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TRANSBOUNDARY AIR AND WATER POLLUTION IN NORTH AMERICA: LESSONS FROM THE GREAT LAKES

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I. INTRODUCTION

Because of an extensive common boundary, Canada and the United States share many diverse ecosystems, from the Gulf of Maine to the Beaufort Sea. The two also have a close economic relationship which includes extensive trade in resources such as energy, minerals and agricultural and forest products. Because of the pattern of economic development that has evolved, the two countries also share the less noble experience of significant transboundary air and water pollution and other types of degradation to shared ecosystems.

The transboundary pollution problems between Canada and the United States range from temporary, localized incidents such as spills into a boundary water or coastal zone to intractable, region-wide problems such as acid rain or contamination of the Great Lakes.¹ Both countries also contribute to, and may potentially suffer from, more global problems such as stratospheric ozone depletion and climate change.

It is not the purpose of this paper to address the full range of transboundary pollution problems in any detail. Instead, the focus will be on pollution in the shared Great Lakes Basin ecosystem. Discussion will be on the approaches that have been used to try to address this pollution over the last 75 years in order to draw out some lessons that have been learned in using these particular approaches. Although it cannot be claimed that these approaches have been successful in cleaning up the Great Lakes, they collectively represent one of the most advanced and

comprehensive experiments in international environmental problem solving in the world. It is hoped that the successes and failures gleaned from this experiment will be useful when considering other transboundary pollution problems in North America.

II. CASE STUDY: THE GREAT LAKES

The Great Lakes Basin is an ecosystem of enormous environmental, economic and social importance to Canada and the United States. It is home to 35 million people and contains 20% of the world's supply of fresh water.² The lands, waters, resources and people of the region have contributed to the economic success of the two countries since the last century, but as a result, the region "has paid a high price for its contribution, suffering unrelenting environmental degradation."³ This degradation represents the most enduring transboundary environmental problem between Canada and the United States, and the most complex.

Environmental concerns in the Great Lakes Basin relate primarily to the cumulative impacts on humans and wildlife from releases of toxic chemicals to the air, surface waters, groundwater and land and the build-up of these chemicals in the sediments and in living organisms.⁴ Sources of chemicals include direct discharges from industry and power generation, non-point sources such as run-off from cities and agriculture and air emissions from both stationary and mobile sources. Other concerns include the destruction of natural ecosystems such as wetlands through urbanization and agricultural development; introduction of exotic

species, such as lampreys and zebra mussels, with devastating impacts on natural species; and consumptive uses and diversions of water out of the Basin. Complicating these concerns is the following: there are 10 states and provinces as well as two national governments with jurisdiction for the region, the region is in economic decline, with many aging industries and infrastructure, and the poor and racial minorities bear a disproportionate burden of the effects of the region's pollution.

In the Great Lakes region, many actions have been taken to attempt to resolve these problems. These actions have occurred at all levels of government and have involved NGOs, citizens, industry and scientists. The following is a review of the major actors and their roles.

1. The binational approach. The Great Lakes Basin is one of the areas of focus for the work of the International Joint Commission, established under the 1909 Boundary Waters Treaty. The first "reference" to the Commission, in 1912, was on the issue of contamination of the Great Lakes.⁵ Since then, there have been further references on water quality, air quality and water levels.

The work of the Commission under these references has been invaluable to an understanding of the problems in the Basin and has led to controls. The report from the 1946 reference resulted in mutual controls on air pollution from ships on the Detroit and St. Clair Rivers. The report of the 1964 reference on water quality in the lower lakes provided the basis for the landmark 1972 Great Lakes Water Quality Agreement, signed by Canada and the United

States. This agreement established the framework for the approaches we use today: bilateral agreement on principles and objectives; domestic implementation of the objectives; reliance on the Commission and its subordinate institutions for ongoing monitoring of the Great Lakes environment and monitoring of implementation of the agreement. The agreement also established some new bilateral institutions: the Great Lakes Water Quality Board, the Great Lakes Science Advisory Board and the Windsor Regional Office. These institutions have played a pivotal role in advancing the clean-up of the Great Lakes by providing a depoliticized forum for scientific debate and consensus-building on the extent of the problems and possible solutions; and by evaluating the performance of the governments in fulfilling the objectives of the agreement and reporting on deficiencies in that performance.

The bilateral agreements and institutions have changed in the 20 years since the first GLWQA as a result of a growing understanding of the problems and their complexities. A new agreement was signed in 1978, with further modifications in 1987. The emphasis in the 1972 agreement, on phosphorus loading to surface water, shifted over time to a primary concern with toxic contamination (with the objective now the "virtual elimination" of inputs of persistent toxic substances) and to a commitment to deal with the Basin as an integrated "ecosystem". This ecosystem approach has led to a more holistic understanding of the appropriate fronts for action: air pollution, groundwater

contamination, contaminated sediments, vessel-source pollution, and other non-point sources such as run-off from agriculture and urban areas and waste disposal. Within the structure of this agreement, the focus has recently shifted even more, toward a broader, more integrated perspective. The need for sustainable economic development and pollution prevention, for land-use planning and habitat protection, for changes in consumer choices, and for environmental education to drive changes in social values respecting the environment have all been recognized by the Commission under its Great Lakes jurisdiction.⁶

Another shift has occurred within the binational institutions themselves, which as discussed in another session is not necessarily positive, and with the creation of new structures to do the hard work of actually resolving specific problems. Especially significant as a new structure is the Remedial Action Plan ("RAP") process which establishes a broad-based consultative mechanism for each of 43 "Areas of Concern" in the Basin. The Areas of Concern are the most severely effected by toxic contamination. Five of them are shared between Canada and the United States. By requiring a RAP for each area, decision making on clean-up and protection will be decentralized to the local, community level. This is significant because it recognizes that community support is essential to the success of any clean-up plan.

2. The national approach. The agreed framework for action on transboundary pollution in the Great Lakes was to agree on common objectives at the binational level and leave implementation up to

each country according to its own particular regulatory system. This has created divergence in the approaches taken, often with little coordination or consistency across the Basin, both between the two countries and even within each country.⁷

There are numerous programs within each country directed at water quality which apply to the Great Lakes and some directed specifically at the Great Lakes. For the purpose of this paper, it is sufficient to note that the pattern in the United States is to have greater federal direction to the states than is the case in Canada.⁸ Both countries participate in the work of the IJC's Boards and Task Forces through their employees.

3. Sub-national approach. States and provinces have played an important role individually and collectively in advancing solutions to Great Lakes issues. This has been particularly true when the national governments were seen as not moving on the issues and when they did not appear to support regional interests.⁹

Domestically, the Great Lakes States are members of the Great Lakes Commission which researches and promotes the interests of the region. At the executive level, all States in the region participate in the Council of Great Lakes Governors; the Premiers of Ontario and Quebec are associate members. The Council provides a forum for discussion and cooperative action on regional economic and environmental issues. Through the Council, States and Provinces have adopted their own multilateral agreements: the Great Lakes Charter which established principles for the management of the waters of the Great Lakes, including diversions of waters

out of the Basin; and the Great Lakes Toxic Substances Control Agreement which established a framework for more coordinated action to control toxic contaminants entering the environment of the region. These agreements have helped develop cooperation and effective action between the different jurisdictions on many issues.¹⁰

Another level of interaction at this level is through the participation of State and Provincial agency staff on the IJC's Boards and Task Forces.¹¹ This has proved invaluable for network creation and for development of a Basin-wide perspective which staff take back to their respective home agencies.

Also at the sub-national level, local municipal governments and agencies participate on Great Lakes issues individually and collectively. Generally speaking it is municipalities that are responsible for important sources of toxic pollution, including sewage treatment plants and waste disposal sites. Representatives of municipal agencies participate in Remedial Action Plans, including the bilateral ones, and the Great Lakes Mayors meet annually to discuss common concerns.

4. Citizens and Non-governmental Organizations. Within each jurisdiction and collectively across the entire region, citizens and NGOs play a very active role in Great Lakes pollution issues. There are many local groups involved in the issues and many coalitions linking local groups around some of the Lakes.¹² Over the last 10 years, largely through the efforts of the coalition Great Lakes United, strong Basin-wide links have developed.

Citizens and groups play many roles in advancing environmental protection in the Great Lakes. Lobbying for change, participation on Remedial Action Plans, IJC Boards and Task Forces and all manner of consultative processes, education and litigation are all part of the important work done by these groups.

5. Industry. Representatives of industry have always been involved and influential in attempts to regulate pollution. It is only recently, however, that they have organized themselves into a group, the Council of Great Lakes Industries, for lobbying purposes. The Council now participates in many consultations and RAPs. Individual companies have taken many actions to improve their pollution problems including voluntary clean-up actions and pollution prevention initiatives.

6. Scientists. There is great reliance on scientists and other researchers for quality data on the state of environmental quality in the Great Lakes. Researchers in this region also work collectively. The Council of Great Lakes Research Managers meets to track and review relevant research and to develop coordinated research priorities and directions.¹³ A private association of professional researchers, the International Association of Great Lakes Research, meets annually and publishes a journal of relevant research findings.

What should be obvious from this summary of the actors involved in Great Lakes environmental protection is that there are continual, intensive and extensive interactions among actors at all

levels. While it appears chaotic, there is arguably a strength in this diversity. The feedback from these continual interactions creates a momentum that has helped push everyone toward putting solutions into place. This movement has been admittedly slow, with most efforts taken on the easiest and cheapest solutions rather than on the more difficult challenges. Although we have not yet reached our goal of restoring ecosystem health, there have been significant improvements and the structures are in place to tackle the more difficult challenges ahead.

III. LESSONS FROM THE GREAT LAKES EXPERIENCE

This experience with attempting to resolve such complex problems in the Great Lakes does provide a number of lessons that can be useful for other transboundary pollution problems. Admittedly, certain prerequisites to regional cooperation are in place for this region: there are shared resources between Canada and the United States, the Great Lakes are an identifiable ecosystem, activities in each country affect the environment in the other, there is a need for coordinated action and there is willingness to cooperate.¹⁴ The following lessons do not address these prerequisites. Other transboundary pollution problems may require greater effort to establish these links.

Lesson 1 - Agreement on common principles and objectives. It should be self-evident that progress on environmental protection requires agreement among the parties on common principles and objectives. Only with this agreement can the parties put in place

effective regulations. From the Great Lakes experience, it does not appear that the form of the agreement matters, so long as the relevant parties are included and feel bound by its terms.

However, while an agreement is essential, it is not sufficient by itself. The agreement must reflect a true consensus of the ecosystem's constituents in order to achieve implementation of the principles. In the Great Lakes, many years were spent trying to determine what the parties to the GLWQA had meant by establishing the goal of virtual elimination for persistent toxic substances. There was significant resistance to steps to implement the goal until a consensus began to emerge.

In addition, the agreement must reflect the true complexity of the issues being faced. In the Great Lakes, this did not begin until 1978, with modifications coming again in 1987.

Lesson 2 - Good data base. Choices about levels of environmental protection are policy choices but must be grounded in good science. In the Great Lakes, much effort has gone into developing a solid data base relating to sources, pathways and effects of toxic pollution. Sufficient information now exists to justify strong regulatory controls. A "weight of evidence" or precautionary approach has been adopted which recognizes that uncertainty is inherent and should not prevent choices being made, but good information is still essential. Without it, consensus on the problems and solutions will be extremely difficult. Consensus also requires that the data be made available to all those interested in the issues.

Lesson 3 - Monitoring Mechanism. Feedback on regulatory and other actions is necessary in order to monitor progress toward common goals. Independent monitoring and reporting can be an important lever for adjusting programs and taking further actions. In the Great Lakes, this role has been played formally (i.e., under the provisions of the GLWQA) by the International Joint Commission and informally by citizens' groups and has proved quite valuable in identifying the limits and gaps as well as the effective actions taken by the parties in attempting to implement the goals of the GLWQA.

Lesson 4 - Constituency. A well-informed, active, engaged constituency is essential to making real progress on solving complex environmental pollution problems. There are many difficult choices required that will only occur with broad public support for the goals and respect for the integrity of the process. This support will not happen without open access to information, fora for representations and debate and respect shown by governments and industry for the views of the citizens of the ecosystem.

Lesson 5 - Depoliticized forum for discussion and debate. The choices required in complex environmental pollution problems are highly charged, political choices. In the Great Lakes, a number of fora for discussion and debate of the issues and potential solutions have helped achieve greater support because they were depoliticized to at least some extent. For example, through the references and structures of the IJC, consensus was achieved on many of the priority issues in the Basin. This allowed objectives

to be established and clean-up efforts to begin.

Lesson 6 - Action at all levels of society. ("Think globally, act locally") The complexity of environmental issues and their roots in societal and cultural values means that it is not sufficient for national governments alone to act on solutions. State and Provincial governments, municipal governments, industry and citizens must also recognize their common responsibility toward their home and begin to act to protect it. Common principles and objectives are important so that initiatives are coordinated, but local action is essential. In the Great Lakes, this move away from a top-down approach is reflected in the Remedial Action Plan process which addresses clean-up in the 43 Areas of Concern.

In short, all community members must share a common vision and take on the shared responsibility of carrying it out. Environmental protection will not occur if treated as a secretive, professional task. It is a task for us all. In the words of the International Joint Commission, "[t]his is the example we set for the rest of the world and the legacy we leave our children."¹⁵

ENDNOTES

1. In any given year, there are many examples of transboundary environmental problems between Canada and the United States. For a survey of the types of problems encountered, see, John Carroll, Environmental Diplomacy: An Examination and a Prospective of Canadian-U.S. Transboundary Environmental Relations (Ann Arbor: Univ. of Michigan Press, 1983); and Marcia Valiante and Paul Muldoon, "Annual Review of Canadian-American Environmental Relations - 1988,"
2. Environment Canada, The State of Canada's Environment (Ottawa: Minister of Supply and Services, 1991), p. 18-4.
3. Ibid.
4. For discussions of Great Lakes environmental concerns see, Ibid., and Theodora Colborn, et al., Great Lakes, Great Legacy? (Washington, D.C. and Ottawa: Conservation Foundation and Institute for Research on Public Policy, 1990).
5. References are made to the Commission from the two governments under the terms of Article IX of the Boundary Waters Treaty on matters "of difference arising between them involving the rights, obligations, or interests of either in relation to the other or to the inhabitants of the other, along the common frontier..." Under a reference, the Commission investigates the matter and makes a report to the two governments stating conclusions and recommendations.
6. See, International Joint Commission, Sixth Biennial Report on Great Lakes Water Quality (Washington, D.C., Ottawa, Windsor: IJC, 1992).
7. Lack of domestic coordination is one of the primary motivations behind the new U.S. Environmental Protection Agency's "Great Lakes Initiative", which will require a consistent approach to water quality standards in the eight States of the region. Unfortunately, Canada missed an opportunity at improving coordination by not participating in the Great Lakes Initiative.
8. In Canada, the federal and Ontario governments have until recently operated under an Agreement that provided that Ontario would undertake the implementation obligations under the GLWQA and

the federal government would provide funding for certain of these functions.

9. For example, Ontario has undertaken legal action in U.S. courts to challenge U.S. positions on transboundary impacts of acid rain and the Detroit Incinerator.

10. For example, under the Great Lakes Charter, diversions of more than 19 million litres per day require that the permitting state give notice and consult with the other jurisdictions. This principle has been adopted into U.S. law so that approval of all the Governors is required. Failure to get unanimous approval has stopped diversions and the practice has been followed as a courtesy even when not required because less than 19 million litres per day was involved. See, Bill Neuhaus, "Proposed Diversion Draws Fire," The Great Lakes United, Vol. IV No. 3, Fall 1989, p. 4; and Glenda Daniel and Bruce Kershner, "Success! Great Lakes Diversion in Indiana is Vetoed," The Great Lakes United, Vol. VII, No. 1, Summer 1992, p. 6.

11. Some structures created to address issues under the GLWQA have national and subnational membership, e.g., the Lake Ontario Toxic Management Plan was developed jointly by Environment Canada, U.S. EPA, Ontario Ministry of the Environment and New York Department of Environmental Conservation.

12. E.g., in 1988 the Lake Ontario Organizing Network was established; in 1992, the Lake Erie Alliance was formed to bring together citizens groups in both Canada and the United States around Lake Erie.

13. The Council now reports directly to the International Joint Commission. See, Council of Great Lakes Research Managers, 1993 Report to the International Joint Commission (Windsor: IJC, June 1993).

14. Dr. Alberto Szekely identifies these as "indispensable" for establishment of a region for international cooperative management of natural resources or environmental protection. See, Alberto Szekely, "Establishing a Region for Ecological Cooperation in North America," (1992), 32 Natural Resources Journal 563, at p. 572.

15. International Joint Commission, Sixth Biennial Report on Great Lakes Water Quality, supra, p. 46.