United States Government Accountability Office

GAO

Report to Congressional Requesters

July 2005

GREAT LAKES INITIATIVE

EPA Needs to Better Ensure the Complete and Consistent Implementation of Water Quality Standards

GAO-05-829

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Highlights

Highlights of GAO-05-829, a report to congressional requesters

Why GAO Did This Study

The virtual elimination of toxic pollutants in the Great Lakes is a goal shared by the United States and Canada. While some progress has been made, pollution levels remain unacceptably high. The Great Lakes Initiative (GLI) requires stringent water quality standards for many pollutants in discharges regulated by states administering National Pollution Discharge Elimination System (NPDES) permit programs.

As requested, this report examines the (1) GLI's focus and potential impact on water quality in the Great Lakes Basin, (2) status of GLI's adoption by the states and any challenges to achieving intended goals, and (3) steps taken by the Environmental Protection Agency (EPA) for ensuring full and consistent implementation of GLI and for assessing progress toward achieving its goals.

What GAO Recommends

GAO recommends that EPA take three actions to better ensure full and consistent implementation of GLI, including issuing a permitting strategy for a more consistent approach to controlling mercury and, resolve disagreements with the state of Wisconsin on GLI provisions.

EPA generally agreed with GAO's recommendations. It plans to work with the Great Lakes states in assessing approaches for reducing mercury in lieu of developing a mercury permitting strategy.

www.gao.gov/cgi-bin/getrpt?GAO-05-829.

To view the full product, including the scope and methodology, click on the link above. For more information, contact John Stephenson at (202) 512-3841 or stephensonj@gao.gov.

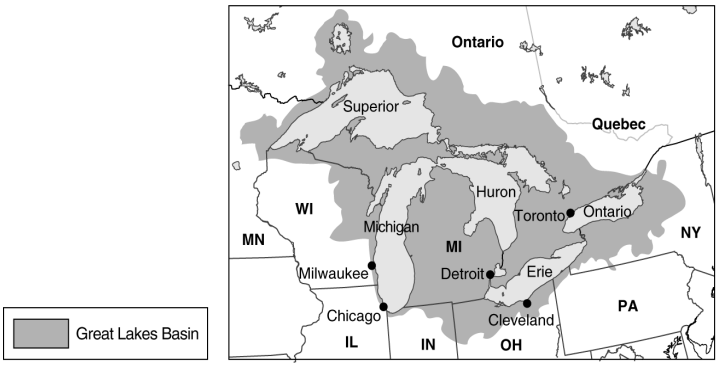
What GAO Found

GLI has limited potential to improve overall water quality in the Great Lakes Basin because it primarily focuses on regulated point sources of pollution, while nonpoint sources, such as air deposition and agricultural runoff, are greater sources of pollution. GLI's potential impact is further limited because it allows the use of flexible implementation procedures, such as variances, whereby facilities can discharge pollutants at levels exceeding stringent GLI water quality standards. Finally, many of the chemical pollutants regulated by GLI have already been restricted or banned by EPA and have a limited presence in point source discharges.

By 1998, the eight Great Lakes states had largely adopted GLI water quality standards and implementation procedures in their environmental regulations and NPDES programs. However, EPA determined that some states had failed to adopt some GLS provisions or had adopted provisions that were inconsistent with GLI and EPA promulgated rules imposing GLI standards. Wisconsin officials, however, believe that the state cannot implement standards that are not explicitly supported by state law, and disagreements with EPA over the rules remain unresolved. As a result, GLI has not been fully adopted or implemented in the state. Finally, a major challenge to fully achieving GLI's goals remains because methods for measuring many pollutants at the low levels established in GLI do not exist. Consequently, some pollutants cannot be regulated at these levels.

EPA has not ensured consistent GLI implementation by the states nor has the agency taken adequate steps toward measuring progress. For example, EPA did not issue a mercury permitting strategy to promote consistent approaches to the problems posed by mercury as it stated in GLI. In the absence of a strategy, states developed permits for mercury that vary from state to state. Attempts by EPA to assess GLI's impact have been limited because of inadequate data or information that has not been gathered for determining progress on dischargers' efforts to reduce pollutants.

Great Lakes Basin Area in the United States and Canada



Sources: GAO, MapArt.

Contents

Abbreviations

BCC	bioaccumulative chemicals of concern
EPA	Environmental Protection Agency
GLI	Great Lakes Initiative
GLWQA	Great Lakes Water Quality Agreement
NPDES	National Pollution Discharge Elimination System
PCS	Permit Compliance System
PMP	pollutant minimization program
PCB	polychlorinated biphenyl
POTW	publicly owned treatment works
TMDL	total maximum daily load
TRI	Toxics Release Inventory
WET	whole effluent toxicity

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United States Government Accountability Office
Washington, D.C. 20548

July 27, 2005

Congressional Requesters:

Millions of people in the United States and Canada depend on the Great Lakes—the largest system of freshwater in the world—as a source of drinking water, recreation, and economic livelihood. Over the last several decades, the Great Lakes Basin—which includes the five Great Lakes—Superior, Michigan, Huron, Ontario, and Erie—and a large land area that extends beyond the lakes, including their watersheds, tributaries, and connecting channels, has proven vulnerable to the effects of toxic pollutants as a result of industrial, agricultural, and residential development. During the 1970s, it became apparent that certain toxic chemicals such as mercury and dioxin, can accumulate over time in aquatic species, such as fish, posing risks to those species as well as humans and wildlife that consume fish from the Great Lakes Basin. These chemicals, known as bioaccumulative chemicals of concern (BCC), are discharged into the basin from point sources, such as industrial or municipal facilities' pipes and drains, or from nonpoint sources, which include air emissions mainly from coal-fired power plants, agricultural runoff, and sediments highly contaminated from past industrial practices.

The United States and Canada have undertaken a variety of binational initiatives to improve environmental conditions in the Great Lakes Basin. In 1972, the two countries signed the first international Great Lakes Water Quality Agreement (GLWQA) to restore and enhance water quality in the lakes. In 1978, the parties signed a second GLWQA reaffirming the goals of the earlier agreement and calling for increased control over the discharge of toxic pollutants, such as BCCs, and their virtual elimination throughout the Great Lakes Basin. While progress has been made to control these toxic pollutants, inconsistencies developed in the way pollutants from point sources were controlled by the eight states bordering the Great Lakes. In 1989, to promote consistency in Great Lakes states' environmental regulatory programs, the eight states began developing a framework for coordinating regional action for controlling point sources of toxic pollution, based on the 1986 Great Lakes Toxic Substances Control Agreement or "the Governors' Agreement." Controlling point sources of pollution was already under way through the implementation of the National Pollution Discharge Elimination System (NPDES) program authorized in 1972 by the Clean Water Act. In most cases, states administer the NPDES program, which regulates the discharge of pollutants into

surface waters of the United States from industrial, municipal, and other facilities through permits.

In 1990, the Great Lakes Critical Programs Act amended the Clean Water Act to require the U.S. Environmental Protection Agency (EPA) to publish final guidance for the Great Lakes states, conforming to the objectives and provisions of the GLWQA, on minimum water quality standards, implementation procedures, and antidegradation policies for protecting existing water quality. The act required states to adopt provisions consistent with these standards, procedures, and policies.[1] In 1995, EPA issued the *Final Water Quality Guidance for the Great Lakes System*, also known as the Great Lakes Initiative (GLI). To control toxic substances and protect aquatic life, wildlife, and human health, GLI sets forth water quality criteria for 29 toxic substances, including BCCs and it primarily focused on 22 BCC pollutants, such as mercury, polychlorinated biphenyls (PCB), and dioxin. Mercury is the most prevalent BCC in the Great Lakes Basin and poses a significant threat to human health. GLI also contains detailed methodologies for developing criteria for additional pollutants and implementation procedures for developing more consistent, enforceable water quality-based effluent limits in NPDES discharge permits for point sources of pollution. The eight Great Lakes states—Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin—are responsible for implementing GLI, which provides them some flexibility in implementing water quality standards. EPA's Regions 2, 3, and 5 are responsible for ensuring the adoption and implementation of GLI by the states. The NPDES program and the GLI are strictly U.S. efforts and do not apply to Canada, which follows a different approach to regulating point source pollution.

You asked us to examine (1) the focus of GLI and its potential to impact water quality in the Great Lakes Basin; (2) the status of GLI's adoption by the states and the challenges, if any, to achieving GLI's intended goals; and (3) steps EPA has taken for ensuring the full and consistent implementation of GLI and for assessing progress toward achieving GLI's goals. Because of the prevalence of mercury in the Great Lakes Basin, this report focuses on control of this pollutant.

[1]EPA has interpreted the term "consistent with GLI" to mean as environmentally protective as GLI. The Court of Appeals for the D.C. Circuit has upheld this interpretation as reasonable under the Clean Water Act. *American Iron and Steel Inst. v. EPA*, 115 F.3d 979 (D.C. Cir. 1997).

To determine the focus of GLI and its potential to affect water quality in the Great Lakes Basin, we reviewed the finalized GLI requirements and available data on the major sources of toxic pollutants in the Great Lakes Basin. We obtained information on the impact of GLI from officials of several state and other environmental organizations, including officials that were involved in developing GLI. To determine the status of GLI's adoption by the states, we examined EPA regulations and analyzed documents pertaining to EPA's review of state submissions under GLI to identify any remaining unresolved matters. To identify challenges that might exist to achieve GLI's intended goals, we reviewed the water quality criteria established for individual pollutants in GLI, particularly BCCs, and analyzed information provided by EPA and state officials to determine if any challenges existed. To identify the steps EPA has taken for ensuring the full and consistent implementation of GLI, we reviewed GLI to identify the activities EPA committed to undertake and obtained information from EPA and Great Lakes state officials on the status of implementation, including any consequences resulting from delays in implementation. To determine the steps taken by EPA for assessing progress toward achieving GLI's goals, we reviewed efforts by EPA Region 5 officials to determine progress made under GLI for improving water quality, including the agency's analysis of available databases, and its efforts in monitoring of the states' implementation of GLI. We performed our work from October 2004 to June 2005 in accordance with generally accepted government auditing standards. A more detailed discussion of our scope and methodology is outlined in appendix I.

Results in Brief

GLI has limited potential to improve overall water quality in the Great Lakes Basin because it focuses primarily on point sources of pollution regulated by state NPDES programs rather than nonpoint sources, such as air deposition and agricultural runoff, which are a greater source of pollution. While the importance of nonpoint sources of pollution was mentioned in GLI, they were not specifically addressed. GLI's ability to impact overall water quality is further limited because under certain circumstances it lets states use flexible implementation procedures, such as variances, when issuing permits for facilities, allowing them to discharge pollutants at levels exceeding stringent GLI water quality standards. Thus, while mercury is the only BCC with a significant number of permit limits established as a result of GLI, the discharger is often allowed to exceed mercury water quality standards in GLI because states have granted them variances, limiting GLI's ability to impact water quality. GLI's incremental impact is also limited by the fact that many of the BCCs regulated by GLI

had already been previously restricted or banned by EPA. For example, certain pesticides targeted by GLI were banned in the 1970s and 1980s. Consequently, many of these chemicals are not present or are present only at low levels in Great Lakes point source discharges. While these factors limit GLI's incremental ability to impact overall water quality in the Great Lakes, its effective implementation is still important because the virtual elimination of toxic pollutants remains a goal and controls on point source discharges are still needed to meet this goal.

While EPA has concluded that the Great Lakes states have largely completed adopting GLI provisions in their regulatory programs, measuring some pollutants at GLI levels is a significant challenge to implementing the stringent water quality standards called for in GLI. By 1998, the eight Great Lakes states had generally incorporated provisions consistent with GLI—including water quality criteria and implementation procedures—into their environmental regulations and NPDES permit programs. However, in 2000, EPA determined that six states had either failed to adopt some GLI provisions or had adopted some provisions that were inconsistent with GLI guidance. EPA promulgated rules disapproving these elements of the six states' submissions and imposing the GLI standards. In Wisconsin, however, officials believe that the state cannot implement standards that are not explicitly supported by state law, and disagreements over certain GLI provisions between state and EPA officials have continued since 2000. As a result, GLI is not fully adopted or implemented in the state. While provisions consistent with GLI have largely been adopted in other state programs, a significant obstacle exists to achieving GLI's intended goals. Specifically, many of the BCCs cannot be measured at the low level of GLI water quality criteria because sufficiently sensitive measurement methods do not exist. It is difficult to accurately assess the need for, or implement a permit limit for a pollutant when its presence in a facility's discharge cannot be measured at the level established by the water quality standard. For example, when GLI was issued, mercury could only be measured at levels many times greater than its GLI water quality criteria. With the development of a new measurement method, a much more widespread and pervasive problem with mercury levels was found, resulting in many more facilities being required to have mercury discharge limits and monitoring requirements in their permits. In the case of other BCCs, such as PCBs, methods to measure at low levels have not been developed.

EPA has not ensured the consistent implementation of GLI across the Great Lakes states or taken adequate steps to measure progress toward achieving

GLI's goals. Of particular note, to promote a uniform and consistent approach to the problems posed by mercury, EPA stated in GLI that it was committed to issuing a mercury permitting strategy for the Great Lakes Basin no later than 2 years after publishing GLI. Although EPA drafted a strategy, it was never issued because the agency perceived a general lack of public interest, and agency resources were directed to other GLI activities, according to EPA officials. In the absence of an EPA strategy, individual states developed permits for mercury that vary from state to state. For example, in Michigan, variances for dischargers allowing them to exceed mercury water quality standards are based on discharge levels that the state regulatory agency considers achievable by most dischargers in the state, while in Ohio, discharge levels are based on the level currently achievable by the individual facility. Such different approaches fail to promote the consistent implementation of water quality standards as envisioned by GLI. In addition, GLI stated that EPA Region 5, in cooperation with EPA Regions 2 and 3 and headquarters would establish a GLI Clearinghouse—a database that would allow states to share information for developing and updating consistent water quality standards. While development of the Clearinghouse was initiated in 1996, because of other agency priorities it was not made available to the states until 2005. In the absence of the Clearinghouse, some states developed their own water quality standards without the benefits of this shared information. As a result, EPA cannot be assured the Great Lakes states have adequate information to develop and update water quality standards in a consistent manner, which is a guiding GLI principle. Finally, EPA has been unable to sufficiently assess the impact of GLI with existing data sources and has not gathered additional information to monitor progress. The automated system that tracks NPDES permits does not provide accurate information that can be used to determine whether pollutant discharges have decreased under GLI. EPA Region 5 officials are attempting to assess the impact of GLI by comparing individual permits before and after GLI requirements, but this effort has yet to yield even preliminary results. EPA has also not assessed the impact of programs required by permits for minimizing pollutants that might exceed GLI standards.

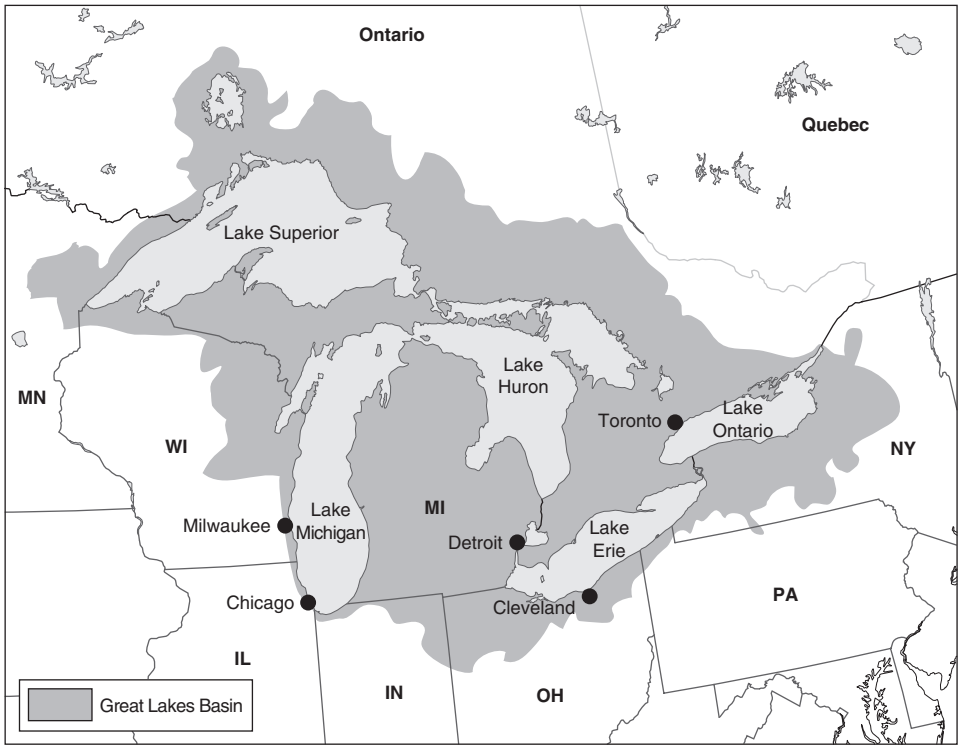
To better ensure the full and consistent implementation of GLI and improve measures for monitoring progress toward achieving GLI's goals, we are making a number of recommendations to EPA aimed at issuing a mercury permitting strategy, fully developing a GLI Clearinghouse, and collecting information on the impact of discharger plans to minimize pollutants, among other actions.

In commenting on this report, EPA believes that we did not effectively consider other benefits from GLI and that differences in how states address mercury in NPDES permits does not result in an unacceptable level of inconsistency. EPA plans to assist and work with the Great Lakes states in assessing the most effective approaches for reducing mercury loadings by dischargers. It will continue efforts to develop the Clearinghouse, collect information on pollutant minimization programs, and work with the state of Wisconsin to resolve outstanding issues.

Background

The Great Lakes and their connecting channels form the largest system of freshwater on earth. Covering more than 94,000 square miles, they contain about 84 percent of North America's surface freshwater and 21 percent of the world's supply. The lakes provide water for a multitude of activities and occupations, including drinking, fishing, swimming, boating, agriculture, industry, and shipping for more than 30 million people who live in the Great Lakes Basin—which encompasses nearly all of the state of Michigan and parts of Illinois, Indiana, Minnesota, New York, Ohio, Pennsylvania, Wisconsin, and the Canadian province of Ontario.

Figure 1: Area Comprising the Great Lakes Basin



Sources: GAO, MapArt.

During the 1970s, it became apparent that pollution caused by persistent toxic substances, such as BCCs, was harming the Great Lakes and posing risks to human health and wildlife. On average, less than 1 percent of the Great Lakes' water recycles or turns over each year, and many pollutants stay in place, settling in sediments or bioaccumulating in organisms. As a result, under the GLWQA of 1978, the United States and Canada agreed to a policy of prohibiting the discharge of harmful pollutants in toxic amounts and virtually eliminating the discharge of such pollutants. The two parties also pledged to develop programs and measures to control inputs of persistent toxic substances, including control programs for their production, use, distribution, and disposal. The concept of virtual elimination recognizes that it may not be possible to achieve total elimination of all persistent toxic substances. Some toxic substances may be produced by or as a result of natural processes, persist at background or natural levels, or cannot be eliminated for technological or economic reasons.

In addition to agreeing to a policy calling for the virtual elimination of toxic pollutants, the 1978 GLWQA, as amended, also established a process and set of commitments to address the pollutant problem. Other joint United States and Canada toxic reduction efforts were initiated in subsequent years, in keeping with the objectives of the agreement. These included the 1991 *Binational Program to Restore and Protect the Lake Superior Basin*—which, among other things, established a goal of achieving zero discharge of designated persistent and bioaccumulative toxic substances from point sources in the Lake Superior Basin. In addition, recognizing the long-term need to address virtual elimination, the EPA Administrator and Canada's Minister of the Environment signed the *Great Lakes Binational Toxics Strategy* in 1997, which provides a framework for actions to reduce or eliminate persistent toxic substances, especially those that bioaccumulate in the Great Lakes Basin.

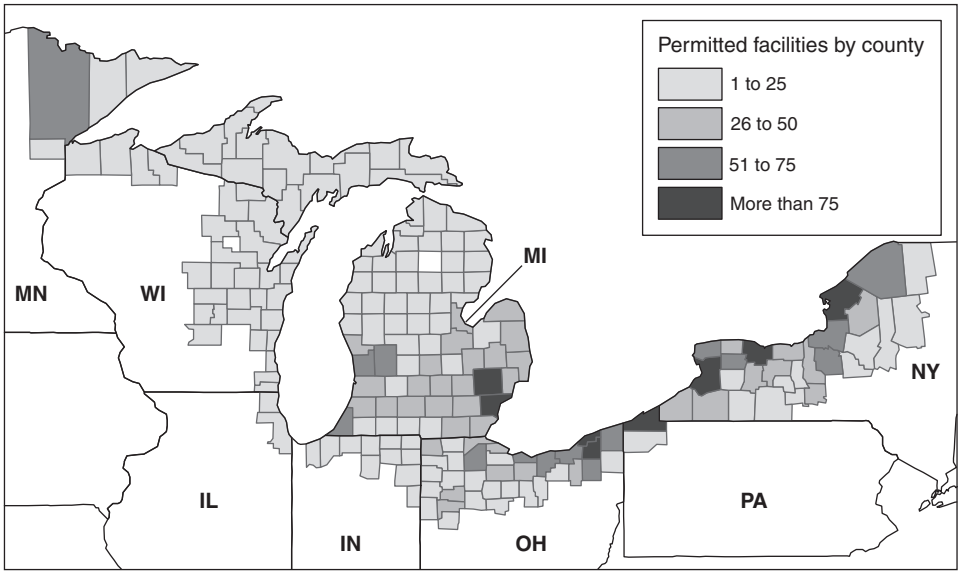
Agreements within the two countries also addressed the problem of toxic pollutants and the implementation of the GLWQA. In the United States, the Governors' Agreement in 1986 developed by the Council of Great Lakes Governors recognized that the problem of persistent toxic substances was the foremost environmental issue confronting the Great Lakes, and they were committed to managing the Great Lakes as an integrated ecosystem. At that time, inconsistencies in state standards and implementation procedures became an increasing concern to EPA and state environmental managers. The Governors agreed to work together to, among other things, establish a framework for coordinating regional action in controlling toxic pollutants entering the Great Lakes Basin, increase federal emphasis on controlling toxic pollution, and expedite the development of additional national criteria or standards for toxic substances to protect both the ecosystem and human health. In Canada, the Canadian and Ontario governments entered into several agreements with each other over the last 30 years to address environmental problems in the Great Lakes. These agreements, each referred to as the *Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem*, included a focus on the control of toxic chemical pollution and runoff. In addition, a 2002 agreement outlines how these two governments will continue to work together to focus efforts to help clean up the Great Lakes Basin ecosystem. Several priority projects are planned under the agreement, including reducing the amount of harmful pollutants, such as mercury, that find their way into the Great Lakes.

To further control toxic substances in the United States, efforts on the GLI began in the late 1980s to establish a consistent level of environmental

protection for the Great Lakes ecosystem, particularly in the area of state water quality standards and NPDES programs for controlling point sources of pollution. As authorized by the Clean Water Act, the NPDES permit program controls water pollution by regulating point sources that discharge pollutants into U.S. surface waters. Under NPDES, all facilities that discharge pollutants from any point source into U.S. waters are required to obtain a permit that provides two levels of control: (1) technology based limits (discharge limits attainable under current technologies for treating water pollution) and (2) water quality-based effluent limits (based on state water quality standards). Point sources are discrete conveyances such as pipes or constructed ditches. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge, do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. As of May 2005, there were nearly 5,000 facilities in the Great Lakes Basin that had NPDES permits, and over 500 of these were considered major facilities.[2]

[2]Major dischargers include municipalities with capability to discharge greater than one million gallons per day and certain industrial facilities based on ratings by EPA and the states.

Figure 2: Number of Facilities with NPDES Permits in the Great Lakes Basin by County



Sources: State NPDES program officials, GAO, MapArt.

Note: Data provided by state officials, from February through May 2005.

In 1989, the Council of Great Lakes Governors agreed to join EPA in developing GLI because it supported the goal of consistent regulations among the Great Lakes states. The effort to develop GLI was under way when Congress amended the Clean Water Act with the passage of the Great Lakes Critical Programs Act of 1990. This act required EPA to publish by June 1992, final water quality guidance for the Great Lakes System that conformed to the objectives and provisions of the GLWQA. It further required the states to adopt water quality standards, antidegradation policies, and implementation procedures consistent with the guidance no later than 2 years after it was published. If the states failed to adopt such water quality standards, policies, and procedures consistent with the guidance, EPA was to promulgate them not later than the end of the 2-year period. In making such a determination, EPA reviewed the states water quality standards, antidegradation policies, and implementation procedures for consistency with the guidance.

To control toxic substances and protect aquatic life, wildlife, and human health, GLI sets forth water quality criteria for 29 toxic substances, such as PCBs, mercury, dioxin, and chlordane. These criteria include standards for

9 of 22 BCCs. GLI also contains detailed methodologies for developing criteria for additional pollutants and implementation procedures for developing more consistent, enforceable water quality-based effluent limits in discharge permits for point sources of pollution. The most common of the 22 BCCs currently being discharged from point sources in the Great Lakes Basin is mercury. Because mercury can be highly toxic and travel great distances in the atmosphere, it has long been recognized to have a wide range of detrimental effects for ecosystems and human health. When mercury is deposited within a water body, microorganisms can transform it into a very toxic substance known as methyl mercury. Methyl mercury tends to remain dissolved in water and can bioaccumulate in the tissues of fish to concentrations much higher than in the surrounding water. The primary way people are exposed to mercury is by eating fish containing methyl mercury. Poisoning can result from eating fish contaminated with bioaccumulated methyl mercury, which is dangerous to certain adults, children, and developing fetuses.

Three general principles guided the development of GLI: (1) to incorporate the best science available to protect the Great Lakes Basin ecosystem; (2) to promote consistency in standards and implementation procedures in Great Lakes states' water quality standards while allowing appropriate flexibility; and (3) to reflect the unique nature of the Great Lakes Basin ecosystem by establishing special provisions for toxic substances, such as BCCs. Although improved consistency in Great Lakes states' water quality standards and NPDES programs was a primary goal of GLI, implementing and supplemental regulations published by EPA provided flexibility to states in adopting and implementing GLI provisions in several areas.[3] These regulations included relief from GLI provisions for point source dischargers through the use of existing NPDES program provisions such as variances, mixing zones, and compliance schedules. For example, provisions in GLI allow the states to grant dischargers variances for up to 5 years from GLI water quality standards, which are the basis of a water quality based effluent limitation included in NPDES permits. According to GLI, variances are to apply to individual dischargers requesting permits and apply only to the pollutant or pollutants specified in the variance.

[3]60 Fed. Reg. 15366 (Mar. 23, 1995).

Great Lakes Initiative Has Limited Potential to Impact Overall Water Quality

GLI has limited potential to incrementally improve water quality in the Great Lakes Basin because first, it primarily focuses on point sources, which are not the major source of certain toxic pollutants that currently affect the Great Lakes Basin. Moreover, once GLI was implemented, few NPDES permits included limits for BCCs because they were not in discharges, and many of these BCCs were already regulated or banned before the GLI guidance was issued. Finally, for mercury, which is the BCC that is most frequently controlled in NPDES permits, GLI provisions provide flexible implementation procedures, including variances, that under certain circumstances are used by states to allow dischargers relief from the more stringent water quality standards. The stringent water quality standards may be either technically or economically unattainable by dischargers.

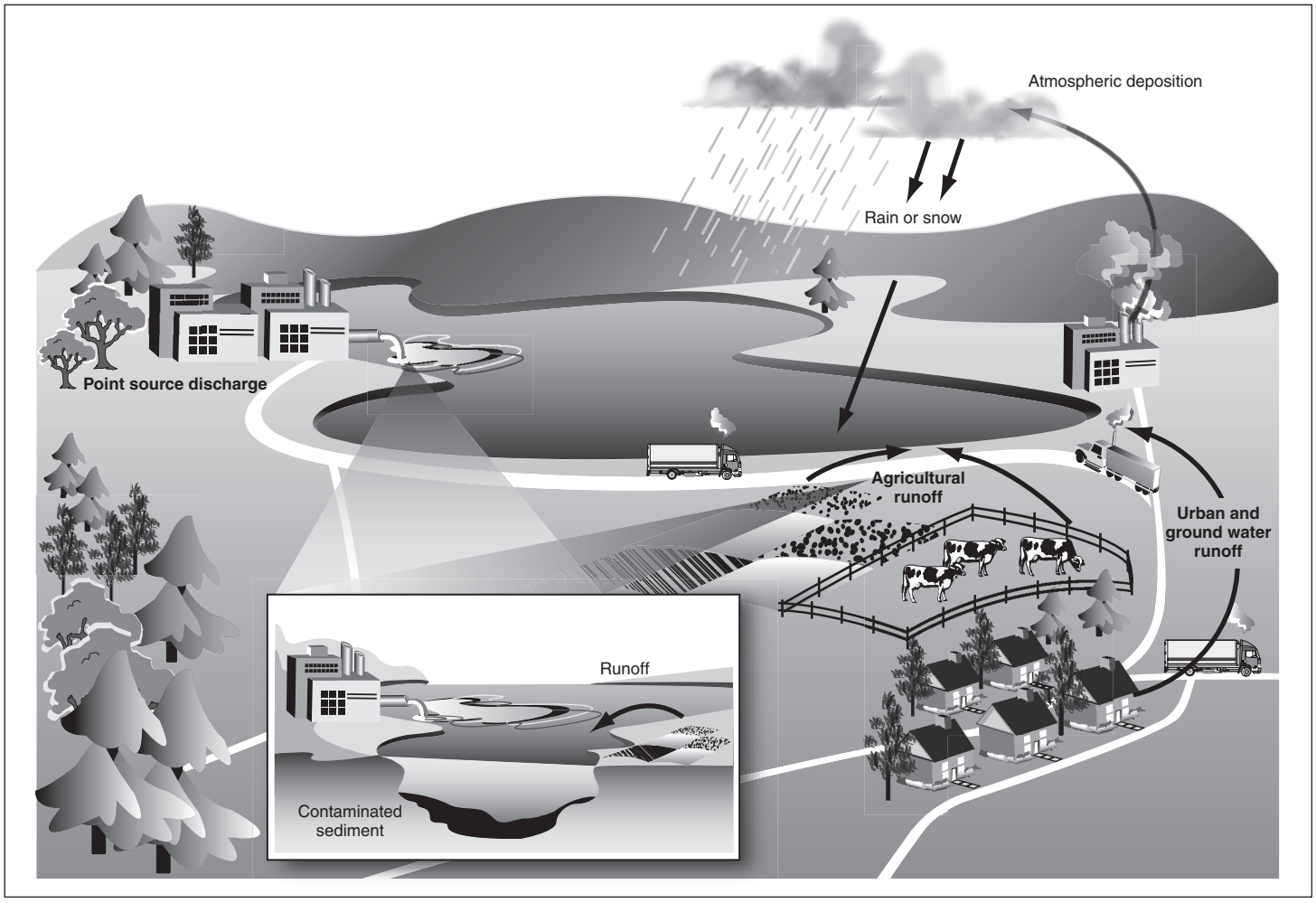
GLI's Primary Focus Is on Point Sources Which Are Not the Major Source of Many Toxic Pollutants

A primary focus of GLI is to establish consistent water quality standards within the Great Lakes Basin, which apply to all sources of pollutants but mainly to point sources. Thirty-three years ago, point sources of pollution were the basis for the establishment of the NPDES program and the major cause of poor water quality in the Great Lakes Basin. In implementing this program, it was recognized that controlling point sources was an important means of reducing pollutants discharged into waterways by requiring permits that specified allowable levels of pollutants. Since the introduction of the NPDES program there have been significant water quality improvements in the Great Lakes Basin. Currently, however, nonpoint sources of certain toxic pollutants are a significant threat to overall water quality in the Great Lakes Basin and other areas within the United States and Canada. Nonpoint sources of pollutants often impact overall water quality through runoff from agricultural processes or releases into the air from industrial facilities, which are then deposited into the Great Lakes. For example, major sources of mercury released into the air include coal-fired power plants, industrial boilers, and waste incinerators that burn materials containing mercury. Much, if not most, of the mercury entering the Great Lakes is from atmospheric deposition. EPA Great Lakes National Program Office officials stated that air deposition is likely responsible for more than 80 percent of mercury loadings into the Great Lakes.[4] Currently,

[4]The Clean Water Act established the Great Lakes National Program Office within EPA, charging it to, among other things, develop and implement specific action plans to carry out responsibilities under the GLWQA.

nonpoint sources of pollution are more difficult to regulate than point sources because it is more difficult to determine the specific sources of pollutants. The dynamic nature of various source pollution is illustrated below.

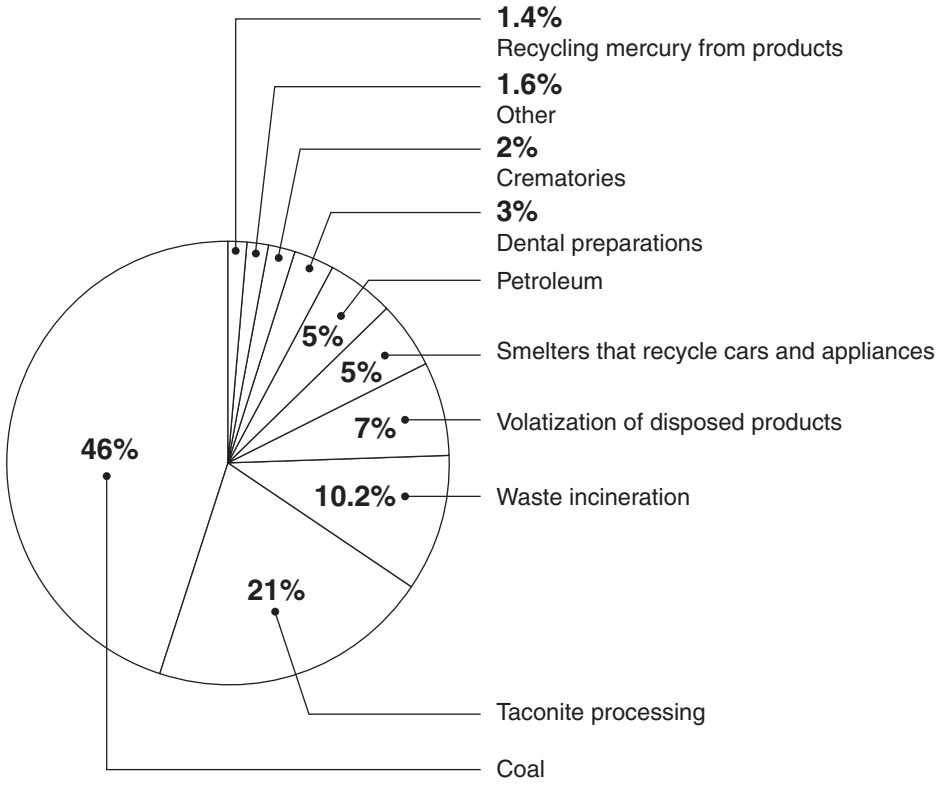
Figure 3: Illustration of Point and Nonpoint Sources of Pollution



Source: GAO depiction of EPA data.

Several state and environmental officials commented that while GLI resulted in states becoming more aware of the need to attain water quality standards for BCCs from point sources, it did not specifically address the larger problem of nonpoint sources of pollution. For example, Minnesota officials stated that they do not anticipate any water quality improvements from GLI for mercury, the most prevalent BCC in the Lake Superior Basin, because GLI does not specifically address nonpoint sources, such as atmospheric deposition. A 2004 state study estimated that 99 percent of mercury in Minnesota lakes and rivers comes from atmospheric deposition. The study concluded that although 30 percent of mercury atmospheric deposition in Minnesota is the result of natural cycling of mercury, 70 percent is the result of human activities, such as the release of trace concentrations that are naturally present in the coal used by power plants, and in the mining and processing of taconite ore, which is used to produce iron and steel. Of the mercury atmospheric deposition in Minnesota, it is estimated that 10 percent of this is from emissions within Minnesota. The sources of mercury atmospheric deposition from within Minnesota are shown in figure 4.

Figure 4: Minnesota Mercury Emissions



Sources: GAO and Minnesota Pollution Control Agency.

Note: The "other" category includes sources such as natural gas, wood, and fluorescent lamp breakage, which each, individually, make up less than 1 percent of the total. Due to rounding total percentage of individual categories exceeds 100 percent.

While the focus of GLI is on point sources, the importance of controlling nonpoint sources of pollution to improve overall water quality in the Great Lakes is recognized in GLI guidance. The guidance states that once GLI is implemented by the states, water quality criteria for pollutants and other provisions that are included in the guidance would be applied to nonpoint sources. However, according to the guidance, to be implemented, nonpoint source provisions would need to be enforced through the states' own regulatory programs. GLI also promotes the use of total maximum daily loads (TMDL) as the best approach for equitably addressing both point

and nonpoint sources.[5] TMDLs for the Great Lakes are also addressed in the *Great Lakes Strategy 2002*, which was developed by the U.S. Policy Committee for the Great Lakes.[6] The strategy has an objective that TMDLs for each of the Great Lakes and impaired tributaries will be completed by 2013; but according to EPA officials, TMDLs for BCCs have not been established for any of the Great Lakes, and only two TMDLs for BCCs have been completed for tributaries.

Few Permits Contain Limits for Toxic Pollutants, and Many Toxic Pollutants Are Already Restricted or Banned

While GLI identified many toxic pollutants, few NPDES permits currently limit the discharge of these pollutants, particularly BCCs, because they are either not present in discharge water or the pollutants are already restricted or banned. BCCs are still present in some facilities' discharges and are regulated by NPDES permits, but while there are nearly 5,000 permits for facilities in the Great Lakes Basin, there are only about 250 discharge limits for BCCs, according to Great Lake states' officials. Five of the eight states reported that they had discharge limits for BCCs in the Great Lakes Basin.[7] Further, not only are there relatively few BCC discharge limits in permits, but most, 185, are for mercury—with Michigan issuing the most discharge limits of the five states. The number of BCC discharge limits by state and pollutant is shown in table 1.

[5]TMDLs are limits for identified pollutants in impaired water bodies identified by the states as required by the Clean Water Act.

[6]The U.S. Policy Committee is a group of senior level representatives from federal, state, and tribal government agencies with environmental protection or natural resource responsibilities in the Great Lakes Basin.

[7]The information presented is based on data reported from Great Lakes states' permit officials. The states of Illinois, Pennsylvania, and Wisconsin reported that none of their permits in the Great Lakes Basin establish discharge limits for BCCs.

Table 1: BCC Discharge Limits in Great Lakes States' NPDES Permits

	Illinois	Indiana	Michigan	Minnesota	New York	Ohio	Pennsylvania	Wisconsin	Total
Mercury	0	20	83	2	37	43	0	0	**185**
PCBs	0	1	10	1	10	3[a]	0	0	**25**
Dioxin	0	0	2	1	0	0	0	0	**3**
Lindane	0	0	2	0	2	0	0	0	**4**
Hexachlorobenzene	0	0	2	0	4	0	0	0	**6**
Hexachlorobutadiene	0	0	2	0	3	0	0	0	**5**
Other	0	0	2	0	16	0	0	0	**18**
Total	**0**	**21**	**103**	**4**	**72**	**46**	**0**	**0**	**246**
Great Lakes Basin Permitted Facilities	12	150	1753	89	1275	1041	84	319	**4723**

Sources: GAO and state NPDES program officials.

Note: Data provided by state officials, from February through May 2005.

[a]Ohio officials provided an estimate of 1-5 PCB discharge limits in Great Lakes Basin permits. The number "3" is used as an approximation.

Several of the pollutants addressed by GLI had their use restricted or banned by EPA in the 1970s and 1980s and therefore are not used by facilities or found in their discharges. Of the 22 BCCs covered by GLI, at least 12 are either banned or are no longer produced in the United States. Some of the banned BCCs, such as toxaphene and dieldrin, are pesticides and insecticides that are likely to be present in the Great Lakes Basin water bodies as contaminated sediments from prior agricultural runoff rather than municipal and industrial point source discharges. Other BCCs, such as lindane, are no longer produced in the United States, while others, such as mirex and hexachloracyclohexane, are no longer produced or used in the United States. See appendix II for BCCs identified in GLI and whether they have been banned, restricted, or are still in use.

While the preceding factors limit GLI's potential to improve overall water quality in the Great Lakes, its effective implementation is still important because the virtual elimination of toxic pollutants in the Great Lakes Basin remains a goal for the United States and Canada. Controlling point source pollution is still needed to meet this objective. Although point source discharges of toxic pollutants are not as widespread as nonpoint sources, point source discharges may create localized "hot spots" of elevated concentrations of BCCs. These areas can have potentially adverse effects on aquatic life, wildlife, and humans. For example, while the major sources of mercury are nonpoint sources, it is still the most prevalent BCC found in

point source discharges overall in the Great Lakes, and heavy concentrations of mercury in these hot spots may result in its bioaccumulation in fish to levels that are dangerous to both humans and wildlife that consume them. Achieving GLI's objective to have consistent water quality standards for controlling point sources of toxic pollutants may prove difficult, however, because of flexible implementation procedures that allow discharge of pollutants at levels greater than GLI water quality standards.

Many NPDES Permits Allow for Dischargers' Mercury Pollutant Levels to Exceed GLI Standards

Many NPDES permits for facilities in the Great Lakes Basin allow the discharge of mercury at levels greater than the GLI water quality standard. Flexible implementation procedures such as variances are widely used to allow dischargers to exceed the strict GLI mercury water quality standard of 1.3 nanograms per liter of water (ng/L). GLI allows states to grant variances for complying with the mercury and other water quality standards under certain circumstances, such as if the imposition of water quality standards would result in substantial and widespread harmful economic and social impact. Variances are applicable only to the permit holder requesting the variance for up to 5 years and are only available for dischargers that were in existence as of March 23, 1997.[8] New facilities are not eligible for variances and must comply with the water quality standard for mercury established under GLI. Officials in two states—Minnesota and Michigan—expressed concerns that new industrial facilities that discharge mercury may not locate in the state because of their inability to comply with the mercury standard.

The use of variances for mercury became a more critical concern when new methods to measure the pollutant were approved by EPA in 1999, allowing mercury to be measured at a quantification level of 0.5 ng/L, below the GLI water quality standard of 1.3 ng/L.[9] This method was 400 times more sensitive than the one previously used by EPA and allowed the very low GLI limits to be quantified for the first time, causing potentially widespread problems for Great Lakes Basin dischargers that discovered for the first time that they were exceeding the mercury water quality criteria,

[8]Variances may be renewed along with the renewal of a NPDES permit, which may be issued for up to 5 years.

[9]A quantification level is the lowest concentration of a contaminant that can be quantitatively measured using a specific laboratory procedure.

according to state NPDES program officials. Using the more sensitive method, many more facilities were found to have levels of mercury in their effluent that exceeded water quality standards. State and EPA officials also determined that no economically feasible treatment technologies existed to reduce mercury to the lower level, and states were unwilling to issue permits that placed facilities in noncompliance. Michigan officials stated that they knew of only one permitted facility that was able to comply with the lower standard. As a result, states issued variances under their GLI regulations that provide for the most efficient short-term relief to "ubiquitous" pollutants, and EPA encouraged states to consider variances for multiple dischargers on a watershed basis, where appropriate.[10] EPA wanted to provide the states appropriate flexibility in adopting and implementing GLI's requirements, while also maintaining a minimum level of consistency. To facilitate granting variances for numerous facilities exceeding the mercury standard, three states—Indiana, Ohio, and Michigan—adopted procedures that expedited and simplified the variance application and granting process.

While variances are widely used under GLI, mixing zones and compliance schedules are also options that states may use under GLI. Mixing zones are areas around a facility's discharge pipe where pollutants are mixed with cleaner receiving waters to dilute their concentration. Within the mixing zone, concentrations of toxic pollutants, such as mercury, are generally allowed to exceed water quality criteria as long as standards are met at the boundary of the mixing zone. Several Great Lakes states no longer allow the use of mixing zones for BCCs in their permits, and GLI authorization for their use by all existing BCC dischargers expires in November 2010.[11] Mixing zones, as with variances, are not authorized for new dischargers. Compliance schedules are another option and grant dischargers a grace period of up to 5 years before they must comply with certain new or more restrictive permit limits. Similar to mixing zones, compliance schedules are also not available to new dischargers in the Great Lakes Basin and are only available for existing permits reissued or modified on or after March 23, 1997. According to state officials, Minnesota uses compliance schedules for

[10]*Final Water Quality Guidance for the Great Lakes System: Supplementary Information Document (SID)*, EPA, 1995, 820-B-95-001.

[11]EPA's initial 1995 mixing zone provision under the GLI was vacated by the U.S. Court of Appeals for the District of Columbia Circuit in *American Iron & Steel Institute v. EPA*, 115 F.3d 979 (D.C. Cir. 1997) and was remanded to EPA for further consideration. EPA promulgated a final rule in 2000 in response. 65 *Fed. Reg.* 67638 (Nov. 13, 2000).

existing dischargers to issue permits for facilities that have mercury levels above GLI water quality criteria. These schedules extend no later than March 2007, and then the GLI water quality standard of 1.3 ng/L must be met, unless a variance is granted, according to a state official.

States Have Largely Completed Adopting GLI Standards in Their Regulatory Programs, but Measuring Some Pollutants at GLI Levels Is a Significant Challenge

By 1998, the Great Lakes states largely completed adopting GLI provisions in their regulatory programs by incorporating GLI standards in their environmental regulations and NPDES permit programs. Upon reviewing state regulations, however, EPA found that several states had either failed to adopt some GLI provisions or adopted provisions that were inconsistent with GLI guidance. As a result, EPA promulgated regulations applying certain GLI provisions to some states, but issues surrounding the implementation of these provisions, particularly in Wisconsin, have not been fully resolved. Further, while GLI provisions have been adopted in most state programs, a significant obstacle exists to achieving GLI's intended goals, in that many BCCs targeted by GLI cannot be measured at the low level of GLI water quality criteria because sufficiently sensitive measurement methods do not exist. Without the ability to measure to the water quality criteria, it is difficult to accurately determine whether there is a need for a pollutant permit limit for a facility's discharge.

Great Lakes States Have Generally Incorporated GLI Provisions into Their Regulations and NPDES Programs

GLI provisions have generally been incorporated into state regulations and NPDES programs, but this did not occur within the statutory time frame; and, as a result, two lawsuits were filed against EPA to implement the requirements of the Great Lakes Critical Programs Act of 1990. This act, which amended the Clean Water Act, required the Great Lakes states to adopt standards, policies, and procedures consistent with GLI within 2 years of its publication. The act further required EPA to issue GLI standards by the end of that 2-year period for any state that had failed to do so. EPA, however, did not issue GLI standards by the required date for those states that had failed to develop standards. Consequently, in July 1997, the National Wildlife Federation filed a lawsuit to force EPA to take action. In response, EPA negotiated a consent decree providing that it must make GLI provisions effective in any state that failed to make a submission by February 1998. EPA was never forced to take action, however, because all of the Great Lakes states adopted GLI standards into their regulations and submitted them to EPA for approval by the February deadline. For example, in July 1997, Michigan modified its administrative rules for water quality standards and added implementing procedures to the state's

administrative rules. Other states adopted GLI into their regulations for the Great Lakes Basin area of their states, and they later adopted aspects of the GLI provisions, or all of them, for the entire state. For example, according to state officials, when GLI was originally adopted by Ohio, most of its provisions only applied to the Lake Erie Basin, but in 2002, Ohio adopted GLI aquatic life criteria statewide. Further, Ohio applied GLI criteria for human health only to the Lake Erie Basin and based human health criteria for the remainder of the state on EPA national guidance. However, according to Ohio environmental officials, the two health criteria have been converging since the adoption of GLI.

In addition to the requirements of the Great Lakes Critical Programs Act and the consent decree provisions, EPA's GLI regulations bound the agency to publish a notice approving the submission within 90 days or to notify the state that all or part of their submission was disapproved and to identify changes required for EPA's approval. Because EPA did not take the required actions on every state's submission, in November 1999, the National Wildlife Federation and the Lake Michigan Federation filed a lawsuit to force EPA to take action on all Great Lakes states' GLI submissions.[12] EPA negotiated another consent decree providing that EPA would take the required actions by July 31, 2000, for six states—Illinois, Indiana, Michigan, Minnesota, Ohio, and Pennsylvania—and by September 29, 2000 and October 31, 2000, for New York and Wisconsin, respectively. EPA ultimately issued its final determinations for Michigan, Ohio, Indiana, Minnesota, Pennsylvania, and Illinois in August 2000. Determinations for New York and Wisconsin followed in October and November 2000, respectively. Although a few exceptions were identified, EPA determined that all the Great Lakes states had generally adopted requirements consistent with GLI; however, certain matters relating to the state submissions remained unresolved.

Unresolved Matters Affecting Full GLI Adoption Remain in Several Great Lakes States

While EPA determined that all the Great Lakes states had generally adopted requirements consistent with GLI, it disapproved certain elements of six states' submissions as less protective than GLI. EPA promulgated final rules applying the relevant GLI provisions to the disapproved elements. For example, EPA disapproved four states' rules relating to determining the need for permit limits on the aggregate toxicity of facility's

[12]The Lake Michigan Federation changed its name to the Alliance for the Great Lakes, effective April 14, 2005.

discharge—termed whole effluent toxicity (WET) reasonable potential. EPA disapproved certain elements of the state rules because they were deemed inconsistent with GLI provisions. In determining whether the states adopted policies, procedures, and standards consistent with GLI, EPA evaluated whether the states' provisions provided at least as stringent a level of environmental protection as the corresponding provisions of the guidance. In 12 instances, EPA determined that state provisions were not as stringent or were absent. EPA then promulgated final rules specifying which state provisions it was disapproving as being inconsistent with GLI and applying the relevant GLI provisions. If the state later adopted requirements that EPA approved as being consistent with the GLI provisions, then EPA indicated that it would amend its regulations so that they would no longer apply for the state.

The individual provisions disapproved by EPA vary from state to state, although the WET provisions were disapproved for four of the six states with disapproved elements. For Michigan and Ohio, the WET reasonable potential procedure was the only GLI provision that was disapproved. For Indiana, EPA disapproved its WET reasonable potential procedure and two additional provisions. Specifically disapproved were Indiana's criteria for granting of variances from water quality standards and provisions preventing the inclusion of discharge limits in permits when a facility has applied for a variance. Illinois' sole disapproved provision related to TMDL development while New York's disapproved provisions related to chronic aquatic life criteria and mercury criterion for the protection of wildlife. GLI provisions disapproved by EPA are summarized in table 2.

Table 2: State GLI Provisions Disapproved by EPA

Illinois	TMDL development
Indiana	WET reasonable potential
	Criteria for granting variances
	Inclusion of discharge limits in permits with a pending variance application
Michigan	WET reasonable potential
New York	Chronic aquatic life criteria
	Mercury wildlife criterion
Ohio	WET reasonable potential
Wisconsin	WET reasonable potential
	Consideration of intake pollutants in establishing discharge limits
	Aquatic life criteria for copper and nickel; chronic aquatic life criteria for endrin and selenium
	TMDL development

Source: EPA.

Note: Pennsylvania and Minnesota had no disapproved elements in their adoption of GLI.

The Great Lakes states now have requirements, consistent with GLI, to follow that are either fully incorporated into their rules or that have been promulgated by EPA.[13] However, in Wisconsin, the GLI provisions promulgated by EPA have not been implemented because state officials believe provisions that are not explicitly supported by Wisconsin law cannot be implemented and because material disagreements exist between state officials and EPA over the GLI provisions. This situation has resulted in delays in issuing renewals of some NPDES permits or issuing permits under state provisions that are inconsistent with GLI, according to state officials.

Of the four requirements EPA found inconsistent for Wisconsin, one significant disagreement involved certain technical and scientific details relating to the consideration of intake pollutants and another involved the determination of WET reasonable potential under GLI. For the WET

[13]None of the states with rules promulgated by EPA have amended their rules and regulations to resolve inconsistencies; and there is no requirement that they do so, as long as they are following the EPA promulgated rules. However, Michigan and New York are attempting to change their rules and regulations to have the federally imposed GLI requirements withdrawn.

determination, Wisconsin Department of Natural Resources officials stated that the GLI requirements are a misapplication of statistical procedures and overly burdensome. Because of these differences in determining WET reasonable potential, Wisconsin uses both state and GLI procedures. If the Wisconsin procedures result in the need for a WET limit, but the GLI procedures do not, then the permit is issued with the WET limit. However, if GLI procedures result in the need for a WET limit, but the state procedures do not, the permit is backlogged until a solution can be negotiated. As a possible resolution to this issue, EPA has recently provided the state with a small grant to reevaluate their WET procedure and identify possible changes that would be as protective as the GLI and acceptable to Wisconsin officials. While the state has not implemented WET reasonable potential provisions that are consistent with GLI, it has only impacted a relatively small number of permits in the Great Lakes Basin.

The disagreement involving Wisconsin's provisions for intake pollutants that are inconsistent with GLI have a potentially greater impact and, according to state officials, they do not have the resources to use the more complex GLI approach. The GLI provisions for intake pollutants are important because, according to state officials, the most prevalent BCC, mercury, exists at levels exceeding its water quality criteria throughout the Great Lakes Basin. GLI provisions address the condition where pollutant levels in a water body contain "background" levels that exceed the water quality criteria for that pollutant. Specifically, provisions address the discharge of pollutants that are taken in through a facility's source or intake water and are then returned to the same water body. GLI allows facilities to discharge the same mass and concentration of pollutants that are present in its intake water—a concept of "no net addition"—provided the discharge is to the same body of water and certain other conditions are met. EPA considers this practice to be environmentally protective and consistent with the requirements of the Clean Water Act when a pollutant is simply moved from one part of a water body to another that it would have reached regardless of its use by a facility.

However, EPA determined that Wisconsin's procedures allow pollutant discharges at background levels, regardless of whether the pollutant originated from the same body of water, a different body of water, or the facility generated the pollutant itself. Further, EPA found that the state's procedures would allow granting of a permit without discharge limits in situations where one would be required by GLI. EPA therefore determined that the state's procedure was inconsistent with GLI because it would allow

facilities to discharge pollutants that were not previously in the water body at levels greater than the applicable water quality criteria, which EPA believed was inconsistent with the fundamental principles of GLI permitting procedures. Although the procedures were disapproved, state officials continue to disagree with EPA's determination. The disagreement has remained unresolved since 2000, and EPA's rule applying the GLI provisions to Wisconsin have not been followed by the state. EPA Region 5 officials stated that they have had some contacts with the Wisconsin officials, but these contacts have not resulted in resolving the differences.

GLI Has Provided Benefits but the Inability to Measure Pollutants at Low Levels Is a Significant Challenge

The introduction of GLI in the Great Lakes states has produced several benefits. GLI introduced new standards and methodologies that are based on the best science available for protecting wildlife, deriving numeric criteria for additional pollutants, developing techniques to provide additional protection for mixtures of toxic pollutants, and determining the bioaccumulative properties of individual pollutants. GLI also formalized a set of practices and procedures for states to use in administering their NPDES permit programs and resolved legal challenges to provisions similar to GLI in at least one state. Through its emphasis on BCCs, GLI played a large role in stimulating efforts to address these particularly harmful and problematic toxic chemicals. GLI's impact on state water quality programs has also extended beyond the Great Lakes Basin, as a number of states have adopted GLI standards and procedures statewide. Also, according to EPA officials, parts of GLI have been used nationally and in other states, including implementation methods in California, wildlife criteria in New Jersey, and bioaccumulation factors in EPA's revised national guidance for deriving human health water quality criteria.

While GLI has provided benefits, developing the ability to measure pollutants at GLI water quality criteria levels remains a challenge to fully achieving GLI goals in the Great Lakes Basin. Several GLI pollutants cannot be measured near their water quality criteria, and without this ability it is difficult to determine whether a discharge limit is needed and to assess compliance. For example, if a pollutant has a water quality criteria of 4 ng/L but can only be measured at 40 ng/L, it cannot be determined if the pollutant is exceeding the criteria unless it is at or above the measurement level, which is about 10 times greater than the criteria level. Therefore, the ability to accurately and reliably measure pollutant concentrations is vital to the successful implementation of GLI water quality standards. Michigan and Ohio officials identified 23 GLI pollutants where the water quality criteria is lower than the level at which the pollutant's concentration in

water can be reliably measured. In addition, for Ohio, 11 of the 22 BCCs that are the central focus of GLI cannot be measured to the level of their water quality criteria. These include two of the more prevalent BCCs—PCBs and dioxin. Currently, using EPA approved methods, PCBs can be detected only at levels around 65,000 times greater than the levels established by their water quality criteria. Minnesota officials stated that, if methods existed to measure PCBs at low levels, it might be revealed that PCBs are as much of a problem as mercury. At the time GLI was developed, it was envisioned that more sensitive analytical methods would eventually be developed to allow measurement of pollutant concentrations at or below the level established by GLI water quality criteria, which would allow for the implementation of enforceable permit limits based on GLI criteria. Until this could be realized, EPA provided a provision in GLI requiring dischargers to implement a pollutant minimization program (PMP) to increase the likelihood that the discharger is reducing all potential sources of a pollutant to get as close as possible to the water quality criteria. A PMP sets forth a series of actions by the discharger to improve water quality when the pollutant concentration cannot be measured down to the water quality criteria.

The Great Lakes states' experience with mercury illustrates the impact that having sufficiently sensitive measurement methods can have on identifying pollutant discharges from point sources. Until 1999, methods to measure mercury at low levels were generally not available. Few mercury permit limits existed, and measurement sensitivity using EPA approved methods was about 400 times less sensitive than the currently used method. Then, in 1999, EPA issued a newly approved analytical method with the capability to reliably measure mercury concentrations down to 0.5 ng/L, well below the lowest GLI mercury water quality criteria of 1.3 ng/L. This development had a significant impact on discharging facilities and permitting authorities as the more sensitive measurement methods disclosed a more pervasive problem of high mercury levels in Great Lakes Basin waterbodies than previously recognized. Likewise, the new measurement methods showed that many facilities had mercury levels in their discharges exceeding water quality criteria; and, for the first time, permits could include enforceable discharge limits, based on these low criteria. The result was a significant increase in the number of permits needing mercury limits and monitoring requirements. The enhanced measurement capability also resulted in the development of statewide mercury strategies, including variances, to assist facilities in implementing the new measurement methods and eventually attaining the GLI water quality criteria. In conjunction with the use of variances for mercury, EPA encouraged the use of PMPs so that facilities

could reduce potential sources of mercury and thus move closer to meeting the GLI water quality standards. While the development of more sensitive methods for measuring other BCCs may not have as significant an impact as it did with mercury, such a development would provide for a more meaningful assessment of comparing pollutant levels with GLI water quality criteria.

When GLI was developed, EPA recognized that the relatively low water quality criteria levels for many pollutants would result in instances where limits were set below levels that could be reliably measured. Water quality criteria levels were based on the best science available for protecting wildlife, aquatic species, and human health whether or not methods were available for measuring pollutants at those levels. While EPA officials involved in developing GLI believed that measurement methods would eventually be available, developing EPA approved methods can be a time-consuming and costly process. EPA officials involved in the development of measurement methods explained that the development process is based on needs and priorities as well as development costs and resources. EPA is currently involved in developing a more sensitive analytical method for measuring PCBs, but EPA officials believe it will take 4 to 5 more years before it will be used because of the nature of the agency's approval process and potential legal challenges. One class of pollutant that has not yet been included as a BCC under GLI is polybrominated diphenyl ethers or PBDEs—a flame retardant containing toxic chemicals with bioaccumulative characteristics. The agency has allocated $60,000 to develop an analytical method for this class of pollutant. EPA officials did not know when a method for this class of pollutant will be approved but may have a better idea at the end of 2005. At that point, if results are promising and funding is available, EPA would validate the method.

EPA Has Not Ensured Consistent Implementation of GLI Standards or Taken Adequate Steps Toward Measuring Progress in Achieving GLI Goals

To ensure the eight Great Lakes states implement GLI consistently, EPA stated in GLI that it would undertake certain activities, including issuing a mercury permitting strategy and developing and operating a Clearinghouse for the sharing of information by states to facilitate the development and implementation of GLI water quality standards. EPA began work on the mercury strategy but abandoned efforts because of a perceived lack of interest and other agency priorities. Further, EPA has yet to fully develop the Clearinghouse. Additionally, because EPA has not collected sufficient data, the agency cannot determine whether GLI is reducing pollutant discharges into the Great Lakes, whether GLI is improving water quality, or assess overall progress toward achieving GLI goals.

EPA Has Not Developed the Mercury Permitting Strategy Envisioned in GLI

To promote a uniform and consistent approach to the problems posed by mercury from point sources, EPA stated in GLI that it was committed to issuing a mercury permitting strategy for use by the Great Lakes states no later than 2 years after GLI's publication. Although EPA believed that there was sufficient flexibility in GLI to handle the unique problems posed by mercury, such as variances and TMDLs, it intended to develop a mercury permitting strategy to provide a holistic, comprehensive approach by the states for addressing this pollutant. In June 1997, EPA published a draft of this strategy for public comment. The strategy described the flexibility in developing requirements for controls on the discharge of mercury. However, the strategy was not implemented because, according to EPA officials, few substantive comments were submitted on the draft strategy, and agency resources were directed to other GLI activities. Three states—New York, Michigan, and Wisconsin—that provided comments generally supporting the effort each provided additional observations. For example, New York noted that the strategy offered only administrative solutions rather than tangible technical solutions to the mercury problem. Wisconsin suggested that the strategy conformed to the basic framework and principles of a previously developed state strategy and therefore thought it unnecessary to substitute EPA's strategy for their own.

In lieu of a formal strategy, EPA participated in meetings with state officials and has approved mercury permitting strategies submitted by some of the Great Lakes states. However, in the absence of an EPA strategy on implementing water quality standards for mercury, most of the Great Lakes states developed their own approaches to ensuring that facilities meet the water quality criteria established in GLI, but these approaches have been inconsistent and create the potential for states to have different mercury

discharge requirements. A major goal of GLI was to ensure that water quality standards of Great Lakes states were consistent within this shared ecosystem, however, the mercury permitting approaches adopted by the Great Lakes states contained different requirements for mercury. For example, limits in Ohio were set at 12 ng/L based on state standards existing before adoption of GLI, and limits established in Michigan were initially set at 30 ng/L primarily based on data from the state of Maine. EPA officials stated that while disparities exist, the overall limits are being lowered.

Further, differences in states' strategies for reducing mercury from point sources have emerged in states' use of variances for existing facilities.[14] Each state followed their own approach for mercury based on their needs and a consideration of the approaches taken by other Great Lakes states. While Ohio, Michigan, and Indiana based their mercury strategies on the use of streamlined processes for obtaining mercury variances, each state's approach varies in significant ways. For example, Michigan uses a mercury permitting strategy where all existing facilities in the state are granted a variance in their NPDES permits if there is reasonable potential for the mercury standard to be exceeded. The variance exempts a facility from meeting the GLI water quality standard of 1.3 ng/L and establishes this water quality standard as a goal for a PMP. The variance establishes a universal discharge limit, based on all the facilities in the state, rather than on a facilities' current discharge level or discharge level it could achieve individually. Michigan chose this approach after the new measurement method was approved in 1999, substantially increasing sensitivity for mercury in water, and most facilities found they could not meet the GLI water quality standard. As a result, Michigan established an interim discharge level of 30 ng/L, based on what could be achieved by the majority of the facilities in the state, and dischargers are considered to be in compliance with the mercury limit if they do not exceed the level in their permit and are implementing a PMP. Michigan has recently lowered this discharge level to 10 ng/L for permits issued or renewed in 2005.

Conversely, Ohio's mercury strategy requires dischargers to apply for a variance and submit detailed studies and action plans to identify and eliminate known sources of mercury. According to state officials, Ohio's mercury permitting strategy allows dischargers to operate for 19 months using the new mercury measurement method to determine their discharge

[14]New facilities constructed after 1997 are not eligible for variances under GLI.

levels and evaluate whether they are able to comply with the water quality standard. If the discharger can comply with the GLI water quality standard, then the limit is included in their permit. If the discharger cannot comply they may request a variance. A variance establishes a monthly permit limit, based on the level currently achievable for that individual facility, and includes a required PMP. An annual permit limit of 12 ng/L is included as an annual discharge requirement for all facilities with a variance. According to state officials, Indiana's NPDES permits for major facilities may contain monitoring requirements for mercury, and some will contain effluent limits that must be achieved after a 3 to 5 year compliance schedule. Additionally, Indiana developed a streamlined mercury variance rule. This rule establishes a process for dischargers to obtain temporary effluent limits, based on the level of mercury currently in their effluent, and requires dischargers to develop and implement a PMP in conjunction with a mercury variance.

Other states have developed different mercury permitting approaches. Minnesota includes a discharge limit in permits, based on the standard of 1.3 ng/L and implemented through a compliance schedule allowing the facility up to 5 years to meet the limit. According to state officials, if dischargers are unable to meet the limit at the expiration of the compliance schedule, they will be required to apply for a variance on an individual basis. State officials also reported that Minnesota recently developed a draft statewide TMDL for mercury as a response to the mercury problem. Wisconsin has not granted variances, but it has granted PMP's for about 20 facilities that are unable to comply with the mercury standard. According to a Wisconsin official, the state considers that granting PMPs without a limit is in essence a variance. However, it is referred to as an "alternative mercury limitation," and the state official explained that, if it were an official variance, the discharge limit would actually be in the permit, and the variance would be a part of that limit. New York and Pennsylvania only recently began using the more sensitive mercury testing method and therefore have yet to address how facilities will be granted variances.

EPA's Delayed Introduction of the GLI Clearinghouse Limited the Development of Consistent Water Quality Standards

To promote a more consistent and shared approach to developing water quality standards among the Great Lakes states, EPA stated in GLI that Region 5 would develop a GLI Clearinghouse. As envisioned in GLI, this Clearinghouse would be a database containing all the information on the criteria and data used by the Great Lakes states in developing water quality standards. The Clearinghouse was to be developed in cooperation with EPA Headquarters, Regions 2 and 3, and the Great Lakes states. As

envisioned, data included in the Clearinghouse could be quickly shared between the states to assist them in developing or updating numeric water quality criteria for toxic chemicals for aquatic life, wildlife, and human health. It could also be used to share data on any new pollutants that might be designated a BCC. When EPA developed GLI, it assumed that more chemicals would emerge as BCCs in the future and require development of additional water quality standards. GLI allows the Great Lakes states to designate additional chemicals for BCC controls without EPA sponsoring a public review and comment process. EPA was concerned that inconsistencies could arise among states when they identified future BCCs and believed the Clearinghouse would minimize this possibility. As envisioned in GLI, EPA Region 5 would operate the Clearinghouse, and if new information indicated a pollutant was a potential BCC, this information would be reviewed by EPA and the states and placed in the Clearinghouse to alert all the other Great Lakes states. Once alerted, states could then notify the public of any revisions to their water quality standards or permit requirements.

The development of the Clearinghouse did not proceed as envisioned in the GLI. The Clearinghouse development effort was initiated in 1996 and EPA began entering data into the database at that time. However, the database was not available for use by the states until recently, because of other EPA priorities. Meanwhile, states developed their own water quality criteria for some GLI pollutants without centralized access to information from other states, likely resulting in longer development time and potential for inconsistencies among states. According to Minnesota state officials, without a GLI Clearinghouse, developing numeric criteria has been a problem since information on toxic chemicals or criteria are not readily available from other Great Lakes states. Currently, Minnesota is not close to developing criteria for all GLI pollutants. Officials stated that the availability of the Clearinghouse will help them in developing these criteria. Ohio officials expressed disappointment that EPA had not developed the Clearinghouse so many years after the guidance was issued because of its importance as a resource for developing water quality criteria. EPA renewed its efforts to complete the development of the Clearinghouse in late 2004. In early 2005, EPA Region 5 officials held conference calls with officials from the eight Great Lakes states, resulting in an agreed approach for jointly populating and maintaining the Clearinghouse. It is unclear, however, whether the Clearinghouse was jointly developed as planned with the active participation of EPA Regions 2 and 3, headquarters, and the eight Great Lakes states. As of April 2005, the Clearinghouse was still in the testing stage and, according to EPA Region 5 officials, by July 2005, all

states had access to its information. However, currently, the states are not able to make additions or modifications to the data in the Clearinghouse. States were also providing comments to EPA Region 5 on the Clearinghouse's operation, and EPA planned to make modifications based on these comments. EPA has yet to determine the most efficient approach for maintaining and updating information in the database. Until the database is fully operational and utilized, however, EPA cannot be assured that the Great Lakes states have adequate information for developing and updating consistent water quality standards.

EPA Has Not Determined the Overall Impact of GLI or of PMPs in Reducing Pollutant Loadings

While monitoring the impact of GLI on water quality and pollutant loadings may be difficult and not required by the Critical Programs Act or GLI, it is important to determine if progress is being made toward GLI goals and the virtual elimination of toxic substances in the Great Lakes Basin. Currently, the effect of GLI in improving water quality and reducing loadings of toxic pollutants is unclear because EPA has been unable to assess GLI's impact with existing data sources and has not gathered additional information to monitor progress on plans to reduce future loadings. EPA's primary data source for the NPDES permits program is the Permit Compliance System (PCS), an automated system used for tracking compliance with individual permits. Information is entered into the system by states administering the program, and the system tracks when a permit is issued and expires, how much a facility is allowed to discharge, and what a facility has discharged. The system is useful for identifying noncompliance with GLI-based effluent limits by major NPDES dischargers through quarterly noncompliance reports. However, the system is inadequate for determining whether GLI has reduced pollutant loadings.

EPA Region 5 officials attempted to use PCS to estimate the trends of point source loadings for specific pollutants in the Great Lakes Basin, but frequent errors occurred because of system limitations. These errors resulted from missing or inaccurate data, which distorted a clear estimate of pollutant loadings by facilities. For example, discharge quantities for some pollutants were reported as zero in some instances when they do not require monitoring, resulting in lower estimated total discharges. In addition, PCS data are primarily for major facilities, so calculated pollutant loadings do not reflect the sizeable universe of minor facilities. Inconsistencies in PCS also occur from the way state discharge monitoring report data are entered into the system. Because of these data limitations, EPA's attempt to identify trends in point source loadings did not produce firm conclusions, rather, it produced only speculation as to why actual

loadings increased or decreased in certain states. In addition, loading data that compared the years 1999 through 2000 to the years 2000 through 2001 was considered too short a time frame for comparative analysis since most of the permits had not been modified or reissued to reflect the new GLI standards during these time periods. Further hampering this effort was a lack of baseline data for loadings before GLI, which prevented comparisons between pollutant loadings before and after GLI implementation. The overall limitations of PCS to support the NPDES program were first recognized by EPA as an agency weakness in 1999. While EPA has attempted to modernize the system, the costs and time to complete the project have escalated significantly, as reported by the EPA Office of Inspector General.[15] As of June 2005, the modernization project had not been completed.

Officials from EPA Region 5 made two other attempts to determine GLI's impact on Great Lakes water quality. One attempt involved using Toxics Release Inventory (TRI) data.[16] However, EPA officials stated that for a number of reasons TRI did not lend itself to assessing the changes in water quality attributed to GLI. For example, TRI does not include information from publicly owned treatment works (POTW). Based on this effort, EPA concluded that any improvements in water quality resulting from GLI could not be isolated from the many other initiatives undertaken to improve water quality in the Great Lakes Basin. A second effort is currently under way and involves comparing a sample of individual permits before and after GLI implementation to determine its impact on permit limits. However, this effort has yet to yield preliminary results. Further, even when this effort is completed, EPA will only be able to make limited conclusions about how certain permit requirements have changed, and may incorrectly assume that the changes were a result of implementing GLI. This latest effort will not provide an ongoing monitoring of the impact of GLI, and EPA officials stated that in order to do a good analysis of GLI, all relevant data would have to be stored in a central database for analysis. Currently different types of information are stored in a variety of areas.

[15]Memorandum Report: *EPA Should Take Further Steps to Address Funding Shortfalls and Time Slippages in Permit Compliance System Modernization Effort*, EPA, OIG Rpt. No. 2003-M-00014, May 20, 2003.

[16]TRI is a database that contains information on releases and transfers of certain toxic chemicals from industrial facilities, and waste management and source reduction activities.

In addition to attempts by EPA Region 5 to determine GLI's impact, as part of its oversight of the NPDES program, regional staff review a sample of major NPDES permits issued by the six Great Lakes states in the region. The criteria for selecting permits for review varies from year to year and is typically based on issues that concern EPA staff. One factor in the selection of permits is whether the facility discharges within the Great Lakes Basin, thus requiring compliance with GLI. EPA officials stated that permits are reviewed in accordance with applicable federal rules and policies, including GLI implementation procedures. For selected permits issued by the state of Michigan, EPA specifically reviews the implementation of GLI requirements. For the other states, compliance reviews addressing GLI requirements are being phased in and will take significant time to fully implement, according to EPA officials. EPA's reviews have not included a determination of whether GLI is being implemented consistently among states, but rather, focus on issues of compliance.

Finally, EPA is not gathering information on how the implementation of PMPs or other GLI provisions is reducing pollutant discharges in the basin. EPA officials in Region 5 stated that GLI was intended to make the standards and goals of the Great Lakes states more consistent and implementing an elaborate monitoring scheme was not its intent. Without some type of monitoring, however, it is difficult to determine whether the standards and goals are having the desired environmental effect and whether GLI is being implemented consistently. This is particularly important because the use of flexible implementation procedures, such as variances and PMPs, adds uncertainty as to when facilities' discharge levels will ultimately attain GLI water quality standards. For PMPs, EPA Region 5 and the states cooperatively developed mercury PMP guidance for POTWs.[17] This guidance was finalized in November 2004 and provides information on what elements should be in PMPs, including reporting of progress by the facility to the state in achieving PMP goals. The reported information, however, is not reviewed by EPA, and, therefore, the agency cannot determine what overall progress is being achieved. When EPA reviews a state-issued permit under a compliance review the agency checks only to see if PMP requirements are recorded appropriately in the permits

[17]POTWs collect wastewater from homes, commercial buildings, and industrial facilities and transport it via a series of pipes, known as a collection system, to the treatment plant. POTWs remove harmful organisms and other contaminants from the sewage so it can be discharged safely into the receiving stream. Generally, POTWs are designed to treat domestic sewage only. However, POTWs also receive wastewater from industrial (nondomestic) users.

and it does not determine if progress is being made to reduce pollutants under PMPs. EPA Region 5 officials stated that they could get a better understanding of GLI implementation if PMP data were collected and analyzed. Region 5 has not yet initiated a regional review process for these programs, but it will be developing a strategy to do so in its NPDES Program Branch. This strategy would involve working with the states on review criteria and compliance determination issues. Region 5 officials stated that their efforts are for the six states in their region. They do not have responsibility to gather information on PMPs or other activities regarding GLI implementation for New York or Pennsylvania, which are in EPA regions 2 and 3, respectively.

Conclusions

While GLI has limited potential to improve overall water quality in the Great Lakes Basin because of its focus on point source pollution, it is important that GLI's goals be achieved because they assist in the virtual elimination of toxic pollutants called for in the GLWQA. Several factors, however, have undermined progress toward achieving GLI's goal of implementing consistent water quality standards. First, EPA has taken steps to implement GLI by ensuring that states adopt GLI standards or by issuing federal rules in the absence of state standards but has yet to resolve long-standing issues with the state of Wisconsin regarding the state's adoption and implementation of GLI provisions. Second, EPA chose not to issue a mercury permitting strategy that it committed to do in GLI, and subsequently mercury was addressed in NPDES permits in different ways. Third, EPA's efforts to complete the development of the GLI Clearinghouse have only recently been renewed, reflecting a lethargic approach to implementing actions it committed to in GLI. Finally, while EPA has made efforts to assess GLI's impact on water quality, we believe additional efforts are needed to obtain information on the progress in implementing GLI and on reducing pollutant discharges from point sources in the Great Lakes Basin. In particular, information is needed to gauge dischargers' progress in using PMPs to address pollutants that are exceeding GLI standards.

Recommendations for Executive Action

To better ensure the full and consistent implementation of the Great Lakes Initiative and improve measures for monitoring progress toward achieving GLI's goals, we are recommending that the EPA Administrator direct EPA Region 5, in coordination with Regions 2 and 3, to take the following three actions:

- issue a permitting strategy that ensures a more consistent approach to controlling mercury by the states,

- ensure the GLI Clearinghouse is fully developed, maintained, and made available to the Great Lakes states to assist them in developing water quality standards for pollutants covered by GLI, and

- gather and track information that can be used to assess the progress of implementing GLI and the impact it has on reducing pollutant discharges from point sources in the Great Lakes Basin. In particular, EPA should consider collecting better information on the impact of discharger programs to minimize pollutants that are exceeding GLI standards.

In addition, we recommend that the EPA Administrator direct EPA Region 5 take the following action:

- increase efforts to resolve the disagreements with the State of Wisconsin over the implementation of provisions to ensure the equitable and timely implementation of GLI among all Great Lakes states.

Agency Comments and Our Evaluation

GAO provided EPA with a draft of this report for its review and comment. The agency generally agreed with the findings and recommendations in the report, but stated that our draft report has overlooked significant results or benefits of GLI, such as establishing a consistent and scientifically sound method to derive point source permit limits for mixtures of toxicants. We acknowledge the many benefits of GLI in our report, however, our review focused on the potential impact of GLI on water quality, implementation of GLI, and the steps taken by EPA to ensure consistent implementation and assessing progress toward achieving GLI goals. EPA also stated that while our report recognizes that many of the Great Lakes water quality problems are due to nonpoint sources, the benefits from GLI point source implementation procedures are not fully recognized in the report. Further, EPA stated that it was never expected that GLI would address nonpoint source discharges, and it is not authorized to develop and implement programs for nonpoint discharges. However, our report recognizes the importance of controlling point source pollution and that under the GLWQA of 1978, the United States and Canada agreed to a policy of prohibiting harmful pollutants in toxic amounts and virtually eliminating the discharge of such pollutants. GLI was an effort by the United States to further control these substances. Moreover, as we note above, our review

focused on the potential impact of GLI on water quality and therefore, we note as a factual matter in our report that nonpoint sources are not addressed.

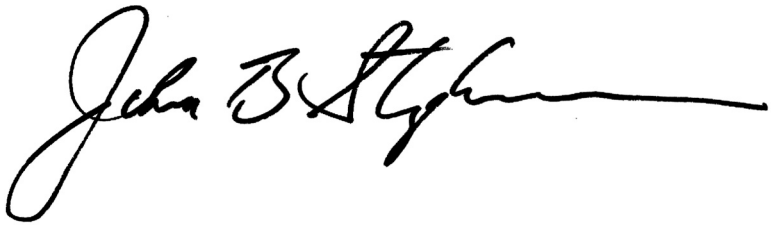
Regarding the differences in the Great Lakes states approaches to mercury and our recommendation for EPA to develop a mercury permitting strategy, the agency stated that some differences exist in mercury requirements for individual facilities. However, EPA did not believe these differences represented an unacceptable level of inconsistency and believed that state approaches were similar. Further, EPA compares pre-GLI standards to post-GLI standards to illustrate the consistency in addressing mercury. While consistent standards are an expected outcome of GLI, the guidance does not ensure consistent implementation, particularly with the use of variances and PMPs by states in lieu of compliance with the stringent GLI water quality standards. EPA Region 5 has issued guidance for consistency in development of PMPs by the states for publicly owned treatment works, but states are not required to follow the guidance, and the regional guidance does not apply to the two Great Lakes states that are outside of the geographic boundaries of Region 5. EPA further states that mercury variances are temporary measures allowing time to transition to the stringent GLI standards. However, facilities with NPDES permits can apply to have a variance renewed with a permit renewal and, therefore, variances can be approved by the states for a 5-year period, which may be in addition to a previous 5-year variance. It is also not evident that time frames exist for when facilities are to meet these stringent GLI standards. EPA stated that a mercury permitting strategy would not improve consistency and, rather than focusing on a strategy, it would work with the states and provide assistance on the most effective approaches for reducing mercury loadings by point source dischargers. The agency, however, committed itself in the GLI to developing a strategy. An overall goal of GLI is to have consistency among the Great Lakes states, and mercury is clearly the most important pollutant regulated in NPDES permits.

Regarding our recommendation on the GLI Clearinghouse, EPA stated that the Clearinghouse has a vital role to play in the GLI implementation. In early 2005, Region 5 and the eight Great Lakes states reached agreement for populating and maintaining the Clearinghouse. After further information updates and revisions by EPA, the states will review the Clearinghouse for accuracy and thoroughness, and then it will be functional, according to EPA.

Regarding our recommendation on the need to gather and track information to assess the implementation of GLI, EPA stated that it will be working with the states to develop PMP oversight tools, and it will be tracking the permits issued for mercury requirements and biosolids data regarding trends in mercury levels. For resolving its differences with the state of Wisconsin regarding GLI, EPA stated that Region 5 is working with the state to resolve outstanding issues. Further, the state is evaluating its whole effluent toxicity reasonable potential procedures, and then EPA will work with the state to ensure that its procedures are at least as protective as EPA's. EPA also provided specific comments on the draft report, and we have made changes in our report to reflect many of these comments. The full text of EPA's comments is included in appendix III.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies of this report to appropriate Congressional Committees, the EPA Administrator, various other federal and state departments and agencies. We also will make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at http://www.gao.gov.

If you or your staff have any questions, please call me at (202) 512-3841. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix IV.



John B. Stephenson
Director, Natural Resources
and Environment

List of Congressional Requesters

The Honorable Mike DeWine
The Honorable Russell D. Feingold
The Honorable Carl Levin
The Honorable Debbie Stabenow
The Honorable George V. Voinovich
United States Senate

The Honorable John Conyers, Jr.
The Honorable John D. Dingell
The Honorable Rahm Emanuel
The Honorable Vernon J. Ehlers
The Honorable Marcy Kaptur
The Honorable Dale Kildee
The Honorable Ron Kind
The Honorable Mark Kirk
The Honorable Dennis Kucinich
The Honorable Steven C. LaTourette
The Honorable Sander M. Levin
The Honorable Candice S. Miller
The Honorable James Oberstar
The Honorable Bart T. Stupak
House of Representatives

Scope and Methodology

To determine the focus and its potential to affect water quality in the Great Lakes Basin we analyzed the published final rule on the Great Lakes Initiative (GLI), including its methodologies, policies, and procedures. Specifically, we reviewed the flexible implementation procedures allowed under GLI, such as those allowed for mercury, the most common bioaccumulative chemical of concern (BCC) regulated in permits for point sources of pollution. We also obtained opinions on GLI's impact from officials representing environmental organizations that were involved in the formulation of GLI, such as the Lake Michigan Federation and the Great Lakes Water Quality Coalition. We also gathered and analyzed available data on the major sources of toxic pollutants in the Great Lakes Basin from water quality permit officials in the Environmental Protection Agency's (EPA) Region 5, and state environmental agency officials in each of the Great Lakes states—Illinois, Indiana, Ohio, Michigan, Minnesota, New York, Pennsylvania, and Wisconsin. Specifically, for each state agency, we obtained information from state National Pollution Discharge Elimination System (NPDES) permit databases regarding the location and number of NPDES permits covered under GLI in each state, including those permits that included BCCs. We questioned officials knowledgeable about the data and systems that produced them and determined the data were sufficiently reliable for the purposes of this report. In two instances where we noticed inconsistencies in the data, we verified with state officials the correction of the data.

To determine the status of GLI's adoption by the states, we analyzed the Clean Water Act, as amended by the Great Lakes Critical Programs Act of 1990, and its requirements for the Great Lake states to adopt standards, policies, and procedures consistent with GLI. We also gathered and analyzed documentation from EPA on its approval process for states' submissions of their standards, policies, and procedures and whether they reflected GLI requirements; and we interviewed EPA Region 5 and Great Lakes states' officials on any unresolved matters regarding EPA's rulings on state submissions. To identify any challenges that might exist to achieving GLI's intended goals, we reviewed the water quality criteria established for pollutants in the GLI, particularly BCCs, and interviewed EPA Region 5 and state officials to determine how many pollutants covered by GLI did not have methods and water quality criteria yet developed. We also collected and analyzed data from officials of EPA's Office of Science Technology to determine EPA's current efforts in developing new methods for BCCs.

To identify the steps EPA has taken for ensuring the full and consistent implementation of GLI, we reviewed the GLI to see what actions EPA had

committed itself to taking. We obtained information from EPA Region 5 and EPA Headquarters on the status of these activities, such as the establishment of a database clearinghouse and mercury permitting strategy. We collected and analyzed opinions from several of the eight Great Lakes states on the need for these GLI requirements and any consequences resulting from delays in their implementation. To determine the steps EPA has taken for assessing progress toward achieving GLI's goals, we interviewed EPA Region 5 officials on its processes for determining progress made under GLI in improvements to water quality, including the agency's use of available databases in this exercise, and its monitoring of the states' implementation of GLI.

We performed our work from October 2004 to June 2005 in accordance with generally accepted government auditing standards.

Purpose and Status of Bioaccumulative Chemicals of Concern (BCC) Identified in GLI

Chemical	Purpose	Status
Chlordane	Pesticide	Uses banned
4,4'-DDD; p,p'-DDD; 4,4'-TDE	Pesticide	Uses banned
4,4'-DDE; p,p'-DDE	No commercial use	Chemical by-product—not deliberately manufactured
4,4'-DDT; p,p'-DDT	Pesticide	Uses banned
Dieldrin	Pesticide for crops like cotton and corn	Uses banned
Hexachlorobenzene	Pesticide, fireworks, synthetic rubber	No longer used commercially
Hexachlorobutadiene; hexachloro-1, 3-butadiene	To make rubber compounds and lubricants; used as a solvent	Still in use
Hexachlorocyclohexanes (HCH); benzene hexachlorides or BHCs	Insecticide	No longer produced or used in the United States
alpha-Hexachlorocyclohexane; alpha-BHC	One of eight chemical forms that comprise technical grade HCH	No longer produced in the United States
beta-Hexachlorocyclohexane; beta-BHC	One of eight chemical forms that comprise technical grade HCH	No longer produced in the United States
delta-Hexachlorocyclohexane; delta-BHC	One of eight chemical forms that comprise technical grade HCH	No longer produced in the United States
gamma-Hexachlorocyclohexane; gamma BHC or Lindane	Insecticide on fruit and vegetable crops. Still used as a treatment for lice	Not produced in the United States since 1977, but is still imported to the United States
Mercury	Metallic mercury to produce chlorine gas and caustic soda and used in thermometers, dental fillings, and batteries	Still in use
Mirex	Control of fire ants; flame retardant in plastics, rubber, paint, paper and electrical goods	No longer manufactured or used
Octachlorostyrene	Not available	Chemical by-product—not deliberately manufactured
PCBs; polychlorinated biphenyls	Products made before 1977 that may still contain PCBs include electrical equipment, such as transformers and capacitors	Manufacture and certain uses banned
Pentachlorobenzene	Used to make pentachloronitrobenzene, a fungicide and used as a fire retardant	Still in use
Photomirex	Created from the decomposition of mirex when exposed to sunlight	Chemical by-product—not deliberately manufactured
2,3,7,8-TCDD; dioxin	Formed during chlorine bleaching process at pulp and paper mills, during chlorination by water treatment plants, and are released in emissions from municipal and industrial incinerators	Chemical by-product—not deliberately manufactured
1,2,3,4-Tetrachlorobenzene	Used as a dielectric fluid and as an organic intermediate	Still in use

(Continued From Previous Page)

Chemical	Purpose	Status
1,2,4,5-Tetrachlorobenzene	Used as an intermediate or building block to make herbicides, insecticides, defoliants, and other chemicals	Still in use
Toxaphene	Insecticide primarily used on agricultural crops and livestock and to kill unwanted fish in lakes	Banned

Sources: GAO, EPA, and the Agency for Toxic Substances and Disease Registry, Center for Disease Control.

Comments from the Environmental Protection Agency

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUL 19 2005

OFFICE OF WATER

Mr. John B. Stephenson
Director
Natural Resources and Environment
U.S. Government Accountability Office
Washington, DC 20548

Dear Mr. Stephenson: John

Thank you for the opportunity to review and comment on the Government Accountability Office (GAO) draft report Great Lakes Initiative: EPA Needs to Better Ensure the Complete and Consistent Implementation of Water Quality Standards (Report). This letter provides EPA's comments and perspectives on the Report, and characterizes how we would address each of its recommendations.

I am particularly concerned, however, that the Report fails to effectively consider the significant results of the Great Lakes Initiative (GLI) which include:

- The GLI has advanced the science of surface water protection (e.g., wildlife criteria, bioaccumulation factors) resulting in more scientifically rigorous and consistent water quality criteria and implementation procedures across the Great Lakes states.
- The GLI Tier 2 methods allow States and Tribes to control hundreds of pollutants that would not otherwise have been regulated because of the lack of data to derive criteria.
- The GLI, for the first time, established a consistent and scientifically sound method to derive point source permit limits for mixtures of toxicants.

As the Report recognizes, many of the Great Lakes water quality problems are due to nonpoint sources, including air deposition. The GLI stems from the Great Lakes Critical Programs Act (GLCPA) and the Clean Water Act (CWA). Since neither the CWA nor the GLCPA authorize EPA to develop and implement permitting programs for nonpoint source discharges, it was never expected that the GLI would address those sources of pollution. Instead, it was recognized that states would need to continue to rely on their own authorities to regulate these sources to achieve water quality standards.

The benefit of the point source implementation procedures in the Great Lakes System is not fully recognized in the Report. Point source contributions of pollutants to the Great Lakes have been reduced over the years. The implementation procedures of the GLI lock in this progress. Part of the purpose of the GLI was to reduce inconsistencies between states and to formalize these

requirements in regulations to ensure a level playing field for all Great Lakes states and to prevent erosion of this progress.

Another conclusion of the Report is that an undue level of inconsistency remains among the states in implementing GLI, particularly for mercury. EPA acknowledges there are some differences in mercury requirements for individual facilities, but does not believe the differences amount to an unacceptable level of inconsistency. Some differences in mercury limits result from the normal development and derivation of applicable effluent limits. However, even when variances are factored in, EPA believes the different state approaches result in very similar effluent limits. Finally, I would emphasize that the relief mechanisms (e.g., variances, compliance schedules, and mixing zones for bioaccumulative pollutants) discussed in the Report are temporary. The purpose of these relief mechanisms was to allow time for transitioning to more stringent post-GLI requirements.

The Report notes that EPA has not assessed the effectiveness of Pollutant Minimization Programs (PMPs) in reducing mercury loadings. EPA acknowledges the recent focus on the guidance for PMP development to ensure consistency in the structure and content of these programs. EPA Region 5 will develop a regional review process for these programs. Region 5 has also gathered baseline data and will track the effects of PMP implementation on mercury levels in biosolids and effluents.

EPA Responses to GAO's Recommendations:

The need for a mercury permitting strategy. In developing the GLI, EPA noted a range for mercury criteria in state water quality standards from 500 to 2400 parts per trillion (ppt). After GLI, all states across the basin have wildlife criteria of 1.3 ppt (three orders of magnitude lower than the previous criteria). Although there are some minor differences among mercury criteria for human health and aquatic life, the level of protection is the same across states. EPA believes there is a high level of consistency in mercury criteria among the Great Lakes states.

GAO focuses on differences among permit limits that are derived from water quality standard variances, noting that limits based on variances may range from 12-30 ppt, a difference of 18 ppt. If limits were derived directly from the pre-GLI criteria, they would range from 500 to 2400 ppt (or greater if a state used mixing zones and dilution pre-GLI). Thus, EPA regards the post-GLI range to be significantly smaller than the pre-GLI range. EPA believes that even with variances, states will have very similar mercury controls. At least four of the states establish a process for setting variance-based limits based on a lowest achievable concentration that will be within a few parts per trillion of each other. They also require PMPs to move permittees towards the water quality based effluent limits that would apply in the absence of a variance. The activities needed to reduce mercury loadings to and from publicly owned treatment works will be essentially the same across the region, regardless of the calculated lowest achievable concentration. EPA believes that a permitting strategy would not be effective in improving the consistency of mercury permit limits.

Rather than focusing on a permitting strategy, Region 5 states have requested assistance and support for implementation efforts, such as evaluating and determining compliance with PMPs, and

assessing the most effective approaches for reducing mercury loadings by point source dischargers. EPA will continue to work with the states on these matters, and to provide oversight regarding proper implementation of mercury requirements in state-issued permits.

The need to ensure the GLI Clearinghouse is fully developed, maintained, and made available to the states. EPA agrees that the Clearinghouse has a vital role to play in GLI implementation. All eight states currently have access to the information in the Clearinghouse. EPA Region 5 periodically updates the states and EPA Regions 2 and 3 on revisions to the Clearinghouse and requests input from them, where necessary. The Clearinghouse currently has Tier 1 criteria for almost 60 pollutants and Tier 2 criteria for almost 200 chemicals. In early 2005, EPA Region 5 and all eight Great Lakes states agreed to an approach for jointly populating and maintaining the Clearinghouse. EPA is currently updating the information in the Clearinghouse and is making minor revisions to its structure. After all eight states review the Clearinghouse content for accuracy and thoroughness, the Clearinghouse will be functional.

The need to gather and track information that can be used to assess the progress of implementing the GLI and the impact it has on reducing pollutant discharges from point sources in the Great Lakes Basin. EPA agrees this is an important goal. With respect to mercury, we will be working with the states to develop PMP oversight tools, and will be tracking permit issuance with mercury requirements, as well as effluent and biosolids data regarding trends in mercury levels. As we develop these tools and approaches, we agree that additional quantitative measures of progress should be considered.

In addition, we recommend that the EPA Administrator direct EPA Region 5 to increase efforts to resolve the disagreements with the state of Wisconsin over implementation of provisions that EPA found inconsistent with the GLI to ensure the equitable and timely implementation of GLI among all the Great Lakes states. Region 5 is working with Wisconsin to resolve the outstanding issues. The Wisconsin Department of Natural Resources (WDNR) is developing a rule package to correct the errors in aquatic life criteria for four pollutants. WDNR is evaluating its whole effluent toxicity reasonable potential procedures to determine what changes are necessary to assure the procedures are at least as protective as EPA's procedures. Region 5 will work with WDNR to resolve requirements for intake credits; to date we do not believe that these have had a practical effect on permit determinations in Wisconsin.

I appreciate the opportunity to comment on this Report. I hope you will consider these comments as you prepare the final report. If you have any questions or would like additional information, please do not hesitate to contact me or Ms. Jo Lynn Traub, Director of Region 5's Water Division at (312) 353-2147.

Sincerely,

Benjamin H. Grumbles
Assistant Administrator

GAO Contact and Staff Acknowledgments

GAO Contact

John Stephenson (202) 512-3841 (stephensonj@gao.gov)

Staff Acknowledgments

In addition to the individual named above, Kevin Averyt, Greg Carroll, John Delicath, John Wanska, and Amy Webbink made key contributions to this report.

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