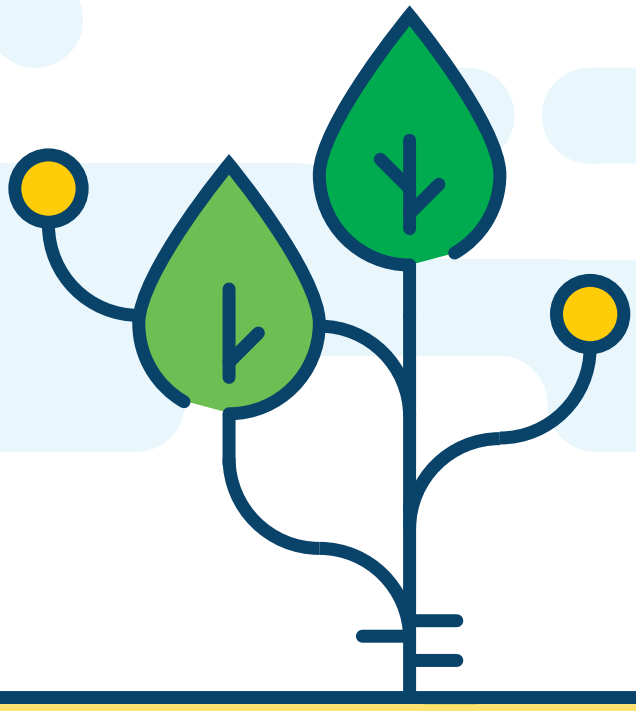
Air Quality in Ontario 2014 Report

MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE



Ontario

2014 Air Quality Report Highlights

- The 2014 air quality report marks 44 years of long-term reporting on the state of air quality in Ontario. This report summarizes province-wide trends for key airborne pollutants affecting Ontario's air quality.
- Overall, air quality has improved significantly over the past 10 years, especially for nitrogen dioxide (NO_2), sulphur dioxide (SO_2) and carbon monoxide (CO) – pollutants emitted by vehicles and industry, as well as fine particulate matter ($PM_{2.5}$) which may be emitted directly into the atmosphere as a by-product of fuel combustion or it may be formed indirectly in the atmosphere through a series of complex chemical reactions.
- Ozone is a secondary pollutant formed when nitrogen oxides (NO_x) and volatile organic compounds (VOCs) react in the presence of sunlight. Ozone annual means have increased by 3 per cent from 2005 to 2014; however, ozone summer means have decreased by 8 per cent over the same period.
- Emissions of nitrogen oxides (NO_x), CO and SO_2 continue to decrease due in part to Ontario's air quality initiatives such as the phase-out of coal-fired generating stations, emissions trading regulations (O. Reg. 397/01 and O. Reg. 194/05), emissions controls at Ontario smelters, and Drive Clean emissions testing, which supports the federal vehicle emission standards and lower sulphur content in transportation fuels.

Decreasing Provincial Ambient Concentrations (2005 – 2014)	
NO_2	↓ 42%
SO_2	↓ 49%
CO	↓ 40%
$PM_{2.5}$	↓ 31%

Decreasing Provincial Emissions (2004 – 2013)	
NO_x	↓ 41%
SO_2	↓ 50%
CO	↓ 38%
$PM_{2.5}$	↓ 22%

Reduce smog, reduce the risk, breathe easy.

For more information on Ontario's air quality, visit www.airqualityontario.com

Table of Contents

1.0 Introduction

This annual report, the 44th in a series, summarizes the state of ambient air quality in Ontario during 2014 and examines 10-year trends.

It reports on the measured levels of six common air pollutants: ground-level ozone (O_3), fine particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2), carbon monoxide (CO), sulphur dioxide (SO_2) and total reduced sulphur (TRS) compounds, and how Ontario is performing compared to the province's Ambient Air Quality Criteria (AAQC). This report also provides an overview of the Ministry of the Environment & Climate Change' s Air Quality Index (AQI) and Smog Alert programs in addition to the federal Air Quality Health Index (AQHI). Annual statistics, as well as 10 and 20-year trends of ambient air quality data are provided in the attached Appendix.

FACT: An AAQC is a desirable concentration of a contaminant in air, based on protection against adverse effects on health or the environment. The term "ambient" is used to reflect general air quality independent of location or source of a contaminant. AAQCs 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. AAQCs are set with different averaging times appropriate for the effect they are intended to protect against.

Contaminant	1-hour AAQC	8-hour AAQC	24-hour AAQC	Annual AAQC
O_3	80 ppb	-	-	-
$PM_{2.5}$	-	-	28 µg/m$^{3(1)}$	-
NO_2	200 ppb	-	100 ppb	-
SO_2	250 ppb	-	100 ppb	20 ppb
CO	30 ppm	13 ppm	-	-

(1) Reference level based on Canadian Ambient Air Quality Standard (CAAQS).

Ontario continues to benefit from one of the most comprehensive air monitoring systems in North America, comprised of 40 monitoring sites across the province that undergo regularly scheduled maintenance and strict data quality assurance and quality control (QA/QC) procedures to ensure a high standard of data quality and data completeness. The data, which are collected continuously at these sites, are used to determine the current state of ambient air quality and are reported every hour on the ministry's web site, www.airqualityontario.com.

2.0 Ground-Level Ozone (O_3)

Ground-level ozone is a gas formed when nitrogen oxides (NO_x) and volatile organic compounds (VOCs) react in the presence of sunlight. While ozone at ground level is a significant environmental and health concern, the naturally occurring ozone in the stratosphere, 10 to 40 kilometres above the earth's surface, is beneficial as it shields the earth from harmful ultraviolet radiation.

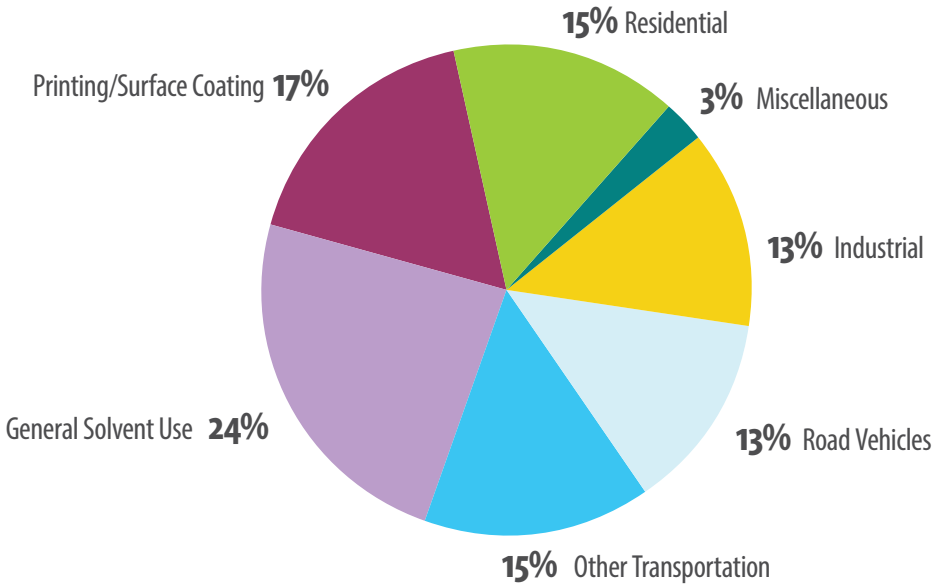
Ozone is a colourless, odourless gas at typical ambient concentrations, and is a major component of smog. Ozone is not generally emitted directly into the atmosphere; the formation and transport of ozone is strongly dependent on meteorological conditions and emissions of chemical precursors, particularly NO_x and VOCs. Changing weather patterns contribute to differences in ozone concentrations hour-to-hour, day-to-day, season-to-season, and year-to-year. In Ontario, the highest concentrations of ground-level ozone are typically recorded on hot and sunny days from mainly May to September, between noon and early evening.

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 (COPD), are also at risk. Ozone is associated with increased hospital admissions and premature deaths. Ozone also causes many losses in agricultural crops each year in Ontario, with visible leaf damage in many crops, garden plants and trees, especially during the summer months.

Figure 1 shows the estimates of Ontario's VOCs emissions from point, area and transportation sources. Transportation sectors accounted for approximately 28 per cent of VOCs emissions and the second largest source was general solvent use accounting for approximately 24 per cent. **Figure 2** shows the estimates for Ontario's NO_x emissions from point, area and transportation sources. The transportation sectors accounted for approximately 71 per cent of NO_x emissions (NPRI, 2015).

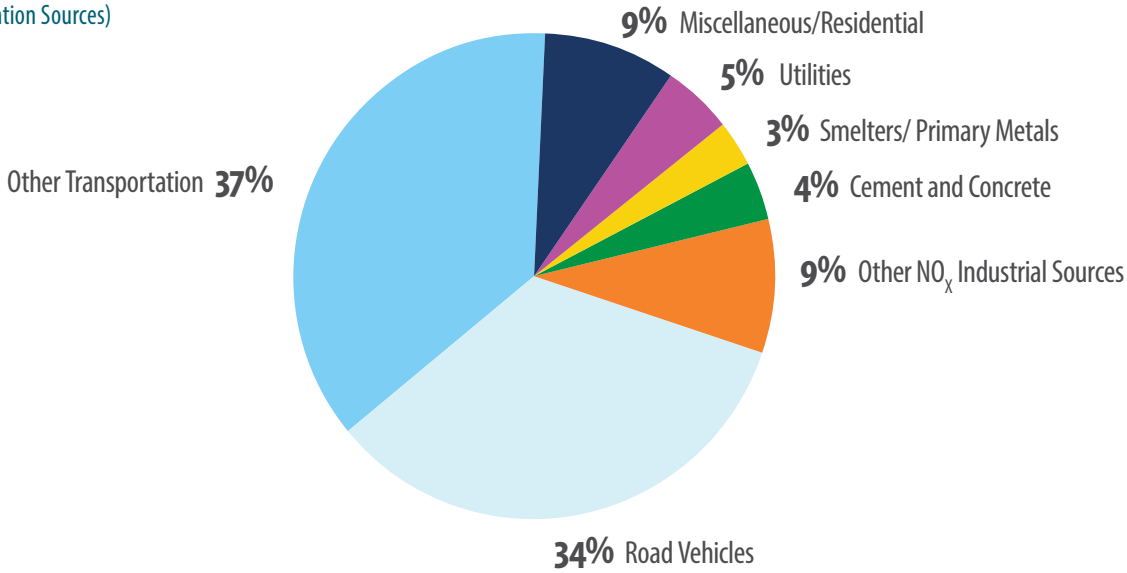
In 2014, ozone was monitored at the ministry's 40 AQI sites. The highest annual mean was 32.3 parts per billion (ppb), measured at Port Stanley, a transboundary-influenced site on the northern shore of Lake Erie. The lowest annual mean, 21.1 ppb, was measured at Toronto West, an urban site located near a major transportation corridor, Highway 401, and directly impacted by local nitric oxide (NO) emissions from vehicles. Generally, ozone concentrations are lower in urban areas because ozone is depleted by reacting with NO emitted by vehicles and other local combustion sources.

Figure 1:
Ontario VOCs Emissions by Sector
(2013 Estimates for Point/Area/
Transportation Sources)



Note: Excludes emissions from open and natural sources.

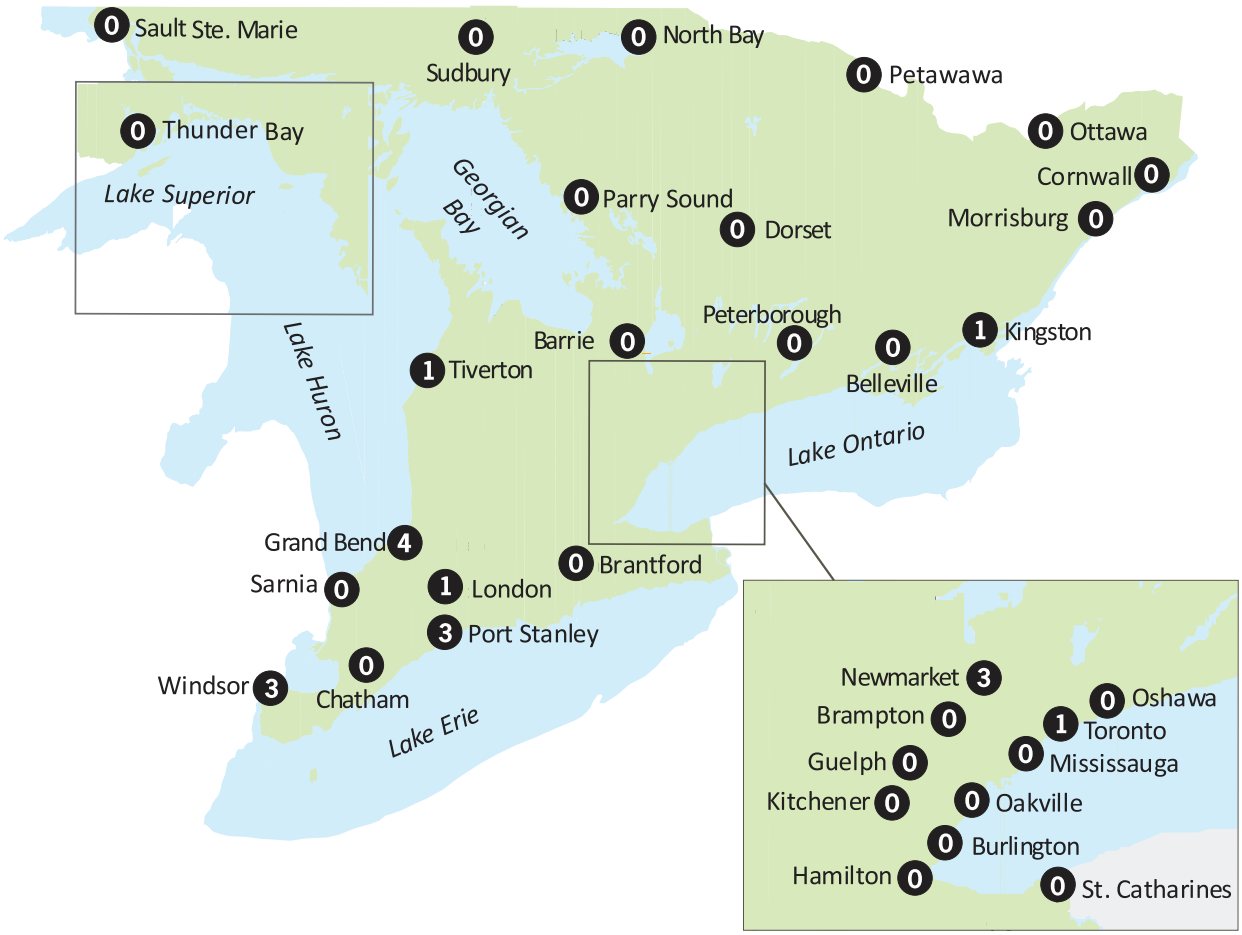
Figure 2:
Ontario NO_X Emissions by Sector
(2013 Estimates for Point/Area/
Transportation Sources)



Note: Excludes emissions from open and natural sources.

Ground-level ozone concentrations exceeded the provincial one-hour Ambient Air Quality Criterion (AAQC) of 80 ppb at 8 sites in 2014. These 8 sites measured ozone levels above 80 ppb for at least one hour in 2014. The maximum one-hour ozone concentrations ranged from 63 ppb recorded at Ottawa Central, to 90 ppb recorded in Grand Bend. Ontario's one-hour AAQC for ozone was exceeded the most often at Grand Bend on 4 occasions. The geographical distribution of one-hour ozone exceedances across the province is shown in **Figure 3.**

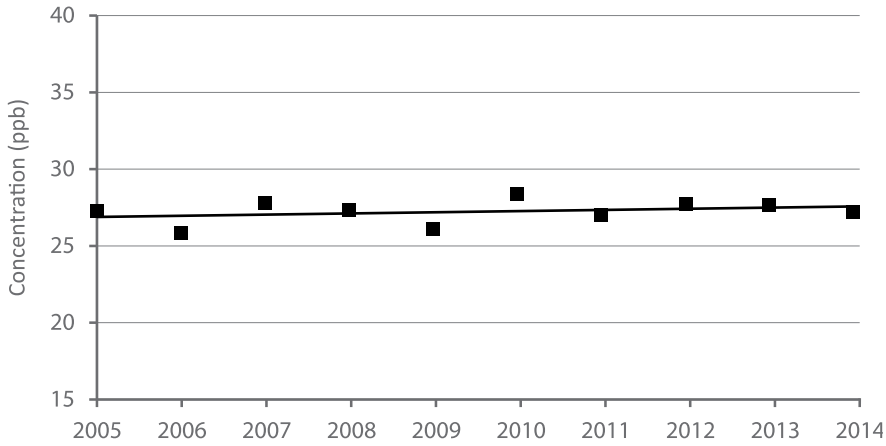
Figure 3:
Geographical Distribution of the Number of Hours Above the One-Hour Ozone AAQC Across Ontario in 2014



The ozone exceedances reported in southwestern Ontario, on the eastern shore of Lake Huron and on the northern shore of Lake Erie, are typically resulting from transboundary flow of pollutants. As stated in the *Transboundary Air Pollution in Ontario* report, elevated ozone levels in southwestern Ontario are generally attributed to the long-range transport of pollutants from the United States (Yap et al, 2005).

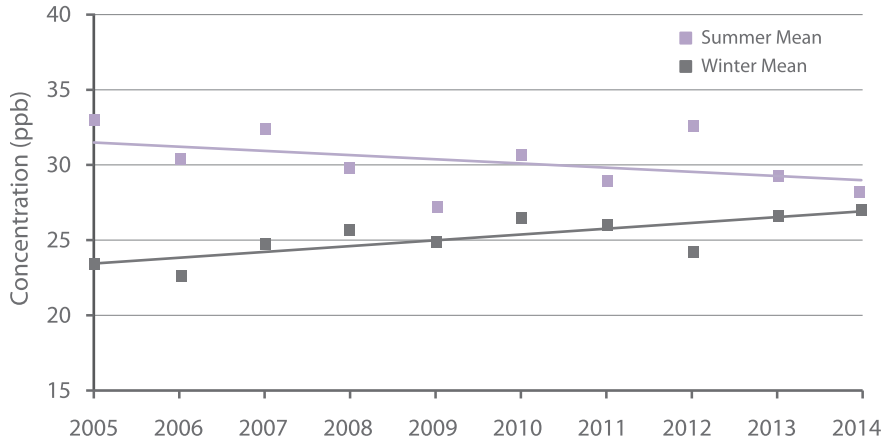
The ozone annual means in **Figure 4** display an increasing trend of 3 per cent for the 10-year period from 2005 to 2014. The trend of ozone summer means and ozone winter means are shown in **Figure 5.** The ozone summer means trend decreased by 8 per cent from 2005 to 2014, whereas the ozone winter means have increased by 13 per cent over the same 10-year period. The decrease in summer means over the past 10 years is largely due to the progressive reductions of NO_x emissions in Ontario and the U.S. resulting in the decrease in local ozone formation and transboundary influences especially during the summer months. The increase in the ozone winter means are mainly attributed to the rising global background concentrations which in turn drives the increasing trend of ozone annual means (Reid et al, 2008). In general, even with the increase in ozone winter means, ozone concentrations during the winter months continue to remain well below the Ontario AAQC of 80 ppb.

Figure 4:
Trend of Ozone Annual Means Across Ontario (2005-2014)



Note: 10-year trend is a composite annual mean based on data from 40 monitoring sites.

Figure 5:
Trend of Ozone Summer and Winter Means Across Ontario (2005-2014)



Note: 10-year trends are composite means for the summer and winter months based on data from 40 monitoring sites.
Summer: May - September; Winter: January - April, October - December.

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

Airborne particulate is the general term used to describe a mixture of microscopic solid particles and liquid droplets suspended in air. Particulate matter (PM) is classified according to its aerodynamic size, mainly due to the different health effects associated with particles of different diameters. Fine particulate matter, denoted as $PM_{2.5}$, refers to respirable particles that are less than 2.5 micrometres in diameter, approximately 30 times smaller than the average diameter of a human hair. Due to their small size, they can penetrate deep into the lungs.

Particulate matter includes aerosols, smoke, fumes, dust, fly ash and pollen. Its composition is complex and varies with origin, residence time in the atmosphere, time of year and environmental conditions. Major components of $PM_{2.5}$ in Ontario are typically nitrates, sulphates, organic matter and particle-bound water. Higher nitrate levels are common in the cooler months whereas sulphates are more elevated during warm temperatures. Fine particulate matter may be emitted directly into the atmosphere as a by-product of fuel combustion or it may be formed indirectly in the atmosphere through a series of complex chemical reactions. Major sources of $PM_{2.5}$ include motor vehicles, smelters, power plants, industrial facilities, residential fireplaces and wood stoves, agricultural burning and forest fires.

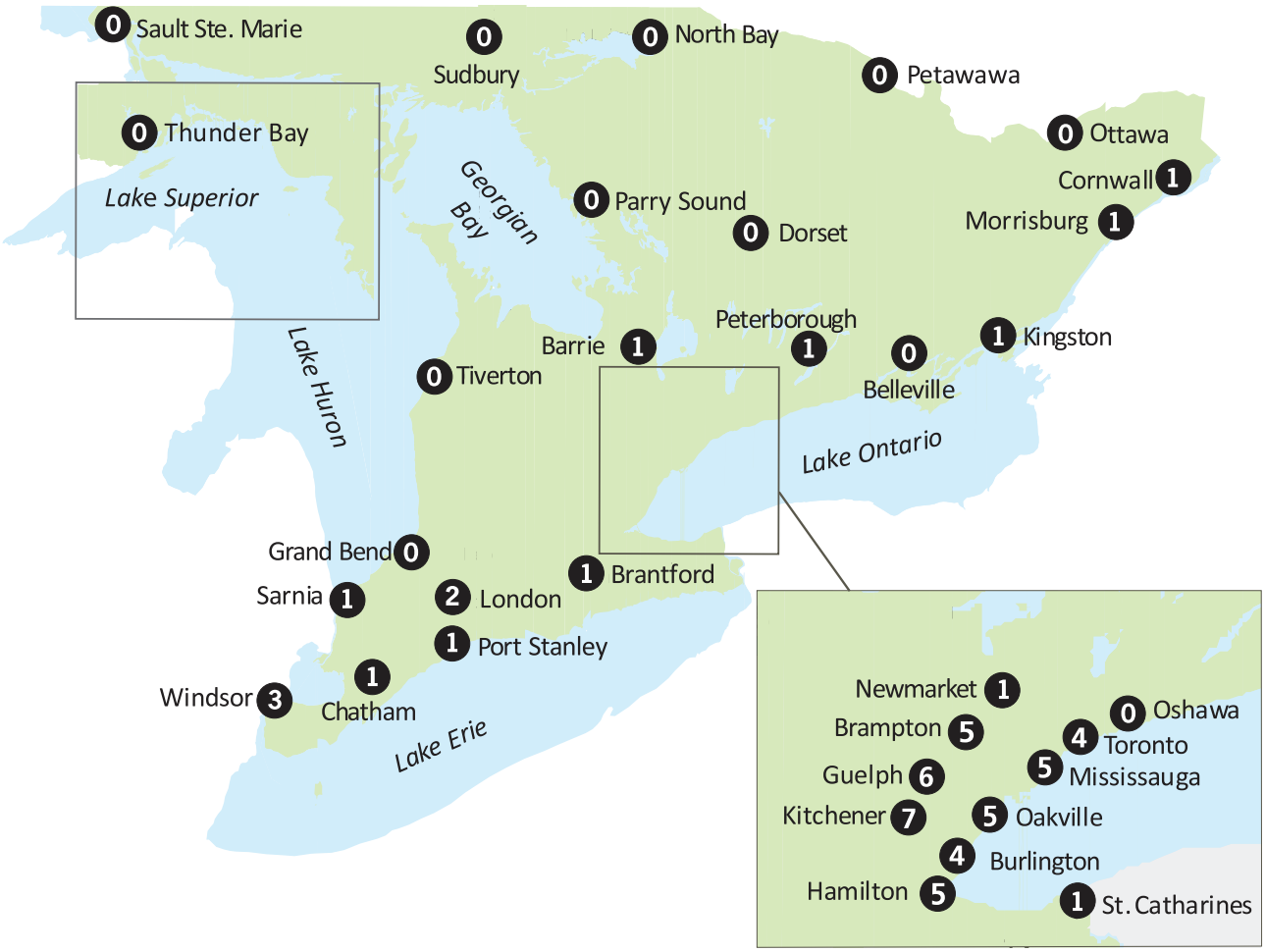
The 2013 estimates for Ontario's $PM_{2.5}$ emissions from point, area and transportation sources (excluding emissions from open and natural sources) indicate residential fuel combustion accounted for 57 per cent. The major contributor to residential emissions is fuel wood combustion in fireplaces and wood stoves. Industrial processes and transportation sectors accounted for 21 per cent and 16 per cent, respectively (NPRI, 2015).

In 2013, as part of a national initiative funded by Environment Canada, Ontario upgraded all $PM_{2.5}$ monitors across the ambient air monitoring network and started reporting with this new technology. While annual means and maximums are reported for 2014, 10-year trends for the entire ambient air monitoring network cannot be determined since the 2013 and 2014 $PM_{2.5}$ data set is not directly comparable to data collected using the older technology. Ontario's new $PM_{2.5}$ measurement technology and 10-year trends are discussed further in **Section 3.1**: Technical Discussion – New $PM_{2.5}$ Measurement Technology in Ontario.

In 2014, 27 of the 40 AQI sites exceeded Ontario's 24-hour $PM_{2.5}$ reference level of 28 micrograms per cubic metre ($\mu g/m^3$)on at least one occasion. The $PM_{2.5}$ 24-hour maximum concentrations ranged from 17 $\mu g/m^3$ in both Petawawa and Sault Ste. Marie to 46 $\mu g/m^3$ recorded at Hamilton West. The 2014 $PM_{2.5}$ annual mean concentrations ranged from 4.7 $\mu g/m^3$ in Petawawa to 10.8 $\mu g/m^3$ in downtown Hamilton. The geographical distribution of 24-hour $PM_{2.5}$ exceedances above the 28 $\mu g/m^3$ reference level across the province is shown in **Figure 6.**

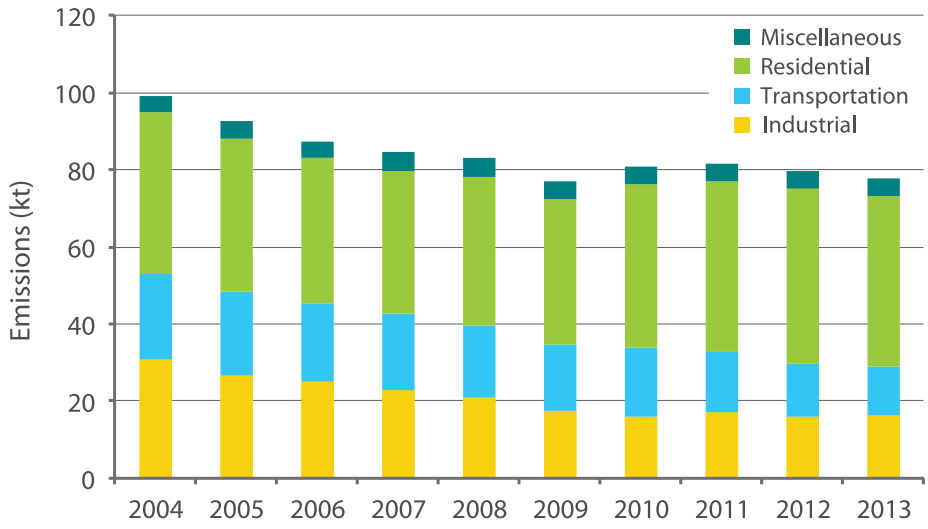
The number of days above the 28 µg/m³ reference level is generally highest in border communities that are affected by transboundary pollutants, and in urban areas. During periods of elevated concentrations of $PM_{2.5}$ in Ontario, notwithstanding forest fires, it is estimated that there are significant contributions from the U.S., specifically affecting border communities (Yap et al, 2005). Higher $PM_{2.5}$ concentrations are often observed in urban areas during the winter months and are typically associated with relatively stagnant conditions and the development of strong temperature inversion conditions overnight, which can lead to pollutants being trapped at the surface.

Figure 6:
Geographical Distribution of the Number of Days Above the 24-Hour $PM_{2.5}$ Reference Level Across Ontario in 2014



Provincial $PM_{2.5}$ emissions have decreased approximately 22 per cent from 2004 to 2013 as shown in **Figure 7.** Fine particulate matter emissions from electric utilities and industrial processes have been reduced approximately 47 per cent during this period. Emissions from the transportation sector decreased 43 per cent with the phase-in of new vehicles/engines having more stringent emission standards over the same period.

Figure 7:
Ontario $PM_{2.5}$ Emissions Trend (2004-2013)



Note: Excludes emissions from open and natural sources.

3.1 Technical Discussion

New $PM_{2.5}$ Measurement Technology in Ontario

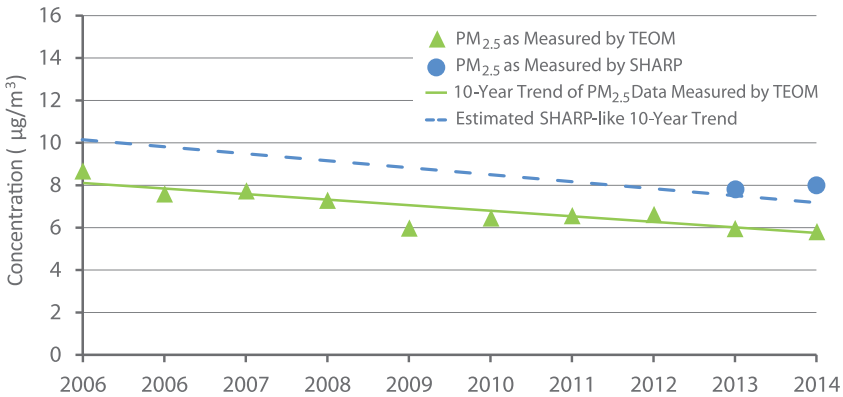
In 2002 Ontario became the first province in Canada to report hourly $PM_{2.5}$ concentrations to the public under the AQI program utilizing Tapered Element Oscillating Microbalance (TEOM) instruments that provided continuous PM monitoring. Continuous PM monitoring is essential for reporting hourly ambient concentrations. The TEOM was the most innovative method at the time for continuous real-time $PM_{2.5}$ monitoring (Patashnick and Rupprecht, 1991), and continues to be used by many jurisdictions across North America.

Over the last decade, continuous $PM_{2.5}$ monitoring technologies have evolved dramatically to address the technical issues associated with cold weather $PM_{2.5}$ measurements. After extensive evaluation of four new PM2.5 monitors, it was determined that Ontario's TEOM instruments did not perform as well as these new $PM_{2.5}$ monitors, particularly during the winter. Ontario selected the Synchronized Hybrid Ambient Real-time Particulate (SHARP) 5030 to replace the aging TEOM monitors deployed in the AQI network. As part of a national initiative funded by Environment Canada, Ontario deployed the SHARP 5030

monitors in 2012 across the ambient air monitoring network for testing. In January 2013, Ontario commenced public reporting with the new SHARP 5030 instruments. The SHARP 5030 reports higher $PM_{2.5}$ concentrations than the TEOM analyzer during cold weather due to the improved performance of the SHARP 5030 (Sofowote et al, 2014). This has resulted in an increase in Ontario's $PM_{2.5}$ annual mean in 2013 and 2014, however this is not an indication that the air quality has changed; only that the measurement is more accurate.

A network-wide trend using historical TEOM and 2013/2014 SHARP data cannot be determined as the two datasets are not directly comparable. In anticipation of this, TEOM and SHARP monitors were collocated at a sub-set of the air monitoring network to continue reporting annual trends and work towards making the new $PM_{2.5}$ measurements comparable to historical data. Seven sites including Sarnia, Port Stanley, Hamilton Downtown, Toronto West, Ottawa Downtown, Cornwall and North Bay, were selected to be representative of Ontario's $PM_{2.5}$ network, taking into consideration the differences in air quality across the province. The 10-year $PM_{2.5}$ trend for these sites, using TEOM technology, continues to show a decrease of PM2.5 levels. For the period of 2005 to 2014 a decrease of 31 per cent was observed **(Figure 8).** Additionally, Ontario developed corrections for historical TEOM measurements, for the fall and winter seasons, for the purpose of making them more comparable to SHARP measurements through a multiple linear regression analysis. This analysis, using collocated TEOM and SHARP instruments, showed that on average, annual SHARP measurements were 25 per cent higher than TEOM measurements (Sofowote et al, 2014). Using this as an approximate correction factor, **Figure 8** displays an estimated SHARP-like 10-year trend that parallels the TEOM trend, and illustrates that Ontario's air quality is still improving based on measurements using the new technology.

Figure 8:
Trend of $PM_{2.5}$ Annual Means at Selected Sites Across Ontario (2005-2014)



Note: The trend is a composite mean based on data from Sarnia, Port Stanley, Hamilton Downtown, Toronto West, Ottawa Downtown, Cornwall and North Bay.
$PM_{2.5}$ concentrations as measured by TEOM operated at 30˚C with SES (2005-2014) and by SHARP 5030 (2013-2014).

With more accurate, but higher, reported $PM_{2.5}$ values resulting from the implementation of SHARP instruments, achievement of $PM_{2.5}$ reference levels and standards may be more challenging. In 2014, Kitchener exceeded the 24h $PM_{2.5}$ reference level of 28 µg/m³ on 7 occasions, more than any other station in Ontario. Most of these days at Kitchener were marginally above the 28 µg/m³ reference level.

4.0 Other Air Pollutants

Nitrogen Dioxide (NO_2)

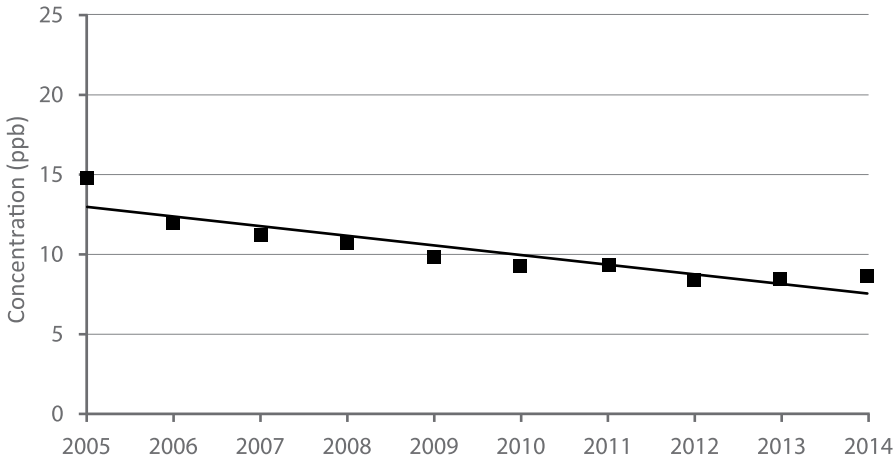
Nitrogen dioxide is a reddish-brown gas with a pungent odour, which transforms in the atmosphere to form gaseous nitric acid and nitrates. It plays a major role in atmospheric reactions that produce ground-level ozone, a major component of smog. Nitrogen dioxide also reacts in the air and contributes to the formation of $PM_{2.5}$ (Seinfeld & Pandis, 2006). All combustion in air produces NO_x, of which NO_2 is a component. Major sources of NO_x emissions include the transportation sector, industrial processes and utilities. Nitrogen dioxide can irritate the lungs and lower their resistance to respiratory infection. People with asthma and bronchitis have increased sensitivity to NO_2. Nitrogen dioxide 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.

There were no exceedances of the provincial one-hour and 24-hour AAQC for NO_2, 200 ppb and 100 ppb, respectively, at any of the monitoring locations in Ontario during 2014. The Toronto West air monitoring station, located in an area of Toronto influenced by significant vehicular traffic, recorded the highest NO_2 annual mean (17.1 ppb) during 2014; whereas Tiverton, a rural site, recorded the lowest NO_2 annual mean (2.7 ppb). The highest NO_2 means were recorded in large urbanized areas, such as the Greater Toronto Area of southern Ontario. The Toronto East station recorded the highest one-hour NO_2 concentration (89 ppb), and Toronto West recorded the highest 24-hour NO_2 concentration (51 ppb). Both of these stations are located in close proximity to major roadways, and are designated as road-side monitoring stations.

The NO_2 annual mean concentrations across Ontario have decreased 42 per cent from 2005 to 2014, as displayed in **Figure 9.** The NO_x emission trend from 2004 to 2013 indicates a decrease of approximately 41 per cent as shown in **Figure 10** (NPRI, 2015). Ontario's emissions trading regulations on sulphur dioxide and nitrogen oxides (O. Reg. 397/01 and O. Reg. 194/05) have contributed to the reduction in nitrogen oxides emissions in recent years. Nitrogen oxides emissions from on-road vehicles have also decreased due to the phase-in of

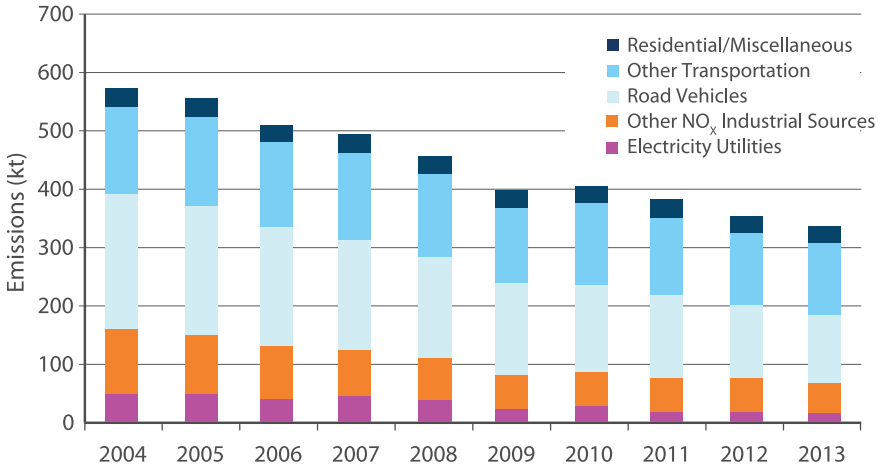
new vehicles having more stringent emission standards. The implementation of the Ontario Drive Clean program in southern Ontario in 1999 has also helped further reduce the NO_x emissions from light duty gasoline vehicles.

Figure 9:
Trend of NO_2 Annual Means Across Ontario (2005-2014)



Note: 10-year trend is a composite mean based on data from 30 monitoring sites.

Figure 10:
Ontario NO_X Emissions Trend (2004-2013)



Note: Excludes emissions from open and natural sources.

Sulphur Dioxide (SO_2)

Sulphur dioxide is a colourless gas that smells like burnt matches. It can also be oxidized in the atmosphere to form sulphuric acid aerosols. In addition, sulphur dioxide is a precursor to sulphates, one of the main components of airborne secondary $PM_{2.5}$. Major sources of SO_2 include smelters, industrial processes and electric utilities.

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. Sulphur dioxide damages trees and crops. Similar to NO_2, SO_2 leads to the formation of $PM_{2.5}$ and is also a precursor to acid rain, which contributes to the acidification of soils, lakes and streams, accelerated corrosion of buildings, and reduced visibility.

Smelters in central Ontario are the major sources of SO_2 emissions in Ontario, accounting for approximately 68 per cent of the provincial SO_2 emissions according to 2013 estimates for point, area and transportation sources (excluding emissions from open and natural sources). Electric utilities and other industrial processes (e.g. petroleum refining, cement and concrete manufacturing) accounted for an additional 29 per cent. The transportation sector and miscellaneous sources accounted for the remaining 3 per cent of all SO_2 emissions in the province (NPRI, 2015).

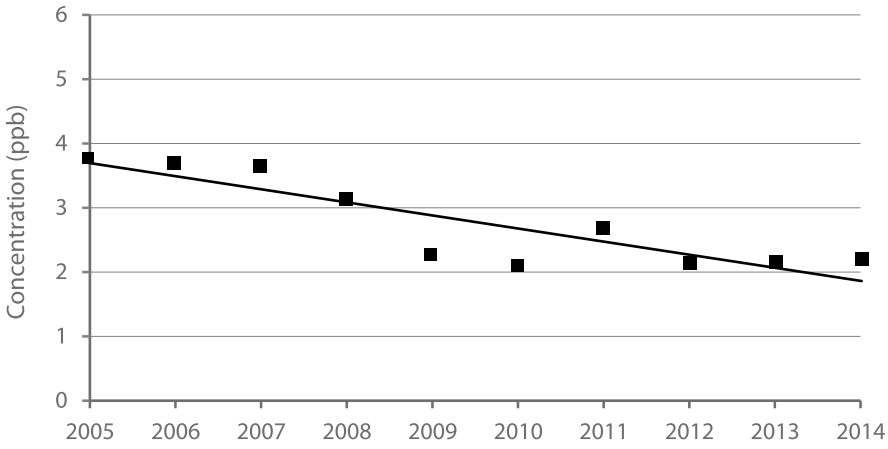
There were no exceedances of the provincial 24-hour and annual AAQC for SO_2 of 100 ppb and 20 ppb, respectively, at any of the monitoring locations in Ontario during 2014. There was one exceedance of the provincial one-hour AAQC for SO_2 of 250 ppb in Sudbury. Hamilton Downtown recorded the highest SO_2 annual mean (5.1 ppb) during 2014, and the highest 24-hour maximum concentration (40 ppb) was recorded at both Hamilton Downtown and Sarnia. Sudbury recorded the highest one-hour maximum concentration (297 ppb) during 2014.

The SO_2 annual mean concentrations from 2005 to 2014 show a decreasing trend of 49 per cent across Ontario in **Figure 11**. Overall, provincial SO_2 emissions have decreased by approximately 50 per cent from 2004 to 2013 as shown in **Figure 12** (NPRI, 2015). The reduction of SO_2 emissions over the years is the result of various initiatives, which include, but are not limited to,

i. Control orders for Ontario smelters;
ii. Countdown Acid Rain program and Canada-wide Acid Rain Strategy
iii. Ontario emissions trading regulations on sulphur dioxide and nitrogen oxides (O. Reg. 397/01 and O. Reg. 194/05);
iv. Cessation of coal use in electricity generation; and
v. Low sulphur content in transportation fuels.

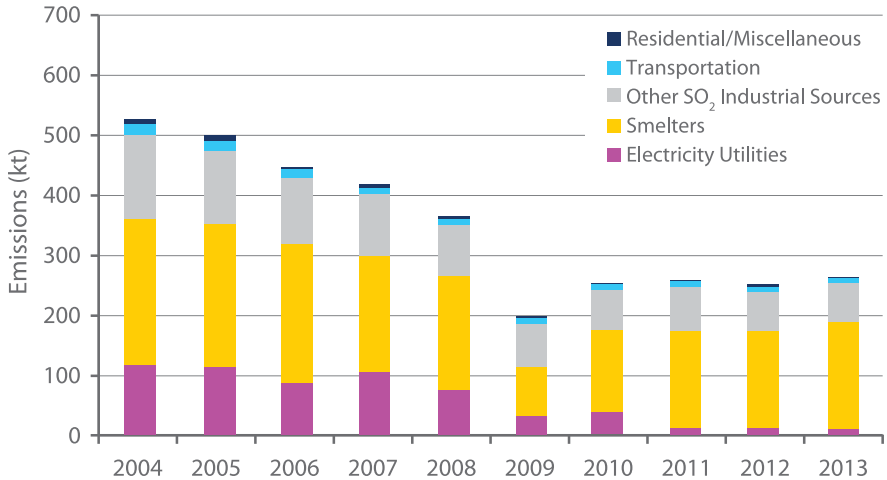
FACT: NO_X and SO_2 electricity sector emissions trading regulation (O. Reg. 397/01) placed limits on Ontario Power Generation's (OPG) fossil fuel-fired generating stations starting 2002. Effective January 1, 2004 the program also applied to independent power producers (IPPs). The trading program was expanded in 2006 to include thirty facilities from seven industrial sectors. NO_X and SO_2 for electricity generators covered under the trading program have fallen by approximately 80% and 98% respectively between 2004 and 2014, largely because of coal closure. NO_X and SO_2 emissions for the industrial facilities regulated under the program have fallen by approximately 29% and 26% between 2006 and 2014. This decline is the result of a combination of factors including emissions reduction initiatives undertaken by facilities covered by the program and industry restructuring

Figure 11:
Trend of SO_2 Annual Means Across Ontario (2005-2014)



Note: 10-year trend is a composite mean based on 10 sites.

Figure 12:
Ontario SO_2 Emissions Trend (2004-2013)



Note: Excludes emissions from open and natural sources.

Carbon Monoxide (CO)

Carbon monoxide is a colourless, odourless, tasteless and, at high concentrations, poisonous gas. This gas can enter the bloodstream and reduce oxygen delivery to the organs and tissues. People with heart disease are particularly sensitive to CO. Exposure to high CO levels is associated with the impairment of vision, work capacity, learning ability and performance of complex tasks. Carbon monoxide is produced primarily by the incomplete combustion of fossil fuels. The 2013 estimates for point, area and transportation sources (excluding emissions from open and natural sources) indicate that the transportation sector accounted for 70 per cent of all CO emissions (NPRI, 2015).

In 2014 there were no exceedances of the provincial one-hour and eight-hour AAQC of 30 ppm and 13 ppm, respectively, at any of the monitoring locations in Ontario. Hamilton Downtown recorded the highest one-hour CO maximum of 2.88 parts per million (ppm) and Toronto West recorded the highest eight-hour maximum (1.07 ppm). Typically, higher CO concentrations are recorded in urban centres attributable to vehicle emissions.

The composite means of the one-hour and eight-hour CO maximums have decreased 40 per cent and 42 per cent, respectively, across the province from 2005 to 2014. Carbon monoxide emissions have been reduced by approximately 38 per cent from 2004 to 2013 (NPRI, 2015).

5.0 Canadian Ambient Air Quality Standards

In May of 2013 the federal government published the Canadian Ambient Air Quality Standards (CAAQS) as non-binding objectives under the Canadian Environmental Protection Act. The CAAQS were developed under the auspices of the Canadian Council of Ministers of the Environment (CCME) as outdoor air quality targets that "set the bar" for air quality actions across the country.

The CAAQS replaced the existing Canada-wide Standards (CWS) for ozone and $PM_{2.5}$ in 2013 by setting stricter targets, and introducing an annual standard for $PM_{2.5}$. An annual standard helps protect human health from long-term or chronic exposure to fine particles. The purpose of the CAAQS is to drive continuous improvement in air quality. Ontario's ambient air quality will be compared to the new standards for the first time in 2015. **Table 5.1** shows the standards for the 2015 target date for achieving the CAAQS.

Table 5.1:
CCME Standards

Type	Ozone 8h	$PM_{2.5}$ 24h	$PM_{2.5}$ Annual
CAAQS	63 ppb[(1)]	28 µg/m^3 [(2)]	10 µg/m^3 [(3)]

[(1)] based on the annual 4th highest daily maximum eight-hour running average, averaged over three consecutive years.

[(2)] based on the 98th percentile measurement annually, averaged over three consecutive years.

[(3)] based on the annual mean averaged over three consecutive years.

Table 5.2 displays the ozone and $PM_{2.5}$ CAAQS metric values for CAAQS designated Ontario sites for 2014 (based on a three-year average, 2012-2014). The 2014 ozone CAAQS metric values ranged from 54 ppb reported for Thunder Bay to 73 ppb reported for Windsor Downtown. Only two of the 21 designated sites, Ottawa and Thunder Bay, met the CAAQS of 63 ppb for ozone in 2014. The 2014 24-hour $PM_{2.5}$ CAAQS metric values ranged from 14 µg/m^3 reported for both Sudbury and Thunder Bay to 25 µg/m^3 reported for Hamilton Downtown. The 2014 annual $PM_{2.5}$ CAAQS metric concentrations ranged from 5.2 µg/m^3 reported for Sudbury to 9.7 µg/m^3 reported for Hamilton Downtown. There were no exceedances of either $PM_{2.5}$ CAAQS in 2014 at any of the 21 CAAQS designated sites.

Table 5.2:
Ozone and $PM_{2.5}$ CAAQS Metric Values for Designated Sites Across Ontario (2014)

City/Town	8h Ozone ppb	24h $PM_{2.5}$ µg/m^3	Annual $PM_{2.5}$ µg/m^3
Windsor Downtown	73	21	8.9
Chatham	71	18	7.6
London	71	21	8.1
Brantford	70	21	8.0
Kitchener	68	22	8.0
Guelph	69	20	7.6
St. Catharines	67	19	7.9
Hamilton Downtown	65	25	9.7
Hamilton Mountain	69	22	8.4
Burlington	68	22	8.2
Oakville	68	20	7.5
Mississauga	66	21	7.5
Brampton	68	21	7.7
Toronto	69	21	8.1
Oshawa	65	18	6.9
Barrie	64	19	6.9
Peterborough	67	17	6.4
Kingston	70	19	6.7
Ottawa Downtown	59	18	6.3
Sudbury	64	14	5.2
Thunder Bay	54	14	5.7

Note:

Designated sites include communities with populations greater than 100,000.

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

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

The CAAQS for annual $PM_{2.5}$ is based on the annual mean averaged over three consecutive years.

Toronto reporting is based on Toronto Downtown, Toronto North, Toronto East and Toronto West stations.

Red font indicates an exceedance of the CAAQS.

Outdoor concentrations of ozone and $PM_{2.5}$ can be influenced by emission sources that are outside the control of provinces and territories, such as trans-boundary flows and exceptional events including forest fires. *The Guidance Document on Achievement Determination for the Canadian Ambient Air Quality Standards for Fine Particulate Matter and Ozone (2012)* guides provinces and territories in the consideration of transboundary flows and exceptional events when implementing management actions, and in conveying to the public that a standard was not achieved as a result of these influences.

To demonstrate the influence of transboundary flows, a preliminary weight of evidence (WOE) analysis was conducted for selected sites, Windsor Downtown, Toronto, Sudbury and Kitchener, where the ozone CAAQS was exceeded in 2014. A comprehensive network-wide assessment of transboundary influence using WOE will be completed for 2015, the first year that achievement will be assessed relative to the CAAQS. The WOE approach consists of performing, evaluating and documenting a series of technical analyses that collectively support the conclusion that exceedances of the standard using WOE on a given day were influenced by, in this case, transboundary flows. **Table 5.3a** shows the 2014 ozone CAAQS metric values including and excluding transboundary flow days for Windsor Downtown, Toronto, Sudbury and Kitchener. The WOE approach confirms that these four Ontario cities listed in **Table 5.3a** would have met the ozone CAAQS if they had not been influenced by days with transboundary flow. **Table 5.3b** displays the number of transboundary flow days that were removed for each of the four sites using WOE.

Table 5.3a:
Ozone CAAQS Metric Values Using the Weight of Evidence Approach (2014)

City	Transboundary Flow Days	4th Highest Daily Max 8h Running Average			3y CAAQS Metric Value
		2012	2013	2014	
Windsor Downtown	included	82.9	68.0	69.3	73
	excluded	62.3	57.4	60.0	60
Toronto	included	76.3	67.2	64.0	69
	excluded	53.8	62.0	57.4	58
Sudbury	included	72.8	60.8	59.0	64
	excluded	52.3	60.8	59.0	57
Kitchener	included	73.5	65.6	64.9	68
	excluded	58.5	54.6	55.8	56

Note:
Ozone concentrations reported in ppb.
Red font indicates an exceedance of the CAAQS.

Table 5.3b:
Number of Transboundary Flow Days Removed by Year

City/Town	2012	2013	2014
Windsor Downtown	40	17	15
Toronto	43	4	7
Sudbury	27	0	0
Kitchener	30	19	15

Transboundary influences, mainly from the U.S., account for approximately half of Ontario's smog on high concentration days. Emission reductions in Ontario and the U.S. have contributed to decreases in $PM_{2.5}$ and ozone precursors. However, while outdoor concentrations have improved, the province continues to experience high levels of ozone due to transboundary air pollution which can result in exceedances of the ozone standard. It is therefore important to consider the influence of transboundary flows using WOE for each CAAQS designated monitoring station when reporting on achievement of the CAAQS.

6.0 Air Quality Index and Smog Advisories

Ontario Air Quality Index (AQI)

The Air Quality Office of the Environmental Monitoring and Reporting Branch continuously collects near real-time data for criteria pollutants from 40 AQI sites as displayed in Map A1 of the Appendix. The AQI, based on pollutants that have adverse effects on human health and the environment, includes O_3, $PM_{2.5}$, NO_2, SO_2, CO and TRS compounds. At the end of each hour, the concentration of each pollutant measured at each site is converted into a number ranging from zero upwards using a common scale or index. The calculated number for each pollutant is a sub-index value. At a given air monitoring site, the highest sub-index value for any given hour becomes the reporting AQI for that hour. The index is a relative scale, in that the lower the index, the better the air quality. Index values between 0 and 15 are very good, 16-31 good, 32-49 moderate, 50-99 poor, and 100+ are very poor. The ministry web site, www.airqualityontario.com, provides index values, corresponding categories, and potential health and environmental effects.

Based on the AQI categories, in 2014, Ontario reported very good to good air quality 94 per cent of the time, and moderate to poor air quality 6 per cent of the time. **Table A19** of the Appendix provides the percentage distribution of hourly AQI readings for each of the 40 monitoring sites by AQI category and the number of poor air quality days.

Smog Advisories

Smog advisories are issued to the public in advance when AQI values are expected to be in the poor category due to elevated, widespread and persistent levels, generally 3 or more hours in duration. Smog advisories are typically issued for elevated levels of O_3 and/or $PM_{2.5}$ but can be issued for other pollutants. Smog advisories are usually issued 24 hours in advance; however, if elevated smog conditions occur suddenly, and weather conditions conducive to elevated smog levels are expected to continue for several hours, a smog advisory is issued effective immediately. Note that a smog advisory is a forecast and does not necessarily mean elevated smog is a certainty since it is based on weather forecasts.

Smog advisories are issued via the ministry's web site, and through email notification as per the Smog Alert Network. (To receive a direct email notification of a smog advisory, visit the ministry web site and subscribe to the Smog Alert Network).

2014 was the first time since the start of the program in 1993 that no smog advisories were issued in Ontario. This can be attributed to reductions in both emissions and pollutant concentrations, along with a relatively cool summer in 2014. **Table A20** of the Appendix summarizes the number of smog advisories issued for Ontario from 2005 to 2014.

Access to Air Quality Information

Near real-time and historic pollutant concentration data and index values are available to the public (24 hours per day, 7 days a week) from across the province on the ministry's web site. The public can also access index values via the Interactive Voice Response (IVR) system. (To access an English recording, call 1.800.387.7768, or in Toronto, call 416.246.0411. For a French recording, call 1.800.221.8852). The ministry's web site also provides daily air quality forecasts, based on regional meteorological conditions and current pollution levels in Ontario and bordering U.S. states.

Federal Air Quality Health Index (AQHI)

In September 2006, Health Canada proposed the AQHI, an air quality health index that derives a value based on the cumulative health effects of three pollutants – O_3, $PM_{2.5}$ and NO_2. It is being developed and implemented by Health Canada with the assistance of Environment Canada and all provinces. The AQHI for Canada informs the public about health risks associated with air quality and encourages the public to make their own decisions or modify their behaviour depending on how they are individually affected by air quality.
In 2007, the ministry began participating in the development of the national AQHI by providing Environment Canada with air quality data for a pilot program taking place in the Greater Toronto Area (GTA) including Burlington, Oakville, Mississauga, Brampton, Newmarket, Toronto and Oshawa.
This pilot program was then expanded over the years to include Windsor, London, Hamilton, St. Catharines, Peterborough, Kingston, Ottawa, Barrie, Dorset and Sault Ste. Marie.

In 2014, the ministry established an AQHI Steering Committee, which includes representatives from the Ministry of Health and Long-Term Care (MOHLTC) and the federal government (Health Canada and Environment Canada), to determine the best path forward for reporting air quality in the province.
The ministry intends to implement the AQHI across Ontario in 2015 by combining the best features of the AQI and the federal AQHI to report on air quality and associated health information for Ontarians. For more information on the federal AQHI, please visit www.airhealth.ca.

Glossary

Air Quality Index - real-time information system that provides the public with an indication of air quality in cities, towns and in rural areas across Ontario.

AQI 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.

Annual mean - the average value of hourly data for a given year.

Carbon monoxide - a colourless, odourless, tasteless, and at high concentrations, poisonous gas.

Continuous pollutants - pollutants for which a continuous record exists; effectively, pollutants that have hourly data (maximum 8,760 values per year except leap year – e.g. 2004 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.

Exceedance - violation of the air pollutant concentration levels established by environmental protection criteria or other environmental standards.

Fine Particulate Matter - particles smaller than 2.5 micrometres in aerodynamic diameter, which arise mainly from fuel combustion, condensation of hot vapours and chemically-driven gas-to-particle conversion processes; also referred to as $PM_{2.5}$ or respirable particles. 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.

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.

Micrometre - a millionth of a metre.

Nitrogen dioxide - a reddish-brown gas with a pungent and irritating odour.

Glossary

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.

Percentile value - percentage of the data set that is equal to or lies below the stated value; if the 70 percentile value is 0.10 ppm, then 70 per cent of the data are equal to or below 0.10 ppm.

Primary pollutant - pollutant emitted directly to the atmosphere.

Secondary pollutant - pollutant formed from other pollutants in the atmosphere.

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

Smog advisory - smog advisories are issued to the public when there is a strong likelihood that widespread, elevated and persistent smog levels are expected.

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.

Sulphur dioxide - a colourless gas that smells like burnt matches.

Troposphere - atmospheric layer extending from the surface up to about 10 kilometres above the Earth's surface.

Acronyms

AAQC	Ambient Air Quality Criteria (Ontario)
AQI	Air Quality Index
CO	carbon monoxide
CAAQS	Canadian Ambient Air Quality Standard
IVR	Interactive Voice Response
NO	nitric oxide
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
O_3	ozone
$PM_{2.5}$	fine particulate matter
SHARP	Synchronized Hybrid Ambient Real-time Particulate
SO_2	sulphur dioxide
TEOM	Tapered Element Oscillating Microbalance
TRS	total reduced sulphur
VOCs	volatile organic compounds
WOE	weight of evidence
kt	kilotonnes
$\mu g/m^3$	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

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Air Quality in Ontario

2014 Appendix

The **Appendix** is intended for use in conjunction with the *2014 Annual Air Quality in Ontario Report.* The Appendix briefly describes the provincial Air Quality Index (AQI) network, quality assurance and quality control procedures, and the Ministry of the Environment and Climate Change's 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 pollutants are displayed for 10- and 20-year periods.

Monitoring Network Operations

Network Description

In 2014, the Environmental Monitoring and Reporting Branch (EMRB) operated 40 ambient air monitoring sites across Ontario as part of the AQI network. Monitoring site locations for the AQI network are illustrated in **Map A1.** The AQI network was comprised of 134 continuous monitoring instruments at 40 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 EMRB 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 in order 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 bi-monthly 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 in an effort 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:

- Ozone – TE49C/I
- Fine Particulate Matter – SHARP 5030
- Nitrogen Oxides – TE42C/I
- Carbon Monoxide – TE48C/I
- Total Reduced Sulphur – TE43C/CDN101
- Sulphur Dioxide – TE43C/I

EMRB 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 Canada. The secondary transfer standards used by station operators are referenced and certified to EMRB's NIST primary standards on a quarterly basis.

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 EMRB 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 2014 ambient air quality monitoring network had greater than 98 per cent 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). 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 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 O_3, $PM_{2.5}$, $NO/NO_2/NO_x$, CO, SO_2 and TRS compounds. A valid annual mean requires at least 6,570 hourly readings. In addition, the 2nd and 3rd quarters of the year should have 75 per cent valid data for ozone, whereas for $PM_{2.5}$, each quarter of the year should have 75 per cent valid data.

Network Descriptive Table, Annual Statistics and Trends

The AQI network for 2014 is summarized in **Table A1.** 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.

Table A1 also identifies the type of air monitoring site: ambient, road-side, 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 within approximately 100 m of a major roadway with daily traffic volumes greater than 10,000 vehicles per day.

The 2014 statistical data and 10-year trends for various continuous pollutants are provided in **Tables A2-A9**, and **Tables A10-A18,** respectively. To be included in the 10-year trend analysis, a site must have valid annual means for a minimum of 8 years over the 10-year period from 2005-2014. The 20-year trends for ozone, NO_2 and SO_2 are provided in **Figures A1-A27, Figures A28-A43,** and **Figures A44-A51,** respectively. To be included in the 20-year trend analysis, a site must have valid annual means for a minimum of 15 years over the 20-year period from 1995-2014. A linear regression was applied to each of the 20-year trends presented to calculate the per cent change in concentrations over time.

Map A1: Air Quality Index (AQI) Monitoring Sites Across Ontario in 2014

Table A1: 2014 Ontario Continuous Ambient Air Monitoring Network

ID	STATION NAME	STATION LOCATION	YEAR	LATITUDE (D:M:S)	LONGITUDE (D:M:S)	AIR INTAKE (AGL)	TYPE	AQI	O_3	$PM_{2.5}$	NO_2	SO_2	CO	TRS
12008	Windsor Downtown	467 University Ave. W.	1969	42°18'56.8"	-83°02'37.2"	8	A/RS/C/N	Y	T	T	T	T	T	.
12016	Windsor West	College Ave./South St.	1975	42°17'34.4"	-83°04'23.3"	4	A/N	Y	T	T	T	T	.	T
13001	Chatham	435 Grand Ave. W.	2005	42°24'13.3"	-82°12'29.9"	15	A/C/N	Y	T	T	T	.	.	.
14064	Sarnia	Front St. N./Cn Tracks, Centennial Park	1978	42°58'56.2"	-82°24'18.3"	3	A/N	Y	T	T	T	T	.	T
15020	Grand Bend	Point Blake Conservation Area	1991	43°19'59.1"	-81°44'34.4"	5	A/N	Y	T	T	T	.	.	.
15026	London	42 St. Julien St.	2013	42°58'28.1"	-81°12'03.1"	5	A/C/N	Y	T	T	T	.	.	.
16015	Port Stanley	43665 Dexter Line, Elgin Water T. Plant	2002	42°40'19.5"	-81°09'46.4"	5	A/N	Y	T	T	.	.	.	.
18007	Tiverton	4Th Concession/ Bruce Rd. 23	1979	44°18'52.1"	-81°32'59.0"	4	A/N	Y	T	T	T	.	.	.
21005	Brantford	324 Grand River Ave.	2004	43°08'19.0"	-80°17'33.5"	5	A/C/N	Y	T	T	T	.	.	.
26060	Kitchener	West Ave./ Homewood Ave.	1990	43°26'37.8"	-80°30'13.7"	5	A/C/N	Y	T	T	T	.	.	.
27067	St. Catharines	Argyle Cres., Pump Stn.	1987	43°09'36.2"	-79°14'05.1"	4	A/C/N	Y	T	T	T	.	.	.
28028	Guelph	Exhibition St./Clark St. W.	2000	43°33'05.8"	-80°15'51.0"	4	A/C/N	Y	T	T	T	.	.	.
29000	Hamilton Downtown	Elgin St./Kelly St.	1987	43°15'28.0"	-79°51'42.0"	4	A/RS/C/N	Y	T	T	T	T	T	T
29114	Hamilton Mountain	Vickers Rd./E. 18Th St.	1985	43°13'45.9"	-79°51'46.0"	3	A/C/N	Y	T	T	T	T	.	.
29118	Hamilton West	Main St. W./Hwy 403	1985	43°15'26.8"	-79°54'27.9"	3	A/RS	Y	T	T	T	.	.	.
31103	Toronto Downtown	Bay St./Wellesley St. W.	2000	43°39'46.7"	-79°23'17.2"	10	A/RS/C/N	Y	T	T	T	.	.	.
33003	Toronto East	Kennedy Rd./ Lawrence Ave. E.	1970	43°44'52.5"	-79°16'26.6"	4	A/RS/C/N	Y	T	T	T	.	.	.
34020	Toronto North	Hendon Ave./Yonge St.	1988	43°46'53.8"	-79°25'03.8"	5	A/RS/C/N	Y	T	T	T	.	.	.
35125	Toronto West	125 Resources Rd.	2003	43°42'34.0"	-79°32'36.6"	8	A/RS/C/N	Y	T	T	T	T	T	.
44008	Burlington	North Shore Blvd. E./ Lakeshore Rd.	1979	43°18'54.4"	-79°48'09.5"	5	A/C/N	Y	T	T	T	.	.	.
44017	Oakville	Eighth Line/Glenashton Dr., Halton Reservoir	2003	43°29'12.9"	-79°42'08.2"	12	A/C/N	Y	T	T	T	.	.	.
45026	Oshawa	2000 Simcoe St. N., Durham College	2005	43°56'45.4"	-78°53'41.7"	7	A/RS/C/N	Y	T	T	T	.	.	.
46089	Brampton	525 Main St. N., Peel Manor	2000	43°41'55.5"	-79°46'51.3"	5	A/C/N	Y	T	T	T	.	.	.
46108	Mississauga	3359 Mississauga Rd. N., U Of T Mississauga	2007	43°32'49.1"	-79°39'31.3"	5	A/C/N	Y	T	T	T	T	.	.

Table A1: 2014 Ontario Continuous Ambient Air Monitoring Network (continued)

ID	STATION NAME	STATION LOCATION	YEAR	LATITUDE (D:M:S)	LONGITUDE (D:M:S)	AIR INTAKE (AGL)	TYPE	AQI	O_3	$PM_{2.5}$	NO_2	SO_2	CO	TRS
47045	Barrie	83 Perry St.	2001	44°22'56.5"	-79°42'08.3"	5	A/C/N	Y	T	T	T	.	.	.
48006	Newmarket	Eagle St. W./ Mccaffrey Rd.	2001	44°02'39.5"	-79°28'59.7"	5	A/N	Y	T	T	T	.	.	.
49005	Parry Sound	7 Bay St.	2001	45°20'16.3"	-80°02'17.4"	5	A/N	Y	T	T	T	.	.	.
49010	Dorset	1026 Bellwood Acres Rd.	1981	45°13'27.4"	-78°55'58.6"	3	A/N	Y	T	T	.	.	.	.
51001	Ottawa Downtown	Rideau St./ Wurtemburg St.	1971	45°26'03.6"	-75°40'33.6"	4	A/C/N	Y	T	T	T	T	T	.
51002	Ottawa Central	960 Carling Ave.	2007	45°22'57.1"	-75°42'51.1"	5	A/N	Y	T	T	T	.	.	.
51010	Petawawa	Petawawa Research Forest Facility	2007	45°59'48.2"	-77°26'28.3"	6	A/N	Y	T	T	.	.	.	.
52023	Kingston	23 Beechgrove Lane	2014	44°13'11.5"	-76°31'16.1"	5	A/C/N	Y	T	T	T	.	.	.
54012	Belleville	2 Sidney St., Water Treatment Plant	2002	44°09'01.9"	-77°23'43.8"	10	A/N	Y	T	T	T	.	.	.
56010	Morrisburg	County Rd. 2, Morrisburg Water Tower	2005	44°53'59.1"	-75°11'23.8"	5	A/N	Y	T	T	.	.	.	.
56051	Cornwall	Bedford St./3Rd St. W.	1970	45°01'04.7"	-74°44'06.8"	4	A/N	Y	T	T	T	.	.	.
59006	Peterborough	10 Hospital Dr.	1998	44°18'06.9"	-78°20'46.4"	10	A/C/N	Y	T	T	T	.	.	.
63203	Thunder Bay	421 James St. S.	2004	48°22'45.8"	-89°17'24.6"	15	A/RS/C/N	Y	T	T	T	.	.	.
71078	Sault Ste. Marie	Sault College	2004	46°31'59.5"	-84°18'35.7"	8	A/N	Y	T	T	T	T	.	T
75010	North Bay	Chippewa St. W., Dept. National Defence	1979	46°19'23.5"	-79°26'57.4"	4	A/RS/N	Y	T	T	T	.	.	.
77233	Sudbury	155 Elm St.	2013	46°29'31.0"	-81°00'11.2"	3	A/C/N	Y	T	T	T	T	.	.
TOTAL								**40**	**40**	**40**	**36**	**10**	**4**	**4**

Notes:
ID - station identfication 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 = CAAQS, N = NAPS
AQI - Air Quality Index site
T - telemetry
O_3 - ground-level ozone
$PM_{2.5}$ - fine particulate matter
NO_2 - nitrogen dioxide
CO - carbon monoxide
SO_2 - sulphur dioxide
TRS - total reduced sulphur

Table A2: 2014 Ozone (O_3) Annual Statistics

Unit: parts per billion (ppb)
O_3 1h AAQC: 80 ppb

ID	City	Location	PERCENTILES								Maximum		No. of Times Above Criterion
			Valid h	10%	30%	50%	70%	90%	99%	Mean	1h	24h	1h
12008	Windsor Downtown	467 University Ave. W.	8568	8	18	25	33	44	65	26.0	78	53	0
12016	Windsor West	College Ave./South St.	8490	8	19	26	34	46	66	27.2	86	52	3
13001	Chatham	435 Grand Ave. W.	8745	14	22	28	35	46	62	29.3	78	53	0
14064	Sarnia	Front St. N./CN Tracks, Centennial Park	8649	11	20	27	33	43	61	27.1	79	49	0
15020	Grand Bend	Point Blake Conservation Area	8664	16	25	31	37	45	64	31.0	90	57	4
15026	London	42 St. Julien St.	8663	9	21	28	35	45	62	28.1	82	61	1
16015	Port Stanley	43665 Dexter Line, Elgin Water T. Plant	8696	17	26	32	38	48	64	32.3	87	60	3
18007	Tiverton	4th Concession/Bruce Rd. 23	8599	18	26	32	37	44	61	31.8	86	60	1
21005	Brantford	324 Grand River Ave.	8499	10	22	30	36	47	62	29.4	80	59	0
26060	Kitchener	West Ave./Homewood Ave.	8728	11	21	28	34	43	59	27.3	76	57	0
27067	St. Catharines	Argyle Cres., Pump Stn.	8674	11	23	29	35	43	58	28.5	70	55	0
28028	Guelph	Exhibition St./Clark St. W.	8626	11	21	28	34	44	60	27.8	79	57	0
29000	Hamilton Downtown	Elgin St./Kelly St.	8671	9	19	25	31	41	59	25.3	74	56	0
29114	Hamilton Mountain	Vickers Rd./E. 18th St.	8656	13	23	29	35	45	61	29.1	79	61	0
29118	Hamilton West	Main St. W./Hwy 403	8739	4	16	24	30	38	52	22.7	70	52	0
31103	Toronto Downtown	Bay St./Wellesley St. W.	8710	10	19	25	32	42	57	25.7	80	55	0
33003	Toronto East	Kennedy Rd./Lawrence Ave. E.	8660	6	17	23	30	40	55	23.4	73	52	0
34020	Toronto North	Hendon Ave./Yonge St.	8696	9	18	25	31	41	58	25.3	82	57	1
35125	Toronto West	125 Resources Rd.	8673	3	13	20	27	39	56	21.1	72	48	0
44008	Burlington	North Shore Blvd. E./Lakeshore Rd.	8679	9	19	26	32	41	57	25.5	73	50	0
44017	Oakville	Eighth Line/Glenashton Dr., Halton Res.	8736	11	21	27	34	43	57	27.2	72	56	0
45026	Oshawa	2000 Simcoe St. N., Durham College	8664	11	20	27	34	42	57	27.2	73	46	0

Table A2: 2014 Ozone (O_3) Annual Statistics (continued)

Unit: parts per billion (ppb)
O_3 1h AAQC: 80 ppb

ID	City	Location	PERCENTILES								Maximum		No. of Times Above Criterion
			Valid h	10%	30%	50%	70%	90%	99%	Mean	1h	24h	1h
46089	Brampton	525 Main St. N., Peel Manor	8657	8	19	27	34	43	58	26.5	80	60	0
46108	Mississauga	3359 Mississauga Rd. N., U of T Campus	8653	7	18	26	32	42	57	25.4	76	58	0
47045	Barrie	83 Perry St.	8733	9	19	25	32	41	53	25.6	68	49	0
48006	Newmarket	Eagle St. W./McCaffrey Rd.	8690	13	22	29	35	44	58	28.6	87	59	3
49005	Parry Sound	7 Bay St.	8740	15	24	30	35	43	56	29.6	74	60	0
49010	Dorset	1026 Bellwood Acres Rd.	8728	11	22	28	34	43	54	27.7	79	56	0
51001	Ottawa Downtown	Rideau St./Wurtemburg St.	8541	10	18	25	31	40	50	24.8	64	50	0
51002	Ottawa Central	960 Carling Ave.	8683	11	20	27	33	41	53	26.6	63	48	0
51010	Petawawa	Petawawa Research Forest Facility	8733	11	21	28	33	41	52	26.8	68	50	0
52023	Kingston	23 Beechgrove Lane	8686	16	26	31	37	46	61	31.4	81	57	1
54012	Belleville	2 Sidney St., Water Treatment Plant	8746	14	24	29	36	45	60	29.6	80	57	0
56010	Morrisburg	County Rd. 2, Morrisburg Water Tower	8750	12	22	29	34	42	53	27.9	74	48	0
56051	Cornwall	Bedford St./3rd St. W.	8646	12	21	28	33	42	52	27.3	70	49	0
59006	Peterborough	10 Hospital Dr.	8708	14	23	29	35	44	59	29.2	74	60	0
63203	Thunder Bay	421 James St. S.	8442	7	18	25	30	36	46	23.4	70	47	0
71078	Sault Ste. Marie	Sault College	8676	14	22	28	34	43	55	28.4	73	54	0
75010	North Bay	Chippewa St. W., Dept. National Defence	8575	10	20	28	33	41	54	26.7	71	53	0
77233	Sudbury	155 Elm St.	8671	11	20	27	32	41	55	26.3	73	56	0

Table A3: 2014 Fine Particulate Matter ($PM_{2.5}$) Annual Statistics

Unit: micrograms per cubic metre (µg/m^3)
$PM_{2.5}$ 24h Reference Level: 28 µg/m^3

ID	City	Location	PERCENTILES								Maximum		No. of Times Above Reference Level
			Valid h	10%	30%	50%	70%	90%	99%	Mean	1h	24h	24h
12008	Windsor Downtown	467 University Ave. W.	8624	4	6	9	12	19	31	10.1	71	29	1
12016	Windsor West	College Ave./South St.	8726	4	6	9	13	20	34	10.7	84	31	3
13001	Chatham	435 Grand Ave. W.	8562	3	5	7	10	16	28	8.6	51	34	1
14064	Sarnia	Front St. N./CN Tracks, Centennial Park	8653	3	5	7	10	18	33	9.0	105	41	1
15020	Grand Bend	Point Blake Conservation Area	8654	2	4	6	9	17	31	8.1	72	28	0
15026	London	42 St. Julien St.	8581	3	5	7	10	16	34	8.8	58	30	2
16015	Port Stanley	43665 Dexter Line, Elgin Water T. Plant	8182	2	5	7	10	16	29	8.2	48	34	1
18007	Tiverton	4th Concession/Bruce Rd. 23	8581	2	3	5	8	13	24	6.5	40	27	0
21005	Brantford	324 Grand River Ave.	8688	3	5	7	10	18	34	9.2	60	29	1
26060	Kitchener	West Ave./Homewood Ave.	8488	3	5	7	11	18	36	9.3	64	32	7
27067	St. Catharines	Argyle Cres., Pump Stn.	8681	3	5	7	10	16	29	8.8	65	29	1
28028	Guelph	Exhibition St./Clark St. W.	8572	3	5	7	10	17	37	8.9	64	37	6
29000	Hamilton Down-town	Elgin St./Kelly St.	8718	3	6	9	13	21	38	10.8	78	45	5
29114	Hamilton Mountain	Vickers Rd./E. 18th St.	8704	3	5	8	11	19	35	9.4	61	32	1
29118	Hamilton West	Main St. W./Hwy 403	8732	3	5	8	11	19	37	9.9	86	46	4
31103	Toronto Downtown	Bay St./Wellesley St. W.	8720	3	5	7	10	17	31	8.7	52	33	3
33003	Toronto East	Kennedy Rd./Lawrence Ave. E.	8687	3	5	7	10	17	34	8.9	60	33	3
34020	Toronto North	Hendon Ave./Yonge St.	8609	3	5	7	11	17	34	9.2	58	33	2
35125	Toronto West	125 Resources Rd.	8685	3	5	7	10	17	35	9.1	65	35	4
44008	Burlington	North Shore Blvd. E./ Lakeshore Rd.	8704	3	5	8	11	18	35	9.6	64	42	4
44017	Oakville	Eighth Line/Glenashton Dr., Halton Res.	8727	3	5	7	10	16	32	8.5	69	36	5
45026	Oshawa	2000 Simcoe St. N., Durham College	8676	2	4	6	9	15	28	7.7	47	27	0

Table A3: 2014 Fine Particulate Matter ($PM_{2.5}$) Annual Statistics (continued)

Unit: micrograms per cubic metre (µg/m^3)
$PM_{2.5}$ 24h Reference Level: 28 µg/m^3

ID	City	Location	PERCENTILES								Maximum		No. of Times Above Reference Level
			Valid h	10%	30%	50%	70%	90%	99%	Mean	1h	24h	24h
46089	Brampton	525 Main St. N., Peel Manor	8675	3	5	7	10	18	35	8.9	85	42	5
46108	Mississauga	3359 Mississauga Rd. N., U of T Campus	8715	3	5	7	10	16	34	8.7	62	40	5
47045	Barrie	83 Perry St.	8715	2	4	6	9	16	29	7.6	50	29	1
48006	Newmarket	Eagle St. W./McCaffrey Rd.	8711	1	3	6	9	15	30	7.3	59	30	1
49005	Parry Sound	7 Bay St.	8416	2	3	5	7	11	20	5.8	43	25	0
49010	Dorset	1026 Bellwood Acres Rd.	8618	1	3	4	6	11	20	5.3	41	20	0
51001	Ottawa Downtown	Rideau St./Wurtemburg St.	8622	2	4	6	8	14	27	7.0	80	27	0
51002	Ottawa Central	960 Carling Ave.	8441	2	4	5	8	13	28	6.8	45	27	0
51010	Petawawa	Petawawa Research Forest Facility	8700	2	3	4	5	9	16	4.7	34	17	0
52023	Kingston	23 Beechgrove Lane	8675	2	4	5	8	13	24	6.8	52	30	1
54012	Belleville	2 Sidney St., Water Treatment Plant	8722	2	4	6	8	13	24	6.8	43	23	0
56010	Morrisburg	County Rd. 2, Morrisburg Water Tower	8633	2	4	6	8	13	25	7.0	56	33	1
56051	Cornwall	Bedford St./3rd St. W.	8699	2	4	6	8	13	26	7.0	58	31	1
59006	Peterborough	10 Hospital Dr.	8637	2	4	5	8	14	24	6.9	61	29	1
63203	Thunder Bay	421 James St. S.	8253	2	3	5	8	13	25	6.6	48	21	0
71078	Sault Ste. Marie	Sault College	8624	2	3	5	7	12	21	6.0	51	17	0
75010	North Bay	Chippewa St. W., Dept. National Defence	8616	2	3	4	6	10	20	5.3	43	18	0
77233	Sudbury	155 Elm St.	8693	2	3	5	7	12	22	6.0	60	24	0

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

Table A4: 2013 Nitric Oxide (NO) Annual Statistics

Unit: parts per billion (ppb)

ID	City	Location		PERCENTILES							Maximum	
			Valid h	10%	30%	50%	70%	90%	99%	Mean	1h	24h
12008	Windsor Downtown	467 University Ave. W.	8685	0	1	2	3	9	46	4.0	158	50
12016	Windsor West	College Ave./South St.	8269	0	1	1	3	8	42	3.8	264	37
13001	Chatham	435 Grand Ave. W.	8731	0	0	1	1	4	15	1.5	64	13
14064	Sarnia	Front St. N./CN Tracks, Centennial Park	8598	0	0	1	1	5	24	1.9	142	35
15020	Grand Bend	Point Blake Conservation Area	8704	0	0	0	0	1	4	0.2	11	3
15026	London	42 St. Julien St.	8666	0	0	0	1	2	20	1.3	101	29
18007	Tiverton	4th Concession/Bruce Rd. 23	8623	0	0	0	1	3	10	1.3	38	10
21005	Brantford	324 Grand River Ave.	8479	0	0	0	0	2	15	0.9	76	14
26060	Kitchener	West Ave./Homewood Ave.	8728	0	0	0	1	2	26	1.6	144	56
27067	St. Catharines	Argyle Cres., Pump Stn.	8677	0	0	1	1	3	21	1.7	105	29
28028	Guelph	Exhibition St./Clark St. W.	8626	0	0	0	1	2	20	1.2	106	20
29000	Hamilton Downtown	Elgin St./Kelly St.	8642	0	1	1	3	9	51	3.9	211	71
29114	Hamilton Mountain	Vickers Rd./E. 18th St.	8635	0	0	1	1	4	21	2.0	82	24
29118	Hamilton West	Main St. W./Hwy 403	8661	0	1	2	4	14	66	5.9	227	85
31103	Toronto Downtown	Bay St./Wellesley St. W.	8547	0	0	1	2	6	26	2.5	99	34
33003	Toronto East	Kennedy Rd./Lawrence Ave. E.	8669	1	1	3	5	13	55	6.2	316	91
34020	Toronto North	Hendon Ave./Yonge St.	8709	0	1	2	3	10	42	4.3	231	74
35125	Toronto West	125 Resources Rd.	8546	0	1	4	9	23	87	9.5	282	89
44008	Burlington	North Shore Blvd. E./Lakeshore Rd.	8674	0	1	2	3	10	55	4.6	191	61
44017	Oakville	Eighth Line/Glenashton Dr., Halton Res.	8688	0	1	2	3	7	33	3.4	136	36
45026	Oshawa	2000 Simcoe St. N., Durham College	8734	0	0	1	2	4	20	2.0	93	22
46089	Brampton	525 Main St. N., Peel Manor	8637	0	1	1	2	8	56	4.0	209	54
46108	Mississauga	3359 Mississauga Rd. N., U of T Campus	8606	0	0	1	1	5	45	2.9	200	59
47045	Barrie	83 Perry St.	8731	1	2	2	2	5	38	3.7	173	25
48006	Newmarket	Eagle St. W./McCaffrey Rd.	8686	0	0	0	1	3	20	1.4	132	31
49005	Parry Sound	7 Bay St.	8730	0	0	0	0	1	9	0.6	51	5
51001	Ottawa Downtown	Rideau St./Wurtemburg St.	8677	0	1	1	2	4	16	1.9	88	12
51002	Ottawa Central	960 Carling Ave.	8683	0	0	0	1	2	16	1.0	84	19
52023	Kingston	23 Beechgrove Lane	8684	0	0	0	1	2	7	0.8	78	12
54012	Belleville	2 Sidney St., Water Treatment Plant	8744	0	0	0	1	3	15	1.2	117	18
56051	Cornwall	Bedford St./3rd St. W.	8638	0	0	1	1	2	20	1.5	171	42
59006	Peterborough	10 Hospital Dr.	8656	0	1	1	2	3	17	1.8	93	28
63203	Thunder Bay	421 James St. S.	8441	1	1	2	3	11	39	4.2	129	28
71078	Sault Ste. Marie	Sault College	8675	1	1	1	2	4	14	2.0	74	9
75010	North Bay	Chippewa St. W., Dept. National Defence	8542	1	1	1	2	4	29	2.6	109	19
77233	Sudbury	155 Elm St.	8666	1	1	2	2	6	38	3.3	168	40

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

Table A5: 2014 Nitrogen Dioxide (NO_2) Annual Statistics

Unit: parts per billion (ppb)
NO_2 1h AAQC: 200 ppb
NO_2 24h AAQC: 100 ppb

ID	City	Location	PERCENTILES								Maximum		No. of Times Above Criteria	
			Valid h	10%	30%	50%	70%	90%	99%	Mean	1h	24h	1h	24h
12008	Windsor Downtown	467 University Ave. W.	8685	5	8	11	16	27	48	14.0	68	42	0	0
12016	Windsor West	College Ave./South St.	8269	3	6	10	14	23	41	11.8	73	37	0	0
13001	Chatham	435 Grand Ave. W.	8718	3	4	5	8	13	27	6.8	51	25	0	0
14064	Sarnia	Front St. N./CN Tracks, Centennial Park	8598	2	4	7	11	20	33	9.0	59	36	0	0
15020	Grand Bend	Point Blake Conservation Area	8704	0	1	2	4	7	14	3.1	41	15	0	0
15026	London	42 St. Julien St.	8667	2	4	5	8	13	33	6.9	53	32	0	0
18007	Tiverton	4th Concession/Bruce Rd. 23	8623	1	1	2	3	5	10	2.7	25	11	0	0
21005	Brantford	324 Grand River Ave.	7694	1	2	4	6	12	29	5.5	51	26	0	0
26060	Kitchener	West Ave./Homewood Ave.	8728	2	3	5	8	14	34	7.0	59	35	0	0
27067	St. Catharines	Argyle Cres., Pump Stn.	8677	2	4	5	8	15	29	7.3	53	27	0	0
28028	Guelph	Exhibition St./Clark St. W.	8626	2	3	5	8	14	36	7.1	54	33	0	0
29000	Hamilton Downtown	Elgin St./Kelly St.	8642	4	7	10	15	24	42	12.4	67	47	0	0
29114	Hamilton Mountain	Vickers Rd./E. 18th St.	8638	3	4	7	10	20	37	9.3	64	35	0	0
29118	Hamilton West	Main St. W./Hwy 403	8661	4	7	10	15	25	42	12.8	66	43	0	0
31103	Toronto Downtown	Bay St./Wellesley St. W.	8548	6	9	12	16	25	44	14.0	65	42	0	0
33003	Toronto East	Kennedy Rd./Lawrence Ave. E.	8669	5	8	12	16	27	50	14.2	89	48	0	0
34020	Toronto North	Hendon Ave./Yonge St.	8708	4	7	11	17	26	45	13.4	69	43	0	0
35125	Toronto West	125 Resources Rd.	8546	6	10	15	20	31	54	17.1	83	51	0	0
44008	Burlington	North Shore Blvd. E./Lakeshore Rd.	8674	3	6	9	13	22	40	10.9	60	38	0	0
44017	Oakville	Eighth Line/Glenashton Dr., Halton Res.	8688	2	4	6	9	17	39	8.2	62	41	0	0
45026	Oshawa	2000 Simcoe St. N., Durham College	8734	2	3	5	8	14	29	6.8	45	27	0	0
46089	Brampton	525 Main St. N., Peel Manor	8637	2	4	7	12	24	46	10.6	66	44	0	0
46108	Mississauga	3359 Mississauga Rd. N., U of T Campus	8605	3	4	7	11	19	40	9.2	73	41	0	0
47045	Barrie	83 Perry St.	8731	2	4	6	8	17	43	8.1	64	30	0	0
48006	Newmarket	Eagle St. W./McCaffrey Rd.	8686	2	3	4	7	14	39	6.8	62	36	0	0
49005	Parry Sound	7 Bay St.	8730	1	1	2	3	7	19	3.3	39	12	0	0
51001	Ottawa Downtown	Rideau St./Wurtemburg St.	8677	2	3	5	8	16	32	7.4	46	25	0	0
51002	Ottawa Central	960 Carling Ave.	8683	1	2	4	6	13	35	6.0	55	27	0	0
52023	Kingston	23 Beechgrove Lane	8684	1	2	3	4	9	22	3.9	45	15	0	0
54012	Belleville	2 Sidney St., Water Treatment Plant	8744	1	2	3	5	10	27	4.5	46	20	0	0
56051	Cornwall	Bedford St./3rd St. W.	8638	1	2	4	6	12	34	5.6	60	36	0	0
59006	Peterborough	10 Hospital Dr.	8656	1	2	4	6	11	31	5.3	43	27	0	0
63203	Thunder Bay	421 James St. S.	8441	2	3	5	9	18	35	7.8	51	27	0	0
71078	Sault Ste. Marie	Sault College	8675	1	2	4	6	12	26	5.3	51	18	0	0
75010	North Bay	Chippewa St. W., Dept. National Defence	8542	1	2	3	5	12	36	5.6	46	25	0	0
77233	Sudbury	155 Elm St.	8666	2	3	5	8	15	42	7.3	58	28	0	0

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

Table A6: 2014 Nitrogen Oxides (NO_x) Annual Statistics

Unit: parts per billion (ppb)

ID	City	Location		PERCENTILES							Maximum	
			Valid h	10%	30%	50%	70%	90%	99%	Mean	1h	24h
12008	Windsor Downtown	467 University Ave. W.	8685	6	9	13	20	35	87	18.0	225	92
12016	Windsor West	College Ave./South St.	8266	4	8	11	17	30	75	15.7	337	74
13001	Chatham	435 Grand Ave. W.	8718	3	4	6	9	16	37	8.2	103	36
14064	Sarnia	Front St. N./CN Tracks, Centennial Park	8598	2	4	8	13	23	51	10.9	201	55
15020	Grand Bend	Point Blake Conservation Area	8704	0	1	2	4	8	16	3.4	47	17
15026	London	42 St. Julien St.	8666	2	4	6	9	16	44	8.3	143	60
18007	Tiverton	4th Concession/Bruce Rd. 23	8623	1	2	3	5	8	14	4.0	41	14
21005	Brantford	324 Grand River Ave.	7694	1	2	4	6	14	41	6.4	109	39
26060	Kitchener	West Ave./Homewood Ave.	8728	2	4	6	9	16	54	8.5	196	91
27067	St. Catharines	Argyle Cres., Pump Stn.	8677	3	4	6	9	18	47	9.1	153	48
28028	Guelph	Exhibition St./Clark St. W.	8626	2	4	6	9	16	52	8.5	154	52
29000	Hamilton Downtown	Elgin St./Kelly St.	8642	5	8	12	17	31	86	16.3	278	118
29114	Hamilton Mountain	Vickers Rd./E. 18th St.	8627	3	5	8	12	24	53	11.3	145	57
29118	Hamilton West	Main St. W./Hwy 403	8661	5	8	12	20	39	99	18.7	293	129
31103	Toronto Downtown	Bay St./Wellesley St. W.	8548	6	10	13	18	30	63	16.5	162	76
33003	Toronto East	Kennedy Rd./Lawrence Ave. E.	8669	6	10	15	22	39	99	20.4	396	139
34020	Toronto North	Hendon Ave./Yonge St.	8709	4	8	13	20	35	80	17.7	300	116
35125	Toronto West	125 Resources Rd.	8546	7	12	20	29	52	136	26.5	362	140
44008	Burlington	North Shore Blvd. E./Lakeshore Rd.	8672	3	7	11	16	30	90	15.5	251	98
44017	Oakville	Eighth Line/Glenashton Dr., Halton Res.	8688	3	5	8	12	24	64	11.6	176	77
45026	Oshawa	2000 Simcoe St. N., Durham College	8734	2	4	6	9	18	47	8.8	132	49
46089	Brampton	525 Main St. N., Peel Manor	8637	3	5	9	15	32	92	14.6	248	84
46108	Mississauga	3359 Mississauga Rd. N., U of T Campus	8605	3	5	8	12	24	77	12.1	273	100
47045	Barrie	83 Perry St.	8731	4	6	8	11	22	78	11.8	221	53
48006	Newmarket	Eagle St. W./McCaffrey Rd.	8686	2	3	5	8	16	55	8.2	193	64
49005	Parry Sound	7 Bay St.	8730	1	2	2	4	8	24	4.0	89	13
51001	Ottawa Downtown	Rideau St./Wurtemburg St.	8677	3	4	7	10	19	44	9.3	113	37
51002	Ottawa Central	960 Carling Ave.	8683	2	3	4	7	15	44	7.1	129	44
52023	Kingston	23 Beechgrove Lane	8684	1	2	3	5	10	28	4.8	118	28
54012	Belleville	2 Sidney St., Water Treatment Plant	8744	1	2	3	6	12	39	5.7	158	37
56051	Cornwall	Bedford St./3rd St. W.	8638	1	3	4	7	14	51	7.0	231	79
59006	Peterborough	10 Hospital Dr.	8656	2	3	5	7	14	44	7.1	134	54
63203	Thunder Bay	421 James St. S.	8441	3	4	7	12	27	67	11.9	163	48
71078	Sault Ste. Marie	Sault College	8675	2	3	5	7	15	36	7.3	125	27
75010	North Bay	Chippewa St. W., Dept. National Defence	8541	2	3	5	7	16	64	8.1	155	41
77233	Sudbury	155 Elm St.	8666	3	4	6	10	21	76	10.6	226	68

Table A7: 2014 Sulphur Dioxide (SO_2) Annual Statistics

Unit: parts per billion (ppb)
SO_2 1h AAQC: 250 ppb
SO_2 24h AAQC: 100 ppb
SO_2 1y AAQC: 20 ppb

ID	City	Location	PERCENTILES								Maximum		No. of Times Above Criteria		
			Valid h	10%	30%	50%	70%	90%	99%	Mean	1h	24h	1h	24h	1y
12008	Windsor Downtown	467 University Ave. W.	8703	0	0	1	2	6	25	2.4	66	20	0	0	0
12016	Windsor West	College Ave./South St.	8286	0	0	1	2	8	25	2.8	59	24	0	0	0
14064	Sarnia	Front St. N./CN Tracks, Centennial Park	8660	0	0	1	2	9	44	3.5	95	40	0	0	0
29000	Hamilton Downtown	Elgin St./Kelly St.	8673	0	0	1	2	17	55	5.1	122	40	0	0	0
29114	Hamilton Mountain	Vickers Rd./E. 18th St.	8595	0	0	1	2	8	32	2.9	106	27	0	0	0
35125	Toronto West	125 Resources Rd.	8670	0	0	1	1	1	5	0.7	21	6	0	0	0
46108	Mississauga	3359 Mississauga Rd. N., U of T Campus	8654	0	1	1	2	3	6	1.3	38	6	0	0	0
51001	Ottawa Downtown	Rideau St./Wurtemburg St.	8661	0	0	0	0	1	2	0.3	8	2	0	0	0
71078	Sault Ste. Marie	Sault College	8674	0	0	0	0	1	17	0.8	53	11	0	0	0
77233	Sudbury	155 Elm St.	8681	0	0	0	1	6	34	2.4	297	26	1	0	0

Table A8: 2014 Carbon Monoxide (CO) Annual Statistics

Unit: parts per million (ppm)
CO 1h AAQC: 30 ppm
CO 8h AAQC: 13 ppm

ID	City	Location	PERCENTILES								Maximum		No. of Times Above Criteria	
			Valid h	10%	30%	50%	70%	90%	99%	Mean	1h	8h	1h	8h
12008	Windsor Downtown	467 University Ave. W.	8571	0.17	0.20	0.23	0.29	0.42	0.76	0.27	1.81	0.89	0	0
29000	Hamilton Downtown	Elgin St./Kelly St.	8687	0.16	0.19	0.22	0.27	0.40	0.76	0.26	2.88	0.98	0	0
35125	Toronto West	125 Resources Rd.	8390	0.17	0.20	0.23	0.27	0.37	0.69	0.26	1.6	1.07	0	0
51001	Ottawa Downtown	Rideau St./Wurtemburg St.	8559	0.14	0.16	0.18	0.21	0.28	0.43	0.2	0.8	0.57	0	0

Table A9: 2014 Total Reduced Sulphur (TRS) Compounds Annual Statistics

Unit: parts per billion (ppb)

ID	City	Location	PERCENTILES								Maximum	
			Valid h	10%	30%	50%	70%	90%	99%	Mean	1h	24h
12016	Windsor West	College Ave./South St.	8460	0	0	0	0	1	3	0.2	10	2
14064	Sarnia	Front St. N./CN Tracks, Centennial Park	8708	0	0	1	1	2	3	0.8	5	3
29000	Hamilton Downtown	Elgin St./Kelly St.	8533	0	0	0	1	1	3	0.4	5	2
71078	Sault Ste. Marie	Sault College	8650	0	0	0	0	0	1	0.0	4	1

Table A10: 10y Trend for O_3 Annual Mean (ppb)

ID	City/Town	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Change Over Time
12008	Windsor Downtown	25.3	24.6	27.0	26.9	24.8	28.0	27.2	28.0	26.9	26.0	↑ 7%
12016	Windsor West	25.6	24.3	25.3	25.9	24.9	26.7	26.4	28.0	26.7	27.2	↑ 10%
13001	Chatham	31.0	28.7	30.9	30.9	28.8	31.9	29.7	29.5	29.6	29.3	↓ 3%
14064	Sarnia	27.4	26.7	28.6	28.7	26.6	30.7	29.7	29.7	28.6	27.1	↑ 5%
15020	Grand Bend	32.5	29.7	31.7	31.3	29.6	35.0	32.8	33.2	32.3	31.0	↑ 4%
15026	London	26.1	25.1	27.2	27.0	25.1	28.2	26.8	27.7	28.7	28.1	↑ 10%
16015	Port Stanley	34.6	32.4	34.3	34.3	30.9	34.6	32.8	33.1	33.9	32.3	↓ 3%
18007	Tiverton	31.8	29.0	34.3	32.6	31.4	33.8	32.1	32.0	32.4	31.8	↑ 2%
21005	Brantford	27.9	27.0	28.9	28.4	26.5	29.4	28.7	28.8	29.0	29.4	↑ 6%
26060	Kitchener	28.0	26.6	28.6	28.1	27.0	29.4	27.6	28.0	28.0	27.3	→ 0%
27067	St. Catharines	26.3	26.2	28.1	27.5	25.6	28.3	28.0	28.7	28.6	28.5	↑ 9%
28028	Guelph	28.6	26.8	28.1	27.9	27.3	30.7	28.9	28.8	29.0	27.8	↑ 4%
29000	Hamilton Downtown	23.3	23.2	24.8	25.1	24.3	26.9	25.4	25.7	25.0	25.3	↑ 9%
29114	Hamilton Mountain	28.2	27.5	29.2	29.0	27.2	29.7	28.8	30.2	29.5	29.1	↑ 6%
29118	Hamilton West	21.2	20.9	23.0	23.3	21.8	24.5	24.2	24.2	24.4	22.7	↑ 13%
31103	Toronto Downtown	24.5	22.6	25.7	26.0	24.6	26.1	25.4	26.6	26.2	25.7	↑ 9%
33003	Toronto East	22.4	22.0	23.2	21.6	22.1	23.0	23.3	24.6	24.1	23.4	↑ 9%
34020	Toronto North	24.5	23.3	24.5	22.7	22.1	24.8	23.6	25.7	25.3	25.3	↑ 7%
35125	Toronto West	20.3	19.0	21.1	20.7	19.5	20.6	20.1	21.5	21.5	21.1	↑ 7%
44008	Burlington	23.9	23.5	24.6	24.9	24.1	26.6	25.9	26.7	26.4	25.5	↑ 12%
44017	Oakville	27.7	26.1	27.5	27.0	25.5	28.0	26.8	27.7	28.3	27.2	↑ 3%
45026	Oshawa	28.6	25.1	28.0	27.0	25.5	28.0	26.6	27.0	27.2	27.2	→ 0%
46089	Brampton	26.8	25.5	26.8	26.6	25.2	27.5	26.1	26.6	26.7	26.5	↑ 1%
46108	Mississauga	23.1	22.4	23.3	24.6	24.0	25.9	24.1	25.6	25.2	25.4	↑ 13%
47045	Barrie	26.9	24.1	25.9	26.5	24.3	26.8	25.3	26.3	25.5	25.6	→ 0%
48006	Newmarket	30.8	28.8	31.7	29.5	28.6	31.5	27.8	29.4	28.7	28.6	↓ 6%
49005	Parry Sound	33.8	30.7	31.8	32.1	29.7	31.3	29.7	30.1	30.4	29.6	↓ 9%
49010	Dorset	32.3	28.9	29.9	29.3	27.7	28.6	27.0	28.0	28.1	27.7	↓ 11%
51001	Ottawa Downtown	23.3	23.6	24.7	23.3	23.4	25.7	24.2	26.0	25.6	24.8	↑ 9%
51002	Ottawa Central	n/a	INS	26.5	27.4	24.7	26.6	24.8	25.6	26.6	26.6	↓ 1%
51010	Petawawa	n/a	INS	28.3	27.6	27.3	27.9	26.7	27.7	27.6	26.8	↓ 3%
52023	Kingston	n/a	INS	33.9	32.7	30.3	32.6	30.3	32.7	30.3	31.4	↓ 6%
54012	Belleville	29.4	29.2	32.0	29.8	28.5	30.0	27.9	28.0	29.2	29.6	↓ 4%
56010	Morrisburg	27.8	28.0	29.2	27.9	26.1	28.6	27.2	28.2	28.7	27.9	→ 0%
56051	Cornwall	27.7	27.5	28.3	26.6	25.5	27.9	26.1	27.1	26.9	27.3	↓ 3%
59006	Peterborough	31.2	24.9	27.6	28.2	27.7	30.5	27.9	29.1	28.6	29.2	↑ 3%
63203	Thunder Bay	22.3	23.5	24.2	23.0	24.2	25.7	25.2	25.0	26.3	23.4	↑ 10%
71078	Sault Ste. Marie	30.2	29.1	29.7	28.9	27.8	28.4	27.8	28.8	28.9	28.4	↓ 5%
75010	North Bay	28.0	26.7	27.1	27.7	26.1	28.0	26.7	26.1	27.4	26.7	↓ 2%
77233	Sudbury	31.0	28.4	28.1	27.9	25.9	28.7	28.7	28.5	27.2	26.3	↓ 8%

Notes:

n/a indicates pollutant not monitored.

INS indicates there was insufficient data in the 2nd and/or 3rd quarter to calculate a valid annual mean.

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

Station 45026 replaced station 45025 as the Oshawa site in 2005.

Station 46108 replaced station 46109 as the Mississauga site in 2008.

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

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

Table A11: 10y Trend for O_3 Summer Means (May - September) Summer Mean (ppb)

ID	City/Town	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Change Over Time
12008	Windsor Downtown	35.6	32.6	36.3	34.1	30.4	34.6	33.8	36.8	32.5	30.9	↓ 6%
12016	Windsor West	35.8	31.9	33.5	32.1	29.5	31.8	31.9	35.7	30.9	30.9	↓ 6%
13001	Chatham	39.5	35.5	38.2	36.7	32.6	36.5	34.4	36.6	34.2	32.4	↓ 12%
14064	Sarnia	34.1	32.0	34.2	33.0	28.6	34.3	32.9	36.6	32.0	29.4	↓ 4%
15020	Grand Bend	36.3	33.5	34.9	32.4	29.7	37.8	33.9	38.9	33.1	31.5	↓ 2%
15026	London	33.9	31.2	33.2	31.6	28.4	32.5	30.7	34.4	30.9	29.5	↓ 6%
16015	Port Stanley	42.3	38.5	40.4	38.8	33.2	38.9	35.5	38.4	36.9	33.7	↓ 14%
18007	Tiverton	33.3	30.4	38.3	34.0	30.3	33.3	31.7	36.0	32.5	30.8	↓ 4%
21005	Brantford	33.5	31.8	33.6	31.0	27.5	31.6	31.1	33.5	30.1	29.9	↓ 7%
26060	Kitchener	34.3	32.0	34.2	31.0	28.8	31.6	30.2	33.5	29.8	28.5	↓ 12%
27067	St. Catharines	33.6	32.6	33.9	31.2	27.7	32.0	31.2	35.0	31.2	29.5	↓ 6%
28028	Guelph	34.0	31.5	33.1	30.4	28.7	32.5	31.3	34.5	30.4	28.9	↓ 7%
29000	Hamilton Downtown	30.4	29.2	30.8	29.8	28.2	31.6	28.7	32.4	28.4	27.5	↓ 4%
29114	Hamilton Mountain	36.7	33.7	36.1	33.6	31.0	34.4	32.3	37.4	32.5	31.6	↓ 7%
29118	Hamilton West	25.7	25.3	26.9	26.7	23.9	27.9	26.2	29.2	26.4	22.7	↓ 1%
31103	Toronto Downtown	31.9	28.7	33.2	30.9	27.9	31.1	29.5	33.3	30.1	28.9	↓ 3%
33003	Toronto East	30.6	27.2	28.3	24.9	25.2	26.7	27.4	30.6	27.1	25.9	↓ 4%
34020	Toronto North	30.2	28.6	29.9	26.4	25.6	28.0	27.5	32.7	29.4	28.6	↑ 2%
35125	Toronto West	26.5	24.3	25.9	24.8	22.5	24.3	23.6	27.5	24.4	23.5	↓ 4%
44008	Burlington	30.2	29.2	30.0	28.3	26.7	30.2	29.2	32.5	29.2	27.4	↓ 1%
44017	Oakville	34.4	31.7	32.8	30.8	28.2	31.5	29.9	34.2	30.6	28.3	↓ 9%
45026	Oshawa	INS	28.0	31.5	28.3	26.4	29.5	28.5	31.1	28.3	27.9	↓ 1%
46089	Brampton	31.7	31.3	31.9	31.0	28.5	30.8	29.3	32.7	29.5	28.9	↓ 6%
46108	Mississauga	31.6	28.5	28.6	27.3	26.2	29.0	26.7	30.4	26.5	26.5	↓ 9%
47045	Barrie	30.7	28.1	28.6	30.0	25.0	27.9	26.2	29.7	25.6	25.4	↓ 13%
48006	Newmarket	36.1	33.7	36.0	32.1	30.9	34.4	30.5	34.2	30.3	29.4	↓ 15%
49005	Parry Sound	36.9	33.3	33.6	32.2	28.6	30.4	28.7	32.8	30.1	28.2	↓ 18%
49010	Dorset	33.0	29.2	30.0	27.2	25.0	25.2	23.8	28.3	25.3	24.4	↓ 22%
51001	Ottawa Downtown	27.2	26.5	28.2	24.9	24.6	26.1	25.1	29.3	26.5	24.6	↓ 3%
51002	Ottawa Central	n/a	INS	27.9	25.3	26.3	25.4	29.4	27.0	26.2	26.2	→ 0%
51010	Petawawa	n/a	INS	26.7	24.7	24.4	23.8	22.8	28.1	24.5	22.9	↓ 6%
52023	Kingston	n/a	INS	39.3	35.4	32.5	35.9	32.0	38.5	32.4	32.7	↓ 11%
54012	Belleville	35.6	34.1	37.0	32.3	30.6	34.2	29.9	32.7	30.6	30.4	↓ 15%
56010	Morrisburg	30.6	30.6	31.6	27.8	26.7	29.5	27.1	31.1	28.2	26.8	↓ 9%
56051	Cornwall	31.8	29.8	31.1	27.6	27.1	29.8	26.7	30.7	28.1	27.0	↓ 10%
59006	Peterborough	36.5	27.2	30.0	31.6	29.2	32.0	29.8	34.2	29.5	30.0	↓ 4%
63203	Thunder Bay	23.6	24.7	24.6	21.3	24.2	23.9	24.2	25.3	24.7	22.7	↑ 1%
71078	Sault Ste. Marie	32.0	31.4	31.5	28.4	27.5	27.2	26.4	30.3	28.2	27.4	↓ 13%
75010	North Bay	31.0	29.0	28.5	28.3	26.5	28.4	26.3	28.5	26.9	26.2	↓ 11%
77233	Sudbury	32.4	30.1	29.5	26.0	25.7	26.3	26.9	29.8	28.0	27.0	↓ 11%

Notes:
n/a indicates pollutant not monitored.
INS indicates there was insufficient data to calculate a valid summer mean.
Station 15026 replaced station 15025 as the London site in 2013.
Station 45026 replaced station 45025 as the Oshawa site in 2005.
Station 46108 replaced station 46109 as the Mississauga site in 2008.
Station 52023 replaced station 52022 as the Kingston site in 2014.
Station 77233 replaced station 77219 as the Sudbury site in 2013.

Table A12: 10y Trend for O_3 Winter Means (January-April, October-December) Winter Mean (ppb)

ID	City/Town	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Change Over Time
12008	Windsor Downtown	16.5	18.8	20.3	21.7	20.8	23.2	22.5	21.7	22.8	22.8	↑ 29%
12016	Windsor West	18.2	18.8	19.4	21.5	21.6	22.8	22.5	22.3	23.4	24.5	↑ 32%
13001	Chatham	25.1	23.9	25.4	26.8	26.1	28.5	26.7	24.3	26.2	27.1	↑ 7%
14064	Sarnia	INS	23.0	24.7	25.5	25.2	28.1	27.4	24.7	26.2	25.4	↑ 8%
15020	Grand Bend	29.8	26.8	29.4	30.5	29.5	33.0	32.1	29.1	31.8	30.6	↑ 9%
15026	London	20.4	20.7	22.8	23.7	22.8	25.0	24.2	22.9	26.9	27.1	↑ 28%
16015	Port Stanley	29.2	28.0	30.0	31.0	29.4	31.5	31.0	29.3	31.8	31.3	↑ 8%
18007	Tiverton	30.7	28.2	31.5	31.7	32.3	34.1	32.2	29.2	32.4	32.7	↑ 7%
21005	Brantford	23.9	23.6	25.5	26.6	25.8	27.8	27.1	25.4	28.3	28.8	↑ 18%
26060	Kitchener	23.4	22.7	24.6	26.0	25.9	27.8	25.7	24.0	26.7	26.5	↑ 12%
27067	St. Catharines	20.9	21.7	24.1	24.9	24.1	25.6	25.8	24.1	26.8	27.9	↑ 26%
28028	Guelph	24.8	23.4	24.8	26.1	26.4	29.3	27.2	24.8	28.0	27.0	↑ 13%
29000	Hamilton Downtown	18.2	18.9	20.5	21.7	21.5	23.5	23.1	20.9	22.5	23.7	↑ 24%
29114	Hamilton Mountain	22.1	23.0	24.2	25.7	24.5	26.3	26.3	25.0	27.3	27.3	↑ 20%
29118	Hamilton West	17.9	17.8	20.1	20.9	20.4	22.1	22.7	20.6	23.0	22.8	↑ 27%
31103	Toronto Downtown	19.1	18.2	20.4	22.2	22.4	22.4	22.6	21.8	23.5	23.5	↑ 24%
33003	Toronto East	17.5	18.2	19.5	19.3	19.9	20.4	20.4	20.3	22.0	21.6	↑ 22%
34020	Toronto North	20.4	19.4	20.7	20.1	19.5	22.5	20.8	20.7	22.3	22.8	↑ 13%
35125	Toronto West	15.8	15.1	17.7	17.7	17.4	18.0	17.7	17.2	19.5	19.4	↑ 21%
44008	Burlington	19.3	19.3	20.7	22.5	22.3	23.9	23.5	22.5	24.4	24.1	↑ 26%
44017	Oakville	22.8	22.0	23.7	24.4	23.6	25.5	24.7	23.1	26.6	26.5	↑ 16%
45026	Oshawa	24.1	23.0	25.6	25.7	24.9	26.9	25.2	24.1	26.4	26.7	↑ 9%
46089	Brampton	23.3	21.4	23.1	23.4	22.8	25.2	23.8	22.2	24.6	24.8	↑ 9%
46108	Mississauga	17.0	18.0	19.2	22.8	22.5	23.7	22.5	22.2	24.3	24.7	↑ 39%
47045	Barrie	24.2	21.3	24.0	24.2	23.8	26.0	24.7	23.9	25.5	25.8	↑ 11%
48006	Newmarket	27.0	25.3	28.6	27.6	27.1	29.4	25.8	26.0	27.5	28.1	↑ 2%
49005	Parry Sound	31.6	28.9	30.6	32.0	30.5	31.9	30.4	28.1	30.6	30.6	↓ 2%
49010	Dorset	31.8	28.6	30.1	30.7	29.6	31.0	29.5	27.7	30.1	30.1	↓ 3%
51001	Ottawa Downtown	20.7	21.4	22.0	22.2	22.6	25.5	23.6	23.5	24.9	25.1	↑ 20%
51002	Ottawa Central	n/a	INS	25.6	27.0	24.1	26.8	24.5	22.9	26.3	26.9	→ 0%
51010	Petawawa	n/a	INS	29.5	29.6	29.5	30.8	29.5	27.5	29.9	29.6	↓ 1%
52023	Kingston	n/a	INS	30.1	30.6	28.6	30.0	29.0	28.6	28.8	30.4	↓ 2%
54012	Belleville	25.1	25.8	28.4	28.0	26.9	27.0	26.4	24.6	28.2	29.1	↑ 6%
56010	Morrisburg	25.7	26.2	27.5	27.9	25.7	28.0	27.5	26.0	29.1	28.7	↑ 8%
56051	Cornwall	24.8	25.9	26.3	26.0	24.5	26.5	25.7	24.2	25.7	27.6	↑ 3%
59006	Peterborough	27.3	23.3	25.9	26.0	26.7	29.5	26.6	25.5	28.0	28.6	↑ 10%
63203	Thunder Bay	21.7	22.6	23.9	24.3	24.2	27.1	26.1	24.7	27.4	23.8	↑ 16%
71078	Sault Ste. Marie	28.9	27.5	28.6	29.3	28.4	29.3	28.9	27.6	29.4	29.2	↑ 2%
75010	North Bay	25.9	25.0	26.2	27.2	25.8	27.7	27.0	24.4	27.8	27.1	↑ 5%
77233	Sudbury	30.0	27.2	27.2	29.3	26.0	30.5	30.0	27.6	26.6	25.8	↓ 6%

Notes:

n/a indicates pollutant not monitored.

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

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

Station 45026 replaced station 45025 as the Oshawa site in 2005.

Station 46108 replaced station 46109 as the Mississauga site in 2008.

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

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

Ontario's move to new measurement technology in 2013 has resulted in increased $PM_{2.5}$ annual means; the increases are not an indication that the air quality has changed, but that the measurements are more accurate. For more information see Section 3.1: Technical Discussion – New $PM_{2.5}$ Measurement Technology in Ontario.

Table A13: 10y Summary for $PM_{2.5}$ Annual Mean (µg/m^3)

ID	City/Town	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
12008	Windsor Downtown	10.4	8.2	9.5	8.3	7.2	7.7	7.6	7.4	**9.2**	**10.1**
12016	Windsor West	10.5	9.2	9.8	8.9	7.4	7.8	7.8	7.6	**10.0**	**10.7**
13001	Chatham	9.1	7.4	7.9	7.3	6.3	6.5	6.6	6.0	**8.1**	**8.6**
14064	Sarnia	12.9	11.3	12.2	11.4	9.8	10.4	10.5	10.2	**8.5 (7.0*)**	**9.0 (6.7*)**
15020	Grand Bend	7.4	6.5	6.7	6.8	5.8	6.1	6.1	5.8	**7.3**	**8.1**
15026	London	8.8	6.9	6.5	6.8	5.7	INS	6.2	6.5	**9.1**	**8.8**
16015	Port Stanley	8.6	7.3	7.2	6.7	5.6	5.9	6.0	5.9	**7.4 (5.3*)**	**8.2 (5.6*)**
18007	Tiverton	6.6	5.6	5.6	5.0	4.0	4.5	4.7	INS	**5.8**	**6.5**
21005	Brantford	8.9	7.6	7.7	6.8	5.8	6.5	6.6	6.2	**8.5**	**9.2**
26060	Kitchener	9.5	7.7	8.0	7.1	5.8	6.3	6.2	6.0	**8.7**	**9.3**
27067	St. Catharines	8.6	7.9	8.2	7.4	6.0	6.5	6.3	6.3	**8.5**	**8.8**
28028	Guelph	8.8	7.0	7.5	6.5	5.6	5.7	5.9	5.8	**8.1**	**8.9**
29000	Hamilton Downtown	10.0	9.1	8.9	8.3	6.8	7.7	8.1	8.3	**10.1 (7.8*)**	**10.8 (8.5)**
29114	Hamilton Mountain	9.8	8.1	7.8	7.3	6.3	6.2	6.7	6.5	**9.2**	**9.4**
29118	Hamilton West	9.6	8.2	8.3	7.6	6.1	6.8	7.1	7.3	**9.6**	**9.9**
31103	Toronto Downtown	8.5	7.3	7.3	6.6	5.6	6.0	6.2	6.4	**8.3**	**8.7**
33003	Toronto East	8.4	7.6	7.8	6.7	5.9	6.7	6.2	6.3	**8.2**	**8.9**
34020	Toronto North	9.4	7.6	7.8	7.3	5.9	6.2	7.7	7.3	**8.3**	**9.2**
35125	Toronto West	10.0	8.2	8.4	7.5	6.1	6.5	6.9	7.1	**8.8 (6.6*)**	**9.1 (6.7*)**
44008	Burlington	9.1	7.6	7.3	6.9	5.9	6.2	6.2	6.4	**8.7**	**9.6**
44017	Oakville	8.9	7.4	7.6	6.7	5.3	5.7	6.4	6.1	**8.0**	**8.5**
45026	Oshawa	8.1	6.8	6.8	6.3	5.2	5.6	5.5	5.5	**7.4**	**7.7**
46089	Brampton	8.9	7.2	7.4	6.8	5.6	5.8	6.0	5.7	**8.5**	**8.9**
46108	Mississauga	9.2	7.6	7.2	7.1	5.8	6.1	6.0	6.0	**7.9**	**8.7**
47045	Barrie	8.1	6.7	6.9	6.1	5.2	5.4	5.7	5.6	**7.5**	**7.6**
48006	Newmarket	7.7	6.4	6.6	6.0	5.1	5.6	5.5	5.6	**7.3**	**7.3**
49005	Parry Sound	6.1	5.3	5.5	4.7	3.9	4.4	4.7	4.8	**5.8**	**5.8**
49010	Dorset	5.8	4.5	5.0	4.5	3.6	4.0	4.1	4.1	**5.4**	**5.3**
51001	Ottawa Downtown	7.7	6.1	6.0	5.3	4.6	4.5	4.9	4.8	**7.0 (5.1*)**	**7.0 (4.8*)**
51002	Ottawa Central	n/a	INS	5.8	5.1	4.4	4.3	4.5	5.0	**7.1**	**6.8**
51010	Petawawa	n/a	INS	4.0	3.9	3.1	3.2	3.4	3.6	**4.8**	**4.7**
52023	Kingston	n/a	INS	7.5	7.0	6.4	6.5	6.9	6.8	**6.5**	**6.8**
54012	Belleville	7.0	6.2	6.2	6.1	4.9	INS	4.8	5.1	**6.9**	**6.8**
56010	Morrisburg	7.0	6.8	6.2	5.7	5.0	5.3	5.2	5.0	**6.7**	**7.0**
56051	Cornwall	7.6	6.5	6.4	6.1	5.4	5.7	5.7	5.4	**7.7 (5.2*)**	**7.0 (5.1*)**
59006	Peterborough	7.5	6.3	6.4	6.0	4.9	5.1	5.5	4.9	**7.4**	**6.9**
63203	Thunder Bay	4.4	4.8	4.4	4.2	3.8	4.1	4.8	4.1	**6.3**	**6.6**
71078	Sault Ste. Marie	5.4	5.2	5.3	4.4	4.0	4.1	4.4	4.4	**5.6**	**6.0**
75010	North Bay	5.6	4.9	5.0	4.6	3.8	3.8	4.2	4.1	**5.2 (3.8*)**	**5.3 (3.8*)**
77233	Sudbury	5.1	4.6	4.9	4.1	3.4	3.6	4.0	4.0	**5.7**	**6.0**

Notes:
*For data comparison purposes, measurements were taken by Tapered Element Oscillating Microbalance (TEOM) sampler at selected sites.
From 2004-2012, measurements taken by TEOM sampler operated at 30°C with a Sample Equilibration System (SES).
As of 2013, measurements taken by Synchronized Hybrid Ambient Real-time Particulate (SHARP) 5030.
Due to change in the $PM_{2.5}$ monitoring method in 2013, it is inappropriate to calculate a change over time.
n/a indicates pollutant not monitored.
INS indicates there was insufficient data in any one quarter to calculate a valid annual mean.
Station 15026 replaced station 15025 as the London site in 2013.
Station 45026 replaced station 45025 as the Oshawa site in 2005.
Station 46108 replaced station 46109 as the Mississauga site in 2008.
Station 52023 replaced station 52022 as the Kingston site in 2014.
Station 77233 replaced station 77219 as the Sudbury site in 2013.

Table A14: 10y Trend for NO

Annual Mean (ppb)

ID	City/Town	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Change Over Time
12008	Windsor Downtown	7.8	7.2	6.4	5.9	5.6	4.7	4.5	4.7	3.7	4.0	↓ 53%
12016	Windsor West	8.3	7.2	6.5	5.1	5.4	6.1	3.8	4.6	3.6	3.8	↓ 56%
13001	Chatham	2.5	2.6	2.4	3.1	3.5	2.6	1.9	1.8	1.6	1.5	↓ 43%
14064	Sarnia	3.8	3.7	3.2	3.2	2.8	2.2	3.1	2.1	1.7	1.9	↓ 53%
15026	London	5.5	4.4	3.6	3.1	2.8	2.9	3.3	4.2	1.4	1.3	↓ 64%
18007	Tiverton	n/a	INS	0.2	0.2	0.4	0.7	0.9	0.7	0.1	1.3	not available
21005	Brantford	3.8	2.5	1.8	1.3	1.7	1.3	1.2	1.1	1.2	0.9	↓ 78%
26060	Kitchener	4.4	3.5	2.7	2.5	2.1	2.5	2.0	2.1	1.6	1.6	↓ 64%
27067	St. Catharines	5.5	5.5	4.5	3.6	3.7	2.8	2.3	2.5	2.2	1.7	↓ 73%
29000	Hamilton Downtown	9.9	8.0	7.7	6.5	5.8	5.0	4.8	4.6	4.3	3.9	↓ 62%
29114	Hamilton Mountain	n/a	3.6	3.2	2.4	2.5	2.2	2.3	1.9	2.0	2.0	↓ 48%
31103	Toronto Downtown	7.2	7.0	5.9	5.0	5.1	4.1	3.4	2.8	2.7	2.5	↓ 72%
33003	Toronto East	14.4	12.5	10.8	9.2	7.8	7.8	7.6	6.6	5.7	6.2	↓ 63%
34020	Toronto North	10.8	10.0	8.3	7.7	7.1	5.7	6.2	5.0	4.1	4.3	↓ 65%
35125	Toronto West	26.1	20.1	17.5	16.2	13.5	13.4	12.4	11.3	8.6	9.5	↓ 67%
44008	Burlington	12.3	9.8	8.8	6.5	5.9	5.0	4.6	4.6	4.6	4.6	↓ 71%
44017	Oakville	5.2	4.3	3.9	4.0	3.5	3.6	2.7	3.4	2.1	3.4	↓ 44%
45026	Oshawa	INS	3.8	3.2	3.2	3.0	2.3	2.3	2.1	1.5	2.0	↓ 56%
46089	Brampton	8.9	9.1	6.0	5.8	6.5	3.7	4.6	4.4	4.6	4.0	↓ 60%
47045	Barrie	7.1	8.0	5.5	5.5	5.1	4.3	3.8	3.2	3.2	3.7	↓ 62%
48006	Newmarket	3.5	3.0	2.2	2.6	3.2	2.3	2.2	2.0	1.5	1.4	↓ 54%
51001	Ottawa Downtown	3.3	3.0	3.4	2.7	2.4	1.6	1.8	2.4	2.1	1.9	↓ 45%
51002	Ottawa Central	n/a	INS	2.4	2.7	1.8	1.4	1.5	2.0	2.8	1.0	↓ 29%
52023	Kingston	n/a	INS	0.6	1.1	0.6	0.3	0.5	0.4	0.2	0.8	↓ 43%
54012	Belleville	4.5	3.0	3.2	3.0	1.9	2.3	2.3	1.6	1.7	1.2	↓ 70%
56051	Cornwall	n/a	3.1	3.5	3.6	3.2	2.0	1.9	2.2	1.9	1.5	↓ 65%
59006	Peterborough	n/a	2.5	2.3	3.0	1.9	1.7	2.2	1.8	1.7	1.8	↓ 36%
63203	Thunder Bay	n/a	6.1	5.4	5.1	5.7	4.6	5.9	5.1	4.7	4.2	↓ 22%
71078	Sault Ste. Marie	INS	1.6	1.4	1.4	1.8	1.9	2.0	1.7	1.3	2.0	↑ 18%
75010	North Bay	3.7	4.4	3.5	3.8	4.2	3.4	4.0	2.9	2.5	2.6	↓ 34%

Notes:

n/a indicates pollutant not monitored.

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

The measured NO concentrations at Tiverton are mostly below instrument detection limits and are considered regional background levels. As such, a meaningful change over time could not be calculated with any statistical significance.

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

Station 45026 replaced station 45025 as the Oshawa site in 2005.

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

Table A15: 10y Trend for NO_2 Annual Mean (ppb)

ID	City/Town	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Change Over Time
12008	Windsor Downtown	16.9	17.2	17.2	15.2	14.4	15.6	14.5	13.2	12.4	14.0	↓ 26%
12016	Windsor West	17.1	15.7	16.1	16.2	13.2	14.5	12.9	11.4	11.5	11.8	↓ 35%
13001	Chatham	11.0	9.5	8.6	7.0	7.5	6.4	6.6	5.7	6.0	6.8	↓ 44%
14064	Sarnia	12.7	11.0	11.3	10.8	8.2	8.0	8.6	8.6	8.1	9.0	↓ 35%
15026	London	14.1	12.3	11.7	10.8	9.0	8.8	8.3	6.3	6.4	6.9	↓ 58%
18007	Tiverton	n/a	INS	2.9	3.0	2.3	1.9	2.5	2.5	1.9	2.7	↓ 19%
21005	Brantford	10.1	8.8	7.7	6.9	7.3	5.8	6.1	5.4	4.8	5.5	↓ 50%
26060	Kitchener	12.9	10.8	9.7	9.0	8.6	7.7	7.7	7.1	6.7	7.0	↓ 48%
27067	St. Catharines	13.1	11.7	12.0	10.4	9.9	9.1	8.5	8.1	7.7	7.3	↓ 46%
29000	Hamilton Downtown	19.3	17.0	17.0	14.7	13.6	12.7	13.5	11.9	12.4	12.4	↓ 38%
29114	Hamilton Mountain	n/a	11.6	11.9	10.5	9.9	8.9	9.9	8.6	9.0	9.3	↓ 25%
31103	Toronto Downtown	20.7	19.2	18.2	17.0	16.5	16.1	14.9	13.4	13.5	14.0	↓ 36%
33003	Toronto East	20.1	17.4	17.2	16.5	14.9	14.8	15.2	14.0	13.6	14.2	↓ 29%
34020	Toronto North	19.2	17.4	16.7	16.5	15.8	14.3	15.4	13.4	12.9	13.4	↓ 31%
35125	Toronto West	26.6	22.3	22.1	20.8	19.0	20.1	19.1	16.3	16.1	17.1	↓ 36%
44008	Burlington	17.2	16.2	16.0	13.6	12.5	12.2	11.8	11.0	11.0	10.9	↓ 41%
44017	Oakville	14.5	12.5	13.0	12.0	11.1	9.2	10.3	9.1	9.2	8.2	↓ 42%
45026	Oshawa	INS	8.9	8.1	8.5	7.4	7.2	7.0	5.6	5.9	6.8	↓ 33%
46089	Brampton	16.9	15.2	13.9	13.1	13.3	10.7	11.3	10.4	9.1	10.6	↓ 43%
47045	Barrie	13.8	12.6	11.5	10.8	9.9	8.7	8.6	8.1	7.8	8.1	↓ 46%
48006	Newmarket	8.5	9.0	8.3	8.0	7.8	7.2	8.1	7.2	6.8	6.8	↓ 23%
51001	Ottawa Downtown	9.8	8.6	8.7	11.4	8.6	7.4	7.9	7.8	7.9	7.4	↓ 24%
51002	Ottawa Central	n/a	INS	7.9	8.1	6.6	6.2	6.6	6.6	6.6	6.0	↓ 22%
52023	Kingston	n/a	INS	5.5	5.5	5.0	4.3	4.6	4.0	3.6	3.9	↓ 35%
54012	Belleville	8.2	4.5	6.4	7.3	6.0	5.5	6.3	4.7	4.7	4.5	↓ 34%
56051	Cornwall	n/a	6.7	7.6	7.5	7.3	6.5	6.5	6.1	6.2	5.6	↓ 25%
59006	Peterborough	n/a	6.3	6.4	7.0	5.6	5.0	4.3	3.7	5.0	5.3	↓ 33%
63203	Thunder Bay	n/a	8.1	8.7	8.1	8.4	7.8	8.6	7.3	7.3	7.8	↓ 11%
71078	Sault Ste. Marie	INS	5.2	5.0	5.5	5.1	5.5	5.3	4.8	5.0	5.3	↓ 2%
75010	North Bay	6.8	7.7	7.4	7.5	8.2	7.6	7.4	6.1	5.8	5.6	↓ 21%

Notes:
n/a indicates pollutant not monitored.
INS indicates there was insufficient data to calculate a valid annual mean.
Station 15026 replaced station 15025 as the London site in 2013.
Station 45026 replaced station 45025 as the Oshawa site in 2005.
Station 52023 replaced station 52022 as the Kingston site in 2014.

Table A16: 10y Trend for NO_X Annual Mean (ppb)

ID	City/Town	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Change Over Time
12008	Windsor Downtown	24.9	24.4	23.6	21.1	20.0	20.2	18.9	17.8	16.2	18.0	↓ 34%
12016	Windsor West	25.6	22.8	22.6	21.3	18.6	20.6	16.7	16.0	15.2	15.7	↓ 42%
13001	Chatham	13.5	12.1	11.0	10.1	10.9	9.0	8.4	7.5	7.7	8.2	↓ 44%
14064	Sarnia	16.8	14.7	14.5	13.9	11.0	10.2	11.7	10.7	9.8	10.9	↓ 40%
15026	London	19.4	16.7	15.3	13.9	11.9	11.7	11.6	10.5	7.8	8.3	↓ 59%
18007	Tiverton	n/a	INS	3.0	3.3	2.7	2.6	3.4	3.1	2.1	4.0	↑ 8%
21005	Brantford	13.7	11.3	9.5	8.2	9.1	7.2	7.3	6.7	5.7	6.4	↓ 57%
26060	Kitchener	17.4	14.3	12.4	11.5	10.8	10.3	9.6	9.2	8.3	8.5	↓ 52%
27067	St. Catharines	18.8	17.2	16.5	14.0	13.7	11.8	10.9	10.6	9.9	9.1	↓ 54%
29000	Hamilton Downtown	30.1	24.9	24.7	21.2	19.5	17.8	18.3	16.6	16.8	16.3	↓ 47%
29114	Hamilton Mountain	n/a	15.3	15.1	12.9	12.4	11.2	12.2	10.5	11.0	11.3	↓ 30%
31103	Toronto Downtown	28.2	26.1	24.2	22.1	21.6	20.3	18.4	16.2	16.1	16.5	↓ 46%
33003	Toronto East	34.7	29.9	28.0	25.7	22.7	22.6	22.8	20.6	19.4	20.4	↓ 43%
34020	Toronto North	30.4	27.5	25.0	24.3	22.8	20.0	21.5	18.5	17.0	17.7	↓ 44%
35125	Toronto West	52.4	42.4	39.6	37.0	32.5	33.5	31.5	27.6	24.7	26.5	↓ 51%
44008	Burlington	29.3	26.0	24.8	20.0	18.4	17.2	16.4	15.6	15.6	15.5	↓ 52%
44017	Oakville	19.5	16.7	16.9	16.1	14.6	12.8	13.0	12.6	11.2	11.6	↓ 42%
45026	Oshawa	INS	12.7	11.3	11.7	10.4	9.5	9.2	7.8	7.4	8.8	↓ 39%
46089	Brampton	25.9	24.2	19.9	18.9	19.9	14.4	15.9	14.8	13.9	14.6	↓ 48%
47045	Barrie	21.0	20.6	17.0	16.3	15.1	13.1	12.4	11.3	11.0	11.8	↓ 52%
48006	Newmarket	12.2	11.8	10.4	10.4	11.0	9.5	10.3	9.2	8.4	8.2	↓ 31%
51001	Ottawa Downtown	13.7	11.5	12.0	14.0	11.0	9.0	9.7	10.2	10.1	9.3	↓ 31%
51002	Ottawa Central	n/a	INS	10.2	10.8	8.4	7.5	8.1	8.7	9.4	7.1	↓ 23%
52023	Kingston	n/a	INS	6.3	6.5	5.7	4.7	5.3	4.6	3.8	4.8	↓ 35%
54012	Belleville	12.6	7.5	9.6	10.2	7.9	7.8	8.7	6.4	6.3	5.7	↓ 46%
56051	Cornwall	n/a	9.8	11.0	11.1	10.6	8.5	8.4	8.4	8.0	7.0	↓ 38%
59006	Peterborough	n/a	8.8	8.6	10.0	7.5	6.7	6.6	5.4	6.6	7.1	↓ 34%
63203	Thunder Bay	n/a	14.2	14.1	13.2	14.1	12.4	14.5	12.4	12.0	11.9	↓ 15%
71078	Sault Ste. Marie	INS	6.9	6.4	6.9	6.9	7.4	7.2	6.4	6.3	7.3	↑ 1%
75010	North Bay	11.2	12.1	10.9	11.3	12.4	11.0	11.5	9.1	8.3	8.1	↓ 28%

Notes:
n/a indicates pollutant not monitored.
INS indicates there was insufficient data to calculate a valid annual mean.
Station 15026 replaced station 15025 as the London site in 2013.
Station 45026 replaced station 45025 as the Oshawa site in 2005.
Station 52023 replaced station 52022 as the Kingston site in 2014.

Table A17: 10y Trend for CO

1h Maximum (ppm)
CO 1h AAQC: 30 ppm

ID	City/Town	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Change Over Time
12008	Windsor Downtown	1.3	2.9	5.0	1.3	1.4	2.5	3.8	2.1	1.9	1.8	↓ 18%
29000	Hamilton Downtown	2.6	2.8	6.0	3.3	5.0	2.2	1.8	1.7	2.0	2.9	↓ 45%
35125	Toronto West	2.7	3.0	1.4	1.7	1.6	1.8	1.4	1.4	1.4	1.6	↓ 49%
51001	Ottawa Downtown	2.0	1.4	1.5	1.3	1.4	1.5	1.5	0.9	0.9	0.8	↓ 50%

Table A18: 10y Trend for SO_2

Annual Mean (ppb)
SO_2 1y AAQC: 20 ppb

ID	City/Town	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Change Over Time
12008	Windsor Downtown	4.9	5.0	5.5	4.5	3.5	3.5	3.5	2.8	2.4	2.4	↓ 58%
12016	Windsor West	5.1	4.9	5.2	4.7	3.6	3.2	3.4	2.8	2.6	2.8	↓ 56%
14064	Sarnia	7.8	8.3	8.0	7.7	4.5	3.9	5.3	4.1	3.8	3.5	↓ 64%
29000	Hamilton Downtown	5.3	4.8	4.2	4.3	3.3	3.3	5.2	4.8	4.8	5.1	↑ 5%
29114	Hamilton Mountain	n/a	3.3	3.5	3.0	3.0	2.9	4.1	3.7	2.8	2.9	↓ 5%
35125	Toronto West	2.3	2.0	1.5	1.4	1.2	0.9	1.5	0.6	0.6	0.7	↓ 75%
46108	Mississauga	2.6	INS	n/a	1.6	1.1	1.0	1.3	0.6	0.7	1.3	↓ 71%
51001	Ottawa Downtown	1.5	1.1	0.9	1.0	0.9	0.2	0.4	0.3	0.3	0.3	↓ 94%
71078	Sault Ste. Marie	1.5	1.4	1.8	1.2	0.6	0.7	0.8	0.6	0.8	0.8	↓ 64%
77233	Sudbury	2.8	2.4	2.3	2.0	1.1	1.3	1.5	1.3	2.8	2.4	↓17%

Notes:
n/a indicates pollutant not monitored.
INS indicates there was insufficient data to calculate a valid annual mean.
Station 46108 replaced station 46109 as the Mississauga site in 2008.
Station 77233 replaced station 77219 as the Sudbury site in 2013.

Table A19: 2014 Air Quality Summary

City/Town	No. of Valid Hours	Percentage of Valid Hours AQI in Range					No. of Days
		Very Good 0-15	Good 16-31	Moderate 32-49	Poor 50-99	Very Poor 100+	At Least 1 Hour > 49
Windsor Downtown	8709	27.2	62.3	10.4	0.1	0	3
Windsor West	8737	23.5	63.6	12.7	0.2	0	5
Chatham	8751	24.2	68.0	7.9	<0.1	0	1
Sarnia	8727	26.1	65.8	7.8	0.2	<0.1	6
Grand Bend	8711	20.1	70.8	9.0	0.1	0	3
London	8749	24.4	66.3	9.2	0.1	0	3
Port Stanley	8747	18.3	72.4	9.2	<0.1	0	2
Tiverton	8646	20.1	74.7	5.2	<0.1	0	1
Brantford	8715	21.7	67.8	10.4	0.1	0	3
Kitchener	8735	25.3	66.0	8.5	0.3	0	7
St. Catharines	8720	22.1	70.6	7.3	<0.1	0	2
Guelph	8663	24.7	66.6	8.4	0.3	0	7
Hamilton Downtown	8739	24.8	63.6	11.4	0.2	0	5
Hamilton Mountain	8723	20.7	68.9	10.4	0.1w	0	3
Hamilton West	8747	30.9	61.3	7.4	0.4	0	9
Toronto Downtown	8739	33.3	60.1	6.4	0.1	0	2
Toronto East	8757	37.3	56.1	6.6	0.1	0	3
Toronto North	8715	29.9	62.8	7.1	0.2	0	6
Toronto West	8739	44.0	49.4	6.4	0.2	0	6
Burlington	8739	29.2	62.6	8.0	0.2	0	3
Oakville	8746	28.4	65.1	6.4	0.1	0	2
Oshawa	8742	29.3	65.4	5.3	<0.1	0	1
Brampton	8741	28.0	63.0	8.7	0.3	0	9
Mississauga	8724	31.9	61.4	6.6	0.2	0	5
Barrie	8740	32.4	63.2	4.3	<0.1	0	1
Newmarket	8748	26.5	66.7	6.7	0.1	0	5
Parry Sound	8745	25.3	71.4	3.2	0	0	0
Dorset	8742	31.5	66.0	2.5	0	0	0
Ottawa Downtown	8745	38.6	58.7	2.7	<0.1	0	1
Ottawa Central	8747	32.2	64.2	3.6	0	0	0
Petawawa	8745	35.7	62.8	1.5	0	0	0
Kingston	8741	21.8	72.0	6.1	0.1	0	2
Belleville	8751	24.6	69.8	5.6	0	0	0
Morrisburg	8755	27.8	69.0	3.1	<0.1	0	1
Cornwall	8714	28.9	67.9	3.2	<0.1	0	1
Peterborough	8741	25.9	69.2	4.9	<0.1	0	1
Thunder Bay	8496	36.0	62.6	1.4	0	0	0
Sault Ste. Marie	8739	30.1	66.9	3.0	0	0	0
North Bay	8748	35.0	62.8	2.2	0	0	0
Sudbury	8751	33.9	63.5	2.6	<0.1	0	1

Table A20: Summary of Smog Advisories (2005 - 2014)

Air Quality Forecast Region	2005		2006		2007		2008		2009		2010		2011		2012		2013		2014	
	Adv.	Days	Adv.	Days	Adv.	Days	Adv.	Days	Adv.	Days	Adv.	Days	Adv.	Days	Adv.	Days	Adv.	Days	Adv.	Days
Algonquin	5	16	1	3	1	3	0	0	1	1	0	0	0	0	1	3	0	0	0	0
Bancroft-Bon Echo	7	21	1	3	4	13	2	3	2	4	1	5	0	0	2	5	1	2	0	0
Barrie-Orillia-Midland	13	39	5	11	8	21	3	7	2	4	1	4	1	1	7	15	0	0	0	0
Belleville-Quinte-Northumberland	13	42	5	12	9	24	4	8	2	4	2	8	1	1	6	13	1	2	0	0
Brockville-Leeds and Grenville	7	24	2	5	3	5	2	4	2	4	1	2	0	0	2	4	1	2	0	0
Burk's Falls Bayfield Inlet	8	24	2	4	1	3	0	0	1	1	0	0	0	0	2	4	0	0	0	0
City of Hamilton	13	45	5	11	10	31	6	13	2	4	2	8	2	2	7	18	1	2	0	0
City of Ottawa	7	25	2	5	2	4	1	1	2	4	1	2	0	0	1	2	1	2	0	0
City of Toronto	14	48	5	11	11	29	6	13	2	4	2	8	1	1	8	16	1	2	0	0
Cornwall-Morrisburg	7	25	2	5	3	5	2	4	2	4	1	2	0	0	1	2	1	2	0	0
Dufferin-Innisfil	13	44	5	11	9	27	3	7	2	4	1	5	1	1	7	15	0	0	0	0
Dunnville-Caledonia-Haldimand	13	45	5	11	12	31	4	11	2	4	2	8	1	1	6	16	0	0	0	0
Elgin	12	45	4	13	13	37	6	15	2	4	2	10	2	4	7	18	0	0	0	0
Elliot Lake-Ranger Lake	4	12	1	3	1	3	0	0	0	0	0	0	0	0	2	4	0	0	0	0
Greater Sudbury and Vicinity	7	20	2	4	1	3	0	0	1	1	0	0	0	0	2	4	0	0	0	0
Grey-Bruce	10	32	4	10	9	22	1	2	2	4	2	8	1	1	6	14	0	0	0	0
Haliburton	10	30	4	10	6	17	1	2	2	4	1	4	0	0	3	6	0	0	0	0
Halton-Peel	14	48	5	11	11	31	6	13	2	4	2	8	1	1	8	17	1	2	0	0
Huron-Perth	12	44	4	11	12	27	3	7	2	4	2	10	1	1	7	18	0	0	0	0
Kingston-Prince Edward	10	32	5	12	9	23	4	8	2	4	2	8	1	1	5	11	1	2	0	0
London-Middlesex	12	45	4	12	12	27	5	11	2	4	2	9	1	1	7	18	0	0	0	0
Manitoulin-Northshore-Killarney	6	18	2	4	1	3	0	0	1	1	0	0	0	0	2	4	0	0	0	0
Niagara	13	45	5	11	10	29	4	11	2	4	2	8	1	1	6	16	0	0	0	0
North Bay-West Nipissing	7	20	2	4	1	3	0	0	1	1	0	0	0	0	2	4	0	0	0	0
Oxford-Brant	13	46	5	11	12	31	4	11	2	4	2	8	1	1	6	16	0	0	0	0
Parry Sound-Muskoka-Huntsville	10	30	4	10	8	21	2	5	2	4	1	4	0	0	5	10	0	0	0	0
Peterborough-Kawartha Lakes	12	38	4	10	8	21	3	6	2	4	2	8	0	0	6	13	1	2	0	0
Prescott and Russell	7	25	2	5	2	4	1	1	2	4	1	2	0	0	1	2	1	2	0	0
Renfrew-Pembroke-Barry's Bay	5	17	1	3	2	5	0	0	2	4	1	2	0	0	1	2	1	2	0	0
Sarnia-Lambton	13	46	4	12	13	29	4	10	2	4	2	10	2	4	7	18	0	0	0	0
Sault Ste. Marie-Superior East	4	10	1	3	1	3	0	0	0	0	0	0	0	0	1	3	0	0	0	0
Simcoe-Delhi-Norfolk	13	46	5	11	12	31	4	11	2	4	2	10	1	1	6	16	0	0	0	0
Smiths Falls-Lanark-Sharbot Lake	6	19	2	5	2	4	1	1	2	4	1	2	0	0	1	2	1	2	0	0
Stirling-Tweed-South Frontenac	8	25	2	5	5	13	2	3	2	4	2	8	0	0	3	6	1	2	0	0
Waterloo-Wellington	13	45	5	11	11	29	3	7	2	4	2	8	1	1	6	15	0	0	0	0
Windsor-Essex-Chatham-Kent	13	46	4	14	13	38	5	12	3	5	2	10	4	8	8	24	0	0	0	0
York-Durham	14	48	5	11	11	29	5	9	2	4	2	8	1	1	8	16	1	2	0	0
ONTARIO	**15**	**53**	**6**	**17**	**13**	**39**	**8**	**17**	**3**	**5**	**3**	**12**	**5**	**9**	**12**	**30**	**1**	**2**	**0**	**0**

Note:
A smog advisory day refers to a calendar day when a smog advisory is in effect.

Figure A1: 20y Trend of Ozone Annual Mean at Windsor Downtown

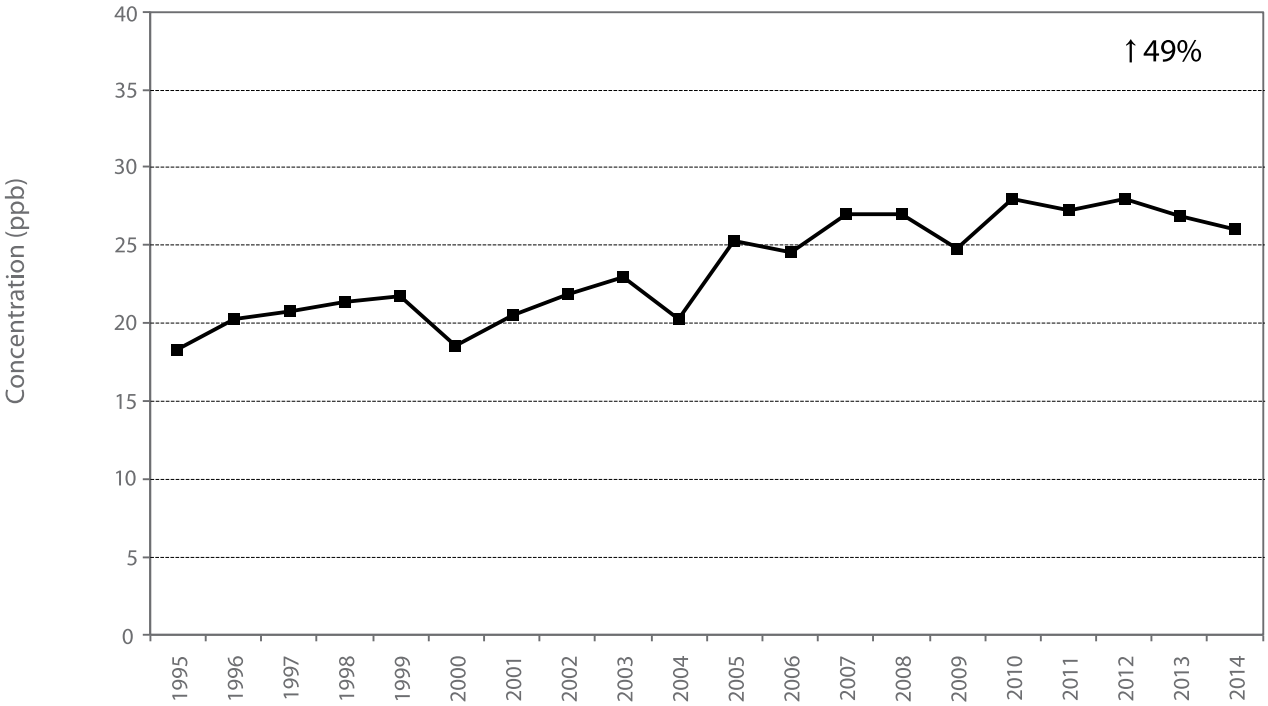


Figure A2: 20y Trend of Ozone Annual Mean at Windsor West

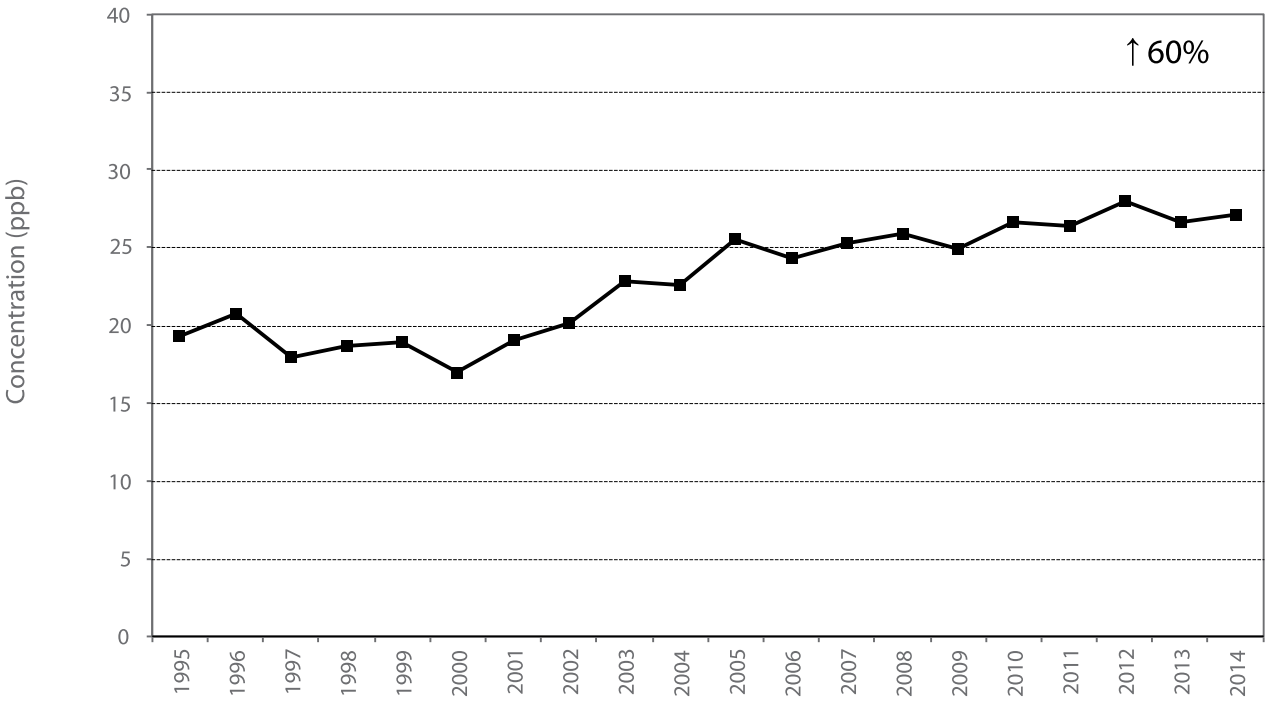


Figure A3: 20y Trend of Ozone Annual Mean at Sarnia

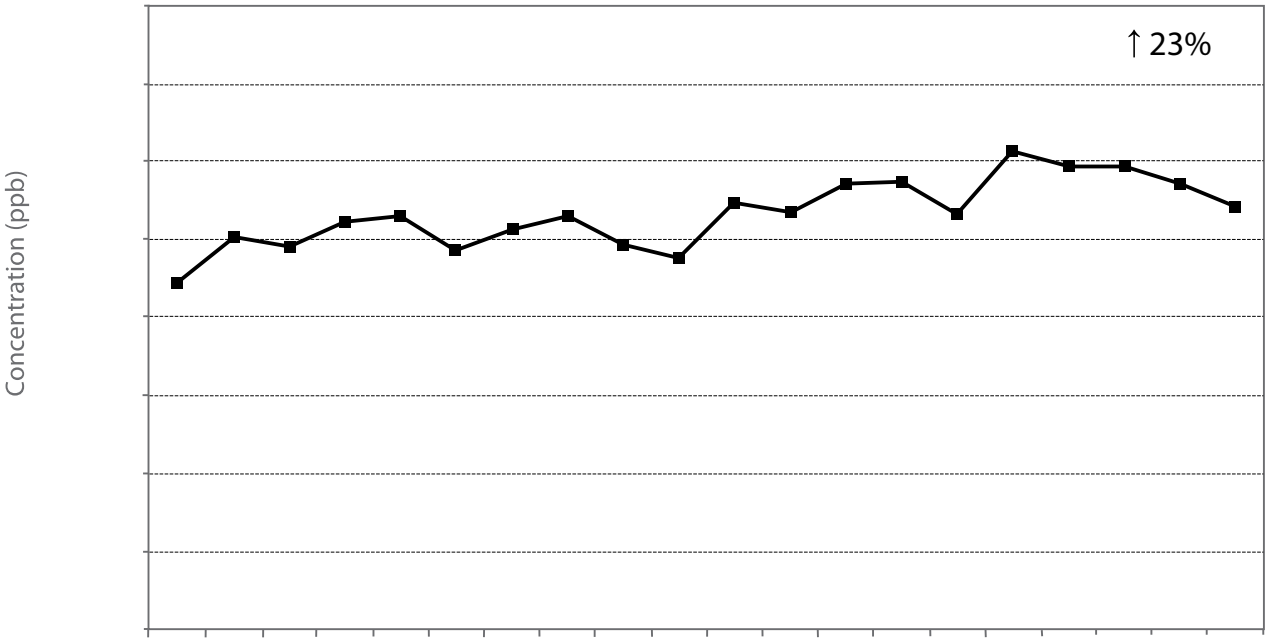


Figure A4: 20y Trend of Ozone Annual Mean at Grand Bend

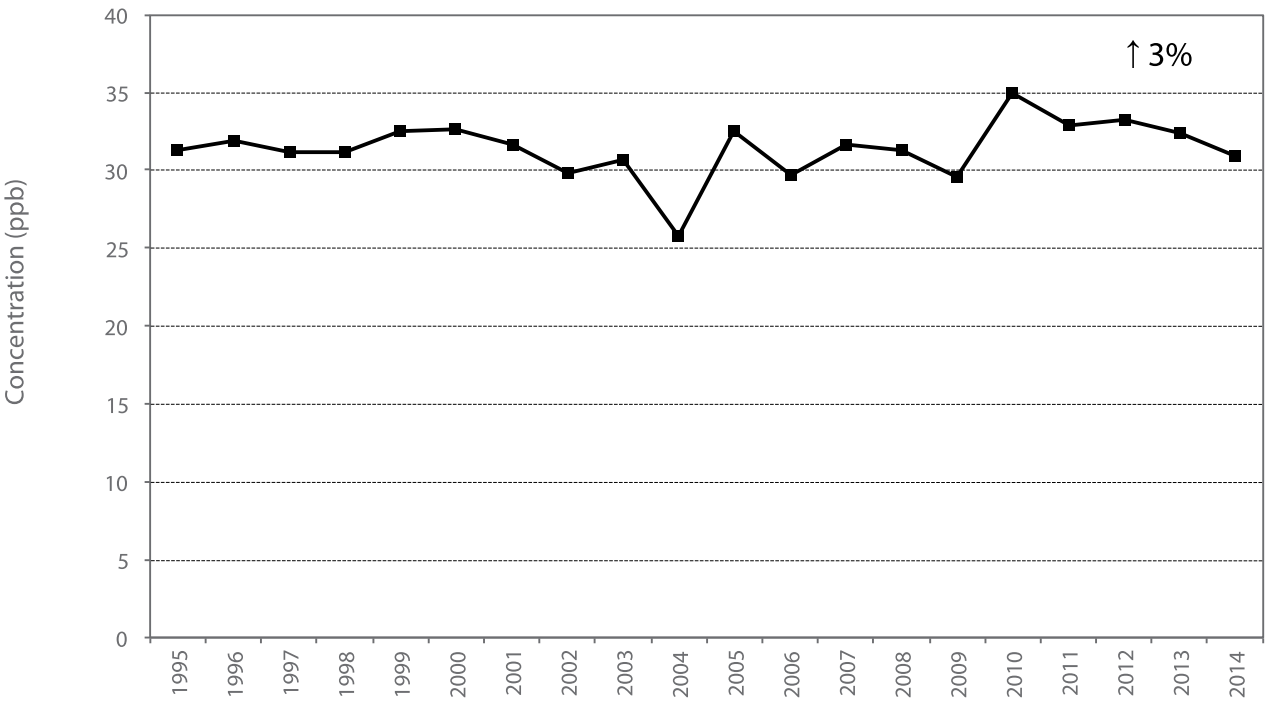


Figure A5: 20y Trend of Ozone Annual Mean at London

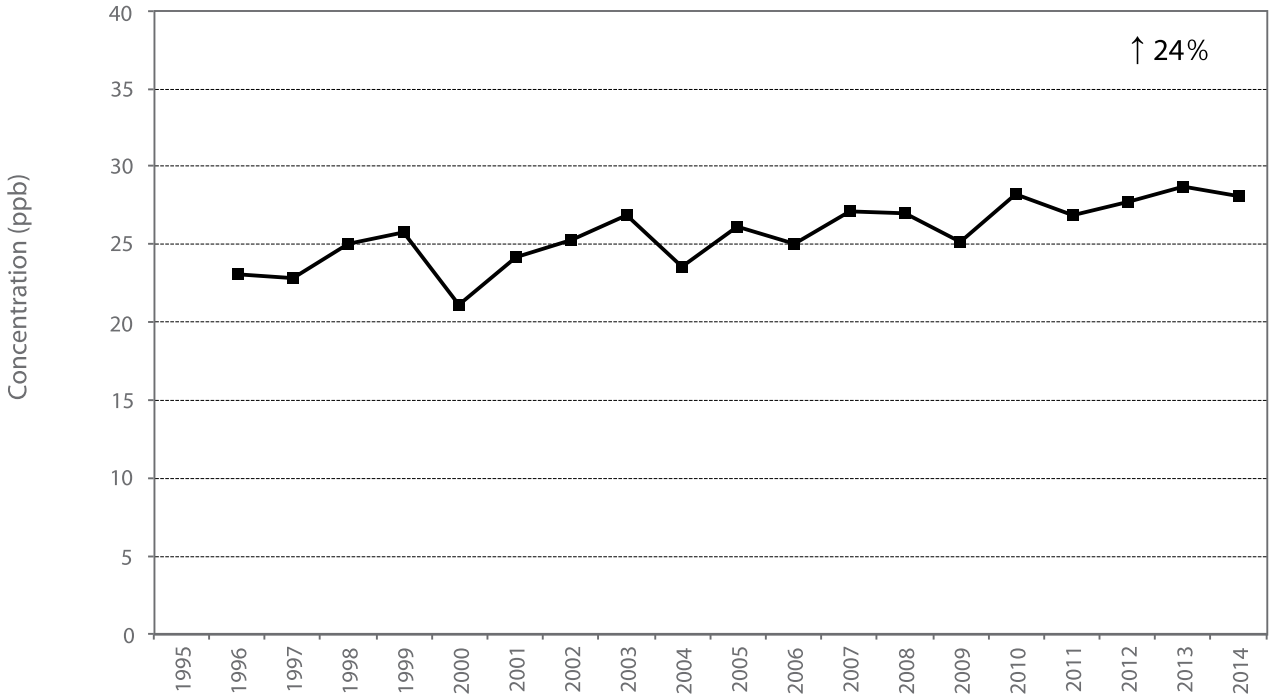


Figure A6: 20y Trend of Ozone Annual Mean at Tiverton

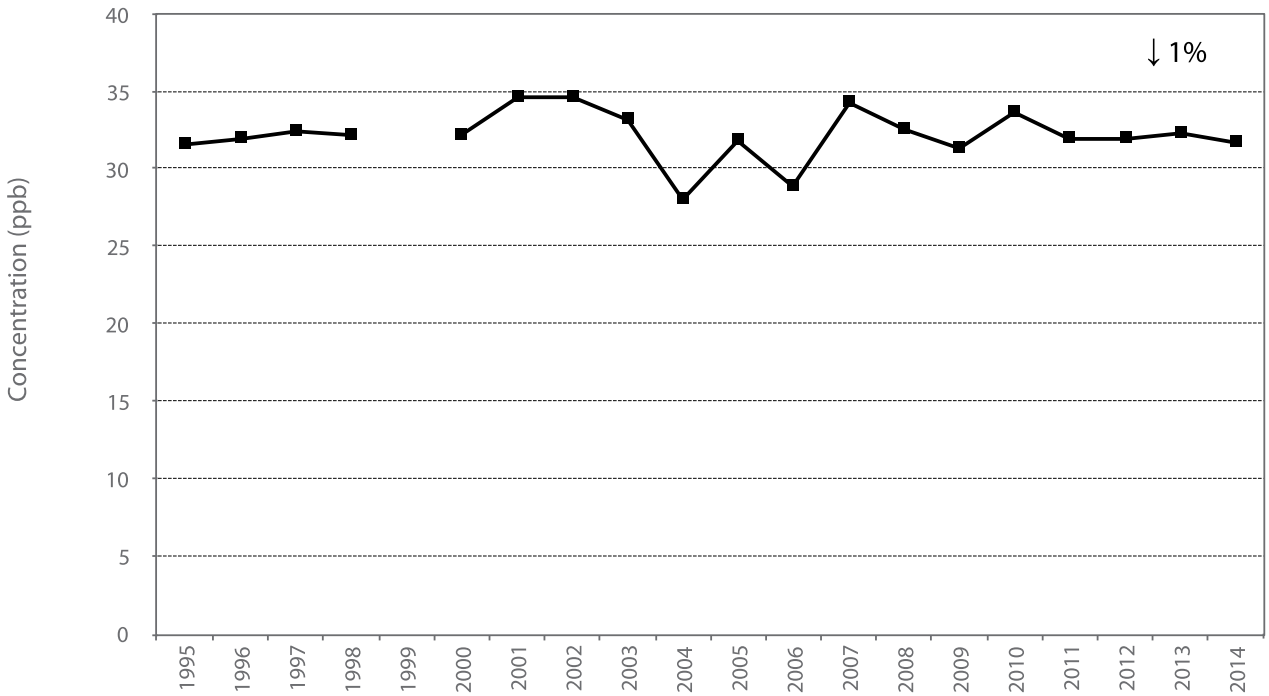


Figure A7: 20y Trend of Ozone Annual Mean at Kitchener

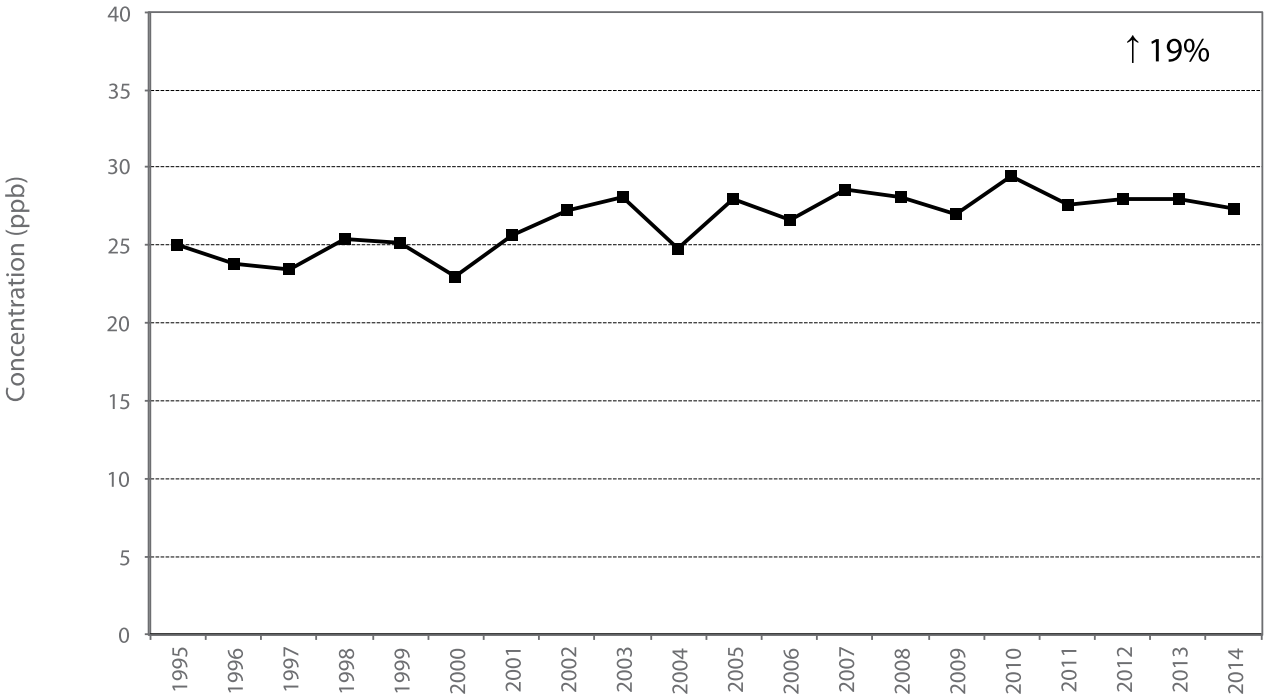


Figure A8: 20y Trend of Ozone Annual Mean at St. Catharines

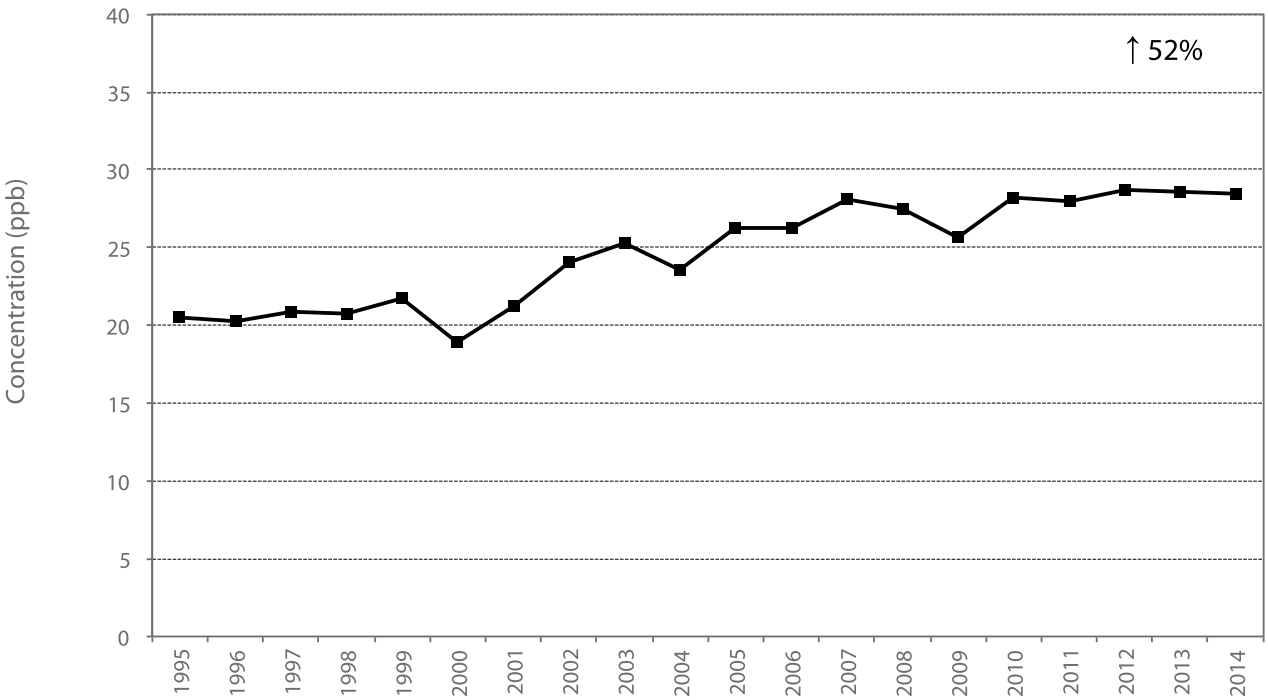


Figure A9: 20y Trend of Ozone Annual Mean at Guelph

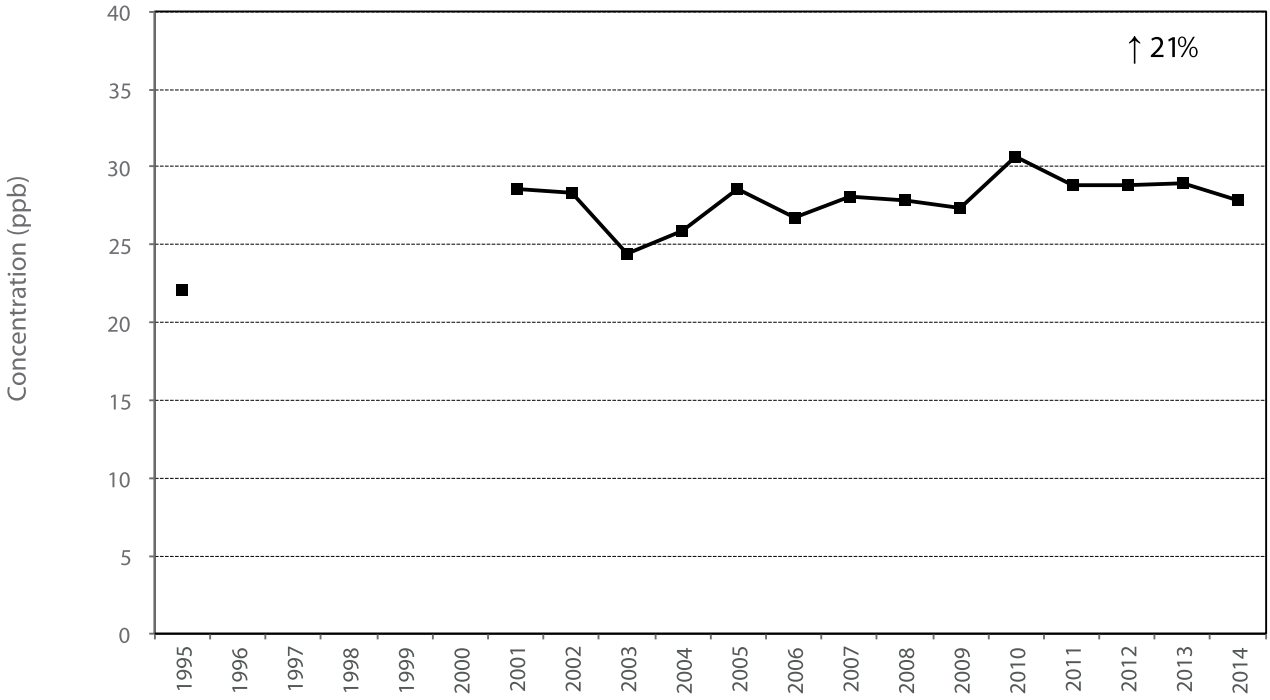


Figure A10: 20y Trend of Ozone Annual Mean at Hamilton Downtown

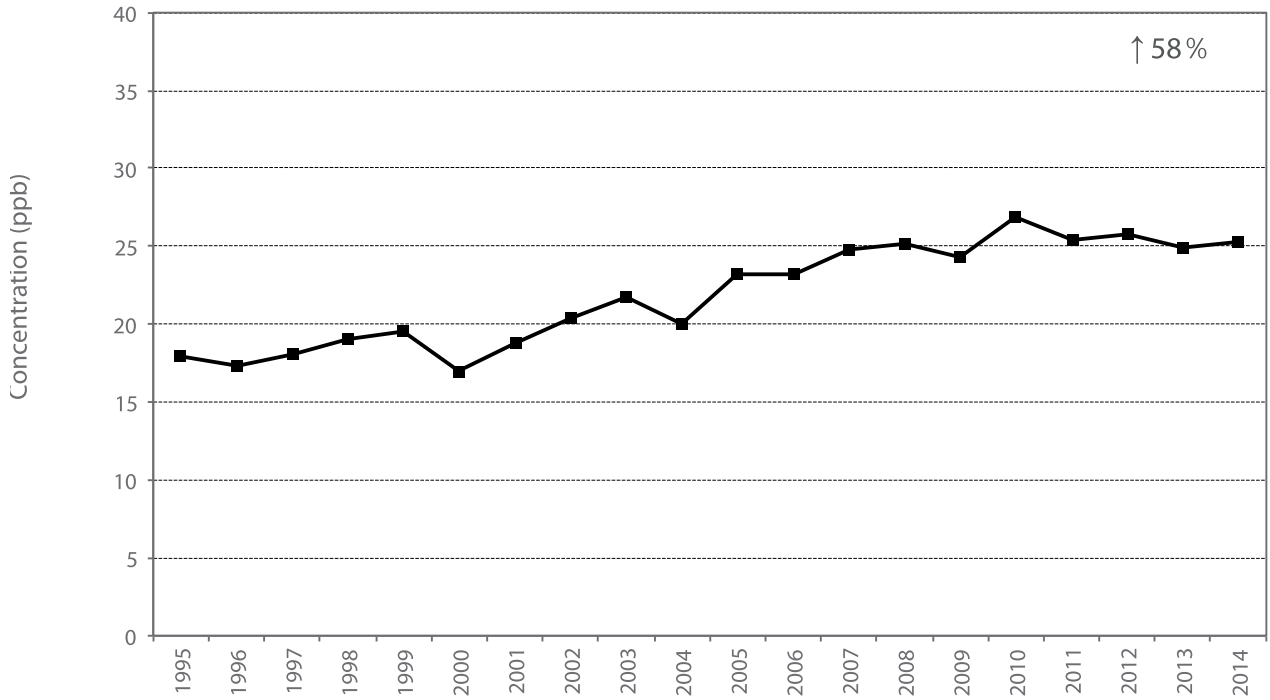


Figure A11: 20y Trend of Ozone Annual Mean at Hamilton Mountain

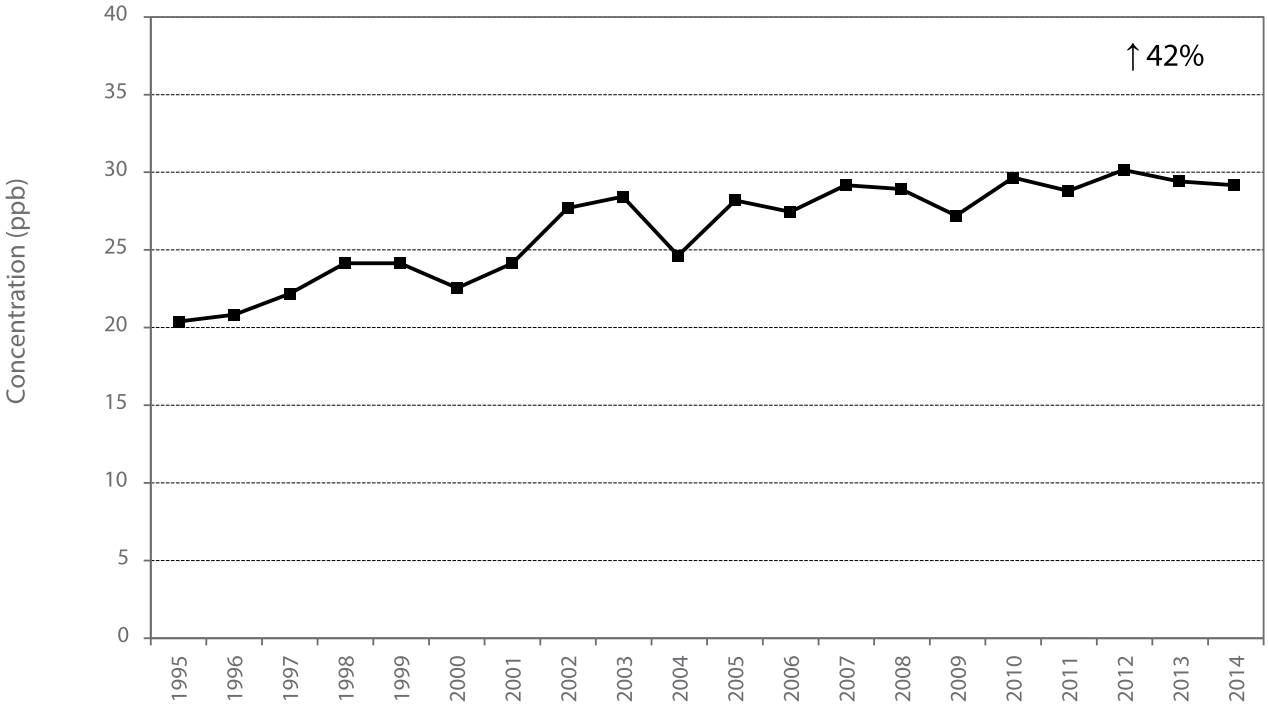


Figure A12: 20y Trend of Ozone Annual Mean at Hamilton West

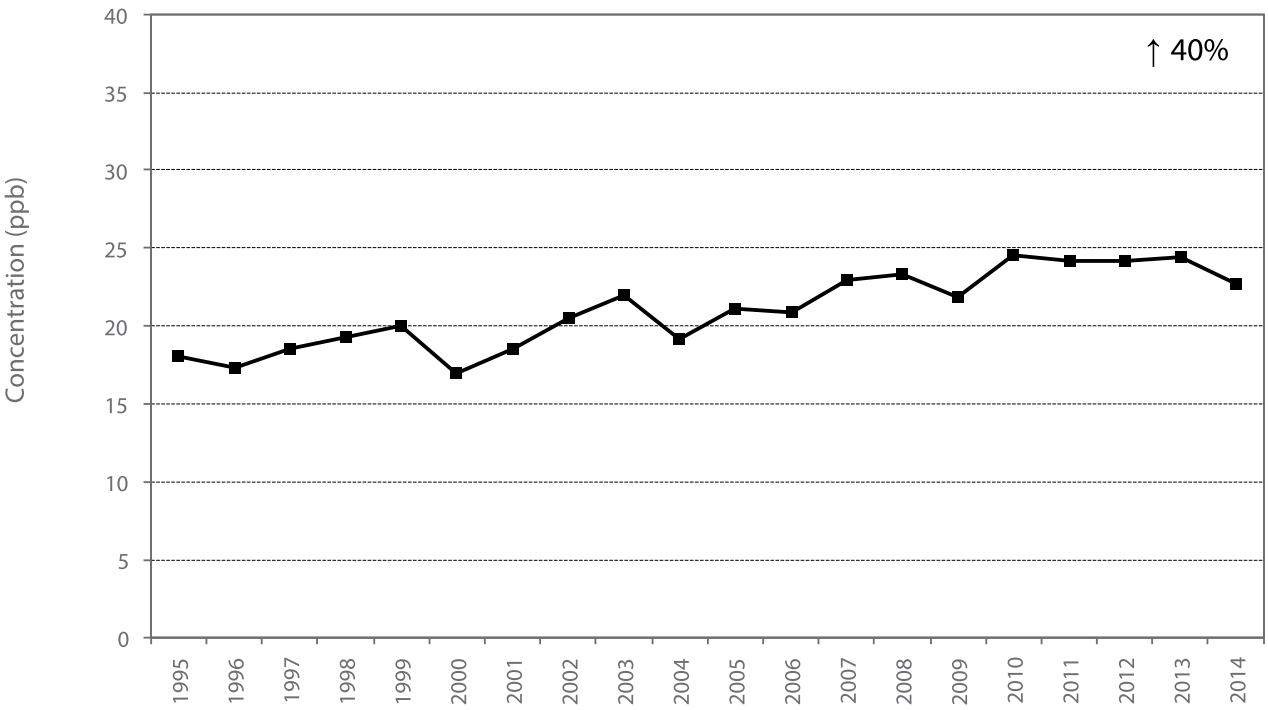


Figure A13: 20y Trend of Ozone Annual Mean at Toronto Downtown

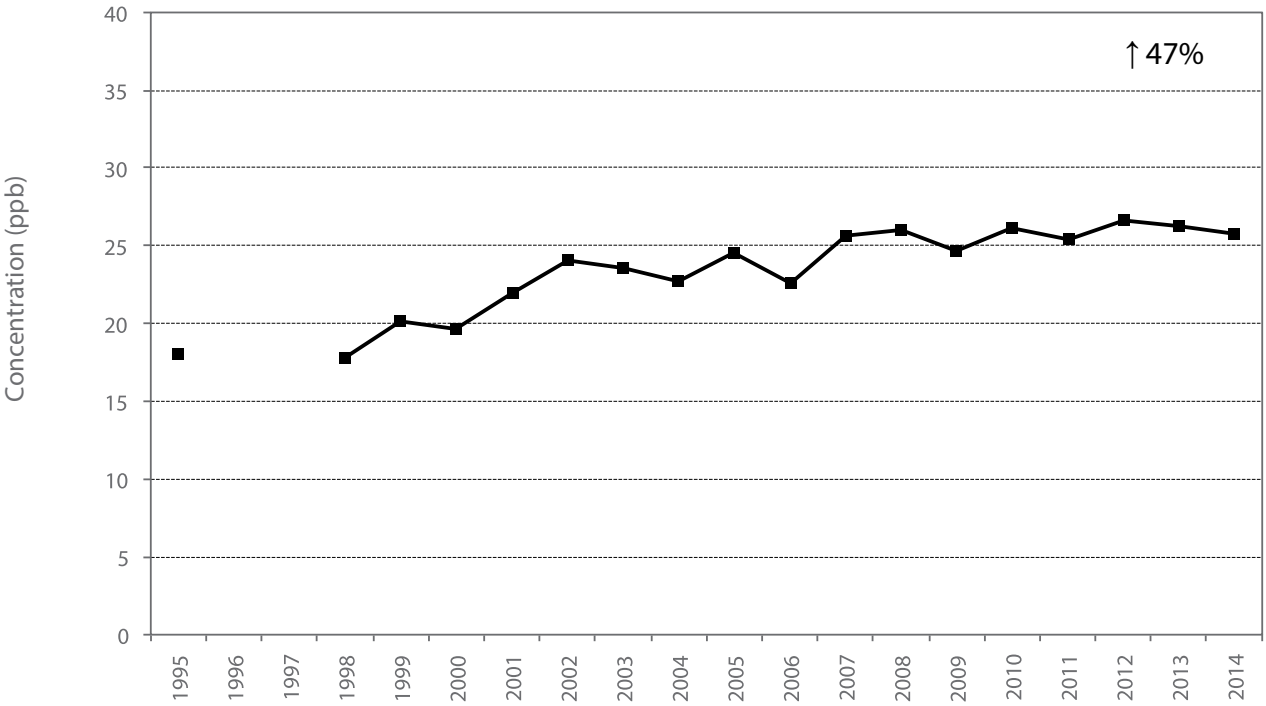


Figure A14: 20y Trend of Ozone Annual Mean at Toronto East

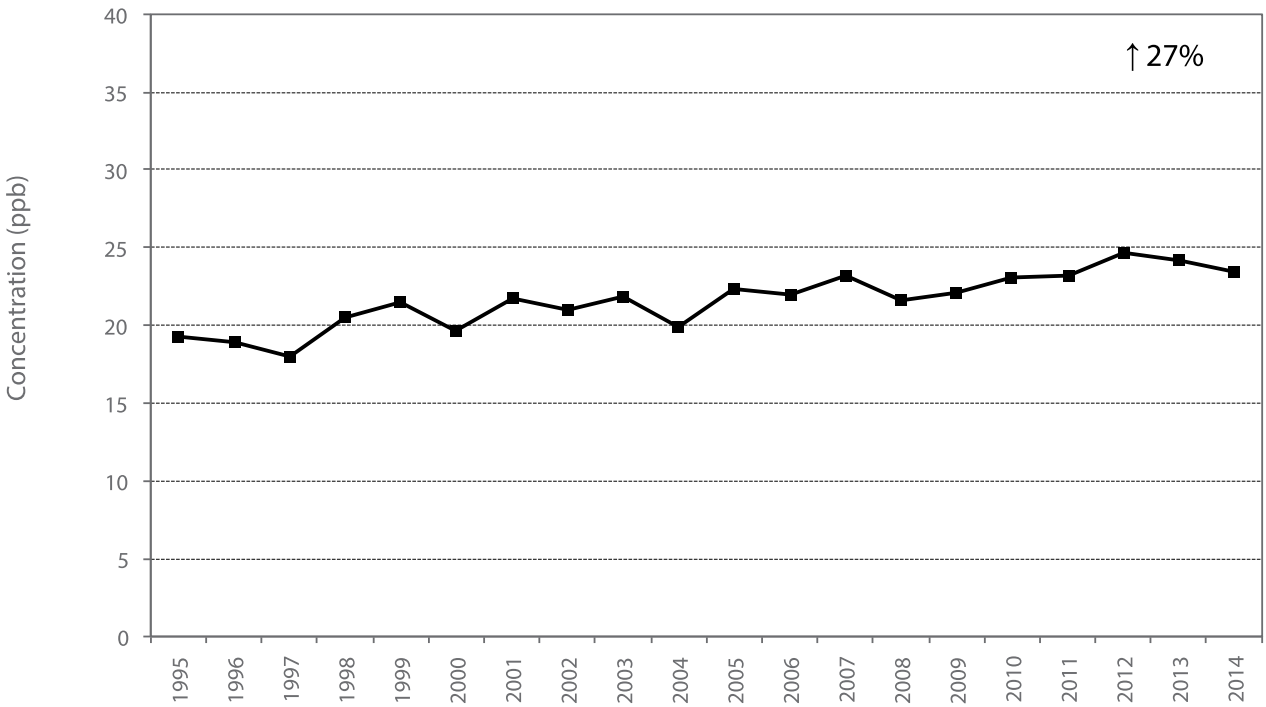


Figure A15: 20y Trend of Ozone Annual Mean at Toronto North

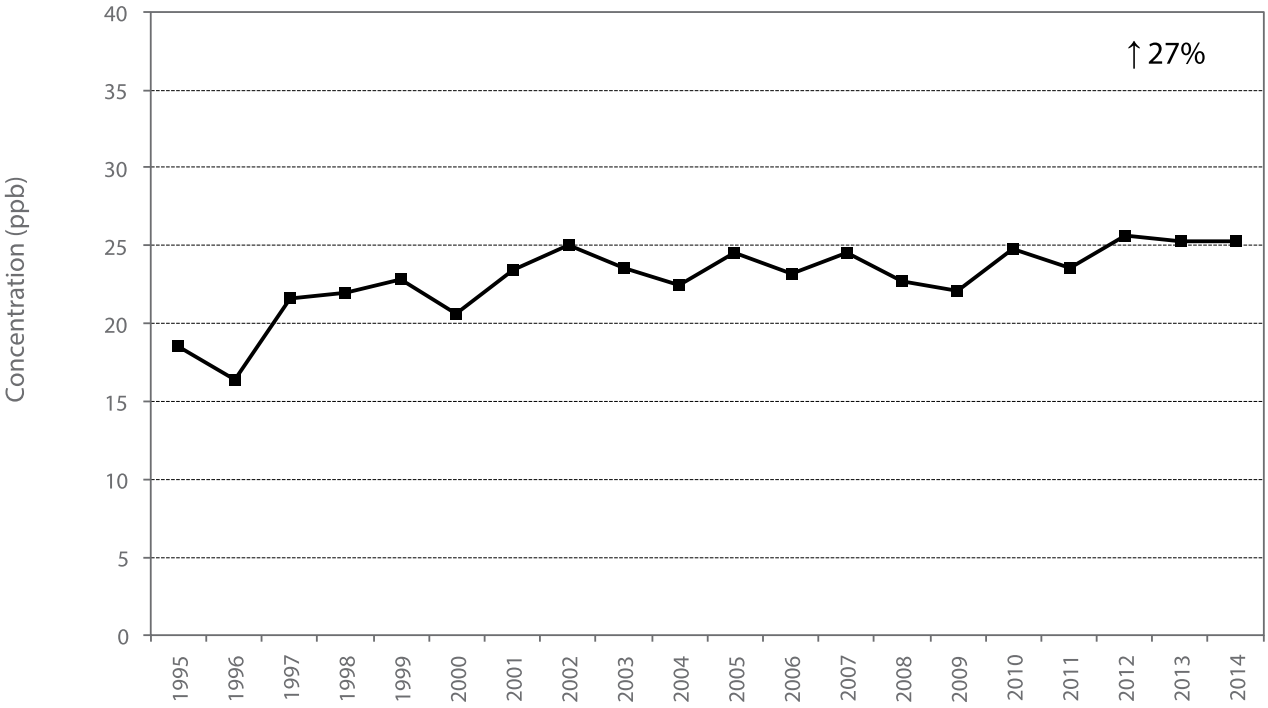


Figure A16: 20y Trend of Ozone Annual Mean at Burlington

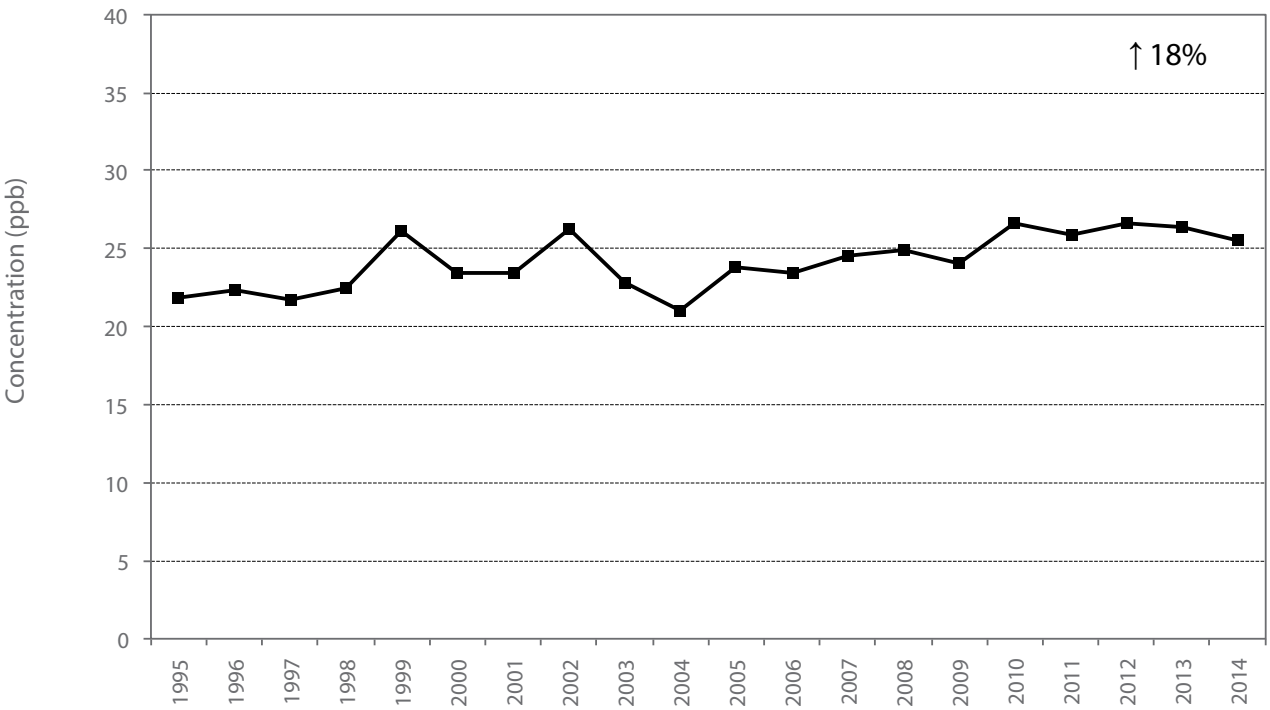


Figure A17: 20y Trend of Ozone Annual Mean at Oakville

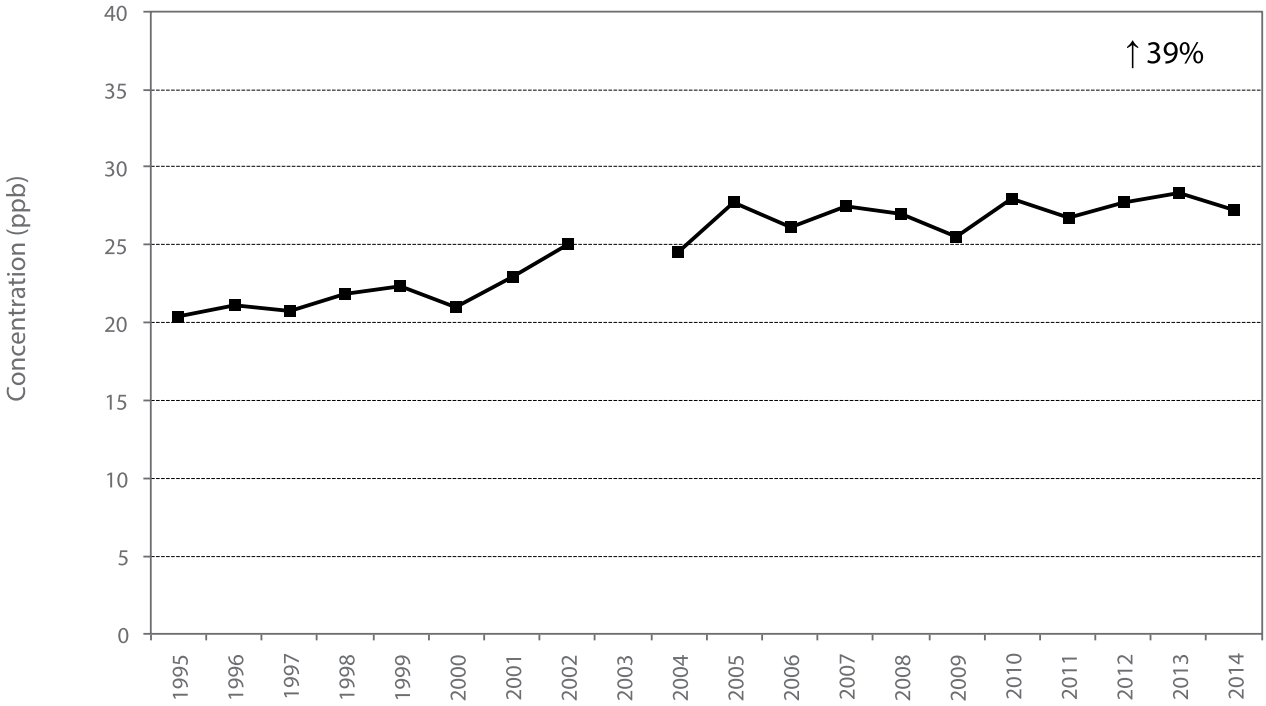


Figure A18: 20y Trend of Ozone Annual Mean at Oshawa

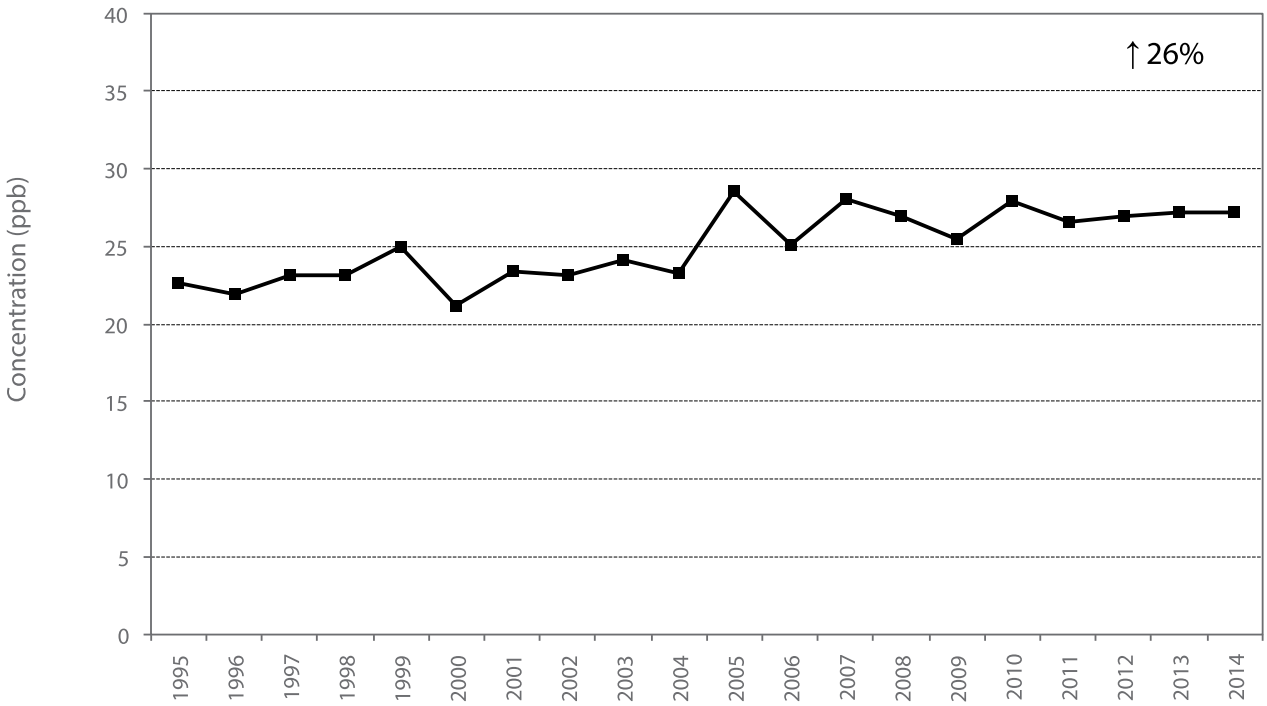


Figure A19: 20y Trend of Ozone Annual Mean at Mississauga

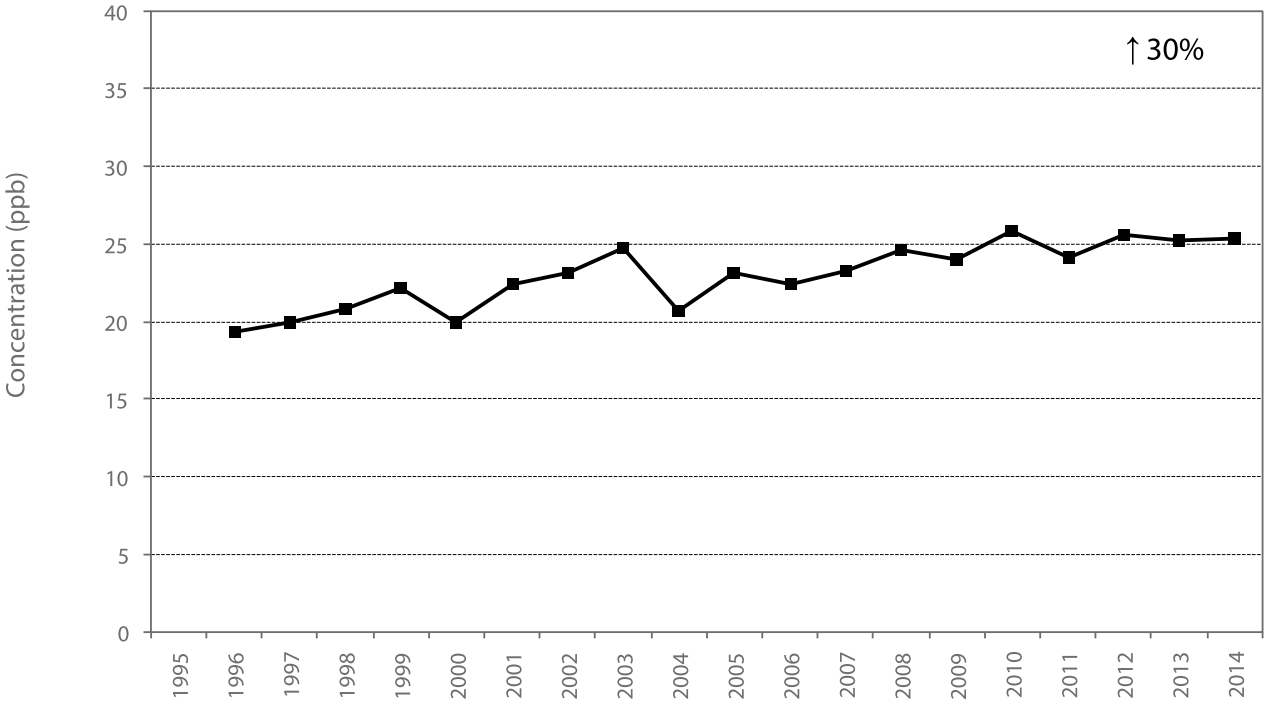


Figure A20: 20y Trend of Ozone Annual Mean at Dorset

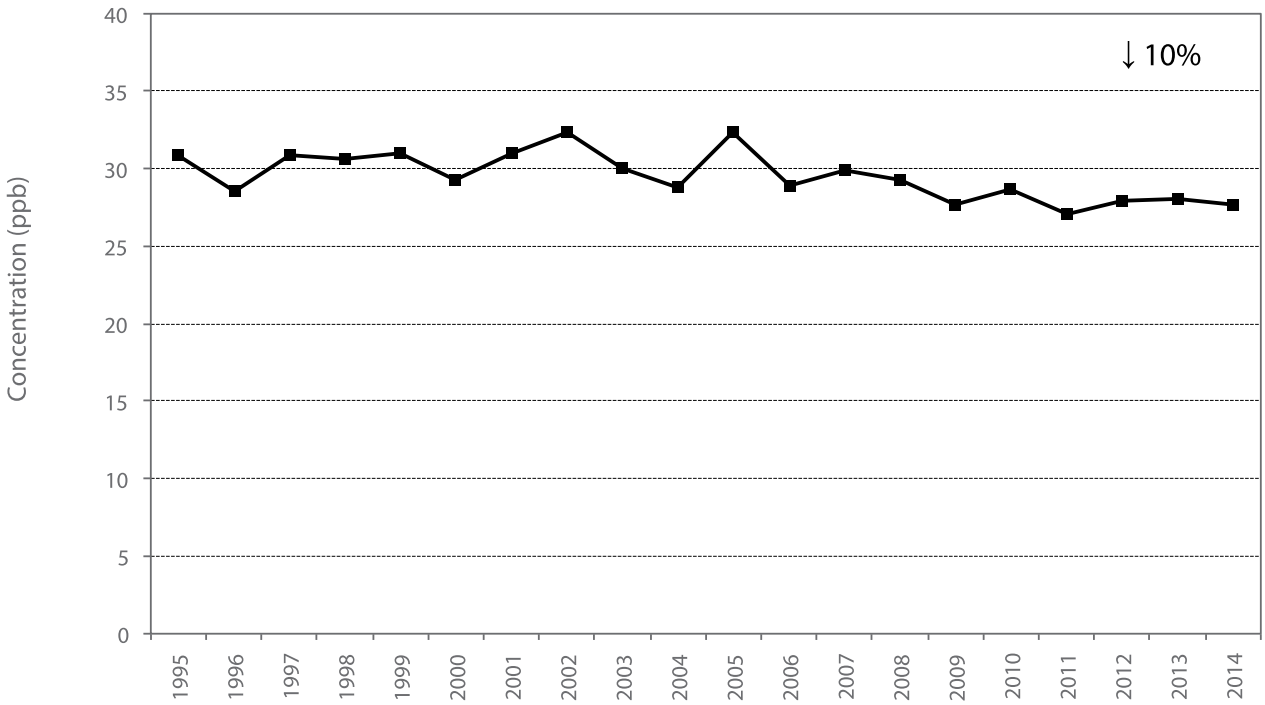


Figure A21: 20y Trend of Ozone Annual Mean at Ottawa Downtown

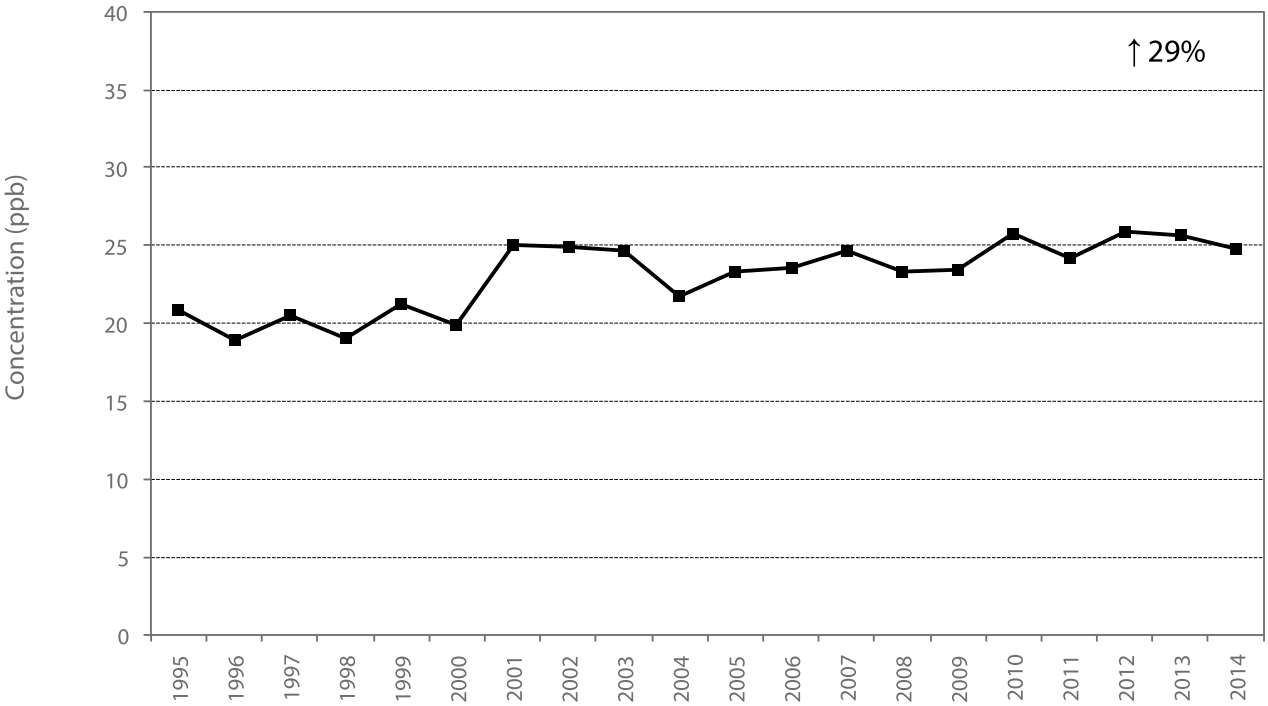


Figure A22: 20y Trend of Ozone Annual Mean at Cornwall

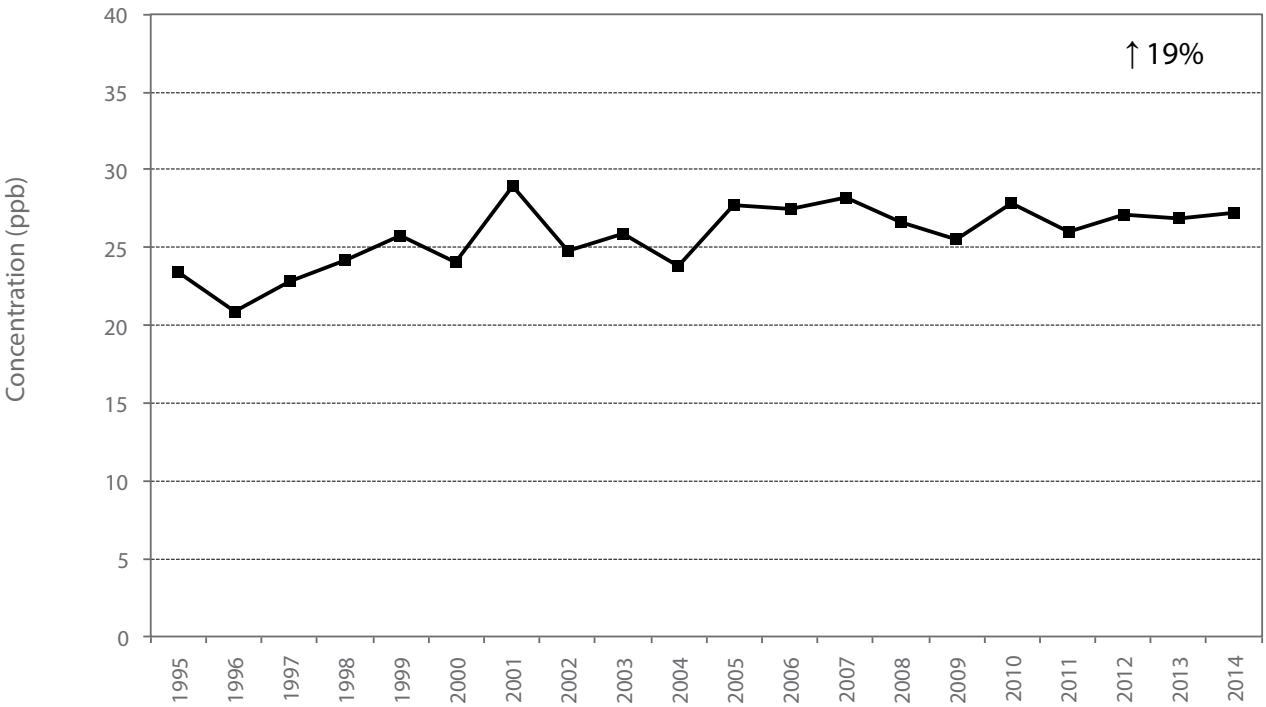


Figure A23: 20y Trend of Ozone Annual Mean at Peterborough

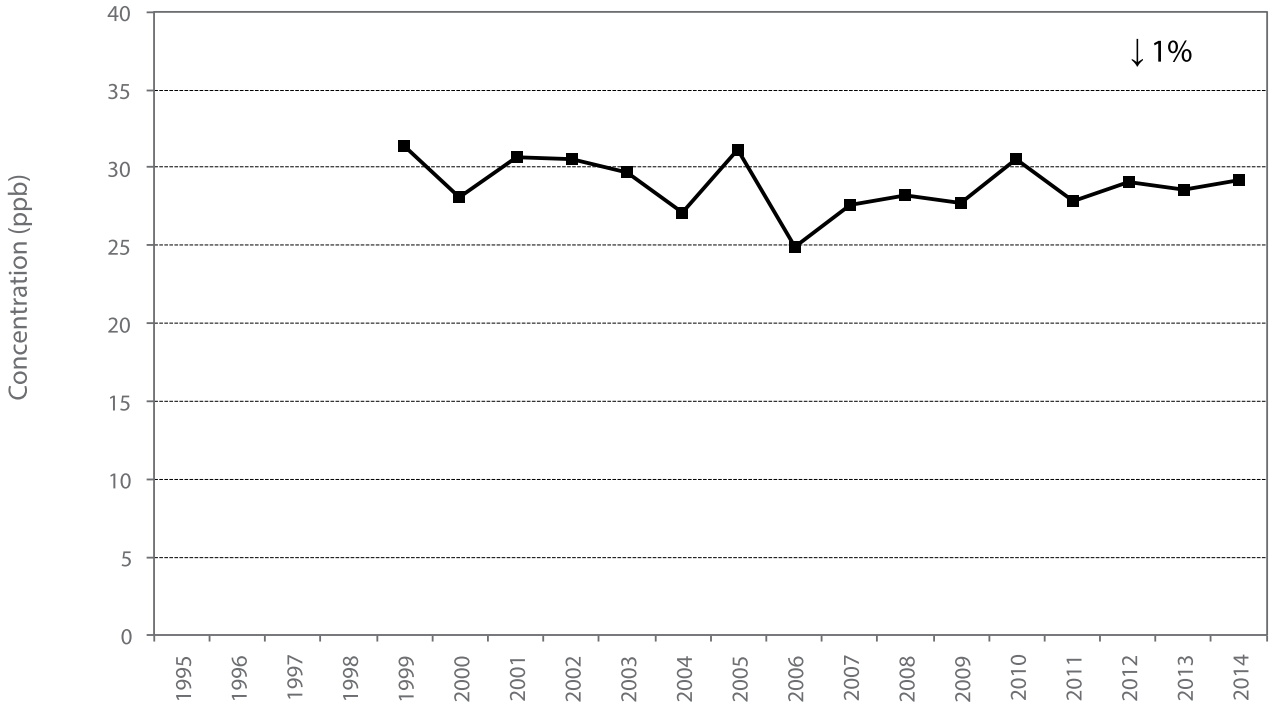


Figure A24: 20y Trend of Ozone Annual Mean at Thunder Bay

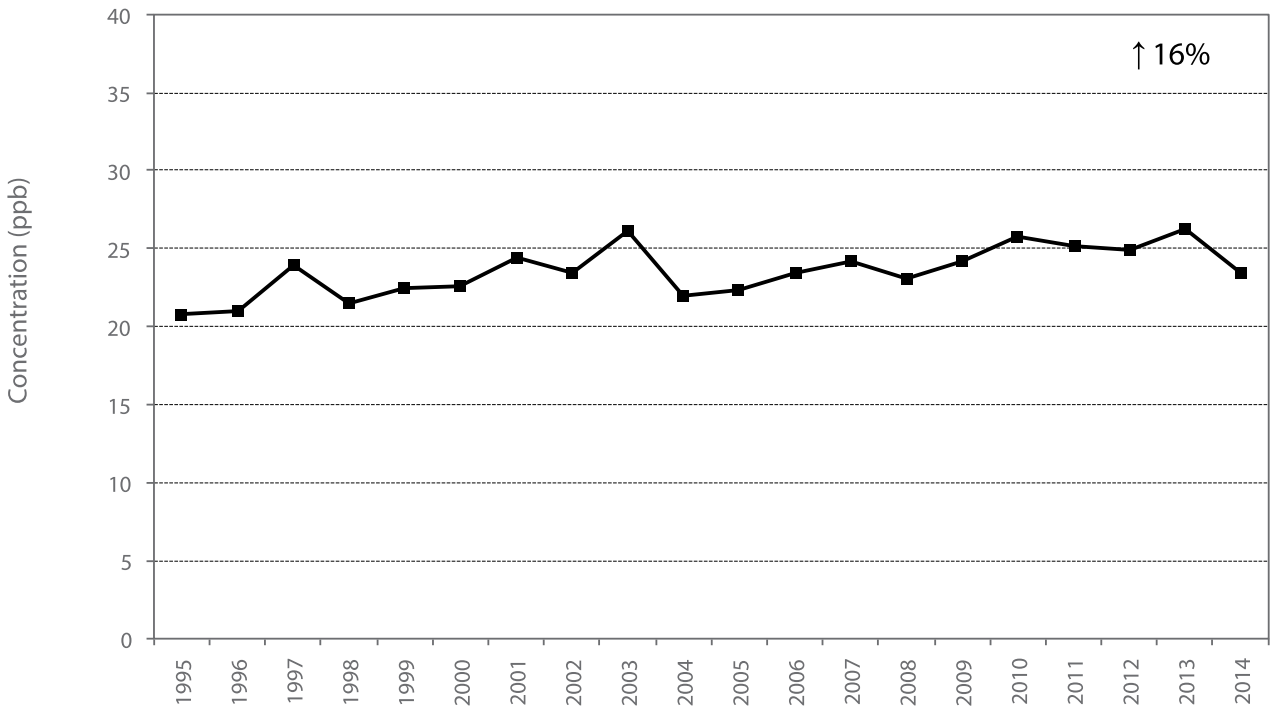


Figure A25: 20y Trend of Ozone Annual Mean at Sault Ste. Marie

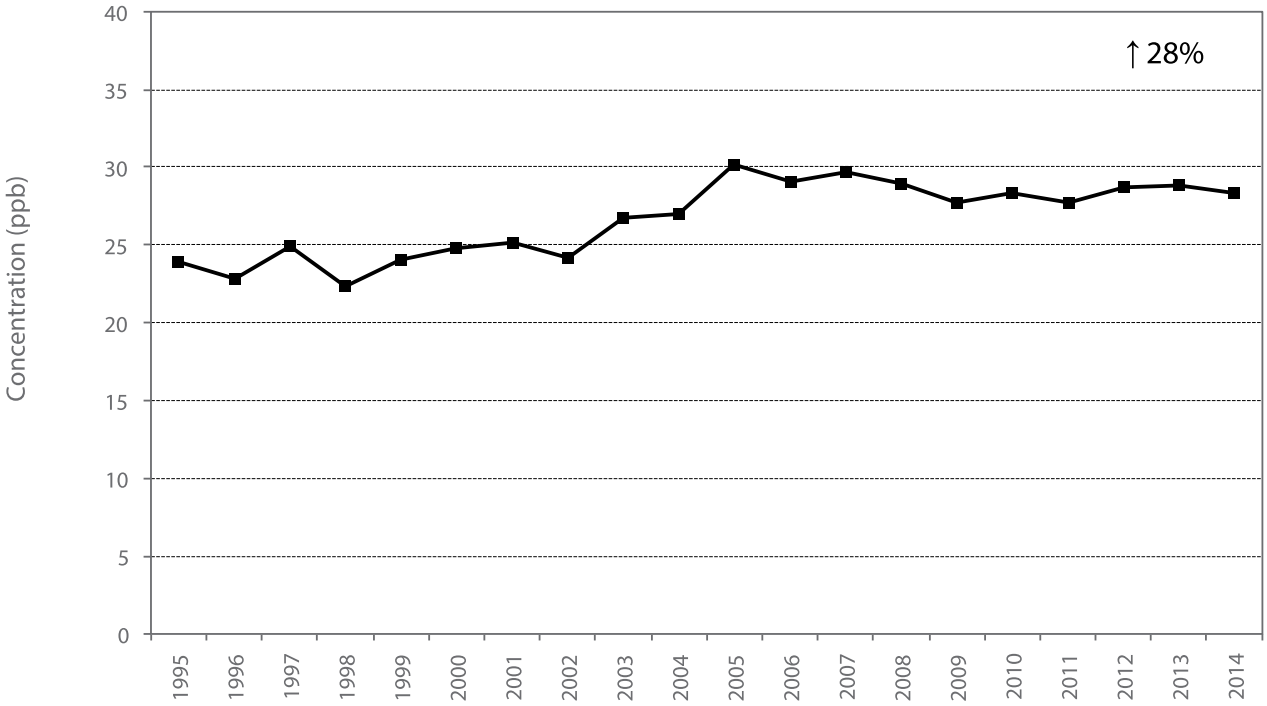


Figure A26: 20y Trend of Ozone Annual Mean at North Bay

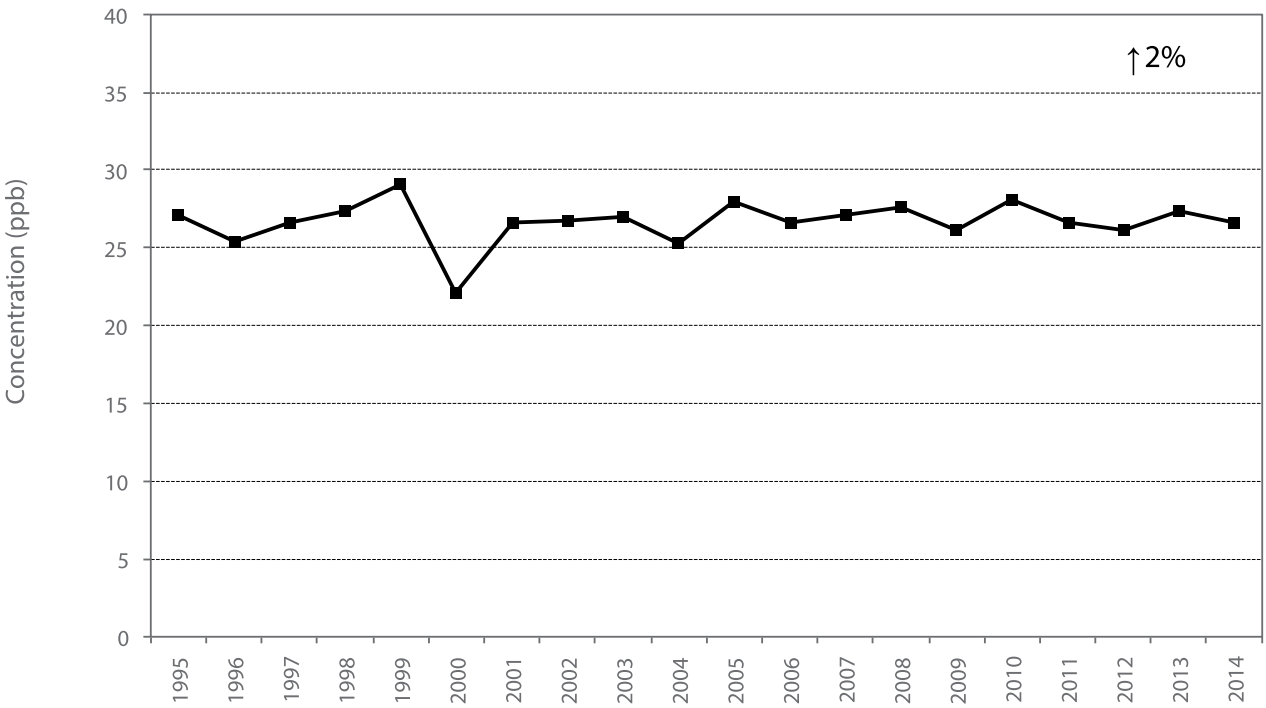


Figure A27: 20y Trend of Ozone Annual Mean at Sudbury

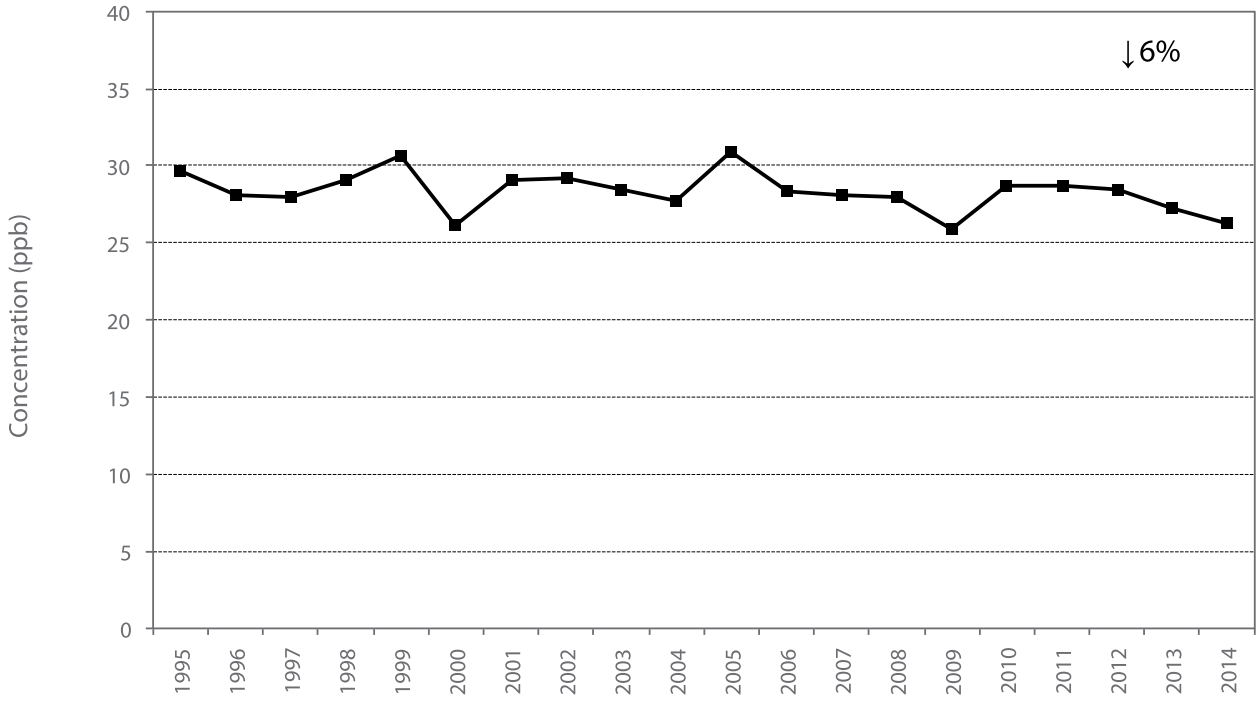


Figure A28: 20y Trend of NO_2 Annual Mean at Windsor Downtown

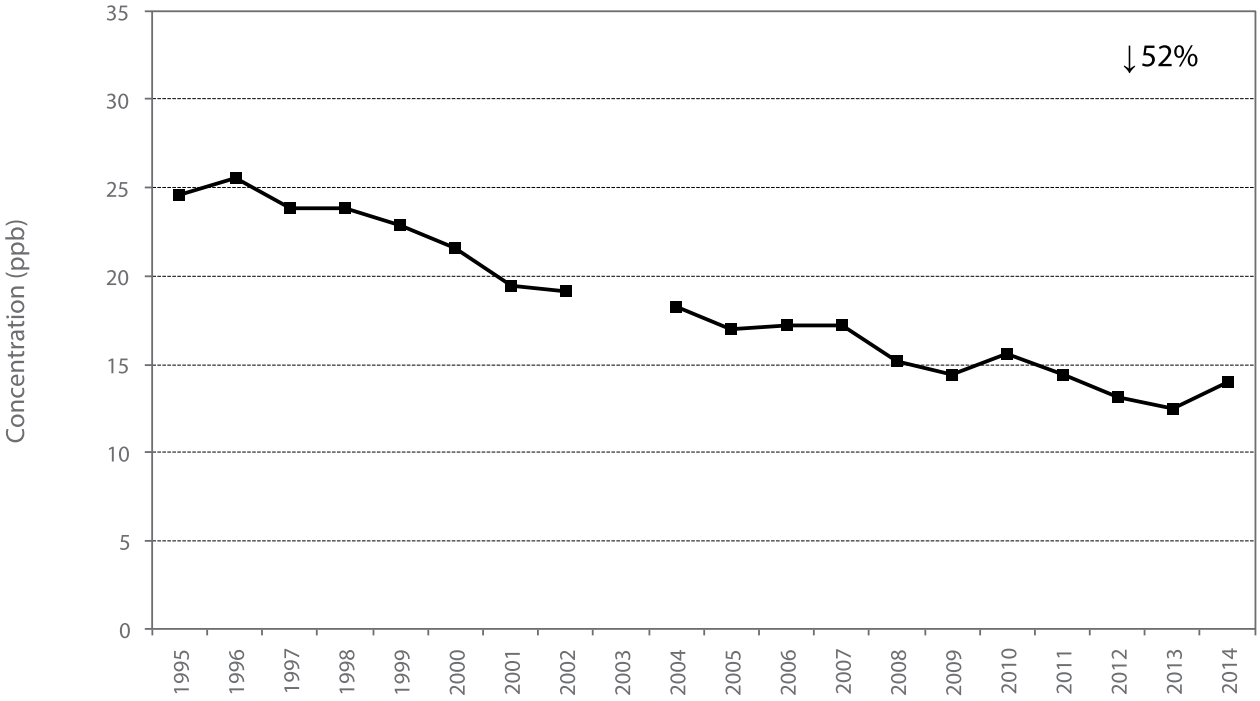


Figure A29: 20y Trend of NO_2 Annual Mean at Sarnia

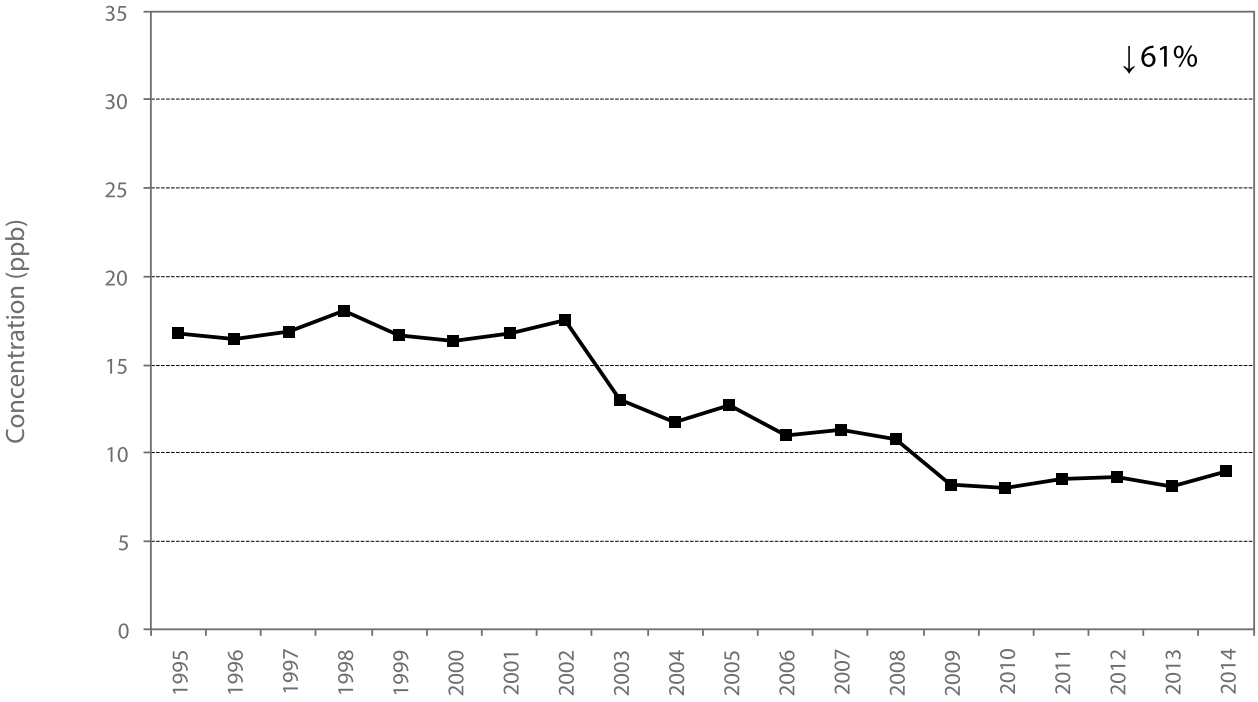


Figure A30: 20y Trend of NO_2 Annual Mean at London

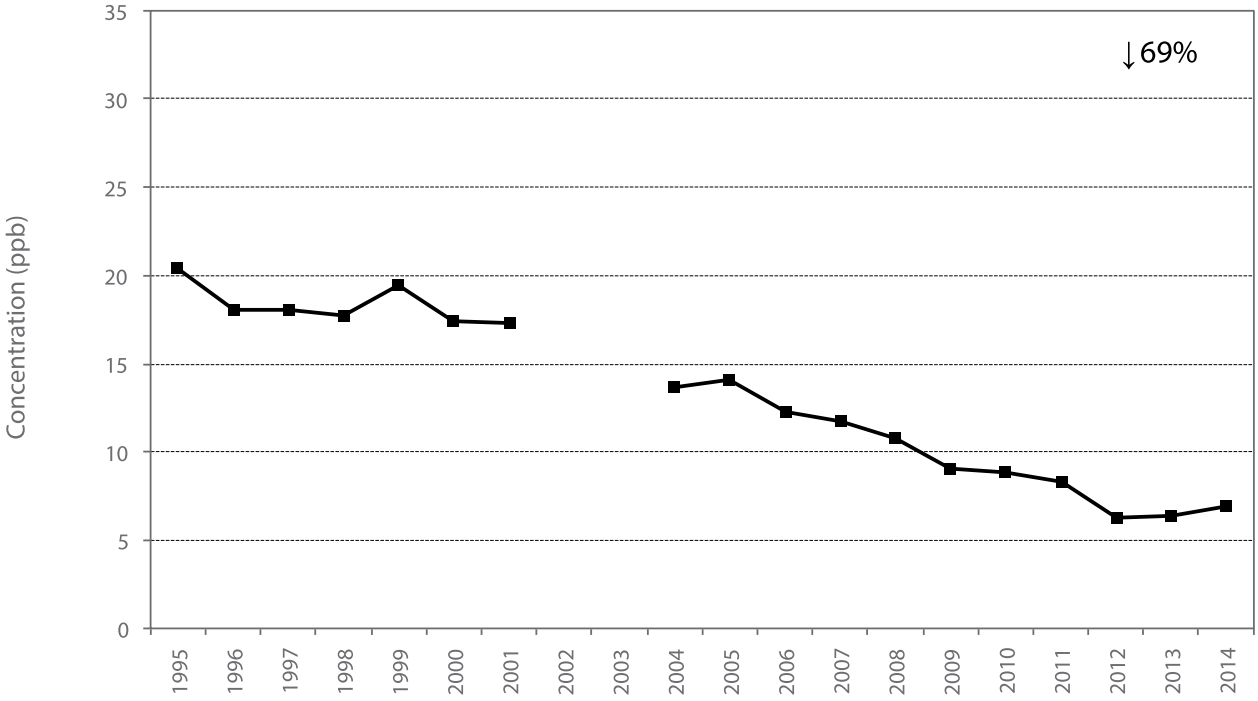


Figure A31: 20y Trend of NO_2 Annual Mean at Kitchener

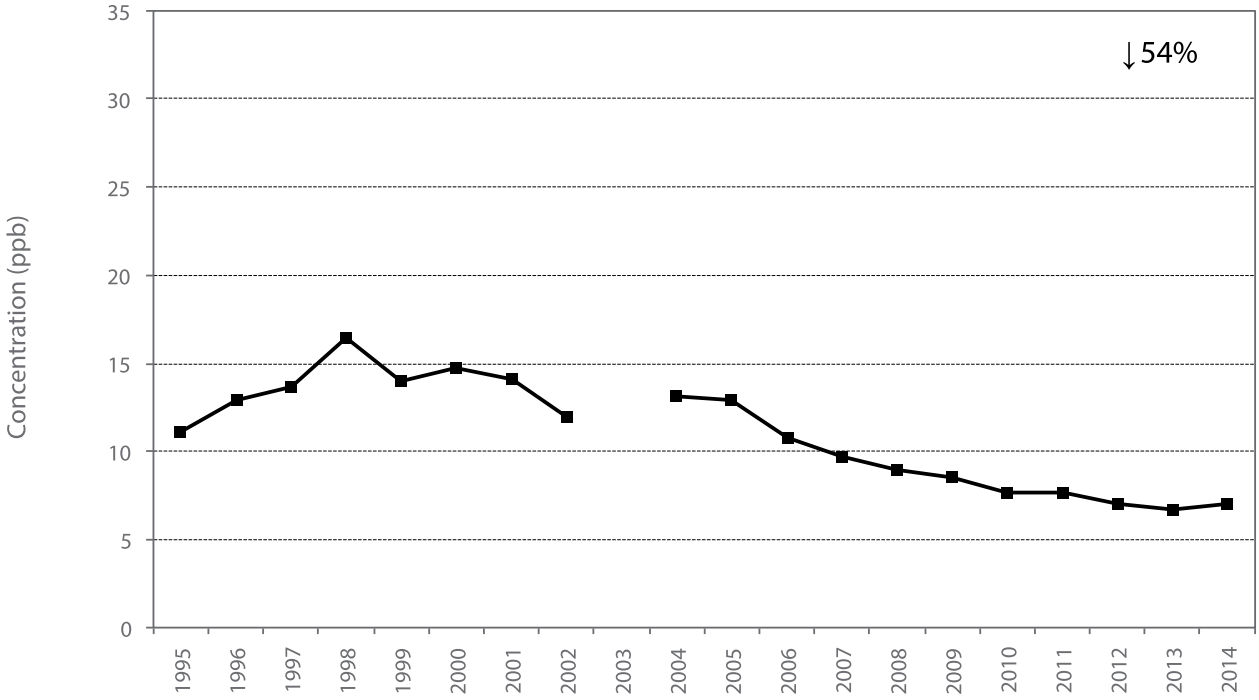


Figure A32: 20y Trend of NO_2 Annual Mean at St. Catharines

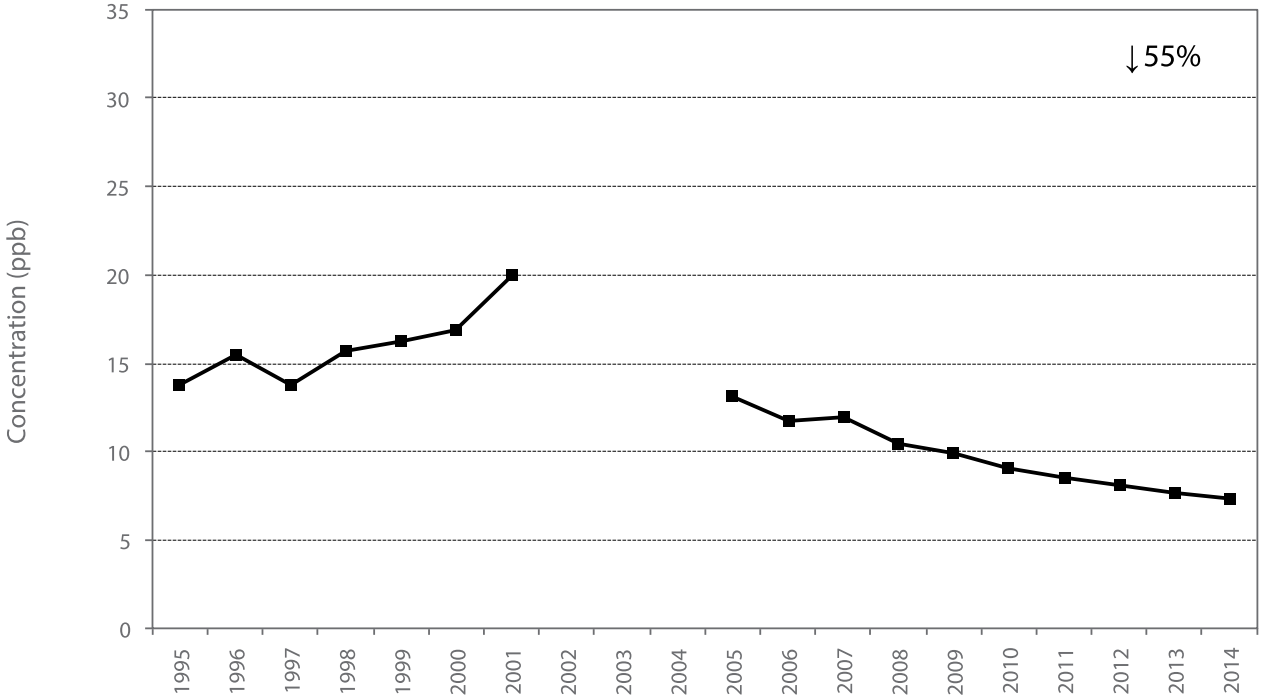


Figure A33: 20y Trend of NO_2 Annual Mean at Hamilton Downtown

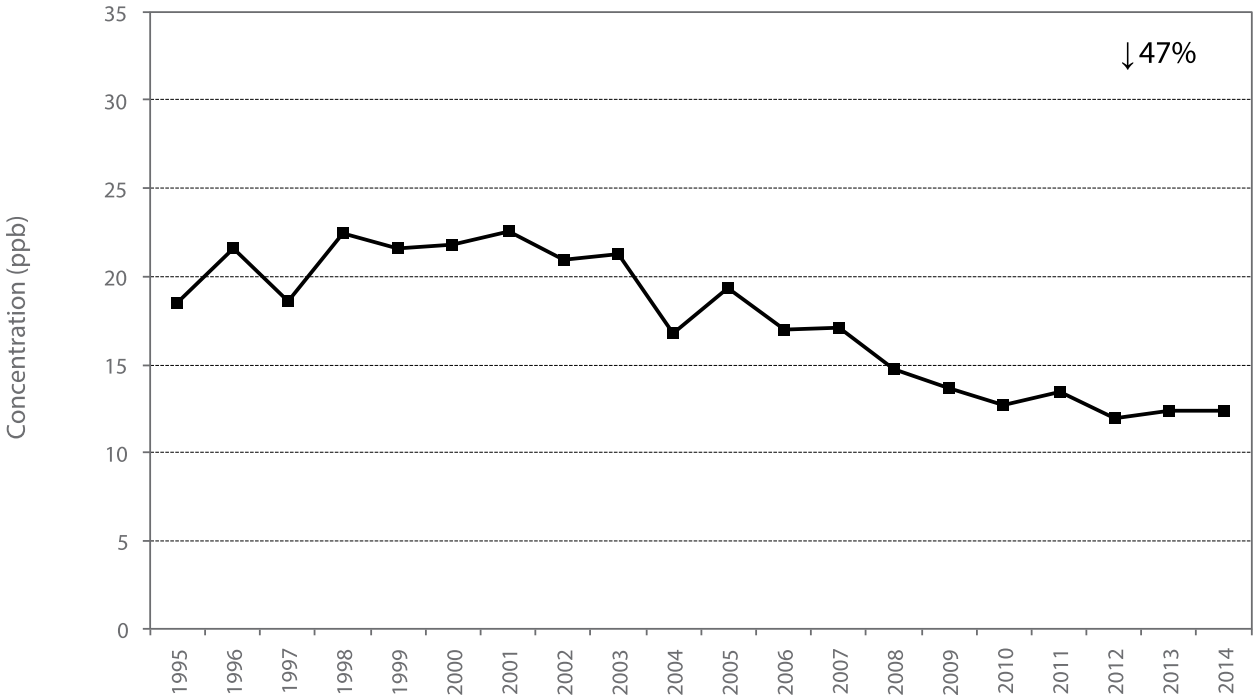


Figure A34: 20y Trend of NO_2 Annual Mean at Hamilton Mountain

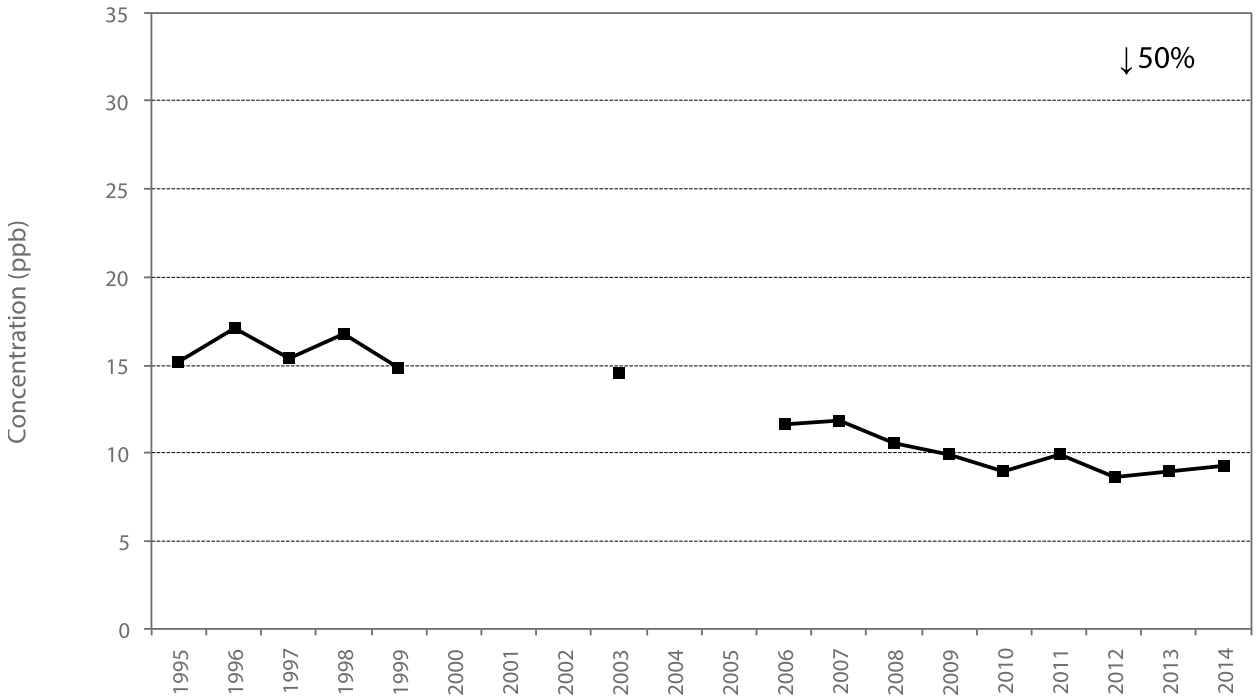


Figure A35: 20y Trend of NO_2 Annual Mean at Toronto Downtown

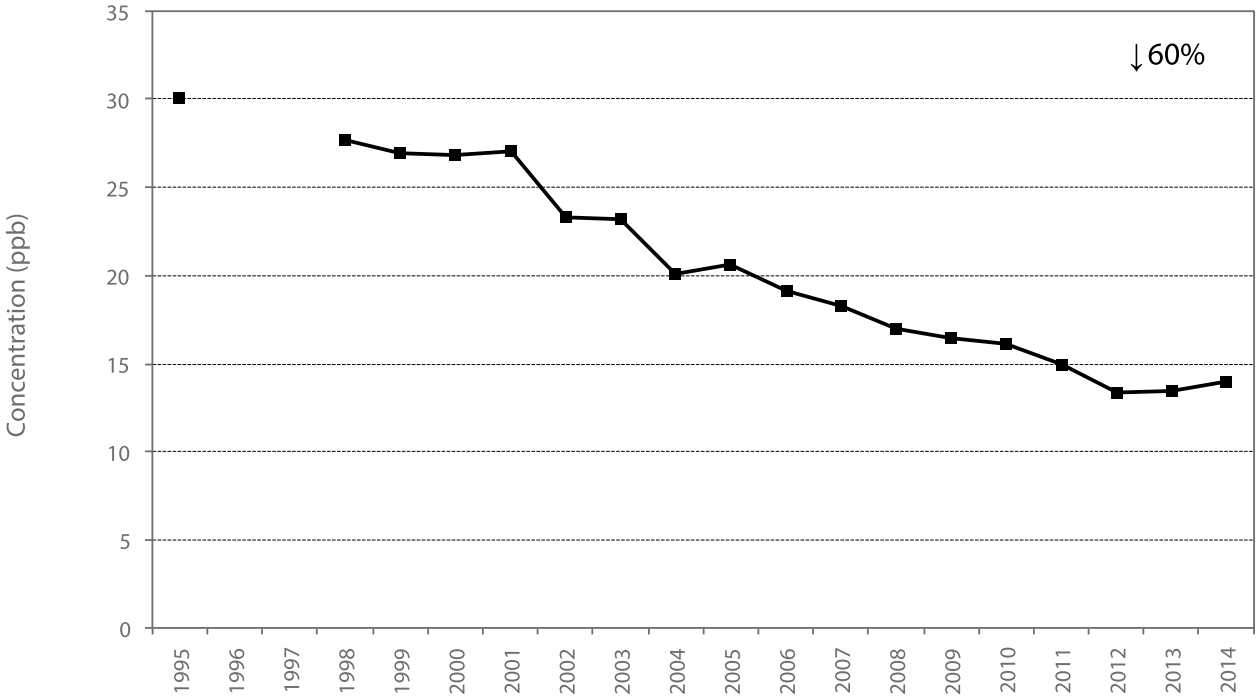


Figure A36: 20y Trend of NO_2 Annual Mean at Toronto East

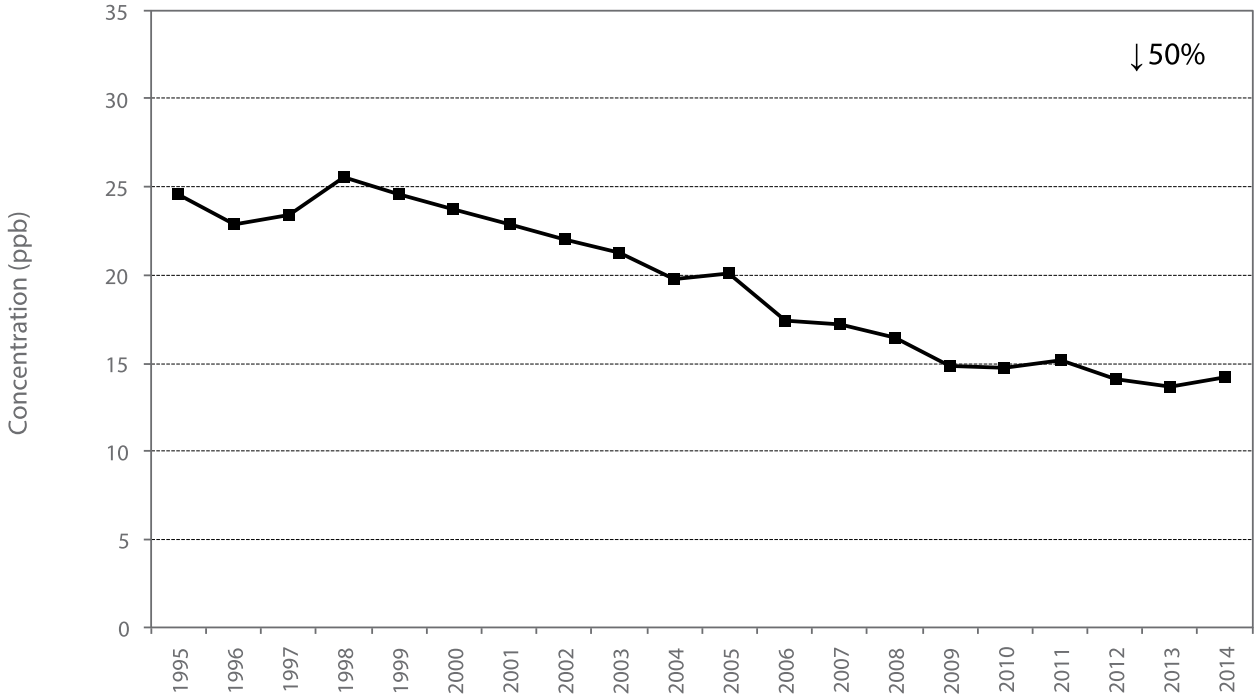


Figure A37: 20y Trend of NO_2 Annual Mean at Toronto North

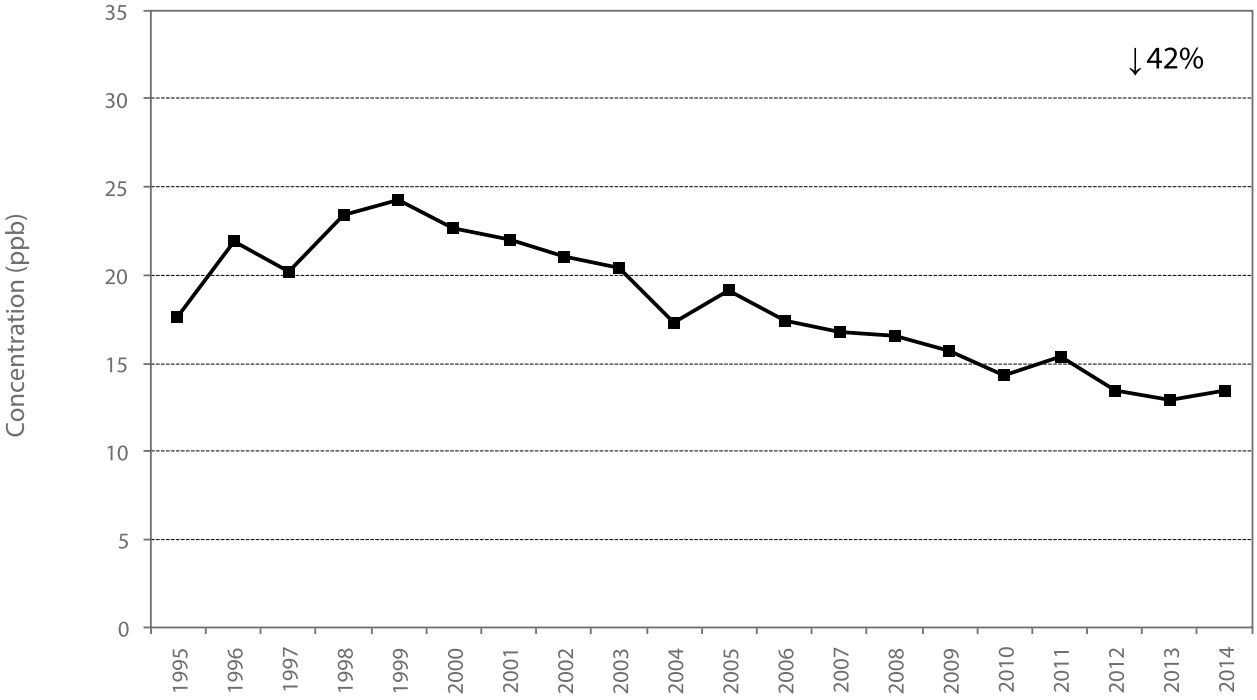


Figure A38: 20y Trend of NO_2 Annual Mean at Burlington

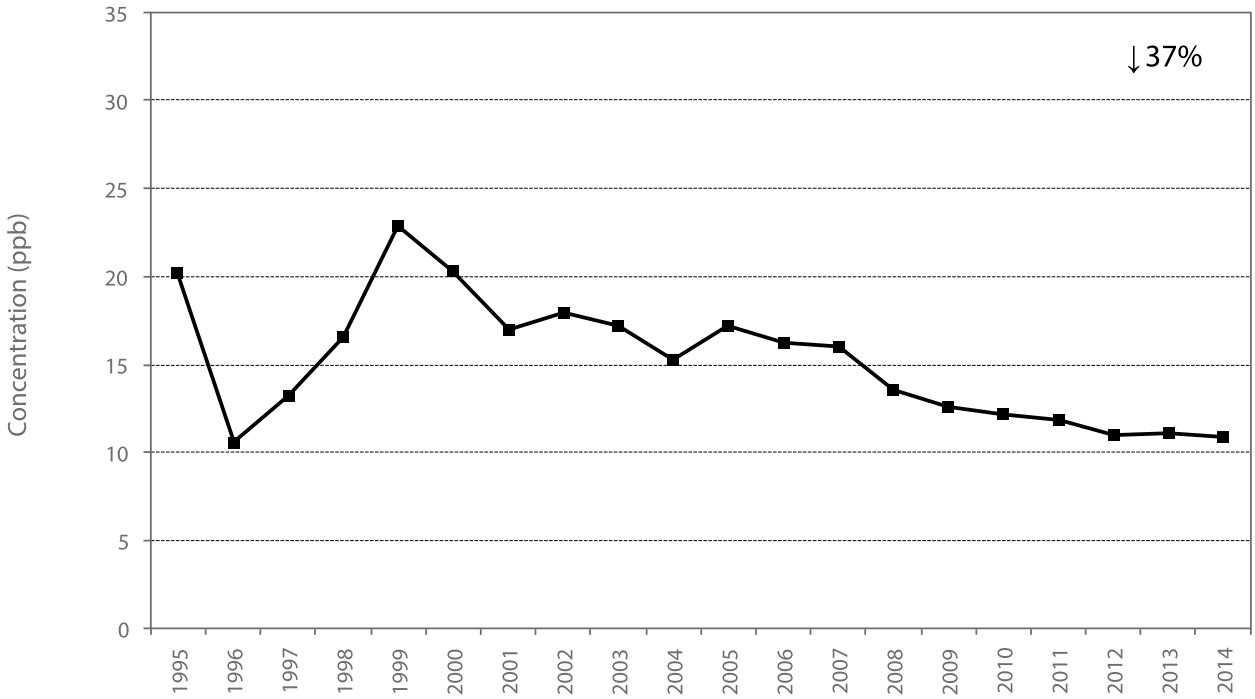


Figure A39: 20y Trend of NO_2 Annual Mean at Oakville

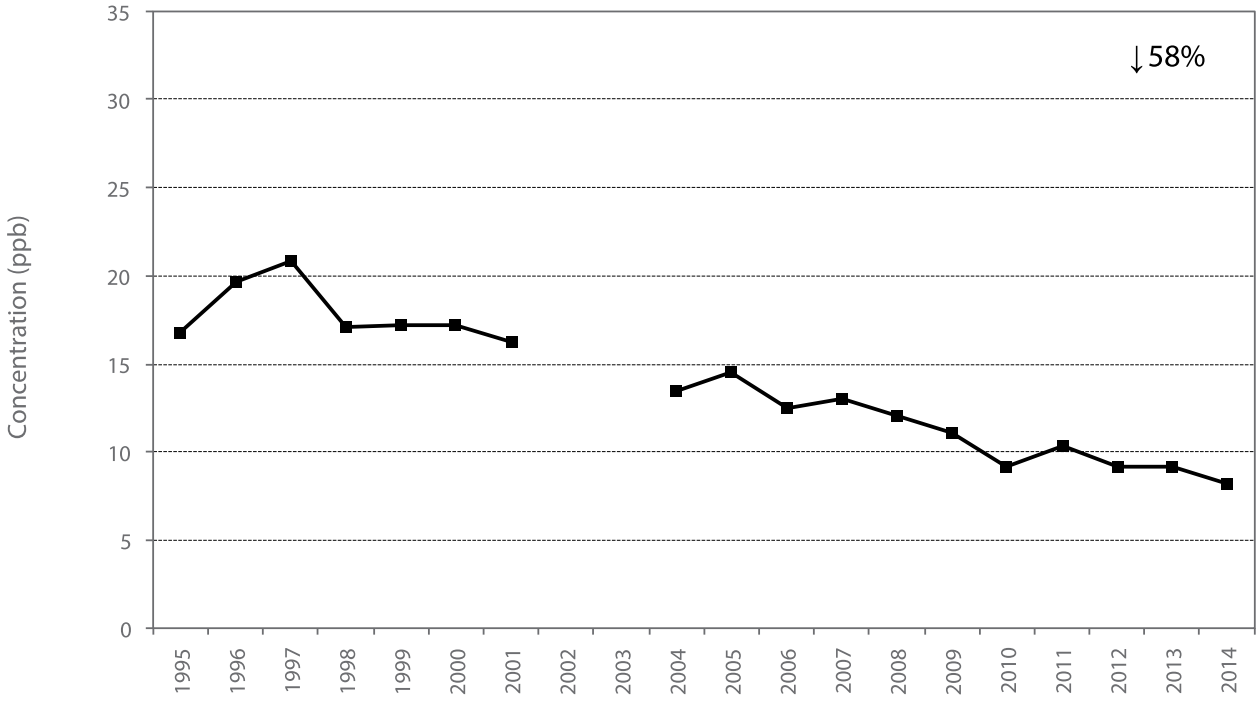


Figure A40: 20y Trend of NO_2 Annual Mean at Oshawa

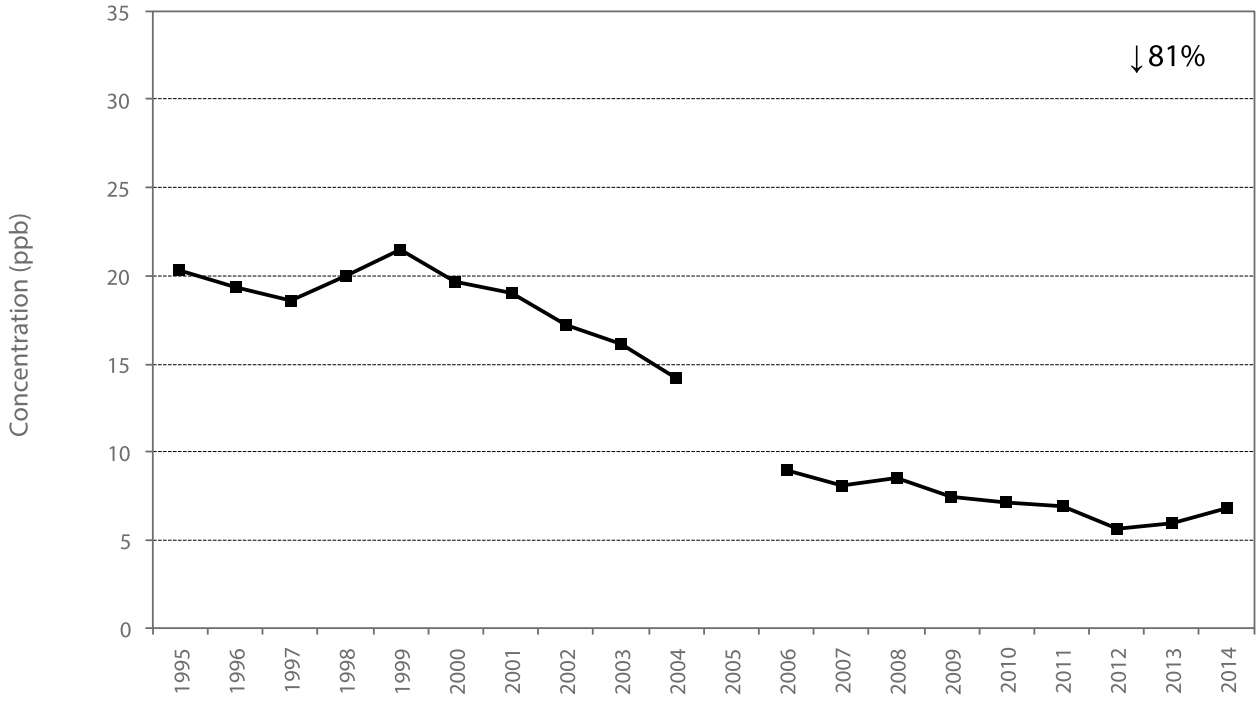


Figure A41: 20y Trend of NO_2 Annual Mean at Ottawa Downtown

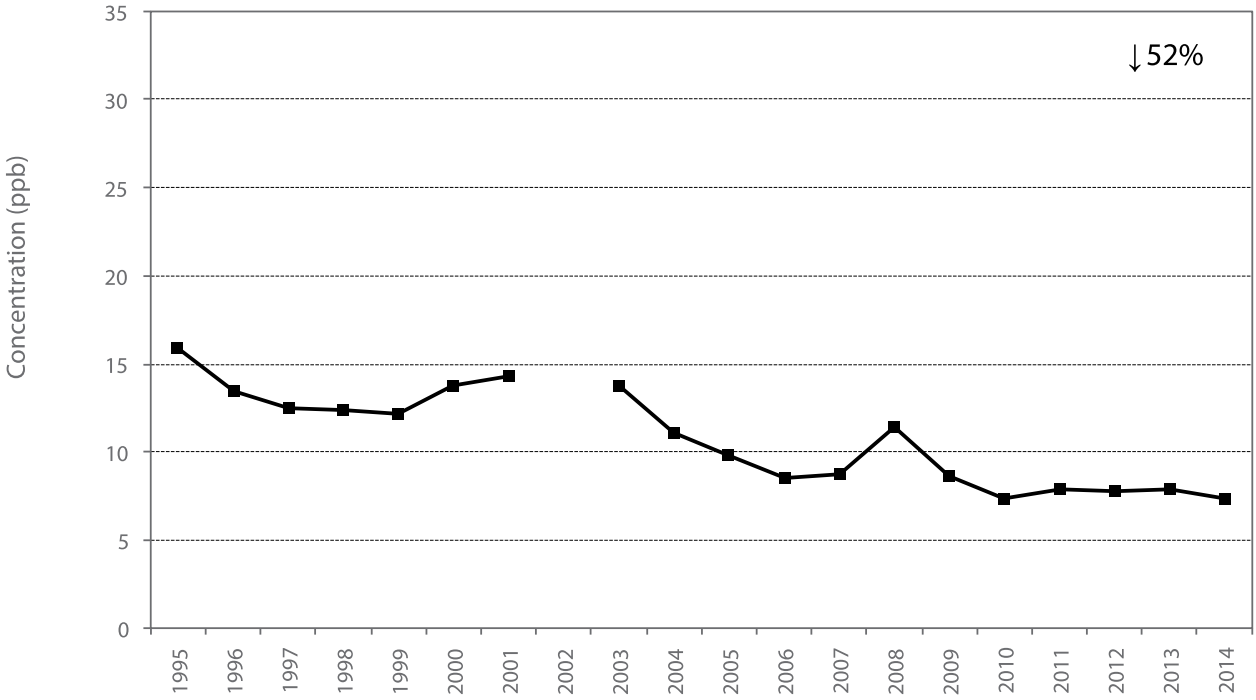


Figure A42: 20y Trend of NO_2 Annual Mean at Thunder Bay

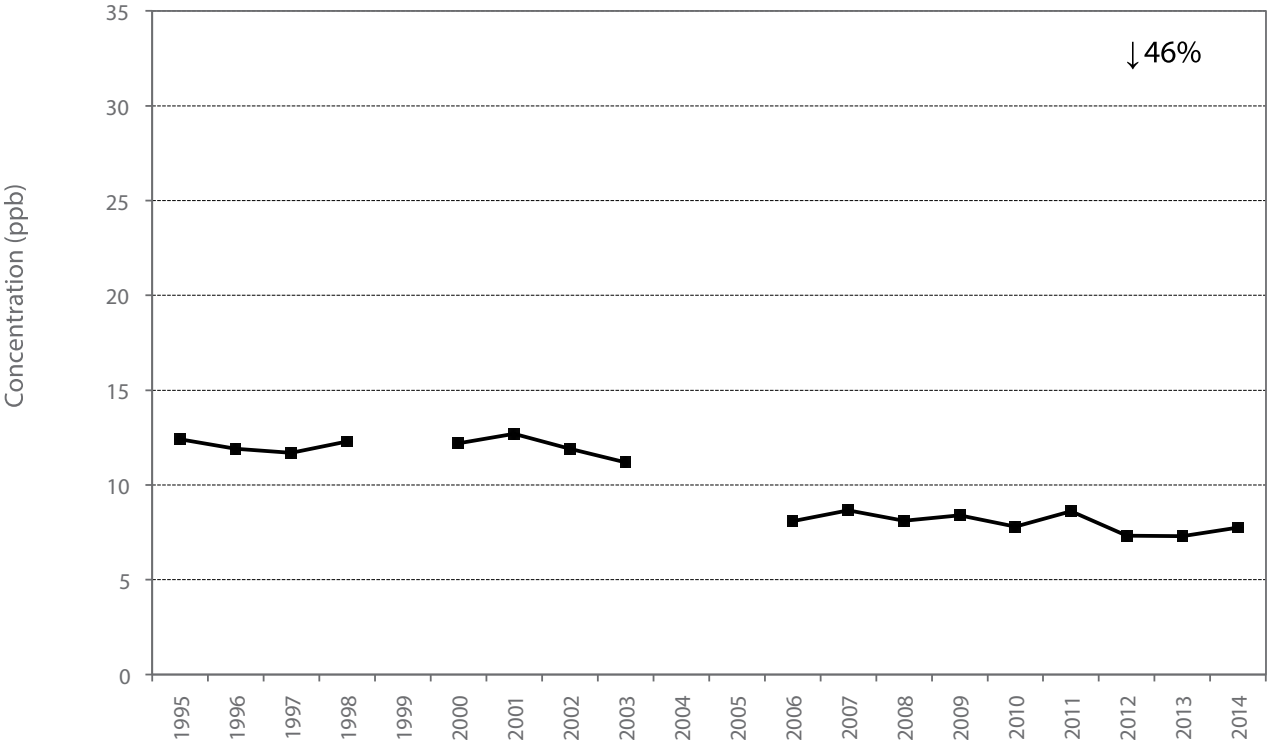


Figure A43: 20y Trend of NO_2 Annual Mean at Sault Ste. Marie

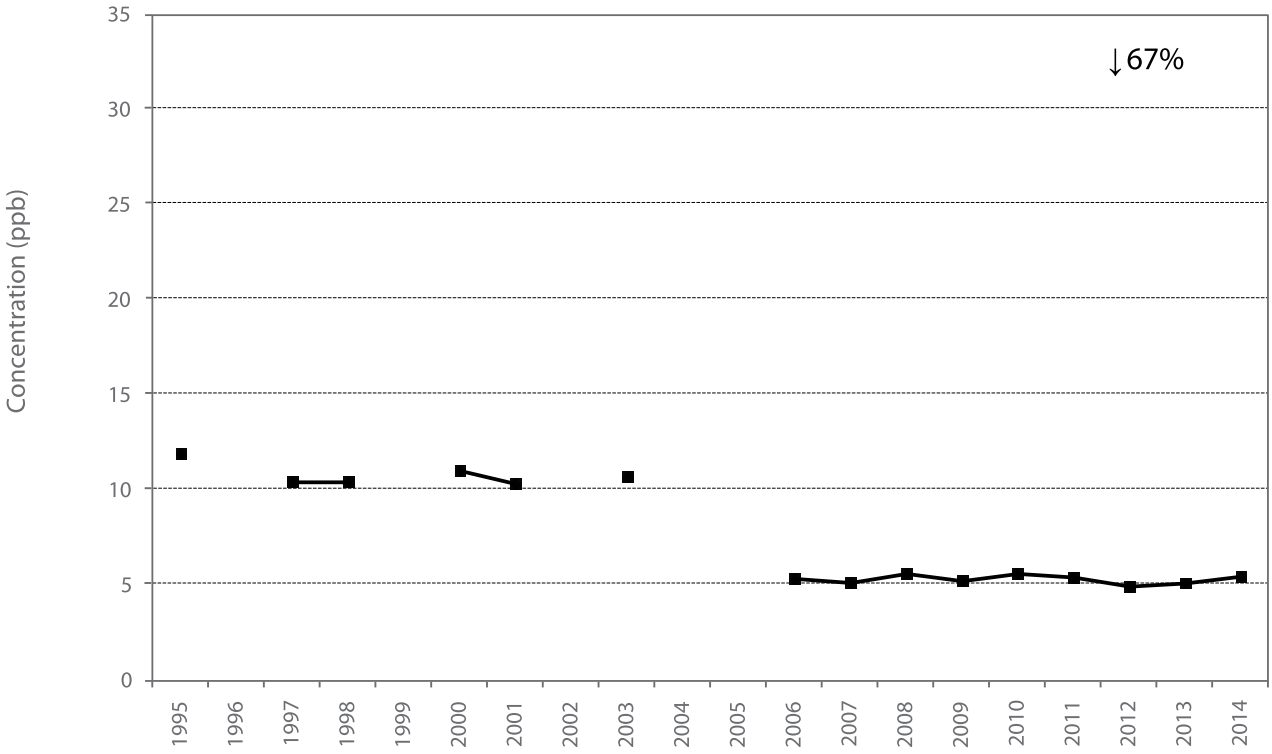


Figure A44: 20y Trend of SO_2 Annual Mean at Windsor Downtown

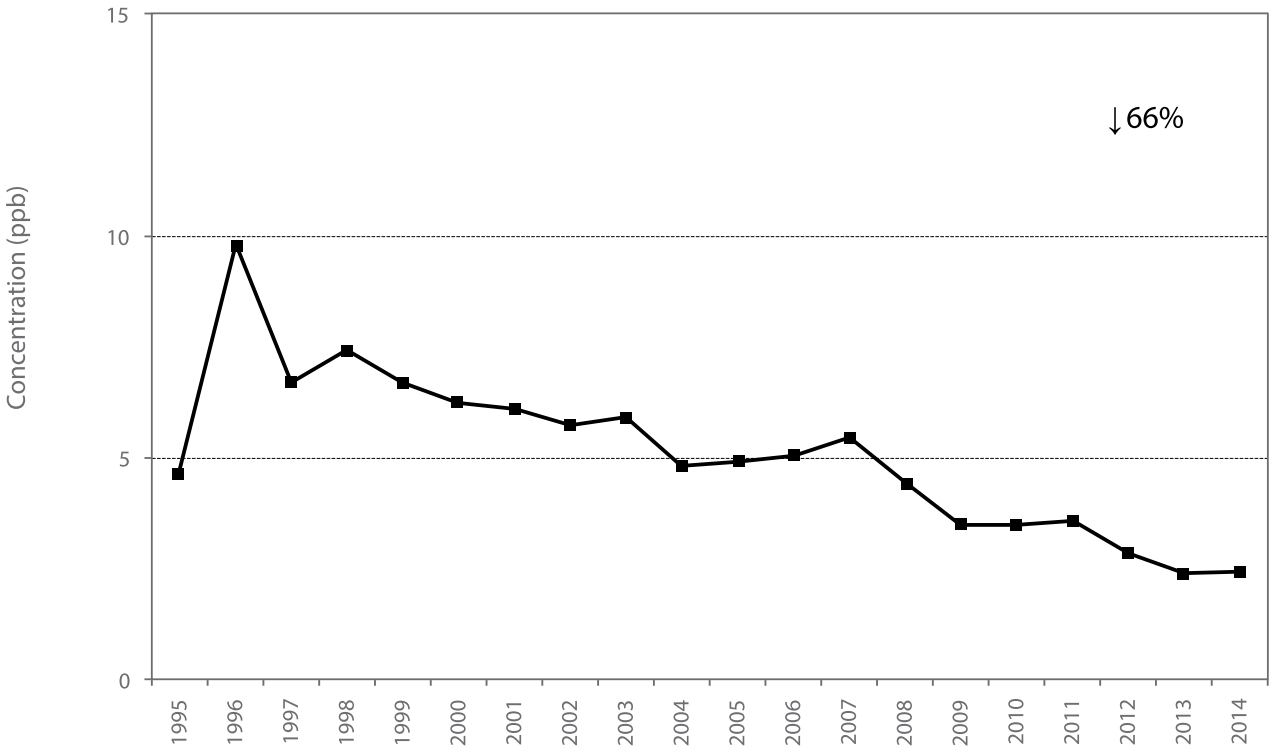


Figure A45: 20y Trend of SO_2 Annual Mean at Windsor West

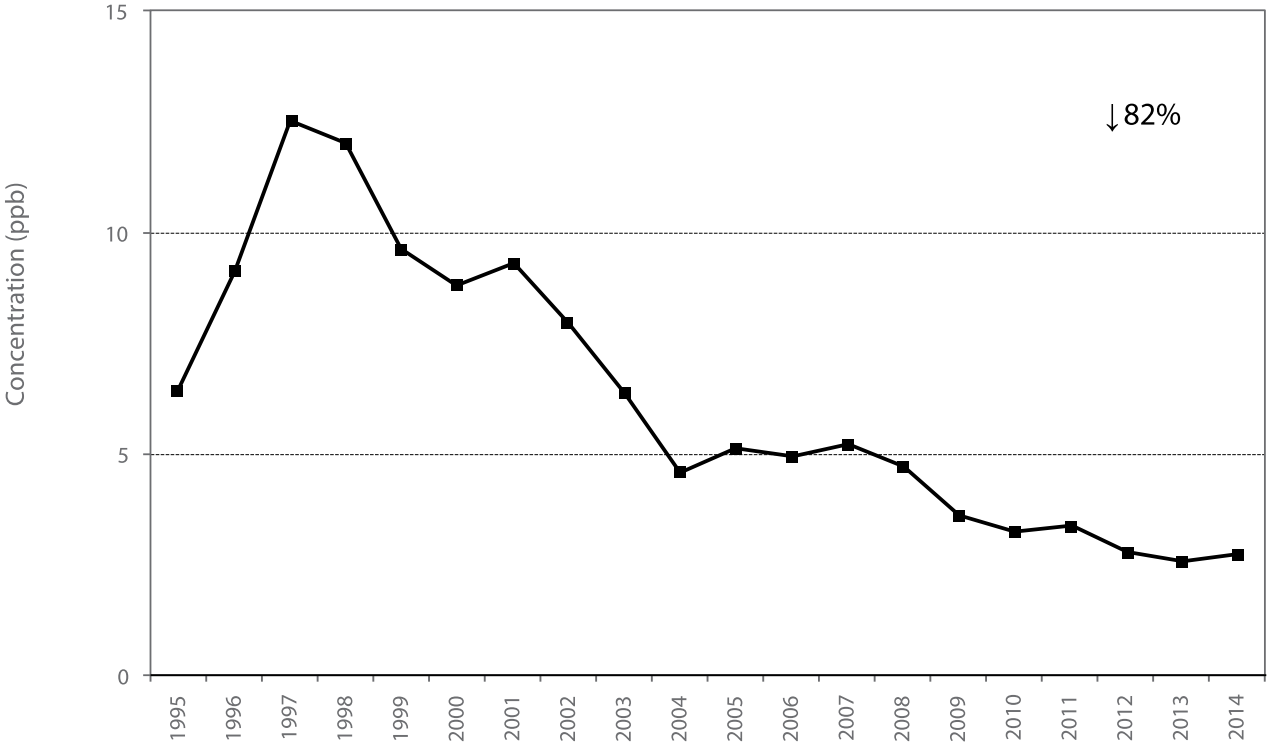


Figure A46: 20y Trend of SO_2 Annual Mean at Sarnia

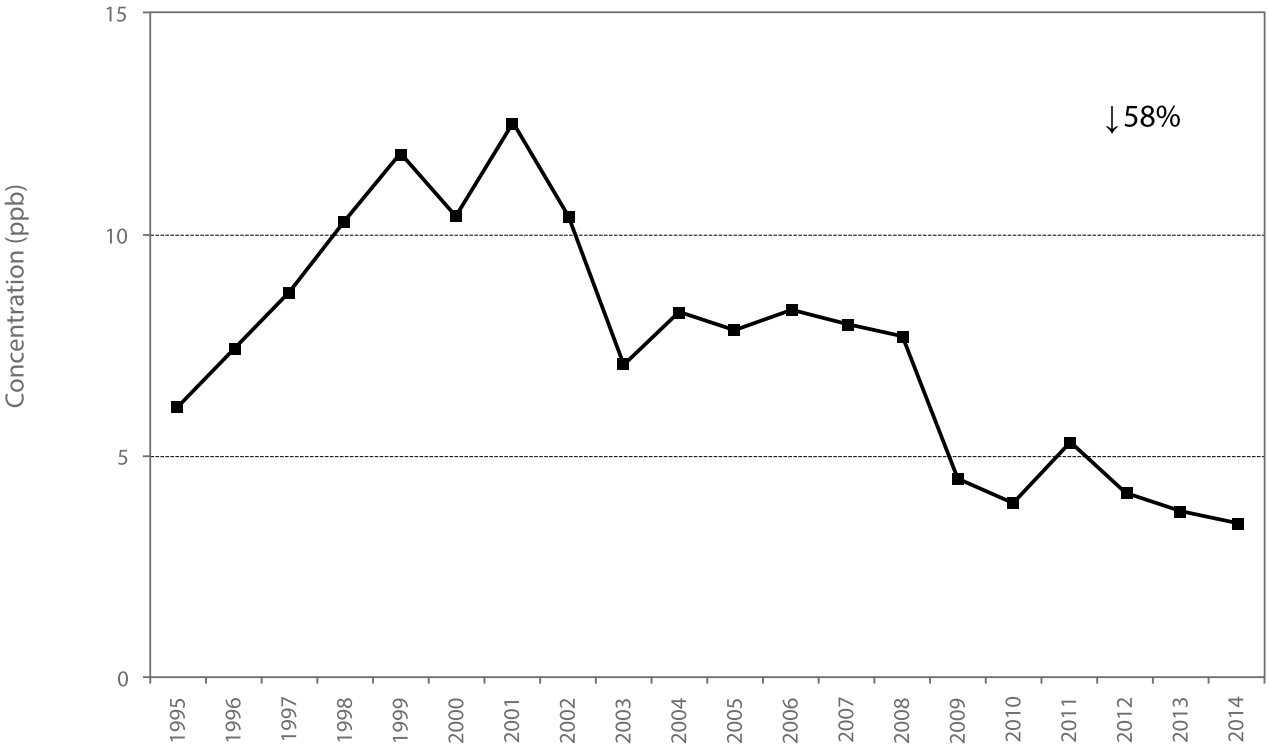


Figure A47: 20y Trend of SO_2 Annual Mean at Hamilton Downtown

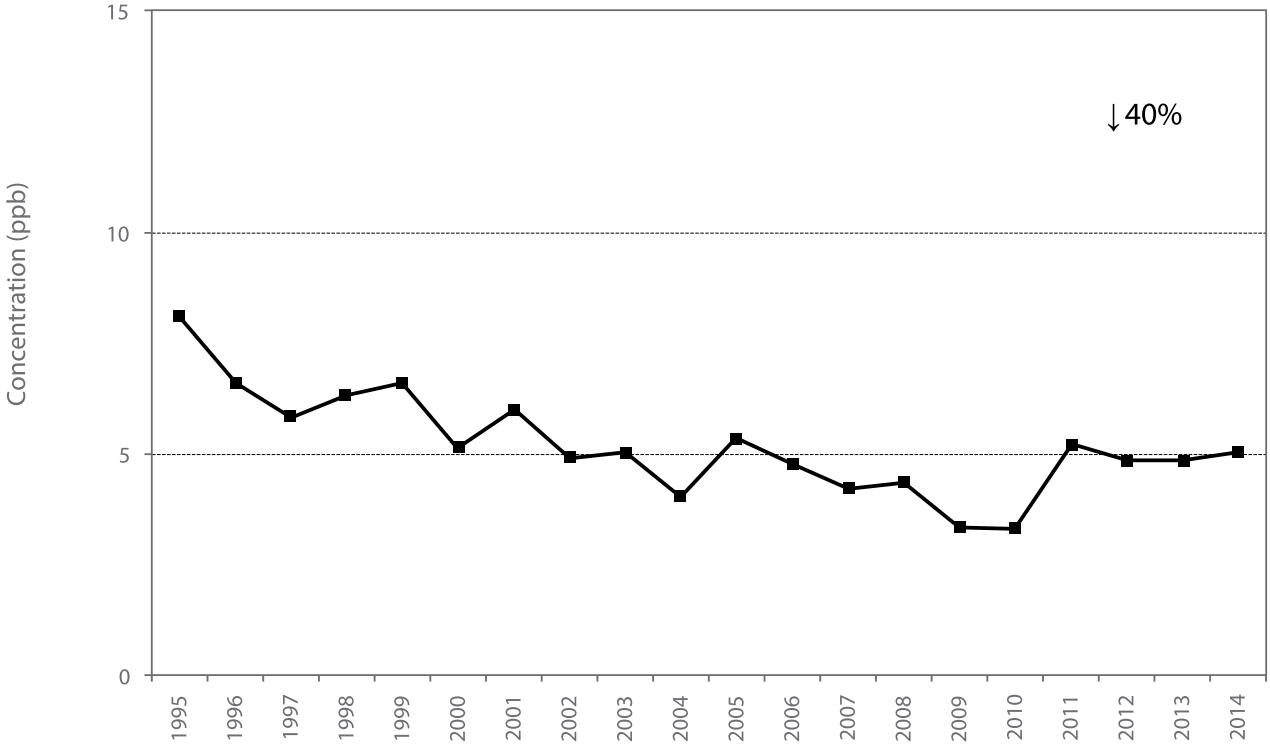


Figure A48: 20y Trend of SO_2 Annual Mean at Hamilton Mountain

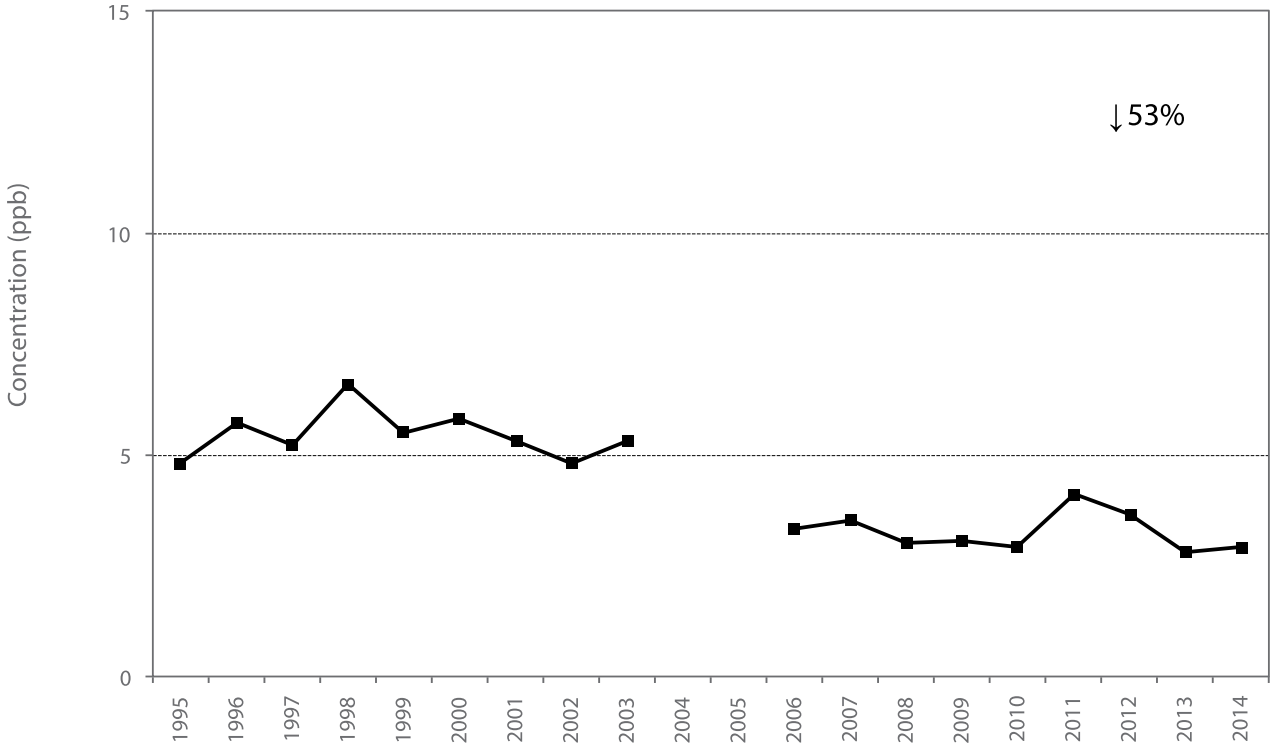


Figure A49: 20y Trend of SO_2 Annual Mean at Ottawa Downtown

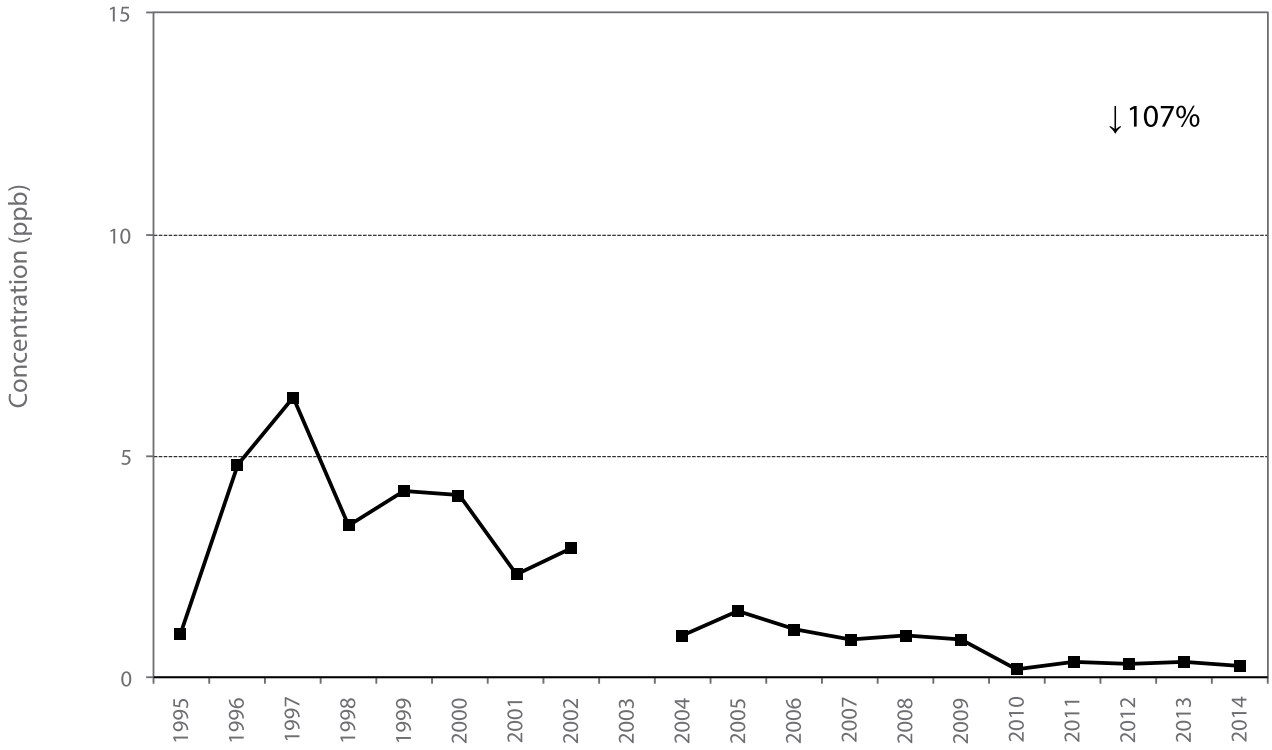


Figure A50: 20y Trend of SO_2 Annual Mean at Sault Ste. Marie

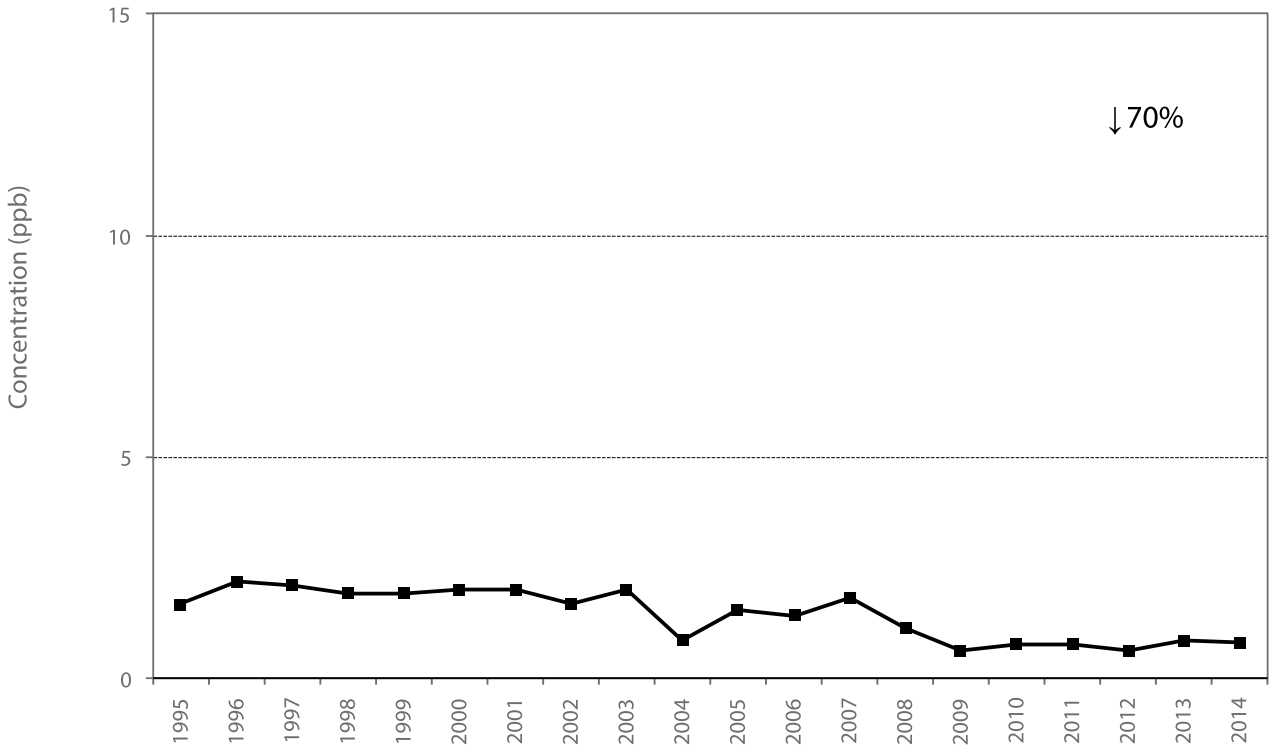
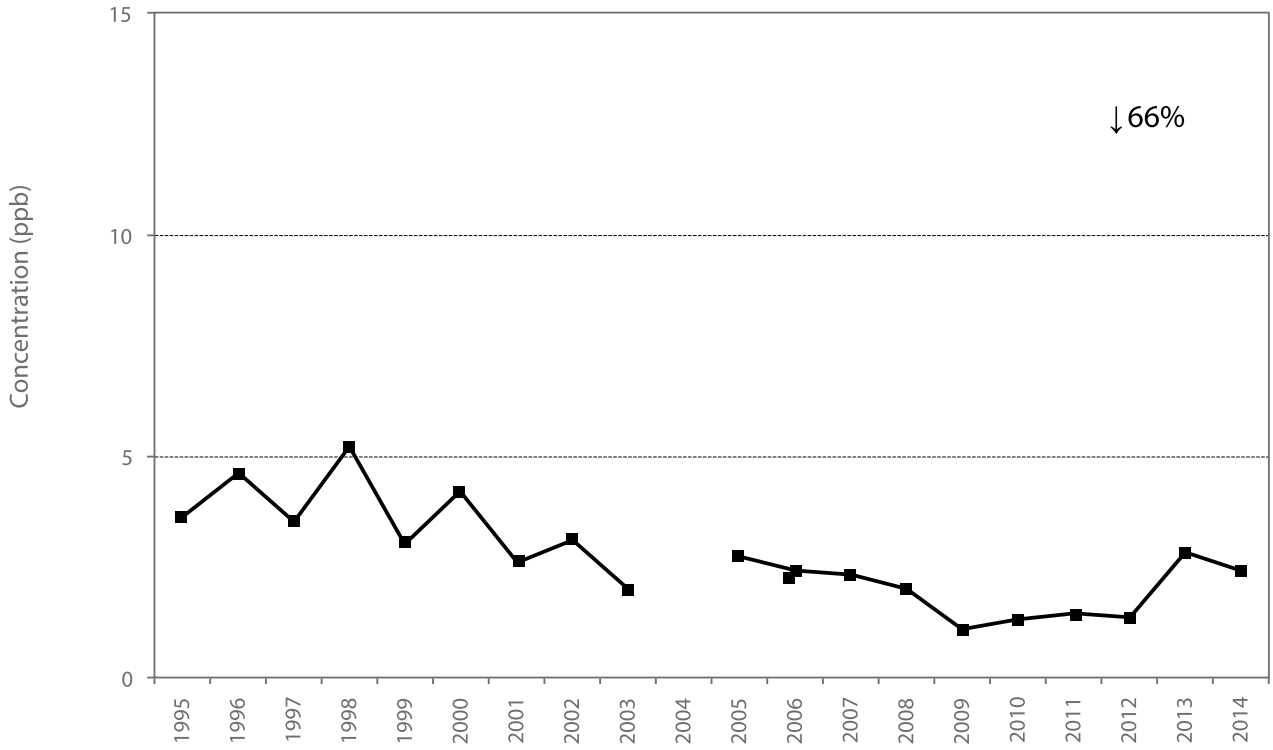


Figure A51: 20y Trend of SO_2 Annual Mean at Sudbury



Acknowledgements

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