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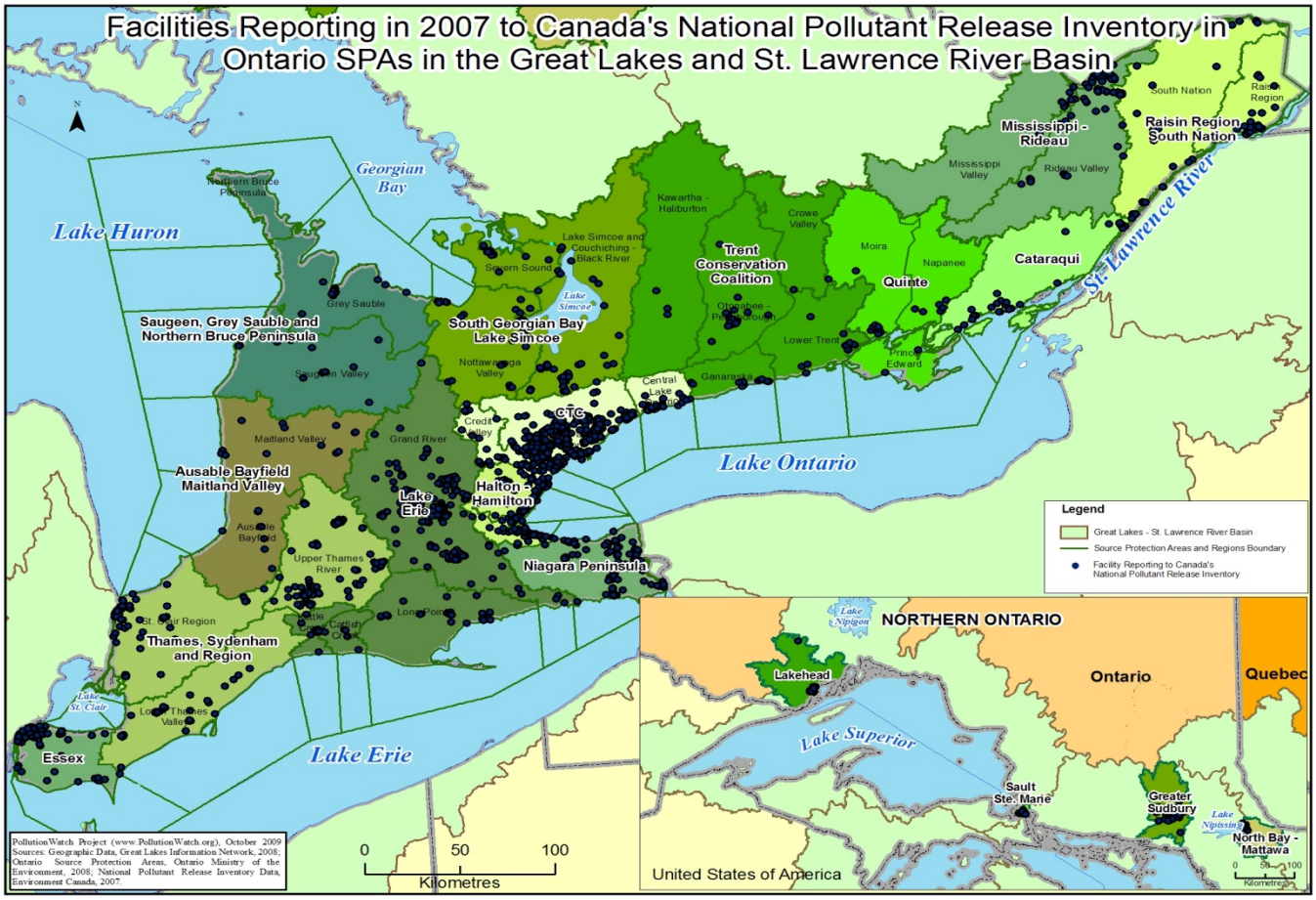
ENVIRONMENTAL DEFENCE

CANADIAN ENVIRONMENTAL LAW ASSOCIATION

PollutionWatch
www.PollutionWatch.org

Protecting the Great Lakes - St. Lawrence River Basin and Drinking Water Sources



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About PollutionWatch

PollutionWatch (www.PollutionWatch.org) is a collaborative project of Environmental Defence and the Canadian Environmental Law Association. The web site tracks releases and transfers of pollutants across Canada based on data collected by Environment Canada through the National Pollutant Release Inventory (NPRI) and emissions of greenhouse gases based on the federal government's mandatory Greenhouse Gas Emissions Reporting Program. NPRI and the Greenhouse Gas Emissions Reporting Program do not include data from all pollutants or sources. Visitors to the PollutionWatch web site can identify facilities in their home towns by searching by postal code or by a specific street address, access "quick lists" of the facilities reporting the largest releases and transfers of pollutants and greenhouse gases in the country, or create their own ranked lists of facilities by province, industrial sector, or corporation.

Disclaimer

The data used in this report are based on the Canadian National Pollutant Release Inventory, a publicly available database administered by Environment Canada.

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EXECUTIVE SUMMARY

Ontario's Source Water Protection Program was set up to ensure that sources of treated drinking water are protected from potential threats, such as storage and management of agricultural source material and the handling and storage of fuel. Through the program, local committees in each source protection region and area are assessing potential threats and recommending solutions. Through the PollutionWatch project, the Canadian Environmental Law Association and Environmental Defence are seeking to provide additional information on potential threats that can be used by the source protection committees.

PollutionWatch (www.PollutionWatch.org) uses National Pollutant Release Inventory (NPRI) data, collected by Environment Canada, to track reported releases and transfers of pollutants from facilities across Canada. As this report demonstrates, many of these NPRI facilities report releases and transfers in source protection areas and regions throughout Ontario. The NPRI data offer additional information on specific pollutants that source protection committees can use to better assess threats to their local drinking water sources.

This report maps NPRI facilities for each source protection area and region and, analyzes reported pollutant releases to the air, water and land, some of which may be a threat to Ontario's drinking water. Section 2 of the report presents the pollution releases and transfer data in the source protection areas and regions. Some of the findings include:

- NPRI facilities in source protection areas and regions release large amounts of chemicals to the air, water and land.
    - NPRI facilities in source protection regions release to the air over 32 million kg of toxic chemicals and 722 million kg of criteria air contaminants, pollutants associated with smog, acid rain, contributing nitrogen to waterways and health effects.
    - NPRI facilities release over 54 million kg of chemicals to water, and 19 million kg of chemicals to land.
    - In addition to these amounts, another 22 million kg are sent off-site for disposal, treatment and further management. About 163 million kg are recycled. (See Appendix A)

The following recommendations, presented in greater detail in Section 4, offer solutions for improving the source water protection program to ensure the greatest possible protection of Ontario's drinking water:

Recommendations:

- Recognize that air pollution is a major source of chemicals and nutrients to Great Lakes.

- Incorporate the significant contribution of air releases into the Source Water Protection Program for Great Lakes drinking water sources.
    - Certain categories on the list of threats to drinking water under Ontario’s drinking water source protection program should be expanded to include chemical emissions to air, as many of these air emissions will eventually fall into the water and land.

- Increase the emphasis on protection of Great Lakes sources in Ontario's drinking water source protection program.

- Increase the use of NPRI data as a source of information for Ontario's drinking water source protection program. NPRI can provide valuable inputs into many different categories of drinking water list of threats. The NPRI facilities and their emissions to air, water and land need to be considered as part of the source protection planning process and the assessment of potential threats to drinking water.

Purpose of this Report

This fact sheet provides:

1) An analysis of Ontario's Source Protection Program

2) An overview of the pollutant releases from NPRI facilities in each of the source protection areas and regions located in Ontario in the Great Lakes Basin

3) Inputs to the work of the source protection committees in identifying the threats to drinking water sources for their source protection area or region

4) A list of recommendations to further protect sources of drinking water for Ontarians and the Great Lakes-St. Lawrence River Basin from toxic pollution

This is one of two fact sheets focused on the Great Lakes-St. Lawrence River Basin completed by the Canadian Environmental Law Association (CELA) and Environmental Defence under its PollutionWatch Project (www.PollutionWatch.org). See *Partners in Pollution 2: An Update on the Continuing Canadian and United States Contributions to Great Lakes Pollution* (in production).

The value of drinking water as an ecosystem service has been quantified in a few studies. In Lake Simcoe, the annual value of water supply was estimated at about $22 million. If the daily residential water use in the Lake Simcoe watershed had to be supplied through bottled water, the cost would be about $200 million a day, or over $75 billion a year. In a study of the Greenbelt, the Greater Toronto and Hamilton area which covers some of the Source Protection Areas (SPAs), the total replacement cost of water if supplied by bottled water was estimated at $2.2 billion a day or $825 billion a year.

Introduction

The Great Lakes-St. Lawrence River Basin is a significant natural resource and home to 40 million people in the United States and Canada. The Great Lakes - Superior, Michigan, Huron, Erie and Ontario - and the St. Lawrence River and their connecting channels form the largest freshwater system on earth; the area drained by the basin covers 766,000 square kilometres. The Great Lakes-St. Lawrence River Basin holds 95% of the North America's fresh water supply. These water bodies represent 20% of the world's total fresh water supply.[1] For residents of Ontario, the Great Lakes-St. Lawrence River Basin is a source of drinking water for 98% of Ontario's population, while over 70% of Ontarians (over 10 million) rely on the Great Lakes as its source of drinking water.[2]

The threats to the well-being of the Great Lakes-St. Lawrence River Basin ecosystem are wide ranging – from toxic pollution (e.g. industrial emissions, pharmaceuticals, bacteria, pathogens), to increasing numbers of invasive species, urban development, demands for water withdrawal and diversion, climate change, contaminated sediments, and shoreline development.

[1] Environment Canada. About the Great Lakes. See: www.on.ec.gc.ca/greatlakes/default.asp?lang=En&n=7B8BFD89-1 dated June 16, 2009.

[2] Ibid.
Ministry of Environment. Great Lakes. See: www.ene.gov.on.ca/en/water/greatlakes/index.php dated October 19, 2009.
Sara Wilson. Lake Simcoe Basin Natural Capital. See: www.lsrca.on.ca/PDFs/Lake%20Simcoe%20Final%20June%2020_2_.pdf dated June 2008.
Ontario's Wealth, Canada's Future. Greenbelt Foundation and Suzuki Foundation. September 2008.

Increasingly, government agencies, scientists, environmentalists and health workers are focusing on addressing the effects of the threats to the Great Lakes. Hundreds of toxic chemicals are now being detected in the Great Lakes. However, the chemicals management activity by government and industry have been on only a few toxic chemicals (i.e., mercury, lead, PCBs, dioxins and furans, etc.) to date. The growing body of evidence demonstrating that toxic substances may be linked to significant problems for human health and wildlife in even extremely small doses that can affect future generations makes protecting the Great Lakes Basin essential. Many of these toxic substances enter the Great Lakes from the air, from either local or distant manufacturing sources, or are released from wastewater treatment plants and runoff from roads and agricultural sources. In addition, many toxics cannot be removed effectively by available drinking or wastewater treatment systems or captured completely through current control technologies.

To take action on the highlighted threats, it is important to consider not only the Great Lakes themselves, but all activities that affect the aquifers, streams, rivers, lakes and lands within the entire Great Lakes Basin, as well as distant sources of contamination which enter the Basin through air deposition. Taking action that mitigates the potential threats to human health and the Great Lakes environment in such a manner is known as a watershed approach. A watershed approach to land management was adopted in Ontario in the 1950s, when the province's first Conservation Areas were established. More recently, the watershed approach has been applied to the protection of Ontario's drinking water.

Section 1 - Source Protection Program

1.1 A Multi-Barrier Approach to Protecting Drinking Water in Ontario

The Canadian Environmental Law Association (CELA) and Environmental Defence have long advocated for a multi-barrier approach to the protection of Ontario's drinking water. A multi-barrier approach ensures that drinking water is protected in all stages of the drinking water cycle, from intake to distribution system to treatment of wastewater. This approach emphasizes the importance of monitoring and mitigating threats to untreated water in the natural environment, known as source water, to water being delivered through the municipal distribution systems, and to water processed in water and wastewater treatment facilities. In addition, potential threats to drinking water need to be communicated to all parties involved in implementing the multi-barrier approach.

A multi-barrier approach to protecting drinking water was taken up in earnest by the province of Ontario in the wake of the tragedy at Walkerton, Ontario in May 2000. During this event, seven people died and approximately half the town's 4,200 residents became sick; hundreds continue to live with severe health problems and social impacts. This tragedy resulted from the failure of an entire regulatory framework and oversight system responsible for protecting water sources, a failure to address threats to the quality of drinking water, and poor communication among decision-makers at the provincial government, the municipality's water system managers and the region's water treatment laboratory.

Based on the result of the Walkerton Inquiry, which was established to determine the cause of the tragedy, and the final recommendations made by Justice Dennis O'Connor, the province moved towards a multi-barrier approach to water protection. In response to these recommendations, the provincial government passed two important laws intended to protect drinking water. In 2002 the government passed the *Safe Drinking Water Act*, which addresses water treatment and distribution systems. In 2006, the *Clean Water Act*, a source protection law, was passed. These Acts are now being implemented.

1.2 The Clean Water Act, 2006: Source Water Protection in Ontario

The *Clean Water Act, 2006* (CWA) is the Ontario law under which source protection efforts are being undertaken in the province to protect drinking water. At present, source protection activities in Ontario are focused on the protection of sources of treated drinking water. Source protection is being implemented on a local scale, by source protection area (SPA) and source protection region[3] – areas which correspond to the watersheds of Southern, Central and parts

[3] There are 19 source protection authorities in Ontario, each of which is staffed by Conservation Authority personnel. There are also 19 corresponding source protection committees, which comprise stakeholders representing municipal, business, industrial, agricultural, environmental and broader community interests. Some source protection authorities and committees oversee the source protection work in a single source protection area, such as in the Niagara Peninsula Source Protection Area, and the Lakehead Source Protection Area. Other authorities and committees oversee work in more than one source protection area: the conglomerated areas they oversee are called source protection *regions*. In this report, the acronym SPA refers to the working area of an authority and committee, regardless of its designation as a source protection area or source protection region.

of Northern Ontario. The Ontario Ministry of the Environment (MOE) and the province's Conservation Authorities (CAs), are currently identifying potential threats to drinking water located in each SPA, as well as gauging the severity of each potential threat. Geographic information systems are being used to store and map data on water quality, water quantity, and threats to source water. These data will be used to help identify, address and mitigate potential threats to drinking water. The 19 source protection committees (SPCs) are ensuring the source protection planning process is sufficiently tailored to the unique geology and human and natural geographies of each of the province's SPAs. (See Figure 1)

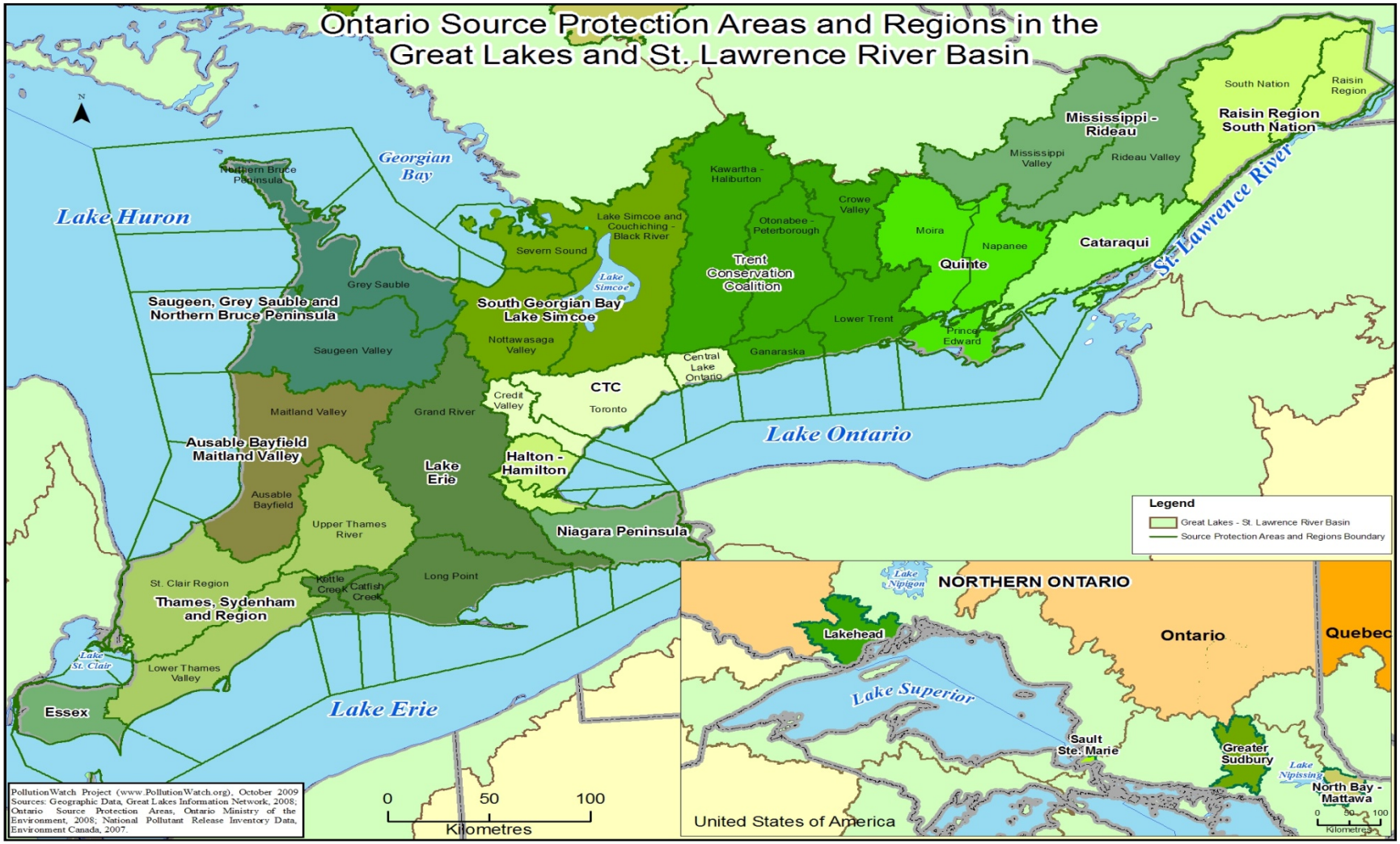
Ministry of Environment List of Threats to Drinking Water	
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the *Environmental Protection Act*.
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.
3	The application of agricultural source material to land.
4	The storage of agricultural source material.
5	The management of agricultural source material.
6	The application of non-agricultural source material to land.
7	The handling and storage of non-agricultural source material.
8	The application of commercial fertilizer to land.
9	The handling and storage of commercial fertilizer.
10	The application of pesticide to land.
11	The handling and storage of pesticide.
12	The application of road salt.
13	The handling and storage of road salt.
14	The storage of snow.
15	The handling and storage of fuel.
16	The handling and storage of a dense non-aqueous phase liquid.
17	The handling and storage of an organic solvent.
18	The management of runoff that contains chemicals used in the de-icing of aircraft.
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.
20	An activity that reduces the recharge of an aquifer.
21	The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard.

As of the fall of 2009, all SPCs' Terms of Reference, the "workplans" that outline what actions are to be taken in each SPA, have been approved by the MOE. SPCs are now preparing Assessment Reports.

In these documents, potential threats to drinking water will be identified and the risks they present to drinking water gauged. The province has identified 21 activities which are considered drinking water threats:[4] Once these potential threats to drinking water have been identified, the SPCs will develop their Source Protection Plans. These plans will outline the ways certain drinking water threats will be addressed and mitigated. These plans are expected to be ready for implementation from the beginning of 2010.

[4] See: O. Reg. 385/08.

Figure 1: Ontario SPAs in the Great Lakes and St. Lawrence River Basin



Section 2 - What Can National Pollutant Release Inventory data tell us about Pollution in Source Protection Areas and Regions?

This section uses the federal National Pollutant Release Inventory (NPRI) data to identify releases and transfers of over 300 pollutants from facilities in Source Protection Regions. Each year, over 8,500 facilities across Canada submit their pollutant data to Environment Canada. A facility reports on the amount of pollutants released to the air, water, land or injected underground and also on the amounts of pollutants transferred off the site for disposal, treatment or recycling. NPRI data are a good source of information about pollutant releases from larger industrial and municipal facilities which are required to be assessed as drinking water threats in the source protection program.

Previous years of NPRI data are posted for public access on the PollutionWatch web site and are also searchable at www.PollutionWatch.org. For more information about NPRI, please see the section titled "Understanding the Data" under the link "About PollutionWatch" on the PollutionWatch website at www.PollutionWatch.org

2.1 Number of NPRI Facilities in the Source Protection Regions and Areas in Ontario

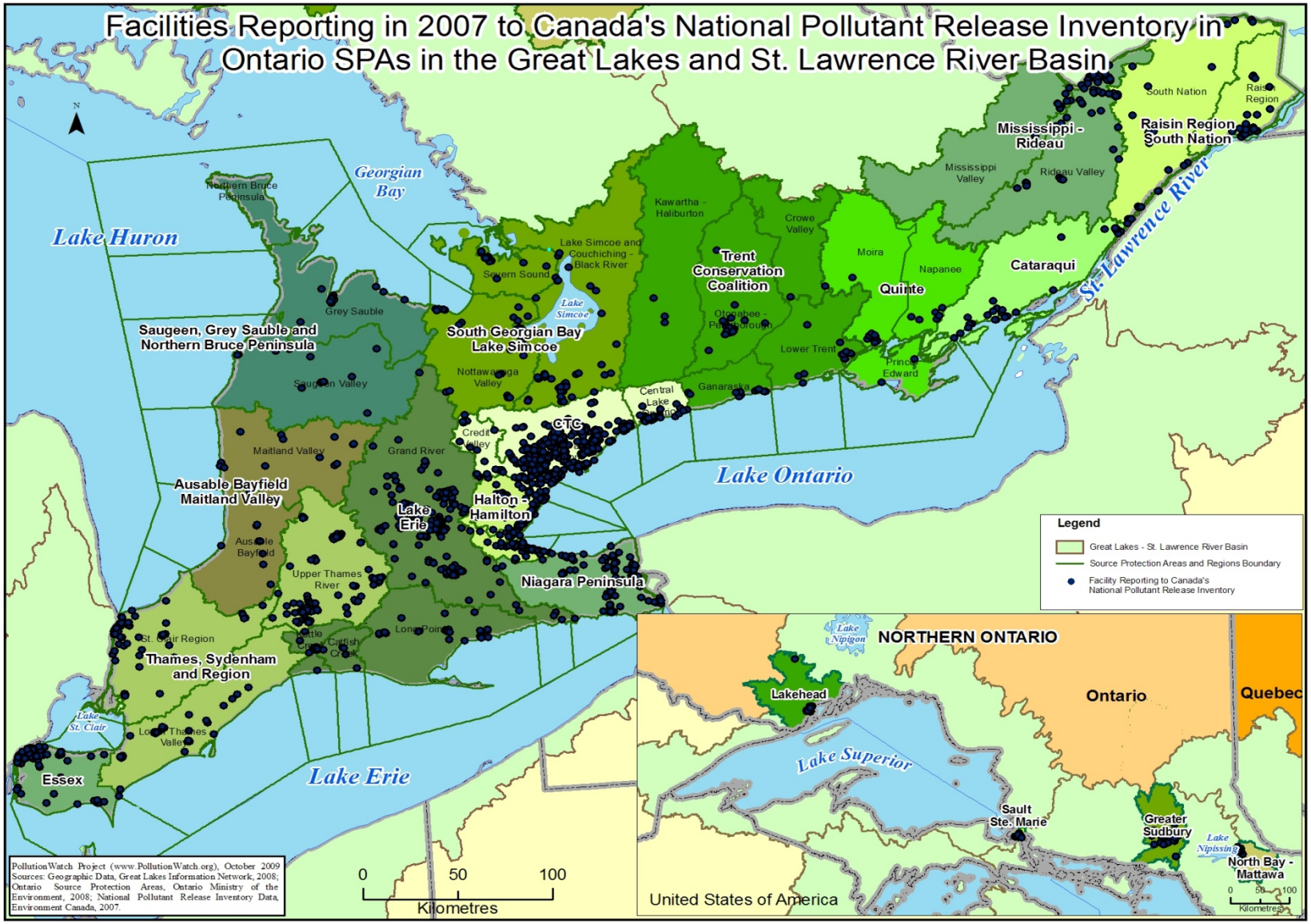
Of Ontario's 19 SPAs, only one, the Mattagami Source Protection Area, is located outside of the Great Lakes Basin.

There are 2,144 NPRI facilities in SPAs in the Great Lakes Basin in the 2007 reporting year. This is almost one-quarter of all NPRI facilities in Canada (8,731). (See Figure 2)

The Credit, Toronto and Central (CTC) Source Protection Region has the largest number of NPRI facilities of any SPA (754 facilities, about 33% of the total NPRI facilities in Ontario). The Lake Erie Source Protection Region has the second largest number of NPRI facilities (313 facilities with 14% of total). The Thames, Sydenham and Region Source Protection Region has the third largest number of NPRI facilities (223 NPRI facilities, about 10% of total). There are 8 SPAs in the Great Lakes Basin each of which has fewer than 40 NPRI facilities. (See Table 1)

Table 1. Number of NPRI facilities in each SPA in 2007			
	Name of Source Protection Area or Region	**Number of NPRI facilities**	**% of Ontario Facilities**
1	Credit, Toronto and Central (CTC) Source Protection Region	754	32.9%
2	Lake Erie Source Protection Region	313	13.7%
3	Thames, Sydenham and Region Source Protection Region	223	9.7%
4	Halton-Hamilton Source Protection Region	176	7.7%
5	South Georgian Bay Lake Simcoe Source Protection Region	109	4.8%
6	Niagara Peninsula Source Protection Area	95	4.1%
7	Essex Region Source Protection Area	82	3.6%
8	Mississippi-Rideau Source Protection Region	69	3.0%
9	Raisin-South Nation Source Protection Region	59	2.6%
10	Trent Conservation Coalition Source Protection Region	56	2.4%
11	Lakehead Source Protection Area	34	1.5%
12	Cataraqui Source Protection Area	35	1.5%
13	Greater Sudbury Source Protection Area	35	1.5%
14	Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region	25	1.1%
15	Quinte Source Protection Region	23	1.0%
16	Ausable Bayfield Maitland Valley Source Protection Region	23	1.0%
17	North Bay-Mattawa Source Protection Area	17	0.7%
18	Sault Ste Marie Source Protection Region	16	0.7%
	Total NPRI Facilities in Great Lakes SPAs Reporting for 2007	**2,144**	
	Mattagami Source Protection Area	10	0.4%
	Not in a Source Protection Area	138	6.0%
	Total NPRI Facilities in Ontario, Reporting for 2007	**2,292**	**100.0%**
	Total NPRI Facilities in Canada, Reporting for 2007	**8,731**	
	% Ontario is of Total Canada	26.3%	

Figure 2: Locations of NPRI facilities in SPAs in the Great Lakes and St. Lawrence River Basin



2.2 Air Releases – Toxics and Criteria Air Contaminants

Large amounts of chemicals are released into the air from NPRI facilities in SPAs. Some of these are "toxic chemicals" (those reported in Part 1, 2 and 3 in NPRI) and some are called "criteria air contaminants"(CACs), pollutants associated with smog, acid rain, contributing nitrogen to waterways and health effects (reported in Part 4 in NPRI).

More than 32 million kg of toxic chemicals were released to the air in 2007 by NPRI facilities in SPAs. This is about 29% of Canada's total of 111 million kg. The SPAs with the largest amounts of toxic chemicals released to the air are the Thames, Sydenham and Region Source Protection Region, followed by the Credit, Toronto and Central (CTC) Source Protection Region and the Lake Erie Source Protection Region. (See Figure 3 and Table 2)

More than 722 million kg of criteria air contaminants (CACs) were released to the air in 2007 in SPAs. This is about 17% of Canada's total of 4,199 million kg. The SPA with the largest releases of CACs is the Greater Sudbury Source Protection Area, followed by the Thames, Sydenham and Region Source Protection Region and the Lake Erie Source Protection Region. (See Table 2)

Figure 3: Facilities Reporting in 2007 to the NPRI for Air Releases of Toxics in SPAs in the Great Lakes and St. Lawrence River Basin

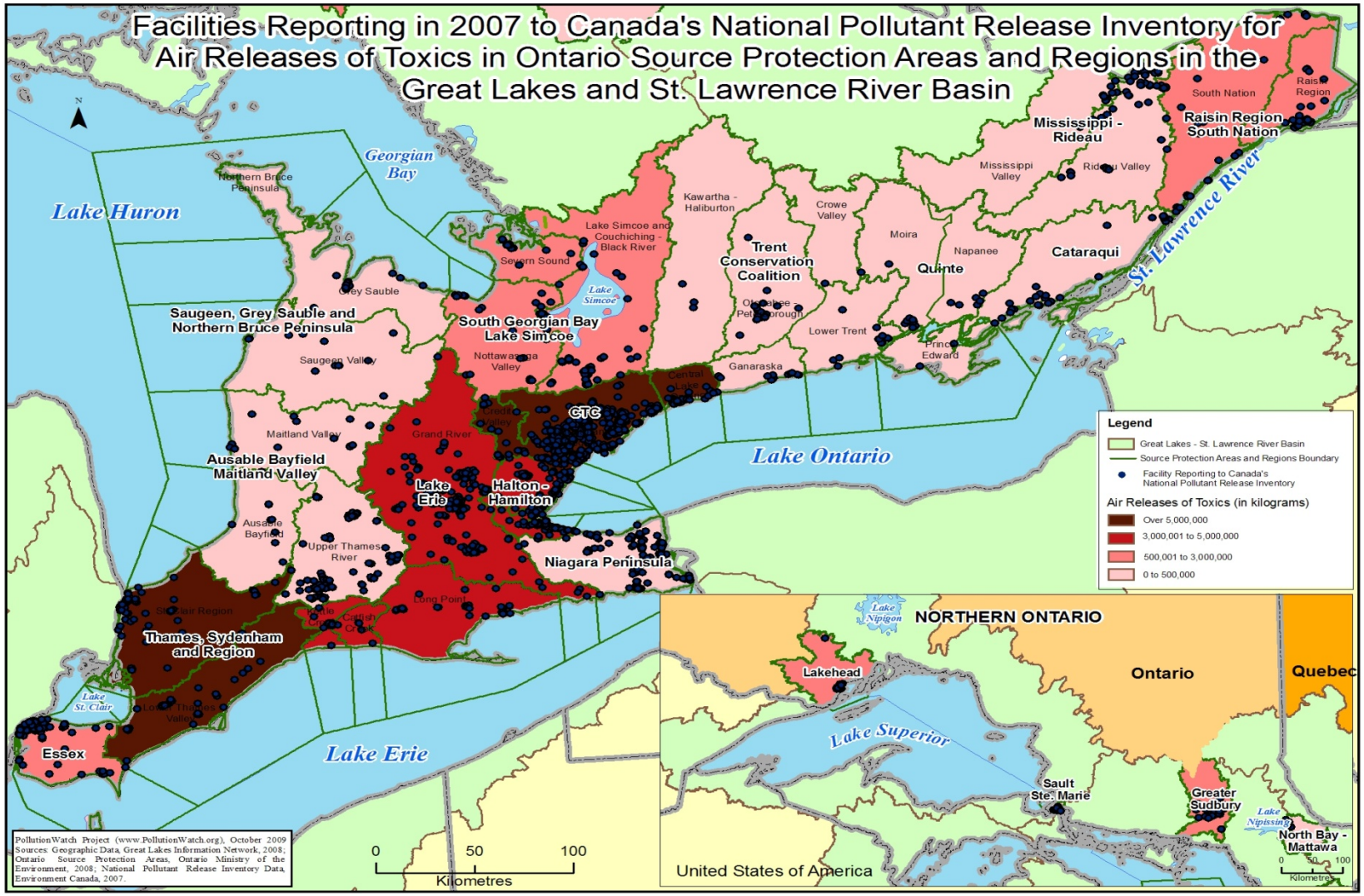


Table 2: Air releases of toxics and criteria air contaminants from NPRI facilities in SPAs in 2007

Name of Source Protection Area or Region	Air Releases of Toxics		Air Releases of Criteria Air Contaminants	
	(kg)	Rank	(kg)	Rank
Thames, Sydenham and Region Source Protection Region	8,052,597	1	160,322,237	2
Credit, Toronto and Central (CTC) Source Protection Region	5,759,408	2	57,987,754	5
Lake Erie Source Protection Region	4,432,363	3	137,833,920	3
Halton-Hamilton Source Protection Region	4,210,997	4	68,376,439	4
Lakehead Source Protection Area	2,302,847	5	24,372,327	6
Greater Sudbury Source Protection Area	2,301,772	6	199,546,932	1
Raisin-South Nation Source Protection Region	1,973,873	7	9,871,744	10
Essex Region Source Protection Area	1,061,357	8	11,941,758	8
South Georgian Bay Lake Simcoe Source Protection Region	699,704	9	4,459,099	12
Mississippi-Rideau Source Protection Region	457,918	10	3,288,285	14
Niagara Peninsula Source Protection Area	336,022	11	2,798,283	15
Sault Ste Marie Source Protection Region	316,719	12	13,397,049	7
Trent Conservation Coalition Source Protection Region	291,349	13	1,359,996	17
Cataraqui Source Protection Area	117,769	14	9,026,010	11
Ausable Bayfield Maitland Valley Source Protection Region	91,544	15	1,581,037	16
Quinte Source Protection Region	83,428	16	11,328,854	9
North Bay-Mattawa Source Protection Area	76,262	17	433,920	18
Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region	17,626	18	4,391,297	13
Total for Great Lakes SPAs	**32,583,554**		**722,316,940**	
Mattagami Source Protection Area	275,203		10,366,772	
Other in Ontario	1,668,921		52,610,190	
Total for Ontario	**34,527,678**		**785,293,902**	
Total for Canada	**111,116,071**		**4,199,406,696**	

Note: In this table, “toxic chemicals” are those reported to NPRI in Parts 1, 2 and 3 and criteria air contaminants are those reported in Part 4 (sulphur dioxide, carbon monoxide, nitrogen oxides, volatile organic compounds, total particulate matter, PM less than or equal to 10 microns, PM less than or equal to 2.5 microns).

A few NPRI facilities stand out as releasing the largest amounts of air pollutants. These top 15 NPRI facilities released over 15 million kg of air pollutants, and accounted for almost half (47%) of toxic air releases from all NPRI facilities in SPAs. (See Table 3)

Table 3: Top 15 NPRI facilities in SPAs releasing largest amounts of toxic chemicals to air in 2007 (kg)

Facility Name	Company Name	City	SPA	Air Releases of Toxics
				(kg)
Nanticoke Generating Station	ONTARIO POWER GENERATION	Nanticoke	Lake Erie Source Protection Region	2,315,272
Lambton Generating Station	ONTARIO POWER GENERATION	Courtright	Thames, Sydenham and Region Source Protection Region	2,092,367
Copper Cliff Smelter Complex	Vale Inco	Copper Cliff	Greater Sudbury Source Protection Area	1,788,756
Woodward Avenue Wastewater Treatment Plant	City of Hamilton	Hamilton	Halton-Hamilton Source Protection Region	1,622,327
LANXESS EAST	LANXESS Inc.	Sarnia	Thames, Sydenham and Region Source Protection Region	1,305,703
Terrace Bay Pulp	Terrace Bay Pulp Inc.	TERRACE BAY	Lakehead Source Protection Area	1,104,084
Dyno Nobel Nitrogen Inc.-Maitland site	Dyno Nobel Nitrogen Inc.	Twp of Augusta, United Counties of Leeds	Raisin Region South Nation Source Protection Region	953,360
Oakville Assembly Plant	FORD MOTOR OF CANADA	Oakville	Halton-Hamilton Source Protection Region	641,466
MARATHON PULP – MARATHON	MARATHON PULP INC	Marathon	Lakehead Source Protection Area	618,975
Terra Nitrogen	TERRA INTERNATIONAL CANADA INC	Courtright	Thames, Sydenham and Region Source Protection Region	618,704
Sarnia Refinery Plant	IMPERIAL OIL	SARNIA	Thames, Sydenham and Region Source Protection Region	517,346
Thunder Bay Operations	BOWATER	Thunder Bay	Lakehead Source Protection Area	497,594
MAITLAND SITE	INVISTA (Canada) Company	Maitland	Raisin Region South Nation Source Protection Region	445,153
Dofasco Hamilton	ArcelorMittal-Dofasco Inc.	Hamilton	Halton-Hamilton Source Protection Region	439,188
NOVA CHEMICALS CORP-ST. CLAIR RIVER SITE	NOVA CHEMICALS	Corunna	Thames, Sydenham and Region Source Protection Region	395,886
Total for 15 facilities				**15,356,182**
Total for all facilities in Great Lakes SPAs				**32,583,554**

Note: The facility and company names appear here as reported to NPRI in 2007. In this table, "toxic chemicals" are those reported to NPRI in Part 1, 2 and 3.

2.2.1 Importance of Air Releases as Source of Pollutants to Great Lakes

Many monitoring results and models of the Great Lakes have identified that deposition of airborne contaminants is an important source of toxic chemicals to the Great Lakes Basin. However, this important source of air pollutants is not included in the MOE list of threats to drinking water, and so may not be assessed or considered in Source Protection Plans. For drinking water that comes from the Great Lakes, air deposition of toxics should be included in the list of threats. NPRI data confirm that air releases are larger than water releases for many of the chemicals considered in the Source Protection Program.

Chemical Name	***Air Releases (kg)***	***Water Releases (kg)***
Toluene	*1,906,571*	*195*
Xylene (all isomers)	*2,056,948*	*72*
Arsenic (and its compounds)	*12,888*	*2,082*
Benzene	*309,131*	*134*
Formaldehyde	*208,468*	*4,373*
Lead (and its compounds)	*41,970*	*4,442*
Total all chemicals in SPRs	***32,583,554***	***53,879,369***

A significant portion of certain metals and organic compounds, such as lead, arsenic, benzene, toluene and xylene, also enter the Great Lakes through air deposition. (See Sidebar; Figures 4 and 5). These chemicals are also on the MOE list of drinking water threats, and some of them have been linked to significant health effects such as cancer, hormone disruption, neurodevelopmental toxicity, and reproductive developmental, and learning disabilities.

Figure 4: Amounts of Arsenic (and its compounds), Benzene, Formaldehyde and Lead (and its compounds) Released from NPRI facilities into the Air and Water in SPAs in 2007 (kg)

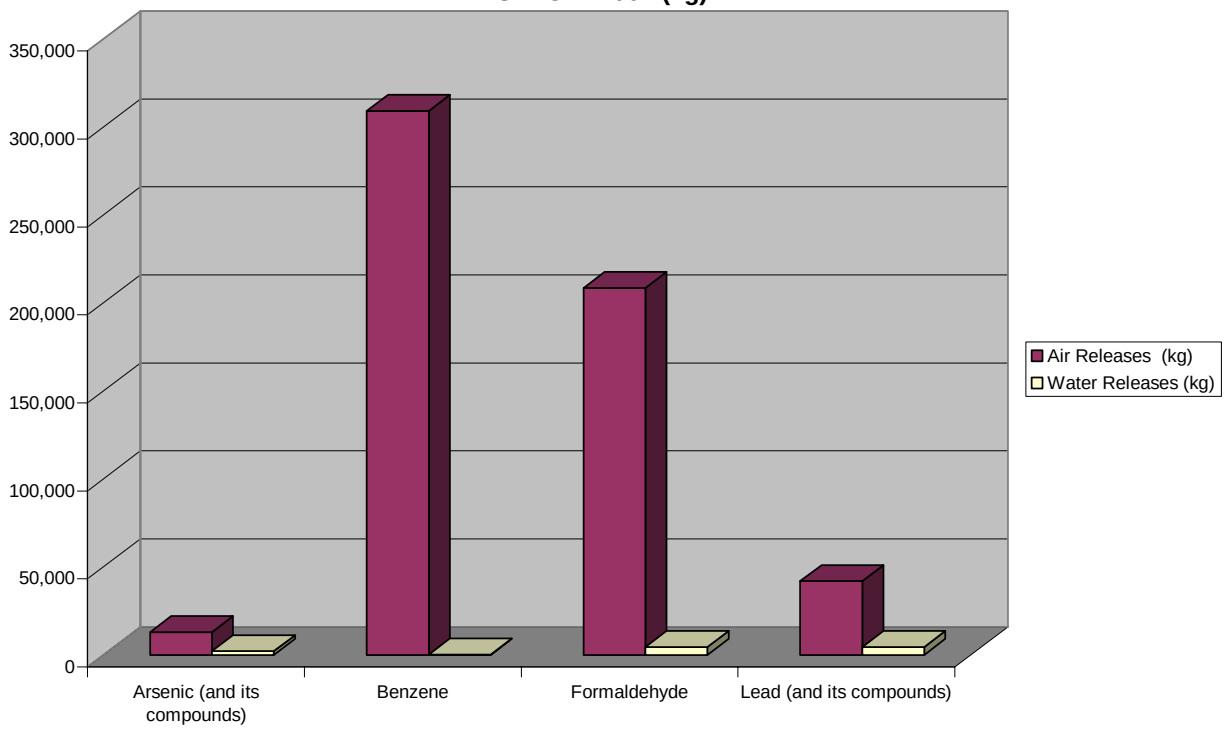
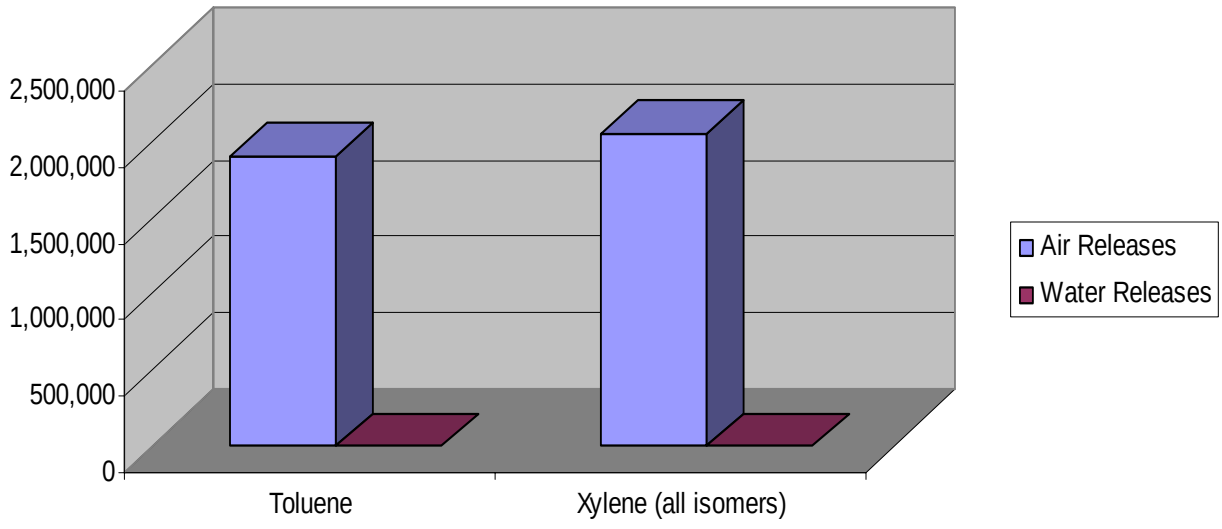


Figure 5: Amounts of Toluene and Xylene Released into the Air and Water from NPRI facilities in Source Protection Areas in 2007 (kg)



2.2.2 Air Releases of Known or Suspected Carcinogens

Some of the pollutants released to air are considered known or suspected carcinogens (as identified by California Proposition 65).

Total air releases of chemicals considered known or suspected carcinogens in 2007 from NPRI facilities in SPAs was approximately 1.5 million kg (over 6% of all air releases in SPAs are chemicals considered known or suspected carcinogens). This was about one-quarter of Canada's total air releases of known or suspected carcinogens (5.9 million kg). (See Table 4)

The five SPAs with the largest air releases of known or suspected carcinogens are: 1) Credit, Toronto and Central (CTC); 2) Thames, Sydenham and Region; 3) Halton-Hamilton; 4) Lakehead; and 5) Greater Sudbury.

Table 4: On-site releases of known or suspected carcinogens from NPRI facilities in each SPA in 2007

	Source Protection Area or Region	Facilities Number	Chemical Reports Number	Air Releases of Toxics (kg)	Water (kg)	Under-ground Injection (kg)	Land (kg)	Total On-site Releases (kg)
1	Credit, Toronto and Central (CTC) Source Protection Region	252	507	314,455	3,412	0	209,008	531,340
2	Lake Erie Source Protection Region	104	207	101,683	1,733	0	42,062	146,124
3	Thames, Sydenham and Region Source Protection Region	89	297	308,751	334	0	6,824,840	7,134,688
4	Halton-Hamilton Source Protection Region	59	166	257,003	910	0	2,387,745	2,646,158
5	South Georgian Bay Lake Simcoe Source Protection Region	42	68	56,872	0	0	6,452	63,723
6	Niagara Peninsula Source Protection Area	36	63	10,838	1,507	0	997,669	1,010,013
7	Essex Region Source Protection Area	25	55	55,087	1,076	0	0	56,366
8	Mississippi-Rideau Source Protection Region	18	28	7,993	0	0	243,640	251,634
9	Raisin-South Nation Source Protection Region	15	37	17,555	16	0	23,751	41,655
10	Trent Conservation Coalition Source Protection Region	18	28	24,729	28	0	0	24,799
11	Lakehead Source Protection Area	9	47	167,897	6,189	0	1,174	175,309
12	Cataraqui Source Protection Area	14	31	6,788	321	0	2,387	10,574
13	Greater Sudbury Source Protection Area	18	61	113,268	11,756	0	215	125,240
14	Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region	12	26	401	1,741	0	6,665	8,808
15	Quinte Source Protection Region	7	13	62	0	0	0	62
16	Ausable Bayfield Maitland Valley Source Protection Region	3	3	94	0	0	0	94
17	North Bay-Mattawa Source Protection Area	9	15	20,793	0	0	62	20,858
18	Sault Ste Marie Source Protection Region	6	16	51,658	137	0	0	51,795
	Total for Great Lakes SPAs	**736**	**1,668**	**1,515,926**	**29,160**	**0**	**10,745,670**	**12,299,239**
	Mattagami Source Protection Area	4	30	56,974	3,301	0	0	60,275
	Other in Ontario	43	104	357,916	2,370	0	35,313	396,310
	Total for Ontario	**783**	**1,802**	**1,930,816**	**34,831**	**0**	**10,780,983**	**12,755,824**
	Total for Canada	**1,828**	**4,663**	**5,893,113**	**223,014**	**227,687**	**23,194,045**	**29,556,956**

Note: In this table, chemicals are “toxic chemicals”, those reported to NPRI in Parts 1, 2 and 3.

2.2.3 Air Releases of Reproductive and Developmental Toxins

About 9% of all air releases in SPAs in 2007 were chemicals considered known or suspected reproductive and developmental toxins (as identified by California Proposition 65).

Total air releases of chemicals considered reproductive and developmental toxins in 2007 from NPRI facilities in SPAs equalled almost 3 million kg. This is about one-third of Canada's total air releases (8.5 million kg). (See Table 5)

Table 5: On-site releases of known or suspected reproductive or developmental toxins from NPRI facilities in each SPA in 2007

Rank	Name of Source Protection Area or Region	Facilities	Chemical Reports	Air Releases of Toxics	Water	Under-ground Injection	Land	Total On-site Releases
		Number	Number	(kg)	(kg)	(kg)	(kg)	(kg)
1	Credit, Toronto and Central (CTC) Source Protection Region	203	318	1,050,802	2,546	0	204,704	1,261,728
2	Lake Erie Source Protection Region	65	109	350,991	411	0	12,973	364,608
3	Thames, Sydenham and Region Source Protection Region	57	138	518,291	492	0	2,775,705	3,294,637
4	Halton-Hamilton Source Protection Region	44	82	323,456	612	0	4,724	329,171
5	South Georgian Bay Lake Simcoe Source Protection Region	26	37	57,312	0	0	6,259	64,967
6	Niagara Peninsula Source Protection Area	26	38	9,426	682	0	2,450	12,557
7	Essex Region Source Protection Area	23	46	115,610	1,076	0	0	117,545
8	Mississippi-Rideau Source Protection Region	17	23	10,971	0	0	18,640	29,932
9	Raisin-South Nation Source Protection Region	13	24	79,645	15	0	323	79,983
10	Trent Conservation Coalition Source Protection Region	16	19	17,807	28	0	0	17,835
11	Lakehead Source Protection Area	9	36	12,250	565	0	1,127	13,948
12	Cataraqui Source Protection Area	9	19	126	309	0	2,387	2,821
13	Greater Sudbury Source Protection Area	12	37	169,468	1,003	0	94	170,566
14	Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region	10	18	11,781	1	0	6,659	18,441
15	Quinte Source Protection Region	5	8	60,293	0	0	0	60,293
16	Ausable Bayfield Maitland Valley Source Protection Region	5	7	66,849	0	0	0	66,849
17	North Bay-Mattawa Source Protection Area	5	8	2	0	0	62	64
18	Sault Ste Marie Source Protection Region	4	8	5,736	134	0	0	5,870
	Total for Great Lakes SPAs	**549**	**975**	**2,860,817**	**7,874**	**0**	**3,036,108**	**5,911,814**
	Mattagami Source Protection Area	4	15	54,507	163	0	0	54,670
	Other in Ontario	36	74	11,030	1,301	0	35,169	47,499
	Total for Ontario	**589**	**1,064**	**2,926,353**	**9,338**	**0**	**3,071,278**	**6,013,983**
	Total for Canada	**1,491**	**3,053**	**8,456,658**	**123,433**	**362,465**	**8,183,977**	**17,137,862**

Note: In this table, “toxic chemicals” are those reported to NPRI in Part 1, 2 and 3.

2.3 Water Releases

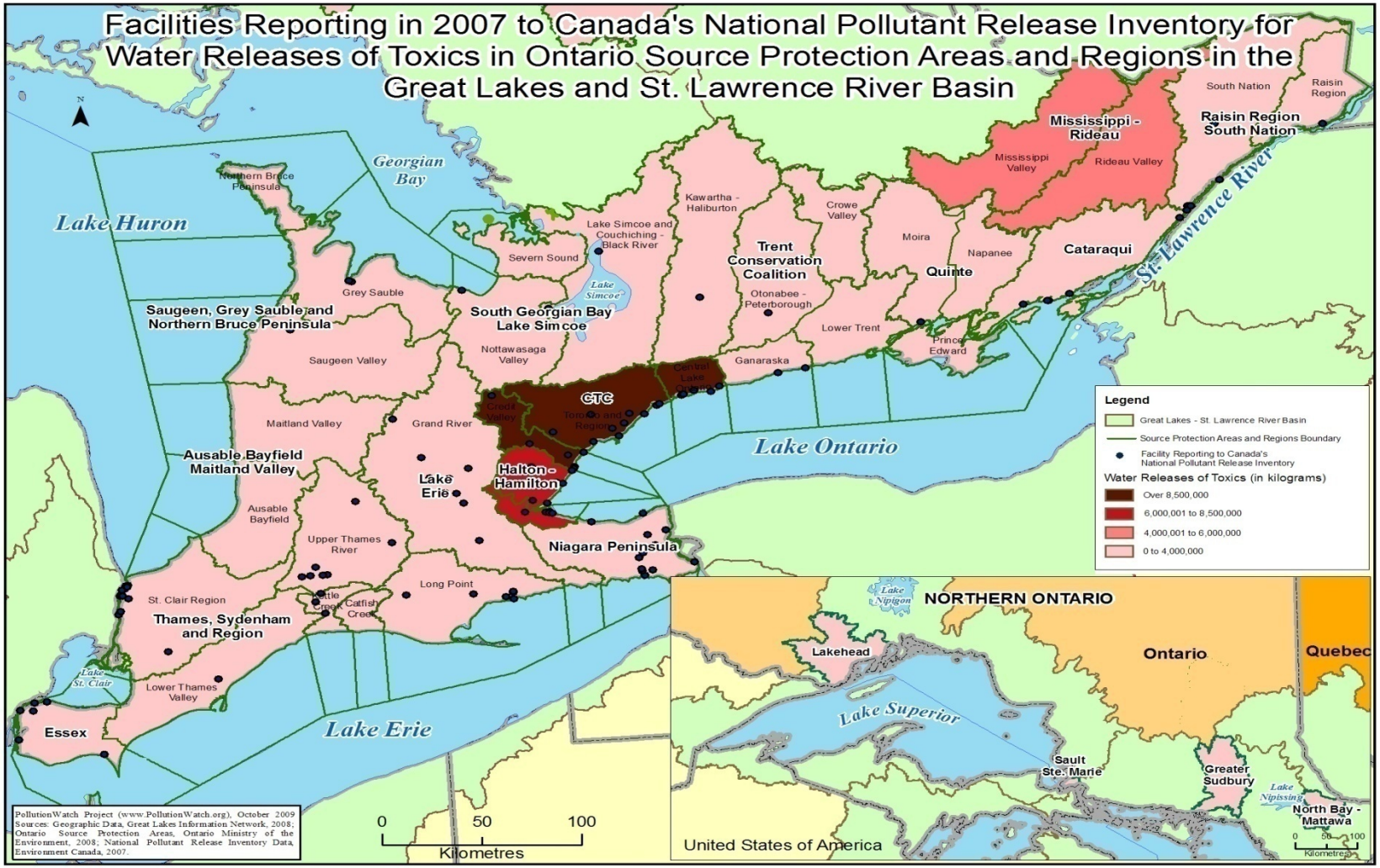
Large amounts of pollutants were released to the water from NPRI facilities in 2007 in SPAs. (See Figure 6). About 54 million kg of pollutants were released to the water in SPAs in 2007, almost half of Canada's total of 117 million kg. Common water pollutants released in SPAs included ammonia, nitrate ion, phosphorus, chlorine and some of the metals, such as lead and cadmium. Many of these pollutants are classified as toxic under the *Canadian Environmental Protection Act* (CEPA). About 30% of water releases in SPAs are pollutants considered CEPA toxic. Ammonia accounts for almost 99% of the total water releases of CEPA toxic chemicals. (See Table 6)

Table 6: Water releases of toxic contaminants from NPRI facilities in SPAs in 2007

Rank	Source Protection Area or Region	Water Releases in 2007 (kg)
1	Credit, Toronto and Central (CTC) Source Protection Region	27,537,713
2	Halton-Hamilton Source Protection Region	8,482,378
3	Mississippi-Rideau Source Protection Region	5,367,144
4	Lake Erie Source Protection Region	3,535,866
5	Thames, Sydenham and Region Source Protection Region	1,929,215
6	South Georgian Bay Lake Simcoe Source Protection Region	1,667,519
7	Niagara Peninsula Source Protection Area	1,446,560
8	Essex Region Source Protection Area	911,922
9	Cataraqui Source Protection Area	784,069
10	Greater Sudbury Source Protection Area	523,194
11	Lakehead Source Protection Area	520,584
12	Raisin-South Nation Source Protection Region	377,180
13	Trent Conservation Coalition Source Protection Region	259,949
14	North Bay-Mattawa Source Protection Area	230,618
15	Sault Ste Marie Source Protection Region	201,466
16	Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region	69,532
17	Quinte Source Protection Region	34,460
18	Ausable Bayfield Maitland Valley Source Protection Region	0
	Total for Great Lakes SPAs	**53,879,369**
	Mattagami Source Protection Area	*158,194*
	Other in Ontario	*512,370*
	Total for Ontario	**54,549,933**
	Total for Canada	**117,451,206**

Note: In this table, "toxic chemicals" are those reported to NPRI in Part 1, 2 and 3

Figure 6: Facilities Reporting in 2007 to Canada's National Pollutant Release Inventory for Water Releases in SPAs in the Great Lakes and St. Lawrence River Basin



Water releases in the Credit, Toronto and Central (CTC) Source Protection Region accounted for more than half of the total water releases in all Great Lakes SPAs, driven by the large number of wastewater treatment plants in this SPA. Wastewater treatment plants receive and treat large amounts of wastewater from households, businesses and industries.

Table 7: Top 15 NPRI facilities in SPAs releasing largest amounts of chemicals to water in 2007

Facility Name	Company Name	City	SPA	On-Site Water Releases (kg)
Ashbridges Bay Treatment Plant	CITY OF TORONTO	Toronto	Credit, Toronto and Central (CTC) Source Protection Region	14,525,453
Robert O. Pickard Environmental Centre	CITY OF OTTAWA	Gloucester	Mississippi-Rideau Source Protection Region	5,367,144
Highland Creek Treatment Plant	CITY OF TORONTO	Toronto	CTC Source Protection Region	4,844,496
Skyway Waste Water Treatment Plant	Regional Municipality of Halton	Burlington	Halton-Hamilton Source Protection Region	4,069,436
Humber Treatment Plant	CITY OF TORONTO	Toronto	CTC Source Protection Region	2,583,168
Woodward Avenue Wastewater Treatment Plant	City of Hamilton	Hamilton	Halton-Hamilton Source Protection Region	1,987,744
City of Guelph Wastewater Treatment Plant	CITY OF GUELPH	Guelph	Lake Erie Source Protection Region	1,831,449
Barrie Water Pollution Control Centre	CITY OF BARRIE	Barrie	South Georgian Bay Lake Simcoe Source Protection Region	1,651,245
G.E. Booth (Lakeview) Wastewater Treatment Facility	Ontario Clean Water Agency	Miss.	CTC Source Protection Region	1,541,780
Mid-Halton Waste Water Treatment Plant	Regional Municipality of Halton	Oakville	Halton-Hamilton Source Protection Region	1,525,204
Clarkson Wastewater Treatment Facility	Ontario Clean Water Agency	Miss.	CTC Source Protection Region	1,501,070
Lou Romano Water Reclamation Plant	City of Windsor	Windsor	Essex Source Protection Area	779,499
Southwest Oakville Wastewater Treatment Plant	The Regional Municipality of Halton	Oakville	CTC Source Protection Region	671,049
Woodstock Wastewater Treatment Plant	County of Oxford	Woodstock	Thames, Sydenham and Region Source Protection Region	633,726
KITCHENER WASTE WATER TREATMENT PLANT	Ontario Clean Water Agency	Kitchener	Lake Erie Source Protection Region	608,383
Total for 15 facilities				**44,120,846**
Total for all facilities in Great Lakes SPAs				**53,879,369**

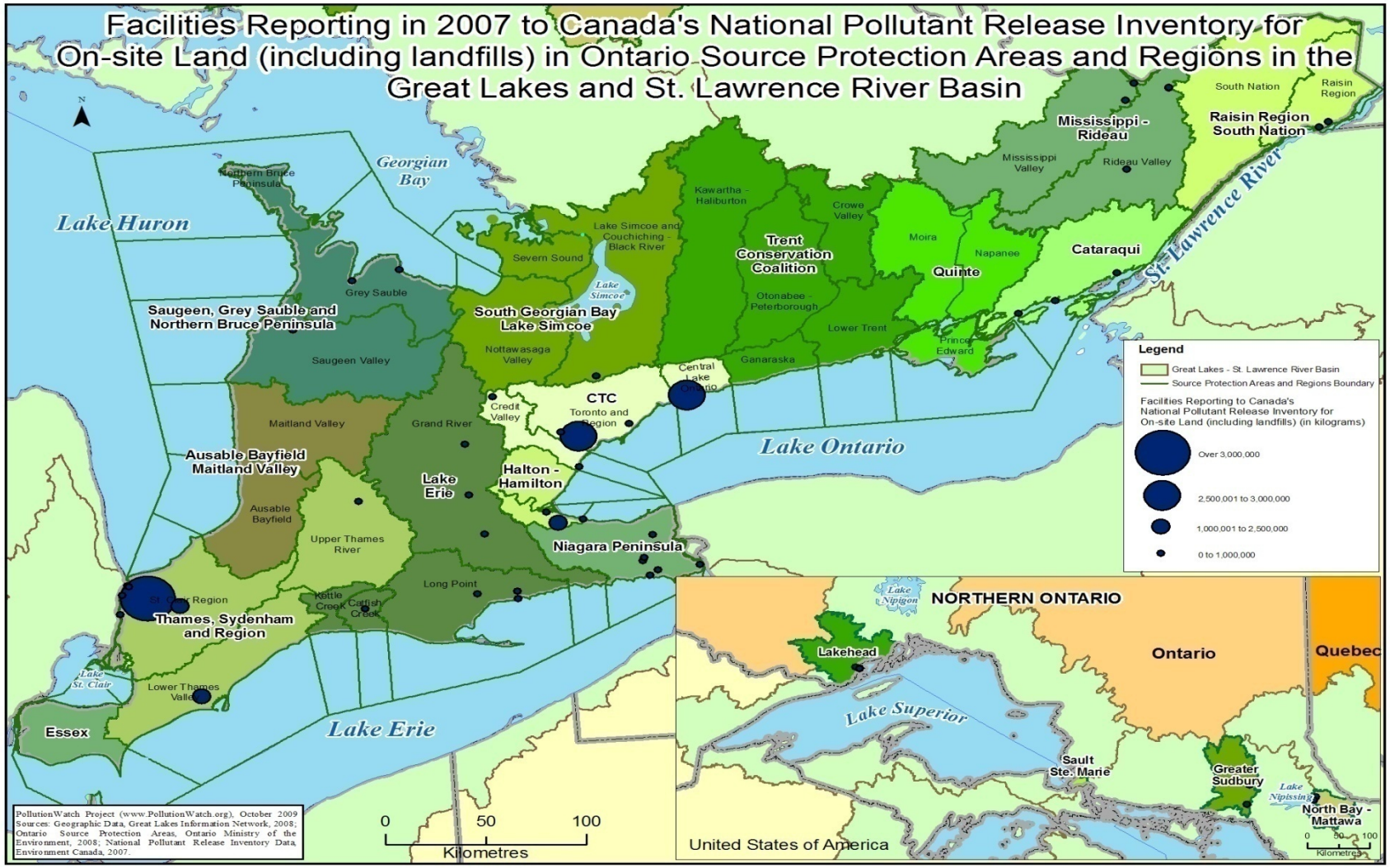
Note: The facility and company names appear here as reported to NPRI in 2007. In this table, “toxic chemicals” are those reported to NPRI in Part 1, 2 and 3

2.4 Land releases and disposal

In 2007, large amounts of chemicals were landfilled on-site at NPRI facilities in SPAs in Ontario, about 19 million kg (almost 20% of Canada's total of 98 million kg). These chemicals were landfilled on-site in SPAs at a variety of facilities: hazardous or municipal waste landfill sites; at industrial facilities like steel mills and power plants, where materials are landfilled on-site in berms or landfills. While many of these landfill sites are constructed to minimize leakage, there is the potential for some of these chemicals to enter the groundwater, lakes and streams in SPAs. (See Figure 7)

The following map shows the amount of NPRI chemicals reported released or disposed to land (including landfill) at the site of NPRI facilities.

Figure 7: Facilities Reporting in 2007 for On-Site Land Releases in SPAs in the Great Lakes and St. Lawrence River Basin



Note: The amounts of NPRI chemicals reported in 2007 by NPRI facilities in the Environment Canada categories of on-site land releases and on-site disposal.

Land disposal of wastes are on the MOE list of drinking water threats. NPRI data can contribute valuable information to assess potential threats from toxic pollutants found in land disposal of chemicals. For example, several of the facilities releasing the largest amounts of chemicals to land are airports, often de-icing chemicals (e.g., ethylene glycol) which are listed as drinking water threats (MOE list of threats #327-334), waste disposal sites (MOE list of threats #1559-1584) and industrial facilities which landfill materials on site (MOE list of threats #1675-1710).[5]

In addition to the chemicals landfilled on-site, NPRI facilities also produce chemicals which are shipped off-site for land disposal. In 2007, NPRI facilities in SPAs produced another 25 million kg of chemicals requiring off-site land disposal. Most of these chemicals were sent to nearby facilities in Ontario, and a smaller amount was sent to facilities in other provinces or countries. NPRI data provide information on the amount of chemicals received at a landfill site and the sender. (See Table 8)

There was no underground injection of chemicals in SPAs reported to NPRI in 2007.

[5] Ontario Ministry of the Environment. Tables of Drinking Water Threats
Clean Water Act, 2006 , Table 1 – Drinking Water Threats – Chemicals. 2008. See:
www.ene.gov.on.ca/en/water/cleanwater/cwadocs/TablesofDrinkingWaterThreats.pdf dated December 2009.

Table 8: Land Releases and Disposal (mainly landfill) of toxic contaminants from NPRI facilities in SPAs in 2007

Source Protection Area or Region	On-site (kg)	Transferred Off-site (kg)
Thames, Sydenham and Region Source Protection Region	8,123,705	4,506,307
Credit, Toronto and Central (CTC) Source Protection Region	5,284,500	9,264,646
Halton-Hamilton Source Protection Region	2,429,060	4,368,834
Niagara Peninsula Source Protection Area	1,111,952	1,108,737
Mississippi-Rideau Source Protection Region	1,005,937	445,818
Lake Erie Source Protection Region	816,989	1,540,939
Cataraqui Source Protection Area	265,041	57,078
Lakehead Source Protection Area	58,665	309,044
Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region	49,045	219,827
Raisin-South Nation Source Protection Region	24,310	1,551,018
South Georgian Bay Lake Simcoe Source Protection Region	6,452	630,707
Greater Sudbury Source Protection Area	226	1
North Bay-Mattawa Source Protection Area	62	8,296
Essex Region Source Protection Area	0	922,923
Trent Conservation Coalition Source Protection Region	0	124,420
Quinte Source Protection Region	0	35,033
Ausable Bayfield Maitland Valley Source Protection Region	0	8,636
Sault Ste Marie Source Protection Region	0	75,384
Total for Great Lakes SPAs	**19,175,944**	**25,177,650**
Mattagami Source Protection Area	163	6,665
Other in Ontario	446,635	520,556
Total for Ontario	**19,622,742**	**25,704,871**
Total for Canada	**98,460,623**	**397,337,814**

Note: In PollutionWatch, the category on-site land releases includes all pollutants reported to NPRI as land releases (spills, leaks and other to land). It also includes on-site land disposal (landfilled on-site, land treatment on- site, underground injection on-site). It is broader than the traditional use of the words “land releases” in NPRI which includes only spills, leaks and other to land, and does not include on-site landfills or on-site land treatment or on-site underground injection. In NPRI on-site landfill, land treatment and underground injection are considered disposal. Because Source Protection Committees need to assess a variety of wastes and materials sent to a variety of landfills, we have chosen to use the words “on-site land” to best fit the Source Protection Program needs. The majority of chemicals reported to on-site land releases and on-site land disposal in Ontario are actually to landfill.

Table 9: Top 15 NPRI facilities in SPAs reporting largest amounts of chemicals to land on-site in 2007				
Facility Name	**Company Name**	**City**	**SPA**	**On-site Land (kg)**
Lambton Facility	Clean Harbors	Corunna	Thames, Sydenham and Region Source Protection Region	3,643,889
TPIA – Central Deicing Facility	Servisair Inc.	Mississauga	Credit, Toronto and Central (CTC) Source Protection Region	2,700,000
Whitby	Gerdau AmeriSteel	Whitby	CTC Source Protection Region	2,527,836
TARO LANDFILL – 2	Newalta Industrial Services Inc.	Stoney Creek	Halton-Hamilton Source Protection Region	2,382,910
Ridge Landfill	BFI Canada	Blenheim	Thames, Sydenham and Region Source Protection Region	2,339,430
Petrolia Landfill	WASTE MANAGEMENT OF CANADA	Petrolia	Thames, Sydenham and Region Source Protection Region	1,570,000
Niagara Waste Systems Landfill Sites	NIAGARA WASTE SYSTEMS	Thorold	Niagara Peninsula Source Protection Area	983,000
Nanticoke Generating Station	ONTARIO POWER GENERATION	Nanticoke	Lake Erie Source Protection Region	716,984
Ottawa International Airport	Air Canada Ground Handling Services	Ottawa	Mississippi-Rideau Source Protection Region	565,744
Lambton Generating Station	ONTARIO POWER GENERATION	Courtright	Thames, Sydenham and Region Source Protection Region	564,149
Ottawa Landfill	WASTE MANAGEMENT OF CANADA	Ottawa	Mississippi-Rideau Source Protection Region	225,000
Bath Cement Plant	LAFARGE Canada Inc.	BATH	Cataraqui Source Protection Area	222,661
Ottawa	Servisair Inc.	Ottawa	Mississippi-Rideau Source Protection Region	170,000
Simcoe Sewage Treatment Plant	Norkfolk County Public Works & Environmental Services	Simcoe	Lake Erie Source Protection Region	98,800
Thorold Division	ABITIBI CONSOLIDATED OF CANADA	Thorold	Niagara Peninsula Source Protection Area	88,625
Total for 15 facilities				**18,799,028**
Total for all facilities in Great Lakes SPAs				**19,175,944**

Note: The facility and company names appear here as reported to NPRI in 2007. In this table, "toxic chemicals" are those pollutants reported to NPRI in Part 1, 2 and 3. The category on-site land includes all pollutants reported to NPRI as on-site land releases (spills, leaks and other to land) and on-site land disposal (landfilled on-site, land treatment on-site, underground injection on-site). It is broader than the traditional use of the words "land releases" in NPRI which does not include on-site landfills, land treatment or underground injection.

2.5 Total Releases and Transfers

Total amounts of chemicals released and transferred (excluding recycling) from NPRI facilities in SPAs in the Great Lakes Basin in 2007 was about 153 million kg (about 14% of Canada's total). Large amounts are also sent for recycling, over 163 million kg.

Section 3 - Why use National Pollutant Release Inventory information in the Source Protection Program?

The NPRI can be a useful source of information for the Source Protection Program. The NPRI data can provide:

1) Estimates of annual releases and transfers of over 300 chemicals from each facility

The main power of NPRI data is that they provide publicly available information on the releases and transfers of chemicals from each facility that reports to NPRI. For example, a source protection manager or the committee would be able to find all NPRI facilities in their SPA, determine emissions of a wide range of chemicals to the air, water and land from those facilities, and also the amount of chemicals shipped off site to landfill, sewage, underground injection, treatment and recycling. This information would be helpful for the required assessment of threats. For the purposes of the Source Protection Program, some of the NPRI data which may be most useful is listed in Table 10.

Table 10: How NPRI data can help provide information for MOE list of drinking water threats			
Drinking water threats from MOE guidance[6]		**How NPRI data can help**	**MOE Threat reference numbers**
The management of runoff that contains chemicals used in the de-icing of aircraft		NPRI data requires reporting on many chemicals used in de-icing of aircraft, many of these airports report large amounts of de-icing chemicals to NPRI	327-334
The establishment, operation, or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Wastewater treatment plants	NPRI requires reporting on most chemicals listed from wastewater treatment plants (i.e., arsenic, cadmium and mercury) NPRI data shows large amounts of many nutrients such as nitrates and metals released to water from waste water treatment plants	412-476
	Industrial facilities	NPRI requires reporting on most chemicals listed from industrial facilities	768-830
	Wastewater treatment plants no bypass	NPRI requires reporting from many wastewater treatment plants for most of the chemicals listed	919-1036
	Spills above and below ground	NPRI requires reporting on spills to water and land	1037 -1076
The handling and storage of an organic solvent		NPRI does not require reporting on handling and storage but NPRI can identify facilities that report releasing chemicals listed, and so can start the lines of inquiry as to whether these solvents are also handled and stored on site	1345-1392
The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the *Environmental Protection Act*	Tailings from mine operations	NPRI requires reporting of most of the chemicals listed from mining operations	1559-1584
	Land disposal of petroleum refining waste	NPRI data may help identify land disposal of petroleum wastes	1585-1602
	Land disposal of hazardous, liquid industrial or processed liquid industrial wastes	NPRI data can help identify land disposal sites and provide data on chemicals annually disposed of in these sites NPRI data can also provide information on the sender of these chemicals to land disposal sites	1603-1638
	Land disposal of industrial, commercial waste	Same	1675-1878
	Land disposal of hazardous, liquid industrial	Same	1894-1913
	Land disposal of certain types of waste	Same	1914-1953

[6] See: O. Reg. 385/08.

2) Map based information on certain industrial, municipal and commercial facilities in SPAs

NPRI can be used to identify location, ownership and contacts for industrial, municipal and commercial facilities in a SPA. Each facility reports to NPRI their legal name, ownership, address, geocoding and coordinator contacts. This information could assist SPCs and SPA managers in identifying certain industrial, municipal and commercial facilities in their SPA, and which facilities may be particularly important to Ontario's drinking water source protection program. This facility identification would be especially important in areas with highly vulnerable aquifers, significant groundwater recharge areas, wellhead protection areas, and intake protection zones. NPRI data are also available in a variety of formats which allow facilities to be viewed using Google or other GIS mapping programs.

3) Historical trends and information on chemical releases and transfers

NPRI data can also give SPCs and SPA managers a sense of how emissions of chemicals at a facility or within a SPA have changed over time. This would assist in the answering of questions like "Are chemical releases to the air or water increasing or decreasing?" NPRI data have been reported since 1995. This historical NPRI information can also indicate which chemicals a facility used to release or transfer and perhaps no longer does. This information could indicate a potential for historical use at the facility of chemicals listed in the list of threat (e.g., benzene, toluene and xylene).

Limits of NPRI

NPRI data are a useful source of information about releases and transfers of chemicals from a wide range of facilities. However, like any program, NPRI has limitations which need to be considered when reviewing the pollution data presented in this factsheet. NPRI limitations include:

- Does not cover all potential harmful chemicals – currently only 347 pollutants are listed on the 2007 NPRI list. These include pollutants that contribute to smog and acid rain formation such as volatile organic pollutants, as well as pollutants such as mercury, dioxins and furans, hexachlorobenzene, that cause learning disabilities, cancer, neurodevelopmental toxicity, or behaviourial problems in children. There are currently over 23,000 chemicals manufactured, imported sold or used in the Canadian market. Many thousands of these chemicals are not listed under NPRI.
- Does not include all pollutants, such as pesticides and greenhouse gases;
- Generally does not include releases that fall below the reporting threshold of 10 tonnes manufactured, processed or otherwise used;
- Does not include mobile sources such as cars, trucks, and construction equipment;
- Does not include natural sources such as forest fires and erosion;
- Does not include sources such as dry cleaners and gas stations;
- Does not include facilities that are exempted such as schools, research facilities, forestry, fishing, agriculture or mining (processing of mined materials is including in NPRI);
- Generally, does not include small facilities with fewer than 10 employees;
- Does not include information on risks of chemicals released or transferred;
- Does not include information on exposures to people or the environment; and,
- Does not include information on the amount of chemicals allowed to be released under permits, regulations or agreements.

Section 4 - Recommendations

This report demonstrates the large amount of pollutants being released to the air, water and land in SPAs. Some of these pollutants may pose a risk to our drinking water systems. While Ontario's drinking water source protection program is a major step forward in protecting our drinking water systems, we are making the following recommendations for further improvement:

1) Recognize that air pollution is a major source of chemicals and nutrients to the Great Lakes and needs to be incorporated into Ontario's Source Protection Program

The old saying "what goes into the air, comes out in the water" turns out to be true for the Great Lakes. Many models and monitoring results have illustrated the important role that atmospheric deposition plays in contributing chemicals and nutrients to the Great Lakes. In some cases, chemicals and nutrients in the air are the single largest pollution source to the Great Lakes. If the efforts to protect the Great Lakes as an important source for drinking water are to be effective, an enhanced effort to recognize the huge importance of air sources is necessary. We need to realign Ontario's drinking water source protection program to include air releases. We need a careful consideration of how best to incorporate the treatment of air deposition in the program for Great Lakes sources. For example, this could mean adding air releases to certain categories of drinking water threats.

2) Increased emphasis on protection of Great Lakes sources in Source Protection Program

The majority of people living in Ontario – over 70 per cent or over 10 million people - rely on the Great Lakes for their drinking water. Eighteen of the 19 SPAs are located in the Great Lakes Basin. Threats to Great Lakes drinking water are gauged through identifying potential drinking water issues in the vicinity of Great Lakes drinking water intakes.

To assist with source protection efforts on the Great Lakes, we recommend the establishment of a Great Lakes advisory committee. Section 83 of the *Clean Water Act, 2006* provides for such a committee. The committee would provide the Minister with advice on matters relating to the use of the Great Lakes as a source of drinking water. We encourage the Minister to establish a Great Lakes committee as soon as possible, so that its findings and advice to the Minister can inform the source protection planning process at the earliest possible opportunity.

We also recommend the Minister establish targets relating to the use of the Great Lakes as a source of drinking water. Section 85 of the *Clean Water Act, 2006* provides for the establishment of such targets.

3) Renewed emphasis on the newer threats to Great Lakes drinking water systems

There are new scientific findings on threats to drinking water sources that need to be incorporated into Ontario's drinking water source protection program. Some of the newer threats to the Great Lakes drinking water systems which are not currently addressed under this program are:

- hazardous algal blooms which release neurotoxins and are now commonly found in Lake Erie and Lake Ontario;
- increased nuisance algal blooms which harbour bacteria and viruses; increasing water temperature;
- taste and odour concerns;
- changes in water levels and currents due to climate change which affect drinking water intakes; and
- chemicals of emerging concern including pharmaceuticals, flame retardants and other less studied chemicals.

In addition, the severity of certain recognized threats is increasing, the volumes of wastewater releases in some areas is on the rise as a result of urban growth and the volumes of some nutrient loadings are also increasing.

A Great Lakes advisory committee could be mandated to scope out the new and emerging threats to the drinking water such as those noted above.

The source protection planning process should address all chemicals under Canada's NPRI affecting drinking water supplies through air deposition. In particular, there should be a focus on such contaminants entering the Great Lakes.

4) Source protection coverage should extend to a larger portion of Ontarians whose groundwater comes from private wells and surface water intakes.

Between one and two million Ontarians live in SPAs and rely on private drinking water systems (either wells or surface water intakes) for their drinking water. These private systems include over 500,000 individual wells.[7]

Under changes to the CWA technical rules proposed in August 2009, drinking water issues at private drinking water systems in vulnerable areas (wellhead protection zones, intake protection zones, highly vulnerable aquifers and significant groundwater recharge areas) will be automatically assigned a "moderate" drinking water threat status. While this approach addresses drinking water issues for private systems, mitigation of moderate threats is not compulsory under the CWA. This means that a threat which would have been assessed as a significant or low threat to a municipal drinking water system is assessed and addressed as a moderate threat, with mitigation measures either insufficient to deal with the level of threat (if significant), or potentially wasteful of resources (if low). Moreover, private individual systems outside of vulnerable areas are left essentially unprotected under the CWA unless "clusters" of

[7] Canadian Environmental Law Association. *Proposed Amendments to Regulation 903 (Wells) EBR REGISTRY NOTICE NO. 010-0098.* See: www.cela.ca/publications/proposed-amendments-regulation-903-wells-supplementary-april-23-2007-submission.

such systems are elevated by a municipality or the MOE; it is unclear at present just how many private individual systems will be elevated in this way.

Effective, SPA-wide source protection therefore should aim to address fully all drinking water issues at *all* systems.

6) More effective source protection is required for Ontarians living outside of SPAs

Approximately 250,000 Ontarians live outside of SPAs and are at present generally not covered within the scope of source protection efforts. These people rely on municipal and private well sources. Provisions for undertaking local source protection activities are available to such Ontarians under the MOE's Ontario Drinking Water Stewardship Program, in the form of funds for runoff protection, best management practices, well decommissioning, etc. However, because Ontarians seeking such funds must live within identified wellhead protection areas or intake protection zones, it is unlikely that many will qualify under the current program.

In order to ensure that Ontarians residing outside of SPAs are effectively protected, the means to effective source protection measures – addressing and mitigating threats to drinking water systems in these areas – should be made available.

7) Support implementation of the Toxics Reduction Strategy

The *Toxic Reduction Act* in Ontario, which would require the development of pollution prevention planning in industry and other sectors, was passed in the spring of 2009. The focus of the Act on pollution prevention and toxic reduction should contribute to the protection of Great Lakes drinking water sources. However, much of the detailed work for scope and implementation of the Act will be outlined in regulations which are currently being developed. In the efforts to ensure protection to the Great Lakes basin, the government efforts under the Act should include a comprehensive list of chemicals for pollution prevention efforts (including all NPRI pollutants and other chemicals that are known carcinogens, reproductive developmental toxicants and endocrine disrupters) that should result in reductions and elimination of these chemicals, require public reporting on use and progress of implementation efforts and provide a strong public right to know and engagement component, and the establishment of a pollution prevention institute to support pollution prevention planning. Furthermore, early implementation of the Act is strongly recommended. For a detailed review of toxic reduction see CELA's Model Toxic Reduction Act.

8) Increase the use of NPRI data as a source of information in Ontario's drinking water source protection program

NPRI data can provide a useful source of information to help identify and assess many of the threats to drinking water. Based on the findings of this report, PollutionWatch has effectively demonstrated that the releases and transfer of pollutants from facilities reporting to NPRI represents significant sources of threats to drinking water sources, particularly in the Great Lakes Basin. Furthermore, the data on air releases of pollutants add emphasis for the need to include air sources of pollutants in the Threats Assessment Process.

Currently, SPCs have not fully incorporated the data contained from the NPRI into their decision making process to assess threats to drinking water sources. The focus of SPCs should include a comprehensive investigation of the contribution of pollutant levels from facilities reporting to NPRI.

APPENDICES

Appendix A: Total Releases and Transfers of Chemicals from NPRI facilities in each Source Protection Area and Region in 2007

Appendix B: Methodology

Appendix A: Total Releases and Transfers of Chemicals from NPRI facilities in each SPA in 2007

Releases On- and Off-site

Name of Source Protection Area or Region	On-site Releases: Air Releases of Toxics	On-site Releases: Water	On-site Releases: Underground Injection	On-site Releases: Land	Total On-site Releases	Total Off-site Releases	Total Releases On- and Off-site	Off-site Transfers for Further Management*	Total Releases and Transfers (exclude recycling)	Rank	Total Transfers to Recycling
	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)		(kg)
Credit, Toronto and Central (CTC) Source Protection Region	5,759,408	27,537,713	0	5,284,500	38,627,890	9,264,646	47,892,536	12,727,349	60,619,884	1	34,605,773
Thames, Sydenham and Region Source Protection Region	8,052,597	1,929,215	0	8,123,705	18,114,236	4,506,307	22,620,544	993,805	23,614,348	2	10,371,188
Halton-Hamilton Source Protection Region	4,210,997	8,482,378	0	2,429,060	15,131,920	4,368,834	19,500,754	2,114,132	21,614,886	3	19,676,714
Lake Erie Source Protection Region	4,432,363	3,535,866	0	816,989	8,797,286	1,540,939	10,338,225	3,927,967	14,266,191	4	74,905,236
Mississippi-Rideau Source Protection Region	457,918	5,367,144	0	1,005,937	6,831,966	445,818	7,277,784	195,041	7,472,825	5	1,585,867
Raisin-South Nation Source Protection Region	1,973,873	377,180	0	24,310	2,379,717	1,551,018	3,930,735	485,258	4,415,993	6	332,340
Niagara Peninsula Source Protection Area	336,022	1,446,560	0	1,111,952	2,894,891	1,108,737	4,003,629	142,313	4,145,942	7	2,060,547
Essex Region Source Protection Area	1,061,357	911,922	0	0	1,976,911	922,923	2,899,835	727,720	3,627,555	8	7,401,465
South Georgian Bay Lake Simcoe Source Protection Region	699,704	1,667,519	0	6,452	2,383,700	630,707	3,014,407	447,271	3,461,678	9	8,085,992
Lakehead Source Protection Area	2,302,847	520,584	0	58,665	2,883,065	309,044	3,192,109	3,323	3,195,432	10	40,933
Greater Sudbury Source Protection Area	2,301,772	523,194	0	226	2,825,458	1	2,825,458	63,000	2,888,458	11	297,876
Cataraqui Source Protection Area	117,769	784,069	0	265,041	1,170,607	57,078	1,227,685	54,302	1,281,987	12	133,148
Trent Conservation Coalition Source Protection Region	291,349	259,949	0	0	552,557	124,420	676,977	72,415	749,392	13	2,294,299
Sault Ste Marie Source Protection Region	316,719	201,466	0	0	518,185	75,384	593,569	0	593,569	14	216,432
Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region	17,626	69,532	0	49,045	136,206	219,827	356,033	15,826	371,859	15	279,499
North Bay-Mattawa Source Protection Area	76,262	230,618	0	62	307,090	8,296	315,386	49	315,435	16	181,300
Quinte Source Protection Region	83,428	34,460	0	0	117,957	35,033	152,990	146	153,136	17	157,461
Ausable Bayfield Maitland Valley Source Protection Region	91,544	0	0	0	91,597	8,636	100,233	0	100,233	18	660,764
Total for Great Lakes SPA	**32,583,554**	**53,879,369**	**0**	**19,175,944**	**105,741,239**	**25,177,650**	**130,918,889**	**21,969,916**	**152,888,805**		**163,286,834**

Appendix A: Total Releases and Transfers of Chemicals from NPRI facilities in each SPA in 2007

Releases On- and Off-site

Name of Source Protection Area or Region	On-site Releases: Air Releases of Toxics	On-site Releases: Water	On-site Releases: Underground Injection	On-site Releases: Land	Total On-site Releases	Total Off-site Releases	Total Releases On- and Off-site	Off-site Transfers for Further Management*	Total Releases and Transfers (exclude recycling)	Rank	Total Transfers to Recycling
	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)		(kg)
Mattagami Source Protection Area	275,203	158,194	0	163	433,560	6,665	440,225	0	440,225		12,173,294
Other in Ontario	1,668,921	512,370	0	446,635	2,630,194	520,556	3,150,750	69,554	3,220,304		2,635,495
Total for Ontario	**34,527,678**	**54,549,933**	**0**	**19,622,742**	**108,804,993**	**25,704,871**	**134,509,864**	**22,039,470**	**156,549,334**		**178,095,623**
Total for Canada	**111,116,071**	**117,451,206**	**304,944,484**	**98,460,623**	**632,152,075**	**397,337,814**	**1,029,489,889**	**40,971,190**	**1,070,461,079**		**1,212,735,726**

* Includes transfers to energy recovery, treatment and sewage (excluding metals).

Note: In this table, chemicals are “toxic chemicals”, those reported to NPRI in Parts 1, 2 and 3
The category on-site land (mainly landfill) includes all pollutants reported to NPRI as on-site land disposal (landfilled on-site, land treatment on-site, underground injection on-site) and land releases (spills, leaks and other to land). It is broader than the traditional use of the words “land releases” in NPRI which does not include on-site landfills or land treatment

APPENDIX B – METHODOLOGY

Mapping NPRI Data

NPRI data used in this study were downloaded from Environment Canada's NPRI website at www.ec.gc.ca/inrp-npri/. PollutionWatch used 2007 data for facilities located in the Great Lakes and St. Lawrence River Basin reporting a range of pollutant releases and transfers. The 2007 dataset was downloaded in February 2009. The facilities that were included in the analysis of the report had to meet two geographic criteria:

- located within an Ontario SPA; and
- located in the Great Lakes and St. Lawrence River Basin

The queries that determined facility inclusion were undertaken on the website http://itouchmap.com/latlong.html. PollutionWatch relied on two data layers to outline the boundaries for the Great Lakes and St. Lawrence River Basin and Ontario SPAs boundaries. The geographic data layer for the Great Lakes and St. Lawrence River Basin boundary was downloaded from the Great Lakes Information Network website in 2008. The SPA boundary was downloaded from the Ontario Ministry of Environment website in 2008. A total of 18 of Ontario's 19 SPAs are located in the Great Lakes and St. Lawrence River Basin.

All facilities meeting the above criteria were mapped based on facility coordinates provided in the NPRI dataset using ArcGIS 9.0 (ArcMap 9.1). On mapping the facilities it was determined that 21 facilities were located outside of SPAs; these facilities were recorded and removed from map.

Based on the mapping of facilities, it was determined that four facilities in the water releases layout, and one facility in the land pollution layout, were located outside of SPAs; these facilities were recorded and removed from the layout and final map. The deletion of the data related to these facilities did not impact the observations made. The maps presented in this report highlights air releases, water releases and on- and off-site releases to land

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