

June 1989

## Binational Cooperation for Great Lakes Water Quality: A Framework for the Groundwater Connection

George Francis

Follow this and additional works at: <https://scholarship.kentlaw.iit.edu/cklawreview>

 Part of the [Law Commons](#)

---

### Recommended Citation

George Francis, *Binational Cooperation for Great Lakes Water Quality: A Framework for the Groundwater Connection*, 65 Chi.-Kent L. Rev. 359 (1989).

Available at: <https://scholarship.kentlaw.iit.edu/cklawreview/vol65/iss2/3>

This Article is brought to you for free and open access by Scholarly Commons @ IIT Chicago-Kent College of Law. It has been accepted for inclusion in Chicago-Kent Law Review by an authorized editor of Scholarly Commons @ IIT Chicago-Kent College of Law. For more information, please contact [dginsberg@kentlaw.iit.edu](mailto:dginsberg@kentlaw.iit.edu).

# BINATIONAL COOPERATION FOR GREAT LAKES WATER QUALITY: A FRAMEWORK FOR THE GROUNDWATER CONNECTION

GEORGE FRANCIS\*

This article<sup>1</sup> provides an overview of the ongoing cooperation between the United States and Canada on matters of shared concern about the quality and uses of the Great Lakes. The institutional arrangements that constitute a binational framework for "governance" over the Lakes are outlined first. The Great Lakes Water Quality Agreement and programs to implement it are then described because this is the most relevant framework within which to incorporate groundwater issues. Other binational agreements are noted briefly to illustrate the development of binational cooperation for the Great Lakes over the past decade. The concluding section comments on the need to consider groundwater as an integral part of "an ecosystem approach," which the United States and Canadian governments implicitly adopted a decade ago to guide their joint and several efforts towards restoring the quality of the Lakes.

## I. FRAMEWORK FOR GOVERNANCE

The basic framework for governance is provided by the two constitutional federalist nations whose jurisdictions extend to the middle of the Lakes (except Lake Michigan) and to the middle of the connecting rivers. Constitutional provisions define the appropriate functions for governments vis-à-vis other sectors of society and divide responsibilities for governance between the central (federal) government and the states or provinces. The latter in turn have assigned rights and responsibilities to local governments. In both countries, governing arrangements have also been developed at levels above municipal governments but below the state or provincial government, such as multi-county planning commissions or watershed conservation authorities. Actions at all of these levels can affect the Lakes.

There are some important differences between the two countries on

\* Professor, Department of Environment and Resource Studies, University of Waterloo, Ontario, Canada.

1. Earlier versions of parts of this paper were included in Francis, *Great Lakes Governance and the Ecosystem Approach: Where Next?*, in PERSPECTIVES ON ECOSYSTEM MANAGEMENT FOR THE GREAT LAKES 319 (L. Caldwell ed. 1988), and in Francis, *Institutions and Ecosystem Redevelopment in Great Lakes America with Reference to Baltic Europe*, 17 AMBIO, No. 2, 1988 at 106.

these basic divisions of responsibilities. For example, the checks and balances arising from the separation of powers in the U.S. presidential government are not so clearly developed in the Canadian parliamentary government, where checks and balances operate between federal and provincial governments. In addition, constitutional jurisdiction over natural resources and by extension the environment resides almost exclusively at the provincial level in Canada, while in the U.S. the federal government has the major responsibilities along with the state governments.<sup>2</sup>

Figure 1 sketches the basic structure of governance for the Great Lakes Basin, and emphasizes the binational and intergovernmental coordination arrangements. The International Joint Commission (IJC) established by the Boundary Waters Treaty of 1909<sup>3</sup> and the Great Lakes Fishery Commission established by convention in 1955<sup>4</sup> are the two pre-eminent bodies. These bodies oversee the implementation of the Great Lakes Water Quality Agreement and the Strategic Plan for the Management of Great Lakes Fisheries. The regulatory and administrative programs to implement the intent of the agreement are carried out by federal, state and provincial environmental protection agencies and fisheries management agencies respectively.

Federal-provincial agreements are used in Canada to coordinate intergovernmental programs. The Canada-Ontario Agreement on Great Lakes Water Quality and the Strategic Plan for Ontario Fisheries guide the shared implementation of measures to fulfill Canadian responsibilities under the two binational agreements for water quality and fisheries, respectively. In the United States, until it was abolished in 1981, the Great Lakes Basin Commission provided the forum to bring together state and federal officials to address issues in the Great Lakes Framework Studies.<sup>5</sup> There appears to be no comparable arrangement to replace it. The Great Lakes Commission was established as an interstate compact in 1965 and

2. These issues have been discussed by Carroll, *Differences in the Environmental Regulatory Climate of Canada and the United States*, 4 CAN. WATER RESOURCES J., No. 4, 1979 at 16, and in J. Carroll, ENVIRONMENTAL DIPLOMACY: AN EXAMINATION AND A PROSPECTIVE OF CANADIAN-U.S. TRANSBOUNDARY ENVIRONMENTAL RELATIONS (1983).

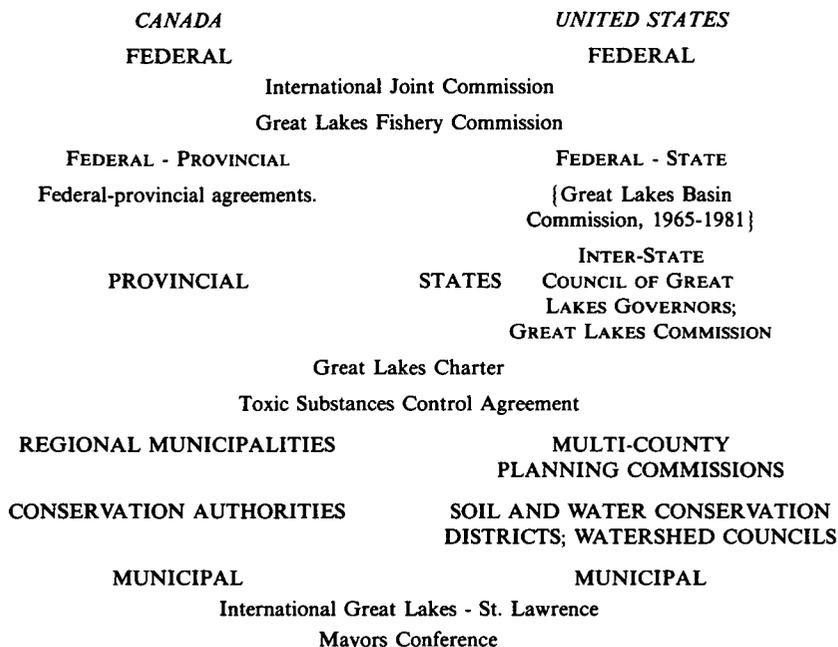
3. Treaty Relating to Boundary Waters, and Questions Arising Between the United States and Canada, Jan. 11, 1909, United States-Great Britain, 36 Stat. 2448, T.S. No. 548.

4. Convention on Great Lakes Fisheries, Sept. 10, 1954, United States-Canada, 6 U.S.T. 2836, T.I.A.S. No. 3326.

5. The Great Lakes Basin Commission was established under Title 2 of the U.S. Water Resources Planning Act, Pub. L. No. 89-90, § 201, 79 Stat. 244, 246-51 (1965). The twenty-seven Great Lakes Framework Studies fulfilled requirements for "Level A" planning which compiled data on land and water resources, resource use and resource needs. GREAT LAKES BASIN COMM'N, GREAT LAKES FRAMEWORK STUDIES (1975). This was to assist in the development of "comprehensive, coordinated, joint plans" for the development of water and related resources, albeit for only one half of four of the Great Lakes.

helps to coordinate state interests in Great Lakes water uses.<sup>6</sup>

**FIGURE 1: BASIC FRAMEWORK OF GOVERNANCE FOR THE GREAT LAKES**



## II. THE GREAT LAKES WATER QUALITY AGREEMENT

The Great Lakes Water Quality Agreement is the most relevant agreement for addressing groundwater issues within its overall scope and purpose. Under the terms of the Boundary Waters Treaty, the IJC serves as a commission of inquiry on transboundary water issues referred to it by the parties to the Treaty. In 1970, the IJC reported on a 1964 Reference to investigate the pollution problems of the lower Great Lakes.<sup>7</sup> Its recommendations laid the foundation for the first Great Lakes Water Quality Agreement, signed in 1972. The Agreement was

6. The Great Lakes Commission pursues its information clearinghouse, coordination and advocacy activities through five program areas, one of which is "Resource Management and Environmental Quality." Issues being addressed under this program area include soil erosion and sediment control, harbor dredging, maintaining a "Great Lakes Water Use Data Base Registry" under terms of the 1985 Great Lakes Charter and provision of information for Great Lakes educators. The Great Lakes Charter, 1985, Governors and Premiers of the Great Lakes States and Provinces.

7. INT'L JOINT COMM'N., POLLUTION OF LAKE ERIE, LAKE ONTARIO, AND THE INTERNATIONAL SECTION OF THE ST. LAWRENCE RIVER (1970).

renewed and expanded considerably in 1978 and was amended in 1987.<sup>8</sup> The IJC has in effect been given a continuing Reference to oversee the implementation of the Agreement and recommend to the parties particular measures to be taken. Since 1978, the IJC reports biennially, following a public meeting at which its two main Advisory Boards present their reports and statements are heard from various interest groups.

The Agreement has five main provisions, many of which have been considerably elaborated since 1972. They call for:

1. The establishment of general and specific water quality objectives. The 1987 Protocol expanded this to call for "lake ecosystem objectives" for each Lake or portion thereof and for "ecosystem health indicators" to assess progress towards reaching these objectives;<sup>9</sup>

2. Programs and measures to be taken by federal, state and provincial jurisdictions to meet these objectives. Each jurisdiction would develop its own regulatory and administrative programs to do this;

3. Cooperation through IJC in a joint monitoring of the measures being taken and of their effectiveness in achieving the objectives as determined by environmental monitoring. IJC was originally to have been given an independent verification capability for doing this evaluation;<sup>10</sup>

4. Additional studies to be conducted, as necessary, to determine the extent and nature of problems being confronted. Initially, the studies were directed toward assessing the water quality of the upper Lakes and the extent to which pollution associated with land use activities was impacting the Lakes;<sup>11</sup> and

5. The establishment of a Great Lakes Water Quality Board, a Science (formerly Research) Advisory Board to advise the Commission, and a Great Lakes Regional Office. The office is located in Windsor, Ontario,

8. Great Lakes Water Quality Agreement, Apr. 15, 1972, United States-Canada, 23 U.S.T. 301, T.I.A.S. No. 7312 [hereinafter WQA '72]; Great Lakes Water Quality Agreement of 1978, Nov. 22, 1978, United States-Canada, 30 U.S.T. 1383, T.I.A.S. No. 9257 [hereinafter WQA '78] (With a Phosphorus Load Reduction Supplement, Oct. 16, 1983, 98 Stat. 97, T.I.A.S. No. 10798); Revised Great Lakes Water Quality Agreement of 1978, Nov. 18, 1987, United States-Canada, Protocol, 101 Stat. 7 [hereinafter WQA '87] (Consolidated by the International Joint Commission in January, 1988). With the amending Protocol, the Agreement has become a complex document of 130 pages, including 17 technical annexes.

9. WQA '87, *supra* note 8, Supp. to Annex 2, § 3, and Annex 11, § 4.

10. WQA '72, *supra* note 8, art. VI, § 5; WQA '78, *supra* note 8, art. VII, § 5. The IJC, however, relies upon information provided to the Commission. See NATIONAL RESEARCH COUNCIL OF THE U. S. AND THE ROYAL SOC. OF CANADA, THE GREAT LAKES WATER QUALITY AGREEMENT: AN EVOLVING INSTRUMENT FOR ECOSYSTEM MANAGEMENT 83-86 (1985) [hereinafter EVOLVING INSTRUMENT].

11. INT'L JOINT COMM'N, WATER QUALITY OF THE UPPER GREAT LAKES (1979); INT'L JOINT COMM'N, POLLUTION IN THE GREAT LAKES BASIN FROM LAND USE ACTIVITIES (1980).

and it works with Commission staff in Washington and Ottawa on various program matters.

The purpose of the Agreement was made quite explicit in 1978, namely: "to restore and maintain the physical, chemical and biological integrity of the waters of the Great Lakes Basin Ecosystem." This purpose reflected an emerging view from within some research and academic circles that much more was involved in defining water quality than physical and chemical terms.<sup>12</sup> Experience gained from years of effort at "cleaning up" the Great Lakes showed that a much more systemic perspective was required to understand the problems and what might be done about them. A brief synopsis of this experience is presented below with reference to the first three of the main provisions of the Agreement. Special note will then be made of the new Annex 16: "Pollution from Contaminated Groundwater."

#### A. *Setting the Objectives*

Until 1987, a technical working group reporting to both Boards and through the Boards to the Commission undertook detailed reviews of the scientific and technical literature for particular contaminants. Using the "most sensitive beneficial use" as the standard for water quality, the group recommended specific quality objectives in terms of safe levels that should not be exceeded anywhere in the Lakes.<sup>13</sup> Some forty-one specific objectives have been recommended, and at least thirty-five of them have been incorporated into the 1987 Protocol.<sup>14</sup> The parties to the Agree-

12. The language in the statement of purpose was apparently taken from § 101 of the Federal Water Pollution Control Act Amendments of 1972. 33 U.S.C. § 1251 (1976). "The objective of the concept [integrity] is a maximal patterning of human communities upon natural biogeochemical cycles and a minimum departure from the geological, or background rates of change in the biosphere. Framed another way the objective is to move from linear pathways in the movement of matter and energy to circular pathways." Jorling, *Incorporating Ecological Principles into Public Policy*, 2 ENVTL. POL. & L., No. 3, 1976 at 140, 142. In 1978, the IJC adopted "the ecosystem approach" for interpreting its rolls following a recommendation from the Research Advisory Board. See GREAT LAKES SCIENCE ADVISORY BD., THE ECOSYSTEM APPROACH: SCOPE AND IMPLICATIONS OF AN ECOSYSTEM APPROACH TO TRANSBOUNDARY PROBLEMS IN THE GREAT LAKES BASIN (1978). A more operational analysis was also being worked out concurrently through a group convened by the Great Lakes Fishery Commission. See REHABILITATING GREAT LAKES ECOSYSTEMS (G. Francis, J. Maguson, H. Regier & D. Talhelm eds. 1979).

13. The levels are usually given as so many parts per million or parts per billion in the water. "Mixing zones" immediately surrounding discharge sites would not always meet these objectives. It was agreed that such zones would be kept as small as possible, and in no case should they cross the international boundary. WQA '78, *supra* note 8, art. IV, § 1(f) and Annex 2. These zones are now referred to as "point source impact zones" and they correspond mainly with designated "areas of concern" for which remedial action plans are being prepared.

14. WQA '87, *supra* note 8, Annex 1. Annex 10 requires the parties to maintain a list of hazardous polluting substances in Appendix 1 (currently with 271 entries) and of potentially hazardous substances in Appendix 2 (currently with 106 entries). Programs and measures to minimize or elimi-

ment have now taken it upon themselves to determine the new ecosystem objectives.

Several difficulties have arisen from the approach taken by the technical working group to fulfill its task of deciding upon contaminant specific objectives. First, the scientific knowledge required to decide upon an objective was sufficient for only a relatively small number of contaminants. By 1985, the number of contaminants reported from the water, the sediment, the fish, and the fish-eating birds in the Great Lakes exceeded 1000.<sup>15</sup> This list is presently being scrutinized very critically, but it appears that the knowledge needed to set objectives may be sufficient for less than ten percent of the confirmed contaminants. Second, contaminants for which there is sufficient knowledge to propose objectives may not pose serious problems compared with others that are less well known and for which objectives cannot be proposed. Regulatory agencies were faced with expectations that they would monitor for the presence of certain contaminants in the Lakes only when scientists could agree on safe levels for them. Regulatory agencies, however, had their own priorities for monitoring.

Third, laboratory work confirmed the view that different contaminants do not always act independently of one another in the environment. Instead, the contaminants may interact in the water or the biota and give rise to synergistic or antagonistic effects. Some contaminants bioaccumulate and biomagnify such that safe levels in fish for human consumption may require water quality objectives to be set at levels below those at which they could be detected.<sup>16</sup> From the mid-1970s, higher incidences of cancers and birth defects were found in fish, turtles, and fish-eating birds in the more heavily contaminated nearshore areas around the Lakes.<sup>17</sup> Human health concerns were raised by these findings, but, with a few exceptions, these concerns have not been addressed.<sup>18</sup>

nate the risk of release of hazardous polluting substances to the Great Lakes are to be developed and implemented.

15. GREAT LAKES WATER QUALITY BD., 1985 REPORT ON GREAT LAKES WATER QUALITY (1985).

16. "For other organic contaminants, for which Specific Objectives have not been defined but which can be demonstrated to be persistent and are likely to be toxic, the concentrations of such compounds in water or aquatic organisms should be substantially absent, i.e. less than detection levels as determined by the best scientific methodology available." WQA '87, *supra* note 8, Annex 1, § 1 A [b].

17. Incidences are reported by the Great Lakes Water Quality Board. See also 21 TOXIC CONTAMINANTS AND ECOSYSTEM HEALTH: A GREAT LAKES FOCUS (M. Evans ed. 1988).

18. The main exception is a longitudinal study of people who regularly eat coho salmon from Lake Michigan, and of the health of infants born in this cohort. The Science Advisory Board recently recommended that "[t]he Commission actively encourage the Governments of Canada and

These findings gave rise to debates about the use of multi-chemical objectives based on ecotoxicological tests under field rather than laboratory conditions and about the search for ecosystem objectives that would rely heavily on biomonitoring.<sup>19</sup> The 1987 Protocol reflects this thinking.

### *B. Programs and Measures*

Especially during the first five years of the Agreement, priority was given to the reduction of phosphorus entering the Lakes. The purpose was to reduce eutrophication and the associated problems of nuisance algae growth and oxygen depletion of the bottom waters, especially in the central basin of Lake Erie. Five strategies have been used to achieve this:

1. Set legal limits on phosphorus in detergents while searching for substitute compounds. Ontario had a limit of 2.2% phosphorus set by federal legislation in 1973. From 1972 through 1988, the eight states have set limits of 0.5% phosphorus in detergents, and the soap and detergent industry has apparently found acceptable substitutes for phosphorus;<sup>20</sup>

2. Construct or upgrade municipal sewage treatment plants and maintain effluent concentrations of one milligram per liter total phosphorus maximum for all treatment plants discharging more than one million gallons per day directly into the Lakes. This has been the major thrust of attention and expenditure during the Agreement, especially in the earlier years. About three-quarters of the forty or so municipal sewage treatment plants subject to this measure are reported to be complying with this requirement;

3. Regulate phosphorus from industrial discharges "to the maximum practicable extent." This is part of the overall industrial pollution control programs within each jurisdiction, and quantitative information on the extent to which phosphorus discharges have been reduced does not seem to be available;

the United States to carry out a comprehensive binational investigation, possibly a reference, concerning the significance, nature and extent of human exposure to toxic chemicals." GREAT LAKES SCIENCE ADVISORY BD., REPORT (1989). In the review of the state of the environment of the Great Lakes carried out by The Conservation Foundation (Washington) and The Institute for Research on Public Policy (Ottawa), human health concerns were also emphasized in the light of findings about the conditions of certain fish and wildlife. See T. COLBORN, A. DAVIDSON, S. GREEN, R. HODGE, C. JACKSON & R. CIROFF, GREAT LAKES, GREAT LEGACY? (1989).

19. See, e.g., RYDER & EDWARDS, A CONCEPTUAL APPROACH FOR THE APPLICATION OF BIOLOGICAL INDICATORS OF ECOSYSTEM QUALITY IN THE GREAT LAKES BASIN (1985)(A joint effort of the International Joint Commission and the Great Lakes Fishery Commission).

20. The Science Advisory Board examined alternatives to phosphorus, especially nitrilotriacetic acid (NTA) in reports issued in 1978 and 1980.

4. Agree on "targets" for reducing the total loadings of phosphorus in the lower Lakes. This was called for by the 1978 Agreement to be in place by 1980, but the "Phosphorus Load Reduction Supplement" did not get signed until October 1983. The load reductions for Lakes Erie and Ontario were deemed to require additional measures besides the ones being implemented, and target reductions were allocated between the two countries;<sup>21</sup> and

5. Introduce strategies to reduce non-point sources of phosphorus entering the Lakes from agricultural and other land use practices. These are required to meet load reductions agreed to in 1983. Pilot projects to promote conservation tillage systems which minimize sediment and nutrient losses from cultivated land are underway in the Lake Erie basin in both countries. If widely adopted by farmers, they are expected to reduce the losses of fertilizers and at the same time reduce loadings to rivers and the Lake.

By the time of the 1978 Agreement, toxic contaminants had become the central issue to be addressed.<sup>22</sup> This focus resulted from the apparently sudden discoveries of substances such as methylated mercury, PCBs, and mirex at certain localities in the Lakes over the preceding ten years. This led to more systematic surveys of the extent of the problems. The 1978 Agreement declared that "[t]he intent . . . is to virtually eliminate the input of persistent toxic substances in order to protect human health and to ensure the continued health and productivity of living aquatic resources and man's use thereof," and that the philosophy adopted to achieve this "shall be zero discharge."<sup>23</sup> Four strategies are being pursued:

1. Develop effective controls for the eleven first priority persistent toxic contaminants, the "critical pollutants." As the number of reported contaminants in the Great Lakes increased, so did the debate over how to select the top priority contaminants for regulatory control. Technical committees in various jurisdictions were convened to select the critical pollutants, and using somewhat different criteria they each derived different but often overlapping lists. The Water Quality Board finally chose eleven based on the fact that they:

\* are known to be present in the Great Lakes,

21. There were a number of difficulties inherent in estimating the amounts of phosphorus entering the lakes, and especially in determining the proportions of it that were biologically active. See PHOSPHORUS MANAGEMENT STRATEGIES TASK FORCE, PHOSPHORUS MANAGEMENT FOR THE GREAT LAKES (1980).

22. For an overview of the situation, see Hileman, *The Great Lakes Cleanup Effort*, CHEMICAL & ENGINEERING NEWS, Feb. 8, 1988, at 22.

23. WQA '78, *supra* note 8, Annex 12, § 2.

- \* are highly toxic and persistent,
- \* can bioaccumulate to levels that threaten human health and biota in the aquatic ecosystem,
- \* have had abatement or other corrective actions taken but are still present in unacceptable levels,
- \* represent a variety of sources, pathways and uses, and
- \* may also be members of larger chemical families so that actions taken for one could be expected to concurrently control or apply to other substances with similar properties.<sup>24</sup>

Data are being sought to create a "mass balance" accounting for the quantity of each substance entering the ecosystem, the quantity stored, transferred, or degraded within the ecosystem, and the quantity leaving the ecosystem.<sup>25</sup> Sources are to be identified and the goal is to eliminate these sources within five years;

2. Analyze the "quantitative structure-activity relationships" of all other reported contaminants to determine priorities for further research, testing and/or control measures. The list of reported contaminants is being scrutinized as a first step;

3. Prepare remedial action plans (RAPs) for forty-two designated "areas of concern" identified by the Water Quality Board.<sup>26</sup> These are badly polluted nearshore areas and rivers connecting the Lakes. The RAPs have become a major focal point of interest in the Water Quality Agreement, mainly because they require the cooperation of a range of governmental agencies, industries, non-governmental organizations and local citizen groups, many of which had not previously been associated with Great Lakes issues. The Water Quality Board has specified the range of topics to be addressed in each RAP, and they review drafts of them. Few have been completed as of mid-1989, and the ones that have, such as that for Green Bay, Wisconsin, will have to develop effective cooperation over a number of years to implement what is required by the approved Plan; and

4. Prepare "lake-wide management plans for critical pollutants." The first of these, for Lake Ontario, was completed in 1989. They raise issues similar to those of the RAPs in terms of public involvement and inter-agency cooperation to implement what has to be done.

24. GREAT LAKES WATER QUALITY BD., 1987 REPORT ON GREAT LAKES WATER QUALITY (1987).

25. There are major information gaps to be filled in order to develop reliable mass balance models that could serve as management guides. See GREAT LAKES SCIENCE ADVISORY BD., GREAT LAKES WATER QUALITY BD. & INT'L AIR QUALITY ADVISORY BD., SUMMARY REPORT OF THE WORKSHOP ON GREAT LAKES ATMOSPHERIC DEPOSITION (1987).

26. For a general overview of the remedial action plans and planning process, see Hartig & Thomas, *Development of Plans to Restore Degraded Areas in the Great Lakes*, 12 ENVTL. MGMT., No. 3, 1988, at 327.

### C. *The Great Lakes International Surveillance Plan*

Surveillance and monitoring activities are carried out under the terms of the Agreement to determine the degree to which jurisdictional control requirements are being met: to assess progress towards achieving the water quality and ecosystemic objectives, to evaluate trends in variables being monitored, and to identify emerging problems. The Great Lakes Water Quality Board first developed the International Surveillance Plan (GLISP) in 1975. It is subject to periodic modifications in the light of changing information requirements and the most recent version was prepared in 1986. Under GLISP, the Board strived to incorporate data needed for enforcement actions by regulatory agencies with information useful for understanding aquatic ecosystems, a combination which leads to periodic criticisms from those who seek more comprehensive data sets to serve one or the other of these two purposes.

The data are gathered by state and provincial agencies for the near-shore areas of the Lakes and by federal agencies for the offshore areas through to the international boundary. Samples are analyzed by government and private laboratories, and quality checks are required from time to time. The data are compiled and reviewed by the Water Quality Board which prepares reports every two years for the IJC. Special intensive surveys are conducted for each of the Lakes every five years or so.<sup>27</sup>

This monitoring has shown a gradual decline in the amounts of phosphorus in the lower Lakes in the spring, before algae growth occurs, and to a lesser extent, during the summer months. Biomonitoring of gull eggs and fish has also shown a sharp decline over ten years in the concentrations of DDT and PCBs, related to the cessation of use of these chemicals in the Basin. Monitoring has also revealed the extent to which many other contaminants are present. Particular problem areas have been identified repeatedly over the years and have led the Water Quality Board in 1985 to designate forty-two of them as special "areas of concern" for which remedial action plans are being prepared. With the effects of water pollution control measures starting to appear, the importance of controlling airborne pollutants and nonpoint source pollutants running off the lands and from combined sewage and storm water overflows has become more evident.

27. See, e.g., GREAT LAKES WATER QUALITY BD., A REVIEW OF TRENDS IN LAKE ERIE WATER QUALITY WITH EMPHASIS ON THE 1978-1979 INTENSIVE SURVEY (1985); GREAT LAKES WATER QUALITY BD., A REVIEW OF LAKE ONTARIO WATER QUALITY WITH EMPHASIS ON THE 1981-1982 INTENSIVE YEARS (1988).

#### D. The Groundwater Connection

The Great Lakes Science Advisory Board undertakes state-of-the-art reviews of a wide range of topics that could have some bearing on the implementation of the agreement in light of the agreement's intent. In 1983 the Board identified contaminated groundwater from waste disposal sites as a potential problem to be addressed and established a task force to prepare a detailed proposal to identify major hydrogeologic regimes that have a high potential for contaminating the Great Lakes. The study proposal was submitted to IJC in 1985, and it was also endorsed by the National Research Council of the United States and the Royal Society of Canada.<sup>28</sup> Some work has been initiated to compile an inventory of all aspects of groundwater within the U.S. portion of the Great Lakes Basin.

Annex 16 of the Agreement, amended by the 1987 Protocol, calls upon the parties to coordinate existing programs to control contaminated groundwater affecting the Great Lakes. The activities to be carried out to assess the extent of the problem are essentially those recommended by the Science Advisory Board.

In 1989, the Water Quality Board noted that the existing and potential sources of contaminated groundwater affecting the boundary waters of the Great Lakes system had not been delineated nor mapped, and they expressed particular concern about sources of contamination from improperly designed or operated hazardous waste landfill sites and leaking storage tanks. The Niagara River and the St. Clair River near Sarnia may be particularly threatened from these sources.<sup>29</sup>

### III. BINATIONAL COOPERATION DURING THE 1980s

Table 1 lists binational agreements concerning the Great Lakes. The Strategic Plan for the Management of Great Lakes Fisheries<sup>30</sup> merits a brief note because it is predicated in large measure on the success of measures taken under the Great Lakes Water Quality Agreement.

The fisheries plan is overseen by the Great Lakes Fishery Commission. The Commission has an executive role in the control of sea lampreys, it funds fisheries research, and it facilitates cooperation among federal, state and provincial fish management agencies. Lake Committees for each of the Lakes exchange information on the state of the Great

28. SCIENCE ADVISORY BD., A STUDY PROPOSAL FOR ASSESSING POTENTIAL FOR GREAT LAKES CONTAMINATION VIA GROUNDWATER (1985); EVOLVING INSTRUMENT, *supra* note 10.

29. GROUNDWATER CONTAMINATION TASK FORCE, REPORT ON GREAT LAKES WATER QUALITY 57 (1989).

30. GREAT LAKES FISHERY COMM'N, A JOINT STRATEGIC PLAN FOR MANAGEMENT OF GREAT LAKES FISHERIES (1980).

**Table 1: BINATIONAL AGREEMENTS CONCERNING THE GREAT LAKES**

**BOUNDARY WATERS TREATY, 1909**

- International Lake Superior Board of Control, 1914
- International St. Lawrence River Board of Control, 1953
- International Air Quality Advisory Board, 1966
- Great Lakes Water Quality Agreement, 1972; 1978; 1987
- International Great Lakes Levels Advisory Board, 1979

**THE MIGRATORY BIRDS TREATY, 1969**

- The North American Waterfowl Management Plan, 1986

**THE NIAGARA TREATY, 1950**

- International Niagara Board of Control, 1953

**CONVENTION ON GREAT LAKES FISHERIES, 1955**

- Joint Strategic Plan for the Management of Great Lakes Fisheries, 1981

**ST. LAWRENCE SEAWAY, 1959**

**GREAT LAKES CHARTER, 1985**

- Great Lakes Regional Water Use Data Base, 1988

**MICHIGAN-ONTARIO AGREEMENTS**

- Air Pollution Agreement, 1985
- Joint Maritime Advisory Committee, 1988

**THE GREAT LAKES TOXIC SUBSTANCE CONTROL AGREEMENT, 1986**

- Great Lakes Protection Fund, 1988

**DECLARATION OF INTENT . . . (FOR THE NIAGARA RIVER AND LAKE ONTARIO), 1987**

- Lake Ontario Toxics Management Plan, 1989

Lakes fisheries in each jurisdiction and on restocking programs. Informally, the committees may also negotiate inter-jurisdictional allocations of shared fish stocks. Under the terms of the strategic plans, each Lake Committee is to develop its preferred "fish community objectives" for the Lake and identify measures needed to achieve and maintain these objectives. Control of toxic contaminants and habitat rehabilitation measures are required in each case. Seepage of contaminated groundwater into the Lakes, especially near spawning and nursery areas for the preferred species, would be judged a serious problem.<sup>31</sup>

Developments during the 1980s have increased the extent of U.S.-Canada cooperation on Great Lakes matters and the arrangements through which this cooperation is being accomplished. The Council of Great Lakes Governors initiated the Great Lakes Charter (1985)<sup>32</sup> and

31. Projects and programs under The North American Waterfowl Management Plan could also be affected as well. Several major wintering areas for waterfowl on the Great Lakes are major "areas of concern" requiring remedial action plans.

32. COUNCIL OF GREAT LAKES GOVERNORS, CHARTER OF PRINCIPLES FOR THE MANAGE-

the Toxic Substances Control Agreement (1986),<sup>33</sup> both of which have been signed by the Governors of the eight lake states and the Premiers of Ontario and Quebec. Under the Great Lakes Charter, major consumptive uses of water are recorded into a central database maintained by the Great Lakes Commission.

Under the Toxic Substances Control Agreement, the Governors have established a Great Lakes Fund of \$100 million, allocated among states in proportion to their water withdrawals from the Lakes, to provide funds for applied research and pilot projects on remedial measures, with a high priority given to issues associated with contaminated sediments. Ontario and Quebec are looking into ways of developing a parallel arrangement.

Since 1985, Quebec has taken a direct interest in the Great Lakes as an affected jurisdiction and it has become party to several inter-jurisdictional agreements. For example, the Great Lakes-St. Lawrence Maritime Forum sponsored an "International Great Lakes-St. Lawrence Mayors Conference" in 1987. It has now become an annual event.

Likewise, there has been an increase in the number of non-governmental organizations. Since 1966 the International Association for Great Lakes Research has provided a forum for annual meetings of scientists doing research on Great Lakes topics. It also publishes the *Journal of Great Lakes Research*.

In 1982, Great Lakes United (GLU) was established as a coalition of diverse public groups concerned about the Lakes; it is headquartered in Buffalo and Windsor. GLU has developed a strong activist role directed towards issues of implementation of the Great Lakes Water Quality Agreement, and it presses for a wider measure of public involvement. GLU publishes citizen guides on Great Lakes issues and a newsletter, *The Great Lakes United*.<sup>34</sup> In 1983, a Center for the Great Lakes was established in Chicago, and it opened an office in Toronto in 1985. The Center does policy studies on matters of interest to Governors, Premiers and business groups, it organizes briefing sessions for members of state

MENT OF GREAT LAKES WATER RESOURCES (1985). This arose from recommendations in a 1985 report by a Great Lakes Governors Task Force on Water Diversion and Great Lakes Institutions. GREAT LAKES GOVERNORS TASK FORCE, WATER DIVERSION AND GREAT LAKES INSTITUTIONS (1985).

33. COUNCIL OF GREAT LAKES GOVERNORS, THE GREAT LAKES TOXIC SUBSTANCES CONTROL AGREEMENT (1986).

34. Great Lakes United held its own public hearings on Great Lakes pollution problems in 1986. GREAT LAKES UNITED'S WATER QUALITY TASK FORCE, UNFULFILLED PROMISES: A CITIZENS' REVIEW OF THE INTERNATIONAL GREAT LAKES WATER QUALITY AGREEMENT (1987). As a result, GLU was invited to have representatives at the negotiations for the WQA '87. It was the only non-governmental group involved in this precedent.

and provincial legislative assemblies, it convenes conferences on issues of concern to diverse interest groups, and it publishes the *Great Lakes Reporter* to enhance public information.

By the late 1980s then, even though the formal governmental institutions have remained the same, the number of agencies and other organizations involved with policy and program issues, and also in taking initiatives, had increased considerably. There is now a better balance between the involvement of government and non-governmental organizations and among different organizations working at local, Lake-wide, and Great Lakes Basin levels. Governance may have become more complex, but it is also more firmly rooted in growing regional and local constituencies.<sup>35</sup> Each of the binational agreements was negotiated to address different issues at different times. In a recent review of these agreements, prepared as part of a study sponsored through the Rawson Academy of Aquatic Science (Ottawa), one of the main perceived weaknesses was identified as follows:

For the most part, principles of international law and those principles derived from the [Great Lakes] bilateral agreements attempt to define the outer limits of behavior that remain internationally acceptable rather than the achievement of long-term goals, such as joint stewardship over shared resources, inter-generational equity, or the maintenance of environmental or ecosystemic integrity.<sup>36</sup>

This reflects a reactive crisis-by-crisis approach that leads to new ad hoc agreements to deal with each situation as it arises. Groundwater contamination should not be allowed to reach the point that it, too, will be the subject of a new binational agreement negotiated in isolation from all the others.

Any interpretation of adopting an ecosystem approach for the Lakes would clearly have to include groundwater as an integral component of the hydrological cycle nurturing the entire Great Lakes Basin. There is growing support for the idea of articulating an "Ecosystem Charter" for the Great Lakes to reflect ideals and aspirations oriented towards achieving and maintaining sustainability. Ecological sustainability is one prerequisite for a sustainable society. Some principles to be adopted to guide policies, programs, and individual commitments have already been

35. Great Lakes Tomorrow was the first binational non-governmental citizens group formed during the mid-1970s as a spin-off from the Lake Michigan Federation. GLT has sponsored extension courses on "Great Lakes Decisions" at various colleges and universities around Lakes Erie and Ontario. The Greenpeace organization has taken recent initiatives to publicize the plight of the Lakes. In addition, there seem to be a growing number of volunteer stewardship groups emerging around the Lakes to take an active interest in local issues.

36. THE RAWSON ACADEMY OF AQUATIC SCIENCE, TOWARDS AN ECOSYSTEM CHARTER FOR THE GREAT LAKES-ST. LAWRENCE (1989).

articulated by the World Conservation Strategy, the World Commission on Environment and Development (the Brundtland Commission) and in statements about environmental bills of rights.<sup>37</sup>

Collectively, these recent developments should help assure that Great Lakes groundwater, although out of sight, will no longer be out of mind.

37. *Id.*

