Heartland Air Monitoring Partnership 25 YEARS

We Monitor the Air You Breathe

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Air Quality Trending and Comparison Report

February 26, 2025

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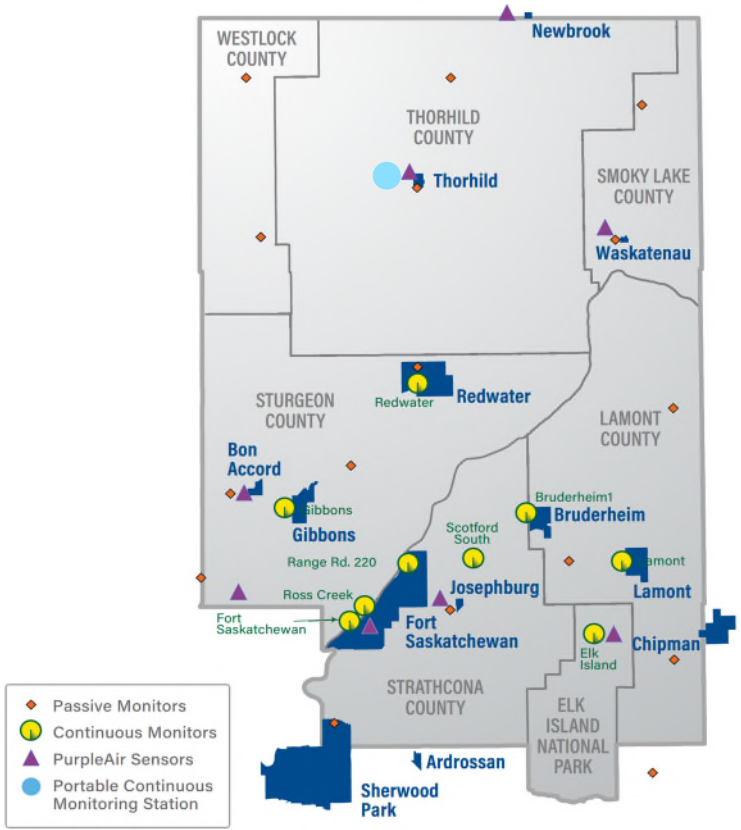
AIR MONITORING NETWORK

HAMP Network

Boundary: 4500 km^2

Monitoring Sites:

- 10 continuous monitoring stations
  - Monitor for 18 substances and meteorological conditions
    - Hourly data provided 24/7
- 16 passive monitoring sites
  - Hydrogen Sulphide
  - Sulphur Dioxide
- 8 Purple Air Sensors



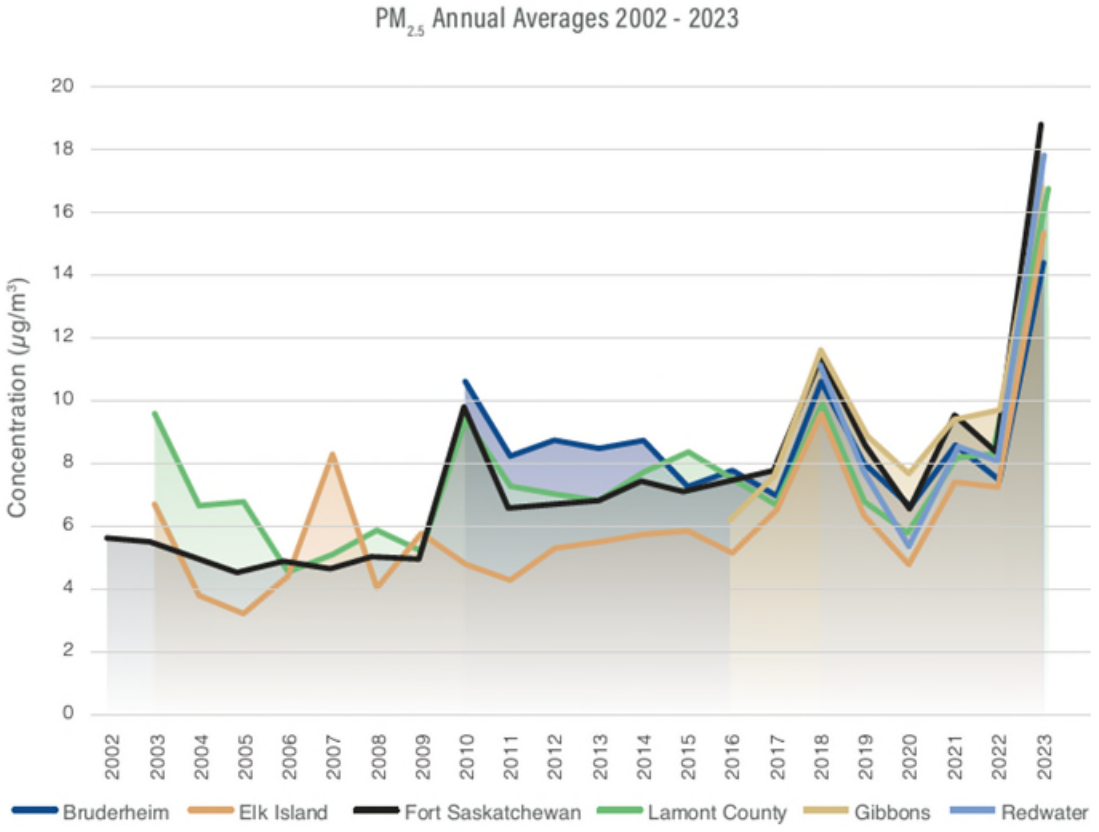
Introduction

- Fine particulate matter, ozone, sulphur dioxide, nitrogen dioxide and carbon monoxide.
- Trends and comparisons among HAMP stations, and between Fort Saskatchewan and other selected Alberta, national and international locations.
- Locations chosen to provide a wide variety of population, industrial density, as well as for general interest. All were pre-chosen without prejudice for how Fort Saskatchewan would compare.
- Many trends show notable changes that can be tied to major natural events like wildfires, or changes over a longer period of time attributed to new environmental policies and technologies.

HAMP Stations

Fine Particulate Matter ($PM_{2.5}$)

- Sources: roads, dust, vehicles, industry, wildfires, home heating.
- 2010, 2018 and 2023 peaks due to wildfire smoke.
- Wintertime temperature inversions also have an impact.
- Elk Island tends to trend the lowest.



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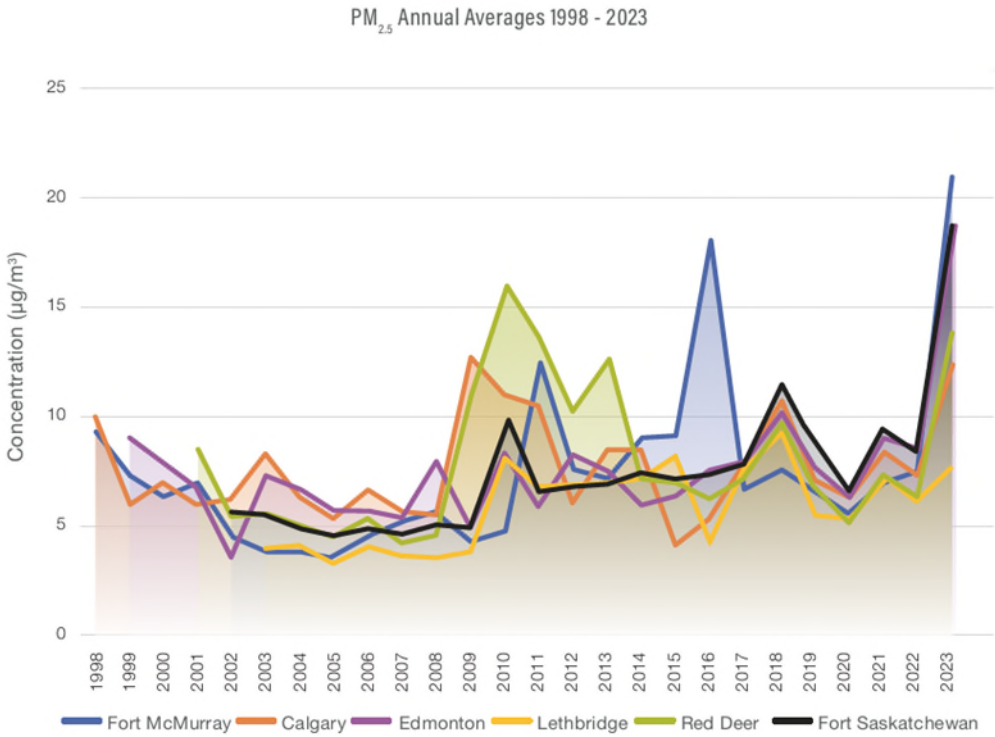
Provincial Stations

Fine Particulate Matter ($PM_{2.5}$)

- 2010, 2018 and 2023 peaks due to wildfire smoke. As well as 2016 peak in Fort MacMurray.
- Fort Saskatchewan trends in the middle until 2017 when it begins to trend higher.
- Lethbridge tends to trend the lowest.



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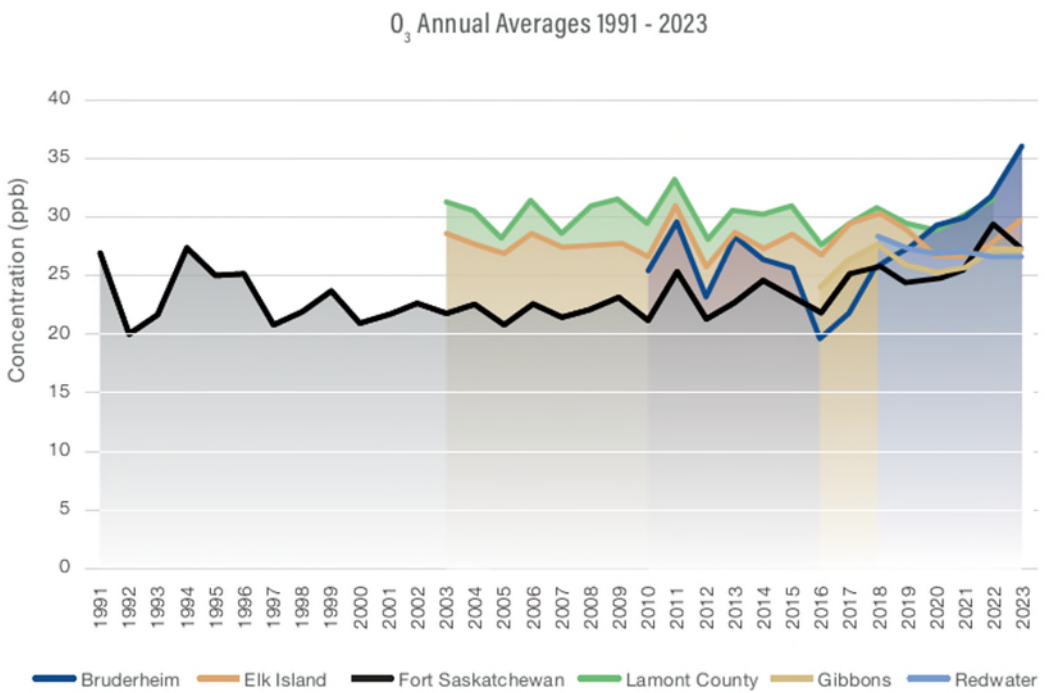
HAMP Stations

Ozone (O_3)

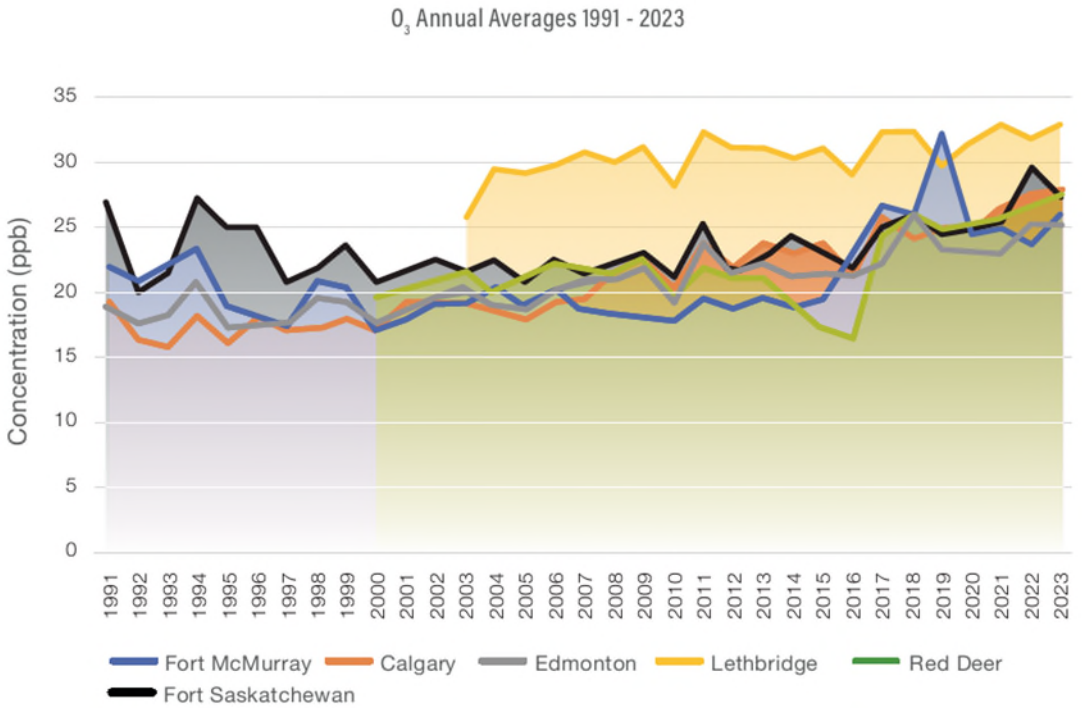
- Higher annual average concentrations in rural vs. urban stations.
- Rural areas have more vegetation - emit natural compounds that can lead to the formation of ozone.
- Urban areas experience ozone scavenging.



Provincial Stations

Ozone (O_3)

- Fort Saskatchewan shows consistently higher annual averages than the larger urban centres used in the comparison.
- Lethbridge experiences warmer mean temperatures, which can result in higher ozone levels.



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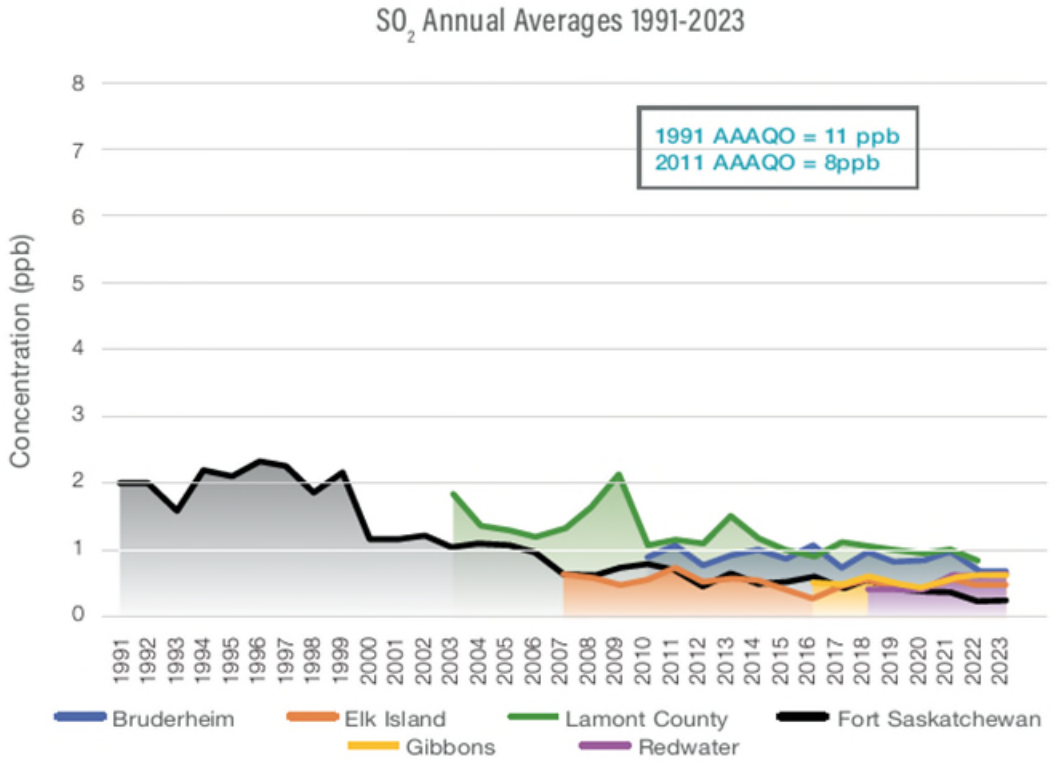
HAMP Stations

Sulphur Dioxide (SO_2)

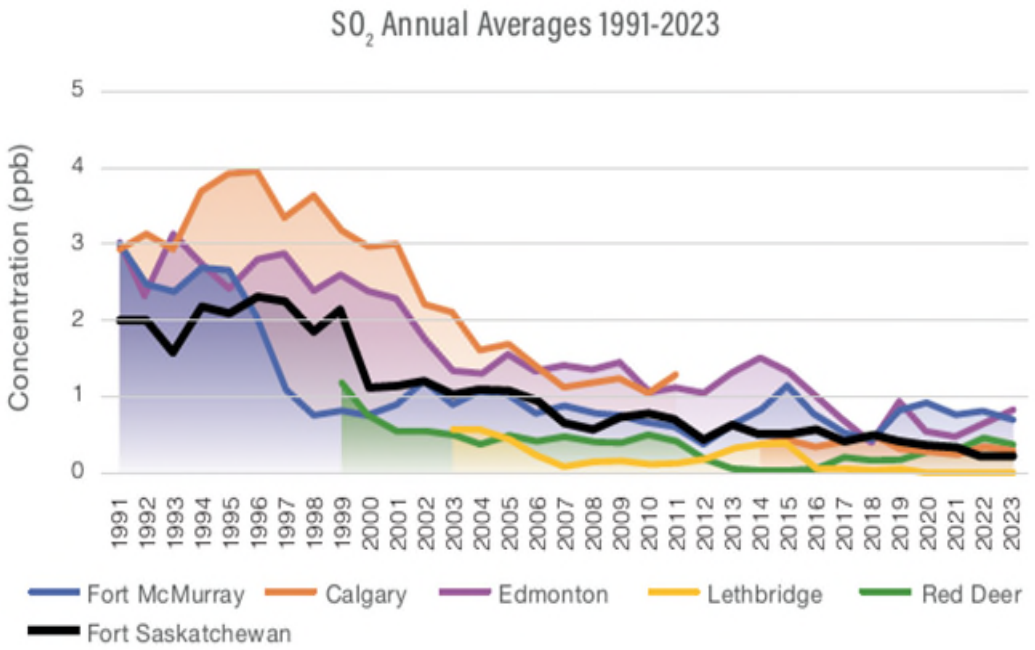
- Sources: primarily industrial.
- Decreasing trend in annual averages since 1991.
- Due to reduced flaring and improved emission technologies.
- All years well below annual Alberta Ambient Air Quality Objective (AAAQO) of 11 ppb.



Provincial Stations

Sulphur Dioxide (SO_2)

- Fort Saskatchewan has sulphur dioxide levels comparable to other provincial locations.
- Lethbridge and Red Deer experience the lowest levels of SO_2, possibly due to less oil and gas development in those areas.



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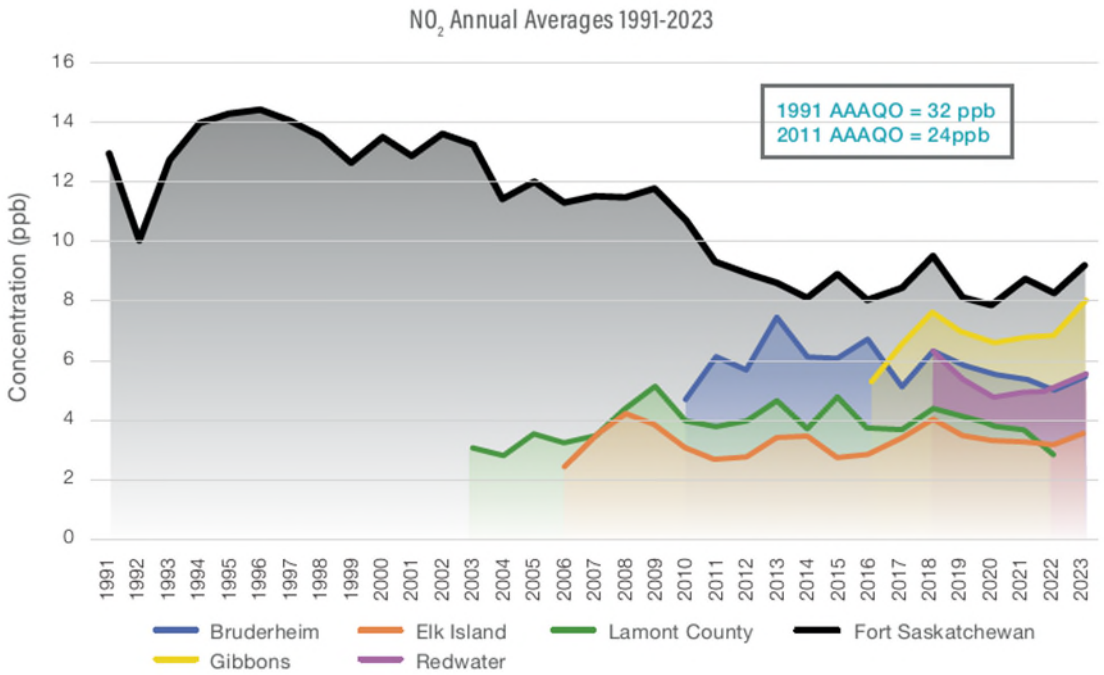
HAMP Stations

Nitrogen Dioxide (NO_2)

- Sources: transportation, industry, home heating, wildfires.
- Nitrogen dioxide levels continue to trend downward, likely due to increased efficiencies in home heating and vehicles.
- Fort Saskatchewan trends highest due to larger number of NO_2 sources.



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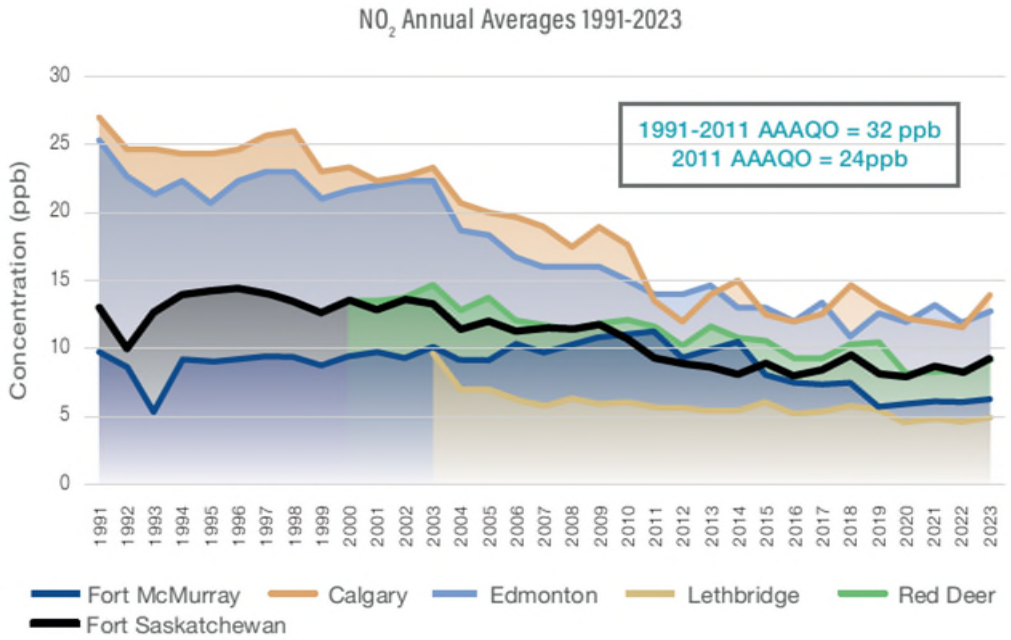
Provincial Stations

Nitrogen Dioxide (NO_2)

- A provincial comparison shows that larger urban centres such as Calgary and Edmonton have the highest annual NO_2 averages simply because they have a greater number of emission sources.



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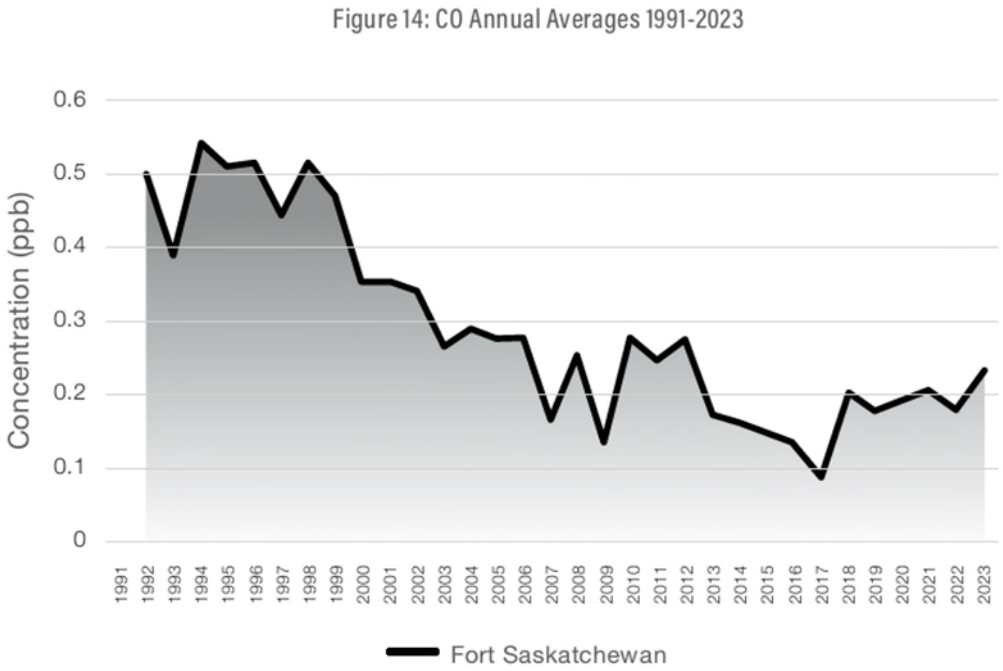
HAMP Stations

Carbon Monoxide (CO)

- Sources: primarily vehicles, wildfires.
- Fort Saskatchewan the only station that monitors for CO in HAMP.
- Downward trend mainly due to more efficient and cleaner emissions technology in vehicles.



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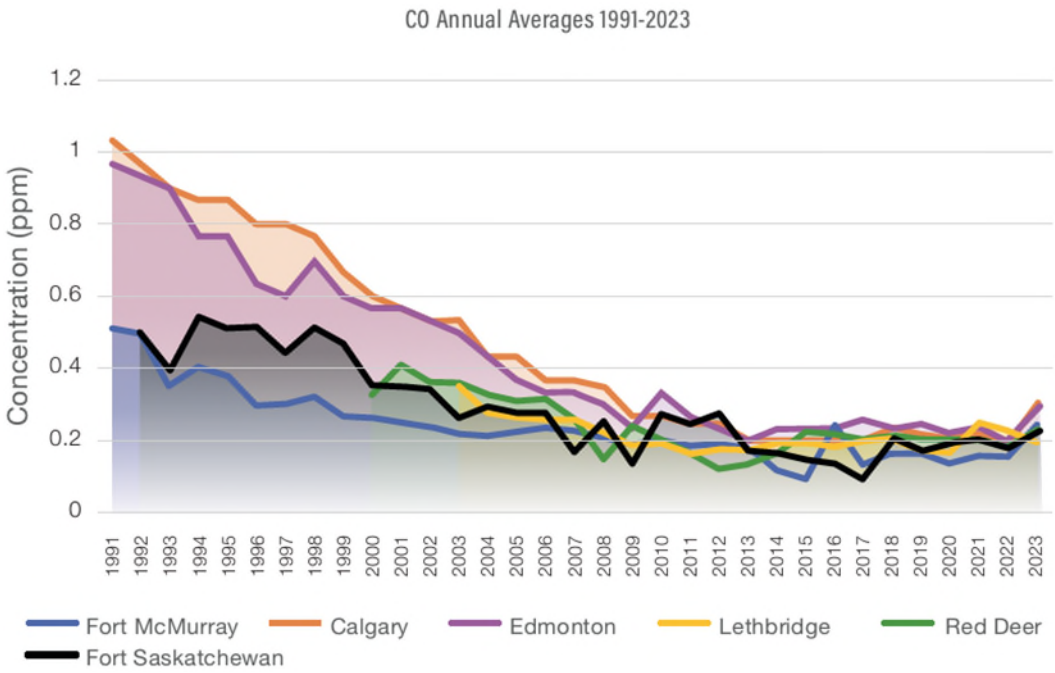
Provincial Stations

Carbon Monoxide (CO)

- Similar downward trend for the rest of the province.
- Larger urban areas tend to trend higher.



National/International

- Fort Saskatchewan selected as representative of the Airshed.
- Fort Saskatchewan's ozone, sulphur dioxide, nitrogen dioxide and carbon monoxide levels are in the mid-range when compared to the other locations. Fine particulate matter is in the lower half of the range.
- Details available in the report at: https://www.heartlandairmonitoring.org/reports

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