

Air Quality in Ontario 2022 Report

Learn about the state of ambient air quality in 2022 and long-term trends for key airborne pollutants affecting Ontario's air quality.

Air quality highlights

- Overall, air quality in Ontario has improved over time as both ambient concentrations of common air pollutants and emissions to air have decreased. Over the last 10 years, concentrations have decreased by 28% for nitrogen dioxide, by 18% for fine particulate matter concentrations, and by 48% for sulphur dioxide concentrations on average across the province (see table below).
- In 2022, Ontario reported air quality in the low-risk category 94% of the time, based on the Air Quality Health Index (AQHI).
- Transboundary influences, from both the U.S. and beyond, account for a significant portion of Ontario's ozone when its levels are elevated.
- Ozone and fine particulate matter, the main components of smog, remain as pollutants of concern from a regional perspective. Sulphur dioxide and benzene remain a concern at the local level in some communities.
- In 2022, there were exceedances of the provincial Ambient Air Quality Criteria (<https://www.ontario.ca/document/air-quality-ontario-2022-report/10-year-trends-and-annual-results#section-5>) and/or Canadian Ambient Air Quality Standard (<https://www.ontario.ca/document/air-quality-ontario-2022-report/national-air-quality-management-system#section-0>) for ground-level ozone, fine particulate matter and sulphur dioxide in some communities.
- Decreasing trends were observed for some traffic-related pollutants including black carbon and sulphate in fine particulate matter, while others showed no trend.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long-term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Province-wide trends in common air pollutants, 2013-2022

Pollutant	Concentrations	Emissions
Nitrogen dioxide/Nitrogen oxides (NO ₂ /NO _x)	-28%	-35%
Fine particulate matter (PM _{2.5})	-18%	-14%
Ground-level ozone (O ₃)	No trend	N/A
Sulphur dioxide (SO ₂)	-48%	-56%

Province-wide trends in volatile organic compounds, 2013-2022

Pollutant	Concentrations
Benzene	-33%
Toluene	-50%
Ethylbenzene	-39%
m- and p-xylene	-37%

Pollutant	Concentrations
o-xylene	-31%
1,3-Butadiene	No trend

Introduction

Protecting the air we breathe

The ministry is protecting Ontario's air quality and ensuring we have strong environmental standards that protect human health and the environment. In doing so, the ministry is working to ensure cleaner air for all Ontarians by regulating air contaminants released by certain industrial and commercial facilities. Since air pollution arises from a wide range of activities and can cross boundaries, the ministry also works collaboratively with the federal government and other provinces and territories to develop standards and a framework for action, and with the U.S. to better understand the transboundary flow of air pollutants into Ontario.

Overall, ambient air quality confirms that Ontario's actions to reduce airborne pollutants are working and that regional air quality has been steadily improving in Ontario for many common air pollutants over the past 10 years.

While improvements have been made, we recognize more work needs to be done to ensure communities are protected from local sources of contaminants to air. The ministry will continue to hold facilities accountable, while working with municipalities, Indigenous communities, and industry to improve air quality and address unique challenges in communities with tailored solutions.

Learn more about what Ontario is doing to protect our air. (<https://www.ontario.ca/page/air-quality-ontario>)

About this report

This report summarizes 10-year air quality trends and the state of ambient air quality in Ontario during 2022. It reports on the major sources of emissions to air, pollutant

concentrations measured across the ministry's Air Quality Health Index monitoring network, and Ontario's performance against both provincial and federal ambient air quality criteria that were in effect in 2022. The ministry monitored ambient air quality in real time at 38 air monitoring stations in communities across Ontario in collaboration with the federal National Air Pollutant Surveillance (<https://open.canada.ca/data/en/dataset/1b36a356-defd-4813-acea-47bc3abd859b>) (NAPS) program during 2022^[1]. This information was reported 24 hours a day, seven days a week, through the ministry's public website (<http://www.airqualityontario.com>) .

The ministry's Air Quality Health Index monitoring stations are generally representative of ambient air quality which reflects the contribution of all sources of air contaminants to air. These air monitoring stations are sited to be representative of general population exposure and thus do not necessarily reflect air quality at locations within a community that may be influenced by nearby local sources of air contaminants such as large industrial facilities or major transportation corridors. Concentrations of some air contaminants in neighborhoods located in close proximity to local sources such as an industrial facility may be higher than those measured at the ministry's Air Quality Health Index monitoring stations.

There are also local air quality monitoring networks operated by industrial associations in the communities of Hamilton (Hamilton Air Monitoring Network (<http://www.hamnair.ca>)), Sarnia (Clean Air Sarnia and Area (<https://www.cleanairsarniaandarea.com>)) and Sudbury (Greater Sudbury Air Quality (<https://sciencenorth.bestech.com/sciencenorth/>)) that provide additional air quality information for these communities.



Two photographs showing the exterior (left) and interior (right) of the Toronto North Air Quality Health Index Station.

Air Quality Health Index monitoring stations

This is a map depicting the 38 Air Quality Health Index monitoring stations across Ontario that were in operation during 2022.

Notes:

T: telemetry
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NO₂: nitrogen dioxide
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PM_{2.5}: fine particulate matter
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O₃: ground-level ozone
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SO₂: sulphur dioxide
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CO: carbon monoxide
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TRS: total reduced sulphur
.....

Key air contaminants

Ontario monitors levels of common air pollutants associated with smog formation across the ambient air monitoring network. These pollutants have numerous, diverse and widespread sources, and can have adverse effects on human health, the environment, and property. More information on the key air contaminants, their impacts to health and the environment, and their sources is available below.

Nitrogen dioxide

Nitrogen dioxide (NO_2) is a reddish-brown gas with a pungent odour, which transforms in the atmosphere to form gaseous nitric acid and nitrates.

NO_2 plays a major role in atmospheric reactions that produce ground-level ozone, a major component of smog.

NO_2 also reacts with other gaseous contaminants in the air (e.g., ammonia) leading to the formation of $\text{PM}_{2.5}$.

Impacts to health and environment

NO_2 can irritate the lungs and lower resistance to respiratory infection. People with asthma and bronchitis have increased sensitivity to NO_2 .

NO_2 chemically transforms into nitric acid in the atmosphere and, when deposited, contributes to the acidification of lakes and soils in Ontario. Nitric acid can also corrode metals, fade fabrics, degrade rubber, and damage trees and crops.

Sources of nitrogen oxides

Combustion or burning of carbon-based materials (e.g., wood, gasoline etc.) in air produces nitrogen oxides (NO_x), of which NO_2 is a component. The transportation sector is the main source of nitrogen dioxide in Ontario.

Fine particulate matter

Airborne particulate is the general term used to describe a mixture of microscopic solid particles and liquid droplets suspended in air. Particulate matter (PM) includes aerosols, smoke (i.e., black carbon), fumes, dust, fly ash, pollen and trace metals (e.g., copper and iron). PM species can be measured with various methods, for instance, continuous monitoring of major components of fine PM in the ambient air can be measured using

aerosol mass spectrometric methods such as the Aerosol Chemical Speciation Monitor (ACSM).

Fine particulate matter, denoted as $PM_{2.5}$, is less than 2.5 micrometres in diameter, approximately 30 times smaller than the average diameter of a human hair. Ultrafine particles are less than 0.1 micrometres in diameter.

Impacts to health and environment

Small particles, such as $PM_{2.5}$, can get deep into lungs. Fine particulate matter can have various negative health effects, especially on the respiratory and cardiovascular systems.

Exposure to fine particulate matter is associated with increased hospital admissions and emergency room visits—and even to death from heart or lung diseases. Both long- and short-term particle exposures have been linked to health problems. The International Agency for Research on Cancer has classified outdoor air pollution including $PM_{2.5}$, as a carcinogen for humans.

People with heart or lung disease, children and older adults are particularly sensitive to this pollutant.

Sources of fine particulate matter

Fine particulate matter consists of primary and secondary $PM_{2.5}$. Primary $PM_{2.5}$ is emitted directly to the atmosphere. Major sources of primary $PM_{2.5}$ include residential fireplaces and wood stoves, motor vehicles, smelters, power plants, industrial facilities, and agricultural burning and wildfires. Secondary $PM_{2.5}$ is formed indirectly in the atmosphere through a series of complex chemical reactions of gaseous precursors such as nitrogen dioxide and sulphur dioxide. PM can travel long distances, along with its precursor pollutants, affecting air quality far from sources of emissions.

Ground-level ozone

Ground-level ozone (O_3) is a colourless, odourless gas at typical ambient concentrations, and is a major component of smog.

Ground-level ozone is a gas formed when NO_x and volatile organic compounds (VOCs) react in the presence of sunlight. NO_2 breaks down in the presence of sunlight to form

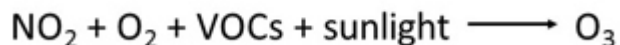
oxygen atoms (O) and NO. These oxygen atoms then react rapidly with molecular oxygen (O₂) in the atmosphere to produce ground-level ozone.

The formation and transport of ozone is strongly dependent on weather conditions and emissions of chemicals that contribute to the formation of ozone, such as NO_x and VOCs (also known as ozone precursors).

Schematic formation and scavenging of ozone

Ground-level ozone is a gas formed when nitrogen oxides (NO_x) and volatile organic compounds (VOCs) react in the presence of sunlight. NO_x is comprised of NO₂ and nitric oxide (NO). NO₂ breaks down in the presence of sunlight to form oxygen atoms (O) and NO. These oxygen atoms then react rapidly with molecular oxygen (O₂) in the atmosphere to produce ground-level ozone. This series of reactions, however, can be influenced by the presence of other chemicals, such as VOCs. Ground-level ozone is depleted when it reacts with nitric oxide to form NO₂ (a process known as scavenging) decreasing ozone concentrations.

Ozone formation (Daytime)



Schematic of ozone formation during the day and the scavenging of ozone at night.

Ozone scavenging
(Nighttime)



In large urban centres, ozone concentrations are generally lower, because ozone is depleted by reacting with NO emitted by vehicles and other local combustion sources to form NO_2 . The NO_2 reacts with volatile organic compounds in the presence of sunlight to form ozone in downwind suburban and rural areas, resulting in higher ozone levels.

Impacts to health and environment

Ozone irritates the respiratory tract and eyes. Exposure to ozone in sensitive people can result in chest tightness, coughing and wheezing. Children who are active outdoors during the summer, when ozone levels are highest, are particularly at risk. Individuals with pre-existing respiratory disorders, such as asthma and chronic obstructive pulmonary disease, are also at risk. Ground-level ozone is associated with increased hospital admissions and premature deaths.

Sources of ground-level ozone

Major sources of ozone precursors, NO_x and VOCs , include the transportation and industrial sectors and general solvent use.

Sulphur dioxide

Sulphur dioxide (SO_2) is a colourless gas that smells like burnt matches. It can also be oxidized in the atmosphere to form sulphuric acid aerosols. In addition, SO_2 is a precursor to sulphates, one of the main components of airborne secondary $\text{PM}_{2.5}$.

Impacts to health and environment

Health effects caused by exposure to high levels of SO_2 include breathing problems, respiratory illness, and the exacerbation of respiratory and cardiovascular disease. People with asthma, chronic lung disease or heart disease are the most sensitive to SO_2 . Health impacts of sulphur dioxide may be more severe when someone is also exposed to elevated levels of other respiratory irritants like nitrogen dioxide and fine particulate matter.

Sulphur dioxide damages trees and crops and reduces visibility.

Sources of sulphur dioxide

Major sources of SO_2 include smelters, other industrial processes and coal-fired electric power generation from outside Ontario.

Volatile organic compounds

Volatile organic compounds (VOCs) are organic chemical compounds that may evaporate under normal ambient conditions of temperature and pressure, such as benzene and toluene. VOCs are precursors of ground-level ozone and $\text{PM}_{2.5}$. VOCs are emitted into the atmosphere from a variety of sources, including vehicles, fossil fuel combustion, steel-making, petroleum refining, fuel-refilling, industrial and residential solvent use, paint application, manufacturing of synthetic materials (e.g., plastics, carpets), food processing, agricultural activities and wood processing and burning.

Benzene

Benzene is primarily used in the production of plastics and other chemical products. Large quantities of benzene are produced from petroleum-related processes, either by direct extraction from certain types of crude oils or by chemical treatment of gasoline. Benzene is a known human carcinogen. Additionally, short-term and long-term exposure to benzene can adversely affect blood cells.

Toluene

Toluene is used to make chemicals, explosives, dyes and many other compounds. It is also applied as a solvent for inks, paints, lacquers, resins, cleaners, glues and adhesives. Toluene is found in gasoline and aviation fuel. Studies indicate that toluene affects the central nervous system of humans and animals.

Ethylbenzene

Ethylbenzene is a colourless liquid that smells like gasoline and is mainly used in the manufacture of styrene. Exposure to ethylbenzene occurs from the use of consumer products, fuel, pesticides, solvents, carpet glues, varnishes and paints. In humans, acute exposure results in respiratory and neurological effects and chronic exposure is associated with developmental and neurotoxic effects.

Xylene

Xylene, also referred to as mixed xylenes, is a mixture of three isomers: ortho-, meta- and para-xylene, commonly known as o-, m- and p-xylene, which have the same molecular formula but different chemical structures, meaning the arrangement of their atoms is different. Xylene is a colourless, sweet-smelling liquid or gas occurring naturally in petroleum, coal and wood tar; it is also used as a solvent in the printing, rubber, paint and leather industries. In humans, acute and chronic exposures result in respiratory and neurological effects.

1,3-Butadiene

1,3-Butadiene is a colourless gas with a mild gasoline-like odour. It is released into the air through motor vehicle exhaust, manufacturing and processing facilities, wildfires or other combustion. 1,3-Butadiene is a known human carcinogen. Additionally, acute exposure by inhalation in humans results in irritation of the eyes, nasal passages, throat and lungs.

10-year trends and annual results

Concentrations of air contaminants measured at the ministry's Air Quality Health Index monitoring stations are generally representative of ambient air quality which reflects the contribution of all sources of air contaminants to air. These air monitoring stations are sited to be representative of general population exposure and thus do not necessarily reflect air quality at locations within a community that may be influenced by nearby local sources of air contaminants such as large industrial facilities or major transportation corridors. Concentrations of some air contaminants in neighborhoods located in close proximity to local sources such as an industrial facility may be higher than those measured at the Ministry's Air Quality Health Index monitoring stations.

This section presents the 10-year trends and annual results for concentrations of key air contaminants listed below including volatile organic compounds such as benzene,

toluene, ethylbenzene, xylene (BTEX) and 1,3-butadiene as measured at the Ministry's Air Quality Health Index air monitoring stations. Emission trends for these key air contaminants from major emissions sources in Ontario such as industry, electricity utilities, transportation, and residential properties are also provided. Further details on emissions can be found at Air Pollutant Emission Inventory (APEI) 1990-2022 (<https://www.canada.ca/en/environment-climate-change/services/pollutants/air-emissions-inventory-overview.html>) .

Nitrogen dioxide

Highlights

10-year trends

- NO₂ concentrations have decreased by 28%
- NO_x emissions have decreased by 35%

2022 results

- No exceedances of Ontario's 1-hour and 24-hour Ambient Air Quality Criteria (AAQC) of 200 ppb and 100 ppb, respectively.

10-year trends

Trend of NO₂ annual means across Ontario, 2013-2022

This is a line graph showing the trend of nitrogen dioxide annual means from 2013 to 2022. The nitrogen dioxide annual mean concentrations across Ontario have decreased 28% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 34 ambient air monitoring stations.
- Ontario does not have an annual AAQC for NO₂.
- Air quality in Ontario can vary from year to year due to a variety of factors including

pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 10-year trend for NO₂ at individual AQHI air monitoring stations in Ontario is presented in the Appendix: 10-year trend for nitrogen dioxide (NO₂) (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-no2>) .

Ontario NO_x emission trend, 2013-2022

This is a stacked column chart displaying the Ontario NO_x emissions trend from 2013 to 2022 indicating a decrease of approximately 35% or 99 kilotonnes, of which 65 kilotonnes of the decrease was due to the road vehicles. Seventeen kilotonnes was due to other transportation (e.g. air, marine, rail transportation, and non-road vehicles/engines) and 12 kilotonnes was due to the electricity utilities sector. Please note this chart excludes emissions from open and natural sources (Air Pollutant Emission Inventory 1990-2022, 2024). Ontario’s former emissions trading regulations (O. Reg. 397/01 and O. Reg. 194/05) and Drive Clean light duty vehicle program, and the phase-in of more stringent emission and vehicle standards for new vehicles have contributed to the reduction in nitrogen oxides emissions over time.

2022 results

Summary of NO₂ results for 2022

Averaging time	Low range	High range	Number of sites with AAQC exceedances
NO ₂ 1-hour max	18.7 ppb at Port Stanley	75.6 ppb at Toronto Downtown	0

Averaging time	Low range	High range	Number of sites with AAQC exceedances
NO₂ 24-hour max	7.0 ppb at Port Stanley	35.7 ppb at Hamilton Downtown	0
NO₂ annual mean	2.2 ppb at Port Stanley	14.4 ppb at Toronto Downtown	Not applicable

The highest NO₂ means were recorded in large, urbanized areas which are influenced by significant vehicular traffic, such as the Greater Toronto Area.

A summary of the 2022 NO₂ annual statistics for individual AQHI air monitoring stations is detailed in the Appendix: 2022 nitrogen dioxide (NO₂) annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-nox>).

Ontario NO_x emissions by sector, 2022

Other transportation

33%

Road vehicles

23%

Miscellaneous/Residential

17%

Other industrial sources

14%

Cement and concrete

6%

Smelters/Primary metals

4%

Electricity utilities

3%

This is a chart depicting Ontario's NO_x emissions by sector based on 2022 estimates for point/area/transportation sources. Please note this chart excludes emissions from open and natural sources (Environment and Climate Change Canada, Air Pollutant Emission Inventory 1990-2022, 2024).

The transportation sector accounted for approximately 56% of total NO_x emissions in 2022.

Fine particulate matter

Highlights

10-year trends

- PM_{2.5} concentrations have decreased by 18%
- PM_{2.5} emissions have decreased by 14%

2022 results

- 16 AQHI air monitoring stations measured above the 24-hour reference level of 27 µg/m³ on at least one occasion.

- 1 AQHI air monitoring station measured above the annual reference level of 8.8 $\mu\text{g}/\text{m}^3$.

10-year trends

Trend of $\text{PM}_{2.5}$ annual means across Ontario, 2013-2022

This is a line graph showing the trend of fine particulate matter annual means from 2013 to 2022. The fine particulate matter annual mean concentrations across Ontario have decreased 18% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 37 ambient air monitoring stations.
- Ontario uses the annual $\text{PM}_{2.5}$ CAAQS “as is” for comparison to a single annual average of air quality data; this value, 8.8 $\mu\text{g}/\text{m}^3$, is considered a Reference Level.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 10-year trend for $\text{PM}_{2.5}$ at individual AQHI air monitoring stations in Ontario is presented in the Appendix: 10-year trend for fine particulate matter ($\text{PM}_{2.5}$) (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-pm25>).

Ontario $\text{PM}_{2.5}$ emissions trend, 2013-2022

This is a stacked column chart displaying the Ontario $\text{PM}_{2.5}$ emissions trend from 2013 to 2022 indicating a decrease of approximately 14% or 8 kilotonnes, of which 4 kilotonnes was due to the transportation sector (e.g. road vehicles, air, marine, rail transportation, and non-road vehicles/engines), 2 kilotonnes was contributed by various industries, (e.g. smelters, iron and steel, cement) and the remaining 2 kilotonnes is attributed to reductions in residential wood combustion. Please note this chart excludes emissions from open and natural sources (Air Pollutant Emission Inventory 1990-2022, 2024).

The phase-in of more stringent emission and vehicle standards for new vehicles, Ontario’s

closure of coal burning electricity generating utilities (which decreased secondary particulate formation through a reduction in SO₂), and reduced emissions from industrial processes have contributed to the reduction in PM_{2.5} emissions in Ontario.

2022 results

Summary of PM_{2.5} results for 2022

Averaging time	Low range	High range	Number of sites with reference level exceedances
PM _{2.5} 1-hour max	28 µg/m ³ at Dorset	523 µg/m ³ at Brampton	Not applicable
PM _{2.5} 24-hour max	15.8 µg/m ³ at North Bay	72.9 µg/m ³ at Brampton	16
PM _{2.5} annual mean	4.45 µg/m ³ at Sault Ste. Marie	8.82 µg/m ³ at Windsor West	1

A summary of the 2022 PM_{2.5} annual statistics for individual AQHI air monitoring stations is detailed in the Appendix: 2022 fine particulate matter (PM_{2.5}) annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-pm25>) .

Ontario PM_{2.5} emissions by sector, 2022

Residential

41%

Miscellaneous

18%

Other industrial sources

13%

Smelters/Primary metals

10%

Other transportation

8%

Cement and concrete

6%

Road vehicles

4%

This is a chart depicting Ontario's PM_{2.5} emissions by sector based on 2022 estimates for point/area/transportation sources. Please note this chart excludes emissions from open and natural sources, such as wildfires (Environment and Climate Change Canada, Air Pollutant Emission Inventory 1990-2022, 2024).

Residential fuel combustion accounted for approximately 41% of the total PM_{2.5}

emissions in 2022. The major contributor to residential emissions is fuel wood combustion in fireplaces and wood stoves.

PM_{2.5} emissions from wildfires vary from year to year and generally depend on the total number of hectares burned. Wildfire season typically occurs from early April to late October in Ontario. As wildfires burn through forests and grasslands, they produce dense smoke. Wildfire smoke may be carried hundreds or thousands of kilometres from the fire zone. There was no significant impact of wildfire smoke on Ontario's air quality in 2022.

Ground-level ozone

Highlights

10-year trends

- No trend in the ozone maximum concentrations
- No trends in the annual and seasonal means

2022 results

- 19 AQHI air monitoring stations measured ozone levels above the 1-hour AAQC of 80 ppb on at least one occasion.

10-year trends

Trend of ozone maximums across Ontario, 2013-2022

This is a line graph showing the trend of ozone one-hour maximums from 2013 to 2022. There was no trend detected for Ontario over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 37 ambient air monitoring stations.
- The Ontario one-hour AAQC for ozone is 80 ppb.

The 10-year trend of one-hour maximum ozone for individual AQHI air monitoring

stations in Ontario is presented in the Appendix: 10-year trend for ozone (O₃)
maximums (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-o3a>) .

Trend of ozone means across Ontario, 2013-2022

This is a line graph showing the trend of ozone annual, summer and winter means from 2013 to 2022. There were no trends detected for Ontario over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 37 ambient air monitoring stations.
- Summer: May - September; Winter: January - April, October - December.
- Ontario does not have an annual or seasonal AAQC for ozone.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

There has been no increasing or decreasing trend in annual and seasonal ozone means over the past 10 years.

Ozone levels continue to exceed Ontario's 1-hour AAQC for ozone during the warmer months and remain a challenge in some areas of the province, such as southwestern Ontario. However, ozone concentrations during the winter months were well below Ontario's ozone 1-hour AAQC of 80 ppb across Ontario in 2022.

The 10-year trend of annual, summer and winter ozone for individual AQHI air monitoring stations in Ontario is presented in the Appendix: 10-year trend for ozone (O₃) (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-o3b>) , 10-year trend for ozone (O₃) summer means (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-o3c>) , and 10-year trend for ozone (O₃) winter means (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-o3d>) .

Ozone annual means for urban and rural Ontario, 2013-2022

This is a line graph displaying the ozone annual means for urban and rural Ontario from 2013 to 2022.

Note:

- Urban S. are urban areas in southern Ontario - Windsor, London, Hamilton, Toronto.
- Urban N. are urban areas in northern Ontario - Thunder Bay, Sault Ste. Marie, Sudbury, North Bay.
- Rural areas in Ontario - Port Stanley, Tiverton, Parry Sound, Dorset.
- Ontario does not have an annual AAQC for ozone.

Ozone annual mean concentrations in urban areas in southern Ontario have been more comparable to those of urban areas in northern Ontario in recent years.

Generally, ozone concentrations are higher in rural, transboundary-influenced sites on the northern shore of Lake Erie and the eastern shore of Lake Huron. Ozone concentrations are lower in urban areas because it is depleted (scavenged) by reacting with NO emitted by vehicles and other local combustion sources.

2022 results

Summary of Ozone results for 2022

Averaging time	Low range	High range	Number of sites with AAQC exceedances
Ozone 1-hour max	58 ppb at Thunder Bay	97 ppb at Sarnia	19

Averaging time	Low range	High range	Number of sites with AAQC exceedances
Ozone 24-hour max	43.7 ppb at Barrie	63.1 ppb at Tiverton	Not applicable
Ozone annual mean	22.0 ppb at Toronto West	31.9 ppb at Grand Bend and Tiverton	Not applicable

A summary of the 2022 ozone annual statistics for individual AQHI air monitoring stations is detailed in the Appendix: 2022 ozone (O₃) annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-o3>).

Sulphur dioxide

Highlights

10-year trends

- SO₂ concentrations have decreased by 48%
- SO₂ emissions have decreased by 56%

2022 results

- Five AQHI air monitoring stations measured sulphur dioxide levels above the 10-minute AAQC of 67 ppb on at least one occasion.
- Four AQHI air monitoring stations measured sulphur dioxide levels above the 1-hour AAQC of 40 ppb on at least one occasion.

- No exceedances of Ontario's annual AAQC.

10-year trends

Trend of SO₂ annual means across Ontario, 2013-2022

This is a line graph showing the trend of sulphur dioxide annual means from 2013 to 2022. The sulphur dioxide annual mean concentrations across Ontario have decreased 48% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 9 ambient air monitoring stations.
- The Ontario annual AAQC for SO₂ of 4 ppb was introduced in 2018.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 10-year trend for SO₂ at individual AQHI air monitoring stations in Ontario is presented in the Appendix: 10-year trend for sulphur dioxide (SO₂) (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-so2>).

Ontario SO₂ emission trend, 2013-2022

This is a stacked column chart displaying the Ontario SO₂ emissions trend from 2013 to 2022 indicating a decrease of approximately 56% or 149 kilotonnes, of which 127 kilotonnes of the decrease was due to the smelter sector and 10 kilotonnes was due to the electricity utilities sector. Please note this chart excludes emissions from open and natural sources (Air Pollutant Emission Inventory 1990-2022, 2024).

Emissions reductions at Ontario smelters through the implementation of site-specific standards under the Local Air Quality Regulation (O. Reg. 419/05) and the sector specific smelter regulation (O. Reg. 652/21), Ontario's closure of coal burning electricity generating utilities, Ontario's former emissions trading regulations (O. Reg. 397/01 and O. Reg. 194/05), and federal and provincial low sulphur content in transportation fuels have

contributed to the reduction in SO₂ emissions in Ontario.

2022 results

Summary of SO₂ results for 2022

Averaging time	Low range	High range	Number of sites with AAQC exceedances
SO ₂ 10-minute max	4.5 ppb at Ottawa Downtown	149.4 ppb at Hamilton Downtown	5
SO ₂ 1-hour max	3.9 ppb at Ottawa Downtown	126.1 ppb at Sarnia	4
SO ₂ 24-hour max	1.0 ppb at Ottawa Downtown	59.4 ppb at Sarnia	Not applicable
SO ₂ annual mean	0.17 ppb at Toronto North	3.73 ppb at Hamilton Downtown	0

Concentrations of sulphur dioxide in neighborhoods that are located in close proximity to local sources such as an industrial facility may be higher than those measured at the ministry’s AQHI monitoring stations which are sited to be representative of general population exposure.

A summary of the 2022 SO₂ annual statistics for individual AQHI air monitoring stations is

detailed in the Appendix: 2022 sulphur dioxide (SO₂) annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-so2>) .

There are local air quality monitoring networks operated by industrial associations in the communities of Hamilton (Hamilton Air Monitoring Network (<https://www.hamnair.ca>)), Sarnia (Clean Air Sarnia and Area (<https://www.cleanairsarniaandarea.com>)) and Sudbury (Greater Sudbury Air Quality (<https://sciencenorth.bestech.com/sciencenorth/>)) that provide additional air quality information for these communities. These data have not been integrated into this ministry report; however, they are being addressed with regulations which aim to decrease local concentrations of SO₂, namely O. Reg. 88/22 which addresses SO₂ emissions from the petroleum refining sector and O. Reg. 65/21 which addresses SO₂ emissions from nickel smelting facilities, which are located primarily in the Sudbury area.

Ontario SO₂ emissions by sector, 2022

Smelters

44%

Petroleum refineries

18%

Other industrial sources

14%

Cement and concrete

12%

Iron and steel

10%

Miscellaneous/Residential

1%

Transportation

<1%

This is a chart depicting Ontario’s sulphur dioxide emissions by sector based on 2022 estimates for point/area/transportation sources. Please note this chart excludes emissions from open and natural sources (Environment and Climate Change Canada, Air Pollutant Emission Inventory 1990-2022, 2024).

Although they have achieved significant reductions in the past several years, smelters in northern Ontario remain the major sources of SO_2 emissions in Ontario, accounting for approximately 44% of the provincial SO_2 emissions.

Volatile organic compounds

Volatile organic compounds (VOC) are measured at select ambient air monitoring stations across Ontario as part of a co-operative federal-provincial program under the National Air Pollution Surveillance program.

Note: No VOC samples were collected in 2020 and only limited VOC samples were collected in 2021 and 2022 due to COVID-19 measures put in place by Environment and Climate Change Canada’s laboratories following Public Health guidelines. As a result, only three of six AQHI air monitoring stations were operational for VOC monitoring in 2021 and 2022.

Highlights

10-year trends

- Benzene concentrations have decreased by 33%
- Toluene concentrations have decreased by 50%
- Ethylbenzene concentrations have decreased by 39%

- m- and p-xylene concentrations have decreased by 37%
- o-xylene concentrations have decreased by 31%
- No trend in 1,3-butadiene concentrations

2022 results

- Ontario's AAQC for these volatile organic compounds (where applicable) were met except for one AQHI air monitoring station that measured benzene levels above the 24-hour and annual AAQC of 2.3 $\mu\text{g}/\text{m}^3$ and 0.45 $\mu\text{g}/\text{m}^3$, respectively.

10-year trends

VOCs are measured at six AQHI air monitoring stations (Windsor West, Sarnia, London, Kitchener, Hamilton Downtown, and Newmarket), however only three (Windsor West, Sarnia and Hamilton Downtown) were operational for VOC monitoring in 2021 and 2022 due to COVID-19 measures put in place following Public Health guidelines.

In 2022, 107 VOCs were analyzed and reported for each sample at each site. For the purposes of this report, commonly detected VOCs (benzene, toluene, ethylbenzene, xylene, and 1,3-butadiene) between 2013 and 2022 are included in this discussion.

Trend of benzene annual means across Ontario, 2013-2022

This is a line graph showing the trend of benzene annual means from 2013 to 2022. The benzene annual mean concentrations across Ontario have decreased 33% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 6 ambient air monitoring stations.
- The 2021 and 2022 averages are based on 3 ambient air monitoring stations.
- VOC samples were not collected in 2020 as Environment and Climate Change Canada's laboratories were shut down due to COVID-19 measures put in place following Public Health guidelines.
- The Ontario annual AAQC for benzene of 0.45 $\mu\text{g}/\text{m}^3$ was introduced in 2016.

- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of toluene annual means across Ontario, 2013-2022

This is a line graph showing the trend of toluene annual means from 2013 to 2022. The toluene annual mean concentrations across Ontario have decreased 50% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 6 ambient air monitoring stations.
- The 2021 and 2022 averages are based on 3 ambient air monitoring stations.
- VOC samples were not collected in 2020 as Environment and Climate Change Canada's laboratories were shut down due to COVID-19 measures put in place following Public Health guidelines.
- Ontario does not have an annual AAQC for toluene.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of ethylbenzene annual means across Ontario, 2013-2022

This is a line graph showing the trend of ethylbenzene annual means from 2013 to 2022. The ethylbenzene annual mean concentrations across Ontario have decreased 39% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 6 ambient air monitoring stations.

- The 2021 and 2022 averages are based on 3 ambient air monitoring stations.
- VOC samples were not collected in 2020 as Environment and Climate Change Canada's laboratories were shut down due to COVID-19 measures put in place following Public Health guidelines.
- Ontario does not have an annual AAQC for ethylbenzene.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of xylene annual means across Ontario, 2013-2022

This is a line graph showing the trend of xylene annual means from 2013 to 2022. The m- and p-xylene and o-xylene annual mean concentrations across Ontario have decreased 37% and 31%, respectively, over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 6 ambient air monitoring stations.
- The 2021 and 2022 averages are based on 3 ambient air monitoring stations.
- VOC samples were not collected in 2020 as Environment and Climate Change Canada's laboratories were shut down due to COVID-19 measures put in place following Public Health guidelines.
- Ontario does not have an annual AAQC for xylene.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of 1,3-butadiene annual means across Ontario, 2013-2022

This is a line graph showing the trend of 1,3-butadiene annual means from 2013 to 2022. There was no trend detected for Ontario over this 10-year period. To view the data for a

specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 6 ambient air monitoring stations.
- The 2021 and 2022 averages are based on 3 ambient air monitoring stations.
- VOC samples were not collected in 2020 as Environment and Climate Change Canada's laboratories were shut down due to COVID-19 measures put in place following Public Health guidelines.
- The Ontario annual AAQC for 1,3-butadiene is $2.0 \mu\text{g}/\text{m}^3$.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 10-year trend for VOCs at individual AQHI air monitoring stations in Ontario is presented in the Appendix: 10-year trend for benzene (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-benzene>), 10-year trend for toluene (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-toluene>), 10-year trend for ethylbenzene (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-ethylbenzene>), 10-year trend for m- and p-xylene (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-pxylene>), 10-year trend for o-xylene (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-oxylene>), and 10-year trend for 1,3-butadiene (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-butadiene>).

Concentrations of in neighborhoods that are located in close proximity to local sources such as an industrial facility may be higher than those measured at the ministry's AQHI monitoring stations which are sited to be representative of general population exposure.

There are local air quality monitoring networks operated by industrial associations in the communities of Hamilton (Hamilton Air Monitoring Network (<https://www.hamnair.ca/>)) and Sarnia (Clean Air Sarnia and Area (<https://www.cleanairsarniaandarea.com/>)) that provide additional air quality information for these communities. These data have not been integrated into this ministry report; however, they are being addressed with regulations and requirements which aim to decrease local concentrations of VOCs

including benzene.

There are also requirements that require certain facilities to conduct property line monitoring of benzene and publicly report it. For example, the Sarnia (CASA) website provides links to facility property line monitoring data. The property line monitoring concentration may be higher than those measured at the ministry’s AQHI monitoring stations which are sited to be representative of general population exposure.

Ontario VOC emission trend, 2013-2022

This is a stacked column chart displaying the Ontario VOC emissions trend from 2013 to 2022 indicating a decrease of approximately 25% or 87 kilotonnes, of which 49 kilotonnes was due to the transportation sector and 28 kilotonnes was due to the solvent use, surface coating and printing sectors. Please note this chart excludes emissions from open and natural sources (Environment and Climate Change Canada, Air Pollutant Emission Inventory 1990-2022, 2024).

The introduction of more stringent federal vehicle and engine emission standards for new vehicles, the former Drive Clean light duty vehicle program and various regulations, and Canadian Council of Ministers of the Environment VOC emissions guidelines and codes of practice for VOC emitting products and materials have contributed to the reduction in VOC emissions in Ontario.

2022 results

Summary of VOC results for 2022

Averaging time	Low range	High range	Number of sites with AAQC exceedances
Benzene 24-hour max	0.788 µg/m ³ at Windsor West	2.928 µg/m ³ at Hamilton Downtown	1

Averaging time	Low range	High range	Number of sites with AAQC exceedances
Benzene annual mean	0.369 $\mu\text{g}/\text{m}^3$ at Windsor West	0.706 $\mu\text{g}/\text{m}^3$ at Hamilton Downtown	1
Toluene 24-hour max	3.270 $\mu\text{g}/\text{m}^3$ at Windsor West	10.088 $\mu\text{g}/\text{m}^3$ at Sarnia	0
Toluene annual mean	0.730 $\mu\text{g}/\text{m}^3$ at Windsor West	0.895 $\mu\text{g}/\text{m}^3$ at Sarnia	Not applicable
Ethylbenzene 24-hour max	0.364 $\mu\text{g}/\text{m}^3$ at Windsor West	0.728 $\mu\text{g}/\text{m}^3$ at Hamilton Downtown	0
Ethylbenzene annual mean	0.122 $\mu\text{g}/\text{m}^3$ at Hamilton Downtown	0.127 $\mu\text{g}/\text{m}^3$ at Sarnia	Not applicable

Averaging time	Low range	High range	Number of sites with AAQC exceedances
m- and p-xylene 24-hour max	1.158 µg/ m ³ at Windsor West	2.508 µg/ m ³ at Hamilton Downtown	0
m- and p-xylene annual mean	0.272 µg/ m ³ at Sarnia	0.383 µg/ m ³ at Hamilton Downtown	Not applicable
o-xylene 24-hour max	0.428 µg/ m ³ at Windsor West	0.842 µg/ m ³ at Hamilton Downtown	0
o-xylene annual mean	0.100 µg/ m ³ at Sarnia	0.137 µg/ m ³ at Hamilton Downtown	Not applicable
1,3-butadiene 24-hour max	0.050 µg/ m ³ at Windsor West	0.296 µg/ m ³ at Sarnia	0

Averaging time	Low range	High range	Number of sites with AAQC exceedances
1,3-butadiene annual mean	0.050 µg/m ³ at Windsor West	0.062 µg/m ³ at Sarnia	0

Concentrations of some VOCs in neighborhoods that are located in close proximity to local sources such as an industrial facility may be higher than those measured at the ministry's AQHI monitoring stations which are sited to be representative of general population exposure.

A summary of the 2022 VOCs annual statistics for individual AQHI air monitoring stations is detailed in the Appendix: 2022 benzene annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-benzene>) , 2022 toluene annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-toluene>) , 2022 ethylbenzene annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-ethylbenzene>) , 2022 m- and p-xylene annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-pxylene>) , 2022 o-xylene annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-pxylene>) , and 2022 1,3-butadiene annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-oxylene>) .

Ontario VOC emissions by sector, 2022

General solvent use

28%

Printing/Surface coating

17%

Industrial

16%

Other transportation

14%

Residential

11%

Miscellaneous

7%

Road vehicles

7%

This is a chart depicting Ontario's VOC emissions by sector based on 2022 estimates for point/area/transportation sources. Please note this chart excludes emissions from open and natural sources (Environment and Climate Change Canada, Air Pollutant Emission Inventory 1990-2022, 2024).

General solvent use (e.g., degreasing, adhesives and sealants, consumer and commercial products) accounted for 28% of VOC emissions in 2022; and transportation sector accounted for 21% (Air Pollutant Emission Inventory 1990-2022, 2024).

Ontario Ambient Air Quality Criteria

Ambient air quality refers to general air quality resulting from all sources of contaminants to air. Ambient Air Quality Criteria (AAQC) are a concentration of a contaminant in air that is protective against adverse effects on health and/or the environment. AAQC are not regulatory values but are used to assess general (ambient) air quality resulting from all sources (i.e., industrial and non-industrial sources) of a contaminant to air. AAQC are most commonly used in environmental assessments, special studies using ambient air monitoring data, assessment of general air quality in a community and annual reporting on air quality across the province.

Ontario's Ambient Air Quality Criteria for common air pollutants

Contaminant	10 minute AAQC Assesses protection against acute effects	1-hour AAQC Assesses protection against acute effects	8-hour AAQC Assesses protection against acute effects	24-hour AAQC Assesses protection against chronic effects	Annual AAQC Assesses protection against chronic effects
NO ₂	N/A	200 ppb	N/A	100 ppb	N/A
PM _{2.5}	N/A	N/A	N/A	27 µg/m ³ [1]	8.8 µg/m ³ [2]
O ₃	N/A	80 ppb	N/A	N/A	N/A
SO ₂	67 ppb	40 ppb	N/A	N/A	4 ppb
CO	N/A	30 ppm	13 ppm	N/A	N/A
Benzene	N/A	N/A	N/A	2.3 µg/m ³	0.45 µg/m ³

Toluene	N/A *****	N/A *****	N/A *****	2,000 µg/ m ³ [3] *****	N/A *****
Ethylbenzene	1,900 µg/ m ³ [3] *****	N/A *****	N/A *****	1,000 µg/ m ³ *****	N/A *****
Xylene	3,000 µg/ m ³ [3] *****	N/A *****	N/A *****	730 µg/ m ³ *****	N/A *****
1,3-Butadiene	N/A *****	N/A *****	N/A *****	10 µg/m ³ *****	2 µg/m ³ *****
Manganese in PM_{2.5}	N/A *****	N/A *****	N/A *****	0.1 µg/ m ³ *****	N/A *****

Notes:

- ppb – parts (of contaminant) per billion (parts of air) – by volume.
- µg/m³ – micrograms (of contaminant) per cubic metre (of air) – by weight.
- ppm – parts (of contaminant) per million (parts of air) – by volume.

National Air Quality Management System

The national Air Quality Management System (<https://ccme.ca/en/air-quality-report>) (AQMS) is a collaborative approach for reducing air pollution in Canada. It consists of several elements:

- Canadian Ambient Air Quality Standards: non-regulatory health and environmental-

based air quality objectives intended to drive improvements where needed.

- air zone management framework: management approach builds around air zone areas delineated within a province or territory.
- regional airsheds: six regional airsheds cover all of Canada and allow for coordination and joint action in resolving issues across provincial/territorial boundaries and international borders.
- base-level industrial emissions requirements: intended to ensure that all significant industrial sources in Canada, regardless of where facilities are located, meet base-level performance standards.
- addressing mobile emission sources: builds on the existing range of federal, provincial and territorial initiatives aimed at reducing emissions from the transportation sector.

Canadian Ambient Air Quality Standards

The Canadian Council of Ministers of the Environment (<https://www.ccme.ca/en>) have developed Canadian Ambient Air Quality Standards (CAAQS) as a key element of the Air Quality Management System to drive improvement of air quality across Canada. CAAQS are non-regulatory ambient air objectives that are used to assess general air quality and reflect desirable concentrations of contaminants in air from all sources. CAAQS have been developed for fine particulate matter, ozone, nitrogen dioxide and sulphur dioxide.

Canadian Ambient Air Quality Standards

Pollutant	Averaging time	Numerical value 2015	Numerical value 2020	Numerical value 2025	Statistical form
Fine particulate	24-hour	28 µg/m ³	27 µg/m ³	N/A	The 3-year average of the annual

Pollutant	Averaging time	Numerical value 2015	Numerical value 2020	Numerical value 2025	Statistical form
matter (PM_{2.5})					98 th percentile of the PM _{2.5} daily 24-hour average concentrations
Fine particulate matter (PM_{2.5})	Annual	10.0 µg/m ³	8.8 µg/m ³	N/A	The 3-year average of the annual average of the PM _{2.5} daily 24-hour average concentrations
Ozone (O₃)	8-hour	63 ppb	62 ppb	60 ppb	The 3-year average of the annual 4 th highest of the daily maximum 8-hour average ozone concentrations
Nitrogen dioxide (NO₂)	1-hour	N/A	60 ppb	42 ppb	The 3-year average of the annual 98 th percentile of the NO ₂ daily maximum 1-hour average concentrations

Pollutant	Averaging time	Numerical value 2015	Numerical value 2020	Numerical value 2025	Statistical form
Nitrogen dioxide (NO₂)	Annual	N/A	17 ppb	12 ppb	The average over a single calendar year of all NO ₂ 1-hour average concentrations
Sulphur dioxide (SO₂)	1-hour	N/A	70 ppb	65 ppb	The 3-year average of the annual 99 th percentile of the SO ₂ daily maximum 1-hour average concentrations
Sulphur dioxide (SO₂)	Annual	N/A	5.0 ppb	4.0 ppb	The average over a single calendar year of all 1-hour average SO ₂ concentrations

Source: Canadian Council of Ministers of the Environment (<https://ccme.ca/en>)

Air zone management framework

- The air zone management framework (AZMF) is a place-based approach to managing air quality under the AQMS.
- The framework provides guidance on management, monitoring and reporting actions to be implemented in an area to achieve the CAAQS.

- Under the AQMS, each jurisdiction is required to:
 - delineate air zones to cover their entire jurisdiction
 - publicly report on monitored levels of the CAAQS pollutants in their air zones
 - identify management actions to improve air quality in their air zones

Air zones – Managing air quality in Ontario

As part of its implementation of the federal AQMS, Ontario has identified six geographic air zones falling into one of three air zone categories. These air zone designations are based on factors such as pollutant sources, topography, meteorological patterns, population density and other factors that potentially influence ambient air concentrations.

Ontario air zone categories and areas

Air zone categories	Air zone areas
Category 1 Areas with limited pollution from either point or non-point sources or transboundary influence	Northern Ontario (except for Sudbury and Sault Ste. Marie)
Category 2 Areas under pressure from multiple sources including some or all of the following: non-point sources, smaller point sources, individual large industrial point sources, transboundary influences	Southern Ontario (except for Sarnia/ St. Clair Township and Hamilton) Sault Ste. Marie Sudbury
Category 3 Areas with a concentration of large industrial sources	Sarnia/St. Clair Township Hamilton

Ontario has designated 27 AQHI ambient air monitoring stations located across all of the

province’s air zones as CAAQS reporting stations. These 27 designated stations report for each of the CAAQS parameters, except for SO₂ which only has 9 CAAQS reporting stations. Designated sites normally refer to communities with populations greater than 100,000 and/or communities with large industrial emission sources.

CAAQS reporting stations in Ontario air zone categories and areas

This map presents the locations of the designated CAAQS reporting stations within the air zone areas of each air zone category in Ontario.

Air zone management levels and objectives

- Four “management levels” provide general guidance on the state of air quality in each air zone relative to the CAAQS.
- The four management levels are identified by specific colours: red, orange, yellow and green, each corresponding to a contaminant concentration range that is specific to each CAAQS.
- Each management level is associated with a suite of actions that become progressively more stringent as air pollution concentrations approach or exceed the CAAQS.
- The air zone management level is determined by the designated CAAQS reporting station(s) with the highest CAAQS metric within the air zone.

The air zone management framework

Progressively more rigorous actions as air pollutant concentrations approach or exceed the CAAQS.

Management level	Objective
Red The highest level of air quality management	To reduce pollutant levels below the CAAQS through advanced air management actions

Management level	Objective
Orange The second highest level of air quality management	To improve air quality through active air management and prevent exceedance of the CAAQS
Yellow The second lowest level of air quality management	To improve air quality using early and ongoing actions for continuous improvement
Green The lowest level of air quality management	To maintain good air quality through proactive air management measures to keep clean areas clean

The numeric concentration ranges for each management level for each CAAQS pollutant are presented in the Appendix: Management Levels for CAAQS Pollutants.

Air zone management

Taking action within each air zone area to reduce emissions, provide information on air quality conditions and report publicly on these actions is an important part of the air management framework. Ontario's approach to air zone management is to combine a province-wide framework of regulations and programs to protect air quality across Ontario with enhanced activities within specific air zone areas as appropriate.

An inventory of the actions Ontario was taking in 2022 to improve and maintain air quality across Ontario is presented in the Appendix: Air Quality Management Actions by Air Zone Area (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#airzones>). This inventory provides an overview of measures likely to have an impact on the four CAAQS pollutants (PM_{2.5}, ozone, NO₂ and SO₂), or their precursors.

This inventory is organized into three sections: (i) Ontario air quality management actions across all air zone areas in effect in 2022, which describes province-wide initiatives; (ii) Air

zone area-specific actions in effect in 2022, including regulations, policies, industrial site-specific standards and technical standards; and (iii) Changes that occurred between 2022 and the publication of this report.

Information about Ontario's air zone management planning are presented in the Appendix: Ontario Air Quality Management Actions by Air Zone (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#airzones2>) , Ontario Air Quality Management Actions Across All Air Zones (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#airzones>) , and Changes in Air Quality Management Actions since 2022 (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#airzonechanges>) .

Canadian Ambient Air Quality Standard achievement

Highlights

10-year trends

- 24-hour PM_{2.5} CAAQS metric concentrations have decreased by 17%.
- Annual PM_{2.5} CAAQS metric concentrations have decreased by 19%.
- 8-hour ozone CAAQS metric concentrations have decreased by 7%.
- 1-hour NO₂ CAAQS metric concentrations have decreased by 13%.
- Annual NO₂ CAAQS metric concentrations have decreased by 27%.
- 1-hour SO₂ CAAQS metric concentrations have decreased by 41%.
- Annual SO₂ CAAQS metric concentrations have decreased by 42%.

2022 results

- All CAAQS reporting sites achieved the 24-hour and annual PM_{2.5} CAAQS.
- Six CAAQS reporting sites achieved the CAAQS of 62 ppb for ozone in 2022, whereas the remaining 21 sites did not.
- All CAAQS reporting sites achieved the 1-hour and annual NO₂ CAAQS.

- Eight CAAQS reporting sites achieved the 1-hour CAAQS of 70 ppb for SO₂ in 2022, whereas the remaining 1 site did not.
- All CAAQS reporting sites achieved the annual SO₂ CAAQS.

10-year trends – Fine particulate matter

10-year trend of 24-hour PM_{2.5} CAAQS metrics in Ontario

This is a line graph showing the trend of the 24-hour fine particulate matter Canadian Ambient Air Quality Standard metrics from 2013 to 2022 in Ontario. This trend shows Ontario's decrease of 17% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 26 ambient air monitoring stations.
- The CAAQS for 24h PM_{2.5} (27 µg/m³) is based on the 98th percentile measurement annually, averaged over three consecutive years.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

10-year trend of annual PM_{2.5} CAAQS metrics in Ontario

This is a line graph showing the trend of the annual fine particulate matter Canadian Ambient Air Quality Standard metrics from 2013 to 2022 in Ontario. This trend shows Ontario's decrease of 19% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 26 ambient air monitoring stations.
- The CAAQS for annual PM_{2.5} (8.8 µg/m³) is based on the annual mean averaged over three consecutive years.

- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 10-year trends, based on the 24-hour and annual PM_{2.5} CAAQS metrics at each of the designated monitoring sites, are presented in the Appendix: PM_{2.5} and ozone CAAQS metric trends for designated sites across Ontario (2013-2022) (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-caaqs>) .

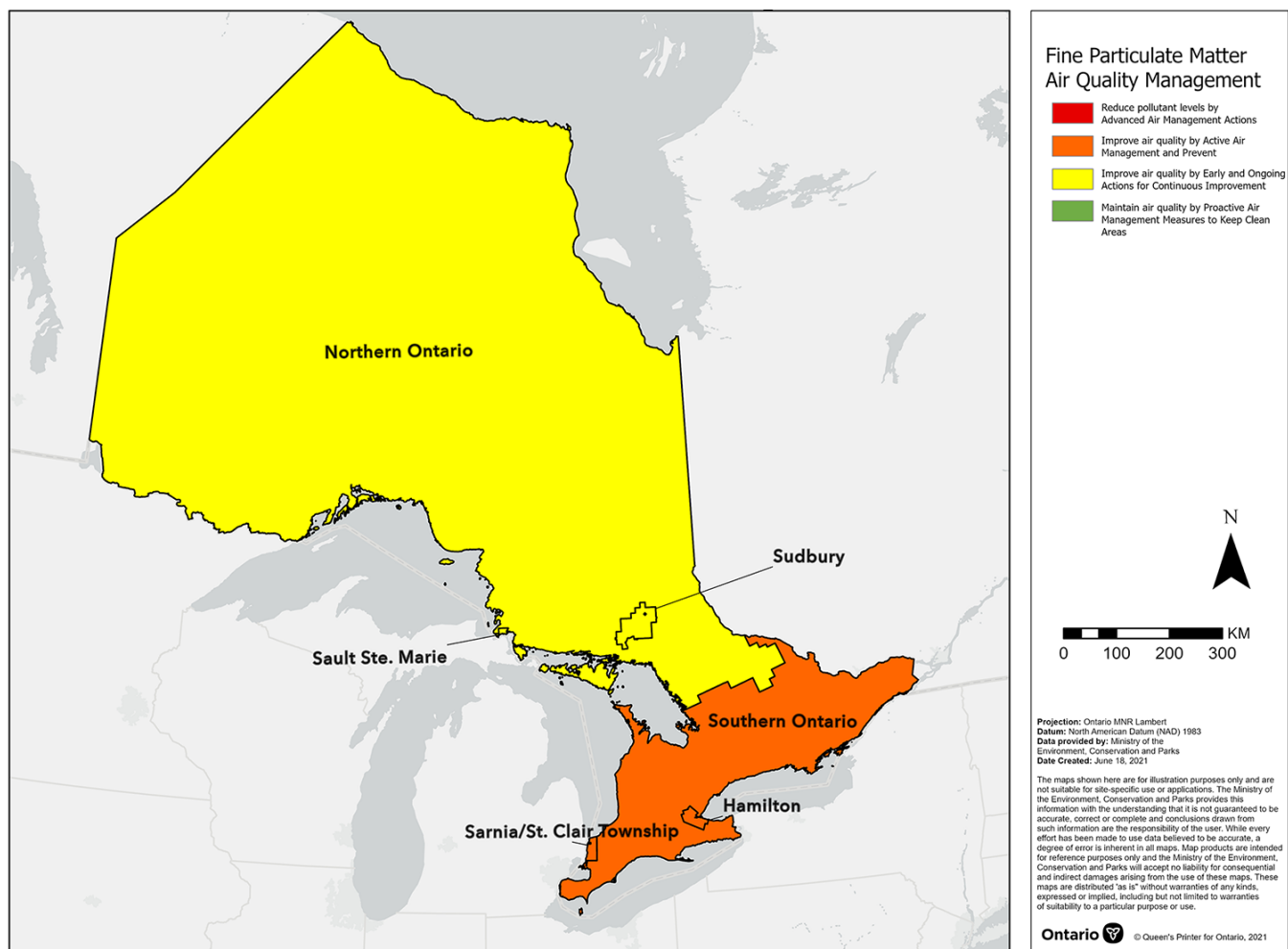
2022 results – Fine particulate matter

Summary of PM_{2.5} CAAQS metrics for 2022

Averaging time	Low range	High range	Number of sites with CAAQS exceedances
PM _{2.5} 24-hour	13 µg/m ³ at Sault Ste. Marie	22 µg/m ³ at Hamilton Downtown	0
PM _{2.5} annual	4.9 µg/m ³ at Sault Ste. Marie	8.5 µg/m ³ at Hamilton Downtown	0

All six air zones achieved the CAAQS for PM_{2.5}. A summary of the 2022 CAAQS metric values for the 24-hour and annual PM_{2.5} at individual CAAQS reporting stations is in the Appendix: PM_{2.5} and ozone CAAQS metric values for designated sites across Ontario (2022) (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-caaqs>) .

PM_{2.5} CAAQS management levels for air zones across Ontario, 2022



This map displays the fine particulate matter Canadian Ambient Air Quality Standard management levels for air zones across Ontario in 2022. These management levels are based on the highest CAAQS metric value reported by designated CAAQS reporting sites within each air zone. According to AQMS air quality management guidance, it is recommended that the Sarnia/St. Clair Township, Hamilton and Southern Ontario air zones improve air quality by active air management and prevent exceedance of the CAAQS, while the Sudbury, Sault Ste. Marie and Northern Ontario air zones are encouraged to use early and ongoing actions for continuous improvement.

The PM_{2.5} CAAQS metrics associated with the management levels are presented in the Appendix: Management levels for PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#management-levels>).

10-year trends – Ground-level ozone

10-year trend of 8-hour O₃ CAAQS metrics in Ontario

This is a line graph showing the trend of the 8-hour ozone Canadian Ambient Air Quality

Standard metrics from 2013 to 2022 in Ontario. This trend shows Ontario's decrease of 7% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 26 ambient air monitoring stations.
- The CAAQS for ozone (62 ppb) is based on the consecutive three-year average of the annual 4th highest daily maximum eight-hour running average.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 10-year trends, based on the 8-hour ozone CAAQS metrics at each of the designated monitoring sites, are presented in the Appendix: PM_{2.5} and ozone CAAQS metric trends for designated sites across Ontario (2013-2022) (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-caaqs>) .

2022 results – Ground-level ozone

Summary of ozone CAAQS metrics for 2022

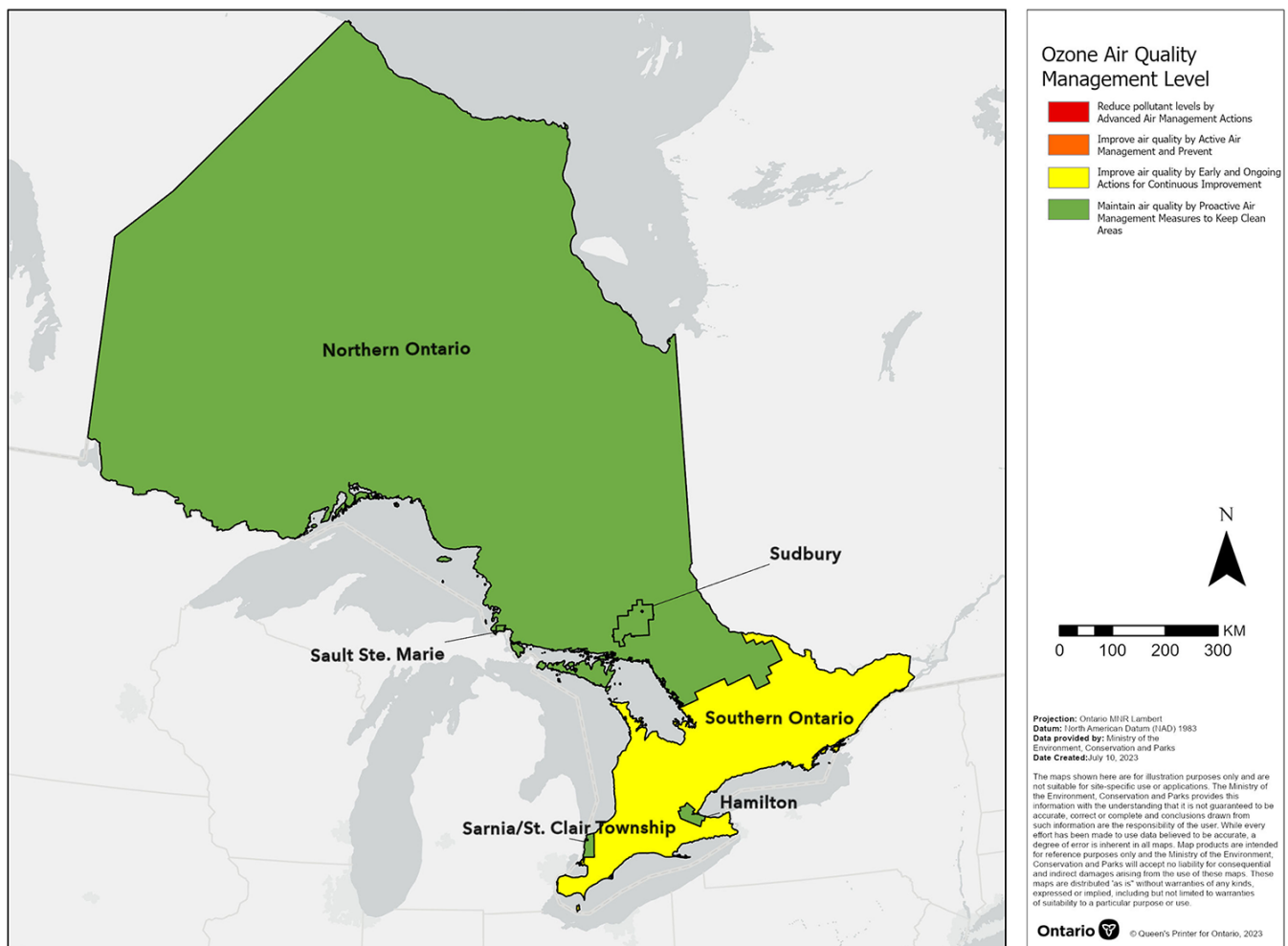
Averaging time	Low range	High range	Number of sites with CAAQS exceedances
Ozone 8-hour	50 ppb at Thunder Bay	69 ppb at Sarnia	21

Three air zones did not achieve the CAAQS for ozone. Transboundary influences, from both the U.S. and beyond, account for a significant portion of Ontario's ozone when their levels are elevated. All of Ontario's CAAQS reporting stations would have met the ozone CAAQS if transboundary flow days were excluded from the calculated metric using a

weight of evidence (WOE) analysis.

A summary of the 2022 CAAQS metric values for 8-hour ozone at individual CAAQS reporting stations is in the Appendix: PM_{2.5} and ozone CAAQS metric values for designated sites across Ontario (2022) (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-caaqs>) .

Ozone CAAQS effective management levels for air zones across Ontario, 2022



This map displays the ozone Canadian Ambient Air Quality Standard effective management levels for air zones across Ontario in 2022. The assignment of effective management levels was based upon the removal of transboundary influence using a WOE approach. These management levels are based on the highest Canadian Ambient Air Quality Standard metric value reported by designated CAAQS reporting sites within each air zone once transboundary influence was removed. According to AQMS air quality management guidance, it is recommended that the Southern Ontario air zone use early and ongoing actions for continuous improvement, while the Sarnia/St. Clair Township, Hamilton, Sudbury, Sault Ste. Marie and Northern Ontario air zones are encouraged to maintain good air quality through proactive management measures to keep clean areas clean.

The ozone CAAQS metrics associated with the management levels are presented in the Appendix: Management levels for ozone.

Weight of Evidence analysis

Transboundary influences, from both the U.S. and beyond, account for a significant portion of Ontario's ozone when levels are elevated. A Weight of Evidence (WOE) analysis

demonstrates the influence of transboundary flow on days with elevated ozone concentrations and confirms that Ontario's CAAQS reporting stations would have met the ozone CAAQS if transboundary flow days were excluded from the calculated metric.

The WOE approach consists of performing, evaluating, and documenting a series of technical analyses that collectively support the conclusion that exceedances of the CAAQS on a given day were influenced by transboundary flows or exceptional events. These analyses may include assessing the meteorological conditions (airflow, wind speed and direction, temperature, stability, etc.) and pollutant concentrations in Ontario and upwind locations.

10-year trends – Nitrogen dioxide

10-year trend of 1-hour NO₂ CAAQS metrics in Ontario

This is a line graph showing the trend of the 1-hour nitrogen dioxide Canadian Ambient Air Quality Standard metrics from 2013 to 2022 in Ontario. This trend shows Ontario's decrease of 13% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 26 ambient air monitoring stations.
- The CAAQS for 1-hour NO₂ (60 ppb) is based on the 98th percentile of the daily maximum 1-hour average concentrations, averaged over three consecutive years.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

10-year trend of annual NO₂ CAAQS metrics in Ontario

This is a line graph showing the trend of the annual nitrogen dioxide Canadian Ambient Air Quality Standard metrics from 2013 to 2022 in Ontario. This trend shows Ontario's decrease of 27% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 26 ambient air monitoring stations.
- The CAAQS for annual NO₂ (17 ppb) is based on the average over a single calendar year of all 1-hour average NO₂ concentrations.

The 10-year trends, based on the 1-hour and annual NO₂ CAAQS metrics at each of the designated monitoring sites, are presented in Appendix: NO₂ and SO₂ CAAQS Metric Trends for Designated Sites Across Ontario (2013-2022) (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-caaqs>) .

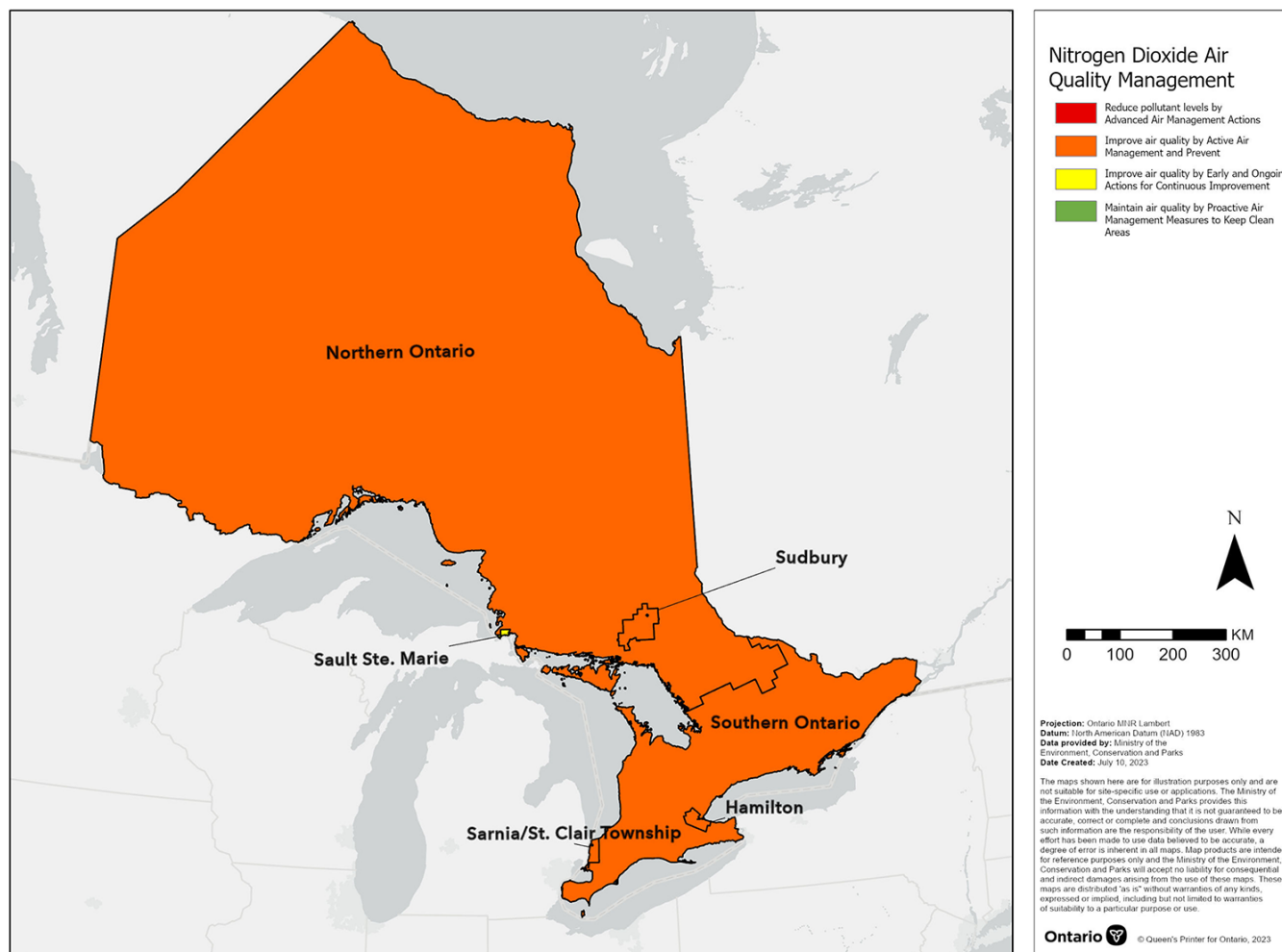
2022 results – Nitrogen dioxide

Summary of NO₂ CAAQS metrics for 2022

Averaging time	Low range	High range	Number of sites with CAAQS exceedances
NO ₂ 1-hour	22 ppb at Oshawa	52 ppb at Toronto Downtown	0
NO ₂ annual	3.5 ppb at Kingston	14.4 µg/m ³ at Toronto Downtown	0

All six air zones achieved the CAAQS for NO₂. A summary of the 2022 CAAQS metric values for the 1-hour and annual NO₂ at individual CAAQS reporting stations is in the Appendix: NO₂ and SO₂ CAAQS Metric Values for Designated Sites Across Ontario (2022) (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-caaqs>) .

NO₂ CAAQS management levels for air zones across Ontario, 2022



This map displays the nitrogen dioxide Canadian Ambient Air Quality Standard management levels for air zones across Ontario in 2022. These management levels are based on the highest CAAQS metric value reported by designated Canadian Ambient Air Quality Standard reporting sites within each air zone. According to AQMS air quality management guidance, it is recommended that the Sarnia/St. Clair Township, Hamilton, Sudbury, Southern and Northern Ontario air zones improve air quality by active air management and prevent exceedance of the CAAQS, while it is encouraged that the Sault Ste. Marie air zone improve air quality using early and ongoing actions for continuous improvement.

The NO₂ CAAQS metrics associated with the management levels are presented in the Appendix: Management levels for NO₂.

10-year trends – Sulphur dioxide

10-year trend of 1-hour SO₂ CAAQS metrics in Ontario

This is a line graph showing the trend of the 1-hour sulphur dioxide Canadian Ambient Air

Quality Standard metrics from 2013 to 2022 in Ontario. This trend shows Ontario's decrease of 41% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 8 ambient air monitoring stations.
- The CAAQS for 1-hour SO_2 (70 ppb) is based on the annual 99th percentile of the SO_2 daily maximum 1-hour average concentrations, averaged over three consecutive years.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

10-year trend of annual SO_2 CAAQS metrics in Ontario

This is a line graph showing the trend of the annual sulphur dioxide Canadian Ambient Air Quality Standard metrics from 2013 to 2022 in Ontario. This trend shows Ontario's decrease of 42% over this 10-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The Ontario 10-year trend is based on data from 8 ambient air monitoring stations.
- The CAAQS for annual SO_2 (5.0 ppb) is based on the average over a single calendar year of all 1-hour average SO_2 concentrations.

The 10-year trends, based on the 1-hour and annual SO_2 CAAQS metrics at each of the designated monitoring sites, are presented in Appendix: NO_2 and SO_2 CAAQS Metric Trends for Designated Sites Across Ontario (2013-2022) (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#tenyear-caaqs>) .

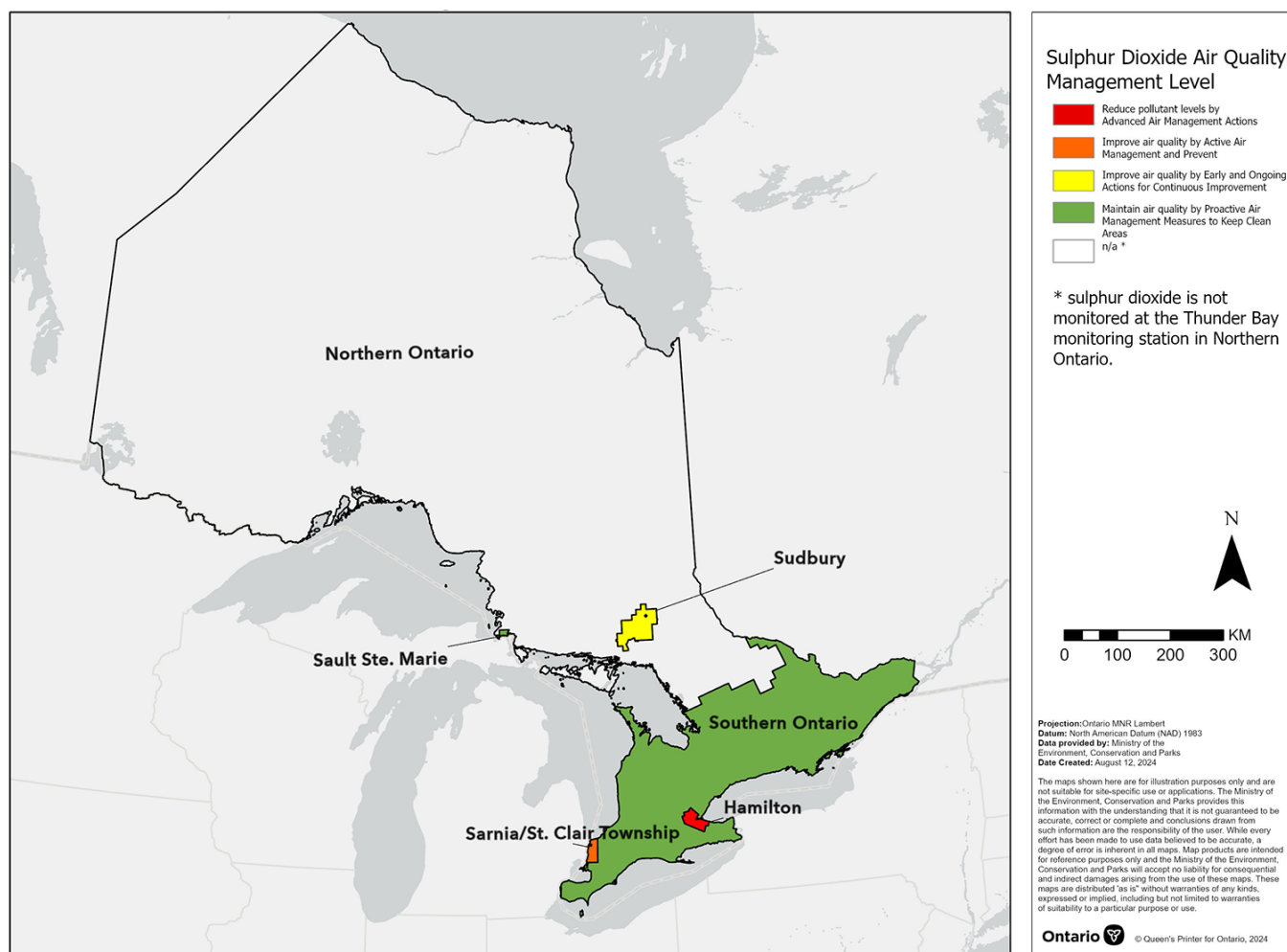
2022 results – Sulphur dioxide

Summary of SO₂ CAAQS metrics for 2022

Averaging time	Low range	High range	Number of sites with CAAQS exceedances
SO ₂ 1-hour	2 ppb at Ottawa Downtown	81 ppb at Hamilton Downtown	1
SO ₂ annual	0.2 ppb at Toronto North	3.7 ppb at Hamilton Downtown	0

One air zone did not achieve the CAAQS for SO₂. A summary of the 2022 CAAQS metric values for the 1-hour and annual SO₂ at individual CAAQS reporting stations is in the Appendix: NO₂ and SO₂ CAAQS Metric Values for Designated Sites Across Ontario (2022).

SO₂ CAAQS management levels for air zones across Ontario, 2022



This map displays the sulphur dioxide Canadian Ambient Air Quality Standard management levels for air zones across Ontario in 2022. These management levels are based on the highest CAAQS metric value reported by designated Canadian Ambient Air Quality Standard reporting sites within each air zone. According to AQMS air quality management guidance, it is recommended that the Hamilton air zone reduce pollutant levels below the CAAQS through advanced air management actions. For the Sarnia/St. Clair Township air zone, it is recommended that the air zone improve air quality through active air management and prevent exceedance of the CAAQS. Using early and ongoing actions for continuous improvement is encouraged for the Sudbury air zone, while the Sault Ste. Marie and Southern Ontario air zones are encouraged to maintain good air quality through proactive management measures to keep clean areas clean. The designated CAAQS site in the Northern Ontario air zone (Thunder Bay) does not measure SO₂.

The SO₂ CAAQS metrics associated with the management levels are presented in the Appendix: Management levels for SO₂.

Transboundary influences on Ontario's smog

Smog related air pollutants (i.e., $PM_{2.5}$, ozone and their precursors) are generated both locally and regionally, and, with winds, can travel hundreds of kilometres, affecting areas far from the source of the pollution. The long-range transport and transboundary flow of air pollutants play a significant role in Ontario's air quality. Typically, during the summer, elevated levels of these smog related pollutants are often associated with distinct weather patterns (e.g., slow-moving high-pressure systems originating from south of the lower Great Lakes) that results in the long-range transport of these pollutants into Ontario from neighbouring U.S. industrial and urbanized states during south to southwesterly flow conditions (Yap et al., 2005).

Transboundary sources from around the globe (global background) are also significant contributors to Ontario's ozone levels.

Long-range transport and transboundary flow of air pollutants

During the smog season (May to September) prevailing southwesterly airflows results in the transport of smog related pollutants from the U.S. (for example, NO_x emissions from electricity generators in the Ohio Valley) into Ontario.

NO_x emissions from electricity generators and prevailing winds

This map shows the nitrogen oxides emissions from electricity generators located in eastern U.S. and Canada with prevailing winds during smog season.

Note:

- Canadian Data: National Pollutant Release Inventory, Environment and Climate Change Canada (ECCC) (<https://www.canada.ca/en/services/environment/pollution-waste-management/national-pollutant-release-inventory.html>)
- U.S. Data: Clean Air Markets Program Data, United States Environmental Protection Agency (USEPA) (<https://campd.epa.gov/>)

Modelling transboundary impacts on Ontario's air quality

The Community Multi-Scale Air Quality model (CMAQ) (USEPA, 2018), developed by the U.S. Environmental Protection Agency, was used to characterize and predict the formation, transportation, deposition and transformation of smog related pollutants (e.g., ozone and PM_{2.5}) in the atmosphere. Emissions of smog precursors from a region that included eastern North America was used along with meteorological conditions to assess ambient concentrations of pollutants using model-ready inventory data ^[1] as compiled and made available periodically by Environment and Climate Change Canada (ECCC) and the United States Environmental Protection Agency (U.S. EPA). The CMAQ model results quantify the impact of transboundary flows of smog related pollutants into and across Ontario.

Transboundary influences on Ontario's smog

Fine particulate matter (PM_{2.5})

Transboundary contributions to Ontario's PM_{2.5} concentrations are mainly due to secondary PM_{2.5} formation (i.e., PM_{2.5} is formed in the atmosphere through a series of complex reactions involving precursor emissions such as sulphur dioxide and nitrogen oxides) originating from U.S. sources. These transboundary contributions vary across the province, ranging from approximately 25% to 87%.

Along Canada-U.S. border areas of southwestern Ontario, transboundary sources of PM_{2.5} (mainly secondary PM_{2.5}) dominate, contributing to over 70% of the annual PM_{2.5} concentrations, and decreasing further away from border areas as shown below.

Transboundary influences on Ontario's annual average PM_{2.5} concentrations

This map shows the transboundary influences on Ontario's annual average fine particulate matter concentrations.

In the Greater Toronto Area (GTA) and Ottawa, where there are many more local sources of directly emitted PM_{2.5}, transboundary contributions of PM_{2.5} are much less (e.g. up to 25% in the GTA and 35% in Ottawa).

Outside of urban areas, transboundary influences increase in all directions. In much of northern Ontario the majority of the PM_{2.5} is dominated by transboundary sources (over 80% in most cases) as there are very few local sources of directly emitted PM_{2.5}.

Ozone

The influence of transboundary sources (U.S. and global background) on ozone levels in Ontario varies across the province. Transboundary contributions are most notable in areas of southwestern Ontario, in close proximity to the U.S. border, and along the northern shore of Lake Erie and the eastern shore of Lake Huron/Georgian Bay. In southwestern Ontario, when ozone levels are elevated, over 95% of the ozone is attributable to transboundary sources, with the U.S. contributing to as much as 40% and the remainder attributable to global background, as shown below.

Transboundary contributions vary across the province, ranging from approximately 87% to 99% with the US contributions accounting for approximately 11% to 38%.

Influences on Ontario's ozone concentrations on high concentration days

This map shows influences on Ontario's ground-level ozone concentrations on high concentration days.

Global background plays a significant role in Ontario's transboundary air pollution, contributing to 60-80% of ozone concentrations on poor air quality days across the province. In areas of northern Ontario, global background levels are more significant and could be more than 80%.

As ozone precursor emissions continue to decrease across North America, the rising global background levels play an increasingly important role in Ontario's air quality (Environment and Climate Change Canada, 2013).

Michigan-Ontario Ozone Source Experiment Study

Transboundary influences, from both the U.S. and beyond, account for a significant portion of Ontario's ozone. In southwestern Ontario, when ozone levels are elevated, over 95% of the ozone is attributable to transboundary sources, with the U.S. contributing to as much as 40% and the remainder attributable to global background.

The Michigan-Ontario Ozone Source Experiment (MOOSE) was a two-year collaborative project designed to improve our understanding of how meteorology and various emission sources of ozone precursors (e.g., NO_x from transportation and VOCs from landfills and

petroleum refineries) contribute to elevated ozone levels in the southeast Michigan/southwestern Ontario airshed. The Ontario Ministry of the Environment, Conservation and Parks (MECP) participated in the study led by the Michigan Department of Environment, Great Lakes and Energy (<https://www.michigan.gov/egle>) (EGLE), which also involved the United States Environmental Protection Agency (<https://www.epa.gov/>) , Environment and Climate Change Canada (ECCC) (<https://www.canada.ca/en/environment-climate-change.html>) and the Lake Michigan Air Directors Consortium (<https://www.ladco.org>) (LADCO). The National Aeronautics and Space Administration (<https://www.nasa.gov>) (NASA), National Oceanic and Atmospheric Administration (<https://www.noaa.gov>) (NOAA), U.S. Forest Service (<https://www.fs.usda.gov>) , and several universities also took part.

Fieldwork for the MOOSE study was carried out over the summer periods of 2021 and 2022, and was comprised of three sub-experiments:

1. Great Lakes Meteorology and Ozone Recirculation (GLAMOR) designed to:
 - better understand and model complex meteorology, lake breezes, urban heat island effects and their impacts on ozone events and transport
2. Chemical Source Signatures (CHESS) designed to:
 - measure ozone precursors at monitoring stations where ozone values are highest
 - characterize ozone precursor emissions in Sarnia and Windsor (e.g., emissions from industrial facilities), and assess their impacts on ozone levels on both sides of the U.S.–Canada Border
 - perform air modelling to improve emission inventories of ozone precursors and to inform emission control strategies
3. Methane Releases from Landfills and Gas Lines (MERLIN) designed to:
 - quantify methane emissions (an ozone precursor) from natural gas pipelines and landfills in southeast Michigan

As part of Ontario's contributions to the MOOSE study, the ministry enhanced air monitoring activities at its Windsor West AQHI air monitoring station and conducted mobile air monitoring of VOCs (other ozone precursors) upwind and downwind of industrial sources in Sarnia, Windsor, and the U.S./Canada border.



Two photographs showing the exterior (left) and interior (right) of the Windsor West Air Quality Health Index Station.

Findings of the MOOSE study include:

- Local ozone production in southeast Michigan is likely most sensitive to VOC emission controls, meaning that reducing VOC emissions has the most impact on ozone mitigation.
- Concentrations of VOCs (including toluene, benzene, methyl ethyl ketone and butene) were generally elevated near industrial facilities.
- Storage of benzene at petrochemical facilities was the main local source contributing to measured ambient benzene levels.
- Toluene and xylenes were mainly linked to petroleum refineries and road vehicles, whereas methyl ethyl ketone was associated with chemical waste handling.
- VOC emissions from solvent use have increased as urban areas expanded, while emissions from transportation sources have declined over the past decades.
- Local traffic and regional/transboundary industrial sources make approximately equal contributions to concentrations of heavy metals (e.g., iron and copper) in Windsor, Ontario.
- VOC emissions from specific facilities are identifiable based on distinct chemical signatures that differentiate emissions from neighboring sources.
- Methane leaks from landfills and natural gas pipelines were observed and could substantially increase ozone formation from VOC and NO_x emissions.

The results of the MOOSE study highlighted the need for more improved modeling (e.g., the use of finer-resolution air quality models) to better to assess the effectiveness of emission control strategies in the border region. Based on the findings of this study, a regional-scale reduction in nitrogen dioxide emissions from transportation sources combined with more localized reductions in industrial sources of VOCs is likely the best approach to reducing ozone episodes in southern Ontario. Overall, the MOOSE study provided important insights to help guide emission reduction efforts to improve air quality in the US-Canada border region.

Additional information on the MOOSE study is available in the following publications:

Healy, R.M.; Sofowote, U.M.; Wang, J.M.; Chen, Q.; Todd, A. Spatially Resolved Source Apportionment of Industrial VOCs Using a Mobile Monitoring Platform (<https://doi.org/10.3390/atmos13101722>) . Atmosphere 2022, 13, 1722. .

Olague, E.P.; Su, Y.; Stroud, C.A.; Healy, R.M.; Batterman, S.A.; Yacovitch, T.I.; Chai, J.; Huang, Y.; Parsons, M.T. The Michigan–Ontario Ozone Source Experiment (MOOSE): An Overview (<https://doi.org/10.3390/atmos14111630>) . Atmosphere 2023, 14, 1630.

Yacovitch, T.I.; Lerner, B.M.; Canagaratna, M.R.; Daube, C.; Healy, R.M.; Wang, J.M.; Fortner, E.C.; Majluf, F.; Claflin, M.S.; Roscioli, J.R.; et al. Mobile Laboratory Investigations of Industrial Point Source Emissions during the MOOSE Field Campaign (<https://doi.org/10.3390/atmos14111632>) . Atmosphere 2023, 14, 1632.

Zhang, T.; Su, Y.; Debosz, J.; Noble, M.; Munoz, A.; Xu, X. Continuous Measurements and Source Apportionment of Ambient PM_{2.5}-Bound Elements in Windsor, Canada (<https://doi.org/10.3390/atmos14020374>) . Atmosphere 2023, 14, 374.

Zhang, T.; Su, Y.; Debosz, J.; Noble, M.; Munoz, A.; Xu, X. Sensitivity of Source Apportionment of Ambient PM_{2.5}-Bound Elements to Input Concentration Data (<https://doi.org/10.3390/atmos14081269>) . Atmosphere 2023, 14, 1269

Air Quality Health Index overview

The federal Air Quality Health Index (<https://www.canada.ca/en/environment-climate-change/services/air-quality-health-index/about.html>) (AQHI) is a health protection communication tool designed to help the public make decisions to protect their health by limiting short-term exposure to air pollution and adjusting activities during increased levels of air pollution. It is based on the cumulative health effects of three common air pollutants: ozone, nitrogen dioxide, and fine particulate matter. It is measured on a scale

from 1 to 10+, the lower the number, the lower the risk. Each risk category has accompanying health messaging ^[1] . The health messages associated with the AQHI are outlined in the table below.

Air Quality Health Index categories and health messages

Health Risk	Air Quality Health Index	Health messages At risk population [2]	Health messages General population
Low	1-3	Enjoy your usual outdoor activities.	Ideal air quality for outdoor activities.
Moderate	4-6	Consider reducing or rescheduling strenuous activities outdoors if you are experiencing symptoms.	No need to modify your usual activities unless you experience symptoms such as coughing and throat irritation.
High	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	Above 10	Avoid strenuous activities outdoors. Children and the elderly should also	Reduce or reschedule strenuous activities outdoors, especially if you experience symptoms such

Health Risk	Air Quality Health Index	Health messages At risk population [2]	Health messages General population
		avoid outdoor physical exertion.	as coughing and throat irritation.

Source: Environment and Climate Change Canada.

Air Quality Health Index annual results

- Based on the AQHI categories, in 2022, Ontario reported low risk air quality 94.40% of the time, moderate risk 5.57% of the time, high risk 0.03% of the time and very high risk 0.002% of the time.
- The percentage distribution of hourly AQHI readings for each of the 38 monitoring sites by AQHI value and the number of high risk AQHI days is detailed in the Appendix: 2022 Air Quality Health Index summary (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#section-8>)

Roadside air monitoring in Ontario

Vehicles are a major source of air pollution in Ontario. Traffic-related air pollution is emitted from vehicle exhausts, fuel evaporation, and non-tailpipe sources such as brakes, tires and road dust. Elevated levels of traffic-related air pollution can be found up to 250 meters from a major road.

Exposure to traffic-related air pollutants has been linked to a wide range of adverse health outcomes, including respiratory and cardiovascular diseases, cancer, adverse birth and developmental outcomes, and premature mortality. Children, seniors, and people with pre-existing health conditions are more vulnerable to the adverse health effects from traffic-related pollution.

In 2015, Ontario, in collaboration with Environment and Climate Change Canada, established a dedicated roadside air monitoring network, the first of its kind in Canada, to

better understand traffic-related air pollution in highly urbanized settings. These three dedicated roadside air monitoring stations monitor common air pollutants as well as the traffic-related pollutants such as NO₂, PM_{2.5}, ultrafine particles, black carbon, metals and major components of PM_{2.5}. The ministry has also designated 10 of its AQHI stations located near major roads as roadside air monitoring stations to complement the roadside air monitoring network.

Roadside air monitoring stations

This is a map depicting the three dedicated and ten AQHI roadside air monitoring stations across Ontario that were in operation during 2022.

Note:

- Roadside air monitoring stations are located typically within approximately 100 m of a major roadway with daily traffic volumes greater than 10,000 vehicles per day.

Nitrogen dioxide

Combustion or burning of carbon-based materials (e.g., wood, gasoline) in air produces nitrogen oxides (NO_x), of which NO₂ is a component. The transportation sector is the main source of nitrogen dioxide in Ontario.

Highlights

7-year trends

- NO₂ concentrations across the roadside air monitoring network have decreased by 15%.

2022 results

- No exceedances of Ontario's 1-hour and 24-hour Ambient Air Quality Criteria (AAQC) of 200 ppb and 100 ppb, respectively.

7-year trends

Trend of NO₂ annual means across the roadside air monitoring network,

2016-2022

This is a line graph showing the trend of NO₂ annual mean concentrations across the roadside air monitoring network from 2016 to 2022. The NO₂ annual mean concentrations decreased by 15% over this 7-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 7-year trend is based on data from 12 roadside air monitoring stations.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 7-year trend for NO₂ at individual roadside air monitoring stations in Ontario is presented in the Appendix: 7-year trend for nitrogen dioxide (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#seven-no2>) .

2022 results

Summary of NO₂ results for 2022 at roadside air monitoring stations

Averaging time	Low range	High range	Number of sites with AAQC exceedances
NO ₂ 1-hour max	40.7 ppb at North Bay	75.6 ppb at Toronto Downtown	0
NO ₂ 24-	20.5 ppb	40.4 ppb at Toronto	0

Averaging time	Low range	High range	Number of sites with AAQC exceedances
hour max	at North Bay	Hwy 401	
NO₂ annual mean	4.1 ppb at North Bay	17.8 ppb at Toronto Hwy 401	Not applicable

A summary of the 2022 NO₂ annual statistics for individual roadside air monitoring stations is detailed in the Appendix: 2022 nitrogen dioxide (NO₂) annual statistics for the roadside air monitoring network (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#section-9>).

Fine particulate matter

Fine particulate matter consists of primary and secondary PM_{2.5}. Primary PM_{2.5} is emitted directly to the atmosphere. Major sources of primary PM_{2.5} include residential fireplaces and wood stoves, motor vehicles, smelters, power plants, industrial facilities, and agricultural burning and wildfires. Secondary PM_{2.5} is formed indirectly in the atmosphere through a series of complex chemical reactions of gaseous precursors such as nitrogen dioxide and sulphur dioxide.

Highlights

7-year trends

- No trend in PM_{2.5} concentrations across the roadside air monitoring network

2022 results

- 10 roadside air monitoring stations measured above the 24-hour reference level of 27 µg/m³ on at least one occasion.
- 2 roadside air monitoring station measured above the annual reference level of

8.8 $\mu\text{g}/\text{m}^3$.

7-year trends

Trend of $\text{PM}_{2.5}$ annual means across the roadside air monitoring network, 2016-2022

This is a line graph showing the trend of $\text{PM}_{2.5}$ annual mean concentrations across the roadside air monitoring network from 2016 to 2022. There was no trend over this 7-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 7-year trend is based on data from 12 roadside air monitoring stations.
- Ontario uses the annual $\text{PM}_{2.5}$ CAAQS “as is” for comparison to a single annual average of air quality data; this value, 8.8 $\mu\text{g}/\text{m}^3$, is considered a Reference Level.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 7-year trend for $\text{PM}_{2.5}$ at individual roadside air monitoring stations in Ontario is presented in the Appendix: 7-year trend for fine particulate matter (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#sevenyear-pm2.5>).

2022 results

Summary $\text{PM}_{2.5}$ results for 2022

Averagin g time	Low range	High range	Number of sites with AAQC exceedances

Averaging time	Low range	High range	Number of sites with AAQC exceedances
PM_{2.5} 1-hour max	30 µg/m ³ at Thunder Bay	90 µg/m ³ at Hamilton Downtown	Not applicable
PM_{2.5} 24-hour max	15.8 µg/m ³ at North Bay	39.4 µg/m ³ at Toronto Hwy 401	10
PM_{2.5} annual mean	5.03 µg/m ³ at Thunder Bay	9.09 µg/m ³ at Toronto Hwy 401	1

A summary of the 2022 PM_{2.5} annual statistics for individual roadside air monitoring stations is detailed in the Appendix: 2022 fine particulate matter (PM_{2.5}) annual statistics for the roadside air monitoring network (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#section-9>) .

Ultrafine particles

Ultrafine particles are less than 0.1 µm in aerodynamic diameter and are mostly emitted from road traffic in urban environments. These tiny particles have larger surface areas per unit mass to absorb toxic chemicals and can also penetrate deep into the lungs.

Highlights

7-year trends

- No trend in ultrafine particles

2022 results

- There is no AAQC for ultrafine particles.

7-year trends

Trend of ultrafine particles annual means across the roadside air monitoring network, 2016-2022

This is a line graph showing the trend of ultrafine particles annual mean concentrations from 2016 to 2022. There was no trend for the roadside air monitoring network over this 7-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 7-year trend is based on data from three roadside air monitoring stations.
- Ontario does not have an annual AAQC for ultrafine particles.

- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 7-year trend for ultrafine particles at individual roadside air monitoring stations in Ontario is presented in the Appendix: 7-year trend for ultrafine particles (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#sevenyear-ultrafine>) .

2022 results

Summary of ultrafine particles results for 2022

Averaging time	Low range	High range	Number of sites with AAQC exceedances
Ultrafine particles 1-hour max	65,460 particles/cm ³ at Toronto Island	236,400 particles/cm ³ at Toronto Hwy 401	Not applicable
Ultrafine particles 24-hour max	24,705 particles/cm ³ at Toronto North	145,390 particles/cm ³ at Toronto Hwy 401	Not applicable

A summary of the 2022 ultrafine particles annual statistics for individual roadside air monitoring stations is detailed in the Appendix: 2022 ultrafine particles annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-ultrafine>) .

Black carbon

Black carbon is a sooty black material produced through incomplete combustion processes. It is emitted from anthropogenic (e.g., engines and coal-fired power plants) and natural sources (e.g., wildfires). Black carbon comprises a significant portion of fine particulate matter and is linked to both climate warming and adverse health effects.

Highlights

7-year trends

- Black carbon concentrations have decreased by 30%

2022 results

- There is no AAQC for black carbon.

7-year trends

Trend of black carbon annual means across the roadside air monitoring network, 2016-2022

This is a line graph showing the trend of black carbon annual mean concentrations from 2016 to 2022 across the roadside air monitoring network. The black carbon annual mean concentrations within the network have decreased by 30% over this 7-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 7-year trend is based on data from 8 roadside air monitoring stations.
- Ontario does not have an annual AAQC for black carbon.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 7-year trend for black carbon at individual roadside air monitoring stations in Ontario is presented in the Appendix: 7-year trend for black carbon (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#sevenyear-carbon>) .

2022 results

Summary of black carbon results for 2021

Averaging time	Low range	High range	Number of sites with AAQC exceedances

Averaging time	Low range	High range	Number of sites with AAQC exceedances
Black carbon 1-hour max	3.52 µg/m ³ at Hamilton Downtown	6.48 µg/m ³ at Toronto Hwy 401	Not applicable
Black carbon 24-hour max	1.21 µg/m ³ at Toronto Island	3.10 µg/m ³ at Toronto Hwy 401	Not applicable

A summary of the 2022 black carbon annual statistics for individual roadside air monitoring stations is detailed in the Appendix: 2022 black carbon annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#sixyear-nitrate>) .

Heavy metals in PM_{2.5}

Heavy metals are a loose term used to refer to naturally occurring trace elements, including metals that reside lower in the Periodic Table of Elements. In PM_{2.5}, they are often associated with industrial processes, vehicle emissions, and various human activities. When inhaled, these airborne particles can accumulate in the body over time and have adverse health effects, particularly when exposure levels are high or prolonged. The ministry measures 24 heavy metals in PM_{2.5}^[1], of which six select metals are presented below since they are often measured above their respective detection limits.

Highlights

7-year trends

- No trend for iron in ambient air.
- Ambient copper concentrations have decreased by 22%.

- Ambient manganese concentrations have decreased by 24%.
- Ambient lead concentrations have decreased by 14%.
- Ambient selenium concentrations have increased by 25%.
- Ambient zinc concentrations decreased by 37%.

2022 results

- No exceedances of the 24-hour AAQC for manganese in PM_{2.5}.
- There are no AAQC for iron, copper, lead, selenium and zinc in PM_{2.5}.

7-year trends

Trend of iron in PM_{2.5} annual means across the roadside air monitoring network, 2016-2022

This is a line graph showing the trend of iron in PM_{2.5} annual mean concentrations from 2016 to 2022 across the roadside air monitoring network. There was no trend over this 7-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 7-year trend is based on data from 2 roadside air monitoring stations.
- Ontario does not have an annual AAQC for iron in PM_{2.5}.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of copper in PM_{2.5} annual means across the roadside air monitoring network, 2016-2022

This is a line graph showing the trend of copper in PM_{2.5} annual mean concentrations from 2016 to 2022 across the roadside air monitoring network. Copper in PM_{2.5} annual mean concentrations decreased by 22% over this 7-year period. To view the data for a

specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 7-year trend is based on data from 2 roadside air monitoring stations.
- Ontario does not have an annual AAQC for copper in PM_{2.5}.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of manganese in PM_{2.5} annual means across the roadside air monitoring network, 2016-2022

This is a line graph showing the trend of manganese in PM_{2.5} annual mean concentrations from 2016 to 2022 across the roadside air monitoring network. Manganese in PM_{2.5} annual mean concentrations decreased by 24% over this 7-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 7-year trend is based on data from 2 roadside air monitoring stations.
- Ontario does not have an annual AAQC for manganese in PM_{2.5}.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of lead in PM_{2.5} annual means across the roadside air monitoring network, 2016-2022

This is a line graph showing the trend of lead in PM_{2.5} annual mean concentrations from 2016 to 2022 across the roadside air monitoring network. Lead in PM_{2.5} annual mean concentrations decreased by 14% over this 7-year period. To view the data for a specific

location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 7-year trend is based on data from 2 roadside air monitoring stations.
- Ontario does not have an annual AAQC for lead in $PM_{2.5}$.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of selenium in $PM_{2.5}$ annual means across the roadside air monitoring network, 2016-2022

This is a line graph showing the trend of selenium in $PM_{2.5}$ annual mean concentrations from 2016 to 2022 across the roadside air monitoring network. Selenium in $PM_{2.5}$ annual mean concentrations increased by 25% over this 7-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 7-year trend is based on data from 2 roadside air monitoring stations.
- Ontario does not have an annual AAQC for selenium in $PM_{2.5}$.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of zinc in $PM_{2.5}$ annual means across the roadside air monitoring network, 2016-2022

This is a line graph showing the trend of zinc in $PM_{2.5}$ annual mean concentrations from 2016 to 2022 across the roadside air monitoring network. Zinc in $PM_{2.5}$ annual mean concentrations decreased by 37% over this 7-year period. To view the data for a specific location, please select the 'Stations' radio button and use the drop-down menu.

Note:

- The 7-year trend is based on data from 2 roadside research air monitoring stations.
- Ontario does not have an annual AAQC for zinc in PM_{2.5}.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

The 7-year trend for heavy metals at individual roadside air monitoring stations in Ontario is presented in the Appendix: 7-year trend for iron in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#sevenyear-iron>) ; 7-year trend for copper in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#sevenyear-copper>) ; 7-year trend for manganese in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#sevenyear-manganese>) ; 7-year trend for lead in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#sevenyear-lead>) ; 7-year trend for selenium in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#sevenyear-selenium>) ; 7-year trend for zinc in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#sevenyear-zinc>) .

2022 results

Summary of heavy metals in PM_{2.5} results for 2022

Averaging time	Low range	High range	Number of sites with AAQC exceedances
Iron in PM _{2.5} 1-hour max	4,909.5 ng/m ³ at Hamilton Downtown	5,874.0 ng/m ³ at Toronto Hwy 401	Not applicable

Averaging time	Low range	High range	Number of sites with AAQC exceedances
Iron in PM_{2.5} 24-hour max	737.0 ng/m ³ at Hamilton Downtown	1,020.6 ng/m ³ at Toronto Hwy 401	Not applicable
Copper in PM_{2.5} 1-hour max	216.7 ng/m ³ at Hamilton Downtown	603.7 ng/m ³ at Toronto Hwy 401	Not applicable
Copper in PM_{2.5} 24-hour max	36.6 ng/m ³ at Hamilton Downtown	45.6 ng/m ³ at Toronto Hwy 401	Not applicable
Manganese in PM_{2.5} 1-hour max	94.3 ng/m ³ at Toronto Hwy 401	608.0 ng/m ³ at Hamilton Downtown	Not applicable
Manganese in PM_{2.5} 24-hour max	14.1 ng/m ³ at Toronto Hwy 401	41.2 ng/m ³ at Hamilton Downtown	0
Lead in PM_{2.5} 1-hour max	151.1 ng/m ³ at Hamilton Downtown	197.7 ng/m ³ at Toronto Hwy 401	Not applicable

Averaging time	Low range	High range	Number of sites with AAQC exceedances
Lead in PM_{2.5} 24-hour max	20.8 ng/m ³ at Hamilton Downtown	22.3 ng/m ³ at Toronto Hwy 401	Not applicable
Selenium in PM_{2.5} 1-hour max	13.57 ng/m ³ at Hamilton Downtown	61.62 ng/m ³ at Toronto Hwy 401	Not applicable
Selenium in PM_{2.5} 24-hour max	4.35 ng/m ³ at Hamilton Downtown	10.46 ng/m ³ at Toronto Hwy 401	Not applicable
Zinc in PM_{2.5} 1-hour max	1,031.0 ng/m ³ at Hamilton Downtown	3,637.9 ng/m ³ at Toronto Hwy 401	Not applicable
Zinc in PM_{2.5} 24-hour max	173.4 ng/m ³ at Toronto Island	347.5 ng/m ³ at Toronto Hwy 401	Not applicable

A summary of the 2022 heavy metals in PM_{2.5} annual statistics for individual roadside air monitoring stations is detailed in the Appendix: 2022 iron in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-iron>) ; 2022 copper in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-copper>) ; 2022 manganese in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-manganese>)

www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-manganese) ; 2022 lead in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-lead>) ; 2022 selenium in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-selenium>) ; and 2022 zinc in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-zinc>) .

Major components in PM_{2.5}

Major components in PM_{2.5}, with the exception of black carbon and metals, are the parts of tiny particles that can change or evaporate when exposed to heat (also known as non-refractory species in PM_{2.5}). In the air, these include organic compounds, sulphate, nitrate and ammonium compounds. Vehicle emissions and industry are major sources of these components which can affect human health.

The ministry measures five major components in PM_{2.5}, of which four components are presented since chloride is mostly below its detection limit.

Highlights

7-year trends

- No trend for organics in PM_{2.5}
- Sulphate in PM_{2.5} has decreased 34%
- Nitrate in PM_{2.5} has decreased 36%
- Ammonium in PM_{2.5} has decreased 27%

2022 results

- There are no AAQC for major components in PM_{2.5}, such as, organics, sulphate, nitrate and ammonium.

7-year trends

Trend of organics in PM_{2.5} at Toronto Hwy 401, 2016-2022

This is a line graph showing the trend of organics in $PM_{2.5}$ annual mean concentrations from 2016 to 2022 at the Toronto Hwy 401 roadside air monitoring station. There was no trend over this 7-year period.

Note:

- Ontario does not have an annual AAQC for organics in $PM_{2.5}$.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of sulphate in $PM_{2.5}$ at Toronto Hwy 401, 2016-2022

This is a line graph showing the trend of sulphate in $PM_{2.5}$ annual mean concentrations from 2016 to 2022 at the Toronto Hwy 401 roadside air monitoring station. Sulphate in $PM_{2.5}$ annual mean concentrations decreased by 34% over this 7-year period.

Note:

- Ontario does not have an annual AAQC for sulphate in $PM_{2.5}$.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of nitrate in $PM_{2.5}$ at Toronto Hwy 401, 2016-2022

This is a line graph showing the trend of nitrate in $PM_{2.5}$ annual mean concentrations from 2016 to 2022 at the Toronto Hwy 401 roadside air monitoring station. Nitrate in $PM_{2.5}$ annual mean concentrations decreased by 36% over this 7-year period.

Note:

- Ontario does not have an annual AAQC for nitrate in $PM_{2.5}$.
- Air quality in Ontario can vary from year to year due to a variety of factors including

pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Trend of ammonium in PM_{2.5} at Toronto Hwy 401, 2016-2022

This is a line graph showing the trend of ammonium in PM_{2.5} annual mean concentrations from 2016 to 2022 at the Toronto Hwy 401 roadside air monitoring station. Ammonium in PM_{2.5} annual mean concentrations decreased by 27% over this 7-year period.

Note:

- Ontario does not have an annual AAQC for ammonium in PM_{2.5}.
- Air quality in Ontario can vary from year to year due to a variety of factors including pollutant emissions, weather, natural events such as wildfires, and the long-range transport of air pollutants from the United States and elsewhere. Long term trends are thus a better reflection of any improvements or a deterioration in air quality over time versus year over year changes.

Relative distribution of major components in PM_{2.5} at Toronto Hwy 401, 2016-2022

This is a stacked column chart showing the relative distribution of major components in PM_{2.5} based on annual mean concentrations from 2016 to 2022 at the Toronto Hwy 401 roadside air monitoring station. Relative contribution of PM_{2.5} components varied from year to year with the organic component representing the largest contribution across all years.

The 7-year trends for the four major components in PM_{2.5} monitored at the Toronto Hwy 401 roadside air monitoring station in Ontario are presented in the Appendix: 7-year trend for organics in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#sevenyear-organics>) ; 7-year trend for sulphate in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#sevenyear-sulphate>) ; 7-year trend for nitrate in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#sevenyear-nitrate>) ; 7-year trend for ammonium in PM_{2.5} (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#sevenyear-ammonium>) .

Summary of major components in PM_{2.5} results for 2022 at Toronto Hwy 401

Averaging time	Concentration	Number of sites with AAQC exceedances
Organics in PM _{2.5} 1-hour max	79.3 µg/m ³	Not applicable
Organics in PM _{2.5} 24-hour max	17.31 µg/m ³	Not applicable
Sulphate in PM _{2.5} 1-hour max	9.4 µg/m ³	Not applicable
Sulphate in PM _{2.5} 24-hour max	3.63 µg/m ³	Not applicable
Nitrate in PM _{2.5} 1-hour max	9.5 µg/m ³	Not applicable
Nitrate in PM _{2.5} 24-hour max	6.77 µg/m ³	Not applicable

Averaging time	Concentration	Number of sites with AAQC exceedances
Ammonium in PM_{2.5} 1-hour max	32.0 µg/m ³	Not applicable
Ammonium in PM_{2.5} 24-hour max	2.67 µg/m ³	Not applicable

A summary of the 2022 annual statistics for major components in PM_{2.5} at the Toronto Hwy 401 roadside air monitoring station is detailed in the Appendix: 2022 organics in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-organics>) ; 2022 sulphate in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-sulphate>) ; 2022 nitrate in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-nitrate>) ; 2022 ammonium in PM_{2.5} annual statistics (<https://www.ontario.ca/document/air-quality-ontario-2022-report/appendix#annual-ammonium>) .

Learn more about what Ontario is doing to protect our air. (<https://www.ontario.ca/page/air-quality-ontario>)

Acronyms

AAQC

Ambient Air Quality Criterion (Ontario)

AQHI

Air Quality Health Index

CAAQS

Canadian Ambient Air Quality Standard

CCME

Canadian Council of Ministers of the Environment

CHESS

Chemical Source Signatures

CO

carbon monoxide

ECCC

Environment and Climate Change Canada

GLAMOR

Great Lakes Meteorology and Ozone Recirculation

Hwy

Highway

M-K

Mann-Kendall (statistical test)

MERLIN

Methane Releases from Landfills and Gas Lines

MOOSE

Michigan-Ontario Ozone Source Experiment

NAPS

National Air Pollution Surveillance

NO

nitric oxide

NO₂

nitrogen dioxide

NO_x

nitrogen oxides

O₃

ozone

PM

particulate matter

PM_{2.5}

fine particulate matter

SAHA

Smog and Air Health Advisory

SAQS

Special Air Quality Statement

SHARP

Synchronized Hybrid Ambient Real-time Particulate

SO₂

sulphur dioxide

TRAP

Traffic-related air pollutants

TRS

total reduced sulphur

U.S.

United States (of America)

VOCs

volatile organic compounds

WOE

weight of evidence

Km

kilometres

Kt

kilotonnes

#/cm³

number (of contaminant) per cubic centimetre (of air) – count

ng/m³

nanograms (of contaminant) per cubic metre (of air) – by weight

µg/m³

micrograms (of contaminant) per cubic metre (of air) – by weight

ppb

parts (of contaminant) per billion (parts of air) – by volume

ppm

parts (of contaminant) per million (parts of air) – by volume

Glossary

Air Quality Health Index

Real-time information system that provides the public with an indication of air quality in cities, towns and in rural areas across Ontario. The AQHI derives a value based on the cumulative health effects of three pollutants – O₃, PM_{2.5} and NO₂.

AQHI station

Continuous monitoring station used to inform the public of general ambient air quality levels over an entire region (not a localized area) on a real-time basis; station reports on criteria pollutant levels that are not unduly influenced by a single emission source, but rather are the result of emissions from multiple sources, including those in neighbouring provinces and states.

Ambient air

Outdoor or open air.

Ambient monitoring

Measurements of regional air quality less influenced by local and industrial sources of air contaminants.

Annual mean

The average value of data for a given year.

Area sources

Small collective emission sources that are inventoried as a group, such as any small residential, governmental, institutional, commercial or industrial fuel combustion operations, which are too numerous to inventory as point sources.

Black carbon

The sooty black material produced through incomplete combustion processes. It is emitted from anthropogenic (e.g., engines and coal-fired power plants) and natural sources (e.g., wildfires). Black carbon comprises a significant portion of fine particulate matter and is linked to both climate warming and adverse health effects.

Butene

Butene, also known as butylene, is a colourless gas that is present in crude oil. It is highly flammable.

Carbon monoxide

A colourless, odourless, tasteless, and at high concentrations, poisonous gas.

Continuous pollutants

Pollutants for which a continuous measurement record exists; effectively, pollutants that have hourly data (maximum 8,760 values per year except leap year – e.g. 2020 where maximum values for the year are 8,784).

Continuous station

Where pollutants are measured on a real-time basis and data determined hourly (for example ozone, sulphur dioxide).

Criterion

Maximum concentration or level (based on potential effects) of pollutant that is desirable or considered acceptable in ambient air.

Downwind

The direction the wind is going to. If the wind is blowing towards the Southeast (blowing from the Northwest), then the downwind direction is towards the Southeast and the upwind direction is towards the Northwest.

Exceedance

Above the air pollutant concentration levels established by environmental protection criteria or other environmental standards.

Fine particulate matter

Also referred as $PM_{2.5}$ or respirable particles: particles smaller than 2.5 micrometres in

aerodynamic diameter, which arise mainly from fuel combustion, condensation of hot vapors and chemically driven gas-to-particle conversion processes. These are fine enough to penetrate deep into the lungs.

Fossil fuels

Natural gas, petroleum, coal and any form of solid, liquid or gaseous fuel derived from organic materials for the purpose of generating heat.

Fly ash

Generated as a by-product of incineration and coal combustion, and is used as a replacement for cement in concrete, among other uses.

Ground-level ozone

Colourless gas formed from chemical reactions between nitrogen oxides and volatile organic compounds (VOCs) in the presence of sunlight near the Earth's surface.

Heavy metals

Refers to naturally occurring trace elements including metals that reside lower in the Periodic Table of Elements. In PM_{2.5}, they are often associated with industrial processes, vehicle emissions, and various human activities. When inhaled, these airborne particles can accumulate in the body over time and have adverse health effects, particularly when exposure levels are high or prolonged.

Mann-Kendall (M-K) test

A nonparametric statistical approach that can be applied to data without making assumptions on the nature of the data distribution. The M-K test is suitable for environmental monitoring data to handle missing, trace and below detection limit values.

Meteorological conditions

The conditions in the atmosphere (e.g. temperature, air pressure, water vapour, air flows, etc.), and the variations (over time and space, both vertically and horizontally) and interactions of these conditions.

Methane

Methane is a colourless and odourless hydrocarbon that is a primary component of natural gas. It is also a greenhouse gas which affects the earth's temperature. Sources of methane are both anthropogenic and natural.

Methyl ethyl ketone

Methyl ethyl ketone is a colorless liquid with a sharp, sweet odour. It is a manufactured chemical, but it is also found in the environment from natural sources.

Metric

Concentrations measured at a monitoring station calculated in the statistical form of a standard.

Micrometre

A millionth of a metre.

Miscellaneous sources

The term used to describe groupings of sources that are in general minor when

considered individually and are grouped together to illustrate their total contributions. These typically include agricultural/commercial/institutional/ construction fuel combustion; commercial cooking; incineration and waste; solvent use, etc.

Natural sources

Emission sources such as biogenic emissions from vegetation, biological and geological sources, wildfires, and other sources not made by humans.

Nitrogen dioxide

A reddish-brown gas with a pungent and irritating odour.

Non-refractory species in PM_{2.5}

Species or components in PM_{2.5} that require less than approximately 600 – 650°C during analyses, such as organics, sulphate, nitrate and ammonium.

Open sources

Emission sources that emit air contaminants over large geographical areas. Examples include dust from farms, construction, and paved and unpaved roads.

Other transportation sources

The general term used to describe non-road transportation sources including off-road motor vehicles and engines, aircraft, marine and railways.

Oxidation

A chemical reaction where a substance gains an oxygen; for example, in the atmosphere, sulphur dioxide is oxidized by hydroxyl radicals to form sulphate.

Particulate matter

The general term used to describe a mixture of microscopic solid particles and liquid droplets suspended in air.

Point sources

Sources that have a fixed location and are identified individually by name and location.

Precursor

A substance that changes into another substance through a chemical reaction.

Primary pollutant

Pollutant emitted directly to the atmosphere.

Reference Level

Ontario uses some benchmarks from other jurisdictions, for comparison to measured air quality (notably in this report, the Canadian Ambient Air Quality Standards for fine particulate matter). Since these benchmarks are not “air standards” under Ontario regulation, they are referred to in this report as “reference levels.”

Residence time

The average length of time during which a particle is in a given location or condition.

Respirable particles

See definition for fine particulate matter.

Secondary pollutant

A pollutant formed from other pollutants in the atmosphere.

Sen's slope

The Sen's slope (also known as the Thiel-Sen's estimator) is closely-related to and applied in conjunction with the Mann-Kendall Test. Compared to the common least squares regression, the Sen's slope procedure is a nonparametric method for computing the value of the true slope when there are gross errors or outliers in the data (Gilbert, 1987) without making assumptions of a normal distribution on the data.

Smog

A contraction of smoke and fog; colloquial term used for photochemical smog, which includes ozone, fine particulate matter and other contaminants; tends to be a brownish haze.

Stratosphere

Atmosphere 10 to 40 kilometres above the Earth's surface.

Stratospheric ozone

Ozone formed in the stratosphere from the conversion of oxygen molecules by solar radiation; ozone found there absorbs some of the sun's ultraviolet radiation and prevents it from reaching the Earth.

Styrene

Primarily a synthetic chemical that is used extensively in the manufacture of plastics, rubber, and resins. It is also known as vinylbenzene, ethenylbenzene, cinnamene, or phenylethylene.

Sulphur dioxide

A colourless gas that smells like burnt matches.

Transportation sources

Mobile emission sources such as wheeled vehicles, ships, aircraft and railroad locomotives.

Troposphere

Atmospheric layer extending from the surface up to about 10 kilometres above the Earth's surface.

Ultrafine particles

Particles that are less than 0.1 μm in aerodynamic diameter; mostly emitted from road traffic in urban environments. These tiny particles have larger surface areas per unit mass to absorb toxic chemicals and can penetrate deep into the lungs.

Upwind

The direction the wind is coming from. If the wind is blowing from the Northwest (blowing toward the Southeast) then the upwind direction is toward the Northwest and the downwind direction is toward the Southeast.

Appendix

The Appendix is intended for use in conjunction with the 2022 Annual Air Quality in Ontario Report. The Appendix briefly describes the provincial Air Quality Health Index (AQHI) network, quality assurance and quality control procedures, and the Ministry of the Environment, Conservation and Parks' air quality database. It also includes a series of tables displaying station locations and a listing of the summary statistics including means, maximums, percentile values and the number of exceedances of the Ontario Ambient Air Quality Criteria (AAQC) for each pollutant. In addition, trends for select common pollutants are displayed for a 10-year period, whereas trends for select research parameters are displayed for a 7-year period.

Monitoring network operations

Network description

In 2022, the ministry operated 38 ambient air monitoring sites across Ontario as part of the AQHI network. The AQHI network was comprised of 131 continuous monitoring instruments at 38 sites. These instruments have the capability of recording minute data (approximately 70 million data points per year) that are used to scan and validate the continuous hourly data.

Quality assurance and quality control

Day-to-day maintenance and support of the instruments are administered by ministry staff. Instrumentation precision is verified by daily automatic internal zero and span checks. Data analysts and station operators review span control charts to confirm instrument precision using a telemetry system. A quarterly quality assurance and quality control (QA/QC) review is performed on the ambient data set to highlight anomalies and administer corrective action in a timely manner.

The air monitoring station operators routinely inspect and maintain monitoring equipment and stations with mandatory quarterly on-site visits where secondary transfer standards are used to calibrate instrumentation. Station maintenance activities are recorded using Fieldworker Inc. software, an electronic documentation solution; this information is transferred directly to the ministry's database. The instrumentation used throughout the provincial air monitoring network has been standardized to Thermo Electron Corporation analyzers to streamline parts inventory and leverage common hardware used within each analyzer. The following is a summary of the instrumentation deployed within the network and are all US EPA designated equivalent methods:

- Nitrogen Oxides – TE42C/I
- Fine Particulate Matter – SHARP 5030
- Ozone – TE49C/I
- Sulphur Dioxide – TE43I
- Carbon Monoxide – TE48I
- Total Reduced Sulphur – TE43I/CDN101

The ministry operates a laboratory with gas reference standards that adhere to those of the U.S. National Institute of Standards and Technology (NIST) and the Air Quality Research Division of Environment and Climate Change Canada. The secondary transfer standards used by station operators are referenced and certified to the ministry's NIST primary standards on a quarterly basis.

The TRAP instrumentation used throughout the roadside air monitoring network include:

- Ultrafine Particles – Teledyne API Model 651
- Black Carbon in PM_{2.5} – Magee Scientific AE33 Aethalometer
- Heavy Metals in PM_{2.5} – Cooper Environmental Xact 625
- Major Components in PM_{2.5} – Aerodyne Quadrupole Aerosol Chemical Speciation Monitor (ACSM)

The Ontario ambient air quality monitoring network undergoes constant maintenance to ensure a high standard of quality control. Continuous real-time data are consistently reviewed, assessed and validated by ministry staff. Immediate actions are taken to correct any inconsistencies that may affect the validity of the data. These measures ensure ambient air monitoring data are valid, complete, comparable, representative and accurate. As a result, the 2022 ambient air quality monitoring network had 98.3% valid data from over one million hourly data points.

Data base

The ambient air quality data used in this report are stored in the ministry's air quality information system (AQUIS) and are made available through the Air Quality Ontario web site (<http://www.airqualityontario.com/history/>) , and the Ontario Data Catalogue (<https://www.ontario.ca/search/data-catalogue?sort=asc>) . A statistical pattern test is used to

identify data anomalies, such as unusual pollutant concentrations. Each pollutant has a predetermined concentration range based on historical data. Values outside this range are flagged for further investigation.

Data are obtained from automated ambient air monitoring instruments that operate continuously to produce an average measurement for every hour for a possible total of 8,760 measurements in a given year. Hourly parameters measured include NO/NO₂/NO_x, PM_{2.5}, O₃, SO₂, CO and TRS compounds. An annual mean requires at least 6,570 hourly readings. In addition, each quarter of the year should have 75% valid data for PM_{2.5}, whereas for ozone, only the 2nd and 3rd quarters of the year require 75% valid data based on protocols that are consistent with the Canadian Council of Ministers of the Environment (CCME) and the United States Environmental Protection Agency (U.S. EPA). For VOC samples, half of the method detection limit (MDL) is applied as appropriate to concentrations measured below the detection limit. An annual and/or monthly mean for 24-hour VOC samples requires 50% of valid samples. The 50% data requirement also applies to the research parameters (ultrafine particles, black carbon and trace metals and major components of PM_{2.5}).

Network descriptive table

The AQHI network for 2022 is summarized in the 2022 Ontario Continuous Ambient Air Monitoring Network. The table displays the station name, numerical identifier and pollutants measured. The numerical identifier is the station (ID) number, the first digit of which identifies the geographic region in which the station is located. Air monitoring stations within the AQHI network can measure up to six common pollutants (NO₂, PM_{2.5}, ozone, SO₂, CO and TRS compounds) based on the pollutant(s) of concern for the regional area it represents.

The 2022 Ontario Continuous Ambient Air Monitoring Network also identifies the type of air monitoring site: ambient, roadside, Canadian Ambient Air Quality Standard (CAAQS), and/or National Air Pollution Surveillance (NAPS). Ambient sites represent the general air quality of an area without any direct influence of local industrial sources. Road-side sites are typically within approximately 100 m of a major roadway with daily traffic volumes greater than 10,000 vehicles per day.

Annual statistics and trends

The annual statistical data and trends for various continuous pollutants and selected

volatile organic compounds are presented in the Appendix. The annual averages, maximums and percentiles are displayed in the annual statistics tables. (A percentile is the value equal to or below which a given percentage of the data set falls. For example, if 70% of the data are equal to or below 0.10 ppm, the 70th percentile is 0.10 ppm).

The trends are calculated from monthly means through the Mann-Kendall (M-K) test. The M-K test is a nonparametric statistical approach that can be applied to data without making assumptions on the nature of the data distribution. The M-K test is essentially a test for uniform progression (zero change) in the slope of the linear regression of time-ordered data versus time (Gilbert, 1987). The M-K test is particularly suitable for environmental monitoring data since missing, trace and below detection limit values can be handled. This test can also be used to compare trends at multiple stations. The seasonal Kendall test, also performed in this Report, is a generalization of the M-K test (Gilbert, 1987) for use to determine the true trend when there are seasonal cycles in the data which do not constitute a true long-term trend. The change over time was based on the Sen's slope, also known as the Thiel-Sen's estimator of linear trend. The Sen's slope is closely related to and applied in conjunction with the M-K Test. Compared to the common least squares regression, the Sen's slope procedure is a nonparametric method for computing the value of the true slope when there are gross errors or outliers in the data without making assumptions of a normal distribution on the data (Gilbert, 1987).

Other informative tables

Calculated CAAQS metrics for PM_{2.5}, ozone, NO₂ and SO₂ are presented for 2022 (based on a three-year average, 2020-2022) and over a 10-year period in Canadian Ambient Air Quality Standard Reporting. The air zone management levels associated to each CAAQS reporting pollutant are also provided for reference. The percentage distribution of hourly AQHI readings within the various health risk categories for each of the 38 monitoring sites, and the number of air quality alerts issued in Ontario during 2022 are summarized in AQHI and Air Quality Alert Program Reporting.

2022 air monitoring network

2022 Ontario continuous ambient air monitoring network

I	S	S	Y	L	L	A	T	A	N	P	O	S

D ****	ta ti o n n a m e	t a ti o n l o c a ti o n	e a r	a t i t u d e	o n g t i u d e	ir i n t a k e	y p e	Q H I ****	O 2 ****	M 2. 5 ****	3 ****	O 2 ****
1 2 0 0 8	W in d s or D o w nt o w n	4 6 7 U ni v e r si ty A v e. W : .	1 9 6 9	4 2 ° 1 8 ' 5 8 . 8 "	- 8 3 ° 0 2 ' 3 7 . 2 "	4	A / R S / C / N ****	Y ****	T ****	T ****	T ****	T ****
T o t a l								3 8	3 6	3 8	3 8	1 1

1 2 0 1 6	W i n d s o r W e s t	C o l l e g e A v e. / S o u t h S t.	1 9 7 5	4 2 ° 1 7 ' 3 4 . 4 "	- 8 3 ° 0 4 ' 2 3 . 3 "	4	A / R S / N	Y	T	T	T	T
T o t a l								3 8	3 6	3 8	3 8	1 1

1 3 0 0 1	C h a t h a m	4 3 5 G r a n d A v e. W :	2 0 0 5	4 2 ° 2 4 ' 1 3 . 3 "	- 8 2 ° 1 2 ' 2 9 . 9 "	1 5	A / C / N	Y	T	T	T	N / A
1 4 1 1 1	S a r n i a	7 0 0 C h r i s t i n a S t. N :	2 0 1 6	4 2 ° 5 9 ' 2 5 . 0 "	- 8 2 ° 2 3 ' 4 3 . 2 "	3	A / C / N	Y	T	T	T	T
T o t a l								3 8	3 6	3 8	3 8	1 1

1 5 0 2 0	G r a n d B e n d	P o i n t B l a k e C o n s e r v a t i o n A r e a	1 9 9 1	4 3 ° 1 9 ' 5 9 . 1 "	- 8 1 ° 4 4 ' 3 4 . 4 "	5	A .. / N ...	Y ..	T ..	T ..	T ..	N .. / .. A ...
T o t a l								3 8	3 6	3 8	3 8	1 1

1 5 0 2 6	L o n d o n	4 2 S t. Ju li e n S t. t.	2 0 1 3	4 2 ° 5 8 ' 2 8 .1 "	- 8 1 ° 1 2 ' 0 3 .1 "	5	A / C / N	Y	T	T	T	N / A
1 6 0 1 5	P o r t S t a n l e y	4 3 6 6 5 D e x t e r L i n e, E l g i n	2 0 0 2	4 2 ° 4 0 ' 1 9 .5 "	- 8 1 ° 0 9 ' 4 6 .4 "	5	A / N	Y	T	T	T	N / A
T o t a l								3 8	3 6	3 8	3 8	1 1

		W at e r T. Pl a n t										
1 8 0 0 7	Ti v er to n	4 th h C o n c e s s i o n / B r u c e R d. 2	1 9 7 9	4 4 ° 1 8 ' 5 2 . 1 "	- 8 1 ° 3 2 ' 5 9 . 0 "	4	A / N	Y	N / A	T	T	N / A
T o t a l								3 8	3 6	3 8	3 8	1 1

		3										
21005	Brantford	324 Grand River Ave.	2004	43°08'19.0"	-80°17'33.5"	5	A / C / N	Y	T	T	T	N / A
26060	Kitchen	West Ave. / Home	1990	43°26'37.8"	-80°30'13.7"	5	A / C / N	Y	T	T	T	N / A
Total								38	36	38	38	11

		w o o d A v e.			"							
2 7 0 6 7	St : Catharines	A r g yl e C r e s. , P u m p S t n.	1 9 8 7	4 3 ° 0 9 ' 3 6 .2 "	- 7 9 ° 1 4 ' 0 5 .1 "	4	A / C / N	Y ..	T ..	T ..	T ..	N ... / .. A ...
2 8 0	G u el	E x hi	2 0 0	4 3 °	- 8 0	4	A / C ..	Y ..	T ..	T ..	T ..	N ... / .. A ...
T o t a l								3 8	3 6	3 8	3 8	1 1

28	ph	bition St. ./ Clark St. : W :	0	33' 05. 8"	°15' 51. 00"		/N					
29000	Hamilton Downtown	Elgin St. / Kelly St.	1987	43° 15' 28. 0"	-79° 05' 14. 20"	4	A / R S / C / N	Y	T	T	T	T
Total								38	36	38	38	11

2 9 1 1 8	H a m i l t o n W e s t	M a i n S t. W ./ H w y 4 0 3	1 9 8 5	4 3 ° 1 5 ' 2 6 . 8 "	- 7 9 ° 5 4 ' 2 7 . 9 "	3	A / R S / N	Y ..	T ..	T ..	T ..	N ... / .. A ...
2 9 2 1 4	H a m i l t o n M o u n t a i n	2 5 0 F e n n e l A v e. W : .	2 0 1 9	4 3 ° 1 4 ' 2 8 . 4 "	- 7 9 ° 5 3 ' 2 1 . 9 "	3	A .. / C .. / N ...	Y ..	T ..	T ..	T ..	T ..
T o t a l								3 8	3 6	3 8	3 8	1 1

3 1 1 2 9	T o r o n t o D o w n t o w n	5 5 J o h n S t. , M e t r o H a l l	2 0 1 9	4 3 ° 3 8 ' 4 3 .5 "	- 7 9 ° 2 3 ' 2 0 .7 "	2	A / R S / C / N	Y	T	T	T	N / A
3 3 0 0 3	T o r o n t o E a s t	K e n n e d y R d. / L a w	1 9 7 0	4 3 ° 4 4 ' 5 2 .5 "	- 7 9 ° 1 6 ' 2 6 .6 "	4	A / R S / C / N	Y	T	T	T	N / A
T o t a l								3 8	3 6	3 8	3 8	1 1

		re n c e A v e. E.										
3 4 0 2 1	T o r o n t o N o r t h	4 9 0 5 D u f f e r i n S t. , E C C C	1 9 8 8	4 3 ° 4 6 ' 5 3 .8 "	- 7 9 ° 2 5 ' 0 3 .8 "	5	A / R S / C / N	Y	T	T	T	T
3 5	T o r	1 2	2 0	4 3	- 7	8	A / /	Y	T	T	T	T
T o t a l								3 8	3 6	3 8	3 8	1 1

1 2 5	o nt o W es t	5 R e s o u rc e s R d. *** ****	0 3	° 4 2 ' 3 4 .0 "	9 ° 3 2 ' 3 6 .6 "		R S / C / N *** *** ** ***					
4 4 0 0 8	B ur li n gt o n	N o rt h S h o r e B lv d. *** **** **** E. *** / L a k e	1 9 7 9	4 3 ° 1 8 ' 5 4 .4 "	- 7 9 ° 4 8 ' 0 9 .5 "	5	A / C / N ** ** ** ***	Y **	T **	T **	T **	N / A *** ** ***
T o t a l								3 8	3 6	3 8	3 8	1 1

		s h o r e R d.										
4 4 0 1 7	O a k v i l l e	Ei g h t l i n e / G l e n a s h t o n D r. ... , H a l t o	2 0 0 3	4 3 ° 2 9 ' 1 2 . 9 "	- 7 9 ° 4 2 ' 0 8 . 2 "	1 2	A .. / C .. / N ...	Y ..	T ..	T ..	T ..	N .. / .. A ...
T o t a l								3 8	3 6	3 8	3 8	1 1

		n R e s e r v o i r										
4 4 0 2 9	M i l t o n	1 1 2 0 M a i n S t. E.	2 0 1 9	4 3 ° 3 1 ' 4 6 . 7 "	- 7 9 ° 5 1 ' 4 4 . 8 "	4	A / C / N	Y	T	T	T	T
4 5 0 2 7	O s h a w a	B r i t t a n i a A	2 0 0 5	4 3 ° 5 7 ' 0	- 7 8 ° 5 4 '	7	A / C / N	Y	T	T	T	N / A
T o t a l								3 8	3 6	3 8	3 8	1 1

		v e. W . E p T a yl o r St a bl e s		7 . 5 "	4 5 . 2 "							
T o t a l								3 8	3 6	3 8	3 8	1 1

46090	Br a m p t o n	1 0 9 M c l a u g h l i n R d. S.	2 0 0 0	4 3 ° 4 ' 5 5 . 5 "	- 7 9 ° 4 6 ' 5 1 . 3 "	5	A / C / N	Y	T	T	T	N / A
46108	M i s s i s s a u g a	3 3 5 9 M i s s i s s a u g a R d.	2 0 0 7	4 3 ° 3 2 ' 4 9 . 1 "	- 7 9 ° 3 9 ' 3 1 . 3 "	5	A / C / N	Y	T	T	T	N / A
T o t a l								3 8	3 6	3 8	3 8	1 1

		N ... : U ... of ... T ... C ... a ... m ... p ... u ... s										
4 7 0 4 5	B ar ri e	8 3 P e rr y S ... t. ...	2 0 0 1	4 4 ° 2 2 ' 5 6 . 5 "	- 7 9 ° 4 2 ' 0 8 . 3 "	5	A ... / ... C ... / ... N ...	Y ...	T ...	T ...	T ...	N ... / ... A ...
4 8 0 0 0	N e w m	E a gl e	2 0 0 1	4 4 ° 0	- 7 9 °	5	A ... / ... N ...	Y ...	T ...	T ...	T ...	N ... / ... A ...
T o t a l								3 8	3 6	3 8	3 8	1 1

6	ar ke t	St . W ./ M cc af fr e y R d.		2 ' 3 9 .5 "	2 8 ' 5 9 .7 "							
4 9 0 0 5	P ar ry S o u n d	7 B a y S t.	2 0 0 1	4 5 ° 2 0 ' 1 6 .3 "	- 8 0 ° 0 2 ' 1 7 .4 "	5	A / N	Y	T	T	T	N / A
4 9 0	D or se	1 0 2	1 9 8	4 5 °	- 7 8	3	A / N	Y	N / A	T	T	N / A
T o t a l								3 8	3 6	3 8	3 8	1 1

10	t	6 B el l w o o d A cr e s R d.	1	1 3 ' 2 7 . 4 "	° 5 5 ' 5 8 . 6 "							
51001	O tt a w a D o w n t o w n	Ri d e a u S t. / W u r t e m b u	1 9 7 1	4 5 ° 2 6 ' 0 3 . 6 "	- 7 5 ° 4 0 ' 3 3 . 6 "	4	A .. / C .. / N ...	Y ..	T ..	T ..	T ..	T ..
T o t a l								38	36	38	38	11

		rg St :										
5 2 0 2 3	Ki n gs to n	2 3 B e e c h g r o v e L a n e	2 0 1 4	4 4 ° 1 3 ' 1 1 .5 "	- 7 6 ° 3 1 ' 1 6 .1 "	5	A / C / N	Y	T	T	T	N / A
5 4 0 1 2	B el le vil le	2 Si d n e y S t.	2 0 0 2	4 4 ° 0 9 ' 0 1	- 7 7 ° 2 3 ' 4	1 0	A / N	Y	T	T	T	N / A
T o t a l								3 8	3 6	3 8	3 8	1 1

		, W a t e r T r e a t m e n t P l a n t		. 9 "	3 .8 "							
5 6 0 5 1	C o r n w a l l	B e d f o r d S t. / 3 r d	1 9 7 0	4 5 ° 0 1 ' 0 4 .7 "	- 7 4 ° 4 4 ' 0 6 .8 "	4	A / N	Y	T	T	T	N / A
T o t a l								3 8	3 6	3 8	3 8	1 1

		St : W :										
5 9 0 0 6	P et er b or o u g h	1 0 H o s pi t al D r.	1 9 9 8	4 4 ° 1 8 ' 0 6 . 9 "	- 7 8 ° 2 0 ' 4 6 . 4 "	1 0	A / C / N	Y	T	T	T	N / A
6 3 2 0 3	T h u n d er B a y	4 2 1 Ja m e s S t. S.	2 0 0 4	4 8 ° 2 2 ' 4 5 . 8 "	- 8 9 ° 1 7 ' 2 4 . 6	1 5	A / R S / C / N	Y	T	T	T	N / A
T o t a l								3 8	3 6	3 8	3 8	1 1

					"							
7 1 0 7 8	S a ul t St e. M ar ie	S a ul t C ol le ge	2 0 0 4	4 6 ° 3 1 ' 5 9 . 5 "	- 8 4 ° 1 8 ' 3 5 . 7 "	8	A / C / N	Y	T	T	T	T
7 5 0 1 0	N or th B a y	C hi p p e w a S t. W " D e p	1 9 7 9	4 6 ° 1 9 ' 2 3 . 5 "	- 7 9 ° 2 6 ' 5 7 . 4 "	4	A / R S / N	Y	T	T	T	N / A
T o t a l								3 8	3 6	3 8	3 8	1 1

		t. N at io n al D ef e n c e										
7 7 2 3 3	S u d b u r y	1 5 5 El m S t. ...	2 0 1 3	4 6 ° 2 9 ' 3 1 . 0 "	- 8 1 ° 0 0 ' 1 1 . 2 "	3	A / C / N ...	Y ..	T ..	T ..	T ..	T ..
T o t a l								3 8	3 6	3 8	3 8	1 1

Notes:

ID
....
station identification number

Year

year station began monitoring

Air intake

height of air intake above ground (m)

Type

type of monitoring site

A

ambient

RS

road-side

C

Canadian Ambient Air Quality Standard (CAAQS)

N

National Air Pollution Surveillance (NAPS)

AQHI

Air Quality Health Index

T

telemetry

NO₂

nitrogen dioxide

PM_{2.5}

fine particulate matter

O₃

ground-level ozone

SO₂

sulphur dioxide

CO

carbon monoxide

TRS

total reduced sulphur

Y

yes

2022 annual statistics

2022 nitric oxide (NO) annual statistics

Unit: parts per billion (ppb)

I D 0000	C it y	L o c a t i o n	V a l i d h 000	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h 000	
1 2 0 0 8	W in d s o r D o w n t o w n	4 6 7 U ni v e r s i t y A v e . W : 0	8 6 8 9	0. 2	0. 6	1. 0 0	1. 7	4. 2	2 9. 3	2. 4	1 8 8. 8	
1 2 0 1 6	W in d s o r W e s t	C o l l e g e A v e . / S o	8 6 4 5	0. 2	0. 3	0. 6 0	1. 2	3. 6	4 7. 1	2. 4	1 8 3. 8	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		u t h St : :										
1 3 0 0 1	C h a t h a m	4 3 5 G r a n d A v e. W :	8 5 9 7	0. 1	0. 3	0. 5 0	0. 9	2. 4	1 0. 3	1. 1	5 2. 9	
1 4 1 1 1	S a r n i a	7 0 0 C h r i s t i n	8 6 1 3	0. 7	1. 0	1. 3 0	1. 6	3. 0	1 3. 9	2. 0	1 0 7. 2	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		a S t : N :										
1 5 0 2 0	G r a n d B e n d	P o i n t B l a k e C o n s e r v a t i o n A r e	8 5 5 3	0. 0	0. 0	0. 1 0	0. 1	0. 5	1. 8	0. 2	9. 0	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		a										
1 5 0 2 6	L o n d o n	4 2 S t. Ju li e n S t.	8 6 6 0	0. 0	0. 1	0. 2 0	0. 5	1. 4	1 3. 2	0. 8	8 2. 2	
1 6 0 1 5	P o r t S t a n l e y	4 3 6 6 5 D e x t e r L i n e, E l g i	8 6 8 1	0. 0	0. 0	0. 1 0	0. 2	0. 7	2. 4	0. 3	1 5. 7	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		n W a t e r T. Pl t										
2 1 0 0 5	B r a n t f o r d	3 2 4 G r a n d Ri v e r A v e.	8 5 9 4	0. 0	0. 1	0. 2 0	0. 4	1. 3	8. 2	0. 7	5 2. 5	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
2 6 0 6 0	Ki tc h e n e r	W e s t A v e. / H o m e w o o d A v e.	8 5 5 6	0. 1	0. 2	0. 3 0	0. 5	1. 6	1 9. 2	1. 1	9 3. 9	
2 7 0 6 7	S t. C a t h a r i	A r g y l e C r e	8 6 9 7	0. 2	0. 4	0. 5 0	0. 8	1. 9	1 7. 5	1. 3	9 0. 9	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h
	n e s	s. , P u m p St n.									
2 8 0 2 8	G u e l p h	E x h i b i t i o n S t. / C l a r k S t. W :	8 6 8 8	0. 0	0. 1	0. 2 0	0. 5	1. 5	1 7. 2	0. 9	6 4. 7

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
2 9 0 0 0	H a m i l t o n D o w n t o w n	El gi n S t. / K el ly S t.	8 6 1 0	0. 0	0. 2	0. 9 0	2. 0	7. 7	5 1. 7	3. 5	1 2 6. 9	
2 9 1 1 8	H a m i l t o n W e s t	M ai n S t. W ./ H w y 4	8 6 5 8	0. 3	0. 4	0. 9 0	1. 8	7. 7	5 1. 2	3. 6	1 0 5. 6	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		0 3										
2 9 2 1 4	H a m i l t o n M o u n t a i n	2 5 0 F e n n e l A v e. W :	8 6 9 5	0. 6	1. 0	1. 4 0	2. 4	6. 1	2 8. 9	3. 0	8 4. 2	
3 1 1 2 9	T o r o n t o D o w	5 5 J o h n S t.	8 5 8 3	1. 0	2. 0	3. 4 0	6. 4	1 6. 3	5 4. 3	7. 1	2 5 4. 1	

I D	C i t y	L o c a t i o n	V a l i d h ...	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h ...	
	n t o w n											
3 3 0 0 3	T o r o n t o E a s t	K e n n e d y R d. ... / L a w r e n c e A v e. ... E. ...	8 6 8 1	0. 0	0. 4	1. 0 0	2. 1	5. 3	2 7. 7	2. 5	1 4 4. 2	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h
3 4 0 2 1	T o r o n t o N o r t h	4 9 0 5 D u f f e r i n S t. , E C C C	8 7 2 7	0. 0	0. 2	0. 7 0	1. 6	4. 8	3 0. 3	2. 3	1 3 7. 2
3 5 1 2 5	T o r o n t o W e	1 2 5 R e s o u rc	8 6 0 4	0. 1	0. 6	1. 9 0	4. 7	1 4. 1	6 2. 8	5. 9	1 3 6. 6

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
	st	e s R d.										
4 4 0 0 8	B u r l i n g t o n	N o r t h S h o r e B l v d. E. / L a k e s h o r e	8 6 9 3	0. 5	0. 8	1. 4 0	2. 4	5. 8	3 0. 9	3. 1	1 5 9. 4	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		R d.										
4 4 0 1 7	O a k v i l l e	Ei g h tL in e / G le n a s h t o n D r. , H al t o n R	8 6 4 1	0. 2	0. 4	0. 5 0	1. 0	3. 5	2 0. 9	1. 7	6 8. 9	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		e s.										
4 4 0 2 9	M i l t o n	1 1 2 0 M a i n S t. E.	8 6 9 1	0. 4	0. 6	0. 9 0	1. 7	4. 9	4 7. 1	3. 1	1 3 9. 1	
4 5 0 2 7	O s h a w a	B r i t t a n i a A v e. W 'E P T	8 6 5 4	0. 0	0. 0	0. 4 0	0. 7	1. 4	5. 8	0. 7	2 1. 5	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		a yl o r St a bl e s										
4 6 0 9 0	B r a m p t o n	1 0 9 M c L a u g hl in R d. S.	8 6 9 3	0. 0	0. 2	0. 3 0	0. 7	3. 5	3 1. 4	1. 9	1 3 7. 2	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h
4 6 1 0 8	M i s s i s s a u g a	3 3 5 9 M i s s i s s a u g a R d. N o f T C a m p u s	8 6 4 0	0. 1	0. 2	0. 4 0	0. 9	4. 1	3 4. 4	2. 2	1 0 3. 5

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
47045	B a r r i e	83 P e r r y S t.	8547	0.2	0.5	0.70	1.0	2.5	22.2	1.6	104.1	
48006	N e w m a r k e t	E a g l e S t. W ./ M c C a f f r e y R d.	8623	0.1	0.3	0.50	0.7	2.1	13.1	1.1	69.4	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h
4 9 0 0 5	P a r r y S o u n d	7 B a y S t.	8 6 2 8	0. 1	0. 2	0. 4 0	0. 5	0. 9	5. 1	0. 6	2 8. 6
5 1 0 0 1	O t t a w a D o w n t o w n	Ri d e a u S t. / W u r t e m b u r g	8 6 5 8	0. 4	0. 6	0. 8 0	1. 1	2. 5	1 3. 7	1. 5	6 4. 3

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		St :										
5 2 0 2 3	Ki n g s t o n	2 3 B e e c h g r o v e L a n e	8 6 8 7	0. 2	0. 3	0. 4 0	0. 6	1. 2	4. 7	0. 6	2 6. 9	
5 4 0 1 2	B e l l e v i l l e	2 Si d n e y S t.	8 6 9 3	0. 1	0. 1	0. 2 0	0. 6	2. 9	1 6. 5	1. 2	7 3. 0	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		, W a t e r T r e a t m e n t P l a n t										
5 6 0 5 1	C o r n w a l l	B e d f o r d S t. / 3	8 6 9 0	0. 0	0. 2	0. 3 0	0. 6	1. 9	3 3. 3	1. 6	1 4 2. 9	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		r d St : W :										
5 9 0 0 6	P e t e r b o r o u g h	1 0 H o s p i t a l D r.	8 6 0 2	0. 0	0. 1	0. 3 0	0. 7	1. 8	1 1. 0	0. 9	5 3. 9	
6 3 2 0 3	T h u n d e r B	4 2 1 Ja m e s S	8 7 1 8	0. 7	1. 0	1. 5 0	2. 7	1 0. 0	3 6. 8	4. 1	8 6. 7	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
	a y	t. S.										
7 1 0 7 8	S a ul t S t e. M a ri e	S a ul t C ol le g e	8 7 4 5	0. 2	0. 4	0. 7 0	1. 2	2. 9	1 2. 0	1. 4	5 4. 4	
7 5 0 1 0	N o rt h B a y	C hi p p e w a S t. W 'D e	8 7 0 9	0. 5	0. 6	0. 8 0	1. 2	2. 7	1 5. 4	1. 5	7 1. 8	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		p t. N a t i o n a l D e f e n c e										
7 7 2 3 3	S u d b u r y	1 5 5 El m S t.	8 6 8 3	0. 5	0. 7	1. 1 0	1. 7	4. 3	3 6. 5	2. 7	1 1 2. 3	

2022 nitrogen dioxide (NO₂) annual statistics

Unit: parts per billion (ppb)

NO₂ 1h AAQC: 200 ppb

NO₂ 24h AAQC: 100 ppb

I D 01000	C i t y	L o c a t i o n	V a l i d h 000	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h 000000000
1 2 0 0 8	W i n d s o r D o w n t	4 6 7 U n i v e r s i t y A 000	8 6 8 9	3. 4	5. 2	7. 3	1 0. 2	1 7. 7	3 8. 5	9. 4	6 0. 3

	o w n	v e. W :										
1 2 0 1 6	W in d s o r W e st	C ol le g e A v e. / S o u t h S t.	8 6 4 5	2. 4	4. 0	5. 9	8. 7	1 6. 3	3 6. 0	8. 0	5 1. 5	
1 3 0 0 1	C h a t h a m	4 3 5 G r a n d A v e. W :	8 5 9 7	1. 3	2. 4	3. 5	5. 1	8. 8	1 9. 2	4. 5	4 4. 2	

1 4 1 1 1	S a r n i a	7 0 0 C h r i s t i n a S t. N :	8 6 1 3	1. 3	2. 7	4. 7	7. 9	1 4. 6	2 8. 9	6. 7	4 9. 6	
1 5 0 2 0	G r a n d B e n d	P o i n t B l a k e C o n s e r v a t i o n A r e	8 5 5 3	0. 7	1. 4	2. 2	3. 3	5. 2	9. 2	2. 7	2 2. 1	

		a										
1 5 0 2 6	L o n d o n	4 2 S t. Ju li e n S t.	8 6 6 0	1. 3	2. 6	3. 9	5. 6	9. 5	2 2. 4	5. 0	4 3. 2	
1 6 0 1 5	P o r t S t a n l e y	4 3 6 6 5 D e x t e r L i n e, E l g i n W a t e r T. Pl	8 6 8 1	0. 6	1. 2	1. 8	2. 6	4. 2	7. 9	2. 2	1 8. 7	

		t ..										
2 1 0 0 5	B r a n t f o r d	3 2 4 G r a n d Ri v e r A v e.	8 5 9 4	1. 9	2. 7	3. 7	5. 2	9. 7	2 0. 5	5. 0	3 5. 5	

2 6 0 6 0	Ki tc h e n e r	W e st A v e. / H o m e w o o d A v e.	8 5 5 6	1. 3	2. 4	3. 7	5. 8	1 1. 2	2 8. 0	5. 4	4 6. 4

2 7 0 6 7	S t. C a t h a r i n e s	A r g y l e C r e s. , P u m p S t n.	8 6 9 7	1. 9	2. 9	4. 0	6. 0	1 1. 9	2 5. 5	5. 7	4 7. 1	

28028	Guelph	Exhibition St. / Clark St. W	8688	0.9	2.0	3.4	5.6	11.1	26.9	5.1	44.1	
29000	Hamilton Downtown	Elgin St. / Kelly St.	8610	3.2	5.0	7.5	12.0	23.2	39.9	10.6	57.0	

29118	H a m i l t o n W e s t	M a i n S t. W ./ H w y 4 0 3	8 6 5 8	2. 9	4. 5	6. 8	1 1. 3	2 1. 7	3 6. 3	9. 8	5 4. 6	
29214	H a m i l t o n M o u n t a i n	2 5 0 F e n n e l A v e. W :	8 6 9 5	1. 7	2. 6	4. 0	6. 6	1 3. 7	2 6. 4	6. 1	4 3. 7	
31129	T o r o n t	5 5 J o h n S	8 5 8 3	6. 2	9. 2	1 2. 2	1 6. 3	2 5. 9	4 3. 8	1 4. 4	7 5. 6	

	o D o w n t o w n	t. ...										
3 3 0 0 3	T o r o n t o E a s t	K e n n e d y R d. / L a w r e n c e A v e. E.	8 6 8 1	3. 1	5. 2	7. 5	1 1. 0	2 0. 3	3 8. 6	9. 9	6 3. 7	

3 4 0 2 1	T o r o n t o N o r t h	4 9 0 5 D u f f e r i n S t. , E C C C C	8 7 2 7	2. 9	5. 0	7. 7	1 2. 0	2 0. 9	3 9. 8	1 0. 2	5 9. 0	
3 5 1 2 5	T o r o n t o W e s t	1 2 5 R e s o u r c e s R d. .	8 6 0 4	4. 2	7. 5	1 0. 8	1 5. 8	2 6. 0	4 1. 1	1 3. 2	5 7. 8	
4 4 0	B u r l	N o r t	8 6 9	2. 3	4. 1	6. 3	9. 7	1 7. 5	3 5. 3	8. 5	5 2. 2	

08	ington	h Shore Blvd. E. / Lakeshore Rd.	3									
44017	Oakville	Eighth Line / Glenashington	8641	2.0	3.4	5.4	8.6	17.2	34.1	7.8	45.8	

		D r., H al to n R e s. ...										
4 4 0 2 9	M il t o n	1 1 2 0 M ai n S t. E. ...	8 6 9 1	1. 6	3. 5	5. 6	9. 1	1 9. 3	3 5. 7	8. 3	5 5. 6	
4 5 0 2 7	O s h a w a	B ri tt a ni a A v e. W . E P T a	8 6 5 4	0. 8	1. 6	2. 6	4. 2	8. 1	1 6. 4	3. 7	3 2. 5	

		yl o r St a bl e s										
4 6 0 9 0	B r a m p t o n	1 0 9 M c L a u g hl in R d. S. S.	8 6 9 3	1. 0	2. 4	4. 3	7. 8	1 8. 1	3 5. 2	7. 2	5 4. 5	
4 6 1 0 8	M is si s s a u g a	3 3 5 9 M is si s s a u g	8 6 4 0	1. 6	3. 2	5. 2	8. 7	1 6. 7	3 2. 6	7. 5	4 5. 7	

		a R d. N U of T C a m p u s										
4 7 0 4 5	B a r r i e	8 3 P e r r y S t.	8 5 4 7	1. 6	2. 5	3. 7	6. 0	1 2. 8	3 0. 4	5. 8	4 9. 6	
4 8 0 0 6	N e w m a r k e t	E a g l e S t. W ./ M c C a	8 6 2 3	0. 9	1. 9	3. 4	6. 1	1 3. 0	3 1. 8	5. 6	4 9. 8	

		ff re y R d.										
4 9 0 0 5	P a rr y S o u n d	7 B a y S t.	8 6 2 8	0. 5	0. 9	1. 5	2. 4	5. 1	1 5. 3	2. 4	3 6. 2	
5 1 0 0 1	O tt a w a D o w n t o w n	Ri d e a u S t. / W u rt e m b u r g S t.	8 6 5 8	1. 4	2. 6	4. 0	6. 5	1 3. 4	3 0. 9	6. 1	4 8. 2	

5 2 0 2 3	Ki n g s t o n	2 3 B e e c h g r o v e L a n e	8 6 8 7	1. 0	1. 5	2. 3	3. 4	7. 1	2 1. 7	3. 5	4 2. 2	
5 4 0 1 2	B el le vi ll e	2 Si d n e y S t. , W a t e r T r e a t	8 6 9 3	1. 0	1. 7	2. 6	4. 1	9. 0	2 5. 0	4. 2	3 9. 8	

		m e n t P l a n t										
5 6 0 5 1	C o r n w a l	B e d f o r d S t. / 3 r d S t. W :	8 6 9 0	1. 2	1. 9	2. 9	4. 6	1 1. 9	3 0. 3	5. 1	5 6. 3	
5 9 0 0 6	P e t e r b o r o	1 0 H o s p i t a l D	8 6 0 2	0. 9	1. 8	3. 0	4. 9	9. 2	2 7. 6	4. 5	4 5. 5	

	u g h	r. ...										
6 3 2 0 3	T h u n d e r B a y	4 2 1 Ja m e s S t. S. ...	8 7 1 8	1. 3	2. 6	4. 3	7. 3	1 6. 5	3 6. 9	7. 0	5 5. 6	
7 1 0 7 8	S a ul t S t e. M a r i e	S a ul t C ol le g e	8 7 4 5	1. 1	1. 8	2. 6	4. 0	7. 9	1 8. 7	3. 8	4 1. 4	
7 5 0 1 0	N o rt h B a y	C hi p p e w a S t. ...	8 7 0 9	0. 8	1. 4	2. 2	3. 9	9. 4	2 7. 9	4. 1	4 0. 7	

		W ... ' D ... e ... p ... t. ... N at io n al D ef e n c e										
7 7 2 3 3	S u d b u r y	1 5 5 El m S ... t. ...	8 6 8 3	1. 3	2. 2	3. 6	6. 0	1 3. 8	4 1. 0	6. 1	5 0. 8	

2022 nitrogen oxides (NO_x) annual statistics

Unit: parts per billion (ppb)

I D 0000	C it y	L o c a t i o n	V a l i d h 000	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h 000	
1 2 0 0 8	W i n d s o r D o w n t o w n	4 6 7 U n i v e r s i t y A v e . W : 0	8 6 8 9	4. 0	6. 1	8. 6	1 2. 0	2 1. 1	6 4. 8	1 1. 8	2 4 9. 1	
1 2 0 1 6	W i n d s o r W e s t	C o l l e g e A v e . / S o	8 6 4 5	2. 8	4. 6	6. 7	1 0. 0	1 9. 2	7 7. 2	1 0. 4	2 2 7. 8	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		u t h St : :										
1 3 0 0 1	C h a t h a m	4 3 5 G r a n d A v e. W :	8 5 9 7	1. 6	2. 9	4. 2	6. 2	1 0. 9	2 5. 8	5. 6	9 6. 1	
1 4 1 1 1	S a r n i a	7 0 0 C h r i s t i n	8 6 1 3	2. 4	3. 9	6. 0	9. 4	1 7. 5	4 0. 9	8. 6	1 3 8. 1	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		a St : N :										
1 5 0 2 0	G r a n d B e n d	P o i n t B l a k e C o n s e r v a t i o n A r e	8 5 5 3	0. 7	1. 5	2. 4	3. 4	5. 6	1 0. 2	2. 9	2 3. 5	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		a										
1 5 0 2 6	L o n d o n	4 2 S t. Ju li e n S t.	8 6 6 0	1. 5	2. 9	4. 2	6. 1	1 0. 7	2 9. 5	5. 8	1 1 3. 1	
1 6 0 1 5	P o r t S t a n l e y	4 3 6 6 5 D e x t e r L i n e, E l g i	8 6 8 1	0. 7	1. 3	1. 9	2. 8	4. 8	9. 6	2. 4	2 3. 4	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		n W a t e r T. Pl t										
2 1 0 0 5	B r a n t f o r d	3 2 4 G r a n d Ri v e r A v e.	8 5 9 4	2. 1	3. 0	3. 9	5. 6	1 1. 1	2 6. 3	5. 6	8 6. 2	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
2 6 0 6 0	Ki tc h e n e r	W e s t A v e. / H o m e w o o d A v e.	8 5 5 6	1. 6	2. 7	4. 1	6. 4	1 2. 3	4 2. 7	6. 5	1 3 7. 3	
2 7 0 6 7	S t. C a t h a r i	A r g yl e C r e	8 6 9 7	2. 3	3. 3	4. 6	6. 8	1 3. 8	4 0. 1	7. 0	1 0 6. 5	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h
	n e s	s. , P u m p St n.									
2 8 0 2 8	G u e l p h	E x h i b i t i o n S t. / C l a r k S t. W :	8 6 8 8	1. 0	2. 3	3. 8	6. 1	1 2. 7	4 0. 5	6. 0	1 0 4. 0

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
2 9 0 0 0	H a m i l t o n D o w n t o w n	El gi n S t. / K el ly S t.	8 6 1 0	3. 2	5. 6	8. 6	1 4. 3	2 9. 8	8 3. 9 8	1 4. 0	1 5 9. 7	
2 9 1 1 8	H a m i l t o n W e st	M ai n S t. W ./ H w y 4	8 6 5 8	3. 4	5. 2	7. 8	1 3. 5	2 9. 5	8 0. 2 4	1 3. 4	1 4 2. 5	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		0 3										
2 9 2 1 4	H a m i l t o n M o u n t a i n	2 5 0 F e n n e l A v e. W :	8 6 9 5	2. 5	3. 7	5. 5	9	1 9. 7	5 3. 2 1	9. 1	1 0 8. 2	
3 1 1 2 9	T o r o n t o D o w	5 5 J o h n S t.	8 5 8 3	7. 8	1 1. 8	1 6. 3	2 3. 2	4 0. 0	9 1. 3	2 1. 5	3 1 1. 7	

I D ****	C i t y	L o c a t i o n	V a l i d h ***	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h ****	
	n t o w n											
3 3 0 0 3	T o r o n t o E a s t	K e n n e d y R d. **** / L a w r e n c e A v e. **** E. ***	8 6 8 1	3. 5	6. 2	8. 8	1 3	2 4. 8	6 4. 0 6	1 2. 5	2 0 7. 9	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h
3 4 0 2 1	T o r o n t o N o r t h	4 9 0 5 D u f f e r i n S t. , E C C C	8 7 2 7	3. 3	5. 8	8. 9	1 3. 5	2 5. 2	6 5. 2 5	1 2. 5	1 9 4. 5
3 5 1 2 5	T o r o n t o W e	1 2 5 R e s o u rc	8 6 0 4	5	8. 9	1 3. 4	2 0. 6	3 8. 7	9 5. 3 9	1 9. 1	1 8 3. 1

I D	C i t y	L o c a t i o n	V a l i d h ...	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h ...	
	st	e s R ... d.										
4 4 0 0 8	B u r l i n g t o n	N o r t h S h o r e B ... l v ... d. E. ... / L a k e s h o r e	8 6 9 3	3. 1	5. 3	8	1 2. 2	2 2. 7	6 2. 5 2	1 1. 5	1 9 6. 1	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		R d.										
4 4 0 1 7	O a k v i l l e	Ei g h tL in e / G l e n a s h t o n D r. , H a l t o n R	8 6 4 1	2. 4	3. 9	6. 1	9. 8	2 0. 5	5 1. 5 2	9. 5	1 0 4. 2	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		e s.										
4 4 0 2 9	M i l t o n	1 1 2 0 M a i n S t. E.	8 6 9 1	2. 4	4. 4	6. 8	1 0. 7	2 4. 2	7 8. 7 6	1 1. 3	1 9 4. 7	
4 5 0 2 7	O s h a w a	B r i t t a n i a A v e. W 'E P T	8 6 5 4	1	1. 9	3	4. 8	9. 4	2 0. 8	4. 3	4 6. 7	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		a yl o r St a bl e s										
4 6 0 9 0	B r a m p t o n	1 0 9 M c L a u g hl in R d. S.	8 6 9 3	1. 3	2. 7	4. 8	8. 8	2 1. 5	6 2. 2 2	9. 1	1 8 9. 7	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h
4 6 1 0 8	M i s s i s s a u g a	3 3 5 9 M i s s i s s a u g a R d. N o f T C a m p u s	8 6 4 0	1. 9	3. 6	5. 8	9. 7	2 1. 1	6 2. 9	9. 7	1 4 5. 7

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
4 7 0 4 5	B a r r i e	8 3 P e r r y S t.	8 5 4 7	2. 1	3. 2	4. 5	6. 9	1 5. 4	4 8. 4 6	7. 4	1 5 1. 6	
4 8 0 0 6	N e w m a r k e t	E a g l e S t. W ./ M c C a f f r e y R d.	8 6 2 3	1. 2	2. 4	4	6. 9	1 5. 1	4 0. 8 8	6. 7	1 0 4. 7	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
4 9 0 0 5	P a r r y S o u n d	7 B a y S t.	8 6 2 8	0. 8	1. 3	1. 9	2. 9	6. 1	1 8. 6	3. 0	5 2. 1	
5 1 0 0 1	O t t a w a D o w n t o w n	Ri d e a u S t. / W u r t e m b u r g	8 6 5 8	2. 1	3. 4	4. 9	7. 7	1 5. 9	3 9. 7 4	7. 5	1 0 3. 4	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		St :										
5 2 0 2 3	Ki n g s t o n	2 3 B e e c h g r o v e L a n e	8 6 8 7	1. 3	1. 9	2. 7	4	8. 1	2 5. 6 6	4. 1	6 5. 7	
5 4 0 1 2	B e l l e v i l l e	2 Si d n e y S t.	8 6 9 3	1. 2	2	3	5	1 2. 1	3 6. 9 1	5. 4	1 0 4. 8	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		, W a t e r T r e a t m e n t P l a n t										
5 6 0 5 1	C o r n w a l l	B e d f o r d S t. / 3	8 6 9 0	1. 4	2. 2	3. 3	5. 3	1 3. 9	5 9. 9 8	6. 7	1 9 9. 2	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		r d St : W :										
5 9 0 0 6	P e t e r b o r o u g h	1 0 H o s p i t a l D r.	8 6 0 2	1. 1	2. 1	3. 4	5. 5	1 0. 6	3 7. 9	5. 4	8 9. 6	
6 3 2 0 3	T h u n d e r B	4 2 1 Ja m e s S	8 7 1 8	2. 3	3. 8	6. 1	1 0. 5	2 6. 2	6 7. 2 2	1 1. 1	1 3 4. 7	

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
	a y	t. S.										
7 1 0 7 8	S a ul t S t e. M a r i e	S a ul t C ol le g e	8 7 4 5	1. 5	2. 3	3. 4	5. 4	1 1. 0	2 7. 5	5. 2	8 8. 3	
7 5 0 1 0	N o rt h B a y	C hi p p e w a S t. W 'D e	8 7 0 9	1. 3	2. 1	3. 2	5. 2	1 2. 2	4 0. 7	5. 7	1 0 6. 2	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		p t. N a t i o n a l D e f e n c e										
7 7 2 3 3	S u d b u r y	1 5 5 El m S t.	8 6 8 3	1. 9	3. 2	4. 8	7. 7	1 7. 9	7 3. 3 8	8. 8	1 5 7. 2	

2022 fine particulate matter (PM_{2.5}) annual statistics

Unit: micrograms per cubic metre (µg/m³)

PM_{2.5} 24h Reference Level: 27 µg/m³

PM_{2.5} Annual Reference Level: 8.8 µg/m³

ID	City	Location	Valid h	10%	30%	50%	70%	90%	99%	Mean	Max 1h

1 2 0 0 8	W in d s o r D o w n t o w n	4 6 7 U ni v e r si ty A v e. W :	8 7 4 3	2	4	6	9	1 5	2 8	7. 8 3	5 5	
1 2 0 1 6	W in d s o r W e st	C ol le g e A v e. / S o u t h S t.	8 7 0 5	3	5	8	1 0	1 6	2 9	8. 8 2	4 7	
1 3	C h	4 3	8 4	2	3	5	8	1 4	2 7	6. 7	6 7	

001	at h a m	5 G r a n d A v e. W :	2 4							4		
14111	S a r n i a	7 0 0 C h r i s t i n a S t. N :	8 6 6 5	1	3	5	9	1 6	2 7	7. 0 9	5 5	
15020	G r a n d B e n d	P o i n t B l a k e C o n	8 2 5 8	1	3	4	7	1 1	2 4	5. 6 3	3 9	

		s e r v a t i o n A r e a										
1 5 0 2 6	L o n d o n	4 2 S t. Ju li e n S t.	8 6 2 2	2	4	6	8	1 3	2 5	7. 0 7	5 5	
1 6 0 1 5	P o r t S t a n l e y	4 3 6 6 5 D e x t e r L i n e, E l g i	8 7 0 9	2	3	5	8	1 4	2 6	6. 7 4	6 0	

		n W at e r T. Pl t										
1 8 0 0 7	Ti v e rt o n	4 ^t h C o n c e s s i o n / B r u c e R d. 2 3	8 5 5 6	1	2	3	5	1 0	2 0	4. 6 0	4 7	

21005	Brantford	324 Grand River Ave.	8647	2	4	6	8	13	26	6.97	48	
26060	Kitchener	West Ave. / Home Wood Ave.	8579	1	3	6	9	16	29	7.48	69	

2 7 0 6 7	S t. C a t h a r i n e s	A r g y l e C r e s. , P u m p S t n.	8 6 9 5	1	3	4	6	1 1	2 2	5. 4 1	3 2	

2 8 0 2 8	G u e l p h	E x h i b i t i o n S t. / C l a r k S t. W :	8 4 8 7	2	4	6	8	1 3	2 4	6. 7 4	3 8	
2 9 0 0 0	H a m i l t o n D o w n t o w n	E l g i n S t. / K e l l y S t.	8 6 4 5	2	4	7	1 1	1 8	3 3	8. 6 4	9 0	

29118	H a m i l t o n W e s t	M a i n S t. W ./ H w y 4 0 3	8 7 1 5	2	4	6	9	1 4	2 6	7. 3 0	8 3	
29214	H a m i l t o n M o u n t a i n	2 5 0 F e n n e l A v e. W :	8 5 6 7	2	4	6	9	1 6	3 0	7. 7 1	8 8	
31129	T o r o n t	5 5 J o h n S	8 7 2 9	2	5	7	9	1 5	2 9	7. 9 2	5 0	

	o D o w n t o w n	t. ...										
3 3 0 0 3	T o r o n t o E a s t	K e n n e d y R d. / L a w r e n c e A v e. E.	8 6 8 6	1	4	6	8	1 3	2 6	6. 7 0	8 3	

3 4 0 2 1	T o r o n t o N o r t h	4 9 0 5 D u f f e r i n S t. , E C C C C	8 6 5 6	2	4	6	8	1 3	2 6	6. 7 9	5 0	
3 5 1 2 5	T o r o n t o W e s t	1 2 5 R e s o u r c e s R d. .	8 6 7 0	2	4	6	8	1 3	2 4	6. 9 0	5 8	
4 4 0	B u r l	N o r t	8 5 7	2	4	5	8	1 3	2 4	6. 6 2	3 9	

08	ington	h Shore Blvd. E. / Lakeshore Rd.	2									
44017	Oakville	Eighth Line / Glenashington	8624	2	4	6	8	13	25	6.74	50	

		D r., H al to n R e s. ...										
4 4 0 2 9	M il t o n	1 1 2 0 M ai n S t. E. ...	8 6 8 4	2	4	6	8	1 3	2 6	6. 8 7	5 0	
4 5 0 2 7	O s h a w a	B ri tt a ni a A v e. W . E P T a	8 6 7 1	2	3	5	6	1 1	2 1	5. 7 1	4 1	

		yl o r St a bl e s										
4 6 0 9 0	B r a m p t o n	1 0 9 M c L a u g hl in R d. S.	8 6 9 6	2	4	6	8	1 3	2 5	7. 1 1	5 2 3	
4 6 1 0 8	M is si s s a u g a	3 3 5 9 M is si s s a u g	8 6 8 2	2	3	6	9	1 4	2 7	7. 1 4	1 0 6	

		a R d. N U of T C a m p u s										
4 7 0 4 5	B a r r i e	8 3 P e r r y S t.	8 3 9 9	2	3	5	7	1 3	2 4	6. 3 6	4 3	
4 8 0 0 6	N e w m a r k e t	E a g l e S t. W ./ M c C a	8 7 3 4	1	3	5	8	1 2	2 2	6. 1 8	5 6	

		ff re y R d.										
4 9 0 0 5	P a r r y S o u n d	7 B a y S t.	8 6 6 8	1	2	4	6	1 0	1 8	4. 6 7	3 3	
4 9 0 1 0	D o r s e t	1 0 2 6 B el l w o o d A cr e s R d.	8 6 8 2	1	2	3	5	9	1 7	4. 4 7	2 8	

5 1 0 0 1	O t t a w a D o w n t o w n	Ri d e a u S t. / W u r t e m b u r g S t.	8 7 5 2	2	3	5	7	1 1	2 0	5. 9 1	4 0	

5 2 0 2 3	Ki n g s t o n	2 3 B e e c h g r o v e L a n e	8 7 1 8	1	3	4	7	1 0	1 8	5. 2 9	4 1	
5 4 0 1 2	B e l l e v i l l e	2 S i d n e y S t. , W a t e r T r e a t	8 7 4 1	2	3	4	6	1 1	1 9	5. 4 9	5 0	

		m e n t P l a n t										
5 6 0 5 1	C o r n w a l	B e d f o r d S t. / 3 r d S t. W :	8 7 2 6	2	3	5	8	1 3	2 5	6. 4 0	4 9	
5 9 0 0 6	P e t e r b o r o	1 0 H o s p i t a l D	8 6 0 1	1	3	5	8	1 4	2 6	6. 6 4	4 5	

	u g h	r. ...										
6 3 2 0 3	T h u n d e r B a y	4 2 1 Ja m e s S t. S. ...	8 7 4 8	2	3	4	6	9	1 5	5. 0 3	3 0	
7 1 0 7 8	S a ul t S t. e. M a ri e	S a ul t C ol le g e	8 7 2 7	1	2	3	5	9	1 8	4. 4 5	5 1	
7 5 0 1 0	N o rt h B a y	C hi p p e w a S t. ...	8 6 9 1	2	3	4	6	1 0	1 8	5. 0 6	3 4	

		W ... : D ... e ... p ... t. ... N at io n al D ef e n c e										
7 7 2 3 3	S u d b u r y	1 5 5 El m S ... t. ...	8 7 0 7	1	3	4	6	1 1	2 1	5. 2 3	4 5	

Notes

Ontario uses the 24-hour $PM_{2.5}$ CAAQS “as is” for comparison to the 24-hour measurement of air quality data; this value is considered a Reference Level.

Ontario uses the annual $PM_{2.5}$ CAAQS “as is” for comparison to a single annual average of air quality data; this value is considered a Reference Level.

2022 ground-level ozone (O_3) annual statistics

Unit: parts per billion (ppb)

O_3 1h AAQC: 80 ppb

I D 010000	C i t y	L o c a t i o n	V a l i d h 000	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h 0000000000
1 2 0 0 8	W i n d s o r D o w n t	4 6 7 U n i v e r s i t y A 000	8 5 2 9	1 4	2 3	3 0	3 6	4 7	6 5	3 0. 4	8 4

	o w n	v e. W :										
1 2 0 1 6	W i n d s o r W e s t	C o l l e g e A v e. / S o u t h S t.	8 6 8 2	1 3	2 3	2 9	3 6	4 7	6 3	2 9. 5	8 1	
1 3 0 0 1	C h a t h a m	4 3 5 G r a n d A v e. W :	8 6 7 1	1 7	2 5	3 1	3 7	4 6	6 3	3 1. 6	8 5	

1 4 1 1 1	S a r n i a	7 0 0 C h r i s t i n a S t. N :	8 6 1 3	1 6	2 5	3 1	3 7	4 5	6 2	3 1. 0	9 7	
1 5 0 2 0	G r a n d B e n d	P o i n t B l a k e C o n s e r v a t i o n A r e	8 6 5 6	1 8	2 7	3 2	3 7	4 4	6 2	3 1. 9	9 2	

		a										
1 5 0 2 6	L o n d o n	4 2 S t. Ju li e n S t.	8 6 6 8	1 2	2 4	3 0	3 6	4 5	5 9	2 9. 6	8 9	
1 6 0 1 5	P o r t S t a n l e y	4 3 6 6 5 D e x t e r L i n e, E l g i n W a t e r T. Pl	8 6 7 8	1 7	2 6	3 1	3 6	4 4	6 0	3 1. 1	8 9	

		t										
1 8 0 0 7	Ti v e r t o n	4 ^t h C o n c e s s i o n / B r u c e R d. 2 3	8 6 1 6	1 9	2 6	3 2	3 7	4 5	6 1	3 1. 9	8 5	
2 1 0 0 5	B r a n t f o r d	3 2 4 G r a n d Ri v e r	8 5 9 6	1 1	2 2	3 0	3 6	4 5	6 0	2 9. 0	9 0	

		A v e. 001 000 1000										
2 6 0 6 0	Ki tc h e n e r	W e st A v e. 001 000 1000 / H o m e w o o d A v e. 001 000 1000	8 5 5 8	1 4	2 4	2 9	3 4. 9	4 3	5 8	2 8. 9	7 9	
2 7 0 6 7	S t. C a t h a r i n e s	A r g yl e C r e s. , P u m	8 6 4 9	1 4	2 4	3 0	3 6	4 4	5 9	2 9. 8	8 4	

		p St n.										
2 8 0 2 8	G u e l p h	E x h i b i t i o n S t. ... / C l a r k S t. ... W ... :	8 6 7 2	1 4	2 5	3 1	3 7	4 6	6 3	3 0. 9	8 2	
2 9 0 0 0	H a m i l t o n D o w n t o	E l g i n S t. ... / K e l l y S t. ...	8 6 2 6	9	2 0	2 6	3 2	4 1	5 6	2 5. 9	8 4	

	w n											
2 9 1 1 8	H a m i l t o n W e s t	M a i n S t. W ./ H w y 4 0 3	8 6 6 6	6	1 9	2 6	3 2	4 1	5 6	2 5. 2	8 2	
2 9 2 1 4	H a m i l t o n M o u n t a i n	2 5 0 F e n n e l A v e. W :	8 6 7 7	1 4	2 3	2 8	3 3	4 2	5 7	2 8. 2	8 1	

31129	Toronto Downtown	55 John St. ...	8581	10	18	24	30	38	54	24.3	72	
33003	Toronto East	Kennedy Rd. ... / Lawrence Ave ...	8673	10	20	25	31	39	53	25.1	77	

		e. ... E. ...										
3 4 0 2 1	T o r o n t o N o r t h	4 9 0 5 D u f f e r i n S t. ... , E C C C C ...	8 7 2 6	8	1 8	2 5	3 0	4 0	5 8	2 4. 3	8 1	
3 5 1 2 5	T o r o n t o W e s t	1 2 5 R e s o u r c e s R d.	8 6 0 6	5	1 5	2 2	2 8	3 8	5 5	2 2. 0	7 0	

44008	Burlington	North Shore Blvd. E. / Lakeshore Rd.	8692	10	21	27	33	41	56	26.6	79	
44017	Oakville	EightLine / Glen	8680	13	22	28	34	43	58	28.1	83	

		a s h to n D r., H al to n R e s.										
4 4 0 2 9	M il t o n	1 1 2 0 M ai n S t. E.	8 6 3 4	9	2 1	2 8	3 4	4 4	6 0	2 7. 6	8 1	
4 5 0 2 7	O s h a w a	B ri tt a ni a A v e. W	8 7 1 8	9. 7	2 1	2 8	3 3	4 0	5 3	2 6. 6	8 0	

		“ E P T a yl o r St a bl e s										
4 6 0 9 0	B r a m p t o n	1 0 9 M c L a u g hl in R ... d. S. ...	8 6 9 3	1 0	2 1	2 8	3 3	4 2	5 8	2 7. 0	7 5	
4 6 1 0 8	M is si s s a u	3 3 5 9 M is si	8 6 2 6	7	2 0	2 6	3 2	4 1	5 7	2 5. 7	8 0	

	g a	ss a u g a R d. N U of T C a m p u s										
4 7 0 4 5	B a rr ie	8 3 P e rr y S t.	8 5 1 3	1 1	2 0	2 6	3 1	3 9	5 2	2 5. 3	7 1	
4 8 0 0 6	N e w m a r k e	E a gl e S t. W ./	8 6 9 3	1 3	2 3	2 8	3 4	4 2	5 8	2 8. 1	9 0	

	t	M c C af fr e y R d.										
4 9 0 0 5	P a rr y S o u n d	7 B a y S t.	8 4 8 0	1 6	2 4	3 0	3 5	4 4	5 7	2 9. 9	7 3	
4 9 0 1 0	D o r s e t	1 0 2 6 B el l w o o d A cr e s R ...	8 6 9 3	9	2 1	2 7	3 3	4 1	5 4	2 6. 3	6 4	

		d.										
5 1 0 0 1	Ottawa Downtown	Rideau St. / Wurtem burgh St.	8755	12	21	26	32	40	52	26.1	61	
5 2 0 2 3	Kington	23 Beech grove La	8687	17	25	30	35	42	56	29.9	79	

		n e										
5 4 0 1 2	B e l l e v i l l e	2 S i d n e y S t. , W a t e r T r e a t m e n t P l a n t	8 6 9 3	1 5	2 5	3 1	3 6	4 4	5 9	3 0. 3	9 6	

56051	Cornwall	Bedford St. / 3rd St. W	8690	11	21	27	32	40	51	26.3	66	
59006	Peterborough	10 Hospital Dr.	8603	13	22	28	33	41	54	27.4	79	
6320	Thun	421 Ja	8347	8	19	26	31	38	45	24.6	58	

3	d e r B a y	m e s St ... : S. ...										
7 1 0 7 8	S a ul t S ... t ... e. ... M a ri e	S a ul t C ol le g e	8 7 4 5	1 5	2 4	2 9	3 4	4 2	5 5	2 8. 8	7 5	
7 5 0 1 0	N o rt h B a y	C hi p p e w a S ... t. ... W ... " D ... e ... p ... t. ... N a	8 7 4 5	1 0	2 1	2 8	3 3	4 3	5 7	2 7. 2	7 2	

1 2 0 0 8	W in d s o r D o w n t o w n	4 6 7 U ni v e r si ty A v e. W : :	8 4 7 1	0. 0	0. 0	0. 1	0. 3	1. 1	5. 5	0. 4 5	3 0. 4	

1 2 0 1 6	W in d s o r W e st	C ol le g e A v e. / S o u t h S t.	8 6 9 6	0. 0	0. 1	0. 2	0. 4	1. 5	7. 7	0. 6 5	4 1. 7	
1 4 1 1 1	S a r ni a	7 0 0 C h ri st in a S t. N :	8 6 1 6	0. 1	0. 2	0. 3	0. 7	4. 6	4 3. 0	2. 4 7	1 4 3. 4	
2 9 0 0	H a m il	El gi n S	8 5 7 1	0. 0	0. 2	0. 5	1. 3	1 0. 5	4 9. 8	3. 7 3	1 4 9. 4	

0	to n D o w n to w n	t. / K el ly St : :										
2 9 2 1 4	H a m il t o n M o u n t ai n	2 5 0 F e n n el l A v e. W :	8 6 4 8	0. 1	0. 3	0. 5	1. 3	8. 6	3 7. 7	3. 1 0	1 4 5. 7	

3 4 0 2 1	T o r o n t o N o r t h	4 9 0 5 D u f f e r i n S t. , E C C C C	8 7 3 1	0. 0	0. 0	0. 0	0. 1	0. 4	2. 2	0. 1 7	1 3. 4	
3 5 1 2 5	T o r o n t o W e s t	1 2 5 R e s o u r c e s R d.	8 5 0 9	0. 0	0. 1	0. 2	0. 3	0. 6	2. 5	0. 2 9	1 0. 2	
4 4 0	M i l t	1 1 2	8 4 2	0. 1	0. 2	0. 3	0. 5	1. 4	4. 9	0. 6 3	3 8. 3	

29	on	0 Main St : E.	1									
51001	Ottawa Downtown	Rideau St. / Wurttemberg St.	8729	0.1	0.1	0.3	0.4	0.5	0.9	0.28	4.5	
71078	Sault Ste. M	Sault College	8742	0.4	0.4	0.5	0.6	0.9	8.4	0.81	73.9	

12008	W in d s o r D o w n t o w n	4 6 7 U n iv e r si t y A v e. W :	7 9 7 2	0. 1 5	0. 1 8	0. 2 0	0. 2 3	0. 3 0	0. 5 7	0. 2 2	1. 4 3	
29000	H a m il t o n D o w n t o	El gi n S t. / K el ly S t.	7 2 1 7	0. 1 3	0. 1 6	0. 1 9	0. 2 3	0. 4 0	0. 7 4	0. 2 3	1. 7 9	

	w n											
3 4 0 2 1	T o r o n t o N o r t h	4 9 0 5 D u f f e r i n S t. , E C C C	8 5 4 0	0. 1 5	0. 1 7	0. 2 0	0. 2 3	0. 2 9	0. 5 2	0. 2 1	1. 4 2	

35125	Toronto West	125 Resources Rd :	858	0.16	0.19	0.22	0.26	0.35	0.64	0.62	1.39

2022 total reduced sulphur (TRS) compounds annual statistics

Unit: parts per billion (ppb)

ID	City	Location	Valid h	10 %	30 %	50 %	70 %	90 %	99 %	Mean	Max 1 h

I D	C it y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
1 2 0 1 6	W i n d s o r W e s t	C o l l e g e A v e ./ S o u t h S t.	8 6 9 4	0	0	0	0	0	3	0. 1 4	1 5	
1 4 1 1 1	S a r n i a	7 0 0 C h r i s t i n	8 6 1 4	0	0	0	0	0	1	0. 0 3	2	

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x 1 h	
		a S t. N :										
2 9 0 0 0	H a m i l t o n D o w n t o w n	E l g i n S t. / K e l l y S t.	7 3 2 8	0	0	0	0	1	3	0. 2 2	1 3	
7 1 0 7 8	S a u l t S t.	S a u l t C o	8 6 1 0	0	0	0	0	0	1	0. 0 9	4	

											o n	
1 2 0 1 6	W in d s o r W e st	5 1	0. 2 1 6	0. 2 5 7	0. 3 4 0	0. 4 6 6	0. 5 4 6	0. 7 8 8	0. 1 7 4	0. 3 6 9	0 .1 3 9	
1 4 1 1 1	S a r ni a	5 9	0. 1 5 7	0. 2 0 6	0. 3 7 0	0. 4 7 2	0. 7 9 2	1. 9 9 0	0. 0 8 8	0. 4 2 7	0 .3 2 9	
1 5 0 2 6	L o n d o n	N /A ****	N / A ***	N / A ***	N / A ***	N / A ***	N / A ***	N /A ****	N /A ****	N /A ****	N / A ***	

26060	Kitchen ener	N ... /A	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... /A	N ... /A	N ... /A	N ... / .. A ...
29000	Hamilton Down town	43	0.138	0.267	0.452	0.883	1.688	2.928	0.090	0.706	0.720
48006	New market	N ... /A	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... /A	N ... /A	N ... /A	N ... / .. A ...

2022 toluene annual statistics

Unit: micrograms per cubic metre (µg/m³)

Toluene 24h AAQC (based on odour): 2,000 µg/m

I D	C i t y	N u m b e r o f s a m p l e s	1 0 %	2 5 %	5 0 %	7 5 %	9 0 %	M a x	M i n	M e a n	S t a n d a r d d e v i a t i o n
1 2 0 1 6	W i n d s o r W	5 1	0. 2 1 2	0. 3 5 1	0. 5 2 6	0. 8 4 6	1. 5 0 8	3. 2 7 0	0. 1 0 0	0. 7 3 0	0 .599

	e st											
1 4 1 1 1	S a r ni a	5 9	0. 1 0 0	0. 2 8 2	0. 5 5 4	1. 0 4 5	1. 6 5 0	1 0. 0 8 8	0. 1 0 0	0. 8 9 5	1 .4 0 1	
1 5 0 2 6	L o n d o n	N ... /A	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... /A	N ... /A	N ... /A	N ... / .. A ...	
2 6 0 6 0	Ki tc h e n e r	N ... /A	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... /A	N ... /A	N ... /A	N ... / .. A ...	
2 9 0 0 0	H a m il t o n D o w n	4 3	0. 2 8 0	0. 4 1 2	0. 5 5 0	1. 1 0 7	1. 6 0 6	4. 3 7 0	0. 1 0 0	0. 8 7 2	0 .8 1 7	

											n	
1 2 0 1 6	W in d s o r W e st	5 1	0. 0 3 5	0. 0 7 1	0. 1 1 0	0. 1 6 1	0. 2 4 4	0. 3 6 4	0. 0 3 5	0. 1 2 6	0 .0 8 5	
1 4 1 1 1	S a r ni a	5 9	0. 0 3 5	0. 0 3 5	0. 0 8 4	0. 1 7 6	0. 2 7 9	0. 4 9 2	0. 0 3 5	0. 1 2 7	0 .1 1 6	
1 5 0 2 6	L o n d o n	N ... /A	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... /A	N ... /A	N ... /A	N ... / .. A ...	
2 6 0	Ki tc h	N ... /A	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... /A	N ... /A	N ... /A	N ... / .. A ...	

60	ener											
290000	Hamilton Down town	43	0.035	0.035	0.0396	0.0144	0.0232	0.0728	0.035	0.0122	0.120	
48006	Newmarket	N /A	N /A	N /A	N /A	N /A	N /A	N /A	N /A	N /A	N /A	

2022 m- and p-xylene annual statistics

Unit: micrograms per cubic metre ($\mu\text{g}/\text{m}^3$)

[illegible]

5 0 2 6	o n d o n	/A ****	/A ****	/A ****	/A ****	/A ****	/A ****	/A ****	/A ****	/A ****	/A ****
2 6 0 6 0	Ki tc h e n e r	N *** /A ****	N *** / ** A ***	N *** / ** A ***	N *** / ** A ***	N *** / ** A ***	N *** / ** A ***	N *** /A ****	N *** /A ****	N *** /A ****	N *** / ** A ***
2 9 0 0 0	H a m i l t o n D o w n t o w n	4 3	0. 1 0 0	0. 1 0 0	0. 3 0 6	0. 4 2 4	0. 7 7 4	2. 5 0 8	0. 1 0 0	0. 3 8 3	0 .4 2 1
4 8 0 0 6	N e w m a r	N *** /A ****	N *** / ** A ***	N *** / ** A ***	N *** / ** A ***	N *** / ** A ***	N *** / ** A ***	N *** /A ****	N *** /A ****	N *** /A ****	N *** / ** A ***

	k et										

2022 o-xylene annual statistics

Unit: micrograms per cubic metre (µg/m³)

I D	C it y	N u m b e r o f s a m p l e s	1 0 %	2 5 %	5 0 %	7 5 %	9 0 %	M a x	M i n	M e a n	S t a n d a r d d e v i a t i o n
1 2 0 1 6	W in d s o r W e st	5 1	0. 0 4 5	0. 0 4 5	0. 1 2 4	0. 1 7 7	0. 2 7 6	0. 4 2 8	0. 0 4 5	0. 1 3 6	0 .0 9 8

1 4 1 1 1	S a r n i a	5 9	0. 0 4 5	0. 0 4 5	0. 0 4 5	0. 1 2 2	0. 1 9 7	0. 5 2 0	0. 0 4 5	0. 1 0 0	0 . 0 9 6
1 5 0 2 6	L o n d o n	N ... /A	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... /A	N ... /A	N ... /A	N ... / .. A ...
2 6 0 6 0	Ki tc h e n e r	N ... /A	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... /A	N ... /A	N ... /A	N ... / .. A ...
2 9 0 0 0	H a m il t o n D o w n t o w	4 3	0. 0 4 5	0. 0 4 5	0. 1 0 2	0. 1 7 4	0. 2 5 2	0. 8 4 2	0. 0 4 5	0. 1 3 7	0 . 1 4 2

	n										
4	N	N	N	N	N	N	N	N	N	N	N
8	e	/A	/	/	/	/	/	/A	/A	/A	/
0	w		A	A	A	A	A				A
0	m										
6	a										
	r										
	k										
	e										
	t										

2022 1,3-butadiene annual statistics

Unit: micrograms per cubic metre (µg/m³)

1,3-Butadiene 24h AAQC: 10.0 µg/m³

1,3-Butadiene Annual AAQC: 2.0 µg/m³

I D	C it y	N u m b e r o f s a m p l e s	1 0 %	2 5 %	5 0 %	7 5 %	9 0 %	M a x	M i n	M e a n	S t a n d a r d d e v i a t i o n

1 2 0 1 6	W in d s o r W e st	5 1	0. 0 5 0	0. 0 5 0	0. 0 5 0	0. 0 5 0	0. 0 5 0	0. 0 5 0	0. 0 5 0	0. 0 5 0	0 .0 0 0
1 4 1 1 1	S a r ni a	5 9	0. 0 5 0	0. 0 5 0	0. 0 5 0	0. 0 5 0	0. 0 5 0	0. 2 9 6	0. 0 5 0	0. 0 6 2	0 .0 4 3
1 5 0 2 6	L o n d o n	N ... /A	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... /A	N ... /A	N ... /A	N ... / .. A ...
2 6 0 6 0	Ki tc h e n e r	N ... /A	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	N ... /A	N ... /A	N ... /A	N ... / .. A ...
2 9 0	H a m	4 3	0. 0 5	0. 0 5	0. 0 5	0. 0 5	0. 0 5	0. 1 4	0. 0 5	0. 0 5	0 .0

00	ilt o n D o w n to w n		0	0	0	0	0	8	0	2	1 5
480006	N e w m a r k e t	N /A	N / A	N / A	N / A	N / A	N / A	N / A	N / A	N / A	N / A

10-year trends

10-year trend for nitric oxide (NO)

Annual mean (ppb)

I D 2008	C i t y / T o w n	2 0 1 3	2 0 1 4	2 0 1 5	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	C h a n g e o v e r 1 0 y e a r (%)
1 2 0 0 8	W i n d s o r D o w n t o w n	3 . 7	4 . 0	3 . 5	3 . 1	3 . 3	3 . 2	2 . 7	1 . 7	2 . 5	2 . 4	-3 5. 9
1	W	3	3	4	2	2	2	3	1	2	2	-3

2016	in d s o r W e st	. 6	. 8	. 2	. 9	. 6	. 6	. 1	. 7	. 3	. 4	9. 8
13001	C h a t h a m	1 .6	1 .5	1 .7	1 .4	1 .9	1 .8	1 .4	1 .5	1 .2	1 .1	-1 1. 0
14111	S a r n i a	1 .7	1 .9	2 .4	I . N ... S ..	1 .5	1 .8	1 .7	1 .6	1 .9	2 .0	N ... - . S ... S ... S ..
15020	G r a n d B e n d	1 .0	0 .2	0 .3	0 .5	0 .3	0 .2	0 .3	0 .4	0 .4	0 .2	N ... - . S ... S ... S ..

15026	L o n d o n	1 . 4	1 . 3	1 . 4	1 . 0	1 . 0	0 . 8	0 . 9	0 . 7	0 . 9	0 . 8	-3 5. 5
21005	B r a n t f o r d	1 . 2	0 . 9	1 . 3	0 . 8	0 . 8	1 . 0	0 . 9	0 . 8	0 . 7	0 . 7	-2 0. 8
26060	Ki tc h e n e r	1 . 6	1 . 6	1 . 6	1 . 3	1 . 0	0 . 9	1 . 2	0 . 7	0 . 9	1 . 1	-1 9. 5
27067	St ... : C a t h a r i n e s	2 . 2	1 . 7	2 . 1	1 . 5	1 . 2	0 . 9	1 . 2	0 . 9	1 . 0	1 . 3	-3 8. 5

28028	Guelph	1 . 1	1 . 2	1 . 3	1 . 1	1 . 1	1 . 2	0 . 9	0 . 8	1 . 0	0 . 9	-1 4. 9
29000	Hamilton Downtown	4 . 3	3 . 9	1 . 3	4 . 2	3 . 9	3 . 9	4 . 0	2 . 9	3 . 5	3 . 5	-2 0. 7
29118	Hamilton West	5 . 4	5 . 9	5 . 1	6 . 2	3 . 9	4 . 2	4 . 2	3 . 2	3 . 2	3 . 6	-4 4. 9
2921	Hamilton	2 . 0	2 . 0	1 . 8	1 . 2	1 . 2	1 . 2	1 . 8	1 . 4	1 . 4	3 . 0	N ... - ... S ... S ...

4	o n M o u n t a i n											S ..
3 3 0 0 3	T o r o n t o E a s t	5 . 7	6 . 2	5 . 8	5 . 4	4 . 4	3 . 1	3 . 4	2 . 3	2 . 4	2 . 5	-6 4. 3
3 4 0 2 1	T o r o n t o N o r t h	4 . 1	4 . 3	3 . 9	3 . 5	3 . 0	2 . 5	2 . 7	2 . 1	2 . 8	2 . 3	-4 4. 8
3 5 1 2	T o r o	8 . 6	9 . 5	9 . 2	8 . 2	7 . 7	6 . 7	7 . 5	5 . 2	6 . 0	5 . 9	-3 9. 3

5	nt o W e st											
4 4 0 0 8	B u r l i n g t o n	4 . 6	4 . 6	3 . 9	3 . 9	3 . 4	2 . 7	3 . 0	2 . 3	2 . 1	3 . 1	-4 2. 4
4 4 0 1 7	O a k v i l l e	2 . 1	3 . 4	2 . 7	1 . 8	1 . 7	1 . 8	1 . 8	1 . 3	1 . 6	1 . 7	-2 5. 5
4 4 0 2 9	M i l t o n	2 . 8	3 . 1	3 . 5	4 . 2	2 . 3	3 . 6	3 . 6	2 . 7	2 . 6	3 . 1	N - S S S
4 5 0 2 7	O s h a w a	1 . 5	2 . 0	2 . 3	2 . 5	2 . 4	0 . 9	0 . 9	0 . 9	0 . 7	0 . 7	-7 3. 0

46090	B r a m p t o n	4 . 6	4 . 0	3 . 8	3 . 4	2 . 2	2 . 2	2 . 2	1 . 4	1 . 5	1 . 9	-4 3. 5
46108	M i s s a u g a	3 . 1	2 . 9	3 . 1	3 . 6	2 . 0	1 . 6	2 . 6	1 . 4	1 . 6	2 . 2	-3 6. 9
47045	B a r r i e	3 . 2	3 . 7	3 . 5	3 . 7	2 . 6	1 . 8	2 . 2	1 . 4	1 . 4	1 . 6	-7 2. 7
48006	N e w m a r k e t	1 . 5	1 . 4	1 . 7	1 . 6	1 . 4	1 . 3	1 . 3	0 . 8	0 . 9	1 . 1	-4 0. 7

49005	Parrysound	0 . 5	0 . 6	0 . 8	0 . 6	0 . 5	0 . 5	0 . 7	0 . 4	0 . 5	0 . 6	N ... - . S ... S ... S ..
51001	Ottawa Downs town	2 . 1	1 . 9	2 . 0	1 . 7	1 . 5	1 . 7	1 . 6	1 . 4	1 . 5	1 . 5	-9 . 3
52023	Kington	0 . 2	0 . 8	0 . 9	0 . 7	0 . 6	0 . 6	0 . 6	0 . 7	0 . 7	0 . 6	N ... - . S ... S ... S ..
54001	Belleve	1 . 7	1 . 2	1 . 5	1 . 8	1 . 1	1 . 0	1 . 3	1 . 4	1 . 3	1 . 2	-7 . 2

2	ll e											
5 6 0 5 1	C o r n w a l l	1 . 9	1 . 5	1 . 8	2 . 1	1 . 2	1 . 4	1 . 5	1 . 2	1 . 4	1 . 6	-8 .1
5 9 0 0 6	P e t e r b o r o u g h	1 . 7	1 . 8	1 . 5	1 . 3	1 . 2	0 . 9	1 . 2	1 . 0	0 . 8	0 . 9	-5 0. 5
6 3 2 0 3	T h u n d e r B a y	4 . 7	4 . 2	5 . 2	3 . 8	4 . 1	3 . 8	3 . 8	3 . 4	3 . 5	4 . 1	-1 3. 3

71078	S a u l t St e. M a r i e	1 . 3	2 . 0	1 . 7	1 . 0	1 . 3	1 . 2	1 . 5	1 . 6	1 . 4	1 . 4	N - S S S
75010	N o r t h B a y	2 . 5	2 . 6	2 . 1	2 . 0	1 . 6	1 . 7	1 . 8	1 . 4	1 . 5	1 . 5	-3 6. 9
77233	S u d b u ry	2 . 9	3 . 3	2 . 9	3 . 3	2 . 5	2 . 3	2 . 8	2 . 4	1 . 9	2 . 7	-2 5. 6

Notes:

N/A indicates data not available.

INS indicates there was insufficient data to calculate a valid annual mean.

Station 14111 replaced station 14064 as the Sarnia site in 2016.

Station 15026 replaced station 15025 as the London site in 2013.

Station 29214 replaced station 29114 as the Hamilton Mountain site in 2019.

[illegible]

12008	Windsor Downtown	12.4	14.0	12.7	11.4	11.1	11.0	10.9	9.0	9.6	9.4	-29.5
12016	Windsor West	11.5	11.8	11.4	10.6	9.9	8.8	10.0	8.1	8.4	8.0	-34.6
13001	Chatham	6.0	6.8	6.8	5.4	6.1	5.1	5.8	5.1	5.1	4.5	-26.1

1 4 1 1 1	S a r n i a	8 . 1	9 . 0	9 . 3	I . N ... S ..	7 . 3	7 . 6	6 . 8	5 . 9	6 . 8	6 . 7	-2 5. 7
1 5 0 2 0	G r a n d B e n d	4 . 4	3 . 1	3 . 4	2 . 8	3 . 0	3 . 3	2 . 5	2 . 3	2 . 4	2 . 7	-2 6. 5
1 5 0 2 6	L o n d o n	6 . 4	6 . 9	6 . 6	5 . 4	5 . 8	5 . 4	5 . 8	4 . 5	5 . 2	5 . 0	-2 8. 2
2 1 0 0 5	B r a n t f o r d	4 . 8	5 . 5	5 . 5	4 . 8	4 . 4	5 . 2	5 . 6	4 . 3	4 . 6	5 . 0	-8 .1
2 6	Ki tc	6 .	7 .	6 .	6 .	5 .	5 .	6 .	4 .	4 .	5 .	-2 6.

060	h e n er	7	0	8	2	8	8	3	9	8	4	4
27067	St ... : C at h a ri n e s	7 . 7	7 . 3	7 . 3	6 . 6	6 . 6	6 . 0	6 . 0	5 . 3	5 . 8	5 . 7	-2 7. 4
28028	G u el p h	6 . 6	7 . 1	6 . 3	6 . 2	5 . 9	5 . 9	5 . 4	4 . 9	5 . 5	5 . 1	-2 7. 7

29000	H a m i l t o n D o w n t o w n	1 2 . 4	1 2 . 4	1 2 . 2	1 1 . 9	1 1 . 9	1 1 . 6	1 2 . 5	9 . 9	1 0 . 2	1 0 . 6	-1 9. 5
29118	H a m i l t o n W e s t	1 2 . 7	1 2 . 8	1 2 . 2	1 1 . 8	1 0 . 4	1 1 . 0	1 1 . 3	9 . 5	1 0 . 1	9 . 8	-2 6. 3
29214	H a m i l t o n M o u n	9 . 0	9 . 3	9 . 0	7 . 9	7 . 8	7 . 8	8 . 8	6 . 9	6 . 3	6 . 1	-3 2. 0

	ta in											
3 3 0 0 3	T o r o n t o E a st	1 3 . 6	1 4 . 2	1 3 . 9	1 2 . 1	1 1 . 5	1 0 . 6	1 0 . 2	8 . 4	9 . 5	9 . 9	-4 0. 3
3 4 0 2 1	T o r o n t o N o r t h	1 2 . 9	1 3 . 4	1 2 . 9	1 2 . 0	1 0 . 5	1 0 . 4	1 0 . 5	8 . 9	9 . 3	1 0 . 2	-3 4. 8

35125	T o r o n t o W e s t	1 6 . 1	1 7 . 1	1 6 . 6	1 5 . 7	1 5 . 0	1 4 . 4	1 4 . 6	1 2 . 1	1 2 . 9	1 3 . 2	-2 5. 4
44008	B u r l i n g t o n	1 1 . 0	1 0 . 9	1 0 . 4	1 0 . 2	9 . 7	9 . 4	9 . 6	8 . 2	8 . 7	8 . 5	-2 5. 9
44017	O a k v i l l e	9 . 2	8 . 2	7 . 5	8 . 2	8 . 2	8 . 5	9 . 1	6 . 8	7 . 3	7 . 8	-1 4. 8
44029	M i l t o n	8 . 5	8 . 4	9 . 4	9 . 3	7 . 7	9 . 8	8 . 9	7 . 6	8 . 2	8 . 3	N ... - ... S ... S ... S ...
45	O s	5 .	6 .	6 .	6 .	6 .	3 .	3 .	3 .	3 .	3 .	-5 2.

0 2 7	h a w a	9	8	6	3	4	8	5	6	4	7	6
4 6 0 9 0	B r a m p t o n	9 . 1	1 0 . 6	9 . 9	9 . 7	8 . 3	8 . 1	8 . 6	6 . 8	6 . 5	7 . 2	-3 9. 0
4 6 1 0 8	M i s s i s s a u g a	9 . 5	9 . 2	9 . 2	8 . 6	8 . 0	7 . 2	8 . 4	6 . 7	7 . 0	7 . 5	-2 6. 7
4 7 0 4 5	B a r r i e	7 . 8	8 . 1	7 . 4	8 . 1	7 . 3	6 . 4	6 . 3	5 . 6	5 . 6	5 . 8	-3 1. 9

48006	N e w m a r k e t	6 . 8	6 . 8	6 . 8	6 . 5	6 . 3	6 . 1	5 . 5	4 . 5	4 . 5	5 . 6	-3 3. 3
49005	P a r r y S o u n d	2 . 9	3 . 3	3 . 2	2 . 9	2 . 7	2 . 9	2 . 6	2 . 4	2 . 5	2 . 4	-2 7. 2
51001	O t t a w a D o w n t o w n	7 . 9	7 . 4	7 . 4	6 . 9	7 . 1	7 . 3	6 . 7	5 . 9	5 . 7	6 . 1	-2 4. 5
52	Ki n	3 .	3 .	4 .	4 .	4 .	4 .	4 .	3 .	3 .	3 .	-1 5.

023	gston	6	9	4	4	4	2	0	5	8	5	5
54012	Belleville	4. 7	4. 5	4. 8	5. 1	4. 3	3. 7	4. 2	3. 5	3. 8	4. 2	-2 0. 6
56051	Cornwall	6. 2	5. 6	5. 3	5. 5	5. 0	5. 1	5. 0	4. 6	4. 8	5. 1	-1 0. 4
59006	Peterborough	5. 0	5. 3	5. 1	4. 5	4. 7	4. 5	3. 9	4. 1	4. 1	4. 5	-2 1. 2
63	Th	7. 	7. 	7. 	7. 	6. 	7. 	6. 	6. 	6. 	7. 	-1 3.

203	u n d e r B a y	3	8	5	1	7	5	7	1	5	0	8
71078	S a u l t St e. M a r i e	5 . 0	5 . 3	4 . 8	4 . 0	4 . 4	4 . 4	4 . 5	3 . 7	4 . 0	3 . 8	-2 4. 6
75010	N o r t h B a y	5 . 8	5 . 6	5 . 6	4 . 7	4 . 6	4 . 9	5 . 1	4 . 3	3 . 9	4 . 1	-2 3. 3
77233	S u d b u ry	7 . 2	7 . 3	7 . 2	7 . 0	6 . 8	6 . 5	6 . 9	6 . 3	5 . 6	6 . 1	-2 0. 5

Notes:

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ID	City / Town	Change over 10 year (									
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022

												%)
1 2 0 0 8	W in d s o r D o w n t o w n	1 6 . 2	1 8 . 0	1 6 . 2	1 4 . 5	1 4 . 4	1 4 . 2	1 3 . 6	1 0 . 7	1 2 . 1	1 1 . 8	-3 1. 1
1 2 0 1 6	W in d s o r W e st	1 5 . 2	1 5 . 7	1 5 . 5	1 3 . 5	1 2 . 5	1 1 . 3	1 3 . 0	9 . 9	1 0 . 7	1 0 . 4	-3 5. 8
1 3 0 0 1	C h at h a m	7 . 7	8 . 2	8 . 5	6 . 8	8 . 0	6 . 9	7 . 2	6 . 6	6 . 3	5 . 6	-2 7. 0

14111	Sarنيا	9. 8	10. 9	11. 7	I N S	8. 7	9. 4	8. 5	7. 5	8. 7	8. 6	-19. 4
15020	Grand B end	5. 4	3. 4	3. 8	3. 3	3. 4	3. 4	2. 7	2. 7	2. 8	2. 9	-23. 4
15026	London	7. 8	8. 3	8. 0	6. 5	6. 8	6. 2	6. 6	5. 2	6. 1	5. 8	-28. 4
21005	Brantford	5. 7	6. 4	6. 8	5. 7	5. 3	6. 2	6. 5	5. 1	5. 3	5. 6	N - S S S
26	Ki tc	8. .	8. .	8. .	7. .	6. .	6. .	7. .	5. .	5. .	6. .	-24.

060	h e n er	3	5	4	5	9	7	4	5	7	5	9
27067	St : C at h a ri n e s	9 . 9	9 . 1	9 . 4	8 . 2	7 . 9	6 . 8	7 . 1	6 . 2	6 . 8	7 . 0	-3 0. 3
28028	G ul e p h	7 . 8	8 . 4	7 . 7	7 . 3	7 . 0	7 . 1	6 . 4	5 . 6	6 . 5	6 . 0	-2 6. 7

29000	H a m i l t o n D o w n t o w n	1 6 . 8	1 6 . 3	7 . 7	1 6 . 1	1 5 . 8	1 5 . 5	1 6 . 5	1 2 . 8	1 3 . 7	1 4 . 0	-2 1. 8
29118	H a m i l t o n W e s t	1 8 . 1	1 8 . 7	1 7 . 3	1 7 . 9	1 4 . 2	1 5 . 2	1 6 . 5	1 2 . 6	1 3 . 2	1 3 . 4	-3 4. 9
29214	H a m i l t o n M o u n	1 1 . 0	1 1 . 3	1 0 . 9	9 . 2	9 . 1	8 . 9	1 5 . 4	8 . 3	7 . 7	9 . 1	-2 5. 7

	ta in											
3 3 0 0 3	T o r o n t o E a st	1 9 . 4	2 0 . 4	1 9 . 7	1 7 . 5	1 5 . 8	1 3 . 7	1 3 . 7	1 0 . 7	1 1 . 9	1 2 . 5	-4 8. 3
3 4 0 2 1	T o r o n t o N o r t h	1 7 . 0	1 7 . 7	1 6 . 9	1 5 . 4	1 3 . 5	1 2 . 8	1 3 . 2	1 1 . 0	1 2 . 1	1 2 . 5	-3 9. 8

3 5 1 2 5	T o r o n t o W e s t	2 4 . 7	2 6 . 5	2 5 . 7	2 3 . 8	2 2 . 7	2 1 . 1	2 2 . 1	1 7 . 2	1 8 . 9	1 9 . 1	-3 1. 6
4 4 0 0 8	B u r l i n g t o n	1 5 . 6	1 5 . 5	1 4 . 3	1 4 . 2	1 3 . 2	1 2 . 0	1 2 . 6	1 0 . 5	1 0 . 7	1 1 . 5	-3 1. 7
4 4 0 1 7	O a k v i l l e	1 1 . 2	1 1 . 6	1 0 . 1	1 0 . 1	9 . 9	1 0 . 4	1 0 . 9	8 . 0	8 . 8	9 . 5	-2 2. 2
4 4 0 2 9	M i l t o n	1 1 . 8	1 2 . 0	1 3 . 2	1 3 . 5	1 0 . 0	1 3 . 4	1 2 . 5	1 0 . 3	1 0 . 8	1 1 . 3	N ... - . S ... S ... S ..
4 5	O s	7 .	8 .	8 .	8 .	8 .	4 .	4 .	4 .	4 .	4 .	-5 6.

0 2 7	h a w a	4	8	9	8	8	7	4	5	1	3	8
4 6 0 9 0	B r a m p t o n	1 3 . 9	1 4 . 6	1 3 . 7	1 3 . 1	1 0 . 6	1 0 . 3	1 0 . 7 4	8 . 1	8 . 0	9 . 1	-4 4. 6
4 6 1 0 8	M i s s s a u g a	1 2 . 6	1 2 . 1	1 2 . 3	1 2 . 2	9 . 9	8 . 8	1 0 . 9 7	8 . 0	8 . 6	9 . 7	-2 7. 9
4 7 0 4 5	B a r r i e	1 1 . 0	1 1 . 8	1 0 . 9	1 1 . 9	9 . 9	8 . 3	8 . 5 2	6 . 9	7 . 0	7 . 4	-4 3. 9

48006	Newmarket	8.4	8.2	8.5	8.1	7.8	7.4	6.78	5.2	5.4	6.7	-35.2
49005	ParrySound	3.4	4.0	4.0	3.6	3.3	3.3	3.34	2.8	3.1	3.0	-26.4
51001	OttawaDowntown	10.1	9.3	9.5	8.6	8.6	9.0	8.31	7.3	7.2	7.5	-22.9
52	Kin	3.	4.	5.	5.	4.	4.	4.	4.	4.	4.	-18.

023	g st o n	8	8	3	2	9	7	5 5	1	5	1	2
54012	B el le vi ll e	6 . 3	5 . 7	6 . 2	6 . 7	5 . 4	4 . 7	5 . 5 3	4 . 9	5 . 1	5 . 4	-1 8. 0
56051	C o r n w al l	8 . 0	7 . 0	7 . 1	7 . 6	6 . 2	6 . 3	6 . 5 4	5 . 8	6 . 2	6 . 7	-1 1. 8
59006	P e t e r b o r o u g h	6 . 6	7 . 1	6 . 6	5 . 9	5 . 8	5 . 3	5 . 1 4	5 . 0	4 . 8	5 . 4	-2 7. 9

63203	T h u n d e r B a y	1 2 . 0	1 1 . 9	1 2 . 7	1 1	1 0 . 8	1 1 . 3	1 0 . 4 4	9 . 5	1 0 . 0	1 1 . 1	-1 5. 0
71078	S a u l t St e. M a r i e	6 . 3	7 . 3	6 . 6	5 . 1	5 . 8	5 . 6	5 . 9 5	5 . 2	5 . 3	5 . 2	-2 2. 3
75010	N o r t h B a y	8 . 3	8 . 1	7 . 8	6 . 7	6 . 2	6 . 6	6 . 9 1	5 . 6	5 . 4	5 . 7	-2 6. 9

	n											ver 10 year (%)
1 2 0 0 8	W in d s o r D o w n t o w n	9 . 2	1 0 . 1	9 . 3	8 . 1	7 . 8	8 . 5	7 . 8	7 . 1	8 . 3	7 . 8	-2 0. 4

12016	Wind sor West	100	107	99	85	85	87	91	88	96	88	-8.4
13001	Ch ath am	8.1	86	81	66	64	68	68	67	71	67	-15.9
14111	S a r ni a	8.5	90	84	I N S	70	74	71	71	77	71	-16.5
15020	G r a n d B e n d	7.3	81	77	60	51	56	54	48	57	56	-34.2
1	L	9	8	8	7	7	7	6	6	7	7	-2

5026	o n d o n	. 1	. 8	. 3	. 1	. 0	. 3	. 7	. 5	. 8	. 1	0. 7
16015	P o r t S t a n l e y	7 . 4	8 . 2	8 . 0	6 . 5	6 . 3	6 . 8	6 . 7	6 . 5	7 . 0	6 . 8	-1 4. 6
18007	Ti v e r t o n	5 . 8	6 . 5	6 . 4	5 . 1	5 . 1	5 . 7	5 . 0	4 . 8	5 . 4	4 . 6	-1 9. 9
21005	B r a n t f o r d	8 . 5	9 . 2	8 . 7	7 . 3	7 . 2	7 . 7	7 . 4	6 . 7	7 . 7	7 . 0	-1 9. 7
2606	Ki t c h e	8 . 7	9 . 3	8 . 8	7 . 3	7 . 0	7 . 4	7 . 2	6 . 6	7 . 8	7 . 5	-1 9. 8

0	ner											
27067	St... : C at h a ri n e s	8 . 5	8 . 8	8 . 4	6 . 9	7 . 0	7 . 0	7 . 0	6 . 3	6 . 5	5 . 4	-3 4. 3
28028	G u el p h	8 . 1	8 . 9	8 . 4	6 . 9	6 . 8	7 . 4	7 . 1	6 . 9	7 . 7	6 . 7	-1 6. 3
29000	H a m ilt o n D o w n t o w n	1 0 . 1	1 0 . 8	1 0 . 2	8 . 2	8 . 5	9 . 2	8 . 8	8 . 1	8 . 9	8 . 6	-2 0. 7

29118	H a m i l t o n W e s t	9 . 6	9 . 9	9 . 9	7 . 9	7 . 5	8 . 2	7 . 8	7 . 8	8 . 0	7 . 3	-2 5. 5
29214	H a m i l t o n M o u n t a i n	9 . 2	9 . 4	9 . 0	7 . 2	7 . 4	7 . 7	7 . 9	7 . 1	8 . 0	7 . 7	-1 8. 0
33003	T o r o n t o E a s t	8 . 2	8 . 9	8 . 5	7 . 0	7 . 4	7 . 2	7 . 0	6 . 7	7 . 4	6 . 7	-2 1. 0
3	T	8	9	9	7	7	7	6	6	7	6	-2

4021	or o nt o N o rt h	. 3	. 2	. 4	. 3	. 4	. 6	. 8	. 4	. 4	. 8	6. 5
35125	T o r o n t o W e st	8 . 8	9 . 1	8 . 5	7 . 0	7 . 4	7 . 7	7 . 2	6 . 9	7 . 7	6 . 9	-1 9. 7
44008	B u rl in gt o n	8 . 7	9 . 6	9 . 4	7 . 6	7 . 0	7 . 2	7 . 0	6 . 4	7 . 2	6 . 6	-3 1. 1
44017	O a k vi ll e	8 . 0	8 . 5	8 . 3	7 . 0	6 . 9	7 . 4	7 . 2	6 . 3	7 . 1	6 . 7	-1 7. 0

44029	Milton	8. 5	10. 3	8. 8	7. 1	7. 0	7. 5	7. 5	7. 1	7. 6	6. 9	0. 0
45027	Oshawa	7. 4	7. 7	7. 5	5. 9	5. 9	6. 4	6. 1	6. 2	6. 2	5. 7	-2 1. 4
46090	Brampton	8. 5	8. 9	8. 4	6. 8	7. 0	7. 3	6. 8	6. 7	7. 2	7. 1	-2 0. 4
46108	Mississauga	7. 9	8. 7	8. 5	7. 2	6. 8	7. 3	7. 0	6. 6	7. 6	7. 1	-1 7. 0
47	Ba	7. .	7. .	7. .	6. .	7. .	7. .	7. .	6. .	6. .	6. .	-1 2.

0 4 5	rr ie	5	6	6	5	0	7	5	8	9	4	2
4 8 0 0 6	N e w m a r k et	7 . 3	7 . 3	7 . 1	6 . 0	5 . 9	6 . 4	5 . 9	5 . 9	6 . 5	6 . 2	-1 5. 7
4 9 0 0 5	P a rr y S o u n d	5 . 8	5 . 8	5 . 7	4 . 8	4 . 6	5 . 0	4 . 4	4 . 4	5 . 0	4 . 7	-2 1. 5
4 9 0 1 0	D o rs e t	5 . 4	5 . 3	5 . 6	4 . 6	4 . 6	4 . 9	4 . 1	4 . 5	4 . 7	4 . 5	-1 6. 8
5 1 0 0 1	O tt a w a D	7 . 0	7 . 0	6 . 9	5 . 9	5 . 9	5 . 9	5 . 9	6 . 0	6 . 3	5 . 9	-1 6. 0

	o w n t o w n											
5 2 0 2 3	Ki n g s t o n	6 . 5	6 . 8	6 . 3	5 . 8	5 . 3	5 . 6	5 . 4	5 . 6	6 . 5	5 . 3	-1 2. 5
5 4 0 1 2	B el le vi ll e	6 . 9	6 . 8	6 . 6	5 . 5	5 . 8	6 . 4	6 . 1	6 . 3	6 . 0	5 . 5	-1 1. 5
5 6 0 5 1	C o r n w al l	7 . 7	7 . 0	6 . 9	6 . 4	5 . 9	6 . 3	5 . 9	6 . 0	6 . 5	6 . 4	-1 3. 0
5 9 0 0 6	P e t e r b	7 . 4	6 . 9	6 . 8	5 . 8	5 . 8	6 . 3	6 . 0	5 . 6	6 . 5	6 . 6	-1 4. 4

	o r o u g h											
6 3 2 0 3	T h u n d e r B a y	6 . 3	6 . 6	6 . 5	4 . 9	5 . 1	6 . 0	5 . 1	5 . 5	6 . 6	5 . 0	-1 5. 6
7 1 0 7 8	S a u l t St e. M a r i e	5 . 6	6 . 0	5 . 9	4 . 9	5 . 0	5 . 5	4 . 8	4 . 5	5 . 8	4 . 5	-1 9. 8
7 5 0 1 0	N o r t h B a y	5 . 2	5 . 3	5 . 3	4 . 6	4 . 6	5 . 5	4 . 5	4 . 6	5 . 7	5 . 1	N - S S S

7	S	5	6	6	5	5	5	5	5	5	5	-1
7	u	.	.	.	.	.	.	.	.	.	.	5.
2	d	7	0	3	4	0	4	0	1	8	2	4
3	b											
3	u											
	ry											

Notes:

Measurements taken by Synchronized Hybrid Ambient Real-time Particulate (SHARP) 5030.

INS indicates there was insufficient data in any one quarter to calculate a valid annual mean.

Station 14111 replaced station 14064 as the Sarnia site in 2016.

Station 15026 replaced station 15025 as the London site in 2013.

Station 29214 replaced station 29114 as the Hamilton Mountain site in 2019.

Station 34021 replaced station 34020 as the Toronto North site in 2017.

Station 44029 was operated by the Halton Region prior to 2019.

Station 45027 replaced station 45026 as the Oshawa site in 2018.

Station 46090 replaced station 46089 as the Brampton site in 2017.

Station 52023 replaced station 52022 as the Kingston site in 2014.

Station 77233 replaced station 77219 as the Sudbury site in 2013.

N-SSS - Non-Significant Sen's Slope (significant trend not detected).

10-year trend for ground-level ozone (O₃) 1h maximum

1h Maximum (ppb)

O₃ 1h AAQC: 80 ppb

I D 2013	C i t y / T o w n	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	C h a n g e o v e r 1 0 y e a r (%)
1 2 0 0 8	W i n d s o r D o w n t o w n	89	78	89	95	78	89	82	81	82	84	N - S S S
1	W	8	8	8	9	8	9	8	8	8	8	N

2016	ind s o r W e st	7	6	7	5	2	0	0	3	6	1	- S S S
13001	C h a t h a m	85	78	79	84	90	78	76	77	75	85	N - S S S
14111	S a r n i a	83	79	83	83	80	101	87	82	97	97	N - S S S
15020	G r a n d B e n d	86	90	87	91	82	100	85	93	104	92	N - S S S
150	L o n	82	82	77	82	78	76	70	77	78	89	N - S

26	d o n											S S
16015	P o r t S t a n l e y	85	87	86	84	90	86	77	76	74	89	N - S S S
18007	Ti v e r t o n	92	86	83	85	82	104	81	75	78	85	N - S S S
21005	B r a n t f o r d	74	80	79	84	74	76	74	74	79	90	N - S S S
26060	Ki t c h e n e	72	76	76	81	75	75	77	74	81	79	N - S S S

	r											
2 7 0 6 7	St : C at h a ri n e s	9 6	7 0	7 3	8 0	7 3	7 5	7 0	7 5	7 3	8 4	N - S S S
2 8 0 2 8	G u el p h	7 3	7 9	7 9	8 2	7 6	7 8	7 4	7 0	8 3	8 2	N - S S S
2 9 0 0 0	H a m ilt o n D o w n t o w n	8 6	7 4	7 4	7 8	7 3	7 7	6 5	7 7	8 0	8 4	N - S S S
2	H	7	7	7	7	7	7	6	7	7	8	N

9 1 1 8	a m ilt o n W e st	8	0	1	8	4	6	5	6	8	2	- S S S S
2 9 2 1 4	H a m ilt o n M o u n ta in	8 6	7 9	7 9	7 6	8 1	8 0	7 0	7 9	8 0	8 1	N - S S S S
3 3 0 0 3	T o r o n t o E a st	8 7	7 3	9 1	9 9	8 2	7 2	6 7	7 7	7 8	7 7	N - S S S S
3 4 0	T o r	8 7	8 2	9 0	8 5	8 2	8 3	7 7	9 5	8 6	8 1	N - S

21	Ontario North											SS
35125	Toronto West	83	72	82	79	82	76	77	81	81	70	N - SSS
44008	Burlington	92	73	84	80	88	83	74	86	80	79	N - SSS
44017	Oakville	101	72	80	74	84	82	71	81	84	83	N - SSS
4	M	9	8	8	7	7	8	7	7	8	8	N

4029	ilt o n	3	0	0	9	4	1	7	7	4	1	- S S S S
45027	O s h a w a	9 6	7 3	7 3	8 1	8 6	7 6	6 6	8 8	8 0	8 0	N - S S S
46090	B r a m p t o n	8 4	8 0	8 4	7 9	7 5	8 3	7 2	8 3	8 4	7 5	N - S S S
46108	M i s s a u g a	8 3	7 6	7 9	7 9	7 8	7 9	6 5	8 0	8 1	8 0	N - S S S

4 7 0 4 5	B a r r i e	7 3	6 8	8 0	7 9	7 5	7 2	7 5	7 0	8 2	7 1	N - S S S
4 8 0 0 6	N e w m a r k e t	7 2	8 7	9 2	9 4	8 5	9 1	8 8	8 7	8 1	9 0	N - S S S
4 9 0 0 5	P a r r y S o u n d	7 7	7 4	8 6	7 4	7 4	8 0	6 8	7 3	8 0	7 3	N - S S S
4 9 0 1 0	D o r s e t	6 9	7 9	7 8	7 4	6 9	7 7	6 4	6 6	7 0	6 4	N - S S S
5 1 0	O t t a	6 7	6 4	6 9	7 3	7 1	7 2	5 7	6 4	6 8	6 1	N - S

01	w a D o w n t o w n											S ... S ..
52023	Ki n g s t o n	7 9	8 1	7 4	8 2	9 4	7 8	6 8	7 2	7 8	7 9	N ... - ... S ... S ... S ..
54012	B el le vi ll e	9 2	8 0	7 7	9 6	8 6	8 5	7 3	8 1	8 2	9 6	N ... - ... S ... S ... S ..
56051	C o r n w al l	7 3	7 0	6 9	7 4	7 2	6 8	5 8	6 2	7 0	6 6	N ... - ... S ... S ... S ..
590	P e t	7 4	7 4	7 8	8 5	8 0	8 6	6 8	8 7	8 5	7 9	N ... - ... S ...

06	er b o ro u g h											S S
63203	T h u n d e r B a y	63	70	62	62	51	63	56	56	65	58	N - S S S
71078	S a u l t St e. M a r i e	66	73	75	80	70	69	61	77	66	75	N - S S S
75010	N o r t h B a	72	71	70	78	69	63	63	74	71	72	N - S S S

	y											
7 7 2 3 3	S u d b u r y	7 6	7 3	6 7	8 0	6 9	7 0	7 5	6 2	5 6	6 4	N - S S S

Notes:

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Station 52023 replaced station 52022 as the Kingston site in 2014.

Station 77233 replaced station 77219 as the Sudbury site in 2013.

N-SSS - Non-Significant Sen's Slope (significant trend not detected).

10-year trend for ground-level ozone (O₃)

Annual mean (ppb)

I D	C i t y / T o w n	2 0 1 3	2 0 1 4	2 0 1 5	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	C h a n g e o

	n											ver 10 year (%)
1 2 0 0 8	Wind sor Down town	2 6 . 9	2 6 . 0	2 7 . 0	2 7 . 7	2 7 . 3	2 6 . 9	2 6 . 6	2 7 . 3	2 8 . 8	3 0 . 4	1 0. 4

[illegible]

5026	o n d o n	8 . 7	8 . 1	7 . 9	8 . 2	8 . 1	7 . 6	6 . 8	7 . 7	8 . 9	9 . 6	- . S S S S
16015	P o r t S t a n l e y	3 3 . 9	3 2 . 3	3 2 . 8	3 2 . 9	3 3 . 0	3 2 . 3	3 2 . 3	3 0 . 9	3 1 . 4	3 1 . 1	-6 .0
18007	Ti v e r t o n	3 2 . 4	3 1 . 8	3 2 . 5	3 3 . 1	3 2 . 4	3 2 . 3	3 1 . 1	3 0 . 5	3 2 . 4	3 1 . 9	N - . S S S S
21005	B r a n t f o r d	2 9 . 0	2 9 . 4	2 8 . 9	2 9 . 5	2 8 . 3	2 8 . 3	2 7 . 5	2 8 . 0	2 8 . 5	2 9 . 0	N - . S S S S

26060	Kitchen ener	28.0	27.3	27.9	28.8	28.1	27.7	27.2	27.7	28.4	28.9	N - S S S
27067	St : Cath arines	28.6	28.5	28.6	29.8	28.1	28.5	28.4	30.2	29.8	29.8	4. 1
28028	Guelph	29.0	27.8	27.7	28.7	28.4	28.9	26.3	27.0	29.5	30.9	N - S S S
29000	Hamilton Down	25.0	25.3	25.9	26.7	25.6	25.6	24.4	26.3	26.4	25.9	N - S S S

	to w n											
2 9 1 1 8	H a m ilt o n W e st	2 4 . 4	2 2 . 7	2 3 . 9	2 4 . 4	2 5 . 0	2 5 . 5	2 3 . 6	2 5 . 2	2 4 . 9	2 5 . 2	N - S S S
2 9 2 1 4	H a m ilt o n M o u n ta in	2 9 . 5	2 9 . 1	2 9 . 4	2 9 . 5	2 9 . 1	2 9 . 3	2 7 . 5	2 9 . 3	2 8 . 7	2 8 . 2	N - S S S
3 3 0 0 3	T o r o n t o E a	2 4 . 1	2 3 . 4	2 3 . 5	2 5 . 5	2 4 . 4	2 5 . 2	2 4 . 6	2 6 . 1	2 6 . 2	2 5 . 1	9. 8

	st											
3 4 0 2 1	T o r o n t o N o r t h	2 5 . 3	2 5 . 3	2 5 . 7	2 5 . 9	2 4 . 0	2 5 . 5	2 4 . 1	2 6 . 0	2 6 . 4	2 4 . 3	N - S S S
3 5 1 2 5	T o r o n t o W e st	2 1 . 5	2 1 . 1	2 1 . 3	2 2 . 1	2 2 . 1	2 2 . 3	2 1 . 8	2 3 . 4	2 2 . 8	2 2 . 0	7. 3
4 4 0 0 8	B u r l i n g t o n	2 6 . 4	2 5 . 5	2 6 . 5	2 7 . 6	2 7 . 1	2 7 . 6	2 6 . 6	2 8 . 3	2 7 . 4	2 6 . 6	5. 0
4 4	O a	2 8	2 7	2 7	2 7	2 7	2 8	2 7	2 8	2 8	2 8	N - .

0 1 7	k v i l l e	. 3	. 2	. 4	. 1	. 4	. 7	. 1	. 0	. 8	. 1	S . S . S . S .
4 4 0 2 9	M i l t o n	2 7 .6	2 7 .1	2 7 .2	2 7 .2	2 7 .5	2 8 .1	2 6 .9	2 6 .8	2 7 .2	2 7 .6	N . - .S . S . S .
4 5 0 2 7	O s h a w a	2 7 .2	2 7 .2	2 6 .2	2 7 .2	2 7 .9	2 5 .8	2 4 .4	2 6 .4	2 6 .9	2 6 .6	N . - .S . S . S .
4 6 0 9 0	B r a m p t o n	2 6 .7	2 6 .5	2 6 .5	2 7 .1	2 7 .2	2 8 .6	2 6 .5	2 8 .4	2 8 .3	2 7 .0	5. 6
4 6 1 0 8	M i s s i s a u g	2 5 .2	2 5 .4	2 5 .4	2 6 .0	2 6 .2	2 6 .1	2 4 .5	2 5 .6	2 6 .2	2 5 .7	N . - .S . S . S .

	a											
47045	Barrie	25.5	25.6	25.4	25.9	25.9	27.5	25.7	25.9	25.0	25.3	N - S S S
48006	Newmarket	28.7	28.6	28.5	28.6	27.9	29.8	27.8	28.5	30.2	28.1	N - S S S
49005	Parry Sound	30.4	29.6	30.4	29.6	29.7	30.8	29.8	29.9	30.3	29.9	N - S S S
49010	Dorset	28.1	27.7	27.0	27.4	26.9	28.2	27.5	27.1	26.8	26.3	N - S S S
51	Ott	25	24	25	25	25	26	25	25	25	26	N -

001	a w a D o w n t o w n	. 6	. 8	. 6	. 6	. 5	. 4	. 9	. 2	. 8	. 1	S S S
52023	Ki n g st o n	3 0 .3	3 1 .4	3 0 .3	3 0 .5	3 0 .4	3 0 .5	2 9 .9	3 0 .1	3 0 .2	2 9 .9	-3 .1
54012	B el le vi ll e	2 9 .2	2 9 .6	2 9 .6	3 0 .5	3 0 .2	2 9 .9	2 9 .6	2 9 .7	3 0 .3	3 0 .3	N - S S S
56051	C o r n w al l	2 6 .9	2 7 .3	2 7 .9	2 7 .1	2 7 .2	2 7 .6	2 6 .9	2 6 .4	2 6 .7	2 6 .3	N - S S S
59	P e	2 8	2 9	2 9	2 9	2 8	2 9	2 8	2 7	2 8	2 7	N -

006	terborough	.6	.2	.3	.7	.9	.7	.3	.6	.6	.4	S S S
63203	Thunder Bay	26.3	23.4	24.0	23.2	23.4	24.3	23.7	22.9	24.4	24.6	N - S S S
71078	Sault Ste. Marie	28.9	28.4	27.8	27.3	28.1	29.7	28.1	28.2	29.2	28.8	N - S S S

75010	N o r t h B a y	27.4	267	270	264	264	260	264	262	264	272	N - S S S
77233	S u d b u r y	272	263	257	251	259	271	263	268	269	256	N - S S S

Notes:

Station 14111 replaced station 14064 as the Sarnia site in 2016.

Station 15026 replaced station 15025 as the London site in 2013.

Station 29214 replaced station 29114 as the Hamilton Mountain site in 2019.

Station 34021 replaced station 34020 as the Toronto North site in 2017.

Station 44029 was operated by the Halton Region prior to 2019.

Station 45027 replaced station 45026 as the Oshawa site in 2018.

Station 46090 replaced station 46089 as the Brampton site in 2017.

Station 52023 replaced station 52022 as the Kingston site in 2014.

Station 77233 replaced station 77219 as the Sudbury site in 2013.

N-SSS - Non-Significant Sen's Slope (significant trend not detected).

10-year trend for ground-level ozone (O₃) summer means (May - September)

Summer mean (ppb)

[illegible]

2016	ind s o r W e st	0 . 9	0 . 9	1 . 8	3 . 0	1 . 8	2 . 4	1 . 2	0 . 6	3 . 8	4 . 0	- . S S S S
13001	C h a t h a m	3 4 . 2	3 2 . 4	3 4 . 4	3 2 . 9	3 3 . 1	3 2 . 1	3 1 . 9	3 2 . 5	3 3 . 6	3 5 . 0	N . - . S S S S
14111	S a r n i a	3 2 . 0	2 9 . 4	3 1 . 1	3 2 . 1	3 2 . 0	3 4 . 0	3 1 . 5	3 0 . 1	3 5 . 1	3 3 . 8	N . - . S S S S
15020	G r a n d B e n d	3 3 . 1	3 1 . 5	3 2 . 3	3 2 . 0	3 2 . 1	3 2 . 7	3 1 . 7	3 1 . 7	3 3 . 1	3 2 . 2	N . - . S S S S
150	L o n	3 0 .	2 9 .	3 1 .	3 0 .	2 9 .	3 0 .	2 7 .	2 9 .	3 1 .	3 1 .	N . - . S S

26	d o n	9	5	0	4	8	5	4	1	0	0	S ... S ..
16015	P o rt St a nl e y	36. 9	33. 7	35. 6	35. 2	35. 0	35. 3	33. 7	32. 8	34. 3	32. 7	-8 .3
18007	Ti v e rt o n	32. 5	30. 8	33. 3	34. 1	32. 2	32. 9	29. 7	30. 5	33. 0	31. 9	N ... - . S ... S ... S ..
21005	B r a n tf o r d	30. 1	29. 9	31. 2	32. 2	29. 4	30. 4	28. 3	29. 5	31. 1	30. 7	N ... - . S ... S ... S ..
26060	Ki tc h e n e	29. 8	28. 5	30. 2	31. 8	29. 8	30. 6	29. 2	29. 6	30. 6	30. 5	N ... - . S ... S ... S ..

[illegible]

9 1 1 8	a m ilt o n W e st	6 . 4	2 . 7	6 . 5	7 . 1	6 . 8	8 . 5	4 . 4	7 . 7	7 . 9	6 . 8	- . S . S . S . S
2 9 2 1 4	H a m ilt o n M o u n ta in	3 2 . 5	3 1 . 6	3 3 . 9	3 3 . 2	3 1 . 5	3 4 . 0	2 9 . 6	3 2 . 3	3 2 . 3	3 0 . 6	N . - . S . S . S . S
3 3 0 0 3	T o r o n t o E a st	2 7 . 1	2 5 . 9	2 7 . 7	2 9 . 7	2 6 . 0	2 9 . 2	2 6 . 0	2 8 . 8	2 9 . 2	2 7 . 2	N . - . S . S . S . S
3 4 0	T o r	2 9 .	2 8 .	3 0 .	3 0 .	2 6 .	3 0 .	2 5 .	2 9 .	2 9 .	2 7 .	N . - . S . S

21	o nt o N o rt h	4	6	7	7	3	4	9	3	8	1	S ... S ..
35125	T o r o n t o W e st	2 4 . 4	2 3 . 5	2 5 . 0	2 5 . 9	2 4 . 3	2 6 . 3	2 4 . 3	2 5 . 9	2 5 . 9	2 4 . 3	N ... - . S ... S ... S ..
44008	B u rl in gt o n	2 9 . 2	2 7 . 4	3 0 . 1	3 0 . 5	2 9 . 0	3 1 . 8	2 8 . 8	3 1 . 2	3 0 . 4	2 8 . 9	N ... - . S ... S ... S ..
44017	O a k vi ll e	3 0 . 6	2 8 . 3	3 0 . 2	2 9 . 9	2 9 . 5	3 2 . 4	2 8 . 8	3 0 . 4	3 2 . 1	3 0 . 7	N ... - . S ... S ... S ..
4	M	3	2	3	3	2	3	2	2	3	3	N ...

4029	ilt o n	0 . 6	8 . 2	0 . 4	0 . 6	9 . 6	4 . 3	8 . 9	8 . 6	0 . 6	0 . 2	- . S . S . S . S
45027	O s h a w a	2 8 . 3	2 7 . 9	2 8 . 9	2 9 . 4	2 8 . 6	2 6 . 6	2 4 . 4	2 7 . 4	2 7 . 4	2 5 . 1	N . - . S . S . S
46090	B r a m p t o n	2 9 . 5	2 8 . 9	3 0 . 3	3 1 . 2	2 9 . 5	3 2 . 7	2 8 . 2	3 1 . 0	3 1 . 6	2 9 . 9	N . - . S . S . S . S
46108	M is s i s s a u g a	2 6 . 5	2 6 . 5	2 8 . 0	2 8 . 5	2 7 . 2	2 8 . 3	2 4 . 9	2 7 . 0	2 8 . 5	2 7 . 4	N . - . S . S . S . S

47045	Barrie	25.6	25.4	26.8	27.4	25.6	29.0	24.7	25.8	25.1	25.0	N - S S S
48006	Newmarket	30.3	29.4	31.2	31.7	29.0	33.2	28.4	30.1	32.2	29.8	N - S S S
49005	Parry Sound	30.1	28.2	31.4	28.9	27.7	30.9	27.8	28.5	30.0	29.1	N - S S S
49010	Dorset	25.3	24.4	24.6	25.1	23.0	25.8	23.9	23.7	24.1	22.8	N - S S S
510	Ottawa	26.	24.	27.	27.	25.	27.	25.	25.	27.	26.	N - S

01	w a D o w n t o w n	5	6	8	5	3	6	6	7	4	2	S ... S ..
52023	Ki n g s t o n	3 2 . 4	3 2 . 7	3 2 . 2	3 3 . 3	3 0 . 9	3 3 . 1	3 0 . 0	3 1 . 3	3 2 . 0	3 0 . 6	N ... - . S ... S ... S ..
54012	B el le vi ll e	3 0 . 6	3 0 . 4	3 3 . 2	3 3 . 7	3 0 . 9	3 2 . 4	3 0 . 0	3 1 . 0	3 2 . 8	3 1 . 4	N ... - . S ... S ... S ..
56051	C o r n w al l	2 8 . 1	2 7 . 0	2 9 . 7	2 8 . 7	2 7 . 1	2 9 . 4	2 6 . 1	2 6 . 3	2 7 . 8	2 5 . 6	N ... - . S ... S ... S ..
590	P e t	2 9 .	3 0 .	3 1 .	3 2 .	2 9 .	3 2 .	2 8 .	2 8 .	2 9 .	2 7 .	N ... - . S ...

06	er b o ro u g h	5	0	5	3	2	2	1	4	9	9	S S
63203	T h u n d e r B a y	247	227	236	220	204	221	218	213	244	229	N - S S S
71078	S a ul t St e. M a ri e	282	274	281	263	263	291	262	264	288	270	N - S S S
75010	N o rt h B a	269	262	278	264	247	263	257	244	274	263	N - S S S

	W n											o v e r 1 0 y e a r (%)
1 2 0 0 8	W i n d s o r D o w n t o w n	2 2 . 8	2 2 . 8	2 2 . 4	2 3 . 6	2 3 . 3	2 2 . 4	2 3 . 1	2 3 . 5	2 5 . 1 9	2 6 . 9	N - S S S
1 2 0 1 6	W i n d s o r W e	2 3 . 4	2 4 . 5	2 2 . 7	2 3 . 9	2 3 . 6	2 3 . 1	2 4 . 4	2 2 . 8	2 6 . 3 2	2 6 . 3	N - S S S

	st											
13001	Chatham	26. 2	27. 1	26. 3	27. 2	26. 8	26. 2	27. 4	26. 7	28. 2 1	29. 2	N - S S S
14111	Sarنيا	26. 2	25. 4	25. 4	I N S	26. 0	25. 4	27. 6	24. 3	26. 2 6	29. 1	N - S S S
15020	Grand Bend	31. 8	30. 6	29. 1	29. 8	30. 2	30. 7	31. 6	30. 5	31. 3 2	31. 7	N - S S S
15026	London	26. 9	27. 1	25. 8	26. 6	26. 9	25. 6	26. 4	26. 7	27. 4 9	28. 6	N - S S S
1600	Port	31. .	31. .	31. .	31. .	31. .	30. .	31. .	29. .	29. .	30. .	-7 .8

1 5	Stanley	8	3	2	2	5	2	4	6	3 7	0	
1 8 0 0 7	Tiverton	3 2 . 4	3 2 . 7	3 1 . 9	3 2 . 4	3 2 . 6	3 1 . 9	3 2 . 1	3 0 . 6	3 2 . 0	3 1 . 9	N - S S S
2 1 0 0 5	Brantford	2 8 . 3	2 8 . 8	2 7 . 2	2 7 . 7	2 7 . 5	2 6 . 7	2 6 . 9	2 7 . 0	2 6 . 8	2 7 . 8	N - S S S
2 6 0 6 0	Kitchen	2 6 . 7	2 6 . 5	2 6 . 1	2 6 . 6	2 7 . 1	2 5 . 6	2 5 . 8	2 6 . 4	2 6 . 9 3	2 7 . 9	N - S S S

27067	St : C at h a r i n e s	268	279	263	272	270	264	275	278	278	286	N - S S S
28028	G u e l p h	280	270	260	268	275	269	277	276	285	296	N - S S S
29000	H a m i l t o n D o w n t o w n	225	237	233	239	242	266	272	274	281	283	N - S S S
291	H a m	238	228	228	228	238	238	238	238	232	248	N - S

1 8	ilt o n W e st	0	8	1	5	7	3	0	5	8 5	1	S ... S ..
2 9 2 1 4	H a m ilt o n M o u n ta in	2 7 . 3	2 7 . 3	2 6 . 3	2 6 . 8	2 7 . 4	2 5 . 9	2 5 . 9	2 7 . 2	2 6 . 2 1	2 6 . 5	N ... - .. S ... S ... S ..
3 3 0 0 3	T o r o n t o E a st	2 2 . 0	2 1 . 6	2 0 . 5	2 2 . 5	2 3 . 3	2 2 . 4	2 3 . 5	2 4 . 2	2 4 . 0 7	2 3 . 7	1 2. 9

3 4 0 2 1	T o r o n t o N o r t h	2 2 .3	2 2 .8	2 2 .1	2 2 .6	2 2 .3	2 2 .0	2 2 .8	2 3 .7	2 3 .8	2 2 .3	N ... - ... S ... S ... S ...
3 5 1 2 5	T o r o n t o W e s t	1 9 .5	1 9 .4	1 8 .6	1 9 .4	2 0 .5	1 9 .4	2 0 .1	2 1 .6	2 0 .7 4	2 0 .4	9. 1
4 4 0 0 8	B u r l i n g t o n	2 4 .4	2 4 .1	2 3 .8	2 5 .6	2 5 .7	2 4 .7	2 5 .2	2 6 .2	2 5 .2 9	2 5 .0	N ... - ... S ... S ... S ...

44017	O a k v i l l e	2 6 .6	2 6 . 5	2 5 . 3	2 5 . 1	2 5 . 9	2 6 . 0	2 6 . 0	2 6 . 3	2 6 . 4 9	2 6 . 3	N - S S S
44029	M i l t o n	2 5 . 5	2 6 . 3	2 4 . 9	2 4 . 7	2 5 . 9	2 4 . 9	2 5 . 5	2 5 . 6	2 4 . 8 1	2 5 . 6	N - S S S
45027	O s h a w a	2 6 . 4	2 6 . 7	2 4 . 3	2 5 . 6	2 7 . 3	2 5 . 4	2 4 . 5	2 5 . 7	2 6 . 7 3	2 7 . 8	N - S S S
46090	B r a m p t o n	2 4 . 6	2 4 . 8	2 3 . 8	2 4 . 1	2 5 . 6	2 5 . 6	2 5 . 3	2 6 . 5	2 6 . 1	2 5 . 0	N - S S S
46108	M i s s i s	2 4 . 3	2 4 . 7	2 3 . 6	2 4 . 2	2 5 . 5	2 4 . 6	2 4 . 2	2 4 . 7	2 4 . 6 7	2 4 . 5	N - S S S

	a u g a											
4 7 0 4 5	B a r r i e	2 5 . 5	2 5 . 8	2 4 . 4	2 4 . 8	2 6 . 3	2 6 . 5	2 6 . 4	2 6 . 1	2 5 . 0 7	2 5 . 6	N - S S S
4 8 0 0 6	N e w m a r k e t	2 7 . 5	2 8 . 1	2 6 . 6	2 6 . 3	2 7 . 2	2 7 . 3	2 7 . 3	2 7 . 5	2 8 . 7 8	2 6 . 9	N - S S S
4 9 0 0 5	P a r r y S o u n d	3 0 . 6	3 0 . 6	2 9 . 8	3 0 . 0	3 1 . 1	3 0 . 7	3 1 . 3	3 1 . 0	3 0 . 6	3 0 . 5	N - S S S

49010	D o r s e t	3 0 . 1	3 0 . 1	2 8 . 8	2 9 . 0	2 9 . 6	3 0 . 0	3 0 . 1	2 9 . 5	2 8 . 8 4	2 8 . 8	N - S S S
51001	O t t a w a D o w n t o w n	2 4 . 9	2 5 . 1	2 4 . 0	2 4 . 3	2 5 . 6	2 5 . 5	2 6 . 2	2 4 . 9	2 4 . 6 8	2 6 . 0	N - S S S
52023	Ki n g s t o n	2 8 . 8	3 0 . 4	2 8 . 9	2 8 . 5	3 0 . 2	2 8 . 6	2 9 . 9	2 9 . 2	2 8 . 9 4	2 9 . 5	N - S S S
54012	B e l l e v i l l e	2 8 . 2	2 9 . 1	2 7 . 0	2 8 . 2	2 9 . 7	2 8 . 1	2 9 . 3	2 8 . 7	2 8 . 6 7	2 9 . 6	N - S S S

56051	Cornwall	257	276	266	260	274	263	275	265	260	269	N - S S S
59006	Petterborough	280	286	277	278	287	279	285	273	2772	271	N - S S S
63203	Thunders Bay	274	238	242	242	256	259	251	241	244	256	N - S S S
710	Saul	29	29	27	28	29	30	29	29	29	30	2. 3

7 8	t St e. M ar ie	4	2	7	0	5	2	5	6	5 4	1	
7 5 0 1 0	N o rt h B a y	2 7 .8	2 7 . 1	2 6 . 4	2 6 . 4	2 7 . 6	2 5 . 9	2 6 . 9	2 7 . 4	2 6 . 2 3	2 7 . 9	N - S S S
7 7 2 3 3	S u d b u ry	2 6 . 6	2 5 . 8	2 4 . 3	2 4 . 0	2 6 . 1	2 6 . 0	2 6 . 7	2 5 . 7	2 4 . 3 9	2 5 . 4	N - S S S

Notes:

Station 14111 replaced station 14064 as the Sarnia site in 2016.

Station 15026 replaced station 15025 as the London site in 2013.

Station 29214 replaced station 29114 as the Hamilton Mountain site in 2019.

Station 34021 replaced station 34020 as the Toronto North site in 2017.

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Station 45027 replaced station 45026 as the Oshawa site in 2018.

Station 46090 replaced station 46089 as the Brampton site in 2017.

Station 52023 replaced station 52022 as the Kingston site in 2014.

Station 77233 replaced station 77219 as the Sudbury site in 2013.

N-SSS - Non-Significant Sen's Slope (significant trend not detected).

10-year trend for sulphur dioxide (SO₂)

Annual mean (ppb)

SO₂ 1y AAQC: 4 ppb

I D	C it y / T o w n	2 0 1 3	2 0 1 4	2 0 1 5	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	C h a n g e o v e r 1 0 y e a r (%)
1 2 0 0 8	W in d s o r D o w n	2 .4	2 .4	1 .9	1 .1	1 .0	0 .6	0 .4	0 .3	0 .4	0 .5	-8 1. 3

	to w n											
1 2 0 1 6	W in d s o r W e st	2 . 6	2 . 8	1 . 9	1 . 4	0 . 9	0 . 7	0 . 8	0 . 8	0 . 7	0 . 7	-6 3. 0
1 4 1 1 1	S a r ni a	3 . 8	3 . 5	3 . 2	I . N ... S ..	1 . 7	1 . 9	1 . 9	2 . 0	2 . 2	2 . 5	-3 0. 0
2 9 0 0 0	H a m ilt o n D o w n t o w n	4 . 8	5 . 1	4 . 3	3 . 2	3 . 5	5 . 0	4 . 8	3 . 7	3 . 8	3 . 7	-1 4. 3

29214	H a m i l t o n M o u n t a i n	2 . 8	2 . 9	2 . 6	1 . 8	1 . 8	2 . 4	3 . 5	2 . 5	3 . 2	3 . 1	N ... - ... S ... S ... S ..
35125	T o r o n t o W e s t	0 . 6	0 . 7	1 . 0	0 . 6	0 . 5	0 . 3	0 . 3	0 . 2	0 . 2	0 . 3	-7 9. 0
51001	O t t a w a D o w n t o	0 . 3	0 . 3	0 . 4	0	0 . 1	0 . 2	0 . 2	0 . 1	0 . 2	0 . 3	N ... - ... S ... S ... S ..

	w n											
7 1 0 7 8	S a ul t St e. M a ri e	0 . 8	0 . 8	0 . 8	0 . 6	0 . 7	0 . 8	0 . 7	0 . 6	0 . 8	0 . 8	N - S S S
7 7 2 3 3	S u d b u ry	2 . 8	2 . 4	2 . 4	2 . 1	1 . 3	1 . 2	1 . 2	0 . 9	0 . 9	1 . 1	-6 4. 8

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.

Station 14111 replaced station 14064 as the Sarnia site in 2016.

Station 29214 replaced station 29114 as the Hamilton Mountain site in 2019.

N-SSS - Non-Significant Sen's Slope (significant trend not detected).

10-year trend for carbon monoxide (CO) *****

1h maximum (ppm) *****

CO 1h AAQC: 30 ppm

I D 01 0000	C i t y / T o w n	2 0 1 3	2 0 1 4	2 0 1 5	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	C h a n g e o v e r 1 0 y e a r (%)
1 2 0 0 8	W i n d s o r D o w n t o w n	1 . 9	1 . 8	1 . 9	2 . 3	2 . 6	1 . 9	2 . 3	1 . 2	1 . 6	0 . 2 2	N . S . S . S . S .
2	H	2	2	1	1	2	1	1	1	1	0	N .

9 0 0 0	a m i l t o n D o w n t o w n	. 0	. 9	. 3	. 4	. 1	. 7	. 9	. 2	. 5	. 2 3	- . S . S . S . S .
3 5 1 2 5	T o r o n t o W e s t	1 . 4	1 . 6	1 . 3	1 . 7	1 . 2	0 . 9	1 . 5	1 . 6	1 . 2	0 . 2 1	N . . S . S . S .
5 1 0 0 1	O t t a w a D o w n t o w	0 . 9	0 . 8	0 . 8	0 . 9	0 . 7	1 . 0	0 . 7	0 . 9	0 . 8	0 . 2 4	N . . S . S . S .

	n											

Note:

N-SSS - Non-Significant Sen's Slope (significant trend not detected).

10-year trend for benzene

Annual mean (µg/m³)

I D	C i t y / T o w n	2 0 1 3	2 0 1 4	2 0 1 5	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	C h a n g e o v e r 1 0 y e a r (%)
1 2 0 1 6	W i n d s o r W e	0 . 5 1 9	0 . 6 1 0	0 . 5 6 6	0 . 5 2 1	0 . 4 5 0	0 . 4 7 8	0 . 4 4 5	N / A	0 . 5 2 7	0 . 3 6 9	-2 8. 4

	st											
14111	Sarنيا	0 . 8 2 0	1 . 0 0 7	1 . 1 9 1	0 . 6 8 9	0 . 6 0 4	0 . 5 7 4	0 . 4 1 9	N / A	0 . 5 7 0	0 . 4 2 7	-4 8. 8
15026	Londون	0 . 4 1 3	0 . 4 4 6	0 . 4 5 1	0 . 3 4 1	0 . 3 3 9	0 . 3 2 1	0 . 2 9 6	N / A	N / A	N / A	-5 5. 4
26060	Kitchenener	N / A	0 . 4 8 3	0 . 5 4 8	0 . 3 9 5	0 . 4 4 6	0 . 3 5 5	0 . 2 9 0	N / A	N / A	N / A	-6 1. 4
29000	HamiltonDownto	I N S	0 . 8 9 9	1 . 0 9 2	0 . 6 7 5	0 . 5 6 9	0 . 6 3 9	0 . 5 6 8	N / A	0 . 6 1 3	0 . 7 0 6	-3 6. 0

	wn											o v e r 1 0 y e a r (%))
1 2 0 1 6	W in d s o r W e st	1 . 0 1 7	1 . 5 4 2	1 . 2 4 8	1 . 2 7 2	0 . 9 7 2	1 . 1 3 1	0 . 7 9 7	N / A	1 . 0 8 5	0 . 7 3 0	-4 1. 1
1 4 1 1 1	S a r ni a	1 . 5 8 7	1 . 9 0 8	2 . 3 5 0	1 . 7 7 8	1 . 5 5 0	1 . 0 1 4	0 . 7 7 9	N / A	1 . 0 5 3	0 . 8 9 5	-5 3. 5
1 5 0 2 6	L o n d o n	0 . 8 8 7	0 . 8 3 9	1 . 0 1 3	0 . 7 2 7	0 . 6 3 3	0 . 6 5 7	0 . 4 9 1	N / A	N / A	N / A	-7 0. 5

26060	Kitchen ener	N ... / .. A ...	1 . 2 7 8	1 . 0 5 2	1 . 0 2 0	1 . 0 0 2	0 . 6 2 5	0 . 5 7 2	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	-7 7. 7
29000	Hamilton Downtown	I . N ... S ..	2 . 2 2 9	2 . 2 4 9	1 . 6 4 2	1 . 2 9 6	0 . 8 6 2	0 . 8 1 7	N ... / .. A ...	1 . 3 1 4	0 . 8 7 2	-6 2. 5
48006	New market	0 . 9 1 6	0 . 7 3 2	1 . 3 4 0	1 . 1 1 8	0 . 8 0 7	I . N ... S ..	0 . 4 1 8	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	-5 2. 0

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.
.....

N/A indicates data not available.

The 2016 average for Sarnia is derived from data from May to December 2016.

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The 2018 average for Hamilton Downtown is derived from data from March to June, August, and October to December in 2018.

10-year trend for ethylbenzene

Annual mean (µg/m³)

I D	C i t y / T o w n	2 0 1 3	2 0 1 4	2 0 1 5	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	C h a n g e o v e r 1 0 y e a r (%)
1	W	0	0	0	0	0	0	0	N ..	0	0	-4

2016	in d s o r W e st	. 1 7 9	. 2 6 7	. 2 3 8	. 2 3 4	. 1 8 1	. 1 8 7	. 1 3 7	/ ... A ...	. 3 2 8	. 1 2 6	6. 9
14111	S a r ni a	0 .255	0 .253	0 .362	0 .282	0 .211	0 .235	0 118	N ... / ... A ...	0 .187	0 .127	-5 0. 0
15026	L o n d o n	0 .125	0 .121	0 .149	0 .108	0 .105	0 .141	0 070	N ... / ... A ...	N ... / ... A ...	N ... / ... A ...	-5 6. 7
26060	Ki tc h e n e r	N ... / ... A ...	0 .167	0 .168	0 .159	0 .164	0 .109	0 079	N ... / ... A ...	N ... / ... A ...	N ... / ... A ...	-6 7. 3

29000	H a m ilt o n D o w n t o w n	I N S	0 . 1 9 2	0 . 2 1 0	0 . 1 8 6	0 . 1 8 7	0 . 1 2 9	0 . 1 2 6	N / A	0 . 1 7 2	0 . 1 2 2	-4 2. 3
48006	N e w m a r k et	0 . 1 3 4	0 . 1 2 5	0 . 2 4 9	0 . 2 1 5	0 . 1 3 0	I N S	0 . 0 6 7	N / A	N / A	N / A	-4 7. 2

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10-year trend for m- and p-xylene

Annual mean ($\mu\text{g}/\text{m}^3$)

I D	C i t y / T o w n	2 0 1 3	2 0 1 4	2 0 1 5	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	C h a n g e o v e r 1 0 y e a r (%)
1 2 0 1 6	W i n d s o r W e s t	0 . 5 3 6	0 . 8 2 5	0 . 7 0 2	0 . 6 3 5	0 . 5 0 5	0 . 5 0 2	0 . 4 0 9	N / A	0 . 6 1 9	0 . 3 5 9	-5 1. 6

14111	S a r n i a	0 . 5 1 0	0 . 6 2 9	0 . 8 5 0	0 . 4 9 5	0 . 4 9 9	0 . 5 6 3	0 . 2 5 6	N ... / .. A ...	0 . 3 1 9	0 . 2 7 2	-4 4. 0
15026	L o n d o n	0 . 3 4 5	0 . 3 1 8	0 . 3 9 8	0 . 2 6 7	0 . 2 6 8	0 . 4 0 7	0 . 2 0 0	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	-5 2. 3
26060	Ki tc h e n e r	N ... / .. A ...	0 . 4 6 9	0 . 4 6 4	0 . 4 3 4	0 . 4 5 1	0 . 2 7 6	0 . 2 2 3	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	-6 9. 4

29000	H a m ilt o n D o w n t o w n	I N S	0 . 5 9 4	0 . 6 2 1	0 . 5 1 8	0 . 5 3 2	0 . 3 5 9	0 . 3 9 8	N / A	0 . 4 8 6	0 . 3 8 3	-4 3. 8
48006	N e w m a r k et	0 . 3 6 2	0 . 3 3 4	0 . 5 8 2	0 . 4 8 4	0 . 3 5 0	I N S	0 . 1 9 1	N / A	N / A	N / A	-5 3. 1

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The 2018 average for Hamilton Downtown is derived from data from March to June, August, and October to December in 2018.

10-year trend for o-xylene

Annual mean ($\mu\text{g}/\text{m}^3$)

I D	C i t y / T o w n	2 0 1 3	2 0 1 4	2 0 1 5	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	C h a n g e o v e r 1 0 y e a r (%)
1 2 0 1 6	W i n d s o r W e s t	0 . 1 8 4	0 . 2 8 3	0 . 2 3 9	0 . 2 3 2	0 . 1 9 0	0 . 1 8 4	0 . 1 4 7	N / A	0 . 2 4 6	0 . 1 3 6	-3 8. 9

14111	S a r n i a	0 . 1 7 1	0 . 2 2 6	0 . 3 1 3	0 . 1 7 8	0 . 1 9 2	0 . 2 1 3	0 . 1 0 1	N ... / .. A ...	0 . 1 2 2	0 . 1 0 0	-4 3. 2
15026	L o n d o n	0 . 1 1 8	0 . 1 1 3	0 . 1 4 6	0 . 1 0 3	0 . 1 0 3	0 . 1 4 8	0 . 0 7 4	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	-4 2. 4
26060	Ki tc h e n e r	N ... / .. A ...	0 . 1 6 6	0 . 1 6 4	0 . 1 5 3	0 . 1 6 4	0 . 1 0 7	0 . 0 8 2	N ... / .. A ...	N ... / .. A ...	N ... / .. A ...	-6 9. 2

29000	H a m ilt o n D o w n t o w n	I N S	0 . 2 0 6	0 . 2 1 6	0 . 1 8 9	0 . 1 9 8	0 . 1 3 1	0 . 1 4 5	N / A	0 . 1 8 3	0 . 1 3 7	-3 2. 8
48006	N e w m a r k et	0 . 1 2 6	0 . 1 3 4	0 . 2 1 8	0 . 1 9 2	0 . 1 2 8	I N S	0 . 0 6 8	N / A	N / A	N / A	-6 1. 0

Notes:

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- The 2018 average for Sarnia is derived from data from February to May, July, and October to December in 2018.

- The 2018 average for Hamilton Downtown is derived from data from March to June, August, and October to December in 2018.

10-year trend for 1,3-butadiene

Annual mean ($\mu\text{g}/\text{m}^3$)

I D	C i t y / T o w n	2 0 1 3	2 0 1 4	2 0 1 5	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	C h a n g e o v e r 1 0 y e a r (%)
1 2 0 1 6	W i n d s o r W e s t	0 . 0 3 6	0 . 0 4 2	0 . 0 3 5	0 . 0 3 2	0 . 0 3 4	0 . 0 2 8	0 . 0 2 8	N / A	0 . 0 3 8	0 . 0 5 0	N - S S

1411	Sar ni a	0 . 2 0 9	0 . 1 2 4	0 . 2 1 6	0 . 0 8 9	0 . 0 7 7	0 . 0 8 8	0 . 0 5 4	N / A	0 . 0 7 1	0 . 0 6 2	-6 3. 4
15026	Lon don	0 . 0 2 3	0 . 0 2 5	0 . 0 2 6	0 . 0 2 0	0 . 0 3 5	0 . 0 2 5	0 . 0 2 5	N / A	N / A	N / A	N - S S S
26060	Ki tc h e n e r	N / A	0 . 0 2 9	0 . 0 2 9	0 . 0 2 3	0 . 0 3 8	0 . 0 2 6	0 . 0 2 5	N / A	N / A	N / A	N - S S S

29000	H a m ilt o n D o w n t o w n	I N S	0 . 0 3 2	0 . 0 3 7	0 . 0 2 5	0 . 0 3 9	0 . 0 2 8	0 . 0 2 8	N / A	0 . 0 3 6	0 . 0 5 2	2 4. 4
48006	N e w m a r k et	0 . 0 2 1	0 . 0 2 0	0 . 0 2 8	0 . 0 2 4	0 . 0 3 5	I N S	0 . 0 2 5	N / A	N / A	N / A	6 2. 8

Notes:

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N/A indicates data not available.

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Station 14111 replaced station 14064 as the Sarnia site in 2016.

The 2018 average for Windsor West is derived from data from February to July, and October to December in 2018.

The 2018 average for Sarnia is derived from data from February to May, July, and October to December in 2018.

The 2018 average for Hamilton Downtown is derived from data from March to June, August, and October to December in 2018.

N-SSS - Non-Significant Sen's Slope (significant trend not detected).

Canadian Ambient Air Quality Standard reporting

PM_{2.5} and ozone CAAQS metric values for designated sites across Ontario (2022)

Air zone area	City/Town	24-hour PM _{2.5} (µg/m ³)	Annual PM _{2.5} (µg/m ³)	8-hour ozone (ppb)
Sarnia	Sarnia	19	7.3	69*(42)
Hamilton	Hamilton Downtown	22	8.5	64*(49)
Hamilton	Hamilton Mountain	19	7.6	65*(50)
Sudbury	Sudbury	15	5.4	55(42)
Sault Ste. Marie	Sault Ste. Marie	13	4.9	62(43)
Northern Ontario	Thunder Bay	16	5.7	50(43)

Air zone area	City/Town	24-hour PM_{2.5} (µg/m³)	Annual PM_{2.5} (µg/m³)	8-hour ozone (ppb)
Southern Ontario	Windsor Downtown	19	7.7	68*(42)
Southern Ontario	Chatham	17	6.8	65*(43)
Southern Ontario	London	18	7.1	64*(45)
Southern Ontario	Brantford	17	7.1	66*(51)
Southern Ontario	Kitchener	19	7.3	64*(46)
Southern Ontario	Guelph	19	7.1	67*(48)
Southern Ontario	St. Catharines	16	6.1	65*(49)
Southern Ontario	Burlington	17	6.7	64*(53)
Southern Ontario	Oakville	17	6.7	66*(55)

Air zone area	City/Town	24-hour PM_{2.5} (µg/m³)	Annual PM_{2.5} (µg/m³)	8-hour ozone (ppb)
Southern Ontario	Milton	19	7.2	65*(51)
Southern Ontario	Mississauga	18	7.2	63*(52)
Southern Ontario	Brampton	18	7.0	67*(51)
Southern Ontario	Toronto West	17	7.1	63*(51)
Southern Ontario	Toronto Downtown	20	8.0	63*(51)
Southern Ontario	Toronto North	19	6.9	67*(51)
Southern Ontario	Toronto East	19	6.9	63*(47)
Southern Ontario	Oshawa	17	6.0	64*(44)
Southern Ontario	Barrie	18	6.7	60(44)

Air zone area	City/Town	24-hour PM_{2.5} (µg/m³)	Annual PM_{2.5} (µg/m³)	8-hour ozone (ppb)
Southern Ontario	Peterborough	18	6.2	62(46)
Southern Ontario	Kingston	15	5.8	66*(46)
Southern Ontario	Ottawa Downtown	17	6.1	58(47)

Note:

Designated sites normally refer to communities with populations greater than 100,000.

The CAAQS for 24h PM_{2.5} is 27 µg/m³ based on the 98th percentile measurement annually, averaged over three consecutive years.

The CAAQS for annual PM_{2.5} is 8.8 µg/m³ based on the annual average of the daily 24-hour average concentrations averaged over three consecutive years.

The CAAQS for ozone is 62 ppb based on the consecutive three-year average of the annual 4th highest daily maximum eight-hour running average.

An asterisk denotes an exceedance of the CAAQS.

Value in parenthesis is the calculated 8h ozone CAAQS metric once the transboundary influence was removed.

NO₂ and SO₂ CAAQS metric values for designated sites across Ontario (2022)

Air zone	City/	1-hour	Annual	1-hour	A

area	Town	NO ₂ (ppb)	NO ₂ (ppb)	SO ₂ (ppb)	annual SO ₂ (ppb)
Sarnia	Sarnia	36	6.7	68	2.5
Hamilton	Hamilton Downtown	44	10.6	81*	3.7
Hamilton	Hamilton Mountain	36	6.1	63	3.1
Sudbury	Sudbury	45	6.1	45	1.1
Sault Ste. Marie	Sault Ste. Marie	29	3.8	26	0.8
Northern Ontario	Thunder Bay	43	7.0	N/A	N/A

Southern Ontario	Windsor Downtown	42	9.4	14	0.4
Southern Ontario	Chatham	28	4.5	N/A *****	N ... / ... A ...
Southern Ontario	London	28	4.9	N/A *****	N ... / ... A ...
Southern Ontario	Brantford	25	5.0	N/A *****	N ... / ... A ...
Southern Ontario	Kitchener	35	5.4	N/A *****	N ... / ... A ...
Southern Ontario	Guelph	34	5.1	N/A *****	N ... / ... A ...
Southern Ontario	St. Catharines	33	5.7	N/A *****	N ... / ... A ...
Southern Ontario	Burlington	40	8.5	N/A *****	N ... / ... A ...

Southern Ontario	Oakville	39	7.8	N/A *****	N ... / .. A ...
Southern Ontario	Milton	43	8.3	INS	I N S
Southern Ontario	Mississauga	37	7.5	N/A *****	N ... / .. A ...
Southern Ontario	Brampton	42	7.2	N/A *****	N ... / .. A ...
Southern Ontario	Toronto West	48	13.2	7	0. 3
Southern Ontario	Toronto Downtown	52	14.4	N/A *****	N ... / .. A ...
Southern Ontario	Toronto North	44	10.2	6	0. 2
Southern Ontario	Toronto East	45	9.9	N/A *****	N ... / .. A ...
Southern Ontario	Oshawa	22	3.7	N/A *****	N ... / ..

					A ...
Southern Ontario	Barrie	40	5.8	N/A	N ... / .. A ...
Southern Ontario	Peterborough	36	4.5	N/A	N ... / .. A ...
Southern Ontario	Kingston	32	3.5	N/A	N ... / .. A ...
Southern Ontario	Ottawa Downtown	40	6.1	2	0. 3

Note:

Designated sites normally refer to communities with populations greater than 100,000.

The CAAQS for 1h NO₂ is 60 ppb is based on the 3-year average of the annual 98th percentile of the daily maximum 1-hour average NO₂ concentrations.

The CAAQS for annual NO₂ is 17.0 ppb based on the average over a single calendar year of all the 1h average NO₂ concentrations.

The CAAQS for 1h SO₂ is 70 ppb based on the 3-year average of the annual 99th percentile of the SO₂ daily maximum 1-hour average concentrations.

The CAAQS for annual SO₂ is 5.0 ppb based on the average over a single calendar year of all 1h average SO₂ concentrations.

An asterisk denotes an exceedance of the CAAQS.

INS denotes insufficient data to report a valid CAAQS metric.

N/A denotes not applicable (parameter not monitored at location).

PM_{2.5} and ozone CAAQS metric trends for designated sites across Ontario (2013-2022)

Air zone area	City/Town	10-year trend (%) based on 24-hour PM _{2.5}	10-year trend (%) based on annual PM _{2.5}	10-year trend (%) based on 8-hour ozone
Sarnia	Sarnia	-19.8	-34.4	N-SSS
Hamilton	Hamilton Downtown	-24.9	-19.0	N-SSS
Hamilton	Hamilton Mountain	-16.2	-15.5	-7.6
Sudbury	Sudbury	N-SSS	N-SSS	-13.8
Sault Ste. Marie	Sault Ste. Marie	-15.3	-17.6	N-SSS
Northern Ontario	Thunder Bay	N-SSS	N-SSS	-8.2
Southern Ontario	Windsor Downtown	-16.4	-20.5	-7.8
Southern	Chatham	N-SSS	N-SSS	-12.2

Air zone area	City/Town	10-year trend (%) based on 24-hour PM_{2.5}	10-year trend (%) based on annual PM_{2.5}	10-year trend (%) based on 8-hour ozone
Ontario				
Southern Ontario	London	-20.7	-23.9	-12.7
Southern Ontario	Brantford	-20.9	-17.5	-12.5
Southern Ontario	Kitchener	-16.4	-17.0	-8.8
Southern Ontario	Guelph	N-SSS	-11.4	-6.4
Southern Ontario	St. Catharines	-15.7	-27.8	N-SSS
Southern Ontario	Burlington	-27.7	-26.2	-5.7
Southern Ontario	Oakville	-20.9	-17.8	N-SSS

Air zone area	City/Town	10-year trend (%) based on 24-hour PM_{2.5}	10-year trend (%) based on annual P M_{2.5}	10-year trend (%) based on 8-hour ozone
Southern Ontario	Milton	-10.7	-15.9	-7.6
Southern Ontario	Mississauga	-20.2	-12.7	-8.1
Southern Ontario	Brampton	-20.0	-15.1	N-SSS
Southern Ontario	Toronto West	-20.7	-20.5	-8.2
Southern Ontario	Toronto Downtown	INS	INS	INS
Southern Ontario	Toronto North	-25.2	-28.1	N-SSS
Southern Ontario	Toronto East	N-SSS	-18.9	N-SSS
Southern Ontario	Oshawa	N-SSS	-20.7	N-SSS

Air zone area	City/Town	10-year trend (%) based on 24-hour PM _{2.5}	10-year trend (%) based on annual PM _{2.5}	10-year trend (%) based on 8-hour ozone
Southern Ontario	Barrie	N-SSS	N-SSS	-8.3
Southern Ontario	Peterborough	N-SSS	-16.3	-11.2
Southern Ontario	Kingston	N-SSS	-26.1	N-SSS
Southern Ontario	Ottawa Downtown	-19.3	N-SSS	N-SSS

Notes:

Designated sites normally refer to communities with populations greater than 100,000.

N-SSS denotes Non-Significant Sen's Slope (significant trend not detected).

INS denotes insufficient data for a valid 10-year trend.

NO₂ and SO₂ CAAQS metric trends for designated sites across Ontario (2013-2022)

Air zone area	City/Town	10-year trend (%) based on	10-year trend (%) based on	10-year trend (%) based on	10-year trend (%) based on

		n 1-hour NO ₂ *****	n annual NO ₂ *****	n 1-hour SO ₂ *****	a r t r e n d (%) b a s e d o n a n n u a l S O ₂ *****
Sarnia	Sarnia	N-SSS *****	-25.7	N-SSS *****	-30.0
Hamilton	Hamilton Downtown	-8.4	-19.5	N-SSS *****	-14.3
Hamilton	Hamilton Mountain	-16.4	-32.0	N-SSS *****	N - S S

					S ..
Sudbury	Sudbury	N-SSS	-20.5	-91.5	-6 4. 8
Sault Ste. Marie	Sault Ste. Marie	-14.1	-24.6	-22.5	N ... - 0. S ... S ... S ..
Northern Ontario	Thunder Bay	N-SSS	-13.8	N/A	N ... / 0. A ...
Southern Ontario	Windsor Downtow n	-18.4	-29.6	-80.7	-8 1. 3
Southern Ontario	Chatham	-19.9	-26.1	N/A	N ... / 0. A ...
Southern Ontario	London	-25.0	-28.2	N/A	N ... / 0. A ...
Southern Ontario	Brantford	-21.1	-8.1	N/A	N ... / 0. A ...

Southern Ontario	Kitchener	-15.0	-26.4	N/A *****	N ... / ..1 A ...0
Southern Ontario	Guelph	-16.2	-27.7	N/A *****	N ... / ..1 A ...0
Southern Ontario	St. Catharines	-19.7	-27.4	N/A *****	N ... / ..1 A ...0
Southern Ontario	Burlington	-10.2	-25.9	N/A *****	N ... / ..1 A ...0
Southern Ontario	Oakville	-13.0	-14.8	N/A *****	N ... / ..1 A ...0
Southern Ontario	Milton	N-SSS *****	N-SSS *****	INS	I N S
Southern Ontario	Mississauga	-16.7	-26.7	N/A *****	N ... / ..1 A ...0
Southern Ontario	Brampton	-15.0	-39.0	N/A *****	N ... / ..1 A ...0

Southern Ontario	Toronto West	-16.4	-25.4	-46.9	-79.0
Southern Ontario	Toronto Downtown	INS	INS	N/A *****	N *** / ** A ***
Southern Ontario	Toronto North	-12.0	-34.8	N/A *****	N *** / ** A ***
Southern Ontario	Toronto East	-11.7	-40.3	N/A *****	N *** / ** A ***
Southern Ontario	Oshawa	-39.0	-52.6	N/A *****	N *** / ** A ***
Southern Ontario	Barrie	N-SSS *****	-31.9	N/A *****	N *** / ** A ***
Southern Ontario	Peterborough	N-SSS *****	-21.2	N/A *****	N *** / ** A ***
Southern Ontario	Kingston	N-SSS *****	-15.5	N/A *****	N *** / ** A ***

Southern Ontario	Ottawa Downtown	N-SSS *****	-24.5	-90.0	N ... - ... S ... S ... S ...

Notes:

Designated sites normally refer to communities with populations greater than 100,000.

N-SSS denotes Non-Significant Sen's Slope (significant trend not detected).

INS denotes insufficient data for a valid 10-year trend.

N/A denotes not applicable (parameter not monitored at location).

Management levels for CAAQS pollutants *****

Ozone

Management level	8-hour 2020 ***
Red	> 62 ppb *****
Orange	57 to 62 ppb *****
Yellow	51 to 56 ppb *****
Green	≤ 50 ppb *****

Fine particulate matter (PM_{2.5})

Management level	24-hour 2020	Annual 2020
Red	> 27 µg/m ³	> 8.8 µg/m ³
Orange	20 to 27 µg/m ³	6.5 to 8.8 µg/m ³
Yellow	11 to 19 µg/m ³	4.1 to 6.4 µg/m ³
Green	≤ 10 µg/m ³	≤ 4.0 µg/m ³

Sulphur dioxide (SO₂)

Management level	1-hour 2020	Annual 2020
Red	> 70 ppb	> 5.0 ppb
Orange	51 to 70 ppb	3.1 to 5.0 ppb
Yellow	31 to 50 ppb	2.1 to 3.0 ppb
Green	≤ 30 ppb	≤ 2.0 ppb

Nitrogen dioxide (NO₂)

Management level	1-hour 2020	Annual 2020
Red	> 60 ppb	> 17.0 ppb
Orange	32 to 60 ppb	7.1 to 17.0 ppb
Yellow	21 to 30 ppb	2.1 to 7.0 ppb
Green	≤ 20 ppb	≤ 2.0 ppb

Air quality management actions by air zone area

Ontario air quality management actions across all air zones

Type	Action	Description
Air permission and approvals	Air Emissions Environmental Activity and Sector Registry	Businesses that engage in certain routine activities that generate air emissions must self-register online in the Environmental Activity and Sector Registry (EASR). They must submit information about their emissions to the MECP and follow standardized rules set out in guidance materials. A business may also be inspected to ensure conditions are met.

Type	Action	Description
Air permits and approvals	Environmental Compliance Approvals	Businesses with complex or unique types of operations must apply for an Environmental Compliance Approval (ECA). By law, a business must meet the specific conditions set out in the ECA. A business may also be inspected to ensure conditions are met.
Regulations	Regulation 419/05: Air Pollution - Local Air Quality (https://www.ontario.ca/laws/regulation/910271 https://www.ontario.ca/laws/regulation/050419)	This regulation establishes air health or environmental-based standards that apply to industrial and commercial facilities. Facilities can comply with O. Reg. 419/05 in one of three ways. First, meeting the air standards set out in the regulation is the default compliance approach. For facilities that are technically and/or economically unable to meet the air standards, two additional options are available: requesting, obtaining and complying with a site-specific standard for an individual facility; or registering to a technical or industry standard, if an applicable standard is available for the sector.
Regulations	Regulation 271/91: Gasoline Volatility (https://www.ontario.ca/laws/regulation/910271)	O. Reg. 271/91 specifies upper limits for gasoline volatility in southern and northern Ontario for the summer driving season and requires petroleum facilities to track and report gasoline volatility limits during this period.

Type	Action	Description
	ca/laws/regulation/910271)	
Regulations	O. Reg. 455/94: Recovery of Gasoline Vapour in Bulk Transfers (https://www.ontario.ca/laws/regulation/940455)	O. Reg. 455/94 reduces the discharge of gasoline vapour into the natural environment from terminals, bulk plants or service stations.
Ambient air standards	Ambient Air Quality Criteria (AAQC) (https://www.ontario.ca/page/ontarios-ambient-air-quality-criteria)	The AAQCs set out air contaminant concentrations that are protective against adverse effects on health and/or the environment. AAQCs are used to assess general (ambient) air quality resulting from all sources of a contaminant to air.
Ambient	Canadian Ambient Air Quality	The CAAQS are national ambient air quality objectives set out by the Canadian Council of Ministers of the Environment (CCME), in

Type	Action	Description
air standards	Standards (CAAQS) (https://ccme.ca/en/air-quality-report#slide-7)	collaboration with provinces and territories, for nitrogen dioxide (NO ₂), sulphur dioxide (SO ₂), fine particulate matter (PM _{2.5}) and ozone (O ₃).
Monitoring	Provincial Air Monitoring Network (http://www.airqualityontario.com)	Ontario operates a network of 38 ambient (outside) air monitoring stations across the province that collect real-time air pollution data.
Monitoring	Air Quality Health Index (AQHI) (http://www.airqualityontario.com/aqhi/index.php)	The AQHI evaluates air monitoring information and issues hourly forecasts to help you understand what the quality of the air around you means to your health.

Type	Action	Description
Community engagement	Air Standards/ Local Air Quality External Working Group	Ministry led facilitated discussions with industry, public health groups, environmental non-government organizations and some First Nations on matters relating to the local air quality regulation (O. Reg. 419/05).

Ontario air quality management actions by air zone

Northern Ontario (excluding Sault Ste. Marie and Sudbury)

CAAQS management levels

PM_{2.5}: yellow

Ozone: green

SO₂: nil (no monitoring station in air zone)

NO₂: orange

Type	Action	Description

Type	Action	Description
Industry standard registrations	Forest products industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/forest-products-industry-standard)	- Imposes requirements on registered forest product facilities (e.g., sawmills) to reduce emissions of acrolein and other contaminants that can contribute to the development of PM_{2.5}. - As of 2022, 13 facilities were registered in the Northern Ontario air zone.
Industry standard registrations	Pulp and paper industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/pulp-and-paper-industry-standard)	- Imposes requirements on registered pulp and paper facilities to reduce emissions of total reduced sulphur, acrolein and other contaminants which can contribute to the development of PM_{2.5}. - As of 2022, 4 facilities were registered in the Northern Ontario air zone.

Southern Ontario (excluding Sarnia/St. Clair Township and Hamilton)

CAAQS management levels

PM_{2.5}: orange

Ozone: yellow

SO₂: green

Type	Action	Description
Regulations	O. Reg. 88/22 Air Pollution – Discharge of Sulphur Dioxide from Petroleum Facilities (https://www.ontario.ca/laws/regulation/r22088)	• Came into effect on February 25, 2022. • Imposes requirements on specified petroleum facilities to address sulphur dioxide air emissions with new requirements starting in 2024 to 2029. Two of the specified facilities are in the southern air zone – Imperial Oil Limited (Nanticoke) and PCLI (Mississauga).
Regulations	O. Reg. 530/18: Air Pollution – Discharge of Sulphur Dioxide from Petroleum Facilities (https://www.ontario.ca/laws/regulation/r18530)	• Improves how acid gas flaring events are managed and strengthens accountability through reporting, monitoring and environmental penalties. It applies to specific facilities, including two facilities in the southern air zone – Imperial Oil Limited (Nanticoke) and PCLI (Mississauga).

Type	Action	Description
Regulations	O. Reg. 222/07 Environmental Penalties (https://www.ontario.ca/laws/regulation/070222)	Enables environmental penalties to be levied from petroleum facilities that are in contravention of requirements under O. Reg. 530/18 and 88/22.
Industry standard registrations	Metal finishers industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/metal-finishers-industry-standard)	- Imposes requirements on registered metal finishing facilities to reduce emissions of various contaminants including hexavalent chromium. - As of 2022, 8 facilities were registered in the Southern Ontario air zone.
Industry standard registrations	Foundries industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/foundries-industry-standard)	- Imposes requirements on registered foundries (e.g., metal works facilities) to reduce emissions of various contaminants including SO₂ and NO₂. - As of 2022, 16 facilities were registered in the Southern Ontario air zone.
Industry standard regis	Petroleum refining industry standard (https://www.ontario.ca/document/technical-	Requirements related to sources of benzene and benzo[a]pyrene from storage vessels, equipment leaks, sewage treatment operations and

Type	Action	Description
trati ons	standards-manage-air-pollution/petroleum-refining-industry-standard)	truck and railcar product loading racks and marine vessel loading berths. As of 2022, 1 facility was registered in the Southern Ontario air zone.
Site-specific standards	ADM Agri-Industries Company in Windsor (https://ero.ontario.ca/archive/013-3239)	- Requires action to reduce emissions of, and sets an alternative air standard for, suspended particulate matter emissions at a grain handling and oilseed processing facility. - This site-specific standard was issued in December 2018 and expires in 2028.
Site-specific standards	Stelco Lake Erie Works in Nanticoke (https://ero.ontario.ca/archive/012-4685)	- Requires action to reduce emissions of and sets an alternative air standard for suspended particulate matter (https://ero.ontario.ca/archive/012-210) , benzene and benzo[a]pyrene. - These site-specific standards were issued in March 2015 and May 2016 and all will expire in 2023.
Site-specific stan	Harsco Canada Corp in Nanticoke (https://ero.ontario.ca/)	Requires action to reduce emissions of, and sets an alternative air standard for, suspended particulate matter emissions at a slag processing

Type	Action	Description
Standard	archive/012-2815)	operation located on site at Stelco's Lake Erie Works facility in Nanticoke. This site-specific standard was issued in March 2015 and expires in 2023.
Site-specific standards	Owens Corning Composite Materials Canada LP in Guelph (https://ero.ontario.ca/archive/012-5061)	- Requires action to reduce emissions of, and sets an alternative air standard for, hexavalent chromium. - This site-specific standard was issued in July 2016 and will expire in 2026.
Site-specific standards	Oxy Vinyls Canada Co. in Thorold	- Requires action to reduce emissions of, and sets an alternative air standard for, vinyl chloride air emissions - This site-specific standard was issued in February 2017 and will expire in 2027.

Sudbury

CAAQS management levels

PM_{2.5}: yellow

Ozone: green

SO₂: yellow

NO₂: orange

Type	Action	Description
Regulations	O. Reg. 652/21: Air Pollution - Discharge of Sulphur Dioxide from Nickel Smelting and Refining Facilities in the Sudbury Area (https://ero.ontario.ca/notice/019-1107)	• Came into effect on January 1, 2022. • Imposes requirements on the nickel smelting and refining industry in the Sudbury area to address sulphur dioxide air emissions.
Industry standards registrations	Metal finishers industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/metal-finishers-industry-standard)	• Imposes requirements on registered metal finishing facilities to reduce emissions of various contaminants including hexavalent chromium. • As of 2022, 1 facility was registered in the Sudbury air zone.
Site-specific standards	Glencore Canada Corporation (https://ero.ontario.ca/notice/019-1958)	• Requires action to reduce emissions of, and sets an alternative air standards for, cadmium, nickel and nickel compounds (https://ero.ontario.ca/archive/012-4796) . • These site-specific standards were issued between 2015

Type	Action	Description
		and 2020 and expire between 2020 and 2030.
Site-specific standards	Vale Canada Ltd. (https://ero.ontario.ca/notice/019-4518)	- Requires action to reduce emissions of, and sets an alternative air standard for, nickel and nickel compounds. - This site-specific standard was issued in December 2021 and will expire in 2030.

Sault Ste. Marie

CAAQS management levels

PM_{2.5}: yellow

Ozone: green

SO₂: green

NO₂: yellow

Type	Action	Description
Industry standard register	Forest products industry standard (https://www.ontario.ca/document/technical-	Imposes requirements on registered forest product facilities (e.g., sawmills) to reduce emissions of acrolein and other contaminants

Type	Action	Description
Standards	standards-manage-air-pollution/forest-products-industry-standard)	that can contribute to the development of PM_{2.5}. As of 2022, 1 facility was registered in the Sault Ste. Marie air zone.
Site-specific standards	Algoma Steel Inc. (https://ero.ontario.ca/notice/019-2301)	- Requires action to reduce emissions of, and sets an alternative air standards for, benzene, benzo[a]pyrene and suspended particulate matter. - The site-specific standard for benzo[a]pyrene, issued in 2017, expired in November 2022. - These site-specific standards were issued between 2015 and 2017 and expire between 2022 and 2023.
Financial Support for Clean Steelmaking	Algoma Steel Inc. (https://ero.ontario.ca/notice/019-2301)	Ontario is providing financial support to this facility (as well as ArcelorMittal Dofasco in Hamilton) as it transitions away from the use of coal to clean steelmaking that is expected to reduce air pollutants in addition to greenhouse gas emissions.

Sarnia/St. Clair Township

PM_{2.5}: orange
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Ozone: green

SO₂: orange
.....

NO₂: orange
.....

Type	Action	Description
Regulations	O. Reg. 88/22: Air Pollution – Discharge of Sulphur Dioxide from Petroleum Facilities (https://www.ontario.ca/laws/regulation/r22088)	• Came into effect on February 25, 2022. • Imposes requirements on specified petroleum facilities to address sulphur dioxide air emissions with new requirements starting in 2024 to 2029. Three of the specified facilities are in the Sarnia/St. Clair Township air zone.
Regulations	O. Reg. 530/18: Air Pollution – Discharge of Sulphur Dioxide from Petroleum Facilities (https://www.ontario.ca/laws/regulation/	• Improves how acid gas flaring events are managed and strengthens accountability through reporting, monitoring and environmental penalties. • Three facilities in the Sarnia/St. Clair Township air zone.

Type	Action	Description
	r18530)	
Regulations	O. Reg. 222/07 Environmental Penalties (https://www.ontario.ca/laws/regulation/070222)	Enables environmental penalties to be levied from petroleum facilities that are in contravention of requirements under O. Reg. 530/18 and 88/22.
Regulations	Regulation 350 - Lambton Industry Meteorological Alert (LIMA) (https://www.ontario.ca/laws/regulation/900350)	Public alerts are issued if the running daily (24-hr) average sulphur dioxide concentration reaches 0.07 parts per million at any of the monitoring stations in the LIMA network.
Policy	Cumulative effects assessment in air approvals (https://ero.ontario.ca)	Guides decisions on Environmental Compliance Approval (ECA) applications for new or expanding facilities with emissions of benzene (in Sarnia and Hamilton) and/or benzo[a]pyrene (Hamilton only).

Type	Action	Description
	/ notice/013-16 80)	
Industry standard registrations	Petroleum refining industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/petroleum-refining-industry-standard)	• Requirements related to sources of benzene and benzo[a]pyrene from storage vessels, equipment leaks, sewage treatment operations and truck and railcar product loading racks and marine vessel loading berths. • As of 2022, 3 facilities were registered in the Sarnia/St. Clair Township air zone.
Industry standard registrations	Petrochemical industrial standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/petrochemical-industry-standard)	• Requirements related to sources of benzene and 1,3-butadiene from storage vessels, equipment leaks, sewage treatment operations and truck and railcar product loading racks and marine vessel loading berths. • As of 2022, 4 facilities were registered in the Sarnia/St. Clair Township air zone.

Type	Action	Description
	standard)	
Enhanced monitoring	Property line monitoring, petroleum refining and petrochemical industries (https://www.cleanairsarniaandarea.com/reporting/property-line-monitoring.aspx)	Facilities registered to the Petroleum Refining and Petrochemical Industry Standards are required to monitor benzene or 1,3-butadiene levels at their fence lines (known as “property line monitoring”) and provide the results on a public website within 60 days.
Enhanced monitoring	Clean Air Sarnia and Area (CASA) Air Monitoring Network (https://www.cleanairsarniaandarea.com/reporting/sarnia-real-time-air-quality.aspx)	This monitoring network includes 9 ambient air monitoring stations operated by the Bluewater Association for Safety, Environment, and Sustainability (BASES) (previously known as the Sarnia Lambton Environmental Association), an industrial cooperative of 18 facilities operating in Lambton County as well as one provincial MECP AQHI stations and four local MECP-operated stations.

Type	Action	Description
Enhanced community engagement	Sarnia Area Environmental Health Project (https://www.cleanairsarniaandarea.com/sarnia-area-environmental-health-project/about.aspx)	This project assesses the impact of air exposures and other stressors in the Sarnia Area on human health.
Enhanced community engagement	Clean Air Sarnia Area (CASA) (https://www.cleanairsarniaandarea.com/about/casa.aspx)	Community advisory panel is made up of representatives from the public, government, First Nations, and industry, who are dedicated to providing the community with a clear understanding of ambient air quality in the Sarnia area. Roles include information sharing, identifying and researching local air quality issues, provide info and recommendations to MECP and Sarnia-Lambton Environmental Association, informing public of local air quality, also maintenance of public CASA website which contains air monitoring data from SLEA and MECP as well as 1 AQHI station.

CAAQS management levels

PM_{2.5}: orange

Ozone: green

SO₂: red

NO₂: orange

Typ e	Action	Description
Poli cy	Cumulative effects assessment in air approvals (https://ero.ontario.ca/notice/013-1680)	Guides decisions on Environmental Compliance Approval (ECA) applications for new or expanding facilities with emissions of benzene (in Sarnia and Hamilton) and/or benzo[a]pyrene (Hamilton only).
Poli cy	Local Poor Air Quality Notification Protocol	The Local Poor Air Quality Notification (LPAQN) protocol is a program through which companies are asked to voluntarily implement operational practices and control measures to reduce releases of dust and particulate matter to air during poor air quality events. The protocol addresses poor air quality events that are the result of unique conditions in Hamilton that are conducive to the build-up of pollutants in the lower part of the City. Approximately 33 industries and municipal operations participate and enact

Type	Action	Description
		poor air quality plans when a Notification is issued in response to defined considerations.
Industry standards registration	Foundries industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/foundries-industry-standard)	- Imposes requirements on registered foundries (e.g., metal works facilities) to reduce emissions of various contaminants including metals, VOCs, suspended particulate matter, SO₂ and NO₂. - As of 2022, 1 facility was registered in the Hamilton air zone.
Site-specific standards	Stelco (https://ero.ontario.ca/notice/019-3242)	- Requires action to reduce emissions of, and sets an alternative air standards for, benzene, benzo[a]pyrene, (https://ero.ontario.ca/notice/019-2298) and suspended particulate matter. - These site-specific standards were issued in 2015 and 2016 and expire in 2023.
Site-specific stan	ArcelorMittal Dofasco (https://ero.ontario.ca)	Requires action to reduce emissions of, and sets an alternative air standards for, benzene, benzo(a)pyrene, manganese and manganese compounds (https://ero.ontario.ca/)

Type	Action	Description
Standards	/ notice/019-3241)	notice/019-2297) , and total suspended particulate matter. • These site-specific standards were issued in 2015 and 2016 and expire in 2023.
Site-specific standards	Harsco Canada Corp (https://ero.ontario.ca / archive/012-2815)	• Requires action to reduce emissions of, and sets an alternative air standard for, suspended particulate matter and manganese and manganese compound emissions at a slag processing operation located on site at the ArcelorMittal Dofasco facility in Hamilton. • These site-specific standards were issued in May 2016 and expires in 2023.
Site-specific standards	Rain Carbon (formerly Ruetgers Canada Inc.) (https://ero.ontario.ca / archive/013-0752)	• Requires action to reduce emissions of, and sets alternative air standards for, benzene and benzo(a)pyrene. • These site-specific standards were issued in 2017 and expire in 2022.
Site-specific standards	Carmeuse Lime (Canada) Limited (https://	• Requires action to reduce emissions of, and sets alternative air standards for, calcium oxide and suspended particulate matter.

Type	Action	Description
Standards	ero.ontario.ca / archive/012-9911	• These site-specific standards were issued in 2018 and expire in 2028.
Enhanced monitoring	Hamilton Air Monitoring Network (HAMN) (http://www.hamnair.ca/)	• A comprehensive air monitoring network, made up of industry-operated and ministry-operated stations that measure impacts from industrial operations and is used to assess ambient air conditions in Hamilton. The ministry conducts regular audits of industry station in the network since 2003. HAMN provides the ministry with real-time air quality alerts based on agreed thresholds as well as monthly exceedance reports and quarterly and annual summary reports.

Type	Action	Description
Enhanced community engagement	Clean Air Hamilton (https://cleanairhamilton.ca/who-we-are/)	• Clean Air Hamilton is a multi-stakeholder, member-based organization dedicated to improving air quality in Hamilton. The ministry has been a long-standing member of Clean Air Hamilton for over 20 years. Staff from the ministry's West Central Region participate in monthly Clean Air Hamilton meetings to discuss updates on local air quality initiatives and activities and respond to questions regarding ministry air quality related activities in Hamilton. The ministry provides supporting information for the Clean Air Hamilton annual progress report.
Financial Support for Clean Steelmaking	ArcelorMittal Dofasco (https://news.ontario.ca/en/release/1001604/province-invests-in-clean-steelmaking-technology-in-hamilton-to-support-future-of-ontarios-auto-sector)	• Ontario is providing financial support for this facility (as well as Algoma Steel in Sault Ste. Marie) as it transitions away from the use of coal to clean steelmaking that is expected to reduce air pollutants in addition to greenhouse gas emissions.

Approvals/programs/regulations that have since ended

Air zone	Program/Regulation	Description
Northern Ontario	Pulp and Paper Industry Standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/pulp-and-paper-industry-standard)	- Imposes requirements on registered pulp and paper facilities to reduce emissions of total reduced sulphur, acrolein and other contaminants which can contribute to the development of PM_{2.5}. - In 2024 Domtar Espanola was deregistered at the company's request due to the facility ceasing operations. This brings the total number of registered facilities in the Northern Ontario Air Zone to 3.
Sarnia/St. Clair Township	Sarnia Area Environmental Health Project (https://www.cleanairsarniaandarea.com/sarnia-area-environmental-health-project/about.aspx)	Final reports of findings (https://www.cleanairsarniaandarea.com/sarnia-area-environmental-health-project.aspx) from the Sarnia Area Environmental Health Project were posted to the CASA website in March 2024.

New actions since 2022

Air zone	Program/Regulation	Description
Northern Ontario	Foundries industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/foundries-industry-standard)	- Imposes requirements on registered foundries (e.g., metal works facilities) to reduce emissions of various contaminants including metals, VOCs, suspended particulate matter, SO₂ and NO₂. - On January 12, 2023, a facility registered to this industry standard bringing the total number of registered facilities in the Northern Ontario Air Zone to one.
Southern Ontario	Metal finishers industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution/metal-finishers-industry-standard)	- Imposes requirements on registered metal finishing facilities to reduce emissions of various contaminants including hexavalent chromium. - On March 12, 2024, an additional facility registered to this industry standard bringing the total number of registered facilities in the Southern Ontario Air Zone to 10.

Air zone	Program/Regulation	Description
Southern Ontario	OPG Lennox site-specific standards (https://ero.ontario.ca/notice/019-5142)	On March 15, 2023, the MECP issued multiple site-specific standards requiring action to reduce emissions of, and set an alternative air standard for, SO₂, NO_x, and sulfuric acid from natural gas/RFO electricity generation. These site-specific standards expire in 2033.
Southern Ontario	Asphalt mix industry standard (https://www.ontario.ca/document/technical-standards-manage-air-pollution-0/asphalt-mix-industry-standard)	- Requirements to control emissions of various compounds, including metals, particulate, and VOCs from asphalt mixing, storage, crushing, roads, and dryers/oil burners and generators. - Between January 2023 and July 2024, 4 companies registered to this industry standard bringing the total number of registered facilities in the Southern Ontario Air Zone to 4.
Southern Ontario	Stelco Lake Erie Works	- On July 1, 2023, the site-specific standards for Stelco Inc. expired. On the same day, updated general air standards for sulphur dioxide came into effect. - Stelco Inc. is now out of compliance with O. Reg. 419/05 general air standards for benzene, benzo[a]pyrene, suspended

Air zone	Program/Regulation	Description
		particulate matter and sulphur dioxide. In accordance with the regulation, the facility has submitted notices of exceedance and a proposed abatement plan. • The environmental compliance approvals for Stelco Inc. contains requirements to manage the emissions of the contaminants that had site-specific standards. The operations and environmental controls that were in place prior to the expiry of the site-specific standards remain in effect. • The abatement plans in combination with the environmental compliance approvals will ensure accountability until a longer-term compliance pathway is determined. • The ministry continues to inspect Stelco Hamilton and Lake Erie Works to assess compliance with air legislation, regulations and conditions in environmental approvals and orders.
Southern Ontario	Harsco Canada Corp Nanticoke	• On July 1, 2023, the site-specific standards for Harsco expired. • Harsco is now out of compliance with O. Reg. 419/05 general air standards for suspended particulate matter, manganese and manganese compounds. In accordance with the regulation, the facility has submitted notices of exceedance and

Air zone	Program/Regulation	Description
		a proposed abatement plan. • The environmental compliance approvals for Harsco contains requirements to manage the emissions of the contaminants that had site-specific standards. The operations and environmental controls that were in place prior to the expiry of the site-specific standards remain in effect. • The abatement plans in combination with the environmental compliance approvals will ensure accountability until a longer-term compliance pathway is determined. • The ministry continues to inspect Harsco to assess compliance with air legislation, regulations and conditions in environmental approvals and orders.
Sault Ste. Marie	Algoma Steel Inc.	• In November 2022 and July 2023, the site-specific standards for Algoma Steel Inc. expired. On July 1, 2023, updated general air standards for sulphur dioxide came into effect. • In March 2023 Algoma Steel submitted applications for new site-specific standards, which are still under review by the ministry. • As such, Algoma Steel is out of compliance with O. Reg. 419/05 general air standards for benzene, benzo[a]pyrene, suspended

Air zone	Program/Regulation	Description
		particulate matter and sulphur dioxide. In accordance with the regulation, the facility has submitted notices of exceedance and a proposed abatement plan. • The environmental compliance approvals for Algoma Steel contain requirements to manage the emissions of the contaminants that had site-specific standards. The operations and environmental controls that were in place prior to the expiry of the site-specific standards remain in effect. • The abatement plans in combination with the environmental compliance approvals will ensure accountability until a longer-term compliance pathway is determined. • The ministry continues to inspect the facility to assess compliance with air legislation, regulations and conditions in environmental approvals and orders.
Hamilton	ArcelorMittal Dofasco	• On July 1, 2023, the site-specific standards for ArcelorMittal Dofasco expired. On the same day, updated general air standards for sulphur dioxide came into effect. • ArcelorMittal Dofasco is now out of compliance with O. Reg. 419/05 general air standards for benzene, benzo[a]pyrene, suspended particulate matter, manganese and manganese compounds and sulphur

Air zone	Program/Regulation	Description
		dioxide. In accordance with the regulation, the facility has submitted notices of exceedance and a proposed abatement plan. • The environmental compliance approvals for ArcelorMittal Dofasco contains requirements to manage the emissions of the contaminants that had site-specific standards. The operations and environmental controls that were in place prior to the expiry of the site-specific standards remain in effect. • The abatement plans in combination with the environmental compliance approvals will ensure accountability until a longer-term compliance pathway is determined. • The ministry continues to inspect ArcelorMittal Dofasco to assess compliance with air legislation, regulations and conditions in environmental approvals and orders.
Hamilton	Stelco Hamilton	• On July 1, 2023, the site-specific standards for Stelco Inc. expired. On the same day, updated general air standards for sulphur dioxide came into effect. • Stelco Inc. is now out of compliance with O. Reg. 419/05 general air standards for benzene, benzo[a]pyrene, suspended

Air zone	Program/Regulation	Description
		particulate matter and sulphur dioxide. In accordance with the regulation, the facility has submitted notices of exceedance and a proposed abatement plan. • The environmental compliance approvals for Stelco Inc. contains requirements to manage the emissions of the contaminants that had site-specific standards. The operations and environmental controls that were in place prior to the expiry of the site-specific standards remain in effect. • The abatement plans in combination with the environmental compliance approvals will ensure accountability until a longer-term compliance pathway is determined. • The ministry continues to inspect Stelco Hamilton and Lake Erie Works to assess compliance with air legislation, regulations and conditions in environmental approvals and orders.
Hamilton	Harsco Canada Corp Hamilton	• On July 1, 2023, the site-specific standards for Harsco expired. • Harsco is now out of compliance with O. Reg. 419/05 general air standards for suspended particulate matter, manganese and manganese compounds. In accordance with the regulation, the facility has submitted notices of exceedance and

Air zone	Program/Regulation	Description
		a proposed abatement plan. • The environmental compliance approvals for Harsco contain requirements to manage the emissions of the contaminants that had site-specific standards. The operations and environmental controls that were in place prior to the expiry of the site-specific standards remain in effect. • The abatement plans in combination with the environmental compliance approvals will ensure accountability until a longer-term compliance pathway is determined. • The ministry continues to inspect Harsco to assess compliance with air legislation, regulations and conditions in environmental approvals and orders.
Hamilton	Rain Carbon (formerly Ruetgers Canada Inc.) *****	• Rain Carbon's site-specific standard expired on November 21, 2022. A request for new site-specific standards for Benzene and Benzo(a)pyrene and an application for an amended ECA was submitted to the ministry on May 1, 2023. Following a review by the ministry, revised documents were submitted on May 13, 2024, and these applications are currently under review. • Now that these site-specific standards have expired, the general standards for

Air zone	Program/Regulation	Description
		benzene and benzo(a)pyrene within the local air quality regulation apply to the facility. Emission estimates and monthly air monitoring results submitted by Rain Carbon indicate that the company is exceeding these air standards.
Sarnia/St. Clair Township	O. Reg. 206/24: Air Pollution – Discharge of Benzene from INEOS Styrolution (https://www.ontario.ca/laws/regulation/240206)	• This regulation came into effect on June 14, 2024. It imposes requirements on INEOS Styrolution in Sarnia to address benzene emissions, including new health-based benzene concentration limits and enhanced monitoring requirements.

AQHI and air quality alert program reporting

2022 Air Quality Health Index summary

S t a t i o n I D	C i t y / T o w n	N o . o f v a l i d h o u r s	L o w r i s k A Q H I = 1	L o w r i s k A Q H I = 2	L o w r i s k A Q H I = 3	M o d e r a t e r i s k A Q H I = 4	M o d e r a t e r i s k A Q H I = 5	M o d e r a t e r i s k A Q H I = 6	H i g h r i s k A Q H I = 7	H i g h r i s k A Q H I = 8	H i g h r i s k A Q H I = 9	
1 2 0 0 8	W i n d s o r D o	8 5 8 4	2. 2 0	3 6. 3 1	4 8. 2 4	1 1. 3 9	1. 7 1	0. 0 7	0. 0 7	0	0	

	w nt o w n											
1 2 0 1 6	W in d s o r W e st	8 6 4 4	2. 1 3	4 4. 9 2	4 1. 9 6	9. 8 6	1. 1 0	0. 0 2	0. 0 1	0	0	
1 3 0 0 1	C h at h a m	8 3 5 1	8. 6 7	5 4. 8 7	3 1. 1 6	4. 9 2	0. 3 4	0. 0 1	0. 0 4	0	0	
1 4 1 1 1	S a r ni a	8 6 3 9	6. 2 3	4 9. 5 7	3 3. 0 2	9. 8 4	1. 1 5	0. 1 4	0. 0 6	0	0	
1 5 0 2 0	G r a n d B	8 1 5 1	1 3. 8 5	6 1. 8 5	2 0. 7 3	3. 1 9	0. 2 9	0	0. 0 9	0	0	

	e n d											
1 5 0 2 6	L o n d o n	8 5 9 6	1 1. 5 9	5 3. 2 2	3 1. 0 1	3. 9 3	0. 2 0	0	0. 0 5	0	0	
1 6 0 1 5	P o r t S t a n l e y	8 7 0 6	1 4. 7 6	6 2. 1 3	1 9. 5 0	3. 1 6	0. 3 6	0. 0 2	0. 0 7	0	0	
1 8 0 0 7	Ti v e r t o n	8 5 5 9	1 3. 7 2	6 2. 9 0	2 0. 7 3	2. 3 7	0. 2 1	0	0. 0 7	0	0	

21005	B r a n t f o r d	8638	13.39	52.23	29.84	4.17	0.29	0	0.07	0	0	
26060	Ki tc h e n e r	8555	11.44	52.06	30.99	4.93	0.51	0.06	0	0	0	
27067	St . C at h a ri n e s	8645	8.94	57.47	30.35	3.03	0.20	0	0.01	0	0	
28028	G u el p h	8441	9.64	50.81	33.48	5.89	0.15	0	0.02	0	0	

29000	H a m i l t o n D o w n t o w n	8 6 3 7	4. 7 5	4 2. 2 9	3 9. 1 5	1 1. 1 5	2. 3 9	0. 2 4	0. 0 3	0	0	
29118	H a m i l t o n W e s t	8 7 1 2	6. 2 0	4 9. 3 7	3 5. 9 7	7. 4 0	0. 9 6	0. 0 7	0. 0 2	0	0	
29214	H a m i l t o n M o u n	8 5 3 8	7. 3 8	5 7. 5 5	2 8. 5 5	6. 0 1	0. 4 3	0. 0 6	0. 0 1	0	0	

	ta in											
3 1 1 2 9	T o r o n t o D o w n t o w n	8 7 2 7	2. 2 1	3 1. 7 3	4 8. 6 0	1 4. 1 9	2. 8 4	0. 3 1	0. 1 3	0	0	
3 3 0 0 3	T o r o n t o E a st	8 6 5 7	5. 8 7	5 0. 4 0	3 6. 3 8	6. 3 1	1. 0 2	0. 0 3	0	0	0	
3 4 0 2 1	T o r o n t	8 6 4 5	7. 7 2	4 9. 5 1	3 4. 0 9	7. 6 1	0. 9 7	0. 0 8	0. 0 2	0	0	

	o N o r t h											
3 5 1 2 5	T o r o n t o W e s t	8 6 2 0	3. 1 2	4 5. 2 3	4 2. 8 2	7. 8 4	0. 9 2	0. 0 7	0	0	0	
4 4 0 0 8	B u r l i n g t o n	8 5 7 5	6. 3 8	5 3. 4 6	3 4. 0 2	5. 8 0	0. 3 4	0. 0 1	0	0	0	
4 4 0 1 7	O a k v i l l e	8 5 6 6	6. 6 9	5 0. 1 3	3 5. 5 5	7. 2 6	0. 3 4	0	0. 0 4	0	0	

44029	Milton	8629	5.37	51.37	36.19	6.41	0.63	0.02	0.01	0	0	
45027	Oshawa	8676	24.11	56.75	17.61	1.48	0.02	0.02	0	0	0	
46090	Brampton	8693	8.96	54.16	29.99	6.28	0.48	0.03	0.02	0	0.01	
46108	Mississauga	8661	8.53	56.91	27.99	4.30	0.39	0.08	0	0	0	
47	Ba	83	17.	58.	21.	3.1	0.0	0	0	0	0	

045	rr ie	53	00	13	63	5	8					
48006	N e w m a r k et	8638	13.76	54.14	27.08	4.64	0.32	0.02	0.02	0	0	
49005	P a rr y S o u n d	8502	23.44	57.09	17.83	1.63	0	0	0	0	0	
49010	D o rs e t	8684	28.34	57.92	13.06	0.68	0	0	0	0	0	
51001	O tt a w a D	8657	17.40	54.89	24.62	2.97	0.13	0	0	0	0	

	o w n t o w n											
5 2 0 2 3	Ki n g s t o n	8 7 1 8	1 4. 1 9	6 3. 0 6	2 1. 2 9	1. 3 9	0. 0 7	0	0	0	0	
5 4 0 1 2	B el le vi ll e	8 7 4 4	1 2. 5 1	6 0. 0 9	2 4. 8 5	2. 3 1	0. 1 5	0. 0 1	0. 0 8	0	0	
5 6 0 5 1	C o r n w al l	8 7 2 3	1 8. 6 9	5 6. 5 1	2 2. 1 5	2. 5 4	0. 1 0	0. 0 1	0	0	0	
5 9 0 0 6	P e t e r b	8 5 9 8	1 7. 6 4	5 7. 2 7	2 1. 5 7	3. 1 2	0. 3 7	0. 0 2	0	0	0	

	o ro u g h											
63203	T h u n d e r B a y	8315	18.34	55.17	23.81	2.50	0.18	0	0	0	0	
71078	S a ul t St e. M a ri e	8728	20.96	56.93	20.46	1.62	0.03	0	0	0	0	
75010	N o rt h B a y	8655	21.64	57.84	19.04	1.46	0.02	0	0	0	0	

7	S	8	1	5	1	3.	0.	0	0	0	0	
7	u	7	8.	8.	9.	3	3					
2	d	0	3	1	8	9	0					
3	b	7	4	6	1							
3	u											
	ry											

2022 air quality alert summary

Air quality forecast region	Special air quality statement	Smog and air health advisory
Algonquin	0	0
Atikokan - Upsala - Quetico	0	0
Attawapiskat	0	0
Bancroft - Bon Echo Park	0	0
Barrie - Orillia - Midland	0	0
Belleville - Quinte - Northumberland	1	0
Ontario	4	0

Air quality forecast region	Special air quality statement	Smog and air health advisory
Big Trout Lake - Sachigo Lake	0	0
Brockville - Leeds and Grenville	0	0
Burk's Falls - Bayfield Inlet	0	0
Chapleau - Gogama	0	0
City of Hamilton	2	0
City of Ottawa	0	0
City of Thunder Bay	0	0
City of Toronto	3	0
Cornwall - Morrisburg	0	0
Dryden - Ignace	0	0
Dufferin - Innisfil	1	0
Ontario	4	0

Air quality forecast region	Special air quality statement	Smog and air health advisory
Dunnville - Caledonia - Haldimand	1	0
Elgin	2	0
Elliot Lake - Ranger Lake	0	0
Fort Frances - Rainy Lake	0	0
Fort Hope - Webequie	0	0
Fort Severn	0	0
Geraldton - Manitouwadge - Hornepayne	0	0
Greater Sudbury and Vicinity	0	0
Grey - Bruce	2	0
Haliburton	0	0
Halton - Peel	3	0
Ontario	4	0

Air quality forecast region	Special air quality statement	Smog and air health advisory
Huron - Perth	3	0
Kapuskasing - Hearst	0	0
Kenora - Nestor Falls	0	0
Kingston - Prince Edward	0	0
Kirkland Lake - New Liskeard - Temagami	0	0
Lake Nipigon - Wabakimi	0	0
London - Middlesex	1	0
Manitoulin - Northshore - Killarney	0	0
Moosonee - Fort Albany	0	0
Niagara	1	0
Nipigon - Marathon - Superior North	0	0
Ontario	4	0

Air quality forecast region	Special air quality statement	Smog and air health advisory
North Bay - West Nipissing	0	0
Oxford - Brant	1	0
Parry Sound - Muskoka	0	0
Peawanuck	0	0
Peterborough - Kawartha Lakes	1	0
Pickle Lake - Wunnummin Lake	0	0
Prescott and Russell	0	0
Red Lake - Ear Falls	0	0
Renfrew - Pembroke - Barry's Bay	0	0
Sandy Lake - Pikangikum	0	0
Sarnia - Lambton	3	0
Ontario	4	0

Air quality forecast region	Special air quality statement	Smog and air health advisory
Sault Ste. Marie - Superior East	0	0
Simcoe - Delhi - Norfolk	1	0
Sioux Lookout - Savant Lake	0	0
Smiths Falls - Lanark - Sharbot Lake	0	0
Stirling - Tweed - South Frontenac	0	0
Superior West	0	0
Timmins - Cochrane	0	0
Waterloo - Wellington	2	0
Wawa - White River - Pukaskwa	0	0
Ontario	4	0

1 2 0 0 8	W in d s o r D o w n t o w n	4 6 7 U ni v e r si ty A v e. W :	8 6 8 9	3. 4	5. 2	7. 3	1 0. 2	1 7. 7	3 8. 5	9. 4	6 0. 3	
1 2 0 1 6	W in d s o r W e st	C ol le g e A v e. / S	8 6 4 5	2. 4	4. 0	5. 9	8. 7	1 6. 3	3 6. 0	8. 0	5 1. 5	

		o u t h St : :										
2 9 0 0 0	H a m i l t o n D o w n t o w n	El gi n S t. / K el ly S t.	8 6 1 0	3. 2	5. 0	7. 5	1 2. 0	2 3. 2	3 9. 9	1 0. 6	5 7. 0	
2 9 2 1 4	H a m i l t o n M o u n t ai	2 5 0 F e n n el A v e. W	8 6 9 5	1. 7	2. 6	4. 0	6. 6	1 3. 7	2 6. 4	6. 1	4 3. 7	

	n	:										
3 1 1 2 9	T o r o n t o D o w n t o w n	5 5 Jo h n S t. ...	8 5 8 3	6. 2	9. 2	1 2. 2	1 6. 3	2 5. 9	4 3. 8	1 4. 4	7 5. 6	
3 3 0 0 3	T o r o n t o E a st	K e n n e d y R d. ... / L a w r e n c e	8 6 8 1	3. 1	5. 2	7. 5	1 1. 0	2 0. 3	3 8. 6	9. 9	6 3. 7	

		A v e. E. E.										
3 4 0 2 1	T o r o n t o N o r t h	4 9 0 5 D u ff e ri n S t. , E C C C	8 7 2 7	2. 9	5. 0	7. 7	1 2. 0	2 0. 9	3 9. 8	1 0. 2	5 9. 0	

35033	E t o b i c o k e S o u t h	185Ju d s o n S t. ...	8529	4. 3	7. 4	1 0. 9	1 6. 2	2 7. 1	4 4. 4	1 3. 7	7 1. 6	
35125	T o r o n t o W e st	125Re s o u rc e s R d.	8604	4. 2	7. 5	1 0. 8	1 5. 8	2 6. 0	4 1. 1	1 3. 2	5 7. 8	
63203	T h u n d e r	421Ja m e s	8718	1. 3	2. 6	4. 3	7. 3	1 6. 5	3 6. 9	7. 0	5 5. 6	

	B a y	St : S.										
7 5 0 1 0	N o r t h B a y	C h i p p e w a S t. W : D e p t. N a t i o n a l D e f e n c e	8 7 0 9	0. 8	1. 4	2. 2	3. 9	9. 4	2 7. 9	4. 1	4 0. 7	

8 3 1 2 6	T o r o n t o H w y 4 0 1	1 2 5 R e s o u r c e s R o a d, H w y 4 0 1	8 7 2 0	5. 7	1 0. 5	1 6. 2	2 2. 3	3 2. 7	4 6. 7	1 7. 8	6 1. 4	
8 3 1 3 3	T o r o n t o I s l a n d	5 3 5 L a k e s h o r e A v e	8 6 4 4	2. 2	3. 4	4. 7	6. 9	1 3. 6	3 1. 1	6. 6	5 4. 7	

1 2 0 0 8	W in d s o r D o w n t o w n	4 6 7 U ni v e r si ty A v e. W :	8 7 4 3	2	4	6	9	1 5	2 8	7. 8 3	5 5	
1 2 0 1 6	W in d s o r W e	C ol le g e A v e.	8 7 0 5	3	5	8	1 0	1 6	2 9	8. 8 2	4 7	

	st	/ S o u t h St : :										
2 9 0 0 0	H a m i l t o n D o w n t o w n	El gi n S t. / K el ly S t.	8 6 4 5	2	4	7	1 1	1 8	3 3	8. 6 4	9 0	
2 9 2 1 4	H a m i l t o n M o u n	2 5 0 F e n n el A v	8 5 6 7	2	4	6	9	1 6	3 0	7. 7 1	8 8	

	ta in	e. W :										
3 1 1 2 9	T o r o n t o D o w n t o w n	5 5 Jo h n S t.	8 7 2 9	2	5	7	9	1 5	2 9	7. 9 2	5 0	
3 3 0 0 3	T o r o n t o E a st	K e n n e d y R d. / L a w r e n	8 6 8 6	1	4	6	8	1 3	2 6	6. 7 0	8 3	

		c e A v e. E.										
3 4 0 2 1	T o r o n t o N o r t h	4 9 0 5 D u f f e r i n S t. , E C C C	8 6 5 6	2	4	6	8	1 3	2 6	6. 7 9	5 0	
3 5 0 3 3	E t o b i c o k e S o u	1 8 5 Ju d s o n S t.	8 2 9 6	2	4	6	9	1 5	2 7	7. 7 3	4 8	

	t h											
3 5 1 2 5	T o r o n t o W e s t	1 2 5 R e s o u r c e s R d.	8 6 7 0	2	4	6	8	1 3	2 4	6. 9 0	5 8	
6 3 2 0 3	T h u n d e r B a y	4 2 1 J a m e s S t. ... S. ...	8 7 4 8	2	3	4	6	9	1 5	5. 0 3	3 0	
7 5 0 1 0	N o r t h B a y	C h i p p e w a S ...	8 6 9 1	2	3	4	6	1 0	1 8	5. 0 6	3 4	

		t. W : D e p t. N at io n al D ef e n c e										
8 3 1 2 6	T o r o n t o H w y 4 0 1	1 2 5 R e s o u rc e s R o a d, H w y	8 5 0 7	2	5	8	1 1	1 7	3 3	9. 0 9	8 6	

		4 0 1										
8 3 1 3 3	T o r o n t o I s l a n d	5 3 5 L a k e s h o r e A v e. , T o r o n t o I s l a n d	8 4 5 7	1	2	4	7	1 3	2 5	5. 7 9	5 1	

Notes:

Ontario uses the 24-hour PM_{2.5} CAAQS “as is” for comparison to the 24-hour measurement of air quality data; this value is considered a Reference Level.

Ontario uses the annual PM_{2.5} CAAQS “as is” for comparison to a single annual average of air quality data; this value is considered a Reference Level.

2022 ultrafine particles annual statistics

Unit: particles per cubic centimetre (#/cm³)

I D ****	C i t y	L o c a t i o n	V a l i d h ***	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x i m u m 1 h ***	
3 4 0 2 1	T o r o n t o N o r t h	4 9 0 5 D u f f e r i n S t. , E C C C	8 4 2 4	3, 3 2 5	6, 2 8 5	9, 2 1 3	1 2, 6 7 0	1 9, 7 4 7	3 5, 8 9 2	1 0, 6 9 6. 6	9 4, 0 4 0	

83126	Toronto Hwy 401	Hwy 401 at Hwy 401	8597	9,537	18,157	31,215	50,102	85,891	156,002	40,806	23,640	
83133	Toronto Islands	535 Lakeshore	4804	2,369	3,923	5,806	8,567	14,537	31,540	7,553	65,460	

	n d	e A v e ., H a n l a n' s P o i n t										

2022 black carbon annual statistics

Unit: micrograms per cubic metre (µg/m³)

I D	C i t y	L o c a t i o n	V a l i d h ...	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x i m u m 1 h ...

12008	Windsor Downs town	47 University Ave. W.	8350	0.13	0.21	0.31	0.45	0.76	1.82	0.40	4.79	
12016	Windsor West	College Ave. / South St. ...	8416	0.14	0.23	0.33	0.48	0.82	1.93	0.44	5.45	

29000	Hamilton Downtown	Elgin St. / Kelly St.	6114	0.12	0.23	0.36	0.55	1.12	2.23	0.51	3.52	
33003	Toronto East	Kennedy Rd. / Lawrence Av	8636	0.12	0.20	0.30	0.44	0.76	1.53	0.39	5.84	

		e. E.										
3 4 0 2 1	T o r o n t o N o r t h	4 9 0 5 D u f f e r i n S t. , E C C C	8 7 0 2	0. 1 0	0. 1 9	0. 3 0	0. 4 9	0. 8 9	1. 8 9	0. 4 2	4. 8 9	
3 5 0 3 3	E t o b i c o k e S o u t h	1 8 5 J u d s o n S t.	8 4 8 5	0. 1 9	0. 3 2	0. 4 7	0. 6 7	1. 1 7	2. 6 3	0. 6 1	6. 1 0	

83126	T o r o n t o H w y 4 0 1	H w y 4 0 1 a t 1 2 5 R e s o u r c e s R e d : :	8740	0.26	0.48	0.76	1.25	2.22	4.09	1.05	6.48	
83133	T o r o n t o l s l a n d	535 L a k e s h o r e	8649	0.00	0.11	0.20	0.34	0.67	1.57	0.29	4.16	

		A v e. , H a n l a n' s P o i n t										

2022 iron in PM_{2.5} annual statistics

Unit: nanograms per cubic metre (ng/m³)

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x i m u m 1 h
29000	Hamilton	Elgin	4714	13	29	47	80	242	1016	108.6	4909.5

	o n D o w n to w n	S t. / K e l l y S t.										
8 3 1 2 6	T o r o n t o H w y 4 0 1	H w y 4 0 1 a t 1 2 5 R e s o u r c e s R d :	7 4 2 7	4 4	9 5	1 8 2	3 4 0	6 4 1	1 3 0 4	2 8 0. 8	5 8 7 4. 0	

2022 copper in PM_{2.5} annual statistics

Unit: nanograms per cubic metre (ng/m³)

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x i m u m 1 h	
2 9 0 0 0	H a m i l t o n D o w n t o w n	E l g i n S t. / K e l l y S t.	4 7 1 4	1. 2	1. 6	2. 1	3. 2	9. 0	3 8. 6	4. 5	2 1 6. 7	
8 3 1 2 6	T o r o n t	H w y 4 0 1	7 4 2 7	2. 4	3. 7	5. 9	1 0. 1	1 7. 0	3 2. 7	8. 5	6 0 3. 7	

2 9 0 0 0	H a m i l t o n D o w n t o w n	E l g i n S t. / K e l l y S t.	4 7 1 4	0. 0	0. 3	0. 7	1. 6	7. 7	4 5. 8	3. 5	6 0 8. 0	
8 3 1 2 6	T o r o n t o	H w y 4 0 1 a	7 4 2 7	0. 8	1. 6	2. 7	4. 2	7. 7	1 7. 7	3. 8	9 4. 3	

	H w y 4 0 1	t 1 2 5 R e s o u r c e s R d :										

2022 lead in PM_{2.5} annual statistics

Unit: nanograms per cubic metre (ng/m³)

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x i m u m 1 h
2 9	H a	E l	4 7	0. 6	1. 0	1. 7	2. 8	6. 5	2 3.	3. 1	1 5

000	milt on Down town	gin St. / Kelly St.	14						3		1.1	
83126	Toronto Hwy 401	Hwy 401 at 125 Resour ces Rd.	7427	0.7	1.1	1.7	2.6	4.8	12.6	2.5	197.7	

2022 selenium in PM_{2.5} annual statistics

Unit: nanograms per cubic metre (ng/m³)

I D	C i t y	L o c a t i o n	V a l i d h ...	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x i m u m 1 h ...	
2 9 0 0 0	H a m i l t o n D o w n t o w n	E l g i n S t. / K e l l y S t. ...	4 7 1 4	0. 0 2	0. 1 1	0. 2 4	0. 5 4	1. 8 4	6. 0 0	0. 6 8	1 3. 5 7	

8	T	H	7	0.	0.	0.	0.	0.	5.	0.	6
3	o	w	4	0	1	2	4	9	8	5	1.
1	r	y	2	6	5	5	1	9	2	6	6
2	o	4	7								2
6	n	0									
	t	1									
	o	a									
	H	t									
	w	1									
	y	2									
	4	5									
	0										
	1	R									
		e									
		s									
		o									
		u									
		r									
		c									
		e									
		s									
		R									
		d									
		:									

2022 zinc in PM_{2.5} annual statistics

Unit: nanograms per cubic metre (ng/m³)

I D ****	C it y	L o c a t i o n	V a l i d h ***	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x i m u m 1 h ***	
2 9 0 0 0	H a m i l t o n D o w n t o w n	E l g i n S t. *** / K e l l y S t. ***	4 7 1 4	1. 6	4. 0	7. 4	1 3. 1	3 6. 9	2 7 2. 9	2 1. 0	1, 0 3 1. 0	
8 3 1 2 6	T o r o n t o H w ***	H *** w *** y *** 4 0 1 a t 1	7 4 2 7	4. 2	7. 6	1 1. 4	1 7. 2	3 3. 8	1 1 1. 1	1 8. 4	3, 6 3 7. 9	

	y 4 0 1	2 5 R e s o u r c e s R d :										

2022 organics in PM_{2.5} annual statistics

Unit: micrograms per cubic metre (µg/m³)

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x i m u m 1 h	
8 3 1 2	T o r o	H w y 4	8 1 0 1	1. 3	2. 3	3. 4	5. 2	9. 0	1 6. 0	4. 4 2	7 9. 3	

6	n t o H w y 4 0 1	0 1 a t 1 2 5 R e s o u r c e s R d :										

2022 sulphate in PM_{2.5} annual statistics

Unit: micrograms per cubic metre (µg/m³)

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x i m u m 1 h	

8 3 1 2 6	T o r o n t o H w y 4 0 1	H w y 4 0 1 a t 1 2 5 R e s o u r c e s R d :	8 1 0 1	0. 1	0. 3	0. 5	0. 7	1. 4	2. 8	0. 6 5	9. 4	:

2022 nitrate in PM_{2.5} annual statistics

Unit: micrograms per cubic metre (µg/m³)

I D 0000	C i t y	L o c a t i o n	V a l i d h 000	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x i m u m 1 h 000	
8 3 1 2 6	T o r o n t o H w y 4 0 1	H 000 w 000 y 00 4 0 1 a t 1 2 5 R e s o u r c e s R 000 d 000 :	8 1 0 1	0. 1	0. 2	0. 3	0. 7	2. 2	5. 6	0. 7 7	9. 5	

2022 ammonium in PM_{2.5} annual statistics

Unit: micrograms per cubic metre (µg/m³)

I D	C i t y	L o c a t i o n	V a l i d h	1 0 %	3 0 %	5 0 %	7 0 %	9 0 %	9 9 %	M e a n	M a x i m u m 1 h
8 3 1 2 6	T o r o n t o H w y 4 0 1	H w y 4 0 1 a t 1 2 5 R e s o u r c e s R	8 1 0 1	0. 0	0. 2	0. 3	0. 4	1. 0	2. 4	0. 4 2	3 2. 0

7-year trend NO₂

Annual mean (ppb)

ID	City/ Town	2016	2017	2018	2019	2020	2021	2022	Change over 7 year (%)
12008	Windsor Downtown	11.40	11.10	10.99	10.94	8.99	9.56	9.37	-20.3
12016	Windsor West	10.60	9.90	8.77	9.98	8.14	8.44	7.98	-23.5
29000	Hamilton Downtown	11.90	11.90	11.63	12.49	9.87	10.23	10.61	-17.9

ID	City/ Town	20 16	20 17	20 18	20 19	20 20	20 21	20 22	Ch ang e ove r 7 y ear (%)
29 21 4	Hamilt on Mount ain	7. 90	7. 80	7. 76	8. 81	6. 91	6. 33	6. 09	-26. 4
33 00 3	Toront o East	12 .1 0	11 .5 0	10 .5 5	10 .2 4	8. 41	9. 50	9. 93	-23. 3
34 02 1	Toront o North	12 .0 0	10 .5 0	10 .3 5	10 .5 1	8. 89	9. 30	10 .2 1	-15. 2
35 03 3	Etobico ke South	14 .6 9	15 .4 7	14 .7 5	14 .7 4	12 .2 4	13 .8 5	13 .6 8	-12. 5
35 12 5	Toront o West	15 .7 0	15 .0 0	14 .4 1	14 .6 2	12 .1 0	12 .8 8	13 .2 1	-16. 7
63 20 3	Thund er Bay	7. 10	6. 70	7. 48	6. 65	6. 11	6. 53	6. 98	-8.5

ID	City/ Town	20 16	20 17	20 18	20 19	20 20	20 21	20 22	Ch ang e ove r 7 y ear (%)
75 01 0	North Bay	4. 70	4. 60	4. 93	5. 11	4. 26	3. 92	4. 12	-14. 0
83 12 6	Toront o Hwy 401	18 .9 5	18 .8 3	18 .6 3	18 .5 5	16 .0 9	17 .6 4	17 .7 8	-9.9
83 13 3	Toront o Island	6. 37	IN S ..	5. 86	6. 35	5. 12	6. 54	6. 64	N- SSS

Notes:

- INS indicates there was insufficient data to calculate a valid annual mean.
.....
- N-SSS - Non-Significant Sen's Slope (significant trend not detected).
.....

7-year trend PM_{2.5}
.....

Annual mean (µg/m³)
.....

ID	City/ Town	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	Ch an ge ov er 7 y ear (%)
12 00 8	Windso r Downt own	8. 10	7. 80	8. 48	7. 79	7. 05	8. 34	7. 83	N- SSS
12 01 6	Windso r West	8. 50	8. 50	8. 66	9. 05	8. 77	9. 57	8. 82	9.3
29 00 0	Hamilt on Downt own	8. 20	8. 50	9. 18	8. 83	8. 08	8. 89	8. 64	N- SSS
29 21 4	Hamilt on Mount ain	7. 20	7. 40	7. 73	7. 87	7. 06	8. 02	7. 71	N- SSS
33 00 3	Toront o East	7. 00	7. 40	7. 18	6. 99	6. 65	7. 41	6. 70	N- SSS
34	Toront	7.	7.	7.	6.	6.	7.	6.	N-

ID	City/ Town	20 16	20 17	20 18	20 19	20 20	20 21	20 22	Ch ang e ove r 7 y ear (%)
02 1	o North	30	40	60	84	41	37	79	SSS
35 03 3	Etobico ke South	8. 06	8. 17	8. 21	7. 81	7. 38	8. 53	7. 73	N- SSS
35 12 5	Toront o West	7. 00	7. 40	7. 71	7. 18	6. 88	7. 66	6. 90	N- SSS
63 20 3	Thunde r Bay	4. 90	5. 10	5. 95	5. 10	5. 45	6. 61	5. 03	N- SSS
75 01 0	North Bay	4. 60	4. 60	5. 49	4. 49	4. 57	5. 66	5. 06	12. 2
83 12 6	Toront o Hwy 401	9. 21	9. 39	9. 01	8. 72	8. 76	9. 34	9. 09	N- SSS

ID	City/ Town	20 16	20 17	20 18	20 19	20 20	20 21	20 22	Ch ang e ove r 7 y ear (%)
83 13 3	Toront o Island	6. 84	6. 48	7. 08	6. 49	6. 11	6. 81	5. 79	-1.4

Notes:

- INS indicates there was insufficient data to calculate a valid annual mean.
.....
- N-SSS - Non-Significant Sen's Slope (significant trend not detected).
.....

7-year trend for ultrafine particles

Annual mean (#/cm³)
.....

ID	City / Tow n	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	Chang e over 7 years (%)
34 02 1	Toro nto Nort h	11 95 3	12 07 4	12 29 3	1 0 8 7 3	9 0 5 6	1 0 2 6 2	1 0 6 9 7	-18.0

ID	City / Town	20 16	20 17	20 18	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	Change over 7 years (%)
83 12 6	Toro nto Hwy 401	43 28 0	39 05 3	37 98 4	3 9 8 3 1	4 0 6 3 5	4 2 5 7 9	4 0 8 0 6	N-SSS
83 13 3	Toro nto Island	IN S ..	IN S ..	IN S ..	6 6 9 3	6 1 2 6	6 4 1 5	7 5 5 5	N-SSS

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.
.....

N-SSS - Non-Significant Sen's Slope (significant trend not detected).
.....

7-year trend for black carbon

Annual mean ($\mu\text{g}/\text{m}^3$)
.....

ID	City/ Town	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	Change over 7 years (%)
12 00	Winds or	0. 5	0. 5	0. 5	0. 5	0. 4	0. 4	0. 4	-23.4

ID	City/ Town	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	Chang e over 7 years (%)
8	Down town	3	0	7	9	3	9	0	
12 01 6	Winds or West	0. 7 0	0. 6 5	0. 6 0	0. 5 9	0. 4 5	0. 5 0	0. 4 4	-40.9
29 00 0	Hamil ton Down town	0. 5 1	0. 7 1	0. 7 2	0. 6 7	0. 5 7	0. 5 7	0. 5 1	N-SSS
33 00 3	Toron to East	0. 6 2	0. 6 2	0. 4 5	0. 4 5	0. 4 5	0. 4 4	0. 3 9	-40.5
34 02 1	Toron to North	0. 6 2	0. 6 0	0. 4 9	0. 5 3	0. 5 1	0. 4 7	0. 4 2	-27.1
35 03 3	Etobic oke South	0. 8 9	0. 9 7	0. 7 9	0. 8 3	0. 8 8	0. 6 9	0. 6 1	-26.7
83 12 6	Toron to Hwy	1. 6 2	1. 5 1	1. 3 1	1. 4 3	1. 2 0	1. 1 8	1. 0 5	-31.8

ID	City/ Town	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	Chang e over 7 years (%)
	401								
83 13 3	Toron to Island	0. 4 4	0. 3 5	0. 3 7	0. 3 7	0. 3 4	0. 3 3	0. 2 9	-32.4

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.
.....

N-SSS - Non-Significant Sen's Slope (significant trend not detected).
.....

7-year trend for iron in PM_{2.5}
.....

Annual mean (ng/m³)
.....

ID	City/ Town	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	Chang e over 7 years (%)
29 00 0	Hamil ton Down town	1 1 6. 6	1 1 6. 9	1 0 5. 9	1 0 6. 9	8 8. 3	1 0 4. 0	1 0 8. 6	-23.3
83 12	Toron to	IN S ..	2 6	2 7	IN S ..	2 8	2 5	2 8	N-SSS

ID	City/ Town	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	Change over 7 years (%)
6	Hwy 401		1. 6	5. 7		8. 6	7. 0	0. 8	

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.
.....

N-SSS - Non-Significant Sen's Slope (significant trend not detected).
.....

7-year trend for copper in PM_{2.5}
.....

Annual mean (ng/m³)
.....

ID	City/ Town	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	Change over 7 years (%)
29 00 0	Hamil ton Down town	4. 7	4. 8	4. 2	4. 0	3. 5	4. 4	4. 5	N-SSS
83 12 6	Toron to Hwy 401	IN S ..	1 1. 5	1 1. 9	IN S ..	1 0. 2	9. 8	8. 5	-30.1

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.

N-SSS - Non-Significant Sen's Slope (significant trend not detected).

7-year trend for manganese in PM_{2.5}

Annual mean (ng/m³)

ID *****	City/ Town	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	Change over 6 years (%)
29 00 0	Hamilton Downtown	5. 5	3. 9	3. 5	4. 2	2. 9	3. 4	3. 5	-51.7
83 12 6	Toronto Hwy 401	INS *****	3. 7	3. 7	INS *****	3. 7	3. 6	3. 8	N-SSS *****

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.

N-SSS - Non-Significant Sen's Slope (significant trend not detected).

7-year trend for lead in PM_{2.5}

Annual mean (ng/m³)

ID *****	City/ Town	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	Chang e over 7 years (%)
29 00 0	Hamil ton Down town	4 0. 1	2 5. 8	2 6. 5	2 9. 0	2 0. 5	2 3. 9	2 1. 0	-45.4
83 12 6	Toron to Hwy 401	IN S ..	2 4. 2	2 2. 3	IN S ..	1 8. 1	1 9. 5	1 8. 4	-27.8

Notes:

INS indicates there was insufficient data to calculate a valid annual mean.

7-year trend for organics in PM_{2.5}

Annual mean (µg/m³)

ID *****	City/ Town	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	Chang e over 7 years (%)
83 12 6	Toro nto Hwy 401	4. 1 3	7. 0 1	5. 2 0	3. 8 8	4. 8 3	3. 9 4	4. 4 2	N-SSS *****

Notes:

N-SSS - Non-Significant Sen's Slope (significant trend not detected).

7-year trend for sulphate in PM_{2.5}

Annual mean (µg/m³)

ID	City/ Town	2016	2017	2018	2019	2020	2021	2022	Change over 7 years (%)
83126	Toronto Hwy 401	0.91	1.12	0.66	0.65	0.67	0.56	0.65	-34.4

7-year trend for nitrate in PM_{2.5}

Annual mean (µg/m³)

ID	City/ Town	2016	2017	2018	2019	2020	2021	2022	Change over 7 years (%)
83126	Toronto Hwy 401	1.31	1.77	1.65	1.20	1.38	1.14	0.77	-36.2

7-year trend for ammonium in PM_{2.5}

Annual mean (µg/m³)

ID	City/ Town	2 0 1 6	2 0 1 7	2 0 1 8	2 0 1 9	2 0 2 0	2 0 2 1	2 0 2 2	Change over 7 years (%)
83 12 6	Toro nto Hwy 401	0. 7 3	1. 4 6	0. 6 5	0. 4 1	1. 0 6	0. 8 9	0. 4 2	-26.9

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