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Assessing North America's Management of Its Transboundary Waters

ABSTRACT

The United States, Mexico and Canada have relied on two commissions to reconcile disputes over their international boundary waters for nearly 100 years. The International Joint Commission (U.S.–Canada) and the International Boundary and Water Commission (U.S.–Mexico) have been model organizations, but little is known of them. Recently their successes have been challenged by change due to population growth, industrialization, greater demands on jointly owned resources and shifting trading patterns. The Project considers 9 issues of overriding importance to prepare the Commissions for the future. Project data relies on three sources: (1) A trinational conference of seventy leaders and 12 commissioned papers, (2) proposals in the public record over two decades, (3) an assessment of recent societal change.

INTRODUCTION

This report summarizes the results and recommendations of the project entitled "The North American Experience Managing International Transboundary Water Resource: International Joint Commission and the

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Volume 33, No. 1, 1993 was the first of two issues of this Journal reporting on a project entitled, "The North American Experience Managing Transboundary Water: The International Joint Commission and the International Boundary and Water Commission." It contained an introduction to the project, and the commissioned papers and the prepared commentaries for three of the six project issues presented at a trinational conference. (The papers and commentaries on the remaining three issues are presented in this volume.) The conference was held at the Gasparilla Island, Florida, April 19–23, 1991. The conferees included 70 scholars and administrators from Canada, the United States, and Mexico.

This report is based importantly, but not solely, on the record of the conference. The long experience of and the extensive literature about the two commissions and the three governments provide additional information and are reflected in project findings and recommendations.

The project leaders are indebted to the Ford Foundation for project support.

International Boundary and Water Commission." Key concepts in the rational use of resources which are divided by political boundaries have to include future orientation, international cooperation, coordination, and preventive diplomacy. In a time of increasing populations and advancing economic growth, it is becoming urgently important to address the issues of the prudent and cooperative use of shared resources before reaching a state of contention. Preventive diplomacy is a necessity to minimize debilitating disputes. Project complexity and resources demanded that we select a limited set of generic issues to initiate the study. Only in this way could we engage the assistance of a manageable number of competent and experienced persons to write papers for discussion, review, and critique at a trilateral conference that was the project's centerpiece.

The inherent nature of the resources which are both migratory and divided by political boundaries makes their prudent use and development, and the avoidance of disputes over their use, an unusual challenge. The general objectives of the project were two-fold: (1) to assist in the quest to avoid and resolve international conflicts arising from the use of transboundary water resources, and (2) to provide for the better management of these limited international resources.

The institutions examined were the three federal governments (United States, Mexico, and Canada) and the two boundary commissions that serve them: the International Joint Commission (United States/Canada) and the International Boundary and Water Commission (United States/Mexico).

The actual practice of the International Joint Commission (sitting astride the 4,000 mile Canadian border to the north and the additional 1,500 miles between Alaska and the Canadian Northwest Territories) and the International Boundary and Water Commission (with jurisdiction over a 2,000 mile border) has provided a rich North American experience. Although these two commissions are similar in some respects, they are also quite different. Why are they different? What can each learn from the other? What changes and accommodations need to be made to deal with emerging issues and changing conditions? Now, with the advantage of the better part of a century of actual experience for each commission, the project examined these and other questions.

From the beginning, the dispute resolution agendas of the commissions have been broad and have been concerned with domestic, municipal, agricultural, and industrial water supplies; with fish and wildlife and recreation; with floods and drought; with pollution; and with land use and environmental relationships. Disputes have occurred on such matters as water allocation for irrigated agriculture, flood control, hydroelectric power generation, water levels, navigation, dams, remedial works, obstructions of water, water quality control over surface and ground waters, and diversions and consumptive uses of water.

In the past 20 years, agenda items reflecting new concerns have become more pronounced. As a result, the project gave special attention to matters such as improved management techniques; information sharing; and institutional innovation. In addition, issues of concern included: the effects of the chemical age on water quality (both surface and underground), the land and the atmosphere; respect for natural systems and environmental implications, including Biodiversity; new trade agreements; and a strong movement toward an ecosystem approach to planning and management.

These changes in the nature of water planning and management practices in the United States, Canada, and Mexico have been and are being reflected in policies and programs affecting transboundary resources along both borders. One of the important questions posed by the study is whether the two boundary commissions have been able to meet these changes and will be able to meet the emerging future.

About the Issues

Water resources are under increasing pressure worldwide. In Europe: acid deposition continues to degrade water resources across national boundaries; industrial and power plant discharges, particularly nuclear fission products, create periodic crises on international rivers; and water allocation, navigation, and multi-purpose water storage programs continue as matters of international negotiation. The redistribution of political power in central and southern Europe and Asia has magnified the physical, chemical, and biological impacts of pollution on a bewildered population. In addition, water related conflicts continue to loom in the middle east, north Africa and southeast Asia. In South America, differences involving some of the largest water and land developments in the world remain on the continent's agenda.

The International Joint Commission (IJC) and the International Boundary and Water Commission (IBWC) provide excellent examples of international water management institutions wrestling with transboundary water problems. They are models of success in many ways, but new developments are creating new issues that are demanding their attention. These new problems, encompassing high risks to water quality and water quantity, linking border environments to binational trade agreements, and new stresses in public health and national economies, are challenging the commissions' records.

Competition is severe for the life giving waters of the Colorado, one of the most developed rivers in the world. The International Boundary and Water Commission administers the major treaties on the Colorado, Rio Grande, and Tijuana Rivers. The border area is changing under intense industrial and population growth, and demands for improved social well being are increasing. New authority, or greater use of existing

authority, is under examination to determine how to meet current needs as well as rapidly evolving new needs.

On the United States/Canada boundary, the International Joint Commission has been at work since 1912, under the 1909 Boundary Waters Treaty.¹ In most evaluations, the Commission comes out with high grades. From its first task in 1912 concerned with Great Lakes pollution until 1987 the Commission has been involved in over 110 dockets along a border in excess of four thousand miles (excluding the boundary with Alaska).²

The past two decades have brought both commissions into the public eye in ways new to both the commissions and to the three governments. On the northern boundary, new and difficult problems had to be faced involving Great Lakes pollution as well as the management of a multi-functional basin-wide ecosystem, on the Garrison Diversion Project affecting the Red and Souris Rivers in Canada, for air pollution at Windsor/Detroit, for power plant discharges and land mining on the Poplar River (Montana/Saskatchewan), and on acid rain involving the entire northeastern United States and Canada.

On the southern boundary, heavy groundwater use raises the potential for adversely affecting United States/Mexico relations. Air pollution in the El Paso/Juarez, Brownsville/Matamoros, and Tijuana/San Diego border areas is a difficult problem. Salinity from irrigation return flows and severe sewage problems have to be contended with in the context of a new environmental awareness by the public and the governments in both countries.

ANALYSIS

Introduction

This section contains the substantive part of the report: issues are identified, discussions or summaries of discussions are presented, and conclusions and recommendations are given.

The conference papers and commentaries contained in the two *Natural Resources Journal* issues are oriented around six topics:

- (1) emerging boundary environmental challenges,
- (2) improving management capacity of governments and commissions,

1. Treaty with Great Britain Relating to Boundary Waters Between the United States and Canada, Jan. 11, 1909, 36 Stat. 2448 (1910) (entered into force May 13, 1910).

2. While not yet of immediate concern, that north-south border of 1,500 miles holds potential conflicts involving hydro-electric power and fishery issues adjacent to the inside passage water navigation route, water resource developments in the massive Yukon River basin, and sluice and other mining impacts along the border.

- (3) commissions' relation to states and provinces,
- (4) improving public participation,
- (5) ecosystem management, and
- (6) accommodating an uncertain future.

This analysis identifies a number of "overarching issues" related to each border. For each issue we provide:

- (1) summary discussion,
- (2) conclusion, and
- (3) recommendations.

The analysis considers a number of "overarching issues" responding to the remarkable changes that have taken place in the last several years that made project assumptions, valid at an earlier time, unsatisfactory for use in the concluding stages of the Project. The analysis begins with these "overarching issues."

In addition, it will be noted that report findings approach change in a manner that respects the value of long standing treaties or other agreements, and that is responsive to political, economic or other well established consensual arrangements that have proven valuable in the management of transnational water, environmental resources and the management of disputes. Where the analysis departs from this attitude, a detailed discussion is provided for justification.

Former IJC Chairman Maxwell Cohen must have had similar concerns about changes in management of transboundary resources when he presented his paper on "The Commission from the Inside" on the 70th anniversary of the IJC.

Given the complexity that environmental-ecological values have imposed on all parties, and given the highly vocal public pressures from a variety of sectional interests, a certain mature understanding must be developed by the IJC on the one hand, and the governments on the other, as to how they deal with each other so as to minimize any sense of exceeding mandates at the same time as the Commission is not inhibited from exploring, in its wisdom, all the implications of issues properly before it. The IJC has little chance of maintaining its stature and credibility without convincing evidence of a capacity to adapt to new social values and related physical situations, while at the same time, in the process of such adaptation it retains a tough-minded binational independence. The Commission will be of little use to governments if it does not have wide public confidence, and it will not be able to maintain that confidence without a public belief in both countries in the Commission's determined impartiality as well as its actual and legal autonomy.³

3. University of Toronto, Canada, Centre for International Studies, *The International Joint Commission: Seventy Years On 139* (1981).

UNITED STATES-CANADA BOUNDARY ISSUES

We were pleased to read in the March-April 1993 issue of *Focus* statements that were appropriate to introduce the issues we had in mind here. *Focus* reports that in its Sixth Biennial Report to the two governments, the IJC said, "Much remains to be done, and efforts should be directed toward implementing what the Parties have previously agreed to." By similar letters to the Commission the two governments agreed to accept this recommendation and, in consultation with Great Lakes States and Provinces, focus on how to improve programs and methods to achieve the requirements and overall objectives of the Agreement.⁴

We are happy that the Commission and the two governments have agreed to "focus on how to improve programs and methods" rather than to negotiate further amendments to the Great Lakes Water Quality Agreement⁵ at this time. The Commission has compiled a remarkably frank record of actions agreed to on paper but lacking implementation over the 20 years of the Agreement. The governments will find a positive response to this new commitment to implementation in those who have devoted so much time and energy toward improving the management of the Great Lakes Basin.

There are, among other considerations, two matters of substantial interest in the IJC's Sixth Biennial Report that makes the Commission's recommendation and the governments concurrence necessary and timely, and that are very important to the selection of issues presented here. First, the IJC is clearly telling the governments of the United States and Canada:

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.⁶

Second, in support of this finding, the IJC is saying:

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

The principal problem is the presence and impact of persistent toxic substances on all sectors of the ecosystem. This issue defies boundaries and is not easily resolved through traditional technologies and regu-

4. *Focus* 6 (Mar.-Apr. 1993).

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

6. IJC, Sixth Biennial Report on the Great Lakes Water Quality Agreement 18 (1992).

lations. These substances cross jurisdictional, geographic and disciplinary lines that have tended to circumscribe previous efforts to restore and protect the ecosystem. Persistent toxic substances have helped to move the term "ecosystem" from concept to reality by forcing us to remove those imaginary lines. In their place, we are recognizing that there are no preordained boundaries in the way the natural system functions and how humans interact with and within it. All parts of the system are now recognized as interdependent.⁷

One substantial impact resulting from persistent toxic substances is on the use of water quality objectives as the basis for remedial action in controlling Great Lakes pollution.

The "overarching issues" on which we comment are directly concerned with implementation.

- The need for and the willingness of the two governments to confront and re-evaluate several important basic institutional structures to which they committed themselves before the adoption of major strategic changes in United States pollution control policies by the Water Pollution Control Act of 1972.⁸
- Getting the two federal governments more directly involved in the control and regulation of water pollution, guided by the regulatory and permitting authority already granted to the United States EPA under the United States Clean Water Act.⁹
- Recognizing the existence of, and the need to define explicitly and precisely, a Great Lakes ecosystem, (including but not limited to water quality under the Agreement); and providing a means to initiate gradual and consistent implementation of long-term management arrangements over that ecosystem.
- The need and means for implementation of a science policy for the Great Lakes.
- The need to respect while more effectively using the federal systems to which the two countries subscribe for the long-term ecosystem management of the Great Lakes.
- A renewed dedication to an ecosystem approach as the basis for Great Lakes and boundary waters management within the definition of ecosystem integrity (based on appropriate scale and function elements) adopted by the Ecosystem Committee of the IJC's Science Advisory Board.¹⁰

7. *Id.* at 1.

8. Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. §§ 1251-1382 (1986).

9. *Id.* Under the National Pollutant Discharge Elimination System, the federal government retains veto power over permits discharge. See 33 U.S.C. § 1311 (1986).

10. IJC, Science Advisory Bd., Ecology Comm., *The Ecosystem Approach: Theory and Ecosystem Integrity* (1993).

ISSUE I: NEW CONDITIONS

The Boundary Waters Treaty "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."¹¹ Under the authority of that Treaty, the governments granted impressive new responsibilities to the IJC to implement the Great Lakes Water Quality Agreement, thereby substantially extending the principles and mechanisms in the direction of Great Lakes ecosystem management, as well as dispute resolution.

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? 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?

Summary

This issue is the essential question that must be confronted and answered by the two governments before needed institutional change can bring about effective boundary waters (and especially Great Lakes) ecosystem management.

The character of institutional change that is needed for boundary waters, especially for the Great Lakes, is likely to be considered a major policy shift, involving substantial inter-governmental and interdepartmental adjustments, as well as substantial planning, budgeting, and personnel considerations. The difficulty of career desk officers or the head of a specialized office, such as the Bureau of Oceans and International Environmental Affairs to lead a successful charge to bring these matters to the top of the departments' already overloaded agenda is appreciated.

Why do we believe the new conditions in the border are the issue most vital to the protection and future management of the health of the public and of the natural systems in the Great Lakes Basin? First, the present institutional arrangements are not providing the implementation necessary to protect against persistent toxic chemicals. Second, as the IJC has concluded on the matter of the injury to humans and other living things from persistent toxic substances: "the evidence is sufficient that

11. The International Joint Commission and the Boundary Waters Treaty: Canada and the United States 3 (1990).

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."¹²

Third, an October 1991 report of the U.S. Government Accounting Office (GAO) concluded that:

no 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. 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.¹³

The IJC conclusion on persistent toxic substances is supported by:

- the GAO report,
- the preceding scientific investigations,
- the growing concern of the United States Congress (Senate Committee on Government Operations led by Senator John Glenn, and the Great Lakes caucus of members of Congress),
- Congressional enactment of the Great Lakes Critical Program Act as an amendment to the federal Clean Water Act,¹⁴ and
- the new research authorized to the Agency for Toxic Substances and Disease Registry in the United States Public Health Service.

We have only touched part of the institutional record here.

- Persistent toxic substances were one of the first major issues considered by the IJC and its boards from the first year of the Water Quality Agreement and still remain the highest priority in 1993.
- The two federal governments have failed to implement important Water Quality Agreement programs by the continued delegation of responsibilities to state, provincial, and local governments.
- The two federal governments have refused to acknowledge the limited implementation gains that have been made despite the repeated advice and reports of the IJC.

12. IJC, *supra* note 6, at 17-34.

13. GAO, Reproductive and Developmental Toxicants: Regulatory Actions Provide Uncertain Protection (1992) (GAO/PEMP-92-3).

14. Great Lakes Critical Programs Act, Pub. L. No. 101-596, 104 Stat. 3000 (codified in scattered sections of 33 U.S.C.).

- The two federal governments 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.

Conclusion

The two federal governments should place high on their agendas the exploration of options to strengthen the implementation roles of boundary waters management institutions, particularly the Great Lakes ecosystem, to meet perceived environmental dangers.

A variety of crises have explicitly and implicitly been described, and implementing action taken, since the fourth (1912) reference on water pollution under the 1909 Treaty.¹⁵ Some crises, like phosphorous and the more readily treated municipal and industrial wastes, have been ameliorated.¹⁶ The crisis involving persistent toxic substances, long in coming to be recognized 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 federal systems (involving local, state, provincial, and federal governments) of the two countries. The two governments have used the Boundary Waters Treaty to enforce and control water levels, water diversions, and water allocations. The Treaty contains unused power to achieve effective binational control and enforcement of water quality. The time has come to more directly use that authority, just as the United States did when it finally exerted federal control over water pollution throughout the country.

Recommendations

1. The highest levels of the governments of Canada and the United States must recognize and give credence to the International Joint Commission's advise for action to protect the public health of the people in the Great Lakes Basin and of the natural ecosystems of which they are a part. The two governments must evaluate the kinds of institutions and authorities needed in 1993 and beyond to meet the changing conditions.
2. The IJC proposal for effective programs of virtual elimination of persistent toxic substances in the Sixth Biennial Report is an important remedial milestone.¹⁷ 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

15. IJC, Biennial Reports on Great Lakes Water Quality Agreement (II-VI).

16. It took more than 10 years to get all of the Great Lakes states to ban phosphorous use. After 20 years major sewage and waste treatment and related remedies have yet to be accomplished, especially those areas under the RAP processes.

17. IJC, *supra* note 6, at chs. 2, 24.

the direct, not merely delegated, intervention of and implementation by the two federal governments.¹⁸

3. While we respect the practical need for some private deliberation by the two governments, the process necessary to address this issue must be opened to the public and the nongovernmental organizations, governmental agencies, the private sector, and most important, the United States Congress and the Canadian Parliament. Members of Congress and Parliament have not been given the opportunity to assess the history, current conditions, and the essential future needs of Great Lakes and other boundary waters management.
4. Consideration should be given to presenting the Great Lakes Water Quality Agreement for treaty approval. The politicization of the management of the Great Lakes Basin is already under way in the United States Congress, due primarily to the inability of the public to have access to executive branch decisionmakers. 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 beneficial in the long term. Continued legislative action of this sort, if continued, may exacerbate effective international Great Lakes and boundary waters ecosystem management.

Institutional change of a significant nature is needed and the governments must pay attention to this need before large scale overt public damage becomes unmanageable.

ISSUE 2: BINATIONAL CONTROL AND REGULATION OF POLLUTION

If the two governments agree to consider the adoption of new institutional arrangements, what guiding rationale would justify implementing stronger and more effective control and regulation over water pollution in the Great Lakes Basin and the other boundary waters? What practical options ought to be considered? Are there practical options available?

Summary

Issue 1 argued the need for change in the institutional management of the international Great Lakes and other boundary waters between the

18. This statement is justified in the following issue within this section. There is need for a central binational entity to guide and to have recourse to 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.

United States and Canada. Issue 2 follows as a supplement. The most directly applicable and convincing argument is the experience of the United States federal system (involving the federal, state, and local governments).

The first comprehensive Federal legislation addressing the problems of water pollution was the Water Pollution Control Act enacted in 1948. Among other matters . . . [i]t authorized the Department of Justice to bring suits to require the cessation of practices leading to pollution, but only after notice and hearing and with the consent of the state [within which the pollution was created].¹⁹

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 (both surface and ground waters) of the United States.

The nation gained twenty-four years of experience under the 1948 Act, strengthened through five amendments.²⁰ The 1972 amendments concluded slow but persistent legislative steps toward a new strategy. "The Federal Water Pollution Control Act was completely rewritten in 1972. The National Pollution 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."²¹

The lessons learned in this 24 year experiment ought to be self evident.

- Implementing interstate pollution control, attempted under four cooperative federal/state designs (each one more stringent than the other) was not working well (or well enough).
- Implementing interstate pollution control based on water quality standards linked to a planning format and a time schedule, an implementing design promulgated in the two amendments, foreshadowed the demise of this experimental period.²²

This design did not work for a number of reasons.

- (1) The lack of capacity in resources and technical competency of many, perhaps most, state water pollution control agencies to undertake these tasks at that time.

19. Statement of E. Tyler, Counsel, House Subcomm. on Water Resources, Comm. on Public Works and Transportation (Spring 1992).

20. Federal Water Pollution Control Act, 33 U.S.C. 466a (amended in 1955, 1956, 1961, 1970, and 1972).

21. Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. §§ 1251-1382 (1986).

22. Water Quality Act of 1965, Pub. L. No. 89-272 (transferred and now appears in scattered sections of 42 U.S.C. §§ 7401, 7402, 7403); and the Clean Waters Restoration Act of 1966, Pub. Law No. 89-675 (transferred and now appears as 42 U.S.C. § 7405).

- (2) The establishment of water quality standards and their enforcement if water quality was reduced below the established standards implied the use of a water quality planning program. The tasks involved in both were complex, demanding, and required substantial state capacity.
- (3) Senator Edmund Muskie's statement in the Senate debate on the 1971 Amendments to the Federal Water Pollution Control Act,²³ explained much.

[T]he Committee proposes a major change in the enforcement mechanism—from water quality standards to effluent limits—of the Federal Water Pollution Control Program.

Under the 1965 act, water quality standards were to be set as the control mechanism The water quality standards program is limited in its success. After five years, many states do not have approved standards. 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.

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.*²⁴

- (4) The American industrial community, too, recognized the competitive even-handedness that a simple and practical national program would bring about.

Given these notes on the matter of water quality standards, several questions may be asked.

- (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 above?

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.

.23. Subsequently enacted as Pub. L. No. 92-500 (codified at 33 U.S.C. § 1251 (1987)).

24. Cong. Rec., § 17396–97, Nov. 2, 1971.

Regarding question (2), we refer to the comments of then Senator Muskie provided above.

Regarding question (3), the conclusions about public health dangers drawn by the IJC in their Sixth Biennial Report requires the two governments to reassess the value and use of water quality standards. Canada and the Province of Ontario currently and historically (under the former Ontario Water Resources Commission) prefer the flexibility of the water quality standard concept in its negotiations with polluters. As the Sixth Biennial Report makes clear, however, the control of persistent toxic materials will require a change in control and regulatory processes.

This discussion of change in the use of water quality standards is not the first time the use of such standards has been challenged.

There is strong disagreement on this question between the United States 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.²⁵

The IJC, in responding to the 1912 and 1964 pollution-related references, have been consistent in their concern for pollution control implementation. The 1918 recommendation stated that

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.²⁶

The IJC response to the 1964 Reference recommends

[t]he Governments of Canada and the United States confer upon this Commission the authority, responsibility and means for coordination, surveillance, monitoring, *implementation*, reporting, making recommendations to governments . . . and such other duties . . . as may be agreed by the . . . governments: the Commission to be authorized to establish, in consultation with the governments, an international board or boards to assist it in carrying out these duties and to delegate to said board or boards such authority and responsibility as the Commission may deem appropriate.²⁷

All the above recommendations in this second IJC report were acted upon in part or in whole, with the exception of the recommendation on implementation. As in the 1920 recommendation, no direct powers of

25. Report of Sub-Group of the United States Senior Review Group on Review of the Great Lakes Water Quality Agreement app. 1, at 2 (April 29, 1977).

26. IJC Docket No. 4, Pollution of Boundary Waters; Final Report 131 (Sept. 1918).

27. IJC, 1970 Report 156 (Recommendation 22) (emphasis added).

implementation, other than the good sense and persuasive characteristics of the Commission, were granted or authorized.

We remind the two governments of the fundamental concept stated by Surgeon McLaughlin, the person that was to be their "Chief Sanitary Officer" to head the 1912 Reference:

[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.²⁸

Surgeon McLaughlin was right and the Commission has been right to follow his views. The government's staffs that designed the Water Quality Agreement were not able to transfer to the Great Lakes Water Quality Agreement of 1978 or include in the Protocols of 1987 the 24 years experience that resulted in the United States Clean Water Act of 1972.

It is time to reconsider.

Conclusions

Have we learned enough from the costly 24 year experiment of United States federal/state cooperation and from the positive experience using central control during the last 21 years under the Clean Water Act? The two governments should give thoughtful consideration to needed institutional change as a major contribution to the effective management of water pollution in the international Great Lakes. The time for change has come.

To re-emphasize: the IJC's Sixth Biennial Report of 1992²⁹ provides the fundamental reasoning why institutional change is a paramount necessity. It deserves careful reading.

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.

Recommendation

The two governments should give immediate attention to the changes needed to bring about a binational institution to administer and implement the control and regulation of water pollution in the Great Lakes and the other boundary waters directly under the responsibilities and authorities granted by the two governments, and answerable to them.

We do not offer detailed specifications for such an institution, but in general it ought to be:

28. U.S. Public Health Service, Annual Report 41-41 (1913).

29. IJC, *supra* note 6.

- (1) encompassed within the broad and flexible charter of the Boundary Waters Treaty of 1909, if possible;
- (2) responsive to the two governments;
- (3) empowered by the two federal governments to act 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 prevention, control, abatement, and elimination of water pollution on an anticipatory basis;
- (4) capable of using authorities now available to the IJC (including hearings, findings, and orders for the management of water levels, water diversions, and water allocations) for water pollution control activities;
- (5) trusted to use the full range of authorities specified in the Boundary Waters Treaty, including Article X;³⁰
- (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) relieved of the requirement to "prove the case" as is usual when using water quality standards; and
- (8) provided with adequate management resources to execute the important tasks to which it is assigned.

Because the IJC has concluded that a direct public health concern is present, this matter should be a priority to the President's new Office of Environmental Policy and the Office of Science and Technology Policy. In the United States Congress it should be a priority to the members of the Congressional Great Lakes Caucus and specifically the chairman of the Senate Committee on Governmental Affairs responsible for the Government Accounting Office (GAO) investigation report.³¹

It is more difficult to specify priorities for specific Canadian governmental entities, although one suggestion is the Senate Parliament, Committee on Foreign Affairs on United States-Canada Relations re: Great Lakes management matters. Members of Parliament and the Ontario government should be alerted to the report, "Toxic Chemicals in the Great Lakes and Associated Effects" that says: "toxic chemicals found in the Great Lakes can have subtle effects on cellular metabolism."³² These

30. Article X authorizes the International Joint Commission to render "decisions or findings" on matters in dispute between the parties.

31. GAO, Reproductive and Developmental Toxicants: Regulatory Actions Provide Uncertain Protection (1992) (GAO/PEMP-92-3).

32. Dep't of Fisheries and Oceans & Health and Welfare Canada, Environment Canada (1991) (set contains 2 volumes and a summary) (Catalogue EN 37-95/1990-1E, Dep't Supply and Services, Ottawa).

"may not be adverse health effects in themselves and their ability to predict the eventual occurrence of adverse health effects is unclear."³³ Nonetheless, such subtle effects "are undesirable and support the need for a reduction in our exposure to such substance."³⁴

ISSUE 3: ECOSYSTEM MANAGEMENT OF THE GREAT LAKES

Can the concept of ecosystem management as applied to the Great Lakes (with 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? How should it evolve?

Issue 1 has to do with the "will to change" of the two governments when confronted with new conditions. Issue 2 exemplifies the urgent need to change toward direct binational control, regulation, and authority over water pollution, one specific problem that has developed to crisis proportions. Issue 3, 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.

Summary

Cornell University faculty, together with university faculty in Canada and the United States and others, have been engaged in furthering understanding about the need for and characteristics of a long-term Great Lakes ecosystem management strategy. The management tasks envisioned include the integration of water quality and water quantity, and such matters as navigation, lake levels and flows, fisheries, diversions and consumptive uses, energy, air quality, and shoreland use, among others.

The original report resulting from the Canada/United States Inter-university Seminar of 1971-72 recommended that the governments adopt this strategy. A first step would be to authorize a overview study of the current and foreseeable problems involving the Great Lakes (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, and to consider priority options.

33. *Id.*

34. The IJC took this statement into account in arriving at its conclusion on the public health danger as reported earlier in the Sixth Biennial Report.

Such a strategy has not yet formally been adopted.³⁵ In view of the complexity of the Great Lakes situation, not the least of which is its binationality, it would seem that the governments of Canada and the United States should have come to the same conclusion and authorized such a report during the 20 years since the Water Quality Agreement was first signed. It is evident, however, that both the IJC and the two governments have taken important steps leading to the evolution of such a strategy. Several of the IJC's important contributions to this record are illustrated in the following.

In 1979, the IJC's Science Advisory Board sponsored a workshop on anticipatory planning for the Great Lakes, which called for the development of a Great Lakes perspective, and 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.³⁶

In 1985, an advisory the IJC issued to the two governments stated that

[n]otwithstanding 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 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.* (Emphasis added.)³⁷

The significance of the 1989 IJC Commentary is that it was included in the Sixth Biennial Report of the Commission issued under the

35. In 1990, the Conservation Foundation and the Institute for Research on Public Policy (IRPP) issued an excellent report in which they 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 decisionmakers and the public; a single, well-documented volume would promote public understanding of environmental trends and help identify needs for new policies and programs." It could not have been said better. Foundation staff are to be complimented for identifying the needed task and for undertaking its presentation. The two governments have no excuse for not having addressed the need to prepare a comprehensive report from a Great Lakes perspective as attempted by the two private institutions. Conservation Foundation & Institute for Research on Public Policy, *Great Lakes, Great Legacy* (1990).

36. IJC, *Anticipatory Planning for the Great Lakes* (1980).

37. IJC, *Diversions and Consumptive Uses pt. 2* (1980).

authority of the Great Lakes Water Quality Agreement. The Commentary extends beyond the restricted scope of water quality.

Since . . . 1972, substantial progress has been made in abating specific pollution problems affecting the Great Lakes. . . . [E]ven 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.³⁸

The IJC could not be more clear in its advice to the two governments. The conclusion of this line of thought is that the long-term management of the Great Lakes Basin requires ecosystem management. Institutional arrangements and capabilities will thus have to be devised appropriate to the tasks of such a program.

Conclusions

Professor George Francis clarified the distinction between "environmental management" and "ecosystem management."³⁹ Environmental management is characterized more by the ideas of regulatory and related measures to reduce the pollution of water, air, and land.⁴⁰ Ecosystem management encompasses goals for ecological sustainability, the ideas for which emerged from the World Conservation Strategy in 1980,⁴¹ reinforced by the World Commission on Environment and Development in 1987.⁴² These goals include: (1) maintenance of essential ecological processes, (2) conservation of biological diversity, and (3) the sustainable use of renewable resources. 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 it requires more substantial social change to achieve.

38. IJC, *supra* note 6, at 48-53.

39. See his discussion in this issue of Nat. Res. J.

40. *Id.*

41. *Id.*

42. *Id.*

In a 1988 reader on "Perspectives on Ecosystem Management for the Great Lakes," Professor Caldwell outlined five implications pertaining to necessary institutional arrangements.⁴³ These, in brief, are:

- (1) "We need coordinated scientific work, including research."
- (2) "Conventional institutional assumptions and arrangements will be stressed by demands for action beyond the competence of existing agencies to respond."
- (3) "We need a purposeful and articulate transnational constituency."
- (4) "Institutional innovations must be appropriate and responsive to the environmental problems of the lakes."
- (5) "*An 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.*" (Emphasis added)⁴⁴

In addition, a note from the 1992 draft, "The Ecosystem Approach: Theory and Ecosystem Integrity" emphasizes the intent of this issue.

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.⁴⁵

Professor Caldwell's "implication" on the "authoritative institution" and the Ecological Committee's note on the development of an ecosystem approach are primary guides to the formulation of the following recommendations on this issue.

Recommendations

An opportunity exists now to provide a new way to meet the challenge of managing the Great Lakes as an integrated ecosystem, building on the existing strengths or those currently developing. Recapping, some of the strengths are:

- (1) experience under the Great Lakes Water Quality Agreement;
- (2) commitment to the ecosystem approach;
- (3) perceptions and philosophies expressed by the IJC on the need for a broader ecosystem approach, and the likelihood of governments adopting these views for early action.

43. L. Caldwell, *Perspectives on Ecosystem Management for the Great Lakes: A Reader* (1988).

44. *Id.* at 18.

45. IJC, *supra* note 10.

Consideration of ecosystem management for the Great Lakes Basin leads to five specific recommendations.

1. The two governments should authorize an overview study of the entire Great Lakes Basin. This study should bring together available information to get an ecosystem perspective of the Great Lakes, to identify issues, to define issue relationships, and to establish priorities and can be accomplished.⁴⁶ The governments will not be risking much if they authorize (by reference) the IJC to pursue such a task, or by some other vehicle that can combine the efforts of the two governments.
2. Nongovernmental organizations and the states and provinces should use such information to improve institutional designs for managing 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 continuing competent and acceptable guidance to the existing systems.
3. The two governments should authorize the IJC to establish a leadership institution, in the form of an Ecosystem Study Board (through the usual reference process), to study further actions to implement an integrated ecosystem approach for the long-term management of the Great Lakes Basin.

The board should be thought of as a continuing study and advisory body to the IJC and, through them, to the governments. What is needed is objective advice with a wide horizon 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 in the development of a realistic agenda.

The governments can terminate the board at will, depending on a periodic assessment of its value 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 implementation in future years.⁴⁷

4. By providing guidance for implementation, the governments can facilitate the integrated ecosystem approach without

46. Cornell University, *The Great Lakes of the United States and Canada: An Advisory Report to the Governments of the United States and Canada* (1985) (prepared by the simulated Ecosystem Study Board of Cornell University). A similar proposal was made in the *Lake Levels Reference Report, Phase One*.

47. 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" will be useful to review.

recourse to new authority or law. The governments can authorize the IJC to provide guidance through the provision of information, expert panels, and standard models.⁴⁸

Benefits stem from the IJC (a respected neutral agent of the two national governments) making recommendations for the good of the entire Great Lakes Basin. 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.

5. Structural change in Great Lakes management institutions should be made carefully, and only when the needed change is well-defined. The guidance of an ecosystem study board could help assess the need for new institutions. Institutional characteristics will evolve with experience, improved information about issues and needs on an ecosystem basis, time, and patience.

In closing, the governments have made impressive progress toward the utilization of an integrated ecosystem management approach for the long-term management of the Great Lakes Basin. But the constraints against further utilization involving political institutions, existing laws and regulations, and financial matters are real. We ought not feel that we can ease our way past these obstacles as easily and with unlimited time as we have with past obstacles. What is needed is a definite institutional center that can provide leadership under government guidelines to pursue ways to overcome and move beyond the obstacles.

Public and private leaders should support the IJC and request the governments (1) to redefine the integrated ecosystem management for the Great Lakes on a basis broader than, but including, water quality; and (2) to initiate improved implementation of the management of that ecosystem by adopting and supporting the above recommendations. New reference authority to the IJC and the creation of an ecosystem study board will allow for the exploration of ways to meet the future for effective Great Lakes integrated ecosystem management.

48. 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 that related to public health dangers, techniques for erosion control, land use guidance relative to energy development, and matters pertaining to recreation. The models can also direct the information to the appropriate level of government.

ISSUE 4: IMPLEMENTING A SCIENCE POLICY FOR THE GREAT LAKES: INSTITUTIONAL AND PUBLIC RESPONSIBILITIES

Science Policy relates to the planning, funding, and administration of Science under the Great Lakes Water Quality Agreement. How do we value and use science policy to serve the needs of the international Great Lakes of Canada and the United States? How are such policies implemented? Can we do better?

Conclusions

Canada and the United States place great value on the science policies in place, and the Great Lakes Council of Resource Managers provided a concise and effective statement of how the two countries are viewing future policy needs and applying research resources to meet existing policies.⁴⁹ In search of the policy arena for the boundary waters generally, and the Great Lakes Water Quality Agreement, in particular we found both a lack of explicit identifiable concern and information on how such policies are implemented and if more can be done.⁵⁰

We note in the Discussion that "We are impressed with the totality and breadth of research. While we are impressed with the expansive research infrastructure, we are concerned not so much about its diffusion as 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 it is not accomplished, for example, merely by stating in Annex 17 of the Water Quality Agreement that "[t]he Parties, in cooperation with State and Provincial Governments shall conduct research in order to" and there then follows nine research needs which presumably are to be implemented. But by whom? the federal governments? the states and the provinces? How is the cooperation to be engaged and carried out? Nothing is said, nor 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 that, "You are responsible. Go do it."? Have representatives of the IJC, the foreign offices, the Science Advisory Board, and research entities seeking intergovernmental or international collaboration testified in Congressional appropri-

49. IJC, *Great Lakes 2000: Building a Vision* (1989).

50. The managers' search included catalogues of research agencies and catalogs of their work; listings of needed research and attempts at setting priorities; the need for improved coordination, collaboration, cooperation and synthesis; the need for interagency and intergovernmental planning and programming; and the heavy responsibilities laid on research directors; all these and others were dealt with.

ation hearings to further Great Lakes science policies and programs. Have representatives of public organizations and nongovernmental organizations (NGOs) taken the time to appear before legislative 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.

Information about research objectives and meaning is needed by decisionmakers regarding research matters. Coordination of United States federal water resources research was a successful example, but it was abandoned after more than a decade of useful service. Decisionmakers were at least 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, the character of research agency missions, and the lack of flexibility to turn career research personnel and on-going research in new directions. Research is always hampered by the lack of available resources. Great Lakes interests (at the congressional, parliamentary, state, provincial, local, and other public and private sectors) must make their case before budget decisionmakers within and outside of the research community to ensure implementation of Great Lakes programs and goals. Unless these interests do so, implementation of the hopes and expectations so well expressed in "Great Lakes 2000: Building a Vision," will remain merely a vision. This need not be.

Recommendations

Great Lakes research needs an institution (not necessarily new) to focus and support the implementation of formulated research goals, and to support the Science Advisory Board in its primary role as science advisor to the International Joint Commission.

There should be an Office for Research Information. Such an office can readily be established as part of the IJC's Regional Office in Windsor, Ontario. Using computer capacity already available, such an office could:

- (1) maintain and update a Great Lakes research directory file including, selected major elements outside the Great Lakes (as for example the Corps of Engineers Vicksburg Laboratory);
- (2) maintain and update a Great Lakes research projects list in accordance with a standard catalogue of research areas defined and agreed to by the research communities of both countries;
- (3) maintain the minimum budget information necessary for a reasonable understanding of the financial resources allotted to research objectives, projects or research areas (this information would be useful in facilitating support and implementation of

- research priorities; and of aiding intergovernmental, international, interagency, and public and private research coordination);
- (4) provide more precise information needed by the Science Advisory Board and others to support the IJC in its responsibilities to advise the governments, and to provide information for wide public use; and
 - (5) provide the information needed by the official research agencies and the public in developing responses to inquiries from legislative bodies and decisionmakers of national, state, provincial, and local governments.

Advisory and working groups from research agencies and the public could be utilized to assist in the programs to be carried out by this office. The computerized information should be managed in an open manner so as to be recalled, transmitted, and utilized via ordinary computer machinery.⁵¹

ISSUE 5: THE VALUE AND USE OF FEDERAL SYSTEMS OF GOVERNMENT IN THE GREAT LAKES

How can we continue to respect but more effectively use the federal systems of government (federal, state/provincial, and local), to which the two countries subscribe, to provide for the long-term ecosystem management of the Great Lakes?

Discussion

The government of the United States was initially thought to be designed as a system in which the federal government would exercise relatively less power than state government. But the early decisions of the Supreme Court under Chief Justice Marshall reversed this expectation. Under the British North American Act of 1867, modern Canada was thought to be designed as a system in which the federal government would exercise relatively more power than the provincial governments. During the course of the last 125 years, the reverse has taken place.

Under either condition the two federal governments have found in their systems sufficient flexibility to meet changing needs, an ability to control the concentration of government power, and ways to allow citizens to participate directly in matters close to home through local, state, and provincial governments.

51. This option outlines one way to facilitate implementation of Great Lakes research agenda and needs. It has the benefit of having been tried for about ten years as a coordinating vehicle for U.S. federal water resources research. Full information is available upon request to the author.

While the federal systems provide for sharing responsibilities among the three major levels of government, the sharing takes many forms: responsibilities have to be defined; administrative procedures and often laws have to be re-cast and coordinated; costs must be allocated; and some form of oversight must be provided to ensure that the public objectives sought are achieved. But the implementation of broad social objectives that involve all of the parties in both countries cannot be left either casually or by general and diffuse assignment to the members.

For 21 years (1972–1993) the two governments have sought to attain the objectives of the Great Lakes Water Quality Agreement within the context of Article XI. The two clauses of the Articles are simple and clear.

1. The obligations undertaken in this Agreement shall be subject to the appropriation of funds in accordance with the constitutional procedure of the parties. (This means, for example, that the United States government as one party can seek funds from the Congress for its own direct responsibility but does not and cannot assure the appropriation of funds for those actions that must be accomplished by state or local governments.)
2. The Parties commit themselves to seek:
 - (a) The appropriation of funds required to implement this Agreement.
 - (b) The enactment of any additional legislation that may be necessary in order to implement . . . this Agreement; and
 - (c) The cooperation of the state and provincial governments in all matters relating to this Agreement.⁵²

The key words in clause (2) are "to seek." For 21 years the Parties, supported by the work of the International Joint Commission, have done the "easy to do" tasks.⁵³ At the same time, it must be recognized that the states and provinces and their localities were required by 1972 to meet strong national legal requirements and concurrent state and provincial legislation to control overt water pollution. The Great Lakes Water Quality Agreement added an important new dimension.

There were and are some important failures as well. Toxic substances, especially persistent toxic materials control, awareness of public health implications of toxic substances, and control of critical area pollution are examples of issues which have not been sufficiently dealt with despite the repetitive alerts by the IJC to the governments.

52. Great Lakes Water Quality Agreement, Nov. 22, 1978, U.S.–Can., 30 U.S.T. 1383.

53. For example, they made major advances in phosphate management and eutrophication control in the lower Lakes, made good progress in the control of municipal waste management, and received good support from the two boards and the Regional Office.

The critical situation caused by the new conclusion of the IJC in the Sixth Biennial Report relative to persistent toxic substances demands this change. For example if, as the IJC recommends, toxic control requires a deep entrance into the chemical process industries and, even more, into their supplier industries wherever they may be located, 'seeking' the cooperation of state and provincial governments will hardly do. It is doubtful that any political leader will raise a hand to challenge Dow, Monsanto, or any other major industrial complex so vital to the jobs and economies of local, state, and provincial governments.

Conclusions

The time has arrived to strengthen the implementation roles of the two governments under the Water Quality Agreement. The milieu of two federal governments, eight or more states, two or more provinces, and hundreds of local governments acting as they can, when they can, if they can, with no senior government (or two governments acting in concert) willing to take a responsible leadership role provides little assurance of success for protecting the public health and other important matters covered by the Great Lakes Water Quality Agreement.

Recommendations

The federal systems of the two countries provide flexibility to resolve social and environmental problems. To use them responsibly, they must be used effectively. Therefore, the two governments should reconsider Article XI of the Great Lakes Water Quality Agreement (on the subject of implementation) with the view to strengthening their direct responsibilities for implementation of the goals of the Agreement.

ISSUE 6: REVISITING AND EXPANDING AN ECOSYSTEM APPROACH FOR APPLICATION TO THE BOUNDARY WATERS

A renewed dedication to and understanding of an ecosystem approach to boundary waters (especially in the Great Lakes) is an increasingly important management skill.

The main role of an ecosystem approach is to bring the most useful systems perspective to bear on the analysis of a perceived problem or issue, and to formulate possible solutions. The ecosystem approach requires that the most relevant systems for the tasks at hand be defined and bounded, taking into consideration the component sub-systems (ecological, sociologic, institutional), their space and time scales, and critical feedback interrelationships which drive the dynamics of the system and

sub-systems. (In some cases, the scale to consider may be all or most of North America (Canada–Mexico–United States).)

Actions taken to deal with the problems or issues should be consistent with the goal of restoring and maintaining ecosystem integrity. This is a challenging concept because it is difficult to define 'integrity.' Therefore, there is some element of human choice. The preferred choices require only that the affected ecosystems retain their integrity, which is currently interpreted to mean that they function naturally, deal with external stresses, and retain their inherent capacity for self organization.

Policy interventions should strive to maintain the sustainability of the overall ecosystems (which can be viewed as interacting ecological, sociologic, and institutional sub-systems). This requires that changes in any one sub-system should not impair the integrity of the other sub-systems. If this is not possible, it is the institutional sub-system that should adapt, though in practice they are more likely to struggle to remain the same at the expense of either or both the ecological or sociological sub-systems (i.e. no one is responsible for maintaining ecosystem 'integrity').

Recommendation

The governments and the Commission should adopt this approach. It would serve as a flexible basic principle (similar to the one in the 1909 Boundary Waters Treaty that simply prohibited transboundary pollution) and would encourage innovation in the ways the Commission and its cooperating agencies address the problems and issues before them.

UNITED STATES–MEXICO BOUNDARY ISSUES

Introduction

There are differences between the boundary regions of the United States and Canada and those of the United States and Mexico. The reasons are fundamental and include history, climate, culture and language and, not unimportantly, the way United States citizens have been trained to think about Mexico and Mexicans.

Our history books and our media have instructed us well about the skulking Indians and their French allies using the Connecticut Valley paths and waterways to attack the Deerfield's of Massachusetts and elsewhere. If Blair and Arnold and Sullivan had succeeded in their invasions of Canada during the Revolution, if the invasion of Canada during the war of 1812 and the threat of another attempted invasion had not been aborted at the end of the Civil War, and if the Hudson Bay Company had not held the Canadian west against the Americans, the management of the northern boundary region would have been different. But, for the most part, sharing a common climate, culture and language together with

respect for the people of Canada produced a unique Boundary environment. The result was the respected, both in law and spirit, Boundary Waters Treaty of 1909.

On the southern boundary, 300 years of Spanish imperial rule did not end until 1821. Mexican administration of its northern border left an invitation to United States land owners and others to extend their agriculture and economic system west. And there are other differences. Much of the climate in the acquired lands is harsh and arid. Most of the boundary lands were desert and demanded a new lifestyle from newcomers from the states. Cultural differences were marked. The 300 year occupation by Spain had produced a people of multiple origins (a condition frowned upon by 19th century America, and still a problem as we enter the 21st). Mexican law and land tenure contrasted with the common law system inherited by the United States from England.⁵⁴

One review of the Treaty of Guadalupe Hidalgo tends to illustrate cultural and other factors that have had an important bearing on United States/Mexico relations.⁵⁵

- After the Mexican War, American leaders assumed an attitude of moral superiority in their negotiations of a treaty.
- North Americans viewed the forcible incorporation of almost one-half of Mexican national territory as an event foreordained by Providence.
- With an arrogance born of superior military, economic, and industrial power, the United States virtually dictated the terms of settlement.
- This Treaty established a pattern of inequality between the two countries, and this lopsided relationship has shadowed Mexican/American relationships ever since.
- The record of treaty compliance . . . since 1848 is not a good one; the U.S. has not only repeatedly violated the Treaty's provisions for the peaceful settlement of future disputes . . . but it has also either ignored or violated international laws during political and military interventions in the 20th century.

Not in the review, but familiar to readers, moviegoers, and even current television viewers are the stereotypes that have become the norm for many (if not most) Americans as the way they view Mexico and Mexicans. These references emphasize the place that attitude and associated culture, economy, and power can and did have and continues to have in United States/Mexico relations.

54. It is perhaps this last point that has made the United States/Mexico boundary much different than its northern neighbor. It is seen in the new reviews of the Treaty of Guadalupe Hidalgo, which ended the Mexican War of 1846-48.

55. R. Griswold del Castillo, *The Treaty of Guadalupe Hidalgo: A Legacy of Conflict*, 6 Transboundary Res. Rep. 5 (1992).

Walter Prescott Webb made the resounding and still valid comment that the great problem of the American West is the "search for water."⁵⁶ Water (above and below the ground) and its safe, efficient use, remains the critical issue in United States/Mexico boundary relations. Water impacts human life and public health, population growth and migration, urban and rural living, industry and agriculture, animal husbandry, and indigenous natural systems. It has no less an impact on the most sophisticated trade relations among nations. Other environmental matters such as hazardous waste, toxic substances, and air pollutants impact water and its uses.

The historic concern of the two governments and their agent, the International Boundary and Water Commission (IBWC) was both a "search for water" (in accord with Webb's conclusion) and the means for its equitable allocation to users on both sides of the boundary. The most important implication of the work of the IBWC has been the institutionalization of its concept, facilities, water quantity management, and the legal framework widely established on both sides of the boundary as a result of and in support of its international programs.⁵⁷

The selection of issues is limited to those of overriding importance.⁵⁸

ISSUE 1: NEW CONDITIONS

Are there new conditions that challenge the governments of Mexico and the United States to confront and rethink institutional structures to which they have long been committed?

Discussion

The International Boundary and Water Commission and the treaties which direct its work have served the two governments and the public in the boundary region well to date. However, new developments and changing attitudes, accentuated during the past decade, have posed new and growing problems to the governments. These include: concern for the

56. W. Webb, *The Great Plains* (1936).

57. The character of the boundary region is changing and new conditions may force existing institutions to change functions and the allocation of responsibilities. We will attempt to respond to some of these in the issues we take up. But the negotiations on trade treaties under way by the governments (and the many related side exchanges to care for a variety of issues) place substantial practical limits on our comments. Accordingly, we are addressing issues that we expect will be important to the implementation of any treaties concluded by the governments, or issues that need exploration to meet emerging and future concerns.

58. Many other issues are important, and many of them are considered in the conference papers and commentaries in this issue and the prior issue of the *Natural Resources Journal*. Where appropriate, we will discuss, conclude and make recommendations by reference to the issues considered in the Canada/United States boundary part of the report.

quantity and quality of transboundary groundwater resources; the implication of legal decisions on water allocation in the United States on international surface and ground waters; a rising tide of public concern for safe drinking water, urban sanitation, and water pollution control from Tijuana/San Diego to Brownsville/Matamoros. In addition to these water driven concerns, other environmental issues are growing, including hazardous waste, toxic substances, and air pollution.

So far, the new developments that can and do have wide ecosystem effects have been dealt with by the governments on a bilateral basis. Thus, the La Paz Agreement and other arrangements have been stimulated by the evolving character of the conditions present or likely to expand greatly in relation to the trade treaty developments. These developments have not helped to make clear the position of the International Boundary and Water Commission.

Conclusions

The historic legal position of the Commission, its works, and its influence on dispute resolution in the boundary region should be guarded, but within an enlarged Commission framework. There is need for more flexibility in assigning tasks to an enlarged Commission beyond those framed by the specific treaties now in existence. An enlarged Commission, because of its posture and importance to the boundary region, can learn to accommodate new assignments. As such a Commission learns to implement an ecosystem approach, management responsibilities must not be dispersed among institutions in the region.

Recommendation

The governments of Mexico and the United States should continue to recognize and give credence to the new conditions in the boundary region. The two governments should confront the question of the kinds of institutions and authorities needed in 1993 and beyond to meet these changing conditions. In considering this question, the value of matching institutional form and responsibilities to a transboundary ecosystem carefully defined in space and function should be a prime criterion.

ISSUE 2: A NEW INSTITUTION FOR THE BOUNDARY REGION

Are the two governments of Mexico and the United States willing to provide leadership to the world community by committing themselves to the creation of an institution that would work toward the adoption of the decisionmaking elements of Agenda 21 of the United Nations Rio Conference, and that would specifically:

- 1) seek sustainable development through the mutual consideration of environmental and economic factors within a framework of ecosystem management;
- 2) be guided by a definition of ecosystem comprising water, land, the atmosphere, and biological and human social systems for application to the United States–Mexico Boundary region and that has been tested in substantial part by Canada and the United States under the Great Lakes Water Quality Agreements of 1972 and 1978, amended by the Protocols of 1987?

Discussion

The Boundary Waters Treaty of 1909 between the United States and Great Britain, then acting for Canada, has been used to prevent or reconcile Boundary disputes in over 120 situations and to begin to engage in broader ecosystem management affairs. In all of these, the Institution used by the two governments for fact finding, advice, and implementation of government agreements has been the International Joint Commission.

The Commission is composed of six members equally divided between the two countries with two modest and separate staffs in Ottawa, Ontario and Washington, D. C. From 1912 until 1993, Field Boards and, since 1972 a combined regional office at Windsor, Ontario, together with an ability to call on the resources of the two governments has made this Commission of immense value to the two governments.

The Commission agenda includes or has included problems of water pollution; water supplies, diversions and consumptive uses; water allocation and water levels; air pollution; land pollution and related problems including the economy and natural and biological resources. Under the Great Lakes Water Quality Agreement the Commission has for 21 years been intimately concerned with the full range of environmental problems including hazardous waste and toxic substances, especially persistent toxic substances, public health and the health of natural systems including birds, wildlife, fish and aquatic organisms; and with research under a science policy that is open-minded.

The cornerstones of a comparable but not identical institution to serve the Mexican–United States Boundary should be:

- 1) the flexibility to serve the needs of the two governments as they and their respective publics determine Boundary related needs on a priority basis,
- 2) the definition of needs within the context of an ecosystem approach built on system integrity reflecting boundary scale and functions of significance to boundary region health and welfare,
- 3) the determination by the two governments of issues requiring anticipatory and proactive initiatives to protect boundary region health and welfare, and

- 4) the inclusion of the responsibilities and authorities granted by the two governments and the subsequent implementation activities completed or under way by the International Boundary and Water Commission.

The composition, functions and 21 years of experience of the International Joint Commission under the Great Lakes Water Quality Agreement are well known to the United States Department of State; to the Department of External Affairs of Canada and, no doubt, to the Foreign Office of Mexico. If that office or any other office(s) selected by the government of Mexico wish, they can readily receive, as needed, additional information relative to the establishment of a Commission charged with tasks like those assigned to the International Joint Commission but within the context of the Mexico–United States Boundary Region. The powers, responsibilities and functions of the International Joint Commission assigned under the Great Lakes Water Quality Agreement are provided in Article VI of that Agreement. A brief summary of some of these include:

1. Assist in the implementation of this Agreement
 - a) collation, analysis and dissemination of data . . .
 - b) collation, analysis and dissemination of data concerning the General and Specific Objectives of the operation and the effectiveness of operations of programs established . . .
 - c) tendering of advice and recommendations to the parties and to the State and Provincial governments . . . including . . . objectives, legislation, standards . . . regulatory requirements . . . intergovernmental agreements . . .
 - d) tendering of advice and recommendations to the Parties in connection with . . . the annexes to the this Agreement . . . assistance in the coordination of joint activities . . . assistance and advice on matters relating to research in the Great Lakes Basin . . . Ecosystem . . .
 - e) investigation of such subjects...related to the Great Lakes Basin Ecosystem as the Parties may refer . . . to it
2. . . . exercise all the powers conferred upon it by the Boundary Waters Treaty . . . including the power to conduct public hearings . . . compel testimony of witnesses, production of documents . . .
3. . . . shall make full Reports to the Parties and the State and Provincial governments . . . assessment of (program) effectiveness . . . and advice and recommendations. . . at any time make special reports to . . . the . . . governments . . . and to the public . . .
4. . . . publish any . . . document prepared by it under this Reference
5. . . . verify independently . . . data and other information submitted to it . . .

6. . . . carry out its responsibilities . . . utilizing principally . . . Board(s) established under Article VIII of this Agreement . . . shall ensure liaison and coordination (with) other institutions . . . and other international bodies as appropriate.

In addition to the above illustrations special note is made of the authority granted the International Joint Commission to engage in a program of public participation. This has been one of the strengths of the Commission.

There may be new opportunities for sharing financial resources among the Federal governments, the states in both the United States and in Mexico, and the local governments, as well as new opportunities to seek direct revenue from industrial and commercial contributions.

To remedy a condition critical to the public health of the United States–Mexico Boundary Region communities, the International Boundary and Water Commission and the two governments together with local and state financial support are presently engaged in planning, constructing, and operating if necessary drinking water and sanitary facilities as sewerage works and treatment plants. The cost of the works under way as reported in February, 1992 amount to \$457 million dollars.

Conclusions

We believe it is important, in designing a new, broadly based and effective Boundary Commission, to respect and maintain the identity and functions of the International Boundary and Water Commission, the existing Treaties between Mexico and the United States relative to the IBWC.

While we suggest a review in depth of the structure and authorities of the 1909 Boundary Waters Treaty between the United States and Canada, of the International Joint Commission created by that Treaty, and of the 21 years of experience of the two governments under the Great Lakes Water Quality Agreements, it is important to recognize the differences that exist now between the IJC and the IBWC.

The most important differences are in the functions of the two Commissions. The functions of the IBWC such as planning, design, construction and operation of water storage and related facilities for the purposes of allocation of water between the two countries under specific treaties for different water bodies along the boundary, and for drinking water and sanitation finds no counterpart in the Great Lakes Basin. A second difference lies in the specificity of assignments and tasks under each of the Mexico–United States Treaties in contrast to the flexibility for assigning tasks widely variable in subject, scope and time under the Boundary Waters Treaty of 1909 and the Great Lakes Agreements. A third is the ability to appoint boards of investigation and of implementation, including representatives of general public interest, over unlimited time to ensure problem solutions and implementation. There are others that will become apparent upon additional review.

There is a need to reconstitute the current International Boundary and Water Commission on a broader and firmer base; as a commission capable of dealing with the totality of issues that may arise within the ecosystem of the United States–Mexico boundary; with the capability to deal with the issues on a priority basis giving full consideration to the social as well as the scientific and technologic implications of the issues.

We suggest a reconstituted institution under an enlarged Board of Commissioners, with whatever special provisions may be necessary to ensure the viability of the functions of the current International Boundary and Water Commission within the framework of boundary ecosystem management.⁵⁹ One of the objectives of the search for a strengthened boundary region institution is to avoid or restrain the proliferation of institutions designed to meet unmet or evolving problems in the region. The major criterion to apply in considering the development of a strengthened boundary region institution is the ecosystem concept. The experience of the two governments during the past several decades has confirmed one essential fact: that the consequences of environmental degradation or environmental regulation in one part of the environment (i.e. water, air, land, biological systems, human activities) have effects, often unintended, on other part(s).

It is now generally agreed that an ecosystem approach to the management of environmental issues must be accomplished by an approach that encompasses as many of the environmental concerns as practical in a clearly defined space. While the ecosystem approach is well accepted by scientific and environmental practitioners, there is a significant lag in its adoption by public decisionmakers. Yet in the Great Lakes Region, the two governments have committed their policies to an ecosystem approach at the recommendation of the International Joint Commission. Similarly, the Council of Great Lakes Governors and Provincial Ministers have agreed to seek environmental remedies for the Great Lakes on an ecosystem basis. On a global scale, the United Nations has endorsed this approach as the only practical way to move toward economic sustainability.

59. Many, including one of the authors, believe that this type of fundamental change may be too difficult to achieve in view of political realities and the difficulty in renegotiating the existing treaties. Therefore, a more achievable alternative suggestion would be to maintain and protect the IBWC's jurisdiction over water resources, and in addition to strengthen the management institutions of the La Paz Agreement for dealing with environmental questions ranging from air quality to toxic wastes (with the IBWC being the lead agency in regard to water quality questions.) This would not provide the ideal of one institution that could take a broad ecological perspective, but it would provide two partner agencies, the IBWC for water and perhaps an IBEC (International Border Environmental Commission) for environmental protection, which working in tandem would cover all environmental concerns from water administration to environmental regulation. Cliff Metzner and Alberto Szekely have both suggested the need for a stronger management structures for the La Paz Agreement in Part I of this report in the Journal.

The 1983 joint United States–Mexico (Las Paz) Environmental Agreement represented an important bilateral approach to aspects of the boundary region environment. At the request of Presidents Bush and Salinas, an environmental plan was formulated for the boundary region. The first stage of this plan for 1992–1994, was presented in February 1992. As a result of the 1983 agreement, four binational work groups have addressed air, water, hazardous waste and emergency response issues. The new 1992 plan addresses international waste water treatment, hazardous waste disposal, air quality in densely populated areas, transboundary shipment of hazardous waste, environmental enforcement and emergency preparedness.

The 1992 plan does not stand alone. The International Boundary and Water Commission, acknowledged by the plan, covers surface and groundwater resource management including the critical areas of water storage, distribution and allocation. In addition the IBWC, has for fifty years been the two governments boundary agency concerned with drinking water and sanitation. Most of those years were spent trying to seek appropriations for the facilities they knew were needed from governments that showed little interest in the boundary region cities and towns on both sides of the boundary region.

Other federal agencies in Mexico and the United States are also engaged either under bilateral cooperation or unilaterally in the environmental protection projects in the Boundary Region. The EPA Summary of the 1992 Plan notes that: “Even though these projects have not been included as formal parts of the La Paz Plan, they are important components of the overall binational strategy to protect human health and ecological resources along the Mexican–United States border.” Illustrations of these are:

- Convention for the Protection of Migratory Birds and Game Mammals: Both Countries;
- a bilateral Joint Committee on Wildlife Conservation; United States Fish and Wildlife Service and Mexico’s SEDUE, to protect endangered species and habitat protection of migratory birds. In addition, the Fish and Wildlife Service has projects in Mexico under the North American Conservation Act.
- Protection of cultural and natural ecosystem resources; SEDUE and the U.S. National Park Service.
- Mexico Ministries of Agriculture and Water Resources and the United States Forest Service on forest issues, fires, and endangered species.
- Gulf of Mexico binational concerns re: tourism; oil production; shipboard waste disposal; fish and shellfish resources;
- and a half-dozen other cooperative environmentally related matters.

The boundary region institutional milieu is further complicated by the laws and direct regulations and control responsibilities of the four United States states of Texas, New Mexico, Arizona and California, and the six states in Mexico: Tamaulipas, Nuevo Leon, Coahuila, Chihuahua, Sonora and Baja California Norte. In the United States states alone well over a dozen major bureaus, many with regional offices, have basic responsibilities relating to environmental protection. It should be evident from the above enumeration of environmental programs and entities that there is no institutional arrangement to view the boundary region as an ecosystem, much less provide ecosystem management.

Neither is the International Joint Commission responsible for providing ecosystem management of the Great Lakes. That task belongs to the two governments of Canada and the United States, and they carry out their responsibilities in a variety of ways: some directly binational, others by reference to the members of the federal systems of both countries (federal, state/provincial, local, and others through broad based international agreements. What the IJC does do is provide the two governments with a single vehicle that can provide an overview from an ecosystem management perspective of a specific area, in this case the Great Lakes, a region at least and perhaps more complex in size and problems than the Mexico-United States boundary region. It both supports and limits the overview by a set of guidelines that carefully avoids engaging in the direct administration of work as many agencies as we have indicated are present in the southern boundary region.

Finally, it is important to remember that neither of the governments of Mexico and the United States are likely to yield any sovereign decisionmaking authority to a new or renovated boundary institution unless they believe that conditions and circumstances warrant such action. The point to be made is that the governments determine what a boundary institution may or may not do. But the critical point to be made is that they can design and establish a boundary institution that can respond to their needs when and if they so determine that the tasks to be accomplished will be consonant with an ecosystem approach.

Recommendation

The governments of Mexico and the United States initiate discussions in depth with the objective of meeting the challenge of sustainable development by creating a new institution or changing or reconstituting the present International Boundary and Water Commission to move toward the ecosystem management needs of the boundary region.⁶⁰

60. See discussion *supra* note 59.

ISSUE 3: A BOUNDARY REGION SCIENCE POLICY

Is there a need for a science policy for the boundary region of the United States and Mexico? Are there provisions for the implementation of a science policy?

Summary

Only in recent years, due largely to the forces of new international trade, has attention been focused intensely on the broader characteristics of the boundary region. Largely arid, change has been induced by development of two of the largest river systems in North America. Development of land and other resources and population growth are subjecting the region to increasing environmental deterioration.

Human ability to restrain ecosystem deterioration and enhance public health and welfare depends on the acquisition and application of knowledge. Research in the physical, biological, and social sciences and the appropriate use of technologic information is a necessary component to the short and long-term recovery and improvement of the boundary region ecosystem. The governments, academic institutions, research entities, and the private sector should develop the coordination necessary to identify the components of a science strategy and related policies to strengthen boundary related research.⁶¹

Recommendation

As the governments explore the characteristics of a new or revised institution to enhance ecosystem management, a science policy for the acquisition, dissemination, and implementation of knowledge should be a fundamental element.

A SAMPLING OF THE CONFERENCE PAPERS

The findings reported above were not based solely on the papers presented at a trinational conference held in April, 1991. These papers contain important commentaries implying or proposing recommendations for the topics they address. A sample of the recommendations or ideas that appear in those papers are herein provided.

61. The discussion of implementation of science policy under U.S.-Canada Issue 4 is appropriate to this issue as well.

SESSION I: EMERGING BOUNDARY ENVIRONMENTAL CHALLENGES

Caldwell suggests five options for the IJC.

- (1) No significant change.
- (2) Each party (government) acts to strengthen its own coordinative authority.
- (3) The IJC and its Great Lakes Regional office are given limited coordinative responsibilities.
- (4) The IJC is given specified executive powers with selective replacement of national agency initiatives in policy making.
- (5) An autonomous Great Lakes authority is established by treaty, providing for a representative assembly, and limited powers to raise revenues and to issue and enforce regulations.

Szekely finds that the proliferation of environmental issues on the southern border will test the ability, imagination, and political will of the two governments to have in place the necessary institutional mechanisms to deal effectively with these issues. Emerging bilateral water issues (availability, quality, and groundwater) constitute a prominent part of the future binational agenda, even above all political, economic, commercial, and other issues. The two governments have not yet commenced, or even planned for, bilateral negotiations to agree on the rules that will govern the utilization of transboundary groundwater. Such inaction may be the first symptom of the inability of the International Boundary and Water Commission to deal with the new issues at hand.

The magnitude of the transboundary environmental agenda is such that bilateral work must be started with no delay. Great stress is placed on bilateral and multilateral arrangements for issues which may transcend part or all of the responsibilities of the IBWC. This is an especially important matter with regard to environmental cooperation. One issue is whether it still makes sense to maintain the La Paz National Coordinators and the IBWC as separate entities or whether a global body is possible or, necessary. The three countries of North America need to contemplate the advantages of formalizing a region of ecological cooperation through a treaty that would include the creation of a trilateral international organization, coordinating the endeavors of their institutions in a coherent and compatible manner.

**SESSION 2:
ARE THERE WAYS TO IMPROVE THE CAPACITY
AND RESPONSIVENESS OF THE GOVERNMENTS
AND THE COMMISSIONS TO MANAGE
TRANSBOUNDARY RESOURCES?**

LeMarquand summarizes the current situation with the IJC as follows:

"Since the 1970s there has been a recurring theme that the Commission is not living up to its potential."

"It has proven to be capable, independent, impartial. If given responsibility and support it could do more to realize the objective of stable boundary relations."

"The Boundary Waters Treaty is inadequate to today's conditions, but it would be counter-productive to reopen it; . . . impossible to negotiate as good a treaty today . . . sufficiently broad to allow the Commission to expand its role into the environmental field. No reform should be made to confer upon the IJC management, regulatory and enforcement authority for the Great Lakes that would give the IJC supra-national authority to bind the governments.

LeMarquand makes five proposals for change.

- (1) Setting the bilateral agenda. The IJC should have authority to advise the governments on emerging issues (the watch dog role), setting boundary environmental quality objectives, revising orders of approval to meet changing circumstances, and calling to task the governments for failures in meeting those objectives.
- (2) Give the IJC a more formal role in transboundary environmental project assessment.
- (3) The IJC should perform a greater and more effective role in research and program implementation.
- (4) Reduce the IJC's dependence on governments for expertise and resources.
- (5) Encourage greater public involvement in the Commission's work.

Reforms should focus on what the IJC does well rather than propose new functions, altering the relationship the Commission has to its principal clients, the two governments. Reforms should not be dramatic, but they could prepare the Commission for increased responsibilities. Such reforms include

[t]he Commission's strength as a third party advisor, a fact finder, an environmental assessment project evaluator, an overseer keeping certain types of issues off the binational agenda, a consensus builder, and increasingly as an evaluator under the Great Lakes Water Quality Agreement . . . areas of information generation in response to public and governmental needs, and in the use of objective evaluations in forcing the governments to be more politically accountable to their citizens in demonstrating progress in dealing with bilateral environmental issues.

Mumme finds that the IBWC's functions can be expanded under the authority already conferred by the treaty, water quality, recreation, and instream flow issues and staffing needs. Drought, flood, lesser surface streams, apportionment of water, and groundwater quality are defined as secondary to the IBWC, but are pressed by public opinion. The relationship of the IBWC to the United States EPA, the states, and other institutions implies needed new arrangements that the IBWC should consider. Any effort to address the Commission's jurisdiction and functions through international treaty should be rightly considered with a great deal of skepticism. Such efforts are less likely to succeed to the extent that they are linked to or affect the jurisdiction and functions already entrusted to the Commission.

SESSION 3: IS THE PUBLIC PARTICIPATION PROCESS ADEQUATE? IF NOT, HOW CAN IT BE IMPROVED?

Becker offered recommendations in seven categories: access, constituency, credibility, soft international law, old institutions, accountability, and implementation.

Hayton offered recommendations for procedures regularizing public participation in important IBWC decisionmaking. These procedures could be adopted by the United States Section by its own rule and help broaden public support for its work and the institution itself.

Sanchez concluded that:

in any case, the pressure for public participation in the solution of environmental issues will keep on growing in the border communities. For them, public participation goes beyond the basic demand of being considered in those decisions that affect their standard of living. It is also a means to fight the imposition of a national interest to local needs, when that national

interest is defined subjectively thousands of miles away from the reality of the border.

SESSION 4: ECOSYSTEM MANAGEMENT

Francis finds that management directions are implied by consideration of the whole in the Great Lakes. A charter (prepared by the Rawson Academy of Aquatic Sciences) is proposed for consideration as a value based set of goals to which the public, the IJC, and the governments can subscribe.

Dworsky proposed a pragmatic and highly specific program to carry out an ecological approach to the management of the Great Lakes Basin. Its major thrust is to avoid the incrementalist trap through participatory planning that prepares stakeholders for larger policy changes when issues generate crises and resulting policy options open. Such planning would evolve working definitions of the specific ecosystem it proposes to manage.

Five recommendations are:

- (1) develop a "state of the lakes" report from a Great Lakes perspective;
- (2) the ecosystem definition should include water quality, water quantity, energy, economic development, and other environmental elements that have significant, definable impacts on each other;
- (3) provide a focus for leadership through an IJC Ecosystem Study Board to explore unmet or emerging issues;
- (4) governments should use the IJC to provide ecosystem management implementation guidance (not regulation) to Great Lakes governments, interests, and the public; and
- (5) there should be no major change in Great Lakes management institutions until the nature and purpose of change becomes better defined.

SESSION 5: HOW HAVE THE COMMISSIONS RELATED TO THE STATES AND PROVINCES?

Ingram finds that the boundaries between the United States and Mexico, and Canada, far from being rigidly defined lines, have proven to be fluid concepts whose dimensions have evolved in conjunction with policies, goals, and events of the countries sharing the border. The two

boundary commissions were established in response to particular definitions of the boundaries which were important at specific times. Over time, and with increased complexity of international issues, considerable pressure has been exerted over the governments and commissions to broaden their realm of activity. As a result, the size of the boundary area defined as being within the purview of the commissions has become quite fluid, changing with the nature of the issue under consideration. In particular, border states, provinces and other entities have become increasingly active in promoting their valid interests before the commissions and have attempted to influence the commissions' activities and jurisdictional realm. Notably, the governments and commissions have responded to some of the issues raised, but not others. Likewise, the governments and commissions have recognized some of the new vested interests, but not others. New international relationships and patterns of interaction have also emerged outside the institutional framework of the commissions in response to boundary definitions and issues which the governments and commissions themselves have not (or not yet) displayed a willingness to respond. The analysis examines the fluidity of the concept of international boundary, drawing upon experience on issues such as groundwater pumping, salinity, surface and ground water pollution, flow regulation and diversions and similar issues. As the nature and extent of the boundary has changed the role of the governments and commissions in relation to border states, local governments, and interest groups have also been altered. The emerging pattern of interaction around boundaries are the focus of this analysis.

Necessary attributes of contemporary border decisionmaking for the IBWC are:

- (1) anticipate problems prior to emergency;
- (2) social expertise;
- (3) open and participatory deliberations of issues;
- (4) use of a range of policy tools including planning, regulation, and technology transfer;
- (5) capable of negotiating and funding local solutions; and
- (6) grassroots, informal, continuing binational communication.

Allee reviews the way the IJC has related to states and provinces, but emphasizes local involvement. He develops the background to the current relationship and summarizes by outlining several ways to strengthen the relationships as well as to strengthen the local, state and provincial roles.

- (1) Expand the application of the Remedial Action Plans.
- (2) Facilitate more cross-border (state, provincial, local) interaction.

- (3) Create an Ecosystem Study Board with: only fact finding functions; substantial input and a national response system; or two national boards with sufficient interaction between them for information exchange, fact finding, and dispute resolution.

SESSION 6: HOW TO ACCOMMODATE AN UNCERTAIN FUTURE THROUGH INSTITUTIONAL RESPONSIVENESS AND PLANNING

In recent years new scientific knowledge about the global environment and unprecedented shifts in national and global economic relationships have identified new forces for change of immense importance. Scenarios considering natural and man-induced change include: global climate change, increased demands on finite resources, loss of biological diversity and quality, maintenance of natural capital through sustainable development, incremental but cumulative erosion of resource potentials, and declines in water supply and quality.

Sadler identifies four building blocks for the IJC.

- (1) Implement existing policy.
- (2) Make sustainability principles operational through the ecosystem approach.
- (3) Reform the IJC and other bilateral institutions on ecological sustainability principles.
- (4) Promote the science of sustainability.

Five principles apply within each of these building blocks.

- (1) Identification of integrative concepts and indicators of sustainability,
- (2) Valuation of ecological goods and services.
- (3) Design of human ecological models for simulating regional change.
- (4) Exploration of alternative instruments for environmental management in the context of achieving sustainability and coping with uncertainty.
- (5) Investigation of new and conventional resource and industrial technologies.

Szekely finds that a wider scope for the IBWC should include new mechanisms for management, allowing Mexico, Canada, and the United States to meet on a trilateral basis. He points out the evolution and past value of IBWC and notes the lack of capacity for selected problems (like groundwater and global climate change). Changes are needed to meet

future concerns, including a wider scope of work for the IBWC than in the past. Binational environmental arrangements like the La Paz Agreement should encompass the needs of the IBWC. There is a need to study and consider new mechanisms for environmental management.

REPORT SUMMARY

The contents of the two Journal issues, Volume 33, Nos. 1 and 2, 1993 contain the essentials of our Report to the Ford Foundation on The North American Experience Managing International Transboundary Water Resources. The result of our examination of the three governments and the two boundary commissions (The International Joint Commission, United States–Canada; the International Boundary and Water Commission, United States–Mexico) has led us to concentrate on nine overriding issues: six relate to the Canada–United States boundary region, three to the Mexico–United States boundary region.

These issues were selected from three data bases: (1) a Tri-National Conference of April, 1991 with their commissioned papers, commentaries and discussions; (2) the record of proposals for change by the Commissions to their respective governments, and the proposals for change in the public record over the last 25 years; and (3) an assessment of change and the rapidity of change that has taken place in recent time among the three governments; between them and the world community concerning trade, environment and the structure of national governments; and public expectations. It is evident, too, that we and most of our colleagues that have contributed to this examination have a record of active participation in matters that concern the commissions and governments.

The nine overriding issues were selected for reasons we have already stated. We easily could have considered several dozen or more issues that would have proposed additional change of government management of the boundary regions or of commission processes and activity. A sample of many of these will be found stated implicitly or explicitly in the commissioned papers and commentaries contained in the two Journal issues. In addition, many of the themes covered by the overriding issues are briefly introduced as proposals for change in these papers.

We noted in the first paragraph of this summary that the two Journal issues present the essentials of our report to the Ford Foundation. Notwithstanding the detailed examination and discussion we have provided for the nine issues we have selected, publication format has required us to restrict the inclusion of other desirable background information. For example, we had planned to tell more about the characteristics of the boundary regions, about the government and Commission structures, and about how they go about their work.

We also find ourselves unable to report here more fully on the contribution made by the International Conference organized to review our tentative proposals in relation to other international boundary water management situations. The conference was held December 7–11, 1992 at the Rockefeller Foundation Conference Center, Bellagio, Italy, with financial assistance from the Foundation and with additional funding from the Ford Foundation.

Following a review of the papers and proposals for change that emerged from the Tri-National Conference, invited leaders each presented a paper describing the conditions, programs and problems confronting their boundary regions. During the summary session, three questions were posed to the conferees: (1) Are there emerging boundary environmental challenges? (2) How can the capacity and responsiveness of governments and commissions be improved to manage transboundary resources? (3) Is there a role for public participation?

On the first, it was clear that emerging problems are beginning to overshadow, but not replace, older problems. Changing boundaries of new nation-states in central Europe and Asia are creating major issues. New organizational proposals in western Europe are complicating older environmental problems. Changes in governments in East Africa and in Latin America are requiring new approaches to boundary resource management.

On the second, the papers and subsequent discussion provided a catalogue of well known limitations confronting governments and commissions as they attempt to deal with international boundary resource matters. Comparisons illustrated the differences among other commissions and the International Joint Commission and the International Boundary and Water Commission of North America. While there were identifiable differences, the accomplishments of the two North American commissions were recognized. The benefits stemming from the flexibility of the Boundary Waters Treaty of 1909, both in scale and substance, and the well established and institutionalized water storage and water allocation programs under the Mexico–United States Treaties were thought to be useful models.

On the third question, the response from the international community was unexpected. The general, but not universal, attitude expressed brought forward a changing public demand for more information, for more openness and for a desire to participate more directly in matters affecting their lives. A positive outlook toward this view was expressed not only in the European community but in the attitudes reflecting the far east and other regions.

We conclude this summary with thanks again to the Ford and Rockefeller Foundations, and specifically to our program contact officers

for their support and help. Equally, we are indebted to all our colleagues that participated with us in this endeavor.