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BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

A More Comprehensive Approach Is Needed To Clean Up The Great Lakes

Despite spending millions of dollars on water pollution control, the United States is finding it difficult to meet the comprehensive objectives of its Great Lakes Water Quality Agreement with Canada. Although the lakes are cleaner, the United States is not fully meeting its agreement commitments.

GAO is recommending that the Congress and the Environmental Protection Agency Administrator take steps to improve U.S. efforts to clean up the Great Lakes and meet water quality agreement commitments.



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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D.C. 20548

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To the President of the Senate and the
Speaker of the House of Representatives

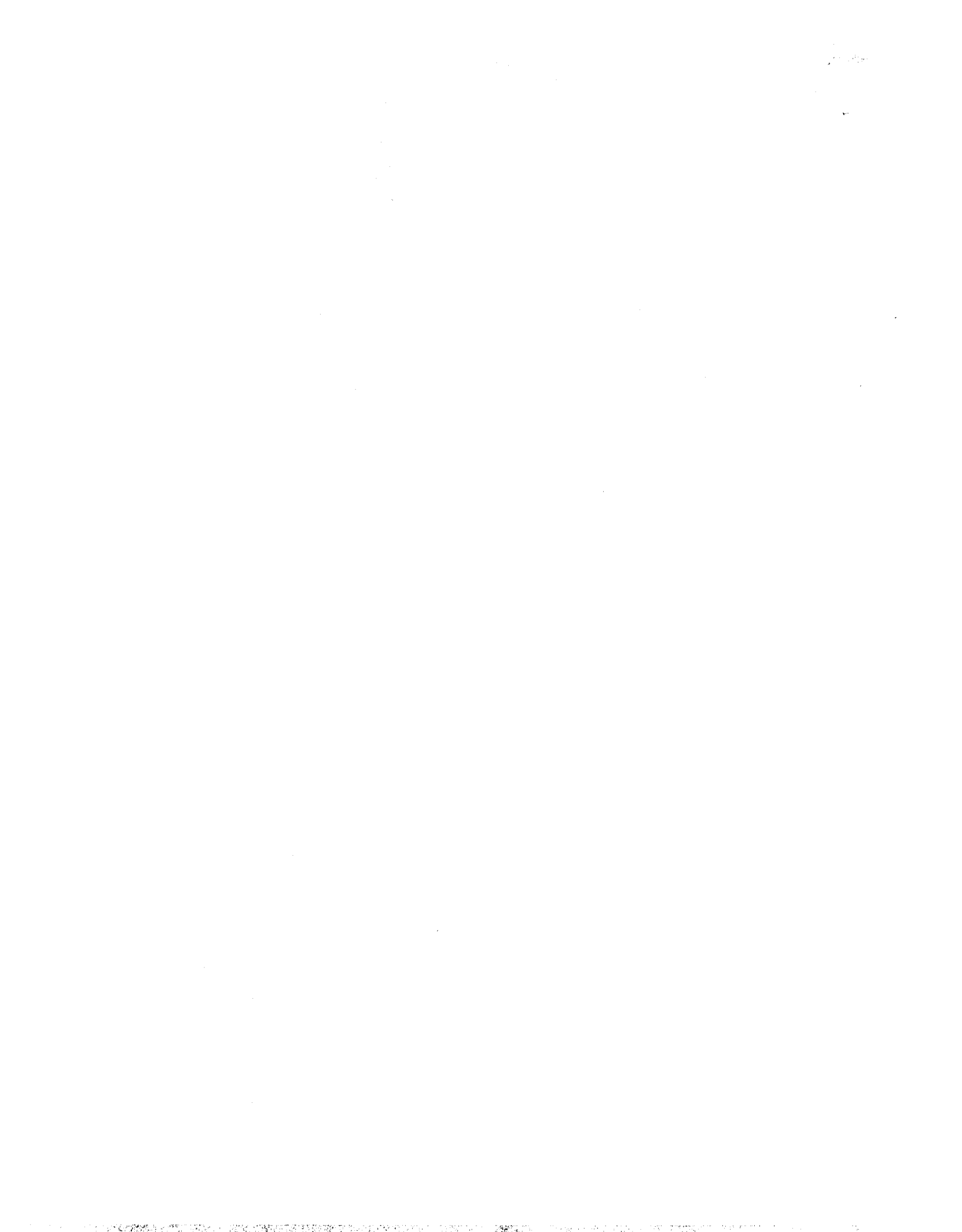
The U.S.-Canadian Great Lakes Water Quality Agreement has resulted in cleaner water in the lakes, but serious pollution problems remain. Furthermore, the United States is having difficulty meeting its commitments under the agreement. This report discusses ways the Congress and the Environmental Protection Agency can help to meet U.S. commitments and accomplish objectives of the water quality agreement.

In a 1975 report we stated that the United States needed to make a greater commitment to support Great Lakes Water Quality Agreement objectives. In 1978 the United States and Canada entered into a new, more comprehensive agreement which required a substantial commitment by the United States. We made this review to determine whether the United States is meeting the objectives of the water quality agreement.

We are sending copies of this report to the Director, Office of Management and Budget; the Administrator, Environmental Protection Agency; the Secretaries of State, Agriculture, and Commerce; interested congressional committees; Members of Congress; the International Joint Commission; the Governors of affected States; and other interested parties.

A handwritten signature in cursive script that reads "Charles A. Bowler".

Comptroller General
of the United States



D I G E S T

The United States and Canada have an agreement to develop and implement programs and other measures to protect the water quality of the Great Lakes. The Great Lakes Water Quality Agreement has comprehensive objectives to improve Great Lakes water quality and requires a substantial U.S. commitment. GAO found that, although the lakes are cleaner, the United States is finding it difficult to meet agreement commitments and that to do so will require greater focus and direction of existing efforts.

U.S. efforts have been hampered by the (1) lack of effective overall strategies for dealing with Great Lakes water quality problems, (2) lack of knowledge about the extent of pollution problems and the impact of control programs, and (3) need for improved management of Great Lakes pollution cleanup activities.

GAO made this review to determine if the United States is meeting the objectives of the Great Lakes Water Quality Agreement because (1) a 1975 GAO report showed the United States needed to make a greater commitment to support water quality agreement objectives and (2) the new 1978 agreement is very comprehensive and requires a substantial United States commitment.

In the United States, both Federal and State agencies are responsible for Great Lakes cleanup efforts. The Department of State and the Environmental Protection Agency (EPA) are the two Federal agencies most involved with the water quality agreement. GAO's review was necessarily confined to U.S. Great Lakes water quality efforts. Canadian efforts referred to herein are based on reports published primarily by the International Joint Commission--the permanent U.S.-Canadian body responsible for advising both Governments on Great Lakes water pollution matters.

MUNICIPAL POLLUTION SOURCES

The agreement goal of December 31, 1982, for adequate treatment of all municipal sewage discharges to the lakes will not be met. For example, 31 percent of the municipal dischargers on Lake Erie and 32 percent of those on Lake Ontario will not be under control until sometime after 1982. Furthermore, according to the International Joint Commission, only 64 percent of the sewered population in the U.S. portion of the Great Lakes Basin was receiving adequate treatment, compared with 99 percent of the Canadian sewered population. Reasons cited for not meeting the agreement goal include unrealistic timetables for constructing facilities, problems in obtaining and using Federal grant funds, and lack of municipal officials' support for construction activities. Budget reductions also could set back the already extended dates for completing municipal projects in the Great Lakes Basin. (See pp. 10 to 13.)

Discharges from combined sewers (sewers that carry municipal wastewater along with storm runoff) continue to be a major source of pollution to the lakes, but little funding has been directed to controlling these discharges. Of 51 specific problem areas on the Great Lakes, 20 had serious combined sewer overflows. Structural solutions to controlling combined sewer problems are costly--\$8 billion according to one EPA estimate. But unless combined sewer overflows are controlled, existing municipal sewage treatment programs will not be fully effective. (See pp. 14 and 15.)

PHOSPHORUS CONTROL

Phosphorus contamination--a prime factor in lake eutrophication (aging)--is a major problem facing the Great Lakes, particularly Lakes Erie and Ontario. Phosphorus inputs to the lakes from municipal treatment plants are being reduced. However, about 41 major U.S. treatment plants may not meet the agreement's phosphorus limitations because of plant equipment availability problems and/or operational difficulties. (See pp. 15 to 19.)

Efforts to control phosphorus pollution from other sources, such as high-phosphate household detergents, have been controversial. Research to resolve uncertainty about the nature and extent of overall phosphorus controls may not be undertaken because a coordinated Great Lakes research program does not exist. (See pp. 19 to 26.)

TOXIC POLLUTION

The U.S.-Canadian agreement recognized the extent of toxic pollution of the lakes and required the two Governments to meet specific toxic control objectives. However, the problem has yet to be addressed comprehensively. Information is lacking about the nature, extent, and source of toxic pollution, and the activities necessary to provide the information have been limited. Also, U.S. toxic control programs are very new and their effectiveness is not known. (See pp. 33 to 37.)

NONPOINT POLLUTION SOURCES

In some areas, nonpoint (diffused) sources, such as agricultural, forestry, and urban runoff, deposit the major portion of pollutants entering the lakes. However, State and areawide plans to address nonpoint pollution problems have not been comprehensive and may not be completed. Federal funding for new planning has been cut off. Projects to control nonpoint pollution have not been extensive, and implementation of control mechanisms developed are site specific.

Without more attention to nonpoint sources and a coordinated strategy and plan for dealing with them, the Great Lakes water quality objectives may not be achieved even if all other sources of pollution are completely controlled or eliminated. (See pp. 26 to 33.)

WATER QUALITY MONITORING

Accurate, reliable data describing existing water quality conditions and trends, how pollution occurs, and the effect of eliminating sources of pollution is essential to control efforts. But current water quality monitoring is not providing the data needed to address questions about toxic, nonpoint, and phosphorus pollution problems.

Specific U.S. monitoring efforts have been hampered by a lack of funds. In addition, the International Joint Commission has yet to endorse the Great Lakes International Surveillance Plan, advocated by the agreement as the basic model for monitoring activities in the Great Lakes Basin. The Commission is not sure whether the plan is effective and can be implemented. (See pp. 37 to 42.)

EPA's RESPONSIBILITIES

EPA has broad responsibilities for carrying out programs and activities to implement agreement objectives and coordinating the Great Lakes activities of many Federal and State agencies. EPA's Great Lakes National Program Office has been frustrated in its efforts to ensure that U.S. agreement commitments are met because it does not have the visibility, authority, or resources needed to meet its responsibilities. (See pp. 53 to 59.)

RECOMMENDATIONS TO THE CONGRESS

GAO recommends that the Congress, in consultation with the Secretary of State and the Administrator, EPA, determine whether (1) the Great Lakes Water Quality Agreement objectives and commitments are overly ambitious and (2) sufficient funding to meet agreement objectives and commitments can be provided, given current economic and budgetary conditions. GAO also recommends that the Congress pass legislation currently pending to establish a Great Lakes research office in the National Oceanic and Atmospheric Administration to coordinate and carry out needed research activities. (See p. 43.)

RECOMMENDATIONS TO EPA

GAO recommends that the EPA Administrator (1) develop a comprehensive plan and strategy to address phosphorus, nonpoint, and toxic pollution problems in the Great Lakes and (2) elevate the Great Lakes National Program Office within EPA and give it the authority and resources necessary to direct the Federal Government's Great Lakes water quality activities. GAO also makes other recommendations to improve Great Lakes water quality activities. (See pp. 43, 44, and 59.)

AGENCY COMMENTS

EPA, the Departments of State and Agriculture, and the U.S. Section of the International Joint Commission provided comments on this report. Although the agencies generally agreed that Great Lakes water quality activities are complex, involve a number of Federal, State and local agencies, and are comprehensive, they provided additional comments and clarifications on specific items. None of the agencies commented on GAO's recommendation to the Congress on agreement objectives and funding.

EPA stated that GAO had failed to acknowledge (1) the comprehensiveness of the Great Lakes agreement's phosphorus objectives and (2) the numerous Federal and State efforts taken to meet agreement terms. Also, although EPA strongly supports more effective coordination of Great Lakes research activities, it is concerned that the pending legislation endorsed by GAO will fragment EPA's established mechanisms for addressing Great Lakes problems. Furthermore, EPA had serious reservations about GAO's water quality monitoring discussion and did not believe the National Program Office needs to be elevated within EPA to exercise more authority over Great Lakes water quality programs.

GAO has not understated the comprehensive nature of the water quality agreement or the U.S. efforts to meet agreement objectives. GAO believes that:

- Its discussion of phosphorus objectives is comprehensive and demonstrates that the objectives have yet to be met.
- So far EPA has not developed a coordinated Great Lakes research program and has not funded important research activities.
- Problems with water quality monitoring will hinder identifying pollution sources and levels, developing control strategies, and evaluating control measures.

Appendixes IX to XII contain the agencies' comments and GAO's responses.



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ABBREVIATIONS

EPA	Environmental Protection Agency
GAO	General Accounting Office
GLISP	Great Lakes International Surveillance Plan
GLNPO	Great Lakes National Program Office
IJC	International Joint Commission
NOAA	National Oceanic and Atmospheric Administration
mg/l	milligrams per liter

GLOSSARY

Combined sewer	A sewer that carries both wastewater and storm water to a treatment plant. During a storm, only part of the flow is intercepted, and the remainder goes directly into the receiving stream untreated.
Detergent	Synthetic, water-soluble or liquid, surface active agents used in washing. To the extent that they are not biodegradable, they create a long-term pollution problem.
Effluent	The wastewater discharged by an industry or municipality.
Effluent limitations	Restrictions established by a State or EPA on quantities, rates, and concentrations of chemical, physical, biological, and other constituents discharged from point sources.
Eutrophication	The normally slow aging process by which a lake evolves into marsh and ultimately becomes completely filled with debris and disappears. It is caused by an excess of dissolved nutrients--for example, nitrogen and phosphorus. Untreated wastes (pollution) greatly accelerate the aging process.
Nonpoint sources	Sources of pollution that are difficult to pinpoint and measure. Common examples include runoff from agriculture and forest lands, runoff from mining and construction, and storm runoff from urban areas.
Phosphorus	An essential element and nutrient for all life forms present in wastewater.
Point sources	Specific sources of pollution that can be readily identified, such as factories and sewage treatment plants.
Toxic substance	A substance that either directly poisons living things or alters their environment so that they die. Examples are cyanides found in plating and steel mill wastes, phenols from coke and chemical operations, pesticides and herbicides, and heavy metal salts. Another group includes sulfides, produced by oil refineries, smelters, and chemical plants.

CHAPTER 1

INTRODUCTION

The Great Lakes have been viewed as a virtually inexhaustible supply of high-quality water. But intensifying water and land use coupled with various forms of municipal and industrial pollution has resulted in a continuing degradation of the lakes. To protect this vast and valuable natural resource, the United States and Canada have entered into a series of treaties and agreements.

IMPORTANCE OF THE GREAT LAKES

The United States and Canada share the Great Lakes--Erie, Huron, Michigan, Ontario, and Superior (see map on p. 2)--and the connecting channels which form the Earth's largest freshwater lake system. The lakes contain about 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 Great Lakes Basin--that part of North America drained by the five lakes, their tributaries and connectors, and the international section of the St. Lawrence River--includes all of Michigan and parts of Illinois, Indiana, Minnesota, New York, Ohio, Pennsylvania, Wisconsin, and the Province of Ontario. The basin constitutes one of North America's most important regions. It contains about 50 percent of Canada's total population and nearly 20 percent of the total U.S. population. The basin supports economic activity that accounts for 60 percent of the annual national income for Canada and 25 percent for the United States. Thus, the abundant water resources of the Great Lakes must be protected.

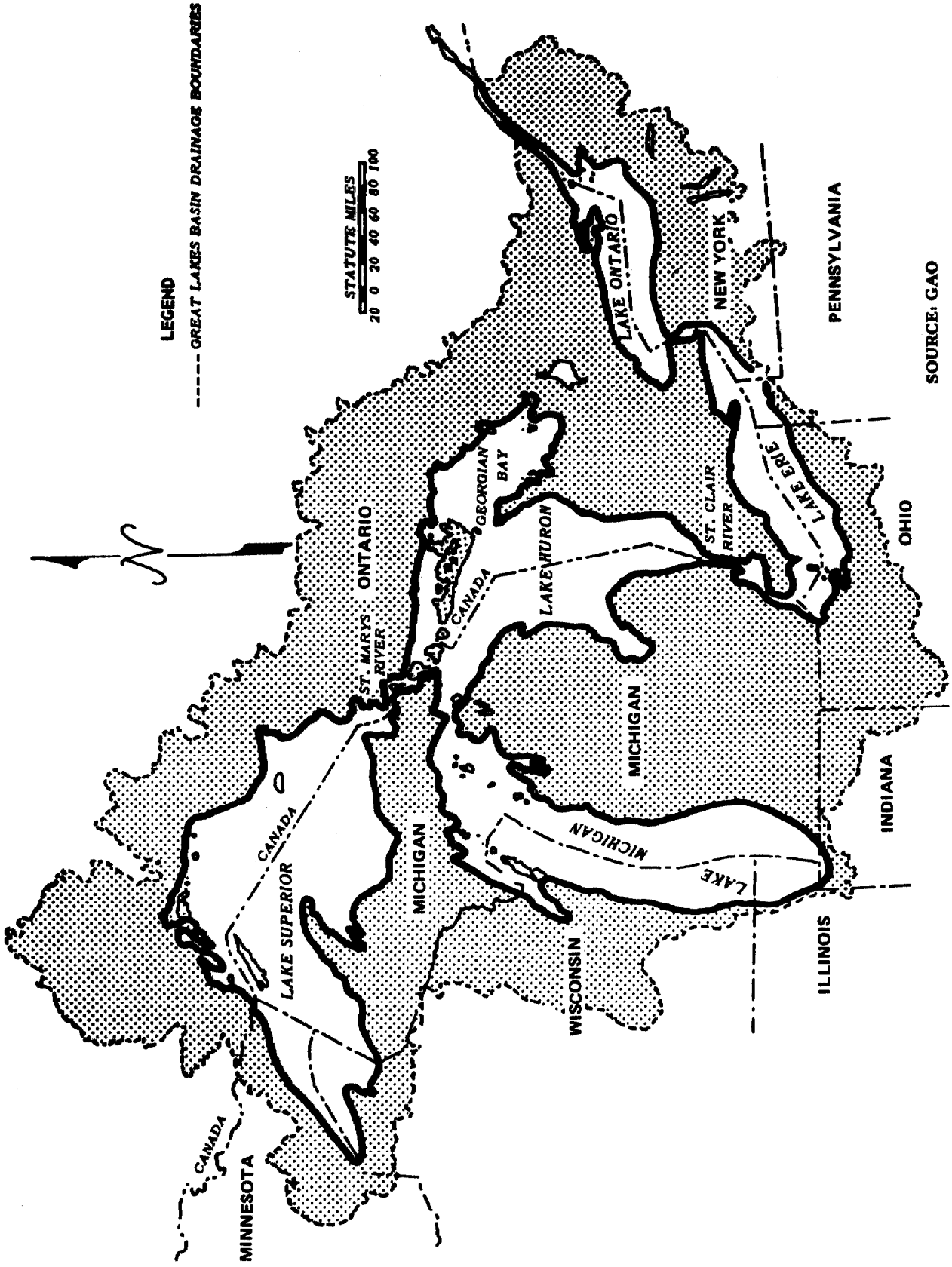
BOUNDARY WATERS TREATY OF 1909

The Great Lakes are unique in that virtually all lake activities require a cooperative effort by both the United States and Canada. Consequently, both countries must work together to ensure the continued cleanup of the lakes.

The basic U.S.-Canadian agreement covering the Great Lakes is the Boundary Waters Treaty of 1909, which was to prevent and settle disputes over the use of boundary waters including, but not limited to, the Great Lakes. The treaty provides that 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.

To carry out the purposes of the treaty, the International Joint Commission (IJC) was established. The IJC, a permanent body made up of three members from each country, is responsible for:

- Approving or disapproving applications from the governments, companies, or individuals for the use, obstruction, or diversion of boundary waters.



SOURCE: GAO

--Investigating any differences arising between the two governments involving the rights, obligations, interests, and inhabitants of the other along the boundary. These investigations are called references and are referred to IJC by the two Governments.

--Monitoring compliance with the terms and conditions set forth in its approval of applications and, when requested by the Governments, monitoring and coordinating actions or programs it has recommended.

Responding to requests by the U.S. and Canadian Governments between 1909 and 1970, IJC made three major studies on Great Lakes water pollution. One study, made from 1964 to 1970, examined water pollution in Lakes Erie and Ontario (the lower lakes) and the international section of the St. Lawrence River. This IJC study recommended that common water quality objectives be established for the Great Lakes and that the United States and Canada agree on the programs and measures needed to achieve these objectives. IJC further recommended that its powers be expanded to include coordinating and monitoring efforts to implement international agreements reached. These recommendations led to the Great Lakes Water Quality Agreement of 1972.

U.S. AND CANADIAN GREAT LAKES WATER QUALITY AGREEMENTS

The first Great Lakes Water Quality Agreement between the United States and Canada was signed April 15, 1972, by the President and the Prime Minister. The agreement was to provide a basis for more effective cooperation to restore and enhance Great Lakes water quality. The initial emphasis under the 1972 agreement was to find solutions to the more obvious water quality problems. Accordingly, high priority was given to implementing effective industrial and municipal wastewater treatment, including phosphorus removal.

In November 1978, the Governments reaffirmed their determination to clean up the Great Lakes by entering into a new agreement. Like its predecessor, the new agreement established both general and specific water quality objectives for Great Lakes waters. The specific objectives were, however, far more comprehensive and stringent than those established in 1972. The 1978 agreement recognized that water quality depends on the interacting components of air, land, water, and living organisms and therefore more comprehensively addressed the remedial programs and measures to be developed by the Governments and committed them to specific actions to meet the objectives.

Each Government agreed to develop and implement programs and other measures to control, abate, and prevent pollution from seven specific sources or activities: (1) municipalities, (2) industries, (3) agriculture, forestry, and other land uses, (4) shipping, (5) dredging, (6) onshore and offshore facilities,

and (7) airborne contaminants. The Governments also agreed to develop and implement programs and measures to reduce and control inputs of phosphorus to the lakes, minimize or eliminate the release of hazardous substances, and eliminate all discharges of persistent toxic substances. Further, the agreement requires a coordinated surveillance and monitoring program which, when successfully implemented, would (1) assess compliance with pollution control requirements and achievement of agreement objectives, (2) provide information for measuring lake response to control measures, and (3) identify emerging problems.

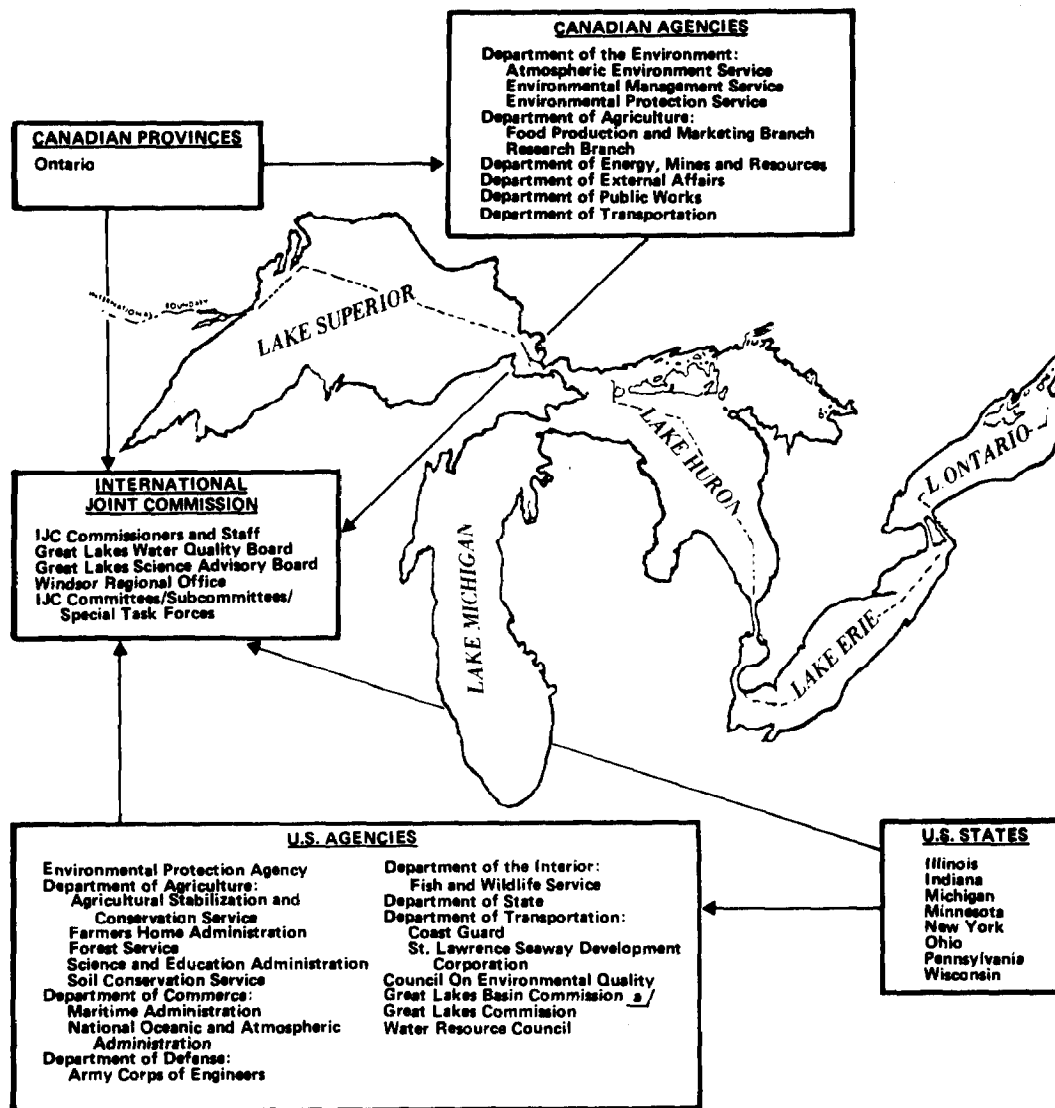
The 1978 agreement remains in force for a period of 5 years and thereafter, until terminated by one of the Governments. Article 10 of the agreement requires the Governments to conduct a comprehensive review of the operation and effectiveness of the agreement following the third biennial report of the IJC due in 1986. Therefore, the Governments may not be assessing the agreement until then.

PRIMARY AGENCIES INVOLVED IN GREAT LAKES CLEANUP

In the United States, both Federal and State agencies are responsible for Great Lakes cleanup efforts. The Department of State and the Environmental Protection Agency (EPA) are the two Federal agencies most involved with the water quality agreement. The Department's Office of Canadian Affairs was primarily responsible for negotiating the agreement and now works with EPA to maintain open communication with Canada and IJC concerning agreement implementation. EPA is the prime U.S. agency responsible for actually implementing the agreement. EPA implements programs and measures through existing Federal legislation, primarily through the Clean Water Act, as amended, although numerous other legislative authorities governing clean air, toxic substances control, and resource conservation and recovery play important roles. Also, Great Lakes agreement activities are not generally separately funded under domestic law.

To fulfill its responsibilities under the agreement, EPA created the Great Lakes National Program Office (GLNPO). This office, located within EPA's region V office, acts as the focal point to plan, coordinate, and oversee cleanup efforts by EPA divisions, other Federal agencies, and the Great Lakes States. Other Federal agencies which directly support activities related to the agreement include the Departments of Agriculture, Commerce, Defense, the Interior, and Transportation. As with other U.S. pollution control efforts, the States are responsible for implementing control programs under EPA's direction. Appendix I lists selected U.S. agencies, departments, and organizations and U.S. laws affecting Great Lakes activities.

The chart below shows the primary agencies, departments, and organizations involved with activities covered by the Great Lakes Water Quality Agreement in both Canada and the United States. It also shows that the efforts of all these groups should be coordinated with the IJC.



^{a/}The commission was abolished effective Sept. 30, 1981.

OBJECTIVES, SCOPE, AND METHODOLOGY

On March 21, 1975, we issued a report entitled "Cleaning Up the Great Lakes: United States and Canada Are Making Progress in Controlling Pollution from Cities and Towns" (RED-75-338). We reported that both nations had made substantial progress in controlling pollution from municipal sources, but the United States needed to make a greater commitment to support other agreement provisions. Since our 1975 report, the United States and Canada have entered into a new Great Lakes Water Quality Agreement.

Because over 6 years have passed since our report and because the United States and Canada have entered into a new agreement, we believed that a followup study of Great Lakes pollution control efforts would be useful to the Congress, EPA, and the Department of State in assessing U.S. progress in meeting agreement commitments with Canada.

The objectives of our review were to

- evaluate whether substantial progress is being made in controlling pollution from municipal sources since our last report in 1975,
- determine how well the United States is meeting other agreement provisions,
- evaluate whether EPA is fulfilling its lead agency responsibility for implementing the programs and other measures necessary to achieve agreement objectives, and
- determine whether IJC is fulfilling its advisory role required under the latest agreement.

We did not review the entire 1978 water quality agreement because of the time and resources that would have been required to comprehensively evaluate the numerous provisions. Rather, to meet our objectives, we focused on several key areas of the agreement--the control of municipal wastewater and phosphorus discharges, nonpoint (diffused) pollutants, toxic substances, and surveillance and monitoring efforts. We selected these areas because (1) the construction of municipal wastewater treatment plants has been slow despite the substantial Federal investment in these plants, (2) the control of phosphorus, particularly in the two lower lakes (Erie and Ontario), was identified in the 1972 and 1978 agreements as being of high importance, (3) the 1978 agreement recognized that nonpoint pollution was a major problem, (4) the control of toxics and other hazardous polluting substances was identified in the 1978 agreement as being needed, and (5) the need for comprehensive surveillance and monitoring to provide the management data needed for decisionmaking with respect to Great Lakes activities was an important requirement in both agreements.

We performed our review during the period February to October 1981 at the following principal locations:

- EPA headquarters, Washington, D.C.; EPA's region V office and the Great Lakes National Program Office, Chicago, Illinois; EPA's Large Lakes Research Station, Grosse Ile, Michigan; and EPA's Environmental Research Laboratory, Duluth, Minnesota.
- IJC headquarters, Washington, D.C.; and the Great Lakes IJC regional office, Windsor, Ontario.

- Department of Agriculture (Soil Conservation Service and the Agricultural Stabilization and Conservation Service) headquarters, Washington, D.C.
- The Great Lakes Basin Commission, Ann Arbor, Michigan.
- The Michigan Department of Natural Resources, Lansing, Michigan.
- The New York Department of Environmental Conservation, Albany, New York.
- The Ohio Environmental Protection Agency, Columbus, Ohio.
- U.S. Department of State headquarters, Washington, D.C.

Our review was performed in accordance with our "Standards for Audit of Governmental Organizations, Programs, Activities, and Functions."

We made an extensive literature and legislative search to identify the major U.S. Federal agencies and laws affecting the water quality agreements. (See app. I.) We also researched our reports and studies dealing with water quality issues and problems Federal agencies have experienced in meeting legislated objectives for water quality. Appendix II is a selected and annotated bibliography of our reports involving water quality issues in the United States.

To evaluate EPA region V activities related to the water quality agreements, we interviewed the current and former regional administrators, the director and individual staff members in the Great Lakes National Program Office, and other regional officials responsible for specific programs needed to meet water quality agreement objectives. To determine the extent of EPA's efforts to fulfill its lead agency responsibility under the agreement, we obtained and analyzed congressional budget justifications for fiscal years 1979 through 1982, funding and position statements for fiscal years 1977 through 1980, organizational and function statements, staff position descriptions, Great Lakes strategies and program plans for fiscal years 1980 and 1981, internal evaluations of EPA programs or operations, and cost data for various programs and demonstration projects. To determine the role of EPA headquarters and its relationship with region V, we interviewed headquarters staff involved with international activities and obtained and analyzed correspondence and records pertaining to EPA headquarters' role as the liaison between region V and the Department of State.

IJC was a significant source of information. We interviewed various IJC officials, including the three former U.S. commissioners, the IJC Secretary and staff members of the headquarters office, the current and former directors of the IJC regional office, and the U.S. chairpersons of IJC advisory

boards. We also examined and analyzed numerous IJC studies, reports, and other documents and correspondence, some dating back to 1972, dealing with government activities and progress under the agreements and other water quality problems peculiar to the Great Lakes. One of the key documents obtained and analyzed was the Great Lakes International Surveillance Plan (GLISP) which represents the long-term strategy to coordinate and plan water quality monitoring activities in the Great Lakes Basin. We also attended various IJC public hearings, as well as the 1980 and 1981 IJC annual meetings.

To determine State Great Lakes activities, we interviewed officials in State environmental departments and agencies responsible for the administration and coordination of State activities involving Great Lakes water quality. We obtained and analyzed State water quality planning and programming documents; State/EPA agreements; State legislation and hearings; and various Great Lakes water quality studies done by industry, academia, and other private organizations. Our State work was limited to agreement activities in Michigan, New York, and Ohio because these States border the two lower lakes--Erie and Ontario--which have experienced the most serious pollution problems over the years. In addition, the State of Michigan borders Lakes Huron, Michigan, and Superior. We did, however, obtain and analyze information concerning the other five Great Lakes States' activities, primarily from IJC and the Great Lakes Basin Commission.

To obtain information on the activities of other agencies and organizations related to Great Lakes water quality activities, we interviewed the Department of State officer responsible for coordinating environmental affairs with Canada; key staff members in Water Quality Project Implementation in the Soil Conservation Service of the Department of Agriculture; officials and staff members of the Army Corps of Engineers (North Central Division); the Deputy Director of the Office of Marine Pollution Assessment in the National Oceanic and Atmospheric Administration (NOAA); the Director of EPA's Large Lakes Research Station; senior staff members with the Council on Environmental Quality; and various officials, including the Executive Director, of the Great Lakes Basin Commission.

To determine program costs for pollution control activities in the Great Lakes Basin, we obtained funding data for the State and county levels for fiscal years 1978 through 1980 from the Federal Information Exchange System compiled by the Community Services Administration. Assistance in obtaining and processing this data was provided by House Information Systems, Committee on House Administration, the U.S. House of Representatives. We also obtained overall fiscal years 1981 and 1982 funding for these activities and assessed the impact of the March 1981 budget revisions proposed by the President.

This report relates to only U.S. Great Lakes water quality efforts because we have neither the authority nor responsibility

to review Canadian efforts. Any references to Canadian data or efforts in this report are based on reports published by IJC and others. We did not verify the accuracy of the data on Canadian efforts or evaluate their effectiveness in meeting Canadian responsibilities under the agreement.

CHAPTER 2

U.S. GREAT LAKES WATER QUALITY OBJECTIVES

ARE NOT BEING FULLY MET

Although in 1978 the United States committed itself to a comprehensive program to control Great Lakes pollution, the lakes continue to experience eutrophication (aging) and toxic pollution problems because

- controlling municipal pollution sources continues to lag behind schedule;
- phosphorus, a major factor in controlling lake eutrophication, is not being completely controlled and control efforts may not be properly focused;
- little attention has been directed to nonpoint sources of lake pollution;
- the extent and sources of toxic pollution remain undefined, and an overall toxic control strategy has not been developed; and
- comprehensive, effective surveillance and monitoring activities needed to determine water quality conditions and trends and assess pollution control efforts have not been developed and implemented.

Although progress is being made in cleaning up the Great Lakes, the United States has experienced many difficulties in attempting to meet its water quality agreement commitments. The lack of information about the nature, source, and extent of lake pollution from some substances, funding constraints, and other factors have all hindered U.S. efforts. If the United States is to meet its commitments to protect the Great Lakes, however, greater and more comprehensive efforts will be needed.

CONTROLLING MUNICIPAL POLLUTION SOURCES CONTINUES TO LAG BEHIND SCHEDULE

From 1972 to February 1981, the United States spent about \$4.9 billion in Federal, State, and local funds to construct and upgrade municipal sewage facilities to treat wastewater discharges to the lakes, but more remains to be done. The Nation will not meet the December 31, 1982, agreement goal for adequate treatment of all municipal sewage discharges to the lakes. In addition, discharges from combined sewers (sewers that carry municipal wastewater along with storm runoff) continue to be a major source of lake pollution, but little funding or effort has been directed to controlling these discharges. Ambitious agreement timetables, difficulties in obtaining funding, and treatment plant operational problems, among other factors, have all

contributed to the difficulties in controlling municipal pollution sources.

Sewage treatment goals will not be met

The Water Quality Agreements require the United States to (1) construct and operate waste treatment facilities to provide adequate treatment for the sewered population in the U.S. portion of the Great Lakes Basin, (2) provide financial resources to ensure prompt construction of needed facilities, and (3) establish pretreatment requirements for industrial plants discharging waste into municipal systems. We reported in March 1975 that the United States had made substantial progress with its municipal point source control program, but that much remained to be done. That continues to be the case today.

A goal of the 1972 agreement was that the municipal point source control programs in both Canada and the United States would be either completed or in process by December 31, 1975. We reported in 1975 that the United States would not realize this goal. We further reported that, at that time, only about 60 percent of the U.S. sewered population had adequate treatment compared with about 98 percent for Canada.

When the Governments negotiated the 1978 agreement, they established December 31, 1982, as the new goal for completion of municipal point source control programs, including the requirement for providing adequate treatment. In the United States, the Clean Water Act, as amended, requires publicly owned treatment works to provide a minimum of secondary treatment with more stringent treatment to be provided if secondary treatment would be insufficient to protect water quality. Meeting the requirement for secondary treatment satisfies 1/ the 1978 agreement requirement for adequate municipal treatment.

In its Seventh Annual Report on Great Lakes Water Quality, issued October 1980, IJC reported that only 64 percent (compared with 60 percent in 1975) of the sewered population in the U.S. portion of the basin has adequate sewage treatment, compared to 99 percent for Canada. In that report, EPA estimated that completion of treatment facilities under construction should provide 99 percent of the U.S. sewered population with adequate treatment by 1983. We found, however, that a significant number of municipal plants on the Great Lakes will not be completed in time to meet the agreement goal of December 31, 1982. EPA's own estimates (see app. III) show that 31 percent of all major municipal treatment facilities on the lower Great Lakes will not be completed until 1983 or later. At the same time, however, EPA

1/The agreement also requires phosphorus effluent limitations for municipal wastewater treatment plants. Phosphorus control efforts are discussed on pp. 15-26.

points out that the unfinished facilities represent only about 15 percent of the total municipal sewage flow from major facilities into the lower lakes.

In addition, the completion of municipal treatment plants does not in itself guarantee that adequate treatment will be provided. For example, in a 1980 report 1/ on wastewater treatment plants, we found that municipal facilities nationwide were experiencing severe problems limiting their ability to treat waste. These problems included plant design and equipment deficiencies, defective sewer systems allowing infiltration of ground water that overloads existing facilities, industry waste that is not compatible with the plant's treatment system process, and operation and maintenance deficiencies. We reported that inadequate operation and maintenance of the 242 municipal plants sampled nationwide resulted in such repeated violations of discharge permits 2/ that the violations constituted the norm rather than the exception. Using the sampling data in that report, we determined that 22 (85 percent) of the 26 sampled municipal dischargers in the Great Lakes Basin violated their discharge permits at least 1 month during the 12-month study period. Further analysis showed that 35 percent of the 26 sampled plants were, in our opinion, in serious violation of the permit discharge limits for biochemical oxygen demand, total suspended solids, or total phosphorus.

According to the GLNPO director and staff, several reasons exist for the delays in completing adequate treatment facilities in the United States. They stated that (1) unrealistic time-tables were set to pressure the Governments to take action, (2) larger, more complex facilities are needed in the United States than in Canada because of greater population and industrialization, thereby necessitating a longer time frame, and (3) lack of expertise among State and local recipients in handling construction grant funds impeded efforts to assess treatment needs and design the types of facilities needed to correct pollution problems. An official with the Ohio EPA cited several reasons for the program slippage in Ohio, including the time required to obtain Federal construction grants, construction problems, and the lack of support by municipal officials for the construction of treatment facilities at a time when other pollution sources are not being controlled.

1/"Costly Wastewater Treatment Plants Fail To Perform as Expected" (CED-81-9, Nov. 1980).

2/All dischargers are required to have a permit issued by EPA or an EPA-approved State which specifies the pollutants that may be discharged and the limits on such discharges. The discharge permit is the principal enforcement mechanism for the water pollution program.

While many factors have limited the pace of construction for waste treatment facilities, EPA believes that funding limits have also slowed construction. For example, when a large Federal grants program made funds available to local communities to use in completing construction of waste treatment facilities, the communities were no longer willing to construct facilities using only local funds. In addition, faced with limited funds, States were not funding low-priority projects--typically the large number of small plants that will fail to meet the December 31, 1982, deadline.

From 1972 through February 1981, almost \$4.9 billion in Federal, State, and local funds was provided for municipal sewerage construction in the Great Lakes Basin. (App. IV shows municipal wastewater treatment plant construction funding by State.) Actions being taken to reduce the Federal budget, however, could affect the already extended dates for completing municipal projects in the Great Lakes Basin. For fiscal year 1980, actual funding for the construction grants program nationwide was \$3.4 billion, \$1.6 billion less than the \$5 billion authorized. Furthermore, as part of his economic recovery program, the President proposed, and the Congress agreed, to rescind \$1.7 billion in previously appropriated but unobligated construction grant funds. Also, on December 29, 1981, the President signed Public Law 97-117, the Municipal Wastewater Treatment Construction Grant Amendments of 1981. This act amended the construction grant provisions of the Clean Water Act to, among other things, authorize appropriations of \$2.4 billion for fiscal years 1982-85 for the grants program. EPA's fiscal year 1982 appropriation does not include funding for the program, but the administration requested \$2.4 billion for fiscal year 1982. How much of this money, if appropriated, will go for Great Lakes projects is not known.

The 1978 agreement also requires the United States to establish pretreatment requirements for industrial wastes being discharged into municipal treatment systems where such wastes are not amenable to adequate treatment or removal using conventional waste treatment processes. In a 1982 report ^{1/} on EPA's industrial pretreatment program, we reported that although the program was authorized in 1972, it has yet to be fully implemented. We found that the overall scope and impact of the program remains undefined; the program may result in costly, inequitable, and/or redundant treatment which may not address critical pollution problems; and the program will be a further drain on scarce Federal, State, and local pollution control resources. In addition, we found that the program is undergoing a regulatory review analysis and EPA has proposed that the effective date for program implementation be postponed indefinitely.

^{1/}"A New Approach Is Needed for the Federal Industrial Wastewater Pretreatment Program" (CED-82-37, Feb. 19, 1982).

Limited progress in controlling combined sewer discharges

To avoid overloading treatment facilities, combined sewer systems divert part of the storm flows directly into waterways. Combined sewers have caused pollution resulting in beach closures; health hazards; fish kills; and unsightly conditions in rivers, harbors, and bays. Although both the 1972 and 1978 water quality agreements addressed the need to control this problem, limited progress has been made, primarily because the structural solutions proposed are very expensive and EPA has not emphasized alternative control techniques. In addition, according to EPA, any funds available for controlling combined sewer discharges have instead been spent on waste treatment facilities for treatment of the more concentrated portion of wastewaters.

In 1976 IJC reported that overflows from combined sewers were reaching serious proportions and that accelerated control efforts were needed. In November 1980 IJC's Great Lakes Water Quality Board reported that, of 51 specific problem areas (hot spots) on the Great Lakes, 20 had serious combined sewer overflows. Our analysis of these 20 areas showed that the overflows were most severe on Lakes Erie and Ontario.

One reason for the limited progress made in controlling combined sewer problems is that structural solutions to the problems, such as catchment basins, are costly. EPA estimates that the Great Lakes Basin States will need \$8 billion to control combined sewer overflows--\$2 billion just in the Chicago area. In the past, little funding was directed to correcting overflow problems largely because States gave combined sewers low priority compared to other municipal treatment needs.

The adequacy of future funding to control combined sewer overflows is highly questionable. Beginning in fiscal year 1983, \$200 million a year is authorized for combined sewer projects nationwide, but the Great Lakes are ineligible for this funding as it only applies to projects which address water quality problems of marine bays and estuaries. Funding to address combined sewer problems in the Great Lakes will not be available until October 1, 1984, at which time the EPA Administrator is authorized to use construction grant funds for combined sewer overflow projects but only when such projects are major State priorities and the State Governor specifically requests the funding. Although a funding level of \$2.4 billion annually is expected for the construction grants program, it is important to note that this money will be competed for on a national basis. Consequently, the amount of money that will become available for combined sewer problems in the Great Lakes is uncertain.

In controlling pollution from combined sewers, the 1978 agreement emphasizes the adoption of practical solutions, but, as noted previously, the solutions usually proposed are costly,

large-scale structural projects. In a 1979 report 1/ we noted that a number of innovative or alternative control techniques which hold promise in helping control overflows are available. These techniques include storing rainwater on rooftops, parking lots, and elsewhere; disconnecting downspouts; cleaning streets; and using devices to increase sewage flow and to regulate and treat sewage at overflow points. While no technique alone provides the same degree of improvement offered by structural changes, a number of techniques together could minimize overflows and reduce the size of the construction projects. In our report we recommended that EPA emphasize the use of inexpensive techniques and require communities to make maximum use of lower cost alternatives.

Until additional emphasis is placed on abating pollution from combined sewer overflows, the United States will not meet a major provision of the 1978 agreement. Furthermore, uncontrolled overflows from combined sewers will diminish the effectiveness of existing municipal sewage treatment programs in those metropolitan areas in the Great Lakes Basin experiencing overflow problems.

PHOSPHORUS IS NOT BEING COMPLETELY CONTROLLED,
AND CONTROL EFFORTS MAY NOT BE PROPERLY FOCUSED

Excessive phosphorus is a significant factor in lake eutrophication. 2/ Phosphorus control was identified in both the 1972 and 1978 agreements as a major objective, but the agreement objectives are not being met. Progress is being made but treatment plants are not achieving the phosphorus discharge limits established, and the need for detergent phosphate controls is controversial. In addition, many uncertainties exist concerning the extent of the phosphorus pollution problem, acceptable levels of phosphorus inputs to the lakes, and the value and cost effectiveness of various control programs. Research efforts

1/"Large Construction Projects To Correct Combined Sewer Overflows Are Too Costly" (CED-80-40, Dec. 28, 1979).

2/Substantial additions of phosphorus to a body of water such as the Great Lakes usually results in accelerated plant growth and oxygen depletion. As chemical and biological conditions in the lakes become altered (eutrophication), less desirable types of fish become prevalent, the water takes on an unpleasant odor, and algae builds up on the water surface. While such changes can occur naturally, human activities have accelerated the process substantially by adding large amounts of phosphorus to the lakes from such sources as agricultural and urban runoff and effluents from municipal sources carrying sewage, detergent residues, and garbage. Human-induced eutrophication can be reversed.

needed to better understand these uncertainties and their implications for future U.S. control strategies may not be undertaken or coordinated. Without more accurate data on phosphorus inputs and a more thorough understanding of how phosphorus affects the eutrophication process, the United States is not in the best position to implement control programs most likely to result in the greatest improvements in Great Lakes water quality.

Discharge limits not being met

A cornerstone of the 1972 agreement was the requirement that phosphorus concentrations in effluent from major municipal sewage treatment plants (those discharging more than 1 million gallons per day), and from smaller plants as required by regulatory agencies, would not exceed a daily average of 1 milligram per liter (1.0 mg/l) into the lower lakes. The 1978 agreement extended the 1.0 mg/l limit to the three upper lakes and further reduced the limit on the lower lakes to 0.5 mg/l, as necessary to meet phosphorus target loads. The 1978 agreement is silent, however, as to whether the 1.0 mg/l limit was intended to be a daily, monthly, annual, or some other type of average. The 1978 requirements do not take effect until the Governments determine the allowable future phosphorus loads to all the Great Lakes and allocate these target loads between the United States and Canada and among the States and the Province of Ontario. This allocation was to have been finished by May 22, 1980, but the Governments have extended this date twice since then and still have not reached a formal agreement. (See p. 23.) According to the U.S. Section of IJC, attention is not likely to be paid to the more stringent phosphorus requirements in the 1978 agreement until the allocations are made.

According to EPA, until the 1978 agreement requirements become effective, only major treatment plants on the two lower lakes are required to achieve the 1972 requirement of 1.0 mg/l daily average phosphorus discharge by December 31, 1982. Nevertheless, major municipal plants, as well as some smaller ones, in operation throughout the Great Lakes Basin generally have a Federal requirement for a 1.0 mg/l monthly average phosphorus discharge in their discharge permits.

In its November 1981 report to IJC, the Great Lakes Water Quality Board stated that most major municipal facilities on the lower lakes had achieved an annual average of 1.0 mg/l, despite earlier predictions that many of the major plants would not achieve this limit until as late as 1986. According to the Director of GLNPO, EPA has been very successful, especially during the last half of fiscal year 1981, in working with the States to accelerate the installation of phosphorus removal equipment at major U.S. municipal plants on the lower lakes. Another GLNPO official said that a major problem in getting municipal plants ready for phosphorus removal is the time needed to construct the facilities to handle the large quantities of sludge produced as a result of the phosphorus removal process.

While we agree that the United States has made substantial progress in limiting municipal phosphorus discharges on the two lower lakes, we do not agree that the 1982 target date will be met. As discussed below, we believe it is unlikely that many major U.S. municipal plants on the lower lakes will be achieving a daily average phosphorus discharge of 1.0 mg/l by December 31, 1982.

The following chart, based on statistics compiled for region V by a contractor and released in September 1981, shows that for major municipal facilities on the lower lakes alone, 85 plants had not achieved an annual average of 1.0 mg/l at the end of 1980. These 85 major plants accounted for about 76 percent of the municipal sewage flow into the lower lakes for fiscal year 1980. Furthermore, of these 85 plants, as many as 41 may not have the equipment for phosphorus removal capability necessary to achieve an annual average of 1.0 mg/l until after the 1982 deadline.

Status of Phosphorus Removal Equipment Installation
at Major Municipal Plants Exceeding 1.0 mg/l
on the Lower Lakes
Fiscal Year 1980

<u>Lake</u>	<u>Number of plants exceeding 1.0 mg/l</u>	<u>Calendar year phosphorus removal capability completed</u>				
		<u>Completed</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Erie	56	9	18	7	13	9
Ontario	<u>29</u>	<u>4</u>	<u>13</u>	<u>11</u>	<u>-</u>	<u>1</u>
Total	<u>85</u>	<u>13</u>	<u>31</u>	<u>18</u>	<u>13</u>	<u>10</u>

Even if the completion dates are met, this in itself does not guarantee that a 1.0 mg/l effluent will be achieved. Of the 85 municipal plants in the above table, 13 already have the necessary phosphorus removal equipment installed but were not achieving the 1.0 mg/l effluent limitation. GLNPO staff and a regional water division official told us that this was caused by either startup problems or operational difficulties at the municipal plants. As discussed on page 12, operational difficulties are a major problem at U.S. municipal plants and many plants, both major and minor, violated their discharge permits. Discharges of phosphorus in excess of 1.0 mg/l were a common violation.

Once the United States and Canada agree on an allocation of the phosphorus target loads for all the lakes, the 1978 agreement requirements will take effect. The requirements are 1.0 mg/l phosphorus discharge limit for major municipal plants on the upper lakes and a 0.5 mg/l limit for plants on the lower lakes where necessary to achieve the target loads, unless the Governments decide the phosphorus limits should be either relaxed or

set at even stricter limits than currently called for by the agreement.

More stringent phosphorus discharge limitations may be needed. In 1980 an IJC Phosphorus Management Task Force report concluded after 2 years of study that phosphorus limits in the range of 0.1 to 0.5 mg/l may be needed on the lower lakes if other suggested measures did not prove effective. IJC recommended in a January 1981 supplemental report to the Governments that they assess the ability of municipal plants in the basin to achieve concentrations below 1.0 mg/l and consider requiring that plants meet the more stringent limitation where technically and economically feasible.

It is unlikely that U.S. municipal plants will be able to meet more stringent discharge limits. The following table shows that in 1980 only 123 of 240 plants were achieving annual average discharge limits of 1.0 mg/l or less.

Status of Phosphorus Discharges
by Major Municipal Dischargers
on All the Great Lakes
Water Year 1980

<u>Upper lakes</u>	<u>Total plants</u>	<u>Number of plants achieving 0.5 mg/l or less</u>	<u>Number of plants achieving between 0.5 and 1.0 mg/l</u>	<u>Number of plants exceeding 1.0 mg/l</u>
Huron	19	3	8	8
Michigan	76	18	37	21
Superior	<u>9</u>	<u>1</u>	<u>5</u>	<u>3</u>
Total	<u>104</u>	<u>22</u>	<u>50</u>	<u>32</u>
<u>Lower lakes</u>				
Erie	97	15	26	56
Ontario	<u>39</u>	<u>1</u>	<u>9</u>	<u>29</u>
Total	<u>136</u>	<u>16</u>	<u>35</u>	<u>85</u>
Total	<u>240</u>	<u>38</u>	<u>85</u>	<u>117</u>

As shown, 117 (about 49 percent) of 240 major municipal dischargers on the Great Lakes did not achieve an annual average phosphorus discharge limit of at least 1.0 mg/l in 1980. According to EPA, 16 of these dischargers, although not achieving an annual average, were in compliance with the 1.0 mg/l limit by the end of the year. We found that the 117 plants shown above comprised about 61 percent of the municipal sewage flow in the basin.

We also found that at least 56 (48 percent) of these 117 plants were not expected to achieve an annual average of 1.0 mg/l until after 1982. In addition, of 136 municipal plants on the lower lakes, only 16 (12 percent) were achieving the 1978 agreement proposed limit of 0.5 mg/l or less.

Detergent phosphate bans are controversial

In 1970 IJC estimated that 70 percent of the phosphorus entering the lakes from municipal waste came from laundry detergents. IJC advocated banning or limiting phosphates in household detergents if necessary to achieve target phosphorus loads for the lakes. Even though the 1972 and 1978 water quality agreements advocated limitations on phosphorus in detergents, key Great Lakes States have resisted such limitations because of the increased cost to consumers and the uncertainties about the benefit the limitations would actually provide.

While the 1972 water quality agreement only suggested the use of detergent phosphate limitations, the 1978 agreement requires a 0.5-percent weight limitation of phosphorus in household detergents when necessary to meet allowable phosphorus levels. But not all the Great Lakes States have achieved the 0.5-percent detergent phosphate limitation. For example, of the four States bordering Lake Erie, the most severely polluted lake, only New York and Michigan have enacted detergent phosphorus limitations. Ohio and Pennsylvania have not enacted limits, although Pennsylvania claims that limits in New York and Ohio would cover the grocery wholesalers in the two affected Pennsylvania counties. In addition, Canada's detergent phosphorus limitation is 2.2 percent by weight, as opposed to 0.5 percent in the United States, which has been the basis for controversy.

The Ohio EPA and the Soap and Detergent Association strongly oppose a detergent phosphorus ban or limitation. They believe it is more cost effective overall to remove phosphorus at sewage treatment plants. A 1980 study funded by the Soap and Detergent Association estimated that detergent phosphate bans currently in effect may cost consumers as much as \$448 million per year (not including industry's costs) for additional hot water, whiteners, and water softeners necessary to achieve the cleaning power of phosphate detergents. In addition, the Pennsylvania representative to the IJC Water Quality Board pointed out that no one has come up with good economic criteria to justify detergent phosphorus limits. The issue became more controversial in 1980 when IJC's Phosphorus Management Strategies Task Force reported that voluntarily the detergent industry had drastically reduced the amount of phosphorus in detergents (detergents now account for 20 to 35 percent of phosphorus in wastewater rather than 70 percent). The task force also reported that all that may be necessary now for phosphorus control on the two lower lakes is municipal sewage treatment at 1.0 mg/l. On the other hand, in a January 1981 supplemental report (see p. 18), the task force reported that more stringent control measures may be necessary

for the lower lakes. According to EPA, additional evidence uncovered since the task force report was released shows further phosphorus load reductions more likely to be needed.

Despite the controversy, EPA and IJC continue to press for extension of phosphorus limitations to Ohio and Pennsylvania. A GLNPO environmental protection specialist told us that the cost estimates in the Soap and Detergent Association study were too high. In addition to questioning the industry study cost figures, IJC and EPA support detergent phosphate limits because they provide partial control for small sewage treatment plants that are not required to remove phosphorus and communities whose sewage occasionally bypasses treatment because of combined sewer overflows and sewage systems breakdowns. For treatment plants that remove phosphorus, detergent limits also reduce the degree of treatment required, the amount of energy and chemicals used, and the volume of sludge produced. In addition, the U.S. Section of IJC believes that, if the detergent phosphate limit were suddenly removed, treatment plants now barely achieving their 1.0 mg/l effluent limitation would no longer meet this requirement, as an increase of about 20 to 35 percent could be expected in the quantity of phosphorus that would need to be removed.

Need to resolve uncertainties about lake phosphorus inputs and target loads

Even though eutrophication control through phosphorus removal has received most of the attention since the first water quality agreement, uncertainties abound concerning the extent of the phosphorus pollution problem, the acceptable level of phosphorus inputs to the Great Lakes, and the value and cost effectiveness of various control programs. These uncertainties exist because of the difficulty in accurately measuring phosphorus inputs to the lakes, calculating phosphorus target loads to direct future control efforts, and analyzing in-lake biological and chemical processes, such as whether all of the phosphorus going into the lakes will result in excessive algae blooms and what happens to phosphorus as it travels to the lakes in rivers and streams. In addition, research efforts needed to better understand these issues and their implications may not be undertaken or coordinated. Without more accurate data on phosphorus inputs and a more thorough understanding of how phosphorus acts in the aging process, the United States is not in the best position to implement control programs most likely to result in the greatest improvement in Great Lakes water quality.

Future phosphorus control strategy uncertain

The 1978 agreement contained estimated target phosphorus loads for each of the Great Lakes and required the Governments to confirm what the future phosphorus loads would be and use this data to establish load allocations and compliance schedules for each country. Establishing valid target loads is critical

because they will form the basis for an overall phosphorus control strategy to direct future Great Lakes control programs.

To answer a number of unresolved phosphorus questions, IJC in 1978 established a Phosphorus Management Strategies Task Force comprised of representatives from government and academia. The task force was to review and analyze data concerning phosphorus input loads for 1976 (the base year) and evaluate the scientific models used to establish target loads.

In a July 1980 report, endorsed by IJC, the task force concluded that (1) clear directions on the extent, timing, and type of phosphorus controls are not apparent and (2) many uncertainties (information needs) should be dealt with so that future phosphorus management decisions can be more reliable. The task force also reported that its efforts were constrained because it had to use secondary sources of information, had little opportunity to resolve conflicts among these sources, and had to rely on models that could not resolve crucial issues.

In confirming what the target loads should be, the task force accounted for some of the uncertainty by calculating both a best estimate and a range of phosphorus input reductions needed. The calculations assumed that the goal of reducing wastewater treatment plant phosphorus discharges to 1.0 mg/l would be achieved on all the lakes. The following table shows the target loads for all the lakes and depicts the measured uncertainty for Lakes Erie and Ontario.

Estimated Phosphorus Loads
in Metric Tons per Year

<u>Lake</u>	<u>1976 best estimate (note a)</u>	<u>Target load best estimate</u>	<u>Load after municipal treatment plants achieve 1.0 mg/l best estimate (note a)</u>	<u>Additional reductions which may be required best estimate</u>	<u>Range</u>
Superior	4,200	3,400	3,400	(b)	(b)
Michigan	6,400	5,600	5,600	(b)	(b)
Huron	4,900	4,400	4,400	(b)	(b)
Erie	18,400	c/ 11,000	14,700	3,700	0 to 9,400
Ontario	11,800	c/ 7,000	9,600	2,600	200 to 5,400

a/The Task Force found that the 1976 (the base year) estimates of phosphorus inputs had no rigid scientific or statistical basis. The task force considered these estimates to be accurate within plus or minus 15 percent.

b/Although the estimates for the three upper lakes are subject to the same uncertainty as for the lower lakes, the task force believed that to maintain the present high quality waters of the upper lakes, only phosphorus from sewage needs to be controlled.

c/The figures shown represent the best estimate. The task force used four different models to predict the phosphorus target loads for the lakes with each model producing similar results. Considering the error inherent in the modeling process, coupled with the discrepancies among the four models used, the task force estimated that the range of uncertainty for Lakes Erie and Ontario target loads is plus or minus 30 percent and 20 percent, respectively. (According to EPA, the amount of error associated with models has since been reduced.)

Although the task force was not able to quantify all the errors or uncertainties surrounding the phosphorus issue, the two errors it measured (estimated actual loads and target loads) alone could justify program decisions ranging from doing no additional cleanup work to instituting massive new programs. For example, the best estimate for Lake Erie required reducing phosphorus inputs by an additional 3,700 metric tons per year if treatment plants achieved the discharge goal of 1.0 mg/l. However, because of the mathematical uncertainty, the estimates of control needed ranged from no additional reductions to reducing inputs by another 9,400 metric tons per year. For example, on Lake Erie the target load could be as high as 14,300 metric tons if the high range is accepted. Conversely, the load after municipal treatment plants achieve 1.0 mg/l could be as low as 12,495 tons (minus 15 percent). Therefore, no additional phosphorus reductions would be required for Lake Erie.

According to the Canadian Chairman of the IJC Water Quality Board, if the figures are viewed optimistically, they indicate that all that is needed is to achieve the 1.0 mg/l point source phosphorus discharge limit on municipal sources. Conversely, if the worst case is considered, much stricter point source controls and nonpoint source programs would be needed.

The 1978 water quality agreement requires the two countries to establish phosphorus loads and compliance schedules within 18 months after the effective date of the agreement. It was not until May 1981, however, that representatives from the two Governments met to negotiate the details of a phosphorus supplement to the agreement. The result of that meeting was a draft document entitled "Phosphorus Load Reduction Supplement to Annex 3 of the 1978 Agreement Between Canada and the United States of America on Great Lakes Water Quality." The agreement still has not been finalized between the two countries. In the phosphorus supplement being proposed, the Governments basically are (1) agreeing about the target loads in the Phosphorus Management Strategies Task Force report and (2) beginning the process of allocating the loads and establishing completion schedules for each country. In addition, the Governments are proposing that all municipal wastewater treatment plants discharging more than 1 million gallons per day achieve compliance with a 1.0 mg/l effluent concentration (on a monthly average basis). The Governments also recognize that reductions from nonpoint sources will be required to meet the phosphorus target loads and have proposed measures and programs to accomplish this.

The Phosphorus Management Strategies Task Force stated that the next major decision point in the phosphorus management program for the lakes advocated by the task force should be in about 5 years and that the Governments should use this time to resolve or reduce the uncertainties concerning the extent, timing, and type of phosphorus controls needed. In addition to the problems created by the task force's inability to calculate phosphorus inputs to the lakes and set valid target loads, other uncertainties remain which could have a significant impact on the selection of an optimum phosphorus control strategy. For example, questions about (1) the extent to which different phosphorus forms contribute to algae growth, (2) the contribution of tributaries to phosphorus loads, (3) shoreline erosion contributions to phosphorus inputs, and (4) the extent to which the atmosphere contributes to phosphorus inputs all remain unanswered. As discussed in appendix V, obtaining definite information regarding any one of these issues could drastically affect the types and extent of programs needed to control the phosphorus problem.

Needed research efforts may not
be undertaken or coordinated

The IJC Phosphorus Management Strategies Task Force reported in 1980 that its efforts to resolve the uncertainties surrounding phosphorus pollution and control were hampered by its inability

to conduct its own research. For the future, the task force recommended that a permanent organization be established within IJC and given the responsibility for continually analyzing and refining information concerning target loads, availability of phosphorus for algae growth, benefits and costs of control measures, and other related phosphorus issues. According to the Chief of GLNPO's Environmental Planning Staff, such a group has not been established within IJC. This official further stated that a coordinated approach to dealing with phosphorus-related research issues does not currently exist.

EPA, as the lead U.S. agency on agreement matters, is responsible for coordinating research efforts and ensuring that the principal U.S. research funding agencies consider identified Great Lakes research needs as part of their organizations' research programs. In 1974 we issued a report ^{1/} critical of EPA's research coordination efforts and calling for stronger EPA leadership to improve Great Lakes research coordination. EPA's research coordination efforts since then generally have been limited, informal, and have not ensured that agreement commitments are met. For example, according to the Director of EPA's Large Lakes Research Station, since 1975 the station's coordination efforts primarily have involved periodic meetings with two other research facilities--NOAA's Great Lakes Environmental Research Laboratory, and the Department of the Interior's Great Lakes Fisheries Laboratory. In addition, the EPA official said that, beginning in May 1981, U.S. and Canadian directors of various research organizations have met under the aegis of IJC to discuss research projects, data collection methods, and interpretations of research results to prevent overlapping research. The official said that meetings are informal--agendas, meeting minutes, or other documentation are not prepared. The Director of EPA's Environmental Research Laboratory agreed that formal coordination among EPA, the States, and other Federal agencies, including NOAA, does not occur. This official cited an example in which three research laboratories funded by three different Federal agencies and located within 50 miles of one another in one of the Great Lakes Basin States were doing similar research work.

In 1980 EPA developed a draft of a research strategy and 5-year plan in conjunction with the Argonne National Laboratory and two EPA laboratories. According to the Director of EPA's Environmental Research Laboratory, the EPA plan is in its third draft and has not been implemented because two of the participating laboratories were not funded in fiscal year 1982. We found that the EPA plan is limited to the work performed by the three laboratories and thus it is not a comprehensive, multiagency

^{1/}"Cleaning North America's Inland Seas: A Study of Federal Water Pollution Research and Demonstration Programs on the Great Lakes" (Vol. II, B-166506, Jan. 16, 1974).

strategy and plan for all Great Lakes research. Officials with the Great Lakes Basin Commission told us that an overall plan is needed to identify research needs, establish priorities, and coordinate efforts, but that such a plan has not been developed.

The National Ocean Pollution Research and Development and Monitoring Planning Act of 1978 (Public Law 95-273) gives NOAA the responsibility to develop a 5-year plan for the overall Federal effort in ocean pollution research and development. EPA is responsible, however, for providing input to this Federal research plan to ensure that Great Lakes research needs, such as those identified by the IJC Task Force to resolve the uncertainties about phosphorus, are included and receive attention.

The first 5-year plan was published in August 1979. In formally commenting on this plan, the Chairman of the Great Lakes Basin Commission wrote that the plan was "incomplete, inaccurate, and inadequate" and only superficially addressed Great Lakes issues. The chairman further stated that the section in the plan dealing with the Great Lakes was too general to provide a basis for decisionmaking. Our review of the plan showed no new specific research goals and objectives listed for the Great Lakes, no suggested increases or decreases in funding for existing programs, and no specific proposals for interagency cooperation. According to the Deputy Director of NOAA's Office of Marine Pollution Assessment, the 5-year plan was intentionally made very general to accommodate the wide range of legislatively mandated missions of the various Federal agencies involved in Great Lakes pollution research. In the absence of a complete and effective research plan and strategy for the Great Lakes, the Great Lakes Basin Commission attempted to provide some leadership in this area by developing such a plan. However, the Commission received no funds for 1982 and shut down its operations in September 1981.

NOAA is preparing its next 5-year plan and EPA's input to that process thus far consists of a small writeup on Great Lakes research which discusses the activities of two EPA groups--one primarily involved in Great Lakes research and the other primarily involved in surveillance and monitoring activities. The few research activities listed are grouped into very broad areas with no explanation of what the research is attempting to accomplish and how these efforts relate to a coordinated research strategy for the Great Lakes. Further, the EPA input does not identify any type of priority to be placed on Great Lakes research projects, nor does it identify other Federal organizations that are or need to be involved with Great Lakes research activities. The Director of EPA's Environmental Research Laboratory said that EPA's research process is not geared to setting priorities for the Great Lakes. Instead, any priorities established are in response to EPA program office needs and an attempt is made to balance regulatory and scientific research within EPA. In the absence of EPA's identifying Great Lakes

research needs and placing some type of priority on these needs, such information is not being provided to NOAA's planning process.

On May 14, 1981, a bill entitled the "Great Lakes Protection Act of 1981" (H.R. 3600) was introduced into the House of Representatives. This bill would amend the National Ocean Pollution Research Development and Monitoring Planning Act to provide greater coordination of research efforts concerning the Great Lakes. More specifically, the bill would direct NOAA to establish a Great Lakes research office to identify research needs and priorities, coordinate federally supported research, and encourage the utilization of research results and findings. As proposed, the bill would set aside for the Great Lakes research office a part of the funds authorized under the National Ocean Pollution Research Development and Monitoring Planning Act. Since the total amounts authorized under that act would be consistent with previous fiscal year authorizations, the amount set aside for the research office would not seem to require an increase in the Federal budget.

EPA's efforts to coordinate research have been limited, and NOAA's current 5-year research plan contains no specific research goals or objectives for the Great Lakes. Enactment of H.R. 3600, or similar legislation, would help assure that needed Great Lakes research activities are pursued and coordinated.

NONPOINT POLLUTION SOURCES HAVE RECEIVED LITTLE ATTENTION

In both the 1972 and 1978 water quality agreements, the U.S. Government agreed to develop a variety of programs and other measures for the abatement and control of pollution from nonpoint sources. Little attention, funding, and effort have been directed to nonpoint sources, particularly sources contributing toxic pollutants, even though nonpoint sources in some areas constitute the majority of the pollutants entering the lakes. EPA has focused its planning efforts and funding on point sources, and recent attempts to plan for and control nonpoint sources have not been comprehensive or coordinated. In addition, the resources devoted to the actual control of nonpoint sources have not been extensive and have had limited impact. Without more attention to nonpoint sources and a coordinated strategy and plan for dealing with them, the Great Lakes water quality objectives may not be achieved even if all other sources of pollution are eventually controlled or eliminated.

Nonpoint sources may contribute most to Great Lakes pollution

Nonpoint sources of pollution generally involve the contamination of receiving waters by storm runoff. Runoff contributes pollutants from farmlands, forests, urban streets, construction sites, and mines. The pollutants are deposited in streams, rivers, and lakes in a diffused manner rather than from a

specific point. EPA estimates that nonpoint sources account for more than half of the pollutants entering the Nation's waters.

With the exception of Lake Superior, agricultural activities and urban storm water runoff are the major sources of nonpoint pollution to the lakes. In volume, the major nonpoint pollutant is sediment from soil erosion of agricultural lands. As erosion depletes topsoil from the land, the resulting sediment transports other pollutants, such as pesticides and excess nutrients, into the waterways. Runoff from lands used to support livestock also contributes large quantities of nitrogen and phosphorus. Urban runoff contains a variety of pollutants, such as sediment, toxic materials, oil and suspended grease, and animal litterings. IJC and EPA have recognized that the deposition of air pollutants into the Great Lakes is an important source of nonpoint pollution. A 1981 IJC report shows that some of the pollutants being transported by air include polychlorinated biphenyls (PCB's), DDT, and the pesticide dieldrin, which can seriously threaten human health or biological resources. The report further shows that air transport is believed to be a major route of phosphorus and a number of other substances entering the lakes.

In 1978 the Council on Environmental Quality reported that nutrient loadings from nonpoint sources are approximately five to six times the loadings from municipal and industrial point sources. IJC has supported two major studies 1/ to identify all sources of phosphorus inputs to the lakes and determine their relative importance. These studies confirmed that nonpoint sources are the largest component of the overall phosphorus inputs to the Great Lakes. The table on the following page shows IJC's best estimates of the percentage of phosphorus inputs by source for each lake.

1/International Reference Group on Great Lakes Pollution from Land Use Activities, "Environmental Management Strategy for the Great Lakes System," Final Report to the International Joint Commission, Windsor, Ontario, July 1978; and "Phosphorus Management for the Great Lakes," Final Report of the Phosphorus Management Strategies Task Force, July 1980.

1976 Phosphorus Loadings by Source (Percent)

<u>Lake</u>	<u>Point</u>			<u>Nonpoint</u>			
	<u>Municipal</u>	<u>Industrial</u>	<u>Total</u>	<u>Air</u>	<u>Upstream</u>	<u>Land</u>	<u>Total</u>
Superior	7	3	10	37	0	54	91
Michigan	39	5	44	26	0	30	56
Huron	11	2	13	23	14	50	87
Erie	39	3	42	4	6	49	59
Ontario	24	2	26	4	41	31	76

As shown, nonpoint sources are estimated to contribute the greatest amount of phosphorus to all five Great Lakes, accounting for 74 percent overall. Land uses (primarily farming) account for about 50 percent of the total input on three lakes and about 30 percent on the other two. However, as discussed on pages 16 to 19, the major emphasis in controlling phosphorus pollution has been in point source controls. EPA's justification for this is that the type of phosphorus from nonpoint sources does not affect algal growth as much as the type from point sources.

As discussed on pages 20 to 23, uncertainties exist about phosphorus loadings. At the same time, however, much more is known about phosphorus than is known about toxic and hazardous substances loadings to the lakes from nonpoint sources. IJC considers toxic and hazardous substance pollution from nonpoint sources of equal or greater concern than nutrient loadings.

Whatever the present percentage of the total pollution problem represented by nonpoint sources, the percentage will only increase as further progress is made in abating point sources of pollution. On June 10, 1981, in testimony before the Subcommittee on Environmental Pollution, Senate Committee on Environment and Public Works, we stated that the funds now being spent to build facilities to control point sources of pollution may not have as much impact on improving water quality as originally believed because nonpoint pollution may be negating or at least lessening the impact.

Nonpoint control efforts have been slow and resources devoted minimal

Various provisions in the Great Lakes agreements address the need to control pollution from nonpoint sources. Under the 1972 agreement, the Governments agreed to develop a variety of programs and other measures for the abatement and control of pollution from agricultural, forestry, and other land use activities and to implement the control programs and measures by December 31, 1975. The 1978 agreement removed the target date for the implementation of control programs and measures but

substantially broadened the control requirements for nonpoint sources to include measures to (1) control soil losses from all areas, (2) encourage and facilitate improvements in land use planning and management programs, and (3) abate and control inputs of toxic substances from nonpoint sources.

The major U.S. legislation addressing pollution from nonpoint sources is the Clean Water Act, as amended. The act sets forth specific provisions for nonpoint planning and control efforts, including (1) grants for the development of areawide management plans to identify and develop procedures for controlling nonpoint pollution sources, (2) grants for projects to demonstrate new methods and techniques for the elimination of pollution in the Great Lakes, (3) long-term contracts with rural landowners and operators for the purpose of installing and maintaining measures to control nonpoint sources, and (4) the design and development of a demonstration wastewater management program for the rehabilitation and environmental repair of Lake Erie.

Despite the significant provisions in the Clean Water Act addressing nonpoint pollution problems on the Great Lakes, we found that overall progress has been limited and slow, as discussed below.

Planning efforts have not been
comprehensive or coordinated

Areawide water quality management plans authorized by section 208(a) of the Clean Water Act, as amended, were intended to be a primary U.S. vehicle for addressing nonpoint pollution problems in the Great Lakes. This program, which is administered by EPA, has yet to have a significant impact on nonpoint problems. In 1978 we reported ^{1/} that although the planning program had achieved some success, many problems hindered its effectiveness. We specifically noted that the technical capability to identify the cause and effect relationship among nonpoint pollution sources and the expected water quality impacts of various control techniques still does not exist; planning agencies will not continue areawide planning without Federal funds; areawide plans, if developed, may not be implemented because of institutional problems; and the general public has participated little in the planning process.

No funding has been provided for the areawide planning program for fiscal year 1982. However, the Municipal Wastewater Treatment Construction Grant Amendments of 1981 (Public Law 97-117) authorize the Administrator to reserve up to 1 percent of the sum allotted and available for construction grants for State

^{1/}"Water Quality Management Planning Is Not Comprehensive and May Not Be Effective for Many Years" (CED-78-167, Dec. 11, 1978).

grants to carry out water quality management planning, including facility and nonpoint measures to meet and maintain water quality standards. As noted previously, however, funding has not yet been provided for the construction grants programs for fiscal year 1982.

Although section 208 planning funds were for both point and nonpoint planning activities, nonpoint planning has been emphasized only recently. For example the 38 water quality management planning agencies in region V have obligated about \$14 million for nonpoint planning activities in the basin since 1972, but about \$11.4 million of the \$14 million has been obligated since 1979. In addition, the nonpoint portions of most areawide plans have yet to be completed.

According to region V Water Division officials, the point source portions of the areawide plans identify specific point source problems that need to be addressed and recommend solutions, but this level of planning does not yet exist on a broad scale for nonpoint sources. These officials said the areawide plans do not generally include implementation plans and strategies to identify and set priorities on worthwhile projects and identify best management practices which, if successfully implemented, would remedy specific nonpoint problems. According to region V Water Division officials, the States are preparing statewide strategies which will identify worthwhile projects and rank these projects. The officials said the State of Wisconsin is finished with its strategy but the strategies of the other Great Lakes states are in various stages of completion and will require more work before EPA can approve them unconditionally.

Department of Agriculture Soil Conservation Service (SCS) officials involved with water quality matters stated that the Great Lakes States were beginning to make progress in nonpoint planning efforts but that these plans may remain uncompleted because the section 208 planning program has not been funded in fiscal year 1982. These officials further stated that a question remains as to who will coordinate the individual State plans into an overall basinwide strategy, should they be completed, because the primary coordinating mechanism in the Great Lakes--the Great Lakes Basin Commission--has been abolished.

A coordinated nonpoint strategy and plan for the Great Lakes Basin is particularly important because the authority and responsibility for nonpoint programs and activities in the basin is spread among several Federal agencies--EPA, the Army Corps of Engineers, and the Department of Agriculture--in addition to various State and local governments. In 1981 EPA, the Army Corps of Engineers North Central Division, and the Soil Conservation Service, Department of Agriculture, entered into an agreement to (1) foster accelerated implementation of agricultural nonpoint source controls in Great Lakes Basin areas where such sources preclude the achievement of phosphorus goals contained in the

1978 water quality agreement and (2) identify critical areas for targeting nonpoint control efforts. Although a good step, the agreement does not include Department of Agriculture agencies other than SCS and only focuses on obtaining acceptance of reduced tillage practices on certain soil types in the south-western portion of the Lake Erie Basin. For example, the agreement does not include the Agricultural Stabilization and Conservation Service which manages the Agriculture Conservation Program and the Rural Clean Water Program, both of which provide up to 75 percent of the cost to carry out needed conservation and environmental measures.

Moreover, the Department's Farmers Home Administration provides water conservation and protection loans for a variety of activities, including the construction of livestock waste storage facilities. Its Science and Education Administration carries out basic, applied, and developmental agricultural research, including research directed to water quality improvements, through both inhouse efforts and grants to State agricultural experiment stations and land grant universities. These agencies could be of assistance in developing and carrying out more comprehensive efforts to address agricultural pollution concerns covered by the water quality agreement.

In our opinion, Great Lakes nonpoint pollution planning efforts would be greatly facilitated by a coordinated approach with a single agency because of the many Federal, State, and local agencies involved in these activities. Furthermore, without a central coordinating agency--the Great Lakes Basin Commission has been disbanded--areawide plans being developed by the States and the plans and efforts of other agencies may not be brought together into an overall nonpoint control strategy.

Control efforts have been minimal

Very few projects to actually control nonpoint pollution problems in the Great Lakes Basin have been undertaken because only limited funds have been provided for such purposes. In addition, the implementation of control efforts or projects undertaken are usually site specific, the use of some nonpoint control measures requires new management skills and increased technical assistance, and the effectiveness and acceptability of some of the techniques is not known.

Several Federal programs provide funds for projects to control nonpoint pollution sources, but some of these programs also serve other purposes, such as the stimulation of agricultural production. Therefore, it is difficult to determine the total number of projects or amount of funds in the basin specifically directed to nonpoint control efforts. We found, however, that Federal pollution funding for all purposes for fiscal years 1978-80, including funding for nonpoint control and planning efforts, was very low compared to Federal funding for the construction of municipal point source facilities during the

same period. (See app. VI.) This is particularly significant, given that nonpoint pollution sources may constitute the majority of many pollutants entering the lakes.

The experimental Rural Clean Water Program authorized by Public Law 96-108--a major nonpoint pollution control program--provides an example of limited nonpoint control efforts to date. This program, which provides Federal financial assistance through long-term contracts to agricultural producers to voluntarily adopt practices to control agricultural nonpoint pollution, was appropriated only \$50 million in fiscal year 1980 and \$20 million in fiscal year 1981. Although the Great Lakes area received additional consideration in the selection of projects in 1980, the program has had limited impact. Of 21 projects funded nationwide, only 2 projects, valued at \$3.5 million, are located in the Great Lakes Basin. In addition, according to IJC and the Department of Agriculture, the implementation program developed in Great Lakes Basin projects, as well as the projects outside the basin, are site specific and must be tailored to specific problems identified at each project site.

Another major nonpoint control program authorized by the Clean Water Act--the demonstration project program under section 108(a)--has also had limited impact. Since 1972, EPA has funded 10 projects, totaling about \$9.9 million, to develop and implement new methods and techniques for reducing sediment and related pollutants from rural runoff. As of December 1981, 6 of the 10 projects were still active. No new demonstration projects have been funded for fiscal year 1982.

Of the 10 demonstration projects, 7, totaling about \$4.7 million in Federal funds, have been in the Maumee River Basin of Lake Erie. The GLNPO program administrator for these projects said that little has been accomplished in the other Great Lakes, although Lake Ontario has been discussed as a possibility for locating future projects if EPA region II would cooperate. The program administrator said that none of the demonstration projects involved toxics aspects of nonpoint pollution because EPA has been unable to decide on what type of project could be demonstrated that would not be too costly.

According to the Chief of GLNPO's Environmental Planning Section, most of EPA's efforts have centered around demonstrating the feasibility of using minimum or no-tillage farming practices at sites identified by the Army Corps of Engineers as susceptible to erosion. Further, according to the Chief, careful measurement of results has been used to create and verify a computer simulation model to estimate loading reductions that can reasonably be attributed to the adoption of modified tillage practices.

EPA region V officials question, however, the acceptability of the practices being promoted by the demonstration projects and the willingness of program participants to continue using such practices. They pointed out that minimum or no-tillage practices

are not suitable for all crops, soils, and climates and EPA has experienced difficulty in demonstrating phosphorus and sediment runoff reductions along with equal or better crop yields at reduced costs through the use of such practices. For example, Ohio EPA water quality officials estimated that only about 5 to 10 percent of the farms in the Maumee River Basin currently use no-tillage practices. A GLNPO official told us that other farmers may be reluctant to use no-tillage practices and because participation in nonpoint control programs is voluntary, program acceptance may be slow and unpredictable. Another problem related to the increased use of minimum/no-tillage practices pointed out by the U.S. Section of IJC is that such practices may require greater use of herbicides for the control of weeds. Also, the Department of Agriculture pointed out that the adoption of minimum or no-tillage technology is slow because of the need for new equipment and increased management skills, which necessitates greater technical assistance to farmers.

TOXIC POLLUTION--POTENTIALLY THE GREATEST PROBLEM

As early as 1970 EPA and IJC recognized that toxic pollution is potentially a greater threat to the Great Lakes than eutrophication. Toxic pollution could endanger human health, destroy Great Lakes commercial fishing, and ultimately render the lakes useless for a variety of desirable activities. The 1978 water quality agreement emphasized the toxic pollution problem and required the Governments to meet specific toxic control objectives. Great Lakes toxic pollution has yet to be comprehensively addressed, however, because too little is known about the nature, extent, and source of such pollution. Likewise, toxic control programs are only in their infancy and their effectiveness is not yet known.

Emphasis on toxics is relatively new

While the 1972 agreement required the United States and Canada to control toxic substance pollution, the emphasis was clearly on eutrophication control. The agreement provisions concerning toxic and hazardous polluting substances were limited and very general. Since the agreement emphasized eutrophication control, the United States and Canada concentrated efforts in that area and little was done about toxic substance pollution.

When the water quality agreement was renegotiated in 1978, it gave increased emphasis to the problem of toxic and hazardous substance pollution. The 1978 agreement expanded the Governments' responsibilities by including specific objectives for certain known, persistent toxic substances, and requiring the development of lists of hazardous and potentially hazardous polluting substances and the development of general programs to control them. It also called for monitoring and research programs to determine the sources, fate, and effects of toxic substances in the Great Lakes.

Nature, extent, and source
of toxics are undefined

Neither IJC, EPA, or other concerned organizations have quantified the toxic substance pollution problem in the Great Lakes or addressed the questions needed to make effective toxic control decisions. However, the potential harm of toxic substance pollution has been demonstrated by its effect on the Great Lakes fishing industry. According to the Acting Chief of GLNPO's Remedial Programs Staff, toxic substances in fish have already severely reduced commercial fishing for some preferred species on the Great Lakes, and if the Food and Drug Administration reduces the allowable amount of PCB's in fish, as proposed, commercial fishing could be further reduced.

In its 1975 annual report, IJC stated that too little was known about toxic substances--identity, sources, amounts present, characteristic forms and behavior, and effects. The report went on to say that research was required to enable the establishment of objectives and the evaluation of potential hazards. While IJC and EPA have given increased attention to the problem of toxic substance pollution in the Great Lakes, many questions about toxic substances remain unanswered.

In fiscal year 1981, the IJC Toxic Substances Committee reported that more than 30,000 chemical compounds were produced in the Great Lakes Basin. To date over 450 of these chemical compounds have been found in the lakes. Some of the compounds identified are known to be toxic, but the environmental and human health effects of many others are as yet unknown. In addition, IJC reported that other toxic and hazardous substances will undoubtedly be found as detection methods improve.

Information on some of the "traditional" toxic substances, such as DDT, mercury, and PCB's, has been available for some time because these substances have been studied fairly well, and some control measures implemented. In 1980 the IJC Water Quality Board reported that the levels of PCB's and DDT in Great Lakes fish have begun to decline and attributed this decline to the controls implemented.

Lack of data is a major stumbling block to U.S. efforts to control toxic substance pollution. For example, in 1980 the IJC Committee on the Assessment of Human Health Effects of Great Lakes Water Quality reported that of 381 chemical compounds examined, data to allow for meaningful toxicity evaluations was available for only 89 compounds. Even for the 89, the committee said that much more information was needed to set acceptable exposure levels and allowable limits for the safe consumption of fish. Although the committee originally was asked to gather exposure data in 1978, in November 1980 the acting chairman told IJC that little progress had been made in gathering this data because monitoring and research efforts had not provided the needed information.

Delays in EPA's open lake fish monitoring program have hampered U.S. efforts to identify toxic substances and track the lakes' status. Toxic substances are generally present at very low concentrations in the lakes and accumulate in certain fish over time. By analyzing the tissue of fish caught in the open lake, EPA can determine the lake's status concerning toxics and determine trends and the general effectiveness of control programs. According to the Chief of GLNPO's Surveillance and Research Staff, EPA has a 3-year backlog (1978, 1979, and 1980) of fish samples from all five Great Lakes to be tested. The backlog resulted because funds were not available to develop the laboratory capability to do the testing. The Chief said EPA has now developed the capability to test these samples and plans to gradually reduce the backlog. Michigan environmental officials, however, questioned the value of testing 3-year old fish samples because the fish have suffered some dehydration and any test results may not be accurate.

Limited laboratory capability is also a major problem affecting monitoring for toxic substances in the Great Lakes. The Chief of GLNPO's Surveillance and Research Staff said that the United States currently lacks the personnel and equipment to adequately monitor for toxics. He said that the problem would probably be solved by the forces of supply and demand but estimated that it would take several years. In 1980 the Great Lakes Water Quality Board advised IJC that all jurisdictions along the lakes were having problems funding the needed analytical capacity and capability. The board concluded that the increasing demands for complex analyses, sophisticated equipment, and skilled staff must be met, or timely and accurate toxic pollution information will not be available and control programs will be hindered.

In January 1981 IJC issued "Special Report on Pollution in the Niagara River" to the Governments in which it expressed concern with the extent of pollution from toxic and hazardous substances as well as the unknown impact of the pollutants on the Niagara River and Lake Ontario. IJC also pointed out (1) the need for a comprehensive study to identify the sources, concentrations, fate, and probable effects of these pollutants so that the seriousness of the problem could be assessed and required remedial actions pursued and (2) the need for a comprehensive and continuing monitoring program which would allow a better understanding of interactions among pollutants for which agreement objectives or human health or biological criteria do not yet exist. The Governments have yet to respond formally to the IJC report, but they have consulted and have begun to take corrective action beginning with designating the Niagara area as a priority area for remedial action. In addition, the Governments are proceeding with further efforts to identify and characterize the significant sources of persistent toxic substances entering the Niagara River, and interagency consultations involving EPA, the New York Department of Environmental Conservation, the Ontario Ministry of the Environment, and Environment Canada have been increased in an effort to expand remedial efforts. Although

corrective action has begun, several questions and issues raised by IJC have yet to be comprehensively addressed and the effectiveness of those corrective actions already being pursued is unknown at the present time.

Effectiveness of control efforts unknown

Just as information about toxic substance pollution is needed to design control programs, information about toxic control programs is needed to determine their effectiveness. By the end of fiscal year 1981, no overall analysis of U.S. toxic substance control programs had been completed.

Early in 1980, IJC's Water Quality Board formed a Toxic Substances Committee to evaluate the effectiveness of existing programs. In a November 1980 report, the committee stated that the United States has an adequate legislative base to protect people and the environment from toxic substances but the committee was unable to assess the effectiveness of programs under this legislation.

In testimony before IJC, the New York representative to the IJC Water Quality Board stated that the Government's failure to recognize the need for an integrated approach to control toxics has been devastating. He pointed out that to date both U.S. and Canadian toxic efforts have been piecemeal and such an approach cannot control the discharge of toxic substances. In 1980 the Great Lakes Basin Commission reported similar findings. The Commission stated that a major shortcoming to controlling toxic substances is the lack of sufficient coordination and integration among State and Federal programs. For example, the Commission said that confidential information on toxic substances production collected by EPA is not available to the States, which need it for effective State programs. Without this information the States must create their own data programs, which places an added burden on both the States and industry.

In a report released at IJC's November 1981 annual meeting, the Toxic Substances Committee reported that an overall strategy for toxic substances control activities does not exist and therefore the overall management of toxic substances control programs is difficult. The committee reported that control programs were fragmented, which resulted in incomplete program coverage, duplicative activities, or limited impact on emerging problems. The report also stated that actions are being taken in the United States to improve toxics coordination at the Federal and State levels. Specifically, EPA is developing a toxic substances integration strategy and EPA regional offices as well as many of the States have developed internal coordination mechanisms to improve integration. However, these programs are in their initial stages of development and the extent to which they will be able to effectively coordinate toxic substances programs remains to be seen.

In addition to improved coordination among the various toxic substance control programs, the United States needs to understand how conventional wastewater treatment affects toxic pollutants and take advantage of possible benefits. EPA's pretreatment program to control toxic industrial pollution is an example of a control measure that could provide these benefits. Both U.S. legislation and the 1978 agreement require the Government to establish requirements to pretreat industrial wastewater containing toxic pollutants before they are discharged to municipal wastewater treatment plants.

In a fiscal year 1982 report 1/ on EPA's industrial pretreatment program, we reported that although the program was authorized in 1972, it has yet to be fully implemented. As of December 15, 1981, EPA has issued final standards for only 2 industries and has proposed standards for only 13 of the other 32 industries required to be regulated by U.S. law. The report concluded that the delays were at least partially due to the lack of data about the nature and source of toxic substances, their impact on the environment and health, or the effectiveness of available treatment measures. For example, an EPA study found that conventional wastewater treatment technologies effectively remove some toxic pollutants, but the source of these pollutants--storm runoff, industrial discharges, or other sources--was not identified.

EFFECTIVE WATER QUALITY MONITORING ACTIVITIES
HAVE NOT BEEN DEVELOPED AND IMPLEMENTED

Accurate, reliable data describing existing water quality conditions and trends, how pollution occurs, and the effect of eliminating sources of pollution is essential to control efforts. EPA monitoring efforts, however, have been hampered by funding constraints and questions have been raised about their adequacy. Also, the IJC has yet to endorse the Great Lakes International Surveillance Plan, advocated in the agreement as the model for monitoring activities in the Great Lakes Basin, because the Commission has not concluded whether the plan is scientifically effective and managerially implementable. Comprehensive and scientifically valid monitoring efforts are needed if Great Lakes pollution problems are to be identified, control strategies are to be developed, and the effectiveness of control measures are to be evaluated.

Importance of monitoring recognized
in water quality agreement

The 1978 agreement devotes an entire section to monitoring and requires the United States to

1/"A New Approach Is Needed for the Federal Industrial Wastewater Pretreatment Program" (CED-82-37, Feb. 19, 1982).

- determine if pollution control requirements are being met;
- identify and report on instances where agreement objectives are not being achieved;
- evaluate water quality trends in order to assess the effectiveness of remedial and preventive measures, assess enforcement and management strategies, and identify the need for further technology and research activities; and
- identify emerging problems in order to develop and implement appropriate pollution control measures.

The agreement also requires the United States to develop monitoring programs which will allow assessments of (1) inputs from tributaries, point source discharges, the atmosphere, and connecting channels and (2) whole lake data for nearshore areas, open waters of the lakes, and fish and wildlife contaminants.

The benefits of good monitoring have been well established. IJC has reported that early measurements of phosphorus content in the lakes led to phosphorus controls being implemented basinwide. Monitoring PCB levels in fish led to the closing of Green Bay commercial fisheries, and water quality surveys of the Cuyahoga River demonstrated the need for more stringent industrial and municipal effluent controls. According to an environmental advisor to IJC, reliable and comparable monitoring data is needed to arrive at correct conclusions about the state of the lakes so that intelligent decisions about their future can be made.

Existing Great Lakes monitoring activities have been constrained and criticized

Since 1969 IJC has repeatedly called for the Governments to pay more attention to monitoring needs. For example, in February 1977 IJC reported that

"The Commission has * * * in the past emphasized to the Governments the need to implement a comprehensive water quality surveillance and monitoring program to provide the information necessary to identify water quality issues, to assess the achievement of water quality objectives, and to relate achievement or non-achievement of objectives to a particular cause. The Commission reiterates the need for adequate surveillance and monitoring of water quality and * * * longterm funding * * *."

In a January 1981 interim report to the Governments, IJC again concluded that adequate water quality monitoring is a cornerstone to successful implementation of agreement requirements, but that substantial concerns cloud the Governments' ability to meet the intent of the agreement. IJC raised concern

that the surveillance and monitoring plan followed by the Governments in the Great Lakes may not satisfy the specific information and reporting requirements for the four purposes of surveillance specified in the agreement, and may have been constrained in its development by budgetary considerations to the detriment of ensuring the satisfaction of agreement requirements. IJC also expressed concern with the adequacy of analytical resources needed to accommodate the increased and more complex Great Lakes water quality monitoring activities.

Funding constraints have affected EPA's ability to meet its Great Lakes monitoring responsibilities. For example, EPA's Great Lakes Fish Monitoring Program, a cooperative effort among nine State and three Federal agencies throughout the Great Lakes Basin, includes both open lake and nearshore fish monitoring. Its three objectives are to (1) identify environmental problems and public health concerns by determining contaminant levels in Great Lakes fish, (2) evaluate the effectiveness of remedial programs in controlling sources and distribution of toxic substances, and (3) detect new problems by scanning appropriate samples for the presence of a wide range of contaminants.

According to GLNPO's Chief of Surveillance and Research, timely testing of fish samples is essential for measuring the levels and extent of toxic contaminants. However, EPA has a 3-year backlog of fish samples because lack of funds precluded it from contracting with a testing facility. Although the samples may still provide valid data, the Chief said that a 3-year data gap means trend data is not being established and toxics harmful to the environment may remain undetected.

Other EPA monitoring activities have faced funding constraints. In 1976 EPA completed its open lake water quality monitoring but did not do river mouth or nearshore monitoring. (Nearshore conditions change often and must be monitored regularly to get good data.) In 1977 EPA completed an estimated one-third of the open lake monitoring and approximately one-half of the nearshore program, but water supply intake and river mouth monitoring was not done. In 1980 EPA met its requirements for open lake monitoring but completed less than 20 percent of its nearshore program.

Because of anticipated budget cuts, GLNPO will not be able to fund some monitoring functions in upcoming fiscal years that are essential to the overall monitoring strategy on the Great Lakes. GLNPO's Chief of Surveillance and Research said that budget cuts for fiscal year 1983 will result in the elimination of open lake monitoring scheduled for Lake Superior. In addition, State agencies anticipate cutbacks in their monitoring programs. In Michigan, for example, funding problems will result in the State's scrapping most of its tributary monitoring activities. Since Michigan tributaries feed into four of the five Great Lakes, cessation of tributary monitoring will reduce the ability of the United States to measure progress toward achieving

agreement objectives and to identify problem areas. The GLNPO Chief said that not being able to measure tributary loadings will keep EPA from using models to determine how the Lakes are responding and thus from establishing trend data.

Questions raised about proposed monitoring plan

The 1978 agreement calls upon the Governments to design and implement a strategy to coordinate and plan monitoring activities. A prototype Great Lakes International Surveillance Plan was developed by the IJC Water Quality Board as early as 1975, but IJC has yet to endorse a final plan.

IJC refuses to endorse the present GLISP because, as stated in a January 1981 report, the IJC "has not concluded whether GLISP represents a scientifically effective and managerially implementable plan to obtain and assess the data required by (the agreement)." Major problems with the plan include

- sampling time frame and location biases which could produce unrealistic estimates of sampled substances,
- inconsistent sampling techniques which could result in noncomparable data, and
- omissions of key components which could result in the failure to monitor certain elements directly affecting the quality of water in the lakes.

In commenting on the GLISP, an environmental advisor to IJC stated that:

"Overall, the plan reads as though it were a eutrophication study to which has been added anything and everything somebody thought we ought to know about toxic substances. * * * The frequencies of sampling * * * the station choices, data handling procedures, rationales for what is done and where are unexplained. Basically one has a phosphorus plan with an associated menagerie of chemical tests."

Timing and location bias distort data

Knowing when and where to take water quality samples is important for comparable and meaningful water quality measurements. Sample timing bias is demonstrated by the GLISP specifications for nearshore monitoring. Although the plan requires samples of nearshore water conditions three times annually--in spring, summer, and fall--it does not specify the month, day, or hour for the sampling. An environmental advisor to IJC believes that jurisdictions and agencies doing monitoring could schedule their activities based on the availability of vessels, facilities, and personnel and not on the basis of the best or most

critical times for sampling nearshore conditions. Unreliable or misleading trend data and overlooked water quality problems or changes could result.

GLISP tributary monitoring requirements provide an example of sample location bias. Environmental advisors to IJC criticized the plan because in instances where two or more streams or rivers meet, the plan does not require monitoring of the tributaries above that meeting point. Rather, samples are to be taken below or right at the meeting point. One advisor believes that failure to sample above the meeting point prevents assessing where specific pollutants originated. Another advisor agreed with this observation and said that because tributaries represent a major transport mechanism for many point and nonpoint pollutant loads to the Great Lakes, monitoring tributaries at improper locations will result in an inability to accurately quantify the inputs to the lakes, as well as an inability to identify specific sources of pollutant inputs in the basin.

A water quality consultant who reviewed the GLISP said that data obtained from tributary monitoring may not be useful because sampling sites are located at distances too far away from cities and industries to identify loadings to the lakes from municipal and industrial sources. He said to accurately assess pollution from tributaries, samples should also be taken at the river mouth (where the river flows into the lake), not at an isolated site upriver of major cities and industries. An examination of sampling locations for Lake Erie specified in the plan shows that two sites--the Maumee and Sandusky Rivers--are located at least 20 miles from Toledo and Sandusky, two large Ohio cities situated at the river mouths. The map in appendix VII taken from the GLISP shows that most of the sampling sites in the United States and in Canada generally are substantially upriver from the lakes.

Inconsistent sampling makes data noncomparable

Data comparisons are facilitated when the number of samples taken and the way they are taken are identical. However, the GLISP does not require the various State and Federal monitoring agencies to use the same techniques and the results may not be comparable. According to environmental advisors to IJC, because the data may not be comparable, data users may not be able to gain the overall basin perspective so important in making decisions affecting the Great Lakes.

A water quality consultant told us that GLISP requirements for monitoring nearshore fish contaminants in Lake Erie do not provide for collecting consistent, comparable data. He found that the monitoring requirements differed for each of the four States performing monitoring on Lake Erie. He also found that (1) the times for monitoring nearshore conditions are not defined, (2) the species sampled and number of samples may differ

for each State even when sampling is done on the same lake, and (3) the types of samples taken (for example, fillet versus whole fish) and the contaminants analyzed differ. For Ohio, for example, under the categories of time sampled, species to be sampled, number of samples, and sample type, the GLISP shows "N/A" or "not applicable." The consultant believes that problems in the fish sampling program, such as those identified above, will produce monitoring data which cannot be meaningfully compared and interpreted.

Omissions from the plan result in incomplete monitoring

Major omissions from the plan may further limit the GLISP's usefulness. For example, IJC has had reservations for years about using the herring gull as the sole indicator of how pollutants affect wildlife. The current GLISP, however, does not provide for sample monitoring of other birds and animals. Further, the GLISP does not provide for monitoring ground water that seeps into the lakes, does not examine the relationship of wetlands to the lakes, and does not require sampling of tributary sediments which may release pollutants into the lakes.

The answers to many eutrophication, nonpoint source, and toxic questions might be provided by an adequate surveillance and monitoring program. Such a program has yet to be developed and implemented, however, despite the importance placed on such a program in the 1978 Great Lakes Water Quality Agreement.

CONCLUSIONS

Progress is being made in cleaning up the Great Lakes, but the United States has experienced difficulty in meeting its water quality agreement commitments. A variety of factors has hindered U.S. efforts, but if the United States is to meet its commitments to protect the Great Lakes, greater and more comprehensive efforts will be needed. Municipal sources of water pollution will not be controlled by the December 31, 1982, agreement goal and it may be many years before such sources are completely controlled. Agreement phosphorus control objectives are not being met for both municipal and nonpoint sources, and detergent phosphorus limitations have met with controversy. At the same time, however, the need for greater phosphorus controls is clouded by possible uncertainties about phosphorus inputs to the lakes and the target phosphorus loadings established for the lakes. Research needed to resolve these potential uncertainties has not been pursued and coordinated.

Although the water quality agreement emphasizes the need to control nonpoint sources of water pollution, which may be the largest contributor to pollution in the lakes, such sources have received little attention. Nonpoint planning efforts under EPA's areawide water pollution planning program have not been completed, Federal program funding has been terminated, and the primary

coordinating mechanism--the Great Lakes Basin Commission--has been abolished. Actual nonpoint control efforts in the basin have generally been experimental and an overall control strategy or plan has not been developed. Likewise, although the 1978 water quality agreement emphasized the control of toxic pollution and set forth specific objectives, an overall toxic control strategy has not been developed. The nature, extent, and sources of toxic pollutants in the lakes remain relatively undefined, and little is known about the effectiveness of the few control efforts implemented to date.

Given the many uncertainties and the lack of information about many eutrophication, nonpoint sources, and toxic pollution issues included in the water quality agreement, an overall Great Lakes surveillance and monitoring plan is needed. Despite the importance placed on the need for a basic framework for monitoring activities in the water quality agreement, an overall plan has yet to be approved. Also, EPA's monitoring efforts have been hampered by funding constraints and, in some instances, the adequacy of the efforts has been criticized. Unless an adequate, scientifically valid plan is developed and implemented, many questions about Great Lakes pollution matters will likely remain.

RECOMMENDATIONS TO THE CONGRESS

The United States and Canada are not required to make a comprehensive review of the operation and effectiveness of the 1978 agreement until the IJC issues its third biennial report in 1986. Given the lack of U.S. progress in meeting its commitments under two water quality agreements, we recommend that the Congress, in consultation with the Secretary of State and the Administrator, EPA, determine (1) whether the 1978 Great Lakes Water Quality Agreement objectives and commitments are overly ambitious and (2) whether sufficient funding to meet agreement objectives and commitments can be provided given current economic and budgetary conditions.

In view of the need to resolve the many uncertainties associated with the Great Lakes water quality issues and agreement objectives, we further recommend that the Congress pass legislation currently pending which would amend the National Ocean Pollution Research and Development and Monitoring Planning Act of 1978 to require NOAA to establish a Great Lakes research office.

RECOMMENDATIONS TO THE ADMINISTRATOR, EPA

We recommend that the Administrator, EPA, direct GLNPO to develop a comprehensive plan and strategy to address phosphorus, nonpoint, and toxic pollution problems in the Great Lakes Basin. In developing such a plan and strategy, the Administrator should direct GLNPO to:

- Revise its interagency agreement with the Army Corps of Engineers and SCS to include other Federal agencies with responsibilities for nonpoint programs affecting the Great Lakes.
- Serve as the coordinating mechanism for Great Lakes Basin water quality plans being developed by areawide agencies and the States; work with the States and areawide planning agencies to ensure completion of the nonpoint portions of the plans; and consolidate the individual State and areawide plans into an overall basin plan.
- Enter into an interagency agreement with NOAA to define the duties and responsibilities of EPA and NOAA concerning Great Lakes research activities, including specific responsibilities for (1) developing an inventory of needed research on phosphorus and toxic pollution control issues, (2) setting priorities on identified research needs and incorporating such needs in NOAA's Federal ocean pollution research and development plan, and (3) coordinating the research efforts of agencies involved in Great Lakes matters to ensure that work undertaken addresses identified needs.

We also recommend that the Administrator, EPA, direct GLNPO to develop a surveillance and monitoring plan for the U.S. portion of the Great Lakes. Such a plan should (1) delineate the roles and responsibilities of various Federal, State, and local agencies involved in Great Lakes surveillance and monitoring activities, (2) include methods and procedures to ensure that monitoring activities are carried out promptly and that the data gathered is complete and consistent in order to provide meaningful evaluations and comparative analyses, and (3) include procedures to ensure that U.S. and Canadian monitoring efforts are consistent.

We recognize that the actions recommended will significantly affect GLNPO. Chapter 3 discusses GLNPO's role in the efforts of the United States under the water quality agreement and the need to provide GLNPO with the authority to assure that U.S. commitments are met.

AGENCY COMMENTS AND OUR EVALUATION

We provided a draft of this report to EPA, the Departments of State, Agriculture, and Commerce, and the U.S. Section of IJC for review and comment. The Department of Commerce provided comments on the draft, but the comments were not received in time to be included in this final report. The comments of EPA, the Departments of State and Agriculture, and the U.S. Section of IJC are included in appendixes IX to XII. The agencies' comments on the matters discussed in this chapter are summarized below, along with our evaluation of the comments.

EPA comments

EPA had a number of comments about our understanding of the ambitious scope of the 1978 agreement, phosphorus control activities, research, toxics, water quality monitoring, and the organizational level of GLNPO. EPA's comments are included in appendix IX. EPA comments and our evaluation of the comments on matters discussed in this chapter are set forth below. The comments on the organizational level of GLNPO and our evaluation of these comments are included in chapter 3.

Scope of agreement objectives

EPA is concerned that we do not recognize the scope of the ambitious objectives of the 1978 water quality agreement, which does not directly control the water quality programs used to support the agreement objectives. EPA pointed out that Great Lakes programs are not separately funded under Federal law. EPA stated that it realizes pollution problems have not been solved but the necessary plans, mechanisms, and facilities are generally in place and the cleanup is progressing.

We believe we have fully recognized that the agreement objectives are ambitious and that U.S. efforts to meet agreement objectives are implemented through domestic laws. For example, in chapter 1 we state that the 1978 agreement objectives are comprehensive and stringent and a variety of remedial programs and measures are required to meet the objectives. Chapter 1 also recognizes that EPA implements Great Lakes activities through existing Federal legislation. Furthermore, in the recommendation to the Congress we specifically suggest a review of whether the agreement objectives and commitments are overly ambitious.

Phosphorus

EPA is concerned that we failed to acknowledge the comprehensive nature of the agreement's phosphorus objectives and the numerous Federal and State efforts taken to meet the terms of the agreement. EPA also is concerned about our characterization of the role of phosphorus in the eutrophication process and the subsequent mix of measures to control its input into the Great Lakes. More specifically, EPA stated that:

- Point sources of pollution produce far more bioavailable phosphorus than nonpoint sources and are relatively more important to the control of eutrophication.
- It should be pointed out that only 15 percent of the total phosphorus from major municipal plants will not be controlled by December 1982.
- The agreement does not define phosphorus compliance in terms of a daily average of 1.0 mg/l.

--Detergent phosphate bans, which must be voluntary in nature, have not met with "resistance" by Great Lakes States.

--Nonpoint controls, particularly for phosphorus, can be transferred to other areas.

We believe we have recognized the comprehensive nature of the phosphorus objectives and the efforts taken to meet them, as well as the role of phosphorus in the eutrophication process. The report (see pp. 15 to 26) presents a comprehensive picture of the importance of controls for both point and nonpoint sources, the extent to which agreement objectives for point and nonpoint sources are being met, and the extent to which uncertainties about phosphorus exist and continue to cloud the question of the most effective mix of controls to meet agreement phosphorus objectives.

With respect to the control of phosphorus from municipal plants, the agreement objectives are not being met. The 1972 agreement requires all major municipal plants on the two lower lakes to meet a 1.0 mg/l daily average. As discussed in this chapter, the 1972 agreement remains in effect until the Governments allocate the target loadings in the 1978 agreement and this has yet to be done. Even using a 1.0 mg/l annual average, which seems to be the accepted EPA measurement criteria in recent years, not all major municipal plants are meeting this objective. Because of demonstrated operational difficulties, we also question the ability of many U.S. municipal plants to meet an annual average of 1.0 mg/l phosphorus, let alone more stringent limits which could be imposed in the future to meet overall phosphorus objectives set forth in the 1978 agreement.

We do not deny that, based on current knowledge, point sources of phosphorus have a high degree of bioavailability and need to be addressed. Progress in controlling point sources has been made. However, the control of nonpoint sources of phosphorus, as recognized by EPA, is an essential part of any phosphorus strategy. But, as stated earlier, target phosphorus loads have a wide error range and have yet to be allocated by the Governments. In addition, too many uncertainties exist about phosphorus inputs to the lakes and the extent to which such inputs contribute to algae growth (bioavailability). The resolution of such uncertainties could have dramatic effects on optimum phosphorus control strategies, including the need to meet stringent point source controls. Consequently, we continue to believe that agreement objectives for both point and nonpoint sources of phosphorus are not being met and the overall effectiveness of U.S. phosphorus control efforts is not known.

With respect to "resistance" by key Great Lakes States to detergent phosphorus bans, we believe our overall characterization of such bans as "controversial" is appropriate. Undoubtedly, Ohio and Pennsylvania, which cover a significant portion of the

U.S. part of Lake Erie (the lake most heavily polluted with phosphorus) and which have yet to enact detergent phosphorus bans, are key States. To this extent, Ohio and Pennsylvania have resisted such bans. In addition, just because the other Great Lakes States have enacted such bans does not mean they are not controversial. In fact, we believe the higher Canadian limit on detergent phosphorus contributes to even greater controversy.

Finally, we agree that our characterization of the technology for nonpoint control measures as being site specific was not correct. As the Department of Agriculture and IJC pointed out, the technology for nonpoint sources can be transferred but the implementation of the technology is site specific. We have revised the report to correct this matter.

Research

EPA strongly supports the need for more effective coordination of Great Lakes research activities, but is concerned that H.R. 3600 will fragment EPA's already established mechanisms for addressing Great Lakes problems. EPA points out that it is already the primary source of technical and policy expertise for the Department of State in its Great Lakes-related diplomatic negotiations and that it plays key roles on international boards which advise IJC and the Governments on various research matters. EPA believes that H.R. 3600, if passed, would place responsibility for research coordination with another agency which has neither the authority nor the ability to link research needs or the results with water quality trends or the remedial actions necessary to correct or abate identified pollution problems. EPA believes that such action could jeopardize current efforts to develop compatible and coordinated Great Lakes management programs which are responsive to both domestic mandates and international commitments.

We applaud EPA's strong endorsement for a coordinated Great Lakes research program, but we do not agree that only EPA can be charged with this responsibility. EPA has had Great Lakes research responsibilities in the past and its efforts to develop a coordinated program have been limited. Also, as pointed out in this chapter and chapter 3, EPA's own actions in not funding Large Lakes Research Station at Grosse Isle, Michigan, raise questions about its willingness and ability to develop and carry out a comprehensive, coordinated research effort in the future.

Concerning EPA's belief that separating the research coordination responsibility from remedial actions to correct or abate pollution problems could jeopardize its efforts to develop Great Lakes management plans, we note that EPA's own internal organization separates the research function from the pollution abatement and control functions for all of its programs. We continue to believe that a coordinated Great Lakes research program is needed if the many unknowns about Great Lakes pollution are

to be resolved and effective remedial programs implemented. We believe H.R. 3600 meets that need.

Toxics

EPA generally concurs with our discussion of toxics, except for three points. First, EPA cites that some evidence indicates that controls over toxic pollutants can be effective. Second, EPA points out that the Food and Drug Administration sets allowable limits of toxic levels in fish. And finally, EPA believes that the issue of laboratory capacity and capability is not an issue peculiar to the Great Lakes.

We concur with EPA that controls over toxic pollutants can be effective, as evidenced by the declining levels of PCB's in some areas and the decrease in levels of DDT in Great Lakes fish. However, as discussed in the report, the major problem is that too little is known about the overall nature, extent, and source of toxic substance pollution in the Great Lakes. The level of control achieved with PCB's and DDT is largely due to the fact that these toxic substances have been carefully studied and regulated for some time, and consequently more is known about them. Further, our report discussion shows that the lack of information about toxic substances make it difficult to assess the effectiveness of control programs currently in place.

EPA correctly points out that the Food and Drug Administration, and not EPA, sets allowable limits of toxic levels in fish, and we have revised our discussion accordingly. EPA's comment that limited laboratory capacity and capability is a national and worldwide problem may be true. It does not alter the fact, however, that the need for such capacity and capability is both real and necessary to adequately address toxic pollution problems on the Great Lakes and meet agreement objectives.

Water quality monitoring

EPA stated that it had serious reservations about the water quality monitoring discussion. Specifically, EPA stated that:

- IJC never stated that GLISP is biased and incomplete and lacks scientific validity, and IJC has taken no action to approve or disapprove the plan.
- GLISP is a framework to be used to determine overall program priorities and should not be a rigidly prescribed set of activities and timetables.
- The discussion on tributary monitoring appears to be a series of opinions, which do not reflect a full understanding of either the site selection process or the purpose of tributary monitoring.

--Toxic substances monitoring is quite different from phosphorus monitoring and EPA's strategy is to look for toxics in the most probable source areas, to locate hot spots, and to warn the public of any acute concentrations in local fish.

--The report leaves the reader with the impression that much of the data collected through monitoring is useless because it cannot be compared or verified, and this is not the case.

--The discussion of the adequacy of the Great Lakes Atmospheric Deposition Network data is not a true reflection of the current situation because at the time we were gathering our data for the report, the upgraded network was not implemented.

We agree that IJC never stated that the GLISP is biased and incomplete or lacks scientific validity and that IJC has taken no action to approve or disapprove the plan. Before sending the draft report to EPA, we inadvertently failed to revise the report everywhere this language was used. We have revised the report to reflect the actual situation.

We agree with EPA's position that the GLISP is a framework to be used to determine overall program priorities and should be responsive to changing environmental conditions and other factors. But we believe that the report clearly shows that the GLISP permits wide latitude for a variety of monitoring activities, including sample timing and location, which can have a substantial effect on consistency. Inconsistent monitoring makes data comparisons difficult and creates problems in evaluating the causes of pollution and the effectiveness of various control measures.

We disagree with EPA's comment that the report gives the impression that much of the data being collected is useless because it cannot be compared. We recognize that EPA has quality assurance guidelines and that laboratories participate in performance reviews, and we are not saying that the data is useless. Our point is that data is difficult to compare if the sampling methods, timing, locations, and circumstances are not similar. We believe that EPA needs to develop a surveillance and monitoring plan for the U.S. portion of the Great Lakes that is consistent with Canadian efforts and which, among other things, ensures that the data gathered can be used to provide meaningful evaluations and comparative analyses.

We also do not agree that our discussion of monitoring reflects a misunderstanding of either the site selection process or the purpose of tributary monitoring. While the discussion does contain opinions, they are the opinions of environmental advisors to IJC and a water quality consultant who has reviewed the GLISP and believes it needs improvement.

EPA states that tributary monitoring sites were selected to avoid lake effects, which greatly complicates monitoring at river mouths, and by adding point source loadings entering the tributary downstream from the monitoring sites to the loadings determined at the monitoring sites, total loadings to the lakes can be determined. This comment, however, does not consider nonpoint contributions to tributaries between the monitoring site and the lakes. As discussed in the report, nonpoint sources contribute substantially to total pollution loadings to the lakes and adding direct discharges between the monitoring site and the lakes will not account for total tributary pollution loadings to the lakes.

Likewise, we do not agree that effluent monitoring alone will determine tributary sources of pollution. Knowing the source of pollution is important to determining how to control pollution, and failure to sample secondary tributaries could lead to erroneous assumptions about the source of pollutants. Also, the nature of specific pollutants can change as tributaries flow to the lakes, the pollutants may settle out or combine with other pollutants only to be released by a storm or other events, or they may be masked by other pollutants. Therefore, we believe that improper sampling locations can result in inaccuracies in the identification of both quantities and sources of pollution.

We agree with EPA's position that toxic monitoring is different from phosphorus monitoring and we agree with EPA's stated toxic monitoring strategy. As pointed out, however, EPA's toxic monitoring efforts have been hampered by a lack of funding and the GLISP does not provide for consistent monitoring in terms of location, species, sample timing, and types of samples. In addition, although EPA identifies the sampling of sediments as an important auxiliary monitoring medium, the GLISP does not provide for the sampling of tributary sediment, which may release pollutants to the lakes.

With respect to EPA's comment about its Atmospheric Deposition Network, we agree that the upgraded network was not implemented at the time we gathered our information for the report. The information provided by EPA indicates that the upgraded network corrects many of the problems associated with the old network, and therefore we have deleted our discussion of the Atmospheric Deposition Network from the report.

Department of State comments

The Department stated (see app. X) that the draft report did not include reference to its recent work in developing a proposed supplement to the 1978 agreement on phosphorus control or new initiatives and cooperative efforts to deal with toxic pollution in the Niagara River. The Department stated that including material on these subjects would make the report more useful.

At the time we conducted our fieldwork, the phosphorus supplement was being developed and negotiated and little

information on the subject was available. Also, as the Department noted, the Niagara River cooperative efforts are recent and were taken after we completed our fieldwork. We agree, however, that these matters are important, and we have included them in this report. (See p. 23 and pp. 35 and 36.)

Department of Agriculture comments

The Department's comments (see app. XI) related primarily to its role in nonpoint pollution activities and the Rural Clean Water Program. The Department noted that the coordination of nonpoint programs in the Great Lakes Basin is a persistent problem because no formal agreements exist between the Department and EPA regarding who is responsible for implementing agricultural nonpoint control programs. The Department also noted that the primary coordinating mechanism for the lakes--the Great Lakes Basin Commission--has been abolished and that the Department has no formal representation on IJC boards. The Department also stated that good communication exists at informal staff levels but that no formal arrangements exist. The Department stated that it would welcome the opportunity to participate in a coordinated program to correct agricultural nonpoint sources of water pollution in the Great Lakes.

We agree with the Department's position on the problem of coordination of Great Lakes nonpoint activities and the need for a coordinating mechanism and formal interagency arrangements. Our recommendations to the Administrator, EPA, address this matter.

With respect to the transfer of nonpoint source control technology, such as minimum or no-tillage farming methods, the Department stated that although individual water sheds have different characteristics which must be recognized and considered, such technology can be transferred. The Department pointed out, however, that implementation of the technology must be tailored to the specific site. The Department also pointed out that technology such as minimum or no-tillage farming is adopted slowly because it requires new management skills and increased technical assistance.

We agree with the Department's comments on this matter and have revised the discussion in the report (p. 33) to clarify that the implementation of technology is site specific, rather than the technology itself. We have also included in the discussion the need for new management skills and increased technical assistance.

The Department also suggested some changes to the report to correct or clarify several matters on its program or activities. The report has been changed where appropriate to reflect the Department's suggestions.

U.S. Section of IJC comments

The U.S. Section provided detailed comments on our draft report. Most of the comments were technical and suggested clarifications of IJC positions or provided additional information on matters discussed. Appendix XII contains the U.S. Section comments and our evaluation. Changes have been made to the report, where appropriate.

CHAPTER 3

EPA SHOULD GIVE GREATER VISIBILITY

TO ITS GREAT LAKES ACTIVITIES

EPA, the lead U.S. agency for carrying out water quality activities and implementing the Great Lakes Water Quality Agreement, has broad and complex responsibilities requiring it to work and cooperate with a variety of Federal, State, and local agencies as well as IJC and Canadian environmental agencies. EPA's Great Lakes National Program Office has had difficulty obtaining the cooperation needed from other EPA offices, other Federal agencies, and the States because it does not have the visibility, authority, and resources needed to assure that its Great Lakes water quality program can compete with other important national issues.

GREAT LAKES RESPONSIBILITIES ARE BROAD AND COMPLEX

Article VI of the 1978 agreement and the attached annexes call for over 50 programs and other measures to deal with virtually the entire spectrum of environmental concerns. In addition to EPA, many other Federal agencies administer programs or activities directly affecting the Great Lakes. (See app. I.) Three Federal agencies--the Departments of Agriculture, Commerce (National Oceanic and Atmospheric Administration), and Defense (Army Corps of Engineers)--have major responsibilities for programs and activities specified in the agreement. EPA is charged with coordinating these Federal efforts, as well as working with the eight Great Lakes States which are responsible for implementing and administering many of the Federal environmental programs. In addition, EPA must work through IJC to coordinate with Canadian Federal and Provincial environmental agencies.

The chart in appendix VIII illustrates the tangled network of interrelationships among EPA, other major Federal participants, and the Great Lakes States involved in carrying out agreement commitments.

Within EPA, virtually every major program office is responsible for activities covered under the agreement. In addition to region V (Chicago), EPA's regions II (New York) and III (Philadelphia) are involved in Great Lakes activities. Region II is especially important because it covers the entire U.S. border on Lake Ontario and a significant portion of Lake Erie.

The numerous programs and measures called for in the agreement, and the multitude of entities involved in carrying them out, require that a high-level office have the authority and the resources needed to oversee and coordinate the activities of the various agencies involved. The EPA office responsible for

overseeing and coordinating Great Lakes activities--GLNPO--does not meet this critical need.

PROBLEMS LIMIT EPA EFFORTS
TO MEET AGREEMENT OBJECTIVES

Though its lead agency responsibilities are heavy and require a high level of visibility, through the years EPA has placed Great Lakes program responsibilities at a relatively low level within the organization; thus, GLNPO lacks the authority to carry out the broad U.S. mandate under the water quality agreement. In addition, EPA funding of the Great Lakes program has been erratic. As a result, GLNPO has had difficulty carrying out the Great Lakes program.

Great Lakes responsibilities are
handled at a low organizational level

The Great Lakes Initiative Program (started in 1973) was EPA's first attempt to centrally manage an EPA program for the Great Lakes. The program was to serve as the focal point for coordination of program planning and budgeting within EPA to carry out its assigned responsibilities under the agreement. The program was delayed in fiscal year 1973, however, because (1) EPA transferred research funds to a higher priority program, (2) not enough research staff were assigned to the program, and (3) the administration impounded \$3.5 million in program funds in fiscal years 1973 and 1974.

The program relied on a coordination committee made up of representatives from various EPA headquarters and regional offices, with the region V administrator serving as the national program manager. Under the region V administrator, a Great Lakes coordinator with a small staff was responsible for carrying out program activities. Most program functions, however, continued to be conducted by other EPA divisions.

In fiscal year 1978 EPA established GLNPO to administer the Great Lakes program. Located in region V, GLNPO was to integrate and consolidate EPA Great Lakes activities and to provide coordinated support to the IJC Great Lakes Water Quality Board. GLNPO is headed by a director reporting to the region V administrator, who reports to the Administrator of EPA. The region V administrator is the Great Lakes national program manager and the U.S. cochairman of the IJC Water Quality Board.

According to the GLNPO Director, GLNPO was located in region V for several reasons. GLNPO was intended to support the U.S. cochairman of the IJC Water Quality Board, who is also the region V administrator, and such support could be best provided if GLNPO was a region V office. Also, because region V carries out the major Great Lakes activities, locating GLNPO in region V would allow it to work closely with region V program staffs.

According to the U.S. Section of IJC, the relatively low priority given to Great Lakes program responsibilities has caused many of the problems related to fulfilling the requirements of the agreement. Further, the U.S. Section believes that there is no incentive for the involved regional offices or associated laboratories to attach any particular significance to agreement activities if a similar commitment is not evident at the EPA headquarters level.

Although we understand the rationale for the organizational location of GLNPO, we agree that the situation has created serious problems. GLNPO, as an EPA national office not administered out of headquarters, has had difficulty in carrying out some of its functions and in gaining attention for Great Lakes issues at the national level. A 1979 internal EPA evaluation found that GLNPO

- lacked a written strategy to tie together all EPA programs dealing with the Great Lakes,
- suffered from uncertainties regarding staff and resource levels from one year to another, and
- needed to further integrate the program with the other regions.

Although GLNPO has prepared documents for fiscal years 1980 and 1981 outlining its goals, objectives, and work plans, we found that these documents have not been used to assess GLNPO's effectiveness in achieving the objectives of the agreement. Had EPA management compared GLNPO's objectives and accomplishments, we believe the comparison would have revealed that GLNPO was having difficulties achieving coordination and cooperation within EPA and with other Federal agencies and the States. These difficulties are discussed below.

Lack of authority frustrates GLNPO's ability to carry out responsibilities

In addition to low visibility, GLNPO lacks the authority to ensure that those responsible for developing and implementing agreement programs and measures focus sufficient attention on them. As noted previously, EPA implements nationwide environmental protection activities in accordance with specific Federal legislation covering air, water, toxic substances, and other programs. Great Lakes agreement activities generally are not funded separately under Federal law, and therefore Great Lakes agreement activities and programs must take place within the context of existing Federal legislation.

Without the authority to specifically direct EPA's, States', and other Federal agencies' Great Lakes activities, GLNPO has been frustrated in its attempts to carry out its responsibilities for meeting water quality agreement objectives. The following

examples of GLNPO's problems in carrying out its responsibilities were provided by GLNPO officials and staff. Although we did not analyze the examples to determine if the decisions ultimately made were justified, we do believe the examples demonstrate the frustrations GLNPO has experienced.

In one case, GLNPO attempted to obtain revisions to a State's annual water quality program plan to provide greater detail on what the State planned to do to address Great Lakes issues. GLNPO's objective was to determine the adequacy of the State's efforts in meeting water quality agreement objectives.

The GLNPO director first expressed concerns about the State's fiscal year 1981 program plan in an August 1980 memorandum to the region V Water Division director. The memorandum characterized the State's draft plan as being overgeneralized, inaccurate, and incomplete. Specifically, the memorandum stated that the plan did not summarize program objectives and program outputs or performance measures for Great Lakes activities as requested in GLNPO guidance. In January 1981 GLNPO again commented on the specific inadequacies in the State's program plan and the corrective actions needed. Despite GLNPO's objections, the Water Division director approved the program plan on the basis of the State's financial needs and what he considered to be an inconsequential part of the plan over which GLNPO expressed concern.

The controversy between GLNPO and the region V Water Division about the adequacy of the State's program plan resulted in delays in EPA's approval and funding of the State plan. State officials told us that the plan was submitted to EPA 6 months before the start of fiscal year 1981 but was not approved until 9 months into the fiscal year (June 1981). As a result, several Great Lakes project completion dates had to be extended and some State monitoring activities (which needed to be carried out in the spring) had to be written out of the 1981 program.

In another case GLNPO experienced problems in obtaining region V Water Division cooperation in developing a strategy for controlling pollution from nonpoint sources. In 1980 GLNPO requested that the region V Water Division develop a nonpoint source regional strategy for both urban and rural pollution sources, including criteria for priority ranking and funding for Great Lakes geographic areas with significant nonpoint source water quality problems. According to GLNPO officials, it emphasized the importance of developing this strategy by making it an objective in both the fiscal year 1980 and 1981 Great Lakes strategy documents.

To date the Water Division has not developed such a strategy. The Chief of the Division's Water Quality Management Branch told us that the region does not consider this objective to be a high-priority issue. He said that the region is relying on the States to develop individual nonpoint strategies, but for various

reasons, including financial limitations, political constraints, and low priorities, the States may not develop timely, complete, or otherwise acceptable nonpoint strategies. Michigan water quality officials told us that, while EPA has requested the State to develop a strategy for controlling nonpoint pollution, they believe the State has far more serious problems such as toxics, hazardous wastes, and municipal discharges. As a result, the State has put most of its effort into addressing these higher priority concerns.

Interregional cooperation has also created frustrations for GLNPO. Although it has responsibility for Great Lakes agreement activities, GLNPO is located within region V and is not on the same organizational level as the other two Great Lakes regions--regions II and III--and has no authority over these regions. Effective cooperation with region II is especially important because it includes significant portions of the two most polluted Great Lakes (Erie and Ontario) and the toxic laden Buffalo Harbor/Niagara River.

Both the administrator of region V and the GLNPO director told us that regions II and III are reluctant to commit resources to Great Lake activities because they are not specifically funded for such purposes. According to these officials, GLNPO and the region V program divisions have had to carry out most of the work directed to Great Lakes agreement objectives without assistance from regions II and III. For example, the 1980 Great Lakes strategy documents prepared by GLNPO did not designate any agreement responsibilities to regions II and III. Only 2 of 59 objectives in the 1981 strategy require a minor amount of involvement by regions II and III, and GLNPO continues to carry most of the burden for activities involving Lake Ontario.

Regions II and III's lack of involvement in Great Lakes activities also affects State efforts under the agreement. State of New York officials told us that the lack of EPA guidance is a major reason the State has not directed its attention toward Great Lakes issues. Also, three States (Michigan, Wisconsin, and Ohio) are responsible for gathering fish samples from Lakes Erie, Huron, and Michigan as part of the total effort to assess toxic pollution problems. Although the strategy document also focuses on problem areas in Pennsylvania and New York, these States are not involved in fish sampling or analysis activities.

GLNPO has also experienced problems in directing and coordinating the efforts of other Federal agencies involved in Great Lakes activities. As discussed in chapter 2, GLNPO has not developed a comprehensive nonpoint control strategy which includes the Department of Agriculture and has had research coordination problems with NOAA. (See pp. 29-31 and 24-26.)

Funding problems limit Great Lakes activities

The resources necessary for EPA to function as the lead U.S. agency under the 1978 agreement have not been provided. As noted on page 54, the scheduled 1973 start of EPA's Great Lakes Initiative Program was delayed until 1974 because funds earmarked for the program were transferred to a higher priority program. A proposed major cut in fiscal year 1979 funding for Great Lakes activities was avoided only when the Office of the Vice President raised concern about the impact of funding reductions.

The table below for fiscal years 1977-82 shows that funding and staff positions for GLNPO have declined since 1978.

<u>Fiscal year</u>	<u>Full-time positions</u>	<u>Funds</u> (millions)
1977	27	\$4.0
1978	36	7.5
1979	22	6.4
1980	15	6.5
1981	18	6.1
1982 (proposed)	15	3.9

Funding cutbacks have affected and will continue to affect Great Lakes activities. For example, as discussed on pages 38 and 39, monitoring has been reduced or will be eliminated by budget cuts. EPA travel cutbacks occasionally have limited employee attendance at important IJC functions. Also, congressional committee intervention was required to prevent the fiscal year 1982 closing of EPA's Large Lakes Research Station at Grosse Ile, Michigan. This station has been "zeroed out" in the fiscal year 1983 budget. According to the research station director, closing the station would eliminate station contributions to eutrophication issues and toxic substance problems and eliminate participation by the station's staff on six IJC work groups or committees, one of which--the Toxic Substances Control Committee--is studying toxic control measures and their effectiveness. In addition, the U.S. Section of IJC believes that closing the station not only would result in the loss of a major Great Lakes research activity but would also make the IJC work related to the agreement more difficult to accomplish.

According to its director, GLNPO may also be eliminated in fiscal year 1983 because of budget cuts. Should this occur, EPA may no longer have an office entity to oversee and coordinate Great Lakes Water Quality Agreement activities within EPA or with other Federal agencies, IJC, or Canadian ministries and agencies.

CONCLUSIONS

EPA's responsibilities as the lead U.S. agency for matters under the water quality agreement are broad and complex and require the cooperation and assistance of a variety of EPA divisions, offices, and regions as well as other Federal agencies and the Great Lakes States. Yet EPA has assigned Great Lakes program responsibilities at a relatively low level within EPA. As a result, GLNPO does not have the authority to specifically direct the Great Lakes activities of other EPA divisions, offices, and regions much less the Great Lakes activities of other Federal and State agencies. GLNPO has been frustrated in its attempts to ensure that U.S. Great Lakes Water Quality Agreement commitments are met.

Funding cuts have also hampered GLNPO's and EPA's efforts to meet agreement responsibilities. Great Lakes activities have had difficulty competing with other EPA programs for funding. GLNPO funding and staffing have been reduced over the last several years and may be terminated in fiscal year 1983. Should this occur, EPA will not have an office to oversee and coordinate its lead agency responsibilities.

RECOMMENDATIONS TO THE ADMINISTRATOR, EPA

We recommend that the Administrator, EPA, raise GLNPO to a high level in the organization and give it the authority and resources necessary to

- develop and implement specific action plans to carry out U.S. responsibilities under the agreement,
- coordinate internal EPA actions aimed at improving Great Lakes water quality,
- coordinate with other Federal agencies and the States to ensure their input in developing water quality strategies and their support in achieving agreement objectives, and
- serve as the liaison with and provide input to IJC and EPA counterparts in Canada.

Further, we recommend that the Administrator, EPA, direct GLNPO and the various EPA organizational elements involved in Great Lakes activities to enter into agreements specifically delineating (1) the Great Lakes duties and responsibilities of each entity, (2) time frames for carrying out assigned duties and responsibilities, and (3) the resources to be committed to these duties and responsibilities.

AGENCY COMMENTS AND OUR EVALUATION

EPA and Department of State comments on the matters discussed in this chapter and our evaluation of the comments are summarized below.

EPA comments

EPA did not agree with our recommendation to elevate the function of GLNPO to a high level in the organization. (See appendix IX.) EPA stated that its experience over the years has shown that elevating GLNPO to a headquarters function was not conducive to sound environmental data gathering, day-to-day coordination of remedial programs, and international working relationships. EPA further stated that the question of how regions II and III and headquarters support relate to GLNPO's authority can be resolved by an Administrator's directive to focus operating program attention on Great Lakes problems with coordination by GLNPO. Also, while EPA did not disagree with the tasks we recommended for GLNPO, it believed such tasks will require substantially more resources.

We disagree with EPA's position on these matters. This chapter and the report in general contain numerous examples of the frustrations experienced by GLNPO in attempting to coordinate and direct Great Lakes matters without the authority necessary to do so. In addition, as discussed in this chapter, funding for GLNPO has been declining since 1978 and GLNPO may be eliminated in 1983.

The Great Lakes situation is highly complex; involves numerous Federal, State, and local organizations; and is exacerbated by the lack of specific funding for Great Lakes activities. Under such circumstances we believe that GLNPO's present position within EPA and its lack of resources further fragment Great Lakes activities and hinder attainment of Great Lakes Water Quality Agreement objectives. We believe that our recommendations concerning GLNPO are appropriate and should be implemented.

Department of State comments

The Department stated that it noted with great interest the recommendations to elevate GLNPO's functions within EPA and was sympathetic to such a step, assuming the concurrence of EPA. (See p. 90.) The Department noted that the Government of Canada places a high priority on joint, cooperative efforts to protect and preserve the Great Lakes and the Department has relied heavily on EPA and GLNPO in implementing the agreement. We agree with the Department's comments.

SELECTED FEDERAL ENVIRONMENTAL LEGISLATION AND
AGENCIES AFFECTING THE GREAT LAKES

The principal Federal law which guides nationwide water pollution control efforts is the Federal Water Control Act Amendments of 1972, as amended by the Clean Water Act of 1977 (commonly referred to as the Clean Water Act). This comprehensive law authorizes a variety of nationwide planning, regulatory, financial assistance, demonstration, monitoring, and research programs as well as programs specifically for the Great Lakes. These programs have been the primary U.S. mechanism for meeting the goals of the 1978 Great Lakes Water Quality Agreement.

The U.S. Environmental Protection Agency (EPA), established in 1970, is the principal Federal agency responsible for implementing both the Great Lakes Water Quality Agreement and the Clean Water Act. EPA sets environmental standards, develops and issues regulations and guidelines, provides research and technical support, and administers grants.

The following sections provide details on U.S. laws applicable to and agencies involved in Great Lakes water quality improvement efforts. Section I describes critical U.S. Federal legislation while section II lists the principal Federal agencies involved. While State and local laws, programs, and agencies also have a significant impact on Great Lakes water quality, they are not described in this document.

SECTION I

ENABLING U.S. FEDERAL LEGISLATION

THE CLEAN WATER ACT

The Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1251 *et seq.*) established goals to attain water quality by 1983, wherever possible, suitable for recreational contact and the protection and propagation of fish and wildlife, and to eliminate any discharges of pollutants into the Nation's waters by 1985. Moreover, it established specific deadlines for controlling municipal and industrial discharges. The 1977 Clean Water Act (Public Law 95-217) amended the act to revise definitions and timetables, continue funding, and to further address toxic substances. The act contains various provisions, most of which the States have assumed responsibility for implementing.

The legislation addresses both point and nonpoint sources of pollution and both conventional and toxic pollutants. It authorizes a number of nationwide planning, regulatory, financial assistance, demonstration, monitoring, and research programs and some programs specific to Great Lakes water quality. These major programs have been utilized as the primary mechanism for meeting

some of the goals of the 1978 Great Lakes Water Quality Agreement. The more pertinent programs are described below.

Research program

Section 104(f) authorizes special ambient water quality and waste treatment studies to protect Great Lakes water quality. It calls for research, technical development work, and studies of the lakes' water quality, including an analysis of the present and projected future quality, an evaluation of water quality needs and disposal practices, and a study of alternate means of solving pollution problems.

Grants for administration of pollution control programs

Section 106 provides for annual grants to States to assist them in administering programs for the prevention, reduction, and elimination of pollution. The funds are for operations and implementation activities, such as monitoring, evaluation, enforcement, and administration.

Pollution control in watersheds of the Great Lakes

Section 108(a) authorizes the Administrator of EPA to enter into agreements to carry out one or more projects to demonstrate new methods and techniques and to develop preliminary plans for the elimination or control of pollution within all or any part of the Great Lakes watershed.

Section 108(d) directs the U.S. Army Corps of Engineers to develop a wastewater management program for the rehabilitation and environmental repair of Lake Erie, and under the 1977 amendments, the Corps of Engineers was authorized additional funds for Lake Erie to develop alternative waste control measures for point and nonpoint sources and contaminated sediments.

Construction grant program

Section 205 provides Federal grants for planning, designing, and constructing municipal sewage treatment facilities. These grants provide between 75 and 85 percent of the facilities' eligible costs. The States determine the specific facilities to be constructed and may provide additional funding support.

Section 205(g) of the act authorizes an EPA-approved State to use \$400,000, or 2 percent of its construction grant allocation (whichever is greater), to support State program administration costs. This grant supplements other moneys provided to the States for program administration.

Areawide planning program

Section 208 provides grants to State and local agencies to encourage and facilitate the development and implementation of areawide water quality management plans to address all water quality problems within a geographic area.

Section 208(j) authorizes the Department of Agriculture, with the concurrence of EPA, to establish and administer a Rural Clean Water Program to enter into 5- to 10-year contracts with owners and operators to apply and maintain best management practices on rural lands to control agricultural nonpoint source pollution. For fiscal years 1979 and 1980, \$200 million and \$400 million, respectively, was authorized for the program. Under the contracts, owners and operators were to receive Federal matching funds for up to 50 percent of the total project cost, to an upper limit of \$50,000 on the cost share to an individual. The Department's Agricultural Stabilization and Conservation Service was to be responsible for administering the program, and the Department's Soil Conservation Service was to provide technical assistance to landowners. This section of the Clean Water Act, however, has never been funded. In its place, an experimental Rural Clean Water Program was included in the Department of Agriculture appropriations in 1980 and 1981 with funding levels of \$50 and \$20 million, respectively.

NPDES permit program

Section 402 authorizes the National Pollutant Discharge Elimination System (NPDES) permit program, which is the basic enforcement mechanism for reducing or eliminating point source pollution from industrial, municipal, commercial, and certain agricultural discharges. The eight Great Lakes States issue permits for all discharges into U.S. waters within their jurisdiction. An NPDES permit generally specifies discharge limitations for specific pollutants, establishes schedules for upgrading controls to meet such limits, and requires periodic reports on compliance.

Dredge and fill program

Section 404 authorizes the dredge and fill program, which is a permit program to control the discharge of dredged and/or fill material into navigable waters. This program is administered by either the Army Corps of Engineers or the States. The permits are issued through the application of guidelines developed jointly by EPA and the Corps.

THE CLEAN AIR ACT

The Clean Air Amendments of 1970 (42 U.S.C. 1857 et seq.) provide the basic Federal statutory provisions for control of air contaminants. This legislation establishes a joint Federal-State program to protect and upgrade the Nation's air quality.

Under this program, the States have primary responsibility for controlling air pollution from stationary sources while EPA is responsible for controlling pollution from mobile sources, such as automobiles.

THE RESOURCE CONSERVATION AND RECOVERY ACT

In 1976 the Congress passed the Resource Conservation and Recovery Act (42 U.S.C. 6901) to protect health and the environment and conserve valuable material and energy resources. This mandates a national program to control hazardous wastes from their generation point to ultimate disposal and sets forth a program to manage nonhazardous solid wastes. The act was intended to be implemented primarily by the States.

Under subtitle C (hazardous wastes) of the act, EPA must establish a national regulatory program to control hazardous wastes, which the Federal Government will operate and enforce when EPA does not approve the State program. "Cradle to grave" hazardous waste control is to be achieved by (1) establishing Federal standards for hazardous waste generators, transporters, and facilities for treatment, storage, and disposal, (2) using a nationwide manifest system to track hazardous waste movement, (3) issuing permits for new and existing treatment, storage, and disposal facilities, and (4) enforcing these Federal requirements. States can receive financial and technical aid to develop hazardous waste programs meeting EPA requirements.

Hazardous wastes include wastes which can be toxic, carcinogenic, mutagenic, or teratogenic. This program therefore promises to have a significant mitigating impact on the amount of toxic material entering the Great Lakes by establishing a national management system designed to control waste handling and preclude the entry of hazardous wastes into surface waters, groundwater, and air. In addition, the disposal of any material dredged from the lakes, if found to be hazardous, would need to comply with the act.

THE SAFE DRINKING WATER ACT

In December 1974 Congress passed the Safe Drinking Water Act (42 U.S.C. 300f, et. seq.) to ensure that public water supply systems throughout the Nation meet minimum national health standards. This act was the first national commitment to safeguard all public drinking water supplies. Another major provision of the act addresses the protection of underground water sources by controlling subsurface fluids injection.

The emphasis of the act for the Great Lakes is on controlling the use of the lakes, and the act deals mainly with standards for water supplied to consumers rather than the raw water supply. Under the act, sources contributing to elevated toxicant levels affecting drinking water systems can be ordered to limit their

discharges. It was intended that the individual States would assume primary responsibility for implementing the act. However, EPA continues to be responsible for monitoring State implementation efforts and is either responsible or has assumed responsibility for implementing the provisions of the act in those States which have not assumed the lead role.

SECTION IIFEDERAL EXECUTIVE AGENCIESENVIRONMENTAL PROTECTION AGENCY

The Environmental Protection Agency, established in 1970, is charged with the basic mission of mounting an integrated, coordinated attack on the environmental problems of air and water pollution, solid waste management, pesticides, radiation, and noise. Generally, EPA is responsible for establishing environmental standards, developing and issuing regulations and guidelines, providing research and technical support, awarding and administering grants, and enforcing various environmental laws. These laws usually provide for State implementation of air, solid waste, pesticide, and water pollution programs within bounds established by EPA and for EPA to carry out the programs when a State elects not to do so. The congressional intent is clearly that EPA and the States act in partnership to implement these programs.

The Great Lakes National Program Office (GLNPO), located in Chicago, is responsible for planning, coordinating, and overseeing EPA's pollution control programs as they affect the implementation of the U.S. portion of the 1978 water quality agreement between the United States and Canada. GLNPO's primary responsibility is to work with other EPA divisions and the States to identify Great Lakes problems and recommend solutions. It also is EPA's focal point for coordinating and communicating with other agencies and the public.

The Large Lakes Research Station, located on Grosse Ile, Michigan, studies pollutants in the Great Lakes. It determines what those pollutants are and finds out where they go and how they affect water quality.

DEPARTMENT OF AGRICULTURE

Several agencies within the U.S. Department of Agriculture administer programs which relate to and/or involve nonpoint source pollution.

Agricultural Stabilization and
Conservation Service (ASCS)

ASCS administers the Agricultural Conservation Program which provides cost sharing assistance to farmers and ranchers to carry out conservation measures on their land, such as practices to control erosion and sedimentation and pollution from animal wastes. ASCS also administers the Rural Clean Water Program authorized under the Clean Water Act.

Soil Conservation Service (SCS)

SCS is responsible for developing and carrying out a national soil and water conservation program and assists in agricultural pollution control and environmental improvement. SCS assists local units of government (208 planning agencies) in implementing soil and water quality management plans and provides financial and technical assistance for watershed projects to improve water quality and reduce soil erosion. SCS also cooperates with ASCS in administering the Rural Clean Water Program.

Farmers Home Administration (FmHA)

FmHA provides credit for those in rural America who are unable to get credit from other sources at reasonable rates and terms. Its loan coverage includes water conservation, watershed protection, and resource conservation projects and efforts.

Science and Education Administration (SEA)

SEA conducts and funds research programs in agricultural sciences and communicates and demonstrates the research results to farmers. The agricultural research staff administers a basic, applied, and developmental research program which includes coverage of "the use and improvement of soil, water, and air." The cooperative research staff administers Federal grant funds for agricultural research. The extension service staff administers Federal funds for constructing cooperative extension education programs.

DEPARTMENT OF DEFENSEDepartment of the Army, Corps of Engineers

The Corps of Engineers is involved in the entire field of water resources planning and development, including commercial navigation, shore and beach erosion protection, water quality management, and wastewater management. In the basin the Corps has

- administered the permit programs for discharge or placement of fill or dredged material in navigable waterways and for creation of alternatives to obstructions in navigable waterways,
- studied the feasibility of winter shipping on the lakes, and
- carried out a wastewater management study under sections 108 (d) and 108(e) of the Clean Water Act aimed at developing a plan for managing phosphorous inputs into Lake Erie.

DEPARTMENT OF COMMERCENational Oceanic and Atmospheric
Administration (NOAA)

NOAA provides Federal leadership in promoting wise and balanced management of the Nation's coastal zone, including the award of grants to States for developing and carrying out plans for the management of their coastal zones.

In addition, NOAA provides satellite observations of the environment by establishing and operating a national environmental satellite system and conducts an integrated program of research and services relating to the oceans and inland waters.

NOAA also administers and directs the National Sea Grant program by providing grants to institutions for marine research, education, and advisory services, and promotes the development of technology to meet future needs of the marine community.

In the basin NOAA operates a Great Lakes Environmental Research Laboratory in Ann Arbor, Michigan. The laboratory conducts research directed toward understanding the environmental processes and solving problems in research management and environmental services in the Great Lakes and their watersheds.

DEPARTMENT OF TRANSPORTATIONCoast Guard

The Coast Guard has major responsibilities in implementing the Nation's policies for protection of the marine environment. The program objectives are to maintain or improve the quality of the marine environment and to minimize the damage caused by pollutants discharged into it.

The functions conducted include boarding tank vessels, monitoring transfer operations, and inspecting liquid bulk facilities to ensure compliance with the laws, executive orders, and agreements that constitute the legal mandate for the marine environmental protection program. A national strike force also has been established to respond in the event of a major pollution incident.

DEPARTMENT OF THE INTERIORU.S. Geological Survey

The U.S. Geological Survey provides the hydrologic information and understanding needed for optimum use and management of the Nation's water resources. This is accomplished through cooperation with other Federal and non-Federal agencies by (1) collecting systematically data needed to continually determine and evaluate the quantity, quality, and use of the Nation's

water resources, (2) conducting water resource appraisals describing the occurrence, availability, and the physical, chemical, and biological characteristics of surface and ground waters, (3) conducting basic and problem-oriented research in hydraulics, hydrology, and related fields, (4) disseminating water data and research through reports, maps, computerized information services, and other public releases, (5) coordinating the activities of other Federal agencies concerning water data for streams, lakes, reservoirs, estuaries, and ground waters, and (6) providing scientific and technical assistance in hydrologic fields to other Federal, State, and local agencies, licensees of the Federal Energy Regulatory Commission, and international agencies on behalf of the Department of State.

U.S. Fish and Wildlife Service

In the area of resource management, the Fish and Wildlife Service provides leadership for the protection and improvement of land and water environments (habitat preservation) which directly benefit the living natural resources and add quality to human life. Activities include

--biological monitoring through scientific research; surveillance of pesticides, heavy metals, and thermal pollution; studies of fish and wildlife population; and ecological studies; and

--environmental impact assessment through river basin studies, including hydroelectric dams, nuclear power-sites, stream channelization, dredge and fill permits; associated research; and environmental impact state-ment review.

The Great Lakes Fishery Laboratory located in Ann Arbor, Michigan, carries out research on the fish resources of the Great Lakes. Laboratory research concentrates on the effects of pollution, lamprey predation, and habitual changes of food and game-fish. Research results are given to State and Federal agencies to help them develop fishery management plans.

SELECTED AND ANNOTATED BIBLIOGRAPHY
OF GAO REPORTS INVOLVING
WATER QUALITY ISSUES IN THE
UNITED STATES

"Better Monitoring Techniques Are Needed To Assess the Quality of Rivers and Streams," Volumes I and II (CED-81-30, Apr. 30, 1981).

This report describes how the Environmental Protection Agency and the Geological Survey use sampling networks, which generally sample once a month at widely spaced sites, to assess the quality of the Nation's rivers and streams. It concludes that water quality is far too complex to be monitored by these networks and nationwide reports based on data from the networks are unreliable.

"Cleaning North America's Inland Seas: Study of Federal Water Pollution Research Demonstration Programs on the Great Lakes" (B-166506, Jan. 16, 1974).

This report describes how certain factors have limited EPA's efforts to meet the lakes' research and development needs. It concludes that greater Federal agency coordination and teamwork with EPA leadership are needed if the U.S. contribution under the water quality agreement is to be effective.

"Cleaning Up the Great Lakes: United States and Canada Are Making Progress in Controlling Pollution from Cities and Towns" (RED-75-338, Mar. 21, 1975).

This report describes how the United States and Canada are progressing in controlling pollution from cities and towns. It concludes that the United States will substantially meet 1972 water quality agreement requirements for construction of municipal waste treatment facilities by 1978; however it will take many years and cost millions of dollars before combined sewer overflows are controlled.

"Combined Sewer Flooding and Pollution--A National Problem. The Search For Solutions in Chicago," Volumes 1-6 (CED-79-77, May 15, 1979).

This report describes the combined sewer and flooding problems in the Chicago metropolitan area. It questions the project's continuation because of its

high cost (estimated at \$11 billion by 1983) and its uncertain impact on water quality.

Volume 1, an executive summary, synthesizes information in the other volumes. Volume 2 describes the current status and impact of the Chicago Tunnel and Reservoir Plan; Volume 3 profiles the extent and location of flooding and damage in the Chicago metropolitan area; Volume 4 summarizes the limited availability of funds to correct the problems; Volume 5 describes several alternatives for local communities and individual citizens to consider; and Volume 6 contains summaries of the flooding experienced by each of the 54 Chicago area communities, actions planned or taken to alleviate or mitigate the problem, and the anticipated impact of the Tunnel and Reservoir Plan.

"Congressional Action Needed To Provide a Better Focus on Water-Related Research Activities" (CED-81-87, June 5, 1981).

This report describes how water-related research and development activities are fragmented among 28 Federal organizations that planned to spend about \$380 million during fiscal year 1981. It concludes that more effective use of these funds is needed.

"Continuing Need for Improved Operation and Maintenance of Municipal Waste Treatment Plants" (CED-77-46, Apr. 11, 1977).

This report found that operational and maintenance problems at treatment plants have caused inefficient plant operation and discharging of unnecessarily high pollution loads into the Nation's waterways. It concludes that EPA must strengthen its regional office and State efforts to improve plant operation and maintenance and that EPA, the States, and local communities must place a higher priority on plant operation and maintenance.

"Costly Wastewater Treatment Plants Fail To Perform as Expected" (CED-81-9, Nov. 14, 1980).

This report describes how despite a Federal investment of \$25 billion, plus several billion more in State and local funds to construct new wastewater treatment plants or to modify and expand existing plants, many are not treating wastewater at the efficiency levels they were designed to achieve. These treatment plant failures were usually the result of a combination of often overlapping problems. It concludes that a change to the construction grants funding program is needed to assure that wastewater treatment plants, once constructed and paid for, will operate as intended.

"Federal-State Environmental Programs--the State Perspective" (CED-80-106, Aug. 22, 1980).

This report describes how the States, which are primarily responsible for carrying out Federal environmental programs, overwhelmingly believe that Federal requirements--legislative, regulatory, and administrative--and the uncertainties of Federal funding impede their management of these programs. It concludes that because of these obstacles the Federal-State partnership envisioned by the Congress for administering Federal environmental programs has not materialized.

"Large Construction Projects To Correct Combined Sewer Overflows Are Too Costly" (CED-80-40, Dec. 28, 1979).

This report describes how neither the Federal Government nor local communities can supply the billions of dollars required for the large construction projects usually needed to stem pollution and flooding caused by combined stream sewer and sewage systems. It identifies a number of new control techniques which offer promise and are far less expensive than the construction projects.

"Many Water Quality Standard Violations May Not Be Significant Enough To Justify Costly Preventive Actions" (CED-80-86, July 2, 1980).

This report describes how advanced wastewater treatment for municipal sewage, with few exceptions, may not be worth the tremendous costs--estimated by the Environmental Protection Agency at \$10 billion. Although it recognizes there may be times when advanced treatment is justified, such as phosphorus removal from the Great Lakes to comply with water quality agreement commitments, it concludes that funding of these projects should be curtailed.

"Millions of Dollars Could Be Saved by Implementing GAO Recommendations on Environmental Protection Agency Programs" (CED-81-92, May 5, 1981).

This report discusses opportunities to realize substantial savings through legislative and administrative changes in the Environmental Protection Agency's water pollution control and hazardous and solid waste programs. It focuses on the recommendations to the Congress and to the Agency contained in seven reports on these two programs.

"National Water Quality Goals Cannot Be Attained Without More Attention to Pollution from Diffused or 'Nonpoint' Sources" (CED-78-6, Dec. 20, 1977).

This report describes how nonpoint pollution, which currently produces more than half of the pollutants entering the Nation's waterways, will prevent the achievement of 1983 water quality goals. It concludes that there is a need for a greater Federal, State, and local effort to control nonpoint sources of pollution.

"River Basin Commissions Have Been Helpful, But Changes Are Needed" (CED-81-69, May 28, 1981).

This report describes how river basin commissions (including the Great Lakes Basin Commission), which spend \$3 million annually, contribute toward water resource planning and development. It concludes that the commissions, as they are now operating, do not accomplish optimum planning. While they have provided a forum for Federal and State members to exchange views and have assisted States in various water studies, they have fallen short of meeting some of their legislative objectives.

"Water Quality Management Planning Is Not Comprehensive and May Not Be Effective for Many Years" (CED-78-167, Dec. 11, 1978).

This report describes how the Environmental Protection Agency has administered a planning program for geographic areas with substantial water quality control problems. It points out the problems that have hindered the effectiveness of the program and the problems being experienced by the States and areawide agencies which do the planning. It concludes that although the program has had a number of accomplishments in a relatively short period of time, planning has not been comprehensive and it may take many years before the program can be fully effective in cleaning the Nation's waters.

ESTIMATED CONSTRUCTION COMPLETION
DATES FOR MAJOR U.S. MUNICIPAL
TREATMENT PLANTS, LOWER GREAT LAKES

<u>Jurisdiction</u>	<u>Year</u>					<u>Total not meeting 1982 deadline</u>	<u>Percent not meeting 1982 deadline</u>
	<u>1981*</u>	<u>1982*</u>	<u>1983*</u>	<u>1984*</u>	<u>1985* or later</u>		
Lake Erie:							
Ohio (69)	35	6	5	12	11	28	41
Mich. (22)	19	0	3	0	0	3	14
Ind. (4)	3	0	0	1	0	1	25
Pa. (2)	1	1	0	0	0	0	0
N.Y. (9)	<u>6</u>	<u>2</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	11
Total (106)	64	9	8	14	11	33	31
Lake Ontario							
N.Y. (44)	<u>24</u>	<u>6</u>	<u>13</u>	<u>0</u>	<u>1</u>	<u>14</u>	32
Total (150)	<u>88</u>	<u>15</u>	<u>21</u>	<u>14</u>	<u>12</u>	<u>47</u>	31

*Completed or abandoned during given year (1981 includes previous years totals).
 () denotes total number of plants.

GREAT LAKES BASIN FUNDING
FOR MUNICIPAL SEWAGE TREATMENT PLANTS

<u>EPA region</u>	<u>State</u>	<u>Period (fiscal year) (note a)</u>	<u>Number of projects</u>	<u>Eligible costs</u>	<u>Federal share</u>	<u>State and local share</u>
				- - - - - (millions) - - - - -		
V	Ind.	1973-81	114	\$ 304.7	\$ 231.5	\$ 73.2
	Mich.	1972-81	756	1,855.4	1,374.7	480.7
	Minn.	1973-80	44	127.2	95.5	31.7
	Ohio	1972-81	275	947.0	700.0	247.0
	Wis.	1972-81	<u>269</u>	<u>482.7</u>	<u>360.0</u>	<u>122.7</u>
Total (note b)			1,458	3,717.0	c/ 2,761.8	c/ 955.2
II	N.Y.	1973-79	123	1,136.6	852.7	283.9
III	Pa.	1977	<u>2</u>	<u>1.8</u>	<u>1.4</u>	<u>0.4</u>
Total			<u>1,583</u>	<u>\$4,855.4</u>	<u>\$3,615.9</u>	<u>\$1,239.5</u>

a/Covers period July 1, 1971, through February 1981. Gaps in fiscal years shown for the States indicate that EPA did not approve any grants in that State's portion of the Great Lakes basin during those years.

b/Although Illinois is in region V, the cost of sewage treatment plants in that State are excluded because none of the plants discharge wastes directly into the Great Lakes or their tributaries.

c/Columns do not total due to rounding.

ADDITIONAL UNCERTAINTIES ABOUT
GREAT LAKES PHOSPHORUS CONTROLS

Four areas of uncertainty remain to be resolved concerning phosphorus control measures on the Great Lakes:

- The extent to which different phosphorus forms contribute to algae growth.
- The contribution of tributaries to phosphorus loads.
- The contribution of shoreline erosion to lake phosphorus inputs.
- The extent to which the atmosphere contributes phosphorus to the lakes.

Resolution of these four relative unknowns could drastically affect the types and extent of programs needed to control the lakes' phosphorus problems.

EXTENT TO WHICH DIFFERENT PHOSPHORUS
FORMS CONTRIBUTE TO ALGAE GROWTH

According to experts from IJC and the Great Lakes Basin Commission, phosphorus bioavailability remains one of the most critical considerations in assessing the desirability and effectiveness of phosphorus control programs on the Great Lakes. (The term bioavailability refers to phosphorus that is immediately available for algae growth or that can become available for algae growth over a short time period.) Some forms of phosphorus, such as those in sewage treatment plant effluent, are more readily available or harmful than other forms, such as those in urban and rural runoff.

Although recent studies have focused on different phosphorus forms, much still remains to be learned. Still unresolved are questions about which sources contribute the largest amount of harmful phosphorus, what conditions affect the amount and rate at which phosphorus is used in the lakes, and how different sources should be controlled to achieve water quality objectives in the most cost-effective way. In its 1981 annual report to IJC, the Great Lakes Science Advisory Board concluded that techniques to provide a meaningful assessment of the bioavailability problem do not exist and that such techniques would not likely be developed without a significant increase in research efforts.

Management practices for controlling Great Lakes eutrophication historically have been directed toward all phosphorus (total phosphorus) whether harmful or not. The target phosphorus loads developed for the 1978 agreement have been based on total phosphorus values, because little information exists on the inputs of different forms of phosphorus from various sources. However, the

importance of the bioavailability issue is widely recognized by EPA, IJC, and others within the Great Lakes scientific community and deserves particular attention when evaluating phosphorus management strategies for the lakes. It makes little sense to design an expensive strategy for controlling total phosphorus if the possibility exists that only some unknown part of the total phosphorus load is actually harmful.

CONTRIBUTION OF TRIBUTARIES TO PHOSPHORUS LOADS

Tributaries carry phosphorus from both wastewater treatment plants and urban and rural runoff, but uncertainty exists concerning when and how much phosphorus in tributary sediment is released to the lakes after it has originally settled to the bottom. To minimize the impact of the backwater of the lake on the measurements taken, tributary loads are estimated from measurements made in rivers and streams at a point upriver from where the tributary flows into the lake. However, the 1980 final report of the IJC Phosphorus Management Strategies Task Force indicated that much could happen to the phosphorus before it reaches, if it ever reaches, the lakes. The phosphorus could, for example, settle in river bottoms and either never be released or be released little by little over time and with no assurance of how much would be harmful. The Phosphorus Management Strategies Task Force believes that tributary phosphorus loads to the Great Lakes could be underestimated by 10 to 30 percent because traditional methods for estimating tributary phosphorus loadings also do not adequately take into account periods of high flow, such as those that occur after a storm. According to the task force, no consistent or comprehensive data base with associated analysis exists concerning the effect of storm runoff on phosphorus inputs to the Great Lakes.

SHORELINE EROSION CONTRIBUTIONS TO PHOSPHORUS INPUTS

Erosion from the thousands of miles of Great Lakes shoreline contributes a potentially large share of the total phosphorus loadings to the lakes. Yet, shoreline erosion has not been factored into current phosphorus input estimates and target loads. The Phosphorus Management Strategies Task Force concluded that any development of target loads based on total phosphorus for the Great Lakes should include any source, such as shoreline erosion, which could affect lake eutrophication. The task force admits that excluding shoreline erosion may result in overestimating the benefits from controlling phosphorus from tributaries and other sources. If these benefits are overestimated, the most cost-effective control measures may not be selected.

The amount of total phosphorus that shoreline erosion contributes to the Great Lakes is significant, especially when compared to the amount of total phosphorus inputs contributed by all other sources. The following table, taken from the final report of the

Phosphorus Management Strategies Task Force, issued July 1980, shows this relationship.

Shoreline Erosion as a Source
of Lakewide Total Phosphorus

<u>Lake</u>	<u>Total sediment from shoreline erosion</u>	<u>Total phosphorus from shoreline erosion</u>	<u>1976 total phosphorus from all other sources</u>
- - - - - (metric tons per year) - - - - -			
Superior	11,279,000	3,800	4,200
Michigan	21,778,000	3,800	6,400
Huron	1,763,000	794	4,900
Erie	11,131,000	10,536	18,400
Ontario	3,206,000	1,280	11,800

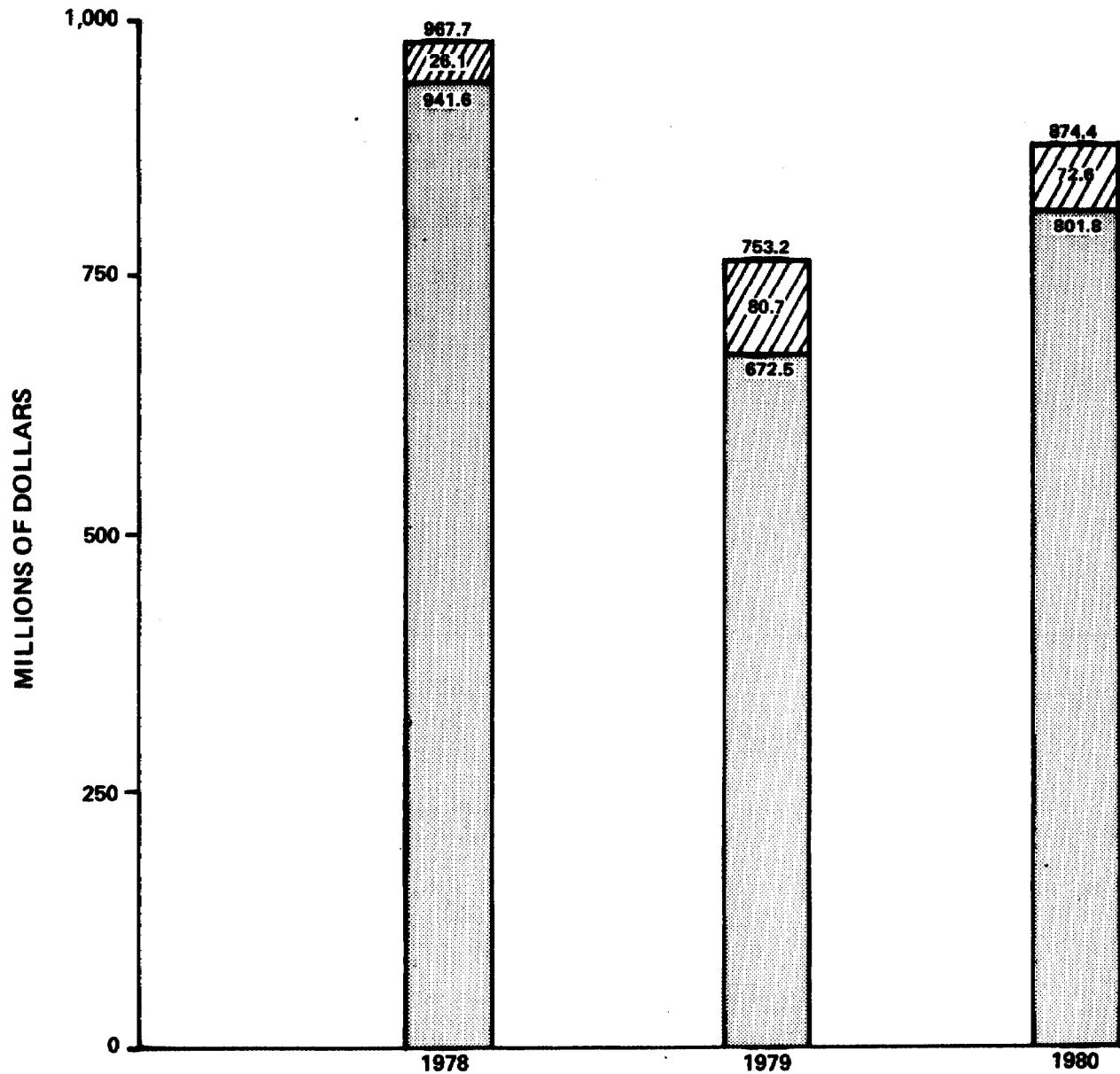
In calculating the target loads for the lakes, the task force assumed that phosphorus from shoreline erosion settles near the shore and does not enter lakewide processes. If it does settle rapidly, the impact of this source of pollution would be lessened, but no data base exists to determine what percentage of these loads actually does settle and is not available to the lakes. According to a 1981 Great Lakes Basin Commission report, some experts have estimated that anywhere from 1 to 40 percent of the total phosphorus from shoreline erosion actually contributes to eutrophication. Because of the potentially large amount of phosphorus that could be available to the lakes, the exclusion of shoreline erosion raises serious questions about the integrity of the target loads proposed to direct future control efforts on the Great Lakes.



CONTRIBUTION OF ATMOSPHERIC
DEPOSITION TO PHOSPHORUS LOADS

Phosphorus is one of several inorganic but biologically active elements deposited in significant quantities from the atmosphere. While the atmospheric waste was suspected of being of major importance in the movement and behavior of pollutants in previous years, the atmospheric deposition of pollutants like phosphorus to the Great Lakes had not really been addressed. Studies to date indicate, however, that the atmosphere may contribute a large percentage of the phosphorus loads to Lakes Huron, Michigan, and Superior and to a much lesser extent to the loads for the two lower lakes. The upper lakes are particularly susceptible to atmospheric inputs because of their large surface areas and air mass circulation patterns.

In a January 1981 interim report under the water quality agreement, IJC recommended that the Governments act to overcome the lack of sufficient monitoring data and to fulfill the need for a well-designed, coordinated, efficient sampling network and monitoring study to identify and measure the atmospheric deposition occurring throughout the Great Lakes Basin. As of February 1982, the U.S. Section of IJC continues to believe that more accurate information on the quantities and types of phosphorus entering the lakes by air is needed. We agree and can only conclude that the lack of understanding surrounding atmospheric inputs of phosphorus to the lakes adds to the uncertainty about what the overall U.S. phosphorus control strategy should be for the Great Lakes.

**FEDERAL GRANT OUTLAYS FOR
POLLUTION CONTROL PROGRAMS AND
ACTIVITIES IN THE GREAT
LAKES BASIN, 1978-1980**

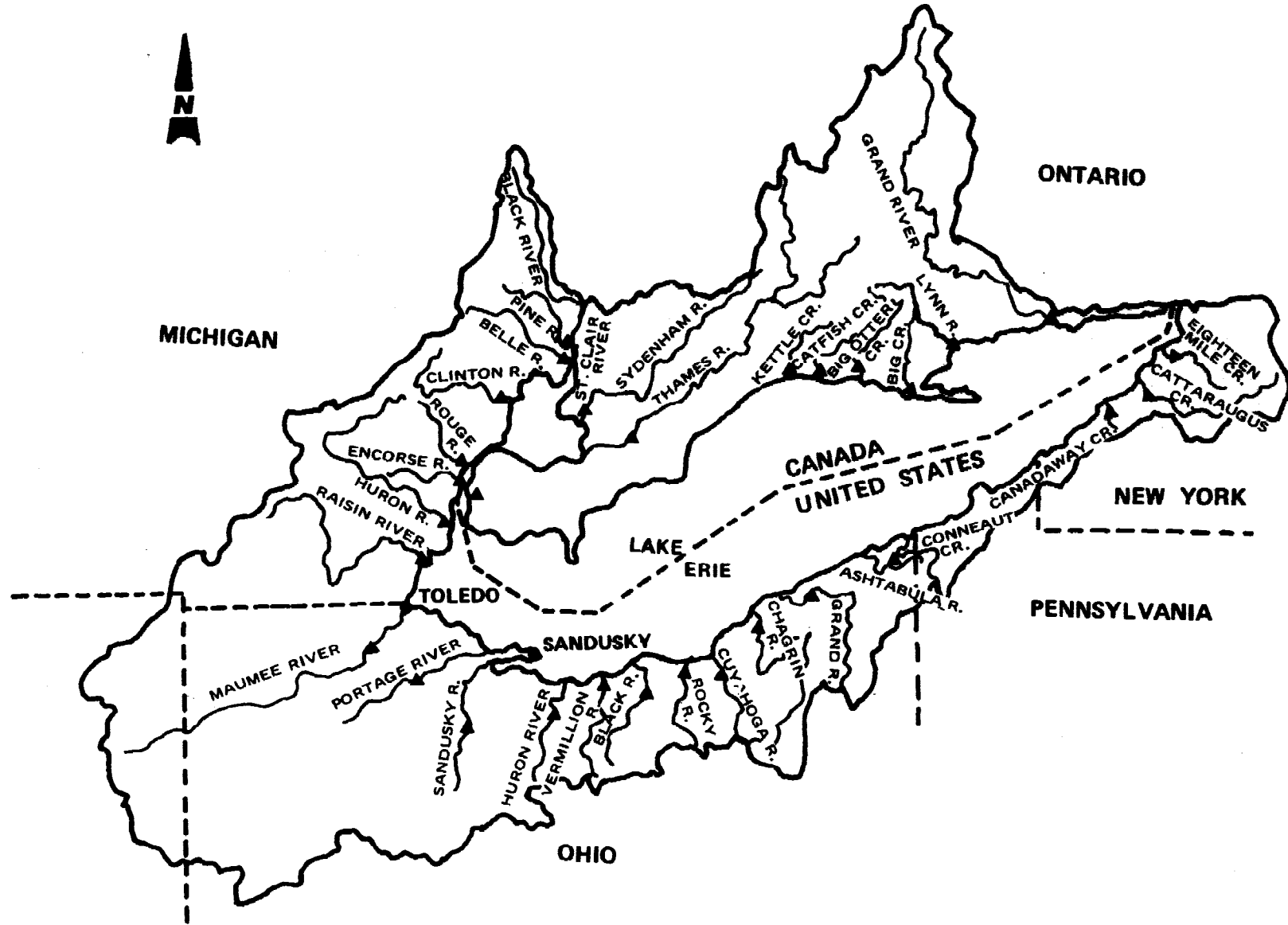


 EPA CONSTRUCTION GRANT OUTLAYS FOR GREAT LAKES BASIN
 FEDERAL OUTLAYS FOR OTHER GREAT LAKES BASIN PROGRAMS

SOURCE: The Geographic Distribution of Federal Funds Reports for fiscal years 1978 through 1980 compiled by The Community Services Administration.

SIGNIFICANT TRIBUTARY SAMPLING LOCATIONS

81

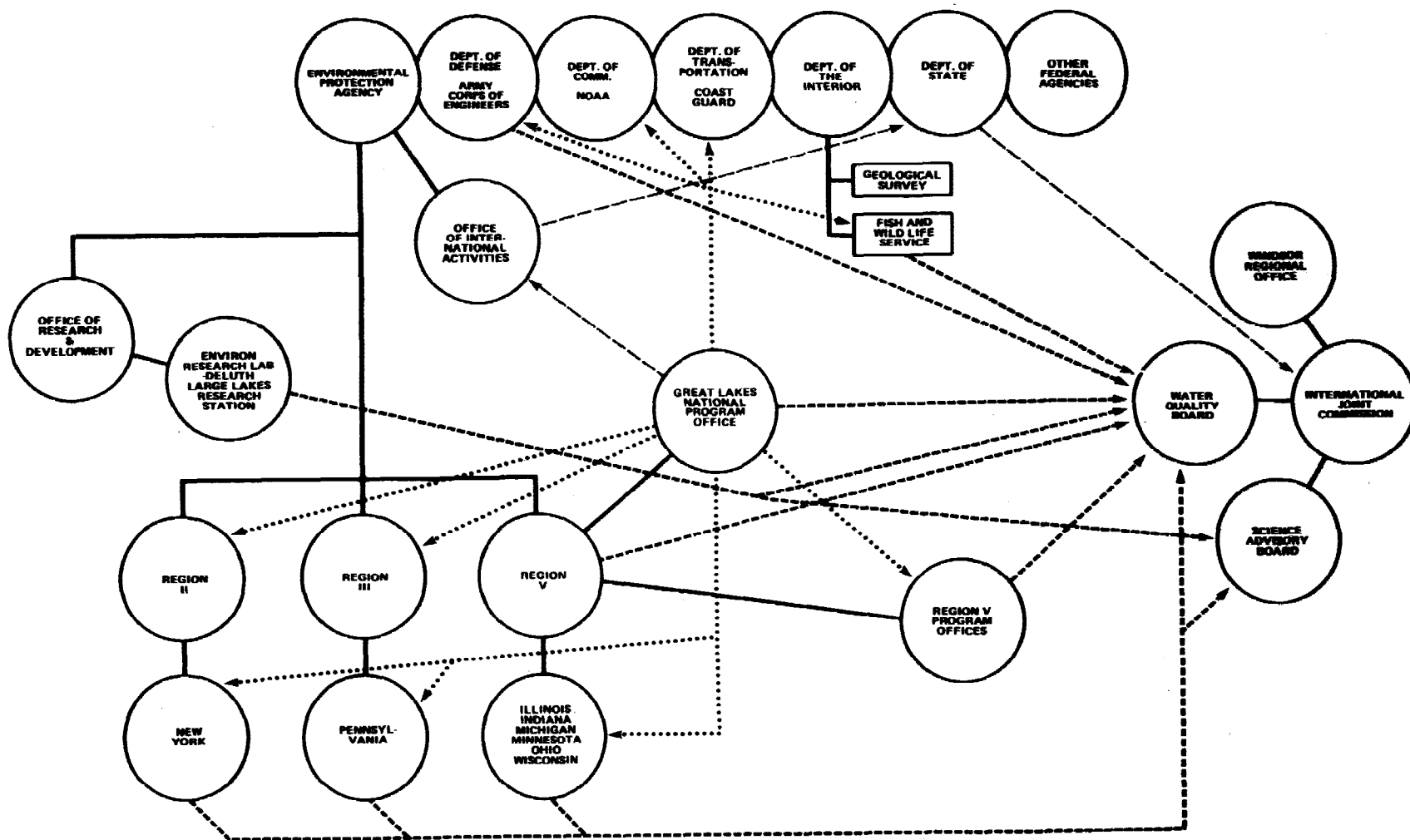


SOURCE: Great Lakes International Surveillance Plan.

INTERRELATIONSHIPS OF MAJOR FEDERAL AND STATE AGENCIES INVOLVED IN CARRYING OUT GREAT LAKES WATER QUALITY AGREEMENT OBJECTIVES

APPENDIX VIII

APPENDIX VIII



- Legend.**
- Represented on boards or committees -----
 - Provides coordination, guidance and direction on agreement programs and activities (dotted line)
 - Formal government channels of communication on agreement matters - - - - - (long-dashed line)



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

MAR 5 1982

OFFICE OF
POLICY AND RESOURCE MANAGEMENT

Mr. Henry Eschwege
Director
Community and Economic
Development Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Eschwege:

The Environmental Protection Agency (EPA) has reviewed the General Accounting Office (GAO) draft report entitled "Great Lakes Cleanup Efforts Need More Focus and Direction". Public Law 96-223 requires the Agency to submit comments on the report for consideration prior to publication of the final report. We believe that our corrections, clarifications and comments, presented in this letter and its enclosure, would improve the final report and should be addressed in the report to Congress.

We are concerned that GAO does not fully recognize the scope of the ambitious objectives of the 1978 Great Lakes Water Quality Agreement, which does not directly control the water quality programs used to support these objectives. Great Lakes programs are generally not separately funded under federal law, and therefore, specific water quality activities usually take place only within the context of existing and broadly targeted federal pollution control legislation. Such water quality programs include National Pollutant Discharge Elimination System (NPDES) Permit and Construction Grants Programs. We realize that the pollution problems, both point and nonpoint source, have not been solved; however, pollution control plans, mechanisms and facilities are generally in place and the cleanup is progressing.

In addition, we believe the draft report is deficient in a number of areas. First, its major emphasis on phosphorus control measures and Great Lakes monitoring fails to acknowledge both the comprehensive nature of the Agreement and the numerous Federal and State actions undertaken to meet the terms of that Agreement. We are also concerned with the apparent lack of technical and scientific expertise expressed in the draft regarding the role of phosphorus in the eutrophication process and the subsequent mix of measures to control its input into the Great Lakes system.

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We do not concur with the GAO recommendation that H.R.3600 should be enacted to better coordinate Great Lakes research. We strongly support the general goal of this bill, i.e., the more effective coordination of U.S. Great Lakes research activities. However, we seriously doubt that the goal will be achieved if the bill, as written, is enacted.

EPA representatives co-chair and provide staff assistance to the two principal joint U.S.-Canada Boards created by the Agreement to advise the International Joint Commission (IJC) and the governments on research needs, program policies and Agreement progress. In addition, EPA is the primary source of technical and policy expertise for the State Department in its Great Lakes related diplomatic negotiations with the Canadian government. If H.R.3600 is passed, this established mechanism for addressing Great Lakes problems would be fragmented by placing responsibility for research coordination in a separate office which has no authority or ability to link research needs or the results with water quality trends or the remedial actions necessary to correct or abate identified pollution problems. This separation of research from monitoring and pollution control programs would, in our opinion, seriously jeopardize current efforts to develop, with the States, compatible and coordinated Great Lakes management programs which are responsive to both domestic mandates and international commitments.

The draft report notes that the organization and funding for Great Lakes research and surveillance merits close examination. In many respects, the present system for administering these programs has been ineffective. This situation can be attributed to the complexity of organizations involved in the Great Lakes pollution control programs, as cited in the draft report. We also do not agree that the Great Lakes National Program Office (GLNPO) has to be "elevated within the Agency" to exercise more authority over U.S. programs affecting Great Lakes water quality. The Agency has found, through experience over the years, that elevation of GLNPO to a Headquarters' function was not conducive to sound environmental data gathering, day-to-day coordination of remedial programs and international working relationships. The question of how Region II and III's and Headquarters' support relate to GLNPO authority can be positively resolved by an Administrator's directive to focus operating program attention to Great Lakes problems under the coordination of GLNPO.

While we do not disagree with the tasks GAO recommends be undertaken by GLNPO, we believe GAO is calling for an unnecessarily resource-intensive effort to carry them out.

Phosphorus

One important reason both the U.S. and Canada have emphasized control of municipal sewage discharges as the first and major component of their control strategies is that these point sources, in general, produce far more bioavailable phosphorus than other sources and, therefore, are relatively more important in the control of accelerated eutrophication. This is not to diminish

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the current emphasis on the control of nonpoint sources, but rather to put the control of point sources of phosphorus into its proper scientific context and to suggest that future phosphorus control strategies, as contemplated in the current U.S.-Canada negotiations, will emphasize the most cost-effective means of further reducing phosphorus inputs.

We do not disagree with the statement that the December 31, 1972 Agreement goal for adequate treatment of all municipal sewage discharges to the Lower Lakes will not be met. However, it is the amount of phosphorus entering the Lakes which will ultimately determine the success or failure of control programs, not the number of small facilities in or out of compliance. Hence, we believe it is significant to point out that the plants not in compliance by December 1982 will represent only 15% of the total major plant flow and that 85% of the sewered flow from these facilities will be complying with 1.0 mg/l phosphorus limits.

The Agreement does not define 1.0 mg/l compliance in terms of a daily average. The IJC has been tracking plant performance on the basis of an annual average. State NPDES permits, with the exception of those in Indiana, have required compliance on a monthly average basis. Indiana permits have required compliance with a daily maximum of 1.0 mg/l. As a result, the annual Indiana average for phosphorus removal facilities in the Great Lakes Basin is below 0.8 mg/l.

On the matter of detergent phosphate limitations, we find the statement regarding "resistance" by key Great Lakes States to be misleading. We believe the fact that six out of eight Great Lakes States have voluntarily adopted detergent phosphate limits is evidence of strong State support of just one of many measures available to control the input of excessive phosphorus into the Great Lakes system. It also should be noted that it is EPA policy that any ban should be voluntary.

We concur, as stated earlier, that the control of nonpoint sources is an essential part of any phosphorus strategy. But we do question several of the conclusions relative to technology transfer. Our experience with the section 108(a) demonstration program leads us to the opposite conclusion, i.e., technology can and has been transferred to other areas. We are also unaware of the "EPA and IJC Reports" mentioned on page 29 which also refer to the lack of technology transfer. We view section 108(a) as only one of the available programs to actually implement and test new nonpoint source control techniques. However, it is our policy to use this program to continue that testing of innovative practices and look to our cooperative efforts with the States and other Federal agencies to carry out any long-term program. While we agree that no formal and official U.S. nonpoint source strategy has been adopted, we again point to the current bi-lateral negotiations on Annex III, which should address this question in more detail.

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Toxics

Concerning the toxic pollution discussion, we generally concur, but three items should be noted. First, we do have some evidence that controls can be effective. For example, there has been a 90% decrease in the levels of DDT in Great Lakes fish since that ban was imposed, and there is evidence that levels of PCBs are declining in some areas. Secondly, on page 31, the report should read that the Food and Drug Administration, not EPA, is responsible for setting allowable limits in fish. And finally, the issue of laboratory capacity and capability is not limited to the Great Lakes. It is both a national and worldwide problem.

Water Quality Monitoring

We have serious reservations about the water quality monitoring discussion, especially as it relates to the Great Lakes International Surveillance Plan (GLISP), tributary monitoring, toxics monitoring and quality assurance. To our knowledge, the IJC has never stated that the GLISP is "biased, incomplete and lacks scientific validity." In fact, the IJC has taken no action to approve or disapprove the Plan. Moreover, it is the Parties' responsibility, ultimately, to adopt such a Plan. From our Agency perspective, the current GLISP is a framework which the jurisdictions use in determining their overall program priorities. It is not, nor do we believe it should be, a rigidly prescribed set of activities and timetables which are unresponsive to changing environmental conditions, knowledge gained through past experience, and the use of advanced modeling techniques.

The discussion of tributary sampling appears to be a series of opinions. The comments do not, we believe, reflect a full understanding of either the site selection process or the purpose of tributary monitoring.

For example, the location of tributary monitoring sites have been carefully selected to avoid lake effects. Each stream has an estuary near its mouth with complex intermixing of river and lake water. This greatly complicates any river monitoring program at these sites. The plan clearly states that the point sources located downstream from tributary monitoring sites are to be treated as direct discharges to the lakes and simply added to the river loadings monitored upstream.

The comments regarding sampling of secondary tributaries lose sight of the fundamental purpose of sampling the tributaries, which is to determine loadings and not to find sources. Effluent monitoring is a far more efficient method of determining sources of nutrients and metals. Sediment and fish sampling is much more efficient for determining sources of most trace organics accumulating in the environment. Effluent monitoring is not covered by GLISP and is the responsibility of the discharger under self-monitoring requirements of the NPDES permits and the jurisdictions.

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In regard to toxic substances monitoring, the problem is quite different from phosphorus. We must determine where they are, where they come from, and what threat they pose. We know relatively well where phosphorus comes from and the threat it poses. Toxics are not a problem to human health unless the human is exposed to them. Humans will be exposed in nearshore areas and by eating fish. Toxics are most likely to be found near their sources which, except for atmospheric deposition, are in nearshore areas. Therefore, our toxics monitoring strategy must concentrate on most probable source areas and on fish, both local and lakewide. Since many toxics accumulate in sediments, and sediments can be associated with sources far more easily than fish, sediments are a very useful auxiliary monitoring medium. Our strategy, therefore, is to look for toxics in the most probable source areas, which are harbors and rivermouths, and to look at fish from both the open waters and harbors and rivermouths. Immediate objectives are to locate hot spots, if they exist, and warn the public of any acute concentrations in local fish. Longer-term objectives are to establish the general pattern of organic contamination in the basin and to monitor trends.

The question of quality assurance and data comparability is also of serious concern to us, other U.S. jurisdictions and Canada. The draft report, however, tends to leave the reader with a sense that much of the data collected is useless because it cannot be compared or verified. This is not the case. For example, all EPA Great Lakes monitoring grants or contracts include requirements for adherence to Agency quality assurance guidelines and require that laboratories participate in the Water Quality Board's review of both U.S. and Canadian laboratory performance.

Specifically, the discussion of the adequacy of the the Great Lakes Atmospheric Deposition (GLAD) network data is not a true reflection of the current situation.

When the basic data for the GAO report was being gathered, the upgraded atmospheric deposition network was not implemented. The report correctly cited inadequacies of the old network, i.e., lack of equipment, poor collection location, and different collection techniques. The Great Lakes National Program management also recognized these deficiencies and is implementing a plan to correct the noted deficiencies.

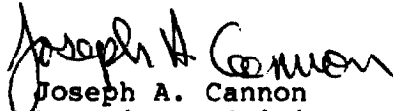
"State of the Art" collection equipment was purchased and deployed to the field. The heart of the collection equipment is the Aerochemic Metric Collector, which is identical to that used in the national acid rain studies. The bulk collector was redesigned to eliminate leakage, evaporation, sample degradation and contamination. The bulk collector is also capable of collecting organic toxics data. The GLAD network is using the basic equipment that has been recognized by the scientific community with reliability for collecting precipitation samples.

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The GLAD network was sited to collect data from a variety of demographic and land uses. Topographic maps, emissions data and meteorological data were used to select the network sites. The collectors were installed using EPA guidelines for installing ambient air quality monitors. Thus, local contamination and influences are minimized. In many cases, the deposition collectors are co-located with conventional ambient pollution monitoring. While the National Acid Rain Program is contemplating the additions of gaseous monitors, the GLAD network is collecting its second year of gaseous pollution data at selective sites to determine the impact of gaseous deposition. Collectors on the lakes are impractical for several reasons. The most important reason, disclosed in a recent GLNPO study, is that collectors on the lakes are collecting significant amounts of lake water which may mask the atmospheric deposition.

We appreciate the opportunity to comment on this draft report prior to its publication. We hope that you find our comments useful in clarifying the report and its analysis.

Sincerely yours,



Joseph A. Cannon
Acting Associate Administrator
for Policy and Resource Management

Enclosure

Corrections, Clarifications and Comments on GAO Draft Report
"Great Lakes Cleanup Efforts Need More Focus and Direction"

Page ii, Digest, second paragraph

The first sentence indicates that little funding has been directed to controlling discharges from combined sewers. As a matter of fact, construction grant priority systems do not distinguish between sanitary and combined sewer discharges.

Combined sewer overflows continue to be a problem because utilization of available funds for facilities to treat the more concentrated portion of these wastewaters has been more effective in improving water quality. With achievement of secondary treatment goals and requirements on phosphate removal, efforts will be directed toward treatment of combined sewer overflows where necessary to achieve water quality standards. Increasing consideration is being given to nonpoint source pollutants in the development of wasteload allocations and effluent limits for publicly owned treatment works (POTWs) to determine the most overall cost effective solution. It may prove to be more cost effective in some cases to control nonpoint source phosphorus discharges than to treat small POTW wastewaters or provide very high levels of treatment to achieve additional removal at major treatment plants.

[GAO Comment: State construction grant priority systems very often distinguish between sanitary and combined sewer discharges and, as discussed on p. 14, the States have given combined sewers low priority compared to other treatment needs. We have, however, revised the report (see p. 14) to state that available funds have been used to treat more concentrated portions of wastewater. Also we agree that increased consideration should be given to nonpoint sources of pollution, such as combined sewer overflows, to ensure that pollution control efforts are the most cost effective.]

The Municipal Wastewater Treatment Construction Grant Amendments of 1981 recognize the problem of combined sewer overflows by providing for Step 3 grants after October 1, 1984, upon request by the Governor, where such discharge is a major State priority.

[GAO Comment: The report (see p. 14) has been revised to reflect the combined sewer provisions of the 1981 amendments.]

GAO Note: page numbers in this appendix have been changed to refer to the final report.

Page ii, Digest, third paragraph

The statement regarding 41 major U.S. treatment plants is ambiguous with language such as "may not meet the 1972 agreement phosphorus limitation because the plants may not have the necessary equipment and/or may have operational difficulties." This conclusion on operation of treatment plants is not substantiated in the report (page 12), but is based on use of a percentage value derived from a 1980 report "Costly Wastewater Treatment Plants Fail to Perform as Expected". Such percentage values derived on a national basis do not justify this conclusion on water basins. It is suggested this statement be revised to cover only equipment deficiencies.

[GAO Comment: We did not use a percentage value derived from our 1980 report. We specifically reviewed the performance of 26 Great Lakes Basin plants included in the 1980 report and found that 24 of the 26 plants are not making permit requirements.]

Page iii, Digest, third and fourth paragraphs

We agree with the principal thoughts expressed throughout the draft report that much needs to be done to further clean up pollution in the Great Lakes Basin. Considerable effort has already been exerted by EPA, however, to initiate the development and implementation of State and local control programs, particularly with regard to the nonpoint sources of pollution. State and local Agencies have the prime responsibility for control of these sources. Under authority provided by the Clean Water Act, the Agency has provided grant funds, institutional guidance, and technical assistance to these water quality management agencies throughout the United States, as well as to other Federal and State organizations, for development of these programs, many of which are now being implemented. Although other Federal agencies deal with portions of the pollution problem, EPA's water quality management program is the only Federal program with a mandate to comprehensively address the nonpoint sources.

[GAO Comment: We believe the discussion (see pp. 26-33) on nonpoint sources comprehensively sets forth the status of nonpoint planning and control efforts. While EPA and others have provided funding for nonpoint efforts, much remains to be done.]

Glossary

The third sentence defining the term "toxic substance" should be deleted. Oxygen-consuming substances such as organic matter are not considered "toxic substances" by the Agency.

[GAO Comment: The report (see glossary) has been revised as suggested.]

Page 5

The chart omits the USDA Cooperative Extension Service. It should be included due to its major role in providing education and assistance for agricultural practices needed to control nonpoint sources. This comment also applies to Appendix I pages 53 and 54.

[GAO Comment: The Extension Service is part of the Science and Education Administration. As suggested by the Department of Agriculture, a discussion of the Extension Service has been added to appendix I. (See p. 67.)]

Pages 11 and 12

While current estimates indicate that 31% of the larger municipal facilities (flow \geq 1 MGD) discharging to the Lower Lakes will not have finished construction to meet phosphorus limits, these plants represent only 15% of the total major plant flow. In other words, 85% of the sewered flow from these facilities will be complying with 1.0 mg/l phosphorus limits. Since the effluent of many U.S. plants, having completed and operating phosphorus removal facilities, averages significantly lower than 1.0 mg/l of phosphorus, it can be expected that the aggregate U.S. municipal flow would be at 1.0 mg/l or less at the end of 1982. This effect was noted in the 1981 Great Lakes Water Quality Board's Report to the International Joint Commission. The report states on page 51 "The Board notes, with gratification...these efforts have resulted in initial achievement of an average phosphorus effluent limitation of 1.0 mg/l at all municipal treatment facilities in the Lower Lakes Basin, as called for in the 1972 Agreement." The report goes on to note, that in Lake Michigan (which lies wholly within the United States) the gross municipal plant effluent averaged 0.96 mg/l phosphorus in 1980. This was achieved despite the fact that not all municipal treatment facilities in the Lake Michigan Basin have finished their construction programs.

[GAO Comment: We do not agree with EPA. The discussion refers to construction completion dates, not to whether the plants will comply with the discharge limits. We do agree, however, that EPA's comment about aggregate flow is important and have revised the discussion (see p. 12) to include the information on flow.]

Page 12, first paragraph

The attempt of the GAO report to extrapolate its earlier findings regarding national plant performance to Great Lakes plant performance for phosphorus removal is not valid. As noted on pages 15 and 16, 123 facilities of 240 Great Lakes municipal facilities discharge treated effluent at 1.0 mg/l or less. There are 16 facilities as per the cited GLNPO report, whose 1980 loading data showed levels in excess of 1.0 mg/l. These 16 facilities include:

- A) 2 facilities that completed plant start-up in FY 1980; and
- B) 4 facilities experiencing start-up and/or operational problems.

Thus, of the total 139 facilities that should have been in compliance only 4 or 2.2% were out of compliance due to poor performance. It should also be noted that the report does not acknowledge the existence of interim measures and treatment systems installed by municipalities having facilities under construction.

This has resulted in a large number (22) of facilities in early compliance or discharging at near compliance levels. Their effluent levels average well below the 4-7 mg/l range associated with municipal effluent not treated for phosphorus.

[GAO Comment: As discussed in our evaluation of a previous EPA comment (see p. 90), we did not extrapolate the findings from our report. We have, however, revised the report (see pp. 18 and 19) to more clearly show the status of the performance of Great Lakes municipal facilities, as suggested by EPA. Also, although municipalities with facilities under construction may have installed interim measures and treatment systems, the plants are still not meeting the agreement objectives as discussed in the report.]

Page 13, first paragraph

It is stated that lack of funds "has not been an obstacle to meeting the Agreement requirements for constructing waste treatment facilities." While it is true that many other factors operated to limit the pace of construction, funding limits have slowed municipal compliance in several respects.

1. With the advent of a program for large Federal grants, communities were no longer willing to construct facilities using only local funds.
2. States have not had sufficient funds to provide grants to low priority projects which are typically the small plants which constitute the large number of plants that will fail to meet the December 31, 1982 deadline.
3. During 1973 and 1974, EPA attempted to shift funding to municipalities discharging to the Great Lakes by calling upon the States to give them added priority within the state priority systems. Congress responded with language prohibiting such priority and in the Clean Water Act of 1977 (section 216) assigned authority for setting priorities to the States.

[GAO Comment: The report has been revised (see p. 13) to include the matters suggested.]

Page 14, second paragraph

The report under combined sewer overflows cites the 1981 IJC reports as identifying 51 problem areas. The 1981 Water Quality Board report to the IJC identifies 39 areas of concern in Canada and the United States. We are unable to find a reference to 51 areas.

[GAO Comment: The IJC report was issued in 1981 but contains calendar year 1980 data. The report (see p. 14) has been revised to clarify this matter.]

Page 6, first paragraph, Discharge limits not being met:

The decision to reduce the 1 mg/l limit to 0.5 mg/l in the lower lakes as per the 1978 agreement is pending.

[GAO Comment: The remainder of the discussion (see p. 16) sets forth the status of this matter.]

Page 16, last paragraph

The characterization of large quantities of "harmful" sludge generated as a result of phosphorus removal process is incorrect. The additional sludge being generated is in no way more harmful than that generated by the normal treatment processes. Second, at some facilities the same chemical would be added for solids control, although not in such quantities.

[GAO Comment: The term "harmful" has been deleted. (See p. 16.)]

Page 15, second paragraph

U.S. municipal facilities are not required to achieve as a body a 1.0 mg/l daily average limit by the end of 1982.

[GAO Comment: The report (see p. 16) has been revised to show that the agreement pertains to major dischargers.]

Page 17, Table

This table is potentially misleading in its evaluation of progress made in achieving 1.0 mg/l Total Phosphorus limitation. This table should list total flow presently treated, not number of facilities.

[GAO Comment: Information on flow has been added to the report (see p. 17) as suggested.]

Page 18, first paragraph

This same Task Force report indicated that existing treatment technologies would not achieve effluent levels in the range 0.1-0.5 mg/l. As GAO's own analysis on page 16 shows, 31% of the facilities meeting 1.0 mg/l are discharging effluent having 0.5 mg/l phosphorus or less.

[GAO Comment: We agree that the technology exists, but, as the discussion points out, many plants are having problems meeting the discharge limits. It is not a question of technology, but performance.]

Page 18, last paragraph

We do not concur with the GAO conclusion. We believe that the aggregate U.S. municipal flows will reach 1.0 mg/l and that interim noncompliance of remaining smaller plants will be compensated by greater than expected performance of larger facilities. Plant performance reviews in the past year have shown that many facilities using existing phosphorus and solids removal facilities can, with good operation and maintenance, remove phosphorus to low levels consistently without new technology.

[GAO Comment: We do not agree. While good operation and maintenance of municipal facilities is needed to help achieve the discharge limits, we continue to believe that achieving the 1.0 mg/l limit is unlikely, as discussed in the report.]

Pages 20 and 21

The pertinent concern should be whether uncertainty about phosphorus target loads and inputs has been sufficiently reduced to allow the selection of a logical and reliable course of action. This question underlies the summary items which begin in Chapter 2 on page 9 and a series of items on pages 18, 19 and 20. The first phrase on page 18 states, "the Task Force also reported that all that may now be necessary for phosphorus control on the Lower Lakes is municipal treatment at 1.0 mg/l" this is substantially repeated in the first paragraph of page 20. This is accurate only in the sense that the extreme range of probability reported by the Task Force included the possibility that no further abatement would be needed. This is an extremely remote possibility. Further work was reported during the public hearing on the Task Force report¹ that clearly shows that such action will not be adequate without further measures. This evidence showed a substantial reduction in the range of target loads predicted by the models for Lake Erie. The result is that the range of load reductions necessary to meet the targets was also narrowed, thus showing a need to achieve further load reductions even under the full range of possible outcomes from current control efforts.

[GAO Comment: The report (see pp. 19 and 20) has been revised to show that additional information made available since the task force report suggests that further controls may be needed, rather than maintaining the status quo or even less controls.]

We agree with the stated need to further reduce uncertainty; but, we know that it cannot be eliminated entirely. Thus, a prudent management strategy includes the use of low cost measures to address nonpoint sources while further efforts are made to reduce uncertainties before pursuing higher cost measures, if these prove necessary. This is the central theme of the Phosphorus Management Strategies Task Force and the informally accepted strategy within EPA. This is also the approach developed with the U.S. Corps of Engineers Lake Erie Wastewater Management Study nearing completion under section 108(d) of the Clean Water Act.

[GAO Comment: EPA has no assurance that its approach of low-cost controls is really the needed strategy. The uncertainties discussed, if and when studied, could have a dramatic effect on the U.S. strategy. As stated in the report, we are concerned that efforts needed to resolve the uncertainties and their implications for future control strategies may not be undertaken and coordinated.]

Page 21, first paragraph

The paragraph states that the Task Force included representatives from industry. They were not actually members of the Task Force.

[GAO Comment: The report (p. 21) has been revised as suggested.]

Page 26

It should be acknowledged that resources available to GLNPO have been used in a very logical and systematic manner over the past ten years in evolving an agricultural nonpoint source strategy that is now reflected in the coordinated EPA/USDA/USCOE projects in western Lake Erie.

[GAO Comment: We do not agree. We believe that the report clearly shows that EPA efforts have been slow; have not been comprehensive; and, to a large extent, they have not been coordinated. EPA, Agriculture, and Corps of Engineers efforts in Western Lake Erie are discussed in the report (see pp. 29 to 33) and the discussion shows that the efforts have been limited. Also, the Department of Agriculture stated in its comments that coordination with EPA has been hampered by a lack of formal agreements between EPA and the Department.]

Page 26, third paragraph, Nonpoint Pollution Sources Have Received Little Attention:

This statement fails to recognize efforts to control agricultural and urban nonpoint sources of pollution. For instance, seven out of eight States bordering the Great Lakes have developed their agricultural nonpoint source control priorities sufficiently to participate in the Department of Agriculture administered Rural Clean Water Program. This pollution control implementation program requires that State priority lists for agricultural nonpoint source problems be developed similar to the Construction Grants priority lists.

¹ V.J. Bierman, Jr., Presentation to the International Joint Commission November 19, 1980

These priorities were usually developed as part of the statewide Water Quality Management plans. Five of the seven States which applied have received over 10 million dollars in technical assistance and implementation grants in the past two years from this program which provides evidence of a satisfactory level of planning detail. However, the States in some cases have chosen projects which drain outside the Great Lakes to represent their most significant pollution problems.

[GAO Comment: We believe our assessment is correct. The 1972 agreement objectives for nonpoint controls for agriculture, forestry, and other land use activities were not met. The 1978 agreement nonpoint objectives are much broader and include matters such as soil losses, land use planning and management, and toxic substances. Little has been done in any of these areas, particularly toxic substances. As discussed at length in the report, phosphorus controls for agricultural sources have been limited (primarily to the Western Lake Erie Basin), comprehensive implementation plans are lacking, and control efforts are voluntary and have been slow to be accepted (only 5 to 10 percent of the farms in the Maumee Basin have accepted tillage controls). The Department of Agriculture also pointed out in its comments that only two projects under the Rural Clean Water Program have been in the Great Lakes Basin. Therefore, we believe that much nonpoint work continues to be needed.]

In the area of urban nonpoint source control, the Nationwide Urban Runoff Program (NURP) is designed to provide assistance in the development of water quality plans and focuses on determining the significance of urban runoff as a source of pollution. Of the 28 cities participating in the program, 6 are located with the Great Lakes Watershed. They are: Rochester, NY; Detroit, MI; Ann Arbor, MI; Lansing, MI; Chicago, IL; and Milwaukee, WI. These cities, as well as the other 22, are concentrating on problems they have identified. They are determining what pollutants are causing water quality impacts and then characterizing these pollutants as to concentration, loads, effects, and controllability.

[GAO Comment: The Nationwide Urban Runoff Program is a very limited effort. According to the program director, it covers only five pollutants, it has received only \$6 million in funding nationwide over a 3-year period, and the projects are very specific to the communities in which they are located. The program director also stated that the future of the program is unknown at this time.]

Page 28

The Table and first paragraph statements that nonpoint sources are the largest contributor of total phosphorus are accurate, but misleading. The type of total phosphorus from nonpoint source does not impact algal growth as much as the type from point sources (primarily ortho-P).

[GAO Comment: The report (see p. 28) has been revised to add the information suggested.]

Page 32

Discussion of the section 108(a) Great Lakes Demonstration Grant Program omits mention of several projects which have addressed combined sewer overflows.

[GAO Comment: We are aware of only five section 108(a) projects which have been funded to demonstrate such technology as swirl concentrators and hydrobrakes for urban combined sewer problems. Also, this comment relates to a discussion of rural nonpoint runoff, not combined sewers.]

Page 32, next to last paragraph

The last paragraph does not give an accurate picture of the section 108(a) program or the GLNPO staff chief's view. The section 108 agricultural nonpoint source control demonstrations began with implementation and detailed monitoring of resulting water quality benefits in the Black Creek Project in Allen County, Indiana. Based upon those results and later results from the Corps of Engineers project in the Sandusky River Basin, current projects have concentrated on tillage practices. Careful measurement of results have been used to create and verify a computer simulation model (ANSWERS) which estimates the results of implementing various practices under various conditions. Since it is far too costly to monitor ambient results throughout entire river basins, the predictive model is used to estimate loading reductions based upon information on the adoption of modified tillage practices.

[GAO Comment: The GLNPO Chief's comments have been clarified as suggested. (See p. 32.)]

Page 32, last paragraph

This statement may accurately reflect the opinion of an EPA staff member; but, it is contrary to our general experience. The statement is typical of those made by skeptics at the outset of most tillage projects. We do not consider no-till practices to be a panacea, but are satisfied as to its benefits and have found that most skepticism is reversed by the end of each demonstration.

It is quite true that only 5-10% of farms in the Maumee River Basin currently use no-till practices and is why demonstration projects are needed.

[GAO Comment: Both the IJC and Department of Agriculture comments on this report support the position that new technology will be slow to be implemented. Therefore, we agree that demonstration projects are needed.]

Page 43, first paragraph

The second paragraph contains the statement, "an overall control strategy or plan has not been developed" (for nonpoint sources). While we agree that no formal, official overall strategy has been adopted for the U.S. portion of the Great Lakes, we submit that an informal and quite workable strategy has evolved among the various agencies. This strategy reflects the knowledge gained from studies and demonstrations supported by the IJC and various State and Federal agencies and the main recommendations of the Phosphorus Management Strategies Task Force. The strategy is incremental and adaptive in nature, emphasizing the implementation of low cost measures while deferring costlier measures while further information is gathered.

[GAO Comment: We do not agree that an overall strategy exists. The report clearly points out that the authority and responsibility for nonpoint efforts is spread among several Federal agencies and States and that the nonpoint problem will be addressed adequately only if an overall, comprehensive strategy and plan is developed to delineate the responsibilities of the many parties involved.]

Page 56

With respect to the example of differences between GLNPO and Region V-Water Division, we do not dispute that fact that there are differences in opinion between organizational units, usually due to differences in the programs that they administer. However, by working closely with operating programs at the Regional Office level, GLNPO has been successful in redirecting program efforts to optimize operating program activities to the Great Lakes benefit. It should be noted that during the same time an impasse developed over the Michigan State program grant, substantial modifications were successfully negotiated in the programs for all five of the other States in Region V. It should also be noted that the delay in approving the Michigan grant was not due to the question of whether GLNPO's concerns would be met, but due to disagreements between Region V and Michigan concerning other matters. Unfortunately, the debate over those other issues operated to obscure GLNPO's concern.

Also in respect to GLNPO's relationship to Region V's operating divisions, it should be noted that during this same timeframe GLNPO convened and chaired the Region V Phosphorus Committee which has enjoyed outstanding success in obtaining standardized compliance tracking and acceleration of actual compliance by Great Lakes municipalities. By focusing attention on key dischargers, the Committee representatives from enforcement, construction grants, and water quality programs in cooperation with the State of Ohio, have been able to ensure compliance with target dates and, in several cases, actually advance the dates for phosphorus compliance by as much as a full year.

With reference to the State nonpoint sources strategies, it should also be noted that they were funded at the direction of the Water Division Director, utilized section 208 funds (funding source administered by the Water Division Director) and will provide for priority consideration of Great Lakes impact. Far from downplaying the impact of nonpoint source control, these funding actions taken in the face of extremely limited funds are solid evidence of the importance attached by Water Division to Great Lakes matters generally and nonpoint source control matters specifically.

[GAO Comment: We agree that GLNPO has achieved some success at its present level. But it has difficulty getting cooperation from other EPA program offices and regions for its Great Lakes pollution control activities, and it lacks resources to carry out its responsibilities. We believe that elevating GLNPO to a higher level within EPA will help to ensure that the water quality agreement receives the resources and status it needs to meet the U.S. commitments.]

Page 74

This table contains an addition error for Pennsylvania in the 1981 column.

[GAO Comment: The addition error (p. 74) has been corrected.]

Page 75

The Funding Table ignores construction cost of Illinois facilities built to eliminate direct municipal discharges to Lake Michigan.

[GAO Comment: We agree that the table (p. 75) does not include Illinois facilities as noted in footnote b to the table.]



DEPARTMENT OF STATE
Comptroller
Washington, D.C. 20520

March 8, 1982

Mr. Frank C. Conahan
Director
International Division
U. S. General Accounting Office
Washington, D. C.


Dear Frank:

I am replying to your letter of January 26, 1982, which forwarded copies of the draft report: "Great Lakes Cleanup Efforts Need More Focus and Direction."

The enclosed comments on this report were prepared by the Deputy Assistant Secretary in the Bureau of European Affairs.

We appreciate having had the opportunity to review and comment on the draft report. If I may be of further assistance, I trust you will let me know.

Sincerely,


Roger B. Feldman

Enclosure:
As Stated.

GAO DRAFT REPORT: "Great Lakes Cleanup Efforts Need More
Focus and Direction"

I am pleased to comment on the General Accounting Office draft report on implementation of the Great Lakes Water Quality Agreement.

We have noted with interest the recommendations of the report in favor of elevating the functions of the Great Lakes National Program Office to a higher level in the Environmental Protection Agency. This Department would be sympathetic to such a step, assuming the concurrence of EPA. The Great Lakes National Program Office has been the focus of US work to comply with obligations under the Great Lakes Water Quality Agreement with Canada. The Government of Canada places a high priority on joint, cooperative efforts to protect and preserve the Great Lakes. This Department has relied heavily on the Environmental Protection Agency and the Great Lakes National Program Office in the US implementation of the agreement.

In considering the draft report, we have noted the lack of reference to work over the past months to meet US-Canadian responsibilities in two important areas under the Great Lakes Agreement. The two countries developed a proposed supplement to the Agreement on phosphorus control in a series of meetings last year. The draft text is in final stages of negotiation. The US and Canada have recently increased cooperative efforts to deal with toxic pollution in the Niagara River. Announcement of new US initiatives, to be undertaken in cooperation with Canada, is expected shortly. The inclusion of material on these subjects would enhance the usefulness of the report.

I hope these comments are helpful to you.


Thomas M. T. Niles
Deputy Assistant Secretary
for European Affairs



DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

MAR 04 1982

Mr. Henry Eschwege
Director
Community and Economic
Development Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Eschwege:

We appreciate the opportunity to comment on the GAO draft report entitled, "Great Lakes Cleanup Efforts Need More Focus and Direction."

It is noted that several persons from this Department were interviewed during the preparation of this report. Agricultural water quality management is a very complex area. There are several areas covered within this report that require clarification. Our enclosed comments are not suggested word changes, but comments of clarification in three general areas--coordination, implementation, and nonpoint sources.

We hope that these general comments will be of value to you in preparing your final report.

Sincerely,

A handwritten signature in cursive script, reading "John R. Block".

Secretary

Enclosure

Comments on GAO Draft Report Entitled, "Great Lakes Cleanup Efforts Need More Focus and Direction"

COORDINATION:

The Great Lakes Basin Commission has been the primary coordinating mechanism in the Great Lakes. The U.S. Department of Agriculture (USDA) did have a representative from the Soil Conservation Service (SCS) on the Commission. This group has gone out of existence. Coordination with the International Joint Commission (IJC) and its Boards has been on an informal staff basis. There is no formal representation of USDA on any of the Boards at this time but some informal discussions concerning this have taken place. The SCS has had a full-time liaison position with the U.S. Environmental Protection Agency (EPA) Region V since 1978. This position includes liaison to the Great Lakes National Program Office (GLNPO). The SCS has entered into an agreement (page 28) with EPA and the Corps of Engineers (C/E). The reduced tillage program mentioned was not the primary focus of this agreement but was an early action by EPA to implement some of the findings of the Lake Erie Study by the C/E.

The USDA Work Group on Water Quality, chaired by SCS has taken this agreement and is currently developing a draft departmental position paper regarding the Great Lakes. The reason behind this effort is the development of common goals for all of the agencies in the Department as they relate to their individual program responsibilities.

The persistent problem of coordination is that no formal agreements regarding responsibility for implementation of agricultural nonpoint control programs exist between USDA and EPA. In relation to the Great Lakes, there is no mechanism now in place to include USDA representatives on any of the Boards of the IJC where nonpoint source issues can be addressed.

Implementation of agricultural nonpoint source control programs must of necessity include many of the agencies of USDA. USDA would welcome the opportunity to participate in a coordinated program to correct agricultural nonpoint source water quality problems in the Great Lakes. We do not see EPA as the director of our activities (page 55) but do see their role as handling coordination.

The statement (page 57) that GLNPO has had difficulty in dealing with USDA is misleading. There is good informal staff communication as already noted. The difficulty is that there are no formal arrangements for the EPA or the GLNPO to communicate with USDA. The informal communications are through SCS to the USDA Work Group on Water Quality.

IMPLEMENTATION:

The implementation which has occurred in the Great Lakes has included USDA agencies since it depended on the existing agricultural delivery system including Soil and Water Conservation Districts. This included technical assistance, information and education, and in some instances additional cost share funds. Most of the demonstration funds for implementation were

GAO Note: Page numbers in this appendix have been changed to refer to the final report.

-2-

directed to the Soil and Water Conservation Districts. The USDA agencies assisting these Districts responded to these projects to supply the necessary support. These projects were in response to identified problems and were generally successful. It required the USDA agencies to respond to the grant, and did not allow for participation in the selection of project areas or take into account their existing manpower commitments.

RURAL CLEAN WATER PROGRAM:

The section on the areawide planning program (page 63) refers to Section 208j. This amendment to Public Law 92-500 in 1977 has not been funded. The experimental Rural Clean Water Program was included in the USDA budgets (Public Law 96-108) in 1980 and 1981 with funding levels of 50 and 20 million dollars respectively. It is administered by the Department's Agricultural Stabilization and Conservation Service (ASCS) as stated. This section and the paragraph on ASCS (pages 32 and 57) confuses Section 208j of the Clean Water Act and the present experimental Rural Clean Water Program. It should be noted that the Great Lakes area received additional consideration in the selection of projects for 1980. Only two projects presented a sufficiently strong proposal for selection.

NONPOINT SOURCES:

Several references are made to the fact that technology cannot be transferred (page 33) from one project area to another. It is true that individual watersheds are different from the standpoint of soils, land use, farming enterprises, runoff characteristics, etc. It is likewise true that not all streams are impacted by pollution from agriculture. It is also true that other nonpoint sources do exist and may contribute pollution to streams within an agricultural area. It is the implementation program that is site specific rather than the technology. It is necessary to determine within each new project area the cause or causes of the problem and to tailor the implementation program to treat the cause. The minimum or no-tillage program (page 32) referred to was an effort to accelerate the adoption of the technique in those counties where adaptable soils were present as identified by the Lake Erie Study, not to sites identified, as stated. The monitoring program mentioned is to track the adoption rate not the water quality benefits. This program is designed to run for three years.

The adoption of minimum or no-till technology is slow because of the need for new equipment and increased managerial skills. When increased technical assistance is made available to assist with learning these new skills, adoption rates increase rapidly. The programs funded by EPA in the Lake Erie Basin are designed to provide this assistance from employees hired by Soil and Water Conservation Districts. The reluctance of farmers to adopt these new practices (page 33) is not the result of higher costs or lack of desire. Minimum and no-till technology requires new managerial skills. It has been demonstrated that increased technical assistance will accelerate the adoption rate. The present statement in the report indicates an overall reluctance to adapt which is misleading, if not further qualified.

- 3 -

The section on Sewage Treatment Goals (page 11) suggests that the United States is doing a less adequate job than Canada in municipal point source control. It does not take into account the vast difference in the magnitude of the needs of the two countries. The 1981 Annual Meeting of the International Joint Commission reported substantial progress by the United States in meeting the goals of the agreement.

The paragraph about the Science and Education Administration (SEA) (page 67) does not reflect the current agency status of the Agricultural Research Service (ARS), Cooperative State Research Service (CSRS) and the Extension Service (ES). The Extension Service is not listed. A suggested statement for their function is as follows: "The Extension Service staff administers Federal funds for conducting Cooperative Extension education programs."

The planning efforts (page 29) referred to were authorized by Section 208(a) rather than Section 208(b). The reference in Appendix I (page 50) referring to the cost share rate under the experimental Rural Clean Water Program should state that...owners and operators may receive Federal matching funds for up to 75 percent...



INTERNATIONAL JOINT COMMISSION
UNITED STATES AND CANADA
WASHINGTON, D.C. 20440



February 26, 1982

Mr. Frank C. Conahan
Director, International Division
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Conahan:

The International Joint Commission has received the GAO report entitled, "Great Lakes Cleanup Efforts Need More Focus and Direction" for Commission review and comment. The Commission appreciates the opportunity to provide comments regarding the report and hopes they are of value to the GAO.

Commission staff has been encouraged to comment on both the general thrust and specifics of your report. Attached you will find these general and specific comments. We hope you find them useful as you prepare your final draft. Should you have questions regarding these comments, please do not hesitate to contact me at (202) 673-6222.

Yours very sincerely,

David A. LaRoche
Secretary
United States Section

Attachment

Comments on Draft GAO Report:
Great Lakes Clean-Up Efforts
Need More Focus and Direction

Page 4, para 4, line 5: The participation by states in Great Lakes cleanup activities is basically under the federal mandate. The state programs are not usually designed to specifically address Great Lakes concerns, but rather are state programs which have been incorporated into the federal Great Lakes program. It is somewhat misleading, therefore, to imply that the states have active interest in Great Lakes cleanup efforts, per se. Since the Agreement does not have the force of domestic law, the main effort must rest on the federal level.

[GAO Comment: While we agree that States' participation in Great Lakes activities is under the Federal mandate, we do not agree that our characterization of the States' roles is misleading. The report clearly notes that the agreement does not have the force of domestic law, but U.S. environmental laws provide for a strong State role in implementing environmental programs. In particular the Clean Water Act, which is a major factor in U.S. Great Lakes cleanup efforts, provides for an active State role.]

Page 4, para 4, line 6: Other federal agencies do support activities related to the Agreement. It must be recognized, however, that the relative efforts of the Departments of Agriculture, Commerce, Defense, Interior, Transportation, etc., in regard to Great Lakes' matters vary considerably.

[GAO Comment: We believe that appendix I clearly spells out the roles and responsibilities of the various Federal agencies.]

Page 5, para 4, line 4: It is stated that the efforts of the above noted groups in Agreement activities "must be tied to the International Joint Commission". The meaning of this statement is unclear. The IJC relies heavily on the goodwill of the various agencies associated with the Agreement. This goodwill and cooperation is a mainstay of IJC activities in regard to Agreement commitments and, indeed, the work of the Commission in general. There is, however, no mandate which requires these agencies to work with the IJC.

[GAO Comment: The report (see p. 5) has been revised to make it clear that efforts of agencies and departments involved in Great Lakes activities should be coordinated with IJC.]

GAO Note: Page numbers in this appendix have been changed to apply to the final report.

Page 5, Figure: The Department of Transportation should be added to the "Canadian Agencies" box. The Great Lakes Basin Commission and the Water Resource Council should be omitted from the "U.S. Agencies" box, since these agencies no longer exist.

[GAO Comment: The Canadian Department of Transportation has been added to the chart and a footnote has been added to show that the Great Lakes Basin Commission has been terminated. The Water Resources Council continues to exist, however.]

Page 6, para 4, 1st item in list: It is stated that GAO contacted EPA headquarters in Washington, Region V, the Great Lakes National Program Office (GLNPO) and the Large Lakes Research Station to obtain information for its report. Was the EPA's Environmental Research Laboratory in Duluth, Minnesota contacted? Research related to the Agreement is conducted at this laboratory. If it was not contacted, this is a noteworthy omission.

[GAO Comment: EPA's Environmental Research Laboratory was contacted during our review and has been added to the report. (See p. 6.)]

Page 7, para 3, line 15: It is stated that EPA headquarters staff were interviewed by the GAO. Unfortunately, EPA headquarters appears to have displayed little interest in recent years for the Great Lakes Basin as an international concern. It is unclear, therefore, that relevant insights can be obtained from this source. The IJC experience is that there is somewhat of a "gulf" in recent years between the interests of EPA's headquarters staff and those of EPA Region V regarding the requirements of the Great Lakes Water Quality Agreement.

[GAO Comment: EPA headquarters plays an important role in carrying out U.S. environmental programs, and therefore it was important that headquarters staff be contacted and interviewed.]

Page 8, para 3, line 11: It is stated that staff of the Council on Environmental Quality were interviewed. It is noted, however, that most of the information on the Great Lakes in recent CEQ reports has been supplied by IJC headquarters staff in Washington.

[GAO Comment: Information provided to us by CEQ may have been provided initially by the IJC staff, but CEQ plays an important advisory role in U.S. environmental activities. Therefore, the views of the CEQ staff were important to us.]

Page 10, 5th item in list: It is stated that the Great Lakes continue to experience problems because effective surveillance and monitoring activities have not been developed and implemented. This is only partially true since some information is, in fact, obtained as a result of these activities. The major problem is that such activities are not sufficient to give a comprehensive indication of

overall water quality conditions and trends in the Great Lakes. Rather, attempts are made to extrapolate overall conditions based on the concentrations of a limited number of conventional and toxic pollutants. This can lead to erroneous conclusions, since some pollutants in the lakes do not respond in the same manner nor in the same time frame to clean-up efforts as do other pollutants.

[GAO Comment: The report (see p. 10) has been revised to state that comprehensive and effective surveillance and monitoring activities have not been developed.]

Page 11, para 4, line 9: It is stated that meeting the requirements for secondary treatments satisfies the 1978 Agreement requirements for adequate municipal treatment. This is incorrect, at least in regard to phosphorus limits. The Agreement calls for a 1 mg/L phosphorus effluent limit for municipal wastewater treatment plants discharging more than one million gallons per day. This limitation usually requires some degree of phosphorus removal at the plants, which is not normally a component of secondary treatment.

[GAO Comment: A footnote has been added to the report (see p. 11) to indicate that phosphorus limitations are discussed separately later in the chapter.]

Page 11, para 5, line 2: It is stated that only 64 percent of the sewered population in the U.S. portion of the Great Lakes Basin has adequate sewage treatment, compared to 99 percent in Canada. It would be informative to point out the scale of the effort in both countries. With a U.S. basin population of approximately 30 million people versus about seven million in the Canadian basin, this means approximately 19 million people in the United States are sewered versus about seven million in Canada. Thus, if absolute numbers are considered, one could conclude that the U.S. have achieved an effort almost three times greater in scope than that of Canada.

[GAO Comment: No doubt the U.S. effort has been larger than Canada's in terms of absolute numbers, but as also noted the U.S. Great Lakes Basin population is much larger than Canada's. Also, although Canada has the right to 50 percent of the assimilative capacity of the Great Lakes (with the exception of Lake Michigan), the United States currently consumes a much greater percentage because only 64 percent of the sewered U.S. population receives adequate treatment. Therefore, we believe that the report accurately reflects the U.S. contribution to Great Lakes pollution problems.]

Page 12, para 2, line 3: A 1980 GAO report on wastewater treatment plants is cited as a basis for the observation that municipal facilities nationwide are experiencing severe problems which limit their ability to treat wastes. It should also be pointed out, however, that more overall effort has probably been expended in the Great Lakes Basin toward the proper operation of municipal facilities, in large part because of the requirements of the Agreement. It may not be appropriate, therefore, to compare or extrapolate the results of a nationwide study (in which operation of municipal facilities may not have the same priority) to conditions in the Great Lakes Basin.

[GAO Comment: We did not extrapolate the results of our 1980 nationwide report. The discussion clearly shows that we specifically reviewed the performance of 26 Great Lakes Basin plants included in our report and found that 24 are not meeting their permit requirements. Plants in the Great Lakes Basin may have received more attention and effort in terms of proper operation, but they are still not meeting their permit conditions.]

Page 13, para 3, line 2: It is stated that the 1978 Agreement requires pretreatment for industrial wastes discharged into municipal treatment systems. This is only partially correct. The Agreement requires pretreatment for industrial wastes only where such wastes are not amenable to adequate treatment or removal using conventional municipal treatment processes. The Agreement does not automatically require pretreatment of industrial wastes.

[GAO Comment: The report (see p. 13) has been revised to clarify this matter as suggested.]

Page 14, para 1, lines 6 and 7: It is stated that only "limited progress" has been made in regard to control of combined sewage discharges. The title of this section, however, says that such discharges "continue unabated". It is suggested the correct observation is that limited progress has been made.

[GAO Comment: The caption for this section (see p. 14) has been changed as suggested.]

Page 15, para 1, line 1: A 1979 GAO report is cited as the source of a number of innovative/alternative technologies for control of combined sewer overflows. It is worth noting the indicated technologies were suggested earlier as possible nonpoint source control measures in the 1978 PLUARG Final Report to the IJC.

[GAO Comment: We do not believe that additional reference to the IJC report is needed.]

Page 16, para 1, line 3: It is stated that more accurate data on phosphorus inputs and an understanding of the eutrophication process is necessary for the United State to select the most "effective mix" of phosphorus control programs. This is misleading. More accurate data and understanding would obviously be helpful in selecting such measures. However, various mixes of point and nonpoint measures have already been suggested by several Great Lakes' groups, including PLUARG and Task Group III. These suggested mixtures have a considerable technical basis and should be given more serious consideration by the Governments.

[GAO Comment: This comment is the same as the first comment on p. 117 and is addressed there.]

Page 16, para 2, line 5: It is stated that the 1972 Agreement calls for a daily average of 1 mg/L in sewage treatment plant effluents. It should be indicated, however, that the annual average concentration has been used in recent years as the basis for assessing how well the jurisdictions are achieving the 1 mg/L effluent limitation.

[GAO Comment: The Governments may be using an annual average, but the 1972 agreement calls for a daily average. EPA raised the same comment, which is addressed on p. 46.]

Page 16, para 2, line 12: It is stated that the phosphorus limitations in the 1978 Agreement do not take affect until the Governments have determined the allowable future phosphorus loads ("target loads") for the Great Lakes and that this has not yet been done. It should also be mentioned that this should have been done by May 22, 1980, 18 months after the signing of the 1978 Agreement. The Governments have, in fact, extended this date twice since then and have still not reached formal agreement concerning allocation of the loads between the two countries. Until this is done, it is not likely that there will be any significant concern paid to the more stringent phosphorus requirements called for in the 1978 Agreement.

[GAO Comment: The report (see p. 16) has been revised to incorporate this suggestion.]

Page 16, para 3, lines 3 & 6: Reference is made to the 1972 requirement of a "daily average discharge of 1 mg/L". A subsequent reference is made to a federal requirement of a "maximum phosphorus discharge of 1 mg/L". This inconsistency should be corrected. An average versus maximum concentration are two different concepts. A maximum phosphorus discharge of 1 mg/L can be considerably more stringent than an average concentration of 1 mg/L. The same general comment regarding the meaning of the word "average" applies to the next several pages.

[GAO Comment: As noted above, the 1972 agreement calls for a daily average. The report (see p. 16) has been revised, however, to be consistent with the terms of the permits, which with the exception of

Indiana, require a monthly average discharge of 1.0 mg/l. Indiana permits require a daily maximum discharge of 1.0 mg/l.]

Page 16, para 4, line 12: Reference is made to large quantities of "harmful sludge" resulting from phosphorus removal efforts. Sludge can, in fact, contain elevated levels of heavy metals and other pollutants, depending on the types of wastes entering a waste treatment plant. It is not necessarily true, however, that all sludges contain such pollutants. If a treatment plant receives primarily municipal wastes and little or no industrial wastes, the resultant sludge is often an excellent fertilizer for crops. Heavy metals and pollutants in sludge usually become a problems only when a sewage plant receives significant quantities of industrial wastes, in addition to municipal wastes.

[GAO Comment: We agree that not all sludge is harmful and have revised the report as suggested. (See p. 16.)]

Page 17, para 1, line 4: It is stated that it is unlikely many U.S. municipal plants will be achieving a "daily average" phosphorus discharge of 1 mg/L by December 31, 1982. It should also be pointed out, however, that the 1978 Agreement does not indicate a phosphorus limit based on a daily average. It is the understanding of the IJC that the 1 mg/L effluent limitation called for in the 1978 Agreement refers to a monthly average concentration, at least in the current phosphorus negotiations of the Governments. The "daily average" limitation called for in the 1972 Agreement has, in fact, been ignored in recent years and instead the annual average has been used as the basis for the limitation.

[GAO Comment: We agree that the daily average limitation called for in the 1972 agreement has been ignored. The 1972 limitation remains in effect, however, because phosphorus allocations called for in the 1978 agreement have not yet been agreed to by the Governments. This matter is fully discussed on p. 16 of the report.]

Page 17, para 4, line 5: It is stated that once the phosphorus target loads are agreed upon, a 0.5 mg/L effluent limitation for municipal treatment plants will take effect for the lower lakes. It should be noted that this effluent limit applies where necessary to achieve the proposed phosphorus target loads. The particular "mix" of measures to achieve the allocated target loads is actually left to the discretion of the two countries. The only requirement is that the loading allocation be met in each country. It is possible, for example, that the United States may employ some nonpoint source control measures in place of more stringent sewage effluent limitations. This particular aspect of the Agreement should be kept in mind when examining the effluent "requirements" of the Agreement.

[GAO Comment: The report (see p. 17) has been revised to show more clearly that the 0.5 mg/l limitation applies only where necessary to achieve the proposed phosphorus target loads.]

Page 18, para 2, line 4: It is stated that the IJC Phosphorus Management Task Force suggested that effluent limitations in the range of 0.1-0.5 mg/L may be needed for the lower lakes. This is only partially correct. The Task Force presented this range only as a possibility if other suggested measures did not prove effective.

[GAO Comment: The report (see p. 18) has been revised as suggested.]

Page 18, para 2, line 5: Reference is made to the January 1981 IJC supplemental report on phosphorus. It is stated that the IJC recommended that Governments adopt an interim strategy requiring most municipal plants on Lakes Erie and Ontario to be operated at a level below 1 mg/L. This is not correct. The IJC suggested phosphorus limitations below 1 mg/L be implemented where it is found to be technically and economically feasible. It was recommended that the Governments assess the ability of plants in the Basin to achieve concentrations below 1 mg/L, and where it is found to be relatively easy to do so, a more stringent limitation be considered.

[GAO Comment: The report (see p. 18) has been revised as suggested.]

Page 19, para 2, lines 5 and 6: It is stated that the 1972 and 1978 Agreements advocate detergent phosphate limitations. It should also be indicated, however, that these limitations are advocated only as necessary to achieve the target loads. Neither the IJC nor the Governments have advocated a limitation other than as a possible measure for helping to achieve the target loads.

[GAO Comment: The report (see p. 19) has been revised as suggested.]

Page 19, para 2, line 4: Reference is made to the 1972 and 1978 Agreement limitations on phosphorus in detergents. It should be pointed out that this requirement relates to household detergents rather than all types of detergents, at least in the 1978 Agreement.

[GAO Comment: The report (see p. 19) has been revised as suggested.]

Page 19, para 2, line 8: Reference is made to "increased costs to consumers" as a result of detergent phosphate limitations. It does not appear, however, that any states other than Ohio and Pennsylvania (where no limitations are currently in effect) have brought up the issue of increased costs to consumers. Where the detergent phosphate limitation currently exists, there has been no significant reference by consumers to increased costs.

[GAO Comment: We believe that the discussion clearly shows that Ohio and Pennsylvania have opposed the ban on the basis of increased costs to the consumer. We have no knowledge of consumer concerns or the lack thereof in other States.]

Page 19, para 3, lines 4 and 6: It is stated that the Great Lakes' states have been slow to implement detergent phosphate limitations. This is an incomplete statement. Those states that did implement a detergent phosphate limitation did so relatively quickly. The real problem is that not all the states have implemented a limitation and, therefore, it is not a Basin-wide requirement. This factor has been the basis for some controversy in the Basin regarding the need for detergent phosphate limitations.

[GAO Comment: We have revised the report (see p. 19) to eliminate the reference to some States being slow to implement the ban and have clarified the discussion.]

Page 19, para 3, line 12: It is stated that various Great Lakes states have enacted detergent phosphate limitations, but that the process took some time after controls were first believed necessary. Again, this is an incomplete statement (see above comment). It is also stated that Canada's limitation is 2.2 percent (by weight) as opposed 0.5 percent in the United States. This uneven limitation has been the basis for some controversy in the Great Lakes community. The observation has been made that while Canada enacted a detergent phosphate limitation relatively quickly following the signing of the 1972 Agreement, the Canadian limitation is less stringent than that presently in effect in most of the U.S. portion of the Basin. It is unfair, therefore, to directly compare the extent and timing of the Canadian and United States limitations.

[GAO Comment: The report (see p. 19) has been revised to eliminate the reference to the length of time needed to implement the phosphorus limitations and to clarify that the higher Canadian limitation has been the basis for controversy.]

Page 19, para 4, line 3: It is stated that the Soap and Detergent Association believes it is more cost-effective to remove phosphorus at sewage treatment plants than to limit its use in detergent. This belief requires some additional discussion. The industry belief is that when all direct and indirect costs are considered, it is more cost-effective overall to remove phosphorus at sewage treatment plants. These costs include the projected costs for additional hot water, whiteners, water softeners, etc., which the industry contends are necessary to achieve the cleaning power of phosphate detergents. The industry position, however, does not have overall acceptance in the Great Lakes community. The IJC has itself raised a concern that the soap and detergent industry has not considered all the possible phosphate substitutes in its cost-analysis studies and, therefore, its conclusions may be premature.

[GAO Comment: The discussion (see p. 19) has been revised to note that the industry believes it is more cost effective overall to remove phosphorus at treatment plants and to indicate the additional costs.]

Page 19, para 4, line 12: Reference is made to a 1979 Colorado State University report to NOAA which states that detergent phosphate limitations would have little or no observable effect on overall Great Lakes water quality. This is only a partial conclusion which does not address the entire question. Little or no effect will likely be seen if the waterbody is only considered on a whole lake basis. If the various sub-basins and nearshore regions of the Great Lakes are considered, however, the results and conclusions would not necessarily be the same. The conditions considered in the study have no direct relevance to expected conditions within the sub-basins or the nearshore regions. The effect of "averaging" the effects of a detergent phosphate limitation across the entire lake, as was done in this study, is technically inappropriate. Inputs of phosphorus at specific points in a lake can have significant impacts on a regional or local basis which would be masked if only the average whole-lake load and response are considered.

[GAO Comment: The additional information provided by IJC on sub-basin and nearshore areas clarifies the overall position of the Colorado State University study, and therefore we have eliminated the discussion of the study from the report.]

Page 19, para 4, lines 20 and 21: It is stated that the IJC's Phosphorus Task Force reported that a 1 mg/L effluent limitation may be all that is necessary for phosphorus control in the two lower lakes. This may be true, but only if several assumptions regarding the range of uncertainties around the input loads and the lakes responses are correct. There is an equally valid possibility, however, that more stringent control measures may be necessary if the other extreme in the assumptions is considered. It is more significant, in fact, that the Task Force endorsed achievement of the target loads in spite of these uncertainties. Assuming "average" conditions exist in the lakes (as Task Group III did), more stringent control measures may well be necessary for the lower lakes.

[GAO Comment: This matter is discussed on p. 18 of the report and a reference to that discussion has been made on p. 20.]

Page 20, para 2, lines 13-18: A number of reasons are given as rationale for the detergent phosphate limitations. An additional rationale not mentioned is that there are a number of "marginal" plants existing in the Basin, i.e., plants which barely achieve their 1 mg/L effluent limitation. If the detergent phosphate limitation were suddenly removed, these plants may no longer be able to meet a 1 mg/L effluent limitation. As noted on page 17,

detergents account for about 20-35 percent of the phosphorus entering wastewater treatment plants. Therefore, an immediate increase of about 20 to 35 percent in the quantity of phosphorus entering municipal treatment plants would be expected if the detergent phosphate limitation were suddenly removed. Under such conditions, marginal plants may no longer be able to achieve their effluent limitation.

[GAO Comment: The report (see p. 20) has been revised to incorporate the suggestion about the effect of detergent phosphate limitations on "marginal" plants.]

Page 20, para 3, lines 6 and 7: The suggestion is made that uncertainties regarding the extent of the phosphorus problem exist in part because the Governments have not been able to calculate "valid" phosphorus target loads. This is a misleading statement. The methods used to develop the Agreement target loads have undergone refinement since they were first used. However, subsequent analyses with these refined methods produce target loads which are basically the same as the original target loads. The Agreement target loads are, in fact, still the "best" estimates that have been developed to date. It is unlikely that better target loads will be developed in the foreseeable future.

[GAO Comment: The report (see p. 20) has been revised to recognize more clearly the difficulty in resolving these uncertainties. We agree that the proposed target loads are the best estimates developed to date and it may be unlikely that better target loads will be developed in the future. We believe these matters are fully set forth in the subsequent discussion.]

Page 20, para 3, lines 10 and 11: It is stated that phosphorus going into the lakes is "harmful". In this case, "harmful" refers to the excessive growth of algal blooms which interfere with the beneficial use of the water resource by man. Phosphorus, *per se*, is not a harmful pollutant in the same sense as toxic substances.

[GAO Comment: The report (see p. 20) has been revised as suggested.]

Page 20, para 3, lines 14 and 14: It is suggested that without more accurate phosphorus input data and understanding of the eutrophication process, the most "effective mix" of control programs cannot be selected. This is a misleading statement. Does the word "effective" mean cost-effective? If so, PLUARG, the Phosphorus Management Task Force and the IJC have already proposed a mix of phosphorus control measures which they deem to be cost-effective, given the present state of knowledge and experience. It is not accurate, therefore, to say that the United States cannot now select an effective mix of control programs. It is also observed that a lake does not care how the phosphorus load is reduced; rather, it is only important that it be reduced. Thus, the notion of "effective" or "cost-effective" can make a convenient smokescreen for those who desire no further phosphorus control measures at the present time.

[GAO Comment: We do not agree. We believe that the resolution of these uncertainties is very important. If the uncertainties are not resolved, the Governments could spend substantial resources on actions which may later prove to be unproductive or marginally productive. EPA agrees these uncertainties need to be studied, as we stated on pp. 20 to 23 of the report, to allow selection of the most prudent control strategies.]

Page 20, para 4, line 1: It is stated that the 1978 Agreement requires the Governments to confirm what the future phosphorus loads "should be". It is more accurate to use the words "would be".

[GAO Comment: The report (see p. 20) has been revised as suggested.]

Page 21, para 2, line 1: It is stated that the IJC established its Phosphorus Management Task Force "to help the governments" meet the Agreement objectives. This is not the case. The Task Force was established to answer a number of unresolved phosphorus questions arising from the PLUARG study and the Water Quality Board. The Governments have, of course, subsequently used the reports of the Task Force and the IJC in their own work.

[GAO Comment: The report (see p. 21) has been revised as suggested.]

Page 21, para 3, line 4: It is stated that many uncertainties regarding phosphorus control must be dealt with so that future management decisions can be made more reliable. It would be better to use the word "should" instead of "must". While uncertainties may make selection of a phosphorus control program more difficult, it is not necessary to completely clear up such uncertainties before effective phosphorus management decisions can be made.

[GAO Comment: The report (see p. 21) has been revised as suggested.]

Page 22, Table: Footnote C contains a comment regarding uncertainty and error in the modelling process. However, an assumption inherent in this footnote is that all the associated errors are going to be additive in nature. This is in effect an assumption of worse case conditions. It is equally possible that the errors may work to cancel each other out, at least in regard to their effect on the ultimate predictions of a model. The result, therefore, may be a reasonably accurate estimate or prediction. Such possibilities must be examined on a case-by-case basis.

[GAO Comment: The language used in the footnote is not our language but that of the task force. The errors discussed may, as the comment suggests, be additive, but we must present the information as set forth by the task force.]

Page 22, para 1, lines 2 and 3: It is stated that the two errors measured by the Task Force could justify management decisions ranging from doing no additional work to implementing massive new control phosphorus programs. The comment made above about the additive nature of error also applies here. The extreme conditions assumed in the above statement do not necessarily apply in a given situation or even under normal conditions. Managers usually plan for "average" conditions. They would normally use average load, responses, etc., in their management calculations. There is little justification, therefore, for concluding either that no additional work will be needed or that massive new programs will be needed. The same comment applies to the use of "optimistic" versus "pessimistic" conditions discussed in the second paragraph. As a related example of this possibility, it is pointed out that the phosphorus control goals for Lake Erie stated in Annex III of the 1978 Agreement are unclear. In order to achieve the stated Lake Erie control goals, a more stringent target load will be needed. This confusion has been mentioned in the past by PLUARG and the IJC. However, it has not yet been clarified by the Governments.

[GAO Comment: As discussed above, we are merely presenting the information as set forth by the task force. We do not conclude that either no additional work will be needed or massive new programs will be needed. We merely stated that the task force said actions could range between these extremes.]

Page 23, para 2, line 1: It is stated that the Governments tentatively agreed to use the proposed target loads in establishing compliance schedules for each country, but that questions have arisen about the relative merits of proceeding any further at this time because of uncertainty surrounding the target loads. This is illogical and contradictory. It is also stated that the U.S. co-chairman of the Phosphorus Management Task Force described any efforts to allocate the target loads "as a waste of time." It should also be pointed out that this comment does not reflect the opinion of the Task Force itself, which provided considerable detail regarding a timed, sequential approach for achieving the target loads.

[GAO Comment: The report (see p. 23) has been revised to delete the U.S. cochairman's statement.]

Page 23, para 3, line 2: It is stated that the Phosphorus Management Task Force indicated the next major decision point for the lakes will be in about five years. This is incorrect. The Task Force stated was that the next major decision point in their suggested approach should be in about five years. Obviously, if their recommended plan was not used, the five year "decision" period has no relevance.

[GAO Comment: The report (see p. 23) has been revised to clarify the task force position.]

Page 23, para 3, lines 15-18: It is suggested (in relation to Appendix V) that obtaining definite information about any of the uncertainty issues could drastically effect the types and extent of programs needed to control phosphorus. It should also be pointed out, however, that further definite information may not have much of an effect on selecting phosphorus control programs. The Governments are already capable of providing a reasonable estimate of the types and extent of programs necessary to achieve the target loads.

[GAO Comment: This comment is similar to the first comment on p. 117.]

Page 24, para 2, line 1: It is stated that since the IJC lacks a single group for coordinating research efforts in the Great Lakes Basin, this responsibility is given to the EPA. The reference to the IJC is a misstatement. The 1978 Agreement gives the IJC's Science Advisory Board the responsibility of advising jurisdictions of relevant research needs and of soliciting their involvement in promoting research coordination. This responsibility is a coordinating effort for research activities in the Basin within the structure of the IJC.

[GAO Comment: We did not intend to imply that IJC is responsible for coordinating research efforts and have revised the report (see p. 24) to clarify this matter.]

Page 25, para 1, lines 2-5: It is stated that officials of the Great Lakes Basin Commission felt that an overall plan for identifying research needs and coordinatint efforts is needed, but has not been developed. There have been some efforts by EPA's Environmental Research Laboratory at Duluth, Minnesota to establish research priorities. The effort, however, has consisted mainly of attempting to identify and fund research activities related to the Great Lakes Basin Ecosystem, rather than developing an overall plan for the Basin.

[GAO Comment: We believe that the report clearly reflects that we are referring to an overall research plan for the basin.]

Page 25, para 4, line 10: It is stated that the EPA has not prioritized Great Lakes research projects. It is worth noting that the IJC's Science Advisory Board will be providing a report to the IJC on the "state of research" regarding the Great Lakes Basin Ecosystem and the priorities which it feels should be placed on research efforts in the Basin.

[GAO Comment: As noted, the Science Advisory Board has not yet provided the report. In addition, we have no knowledge as to whether EPA will endorse the priorities as established by the board.]

Page 26, para 2, line 1: Reference is made to the Great Lakes Protection Act of 1981. The Bill calls for the establishment of a Great Lakes Research Office to identify research needs, set priorities, coordinate research activities, etc. It is noted that the IJC presently has a mechanism in place, the Science Advisory Board, which could attempt to perform at least part of these functions. The Board is, in fact, the only group on the Great Lakes which would likely have knowledge of research efforts in both countries and such information could be used to identify research needs and help set priorities in both countries.

[GAO Comment: We do not believe the use of the Science Advisory Board to perform these functions would be acceptable. The board is part of an international organization which has only advisory powers and therefore would not be in a position to set priorities and direct research efforts. Although the board could provide valuable advice, we believe a U.S. Government organization needs to carry out this function.]

Page 26, para 5, line 5: It is stated that nonpoint pollutants enter lakes in "a diffused and diluted form". The meaning of this statement is unclear. Nonpoint pollutants are in a "diffused form". However, nonpoint pollutants would not necessarily be in a more diluted form than if they were discharged from a given point source. It all depends on the specific pollutant source in each case.

[GAO Comment: The report (see p. 26) has been revised to eliminate the reference to diluted forms.]

Page 27, para 2, line 1: It is stated that agricultural activities and urban stormwater runoff are the major sources of nonpoint pollution in the Basin. This is true only if the unit area loads from these sources are being considered. It may not be the case, however, when the total load entering a lake is considered. For example, the major nonpoint source of phosphorus in the Lake Superior basin is forestry activities, rather than agricultural or urban land use activities. The unit area loads for agricultural and

urban areas in the Lake Superior basin are, in fact, higher than for forested areas. There is so much more forested area in the watershed, however, that the total load from forests is greater than the agricultural or urban inputs.

[GAO Comment: The report (see p. 27) has been revised to note that, with the exception of Lake Superior, agricultural and urban runoff are the major sources of nonpoint pollution when both unit area and total loads are considered.]

Page 27, para 2, line 16: It is stated that a 1981 IJC report indicates air transport is believed to be a major source of phosphorus except for the lower two lakes. The surface areas of the lakes must be considered, however, when examining the significance of atmospheric inputs. It is true that the atmospheric inputs of phosphorus in the lower lakes are considerably less than in the upper lakes. That is due, however, to the fact that the surface areas of the lower lakes are smaller and, therefore, there is less opportunity for phosphorus to enter the lakes from the atmosphere. The main point to be made is that the atmosphere is a major route for phosphorus and a number of other substances to enter the Great Lakes.

[GAO Comment: The report (see p. 27) has been revised to show that air transport is a major source for a number of other substances entering the lakes.]

Page 28, Table: The last row is entitled "Great Lakes Average". What is meant by the word "average"?

[GAO Comment: The average has been deleted (see p. 28) because it was not needed to illustrate our position.]

Page 28, para 2, line 1: It is stated that although the severity of the nonpoint problem is not known, nonpoint pollution contributions are nevertheless believed to be significant. It is interesting that the stated concerns about "uncertainty" do not appear to apply in regard to nonpoint source pollution as they did in regard to the control of phosphorus. In spite of a stated lack of knowledge, the report nevertheless calls for more vigorous nonpoint pollution control efforts. This is an inconsistency which weakens the whole argument regarding the need to clear up uncertainty before effective pollution control measures can be implemented.

[GAO Comment: We believe that our message on this matter has been misinterpreted and have revised the report (see p. 28) to clarify it. While we recognize that uncertainties exist over phosphorus loadings to the lakes, much more is known about phosphorus nonpoint sources than other nonpoint sources, such as toxic and hazardous substances. In addition, as stated later in the discussion of nonpoint sources,

even when phosphorus from nonpoint sources has been identified as a problem, little has been done to actually control it. We do not agree that the report is calling for more vigorous nonpoint efforts where significant uncertainty exists. We do believe, however, that where data is available to pinpoint problem areas, control measures should be developed and instituted. To the extent that this has not been done, as provided in the agreement, the United States is not meeting the agreement objectives.]

Page 29, para 2, line 6: It is stated that the Clean Water Act has provisions for grants to demonstrate new methods and techniques for eliminating nonpoint pollution "in the Great Lakes". Is the Act this specific as to location? It should be mentioned that the Soil Conservation Service can play a significant role in addressing nonpoint pollution in the Great Lakes Basin. Their recognized expertise in the area of erosion control and associated pollutant generation, as well as their long history of work with the states and the EPA, suggest such a role.

[GAO Comment: Section 108(a) of the Clean Water Act specifically refers to the Great Lakes. Also, the role of the Soil Conservation Service is spelled out in the report.]

Page 29, para 4, line 9: It is suggested the technical capability to identify cause and effect relationships between nonpoint sources and water quality impacts does not exist. This is not the case. What doesn't exist is the technical capability to accurately and precisely identify cause and effect relationships between sources and impacts. There are some mechanisms to identify such relationships, however, which do presently exist. One such project is the OECD international eutrophication study which developed statistical relationships between nutrient loads and water quality in lakes and impoundments.

[GAO Comment: In our previous report we specifically stated that the technical capability to identify cause and effect relationships does not exist. We continue to stand by that statement based on that report and other work we have done. Also, we have no knowledge of the OECD report or the reliability of the statistical relationships which could be used to prove an actual cause and effect relationship.]

Page 30, para 4, line 9: The Great Lakes Basin Commission is called a "primary coordinating mechanism". This description isn't really correct. The Basin Commission was primarily a planning agency, not a coordinating agency, per se. The same comment applies to page 28, para 3, line 5.

[GAO Comment: We are stating the position of SCS officials who were actively involved in nonpoint planning efforts with the Basin Commission. We believe the officials' comment are correct based on our discussions with others, including representatives of the Commission.]

Page 31, para 4, line 4: It is stated that little nonpoint control technology developed in the Great Lakes Basin can be transferred to other areas. This is an incomplete statement. There is no reason to believe that the techniques developed in the Basin cannot be applied elsewhere. It just appears that nobody is making the effort to do so.

[GAO Comment: The discussion (see p. 31) has been revised based on comments from the Department of Agriculture concerning implementation of the technology.]

Page 32, para 1, line 2: It is stated that nonpoint pollution sources "constitute the majority of pollutants entering the lakes". This is incorrect as a general statement. Nonpoint sources do not constitute the majority of all pollutants entering the lakes, especially in the case of toxic substances. Industrial dischargers contribute considerably greater quantities of many toxic pollutants than do nonpoint sources. Thus, while nonpoint sources do contribute significant quantities of many pollutants to the Great Lakes, they do not contribute the majority of all pollutants entering the lakes.

[GAO Comment: The report (see p. 32) has been revised as suggested.]

Page 32, para 2, lines 13-15: It is again stated that little technology developed in Great Lakes Basin projects (as part of the Rural Clean Water Act) can be transferred to other areas. As noted above, it is not so much that such technology can't be transferred, but rather that nobody seems to be making the effort to do so.

[GAO Comment: See first comment on this page.]

Page 33, para 1, line 1: It is stated that EPA Region V officials feel minimum/no tillage practices are not suitable for all crops, soils and climates. It should also be mentioned that there is a potential for greater use of herbicides for the control of weeds when employing minimum/no tillage practices.

[GAO Comment: The report (see p. 33) has been revised as suggested.]

Page 33, para 2, line 5: It is stated that toxic pollutions can render the lakes "useless." Realistically, it is not likely that the Governments would ever allow toxics pollution to render the lakes useless. An admittedly ridiculous example is the fact that, however bad conditions might become in the lakes, the water could nevertheless always be used to put out fires or float ships for the transportation of goods. It is the degree to which the lakes are polluted so that it interferes with the beneficial use of the water resource that is the real issue.

[GAO Comment: The report (See p. 33) has been revised to show that the lakes could be lost to a variety of desirable activities.]

Page 33, para 2, lines 1-10: The observation is made that toxic pollution is a very serious problem in the Great Lakes. At the same time, it is also stated that Great Lakes toxic pollution has not been comprehensively addressed because "too little is known" about the problem. This is a contradictory and illogical statement. It would seem that the very seriousness of the problem, as implied in this paragraph, suggests that toxic control programs be implemented as rapidly as possible, even if the "nature, extent and source of such pollution" is not precisely known. If the problem is as serious as suggested in this paragraph (and indeed it may be), this suggests massive efforts be undertaken to attempt to control the problem. Adjustments to such programs can be made as more is learned about the problem, not vice versa.

[GAO Comment: The report discussion (p. 33) states that toxic pollution is "potentially" a greater threat than eutrophication, but that the extent of toxic pollution is not known and the problem is not being comprehensively addressed. We do not find this to be contradictory or illogical and we cannot agree that a massive program should be undertaken to control toxics regardless of the state of knowledge about toxics. To do so could, in our opinion, result in massive resources being devoted to a potential problem which may not exist or may not be as serious as perceived. Such an approach can rapidly lose its credibility as additional information becomes available and can result in a substantial waste of resources. We believe that attention needs to be devoted to toxic substances, including data gathering and research and, if justified by reliable information, the implementation of specific control measures. Unfortunately, little has been done in any of these areas.]

Page 34, para 1, lines 6-10: It is stated that if the EPA reduces allowable PCB levels in fish, commercial fishing would be "totally eliminated". This is an inaccurate statement. There will likely always be places in the lakes where PCB levels in fish are not exceeded. Further, it is the FDA, not the EPA, which determines the allowable amounts of PCBs in fish. It is also stated that toxic substances in fish have "already severely reduced" commercial fishing. There are fishermen who would disagree with this statement. What has actually happened is that several preferred fish species have basically disappeared from the lakes. The overall tonnage of fish caught in the lakes, however, does not appear to have decreased significantly in recent years.

[GAO Comment: The report (see p. 34) has been revised as suggested.]

Page 34, para 4, lines 2-4: It is stated that DDT, mercury and PCBs "have been carefully studied and regulated". This is an overstatement. They have probably been studied fairly well. It is a matter of opinion, however, as to whether or not these substances have been "carefully regulated".

[GAO Comment: The discussion (p. 34) has been revised to state that these substances have been studied and control measures implemented.]

Page 35, para 1, lines 5-7: The use of fish tissue to determine "the lakes' status relative to toxics" and the effectiveness of control programs is mentioned here. Some care must be used in such assessments. In the case of substances which bioaccumulate, for example, the use of fish tissue may not generate much information about the effectiveness of control programs. It should also be pointed out that fish and other organisms can be looked upon as "integrators" of the effects of multiple inputs of toxics. That is, a fish lives in an environment containing many pollutants. The "state" of the fish reflects the cumulative impacts of all these pollutants.

[GAO Comment: Analysis of fish tissue is an accepted method of measuring levels of toxic substances and therefore the effectiveness of control measures for specific toxics. We do not believe the comment affects the matters discussed in the report.]

Page 35, para 2, lines 2-4: It is stated that the Chief of the GLNPO Surveillance and Research Staff said that the U.S. currently lacks the resources to adequately monitor for toxics. Does this statement apply only to EPA resources or to all the available U.S. resources in the Basin? Other agencies do have personnel and equipment that could be used in toxics monitoring activities related to the Agreement if the U.S. chose to use them in such efforts.

[GAO Comment: The statement is from a key official in a position to have knowledge of the availability of resources from a variety of agencies and does refer to overall U.S. resources.]

Page 35, para 2, lines 5-7: It is stated that lack of equipment and personnel would probably be solved by "the forces of supply and demand". The meaning of this statement is unclear.

[GAO Comment: We believe that the statement is clear. As the demand for information and laboratory capability to provide such information increases, the laboratory capability and other needed resources will become available.]

Page 33, para 2, line 8: It is stated that actions are now been taken in the U.S. to improve toxics coordination at the state and federal level. What actions are being referred to and who is doing them?

[GAO Comment: The report (p. 36) has been revised to provide additional information as suggested.]

Page 37, para 2, line 4: It is stated that EPA has proposed standards for only nine of 34 industries required to be regulated. It would be informative to indicate why such slow progress has been made thus far.

[GAO Comment: We do not believe it is necessary to go into the detail suggested. We have provided a reference to the report for those interested in pursuing this matter further.]

Page 37, para 3, line 7: Reference is made to the Great Lakes International Surveillance Plan (GLISP) as "the basic framework for monitoring activities in the Great Lakes Basin required by the 1978 Agreement". This is an incomplete statement. GLISP is mentioned in the Agreement only as a model, not as the required monitoring program. The Governments themselves must provide the required monitoring program. The degree to which GLISP will play a role in the development and implementation of the required monitoring program is not clear at present, even though GLISP is being touted by some as the program called for in the Agreement.

[GAO Comment: The discussion (p. 37) has been revised to clarify that GLISP is intended to be a model.]

Page 37, para 3, lines 9 and 10: It is stated that "the Commission believes that the plan (GLISP) is biased, incomplete and lacks scientific validity". This is incorrect. While advisors to the IJC have presented their personal technical critiques on the scientific

validity of GLISP, the IJC itself has not yet come to any conclusions regarding GLISP. As an information item, it should be pointed out in the GAO report that the opinions of individual IJC staff members do not necessarily reflect the official opinion of the IJC on any given issue.

[GAO Comment: The report (p. 37) has been revised as suggested. Another reference to this matter was revised in the draft report before it was sent to IJC, but the appropriate revision to this passage was inadvertently not made.]

Page 38, para 5, line 4: It is stated that in a January 1981 interim report, the IJC reported "substantial concerns cloud the governments abilities to meet the intent of the Agreement". It would be informative to expand on this observation.

[GAO Comment: The discussion (pp. 38 and 39) has been revised to delineate the specific concerns.]

Page 39, para 2, line 4: Reference is made to a cooperative effort among nine state and three federal agencies. There are only eight states in the Basin.

[GAO Comment: Ohio is represented by two agencies, thus the total of nine.]

Page 39, para 4, lines 2, 5, and 7: Reference is made to the EPA's open water and nearshore monitoring efforts and their associated inadequacies. It would be informative to indicate why the EPA has experienced such difficulty with its monitoring efforts related to the Agreement.

[GAO Comment: The previous sentence states reasons--funding constraints.]

Page 40, para 2: The statement is made that "the IJC believes" the EPA's Atmospheric Deposition Network is inadequate. This is not correct. The IJC has made no comment on the EPA Atmospheric Deposition Network.

[GAO Comment: The reference to EPA's Atmospheric Deposition Network has been deleted from the report. In its comments, EPA agreed with our assessment that the network was plagued by problems such as lack of equipment, poor collection location, and different collection techniques. However, EPA also pointed out that substantial changes have been made to the network since we made our assessment and that our report discussion was not a true reflection of the current situation. We applaud EPA's efforts to upgrade its atmospheric deposition monitoring system for the lakes and have deleted our assessment of the old system.]

Page 40, para 2: It is stated that because differences exist in the way the U.S. and Canada collect samples, no international comparison of data can be made. This is not correct. Comparisons can be made, although such differences require careful interpretation of the data by those making the comparisons.

[GAO Comment: The discussion has been eliminated because it was part of the discussion of the air deposition network (see previous comment).]

Page 40, para 4, lines 3-10: It is stated that the rationale for much of which is included in GLISP is unexplained. An unexplained rationale, however, isn't necessarily a bad rationale. It is worth mentioning here that in spite of what may be shortcomings in GLISP, when the large extent of the area being monitored is considered, GLISP probably represents one of the best cooperative surveillance plans in the world at the present time. GLISP is also the only cooperative monitoring program in the Basin between the two countries.

[GAO Comment: The statement is a direct quote by an IJC official. Also, for the reasons discussed at length in the report, we do not believe that GLISP is a good plan or model.]

Page 40, para 5, line 1: It is stated that "knowing when and where to take water samples is important". It should also be pointed out, however, that no one "knows" unequivocally when and where to take samples in all situations. There are always differences of opinion as to what constitutes the best locations and frequencies for sampling in a monitoring program.

[GAO Comment: We agree, but, as discussed subsequently, GLISP provides a wide range of latitude which could have substantial effects on the monitoring results.]

Page 40, para 5, line 6: It is stated that GLISP does not specify month, day, or hour for sampling. Such "specifying" can lead to problems in some cases. It may result in an inflexible monitoring program in which a waterbody is sampled in a more or less mechanical manner, regardless of whether or not the situation calls for it. An inflexible program, for example, might not allow for sampling during storm events if such events do not happen to occur in accordance with the schedule incorporated in the sampling program. It is also stated that monitoring activities may be scheduled on the basis of the availability of vessels or other resources. This is obviously not an ideal situation. Such occurrences, however, may represent an unfortunate economic reality in some cases, and this possibility should be considered in developing monitoring programs. It is also noted that the last sentence in this paragraph could be reworded for clarity.

[GAO Comment: We agree that rigid specificity can be detrimental and some latitude must be provided. But as discussed above, the GLISP provides a great deal of latitude which can have a substantial effect on consistency and comparability. Consistency is important for comparison purposes. Also, the remainder of the discussion does note that sampling needs to take place at critical times.]

Page 41, para 2, line 7: It is stated that failing to sample above a "meeting point" prevents one from assessing where specific pollutants originated. This is not necessarily the case. The origins can sometimes be identified simply by looking at upstream dischargers. If a specific pollutant is detected in a stream and there is only one or a few possible dischargers upstream of the meeting point, such sources are likely to be the pollutant source. Some common sense obviously must be involved.

[GAO Comment: We do not agree. As discussed in the nonpoint pollution section, all pollution does not come from dischargers. Knowing the source of pollution is important in determining how to control the pollution. Therefore, failure to sample above the meeting point could lead to erroneous assumptions about the source of the pollution.]

Page 41, para 2, line 12: It is stated again made that sampling in "improper locations" can result in an inability to accurately quantify pollutant inputs to lakes. One can most accurately quantify inputs of pollutants to lakes by sampling at tributary mouths, whereas the identification of specific sources of a pollutant may require sampling upstream from the tributary mouth.

[GAO Comment: This is the opinion of one of IJC's own environmental advisors. The nature of specific pollutants can change as the tributary flows along and the actual amount of a pollutant can be masked by other pollutants if sampling is done only at the mouth. We continue to believe that improper sampling locations can result in inaccuracies in both quantity and source.]

Page 41, para 3, line 3: It is stated that sampling sites may be located too far from cities and industries to identify loadings to the lakes. Again, this is not necessarily the case. Sampling at the tributary mouth might be sufficient to quantify pollutant inputs. It is just a question of the desired accuracy. The easiest way to attempt to quantify inputs to the lakes from municipal and industrial sources is to directly sample the discharges themselves, rather than attempting to sample the contents of the tributaries.

[GAO Comment: We believe that the statement is correct. Many things can happen to a specific

pollutant as it moves to the lakes in tributaries. The pollutant may settle out, change composition, or combine with other pollutants. Therefore, it is important to know the source of the pollutant and only sampling discharges may not identify such sources.]

Page 41, para 3, line 10: Two cities on the Maumee and Sandusky rivers are used as examples of problems related to sampling locations. The point being made in this sentence is unclear.

[GAO Comment: The discussion (p. 41) has been changed to clearly state that the cities are located at the river mouth, much below the tributary sampling location.]

Page 41, para 4, line 1: It is stated that samples have to be taken in exactly the same manner to allow for data comparisons. This is not necessarily the case, although the data comparisons would obviously be more difficult under such circumstances. It is also suggested that if data are not exactly comparable, an overall basin perspective can not be gained. Again, however, this is a question of the specific information being sought.

[GAO Comment: The discussion (p. 41) has been revised to state that data comparisons are facilitated by similar sampling methods.]

Page 41, para 5, line 6: It is stated that the specific times for monitoring nearshore conditions were not defined in GLISP. While such omissions obviously make it difficult to critically assess GLISP, it is remarked again that not defining the monitoring times does not mean that bad data will necessarily be obtained. Also, item 2 says that "species sampled and number of samples made differ". The word should be "may".

[GAO Comment: The point being made is not that the data is bad, but that data will be difficult to compare if the methods, timing, etc., are not similar. The typographical error has been corrected.]

Page 42, para 4, line 11: It is stated that the detergent phosphate limitations have been met with controversy. It should also be pointed out, however, that with the exception of two states in the Basin, the limitations have been in effect in both countries for a number of years. The "controversy" over this issue comes primarily from the soap and detergent industry and the two concerned states, not the Basin population, per se.

[GAO Comment: The point remains that the ban is controversial at least in Ohio and Pennsylvania. The ban may, in fact, also be controversial elsewhere because of the higher Canadian limitations.]

Page 42, para 4, lines 12 and 13: It is stated that the need for greater phosphorus controls "is clouded by uncertainties" about phosphorus inputs and other factors. The point is made again, however, that the existence of uncertainties does not mean that basic errors have been made in the identification of overall phosphorus control programs needed in the Basin. It would be better to call them "possible" uncertainties when discussed in relation to Great Lakes phosphorus control programs.

[GAO Comment: The report (see p. 42) has been revised as suggested.]

Page 43, para 2, lines 3 and 4: It is stated that "an overall Great Lakes surveillance and monitoring plan is needed". It is worth noting that this is precisely what the Agreement says. It is pointed out again that it is the responsibility of the Governments, not the IJC or the Water Quality Board, to develop this plan.

[GAO Comment: The report clearly recognizes these matters.]

Page 43, para 3, line 1: It is stated that the current (1978) Agreement expires in 1983. This is incorrect. According to Article 14 of the Agreement, it remains in force for a period of five years and thereafter, until terminated by one of the Parties. Therefore, if neither Party objected to the Agreement, it presumably would remain in effect indefinitely. It is also pointed out that Article 10 of the Agreement requires the Parties to conduct a comprehensive review of the operation and effectiveness of the Agreement following the third biennial report of the Commission. The third biennial report of the Commission will be presented to Governments in 1986. Therefore, the Governments may not be assessing the Agreement until then.

[GAO Comment: The discussion of the agreement in chapter 1 (see p. 4) has been expanded to clarify this matter, and the report has been revised appropriately.]

Page 43, para 3, lines 5-11: It is recommended that Congress, in conjunction with the Secretary of State and the EPA Administrator review the Agreement when it "expires". Other organizations should also be included in this review. One of the biggest problems with achieving the requirements of the Agreement is a lack of coordination between the various involved agencies. It seems sensible, therefore, to include other groups in the review. Logical groups to be consulted include the Soil Conservation Service, the Fish and Wildlife Service, the Corps of Engineers and NOAA. They all carry out some functions related to the Agreement.

[GAO Comment: The reference to the agreement's expiring has been revised as discussed above. We have specifically identified the need for EPA and the Department of State to be involved in such a

review because of their key roles in Great Lakes activities. Other agencies would not be precluded from being involved in the suggested review.]

Page 53, para 4, line 1: It is stated that "virtually every major program office" in EPA is responsible for activities covered under the Agreement. It is unclear what is meant here by a "major program office", as only Regions II, III and V are subsequently discussed.

[GAO Comment: EPA's various programs are defined in chapter 1. (See p. 4.)]

Page 54, para 1, line 2: It is stated that the GLNPO has not met a critical need for overseeing and coordinating Great Lakes activities. However, this is not entirely the fault of the GLNPO. It has been operating in recent years without much visible cooperation from EPA national headquarters or the Great Lakes' states. There appears to be a lack of commitment by EPA, especially on the national headquarters level, to fulfill its role as the lead implementing agency for the Agreement in the U.S.

[GAO Comment: The discussion in the chapter clearly points out the problems GLNPO has experienced.]

Page 54, para 2, lines 2 and 4: It is stated that the EPA has placed Great Lakes program responsibilities at a relatively low level. It should be pointed out that this action (or inaction) appears to rest primarily in the Washington headquarters office and not necessarily in the Regional Offices. Great Lakes program responsibilities under the Agreement appear to have a relatively high profile within Region V.

[GAO Comment: Chapter 3 of the report specifically discusses this matter.]

Page 54, para 3, line 7: Item 2 in this paragraph states that not enough research staff were assigned to the Great Lakes initiative program. It should be pointed out that neither Region V or the GLNPO consider research to be a primary activity within their sphere of activities. Other EPA facilities within the Basin are more logical research components than Region V.

[GAO Comment: The discussion (p. 54) refers to matters which predate the establishment of GLNPO and the management of the Great Lakes program out of region V. Therefore the comment is not germane.]

Page 55, para 4, line 8: It is stated that the Great Lakes Program "is generally not separately funded under federal law". This is a major continuing problem in regard to the U.S. meeting its responsibilities under the Agreement. The Agreement identifies the Great Lakes as a special resource of both countries, deserving of special attention and funding. Therefore, Agreement responsibilities should not be viewed as activities to be done, if possible, after normal domestic concerns are addressed. Unless Great Lakes funding regarding Agreement responsibilities is identified separately by the U.S. Government, it is unlikely the difficulties experienced thus far in meeting Agreement requirements will improve.

[GAO Comment: This matter is fully discussed in the report. In addition, our recommendation to the Congress emphasizes that it must decide if sufficient funds can be provided for Great Lakes activities given current budgetary and economic conditions.]

Page 56, para 5, line 3: Reference is made to a 1980 request by GLNPO concerning development of nonpoint source regional strategies. It is noted that the nonpoint recommendations contained in this paragraph are basically the same as those PLUARG made several years earlier.

[GAO Comment: We agree, but see no need to expand the discussion further.]

Page 57, para 2, lines 7 and 8: Lake Erie is described as "the most polluted of the Great Lakes", while Lake Ontario is described as the second most polluted. This is actually an oversimplification of the condition of these two lakes. Lake Erie is the most polluted of the Great Lakes with regard to nutrients. In regard to toxic substances, however, Lake Erie is in better condition than Lake Ontario..

[GAO Comment: The discussion (p. 57) has been revised to state that both lakes are the two most polluted of all the Great Lakes.

Page 57, para 4, line 3: It is stated that New York officials have not directed attention toward Great Lakes issues because of a lack of EPA guidance. As pointed out earlier, however, it must also be recognized that there is no mandate requiring Great Lakes Basin states to participate in Great Lakes cleanup efforts. The mandate exists on the federal level.

[GAO Comment: This matter is fully set forth in the report. (See p. 4.)]

Page 57, para 5, line 5: It is stated that GLNPO has experienced difficulties in dealing with the Departments of Agriculture and Commerce. This is surprising if this remark applies to the Soil Conservation Service. The Soil Conservation Service, via its Conservation Districts, has a long history of working with local and state governments and with EPA. It is surprising, therefore, if GLNPO has experienced difficulties in dealing with them.

[GAO Comment: At the local level coordination may be good, but high-level coordination has been missing in the development of a comprehensive non-point strategy. Also, the Department of Agriculture agreed (see app. XI) that there are no formal arrangements for EPA or GLNPO to communicate with the Department.]

Page 58, para 3, line 4: It is stated that EPA travel cutbacks have occasionally limited employee attendance at IJC functions. This is correct and, unfortunately, there is every indication that the problem is getting worse. Several states are also restricting their employee attendance at IJC functions. It is also noted in this paragraph that the FY 82 budget cutbacks could result in closing EPA's Large Lakes Research Station. This did not occur only because of specific congressional intervention. This station, however, has been "zeroed out" in the FY 83 budget. As a result, a major Great Lakes research activity related to the Agreement will be lost, making the work of the Commission related to the Agreement more difficult to accomplish.

[GAO Comment: Travel problems are discussed in the report. The suggested discussion of the congressional action needed to keep the research station operating also has been included in the report. (See p. 58.)]

Page 59, para 1, lines 3 and 4: It is stated that the EPA "has assigned Great Lakes Program responsibilities at a low level". This should be emphasized as a very significant problem. This "relatively low priority" has caused many of the problems related to fulfilling the requirements of the Agreement. The situation may not get any better unless EPA assigns a higher priority to its Agreement responsibilities. Obviously, there is no incentive for the involved Regional Offices or associated laboratories to attach any particular significance to Agreement activities if a similar commitment is not evident at the EPA headquarters level.

[GAO Comment: This matter is emphasized. The IJC position on this matter has been added to the discussion (p. 55).]

Pages 61-65: Appendix 1 lists the environmental legislation and agencies affecting the Great Lakes. It should also be stated, however, that the U.S. has commitments under the Agreement which are extraordinary in nature, relative to U.S. domestic laws. That is, the U.S. has commitments under the Agreement which it has pledged it will attempt to accomplish. To do so may require that the U.S. initiate some activities which are basically outside the structure or requirements of U.S. domestic laws regarding the environment. Therefore, simply assessing the existing U.S. legislative base may not give an accurate picture of what the U.S. actually can or cannot do in regard to its Agreement commitments.

[GAO Comment: We are not aware of any instances where the United States has carried out activities outside of domestic law. Furthermore, we believe that the report clearly states that the United States has made commitments under the agreement which are not being met and the Congress will need to decide the extent to which these agreement commitments can be funded.]

Page 76, para 1: This paragraph has a list containing three "important uncertainties" remaining to be resolved concerning phosphorus control." The implication is that unless these uncertainties can be resolved, it will not be possible to implement appropriate phosphorus control measures. The uncertainties, however, may not be as formidable as one might otherwise believe. For example, in regard to the second uncertainty concerning tributary loads, a tributary is a transport mechanism for water and the chemicals carried in it. Tributaries, per se, do not contribute to the phosphorus load to a waterbody. It is principally the activities of man within the watershed which result in excessive phosphorus inputs to waterbodies. In regard to shoreline erosion contributions of phosphorus, it is unclear whether or not this even warrants a label as a major uncertainty. It is true that there are large inputs of phosphorus from shoreline erosion at certain times of the year. Most current scientific evidence, however, suggests this phosphorus is largely unavailable for algae growth. Therefore, it is of little consequence in regard to eutrophication control measures. One item that should be added to this listing, however, is the atmospheric inputs of phosphorus to the lakes. More accurate information on the quantities and types of phosphorus entering the Great Lakes via atmospheric deposition is needed.

[GAO Comment: A discussion on atmospheric inputs of phosphorus has been added to the report. (See pp. 78 and 79.) With respect to the other uncertainties, we merely state what IJC's own task force identified as uncertainties which need to be resolved.]

Page 76, para 2, lines 2 and 3: It is stated that bioavailability is one of "the most critical considerations" in assessing the desirability and effectiveness of phosphorus control programs. In fact, the quantities of biologically available phosphorus can be used now to set control priorities. Control efforts should concentrate on those sources contributing the greatest quantities of biologically available phosphorus. Also, it is more correct to indicate that bioavailability refers to phosphorus that is immediately available for algae growth or that can become available for algae growth over a short time period.

[GAO Comment: The definition of bioavailability has been clarified (see p. 76). While we agree that controls can be established where information is definitive, we believe that further research is needed to resolve the uncertainties which do exist so that optimal control efforts can be devised.]

Page 77, para 2, lines 11-19: It is stated that phosphorus could settle in river bottoms and may never be released back to the water column. On the other hand, it is also subsequently stated that tributary contributions of phosphorus may be underestimated because storm events are not considered. These are contradictory statements whose implications require further discussion.

[GAO Comment: We do not agree that the statements are contradictory. Phosphorus can settle and never be released or it can be released during storm events. The point is that no one knows, and this needs to be determined.]

Page 78, para 2, line 8: It is stated that anywhere from one to 40 percent of shoreline phosphorus is in a biologically available form. The upper end of this range, however, is not normally encountered in the environment. A more realistic range is on the order of one to ten percent, with even the ten percent value being relatively high. Therefore, to conclude that exclusion of shoreline erosion phosphorus raises serious questions about the integrity of the target loads is misleading. Because of its low bioavailability, shoreline erosion phosphorus likely has little impact on the eutrophication status of a lake.

[GAO Comment: We believe that the discussion clearly points out that this is a range. Also, IJC's own task force has stated that this is a question which needs to be resolved.]

Pages i-v, DIGEST: Where appropriate, the Digest should be changed to reflect the concerns raised above. For example, page ii states that the IJC believes that GLISP is "biased, incomplete, and lacks scientific validity"; page 126 of this critique ("Page 32, para 3, lines and 10") contains a comment addressing this statement.

[GAO Comment: The digest has been revised where appropriate.]





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