Focus on International Joint Commission Activities

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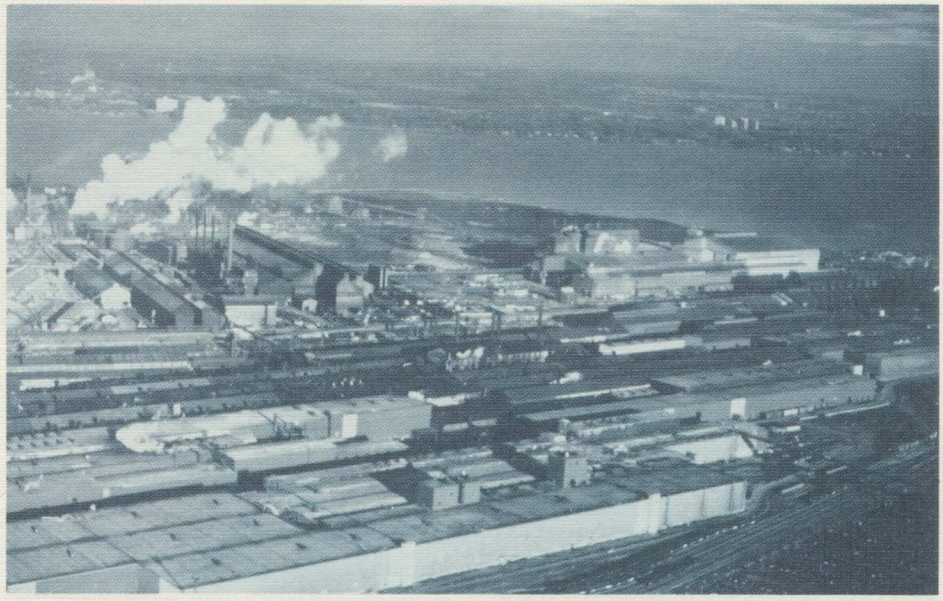
FOCUS
On International Joint Commission Activities

SIGNIFICANT PROGRESS IN RAP DEVELOPMENT AND WATER QUALITY RESTORATION FOR HAMILTON HARBOUR AREA OF CONCERN

by Keith Rodgers

Hamilton Harbour, a deep water port which supports the largest iron and steel industrial complex in Canada, receives runoff and waste effluent from its western rural area as well as the eastern urbanized region. A remedial action plan (RAP) team with representatives from Ontario's Ministries of the Environment, Natural Resources, and Agriculture and Food, Environment Canada, Royal Botanical Gardens and the Department of Fisheries and Oceans was formed in May 1986 to identify sources of pollution and steps and timetables in the remediation process, and to work closely with the community-wide stakeholder groups in developing and implementing the remedial action plan.

A milestone in the development of Hamilton Harbour's RAP was reached in April 1988, when the RAP writing team presented a major report on the condition of the harbour. Entitled *Goals, Problems and Options*, the report provides new information on fisheries and wildlife aspects which complements extensive water quality data previously gathered. It also outlines the harbour's problems in greater detail and presents an initial set of technical remedial measures that have been considered to attempt to reach specified loading reductions for the more common conventional pollutants, such as nutrients and suspended solids. These measures are being reviewed by stakeholders in order to provide advice to the writing team on the preferred remedial options.



An aerial view of Hamilton Harbour. Credit: Keith Rodgers

The writing team's experience in developing this information suggests a number of directions for future work. First, the earlier intensive water quality and benthos surveys have proved invaluable in tracing the response of the harbour to the substantial remedial programs already carried out over the past 20 years by industries and municipalities, at a cost of $300 million. It is essential to the RAP program that this monitoring work be continued.

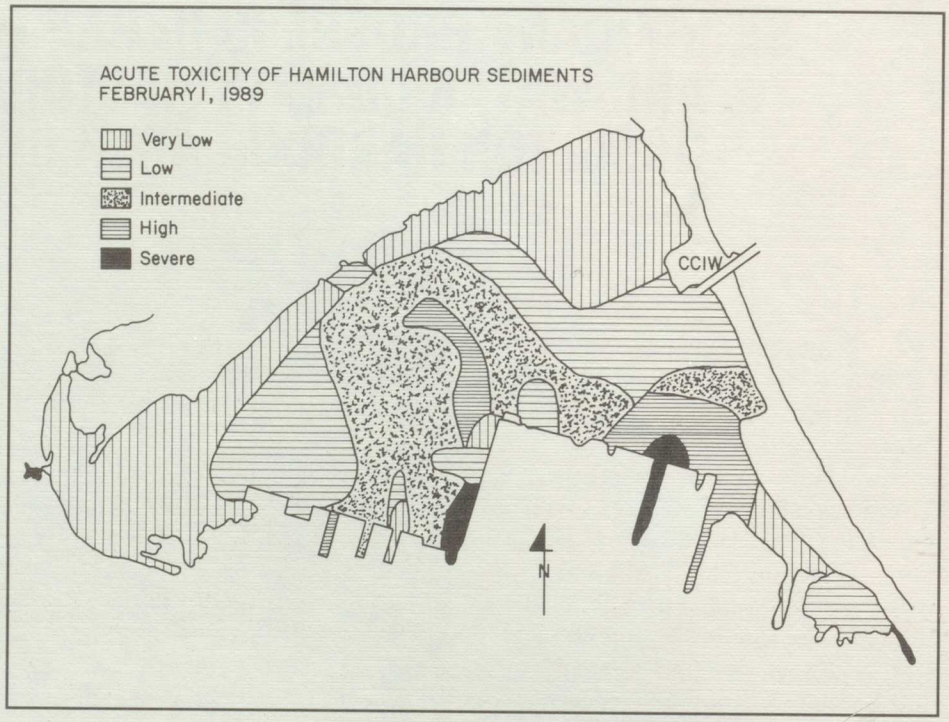
Inside...

Join us in Hamilton for the International Joint Commmission's Biennial Meeting on Great Lakes Water Quality and Public Meeting on Great Lakes Levels. See page nine.

Second, the intensive investigation and data review of the past two to three years have resulted in substantial advances in our understanding of the aquatic system that often comes only from the strong collaboration among investigators who seek to understand the entire system.

As a result of this interaction, the best quantitative links among factors affecting water quality, water clarity and the extent of submerged vegetative habitat have been identified; the extent of the effect of lake-harbour water exchange on surface water quality and low dissolved oxygen in the summer hypolimnion has been confirmed; and an intensive examination of contaminated sediment has been completed.

While the RAP team's attention has centered on the overall mass loading to the harbour (in order to prioritize the most effective points at which to exert source controls), it has also been necessary to examine some of the relatively smaller sources. Sensitive fish and wildlife habitat has been affected by smaller sources of nutrients or suspended solids in ways which are not in proportion to the extent of these loadings. This is important, because habitat is considered a key limitation in the development of a more desirable mix of biota, or maintaining adequate populations of fish, birds or animals in the harbour.



Toxic chemicals, whether currently being discharged to the harbour or present in bottom sediments, have also been a primary focus for the RAP team. Direct harbour industrial discharges that presently meet all control orders will be reviewed under the Municipal-Industrial Strategy for Abatement (MISA) program for best available and economically acceptable technology levels. Limnological work is now being directed toward assessing the level of contaminant loadings that must be met in order for future sediment deposits to meet required standards.

Full-scale testing to improve chemical treatment methods at the Woodward Avenue Sewage Treatment Plant (STP) — the largest STP discharging into the harbour — has led to a 50 percent reduction in phosphorus effluent concentrations, and substantial reductions in ammonia and suspended solid loadings as well. The relatively inexpensive methodology used to produce these reductions has become a permanent part of the plant's control program, and brings the plant's phosphorus discharge into compliance with the 0.5 mg/L standard established in the 1987 revision to the 1978 Great Lakes Water Quality Agreement.

Since this plant was the largest single source of phosphorus (56 percent) and ammonia (70 percent) to the harbour in 1987, the impact on harbour phosphorus and ammonia concentrations and consequent effects on algae and dissolved

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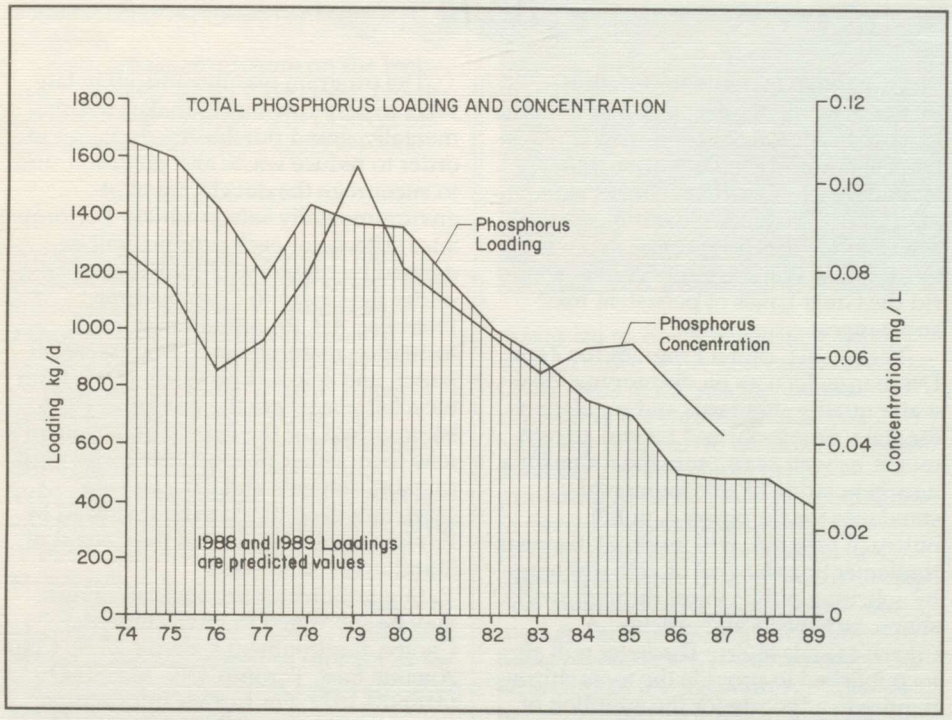

oxygen are being carefully monitored. This will allow the team to better gauge the potential benefits of further remedial measures to the plant, such as filters, which are far more expensive to implement.

It is significant to note that all industrial and municipal sewage treatment plant effluents in the Hamilton Harbour watershed are discharged into the harbour, and not into Lake Ontario. This has been a conscious decision by the municipal and regional authorities, a policy strongly supported by public meeting participants and by most of the RAP stakeholder group, which is working with the writing team to produce the RAP. The consequence of this policy is that the target loadings that are considered necessary to achieve the desired water quality conditions place a premium on applying best technology and on efficient and continuous operation of the improved STP processes, as well as on industrial effluent controls.

As tighter controls are placed on effluent concentrations, the potential for hydraulic overloading of combined sewer systems during storms and the breakdown of treatment processes have become important to address. Thus, for example, retention basins are being installed in combined sewer systems to collect the first (and worst) storm surge of combined stormwater/sewer waste, for release to the plant after the storm has passed. One of these facilities has addressed the source of 25 percent of the stormwater/sewer overflow, and plans and funding have been approved to build two additional retention basins that will substantially reduce combined sewer overflows in sensitive areas along the western section of the harbour. Further facilities are under study as a potential part of the broader pollution control plan for the region.

As sewage treatment plants and industrial effluent controls are upgraded to meet discharge limitations, the "human-machine" interface must be considered; we depend on the skill of the plant's operators to work with the new technology to come up with more efficient plant operations. They have significantly contributed to the development of the current technology and will need the best training and continued involvement to maintain this high level of performance.

Despite the various applications of best available technology to deal with point source pollution, improving and maintaining Hamilton Harbour's water quality conditions into the middle of the 21st century will be possible only if we tackle waste closer to its source. While diffuse sources such as erosion must certainly be dealt with, additional efforts to address waste management in the home may be necessary if the human population continues to increase in the region. Industries, too, will require innovation to recycle, avoid spills, or seek less hazardous substances to replace the toxic materials that they are now handling.

While we work together to develop Hamilton Harbour Remedial Action Plan reports on tight time schedules, it is increasingly evident that the RAP's development is and will be a continual process. Institutions must repeatedly renew progress toward our goals both on a technical level and in the broader consultation and commitment process.

This is not a "one-shot" deal.

For more information about progress on the remedial action plan for Hamilton Harbour, contact Keith Rodgers, National Water Research Institute, Canada Centre for Inland Waters, P.O. Box 5050, Burlington, ON L7R 4A6. (416)336-4888.

PUBLIC INPUT SOUGHT ON PROPOSED LISTING/ DELISTING CRITERIA FOR GREAT LAKES AREAS OF CONCERN

If this graphic and title looks familiar to you, good! An article and table outlining a proposed set of criteria for listing and delisting Areas of Concern were included as a center supplement in the last issue of *Focus*, and we asked for your comments in order to develop the most comprehensive set of criteria possible.

Because of the importance of public input into these criteria, we have extended the deadline for submission of all comments to **MONDAY, JULY 31, 1989**. We look forward to receiving all interested persons' comments, and encourage you to submit your thoughts to:

John Hartig
International Joint Commission
100 Ouellette Avenue
Eighth Floor
Windsor, ON
N9A 6T3
or
P.O. Box 32869
Detroit, MI 48232

BRIEFS

The Canadian Institute for Environmental Law and Policy, together with the National Wildlife Federation, have launched a study to determine if the United States, Canadian, Great Lakes States and Provincial Governments can achieve the goals established under the Great Lakes Water Quality Agreement to rid the Great Lakes of persistent toxic substances.

The project, called **Program for Zero Discharge,** focuses on developing ideal water quality standards and regulations for state, provincial and federal governments, as well as recommendations for a new generation of environmental standards for the basin. A public outreach program will involve citizens in implementing the goal of zero discharge by soliciting public input through workshops, fact sheets and articles. A *Citizen's Guide to Zero Discharge* will also be published to provide the tools citizens require to advocate for the adoption of the program's recommendations by governments.

For more information contact Paul Muldoon at the Canadian Institute for Environmental Law and Policy, 243 Queen Street West, Fourth floor, Toronto, ON M5V 1Z4, telephone (416)977-2410 or Tim Eder, National Wildlife Federation, 802 Monroe, Ann Arbor, MI 48104. (313)769-3351.

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Purchasing products that bear the **Environmental Choice** logo will give Canadians an opportunity to improve the quality of their environment in 1989. The logo, three birds entwined to form a stylized maple leaf, represents the three sectors of society — consumer, industry and government — that can work together to improve the quality of Canada's environment.

The program was introduced in late 1988, to help consumers make environmentally sound purchasing decisions in order to reduce waste and pollution, and to encourage the development of environmentally safe products. Performance criteria for each product will be defined by category in guidelines issued under the *Canadian Environmental Protection Act*. Re-refined motor oil, insulation material made from recycled paper, and selected products made from recycled plastic are the first products to be proposed for the federal government's new logo. Other product categories such as paint, solvents and dry cleaning services will continue to be reviewed by Environment Canada and the Canadian Standards Association.

Suggestions for product categories may be submitted to Environmental Choice, Environment Canada, 25 St. Clair Avenue East, Toronto, ON M4T 1M2. (416)973-1072. For further information contact Robin Haighton at the Canadian Standards Association (416)747-4017 or Bettylynn Stoops at Environment Canada (819)994-0744.

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The continued revitalization of the Great Lakes depends on increasing the amount of US federal funding for pollution control and continued research, according to a report released by the Northeast-Midwest Institute. The report is supported by a coalition of Great Lakes organizations, who used the study in early April as a basis for urging Senate and House Appropriations Committees to increase funding for key Great Lakes programs. The study found that federal funding for Great Lakes protection initiatives has declined by 28 percent since 1980. Funding for construction grants for the region has declined by 51 percent.

The report recommends, among other things, full funding of the US Environmental Protection Agency (EPA) Great Lakes National Program Office, increased funding to Great Lakes states for US EPA matching sewage treatment plant construction grants and enforcement grants, and new funding to develop

a nonchemical sea lamprey control program.

For further information on the Institute's report, contact Cate Leger, Northeast-Midwest Institute, 218 D Street SE, Washington, DC 20003. (202)544-5200.

* * * * *

Awards, job changes, and new faces highlight recent news in the Great Lakes community. **Valdus V. Adamkus**, administrator of US Environmental Protection Agency Region V and co-chairperson of the IJC's Great Lakes Water Quality Board (WQB), was awarded an honorary doctor of philosophy degree from the University of Vilnius in Lithuania on April 1, 1989 in recognition of his long-standing involvement in international environmental protection.

J.D. Snyder, previously an advisor to Michigan's Governor James J. Blanchard, was recently appointed as director of the State's Office of the Great Lakes and state water administrator.

Finally, Great Lakes United named **Philip E. Weller** executive director of the binational citizen coalition organization in early May 1989. Weller previously worked as research associate with the Great Lakes Ecosystem Rehabilitation Network and as coordinator of the Royal Society of Canada's binational review of the Great Lakes Water Quality Agreement. He has just completed his third book, which describes the status and history of the Great Lakes environment.

* * * * *

Recycling of municipal waste is increasingly becoming a part of Canada and the United States' strategy to reduce waste production and the use of landfills. Most of the Great Lakes states and provinces are developing and proposing individualized strategies; we highlight two of them for you here. In Ontario, for example, the province has developed a strategy to transfer 25 percent of its household and commercial-industrial waste into reusable materials by 1992, and 50 percent by 2000. In order to accomplish this, the provincial government will revise its purchasing policies to support recycled product markets, restrict the use of other products, and

maximize recovery of reusable goods such as office paper and cafeteria wastes. Other steps in the strategy include expanding the consumer blue-box recycling program to include apartment dwellers and additional products; providing funds to assist municipalities in developing and expanding composting programs; organization of a research advisory committee to develop new and innovative technologies and markets; and introducing legislation to make recycling activities mandatory for all sectors of the community. Total costs to the province in order to meet the 50 percent goal are estimated at $225 million.

Wisconsin's Legislative Council Special Study Committee on Solid Waste Management has drafted proposals for consideration by the state legislature. Highlights of the proposal include a ban on the sale of polystyrene foam, steel and aluminum food or beverage containers, polyvinyl chloride and plastic bag containers used by retail stores for the carrying of purchases; eliminating all landfilling of aluminum, glass, yard waste, newspapers and eight other items; a one-cent per package advance disposal fee to provide funding for community recycling programs; and developing educational programs and materials for all age levels. Public hearings will be held on the proposals this summer, sent to the state Senate this fall, and are expected to reach the Assembly floor early in 1990.

For more information on Ontario's program, contact the Waste Management Branch at (416)323-5194 or the Communications Branch at (416)323-4622. To obtain a copy of Wisconsin's recycling proposal, contact the Legislative Council, 147 North, State Capitol, Madison, WI 53702. (608)266-1304. To find out if your state is developing similar programs, contact the solid waste divisions of the departments of natural resources or environmental protection.

* * * * *

Activities to date under the *Municipal/Industrial Strategy for Abatement (MISA)* have resulted in new proposed monitoring regulations for the petroleum refining, organic chemicals manufacturing, and iron and steel industries. Monitoring regulations are expected to be proposed for all remaining industrial sectors by the end of 1989, including pulp and paper companies, mining, inorganic chemical producers, metal casting, electric power generating and industrial minerals industries. A regulation requiring monitoring of all municipal sewage treatment plant discharges is expected in early 1990.

The seven companies governed by the petroleum refining sector have completed approximately six months of monitoring, which includes collection and analysis of samples for conventional pollutants and toxic contaminants. Ontario's 19 organic chemical manufacturing companies, seven iron and steel producers, 27 pulp and paper mills, and 22 inorganic chemical plants will begin monitoring of direct discharges in late 1989. Monitoring of discharges from companies within the remaining industrial sectors and from municipal sewage treatment plants will begin in 1990.

Stringent discharge limits have also been set by MISA for Ontario's nine kraft mills, which discharge an estimated 200 tonnes of chlorinated organic compounds daily. New control orders will be issued in July 1989 which require daily and monthly monitoring of kraft mill effluents in an effort to improve effluent quality before the MISA abatement regulation for the pulp and paper sector becomes law in 1991.

For more information, contact the Ontario Ministry of the Environment, 135 St. Clair Avenue West, Toronto, ON M4V 1K6. (416)323-4648.

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Instructional software to illustrate toxic chemicals and their effects has been developed at Cornell University. The self-paced program, **Toxicology and Public Health: Understanding Chemical Exposure**, gives users the equivalent of an intensive, three-day continuing education course. It covers the principles of toxicology on an IBM PC/XT compatible computer with enhanced graphics and uses animation, simulations and interactive exercises to explain chemicals' routes of entry into the body, health effects, risk assessment and management.

To borrow a demonstration disk or order the program, contact Richard Gray, Cornell University, Audio Visual Center, 8 Research Park, Ithaca, NY 14850. (607)255-2091.

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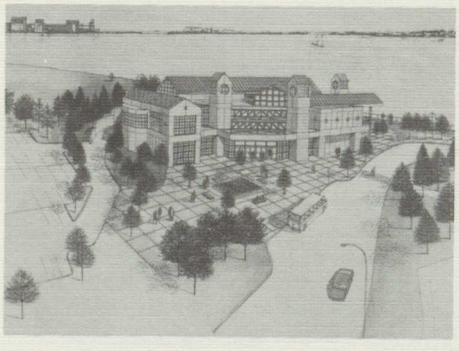

Plans have been unveiled by a group of Minnesotans dedicated to increasing public understanding of freshwater for a $20 million complex called the **Lake Superior Center** to be built on the waterfront at Duluth, the Great Lakes' westernmost harbor. In addition to presenting living and interpretive exhibits, the center will sponsor programs to discuss and resolve issues affecting freshwater resources.

If you wish to receive further information on the Center, please contact Bob Bruce, Lake Superior Center, 353 Harbor Drive, Duluth, MN 55802. (218)720-3033.

* * * * *

In early May, the US Environmental Protection Agency proposed limits on 38 types of cancer-causing chemicals and other pollutants found in drinking water. Under the new regulations, the chemicals will be monitored and kept below certain levels in all public drinking water. The proposed standards cover 17 pesticides used in agriculture, 11 synthetic organic chemicals found to cause health problems, eight inorganic chemicals including asbestos, mercury, cadmium, nitrates and nitrites and two chemicals used to treat drinking water.

* * * * *

An important question in the development and implementation of remedial action plans for Great Lakes Areas of Concern is, "How can we creatively finance RAPs?" One innovative approach has been adopted for Saginaw Bay, Michigan. The Saginaw Basin Alliance has been established as a nonprofit organization which can accept financial contributions from foundations, industries, businesses and individuals in support of public information, education and research projects. This could be an important mechanism to fund the approximately 50 studies underway in the Saginaw River/Bay RAP.

For more information contact Richard Moore, East Central Planning and Development Commission, 500 Federal Building, P.O. Box 930, Saginaw, MI 48606. (517)752-0100.

* * * * *

NIMBI: Now I Must Become Involved is the title for the launch and celebration of the educational and research vessel NIMBI, a unique way for children and adults to learn about the Great Lakes. The 40-foot steel research tug offers an opportunity to be on the lakes, test the water quality and develop a sense of what the lakes are and why they need to be protected.

For more information on NIMBI contact Pat Hayes-Potter, The Environmental Hazards Team, R. R. #7, Dunnville, ON N1A 2W6. (416)774-4769.

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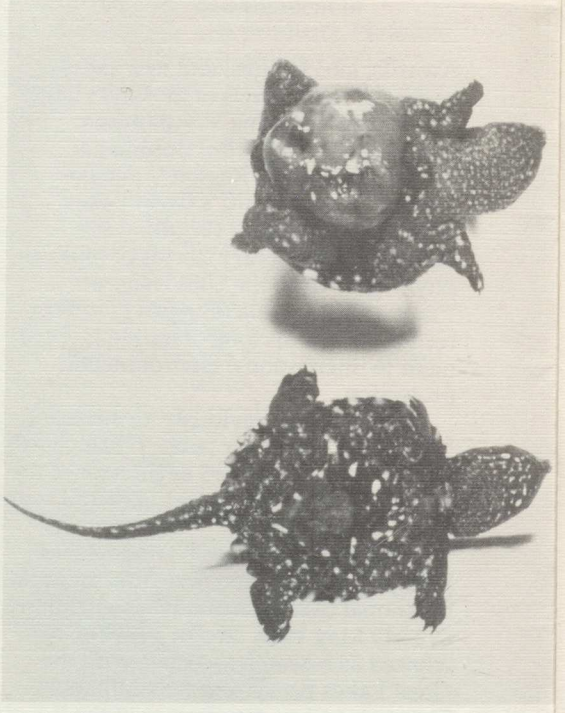

Embryonic deformities in snapping turtles contaminated with PCBs. Credit: Christine Bishop

"How do environmental scientists prove that a chemical caused an observed effect in wild populations of organisms? This question has been puzzling scientists and administrators for years ..."

LINKAGES BETWEEN TOXICS AND HEALTH EFFECTS PRESENTED AT IJC WORKSHOP

by Michael Gilbertson

How do environmental scientists prove that a chemical caused an observed effect in wild populations of organisms? This question has been puzzling scientists and administrators for years, and was the question posed at the Council of Great Lakes Research Managers' workshop hosted by the International Joint Commission (IJC) in Chicago on April 28-29, 1989.

While this issue is not new to human health specialists or epidemiologists, who have developed a set of criteria to test their ideas and evidence for a variety of diseases, the concept of applying the criteria to fish and wildlife diseases is new. Specific criteria were used by each speaker at the workshop to discuss evidence linking chemicals found in the Great Lakes to effects found in fish, wildlife and human populations.

The Criteria

In the workshop's introductory session, Glen Fox of the Canadian Wildlife Service in Ottawa, Ontario reviewed the specific criteria with the workshop participants. The first criterion used is known as *time order*: can we show that the effect only occurred after exposure to the suspected chemical and did not occur beforehand? This seems obvious, but often it is very difficult to show which happened first. When chemical pollution of the Great Lakes reached its highest levels in the 1960s, few researchers were looking at fish and wildlife populations. As a result, part of scientists' work has been to laboriously reconstruct a history of when the effects occurred and when the suspected chemical was released.

The second criterion is *strength of association*, and relates to how often the effect is seen in the populations exposed to the suspected chemical compared to the frequency in the unexposed population.

Some chemicals cause very specific effects and some effects are only caused by specific chemicals. These questions are addressed in the third criterion, known as *specificity*. Further, does the effect still occur when populations are exposed in different places and at different times? Are other related species also affected when they are exposed? These aspects are considered under the *consistency on replication* criterion.

The final criterion is *coherence*. Does the supposed causal linkage make biological sense? Does it fit with existing biological facts and theory, and is there a plausible biological mechanism for the observed effect?

If the evidence linking a relationship between an observed effect and a suspected chemical holds up for these five criteria, there is a strong inference that the chemical caused the effect. However, a strong inference does not mean that the link has been proven. In the end, each person has to consider whether or not they believe the link to be true. Finally, if they believe it, do they believe it enough to do anything about it?

The Case Studies

The workshop was organized according to case studies on species at various levels of the food chain. Paul Baumann of the U.S. Fish and Wildlife Service, Columbus, Ohio presented evidence linking liver tumors in brown bullhead fish to cancer-causing chemicals from soot and tars released from steel-making operations. Michael Mac of the US Fish and Wildlife Service in Ann Arbor, Michigan reported on the linkage between embryo and fry mortality in Lake Michigan lake trout and the presence of two polychlorinated biphenyls, or PCBs, which act like dioxins.

For case studies on birds, Theo Colborn of the Conservation Foundation in Washington, DC described the demise and recovery of the bald eagle population in the Great Lakes basin and the relationship to organochlorine compounds; specifically, dieldrin-induced mortality of adult eagles and embryonic mortality from dichlorodiphenyltrichloroethane (DDT). A joint paper was presented by Michael Gilbertson of the IJC's Great Lakes Regional Office, Tim Kubiak of the US Fish and Wildlife Service in East Lansing, Michigan and Jim Ludwig of Environmental Research Station in Bay City, Michigan. The review linked outbreaks of chick-edema disease (excess fluid accumulation) in embryos of Lake Ontario herring gulls to 2,3,7,8-TCDD, and in embryos of Forster's terns nesting near Green Bay, Wisconsin to two dioxin-like PCBs.

The evidence linking embryonic

Theo Colborn, Glen Fox, Jim Ludwig and Tim Kubiak discuss the implications of toxic contaminants on the Great Lakes bird species.

deformities and mortality observed in certain snapping turtle populations contaminated with PCBs was discussed by Christine Bishop of the Canadian Wildlife Service in Burlington, Ontario. Christopher Wren of B.A.R. Environmental, Guelph, Ontario reported the results of mink and otter trapping data to correlate population declines to exposure to chemicals from the Great Lakes.

Finally, Wayland Swain of ELI Eco Logic Inc. in Ann Arbor, Michigan presented results of epidemiological studies that relate decreases in infant birth weight, size and behavioral deficiencies to the PCB-contaminated Lake Michigan lake trout the childbearing women ate before pregnancy.

The Implications

The workshop presentations demonstrated the value of the five criteria as a valid way to discuss case histories in wild populations as well as in humans. The presentations also showed that, for many of the case studies, vital pieces of information simply do not exist. As a result, the Council has recommended to the Commission that all future research programs on persistent toxic substances be designed using these five criteria.

Despite the shortcomings of the information, a pattern gradually became evident over the course of the workshop. Most of the speakers described changes in the studied populations' reproduction, and most were able to link the changes to persistent toxic substances such as DDT, dieldrin, PCB or 2,3,7,8-dioxin. If reproduction of organisms is impaired, it does not take long for population changes to occur. In the case of liver cancer in brown bullheads, this was attributed to polynuclear aromatic hydrocarbons (PAHs).

Together, these studies imply that the presence of persistent toxic substances in the Great Lakes has caused significant effects on the reproduction and survival of populations of fish and wildlife. These findings are a warning for humans, and the studies on infants of western Michigan mothers that ate fish confirm the risks posed to humans by persistent toxic substances in the Great Lakes.

The Future

Though the concentrations and diversity of chemicals in the Great Lakes have declined during the past 20 years, locations such as Hamilton Harbour, Ontario, Saginaw Bay, Michigan and Green Bay in Wisconsin remain seriously polluted. Despite these improvements, the levels of some of the persistent toxic substances such as DDT, dieldrin and PCB are still too high in many of the Great Lakes to permit reestablishment of top predators such as bald eagles and lake trout.

The Council of Great Lakes Research Managers will host another workshop in September 1989 in order for scientists to develop research priorities. The findings from the March 1989 workshop will undoubtedly constitute a prominent part of the discussions. These findings will also be presented to the IJC at its Biennial Meeting on Great Lakes Water Quality to be held in Hamilton, Ontario from October 11 to 14, 1989.

Finally, the findings form tangible evidence that, even though further controls on persistent toxic substances will cost billions of dollars, we must provide the money, time and resources in order to protect not only fish and wildlife resources, but also future human generations.

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All Interested Citizens Are Invited to Attend
The International Joint Commission's
1989 Biennial Meeting on
Great Lakes Water Quality
October 11-13, 1989

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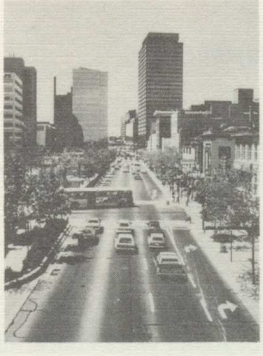
and a Public Meeting on Great Lakes Levels
October 14, 1989 in Hamilton, Ontario



On behalf of the **International Joint Commission**, it is our pleasure to invite you to attend the 1989 Biennial Meeting to be held at the Hamilton Convention Centre from Wednesday, October 11 through Friday, October 13, 1989 and a Public Meeting on Great Lakes Levels on Saturday, October 14, 1989.

The Biennial Meeting provides the opportunity for the public to be present during the formal presentations of the two Great Lakes advisory boards' reports to the Commission. Valuable information will be provided on the status of the Great Lakes Basin Ecosystem to all interested participants through presentations of the reports of the Great Lakes Water Quality and Science Advisory Boards, and through three concurrent workshops on Friday morning. We also look forward to hearing meeting participants' views on the status of progress under the Great Lakes Water Quality Agreement on Thursday afternoon and evening. Saturday afternoon will be devoted to discussing issues related to Great Lakes fluctuating levels.

We encourage your participation in this year's meeting, and ask that you complete the enclosed registration form at your earliest convenience.

We look forward to seeing you in Hamilton.

E. Davie Fulton
Acting Canadian Chairman

Robert C. McEwen
United States Chairman

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BIENNIAL MEETING PROGRAM

Wednesday, October 11

12:00 p.m. - 9:00 p.m. *Registration*
7:00 p.m. - 9:00 p.m. *Opening Reception and Welcome from the Commission*

Thursday, October 12

8:45 a.m. - 12:00 p.m. *Plenary Session*

- Opening Comments by the Commission
- Presentation and Commission discussion of the 1989 Report of the Great Lakes Water Quality Board
- Presentation and Commission discussion of the 1989 Report of the Great Lakes Science Advisory Board

12:15 p.m. - 2:00 p.m. *Formal Luncheon*
*2:00 p.m. - 5:00 p.m. *Public Presentations and Discussion Session*
5:00 p.m. - 7:00 p.m. *Dinner, on your own*
*7:00 p.m. *Public Presentations and Discussion Session Continues*

**At least six hours have been reserved to provide the opportunity for the public to be heard, beginning with meeting participants who have submitted written statements to the Commission in advance of the meeting or by noon on Thursday, October 12. Statements and questions from the floor will follow those with prepared remarks. Audio-visual equipment can be made available to assist presenters if requested in advance.*

Friday, October 13

9:00 a.m. - 12:00 p.m. *Concurrent Workshops*

- **Human Health in the Great Lakes Basin Ecosystem**

The Human Health workshop will review the results of recent work concerning the exposure to and impacts of toxic chemicals on animal and human poulations, with a view to discussing possible human health, research and related policy implications.

- **Remedial Action Plans — Progress and Prospects**

This workshop will assess the successes and obstacles to progress in RAPs with emphasis on the Hamilton Harbour RAP, and a brief review of the New York, Ohio, and Wisconsin RAPs. Discussion will focus on developing recommendations for overcoming potential obstacles.

- **Towards a Sustainable Future for the Great Lakes**

The session will begin with an overview of trends that can be expected to stress the Great Lakes ecosystem, together with concepts and strategies that may lead to a more sustainable future for Great Lakes resources. These trends will be applied to three specific topics in breakout discussions: energy use, waste minimization, and agricultural chemicals.

12:00 p.m. - 1:00 p.m. *Informal luncheon buffet*
1:00 p.m. - 3:00 p.m. *Plenary Session*
Workshop Summaries and Recommendations
Questions from the Audience, Concluding Remarks
3:00 p.m. - 6:00 p.m. *Hamilton Harbour Cruise/Visit to Canada Centre for Inland Waters*
6:00 p.m. - 7:30 p.m. *Barbeque Dinner at Hamilton Harbour*

Saturday, October 14

1:00 p.m. - 5:00 p.m. *Public Meeting on Great Lakes Levels*

Several concurrent activities to the Biennial Meeting are being scheduled, including a Great Lakes Awareness Program for students in the Hamilton region, as well as citizen organization meetings and other special events. For more information about the Biennial Meeting or related events, please contact Sally Cole-Misch, Public Affairs Officer, International Joint Commission, 100 Ouellette Avenue, Eighth floor, Windsor, ON N9A 6T3 or P.O. Box 32869, Detroit, MI 48232. Call (519)256-7821 in Canada or (313)226-2170 in the US.
Ce formulaire est aussi disponible en français.

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Commission mixte internationale

ANNUAL REPORTS REQUEST FORM

The following reports will be produced during 1989 and 1990, and can be sent to you when they become available. Great Lakes Water Quality and Science Advisory Board reports will be sent by September 10, 1989 to all Biennial Meeting participants who register by ***FRIDAY, SEPTEMBER 1, 1989****.*

I would like to receive the following reports:

____ 1989 Report on Great Lakes Water Quality
- ____ French ____ English
- ____ Full report ____ Executive Summary only

____ 1989 Report on Great Lakes Water Quality, Appendix A: Progress in Developing Remedial Action Plans for Areas of Concern in the Great Lakes Basin

____ 1989 Report of the Science Advisory Board
- ____ French ____ English
- ____ Full report ____ Executive Summary only

The following technical reports will be printed in limited quantities only, and requests will be filled as the report becomes available.

____ Proceedings of the Human Machine Interface: Workshop III on Spills Database Management in the Great Lakes
____ Proceedings of the Workshop on Cause-Effect Linkages
____ Proceedings of the Technology Transfer Symposium for the Remediation of Contaminated Sediments in the Great Lakes
____ Proceedings of a Workshop on *In vitro* Assessment of Contaminated Sediments for Potential Carcinogenicity
____ Municipal Pretreatment Task Force Report
____ Atmospheric Deposition Monitoring Task Force Report
____ Toward an Ethic for the Great Lakes Basin Ecosystem
____ Public Participation and Remedial Action Plans: An Overview of Approaches, Activities and Issues

Limited supplies of some reports published prior to 1989 are still available. Again, many are technical documents and may have limited use to the general reader. Please mark any reports you wish to receive, and all requests will be filled on a first come, first served basis.

____ Procedures for the Assessment of Contaminated Sediment Problems in the Great Lakes, 1988
____ Options for Remediation of Contaminated Sediments in the Great Lakes, 1988
____ Mass Balancing of Toxic Chemicals in the Great Lakes: The Role of Atmospheric Deposition, 1988
____ Report on Modeling the Loading Concentration Relationship for Critical Pollutants in the Great Lakes, 1988
____ A Review of Lake Ontario Water Quality with Emphasis on the 1981-1982 Intensive Years, 1988
____ 1987 Report on Great Lakes Water Quality, Main Report
____ 1987 Report on Great Lakes Water Quality, Appendix A
____ 1987 Report of the Great Lakes Science Advisory Board
____ International Joint Commission Third Biennial Report, 1986
____ Lake Huron 1980 Intensive Survey Report, 1986
____ Uses, Abuses and Future of Great Lakes Modeling, 1986
____ Literature Review of the Effects of Persistent Toxic Substances on Great Lakes Biota, 1986
____ Summary Report of the Workshop on Great Lakes Atmospheric Deposition, 1986
____ Committee on the Assessment of Human Health Effects of Great Lakes Water Quality, 1986
____ 1985 Annual Report of the Aquatic Ecosystems Objectives Committee
____ A Review of Trends in Lake Erie Water Quality with Emphasis on the 1978-1979 Intensive Survey, 1985
____ Multi-Institutional Management: The Green Bay Experience, 1985
____ A Conceptual Approach for the Application of Biological Indicators of Ecosystem Quality in the Great Lakes, 1985
____ A Study Proposal for Assessing Potential for Great Lakes Contamination via Groundwater, 1985
____ PCBs: A Case Study, 1985

Please send the above reports as marked to:

NAME _____

ADDRESS _____

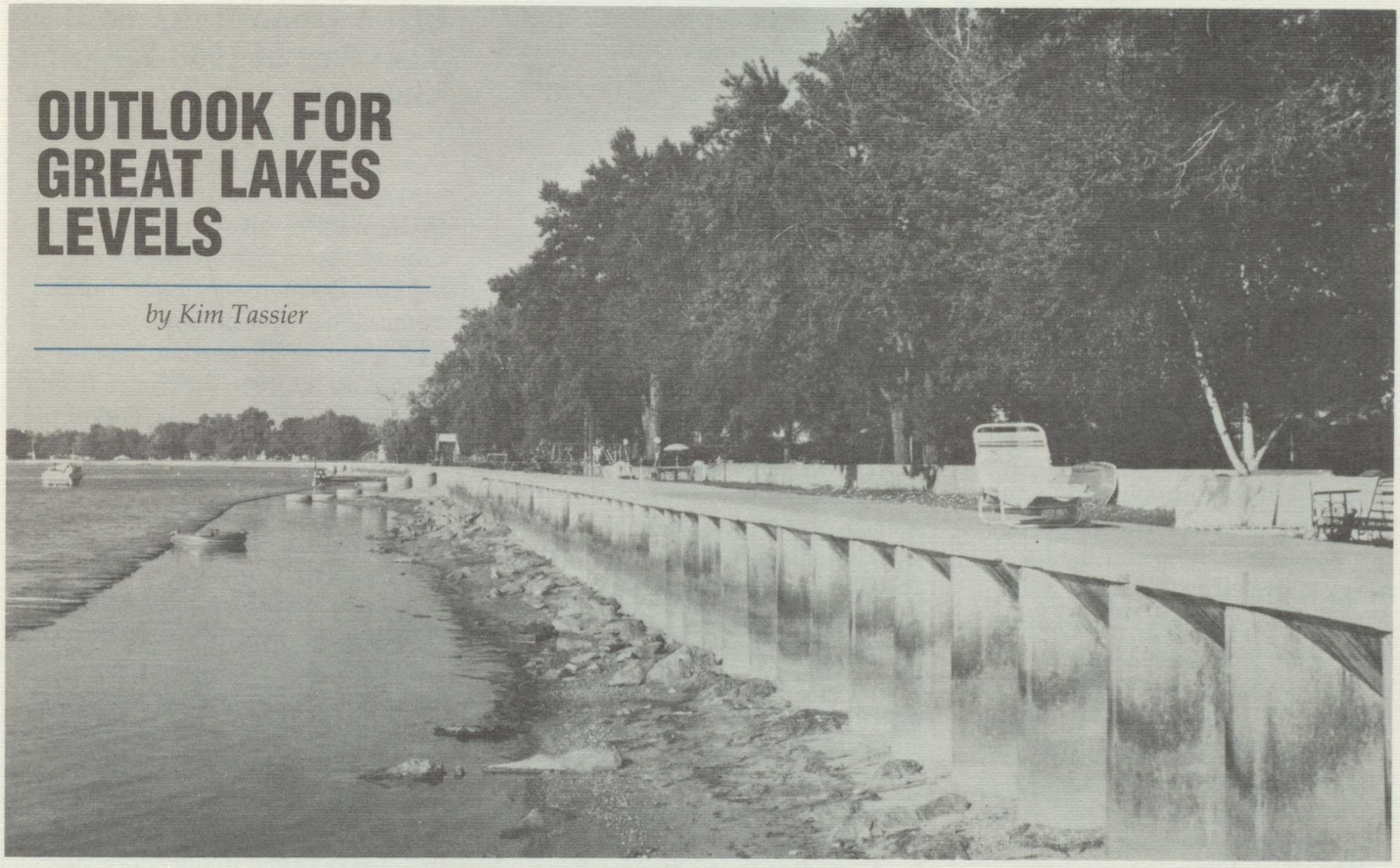
CITY, STATE/PROVINCE _____ ZIP/POSTAL CODE _____

TELEPHONE NUMBER(S) (office) _____ (home) _____

LAKE LEVELS UPDATE

OUTLOOK FOR GREAT LAKES LEVELS

by Kim Tassier



Protective seawalls built during the high water levels of 1986 separate homes from lower lake levels in 1989. Credit: Frank Bevacqua

After three years of near or actual recordbreaking high water levels, Great Lakes users and residents can expect to experience a second summer of near-average levels, barring any extremely unusual weather conditions. Some view this drop in lake levels as good, others are not as pleased. Shoreline property owners can again enjoy their beaches and breathe a sigh of relief, as long as violent storms do not occur. Boaters, who may have grown accustomed to the high water levels of the eighties, must now beware of recently exposed rocks, shoals and shallow slips. Again the lakes show they are a dynamic, ever-changing system.

Many recreational boaters and marina operators contacted the Great Lakes Water Levels Communication Centre in Burlington, Ontario this spring for information on what to expect in the way of summer water levels. Centre Director Ralph Moulton has advised that no significant problems are foreseen for the next few months, and Lake Ontario boaters should have a much better summer due to substantially higher levels.

The driving forces of change for Great Lakes water levels are natural, and not of human design. Precipitation over the entire Great Lakes watershed plays the major role in determining how high or low water levels will be. The evaporation rate, dependent on temperature and wind, also is a factor. In extremely wet periods, such as in the autumn of 1985 and much of 1986, water levels rose. Last year's hot, dry spring and summer contributed to a substantial drop in water levels in all the lakes, just as surface water levels dropped in all other drought-affected areas in North America last summer. These drastic shifts in basin weather conditions have lowered water levels from the record highs of 1986 on all the lakes, ranging from a reduction of 16 inches (40 cm) on Lake Superior to 33 inches (80 cm) on Lake Michigan-Huron.

The changes in lake levels and their effects might be easier to deal with if residents could receive advance notice of what to expect

LAKE LEVELS UPDATE

over a long period of time. Unfortunately, the ability to predict weather with some accuracy is limited to about five to six days, according to Dr. Frank Quinn of the Great Lakes Environmental Research Laboratory in Ann Arbor, Michigan.

What is certain is that the lakes are presently at or within a few inches above or below their long-term average levels, according to Ron Wilshaw of the US Army Corps of Engineers in Detroit, Michigan. When compared with last May, all but two of the lakes are lower, due primarily to a relatively mild winter with little snowfall. The Lake Superior watershed, however, had a heavy snowfall and, despite a dry April, was six inches (15 cm) above last year's level. Lake Ontario owes its four-inch (10 cm) rise above May 1988 levels to the attempt by the St. Lawrence Board of Control to bring the lake level up to long-term average by reducing the flow out of the lake. Montreal Harbour is significantly above last year's summer levels, according to Moulton. Harbour levels increased by approximately 20 inches (52 cm) in the beginning of May, probably as a result of the increased snowmelt flows from the Ottawa River.

Even though current water levels are close to average, they may be perceived as low to people who had grown accustomed to the high levels of the past decade, Wilshaw noted. While the extreme high water levels create more dramatic and serious problems for some Great Lakes users, especially shoreline property owners, the lower lake levels seem to be more aggravating for other interests, such as recreational boaters.

As for shipping, the water levels in most connecting channels are still well above their design depths. The exception is the upper St. Marys River, however, where water levels are nearing this design depth. This occurs whenever the Lake Superior's level nears the 600-foot (180 m) mark, which results in the St. Marys shipping channel nearing its minimum design depth of 27.5 feet (8.4 m).

Predictions by the US Army Corps of Engineers for lake levels for the coming months are based, in part, on the precipitation received during this past winter and spring, on historical trends, and on the projected weather outlook. Precipitation over much of the Great Lakes watershed, except for the Lake Superior area, was low during the 1988-89 winter. The cool, wet spring may have evened the score somewhat. Most of the farmers in the area Wilshaw has talked with have recovered from last year's drought, but note that conditions remain slightly on the dry side.

According to the National Weather Service office in Ann Arbor, Michigan, cooler and wetter than normal conditions should predominate through mid-summer. In light of these factors, the US Army Corps of Engineers has predicted that levels in all lakes will remain near their long-term averages through the summer and into early fall.

Water Quantity Issues Also Part of 1989 Biennial Meeting

The final day of the IJC's 1989 Biennial Meeting, Saturday, October 14, 1989, will focus on issues related to Great Lakes levels, including the Commission's Great Lakes Fluctuating Levels Reference Study. Public discussion and comments will be welcomed on the work to be conducted on the 1986 Reference from October 1989 through the end of the study in late 1991. Meeting participants will include Levels Reference Study team members, interest group representatives, and basin agency and municipal officials.

All interested persons from the Great Lakes - St. Lawrence River basin are invited to attend the meeting site in Hamilton or to view the proceedings from their homes, via cable or public broadcasting television stations. Toll-free telephone lines will be made available to viewers to call in questions or comments to the Hamilton meeting.

For further information and logistical details, contact Kim Tassier at the Great Lakes Regional Office of the International Joint Commission. In the U.S.: P.O. Box 32869, Detroit, Michigan 48232, (313) 226-2170; in Canada: 100 Ouellette Avenue, Eighth floor, Windsor, ON N9A 6T3, (519)/256-7821.

LAKE LEVELS UPDATE

1989 GREAT LAKES LEVELS

Lake	Recorded	Level Max/Year	Min/Year	Long-Term Average (1900-1988)
		FEBRUARY		
Superior	600.25	601.38/1986	598.37/1926	600.18
Michigan-Huron	577.80	580.36/1986	575.44/1964	577.88
St. Clair	573.64	576.17/1986	569.88/1926	572.57
Erie	570.47	572.85/1986	567.49/1936	569.97
Ontario	243.66	246.46/1952	241.59/1936	244.16
		MARCH		
Superior	600.07	601.31/1986	598.32/1926	600.05
Michigan-Huron	577.77	580.40/1986	575.35/1964	577.93
St. Clair	573.39	576.17/1986	570.41/1934	572.99
Erie	570.53	573.11/1986	567.65/1934	570.23
Ontario	243.55	246.77/1952	242.08/1935	244.43
		APRIL		
Superior	600.16	601.49/1986	598.23/1926	600.09
Michigan-Huron	578.05	580.75/1986	575.36/1964	578.19
St. Clair	573.87	576.21/1986	571.09/1901	573.53
Erie	571.05	573.46/1985	568.20/1934	570.78
Ontario	244.56	247.69/1973	242.38/1935	245.10
		MAY		
Superior	600.42	601.72/1986	598.30/1926	600.43
Michigan-Huron	578.18	580.89/1986	575.79/1964	578.50
St. Clair	573.99	576.25/1986	571.64/1934	573.82
Erie	571.29	573.43/1986	568.43/1934	571.06
Ontario	245.51	247.95/1952	242.67/1935	245.50

Progress Report on Reference Completed by PMT

As this issue of *Focus* goes to press, the Commission is awaiting receipt of reports from the Project Management Team (PMT), including its functional groups, on the status of work completed thus far under the Commission's Great Lakes - St. Lawrence River Fluctuating Levels Reference Study. Seven annexes, which detail the work completed and data gathered on a variety of topics by the PMT's five functional groups, will be submitted to the Commission along with the overview progress report.

The Commission will distribute the overview progress report and executive summaries of the annexes to all interested citizens for review and comment. In addition, all reports will be transmitted to both federal governments to apprise them of the status of the reference study. All public comments will be used by the Commission in preparing any additional advice to the federal governments, and in directing the second phase of the reference study. A detailed public comment process will be announced as the overview progress report and annexes are released, currently anticipated for the end of July.

A complete set of reports will be placed in several libraries or similar locations around the Great Lakes basin. To obtain a list of these locations, or to request copies of the reports, contact Alan Clarke, International Joint Commission, 100 Metcalfe, 18th floor, Ottawa, ON K1P 5M1, telephone (613)995-2984. In the US, contact Frank Bevacqua, International Joint Commission, 2001 S Street N.W., Washington, DC 20440. (202)673-6222.

BOOKSHELF

The following two reports are available for distribution from the International Joint Commission's Great Lakes Regional Office:

It took two years and more than 850 pages to pull together all the data used to produce the Great Lakes Water Quality Board's 1987 Report on Great Lakes Water Quality. *Appendix B* to the Board's report synthesizes data necessary to document status and trends in water quality, evaluate the effectiveness of remedial and regulatory programs, and identify new or previously unrecognized problems. Limited copies of the three-volume report are available.

A Review of Lake Ontario Water Quality with Emphasis on the 1981 - 1982 Intensive Years focuses on intensive studies carried out during 1981-1982, and relies heavily on work from 1967 to 1985. The data collection activities discussed in this report predate the 1986 update of the Great Lakes International Surveillance Plan which, in recognition of this problem, has established a framework for a more coordinated and integrated approach to the diverse surveillance, monitoring and research activities required.

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The Governments of the United States and Canada are required to report to the International Joint Commission on progress in implementing the commitments made in the new annexes to the Great Lakes Water Quality Agreement by December 31, 1988 and thereafter on a biennial basis. Canada presented its report to the Commission in March 1989, while the US report was received in mid-May.

Both reports provide general highlights of activities in the areas of specific objectives for toxic substances, remedial action plans and lakewide management plans, phosphorus controls, persistent toxic substances, nonpoint pollution, contaminated sediment, airborne toxic substances and contaminated groundwater. The Canadian report also highlights activities related to other annexes of the Agreement, such as oil and hazardous substance discharges, vessel wastes, pollution from shipping sources, dredging, and surveillance and monitoring, while the US report provides a special section on controls of point sources of pollution.

To obtain copies of the Canadian report, contact Environment Canada, Communications Directorate, 25 St. Clair Avenue East, Room 600, Toronto, ON M4T 1M2, telephone (416)973-1093. In the US, write to the Great Lakes National Program Office of US EPA, 230 South Dearborn Street, Chicago, IL 60604. (312)353-2117.

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The Detroit River is the largest source of oil, grease, mercury and PCBs of any of the connecting channels in the Great Lakes basin, according to research findings reported in the US-Canadian report, *The Upper Great Lakes Connecting Channels Study (UGLCCS)*. Produced by Environment Canada, US Environmental Protection Agency, Ontario's Ministry of the Environment and Michigan's Department of Natural Resources (DNR), the report outlines the environmental conditions, sources of pollution, and recommended actions for the St. Marys, St. Clair and Detroit rivers, and Lake St. Clair.

A limited number of the 600-page report and a 50-page executive summary are available free of charge from each of the four agency offices, or contact Richard Lundgren, Michigan DNR, Surface Water Quality Division, P.O. Box 30028, Lansing, MI 48909, telephone (517)373-2190 or Ontario Ministry of the Environment, Water Resources Branch, 135 St. Clair Avenue West, Suite 100, Toronto, ON M4V 1P5. (416)323-4941.

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Great Lakes United has published *A Citizens' Guide to the Great Lakes Water Quality Agreement*. The booklet reviews the history, format and guiding principles of the Agreement, the various roles and responsibilities of government agencies and the public, and how water quality issues are addressed in the Agreement's goals.

The guide is available free of charge from Great Lakes United, State University College at Buffalo, Cassety Hall, 1300 Elmwood Avenue, Buffalo, NY 14222. (716)886-0142.

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The Canadian Institute for Environmental Law and Policy, formerly the Canadian Environmental Law Research Foundation, has recently published several new publications. Topics vary from environmental assessment for timber management in Ontario, comprehensive hazardous waste strategies, and toxic water pollution to a toxic real estate manual and a handbook for scientists and journalists on toxic pollution. Prices range from $5 to $147 (Canadian funds) per publication.

To receive a publications list or obtain information on a particular report, contact the Institute at 243 Queen Street West, Fourth floor, Toronto, ON M5V 1Z4. (416)977-2410.

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Great Lakes Washington Report is a summary of actions in the US Capitol which affect Great Lakes environmental policy. Published through the Sierra Club Great Lakes Federal Policy Project, the newsletter provides concise and timely summaries of federal activity on issues such as toxic air pollution, Clean Water Act funding for the Great Lakes, emerging legislation on toxic pollution, coastal zone management and the events and activities that help shape policy.

Subscriptions are $10 (US funds) per year, payable to Sierra Club Great Lakes Project. For more information contact Judy Hofrichter, Sierra Club Midwest Office, 214 N. Henry, Suite 203, Madison, WI 53703. (608)257-4994.

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Educators in the United States and Canada are increasing their attention to the environmental, economic and cultural importance of the Great Lakes.

To assist classroom teachers and other educators in their search for information about this vast resource and unique ecosystem, the Great Lakes Commission has prepared a special resource guide, the *Great Lakes Speakers Bureau Directory*.

Listed in the directory are nearly 400 experts from both countries who are interested and available to make presentations on a variety of subjects, including water quality, fisheries, geology, waste management, recreation, shipping and many more.

Preparation of the directory addresses one of several recommendations of the Commission's Great Lakes Education Task Force, aimed at increasing the level of Great Lakes education in the region's classrooms. Copies of the task force report, *Great Lakes Education in the Region's Classrooms: Issues and Opportunities* is available for $5 (US funds) from the Great Lakes Commission; write to Publications, Great Lakes Commission, 400 South Fourth Street, Argus II Building, Ann Arbor, MI 48103. (313)665-9135.

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The Metropolitan Water Board of Onandaga County, New York has produced its *Lake Ontario Water Monitoring Report for 1988*. Such reports have been prepared annually since 1976, when scientific studies revealed that various organic chemicals had been found in tissue of fish and fowl living in or near Lake Ontario, and in lake sediment. The monitoring program is designed to determine whether Lake Ontario water poses health risks to human consumers.

As in past years, the 1988 data shows that the Lake Ontario water supplied by the board is not contaminated with organic chemicals included in the study. Copies of the report are available from the Metropolitan Water Board, Alexander F. Jones Administration Center, 4170 Route 31, Clay, NY 13041. (315)652-8656.

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Proceedings of the American Water Resources Association's (AWRA) 1988 symposium, *The Great Lakes: Living with North America's Inland Waters* are now available from the association. More than 30 papers illustrate how residents of the region are improving the quality of water and life for all species in the basin, despite numerous obstacles. AWRA members may obtain the proceedings for $36 (US funds), or nonmembers for $45 (US funds), from AWRA, 5410 Grosvenor Lane, Suite 220, Bethesda, MD 20814-2192. (301)493-8600. Bulk orders are available on request.

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A guidebook on *Groundwater in Southwest Michigan* has just been published by Western Michigan University. The publication was produced for the Michigan Groundwater Survey, a microcomputer-based approach to local groundwater protection funded by the W.K. Kellogg Foundation since 1985.

The 44-page publication covering 17 southwest Michigan counties can be obtained for $5 (US funds) from the Science for Citizens Center, Western Michigan University, Kalamazoo, MI 49008. (616)387-2715. A free descriptive flyer and order form also is available on request.

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As a part of Ohio's Coastal Resource Management Project, a report on new directions needed in the state's Lake Erie management strategy has been produced by the Ohio Coastal Resource Management Task Force. Entitled *Lake Erie: Who's Minding the Shore?*, the report highlights Lake Erie's coastal resources, water quality and quantity concerns, and the need for a watershed or even statewide approach to dealing with issues among competing interests. The report is available from the Project office at 415 The Arcade, 401 Euclid Avenue, Cleveland, OH 44114. (216)861-6841.

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A new documentary, *Testing the Waters*, recounts the decade-long process to recognize, investigate, resolve and clean up toxic pollution in the Niagara River system. Those who have been involved in the process address the complex issues facing both Canada and the United States in developing ways to deal with hazardous waste, including risk assessment, how much data is required in order to act, choosing between cleanup technologies, and defining how clean is clean. The film also considers the competing interest of industry, government and citizens in resolving these issues.

Testing the Waters is the third in a series of documentaries which examine how the community that was severely affected by the Love Canal discovery has responded in the 1980s to a broad range of environmental pollution issues. All three films are distributed by Bullfrog Films, Olex PA 19547. Call (800)543-3764 for sale and rental information.

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The 1988 Michigan Solid Waste and Resource Recovery Directory is the only document that puts together, in one place, the complete information and data on solid waste management and resource recovery activities in Michigan.

The 48-page directory, with maps and graphics, may be purchased from Michigan Waste Report, Inc. for $43.60 (US funds). Send purchase orders with payment to Michigan Waste Report, Inc., 400 Ann Street NW, Suite 201-A, Grand Rapids, MI 49504 or telephone (616)451-8992.

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The *Lake Michigan Bibliography: 1860-1988, Geological and Physical Processes* provides a listing of approximately 3,100 research publications on geological and physical processes of Lake Michigan. The bibliography can be purchased for $30.50 (US funds) from Beth M. Morgan, Illinois State Geological Survey, Room 7, 615 E. Peabody Drive, Champaign, IL 61820. (217)244-2183.

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POTENTIAL CAUSES, SOLUTIONS AND PREVENTION OPTIONS IDENTIFIED FOR GREAT LAKES SPILLS AT HUMAN-MACHINE WORKSHOPS

by Walter Lyon

As a result of the massive oil spill in Alaska's Prince William Sound, attention has turned in recent weeks to what effects such an accident would have on the Great Lakes. Unlike a flowing stream or an estuary whose water flow pulsates with the tidal cycle, lakes tend to be traps as they capture and hold water for a long time. Thus, a large spill of a toxic substance could have an even greater and more devastating effect on the uses and ecosystem of a lake.

The Great Lakes are used for drinking water, recreational, industrial and urban uses; yet, rough data estimates that up to 3,000 significant toxic chemical spills occur in the Great Lakes system every year. Most of the major cities on the Great Lakes use lake water as their only source of drinking water. Imagine if you will the possibility of Chicago or Toronto having to find alternative water sources as a result of a major spill of a carcinogenic chemical into their drinking water supply.

For the past several years, the Science Advisory Board of the International Joint Commission has dedicated a significant share of its energy to an analysis of this serious potential problem. It has conducted two workshops which provided the opportunity for experts from a variety of disciplines to focus attention on the human-machine relationship which, when it fails, can easily produce a spill to the Great Lakes. (For a review of the first workshop, see *Focus*, Volume 11, Issue 2, pp. 5-6).

Spills are often caused by a breakdown in the complex relationship between humans and machines. However, the human component is often treated as an afterthought in the design and operation of facilities. Workshop participants discovered that programs designed to prevent spills are virtually nonexistent. They also found that a precisely defined spill inventory does not exist for the Great Lakes basin and, as recently discovered in Alaska with the massive oil spill, accidental spills into the Great Lakes can have a much greater impact on the ecosystem than found with discharges from point sources.

Several recommendations were developed to address these issues.

- Workshop participants recommended improvements in data reporting and analysis. Specifically, they urged the adoption of a uniform definition of a spill, a consistent reporting format for all jurisdictions, and the compilation of an inventory of all hazardous materials in the basin which includes information on their production, use, transportation and disposal.
- They encouraged the development of national and international emergency prevention plans that would obligate Great Lakes jurisdictions to provide resources and guidance to local communities and designate responsibility and liability.
- Development of "right-to-know" legislation, and legislation that would allow a worker or operator to refuse to execute nonroutine tasks. They urged more training and education in risk methods, a uniform pollution hazard information system, and development of a formal communication system directed to all potential polluters which might encounter human error, especially for local officials.
- Finally, they recommended a code of industrial practice that would encourage the prevention of spills and provide training to ensure a broader understanding of the implications of spills in the Great Lakes basin.

A third workshop to develop a uniform reporting format, as well as greater clarification of the quantities, trends and causes of spills in the lakes was held February 27-28, 1989 at the University of Windsor. Agreement was reached on definitions, data collection and management, analysis and reports, research and educational needs. As a result of this third workshop, the participants agreed to recommend to the IJC that it coordinate and act as a clearinghouse for a basinwide spills data system, which would report on spills and their causes and develop recommendations for programs to prevent spills.

The challenge will be to get serious about preventing a major spill before it occurs — and the human-machine relationship clearly plays a role in that task.

EVENTS

INTERNATIONAL JOINT COMMISSION

Schedule of Meetings

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

July	19-20	IJC Executive Meeting
	26-27	Water Quality Programs Committee Windsor, Ontario
August	29	Great Lakes Water Quality Board New York
	29-31	Great Lakes Science Advisory Board Thunder Bay, Ontario
September	12-13	Water Quality Programs Committee Windsor, Ontario
	26-28	Semi-Annual Meeting Ottawa, Ontario
October	10	Great Lakes Water Quality Board Hamilton, Ontario
	11	Great Lakes Science Advisory Board Hamilton, Ontario
	11-14	International Joint Commission's Biennial Meeting on Great Lakes Water Quality and Public Meeting on Great Lakes Levels, Hamilton, Ontario
	24-25	Technological Committee Groundwater Workshop Waterloo, Ontario
	24-25	Water Quality Programs Committee Windsor, Ontario
November	16	Great Lakes Water Quality Board Michigan

General Conferences

Working Together to Educate About the Environment is the theme of the annual joint conference of the Conservation Education Association and the North American Association for Environmental Education to be held August 18-23, 1989 at Estes Park Center, Colorado, which borders Rocky Mountain National Park.

For further information on the program contact Michael Gross, College of Natural Resources, University of Wisconsin, Stevens Point, WI 54481. (715)346-2076.

* * * * *

The International Conference on Hydropower, **Waterpower '89**, will be held in Niagara Falls, New York on August 23-25, 1989.

The conference will consider what has been done to develop hydroelectric power projects, weigh the pros and cons associated with different technical and economic approaches and establish new directions for the wise use of hydroelectric power resources.

To receive further information, contact Waterpower '89 Program, ASCE-TAC, 345 East 47th Street, New York, NY 10017 or telephone (212)705-7266.

* * * * *

The **Third International Conference on New Frontiers for Hazardous Waste Management** is scheduled for September 10-13, 1989 in Pittsburgh, Pennsylvania.

The United Nations Environmental Engineering Programme and the World Federation of Engineering Organizations have teamed with the US Environmental Protection Agency, the American Academy of Environmental Engineers, and NUS Corporation to organize and promote this 1989 event.

To receive more information about the conference, contact Lynne Casper or Marilyn Diethorn at the NUS Corporation, Park West Two, Pittsburgh, PA 15275 or telephone (800)245-2730 and in Pennsylvania (412)788-1080.

* * * * *

Ocean pollution is the major emphasis of the **OCEANS '89** conference co-sponsored by the Marine Technology Society and the Oceanic Engineering Society of the Institute for Electrical and Electronics Engineers. The conference will take place in Seattle, Washington, September 18-21, 1989 at the Washington State Convention and Trade Center.

Papers will present an up-to-date, comprehensive status report on science's understanding of the marine environment and will address future challenges. Topics will cover issues such as oil spills, dredging and dumping activities, estuarine cleanup, trash and litter, anti-fouling paints, nonpoint source pollution and sewage discharges.

For further information about Oceans '89, please contact Nancy Penrose, OCEANS '89 Program Coordinator, Applied Physics Laboratory, University of Washington, HN-10, 1013 NE 40th Street, Seattle, WA 98105. (206)543-3445.

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Keeping Waterfronts Distinctive — Choosing the Right Mix is this year's theme for the Annual Urban Waterfronts Conference to be held September 21-23, 1989 at the Mayflower Hotel in Washington, DC.

Economic and private development agencies, design and planning firms, the boating industry, and citizen and environmental groups will take part in panel sessions, an optional day-long workshop and exhibitions at the conference.

For more information contact Susan Kirk, The Waterfront Center, 1536 44th Street N.W., Washington, DC 20007. (202)337-0356.

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Wisconsin is hosting the **Midwest Environmental Education Conference** at the Embassy Suites Hotel and Conference Center in Green Bay, September 27-30, 1989. The conference theme is "Reflecting On Our Water Resources."

Participants will choose from over 70 concurrent sessions on a variety of topics related to water and aquatic environments, current issues and teaching techniques.

For more information on registration and materials contact Wisconsin Association of Environmental Education, 89 Midwest, 2428 Downy Street, Green Bay, WI 54303 or Program Committee Chair Al Stenstrup at (414)527-0232.

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An international working conference on **Evaluating Risks to Human Health Associated with Exposure to Toxic Chemicals in the Great Lakes Basin Ecosystem** is planned for October 3-6, 1989 in Buffalo, New York. The goals of the conference are to reduce public and scientific uncertainty about the potential health impacts posed by toxic chemicals in the Great Lakes ecosystem, and to define a research agenda to address identified knowledge gaps.

Representatives from academia, governmental agencies, industry, special interest groups and legislatures are invited to submit a letter of interest to attend the conference, which is limited to 60 persons. Letters should identify which discipline you wish to represent, in addition to any scientific background. Send letters to Dr. Warren Flint, Great Lakes Program, 207 Jarvis Hall, State University of New York, Buffalo, NY 14260. For further information call (716)636-2088.

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All joggers, runners and exercise enthusiasts, mark your calendars! The Global Environment Fund-Canada is sponsoring the first **Great Lake Ontario Runaround,** a 600-mile run through all cities around the lake.

The event is organized to heighten public awareness of the condition of the Lake Ontario ecosystem, and special events will occur in each city as the run travels around the lake.

The run will begin Saturday, September 23, 1989 in Hamilton and will finish in that city on Saturday, October 14, 1989, the same weekend as the Commission's Biennial Meeting. To obain details about the run, contact Mitchell Gold, 83 Scollard Street, Toronto, ON M5R 1G4 (416)924-4449.

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The Tenth Annual Meeting of the Society of Environmental Toxicology and Chemistry (SETAC) will be held October 28 to November 2, 1989 at the Royal York Hotel, Toronto, Ontario. The meeting theme is **Transboundary Pollution**.

Proposed sessions include discussions on transboundary pollution, chemicals in extreme environments, bioaccumulation, current issues and technology.

For more information contact Peter Hodson, Department of Fisheries and Oceans, Canada Centre for Inland Waters, P.O. Box 5050, Burlington, ON L7R 4A6. (416)336-4864.

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The **Great Lakes Basin Water Quality Conference** will be held at the Westin Hotel in Detroit, Michigan November 13-15, 1989. The conference is cosponsored by the Soil and Water Conservation Society and the Great Lakes Commission, and will focus on such nonpoint source pollution issues as agricultural and urban runoff sources and controls, groundwater contamination and protection, forestry issues and human health concerns.

For more information contact Tom Crane, Great Lakes Commission, The Argus Building II, 400 Fourth Street, Ann Arbor, MI 48103-4816. (313)665-9135.

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