Focus on Great Lakes Water Quality (ISSN 0711-0855): vol.9 iss.2

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consideration in advance of this meeting."

_The Broader Constituency._ Several of us feel that our process would become moribund if continuing closed, a caveat noted in the 1909 Boundary Waters Treaty whereby all aspects of the Commission's process were to be open to the public, all sides being given equal consideration. This does not simply reflect, however, the activities characteristic of a national government, for the Commission's unique role has produced a series of successes in a variety of issues during its 75-year history. The Commission has also avoided identifying the established environmental groups in both countries as its primary constituency.

_Considerations for Discussion: The Role of Science in the Community._ We are extending our process to Indianapolis, a city on the fringe of the Great Lakes Basin, with the environment as a common basis and hence our prime reason for discussion. We stand to benefit with new perspectives to be gained from such a conversation among equals, with Indianapolis' reputation for responsible commitment to principles, institutions and values discussion. Our second reason is the role of science, currently a subject of world-wide debate with widely differing formulations of the problems, yielding viewpoints such as:

- the human factor is important in decision-making where public involvement is mandatory, with scientists providing a better explanation of the risks incurred, leading to mutual benefits; and
- governments may have to adopt an

With the Great Lakes Water Quality Agreement, we have experienced a change in perception in formulating the problem. Initially, the phosphorus issue, with its objectionable manifestations, was both readily discernable and understandable and susceptible to the political system for resolution. With the advent of toxic contaminants, however, an intellectual process is required for problem identification, the question of associated hazards posed and the risks of individual choice of action. The explanatory system utilized becomes crucial in such an issue, intellectual

**Inside...**

Luncheon Speakers, William Ruckelshaus and Charles Caccia ............... 14
Nonpoint Task Force Reports ...... 15
Science Advisory Board Reports . 16
Water Quality Board Reports ..... 17
Cleanup of PCB Contamination ............... 19
Chesapeake Study Calls for Action on Controlling Nonpoint Pollution ............ 19
Building Bridges Between Schools and Communities .......... 20
Lake Ontario Conference Report .................. 21
Environmental Conflict Management - Part 2 .......... 22
Columns
Briefs .................. 13
Events .................. 18
Bookshelf .................. 22

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knowledge being exploited without the customary sensory perception. A conversation among equals, however, may readily facilitate the functioning of the senses in a manner able to validate the intellectual description. Acceptance of objective fact alone, with its associated risk, can pose a moral responsibility which denies intervention of the democratic process. Were the tenets of science to incorporate the sensual and intuitive, then their significance could only be recognized through a conversation among equals. These constitute my principal reasons for relinquishing our earlier meeting formats in favour of testing the new approach among equals in a mutually acceptable form of discussion. Such a social conversation has the potential for constructively addressing and resolving the complex issue of toxic contaminants.

The Community in Action. In earlier articles, (see Focus Volume 9, Issue 1, pages 1-4, “Community, Relevance and Change” by Commissioner E.R. Olson) I have described the role and significance of members of the community, concepts that are already in place in Indianapolis, as witnessed by the activities of Mr. Bulen and other citizens and by the successes of the local planning committee. The Art Awareness and Recognition Program, with its Celebration of Awareness Award Ceremony - without winners - has reflected the Commission’s own modus operandi by consensus. Its organizers deserve our praise.

The Future. We are planning our activities for the Commission’s 75th Anniversary in 1984. Do we build on our Indianapolis meeting or venture on a new approach? Your comments would be most welcome. (Précis of Commissioner E. Richmond Olson’s remarks by Dr. A.E.P. Watson, IJC, Windsor.)

On Tuesday, November 15, Robert D. Orr, Governor of Indiana, welcomed visitors to Indiana from all eight Great Lake states, Ontario, Quebec and the capital cities of both Canada and the United States. He introduced the students whose work was judged best in the Arts Awareness and Recognition Program which IJC co-sponsored with the Indianapolis and Marion County School Systems and the State Department of Public Instruction. (See article page 20). He also spoke about the importance of the phrase, Great Lakes Connection: “No two nations in the world are so blessed as Canada and the United States with a common border each nation enjoys, in particular, that portion of it which is the Great Lakes. In addition to the beauty is the peace and tranquility that grace that border. It is something which these two nations enjoy almost alone in this world, something which we not only should treasure, but do everything possible to preserve. Part of that effort has to be to make sure that we show proper appreciation to the waters of those lakes and other waterways that make up this border.”

J. Blair Seaborn, Chairman, Canadian Section of the International Joint Commission.

following terms. “Early in this century,” he said, “our two Governments decided...that a good treaty, which means a good set of agreed rules, would make good neighbours where our shared waterways were concerned. The result was the United States/Canada Boundary Waters Treaty of 1909, surely one of the most notable and far-sighted examples of transboundary cooperation which exists anywhere in the world. Its preamble says that its purpose is to ‘prevent disputes regarding the use of boundary waters’ and to settle all questions involving all the rights, obligations or interests of the United States and Canada and their inhabitants along their common frontier. The Treaty concentrated on water levels and flows, but also stated that ‘boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other.’

To help ensure that these important commitments and obligations were respected, the Treaty created the International Joint Commission. It consists of six Commissioners, three
appointed by the President of the United States and confirmed by the Senate, three appointed by the Governor General on the advice of the Prime Minister of Canada. While none of us, of course, can forget his national origins, we are expected to act as members of a collegial body. Our decisions and recommendations are based on the jointly-established facts of each case.

The Commission has, to help it carry out its responsibilities, a handful of professionals in its Washington, Ottawa and Windsor offices. The strength of the IJC, however, lies in the use of boards. These are groups of experts in specific fields that provide the Commission with information and advice on a wide range of technical or location-specific questions. Their members are borrowed from government agencies, universities and the private sector, usually in equal numbers from the U.S. and Canada.

Board members are expected to serve in their personal and professional capacities. They bring to the job their background, expertise, and in some cases, some agency or organizational resources. But they do not feel bound by the policies of their agencies. Indeed, over time, the interactions and knowledge gained from their IJC experience, by working together regardless of nationality, may help individuals to influence the positions of home agencies.

The Treaty of 1909 envisaged the Commission playing essentially three roles: to approve applications for changing the level of waters flowing across the boundary; to be asked by Governments to enquire into and report upon any matter arising between them (this is not confined to boundary waters); and to arbitrate between the Parties at the request of both Parties.

The first role has the Commission operating in a quasi-judicial fashion. With the help of a technical board, we decide whether a structure can be built in one country which could, for example, flood a portion of the other country’s territory, and if it can be constructed, subject to what conditions. Handing over this power of decision to the IJC constituted an important ceding of national sovereignty on the part of both Governments.

In its second role, the Commission has been requested by the two federal Governments to enquire into and report on various matters of a transboundary nature. Again with the extensive help of a U.S./Canada technical board, the Commission responds to such references, as they are called, by providing to Governments a report of a purely advisory nature. One example of this type of activity is the major study on Great Lakes water quality which the two federal Governments asked the IJC to undertake in 1964. Six years and a great deal of work later, a report was submitted which laid the basis for the negotiation for the first Great Lakes Water Quality Agreement in 1972 and subsequently its revision in 1978.

In a similar statement, Robert C. McEwen, U.S. Chairman of IJC, described the nature of the Commission and the approach to its work: “This is a binational Commission. We are not representatives of our Governments; we are from our Governments, and try very diligently to serve North Americans as we approach the problems that are of concern to both of our countries. We work by consensus and our ultimate objective is to diminish the boundary that serves as a formal separation between our two great nations.”

John Mutz, Lieutenant Governor of Indiana, in his welcoming remarks reminded those participating on November 16 that Indiana has an ocean port through the Great Lakes water system, giving it access which is important to the commerce of the state. “For that reason alone, it is our pleasure to have you here. Secondly, I am greatly impressed by the reports which deal with the vision of the future, recognize two natural resources among all others which promise a great future economically for our people: a plentiful supply of fresh water and a plentiful supply of fertile soil. Those particular resources are important to us and we believe need to be guarded and carefully maintained for this generation and future generations.

There is a third concern; a growing movement which tends to pit different regions against one another. Our economic future will be best served by a cooperative arrangement that tends to maximize the advantages that we share. If we share our natural resources in a reasonable way, then the quality of life and the spirit of living that we enjoy as citizens can be enhanced.”

**GREAT LAKES WATER QUALITY BOARD**

On Wednesday morning the Chairman of the Great Lakes Water Quality Board made presentations. Highlights follow. (Board report summary on page 17.)

Valdus Adarnkus (EPA Region V) told the participants: “The United States and Canada have begun their second decade of cooperation under the Great Lakes Water Quality Agreement with a solid and significant success story, the accelerated reduction of eutrophication throughout the Great Lakes Basin.

The jurisdictions have jointly tackled one of the most significant global environmental problems and have displayed to the world that it is indeed possible to translate political commitments into environmental accomplishments. We are not finished solving the eutrophication problem; no jurisdiction should rest on its laurels. Our review of nonpoint sources attests...
to the need to complete the job begun over a decade ago. The signing by the two Governments of the supplement to Annex 3 of the Agreement, which includes schedules and allocations for further phosphorus loading reduction, is an important step, but it has been too long in coming.

The Board sees that the traditional water pollution framework is often too narrow and too rigid to deal with the larger natural resource management issues we face in the Great Lakes and the world today. For example, agricultural interests, health agencies and local governmental bodies are often key factors in environmental decisions which were once the sole province of the sanitary engineer. We must thoroughly examine whether our current programs are adequate to address the problems of the Great Lakes and, equally important, whether the Agreement is adequate to address not only the current but also the future needs of the Great Lakes.

I believe we need to ask, are the jurisdictions willing and administratively equipped to form new partnerships of various interests outside the traditional pollution control framework to address the resource management questions of the future? Do we need new institutions and linkages which will clearly define roles and responsibilities of the federal, state and provincial government and agencies, the public, and private industries to deal with more complex social problems? Have we set our goals too high or too low? Do we know the price we pay for either alternative? How do we establish and maintain a solid and credible scientific data base with which to evaluate our Agreement applications?

In my personal view, both the United States and Canada must examine these and other questions, not only in a context of being North American neighbors with shared waters, but also in terms of a global attitude toward environmental protection. I consider it a charge of the Water Quality Board to provide the best technical advice possible to increase the effectiveness of the Commission in keeping the importance of the Great Lakes Agreement in the conscious collective minds of the top policy makers of both countries."

Howard Ferguson (Environment Canada, Ontario Region) continued: “In Annex 12 of the 1978 Great Lakes Water Quality Agreement, the United States and Canada stated their intention to virtually eliminate the input of persistent toxic substances in order to protect human health and to ensure the continued health and productivity of living aquatic resources and man’s use thereof. Further, the Parties are to take all reasonable and practical measures to rehabilitate those portions of the Great Lakes System adversely affected by persistent toxic substances.

This is my report card on how well these policies have been implemented. The bottom line is, we can do better. Persistent toxic chemicals were defined in the ‘78 Agreement in terms of water quality. What we need to consider is the persistence of toxics in the ecosystem. While we have reduced input of several persistent toxic chemicals, we still have a long way to go: progress on the rehabilitation of major Areas of Concern has been very slow. In 1981 the Board put forward a scientifically logical framework for the management of toxic chemicals:

1. Assemble all existing information on a potentially toxic chemical known to exist within the Great Lakes Basin.
2. If this information base is deemed adequate, proceed to the next stage of risk assessment; if not, perform research, monitoring and inventory work.
3. When risk assessment is completed, if risk is judged significant, proceed to design and implement control measures.

4. Evaluate and adjust the control program.

Control actions must be taken now based on very scanty information and best scientific judgement. A two-pronged approach is needed. We have a long term research and monitoring problem. We also have immediate high priority management problems. Both need adequate resourcing and better coordination among the jurisdictions. We lack an overall bilateral strategic plan to manage toxic chemicals in the Great Lakes ecosystem. Once that is in place, we must develop an action plan identifying goals and some milestones toward our objective of virtually eliminating the input of persistent toxic substances. The gap between policy intentions and policy implementation needs to be closed. We also need to question the applicability of a single chemical approach to the objectives and control activities.

Over 800 substances of potential concern have been identified in the Great Lakes Ecosystem. For the vast majority of these, our knowledge of their environmental and health effects is far from complete. Our knowledge of their combined effects is even scantier. Yet, in many areas of the Great Lakes ecosystem we know that large numbers of these chemicals are present, often in concentrations that might be considered negligible if taken individually. In this context we cannot necessarily dismiss parts per trillion or parts per quadrillion as being insignificant.

We must begin to consider the total risk posed by all toxic chemicals present in a given portion of the ecosystem. The logical place to start is in those distressed regions which have been identified as Areas of Concern. This implies that ecosystem objectives and control actions have to be tuned to specific situations within the Great Lakes.
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There is also a problem of perception. One basic cause is the scientific uncertainty about the effects of toxic chemicals. This is a source of frustration for everyone, but probably most of all to the ordinary citizen who hears conflicting views from different authorities.

Compounding the perceptual problem is the rapidly widening gap between our ability to detect and our ability to interpret. Our ability to detect has increased by three orders of magnitude in a decade. What is the significance of the infinitesimal? Public officials and the media are well aware of their responsibility to report new data to the public. If the significance of the data cannot be explained, the possibility of generating public alarm or fear adds a new dimension to that responsibility.

The jurisdictions inadvertently contribute to the perceptual problem by issuing different guidelines or standards for a given toxic chemical. The man in the street's interpretation is that one jurisdiction is saying that a certain concentration of the chemical is safe, while another is saying unsafe. Is it any wonder that our collective credibility suffers?

We need to get our act together. We should not see that as a threat to jurisdictional independence or sovereignty, but rather as a collective, rational response to a real perceptual problem within our Great Lakes community.

I would further suggest that the word 'safe' be eliminated from our lexicon when dealing with toxic chemicals. We need to devote more effort to educating the public on toxic chemicals and levels of risk. We must strive to involve the public in our environmental decision-making. We need to do it collectively to reduce the disparities in our public statements.

We need to re-examine the Great Lakes Connections between toxic chemical problems and our arsenal of solutions. On one hand, we have relatively new and more complex problems; on the other, we have traditional institutionalized solutions. We must ensure that solutions are devised to fit the problems and that we are not trying to oversimplify the problems to fit existing solutions. Given the history of our unique and innovative accomplishments in the Great Lakes, I am confident that together we can meet these challenges.

Discussion

For morning and afternoon sessions on the 16th, the following group process was employed: After 30-minute presentations from the Co-Chairmen of each Board, individuals wrote down their most pressing comment or question. Lead by a facilitator, each table of eight discussed the questions and comments and then decided on a single question or comment which a recorder submitted to the Boards. Several of the questions and responses of the Great Lakes Water Quality Board follow.

"What specific roles could the Water Quality Board or the IJC play in trying to get consistency in fish and consumption advisory or drinking water standards?"

Patrick Chamut (Fisheries and Oceans Canada): "A fisheries agency basically accepts what a health agency provides as a health advisory. The difficulty in coming to any agreed upon standard across the Basin is that those standards are developed not only on toxicology, but also upon consideration of what an average consumption pattern will be in a particular area. It is not a simple matter to bring all of the jurisdictions together and agree upon a single number, but it is really a case of bringing agencies together and having dialogue to ensure that to the extent possible there is consistency."

"Should risk assessments be further
developed as essential to toxic input control, or should resources be directed at restricting toxic input based upon existing risk assessment?"

Mr. Ferguson: "There is a level of risk associated with any toxic chemical. We need to define that level of risk and to make it clear to the public that we do associate such a level of risk with a specific chemical."

"Given the toxic and hazardous natures of the sediments within many of our waterways, for example, Indiana Harbor Shipping Canal and Hamilton Harbour, and the relatively primitive state of the art of dredging and spoils disposal techniques, should we not postpone major dredging projects - including the winter navigation - until such time as safe, proper disposal techniques are developed to protect public health and water quality? Also, will the IJC reaffirm its previous statement against winter navigation?"

William Stiggins (Ontario Ministry of the Environment): "We do not know the significance on the ecosystem of removing contaminated sediments. The Boards are examining the implications of such measures and will develop specific guides for program implementation."

Patrick Berger (Indiana State Board of Health): "Yesterday there was a very productive meeting of government representatives with the Grand Calumet Task Force on the question of dredging the Indiana Shipping Canal and the Grand Calumet River. What everybody decided was that the Corps of Engineers will develop an environmental impact statement on dredging and dredged material disposal which they hope to make available in 1984. The EPA, in cooperation with the State, will study the environmental problems of the Indiana Harbor Ship Canal, the Little Cal and the Grand Cal River."

Russell Mt. Pleasant (New York Department of Environmental Conservation): "New York has investigated the mechanics of PCB contamination with and without dredging, and done substantial monitoring and demonstration projects that show that when modest attention is paid to the housekeeping details of dredging, whether mechanical or hydraulic, recovery and removal of toxic can be above 90%. If we do nothing we know that the contamination is going to continue to plague the resources of the system. We feel very strongly that we have data to suggest that we can use dredging to remove these concentrated deposits of toxic materials and accelerate the rate at which waterbody is going to reclaim itself."

David LaRoche, Secretary of the IJC's U.S. Section: "The Commission in 1979 wrote two letters to the Governments: 1. An inquiry to the Governments regarding potential effects of winter navigation on levels and flows, asking the Governments if a winter navigation project would have such effects, and if so would it require an application to the Commission; 2. An inquiry to Governments about potential effects of winter navigation on Great Lakes water quality. The Commission's position was that winter navigation ought not to be considered in the absence of an extensive environmental impact statement on potential effects of winter navigation on Great Lakes water quality. Those letters were not formally answered by the Government."

GREAT LAKES SCIENCE ADVISORY BOARD

Following a luncheon break, the Science Advisory Board chairmen made their presentations. Vinton Bacon, United States Co-Chairman, spoke about the mandates of the Board and its means of reporting, referring to the Board's 1983 report. Dr. Richard Thomas, Canadian Co-Chairman, amplified some of the statements in the report concerning groundwater and spoke of his own concerns, challenging attendees with several provocative statements. The report: "indicated a basic lack of information on the effects of contaminants on groundwater and the transmission of those contaminants via the groundwater to the Great Lakes...stated that many cities, particularly those in the U.S., are entirely dependent for their water supply on the groundwater system, and noted the need for improved resolution in the mapping of the groundwater resources of the Great Lakes Region. Underpinning our thoughts on Great Lakes groundwater are thoughts of the utilization of the groundwater resources in other parts of continental North America."

The Carbon Dioxide Committee of the U.S. National Research Council recently presented a report listing possible effects of changing climate on the hydrology of the mid-west. Dr. Thomas explained: "The Committee indicated there is a strong likelihood that the carbon dioxide levels in the atmosphere will have doubled by early in the next century, resulting in a progressive warming of the atmosphere of up to 4-1/2°C. The report stated that a 2°C warming combined with a 10% decrease in precipitation would decrease runoff to rivers between 40 and 70%. Depending on the region of the west considered, even current water requirements would exceed supplies by between 20 and 270%. Added to our current knowledge of the drawdown of aquifers and pollution of potable water, this emphasizes the extreme pressure likely to be exerted for extraction and diversion of water supplies from the Great Lakes Region..."
groups process was repeated. Highlights of the question period follow.

"Resource management requires knowledge of habitat including quality, quantity and its use by fish and wildlife. This is the ecosystem approach. What is being done to implement the ecosystem approach?"

Dr. Thomas: "We are starting to see a focus on multi-use resource management. When you think of resource management, you think of man and how he interacts with the system he is managing for his benefit. You measure benefit and disbenefit at various levels because unless you know the total system you cannot manage it at all. A Canadian federal group, the Great Lakes Working Group, is actively talking about a strategic implementation plan. I believe it will be looking at multi-user resource management, adopting ecosystem principles and possibly guidelines for renewable resource management."

"How successful does the SAB feel that it has been in influencing and directing research efforts?"

Dr. Thomas: "I would say fantastically successful. It was the Science Advisory Board that got the Commission and Governments to adopt the Ecosystem Approach. What more can you ask for? I think that's pretty significant."

"What steps are being taken by the Science Advisory Board to develop a comprehensive and coordinated plan for water quality research on the Great Lakes, including means for implementation?"

Dr. Thomas: "We can develop and bring a strategic plan to present to the Commission. We re instituted the Social and Economic Considerations Committee, recognizing the shift from crisis management to resource management. I think we have put in place some of the elements to produce a strategic plan for us."

Richard Thomas (Cdn.) and Vinton Bacon (U.S.), Co-Chairmen of the Great Lakes Science Advisory Board.

With the greater abundance of expertise and resources being applied to the study and management of the Great Lakes, there is a shift from crisis management to sensible management of a multi-use resource, based on continuing assessment of the social and economic ramifications of management actions. The Great Lakes are used by many people for many purposes: from drinking water and habitat to aesthetic pleasure and recreation through to the generation of wealth through heavy industry. Each use has different requirements of the waters; to manage for one user may be to manage for the disbenefit of others. It is extremely necessary to have complete documentation of the effects of any one use on all the others. These measurements should not be solely measures of wealth. They must be tempered with an understanding of the social benefits and disbenefits that may arise from management interventions.

Our attitudes towards the Great Lakes are in the process of changing. The golden age of leisure and affluence from the application of advanced technology in which greater wealth is created by fewer individuals has arrived. The present unemployment, paralleled by a progressive shift in employment opportunity from manufacturing towards service, presents a great opportunity for a shift in our social structures to provide the biological requirements for human existence and gratification through culture and recreation. If this is so, then the high quality of Great Lakes waters and the opportunities they represent become essential ingredients of the type of human existence that we can envisage for the future. Society's failure to meet this opportunity would result in dire consequences."

Discussion

After these presentations, the small
Following the response, Commissioner L. Keith Bulen asked: "Could you briefly describe what the Science Advisory Board has done in the way of identifying research in the Great Lakes Basin, the data that were obtained, what we’ve done and where we are going?"

Dr. Thomas: "We made an initial effort in 1982 to assemble the ongoing research activities in the Great Lakes and to look at the resources being allocated to them. Out of that came the concept of the Council of Research Managers to do two things: insure good coordination among all Great Lakes research institutes and determine how research managers have responded to the IJC recommendations."

"Many people have noted a trend in demand for relevant science. Major decisions are put off until the issue is fully researched. Does SAB have a strategic approach to research potential new opportunities or crises, including expanded use of resource persons from the public and wider public communication?"

Dr. Thomas: "We have to recognize that laws built into our institutional systems, our political systems, take time to respond. Also, when talking about massive expenditures of public funds, it is unwise to spend purely experimentally. There has to be an element of confidence that recommendations and the data on which they are based are adequate. I can understand when Government agencies say we need to do some work on a problem before implementing a final approach. It may be cautious, but it can be understood.

In terms of public communication, SAB has a request from the Commission to inform them how we would involve the public in our decision making process. We’ve already made one or two initial moves: we have changed the format for Board meetings -- we will move around the Basin to Areas of Concern or areas of interest; we will try to deal with administrative matters on the first half day and then discuss the science issues for a day and a half. The third day will be devoted to visiting Areas of Concern and interest in the Basin or receiving public input and interacting with the interested public.

I look back at the study that many of you may have known, the Pollution from Land Use Activities Reference Group, with its public participation program. I found that it was a most valuable experience in obtaining the public’s perception of problems. You discover very quickly the public perceives things very differently from scientists. I think it is a rewarding experience for both parties to come to understand how each relates to the problems we see in the Great Lakes Basin. I would encourage the Water Quality Board, Science Advisory Board and the Commission to adopt a similar mechanism as a means for all of the IJC family to interact with the public."

Commissioner L. Keith Bulen expanded Dr. Thomas’ remarks: "We have been talking about this for two years. We changed the whole Science Advisory Board, bringing in some national and internationally known experts in various fields -- not all from governments. We had the idea we might be getting our advice from governments and then reporting to governments and merely talking to ourselves. You will see private industry, academia and some very prominent, known names. We have been striving to broaden the base of input. We have also raised the number of members of the Water Quality Board.

In opening this meeting, I suggested how we are wrestling with broadening participation, not only in public information, but public input. This is ongoing and we have asked all our committees for help. We will indeed get some answers and we will indeed adopt policies."

"What resources has the SAB used to determine that a rise in temperature would decrease the amount of rainfall in the midwest? What would happen to the polar ice caps?"

Dr. G. Keith Rodgers (National Water Research Institute of Canada): "The report to which Dr. Thomas referred earlier predicting the increase in temperature in the northern hemisphere as a result of the build-up of carbon dioxide in the atmosphere, is one in a series of reports. Recently I received a journal which reported conflicting data indicating that despite the increase in carbon dioxide that has taken place in the atmosphere since the Second World War, some parts of the world have been cooling down.

The second part of the question regarding the polar ice caps is related to that because the latest papers indicate that the effect at the equator and the polar zones may be different in response to that carbon dioxide build-up. The question is still open."

Ruth Reck (General Motors): "There are about nine international groups throughout the world that are involved in global climate modeling. Right now with the release of CO2 to the atmosphere through the burning of fossil fuels, we are conducting an uncontrolled experiment. The only way we have to assess the implications is through computer global climate modeling. To do that, we are doing a controlled experiment, comparing the results of these nine different groups. We try to assess the limitations and predict effects.

The effects are based upon two separate types of physical phenomena: energy balance -- changes as a result of putting carbon dioxide out and its absorbing energy, and changes in the dynamics in the atmosphere. All of the models are very crude. They predict changes in temperature not only at the earth’s surface, but throughout the..."
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atmosphere. They do not typically describe the ocean in any great detail or oceanic dynamics. Because of the time response difference between the atmosphere and the ocean, there is a great deal of uncertainty as to what the answers mean. The way various regions respond can differ; i.e., there will not be heating everywhere; some places will have less heating, some a slight cooling, others a very exaggerated heating.

Best judgement is that there will undoubtedly be some precipitation change. As to the exact location, it is very difficult to predict. In terms of changes in freshwater temperature, those things are just not yet addressable through computer modeling.

In responding to the question, "Will the IJC now take a position on water diversion?", Chairman Seaborn stated: "We have received a report from a technical board on the subject and held a series of public hearings in a number of cities around the Great Lakes on both sides of the border. We are now preparing a Commission report to Governments and continuing to increase our knowledge on that subject through some smaller seminars on various aspects of this very complicated question. Our hope is that we will be able to present at least an initial report to Governments by Spring 1984. One point: There are at the moment no requests to the IJC to examine new diversions to or from the Great Lakes, nor are such proposals firmly and formally before Governments."

"What plans does the Science Advisory Board have to integrate concerns for groundwater contamination and human health effects?"

Wolfgang Fuhs (New York Department of Health): "Over the years, the SAB has discussed the contributions of contaminants from groundwater through the Great Lakes. The agreement includes the Great Lakes and its tributaries. What is included here is groundwater leaching directly into the lakes or leaching into the tributaries. The Health Effects Committee knows that if we reduce or strictly control dumping of all kinds of solid wastes into aquifers leaching into the Great Lakes, we may indirectly encourage their disposal inland. Further inland there are groundwater resources which presently and in the future will serve as drinking water resources for Great Lakes communities."

Paul Foley (Ontario Ministry of the Environment): "The Groundwater Task Force is a part of the SAB and the Health Effects Committee is a joint Committee reporting to the two Boards. There is good cross-pollination of information. In terms of groundwater problems, health effects would be similar and of concern whether the source be groundwater, surface water, air or whatever. The required connection between these committees really concerns the amount of a contaminant, and its priority. The connection will be made for that purpose."

Mr. Foley responded to a related question: "Who is tracking groundwater contamination in the Great Lakes?" in this manner: "On the basis of the findings of the Groundwater Task Force, a great many people are involved. Industry is, particularly in regard to sites located on their own property, and they are reporting on their observation wells to the jurisdictions responsible. In the U.S. there is federal government involvement, particularly under the Superfund activities. The states are involved, as is the Province of Ontario. One of the observations of the Task Force is that not a sufficient amount is being done by any particular jurisdiction, but there is significant activity on all fronts to increase the monitoring."

NONPOINT SOURCES DISCUSSION

On Thursday there was a variation in the format. Roundtable discussions followed speeches on nonpoint source pollution by Philip Hale (Essex Region Conservation Authority - Ontario) and Lawrence Libby (Michigan State University). Each table had a facilitator and a recorder. The entire time at the tables was given to discussion of the issue of nonpoint source pollution. Session moderators Betty Reed (Office of Congressman John Porter of Illinois) and Patricia Douglas-Murray (Queen's University) circulated as did the speakers, listening for provocative discussion points. The Chairmen of the Water Quality Board's Nonpoint Task Force, Garth Bangay (Environment Canada) and Kent Fuller (EPA Region V), served as resource people available to help table groups in their discussions. After nearly an hour of discussion, several groups were asked to share their ideas. Highlights of the speeches and discussions follow:

Philip Hale: "The following is a series of comments and perceptions on the state of implementing nonpoint source pollution abatement in the Great Lakes Basin. Each of these perceptions is arguable and we recognize that individual examples can be found to refute the points being made. However, generally we think they are valid and worth discussing.

1. Systematic technology transfer. A vast amount of technical information has been collected by a variety of agencies, related to a whole series of interrelated questions spread all over the Great Lakes Basin. The difficulty is that there is no systematic approach to generate consistent research or provide
technical information to the many actors involved. Technology transfer must be improved to promote greater efficiency in spending public and private dollars.

2. Measuring progress. Most programs operating in the Basin currently provide on-demand subsidies to rural landowners who wish to modify their farming practices. As a result, funds are spread over a wide land area so thinly that it is very difficult to monitor any success rates in achieving program goals.

3. Setting goals. Because there are many different agencies involved in nonpoint abatement in the Basin, there are several different criteria being used to measure the problem. For example, the Pollution from Land Use Activities Reference Group identified high priority contributing areas on the basis of impact on the Great Lakes. Ontario’s Ministry of Agriculture and Food identified such areas on the basis of soils’ relationship to crop production. Obviously, areas were quite different.

On-farm production and off-farm pollution are distinct consequences of erosion. They are, however, results of the same farmer action and are mitigated by the same conservation practices. The issue is that targeting of conservation funding differs depending on which goal has priority, and no real priority system exists to meld the two and accomplish the greatest possible pollution reduction for the dollars spent stopping erosion.

4. Targeting information. Although most nonpoint programs have been universally available, emphasis has been on working with “innovators”, that small sector of the rural community willing to experiment with new land management practices. Information transfer in this manner can be haphazard and slower than it might be if extension personnel were to concentrate their work in priority management areas. Innovators will likely adapt through exposure to a variety of secondary sources of information. The one-to-one contact should come between the advisor and those who still need to be influenced.

5. Paying the price. Much of the discussion on nonpoint source pollution revolves around the question of who should pay. Many interests are involved. When applied to abating point source pollution, the concept of multiple interests produced extensive cost sharing programs. Funds from a variety of agencies and levels of government were used to either subsidize or replace private sector monies. Benefits derived applied to society at large.

It is clear that one of the major conflicts in any discussion of cost sharing for diffuse source abatement programs will be attempting to apply programs universally to landowners at taxpayers’ expense. It seems reasonable that if the taxpayer is to fund such programs, then they should be expected to be directed to priority management areas where expenditures will do the most good.”

Lawrence Libby: “If we are going to solve the nonpoint problem, we have to face some basic issues. Phil spoke about five of these issues. Six through nine and our recommendations are my job.

6. Affecting behavioral change. It seems obvious that if we want less pollution, we are simply going to have to encourage farmers and land owners to do things differently. Biological and chemical research can help us clarify the consequences of failing to get the people to do things differently, but it is not going to change the basic nature of the problem or its solutions.

People are basically rational. They respond to the incentives within the structure of rights and obligations that define land ownership. Their goals include making a living, having some sort of stability to their business over time, being sensitive to their community, caring about their neighbors, and having some sense of responsibility. Farmers are no less sensitive, yet, it is their actions that will ultimately affect the success or failure of nonpoint pollution abatement. The real challenge is not “educating” the farmer, it is getting the farmer’s attention. Getting attention means adjusting the choices, rights and obligations that define agricultural practice. Nothing less will really reduce nonpoint pollution.

7. Government organization. We should reduce the public cost of delivering nonpoint policies. It seems to me that a greater amount of national level structure is needed to give some real coherence to the nonpoint abatement effort nationwide in the U.S. and in Canada. Perhaps there is strength in diversity. It is probably fortunate for example, on the American side, that neither the Environmental Protection Agency (EPA) nor the Department of Agriculture (USDA) has had complete control.

Neither of these agencies can succeed without the enthusiastic and effective participation by the other. USDA knows farmers; it has access to local people; it understands local solutions to local problems. EPA is very effective in water pollution efforts. It knows how to solve water pollution problems. It has access to the scientists.
that understand the specific details of the pollution problem. Staff members have experience with regulation and controls, and ways to solve problems. They know how to go about the process of getting change. Nonpoint is a local issue, requiring sensitivity to local people, but it also requires the technical skill and the scientific basis that EPA has.

Soil conservation districts are a critical local support link for erosion reduction. In the U.S., districts are supported by local people in part because they keep their distance and independence from federal and state governments.

USDA's Extension Service is an education organization funded by federal, state, and local sources. It has no direct line responsibility in USDA for delivery of policy services. Extension people are likely to be the ones helping farmers see the full implication of reduced tillage agriculture rather than those trying to sell a particular tillage system to all farmers. It is particularly important to recognize that each of the contributors to this structure has its own identity, its own mission and perhaps that is the real strength of the process.

8. Conservation tillage. There has been great enthusiasm over this practice. It seems to benefit everybody, the farmer, downstream water-user, consumer, taxpayer. We know that reduced tillage does a tremendous job of holding moisture, therefore those soils for which holding moisture is important are particularly responsive. We're going to have production increases in those situations. The impacts on production and costs of operation vary significantly by the type of soil and the type of farm enterprise that is involved. We need to separate hype from fact and be candid with farmers.

9. Leadership. Local efforts are doing good work in educating rural land owners, providing research data and efforts should be expanded to at least the small watershed basin level and should be designed to measure the physical and economic performance of delivery systems, the techniques of getting soil conservation practices and erosion abatement practices on the land (not the practices themselves).

2. The question of public sector financing of diffuse source pollution abatement should be asked in the context of the distribution of off-farm impacts. When benefits of abatement are widely disbursed, the cost of achieving that abatement should also be widely disbursed.

3. We need targeted education efforts. Clearly the more exposure that the abatement problem receives, the more likely it will be addressed. Key target groups should be identified and major efforts made to impact on them. Within priority management areas, specific groups should also be targeted for receiving education programs to ensure that those who are most involved and whose actions are most crucial to the final result get the message.

4. There must be genuine commitment to negotiating definable and achievable water quality standards. We need to acknowledge reality by facilitating the kind of negotiation that has to take place in determining what are acceptable environmental quality levels, and what are definable water quality standards that can actually be achieved.

5. The question of marginal return for additional research should be addressed. If we know enough about the erosion problem and its physical treatment, priority should be given to funding implementation. If not, only those areas to which current answers are not available should be funded.

6. We should not ignore policy options that require the farmer to reduce erosion
involvement in it. The public and the individual need to be convinced that part of the problem is some of the things that individuals do. Government needs to put together information to explain that each of us is indeed part of the problem, and highlight things individuals might do."

Final Session

Several organizations were recognized following the luncheon speeches of William Ruckelshaus, Administrator of the United States Environmental Protection Agency, and Charles Caccia, Minister of the Environment for Canada. Representatives of the Petroleum Association for the Conservation of the Canadian Environment, Great Lakes Tomorrow, Société pour Vaincre la Pollution, the Association of Mayors of Ontario, and Save the Dunes Council stated their concerns.

Chairman Robert McEwen closed Great Lakes Connections '83 with these remarks: "From up here, this is the most successful meeting we have had on Great Lakes water quality. I had a feeling we had a greater interest and greater participation here than ever before. One person observed this morning that at

some of our prior meetings, those in the audience were talked to and read to. I think we have made a stride ahead here this year. The Commissioners are looking forward to seeing the transcript of all this, and seeing the questions that time did not permit our Boards to respond to and to all the questions of individuals. They are going to be responded to in a publication that will catch the essence of the proceedings of this meeting. To all of you from all of us in the UC family, thank you and a safe trip home."

BRIEFS

Environment Ontario will provide a grant of $1,174,894 for the construction of a new communal sewage system for the community of Spanish in the Township of North Shore. The $2.4 million project involves the construction of sewage mains and connection piping, a pumping station and a lagoon system. It will provide reliable treatment and replace many obsolete individual systems in the community of 1,200. (From Ministry of the Environment release, October 24, 1983.)

To study the effects of agriculture on water quality and the demands agriculture places on water supply, the Ontario Ministry of Agriculture and Food will establish a new drainage and water management unit. One of the unit's primary functions will be establishing guidelines on water needs throughout the year for agricultural purposes. This will help local conservation authorities plan their water management and anticipate the agricultural demand for water.

The 6-person unit will develop models that can be used to predict the effects on crop and livestock production of varying levels of water quality and at what point poor water quality begins to adversely affect agriculture and to predict the effect of farming practices on water quality. (For details call John Johnston (416) 965-9921.)

An innovative pilot recycling program operated by Total Recycling Systems Limited for the City of Kitchener has expanded to a city-wide source separation and waste recycling system with the help of a $110,000 provincial grant.

The pilot waste recycling project has involved about 1,000 families as part of its domestic waste collection system in Kitchener since 1981. It will expand to serve the area's population of 140,000. Call (416) 965-7117 for details. (From MOE release, October 31, 1983.)

Parks Canada is circulating for review and comment a draft marine park policy recognizing the unique nature of marine ecosystems in Canada. Copies are available from P.A. Thomson, Director, National Parks Branch, Parks Canada, Ottawa, Ontario K1A 1G2.

Ontario drilled for natural gas at 64 Lake Erie sites between May and October 1982; 37 sites became new producers. Since exploration began in 1913, 1,531 sites have been drilled with a 47% success rate. More than half the sites have been drilled in the past 10 years. The output in 1982 was 12.4 billion cubic feet, 81% of Ontario production, generating $4.3 million (Canadian) in revenue. (Information from Conservation Council of Ontario, Suite 202, 74 Victoria Street, Toronto, Ontario M5C 2A5; (416) 362-2218.)
William Ruckelshaus and Charles Caccia Speak at Great Lakes Connections '83

Over 400 persons crowded into the Grand Ballroom of the Atkinson Hotel on November 17, 1983 to hear the featured speaker, William Ruckelshaus, the Administrator of the United States Environmental Protection Agency. They were also treated to remarks from the Honourable Charles Caccia, Minister of the Environment for Canada. Highlights of the speeches presented follow.

Mr. Ruckelshaus spoke about the past history of Canadian-American relations, the Agreement and acid rain:

"The international landscape is strewn with the debris of broken treaties and shattered agreements between nations. But that happily is not the case as far as Canadian-American relations are concerned... 58 Canadian-American treaties are the exception to the rule. They have been scrupulously honored by both sides, to our mutual advantage."

"We are blessed in North America with the largest single expanse of fresh water in the world. In the Great Lakes, Canada and the United States share a common responsibility for maintaining the integrity of that huge and splendid body of water. The Great Lakes have been entrusted, for a time, to our care. It is a trust which we must faithfully discharge."

"Last month in Halifax, Nova Scotia, I joined Secretary of State Schultz, Minister for External Affairs, Alan MacEachen, and Minister Caccia in signing an annex to our earlier agreements which emphasizes the reduction of phosphorus from nonpoint sources. We intend to get at these discharges through what we hope will be low cost programs such as modification of agricultural practices and technical assistance to states and local governments. We think that this phase of our joint effort will work as well as our cooperative efforts in the past..."

"There are still many serious problems which confound us, and stretch us to the limits of our knowledge. We have a particularly difficult problem in the chronic chemical contamination around the Niagara River, on our side of the border. We have found similar problems elsewhere in lands adjacent to the Lakes. We have decided therefore to study the areas surrounding the connecting channels of the Great Lakes. This inquiry will cost some $500,000 this year. We hope to complete the study by 1986..."

"Some Canadians have worried out loud about the level of research funding for the Great Lakes program. To them I am happy to report today that EPA's FY 1984 appropriation includes $2.5 million to maintain the Great Lakes research program at our Grosse Ile, Michigan facility. This is the same level of funding as in previous years. Grosse Ile will still provide technical assistance to the LJC in administering programs under the Great Lakes Water Quality Agreement..."

"As we reflect on what we have accomplished, we should remember the words of Prime Minister Trudeau at the signing of the Great Lakes Agreement in 1972:

'The importance of what we have done this morning cannot be described or measured by conventional means, for this agreement does not fall within the normal categories of international activity. It will not contribute materially to the economies of either of our countries; it makes neither of us more secure in our relations with one another or the world beyond; it does little to diminish or remove any of the social problems which worry Americans and Canadians alike. Yet while doing none of these things it accomplishes much more. For it marks our recognition of the fragility of our planet and the delicacy of the biosphere on which all life is dependent. This agreement deals with the most vital of issues - the process of life itself. In doing so it contributes to the well-being of millions of North Americans, for it promises to restore to a wholesome condition an immense area which, through greed and indifference, has been permitted to deteriorate disgracefully."

"When I came back home to EPA six months ago, President Reagan gave me an assignment of coming to grips with the acid rain problem... What is at stake potentially is billions of dollars and a clash of sectional interests in our country which recalls some of the toughest and thorniest sectional rivalries in our nation's past. A practical policy has so far eluded us, but we are working very intently on it and we are determined to reach a consensus and fashion a policy to deal with acid rain as promptly and as effectively as we can..."

"If someone tells you that the problem..."
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of acid rain or hazardous waste is insoluble, I urge you to remember the lesson of Lake Erie. It was pronounced dead a dozen years ago. Today it is alive and well...It seems to me that together we have the power to solve the problem of acid rain, ‘power’ in the sense of our capacity to act, our capacity to marshal our assets, use our ingenuity, brains and sweat to fashion reasonable and effective solutions...”

“I am confident that historians will give the present acid rain controversy the status of another great success in recounting the long and happy story of Canadian-American friendship.”

Mr. Caccia talked about the successes under the Great Lakes Water Quality Agreement and the remaining problems:

“The solution to the problem of Great Lakes water quality will require an amalgamation of scientific knowledge and political action. In this way, there are many parallels between the Great Lakes Water Quality Agreement and the acid rain issue. Then, as now, industry strongly questioned the need for action. Nevertheless, our two Governments agreed that the problem was serious and that a cleanup could not be delayed.”

“We began with a regime of controls based on what we knew at the time and followed that with a second phase of control in 1978. There is no question that the Great Lakes would be in a very sorry condition if Canada and the United States had not signed that Agreement. What matters most is having the political will and the leadership to take those first crucial steps...”

“Our countries’ concern with Great Lakes water quality is obvious. In Canada’s case, sixty per cent of Ontario’s urban population lives around the Lakes. In 1990, that figure will be eighty per cent. Downstream on the St. Lawrence we have Montreal and Quebec City. Most of the population of my country relies on the Great Lakes for its drinking water, as do millions of Americans.”

“But we all know that the Great Lakes continue to face some serious pollution problems. To illustrate for you the extent of Canadian concern, let me tell you that earlier this month the Gallup Poll posed this question: “How important do you feel it is that we clear the Great Lakes of pollution - would you say it is of critical concern, of some concern, or of no real concern?” Seventy-five per cent of Ontario residents polled said that it was critically important and sixty-six percent viewed the Great Lakes pollution problem as critical...”

“Lake Ontario is Canada’s most important supply of drinking water. In it we find many trace metals and organic pollutants. Toxic pollution from the Niagara River is clearly responsible. There is strong evidence that the toxics come from insecure waste sites...Of the thirty-nine Areas of Concern identified by the IJC’s Water Quality Board, Canada regards the Niagara River as the highest priority problem of transboundary pollution.”

“U.S. decisions affect our drinking water. This is why we need action to protect the Niagara River, and we need it now...We welcome EPA’s willingness to apply Superfund to cleanup efforts along the Niagara. At the recent meeting in Halifax, Mr. Ruckelshaus took notice of Canadian concerns, and assured me of EPA’s cooperation and consultation with Canada in: 1. The design of studies of dump sites in the Niagara district; 2. The evaluation and analysis of the data resulting from these studies. 3. The development of remedial plans for the Niagara dump sites...”

“Three generations ago, our ancestors had the foresight to forge an agreement and take action on waters shared by our two countries. We have benefited from their vision and commitment. Future generations will look back on our efforts and judge us on how we acted to keep the lakes clean. Let us draw encouragement from our past achievements and get on with the task at hand.”

NONPOINT TASK FORCE REPORTS

Nonpoint sources of pollution within the Great Lakes Basin have been recognized as a significant, in some cases, critical factor in pollutant loadings. It has become clear that achievement of the [recently confirmed] phosphorus reduction targets of the 1978 Great Lakes Water Quality Agreement is not feasible without significant reductions in nonpoint source phosphorus.

In 1972 the IJC established the Pollution From Land Use Activities Reference Group (PCLUARG) to determine the levels and causes of pollution from land use activities and recommend appropriate remedial actions. PCLUARG reported its findings and recommendations to the IJC in 1978. The IJC forwarded recommendations to the Parties in 1980, but has received no formal response. Still, it is apparent that some activities related to nonpoint source pollution control have been initiated by various agencies and groups.
throughout the Basin.

In 1981, the Board established a Nonpoint Source Control Task Force to review and evaluate the effectiveness of these activities in reducing nonpoint pollution during the past five years. In its report the Task Force provides an overview of the post-PLUARG state of the art in terms of the extent of implementation and effectiveness of various Canadian and United States nonpoint programs and practices (agricultural and urban) in the Great Lakes Basin. The report reviews scientific and technical issues which PLUARG identified and which require further investigation, and the status of PLUARG's recommendations. The Task Force presented conclusions, and made the following eleven recommendations:

1. The International Joint Commission renew its request to immediately ask the Governments to implement the PLUARG recommendations and to complete their negotiations on Annex 3 [now signed]. Further, agencies and governments should develop and implement policies and funding mechanisms in support of an accelerated nonpoint program: e.g. Ontario's Urban Drainage Policy and Guidelines and funding for the 10-year accelerated conservation tillage program identified in the Lake Erie Wastewater Management Study (LEWMS) 1982. (United States House of Representatives Appropriation Committee Report, 1983, directs the USDA to implement this LEWMS identified program.)

The Commission is also asked to act independently to plan and fund a greater effort to make governmental agencies and the public aware of the PLUARG recommendations and their individual responsibility in the management of the Great Lakes ecosystem.

2. the Governments provide sufficient time and resources to ensure that programs have clearly defined goals and objectives, assess the nature and extent of the problem, prioritize problem areas, provide for demonstration, identify the most cost-effective remedial measures, provide technical assistance and adequate resources and provide for ongoing monitoring and evaluation.

3. areas within watersheds which have a higher potential to deliver pollutants be identified and that implementation of measures in these areas receive priority attention.

4. an effective information and education effort to create a better awareness of remedial measures and their benefits and provision of adequate technical assistance be a part of any implementation effort. This will ensure timely adoption and the long-term success of the program.

5. implementation of remedial practices be, at least in part, focussed on a demonstration watershed approach (e.g. PLUARG pilot watersheds and western Lake Erie tributaries) which will provide a basis for adequate monitoring and evaluation of program success.

6. overall effectiveness of nonpoint source control programs in reducing phosphorus target loads be evaluated through simulation modelling, surveys of the extent of implementation of agricultural practices and tributary monitoring.

7. developing urban areas be guided by a master drainage plan and stormwater management plans which make integration of quality as well as quantity controls possible at the design stage of proposed urban drainage systems to maximize benefits. Urban erosion and sediment control programs should be implemented at the time of land disturbance.

8. studies of urban harbor, estuary and other nearshore problem areas include analysis of urban runoff to determine whether it contributes significant loadings of problem pollutants.

9. monitoring of surface and groundwater for pesticide residues and their metabolites be expanded in those areas of the Basin where pesticides use is most intense.

10. there be greater emphasis on event sampling of tributaries with follow up interpretation in order to provide the IJC and the Parties with an up-to-date assessment of nonpoint loadings.

11. studies be initiated and/or expanded pertaining to nonpoint issues and especially those identified in this report.

Copies of this report are available from the IJC Great Lakes Regional Office.

SCIENCE ADVISORY BOARD REPORTS

In 1983 the Science Advisory Board (SAB) began to examine the state of scientific knowledge of several issues. In its November report the SAB presented current recommendations based on the results of its studies to date:

1. Isotopic ratios of sulphur and lead should be used in conjunction with the data obtained from environmental measurement programs in order to assist in a better understanding of the proportional contributions of pollutants to the Great Lakes from different sources.

2. Detailed mapping of groundwater resources in the Great Lakes Basin is required to assess the degree of groundwater contamination and the transport mechanisms of toxic substances both to the aquifers and the Lakes.

3. Waste disposal sites should be classed according to hydrologic settings and proximity to streams. Sites should be grouped according to tributary basins and land uses for the purpose of developing a management strategy.

4. Sampling methods and strategy should be developed for the monitoring...
of groundwater quality in the Great Lakes Basin.
5. Groundwater research capabilities should be developed and maintained to achieve recommendations 2 and 4.
6. All laboratories undertaking environmental measurements of toxaphene should collaborate, under the auspices of the Governments, to develop a method suitable to identify and quantify this complex residue mixture. Further, once a state of the art method has been described, it should be the adopted procedure for all laboratories making this measurement in support of Great Lakes monitoring and surveillance in order to meet the legislative/regulatory requirements for this product in both nations.
7. The Parties study the desirability and feasibility of maintaining a centralized information repository of Great Lakes tissue and sediment samples.
8. IJC should endorse proposed water quality objectives for microbiological indicators, diazinon and polynuclear aromatic hydrocarbon’s (PAHs).

Copies of the Board report are available from IJC's Windsor office.

WATER QUALITY BOARD REPORTS

The 1983 report of the Water Quality Board (WQB) emphasizes eutrophication and toxic chemicals as the two major systemwide environmental problems of the Great Lakes. The Board reported changes resulting from remedial measures in the 18 Class A Areas of Concern, the state of the lakes and the performance of the Governments under the Agreement, and provided a special report on municipal wastewater facilities.

Eutrophication

Under the Agreement, governments controlled phosphorus content in detergents and removed phosphorus down to 1.0 milligram per liter at sewage treatment plants with greater than one million gallons per day in the Lower Lakes. This year the Board reports that: 1. in 1982 the municipal wastewater treatment plants in the Lake Erie Basin achieved an overall average effluent phosphorus concentration of less than 1.0 mg/L.
2. some large individual plants still do not meet the Agreement effluent requirement: Cleveland Southerly and Westerly STPs in Ohio; Wyandotte STP in Michigan; London Greenway, Toronto Humber and Hamilton STPs in Ontario; Niagara Falls, Buffalo and Amherst STPs in New York.
3. though phosphorus inputs from industrial sources constitute less than 10% of the total municipal loads to the Great Lakes, industrial dischargers are significant contributors of phosphorus to some Areas of Concern.
4. the Commission should continue its support of basinwide limitations on the phosphorus content in laundry detergents.
5. Lake Huron total phosphorus concentrations meet the non-degradation requirement for the Upper Lakes, but the mouth of Saginaw Bay, Thunder Bay in Michigan and the Ontario shoreline of Southern Lake Huron suffer from eutrophic conditions.
6. From 1974 to 1980 algae species in Saginaw Bay changed in a way generally reflective of improved water quality. The Board attributes these changes to local phosphorus control programs.

Toxic Chemicals

In 1982 the Board, with the assistance of jurisdictions, undertook three actions in support of the Agreement goal to virtually eliminate toxic substances: began developing a priority list of chemicals for which further surveillance and/or characteristics information was required; established a toxic substances information clearinghouse in the Windsor office of the Commission, and began updating compilations of potentially toxic chemicals detected in the Great Lakes ecosystem. Based on 1981 and 1982 data the Board reports that contaminant levels appear to have leveled off, but some contaminants indicate an increase. Though the levels...
18

1983 Great Lakes Water Quality Board.

are far below those reported in the mid-70's, this increase bears close watching.

**Areas of Concern**

Areas of Concern are the worst site-specific pollution problems and more than any other aspect of pollution abatement reflect jurisdictional commitments to the 1978 Agreement. The Board notes the following:

**Niagara River** - The carbon filtration beds which broke down in 1978 are not yet repaired at the Niagara Falls, New York municipal sewage treatment plant; completion is now estimated in 1985.

**St. Marys River** - Due to current economic conditions, Algoma Steel in Sault Ste. Marie, Ontario has received a further 18 month extension to 1990 to phase-in remedial measures to reduce phenols and other pollutants.

**Waukegan Harbor** - The U.S. EPA has developed a $17.4 million plan to remove, treat and contain the harbor sediments most heavily polluted with PCBs. Subject to public approval, the program will be implemented in fall 1984 and completed in 1987.

**Saginaw River** - U.S. EPA will spend $6 million of its National Dioxin Action Plan to assess the extent of dioxin contamination in and around Midland, Michigan as a prerequisite to further development and implementation of remedial measures at the site.

**Point Source Control Programs**

The Board's 1982-83 review of municipal abatement found that:

- over $7.6 billion has been spent on the construction and upgrading of municipal sewerage facilities in the Great Lakes Basin.
- 1,079 facilities were constructed with design capacity greater than 380 cubic meters per day; there are 390 major plants with design capacity greater than 3,800 cubic meters per day (1 MGD) which treat over 97% of the total flow of sewage into the lakes.
- 175 of the 390 major plants did not comply with the jurisdictional or final statutory effluent requirements in 1981; of those, 36 did not meet construction deadline, 50 required expansion or upgrading, 57 had operational problems and 32 complied in 1982.

Based on its findings, the Board recommends that the Commission urge the Great Lakes jurisdictions to:

- assign high priority to the completion of basic construction and/or upgrading for the 86 municipal wastewater treatment plants which were not completed by 31 December 1982.
- devote adequate resources to operation and maintenance programs to ensure effective performance and protect their significant capital investments.
- increase efforts to impose phosphorus limits and enforce final effluent discharge requirements at major municipal wastewater treatment facilities in the Great Lakes Basin, particularly New York and Ohio.
- devote greater resources to developing and implementing industrial pretreatment programs, particularly those to control toxic organic contaminants.
- provide improved programs and financial support to reduce operational problems due to inflow and infiltrations and combined sewers at major facilities in the Great Lakes Basin.

Copies of the Board report are available from the IJC's Windsor office.

**EVENTS**

The International Association for Great Lakes Research will hold its annual conference April 30 - May 3, 1984 in St. Catharines, Ontario. For details, contact: J. Terasmae, Dept. of Geological Sciences, Brock University, St. Catharines, Ontario L2S 3A1; (416) 688-5550.

* From April 29 to May 2, 1984 the Joint Annual Conference of the Pollution Control Association of Ontario and the Ontario Section, Air Pollution Control
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Association will be held at the Downtown Holiday Inn in Toronto, Ontario. The theme is 1984 - How far have we come? How far should we go? Further information from Mrs. S. Davey; PCAO, P.O. Box 790, Oak Ridges, Ontario L0G 1P0; (416) 773-6275.

Bridging the Gap between Research and Full-Scale Operation in Wastewater Treatment will be a one-day seminar, sponsored by the Ontario Ministry of the Environment and the Pollution Control Association of Ontario on March 7, 1984. It will be held at the Wastewater Technology Centre in Burlington, Ontario. For further information, contact Mrs. S. Davey, PCAO, P.O. Box 790, Oak Ridges, Ontario L0G 1P0; (416) 773-6275.

Cleanup of PCB Contamination

Ontario Ministry of the Environment (MOE) will oversee the clean-up of soil and other materials contaminated with polychlorinated biphenyls (PCBs) at the Canadian General Electric Company (CGE) Limited's Lansdowne Avenue property in Toronto's west end. The contamination is a result of past use, between 1942 and 1977, of PCBs in the manufacture of electrical transformers.

On October 13, 1983, company officials informed MOE staff that they had discovered PCBs on their plant property. Staff immediately requested complete documentation on the findings by CGE as well as a full report on remedial work to be done. Detailed measures for containment, clean-up and monitoring have been provided by the company. Ministry staff will review the information supplied by the company and its professional consultants. Once this has been completed, appropriate steps, including possible regulatory action, will begin.

MOE staff have been working closely with the Ministry of Labour which will take steps to ensure that the health of the company's present workers, as well as those workers who will be involved in the clean-up, will be protected.

Municipal authorities have been contacted by MOE concerning the contamination and subsequent clean-up. MOE has no evidence the contaminated material poses any danger or risk to the community as the company has taken interim steps to minimize the off-site migration of PCBs.

On the broader issue of PCBs management, MOE recently completed an extensive public and industry review of the matter and soon will release new comprehensive Guidelines on the Management of PCB Wastes in Ontario. (Source: MOE news release, October, 1983.)

Chesapeake Study Calls for Action on Controlling Nonpoint Pollution

The Chesapeake Bay "clearly... is an ecosystem in decline," and nonpoint sources of pollution - primarily from agricultural runoff - are a chief culprit, according to the findings of a seven-year, $27-million study of the bay financed by the Environmental Protection Agency and conducted by EPA personnel, state agency officials and bay scientists. Nutrients are beginning to choke off the bay's aquatic life, with nonpoint sources contributing 67% of the nitrogen and 39% of the phosphorus load to the bay in an average year.

When he presented the voluminous two-volume study to representatives of Maryland and Virginia, EPA Administrator William Ruckelshaus said "the key" to solving this problem "is convincing the farmers that it is in their own self interest to do things to protect their own topsoil" and to prevent fertilizer from migrating. In places where this has been done, "remarkable progress" in cutting pollution has occurred.

The study calls on EPA and the states to develop "a detailed nonpoint source control implementation program" as part of a basin-wide water quality management plan. "Initial efforts should concentrate on establishing strategies to accelerate the application of best management practices (BMPs) in priority subbasins to reduce existing nonpoint source nutrient loadings", the study recommends. By July 1, 1985, a program should be in place that "emphasizes increased education, technical assistance and cost-sharing", with full implementation by July 1, 1988. An incentive program to encourage farmers to implement BMPs should be implemented by July 1984. Such a program could include incentives to keep marginal farmland out of production; changes in state, local and federal tax structures to encourage investment in BMPs; and establishment of agricultural conservation trust funds for additional cost-sharing technical assistance or educational needs. (Land Use Planning Report, October 3, 1983.)

[Note the similarities with the Pollution from Land Use Activities Reference and Nonpoint Task Force recommendations.]
Building Bridges Between Schools and Communities

by Alan Clarke

In her Preface to the Handbook Building Bridges Between Schools and Communities the author Ann B. Timberman notes: "The concept of comprehensive arts in education programs was developed in Indiana in 1974 and was piloted in selected schools throughout the state." The comprehensive arts in education programs are designed "to strengthen and improve instruction in all of the arts, to integrate the arts into the general curriculum and to effectively utilize community arts resources."

It was fortuitous that the IJC decided to hold the 1983 Biennial Meeting, "Great Lakes Connections", in Indianapolis because the growing interest within the Commission in the arts found an almost immediate response from the Department of Public Instruction following their successful Building Bridges Between Schools and Communities Program.

The Program Workshop Series has its primary purpose: "to train regional arts in education leadership teams in order to utilize their expertise in assisting schools within their regions in the development of new programs...and to strengthen school-community collaboration in the use of local and regional resources".

The basis for the interest within the IJC is perhaps best expressed in the final recommendation of its First Biennial Report under the Great Lakes Water Quality Agreement of 1978 which reads, in part, "the Commission is of the view that an evolution in its focus from primarily engineering-scientific concerns, to encourage matters of social relevance, institutions and human concerns may be of benefit in assessing whether the requirements of the Agreement are being adequately met".

The first meeting of Commission staff with the State of Indiana Department of Public Instruction staff took place in April 1983. The discussions led to the establishment of the Art Awareness and Recognition Program, a co-operative effort designed to encourage interdisciplinary teaching and learning about the Great Lakes. One hundred and forty-five students’ works from nineteen elementary and secondary schools in the Indianapolis area were entered in the program as a result of in-school programming and were on display in the Rotunda of the State House for two weeks in November 1983.

Thirteen works were selected for a traveling exhibit which will tour the eight Great Lakes states and the two Canadian provinces. Four of the works were selected for a Great Lakes Connection poster to be designed, printed and distributed by the IJC and with the traveling exhibit. The exhibit and the poster are being developed as examples to be used by other jurisdictions to increase public awareness regarding environmental issues.

An important feature of the program was the use of Great Lakes Water Quality institution materials provided by the Regional Office of the Commission to participating schools. John Harrold - Director of Curriculum, Joe Wright - Science Consultant, and Ann Timberman - Art Consultant for the Department of Public Instruction, were instrumental in helping teachers and students make the link between the Great Lakes and their concerns about the environment. As part of the program...
FOCUS

Joyce Sommers - the Indiana Art League and Mary Latham - The Children's Museum.

Governor Robert D. Orr emphasized on two occasions, at the Opening Reception on October 31st and at the recognition of the artists, their teachers and principals during the 1983 Biennial Meeting on Tuesday, November 15, how impressed he was with the co-operative effort that went to make this first Art Awareness and Recognition Program such an outstanding success.

About the Author
Alan Clarke, of Algonquin College in Ottawa, was on loan to the LC during 1983 and was the staff liason person on the Great Lakes Connections '83 Arts Program.

Lake Ontario Conference Report

by William R. Wagner

Lake Ontario: A Resource in Demand", a conference sponsored by the Center for Environmental Information, the Ontario Ministry of the Environment, the New York State Department of Environmental Conservation and the New York Department of State, took place November 2 and 3, 1983 at the Hilton Hotel in Rochester, New York. Conference participants (142) heard 31 speakers discuss a comprehensive spectrum of Lake Ontario issues, including water consumption and diversion, toxic and conventional pollutants, laws and regulations, fisheries and policy and planning decisions.

Speakers included Andrew S. Brandt, Minister of the Environment, Province of Ontario; Henry G. Williams, Commissioner, New York State Department of Environmental Conservation, and Robert C. McEwen, United States Chairman, International Joint Commission.

Minister Brandt took a strong stand against the possibility of winter navigation, and called for a thorough environmental impact study prior to any decision on the issue. Brandt pointed to the record of joint U.S./Canadian progress with Lake Ontario, which includes the reduction of phosphorus levels, the installation of effective water purification systems and cooperation in the effort to monitor toxic substances entering the lake via the Niagara River.

Commissioner Williams focused his remarks on the status of fish in Lake Ontario. "Despite the progress made by the state in restocking Lake Ontario tributaries with Atlantic Salmon and Chinook," said Williams, "the sad spectre remains that most catches must be returned or mounted due to Health Department warnings of high PCBs, mirex and heavy metals that make them inedible except in small amounts."

Commissioner McEwen outlined the history and function of the International Joint Commission, and in his closing remarks, raised the issue of diversions and consumptive uses of Great Lakes water. Said McEwen, "No Great Lakes issue, with the possible exception of toxic contamination, has received as much public and press attention as has the future use of Great Lakes water. The report of our Diversions and Consumptive Uses Study Board makes it clear that we can no longer afford to view the Lakes as providing an inexhaustible supply of water. As our Board succinctly stated, Great Lakes water levels are going to drop. They will drop most of all in Lake Ontario and the St. Lawrence River. The question is how much, and with what effect. In my
personal judgement, the question of diversions and consumptive uses may become as important a future concern for governmental attention as water quality has been for the last two decades."

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BOOKSHELF
A free teacher's guide on Water and Wildlife Week, March 18-24, 1984 will be made available in January through the National Wildlife Federation. The kit features a color poster, a teachers guide, mini poster stamps, and a Wildlife Week Bulletin - all based upon the theme Water: We Can't Live Without It. Teachers should contact National Wildlife Federation, Wildlife Week TE-84, 1412 16th Street, N.W., Washington, D.C. 20036.

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What are dioxins? Where do they come from? How dangerous are they? These and other common questions about this much publicized contaminant are answered in a new 24-page booklet Dioxin: A Cause for Concern? It is available free of charge from the University of Wisconsin Sea Grant Institute Communications Office, 1800 University Ave., Madison, Wisconsin 53705. Prepared by UW-Madison water chemists Thomas Stolzenburg and John Sullivan, the booklet is written in non-technical terms in a question-and-answer format.

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Proceedings of the Twenty-Fifth Annual Public Water Supply Engineers’ Conference, Engineering for Water Supply in Today’s Economy, have been published by the College of Engineering at the University of Illinois at Urbana-Champaign (UIUC). Eleven papers cover such topics as extending the useful life of concrete structures, upgrading existing plants, effective use of water storage, and funding for the future. Copies of the 104-page proceedings are available for $15.00 (U.S.) each from the Engineering Publications Office, University of Illinois at Urbana-Champaign, 112 Engineering Hall, 1308 W. Green Street, Urbana, Illinois 61801. Payment with order is appreciated. Checks should be made out to the University of Illinois.

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Engineering Approaches for Lake Management is a two volume, 880-page text by Steven C. Chapra and Kenneth H. Reckhow. Its purpose is to synthesize available information into a state of the art on modeling for practical use by consulting engineers and water quality planners. Though written for general use, most of the illustrative examples are from the Great Lakes. Flyers from: Butterworth Publishers, 10 Tower Office Park, Woburn, Massachusetts 01801.

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The American Forestry Association (1319 18th Street N.W., Washington, D.C. 20036; (202) 467-5810) has published a Gypsy Moth Workbook for teachers of pre-school through junior high youngsters. The author is entomologist Dennis R. Hamel. The 80-page book has 25 projects - quizzes, puzzles, word games and activities. The cost is $5.95 (U.S.)

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Haslett Public Schools (Outdoor Education, Haslett, Michigan 48840) has six mimeographed manuals for teachers' use: Outdoor Education, Crafts, Junior Naturalist, Pioneer Life, Indian Life and Camp. Write to the Haslett School system for details and prices.

The October and November issues of the Conservation Foundation Letter have excellent factual articles on Great Lakes issues. Both were written by Tom Kuchenberg.

Environmental Conflict Management Part 2
by Patricia Bidol/Michael Lesnick

The range of traditional environmental conflict management strategies has included legislative decisionmaking and laws, agency decisionmaking and regulations, litigation and court rulings. In recent years, however, individuals from other fields with experience in consensus, mediation, negotiations and empowerment techniques have begun to intentionally intervene in environmental conflicts. People have begun to realize the benefits of conflict management strategies which provide an alternative to formal legislative, administrative and judiciary processes.

Figure 1 displays the range of alternative conflict management strategies. Conflict anticipation involves a thorough analysis of conflict and discussion between parties before the conflict actually emerges. Collaborative problem solving, aimed at reaching consensus, involves the determination of common issues and concerns held by parties with a third party intervenor who facilitates the process. Policy dialogues utilize consensus building techniques in dealing with national or state policy issues that are not site-specific in scope. Mediation and negotiation involve more of the dynamics associated with
labor/management relations. Mediation entails the use of a neutral third party to help facilitate the bargaining process. In data mediation, parties attempt to negotiate agreement on scientific and technical information through the use of computer modeling techniques. Empowerment and advocacy involve the use of organizers and experts who assist groups in the organizing efforts that enable them to be active parties in any of the strategies just reviewed.

The traditional, unmanaged, adversarial, litigious approach to settling environmental disputes often only prolongs the dispute rather than effectively managing it. Settlements usually represent either a total win or total loss for a party; hence there is very little opportunity for parties to develop neutral ground on which they can build an agreement. Alternative management strategies give the parties the opportunity to creatively explore potential areas of agreement away from the rigid requirements of either agency rulemaking or the courtroom. Both scientific information and value considerations can be discussed in an environment where a more creative interchange between the parties is possible, and new ideas can be explored.

While alternative conflict management strategies have been successful in cases where litigation has not been tried or had failed, these methods should be thought of as complements to, rather than replacements for, litigation. There are definitely many savings associated with the avoidance of long, drawn-out court battles. Still, unless parties feel pressure to take the risk of participating in an alternative strategy, there is often little motivation for them to do so. The threat or actual pursuit of legal action is often the single most effective tool to promote the use of alternative methods of conflict management.

**Conflict Management Processes**

The management of environmental conflict is often assumed to include only the utilization of a pre-set strategy such as negotiation or mediation. In fact, effective conflict management is a complex task demanding analysis and the formulation of strategies appropriate to the dynamics of a dispute. Analyses need to include the historical context and positions of all interested parties, their relative levels of power, time available, the stage of the dispute, the parties’ sense of urgency, formulation of a set of potential strategies; consideration of the pros and cons of each approach; implementation of the chosen strategy; and analysis of its effectiveness.

As a management strategy is formulated, it is critical that attention be paid to the relationship of the dispute to other societal processes. Environmental conflict is an important aspect of social change; conflict managers need to be aware of the forces for and against change that are present in a dispute. Conflict management also involves changes within the organizations of the parties in conflict. Effective conflict management can only take place when management strategies are formulated and implemented in a manner that fits the goals and organizational capabilities of the parties involved.

Each group that either anticipates or is engaged in a conflict should become aware of the advantages and disadvantages of different strategic options as evaluated from their perspective. In formulating their strategy for dealing with conflict, organizations should consider a number of factors including:

- What are available resources the organization can devote to a dispute? Does it have people available who are trained in conflict management or can people with those skills be hired if they are needed?
- What is going to be the most effective strategy in terms of both their short and long term goals?
- Who are the other parties involved and what strategy is going to be most effective with those groups?
Future Needs

The level of awareness of alternative environmental conflict management strategies has increased markedly in recent years, but these strategies have seen relatively limited use. There are several reasons for this:

- Organizations that become involved in environmental conflicts do not have personnel who are trained to employ the techniques needed to implement these strategies. While there is a need for trained third-party intervenors, there is even a greater need for members of environmental organizations and resource professionals to be trained so that they can either employ alternative strategies in their own work or be aware of the alternatives available for their organization to utilize in interorganizational conflicts.

- There has been little or no evaluation of the effectiveness of strategies that have been employed. There is not sufficient use of these strategies that meaningful research could be conducted to ascertain how effective these strategies have been for the groups that have utilized them. This work is needed so that organizations that are involved in conflicts can determine what strategies would be most effective for them to consider.

- Groups that are contemplating the use of alternative strategies often do not know how the use of these methods will affect their activities and organizations in the future. The impact of alternative conflict management on the short and long term goals of organizations needs to be studied so that groups can understand better how these methods of conflict management relate to their overall goals and objectives.

- There is a lack of institutional provisions and resources in legal and administrative proceedings to support the use of alternative conflict management strategies. Mechanisms for funding third-party intervention and the participation of non-agency personnel in agency decisionmaking are all issues that merit serious attention.

In addition to these needs, specific work of the following kind should be done:

- New theoretical development relating to both practice and research - available theoretical frameworks need to be critically compared and integrated where possible. Using literature on social conflict, additional theoretical perspectives need to be identified and adapted to environmental conflict. Specific theoretical analyses are needed to provide conceptual understandings of problems like the unequal power of parties, causes of environmental conflict, and the role of scientific data in decision making.

- Empirical research to cut across a variety of environmental disputes, draw more fully on wider academic work on conflict, and use systematically gathered data aimed at assessment of specific disputes - an understanding of the dynamics associated with different interventions should be sought through this research. Applied empirical work is needed to provide new information about what parties can expect from conflict processes and different types of interventions. Also, evaluative data and analyses are needed to better understand the impacts of environmental conflict on the organizations, strategies, and resources of parties.

For further information on conflict management, write to the authors at the Conflict Resolution Project, University of Michigan, Dana Building, Ann Arbor, Michigan 48109.