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FOCUS
On International Joint Commission Activities

INITIATIVE TO PROTECT THE GRAND TRAVERSE BAY

by Mark A. Breederland and Amy Schultz

The Grand Traverse Bay is the focal point of the northwest region of Michigan's lower peninsula, and area residents are vividly aware of its beauty and delicacy. Traverse City, a town of about 20,000 people, historically has pooled its human resources to protect its natural ones. As the International Joint Commission's (IJC) 1991 Biennial Meeting approaches (see page 11 for registration and program information), local energies have intensified to focus on Grand Traverse Bay protection efforts, and conference participants will be impressed by the splendor of the Grand Traverse Bay and the dedication of local people to protect the bay's water quality.

The Grand Traverse Bay

The Grand Traverse Bay is a deep, cold water inlet of Lake Michigan, located in the northwest section of Michigan's lower peninsula. The bay is distinctive for its nearly pristine or oligotrophic water quality, which supports a rapidly growing human population. The bay's surface area spans approximately 936 square km (360 square miles), and its southern portion is divided into two nearly equal segments known as the East Arm and the West Arm. Old Mission Peninsula, approximately 29 km (18 miles) long and an average of 2.4 km (1.5 miles) wide, separates the two sections of the bay. The bay has 211 km (132 miles) of shoreline, contains 39 species of fish, and has a maximum depth of 180 m (600 feet) in its East Arm.

Join Us for the IJC's Biennial Meeting on Great Lakes Water Quality!
See page 11-14 for program and registration information

The beauty of Grand Traverse Bay serves as a focal point for residents of Traverse City, Michigan.

Only five National Pollutant Discharge Elimination System (NPDES) permits for direct point source discharges have been granted in this relatively large embayment, the most significant of which is the Traverse City wastewater treatment plant. Since there are no direct industrial discharges to the bay, nonpoint sources are the primary pollution concern.

The drainage area to the Grand Traverse Bay covers approximately 2,530 square km (973 square miles),

Continued on next page

Inside...

areas and rapidly developing residential sections outside Traverse City. The watershed contains outstanding natural resources, including notable inland lakes, and offers a high quality of life to its residents and visitors.

Because of these features, the region is one of the fastest growing areas in the state. A 1989 National Oceanic and Atmospheric Administration (NOAA) study on coastal population, in fact, predicted a 20 percent increase in population for the three counties of the Grand Traverse Bay between 1988 and 2010, the highest predicted on Lake Michigan's shoreline.

The Grand Traverse Bay Watershed Initiative

The Grand Traverse Bay watershed has more than 40 local governmental jurisdictions, each managing its own planning and zoning as permitted under Michigan law. Coordination among these various entities is essential for adequate management of the watershed, particularly as development pressures increase. Protection of the high quality resources in the Grand Traverse Bay watershed is imperative to sustain the area's tourism and recreation based economy.

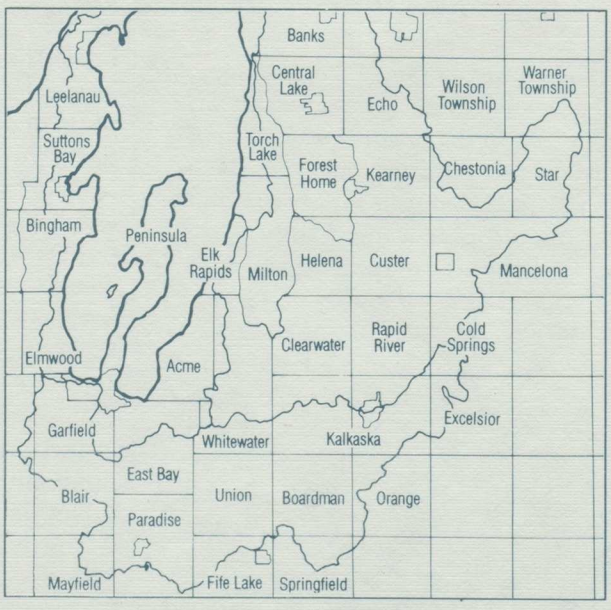
In 1988, the environmental advisory committee of the Northwest Michigan Council of Governments (NWMCOG), representing citizens and agencies, began discussion and planning to develop a long-term management plan. A nationally known consulting firm, the Battelle Memorial Institute, located their Great Lakes Environmental Center in Traverse City in 1989 and thus added to the area's technical resources.

In 1990, initial funding programs became available through Michigan Department of Natural Resources and the U.S. Environmental Protection Agency for programs on nonpoint pollution and Great Lakes issues. A joint program of NWMCOG and Battelle-Great Lakes was funded, and the multi-year Grand Traverse Bay Watershed Initiative was officially begun.

A long-term management team was formed with state, local and business members to develop and implement the initiative. The team developed an ecosystem-based vision statement that "the integrity of the Grand Traverse Bay Watershed will be sustained (or restored) for quality use by future generations." Goals include:

- identify local water quality problems and restoration options;
- assist local units of government in making well-informed decisions that consider water quality, using a computer model or other tools;
- facilitate educational efforts so people in the watershed understand their link to the environment and take responsibility for their actions; and
- investigate and implement a public/private cooperative to manage resources on a watershed basis.

Increased inputs of nutrients are the primary threat to the bay's water quality. Escalated nutrient levels could alter the clear blue waters in the bay considerably and weed beds could dominate the shallow sand bars. While nutrient levels in the open bay haven't changed much in the last 20 years, levels of phosphorus and nitrogen in two major tributaries that drain into the bay's southern portion have more than



The Grand Traverse Bay Watershed

International Joint Commission
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doubled since the 1970s. The mouths of these tributaries show significant effects, including extensive local areas of aquatic weed beds.

The IJC Biennial Meeting's Role as a Catalyst for Grand Traverse Bay Protection

The Grand Traverse Bay Watershed Initiative emphasizes pollution prevention to minimize and eliminate nutrient and toxic loadings to the region. As such, the program may serve as a model for pollution prevention in other rapidly developing areas in the Great Lakes basin. In cooperation with the IJC and in preparation for its 1991 Biennial Meeting in Traverse City, the long-term management team also is investigating the concept of heritage areas for sustainable development as outlined by the IJC's Great Lakes Science Advisory Board, and possible recognition of the bay under this concept. Indeed, the Grand Traverse Bay could be the first "Area of Quality" designated in the Great Lakes region, the complement of the region's Areas of Concern program.

The IJC Biennial Meeting has served as a catalyst for community involvement to protect the Grand Traverse Bay. Local planning committees were developed in 1990 and meet monthly to assist in coordination for the IJC meeting, and the long-term management team accelerated its efforts to present the initiative to meeting participants. In May 1991, a Great Lakes teacher training workshop cosponsored by the IJC and the Traverse City Area Public Schools brought 50 regional teachers together to learn about Great Lakes issues. Educators discussed various issues facing the lakes, participated in several hands-on experiences that could be used in the learning setting, and enjoyed an educational program on the schooner "Malabar."

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IJC'S PRIORITY SETTING PROCESS TO BEGIN AT BIENNIAL MEETING

by Sally Cole-Misch

Under the Great Lakes Water Quality Agreement, the International Joint Commission (IJC) fulfills several responsibilities, including monitoring and assisting progress to accomplish the Agreement's goals. Over the past year, the IJC has reviewed its methods to carry out these responsibilities, and has developed a two-year priority setting process.

The new process was prompted by 1987 revisions in the Agreement itself and a recognition that greater emphasis on fewer priorities over a shorter time period could help the IJC to fulfill its responsibilities more effectively. Also, the process will minimize the degree to which the advice to the IJC is provided by persons responsible for those programs.

The priority setting process will follow a biennial cycle, starting no later than May of each odd-numbered year. A priorities planning group will develop a list of potential priorities, based on advice from the IJC's advisory boards and others, and according to several criteria. For example, the priorities should:

- reflect the IJC's continuing need to assess progress and assist the Parties in achieving the Agreement's purpose of restoring and maintaining the chemical, physical and biological integrity of the Great Lakes Basin Ecosystem's waters;
- reflect an ecosystem approach to water quality issues and therefore, among other things, take into account environmental and socio-economic considerations;
- be anticipatory in identifying emerging issues before they become of serious public concern; and
- take into account the widest range of views practicable within and outside the IJC structure.

To ensure that public input is received for each priorities setting cycle, proposed priorities will be provided to the public before and announced at each biennial meeting. Meeting participants will be asked to provide comments over the course of the meeting on these priorities, or through written comments shortly thereafter, to complete the process and begin work on new priorities no later than November 30 of that year.

All registrants for the upcoming biennial meeting (for registration and program information, see page 11-14 of this issue) thus will receive further information on the proposed priorities for the next biennial cycle and will have the opportunity to participate in discussions on IJC priorities for 1991-1993.

WORKSHOP FOCUSES ON STAGE 2 RAPS

by John Hartig

On April 15-16, 1991 over 100 people actively involved in remedial action plans (RAPs) shared ideas and developed recommendations for Stage 2 RAPs, including specific content, format, level of detail and process for developing the plans. Cosponsored by the IJC's Great Lakes Water Quality Board and the Governments of Canada and the United States, the workshop stimulated discussion and provided valuable opportunities for RAP coordinators and others to share ideas, successes and challenges.

The workshop began with keynote presentations on expectations for Stage 2 RAPs by IJC Chairmen Gordon Durnil and E. Davie Fulton, Great Lakes United President John Jackson, Nancy Douglas-Howayeck, Chairperson of the Menominee River RAP Citizen Advisory Committee, and Steve Skavroneck, a member of the Milwaukee Estuary RAP Citizen Advisory Committee.

A hypothetical Stage 2 RAP outline was then presented to all workshop participants to serve as a basis for small group discussions. Each group critically reviewed the outline and identified key issues that must be addressed or further articulated.

Key issues identified by the small groups were organized into 12 categories for further discussion in breakout sessions the next morning: minimum content for a Stage 2 RAP; incorporating habitat issues; embodying the ecosystem approach; securing commitments; embodying virtual elimination of persistent toxic substances in the plans; establishing quantitative goals; linking RAPs to broader efforts; managing RAP implementation; selecting preferred actions; evaluating benefits; determining meaningful public participation; and incorporating a technical document into public consultation. Specific suggestions and recommendations as to how each issue could be addressed in Stage 2 RAPs were developed, which were then presented in the final plenary session.

The workshop steering committee is preparing a summary of the conclusions and recommendations developed during the Stage 2 RAP workshop, which will be available in advance of the IJC's Biennial Meeting and will serve as the basis for a panel discussion at the RAP Forum on September 27-28, 1991. For more information on the Stage 2 RAP workshop report or the upcoming RAP Forum, please contact John Hartig, International Joint Commission, 100 Ouellette Avenue, Eighth floor, Windsor, ON N9A 6T3 or P.O. Box 32869, Detroit, MI 48232, telephone (519)256-7821 in Canada or (313)226-2170 in the U.S.

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Working with the IJC on its 1991 Biennial Meeting has provided an exciting opportunity for the Grand Traverse community to coordinate and learn from others throughout the Great Lakes region as it develops its own pollution prevention initiative. The community is developing a variety of events, tours and activities with the IJC for meeting participants to enjoy, and looks forward to welcoming meeting participants to the Grand Traverse Bay region.

For more information about the Grand Traverse Bay Watershed Initiative, contact Mark Breederland, Environmental Programs Director, Northwest Michigan Council of Governments, P.O.Box 506, Traverse City, MI 49685-0506, telephone (616)929-5000.

BRIEFS

Recently appointed by the International Joint Commission to the Great Lakes Water Quality Board are **Mary A. Gade** from the Illinois Environmental Protection Agency, Springfield, Illinois and **Charles W. Williams** from the Minnesota Pollution Control Agency, St. Paul, Minnesota.

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Wisconsin's Department of Natural Resources has proposed a statewide **water consumption tax** to help clean up the state's five Areas of Concern. With legislative and governor approval, the department proposes a fee of five cents for every 1,000 gallons used from public drinking water. Under current law, entities which withdraw water at an average of more than 100,000 gallons per day in any 30-day period pay a $45 to $600 fee, depending on the size of the withdrawal.

For further information contact the Wisconsin Department of Natural Resources, Bureau of Water Resources Management, P.O. Box 7921, Madison, WI 53707. (608)267-7610.

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The US Environmental Protection Agency's **Pollution Prevention Action Plan** and the **Great Lakes Pollution Prevention Challenge** emphasize the need to implement pollution prevention activities and reduce or eliminate the use and/or release of toxic substances into the Great Lakes.

In announcing the challenge in April, US EPA Administrator William Reilly said, "Great Lakes industries are the first group to be challenged, and will serve as a role model for the rest of the nation. We want some of our top industries to demonstrate that pollution prevention makes good sense for both the economy and the environment."

Four goals included in the plan are to: 1) protect Lake Superior's high-quality water; 2) help Detroit's big three automakers develop and institutionalize pollution prevention programs; 3) develop a pilot program in Rochester and Buffalo, New York to prevent pollution from stormwater runoff and other diffuse, nonindustrial sources in urban areas; and 4) hold an international symposium in September in Traverse City, Michigan to assess pollution prevention

efforts. The symposium will be held during the IJC's Biennial Meeting (see page 11-14 for registration information).

DuPont and Eastman Kodak Company have announced their commitment to the voluntary program to reduce emissions of 17 priority toxic chemicals by year-end 1995. DuPont's worldwide pollution prevention goals are to reduce by 1993 toxic air emissions by 60 percent, carcinogenic air emissions by 90 percent, total hazardous waste by 35 percent and by 2000 eliminate toxic discharges to land. Eastman Kodak will achieve an overall reduction of 55 percent of the total volume of emissions by waste handling options during the product life cycle through source reduction, recovery, recycling or reuse, treatment and disposal.

For more information contact the Council of Great Lakes Governors (312)407-0177 or EPA Region V (312)886-7857. Copies of the Pollution Prevention Action Plan and the Great Lakes Pollution Prevention Challenge are available from the Great Lakes Commission, Information Clearinghouse, 400 Fourth Street, Ann Arbor, MI 48103-4816. (313)665-9135.

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Climate information in the United States is available from the **Midwestern Climate Center**, located at the Illinois State Water Survey. The center works with the National Oceanic and Atmospheric Administration, the US Department of Agriculture, and the US Environmental Protection Agency. Among the features of the center is the Midwestern Climate Information System (MICIS), a computer system that accesses more than 100 forms of area-specific climate data tailored to individual needs.

For more information on the center or the information system, write or telephone Dr. Kenneth E. Kunkel, Director, Midwestern Climate Center, Illinois State Water Survey, 2204 Griffith Drive, Champaign, IL 61820-7495. (217)244-8226 or 333-2210.

* * * * *

The Financial Post, in cooperation with Air Canada and the Royal Society of Canada, will present **environmental business awards** to identify, encourage and promote technology, design and management initiatives that protect and/or improve the environment. Awards will be presented this fall in the categories of pollution abatement/cleanup, environmental management, green marketing, appropriate technology, and green products. Entries will be accepted from industry, educational and research bodies, public authorities, agencies, and individuals with projects that are developed and/or manufactured by companies or organizations in Canada.

Watch for information on winners in a future issue of *Focus* or contact The Financial Post Environmental Awards for Business, c/o The Royal Society of Canada, 207 Queen Street, Third floor, P.O. Box 9734, Ottawa, ON K1G 5J4.

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Lily Cups Incorporated of Toronto is manufacturing its plates and cups using a new process that replaces hydrofluorocarbons with carbon dioxide to produce the bubble-like spaces in styrofoam products. The replacement eliminates the damage to the ozone layer caused by hydrofluorocarbons. The carbon dioxide is bought as a recycled byproduct from industry and does not add gas to the atmosphere.

For more information, contact John McAllister, DuPont Company, Wilmington, DE 19898, telephone (302)774-5500.

* * * * *

Researchers at the Region V office of the US Environmental Protection Agency have discovered that **quicklime**, a common caustic mineral used to make cement and steel, destroys PCBs and appears to produce no hazardous byproducts. Further testing and research is being done by EPA's Cincinnati laboratory to guarantee that quicklime is an effective treatment method. PCBs have been banned from manufacture since the mid-1970s due to their carcinogenicity, but large quantities of PCBs remain in the environment. Look for updates on the study's results in future issues of *Focus*.

* * * * *

Dr. D.W. Schindler, former chair of the Great Lakes Science Advisory Board's Ecological and Geochemical Aspects Committee, has been awarded the first Stockholm Water Prize. The award recognizes his outstanding research on eutrophication and acidification of lakes, which resulted in environmental legislation in Canada, the United States and the European Economic Community. Dr. Schindler led the Canada Department of Fisheries and Ocean's Experimental Lakes Area Program for 20 years before accepting a chair endowed by the Killam Memorial Foundation at the University of Alberta's zoological department.

* * * * *

Members of the Earth Expo '91 project team at Concord Elementary School in Windsor, Ontario have been named **Champion Defenders** by the United Nations Environment Programme (UNEP), Kids for Saving Earth. The project team, selected from hundreds of entries, was honored at a recent Earth Expo '91 celebration in New York City for their efforts to ward off polluters, pick up litter and build nature trails along the banks of East Windsor's Little River. Pictured above are **Christel Bechard, Alex Marin** and **Simone Wyatt** who represented the project team at the gathering.

* * * * *

The International Joint Commission lost a valuable member of its International St. Lawrence River Board of Control when **David Smith** died of cancer on January 8, 1991. David was chief of the engineering and development division in Environment Canada and was actively involved in the water planning and management activities of that department. His hard work and sensitivity to others earned him the friendship and respect of colleagues in Canada and the US. David is survived by his wife Janet and two children, Michael and Gillian.

IJC COMPLETES ZERO DISCHARGE ROUNDTABLE SERIES IN THUNDER BAY

by Geoffrey Thornburn

The International Joint Commission (IJC) recently completed a series of roundtable discussions on Great Lakes water quality issues. Announced at the Biennial Meeting in October 1989, these roundtables were designed to bring together knowledgable people with a variety of perspectives and broaden the base of advice available to the IJC. Through this process, about a hundred individuals have been given the opportunity to provide their views to Commissioners in a relatively informal setting.

An initial roundtable was held in Toronto to explore procedures and possible topics for discussion using this new method of consultation. The IJC accepted the advice of the session participants that the first roundtables be on a substantive Agreement topic and that forthright discussions be encouraged. Thus, the IJC held a series of four sessions to discuss the concept of zero discharge of persistent toxic substances which was incorporated by the Governments in Annex 12 of the Great Lakes Water Quality Agreement.

The first Roundtable on Zero Discharge, held in Hanover, New Hampshire in July, 1990, explored the issue's dimensions and identified several technical and legal questions related to implementing zero discharge, particularly the production of chlorinated organic compounds. Consequently, the IJC decided to concentrate on technological and legal issues in two smaller roundtables, with specialists from those areas. These sessions were held in Ottawa in February and Washington in April 1991.

Because the IJC wanted to address Lake Superior concerns at the second full roundtable discussion, the technical discussion in Ottawa focused on the pulp and paper industry, a major discharger to the lake. Participants generally felt that, aside from economic and market considerations, it is technically possible to convert paper production away from bleaching with chlorine. Views were divided, however, as to whether it was feasible or even desirable to eliminate the use of any chlorine-based inputs, thereby avoiding the issue of chlorine compounds in the effluent.

Participants of the legal roundtable in April noted that it was possible to ban persistent toxic substances or classes of substances, but that no effective total ban had yet occurred in North America. Experience with interjurisdictional strategies were shared and elements for an effective toxic substances legal regime were identified.

These smaller roundtable discussions culminated in the Roundtable to Discuss How to Stop the Discharge of Persistent Toxic Substances from Point Sources in the Lake Superior Basin, held in Thunder Bay, Ontario on May 21-23, 1991. Despite fundamental disagreement on the definition and desirability of the zero discharge approach, participants discussed the merits of various pollution control strategies, from bans on inputs — through changes in production processes — to market issues and consumer education. Again, the focus fell on the pulp and paper industry because of its role as the major industry in the region, but other sectors such as mining and municipal sources also were considered in plenary and breakout sessions.

While the roundtable participants did not reach definitive conclusions on achieving zero discharge, the 30 participants and observers at Thunder Bay did agree that the session was stimulating and positive and useful to repeat. Together, all roundtables have provided Commissioners with a wealth of information and viewpoints that, along with the technical board and task force reports and the forthcoming Biennial Meeting discussions, will be considered by Commissioners as they formulate their recommendations to Governments in the Sixth Biennial Report on Great Lakes Water Quality.

Although the Thunder Bay session was the last of the current series, future roundtables on a variety of topics may be considered. Single copies of a summary overview for the first zero discharge and technology roundtables are available on request; summaries of the other sessions will be available later this fall. For further information, please contact Geoffrey Thornburn, IJC, 100 Metcalfe Street, Ottawa, ON K1P 5M1, telephone (613)995-2984.

IJC FOSTERS USE OF FORENSIC APPROACH TO IDENTIFY ECOSYSTEM EFFECTS OF PERSISTENT TOXIC SUBSTANCES

by Michael Gilbertson, Theodora Colborn and Alfred Duda

The central policy of the Great Lakes Water Quality Agreement states that "the discharge of toxic substances in toxic amounts is prohibited and the discharge of any or all persistent toxic substances be virtually eliminated." On closer review, this statement actually represents two policies, one on toxic substances and another for persistent toxic substances. While they appear fairly similar, in reality these policies reflect major differences in approaches for research, monitoring and regulation. These differences can be identified and applied to evaluate the success of pollution abatement programs.

Traditional and Forensic Approaches

The first part of the Agreement's policy statement requires that the discharge of toxic substances in toxic amounts be prohibited; the corollary of this, of course, is that the discharge of toxic substances in nontoxic amounts is permitted. This policy reflects the traditional approach to controlling the release of wastes containing toxic substances such as cyanide, ammonia, chlorine, benzene and metals because it assumes that the Great Lakes have a limited assimilative capacity for these degradable wastes. The permitted amount is determined by exposing laboratory test organisms to various concentrations of the chemical and calculating the amount that would kill half the organisms in 96 hours. These calculated amounts become numerical water quality objectives or standards, and analytical chemists then determine the substance's concentration in a water or effluent sample to determine compliance with these standards or objectives.

This approach is the basis for controlling pollution treatable by conventional pollution control technology, and has been incorporated into law in Canada and the United States. Discharge permits are granted and enforced through chemical analytical approaches and bioassays that use experimental fish or invertebrates to measure toxicity, or through benthic community surveys to indicate water quality.

At the same time this traditional approach was applied, the Great Lakes were becoming progressively more contaminated with substances untreatable by conventional pollution control methods. DDT, dieldrin, PCB, dioxin and other contaminants were released from industrial or municipal discharges or from widespread application in agriculture and forestry. These compounds are toxic, their persistence allows them to disperse into areas far from their release sites and, more importantly, they bioconcentrate to more than ten-million-fold from water to top predators in Great Lakes food webs. The traditional approach was applied to control these compounds, and water quality objectives were developed based on the traditional 96-hour toxicity test. Permits were again written based on these objectives.

At the same time these objectives were being developed and implemented, scientists studying the effects of these substances increasingly documented widespread damage to bird populations as a result of exposures to DDT and dieldrin, including egg mortality and interference with reproduction. Other scientists found that PCBs caused reproductive failures in ranch mink fed PCB-contaminated Great Lakes fish. The effects of these compounds on various species thus challenged the idea that the Great Lakes had an assimilative capacity for all wastes.

Researchers documenting these effects use a different approach than that of traditional water pollution researchers. When they observe an abnormality such as poor hatchability, nest desertion, kit mortality or population decline, the researchers survey populations to determine the geographic extent and history of the defect. Once they identify possible factors causing the anomaly, they collaborate with analytical chemists to detect and identify possible responsible chemicals. Their conclusions as a result of this research seek to identify the actual effects on bird and wildlife populations and the chemicals that caused them.

This forensic approach, which combines several disciplines and is practiced by few researchers, helped scientists and others to realize that little or no assimilative capacity exists for persistent, toxic and bioaccumulative compounds. As a result, these compounds must be subject to the most stringent controls, including prohibiting production and use, and remediation of deposits in sediments.

Thus, when the 1978 Great Lakes Water Quality Agreement was

Focus on International Joint Commission Activities, Vol. 16 [1991], Iss. 2, Art. 1

signed, the second part of the Agreement's policy statement required that the discharge of any or all persistent toxic substances be virtually eliminated. The word "virtually" was included because these chemicals already are present in significant amounts in the environment as a result of human activities, and it is impossible to eliminate them.

Unfortunately, this loophole is used to apply the traditional water pollution control approach to writing permits for persistent toxic compounds, allowing substances such as PCBs to continue to be released into the Great Lakes environment. Continued use of such a permitting system forestalls complete recovery of species such as bald eagles and others in the Great Lakes basin.

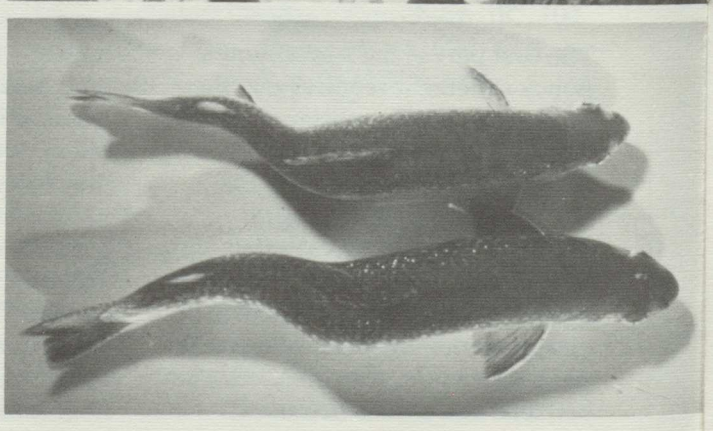
Because the traditional approach includes a high degree of scientific certainty, provides results in a predictable period of time and expands on similarly obtained knowledge, funding agencies prefer this type of proposal. In contrast, it has been almost impossible to obtain funding from conventional funding agencies to investigate the effects of persistent toxic substances using the forensic approach, since it is intellectually complex, scientifically uncertain, involves a long period of time without predictable results, and requires interdisciplinary team work.

While statements of potential effects using the traditional approach led to risk analysis and fish advisories based on carcinogenicity, inferences from the forensic approach call for damage assessment and abatement of chemicals based on noncarcinogenic or developmental effects. Further, this approach generally has been considered disruptive and radical, and information about injury to fish and wildlife — and more recently to human perinatal development — has been met with skepticism by many regulatory authorities. Researchers have been discouraged from using the forensic approach because of perceptions that information on damage to fish and wildlife resources is not consistent with the desired image of the state of the Great Lakes basin.

Institutional Barriers

Traditional pollution controls have worked successfully on a single medium (i.e. specific components of the ecosystem such as water, air, land, etc.), single pollutant basis for particular industrial sectors. Limits set for discharges of cyanide, chlorine, ammonia or zinc into water under the U.S. Clean Water Act and the Canadian Fisheries Act do not address emissions of these compounds to the air or into landfill sites.

Persistent toxic substances are challenging this control approach because they disperse into air, water and land from a variety of industrial and municipal sources, they move readily between sectors of the environment by volatilization, sedimentation, absorption and deposition, and they are absorbed and accumulate in fish, birds, reptiles, mammals and humans. Because resources for research, monitoring and pollution control have been allocated for traditional research and controls addressing only specific environmental sectors, programs have not developed to provide the multi-media approaches



Scientists look for effects of persistent toxic substances on Great Lakes species in various ways. By observing nesting sites, right, researchers can obtain blood samples from young eagles, far right, to determine levels of contaminants in offspring. Some effects may be evident, such as the deformed backbones on fish with high levels of lead, below right, or crossed bills in cormorants nesting on Great Lakes islands, center.

required to abate persistent toxic substances.

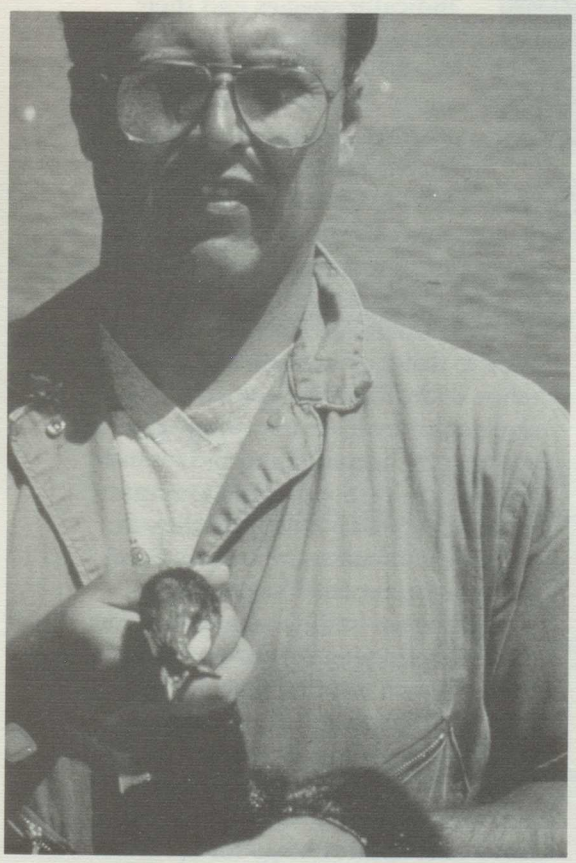
In Canada and the United States, the traditional approach has also included negotiation and compromise based on best practicable and economically achievable technology. These compromises are written into regulations, and routine monitoring measures compliance and results in enforcement action. Regulations are developed based on industry sectors and, where necessary, more stringent controls are developed on a site-specific basis to protect or restore particularly valuable fisheries.

In contrast, the forensic approach relies on detailed assessments of environmental injury and chemicals causing the damage. Corresponding regulations include bans or use prohibitions and criminal sanctions for violations. For example, permits for DDT and dieldrin were eventually cancelled in the United States after lengthy and bitter legal battles. Research and monitoring surveys using the forensic approach were completed to identify impacts of these chemicals; by the time decisions were rendered to prohibit them, species such as the peregrine falcon and the country's own national symbol, the bald eagle, were teetering on the verge of extinction.

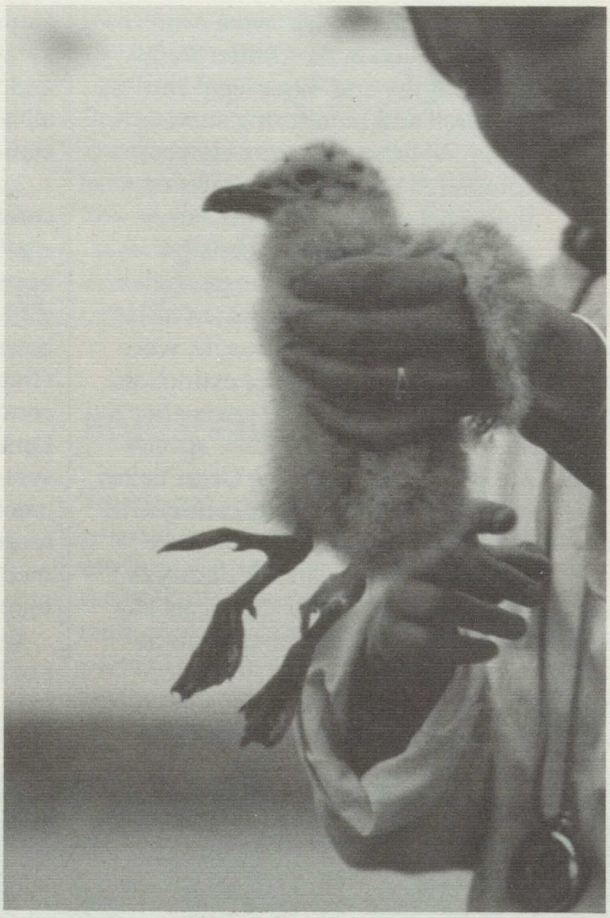
Even now, nearly 20 years after the legal battle was won, these species are still in trouble in the Great Lakes basin because chemicals continue to persist at toxic levels in the food chain. Moreover, similar damages from release of these chemicals has been documented throughout the world. Because persistent toxic chemicals may enter the Great Lakes through atmospheric deposition from sources thousands of miles away, solutions thus require national and international action to prohibit all activities involving these substances.

To do that, political and regulatory communities need information that can be derived only from the forensic approach. Institutional barriers are difficult to overcome, however, and research to analyze noncarcinogenic effects has not been well funded compared to cancer programs. Persistent toxic substances may act synergistically or in combination and create significant uncertainty in forensic investigations. Their multimedia pathways also create obstacles to investigations.

Because the forensic approach has not been adequately institutionalized into research and control programs in either country, information



derived from this approach either is printed in scientific literature, which is virtually inaccessible to the general public, or is publicized through public interest groups and the media, which tends to further alienate forensic researchers from traditional pollution control scientists. Thus, scientists using this approach must be enfranchised and their work legitimized by the regulatory community, even though their stories of crossed beaks in cormorants, kit mortality in mink and behavioral deficiencies in human infants do not reflect the impression of the state of the Great Lakes that many may wish to portray to the public.



Forensic researchers also may find birds with deformities such as extra limbs or feet. *Credit: Jim Ludwig*

The IJC Fosters Change

The International Joint Commission has taken a lead in fostering the use of traditional and forensic approaches. While supporting the development of traditional water quality objectives in the 1970s and 1980s, the Commission's Science Advisory Board recommended "ecosystem objectives" during the 1980s to provide a transition from the chemical-by-chemical to a broader, ecosystemic approach. Some, such as objectives for lake trout and *Pontoporeia hoyi* (a free-swimming shrimplike animal important to the lake trout's diet), were adopted by the Parties in the Agreement's 1987 revisions.

The IJC held a workshop in 1989 through its Council of Great Lakes Research Managers to learn how scientists link observed adverse effects seen in fish, wildlife and human populations to chemicals suspected to have caused the abnormalities (see *Focus*, Volume 14, Issue 2). Workshop participants, including research and resource managers, scientists and regulatory authorities, were divided as to whether the evidence for a causal linkage was believed. Workshop presentors did, however, convince participants that wildlife forensic toxicology is at least a decade ahead of human epidemiology.

Following the workshop, the IJC created a Biological Effects Subcommittee under its Great Lakes Science Advisory Board to further investigate population changes in indigenous species. The subcommittee held four workshops, on bald eagles and ospreys, double-crested cormorants, lake trout and other salmonids, and mink and otter. Both countries are using information from these workshops to develop objectives for these species, so they can be used as indicators of the elimination of releases of persistent toxic substances into the Great Lakes.

These objectives and results from applying forensic approaches will be used to evaluate whether regulatory and other control programs are successful in delivering the Agreement's policy of virtual elimination of persistent toxic substances. Monitoring the restoration of the indicator species and their normal functioning in the ecosystem will more effectively measure success towards meeting this policy than other traditional measurements such as monitoring concentrations in discharges, environmental samples, or bioassays to measure toxicity levels of effluents.

The Commission has taken the first steps to foster greater use and incorporation of the forensic approach. The challenge remains to encourage greater use of both the traditional and forensic approaches by interdisciplinary teams, recognizing that both approaches are valuable and necessary to solve Great Lakes environmental issues. Teamwork between traditional and forensic researchers is required through long-term research commitments to develop additional and more sensitive biochemical indicators to serve as appropriate early warning systems, and to combine the two approaches into a successful strategy for the lakes.

Join Us for the

INTERNATIONAL JOINT COMMISSION'S 1991 BIENNIAL MEETING ON GREAT LAKES WATER QUALITY

SEPTEMBER 27 - OCTOBER 2, 1991

On behalf of the International Joint Commission, it is our pleasure to invite you to participate in the 1991 Biennial Meeting on Great Lakes Water Quality. This year's meeting will be held at the Grand Traverse Resort in Traverse City, Michigan.

The Biennial Meeting provides the opportunity to listen to presentations on the state of the Great Lakes ecosystem by the Commission's two advisory boards and task forces, and to participate in discussions on a variety of issues facing the lakes. This year's agenda also includes a Forum on Remedial Action Plans, to be held September 27-28, workshops, a public discussion session, tours and other events. It's a packed agenda and there will be ample opportunities for everyone to contribute and learn.

Citizens in the Grand Traverse Bay region are developing an extensive pollution prevention plan for the bay, one of the last oligotrophic bays in the Great Lakes, which will be presented at the meeting. While we continue to discuss remediation and restoration of the lakes, particularly through remedial action plans for Areas of Concern, we must move ahead to focus on preventing pollution from entering the ecosystem, and thus preserve pristine areas such as Grand Traverse Bay.

We look forward to your participation in this year's Biennial Meeting, and encourage you to complete the enclosed registration form as soon as possible.

Gordon K. Durnil
United States Chairman

E. Davie Fulton
Canadian Chairman

Registration Form for 1991 Biennial Meeting on Great Lakes Water Quality

Note: A registration fee is not charged for the Biennial Meeting, but REGISTRATION IS REQUIRED. Please complete and return this form BEFORE AUGUST 25, 1991 to ensure hotel accommodations and receipt of Board and Task Force reports, sent approximately one month before the meeting. Preregistrants who reserve meal and tour tickets will receive them when they sign in at the meeting.

Return registration and hotel forms to: Ms. Rita Kerner, International Joint Commission, 2001 S Street N.W., Washington, D.C. 20440

Name _____ Address _____

City, State/Province _____ Zip/Postal Code _____

Agency/Organization (if applicable) _____

Telephone _____ FAX Number _____

☐ I will attend the Forum for Remedial Action Plans in the Great Lakes Basin, September 27-28.

☐ I will attend the 1991 Biennial Meeting on: September 29 ☐ September 30 ☐ October 1 ☐ October 2 ☐

☐ I will attend the Governments' Pollution Prevention Symposium. Please send program information.

☐ I am interested in attending discussion sessions Tuesday afternoon in the French language.

☐ I would like to register to attend: Tour A ☐ Tour B ☐ and have enclosed payment of $5. for each tour I am attending.

☐ Please reserve __ ticket(s) for the dinner Sunday at $22. U.S. funds. ☐ Please reserve __ ticket(s) for the lunch Tuesday at $15. U.S. funds.

The Biennial Meeting hotel is the Grand Traverse Resort, which has reserved a variety of rooms to serve Biennial Meeting participants' needs. **ALL** reservations must be made in writing on the attached Hotel Reservation Form, and sent to Rita Kerner at the address above. The Resort will **NOT** accept telephone reservations at the substantially reduced rates listed below. Meeting participants are responsible for payment of their own hotel accommodations.

Overflow rooms are also available at the Park Place Hotel, in downtown Traverse City (approximately 15 minutes from the Resort) for $85/night. A shuttle bus will provide transportation to and from the hotel. For reservations, call (616)946-5000. For additional hotel information, please contact the Grand Traverse Convention and Visitors Bureau, 415 Munson Avenue, Suite 200, Traverse City, Michigan 49684, tel. (616)947-1120 or (800)872-8377.

Passageways Travel Service is the official travel agency for the 1991 Biennial Meeting and can provide discount airfares on Northwest and American Airlines to all interested meeting participants. Contact Passageways in the U.S. at (800)748-0406 or collect from Canada at (616)947-0880. Please identify that you are calling for Biennial Meeting tickets. The travel agency is open seven days a week: Monday-Friday 6 am - 11 pm; Saturday 9 am - 5 pm and Sunday 9 am - 11 pm Eastern time.

☐ Enclosed please find my check, money order or bank draft IN U.S. FUNDS for the meals and tours, payable to the **1991 Biennial Meeting** in the amount of $_____. *Please indicate any physical or dietary needs that may require advance planning:*

_____

Hotel Registration Form

ORGANIZATION: **INTERNATIONAL JOINT COMMISSION** Official Meeting Dates: **September 27 - October 2.**
ALL REQUESTS FOR RESERVATIONS MUST BE RECEIVED BY **August 25, 1991.** Reservation requests received after this date will be taken on a space available basis.

Name _____ Affiliation _____

Address _____ Business phone _____

City, State/Province _____ Zip/Postal Code _____

Sharing Room with _____ No. of persons _____

Arrival Day _____ Departure Day _____ No. of Nights _____ (Check-in is 3 pm/Checkout is 11am)

Airport Shuttle Requested: Yes ☐ No ☐ Arrival Time _____ Flight # _____

ACCOMMODATIONS BLOCKED: CHECK ONE

☐ Hotel room (1-2 people): $85/night

☐ One bedroom condominium (2-4 people with sofa sleeper): $120/night

REQUEST NONSMOKING

☐ Tower hotel room (1-2 people) $100/night

☐ Two bedroom condominium (4-6 people with sofa sleeper): $180/night

ADVANCED DEPOSIT: To confirm your reservation, a deposit in the amount of one night's lodging is required and will be credited toward your stay. Make check or money order payable to Grand Traverse Resort or deposit by credit card. Do not send currency.

American Express ☐ Visa Bankcard ☐ Mastercard ☐ Diners ☐ Other ☐

_____ Expiration Date _____

CANCELLATION POLICY: Your deposit will be refunded if cancellation is made more than 72 hours prior to your arrival date.

REGRETS: RESERVATIONS CANNOT BE ACCEPTED BY PHONE. Signature _____

_____

Biennial Meeting Program

Friday, September 27 - Saturday, September 28

9:00 am - 5:00 pm — IJC Forum on Remedial Action Plans for Great Lakes Areas of Concern

Saturday, September 28

2:00 - 5:00 pm — Biennial Meeting registration begins

Note: All Biennial Meeting participants are invited to participate in a Cause-Effect Linkages II Workshop, hosted by the Michigan Audubon Society on Friday and Saturday. For registration information, contact Heidi Auman, MAS, c/o 2395 Huron Parkway, Ann Arbor, Michigan 48104, telephone (313)677-0050.

Sunday, September 29

9:00 am - 9:00 pm — Biennial Meeting registration

9:00 am - noon — *Tour A*: Tour of Sleeping Bear Dunes National Lakeshore (limited space available)

1:00 pm - 6:00 pm — Plenary Session

- Opening remarks by Commissioners and review of Commission activities and priorities

Presentations by:
- Great Lakes Water Quality Board
- Great Lakes Science Advisory Board
- Council of Great Lakes Research Managers
- State of Great Lakes Ecosystem Task Force
- Virtual Elimination Task Force
- Great Lakes Environmental Organizations

6:00 pm - 9:00 pm — Dinner, with presentation on Grand Traverse Bay Watershed Initiative and recognition of local education program

Monday, September 30

9:00 am - noon — *Tour B:* Tour of Grand Traverse Bay Watershed Initiatives Activities and Mission Peninsula (limited space available)

1:30 pm - 5:00 pm — Concurrent Workshops

- Heritage Areas in the Great Lakes Basin: discussion of a concept to designate areas for special protection, with particular reference to the Grand Traverse Bay Watershed Initiative
- Integrated Monitoring for the Great Lakes: how to integrate monitoring activities across media and jurisdictions

7:00 pm - 10:00 pm — Concurrent Meetings

- Great Lakes Fluctuating Levels Public Meeting: one of a series of public consultations on study progress
- Council of Great Lakes Industries Panel Session: an interactive discussion with brief presentations by industrial representatives

Note: The Governments of the United States and Canada will host a Pollution Prevention Symposium on Monday, September 30 and Tuesday morning, October 1. The symposium is open to all Biennial Meeting registrants; please check the appropriate box on the attached registration form to register for this session. For additional information, contact Kathy Stubitsch, Ann Becker and Associates, 150 N. Wacker Drive, Suite 1340, Chicago, Illinois 60606, telephone (312)263-2383.

Tuesday, October 1

9:00 am - noon — Concurrent Discussion Sessions on Priority Topics

9:00 am - 10:15 am
- Remedial Action Plans for Great Lakes Areas of Concern
- Shipping, Drinking Water and Other Issues: Are Some Cargoes Inappropriate on the Great Lakes?
- Groundwater Impacts on the Great Lakes

10:30 am - noon
- Putting the Great Lakes into a Global Context
- Progress towards Zero Discharge in Lake Superior

noon - 2:00 pm — Formal Luncheon

Speakers:
William Reilly, US EPA Administrator (invited)
Jean Charest, Canada Minister of Environment (invited)

2:00 pm - 3:30 pm
Concurrent Discussion Sessions on Priority Topics
- Human Health Issues
- Virtual Elimination of Persistent Toxic Substances
- International Joint Commission Priorities for the Great Lakes
- State of the Great Lakes Basin Ecosystem
- Improving the Great Lakes Water Quality Agreement: Structure and Process

3:45 pm - 5:15 pm Concurrent Discussion Sessions: repeat of above sessions

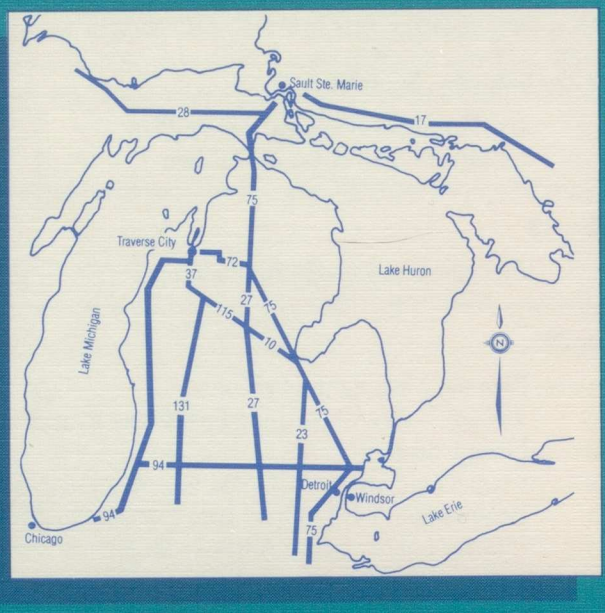
7:00 pm - 10:00 pm Public Discussion Session on Future IJC Priorities for the Great Lakes

Wednesday, October 2

8:45 am - noon — Plenary Session

- Education Program Summary
- Summations and Recommendations from Weekend Forums
- Monday and Tuesday Workshop and Discussion Group Summations and Recommendations
- Closing Remarks by Commissioners

Traverse City is located in the northwestern section of Michigan's lower peninsula, approximately four hours' driving time from Detroit, three hours from Sault Ste. Marie and 4 1/2 hours from Chicago.



Grand Traverse Resort

Scenes from Traverse City and the Grand Traverse Bay Region

LEVELS REFERENCE STUDY UPDATE

by Anne Sudar

The cast of participants is now complete, work plans and budgets are written and approved, and Phase II of the International Joint Commission's Levels Reference Study is moving forward at a brisk pace. The study "team" now encompasses more than 70 people working on over 100 tasks, including John P. D'Aniello, director of the Engineering and Planning Directorate, North Central Division, U.S. Army Corps of Engineers, who replaced Brigadier General Jude W. P. Patin as the U.S. co-chair of the study board on April 12. In response to a 1986 request from the Governments of the United States and Canada, the study will identify actions that can be taken to address the adverse consequences of fluctuating water levels in the Great Lakes-St. Lawrence River basin.

One major milestone was the completion of the study goals and principles. This paper was initiated by the Principles and Evaluation Working Committee and further developed at a workshop attended by representatives from all working committees and the Citizens Advisory Committee. It was distributed to 1,600 interested individuals and groups across the basin for review and revision, and was approved by the study board on May 22. The principles provide guidance to the study team in the evaluation of alternative courses of action and include such guidelines as:

- existing and future beneficial uses are considered and the fundamental character of the Great Lakes-St. Lawrence River system is not adversely affected;
- any recommendations for action are environmentally sustainable and respect the integrity of the ecosystem;
- actions to address the adverse consequences of fluctuating water levels are not implemented unless they produce a net benefit to the system and not result in undue hardship to any particular group;
- structural and nonstructural measures and combinations thereof are considered to determine the optimum response to the adverse consequences of fluctuating water levels for the entire ecosystem; and
- decisionmaking with respect to the management of the Great Lakes-St. Lawrence River system is open, respects the full range of interests affected by any decisions, and facilitates their participation in the policy process.

A public workshop was held in late May in Cleveland, Ohio to address evaluation methodologies. During June, the public reviewed and commented on the recommendations from this workshop, and the study board was expected to discuss the evaluation methodology issue in late June.

Meetings, Meetings, Meetings

Working Committee 1: Public Participation and Information has organized opportunities for the public to meet and interact with the study board and other study personnel. Meetings were held February 25 in Windsor, Ontario and May 21 in Alexandria Bay, New York to focus on recreational boating interests in the St. Lawrence River. On May 29, a public briefing session and evaluation methodology workshop were held in Cleveland, Ohio, and another public meeting addressing shoreline property owners and wetland concerns on Lake Erie was held June 27 in Long Point, Ontario.

Upcoming Public Meetings

In conjunction with the IJC's Biennial Meeting, the Levels Reference Study Board will hold a public workshop on the evening of September 30 in Traverse City (see page 11-14 for program and registration details).

For further information on previous or upcoming meetings, to obtain the documents mentioned above or to be added to the study mailing list, please contact Anne Sudar, c/o International Joint Commission, 2001 S Street NW, Washington, DC 20440, (202)673-6221 or (703)355-2336 in the U.S. In Canada, contact Ruth Edgett at Environment Canada, 867 Lakeshore Road, Burlington, ON L7R 4A6. (416)336-4629.

The **International Niagara Board of Control** will hold a public meeting on Thursday, September 12 at 7:30 p.m. at the Quality Inn in Fort Erie, Ontario. All interested citizens are also invited to attend a public open house of the **International Lake Superior Board of Control** on Tuesday, September 17. The meeting will be held at the Riverside Holiday Inn in Sault Ste. Marie, Ontario and will begin at 7 p.m.

Focus on International Joint Commission Activities, Vol. 16 [1991], Iss. 2, Art. 1

MEET THE MEMBERS OF THE PHASE II STUDY CITIZENS ADVISORY COMMITTEE

by Dick True

The Citizen's Advisory Committee (CAC) was formed to provide advice to the study board on the operation and conduct of the study and to enhance public participation in all aspects of the the Phase II Levels Reference Study. CAC members were invited to serve because of their interest, background and representation of various interest groups around the Great Lakes-St. Lawrence River basin. They hail from all walks of life and represent an extremely broad array of expertise and views on the issue, including shoreline owners, conservationists, fisheries, recreational boaters, marina operators, hydrogeneration, heavy shipping, port cities, local government and native North Americans. As diverse as these interest groups are, a strong common thread to find the best balance of approaches and methodologies that help to reduce the adverse effects of fluctuating water levels in the Great Lakes-St. Lawrence River basin unites the members of the committee.

The CAC has 17 members, nine from Canada and eight from the US (one US position is vacant). Each section has a cochair and board liaison, who serve as CAC representatives on the Phase II Levels Reference Study Board. This integrated system gives the study board direct input from a wide array of concerned interest groups. The process is working well, as all CAC members have developed a strong sense of ownership in the study process. A brief introduction of the CAC members follows.

Ecology, habitat and environment

Complicated ecological issues are embedded in water levels and flows, including wetlands preservation and regeneration, fisheries and habitat, and the maintenance of nature's rhythms and cycles. Canadian CAC Co-Chair **Phil Weller** is executive director of Great Lakes United, teaches at the State University College at Buffalo, and is the author of three books on environmental issues. "Because of our interest in the health of the ecosystem, we are very concerned that the response to water level fluctuations be appropriate," Weller said. "We want to ensure that solutions for water level damage are fair and do not undermine the health of the ecosystem."

US Study Board CAC Liaison **Fred Brown** is past president of Great Lakes United, a forest products pathologist, and serves on the Michigan Water Resources Commission. Fred is active in several conservation groups, advisory and regulatory bodies focusing on water quality management, hazardous waste disposal, environmental impact statements, and small business response to federal and state requirements.

CAC member **Christian Simard** is from Quebec City, is a director in the Union québecoise pour la Conservation de la nature (UQCN), and is an articulate spokesperson for Québecois interests in the St. Lawrence River area. The committee's newest member is **Richard Moore**, a water resources specialist with the Michigan United Conservation Club's office in Lansing, Michigan. His experience includes managing an environmental program near Saginaw Bay, where he interacted with many shoreline property owners who have experienced flooding problems.

Riparian Shore Owners

Riparian shore owners have often felt neglected in the lake levels issue, and have collectively suffered loss of enjoyment and use of their shore properties due to extremely high and low lake levels. The issue of "whole system" water level regulation measures is of utmost importance to these Great Lakes shoreline residents. US Co-Chair **Cliff Sasfy** is vice chair of the US Great Lakes Coalition and executive board member of the International Great Lakes Coalition. Cliff is a fourth generation riparian, following his great grandfather who was one of the original settlers of South Bass Island in Lake Erie. Having served on the Phase I Study Board, he has extensive knowledge of shoreline erosion problems and riparian issues.

Another Lake Erie property owner is **David Rebmann**, who holds three

LAKE LEVELS UPDATE

The study board recently met in Alexandria Bay, New York to tour the Thousand Islands by boat and participate in a public meeting. Shown from left are Doug Cuthbert, Canadian co-chair of Working Committee 1; John D'Aniello, US study board co-chair; cruise boat captain Mike Snyder; Mayor Peter Yeomans of Dorval, Québec and CAC member; Neil Fulton, study director; and Tony Wagner, Canadian study board co-chair.

graduate degrees and is a social studies instructor. David is co-chair of the South Shore Coalition, a past chair of the Erie County Shoreline Task Force and Urban Waterfront Advisory Committee, and has been president of Hoover Beach Association for the past 10 years. He has been involved with shoreline issues for over 20 years.

Joe Milaukas is chair of the International Great Lakes Coalition and lives in Saugatuck, Michigan. Joe owns and operates a family resort business and serves on the Tourist and Convention Bureau, the Lake Shore Association and the Chamber of Commerce. Joe also has served as assistant prosecuting attorney for the shoreline communities of South Haven, Holland and Grand Haven, Michigan. "My goal is to help assure a full, factual and fair study process," Joe said, "and to produce credible and useful recommendations that will mitigate the harm produced by recurring extreme high and low lake levels."

Sharon Hazen is vice chair of the International Great Lakes Coalition and teaches school in her hometown of Port Rowan, Ontario on Lake Erie. Sharon also contributed to Phase I study activities, and brings an experienced focus to the CAC discussions. She is founder and publisher of the Port Rowan Good News, a community newspaper.

Recreational Boating and Marinas

Fluctuating water levels can affect the safety and quality of recreational boating, and play havoc with marina docks and the ability of marinas to service their boating customers. **Dick True** is executive secretary of the Empire State Marine Trades Association representing boating, marina and water dependent business interests and lives in the Albany, New York area. He is a member of the state's Boating Advisory Committee, chairs the Department of Environmental Conservation's and the Coastal Zone Program's Marine Advisory Committees, and serves on the Long Island Sound Study Citizen Advisory Committee and the Sea Grant Advi-

LAKE LEVELS UPDATE

sory Committee.

Leroy Hamilton, longtime marina operator from Iroquois, Ontario, represents the Canadian boating and marina interests. Leroy has an extensive background and understanding of the levels issue and its effects on recreational boating and marina operations.

Native Americans

Native American interests include maintenance of a healthy ecosystem, and the preservation of traditional tribal hunting and fishing activities. **Howard Reynolds** represents the Keweenaw Bay Indian Community on Lake Superior in Baraga, Michigan and is the Keweenaw representative on many federal and state councils on Indian affairs. He has been the environmental officer for the past six years. **Michael Williams** is the assistant director of the Walpole Island Heritage Centre (Nin.Da.Waab.Jig) responsible for natural resources and environmental quality. The Walpole Island First Nation is located at the mouth of the St. Clair River, which funnels water from the upper Great Lakes to Lake St. Clair and the Detroit River. Fluctuating water levels affect the Walpole Island community in many ways, including traditional hunting and fishing activities, shoreline erosion, pollution and other impacts from the St. Clair River shipping channel.

Ports and Cities

Port cities lining the shores of the Great Lakes-St. Lawrence River system are dependent on stable water levels to maintain normal shipping and critical port city functions. CAC member **Henry Hanka** is chair of the eight-state Great Lakes Commission and the government resources director for the Seaway Port Authority of Duluth. Henry feels that "the CAC provides a unique forum to present ideas and options involving a significant aspect of the system. My goal is to monitor and provide input to the committee on issues involving systemwide maritime issues and concerns."

Hydropower Generation

Electric power generation from flows in the lake basin is a major economic interest and industry in the basin. Extreme fluctuations in flows and lake levels affect the potential for hydrogeneration. CAC member **Joan Eaton** is a civil engineer from Toronto, Ontario and has worked for Ontario Hydro for 14 years. She serves on numerous water management boards and the International Niagara Committee.

Local Governments

Local shoreline governments must protect the integrity of their shorelines while adequately maintaining flows to satisfy public health requirements and commercial shipping interests. **Alex Harry** is an attorney in Sault Ste. Marie, Ontario and past mayor of that city. Alex has served on many community boards, including the Ontario Shoreline Management Advisory Council. "I believe the greatest prospect for limiting future damage to the shoreline is through proper management of shoreline development, setting up wildlife reserves, and establishing (use) standards to protect people," Alex said. "I doubt that by setting up (control) gates, we can do much to lessen the highs and lows. I would much sooner expend dollars to clean up the lakes and impose standards to keep them clean."

Canadian Study Board CAC member **Peter Yeomans** is Mayor of Dorval, a city adjacent to Montreal, Quebec. Peter's concerns focus on the St. Lawrence River downstream of Cornwall, and Montreal's ability to maintain freshwater intakes, waste assimilation and port city functions. **Edith Fuller** is mayor of the Town of Haldimand, Ontario, a rural community on the north shore of Lake Erie. Residents of her community experienced severe flooding and erosion problems during the high water levels of 1985 and 1986, and thus she has firsthand knowledge of the effects of fluctuating water levels.

Do you have an opinion or idea you'd like to share with *Focus* readers?

The IJC begins a new "Letters to the Editor" section with the November-December 1991 issues of *Focus*, and welcomes your comments, reactions and thoughts. Please address all letters to Editor, *Focus on International Joint Commission Activities*, 100 Ouellette Avenue, Eighth floor, Windsor, ON N9A 6T3 or P.O. Box 32869, Detroit, MI 48232. Letters may be edited to meet space requirements. Please include your name and address with all correspondence.

BOOKSHELF

The following reports are available from the International Joint Commission's Great Lakes Regional Office, 100 Ouellette Avenue, Eighth floor, Windsor, ON N9A 6T3 or P.O. Box 32869, Detroit, MI 48232. For further information about these or other IJC reports, call (519)256-7821 in Canada or (313)226-2170 in the US.

- *Proceedings of the Mass Balance Workshop*
- *Proceedings of the Expert Consultation Meeting on Bald Eagles*
- *Toxic Substances in the Great Lakes Basin Ecosystem* (brochure)

In addition, the Commission released its *Special Report on Great Lakes Environmental Education* in early June. Copies of this report can also be obtained from the above address, and limited copies of an accompanying videotape program are available on loan.

* * * * *

Several new materials are available through the US Sea Grant program. Thousands of people throughout the Great Lakes region could be spotting and reporting the spread of zebra mussels with the help of a free, wallet-size *zebra mussel card*. Individuals and organizations interested in obtaining bulk quantities of the card should contact a Sea Grant office in Illinois-Indiana (708)818-2901; Michigan (517)353-9568; Minnesota (218)726-8106; New York (716)395-2516; Ohio (614)292-8949 or Wisconsin (414)465-2795. Bulk quantities are available for $.05 each (US funds) in 20-card ($1) increments. Price includes postage and handling. Orders under $20 must be prepaid. Make check or money order payable to the appropriate Sea Grant office.

A Sea Grant *Bibliography of Educational Materials* is also available for $4 (US funds) from the Minnesota Sea Grant College Program, Suite 302, 1518 Cleveland Avenue, University of Minnesota, St. Paul, MN 55108. (612)625-9288.

Great Lakes Pursuit, a game to challenge knowledge of the Great Lakes in environment, history, culture, geography and economics, has been produced by the Ohio Sea Grant College Program. The game includes 75 to 90 questions for each category and is sold for $19 (US funds) plus postage and handling. To receive more information or to place an order contact Maran Brainard, Ohio Sea Grant College Program, 1541 Research Center, 1314 Kinnear Road, Columbus, OH 43212-1194. (614)292-8949.

* * * * *

Great Lakes People is a new 45-minute video program exploring persistent toxic chemicals in the Great Lakes ecosystem and the effects they have on wildlife, fish and human health. The VHS tape is available to all environmental groups, secondary schools, colleges, universities, public libraries, industry and government for $300 (Cdn funds, including public performance rights).

For a copy of the video contact Kannel-Smith, 1203 Avenue Road, Toronto, ON M5N 2G3. (416)489-3570.

* * * * *

Recommendations for action in policy, communication, education, and research regarding chemicals and their risks is summarized in a book entitled *Human Health Risks from Chemical Exposure: The Great Lakes Ecosystem*. Orders can be placed under catalog number L435LAGK at $79.95 (within US), $96 (outside US) by contacting Lewis Publishers Incorporated, 2000 Corporate Boulevard NW, Boca Raton, FL 33431. (800)272-7737 (US only) or (407)994-0563.

* * * * *

The Royal Commission on the Future of the Toronto Waterfront has released its second interim report entitled *Watershed*. Publication of its final report is expected this summer. *Watershed* is available, free of charge, in French and English from the Royal Commission on the Future of the Toronto Waterfront, 207 Queen's Quay West, Fifth floor, Box C.P. 4111, Station "A", Toronto, ON M5W 2V4. (416)973-7185.

* * * * *

Sigurd Olson Environmental Institute has created a 22-minute slide/tape program entitled *A Lake in the Balance* that looks at environmental issues, historic sites and the environmental health of Lake Superior.

The program and 12-page guide are available for $75 (US funds) plus tax or can be rented for $7.50. For more information contact Sigurd Olson Environmental Institute, Northland College, Ashland, WI 54806. (615)682-1223.

* * * * *

The report *Toxic Chemicals in the Great Lakes and Associated Effects* is a review of the scientific knowledge of the levels of toxic chemicals in the Great Lakes basin and their effects on human health, fish and wildlife. The joint report was prepared by Environment Canada, Health and Welfare Canada and the Department of Fisheries and Oceans.

For further information contact Tammara Boughen, Communications Directorate, Environment Canada, Ontario Region, 25 St. Clair Avenue East, Toronto, ON M4T 1M2, (416)973-1113; Robert Greenslade, Health and Welfare Canada, Publications Distribution Centre, 19th floor, Jeanne Mance Building, Tunney's Pasture, Ottawa, ON K1A 0K9, (613)957-9117; or Sharon Leonhard, Department of Fisheries and Oceans Canada, Bayfield Institute, 867 Lakeshore Road, P.O. Box 5050, Burlington, ON L7R 4A6, telephone (204)983-5108.

* * * * *

Statistics on the water quality improvement industry are included in the *1991 Statistical and Market Data report* published by the Water Quality Association. The 40-page report, with charts and graphs, covers industrial and residential water treatment markets, trends in national water use, the United States public water supply and groundwater.

The complete report is available for $250 (US funds) from the Water Quality Association, 4151 Naperville Road, Lisle, IL 60532. (708)505-0160.

* * * * *

Do you know where water comes from and where it goes when you've used it? Do you know what happens when harsh cleansers are poured down the drain? A guide entitled *Water: No Time To Waste* is available in French and English for $1.95 (Cdn funds) from Canada Communication Group-Publishing, Ottawa, ON K1A 0S9.

* * * * *

A book jointly prepared by a Cancer Cause Task Force and a Michigan physician entitled *A Family Doctor's Guide to Understanding and Preventing Cancer* is available in book stores throughout the Great Lakes area for $24.95 (US funds). For more information on how to obtain the book, call toll free 1-800-288-0718, or contact either Dr. Kaura at 3755 Fort Street, Lincoln Park, MI 48146, (313)381-5000 or Pam Frucci of the Cancer Cause Task Force, 24531 Hickory Circle, Grosse Ile, MI 48138, (313)671-0170.

* * * * *

Groundwater Education in America's Schools: A Catalog of Resource Materials for Elementary and Secondary Education Professionals is available free of charge to all schools in the United States by contacting the American Groundwater Trust, 6375 Riverside Drive, Dublin, OH 43017. (614)761-2215.

* * * * *

Most environmentally friendly cleaners are easy to make, as the Ontario Waste Management Corporation (OWMC) shows in a new booklet, *Clean 'n Green: Recipes for a Healthier Planet*. The booklet, produced by OWMC and cosponsored by H.J. Heinz Company of Canada Ltd. and Church and Dwight Ltd., is available free of charge by contacting the OWMC Main Office, 2 Bloor Street West, Toronto, ON M4W 3E2. (416)923-2918 or in Ontario call 1-800-269-1178.

* * * * *

The computer-based program entitled *Balance of the Planet* incorporates information about the many challenges facing the global environment from acid rain to water pollution to global warming. The program charts the problems, and provides information from a variety of sources to save the planet from destruction. For information and costs of the program contact Chris Crawford, P.O. Box 360872, Milpitas, CA 95036-0872. (408)946-4626.

* * * * *

A *Great Lakes Nuclear Hotspots* map can be purchased for $5 (Cdn funds) each including postage and handling from the Nuclear Awareness Project, Box 2331, Oshawa, ON L1H 7V4. (416)725-1565.

* * * * *

The *Ontario Round Table on Environment and Economy* has released its "Challenge Paper" intended to encourage discussion on ways to achieve sustainable development in Ontario. A 25-minute video on the roundtable also has been produced and is available, free of charge by contacting Bob Alexander, Ontario Round Table on Environment and Economy, 790 Bay Street, Suite 1003, Toronto, ON M7A 1Y7. (416)327-2077.

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The Great Lakes Economy: Looking North and South, published by the Federal Reserve Bank of Chicago and the Great Lakes Commission, addresses the region's past performance, present trends and future prospects. Fifteen chapters authored by economists, researchers and policy experts explore a range of economic issues. To receive a copy of the book send check or money order for $30 (US) or $34 (Cdn) to Great Lakes Commission, 400 Fourth Street, Ann Arbor, MI 48103-4816. (313)665-9135. Special discounts are available on bulk orders.

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Standard Protocols for Monitoring and Sampling Zebra Mussels is available from the Illinois Natural History Survey, Lake Michigan Biological Station, Box 634, Zion, IL 60099. The document describes sampling techniques that can be used with a minimum investment in equipment and training. Similar protocols to those described in this document are being developed for use by the Ontario Ministry of Natural Resources. Single copies are free; additional copies are available for $5 (US funds).

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Information on whom to contact in each of the 50 US states on environmental programs, how these are organized and how money is spent can be found in the second edition of the *Resource Guide to State Environmental Management*. The guide (C-184) is available for $40 (US funds) from the Council of State Governments, Order Department, P.O. Box 1190, Lexington, KY 40578. (800)800-1910.

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Soil Management for Sustainability, recently released by the Soil and Water Conservation Society, updates areas in soil management critical to maintaining a productive and sustainable soil resource base for future generations. In particular, it addresses conservation tillage, use of organic wastes and farming by soils.

Single copies are available postpaid for $15 (US funds), from the Soil and Water Conservation Society, 7515 NE Ankeny Road, Ankeny, IA 50021-9764. (515)289-2331.

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A new booklet on *Global Warming and Energy Choices* introduces the public to the implications of energy choices and their impact on the world's climate. This and other publications, including *Household Waste*, *Groundwater*, *Drinking Water*, and *Farmland* may be ordered prepaid at $4 each (US funds) plus postage and handling from Concern, Inc., 1794 Columbia Road, NW, Washington, DC 20009. (202)328-8160.

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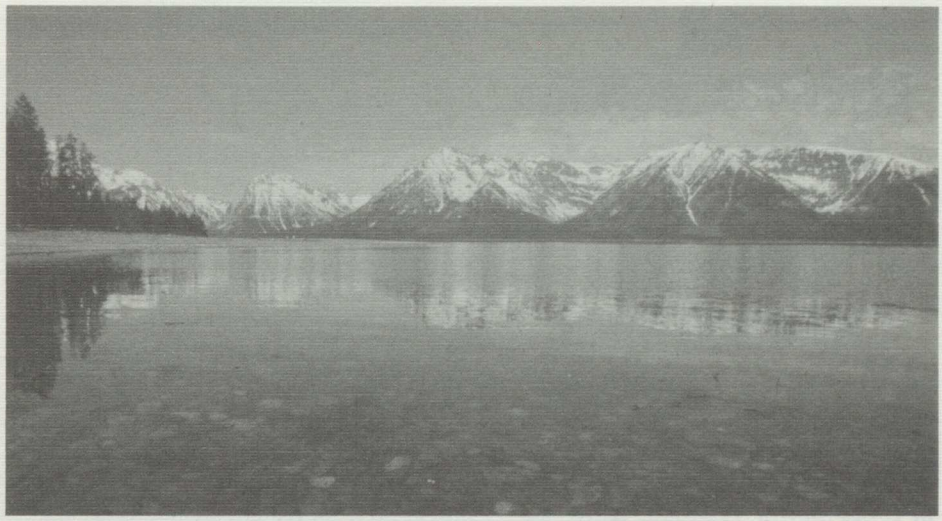
IJC'S AIR QUALITY ACTIVITIES EXPANDED IN US-CANADA AGREEMENT

by E. A. Bailey

As previous articles in *Focus* have highlighted, the responsibilities of the International Joint Commission (IJC) are broader than most people realize. Many think the IJC is involved only with Great Lakes water quality activities, while others view the IJC as focusing only on boundary waters. While the majority of the IJC's activities traditionally have related to boundary waters as outlined in Articles III and IV of the 1909 Boundary Waters Treaty, several have been related to air quality.

The IJC's first air quality reference was in 1928, when it was asked to investigate and report on the extent of damage caused by fumes from a smelter at Trail, British Columbia. Later, in January 1949, the Governments of Canada and the United States asked the IJC to determine the sources of air pollution in the Detroit-Windsor region and to recommend the most practical remedial measures for smoke from ships traveling on the Detroit River. Information on these references can be found in earlier *Focus* articles in Volume 12, Issue 1 and Volume 13, Issue 3.

Additional air pollution references for the Detroit-Windsor area followed in 1966 and 1975. The reference in 1966 also contained a request for the IJC to note air pollution problems in other boundary areas and draw such problems to the Governments' attention. To respond to this portion of the reference, the IJC created the International Air Pollution Advisory Board, later renamed to the International Air Quality Advisory Board (IAQAB) to reflect the broader scope of air quality concerns and the IJC's need for a wide range of advice.



The IJC has received references concerning air quality issues in boundary regions, in addition to its traditional work on boundary waters issues.

The IAQAB remains active today and reports to the IJC semi-annually. Recent activities of the board include analysis and presentation of information on:

- trends in temperature and precipitation in the boundary region since the early 1900s to seek any evidence of a greenhouse effect;
- innovative concepts connected with the "atmospheric region of influence," or the region from which pollution might originate and affect people and the environment in the boundary region;
- time trends of anthropogenic pollutants such as ozone, oxides of nitrogen, particles and sulphur dioxide, to alert the IJC to improvements or deteriorations in air quality in the boundary region (see following article); and
- existing monitoring networks in the boundary region and the development of recommendations related to integrated transboundary monitoring to help in assessing the state of the environment in the region.

With the signing of the Canada-United States Agreement on Air Quality on March 13, 1991 by Prime Minister Brian Mulroney and President George Bush, the Governments assigned to the IJC the responsibility to seek public comment and hold public hearings as needed to assemble a synthesis of views on the reports of the Governments. These reports will be submitted biennially to the IJC. This is a different role than the IJC has traditionally performed, and plans are being developed to fulfill this role when the Parties provide their first report in March 1992. The agreement also allows for the governments to consult the IJC concerning monitoring programs, to refer other matters to the IJC for study, and to utilize the IJC to settle disputes. Future issues of *Focus* will provide further updates of this new IJC responsibility.

Focus on International Joint Commission Activities, Vol. 16 [1991], Iss. 2, Art. 1

AN ENVIRONMENTAL RESPONSE TO SULFUR DIOXIDE EMISSION REDUCTIONS

The following is an excerpt of a presentation by Dr. Lester Machta to the IJC at its Semi-Annual Meeting in Washington, D.C. last April. Dr. Machta is US co-chair of the International Air Quality Advisory Board.

The Clean Air legislation passed by the US Congress and signed by President Bush in 1990 was indeed historic. Of particular interest to the IJC may be the Act's requirements for reductions of sulfur dioxide emissions to partially control acid rain. A staged reduction of sulfur dioxide, from a reference or base US emission level of about 24 million tons as measured in 1980, will begin in 1995. A second reduction is required in the year 2000, each at about 5 million tons.

Soon after the first stage of reductions, or soon after 1995, questions are likely to be asked by the media and public to measure success of this amendment. For example, are the benefits from the controls, on both sides of the border, what were expected? Have the lakes recovered? Has the acid damage to the forests ceased and are they now healthy?

Unfortunately, these questions cannot be answered in the first few years after reductions in sulfur oxide emissions take place. The benefits, when they do occur, will more likely take many years to observe, and those that can be measured may or may not be able to be tied to these reductions.

Our inability to quickly detect small improvements is due to the slow ecological response to reduced deposition and inadequate monitoring tools. Many natural events also may affect daily changes in sulfate deposition rates and levels of visibility beside human emissions of sulfur dioxide. Thus, it will not be easy to directly attribute changes in deposition rates and visibility to the relatively small reductions required in 1995.

Sulfur dioxide and nitrogen oxide emissions have decreased in the US since the late 1970s; of the five million ton sulfur dioxide reduction mandated by 1995, a three million ton reduction had already taken place by 1988. The remaining change in emissions between now and 1995 and soon after 1995 is likely to be very small, perhaps less than ten percent of the 1980 base or reference level. Trying to detect such a small change will be like trying to hear a quiet conversation in a noisy factory.

The debate concerning further emission controls is likely to intensify soon after 1995. Environmentalists will use the lack of observable response to call for even greater reductions, while others, particularly industries required to reduce emissions, will argue that acid rain never was the cause since the controls produce no detectable benefit. Aside from education to explain the time required to measure benefits, what concrete steps can we take to illustrate the benefits of controls?

First, the US Clean Air Act requires utilities to account for reductions using stack monitoring or an alternative method to measure compliance. Thus we can insure that less sulfur oxides are directly emitted into the air. Second, to show that at least some benefits are quickly achieved, we can measure deposition rates to the ground, the lakes and the forests by monitoring the composition of rain, snow and fog. These rates will respond immediately to changes in emission levels. The reduced visibility from sulfate in the air can also be measured immediately. Visibility impairment from sulphates is of more consequence south of the US-Canadian border especially south of the Great Lakes.

Studies at most of the seven US deposition monitoring stations have generally shown the same proportional percentage decrease in sulfate deposition in rain, snow and fog as recent emission rate declines. This and other research shows that even small and gradual changes in sulfur dioxide emissions can be detected by wet deposition monitoring, given a long enough measurement time. It is this analysis of past data that gives us confidence that emission controls will provide positive changes, even if they cannot be measured quickly. The concluding message thus is that programs to monitor the state of ecosystems must be continued for many years. We cannot expect quick improvements in the lakes and forests from the 1990 US Clean Air Act.

EVENTS

International Joint Commission Schedule of Meetings

The following includes meetings scheduled by the Commission and its various boards. Please contact an IJC office for further information.

August
9 Great Lakes Science Advisory Board Windsor, ON
21-22 IJC Executive Meeting (tentative)

September
4-5 Joint IJC/Great Lakes Fishery Commission Meeting Detroit, MI
23-24 Technological Committee Windsor, ON
27-28 Forum on Remedial Action Plans Traverse City, Michigan
27-Oct. 3 International Joint Commission's 1991 Biennial Meeting Traverse City, MI
28 Joint Great Lakes Science Advisory Board / Council of Great Lakes Reserach Managers Traverse City, MI

October
23-25 IJC Semi-Annual Meeting Ottawa, ON

General Conferences

A short summer course on **Great Lakes Shorelines**, August 5-16, 1991 will be given at Eastern Michigan University, Ypsilanti, Michigan. For additional information on the course contact Dr. Nicholas Raphael at (313)487-1480. For registration contact Eastern Michigan University, Continuing Education, Ypsilanti, MI 48197. (313)487-0407 (local) or toll free (800)777-3521.

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Confronting Environmental Challenges in a Changing World is this year's theme for the Twentieth Annual Conference of **The North American Association for Environmental Education** in cooperation with the Midwest Environmental Education Consortium. The conference will be held in St. Paul, Minnesota on September 27 to October 2, 1991. For registration and/or information contact NAAEE Conference Headquarters, P.O. Box 400, Troy, OH 45373. (513)698-6493.

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The Annual **Aquatic Toxicity Workshop** will be held in Ottawa, Ontario on September 30-October 3, 1991. Topics covered will range from contaminant transfer through biotic and abiotic means, population and community responses to stress, and the role of aquatic toxicology and contaminants in the Arctic. To receive more information on the workshop contact Dr. Margaret Taylor, Water Quality Branch, Environment Canada, Ottawa, ON K1A 0H3. ((819)953-1553.

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The **Environmental Resource Center** is conducting seminars on the latest PCB management regulations throughout the United States in 1991. This "how to" seminar will present the latest PCB notification and tracking requirements and cover proper procedures for PCB use, inspection, marking, risk analysis, reclassification, spill cleanup, storage, transportation and disposal. The seminar schedule includes Chicago, August 7; Milwaukee, August 20; Cleveland, September 3; and Indianapolis, November 15.

For further information or to register contact the Environmental Resource Center, 3679 Rosehill Road, Fayateville, NC 28311. (919)822-1172 or (800)537-2372).

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A national **Fisheries Byproducts Composting Conference** will be held October 21-23, 1991 in Madison, Wisconsin.

The purpose of the conference is to assemble information to compile a national reference manual for fisheries byproduct compost producers and users, agricultural agents, business people and others interested in fisheries byproduct compost as a market product or a means of waste disposal.

To receive further information write to Lynn Frederick, Wisconsin Sea Grant Advisory Services, Box 597, Sister Bay, WI 54234-0597.

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The Air and Waste Management Association, Michigan Chapter, and the Engineering Society of Detroit (ESD) have joined together to present **Air, Water and Waste Technologies, an environmental management conference**. The exposition will be held November 11-14, 1991 at Cobo Convention Center in Detroit, Michigan. Topics will address the problems and issues of environmental management and will provide a forum for engineers and policy makers to discuss the latest in techniques, equipment and regulatory compliance.

For program information contact ESD Conferences, 2350 Green Road, Suite 190, Ann Arbor, MI 48105 or send fax to (313)663-7835.

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The **Second International Zebra Mussel Research Conference**, sponsored by the Great Lakes Sea Grant Network, will be held at the Genesee Plaza Holiday Inn in Rochester, New York on November 19-22, 1991. Information resulting from research into the biology, impact and control of the zebra mussel in North American waters will be presented.

To receive further information on the conference, contact Zebra Mussel Research '91, New York Sea Grant, Hartwell Hall, SUNY College at Brockport, Brockport, NY 14420-2928. (716)395-2638.

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The **45th Annual Conference of the Canadian Water Resources Association** will be held in Kingston, Ontario, June 3-5, 1992. The theme is "Resolving Conflicts and Uncertainty in Water Management," and papers are invited in the area of watershed planning, user pay and market mechanisms, public involvement, and reducing uncertainty through monitoring.

For further information on the conference contact Dr. Dan Shrubsole, Department of Geography, Faculty of Social Science, University of Western Ontario, London, ON N6A 5C2. (519)679-2111 ext 5016.

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With the cooperation of the United Nations Office for Ocean Affairs and the Law of the Sea, an international conference on **Ocean Management in Global Change** will be held in Genoa, Italy on June 22-26, 1992. To receive further information write to Professor Adalberto Vallega at the University of Genova, Palazzo Serra Gerace, Via Sottoripa, 5, 16123 Genoa, Italy or telephone (10)284111, fax (10)292693.

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