SESAA

Southeast Saskatchewan Airshed Association

2022 Annual Report

Southeast Saskatchewan Airshed Association

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List of Terms and Definitions

24-hour	A calendar day, average is calculated midnight-to-midnight.
30-day	Passive monitoring data is based on a 30-day average concentration
8-Hour	Using for the 8-hour running average for O_3 Canada-Wide Standard.
SAAQS	Saskatchewan Ambient Air Quality Standards
AIC	Automatic Instrument Check (instrument self-verification process)
AMG	Air Monitoring Guidelines for Saskatchewan, March 2012
Calm	1-hour average wind speed lower than 1 km/hour
CWS	Canada-Wide-Standards
ET	Ambient temperature
H_2S	Hydrogen sulphide
NO_2	Nitrogen dioxide
NO	Nitric oxide
NOx	Oxides of nitrogen
O_3	Ozone
$PM_{2.5}$	Particulate matter with aerodynamic diameter less than 2.5 µm, referred to as fine or respirable particles
QA/QC	Quality Assurance / Quality Control
RH	Relative humidity
SO_2	Sulphur dioxide
WD	Wind direction
WS	Wind speed

Units of Measurement

average	arithmetic average = n Xi / n
m/s	meter per second, or mps
µg/m^3	microgram per cubic meter
ppb	part per billion by volume
mm	millimeter of accumulated precipitation
°C	degree centigrade
%	percent of relative humidity, instrument uptime, etc.
Degree	angle of wind direction from the north

MESSAGE FROM THE EXECUTIVE DIRECTOR

2022 was an excellent year for the Southeast Saskatchewan Airshed Association (SESAA) and for air quality monitoring in the south eastern region of Saskatchewan SESAA is very pleased to inform our members that eight (8) continuous air monitoring sites are now operating in the region and providing real-time data on the airshed's website. SESAA will continue to explore every opportunity to collaborate with other agencies in bringing additional air quality monitoring into the region. In summary, SESAA now manages a continuous air monitoring network which consists of eight monitoring sites, including the new NAPS Station in the City of Estevan.

This monitoring initiative is multi-purpose it: a) collects real time air quality data throughout the SESAA region, b) demonstrates companies are operating in a safe, environmentally sound manner that is enabling sustainable growth, and c) provides companies considering to invest in operations in Saskatchewan with data that shows it is a safe place to invest being that the air quality is well understood and not an impediment to growth. The credibility and strength of the continuous monitoring network is scientifically and financially sound. The continuous data is available live on the internet; it includes hourly concentrations of SO2, H2S, NO/NO2/NOx, PM2.5 and O3 as well as meteorological data at about two metres above the ground. The data is available on the SESAA website: http://www.sesaa.ca

Our goal is to collect credible and defensible air quality data and provide excellent service to our members. The credibility and strength of the continuous monitoring network is scientifically and financially sound.

We have and are continuing to communicate the work we do in many ways. When we do a presentation or place an article or a story in a newspaper, we highlight our members wherever possible. We list our members on our website and do as much as we can to inform the public the names of our member companies. This communication work is very important to SESAA and to its members.

We are reviewing our website and improving our communication abilities.

SESAA had a booth at Saskatchewan Oil Show in June 2022 which was very well attended. We gave away printed material with information about our Association as well as pens, Frisbees and balloons; all with the SESAA website address. We are booked for the Oil Show in 2024.

SESAA has reviewed its communication plan and has decided to redesign our website. It will have all of the data for each site by month since July of 2015. There will also be a feature that will allow our members and the public to search for raw data for the past 120 days. The new website was launched the week of Clean air Day June 4 to 8, 2018.

The SESAA Board is working with the Science Fairs in our area. We will be providing the winner of the science Fair with the SESAA Environmental Award to the best science fair entry with an environmental theme. We will present the award in 2020 and every year after.

All of these showcase the work we do and our members' involvement. It is important that the public is comfortable and welcoming of well-run industry in their municipalities as public acceptance plays a large role in helping to foster a business-friendly environment that promotes future industrial growth. Future plans include determining the need for additional air monitoring stations and the development of more communication materials.

As a part of Clean Air Day on June 8, 2016, the SESAA announced the winners of its first ever Clean Air Poster Awards. The winners received a Family Day Pass to the Estevan Swimming Pool. The winning poster were scanned and posted on the SESAA Website. The posters were judged by an independent panel of the City of Estevan Council. SESAA thanks all students that submitted posters.

SESAA is pleased with the excellent response we received from our members. We have had a very good year financially and with our data monitoring capabilities. This is excellent news for the people of the south east area of Saskatchewan and for all of our valued members. We now have data to help inform our decision-making decision-making process. The Science committee will review all of this data and bring recommendations to the Board as to how we should proceed with managing our monitoring capabilities. The data will direct our decisions as to how to improve our monitoring network.

2022 was another successful year for the SESAA. The Association continues to maintain a high level of membership support in the region, allowing us to collect and report good air quality information to the citizens of southeast Saskatchewan. The SESAA plans to continue building on its success in 2023. Future plans include reviewing and maintaining our network monitoring needs and continuing the development and delivery of a strong communications program that reaches out to organizations such as municipalities, Chambers of Commerce, high school classes, and School Community Council meetings. SESAA thanks all of our members for their committed participation.

Our goal is to collect credible and defensible air quality data and provide excellent service to our members. SESAA thanks all of our members for their participation.

EXECUTIVE SUMMARY

The Southeast Saskatchewan Airshed Association (SESAA), established in October 2005, is Saskatchewan's first airshed association with a mandate to monitor ambient air quality in the southeast region of the province. SESAA is a collaborative group of industry, government, non-government organizations, and private citizens. The airshed covers an area of 36,800 square kilometres and includes 45 municipalities. Major economic activities in the region include agriculture, oil and gas, mining, power generation, and transportation.

SESAA manages a continuous air monitoring network, as shown in Figure 1 of the main report. The passive sampling network has been discontinued indefinitely. The continuous air monitoring network consists of seven airpointers® at the Weyburn, Glen Ewen, Stoughton, Esterhazy, Wauchope, Oxbow and Torquay stations. All stations monitored for the entire year of 2022. The SESAA continuous air monitoring network measures real-time data for sulphur dioxide (SO_2), hydrogen sulphide (H_2S), nitrogen oxides (NO, NO_2, NOx), ozone (O_3), fine particulate matter ($PM_{2.5}$), ambient temperature (ET), relative humidity (RH), precipitation, wind speed (WS) and wind direction (WD).

The continuous data is available live on the internet; it includes hourly concentrations of SO_2, H_2S, NO/NO_2/NOx, $PM_{2.5}$ and O_3. The first airshed site monitoring data was originally made available in early 2011 on the SESAA website: http://www.sesaa.ca/AirQuality/index.php

The installation of continuous monitors throughout the region is helping SESAA meet its monitoring goal. Monitoring also allows the Association to show companies already operating or considering operating in the area that this is a good place to invest because we know the air quality is being monitored, and it is of relatively good quality. SESAA is very excited about what the WEDC initiative, the Ministry of the Economy grant and the Sask Power Station have brought to the Association's monitoring capabilities.

Table ES-1 summarizes the annual averages of continuous air quality data; the measured air quality was within the Saskatchewan Ambient Air Quality Standards (SAAQS), with the exception of H_2S and $PM_{2.5}$. There was a total of 38 exceedance events for 1-hour average H_2S, 2 exceedance events for 24-hour average H_2S, and 3 exceedance events for 24-hour average $PM_{2.5}$. The air quality within the SESAA network was rated Low Risk or Good for more than 99% of the time according to the Air Quality Health Index and Air Quality Index.

All airpointers® were greater than 90% operational for the year 2022, with the exception of the Wauchope. Detailed monthly and annual instrument uptimes can be found in the station summary tables in Appendix B-H.

Table ES-1. Annual average concentrations for continuous parameters for 2022

Parameter	Conc. Unit	Annual Average Concentration for Continuous Measurement Data						
		Weyburn	Glen Ewen	Stoughton	Esterhazy	Torquay	Wauchope	Oxbow
SO_2	ppb	1.1	0.3	0.3	[a]	0.1	0.2	0.5
H_2S	ppb	0.3	0.2	0.2	[a]	0.1	0.4	0.2
NO	ppb	0.5	0.3	0.6	0.7	[a]	[a]	0.3
NO_2	ppb	0.8	1.4	0.8	0.7	[a]	[a]	0.3
NOx	ppb	1.2	1.7	1.2	1.1	[a]	[a]	0.3
O_3	ppb	27	29	[a]	28	[a]	[a]	[a]
$PM_{2.5}$	$\mu g/m^3$	5	[a]	7	5	6	6	5

a. Parameter was not monitored.

1.0 Introduction

The Southeast Saskatchewan Airshed Association (SESAA) is a collaborative group of industry, non-government organizations, government, and private citizens. SESAA was established in 2005 with a mandate to collect credible, scientifically defensible air quality data and to make this data available to the public. We also provide a forum for open communication of air quality concerns among all sectors of society. Membership in the airshed association is currently voluntary, with emitting members sharing funding responsibilities for monitoring programs and studies. SESAA covers an area of 36,800 square kilometres, including 45 municipalities. The airshed boundaries were established based on common history, meteorology, and funding considerations. Major economic activities in the region include agriculture, oil and gas, mining, power generation, and transportation.

Membership in the SESAA is voluntary. The current membership includes members of the agriculture, oil and gas, mining and power generation sectors. The Government of Saskatchewan Ministries of Environment, Energy and Resources, and Health, as well as representatives of the City of Estevan and Rural Municipality of Enniskillen Number 3 also participate as members of the Board of Directors. SESAA's operating budget consists of membership fees, environmental footprint, and emissions-based fees assessed to facilities operating within the airshed zone.

1.1 SESAA Mission

The SESAA mission is to collect credible, scientifically defensible air quality data for the southeast Saskatchewan region, and to make this data freely available to all stakeholders. Our objective is to bring together stakeholders from all backgrounds to identify local air quality issues and to develop innovative solutions for managing these issues

1.2 SESAA Air Monitoring Network

Figure 1 illustrates spatial distribution of the SESAA air monitoring stations. The SESAA air monitoring network includes seven continuous airpointers® monitoring stations at the Weyburn, Glen Ewen, Stoughton, Esterhazy, Torquay, Wauchope, and Oxbow stations. The Weyburn station has been in place and operating since March 2010. The Glen Ewen station started operations in May 2012. The Stoughton, Esterhazy, and Wauchope stations began operation in 2013. The Oxbow station began operation in December 2014. Torquay began operations in November 2018.

Table 1 presents a combination matrix of the monitoring stations and the measured parameters. The SESAA continuous air monitoring network measures sulphur dioxide (SO_2), hydrogen sulphide (H_2S), nitrogen oxides (NO, NO_2, NOx), ozone (O_3), fine particulate matter ($PM_{2.5}$), ambient temperature (ET), relative humidity (RH), precipitation, wind speed (WS) and wind direction (WD). Real-time air monitoring data is available on the SESAA website at: www.sesaa.ca.

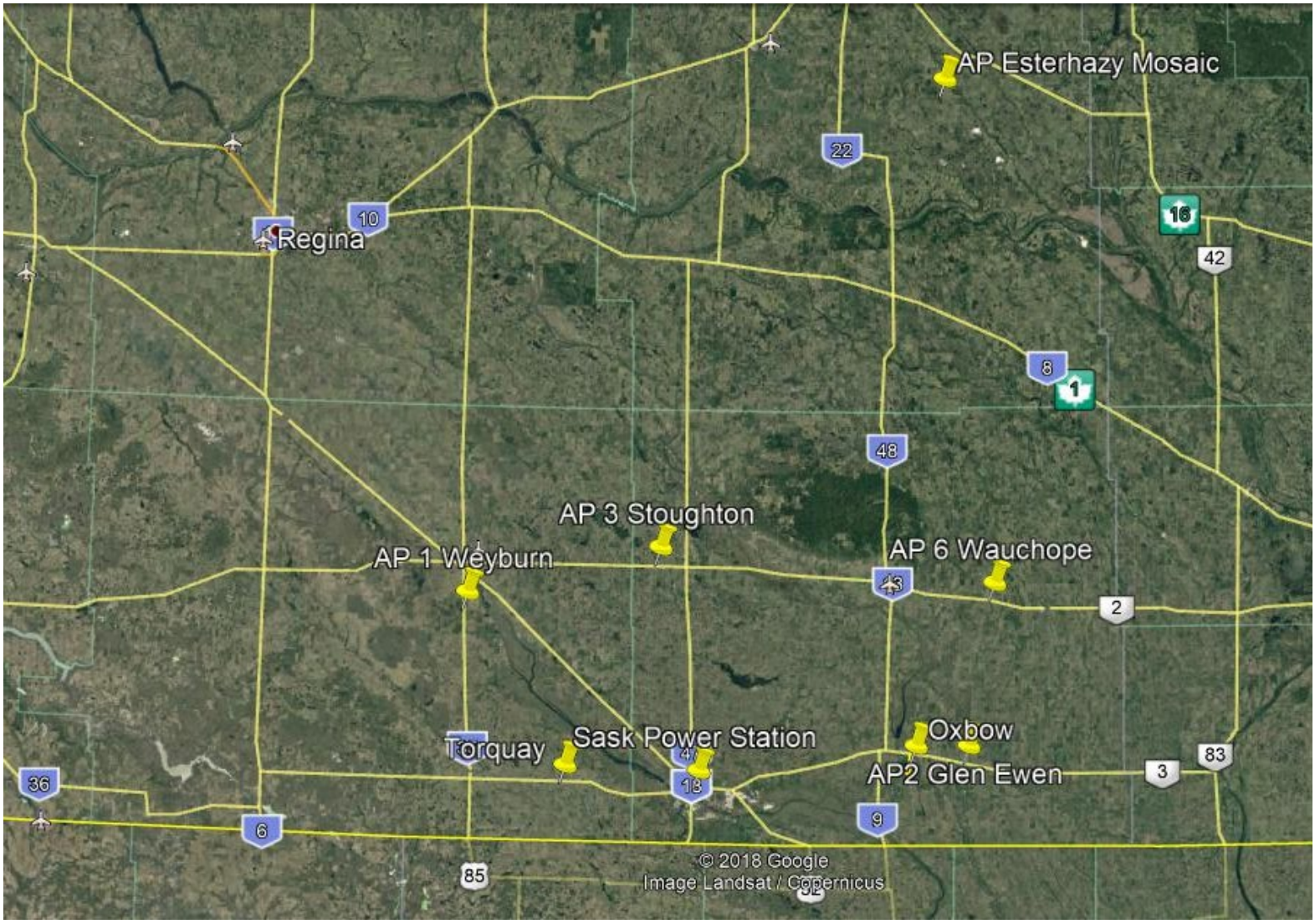


Figure 1. Ambient air monitoring network for the Southeast Saskatchewan Airshed Association

Table 1. SESAA airpointer® continuous monitoring stations and the measurement parameters

Monitoring Parameters	Continuous air quality parameters measured in the SESAA network						
	Weyburn	**Glen Ewen**	**Stoughton**	**Esterhazy**	**Torquay**	**Wauchope**	**Oxbow**
SO_2	√	√	√	-	√	√	√
H_2S	√	√	√	-	√	√	√
NO	√	√	√	√	-	-	√
NO_2	√	√	√	√	-	-	√
NOx	√	√	√	√	-	-	√
O_3	√	√	-	√	-	-	-
$PM_{2.5}$	√	-	√	√	√	√	√
Ambient Temp.	√	√	√	√	√	√	√
Relative Humidity	√	√	√	√	√	√	√
Wind Speed	√	√	√	√	√	√	√
Wind Direction	√	√	√	√	√	√	√

- : Parameter was not monitored

2.0 Air Quality Monitoring

2.1 Summary of Exceedances above the SAAQS

The SESAA air monitoring network measures air pollutant concentrations to indicate the quality of air in the airshed. Air quality data is used to investigate the trends in air quality resulting from emissions of anthropogenic sources (industry, motor vehicles, etc) and natural processes (such as forest fires, decomposition of organic matter, etc).

Table 2 summarizes the Saskatchewan Ambient Air Quality Standards (SAAQS) and the number of exceedances recorded in 2022. A total of 38 exceedance events for 1-hour average H_2S, two exceedance events for 24-hour average H_2S, and two exceedance events for 24-hour average $PM_{2.5}$ were recorded. The detailed exceedance summaries are presented in Appendix I-O.

Table 2. Number of exceedance events for 2022

Parameter	No. of Stations	Average Type	SAAQS	No. of Exceedance
SO_2	5	1-hour	172 ppb	0
		24-hour	48 ppb	0
		Annual	8 ppb	0
H_2S	5	1-hour	11 ppb	38
		24-hour	3.6 ppb	2
NO_2	6	1-hour	159 ppb	0
		Annual	24 ppb	0
O_3	4	1-hour	82 ppb	0
		8-Hour	63 ppb CWS	0
$PM_{2.5}$	6	24-hour	28 µg/m^3	2

2.2 Wind

Wind speed and wind direction are important factors that influence regional air quality. The diffusion and dispersion of air pollutant emissions are greatly impacted by variations in wind speed and corresponding air turbulence. Different degrees of turbulence are created by variable mixing conditions due to the vertical gradient of ambient temperatures and terrain roughness unique to each station.

Figure 2 presents the wind roses for the SESAA stations. According to the international wind classification system, the prevailing winds in SESAA was typically classified as Light Air (<1.4 m/s), Light Breeze (<3.1 m/s), and Moderate Breeze (<7.8 m/s). Strong wind (>7.8 m/s) was slightly more frequent at the Weyburn (11.4%) and Oxbow (12.9%) stations. The occurrence frequency of calm wind ranged from 0.7% (Oxbow) to 2.6% (Esterhazy). Esterhazy had the lowest average windspeeds, with 97.0% below 7.8 m/s.

The prevailing wind direction varied among the seven air monitoring stations. Generally, the prevailing wind direction was from the northwest and southeast quadrants. The Wauchope station exhibited a higher frequency of west winds. The Stoughton station recorded a higher frequency of east-southeast winds (16.8%) while Glen Ewen was primarily from the west-northwest (14.1%). The Esterhazy station exhibited a higher frequency of west winds 18.8%. Weyburn and Torquay had primarily winds from the northwest (17.3% and 14.9% respectively).

The detailed frequency distribution tables and wind roses are presented in the Appendices: Table B-12, Table C-11, Table D-11, Table E-10, Table F-10, Table G-8, and Table H-11.

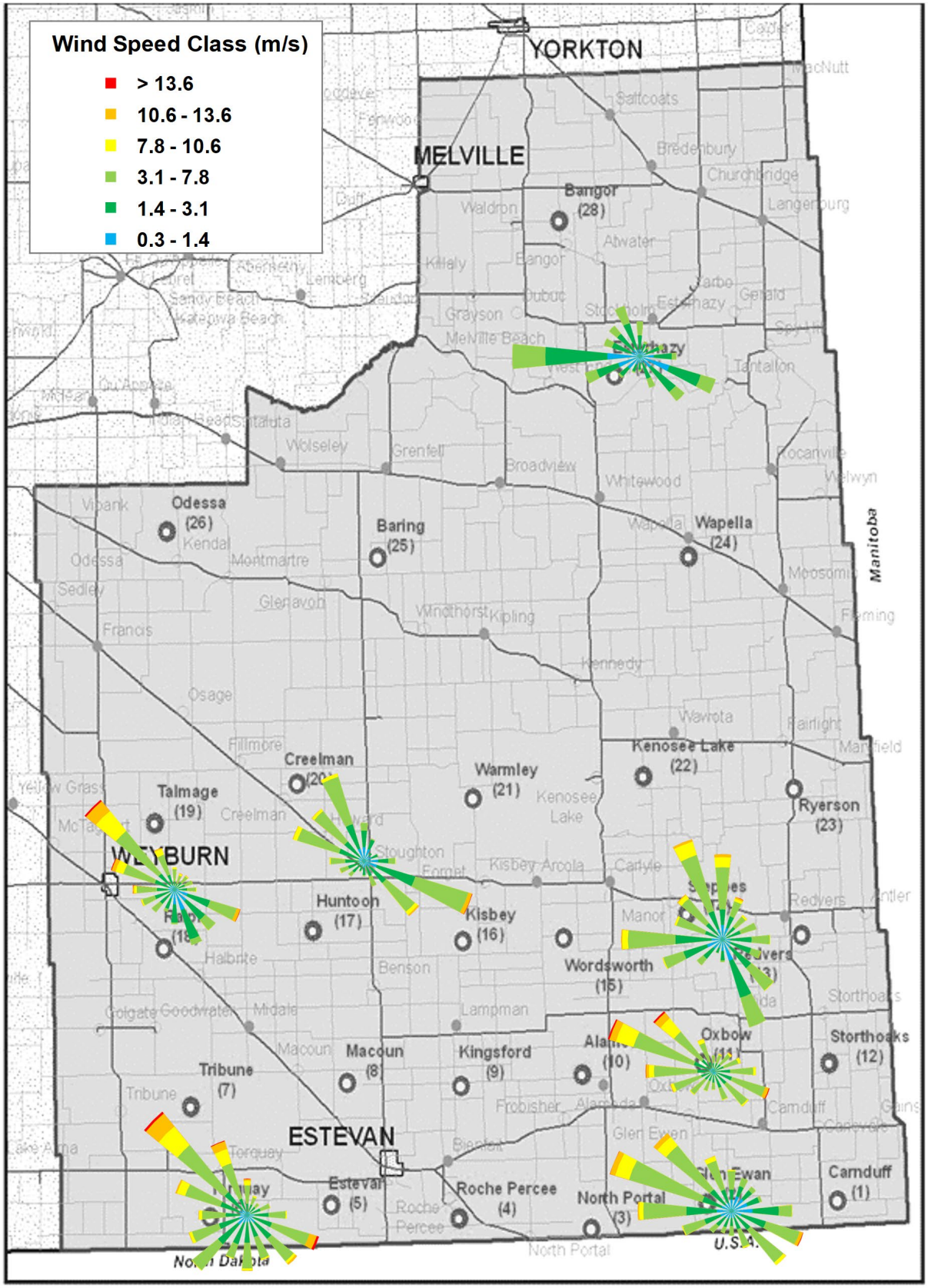


Figure 2. Wind roses for the SESAA continuous monitoring stations for 2022

2.3 Continuous Air Quality Data

2.3.1 Sulphur Dioxide (SO_2)

Sulphur dioxide (SO_2) is a colourless gas with a strong suffocating odour. It smells like burnt matches. At concentrations above 300 ppb, it can be detected by taste and odour. The health effects caused by exposure to high levels of SO_2 include breathing problems, respiratory illness, changes in lung function, and worsening respiratory and cardiovascular disease. People with asthma or chronic lung or heart disease are the most susceptible to SO_2. SO_2 also damages trees and crops.

SO_2, along with nitrogen oxides, are the main precursors of photochemical smog and acid rain, which contributes to the acidification of lakes and streams, accelerated corrosion of buildings, and reduced visibility. SO_2 in the air can form microscopic acid aerosols, which have serious health implications, as well as, contributing to climate change.

Anthropogenic SO_2 emission sources are primarily from combustion of sulphur containing fuels (e.g. gasoline, natural gas and coal) and processing of sulphur containing ores. The major emission sources for SO_2 include large industrial sources such as power plants, petroleum refineries, iron and steel mills, fertilizer plants, pulp and paper mills, and smelters, as well as small industries, such as small oil and gas plants, battery and well flares.

The Saskatchewan Ambient Air Quality Standards (SAAQS) for sulphur dioxide are:

- 1-hour average SAAQS = 172 ppb
- 24-hour average SAAQS = 48 ppb
- annual average SAAQS = 8 ppb

Table 3 presents the summary statistics for SO_2. The annual average concentration range was from 0.1 ppb to 1.1 ppb among the five stations. The maximum 1-hour concentration of 27.6 ppb and the maximum 24-hour concentration of 7.9 ppb was detected at the Weyburn station. There were no exceedance events for the 1-hour, 24-hour, and annual average concentrations in 2022 (see Table 4).

Figures 3 to 8 present the pollutant roses for 1-hour average concentration for SO_2. The measured concentration at all stations was low; greater than 90% of the data was less than 5 ppb (the blue and dark green petals). The pollutant roses indicate that the Weyburn, Glen Ewen, Wauchope and Oxbow stations detected more high concentration

events (>5 ppb) than the other stations. At the Weyburn station, the high concentration events were associated with the winds from the southeast quadrant, where more industrial activities exist, such as coal-fired power plants and upstream oil and gas industry. At the Glen Ewen station, the high concentration events were associated with the winds from the northwest quadrant, where more industrial activities exist, such as upstream oil and gas industry. The high concentration events at the Oxbow station tended to be associated with the winds from the southeast quadrant.

The detailed frequency distribution tables for 1-hour average SO_2 data are presented in the Appendices: Table B-2, Table C-2, Table D-2, Table G-2, and H-2.

Table 3. Summary statistics for SO_2

Monitoring Station	Annual Average	Instrument Uptime	Maximum SO_2 Conc. and Occurrence Time			
			1-hour Max.		24-hour Max.	
	ppb	%	ppb	Time	ppb	Date
Weyburn	1.1	94.7	27.6	Dec 11 08:00	7.9	Sep 04
Glen Ewen	0.3	95.9	21.2	Jan 06 13:00	3.9	Jan 06
Stoughton	0.3	88.7	8.8	Dec 30 11:00	2.1	Sep 13
Torquay	0.1	95.7	13.8	Apr 02 18:00	2.2	Sep 13
Wauchope	0.2	69.5	11.7	Dec 26 05:00	2.4	Dec 26
Oxbow	0.5	99.5	14.6	Sep 05 11:00	2.8	Feb 23

Table 4. Number of exceedance events for SO_2

Monitoring Station	No. of Exceedance to Saskatchewan Ambient Air Quality Standards (SAAQS)		
	1-hr SAAQS	24-hr SAAQS	Annual SAAQS
	172 ppb	57 ppb	11 ppb
Weyburn	0	0	0
Glen Ewen	0	0	0
Stoughton	0	0	0
Torquay	0	0	0
Wauchope	0	0	0
Oxbow	0	0	0

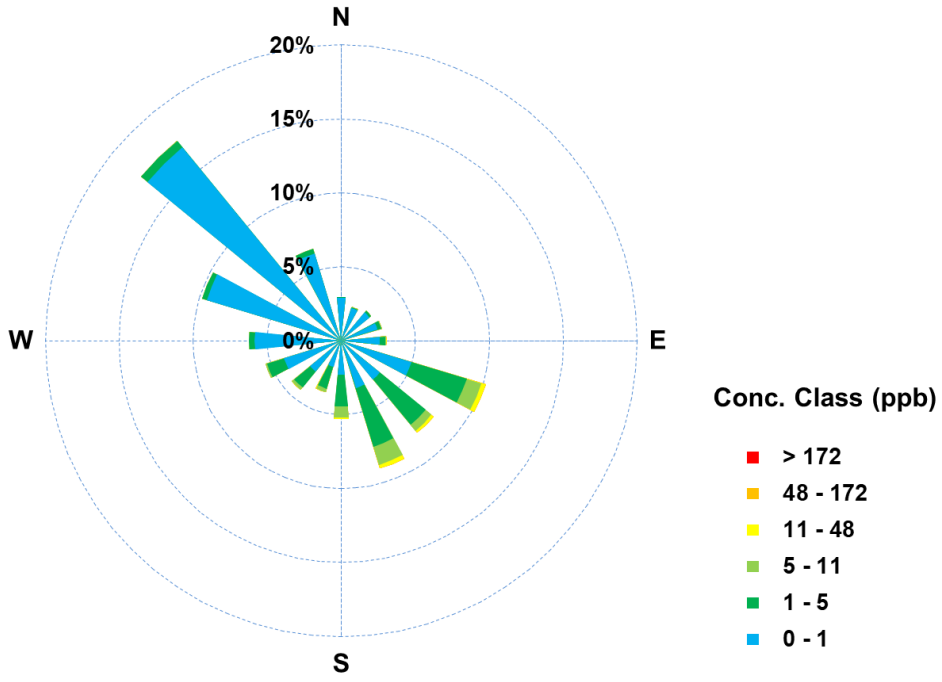


Figure 3. Pollutant rose for 1-hour average SO_2 data at the Weyburn Station

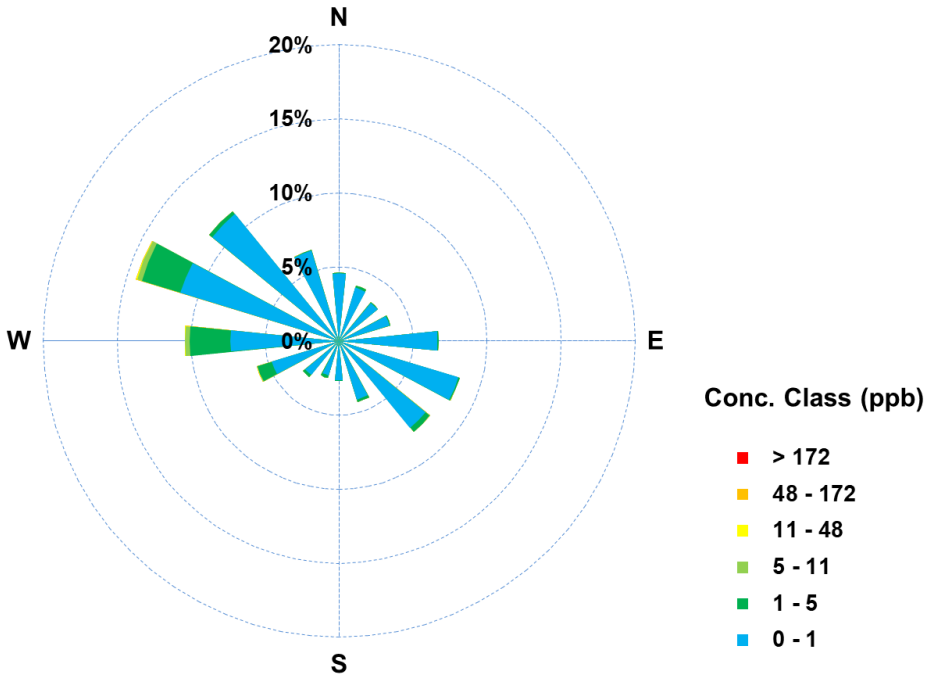


Figure 4. Pollutant rose for 1-hour average SO_2 data at the Glen Ewen Station

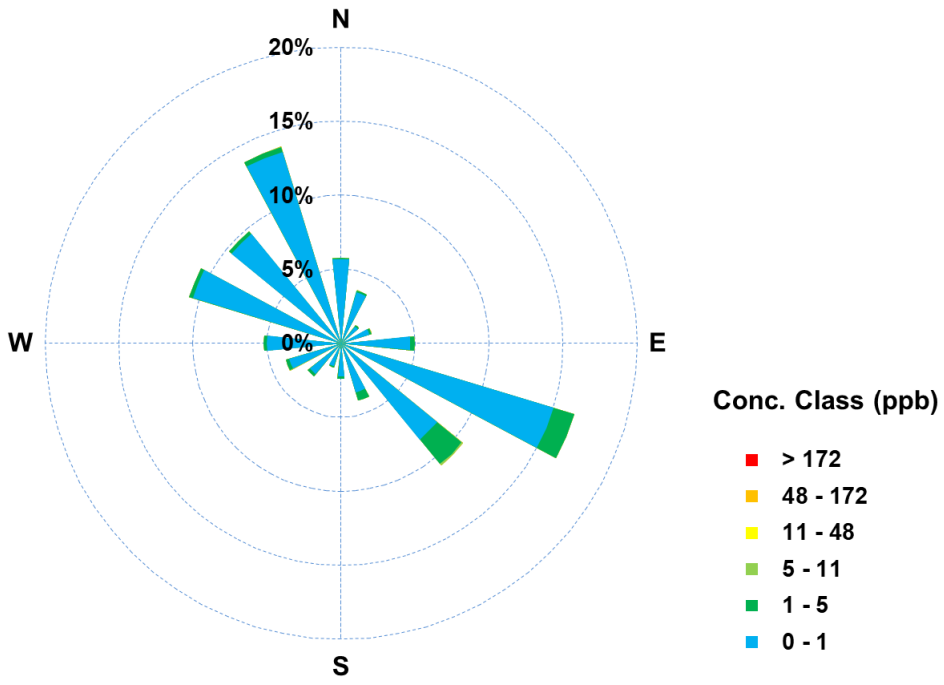


Figure 5. Pollutant rose for 1-hour average SO_2 data at the Stoughton Station

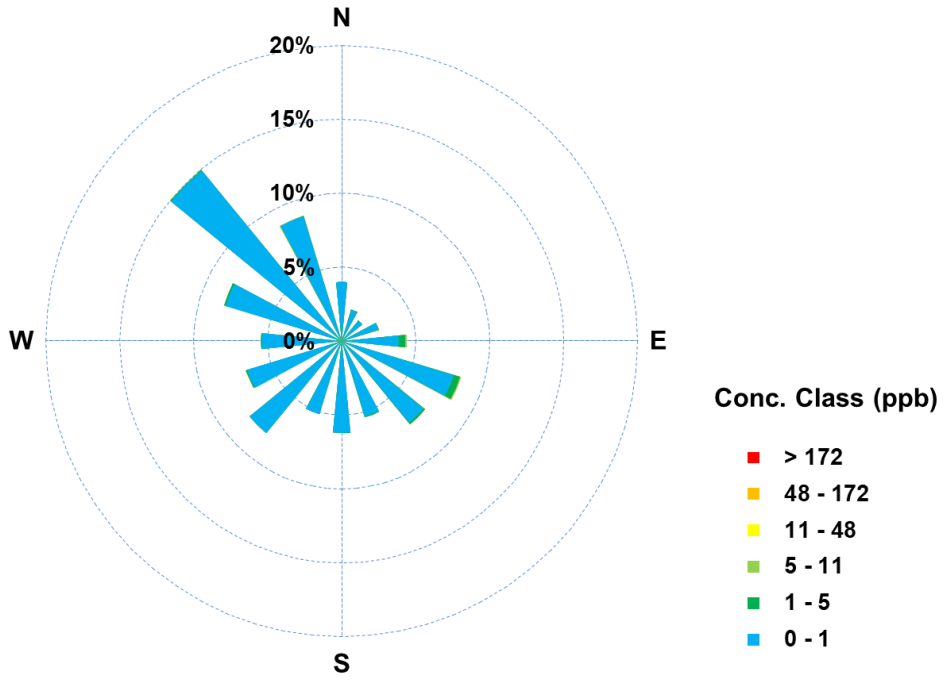


Figure 6. Pollutant rose for 1-hour average SO_2 data at the Torquay Station

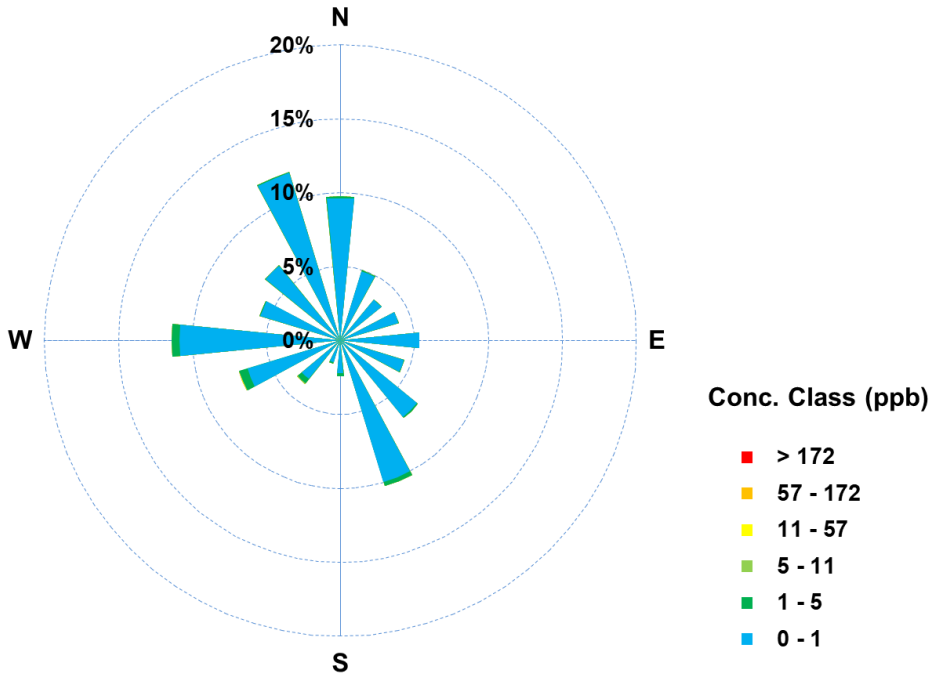


Figure 7. Pollutant rose for 1-hour average SO_2 data at the Wauchope Station

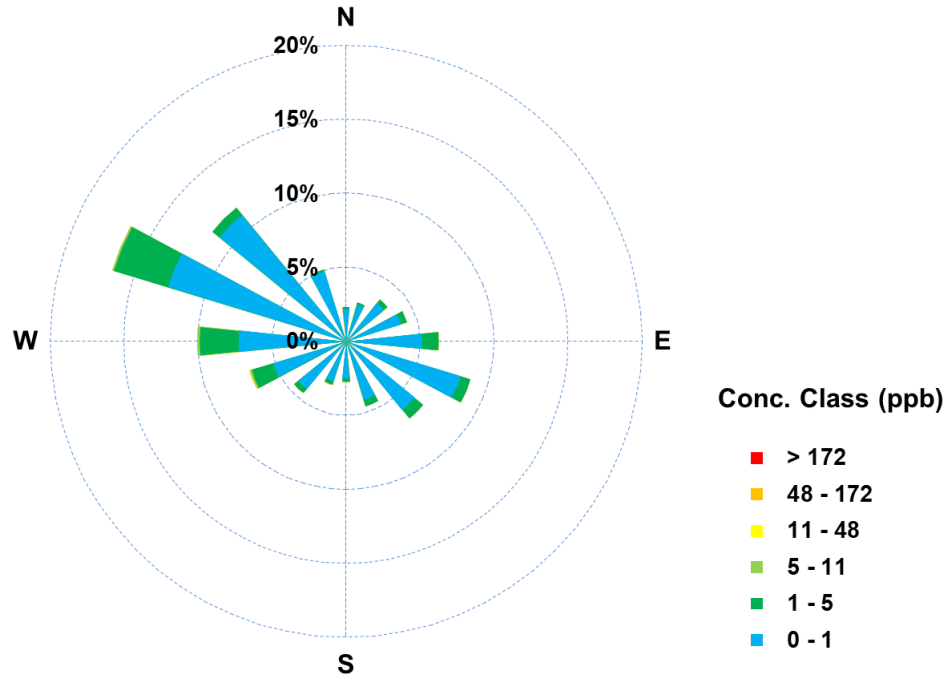


Figure 8. Pollutant rose for 1-hour average SO_2 data at the Oxbow Station

2.3.2 Hydrogen Sulphide (H_2S)

Hydrogen sulphide (H_2S) is a colourless gas with a characteristic "rotten egg" odour. It is produced both naturally and through anthropogenic emission sources. H_2S occurs naturally in coal, crude oil, natural gas, oil, sulphur hot springs, volcanic gases, sloughs, swamps and lakes. The major anthropogenic emission sources include natural gas and petroleum production, wastewater treatment, pulp and paper mills, rayon textile manufacturing, and tar and asphalt manufacturing. Decomposition of organic matter by bacteria under anaerobic conditions releases H_2S as well, forming the characteristic odour commonly associated with sewers, sewage lagoons, and swamps.

Hydrogen sulfide is a highly toxic and flammable gas. It is heavier than air and tends to accumulate at the bottom of poorly ventilated spaces. Although very pungent at first, it quickly deadens the sense of smell. Potential victims may be unaware of its presence until it is too late.
The Saskatchewan Ambient Air Quality Standards (SAAQS) for hydrogen sulphide are:

- 1-hour average SAAQS = 11 ppb
- 24-hour average SAAQS = 3.6 ppb

Table 5 presents summary statistics for H_2S. The annual average concentration ranged from 0.2 ppb to 0.3 ppb among the six stations. The maximum 1-hour concentration of 79.9 ppb was detected at the Wauchope station and the maximum 24-hour concentration of 2.9 ppb was detected at the Weyburn station.

Although H_2S concentrations were generally low at all stations in comparison with the SAAQS for the majority of the time, there were occasional spikes causing exceedances of the 1-hour SAAQS. Table 6 summarizes the number of exceedance events for H_2S. The complete lists of exceedances can be found in Appendix I-O.

Figures 9 through 14 present the pollutant roses for 1-hour average concentration of H_2S. The measured concentration was low at all stations for the majority of the time; greater than 94% of the data was less than 3.6 ppb (the blue and dark green petals). There was a general trend where most of the high concentration events (>5 ppb) were associated with Light Air wind conditions (≤1.4 m/s).

At the Weyburn station, the exceedances and high concentration events (>5 ppb) were primarily associated with the SE-S (southeast to south) directions. The projected area is where more industrial activities exist, such as upstream oil and gas industry. 95% of the

1-hour exceedance events were detected during Light Air wind conditions. At the Glen Ewen station, the high concentration events (>5 ppb) were primarily associated with the west. At the Torquay station, the exceedances and high concentration events (>5 ppb) were associated with the NW direction. 99% of the 1-hour exceedance events were associated with Light Air wind conditions. At the Stoughton station, the high concentration events (>5 ppb) were associated with the SE direction. At the Wauchope station, the exceedances and high concentration events (>5 ppb) were detected the west and southeast. 97% of the 1-hour exceedance events were associated with Light Air wind conditions. At the Oxbow station, the high concentration events (>5 ppb) were primarily associated with winds from the west.

The detailed frequency distribution tables for 1-hour average H_2S data are presented in the Appendices: Table B-7, Table C-7, Table D-6, Table G-3, and H-2.

Table 5. Summary statistics for H_2S

Monitoring Station	Annual Average	Instrument Uptime	Maximum H_2S Conc. and Occurrence Time			
			1-hour Max.		24-hour Max.	
	ppb	%	ppb	Time	ppb	Date
Weyburn	0.3	91.1	24.0	Nov 04 04:00	2.9	Nov 04
Glen Ewen	0.2	95.7	21.9	Mar 11 23:00	2.4	Jul 13
Stoughton	0.2	88.7	6.2	Sep 05 19:00	1.3	Sep 8
Torquay	0.1	95.7	13.8	Jan 17 22:00	1.3	Feb 01
Wauchope	0.4	69.5	55.9	July 13 04:00	11.5	Jun 13
Oxbow	0.3	85.5	27.0	Mar 25 17:00	2.5	Jun 5

Table 6. Number of exceedance events for H_2S

Monitoring Station	No. of Exceedance to Saskatchewan H_2S Ambient Air Quality Standards (SAAQS)	
	1-hr SAAQS	24-hr SAAQS
	11 ppb	3.6 ppb
Weyburn	8	0
Glen Ewen	5	0
Stoughton	0	0
Torquay	1	0
Wauchope	23	2
Oxbow	1	0

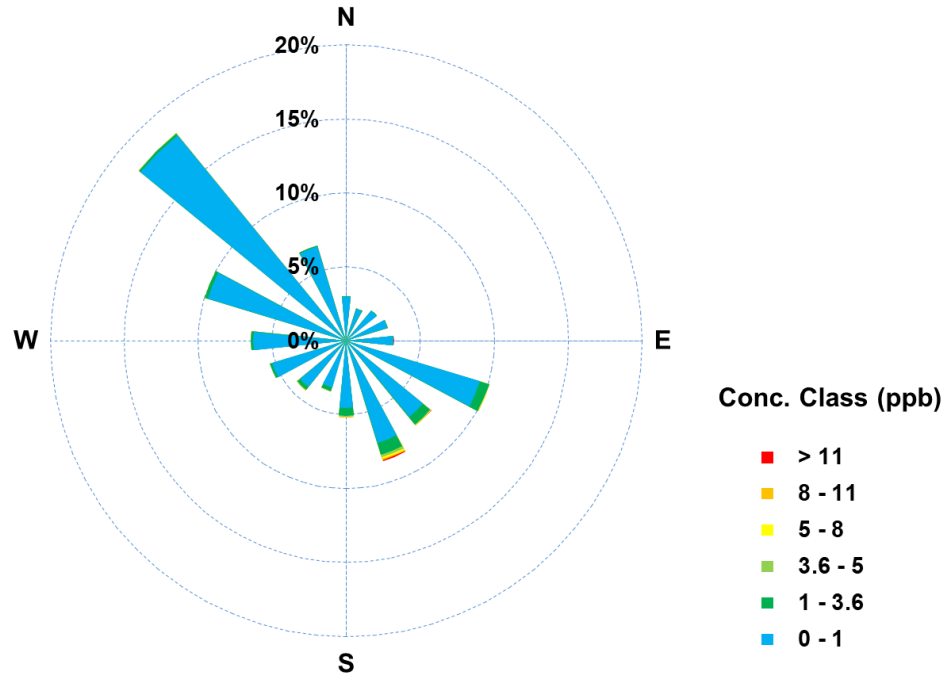


Figure 9. Pollutant rose for 1-hour average H_2S data at the Weyburn Station

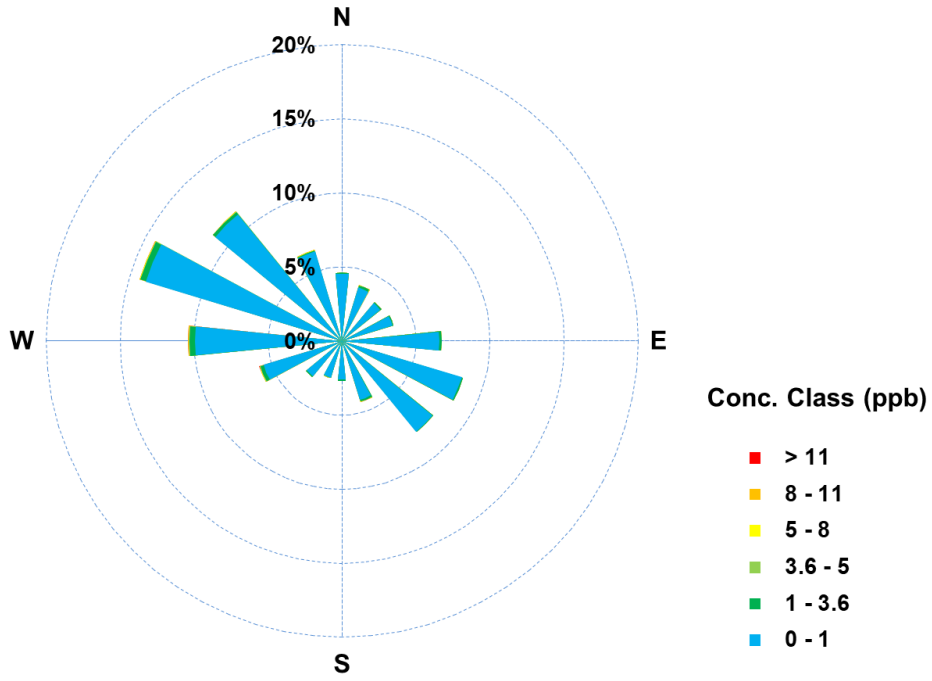


Figure 10. Pollutant rose for 1-hour average H_2S data at the Glen Ewen Station

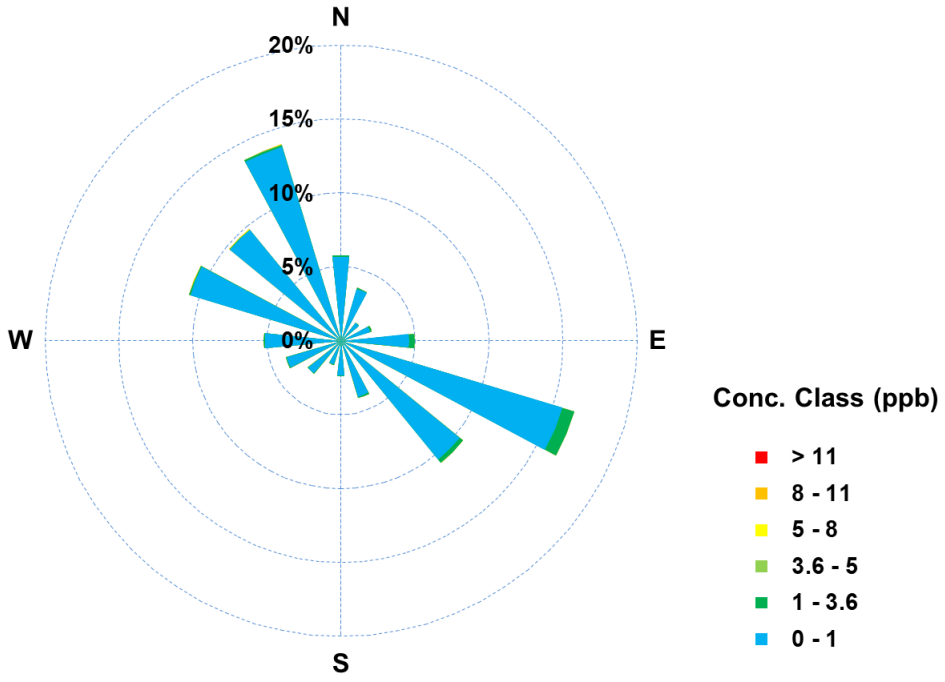


Figure 11. Pollutant rose for 1-hour average H_2S data at the Stoughton Station

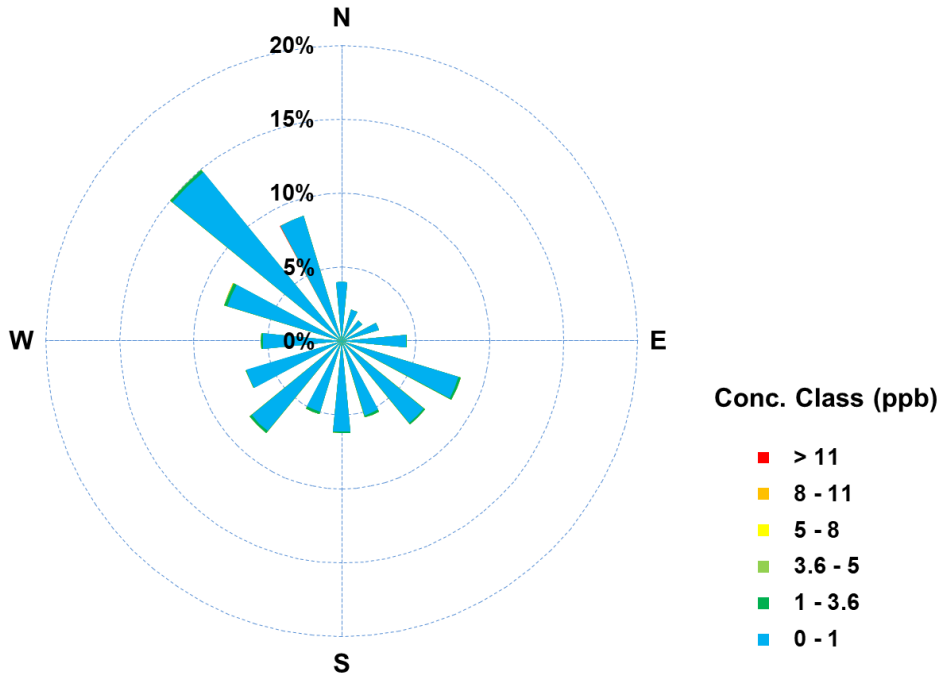


Figure 12. Pollutant rose for 1-hour average H_2S data at the Torquay Station

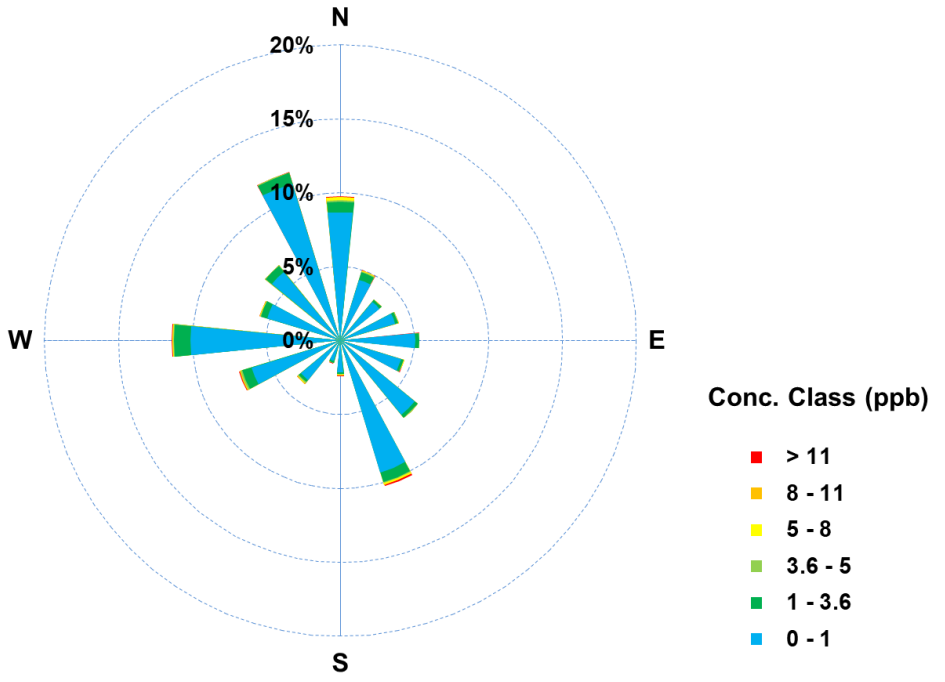


Figure 13. Pollutant rose for 1-hour average H_2S data at the Wauchope Station

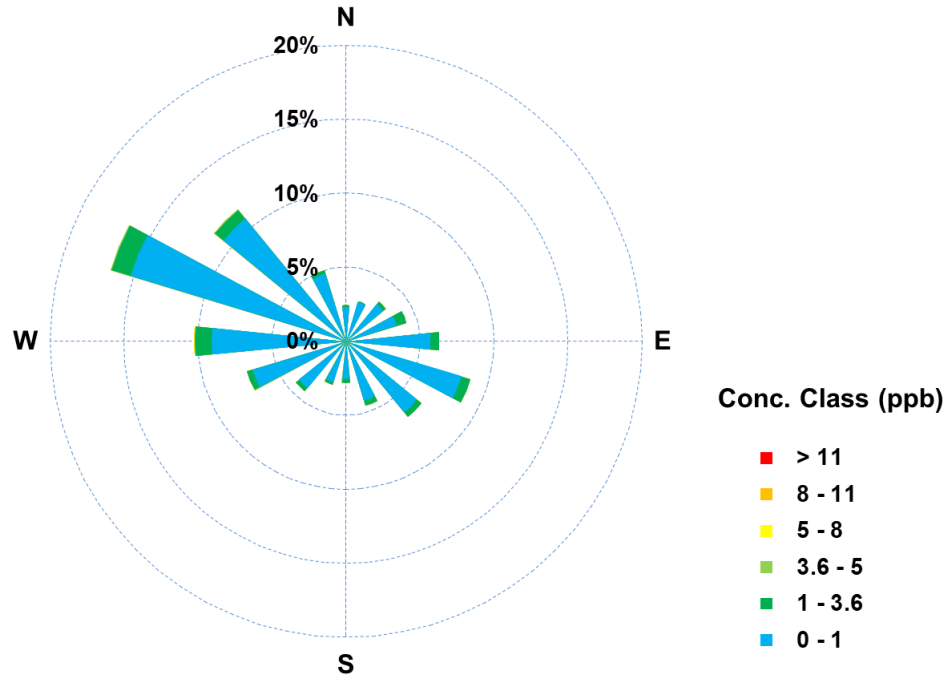


Figure 14. Pollutant rose for 1-hour average H_2S data at the Oxbow Station

2.3.3 Nitrogen Dioxide (NO_2)

Nitrogen oxides, also known as oxides of nitrogen (NO_X), is a collective term for nitric oxide (NO) and nitrogen dioxide (NO_2). Nitric oxide is a colorless, flammable gas with a slight odour. Nitrogen dioxide is a reddish brown, non-flammable gas with a pungent irritating odour. NO_2 is of more interest than NO from both a health and acid rain perspective.

NO_X can cause respiratory disease, damage vegetation, and reduce visibility. The primary concern with NO_X emissions is their contribution to formation of ground-level ozone, smog and acid rain. To a lesser extent, some NO_X compounds (e.g. N_2O) contribute to stratospheric ozone layer depletion and global warming.

NO_X emissions are mainly produced by fossil fuel combustion. High temperature conditions during combustion result in the formation of NO_X as a by-product. The major anthropogenic emission sources for NO_X are associated with fuel combustion, including both stationary sources, such as power plants, oil and gas industries, incinerators, as well as mobile sources such as automobiles. Non-combustion sources, for example nitric acid manufacture, welding processes and the use of explosives, comprise the smaller emission sources. In large cities, motor vehicle emission is the major source of NO_X.

The Saskatchewan Ministry of Environment regulates ambient air concentration for nitrogen dioxide. The Saskatchewan Ambient Air Quality Standards (SAAQS) for nitrogen dioxide are:

- 1-hour average SAAQS = 159 ppb
- annual average SAAQS = 24 ppb

Table 7 presents summary statistics for NO_2 for 2022. The measured NO_2 concentration was low at all stations in comparison with the SAAQS. The annual average concentration ranged from 0.8 ppb to 1.4 ppb. The maximum 1-hour concentration of 43.3 ppb and the maximum 24-hour concentration of 6.9 ppb were detected at Stoughton and Weyburn respectively. There was no exceedance of the 1-hour or annual SAAQS in 2022 (see Table 8).

Figures 15 through 98 present the pollutant roses for 1-hour average NO_2. The concentration at all stations was generally low; greater than 90% of the data was less than 5 ppb (the blue color petals). The Weyburn, Glen Ewen, Stoughton, and Oxbow pollutant roses reveal a higher percent of concentration events greater than 5 ppb than

the other two stations. While industrial activities, such as upstream oil and gas industry and/or coal-fired power plants, could be the potential sources, vehicular emissions may not be excluded. Some stations detected a diurnal trend showing a double-crest pattern with the peak NO_2 concentrations during the morning and afternoon/evening commuting hours.

The detailed frequency distribution tables for 1-hour NO_2 data are presented in Appendices: Table B-4, Table C-4, Table D-4, Table E-3, Table F-3, and Table H-2. The summary tables for NO and NOx are in Tables B-3, B-5, C-3, C-5, D-3, D-5, E-2, E-4, F-2, F-4, and H-2.

Table 7. Summary statistics for NO_2

Monitoring Station	Annual Average	Instrument Uptime	Maximum NO_2 Conc. and Occurrence Time			
			1-hour Max.		24-hour Max.	
	ppb	%	ppb	Time	ppb	Date
Weyburn	0.8	84.2	22.0	Jun 03 22:00	6.9	Jun 17
Glen Ewen	1.4	95.0	25.8	Feb 25 07:00	4.9	Dec 08
Stoughton	0.8	87.9	43.3	May 12 11:00	3.9	Jan 30
Esterhazy	0.7	86.5	28.5	Feb 24 03:00	6.8	Dec 08
Oxbow	0.3	85.8	38.2	Mar 25 17:00	2.5	Dec 10

Table 8. Number of exceedance events for NO_2

Monitoring Station	No. of Exceedance to Saskatchewan NO_2 Ambient Air Quality Standards (SAAQS)	
	1-hr SAAQS	Annual SAAQS
	159 ppb	24 ppb
Weyburn	0	0
Glen Ewen	0	0
Stoughton	0	0
Esterhazy	0	0
Oxbow	0	0

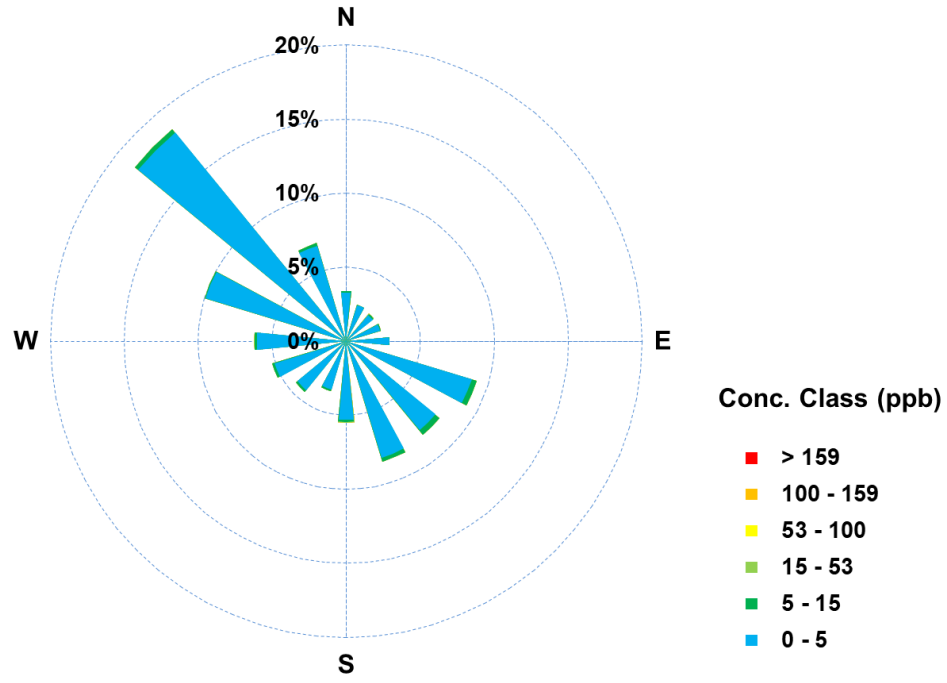


Figure 15. Pollutant rose for 1-hour average NO_2 data at the Weyburn Station

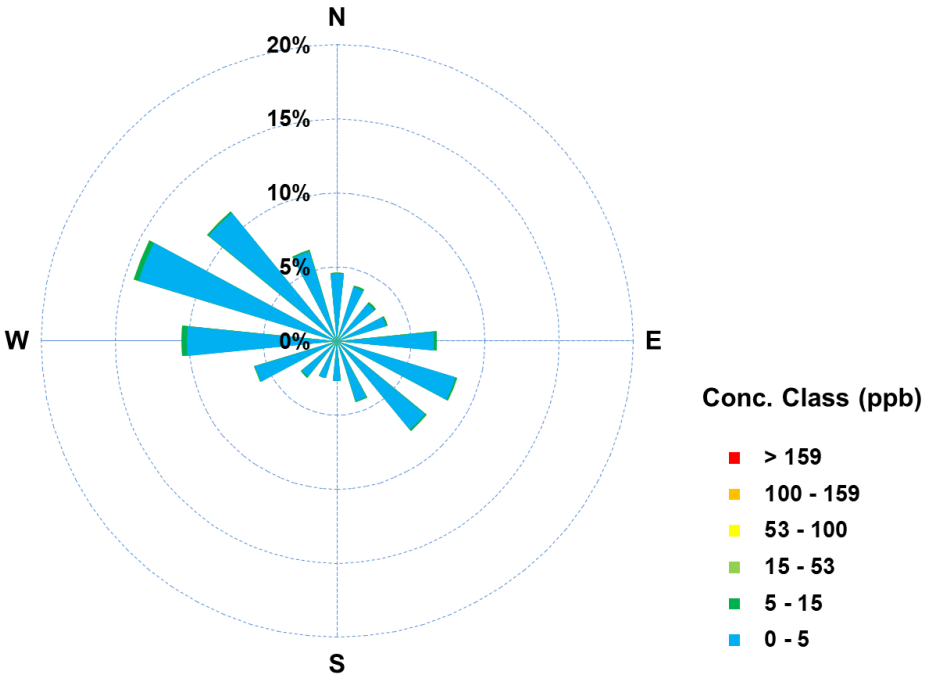


Figure 16. Pollutant rose for 1-hour average NO_2 data at the Glen Ewen Station

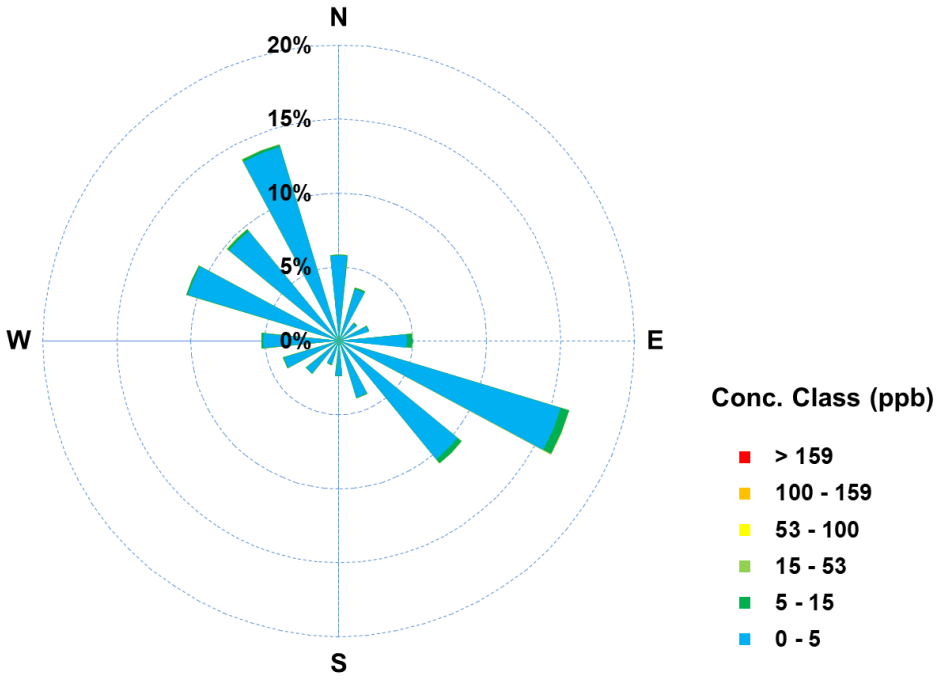


Figure 17. Pollutant rose for 1-hour average NO_2 data at the Stoughton Station

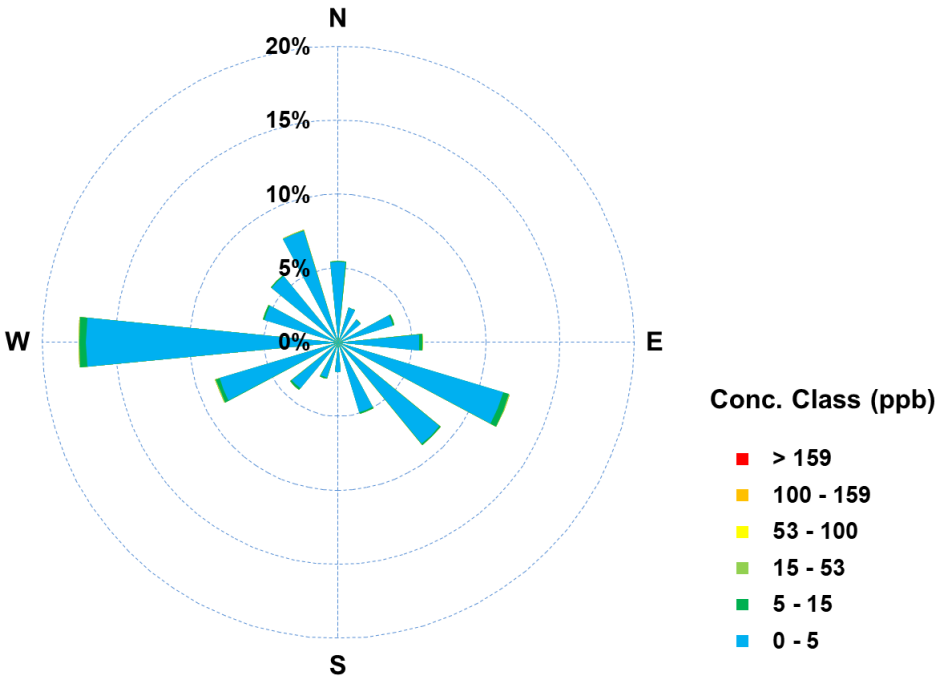


Figure 18. Pollutant rose for 1-hour average NO_2 data at the Esterhazy Station

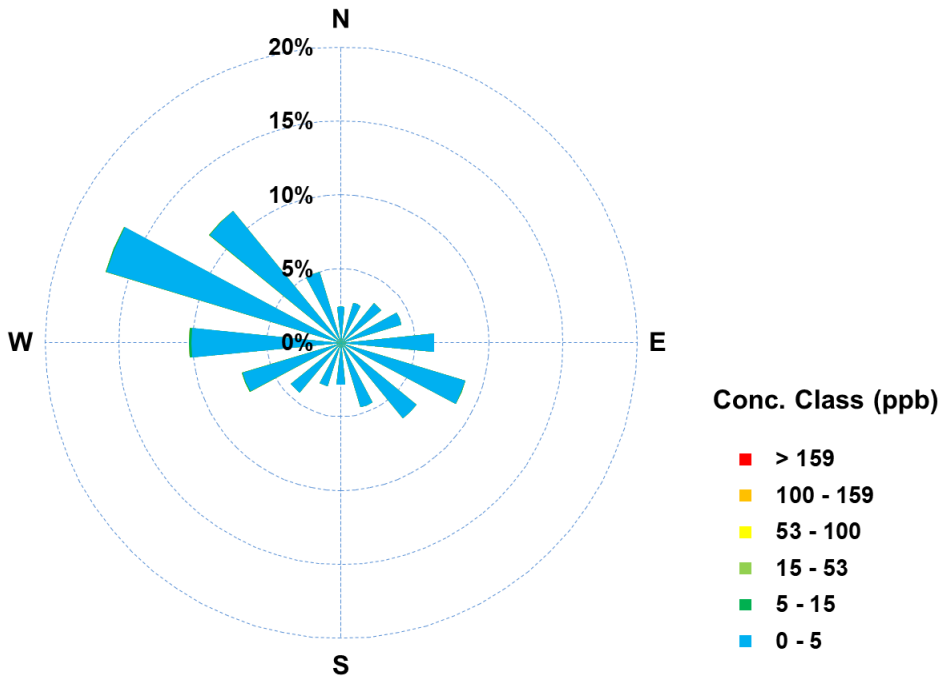


Figure 19. Pollutant rose for 1-hour average NO_2 data at the Oxbow Station

2.3.4 Ozone (O_3)

Ozone (O_3) is a pale blue gas, slightly soluble in water. Most people can detect a sharp odour resembling chlorine bleach at about 10 ppb concentration. Ozone can be formed by electrical discharges and high energy electromagnetic radiation. In the indoor environments, ozone can be present as a result of electronic equipment such as ionic air purifiers, laser printers, photocopiers, and arc welders.

In the ambient air, O_3 is a "secondary" pollutant, meaning it is not directly emitted from a source. Instead, ozone is produced from photochemical reactions between oxides of nitrogen (NO_X) and volatile organic compounds (VOC) in the presence of sunlight. Some research suggests that ground-level ozone could be from intrusion of ozone from the stratosphere, mixing from the upper troposphere, local photochemistry and the medium and long-range transport. There are split opinions regarding relative importance of these mechanisms. A study in Regina suggested that high ozone events could be due to downward transport from the stratosphere.

Exposure to ozone has been linked to premature mortality and a range of morbidity health end-points, such as hospital admissions and asthma symptoms. Acute exposure to high concentrations of ozone can cause eye irritation and breathing difficulty. Ozone can significantly impact vegetation and decrease the productivity of some crops. It damages cotton, acetate, nylon, polyester and other textile materials. Ozone can also damage other synthetic materials, cause cracks in rubber, accelerate fading of dyes, and speed deterioration of some paints and coatings.

The Saskatchewan Ambient Air Quality Standard (SAAQS) for ozone is:

- 1-hour average SAAQS = 82 ppb

The Canada-Wide Standard (CWS) for ozone is:

- 8-hour average CWS = 63 ppb; achievement assessment is based on the 4th highest measurement annually, averaged over three consecutive years.

Table 9 presents summary statistics for O_3. The annual average concentration ranged from 27 ppb to 29 ppb. The maximum 1-hour concentration of 65 ppb was detected at the Glen Ewen station. The maximum of the 4th highest 8-hour running average of 62 ppb was detected at the Glen Ewen station. There was no exceedance of the 1-hour SAAQS (Table 10).

Figures 20 through 22 present the pollutant roses for 1-hour average concentration of O_3. The pollutant roses for all stations showed a higher west-northwest apparent directional trend for high concentration events.

The detailed frequency distribution table for the pollutant roses are presented in Appendices: Table B-6, Table C-6, Table E-5, and Table F-5.

Table 9. Summary statistics for O_3

Monitoring Station	Annual Average	Instrument Uptime	Maximum O_3 Conc. and Occurrence Time			
			1-hour Max.		8-hour 4th Highest	
	ppb	%	ppb	Time	ppb	Time
Weyburn	27	97.1	64	Apr 18 18:00	56	Apr 18 14:00
Glen Ewen	29	95.9	65	Apr 19 00:00	62	Apr 18 22:00
Esterhazy	28	90.7	64	Jun 19 13:00	57	Jun 18 10:00

Table 10. Number of SAAQS exceedance events for O_3

Monitoring Station	No. of Exceedance to Saskatchewan O_3 Ambient Air Quality Standards (SAAQS)
	1-hr SAAQS
	82 ppb
Weyburn	0
Glen Ewen	0
Esterhazy	0

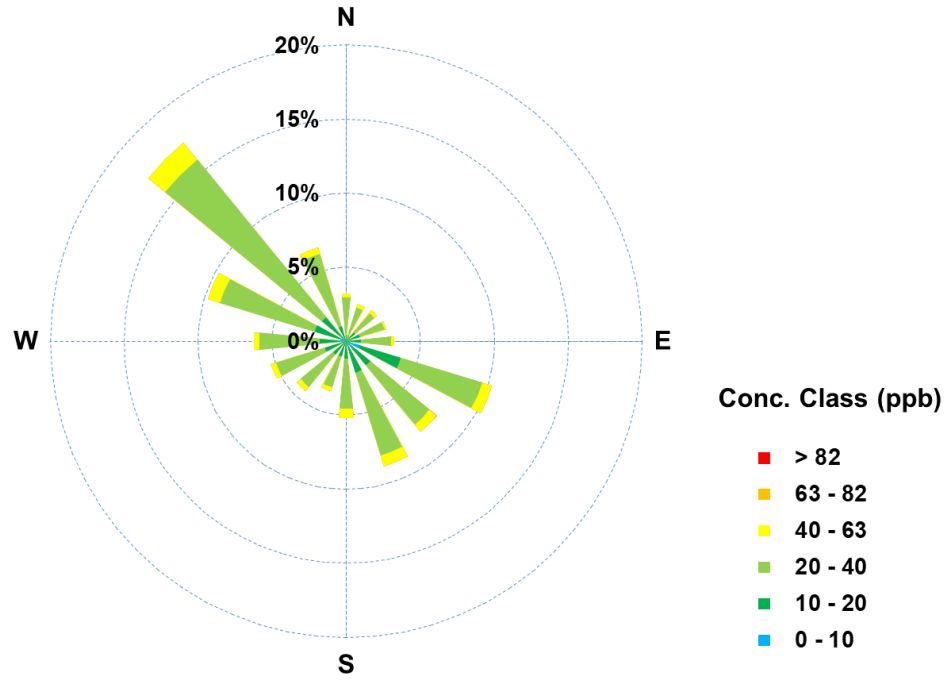


Figure 20. Pollutant rose for 1-hour average O_3 data at the Weyburn Station

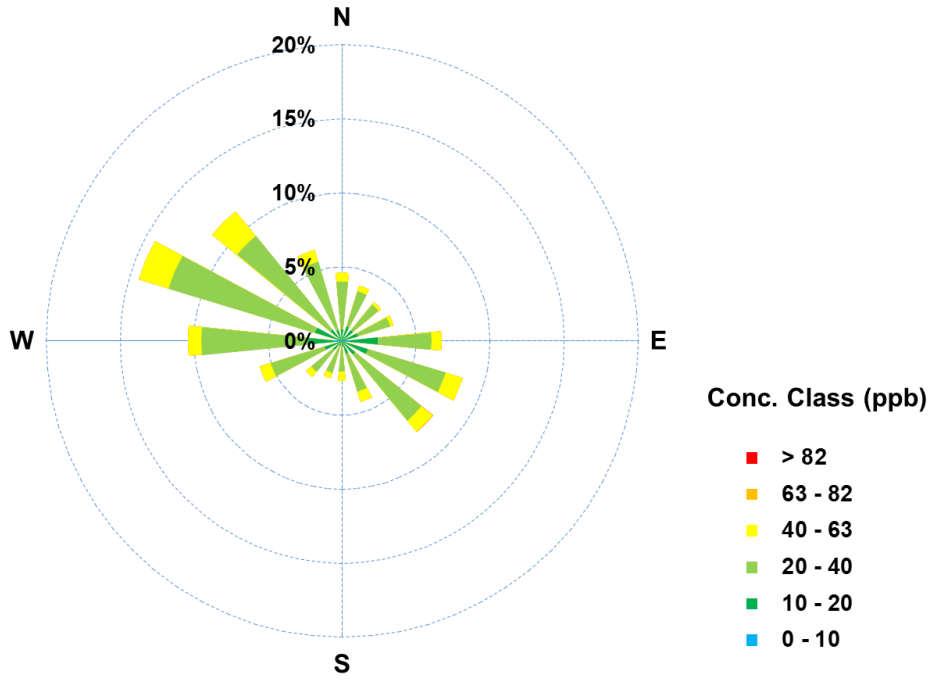


Figure 21. Pollutant rose for 1-hour average O_3 data at the Glen Ewen Station

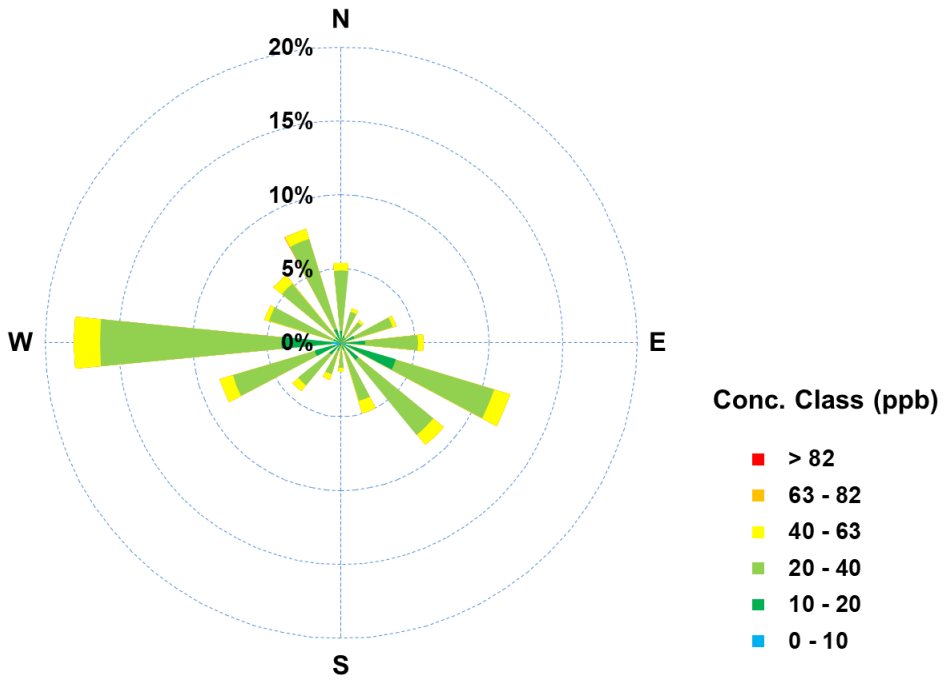


Figure 22. Pollutant rose for 1-hour average O_3 data at the Esterhazy Station

2.3.5 Fine Particulate Matter ($PM_{2.5}$)

Particulate matter is unique among air pollutants, as it is identified by its size rather than by its composition. The major concern for particulate matter deals with small particles referred to as inhalable particulate, or PM_{10}. PM_{10} is defined as particles that have an aerodynamic diameter less than 10 microns (or 0.01 mm). PM_{10} can be divided into two groups of particles based on size: fine particles and coarse particles. The fine particles are those particles with an aerodynamic diameter smaller than 2.5 microns (0.0025 mm) and are identified as $PM_{2.5}$. In contrast, coarse particles are those with aerodynamic diameter greater than 2.5 microns and less than 10 microns.

Fine particles are generally emitted from activities such as industrial and residential combustion, and from vehicle exhaust. Fine particles are also formed in the atmosphere when gases such as sulphur dioxide, nitrogen oxides, and volatile organic compounds, emitted by combustion activities, are transformed by chemical reactions in the air.

Adverse health effects from breathing air with a high $PM_{2.5}$ concentration include: premature death, increased respiratory symptoms and disease, chronic bronchitis, and decreased lung function particularly for individuals with asthma. Particulate matter can clog stomatal openings of plants and interfere with photosynthesis functions, leading to growth stunting or mortality in some plant species.

Saskatchewan endorses the Canada-Wide Standards (CWS) for fine particulate matter ($PM_{2.5}$):

- 28 µg/m^3 averaged over a 24-hour period from midnight to midnight; the standard is based on the 98th percentile annually, averaged over three consecutive years.

Table 11 presents the summary statistics for $PM_{2.5}$. The annual average concentration ranged from 5 µg/m^3 to 7 µg/m^3. The maximum 1-hour concentration of 192 µg/m^3 and the maximum 24-hour concentration of 38 µg/m^3 were detected at the Torquay and Wauchope stations, respectively.

There were two exceedances of the 28 µg/m^3 standard (see Table 13). The exceedances were likely due to wildfire smoke or agricultural activities. The complete lists of exceedances can be found in Appendix I-O.

Figures 23 through 28 present the pollutant roses for 1-hour average concentration of $PM_{2.5}$. Generally, the high concentration events (e.g. >10 µg/m^3 in the yellow, orange

and red petals) were associated with all wind directions. There were no apparent directional trend identifiable from the pollutant roses. The potential sources for the SESAA monitoring stations included wildfire, agricultural activities, vehicular emissions, and industrial emissions.

The detailed frequency distribution tables for the pollutant roses are presented in Appendices: Table B-8, Table D-7, Table E-6, Table F-6, Table G-4, and Table H-2.

Table 11. Summary statistics for $PM_{2.5}$

Monitoring Station	Annual Average	Instrument Uptime	Maximum $PM_{2.5}$ Conc. and Occurrence Time			
			1-hour Max.		24-hour Max.	
	µg/m^3	%	µg/m^3	Time	µg/m^3	Date
Weyburn	5	97.3	120	Aug 09 20:00	27	Jul 15
Stoughton	7	91.1	154	Jun 09 17:00	28	Feb 25
Esterhazy	5	96.1	65	Jan 18 14:00	23	Jan 18
Torquay	6	94.4	192	Oct 18 19:00	27	Sep 06
Wauchope	6	68.0	57	Aug 17 09:00	38	Dec 12
Oxbow	5	99.6	143	Sept 28 18:00	31	Jun 9

Table 112. Number of exceedance events for $PM_{2.5}$

Monitoring Station	No. of Exceedance to Canada-Wide $PM_{2.5}$ Standards (CWS)
	24-hr CWS 28 µg/m^3
Weyburn	0
Stoughton	0
Esterhazy	0
Torquay	0
Wauchope	1
Oxbow	1

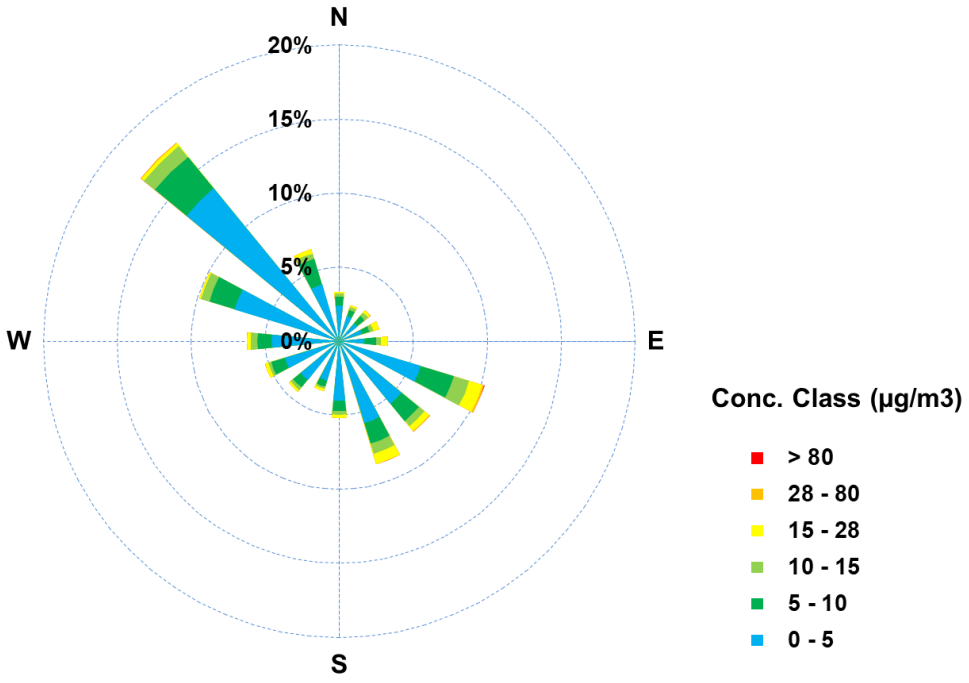


Figure 23. Pollutant rose for 1-hour average $PM_{2.5}$ data at the Weyburn Station

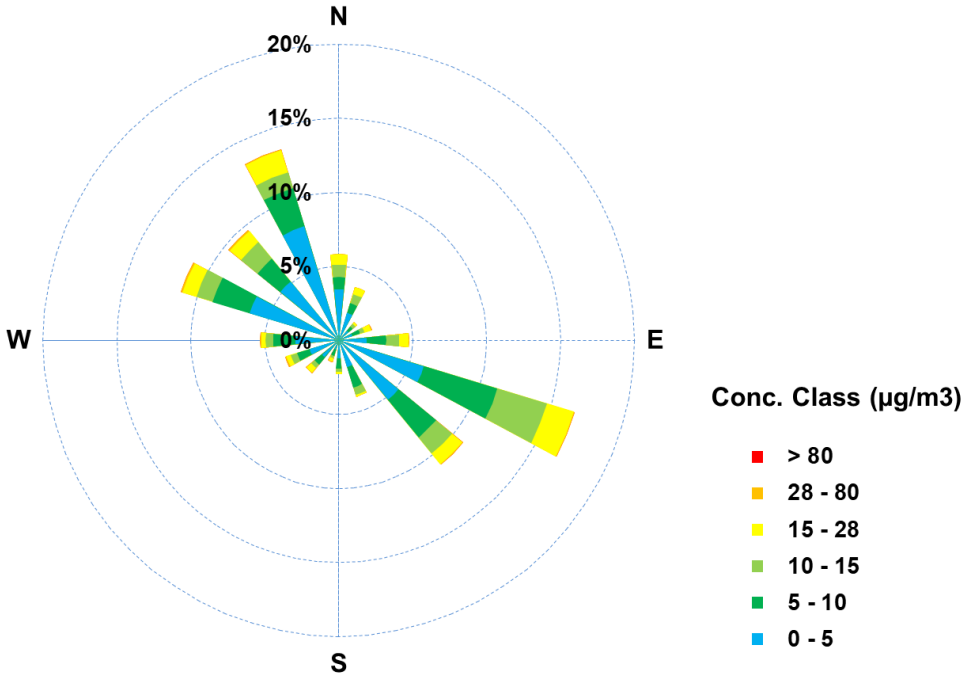


Figure 24. Pollutant rose for 1-hour average $PM_{2.5}$ data at the Stoughton Station

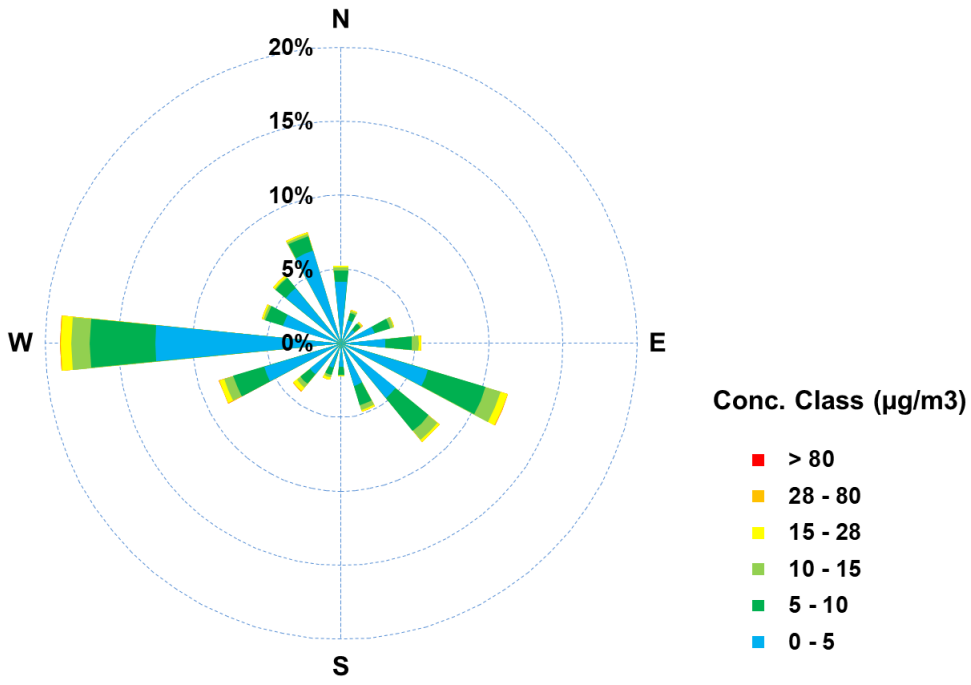


Figure 25. Pollutant rose for 1-hour average $PM_{2.5}$ data at the Esterhazy Station

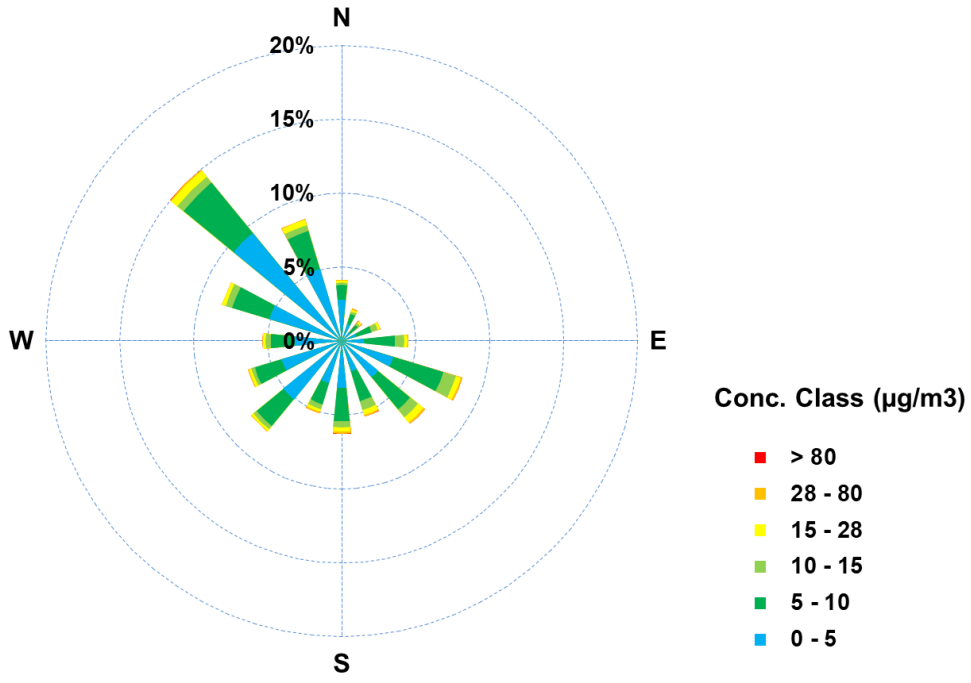


Figure 26. Pollutant rose for 1-hour average $PM_{2.5}$ data at the Torquay Station

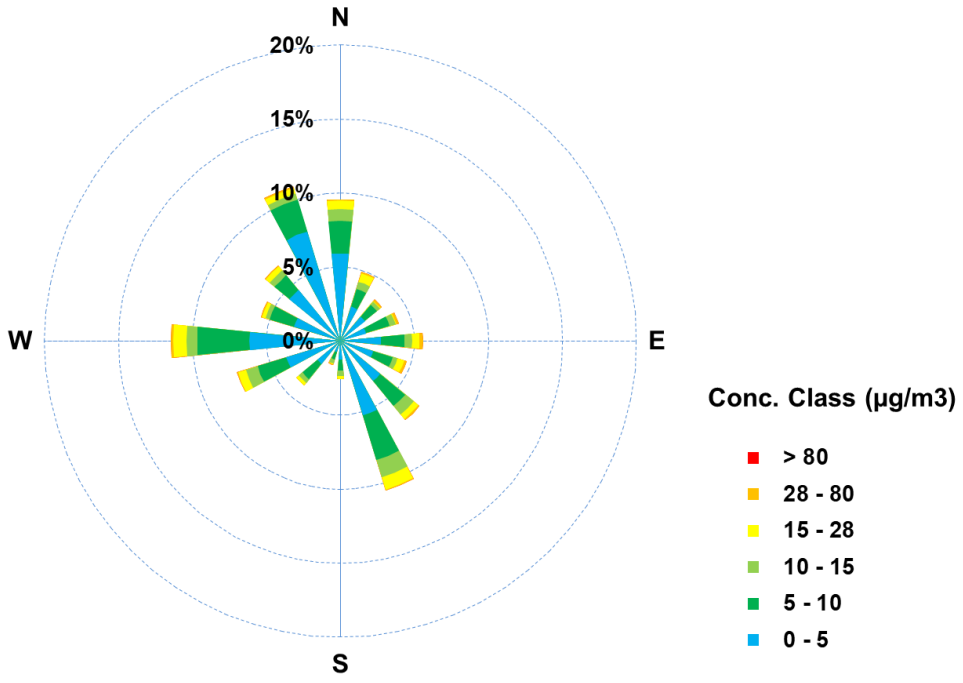


Figure 27. Pollutant rose for 1-hour average $PM_{2.5}$ data at the Wauchope Station

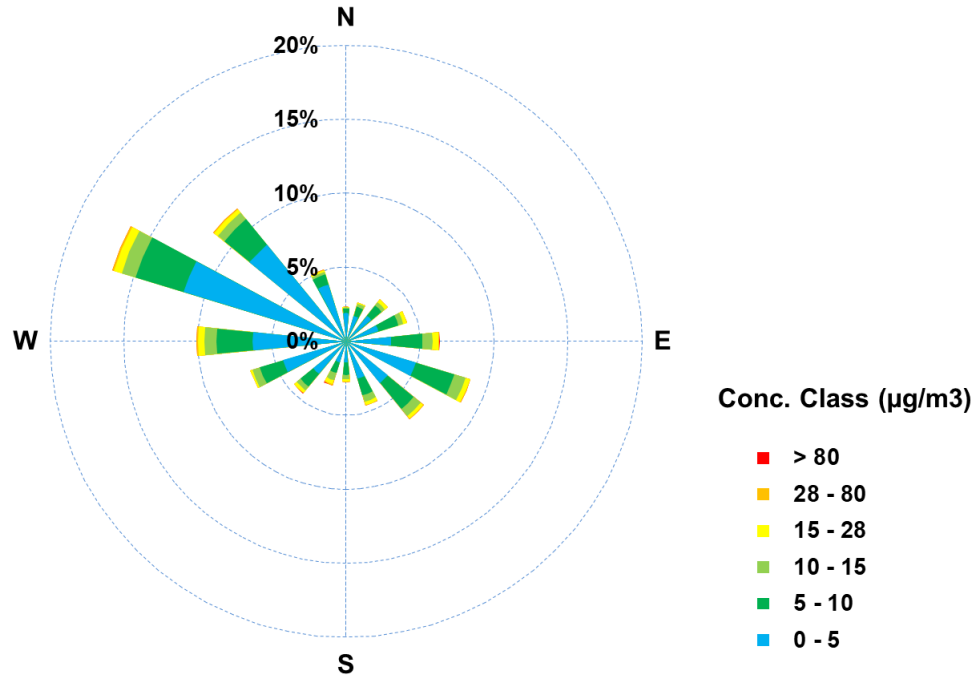


Figure 28. Pollutant rose for 1-hour average $PM_{2.5}$ data at the Oxbow Station

2.4 Air Quality Health Index (AQHI)

The Air Quality Health Index (AQHI) is a health protection tool that is designed to help the public make decisions to protect their health by limiting short-term exposure to air pollution, and adjusting their activity levels during increased levels of air pollution. The AQHI uses readings from three air pollutants to calculate a single numerical value as the indicator of health risk. The three pollutants are fine particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2), and ground-level ozone (O_3). All three pollutants are required to calculate the AQHI.

Figure 29 summarizes the AQHI rating and the health messages for the at-risk population and the general population. The health risk is classified in categories by AQHI: Low Risk (1 to 3), Moderate Risk (4 to 6), High Risk (7 to 10), and Very High Risk (higher than 10).

The Weyburn and Esterhazy stations are eligible for AQHI reporting. Table 13 summarizes the occurrence statistics for AQHI by the health risk categories. Generally, the air quality was good from health risk perspectives; more than 99% of time the AQHI was rated in the Low-Risk category. The frequency of Moderate Risk category ranged from 0.2% to 0.4% for the stations.

Health Risk	Air Quality Health Index	Health Messages	
		At Risk Population	General Population
Low Risk	1 – 3	**Enjoy** your usual outdoor activities.	**Ideal** air quality for outdoor activities.
Moderate Risk	4 – 6	**Consider** reducing or rescheduling strenuous activities outdoors if you are experiencing symptoms.	**No need to modify** your usual outdoor activities unless you experience symptoms such as coughing and throat irritation.
High Risk	7 – 10	**Reduce or reschedule** strenuous activities outdoors. Children and the elderly should also take it easy.	**Consider** reducing or rescheduling strenuous activities outdoors if you experience symptoms such as coughing and throat irritation.
Very High Risk	Above 10	**Avoid** strenuous activities outdoors. Children and the elderly should also avoid outdoor physical exertion.	**Reduce or reschedule** strenuous activities outdoors, especially if you experience symptoms such as coughing and throat irritation.

Source: Environment Canada. http://www.ec.gc.ca/cas-aqhi/default.asp?Lang=En

Figure 29. Risk classification and health messages for Air Quality Health Index

Table 123. Summary of occurrence statistics for AQHI health risk rating

Monitoring Station	Occurrence Statistics	Occurrence Statistics by AQHI Health Risk Rating			
		Low Risk	Moderate Risk	High Risk	Very High Risk
Weyburn	Occurrence Hours	7408	7	0	0
	Occurrence Frequency	99.9%	0.1%	0.0%	0.0%
Esterhazy	Occurrence Hours	7572	12	0	0
	Occurrence Frequency	99.8%	0.2%	0.0%	0.0%

2.5 Air Quality Index (AQI)

The Glen Ewen, Stoughton, and Oxbow stations do not meet the reporting requirements for AQHI. The Air Quality Index (AQI) is used as an alternative index. The AQI index system is developed to provide the public with a meaningful and comparable measure of outdoor air quality. The AQI index is calculated from readings of five major air pollutants: SO_2, NO_2, O_3, $PM_{2.5}$, and carbon monoxide (CO). A minimum of three pollutants is required to calculate AQI. Air quality is rated in four categories according to AQI value: Good (0 to 25), Fair (26 to 50), Poor (51 to 100), and Very Poor (>100). Table 14 summarizes the effects associated with the AQI ratings.

Table 15 summarizes the occurrence statistics for AQI rating. The Glen Ewen AQI was calculated from SO_2, NO_2, and O_3, as the airpointer® does not measure CO or $PM_{2.5}$. The Stoughton and Oxbow AQI was calculated from SO_2, NO_2, and $PM_{2.5}$, as the airpointer® does not measure CO or O_3.

The Air Quality Index at the Glen Ewen station was rated Good for 98.6% of time and was rated Fair 1.4% of time. In 2022, the AQI rating never fell in the Poor or Very Poor categories. The air quality was always Good during the winter months; Fair air quality was mostly detected between March and September.

The Air Quality Index at the Stoughton station was rated Good for 99.6% of time and was rated Fair 0.4% of time. In 2022, the AQI rating never fell in the Poor or Very Poor categories. Generally, the AQI rating was Good during the winter months; deteriorated air quality tended to occur between March and September.

The Air Quality Index at the Oxbow station was rated Good for 99.6% of time and was rated Fair 0.4% of time. There was 0.1% of time in the Poor category. An increased $PM_{2.5}$ concentration was associated with the Poor and Very Poor events.

Table 134. AQI rating and effect description

AQI	Air Quality Rating	Effect Description
0 – 25	Good	Desirable Range: No known harmful effects to soil, water, vegetation, animals, materials, visibility or human health. The long-term goal is for air quality to be in this range all of the time in Canada.
26 – 50	Fair	Acceptable Range: Adequate protection against harmful effects to soil, water, vegetation, animals, materials, visibility and human health.
51 – 100	Poor	Tolerable Range: Not all aspects of human health or the environment are adequately protected from possible adverse effects. Long-term control action may be necessary, depending on the frequency, duration and circumstances of the readings.
>100	Very Poor	Intolerable Range: Continued high readings could pose a risk to public health.

Source: Clean Air Strategic Alliance (CASA) - www.casadata.org/airqualityindex/aqi/whatis.asp

Table 14. Summary of occurrence statistics for AQI rating

Monitoring Station	Occurrence Statistics	Number of Occurrence Hours and Frequency by AQI Rating			
		Good	Fair	Poor	Very Poor
Glen Ewen	Occurrence Hours	7832	112	0	0
	Occurrence Frequency	98.6%	1.4%	0.0%	0.0%
Stoughton	Occurrence Hours	6999	27	1	0
	Occurrence Frequency	99.6%	0.4%	0.0%	0.0%
Oxbow	Occurrence Hours	7143	26	5	0
	Occurrence Frequency	99.6%	0.4%	0.1%	0.0%

3.0 Audited Financial Statement

The 2022 audited financial summary for the SESAA is presented in the following table. The complete audited report is presented in Appendix P.

Table 15. SESAA financial summary for the year of 2022

	As at December 31, 2014	
	2014	2013
Assets		
Current		
Cash	64,903	47,473
Prepaid expenses	7,227	8,287
Goods and Services Tax receivable	3,371	22,803
	75,501	78,563
Equipment *(Note 3)*	594,128	548,733
	669,629	627,296
Liabilities		
Current		
Accounts payable and accruals	21,889	105,164
Deferred contributions *(Note 4)*	279,049	180,000
	300,938	285,164
Net Assets		
Unrestricted net assets	368,691	342,132
	669,629	627,296

Approved on behalf of the Board

Director — Darlene Sakires

Director — D. Nielsen.

APPENDIX A. SASKATCHEWAN AMBIENT AIR QUALITY STANDARDS

Table A-1. Saskatchewan Ambient Air Quality Standards

TABLE 20: SASKATCHEWAN AMBIENT AIR QUALITY STANDARDS ($\mu g/m^3$)				
Air Pollutant	**1 Hour**	**8 Hours**	**24 Hours**	**Annual**
Particulate Matter ($PM_{2.5}$)			28[a]	10
Particulate Matter (PM_{10})			50	
Total Suspended Particulates (TSP)			100	60[b]
Nitrogen Dioxide (NO_2)	300 (159 ppb)		200 (106 ppb)	45[c] (24 ppb)
Sulphur Dioxide (SO_2)	450 (172 ppb)		125 (48 ppb)	20[c] (8 ppb)
Hydrogen Sulphide (H_2S)	15 (11 ppb)		5 (3.6 ppb)	
Ozone (O_3)	160 (82 ppb)	124[d] (63 ppb)		
Carbon Monoxide (CO)	15,000 (13,000 ppb)	6,000 (5,000 ppb)		

Footnotes
(a) The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations.
(b) Geometric means
(c) Arithmetic means
(d) The 3-year average of the annual 4th-highest daily maximum 8-hour average concentrations.

APPENDIX B. WEYBURN STATION: CONTINUOUS MONITORING DATA

Table B-1. Weyburn Station: Summary of airpointer® monitoring results for the year 2022

Parameter	Unit	Hours of Calibration & AIC [a]	Hours of Valid Data	Annual Percent Uptime	Summary Statistics for 1-Hour Average Data		
					Average	Minimum	Maximum
SO_2	ppb	402	7862	94.7%	1.1	< 0.1	27.6
NO	ppb	367	7024	84.2%	0.5	< 0.1	73.7
NO_2	ppb	367	7024	84.2%	0.8	< 0.1	22.0
NO_x	ppb	367	7024	84.2%	1.2	< 0.1	91.1
O_3	ppb	414	8099	97.0%	27	< 1	64
H_2S	ppb	402	7613	91.1%	0.3	< 0.1	24.0
$PM_{2.5}$	µg/m^3	0	8523	97.3%	5	< 1	120
Precipitation	mm	0	8526	97.3%	628.0[b]	< 0.1	27.5
Ambient Temperature	°C	0	8526	97.3%	2.4	-38.0	34.6
Relative Humidity	%	0	8526	97.3%	66	< 1	91
Wind Speed	m/s	0	8515	97.2%	3.9	Calm	17.4

a. Automatic Instrument Check

b. Total Precipitation

Table B-2. Weyburn Station: Summary of airpointer® SO_2 monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤1	1 ~ 5	5 ~ 11	11 ~ 48	48 ~ 172	>172
January	709	99.6%	1.6	16.0	0	5.8	0	62.6	27.8	8.0	1.5	0.0	0.0
February	643	100.0%	1.2	18.6	0	4.1	0	74.5	18.4	6.2	0.9	0.0	0.0
March	703	100.0%	1.2	22.2	0	5.0	0	72.7	20.8	5.7	0.9	0.0	0.0
April	557	80.1%	0.9	14.6	0	2.9	0	74.9	21.4	3.4	0.4	0.0	0.0
May	711	99.7%	0.9	18.8	0	3.9	0	77.5	18.1	3.5	0.8	0.0	0.0
June	426	62.1%	0.5	12.1	0	2.7	0	84.5	13.6	1.6	0.2	0.0	0.0
July	699	98.0%	0.7	13.3	0	2.6	0	81.8	16.2	1.6	0.4	0.0	0.0
August	712	100.0%	0.8	13.5	0	2.4	0	77.4	20.6	1.8	0.1	0.0	0.0
September	680	100.0%	1.3	24.5	0	7.9	0	74.6	19.0	4.4	2.1	0.0	0.0
October	712	100.0%	0.8	18.1	0	2.9	0	76.1	21.2	2.2	0.4	0.0	0.0
November	689	100.0%	1.1	17.5	0	3.6	0	70.4	24.1	5.1	0.4	0.0	0.0
December	621	95.8%	1.8	27.6	0	6.3	0	64.9	25.3	6.9	2.9	0.0	0.0
Annual [c]	7862	94.7%	1.1	27.6	0	7.9	0	74.0	20.8	4.3	0.9	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 172 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 48 ppb

c. Annual Saskatchewan Ambient Air Quality Standard = 8 ppb

Table B-3. Weyburn Station: Summary of airpointer® NO monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤5	5 ~ 15	15 ~ 53	53 ~ 100	100 ~ 159	>159
January	709	99.6%	0.5	4.7	-	1.1	-	100.0	0.0	0.0	0.0	0.0	0.0
February	643	100.0%	0.5	4.4	-	1.0	-	100.0	0.0	0.0	0.0	0.0	0.0
March	703	100.0%	0.4	9.1	-	0.7	-	99.9	0.1	0.0	0.0	0.0	0.0
April	689	99.9%	0.2	5.7	-	0.6	-	99.9	0.1	0.0	0.0	0.0	0.0
May	711	99.7%	0.3	3.7	-	0.9	-	100.0	0.0	0.0	0.0	0.0	0.0
June	426	62.0%	2.0	73.7	-	11.5	-	93.7	3.3	2.3	0.7	0.0	0.0
July	483	66.7%	0.4	8.9	-	1.5	-	99.6	0.4	0.0	0.0	0.0	0.0
August	404	55.6%	0.6	7.7	-	1.9	-	99.8	0.2	0.0	0.0	0.0	0.0
September	234	33.4%	0.4	11.5	-	0.8	-	99.6	0.4	0.0	0.0	0.0	0.0
October	712	100.0%	0.4	4.3	-	0.8	-	100.0	0.0	0.0	0.0	0.0	0.0
November	689	100.0%	0.5	6.6	-	1.4	-	99.7	0.3	0.0	0.0	0.0	0.0
December	621	95.8%	0.7	15.4	-	1.9	-	99.7	0.2	0.2	0.0	0.0	0.0
Annual [c]	7024	84.2%	0.5	73.7	-	11.5	-	99.5	0.3	0.2	0.0	0.0	0.0

a. No 1-hour Saskatchewan Ambient Air Quality Standard
b. No 24-hour Saskatchewan Ambient Air Quality Standard
c. No annual Saskatchewan Ambient Air Quality Standard

Table B-4. Weyburn Station: Summary of airpointer® NO_2 monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤5	5 ~ 15	15 ~ 53	53 ~ 100	100 ~ 159	>159
January	709	99.6%	0.4	8.2	0	1.8	-	99.5	0.5	0.0	0.0	0.0	0.0
February	643	100.0%	0.3	5.4	0	1.6	-	99.8	0.2	0.0	0.0	0.0	0.0
March	703	100.0%	0.2	6.9	0	0.9	-	99.7	0.3	0.0	0.0	0.0	0.0
April	689	99.9%	0.1	3.5	0	0.7	-	100.0	0.0	0.0	0.0	0.0	0.0
May	711	99.7%	0.1	5.6	0	0.7	-	99.9	0.1	0.0	0.0	0.0	0.0
June	426	62.0%	1.8	22.0	0	6.9	-	86.9	11.3	1.9	0.0	0.0	0.0
July	483	66.7%	1.8	10.3	0	3.7	-	94.4	5.6	0.0	0.0	0.0	0.0
August	404	55.6%	1.5	10.2	0	2.1	-	96.5	3.5	0.0	0.0	0.0	0.0
September	234	33.4%	0.7	9.0	0	1.7	-	97.4	2.6	0.0	0.0	0.0	0.0
October	712	100.0%	0.4	8.4	0	1.5	-	99.3	0.7	0.0	0.0	0.0	0.0
November	689	100.0%	1.2	17.9	0	4.0	-	97.5	2.3	0.1	0.0	0.0	0.0
December	621	95.8%	2.4	12.8	0	6.2	-	91.0	9.0	0.0	0.0	0.0	0.0
Annual [c]	7024	84.2%	0.8	22.0	0	6.9	-	97.3	2.6	0.1	0.0	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 159 ppb
b. 24-hour Saskatchewan Ambient Air Quality Standard = 106 ppb
c. Annual Saskatchewan Ambient Air Quality Standard = 24 ppb

Table B-5. Weyburn Station: Summary of airpointer® NOx monitoring results for the year 2022

Month	Valid 1-Hr data	Operational Time	Average Conc.	Maximum 1-Hr Conc.	1-Hour Exceedance [a]	Maximum 24-Hr Conc.	24-Hour Exceedance [b]	Percent of Data in each Concentration Range					
	(no.)	(%)	(ppb)	(ppb)	(no.)	(ppb)	(no.)	≤5	5 ~ 15	15 ~ 53	53 ~ 100	100 ~ 159	>159
January	709	99.6%	0.8	8.7	-	2.8	-	98.1	1.9	0.0	0.0	0.0	0.0
February	643	100.0%	0.6	5.8	-	2.5	-	98.9	1.1	0.0	0.0	0.0	0.0
March	703	100.0%	0.5	11.6	-	2.2	-	99.1	0.9	0.0	0.0	0.0	0.0
April	689	99.9%	0.1	8.6	-	1.2	-	99.6	0.4	0.0	0.0	0.0	0.0
May	711	99.7%	0.1	5.8	-	1.4	-	99.9	0.1	0.0	0.0	0.0	0.0
June	426	62.0%	3.5	91.1	-	18.5	-	83.3	10.8	4.9	0.9	0.0	0.0
July	483	66.7%	2.0	18.1	-	6.3	-	90.7	8.9	0.4	0.0	0.0	0.0
August	404	55.6%	1.9	15.6	-	3.8	-	94.6	5.2	0.2	0.0	0.0	0.0
September	234	33.4%	1.0	19.6	-	2.1	-	96.6	3.0	0.4	0.0	0.0	0.0
October	712	100.0%	0.7	8.7	-	1.8	-	98.9	1.1	0.0	0.0	0.0	0.0
November	689	100.0%	1.6	19.3	-	5.0	-	95.2	4.5	0.3	0.0	0.0	0.0
December	621	95.8%	3.1	26.6	-	7.5	-	86.0	13.8	0.2	0.0	0.0	0.0
Annual [c]	7024	84.2%	1.2	91.1	-	18.5	-	95.7	3.9	0.4	0.1	0.0	0.0

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. No 24-hour Saskatchewan Ambient Air Quality Standard

c. No annual Saskatchewan Ambient Air Quality Standard

Table B-6. Weyburn Station: Summary of airpointer® O_3 monitoring results for the year 2022

Month	Valid 1-Hr data	Operational Time	Average Conc.	Maximum 1-Hr Conc.	1-Hour Exceedance [a]	Maximum 8-Hr Conc.	8-Hour Conc. Above CWS [b]	Percent of Data in each Concentration Range					
	(no.)	(%)	(ppb)	(ppb)	(no.)	(ppb)	(no.)	≤10	10 ~ 20	20 ~ 40	40 ~ 63	63 ~ 82	>82
January	709	99.6%	30	41	0	40	0	3.3	0.4	94.8	1.5	0.0	0.0
February	643	100.0%	32	45	0	44	0	0.0	0.2	93.6	6.2	0.0	0.0
March	703	100.0%	33	48	0	47	0	0.0	5.3	78.9	15.8	0.0	0.0
April	689	99.9%	33	64	0	56	0	0.0	11.5	62.8	25.5	0.1	0.0
May	710	99.6%	31	54	0	51	0	1.0	17.0	59.9	22.1	0.0	0.0
June	480	69.9%	25	57	0	50	0	11.0	23.3	55.4	10.2	0.0	0.0
July	707	99.2%	21	57	0	43	4	18.7	30.6	49.2	1.6	0.0	0.0
August	712	100.0%	22	49	0	46	0	17.8	29.9	46.6	5.6	0.0	0.0
September	680	100.0%	23	49	0	46	0	10.7	32.9	50.4	5.9	0.0	0.0
October	712	100.0%	21	43	0	40	0	8.0	37.8	53.5	0.7	0.0	0.0
November	689	100.0%	23	35	0	34	0	1.9	22.5	75.6	0.0	0.0	0.0
December	665	96.1%	28	37	0	36	0	0.0	5.6	94.4	0.0	0.0	0.0
Annual [c]	8099	97.0%	27	64	0	56	4	6.0	18.1	68.1	7.9	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 82 ppb

b. 8-hour Canada-Wide Standard = 63 ppb

c. No annual Saskatchewan Ambient Air Quality Standard

Table B-7. Weyburn Station: Summary of airpointer® H_2S monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤1	1 ~ 3.6	3.6 ~ 5	5 ~ 8	8 ~ 11	>11
January	709	99.6%	0.2	4.5	0	1.0	0	96.3	3.3	0.4	0.0	0.0	0.0
February	643	100.0%	0.1	12.4	1	0.6	0	98.8	0.6	0.2	0.3	0.0	0.2
March	702	100.0%	0.2	22.6	3	1.7	0	95.9	2.4	0.7	0.3	0.3	0.4
April	439	62.7%	0.3	9.5	0	1.4	0	95.7	2.5	0.9	0.5	0.5	0.0
May	541	75.2%	0.2	10.6	0	0.5	0	97.4	1.7	0.4	0.4	0.2	0.0
June	424	61.8%	0.3	4.9	0	0.7	0	94.3	5.2	0.5	0.0	0.0	0.0
July	698	98.0%	0.4	5.9	0	1.0	0	94.8	4.9	0.0	0.3	0.0	0.0
August	712	100.0%	0.3	3.6	0	0.7	0	95.9	4.1	0.0	0.0	0.0	0.0
September	680	100.0%	0.3	3.2	0	0.7	0	92.5	7.5	0.0	0.0	0.0	0.0
October	711	100.0%	0.3	10.2	0	0.8	0	95.8	3.9	0.1	0.0	0.1	0.0
November	689	100.0%	0.4	24.0	4	2.9	0	94.9	2.9	0.3	1.0	0.3	0.6
December	665	96.1%	0.4	6.7	0	1.5	0	89.5	9.3	0.8	0.5	0.0	0.0
Annual [c]	7613	91.1%	0.3	24.0	8	2.9	0	95.1	4.1	0.3	0.3	0.1	0.1

a. 1-hour Saskatchewan Ambient Air Quality Standard = 11 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 3.6 ppb

c. No annual Saskatchewan Ambient Air Quality Standard

Table B-8. Weyburn Station: Summary of airpointer® $PM_{2.5}$ monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (µg/m³)	Maximum 1-Hr Conc. (µg/m³)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (µg/m³)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤5	5 ~ 10	10 ~ 15	15 ~ 28	28 ~ 80	>80
January	741	99.6%	1	7	-	3	0	98	2	0	0	0	0
February	672	100.0%	3	58	-	7	0	95	4	0	0	0	0
March	744	100.0%	3	17	-	11	0	92	5	2	0	0	0
April	719	99.9%	1	11	-	6	0	97	3	0	0	0	0
May	741	99.6%	5	20	-	9	0	70	27	2	0	0	0
June	523	72.6%	9	23	-	15	0	4	75	16	5	0	0
July	739	99.3%	14	51	-	27	0	3	30	30	34	3	0
August	744	100.0%	9	120	-	17	0	25	40	20	14	0	0
September	720	100.0%	3	96	-	14	0	81	13	4	2	1	0
October	744	100.0%	4	33	-	10	0	75	18	5	2	0	0
November	720	100.0%	2	15	-	8	0	92	6	2	0	0	0
December	716	96.2%	3	18	-	11	0	86	11	3	0	0	0
Annual [c]	8523	97.3%	5	120	-	27	0	69.5	18.3	6.9	4.9	0.4	0.0

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. 24-hour Canada-Wide Standard = 28 µg/m³

c. No annual Saskatchewan Ambient Air Quality Standard

Table B-9. Weyburn Station: Summary of airpointer® ambient temperature monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Temp. (°C)	Minimum 1-Hr Temp. (°C)	Maximum 1-Hr Temp. (°C)	Percent of Data in each Temperature Range					
						≤-30	-30 ~ -15	-15 ~ 0	0 ~ 15	15 ~ 30	>30
January	744	100.0%	-13.5	-35.1	3.6	8.9	32.3	52.5	6.4	0.0	0.0
February	672	100.0%	-14.6	-34.1	4.4	4.5	45.7	39.7	10.1	0.0	0.0
March	744	100.0%	-4.6	-27.6	12.0	0.0	11.8	52.4	35.8	0.0	0.0
April	719	99.9%	0.1	-15.6	16.4	0.0	0.4	46.5	52.3	0.8	0.0
May	741	99.6%	11.2	-2.5	26.1	0.0	0.0	2.2	73.3	24.6	0.0
June	523	72.6%	16.7	2.5	32.2	0.0	0.0	0.0	40.5	58.5	1.0
July	739	99.3%	19.1	7.6	33.0	0.0	0.0	0.0	22.5	75.5	2.0
August	744	100.0%	19.8	8.0	34.1	0.0	0.0	0.0	23.3	71.8	5.0
September	720	100.0%	14.7	-1.5	34.6	0.0	0.0	0.4	59.2	37.4	3.1
October	744	100.0%	6.3	-7.8	23.8	0.0	0.0	15.9	74.1	10.1	0.0
November	720	100.0%	-6.9	-24.4	16.1	0.0	13.6	66.1	19.9	0.4	0.0
December	716	96.2%	-16.7	-38.0	4.4	5.3	48.6	45.0	1.1	0.0	0.0
Annual	8526	97.3%	2.4	-38.0	34.6	1.6	12.8	27.2	34.9	22.6	0.9

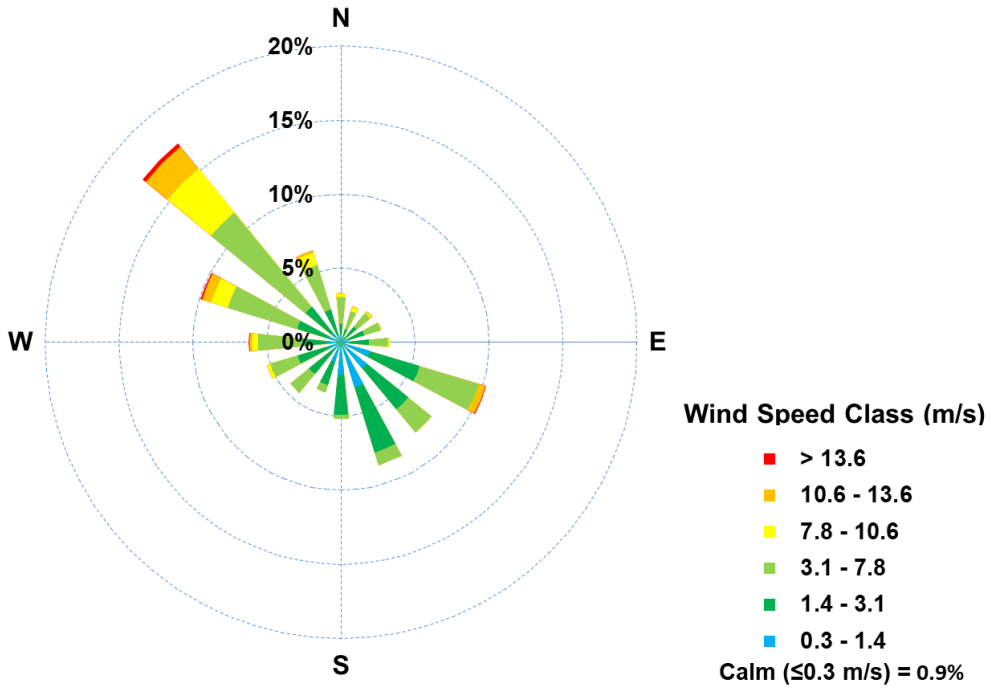
Table B-10. Weyburn Station: Summary of airpointer® relative humidity monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average RH (%)	Minimum 1-Hr RH (%)	Maximum 1-Hr RH (%)	Percent of Data in each Relative Humidity Range					
						≤15	15 ~ 30	30 ~ 60	60 ~ 80	80 ~ 90	>90
January	744	100.0%	69	53	85	3.1	0.0	3.9	82.4	10.5	0.0
February	672	100.0%	71	58	85	0.0	0.0	1.3	93.3	5.4	0.0
March	744	100.0%	69	28	84	0.0	0.1	18.4	72.4	9.0	0.0
April	719	99.9%	65	19	87	0.0	2.4	29.3	55.4	12.9	0.0
May	741	99.6%	59	18	89	0.0	12.4	31.7	35.9	20.0	0.0
June	523	72.6%	58	14	89	0.4	8.0	40.7	33.8	17.0	0.0
July	739	99.3%	72	37	91	0.0	0.0	24.4	33.3	40.6	1.8
August	744	100.0%	66	21	90	0.0	3.9	33.5	28.5	33.9	0.3
September	720	100.0%	56	14	89	0.3	14.6	39.6	30.1	15.4	0.0
October	744	100.0%	60	19	88	0.0	8.1	39.0	32.5	20.4	0.0
November	720	100.0%	71	33	84	0.0	0.0	9.7	86.5	3.8	0.0
December	716	96.2%	72	34	84	0.0	0.0	2.9	88.4	8.7	0.0
Annual	8760	97.3%	66	14	91	0.3	4.0	22.6	56.3	16.6	0.2

Table B-11. Weyburn Station: airpointer® wind frequency table for the year 2022

Wind Direction Sector	Percent of Data in each Wind Speed Range, wind speed unit m/s						
	0.3 ~ 1.4	1.4 ~ 3.1	3.1 ~ 7.8	7.8 ~ 10.6	10.6 ~ 13.6	>13.6	Totals
North NorthEast	0.3%	0.6%	1.3%	0.3%	0.1%	0.0%	2.5%
NorthEast	0.4%	0.9%	1.2%	0.1%	0.0%	0.0%	2.7%
East NorthEast	0.5%	1.1%	1.2%	0.0%	0.0%	0.0%	2.8%
East	0.6%	1.3%	1.3%	0.1%	0.0%	0.0%	3.3%
East SouthEast	2.0%	3.5%	4.2%	0.5%	0.1%	0.0%	10.2%
SouthEast	2.2%	3.6%	2.0%	0.0%	0.0%	0.0%	7.8%
South SouthEast	3.1%	4.6%	0.9%	0.0%	0.0%	0.0%	8.6%
South	2.1%	2.7%	0.3%	0.0%	0.0%	0.0%	5.1%
South SouthWest	1.4%	1.6%	0.5%	0.0%	0.0%	0.0%	3.5%
SouthWest	0.8%	2.0%	1.6%	0.0%	0.0%	0.0%	4.4%
West SouthWest	0.8%	2.2%	1.9%	0.2%	0.0%	0.0%	5.2%
West	0.9%	1.7%	3.0%	0.4%	0.2%	0.0%	6.2%
West NorthWest	0.9%	2.2%	4.9%	1.2%	0.6%	0.1%	9.8%
NorthWest	0.8%	2.3%	8.2%	3.8%	1.9%	0.3%	17.3%
North NorthWest	0.6%	1.7%	3.1%	0.9%	0.2%	0.0%	6.5%
North	0.4%	0.7%	1.8%	0.2%	0.0%	0.0%	3.3%
Total	17.7%	32.8%	37.3%	7.9%	3.1%	0.4%	99.1%

Percent Calm (≤0.3 m/s)	0.9%
Number of Valid Hourly-Average Data	8515
Total Workable Hours in Time Period	8760



APPENDIX C. GLEN EWEN STATION: CONTINUOUS MONITORING DATA

Table C-1. Glen Ewen Station: Summary of airpointer® monitoring results for the year 2022

Parameter	Unit	Hours of Calibration & AIC [a]	Hours of Valid Data	Annual Percent Uptime	Summary Statistics for 1-Hour Average Data		
					Average	Minimum	Maximum
SO_2	ppb	398	8015	95.9%	0.3	< 0.1	21.2
NO	ppb	397	7945	95.0%	0.3	< 0.1	9.7
NO_2	ppb	397	7945	95.0%	1.4	< 0.1	25.8
NO_x	ppb	397	7945	95.0%	1.7	< 0.1	29.0
O_3	ppb	398	8014	95.9%	29	< 1	65
H_2S	ppb	398	8005	95.7%	0.2	< 0.1	21.9
Precipitation	mm	0	8417	96.1%	427.5[b]	< 0.1	16.5
Ambient Temperature	°C	0	8417	96.1%	1.9	-35.6	33.1
Relative Humidity	%	0	8417	96.1%	72	< 1	97
Wind Speed	m/s	0	8408	96.0%	3.6	Calm	14.2

a. Automatic Instrument Check

b. Total Precipitation

Table C-2. Glen Ewen Station: Summary of airpointer® SO_2 monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤1	1 ~ 5	5 ~ 11	11 ~ 48	48 ~ 172	>172
January	710	99.7%	0.9	21.2	0	3.9	0	73.6	23.8	2.3	0.3	0.0	0.0
February	636	98.9%	0.7	14.4	0	3.3	0	82.7	14.6	2.0	0.6	0.0	0.0
March	703	100.0%	0.3	15.1	0	2.1	0	93.2	6.1	0.4	0.3	0.0	0.0
April	616	88.9%	0.2	13.5	0	1.6	0	96.1	3.4	0.3	0.2	0.0	0.0
May	712	100.0%	0.1	3.6	0	0.7	0	95.5	4.5	0.0	0.0	0.0	0.0
June	681	100.0%	0.3	13.4	0	1.1	0	93.4	6.0	0.4	0.1	0.0	0.0
July	566	78.7%	0.1	4.4	0	0.7	0	97.9	2.1	0.0	0.0	0.0	0.0
August	609	84.9%	0.2	7.0	0	1.4	0	95.7	3.9	0.3	0.0	0.0	0.0
September	679	100.0%	0.2	5.3	0	1.0	0	95.4	4.4	0.1	0.0	0.0	0.0
October	712	100.0%	0.1	5.3	0	0.7	0	96.3	3.4	0.3	0.0	0.0	0.0
November	689	100.0%	0.3	9.0	0	2.8	0	93.2	5.8	1.0	0.0	0.0	0.0
December	702	100.0%	0.5	11.2	0	2.4	0	81.3	17.2	1.3	0.1	0.0	0.0
Annual [c]	8015	95.9%	0.3	21.2	0	3.9	0	91.0	8.2	0.7	0.1	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 172 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 48 ppb

c. Annual Saskatchewan Ambient Air Quality Standard = 8 ppb

Table C-3. Glen Ewen Station: Summary of airpointer® NO monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤5	5 ~ 15	15 ~ 53	53 ~ 100	100 ~ 159	>159
January	710	99.7%	0.2	3.6	-	1.0	-	100.0	0.0	0.0	0.0	0.0	0.0
February	636	98.9%	0.3	3.3	-	0.8	-	100.0	0.0	0.0	0.0	0.0	0.0
March	703	100.0%	0.2	3.3	-	0.9	-	100.0	0.0	0.0	0.0	0.0	0.0
April	616	88.9%	0.1	3.0	-	0.4	-	100.0	0.0	0.0	0.0	0.0	0.0
May	712	100.0%	0.2	3.4	-	0.6	-	100.0	0.0	0.0	0.0	0.0	0.0
June	681	100.0%	0.4	5.0	-	0.9	-	100.0	0.0	0.0	0.0	0.0	0.0
July	549	76.4%	0.4	2.1	-	0.7	-	100.0	0.0	0.0	0.0	0.0	0.0
August	556	77.4%	0.3	6.8	-	0.7	-	99.6	0.4	0.0	0.0	0.0	0.0
September	679	100.0%	0.2	6.7	-	0.6	-	99.9	0.1	0.0	0.0	0.0	0.0
October	712	100.0%	0.2	4.8	-	0.6	-	100.0	0.0	0.0	0.0	0.0	0.0
November	689	100.0%	0.3	9.7	-	1.3	-	99.7	0.3	0.0	0.0	0.0	0.0
December	702	100.0%	0.3	5.3	-	1.0	-	99.9	0.1	0.0	0.0	0.0	0.0
Annual [c]	7945	95.0%	0.3	9.7	-	1.3	-	99.9	0.1	0.0	0.0	0.0	0.0

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. No 24-hour Saskatchewan Ambient Air Quality Standard

c. No annual Saskatchewan Ambient Air Quality Standard

Table C-4. Glen Ewen Station: Summary of airpointer® NO_2 monitoring results for the year

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤5	5 ~ 15	15 ~ 53	53 ~ 100	100 ~ 159	>159
January	710	99.7%	1.4	13.2	0	2.9	-	98.8	1.2	0.0	0.0	0.0	0.0
February	636	98.9%	2.0	25.8	0	4.5	-	97.0	2.8	0.2	0.0	0.0	0.0
March	703	100.0%	1.7	9.0	0	3.5	-	98.4	1.6	0.0	0.0	0.0	0.0
April	616	88.9%	1.1	5.2	0	2.6	-	99.8	0.2	0.0	0.0	0.0	0.0
May	712	100.0%	1.1	9.3	0	2.7	-	99.4	0.6	0.0	0.0	0.0	0.0
June	681	100.0%	2.0	9.9	0	4.0	-	93.8	6.2	0.0	0.0	0.0	0.0
July	549	76.4%	0.8	5.5	0	1.6	-	99.5	0.5	0.0	0.0	0.0	0.0
August	556	77.4%	0.6	8.8	0	1.3	-	99.6	0.4	0.0	0.0	0.0	0.0
September	679	100.0%	1.0	9.8	0	2.3	-	99.3	0.7	0.0	0.0	0.0	0.0
October	712	100.0%	1.4	10.4	0	2.7	-	98.0	2.0	0.0	0.0	0.0	0.0
November	689	100.0%	1.8	14.3	0	4.5	-	97.5	2.5	0.0	0.0	0.0	0.0
December	702	100.0%	2.3	12.3	0	4.9	-	94.7	5.3	0.0	0.0	0.0	0.0
Annual [c]	7956	95.0%	1.4	25.8	0	4.9	-	97.9	2.0	0.0	0.0	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 159 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 106 ppb

c. Annual Saskatchewan Ambient Air Quality Standard = 24 ppb

Table C-5. Glen Ewen Station: Summary of airpointer® NOx monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤5	5 ~ 15	15 ~ 53	53 ~ 100	100 ~ 159	>159
January	710	99.7%	1.5	15.6	-	4.0	-	97.7	2.2	0.1	0.0	0.0	0.0
February	636	98.9%	2.2	29.0	-	5.2	-	95.8	3.8	0.5	0.0	0.0	0.0
March	703	100.0%	1.8	9.6	-	4.4	-	97.7	2.3	0.0	0.0	0.0	0.0
April	616	88.9%	1.2	7.2	-	3.0	-	99.4	0.6	0.0	0.0	0.0	0.0
May	712	100.0%	1.3	12.7	-	3.0	-	99.2	0.8	0.0	0.0	0.0	0.0
June	681	100.0%	2.4	13.2	-	4.9	-	89.1	10.9	0.0	0.0	0.0	0.0
July	549	76.4%	1.2	6.8	-	1.8	-	99.3	0.7	0.0	0.0	0.0	0.0
August	556	77.4%	0.8	14.8	-	1.8	-	98.4	1.6	0.0	0.0	0.0	0.0
September	679	100.0%	1.2	11.9	-	2.8	-	98.2	1.8	0.0	0.0	0.0	0.0
October	712	100.0%	1.6	10.7	-	3.0	-	97.9	2.1	0.0	0.0	0.0	0.0
November	689	100.0%	2.1	21.9	-	5.8	-	96.1	3.5	0.4	0.0	0.0	0.0
December	702	100.0%	2.6	17.1	-	5.8	-	91.9	8.0	0.1	0.0	0.0	0.0
Annual [c]	7945	95.0%	1.7	29.0	-	5.8	-	96.6	3.3	0.1	0.0	0.0	0.0

a. No 1-hour Saskatchewan Ambient Air Quality Standard
b. No 24-hour Saskatchewan Ambient Air Quality Standard
c. No annual Saskatchewan Ambient Air Quality Standard

Table C-6. Glen Ewen Station: Summary of airpointer® O_3 monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 8-Hr Conc. (ppb)	8-Hr Conc. Above CWS [b] (no.)	Percent of Data in each Concentration Range					
								≤10	10 ~ 20	20 ~ 40	40 ~ 63	63 ~ 82	>82
January	710	99.7%	31	44	0	42	0	3.3	0.1	93.7	2.9	0.0	0.0
February	635	98.8%	34	48	0	46	0	0.2	0.3	83.1	16.4	0.0	0.0
March	703	100.0%	36	50	0	48	0	0.0	1.1	68.8	30.0	0.0	0.0
April	616	88.9%	35	65	0	62	0	0.5	7.6	59.3	32.3	0.3	0.0
May	712	100.0%	33	58	0	55	0	0.4	12.5	59.6	27.5	0.0	0.0
June	681	100.0%	30	61	0	56	0	5.4	16.3	55.8	22.5	0.0	0.0
July	566	78.7%	24	51	0	45	0	10.2	32.9	50.0	6.9	0.0	0.0
August	609	84.9%	22	52	0	47	0	14.8	31.4	45.5	8.4	0.0	0.0
September	679	100.0%	25	58	0	52	0	5.7	31.5	52.1	10.6	0.0	0.0
October	712	100.0%	23	48	0	43	0	6.5	28.9	62.9	1.7	0.0	0.0
November	689	100.0%	26	37	0	36	0	1.6	17.0	81.4	0.0	0.0	0.0
December	702	100.0%	29	41	0	41	0	0.0	7.3	91.7	1.0	0.0	0.0
Annual [c]	8014	95.9%	29	65	0	62	0	3.9	15.2	67.6	13.2	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 82 ppb

b. 8-hour Canada-Wide Standard = 63 ppb

c. No annual Saskatchewan Ambient Air Quality Standard

Table C-7. Glen Ewen Station: Summary of airpointer® H_2S monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤1	1 ~ 3.6	3.6 ~ 5	5 ~ 8	8 ~ 11	>11
January	710	99.7%	< 0.1	1.3	0	< 0.1	0	99.9	0.1	0.0	0.0	0.0	0.0
February	636	98.9%	< 0.1	3.2	0	0.2	0	99.5	0.5	0.0	0.0	0.0	0.0
March	703	100.0%	0.1	21.9	3	1.8	0	99.1	0.4	0.0	0.0	0.0	0.4
April	616	88.9%	< 0.1	0.4	0	0.1	0	100.0	0.0	0.0	0.0	0.0	0.0
May	712	100.0%	0.1	4.3	0	0.8	0	98.7	1.0	0.3	0.0	0.0	0.0
June	681	100.0%	0.4	10.3	0	1.5	0	90.0	7.5	0.7	1.2	0.6	0.0
July	566	78.7%	0.5	20.0	2	2.4	0	88.7	9.7	0.7	0.5	0.0	0.4
August	599	83.5%	0.3	3.4	0	0.6	0	94.8	5.2	0.0	0.0	0.0	0.0
September	679	100.0%	0.1	3.1	0	0.4	0	99.0	1.0	0.0	0.0	0.0	0.0
October	712	100.0%	0.1	7.0	0	0.5	0	98.3	1.4	0.0	0.3	0.0	0.0
November	689	100.0%	< 0.1	2.3	0	0.2	0	99.7	0.3	0.0	0.0	0.0	0.0
December	702	100.0%	0.4	2.2	0	0.7	0	98.6	1.4	0.0	0.0	0.0	0.0
Annual [c]	8005	95.7%	0.2	21.9	5	2.4	0	97.3	2.2	0.1	0.2	0.0	0.1

a. 1-hour Saskatchewan Ambient Air Quality Standard = 11 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 3.6 ppb

c. No annual Saskatchewan Ambient Air Quality Standard

Table C-8. Glen Ewen Station: Summary of airpointer® ambient temperature results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Temp. (°C)	Minimum 1-Hr Temp. (°C)	Maximum 1-Hr Temp. (°C)	Percent of Data in each Temperature Range					
						≤-30	-30~ -15	≥15-0	>0-15	>15-30	>30
January	766	99.7%	-14.6	-35.6	3.5	7.4	40.9	48.2	3.5	0.0	0.0
February	665	99.0%	-15.9	-35.0	4.5	4.2	54.6	32.2	9.0	0.0	0.0
March	744	100.0%	-5.4	-26.8	10.7	0.0	12.5	56.3	31.2	0.0	0.0
April	647	89.9%	-0.6	-16.9	14.7	0.0	0.9	49.3	49.8	0.0	0.0
May	744	100.0%	10.7	-4.1	25.8	0.0	0.0	2.2	76.5	21.4	0.0
June	720	100.0%	16.5	1.2	33.0	0.0	0.0	0.0	41.1	56.7	2.2
July	591	79.4%	19.6	7.7	33.1	0.0	0.0	0.0	17.1	82.1	0.8
August	636	85.5%	19.3	7.1	32.5	0.0	0.0	0.0	24.7	72.6	2.7
September	720	100.0%	14.5	-1.8	32.5	0.0	0.0	0.8	58.8	38.5	1.9
October	744	100.0%	5.9	-7.5	22.9	0.0	0.0	17.7	73.7	8.6	0.0
November	720	100.0%	-5.9	-19.9	15.6	0.0	8.9	70.3	20.6	0.3	0.0
December	744	100.0%	-16.1	-34.9	2.0	5.9	45.7	47.4	0.9	0.0	0.0
Annual	8441	96.1%	1.9	-35.6	33.1	1.5	14.0	27.7	34.2	22.0	0.6

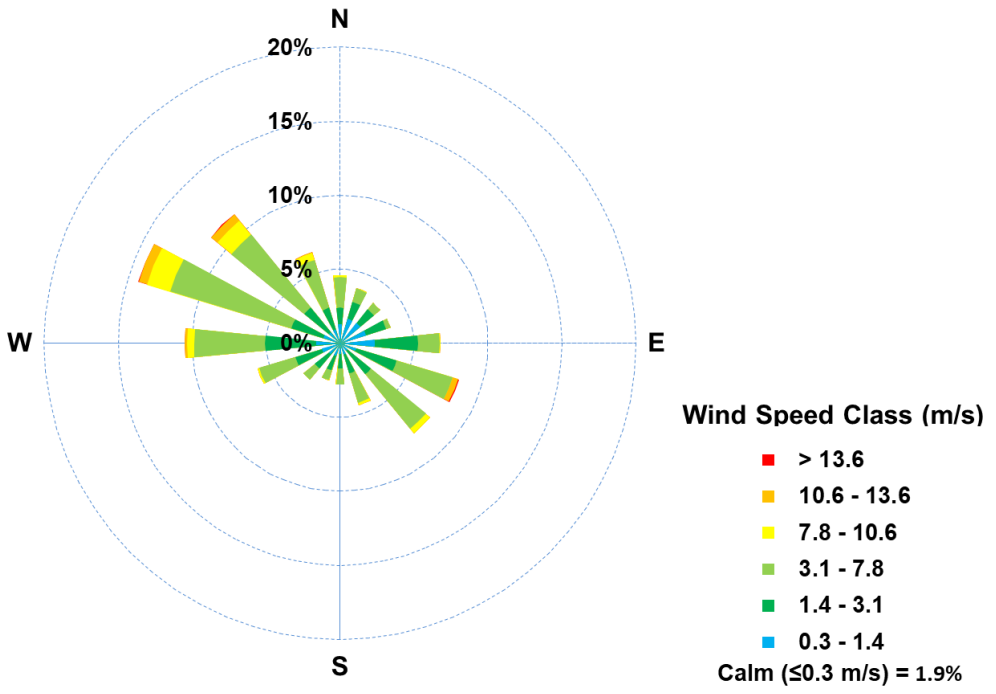
Table C-9. Glen Ewen Station: Summary of airpointer® relative humidity results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average RH (%)	Minimum 1-Hr RH (%)	Maximum 1-Hr RH (%)	Percent of Data in each Relative Humidity Range					
						≤15	15 ~ 30	30 ~ 60	60 ~ 80	80 ~ 90	>90
January	766	99.7%	74	60	89	3.1	0.0	0.1	68.4	28.3	0.0
February	665	99.0%	75	31	90	0.0	0.0	0.9	76.1	22.7	0.3
March	744	100.0%	74	36	90	0.0	0.0	10.6	57.0	32.4	0.0
April	647	89.9%	72	15	93	0.0	1.4	21.2	38.3	31.7	7.4
May	744	100.0%	68	16	94	0.0	4.2	27.7	30.1	26.1	12.0
June	720	100.0%	67	20	95	0.0	5.1	27.9	33.5	22.1	11.4
July	591	79.4%	78	39	97	0.0	0.0	16.8	28.4	25.9	28.9
August	636	85.5%	72	29	97	0.0	0.3	29.1	25.2	24.2	21.2
September	720	100.0%	63	24	95	0.0	3.6	39.7	30.4	16.3	10.0
October	744	100.0%	66	19	95	0.0	4.3	32.8	28.8	22.6	11.6
November	720	100.0%	76	35	89	0.0	0.0	6.0	57.9	36.1	0.0
December	744	100.0%	78	57	91	0.0	0.0	0.5	62.0	32.8	4.7
Annual	8441	96.1%	72	15	97	0.3	1.6	17.7	45.1	26.8	8.5

Table C-10. Glen Ewen Station: airpointer® wind frequency table for the year 2022

Wind Direction Sector	Percent of Data in each Wind Speed Range, wind speed unit m/s						
	0.3 ~ 1.4	1.4 ~ 3.1	3.1 ~ 7.8	7.8 ~ 10.6	10.6 ~ 13.6	>13.6	Totals
North NorthEast	1.6%	1.2%	1.0%	0.0%	0.0%	0.0%	3.7%
NorthEast	1.6%	1.2%	0.5%	0.0%	0.0%	0.0%	3.3%
East NorthEast	1.7%	1.4%	0.3%	0.0%	0.0%	0.0%	3.4%
East	2.2%	2.9%	1.5%	0.0%	0.0%	0.0%	6.7%
East SouthEast	1.1%	2.9%	3.9%	0.4%	0.1%	0.0%	8.3%
SouthEast	0.6%	2.1%	4.8%	0.4%	0.0%	0.0%	7.8%
South SouthEast	0.7%	1.3%	2.1%	0.2%	0.0%	0.0%	4.3%
South	0.7%	0.9%	1.1%	0.0%	0.0%	0.0%	2.8%
South SouthWest	0.9%	1.0%	0.7%	0.0%	0.0%	0.0%	2.6%
SouthWest	0.9%	1.3%	1.0%	0.0%	0.0%	0.0%	3.1%
West SouthWest	1.2%	1.9%	2.5%	0.1%	0.0%	0.0%	5.7%
West	1.5%	3.4%	4.8%	0.5%	0.2%	0.0%	10.3%
West NorthWest	1.1%	2.2%	8.6%	1.6%	0.6%	0.0%	14.1%
NorthWest	0.9%	2.2%	6.3%	1.2%	0.5%	0.0%	11.2%
North NorthWest	0.9%	1.5%	3.4%	0.5%	0.0%	0.0%	6.3%
North	1.1%	1.1%	2.1%	0.1%	0.0%	0.0%	4.4%
Total	18.5%	28.5%	44.5%	5.1%	1.4%	0.0%	98.1%

Percent Calm (≤0.3 m/s)	1.9%
Number of Valid Hourly-Average Data	8408
Total Workable Hours in Time Period	8760



APPENDIX D. STOUGHTON STATION: CONTINUOUS MONITORING DATA

Table D-1. Stoughton Station: Summary of airpointer® monitoring results for the year 2022

Parameter	Unit	Hours of Calibration & AIC [a]	Hours of Valid Data	Annual Percent Uptime	Summary Statistics for 1-Hour Average Data		
					Average	Minimum	Maximum
SO_2	ppb	380	7430	88.7%	0.3	< 0.1	8.8
NO	ppb	376	7364	87.9%	0.6	< 0.1	121.0
NO_2	ppb	376	7364	87.9%	0.8	< 0.1	43.3
NO_x	ppb	376	7364	87.9%	1.2	< 0.1	164.1
H_2S	ppb	380	7429	88.7%	0.2	< 0.1	6.2
$PM_{2.5}$	µg/m^3	2	7973	91.1%	7	< 1	154
Precipitation	Mm	0	8601	98.2%	388.9[b]	< 0.1	26.0
Ambient Temperature	°C	0	8601	98.2%	2.1	-36.7	34.0
Relative Humidity	%	0	8601	98.2%	69	< 1	91
Wind Speed	m/s	0	8480	96.8%	0.9	Calm	12.3

a. Automatic Instrument Check

b. Total Precipitation

Table D-2. Stoughton Station: Summary of airpointer® SO_2 monitoring results for the year 2022

Month	Valid 1-Hr data	Operational Time	Average Conc.	Maximum 1-Hr Conc.	1-Hour Exceedance [a]	Maximum 24-Hr Conc.	24-Hour Exceedance [b]	Percent of Data in each Concentration Range					
	(no.)	(%)	(ppb)	(ppb)	(no.)	(ppb)	(no.)	≤1	1 ~ 5	5 ~ 11	11 ~ 48	48 ~ 172	>172
January	712	100.0%	0.3	4.1	0	2.0	0	89.5	10.5	0.0	0.0	0.0	0.0
February	643	100.0%	0.2	4.6	0	0.9	0	97.5	2.5	0.0	0.0	0.0	0.0
March	443	62.6%	0.4	6.2	0	1.5	0	90.7	9.0	0.2	0.0	0.0	0.0
April	689	100.0%	0.2	2.4	0	0.9	0	94.8	5.2	0.0	0.0	0.0	0.0
May	712	100.0%	0.2	3.3	0	0.8	0	96.2	3.8	0.0	0.0	0.0	0.0
June	679	100.0%	0.2	3.8	0	0.7	0	97.2	2.8	0.0	0.0	0.0	0.0
July	712	100.0%	0.2	3.0	0	0.8	0	97.3	2.7	0.0	0.0	0.0	0.0
August	633	88.5%	0.2	4.7	0	1.0	0	93.5	6.5	0.0	0.0	0.0	0.0
September	576	84.1%	0.6	7.6	0	2.1	0	85.8	11.5	2.8	0.0	0.0	0.0
October	239	32.6%	0.3	3.7	0	1.5	0	86.6	13.4	0.0	0.0	0.0	0.0
November	689	100.0%	0.1	5.3	0	0.5	0	97.1	2.8	0.1	0.0	0.0	0.0
December	703	100.0%	0.5	8.8	0	1.8	0	84.8	14.8	0.4	0.0	0.0	0.0
Annual [c]	7430	88.7%	0.3	8.8	0	2.1	0	93.1	6.7	0.3	0.0	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 172 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 48 ppb

c. Annual Saskatchewan Ambient Air Quality Standard = 8 ppb

Table D-3. Stoughton Station: Summary of airpointer® NO monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤5	5 ~ 15	15 ~ 53	53 ~ 100	100 ~ 159	>159
January	712	100.0%	0.6	20.3	-	1.9	-	98.1	1.5	0.4	0.0	0.0	0.0
February	643	100.0%	0.4	5.2	-	1.7	-	99.8	0.2	0.0	0.0	0.0	0.0
March	443	62.6%	0.7	46.5	-	3.3	-	98.9	0.5	0.7	0.0	0.0	0.0
April	689	100.0%	0.6	17.8	-	2.0	-	99.0	0.9	0.1	0.0	0.0	0.0
May	712	100.0%	0.7	121.0	-	6.8	-	99.0	0.6	0.3	0.0	0.1	0.0
June	679	100.0%	0.9	13.6	-	3.1	-	98.5	1.5	0.0	0.0	0.0	0.0
July	670	94.0%	0.6	12.4	-	1.5	-	99.6	0.4	0.0	0.0	0.0	0.0
August	631	88.1%	1.1	8.4	-	5.0	-	96.4	3.6	0.0	0.0	0.0	0.0
September	557	81.2%	0.8	11.4	-	4.1	-	96.2	3.8	0.0	0.0	0.0	0.0
October	236	32.2%	0.4	16.2	-	0.8	-	98.7	0.8	0.4	0.0	0.0	0.0
November	689	100.0%	0.3	12.0	-	0.8	-	99.9	0.1	0.0	0.0	0.0	0.0
December	703	100.0%	0.3	11.4	-	1.2	-	99.7	0.3	0.0	0.0	0.0	0.0
Annual [c]	7364	87.9%	0.6	121.0	-	6.8	-	98.7	1.2	0.1	0.0	0.0	0.0

a. No 1-hour Saskatchewan Ambient Air Quality Standard
b. No 24-hour Saskatchewan Ambient Air Quality Standard
c. No annual Saskatchewan Ambient Air Quality Standard

Table D-4. Stoughton Station: Summary of airpointer® NO_2 monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤5	5 ~ 15	15 ~ 53	53 ~ 100	100 ~ 159	>159
January	712	100.0%	1.4	17.1	0	3.9	-	95.8	4.1	0.1	0.0	0.0	0.0
February	643	100.0%	1.2	8.7	0	3.0	-	98.0	2.0	0.0	0.0	0.0	0.0
March	443	62.6%	0.7	26.9	0	1.5	-	98.9	0.9	0.2	0.0	0.0	0.0
April	689	100.0%	0.2	6.3	0	1.2	-	99.7	0.3	0.0	0.0	0.0	0.0
May	712	100.0%	0.3	43.3	0	2.2	-	99.4	0.4	0.1	0.0	0.0	0.0
June	679	100.0%	1.7	25.0	0	3.9	-	91.5	7.8	0.7	0.0	0.0	0.0
July	670	94.0%	0.4	6.2	0	1.6	-	99.3	0.7	0.0	0.0	0.0	0.0
August	631	88.1%	0.2	6.1	0	0.8	-	99.2	0.8	0.0	0.0	0.0	0.0
September	557	81.2%	0.7	9.8	0	2.9	-	97.1	2.9	0.0	0.0	0.0	0.0
October	236	32.2%	0.8	11.3	0	1.6	-	96.6	3.4	0.0	0.0	0.0	0.0
November	689	100.0%	1.0	10.4	0	2.5	-	98.5	1.5	0.0	0.0	0.0	0.0
December	703	100.0%	1.5	13.1	0	3.6	-	95.9	4.1	0.0	0.0	0.0	0.0
Annual [c]	7364	87.9%	0.8	43.3	0	3.9	-	97.5	2.4	0.1	0.0	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 159 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 106 ppb

c. Annual Saskatchewan Ambient Air Quality Standard = 24 ppb

Table D-5. Stoughton Station: Summary of airpointer® NOx monitoring results for the year 2022

Month	Valid 1-Hr data	Operational Time	Average Conc.	Maximum 1-Hr Conc.	1-Hour Exceedance [a]	Maximum 24-Hr Conc.	24-Hour Exceedance [b]	Percent of Data in each Concentration Range					
	(no.)	(%)	(ppb)	(ppb)	(no.)	(ppb)	(no.)	≤5	5 ~ 15	15 ~ 53	53 ~ 100	100 ~ 159	>159
January	712	100.0%	1.8	32.9	-	5.1	-	90.2	9.2	0.5	0.0	0.0	0.0
February	643	100.0%	1.4	10.9	-	4.6	-	95.6	4.4	0.0	0.0	0.0	0.0
March	443	62.6%	1.2	73.3	-	4.6	-	97.5	1.8	0.5	0.2	0.0	0.0
April	689	100.0%	0.4	22.3	-	3.0	-	98.4	1.3	0.3	0.0	0.0	0.0
May	712	100.0%	0.6	164.1	-	8.8	-	98.5	1.3	0.1	0.0	0.0	0.1
June	679	100.0%	2.4	28.8	-	5.5	-	88.2	10.5	1.3	0.0	0.0	0.0
July	670	94.0%	0.7	17.8	-	2.4	-	98.8	1.0	0.1	0.0	0.0	0.0
August	631	88.1%	0.7	10.3	-	4.0	-	97.0	3.0	0.0	0.0	0.0	0.0
September	557	81.2%	1.1	11.1	-	3.8	-	94.1	5.9	0.0	0.0	0.0	0.0
October	236	32.2%	1.2	22.8	-	2.1	-	94.1	5.1	0.8	0.0	0.0	0.0
November	689	100.0%	1.2	15.6	-	3.1	-	97.2	2.6	0.1	0.0	0.0	0.0
December	703	100.0%	1.8	16.7	-	4.7	-	93.7	6.0	0.3	0.0	0.0	0.0
Annual [c]	7364	87.9%	1.2	164.1	-	8.8	-	95.3	4.4	0.3	0.0	0.0	0.0

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. No 24-hour Saskatchewan Ambient Air Quality Standard

c. No annual Saskatchewan Ambient Air Quality Standard

Table D-6. Stoughton Station: Summary of airpointer® H_2S monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤1	1 ~ 3.6	3.6 ~ 5	5 ~ 8	8 ~ 11	>11
January	712	100.0%	0.1	1.4	0	0.3	0	99.9	0.1	0.0	0.0	0.0	0.0
February	643	100.0%	0.1	1.3	0	0.4	0	99.8	0.2	0.0	0.0	0.0	0.0
March	443	62.6%	0.2	3.8	0	1.3	0	95.5	4.3	0.2	0.0	0.0	0.0
April	689	100.0%	0.1	0.7	0	0.4	0	100.0	0.0	0.0	0.0	0.0	0.0
May	712	100.0%	0.1	2.5	0	0.5	0	98.9	1.1	0.0	0.0	0.0	0.0
June	679	100.0%	0.2	2.2	0	0.6	0	96.9	3.1	0.0	0.0	0.0	0.0
July	712	100.0%	0.4	3.7	0	1.0	0	89.6	10.1	0.3	0.0	0.0	0.0
August	633	88.5%	0.2	2.6	0	0.8	0	96.7	3.3	0.0	0.0	0.0	0.0
September	575	83.9%	0.2	6.2	0	1.3	0	94.6	4.3	0.3	0.7	0.0	0.0
October	239	32.6%	0.2	3.5	0	0.5	0	97.9	2.1	0.0	0.0	0.0	0.0
November	689	100.0%	0.1	2.2	0	0.3	0	99.4	0.6	0.0	0.0	0.0	0.0
December	703	100.0%	0.1	1.1	0	0.4	0	99.9	0.1	0.0	0.0	0.0	0.0
Annual [c]	7423	88.7%	0.2	6.2	0	1.3	0	97.5	2.4	0.1	0.1	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 11 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 3.6 ppb

c. No annual Saskatchewan Ambient Air Quality Standard

Table D-7. Stoughton Station: Summary of airpointer® $PM_{2.5}$ monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (µg/m³)	Maximum 1-Hr Conc. (µg/m³)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (µg/m³)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤5	5 ~ 10	10 ~ 15	15 ~ 28	28 ~ 80	>80
January	744	99.0%	4	13	-	6	0	80	19	0	0	0	0
February	542	80.7%	10	69	-	22	0	35	12	36	15	3	0
March	332	44.6%	11	41	-	19	0	16	5	70	8	1	0
April	720	100.0%	6	41	-	16	0	62	15	8	14	0	0
May	744	100.0%	4	43	-	8	0	80	18	3	0	0	0
June	640	88.9%	6	154	-	20	0	50	35	8	5	0	0
July	744	100.0%	6	21	-	11	0	43	48	7	2	0	0
August	671	90.2%	9	26	-	18	0	25	42	22	11	0	0
September	638	88.6%	10	50	-	17	0	35	31	16	14	4	0
October	744	100.0%	8	36	-	18	0	43	32	15	9	1	0
November	720	100.0%	11	40	-	19	0	30	13	12	44	0	0
December	742	100.0%	4	23	-	13	0	72	20	7	1	0	0
Annual [c]	7973	91.1%	7	154	-	22	0	50.0	25.1	13.9	10.3	0.8	0.0

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. 24-hour Canada-Wide Standard = 28 µg/m³

c. No annual Saskatchewan Ambient Air Quality Standard

Table D-8. Stoughton Station: Summary of airpointer® ambient temperature monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Temp. (°C)	Minimum 1-Hr Temp. (°C)	Maximum 1-Hr Temp. (°C)	Percent of Data in each Temperature Range					
						≤-30	-30 ~ -15	-15 ~ 0	0 ~ 15	15 ~ 30	>30
January	744	100.0%	-14.9	-36.7	2.5	9.9	37.0	51.3	1.8	0.0	0.0
February	672	100.0%	-16.1	-34.2	3.3	6.5	51.0	38.1	4.3	0.0	0.0
March	658	88.4%	-6.1	-30.3	9.6	0.2	14.3	59.4	26.1	0.0	0.0
April	720	100.0%	-0.2	-17.1	15.5	0.0	0.6	49.3	49.9	0.3	0.0
May	744	100.0%	10.8	-2.3	25.2	0.0	0.0	1.6	76.2	22.2	0.0
June	720	100.0%	16.7	2.4	32.2	0.0	0.0	0.0	38.9	60.3	0.8
July	744	100.0%	19.0	7.0	33.8	0.0	0.0	0.0	23.3	75.3	1.5
August	671	90.2%	19.6	8.2	32.5	0.0	0.0	0.0	21.9	75.6	2.5
September	720	100.0%	14.2	0.8	34.0	0.0	0.0	0.0	61.7	36.0	2.4
October	744	100.0%	5.5	-9.8	23.4	0.0	0.0	19.9	71.2	8.9	0.0
November	720	100.0%	-6.8	-23.0	14.3	0.0	10.0	73.2	16.8	0.0	0.0
December	744	100.0%	-16.6	-35.9	0.1	7.4	45.2	47.2	0.3	0.0	0.0
Annual	8601	98.2%	2.1	-36.7	34.0	2.0	13.1	28.2	32.9	23.1	0.6

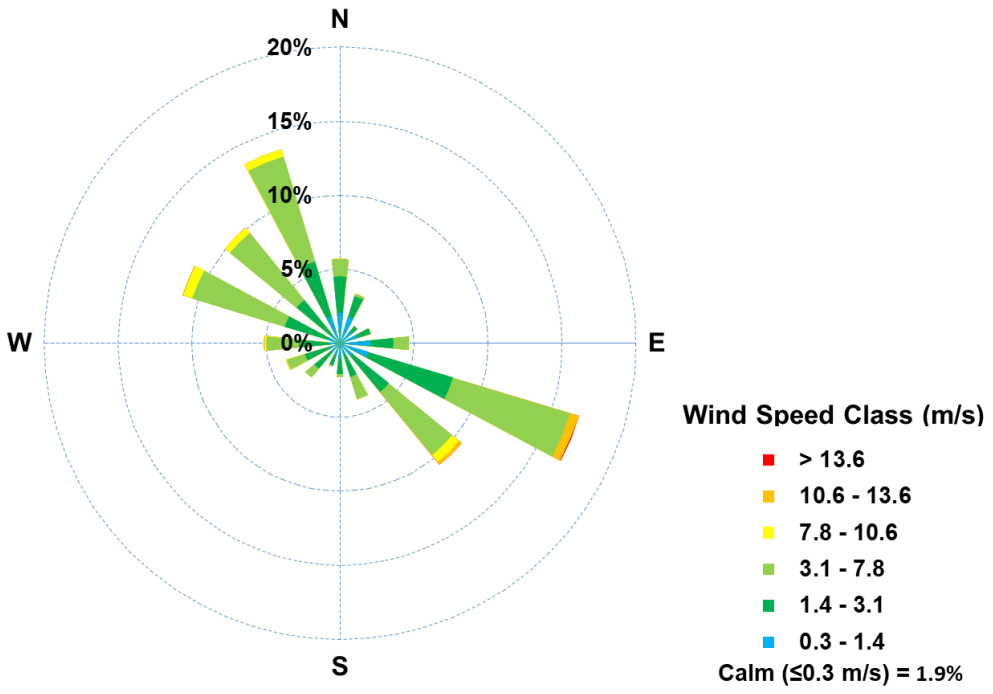
Table D-9. Stoughton Station: Summary of airpointer® relative humidity monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average RH (%)	Minimum 1-Hr RH (%)	Maximum 1-Hr RH (%)	Percent of Data in each Relative Humidity Range					
						≤15	15 ~ 30	30 ~ 60	60 ~ 80	80 ~ 90	>90
January	768	100.0%	74	43	88	3.0	0.0	0.4	65.9	30.7	0.0
February	672	100.0%	75	47	88	0.0	0.0	1.2	79.5	19.3	0.0
March	658	88.4%	75	1	87	0.2	0.5	6.2	57.9	35.3	0.0
April	720	100.0%	69	21	89	0.0	1.4	25.0	48.5	25.1	0.0
May	744	100.0%	62	19	90	0.0	8.6	31.6	35.6	24.2	0.0
June	720	100.0%	60	17	90	0.0	7.8	38.9	34.4	18.3	0.6
July	744	100.0%	72	31	91	0.0	0.0	25.9	32.5	40.7	0.8
August	671	90.2%	67	25	91	0.0	1.3	34.0	30.4	32.9	1.3
September	720	100.0%	58	10	89	0.1	10.4	40.3	31.9	17.2	0.0
October	744	100.0%	62	17	89	0.0	6.7	36.3	28.7	28.3	0.0
November	720	100.0%	74	17	85	0.0	0.1	6.0	73.2	20.7	0.0
December	744	100.0%	75	53	86	0.0	0.0	0.1	75.0	24.9	0.0
Annual	8625	98.2%	69	1	91	0.3	3.1	20.5	49.4	26.5	0.2

Table D-10. Stoughton Station: airpointer® wind frequency table for the year 2022

Wind Direction Sector	Percent of Data in each Wind Speed Range, wind speed unit m/s						
	0.3 ~ 1.4	1.4 ~ 3.1	3.1 ~ 7.8	7.8 ~ 10.6	10.6 ~ 13.6	>13.6	Totals
North NorthEast	1.7%	1.5%	0.2%	0.0%	0.0%	0.0%	3.4%
NorthEast	0.9%	0.5%	0.0%	0.0%	0.0%	0.0%	1.4%
East NorthEast	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%	2.0%
East	2.0%	1.5%	1.1%	0.0%	0.0%	0.0%	4.6%
East SouthEast	1.9%	6.0%	8.2%	0.6%	0.0%	0.0%	16.8%
SouthEast	1.1%	3.1%	5.5%	0.6%	0.2%	0.0%	10.5%
South SouthEast	0.8%	1.6%	1.6%	0.0%	0.0%	0.0%	3.9%
South	0.9%	1.1%	0.2%	0.0%	0.0%	0.0%	2.3%
South SouthWest	0.8%	0.7%	0.1%	0.0%	0.0%	0.0%	1.6%
SouthWest	0.8%	1.4%	0.8%	0.0%	0.0%	0.0%	2.9%
West SouthWest	0.7%	1.7%	1.3%	0.0%	0.0%	0.0%	3.8%
West	0.7%	2.0%	2.2%	0.1%	0.0%	0.0%	5.1%
West NorthWest	0.8%	3.0%	6.5%	0.6%	0.1%	0.0%	11.1%
NorthWest	0.7%	3.0%	5.8%	0.4%	0.0%	0.0%	10.0%
North NorthWest	1.9%	3.8%	7.4%	0.5%	0.0%	0.0%	13.6%
North	1.6%	2.5%	1.2%	0.0%	0.0%	0.0%	5.2%
Total	18.2%	34.4%	42.0%	3.0%	0.4%	0.0%	98.0%

Percent Calm (≤0.3 m/s)	1.9%
Number of Valid Hourly-Average Data	8479
Total Workable Hours in Time Period	8760



APPENDIX E. ESTERHAZY STATION: CONTINUOUS MONITORING DATA

Table E-1. Esterhazy Station: Summary of airpointer® monitoring results for the year 2022

Parameter	Unit	Hours of Calibration & AIC [a]	Hours of Valid Data	Percent Uptime	Summary Statistics for 1-Hour Average Data		
					Average	Minimum	Maximum
NO	ppb	350	7274	86.5%	0.7	< 0.1	38.2
NO_2	ppb	350	7274	86.5%	0.7	< 0.1	28.5
NO_x	ppb	350	7274	86.5%	1.1	< 0.1	53.6
O_3	ppb	364	7616	90.7%	28	< 1	64
$PM_{2.5}$	µg/m^3	1	8438	96.1%	5	< 1	65
Precipitation	mm	0	4247	94.2%	481.4 [b]	< 0.1	16.9
Ambient Temperature	°C	0	8518	97.0%	3.4	-35.5	32.9
Relative Humidity	%	0	8518	97.0%	64	< 1	91
Wind Speed	m/s	0	8519	97.8%	2.2	Calm	6.8

a. Automatic Instrument Check

b. Total Precipitation

Table E-2. Esterhazy Station: Summary of airpointer® NO monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤5	5 ~ 15	15 ~ 53	53 ~ 100	100 ~ 159	>159
January	213	29.0%	0.7	3.5	-	1.3	-	100.0	0.0	0.0	0.0	0.0	0.0
February	568	87.9%	0.7	6.1	-	1.5	-	99.5	0.5	0.0	0.0	0.0	0.0
March	711	100.0%	0.6	28.8	-	4.2	-	99.2	0.7	0.1	0.0	0.0	0.0
April	686	99.6%	0.5	4.7	-	1.6	-	100.0	0.0	0.0	0.0	0.0	0.0
May	712	100.0%	1.2	11.8	-	2.6	-	99.4	0.6	0.0	0.0	0.0	0.0
June	678	99.4%	0.5	7.4	-	1.1	-	99.9	0.1	0.0	0.0	0.0	0.0
July	439	60.7%	0.4	12.1	-	1.3	-	99.8	0.2	0.0	0.0	0.0	0.0
August	638	89.2%	0.4	4.4	-	0.9	-	100.0	0.0	0.0	0.0	0.0	0.0
September	678	99.4%	0.5	19.4	-	2.0	-	99.0	0.7	0.3	0.0	0.0	0.0
October	634	88.5%	0.6	38.2	-	3.6	-	99.2	0.5	0.3	0.0	0.0	0.0
November	611	88.2%	0.6	38.2	-	3.6	-	99.2	0.5	0.3	0.0	0.0	0.0
December	706	100.0%	1.0	26.4	-	3.4	-	99.2	0.6	0.3	0.0	0.0	0.0
Annual [c]	7274	86.5%	0.7	38.2	-	4.2	-	99.5	0.4	0.1	0.0	0.0	0.0

a. No 1-hour Saskatchewan Ambient Air Quality Standard
b. No 24-hour Saskatchewan Ambient Air Quality Standard
c. No annual Saskatchewan Ambient Air Quality Standard

Table E-3. Esterhazy Station: Summary of airpointer® NO_2 monitoring results for the year 2022

Month	Valid 1-Hr data	Operational Time	Average Conc.	Maximum 1-Hr Conc.	1-Hour Exceedance [a]	Maximum 24-Hr Conc.	24-Hour Exceedance [b]	Percent of Data in each Concentration Range					
	(no.)	(%)	(ppb)	(ppb)	(no.)	(ppb)	(no.)	≤5	5 ~ 15	15 ~ 53	53 ~ 100	100 ~ 159	>159
January	213	29.0%	2.4	18.2	0	4.3	-	90.3	9.3	0.4	0.0	0.0	0.0
February	568	87.9%	1.1	28.5	0	4.4	-	94.2	4.6	1.2	0.0	0.0	0.0
March	711	100.0%	0.8	25.5	0	6.6	-	95.6	3.8	0.6	0.0	0.0	0.0
April	686	99.6%	0.2	5.2	0	1.0	-	99.9	0.1	0.0	0.0	0.0	0.0
May	712	100.0%	0.4	13.5	0	2.0	-	98.7	1.3	0.0	0.0	0.0	0.0
June	678	99.4%	1.0	7.9	0	2.6	-	97.2	2.8	0.0	0.0	0.0	0.0
July	439	60.7%	0.4	5.0	0	1.0	-	99.8	0.2	0.0	0.0	0.0	0.0
August	638	89.2%	0.1	5.5	0	0.4	-	99.8	0.2	0.0	0.0	0.0	0.0
September	678	99.4%	0.1	7.7	0	1.2	-	99.4	0.6	0.0	0.0	0.0	0.0
October	634	88.5%	0.4	15.6	0	2.5	-	98.4	1.4	0.2	0.0	0.0	0.0
November	611	88.2%	0.4	15.6	0	2.5	-	98.4	1.5	0.2	0.0	0.0	0.0
December	706	100.0%	1.6	23.0	0	6.8	-	94.6	4.8	0.6	0.0	0.0	0.0
Annual [c]	7274	86.5%	0.7	28.5	0	6.8	-	97.5	2.2	0.2	0.0	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 159 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 106 ppb

c. Annual Saskatchewan Ambient Air Quality Standard = 24 ppb

Table E-4. Esterhazy Station: Summary of airpointer® NOx monitoring results for the year 2022

Month	Valid 1-Hr data	Operational Time	Average Conc.	Maximum 1-Hr Conc.	1-Hour Exceedance [a]	Maximum 24-Hr Conc.	24-Hour Exceedance [b]	Percent of Data in each Concentration Range					
	(no.)	(%)	(ppb)	(ppb)	(no.)	(ppb)	(no.)	≤5	5 ~ 15	15 ~ 53	53 ~ 100	100 ~ 159	>159
January	213	29.0%	3.7	20.3	-	6.6	-	78.9	20.3	0.8	0.0	0.0	0.0
February	568	87.9%	1.7	31.6	-	5.6	-	91.7	7.0	1.2	0.0	0.0	0.0
March	711	100.0%	1.0	49.1	-	10.8	-	95.4	3.8	0.8	0.0	0.0	0.0
April	686	99.6%	0.6	7.8	-	2.7	-	99.3	0.7	0.0	0.0	0.0	0.0
May	712	100.0%	1.3	25.3	-	4.1	-	96.3	3.5	0.1	0.0	0.0	0.0
June	678	99.4%	1.2	14.5	-	2.7	-	96.0	4.0	0.0	0.0	0.0	0.0
July	439	60.7%	0.7	14.7	-	1.4	-	99.1	0.9	0.0	0.0	0.0	0.0
August	638	89.2%	0.2	7.7	-	0.7	-	99.7	0.3	0.0	0.0	0.0	0.0
September	678	99.4%	0.4	24.6	-	3.0	-	98.7	1.0	0.3	0.0	0.0	0.0
October	634	88.5%	0.7	53.6	-	5.9	-	97.5	2.1	0.3	0.2	0.0	0.0
November	611	88.2%	0.7	53.6	-	5.9	-	97.4	2.1	0.3	0.2	0.0	0.0
December	706	100.0%	2.5	48.7	-	10.2	-	88.2	10.6	1.1	0.0	0.0	0.0
Annual [c]	7274	86.5%	1.1	53.6	-	10.8	-	95.6	3.9	0.4	0.0	0.0	0.0

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. No 24-hour Saskatchewan Ambient Air Quality Standard

c. No annual Saskatchewan Ambient Air Quality Standard

Table E-5. Esterhazy Station: Summary of airpointer® O_3 monitoring results for the year 2022

Month	Valid 1-Hr data	Operational Time	Average Conc.	Maximum 1-Hr Conc.	1-Hour Exceedance [a]	Maximum 8-Hr Conc.	8-Hour Conc. Above CWS [b]	Percent of Data in each Concentration Range					
	(no.)	(%)	(ppb)	(ppb)	(no.)	(ppb)	(no.)	≤10	10 ~ 20	20 ~ 40	40 ~ 63	63 ~ 82	>82
January	213	31.2%	25	37	0	36	0	11.8	3.0	85.2	0.0	0.0	0.0
February	568	87.9%	33	45	0	43	0	0.2	1.1	94.0	4.8	0.0	0.0
March	711	100.0%	37	50	0	49	0	0.0	0.8	64.4	34.7	0.0	0.0
April	686	99.6%	35	56	0	51	0	0.3	3.5	72.0	24.2	0.0	0.0
May	712	100.0%	32	54	0	50	0	1.0	9.3	72.1	17.7	0.0	0.0
June	678	99.4%	30	64	0	57	0	2.5	14.2	64.7	18.3	0.3	0.0
July	707	99.3%	25	50	0	49	0	3.0	30.7	61.5	4.8	0.0	0.0
August	712	100.0%	22	45	0	38	0	6.5	38.2	53.5	1.8	0.0	0.0
September	678	99.4%	23	42	0	39	0	4.9	30.5	62.4	2.2	0.0	0.0
October	634	88.5%	22	42	0	40	0	6.3	27.9	64.7	1.1	0.0	0.0
November	611	88.2%	22	42	0	40	0	6.5	27.5	64.8	1.1	0.0	0.0
December	706	100.0%	28	40	0	39	0	0.6	7.5	91.8	0.1	0.0	0.0
Annual [c]	7616	90.7%	28	64	0	54	0	3.1	17.0	69.8	10.0	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 82 ppb

b. 8-hour Canada-Wide Standard = 63 ppb

c. *No annual Saskatchewan Ambient Air Quality Standard*

Table E-6. Esterhazy Station: Summary of airpointer® $PM_{2.5}$ monitoring results for the year 2022

Month	Valid 1-Hr data	Operational Time	Average Conc.	Maximum 1-Hr Conc.	1-Hour Exceedance [a]	Maximum 24-Hr Conc.	24-Hour Exceedance [b]	Percent of Data in each Concentration Range					
	(no.)	(%)	(µg/m^3)	(µg/m^3)	(no.)	(µg/m^3)	(no.)	≤5	5 ~ 10	10 ~ 15	15 ~ 28	28 ~ 80	>80
January	744	100.0%	4	65	-	23	0	81	17	1	0	1	0
February	594	88.4%	4	16	-	9	0	69	27	4	0	0	0
March	744	100.0%	3	16	-	6	0	94	6	0	0	0	0
April	717	99.6%	3	19	-	7	0	81	16	3	0	0	0
May	744	100.0%	3	19	-	7	0	83	15	2	0	0	0
June	716	99.4%	5	29	-	13	0	57	31	8	4	0	0
July	739	99.3%	6	38	-	16	0	50	40	7	3	0	0
August	744	100.0%	7	38	-	20	0	42	35	16	6	1	0
September	629	87.4%	7	61	-	16	0	48	32	10	9	1	0
October	662	89.0%	6	26	-	18	0	55	26	11	8	0	0
November	638	88.6%	6	26	-	18	0	55	26	11	8	0	0
December	743	100.0%	4	24	-	12	0	69	26	3	2	0	0
Annual [c]	8414	96.1%	5	65	-	23	0	65.7	24.5	6.2	3.2	0.3	0.0

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. 24-hour Canada-Wide Standard = 28 µg/m^3

c. No annual Saskatchewan Ambient Air Quality Standard

Table E-7. Esterhazy Station: Summary of airpointer® ambient temperature monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Temp. (°C)	Minimum 1-Hr Temp. (°C)	Maximum 1-Hr Temp. (°C)	Percent of Data in each Temperature Range					
						≤-30	-30 ~ -15	-15 ~ 0	0 ~ 15	15 ~ 30	>30
January	735	98.8%	-15.0	-33.7	1.9	5.1	45.8	45.5	3.6	0.0	0.0
February	594	88.4%	-17.8	-35.5	4.1	4.5	63.1	27.9	4.4	0.0	0.0
March	744	100.0%	-5.8	-27.1	8.9	0.0	12.9	56.9	30.2	0.0	0.0
April	717	99.6%	-0.3	-13.1	13.3	0.0	0.0	48.7	51.3	0.0	0.0
May	744	100.0%	11.0	-0.8	24.7	0.0	0.0	0.8	75.3	23.9	0.0
June	716	99.4%	16.6	3.3	31.4	0.0	0.0	0.0	39.0	60.2	0.8
July	739	99.3%	19.6	9.4	31.1	0.0	0.0	0.0	18.7	80.4	0.9
August	744	100.0%	19.6	8.7	31.8	0.0	0.0	0.0	16.1	82.9	0.9
September	717	99.6%	14.3	0.7	32.9	0.0	0.0	0.0	61.2	38.1	0.7
October	662	89.0%	5.9	-7.2	23.5	0.0	0.0	16.2	74.9	8.9	0.0
November	638	88.6%	5.9	-7.2	23.5	0.0	0.0	16.8	74.0	9.2	0.0
December	744	100.0%	-16.2	-32.8	-1.9	2.4	48.9	48.7	0.0	0.0	0.0
Annual	8494	97.0%	3.4	-35.5	32.9	1.0	13.9	21.9	37.0	26.0	0.3

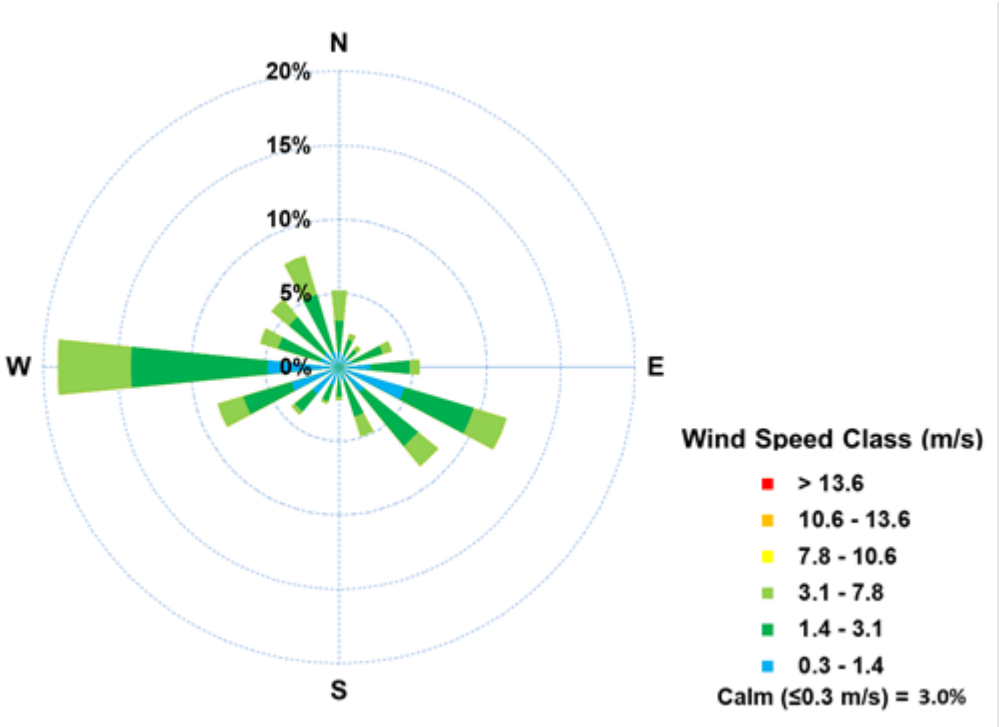
Table E-8. Esterhazy Station: Summary of airpointer® relative humidity monitoring results for the year 2022

Month	Valid 1-Hr data	Operational Time	Average RH	Minimum 1-Hr RH	Maximum 1-Hr RH	Percent of Data in each Relative Humidity Range					
	(no.)	(%)	(%)	(%)	(%)	≤15	15 ~ 30	30 ~ 60	60 ~ 80	80 ~ 90	>90
January	759	98.8%	65	27	82	3.2	0.1	12.6	83.1	0.9	0.0
February	594	88.4%	64	46	82	0.0	0.0	23.1	75.8	1.2	0.0
March	744	100.0%	64	30	83	0.0	0.0	31.5	66.0	2.6	0.0
April	717	99.6%	64	28	86	0.0	0.3	36.5	52.9	10.3	0.0
May	744	100.0%	61	21	89	0.0	7.5	34.7	37.9	19.9	0.0
June	716	99.4%	61	15	90	0.0	8.0	36.0	36.9	19.1	0.0
July	739	99.3%	67	31	91	0.0	0.0	33.8	42.6	22.7	0.8
August	744	100.0%	68	31	91	0.0	0.0	31.9	37.5	29.7	0.9
September	717	99.6%	60	22	90	0.0	3.2	46.4	32.2	18.1	0.0
October	662	89.0%	62	24	90	0.0	3.2	38.8	42.1	15.9	0.0
November	638	88.6%	62	24	90	0.0	3.3	38.6	41.7	16.5	0.0
December	744	100.0%	69	54	83	0.0	0.0	9.1	87.0	3.9	0.0
Annual	8518	97.0%	64	15	91	0.3	2.1	30.9	53.0	13.5	0.2

Table E-9. Esterhazy Station: airpointer® wind frequency table for the year 2022

Wind Direction Sector	Percent of Data in each Wind Speed Range, wind speed unit m/s						
	0.3 ~ 1.4	1.4 ~ 3.1	3.1 ~ 7.8	7.8 ~ 10.6	10.6 ~ 13.6	>13.6	Totals
North NorthEast	0.9%	1.0%	0.4%	0.0%	0.0%	0.0%	2.3%
NorthEast	0.8%	0.8%	0.3%	0.0%	0.0%	0.0%	1.8%
East NorthEast	0.9%	2.1%	0.7%	0.0%	0.0%	0.0%	3.7%
East	2.0%	2.7%	0.7%	0.0%	0.0%	0.0%	5.4%
East SouthEast	4.4%	4.8%	2.3%	0.0%	0.0%	0.0%	11.6%
SouthEast	1.7%	4.7%	1.7%	0.0%	0.0%	0.0%	8.2%
South SouthEast	0.8%	2.4%	1.4%	0.0%	0.0%	0.0%	4.7%
South	0.7%	1.1%	0.3%	0.0%	0.0%	0.0%	2.0%
South SouthWest	1.0%	1.2%	0.2%	0.0%	0.0%	0.0%	2.3%
SouthWest	1.9%	1.5%	0.3%	0.0%	0.0%	0.0%	3.7%
West SouthWest	3.1%	3.4%	1.8%	0.0%	0.0%	0.0%	8.3%
West	4.7%	9.2%	4.9%	0.0%	0.0%	0.0%	18.8%
West NorthWest	1.2%	3.0%	1.3%	0.0%	0.0%	0.0%	5.5%
NorthWest	1.2%	3.1%	1.5%	0.0%	0.0%	0.0%	5.8%
North NorthWest	1.0%	4.1%	2.7%	0.0%	0.0%	0.0%	7.8%
North	0.9%	2.1%	2.1%	0.0%	0.0%	0.0%	5.1%
Total	27.2%	47.1%	22.6%	0.0%	0.0%	0.0%	97.0%

Percent Calm (≤0.3 m/s)	3.0%
Number of Valid Hourly-Average Data	8495
Total Workable Hours in Time Period	8683



APPENDIX F. TORQUAY STATION: CONTINUOUS MONITORING DATA

Table F-1. Torquay Station: Summary of airpointer® monitoring results for 2022

Parameter	Unit	Hours of Calibration & AIC [a]	Hours of Valid Data	Percent Uptime	Summary Statistics for 1-Hour Average Data		
					Average	Minimum	Maximum
SO_2	ppb	389	8013	95.7%	0.1	< 0.1	13.8
H_2S	ppb	389	8013	95.7%	0.1	<0.1	13.8
$PM_{2.5}$	µg/m^3	2	8263	94.4%	6	< 1	192
Precipitation	mm	0	4272	92.2%	453.1[b]	< 0.1	21.8
Ambient Temperature	°C	0	8396	95.9%	3.3	-37.2	35.6
Relative Humidity	%	0	8396	95.9%	69	< 1	93
Wind Speed	m/s	0	8377	95.7%	4.3	Calm	16.2

a. Automatic Instrument Check

b. Total Precipitation

Table F-1. Torquay Station: Summary of airpointer® SO_2 monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤1	1 ~ 5	5 ~ 11	11 ~ 48	48 ~ 172	>172
January	708	99.5%	0.1	4.2	0	0.8	0	98.6	1.4	0.0	0.0	0.0	0.0
February	509	78.4%	0.1	4.9	0	0.8	0	98.6	1.4	0.0	0.0	0.0	0.0
March	703	100.0%	0.1	11.7	0	2.0	0	97.3	2.1	0.4	0.1	0.0	0.0
April	621	89.6%	0.1	13.8	0	0.9	0	97.1	2.6	0.2	0.2	0.0	0.0
May	712	100.0%	0.1	2.4	0	0.4	0	99.0	1.0	0.0	0.0	0.0	0.0
June	658	96.2%	< 0.1	3.3	0	0.3	0	99.4	0.6	0.0	0.0	0.0	0.0
July	709	99.6%	0.1	3.8	0	0.8	0	98.7	1.3	0.0	0.0	0.0	0.0
August	629	87.8%	0.1	9.3	0	1.4	0	97.9	1.6	0.5	0.0	0.0	0.0
September	658	96.2%	0.1	11.5	0	2.2	0	98.0	0.9	0.9	0.2	0.0	0.0
October	712	100.0%	0.1	6.1	0	0.5	0	97.9	2.0	0.1	0.0	0.0	0.0
November	689	100.0%	< 0.1	2.4	0	0.2	0	99.9	0.1	0.0	0.0	0.0	0.0
December	705	100.0%	0.1	3.4	0	0.6	0	96.5	3.5	0.0	0.0	0.0	0.0
Annual [c]	8013	95.7%	0.1	13.8	0	2.2	0	98.2	1.5	0.2	0.0	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 159 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 106 ppb

c. Annual Saskatchewan Ambient Air Quality Standard = 24 ppb

Table F-2. Torquay Station: Summary of airpointer® H_2S monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤1	1 ~ 3.6	3.6 ~ 5	5 ~ 8	8 ~ 11	>11
January	708	99.5%	< 0.1	13.8	1	0.7	0	99.7	0.1	0.0	0.0	0.0	0.1
February	509	78.4%	0.1	3.5	0	1.3	0	96.3	3.7	0.0	0.0	0.0	0.0
March	703	100.0%	< 0.1	0.8	0	0.2	0	100.0	0.0	0.0	0.0	0.0	0.0
April	621	89.6%	0.1	6.2	0	0.4	0	98.7	1.0	0.2	0.2	0.0	0.0
May	712	100.0%	0.1	3.3	0	0.4	0	98.6	1.4	0.0	0.0	0.0	0.0
June	658	96.2%	0.2	1.8	0	0.6	0	97.4	2.6	0.0	0.0	0.0	0.0
July	709	99.6%	0.3	5.9	0	0.6	0	94.9	4.9	0.0	0.1	0.0	0.0
August	629	87.8%	0.3	3.0	0	0.5	0	97.9	2.1	0.0	0.0	0.0	0.0
September	658	95.5%	0.1	3.2	0	0.8	0	97.9	2.0	0.0	0.0	0.0	0.2
October	712	100.0%	< 0.1	0.5	0	0.1	0	100.0	0.0	0.0	0.0	0.0	0.0
November	689	100.0%	< 0.1	1.8	0	0.2	0	99.6	0.4	0.0	0.0	0.0	0.0
December	705	100.0%	0.1	1.5	0	0.5	0	98.4	1.6	0.0	0.0	0.0	0.0
Annual [c]	8013	95.7%	0.1	13.8	2	1.3	0	98.3	1.6	0.0	0.0	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 11 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 3.6 ppb

c. No annual Saskatchewan Ambient Air Quality Standard

Table F-6. Torquay Station: Summary of airpointer® $PM_{2.5}$ monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (µg/m³)	Maximum 1-Hr Conc. (µg/m³)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (µg/m³)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤5	5 ~ 10	10 ~ 15	15 ~ 28	28 ~ 80	>80
January	740	99.5%	2	14	-	6	0	90	9	1	0	0	0
February	418	62.2%	8	26	-	12	0	1	89	5	5	0	0
March	744	100.0%	7	83	-	16	0	18	80	1	0	1	0
April	629	87.4%	4	17	-	8	0	76	21	3	0	0	0
May	744	100.0%	4	23	-	8	0	79	19	1	1	0	0
June	694	96.4%	5	30	-	12	0	61	28	6	5	0	0
July	741	99.6%	6	51	-	13	0	43	45	10	2	0	0
August	657	88.3%	10	66	-	26	0	29	37	19	12	4	0
September	690	95.8%	10	188	-	27	0	40	30	13	10	6	0
October	744	100.0%	7	192	-	19	0	57	26	8	7	1	0
November	720	100.0%	5	35	-	14	0	72	16	7	3	1	0
December	742	100.0%	5	27	-	17	0	66	23	8	4	0	0
Annual [c]	8263	94.4%	6	192	-	27	0	54.7	33.3	6.8	4.1	1.0	0.1

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. 24-hour Canada-Wide Standard = 28 µg/m³

c. No annual Saskatchewan Ambient Air Quality Standard

Table F-7. Torquay Station: Summary of airpointer® ambient temperature monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Temp. (°C)	Minimum 1-Hr Temp. (°C)	Maximum 1-Hr Temp. (°C)	Percent of Data in each Temperature Range					
						≤-30	-30 ~ -15	-15 ~ 0	0 ~ 15	15 ~ 30	>30
January	740	99.5%	-12.7	-35.3	3.0	7.5	31.4	53.9	7.2	0.0	0.0
February	532	79.2%	-12.8	-33.2	4.8	3.0	37.2	48.3	11.5	0.0	0.0
March	744	100.0%	-3.9	-26.4	13.2	0.0	10.9	49.7	39.4	0.0	0.0
April	648	90.0%	0.0	-17.2	16.7	0.0	2.3	42.9	53.5	1.2	0.0
May	742	99.7%	11.4	-1.7	25.4	0.0	0.0	1.6	73.3	25.1	0.0
June	694	96.4%	17.3	3.6	33.1	0.0	0.0	0.0	37.2	61.2	1.6
July	741	99.6%	19.7	7.2	33.0	0.0	0.0	0.0	17.5	79.8	2.7
August	657	88.3%	20.2	7.8	33.3	0.0	0.0	0.0	20.7	73.8	5.5
September	690	95.8%	15.3	-1.1	35.6	0.0	0.0	0.4	56.4	39.7	3.5
October	744	100.0%	6.6	-8.0	23.0	0.0	0.0	13.2	77.4	9.4	0.0
November	720	100.0%	-6.4	-25.4	17.3	0.0	9.0	69.6	20.8	0.6	0.0
December	744	100.0%	-15.8	-37.2	3.7	3.9	46.0	48.4	1.7	0.0	0.0
Annual	8396	95.9%	3.3	-37.2	35.6	1.2	11.2	27.2	35.1	24.3	1.1

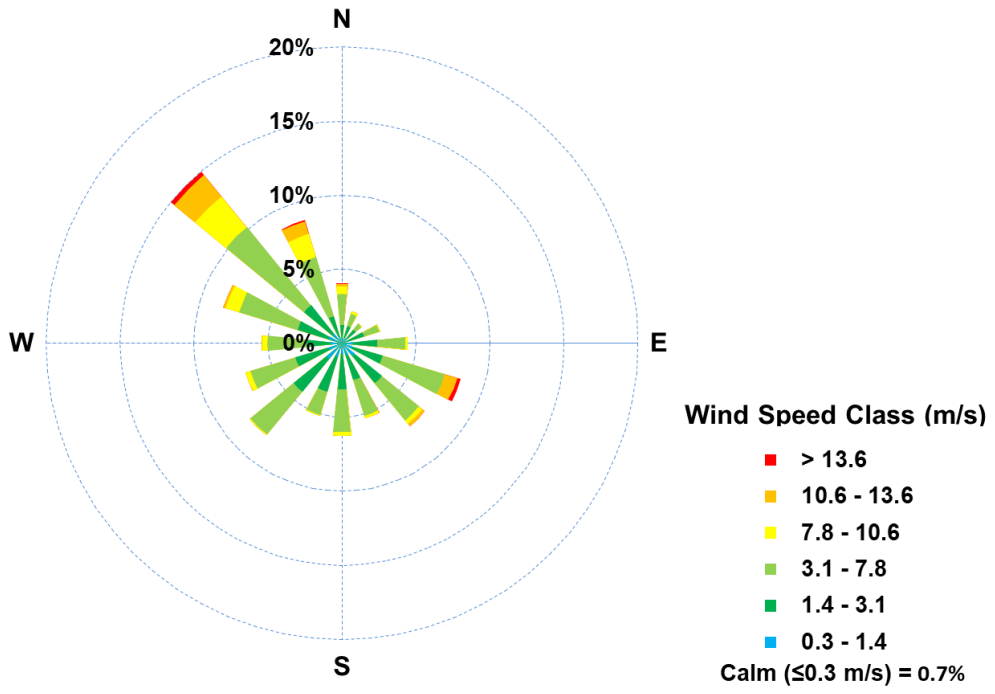
Table F-8. Torquay Station: Summary of airpointer® relative humidity monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average RH (%)	Minimum 1-Hr RH (%)	Maximum 1-Hr RH (%)	Percent of Data in each Relative Humidity Range					
						≤15	15 ~ 30	30 ~ 60	60 ~ 80	80 ~ 90	>90
January	740	99.5%	73	59	88	3.1	0.0	0.3	72.3	24.3	0.0
February	532	79.2%	75	61	89	0.0	0.0	0.0	85.2	14.8	0.0
March	744	100.0%	71	16	88	0.0	0.8	19.1	51.9	28.2	0.0
April	648	90.0%	69	18	92	0.0	3.2	23.5	36.0	32.9	4.5
May	742	99.7%	63	17	93	0.0	9.6	28.8	34.1	23.2	4.3
June	694	96.4%	61	16	92	0.0	8.8	36.3	32.4	20.3	2.2
July	741	99.6%	73	33	93	0.0	0.0	24.0	29.4	38.3	8.2
August	657	88.3%	68	23	93	0.0	3.7	32.3	25.4	27.5	11.1
September	690	95.8%	56	11	93	0.7	16.4	35.4	28.1	14.9	4.5
October	744	100.0%	63	18	93	0.0	7.0	33.7	30.1	25.4	3.8
November	720	100.0%	75	36	85	0.0	0.0	6.8	68.8	24.4	0.0
December	744	100.0%	77	41	89	0.0	0.0	0.7	62.2	37.1	0.0
Annual	8420	95.9%	69	11	93	0.3	4.1	20.2	45.9	26.2	3.2

Table F-9. Torquay Station: airpointer® wind frequency table for December 2022

Wind Direction Sector	Percent of Data in each Wind Speed Range, wind speed unit m/s						
	0.3 ~ 1.4	1.4 ~ 3.1	3.1 ~ 7.8	7.8 ~ 10.6	10.6 ~ 13.6	>13.6	Totals
North NorthEast	0.3%	0.9%	0.9%	0.2%	0.0%	0.0%	2.2%
NorthEast	0.4%	0.7%	0.5%	0.0%	0.0%	0.0%	1.7%
East NorthEast	0.4%	1.1%	1.1%	0.0%	0.0%	0.0%	2.7%
East	0.7%	1.6%	1.9%	0.1%	0.0%	0.0%	4.4%
East SouthEast	0.7%	2.1%	4.4%	0.9%	0.3%	0.0%	8.3%
SouthEast	1.1%	2.4%	3.2%	0.3%	0.2%	0.0%	7.2%
South SouthEast	0.8%	1.8%	2.5%	0.2%	0.0%	0.0%	5.3%
South	0.7%	2.4%	2.9%	0.2%	0.0%	0.0%	6.2%
South SouthWest	0.9%	2.5%	1.6%	0.1%	0.0%	0.0%	5.1%
SouthWest	1.3%	2.9%	3.7%	0.1%	0.0%	0.0%	8.0%
West SouthWest	0.9%	2.3%	3.1%	0.3%	0.0%	0.0%	6.8%
West	0.7%	1.6%	2.6%	0.4%	0.0%	0.0%	5.4%
West NorthWest	0.9%	2.2%	4.1%	1.0%	0.2%	0.0%	8.3%
NorthWest	0.7%	2.5%	6.8%	2.7%	1.9%	0.3%	14.9%
North NorthWest	0.5%	1.4%	4.2%	1.7%	0.9%	0.1%	8.7%
North	0.3%	0.9%	2.1%	0.5%	0.2%	0.1%	4.0%
Total	11.4%	29.4%	45.8%	8.6%	3.7%	0.4%	99.3%

Percent Calm (≤0.3 m/s)	0.7%
Number of Valid Hourly-Average Data	8377
Total Workable Hours in Time Period	8751



APPENDIX G. WAUCHOPE STATION: CONTINUOUS MONITORING DATA

Table G-1. Wauchope Station: Summary of airpointer® monitoring results for 2022

Parameter	Unit	Hours of Calibration & AIC [a]	Hours of Valid Data	Percent Uptime	Summary Statistics for 1-Hour Average Data		
					Average	Minimum	Maximum
SO_2	ppb	308	5869	69.5%	0.2	< 0.1	11.7
H_2S	ppb	308	5869	69.5%	0.4	< 0.1	55.9
$PM_{2.5}$	µg/m^3	14	5869	68.0%	6	< 1	57
Precipitation	mm	0	6232	71.2%	524.7[b]	< 0.1	29.0
Ambient Temperature	°C	0	6232	71.2%	6.5	-34.4	33.9
Relative Humidity	%	0	6232	71.2%	67	8	92
Wind Speed	m/s	0	6232	74.8%	3.5	Calm	14.5

a. Automatic Instrument Check

b. Total Precipitation

Table G-2. Wauchope Station: Summary of airpointer® SO_2 monitoring results for 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤1	1 ~ 5	5 ~ 11	11 ~ 48	48 ~ 172	>172
January	0	0.0%	-	< 0.1	0	< 0.1	0	-	-	-	-	-	-
February	0	0.0%	-	< 0.1	0	< 0.1	0	-	-	-	-	-	-
March	49	6.7%	< 0.1	< 0.1	0	< 0.1	0	100.0	0.0	0.0	0.0	0.0	0.0
April	643	93.1%	< 0.1	2.5	0	0.5	0	98.4	1.6	0.0	0.0	0.0	0.0
May	712	100.0%	0.1	2.0	0	0.3	0	99.6	0.4	0.0	0.0	0.0	0.0
June	676	100.0%	0.1	3.8	0	0.5	0	99.4	0.6	0.0	0.0	0.0	0.0
July	702	98.5%	0.1	7.6	0	0.9	0	99.1	0.7	0.1	0.0	0.0	0.0
August	434	59.9%	0.1	4.5	0	1.1	0	96.8	3.2	0.0	0.0	0.0	0.0
September	683	100.0%	0.2	4.5	0	1.3	0	96.6	3.4	0.0	0.0	0.0	0.0
October	712	100.0%	0.2	3.5	0	0.7	0	97.5	2.5	0.0	0.0	0.0	0.0
November	579	83.4%	0.1	3.2	0	0.5	0	98.8	1.2	0.0	0.0	0.0	0.0
December	703	100.0%	0.4	11.7	0	2.4	0	89.6	9.5	0.7	0.1	0.0	0.0
Annual [c]	5869	69.5%	0.2	11.7	0	2.4	0	97.3	2.6	0.1	0.0	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 172 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 48 ppb

c. Annual Saskatchewan Ambient Air Quality Standard = 8 ppb

Table G-3. Wauchope Station: Summary of airpointer® H_2S monitoring results for 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤1	1 ~ 3.6	3.6 ~ 5	5 ~ 8	8 ~ 11	>11
January	0	0.0%	-	< 0.1	0	< 0.1	0	-	-	-	-	-	-
February	0	0.0%	-	< 0.1	0	< 0.1	0	-	-	-	-	-	-
March	49	6.7%	< 0.1	0.2	0	0.1	0	100.0	0.0	0.0	0.0	0.0	0.0
April	643	93.1%	< 0.1	0.4	0	0.2	0	100.0	0.0	0.0	0.0	0.0	0.0
May	712	100.0%	0.1	2.1	0	0.3	0	99.3	0.7	0.0	0.0	0.0	0.0
June	676	100.0%	0.5	5.7	0	1.2	0	83.6	14.5	1.6	0.3	0.0	0.0
July	702	98.5%	1.9	55.9	23	11.5	2	64.2	24.9	2.4	3.8	1.3	3.3
August	434	59.9%	0.7	7.9	0	1.5	0	81.3	15.4	1.6	1.6	0.0	0.0
September	683	100.0%	0.3	7.0	0	1.3	0	92.5	6.1	0.7	0.6	0.0	0.0
October	712	100.0%	0.2	2.9	0	0.8	0	97.5	2.5	0.0	0.0	0.0	0.0
November	579	83.4%	< 0.1	1.4	0	0.3	0	99.7	0.3	0.0	0.0	0.0	0.0
December	703	100.0%	0.1	6.5	0	0.7	0	99.1	0.6	0.0	0.3	0.0	0.0
Annual [c]	5869	69.5%	0.4	55.9	23	11.5	2	91.1	7.0	0.7	0.7	0.2	0.4

a. 1-hour Saskatchewan Ambient Air Quality Standard = 11 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 3.6 ppb

c. No annual Saskatchewan Ambient Air Quality Standard

Table G-4. Wauchope Station: Summary of airpointer® $PM_{2.5}$ monitoring results for 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (µg/m³)	Maximum 1-Hr Conc. (µg/m³)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (µg/m³)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤5	5 ~ 10	10 ~ 15	15 ~ 28	28 ~ 80	>80
January	0	0.0%	-	< 1	-	< 1	0	-	-	-	-	-	-
February	0	0.0%	-	< 1	-	< 1	0	-	-	-	-	-	-
March	52	7.1%	1	4	-	1	0	100	0	0	0	0	0
April	663	92.1%	3	23	-	8	0	75	19	4	1	0	0
May	744	100.0%	4	16	-	6	0	76	21	2	0	0	0
June	720	100.0%	7	38	-	17	0	54	28	8	8	2	0
July	637	85.6%	7	27	-	11	0	39	43	14	3	0	0
August	454	61.0%	11	57	-	26	0	30	32	15	17	6	0
September	720	100.0%	7	33	-	17	0	43	35	10	11	1	0
October	744	100.0%	7	55	-	23	0	51	26	12	8	2	0
November	607	84.3%	5	51	-	13	0	66	24	6	3	0	0
December	622	83.7%	8	51	-	38	1	54	26	6	9	6	0
Annual [c]	5939	68.0%	6	57	-	38	1	55.6	27.9	8.4	6.4	1.7	0.0

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. 24-hour Canada-Wide Standard = 28 µg/m³

c. No annual Saskatchewan Ambient Air Quality Standard

Table G-5. Wauchope Station: Summary of airpointer® ambient temperature monitoring results for 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Temp. (°C)	Minimum 1-Hr Temp. (°C)	Maximum 1-Hr Temp. (°C)	Percent of Data in each Temperature Range					
						≤-30	-30 ~ -15	-15 ~ 0	0 ~ 15	15 ~ 30	>30
January	0	0.0%	-	-	-	-	-	-	-	-	-
February	0	0.0%	-	-	-	-	-	-	-	-	-
March	122	16.4%	-2.1	-11.3	7.5	0.0	0.0	63.1	36.9	0.0	0.0
April	672	93.3%	-1.1	-13.9	13.0	0.0	0.0	53.3	46.7	0.0	0.0
May	744	100.0%	10.4	-2.4	25.7	0.0	0.0	1.2	80.6	18.1	0.0
June	720	100.0%	16.6	4.0	33.9	0.0	0.0	0.0	40.0	58.3	1.7
July	733	98.5%	19.3	9.6	33.3	0.0	0.0	0.0	17.7	81.4	0.8
August	450	60.5%	19.6	9.1	32.0	0.0	0.0	0.0	17.8	79.8	2.4
September	720	100.0%	14.2	-0.6	32.1	0.0	0.0	0.3	61.1	37.6	1.0
October	744	100.0%	5.6	-6.3	22.9	0.0	0.0	17.6	74.6	7.8	0.0
November	607	84.3%	-5.4	-20.0	15.8	0.0	6.4	73.6	19.6	0.3	0.0
December	744	100.0%	-16.1	-34.4	-1.3	3.6	48.7	47.7	0.0	0.0	0.0
Annual	6256	71.2%	6.5	-34.4	33.9	0.4	6.4	22.0	41.1	29.4	0.6

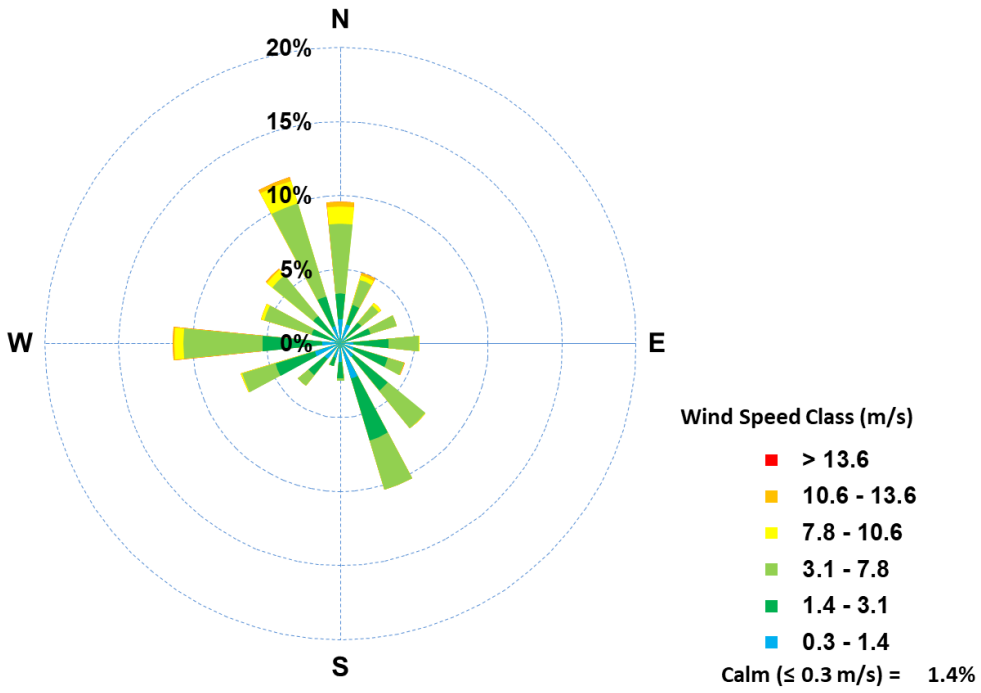
Table G-6. Wauchope Station: Summary of airpointer® relative humidity monitoring results for 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average RH (%)	Minimum 1-Hr RH (%)	Maximum 1-Hr RH (%)	Percent of Data in each Relative Humidity Range					
						≤15	15 ~ 30	30 ~ 60	60 ~ 80	80 ~ 90	>90
January	0	0.0%	-	-	-	-	-	-	-	-	-
February	0	0.0%	-	-	-	-	-	-	-	-	-
March	122	16.4%	65	39	78	0.0	0.0	27.0	73.0	0.0	0.0
April	672	93.3%	69	28	87	0.0	0.6	24.4	53.3	21.7	0.0
May	744	100.0%	66	22	90	0.0	5.4	27.3	40.2	26.9	0.3
June	720	100.0%	63	20	91	0.0	6.4	33.2	39.4	19.7	1.3
July	733	98.5%	72	37	92	0.0	0.0	22.8	37.5	37.1	2.6
August	450	60.5%	69	28	92	0.0	1.3	27.1	40.0	25.6	6.0
September	720	100.0%	61	22	90	0.0	4.7	43.8	30.8	19.9	0.8
October	744	100.0%	63	19	91	0.0	4.4	37.9	37.6	17.5	2.6
November	607	84.3%	71	36	83	0.0	0.0	7.6	84.7	7.7	0.0
December	744	100.0%	72	8	85	0.3	0.0	2.4	83.2	14.1	0.0
Annual	6232	71.2%	67	8	92	0.0	2.6	25.4	49.9	20.8	1.3

Table G-7. Wauchope Station: airpointer® wind frequency table for 2022

Wind Direction Sector	Percent of Data in each Wind Speed Range, wind speed unit m/s						
	0.3 ~ 1.4	1.4 ~ 3.1	3.1 ~ 7.8	7.8 ~ 10.6	10.6 ~ 13.6	>13.6	Totals
North NorthEast	1.2%	1.4%	1.8%	0.3%	0.2%	0.0%	4.9%
NorthEast	0.6%	1.3%	1.5%	0.2%	0.0%	0.0%	3.5%
East NorthEast	0.4%	1.7%	1.9%	0.0%	0.0%	0.0%	3.9%
East	0.8%	2.4%	2.1%	0.0%	0.0%	0.0%	5.3%
East SouthEast	0.8%	2.4%	1.1%	0.0%	0.0%	0.0%	4.5%
SouthEast	1.1%	3.0%	3.3%	0.0%	0.0%	0.0%	7.4%
South SouthEast	2.4%	4.3%	3.5%	0.0%	0.0%	0.0%	10.2%
South	1.2%	1.1%	0.2%	0.0%	0.0%	0.0%	2.4%
South SouthWest	1.0%	0.6%	0.0%	0.0%	0.0%	0.0%	1.6%
SouthWest	1.3%	1.4%	0.9%	0.0%	0.0%	0.0%	3.6%
West SouthWest	1.8%	2.8%	2.3%	0.1%	0.0%	0.0%	7.0%
West	1.1%	4.0%	5.3%	0.6%	0.1%	0.0%	11.3%
West NorthWest	0.6%	1.4%	3.4%	0.2%	0.0%	0.0%	5.5%
NorthWest	0.6%	1.7%	3.5%	0.5%	0.1%	0.0%	6.4%
North NorthWest	1.1%	2.1%	6.6%	1.6%	0.3%	0.0%	11.7%
North	1.4%	1.8%	4.7%	1.2%	0.3%	0.0%	9.4%
Total	17.4%	33.3%	42.0%	4.9%	1.0%	0.0%	98.6%

Percent Calm (≤0.3 m/s)	1.4%
Number of Valid Hourly-Average Data	6232
Total Workable Hours in Time Period	8442



APPENDIX H. OXBOW STATION: CONTINUOUS MONITORING DATA

Table H-1. Oxbow Station: Summary of airpointer® monitoring results for December 2022

Parameter	Unit	Hours of Calibration & AIC [a]	Hours of Valid Data	Annual Percent Uptime	Summary Statistics for 1-Hour Average Data		
					Average	Minimum	Maximum
SO_2	ppb	414	8307	99.5%	0.5	< 0.1	14.6
NO	ppb	364	7174	85.5%	0.3	< 0.1	27.0
NO_2	ppb	364	7174	85.5%	0.3	< 0.1	11.3
NO_x	ppb	364	7174	85.5%	0.3	< 0.1	38.2
H_2S	ppb	414	8305	99.5%	0.2	< 0.1	7.7
$PM_{2.5}$	µg/m^3	120	8722	99.6%	5	< 1	143
Precipitation	Mm	0	8725	99.6%	529.1[b]	< 0.1	47.1
Ambient Temperature	°C	0	8725	99.6%	2.8	-34.0	33.5
Relative Humidity	%	0	8725	99.6%	67	< 1	92
Wind Speed	m/s	0	8716	99.5%	4.7	Calm	17.7

a. Automatic Instrument Check

b. Total Precipitation

Table H-2. Oxbow Station: Summary of airpointer® SO_2 monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤1	1 ~ 5	5 ~ 11	11 ~ 48	48 ~ 172	>172
January	712	100.0%	0.6	6.1	0	1.5	0	76.1	23.5	0.4	0.0	0.0	0.0
February	643	100.0%	0.9	12.3	0	2.8	0	69.5	28.0	2.0	0.5	0.0	0.0
March	703	100.0%	0.5	7.6	0	2.0	0	84.9	14.7	0.4	0.0	0.0	0.0
April	663	96.1%	0.3	5.2	0	2.1	0	92.0	7.7	0.3	0.0	0.0	0.0
May	707	99.2%	0.3	4.5	0	0.8	0	94.5	5.5	0.0	0.0	0.0	0.0
June	677	99.6%	0.3	4.3	0	1.0	0	89.2	10.8	0.0	0.0	0.0	0.0
July	712	100.0%	0.3	4.4	0	1.0	0	94.2	5.8	0.0	0.0	0.0	0.0
August	712	100.0%	0.3	8.8	0	1.5	0	94.0	5.9	0.1	0.0	0.0	0.0
September	679	100.0%	0.5	14.6	0	2.5	0	86.2	12.7	1.0	0.1	0.0	0.0
October	709	99.6%	0.4	7.1	0	1.4	0	90.1	9.4	0.4	0.0	0.0	0.0
November	687	100.0%	0.6	7.5	0	1.6	0	84.9	14.4	0.7	0.0	0.0	0.0
December	703	100.0%	0.7	9.3	0	2.3	0	75.7	23.0	1.3	0.0	0.0	0.0
Annual [c]	8307	99.5%	0.5	14.6	0	2.8	0	86.0	13.4	0.6	0.0	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 172 ppb

c. 24-hour Saskatchewan Ambient Air Quality Standard = 48 ppb

d. Annual Saskatchewan Ambient Air Quality Standard = 8 ppb

Table H-3.Oxbow Station: Summary of airpointer® NO monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤5	5 ~ 15	15 ~ 53	53 ~ 100	100 ~ 159	>159
January	712	100.0%	0.2	4.9	-	0.9	-	100.0	0.0	0.0	0.0	0.0	0.0
February	643	100.0%	0.4	3.1	-	0.8	-	100.0	0.0	0.0	0.0	0.0	0.0
March	703	100.0%	0.2	27.0	-	1.3	-	99.9	0.0	0.1	0.0	0.0	0.0
April	663	96.1%	0.2	1.5	-	0.6	-	100.0	0.0	0.0	0.0	0.0	0.0
May	707	99.2%	0.1	1.6	-	0.4	-	100.0	0.0	0.0	0.0	0.0	0.0
June	647	94.9%	0.7	4.3	-	2.5	-	100.0	0.0	0.0	0.0	0.0	0.0
July	627	87.9%	0.5	6.1	-	1.4	-	99.8	0.2	0.0	0.0	0.0	0.0
August	672	94.1%	0.2	4.8	-	1.8	-	100.0	0.0	0.0	0.0	0.0	0.0
September	518	75.6%	0.2	6.5	-	0.6	-	99.8	0.2	0.0	0.0	0.0	0.0
October	205	27.9%	0.5	2.5	-	1.7	-	100.0	0.0	0.0	0.0	0.0	0.0
November	374	53.2%	0.2	1.5	-	0.6	-	100.0	0.0	0.0	0.0	0.0	0.0
December	703	100.0%	0.5	3.2	-	1.1	-	100.0	0.0	0.0	0.0	0.0	0.0
Annual [c]	7174	85.5%	0.3	27.0	-	2.5	-	100.0	0.0	0.0	0.0	0.0	0.0

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. No 24-hour Saskatchewan Ambient Air Quality Standard

c. No annual Saskatchewan Ambient Air Quality Standard

Table H-4.Oxbow Station: Summary of airpointer® NO_2 monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤5	5 ~ 15	15 ~ 53	53 ~ 100	100 ~ 159	>159
January	712	100.0%	0.3	4.7	0	1.5	-	100.0	0.0	0.0	0.0	0.0	0.0
February	643	100.0%	0.4	5.3	0	1.4	-	99.8	0.2	0.0	0.0	0.0	0.0
March	703	100.0%	< 0.1	11.3	0	0.5	-	99.9	0.1	0.0	0.0	0.0	0.0
April	663	96.1%	< 0.1	1.6	0	0.5	-	100.0	0.0	0.0	0.0	0.0	0.0
May	707	99.2%	< 0.1	0.6	0	< 0.1	-	100.0	0.0	0.0	0.0	0.0	0.0
June	647	94.9%	0.4	5.5	0	2.3	-	99.5	0.5	0.0	0.0	0.0	0.0
July	627	87.9%	< 0.1	3.0	0	0.2	-	100.0	0.0	0.0	0.0	0.0	0.0
August	672	94.1%	< 0.1	1.6	0	0.1	-	100.0	0.0	0.0	0.0	0.0	0.0
September	518	75.6%	< 0.1	7.8	0	0.4	-	99.8	0.2	0.0	0.0	0.0	0.0
October	205	27.9%	< 0.1	3.9	0	0.2	-	100.0	0.0	0.0	0.0	0.0	0.0
November	374	53.2%	0.6	3.1	0	1.7	-	100.0	0.0	0.0	0.0	0.0	0.0
December	703	100.0%	1.1	7.0	0	2.2	-	99.3	0.7	0.0	0.0	0.0	0.0
Annual [c]	7174	85.5%	0.3	11.3	0	2.3	-	99.8	0.2	0.0	0.0	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 159 ppb
b. 24-hour Saskatchewan Ambient Air Quality Standard = 106 ppb
c. Annual Saskatchewan Ambient Air Quality Standard = 24 ppb

Table H-5. Oxbow Station: Summary of airpointer® NOx monitoring results for the year 2022

Month	Valid 1-Hr data	Operational Time	Average Conc.	Maximum 1-Hr Conc.	1-Hour Exceedance [a]	Maximum 24-Hr Conc.	24-Hour Exceedance [b]	Percent of Data in each Concentration Range					
	(no.)	(%)	(ppb)	(ppb)	(no.)	(ppb)	(no.)	≤5	5 ~ 15	15 ~ 53	53 ~ 100	100 ~ 159	>159
January	712	100.0%	0.4	5.4	-	1.6	-	99.9	0.1	0.0	0.0	0.0	0.0
February	643	100.0%	0.6	5.9	-	2.0	-	99.5	0.5	0.0	0.0	0.0	0.0
March	703	100.0%	0.1	38.2	-	1.7	-	99.9	0.0	0.1	0.0	0.0	0.0
April	663	96.1%	0.1	2.9	-	0.9	-	100.0	0.0	0.0	0.0	0.0	0.0
May	707	99.2%	< 0.1	0.7	-	< 0.1	-	100.0	0.0	0.0	0.0	0.0	0.0
June	647	94.9%	0.4	6.4	-	2.0	-	98.9	1.1	0.0	0.0	0.0	0.0
July	627	87.9%	0.2	4.4	-	0.5	-	100.0	0.0	0.0	0.0	0.0	0.0
August	672	94.1%	< 0.1	3.3	-	0.2	-	100.0	0.0	0.0	0.0	0.0	0.0
September	518	75.6%	0.1	9.0	-	1.5	-	99.4	0.6	0.0	0.0	0.0	0.0
October	205	27.9%	0.1	3.8	-	0.3	-	100.0	0.0	0.0	0.0	0.0	0.0
November	374	53.2%	0.6	3.4	-	1.4	-	100.0	0.0	0.0	0.0	0.0	0.0
December	703	100.0%	1.3	6.8	-	2.5	-	98.9	1.1	0.0	0.0	0.0	0.0
Annual [c]	7174	85.5%	0.3	38.2	-	2.5	-	99.7	0.3	0.0	0.0	0.0	0.0

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. No 24-hour Saskatchewan Ambient Air Quality Standard

c. No annual Saskatchewan Ambient Air Quality Standard

Table H-6. Oxbow Station: Summary of airpointer® H_2S monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (ppb)	Maximum 1-Hr Conc. (ppb)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (ppb)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤1	1 ~ 3.6	3.6 ~ 5	5 ~ 8	8 ~ 11	>11
January	712	100.0%	0.2	1.0	0	0.7	0	100.0	0.0	0.0	0.0	0.0	0.0
February	643	100.0%	0.2	1.2	0	0.7	0	99.7	0.3	0.0	0.0	0.0	0.0
March	703	100.0%	0.2	4.4	0	0.5	0	99.6	0.1	0.3	0.0	0.0	0.0
April	662	95.9%	0.1	1.6	0	0.4	0	99.8	0.2	0.0	0.0	0.0	0.0
May	707	99.2%	0.2	2.3	0	0.7	0	99.3	0.7	0.0	0.0	0.0	0.0
June	677	99.6%	0.2	1.8	0	0.6	0	97.5	2.5	0.0	0.0	0.0	0.0
July	712	100.0%	0.3	2.6	0	1.0	0	93.4	6.6	0.0	0.0	0.0	0.0
August	711	99.9%	0.3	1.9	0	0.8	0	97.7	2.3	0.0	0.0	0.0	0.0
September	679	100.0%	0.3	1.7	0	0.7	0	99.1	0.9	0.0	0.0	0.0	0.0
October	709	99.6%	0.2	1.2	0	0.7	0	99.6	0.4	0.0	0.0	0.0	0.0
November	687	100.0%	0.3	7.7	0	1.0	0	99.6	0.3	0.0	0.1	0.0	0.0
December	703	100.0%	0.2	1.4	0	0.7	0	98.6	1.4	0.0	0.0	0.0	0.0
Annual [c]	8305	99.5%	0.2	7.7	0	1.0	0	98.6	1.3	0.0	0.0	0.0	0.0

a. 1-hour Saskatchewan Ambient Air Quality Standard = 11 ppb

b. 24-hour Saskatchewan Ambient Air Quality Standard = 3.6 ppb

c. No annual Saskatchewan Ambient Air Quality Standard

Table H-7. Oxbow Station: Summary of airpointer® $PM_{2.5}$ monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Conc. (µg/m³)	Maximum 1-Hr Conc. (µg/m³)	1-Hour Exceedance [a] (no.)	Maximum 24-Hr Conc. (µg/m³)	24-Hour Exceedance [b] (no.)	Percent of Data in each Concentration Range					
								≤5	5 ~ 10	10 ~ 15	15 ~ 28	28 ~ 80	>80
January	744	100.0%	2	15	-	6	0	85	14	1	0	0	0
February	672	100.0%	3	18	-	8	0	84	15	1	0	0	0
March	744	100.0%	3	19	-	8	0	86	13	2	0	0	0
April	693	96.3%	4	15	-	7	0	75	20	5	0	0	0
May	738	99.2%	5	25	-	10	0	67	25	5	3	0	0
June	717	99.6%	9	117	-	31	1	43	27	14	12	3	1
July	744	100.0%	7	47	-	18	0	41	42	10	7	0	0
August	743	99.9%	8	47	-	17	0	31	42	18	8	1	0
September	720	100.0%	7	143	-	15	0	42	38	11	8	1	0
October	744	100.0%	6	49	-	22	0	58	24	11	5	3	0
November	720	100.0%	4	79	-	12	0	75	17	5	3	0	0
December	743	100.0%	4	20	-	12	0	71	19	8	2	0	0
Annual [c]	8722	99.6%	5	143	-	31	1	62.9	24.7	7.6	4.1	0.6	0.1

a. No 1-hour Saskatchewan Ambient Air Quality Standard

b. 24-hour Canada-Wide Standard = 28 µg/m³

c. No annual Saskatchewan Ambient Air Quality Standard

Table H-8. Oxbow Station: Summary of airpointer® ambient temperature monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average Temp. (°C)	Minimum 1-Hr Temp. (°C)	Maximum 1-Hr Temp. (°C)	Percent of Data in each Temperature Range					
						≤-30	-30 ~ -15	-15 ~ 0	0 ~ 15	15 ~ 30	>30
January	744	100.0%	-14.1	-33.6	3.5	7.0	38.7	50.0	4.3	0.0	0.0
February	672	100.0%	-15.3	-33.9	4.6	2.2	53.9	34.5	9.4	0.0	0.0
March	744	100.0%	-4.9	-26.2	11.6	0.0	11.8	54.8	33.3	0.0	0.0
April	693	96.3%	-0.4	-16.2	15.2	0.0	0.9	49.6	49.2	0.3	0.0
May	738	99.2%	11.2	-2.2	25.5	0.0	0.0	1.2	75.9	22.9	0.0
June	719	99.9%	17.0	4.0	32.8	0.0	0.0	0.0	39.1	59.0	1.9
July	744	100.0%	19.7	8.7	33.5	0.0	0.0	0.0	16.8	82.1	1.1
August	743	99.9%	20.0	9.4	32.5	0.0	0.0	0.0	17.2	79.5	3.2
September	720	100.0%	15.0	0.4	33.1	0.0	0.0	0.0	56.7	41.7	1.7
October	744	100.0%	6.3	-7.3	22.8	0.0	0.0	15.2	75.8	9.0	0.0
November	720	100.0%	-5.9	-19.8	15.0	0.0	8.3	70.4	21.1	0.1	0.0
December	744	100.0%	-15.8	-34.0	1.9	4.8	44.2	49.6	1.3	0.0	0.0
Annual	8725	99.6%	2.8	-34.0	33.5	1.2	13.1	27.0	33.3	24.7	0.7

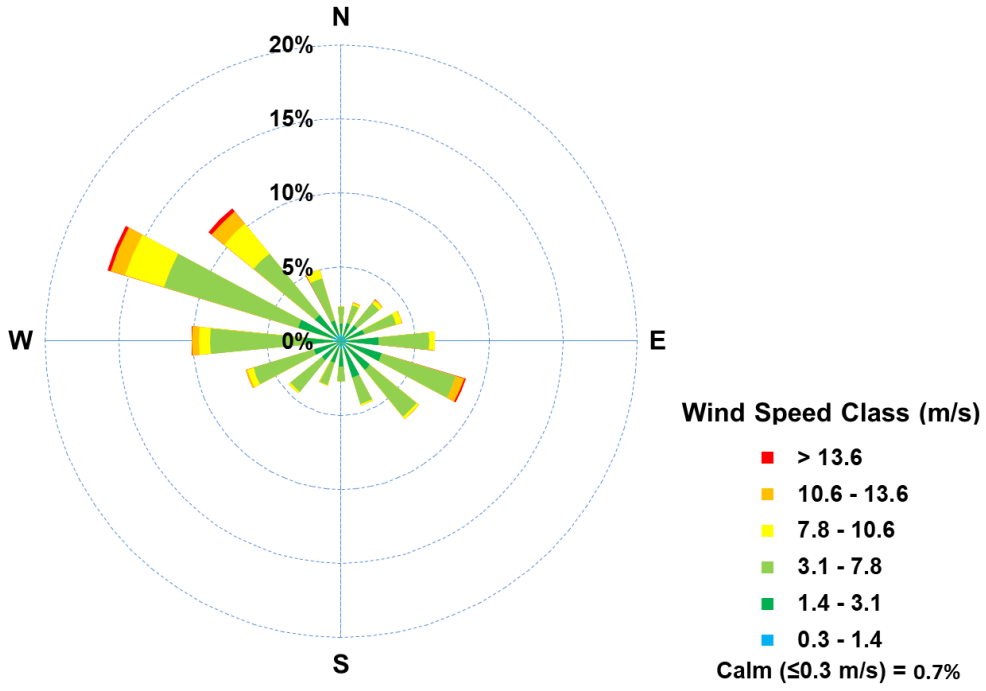
Table H-9. Oxbow Station: Summary of airpointer® relative humidity monitoring results for the year 2022

Month	Valid 1-Hr data (no.)	Operational Time (%)	Average RH (%)	Minimum 1-Hr RH (%)	Maximum 1-Hr RH (%)	Percent of Data in each Relative Humidity Range					
						≤15	15 ~ 30	30 ~ 60	60 ~ 80	80 ~ 90	>90
January	744	100.0%	70	53	85	3.0	0.0	0.8	83.9	12.4	0.0
February	672	100.0%	71	53	85	0.0	0.0	3.4	87.1	9.5	0.0
March	744	100.0%	69	29	85	0.0	0.3	16.3	69.9	13.6	0.0
April	693	96.3%	67	19	88	0.0	2.2	26.8	49.6	21.4	0.0
May	738	99.2%	62	23	90	0.0	7.3	32.2	38.5	21.4	0.5
June	719	99.9%	62	18	91	0.0	6.5	36.0	36.4	19.6	1.4
July	744	100.0%	71	32	92	0.0	0.0	26.7	38.6	31.9	2.8
August	743	99.9%	67	28	92	0.0	1.3	32.3	36.5	24.9	5.0
September	720	100.0%	57	21	90	0.0	7.6	47.1	27.6	16.7	1.0
October	744	100.0%	61	18	91	0.0	6.6	40.3	31.6	19.4	2.2
November	720	100.0%	71	20	84	0.0	0.1	9.9	81.7	8.3	0.0
December	744	100.0%	73	52	86	0.0	0.0	3.2	75.7	21.1	0.0
Annual	8725	99.6%	67	18	92	0.3	2.7	22.9	54.7	18.4	1.1

Table H-10. Oxbow Station: airpointer® wind frequency table for the year 2022

Wind Direction Sector	Percent of Data in each Wind Speed Range, wind speed unit m/s						
	0.3 ~ 1.4	1.4 ~ 3.1	3.1 ~ 7.8	7.8 ~ 10.6	10.6 ~ 13.6	>13.6	Totals
North NorthEast	0.4%	0.9%	1.3%	0.1%	0.0%	0.0%	2.7%
NorthEast	0.3%	1.0%	1.9%	0.2%	0.1%	0.0%	3.6%
East NorthEast	0.4%	1.2%	2.3%	0.4%	0.0%	0.0%	4.2%
East	0.4%	2.1%	3.4%	0.4%	0.0%	0.0%	6.3%
East SouthEast	0.4%	2.4%	5.2%	0.6%	0.1%	0.0%	8.7%
SouthEast	0.5%	1.9%	4.1%	0.2%	0.0%	0.0%	6.8%
South SouthEast	0.7%	1.9%	1.9%	0.1%	0.0%	0.0%	4.5%
South	0.4%	1.2%	1.0%	0.0%	0.0%	0.0%	2.7%
South SouthWest	0.4%	1.0%	1.6%	0.0%	0.0%	0.0%	3.1%
SouthWest	0.4%	1.2%	2.8%	0.1%	0.0%	0.0%	4.5%
West SouthWest	0.4%	1.5%	4.3%	0.4%	0.1%	0.0%	6.7%
West	0.5%	1.9%	6.5%	0.7%	0.5%	0.0%	10.1%
West NorthWest	0.6%	2.4%	9.4%	2.7%	1.0%	0.2%	16.4%
NorthWest	0.4%	1.8%	5.4%	2.6%	1.1%	0.3%	11.6%
North NorthWest	0.5%	0.9%	3.0%	0.6%	0.0%	0.0%	5.0%
North	0.4%	0.7%	1.2%	0.0%	0.0%	0.0%	2.3%
Total	7.3%	24.1%	55.1%	9.3%	3.0%	0.6%	99.3%

Percent Calm (0.3 m/s)	0.7%
Number of Valid Hourly-Average Data	8716
Total Workable Hours in Time Period	8760



APPENDIX I. WEYBURN STATION: EXCEEDANCE SUMMARY

Table I-1. Weyburn Station: Summary of exceedances for 1-hour SAAQS for the year 2022

1-Hour Exceedance Pollutant			Other Parameters During the Exceedance Event							
Pollutant	Conc.	Exceedance Time	WS	WD	AQHI	SO_2	NO_2	O_3	H_2S	$PM_{2.5}$
		mmm-dd hh:mm	m/s	deg	-	ppb	ppb	ppb	ppb	µg/m^3
H_2S	12.4	Feb-27 10:00	12.7	89	2	1.2	0.0	29	12.4	3
H_2S	22.6	Mar-19 08:00	4.3	140	1	2.6	0.0	18	22.6	4
H_2S	11.4	Mar-31 01:00	5.0	162	1	5.7	0.0	18	11.4	2
H_2S	11.1	Mar-15 18:00	4.5	158	1	5.9	0.4	23	11.1	3
H_2S	24.0	Nov-04 04:00	1.2	150	1	7	0	12	24.0	0.4
H_2S	21.9	Nov-04 03:00	1.5	156	1	5	0	12	21.9	0.5
H_2S	14.3	Nov-11 23:00	1.2	161	1	4	3	21	14.3	1.3
H_2S	11.4	Nov-12 01:00	0.9	158	1	4	7	16	11.4	1.9

Table I-2. Weyburn Station: Summary of exceedances for 24-hour SAAQS for the year 2022

No recorded exceedances

APPENDIX J. GLEN EWEN STATION: EXCEEDANCE SUMMARY

Table J-1. Glen Ewen Station: Summary of exceedances for 24-hour SAAQS for the year 2022

1-Hour Exceedance Pollutant			Other Parameters During the Exceedance Event							
Pollutant	Conc.	Exceedance Time	WS	WD	AQHI	SO_2	NO_2	O_3	H_2S	$PM_{2.5}$
		mmm-dd hh:mm	m/s	deg	-	ppb	ppb	ppb	ppb	µg/m^3
H_2S	21.9	Mar-11 23:00	5.0	167	18	0.0	0.3	1.9	36	21.9
H_2S	20.8	Mar-12 00:00	7.1	170	19	0.0	0.5	1.4	37	20.8
H_2S	19.8	Mar-12 02:00	5.4	143	18	0.0	0.0	2.1	36	19.8
H_2S	20.0	Jul-13 03:00	0.4	273	3	0.0	0	2	5	20.0
H_2S	12.4	Jul-13 04:00	0.4	257	2	0.0	0	2	5	12.4

APPENDIX K. STOUGHTON STATION: EXCEEDANCE SUMMARY

Table K-1. Stoughton Station: Summary of exceedances for 24-hour SAAQS for the year 2022

No recorded exceedances

APPENDIX L. ESTERHAZY STATION: EXCEEDANCE SUMMARY

Table L-1. Esterhazy Station: Summary of exceedances for 24-hour SAAQS for the year 2022

No recorded exceedances

APPENDIX M. TORQUAY STATION: EXCEEDANCE SUMMARY

Table M-1. Torquay Station: Summary of exceedances for 1-hour SAAQS for the year 2022

24-Hour Exceedance Pollutant			Other Parameters During the Exceedance Event				
Pollutant	Conc. ppb	Exceedance Date mmm-dd hh:mm	WS m/s	WD deg	SO_2 ppb	H_2S ppb	$PM_{2.5}$ µg/m^3
H_2S	13.9	Jan-17 22:00	11.3	146	0	0.0	0.0

Table M-2. Torquay Station: Summary of exceedances for 24-hour SAAQS for the year 2022

No recorded exceedances

APPENDIX N. WAUCHOPE STATION: EXCEEDANCE SUMMARY

Table N-1. Wauchope Station: Summary of exceedances for 1-hour SAAQS for the year 2022

1-Hour Exceedance Pollutant			Other Parameters During the Exceedance Event					
Pollutant	Conc.	Exceedance Time	WS	WD	ET	SO_2	H_2S	$PM_{2.5}$
	ppb	mmm-dd hh:mm	m/s	deg	C	ppb	ppb	$\mu g/m^3$
H_2S	55.9	Jul-13 04:00	0.1	210	14.1	0.0	55.9	4
H_2S	39.3	Jul-13 05:00	0.3	150	14.1	0.0	39.3	4
H_2S	37.7	Jul-13 02:00	0.1	338	15.2	0.0	37.7	6
H_2S	35.1	Jul-13 06:00	0.4	155	16.2	0.0	35.1	7
H_2S	35.0	Jul-13 00:00	0.1	82	16.3	0.0	35.0	11
H_2S	26.9	Jul-13 03:00	0.2	266	14.8	0.0	26.9	6
H_2S	26.1	Jul-29 00:00	0.3	248	13.2	0.0	26.1	10
H_2S	25.8	Jul-13 01:00	0.2	7	16.0	0.0	25.8	8
H_2S	22.8	Jul-12 23:00	0.1	356	17.0	0.0	22.8	13
H_2S	21.6	Jul-28 23:00	0.3	234	13.7	0.0	21.6	12
H_2S	21.6	Jul-17 04:00	0.5	170	20.2	0.2	21.6	-
H_2S	20.9	Jul-29 01:00	0.6	248	12.7	0.0	20.9	8
H_2S	18.6	Jul-30 05:00	0.4	271	13.3	0.0	18.6	8
H_2S	18.6	Jul-12 22:00	0.4	240	17.8	0.0	18.6	13
H_2S	17.1	Jul-29 05:00	0.4	159	10.7	0.0	17.1	5
H_2S	16.1	Jul-14 23:00	0.5	247	19.9	0.0	16.1	-
H_2S	15.1	Jul-29 06:00	0.3	151	12.5	0.0	15.1	5
H_2S	15.0	Jul-17 05:00	0.6	205	20.0	0.0	15.0	-
H_2S	13.6	Jul-30 04:00	0.3	30	13.6	0.0	13.6	8
H_2S	12.9	Jul-28 22:00	0.2	277	14.5	0.0	12.9	10
H_2S	11.7	Jul-03 05:00	0.4	114	12.2	0.0	11.7	9
H_2S	11.7	Jul-25 05:00	0.5	182	11.4	0.1	11.7	3
H_2S	11.6	Jul-09 23:00	0.4	188	20.9	0.0	11.6	13

Table N-2. Wauchope Station: Summary of exceedances for 24-hour SAAQS for the year 2022

24-Hour Exceedance Pollutant			Other Parameters During the Exceedance Event					
Pollutant	Conc.	Exceedance Time	WS	WD	ET	SO_2	H_2S	$PM_{2.5}$
	ppb	mmm-dd	m/s	deg	C	ppb	ppb	$\mu g/m^3$
H_2S	5.0	Jul-29	0.8	183	19.9	-	5.0	8.2
H_2S	11.5	Jul-13	1.9	164	20.8	-	11.5	6.2
$PM_{2.5}$	38	Dec-12	2.1	88	-4.1	-	0.1	38

APPENDIX O. OXBOW STATION: EXCEEDANCE SUMMARY

Table O-1. Oxbow Station: Summary of exceedances for 24-hour SAAQS for the year 2022

24-Hour Exceedance Pollutant			Other Parameters During the Exceedance Event								
Pollutant	Conc.	Exceedance Date	WS	WD	AQHI	Rain	ET	SO_2	NO_2	H_2S	$PM_{2.5}$
		mmm-dd	m/s	deg	-	mm	C	ppb	ppb	ppb	µg/m^3
$PM_{2.5}$	31	9-Jun	2.2	157	-	0.0	16.8	-	-	-	31

APPENDIX P. 2022 FINANCIAL STATEMENTS

Southeast Saskatchewan Airshed Association

Financial Statements

December 31, 2022

Management's Responsibility

To the Board of Southeast Saskatchewan Airshed Association:

Management is responsible for the preparation and presentation of the accompanying financial statements, including responsibility for significant accounting judgments and estimates in accordance with Canadian accounting standards for not-for-profit organizations. This responsibility includes selecting appropriate accounting principles and methods, and making decisions affecting the measurement of transactions in which objective judgment is required.

In discharging its responsibilities for the integrity and fairness of the financial statements, management designs and maintains the necessary accounting systems and related internal controls to provide reasonable assurance that transactions are authorized, assets are safeguarded and financial records are properly maintained to provide reliable information for the preparation of financial statements.

The Board of Directors is composed entirely of Directors who are neither management nor employees of the Organization. The Board is responsible for overseeing management in the performance of its financial reporting responsibilities and for approving the financial information. The Board fulfils these responsibilities by reviewing the financial information prepared by management and discussing relevant matters with management and external auditors.

MNP LLP is appointed by the directors to audit the financial statements and report directly to them; their report follows. The external auditors have full and free access to, and may meet periodically and separately with, both the Board and management to discuss their audit findings.

June 12, 2023

Independent Auditor's Report

To the To the Board of Southeast Saskatchewan Airshed Association:

Opinion

We have audited the financial statements of Southeast Saskatchewan Airshed Association (the "Organization"), which comprise the statement of financial position as at December 31, 2022, and the statements of operations, changes in net assets and cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of the Organization as at December 31, 2022, and the results of its operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are independent of the Organization in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the Organization's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Organization or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Organization's financial reporting process.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Organization's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Organization's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Organization to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Estevan, Saskatchewan

June 12, 2023

Chartered Professional Accountants

Southeast Saskatchewan Airshed Association
Statement of Financial Position
As at December 31, 2022

	2022	2021
Assets		
Cash		
Cash	**171,429**	193,599
Prepaid expenses	**3,790**	3,833
Goods and Services Tax receivable	**650**	1,677
	175,869	199,109
Capital assets *(Note 3)*	**166,300**	173,077
	342,169	372,186
Liabilities		
Current		
Accounts payable and accruals	**19,001**	45,370
Deferred contributions for capital assets *(Note 4)*	**5,957**	11,913
	24,958	57,283
Deferred contributions for capital assets *(Note 4)*	**-**	5,957
	24,958	63,240
Net Assets		
Unrestricted	**156,869**	153,740
Invested in capital assets	**160,342**	155,206
	317,211	308,946
	342,169	372,186

Approved on behalf of the Board of Directors

Director **Director**

The accompanying notes are an integral part of these financial statements

Southeast Saskatchewan Airshed Association
Statement of Operations
For the year ended December 31, 2022

	2022	2021
Revenue		
Membership fees	**254,530**	152,640
Amortization of deferred contributions for capital assets *(Note 4)*	**11,913**	11,913
	266,443	164,553
Expenses		
Advertising	**2,000**	2,178
Air monitoring	**73,520**	69,560
Amortization	**37,097**	42,505
Bank charges	**224**	133
Insurance	**8,856**	7,880
Licences and fees	**268**	-
Management fees *(Note 5)*	**43,400**	46,414
Office	**11,602**	11,128
Professional fees	**14,278**	8,100
Repairs and maintenance	**65,728**	51,938
Travel	**1,205**	79
	258,178	239,915
Excess (deficiency) of revenue over expenses before other items	**8,265**	(75,362)
Other items		
Interest income	**-**	627
Excess (deficiency) of revenue over expenses	**8,265**	(74,735)

The accompanying notes are an integral part of these financial statements

Southeast Saskatchewan Airshed Association
Statement of Changes in Net Assets
For the year ended December 31, 2022

	Internally restricted	Unrestricted	Invested in capital assets	2022	2021
Balance, beginning of year		**153,740**	**155,206**	**308,946**	383,681
Excess (deficiency) of revenue over expenses	-	**33,449**	**(25,184)**	**8,265**	(74,735)
Interfund transfer *(Note 6)*		**(30,320)**	**30,320**	**-**	-
Balance, end of year	**-**	**156,869**	**160,342**	**317,211**	308,946

The accompanying notes are an integral part of these financial statements

Southeast Saskatchewan Airshed Association
Statement of Cash Flows
For the year ended December 31, 2022

	2022	2021
Cash provided by (used for) the following activities		
Operating		
Cash receipts from membership fees	**254,530**	152,640
Cash paid for program service expenses	**(246,380)**	(183,952)
Cash receipts from interest	**-**	627
	8,150	(30,685)
Investing		
Redemption of marketable securities	**-**	104,433
Purchase of capital assets	**(30,320)**	-
Decrease in cash resources	**(22,170)**	73,748
Cash resources, beginning of year	**193,599**	119,851
Cash resources, end of year	**171,429**	193,599

The accompanying notes are an integral part of these financial statements

1. Incorporation and nature of the organization

Southeast Saskatchewan Airshed Association (the "Organization") was incorporated under The Non-Profit Corporations Act, 1995 on October 7, 2005, and is exempt from income taxes. In order to maintain its status as a not-for-profit organization under the Act, the Organization must meet certain requirements within the Act. In the opinion of management these requirements have been met.

The Organization collects and monitors ambient air quality data in Southeast Saskatchewan and makes this data available to all members.

2. Significant accounting policies

The financial statements have been prepared in accordance with Canadian accounting standards for Not-for-profit organizations as issued by the Accounting Standards Board in Canada and include the following significant accounting policies:

Cash and cash equivalents

Cash and cash equivalents include balances with banks.

Marketable securities

Marketable securities with prices quoted in an active market are measured at fair value while those that are not quoted in an active market are measured at cost less impairment.

Capital assets

Purchased capital assets are recorded at cost. Contributed capital assets are recorded at fair value at the date of contribution if fair value can be reasonably determined.

Amortization is provided using the declining balance method at rates intended to amortize the cost of assets over their estimated useful lives.

	Rate
Equipment	20 %
Fence	10 %

Revenue recognition

The Organization follows the deferral method of accounting for contributions. Restricted contributions are recognized as revenue in the year in which the related expenses are incurred. Unrestricted contributions, including membership fees are recognized as revenue when received.

Measurement uncertainty

The preparation of financial statements in conformity with Canadian accounting standards for not-for-profit organizations requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting period.
{Note to file preparer: Specific reference for each financial statement item subject to significant judgement should be described here}

Amortization is based on the estimated useful lives of capital assets.

These estimates and assumptions are reviewed periodically and, as adjustments become necessary they are reported in excess of revenue over expenses in the periods in which they become known.

Long-lived assets

Long-lived assets consist of equipment. Long-lived assets held (or used) are measured and amortized as described in the applicable accounting policies.

When the Organization determines that a long-lived asset no longer has any long-term service potential to the Organization, the excess of its net carrying amount over any residual value is recognized as an expense in the statement of revenue and expenses. Write-downs are not reversed.

2. Significant accounting policies *(Continued from previous page)*

Financial instruments

The Organization recognizes financial instruments when the Organization becomes party to the contractual provisions of the financial instrument.

Arm's length financial instruments

Financial instruments originated/acquired or issued/assumed in an arm's length transaction ("arm's length financial instruments") are initially recorded at their fair value.

At initial recognition, the Organization may irrevocably elect to subsequently measure any arm's length financial instrument at fair value.

The Organization subsequently measures all other financial assets and liabilities at amortized cost.

Transaction costs and financing fees are added to the carrying amount for those financial instruments subsequently measured at cost or amortized cost.

3. Capital assets

	Cost	*Accumulated amortization*	*2022 Net book value*	*2021 Net book value*
Equipment	**961,421**	**800,075**	**161,346**	167,573
Fence	**6,795**	**1,841**	**4,954**	5,504
	968,216	**801,916**	**166,300**	173,077

4. Deferred contributions for capital assets

Deferred capital contributions consist of the unamortized amount of contributions received for the purchase of equipment. Recognition of these amounts as revenue is deferred to periods when the related equipment are amortized. Changes in deferred capital contributions are as follows:

	2022	*2021*
Balance, beginning of year	**17,870**	29,783
Less: Amount recognized as revenue during the year	**(11,913)**	(11,913)
Balance, end of year	**5,957**	17,870
Less: current portion	**5,957**	11,913
Balance, end of year	**-**	5,957

5. Related party transactions

The Organization has entered into a contract agreement for management services with K2L Consulting Inc., between November 2021 and May 2023. The contract is based on hours required, to a maximum of $50,000 (2021 - $50,000). Any overage is required to be approved by the Board of Directors. Included in expenses for the current year are $43,400 (2021 - $46,414) of management fees. The expenses were incurred in the normal course of operations and measured at the exchange amount, which is the amount of consideration established and agreed to by the related parties.

6. Interfund transactions

During the year, the Organization transferred $30,320 (2021 - $nil) from the Unrestricted fund to the Organization's Capital Fund to purchase capital assets during the year.

7. Commitment

The Organization has the following commitment for maintenance and calibrations of air monitoring systems at a rate of $5,985/month:

2022	71,820
2023	71,820
2024	35,910

8. Financial instruments

The Organization, as part of its operations, carries a number of financial instruments. It is management's opinion that the Organization is not exposed to significant interest, currency, credit, liquidity or other price risks arising from these financial instruments except otherwise disclosed.

Liquidity risk

Liquidity risk is the risk that the Organization will encounter difficulty in meeting obligations associated with financial liabilities. The Organization's exposure to liquidity risk is dependent on the collection of membership fee revenue and obligations to sustain operations.

APPENDIX Q. SESAA BOARD OF DIRECTORS

Board of Directors and Alternates

Bruce Hesselink Board Chair, SaskPower

Bruce grew up in the Estevan area and attended the University of Saskatchewan where he earned a Bachelor's Degree in Agriculture. After twenty-five or so years in agriculture R&D, including Agriculture Canada Research Branch and the PFRA, Bruce joined SaskPower to manage their Shand Greenhouse Program. Currently Bruce is with the Strategic Issues Management group of SaskPower's Environment Department, involved in files such as water and waste management, biodiversity, and air emissions.

Renee Cugnet Vice Chair, City of Weyburn

Renee grew up on a farm south of Weyburn SK. After graduating from the University of Regina with a Bachelor's Degree in Environmental Engineering, she spent the first 10 years of her career in Environmental Consulting for the oil and gas industry in southeast Saskatchewan. Renee is currently a Municipal Engineer at the City of Weyburn and responsible for the City's environmental regulatory compliance primarily with the landfill and wastewater works.

Stu Goranson Secretary Treasurer, Crescent Point Energy

Stuart is a long time rural Weyburn resident, where he continues to reside with his wife and family. Stuart is a Professional Engineer, working in the oil and gas environmental industry for over 25 years. Stuart is currently the Regulatory Coordinator at Crescent Point Energy.

Clayton Stenhouse Board Member

Clayton grew up in the Regina area before attending the University of Lethbridge and Lethbridge College where he earned a Bachelor's Degree in Environmental Science with a Specialization in Fish and Wildlife Technology. Clayton stepped into the mining industry after 12 years as an environmental consultant and certified infrared optical gas imaging specialist throughout Alberta and Saskatchewan. As a registered Professional Agrologist and active Commissioner for Oaths in Saskatchewan, he now hangs his hat in the Estevan area as the Senior Environmental Planner with Westmoreland Mining Holdings LLC – Estevan Mine.

Kelly Gervais Board Member

Kelly was born and raised in Redvers, Saskatchewan. After graduating from University of Saskatchewan in 2005 with bachelor's degree in Mechanical Engineering, he moved to Calgary to start a career in oil & gas industry. He has been a Production Engineer Whitecap Resources (previously Cenovus/EnCana) for the past 15 years and has been living in Weyburn since 2011.

Randal Miller Saskatchewan Industry & Resources

Gerald Knibbs Councillor, Rural Municipality of Tecumseh No. 65

Mr. Knibbs is an organic grain farmer near Stoughton. He currently serves as a counsellor for the R.M. of Tecumsch. He and his wife Dawn were born and raised in the area and are currently raising their family in their community. Air and water quality are important issues now and in the future.

Kristin Waroma Health Representative

Kristin Waroma is the Senior Public Health Inspector for Sun Country Health Region based in the Weyburn office. She has been working in public health since 2008. Her health inspector duties include water, wastewaster, food safety, communicable disease control, recreational water, land use reviews, tobacco control, indoor and outdoor air quality and many other programs. She enjoys the challenges of working in busy Southeastern Saskatchewan.

Rebecca Foord Member

Ken Cross Executive Director

Mr. Cross brings over 30 years of Public Health/Environmental Health experience and 10 years of Airpointer technical support to the position. He has held the position of President of the SK Branch of the Canadian Institute of Public Health Inspectors and has served on many provincial and national boards and committees. Ken is committed to working with industry and regulators to ensure the health of the environment of south east Saskatchewan is always protected.

APPENDIX R. SESAA MEMBER COMPANIES

The Southeast Saskatchewan Airshed Association would like to express our gratitude to our members in good standing for their support of SESAA, for their very strong support regarding quality air data collection, and for their commitment to the citizens and environment of southeast Saskatchewan.

For information on how to become a member, please contact Ken Cross, Executive Director at (306) 861-0186.

- 618555 Saskatchewan Ltd.
- Adonai Resources II Corporation
- Aldon Oils Ltd.
- Allied Energy Corp
- Arruga Resources Ltd
- Audax Investments Ltd
- Brown Bros Resources Ltd
- Canadian Natural Resources Ltd
- Capital Energy Corp
- Caprice Resources Ltd
- Crescent Point Energy Corp
- Crescent Point Resources Partnership
- Crewd Oil and Gas INC
- Deep Earth Energy
- Federated Co-operatives Ltd
- Gear Energy
- Hummingbird Energy Inc
- Java Oil Company Ltd
- Jedi Exploration & Development Inc
- Lakeco Holdings Ltd
- Lakeview Energy Inc.
- Mosaic Potash Esterhazy Ltd Partnership
- Northland Power Spy Hill Power LP
- Pemoco Ltd
- Pinto Resources Ltd
- Potash Corp
- Prairie Mines &Royalty ULC. - Westmoreland Mining Holdings LLC
- Questerre Energy Corporation
- Riverview Developments Inc
- Rok Resources Inc
- Runcible Oil Corp
- Saskpower
- Saturn Oil & Gas Inc
- Shelter Valley Oil & Gas Ltd
- Southern Exploration Inc
- Spectrum Resource Group Inc
- Steel Reef
- Surge Energy Inc
- Tourmaline Oil Corp
- Vermilion Energy
- Villanova Energy Inc
- Whitecap Resources Inc

END OF REPORT