

**Selected Information on Chemical Releases within Great  
Lakes Counties Containing Areas of Concern (AOC)  
(Public Comment Draft 2008)**

**Prepared by**

**Agency for Toxic Substances and Disease Registry  
Department of Health and Human Services**

**Prepared For**

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**Agency for Toxic Substances and Disease Registry**

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## Preface

### Public Health Implications of the Great Lakes Areas of Concern

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The Great Lakes form one of the world's principal freshwater seas, and one of North America's most spectacular and beautiful natural features. For the millions of people who live near the Great Lakes, and the millions more who visit them, the lakes, the watersheds that feed them, and the surrounding land are a source of inspiration and sustenance.

But careless practices over many years have resulted in contamination of the Great Lakes ecosystem. Countless chemical products and byproducts of modern life—solvents, metals, pesticides, persistent organic pollutants, and more—have found their way into the air, water, land, and biota, and even into people's bodies. Substantial cleanup has already been accomplished, and more is underway. We are only beginning to understand the consequences of this contamination.

For almost a century, since the 1909 enactment of the Boundary Waters Treaty, the International Joint Commission (IJC) has helped the U.S. and Canadian governments manage the lake and river systems along the border. An important expression of that commitment was the Great Lakes Water Quality Agreement (GLWQA), first signed in 1972. The GLWQA commits the United States and Canada to restoring and maintaining the chemical, physical, and biological integrity of the Great Lakes basin ecosystem, and explicitly recognizes the importance of protecting human health as part of this task.

The Agency for Toxic Substances and Disease Registry (ATSDR) has been committed to protecting public health from chemical contamination since its formation more than 20 years ago. In 2001, the IJC asked ATSDR for "assistance in evaluating the public health implications of environmental contamination in Great Lakes Areas of Concern." (Areas of Concern are ecologically degraded places in the region.) This report is the response to that request.

In assembling this report, ATSDR scientists surveyed many sources of data on environmental exposures and human health. Ultimately, four kinds of environmental data were included in the report. While each of these draws on a large, sophisticated data base, each has important limitations. Together, these environmental data provide only a partial picture of the burden of chemical exposures people in the region face. Moreover, available health data cannot be clearly linked to the environmental data. As a result, it is impossible to draw firm conclusions about the threat to human health from critical pollutants across the Great Lakes basin.

The major conclusion of this report is that we need better data to allow us to assess threats to human health. Even as we work to prevent pollution, and clean up the residua of past emissions—much-needed efforts that are well underway—we need to advance our understanding of the health consequences of chemical exposures. Better data are an essential first step.

#### *The preparation of this report*

An early draft of this report became public in 2007, before ATSDR had not finished reviewing and finalizing it. That draft raised scientific concerns, which are described at

[http://www.atsdr.cdc.gov/grtlakes/pdfs/Scientific\\_Concerns.pdf](http://www.atsdr.cdc.gov/grtlakes/pdfs/Scientific_Concerns.pdf). Accordingly, ATSDR held up release of the report, and set about correcting the deficiencies.

While this is a routine procedure to assure scientific quality, it was misinterpreted by some as suppression of science. Several important points became clear.

First, good science matters. The 2007 draft was not ready to be released because it did not clearly assemble, analyze, and present the available data. Such a document could lead to incorrect conclusions. Second, good communication matters. It is important to make methods, data, and conclusions clear to all readers of a report. Third, people care passionately about the environment, about health, and about the links between the two. All of us—at our Agency, across the Great Lakes region, across the nation—believe in wholesome, healthy, environments, and believe that accurate, timely information will help us get there. That shared concern is a precious resource.

This report aims to be accurate, informative, and useful to health professionals, decision-makers, and the public. It confirms that the Great Lakes basin is contaminated with toxic chemicals, that we lack sufficient information about human exposure to these chemicals, that we are therefore unable to draw solid conclusions about their health impact across the region, and that we need better information. I am proud that our Agency—together with many partners in government, academia, civil society, and the private sector—is taking steps to fill data gaps and improve our understanding, from our Great Lakes Human Health Effects Research Program (<http://www.atsdr.cdc.gov/grtlakes/program-overview.html>) to our Biomonitoring program (<http://www.cdc.gov/biomonitoring/>).

This report is an important step on the journey toward understanding the public health implications of environmental contamination in the Great Lakes basin. We need to work hard to build that understanding. More importantly, we need to apply that understanding, by taking effective action to protect people now and in the future, and to sustain a healthy ecosystem.

#### *Acknowledgments*

Thanks to the many contributors, reviewers, and partners who helped produce this report, and to the Institute of Medicine Committee to Review ATSDR's Great Lakes Reports, which assessed not only the report but the scientific decision-making behind it. Above all, thanks to the many members of the NCEH/ATSDR staff who came together over recent months to check data quality, explain methods, strengthen data analyses, upgrade GIS maps, clarify writing, and otherwise do what had to be done to produce a high-quality report. Their hard work, dedication, and professionalism made all the difference.

## Executive Summary

**Background:** This report responds to a request from the International Joint Commission (IJC), the binational organization that works to implement the Great Lakes Water Quality Agreement (GLWQA) between the U.S. and Canada. The GLWQA calls for the two nations to define “the threat to human health from critical pollutants” found in the Great Lakes basin.

**This report:** The geographic focus of this report is a set of 26 “Areas of Concern” (AOCs) along Great Lakes streams, rivers, and lakes. These AOCs are defined under the Agreement as ecologically degraded geographic areas requiring remediation. In response to the IJC request, this report summarizes previously-published public health assessment products and chemical release information for the 26 U.S. AOCs and 54 counties that are in close geographic proximity to those AOCs. Much of the available data pertain to counties, and not to AOCs. Some AOCs occupy small parts of a single county, while others may reach across more than one county. The data come from publicly available data sets provided by ATSDR and the U.S. EPA.

**The pollutants:** The GLWQA defines “critical pollutants” as substances that persist in the environment, bioaccumulate in fish and wildlife, and are toxic to humans and animals. There are 12 categories of critical pollutants. This report emphasizes the critical pollutants (within the constraints imposed by using existing data) but also presents information on other pollutants, when such information is available and relevant.

**Environmental data:** This report compiles and presents previously collected environmental data from four sources:

- Data on hazardous waste sites in AOC counties, from evaluations prepared by the Agency for Toxic Substances and Disease Registry (ATSDR)
- Chemical release data from the U.S. Environmental Protection Agency’s (EPA) Toxic Release Inventory (TRI)
- Data on pollutant discharges into water, from EPA’s National Pollutant Discharge Elimination System (NPDES)
- Data on “beneficial use impairments” such as wildlife and drinking water advisories, from each of the Great Lakes states.

These data are presented in three ways: in text, in tables, and in Geographic Information System-based (GIS) maps created by ATSDR for each of the 26 U.S. AOCs.

**Health Data:** To be useful for assessing potential health effects related to AOCs, health data should have the following characteristics:

- Be biologically associated with relevant exposures
- Be well-matched to the environmental data in space and time

Except as noted in the context of ATSDR health assessment products, no currently available health data meet these needs; thus this report does not include other health data. ATSDR remains committed to improving the availability and relevance of data linking health and environment over time.

**Conclusions:** This report yields five principal conclusions.

*First*, there is evidence of environmental pollution in the Great Lakes region, including both past and ongoing releases. Of more than 140 hazardous waste sites located in AOC counties and evaluated by ATSDR, 86 were identified as having a potential human health impact, including 2

classified as “urgent public health hazards,” 47 as “public health hazards,” and 37 as “indeterminate public health hazards.” Many but not all of these sites have been remediated. The TRI and NPDES data reveal ongoing releases of pollutants in or near almost every AOC. Beneficial use impairments exist across much of the region.

*Second*, the available information on environmental pollution in the Great Lakes region is limited and incomplete. Data sources such as TRI exclude important sources of pollutants. Other sources and pathways of exposure—in food, in air, in drinking water, in consumer products, in workplaces—are not captured by available databases.

*Third*, the available information on environmental *pollution* provides little insight on people’s *exposure* to pollutants. TRI data on chemicals used and emitted, and NPDES data on chemicals discharged into water, do not indicate whether these chemicals reach people and enter their bodies. ATSDR assessments of hazardous waste sites do include analysis of exposure pathways, but do not include data on how much exposure actually occurs.

*Fourth*, available health data are not well matched to the exposure data and therefore cannot be used to help assess whether the environmental exposures have adverse health consequences. Much more and better health data will be needed to provide useful information on health outcomes of greatest interest, such as neurobehavioral, endocrine, reproductive, and immune function.

*Fifth*, for all these reasons, it is currently impossible at this time to define “the threat to human health from critical pollutants” found in the Great Lakes basin—the inquiry that motivated this report. This query remains keenly important in view of evidence of contamination in many areas of the Great Lakes basin, and this report serves to highlight the pressing need for better data, properly collected, organized, and analyzed, to help define threats to human health and optimal strategies for protecting health.

**Recommendations:** These conclusions support the need for additional data collection and analysis to permit scientists, decision makers, and members of the public to define the threat to human health from pollutants in the Great Lakes basin. Needed activities include:

- More complete data collection on environmental contaminants, including characterization of air, water, soil, foods, consumer goods, and other sources, and pathways of exposure.
- Biomonitoring to characterize amounts of chemicals in the bodies of people of the Great Lakes basin.
- More complete health data collection including data on outcomes linked to chemical exposures, such as neurobehavioral, endocrine, reproductive, and immune function.
- Data linkage to permit joint analyses of different data sets.
- Analytical epidemiology studies to investigate specific hypotheses arising from the foregoing data sets, using advanced techniques such as genetic analyses, careful control of confounders, and sophisticated data analytic approaches.
- Modeling exposure pathways using appropriate information about historical environmental exposure, if available, can provide useful information for health conditions with long latencies.

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