United States General Accounting Office

GAO

Report to Congressional Requesters

April 2003

GREAT LAKES

An Overall Strategy and Indicators for Measuring Progress Are Needed to Better Achieve Restoration Goals

GAO-03-515

April 2003

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An Overall Strategy and Indicators for Measuring Progress Are Needed To Better Achieve Restoration Goals

GAO Highlights

Highlights of GAO-03-515, a report to congressional requesters

Why GAO Did This Study

The five Great Lakes, which comprise the largest system of freshwater in the world, are threatened on many environmental fronts. To address the extent of progress made in restoring the Great Lakes Basin, which includes the lakes and surrounding area, GAO (1) identified the federal and state environmental programs operating in the basin and funding devoted to them, (2) evaluated the restoration strategies used and how they are coordinated, and (3) assessed overall environmental progress made in the basin restoration effort.

What GAO Recommends

GAO recommends that the Administrator, Environmental Protection Agency

- ensure that the Great Lakes National Program Office fulfills its coordination responsibilities and develop an overarching Great Lakes strategy; and
- develop environmental indicators and a monitoring system for the Great Lakes Basin that can be used to measure overall restoration progress.

EPA generally agreed with GAO's conclusions that better planning, coordination, monitoring and the development of indicators are needed, and stated it would provide the Congress, GAO, and the Office of Management and Budget with a formal response to the report recommendations at a later date.

www.gao.gov/cgi-bin/getrpt?GAO-03-515.

To view the full report, including the scope and methodology, click on the link above. For more information, contact John Stephenson at (202) 512-3841, or John Wanska at (312) 220-7628.

What GAO Found

There are 148 federal and 51 state programs funding environmental restoration activities in the Great Lakes Basin. Most of these programs involve the localized application of national or state environmental initiatives and do not specifically focus on unique basin concerns. However, several programs specifically address environmental conditions in the Great Lakes. GAO identified 33 federal Great Lakes specific programs, and states funded 17 additional unique Great Lakes specific programs. Other governmental, binational, and nongovernmental organizations also fund restoration activities within the basin.

GAO identified several Great Lakes environmental strategies being used at the binational, federal, and state levels. These strategies are not coordinated or unified in a fashion comparable to other large restoration projects such as the South Florida Ecosystem. In an effort to improve coordination, federal and state officials recently published *Great Lakes Strategy 2002*, but this document is largely a description of existing and planned program activities rather than an overarching plan. EPA's Great Lakes National Program Office has coordination authority over many activities but has not fully exercised it to this point.

With available information, it is not possible to comprehensively assess restoration progress in the Great Lakes. Current indicators rely on limited quantitative data and subjective judgments to determine whether conditions are improving, such as whether fish are safe to eat. The ultimate success of an ongoing binational effort to develop a set of overall indicators for the Great Lakes is uncertain because it relies on the resources voluntarily provided by several organizations. Further, no date for completing a final list of indicators has been established.

Great Lakes: Largest Body of Freshwater in the World

Sources: National Oceanic and Atmospheric Administration and GAO.

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Abbreviations

AOCs	Areas of concern
ATSDR	Agency for Toxic Substances and Disease Registry
CERP	Comprehensive Everglades Restoration Plan
Corps	Army Corps of Engineers
EPA	Environmental Protection Agency
FSA	Farm Services Agency
FWS	Fish and Wildlife Service
GLNPO	Great Lakes National Program Office
GLWQA	Great Lakes Water Quality Agreement
IADN	International Atmospheric Deposition Network
IJC	International Joint Commission
LaMPs	Lakewide Management Plans
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	National Resource Conservation Service
OAR	Office of Air and Radiation
ORD	Office of Research and Development
OSWER	Office of Solid Waste and Emergency Response
RAPs	Remedial Action Plans
RCRA	Resource Conservation and Recovery Act
SOLEC	State of the Lakes Ecosystem Conference
USDA	United States Department of Agriculture
USGS	United States Geological Survey
USPC	United States Policy Committee
WRDA	Water Resources Development Act

GAO
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United States General Accounting Office
Washington, DC 20548

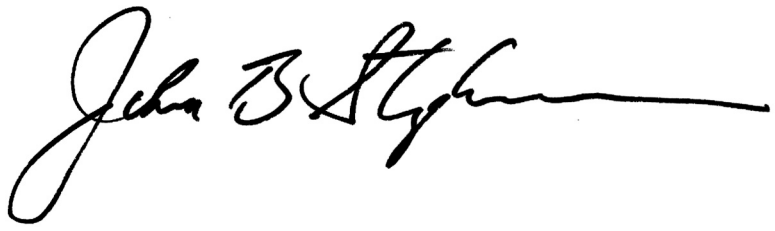
April 30, 2003

Congressional Requesters

As requested, we are reporting to you on the federal and state environmental programs operating in the Great Lakes Basin. This report contains recommendations to the Environmental Protection Agency (EPA) on the need to develop a comprehensive strategic plan for basin restoration, coordinate the multiple restoration activities in the basin, and facilitate the expeditious development of environmental indicators for measuring restoration progress.

As arranged with your offices, we plan no further distribution of this report until 30 days after the date of this letter unless you publicly announce its contents earlier. We will then send copies to appropriate congressional committees; the Administrator, EPA; various other federal departments and agencies; and the International Joint Commission. We will also make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at http://gao.gov.

Should you or your staff need further information, please contact me on (202) 512-3841. Key contributors to this report are listed in appendix VI.



John B. Stephenson
Director, Natural Resources
and Environment

List of Congressional Requesters

The Honorable Evan Bayh
United States Senate

The Honorable Mike DeWine
United States Senate

The Honorable Carl Levin
United States Senate

The Honorable Debbie Stabenow
United States Senate

The Honorable Sherwood Boehlert
House of Representatives

The Honorable Sherrod Brown
House of Representatives

The Honorable John Dingell
House of Representatives

The Honorable Vernon Ehlers
House of Representatives

The Honorable Marcy Kaptur
House of Representatives

The Honorable Steven LaTourette
House of Representatives

The Honorable James Oberstar
House of Representatives

The Honorable Louise Slaughter
House of Representatives

The Honorable Bart Stupak
House of Representatives

Executive Summary

Purpose

The United States and Canada recognize the Great Lakes—the largest system of freshwater in the world—as a natural resource that is threatened on many environmental fronts. To protect this resource and to address common water quality problems, the two countries entered into the bilateral Great LakesWater Quality Agreement in 1972 and last revised it in 1987. However, three decades after the original agreement, polluted beaches are frequently closed to swimmers, fish are unsafe to eat for high risk individuals, and raw sewage is still being dumped into the lakes. Progress has been made on a number of significant fronts, such as controlling the nonnative sea lamprey, reducing the water's phosphorus content, and improving fish populations, but much more remains to be accomplished before the overall goals of the agreement can be met. Several recently released reports have questioned whether the current environmental activities in the Great Lakes being funded by numerous organizations and various programs are adequate to fulfill the U.S. commitments and whether restoration progress is sufficient in the basin. In 2002, GAO reported that the Environmental Protection Agency (EPA) needed to take action to improve its oversight for cleaning up contaminated areas.

To address the progress of restoration, 14 members of Congress participating on the Great Lakes Task Force asked GAO to (1) identify the federal and state environmental programs operating in the Great Lakes Basin and the funding being devoted to them, (2) evaluate how the restoration strategies are used and coordinated, and (3) assess overall environmental progress made in the basin restoration effort thus far.

Background

Millions of people in the United States and Canada rely on the five Great Lakes—Superior, Michigan, Erie, Huron, and Ontario—as a principal source of drinking water, recreation, and economic livelihood. Over time, industrial, agricultural, and residential development on lands adjacent to the lakes has seriously degraded the lakes' water quality, posing threats to human health and the environment, and forcing restrictions on activities, such as swimming and fish consumption.

To protect the Great Lakes Basin, and to address water quality problems, the governments of the United States and Canada entered into the bilateral Great Lakes Water Quality Agreement in 1972. In the agreement, the United States and Canada agreed to restore and maintain the chemical, physical, and biological integrity of the Great Lakes Basin. A new agreement with the same name was reached in 1978. The agreement was amended in 1983 and 1987, expanding the scope of activities by

prescribing prevention and cleanup measures to improve environmental conditions in the Great Lakes. The agreement obligates the International Joint Commission (IJC), an international body, to assist in the implementation of the agreement.

The Clean Water Act directs EPA to lead efforts to meet the goals of the Great Lakes Water Quality Agreement and establishes the Great Lakes National Program Office (GLNPO) within EPA, charging it with, among other things, cooperating with federal, state, tribal, and international agencies to develop action plans to carry out the U.S. responsibilities under the agreement. GLNPO is further responsible for coordinating the agency's actions both in headquarters and in the regions to improve Great Lakes' water quality. In addition to GLNPO, numerous federal, state, binational, and nonprofit organizations conduct activities that focus on improving the overall Great Lakes Basin environment or some specific environmental issue within the basin.

Results in Brief

There are 148 federal and 51 state programs funding environmental restoration activities in the Great Lakes Basin. Most of these programs involve the localized application of national or state environmental initiatives that do not specifically focus on basin concerns. For example, EPA's Superfund program addresses some of the contaminated sites located within the basin. Superfund officials, like officials for most nationwide, as well as most statewide, programs, do not track or itemize their overall funding by region, such as isolating the portion of funding going to specific areas (e.g., the basin), making it difficult to determine their contribution to total Great Lakes spending. In addition to the nationwide federal programs, the Congress has also enacted 33 federal programs focused specifically on the Great Lakes Basin, for which about $387 million was spent in fiscal years 1992 through 2001, to specifically address environmental conditions in the Great Lakes. Additionally, the Corps of Engineers expended about $358 million during the same time period for legislatively directed projects within the basin, such as $93.8 million for restoration of Chicago's shoreline. States funded 17 additional Great Lakes specific programs, for which about $956 million was expended during the same general time period to address unique state needs, such as Ohio's program to control shoreline erosion along Lake Erie. In addition to federal and state programs, county and municipal governmental organizations, binational organizations, and nongovernmental organizations, such as nonprofit organizations, fund restoration activities within the basin.

The numerous restoration programs currently underway in the Great Lakes Basin employ a variety of environmental strategies at the binational, federal, and state levels to address specific environmental problems, but there is no overarching plan for coordinating and tying together the strategies and program activities into a coherent approach to attain overall basin restoration. Experience with other large-scale ecosystem restoration efforts, such as the South Florida ecosystem, has demonstrated the importance of having a comprehensive strategic plan with clearly articulated goals, objectives, and criteria for measuring success and a decision-making body for weighing the merits of, and prioritizing funding for, proposed cleanup and restoration projects. Without such a plan for the basin, it is difficult to determine overall progress and ensure that limited resources are being effectively utilized. Although federal and state officials recently developed and published a report, *Great Lakes Strategy 2002*, to fill this void, the document, largely a description of existing and planned program activities, did not provide a basis or mechanisms to prioritize or make funding commitments to implement the various activities. GLNPO, the office within EPA charged with fulfilling U.S. responsibilities under the agreement and for coordinating federal actions for improving Great Lakes' water quality, has not fully exercised this authority because it has not entered into agreements with other agency organizations regarding their restoration responsibilities as required by the Clean Water Act. GAO is recommending that EPA ensure that GLNPO fulfills its coordination responsibilities and, in consultation with the governors of the Great Lakes states, federal agencies, and other organizations, develop an overarching strategy that clearly defines the roles and responsibilities for coordinating and prioritizing funding for Great Lakes projects, and submit a proposal to the Congress detailing the time-phased funding requirements necessary to implement the strategy.

A comprehensive assessment of restoration progress in the Great Lakes Basin cannot be determined with the piecemeal information currently available. The Great Lakes Water Quality Agreement called for the development and implementation of a monitoring system, but this requirement has not yet been met. The environmental indicators currently being used to determine overall progress are inadequate because they rely on limited quantitative data and subjective judgments to determine whether conditions are improving. An ongoing binational effort initiated in 1996 has worked to develop a set of overall indicators for the Great Lakes through a series of biennial conferences. The ultimate success of this effort, which relies on the volunteer contributions of several organizations, is uncertain and thus far no completion date for developing a final list of indicators has been set. GAO is recommending that EPA, in coordination

with Canadian officials, develop environmental indicators and a monitoring system for the Great Lakes Basin that can be used to measure overall restoration progress and require these indicators to be used to evaluate, prioritize, and make funding decisions on the merits of alternative restoration projects.

Principal Findings

Many Federal and State Programs Fund Restoration Activities in the Great Lakes Basin

About 200 programs—148 federal and 51 state—fund restoration activities within the Great Lakes Basin. Most of these programs involve the localized application of national or state environmental initiatives and do not specifically focus on basin concerns. Officials from 11 agencies identified 115 of these broadly scoped federal programs, and officials from 7 of the 8 Great Lakes states identified 34 similar state programs. EPA administers the majority of the federal programs that provide a broad range of environmental activities involving research, cleanup, restoration, and pollution prevention. For example, EPA's nationwide Superfund program funds cleanup activities at contaminated areas throughout the basin. While the broad scoped federal and state programs contribute to basin restoration, program officials do not track or try to isolate the portion of funding going to specific areas like the basin, making it difficult to determine their contribution to total Great Lakes spending. However, GAO was able to identify basin-specific information on some of these programs. Specifically, basin related expenditures for 53 of the 115 broadly scoped federal programs totaled about $1.8 billion in fiscal years 1992 through 2001, and the expenditures for 14 statewide programs totaled $461.3 million during basically the same time period.

Several federal and state programs were specifically designed to focus on the Great Lakes Basin environmental conditions. Officials from 7 federal agencies identified 33 Great Lakes specific programs that had expenditures of $387 million in fiscal years 1992 through 2001. Most of the programs funded a variety of activities, such as research, cleanup, or pollution prevention. An additional $358 million was expended for legislatively directed Corps of Engineers projects in the basin, such as $93.8 million to restore Chicago's shoreline. Officials from 7 states reported 17 Great Lakes specific programs that expended about $956 million in 1992 through 2001, with Michigan's programs accounting for 96 percent of this amount. State programs focused on unique state needs, such as Ohio's program to control shoreline erosion along Lake Erie, and Michigan's program to provide bond funding for environmental activities.

Besides federal and state programs, county and municipal organizations, binational organizations, and nongovernmental organizations, such as nonprofit organizations, fund restoration activities within the basin.

Different Strategies, Lack of Coordination, and Limited Funding Impede Restoration Efforts

Restoration of the Great Lakes Basin is a major endeavor involving many environmental programs and organizations. The magnitude of this effort cannot succeed without a comprehensive strategy or plan similar to those developed for other large ecosystem restoration projects, such as the South Florida ecosystem and the Chesapeake Bay. Because of the many parties involved in planning, strategizing, and conducting restoration activities in the basin, an overarching strategy and a comprehensive plan are needed that clearly articulate goals, objectives, and criteria for measuring success and that establish a decision-making body to weigh the merits of, and prioritize funding for, proposed cleanup and restoration projects.

Several organizations have developed strategies for the basin at the binational, federal, and state levels that address either the entire basin or the specific problems in the Great Lakes. The *Great Lakes Strategy 2002*, developed by a committee of federal and state officials, is the most recent of these strategies. While this strategy identified restoration objectives and planned actions by various federal and state agencies, it is largely a description of existing program activity relating to basin restoration. State officials involved in developing the strategy told us that states had already planned the actions described in it, but that these actions were contingent on funding for specific environmental programs. The strategy acknowledged that it should not be construed as a commitment for additional funding or resources, and it did not provide a basis for prioritizing activities. In addition, other strategies addressed particular contaminants, restoration of individual lakes, or cleanup of contaminated areas. Ad hoc coordination among federal agencies, states, and other environmental organizations occurs in developing these strategies or when programmatic activity calls for coordination.

Although there are many strategies and coordination efforts ongoing, there is no one organization that is coordinating restoration efforts. The Water Quality Act of 1987 amended the Clean Water Act to charge GLNPO with coordinating actions within EPA for improving the Great Lakes' water quality, but the agency has not fully exercised this authority because it has not entered into agreements with other agency organizations regarding their Great Lakes activities as required by the Clean Water Act. GLNPO officials believe that they fulfilled their responsibilities under the act by

having federal agencies and state officials agree to the restoration activities discussed in the *Great Lakes Strategy 2002*; however, the strategy did not represent formal agreements to conduct specific activities with identified resources. Extensive strategizing, planning, and coordinating have not resulted in significant restoration. The ecosystem remains compromised and contaminated sediments in the lakes produce health problems, as reported by the IJC. Federal and state officials have cited a lack of funding as the chief barrier to restoration progress, but they mentioned that other barriers, such as the absence of an effective coordinating agency, also impede restoration progress.

Insufficient Data and Measures Prevent Determination of Overall Restoration Progress

The Great Lakes Water Quality Agreement, as amended in 1987, calls for establishing a monitoring system to measure restoration progress and assess the degree that the United States and Canada are complying with the goals and objectives of the agreement. Implementation of this provision has not progressed to the point that overall restoration progress can be measured or determined based on quantitative information. Recent assessments of overall progress, which rely on a mix of quantitative data and subjective judgments, do not provide an adequate basis for making an overall assessment. The current assessment process has emerged from a series of biennial State of the Lakes Ecosystem Conferences (SOLEC) initiated in 1994 for developing indicators agreed upon by conference participants. The number of indicators considered during the SOLEC conferences has been pared down from more than 850 indicators in 1998 to 80 indicators in 2000, although data was available for only 33 of them. While this lack of data precluded an overall quantitative-based assessment of the Great Lakes Basin, a qualitative assessment based on general observations was provided. The ultimate success of the SOLEC process in providing an overall quantitative-based assessment of the Great Lakes is uncertain because the assessment process relies on the voluntary participation of many federal, state, and local agency officials in an informal partnership arrangement. In addition, the objectives of the SOLEC process are not directly focused on developing a surveillance and monitoring program as envisioned in the agreement. Other indicators of environmental improvements reported for the numerous federal and state programs operating in the basin focus on program activities, often describing outputs, such as tons of contaminated sediment removed, rather than environmental outcomes, such as improvement of environmental conditions as a result of removing contaminated sediment.

Recommendations for Executive Action

To improve coordination of Great Lakes activities and ensure that federal dollars are effectively spent, GAO recommends that the Administrator, EPA, ensure that GLNPO fulfills its responsibility for coordinating programs within the Great Lakes Basin; charge GLNPO with developing, in consultation with the governors of the Great Lakes states, federal agencies, and other organizations, an overarching strategy that, clearly defines the roles and responsibilities for coordinating and prioritizing funding for projects; and submit a time-phased funding requirement proposal to the Congress necessary to implement the strategy.

To fulfill the need for a monitoring system called for in the GLWQA and to ensure that the limited funds available are optimally spent, GAO recommends that the Administrator, EPA, in coordination with Canadian officials and as part of an overarching Great Lakes strategy, (1) develop environmental indicators and a monitoring system for the Great Lakes Basin that can be used to measure overall restoration progress and (2) require that these indicators be used to evaluate, prioritize, and make funding decisions on the merits of alternative restoration projects.

Agency Comments

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. EPA provided written comments; the full text of which is included in appendix V.

EPA stated that significant accomplishments have improved environmental conditions in the Great Lakes and that GAO's conclusions and recommendations can help ensure that more improvements are made. While EPA agreed with the overall conclusions, namely that better planning, coordination, monitoring, and the development of indicators are needed, it did not specifically address GAO's individual recommendations, stating that it would provide the Congress, GAO, and the Office of Management and Budget with a formal response to the final report recommendations at a later date.

EPA stated that while it can improve its delivery and coordination of restoration programs in the Great Lakes Basin, the complexities of the Great Lakes in terms of scope, geographical scale, and other factors require long-term, complex solutions implemented at a variety of levels. As GAO's report demonstrates, the complexity of the Great Lakes restoration effort provides the basis for the recommendation that EPA develop an overarching strategy that guides the multiple restoration efforts.

EPA highlighted two of its recent efforts to demonstrate compliance with its coordinating responsibilities under the Clean Water Act: the formation of the United States Policy Committee (USPC) and its subsequent release of the *Great Lakes Strategy 2002* and SOLEC for developing environmental indicators for the Great Lakes Basin. As GAO noted, these coordination efforts are significant but cannot be sustained over the long term given the uncertainties surrounding funding sources. Specifically, it provides extensive information on ongoing restoration efforts, but the *Great Lakes Strategy 2002* provides no commitment for funding and resources to assure its implementation. As such, the strategy remains largely a description of ongoing activities that assumes that federal and state restoration programs will maintain the status quo in both the extent of their efforts and funding. Similarly, the SOLEC process, which has successfully engaged a wide range of binational parties, remains a volunteer effort dependent on voluntary funding and does not replace the need to develop the surveillance and monitoring program envisioned in the Great Lakes Water Quality Agreement.

Chapter 1: Introduction

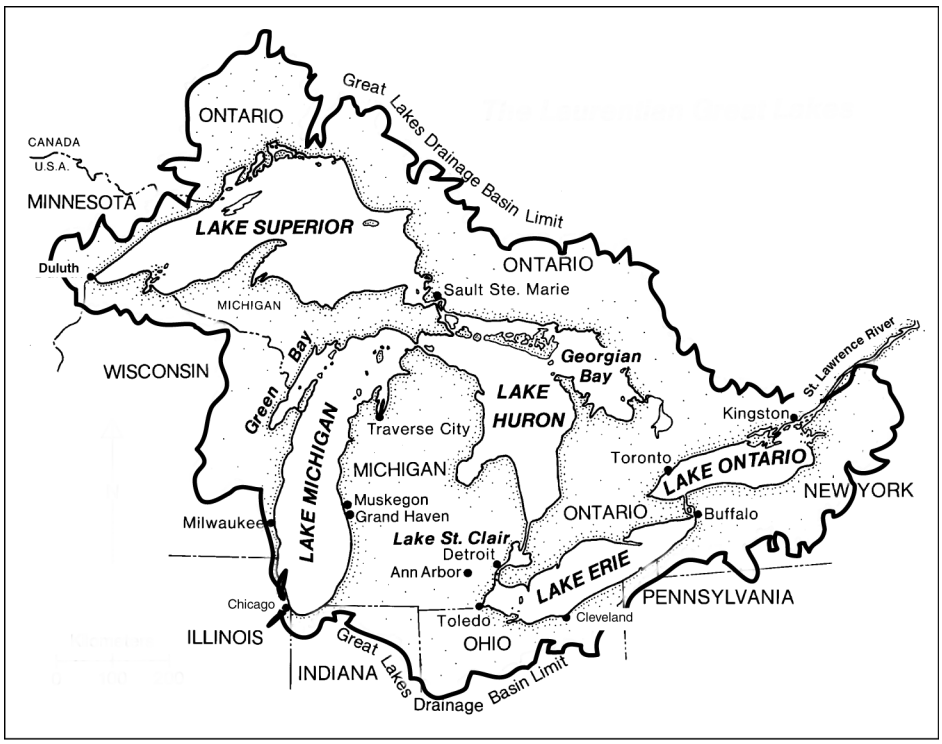
The United States and Canada view the Great Lakes as a valuable national natural resource that needs to be protected and restored to environmental health. The first bilateral agreement between the two countries to protect the Great Lakes was reached in 1972. Since that time further agreements have strengthened the commitment of the two countries to improve environmental conditions in the Great Lakes Basin. The Environmental Protection Agency (EPA), as the lead federal agency, is charged with ensuring that U.S. responsibilities are fulfilled. EPA's Great Lakes National Program Office (GLNPO) is authorized to implement various Great Lakes activities. States and other organizations also play a vital and integral role in fulfilling U.S. commitments. Despite early success in improving conditions in the Great Lakes Basin, significant environmental challenges remain, including increased threats from invasive species and cleanup of areas contaminated with toxic substances that pose human health threats.

The Great Lakes Are a Vital Resource

The five Great Lakes—Superior, Michigan, Huron, Erie, and Ontario—are a critical resource for the United States and Canada. The lakes form the largest freshwater system on Earth, accounting for 20 percent of the world's fresh surface water and over 95 percent of the U.S. fresh surface water supply for the contiguous 48 states. The lakes provide a drinking water source for over 26 million U.S. residents and water for the region's industry. Together, they form an inland waterway to the Atlantic Ocean that facilitates the relatively inexpensive transport of goods both within and outside the region. The lakes are also a recreational resource for boating, swimming, and sport fishing.

The Great Lakes Basin is a large area that extends well beyond the five lakes proper to include their watersheds, tributaries, connecting channels, and a portion of the St. Lawrence River. The basin 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. (See fig. 1.)

Figure 1: Area Comprising the Great Lakes Basin



Sources: National Oceanic and Atmospheric Administration and GAO.

Recognizing the importance and mutual interest in the Great Lakes and other boundary waters, the United States and Canada signed the Boundary Waters Treaty in 1909. The treaty gave both countries equal rights to use the waterways that flow along the international border and provided that the boundary waters and waters flowing across the boundary not be polluted on either side to the point of injuring human health or the property of the other country. The treaty also established the International Joint Commission (IJC) as a permanent binational agency organized to help resolve and prevent disputes concerning the waters along the border.

With increased concern over contaminants in the Great Lakes, the governments of the United States and Canada signed the first international Great Lakes Water Quality Agreement (GLWQA) in 1972 to improve the environmental conditions in the lakes. The agreement focused on controlling phosphorus as a principal means of dealing with eutrophication in the lakes. In 1978, the two countries signed a new GLWQA, which was revised again in 1983. The 1978 agreement reflected an increased understanding of the scope of pollution problems in the

Great Lakes and called for (1) controlling all toxic substances that could endanger the health of any living species and (2) restoring and enhancing water quality throughout the entire basin. The 1983 supplement added the requirement to further limit phosphorus discharges and for the two countries to prepare and implement plans for reducing phosphorus. In 1987, the agreement was revised for the last time to commit the two countries to cooperate with state and provincial governments to ensure, among other things, the development of Lakewide Management Plans (LaMP) to address environmental problems in open waters and Remedial Action Plans (RAP) for problems in designated "areas of concern" located in the basin. (See table 1.)

Table 1: Major Agreements between the United States and Canada Affecting the Great Lakes

Name of agreement	Key provisions
Boundary Waters Treaty of 1909	• Establishes the IJC as a permanent binational agency organized to help resolve and prevent disputes concerning the waters along the border. • Gives both countries equal rights to use the waterways that flow along the international border. • Provides that the boundary waters and waters flowing across the boundary are not to be polluted on either side to the point of injuring human health or the property of the other country.
Great Lakes Water Quality Agreement of 1972	• Provides for more effective cooperation to restore and enhance the Great Lakes. • Emphasizes finding solutions to the more obvious water quality problems.
Great Lakes Water Quality Agreement of 1978	• Establishes both general and specific water quality objectives for the Great Lakes. • Calls for developing and implementing programs to reduce and control phosphorus inputs to the lakes. • Requires a coordinated surveillance and monitoring program.
Phosphorus Load Reduction Supplement to the Great Lakes Water Quality Agreement of 1978, signed October 16, 1983	• Further specifies phosphorus inputs and required the preparation and implementation of plans for reducing phosphorus.
Protocol to the Great Lakes Water Quality Agreement of 1978, signed November 18, 1987	• Adds several annexes for issues to be addressed and activities to be conducted by the two governments. These included the development of RAPs and LaMPs, as well as addressing issues, such as airborne toxic substances, contaminated sediment, and control of phosphorus. • Requires a comprehensive review of the agreement's operation and effectiveness approximately every 6 years. • Calls for a monitoring system to measure restoration progress and assess the degree to which the United States and Canada are complying

Name of agreement	Key provisions
	with the goals and objectives of the agreement. • Calls for semi-annual meetings between the United States and Canada to coordinate work plans and evaluate progress in implementing the agreement.

Source: GAO.

In implementing the 1987 revisions to the agreement, officials for the two countries released complete LaMPs for four lakes in 2000—Erie, Michigan, Ontario, and Superior—and have updated them every 2 years. For Lake Huron, an alternative action plan was prepared instead of a LaMP. Implementation of RAPs for designated areas of concern (AOC)—namely sites that have failed to meet the objectives of the GLWQA and failures that have caused, or are likely to cause, impairment of beneficial uses, such as swimming or fishing—has not fared as well. The countries identified 43 contaminated areas: 26 located entirely within the United States, 12 located entirely within Canada, and 5 for which both countries share responsibility.[1] In 2002, we reported slow progress in cleaning up the contaminated areas and as of April 2002 none of the 26 areas under U.S. responsibility had been restored to beneficial use.[2] We also reported that the RAP process had either been abandoned or modified for several areas. We concluded that EPA was not effectively ensuring RAP implementation for contaminated areas. EPA subsequently took several steps to improve the RAP process, such as gathering information on the status of the contaminated areas and consolidating responsibility for the process within GLNPO.

In addition to two types of plans—LaMPs and RAPs—the agreement contains 16 other "annexes" that define issues that the two countries need to address and activities that they need to conduct, such as airborne toxic substances, contaminated sediment, and control of phosphorus. The 1987 amendment to the GLWQA included a provision that requires a comprehensive review of the agreement about every 6 years, focusing on the agreement's operation and effectiveness. A 1999 binational review of the agreement found that certain provisions of the agreement were out of date and concluded that certain changes should be considered; however, as of March 2003, the two countries had yet to revise the agreement.

[1] Two areas in Canada were restored and removed from the list of AOCs.

[2] See U.S. General Accounting Office, *Great Lakes: EPA Needs to Define Organizational Responsibilities Better for Effective Oversight and Cleanup of Contaminated Areas*, GAO-02-563 (Washington, D.C.: May 17, 2002).

EPA's Great Lakes National Program Office Is Responsible for Leading U.S. Efforts to Improve the Great Lakes Basin

The responsibility for leading the U.S. Great Lakes efforts rests with GLNPO. The Water Quality Act of 1987 amended the Clean Water Act to require EPA to lead and coordinate efforts with other federal agencies and state and local authorities to meet the goals in the agreement. It also established GLNPO within EPA to fulfill U.S. responsibilities under the agreement and to coordinate EPA's actions both at headquarters and the affected EPA regional offices. Specifically, the act requires GLNPO to

- cooperate with federal and state agencies in developing and implementing plans to carry out U.S. responsibilities under the agreement,
- coordinate EPA's efforts to improve water quality of the Great Lakes,
- monitor water quality in the Great Lakes, and
- serve as a liaison with Canada.

The Great Lakes Critical Programs Act of 1990 amended the Clean Water Act to further define GLNPO's role and required that all RAPs be submitted to the office and that the office take the lead in developing a LaMP for Lake Michigan. The act also assigned additional responsibilities to GLNPO in developing water quality standards for the Great Lakes and assessing contaminated sediment characteristics and remediation technologies. In addition to these responsibilities, GLNPO will help implement provisions of the Great Lakes Legacy Act of 2002, which authorized funds for cleaning up AOCs. Key provisions of these statutes are summarized in the following table:

Table 2: Major Statutes Affecting the Great Lakes

Name of statute	Key provisions

Water Quality Act of 1987	• Amends the Clean Water Act to provide that EPA should take the lead in coordinating with other federal agencies and state and local authorities to meet the goals in the agreement.
	• Establishes GLNPO within EPA to fulfill the U.S. responsibilities under the agreement and to coordinate EPA's actions at headquarters and the affected EPA regional offices. Specifically, it requires GLNPO to
	  • cooperate with federal and state agencies in developing and implementing plans to carry out the U.S. responsibilities under the agreement,
	  • coordinate EPA's efforts to improve water quality of the Great Lakes,
	  • monitor water quality in the Great Lakes, and
	  • serve as a liaison with Canada.

Great Lakes Critical Programs Act of 1990	• Requires that all RAPs be submitted to GLNPO. • Directs GLNPO to take the lead in developing a LaMP for Lake Michigan. • Provides additional responsibility for GLNPO in developing water quality standards for the Great Lakes and assessing contaminated sediment characteristics along with remediation technologies. • Requires that GLNPO be a separate line item in EPA's annual budget request.
Great Lakes Legacy Act of 2002	• Authorizes $50 million per year from fiscal year 2004 through 2008 for contaminated sediment projects in AOCs for which the United States has full or partial responsibility. • Requires EPA to report to the Congress by November 2003 on oversight of RAPs.

Source: GAO.

The legislative authorization of GLNPO was preceded by an uneven EPA commitment to addressing Great Lakes issues. In 1972, EPA's Region V Office in Chicago established the Office of Great Lakes Coordinator to monitor a demonstration program on the water quality in the Great Lakes and to conduct research. In 1978, the region established a larger coordinating office, also named the Great Lakes National Program Office, to direct and oversee fulfillment of the U.S. obligations for the agreement and any spending for that purpose. As we reported in 1982, that office had difficultly obtaining cooperation from other agency offices to fulfill its mission, leading us to recommend that GLNPO be allowed to coordinate actions within EPA, other federal agencies, and states in developing

strategies to improve Great Lakes' water quality.[3] In the years immediately following our report, however, the administration excluded GLNPO from the agency's budget proposal. The Congress restored the funding each time it was excluded from the budget and the region provided staff and other support for the office. The Water Quality Act of 1987 required the EPA Administrator to include in the agency's annual budget submission to the Congress a separate budget line item for GLNPO. According to GLNPO officials, recent GLNPO budgets have been generally funded by the Congress at the previous years' level or somewhat greater.

GLNPO is a unique entity within EPA. Unlike other EPA entities that have responsibility for an overall media, such as EPA's Office of Air, GLNPO is focused on a wide range of environmental issues in a specific geographical area of the country. GLNPO and its staff are not physically located with other national program offices in EPA headquarters, and its staff of about 40 professionals is relatively small when compared with EPA's other national programs. The manager is also selected differently than other program office heads. The Great Lakes National Program Manager is the Regional Administrator for EPA's Region V, as opposed to an individual appointed to specifically head a national program office, such as the Office of Water within EPA.

States and Other Organizations Actively Participate in Great Lakes Environmental Activities

States, provincial governments, international organizations, local organizations, independent commissions, and nonprofit organizations are all involved in Great Lakes issues. The eight Great Lake states and the provincial governments of Ontario and Quebec in Canada have historically played key roles in Great Lakes activities. The GLWQA envisioned that the two countries would cooperate with states and provincial governments on a variety of matters, including the development of RAPs for contaminated areas and monitoring environmental conditions within the basin. State and provincial government involvement is necessary for implementing other agreements, such as the *Great Lakes Binational Toxics Strategy* and the *Great Lakes Strategy 2002*. Similarly, the federal government's partnerships with the states are essential for implementation of EPA's Great Lakes and other environmental initiatives.

[3] See U.S. General Accounting Office, *A More Comprehensive Approach Is Needed To Clean Up The Great Lakes*, CED-82-83 (Washington D.C.: May 21, 1982).

The IJC assists in the implementation of the agreement between the two countries, reports every 2 years on implementation progress, and offers recommendations to the two countries. The GLWQA created three binational organizations to assist the IJC in its oversight role:

- Great Lakes Water Quality Board, which is the principal adviser to the IJC and is composed of an equal number of Canadian and U.S. members, including representatives from the governments and each state and provincial government.

- Great Lakes Science Advisory Board, which advises the IJC and the Water Quality Board on research and scientific matters. The board is comprised of managers of Great Lakes research programs and recognized experts.

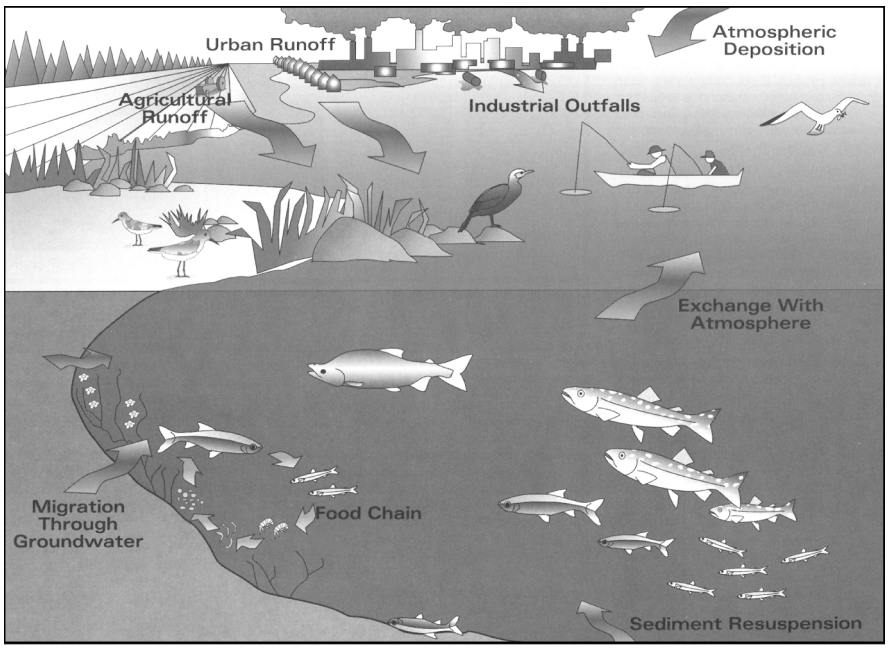
- Great Lakes Regional Office in Windsor, Ontario, which provides administrative and technical support to the boards and operates a public information service for the IJC.

In addition, the IJC has established several other organizations that provide advice and assistance, including the Council of Great Lakes Research Managers, the International Air Quality Advisory Board, and the Health Professionals Task Force.

Significant Environmental Challenges Remain to Restore the Great Lakes

Despite early successes in cleaning up the nation's water, the Great Lakes Basin continues to face significant environmental challenges. Specifically, 41 areas within the Great Lakes, contaminated with toxic substances, need cleanup actions to restore beneficial uses, such as swimming and fishing. Water polluted with toxic substances still flows into the Great Lakes from specific points, such as wastewater treatment plants, and also from nonpoint sources, such as sediment runoff from agricultural land and urban areas. Nonnative species continue to invade the Great Lakes, threatening to interrupt the ecological balance in the region. The number of invasive species increased steadily throughout the 1900s, and the basin now contains more than 160 nonnative species that threaten native fish and plants. Figure 2 illustrates the various sources of pollution to the Great Lakes.

Figure 2: Pollution Sources to the Great Lakes



Source: EPA.

One of the initial environmental successes in the Great Lakes has been the significant reduction in the amount of phosphorus that municipal waste treatment facilities discharged into the lakes. Phosphorus causes excessive algae growth, which greatly reduced the quality of fish populations in the Great Lakes. With improved waste treatment facilities and reduction of phosphates in detergents, phosphorus levels in the Great Lakes were reduced and fish populations improved. However, a portion of Lake Erie remains a "dead zone" no longer able to support fish populations, and this problem appears to be worsening since 1990.

Another notable success was the control of certain invasive species, such as the sea lamprey. The sea lamprey was first found in Lake Ontario and quickly spread through out the Great Lakes. Lampreys attached to native fish, feeding on the body fluids and leaving them either scarred or dead. Federal, provincial, and state governments initiated control measures that have reduced the populations significantly.

Objectives, Scope, and Methodology

Fourteen members of Congress participating on the Great Lakes Task Force asked us to (1) identify the federal and state environmental programs operating in the Great Lakes Basin, (2) evaluate restoration strategies used and how they are coordinated, and (3) assess overall environmental progress made in the basin restoration effort.

To identify environmental programs operating in the Great Lakes Basin, we used a structured data collection instrument provided to each of the 8 Great Lakes states—Illinois, Indiana, Ohio, Michigan, Minnesota, New York, Pennsylvania, and Wisconsin—and 13 federal agencies. For each program, we requested information about the program's purpose, the restoration strategies being used, the extent of program coordination with other federal or state agencies, the amount of funding provided, and the overall environmental progress achieved in restoration efforts. A detailed listing of federal and state agencies that provided program information is included as appendix I.

Furthermore, we interviewed and gathered program documentation from officials representing EPA's Office of Water, Office of Air and Radiation, Office of Research and Development, Office of Solid Waste and Emergency Response, and Great Lakes National Program Office, along with the U.S. Army Corps of Engineers (the Corps). These organizations were selected because they have major responsibilities for Great Lakes cleanup and restoration efforts and account for the majority of funds expended for Great Lakes programs. To obtain additional information on state programs, we interviewed state officials from five of the eight Great Lakes states—Michigan, Minnesota, Ohio, New York, and Wisconsin. These states were selected because they reported the majority of state programs involved in basin restoration. We also gathered and analyzed documentation from other governmental and nongovernmental organizations involved in restoration activities, including counties, townships, conservation districts, and nonprofit organizations.

To evaluate how restoration strategies were used and how they were coordinated, we reviewed and analyzed the data collection instrument responses received from federal and state program officials. From these responses, we identified various coordination methods and determined whether coordination was ongoing or infrequent and whether it was informal or formally documented in a written agreement. We obtained and analyzed strategies for the basin prepared by various organizations or working groups. These strategies were categorized as to whether they were basin-wide strategies or whether they addressed specific environmental problems, such as controlling mercury pollution, or

geographical areas, such as controlling point source pollution for Lake Superior. For the recent basin strategy developed by a committee of regional federal and state officials in 2002, we interviewed officials representing GLNPO, other federal agencies, and states involved in developing the strategy to further understand the strategy's goals, objectives, and resources available to carry out the strategy. We also evaluated the agencies' efforts to coordinate the various strategies.

To determine overall environmental progress made in basin restoration efforts, we obtained and analyzed Great Lakes progress reports prepared by representatives of the United States and Canada in response to the GLWQA. We interviewed GLNPO officials to understand the process for gathering information and reaching conclusions on progress contained in the reports. We gathered and analyzed information on the development of environmental indicators used as part of the reporting process and interviewed GLNPO officials regarding the resources available and implementation plan for monitoring agreed-upon indicators. In our effort to determine the progress environmental programs operating in the basin have achieved, we obtained information on the program accomplishments from responses to the data collection instrument and interviews with various federal and state program officials. We used these responses and studies to identify barriers to developing indicators and overall restoration progress in the Great Lakes.

We provided EPA with a draft of this report for review and comment. EPA's written comments are presented in appendix V. In addition, we received technical comments from EPA that we have incorporated throughout the report as appropriate and technical comments from state and federal program officials on the information and characterization of information they provided.

We conducted our work from May 2002 through March 2003 in accordance with generally accepted government auditing standards.

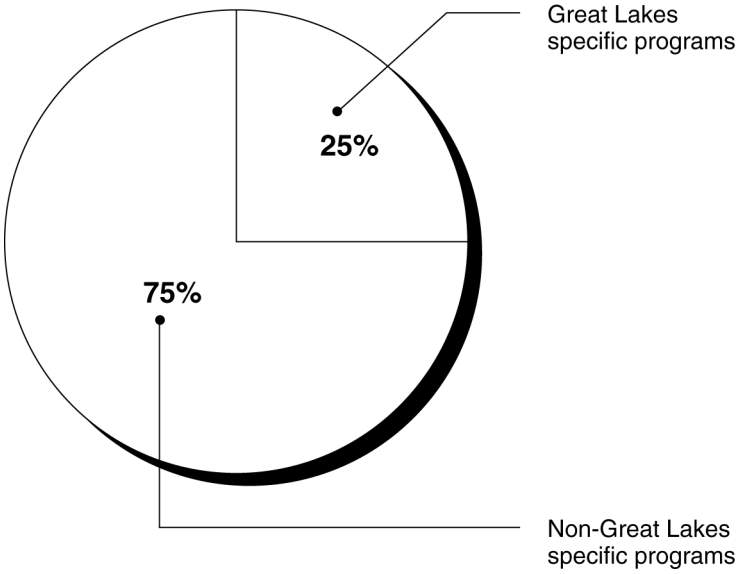
Chapter 2: Numerous Federal and State Environmental Programs Operate in the Great Lakes Basin

About 200 federal and state environmental programs operate within the Great Lakes Basin. Most of these programs involve the localized application of national or state initiatives and do not specifically focus on unique basin concerns, but about 50 specifically address environmental conditions in the basin. The majority of the programs are administered by federal agencies, and for the broad-based programs it is difficult to identify program expenditures that apply to the basin. For the Great Lakes specific programs, expenditures totaled about $1.4 billion over 10 years, with the majority of expenditures coming from state programs. In addition to these program expenditures, the Corps of Engineers expended about $358 million on specifically authorized projects within the basin.

Most Programs Operating in the Great Lakes Have a Nationwide or Statewide Focus

Most of the federal or state programs that address environmental conditions in the Great Lakes Basin operate both within and outside of the basin. Of the 148 federal and 51 state programs operating both within and outside the basin, 149 federal and state programs were identified by agency officials as being designed to address environmental conditions at a nationwide or statewide level, while 50 programs provide Great Lakes specific restoration efforts. (See fig. 3.)

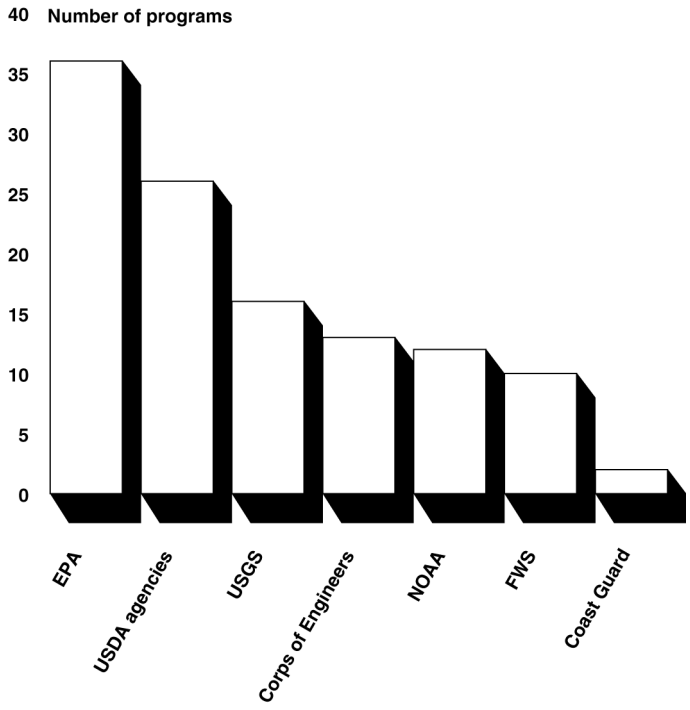
Figure 3: Percentage of Non-Great Lakes Specific and Great Lakes Specific Programs Operating in the Great Lakes Basin



Source: GAO.

Of the 149 non-Great Lakes specific programs, 115 are federal programs administered by 11 federal agencies and 34 are state programs administered by 7 states that provide a wide range of restoration activities that either directly restore or support restoration activities. EPA and agencies within the U.S. Department of Agriculture (USDA) administer most of the federal programs. The U.S. Army Corps of Engineers (the Corps); the Department of the Interior's U.S. Geological Survey (USGS) and Fish and Wildlife Service (FWS); the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA); and the Department of Homeland Security's U.S. Coast Guard administer the remaining ones. (See fig. 4.)

Figure 4: Federal Non-Great Lakes Specific Programs



Sources: EPA, USDA, USGS, NOAA, FWS, Corps of Engineers, Coast Guard, and GAO.

Generally, federal and state programs fund a diverse number of activities relating to cleanup of contaminated areas, habitat restoration, pollution prevention, and research that benefit the basin and other geographical areas outside of the basin. For example, EPA's RCRA Subtitle I Underground Storage Tanks and Leaking Underground Storage Tanks program regulates the use of underground petroleum tanks to prevent the

contamination of drinking water nationwide. This program addresses associated activities in the basin. Likewise, the Conservation Reserve Program administered by the Department of Agriculture's Farm Service Agency (FSA) provides payments to agricultural landowners to establish long-term, resource conserving vegetative cover on eligible farmland for reducing erosion. Some of this funding benefits activities in the basin. The National Fish Passage Program administered by FWS helps the basin and other areas of the country restore native fish and other aquatic species to self-sustaining levels by funding projects to facilitate unimpeded flows and fish movements by removing barriers or providing ways for fish to bypass barriers.

Additionally, non-Great Lakes specific research programs provide information that helps support restoration activities. For example, EPA's Aquatic Stressors Research Program funds research activities to advance scientifically sound approaches for monitoring trends in ecological conditions of the nation's aquatic resources, including the Great Lakes. Another program is the Coastal Remote Sensing, Coastal Change and Analysis program administered by NOAA, which develops and distributes regional landscape data through remote sensing technology. The program develops baseline land cover and characterization information for coastal areas.

Officials from 7 of the 8 Great Lakes states reported 34 state programs that affect areas both within and outside the basin. Of the 34 programs, 13 are in Minnesota, 7 in Ohio, 6 in Wisconsin, 4 in New York, 2 in Pennsylvania, and 1 each in Indiana and Michigan. The programs cover a wide range of activities directly involved in restoration or supporting restoration activities. For example, the Minnesota Mercury Initiative program, which was created in 1999 to reduce mercury contamination in fish by curtailing air deposition of mercury in state waters, solicits voluntary mercury reductions from large companies to achieve its goals. Similarly, Ohio's Ground Water Resources program fosters development of groundwater as a viable and sustainable water supply both within and outside the basin and involves collecting and distributing information on groundwater resources in the Lake Erie and Ohio River Basins. A detailed listing of all federal and state non-Great Lakes specific programs is included as appendix II.

The portion of expenditures devoted to activities in the basin for most of these general federal and state programs is generally not available. However, the following examples provide expenditure information on some of the programs:

- EPA's Superfund program officials calculated that EPA's Region V, which encompasses 6 of the 8 Great Lakes states, expended $745.6 million on cleanup activities within the basin during fiscal years 1992 through 2001.

- NOAA's National Sea Grant College Program, which supports education programs and research relating to the development of marine resources, expended $69.6 million for the basin during fiscal years 1995 through 2001.

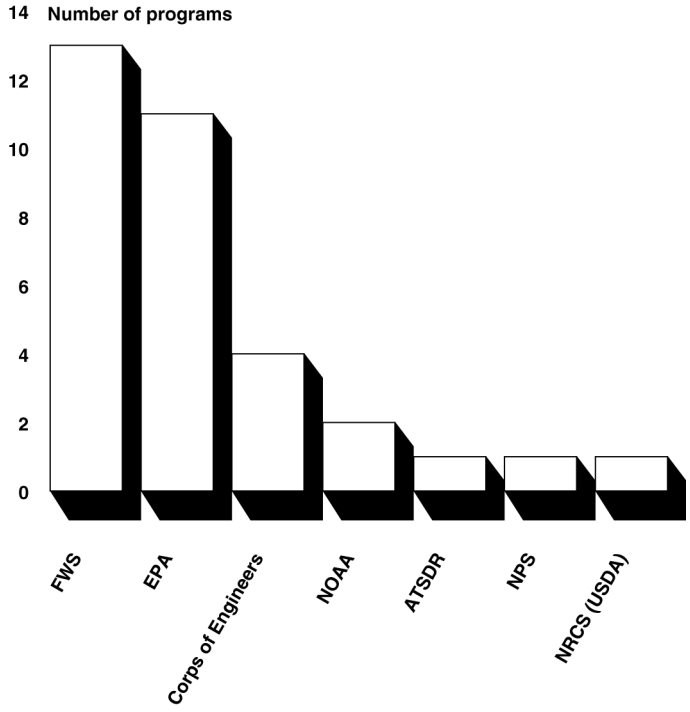
- The Corps' Shore Protection Program, which provides project funding for planning and constructing structures for protecting shores against waves and currents, expended just over $1 million for these activities in the basin during fiscal years 1992 through 2001.

Expenditure data for activities in the basin was available for 53 of the 115 federal non-Great Lakes specific programs and totaled about $1.8 billion during fiscal years 1992 through 2001. Similarly, expenditures for activities in the basin for 14 state non-Great Lakes specific programs were about $461.3 million in state fiscal years 1992 through 2001.

Great Lakes Specific Environmental Programs Focus on Certain Geographic Areas or Problems

We identified 50 federal and state programs that focus specifically on addressing environmental conditions within the basin. Of these, 33 are Great Lakes specific programs that are funded by federal agencies while 17 programs are funded by 7 states. FWS and EPA conduct most of the federal programs while three agencies identified one program each—Interior's National Park Service (NPS), USDA's Natural Resource Conservation Service (NRCS), and the Department of Health and Human Service's Agency for Toxic Substances and Disease Registry (ATSDR). (See fig. 5.)

Figure 5: Number of Great Lakes Specific Programs by Federal Agency



Sources: FWS, EPA, Corps of Engineers, NOAA, ATSDR, NPS, NRCS, and GAO.

The federal programs support a variety of activities, such as research, cleanup, restoration, pollution prevention, and other activities that directly focus on Great Lakes environmental issues. For example:

- EPA's Niagara River Toxics Management Plan program focuses on reducing toxic chemicals input into the Niagara River, achieving ambient water quality, and improving and protecting the water quality of Lake Ontario. The program began in 1987, and funding for remediation efforts comes from two EPA programs.

- EPA's Great Lakes Air Deposition Program funds projects to better understand the impacts of atmospheric deposition of pollutants, such as mercury and other toxics, which are a major source of contamination. The program funds projects in monitoring, modeling, and emissions inventory development, which assist in identifying pollution sources.

- The Corps' Great Lakes Remedial Action Plans and Sediment Remediation program provides technical support to the development

and implementation of remedial action plans to clean up contaminated areas in the Great Lakes. Funds are provided for planning and administrative implementation activities and may not be used for actual construction cleanup.

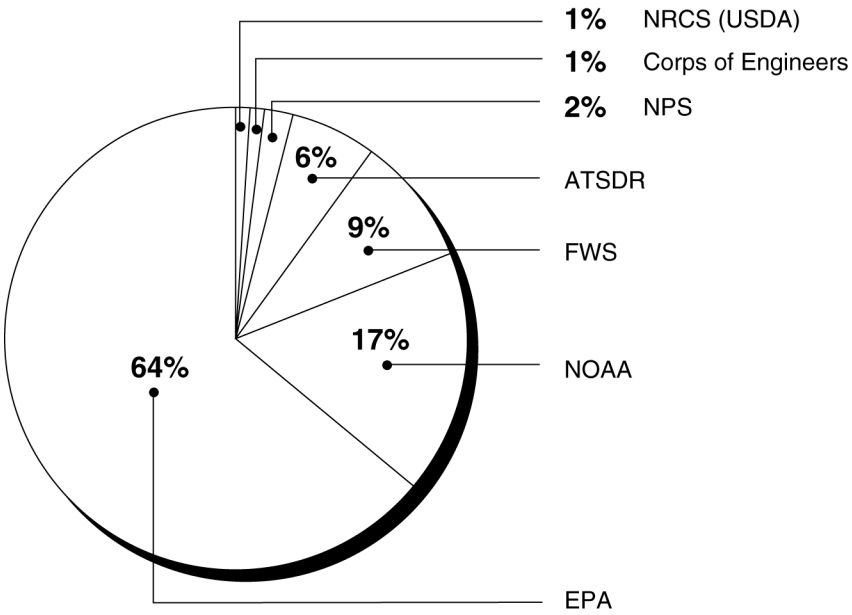
- FWS's Lake Trout Restoration program began in the late 1970s to rehabilitate the lake-trout populations in Lake Erie and Lake Ontario. The goal of the program is to increase the population of native lake trout to a level where it is self-sustaining through natural reproduction, with a harvestable annual surplus.

- USDA's Great Lakes Basin Program for Soil Erosion and Sediment Control, administered by NRCS, focuses on improving Great Lakes water quality by preventing soil erosion through education programs, grants, and technical assistance. Runoff from agricultural land is a source of nonpoint pollution to the Great Lakes.

- FWS's Lower Great Lakes Ruffe Surveillance program, which began in 1993, provides surveillance activities for the ruffe—a nonnative fish that competes with native species, such as walleye and perch. The surveillance activities include monitoring, detecting newly established populations, tracking existing populations, and evaluating current control and management activities.

EPA, NOAA, and FWS provide most of the funding for Great Lakes specific programs. Of the $387.4 million expended by federal agencies for these programs during fiscal years 1992 through 2001, 64 percent, or $248.9 million, was for EPA programs; 17 percent, or $67.2 million, for NOAA programs; and 9 percent, or $33.4 million, for FWS programs. (See fig. 6.)

Figure 6: Percentage of Expenditures for Great Lakes Specific Programs by Federal Agency, Fiscal Years 1992 through 2001



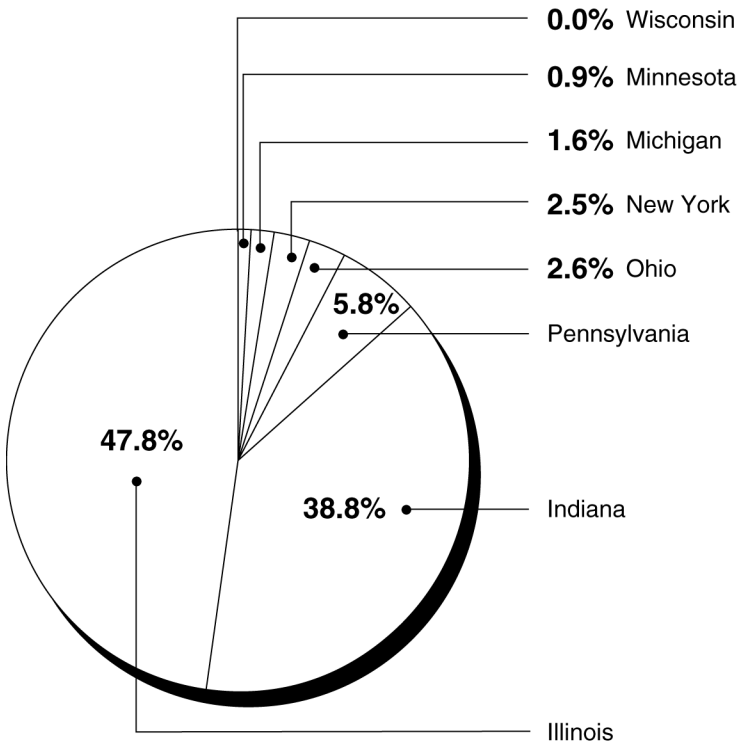
Sources: EPA, FWS, NOAA, NPS, NRCS, ATSDR, Corps of Engineers, and GAO.

While ongoing Great Lakes specific federal programs fund various restoration activities, the Corps funds additional activities through specifically authorized environmental projects that do not fall under its ongoing programs. Most of these projects are authorized under the biennial Water Resources Development Act (WRDA) and are for project studies or construction. Once authorized, these projects can be funded through the annual Energy and Water Appropriations Acts. For most projects, the Corps can only expend the funds if local partners meet the cost-sharing requirements established by the authorization. For example, specific local government projects for wastewater facilities or combined sewer overflow mitigation identified in WRDA cannot be funded until a cost-sharing agreement is reached with the local government. In addition to projects authorized in WRDA, projects may be authorized and initial funding provided through the annual appropriation process.

In fiscal years 1992 through 2001, the Corps expended approximately $358 million on specifically authorized projects. These projects funded a variety of activities, such as the $93.8 million restoration of Chicago's shoreline and the $78.7 million for restoring the Little Calumet River in Indiana. According to a Corps official, many projects are authorized in this manner

because of the unique nature or scope of the project or because of the capabilities of states and local organizations to fund projects. Two states, Illinois and Indiana, received the majority of specific project funding during fiscal years 1992 through 2001, as shown in figure 7.

Figure 7: Percentage of Expenditures for Specifically Authorized Projects Received by Great Lakes States, Fiscal Years 1992 through 2001



Source: U.S. Army Corps of Engineers.

Information on the individual Corps projects funded during fiscal years 1992 through 2001 for the basin is contained in appendix III.

In addition to the federal programs and specifically authorized Corps projects, 17 state Great Lakes Basin specific programs fund a wide range of activities that address unique state concerns or problems in the Great Lakes. The following examples of some specific state programs show the range of activities that states undertake.

- Ohio's Shore Structure Permit Program protects the Lake Erie shoreline by providing assistance to coastal residents and communities in the proper design and construction of structures for controlling

erosion, wave action, and flooding along or near the shoreline. The program began in the 1930s, and funding is provided from state lease revenues for mining mineral resources from the bed of Lake Erie.

- The Clean Michigan Initiative provides general obligation bond funding for environmental activities in Michigan. These activities include Brownfields redevelopment, nonpoint source pollution control, cleanup of contaminated sediments, and pollution prevention. About $255.9 million was expended for projects throughout Michigan, with only a small portion of the state's land area extending outside the basin.

- Pennsylvania established the Office of the Great Lakes, which provides administrative oversight and support to other state offices that have environmental responsibilities. It funds staff travel, salary, and administrative costs of about $100,000 per year for outreach and education activities. Restoration of a particular contaminated area in Lake Erie, Presque Isle Bay, is a major focus of the office's activities.

The states' Great Lakes specific programs include those funded through the Great Lakes Protection Fund. The Great Lakes Governors created and incorporated the fund as a permanent endowment, with each state providing a fixed contribution amount based on the average use of Great Lakes water from 1976 through 1985.[4] Each participating state receives one-third of the fund's annual income based on its proportional endowment contribution. Payments to the states totaled about $31 million from years 1990 through 2001, but payments were suspended in 2002 because of low fund investment performance. States use the funds to support a wide range of basin activities. For example, Michigan funds research projects undertaken by universities and for-profit groups in areas such as toxics and aquatic nuisance species. Minnesota's dividends from the fund are relatively small, and therefore they are combined with state-funded projects, such as a mercury control project and a project retrofitting a sampling vessel. Ohio's program involves the award of grants that support research and implementation projects, in alternating years, and require 10 percent matching funds by the recipient. New York uses its program to fund research, environmental planning, monitoring, and field assessment, and the state has mandated that monies cannot be used to fund construction or cleanup activities. In addition to paying out state dividends, the fund supported 191 grants for regional projects totaling

[4] Indiana does not participate in the Great Lakes Protection Fund.

about $40 million. These grants were awarded from the remaining two-thirds of the fund's undistributed income.

Of the 17 state Great Lakes specific programs, 5 were funded by Michigan, 4 by Ohio, 3 by Wisconsin, 2 by Pennsylvania, and 1 each by Illinois, Minnesota, and New York. Total expenditures for the programs were about $956 million during fiscal years 1992 through 2001. Michigan programs accounted for 96 percent of the expended amount because of major expenditures for three state programs and about 99 percent of the state's border lies within the basin. A detailed listing of all federal and state Great Lakes specific programs is included as appendix IV.

Foundations and Other Organizations Fund Great Lakes Restoration Activities

Besides federal and state government agencies, other organizations, such as foundations, fund a variety of restoration activities in the Great Lakes Basin by providing grants to nonprofit and other organizations, including government agencies. Specifically, four foundations and one trust provide funds for restoration activities.

- The Joyce Foundation supports various public policy initiatives, including long-term efforts to protect the Great Lakes environment, and provides grants to organizations for environmental projects, such as a grant to support activities that examine institutional issues facing the Great Lakes ecosystem.

- The Charles Stewart Mott Foundation supports efforts to conserve freshwater ecosystems in North America, including the Great Lakes. Grants are provided to improve capacity building for environmental organizations and to protect and restore selected freshwater ecosystems through conservation activities.

- The George Gund Foundation provides support for conservation efforts within the Great Lakes Basin and is particularly interested in capacity building of nonprofit environmental organizations. Grants are provided to organizations, such as the National Wildlife Federation, to support ongoing efforts to reduce the contamination of waters by airborne mercury.

- The Delta Institute funds activities for the development of policies and practices for sustainable development and environmental stewardship in the Great Lakes region. Among other things, the Delta Institute provides funding for the development of Lakewide Management Plans,

the Lake Michigan Regional Air Toxics Strategy, and the Lake Erie Fish Consumption Advisory Education Project.

- The Great Lakes Fishery Trust provides grants to nonprofit and governmental organizations to benefit Great Lakes fishery resources, such as a grant to FWS to develop a management plan for lake sturgeon. The trust was created as part of a court settlement for fish losses at a hydroelectric facility in Michigan, and the trust manages the assets of the settlement.

In addition to these organizations, other governmental and nongovernmental organizations fund restoration activities. For example, individual municipalities, such as the City of Toledo, Ohio, led and funded a demonstration project to develop a process for physically stabilizing and isolating contaminated sediment under a permeable covering to avoid dredging the sediment. Municipalities are also instrumental in funding projects to improve wastewater treatment facilities that discharge treated water into the Great Lakes. Several municipalities participate in the International Association of Great Lakes and St. Lawrence Mayors, which holds annual conferences to adopt unified positions and make recommendations for the protection, promotion, and development of the Great Lakes. Counties and township governments also fund environmental activities that benefit the Great Lakes. For example, township governments may have growth development plans that include conservation objectives to help control pollution and preserve open areas in the township. Counties in the Great Lakes Basin fund activities and projects to control nonpoint source pollution, soil erosion, and wildlife areas. Conservation districts within counties provide technical assistance and education in areas such as erosion control and agricultural chemical control. Within the basin, there are 213 counties and 209 conservation districts that support conservation or restoration activities within the Great Lakes Basin.

Numerous nongovernmental organizations also provide coordination roles, policy perspectives, or financially support restoration activities, including the following:

- Council of Great Lakes Governors, a partnership of governors from the eight Great Lakes States and the Canadian Premiers of Ontario and Quebec, encourages and facilitates environmentally responsible economic growth throughout the Great Lakes region.

- Great Lakes Commission, an agency promoting the orderly, integrated, and comprehensive development, use, and conservation of water and related natural resources of the Great Lakes Basin and the St. Lawrence River, includes representatives from the eight Great Lakes states and the Canadian provinces of Ontario and Quebec.

- Great Lakes Fishery Commission, created by the Canadian and U.S. Convention on Great Lakes Fisheries in 1955, coordinates fisheries management and research, and management of sea lamprey. The U.S. Department of State and Canada's Fisheries and Ocean Department provide funding for the commission.

- International Association for Great Lakes Research, a scientific organization comprised of researchers studying the Great Lakes and other large lakes of the world, hosts annual conferences and publishes the *Journal of Great Lakes Research*.

- Great Lakes Research Consortium, an organization of 16 colleges and universities in New York, with 9 affiliate campuses in Ontario, dedicated to collaborative research and education on the Great Lakes, focuses its activities on improving and understanding the Great Lakes ecosystem, including the physical, biological, and chemical processes along with the social and political forces that affect human impact on the lakes.

- Great Lakes United, an international coalition organization focused on preserving and restoring the Great Lakes-St. Lawrence River ecosystem, promotes effective policy initiatives, carries out education programs, and promotes citizen action and grassroots leadership for Great Lakes environmental activities. The coalition is made up of member organizations representing environmentalists, conservationists, hunters and anglers, labor unions, communities, and citizens of the United States, Canada, and First Nations and Tribes.

- Lake Michigan Federation, which works to restore fish and wildlife habitat, conserve land and water, and eliminate toxics in the watershed of Lake Michigan.

- The Nature Conservancy, whose mission is to preserve the plants, animals, and natural communities that represent the diversity of life on Earth by protecting the lands and waters that need to survive. The major initiative of the Nature Conservancy's Great Lakes Office is the Great Lakes Planning Initiative. The initiative has designated 270 priority sites for conservation in the Great Lakes and is in the process

of developing a planning document for each of these sites that will guide conservation work and coordination with other organizations and agencies.

- The Northeast-Midwest Institute, a private, nonprofit, and nonpartisan research organization dedicated to economic vitality, environmental quality, and regional equity for Northeast and Midwest states, has a major area of emphasis on the Great Lakes and has issued several reports on a variety of Great Lakes topics.

While these organizations are involved in Great Lakes activities, each is unique in terms of why it was created, its goals and objectives, scope of operations, and funding source. Several of the organizations are binational, such as the Great Lakes Commission and Great Lakes United, and focus only on Great Lakes issues. For other organizations, such as The Nature Conservancy and the Northeast-Midwest Institute, the Great Lakes are one of several issues addressed by the organizations.

Chapter 3: Multiple Programs, Different Strategies, and a Lack of Coordination Impede Restoration Efforts

The magnitude of the area comprising the Great Lakes Basin and the many environmental programs operating within the basin require the development of one overarching strategy to address and manage the complex undertaking of restoring the basin's environmental health. The Great Lakes region cannot hope to successfully receive support as a national priority without a publicly accepted, comprehensive plan for restoring the Great Lakes. In lieu of such a plan, organizations at the binational, federal, and state levels have developed their own strategies for the Great Lakes, which have inadvertently made the coordination of various programs operating in the basin more challenging. Although coordination among federal agencies, states, and other environmental organizations occurs when strategies are being developed or when programmatic activity calls for coordination, the myriad of current strategies and coordination efforts makes it difficult to determine which organization is in charge. While the Great Lakes National Program Office (GLNPO) has authority for coordinating Environmental Protection Agency (EPA) and other federal efforts, it has not fully exercised its authority. Numerous strategizing, planning, and coordinating efforts have not resulted in extensive restoration activity because of a lack of funding and other barriers.

An Overarching Strategy and Clear Responsibilities Are Needed for Management of Large Watershed Restoration Projects

The Great Lakes region cannot be successfully supported as a national priority without a publicly accepted, comprehensive plan for restoring the Great Lakes. Clearly defined responsibilities for coordination are essential for effective management of large watershed restoration projects. An overarching strategy and governance process to guide restoration activities that transpire over many years have been developed for other large ecosystem restoration projects. The Great Lakes Basin lacks an overarching strategy and in its absence, numerous strategies have been developed to address environmental activities, each with a different purpose and scope. Some strategies attempt to address the entire basin while others are focused on specific environmental problems or geographical areas.

Overarching Strategies Are Essential to Guide Restoration Efforts

Because of the complexity of large ecosystem restoration projects and multiple stakeholders, restoration efforts for other large ecosystems, such as the South Florida ecosystem and the Chesapeake Bay, have developed overarching strategies to guide their activities. These strategies were deemed essential by the organizations involved in the efforts for guiding activities that would occur over extended time periods and with multiple stakeholders whose participation may change over time.

The South Florida ecosystem is a large restoration project initiative with an overall strategic plan to guide its restoration activities. This ecosystem covers a large geographical area that encompasses a major portion of South Florida, including the Everglades wetlands. Numerous changes brought on by urbanization, agricultural activities, and federal efforts to control flooding have detrimentally affected the ecosystem. In response to growing deterioration of the ecosystem, federal agencies established a task force in 1993 to coordinate their restoration activities. In 1996, the task force was expanded to include state, local, and tribal members and was formalized in the Water Resources Development Act of 1996. However, as we reported in 1999, a strategic plan had not been developed laying out how the restoration initiative would be accomplished, including quantifiable goals and performance measures.[5] Without a strategic plan, we noted the ability to accomplish the restoration initiative in a timely and efficient manner was at risk because of its complexity and a mechanism was needed to provide the authority for making management decisions. In a subsequent report,[6] we noted that a strategic plan for the ecosystem would clearly communicate to the Congress and other participants in the restoration effort what it is trying to achieve, the time frames for achieving the expected results, and the level of funding that would be needed. Such a plan was also needed because of the inevitable personnel turnover in task force representation occurring over time and the subsequent need to inform new task force members of restoration progress.

The strategic plan developed for the South Florida ecosystem by the task force made substantial progress in guiding the restoration activities. The plan, which the task force submitted in July 2000, identifies the resources needed to achieve restoration and assigns accountability for specific actions for the extensive restoration effort estimated to cost $14.8 billion. As we reported in 2001, the plan needed additional elements, including a clear picture of how the restoration will occur and linkage between strategic goals and outcome-oriented goals for tracking and measuring restoration progress. The restoration effort was elevated to nationwide recognition with the authorization of the Comprehensive Everglades

[5] See U.S. General Accounting Office, *South Florida Ecosystem Restoration: An Overall Strategic Plan and a Decision-Making Process Are Needed to Keep the Effort on Track*, GAO/RCED-99-121 (Washington, D.C.: Apr. 22, 1999).

[6] See U.S. General Accounting Office, *South Florida Ecosystem Restoration: Substantial Progress Made in Developing a Strategic Plan, but Actions Still Needed*, GAO-01-361 (Washington, D.C.: Mar. 27, 2001).

Restoration Plan (CERP) in the Water Resources Development Act of 2000 (P.L. 106-541). This act contained provisions specifying the coordination among stakeholders, the funding responsibilities, and the authorization for program regulations.

The Chesapeake Bay watershed is another example of a large restoration effort with an overarching strategy. In a 1983 agreement to restore the Chesapeake Bay, the states of Maryland, Virginia, and Pennsylvania; the District of Columbia; the Chesapeake Bay Commission; and EPA signed an agreement to protect and restore the Chesapeake Bay ecosystem. The participants saw the need to establish an executive council to marshal public support for the bay effort and be accountable to the public for progress made under the agreement. Under the 1983 agreement, the executive council must meet at least twice yearly to assess and oversee the implementation of coordinated plans to improve and protect the water quality and living resources of the bay. The council established an implementation committee of agency representatives to coordinate technical matters and the development and evaluation of management plans. In a subsequent agreement, Chesapeake 2000, the partners agreed to a new ecosystem approach to the bay. While continuing to focus restoration efforts on individual species and habitat, such as the blue crab and the oyster reef, the new agreement recognizes the linkage among these efforts and addresses their interdependence within the context of a single, broad ecosystem approach. Several reports by the council have detailed the status of progress toward the goals set forth in the agreements.

The South Florida ecosystem and the Chesapeake Bay watershed are large ecosystems with overarching strategies, but the overall area and population affected by these ecosystems are significantly less than the Great Lakes Basin. The Great Lakes influence more people, land, water, and states by a substantial margin. The population within the basin is more than five times that of the population near the South Florida project and more than twice the population near the Chesapeake Bay. The basin comprises more than 11 times the area of the South Florida project and more than 3 times the area of Chesapeake Bay. Moreover, the basin encompasses eight states as opposed to one state for the South Florida project and six states and the District of Columbia for the Chesapeake Bay watershed. (See table 3.)

Table 3: Geographic Area, Population, and States for Three Restoration Areas

Restoration area	Area size (in square miles)	Area population	Number of affected states
Great Lakes Basin	201,000	33 million	8
Chesapeake Bay watershed	64,000	16 million	6
South Florida ecosystem	18,000	6 million	1

Sources: Environment Canada, EPA, and GAO.

Strategies for the Great Lakes Do Not Provide an Overarching Restoration Approach

Numerous strategies developed for the Great Lakes Basin address environmental restoration activities with different perspectives, purposes, and scopes. Several comprehensive strategies attempt to address restoration activities for the entire basin. Other strategies address a particular concern or geographic area. However, none of the current strategies provides an overarching approach that can be used as a restoration blueprint to guide overall activities similar to the South Florida ecosystem restoration.

The most recent comprehensive strategy developed for the entire basin—the *Great Lakes Strategy 2002*—was developed by the U.S. Policy Committee (USPC), a group of mostly federal regional, and state officials and coordinated by GLNPO. The group focused on federal, state, and tribal government activities as they relate to environmental protection and natural resource management and to fulfilling the goals of the Great Lakes Water Quality Agreement (GLWQA). The strategy sets forth goals, objectives, and actions in various environmental issues, such as storm water discharges, along with goals, objectives, and key actions to achieve for these issues. The strategy also recognizes the other strategies that have been developed for the Great Lakes. Developing the strategy occurred over several months, requiring significant time and efforts by GLNPO and USPC members to agree on the various goals, objectives, and actions. GLNPO officials plan periodic follow-up with USPC representatives to determine the progress made in reaching the objectives. Toward this end, GLNPO has prepared a matrix listing over 100 planned actions for achieving the objectives and will conduct follow-up inquiries with the responsible agency officials to determine progress as an accountability mechanism.

The *Great Lakes Strategy 2002* provides extensive information on planned activities to achieve the objectives, but it is largely a descriptive

compilation of existing program activities that relates to basin restoration. For example, the strategy addresses Brownfields redevelopment by identifying the number of Brownfields sites within the basin and describing ongoing Brownfields activities.[7] The key action called for in the strategy is to continue support for local Brownfields redevelopment efforts through various planned or ongoing activities at the state and federal levels. The strategy also promotes clean and healthy beaches by noting that EPA will implement the Beaches Environmental Assessment and Coastal Health Act of 2000. The act requires all states with coastal waters, including the Great Lakes states, to review water quality criteria for coastal recreation waters and adopt protective water quality standards.

To attain the strategy's objectives, federal and state agencies need to provide level funding to avoid modification of the planned actions and activities, according to GLNPO officials. The strategy states that "(it) should not be construed as a commitment by the U.S. government for additional funding and resources for its implementation. Nor does it represent a commitment by the U.S. government to adopt new regulations."[8] GLNPO officials agreed that the strategy continues with the status quo and is a statement of what they hope to accomplish with better coordination. Some state officials involved in developing the strategy stated that state actions described in the strategy were already planned and that implementation is contingent on states funding the relevant environmental programs.

In 2001, the Great Lakes Commission published another basin strategy, *The Great Lakes Program to Ensure Environmental and Economic Prosperity*, which outlines seven major goals for the Great Lakes Basin. The goals are

- cleaning up toxic hot spots,
- preventing the introduction or limiting the spread of invasive species,
- controlling nonpoint source pollution,
- restoring and conserving wetlands and critical coastal habitat,
- ensuring the sustainable use of our water resources,
- strengthening decision support capability, and
- enhancing the commercial and recreational value of our waterways.

[7] "Brownfields" are properties with real or perceived environmental contamination that hampers redevelopment efforts.

[8] See U.S. Policy Committee, *Great Lakes Strategy 2002*, (p.3), (Feb. 22, 2002).

For each goal, the strategy contains recommendations for actions that target specific programs, authorizations, and appropriations. For example, the commission helped develop and promote the adoption of an action plan for the prevention and control of aquatic nuisance species.

The commission's strategy involves coordinated efforts among the commission and its partner agencies and organizations to secure much needed federal appropriations and legislative initiatives. This strategy emphasizes federal/state and U.S./Canadian partnerships as a means to achieving its goals, but it does not provide detailed implementation plans or identify funding sources to achieve the goals. GLNPO officials stated that they believe this strategy and the *Great Lakes Strategy 2002* are complimentary rather than competing strategies.

Two other organizations—Great Lakes United and the Council of Great Lakes Governors—are developing basin-wide restoration strategies. Great Lakes United, an international coalition of basin stakeholders, has developed and circulated several documents addressing Great Lakes issues. By 2003, Great Lakes United plans to integrate these draft issue documents into an overall agenda for the comprehensive restoration of the basin. The Council of Great Lakes Governors' strategy is being based on the priorities of the Great Lakes governors and is to be used as a basis for identifying priority restoration efforts for the basin.

Additional Strategies Focus on Specific Issues or Geographic Areas

Other Great Lakes specific strategies address unique environmental problems or specific geographical areas. A strategy for each lake addresses open lake waters through Lakewide Management Plans (LaMP), which EPA is responsible for developing. Toward this end, EPA formed working groups for each lake to identify and address restoration activities. For example, the LaMP for Lake Michigan, issued in 2002, includes a summary of the lake's ecosystem status and addresses progress in achieving the goals described in the previous plan, with examples of significant activities completed and other relevant topics.

The Binational Executive Committee for the United States and Canada issued its *Great Lakes Binational Toxics Strategy* in 1997 that established a collaborative process by which EPA and Environment Canada, in consultation with other federal departments and agencies, states, the province of Ontario, and tribes, work toward the goal of the virtual elimination of persistent toxic substances in the Great Lakes. The strategy particularly addresses substances that bioaccumulate in fish or animals and pose a human health risk. After establishing various challenges for

both or either country to meet, the strategy lays out priority activities to meet the challenges. The strategy also incorporates the regular assessment of progress made. Among the successes in reducing persistent toxic substances in the Great Lakes is the cleanup of contaminated sediment sites at some Great Lakes harbors; reduced levels of PCBs, dioxins, and DDT; and improved sport fisheries.

Michigan developed a strategy for environmental cleanup called the *Clean Michigan Initiative*. This initiative provides money for a variety of environmental, parks, and redevelopment programs. It includes nine components, including Brownfields redevelopment and environmental cleanups, nonpoint source pollution control, clean water, cleanup of contaminated sediments, and pollution prevention. The initiative is funded by a $675 million general obligation bond and as of early 2003, most of the funds had not been distributed.

GLNPO Has Not Fully Exercised Its Authority for Coordinating Great Lakes Restoration Programs

Ultimate responsibility for coordinating Great Lakes restoration programs rests with GLNPO, which has the statutory authority to coordinate EPA's and other federal agency activities. However, GLNPO has not fully exercised this authority, and other organizations or committees have formed to assume coordination and strategy development roles.

The Clean Water Act provides GLNPO with the authority to coordinate the actions of EPA's headquarters and regional offices aimed at improving Great Lakes water quality. It also provides GLNPO with the authority to coordinate EPA's actions with the actions of other federal agencies and state and local authorities for obtaining input in developing water quality strategies and obtaining support in achieving the objectives of the GLWQA. Finally, the statute provides that the EPA Administrator shall ensure that GLNPO enters into agreements with the various organizational elements of the agency engaged in Great Lakes activities and with appropriate state agencies. The agreements should specifically delineate the duties and responsibilities, time periods for carrying out duties, and resources committed to these duties. GLNPO officials stated that they do not enter into formal agreements with other EPA offices but rather fulfill their responsibilities under the act by having federal agencies and state officials agree to the restoration activities contained in the *Great Lakes Strategy 2002*. However, the strategy does not represent formal agreements to conduct specific duties and responsibilities with committed

resources. The absence of these agreements was also reported in a September 1999 report by EPA's Office of Inspector General.[9] The report stated that GLNPO did not have agreements as required by the act and recommended that such agreements be made to improve working relationships and coordination.

Other organizations or groups have formed to fulfill coordinating roles in Great Lakes restoration activities, both at the basin level and on a smaller scale for specific issues of concern. For example, the USPC, which was formed initially by GLNPO in 1988 to develop a Great Lakes strategy and provide a coordinating role, developed a strategy and a coordinating plan, "Protecting the Great Lakes," in 1992 to cover the 5-year period from 1992 through 1997. Officials from federal agencies not on the USPC never approved the plan, and many parties involved in environmental activities in the basin felt left out of the strategy development process. The USPC was disbanded in 1995, and the strategy was not used as a guide for restoration activities. GLNPO officials formed a second U.S. Policy Committee in 1999, similar in structure to the first committee, which included federal regional and state officials. The USPC recently developed the *Great Lakes Strategy 2002*, and it meets semi-annually to coordinate agency actions and commitments associated with the strategy, as well as to review progress and ensure accountability. Another group, the Midwest Natural Resources Group, established in 1998, contains a Great Lakes focus team that conducts coordination meetings for eliminating duplication across federal bureaus and agencies. Within this group, representatives from EPA and the Corps facilitate activities, such as developing monitoring protocols, sharing facilities and vessels across agencies, and increasing data sharing.

With several entities involved in coordinating, planning, and strategizing, it appears at times that federal and state officials cannot be sure which entity bears ultimate responsibility for and authority over these activities and their implementation at any given time and whether the entity is a permanent body or an ad hoc organization that may disband if interest wanes. State of Minnesota officials, who were asked to provide input for several restoration plans, stated that they found the significant overlap of the plans inefficient and thought it would be helpful to have a more streamlined approach to Great Lakes issues. They stated that it would be

[9] See U.S. Environmental Protection Agency, *EPA's Great Lakes Program*, EPA/OIG Rept. 99P00212 (Washington, D.C.: Sept. 1, 1999).

better to have an overall structure to carry out environmental activities. Officials from The Nature Conservancy, a nonprofit organization conducting environmental activities in the Great Lakes, stated that it is difficult to understand the array of public sector entities and their involvement in Great Lakes issues. They observed that the Great Lakes community is fractionalized with participants, both public and private, pushing their own agendas rather than a true vision vetted with all stakeholders. They further noted that the heavy bureaucratic framework of many groups and processes made them skeptical that actual work would be conducted.

A USGS official stated that the lack of a unified vision among the many Great Lakes federal, state, and local agencies impedes progress. He noted that individual efforts are not structured or organized in such a way that they can be integrated to provide the hierarchical means to assess, diagnose, and restore the system. The burden to provide the leadership that will bring a Great Lakes program to a level that is consistent with other large-scale efforts, such as the Chesapeake Bay restoration, rests largely with EPA--the only agency under the Clean Water Act and associated agreements with Canada--with regulatory authority to do so. More money, the official said, would not improve restoration progress unless it is combined with a strong, overarching effort of coordination and organization. GLNPO officials stated that the success of the Chesapeake Bay Watershed Restoration Project can be attributed to the buy-in of high-level officials, such as the governors of the related states, a level of influential support that they say GLNPO lacks.

While several organizations are conducting coordination in developing strategies, at the individual program level, most federal and state officials reported coordination with their programmatic counterparts in various ways while implementing their programs. For example, section 404 of the Clean Water Act requires a formal arrangement between EPA and the Corps to coordinate management of a dredge and fill permit program each year, with the agencies jointly reviewing about 10,000 permit applications for the basin. Coordination activities can be formalized in memoranda of understanding or agreement, interagency agreements, or letters of collaboration. For example, in a 1997 memorandum of agreement among NOAA, EPA, the Wisconsin Department of Natural Resources, and two Wisconsin Indian tribes, the parties agreed to coordinate their efforts in removing contaminated sediments from the Lower Fox River in Wisconsin. The agreement specifies an organizational structure, including what the parties' duties are, what their responsibilities are, and how disputes will be resolved. In addition to such formal coordination,

informal coordination also occurs between federal and state officials through meetings or telephone calls. For example, officials from EPA's Region V Water Division coordinated Coastal Environmental Management Program activities with eight federal agencies in developing LaMPs. This coordination included correspondence, conference calls, and various face-to-face meetings.

Major Planning Efforts Have Not Yielded Extensive Restoration Activity because of a Lack of Funding and Other Barriers

Although major planning efforts aimed at restoring the Great Lakes exist, several barriers have prevented these efforts from resulting in extensive restoration activity. Great Lakes program officials often cited insufficient funding for program activities as a major barrier and a reason for not achieving and measuring restoration progress in the Great Lakes. They also cited several other factors affecting progress, including the lack of local technical expertise for conducting restoration activities, poor coordination among groups conducting environmental activity, and a lack of leadership.

Limited Restoration Progress after Many Years of Planning

After years of planning restoration activities for the Great Lakes Basin, significant restoration progress remains to be achieved. Several IJC reports have pointed out the slow restoration progress. For example, in 2002, the IJC reported that after more than 15 years of planning and incremental activity, restoration of the Great Lakes through remedial actions remains elusive and difficult and more needs to be done quickly.[10] Moreover, the IJC stated in 2000 that the Great Lakes ecosystem remains compromised and that contaminated sediments in the lakes produce health problems.[11] Restoration challenges remain in several areas, such as controlling invasive species.

The slow restoration progress is illustrated by the 26 contaminated areas in the Great Lakes Basin for which the United States is responsible for ensuring cleanup under the GLWQA. In April 2002, we reported that none of the areas had been restored to beneficial use and only half of the areas selected remedial and regulatory measures to address the problems, and

[10] See IJC, *11th Biennial Report on Great Lakes Water Quality*, (Sept. 12, 2002).

[11] International Joint Commission, *Tenth Biennial Report on Great Lakes Water Quality*, (June 29, 2000).

all areas had defined their respective environmental problems.[12] The slow progress of cleanup efforts reflects a general departure from the process specified in the agreement, and in some cases the process was abandoned. Based on these findings, it was clear that EPA was not fulfilling its responsibility to ensure that plans for cleaning up the areas were being developed or implemented. Citing resource constraints along with the need to tend to other Great Lakes priorities, EPA reduced its staff and the amount of funding it allocated to states for developing and implementing plans for contaminated areas. Subsequent to our report, GLNPO officials took actions to improve the implementation of cleanup plans.

Lack of Funding Is a Key Barrier to Achieving Restoration Progress

Inadequate funding has also contributed to the failure to restore and protect the Great Lakes, according to the IJC biennial report on Great Lakes water quality issued in July 2000.[13] The IJC restated this conclusion in a 2002 report, concluding that any progress to restore the Great Lakes would continue at a slow incremental pace without increased funding.[14] Lack of funding is consistently mentioned in prior IJC reports as a major roadblock to restoration progress. For example, the 1993 biennial report concluded that remediation of contaminated areas could not be accomplished unless government officials came to grips with the magnitude of cleanup costs and started the process of securing the necessary resources.[15] Despite this warning, however, as we reported in 2002, EPA reduced the funding available for ensuring the cleanup of contaminated areas under the assumption that the states would fill the funding void. States, however, did not increase their funding, and restoration progress slowed or stopped altogether.[16]

Officials for 24 of 33 federal programs and for 3 of 17 state programs reported insufficient funding for federal and state Great Lakes specific programs. They cited specific consequences of funding deficits, including:

[12] See U.S. General Accounting Office, *Great Lakes: EPA Needs to Define Organizational Responsibilities Better for Effective Oversight and Cleanup of Contaminated Areas*, GAO-02-563 (Washington, D.C.: May 17, 2002).

[13] See IJC, *Tenth Biennial Report on Great Lakes Water Quality*, (June 29, 2000).

[14] See IJC, *11th Biennial Report on Great Lakes Water Quality*, (Sept. 12, 2002).

[15] See IJC, *Seventh Biennial Report on Great Lakes Water Quality*, (Dec. 15, 1993).

[16] See GAO-02-563, cited on p. 53, footnote 12.

- Funding for GLNPO's monitoring programs has not kept pace with increased operating costs, allowed for infrastructure repairs for its research vessel, provided for sufficient atmospheric deposition monitoring, or provided for monitoring new or emerging contaminants.

- Michigan's Great Lakes Protection Fund receives funding requests exceeding the amount of money that is available in any given year. For example, in fiscal year 2001, the state received requests for $10.4 million for project funding and was able to fund projects totaling only $700,000.

States are particularly strapped to provide funding for restoration activities within recent budget constraints. For example, an official with the Michigan Department of Environmental Quality stated that the priority for funding an unmandated Great Lakes program is secondary to other programs specifically mandated by the Clean Water and Clean Air Acts and other environmental programs. An official from the Minnesota Pollution Control Agency stated that Minnesota and other states do not routinely set aside funds to implement restoration activities for the Great Lakes. Restoration projects are funded within the constraints of the states' current budgets, and existing funding requirements take precedent. State officials also pointed out the difficulty states face in providing funds to meet federal program matching fund requirements for restoration activities. Although the matching fund percentage required may be relatively low, such as 10 percent, the aggregate amount for several programs can be significant. For example, Michigan Department of Environmental Quality officials informed us that during fiscal years 1992 through 2001, the state expended over $83 million in matching funds to obtain federal funding for programs that contributed to restoration or protection in the basin. During this same period, Ohio's environmental programs expended more than $14 million in matching fund amounts. Corps and other federal officials stated that some states do not solicit federal program funds because they lack the ability to meet the matching fund requirements.

Other Significant Barriers Exist for Restoration Progress

While the lack of funding is the most often cited barrier to restoration progress, other factors, such as lack of technical expertise and effective coordination, also create barriers to restoration progress. A NOAA official stated that while financial resource limitations hinder the restoration process, increased funding without better coordination among the various agencies would not be effective. In a similar observation, a Minnesota state official said that there is no agency at the federal or state level that

knows all the programs and funding that exist to address Great Lakes problems or the steps one must take to obtain these funds. The official further commented that a significant lack of technical knowledge within program management for many Great Lakes projects prevents agencies from identifying and assessing environmental needs and measuring restoration progress. In commenting on efforts to cleanup contaminated areas in the Great Lakes, the IJC reported several other problems besides the lack of funding for cleanup sites, namely the lack of government leadership and accountability, delays caused by disagreements, and inadequate planning.

Conclusions

Although there are several strategies that address restoration of the Great Lakes Basin, no one overarching strategy or plan unifies these strategies in the pursuit of a common goal, similar to the restoration plan for the South Florida ecosystem. The magnitude of the restoration effort and the number of parties involved in the basin restoration necessitate that the major parties involved develop and agree upon an overarching strategy that addresses basin improvements. Without such an overall strategy or plan, there is no road map to follow for achieving the restoration goals agreed to between the United States and Canada in the GLWQA. An overarching strategy for the basin is needed to establish restoration goals, outline how restoration will occur, identify the resources needed to achieve restoration, assign accountability for restoration, and provide a mechanism for measuring progress for achieving goals. While there is a general consensus that more funding is needed for the restoration, without an overall strategy that prioritizes activities, it is unclear which activities should receive additional funding. Furthermore, without a strategy, the cycle of preparing numerous plans without significant restoration progress will likely continue. Although GLNPO is responsible for coordinating U.S. restoration activities within the basin, EPA has not ensured that GLNPO fulfills this responsibility by entering into agreements for conducting restoration activities.

Recommendations for Executive Action

To improve coordination of Great Lakes activities and ensure that federal dollars are effectively spent, we recommend that the Administrator, EPA,

- ensure that GLNPO fulfills its responsibility for coordinating programs within the Great Lakes Basin;
- charge GLNPO with developing, in consultation with the governors of the Great Lakes states, federal agencies, and other organizations, an

overarching strategy that clearly defines the roles and responsibilities for coordinating and prioritizing funding for projects; and
- submit a time-phased funding requirement proposal to the Congress necessary to implement the strategy.

Agency Comments

While EPA stated that it agreed with the need for better coordination and that our recommendations can help ensure that environmental improvements are made, it did not address the specific recommendations to improve coordination of Great Lakes activities. Rather, the agency stated it would provide to our agency, the Congress, and the Office of Management and Budget a formal response to the final report recommendations. The agency stated that it fulfilled its coordination responsibilities by convening the USPC and developing the *Great Lakes Strategy 2002*. We recognized these efforts in our report, but they do not fulfill GLNPO's responsibility for coordinating programs in the Great Lakes Basin, nor does the strategy fulfill the need for an overarching strategy for the basin. EPA does acknowledge that its strategy can be used as a foundation for any future Great Lakes ecosystem restoration plan. The complete text of EPA's comments is presented in appendix V.

Chapter 4: Insufficient Data and Measures Make It Difficult to Determine Overall Restoration Progress

The Great Lakes Water Quality Agreement (GLWQA) calls for a monitoring system to measure restoration progress and ensure that its objectives are met. To date, the implementation of this provision has been limited. While there is recognizable progress in improving some environmental conditions in the Great Lakes Basin, current environmental indicators do not provide an adequate basis for determining overall progress. Recent assessments of overall progress have relied on a mix of quantitative data and subjective judgments, and progress reported on federal and state programs focuses on program activities, frequently citing outputs rather than environmental outcomes. A binational effort to develop a set of overall indicators was initiated in 1996, but the completion date for this effort and the availability of resources needed to gather baseline indicators data are uncertain.

The Great Lakes Water Quality Agreement Calls for a Monitoring System to Ensure Objectives Are Met

One of the 17 agreement annexes in the GLWQA, as amended in 1987, requires that the United States and Canada undertake a joint surveillance and monitoring program to measure restoration progress and assess the degree to which the parties are complying with goals and objectives of the agreement. The program also provides for an evaluation of water quality trends, identification of emerging problems, and support for developing remedial action plans for contaminated areas and lakewide management plans for critical pollutants. Prior to the 1987 amendments, the 1978 agreement between the two countries also contained a requirement for surveillance and monitoring and for the development of a Great Lakes International Surveillance Plan. The IJC Water Quality Board was involved in managing and developing the program until the 1987 amendments placed this responsibility on the United States and Canada. According to a binational review of the agreement in 1999, this change resulted in a significant reduction in the two countries' support for surveillance and monitoring. In fact, the organizational structure to implement the surveillance plan was abandoned in 1990, leaving only one initiative in place—the International Atmospheric Deposition Network (IADN). In 1990, the two countries initiated IADN—a network of 15 air-monitoring stations located throughout the basin.

With the surveillance and monitoring efforts languishing, the IJC established the Indicators for Evaluation Task Force in 1993 to identify the appropriate framework to evaluate progress in the Great Lakes. As the entity responsible for evaluating progress towards meeting the goals and objectives of the agreement, the IJC task force, in 1996, proposed that the following nine desired measurements and outcomes be used to develop indicators for measuring progress (see table 4).

Table 4: Desired Measurements and Outcomes for Great Lakes Indicators

Measurement	Desired outcome
Fishability	No restrictions on the human consumption of fish resulting from the input of persistent toxic substances.
Swimmability	No public beaches closed or swimming restrictions imposed because of human activities.
Drinkability	Treated drinking water is safe for human consumption, and there are no restrictions because of human activities.
Healthy human populations	Human populations in the Great Lakes Basin are healthy and free from acute illness because of exposure to high levels of contaminants or chronic illness because of exposure to low level contaminants.
Economic viability	The regional economy is viable and sustainable and provides adequate sustenance and dignity for the basin population.
Biological community integrity and diversity	The ability of biological communities to function normally in the absence of environmental stress by maintaining ecosystem health, ecological integrity, and the diversity of biological communities.
Virtual elimination of inputs of persistent toxic substances	The virtual elimination of inputs of persistent toxic substances into the Great Lakes.
Absence of excess phosphorus	The absence of excess phosphorus entering the watersheds because of human behavior.
Physical environment integrity	The development, compatible use, and maintenance of aquatic habitat in the quantity and quality necessary and sufficient to sustain an endemic assemblage of fish and wildlife populations.

Source: IJC.

Shortly before the task force began its work, the United States and Canada had agreed to hold conferences every 2 years to assess the environmental conditions in the Great Lakes in order to develop binational reports on the environmental conditions to measure progress under the agreement. Conference participants included U.S. and Canadian representatives from federal, state, provincial, and tribal agencies, as well as other organizations with environmental restoration or pollution prevention interests in the Great Lakes Basin. The first State of the Lakes Ecosystem Conference (SOLEC)[17] was held in 1994 and culminated in a "State of the Great Lakes 1995" report, which provided an overview of the Great Lakes ecosystem at the end of 1994 and concluded that overall the aquatic community health was mixed or improving. The same assessment was echoed in the 1997 state of the lakes report. Meanwhile, the IJC agreed that monitoring the

[17] SOLEC is co-chaired by representatives from the U.S. EPA and Environment Canada.

nine desired outcome areas recommended by the task force would help assess overall progress. It recommended that SOLEC, during the conference in 2000, establish environmental indicators that would allow the IJC to evaluate what had been accomplished and what needed to be done as it relates to the public's ability to eat the fish, drink the water, and swim in the water without any restrictions. The other outcomes would be addressed at a later date.

Current Indicators Do Not Provide an Adequate Basis for Making an Overall Assessment of Restoration Progress

The indicators developed through the SOLEC process and the accomplishments reported by federal and state program managers do not provide an adequate basis for making an overall assessment for Great Lakes restoration progress. The SOLEC process is ongoing, and the indicators that are still being developed are not generally supported by sufficient underlying data for making progress assessments. The ultimate success of SOLEC is uncertain because of limited resources committed to the process, and until indicators are finalized, the accomplishments now reported for individual Great Lakes specific programs do not provide an adequate basis for assessing overall progress. Program accomplishments usually describe program outputs, rather than outcomes, and do not adequately portray whether environmental conditions are improving or deteriorating.

Recent Assessments of Environmental Conditions Rely on Limited Data

SOLEC's recent assessments of the Great Lakes ecosystem have relied on limited quantitative data and subjective judgments in determining the status of desired outcomes, such as swimmability, drinkability, and the edibility of fish within the Great Lakes. At the 1998 SOLEC conference, groups of experts narrowed down a list of more than 850 indicators to 80 basin ecosystem indicators with the objective of reaching an agreement on a list of comprehensive indicators for the basin. The proposed indicators were reviewed, discussed, and revised during the conference and placed in seven categories, such as open waters, coastal wetlands, land use, and human health. Within these categories, the indicators were further classified as a current condition (state), such as population of salmon and trout, or an adverse impact (pressure), such as sea lamprey diminishing fish populations. Conference participants devoted extensive effort to commenting on and modifying these indicators.

The SOLEC 2000 conference focused on assessing the previously identified 80 indicators for reporting on the overall condition of the Great Lakes. Participants further reduced the number of indicators ultimately assessed because data was only readily available for 33 indicators. Subject

experts assessed and classified the indicators on a scale with five classifications—good; mixed, improving; mixed; mixed, deteriorating; and poor. Participants developed these classifications using the following definitions:

- Good. The state of the ecosystem component is presently meeting ecosystem objectives or otherwise is an acceptable condition.

- Mixed, improving. The ecosystem component displays both good and degraded features, but overall, conditions are improving toward an acceptable state.

- Mixed. The state of the ecosystem component has some features that are in good condition and some features that are degraded, perhaps different between lake basins.

- Mixed, deteriorating. The ecosystem component displays both good and degraded features, but overall, conditions are deteriorating from an acceptable state.

- Poor. The ecosystem component is severely negatively impacted and does not display even minimally acceptable conditions.

For example, the level of contaminants in snapping turtle eggs is an indicator for coastal wetlands. The indicator was assessed and placed in the mixed assessment category because of the high levels of contaminants in snapping turtle eggs found at eight locations in Lakes Ontario and Erie, and the St. Lawrence River. The classification of indicators into categories was based on the SOLEC partners' best professional judgments and was not necessarily supported by sound science-based reliable data. The 33 indicators became the basis for the "State of the Great Lakes 2001" report, which concluded that a detailed quantitative assessment could not be made, but that an overall qualitative assessment of "mixed" should be applied to the basin ecosystem. The assessment was based on six observations. One positive observation was that the Great Lakes surface waters remain one of the best drinking water sources in the world; a negative observation was that invasive species continue to present a significant threat to the biological community.

After the SOLEC 2000 conference, IJC staff assessed the indicators supported by data that measured the desired outcomes of swimmability,

drinkability, and the edibility of fish in the Great Lakes.[18] Overall, the IJC commended SOLEC's quick response that brought together information regarding the outcomes and SOLEC's ongoing efforts. The IJC, however, recognized that sufficient data were not being collected from around the Great Lakes and that the methods of collection, the data collection time frames, the lack of uniform protocols, and the incompatible nature of some data jeopardized their use as indicators. Specifically, for the desired outcome of swimmability, which was assessed as "mixed," the IJC concurred that it was not always safe to swim at certain beaches but noted that progress for this desired outcome was limited because beaches were sampled by local jurisdictions without uniform sampling or reporting methods. At the 2002 SOLEC conference, the number of indicators assessed under the 5-tiered scale increased from 33 to 45. The IJC expressed concern that there are too many indicators, insufficient supporting backup data, and a lack of commitment and funding from EPA to implement and make operational the agreed upon SOLEC baseline data collection and monitoring techniques. The IJC recommended in its last biennial report that any new indicators should be developed only where resources are sufficient to access scientifically valid and reliable information.

Successful Development and Assessment of Indicators Are Difficult to Discern

The ultimate successful development and assessment of indicators for the Great Lakes through the SOLEC process are uncertain because insufficient resources have been committed to the process, no plan provides completion dates for indicator development and implementation, and there is a lack of control over the data being collected. While the SOLEC process has successfully engaged a wide range of binational parties in developing indicators, the resources devoted to this process are largely provided on a volunteer basis without firm commitments to continue in the future. GLNPO officials described the SOLEC process as a professional, collaborative process dependent on the voluntary participation of officials from federal and state agencies, academic institutions, and other organizations attending SOLEC and developing information on specific indicators. The resources provided for the process cannot be assured in the future and the financial resources committed by GLNPO to the process have primarily consisted of contributing funding for hosting the conferences and providing two staff members to manage the process. EPA supports the development of environmental indicators as

[18] See IJC, *11th Biennial Report on Great Lakes Water Quality*, (Sept. 12, 2002).

evidenced by the fact that, since 1994, GLNPO has provided about $100,000 annually to sponsor the conferences.

Additionally, GLNPO spends over $4 million per year to collect surveillance data for its open-lake water quality monitoring program, which also provides supporting data for some of the indicators addressed by SOLEC. A significant portion of these funds supports the operation of GLNPO's research vessel, the Lake Guardian, an offshore supply vessel converted for use as a research vessel. GLNPO also supports activities that are linked or otherwise feed information into the SOLEC process, including the following:

- collecting information on plankton and benthic communities in the Great Lakes for open water indicator development;
- sampling various chemicals in the open-lake waters, such as phosphorus for the total phosphorus indicator;
- monitoring fish contaminants in the open waters, directly supporting the indicator for contaminants in whole fish and a separate monitoring effort for contaminants in popular sport fish species that supports the indicator for chemical contaminants in edible fish tissue; and
- operating 15 air-monitoring stations with Environment Canada comprising the IADN that provides information for establishing trends in concentrations of certain chemicals and loadings of chemicals into the lakes. EPA uses information from the network to take actions to control the chemicals and track progress toward environmental goals.

Because SOLEC is a voluntary process, the indicator data resides in a diverse number of sources with limited control by SOLEC organizers. GLNPO officials stated that EPA does not have either the authority or the responsibility to direct the data collection activities of federal, state, and local agencies as they relate to surveillance and monitoring of technical data elements that are needed to develop, implement, and assess Great Lakes environmental indicators. They further stated that the current SOLEC indicator process is based on unofficial professional relationships established between the SOLEC partnerships. Efforts are underway for the various federal and state agencies to take ownership for collecting and reporting data outputs from their respective areas of responsibility and for SOLEC to be sustained and implemented; each indicator must have a sponsor. However, any breakdown in submission of this information would leave a gap in the SOLEC indicator process.

SOLEC's 10-year plan, as presented at the 2000 conference, describes its objectives and the planned conference themes through 2006 with the

theme for 2008 and beyond yet to be determined. Its stated objectives are to

- assess the state of the Great Lakes ecosystem based on accepted indicators,
- strengthen decision making and management,
- inform local decision makers of Great Lakes environmental issues, and
- provide a forum for communication and networking among stakeholders.

Three of the SOLEC objectives do not focus directly on developing indicators, nor do the stated objectives align with the surveillance and monitoring program envisioned in the GLWQA. Whereas the agreement called for a joint surveillance and monitoring program to assess compliance with the agreement, evaluating water quality trends, identification of emerging problems, and support for the development of Remedial Action Plans and Lakewide Management Plans, the achievements reported for the SOLEC process, which include the number of background papers produced and reports prepared on the state of the lakes, do not align with the expected results envisioned by the surveillance and monitoring program.

In November 2001, EPA committed to an agencywide initiative to develop environmental indicators for addressing the agency's nationwide environmental conditions, stating that "indicators help measure the state of our air, water and land resources and the pressures placed on them, and the resulting effects on ecological and human health." However, this initiative does not specifically relate to the Great Lakes. The short-term goal for this initiative is to develop information that will indicate current nationwide environmental conditions and to help EPA make sound decisions on what needs to be done. The long-term goal is to bring together national, regional, state, and tribal indicator efforts to describe the condition of critical environmental areas and human health concerns.

Federal and State Programs Measure Progress in Several Ways, Often Citing Outputs Rather than Outcomes

Progress reported by officials from individual federal and state programs in the basin is generally not presented in a manner that describes how the programs have improved environmental conditions within the Great Lakes Basin. Program output data are frequently cited as measures of success versus actual program accomplishments. As a rule, program output data describe activities, such as projects funded, and are of limited value in determining environmental progress. For example, accomplishments reported for Michigan's Great Lakes Protection Fund were that it funded

125 research projects over an 11-year period and publicized its project results at an annual forum and on a Web site. Another example is the Lake Ontario Atlantic Salmon Reintroduction Program administered by FWS. Under its accomplishments, program officials cited the completion of a pilot study and technical assistance provided to a Native American tribe. For the 50 federal and state programs created specifically to address conditions in the basin, 27 reported accomplishments in terms of outputs, such as reports or studies prepared or presentations made to groups. Because research and capacity building programs largely support other activities, it is particularly difficult to relate reported program accomplishments to outcomes. For example, the National Oceanic Atmospheric Administration's Great Lakes Environmental Research Laboratory conducts extensive research and environmental modeling that helps to improve management of aquatic environments and understanding of coastal and estuarine processes. The federal and state environmental program officials responding to our evaluation generally provided output data or, as reported for 15 programs, the accomplishments had not been measured for these Great Lakes specific programs.

Only eight of the federal or state Great Lakes specific programs reported outcome information, much of which generally described how effective the programs' activity or action had been in improving environmental conditions. For example, EPA's Region II program for reducing toxic chemical inputs into the Niagara River, which connects Lake Erie to Lake Ontario, reported reductions in priority toxics from 1986 through 2002 from ambient water quality monitoring. Other significant outcomes reported as accomplishments for the Great Lakes included (1) reducing phosphorus loadings by waste treatment plants and limiting phosphorus use in household detergents; (2) prohibiting the release of some toxicants into the Great Lakes, and reducing to an acceptable level the amount of some other toxicants that could be input; (3) effectively reducing the sea lamprey population in several invasive species infested watersheds; and (4) restocking the fish-depleted populations in some watersheds.

Conclusions

Without a monitoring system for the Great Lakes Basin, it is impossible to determine overall restoration progress and compliance with goals and objectives of the GLWQA. While it is clear that some restoration progress has occurred for some environmental conditions, definitive observations on overall restoration progress are difficult to make without indicators to measure progress, baseline indicator data, and a process for monitoring indicators. The current SOLEC process fills an important void, but it cannot fulfill the requirements of the surveillance and monitoring program

called for in the agreement. SOLEC serves a useful purpose in creating a consensus on which indicators are the most useful and inventorying available indicator data. There is no assurance, however, that the SOLEC process, which relies heavily on the voluntary participation of interested officials, will continue, or if it does continue, whether it will yield sufficient information for an overall quantitative assessment of the Great Lakes ecosystem.

Recommendations for Executive Action

To fulfill the need for a monitoring system called for in the GLWQA and to ensure that the limited funds available are optimally spent, we are recommending that the Administrator, EPA, in coordination with Canadian officials and as part of an overarching Great Lakes strategy, (1) develop environmental indicators and a monitoring system for the Great Lakes Basin that can be used to measure overall restoration progress and (2) require that these indicators be used to evaluate, prioritize, and make funding decisions on the merits of alternative restoration projects.

Agency Comments

EPA stated that it agreed with the need for better monitoring and generally agreed that our recommendations can help ensure improvements. However, it did not address the specific recommendations for a monitoring system called for in the Great Lakes Water Quality Agreement. Rather, the agency stated it would provide to our agency, the Congress, and the Office of Management and Budget a formal response to the final report recommendations. EPA stated that GLNPO has supported the SOLEC effort, but it did not comment on the recommendations for developing indicators and a monitoring system to measure overall restoration progress. The complete text of EPA's comments is presented in appendix V.

Appendix I: Federal and State Agencies That Provided Great Lakes Program Information

Federal agencies

Environmental Protection Agency

- Great Lakes National Program Office
- Office of Research and Development
- Regions II, III, and V

Department of Agriculture

- Agricultural Research Service
- Cooperative State Research, Education, and Extension Service
- Farm Services Agency
- Forest Service
- Natural Resource Conservation Service

Department of Commerce

- National Oceanic and Atmospheric Administration

Department of Defense

- U.S. Army Corps of Engineers

Department of Health and Human Services

- Agency for Toxic Substances and Disease Registry

Department of Homeland Security

- U.S. Coast Guard

Department of Interior

- U.S. Fish and Wildlife Service
- U.S. Geological Survey
- National Park Service

State agencies

Illinois

- Illinois Environmental Protection Agency

Indiana

- Indiana Department of Natural Resources

Ohio

- Ohio Environmental Protection Agency
- Ohio Department of Natural Resources

Michigan

- Michigan Department of Environmental Quality
- Michigan Department of Natural Resources

Minnesota

- Minnesota Department of Commerce
- Minnesota Pollution Control Agency
- Minnesota Department of Natural Resources
- Minnesota Board of Water and Soil Resources
- Minnesota State Planning Agency

New York

- New York Department of Environmental Conservation

Pennsylvania

- Pennsylvania Department of Environmental Protection

Wisconsin

- Wisconsin Department of Natural Resources

Appendix II: Federal and State Non-Great Lakes Specific Programs, Fiscal Years 1992 through 2001

Table 5 contains a listing of the non-Great Lakes specific programs managed by federal agencies.

Table 5: Federal Non-Great Lakes Specific Programs

Program name	Purpose	Program expenditures (1992-2001)[a]
Army Corps of Engineers		
Aquatic Ecosystem Restoration	This restoration program funds the planning, design, and construction of projects to restore and enhance aquatic ecosystems. Program activities began in 1998.	$2,243,800[a]
Beneficial Use of Dredged Material	This program, which was established in 1992, funds the planning, design, and construction of projects to protect, restore, and enhance aquatic habitats using sediments dredged from federal navigation projects. It is classified as a restoration program.	$384,600[c]
Cleaning and Snagging	Originally created in 1954, the purpose of this program is to plan, design, and construct projects for emergency removal of debris that threatens to aggravate damage caused by flooding.	$4,000
Confined Disposal Facilities	This cleanup program was established in 1970. Its purpose is to design, construct, and operate confined disposal facilities for the disposal of contaminated dredged materials from federal navigation projects.	$72,696,140
Emergency Stream Bank and Shoreline Protection	This program was created in 1946 and its purpose is to plan, design, and construct projects to protect public facilities and services from stream bank and shoreline erosion.	$8,086,400
Environmental Dredging	This environmental cleanup program was created in 1990. The program's purpose is to assist in the planning, design, and construction of projects to remove contaminated sediments from areas outside federal navigation channels.	$670,700[b]
Environmental Improvements	The purpose of this restoration program, which was started in 1986, is to plan, design, and construct projects to restore and enhance aquatic ecosystems at sites impacted by Corps projects.	$13,016,400[d]
Flood Plain Management Services	Created in 1960, this program provides flood plain information and technical assistance to states and local communities.	$4,784,500
Planning Assistance to States	This program was created in 1974, and its purpose is to provide staff and financial assistance to states in planning for the use, development, and conservation of water resources.	$3,123,500
Shore Protection	The purpose of this restoration program, created in 1962, is to plan, design, and construct projects to restore and protect shores against waves and currents.	$1,038,000
Small Flood Control Projects	This program, which was created in 1948, funds activities related to the planning, design, and construction of projects to reduce flood damages.	$11,375,100
Small Navigation Projects	Created in 1960, the purpose of this program is to plan, design, and construct projects to improve navigation.	$7,871,000
Tribal Partnership Program	This program was started in 2000, and it seeks to provide tribal groups with assistance in planning for the use, development, and conservation of water resources.	[f]
Department of Agriculture-Agricultural Research Service (ARS)		
Agricultural Research Service Research Units	This research and pollution prevention program started in 1990 to develop agricultural best management practices, including water management strategies for corn and soybean production systems, and to assess the impact of these practices on field, farm, and watershed scales.	$2,293,700

Program name	Purpose	Program expenditures (1992-2001)[a]
Department of Agriculture-Cooperative State Research, Education, and Extension Service (CSREES)		
Hatch Act Research Program	This research program was started in the late 1800s to promote efficient production, marketing, distribution, and utilization of crops and livestock essential to the food supply and health and welfare of the American people, while conserving resources and improving rural living conditions.	$4,582,000[e]
Integrated Activities Program	This program supports integrated research, education, and extension on critical agricultural issues. Program activities began in 2000.	$11,081,000[e]
McIntire-Stennis Cooperative Forestry Research Program	The purpose of the program, which began in 1962, is to support research essential to the efficient and effective use of the nation's forest resources.	$140,000[e]
National Research Initiative Program	This program provides support for research with the greatest potential of expanding the knowledge base needed to solve current problems and unforeseen issues involving the future agricultural and forestry enterprise. The program was created in 1965 and activities began in 1991.	$433,000[e]
Small Business Innovation Research Program	The purpose of this program, which began in 1986, is to strengthen the role of small, innovative firms in federally funded research and development activities.	$383,000[e]
Special Research Grants Program	This program was created in 1965 to fund research on problems of national, regional, and local interest that fall beyond the normal emphasis of the formula programs.	$1,675,000[e]
Department of Agriculture-Farm Services Agency (FSA)		
Conservation Reserve Program	This voluntary restoration and conservation program for agricultural landowners was created in 1985. Through this program, landowners receive annual rental payments and cost-share assistance to establish long-term, resource conserving vegetative covers on eligible farmland.	$540,718,000
Emergency Conservation Program	This program provides emergency funding for farmers and ranchers to rehabilitate farmland damaged by wind erosion, floods, hurricanes, or other natural disasters and for carrying out emergency water conservation measures during periods of severe drought. This restoration program began in 1978.	$4,670,000
Department of Agriculture-Forest Service (FS)		
Atmospheric Ecosystem Interactions at Multiple Scales	This research program, which began in 1996, focuses on air quality in the western Great Lakes. The program examines factors that impact summertime surface ozone pollution patterns and activities, including observing smoke trajectories from prescribed and wildland fires.	[f]
Cooperative Forestry	Originally created in the 1930s, the current program started in 1978 to address watershed health and water quality activities on nonfederal forest lands. It provides restoration and management assistance activities, including cooperative federal, state, and local forest stewardship; prevention and control of insects and diseases; and improvement of fish and wildlife habitat.	[f]
Forest Health Management	This program was created in1947, with current program activities having begun in 1978 as a coordinated effort among federal, state, and local entities for the management of forest health on nonfederal forested lands. The program funds activities to sustain healthy forest conditions.	[f]
Recreation, Heritage, and Wilderness Management	The purpose of this program, which dates back to the 1930s, is to connect people to the land by providing recreational settings and services.	$36,685,000[g]
Soil, Water, and Air Management	This program funds activities related to the management of water, soil, and air resources for public use, including the inventory, assessment, and monitoring of these resources. It is classified as a cleanup, restoration, and pollution prevention program.	$8,939,000[g]

Program name	Purpose	Program expenditures (1992-2001)[a]
Watershed, Lake, Riparian and Stream Analysis, and Restoration	This research and restoration program, which started in 2000, studies watershed and stream processes from relatively undisturbed systems to highly degraded systems. It develops technologies to restore these systems and tests them in rural forested and urban landscapes.	$165,000[h]
Wildland Fire Management	Originally created in the 1920s, the purpose of the current program is to protect state and private lands from wildland fires by providing protection and management assistance.	[f]
Wildlife, Fish, and Rare Plants Resources Management	This program, which began in the 1930s, funds activities related to cleanup, restoration, pollution prevention, and habitat improvement. The program's goal is to maintain diverse and productive wildlife, fish, and sensitive plant habitats as an integral part of managing national forest ecosystems.	$24,486,000[g]
Department of Agriculture-Natural Resources Conservation Service (NRCS)		
Environmental Quality Incentives Program	The purpose of this program, created in 1985, is to provide technical, educational, and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. It funds pollution prevention, soil and water conservation, and water quality improvement activities.	[f]
Farmland Protection Program	This program, which began in 1996, provides matching funds to help purchase development rights to keep productive farm and ranch land in agricultural uses. The Department of Agriculture provides up to 50 percent of the fair market easement value.	[f]
National Cooperative Soil Survey (NCSS)	This program is a partnership of federal land management agencies, state agricultural experiment stations, and state and local units of government that provides soil survey information necessary for understanding, managing, conserving, and sustaining the nation's limited soil resources. It dates back to 1935.	[f]
Plant Materials for Conservation/Plant Materials	The purpose of this program, which began in 1937, is to use native plants to solve natural resource problems. Scientists search for plants that meet an identified conservation need, such as wetland restoration, and test their performance. Once proven, new species are released to the private sector for commercial production.	[f]
Resource Conservation and Development	This program, which started in 1962, encourages and improves the capability of state and local units of government and local nonprofit organizations in rural areas to plan, develop, and carry out programs for resource conservation and development. Program activities include cleanup, restoration, pollution prevention, coordination, and conservation technical services.	[f]
River Basin Studies, Watershed Surveys and Planning, and Watershed Protection and Flood Prevention	This mid-1940s program was created to provide planning assistance to federal, state, and local agencies for developing and coordinating water and related land resources programs in watershed and river basins. Program activities include restoration, pollution prevention, and financial and technical assistance for watershed protection and flood prevention.	[f]
Soil and Water Conservation/Conservation Technical Assistance	This program provides voluntary conservation technical assistance to land users, communities, units of state and local governments, and other federal agencies in planning and implementing conservation systems. It began in 1935, and it addresses natural resource issues, such as erosion, fish and wildlife habitat, and air quality. Its activities relate to cleanup, pollution prevention, restoration, and technical assistance.	[f]

Program name	Purpose	Program expenditures (1992-2001)[a]
Wetland Reserve Program	This voluntary program provides landowners with financial and technical assistance to restore and protect wetlands. It began in 1985, and it funds cleanup, restoration, and pollution prevention activities.	[f]
Wildlife Habitat Incentive Program	This is a voluntary restoration program for the development and improvement of wildlife habitat, primarily on private lands. It provides technical assistance and up to 75 percent cost-share assistance to establish and improve fish and wildlife habitat. The program began in 1998.	[f]
Department of Commerce-National Oceanic and Atmospheric Administration (NOAA)		
Coastal Mapping/Mapping and Charting Program	This program is part of the National Geodetic Survey. The primary mission of this program is to define the shoreline for nautical charts.	[f]
Coastal Remote Sensing, Coastal Change and Analysis Program	The goal of this program, which started in 2001, is to develop and distribute data in the coastal zone through remote sensing technology. The Great Lakes are the current focus of this program.	$458,000[i]
Coastal Zone Management Program	This program began in 1972. It is a federal-state partnership that provides a basis for protecting, restoring, and responsibly developing the nation's important and diverse coastal communities and resources. The program includes encouraging and assisting states in the wise use of land and water, and encouraging the participation and cooperation of all government sectors with programs affecting the coast.	$107,906,394[j]
Geodesy Program	This program, managed by the National Geodetic Survey, monitors crustal motion in the Great Lakes by measuring latitudes, longitudes, and elevations at 16 water level stations. This information provides better knowledge about flooding and drainage scenarios in the region.	[f]
Landscape Characterization and Restoration Program	This restoration program, which began in 1997, helps coastal resource managers examine the effects of management on coastal habitat through habitat restoration planning activities and ecosystem studies.	[f]
National Estuarine Research Reserve System (NERRS)	NERRS is a network of protected areas established to promote informed management of the nation's coastal and estuarine habitats. This state-federal partnership accomplishes this through linked programs of scientific understanding, education, and stewardship. This research program began in 1972.	$2,174,000
National Sea Grant College Program	The purpose of this research program, which began in 1968, is to support education and research in the various fields relating to the development of marine resources. All Great Lakes states, except Pennsylvania, have a Sea Grant College.	$69,600,000
National Status and Trends Mussel Watch Project	This program is a contaminant-monitoring program for U.S. coastal waters. It collects samples from some 300 sites in the conterminous United States, Alaska, Hawaii, Puerto Rico, and the Great Lakes. Samples are analyzed for a broad suite of contaminants, including toxic elements, pesticides, industrial chemicals, and hydrocarbons. This pollution prevention program began nationwide in 1986, with monitoring in the Great Lakes beginning in 1992.	$240,000
National Weather Service (NWS)	This program, which dates back to the 1890s, provides water, hydrologic, and climate warnings for the United States and its adjacent waters. Ten NWS Great Lakes forecast offices provide users with continuous real-time data and forecasts. NWS also operates the Environmental Modeling Center, which produces numerical weather prediction models that are transmitted to these forecast offices, and the National Data Buoy Center, which manages an observational network.	[f]

Program name	Purpose	Program expenditures (1992-2001)[a]
Office of Response and Restoration - Coastal Protection and Restoration Division	This division has undertaken, in coordination with cleanup and trustee agencies, environmental assessment, pollution prevention, cleanup, mitigation, and restoration activities to protect and restore coastal habitats and resources at hazardous waste sites nationwide since 1985 (in the Great Lakes since 1993).	[f]
Office of Response and Restoration - Damage Assessment Center	The Damage Assessment Center, which started in 1990, conducts natural resources damage assessments to restore coastal resources injured by oil and hazardous material releases. The center conducts cleanup, restoration, and pollution prevention activities.	[f]
Office of Response and Restoration - Hazardous Materials (HAZMAT)	This program, which started in 1987, conducts activities to reduce risks to coastal habitats and resources from oil and chemical spills by providing advice and developing tools to aid in spill response. HAZMAT undertakes cleanup, restoration, and pollution prevention activities.	[f]
Department of Interior-Fish and Wildlife Service (FWS)		
Aquatic Nuisance Species Regional Coordination and Technical Assistance	This program provides regional aquatic nuisance species coordination and technical assistance to the Fisheries Program of FWS's Northeast Region. Activities support regional prevention and control of aquatic nuisance species introductions and range expansions.	$808,900
Aquatic Nuisance Species Surveillance and Control	This program was started in 1991 to prevent and control infestations in the coastal and inland waters of the United States by the zebra mussel and other nonindigenous aquatic nuisance species. Its activities include research, prevention of species introductions, control of introduced species, and mitigation of impacts to native fish and wildlife resources.	$3,659,400
Endangered Species Program	This conservation and restoration program was created in 1973 to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved and to provide for the conservation of such endangered and threatened species.	$4,078,500[l]
Fish and Wildlife Management Assistance - Great Lakes Operations	This program, dating back to 1972, aids in conservation of native fish and wildlife species and their habitats. It provides support for the management of interjurisdictional fisheries, aids in restoration of depleted fish populations to preclude listing as endangered species, and provides technical assistance to state and tribal fish and wildlife management agencies to fulfill federal trust responsibilities. The program funds research, restoration, and technical assistance activities.	$5,915,000
La Crosse Fish Health Center	This center, which began operating in 1962, provides fish health inspection services to six national and four tribal fish hatcheries to minimize the risk of introducing disease agents into the wild. This program assists state research facilities and private fish hatcheries in diagnosing and controlling infectious disease agents and provides technical assistance regarding fish health and propagation.	$3,057,545
National Fish Passage Program	This program restores native fish and other aquatic species to self-sustaining levels. Generally, this restoration is done by removing barriers to fish movement or providing ways for aquatic species to bypass them. The program works on a voluntary basis with federal, state, local, and tribal agencies, as well as private partners and stakeholders. This restoration program's activities began in 1999.	$268,500[n]
Natural Resource Damage Assessment Program	This program's goal is to restore, replace, rehabilitate, or acquire the equivalent of natural resources injured or lost as a result of contamination by oil or hazardous substances. This cleanup and restoration program began in 1981.	$2,496,000[(m)(o)]

Program name	Purpose	Program expenditures (1992-2001)[a]
New York Aquatic Resource Management	The focus of this program is natural resource assessment and management planning on military installations. Specifically, the goal of this program is to determine the presence or absence of threatened or endangered species of state or national concern and to prepare a comprehensive natural resource management plan for the Seneca Army Depot and Fort Drum, both of which lie within the Great Lakes Basin.	$197,032[p]
New York Natural Resource Management Program	The primary focus of this program is natural resource assessment and planning on military installations. Activities under this program include conducting a natural resource community survey for the Niagara Falls Air Reserve Station, conducting additional surveys as needed, and preparing and implementing management plans to protect the natural resources. Program activities began in 1998.	$174,204[q]
Partners for Fish and Wildlife (Private Lands Program)	This is a voluntary habitat restoration program that provides restoration expertise and financial assistance to private landowners, tribes, and other conservation partners who voluntarily restore fish and wildlife habitat on their properties. The program targets restoring habitat for migratory birds, interjurisdictional fish, and threatened or endangered species on private land. Program activities began in 1987.	$5,240,000[m]
Department of Interior-U.S. Geological Survey (USGS)		
Biological Information Management Delivery	This research program has two primary areas relevant to the Great Lakes Basin: the National Biological Information Infrastructure (NBII) and the Gap Analysis Program (GAP). NBII was created in 1993 and provides increased access to data and information on biological resources. The GAP provides broad geographic information on biological diversity that planners, managers, and policy makers need to make informed decisions. In addition, the program provides support for Great Lakes research, primarily at the USGS Great Lakes Science Center.	$1,653,800[m]
Biological Research and Monitoring	This research program, dating back to 1927, funds biological studies to develop new methods and techniques to identify, observe, and manage fish and wildlife. Studies are designed to identify, understand, and control invasive species and their habitats; inventory populations of animals, plants, and their habitats; and monitor changes in abundance, distribution, and health of biological resources through time and determine the causes of the changes.	$10,078,775[d]
Coastal and Marine Geology	The program provides scientific information needed to evaluate the origin and impact of natural coastal processes, especially understanding the effect of human-induced changes. This program has been providing information and products to guide the preservation and sustainable development of the nation's marine and coastal environments since 1994.	[f]
Cooperative Research Units Program	This program, created in 1935, establishes and maintains cooperative partnerships with states and universities to address local, state, regional, national and international issues related to fish, wildlife, and natural resources of concern. The activities of the program are research, technical assistance, and student education.	$6,250,000[r]
Cooperative Topographic Mapping (CTM) Program	This research program provides data that locates and describes the features of the earth's surface. The program provides support for the National Map by continuing to maintain basic data for the United States and its territories.	[f]

Program name	Purpose	Program expenditures (1992-2001)[a]
Cooperative Water Program	This is an ongoing partnership between USGS and nonfederal agencies. The program jointly funds water resources projects in every state, Puerto Rico, and several U.S. Trust territories. Research, data collection, assessment, and aerial appraisal activities are conducted through this program.	[f]
Geographic Analysis and Monitoring Program	This program studies and addresses natural and human-induced changes on the landscape. It encompasses global change research, integrates natural hazard data layers, delivers landscape information, and provides computer support.	[f]
Land Remote Sensing Program	This program, initiated in the 1930s, promotes the use of remote sensing for understanding the earth's land environment through photography and other imagery from aircraft, as well as satellites.	[f]
Mineral Resources Program	This program, created in 1879, provides scientific information for resource assessments and research results of mineral potential, production, consumption, and environmental behavior. This information is used to characterize the life cycles of mineral commodities from deposit formation, exploration, and discovery through production, use, reuse, and disposal.	[f]
National Cooperative Geologic Mapping Program	This program was established in 1992 to implement and coordinate an expanded geologic mapping effort by USGS, the state geological surveys, and universities. The primary goal of the program is to collect, process, analyze, translate, and disseminate earth-science information through geologic maps.	[f]
National Water Quality Assessment (NAWQA) Program	The long-term mission and goals of the NAWQA program, which began in 1991, are to provide long-term, nationwide information on the quality of streams, groundwater, and aquatic ecosystems. NAWQA's goals are to assess the status and trends of national water quality and to understand the factors that affect it.	$16,039,000[r]
National Water Use Information Program	This program was created in 1979 to collect, store, analyze, and disseminate water-use information, both nationally and locally, to a wide variety of government agencies and private organizations. It is a cooperative program that includes state and local government entities.	[f]
USGS Ground-Water Resources Program	This program encompasses regional studies of groundwater systems; provides multidisciplinary studies of critical groundwater issues; provides access to groundwater data, and research and methods development. It also provides scientific information and many of the tools that are used by federal, state, and local management and regulatory agencies to make important decisions about the nation's groundwater resources. It was created in 1995.	$60,000[j]
USGS Toxic Substances Hydrology Program	This program was created in 1982 to provide scientific information and tools that explain the occurrence, behavior, and effects of toxic substances in the nation's hydrologic environments. Program results support decision making by resource managers, regulators, industry, and the public. Work is performed by USGS scientists who collaborate with a wide range of federal and nonfederal organizations and individuals.	[f]
Water Resource Research Act Programs	This program, dating back to 1964, provides an institutional mechanism for promoting state, regional, and national coordination of water resources, research, and training. It comprises a network of institutes to facilitate research and information technology transfer. With its matching requirements, it is also a mechanism for promoting state investments in research and training.	[f]

Program name	Purpose	Program expenditures (1992-2001)[a]
Earth Surface Dynamics Program - Central Great Lakes Geologic Mapping Coalition	This 1998 initiated research program provides scientific information to evaluate natural coastal processes and understand human-induced changes. It develops predictive models of natural systems and the effects of human activities on them, and the capability to predict future changes. Program data is used to guide the preservation and sustainable development of the nation's marine and coastal environments.	$2,977,000[p]
Department of Homeland Security-Coast Guard		
National Invasive Species Act/Ballast Water Program	Under this program, the Secretary of Transportation issues national guidelines to prevent the introduction of aquatic nuisance species into U.S. waters by ships.	$8,000,000[s]
Oil Spill Removal Organization Program	This is a voluntary pollution prevention program created by the Coast Guard to assist facility and vessel responders in writing their oil spill response plans.	[f]
Environmental Protection Agency (EPA)		
Air Program	The purpose of this program, which began in 1970, is to (1) protect and enhance the quality of the nation's air resources, (2) initiate and accelerate a national research and development program to achieve the prevention and control of air pollution, (3) provide technical and financial assistance to state and local governments in connection with the development and execution of their air pollution prevention and control programs, and (4) encourage and assist the development and operation of regional air pollution prevention and control programs.	[f]
Aquatic Stressors Research Program	The goal of this research program, which began in 1975, is to advance scientifically sound approaches for monitoring trends in ecological conditions of the nation's aquatic resources, including the Great Lakes; identify impaired watersheds and diagnose causes of degradation; and develop risk-based assessments for supporting restoration and remediation decisions.	[f]
Children's Health Program	This program (1) identifies and evaluates children's health issues, (2) develops approaches for addressing these issues, and (3) prioritizes and implements appropriate actions on children's health issues. This 1997 program funds pollution prevention activities and is largely a voluntary program building state capacity in human health.	[f]
Clean Water Act (CWA) Water Quality Monitoring and Section 106 Grants	Operating since 1972, this program develops and implements comprehensive monitoring programs at the state and tribal levels to address all water quality management needs under the CWA. Section 106 Grants awards grants to states and to eligible Indian tribes as base program support to maintain their surface water and groundwater programs.	[f]
Clean Water State Revolving Fund	The purpose of this program is to provide grants to states for long-term financing for construction of wastewater treatment facilities and implementation of state management plans. This program began in 1972.	[f]
Drinking Water State Revolving Fund	This program provides grants to states to establish drinking water state revolving funds, whose purpose is to support drinking water system infrastructure improvements. These grants provide loans and other types of financial assistance to eligible public water supply authorities. The program started in 1996.	[f]
Environmental Justice Small Grants	This program, which began in 1994, provides financial assistance to grassroots community-based groups to support projects to design, demonstrate, or disseminate practices, methods, or techniques related to environmental justice.	$256,047[m]

Program name	Purpose	Program expenditures (1992-2001)[a]
Environmental Justice Through Pollution Prevention Grants	This pollution prevention program provides low income, minority communities with pollution prevention resources to address community environmental issues. This program started as a pilot program in 1995 through discretionary funds, but the last year of funding was 2001.	[f]
Environmental Monitoring and Assessment Program	The goal of this program is to advance scientifically sound approaches for monitoring trends in ecological conditions of the nation's aquatic resources, including the Great Lakes. The program identifies impaired watersheds and diagnoses causes of degradation and forecasts risk-based assessments and options to support restoration and remediation decisions. This research program began in 1989.	[f]
Food Quality Protection Act/Strategic Agricultural Initiative	The purpose of this program is to ensure continuing safety of the nation's food supply by promoting the transition from potentially hazardous conventional pesticides to pesticides with reduced risk to human health and the environment. This program started in 1998.	[f]
Global Climate Change Research Program	The goal of this program is to advance scientifically sound approaches for monitoring trends in ecological conditions of the nation's aquatic resources, including the Great Lakes. Program activities identify impaired watersheds and diagnose causes of degradation. This research program began in 1975.	[f]
Indian Environmental General Assistance Program	This 1992 program assists federally recognized Indian tribes and nations to build their overall capacity to manage environmental programs and conduct activities.	[f]
National Pollution Discharge Elimination System	The goal of this program is to assure that U.S. waters remain fishable, swimmable, and drinkable, through regulating point source discharges to surface water. The program ensures that discharges do not cause or contribute to a violation of water quality standards. This program started in 1972 and is largely delegated to states.	[f]
Non-Point Source Program	The purpose of this program is to attain the goals of the CWA. This restoration and pollution prevention program started in 1987.	[f]
Polychlorinated Biphenyls (PCB) Program	This program was created in 1980 to conduct several activities related to PCBs. These activities include reviewing and tracking projects involving the remediation, storage, and disposal of PCBs; conducting inspections to determine compliance with federal PCB regulations; and conducting projects for reducing the use of PCBs. This program includes cleanup and pollution prevention.	[f]
Pollution Prevention (P2) Demonstration Grants	This program provides grants for capacity building and for innovative pollution prevention projects, especially those projects having potential for regional impacts. Funded projects include supporting the Great Lakes regional P2 roundtable, providing technical assistance, and coordinating P2 partnerships. This pollution prevention program began in 1993.	[f]
Pollution Prevention for States Grant Program	The goal of this grant program is to promote strategies and solutions that assist businesses and industries in reducing waste at the source. The majority of grants fund state-based projects in areas of technical assistance and training, education and outreach, regulatory integration, data collection and research, demonstration projects, and recognition programs. This pollution prevention program began in 1991.	[f]
Public Water Supply Program	The purpose of this program is to ensure that clean and safe drinking water is provided to the public. This program was created in 1974.	[f]

Program name	Purpose	Program expenditures (1992-2001)[a]
Resource Conservation and Recovery Act (RCRA) Brownfields	The goal of the program is to encourage re-use of properties that have been stigmatized by the presence of, or perception of, environmental contamination. This restoration program began in 1998.	[f]
RCRA Subtitle C Enforcement and Compliance Program	This program provides for the on-site evaluation and inspection of hazardous waste sites to enforce compliance with regulations designed for protecting human health and the environment and conserving valuable material and energy resources. This program, started in 1976, involves cleanup, restoration, and pollution prevention.	[f]
RCRA Subtitle C Hazardous Waste Management Program Support	This program assists state governments in the development and implementation of an authorized state hazardous waste management program for the purpose of controlling the generation, transportation, storage, and disposal of hazardous waste. Funding first began in 1978.	[f]
RCRA Subtitle C Corrective Action Program	The goals of this program are evaluating the potential environmental risk impacts from RCRA-regulated hazardous waste facilities, ensuring adequate facility investigation, ensuring cleanup of contaminants, and managing facilities' long-term controls for the protection of human health and the environment. This cleanup and restoration program started in 1980.	[f]
RCRA Subtitle C Permitting	The purpose of this program is to issue permits that allow for monitoring the handling of hazardous waste to ensure better waste management and restoration of contaminated waste sites through a regulated permitting program. This program started in 1980, and it addresses restoration and pollution prevention in accordance with RCRA regulations.	[f]
RCRA Subtitle D Solid Waste Management Assistance Program/Jobs Through Recycling Initiative	The purpose of this program is to promote use of integrated solid waste management systems to solve municipal solid waste generation and management problems at the local, regional, and national levels. The program provides assistance to state, local, and tribal governments and organizations to increase waste diversion from landfills and incinerators. This pollution prevention program started in 1976.	[f]
RCRA Subtitle D Tribal Solid Waste Assistance Grants	This 1993 program was created to assist tribes to achieve solid waste management and promote compliance with the provisions of RCRA Subtitle D. This is a cleanup, restoration, and pollution prevention program.	[f]
RCRA Subtitle I Underground Storage Tanks and Leaking Underground Storage Tanks	This program regulates the use of underground storage tanks and requires cleanup of releases and spills. This cleanup program started in 1989.	[f]
Regional Geographic Initiative (RGI)/Environmental Priorities Program (EPP)	The purpose of RGI is to (1) fund projects that are identified as high priority, (2) support geographic place-based projects, (3) address multimedia problems, and (4) highlight agency priorities and strategies. The purpose of EPP is to fund projects or purchases that aid in environmental protection. These activities were started in 1994, and they include research, cleanup, restoration, and pollution prevention.	$6,753,937[t]
State and Tribal Environmental Justice (EJ) Program	This program was created to provide capacity building financial assistance to states and tribes that are working to address EJ issues. This program started in 1998.	[f]
Superfund	The goal of this program is to protect human health and the environment from risks associated with abandoned hazardous waste sites and to respond to hazardous substance spill emergencies. The primary focus of the program is the assessment and remediation of long-term cleanups. This cleanup program was created in 1980.	$749,149,250[u]

Program name	Purpose	Program expenditures (1992-2001)[a]
Total Maximum Daily Load Program	The purpose of this 1973 program is to identify waters not meeting state water quality standards, and for those waters, calculate the maximum amount of a pollutant the water can receive and still meet water quality standards. This is a restoration program according to EPA officials.	[f]
Tribal Solid Waste Assistance Grants	This 1993 program was created to assist tribes in solid waste management and promote compliance with the provisions of RCRA Subtitle D. This is a cleanup, restoration, and pollution prevention program.	[f]
Underground Injection Control	The program was created to protect underground sources of drinking water by controlling underground injection. This is a pollution prevention program.	[f]
Waste Pesticide Collection Program (Agricultural Clean Sweep or Waste Pesticide Disposal)	This pollution prevention program achieves reductions in persistent bioaccumulative toxins and prevents contamination of air, soil, and water resources by safely disposing of pesticides. This program started in 1988.	$194,000[j]
Water Quality Management Planning	The purpose of this program, which began in 1972, is to promote the enhancement of water quality through water quality management planning. This program involves both restoration and pollution prevention.	[f]
Water Quality Standards Program	The purpose of this program is to support efforts to restore and maintain the chemical, physical, and biological integrity of the nation's waters by defining the uses to be protected and the water quality conditions needed to protect these uses.	[f]
Wetlands	The goal of this 1972 program is to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Wetland Program Development Grants are designed to assist state, tribal, and local government agencies in building their wetland management programs.	$129,000[v]

Sources: The Corps, ARS, CSREES, FSA, FS, NRCS, NOAA, FWS, USGS, Coast Guard, EPA, and GAO.

[a]Unless otherwise noted, the funding figures in this column represent program federal fiscal year expenditures.

[b]Funding represents fiscal years 1998 through 2001.

[c]Funding represents fiscal years 1997 through 2001.

[d]Funding represents fiscal years 1994 through 2001.

[e]Funding is for all Great Lakes states, except for Pennsylvania. Figures were only available for fiscal years 1999 and 2000.

[f]Great Lakes Basin funding is not known for this nationwide program.

[g]Funding amounts are for the Huron-Manistee, Ottawa, and Hiawatha Forests, all of which are entirely within the Great Lakes Basin. There is additional funding within the basin, but the precise amount could not be determined.

[h]Funding represents fiscal years 2000 and 2001.

[i]Funding represents fiscal year 2001.

[j]Funding represents fiscal years 1993 through 2001.

[k]This program did not receive any specific funding for the Great Lakes Basin for this time period.

[l]Funding is for fiscal years 1995 to 2001. Support totaling $47.9 million has come in from additional sources over the same time frame. All Sea Grant programs and projects are matched to at least the 50 percent level by nonfederal funds from academia, state agencies, industry, or other sources.

[m]Funding represents fiscal years 1995 through 2001.

[n]Funding represents fiscal years 1999 through 2001.

[o]Funding represents base funding. Department of Interior provides approximately $850,000 more in competitive funding annually.

[p]This funding is for fiscal years 1998 through 2001 and it was provided by several different sources, including the program's specific funding authority.

[q]Funding for this program came from the Department of Defense.

[r]Funding amounts are appropriated funds.

[s]Funding is approximate. The agency did not respond to our survey, so the figures were obtained from the report entitled *The Great Lakes at the Millennium: Priorities for Fiscal 2001*, prepared by the Northeast-Midwest Institute.

[t]Funding amount is for Region 2 and Region 5.

[u]Funding amount is for Region 3 and Region 5.

[v]Funding amount is for Region 2 only.

Table 6 contains a listing of the non-Great Lakes specific programs managed by state agencies.

Table 6: State Non-Great Lakes Specific Programs

Program name	Purpose	Program expenditures (1992-2001)[a]
Indiana Department of Natural Resources (IDNR)		
Lake and River Enhancement Program	This program started in 1987, and it funds restoration activities by providing technical and financial assistance for projects that reduce nonpoint source sediment and nutrient pollution in Indiana's and adjacent state's surface waters.	[b]
Michigan Department of Environmental Quality (MDEQ)		
Michigan State University Forestry Department Dendroremediation	This is a research program administered by Michigan State University. The project began in fiscal year 2000 and funds activities to determine the existence of woody plants, especially native species that would be useful for various approaches to the remediation of heavy metals in soil and/or groundwater. The program also looked to determine whether plants adapted to growing on a site with elevated heavy metals in soils results in greater tolerance for, and ability to takeup, heavy metals.	$594,888
Minnesota Board of Water and Soil Resources (MBWSR)		
Comprehensive Local Water Planning Challenge Grant Program	The challenge grant program began in 1989, and it funds priority projects identified by local governments in their local water plans. It funds restoration activities by providing financial and technical assistance to counties for development and implementation of local water plans.	$428,732[c]
Erosion, Sediment Control, and Water Quality Cost-Share Program	This program was initiated in 1977, and it provides funds to soil and water conservation districts for cost-sharing conservation projects that protect and improve water quality by controlling soil erosion and reducing sedimentation. This restoration program provides technical and financial assistance to landowners who install permanent nonproduction-oriented practices to protect and improve soil and water resources.	$1,293,298[c]
Lakeshore Engineering Program	This program was created in 1991 to support local governments' large erosion control projects on Lake Superior shores by providing engineering assistance, education, and best management practices. Its activities relate to restoration and research to control erosion from private and public shorelines.	$976,313[d]
Local Water Planning and Wetland Conservation Act	This block grant program began in 1985 to assist local governments in implementing four state-mandated programs. Water planning grants are available for restoration activities related to implementing comprehensive water plans and the local administration of grants.	$3,205,505[e]
Minnesota Department of Commerce (MDOC)		
Petroleum Tank Release Cleanup Fund (Petrofund)	The petrofund program was created in 1987 to fund the replacement or upgrade of all underground petroleum storage tanks by 1998. The program provides financial assistance to owners and operators of petroleum storage tanks to assist in cleaning up contamination or replacing leaking tanks. Available program funding is capped at $1 million per project.	$18,514,720[f]

Program name	Purpose	Program expenditures (1992-2001)[a]
Minnesota Department of Natural Resources (MDNR)		
Conservation Partnership Program	This program was started in 1995 to provide grants to private organizations and local units of government for activities related to restorations of fish, wildlife, and native plant habitats. The program also funds research to improve fish and wildlife habitats.	[b]
Environmental Partnership Grant Program	This grant program was initiated in 1997 to provide funding for private companies and local governments for research, cleanup, pollution prevention, and education projects that deal with environmental conservation principles.	[b]
Minnesota Pollution Control Agency (MPCA)		
Basin Planning	MPCA created this program in 1995 to coordinate water management efforts around the state's 10 major drainage basins by focusing financial and staff resources upon key water resource management priorities. The program provides support to local and state agencies and citizen groups to develop watershed plans for making sound resource management decisions. Program activities included research, cleanup, restoration, and pollution prevention.	$175,000[g]
Clean Water Partnership	The program was created in 1987 to fund activities related to runoff from agricultural and urban areas. The program provides funds to local governments for projects that protect and improve lakes, streams, and groundwater resources in Minnesota. Funds can be requested for research, cleanup, restoration, or pollution prevention projects.	$2,613,798[h]
Minnesota Environmental Response and Liability Act	This is Minnesota's Superfund program. It was created in 1983 to fund activities related to investigating and cleaning up releases of hazardous substances or contaminants. As of 1989, the program's authority included funding to investigate and clean up contamination from agricultural chemicals.	$864,410[h]
Minnesota Landfill Cleanup Program (Closed Landfill Program)	This cleanup program was created in 1994 as an alternative to using the federal and state Superfund laws to address the cleanup and long-term maintenance of 106 closed municipal sanitary landfills in the state. Eight of these landfills are in the Lake Superior watershed. Funds are provided for cleanup activities only.	$485,135[i]
Minnesota Mercury Initiative	The purpose of this program is to help reduce mercury contamination in Minnesota fish. Because about 98 percent of mercury in Minnesota waters is due to air deposition, the state looked for ways to reduce mercury in the air. The program solicits voluntary mercury emission reductions from large companies.	[b]
Voluntary Petroleum Investigation and Cleanup	This program was created in 1996 to provide technical assistance and liability assurance to expedite and facilitate the development, transfer, and investigation and/or cleanup of property that is contaminated from petroleum products. MPCA provides technical oversight for this cleanup program.	[b]
New York Department of Environmental Conservation (NYDEC)		
Clean Water and Clean Air Bond Act	This program was established in 1996. It consolidates the funding application processes of several state agencies and programs with a focus on cleanup, restoration, water resource improvement, pollution prevention, nonpoint source abatement, aquatic habitat restoration, safe drinking water system improvement, solid waste management, and other environmental conservation efforts.	$428,820,724[j]

Program name	Purpose	Program expenditures (1992-2001)[a]
Environmental Protection Act and Fund	The purpose of this program is to address the cleanup, restoration, historic preservation, land and open space conservation, and waterfront revitalization of New York watersheds. Proposed projects are reviewed under the consolidated bond application process.	$97,154,829[j]
Fish and Wildlife Conservation Act and Environmental Conservation Fund	This program was created in 1972 to provide the necessary resources to support the state's critical fish and wildlife conservation programs by focusing on the care, management, protection, and enlargement of fish and wildlife resources through research and restoration. Activities also include habitat improvement and enforcement.	$2,500,000[j]
New York State Environmental Quality Protection Fund (Superfund)	This program was started in 1980 in response to the federal Superfund. The state's Superfund program is focused on the investigation, emergency response, and enforcement of cleanups at hazardous waste sites.	[k]
Ohio Department of Natural Resources (ODNR)		
Dam Safety	Created in 1963, the purpose of this regulatory program is to protect the citizens of Ohio from flooding due to dam failure. The program provides support to the owners of dams and residents in downstream areas by permitting the construction of new dams and dikes, approving repairs to existing dams and dikes, and responding to safety emergencies.	[b]
Ground Water Resources	This program was started in 1959, and it seeks to collect, maintain, interpret, and distribute information on the groundwater resources of Ohio in both the Lake Erie and Ohio River basins. Its basic purpose is to foster the development of groundwater as a viable and sustainable water supply for the citizens of the state.	[b]
Hydraulic/Canal Operations	This program was created during the 1800s to operate and maintain the watered portions of the historic Miami/Erie and Ohio/Erie Canals, including water supply distribution, storm water control, historic preservation and recreation. Residents and properties adjacent and downstream from the canal and reservoirs are protected from flooding through the operation of hydraulic structures.	[b]
Pollution Abatement Cost Share	Since 1979, this program has provided funding to landowners to assist in the installation of needed best management practices that abate animal waste pollution, soil erosion, or degradation of the state's waters by soil sediment.	[b]
Water Inventory and Stream and Water Gauging	The purpose of this program, created in 1959, is to collect, compile, analyze, and disseminate hydrologic and climatological data and information concerning all aspects of the hydrologic cycle, operate the statewide groundwater observation well network, and administer cooperative agreements with USGS for stream gauging and other water resource projects.	[b]
Water Planning	This program was created in 1959 to address the need for water supply planning on a regional and statewide basis. It also includes administering the Lake Erie and Ohio River basins' diversion permit and consumptive use permit programs, water resource inventory, and the Lake Erie Basin Plan.	[b]
Ohio Environmental Protection Agency (OEPA)		
Clean Ohio Fund	This program, which began in 2001, awards grants for cleanup and restoration of polluted areas and the preservation and conservation of green space and farmland. The first grant was not awarded until 2002.	[b]

Program name	Purpose	Program expenditures (1992-2001)[a]
Pennsylvania Department of Environmental Protection (PDEP)		
Growing Greener Grant Program	This program began in 1999 to address critical concerns related to education and outreach, as well as wetland restoration, soil erosion and sedimentation controls, and creek assessments in Lake Erie tributaries.	$700,000[l]
Pennsylvania Coastal Zone Program	This program was created in 1980 to support studies of evasive species, bluff evaluations, and property preservation activities identified by the Office of the Great Lakes.	$938,000[m]
Wisconsin Department of Commerce (WDOC)		
Brownfields Grant Program	This grant program began in 1998 to provide financial assistance for Brownfields redevelopment and related environmental remediation projects. It also funds associated environmental remediation activities with emphasis on cleanup and restoration.	[b]
Wisconsin Department of Natural Resources (WDNR)		
Dry Cleaner Fund	This environmental response program was created in 1997 to provide financial assistance awards for reimbursement of certain eligible costs to investigate and remediate contamination from dry cleaning solvents at current and certain former dry cleaning facilities. Program efforts are focused on cleanup and restoration.	[b]
Runoff Management Program	This program began in 1998 and is aimed at abating urban and rural polluted runoff. Three components of the program include (1) implementation of the voluntary Priority Watershed/Lake Projects, (2) point source permitting of storm water and agricultural runoff sources, and (3) implementation of state regulatory performance standards. Its primary focus is research and cleanup.	[b]
Site Assessment Grants	This grant program was started in 2000 to provide local governments with grants to perform the initial investigation of contaminated properties and certain other eligible activities. Its focus is the restoration and cleanup of abandoned, idle, or underused industrial or commercial facilities and sites.	[b]
State Funded Response Program (Environmental Repair)	This is the state's version of the Superfund program, authorized in 1978, but not started until 1985. The program focuses on the cleanup and restoration of all types of hazardous substance sites, including unlicensed or abandoned sites, and can also be used to respond to hazardous substance spills.	[b]
Sustainable Urban Development Zone Program	This 1999 WDNR pilot program operates in cooperation with other state agencies and the cities of Milwaukee, Green Bay, La Crosse, Oshkosh, and Beloit. It seeks to promote the use of financial incentives to clean up, restore, and redevelop contaminated properties in the five cities. Funds may be used to investigate environmental contamination and clean up Brownfields properties in the cities.	$1,700,000[n]

Sources: IDNR, MDEQ, MBWSR, MDOC, MDNR, MPCA, NYDEC, ODNR, OEPA, PDEP, WDOC, WDNR, and GAO.

[a]Unless otherwise noted, the funding figures in this column represent program state fiscal year expenditures.

[b]Program officials could not provide specific Great Lakes funding for this statewide program.

[c]This funding was only for those counties that reside within the Great Lakes Basin.

[d]This amount was provided from 1993 through 2001. It includes total grant funds and 80 percent of the administrative salary costs for the engineer.

[e]This program requires a dollar-for-dollar match by local government.

[f]These funds were spent in the Lake Superior watershed to clean up 628 sites. A 2 percent fee on bulk petroleum sales generates the funding.

[g]This figure relates to Lake Superior funding only for this statewide program.

[h]This figure is a 10 year average and relates to Lake Superior funding only.

[i]This funding was provided from 1995 through 2001, and only for the eight Great Lakes specific sites.

[j]These funds were either expended or committed for Great Lakes Basin projects during the period 1998 through 2001 (state fiscal year).

[k]Program officials could not identify the Great Lakes funding for this statewide program; however, responsible parties have provided more than $400 million for cleanup actions.

[l]Program funding covers state fiscal years1999 through 2001.

[m]This funding figure is for state fiscal year 2001 only.

[n]This amount was identified as the expenditure during state fiscal years 2000 and 2001 by three of the cities. It is not total Great Lakes spending.

Appendix III: Corps of Engineers Special Authorized Projects in the Great Lakes Basin, Fiscal Years 1992 through 2001

State	Project title	Program description	Amount
Illinois			
	Des Plaines River, Ill.	Flood damage reduction - The purpose of this project was to develop measures to reduce or prevent damage from flooding to areas, such as reservoirs, and levees; make channel modifications; remove threatened structures from flood-prone areas; and enhance flood plain management.	$2,496,507
	Kankakee River Basin	Flood damage reduction	1,591,856
	Illinois Shore Erosion	Stream bank and shoreline protection – This project was designed to protect public structures or facilities from damages caused by stream bank erosion or flooding caused by waves from coastal storms, to include hardened protective structures.	254,177
	Chicago River North Branch 1946	Navigation improvements – These projects may involve new channels and structures, such as breakwaters and piers or modifications to existing navigation facilities, such as deepening or lengthening navigation channel.	64,100
	Southeast Chicago, Ill.	Flood damage reduction	595,800
	Waukegan Harbor, Ill.	Flood damage reduction	338,128
	Casino Beach, Ill.	Erosion control – The purpose of this project is providing erosion control.	2,111,815
	Illinois Beach State Park	Ecosystem restoration – These projects seek to restore, protect, or enhance aquatic habitat, such as wetlands and spawning areas, and include efforts to restore degraded lakes and rivers, remove contamination, and provide natural vegetation.	160,640
	McCook & Thornton Reservoir	Flood damage reduction	32,770,600
	Kankakee River Icebreaker	Flood damage reduction	9,200
	North Branch Chicago River	Flood damage reduction	6,754,844
	O'Hare Reservoir	Flood damage reduction	28,088,930
	Chicago Shoreline	Streambank and shoreline protection	93,824,976
	Illinois & Michigan Canal	Navigation improvements	307,100
	Chicago Sanitary & Ship Canal	Ecosystem restoration	1,778,721
	Des Plaines Wetlands Project	Flood damage reduction	183,308
			$171,330,702
Indiana			
	Beauty Creek Watershed, Ind.	Flood damage reduction	$95,900
	Deep River Basin, Ind.	Flood damage reduction	68,600
	Long Lake, Ind.	Ecosystem restoration	75,000
	Hammond, Ind.	Streambank and shoreline protection	42,000
	Little Calumet River Basin, Dyer, Ind.	Flood damage reduction	310,700
	Little Calumet River Basin Township	Flood damage reduction	82,900
	Lake George	Flood damage reduction	1,117,300
	Little Calumet River, Cady Marsh Ditch	Flood damage reduction	1,355,588
	Indiana Shore Erosion	Erosion control	8,239,944
	Little Calumet River	Flood damage reduction	78,770,000
	Indiana Harbor CDF	Navigation improvements	1,297,300

State	Project title	Program description	Amount
	Burns Waterway Harbor, Ind.	Navigation improvements	13,384,194
	Calumet Region, Ind.[a]	Environmental infrastructure	58,903
	Wolf Lake, Ind.	Ecosystem restoration	98,700
	Fort Wayne Metro Area, Ind.	Flood damage reduction	33,944,000
			$138,941,029
Michigan			
	Clinton River Spillway, Mich.	Flood damage reduction	$2,403,300
	Cedar River Harbor, Mich.	Navigation improvements	193,000
	Great Lakes Connecting Channels & Harbors, Mich.	Navigation improvements	300,800
	Great Lakes Connecting Channels & Harbors Replacement Lock, Mich.	Navigation improvements	2,740,000
			$5,637,100
Minnesota			
	Silver Bay Harbor, Minn.	Navigation improvements	$2,600,100
	Knife River Harbor, Minn.	Navigation improvements	116,000
	Duluth-Superior Harbor, Minn. & Wisc.	Navigation improvements	645,400
			$3,361,500
New York			
	New York State Barge Canal	Navigation improvements	$25,479
	Onondaga Lake, N.Y.[a]	Environmental infrastructure	4,169,999
	Onondaga Lake, N.Y. PL 101-596	Environmental infrastructure	2,864,213
	Olcott Harbor, N.Y.	Navigation improvements	1,056,243
	Buffalo Flood and Water Quality	Environmental infrastructure	435,987
	Ellicott Creek, N.Y.	Flood damage reduction	131,307
	Oneida Lake, N.Y.	The purpose of this project is ecosystem restoration and flood damage reduction.	68,881
	Hamlin and Lakeside Beach State Park	Stream bank and shoreline protection	47,887
			$8,799,996
Ohio			
	Cleveland Harbor Recon Study	Navigation improvements	$292,994
	Cleveland Harbor Phase I	Navigation improvements	4,001,960
	Reno Beach, Howard Farms	Flood damage reduction	4,357,730
	Ottawa River, Ohio	Navigation improvements	183,000
	Ohio Infrastructure[a]	Environmental infrastructure	160,840
	Maumee River, Ohio	Flood damage reduction	102,037
	Western Lake Erie Basin	The purpose of this project is flood damage reduction and ecosystem restoration.	67,164
	Cayuga Creek Watershed	Flood damage reduction	25,868
	Sandusky River, Tiffin, Ohio	Flood damage reduction	71,722
			$9,263,315

State	Project title	Program description	Amount
Pennsylvania			
	Presque Isle, Penn. Permanent	Stream bank and shoreline protection	$15,295,637
	Erie Harbor, East Canal Basin, Penn.	Environmental infrastructure	5,480,000
			$20,775,637
Wisconsin			
Wisconsin had one project that was jointly shared with Minnesota.			0
Total			**$358,109,279**

Sources: Corps of Engineers and GAO.

[a] According to the Corps, this special project was authorized as an open-ended project without a stated expiration time frame. Project funding could be appropriated several years into the future.

Appendix IV: Federal and State Great Lakes Specific Programs, Fiscal Years 1992 through 2001

Table 7 contains a listing of the federal programs that specifically fund activities in the Great Lakes Basin.

Table 7: Federal Great Lakes Specific Programs

Program name	Purpose	Program expenditures (1992-2001)[a]
Army Corps of Engineers		
Great Lakes Fishery and Ecosystem Restoration	The purpose of this fiscal year 2000 program, which began in 2002, is to plan, design, and construct projects to restore Great Lakes fisheries and their beneficial uses.	[b]
Great Lakes Remedial Action Plans and Sediment Remediation	This program was started in 1990 to plan, design, and construct research demonstration projects of promising technologies for contaminated sediment remediation.	[c]
Great Lakes Remedial Action Plans and Sediment Remediation Support	This program, which was authorized in 1990, is designed to provide technical support focused on the development and implementation of remedial action plans to clean up the Great Lakes' areas of concern.	$2,595,600[d]
Great Lakes Tributary Models	This program was created in 1996. Its purpose is to develop computer models of sediment loading and transport to Great Lakes tributaries to support state and local conservation and pollution prevention activities.	$1,103,424
Department of Agriculture-Natural Resources Conservation Service		
Great Lakes Basin Program for Soil Erosion and Sediment Control	Originally authorized in 1936, the program, as amended, funds pollution prevention projects that improve Great Lakes water quality by promoting soil erosion and sediment control through information and education programs, grants, technical assistance, and coalition building.	$3,625,000[e]
Department of Commerce-National Oceanic and Atmospheric Administration		
Episodic Events, Great Lakes Experiment	This research program began in 1997 to create a modeling program for seasonal sediment resuspension. It assesses the (1) impact on transporting and the transformation of chemically important materials and (2) effect on Lake Michigan ecology.	$3,792,000[f]
Great Lakes Environmental Research Laboratory	This program was established in 1970 and established the Great Lakes Environmental Research Laboratory to conduct physical, chemical, and environmental modeling research and to provide scientific expertise and services to manage and protect ecosystems.	$63,401,000[g]
Department of Health and Human Services-Agency for Toxic Substances and Disease Registry		
Great Lakes Human Health Effects Research Program	This is a community-based research program that began in 1992, with emphasis on public health education and intervention strategies. Its goal is to prohibit exposure to toxic chemicals and prevent adverse health outcomes in citizens of the Great Lakes.	$24,400,000[h]
Department of Interior-Fish and Wildlife Service		
1836 Fisheries Treaty - Implementation of the August 7, 2000 Consent Decree	This program was mandated in 2000 by a Federal District Court decree. It requires FWS to increase lake trout stocking for restoration programs and to evaluate factors impeding lake trout restoration. It also provides technical assistance to five Native American tribes in the Chippewa-Ottawa Resource Authority, the State of Michigan, and selected federal agencies involved with managing sport and commercial fisheries in certain areas of Lakes	$695,000

Program name	Purpose	Program expenditures (1992-2001)[a]
	Superior, Huron, and Michigan.	
Blue Pike Activities in the Great Lakes	This is a research program that was started in 1993 to establish the scientific relationships among the original Lake Erie blue pike, the recently caught "blue walleyes," and other closely related species using genetic analysis of their DNA.	[i]
Ecosystem Management in the Lower Great Lakes	This program was created in 1990 to develop and adopt aquatic community and habitat goals and objectives. It also develops and conducts comprehensive and standardized ecological monitoring to support ecosystem management.	[i]
Evaluation and Restoration of Great Lakes Estuaries and Tributaries	The purpose of this program, which began in 1992, is to identify, inventory, protect, and rehabilitate significant aquatic habitats, including those used by fish and wildlife for spawning, breeding, nesting, rearing, and feeding.	[i]
Great Lakes Coastal Program	This program, which began in 2000, funds projects that seek to protect and restore Great Lakes coastal ecosystems for the benefit of fish, wildlife, and people. Its goals are to identify and prioritize coastal habitats and conduct research to evaluate ecosystem health, identify threats, and lend biological focus to the planning processes of other agencies.	$500,000[j]
Great Lakes Fish and Wildlife Restoration Act	Since 1991, this program has developed and implemented proposals for restoration of fish and wildlife resources in the Great Lakes Basin. It has provided assistance to the Great Lakes Fishery Commission, states, Indian tribes, and others to encourage cooperative conservation, restoration, and management of the fish and wildlife resources and their habitats.	$10,512,000[k]
Great Lakes Lake Sturgeon Rehabilitation Program	This program started in 1993, and it funds projects that seek to conserve, rehabilitate, and reestablish self-sustaining populations of lake sturgeon to levels that permit delisting from state and federal endangered species lists. Objectives include identification and restoration of critical habitat and public education.	$246,650[l]
Lake Ontario Atlantic Salmon Reintroduction Program	This research program was started in 1993 to determine the feasibility of re-introducing/restoring Atlantic salmon to the Lake Ontario watershed.	[i]
Lake Ontario/St. Lawrence River American Eel Restoration Program	This research program, which started in 1997, provides research funds to protect and enhance the abundance of American eel populations in the Lake Ontario/St. Lawrence River watershed.	[i]
Lower Great Lakes Lake Trout Restoration Program	The purpose of this program is to rehabilitate the lake trout population of Lakes Erie and Ontario so the new population can become self-sustaining through natural reproduction and produce a harvestable annual surplus. Program activities began in the late 1970s.	[i]
Lower Great Lakes Ruffe Surveillance Program	This 1993 program provides funding for surveillance of invasive species to ensure prompt detection of new populations of ruffe and monitor or track expansions of already existing populations.	$241,439[m]
National Fish Hatchery System - Great Lakes Operations	This program began operation in 1950 to manage, produce, and stock native coaster brook trout and lake trout from native Great Lakes strains. This program is part of the interagency restoration programs coordinated through the Great Lakes Fishery Commission, and is based on a strategic plan for management of Great Lakes Fisheries.	$18,205,000

Program name	Purpose	Program expenditures (1992-2001)[a]
New York State Canal System Aquatic Nuisance Species Program	This is a multifaceted program started in 1998. It includes various components to address aquatic invasive species issues within the Canal system. It seeks to work with partner agencies to detect, monitor, and manage populations of aquatic invasive species inhabiting or transiting the Canal and implement prevention strategies as appropriate.	$221,342[n]
Department of Interior-National Park Service		
Midwest Region - Great Lakes Strategic Plan Activities	The purpose of this 1993-initiated program is to foster research cooperation among state and federal agencies involved with natural resource issues of mutual interest. These issues include aquatic exotic species, such as the sea lamprey, shoreline stabilization and monitoring, bald eagle monitoring, near shore fisheries, beach nourishment and fecal coliform issues, air quality, and cultural resource issues.	$6,127,000[o]
Environmental Protection Agency		
Integrated Atmospheric Deposition Network	This program, initiated in 1990, assesses the health of the Great Lakes ecosystem through a series of air-monitoring stations in cooperation with Canada. It provides information to measure the amounts of chemicals and toxic substances deposited into the Great Lakes through air deposition to establish trend analysis and cause/effect relationships.	[p]
Coastal Environmental Management	The purpose of this program, which started in 1991, is to provide grants that would assist in the preparation and implementation of lakewide management plans and remedial action plans for the areas of concern in the Great Lakes. This program addresses cleanup, restoration, and pollution prevention.	$59,100,000
Funding Guidance - Competitive Grants	This is a grant program in which GLNPO, in concert with Regions 2,3, and 5, funds a consortium of programs, agencies, and public and private institutions for reducing the level of toxic substances in the Great Lakes; protecting and restoring vital habitats; protecting human health; and restoring and maintaining stable, diverse, and self-sustaining populations. This program started in 1993, and it funds research, cleanup, restoration, and pollution prevention activities.	[p]
Great Lakes Air Deposition Grant Program	The goals of the Great Lakes Air Deposition Grant Program are to (1) better understand the impacts of deposition of pollutants to all water bodies in the Great Lakes region, (2) ensure continued progress in reducing sources and loadings of atmospheric deposition to the Great Lakes region, and (3) reduce the environmental and public health impacts associated with air emissions and subsequent atmospheric deposition. This research program began in 1993.	$11,135,500
Great Lakes Binational Toxics Strategy	The purpose of this program, which started in 1997, is to reduce and eliminate persistent toxic substances, especially those that bioaccumulate, in the Great Lakes. The strategy uses pollution prevention as a preferred approach. Research and cleanup are also components of this program.	[p]
Lakewide Management Plans	The purpose of the program is to protect the Great Lakes from beneficial use impairments for the "open waters" of each lake and to develop strategies to improve the environmental health of the lake. This program, initiated in 1987, is a cleanup, restoration, and	[p]

Program name	Purpose	Program expenditures (1992-2001)[a]
	pollution prevention program.	
Monitoring Program	The purpose of this research program, which began in 1975, is to assess the ecosystem health of the Great Lakes. Information is gathered to measure whole lake response to control measures using trend analysis and cause/effect relationships.	[p]
Niagara River and New York State Areas of Concern	The purpose of this program, started in 1987, is to restore and protect the beneficial uses in these areas of concern through a remedial action plan. Cleanup, restoration, and pollution prevention are goals of this program.	$2,086,250
Niagara River Toxics Management Plan	The purpose of this program is to reduce toxic chemical inputs to the Niagara River; achieve ambient water quality that will protect human health, aquatic life, and wildlife; and while doing so, improve and protect water quality in Lake Ontario. This program started in 1987 with the goal of cleanup, restoration, and pollution prevention.	$11,150,000
RCRA Subtitle C State Program Support - Great Lakes Initiative	The purpose of this program, started in 1992, is to assist states in developing and implementing an authorized state hazardous waste management program for the purpose of controlling the generation, transportation, storage, and disposal of hazardous wastes. Cleanup and pollution prevention are the goals of this program.	$22,009,710
State of the Lakes Ecosystem Conference	The purpose of this program, started in 1994, is to assess the ecosystem health of the Great Lakes and to provide information to measure whole lake response to control measures using trend analysis and cause/effect relationships.	[p]

Sources: The Corps, NRCS, NOAA, ATSDR, FWS, NPS, EPA, and GAO.

[a]Unless otherwise noted, the funding figures in this column represent program federal fiscal year expenditures.

[b]This program was authorized by WRDA in 2000, and first funded in 2002.

[c]Thus far, no funds have been expended for this program.

[d]The program was first funded in 1994.

[e]The Great Lakes funding first began in 1994.

[f]The amount expended is for fiscal years 1997 through 2001.

[g]NOAA provides base funding for the facility, which averaged over $6.3 million during the 10-year period, but many other federal and state agencies also provide research funds to the laboratory.

[h]The program is considered Great Lakes specific, but research project results would most likely be applicable both within and outside the basin.

[i]Funding to support this program comes from a portion of the annual allocation received by the lower Great Lakes Fishery Resources Office. The amount received from 1992 through 2001 was $2,770,450.

[j]Funding is for fiscal years 2000 and 2001 only.

[k]According to FWS, the authorizing act expires in 2004.

[l]Partial funding for fiscal years 1997 through 2001.

[m]Funding is for fiscal years 1995 through 2001, funding was first provided in 1995.

[n]Funding provided for fiscal years 1998 through 2001.

[o]This is not total funding; expenditures were not available for three known units.

[p]This is a GLNPO program. Funding for GLNPO programs was not available individually. Total GLNPO funding for 1993-2001 is $143,400,000.

[q]Funding provided for fiscal years 1993-2001.

Table 8 contains a listing of the state programs that specifically fund activities in the Great Lakes Basin.

Table 8: State Great Lakes Specific Programs

Program name	Purpose	Program expenditures (1992-2001)[a]
Illinois Environmental Protection Agency (IEPA)		
Illinois Great Lakes Protection Fund (GLPF)	The governors of the eight Great Lakes states created an endowment fund program in 1989. States contributed to the fund and received dividends to use for their Great Lakes projects. The Illinois GLPF program funds special studies and projects related to Great Lakes research, cleanup, restoration, or pollution prevention. The projects are selected as part of the states' budget process.	$5,000,000
Michigan Department of Environmental Quality (MDEQ)		
1988 Quality of Life Bond Fund	This $660 million general obligation bond program was initiated in 1988 to finance environmental programs focused on cleanup of toxic and other contamination sites. It provided funds to address problems relating to solid waste, sewage treatment and water quality, reusing industrial sites, and preserving green space. Funded activities included research, cleanup, restoration, and pollution prevention. The program was replaced by the Clean Michigan Initiative in 1998.	$492,000,000[c]
Clean Michigan Initiative	Michigan voters approved this $675 million general obligation bond program for environmental activities in 1998 to replace the Quality of Life Bond Fund. It is used for cleanup, restoration, or pollution prevention projects, and a portion of the fund is available for parks and monitoring activities.	$255,900,000[d]
Michigan Great Lakes Protection Fund (GLPF)	By mandate, Michigan's GLPF program only funds research projects undertaken by universities and for-profit groups in areas such as toxics and aquatic nuisance species. The research project agenda is determined each year by a MDEQ Technical Advisory Board and may be based on legislative direction, recommendations from MDEQ departments, or current environmental issues, such as ballast water.	$5,199,601[f]
Part 201 Programs	This is the state's version of the federal Superfund program that started in 1995. Its funding is provided by the state Cleanup and Redevelopment Fund, the Revitalization Revolving Loan Fund, the State Site Cleanup Fund, and the Municipal Landfill Cost-Share Grant Program. It can be used to fund research, cleanup, restoration, or pollution prevention.	$169,000,000
Michigan Department of Natural Resources (MDNR)		
Fisheries Research in Great Lakes and Inland Waters	This program funds research projects on fisheries populations, habitats, and anglers. The Fisheries Division of MDEQ began	[e]

Program name	Purpose	Program expenditures (1992-2001)[a]
	funding this research in the 1930s, and overtime it has grown in scope, with Great Lakes fisheries research stations opening in the early 1970s.	
Minnesota State Planning Agency (MSPA)		
Minnesota Great Lakes Protection Fund (GLPF)	By state statute, funds from Minnesota's GLPF can only be spent to protect water quality in the Great Lakes. Grants are awarded to finance projects that advance goals of the binational Toxic Substances Control Agreement and Water Quality Agreement. Projects involve research, cleanup, restoration, or pollution prevention activities.	$987,000[g]
New York Department of Environmental Conservation (NYDEC)		
New York Great Lakes Protection Fund (GLPF)	New York's GLPF program provides for overall intra- and interstate coordination and planning of the state's Great Lakes programs, and is a source of grants for research, data collection, technology development, policy analysis, and public outreach.	$1,494,053[h]
Ohio Department of Natural Resources (ODNR)		
Great Lakes Charter Programs	This suite of programs was created in response to the charter agreement signed by the Great Lakes governors. The purpose of this 1985 initiated program is to administer the Lake Erie-Ohio River Basin diversion and consumptive use permit programs called for under the charter. The program includes a water resource inventory and the Lake Erie Basin plans. Program funds support restoration, planning, and protection activities.	$600,000
Shore Structure Permit Program	Created in the 1930s, this program was transferred to ODNR in 1949 to assist coastal residents and communities in the proper design and construction of structures intended to control erosion, wave action, and flooding along the Ohio shore of Lake Erie. Program officials review construction permits for shore structures and provide technical assistance to shoreline property owners as it relates to structures involving shoreline erosion, lake access, and coastal flooding.	[i]
Submerged Lands Leasing	This program, which was established in 1917, reviews lease applications for the proposed and existing occupation of submerged lands by structures along the coast of Lake Erie. Leasing submerged land enables the state to manage the public trust and protect the rights of shoreline property owners. It provides technical assistance to shoreline property owners regarding shoreline erosion and lake access structures as it relates to flooding and erosion.	$2,084,296[j]
Ohio Environmental Protection Agency (OEPA)		
Ohio Lake Erie Commission/Lake Erie Protection Fund (Ohio Great Lakes Protection Fund - GLPF)	The Ohio GLPF program provides grants to fund research, support cleanup and restoration efforts, and educate nonprofit, government, or public entities seeking to protect or enhance Lake Erie.	$6,943,894
Pennsylvania Department of Environmental Protection (PDEP)		
Pennsylvania Great Lakes Protection Fund (GLPF)	The Pennsylvania GLPF provides grants to fund education, research, and monitoring activities.	$253,721
Pennsylvania's Office of the Great Lakes	This program began in 1995 and was created as the focal point for research, restoration, cleanup, and pollution prevention activities affecting the Great Lakes. This office works with other PDEP	$700,000[k]

Program name	Purpose	Program expenditures (1992-2001)[a]
	offices that provide the projects' funding.	
Wisconsin Department of Natural Resources (WDNR)		
Great Lakes Harbors and Bays Restoration Funding	This 1990 initiated program allows DNR to conduct activities to cleanup or restore environmental areas that are adjacent to, or a tributary of Lake Michigan or Lake Superior, if the activities are included in remedial action plans approved by the department.	$2,316,271
Wisconsin Great Lakes Protection Fund (GLPF)	The Wisconsin GLPF program provides funds to municipalities and other governmental units, groups, nonprofit organizations, universities and others for various projects. Funds are used for (1) implementing activities included in remedial action plans, (2) restoring or protecting fish and wildlife habitats in or adjacent to Lake Michigan or Lake Superior, or (3) planning or providing information related to cleaning up or protecting the Great Lakes.	$2,224,914
Great Lakes Salmon and Trout Stamp Program	This program was created in 1982 to provide funding for projects pertaining to Great Lakes fish stocking programs. The stocking program activities include evaluation, research, or species propagation.	$11,150,000[l]

Sources: IEPA, MDEQ, MDNR, MSPA, NYDEC, ODNR, OEPA, PDEP, WDNR, and GAO.

[a]Unless otherwise noted, the funding figures in this column represent program state fiscal year expenditures.

[b]This figure represents the amount awarded through grants during fiscal years 1993, 1994, and 1998.

[c]This represents funds expended between 1992 and 1997. After 1997, projects were funded from the Clean Michigan Initiative program.

[d]Clean Michigan Program expenditures were from 1999 through 2001.

[e]Program officials were not able to provide research expenditures for this program before 2002.

[f]This figure represents the amount expended for research grants from 1997 through 2001. Grant expenditure data were not readily available for earlier years.

[g]Project funds were first awarded in 1995. Of the amount shown, $537,000 was provided by the GLPF, and the other $450,000 in project costs was provided by other state funding sources.

[h]The program is considered Great Lakes specific, but research project results are primarily applicable only within New York's Great Lakes Basin.

[i]Funds were not available for this program.

[j]Amounts relate to the cost to administer the program; leasing fees cover other program costs.

[k]This figure relates to costs to administer the program since 1995. Program grant amounts were not provided.

[l]Annual expenditures were estimated, but this figure represents total expenditures during the period 1992 through 2001.

Appendix V: Comments from the Environmental Protection Agency

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
GREAT LAKES NATIONAL PROGRAM OFFICE
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

APR 17 2003

John B. Stephenson, Director
Natural Resources and the Environment
U.S. General Accounting Office
Washington, DC 20548

Dear Mr. Stephenson:

Thank you for the opportunity to review the proposed General Accounting Office (GAO) Report *Great Lakes: An Overall Strategy and Indicators for Measuring Progress are Needed to Better Achieve Restoration Goals.* We appreciate your staff's efforts to understand the scope and complexities of the United States Great Lakes Program and we are giving careful consideration to the draft report. Our comments are outlined below. We will provide Congress, GAO, and the White House Office of Management and Budget with a formal response to the final report recommendations.

We agree with the GAO's call for better planning, coordination, monitoring, and the development of indicators for measuring the health of the Great Lakes. EPA's Great Lakes National Program Office (GLNPO) and its partner State, Tribal, and Federal agencies have taken the initiative in these areas to establish the fundamental building blocks for these efforts. I would like to highlight the following four examples of this work: the establishment of the United States Policy Committee (USPC), the State of the Lakes Ecosystem (SOLEC) Indicators development process, the release of the USPC's Great Lakes Strategy 2002, and the development of the multi-partner Lakewide Management Plans.

In the report, GAO identifies language in Section 118 of the Clean Water Act which identifies GLNPO's coordinative responsibilities for improving Great Lakes Water Quality. GLNPO responded to this charge by convening the USPC which is comprised of federal, state, and tribal agencies with significant natural resource and environmental protection authorities and responsibilities. While the formation and operation of the USPC is not backed by a statutory mandate, it has become an effective vehicle for formulating and implementing priorities of basin-wide significance for the Great Lakes.

One of the major outcomes from formation of the USPC is the Great Lakes Strategy 2002, in which GLNPO played a strong leadership role, which coordinates and streamlines efforts of the many governmental partners involved with protecting the Great Lakes. The Strategy serves an important planning and coordination function by focusing on multi-lake and basin-wide environmental issues, and establishes common goals that the governmental partners will work

toward. It also advances the implementation of the United States responsibilities under the Great Lakes Water Quality Agreement of 1987.

The Strategy supports existing efforts underway, including the Lakewide Management Plans (LaMPs) and the Remedial Action Plans (RAPs) for Areas of Concern, by addressing issues that are beyond the scope of these programs, and helping integrate them into an overall basinwide context. It is important to recognize that LaMPs and RAPs work at more focused geographical scales and are also important mechanisms to coordinate priorities and actions for the Great Lakes.

We view the Great Lakes Strategy as making significant progress in Great Lakes planning and coordination, due to its scope and the number of participating agencies. We believe the Strategy has helped the Great Lakes Program meet and exceed the requirements for coordination specified in Section 118 of the Clean Water Act. The Act calls for the development of plans, programs, and demonstration projects for nutrient management and the control of toxics pollutants. The Great Lakes Strategy incorporates these areas and also addresses invasive species, habitat protection and restoration, sustainable land use, brownfields redevelopment, minimizing wet weather events, safe beaches, and implementing best management practices on agricultural lands. These are areas crucial to Great Lakes protection and restoration, but which are not specified in Section 118. It is our view that the long term basin-wide goals, objectives, and environmental indicators in the Strategy can form a solid foundation for any future ecosystem restoration plan for the Great Lakes.

One other product created by the USPC, in coordination with our Canadian colleagues, under the auspices of the Binational Executive Committee (BEC), is the State of the Lakes Ecosystem (SOLEC) Indicators development process. This unprecedented binational effort, which involves many public and private stakeholders, is helping the USPC and BEC member agencies create a suite of the environmental indicators necessary and sufficient to inform management decisions. GLNPO has consistently supported the SOLEC effort and will continue to do so contingent on available resources.

While we can improve upon the delivery and coordination of our programs, the scope, geographic scale, the remedial costs involved, and the interwoven complexities of the environmental issues impacting the Great Lakes require long-term, complex solutions implemented at a variety of levels and by many partners. The implementation can be further complicated by the multi-media nature of the problems encountered and the inter-agency, inter-jurisdictional, and international coordination required to implement these actions. Despite this situation, we continue to make significant environmental progress in the Great Lakes.

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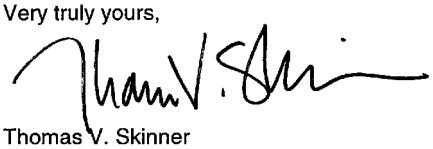
In closing, I want to reiterate EPA's strong commitment to the restoration and protection of the Great Lakes. We have many significant accomplishments that have improved environmental conditions and we recognize that the GAO conclusions and recommendations can help ensure that even more environmental improvements are made.

I appreciate the opportunity to coordinate with your staff on this project and look forward to offering detailed responses to the recommendations contained in the report. Should you need additional information or have further questions, please contact Mr. Gary Gulezian, Director of EPA's Great Lakes National Program Office, at 312-886-4040.

Very truly yours,



Thomas V. Skinner
Great Lakes National Program Manager

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Appendix VI: GAO Contact and Staff Acknowledgments

GAO Contact

John Wanska (312) 220-7628

Staff Acknowledgments

In addition to the name above, Willie Bailey, Heather Holsinger, Stephanie Luehr, Karen Keegan, Jonathan McMurray, and Rosemary Torres Lerma made key contributions to this report.

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