

The purpose of the Parties is to protect and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes Basin Ecosystem. In order to achieve this purpose, the Parties agree to make a maximum effort to develop programs, practices and technology necessary for a better understanding of the Great Lakes Basin Ecosystem and to thereby contribute to the maximum practicable the discharge of pollutants into the Great Lakes System.

International Joint Commission

June, 1982

Great Lakes Water Quality Agreement
September 1978

Commission Offices:

2001 S Street N.W., 2nd Floor
Washington, D.C.
20440

100 Metcalfe Street, 18th Floor
Ottawa, Ontario
K1P 5M1

100 Ouellette Avenue, 8th Floor
Windsor, Ontario
N9A 6T3
(Great Lakes Regional Office)



International Joint Commission

First Biennial Report
under the
Great Lakes Water Quality Agreement
of 1978

This document provides an overview of the major issues that the Commission feels warrant attention.

A separate, more detailed document, published as an Addendum to this Report, provides further discussion of many of these issues. The Addendum is available on request from the Offices of the Commission.

IJC Commissioners

E. Richmond Olson, Q.C.
Robert C. McEwen
L. Keith Bulen
Charles M. Bédard
Donald Totten

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INTERNATIONAL JOINT COMMISSION



July 12, 1982

The Honorable
Mark MacGuigan, P.C., M.P.
Secretary of State for
External Affairs
Lester B. Pearson Building
125 Sussex Drive
Ottawa, Ontario K1A 0G2

The Honorable
Walter J. Stoessel
Acting Secretary of State
Department of State
Washington, D.C.
20520

Dear Sirs:

With this letter, the International Joint Commission transmits its First Biennial Report in accordance with Article VII of the Great Lakes Water Quality Agreement of 1978 to the Governments of the United States and Canada. The report has also been sent directly to the State and Provincial Governments.

This Report provides an overview of the major issues that the Commission feels warrant attention with respect to achievements and activities under the Great Lakes Water Quality Agreement. In addition, a separate document entitled "Addendum to the First Biennial Report under the Great Lakes Water Quality Agreement of 1978" provides a more detailed discussion of many of these issues and should be treated as an essential adjunct to this Report by the Governments and other interested parties.

The Commission notes that the 1972 and 1978 Agreements have been milestones in international cooperation and environmental understanding. Considerable progress has been made by both countries.

As noted in this and previous reports, though, much still remains to be done. There are signs, for example, that the foundations of the present Water Quality Agreement may warrant some reassessment in order to ensure the long term commitment that must reach to the roots of the Great Lakes Basin community and the supporting institutions of government. The resultant


concerns have implications not only for the current Great Lakes Water Quality Agreement, but also for future international agreements. These matters, together with Commission concerns regarding timetable delays, research constraints, travel funding and other Agreement problems, are reviewed in this report.

Future progress under this and future agreements will be enhanced by supportive attitudes and perceptions on the part of persons living within and beyond the boundaries of the Great Lakes Basin. Furthermore, Federal, State and Provincial legislators must be kept aware of the problems addressed in the Agreement. For its part, the Commission intends to undertake a thorough review of its information policy and procedures, and to seek ways to better discern the views and perceptions of the broader Great Lakes Basin community in order to encourage and facilitate this involvement.

The primary responsibility for the success of the Great Lakes Water Quality Agreement of 1978 rests with the Governments of the United States and Canada. The cover of this report is designed around a challenging and historic statement of purpose from Article II of that Agreement. That statement is as valid and appropriate today as it was when the Governments of the United States and Canada signed the Agreement. The Commission hopes that the views expressed in this report will help encourage continued commitment to both the letter and the spirit of that Agreement, by both the governments and the people of our two nations.



Robert C. McEwen
Chairman



E. Richmond Olson, Q.C.
Chairman

First Biennial Report under the Great Lakes Water Quality Agreement of 1978

The Great Lakes System is a priceless North American resource. As the world's single largest surface freshwater system, it makes up about one-fifth of the total world supply. The principal caretakers of this resource are the 60 million citizens who live in the eight states and one province that border the Great Lakes. Some 37 million of these people live in the Great Lakes Basin and approximately 20 million of them get their drinking water from the waters of the Great Lakes. In addition, the Lakes provide an indispensable source of water to supply the heartland of North America. The Lakes provide a unique diversity of recreational opportunities and they support commercial and recreational fisheries with a combined annual economic value over a billion dollars. The values of these uses are all directly influenced by the quality of the waters of the Great Lakes.

The Great Lakes Water Quality Agreement of 1978 is an historic joint commitment by the Governments of Canada and the United States to protect and enhance the quality of the waters of the Great Lakes. That commitment, as summarized in Article II of the Agreement, is "to restore and maintain the chemical, physical and biological integrity of the Great Lakes Basin Ecosystem." Because this commitment remains as valid and as desirable today as on the day the Agreement was signed, the Commission has used it as a central theme in this First Biennial Report to Governments under the 1978 Great Lakes Water Quality Agreement. The Commission hopes that it might thus help encourage a continuing commitment to the letter and the spirit of the 1978 Agreement.

The 1978 Agreement is a specific, important example of one of the ways the Governments of Canada and the United States make use of the Boundary Waters Treaty of 1909. As restated on the back cover of this Report, the overall purpose of that Treaty is to "prevent disputes" and "settle questions." The responsibilities of the Commission under the 1978 Agreement were presented as a reference pursuant to Article IX of the 1909 Treaty and as such reflect an initiative to "prevent disputes" and "settle questions" regarding the chemical, physical and biological integrity of the Great Lakes Basin Ecosystem. The key water quality statement from Article IV of the Boundary Waters Treaty is:

"It is further agreed that the boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health and property of the other."

The 1978 Great Lakes Water Quality Agreement is an important joint commitment by the two countries to this key Article of the Treaty.

During recent decades, our awareness of water pollution problems has increased and there has been a growing recognition of the impact of human activities on the world we live in. The media attention given to resource shortages, pollution problems and the effects of environmental degradation on human health have all helped lead to a more general awareness of the interdependence of man and the environment. We have seen the beginnings of a developing ecosystem perspective and a sense of stewardship towards the environment reflected in individual and collective attitudes and actions. High profile publications and events have helped foster shifts in environmental attitudes, and have helped increase the general awareness of global trends and the level of concern for the future.

New and increasing demands on global resources will inevitably raise difficult questions as to how these resources are to be shared. The sharing of common air and water resources poses unique problems. Difficult allocative conflicts involving the use of shared air and water resources can best be resolved when there is a high degree of common understanding. Such a common understanding also helps build the mutual respect, mutual trust and a willingness to compromise that are also essential to meaningful consultation on such highly complex issues. A sense of shared responsibility and shared interest also increases the likelihood that differences will be resolved in an amicable manner.

In this century, the United States and Canada have generally shown an enlightened attitude toward the use and management of boundary and transboundary waters. Decision making mechanisms have been strengthened by an awareness of the shared responsibility to one another. The basis for resolving differences has often been the shared information and common understanding developed through consultative processes operating under the umbrella of the International Joint Commission. The Great Lakes Water Quality Agreement of 1978 is one important milestone in this continuing consultative process.

The State of the Ecosystem

In one sense, the success of the Great Lakes Water Quality Agreement of 1978 hinges on the degree to which the Purpose of the Agreement is achieved. This is not a simple assessment and inevitably there will be some question as to the Parties' success in "restoring and maintaining the chemical, physical and biological integrity of the Great Lakes Basin Ecosystem". Even an ideal "joint

surveillance and monitoring program", as called for in Annex II of the Agreement, would probably not eliminate many of the uncertainties regarding the state of the Great Lakes Basin Ecosystem. The current level of surveillance is sufficient to provide only a partial picture of the spatial and temporal trends for some of the priority water quality parameters.

Phosphorus control efforts on the Lower Great Lakes (Lakes Erie and Ontario) appear to have at least arrested the discouraging trends that were apparent in the late 1960's and early 1970's. While the phosphorus control goals of the 1978 Agreement have not all been achieved, the Parties and jurisdictions have made progress in this area. Most large municipal facilities in the Lower Lakes basins have now achieved the phosphorus effluent limitation of 1.0 mg/L called for in the 1972 Agreement. Furthermore, the phosphorus concentrations in Lakes Erie and Ontario are improved over what they were in the late 1960's and early 1970's. The current estimated phosphorus loads for all the Great Lakes, however, still exceed the proposed target loads in the 1978 Agreement.

Toxic and hazardous substances are another matter. The Great Lakes Basin Ecosystem suffers from widespread contamination and the Lakes are a major sink for such substances. The surrounding population is exposed to toxic and hazardous substances through a variety of pathways. The Commission recognizes that the impact of these contaminants on human and environmental health is not well understood and considers this lack of understanding to be a matter of great concern. The Commission is in full agreement with the Great Lakes Water Quality Board's recommendation that:

"Ecosystem studies of the transport, fate and effects of ambient levels of toxic substances in the Great Lakes be encouraged."

This recommendation is also consistent with the Great Lakes Science Advisory Board's Recommendation IV concerning the hazardous substance implications of energy alternatives (see Energy Considerations section of this Report). Despite current budgetary constraints, the Commission believes that the level of research, monitoring and surveillance directed towards the assessment of the overall problem of toxic and hazardous substances must be maintained. To do otherwise, in the Commission's view, would be both shortsighted and potentially dangerous.

Some chemicals, such as DDT and mercury compounds, have responded to control programs. Most indications are that PCB levels are also improving although the response to control measures is not, as yet, very dramatic. Dieldrin levels, on the other hand, have remained essentially unchanged or have increased in Great Lakes

organisms. Lake Ontario, especially, continues to have serious problems with toxic and hazardous substances. The Water Quality Board has reported that inputs of mirex, endosulfan and dioxin into the Niagara River have resulted in lake-wide problems.

Current monitoring activities, however, cover only a small percentage of the organic chemicals known to be present in the Great Lakes Basin Ecosystem. Since the use of a number of chemicals has been either banned or sharply curtailed in the Great Lakes Basin, the presence or absence of these specific chemicals may not represent an accurate picture of the "state" of contamination of the Great Lakes Basin Ecosystem by toxic and hazardous substances. A comprehensive picture of the transport, fate and effects of ambient levels or organic pollutants in the Great Lakes System does not exist. Furthermore, it is virtually impossible to adequately assess the synergistic and antagonistic effects of ambient levels of combinations of chemicals known to occur in the Great Lakes System.

In its 1981 Report to the Commission, the Water Quality Board uses the new designation "Areas of Concern" to identify those areas that are of particular concern in the Great Lakes Basin. The Commission fully supports the Board's recommendation that "the Governments place top priority on the cleanup of each area of concern". The Commission expresses its own special concern with pollution problems which seem to have persisted through the years. On the basis of the continued identification of these problems through the years, it appears that whatever remedial measures have been implemented by the Parties have not yet been sufficient to remedy the specific problems. Such repeatedly identified problems are highlighted in the table at the end of this Report. The table also shows the "Areas of Concern" identified in the 1981 Annual Report of the Water Quality Board.

It is of special concern to the Commission that the majority of the "Areas of Concern" listed have been identified in virtually every report of the Water Quality Board since its 1974 Annual Report. The Commission urges the Parties to devote special attention and efforts to the cleanup or restoration of these polluted areas in the Great Lakes System.

Surveillance and monitoring programs for the Great Lakes are carried out by the Parties and the state and provincial governments. According to Annex 11, the Great Lakes International Surveillance Plan (GLISP) was to serve as a model for the joint surveillance and monitoring program under the Agreement. A revised GLISP was provided by the Great Lakes Water Quality Board in 1980. The

Governments have not yet commented on the relationship of GLISP to their current programs or the requirements of Annex 11, but present information suggests that the level of surveillance and monitoring may be substantially less than that outlined in GLISP. It is unlikely that even a fully implemented GLISP would adequately meet the requirements of Annex 11 or the monitoring requirements outlined in Paragraph 4 of Annex 12, since toxic and hazardous substances pose special monitoring problems.

The Commission shares the Science Advisory Board's concern that GLISP was overly reliant on water analysis and that it did not give sufficient consideration to biological indicators. The Science Advisory Board also expressed concern that the plan placed an excessive reliance on data acquisition, and did not give sufficient consideration to data analysis, interpretation and evaluation. The Commission agrees with this assessment.

Direction

A primary focus of the 1978 Agreement is on the assessment and management of toxic and hazardous substances in the Great Lakes System. The Parties endorsed an ecosystem perspective as a framework for addressing international water quality problems in that Agreement. The Commission is mindful of, and agrees with, the statement of the Governments made in their Six-Month Review of the Regional Office that ways must be found to maintain public support of the Water Quality Agreement and to keep the problems addressed in the Agreement in front of federal, state and provincial legislators. Unless the attitudes, perceptions and values of government officials and all the citizens of the Great Lakes Basin are reasonably consistent with an ecosystem approach, implementation of the General and Specific Objectives of the Agreement will be difficult if not impossible to achieve.

The Commission believes that new initiatives on the part of the Parties are required to give a continuing sense of purpose, direction and commitment to Agreement activities. A clear sense of unity and direction on issues central to the Agreement is required. The sense of drift is nowhere more apparent than with the issue of toxic and hazardous substances. The Great Lakes Water Quality Board, the Commission's principal advisor, reported in its 1981 report to the Commission that:

"The underlying problem identified as a result of this evaluation is the absence of an overall Great Lakes Ecosystem strategy for toxic substances control activities that are being carried out under the various pieces of legislation among the jurisdictions. Programs have

*The Commission Recommends,
therefore, that:*

*1. the Parties, Jurisdictions and others
foster and encourage policies,
programs and institutions that:*

*(a) help develop and maintain a
long term ecosystem perspective
with respect to the pursuit of its
other legitimate goals and to be
more anticipatory in its actions;*

*(b) encourage research, monitoring
and analysis of man's impact on
ecosystems in order to facilitate
personal and institutional actions
that are consistent with ecosystem
realities;*

*(c) help make scientific and
technical information about man's
place in nature more accessible,
understandable and relevant to the
individual citizen;*

*(d) encourage citizen involvement
in identifying and shaping long
term ecosystem goals in order to
build greater community consensus
and commitment; and*

*(e) encourage non-adversarial
measures for preventing and
resolving conflicts arising over the
use of shared air and water
resources.*

been compartmentalized under each legislative mandate, and the resources have been allocated accordingly. The result is that the overall management of toxic substances control programs is not facilitated. Furthermore, there has been insufficient coordination of activities within programs. This fragmentation has resulted in duplicate activities in some cases, incomplete program coverage in others, and a limited management capacity to effectively address emerging complex problems."

The problem of toxic and hazardous substances in the Great Lakes Basin Ecosystem is extremely complex, and it may be the sort of problem that cannot be kept under reasonable control without bold and innovative approaches. An "Achilles Heel" of current control strategies seems to be that they are based on single chemical considerations. Science simply does not have realistic means of addressing the *in situ* cumulative effects of the mixes of polluting substances that occur in aquatic ecosystems, and may never be able to adequately predict the additive, synergistic and antagonistic effects of more than a very small proportion of the combinations of toxic substances that now occur in the Great Lakes Basin Ecosystem.

The solutions to the water quality problems of the Great Lakes Basin Ecosystem are not always clear. In the Commission's view, however, it is important to help create a climate where thoughtful, concerned individuals and groups will be encouraged to help find innovative, constructive solutions. To the extent that this must be based on a fund of credible knowledge, support for research and monitoring remains vital as does the dissemination and interpretation of that knowledge.

The Commission believes that there is a need for the Governments to take specific measures to help create an atmosphere conducive to developing a Great Lakes community that is innovative, sustainable and confident. The measures suggested in the following recommendation are directed primarily to the Governments of the United States and Canada because the Commission believes that, under the Agreement, the two Federal Governments have a special leadership responsibility in these areas. Implicit in the recommendation is the realization that the environmental problems in the Great Lakes Basin Ecosystem have been decades in the making and that the development of appropriate ways and means of maintaining the man-environment stresses at acceptable levels will be a long term, continuing process. The recommendations also reflect the conclusion that further progress under the Great Lakes Water Quality Agreement will be enhanced by supportive public attitudes and values.

THE COMMISSION RECOMMENDS, THEREFORE, THAT:

1. the Parties, Jurisdictions and others foster and encourage policies, programs and institutions that:
 - (a) help develop and maintain a long term ecosystem perspective with respect to the pursuit of its other legitimate goals and to be more anticipatory in its actions;
 - (b) encourage research, monitoring and analysis of man's impact on ecosystems in order to facilitate personal and institutional actions that are consistent with ecosystem realities;
 - (c) help make scientific and technical information about man's place in nature more accessible, understandable and relevant to the individual citizen;
 - (d) encourage citizen involvement in identifying and shaping long term ecosystem goals in order to build greater community consensus and commitment; and
 - (e) encourage non-adversarial measures for preventing and resolving conflicts arising over the use of shared air and water resources.

Resources

There has been significant concern expressed to the Commission regarding proposed U.S. budget cuts and the implications of these budget cuts on the United States' ability to meet its Agreement obligations. Although expressed concerns have generally focussed on research cuts, implications of U.S. budgetary restrictions on such Agreement activities as pollution regulation, waste treatment, monitoring and surveillance should also be considered. The Commission believes that any agency or departmental budget cuts which affect activities under the 1978 Great Lakes Water Quality Agreement should be carefully reviewed by the United States government to assess the potential impact of these cuts on the ability of the United States to meet its Agreement obligations.

Monitoring and research functions are essential components of the Agreement for they provide a means of assessing progress and a framework for understanding the problems of the Great Lakes Basin Ecosystem. Without such a framework, there is no rational basis for assessing whether or not there has been progress toward maintaining and restoring the physical, chemical and biological integrity of the

Great Lakes Basin Ecosystem. The Commission is especially concerned that a reduction in relevant and necessary research, monitoring and/or surveillance activities could erode the pool of scientific and technical expertise and understanding that has been available to help develop and implement the existing Great Lakes Water Quality Agreement. The Parties clearly recognized the important role of research and monitoring when negotiating the Agreement. In the case of persistent toxic substances (Annex 12), the need for intensified research efforts is explicitly mentioned. This commitment reads in part: "Research should be intensified to determine the pathways, fate and effects of toxic substances aimed at the protection of human health, fishery resources and wildlife of the Great Lakes Basin Ecosystem."

A major proportion of the research, monitoring and surveillance activities conducted under the Agreement is now carried out by agencies whose prime responsibility is to provide a regulatory function. This is not surprising since these activities provide much of the information and understanding that enables the regulatory agencies to: (1) assess the problem, (2) develop control strategies and practices, and (3) assess the effectiveness of these control measures. However, these uses, while important, are not the only purpose of research and monitoring activities. Perhaps the single most important value of information and knowledge produced by these activities is that they form the basis for a common understanding of the extent, nature and significance of problems in the Great Lakes Basin Ecosystem. Without such a common understanding, there would be little likelihood of reaching mutual agreements on approaches to protect shared air and water resources.

Much of the work contemplated in the Agreement, and the issues which must be addressed, place the Commission and its advisors at the cutting edge of some of the most complex, difficult and sometimes highly emotional environmental issues of the 1980's—contamination of the Great Lakes Basin Ecosystem by toxic and hazardous substances being the best example. If the Commission is to meet its Agreement responsibility to advise Governments effectively and, in the Commission's opinion, if Governments are to implement the Agreement effectively and efficiently, there must be a level of resource commitment that would make it possible for the Commission to determine whether existing or proposed initiatives will be sufficient for the Parties to meet their obligations under the Agreement.

For these reasons, The Commission Recommends that:

2. *The Parties each determine and inform the Commission of the potential impacts of their respective enacted and proposed reductions in Great Lakes federal programs on the ability of the Parties to meet their respective obligations under the 1978 Great Lakes Water Quality Agreement, and take any necessary steps to ensure that the Great Lakes Programs, especially the research, monitoring and surveillance activities, are maintained at a level consistent with both the letter and spirit of the Agreement.*

For these reasons, THE COMMISSION RECOMMENDS THAT:

2. The Parties each determine and inform the Commission of the potential impacts of their respective enacted and proposed reductions in Great Lakes federal programs on the ability of the Parties to meet their respective obligations under the 1978 Great Lakes Water Quality Agreement, and take any necessary steps to ensure that the Great Lakes Programs especially the research, monitoring and surveillance activities are maintained at a level consistent with both the letter and spirit of the Agreement.

The Commission requests a response from each of the Parties to this query by November 1, 1982, to enable the Commission to review this information prior to its next scheduled Annual Great Lakes Water Quality Meeting. The Commission hopes that any inadequacies so identified will be immediately remedied by the Parties.

It should also be noted that the Commission, in response to general concern over the adequacy of current research activities regarding the Great Lakes Basin Ecosystem, has requested its Science Advisory Board to review the adequacy of research activities relevant to the 1978 Agreement. The Board has been requested to assess the past and current Great Lakes research efforts and to identify any gaps in the overall Great Lakes research picture that should be of concern to the Commission and to the Parties in carrying out their responsibilities and obligations under the Agreement. The Board was also requested to provide a perspective as to Great Lakes research trends that have taken place since the signing of the 1972 Agreement. Such information will assist the Commission in assessing the potential impacts of changes in Great Lakes research budgets or other resources.

In the general context of United States support for the Water Quality Agreement, the Commission welcomed the important and encouraging statement by the President of the United States in support of the important work done under the Agreement when, in the text of his address before a joint session of the Canadian Parliament on March 11, 1981, said:

"....We have continued our efforts, begun with the Great Lakes Water Quality Agreement of 1972, to protect our joint heritage in the Great Lakes. We want to continue to work cooperatively to understand and control the air and water pollution that respects no borders."

The Commission is hopeful that Executive Branch agencies in the United States will embrace the President's commitment and insure,

*As a result of these observations,
The Commission Recommends that:*

3. *The Parties, consistent with their responsibilities under Article XI, Section 2, paragraph (a), take necessary steps to develop timely and equitable administrative procedures to ensure that necessary financial resources are available for the expenses of expert advisors who serve the Commission and its Agreement Boards, Committees and Task Forces.*

through the adequate provision of resources for Water Quality Agreement work, a continued commitment to the fulfillment of the Purpose and the General and Specific Objectives set forth in the 1978 Great Lakes Water Quality Agreement.

Another immediate Commission concern relates to the restrictions or curtailment by some jurisdictions of travel expenses for the expert advisors that serve on Commission Boards, Committees and Task Forces. These work units are a primary mechanism for coordinating Agreement-related activities as well as advising the Commission so that it can fulfill its functions under the Agreement. Unless this situation is rectified, it can seriously undermine efforts to develop cooperative, mutually beneficial strategies for dealing with water quality problems in the Great Lakes Basin Ecosystem.

Regarding travel difficulties for Agreement work in the United States, the Commission notes that its United States Chairman in his Congressional budget testimony of March 18, 1982 requested the the Commission receive an additional appropriation of travel funds to ensure an adequate level of participation by Federal and State officials in Water Quality Agreement activities. In addition to re-stating the U.S. Federal commitment in regard to Article XII of the Agreement, the United States Chairman stated that:

"....The United States should be carrying its share of the responsibility under this Agreement, and the fair share, in this case, the necessary expenditure to underwrite necessary U.S. travel costs we are asking be considered by the Committee...."

As a result of these observations, THE COMMISSION
RECOMMENDS THAT:

3. The Parties, consistent with their responsibilities under Article XI, Section 2, paragraph (a), take necessary steps to develop timely and equitable administrative procedures to ensure that necessary financial resources are available for the expenses of expert advisors who serve the Commission and its Agreement Boards, Committees and Task Forces.

These two recommendations complement the Water Quality Board's final recommendation in its 1981 Report to the Commission, which the Commission also fully supports:

"The Board, therefore, recommends that the Parties:

Maintain their resources commitments in support of the specific programs and measures stipulated in the 1978 Great Lakes Water Quality Agreement."

The Commission notes that some States have concluded that since they are not signatories to the Agreement, they are not

mandated to commit the travel resources necessary for the participation of their policy and technical level officials in work related to the Agreement. In this regard, the Commission has observed that an agreement between the Canadian Federal Government and the Province of Ontario, providing the resources necessary to fund, coordinate and assist in the implementation of the Great Lakes Water Quality Agreement, has made it possible for Canada to participate fully in Agreement-related activities.

Noting the success of the Canadian arrangement, the Commission is encouraged by the June, 1982 resolution agreed-to by the eight Great Lakes Basin States at the Great Lakes Water Resources Conference held at Mackinac Island. It was resolved:

"that there be transmitted to the President and the United States Congress a request for the establishment of a formal agreement between the United States Government and the Great Lakes States to meet the objectives of the Great Lakes Water Quality Agreement, and that adequate funding be directed to maintain research, monitoring and programs essential to the implementation of the terms of the Agreement."

In the opinion of the Commission, such a formal arrangement between the United States Federal Government and the eight Great Lakes Basin States would result in a more appropriate level of U.S. participation in Agreement-related matters and, accordingly, the Commission strongly endorses this resolution.

Toxic and Hazardous Substances

The primary focus of the Water Quality Board's 1981 Report is on toxic and hazardous substances and the programs to control these substances in the Great Lakes Basin. As indicated earlier, the Board found a general lack of an overall strategy for toxic substances control activities. Most of the Board's recommendations are aimed at helping to rectify this situation by developing and improving programs for dealing with toxic and hazardous substances. The Commission considers the Board's recommendations on toxic and hazardous substances to be useful and concludes that they would help improve the level of coordination on matters dealing with the evaluation and control of such substances in the Great Lakes Basin Ecosystem.

Therefore, THE COMMISSION RECOMMENDS THAT:

4. The Parties and Jurisdictions adopt the recommendations regarding the control of toxic and hazardous substances included in the Great Lakes Water Quality Board's 1981

*Therefore, The Commission
Recommends that:*

4. *The Parties and Jurisdictions adopt the recommendations regarding the control of toxic and hazardous substances included in the Great Lakes Water Quality Board's 1981 Annual Report as a general statement of intention and develop specific measures for the rapid implementation of these recommendations.*

Annual Report as a general statement of intention and develop specific measures for the rapid implementation of these recommendations.

The Commission does believe that implementation of the Board's recommendations regarding toxic and hazardous substances would be a significant step toward the effective control of such substances.

The Commission is particularly concerned that the absence of a single priority list of toxic substances, as called for in the Board's first recommendation, could delay action on other important recommendations in the package. For this reason, the Commission believes that there are advantages to adopting an existing list on an interim basis rather than risk delaying the implementation of the remaining recommendations while the Parties attempt to prepare a mutually acceptable priority list.

The Commission believes that an appropriate initial list for the Parties is the list of chemicals prepared by the joint Human Health Effects Committee. The chemicals listed in Tables 1, 2 and 4 of the Committee's Report are candidates for an initial priority listing and those listed in Table 5 are potential candidates that might be included. These listings are based on the approximately 400 chemicals which have already been identified in various components of the Great Lakes Basin Ecosystem, and have already been prioritized to some degree by the Committee. Furthermore, many of the chemicals on this list are also incorporated in the "Priority Pollutants List" or the "List of 129 Priority Pollutants" resulting from a consent decree between the Natural Resources Defense Council and the U.S. Environmental Protection Agency.

Although the Human Health Effects Committee list goes a long way towards reducing the number of chemicals to a manageable list, it is still unrealistic to believe that all the chemicals in such a list could be monitored throughout the Great Lakes System. Some measure of priority within the list must also be established. The Commission feels that the sources of such chemicals can be useful in setting priorities within the list. Information on the manufacture, transportation and use of these substances in the Basin could also become a key consideration for modifying and/or updating the joint surveillance and monitoring program for the Great Lakes Basin Ecosystem, called for in Annex 11 of the 1978 Agreement.

In summary, the Commission suggests an interim approach which incorporates many of the elements in the Water Quality Board's recommendations:

Accordingly, The Commission Recommends that:

5. The Parties incorporate the above considerations in the development of an overall strategy for addressing the control of toxic and hazardous substances in the Great Lakes Basin Ecosystem, and, as an interim measure, adopt the lists in Tables 1, 2 and 4 of the 1981 annual report of the Human Health Effects Committee as an initial priority list of chemicals of concern.

- (1) agreement on a master list of chemicals of concern (which can be updated over time) for the Great Lakes Basin Ecosystem;
- (2) use of existing data and information on the manufacture, use, transport, discharge and/or disposal of these chemicals in the Basin to:
 - (a) establish a control priority;
 - (b) to identify where the prioritized chemicals of concern are likely to be found in the Basin; and
 - (c) to augment the Great Lakes Basin Ecosystem joint monitoring and surveillance program as necessary to ensure adequate surveillance and monitoring efforts for these chemicals in the locations where they are likely to occur.

This approach is described in more detail in the Addendum to this Report.

Accordingly, THE COMMISSION RECOMMENDS THAT:

5. The Parties incorporate the above considerations in the development of an overall strategy for addressing the control of toxic and hazardous substances in the Great Lakes Basin Ecosystem, and, as an interim measure, adopt the lists in Tables 1, 2 and 4 of the 1981 annual report of the Human Health Effects Committee as an initial priority list of chemicals of concern.

The Parties should also examine the chemicals listed in Table 5 of the Committee's report for possible inclusion in their initial list of priority chemicals. The Science Advisory Board has developed or is developing Specific Objectives for additional chemicals of concern. These chemicals should also be considered for inclusion in the priority list of chemicals of concern.

The Commission considers the above measures as part of an interim action strategy for addressing the problems of toxic and hazardous substances in the Great Lakes Basin Ecosystem. As discussed in more detail in the Addendum to this Report this suggested approach emphasizes control at the source and is based primarily on the water quality impacts of individual chemicals.

The effective and long term control of toxic and hazardous substances, however, will likely require a considerably greater effort on the parts of the Governments. Greater use of other types of indicators will likely be required in such a long term strategy, e.g. biota and sediments, as pointed out by the Science Advisory Board. A comprehensive long term strategy would also focus on the effects

Accordingly, The Commission Recommends that:

6. *The Parties clarify the intended purpose of the lists of hazardous polluting substances in Annex 10 of the 1978 Agreement and proceed with the revision of these lists, as necessary, and with the development and implementation of the control programs called for in Annex 10.*

of pollutant inputs on the quality of the Great Lakes Basin Ecosystem. Sensitive measures of the "health" of the ecosystem would then provide a basis for assessing whether or not existing source controls were adequate to restore and maintain the chemical, physical and biological integrity of the Great Lakes Basin Ecosystem. Until the knowledge necessary to undertaking such an approach is acquired, however, the Commission feels that the strategy outlined above represents a practical interim approach for attempting to control pollution of the Great Lakes Basin Ecosystem by toxic and hazardous substances. It can also be readily modified or refined as new knowledge becomes available to the Parties.

As an additional observation on the control of toxic and hazardous substances, the Commission notes that Annex 10 of the Agreement requires the Parties to maintain and revise as necessary a list of hazardous polluting substances. Accordingly, Annex 10 contains two lists of chemicals, one list containing chemicals of known toxic effects on biota and the second list containing chemicals of potential toxic effects. The Commission, however, has noted no activity by the Parties to review and/or revise these lists, nor have the Parties developed programs and measures to minimize or eliminate the risk of their release to the Great Lakes Basin Ecosystem. Both of these latter activities are specified in Annex 10 of the Agreement. The rationale for including some of these chemicals in these lists is unclear to the Commission and its Boards.

Accordingly, THE COMMISSION RECOMMENDS THAT:

6. The Parties clarify the intended purpose of the lists of hazardous polluting substances in Annex 10 of the 1978 Agreement and proceed with the revision of these lists, as necessary, and with the development and implementation of the control programs called for in Annex 10.

Eutrophication

Eutrophication of the Great Lakes is another major concern in the Agreement. Phosphorus control is considered to be the most practical method of controlling eutrophication of Great Lakes waters. The Commission's January, 1981 Report on phosphorus management strategies includes a number of recommendations to the Parties as part of an overall strategy for the control of eutrophication. The Commission continues to support the approach described therein. The Commission acknowledges the considerable efforts already expended in this endeavour, noting that

Accordingly, The Commission Again Recommends that:

7. The Parties, in cooperation with the state and provincial governments, confirm the "future phosphorus loads" contained in Annex 3 of the Great Lakes Water Quality Agreement, as the maximum annual loads to allow achievement of the specific phosphorus goals in the Agreement and to achieve and maintain acceptable ecological conditions, and establish load allocations and compliance schedules based on those loads.

approximately six billion dollars have been spent or obligated in the United States and Canada for municipal sewage construction in the Great Lakes Basin. Although many plants have achieved the 1972 Agreement phosphorus requirement of 1 mg/L in effluents from municipal wastewater treatment plants, some large plants, particularly in the Lake Erie and Lake Ontario basins, have not yet achieved this objective. These plants are identified in Table 2 of the Water Quality Board's 1981 annual report to the Commission.

Accordingly, the Commission concurs with an important Board recommendation regarding phosphorus control which has been made repeatedly since before the signing of the 1978 Agreement:

"The Board therefore urges the Commission to: Re-emphasize to Governments the importance of achieving the 1.0 mg/L phosphorus effluent limitation at municipal sewage treatment plants discharging more than 1 million gallons per day."

The more comprehensive phosphorus control goals of the 1978 Agreement do not take effect until the United States and Canadian Governments "confirm" the phosphorus "target loads" contained in Annex 3 of the 1978 Agreement. These target loads represent a scientifically derived basis for phosphorus control efforts and would likely open the way to consider other point and nonpoint source phosphorus control measures.

Accordingly, THE COMMISSION AGAIN RECOMMENDS THAT:

7. The Parties, in cooperation with the state and provincial governments, confirm the "future phosphorus loads" contained in Annex 3 of the Great Lakes Water Quality Agreement, as the maximum annual loads to allow achievement of the specific phosphorus goals in the Agreement and to achieve and maintain acceptable ecological conditions, and establish load allocations and compliance schedules based on those loads.

Annex 3 of the 1978 Agreement contains a listing of programs to be developed and implemented to reduce the input of phosphorus to the Great Lakes where necessary to meet loading allocations to be developed pursuant to achieving the target loads or to meet local conditions, whichever are more stringent. If the Parties do confirm the target loads, as the Commission recommends above, a mix of point and nonpoint source phosphorus control programs in the Basin has been envisioned and is likely to be most cost-effective overall. Specific programs include more stringent point source programs in some cases and the implementation of

nonpoint source programs in other cases.

The Commission notes that, to date, primary attention in controlling phosphorus has been given to point source control and the limitation of phosphates in laundry detergents throughout most of the Great Lakes Basin. This focus began with the 1972 Agreement and, at least at that time, was the logical emphasis for initial pollution control efforts in the Basin. The Commission continues to support such efforts, and has yet to be convinced that they are not desirable components of an overall phosphorus management strategy. Thus, the Commission must view with concern instances of actual relaxation in such measures as have recently taken place, or any proposed relaxations by individual jurisdictions.

The Commission wishes to emphasize again, however, the importance of broadening the focus to other phosphorus inputs to the Great Lakes System. The findings of the multi-year study of the Commission's Pollution from Land Use Activities Reference Group (PLUARG) strongly support the implementation of pollution control programs directed toward nonpoint sources. This study, supported by the subsequent Commission report, concluded that land drainage and atmospheric sources can contribute significant quantities of a wide range of pollutants to the Great Lakes System, especially from urban and agricultural areas in the Basin.

The Commission has concluded that these nonpoint sources of pollution have not yet received adequate attention from the Governments. This is due in part to the continued focus on point source pollution. There is a variety of agricultural and urban nonpoint source control measures which should be given serious consideration by the Parties. This approach does not mean that point source measures should be given less emphasis, but rather that there should be a parallel development and implementation of nonpoint source control measures, as part of the comprehensive management strategy recommended by the Commission.

The PLUARG study showed that many nonpoint source control measures are relatively simple and inexpensive to implement, relative to more stringent point source controls, and can effectively reduce the input of phosphorus to the Great Lakes System. The Commission continues to agree that such measures will aid in achievement of the Great Lakes phosphorus control goals.

For particular attention, THE COMMISSION RECOMMENDS:

8. (a) the effective achievement of 1 mg/L phosphorus effluent at municipal sewage treatment plants discharging in excess of one million gallons per day, as well as at

For particular attention, The Commission Recommends:

8. (a) the effective achievement of 1 mg/L phosphorus effluent at municipal sewage treatment plants discharging in excess of one million gallons per day, as well as at smaller plants where local water quality conditions dictate;
- (b) the development and implementation of programs for the abatement and control of phosphorus inputs from nonpoint sources in the Basin, especially agricultural and urban areas;
- (c) the limitation of phosphorus in household laundry detergents be retained where it is currently in effect in the Basin, and be implemented in those portions of the Basin where it is not currently in effect; and
- (d) a more precise quantification of atmospheric inputs of phosphorus to the Great Lakes System, identification of their sources, and the development and implementation of programs for the effective control of such inputs.

smaller plants where local water quality conditions dictate;

- (b) the development and implementation of programs for the abatement and control of phosphorus inputs from nonpoint sources in the Basin, especially agricultural and urban areas;
- (c) the limitation of phosphorus in household laundry detergents be retained where it is currently in effect in the Basin, and be implemented in those portions of the Basin where it is not currently in effect; and
- (d) a more precise quantification of atmospheric inputs of phosphorus to the Great Lakes System, identification of their sources, and the development and implementation of programs for the effective control of such inputs.

The Science Advisory Board has also emphasized two other concerns in relation to the control of phosphorus:

- “1. Prior to any serious consideration of the extensive use of the carboxymethyltartronate (CMT) as an alternate builder in laundry detergents, the Board recommends that research be undertaken to fully evaluate its toxicological and ecological properties in order to determine its acceptability.
2. It is recommended that the Governments ensure that a sufficiently high level of research is supported to develop accurate methods for determining the relative bioavailability of various forms of phosphorus, and an understanding of the relationship between phosphorus and biological productivity, and the movement of phosphorus through the various parts of large lake ecosystems.”

While the Commission has previously expressed its concern in regard to these two topics, in its January 1981 Interim Report to Governments, it reiterates here its concurrence with these Science Advisory Board recommendations. Although the evaluation of CMT properties would likely be conducted by product formulators in any event, the possibility of its widespread usage and adverse ecological impacts requires this emphasis.

The term “biologically available” has been used in the Great Lakes Basin to describe those forms of phosphorus which can be used readily by aquatic plants and thereby aggravate the eutrophication problem. It is assumed that the other forms of phosphorus will not stimulate plant growth and, therefore, need not

be of immediate concern in developing or implementing phosphorus control programs. There have been efforts to approximate the effects of these two "categories" of phosphorus in the various models used to derive the proposed target loads in Annex 3 of the Agreement. Nevertheless, the Science Advisory Board's conclusion, that there are no current chemical or biological techniques which can provide a "meaningful assessment" as to what portion of the total phosphorus load is biologically available on a whole-lake and long term basis, is appropriate.

The Commission considers that bioavailability is a research area with implications not only for phosphorus but also for other pollutants as well. Many chemicals do not become a problem in freshwater ecosystems unless they are in a biologically available form. There is currently a limited understanding of the processes controlling bioavailability in waterbodies. Additional research is clearly required.

Nonpoint Sources of Pollution

The results of the PLUARG study, and the subsequent Commission report to Governments on that Reference, strongly support the view that control of nonpoint sources is an essential element of the overall comprehensive management strategy that must be developed for the Great Lakes Basin Ecosystem. While there has been some discussion about nonpoint source pollution both within and between jurisdictions, there have been very few nonpoint source control programs implemented in the Great Lakes Basin, even for the control of phosphorus which has been of concern for more than a decade. The Commission concludes that the Parties must give greater priority to the input of pollutants to the Great Lakes Basin from nonpoint sources.

It is clear that a number of pollutants are entering the waters of the Great Lakes System from nonpoint sources. The most significant nonpoint source pollutants identified during the PLUARG study were phosphorus, sediments, a number of industrial organic compounds and pesticides, (e.g., DDT, aldrin-dieldrin, chlordane, PCBs, mirex and hexachlorobenzene) and a number of heavy metals (e.g., mercury and lead). PLUARG identified croplands as the major source of nonpoint inputs of phosphorus, especially those areas characterized by high density row crops and fine-grained soils, e.g., northeastern Ohio, southwestern Ontario and southern Wisconsin. Also of significant concern are those areas where insufficient attention is paid to soil conservation and drainage practices.

PLUARG also indicated that a large proportion of the nonpoint phosphorus input to Lakes Erie and Ontario was from large urban areas in these basins, and that organic compounds were entering the lakes from both urban and agricultural areas.

The Commission, in its earlier report to Governments on land use pollution, identified the disposal of hazardous or toxic liquid and solid wastes, generated by the intense industrial activity in the Great Lakes Basin, as a matter of urgent and immediate concern. PLUARG estimated that there were over 4,000 waste disposal sites in the Basin receiving a wide range of materials. Elevated levels of both organic and inorganic substances have been identified in the leachate from some of these sites. There is a real potential for such leachate to percolate down from waste disposal sites and contaminate groundwaters or to leak out of such sites and contaminate surface waters. The siting and proper operation of sites for the disposal of hazardous wastes have been identified by the Water Quality Board as a severe problem in the Great Lakes Basin. Unfortunately the monitoring of waste disposal sites has also been inadequate over the long-term.

This Commission's concern with nonpoint source pollution includes atmospheric inputs of toxic and hazardous substances to the Great Lakes System. This concern relates especially to the long range transport of organic and inorganic toxic substances, an issue somewhat different from that of acid rain which has recently been the focus of attention. Only recently has the relative impact of the atmospheric deposition of toxic and hazardous substances on water quality in the Great Lakes System become appreciated by the Commission and the Parties. The Commission recognizes that the atmosphere is not a "source" of pollutants, per se, but rather a transport mechanism for many pollutants generated both within and outside the Great Lakes Basin. These pollutants, emitted from both point sources, (e.g., smoke stacks) and nonpoint sources, (e.g. urban areas and sanitary landfills) are then deposited via precipitation or dry deposition onto lake surfaces or onto the land surface where they can subsequently drain to the lakes.

The importance of atmospheric deposition of new pollutants into the Great Lakes System has been pointed out in past reports of the Commission, the Great Lakes Science Advisory Board and Water Quality Board, the Upper Lakes Reference Group and PLUARG. Both the Science Advisory and Water Quality Boards have presented estimates of the atmospheric deposition of airborne pollutants in the Great Lakes Basin as well as recommendations concerning the

*The Commission Again
Recommends that:*

9. *The Parties develop and implement a comprehensive management strategy for the abatement of pollution including that from nonpoint sources; implement specific remedial programs and measures for nonpoint pollution including land use and atmospheric sources; and, in the short term, direct greater effort to identifying and quantifying nonpoint pollution sources in the Great Lakes Basin.*

control of such pollutants. The Commission strongly endorses their conclusions and recommendations. Although a more precise quantification of their inputs and the identification of their specific sources will aid in the development and implementation of effective control measures, the Commission feels that enough is known already about the atmospheric input of toxic and hazardous substances to the Great Lakes System to warrant considerable concern.

The Commission's concern with nonpoint source pollution is also reflected in the 1978 Agreement. As noted in Article VI(1), the Parties are to continue to develop and implement programs and other measures to fulfill the Purpose and the General and Specific Objectives of the Agreement. These programs and other measures shall include "... (e) Pollution from Agricultural, Forestry and Other Land Use Activities" and "... (1) Airborne Pollutants". Such concerns are consistent with the achievement of the ecosystem concept espoused in the Agreement. By their inclusion in the Agreement, these topics were clearly considered by the Parties to warrant their attention. The Commission feels it is time to give them this necessary and overdue attention.

THE COMMISSION AGAIN RECOMMENDS THAT:

9. The Parties develop and implement a comprehensive management strategy for the abatement of pollution including that from nonpoint sources; implement specific remedial programs and measures for nonpoint pollution including land use and atmospheric sources; and, in the short term direct greater effort to identifying and quantifying nonpoint pollution sources in the Great Lakes Basin.

New and Revised Water Quality Objectives

The Science Advisory Board has recommended new or revised water quality objectives for pentachlorophenol, polychlorinated dibenzodioxins, nutrients (phosphorus), lead, chlorine, cyanide, temperature and selenium in its 1981 Annual Report to the International Joint Commission. Having reviewed these objectives, the Commission believes that the temperature objective, while environmentally desirable, would be difficult to implement throughout the Basin. The Commission does, however, encourage regulatory agencies to take the temperature criteria into consideration regardless of whether or not the specific objective is adopted. With regard to the chlorine objective, the Commission

draws the attention of the Governments to the pertinent findings in the 1980 Report of the Commission's Chlorine Objectives Task Force.

With these two caveats, THE COMMISSION RECOMMENDS THAT:

- With these two caveats, The Commission Recommends that:*
10. *The Governments of Canada and the United States incorporate these proposed objectives included in the Great Lakes Science Advisory Board's 1981 Annual Report into Annex 1 of the 1978 Great Lakes Water Quality Agreement.*

10. The Governments of Canada and the United States incorporate these proposed objectives included in the Great Lakes Science Advisory Board's 1981 Annual Report into Annex 1 of the 1978 Great Lakes Water Quality Agreement.

While the Commission generally endorses the existing and proposed water quality objectives for the Great Lakes Basin Ecosystem, it is clear that these objectives are based primarily on the effects of the single chemical or element being considered. Such an approach, however, does not consider that there can also be cumulative effects resulting from chemicals interacting with one another in the environment. For example, the cumulative impacts on organisms of two or more chemicals simultaneously present in a waterbody could be greater (or less) than the individual impacts of each of the chemicals when considered separately. The waters of the Great Lakes System receive inputs of chemicals from a number of natural and man-made sources, and it is obvious that the impacts of individual chemicals in isolation have limited applicability to what is actually occurring in nature.

Accordingly, THE COMMISSION RECOMMENDS THAT:

11. The Parties reassess the Specific Objectives in Annex 1 of the 1978 Agreement in light of current knowledge on the potential cumulative effects of multiple pollutant inputs and consider their revision, where appropriate, to more realistically reflect their expected impact in the Great Lakes Basin Ecosystem.

Energy Considerations

The Science Advisory Board reported on its evaluation of the potential impact of alternate energy sources on the Great Lakes Basin Ecosystem. Assessment of the general environmental problems and consequences of energy use in the Basin was a bigger task than initially envisioned by the Board. Consequently, the Board's Report lacks recommendations addressing specific energy sources or "futures" in the Basin. Nevertheless, the Commission feels that problems associated with energy use in the Basin should be considered by the Parties.

Accordingly, The Commission
Recommends that:

11. *The Parties reassess the Specific Objectives in Annex I of the 1978 Agreement in light of current knowledge on the potential cumulative effects of multiple pollutant inputs and consider their revision, where appropriate, to more realistically reflect their expected impact in the Great Lakes Basin Ecosystem.*

Under the likely scenario that energy sources may become more scarce and be more expensive in the future, it is realistic to expect the Parties and the Basin population to accept "dirtier" energy sources with more potential for environmental or human health consequences as the more desirable sources become depleted and/or more expensive. Therefore, the subject of energy use and energy sources in the Basin needs more intensive consideration on the part of all involved jurisdictions in order that energy "futures" are not based simply on short term economic or political considerations.

The Board made three energy recommendations to the Commission of a general and anticipatory nature, as follows:

"II. The International Joint Commission should encourage the Parties to direct studies for identifying the energy alternatives best suited to achievement of overall environmental quality and to promote the development and use of alternatives so identified.

III. The International Joint Commission should encourage the Parties to coordinate the planning and use of energy alternatives in the Great Lakes Basin.

IV. The International Joint Commission is asked to encourage research into sources and pathways of hazardous substances and monitoring to evaluate which hazardous substances may produce significant adverse environmental or health effects in order to facilitate the identification of the impacts of existing and future energy alternatives."

These Recommendations are supportive of the Commission's conclusions and recommendations made elsewhere in this Report. They are especially consistent with the long term strategies contained in this Report's first recommendation. The Board's Recommendation IV is also consistent with the recommendations of the Water Quality Board and indicates a general recognition of the need for research and monitoring related to the sources, transport, fate and effects of toxic substances in the Great Lakes Basin Ecosystem. The Commission supports the implementation of these Science Advisory Board recommendations.

The Board also recommended that the Commission request integrated information from the Parties regarding their programs for effective energy use in the Basin. While the Commission agrees with the general desire to foster energy conservation implicit in this latter recommendation, it does not see a need for direct Commission involvement in such an information exchange program.

Deadlines and Timetables

One way of measuring progress under the Agreement is to assess the meeting of its reporting deadlines and timetables.

The failure of the Parties to meet such deadlines does not automatically mean a lack of concern or lack of progress, but it can be a signal that problems exist in regard to Agreement commitments.

A fundamental aspect of the Agreement, Article IV, calls for the Parties to adopt Specific Objectives for the Boundary Waters to protect beneficial uses from the effects of pollutants. Article IV also calls for the designation of limited use zones in the vicinity of present and future municipal, industrial and tributary point source discharges within which some of the specific objectives may not apply. Further, Annex 2 provides specific procedures for the designation of such limited use zones. The definition of Specific Objectives that was agreed to in the 1978 Agreement is as follows:

"Specific Objectives means the concentration or quantity of a substance or level of effect that the Parties agree, after investigation, to recognize as a maximum or minimum desired limit for a defined body of water or portion thereof, taking into account the beneficial uses or level of environmental quality which the Parties desire to secure or protect."

This definition, however, does not indicate a definite intent to use these Specific Objectives, nor does it indicate where or when they are to apply.

Progress in meeting the spirit and letter of Article IV and Annex 2 lags well behind schedule and may even have stopped entirely. Limited use zones within the boundary waters of the Great Lakes System were to have been designated for industrial discharges and for municipal discharges in excess of 1 million gallons per day before January 1, 1980. In addition, the Parties, in consultation with the state and provincial governments, were to take measures to define and describe all existing and future limited use zones and were to prepare an annual report on these measures.

This delay is related at least in part to legal arguments over whether or not limited use zones are allowable under the United States Clean Water Act. Canada is apparently prepared to designate some limited use zones but does not wish to do so unilaterally.

The Science Advisory Board also expressed serious concern with this situation in its 1981 Report to the International Joint Commission:

"The Board and its Ecosystem Objectives Committee are concerned that the Parties have not fulfilled their obligations under

Accordingly, The Commission Recommends that:

12. *The Parties, as a matter of priority, review Article IV, Annex 2 and the definition of "Specific Objectives" contained in the Agreement; and either Reaffirm these provisions of the Agreement regarding limited use zones and provide a revised timetable for their implementation; or Amend or delete these provisions of the Agreement and, where appropriate, provide a timetable for their implementation.*

Annex 2 of the Great Lakes Water Quality Agreement to designate limited use zones. Without such limited use zone designations, the setting of Specific Agreement Objectives becomes a meaningless exercise."

The Commission understands the frustration reflected in the above conclusion but does not wish to conclude that the "setting of Specific Objectives becomes a meaningless exercise". The Commission is concerned, however, that without such zones or their equivalent, the action level for implementation of pollution control measures under the Agreement will not occur until Specific Objectives are exceeded at the International Boundary.

The Commission continues to believe that, in the absence of limited use zones, the Specific Objectives should apply everywhere in the Great Lakes System. Under this approach, however, exceedances are so commonplace and so unpreventable that they may not lead to remedial actions on the part of responsible agencies. The designation of limited use zones would directly address this concern since in designating such zones the Parties and Basin jurisdictions would be making a definite statement as to where they intend the Specific Objectives to apply. This uncertainty regarding the relationship between Specific Objectives and limited use zones should be cleared up.

Accordingly, THE COMMISSION RECOMMENDS THAT:

12. The Parties, as a matter of priority, review Article IV, Annex 2 and the definition of "Specific Objectives" contained in the Agreement; and either Reaffirm these provisions of the Agreement regarding limited use zones and provide a revised timetable for their implementation; or Amend or delete these provisions of the Agreement and, where appropriate, provide a timetable for their implementation.

The Commission considers Article IV and Annex 2 of the Agreement to be a useful, practical means of ensuring that the Specific Objectives become part of the planning, managing and disclosure of pollution control programs in the Great Lake Basin Ecosystem. The Commission trusts that any amendments or deletions of these provisions will have the overall effect of strengthening rather than weakening the Agreement.

The longest overdue deadline noted by the Commission is the confirmation of "future phosphorus loads" (target loads) called for in

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- The Commission Recommends that:*
13. *The Parties, as signators to the Agreement, review the specific timetables and deadlines called for in the Agreement; provide the International Joint Commission with a revised schedule for meeting the specific deadlines and timetables called for in the Agreement; and provide the International Joint Commission with a general statement indicating the level of urgency and importance that the Parties currently assign to the Agreement.*

Annex 3 of the Agreement, which were to have been confirmed no later than May 22, 1980. This confirmation date has subsequently been extended twice by diplomatic notes between the two countries, and the Commission is not aware of any new confirmation date. The Commission strongly supports the confirmation of these target loads and their allocation between the two countries. Even if the final compliance schedules require further negotiation, an Agreement by the Parties on these target loads as the phosphorus control goals for the Great Lakes will provide the basis for setting goals for the management of the eutrophication problems in the Great Lakes System.

Article VI of the Agreement commits the Parties to having programs to abate, control and prevent pollution from municipal sources and urban drainage completed and in operation no later than December 31, 1982. Similar programs addressing industrial pollution are to be completed and in operation no later than December 31, 1983. The Water Quality Board has reviewed the progress of programs and measures required under the Agreement in its 1981 Annual Report to the Commission. However, because the Parties had not yet submitted their listings of "pollution abatement requirements" for municipal and industrial facilities in the Basin, the Water Quality Board could not advise on the adequacy of such programs and progress to abate, control and prevent pollution from these sources. Therefore, the Board described but could not evaluate progress under the Agreement in its November 1981 Report to the Commission. A preliminary inventory of "pollution abatement requirements" in the form of discharge permits has since been received by the Commission. The Commission is not yet ready, however, to comment on this listing.

The Board's description noted above did little to allay concern about the general 'state' of the Agreement and, in fact, reinforces the specific and general concerns raised now and previously by the International Joint Commission. Unfortunately it seems that very few of the specific timetables and deadlines called for in the Agreement are, in fact, being met.

The Commission is concerned at the way Agreement deadlines and timetables have passed without clear resolution or visible progress and, therefore,

THE COMMISSION RECOMMENDS THAT:

13. The Parties, as signators to the Agreement, review the specific timetables and deadlines called for in the

Therefore, The Commission
Recommends that:

14. The Parties, as signators to the Agreement,
 - (a) Assess the effectiveness of the existing mechanisms for ensuring that the inter-jurisdictional and international aspects of environmental pollution, and the consideration of measures concerning its control in the Great Lakes System, are given adequate consideration by regulatory agencies; and
 - (b) Take whatever steps are necessary to correct deficiencies in the coordination of activities and measures for addressing the inter-jurisdictional and international aspects of the 1978 Great Lakes Water Quality Agreement.

Agreement; provide the International Joint Commission with a revised schedule for meeting the specific deadlines and timetables called for in the Agreement; and provide the International Joint Commission with a general statement indicating the level of urgency and importance that the Parties currently assign to the Agreement.

The Commission believes such a statement of intention by the Parties to be an important action and hopes that a joint response will be forthcoming. Accordingly, the Commission requests a joint response from the Parties or, if necessary, separate responses from each of the Parties by November 1, 1982.

On a positive note, the Commission does wish to acknowledge the progress made in regard to one class of point source dischargers in the Great Lakes Basin. It was reported by the Water Quality Board's Pulp and Paper Point Sources Task Force that pulp and paper mills contribute to water quality problems in eight "Areas of Concern" primarily in the Lake Superior and Lake Huron basins. It appears, nevertheless, that significant improvement has been made in regard to the quality of wastewaters discharged from U.S. and Canadian mills into the Great Lakes System. The Commission notes that the total suspended solids (TSS) and Biochemical Oxygen Demand (BOD) loads have decreased from mills in both countries during the period 1967 to 1980, even though the production of saleable paper products has increased. Although the types of products produced at the pulp and paper mills in the Basin differ to some degree between the two countries and therefore direct comparisons are difficult, the Commission takes special note of the overall greater than 90 percent reduction in the TSS and BOD loads discharged to the Great Lakes from United States pulp and paper mills.

Inter-Jurisdictional Pollution Impacts

The Commission is concerned at what appears to be a general lack of practical mechanisms to ensure that individual jurisdictions consider the costs and other negative effects of their pollution on other jurisdictions in the Great Lakes Basin Ecosystem. This problem is highlighted in the Niagara River. While the Commission drew attention to this concern in its Special Report on the Niagara River in January, 1980 and made several recommendations at that time, the problem of inter-jurisdictional pollution is relevant to the entire Basin. This problem occurs across the whole range of chemical pollutants, from persistent organic chemicals to phosphorus.

Therefore, THE COMMISSION RECOMMENDS THAT:

14. The Parties, as signators to the Agreement,
 - (a) Assess the effectiveness of the existing mechanisms for ensuring that the inter-jurisdictional and international aspects of environmental pollution, and the consideration of measures concerning its control in the Great Lakes System, are given adequate consideration by regulatory agencies; and
 - (b) Take whatever steps are necessary to correct deficiencies in the coordination of activities and measures for addressing the inter-jurisdictional and international aspects of the 1978 Great Lakes Water Quality Agreement.

Institutional Roles and Opportunities

There has been a continuing long-term concern within the Commission regarding the institutional arrangements provided for the implementation of the Agreement, especially as these arrangements relate to the ability of the Commission to carry out its Agreement responsibilities. The Commission must observe that the Agreement and its institutional framework as cast have fundamental but unnecessary difficulties or weaknesses. These matters need to be addressed if the purpose, goals, and programs of this and future agreements are to be effectively achieved, utilizing the instrumentality of the International Joint Commission or other bodies in the monitoring and advising on governmental activities under such international arrangements.

The situation regarding the funding obligations of the Parties with respect to Board activities has been discussed previously. The remaining concerns also warrant action by the Parties with respect to the Agreement and should also be considered in the formulation of future water quality or other agreements between the two countries.

To a large extent, Agreement activities depend on jurisdictional priorities which may vary both between and within jurisdictions. These changing priorities can lead to uncertainties and fluctuations in the funding of the essential Agreement functions. In order to help ensure that research, monitoring and coordination obligations are not overlooked as a result of changing jurisdictional priorities, it would be desirable to fund the 'core' aspects of these obligations directly through the International Joint Commission or some other joint mechanism.

A basic concern of the Commission, in this regard, is the preservation of its scientific credibility and policy independence.

which it has come to acquire during the years since the Boundary Water Treaty was signed. This reputation—believed key to the Commission's *raison d'être*—is primarily based on the common data base and sound advice provided to the Commission by personnel from the governments, academic community and industry who are involved in the Commission process. Prior to the Water Quality Agreements, the conventional mode of operation was a relatively free interaction between the Commission and its technical and scientific advisors.

Under both the 1972 and 1978 Agreements, however, this mode of operation has been changed and the “principal advisory board” is composed of individuals not necessarily acting independently of their home organizations. Instead, it is composed primarily of representatives from the Parties and from each of the state and provincial governments. This board, of course, is the Water Quality Board. In practice, the nomination of candidates to the Water Quality Board is done by the jurisdictions, with the Commission exercising little role in the selection of suitable candidates from the available pool in each jurisdiction. Furthermore, and even more important, there is no explicit mandate in the Agreement requiring these members to serve in an independent, professional capacity; instead they are to serve as “representatives” from their home governmental entity.

The Commission recognizes that Water Quality Board members, as individuals, often make every effort to give objective advice as professionals in their field, even in cases when this stance means criticism of their home organization or government. The problem, however, is that there is no explicit mandate, assurance or even expectation that this will occur as a general rule.

The Commission believes that a renewed sense of mutual respect and responsiveness between itself and its Great Lakes advisory boards is highly desirable and would enhance the IJC and Agreement process. The Commission believes it is essential for itself and its Great Lakes advisory boards to know and define their responsibilities and perspectives so that misunderstandings will be less likely. Discussions have, in fact, been held on several occasions since September 1981 to air mutual concerns and to address priorities between the Commission and its Boards. It is hoped that such meetings will provide a broader yet more refined sense of role and directions. This is a shift in approach which the Commission expects to continue into the future.

Nevertheless, in order to reduce ambiguity as to the roles of Agreement institutions, it would be desirable to review and clarify

the relationship of members of the Water Quality Board to their agencies and to the Commission. The Commission believes that the Parties and jurisdictions should reassess the constitution of the Water Quality Board and state explicitly whether it is to be a Board of and between the jurisdictions, or a Board of the Commission with members serving in their personal and professional capacity as is the case with all other Commission Boards.

The Agreement assigns responsibility to the Science Advisory Board for reviewing research programs, advising on research needs and promoting coordination of research efforts among jurisdictions. The Commission is concerned that greater coordination of research activities pertinent to the Great Lakes Basin Ecosystem is required. The Parties and jurisdictions should reaffirm the primary role of the Science Advisory Board to coordinate and advise on these research activities.

The continuing, evolving role of the Commission's Great Lakes Regional Office has also contributed to the Commission's concern over its own flexibility to operate effectively within the existing institutions. Under the 1972 Agreement, the Commission was given clear authority by the Parties to create and operate the Great Lakes Regional Office. The significance of this authority was that it reinforced the presence of the Commission as an independent unitary body with the authority to develop the capability for independently gathering, analyzing and evaluating information which was often of a highly technical nature.

The 1978 Agreement, however, presented new and more detailed Terms of Reference for the Regional Office and the two Great Lakes advisory boards. These new Terms of Reference were a significant departure from the interpretation of their roles as presented in the 1972 Agreement and appeared to limit the Commission's ability to manage and directly use the technical expertise available at the Regional Office. The significance of these apparent changes in mandate is not clear. For its part, the Commission is continuing its efforts to develop more effective ways and means of carrying out its responsibilities relating to the Regional Office in a manner that is both consistent with the 1978 Agreement and responsive to current institutional realities.

The Commission acknowledges the central and essential role of its Great Lakes Regional Office in the Commission's meeting its responsibilities under the Great Lakes Water Quality Agreement. The high level of scientific scholarship available to the Boards and their Committees by way of the Regional Office scientific staff and the prominent role it plays in the effective functioning of these

*The Commission Recommends that:
The Parties and jurisdictions take
into account the concerns expressed
above in their further deliberations
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Great Lakes Water Quality
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Boards is especially recognized. The Commission strongly encourages the continued development of this high professional standard and hopes that Governments will support the professional advancement of Commission personnel.

Finally, the Commission is of the view that an evolution in its focus from primarily engineering-scientific concerns, to incorporate matters of social relevance, institutions and human concerns may be of benefit in assessing whether the requirements of the Agreement are being adequately met. The Commission senses that the past information base as provided by its institutions has not been available in a form so that its relevance to larger social concerns and aspirations can be assessed. A more direct form of discourse between the various institutions which are involved in the regulation of the environmental quality of the Great Lakes System and the many individuals in the Basin who would directly be affected by institutional decisions, i.e., the Basin "society at large", is both necessary and desirable. The Commission, therefore, feels it should consider a "broadening" of its base of information in order to establish a process for understanding the human context of Great Lakes goals and achievements. Another related aspect is the development of an effective process by which the Commission can carry out its public information and public hearing responsibilities under the Agreement. This latter topic will be the subject of extensive Commission review in future months.

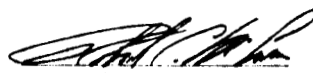
THE COMMISSION RECOMMENDS THAT:

The Parties and jurisdictions take into account the concerns expressed above in their further deliberations concerning institutional arrangements pertinent to the Great Lakes Water Quality Agreement and future agreements.

Signed this 24th day of June 1982 as the International Joint Commission's First Biennial Report
Under The Great Lakes Water Quality Agreement of 1978.



E. Richmond Olson, Q.C.



Robert C. McEwen



L. Keith Bulen



Charles M. Bedard



Donald L. Totten

Areas of Concern in the Great Lakes Basin

CLASS "A" Areas of Concern	CLASS "B" Areas of Concern
I. LAKE SUPERIOR: None Identified	St. Louis River, Minnesota (C) * Thunder Bay, Ontario (C) * Nipigon Bay, Ontario (C) * Jackfish Bay, Ontario (C) Peninsula Harbour, Ontario (C)
II. LAKE MICHIGAN: * Fox River/Southern Green Bay, Wisconsin (C) * Milwaukee Estuary, Wisconsin (C) * Waukegan Harbor, Illinois (C) * Grand Calumet River and Indiana Harbor Canal, Indiana (C)	Manistique River, Michigan (C) Menominee River, Mich.-WI (C) Sheboygan, Wisconsin (C) Muskegon Lake, Michigan (C) White Lake, Montague, Michigan (C)
III. LAKE HURON: * St. Marys River (C) * Saginaw River System and Saginaw Bay, Michigan (C)	* Spanish River Mouth, Ontario (C) * Penetang Bay to Sturgeon Bay, Ontario (E) Collingwood Harbour, Ontario (C,E)
IV. LAKE ERIE: * St. Clair River (C) * Detroit River (C) Rouge River, Michigan (C) Raisin River, Michigan (C) * Maumee River, Ohio (C,E) * Black River, Ohio (C) * Cleveland, Ohio (C) * Ashtabula, Ohio (C)	Clinton River, Michigan (C) * Wheatley Harbour, Ontario (C)
V. LAKE ONTARIO: * Buffalo River, New York (C) * Niagara River (C) * Hamilton Harbour, Ontario (C,E) Cornwall-Massena, Ontario-New York (C)	Eighteen Mile Creek, NY (C,E) * Rochester Embayment, NY (C,E) * Oswego River, New York (C) * Toronto Waterfront, Ontario (C) Port Hope, Ontario (C) * Bay of Quinte, Ontario (E)

(C) - Contamination of the water, sediments and/or biota by organic and/or inorganic substances (excluding phosphorus).

(E) - Eutrophication/phosphorus enrichment problems.

* - Identified as an area of some type of environmental and/or human health concern in every report of the Water Quality Board since its 1974 Annual Report.

SOURCE: Great Lakes Water Quality Board. 1981 Report on Great Lakes Water Quality. Report to the International Joint Commission, November 1981, Cleveland, Ohio pp. 13-28.

“The United States of
America and His Majesty the
King of The United Kingdom of
Great Britain and Ireland and of
the British Dominions beyond the
Sea, Emperor of India being
friendly desiring to prevent
disputes regarding the use of
boundary waters and in settle all
questions which are now pending
between the United States and
the Dominion of Canada
concerning the rights, obligations,
or interests of either in relation to
the water on the boundaries of
the other, along their common
frontier, and to make provision
for the adjustment and settlement
of all such questions as may
hereafter arise, have resolved to
conclude a treaty to the effect
of these words...”

“The Government of the United States of America”