

Foreword

The 2002 State of the Environment Atmosphere Report is comprised of two documents, this Summary report, and a full Technical version of the report that provides additional details and descriptive information. For additional information on the topics listed in this Summary report please see the full version of the report.

State of the Environment (SOE) reporting was formally initiated in the Region of Peel in 1992, based on the recommendations of an Environmental Planning Policy Statement completed for the Region. In the first stage of the SOE reporting process, three initial SOE reports were completed for the Atmosphere, Water and Land resources of the Region, in 1995, 1996 and 1998 respectively. Encapsulating environmental data and information on the Region, the reports provide valuable baseline information, and have shown great potential as an educational resource for those living and working in Peel. The 2002 State of the Environment Atmosphere Report is the first in a series of second generation SOE reports, to be completed between 2002 and 2004. The series is comprised of four reports including Atmosphere, Water, Land and Social components. While each component report is completed individually, it is an integral part of the larger SOE reporting process. Producing component reports individually allows us to include more detail in each report and provides more time between reports so that newer data can be included and trends established. Once completed, these documents will together provide a profile of the state of Peel's environments.

Region of Peel State of the Environment reports are produced through a collaborative process involving Regional Health, Housing, Planning, Public Works, and Social Services Departments, and our many external partners. Peel Police, and the Region's Communications Services, play a supportive role in this process.

This SOE report, and the process that has made it possible, symbolizes the Region of Peel's continuing commitment to monitoring and maintaining the health of this vital component of our environment.

We sincerely hope that you will find this a valuable resource on the environment that surrounds us, and a solid foundation from which to make informed decisions to improve air quality and affect change in our communities.

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Introduction

OVERVIEW OF THE REPORT

The purpose of this State of the Environment report and the series of which it is a part, is to document the changing conditions of Peel's environments, and to convey this information to those who are affected. Through in-depth analysis of many key aspects of Peel's environments this report provides a profile of the changing conditions in the atmosphere above and beyond Peel. Its audience is the resident and worker of Peel, and the Council of the Regional Municipality of Peel. For the public, it is our intention that this report will provide valuable background information on changing atmospheric conditions in Peel Region and beyond. Put simply, this should provide the reader with information on whether atmospheric conditions are changing, and where possible whether they should be concerned. For Regional Council, with the other SOE reports in this series, this SOE report will provide baseline information for future comparison, and a foundation from which to review the policies that affect the Region's environments. For everyone, the checklist provided on the inside back cover of this document provides practical measures that can be taken to improve air quality in our communities.

As a record of baseline information the condition of a component of our environment, (in so far as it can be measured by a given indicator) can be compared to recorded information from the past. If we know whether conditions are improving or getting worse, we can take appropriate action. It is through the actions of the individual, interest groups, and the decision makers that positive change can be made for our health and that of our environments.

While many of the sections of this report deal with air quality, the term 'atmosphere' has intentionally been selected and utilized in the title of this report, due to its more broad definition. This Report includes such topics as electromagnetic fields and human health, and cellular phones and human health, which would typically be outside the scope of a report on air quality.

WHY ARE STATE OF THE ENVIRONMENT REPORTS IMPORTANT?

In Peel Region, a number of key environmental issues are increasingly causing concern and affecting our daily lives. With respect to the atmosphere, these include growing concerns over air quality, air pollution, ozone depletion, and climate change. The atmosphere is a shared resource that is not constrained by regional, provincial or national boundaries. Pollutants added and changes made to the atmosphere in one area, can have a significant impact on another. These modifications to our atmosphere affect human health, and that of the environments upon which we depend.

In Ontario, and particularly the Greater Toronto Area, smog days have become commonplace in summer months. Representative of poor air quality and heightened levels of air pollution, smog can have negative effects on both human health and environmental health. Recent studies by the Ontario Medical Association warn of the threats of pollutants such as ground level ozone¹. These studies show that ozone may negatively impact human health at concentrations below the thresholds at which warnings are provided on smog days². As this SOE report illustrates, this type of ozone is frequently present in our air, and is responsible for poor air quality over 93 per cent of the time in Peel. It is an alarming reality that these pollutants often collect in even greater concentrations in indoor areas. In Ontario approximately 1,900 people die each year as a result of air pollution³.

Our global climate is changing. Locally, we see indicators of this change on a regular basis. The incidence of what is considered to be “unseasonable weather” or unusually long periods of drought or floods are indicators of this change. The northward movement of diseases such as the West Nile Virus is similarly indicative of this change.

Governments around the world are increasingly becoming aware of the negative effects of human induced climate change, and commitments are being made under the Kyoto Protocol to reduce greenhouse gases globally. On September 2, 2002, at the United Nations Earth Summit Conference in Johannesburg, Prime Minister Jean Chretien committed to taking forward Canada’s ratification of the Kyoto Protocol to parliament for a vote by the end of 2002. The Conference yielded a similar commitment from Russian Prime Minister Mikail Kasyanov. The commitment of both country’s ratification would provide the critical mass required for Kyoto to come into force⁴.

This report examines “atmospheric” issues, and their impacts on Peel Region. Where data is not available, information for the Province of Ontario and for Canada is utilized. In all areas, whether the issue is specific to Peel, Ontario or Canada, this report shows that these issues must begin to be addressed at the community level, adopting the principle “think globally act locally”. As we further stress our environments, the effects are felt in every community. Please take a moment to review the checklist on the inside back cover of this document; the health of our communities depends upon each of us taking action.

ABOUT THIS REPORT

In many areas, conclusions are not drawn in this report with respect to trends and the potential significance of the information that is reported. In many areas of the report this would be inappropriate, as trends cannot be directly established based on the variability in the data. Moreover, as the atmosphere has no defined boundaries, sources of the pollutants from ambient (or general) air quality measurements are difficult to definitively identify. Pollutants or their

precursors may be produced in one area, and affect the air quality of another. The movement of pollutants in our atmosphere is significant. The Transboundary Pollution section of this report illustrates that approximately 50 per cent of air pollutants that affect the Greater Toronto Area originate in the United States.

To give the maximum perspective on changing atmospheric conditions in Peel, information is provided for the largest range of years available or applicable. Due to changes in the ways in which data has been collected, relevance, and the changing sources from which we acquire the data, this varies from section to section. In some areas, providing data from 1996 (i.e. since the last SOE Atmosphere report) would be insufficient to depict changes to air quality, or a component of the atmosphere.

Information presented in this report was generally collected between 1998 and 2001. Up-to-date information was added on these topics until the time of printing in 2002, however new topics arising in 2002 have not been covered. These have been deferred for future study, and will be covered in the next State of the Environment: Atmosphere Report.

For your reference, in this report, the term “Region of Peel” generally refers to the Corporation of the Region of Peel. The term “Peel Region” is used to refer to the geographic area of Peel.

REPORT STRUCTURE AND AIR QUALITY CONTEXT

STRUCTURE

This report is split into four sections. The first examines ambient (general) and site specific air quality in Peel, through comparing annual average concentrations of key pollutants to established provincial criterion, and analyzing changing conditions. This analysis is completed through examining Air Quality Index and Air Pollution Index readings, and exploring information collected at site-specific monitoring stations for key air pollutants in Peel. Please note that in some cases, Provincial acceptable limits have not been established for the annual mean concentrations presented.

The second section examines specific air quality issues in Peel. These include airport air quality, rural air quality, and how transportation affects air quality in Peel, among other topics. These issues were selected based upon: topics in the media, those identified in the previous State of the Environment Atmosphere report as being for future study, and those raised during the consultation and peer review phases of the preparation of this document.

Section three provides information on larger scale trends in air and atmospheric quality, including climate change, stratospheric ozone depletion, transboundary pollution, and electromagnetic fields (including cellular phones) and human health. In this section, the information presented is generally at the national or provincial level.

Section four consists of a list of actions being taken by the Region of Peel and the area municipalities to improve air quality. The conclusion at the end of this section provides an overview of significant elements of this report.

AIR QUALITY CONTEXT: INTERCONNECTEDNESS OF AIR QUALITY ISSUES

Many of the key pollutants discussed in this report affect more than one aspect of air or atmospheric quality. Pollutants such as ground-level ozone can influence air quality, lead to the formation of smog, and contribute to global warming⁵. Many of these pollutants affect human health and that of the environment. Provincial criteria exist for many of the pollutants, which specify the level at which health risks may occur.

The tables below provide an overview of the relationship between pollutants and atmospheric issues, and information on the pollutant. Table A provides information on air pollutants and associated issues. Table B provides a list of the characteristics of the pollutant, the sources of the pollutants, along with their effects on human and environmental health. Provincial and Federal criterion (where applicable) are also provided. As discussed in this report, concern exists with respect to the levels at which the criterion have been set, and the potential health effects associated with levels below the established criterion.

Table A: Air Pollutants and Air Issues

	Smog	Global Warming	Air Quality	Health	Aesthetics
Ozone	yes	yes	yes	yes	
Sulphur Dioxide	yes	yes	yes	yes	yes
Carbon Monoxide	yes	yes	yes	yes	
Oxides of Nitrogen	yes	yes	yes	yes	yes
Volatile Organic Compounds	yes	yes	yes	yes	yes
Toxics	yes		yes	yes	
Particles	yes	yes	yes	yes	yes
Total Reduced Sulphur Compounds			yes	yes	

Source: Ontario Ministry of the Environment. 2001. Air Quality in Ontario 1999.
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Table B: Overview of Criteria Pollutants

Pollutant	Characteristics	Sources	Ontario Criteria	General Health Effects	General Ecological Effects
Ozone (O ₃)	A colorless gas responsible for the vast majority of 'Poor' air quality in Peel	Ozone is not emitted directly into the atmosphere. It is created through a chemical reaction involving nitrogen oxides and volatile organic compounds in the presence of sunlight.	1 hr average = 80 ppb	Irritation of the lungs and difficulty breathing. High concentrations can result in chest tightness, coughing and wheezing. Increased hospital admissions and premature death.	Damage to agricultural crops, forests and natural vegetation.
Inhalable Particles (PM ₁₀)	Minute particles of solid or liquid matter that stay suspended in the air in the form of dust, mist, aerosols, smoke, soot, etc.	Industrial processes including combustion, incineration, construction, etc. Other sources include motor vehicle exhaust, road dust, forest fires and volcanic activity.	24 hr average = 60 ug/m ³	Aggravation of respiratory conditions such as asthma.	Damage to vegetation, deterioration in visibility and contamination of soil.
Sulphur Dioxide (SO ₂)	Colourless gas with a strong odour similar to burnt matches.	Electric utilities, metal processing and smelters, pulp and paper and petroleum refineries.	1 hr average = 250 ppb 24 hr average = 100 ppb 1 yr average = 20 ppb	Breathing discomfort, respiratory illness and aggravation, cardiovascular disease.	Leads to acid deposition, which causes lake acidification, corrosion and haze. Damage to tree leaves and crops.
Nitrogen Dioxide (NO ₂)	Gas with a pungent and irritating odour.	Human - Automobiles, thermal power plants, incineration. Natural - lightning and soil bacteria.	1 hr average = 200 ppb 24 hr average 100 ppb	Irritation for people with asthma and respiratory ailments.	Leads to acid deposition - has adverse effects on vegetation.
Carbon Monoxide (CO)	Colourless, odourless poisonous gas	Major source is the transportation sector	1 hr average = 30 ppm 8 hr = 13 ppm	Impairment of visual perception and cognitive abilities.	

Source: Ontario Ministry of the Environment. 2001. Air Quality in Ontario 1999.
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This report has been produced by an interdepartmental steering committee, consisting of representatives from the Region's Planning, Health, Public Works, Social Services, and Housing departments. Information in this report was compiled and written by staff from the Planning and Health departments. Information and peer review for this report was graciously provided by many sources including the Ontario Ministry of the Environment, Environment Canada, and the Greater Toronto Airports Authority. The City of Mississauga, the City of Brampton, the Town of Caledon, Credit Valley Conservation, and the Toronto and Region Conservation Authority have all provided valuable input into the document.

Additional paper copies of this document, or a CD-ROM containing the report are available at the Region of Peel Planning Department for a nominal charge.

Electronic copies of this document and the full version of the State of the Environment Atmosphere Report 2002 (in Adobe Acrobat "PDF" format), can be downloaded from the Region of Peel's website free of charge at the following address: www.region.peel.on.ca/planning/soe/index.htm

1. Reduce Waste

- Compost, recycle and use biodegradable products to reduce the amount of refuse going to landfills and incinerators.
- Be aware of the materials you are using, and both the type and amount of materials going into your garbage. Buy products – especially perishables -- in portions or sizes that suit your use.
- Buy products with as little packaging as necessary. Reuse packaging materials such as containers whenever you can, and buy products made out of recycled material.

2. Reduce your energy consumption

- When purchasing new appliances and fixtures such as energy-efficient furnaces, water heaters and refrigerators, look at energy ratings provided with them.
- Turn off all unnecessary lights and appliances when not in use. Turn down the heat on your hot water tankⁱ.

3. Reduce the use of your car

Ten simple transportation related measures can be taken to reduce your impact on local air quality:

- Utilize public transit and alternative transportation (ie. bicycle, walk) whenever possible, to minimize distances and the number of trips in your vehicle.
- Carpool where possible, both to work and for pleasure trips.
- Take less busy routes, and where possible schedule work around lighter traffic times. You will get to work faster, and pollute less.
- When buying a new vehicle, carefully select your vehicle based on fuel economy.
- Where possible, work within as short a distance as possible of your home community. Try working from home where possible.

- Have your vehicle emission tested and repaired as necessary to ensure maximum efficiency.
- Use alternative, cleaner fuels. Fuels with ethanol and methanol blends burn cleaner and are more efficientⁱⁱ.
- Don't idle your engine while stopped. Turn it off even if it is just for a couple of minutes.
- Plan your trips, such that you can take care of a number of errands at once.
- Make sure that your tires are properly inflated, and fuel-up in the evening after sundown when pollution levels are lower.

4. Know the air quality in your area

- Keep up-to-date on current air quality readings and smog advisories, and adjust your activities accordingly. You can find this information on the Ministry of the Environment's web site at www.airqualityontario.com or by calling 1-800-387-7768 (English) or 1-800-221-8852 (French).
- Learn about potential sources of indoor air quality problems, and assess your indoor environments. Remember that in times of poor outdoor air quality, indoor air quality may be even worse. If possible, avoid long-term exposure in these areas and help raise others' awareness.

5. Reduce Your Exposure to, and Production of, Electromagnetic Fields

- Be aware of the EMFs around you. If you are concerned, try to reduce your exposure to them. Look for sources that you create, occupational exposures, and sources such as power transmission lines. Put more distance between yourself and the EMF sources, and limit the duration of your exposure. Limit your

cell phone calls to less than 6 minutes, and consider using a hands-free device.

6. Take Action

- Plant trees around your home. They'll provide shade, reduce energy consumption and draw carbon dioxide out of the atmosphere.
- Use appliances and vehicles sparingly, and choose manual options whenever you can as an alternative to gasoline and electric-powered tools such as leaf blowers and lawn mowers. Manual items are usually less costly and produce less pollution.
- Use locally produced goods. This will help reduce transportation-related emissions and you'll know more about the conditions in which they were produced.
- Be aware of what you consume -- food, fuel, etc. -- and think about where it came from and where it will go.
- Use environmentally friendly products more often.
- Pass on these important messages to others.

ⁱ In accordance with the manufacturer's or utility's recommendations.

ⁱⁱ Check with your mechanic for which fuel is most appropriate for your vehicle.