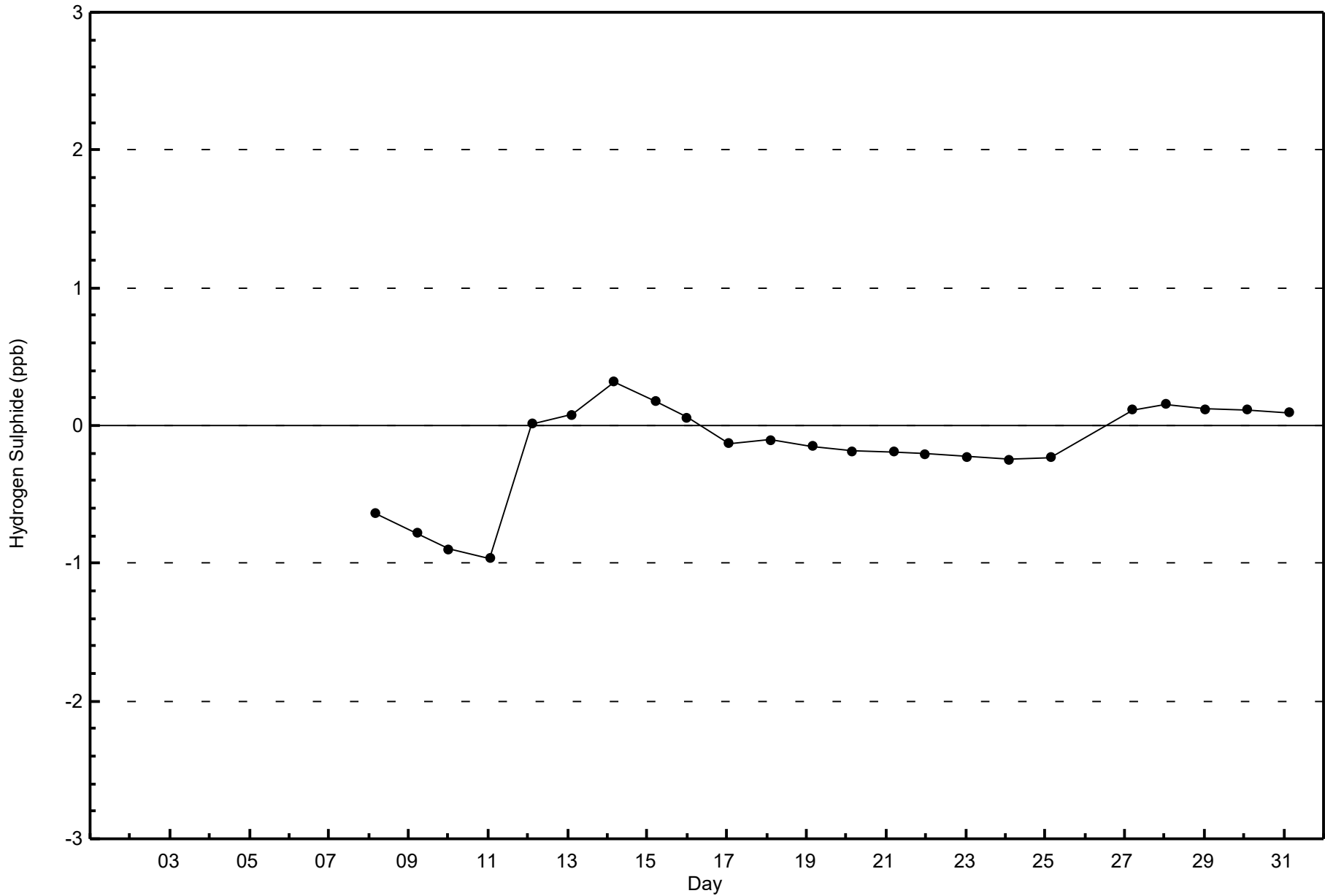


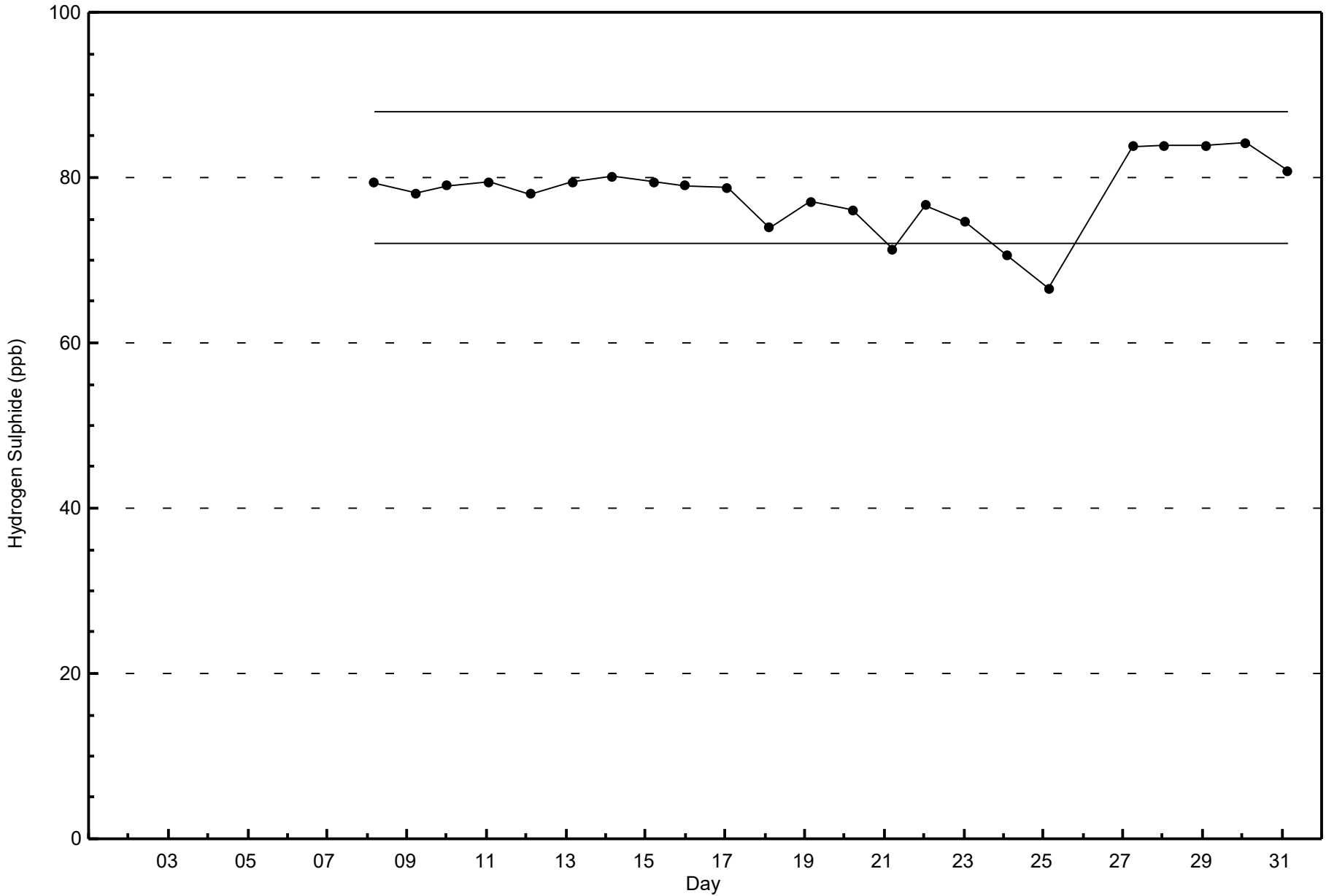
Wood Buffalo Environmental Association
Wind Rose Jul 2023

Hydrogen Sulphide (H₂S) - ppb
Kirby South



Total Number of Valid Hours: 547







Wood Buffalo Environmental Association
Summary of Hour Averages

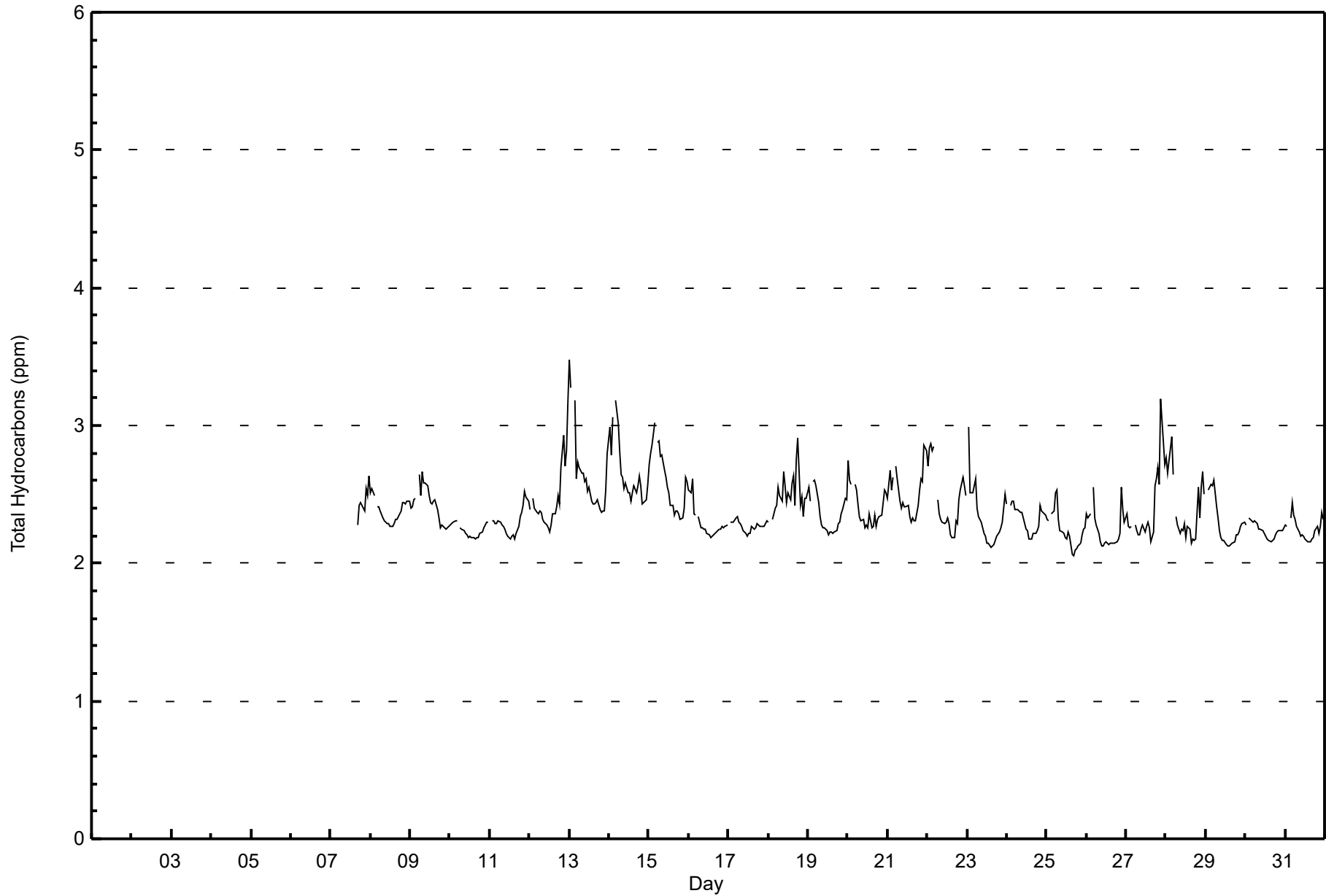
Total Hydrocarbons (THC) - ppm
Kirby South - July 2023

Maximum Value: 3.5 ppm on Jul 13 01:00		Maximum Daily Average: 2.6 ppm on Jul 14		Hours in Service: 610																						
Minimum Value: 2.1 ppm on Jul 25 17:00		Minimum Daily Average: 2.2 ppm on Jul 25		Hours of Data: 560																						
Maximum Diurnal Average: 2.6 ppm at hour 2		Minimum Diurnal Average: 2.3 ppm at hour 16		Hours of Missing Data: 50																						
Monthly Average: 2.38 ppm		Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.5 P ₉₀ = 2.6 P ₉₉ = 3.1		Hours of Calibration: 27																						
				Percent Operational Time: 96.2																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	C	C	C	M	M	M	M	M	M	M	M	--	--
7-Jul	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	2.3	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.6	--	2.6
8-Jul	2.5	2.5	2.5	Z	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	2.5	2.4	2.4	2.5
9-Jul	2.4	2.4	2.5	Z	Z	2.6	2.5	2.7	2.6	2.6	2.6	2.5	2.4	2.4	2.5	2.5	2.4	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.4	2.7
10-Jul	2.3	2.3	2.3	2.3	2.3	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3
11-Jul	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.5	2.4	2.3	2.5
12-Jul	2.4	Z	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.3	2.4	2.4	2.4	2.5	2.4	2.7	2.9	2.7	2.8	3.2	2.5	3.2
13-Jul	3.5	3.3	Z	3.2	2.6	2.7	2.7	2.7	2.7	2.6	2.6	2.5	2.6	2.4	2.4	2.4	2.4	2.5	2.4	2.4	2.4	2.4	2.5	2.8	2.6	3.5
14-Jul	3.0	2.8	3.1	Z	3.2	3.0	2.8	2.6	2.6	2.5	2.6	2.5	2.4	2.5	2.6	2.5	2.6	2.6	2.6	2.6	2.4	2.4	2.5	2.6	2.6	3.2
15-Jul	2.7	2.8	2.9	3.0	Z	2.9	2.9	2.8	2.8	2.7	2.6	2.6	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.4	2.6	2.6	2.6	3.0
16-Jul	2.5	2.5	2.6	2.4	2.4	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	2.3	2.3	2.3	2.3	2.3	2.6
17-Jul	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
18-Jul	2.3	Z	2.3	2.4	2.4	2.4	2.5	2.5	2.5	2.7	2.6	2.4	2.5	2.5	2.6	2.6	2.4	2.8	2.9	2.4	2.5	2.3	2.5	2.5	2.5	2.9
19-Jul	2.6	2.5	Z	2.6	2.6	2.6	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.5	2.4	2.6
20-Jul	2.7	2.6	2.6	Z	2.6	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.5	2.4	2.7
21-Jul	2.5	2.7	2.5	2.6	Z	2.7	2.6	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.6	2.6	2.9	2.8	2.5	2.9
22-Jul	2.7	2.8	2.9	2.8	2.8	Z	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.5	2.5	2.6	2.6	2.5	2.5	2.9
23-Jul	Z	3.0	2.5	2.5	2.6	2.6	2.4	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.4	2.5	2.3	3.0
24-Jul	2.4	Z	2.4	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.3	2.3	2.5
25-Jul	2.3	2.3	Z	2.4	2.4	2.5	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.5
26-Jul	2.4	2.3	2.4	Z	2.6	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.5	2.4	2.3	2.2	2.6
27-Jul	2.4	2.3	2.3	2.3	Z	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.2	2.2	2.6	2.6	2.7	2.6	3.2	2.9	2.7	2.4	3.2
28-Jul	2.8	2.7	2.7	2.9	2.6	Z	2.3	2.3	2.2	2.3	2.2	2.3	2.2	2.3	2.2	2.1	2.2	2.2	2.2	2.6	2.3	2.5	2.7	2.5	2.4	2.9
29-Jul	Z	2.5	2.5	2.6	2.6	2.6	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.6
30-Jul	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3
31-Jul	2.3	2.3	Z	2.3	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	2.3	2.2	2.3	2.4	2.3	2.3	2.4
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance NS - Not in Service																										



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Kirby South - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Kirby South - July 2023

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	553	98.75	98.75
3.1 - 10.0	7	1.25	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 560

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Kirby South - July 2023

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	21	40	37	22	19	23	30	20	53	34	32	44	60	54	34	30	553
3.1 - 10.0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	7
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	25	40	37	22	19	23	30	20	53	34	32	44	60	54	34	33	560

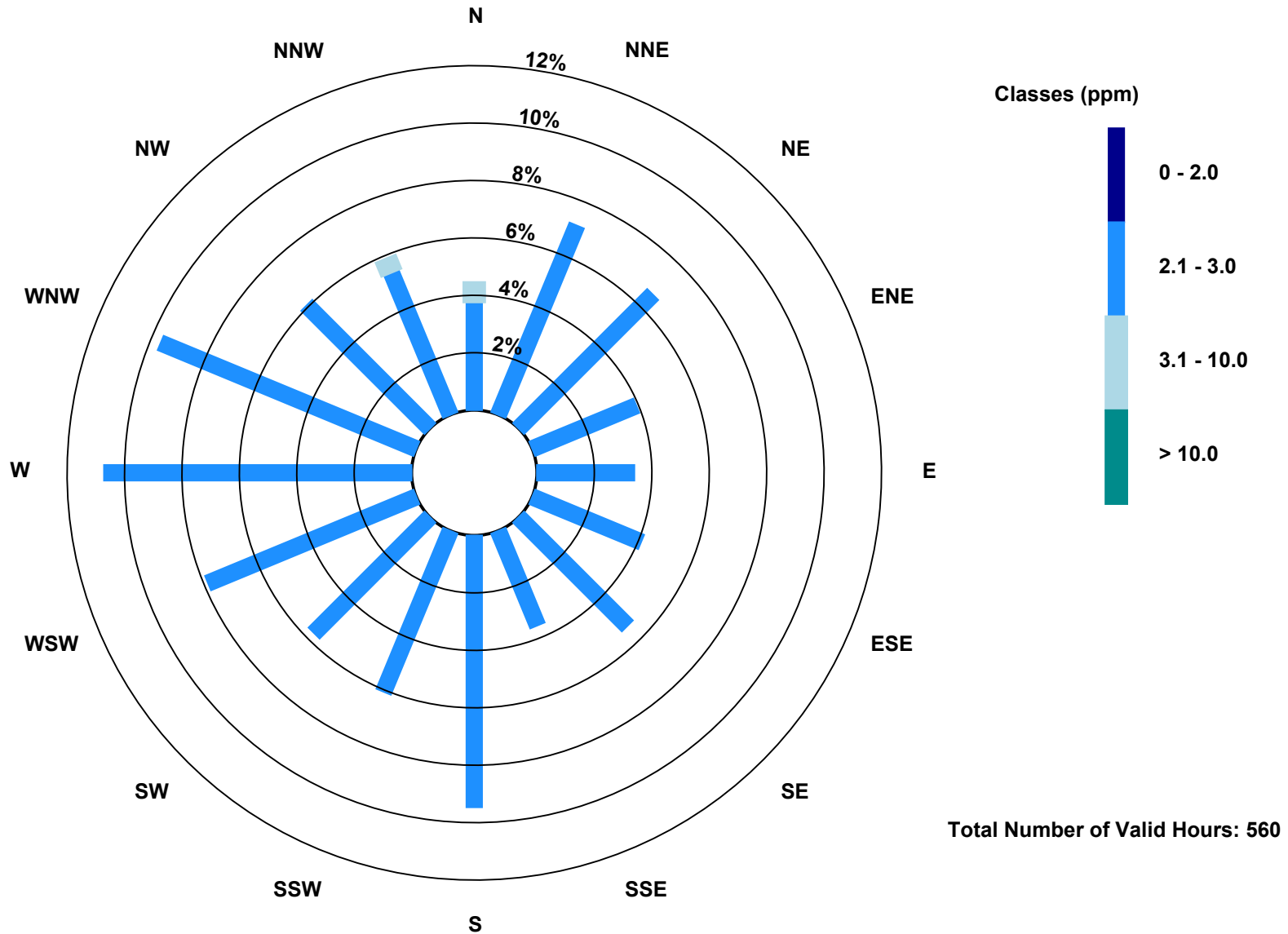
Total Number of Valid Hours: 560

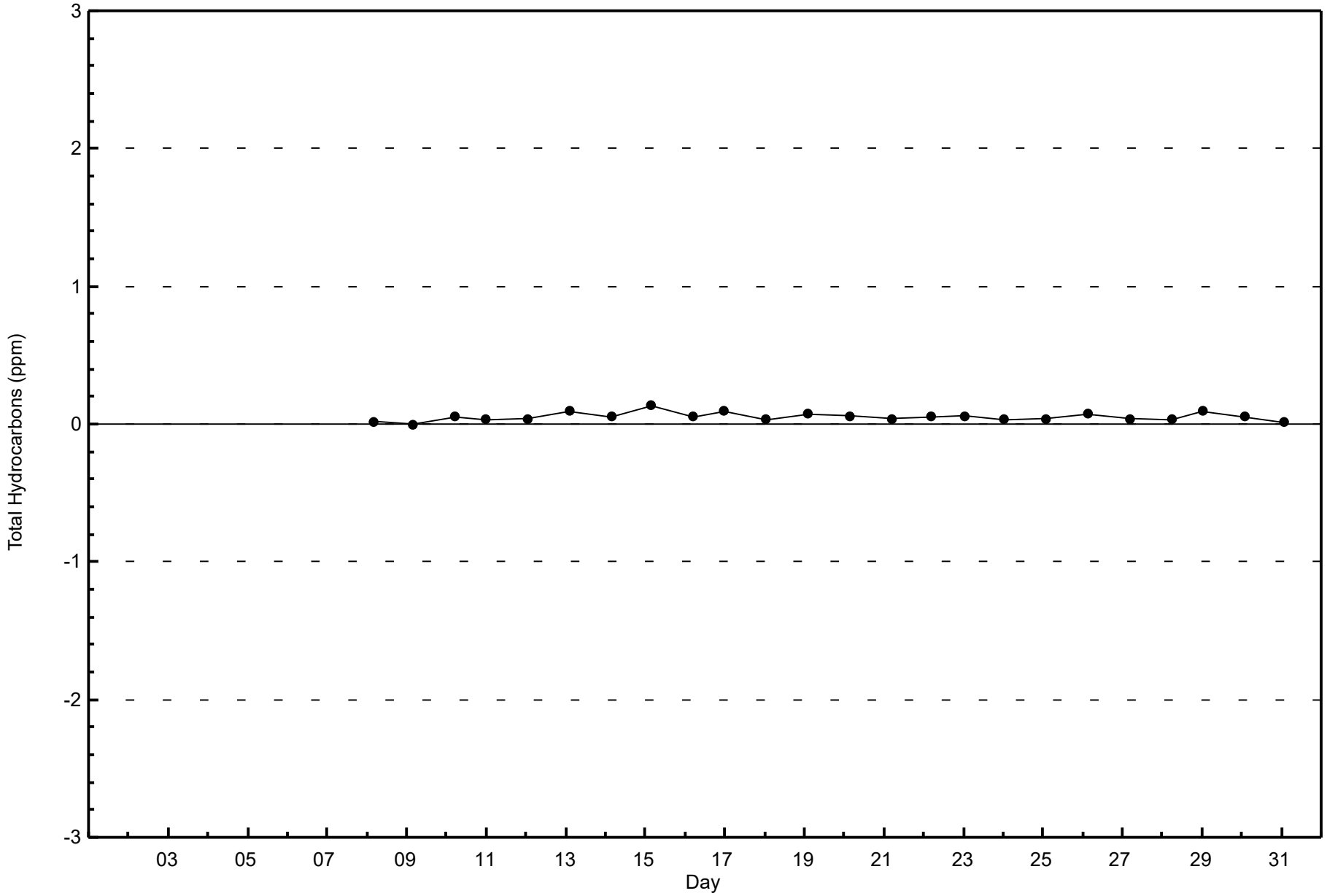
Total Number of Hours: 744

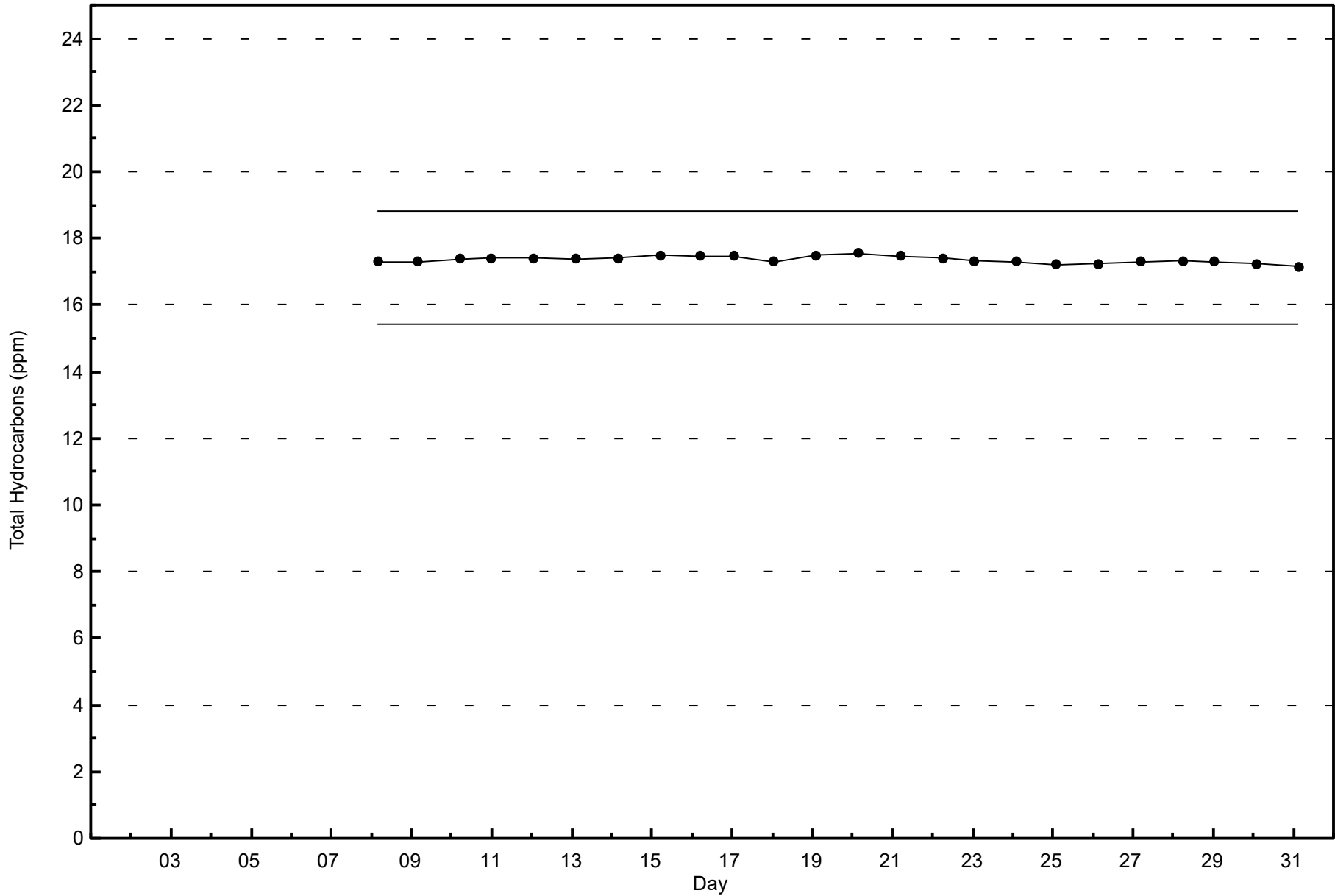


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Total Hydrocarbons (THC) - ppm
Kirby South









Wood Buffalo Environmental Association
Summary of Hour Averages

Nitric Oxide (NO) - ppb
Kirby South - July 2023

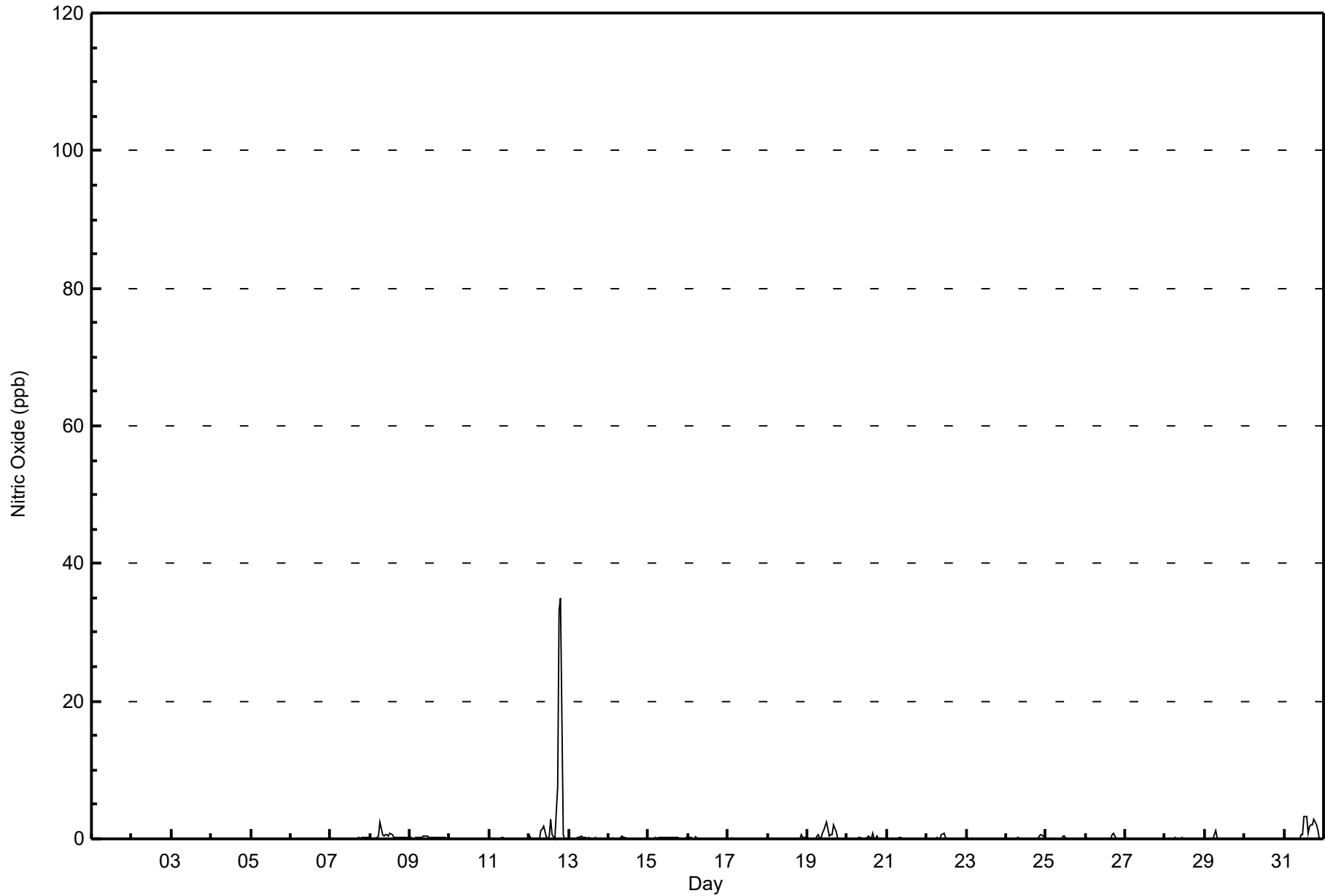
Maximum Value: 34.9 ppb on Jul 12 20:00		Maximum Daily Average: 3.9 ppb on Jul 12		Hours in Service: 610																						
Minimum Value: 0.0 ppb on Jul 10 08:00		Minimum Daily Average: 0.0 ppb on Jul 23		Hours of Data: 560																						
Maximum Diurnal Average: 1.5 ppb at hour 20		Minimum Diurnal Average: 0.0 ppb at hour 2		Hours of Missing Data: 50																						
Monthly Average: 0.28 ppb		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.1 P ₉₀ = 0.3 P ₉₉ = 3.0		Hours of Calibration: 29																						
				Percent Operational Time: 96.6																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	M	M	M	M	M	M	M	M	M	M	M	--	--
7-Jul	M	M	M	M	M	M	M	M	M	M	M	C	C	C	C	C	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	--	0.2
8-Jul	0.1	Z	0.1	0.1	0.2	0.5	2.4	0.5	0.4	0.5	0.6	0.3	0.9	0.6	0.3	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.4	2.4
9-Jul	0.1	0.1	Z	0.2	0.2	0.2	0.2	0.3	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.4
10-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11-Jul	0.0	0.0	0.0	0.0	Z	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1
12-Jul	0.3	0.1	0.1	0.1	0.0	Z	0.1	1.2	1.4	1.9	0.3	0.0	0.5	2.8	0.7	0.1	3.8	7.5	33.1	34.9	0.6	0.0	0.0	0.0	3.9	34.9
13-Jul	Z	0.0	0.1	0.1	0.1	0.1	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	
14-Jul	0.0	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.2	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.4
15-Jul	0.0	0.0	Z	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3
16-Jul	0.2	0.3	0.3	Z	0.4	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	0.1	0.4
17-Jul	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
18-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.3	0.1	0.1	0.0	0.6
19-Jul	Z	0.0	0.1	0.0	0.0	0.1	0.7	0.3	0.1	0.9	1.2	2.4	1.4	0.5	0.5	0.6	2.1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.4
20-Jul	0.0	Z	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.0	0.0	0.0	0.2	0.3	0.0	0.8	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.1	0.8	
21-Jul	0.0	0.0	Z	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
22-Jul	0.0	0.0	0.0	Z	0.0	0.1	0.2	0.0	0.0	0.6	0.8	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	0.1	0.8
23-Jul	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jul	0.0	0.0	0.0	0.0	0.0	Z	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	0.5	0.6	0.5	0.1	0.1	0.6
25-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
26-Jul	0.0	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	0.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8
27-Jul	0.0	0.0	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	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
28-Jul	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
29-Jul	0.0	0.0	0.0	0.0	Z	0.0	1.3	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	0.1	1.3
30-Jul	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
31-Jul	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.6	3.3	3.2	0.8	1.9	1.9	2.0	2.8	2.1	1.1	0.0	0.0	0.0	0.9	3.3
																								Diurnal Average		
																								Diurnal Maximum		
																								0.0 0.3		
																								0.1 0.3		
																								0.2 0.2		
																								0.1 1.4		
																								0.2 1.9		
																								0.2 1.2		
																								0.3 2.4		
																								0.3 3.3		
																								0.3 3.2		
																								0.1 0.8		
																								0.2 1.9		
																								0.4 3.8		
																								0.5 7.5		
																								1.5 33.1		
																								1.5 34.9		
																								0.1 1.1		
																								0.1 0.6		
																								0.1 0.5		
																								0.0 0.2		

Z - zerospan C - Calibration M - Maintenance NS - Not in Service



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Kirby South - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Kirby South - July 2023**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	558	99.64	99.64
21 - 40	2	0.36	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 560

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Kirby South - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	25	38	36	23	20	22	31	20	50	35	35	41	58	57	33	34	558
21 - 40	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	25	40	36	23	20	22	31	20	50	35	35	41	58	57	33	34	560

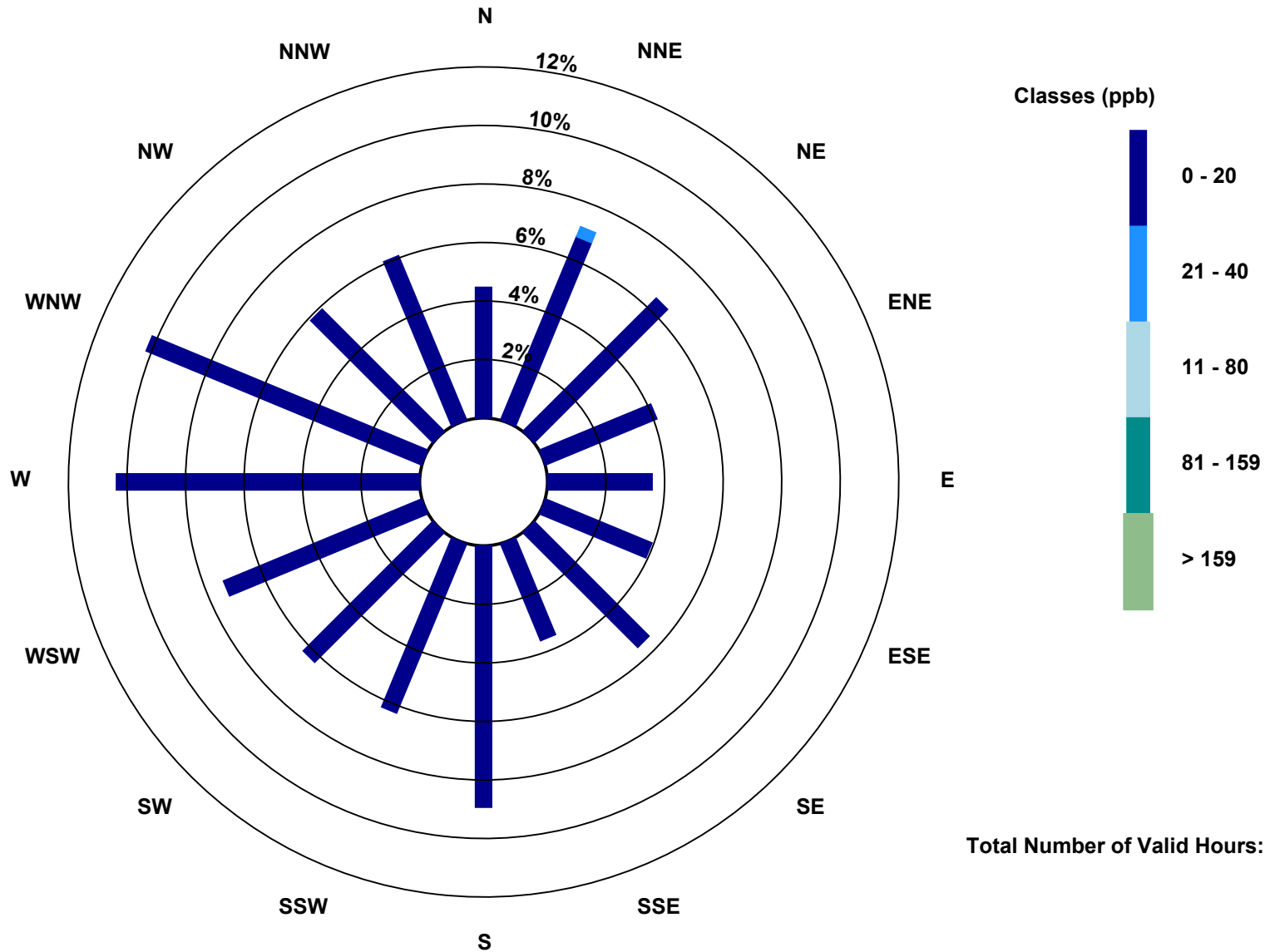
Total Number of Valid Hours: 560

Total Number of Hours: 744

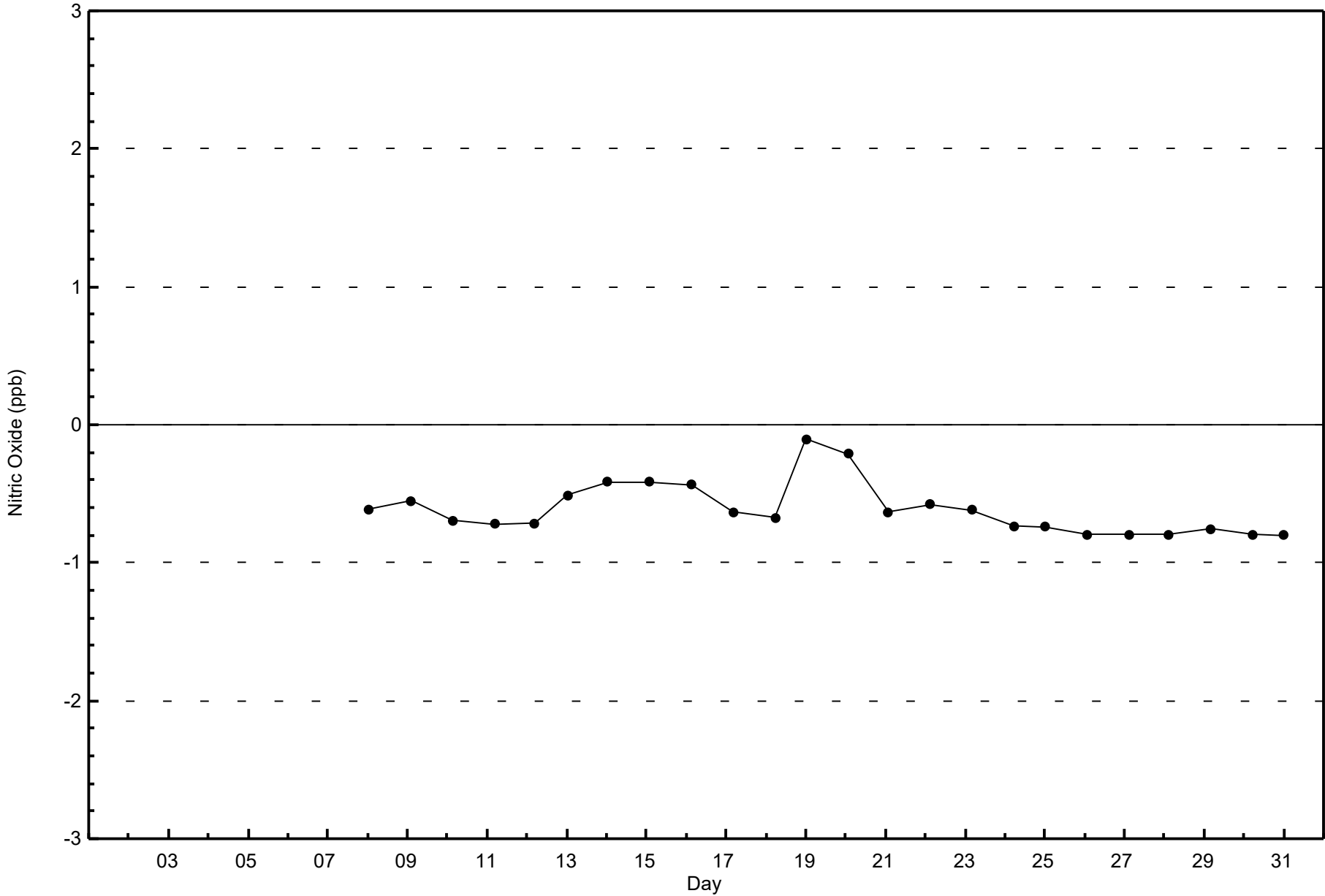


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitric Oxide (NO) - ppb
Kirby South



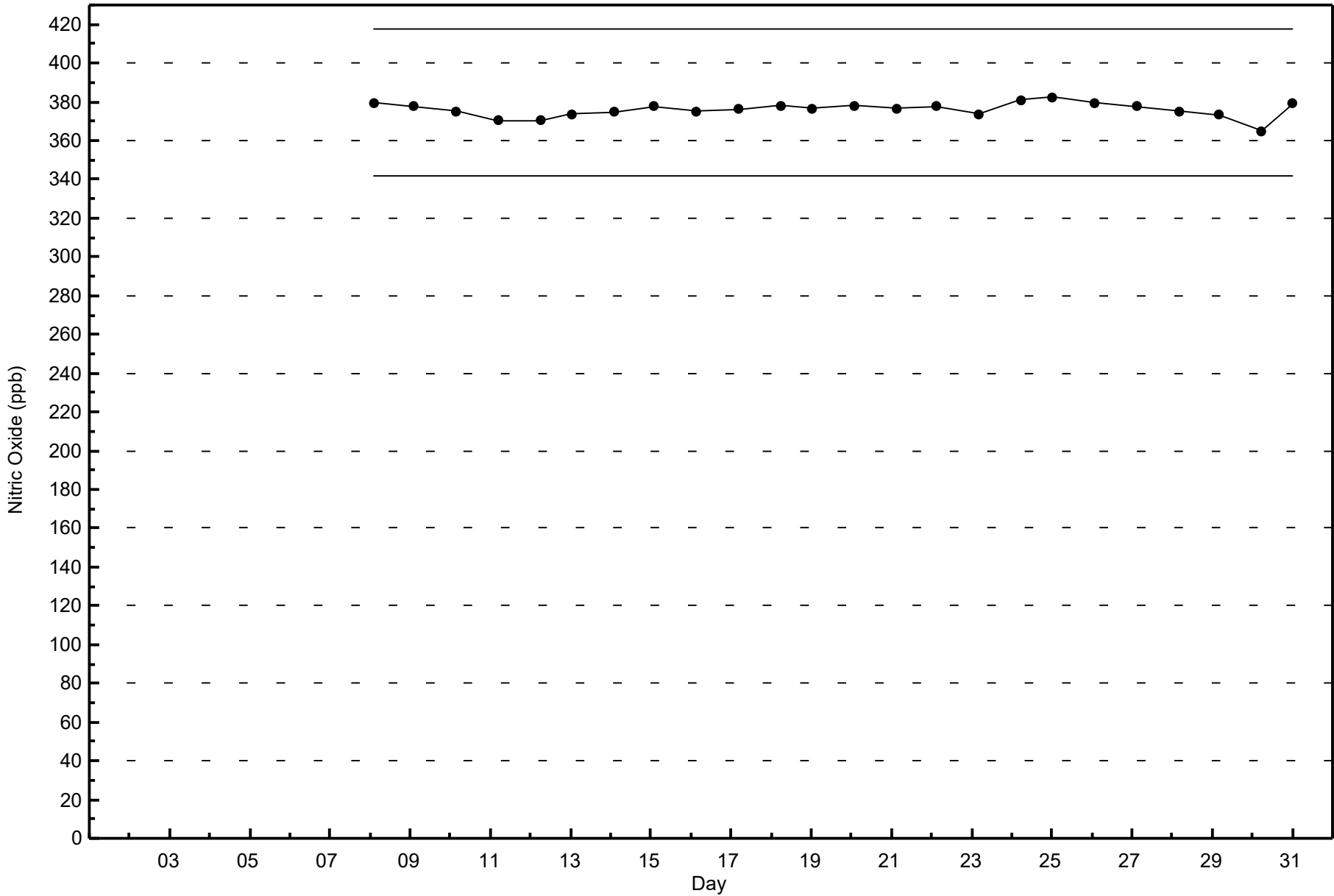
Total Number of Valid Hours: 560





Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Kirby South - July 2023





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Kirby South - July 2023

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	610
Maximum Value: 31.4 ppb on Jul 12 20:00	Maximum Daily Average: 4.3 ppb on Jul 12		Hours of Data:	560
Minimum Value: 0.0 ppb on Jul 27 08:00	Minimum Daily Average: 0.3 ppb on Jul 27		Hours of Missing Data:	50
Maximum Diurnal Average: 2.2 ppb at hour 20	Minimum Diurnal Average: 0.8 ppb at hour 24		Hours of Calibration:	29
Monthly Average: 1.26 ppb	Percentiles: P ₁ = 0.1 P ₁₀ = 0.3 Q ₁ = 0.5 Median = 0.8 Q ₃ = 1.5 P ₉₀ = 2.5 P ₉₉ = 5.8		Percent Operational Time:	96.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	M	M	M	M	M	M	M	M	M	M	--	--
7-Jul	M	M	M	M	M	M	M	M	M	M	M	C	C	C	C	C	0.8	0.7	0.6	0.5	0.5	0.5	0.6	0.6	--	0.8
8-Jul	0.6	Z	1.0	0.9	2.1	2.9	5.4	1.6	1.4	1.7	1.7	1.2	1.5	1.7	1.2	1.0	1.3	1.4	1.3	1.8	1.0	0.7	0.5	0.6	1.5	5.4
9-Jul	0.9	1.0	Z	0.9	1.7	2.2	2.1	1.7	2.5	2.4	2.4	2.0	2.0	1.4	1.2	1.1	0.9	0.8	0.6	0.4	0.4	0.2	0.1	0.2	1.3	2.5
10-Jul	0.2	0.3	0.2	Z	0.7	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.8	0.6	0.8	0.3	0.8
11-Jul	2.1	1.4	1.5	2.5	Z	2.4	1.6	1.2	1.2	1.0	0.6	0.4	0.4	0.5	0.4	0.5	0.4	0.6	0.5	0.6	0.8	0.6	0.6	0.8	1.0	2.5
12-Jul	1.6	0.8	0.6	0.8	0.7	Z	0.8	2.4	2.8	3.1	1.5	0.8	1.4	3.0	1.2	0.7	3.7	6.0	24.0	31.4	4.2	2.7	2.2	2.0	4.3	31.4
13-Jul	Z	1.8	2.0	2.3	2.6	4.5	5.6	5.6	4.3	3.9	2.3	2.1	2.4	1.6	1.5	1.3	1.3	0.8	0.6	0.6	1.0	1.5	1.9	1.9	2.3	5.6
14-Jul	2.9	Z	5.5	6.6	6.1	4.5	3.3	2.8	4.1	3.0	3.2	2.9	2.2	2.3	2.6	2.8	2.7	2.6	2.5	2.7	2.3	2.1	1.6	1.4	3.2	6.6
15-Jul	1.7	1.6	Z	1.8	2.2	2.5	3.0	4.2	3.4	2.8	2.9	2.4	2.0	2.1	2.3	2.3	2.3	2.1	1.8	1.2	0.9	0.9	0.8	0.8	2.1	4.2
16-Jul	0.8	0.8	0.8	Z	1.0	0.5	0.4	0.2	0.4	0.4	0.3	0.5	0.5	0.5	0.7	0.8	1.0	1.0	1.0	1.1	1.0	0.9	0.7	0.4	0.7	1.1
17-Jul	0.5	0.6	0.9	1.4	Z	1.2	1.1	1.0	0.8	0.8	0.8	0.6	0.4	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.6	1.4
18-Jul	0.3	0.3	0.4	0.4	0.7	Z	1.2	1.1	0.4	0.6	0.9	0.9	1.1	0.5	0.6	0.7	0.3	0.1	0.1	0.6	1.5	0.9	1.3	1.4	0.7	1.5
19-Jul	Z	1.2	0.9	1.5	1.3	2.2	2.4	0.8	0.6	1.3	1.7	2.9	1.7	1.0	1.5	1.2	2.3	2.0	0.6	0.5	1.8	1.1	0.8	0.5	1.4	2.9
20-Jul	0.6	Z	0.5	0.6	0.8	1.1	1.8	1.8	1.1	0.5	0.5	0.5	1.0	1.4	0.9	2.2	0.8	0.7	1.7	0.4	0.5	0.8	1.0	0.6	0.9	2.2
21-Jul	0.6	1.3	Z	2.0	0.8	1.9	1.6	1.4	1.4	0.7	0.6	0.7	0.8	1.1	0.9	0.9	1.0	1.0	1.1	1.6	1.0	1.0	0.8	1.1	1.1	2.0
22-Jul	1.0	0.7	0.7	Z	0.7	0.8	1.7	1.2	1.2	2.8	2.8	1.2	0.7	1.1	0.8	0.7	0.8	0.4	0.5	1.0	0.5	0.6	0.6	0.6	1.0	2.8
23-Jul	0.6	0.6	0.6	0.7	Z	0.7	0.9	1.0	1.5	0.7	0.4	0.4	0.4	0.5	0.5	0.4	0.5	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.6	1.5
24-Jul	0.5	0.7	0.9	2.2	4.4	Z	2.0	1.7	1.1	1.2	0.9	0.7	0.8	0.6	0.6	0.6	0.6	0.5	0.4	0.4	0.9	1.5	1.0	0.9	1.1	4.4
25-Jul	Z	0.4	1.0	0.7	1.0	1.1	0.9	0.6	0.3	1.2	1.7	1.1	0.4	0.3	0.5	0.4	0.6	0.4	0.4	0.2	0.2	0.5	1.2	0.9	0.7	1.7
26-Jul	1.0	Z	0.6	0.7	0.7	0.4	0.4	0.6	0.3	0.7	0.4	0.2	0.3	0.3	0.5	0.5	0.7	1.2	0.9	0.6	0.4	0.4	0.4	0.2	0.5	1.2
27-Jul	0.2	0.1	Z	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.2	0.9	0.3	1.2	0.9	0.5	0.5	0.6	0.6	0.3	1.2
28-Jul	0.8	1.0	1.1	Z	1.8	1.7	1.1	0.6	0.2	0.2	0.3	0.1	0.2	0.4	0.5	0.4	0.8	0.6	0.4	0.7	0.5	0.8	2.6	0.8	0.8	2.6
29-Jul	1.2	1.7	2.2	2.3	Z	0.7	4.1	1.2	0.7	0.3	0.3	0.3	0.2	0.3	0.5	0.5	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.6	0.9	4.1
30-Jul	1.4	2.7	2.8	2.7	2.1	Z	1.3	1.2	0.9	0.6	0.5	0.4	0.4	0.5	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.9	1.0	2.8
31-Jul	Z	0.6	0.5	0.8	0.7	0.7	0.7	0.7	0.6	0.7	1.5	1.7	5.0	5.1	2.1	3.9	3.7	4.9	7.6	5.4	4.6	0.6	0.6	0.7	2.3	7.6

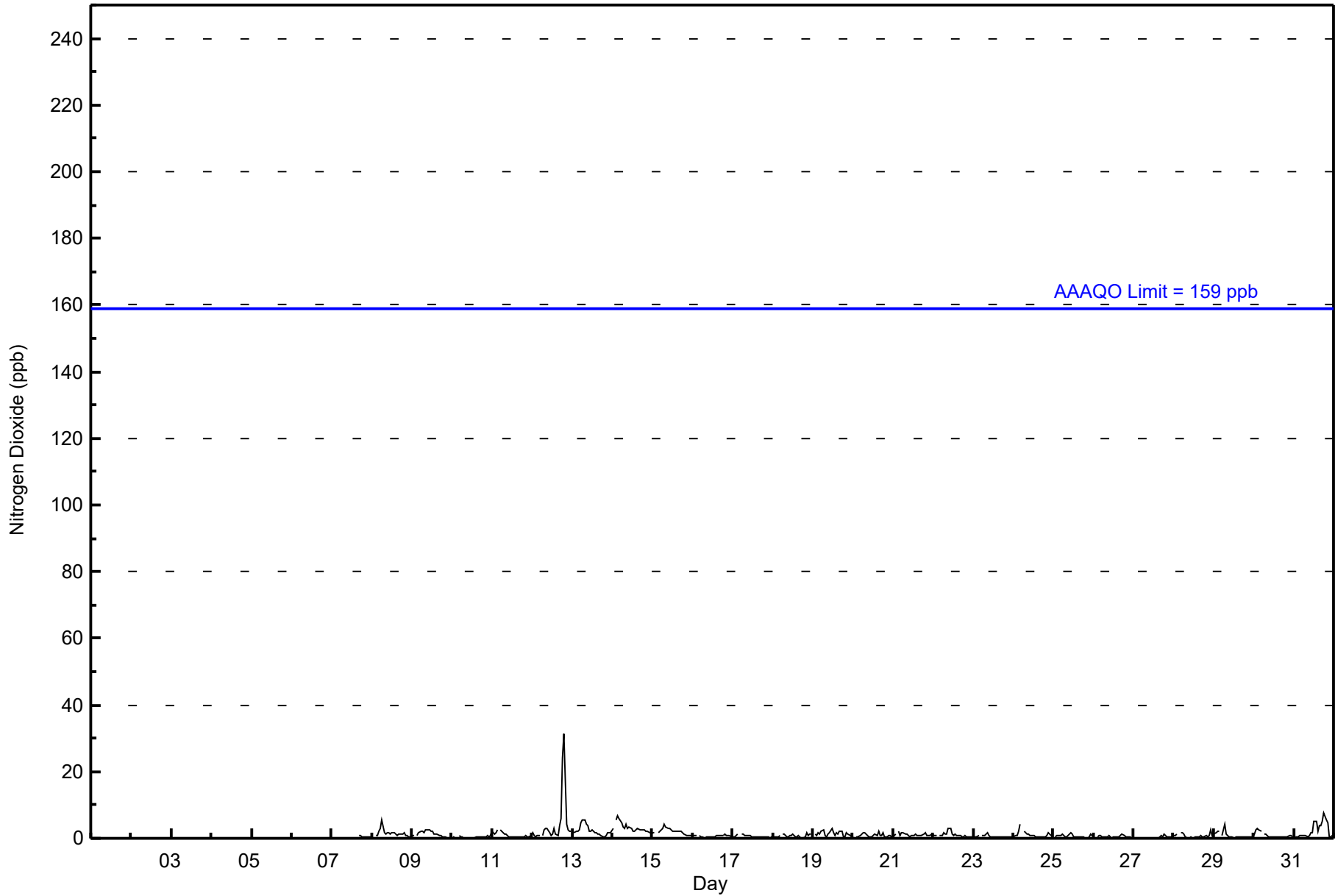
1.0	1.0	1.2	1.6	1.6	1.6	1.8	1.4	1.3	1.3	1.2	1.0	1.1	1.1	0.9	1.0	1.2	1.2	2.0	2.2	1.1	0.9	0.9	0.8	Diurnal Average	
2.9	2.7	5.5	6.6	6.1	4.5	5.6	5.6	4.3	3.9	3.2	2.9	5.0	5.1	2.6	3.9	3.7	6.0	24.0	31.4	4.6	2.7	2.6	2.0	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance NS - Not in Service
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Kirby South - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Kirby South - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	558	99.64	99.64
21 - 40	2	0.36	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 560

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Kirby South - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	25	38	36	23	20	22	31	20	50	35	35	41	58	57	33	34	558
21 - 40	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	25	40	36	23	20	22	31	20	50	35	35	41	58	57	33	34	560

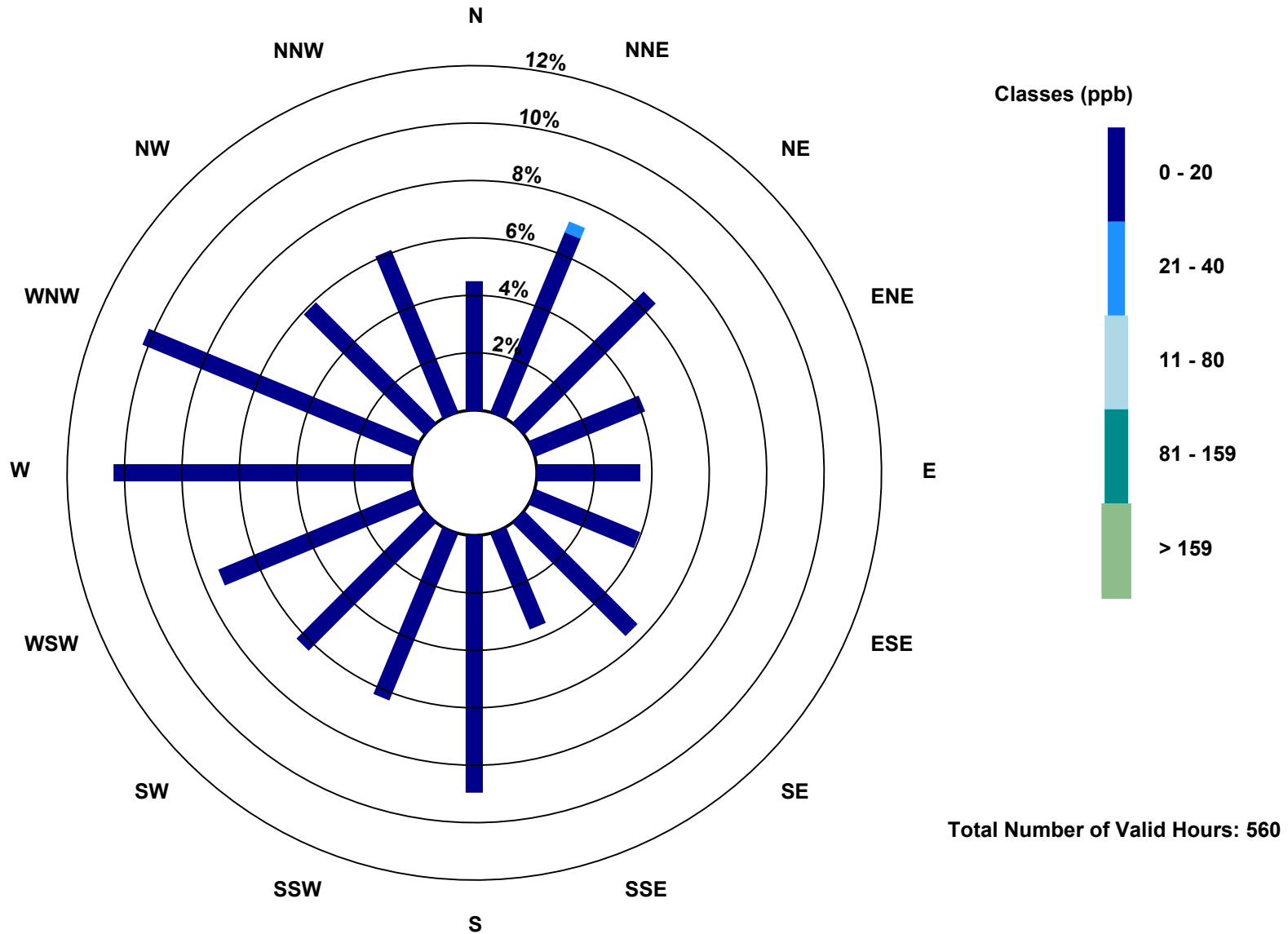
Total Number of Valid Hours: 560

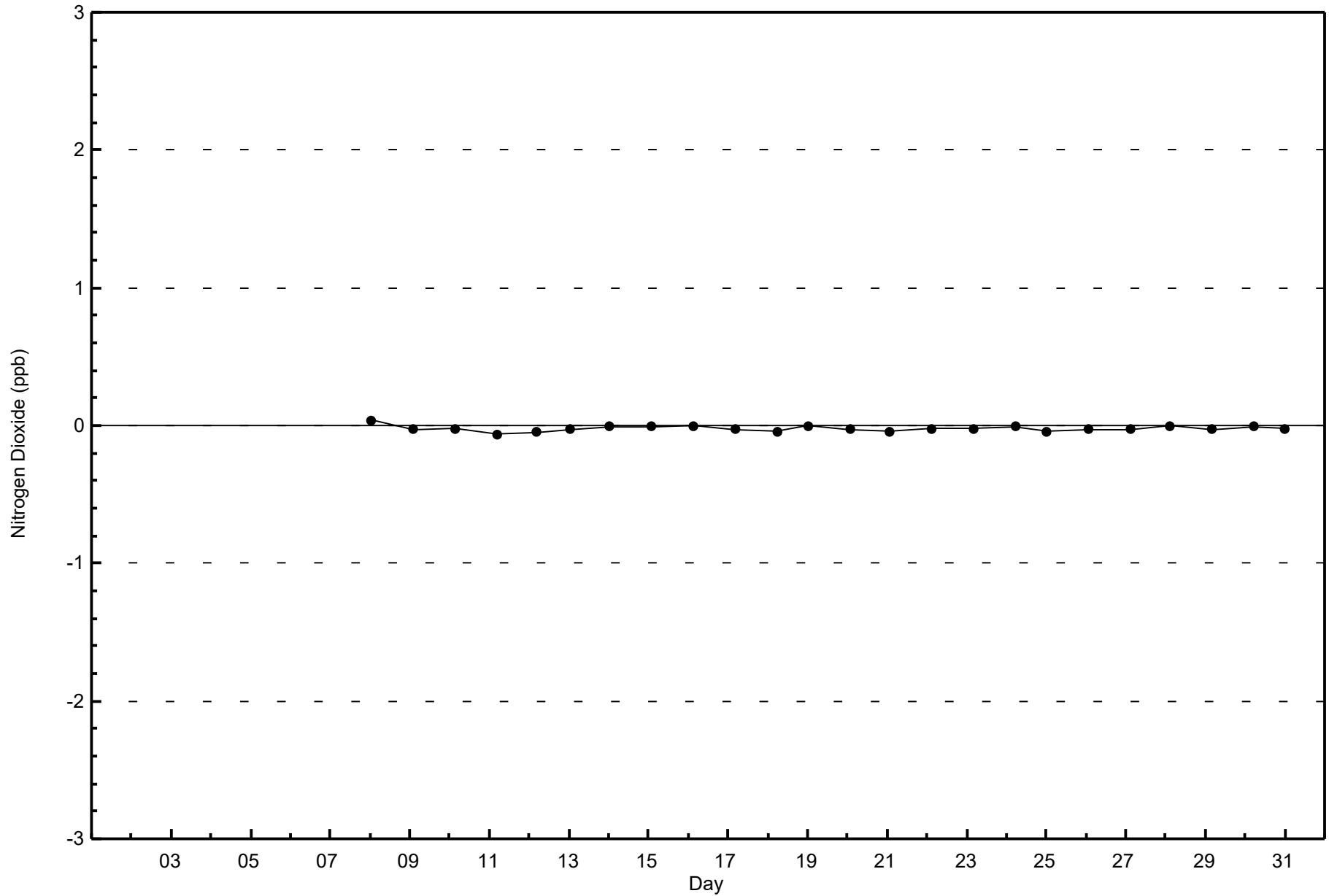
Total Number of Hours: 744

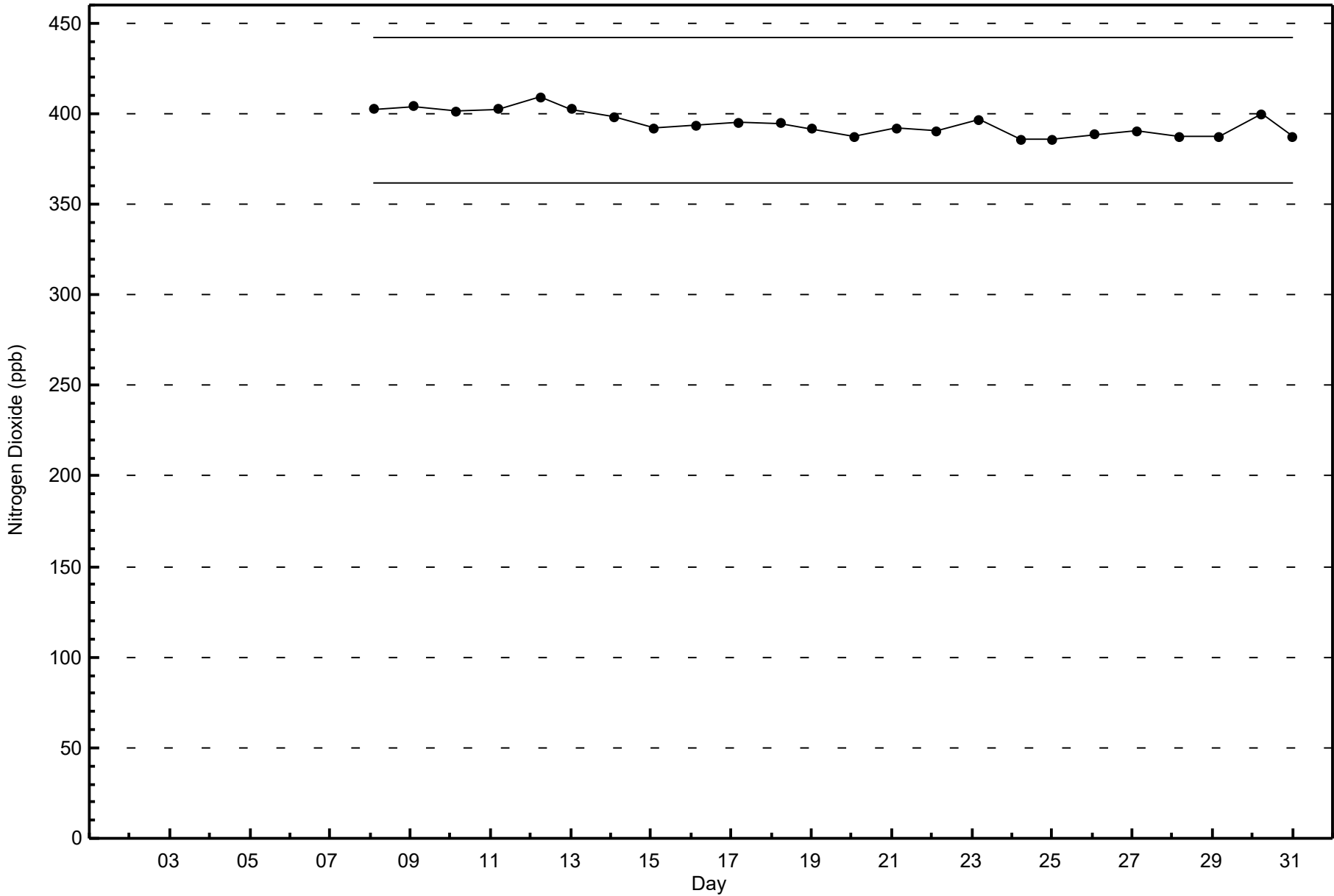


Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Dioxide (NO₂) - ppb
Kirby South









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

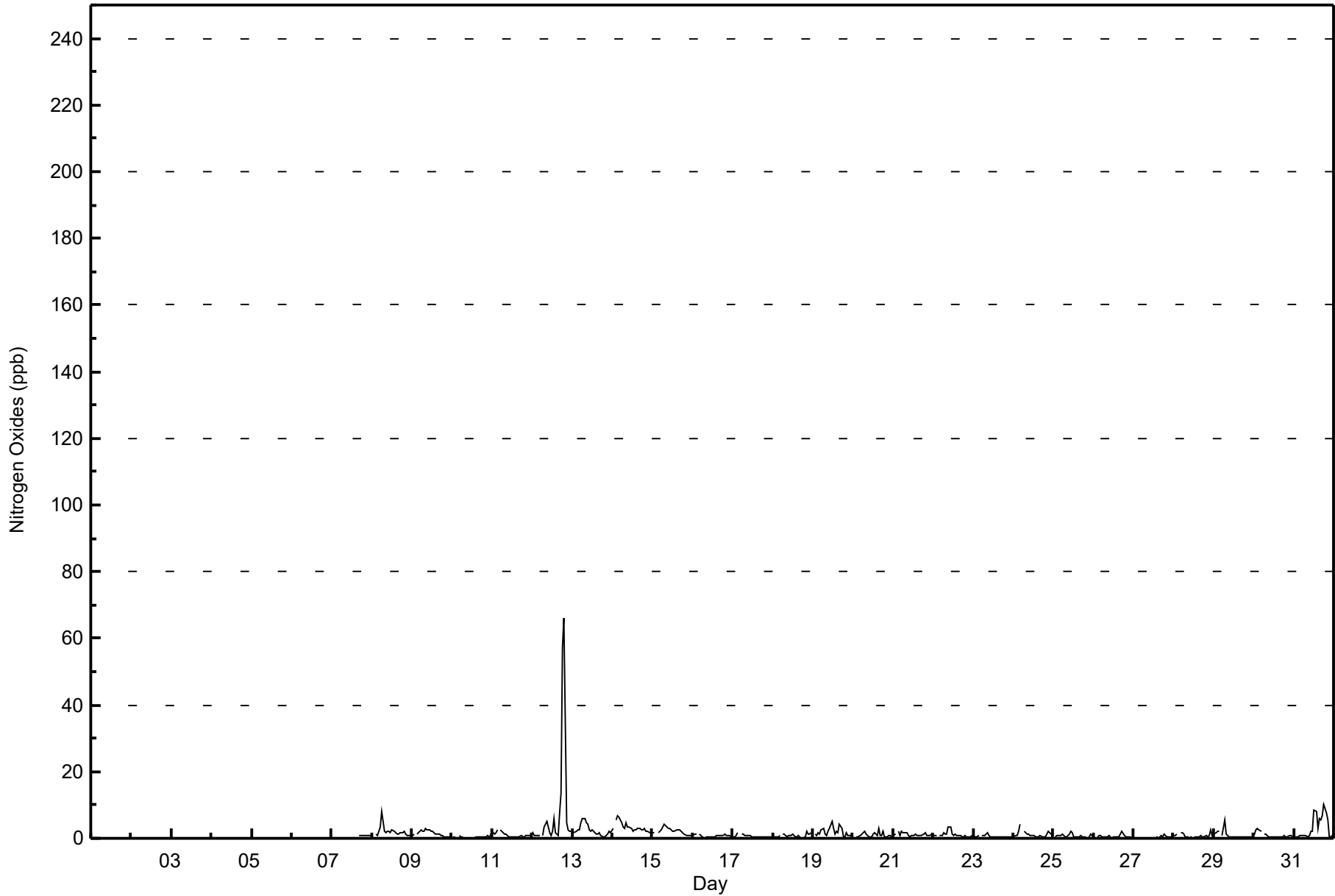
Kirby South - July 2023

Maximum Value: 66.3 ppb on Jul 12 20:00																				Maximum Daily Average: 8.2 ppb on Jul 12					Hours in Service: 610	
Minimum Value: 0.0 ppb on Jul 27 10:00																				Minimum Daily Average: 0.3 ppb on Jul 27					Hours of Data: 560	
Maximum Diurnal Average: 3.7 ppb at hour 20																				Minimum Diurnal Average: 0.8 ppb at hour 24					Hours of Missing Data: 50	
Monthly Average: 1.55 ppb																				Percentiles: P ₁ = 0.1 P ₁₀ = 0.3 Q ₁ = 0.5 Median = 0.8 Q ₃ = 1.7 P ₉₀ = 2.8 P ₉₉ = 8.0					Hours of Calibration: 29	
																									Percent Operational Time: 96.6	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	M	M	M	M	M	M	M	M	M	M	--	--
7-Jul	M	M	M	M	M	M	M	M	M	M	M	C	C	C	C	C	0.9	0.8	0.7	0.6	0.7	0.7	0.7	0.7	--	0.9
8-Jul	0.7	Z	1.1	1.0	2.3	3.4	7.8	2.1	1.8	2.2	2.3	1.5	2.4	2.3	1.5	1.1	1.4	1.6	1.5	2.0	1.2	0.9	0.7	0.7	1.9	7.8
9-Jul	1.0	1.1	Z	1.1	1.9	2.4	2.3	2.0	2.9	2.7	2.7	2.3	2.2	1.6	1.4	1.3	1.1	0.9	0.7	0.5	0.5	0.3	0.2	0.2	1.4	2.9
10-Jul	0.2	0.3	0.2	Z	0.7	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.8	0.6	0.8	0.3	0.8
11-Jul	2.1	1.4	1.5	2.5	Z	2.5	1.7	1.3	1.3	1.0	0.6	0.4	0.4	0.5	0.4	0.5	0.4	0.6	0.5	0.6	0.9	0.7	0.7	0.9	1.0	2.5
12-Jul	1.9	0.9	0.7	0.9	0.7	Z	0.9	3.6	4.2	5.0	1.8	0.8	1.9	5.8	1.9	0.8	7.5	13.5	57.1	66.3	4.8	2.7	2.2	2.0	8.2	66.3
13-Jul	Z	1.8	2.1	2.4	2.7	4.6	5.9	5.9	4.5	4.1	2.4	2.2	2.5	1.7	1.5	1.3	1.5	0.8	0.6	0.6	1.0	1.5	1.9	1.9	2.4	5.9
14-Jul	2.9	Z	5.6	6.7	6.2	4.6	3.4	2.9	4.5	3.2	3.4	3.0	2.2	2.4	2.6	2.9	2.8	2.7	2.6	2.8	2.3	2.1	1.6	1.4	3.3	6.7
15-Jul	1.7	1.6	Z	1.9	2.3	2.6	3.2	4.4	3.7	3.1	3.1	2.6	2.2	2.3	2.5	2.5	2.5	2.3	1.9	1.3	1.0	1.0	0.9	1.0	2.2	4.4
16-Jul	1.0	1.1	1.1	Z	1.4	0.7	0.4	0.2	0.4	0.4	0.3	0.5	0.5	0.5	0.7	0.8	1.0	1.0	1.0	1.1	1.0	0.9	0.7	0.4	0.7	1.4
17-Jul	0.5	0.6	0.9	1.5	Z	1.2	1.1	1.0	0.8	0.8	0.8	0.6	0.4	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.6	1.5
18-Jul	0.3	0.3	0.4	0.4	0.7	Z	1.2	1.1	0.4	0.6	0.9	0.9	1.1	0.5	0.6	0.7	0.3	0.1	0.1	0.6	2.1	1.2	1.4	1.5	0.8	2.1
19-Jul	Z	1.2	1.0	1.5	1.3	2.3	3.1	1.1	0.7	2.2	2.9	5.3	3.1	1.5	2.0	1.8	4.4	3.0	0.6	0.5	1.8	1.1	0.8	0.5	1.9	5.3
20-Jul	0.6	Z	0.5	0.6	0.8	1.1	1.9	2.1	1.2	0.5	0.5	0.5	1.2	1.7	0.9	3.0	0.8	0.7	2.1	0.4	0.5	0.8	1.0	0.6	1.0	3.0
21-Jul	0.6	1.3	Z	2.0	0.8	2.0	1.7	1.5	1.5	0.7	0.6	0.7	0.8	1.1	0.9	0.9	1.0	1.0	1.1	1.6	1.0	1.0	0.8	1.1	1.1	2.0
22-Jul	1.0	0.7	0.7	Z	0.7	0.9	1.9	1.2	1.2	3.4	3.6	1.3	0.7	1.2	0.8	0.7	0.8	0.4	0.5	1.0	0.5	0.6	0.6	0.6	1.1	3.6
23-Jul	0.6	0.6	0.6	0.7	Z	0.7	0.9	1.0	1.5	0.7	0.4	0.4	0.4	0.5	0.5	0.4	0.5	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.6	1.5
24-Jul	0.5	0.7	0.9	2.2	4.4	Z	2.1	1.8	1.1	1.2	0.9	0.7	0.8	0.6	0.6	0.6	0.6	0.5	0.4	0.4	1.4	2.1	1.5	1.0	1.2	4.4
25-Jul	Z	0.4	1.0	0.7	1.0	1.1	0.9	0.6	0.3	1.2	2.0	1.5	0.4	0.3	0.5	0.4	0.6	0.4	0.4	0.2	0.2	0.5	1.2	0.9	0.7	2.0
26-Jul	1.0	Z	0.6	0.7	0.7	0.4	0.4	0.6	0.3	0.7	0.4	0.2	0.3	0.3	0.5	0.5	1.3	2.0	0.9	0.6	0.4	0.4	0.4	0.2	0.6	2.0
27-Jul	0.2	0.1	Z	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.2	0.9	0.3	1.3	0.9	0.5	0.5	0.6	0.6	0.3	1.3
28-Jul	0.8	1.0	1.1	Z	1.8	1.7	1.2	0.6	0.2	0.2	0.5	0.1	0.2	0.4	0.5	0.4	0.8	0.6	0.4	0.7	0.5	0.8	2.6	0.8	0.8	2.6
29-Jul	1.2	1.7	2.2	2.3	Z	0.7	5.4	1.4	0.7	0.3	0.3	0.3	0.2	0.3	0.5	0.5	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.6	0.9	5.4
30-Jul	1.4	2.7	2.8	2.7	2.1	Z	1.3	1.3	0.9	0.6	0.5	0.4	0.4	0.5	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.7	0.9	0.6	1.0	2.8
31-Jul	Z	0.6	0.5	0.8	0.7	0.7	0.7	0.7	0.6	0.7	2.1	2.3	8.3	8.3	2.9	5.8	5.6	6.9	10.4	7.5	5.7	0.6	0.6	0.7	3.2	10.4
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan			C - Calibration			M - Maintenance			NS - Not in Service																	



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Kirby South - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Kirby South - July 2023

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	558	99.64	99.64
21 - 40	0	0.00	99.64
41 - 80	2	0.36	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 560

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Kirby South - July 2023**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	25	38	36	23	20	22	31	20	50	35	35	41	58	57	33	34	558
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	2	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	25	40	36	23	20	22	31	20	50	35	35	41	58	57	33	34	560

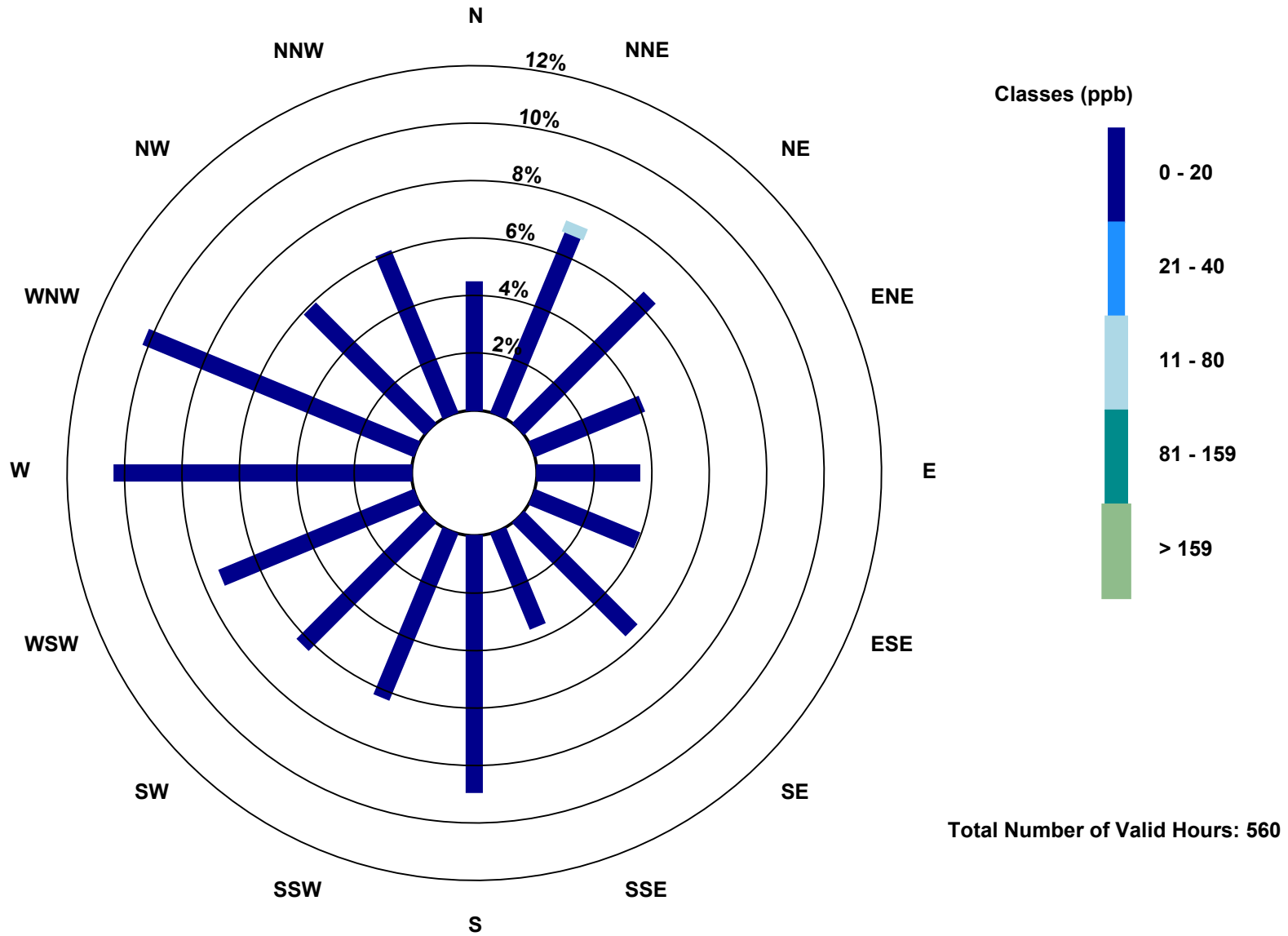
Total Number of Valid Hours: 560

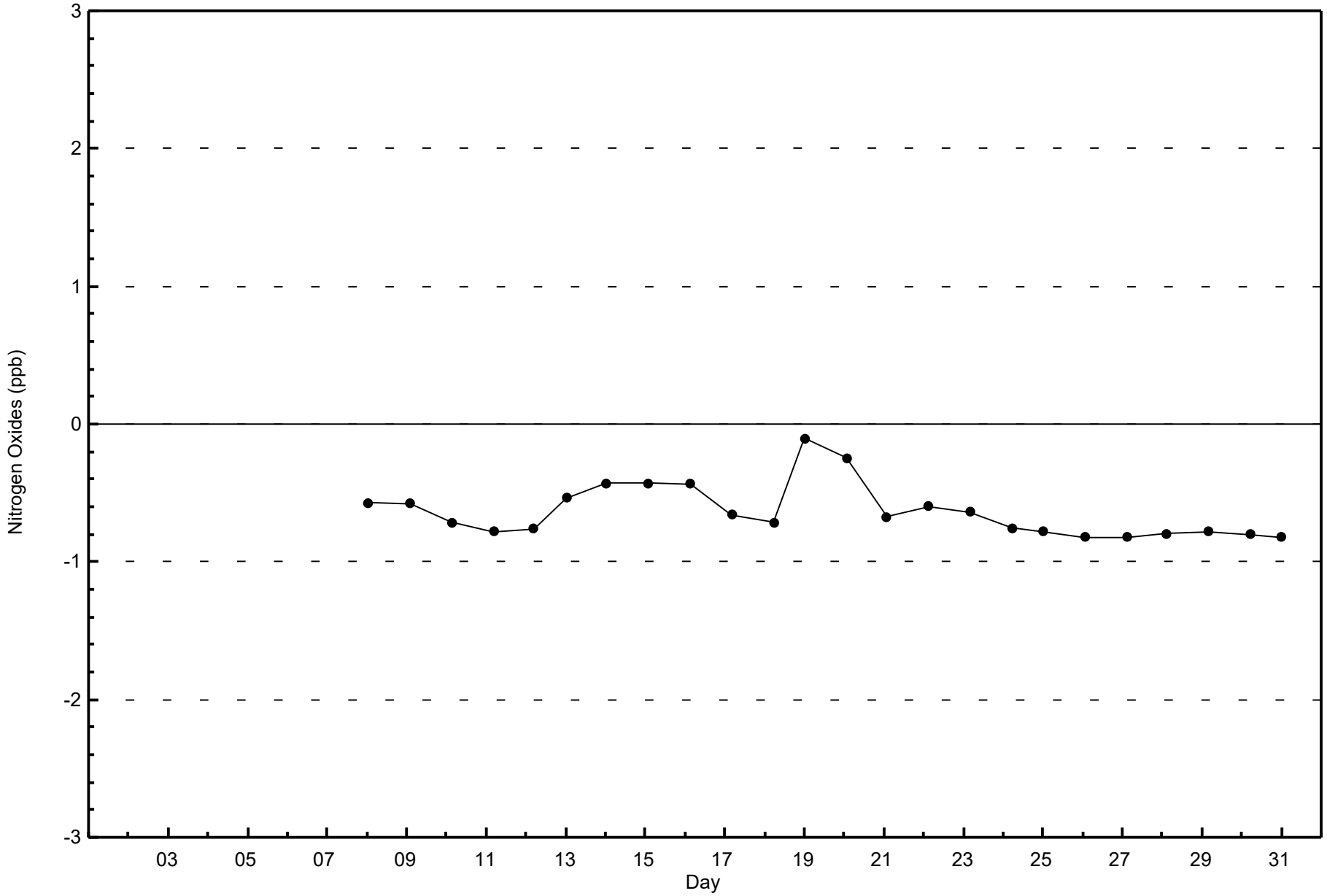
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Nitrogen Oxides (NO_x) - ppb
Kirby South

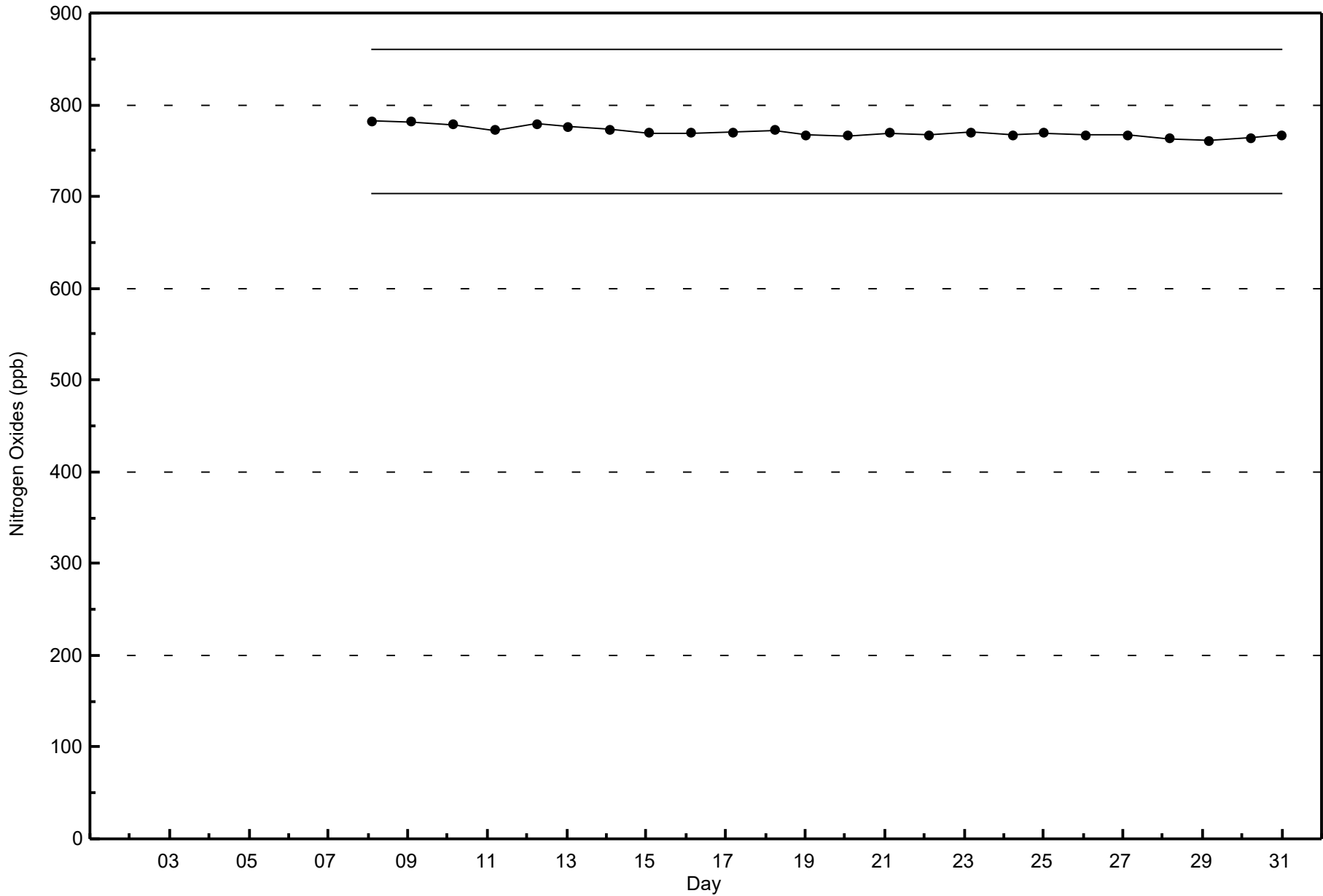






Wood Buffalo Environmental Association
Span Responses

Nitrogen Oxides (NO_x) - ppb
Kirby South - July 2023





Wood Buffalo Environmental Association
Summary of Hour Averages

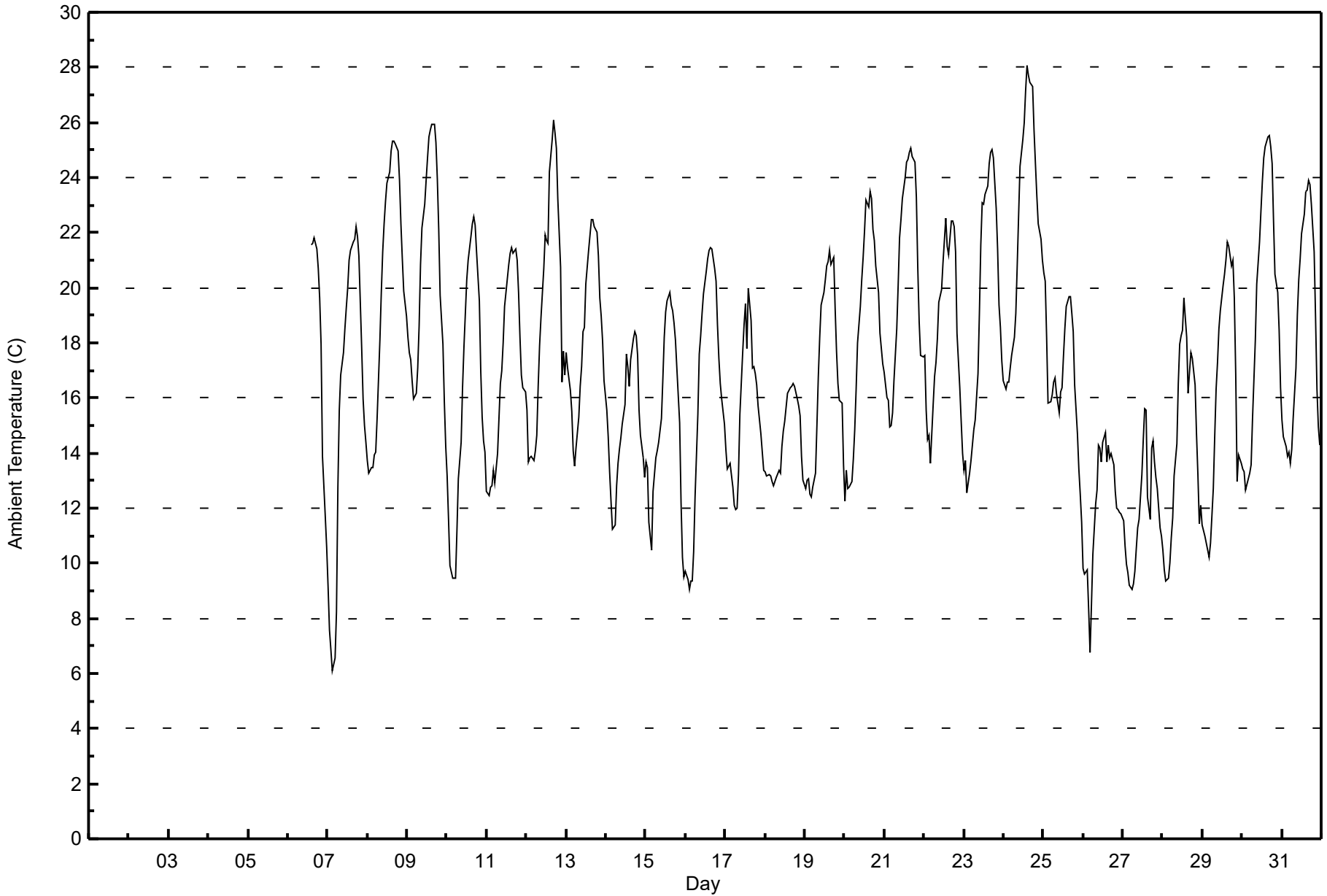
Ambient Temperature (AT) - C
Kirby South - July 2023

Maximum Value: 28.1 C on Jul 24 15:00		Maximum Daily Average: 22.2 C on Jul 24		Hours in Service: 610																							
Minimum Value: 6.1 C on Jul 7 04:00		Minimum Daily Average: 11.9 C on Jul 27		Hours of Data: 610																							
Maximum Diurnal Average: 21.4 C at hour 17		Minimum Diurnal Average: 12.4 C at hour 5		Hours of Missing Data: 0																							
Monthly Average: 17.14 C		Percentiles: P ₁ = 8.4 P ₁₀ = 11.7 Q ₁ = 13.7 Median = 16.8 Q ₃ = 20.8 P ₉₀ = 23.2 P ₉₉ = 26.0		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	21.6	21.6	21.8	21.4	20.7	19.6	17.9	13.9	11.7	10.6	--	21.8		
7-Jul	9.1	7.6	6.9	6.1	6.6	8.2	12.7	15.5	16.8	17.6	18.5	19.3	20.0	21.0	21.4	21.7	21.7	22.2	21.9	21.1	17.8	16.0	15.0	14.4	15.8	22.2	
8-Jul	13.8	13.3	13.5	13.5	13.9	14.0	15.3	18.1	19.8	21.3	22.3	23.1	23.8	24.2	24.9	25.3	25.3	25.2	25.0	23.9	22.3	21.1	19.9	19.0	20.1	25.3	
9-Jul	18.2	17.7	17.4	16.6	15.9	16.2	17.1	18.6	20.9	22.2	23.0	23.9	24.7	25.5	25.7	25.9	25.9	25.3	23.9	22.1	19.7	17.9	15.9	14.3	20.6	25.9	
10-Jul	13.2	11.6	9.9	9.5	9.5	9.5	11.2	13.1	14.4	16.4	17.8	19.0	20.3	21.0	21.9	22.3	22.6	22.3	21.3	19.5	17.0	15.3	14.5	14.0	16.1	22.6	
11-Jul	12.6	12.5	12.7	12.8	13.4	12.9	14.0	15.3	16.5	17.0	18.0	19.3	20.4	20.8	21.3	21.4	21.2	21.4	21.0	19.9	18.2	16.8	16.4	16.2	17.2	21.4	
12-Jul	15.6	13.7	13.9	13.9	13.7	14.1	14.7	16.4	17.9	18.9	20.7	21.9	21.7	21.6	24.2	25.4	26.1	25.6	25.1	23.2	20.7	16.6	17.7	16.9	19.2	26.1	
13-Jul	17.7	17.1	16.3	15.5	14.1	13.5	14.2	15.3	16.4	17.2	18.4	18.6	20.1	21.4	21.9	22.5	22.2	22.0	21.1	19.6	19.0	18.1	16.6	18.4	22.5		
14-Jul	15.6	14.6	13.3	12.3	11.2	11.4	12.8	13.6	14.2	14.6	15.1	15.8	17.6	17.1	16.4	17.4	18.1	18.4	18.3	17.5	15.6	14.6	13.8	13.1	15.1	18.4	
15-Jul	13.7	13.5	11.5	10.5	12.6	13.2	13.8	14.1	14.4	15.3	16.7	18.2	19.1	19.5	19.8	19.4	19.2	18.7	18.1	17.1	15.1	12.2	10.2	9.5	15.2	19.8	
16-Jul	9.7	9.4	9.0	9.4	9.4	10.4	12.4	15.4	17.6	18.3	19.1	19.8	20.6	21.0	21.4	21.5	21.4	20.7	20.2	18.7	17.4	16.5	16.0	15.1	16.3	21.5	
17-Jul	14.1	13.4	13.5	13.6	12.7	12.1	11.9	12.0	13.2	15.4	17.6	18.7	19.4	17.8	20.0	18.8	17.1	17.1	16.9	16.5	15.7	14.7	14.0	13.4	15.4	20.0	
18-Jul	13.3	13.1	13.2	13.2	13.0	12.8	13.0	13.1	13.4	13.3	14.3	14.8	15.2	16.2	16.3	16.4	16.4	16.5	16.4	16.0	15.7	15.4	13.9	13.0	14.5	16.5	
19-Jul	12.7	13.0	13.1	12.5	12.4	12.8	13.3	15.0	16.8	18.2	19.4	19.8	20.3	20.8	20.9	21.3	20.9	21.1	19.3	17.7	16.5	15.9	15.8	13.6	16.8	21.3	
20-Jul	12.3	13.4	12.7	12.8	12.9	13.8	14.9	16.3	18.0	19.3	20.3	21.1	22.1	23.2	22.9	23.5	23.2	22.1	21.7	20.8	19.8	18.4	17.8	17.3	18.4	23.5	
21-Jul	16.9	16.0	15.9	15.0	15.0	15.5	16.6	18.5	20.1	21.8	22.5	23.2	24.0	24.6	24.7	24.9	25.0	24.8	24.6	23.3	20.7	18.8	17.5	17.5	20.3	25.0	
22-Jul	17.6	15.6	14.5	14.7	13.6	15.7	16.8	17.3	18.1	19.5	19.9	20.9	21.7	22.5	21.5	21.2	22.4	22.4	22.2	21.3	18.3	16.4	15.1	14.0	18.5	22.5	
23-Jul	13.4	13.8	12.6	13.3	13.8	14.3	14.8	15.2	16.9	19.1	21.6	23.1	23.0	23.4	23.7	24.5	24.9	25.0	24.7	22.9	21.4	19.4	18.6	17.3	19.2	25.0	
24-Jul	16.6	16.3	16.6	16.6	17.1	17.5	18.2	19.1	20.8	22.7	24.4	25.4	26.0	27.1	28.1	27.7	27.5	27.3	25.7	24.5	23.4	22.3	21.8	21.0	22.2	28.1	
25-Jul	20.6	20.2	18.2	15.8	15.9	16.1	16.6	16.7	16.2	15.5	16.2	16.4	17.5	18.5	19.3	19.7	19.7	19.0	18.4	16.5	14.7	13.4	12.5	11.5	16.9	20.6	
26-Jul	9.8	9.6	9.8	8.3	6.8	8.5	10.3	12.1	12.7	14.3	14.2	13.7	14.4	14.7	13.7	14.3	13.8	14.0	13.6	12.6	12.0	11.9	11.9	11.8	12.0	14.7	
27-Jul	11.6	10.6	10.0	9.6	9.2	9.1	9.3	9.7	10.5	11.3	11.6	13.2	14.5	15.6	15.6	12.4	11.6	14.2	14.5	13.7	13.1	12.7	11.3	11.0	11.9	15.6	
28-Jul	10.5	9.8	9.4	9.5	10.0	10.9	11.7	13.2	14.3	16.5	17.9	18.3	18.4	19.6	18.2	16.2	16.9	17.6	17.4	16.5	14.7	13.2	11.4	12.1	14.3	19.6	
29-Jul	11.4	11.0	10.7	10.5	10.2	10.7	12.7	14.6	16.3	17.3	18.5	19.2	20.1	20.5	21.0	21.7	21.5	20.8	21.0	19.6	16.9	13.0	13.9	13.6	16.1	21.7	
30-Jul	13.4	13.3	12.7	12.9	13.3	13.6	15.2	16.7	18.1	20.1	21.7	22.8	23.8	24.7	25.1	25.5	25.5	25.1	24.5	22.4	20.5	19.8	18.4	16.4	19.4	25.5	
31-Jul	15.2	14.6	14.2	13.9	14.0	13.6	14.2	15.3	17.1	19.0	20.3	21.1	22.0	22.7	23.5	23.5	23.9	23.7	23.0	21.3	18.9	16.3	15.0	14.3	18.4	23.9	
		13.9	13.4	12.9	12.5	12.4	12.8	13.9	15.2	16.5	17.7	18.8	19.6	20.4	21.0	21.3	21.4	21.4	21.3	20.8	19.6	17.8	16.2	15.3	14.5	Diurnal Average	
		20.6	20.2	18.2	16.6	17.1	17.5	18.2	19.1	20.9	22.7	24.4	25.4	26.0	27.1	28.1	27.7	27.5	27.3	25.7	24.5	23.4	22.3	21.8	21.0	Diurnal Maximum	
NS - Not in Service																											



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Kirby South - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Kirby South - July 2023**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	32	5.25	5.25
10 - 20	404	66.23	71.48
> 20	174	28.52	100.00

Total Number of Valid Hours: 610

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

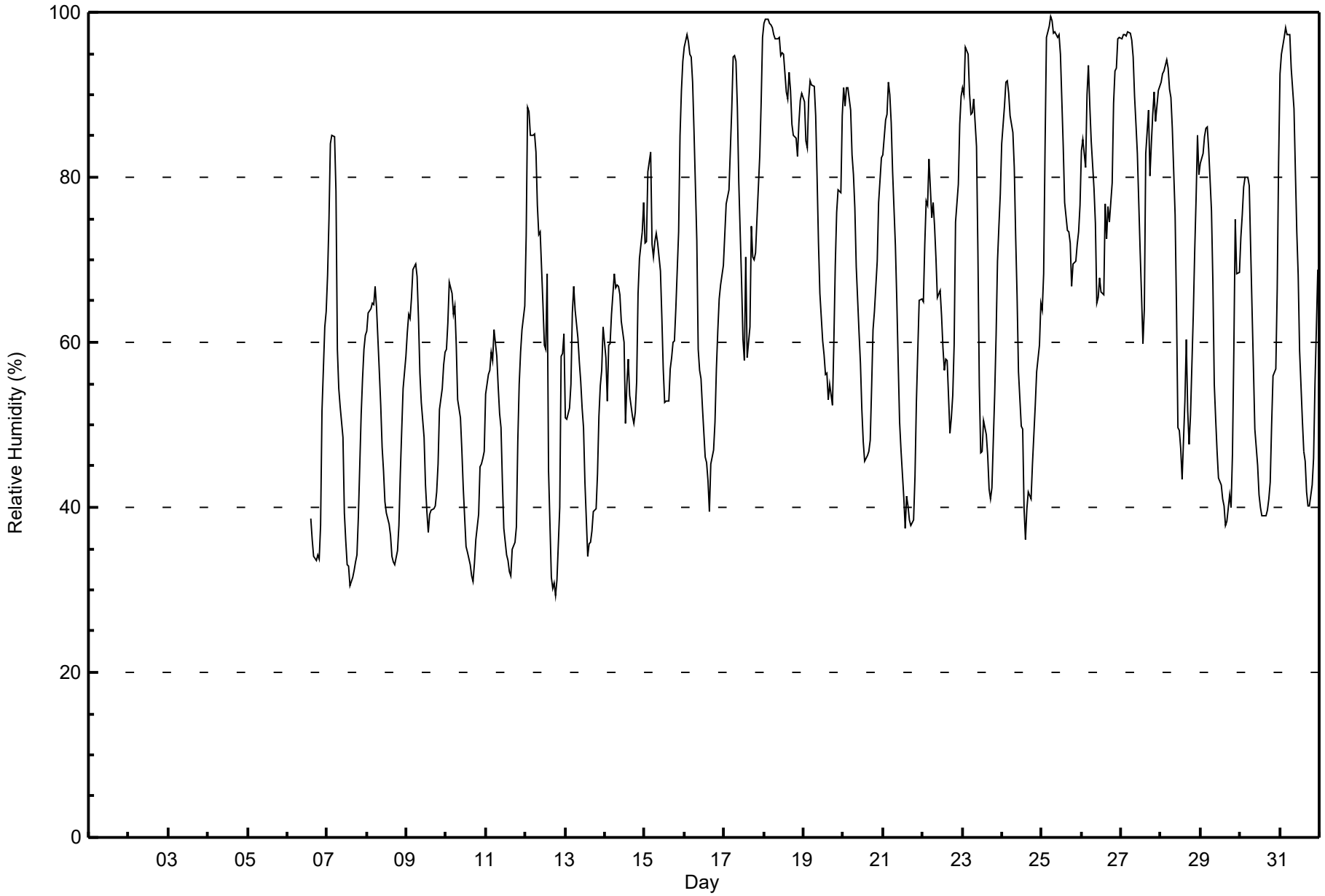
Relative Humidity (RH) - %
Kirby South - July 2023

Maximum Value: 99.5 % on Jul 25 06:00 Maximum Daily Average: 93.0 % on Jul 18																								Hours in Service:	610	
Minimum Value: 29.2 % on Jul 12 19:00 Minimum Daily Average: 47.1 % on Jul 10																								Hours of Data:	610	
Maximum Diurnal Average: 83.3 % at hour 5 Minimum Diurnal Average: 48.8 % at hour 18																								Hours of Missing Data:	0	
Monthly Average: 65.23 % Percentiles: P ₁ = 31.5 P ₁₀ = 39.3 Q ₁ = 50.1 Median = 64.1 Q ₃ = 82.7 P ₉₀ = 91.7 P ₉₉ = 98.4																								Hours of Calibration:	0	
																								Percent Operational Time:	100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	--
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	38.6	36.1	34.1	33.5	34.3	33.8	37.7	51.7	61.9	63.8	--	63.8	
7-Jul	68.1	75.0	84.1	85.1	84.9	78.4	59.2	54.4	52.2	48.5	39.4	36.0	33.1	32.8	30.6	31.5	32.4	33.4	34.3	38.8	51.2	55.6	59.2	60.8	52.5	85.1
8-Jul	61.3	63.5	64.1	64.7	64.6	66.7	64.2	56.4	52.5	47.3	44.4	40.6	39.3	38.0	36.5	34.1	33.5	33.0	34.7	37.7	44.0	49.4	54.3	58.3	49.3	66.7
9-Jul	61.3	63.4	62.9	65.4	68.8	69.5	67.9	62.9	56.3	52.7	48.5	42.7	39.5	36.9	39.1	39.6	39.9	40.1	41.8	45.2	51.9	54.5	57.2	58.9	52.8	69.5
10-Jul	59.2	62.4	67.4	66.0	63.4	64.4	59.6	53.1	50.9	46.9	42.4	38.8	35.2	34.5	33.0	31.6	31.0	33.2	36.1	39.2	44.9	45.3	45.9	46.7	47.1	67.4
11-Jul	53.7	56.1	56.6	58.7	57.9	61.6	58.3	54.6	51.3	49.6	43.0	37.5	34.2	33.6	32.2	31.7	35.0	35.7	37.6	47.9	54.9	58.8	61.5	64.5	48.6	64.5
12-Jul	72.9	88.5	87.9	85.1	85.0	85.2	83.0	76.6	73.1	73.3	64.6	59.6	59.2	68.4	44.4	31.5	30.1	30.8	29.2	31.1	40.0	58.3	58.6	61.0	61.6	88.5
13-Jul	50.9	50.6	52.0	54.9	63.6	66.8	64.0	60.6	57.6	55.2	52.0	49.6	43.0	34.0	35.7	35.7	37.2	39.5	39.8	44.1	51.0	54.7	56.5	61.9	50.5	66.8
14-Jul	58.1	52.9	59.6	59.9	63.4	68.3	66.6	67.0	66.7	65.8	62.5	60.0	50.2	54.9	58.0	53.5	51.1	50.2	51.5	55.2	66.0	70.2	73.3	77.0	60.9	77.0
15-Jul	72.0	72.1	80.6	83.1	71.8	70.4	72.1	73.2	72.0	68.6	63.0	56.8	52.6	52.8	52.9	56.7	58.1	60.0	60.1	64.1	73.3	85.1	90.5	94.1	69.0	94.1
16-Jul	95.7	97.3	96.4	94.9	94.6	91.6	85.6	72.3	59.2	56.7	55.6	52.2	46.1	45.4	43.2	39.6	45.2	46.9	50.3	56.7	61.3	65.3	66.9	69.3	66.2	97.3
17-Jul	73.0	76.7	77.6	78.6	88.3	94.6	94.7	94.1	88.5	79.5	67.5	60.4	57.8	70.3	58.1	61.9	74.0	70.4	70.0	70.8	75.0	82.6	89.0	96.9	77.1	96.9
18-Jul	98.7	99.1	99.1	98.6	98.4	98.2	97.3	96.8	96.9	97.0	94.8	95.1	94.9	90.3	89.5	92.8	90.5	86.5	85.0	84.7	82.6	86.7	89.4	90.2	93.0	99.1
19-Jul	89.2	84.4	83.5	89.5	91.7	91.1	90.9	87.4	80.0	72.0	65.9	60.2	58.4	56.1	56.3	53.1	54.8	52.3	60.2	69.4	75.8	78.5	78.2	87.5	73.6	91.7
20-Jul	90.8	88.6	90.8	90.9	88.2	82.6	80.4	76.2	69.2	61.3	57.4	51.8	48.0	45.6	46.3	46.7	48.1	54.6	61.5	63.8	69.8	77.0	79.7	82.4	68.8	90.9
21-Jul	82.8	87.0	87.6	91.5	90.1	86.7	80.6	71.7	65.0	57.4	50.3	46.9	41.2	37.4	41.4	40.2	38.5	37.8	38.4	43.7	52.6	59.0	65.1	65.2	60.8	91.5
22-Jul	64.9	71.9	77.1	76.6	82.3	75.1	77.0	74.1	70.1	65.4	66.2	63.2	59.3	56.6	57.9	57.8	49.1	50.9	53.6	59.7	74.5	79.2	86.5	89.8	68.3	89.8
23-Jul	90.8	90.1	95.7	94.9	90.2	87.6	87.8	89.5	83.7	70.9	54.7	46.6	46.7	50.5	48.9	46.2	42.2	41.1	42.4	53.8	60.9	69.8	74.0	78.0	68.2	95.7
24-Jul	84.0	88.6	91.6	91.7	90.2	87.5	85.4	81.3	72.8	65.7	56.4	49.8	49.4	39.8	36.2	39.9	41.9	41.0	45.2	48.8	52.4	56.4	59.7	64.8	63.3	91.7
25-Jul	63.9	68.3	83.5	97.0	98.3	99.5	99.0	97.5	97.7	97.0	97.3	94.9	89.4	83.8	77.0	73.6	73.4	72.1	66.7	69.4	69.8	71.9	73.4	76.6	83.0	99.5
26-Jul	83.3	84.6	81.2	90.0	93.5	88.7	84.4	78.6	74.4	64.7	65.5	67.8	66.1	65.8	76.8	72.6	76.5	74.5	79.3	89.0	92.9	93.2	96.8	97.0	80.7	97.0
27-Jul	96.9	97.3	97.3	97.1	97.6	97.5	96.7	94.6	89.8	86.4	82.8	71.0	65.6	59.9	64.1	82.9	88.2	80.2	84.1	87.7	90.3	86.8	90.5	91.0	86.5	97.6
28-Jul	91.5	92.5	93.0	94.3	93.2	90.6	89.7	85.9	75.4	63.9	49.6	49.3	47.1	43.5	52.9	60.3	51.7	47.7	51.2	63.5	71.1	77.5	85.0	80.4	70.9	94.3
29-Jul	81.6	82.8	85.0	85.9	86.1	83.3	75.9	67.3	54.9	50.6	46.8	43.5	42.7	41.1	40.1	37.9	38.3	41.5	40.1	46.5	59.1	75.0	68.4	68.4	60.1	86.1
30-Jul	72.8	75.4	78.8	80.0	80.0	79.0	71.5	64.0	56.9	49.5	45.1	41.6	39.9	39.0	38.9	39.0	39.6	41.0	43.0	50.0	56.0	56.8	66.4	81.9	57.7	81.9
31-Jul	92.5	94.9	97.0	98.1	97.3	97.3	97.2	93.3	88.3	80.7	73.4	68.2	59.0	50.5	46.7	45.6	41.8	40.1	40.2	42.7	45.9	55.0	61.7	68.8	69.8	98.1
																								Diurnal Average		
																								Diurnal Maximum		
76.4 78.6 81.2 82.9 83.3 82.5 79.6 75.3 70.2 65.1 59.6 55.4 51.9 50.5 49.1 48.9 49.1 48.8 50.4 55.3 61.7 67.5 71.1 74.4 98.7 99.1 99.1 98.6 98.4 99.5 99.0 97.5 97.7 97.0 97.3 95.1 94.9 90.3 89.5 92.8 90.5 86.5 85.0 89.0 92.9 93.2 96.8 97.0																										
NS - Not in Service																										



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Kirby South - July 2023





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Kirby South - July 2023

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	74	12.13	12.13
40 - 60	192	31.48	43.61
60 - 80	175	28.69	72.30
80 - 100	169	27.70	100.00

Total Number of Valid Hours: 610

Total Number of Hours: 744



Maximum Speed: 22 km/h on Jul 25 12:00	Maximum Daily Speed Average: 14.2 km/h on Jul 8	Hours in Service: 587
Minimum Speed Value: 0 km/h on Jul 7 15:00	Minimum Daily Speed Average: 1.4 km/h on Jul 28	Hours of Data: 586
Maximum Diurnal Speed Average: 3.1 km/h at hour 13	Minimum Diurnal Speed Average: 1.3 km/h at hour 5	Hours of Missing Data: 1
Monthly Average Velocity: 1.8 km/h 268.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 5 Q ₁ = 7 Median = 10 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 20	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	---	---
7-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	C	N0	N0	NE6	NNE7	NNW6	NNW2	WSW3	WSW4	SW9	SW9	---	SW9
8-Jul	SW10	WSW10	WSW9	W10	W13	W14	W16	W17	W19	WNW19	WNW13	WNW19	WNW19	WNW19	WNW19	WNW18	WNW18	WNW17	WNW12	WNW9	W11	W13	W12	W13	W14.2	WNW19
9-Jul	W12	W12	W11	W10	WNW8	WNW7	NW6	NNE7	NE10	NE12	NE13	NNE11	NNE11	NNE14	N13	NNE11	NE14	NE14	ENE13	ENE8	E6	E11	E11	E9	NNE6.0	NE14
10-Jul	ESE9	E9	E8	ESE10	ESE10	E9	ESE10	SE14	SE13	SE14	ESE14	ESE14	SE12	SSE9	SE9	SE9	SE9	SSE11	S12	SSW10	S9	S9	S12	S12	SE9.3	SE14
11-Jul	S10	SSE11	SSE12	S11	S14	S13	S12	S11	S9	S9	S12	S12	S11	SSW8	SSW8	SW8	SSW6	WSW6	W7	WNW9	W7	SW7	SW8	SW8	SSW7.9	S14
12-Jul	WSW10	SW9	SW8	SW11	SW10	SW10	SW10	WSW11	W10	W11	WNW13	WNW13	WNW15	NW10	NNW13	NNW18	N16	N14	NNE15	NNE7	NNE5	NNW3	WNW8	NNW6	WNW6.4	NNW18
13-Jul	N7	NNW6	NNW7	NNW7	NW9	NW9	NW10	NW10	NNW12	NNW12	N15	NNW16	N17	NNW21	NNW21	N21	NNW19	NNW16	NNW17	NW11	WNW11	WNW14	NNW12	NNW8	NNW12.4	NNW21
14-Jul	N8	NNW9	N10	N11	N9	N8	N11	N15	N15	NNW16	N16	NNW17	N18	NNE17	NNE13	N14	N12	NNE10	NNE8	NNE6	NE5	ENE4	ENE3	NE1	N10.1	N18
15-Jul	NE3	N4	NW3	NW5	NNW6	NNW6	NNE7	NNE8	NNE7	NNE7	NNE9	N10	NNE11	NE8	ENE11	NE11	NE13	NE12	ENE7	ENE5	E3	ENE3	ENE5	NNE6.3	NE13	
16-Jul	E5	ESE5	SE4	ESE6	ESE5	ESE7	SE7	SSE9	SSE10	SSW11	SSW10	S10	S10	S12	S12	S11	S11	S11	S11	S8	SSE9	SSE11	SSE14	SSE14	SSE8.4	SSE14
17-Jul	SE13	SE12	SSE12	SSW10	S6	SSE5	SE11	ESE11	ESE13	SE11	SE12	SE15	SE13	ESE11	ESE18	SE12	E9	E10	E11	ENE13	E12	E11	E11	E8	ESE9.8	ESE18
18-Jul	ENE11	ENE13	ENE15	NE16	NE16	NE17	NNE13	NE13	NE11	NNE10	NNE12	NE10	NE9	NE11	NNE10	NNE7	NE6	NNE6	N5	NW7	NW6	NW8	WNW8	NW7	NNE8.6	NE17
19-Jul	NW6	NW8	NW8	NW7	WNW8	W8	W9	W8	WNW9	WNW10	W12	WNW16	WNW14	W11	W10	WSW13	W16	W14	NW12	NW6	WNW3	WSW3	WSW4	SSW0	WNW8.6	W16
20-Jul	WSW4	WSW5	WSW5	SW7	WSW5	W4	W6	W5	WNW7	NW8	WNW11	NW10	WNW10	NW7	WNW9	WNW8	NNW6	W6	W13	W11	W11	W9	W9	W10	WNW7.2	W13
21-Jul	WNW9	W7	W7	W7	WNW8	WNW8	WNW7	NW8	NW9	NW9	NW10	NNW10	NNW9	NW10	WNW12	NW11	WNW11	WNW11	NW8	WNW6	WNW6	WNW7	WNW7	W7	WNW8.1	WNW12
22-Jul	WSW5	W5	W6	W5	WSW6	SW9	W11	W13	NW6	W10	W9	WNW10	NW6	WNW8	WSW14	WSW11	W6	NW5	WSW1	NNW2	NNW2	NNE5	NNW1	ENE1	W5.7	WSW14
23-Jul	SSW2	N1	E4	SSE3	SSW4	SW10	WSW7	SW8	W5	WSW5	SSE7	S8	SSW8	SSW7	SSW9	SSW7	ESE7	SW3	WSW5	SSW6	SSW7	SW8	SW7	SW4	SSW4.7	SW10
24-Jul	SSW7	SSW6	SSW7	SSW7	SSW7	S8	S5	S7	S9	SSE10	SE10	SSE14	S13	SE10	SE11	ESE12	SE12	SE14	SE9	SE10	ESE11	ESE12	ESE12	ESE13	SSE8.4	SE14
25-Jul	SE15	SE17	WNW19	NNW10	NE10	NE8	NNE11	NE6	ESE12	SW4	WNW12	WNW22	NW20	NNW16	NNW12	NW10	WNW14	WNW19	WNW15	WNW15	W10	W13	W13	NW7.4	WNW22	
26-Jul	WSW8	WSW11	WSW8	SW6	S4	SSW9	SW11	SW16	SSW15	S19	SSW14	SSW11	S11	SSW11	SW8	S7	SE9	ESE9	E8	E6	ENE6	NNE6	NE9	NE13	S5.5	S19
27-Jul	NE14	NE16	ENE14	NE15	ENE13	NE14	ENE14	ENE14	ENE14	NE12	NE13	ENE12	NE9	NE11	NE9	ESE3	WNW5	N7	NNE7	NNE5	NNW5	N5	N4	NNE5	NE9.1	NE16
28-Jul	NNE5	NNE4	NNE5	NNE5	NNE5	NNE4	ENE4	SE1	ESE3	ENE3	ENE5	NNE4	NNE4	NE4	E1	SW10	WSW11	WSW7	NW9	N7	WSW4	WSW3	WSW6	WSW9	NW1.4	WSW11
29-Jul	WSW6	W6	WSW5	W6	WSW5	WSW4	W6	W6	WSW5	SW8	SSW9	SW12	SW12	SW12	SSW10	SW11	SW12	S10	SSW11	SSW8	SSW6	S7	S8	S9	SW7.2	SW12
30-Jul	S10	S10	S10	S10	S9	S9	S13	SSW15	S18	S18	S17	S19	S17	S17	SSW17	S15	S16	S17	S14	SSE9	SE10	SE11	SE12	SSW13	S13.0	S19
31-Jul	S4	SSW7	SE6	W4	WSW6	SSW9	SW9	SW11	WSW12	WSW13	WSW14	WSW15	W18	W18	WSW15	W15	W18	W19	W18	W17	WSW20	SW11	WSW9	WSW12	WSW11.6	WSW20

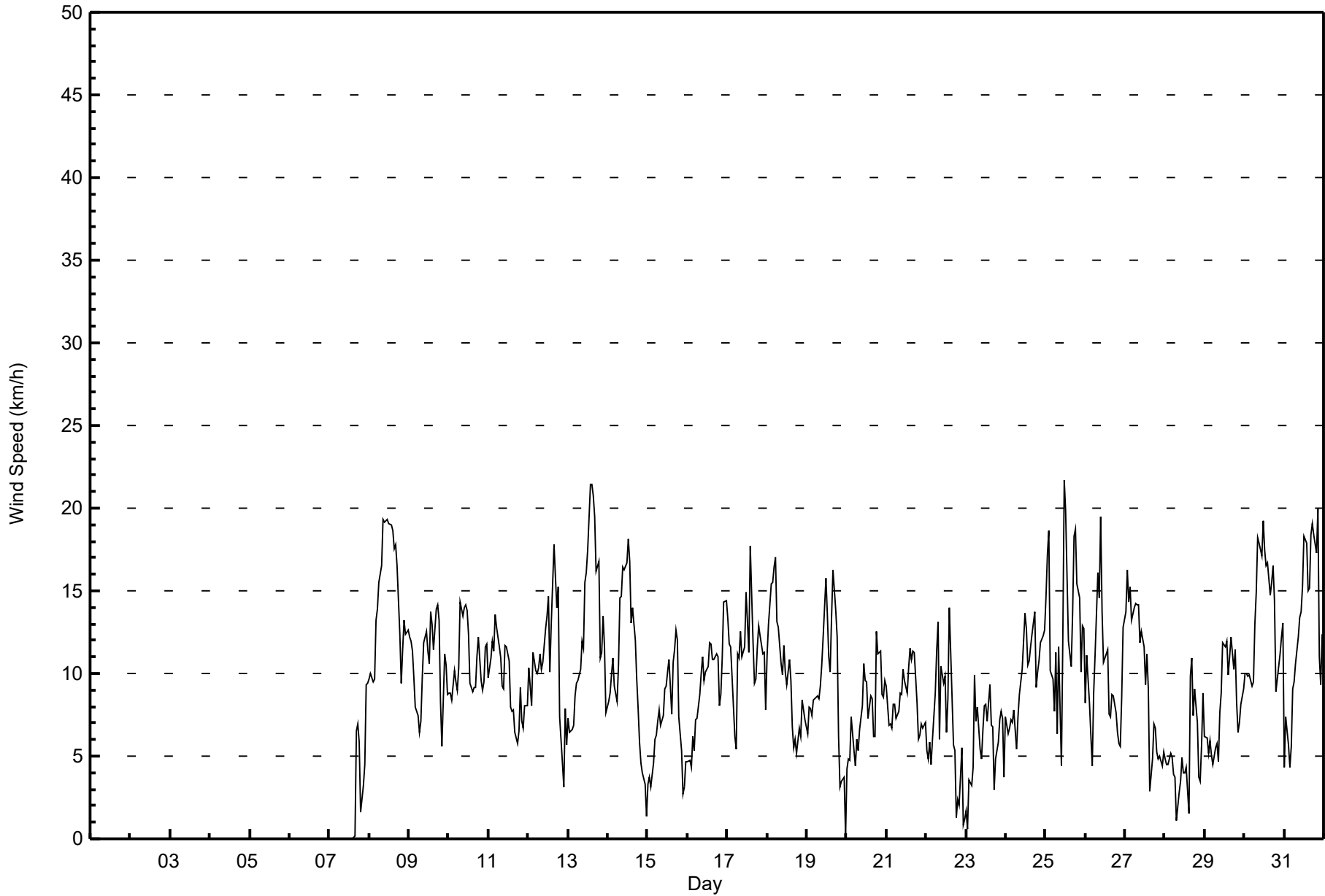
SSW1.4	SSW1.4	W1.3	W1.7	W1.3	WSW1.8	WSW1.7	WSW2.0	SW1.3	WSW2.2	NNW1.9	W3.1	NNW3.1	NW2.9	NNW2.5	W2.5	NNW2.3	NW2.3	NW2.7	NW1.9	WSW2.1	SW1.6	SW2.2	SW2.3	Diurnal Average	
SE15	SE17	WNW19	NE16	NE16	NE17	W16	W17	W19	S19	WNW19	WNW22	NW20	NNW21	NNW21	N21	NNW19	W19	WNW19	W17	WSW20	WNW14	SSE14	SSE14	Diurnal Maximum	

C - Calibration NS - Not in Service
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Kirby South - July 2023





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Kirby South - July 2023**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	88	15.02	15.02
6 - 11	315	53.75	68.77
12 - 19	177	30.20	98.98
20 - 28	6	1.02	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 586

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Kirby South - July 2023**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	7	12	4	9	4	4	2	2	3	3	3	18	5	3	3	6	88
6 - 11	10	23	16	5	15	11	15	12	30	28	28	18	32	29	30	13	315
12 - 19	10	6	17	10	1	9	15	6	22	5	5	8	24	24	1	14	177
20 - 28	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2	6
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	28	41	37	24	20	24	32	20	55	36	36	45	61	57	35	35	586

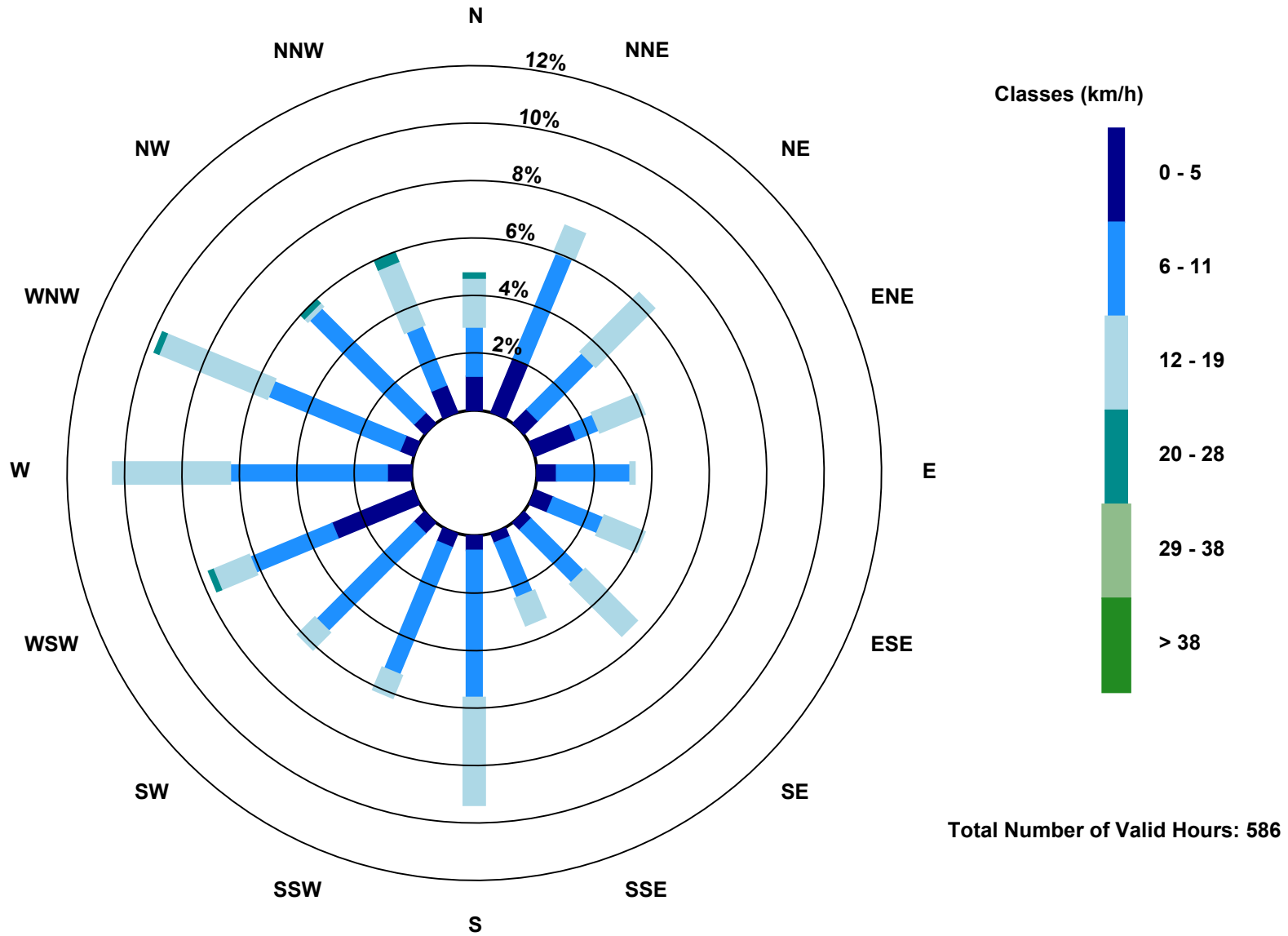
Total Number of Valid Hours: 586

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jul 2023

Wind Speed (WS) - km/h
Kirby South





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Kirby South - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 587
Maximum Value: 7 km/h on Jul 25 03:00	Hours of Data: 586
Minimum Value: 0 km/h on Jul 7 15:00	Hours of Missing Data: 1
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6	Hours of Calibration: 1
	Percent Operational Time: 100.0

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

C - Calibration NS - Not in Service



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Kirby South - July 2023

Direction of Maximum Speed: 286 deg on Jul 25 12:00	Hours in Service: 587
Direction of Maximum Daily Speed Average: 279.3 deg on Jul 8	Hours of Data: 586
Direction of Minimum Speed: 4 deg on Jul 7 15:00	Direction of Minimum Daily Speed Average: 1.4 deg on Jul 28
Direction of Minimum Daily Speed Average: 1.4 deg on Jul 28	Hours of Missing Data: 1
Monthly Average Direction: 268.1 deg	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
7-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	C	4	5	46	23	338	347	237	255	222	223	--
8-Jul	231	244	254	264	265	264	267	277	276	283	286	287	287	289	290	303	297	299	302	286	272	269	272	273	279.3
9-Jul	277	278	274	278	293	293	305	25	42	47	41	30	20	14	4	22	36	44	57	59	79	83	97	100	21.0
10-Jul	105	98	97	103	106	101	118	130	133	127	117	122	135	150	125	124	144	164	185	192	187	188	180	186	138.0
11-Jul	176	164	168	169	176	176	180	188	189	177	174	174	183	196	198	222	204	242	281	293	273	235	219	232	194.4
12-Jul	247	231	231	236	223	228	227	247	264	277	298	290	296	325	343	339	354	9	28	31	20	339	298	330	298.0
13-Jul	354	344	343	345	313	312	318	324	333	329	349	341	349	337	339	350	340	336	329	320	289	303	327	336	333.1
14-Jul	350	333	349	355	6	4	1	358	351	346	358	339	1	24	15	6	3	17	23	32	54	73	63	52	3.1
15-Jul	35	11	324	320	342	338	23	29	13	19	19	13	11	30	42	69	56	52	53	59	73	86	78	75	33.1
16-Jul	89	121	126	121	119	118	128	155	159	205	198	181	177	190	182	182	184	191	177	170	164	160	161	154	166.3
17-Jul	145	145	153	202	191	155	124	112	122	125	125	130	129	109	104	132	99	85	82	76	82	87	96	93	117.7
18-Jul	64	58	57	48	43	44	32	39	43	22	33	44	38	40	25	22	45	18	359	323	307	312	300	309	30.6
19-Jul	307	317	314	306	299	281	273	281	297	296	274	282	285	273	266	253	278	276	313	319	294	246	245	196	285.3
20-Jul	242	245	248	233	250	277	271	268	295	306	289	307	298	322	294	292	328	275	279	279	273	274	270	280	281.5
21-Jul	282	272	271	261	286	294	292	308	308	322	321	327	329	305	298	309	300	302	320	291	283	284	295	281	299.5
22-Jul	255	281	281	280	256	235	274	280	304	264	281	298	306	284	246	248	265	323	249	335	346	29	336	78	276.7
23-Jul	199	356	87	156	197	231	239	234	272	258	157	181	192	213	211	205	107	223	242	202	213	215	217	235	209.8
24-Jul	206	193	200	204	200	188	182	189	174	160	141	160	177	141	139	123	127	128	127	127	116	119	119	110	149.3
25-Jul	132	136	300	329	49	37	25	54	110	231	282	286	317	337	333	306	288	299	292	288	287	274	269	269	304.3
26-Jul	238	246	250	224	184	209	221	223	192	178	192	195	189	208	222	169	145	121	98	81	66	33	45	48	189.1
27-Jul	42	56	59	54	65	54	62	67	71	53	45	58	46	45	44	103	300	7	15	19	331	359	2	18	47.3
28-Jul	13	22	25	24	29	23	59	139	118	57	59	18	19	38	101	216	239	250	305	356	256	253	250	244	326.1
29-Jul	252	261	258	268	256	251	273	271	255	234	207	232	214	226	206	222	232	188	209	208	193	183	180	177	222.3
30-Jul	177	179	180	184	187	182	185	192	191	184	184	181	189	190	196	188	169	173	171	150	138	135	134	202	179.0
31-Jul	179	212	132	275	253	212	223	225	237	241	257	256	271	266	253	263	259	270	266	273	252	231	245	237	250.6

208.3 207.6 263.4 267.2 259.2 246.0 255.1 248.9 230.9 253.6 281.7 273.8 286.9 304.0 287.5 276.1 296.5 310.0 314.6 309.0 253.7 232.4 219.5 224.6

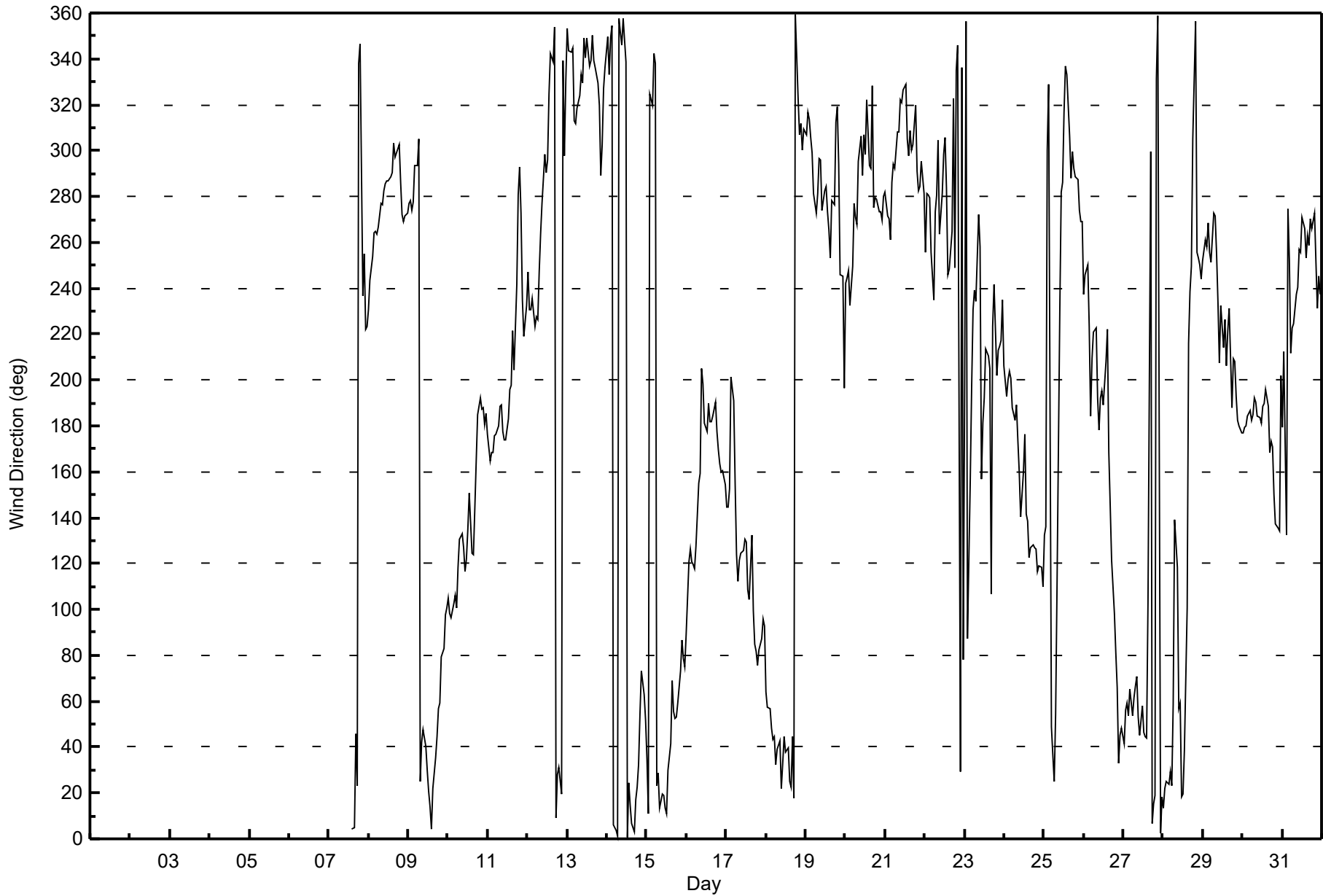
Diurnal Average

C - Calibration NS - Not in Service
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Kirby South - July 2023





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Kirby South - July 2023

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 587
Maximum Value: 96 deg on Jul 27 16:00	Hours of Data: 586
Minimum Value: 2 deg on Jul 7 15:00	Hours of Missing Data: 1
Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 14 Median = 19 Q ₃ = 26 P ₉₀ = 38 P ₉₉ = 81	Hours of Calibration: 1
	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
2-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
3-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
4-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
5-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
6-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--
7-Jul	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	C	2	7	44	32	34	81	22	26	6	9	81
8-Jul	11	9	11	12	11	12	12	13	12	15	15	17	18	18	23	18	17	15	13	13	9	10	8	7	23
9-Jul	8	9	8	24	15	11	20	29	19	21	22	30	38	29	33	26	27	21	17	15	14	18	16	15	38
10-Jul	16	14	13	15	15	15	19	18	19	23	25	26	31	48	50	45	39	31	19	12	9	9	11	14	50
11-Jul	14	12	12	14	15	15	15	16	22	20	17	23	30	48	46	37	36	45	27	10	15	26	14	16	48
12-Jul	19	15	14	13	14	13	14	20	19	24	22	24	20	33	26	24	28	22	20	16	16	24	18	21	33
13-Jul	17	17	17	18	10	18	13	14	23	19	21	20	24	20	21	24	21	22	17	16	14	14	15	19	24
14-Jul	18	14	20	19	18	21	21	21	22	22	23	22	24	20	21	27	35	26	21	15	14	12	24	87	87
15-Jul	59	32	29	18	18	23	20	18	23	30	29	34	31	33	40	25	19	15	17	15	18	27	18	12	59
16-Jul	7	9	18	9	13	12	16	22	23	24	32	36	33	24	26	25	22	17	17	11	11	13	14	15	36
17-Jul	15	15	14	36	22	37	16	16	17	18	21	19	19	24	23	21	16	18	16	15	16	16	15	23	37
18-Jul	13	14	13	12	13	15	14	16	14	17	16	19	22	14	17	21	18	19	20	20	15	12	11	13	22
19-Jul	12	12	12	11	9	13	12	12	17	20	22	14	23	25	29	25	14	16	25	20	64	76	17	90	90
20-Jul	25	28	25	18	16	21	13	24	29	34	27	28	35	59	35	44	52	51	11	10	9	11	10	7	59
21-Jul	8	13	19	21	12	10	12	16	16	28	28	36	37	36	26	28	22	18	19	11	11	9	7	17	37
22-Jul	10	11	14	16	10	10	18	14	18	22	19	19	28	36	17	18	37	39	73	72	56	16	61	71	73
23-Jul	62	82	26	44	21	13	30	22	26	40	45	46	37	55	36	53	49	85	41	11	7	8	19	35	85
24-Jul	12	7	10	13	11	13	17	18	21	26	30	27	32	40	33	25	23	24	15	16	15	16	17	17	40
25-Jul	22	34	23	38	20	28	27	70	51	63	14	14	16	20	26	19	17	17	16	12	11	12	11	10	70
26-Jul	23	20	24	38	44	15	14	17	20	20	21	20	26	26	21	23	28	21	21	20	17	23	16	12	44
27-Jul	14	14	14	14	15	14	13	15	17	20	16	22	30	29	48	96	26	22	20	18	22	18	19	15	96
28-Jul	15	14	11	10	14	17	35	75	33	74	69	92	68	80	76	21	16	33	17	25	47	57	19	9	92
29-Jul	17	13	12	14	10	10	14	19	40	31	35	31	30	29	31	35	20	17	20	13	8	3	5	5	40
30-Jul	7	9	8	11	10	11	14	16	17	18	20	21	23	23	23	29	20	18	17	19	16	14	19	40	40
31-Jul	63	30	41	73	27	13	15	18	16	17	24	25	19	21	27	21	19	18	16	11	14	11	15	15	73
	63	82	41	73	44	37	35	75	51	74	69	92	68	80	76	96	52	85	73	81	64	76	61	90	
	Diurnal Maximum																								

C - Calibration NS - Not in Service

**ELECTRONIC TRANSFER SYSTEM
AIRDATA
SUBMISSION REPORT**

August 31, 2023
3:11:40 PM
Request # 4586307

Submitted by: EN6138_BAS
Submission Date: Aug 31, 2023 2:31:14 PM

File Type

Calibration Report

File Name

CAL-WBEA-202307.pdf

Total Number of Files: 1

*** End of Report ***

**ELECTRONIC TRANSFER SYSTEM
AIRDATA
SUBMISSION REPORT**

August 31, 2023
4:19:13 PM
Request # 4586407

Submitted by: EN6138
Submission Date: Aug 31, 2023 4:17:59 PM

File Type

Ambient Data

File Name

AMB-WBEA-202307-V00.xml

Total Number of Files: 1

*** End of Report ***

**ELECTRONIC TRANSFER SYSTEM
AIRDATA
WARNINGS REPORT**

August 31, 2023
4:27:21 PM
Request # 4586407

AMB-WBEA-202307-V00.xml

- Percent valid data lower than 90 percent: (StationId: 1064, VVC: VVC52), (StationId: 1064, VVC: VVC60), (StationId: 1064, VVC: VVC74), (StationId: 1065, VVC: VVC41), (StationId: 1070, VVC: VVC41), (StationId: 1070, VVC: VVC52), (StationId: 1070, VVC: VVC60), (StationId: 1070, VVC: VVC74), (StationId: 1071, VVC: VVC14), (StationId: 1071, VVC: VVC20), (StationId: 1071, VVC: VVC99), (StationId: 1072, VVC: VVC52), (StationId: 1072, VVC: VVC60), (StationId: 1072, VVC: VVC74), (StationId: 1074, VVC: VVC155), (StationId: 1074, VVC: VVC161), (StationId: 1074, VVC: VVC164), (StationId: 1074, VVC: VVC173), (StationId: 1074, VVC: VVC29), (StationId: 1225, VVC: VVC97), (StationId: 1560, VVC: VVC35), (StationId: 1560, VVC: VVC37), (StationId: 1560, VVC: VVC39), (StationId: 1614, VVC: VVC155), (StationId: 1614, VVC: VVC161), (StationId: 1614, VVC: VVC164), (StationId: 1614, VVC: VVC173), (StationId: 1614, VVC: VVC29), (StationId: 1614, VVC: VVC31), (StationId: 1614, VVC: VVC332), (StationId: 1614, VVC: VVC35), (StationId: 1614, VVC: VVC352), (StationId: 1614, VVC: VVC37), (StationId: 1614, VVC: VVC39), (StationId: 1614, VVC: VVC48), (StationId: 1637, VVC: VVC35), (StationId: 1637, VVC: VVC37), (StationId: 1637, VVC: VVC39), (StationId: 1674, VVC: VVC52), (StationId: 1674, VVC: VVC60), (StationId: 1674, VVC: VVC74)

Total Number of Warnings: 1

*** End of Report ***



End of Report