



Southeast Saskatchewan
Airshed Association

2008 Annual Report



Southeast Saskatchewan
Airshed Association

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Message from the Chairperson

2008 has been a challenging year for the association. A great deal of effort has gone into securing sustainable funding and developing a fair and equitable funding formula. We are happy to report our support from the Electrical Power sector and the Oil and Gas sector has grown considerably. Saskatchewan Environment and Saskatchewan Energy and Resources have made considerable steps to ensure funding sustainability for the Airshed. Plans have been made to implement two continuous air quality monitoring stations in 2009. These stations plus the passive monitoring network will provide high quality data and information regarding our air quality. The continuous data will be available live on the internet; it will include hourly concentrations of SO₂, H₂S, NO₂, PM 2.5 and O₃. The plan is to locate one air monitoring station in the Weyburn area and one in the southern part of the region.

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 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 kilometers and includes 45 municipalities. Major economic activities in the region are agriculture, oil & gas, mining, power generation, and transportation.

In 2008, the passive monitoring data was collected at 28 locations for every 30-day period from January to December. Nitrogen dioxide (NO₂) and sulphur dioxide (SO₂) were monitored at all 28 sites, while ozone (O₃) was monitored at 12 selected sites.

Average concentrations of SO₂, NO₂, and O₃ for the entire network were 1.5, 1.4, and 31 ppb, respectively. Similarly, maximum concentrations of SO₂, NO₂, and O₃ for the entire network were 5.4, 4.7, and 62 ppb, respectively. All measured SO₂ and NO₂ concentrations were well below the Saskatchewan annual ambient air quality standards, and O₃ concentrations were within the normal and above normal range. In overall, there were no air quality issues with the passive monitoring program in 2008.

Introduction

The Southeast Saskatchewan Airshed Association (SESAA) was established in October 2005 to manage ambient air quality in southeast Saskatchewan. The SESAA is a consortium of government, industry, non-government organizations, and private citizen stakeholders. The goal of the association is to collect credible, scientifically defensible air quality data for the southeast region of Saskatchewan, and to make this data freely available to all stakeholders. The SESAA objective is to bring together stakeholders from all backgrounds to identify local air quality issues and to develop innovative solutions for managing these issues.

The southeast Saskatchewan airshed is Saskatchewan's first airshed. It covers an area of 36,800 square kilometers, 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. Development of other airsheds in the province is being planned.

Membership in the SESAA is currently voluntary. Current membership includes members of the agriculture, oil & gas, mining and power generation sectors, as well as the public. The Government of Saskatchewan's Ministries Environment, Energy & Resources, and Health also participate as members of the board of directors. The SESAA's operating budget consists of membership fees and emissions-based fees assessed to facilities operating within the airshed boundaries (Figure 1. Boundary of the Southeast Saskatchewan Airshed.).

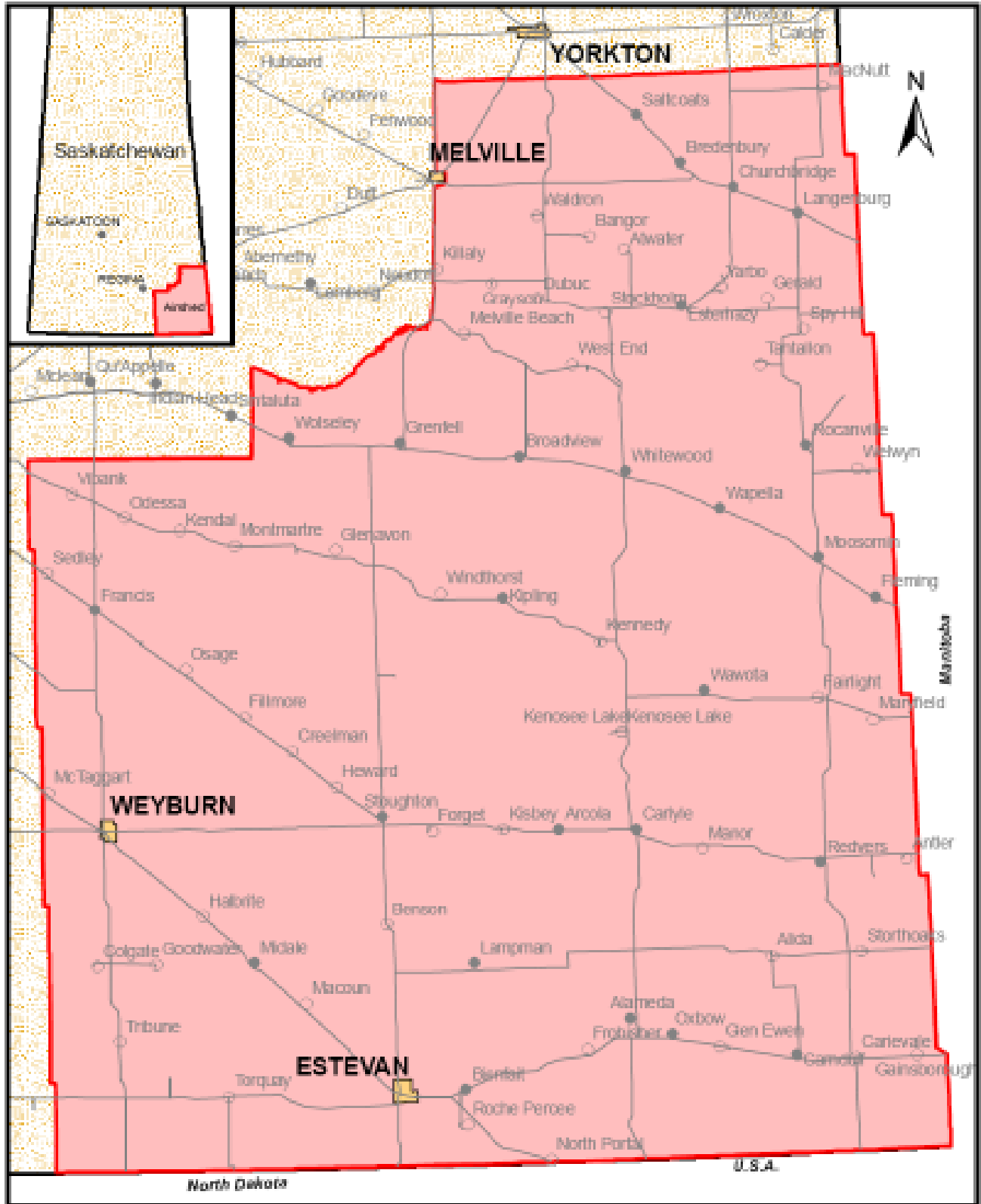


Figure 1. Boundary of the Southeast Saskatchewan Airshed.

Air Quality Monitoring

One of the SESAA's mandates is to collect scientifically credible regional air quality data, and to convey this information in a meaningful way to the public and stakeholders. To fulfill the first part of this mandate, SESAA has developed a comprehensive air quality monitoring program. The program was initiated in June 2006 with monthly passive monitoring.

The passive monitoring program was run at 28 locations in southeast Saskatchewan. AEMC's Multigas Passive samplers were deployed to collect 3-day sulphur dioxide (SO₂), nitrogen dioxide (NO₂) and ozone (O₃) samples at selected stations. Locations of passive monitoring sites are shown in Figure 2. Passive monitoring network for the Southeast Saskatchewan Airshed. Symbols with pink, blue, and yellow circles indicate sites where SO₂, NO₂, and O₃ were monitored. Symbols with blue and yellow circles only indicate sites where SO₂ and NO₂ were monitored. SO₂ and NO₂ were monitored at all 28 sites, while O₃ was monitored at only 12 out of the 28 sites.

In addition to the monthly samples, a field blank and one replicate for each of the monitored substances was collected every 30 days. The field blank detects filter contamination introduced during sample collection/deployment and laboratory processes. Replicate samples are used to quantify variability in sampling and analytical procedures.

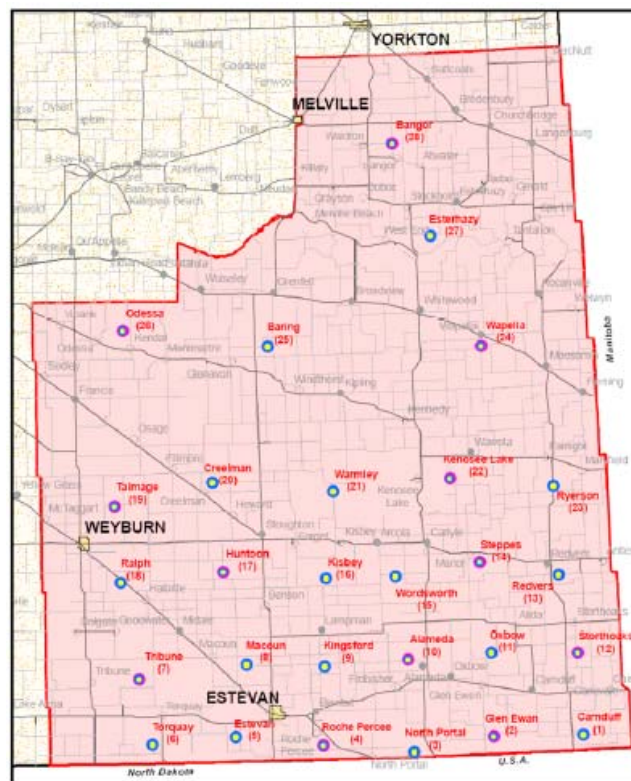


Figure 2. Passive monitoring network for the Southeast Saskatchewan Airshed.

Sulphur Dioxide

Sulphur dioxide (SO₂) 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.

Health effects caused by exposure to high levels of SO₂ include breathing problems, respiratory illness, changes in the lung's defenses, and worsening respiratory and cardiovascular disease. People with asthma or chronic lung or heart disease are the most sensitive to SO₂. It also damages trees and crops. SO₂, along with nitrogen oxides, are the main precursors of acid rain. This contributes to the acidification of lakes and streams, accelerated corrosion of buildings, and reduced visibility. SO₂ also causes formation of microscopic acid aerosols, which have serious health implications, as well as, contributing to climate change.

SO₂ emissions come from the burning of sulphur containing fuels (e.g. gasoline, natural gas and coal) and the processing of sulphur containing ores. SO₂ atmospheric contributions come from industrial sources such as power plants, petroleum refineries, iron and steel mills, fertilizer plants, pulp and paper mills, and smelters. Other sources include smaller oil and gas plants, battery and well flares. Moreover, small sources include residential, commercial and industrial space heating.

Saskatchewan ambient air quality standards for sulphur dioxide are:

- 0.17 ppm (172 ppb) averaged over a 1-hour period;
- 0.06 ppm (57 ppb) averaged over a 24-hour period;
- 0.01 ppm (11 ppb) as an annual arithmetic mean.

In 2008, the passive monitoring data indicates the average and maximum SO₂ concentrations of the entire network were 1.5 and 5.4 ppb, respectively. These concentrations are well below the Saskatchewan annual ambient standard for SO₂ (11 ppb).

Figure 3. **Sulphur dioxide ambient air concentrations by town.** shows average concentrations of SO₂ by town for the year 2008. Kenosee Lake (Station 22) is the location where maximum SO₂ concentration was observed, measuring 5.4 ppb. The stations with higher average concentrations were Roche Percee (Station 4), Kingsford (Station 9), Ralph (Station 18), and Kenosee Lake (Station 22). In comparison, the lowest average (0.8 ppb) was observed at Bangor (Station 28). In general, higher concentrations were found in the southern and central parts of the airshed where more industrial activities exist, such as coal-fired power plants and upstream oil and gas industry. In contrast, lower concentrations were observed in the northern part of the airshed where no major sources of SO₂ exist.

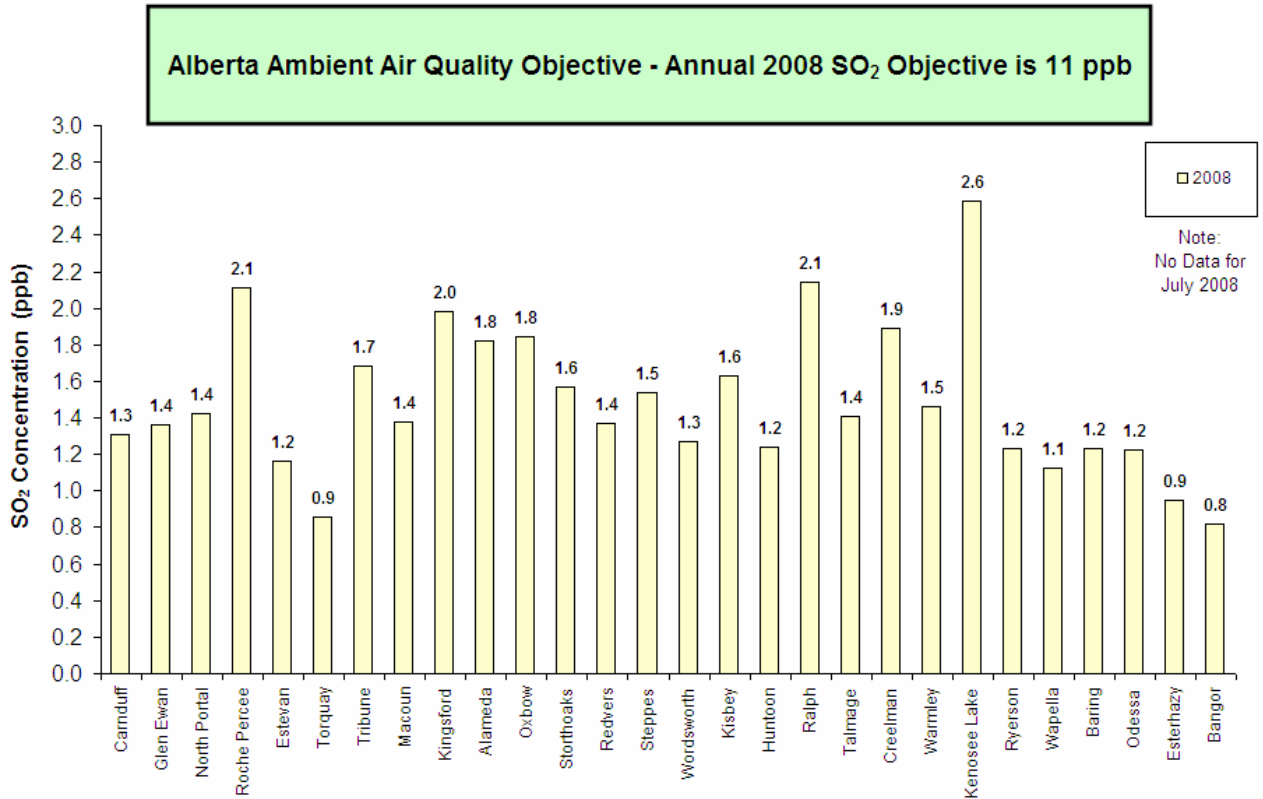


Figure 3. Sulphur dioxide ambient air concentrations by town.

Figure 4. Comparison of sulphur dioxide ambient air concentration by month, from 2006-2008. show yearly comparisons of SO₂ levels for the entire airshed. The average monthly concentrations varied from 0.85 ppb in June to 3.3 ppb in January for 2008. In 2006, the sampling was carried out from June to December, and in the majority of cases was higher than the 2008 data. In 2007, the sampling was carried out for 60-day periods, which makes it difficult to compare to the 2008 data. However, looking at the data one can easily make out the season patterns in the 2007 and 2008 data. The winter months tended to express a higher concentration of SO₂, in comparison to the summer months.

SESAA Passive SO₂ Network

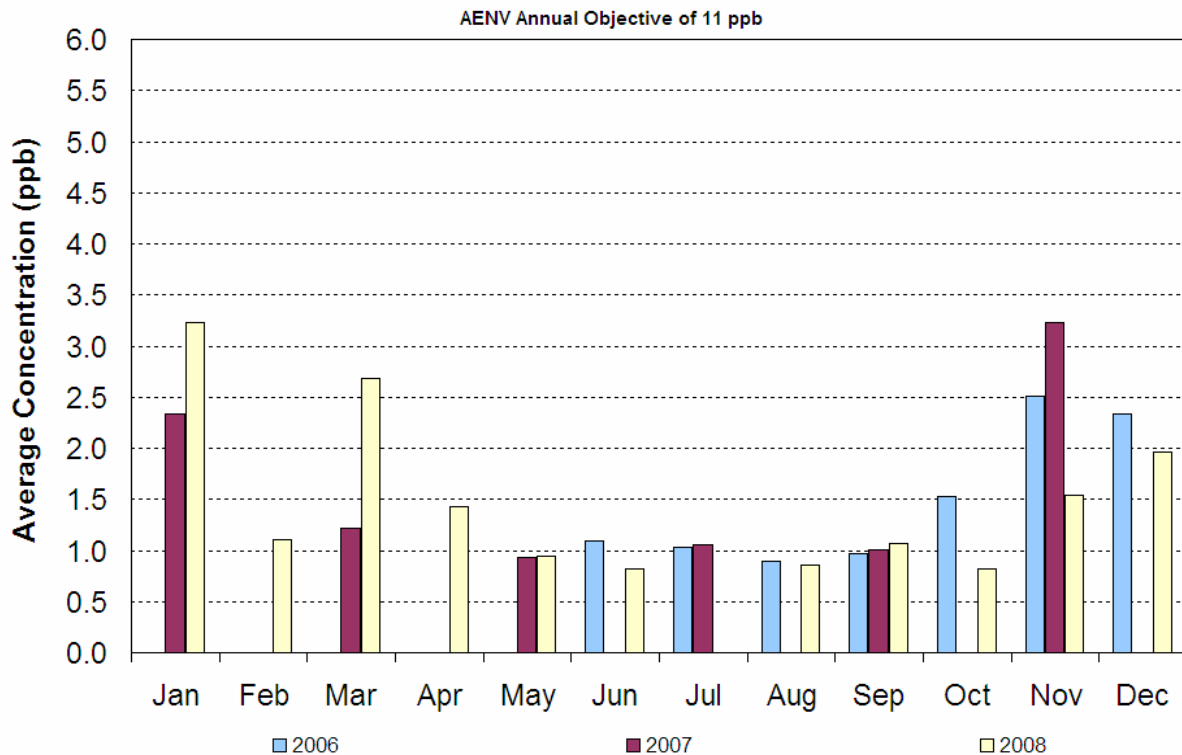


Figure 4. Comparison of sulphur dioxide ambient air concentration by month, from 2006-2008.

Nitrogen Oxides

Nitrogen oxides, also known as Oxides of Nitrogen (NO_x), is a collective term used to refer to two species of nitrogen: nitric oxide (NO) and nitrogen dioxide (NO₂). Nitric oxide is a colorless, flammable gas with a slight odour. Nitrogen dioxide is a reddish brown, nonflammable gas with a pungent irritating odour. NO₂ is of more interest than NO from both a health and acid rain perspective. While NO₂ is soluble in water, it is less soluble than SO₂. NO₂ can be detected at concentrations as low as 106 ppb.

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 lesser extent, some NO_x compounds 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 byproduct. NO_x atmospheric contributions come from both stationary sources, such as power plants, oil and gas industries, incinerators, as well as, mobile sources such as automobiles. Other atmospheric contributions come from non-combustion processes, for example, nitric acid manufacture, welding processes and the use of explosives. The largest urban source of NO_x is emissions from motor vehicles.

Saskatchewan ambient air quality standards for nitrogen dioxide are:

- 0.2 ppm (212 ppb) averaged over a 1-hour period;
- 0.05 ppm (53 ppb) as an annual arithmetic mean.

In 2008, the average and maximum NO₂ concentrations of the entire network were 1.4 and 4.7 ppb, respectively, which are well below the Saskatchewan annual ambient standard of NO₂.

Figure 5. **Nitrogen dioxide ambient air concentrations by town.** shows average concentrations of NO₂ for the year 2008. The stations with higher NO₂ concentrations were Roche Percee (Station 4), Tribute (Station 7), and Ralph (Station 18). In contrast, the stations with lower NO₂ were Torquay (Station 6), Warmley (Station 21), Ryerson (Station 23), and Baring (Station 25). In general, higher concentrations were found in the southern part of the airshed where more industrial activities occur (such as coal-fired power plants and upstream oil & gas industry). Lower concentrations were observed in the northern part of the airshed where no major sources of NO_x exist.

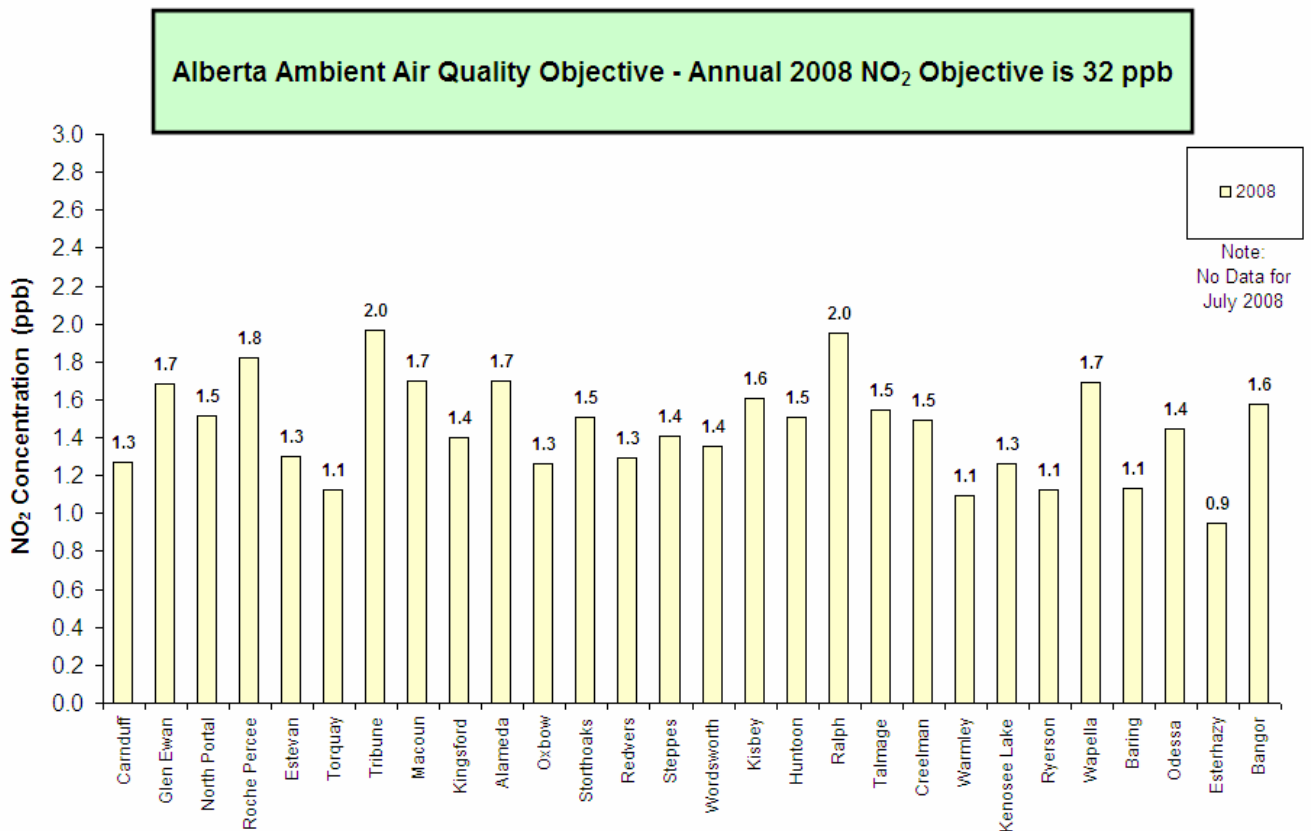


Figure 5. Nitrogen dioxide ambient air concentrations by town.

Figure 6. **Comparison of nitrogen dioxide ambient air concentration by month, from 2006-2008.** shows a yearly comparison of NO₂ levels for the entire airshed. The average monthly concentrations varied from 0.04 ppb in August to 3.2 ppb in January for 2008. In 2006, the sampling was carried out from June to December, and in the majority of cases the concentration was lower compared to the 2008 data. In 2007, the sampling was carried out for 60-day periods, which made it difficult to compare it to the 2008 data. However, looking at the data one can easily make out the season patterns in the 2007 and 2008 data. The winter months tended to express a higher concentration of SO₂, in comparison to the summer months, minus the anomaly in June.

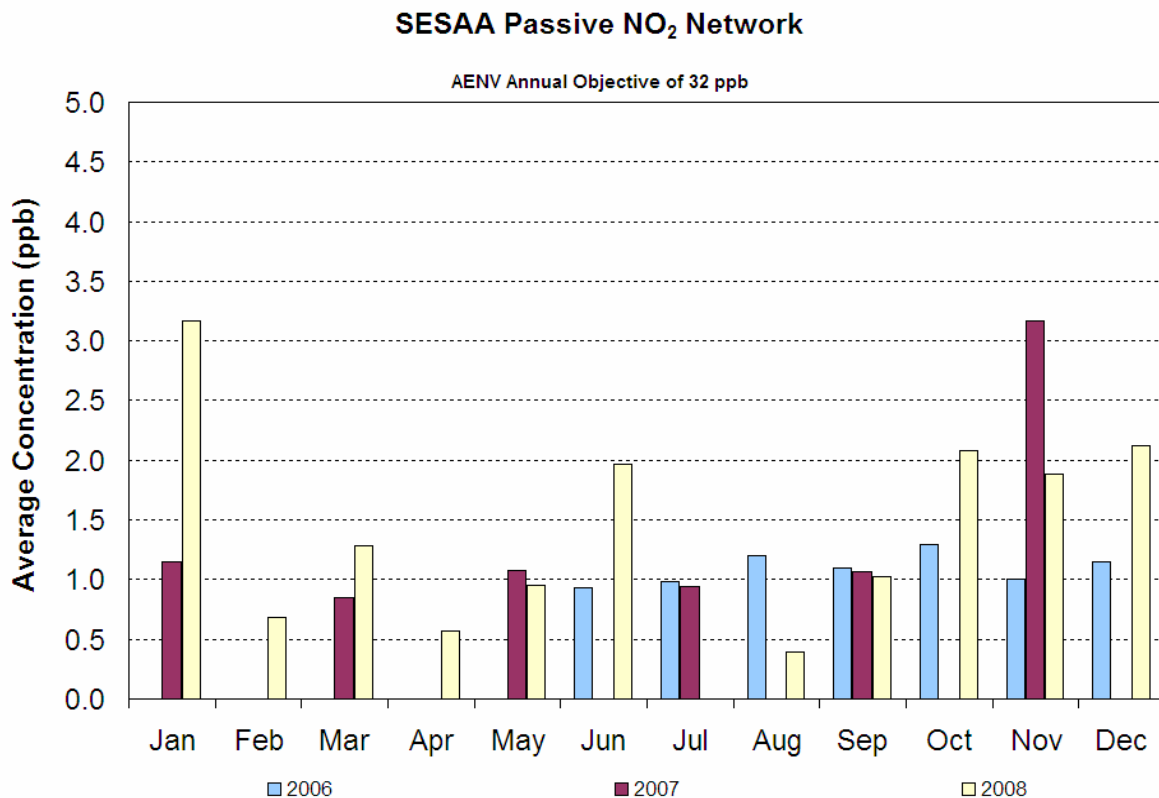


Figure 6. Comparison of nitrogen dioxide ambient air concentration by month, from 2006-2008.

Ozone

Ground-level Ozone (O₃) is a colorless gas that at a normal outdoor concentration is odourless. However, ozone does have a distinctive sharp odour when found at higher concentration, such as those associated with electrical discharges from lightning storms or photocopiers. O₃ can be detected at an odour threshold above 10 ppb.

Exposure to high levels of ozone can cause eye irritation, breathing difficulty, decreased visibility, and vegetation damage. People with respiratory and heart problems are at a higher risk. O₃ has been linked to increased hospital admissions and premature death. It is a key ingredient of urban smog.

O₃ is not emitted directly into the atmosphere. Instead, it results from photochemical reactions between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. High concentration levels typically occur from May to September, between noon and early evening. Emissions of NO_x are produced primarily when fossil fuels are burned in motor vehicle engines, power plants, and industrial boilers. The sources of VOC emissions include automobile emissions, gasoline vapors, chemical solvents, and consumer products like paints.

Saskatchewan ambient air quality standard for ozone is:

- 0.08 ppm (82 ppb) averaged over a 1-hour period.

Canada-wide Standard (CWS) for ozone is:

- 65 ppb, 8-hour averaging time (the achievement statistics is based on the fourth highest measurement annually averaged over three consecutive years).

In 2008, the average and maximum O₃ concentrations of the entire network were 31 and 62 ppb respectively. These measured levels were within the average and above average range. Figure 7. **Ozone ambient air concentrations by town.** shows concentrations of ozone (O₃) for the January to December 2008 period. The station with the highest average O₃ concentration was Talmage (Station 19) measuring 36 ppb, and the lowest average concentration was observed at Huntoon (Station 17), measuring 28 ppb.

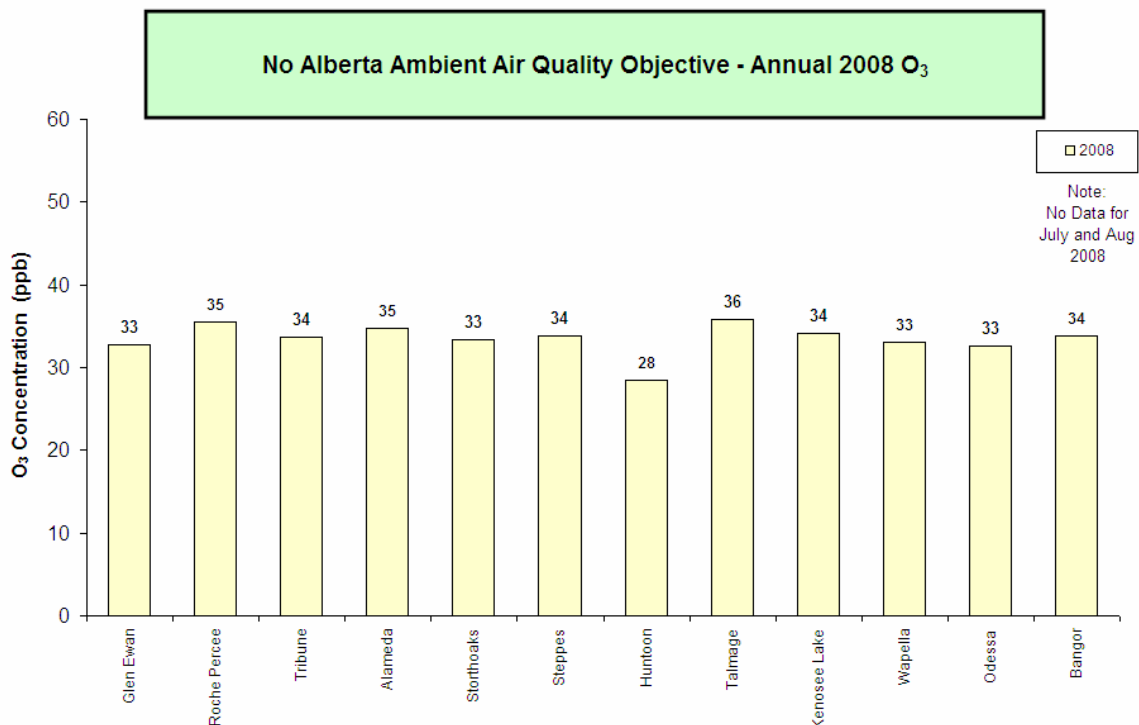


Figure 7. Ozone ambient air concentrations by town.

FINANCIAL REPORT

Southeast Saskatchewan Airshed Association

Balance Sheet

As of December 31, 2008

Assets	
Current	
Cash	74269
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Liabilities	
Current	
Bank indebtedness	
Account payable and accruals	13312
Goods and Services Tax payable	5568
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Net Assets	
Unrestricted net assets	55389
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Southeast Saskatchewan Airshed Association

Statement of Operations and Change in Net Assets

For the year ended December 31, 2008

Revenue	
Membership fees	152823
Grant revenue	25000
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Expenses	
Advertising and promotion	
Air monitoring	61980
Interest and bank charges	55
Management fees	34564
Miscellaneous	202
Professional fees	3000
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Excess of revenues over expenses	78022
Net assets, beginning of year	(22633)
Net assets, end of year	55389
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Southeast Saskatchewan Airshed Association
Statement of Cash Flow
For the year ended December 31, 2008

Cash provided by (used for) the following activities	
Operating activities	
Cash received from customers	177824
Cash paid to suppliers	(96901)
Interest paid	(55)
Increase (decrease) in cash resources	80868
Cash resources, end of year	74269

APPENDIX A: AMBIENT AIR MONITORING DATA

Monthly Average Concentrations

Sample ID	Station Code	January			February			March			April			May			June		
		SO ₂	NO ₂	O ₃	SO ₂	NO ₂	O ₃	SO ₂	NO ₂	O ₃	SO ₂	NO ₂	O ₃	SO ₂	NO ₂	O ₃	SO ₂	NO ₂	O ₃
1	Carnduff	3.5	2.9		1.1	0.6		2.2	1		1.4	0.6		0.6	0.9		0.6	2.2	
2	Glen Ewan	3.3	3.1	53.4	1.2	0.8	16	2.5	1.1	44.6	1.3	0.6	34.4	0.8	0.8	41.6	0.7	1.8	39.1
3	North Portal	3.5	4.7		1.1	0.7		3	1.6		1.6	0.8		1.1	1.1		0.8	2.1	
4	Roche Percee	4.3	3.7	55.3	1.3	0.5	14.7	4.7	2.1	52.6	2.7	0.8	42.3	1.3	1.1	40.6	1.5	2.3	40
5	Estevan	2.5	2.9		0.8	0.6		0.8	1		1.6	0.4		1.8	1.3		1.3	1.9	
6	Torquay	1.4	2.4		0.6	0.5		1.3	0.8		0.9	0.5		0.7	0.9		0.8	2.3	
7	Tribune	2.9	3	54.9	1	0.5	15.7	2.5	1.1	52.1	1.4	0.7	39	1	1	36.7	1	4.3	38.9
8	Macoun	2.3	3.3		0.7	0.9		2.4	1.6		1.7	0.7		1.3	0.9		0.9	2.4	
9	Kingsford	D	D		1.5	1		3.8	1.6		2.5	0.8		1.8	0.8		1.4	1.6	
10	Alameda	4.2	3.3	52.3	1.7	0.8	M	3.1	1.3	47.7	1.9	0.6	43.9	0.8	1.1	39.3	0.8	2.4	36.7
11	Oxbow	4.4	3.3		1.6	0.7		3.3	1.2		1.8	0.3		1.1	0.6		0.9	1.7	
12	Storthoaks	3.8	3.1	55.5	1.4	0.7	15.7	2.8	1	49.1	1.5	0.3	41.4	0.8	1	40.5	0.7	1.8	39.6
13	Redvers	2.5	3.2		1.1	0.7		2.9	0.8		1.4	0.5		0.8	1.2		0.7	2.2	
14	Steppes	3.4	2.6	62	1.3	0.8	17.4	3	1.1	42.7	1.3	0.5	42.8	0.8	0.8	38	0.8	1.4	37.8
15	Wordsworth	3.1	2.7		1.1	0.6		2.4	1.1		1.3	0.5		0.6	0.7		0.8	2.1	
16	Kisbey	3.9	4.6		1.3	0.9		3	1.7		1.5	0.7		1	0.9		0.6	1.6	
17	Huntoon	M	M	M	1	0.7	15.4	2.5	1.3	43	0.5	0.4	25.6	0.4	1	38.9	0.7	2.4	36.8
18	Ralph	4.2	3.8		1.5	1		3.4	2.3		2.4	1.6		1.6	1.3		1.1	2.3	
19	Talmage	3.4	3.3	55.6	1	0.6	18.1	2.8	1.1	55.1	1.2	0.6	53.6	0.7	0.8	38.3	0.6	1.8	37
20	Creelman	4.4	3.7		1.3	0.8		3.2	1.6		1.6	0.8		1.2	0.9		0.9	1.9	
21	Warmley	3.5	2.4		1.1	0.5		2.8	1.1		1.1	0.5		1.1	0.7		0.8	1	
22	Kenosee Lake	5.3	2.8	50.5	1.3	0.5	17	5.4	0.8	44.4	2.4	0.6	38.7	2.4	0.8	38.3	1.4	1.6	40.3
23	Ryerson	2.8	2.6		1	0.5		2.4	1.2		1	0.4		0.5	1.3		0.6	2	
24	Wapella	1.9	3.4	55	0.8	0.7	16.2	1.9	1.7	43.9	D	0.6	41.8	0.5	0.9	40.2	0.5	2	35.4
25	Baring	3.1	2.9		0.5	0.6		2.2	0.9		0.8	0.4		0.7	1.4		0.5	1.4	
26	Odessa	3	3.3	53.1	1.1	0.6	15.5	2.2	1.5	44.2	0.7	0.3	43.4	0.5	0.6	40.6	0.5	1.3	37.7
27	Esterhazy	1.8	2.4		1	0.5		1.4	0.9		0.6	0.2		0.4	0.6		0.4	1.5	
28	Bangor	1.5	2.9	50.9	0.7	0.7	16.7	1.2	1.3	42.4	0.5	0.3	51.8	0.3	1.3	36.9	0.3	1.9	39.3

D = Damaged

M = Missing

Sample ID	Station Code	July			August			September			October			November			December		
		SO ₂	NO ₂	O ₃	SO ₂	NO ₂	O ₃	SO ₂	NO ₂	O ₃	SO ₂	NO ₂	O ₃	SO ₂	NO ₂	O ₃	SO ₂	NO ₂	O ₃
1	Carnduff	0.6	0.3		0.7	1.2		0.8	0.7		0.7	1.9		0.7	1.2		2.2	1.6	
2	Glen Ewan	0.6	1.3	20.8	0.9	1.7	20.8	1	1.1	24.4	0.7	3.1	24.2	0.9	1.8	22	2	3	28
3	North Portal	1.4	0.1		1.2	2.2		1.2	1.4		1	1.9		0.9	2.3		0	0	
4	Roche Percee	2.6	0.1	23.5	2	2.1	23.5	1.7	1.8	24.4	1.4	4	26.9	1.7	3.6	22.5	0	0	0
5	Estevan	0.6	0.6		1	2.4		1	0.9		0.4	1		0.4	1.6		1.6	2.1	
6	Torquay	0.6	0.1		0.8	2.5		0.6	0.7		0.3	0.9		0.4	1.3		1.8	2	
7	Tribune	2.1	2.7	24.9	1.5	2.6	24.9	1.1	1.4	20.6	0.8	2.5	25.3	1	1.8	25.2	3.4	2.7	27.7
8	Macoun	0.9	0.8		1.6	1.5		1.1	1.1		0.6	1.8		0.8	1.8		2.4	3.4	
9	Kingsford	1.1	0.3		1.3	2.7		1.9	1		1.1	1.8		1.7	2.2		3	2.8	
10	Alameda	0.7	0.1	23.6	0.8	1.6	23.6	1.3	1.2	21.3	1.3	2.9	26.3	0.9	2.1	22.4	3.3	2.9	23
11	Oxbow	0.4	0.5		1.4	1.3		1.5	0.7		1.3	1.1		1.3	1.7		2.7	2.1	
12	Storhocks	0.7	0.2	18.6	0.9	1.4	18.6	1.3	0.9	21.4	1	2.5	21.2	1.1	1.9	25.8	2.1	3.2	23.7
13	Redvers	0.8	0.1		1	1.7		1.1	0.8		1.1	1.6		0.8	1.6		1.9	1.5	
14	Steppes	0.7	0.1	22.1	1	1.7	22.1	0.7	0.5	24.3	1	2.7	25.2	1.7	2.4	25.2	2.2	2.6	23
15	Wordsworth	0.5	0.4		0.6	2.3		0.7	0.8		0.7	1.7		2	1.8		0.8	2.5	
16	Kisbey	0.8	0.1		1	2		1.1	1		1	2		1.9	2.4		1.9	1.8	
17	Huntoon	0.5	0.3	23.9	D	D	23.9	0.8	1.7	20.5	D	D	D	2.2	3.1	24.2	2.5	2.7	23.5
18	Ralph	1.2	0.7		1.7	1		2	1.3		1.7	2		1.6	2.4		2.9	2.8	
19	Talmage	0.6	0.4	26.0	1	0.4	26	0.7	1.4	25.6	0.7	2.5	23.2	1.5	2.1	26.2	2.3	2.4	25.9
20	Creelman	0.9	0.3		1.1	0.4		1.2	1		1	1.8		2.3	1.5		2.8	2.1	
21	Warmley	0.8	0.1		1	0.2		0.9	1		0.3	1.7		1.9	1.4		1.8	1.6	
22	Kenosee Lake	2.1	0.1	19.6	1.4	0.2	19.6	1.8	1.2	27	0.7	2.6	29	2.6	1.2	28.2	3.1	1.7	28.5
23	Ryerson	0.7	0.1		0.9	<0.1		0.9	0.6		0.3	1.2		1.6	1.1		1.8	1.4	
24	Wapella	0.9	0.2	20.3	1	0	20.3	0.9	1.1	21.5	0.5	3	26.7	2.2	2.1	23.7	1.1	2.9	26.2
25	Baring	0.4	0.3		0.8	<0.1		0.7	0.6		0.6	1.3		2.5	1.1		1.6	1.6	
26	Odessa	0.5	0.5	24.8	0.9	0.1	24.8	0.5	1.1	21.4	0.6	2.6	26.5	2.2	1.7	21.9	1.6	2.4	22.1
27	Esterhazy	0.1	0.1		0.7	-0.1		0.7	0.4		0.6	1.2		2.3	1.4		1.1	1.2	
28	Bangor	0.1	0.1	21.9	0.6	0.2	21.9	0.6	1.3	24.2	0.6	2.9	22.5	2.2	2.1	24.1	1	2.5	30

D = Damaged
M = Missing

APPENDIX B: COMPLETENESS OF MONITORING DATA

Instances of invalid sample collection for passive monitoring parameters during 2008

Month	Station No.	Parameter	Cause
January	9 - Kingsford	SO ₂ /NO ₂	Damaged Disks
January	17 - Huntoon	SO ₂ /NO ₂ /O ₃	Missing Disks
February	10 - Alameda	O ₃	Missing Disk
April	24 - Wapella	SO ₂	Damaged Disk
August	17 - Huntoon	SO ₂ /NO ₂	Damaged Disks
October	17 - Huntoon	SO ₂ /NO ₂ /O ₃	Damaged Disks

Data capture rates for passive monitoring parameters during 2008

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec*	Total Capture	% Capture
SO ₂	26	28	28	27	28	28	28	27	28	27	28	26	330	98.21%
NO ₂	26	28	28	28	28	28	28	27	28	27	28	26	331	98.51%
O ₃	11	11	12	12	12	12	16	16	12	11	12	11	149	98.03%

*Sample #3 and #4 reported 0.0 ppb for all parameters, not included in data capture totals.

Note: Data capture rates expressed as number of valid samples /total number of samples.

APPENDIX C: METEOROLOGY

Monthly Meteorology Data for Estevan 2007

Latitude: 49° 13' N Longitude: 102° 58' W Elevation: 580.60 m

Month	Mean Max Temp C	Mean Temp C	Mean Min Temp C	Extra Max Temp C	Extra Min Temp C	Total Rain mm	Total Snow cm	Total Precip mm	Snow Grnd Last Day cm	Dir of Max Gust 10's Deg	Speed of Max Gust km/h
Jan	-7.1	-13.9	-20.5	5.1	-37.7	0.0	8.8	8.6	7	31E	83E
Feb	-7.0	-13.8	-20.5	2.2	-32.6	T	18.6	18.0	8	9E	67E
Mar	2.0	-3.9	-9.8	12.6	-32.2	1.0	10.0	11.0	6	32E	83E
Apr	12.6	4.4	-3.9	27.7	-10.7	2.6	3.4	5.6	0	13E	70E
May	18.2	10.1	1.9	26.5	-7.7	39.6	0.0	39.6	0	11E	82E
Jun	21.9	15.0	8.1	31.5	4.0	61.0	0.0	61.0	0	33E	74E
Jul	26.8	19.1	11.3	33.0	7.2	74.8	0.0	74.8	0	31E	78E
Aug	26.7	18.9	11.0	33.8	4.1	96.0	0.0	96.0	0	28E	63E
Sep	19.7	12.3	4.8	29.1	-0.8	78.4	0.0	78.4	0	13B	48B
Oct	12.6	5.4	-1.8	23.9S	-11.0	21.8	17.0	38.8	0	29E	72E
Nov	3.7	-1.9	-7.5	16.4	-17.7	10.8	3.2	14.0	1	33E	56E
Dec	-11.6	-17.4	-23.1	4.5	-35.0	0.0	30.6	30.6	8	33E	63E
Sum						386.0	91.6	476.4			
Avg	9.9	2.9	-4.2								
Xtrm				33.8	-37.7					33E	83E

Note: [empty] = No data available; E = Estimated; T = Trace; * = The value displayed is based on incomplete data

Source: Environment Canada, http://www.climate.weatheroffice.ec.gc.ca/climateData/monthlydata_e.html

APPENDIX D: SESAA BOARD OF DIRECTORS

Interim Board, 2008



Bob Scotten – Executive Director (SEACOR Environmental Inc.)

Mr. Scotten has extensive experience in airshed development and management. He served as the Executive Director of the Wood Buffalo Environmental Association (WBEA) from 1997 to 2000, and is the current Executive Director of the West Central Airshed Society (WCAS) and the Palliser Airshed Society (PAS) in Alberta. He was instrumental in the design and development of the award-winning WBEA air monitoring network and the first real-time website for public access to air quality data. He has also played key roles in the development of the Peace Airshed Society in Alberta.



Chuck Bosgoed – Director (Saskatchewan Environment)

Mr. Bosgoed is an Environmental Engineer who has worked with Saskatchewan Environment for 20 years. He is involved in the airshed because he believes airshed management is an excellent approach to better understand air issues and one more way to resolve air quality problems in a region. Mr. Bosgoed writes, “Being a member of the Board provides me, as an environmental regulator, with a new and effective way of dealing with regional air quality issues.”



Darlene Sakires – Director (Canadian Natural Resources Limited)

Ms. Sakires is an Environmental Coordinator who is responsible for CNRL’s Environmental Management Plan and Environmental Operating Guidelines. She manages site decommissioning and remediation projects across the prairies, ensuring compliance with environmental regulatory requirements in all aspects of the company’s operations. She is active on a variety of committees, including the Saskatchewan Petroleum Industry Government Environmental Committee and the Saskatchewan Environmental Managers Association.



Marian Wilson – Chairperson (Private Business Owner)

Ms. Wilson is a bookkeeper for a construction business that she and her husband have owned and operated for over 23 years in southeast Saskatchewan. She is active in the Estevan community, raising 5 children, volunteering at the long term care centre and other groups, and sitting on the CPR Advisory Committee. As a local resident who has observed the growth of the transportation industry in Estevan, Ms. Wilson is concerned about the quality of air in the area and is pleased to be a director on the SESAA Board.



Tim Macaulay – Director (Saskatchewan Health)

Mr. Macaulay is the Manager of Environmental Health, Population Health Branch, at Saskatchewan Health. He has worked with Saskatchewan Health for 25 years, where his current responsibilities include developing provincial regulations and policies that deal with environmental health programs. Regional Health Authorities (RHAs) are responsible for administering and enforcing these regulations and policies within their jurisdictions. The Southeast Saskatchewan Airshed crosses over the boundaries of three different RHAs (Sun Country Health RHA, Regina Qu'Appelle RHA and Sunrise RHA).

Mike Zeleny – Director (SaskPower)

Jon Hutt – Director (Matrix Solutions Inc.)

Todd Han – Director (Saskatchewan Ministry of Energy and Resources)

Grant Paulson – Director (Sun Country Health Region)

Ifran Khalid – Director (BP Canada Energy Steelman)

Dean Pylpuk – Director (Saskatchewan Ministry of Energy and Resources)

APPENDIX E: SESAA MEMBERSHIP

- 101072464 Saskatchewan Ltd.
- Advantage Oil and Gas
- AltaGas Ltd.
- Apache Canada Ltd.
- Arc (Sask) Energy Trust
- Aspen Endeavour Resources Inc.
- Black Rider Resources Inc.
- Bonavista Petroleum Ltd.
- Border Energy Ltd
- Burmis Energy Inc.
- Canadian Natural Resources Limited
- Canetic Resources Inc.
- Connacher Oil and Gas Limited
- Crescent Point Resources Limited Partnership
- Crescent Point Resources Ltd.
- Cugnet Petroleums Inc.
- Dawn Energy Inc.
- Daylight Energy Ltd.
- Devon ARL Corporation
- Diaz Resources Ltd.
- Elswick Energy Ltd.
- Enbridge Pipelines Inc.
- EnCana Corporation
- Enermark Inc.
- Esprit Exploration Ltd.
- Fairborne Energy Ltd.
- Fire Creek Resources Ltd.
- Flagship Energy Inc.
- Geocan Energy Inc.
- GKN Resources Ltd.
- Gold River Oil and Gas Ltd.
- Grand Banks Energy Corporation
- Grimes Energy Ltd.
- Husky Group of Companies
- Innova Exploration Ltd.
- Jedi Exploration & Development
- K and S Investments Ltd.
- Kenwood Resources Ltd.
- Kinwest Corporation
- Landex Petroleum Corp.
- Midale Petroleums Ltd.
- Mission Oil & Gas Inc.
- Newmont Mining Corporation of Canada Ltd.
- Nexans Canada Inc.

- NorAmera BioEnergy Corporation
- Northrock Resources Ltd.
- Outback Energy Ltd.
- Peerless Energy Inc.
- Pemoco Ltd.
- Penn West Petroleum Ltd.
- Penn West PTF Energy Ltd.
- Petrobank Energy & Resources Ltd.
- Plains Environmental Inc.
- Postell Energy Co. Ltd.
- Prairie Mines & Royalty Ltd.
- Primewest Energy Inc.
- Primrose Drilling Ventures Ltd.
- Provident Energy Ltd.
- Real Resources Inc.
- Regent Resources Ltd.
- Runcible Oil Corp.
- Sask Power
- Saskatchewan Wheat Pool
- Silver Bay Energy Ltd.
- Silver Bay Oil & Gas Ltd.
- Silver Bay Petroleum Ltd.
- Silver Bay Resources Ltd.
- Southern Exploration Inc.
- Strand Resources Ltd.
- Swertz Exploration Ltd.
- Talisman Energy Inc.
- T. Bird Oil Ltd.
- Tiberius Exploration Inc
- TransGas
- Triwest Energy Inc.
- Valleyview Petroleums Ltd.
- Waveform Energy Ltd.
- Zargon Oil & Gas Ltd.

How to Become a Member

For more information on how to become a member, please contact Bob Scotten at (780) 446-3277.



Southeast Saskatchewan
Airshed Association

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