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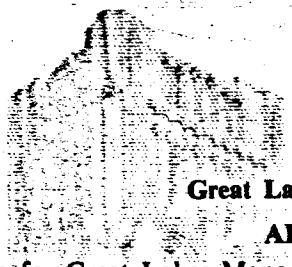

Great Lakes Symposium

ARTICLES

COMMENTS

THE GREAT LAKES: TRANSBOUNDARY ISSUES FOR THE MID-90s

Leonard B. Dworsky, Albert E. Utton** and David J. Allee****

INTRODUCTION

A recent Ford Foundation-supported project[1] considered six broad areas of concern to North American transboundary water[2] and related environmental management. The project considered these areas of concern related to two of the boundary commissions: the International Joint Commission (IJC) established by the United States and Canada and the International Boundary and Water Commission (IBWC) formed by the United States and Mexico.[3] The project brought together in a three-day, tri-national working conference seventy leaders involved in boundary governance to review, critique and expand on twelve commissioned papers and twenty-five prepared commentaries.[4] The conferees responded in detail to the assigned issues and suggested options for improved transboundary resource management.

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* Professor (Emeritus), Civil and Environmental Engineering, Cornell University. B.S. Civil Engineering 1936, University of Michigan; M.A. Public Administration 1956, American University; doctoral studies in Natural Resources and Conservation 1956, University of Michigan.

** Professor of Law and Editor-in-Chief of the *Natural Resources Journal*, Director of the International Transboundary Resources Center and Professor of Law at the University of New Mexico. B.A. (geology) 1953, University of New Mexico; B.A. (jurisprudence) 1956, Oxford, England; graduate studies in International Law 1958, University of London; graduate fellow in Administrative and International Law 1962, Yale.

*** Professor of Resource Economics in the NYS College of Agriculture and Life Sciences at Cornell University. B.S. 1953, M.S. 1954, Cornell University; Dipl. Agr. Economics 1958, Oxford University; Ph.D. 1960, Cornell University.

1. *The North American Experience Managing International Transboundary Water Resources: The International Joint Commission and the International Boundary and Water Commission*, 33 NAT. RESOURCES J. 1 (1993) (published in issues one and two of the journal by the University of New Mexico).

2. The six broad areas of concern are Emerging Boundary Environmental Challenges, Improving Management Capacity of Governments and Commissions, Commission Relations to States and Provinces, Improving Public Participation, Ecosystem Management and Accommodating an Uncertain Future. *See* Leonard B. Dworsky & Albert E. Utton, *Assessing North America's Management of its Transboundary Waters*, 33 NAT. RESOURCES J. 413, *passim* (1993).

3. *Id.* at 414-59 (1993) (leaning importantly, but not solely, on the record of the conference, on proposals in the public record over two decades and on an assessment of recent social change). The analysis section of the project identifies a number of issues, four of which are presented here, each with a summary discussion, conclusion and recommendation.

4. The conference was held April 19-23, 1991, in Boca Grande, Florida.

While the final project report—hereinafter referred to as the analysis—used conference data as well as proposals in the public record over two decades, it responded to changes that have taken place in the last several years. The changes had been made based on assumptions that were valid at an earlier time, but which were unsatisfactory for use in the concluding stages of the project. The analysis also relied heavily on an assessment of recent societal change in determining the character of a special set of "overriding" issues on which to concentrate.[5] These were selected to be the core of the analysis.

The analysis concentrates on matters of substantial interest in the IJC's *Sixth Biennial Report* affecting transboundary conditions.[6] The most recent matter of interest is a conclusive finding by the IJC about the public health hazards of persistent toxic substances in the Great Lakes.[7] On this, the IJC explained:

> [S]ociety faces a daunting challenge: dealing effectively with the persistent toxic substances in the Great Lakes-St. Lawrence Basin Ecosystem . . . . [U]rgent and continuing attention by all sectors of society are [*sic*] needed if it is to protect the environmental integrity of the ecosystem, which includes the humans who live within and depend on it.[8]

The overriding Canada-U.S. issues identified in the analysis are concerned directly with program implementation. They include: (1) the need for the two governments to reconsider several basic institutional structures (enforcement and regulatory reliance on water quality standards) to which they had committed themselves before the United States adopted major strategic changes in pollution control policies in the Water Pollution Control Act of 1972[9]; (2) the need to make the two federal governments collectively more directly responsible for the control and regulation of transboundary water pollution; (3) the need to recognize the existence of a Great Lakes ecosystem (including, but not limited to, water quality under the agreement[10]) and provide a means to initiate a gradual and consistent management arrangement toward the implementation of that ecosystem over the long term; (4) the need and means to implement a science policy for the Great Lakes; (5) the need to respect but, at the same time, more effectively use

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5. Dworsky & Utton, *supra* note 2, at 420, 423, 429, 435 (discussing six major—termed "overriding"—Great Lakes issues, four of which are dealt with in this paper: New Conditions; Bi-National Control and Regulation of Pollution; Ecosystem Management of the Great Lakes; and Implementing a Science Policy for the Great Lakes Institutional and Public Responsibilities).

6. INTERNATIONAL JOINT COMMISSION, SIXTH BIENNIAL REPORT ON GREAT LAKES WATER QUALITY (1992) [hereinafter SIXTH BIENNIAL REPORT].

7. The analysis concurs firmly with the conclusion of the IJC on the matter of "The Injury" to humans and other living things from persistent toxic substances. The IJC explained: "[W]e conclude that the evidence is sufficient that many persistent toxic substances are indeed causally involved, and there can be no defensible alternative: their input to the Great Lakes must be stopped. The urgent need is for effective programs to achieve virtual elimination." *Id.* at 22.

8. Dworsky & Utton, *supra* note 2, at 419.

9. Water Pollution Control Act, Pub. L. No. 92-500, 86 Stat. 816 (1972).

10. Great Lakes Water Quality Agreement of 1978, Nov. 22, 1978, U.S.-Can., 30 U.S.T. 1383.

the federal systems to which the two governments subscribe to provide for the long-term ecosystem management of the Great Lakes; and (6) the need to renew dedication to an ecosystem approach as the basis for Great Lakes and boundary waters management within the definition of ecosystem integrity called for by the Ecosystem Committee of the IJC's Science Advisory Board.[11]

This article provides a summary of the first four of these six "overriding" issues considered in the analysis and bearing on the Great Lakes. They are important because the manner in which the two governments view and act on these issues will determine the future management of the Great Lakes. The effect of that management will be a major determinant of the health and welfare of the citizens of both the United States and Canada whether or not they reside in the Great Lakes basin.

In this article, each issue is restated as reported in the analysis.[12] In addition, changes that are forcing the reconsideration of Great Lakes management policy are indicated and specific recommendations are summarized. Each issue is followed by a table of "Selected Events" and by commentary to identify and clarify the supplemental support bearing on the issue. The tables supplement the arguments and trace the evolution of several basic premises on which current policies are based. The presentations raise questions about the applicability of these policies to the new identified changes in the U.S.-Canada boundary region. The changes call for new approaches and are at the heart of this article. In addition, the tables provide information in the nature of an institutional memoir and were not included in the analysis published previously[13] because of space and publication limitations.

I. ISSUE ONE: NEW CONDITIONS

A. Summary

The Boundary Waters Treaty,[14] signed in 1909, "provides the principles and mechanisms to help prevent and resolve disputes, primarily those concerning water quality and water quantity along the boundary between Canada and the United States."[15] Within that treaty, the United States and Canadian governments granted impressive new responsibilities to the IJC to facilitate the

11. *See generally* INTERNATIONAL JOINT COMMISSION ECOSYSTEM COMMITTEE, THE ECOSYSTEMS APPROACH: THEORY AND ECOSYSTEM INTEGRITY (1993) [hereinafter THEORY AND ECOSYSTEM INTEGRITY] (devoting entire text to definitions of ecosystem approach and ecosystem integrity).

12. *See* Dworsky & Utton, *supra* note 2, at 420 (1993) (covering issue one); *id.* at 423 (covering issue two); *id.* at 429 (covering issue three); *id.* at 435 (covering issue four).

13. *See The North American Experience Managing International Transboundary Water Resources: The International Joint Commission and the International Boundary and Water Commission*, 33 NAT. RESOURCES J. 1 (1993).

14. Boundary Waters Treaty, Jan. 11, 1909, U.S.-Gr. Brit., 36 Stat. 2448.

15. INTERNATIONAL JOINT COMMISSION, THE INTERNATIONAL JOINT COMMISSION AND THE BOUNDARY WATERS TREATY 3 (1909) [hereinafter IJC AND BOUNDARY WATERS TREATY].

implementation of the Great Lakes Water Quality Agreement,[16] thereby extending the principles and mechanisms substantially in the direction of Great Lakes ecosystem management. These responsibilities extended the principles and mechanisms in the direction of Great Lakes ecosystem management.[17]

The issue of new conditions poses two essential questions that must be confronted, and answered, by the two governments before needed institutional change can take place to bring about effective boundary waters and especially Great Lakes ecosystem management. First, what now needs to be done to make the governments of the United States and Canada explicitly accept and act on the new expanding conditions involving both water quality and ecosystem management that are redefining the uses to which the 1909 treaty has been put? Second, do the new conditions require the governments to amplify the traditional uses to which the treaty has been put in order to share its classic "Prevent and Resolve Disputes" objective with the demands of ecosystem management of the international Great Lakes and elsewhere along the boundary on an anticipatory basis?

When governments enter into discussions of policy change, it is necessary to recall that, as President Truman reputedly said, "[t]he buck stops here." In considering change in the Great Lakes management system, "here" is likely to be the desks of the foreign service officers at Canada's Department of External Affairs and the U.S. State Department.

The character of institutional change needed for more effective boundary waters management, especially in the Great Lakes, is likely to be considered a major policy shift, involving substantial inter-governmental and inter-departmental adjustments, as well as substantial planning, budgeting and personnel considerations. To expect a career desk officer or the head of a specialized office to lead the charge to bring these matters to the top of the department's already overloaded agenda, and to succeed, is not realistic.

Instead, the two governments must examine and evaluate, at the highest levels, the kinds of institutions and operational authorities needed in 1995 and beyond to meet these new and evolving conditions and to formulate policies and implementable operational plans. Their approach to this issue will establish whether the two governments have the will (they have the capacity) to protect the health of the public and of the natural systems of the Great Lakes basin. For these reasons, this article lays out institutional history, describes some of the practical obstacles to change and focuses strongly on the evolution of the current public health problem the IJC has laid before the public and the governments.

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16. Great Lakes Water Quality Agreement of 1972, Apr. 15, 1972, U.S.-Can., 23 U.S.T. 301 (as amended by the Great Lakes Water Quality Agreement of 1978, Nov. 22, 1978, U.S.-Can., 30 U.S.T. 1383 and by a 1987 Protocol signed Nov. 18, 1987).

17. CANADA-UNITED STATES UNIVERSITY SEMINAR, A PROPOSAL FOR IMPROVING THE MANAGEMENT OF THE GREAT LAKES OF THE UNITED STATES AND CANADA 1971-1972, at 44 (1973) [hereinafter PROPOSAL FOR IMPROVING MANAGEMENT], *reprinted in* The Great Lakes: Hearings before the Subcommittee on Inter-American Affairs of the House Committee on Foreign Affairs, 93d Cong., 1st Sess. 634-713 (1973).

The issue of institutional change is most vital to the protection of the health of the public and of the natural systems in the Great Lakes basin and for its future management for several reasons. First, the present institutional arrangements are not providing the implementation necessary to protect against persistent toxic chemicals. Second, the injury to humans and other living things from persistent toxic substances has officially been recognized by the IJC.[18] Third, as a report of the U.S. Government Accounting Office (GAO) stated: "[N]o federal United States agency has listed chemicals known or suspected to be toxic to human reproduction and/or development. . . . Two-thirds of the relevant regulatory decisions are based on such considerations as cancer and acute toxicity, rather than on reproductive and developmental toxicity levels."[19] The GAO concluded "that the degree of protection offered to the public against reproductive and development disease as a result of toxic exposure is uncertain at best."[20]

The conclusions of the IJC and the GAO report are supported by scientific investigations, the growing concern of Congress (especially the Senate Committee on Government Operations led by Senator John Glenn and the congressional Great Lakes caucus), congressional enactment of the Great Lakes Critical Programs Act, as an amendment to the Clean Water Act[21] and the congressional authorization of new research to the Agency for Toxic Substances and Disease Registry in the U.S. Public Health Service.[22]

Only a part of the institutional record has been touched here. In addition, other events have been recorded. For example, persistent toxic substances was one of the first major issues considered by the IJC and its boards from the first year of the Water Quality Agreements of 1972[23] and 1978[24] and the 1987 Protocol.[25] This issue remains the highest priority in 1995.[26] In addition, the two governments have failed to implement important Water Quality Agreement programs; instead, they continue to delegate responsibilities to state, provincial and local governments. They have also refused to acknowledge the limited implementation gains that have been made despite the repeated advice and reports of the IJC. Finally, they have failed to augment the sole use of water quality standards with broader criteria aimed at the restoration and rehabilitation of the Great Lakes ecosystem.[27] These points illustrate that the two governments need to explore options to strengthen the implementation roles of boundary waters

18. SIXTH BIENNIAL REPORT, *supra* note 6, at *cover*, 17-34.

19. U.S. GENERAL ACCOUNTING OFFICE, REPRODUCTIVE AND DEVELOPMENTAL TOXICANTS: REGULATORY ACTIONS PROVIDE UNCERTAIN PROTECTION 2 (1992).

20. *Id.* at 3.

21. Great Lakes Critical Programs Act of 1990, Pub. L. No. 101-596, 104 Stat. 3000.

22. *Id.* This research was authorized by legislative language.

23. Great Lakes Water Quality Agreement of 1972, Apr. 15, 1972, U.S.-Can., 23 U.S.T. 301.

24. Great Lakes Water Quality Agreement of 1978, Nov. 22, 1978, U.S.-Can., 30 U.S.T. 1383.

25. INTERNATIONAL JOINT COMMISSION, REVISED GREAT LAKES WATER QUALITY AGREEMENT OF 1978: AS AMENDED BY PROTOCOL (1987) (reprint 1994).

26. *See generally* SIXTH BIENNIAL REPORT, *supra* note 6.

27. While the ecosystem approach proposes restoration, water quality standards remain the principle criteria measuring achievement.

management institutions, particularly the Great Lakes ecosystem, to meet perceived dangers.

A variety of crises has explicitly and implicitly been described, and implementing actions taken, since the fourth reference given the IJC on water pollution under the 1909 treaty.[28] Some crises, like phosphorous and the more readily treated municipal and industrial wastes, have been ameliorated. Elimination of even these crises, however, came only after considerable time. For example, it took more than ten years to get all Great Lakes states to ban phosphorous use. Even after twenty years, major sewage and waste treatment and related remedies have yet to be accomplished, especially those areas under the remedial action plan (RAP) processes.[29] Thus, the crisis involving persistent toxic substances, not quickly acknowledged as a direct public health danger, has arrived.

The conclusions of the IJC *Sixth Biennial Report* cannot and must not be dealt with solely by further delegation of responsibility to the complex systems (involving local, state, provincial and federal governments) of the two governments. To date, the United States and Canada have used the Boundary Waters Treaty to enforce and control water levels, water diversions and water allocations.[30] This treaty contains as yet unused power by which equally effective bi-national control and enforcement of water pollution can be achieved. The time has come for a change to more direct bi-national federal authority, just as the United States did in 1972 when it finally confronted, after twenty-four years of costly experience, the need for federal control over water pollution throughout the United States.

B. Recommendations

1. The governments of Canada and the United States at the highest levels must recognize and give credence to the new concerns expressed by the IJC of the need for action to protect the public health of the two countries' Great Lakes basin residents and the natural ecosystems of which they are a part. The two governments must determine the kinds of institutions and the kinds of authorities needed in 1995 and beyond to meet the changing conditions.

2. The IJC proposal in the *Sixth Biennial Report* should be seen as an important remedial milestone to start the long-term process of reducing persistent toxic substances. The implications are so great and the needed actions so broad, reaching as they do into individual plants, processes and material suppliers widely scattered in both countries, that it cannot be successful without the direct, not merely delegated, intervention of and implementation by the two governments.

This belief is justified in the next issue within this article, which contends that there is a need for a central, bi-national entity to provide guidance and to have

28. DOCKET NO. 4, POLLUTION OF BOUNDARY WATERS (1912).

29. *See generally* IJC AND BOUNDARY WATERS TREATY, *supra* note 15; Mimi Lorsen Becker, *The International Joint Commission and Public Participation: Past Experiences, Present Challenges, Future Tasks*, 33 NAT. RESOURCES J. 235 (1993).

30. IJC AND BOUNDARY WATERS TREATY, *supra* note 15, at 24.

direct enforcement authority in lieu of delegating such responsibility to the Federalism milieu of two federal governments, eight states, two provinces and untold hundreds of local, county and regional governments that comprise the governance of the Great Lakes basin.

3. While the practical need for an adequate amount of private deliberation on the part of the two governments requires respect, the question posed by this issue must be opened to the public and the non-governmental organizations (NGO), several governmental agencies, the private sector and, most important, the Congress and the Canadian Parliament. Members of Congress and Parliament have not been given the opportunity to assess the history, current conditions and essential future needs of Great Lakes and other boundary waters management; as a result, they are ill served.

4. Consideration should be given in the future to presenting the Great Lakes Water Quality Agreement to the U.S. Senate for treaty approval. The politicization of Great Lakes management is already underway in Congress, due primarily to the lack of public access to executive branch decision-makers. While the enactment of narrowly drawn, specific, piecemeal legislation proposed by active interest groups with good intent may be the only practical option available, it may not necessarily be most beneficial in the long term. Continued legislative action of that sort may make international Great Lakes and boundary waters ecosystem management less effective.

Significant institutional change is needed, and the governments must pay attention to this need before large-scale, overt public damage becomes unmanageable.

SELECTED EVENTS FOR ISSUE ONE: NEW CONDITIONS	
1972	The first Canada-United States University Seminar reported: [T]he fundamental question has to do with the general attitude of the Governments of Canada and the United States on the management of the Great Lakes Basin. It is not clear whether or not the two governments believe that the problems emerging in and around the Great Lakes are inexorably leading to critical situations and that it is imperative now to initiate concerted action to conserve and enhance these unique resources for the present and future generations. There should be little doubt that the pollution problem is already critical. Can the two countries afford again to wait for other crises to occur as a prerequisite to action? The major question is the willingness of both countries to exercise their political will at least to the extent of strengthening their ability to resolve existing difficulties and to be better prepared for future problems.[31]

31. PROPOSAL FOR IMPROVING MANAGEMENT, *supra* note 17, at 51.

1990	A critique of the IJC said: "The main burden of criticism placed on the IJC is not directed at the institution at all but at the way it is used or, more accurately, not used by the two governments."[32] "The result is a fairly widespread perception, expressed most recently in Canada by the Commission of Inquiry on Federal Water Policy, that the full potential of the IJC has not been realized."[33]

These two views, two decades apart, recall the first confrontation in 1912 between the IJC and the two governments on a recommendation concerning the use of the IJC in a more forceful way. The first task assigned to the IJC was authorized by one sentence in the treaty:

1912	"It is further agreed that the waters herein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury or health or property on the other."[34]
1912	Docket No. 4, Pollution of Boundary Waters was assigned to the IJC by the governments for investigation, an examination and report. "To what extent and by what causes and in what localities have the boundary waters . . . been polluted so as to be injurious . . . ? In what way or manner . . . is it possible and advisable to remedy or prevent the pollution of . . . ."[35]

32. Barry Sadler, *Shared Resources, Common Futures: Sustainable Management of Canada-U.S. Border Waters*, 33 NAT. RESOURCES J. 375, 392 (1993).

33. *Id.*

34. Boundary Waters Treaty, Jan. 11, 1909, U.S.-Gr. Brit., art. 4, 36 Stat. 2448. *See generally* INTERNATIONAL JOINT COMMISSION, VADE MECUM: A PRACTICAL HANDBOOK FOR THE USE OF THE COMMISSION AND ITS BOARDS CHAIRMAN (1969) [hereinafter VADE MECUM].

An agreement comparable to the 1909 Boundary Waters Treaty likely could not find approval today between the two governments. It also has been said by both IJC and government spokespersons that the treaty's ability to embrace changing needs has precluded the need for treaty change. We add that this is particularly pertinent to water pollution: Few if any articles of the treaty have been used so flexibly, so expansively and so encompassingly as this single sentence.

35. VADE MECUM, *supra* note 34, at 9.

1914	A progress report on January 16, 1914 and a final report on August 12, 1918 recognized the presence of pollution of varying degrees, the situation along the frontier as "generally chaotic, everywhere perilous, and in some cases disgraceful"[36] and "the health and welfare of the citizens . . . in substantial contravention of the spirit of the treaty. . . . . Sewage from vessels, from cities and from industries was found as the major causes of pollution. Remedies could be provided by treatment plants."[37] The last conclusion of the report reads in part: "*It is advisable to confer upon the International Joint Commission ample jurisdiction to regulate and prohibit this pollution of boundary waters and waters crossing the boundary.*"[38]
1919	The governments requested the IJC to draft either reciprocal legislation or a treaty to carry out the recommendations.[39]
1920	The IJC submitted a draft treaty. It was not negotiated to conclusion.[40]

36. *Id.* at 10.

37. *Id.* Thus, we need not be surprised at this strong request in 1918 that "ample jurisdiction to regulate and prohibit . . . pollution" be assigned the IJC. U.S. PUBLIC HEALTH SERVICE, 1908 ANNUAL REPORT 57 (1908). On March 19, 1908 the mayor of the City of Chicago called upon the U.S. Public Health Service to form a Lake Michigan Water Commission comprised of the U.S. War Department, the cities of Chicago, Milwaukee and Grand Haven and the states of Illinois, Wisconsin, Indiana and Michigan. The commission was aimed at establishing "a regional control agency for concerted action to control Lake Michigan Pollution." *Id.*

38. U.S. PUBLIC HEALTH SERVICE, 1908 ANNUAL REPORT 10 (1908) (emphasis added). The U.S. Public Health Service (USPHS) Annual Report of 1909 said "Lake Erie is becoming more and more polluted" and that "the prevention of pollution of these waters is incumbent on the National Government, as the problem is not only an interstate but an international one." U.S. PUBLIC HEALTH SERVICE, 1909 ANNUAL REPORT (1909).

39. VADE MECUM, *supra* note 34, at 10.

40. *Id.*

1913	The general principle to confer upon the IJC ample jurisdiction to regulate and prohibit this pollution was stated by surgeon Allen McLaughlin of the U.S. Public Health Service in his final report on typhoid on the Missouri River: The pollution of rivers, streams, and lakes within a state may be controlled by State laws. The problem of the control of great interstate and international lakes and rivers is not so simple. They must be considered as a complex entity, and not piecemeal. . . . [T]he problem of pollution of interstate and international waters is so broad and affects so many interests that it necessitates for its equitable and efficient handling a central directing authority independent of local influences or prejudices. This central authority must also have the power to deal with foreign countries and adjust international differences. . . . To treat the problem of pollution of these great interstate and international waterways with justice and equity to all concerned there is a necessity for Federal control.[41]
1920-1948	It took twenty-eight years for the governments to again be concerned about Great Lakes pollution.
1946	Docket 54, similar to Docket 4, 1912, was assigned to the IJC to cover the St. Clair River, Lake St. Clair and Detroit River pollution problems. It was extended in 1946 to include the St. Mary's River, and by Docket 55, 1948 to include the Niagara River.[42]
1948	Great Lakes population and industry had increased immensely since 1912. Few if any adequate sewage treatment plants had been built in the intervening years. The public voice was strong for pollution remedies. As a result, the first comprehensive U.S. Water Pollution Control Statute was enacted.[43]

41. U.S. PUBLIC HEALTH SERVICE, 1913 ANNUAL REPORT 41, 42 (1913).

42. VADE MECUM, *supra* note 34, at 11. The 1946 reference must be read as indicating that nothing of significance had occurred to draw the attention of the two governments to the pollution of the international Great Lakes from 1912 to 1946, other than a concern for the limited area of the connecting channels. Yet, Congress was not unaware of the pollution problem. For example, Congress considered more than 100 pollution control bills between 1900 and 1948, enacted the Oil Pollution Control Act of 1924, 43 Stat. 604, achieved a consensus in the mid-1930s and enacted a water pollution control bill in 1939. It was not signed by President Roosevelt for technical reasons.

In 1939, the first national report on water pollution was produced. Water Resources Committee of the National Resources Committee, Water Pollution in the United States, H.R. DOC. NO. 155, 76th Cong., 1st Sess. (1939). In 1943, the U.S. Army Corps of Engineers and the USPHS produced the Ohio River Report, the first major authorized report on water pollution in a river basin. H.R. DOC. 299, 78th Cong., 1st Sess. (1943).

43. Water Pollution Control Act, Pub. L. No. 80-845, 62 Stat. 1155 (1948).

1964	A new reference (Docket 83) was authorized to study pollution of the lower Great Lakes.
1970	The IJC report (resulting from the 1964 reference) reviewed the concept of water quality objectives contained in the final report submitted to the governments in 1950.[44] The introduction also described the 1964 reference that led to the Great Lakes Water Quality Agreements of 1972 and 1978, and as amended and continued in 1987 with attached protocols.[45]
1992	After an additional 20 years of experience (since the Great Lakes Water Quality Agreement), the IJC once again implored the two governments, in very strong language, to understand and act on the realities of human health dangers from modern pollutants in the Great Lakes ecosystem.[46]

44. INTERNATIONAL JOINT COMMISSION, REPORT: POLLUTION OF LAKE ERIE, LAKE ONTARIO AND THE INTERNATIONAL SECTION OF THE ST. LAWRENCE RIVER (1970).

> The Commission's 1950 Report set forth specific Water Quality Objectives designed to restore and maintain the waters of the Connecting Channels in a condition which would not impair the many uses of them. These objectives, the first of their kind on an international basin, anticipated national action by both countries. The recommendations were approved by the two governments to satisfy the requirements of the Treaty and subsequently were reflected in the pollution abatement programs of enforcement agencies in both countries.

Id. at *introduction.* "However, the Commission's Water Quality Objectives are not being met currently in all reaches of the Connecting Channels because the responsible authorities and industries have not provided sufficient treatment facilities to keep pace with the population growth and with industrial expansion." *Id.* The IJC continued:

> Pollution problems have changed materially over the last fifty years. The increased quantity and the different composition of municipal and industrial wastes in the last two decades as well as the residual characteristics of materials discharged into the lakes have led to dramatic changes in the biological conditions of the lower lakes system.

Id.

45. *Id.* Our analysis suggests this was the first opportunity, within the framework of an official reference, for competent and knowledgeable personnel of the U.S. and Canadian federal governments and the affected states and provinces to tell the foreign offices, through the IJC, what they knew of the pollution problems of the Great Lakes, and they did so. In addition, reports and findings of Great Lakes states and provinces and the Comprehensive Pollution Control Planning Program for the Great Lakes initiated by the USPHS in the early 1960s under the Water Pollution Control Act were drawn upon for up-to-date information on the Detroit River and Lake Erie. It was evident there was no way for the two governments to avoid the drastic action that resulted in the Great Lakes Water Quality Agreement (when compared to the inadequate and limited action that was taken during the preceding 50 years).

46. SIXTH BIENNIAL REPORT, *supra* note 6, at 4 ("[I]t is clear to us that persistent toxic substances have caused widespread injury . . . to human health.").

C. Conclusions

As in 1920, the IJC has brought the people of Canada and the United States and their governments face to face with a critical decision about the kind of institution, and the character of its authority, needed to protect the millions of citizens in the Great Lakes basin from water pollution.

The question posed at the beginning of this issue again surfaces: Do the new conditions require the governments to increase the uses of the treaty in order to conform its "Prevent and Resolve Disputes" objective with the demands of ecosystem management of the international Great Lakes on an anticipatory basis? The response to this question is "yes" and is supported by the findings and conclusions of the IJC's *Sixth Biennial Report*.[47]

A commentator writing twenty-five years ago recognized the need to increase the role and authority of the IJC.[48] His insight remains true twenty-five years later. Something needs to be done.

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47. *See id.* at 5-6.

48. Richard B. Bilder, *Controlling Great Lakes Pollution: A Study in United States-Canadian Environmental Cooperation*, 70 MICH. L. REV. 469 (1972).

> [T]he law governing Great Lake pollution continues to be a complex hodgepodge of proliferating and occasionally inconsistent laws, regulations, and ordinances issued separately by the two federal governments and their various agencies, the eight riparian states of the United States, the Province of Ontario, and the hundreds of cities, towns and other local jurisdictions that exercise relevant authority. This jurisdictional complexity has been a major obstacle in efforts for the coordinated handling of over-all Great Lakes problems.

Id. at 478. Within the enhanced role of the IJC under the Water Quality Agreement, he also notes: "The two governments did not grant the Commission any specific enforcement authority nor did they provide any special procedures for dispute settlement for use in the case of claims of non-compliance with the agreement." *Id.*

While he commends the IJC, he sounds a word of caution about drawing any conclusions from that experience. *Id.* at 520. He suggests the commission has been left relatively free from political pressures by the two governments "principally because until recently they have had only limited interest in its work and have consequently had little reason to exert such pressure." *Id.* He notes the two governments have consistently retained careful control and veto power over the submission and the terms of references and are, in any event, free to reject or to "accept" and ignore the commission's advice. *Id.* at 520-21.

He further observes that with the growing political importance of the problems with which the IJC deals and with the commission's growing responsibilities, "the two governments may in the future prove less inclined to respect its traditional independence. There may be at least some pressures toward its politicization." *Id.* at 521. He further notes that a more politicized IJC might actually enhance its usefulness—a politically responsive commission, he reasons, might even be trusted with regulatory or enforcement power. *Id.*

He concludes with some alternatives beyond the Great Lakes Water Quality Agreement. One would expand the IJC's authority under the existing treaty framework to include authority to establish pollution control standards, to approve or license particular waste disposal facilities and to initiate complaints of non-compliance before the courts or agencies of either country. *Id.* at 546-56.

II. ISSUE TWO: BI-NATIONAL CONTROL AND REGULATION OF POLLUTION

If the two governments agree, as proposed in issue one, to consider the adoption of new institutional arrangements, they must justify their subsequent implementation of stronger, more effective control and regulation over water pollution in the Great Lakes and the other boundary waters. They must consider the practical options available, if any.

A. Summary

The provisions of the Water Pollution Control Act of 1948,[49] while weak, established new federal enforcement policies over the interstate waters of the United States. The nation gained twenty-four years of experience between the 1948 act and the 1972 amendments. The act, completely rewritten in 1972, established the National Pollution Discharge Elimination System to control the discharge of pollutants into U.S. waters.[50]

The twenty-four-year experiment, which began in 1948, yielded several important conclusions. First, it illustrated that implementing interstate pollution control—attempted under five cooperative federal/state designs, each one more stringent than the other—was not working well, or well enough. Second, the implementation of interstate pollution control based on the theory of water quality standards linked to a planning format and a time schedule (an implementing design promulgated by the Water Quality Act of 1965[51] and the Clean Waters Restoration Act of 1966,[52] and its amendments), foreshadowed the demise of this experimental period. These acts:

> presaged the existing water pollution control program. States were given the initial opportunity to develop water quality standards for interstate waters, and plans to implement and enforce those standards, for approval of the Secretary of the Interior as Federal standards . . . . If a state failed to adopt standards, the Secretary was authorized to initiate Federal action to establish standards. In addition, substantial increases in grants for construction of sewage treatment plants were authorized.[53]

Third, the implementing design did not work for a number of reasons: Many, perhaps most, state water pollution control agencies lacked the capacity in resources and technical competencies to undertake these tasks at that time; the establishment of water quality standards and their implementation if water quality

49. Water Pollution Control Act of 1948, Pub. L. No. 80-845, 62 Stat. 1155.

50. Water Pollution Control Act of 1972, Pub. L. No. 92-500, 86 Stat. 816 (codified at 33 U.S.C. §§ 1251-1376 (1988)).

51. Water Pollution Control Act Amendment of 1965, Pub. L. No. 89-234, 79 Stat. 903 (codified at scattered sections of 42 U.S.C.).

52. Clean Waters Restoration Act of 1966, Pub. L. No. 89-753, 80 Stat. 1246 (codified at 42 U.S.C. § 2405).

53. Errol L. Tyler, *Reauthorizing The Federal Water Pollution Control Act*, WATER RES. UPDATE, Spring, 1992, at 7.

fell below the established standards implied the use of a water quality planning program;[54] states failed to set water quality standards, as stated by then-Senator Edmund Muskie, the ranking member of the Senate Committee on Public Works;[55] and the views of the American industrial community recognized the need for competitive even-handedness that a simple and practical national program would bring about.[56]

These notes on water quality standards suggest some questions: (1) Why were they initially considered in the formulation of the Great Lakes Water Quality Agreement? (2) How has that process worked? (3) What is likely to happen under the changing conditions described?

Regarding question (1), the agreement was developed while the concept of water quality standards under the Water Pollution Control Acts of 1965-66 was still the policy of the United States. Such standards were also the basis for the Province of Ontario's program and were in agreement with the joint concerns of the province and the federal government of Canada.[57] Regarding question (2), the process has not worked, as Senator Muskie aptly indicated.[58]

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54. The tasks involved in both were complex. Such a plan normally would require: (1) the source and location of polluting discharges; (2) the character, kind, quantity and effects of such discharges; (3) the water uses to be safeguarded to protect public health and welfare; and (4) an assessment of the value of existing pollution control measures or the determination and sanitary design of needed new control measures. The details involved in developing comprehensive water pollution control basin plans had been described in the 1943 congressionally authorized and funded Public Works Committee's Ohio River Report, H.R. DOC. NO. 266, 78th Cong., 1st Sess. 178 (1943), of the U.S. Public Health Service and the Corps of Engineers.

55. 117 CONG. REC. 38,825 (1971) (statements of Senator Edmund Muskie to Senate Debate on 1971 amendments to Water Pollution Control Act). *See* Water Pollution Control Act of 1972, Pub. L. No. 92-500, 86 Stat. 816. "The legislation recommended by the Committee proposes a major change in the enforcement mechanism—from water quality standards to effluent limits—of the Federal Water Pollution Control Program." 117 CONG. REC. 38,825 (1971).

> Under the 1965 act, water quality standards were to be set as the control mechanism. States were to decide the uses of the waters to be protected, the kinds and amounts of pollutants to be permitted, the degree of pollution abatement to be required, the time to be allowed a polluter for abatement.

Id. "The water quality standards program is limited in its success. After 5 years, many states do not have approved standards." *Id.* "The task of setting water quality standards . . . is lagging. More than 4 years after the deadline for submission of standards, only a little more than half the states have fully approved standards. Of the 54 jurisdictions covered by . . . the program, only 27 have fully approved standards." *Id.* "The Committee recommends the change to effluent limits as the best available mechanism to control water pollution. With effluent limits, the administrator can require the best control technology. He need not search for a precise link between pollution and water quality." *Id.*

56. 117 CONG. REC. 38,825 (1971).

57. Great Lakes Water Quality Agreement of 1978, Nov. 22, 1978, art. 3, U.S.-Can., 30 U.S.T. 1383.

58. *See supra* note 55.

Regarding question (3), the conclusions about public health dangers drawn by the IJC in its *Sixth Biennial Report*[59] require the two governments to reassess the value and use of water quality standards. As the *Sixth Biennial Report* makes clear, the control of persistent toxic materials will require a change in control and regulatory processes.

The use of water quality standards had been challenged earlier. The Report of Sub-Group A of the U.S. Senior Review Group on the 1977 review of the Great Lakes Water Quality Agreement said:

> There is strong disagreement on this question between the U.S. and Canadian members of the Water Quality Board . . . and it will not be an easy item to negotiate into the Agreement.
>
> . . . .
>
> If, however, this one change were made to add a minimum effluent requirement into the Agreement, it would accomplish more for the *control of pollution* than has all other activity to date under the Agreement and allow for meaningful review of progress.[60]

The IJC, in responding to the governments' 1912 and 1964 pollution references (the only ones pertaining to the larger Great Lakes system), has been consistent in its concern for pollution control implementation. In so doing, it has proven the 1920 recommendation that "[i]t is advisable to confer upon the International Joint Commission ample jurisdiction to regulate and prohibit this pollution of boundary waters and waters crossing the boundary."[61]

In the response to the 1964 reference, contained in its 1970 report to the governments,[62] the IJC recommended that the two governments "confer upon this Commission eight specific activities including the responsibility for program *implementation*, and such other duties . . . as may be agreed by the . . . governments."[63] All recommendations in the 1970 report were favored with the exception of the recommendation on *implementation*. As in the 1920 recommendation, no direct powers of implementation, other than the good sense and persuasive characteristics of the commission, were granted or authorized.[64]

The two governments need to recall the fundamental concept stated by the person they selected to be their chief sanitary officer, surgeon Allen McLaughlin, to head the 1912 reference. As McLaughlin stated: "The problem of pollution of interstate and international waters is so broad and affects so many interests that it necessitates for its equitable and efficient handling a central directing authority

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59. *See generally* SIXTH BIENNIAL REPORT, *supra* note 6.

60. UNITED STATES SENIOR REVIEW GROUP, SUB-GROUP A, APPENDIX I TO REPORT OF SUB-GROUP A IN REVIEW OF THE GREAT LAKES WATER QUALITY AGREEMENT 5 (1977) [hereinafter SUB-GROUP A APPENDIX I].

61. VADE MECUM, *supra* note 34, at 10.

62. INTERNATIONAL JOINT COMMISSION, 1970 ANNUAL REPORT (1970).

63. *Id.* at 156 (emphasis added).

64. *Id.*

independent of local influences or prejudices."[65] Surgeon McLaughlin was right. The IJC has been right to follow his views. The staff that designed the Water Quality Agreement, to which the heads of governments added their stamp of approval, was not able to transfer to the Great Lakes Water Quality Agreement of 1978, or include in the Protocol of 1987, the meaning of the twenty-four-year experiment that resulted in the Clean Water Act of 1972. It is time to reconsider.

The United States experimented with federal-state cooperation for twenty-four years with little success. However, during the last twenty-one years, it has achieved substantial success under central federal control through the Clean Water Act. The two governments need to recognize this experience and give thoughtful consideration to needed institutional change as a major contribution to the effective management of water pollution in the international Great Lakes. The IJC's *Sixth Biennial Report* provides the fundamental reasoning why institutional change is a paramount necessity.[66] It deserves careful reading.[67]

B. Recommendations

The two governments must address the changes needed to bring about more effective bi-national, institutional arrangements to administer and implement the control and regulation of water pollution in the Great Lakes and the other boundary waters. The institution should be responsible to the two governments.

While detailed specifications for such an institution are not offered, the institution ought, at the minimum, be: (1) encompassed within the broad and flexible charter of the Boundary Waters Treaty of 1909; (2) responsive to the two governments; (3) empowered to act by the two governments with capabilities to apply appropriate laws and regulations using all usual and necessary legal processes to achieve the purposes specified by the two governments, in addition to the tasks required to understand and plan for the prevention, control, abatement and elimination of water pollution on an anticipatory basis; (4) capable of using processes and authorities now available to the IJC, including information and bargaining, hearings, findings and orders for the management of water levels, water diversions and water allocations, and for application to and supplemented as needed for water pollution control activities; (5) trusted to use the full range and flexibility of authorities specified in the Boundary Waters Treaty; (6) capable of developing cooperative working arrangements with legal departments in federal, provincial and state governments on matters of enforcement involving the courts and in other related matters; (7) an institution not required to "prove the case" as is usual when using "water quality standards"[68]; and (8) required to have adequate management resources to execute the important task to which it is assigned.

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65. U.S. PUBLIC HEALTH SERVICE, 1913 ANNUAL REPORT 41 (1913).

66. SIXTH BIENNIAL REPORT, *supra* note 6, at 1.

67. *See id.* at *cover*, 1. "Are humans and our environment in danger from persistent toxic substances now? . . . Are future generations in danger? . . . Based on a review of scientific studies and other recent information, we believe the answer to both questions is yes." *Id.*

68. 117 CONG. REC. 38,825 (1971).

On the U.S. side, and because IJC has concluded that a direct public health concern is present, this matter should be a primary concern to the executive office of the president's new Office of Environmental Policy and the Office of Science and Technology Policy. It also should be a primary concern to members of the congressional Great Lakes Caucus and specifically, to the Chairman of the Senate Committee on Governmental Affairs.[69]

Specifying priorities for specific Canadian governmental entities is more difficult, although testimony has been offered in earlier years before the Senate Parliament Committee on Foreign Affairs on United States-Canada Relations regarding Great Lakes management matters. It is anticipated that members of Parliament and the Ontario government have been alerted to the report "Toxic Chemicals in the Great Lakes and Associated Effects,"[70] which states that "toxic chemicals found in the Great Lakes can have subtle effects on cellular metabolism."[71] These "may not be adverse health effects in themselves and their ability to predict the eventual occurrence of adverse health effects is unclear."[72] Nonetheless, such subtle effects "are undesirable and support the need for a reduction in our exposure to such substance[s]."[73]

SELECTED EVENTS FOR ISSUE TWO: BI-NATIONAL CONTROL AND REGULATION OF POLLUTION[74]	
1824	Federal control over navigable waters (water quantity) was in place for 150 years prior to adopting a policy for federal control over water quality in 1972.[75]
1888	Congress authorized federal control of certain pollutants in New York harbor.[76]
1899	Congress authorized federal control of certain pollutants in navigable waters.[77]

69. *See* GOVERNMENT ACCOUNTING OFFICE, REPRODUCTIVE AND DEVELOPMENTAL TOXICANTS, REGULATORY ACTIONS PROVIDE UNCERTAIN PROTECTION (1991) (reporting on toxins in the Great Lakes).

70. DEPARTMENT OF FISHERIES AND OCEANS & HEALTH AND WELFARE CANADA, ENVIRONMENT CANADA, TOXIC CHEMICALS IN THE GREAT LAKES AND ASSOCIATED EFFECTS (1991).

71. *Id.*

72. *Id.*

73. *Id.* The IJC took this statement into account in arriving at its conclusion on the public health danger reported earlier.

74. The recommendations and related commentary from earlier notes are not repeated.

75. Survey Act, 4 Stat. 34 (1824).

76. Rivers and Harbors Act, 25 Stat. 400, 401 (1888) (expanding the act of 1886, which prohibited the deposit of refuse matter in New York harbor, to cover all matter other than that flowing from streets and sewers in a liquid state).

77. Rivers and Harbors Act, 30 Stat. 1121, 1152 (1899) (prohibiting the deposit of refuse matter that would impede or obstruct navigation in any navigable water of the United States).

1912	Congress authorized research "including sanitation and sewage and the pollution either directly or indirectly of the navigable streams and lakes of the United States."[78]
1924	Congress adopted the Oil Pollution Control Act.[79]
1948	Congress enacted the Water Pollution Control Act, the first comprehensive statute on water pollution that included a new policy of federal enforcement.[80]
1912-1948	By way of recapitulation, the record of federal legislative action over thirty-six years is not indicative of the interest expressed in Congress about the nation's water pollution problems.[81]
1948-1972	While the federal enforcement provisions of the 1948 act were acknowledged as weak, they were important in establishing a new federal policy for the interstate waters of the United States applicable to surface and ground waters.[82]

78. Public Health Service Act, 37 Stat. 309, 309 (1912).

79. Oil Pollution Control Act, 43 Stat. 604 (1924).

80. Water Pollution Control Act, Pub. L. No. 80-845, 62 Stat. 1155 (1948).

81. Alerted by oil pollution, legislators introduced 16 bills and resolutions during 1921-22. Concern was directed to the destruction of fish and oysters, beaches and fire hazards at harbors and docks. Testimony on the Oil Pollution Control Act and other bills introduced in 1923-24 raised added concerns and sought the prevention of pollution in the inland navigable waters from oil fields, oil wells and oil storage, and for the protection of game, fish and public health. Also stressed was the fact that on interstate streams, these concerns could not be controlled through local action. Interest continued during the next five Congresses (1925-35), calling attention also to prohibiting acid wastes, requesting the Forest Service to seek practical methods for disposal of pulp and paper mill wastes and prohibiting the deposit of refuse damaging to navigation, health or seafood. H.R. Doc. 1062, 71st Cong., 2d Sess. (1929-31) got to the hearing stage and provided for expanding the Oil Pollution Control Act to include inland waters and the Great Lakes, the protection of migratory wild fowl and winter food supply of wild birds.

82. Interstate waters were defined to mean "all rivers, lakes, and other waters that flow across, or form a part of, State boundaries," including pollution discharges that flow directly into such waters or indirectly as a discharge into tributaries of such waters. Water Pollution Control Act, Pub. L. No. 80-845, 62 Stat. 1155, 1161 (1948). Pollution was broadly defined as "endangering the health or welfare" of persons. 62 Stat. 1155, 1156. It is to be noted that, notwithstanding the new statement of enforcement policy, "its exercise of jurisdiction over the waterways of the Nation" and its leaning on the public health and welfare clauses of the Constitution, Congress also declared its policy to "recognize, protect and preserve the primary responsibilities and rights of the States in controlling water pollution." 62 Stat. 1155, 1155. Concurrent jurisdiction was not a problem, and federal-state cooperation was necessary, absent the clear assignment of responsibility.

1965	An alternative to the complex water quality standards planning and implementation program was proposed as "a simple and uncomplicated process . . . that the Congress consider the establishment of a positive national policy . . . [of] a basic level of secondary treatment as a national floor for sewage and industrial waste."[83] This alternative was adopted in the 1972 Clean Water Act as the "interim goal for the statutory goal of . . . the elimination of the discharge of pollutants . . . into the Nation's waters."[84] This continues to be national policy, augmented by water quality standard requirements when abatement measures beyond that achieved by secondary treatment are required. In addition President Johnson had specified as a requirement for federal installations: "Federal installations shall provide secondary treatment or its equivalent."[85]
1972	Twenty-four years of experience under the 1948 act—modified, expanded and strengthened through five amendments in 1956,[86] 1961,[87] 1965,[88] 1966,[89] 1970[90] and 1972[91]—represented slow but persistent legislative steps toward a new strategy by 1972 in the U.S. Federal Water Pollution Control Program.[92]
1977	The use of water quality standards was challenged by others.[93]

83. WHITE HOUSE CONFERENCE ON NATURAL BEAUTY, PANEL ON WATER AND WATERFRONTS 145 (1965).

84. Water Pollution Control Act of 1972, Pub. L. No. 92-500, 86 Stat. 204 (referring to the Clean Water Act, Pub. L. No. 92-500, 86 Stat. 816).

85. Exec. Order No. 11,288 (1966).

86. Water Pollution Control Act Amendment of 1956, Pub. L. No. 84-660, 70 Stat. 498.

87. Water Pollution Control Act Amendment of 1961, Pub. L. No. 87-88, 75 Stat. 204.

88. Water Pollution Control Act Amendment of 1965, Pub. L. No. 89-234, 79 Stat. 903.

89. Clean Waters Restoration Act of 1966, Pub. L. No. 89-753, 80 Stat. 1246.

90. Water Pollution Control Act Amendment of 1970, Pub. L. No. 91-224, 84 Stat. 2086.

91. Water Pollution Control Act Amendment of 1972, Pub. L. No. 92-500, 86 Stat. 204.

92. The following is important to understanding the new strategy:

> The Water Pollution Control Act was completely rewritten in 1972. . . . Municipalities were required to achieve secondary treatment of sewage. Industry was required to install the best practicable pollution control technology followed by the best available treatment technology economically achievable. . . . And, where this technology does not result in water quality standards being met, more advanced treatment is necessary. The National Pollutant Discharge Elimination System was established requiring permits from the Environmental Protection Agency, or a state with an EPA-approved permit program, for the discharge of pollutants into the waters of the United States. States were required to adopt and enforce water quality standards, utilizing criteria and guidance developed by EPA setting designated uses of water bodies and permissible levels of uses to ensure those uses.

Tyler, *supra* note 53, at 7-8. These standards were to be applied if technology-based requirements were not adequate. See 117 CONG. REC. 38,825 (1971).

93. As a review group of the water quality agreement stated:

> Considerable time has been spent by the Water Quality Board and IJC on refined objectives for water quality as envisaged in the Agreement. The Board has taken the position that water quality objectives should protect the most sensitive use and most such objectives are based on scientific evidence relating to biological effects.

SUB-GROUP A APPENDIX I, *supra* note 60, at 2. "While the need for numerical objectives (or in the United States, criteria for standards) of water quality has been well established, the purpose for which such numbers are used *under the agreement* has not been of much value." *Id.* at 2-3.

> Considerable time has been devoted to discussion and creation of an array of 'pigeon holes' such as mixing zones, zones of influence, source control zones, areas of non-compliance, biological sensitive areas, environmental value mapping, near-shore zones, open water zones, etc.
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> . . . .
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> Whether intentional or not, this has led to a diversion from the real issues and the essence of the program in the United States, i.e., the implementation and enforcement of policy. The real issues should be: what requirements are imposed by the parties and jurisdictions *to control the addition of pollutants*; how are they enforced and how effective have such programs been. The latter question, i.e., how effective have such programs been, should not be a judgment call by jurisdictions, but rather by complete disclosure of all discharges; whether or not they have a *legally enforceable permit*; whether or not they have *legally enforceable effluent standards*, whether or not they have *legally enforceable construction schedules* to attain compliance; whether they are at present in compliance and if not, when they will be.
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> . . . .
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> In order to make any such comparison meaningful, there must be an agreed upon minimum treatment requirement that incorporates an effluent quality standard. This is the heart and soul of the U.S. program and comparisons of progress against any lesser requirements should be rejected.

Id. at 3. "What has been disheartening is that we have allowed a comparison to be made of the relative effectiveness of the U.S. and Canadian programs using general water quality 'objectives' of open water and leaving it up to the jurisdictions to decide if their programs will meet such objectives." *Id.* at 4.

> That is about where the U.S. program stood in the period 1965-1972 under the 1965 Federal Water Quality Act, which mandated a national water quality program. Public Law 92-500 changed that and the program now relies on effluent standards and best treatment technology. That program is assured under a rigid permitting program shared by the state and federal government.

Id.

> What is a fair treatment requirement on one side of the lakes should be fair for the other as well, and whether that turns out to be the U.S. minimum treatment requirements . . . or something different, the important point is that an agreed upon minimum effluent requirement is needed to make any meaningful comparison of the effectiveness of control programs which can be the only measure of joint progress under the Agreement.
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> . . . .
>
> There is strong disagreement on this question between the U.S. and Canadian members of the Water Quality Board . . . and it will not be an easy item to negotiate into the Agreement.

III. ISSUE THREE: ECOSYSTEM MANAGEMENT OF THE GREAT LAKES

Can ecosystem management of the Great Lakes—under an ecosystem defined by and limited to water quality by a legal instrument adopted by the two governments—be expanded to encompass an ecosystem defined by nature and the cultural impacts of humans? How would such an enlarged ecosystem be defined specifically? Could it be justified? Is it timely and how should it evolve?

Issue one concerned the governments' "will to change" when confronted with new conditions.[94] Issue two exemplified the urgent need to move toward direct bi-national control, regulation and authority over water pollution, a problem that has reached crisis proportions. Issue three, less urgent and with no proposed requirement for direct control and regulatory authority, but nonetheless critical, exemplifies the need for change to achieve the long-term objective of sustained development in the Great Lakes basin.[95]

A. Summary

University faculty and others in Canada and the United States have furthered understanding about the need for, and characteristics of, a Great Lakes ecosystem management strategy for the long-term by the Canadian and U.S. governments. An original report recommended that the governments adopt this strategy.[96] A first step would be to authorize an overview study of current and foreseeable problems involving the Great Lakes, that is, developing a Great Lakes perspective, in order to determine more specifically the nature of the long-term management tasks, the nature and relative importance of task linkages (everything is connected to everything else, but all connections are not of the same importance) and to consider priority options.[97]

Such a strategy has not yet formally been adopted.[98] It is evident, however,

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If, however, this one change were made to add a minimum effluent requirement into the Agreement, it would accomplish more from the control of pollution than has all other activity to date under the Agreement and allow for meaningful review of progress.

Id. at 5.

94. PROPOSAL FOR IMPROVING MANAGEMENT, *supra* note 17, at 51.

95. *See generally* Leonard B. Dworsky, *Ecosystem Management: Great Lakes Perspectives*, 33 NAT. RESOURCES J. 347 (1993) (discussing this issue in one of the commissioned papers).

96. PROPOSAL FOR IMPROVING MANAGEMENT, *supra* note 17, at 51.

97. *Id.*

98. *See* THEODORA E. COLBORN ET AL., GREAT LAKES: GREAT LEGACY? (1990). In 1990, the Conservation Foundation of Washington, D.C. and the Institute for Research on Public Policy (IRPP) of Ottawa, Canada, could no longer wait for the two governments. *Id.* It stated:

> Foundation staff believed that data about environmental conditions in the Great Lakes Basin were plentiful but needed to be better organized and made more accessible to decision makers and the public; a single, well-documented volume would promote public understanding of environmental trends and help identify needs for new policies and programs.

that both the IJC and the two governments have taken important steps leading to the evolution of such a strategy. The additional steps needed to further such a strategy which recognizes the unity of the Great Lakes on an ecosystem basis, defined to include water (quality and quantity), air, land and biological and social systems including humans, are considered in this discussion.

A record of the evolution toward the ecosystem approach is provided in the Table of Selected Events for this issue. Several of the IJC's important contributions to this record are illustrated in the following:

1979	The IJC-sponsored Science Advisory Board's *Workshop on Anticipatory Planning for the Great Lakes* called for the development of a Great Lakes perspective and for a Standing Board on Information Acquisition and Analysis to gather, integrate and interpret Great Lakes data and problems in order to improve the IJC's capability to advise governments on needed programs and policies.[99]
1985	The IJC directed an advisory—hereinafter referred to as the advisory—to the two governments in January 1985.[100]
1989	A commentary was submitted by the IJC to the two governments. The significance of this IJC commentary is that it was contained as a part of the commission's *Fourth Biennial Report* issued under the authority of the Great Lakes Water Quality Agreement.[101] The commentary extends beyond the restricted authority of water quality.[102]

Id. The foundation's statement could not have been better. Foundation staff members are to be complimented for identifying the needed task and for undertaking its presentation. In view of the complexity of the Great Lakes situation, not the least of which is its bi-nationality, it would seem that the governments of Canada and the United States should have reached the same conclusion and authorized such a report during the 20 years since the Water Quality Agreement was signed in 1972. The two governments have no excuse for not having addressed the need to prepare a comprehensive report from a Great Lakes perspective as was attempted by the two private institutions.

99. INTERNATIONAL JOINT COMMISSION SCIENCE ADVISORY BOARD, WORKSHOP ON ANTICIPATORY PLANNING FOR THE GREAT LAKES 14 (1979) [hereinafter ANTICIPATORY PLANNING].

100. INTERNATIONAL JOINT COMMISSION, GREAT LAKES DIVERSIONS AND CONSUMPTIVE USES 41-48 (1985) [hereinafter ADVISORY].

> Notwithstanding the thorough work of the Study Board . . . the Commission . . . is not satisfied with ending its response to the reference at this point. To provide a broader and more appropriate context within which to address the longer-term prospects for the use of Great Lakes water, it seems desirable to consider a wider range of issues within the spirit and intent of the reference. These include the following:
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> . . . .
>
> —the need to consider the *interrelationship of Great Lakes water quantity and water quality in the context of an ecosystem*, including the *other than economic importance* of this vast body of water to the millions of people who live and will live in the basin.

Id. at 41 (emphasis added).

101. INTERNATIONAL JOINT COMMISSION, FOURTH BIENNIAL REPORT (1989).

The IJC could not be more clear in its advice to the two governments: What is required for the long-term management of the Great Lakes basin is *ecosystem management*. Thus, the two governments must devise institutional arrangements and capabilities appropriate to the tasks of such a program.

Professor George Francis of Waterloo University has clarified the distinction between environmental management and ecosystem management.[103] The former, he notes, is characterized more by the ideas of regulatory and related measures to reduce pollution of water, air and land.[104] The latter encompasses goals for ecological sustainability, the ideas for which emerged from the World Conservation Strategy in 1980, reinforced by the World Commission on Environment and Development in 1987.[105] These goals include: maintenance of essential ecological processes; conservation of biological diversity; and the sustainable use of renewable resources.[106] He concludes that while environmental management is more directly associated with environmental protection through modest reform measures, ecosystem management is associated with ecological sustainability and a general belief that more substantial social change is required to achieve this.[107]

Lynton Caldwell has outlined five implications pertaining to necessary ecosystem management institutional arrangements.[108] These implications are: (1) "coordinated scientific work, including research"[109]; (2) "[c]onventional institutional assumptions and arrangements will be stressed by demands for action beyond the competence of existing agencies to respond"[110]; (3) "a purposeful and articulate transnational constituency"[111]; (4) "[i]nstitutional innovations must

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102. The commentary stated:

> Since . . . 1972, substantial progress has been made in abating specific pollution problems affecting the Great Lakes.
>
> [H]owever . . . even as progress is being made . . . our understanding of the problem is changing.
>
> The . . . need for an ecosystem approach in the 1978 Agreement, extended . . . in the 1987 Protocol, indicates . . . that narrow analyses, without considering their overall context and the variety of linkages within the ecosystem, will no longer be adequate.
>
> The Commission . . . must be concerned with long term as well as short term consequences.
>
> As the relationships . . . between the physical-chemical, biological, economic and social systems become clearer, the wisdom of an ecosystem approach becomes more obvious.

Id. at 48-53.

103. George Francis, *Ecosystem Management*, 33 NAT. RESOURCES J. 315, 315 (1993).

104. *Id.* at 328.

105. *Id.* at 321.

106. *Id.* at 317.

107. *Id.*

108. L.K. Caldwell, *A Reader*, *in* PERSPECTIVES ON ECOSYSTEM MANAGEMENT FOR THE GREAT LAKES 1 (L.K. Caldwell ed., 1988).

109. *Id.* at 18.

110. *Id.*

111. *Id.*

be appropriate and responsive to the environmental problems of the lakes"[112]; and (5) "[a]n authoritative institution for Great Lakes management is more likely to evolve piece by piece in response to demonstrated needs than to be created as a fully developed entity."[113]

As noted in the *Ecosystem Approach*:

> There is no one-time solution to the problems in the Great Lakes Basin Ecosystem. The ecosystem approach will not lead us to action that will do the single best thing. Rather the ecosystem approach is a process that keeps identifying problems of various sorts and puts pressure on them so as to improve the situation. Then things will be better, which is all we can reasonably call success. If we aim to do it once for all we will fail, and then give up the whole enterprise.[114]

This statement, together with the last "implication" above, emphasizes the intent of issue three. They are the primary guides to the formulation of recommendations.

B. Recommendations

A new opportunity exists to devise means to manage the Great Lakes as an integrated ecosystem. This opportunity builds on the strengths already in place or developing for managing a Great Lakes integrated ecosystem. Some of the strengths are: experience under the Great Lakes Water Quality Agreement; commitment to the ecosystem approach; and perceptions and philosophies expressed by the IJC concerning the need for a broader ecosystem approach and the likelihood of governments adopting these views for early action.

Specifically, it is proposed:

1. The two governments should authorize an overview study of the Great Lakes to gain a Great Lakes perspective—a study for which essentially all needed information is separately available on a national basis (also proposed Phase One of the Lake Levels Reference Report). A compilation of available information will enable the governments to achieve an ecosystem perspective of the Great Lakes, to identify issues, to define issue relationships and to establish priorities.[115]

The governments will not be risking much if they authorize the IJC to pursue such a task, either by reference or by some other vehicle that can combine the efforts of the two governments.

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112. *Id.*

113. *Id.*

114. *See generally* THEORY AND ECOSYSTEM INTEGRITY, *supra* note 11.

115. *See generally* INTERNATIONAL JOINT COMMISSION ECOSYSTEM STUDY BOARD (SIMULATED), THE GREAT LAKES OF THE UNITED STATES AND CANADA: AN ADVISORY REPORT TO THE GOVERNMENTS OF UNITED STATES AND CANADA (1985) [hereinafter SIMULATED ECOSYSTEM STUDY BOARD] (prepared by seminar students under the guidance of faculty members David Allee and Leonard Dworsky).

2. Non-governmental organizations and the states and provinces should use such information to advance the underlying goal of designing institutional improvements in the management arrangements for a Great Lakes integrated ecosystem. Ultimately, the public needs new understanding; institutional forms and policies need to change. What may be most useful now is not new authority and regulation, but a form of leadership that can provide competent and acceptable guidance to the existing systems in a continuing manner and at a rate commensurate with public and official acceptability.

3. The two governments should authorize the IJC to establish such a leadership institution in the form of an Ecosystem Study Board through the usual reference process to study what needs to be done to further the implementation of an integrated ecosystem approach for the long-term management of the Great Lakes.

The board should be considered a continuing study and advisory body to the IJC and, through it, to the governments. Objective advice with a broad horizon is needed to stimulate and support the federal systems of the two governments to further the integrated ecosystem approach to Great Lakes management. The board will consult with governments, the IJC, other boards and others to develop a realistic agenda.

The governments can terminate the board at will, depending on a periodic assessment of its value and use in furthering its basic objective. Board composition should, over time, encompass the interests that define the Great Lakes integrated ecosystem. Workshops, conferences and board committees will provide means to seek the knowledge needed to advance ecosystem thought and implement action in future years. The experience of the Ecosystem Committee of the Science Advisory Board and the procedures used in the *Workshop on Anticipatory Planning for the Great Lakes*[116] will be useful to review.

4. By providing guidance for implementation, the governments can facilitate the integrated ecosystem approach without recourse to new authority or law. Governments can authorize the IJC, using the Ecosystem Study Board as a resource, to provide informational guidance on matters such as problem definition, solutions to problems using expert panels and the provision of standard models. Models might apply to matters such as land use management to avoid high (or low) water level damage, wetlands definition and conservation methods, coordination of some aspects of fishery policies such as those related to public health dangers, techniques for erosion control, land use guidance relative to energy development and matters pertaining to recreation. In addition, the models can direct the information to the appropriate level of government.

Benefits stem from the IJC, a respected neutral agent of the two national governments that makes recommendations for the good of the entire Great Lakes region. Leadership of this kind will find a favorable response among the Great Lakes communities at relatively little cost to the governments. Staffing could start modestly, building with experience.

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116. *See generally* ANTICIPATORY PLANNING, *supra* note 99.

5. Structural change in Great Lakes management institutions should be undertaken with care and only when the nature of needed change becomes well defined. An Ecosystem Study Board will, in time, help assess the need for new institutions. With improved information about issues and needs on an ecosystem basis, and with experience, time and patience, institutional characteristics will evolve.

To date, governments have made impressive progress toward the utilization of an integrated ecosystem management approach for the long-term management of the Great Lakes. But the constraints against further utilization involving political institutions, existing laws and regulations and financial matters are real. The governments cannot ease their way past these obstacles as easily, and with unlimited time, as they have with past obstacles.

A definite institutional center is needed to provide leadership under government guidelines and to overcome and move beyond the obstacles. Leaders—public and private—need to support the IJC and request that the governments first redefine integrated ecosystem management for the Great Lakes on a basis broader than, but including, Water Quality and, second, *initiate improved implementation* of ecosystem management by adopting and supporting the previously mentioned recommendations.

New reference authority to the IJC and the creation of an Ecosystem Study Board (or under any other name or other specifications for comparable purposes) will encourage the exploration of ways to ensure effective Great Lakes integrated ecosystem management.

SELECTED EVENTS FOR ISSUE THREE: ECOSYSTEM MANAGEMENT OF THE GREAT LAKES	
1965	*Canada and the United States-Principles For Partnership* examined the wisdom of "some expansion of the [IJC's] functions."[117]
1965	Ten Republican members of the House of Representatives proposed the IJC be given a leading role in fulfilling the "obvious need for comprehensive advance planning in the development of water resources."[118]
1968	MacLaren and Clevinger proposed a comprehensive integrated approach for seven water use categories.[119]

117. LIVINGSTON T. MERCHANT & A.D.P. HEENEY, CANADA AND THE UNITED STATES-PRINCIPLES FOR PARTNERSHIP, DEPARTMENT OF STATE BULL. NO. 193-207 (Aug. 1965).

118. 111 CONG. REC. 25,394 (1964).

119. J.W. MACLAREN & R.F. CLEVINGER, PROCEEDINGS OF GREAT LAKES WATER RESOURCES CONFERENCE 361-89 (1968). The conference was held June 24 and 26, 1968, in Toronto, Canada. The seven water use categories discussed are domestic water supply, waste disposal, navigation, power development, agricultural irrigation, fisheries and recreation. *Id.* "Unless a comprehensive plan for the staged development of Great Lakes water and related land use is effectuated, all problems will become increasingly complex and difficult." *Id.*

1971-1972	The first Canada/United States interuniversity seminar was held. Faculty members from sixteen universities recommended that: "The governments of the United States and Canada should initiate, on a joint basis, a comprehensive examination of the problems associated with multiple purpose management of the Great Lakes . . . ."[120]; seminar proposals should be used by the two governments "as a basis for initiating discussion and debate on the modernization of the management of the Great Lakes."[121] Fifteen resource management issues were identified, of which eight were primarily of bi-national importance.[122]
1972	The Great Lakes Water Quality Agreement between the United States and Canada was signed.[123]
1975	A Canadian parliamentary report proposed two recommendations to be implemented jointly with the United States[124]: First, the IJC should be given authority to make on its own initiative preliminary assessments of potential pollution problems along the boundary and to suggest to the two governments that a reference should be made.[125] Second, the IJC should have extended power to publicize all its recommendations as it has under the Great Lakes Water Quality Agreement for that area.[126]
1977	The Research Advisory Board of the IJC urged the IJC to adopt the broader concept of "ecosystem quality" rather than that of "water quality" in evaluating Great Lakes degradation.[127] The IJC responded by proposing that the "ecosystem approach" be considered as complementing rather than replacing water quality objectives.[128]

120. PROPOSAL FOR IMPROVING MANAGEMENT, *supra* note 17, at 51.
121. *Id.*
122. *Id.* at 42. The tasks are integration of water quality and water quantity, navigation, lake levels and flows, diversions and consumptive uses, fisheries, energy, air quality and shoreland use. *Id.*
123. Great Lakes Water Quality Agreement, Apr. 15, 1972, U.S.-Can., 23 U.S.T. 301.
124. STANDING SENATE COMMITTEE ON FOREIGN AFFAIRS, CANADA-UNITED STATES RELATIONS: THE INSTITUTE FRAMEWORK FOR THE RELATIONSHIP, Comm. Print No. 10 (1975).
125. *Id.* at 42.
126. *Id.* at 43.
127. *See generally* INTERNATIONAL JOINT COMMISSION RESEARCH ADVISORY BOARD, 1977 ANNUAL REPORT (1977).
128. *Id.*

1978	The Research Advisory Board recommended that the governments and the IJC "explicitly recognize as policy the need for an ecosystem approach to problem identification, research and management in the Great Lakes Basin"[129] and "that the governments extend or amend the Boundary Waters Treaty of 1909 and the Water Quality Agreement of 1972 in accordance with the philosophy of the ecosystem approach outlined in this report."[130]
1978	"[T]he Commission support[ed] the Research Advisory Board's recommendation . . . . The Commission endorse[d] as policy the need for an ecosystem approach to problem identification, research and management in the boundary waters of the Great Lakes Ecosystem. Further the Commission urge[d] the Parties (governments) to undertake a thorough review of the views and philosophies in the board's report for consideration of adoption of these recommendations."[131]
1978	The second Great Lakes Water Quality Agreement was signed. Governments included the ecosystem concept formally as part of the agreement.
1978	The second session of the Canada-U.S. interuniversity seminar recommended strengthening the role of the IJC to achieve integrated problem analysis of the Great Lakes so that proposed solutions may better fit existing and future conditions.[132] Participants also recommended that the two governments formulate a science policy for the Great Lakes as an indication of their commitment to restore, rehabilitate and improve the management of the lakes and to support the development of new knowledge needed to achieve those ends.[133]

129. INTERNATIONAL JOINT COMMISSION RESEARCH ADVISORY BOARD, 1978 ANNUAL REPORT (1978).

130. *Id.*

131. INTERNATIONAL JOINT COMMISSION, FIRST BIENNIAL REPORT (1978).

132. CANADA-UNITED STATES INTERUNIVERSITY SEMINAR ON THE GREAT LAKES, SECOND SESSION (1976) [hereinafter SECOND SESSION].

133. *Id. See generally* Leonard B. Dworsky, *The International Joint Commission—A Critique, in* PROCEEDINGS OF THE CANADA-UNITED STATES NATURAL RESOURCES AND ENVIRONMENTAL SYMPOSIUM (John Carroll & Diane Carroll eds., 1978).

1979	The Science Advisory Board (SAB) acted rapidly to recommend that the IJC implement Article vii(6) of the 1978 Water Quality Agreement to ensure that "all facets and concerns of the Great Lakes Basin Ecosystem . . . are adequately considered."[134] In the 1979 and subsequent annual reports, the SAB brought forward the problems of long-range transport of airborne pollutants, acid rain, short- and long-term economic costs, energy conservation and the reduction of energy demand (1981), the need to identify energy alternatives to effect the achievement of overall environmental quality and to promote the development and use of such alternatives (1981), groundwater contamination (1982) and socio-economic considerations in light of the effect of water management policies and other developmental decisions.
1979	The IJC's SAB *Workshop on Anticipatory Planning for the Great Lakes* called again for the development of a Great Lakes perspective and for a standing board on Information Acquisition and Analysis to gather, integrate and interpret Great Lakes data and problems to improve IJC capability to advise governments on needed programs and policies.[135] The workshop recognized that the complexity of integrated management of the Great Lakes would require that priorities be established based on more detailed studies of program linkages, that such program linkages would need to reflect the interrelationships of water, land, the atmosphere, plant and animal life and the effect of human behavior, that the long-term planning and management of the Great Lakes called for integrated ecosystem management and that institutional arrangements and capabilities would have to be devised by the two governments appropriate to the tasks of the future. In its *Seventh Annual Report*, the IJC commented: "There is considerable value . . . in shifting some emphasis towards the future in order to try to anticipate and prevent problems rather than simply react to them."[136] For this reason, the IJC supported the anticipatory planning workshop in March 1979. The IJC was to review the findings of this workshop with respect to possible IJC actions in the future.

This long record of change in perspective, philosophy and content by the Great Lakes community, the IJC and the two governments on the management of the Great Lakes since 1972 is impressive. Substantial progress has taken place in enlarging the scope of Great Lakes management strategies.

In the advisory, the IJC provided a report to the governments of the United States and Canada, under a reference of 1977, on *Great Lakes Diversions and Consumptive Uses*.[137] Part one of the report contains the IJC's findings and

134. INTERNATIONAL JOINT COMMISSION SCIENCE ADVISORY BOARD, 1979 ANNUAL REPORT (1979).
135. *See generally* ANTICIPATORY PLANNING, *supra* note 99.
136. INTERNATIONAL JOINT COMMISSION, SEVENTH ANNUAL REPORT (1979).
137. ADVISORY, *supra* note 100.

recommendations.[138] In part two, the IJC offered an advisory to the two governments.[139]

1985	An advisory directed to the two governments in January, 1985 was to be viewed as unique and of substantial significance.[140]

The advisory was written by the IJC in the context of *Diversions and Consumptive Uses* and was concerned with water quantity. The overriding significance of the IJC commentary is that it is a part of the commission's *Fourth Biennial Report* issued under the authority of the Great Lakes Water Quality Agreement. It extends beyond the restricted authority of water quality and speaks out to again reflect the basic thought included in the 1985 advisory that blended the programmatic needs of water quality with water quantity and other Great Lakes-related matters.

1989	The IJC *Fourth Biennial Report* of March 1989 contained useful commentary.[141]

138. *Id.* at 25, 37, 39.

139. *Id.* at 41-48. Extracts of the advisory follow: "In Part 1, . . . the Commission responded principally to the physical-engineering aspects of the 1977 Reference . . . ." *Id.* at 41.

> Notwithstanding the thorough work of the Study Board . . . the Commission . . . is not satisfied with ending its response to the reference at this point. To provide a broader and more appropriate context within which to address the longer-term prospects for the use of Great Lakes water, it seems desirable to consider a wider range of issues within the spirit and intent of the reference. These include the following:
> —the legal framework, . . .
> —longer-term climatic variations and structural economic change . . .
> —the need to consider the *interrelationship of Great Lakes water quantity and water quality in the context of an ecosystem*, including the *other than economic importance* of this vast body of water to the millions of people who live and will live in the basin.

Id. (emphasis added).

> In this part of the Report, . . . the Commission will turn its attention to the human, the historical, the diplomatic, the legal, the economic and the climatic considerations. . . . Our intent is to assist Governments in an area where the requirement[s] may not be just for a series of immediate, practical recommendations but also for observations and counsel that may bear on longer-term development.

Id.

140. *See* SIMULATED STUDY BOARD, *supra* note 115, at 127.

141. INTERNATIONAL JOINT COMMISSION, FOURTH ANNUAL REPORT (1989).

> Since . . . 1972, substantial progress has been made in abating specific pollution problems affecting the Great Lakes.
> [H]owever . . . even as progress is being made . . . our understanding of the problem is changing.

1985-1987	As an aid to governments, faculty and students at Cornell University decided to simulate the application of an ecosystem approach of appropriate scale and functions to the long-term management of the Great Lakes basin. From 1984 to 1987, a seminar adopted a role as a simulated Ecosystem Study Board (ESB) appointed by the IJC.[142]

The . . . need for an ecosystem approach in the 1978 Agreement, extended . . . in the 1987 Protocol, indicates . . . that narrow analyses, without considering their overall context and the variety of linkages within the ecosystem, will no longer be adequate.

The Commission . . . must be concerned with long term as well as short term consequences.

As the relationships . . . between the physical-chemical, biological, economic and social systems become clearer, the wisdom of an ecosystem approach becomes more obvious.

[T]he Commission has encouraged the adoption of anticipatory and preventive strategies since its 7th Annual Report under the 1972 Agreement.

In response to a 1978 Science Advisory Board workshop the Commission observed that there is value in shifting emphasis toward the future and away from short term considerations in order to anticipate and prevent problems rather than simply react to them.

The SAB also addressed the "anticipate and prevent" theme in its 1987 report noting its implication for examining socio-economic issues related to the integrity of the Great Lakes Basin Ecosystem.

In its 1985 Report on Great Lakes Diversions and Consumptive Uses, the Commission explicitly went beyond the immediate issues to express concern about how to deal with a non-linear future. That future can be expected to be one that will be impacted by unexpected and unpredictable changes which have their origins either within or outside the Great Lakes Basin. . . . [C]hanges from past trends should not only be anticipated by planners, but will require a management approach responsive to a wide range of societal needs and adaptive to unexpected change. These same concerns are as applicable to (Water Quality) Agreement-related activities as they are to water quantity issues addressed in that report.

There are a number of specific future issues requiring anticipatory strategies that the Commission wishes to draw to the attention of Governments. . . . These are Climate Change; The Chemical Dilemma; Emerging Technology; Economy-Environment Perspectives;and Focusing On The Great Lakes.

Regarding Economy-Environment Perspectives, the positive links between environmental and economic considerations in decisionmaking are increasingly being recognized. . . . [T]he Great Lakes Water Quality Agreement itself incorporates this critical relationship by specifying that the Water Quality Board should examine programs "in the light of present and future socio-economic imperatives." This aspect of the Board's Terms Of Reference has received little explicit attention to date, and the linkage of environmental prerequisites to economic well being through the protection of beneficial uses has been emphasized in the 1987 Protocol. The Commission believes that if the integrity of the Great Lakes Basin Ecosystem is to be maintained in the face of increasing population, demands for Great Lakes basin water and other resources, and industrial development pressures, present and future socio-economic as well as environmental imperatives must in fact be addressed concurrently and in a systematic way.

Id. at 48-53.

142. SIMULATED ECOSYSTEM STUDY BOARD, *supra* note 115. The ESB established a three-point program to illustrate practical steps the two governments could follow to address the longer-

term prospects for the management of the Great Lakes on an integrated ecosystem basis. These steps were based on commission comments: (1) "[I]t seems desirable to consider a wider range of issues," and the need to address "in a clear fashion a whole range of issues raised at the initiative of one or both governments or of individual jurisdictions," *id.* at 41; (2) "[T]he two governments would be well advised at this stage to engage in broad but systematic discussions of the use of Great Lakes water before they are faced with any sense of crisis, actual or imminent," *id.* at 43; and (3) The question basic to this report is whether institutions in the United States and Canada will be any better prepared to deal with a water crisis, and "it questions whether the institutions of government are in a position to make thoughtful and forward-looking decisions about the use of water, should the need arise." *Id.* at 48.

See generally id. (examining the wide range of issues confronting the two governments together with related resource information background); INTERNATIONAL JOINT COMMISSION ECOSYSTEM STUDY BOARD (SIMULATED), INTERGOVERNMENTAL DISCUSSIONS-IN-DEPTH (1986); INTERNATIONAL JOINT COMMISSION ECOSYSTEM STUDY BOARD (SIMULATED), GREAT LAKES INSTITUTIONS AND THEIR ROLE IN IMPLEMENTING BASIN ISSUES (1987). The logic of the three-point program carried out by the ESB required an enumeration and evaluation of the principal issues that would confront the two governments in considering longer-term action for the management of the Great Lakes.

As of 1993, an official report by the two governments providing a whole lakes perspective—combining both the Canadian and United States sides—still has not been prepared. By 1976, the disbanded (1981) Great Lakes Basin Commission, authorized by the Water Resources Planning Act of 1965, had completed an excellent 27 volume report on the U.S. half of the lakes. A Canadian counterpart had not, and has not, been prepared.

It is not as if the information for such a report was not available in IJC, federal, state, provincial and local documents and from universities and other sources. The initial task of the ESB was to bring together the available at-hand information and to provide the essential intelligence—a baseline—needed by the two governments if and when they decide to engage in "In-Depth-Discussions" called for in the IJC Advisory. The ESB did so in the fourteen-week seminar period. *See generally* SIMULATED ECOSYSTEM STUDY BOARD, *supra* note 115 (referring to 63 citations and identifying and discussing the principal issues of a Great Lakes integrated ecosystem). This report was designed to provide concise background information enumeration of the uses and effects of water, a definition of a Great Lakes Integrated Ecosystem, relation and relative importance of ecosystem elements and priorities among actual or potential problems.

Issues identified included the following areas: (1) Water quality: nutrient control, point and non-point sources, toxic substance control, area of concern remedial works, inadequate information, science policy, funding, scheduling, allocation of research resources, and recommitment to ecosystem approach; (2) Fisheries: rehabilitation of fisheries, toxic substances and bioaccumulation, carcinogenic effects in fish and man; (3) Wetlands: preservation; (4) Endangered species: preservation; (5) Waterway transportation: planning data, dredging, navigation season intermodality, intersystems, locks and canals, ports, relation to other national waterway needs; (6) Energy: environmental effects of hydropower, stack emissions, facility construction lead time, facility deferrals, energy shortages, Lake Erie natural gas, energy growth information, energy alternatives, coordinated energy planning; (7) Land and shorelines: pressure for recreational land, institutions to relate water use to land use, effects on land of water use/economic development/preservation; (8) Lake levels and flows: effects on land use, energy development, navigation, diversions. *Id.* at 54-103.

An ecosystem perspective states that for the two governments to enter into broad-based discussions of Great Lakes water quality and water quantity uses and effects, i.e., an integrated ecosystem, it is necessary to have a working definition of that ecosystem. Under the Water Quality

Agreement, the ecosystem was defined in general terms to mean "the interacting components of air, land, water and living organisms including man." Great Lakes Water Quality Agreement of 1978, U.S.-Can., 30 U.S.T. 1383. It is important that "man" in this definition include explicitly his "social system." But this system and its components were explicitly linked to water quality under the agreement.

In fact, however, a broader Great Lakes ecosystem had been evolving over the years. This evolving ecosystem, undefined in any government or IJC document, was characterized by the history and activities of the two governments. It included, among other matters, boundary agreements, institution building (the several boards of control and other arrangements), agreements on levels and flows, diversions, fisheries, scenic resources, water allocation for hydropower, air quality in the Windsor-Detroit area and water quality.

The ESB believed that to effectively support in-depth-discussions between the two governments, a more precise definition of an integrated ecosystem had to be identified, justified and made explicit. The ESB accomplished this by identifying, for each specific water use or related resource, interrelationships with other uses or resources and by citing specific literature describing the interrelationship characteristics. Thus:

Water Use or Resource	Interrelationships	Citations
For Lake Levels	13	8
For Energy	8	9
For Consumptive Water Use	9	4
For Water Supply, Municipal-Industrial-Agricultural	10	4
For Land Use	15	12
For Dredging and Solid Waste Disposal	4	5
For Fisheries	10	10
For Recreation	10	13
For Air Quality	6	12

See SIMULATED ECOSYSTEM STUDY BOARD, *supra* note 115, at 122-34 tbl. 21. Because of seminar limitations, these data precisely describing the elements of a Great Lakes integrated ecosystem were intended to be illustrative, rather than encyclopedic. Sufficient information was provided to conclude that an improved integrated ecosystem definition was outlined and, with time and resources, could be detailed as required to provide a working basis for discussions between the two governments on future management options.

The ESB closed by identifying a list of policies already determined by the two governments in statutes, regulations or programs to be of concern. From this framework, priorities could be identified for consideration by the two governments in developing an agenda for initial discussions-in-depth. The list of concerned policies was:

1. Water for Drinking: U.S. Safe Drinking Water Act of 1974 et[] seq.
2. Fisheries: International Great Lakes Fisheries Convention
3. Coastal Zone: The Coastal Zone Management Act[s in the United States and Canada]

The end result of the government's stated positions, and the practical results of the Cornell simulated seminar, is that what is required for the long-term management of the Great Lakes basin is integrated ecosystem management. The two governments must devise institutional arrangements and capabilities appropriate to the tasks of such a program.

IV. ISSUE FOUR: A SCIENCE POLICY FOR THE GREAT LAKES

Science policy relates to the planning, funding and administration of science under the Great Lakes Water Quality Agreement.[143] How are science policies

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4. Water Quality: Great Lakes Water Quality Agreement[s]
5. Lake Levels and Flows: Formal references from Governments
6. Navigation/Hydropower: Governmental Commitments toward collaborative action (Federal-State-Provincial)
7. Energy: Governmental involvement either by Government corporation (Provinces) or by regulatory action (Public Service Commissions)
8. Air Quality: Formal Reference from Governments (Detroit-Windsor); involvement in [Great Lakes] Water Quality Agreement[s]; Acid Rain
9. Recreation: . . . Government . . . site ownership[; unrestricted] use by citizens of both countries [to facilities] on both sides of the border . . .
10. Diversions and Consumptive Uses: Formal Reference from Governments

Id. at 137. What was provided here was a start toward the specific definition of a Great Lakes Integrated Ecosystem. It fits the current views, and probable desires, of the IJC. It is consistent with and representative of the ideas expressed by the Commission in its Advisory and Commentary to the two governments. In addition, these 10 mandated policies are supported by information, fiscal and manpower resources and programs to which governments can turn to support discussions.

Finally, the ESB extended beyond these Great Lakes policies of government concern and suggested practical priorities for next action by the governments if and when they engage in "broad but systematic discussions of the[] use of Great Lakes water[s] before they are faced with any sense of crisis, actual or imminent." 1985 ADVISORY, *supra* note 100, at 43. These are:

1. Water for Drinking: [t]oxic substances
2. Fisheries: [b]io-accumulation of toxic substances; [c]oordination of policies, programs; institutions
3. Coastal Zone: [w]etland preservation; erosion; land use controls
4. Water Quality: nutrients; toxic substances; institutions
5. Lake Levels and Flows: shoreline interests; land management; compensation options for management
6. Navigation/Hydropower: infrastructure modernization (navigation); lake levels
7. Energy: rationalization of energy development; land use
8. Air Quality: airborne toxic substances; atmospheric deposition; research
9. Recreation: access; mutuality of use
10. Diversions and Consumptive Use: [c]onservation[;] future needs of the Great Lakes Basin

SIMULATED ECOSYSTEM STUDY BOARD, *supra* note 115, at 138-39. *See id.* at 146-51 tbl. 22.

143. *See* Leonard B. Dworsky, *The Great Lakes 1955-1985*, 26 NAT. RESOURCES J. 291, 307 (1986) ("Under the second major area, problems of management . . . the problem is the design of a science policy for the Great Lakes Basin.").

valued and used to serve the needs of the international Great Lakes of Canada and the United States? How are such policies implemented? Can we do better?

A. Summary

MODIFIED TABLE OF SELECTED EVENTS FOR ISSUE IV: A SCIENCE POLICY FOR THE GREAT LAKES	
1968	Canada built and dedicated the 20 million dollar Canada Centre for Inland Waters at Burlington, Ontario.[144]
1976	The idea of exploring a science policy for the Great Lakes, or of better defining the elements of such a policy, was proposed by Professor George Francis of Waterloo University, Ontario.[145] It was adopted as a major recommendation.[146] It was next brought to the agenda of the Societal Aspects Expert Committee of the IJC's Science (then Research) Advisory Board (RAB) and was approved as an action item by that committee and so reported to the RAB. The RAB thought it was an important idea but did not take further action due "to a lack of RAB resources."[147]
1984	In its *Second Biennial Report* on the Great Lakes Water Quality Agreement, the IJC reported on four major areas.[148] The second of the four concerned "Problems of the Management of Science Under the Agreement." Under this area, the IJC combined a number of previous concerns into an entirely new dimension of its supervisory responsibilities. The problem was the design of a science policy for the Great Lakes basin. The background statement was an excellent description of current problems in planning, funding, administration and management of science under the agreement. The IJC expressed concern for scheduling and allocation of funds, availability of expertise, uncertain levels of support, timing of awards, receipt of funds and effects on personnel and coordination. Similar concerns were expressed regarding planning of scientific research, priorities and laboratory operations. The IJC encouraged the parties to take steps to address these concerns.[149]

144. Leonard B. Dworsky represented Dr. Donald Hornig, President Johnson's science advisor, at the dedication of Canada's new major research laboratory concerned with the inland waters. Since its dedication, the laboratory has played a major role in the development of science and execution of science policy on the Great Lakes. Its library resources on the Great Lakes likely rank first in the nation.

145. *Id.* at 307 n.52.

146. *See generally* SECOND SESSION, *supra* note 132.

147. Dworsky, *supra* note 143, at 307 n.52.

148. INTERNATIONAL JOINT COMMISSION, SECOND BIENNIAL REPORT (1984).

149. *See* SECOND SESSION, *supra* note 132. The Second Seminar recommended that the two governments formulate a science policy for the Great Lakes as an indication of their commitment to restore, rehabilitate and improve the management of the Lakes and to support the development of new knowledge needed by decision-makers. *Id.* The co-chairs of the Second Seminar, Leonard

1992	In *Great Lakes 2000: Building a Vision*, Sly and Gannon took three pages under a title of "Science in the Basin" to describe the late 1980s research facilities in the Great Lakes basin or facilities that served the basin from other locations.[150]

The totality and breadth of research and the expansive research infrastructure are impressive. Yet, the concern is not so much about its diffusion as it is the difficulties inherent in using the committed resources in skilled and scarce human resources, financial resources and the infrastructure in more effective ways to implement the goals of the Water Quality Agreement.

Implementation is the keystone to accomplishment. But implementation is not accomplished simply by the two governments stating that "the Parties, in cooperation with State and Provincial Governments, shall conduct research in order to: . . . ." The Annex then details a set of complex research tasks in paragraph (A)-(L). These research tasks "delineate[] research needs to support the achievement of the goals of this agreement."[151] But by whom? The governments, the states, the provinces? How is the cooperation to be engaged and carried out? Nothing is said, or has been said, about where the responsibility rests to implement perceived research needs or evolving new needs. Is it sufficient to tell the research community: "You are responsible. Go do it?"[152]

When did representatives of the IJC, the foreign offices, the SAB—research entities seeking intergovernmental or international collaboration—testify in

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B. Dworsky and George Francis, and later as appointees to the Societal Aspects Expert Committee of the IJC Science (then Research) Advisory Board, presented and discussed the recommendation with the RAB at the 26th RAB meeting on May 23, 1978 and also at the 27th board meeting. While the idea was accepted as a vital question that should be given further attention, implementation of further action was not accomplished due to lack of resources. *See* INTERNATIONAL JOINT COMMISSION SECOND BIENNIAL REPORT 11-12 (1984).

150. P.G. SLY & J.E. GANNON, GREAT LAKES 2000: BUILDING A VISION (1992). The authors conclude their comments by noting:

> Although there were excellent research scientists working on the Great Lakes in Canada and the United States, American contributions were substantially greater prior to the mid 1960's [*sic*]. Since then Canada has made at least an equal contribution to the knowledge and understanding of the Great Lakes Ecosystem. In Canada, also, research has benefitted to some extent by strong centralization and it is certainly easier to access the bulk of Canadian information.

Id. at 38.

151. Great Lakes Water Quality Agreement of 1978, U.S.-Can., 30 U.S.T. 1383, annex 17 (as amended by Protocol, Nov. 22, 1987).

152. *Id.* The Terms of Reference for the Joint Institutions, of which the Science Advisory Board (SAB) is one, states: "(a) [the] SAB shall be the scientific advisor to the Commission (IJC) . . ." and "(b) . . . SAB shall be responsible for developing recommendations on all materials related to research and the development of scientific knowledge pertinent to the identification, evaluation and resolution of current and anticipated problems related to Great Lakes water quality." *Id.* But the advisor is not the implementing agent.

congressional or Canadian appropriation processes to further Great Lakes science policies and programs? How often, if ever, have individuals or representatives of public organizations or of the wide variety of NGO's taken time to appear before legislative public hearings to support budgets, infrastructure needs, improved training of personnel or other matters that would further the capacity of Great Lakes research entities to meet Great Lakes science needs? More questions of this sort can be asked, but these illustrate the point.

Decision-makers need information about research, objectives and meaning to resolve research matters. As an illustration, consider the coordinated U.S. federal water resources research.[153] It was successful but was abandoned after more than a decade of useful service through no fault of its own. Decision-makers were able to know quickly who was involved in research for what objective within what research area and at what cost.

Implementation is not automatic or easy. Implementation of research for Great Lakes purposes is confounded by research demands for other national needs, by the character of research agency missions, by the lack of flexibility to turn career research personnel and on-going research in new directions and by the lack of available resources when needed.

Unless Great Lakes interests at the congressional, parliamentary, state, provincial, local and other public and private sectors approach decision-makers within and outside of the research community, implementation of Great Lakes hopes and expectations of the kind so well expressed in *Great Lakes 2000: Building a Vision*[154] will remain, unfortunately, merely a vision. This need not be.

B. Recommendations

Great Lakes research needs an institution, and not necessarily a new institution, to focus and support the implementation of formulated research goals, and to support the SAB in its primary role as science advisor to the IJC.

An "Office for Research Information" is proposed. Such an office can readily be established as part of the government's regional office in Windsor, Ontario. Using computer capacity already available, such an office could: maintain and update a Great Lakes research directory file including selected major elements outside the Great Lakes (for example the Corps of Engineers Vicksburg Laboratory); maintain and update a Great Lakes research projects list in accordance with a standard catalogue of research area defined and agreed to by the research communities of both countries; maintain the minimum budget information necessary for a reasonable understanding of the budgetary resources allotted to research objectives, projects or research areas;[155] provide more

153. *See infra* discussion entitled "Recommendations" in part IV B.

154. *See generally* SLY & GANNON, *supra* note 150; INTERNATIONAL JOINT COMMISSION, PROCEEDINGS OF THE WORKSHOP OF THE COUNCIL OF GREAT LAKES RESEARCH MANAGERS ON FUTURES (1992).

155. This information would be useful in facilitating support and implementation of research priorities, and of aiding intergovernmental, international, interagency and public and private research

precise information needed by the SAB and others to support the IJC in its responsibilities to advise governments and to provide information for public use; and provide the information needed by the official research agencies and the public in developing responses to inquiries from legislative bodies and decision-makers of national, state, provincial and local governments.

Advisory and working groups from research agencies and the public could assist with the programs carried out by the office. The computerized information should be managed openly so as to be recalled, transmitted and utilized via usual computer machinery.

The office option outlines one way to facilitate implementation of the Great Lakes research agenda and needs. In fact, the option has already been tried for about ten years as a coordinating vehicle for U.S. federal water resources research.

1963-1975	The U.S. Federal Water Resources Research Program is a prototype "office" institution. The institution may provide a basis for determining research expectations in the Great Lakes.

Complementing the Water Resources Research Act of 1964,[156] an outgrowth of the U.S. Senate Select Committee on National Water Resources of 1960, the Federal Council for Science and Technology in the Executive Office of the President established the Federal Committee on Water Resources Research (COWRR-1963) within the Executive Office. Approximately twenty-five federal agencies were engaged in some aspect of water resources activity, and ten to fifteen had substantial research responsibilities.[157]

Beginning in 1966, a "Brown Book" established categories of research for common identification and enumeration of research activity (e.g., by organization, research area or budget) and outlined a ten-year research program with the opportunity for annual reconsideration of priorities as required.[158]

Annual reports were prepared for the director of the Office of Science and Technology (who was also the president's science advisor) that presented budget information for each major research agency by detailed and common research categories. This information was readily transferred to the program examiners in the Office of Management and Budget, to Congress and its committees and to universities and others.

United States federal water resources research had no arrangement for research coordination before 1963. By the mid-1970s, the president discarded his science advisor's office, the Federal Council for Science and Technology, and with it,

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coordination.

156. Water Resources Research Act of 1964, Pub. L. No. 88-379, 78 Stat. 329, *repealed by* Water Research and Development Act of 1978, Pub. L. No. 95-467, 92 Stat. 1305, 1316.

157. Leading agencies included the Departments of Interior, Agriculture, Army, Commerce, the U.S. Public Health Service and the EPA.

158. FEDERAL COMMITTEE ON WATER RESOURCES RESEARCH, TEN YEAR PROGRAM FOR WATER RESOURCES RESEARCH (1966).

coincidentally, the COWRR. From about 1975 to the present, there has been no comparable arrangement for similar coordination of U.S. federal water resources research across departments and agencies.

The lack of a uniform research program in 1977, as now, produced mixed reactions. As one report revealed:[159]

> If you're talking about the fact that there is no single U.S. research program addressing Great Lakes water quality at the same level of effort as at [the Canada Center for Inland Waters], this is true, but so what. The U.S. has a multi-federal agency program which addresses a set of Great Lakes water related activities. Each agency has its own mission/objective. That's the way the U.S. is organized. I don't believe we should copy the Canadians on this one.[160]

The report continued: "There is an interesting NOAA Technical Memo which points out that bridges between operational and research programs and between research programs cannot be achieved by direction from the top; bridges can be built by $ $ $ $, however."[161] The report explained that "these comments came from Directors of major research laboratories on the Great Lakes and they objected to the . . . suggestion that research managers of programs on the Great Lakes be required to adhere to the research needs identified by the International Joint Commission."[162] The report concluded: "[T]his is where one of our major problems lie[s]."[163] Further, it asserted that "[i]f the [United Nations] is to . . . work . . . countries have to give up their sovereignty. The same is true of research laboratories in the Great Lakes. If we are going to have a coordinated program . . . then we've got to cooperate far more than we are presently doing."[164] The task group "suggestion that the scientific community has not provided knowledge good enough for" an accurate assessment and prediction of all water quality conditions

> in the Great Lakes strikes me as being frivolous and platitudinous, if not completely unrealistic. . . . [T]he indictment by implication of research as being unresponsive, fragmented, disoriented, and unproductive seems grossly unfair, and masks what many feel is the real issue[,] . . . our general ineffectiveness to date in mounting and enforcing measures to halt the deterioration of Great Lakes water quality by agents we already know are doing significant harm.[165]

The IJC and SAB "have developed a long list of research needs with some broad indication of degree of urgency, but this needs to be more selective and definitive.

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159. UNITED STATES SENIOR REVIEW GROUP, REPORT OF SUB-GROUP A IN REVIEW OF THE GREAT LAKES WATER QUALITY AGREEMENT (1977).

160. *Id.* at 2.

161. *Id.*

162. *Id.* at 1.

163. *Id.*

164. *Id.*

165. *Id.*

There also needs to be some mechanism for directing high priority research to those locations having the best competence."[166]

The openness and competency of the reports of the Council of Great Lakes Research Managers are impressive, particularly by the workshop proceedings of *Great Lakes 2000: Building a Vision*. The vision is important. But it will be limited in its accomplishments unless provided with implementation support, some methods of which are recommended within this issue.

166. *Id.*


THE UNIVERSITY OF TOLEDO
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