

# **1996 Inventory of Toxic Air Emissions:**

## **A Product of the Great Lakes Regional Air Toxic Emissions Project**

### **Part 2: Mobile Sources**

## **Executive Summary**

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**On behalf of:**

Illinois Environmental Protection Agency, Bureau of Air  
Indiana Department of Environmental Management, Office of Air Management  
Michigan Department of Environmental Quality, Air Quality Division  
Minnesota Pollution Control Agency, Environmental Outcomes Division  
New York Department of Environmental Conservation, Division of Air Resources  
Ohio Environmental Protection Agency, Division of Air Pollution Control  
Ontario Ministry of Environment, Environmental Monitoring and Reporting Branch  
Pennsylvania Department of Environmental Protection, Air Quality Control  
Wisconsin Department of Natural Resources, Bureau of Air Management

Great Lakes Commission  
400 Fourth Street  
Ann Arbor, MI 48103-4816

# Executive Summary

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## Introduction and Inventory Objective

This report (Part II: Mobile Sources), a product of the Great Lakes Regional Air Toxic Emissions Inventory Project, presents a multijurisdictional inventory of mobile sources emissions of 82 toxic air contaminants that have the potential to impact environmental quality in the Great Lakes basin. Part I of this report, Point and Area Sources, was published in December 1999.

This initiative was undertaken through an intergovernmental partnership involving the eight Great Lakes states, the province of Ontario, and the U.S. Environmental Protection Agency (U.S. EPA). The objective of this ongoing initiative is to present researchers and policy makers with detailed, basin wide data on the source and emission levels of 82 toxic contaminants.

The development and release of the inventory is an important step in meeting the goals of the 1986 Great Lakes Toxic Substances Control Agreement (signed by the Great Lakes governors and Premier of Ontario), and sections 112(c)(6), 112(k) and 112(m) of the 1990 U.S. Clean Air Act Amendments (see <http://www.cglg.org/pub/toxics/index.html> and <http://earth1.epa.gov/oar/caa.html> for further details).

This inventory report presents a compilation of the best available data for calendar year 1996 emissions from mobile sources. Point and area source emission summaries in relation to mobile source emissions are also included. Information will be updated annually and the level of detail will increase year to year. This project also released version 2.0 of the *Regional Air Pollutant Inventory Development System (RAPIDS)*. RAPIDS includes the capability of estimating emissions from mobile sources. The Great Lakes jurisdictions believe this work will provide a strong foundation upon which to build national and binational strategies to reduce toxic air emissions affecting the Great Lakes.

Part II of the inventory effort focused on the identification of mobile source categories that contribute to the total emissions of toxic contaminants listed in Table 1-1. Examples of mobile sources include: cars, trucks, trains, recreation vehicles, airplanes, marine vessels, farm equipment, construction equipment and other non-road engines such as lawnmowers and snowblowers.

Emission estimates for the 82 toxic compounds are presented in the first half of this report, with state reports and methodologies detailed in the appendices.

The inventory project is strengthening decision making capabilities in the basin by promoting interjurisdictional consistency in data collection and analysis, establishing standard procedures and protocols, developing and testing an automated emission estimation and inventory system, and demonstrating the value of client/server technology via the Internet to transmit and exchange environmental data among the Great Lakes jurisdictions and inform the larger Great Lakes community.

## **Inventory Scope and Findings**

The 1996 emissions inventory effort began in September 1998 with primary funding provided by the U.S. EPA. Over the four previous years, the Great Lakes states, with support from the U.S. EPA and the Great Lakes Protection Fund developed and tested (through a Southwest Lake Michigan Inventory), the regional infrastructure and tools for emissions inventory compilation including the *Regional Air Pollutant Inventory Development System (RAPIDS)* versions 1.0 and 2.0 and the *Air Toxic Emissions Inventory Protocol for the Great Lakes States*.

In compiling the inventory, challenges were encountered in the area of data breadth, quality, availability and consistency from one jurisdiction to the next. Given variances in staffing resources and data management from one jurisdiction to the next, project staff received data in varied forms that needed to be standardized before being incorporated into the inventory.

The 1996 inventory should not be used for jurisdictional comparisons, but rather to demonstrate the potential of such a complete and comprehensive inventory as a decision support tool. Key findings associated with the inventory effort, as expressed by the federal, state, and provincial members of the project Steering Committee, are as follows:

- A comprehensive, multijurisdictional inventory of toxic air pollutants, sources and emission levels within the Great Lakes basin provides an important decision-making tool for environmental protection efforts.
- Air emissions data varies significantly from one Great Lakes jurisdiction to the next in terms of breadth, quality and availability. Greater consistency in data acquisition, compilation and analysis is needed to ensure meaningful basin wide assessment and interjurisdictional comparison.
- Great Lakes jurisdictions are well advised to develop and maintain the program and staffing infrastructure needed to participate in basin wide emissions inventory efforts over the long term. Continuity in inventory development and updating will provide a much-needed benchmark for trend identification, analysis and assessing the benefits of implementing control technologies and other emission reduction programs.

## **Inventory Methodology**

The Regional Toxic Air Emissions Inventory effort focuses on significant sources of air emissions of 82 toxic air pollutants in the jurisdictions bordering the Great Lakes. Working cooperatively through the Great Lakes Commission, inventory work is undertaken by the air quality departments of the state and provincial governments in the region. Staff at each agency followed the *Regional Toxic Air Emissions Inventory Protocol* they developed jointly and finalized in June 1994. The protocol provides instructions to accomplish the regional inventory development effort so the inventory is complete, accurate, and consistent from one jurisdiction to the next. The protocol:

- Assigns responsibilities and procedures to the states, Great Lakes Commission, U.S. EPA Great Lakes National Program Office (GLNPO);
- Outlines procedures to identify and locate emission sources of target compounds;
- Guides selection of specific emission estimation techniques;
- Instructs states on compiling and updating the regional repository at GLNPO;
- Outlines quality assurance/quality control procedures for emission data and estimates; and
- Identifies and explains the full suite of automated tools available for developing the regional inventory.

Because the inventory was a multi-state, regional effort, a high level of coordination and communication was necessary to ensure consistency among the states and province of Ontario in terms of data management, methodology, calculation methods and other issues. During the course of inventory development, the Great Lakes Regional Air Toxic Emissions Inventory Technical Steering Committee communicated via daily e-mail exchanges, weekly or biweekly conference calls, and bimonthly in-person meetings. In addition, the Steering Committee developed an Internet group mailing service, [airtoxics@great-lakes.net](mailto:airtoxics@great-lakes.net), which facilitated transmittal of thousands of messages between members, contractors, and with a larger group of peer reviewers, university and industry researchers, other Great Waters/Urban Area Source states (including Texas and Louisiana), and federal agency representatives. A complete archive of all [airtoxics](mailto:airtoxics@great-lakes.net) listserve messages, including minutes for all conference calls and in-person meetings can be found on the Great Lakes Information Network (GLIN) (<http://www.great-lakes.net>). The committee also oversaw contractor development of the inventory software and resolved outstanding issues and inconsistencies among the eight states and Ontario. The Steering Committee is composed of representatives from each of the air management programs from the eight Great Lakes states as well as Ontario and observers from U.S. EPA. A complete list of members with contact information can be found in Appendix K.

The Steering Committee worked closely with the project software development contractor, Windsor Technologies, Inc., to develop and test RAPIDS. Following on the success of the 1993 inventory, RAPIDS was enhanced to include a mobile source module to estimate emissions from on-road and non-road mobile sources; the addition of growth factor algorithms to project emissions; controlled emission factor functionality; development of mobile sources emission factors for the Great Lakes region; and improved emissions estimation and reporting capabilities. This effort represents the first attempt to prepare software for estimating toxic pollutant emissions on a multi-state basis. RAPIDS is a client/server system developed in PowerBuilder® with an ORACLE® back-end database. The software is available for public use from the Commission's website at <http://www.glc.org/air/rapids/rapids.html>. Requests for data can be forwarded to the point of contact listed on the webpage.

Finally, a Quality Assurance/Quality Control (QA/QC) Committee reviewed the inventory report, established QA/QC criteria for use by all states and the province of Ontario, and ensured the report provides an accurate and useful summary of toxic air emissions at the regional level.

## **Next steps**

This inventory will serve as a template for future mobile source inventories for both this project and on an individual state and provincial basis, both within and beyond the Great Lakes region.

Through the continued efforts of the Steering Committee, the inventory will become more comprehensive over time and become an increasingly valuable tool for decision making within the Great Lakes basin. The Steering Committee will continue to meet on a regular basis to discuss inventory enhancements, both through defining data collection and refining and testing the RAPIDS software to accommodate continued expansion of this project.

The Steering Committee has developed RAPIDS to include a mobile source estimation module which is used by Great Lakes jurisdictions to estimate emissions from cars, trucks, trains, recreation vehicles, airplanes, marine vessels, farm equipment, construction equipment and other non-road engines. This expansion of RAPIDS provides a complete profile for air toxic emissions and expands the list of toxic compounds of concern to 82. The complete 1996 point, area and mobile source emissions inventory is available on the Great Lakes Information Network (GLIN) at <http://great-lakes.net/envt/air/airtox.html>.

Collection of 1997 and 1998 data for point and area sources is already underway. For the 1999 Inventory, the Steering Committee is also planning to expand its list from 82 pollutants to match the 188 hazardous air pollutants designated by the 1990 Clean Air Act Amendments.

The Great Lakes Regional Air Toxic Emissions Inventory Project bridges the gap between the science of inventorying toxic air emissions and the public policy debate concerning how these emissions affect human health and the environment and how they should be addressed. Follow-up by state, provincial and federal environmental protection agencies is necessary to make further progress toward these goals. The Steering Committee recommends that regulatory decisions not be based on this data alone.