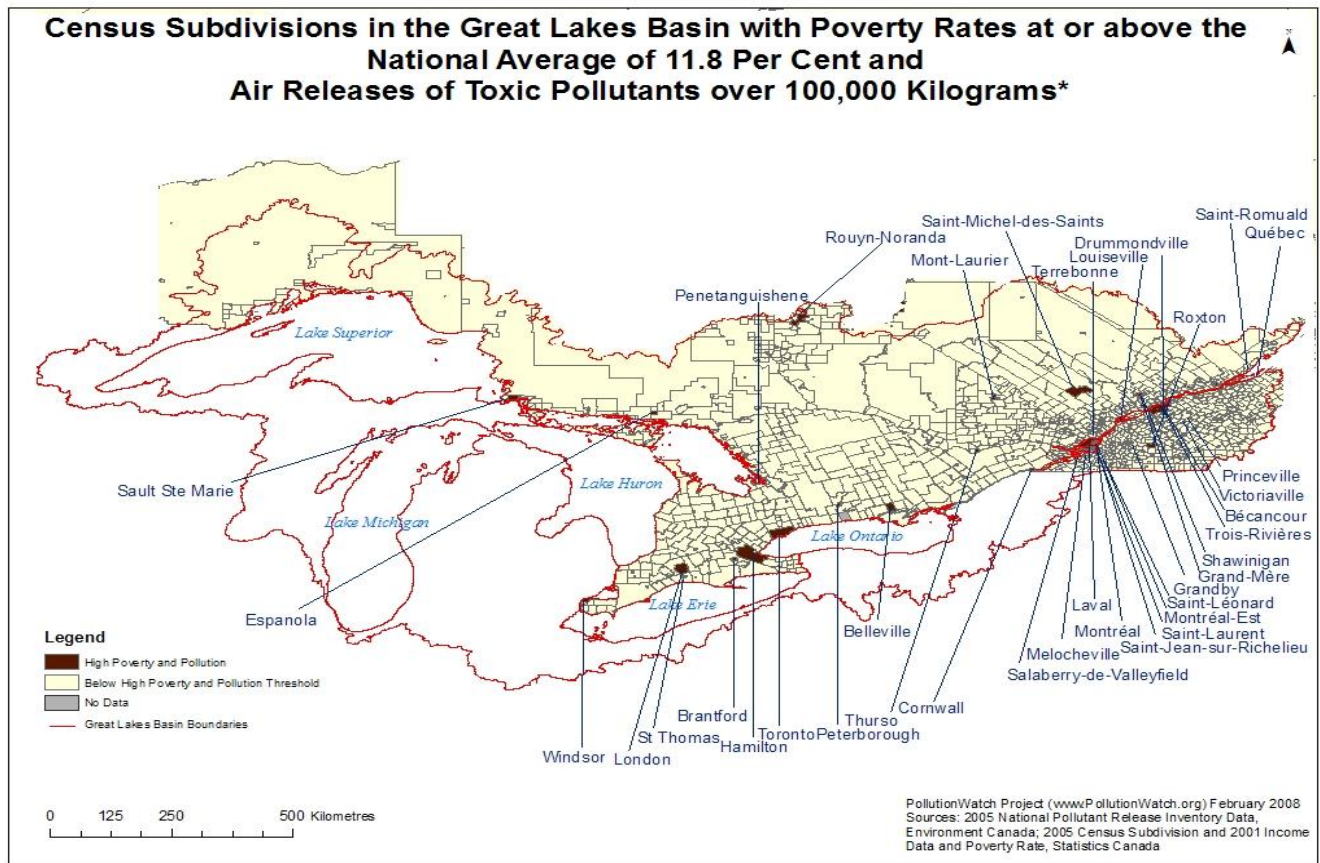


# PollutionWatch Fact Sheet

## An Examination of Pollution and Poverty in the Great Lakes Basin

### POVERTY AND POLLUTION MAP



\* From industrial sources reporting toxic air pollutants to the National Pollutant Release Inventory; national poverty rate based on economic families

November 2008

**PollutionWatch**  
[www.PollutionWatch.org](http://www.PollutionWatch.org)

## Executive Summary

The PollutionWatch partners (the Canadian Environmental Law Association and Environmental Defence) set out to contribute to the dialogue focused on pollution and social factors in Canada by examining the relationship between one measure of pollution – reported industrial air releases through the National Pollutant Release Inventory – and one socio-economic factor – income (specifically, a measure of poverty) – in a specific area of Canada – the Great Lakes basin. This study:

- 1) locates the areas in the Great Lakes basin with the largest releases of air pollutants from industrial facilities reporting to the NPRI;
- 2) locates the areas in the Great Lakes basin with the highest levels of poverty; and
- 3) explores the relationship between pollution and poverty in the Great Lakes basin; and,

This study finds:

- Large amounts of pollutants are released from industrial facilities in the Great Lakes basin; more than 1 billion kilograms, or about 25% of total air pollutants reported in Canada, were reported being released to the air in 2005 in the Great Lakes basin.
- The reported releases of air pollutants from industrial facilities vary widely across the Great Lakes basin.
- There are 37 areas in the Great Lakes basin, such as Montreal and Windsor, that have both high reported air releases of toxic pollutants and high poverty rates. People living in these areas may have a double challenge: high potential for exposure to pollutants, as well as all the physical and social vulnerabilities that come with living in poverty (Figure 5).
- Mapping pollution and income data at the census subdivision level throughout the Great Lakes basin offers one look at the relationship between pollution and poverty.

*An Examination of Pollution and Poverty in the Great Lakes Basin* clearly shows the need to reduce both pollution and poverty and also to connect these efforts. As this study demonstrates, there are still large amounts of pollutants being released from industrial facilities, and still large areas with high poverty rates. For some communities, these two challenges collide.

Based on the findings, the Canadian Environmental Law Association and Environmental Defence highlight the following recommendations:

- further action to reduce and eliminate pollution in the Great Lakes basin through an increased focus on pollution prevention at all levels of society, through toxics use reduction strategies and Toronto's Environmental Reporting, Disclosure and Innovation Program;
- formal recognition by all levels of government that pollution can affect people's mental, physical and emotional health and that people living in poverty may be additionally affected by pollution;
- further research be conducted by all levels of government, academics, anti-poverty and environmental organizations to gain a better understanding as to how people's mental, physical and emotional health is affected by living in poverty in communities with high pollution burdens. These findings should help inform the development of anti-poverty reduction plans; and,
- governments develop, in consultation with a diverse range of communities, including anti-poverty, environmental and health sectors, a clear environmental equity policy framework that considers how the connections between poverty and pollution can be integrated in concrete ways into environmental decision-making processes (e.g., environmental approvals, standards

approvals, management of toxic substances, etc.) The process of facility siting and permit renewals should include the consideration of cumulative loadings from multiple sources in the air shed.

This factsheet highlights findings for the Great Lakes basin, which are part of the larger study titled, *An Examination of Pollution and Poverty in the Great Lakes Basin*. This full technical report provides background information on recent Canadian studies and dialogue addressing social determinants of health, the relationship between pollution and income, the project methodology and the complete findings of the report. This report also includes an examination of the relationship between pollution and poverty by mapping similar data at a neighbourhood level for the City of Toronto. The full technical report outlines some important limitations of the pollution and poverty data, which apply to this fact sheet. To obtain a copy of the full study or the fact sheet on the City of Toronto, see [www.PollutionWatch.org](http://www.PollutionWatch.org).

## **Introduction**

PollutionWatch.org, run by the Canadian Environmental Law Association ([www.cela.ca](http://www.cela.ca)) and Environmental Defence ([www.environmentaldefence.ca](http://www.environmentaldefence.ca)) is an innovative web site that allows individuals to track pollution from industrial facilities in their communities and to compare pollution levels of facilities across Canada. PollutionWatch allows people to see the amount of pollutants released over time and see if these pollutants are considered carcinogens, reproductive toxins, or are associated with other adverse environmental and health effects.

Under PollutionWatch, several reports have been published revealing the continued high pollution levels in the Great Lakes. These reports, and other studies by government agencies and academics over the years, have demonstrated that the pollution burden in the Great Lakes is significant. In response to the pollution levels, the governments of Canada and US, both responsible for protecting and restoring the Great Lakes, have initiated a number of programs and actions aimed at reducing the burden of pollution. Exposure to pollution in the Great Lakes continues to affect the environment and the health of people living in the region, despite these efforts. It is clear that the pollution burdens differ across communities due to available resources, income levels, and access to information necessary to advocate for action.

This study set out to examine whether areas in the Great Lakes basin with high pollution releases also have more people of low income. Using one measure of pollution – air releases, and one measure of socio-economic factor – income, this study:

- 1) locates the areas in the Great Lakes basin with the largest releases of air pollutants from industrial facilities reporting to the NPRI;
- 2) locates the areas in the Great Lakes basin with the highest levels of poverty; and,
- 3) explores the relationship between pollution and poverty in the Great Lakes basin.

## ***Pollution, Poverty and Health***

Much work has been done in the U.S. to investigate the relationship between some measure of pollution, such as air quality data or presence and proximity of industrial facilities, and some measure of race, ethnicity and/or income, such as home ownership, property values, percent African American, percent Latino. Some studies focus on investigating race/ethnicity or income as the most important factors in consideration of proximity to industrial sources of pollution. Other researchers rely on different techniques to demonstrate the relationship: mapping techniques, statistical analysis, monitored data. Others use different measures of pollution (air releases or proximity to landfills) to determine relationship. These investigations resulted in a Presidential Executive Order (1994) that required all federal agencies to develop strategies to incorporate environmental justice concerns. This reform led to an institutionalization of environmental justice in the U.S. government including the formation of U.S. EPA Office of Environmental Justice to coordinate inter-agency environmental justice activities.

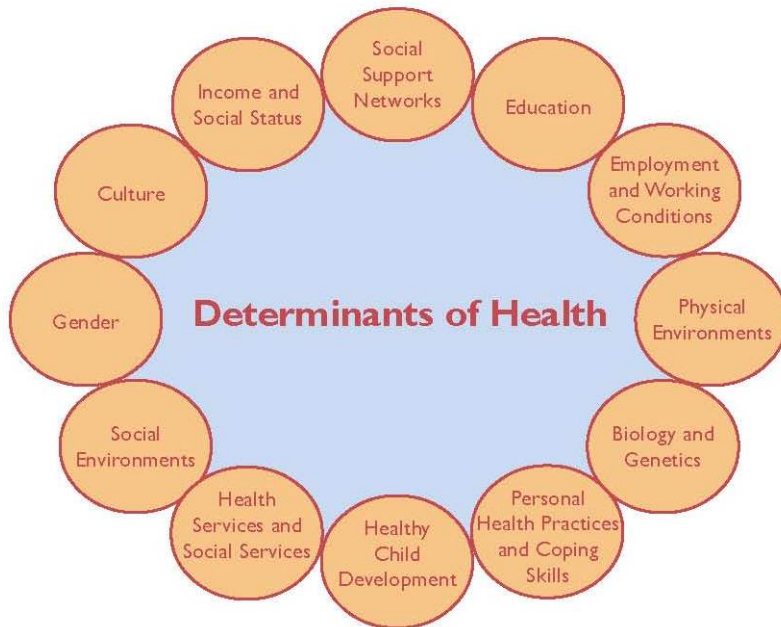
In Canada, these types of reforms have yet to take place. However, there is a growing body of research examining the relationship between pollution and income. There are several key studies worth noting in Canada, including those completed in Hamilton, ON by Michael Jerrett

(2004 and 2007) using ambient air pollution and income and in Montreal, QC by Premji *et al* (2007) who used NPRI data and unemployment rates. Both studies demonstrate that there is a positive relationship between people of low income and pollution levels.

The purpose of this fact sheet is to highlight the findings on the Great Lakes basin from the full technical report, *An Examination of Pollution and Poverty in the Great Lakes Basin*, (which can be accessed at [www.PollutionWatch.org](http://www.PollutionWatch.org)) and to contribute to the on-going discussions in Canada focused on pollution and income.

It is recognized that impacts of pollution on people may differ. There are many factors that affect human health. According to the World Health Organization, the factors include: culture, income and social status, social support network, education, employment and working conditions, physical environments, biology and genetics and child development, etc. (see Figure 1).

**Figure 1: Determinants of Health**



Source: World Health Organization, undated.

Living in poverty is a major determinant of health. Often poverty is associated with greater likelihood of chemical exposure (CPCHE, 2005). Poverty can lead to a number of conditions such as malnutrition (both the lack of food and lack of nutritious choices), obesity, depression, and learning difficulties (CPCHE, 2005; CEC 2006).

Pollution is one of many challenges faced by communities. Exposure to high levels of pollution, particularly some pollutants, such as lead and smog causing substances (e.g. particulate matters, sulphur oxides, etc.), place additional burdens on the citizens of a community.

This study takes a look at the connection between pollution and poverty, and whether some communities in the Great Lakes basin in Canada may be affected by both high levels of pollution and poverty.

# 1. Pollution in the Great Lakes Basin

There are about 2,000 industrial facilities that release air pollutants in the Great Lakes basin in 2005 (see Table 1). These facilities can release toxic pollutants, those often associated with contamination (refer to NPRI Part 1, 2 and 3), or criteria air contaminants which are associated with smog or acid rain and respiratory impacts (refer to NPRI Part 4) or a combination of both categories of pollutants.

**Table 1:** Summary of air releases of pollutants from NPRI facilities in census subdivisions (CSDs) in the Great Lakes basin in 2005

	Type of Air Pollutant Release		
	Toxic Pollutants	Criteria Air Contaminants	Combined Air Pollutants
Total number of CSDs in Great Lakes basin that report to NPRI	282	340	345
Total number of NPRI facilities	1,398	1,798	1,978
<b>Total amount of pollutants reported in Great Lakes basin in 2005 (kg)</b>	<b>51,301,570</b>	<b>1,095,281,842</b>	<b>1,047,526,062</b>

NOTE: the combined air pollutants total does not include the group of VOCs reported as part of criteria air contaminants under the NPRI as to avoid double counting of individual VOCs reported as toxic pollutants.

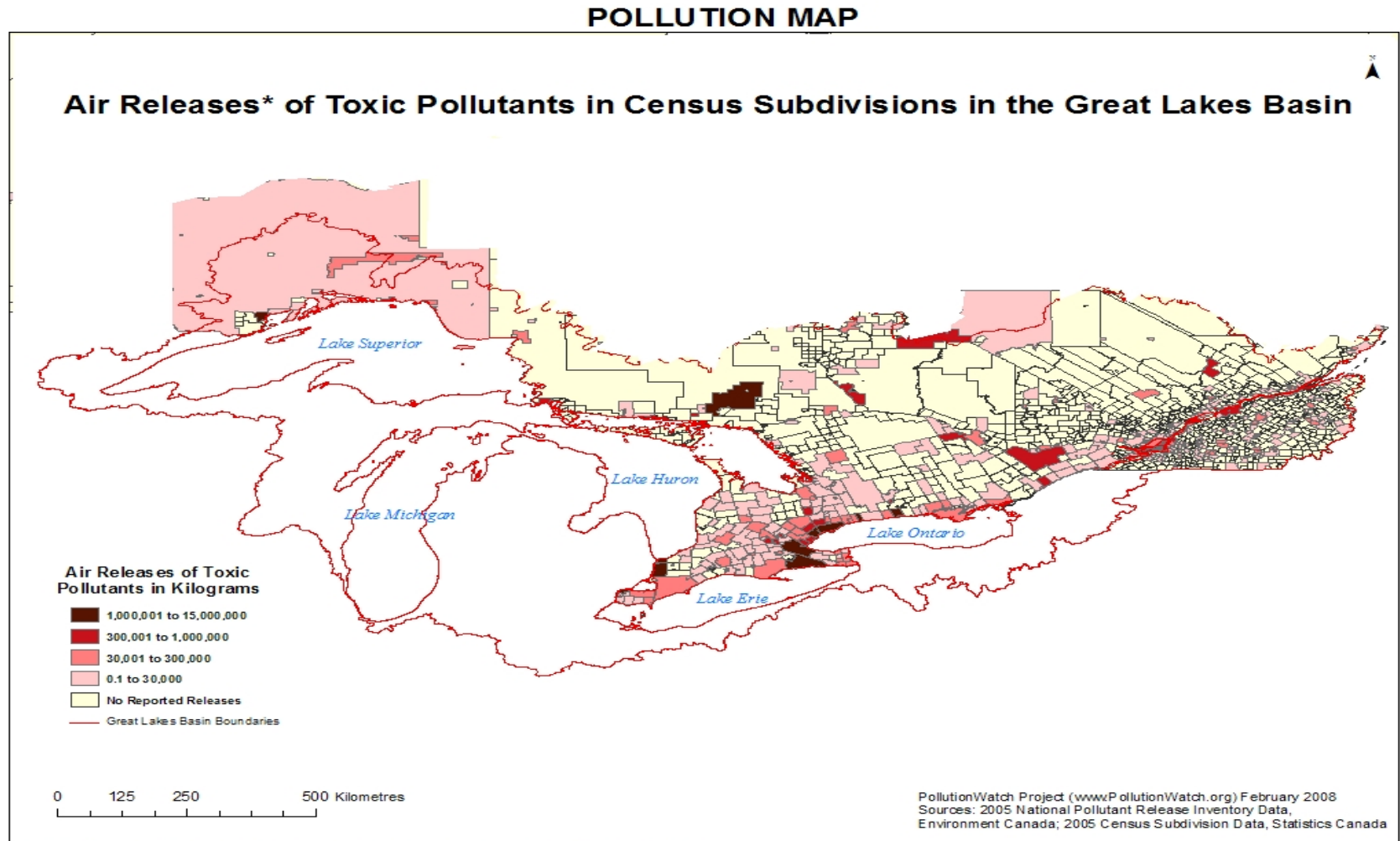
## ***i. Releases of Toxic Air Pollutants***

The total amount of toxic pollutants released from NPRI facilities in the Great Lakes basin in 2005 was 51,301,570 kilograms.

Industrial releases of toxic pollutants vary widely across the Great Lakes basin. Some areas have very large releases of toxic pollutants (over 1 million kilograms) and some areas have very small releases of toxic pollutants (less than 20,000 kilograms) (see Figure 2).

About 20% of the 1,450 census subdivisions in the Great Lakes basin have an NPRI facility that reports air releases of toxic pollutants. The remaining 80% of the census subdivision areas in the Great Lakes, however, have no facilities that meet the reporting thresholds of NPRI (generally 10 people and 10 tonnes of a pollutant). In these areas, however, there may be smaller industrial sources and mobile sources of pollution that are not required to report to NPRI.

Figure 2: Air releases of toxic pollutants (kg) in census subdivisions in the Great Lakes basin in 2005.



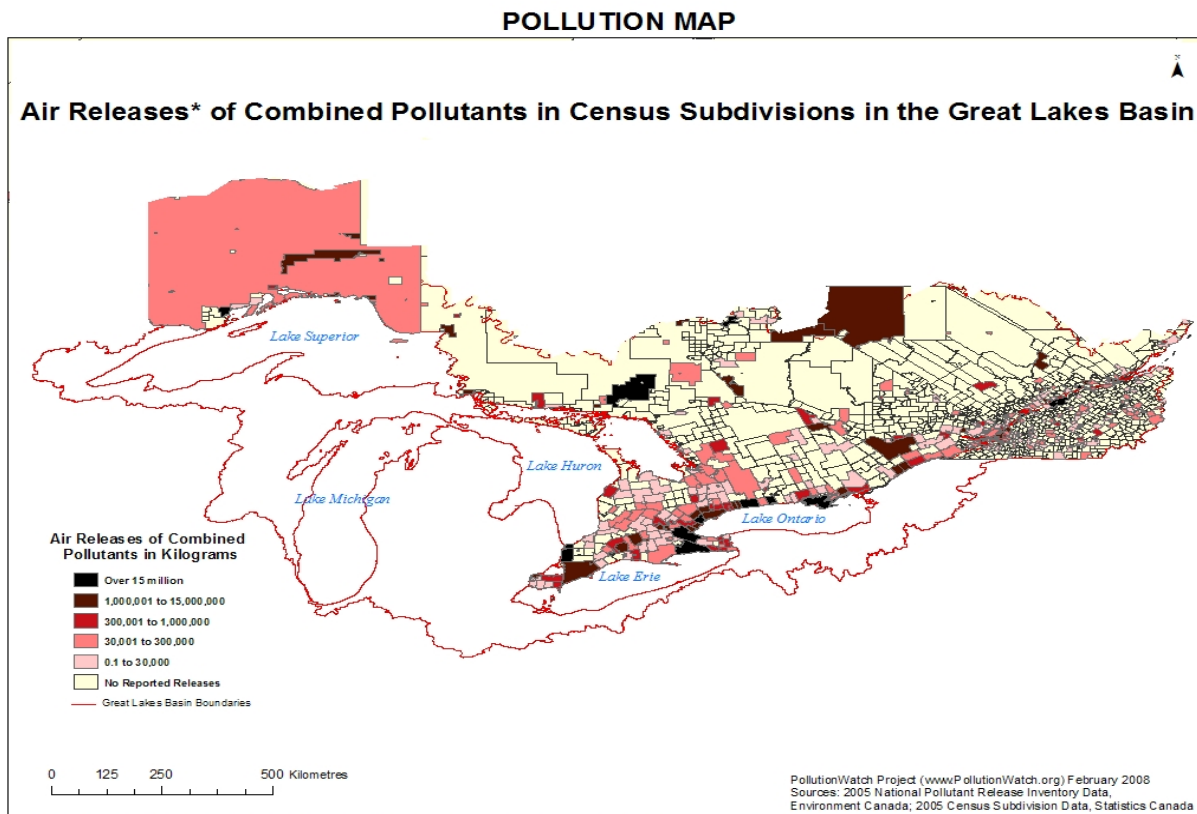
\* From industrial sources reporting toxic air pollutants to the National Pollutant Release Inventory

## ii. Releases of Combined Air Pollutants

The total releases of combined air pollutants<sup>1</sup> in the Great Lakes basin in 2005 were 1,047,526,062 kilograms (see Figure 3). This amount is much larger than the air toxic pollutant noted in the previous section because the criteria air contaminants which are included in the combined air pollutants total, are generally released in much larger amounts. The releases of combined air pollutants are not evenly spread throughout the Great Lakes basin. There are some areas with very large releases (over 15 million kilograms) and some areas with very small releases (less than 20,000 kilograms). Similar to toxic pollutants, about 80% of the census subdivisions in the Great Lakes basin do not have facilities that are required to report to NPRI for combined air pollutants.

Census subdivisions that are ranked at the top for combined air release include: Greater Sudbury, ON (245,632,576 kilograms), followed by Haldimand (128,797,515 kilograms). Deschambault, QC ranks 9<sup>th</sup> (26,0006,500 kg) and Sorel-Tracy, QC ranks 10<sup>th</sup> (25,695,946 kg).

**Figure 3:** Air releases of combined air pollutants (kg) in census subdivisions in the Great Lakes basin in 2005



\* From industrial sources reporting combined (toxics and criteria air contaminants) air pollutants to the National Pollutant Release Inventory

<sup>1</sup> Combined air releases are the sum of toxic pollutants and criteria air contaminants minus volatile organic compounds (VOCs). VOCs are excluded to avoid potential double counting as some of the same compounds are reported as a toxic pollutant and also as a VOC under NPRI. In addition, only total particulate matter is included in the CAC total to avoid adding together TPM, PM<sub>10</sub> and PM<sub>2.5</sub>.



## **2. Poverty in the Great Lakes Basin**

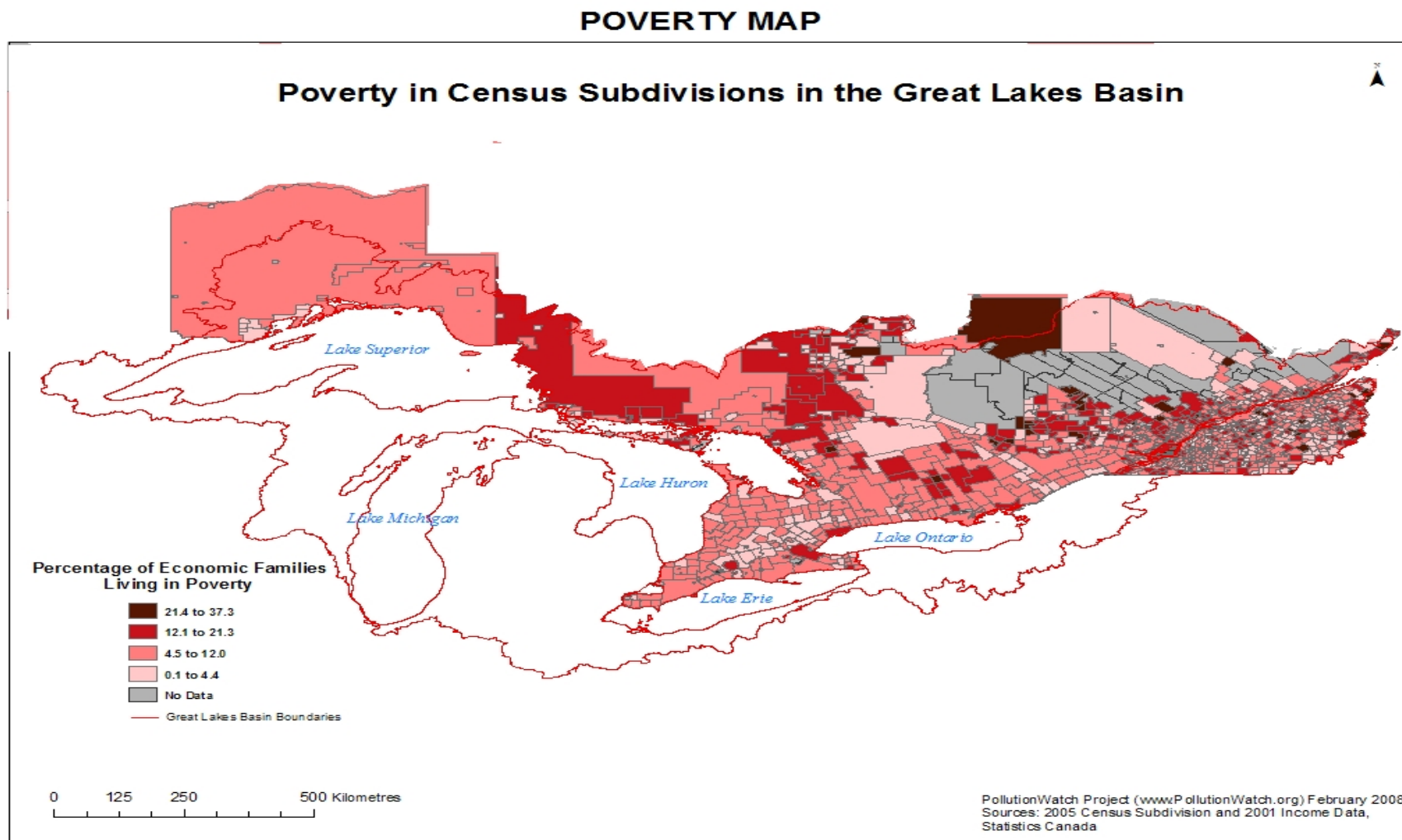
This study finds that:

- The average national poverty rate was 11.8% (based on LICO total income for economic families before tax, 2001 Census). Therefore, in 2000, 11.8% of the economic families in Canada had a total income below the “low income cutoff levels,” indicating that they are living in “straightened circumstances” or the level that social groups consider “living in poverty.”
- The incidence of low income levels varies across the Great Lakes basin (see Figure 4).
- There are 374 census subdivisions (representing 35% of census subdivisions)<sup>2</sup> in the Great Lakes basin with poverty rates above the national average of 11.8%.
- There are many census subdivisions (397 census subdivisions or 27% of total census subdivisions) in the Great Lakes basin with no incidence of poverty data available due to small numbers of people living in these census subdivisions or due to the administration of the census data. Statistics Canada does not release income or poverty data for these areas, which include Aboriginal communities.
- The highest poverty rate is 37.3% in McGarry, Ontario and the lowest poverty rate is 1.7% in Guelph-Eramosa, Ontario.
- In general, the province of Quebec has a higher incidence of poverty than Ontario.

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<sup>2</sup> Note: The number of census subdivisions does not include areas with no income data.

**Figure 4:** Incidence of low income in census subdivisions in the Great Lakes basin (based on economic families before tax, 2001 census)



### 3. Pollution and Poverty in the Great Lakes Basin

Combining both the pollution maps and incidence of low income maps in the Great Lakes basin, the relationship between pollution and poverty begins to emerge. There are many areas in the Great Lakes basin that have both high reported air releases of pollutants and high poverty rates. People living in these areas may have a double challenge: high potential for exposure to pollutants releases and all the physical and social vulnerabilities that come with living in poverty. Living in poverty may also make it harder to access levers to advocate for a reduction in pollution.

This study finds that 37 census subdivisions in the Great Lakes have both high poverty (at or above the national average of 11.8 per cent), and high pollution (air releases of toxic pollutants over 100,000 kg) (see Figure 5).

There is a significant positive correlation between air releases of toxic pollutants and poverty rates in census subdivisions in the Great Lakes basin ( $p < 0.005$ ,  $n = 262$ ,  $r = 0.184$ ). In general, in areas with higher releases of toxic pollutants there are often higher poverty rates. This does not mean that all areas with high releases of pollutants always have high poverty rates. Areas with low releases of pollutants often also tend to have low poverty rates.<sup>3</sup> However, there is a large amount of variability. Not all areas with high pollution levels have high poverty rates. This variability is to be expected as many factors determine the location and emissions of an industrial facility and location of people of low income. This study finds:

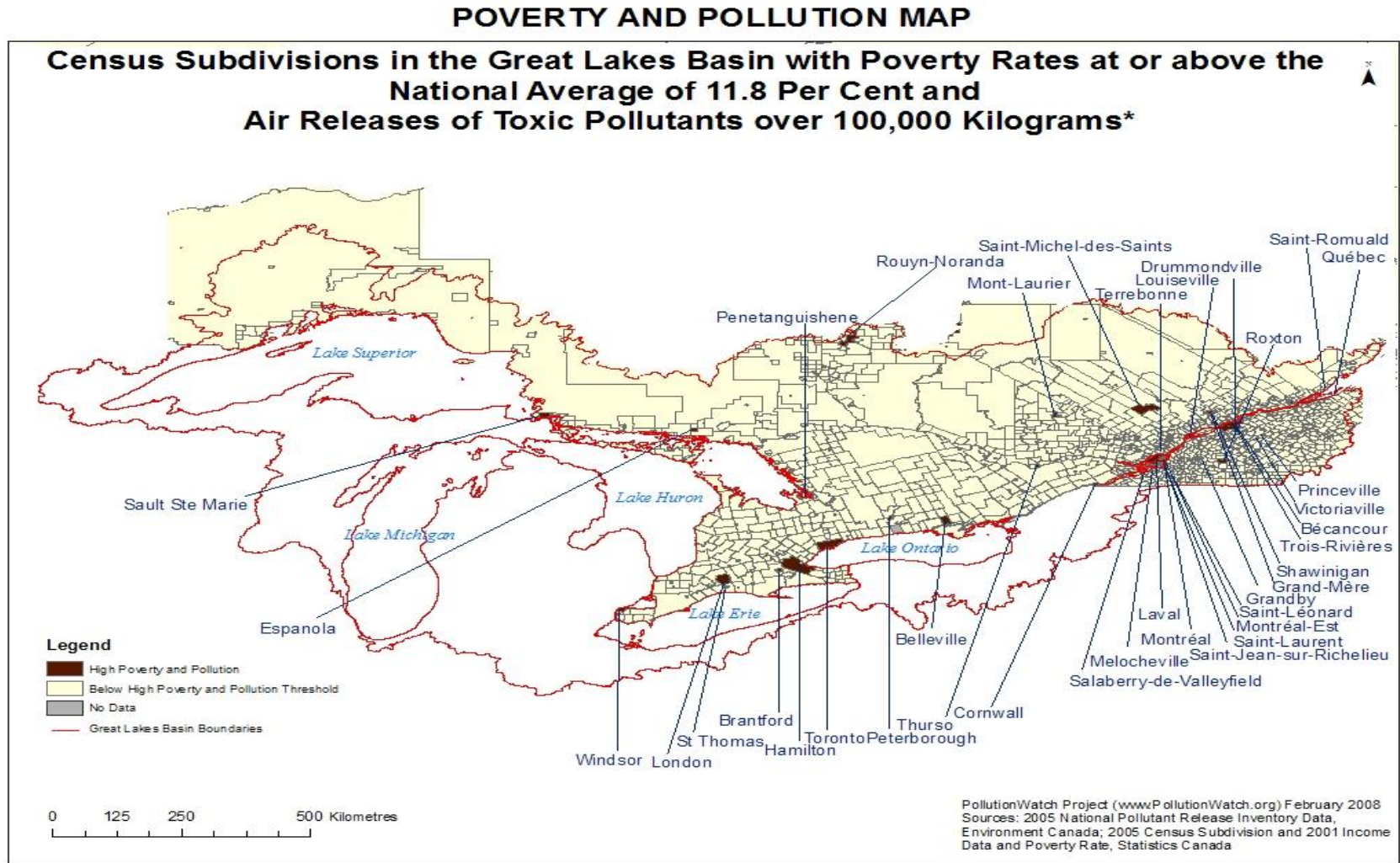
- The census subdivisions with the highest releases of toxic air pollutants also have the highest percentage of high poverty rates of all pollution groups.
- There are no census subdivisions with the highest releases of toxic air pollutants which had the lowest poverty rates.
- Similarly, there are no census subdivisions with the lowest releases of toxic air pollutants and highest poverty rates.

Table 2 lists all census subdivisions in the basin that have high air releases of toxic pollutants and high incidence of poverty.

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<sup>3</sup> For additional details on statistical analysis completed, see full report Section 3: results Pollution and Poverty.

**Figure 5:** Releases of toxic air pollutants and incidence of poverty in the Great Lakes basin



\* From industrial sources reporting toxic air pollutants to the National Pollutant Release Inventory; national poverty rate based on economic families

**Table 2:** Census Subdivisions in the Great Lakes Basin with Poverty Rates at or above the National Average of 11.8% in 2001 and Air Releases of Toxic Pollutants above 100,000 kilograms from NPRI Facilities in 2005

Census Subdivision Name	Census Subdivision ID #	Air Releases of Toxic Pollutants in 2005 (kg)	Air releases of Criteria Air Contaminants (CACs) in 2005 (kg)	Air Releases of Combined (toxics and CACs ) (kg)	Incidence of Poverty in 2001 (%)
Toronto	3520005	2,819,466	13,205,592	7,134,465	19.4
Hamilton	3525005	2,240,453	58,459,377	58,788,549	16.1
Windsor	3537039	1,007,380	8,412,711	7,023,209	13.2
Bécancour	2438010	692,500	45,579,386	45,680,098	11.9
Saint-Laurent	2466075	666,956	826,598	689,016	24.7
Cornwall	3501012	642,468	3,512,262	3,334,161	19.0
Montréal-Est	2466005	587,935	16,248,975	14,962,514	20.2
Montréal	2466025	494,499	11,059,518	9,451,843	26.5
St. Thomas	3534021	392,754	1,284,319	494,892	12.4
Trois-Rivières	2437065	371,805	6,456,454	5,999,475	18.2
Sault Ste. Marie	3557061	364,495	14,439,101	13,845,095	13.5
Peterborough	3515014	340,375	550,445	365,647	13.1
Penetanguishene	3543072	340,334	1,239,206	340,334	12.9
Espanola	3552026	311,826	4,510,685	4,505,528	15.6
Thurso	2480050	302,894	4,774,851	4,656,071	22.6
London	3539036	287,180	1,864,821	1,168,920	12.7
Shawinigan	2436028	272,412	19,722,812	19,791,035	22.5
Laval	2465005	252,108	635,963	261,865	13.0
Terrebonne	2464010	221,851	912,690	221,851	15.9
Roxton	2448015	196,500	172,800	196,500	11.8
Québec	2423025	186,085	2,521,992	2,310,802	22.1
Louiseville	2451015	184,551	195,716	184,551	14.9
Saint-Romuald	2425025	168,128	8,573,863	7,981,183	14.5
Mont-Laurier	2479085	166,360	294,960	240,150	18.2
Victoriaville	2439062	153,722	222,482	180,663	12.4
Belleville	3512005	152,375	596,692	192,443	12.8
Brantford	3529006	147,067	600,386	198,888	12.2
Drummondville	2449057	145,160	148,043	186,207	13.7
Granby	2447015	144,272	367,886	144,272	12.9
Saint-Jean-sur-Richelieu	2456080	133,105	159,996	133,105	16.4
Saint-Michel-des-Saints	2462085	129,016	1,244,544	821,897	15.2
Grand-Mère	2436055	127,025	2,708,417	2,463,901	17.8
Princeville	2432033	122,300	114,900	122,300	16.7
Saint-Léonard	2466015	121,611	817,272	121,611	22.2
Melocheville	2470060	107,697	9,461,000	9,542,697	15.0
Salaberry-de-Valleyfield	2470045	106,728	8,036,315	6,514,506	18.4
Rouyn-Noranda	2486033	101,871	27,212,078	27,313,949	12.3

\*Sources - Statistics Canada 2001, incidence of poverty based on total income of economic family LICO before tax; National Pollutant Release Inventory 2005 data

## Findings

There are four findings from this Great Lakes study:

1. **High pollution levels** - Large amounts of pollutants are released from industrial facilities in the Great Lakes basin. Over 1 billion kilograms of pollutants (toxics and smog-causing pollutants), were reported being released to the air in 2005 from industrial facilities in the Great Lakes basin. This staggering amount of pollutants was released in just one year. For pollutants that are not easily broken down over time, this continuous release represents a huge pollution burden for the Great Lakes' communities and environment.
2. **Unequal pollution burdens** - The amount of air pollution released from industrial sources varies tremendously from one area to another in the Great Lakes basin. Some areas in the basin have industrial facilities releasing much more pollution than others. **Industrial facilities in just 10 census subdivision areas release almost half of the toxic pollutants in the entire Great Lakes basin: Greater Sudbury, Haldimand, St. Clair, Sarnia, Toronto, Hamilton, Mississauga, Oshawa, Thunder Bay and Windsor.**
3. **Pollution and poverty** – This study identifies areas in the Great Lakes basin where communities may face a double challenge: releases of high amounts of air pollutants as well as all the physical and social vulnerabilities that come with living in poverty. It suggests that some low income communities may also have high releases of pollution. There are areas in the Great Lakes basin, such as Montreal and Windsor, that have both high air releases of toxic pollutants and high poverty rates (see Table 2).
4. **Promising methodology** – Mapping pollution data to reveal community differences allows people to quickly identify their home and the releases from industrial facilities in their neighbourhood. It also allows pollution data to be easily included with other socioeconomic information available at census subdivision levels. The methodology of the study can be replicated for future studies focused on investigating the links between pollution and income. Furthermore, the methodology applied in this study also allows for the addition of other sources of pollution or socio-economic data (e.g., health indicators, education, race, etc.) to be considered for future investigation.

## Recommendations

As this study demonstrates, there are still large amounts of pollutants being released from industrial facilities, and still large areas with high poverty rates. For some communities, these two challenges collide.

Governments, agencies and public interest non-governmental organizations including health, environment and social justice/anti-poverty organizations, need to take extra care in areas that are twice challenged: once by poverty and once by pollution. Within these areas, we must also pay attention to people living with a third challenge - those who are in an especially vulnerable group such as children, seniors, or immune suppressed.

In support of the work of various organizations, including the World Health Organization, to promote research and policy programs that address social determinants of health such as

poverty and pollution, the Canadian Environmental Law Association and Environmental Defence recommend:

1. Formal recognition by all levels of government that pollution can affect people's mental, physical and emotional health and that people living in poverty may be additionally affected by pollution.
2. In light of the findings of this study that some low income communities also experience high pollution releases, further research be conducted by all levels of government, academics, anti-poverty and environmental organizations to gain a better understanding as to how people's mental, physical and emotional health is affected by living in poverty in communities with high pollution burdens. These findings should help inform the development of anti-poverty reduction plans.
3. Governments develop, in consultation with a diverse range of communities, including anti-poverty, environmental and health sectors, to develop a clear environmental equity policy framework that considers how the connections between poverty and pollution can be integrated in concrete ways into environmental decision-making processes (e.g., environmental approvals, standards approvals, management of toxic substances, etc.). The process of facility siting and permit renewals should include the consideration of cumulative loadings from multiple sources in the air shed.
4. As the province of Ontario considers the development and enactment of a Toxics Use Reduction law, this law should include prevention and elimination of the most harmful substances, such as cancer causing substances and reproductive and developmental toxicants.
5. The City of Toronto should pass the proposed Environmental Reporting, Disclosure and Innovation Program, allowing for better tracking of pollutants in Toronto's neighbourhoods. Other municipalities in the Great Lakes basin should consider similar environmental reporting and disclosure programs for their communities.

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## About PollutionWatch

About PollutionWatch ([www.PollutionWatch.org](http://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.

The data used in this PollutionWatch study are based on publicly available databases collected by the federal government. PollutionWatch makes no warranties or representation of any kind with respect to its contents and disclaims all such representations and warranties. Neither PollutionWatch nor any other person acting on its behalf makes any warranty, expressed or implied, or assumes any legal responsibility for the accuracy of any information or accepts liability from the use or damages from the use.

## Appendices

Appendix I: Strengths and Limitations - refer to the full report available to download at [www.PollutionWatch.org](http://www.PollutionWatch.org)

Appendix II: Methodology – refer to the full report available to download at [www.PollutionWatch.org](http://www.PollutionWatch.org)

## Contact information

Canadian Environmental Law Association  
130 Spadina Avenue, Suite 301  
Toronto, Ontario  
M5V 2L4  
Tel.: 416-960-2284  
Fax: 416-960-9392  
[www.cela.ca](http://www.cela.ca)

Environmental Defence  
317 Adelaide Street West, Suite 705  
Toronto, Ontario  
M5V 1P9  
Tel.: 416-323-9521  
Fax: 416-323-9301  
[www.environmentaldefence.ca](http://www.environmentaldefence.ca)





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