

Chlorine Sunsetting Discussion Gains Momentum at Biennial Meeting

by Frank Bevacqua

Drawn by a highly visible recommendation to sunset industrial uses of chlorine, a record-setting 1,900 participants came to the **International Joint Commission's Biennial Meeting** on Great Lakes Water Quality in Windsor, Ontario. Participants at the October 21-24, 1993 event also represented a broader spectrum of society than at previous biennial meetings.

The Commission convenes biennial meetings to help "advise our United States and Canadian Governments on how well they are accomplishing the goals they have set for themselves under the 1978 Great Lakes Water Quality Agreement," said Claude Lanthier, the Commission's Canadian Section Chairman. One such commitment in the Agreement is that the discharge of any or all persistent toxic substances be virtually eliminated.

"If virtual elimination has meaning," according to U.S. Section Chairman Gordon Durnil, "it means eliminating some substance, somewhere in the Great Lakes, by some date certain." Over the years, the Commission has recommended that the governments take several specific actions toward that end.

Few seem to have reverberated as strongly in both countries as the Commission's March 1992 recommendation that the two governments, in consultation with industry and other affected interests, develop timetables to sunset the use of chlorine and chlorine-containing compounds as industrial feedstocks.

In making this recommendation, the Commission explicitly recognized that socioeconomic considerations



"Our future is in your hands" was the message presented by school children from around the Great Lakes to participants at the Biennial Meeting on Great Lakes Water Quality.

would be important in setting the timetables and that certain uses of chlorine are of special concern because they provide overwhelming public health benefits.

Calling the recommendation "premature," Council of Great Lakes Industries Chief Executive Officer Paul Tippett suggested that the Commission more thoroughly assess the social and economic impact of its proposals before dropping what he termed "a potential economic bombshell." Phasing chlorine out of industry would cost consumers \$102 billion per year plus a one-time capital investment of \$67 billion, according to a consulting study prepared for the Chlorine Institute.

With 300 registrants, industry's presence was vocal and nearly ten times greater than at the 1991 Biennial Meeting. Industry representatives

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described progress in reducing emissions, suggested that dealing with chlorinated organic compounds as a class was not supported by "sound science" and called for rigorous assessment of possible risks from using alternatives to chlorine-based processes.

"With the exception of a few persistent, bioaccumulative chlorinated organic chemicals in localized areas, there is no evidence that current concentrations of chlorine or chlorine-containing compounds are associated with these (observed) adverse effects in humans or the environment," according to Tippet.

Members of environmental organizations, with over 500 registrants, voiced support for actions to eliminate persistent toxic substances, such as a chlorine sunset, and questioned whether a discharge-reduction approach was consistent with the Great Lakes Water Quality Agreement. "The

call for 'good science' is being used as an excuse for inaction," according to Paul Muldoon of Pollution Probe.

Environmentalists also questioned industry's cost estimates for chlorine substitutes. "Any serious proposal for a chlorine phaseout would make exceptions for essential medicines that could be synthesized in no other way," said Jean Jabanoski of Great Lakes United referring to the pharmaceutical sector that accounts for half of the cost estimates. She also cited studies that farmers who reduced or eliminated pesticide use reaped economic benefits instead of losses.

Equity issues related to contaminated fish and wildlife were raised, including those of the Mohawk Akwesasne who have dietary problems because they no longer eat their traditional foods, and lower income minorities who eat nearly three times more fish than government guidelines assume. "Who are the Great Lakes for? Average adult males?" asked First Nations representative Glen Chism.

Presentations by organized labor advocated help for displaced workers to find comparable employment and a more integrated process to decide which compounds should no longer be produced. When jobs were lost due to a sunset of ozone-depleting substances, "We weren't included in that debate," said Duke King of the Oil Chemical and Atomic Workers International Union.

The Oil Chemical and Atomic Workers proposed an international fund for worker tuition, relocation costs and other benefits to be created with monies from producers of substances targeted for elimination. The proposal was endorsed by a number of environmental organizations in attendance.

The Governments of Canada and the United States declined to accept the chlorine sunset recommendation in formal responses to the Commission released just prior to the

biennial meeting. They stated that further examination of risks posed by a number of specific chlorinated substances is required. In addition, action is proceeding to reduce or eliminate other chlorine-based compounds for which there is no disagreement on the biological injury they cause. (See related article on page 7.)

Though discussion of sunseting chlorine tended to dominate the biennial meeting, a number of other topics were presented and discussed, including recommendations to the Commission by its advisory boards. The Virtual Elimination Task Force presented its final report detailing a comprehensive strategy to prevent future contamination of the ecosystem by persistent toxic substances and remove persistent toxic substances already in the environment. The proposed strategy would employ a full range of actions, including bans, phase-outs, decisionmaking criteria, treatment, remediation and prescreening.

Work by the Great Lakes Water Quality and Science Advisory Boards focused on various aspects of science and risk assessment in setting policy. The Council of Great Lakes Research Managers recommended that the impact of exotic species on Lake Erie be studied on an emergency basis and used as a case study to test a framework for setting research priorities (see *Focus*, July/August 1993, pages 5-6).

A number of specific initiatives to improve the environmental literacy of citizens in the Great Lakes basin were recommended by the Great Lakes Educators Advisory Council. (For information on obtaining the advisory board reports, see the Bookshelf column on page 22 of this issue.)

In addition, representatives of the Binational Lake Superior Program reported on the stakeholder process and plans to protect and restore the integrity of Lake Superior. The program was initiated by the Governments of the United States, Canada, Minnesota, Michigan, Wisconsin and Ontario in



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Commissioners heard comments from diverse sectors of the Great Lakes community during the biennial meeting as portrayed here and on the following pages.

response to a 1990 recommendation by the Commission that Lake Superior be made a demonstration zone for zero discharge of persistent toxic substances.

Two developments indicate that the discussion of sunseting chlorine uses has spread beyond the Great Lakes basin. On October 15, 1993, the 21-nations party to the Barcelona Convention on pollution of the Mediterranean Sea agreed to recommend that their governments phase out toxic, persistent and bioaccumulative substances, particularly organohalogenes, by the year 2005.

The American Public Health Association, on October 27, 1993, passed a resolution calling for industry to prove that there are no significant risks, or no lower-risk substitutes, before using any chlorine-containing organic chemicals in new or existing processes.

While the various sectors of the Great Lakes community did not agree on a common objective at the biennial meeting, they have become engaged in a discussion of the specific actions needed to implement the Great Lakes Water Quality Agreement. "This range of expertise and opinion is needed to shape our understanding of issues that we all face," according to Chairman Lanthier.

The Commission is currently preparing its *Seventh Biennial Report on Great Lakes Water Quality*, which will be released in early 1994. To request a copy, contact a Commission office.

Sommaire

Une recommandation fort marquante, concernant l'élimination graduelle des utilisations industrielles du chlore, a attiré une assistance record de 1 900 personnes à la Biennale sur la qualité de l'eau dans les Grands Lacs organisée à Windsor (Ontario), du 21 au 24 octobre 1993, par la Commission mixte internationale. En outre, non seulement cette assistance était plus nombreuse, mais par comparaison aux autres biennales, elle représentait un éventail beaucoup plus étendu des divers secteurs de notre société.

Selon le président de la section canadienne de la Commission, M. Claude Lanthier, les biennales «permettent de dire aux gouvernements du Canada et des États-Unis jusqu'à quel point ils approchent des objectifs qu'ils se sont fixés dans le cadre de l'Accord de 1978 sur la qualité de l'eau dans les Grands Lacs». En vertu de ce même accord, les deux gouvernements se sont notamment engagés à éliminer à toutes fins pratiques tous les apports de substances toxiques persistantes.

«Si cet engagement signifie quelque chose» d'ajouter le président de la section américaine, M. Gordon Durnil, «c'est assurément l'élimination d'une substance, quelque part dans les Grands Lacs, à une date certaine». Au fil des années, La Commission a recommandé à cette fin plusieurs mesures aux gouvernements concernés.

Parmi ces recommandations, aucune ne semble avoir eu autant d'impact dans les deux pays que

celle que la Commission formulait en mars 1992 lorsqu'elle invitait les deux gouvernements à établir, en consultation avec l'industrie et les autres groupes concernés, des échéanciers en vue d'éliminer graduellement l'utilisation du chlore et des composés chlorés comme matière de base dans les procédés industriels.

Dans sa recommandation, la Commission reconnaissait explicitement l'importance des considérations socio-économiques dans l'établissement des échéanciers et le fait que certains des usages auxquels le chlore est destiné exigent une attention particulière, vu les énormes avantages qu'ils comportent pour la santé publique.

À l'occasion de la Biennale, on a pu connaître le point de vue de l'industrie, d'organismes environnementaux, de syndicats et d'autres groupes intéressés. Les divers secteurs de la communauté des Grands Lacs n'ont pu convenir d'un objectif commun lors de cette rencontre, mais ils ont participé à un débat sur les mesures à mettre expressément en oeuvre pour appliquer l'Accord sur la qualité de l'eau dans les Grands Lacs. Selon M. Lanthier, «il est indispensable qu'une telle diversité d'expertise et de points de vue vienne modeler notre façon de comprendre une question qui nous concerne tous».

La Commission prépare actuellement son *Septième rapport biennal sur la qualité de l'eau dans les Grands Lacs*, qui doit paraître au début de 1994. Les personnes souhaitant en obtenir un exemplaire sont priées de s'adresser au bureau de la Commission.



Scenes from the 1993 Biennial Meeting (starting at top left): City of Windsor Mayor Michael Hurst stated the Commission's process typifies what is best in Canada-U.S. relations; The U.S. Environmental Protection Agency Research Vessel Lake Guardian docked at the biennial meeting to take visitors aboard; Zontians voice support for zero discharge at Dieppe Park rally; Participants in the public hearing stated various points of view; Walpole Island First Nation members provide opening music; The Cleary International Centre, site of the meeting; Chlorine Chemistry Council Chairman Brad Lienhart joined Greenpeace Research Analyst Joe Thornton, at right, at Greenpeace debate on sunseting chlorine; Balloons lift banner over Rally for zero discharge; Walpole Island First Nation Chief Daniel Miskokomon welcomed participants; Students from Buffalo, New York discuss perspectives on Great Lakes water quality with Commissioners Bob Goodwin, Gordon Durnil and Claude Lanthier; The Honourable David Crombie, Commissioner of the Toronto Waterfront Regeneration Trust delivered keynote address; Deputy Minister of Environment Nick Mulder (third from right) is joined by aide and Commissioners Claude Lanthier, Hilary Cleveland, Gordon Durnil, Gordon Walker and Bob Goodwin; U.S. Ambassador to Canada James Blanchard (right) stands with U.S. Environmental Protection Agency Midwest Regional Administrator Valdas Adamkus;



Live exhibits included a great horned owl rescued after injury by the Essex Region Conservation Authority; John Doull of the University of Kansas, Ian Munro of CanTox and Jack Weinberg of Greenpeace participated in a dialogue convened by the Council of Great Lakes Industries; Wayne State University researcher Joseph Jacobsen discusses weight of evidence approach at workshop; "Energy-intensive" nature of vinyl product substitutes is cited by Vinyl Institute Chairman William Patient; Rosalie Bertell, cochair of the Workgroup on Ecosystem Health speaks about space shuttle and nuclear plant discharge; Commissioner Gordon Duruill, University of Windsor President Ron Ianni and Commissioner Claude Lanthier cut the ribbon to open the Great Lakes Collection at the University's Leddy Library; Many audience members contributed to dialogue, and right, wore a variety of attire; Representing various species, students stated why toxic substances should be eliminated from the Great Lakes Basin Ecosystem; Cochair Denis Davis presents Water Quality Board Report; Cochair Anders Andren presents the Virtual Elimination Task Force's report; Paul Heltne, Sally DeRoos, Bill Clemens and Roseanne Fortner present the Great Lakes Educators Advisory Council report; Trinity Theater closed the biennial meeting with their impressions of the proceedings; Various meeting themes were echoed in the exhibits. (Photo credits: Bruce Jamieson and Frank Becacqua)

Remedial Action Plan Forum Focuses on Creative Strategies

More than 500 participants from around the Great Lakes basin came to Windsor, Ontario to share success stories, strategies and practical experiences at the Remedial Action Plan Forum held October 21-22, 1993 immediately prior to the International Joint Commission's Biennial Meeting under the Great Lakes Water Quality Agreement. Information sharing was enhanced by large citizen attendance, travel support by the Great Lakes Protection Fund, creative displays and video showings.

Breakout sessions focused on specific topics such as habitat enhancement, human health issues, public participation and combined sewer overflows, but the major interest was how to sustain the **Remedial Action Plan (RAP)** process and find creative ways to make it work.

RAPs were conceived in the mid-1980s as a community-driven process to restore conditions in severely polluted rivers and bays around the Great Lakes. Efforts to comprehensively define the problems have been completed in most of the 43 Areas of Concern and attention has shifted to looking for ways to finance the actual cleanup efforts.

Commission U.S. Section Chairman Gordon Durnil expressed his admiration and respect for the thousands of people working on RAPs who were not willing to ignore the problems. Having visited many of the communi-

ties, he observed that success in raising resources was often related to successfully communicating why the cleanup is necessary. "For example, what problems could your grandchild suffer if we don't remediate the bay?" he asked.

Fred Fleischer of the Ontario Ministry of Environment and Energy stated that promotion of community initiatives can bring far more momentum than any government process. Danny Epstein from Environment Canada noted that efforts to build public involvement and overcome initial skepticism must be designed to find practical solutions and not just study the problems.

Resources and allies can be found by bringing people from various programs in bureaucracies together, according to Ava Hottman of the Ohio Environmental Protection Agency. "You have to get a battering ram and tear those walls down," she said.



One often reiterated conclusion was that people will make the RAP process work and that organized communities will have better access to the limited resources that are available. In reflecting on her experience with people involved in the RAP process, Commissioner Hilary Cleveland noted that they "had restored my faith in democracy."

For further information telephone Mark Breederland, International Joint Commission Regional Office, (313)226-2170 in the United States or (519)257-6700 in Canada.

Sommaire

Plus de 500 personnes, en provenance de toutes les parties du bassin des Grands Lacs, sont venues parler de leurs succès, de leurs stratégies et de leur expérience pratique au forum sur les Plans d'action correctrice, tenu à Windsor (Ontario) les 21 et 22 octobre, à l'ouverture de la Biennale de la Commission mixte internationale organisée en vertu de l'Accord sur la qualité de l'eau dans les Grands Lacs.

Des ateliers ont été consacrés à certains sujets en particulier comme l'amélioration de l'habitat, les questions de santé publique, la participation de la population et les trop-pleins des égouts mixtes; toutefois, l'attention s'est avant tout portée sur les moyens de soutenir le processus des Plans d'action correctrice et sur de nouvelles façons d'en assurer la bonne marche.

Roger Thoma, Ohio Environmental Protection Agency, stated major efforts to restore lost wetlands are needed for wildlife habitat.

Governments of Canada and United States Act on Water Quality Recommendations

The International Joint Commission provided the **Governments of Canada and the United States** with 13 far-reaching recommendations in its March 1992 *Sixth Biennial Report on Great Lakes Water Quality*. Both governments formally responded in October 1993 and accepted the challenges or reported action toward implementing most of the recommendations. Some highlights are provided below.

Recognizing that the emerging mass of information must at some point be accepted as a sufficient basis for action, the Commission recommended applying a weight-of-evidence approach to identifying and virtually eliminating persistent toxic substances. Governments stated they accept this recommendation.

Both governments indicated strong support for incorporating the Great Lakes and ecosystem considerations into educational programs at all age levels. They cited substantial initiatives under the Canadian Green Plan and U.S. National Environmental Education Act.

Both governments cited strict requirements aimed at sunsetting the use of PCBs, as well as efforts to develop and gain public acceptance of destruction technologies. Canada is committed to destroying all PCBs in federal storage by 1996.

Efforts to alter production processes and eliminate the creation of dioxin were also cited, with the U.S. Government reporting a 70-85 percent reduction of dioxin from U.S. pulp and paper mills between 1988 and 1991.

While neither government supported sunsetting all uses of chlorine and chlorine-containing compounds as industrial feedstocks, both cited efforts

to reduce specific uses in various economic sectors. The United States indicated it is emphasizing the banning, cancellation and suspension of specific chlorinated compounds that exert deleterious and widespread environmental impacts, such as DDT, dieldrin, toxaphene, mirex and hexachlorobenzene. Canada stated it will be proactive by reducing or eliminating those uses of chlorine-based compounds that are determined to be toxic and persistent, including those that are bioaccumulative.

The governments emphasized their commitment to phasing out point source releases of persistent toxic substances into Lake Superior, but stated that setting a specific date to achieve this is either premature or not practical.

Both governments cited progress in reducing and eliminating uses of lead

Progress under Water Quality Agreement was reported by U.S. Environmental Protection Agency Great Lakes Program Office Director Chris Grundler.

and mercury, and both reported they are actively pursuing the development or expansion of a United Nations Man and the Biosphere Reserve within the Lake Superior basin.

Sommaire

En mars 1992, dans son Sixième rapport biennal sur la qualité de l'eau dans les Grands Lacs, la Commission mixte internationale formulait à l'intention des gouvernements du Canada et des États-Unis 13 recommandations d'une grande portée. Les deux gouvernements ont répondu officiellement en octobre 1993, en déclarant accepter de relever le défi, ou en signalant les mesures déjà mises en oeuvre en vue de l'application de la plupart des recommandations.



BRIEFS

Colonel Richard Craig of the U.S. Army Corps of Engineers was recently appointed by the International Joint Commission as the U.S. cochair of the International St. Lawrence River, International Niagara River and International Lake Superior Boards of Control. Craig replaces John P. D'Aniello.

Colonel James T. Scott of the U.S. Army Corps of Engineers has been appointed as the U.S. cochair of the International Rainy Lake, International Souris River and International Lake of the Woods Boards of Control and the International Souris-Red Rivers Engineering Board. Scott replaces Colonel Richard Craig.

Le colonel Richard Craig, du U. S. Army Corps of Engineers, a récemment été nommé par la Commission mixte internationale à la présidence américaine des Conseils internationaux de contrôle du fleuve Saint-Laurent, de la rivière Niagara et du lac Supérieur. Le colonel Craig remplace M. John P. D'Aniello.

Le colonel James T. Scott, également du U. S. Army Corps of Engineers, a été nommé à la présidence américaine des Conseils internationaux de contrôle du lac Rainy, de la rivière Souris et du lac des Bois, ainsi qu'au Conseil international technique des rivières Souris et Red. Le colonel Scott remplace le colonel Richard Craig.

Both good and bad news on toxic contaminants was presented at the 36th Conference of the International Association for Great Lakes Research held June 1993 in DePere, Wisconsin.

PCB concentrations in the open waters of Lake Michigan are about half what they were in 1980, according to Roger Pearson, M.W. Holmes and Debra Swackhamer of the University of Minnesota. Why levels are down is not yet known.

Mercury readings in Wisconsin lakes were 10 to 100 times lower than

previous readings, but contrary to expectations, readings in remote rural wetlands in northern Wisconsin were higher than those in urban areas. One explanation, according to James Hurley of the Wisconsin Department of Natural Resources, is that mercury tends to attach itself to organic matter in boggy northern lakes. The research team for this project also included Dr. Anders Andren, U.S. cochair of the International Joint Commission's Virtual Elimination Task Force.

Atrazine was found in water samples from all Great Lakes in concentrations ranging from two to four nanograms per liter in Lake Superior, to more than 100 nanograms per liter in Lakes Erie and Ontario. According to University of Minnesota researchers Shawn Schotter and Steven Eisenreich, the total amount of atrazine in the Great Lakes was estimated to be nearly 500 tons, enough to treat 400-700 square miles (1,040-1,800 square kilometres) of corn.

Peter Richards from Heidelberg College reported that herbicide levels did not exceed health advisory levels in water samples from 13 water treatment plants along Lake Erie. The study used composite sampling, which can help water treatment plant managers comply more easily with requirements to test drinking water because the method smooths out large or unexpected daily fluctuations.

To obtain abstracts from the 36th conference for \$10 US, or to subscribe to the quarterly *Journal of Great Lakes Research*, write to the International Association for Great Lakes Research, 2200 Bonisteel Boulevard, Ann Arbor, MI 48109-2099.

Citizen lake monitoring programs are well established in numerous inland lakes in the United States and Canada. In many instances, volunteer boaters use a simple tool called a secchi disk to measure how far sunlight penetrates the water. This provides an indication of algae growth and soil erosion problems and can serve, after several years of sampling, as an early warning

system for declining water quality. Data collected through these programs are made available to scientists, policymakers and the public.

The Superior Lakewatch is the first attempt to have citizens monitor one of the Great Lakes. In 1992, Superior Lakewatch volunteers from Ontario, Michigan, Wisconsin and Minnesota sampled 150 sites. Support comes from Environment Canada, the U.S. Environmental Protection Agency, U.S. Sea Grant programs and the University of Minnesota-Duluth. For more information contact Superior Lakewatch Program, Lake Superior Center, 353 Harbor Drive, Duluth MN 55802, telephone (218)720-3033, or Dave Pugh, Ontario Ministry of Environment and Energy, 435 James Street South, Thunder Bay, ON P7C 5G6, telephone (807)475-1759.

Errata

Photographs entered in the 1993 Biennial Report of the Council of Great Lakes Research Managers were selected from the International Joint Commission's photographic library and are not necessarily indicative of the content presented in the research highlights. In particular, the photographs on pages 33-34, with reference to areas of pulp and paper mill effluent, were not obtained from those areas.

Erratum

Les photographies paraissant dans le rapport biennal de 1993 présenté par le Conseil des gestionnaires de la recherche des Grands Lacs proviennent des archives de la Commission mixte internationale et ne correspondent pas nécessairement aux travaux de recherche décrits. Précisons que les photographies des pages 33 et 34, consacrées aux régions où sont déversés des effluents d'usines de pâtes et papiers, n'ont pas été faites dans les régions en question.



"Sandy," a mask or mannequin head was the weirdest find in Illinois during the 1993 Great Lakes Beach Sweep.

Children sift through the sand at Montrose Beach in Chicago reporting their finds to a chaperone with a data card during the 1993 Great Lakes Beach Sweep.

Credit: Martha Benaroya, John G. Shedd Aquarium



What is rapidly becoming the largest Great Lakes citizen participation activity? With 6,600 volunteers, up nearly 50 percent from last year, the answer appears to be the **Great Lakes Beach Sweep**.

Carrying data cards along with their trash bags, volunteers in the third annual Great Lakes Beach Sweep collected and counted over 70,000 cigarette butts, 30,000 glass pieces, 22,000 Styrofoam pieces, 20,000 plastic pieces and everything else from a jar of pickled peppers to a military explosive device.

The purpose of tallying all this trash is to assess the solid pollution problems of the Great Lakes. Counting and categorizing what is on the beach offers a fairly accurate sampling of what is in the water. Significantly, glass pieces did not figure in the trashy top five in the state with a beverage container deposit law, or "bottle bill" (Michigan); where glass containers are forbidden on public beaches (Indiana); and where recycling receptacles have been installed and vigorously promoted (Pennsylvania).

The Great Lakes Beach Sweep is a project of the John G. Shedd Aquarium and is part of the International Coastal Cleanup, which took place September 18, 1993 in more than 30 countries. Funding for the Great Lakes Beach Sweep came in part from the Illinois Tool Works Foundation and the Amoco Foundation.

For more information contact Karen Furnweger, John G. Shedd Aquarium, 1200 South Lake Shore Drive, Chicago, IL 60605.

Economic development, public policy and environmental organizations will gain access to economic and environmental data through a new information network developed by the Great Lakes Commission. A \$330,000, two-year grant from Ameri-tech Foundation will fund the **Great Lakes Information Network**, a computer-based communications network.

Anyone on Internet, a worldwide computer-based research network, will have access to the network's online library of legislative and policy developments, business, industry and socioeconomic statistics, toxic air emissions, human health and lake levels data, as well as press releases, meeting notices and policy statements. The Great Lakes Information Network is believed to be the first anywhere in the world providing such industry, public policy and environmental data for a particular region. For more information contact Carol Ratza, Great Lakes Commission, The Argus II Building, 400 Fourth Street, Ann Arbor, MI 48103-4816, telephone (313)665-9135 or message carol.ratza@um.cc.umich.edu on Internet.

The **Great Experiment**, a one-hour documentary on toxic contaminants in the Great Lakes ecosystem, will be aired by TVOntario and WNED Television in Buffalo on May 24, 1994. The broadcast is part of the *Great Lakes Alive* project by TVOntario and a consortium of 12 Public Broadcasting System stations. An extensive outreach program will include a challenge to participants to choose one of ten action ideas, as well as other activities targeted at the educational community and the community at large. Contact Louise Charbonneau, TVOntario, P.O. Box 200, Station Q, Toronto, ON M4T 2T1.

Five **Environmental Choice product guidelines** were released by Environment Canada in August 1993. Three new guidelines cover adhesives, sealants and caulking, and engine coolant concentrates. Current guidelines for reusable utility bags and water conserving devices were updated to include additional products.

Manufacturers and importers of these products can now apply to the Environmental Choice Program to certify their products according to the criteria established in the guidelines. To date, over 750 products from 145 companies bear the program's "ecolog" rating from reusable cloth

diapers to reduced-pollution paints and re-refined motor oil.

The Environmental Choice Program is a voluntary labeling program launched in 1988 by Environment Canada under the Canadian Environmental Protection Act. It provides consumers with an effective means of encouraging the availability of environmentally responsible products in the marketplace. For more information contact the Office of the Minister, Environment Canada, 107 Sparks Street, Suite 200, Ottawa, ON K1A 0H3, telephone (613)952-9440.

The Council of Great Lakes Governors, in partnership with the U.S. Environmental Protection Agency (U.S. EPA), the Environmental Defense Fund and the Printing Industries of America, is launching the Great Printers Project. This national demonstration project is designed to develop pollution prevention strategies and help guide formal rule-making procedures by states for printing-plant air emissions required over the next two years.

Led by Governors Arne Carlson of Minnesota and Tommy Thompson of Wisconsin, the initiative is the first to build a pollution prevention strategy ahead of the rulemaking process. The printing industry is both a major contributor to toxic air deposits over the Great Lakes and a major employer in the region, employing 300,000 people. The goal of the project is to obtain substantive environmental improvements through toxics reduction while strengthening the competitiveness of a key regional industry.

The Great Printers Project is part of the Great Lakes Pollution Prevention challenge launched in April 1991 by the Great Lakes governors and U.S. EPA Administrator. Other Challenge efforts include the Auto Project partnership between the Michigan Department of Natural Resources, Chrysler Corporation, Ford Motor Company and General Motors Corporation.

For more information contact the Council of Great Lakes Governors, 35 East Wacker Drive, Suite 1850, Chicago, IL 60601, telephone (312)407-0177.

Ecoprint, a commercial printing company in Silver Spring, Maryland, has announced the availability of sheet-fed offset **printing inks based on non-heavy metal pigments**. Standard inks contain copper and barium, two environmentally-undesirable metals. The new inks have only trace amounts of these metals.

Over 2 billion pounds of ink are used annually by the printing industry, according to Ecoprint President Roger Telschow. "These new inks will prevent metal pollutants from entering the environment through landfilling, de-inking of recovered papers and incineration."

While no legal requirement existed, "Our customers have repeatedly requested cleaner inks," said Telschow. Ecoprint responded by writing a proposal to assist with research and received \$25,000 under a U.S. Environmental Protection Agency Pollution Prevention By and For Small Business Grant.

Telschow indicated that initial print-testing of the new inks has produced remarkable results. There is little or no difference in print quality, drying time or compatibility with plates or papers. "We expected there to be more challenges in this area, but were pleasantly surprised," he said.

For more information contact Roger Telschow, President, Ecoprint, 9335 Fraser Avenue, Silver Spring, MD 20910, telephone (301)585-7077.

Canadian Organic Growers recently announced the 1993 winner of the Mary Perlmutter Scholarship, awarded annually to a graduate student undertaking research beneficial to organic growers. Raphael Thierrin of the Faculty of Environmental Design, University of Calgary, Alberta was awarded \$1,000 for his research project entitled "Environmental Audits of Prairie Farms: A Strategy for Advancing Sustainability."

Canadian Organic Growers is a volunteer organization with 2,000 members across Canada and a mandate to educate and inform the public

about organic growing. It supports organic agricultural research, encourages decentralized, regionally-based food production systems, promotes techniques that build long-term soil fertility and reduce fossil fuel use, and assists members and the general public through conferences, hands-on demonstrations, lectures, educational materials and market research studies. For membership information, contact Canadian Organic Growers Membership Secretary, Box 6408, Station J, Ottawa, ON K2A 3Y6.

Louisiana Pacific has announced that quality kraft pulp from its Samoa, California mill is available totally chlorine-free. While some pulp mills have eliminated elemental chlorine and substituted other forms such as chlorine dioxide, Louisiana Pacific's mill is the first in North America to produce bleached kraft pulp on a continuous basis without using any chlorine chemistry at all. As a result of the chlorine-free process and coupled with other modifications, the Samoa mill ranks as one of the world's most environmentally advanced, according to Louisiana Pacific. For example, by eliminating chlorine the mill is able to recycle the waste water from the bleaching stage back through the earlier phases of the manufacturing process. This recycling, which allows unwanted wastewater components to be incinerated in the recovery boiler, is not possible when chlorine is used.

For more information contact Bill Windes, Manager of Public Relations and Government Affairs, P.O. Box 158, Samoa, CA 95564, telephone (707)443-7511.

The Great Lakes are featured on an interactive map in a new exhibition on the environment called "The Living Earth" at the **Ontario Science Centre** in Toronto. The map represents the changes that occurred in the Great Lakes watershed since the pre-European settlements of the 1600s. Made of fiberglass, the relief map is painted to show land mass, water bodies, demographic information over



Pictured Rocks National Lakeshore, located in Michigan's Upper Peninsula, is known for its scenic vistas.

time, waste discharge points throughout the watershed and the 43 Areas of Concern designated under the Great Lakes Water Quality Agreement. For more information contact the Ontario Science Centre, 770 Don Mills Road, Toronto, ON M3C 1T3, telephone (416)429-4100.

Northland College and the Sigurd Olson Environmental Institute were selected from over 200 colleges and universities as the winners of the prestigious Renew America award for environmental education. The award was presented at the Kennedy Center in Washington, D.C. on October 13, 1993.

Renew America is the national consortium of environmental organizations that seeks out, recognizes and promotes exemplary programs, thereby presenting constructive models to inspire communities and businesses to meet environmental challenges. In selecting the college and institute for the award, Renew America said the primary standard was "success in promoting the environment, inspiring others to action and achieving community goals."

For more information contact Dan Greenfield, Communications Director, Renew America, 1400 16th Street NW, Suite 710, Washington, DC 20006, telephone (202)232-2252.

U.S. legislation in 1966 authorizing the **Pictured Rocks National Lakeshore** on the south shore of Lake Superior directed that a scenic drive be built in the park. Over the last three years, the National Park Service has been evaluating proposed construction of 12.2 miles (19.5 kilometres) of two-lane, low speed scenic road located south of the lakeshore's Beaver Basin and Seven Mile Creek areas. A series of workshops and informational meetings have been held, eliciting over 200 letters commenting on the proposed construction. The Park Service is writing the Draft Environmental Impact Statement, which will be available for public review and comment by Spring 1994. For more information contact the Superintendent, Pictured Rocks National Lakeshore, P.O. Box 40, Munising, MI 49862.

A letter from the U.S. Fish and Wildlife Service supporting designation of the bald eagle as an indicator species of Great Lakes ecosystem health has been provided to the governments' Binational Executive Committee under the Great Lakes Water Quality Agreement.

The International Joint Commission wrote to the U.S. Environmental Protection Agency and Environment Canada, the Binational Executive Committee lead agencies, last year to ask that the bald eagle be named as an indicator species. The Commission argued that measurements of bald eagle populations would effectively indicate the success of Great Lakes cleanup efforts. The eagle is at the top of the food chain, its living habits have been well studied and it has been most adversely affected by chemical pollution.

The designation, which has also been supported by the Ontario Ministry of Natural Resources and Canadian Wildlife Service, would facilitate agreement on whether the state of the Great Lakes ecosystem health is improving.

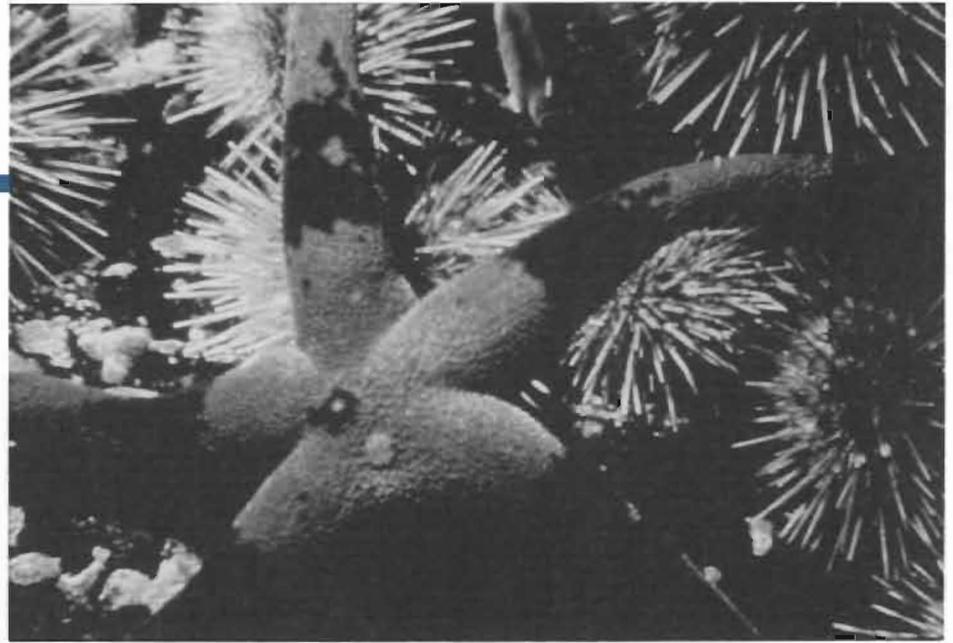
Le parc marin du Saguenay : carrefour de vie, source d'échanges et de richesses

par Daniel Rosset

Intimement liés à l'identité collective des peuples canadien et américain, véritables axes de civilisation, les espaces aquatiques et chemins d'eau qui forment le système des Grands Lacs et du Saint-Laurent ont permis aux premiers occupants d'essaimer à travers tout un continent, de prendre terre et maison, de prospérer en nombre et en richesse.

Des Grands Lacs à l'océan Atlantique, «l'eau qui marche» se fait généreuse, précieuse, changeante, mais aussi vulnérable. Concentrant à eux seuls 20% de l'eau douce disponible à la surface de la planète, les Grands Lacs ont nourri et supporté un développement économique et humain sans précédent au cours des cent dernières années. Sans que ne s'exerce sur elles le frein de notre conscience éclairée, les activités industrielles, agricoles, forestières et urbaines liés à la satisfaction des besoins croissants des millions d'individus vivant en bordure du bassin hydrographique des Grands Lacs et du Saint-Laurent exercent sur ce système ouvert des stress environnementaux majeurs et une ponction importante sur les communautés animales et végétales qui y habitent.

Parmi les nombreuses voies de correction aujourd'hui mises de l'avant pour restaurer équilibre et bonne santé écologique dans ces eaux



L'astérie rouge sang et les oursins font partie des nombreux organismes qui vivent dans le parc marin du Saguenay.

Photos : Justin Maltais, Environnement Canada

Red starfish and sea urchins are among the many creatures living in the Saguenay Marine Park.

de grande valeur, soulignons le Plan d'action Saint-Laurent du gouvernement du Canada (auquel s'apposent les initiatives du gouvernement du Québec et autres partenaires visant les mêmes objectifs).

Ciblant maints objectifs stratégiques, le Plan d'action Saint-Laurent comporte aussi un volet de protection des habitats. La création d'un parc voué à la conservation des milieux marins à la confluence de la rivière Saguenay et de l'estuaire du Saint-Laurent en constitue un des aspects les plus importants.

En 1990, les gouvernements fédéral et provincial concluaient ensemble une entente visant la création du futur parc marin du Saguenay. En avril 1993, les représentants du Service des parcs d'Environnement Canada et Ministère du Loisir, de la Chasse et de la Pêche du Québec présentaient conjointement à la population les limites définitives et une proposition harmonisée de mise en valeur du parc marin du Saguenay et lançaient un programme de consultation publique afin d'intégrer plus justement les préoccupations de la population dans ce projet majeur d'envergure internationale.

Le parc marin du Saguenay couvre,

sur une superficie de 1138 km² (439 mi²), une portion de l'estuaire du Saint-Laurent et la quasi-totalité du fjord du Saguenay. Il représente au sein du réseau des parcs canadiens la région marine de l'Estuaire du Saint-Laurent.

L'estuaire maritime du Saint-Laurent prolonge l'Atlantique au cœur de l'Amérique du Nord. En raison de conditions océanographiques très particulières propices à la vie, il favorise l'apparition d'une chaîne alimentaire marine prospère qui sustente et relie entre eux invertébrés, poissons, oiseaux et mammifères marins.

D'après une étude récente, à ce jour, plus de 451 espèces d'invertébrés, 249 espèces végétales, 107 espèces d'oiseaux, 90 espèces de poissons et 16 espèces distinctes de mammifères marins ont été identifiées à l'intérieur du parc marin et dans les zones périphériques adjacentes.

Le parc marin du Saguenay doit aussi sa renommée actuelle aux exceptionnelles possibilités de venir y admirer dans leur milieu un grand nombre d'espèces de cétacés dont le Rorqual commun, le Petit Rorqual et, plus rarement, le Rorqual bleu, grâce à un service de bateaux d'excursion de tous genres ou à partir de sites



Le béluga est l'une des 16 espèces de mammifères qu'on peut observer au parc marin du Saguenay.

Beluga whales are one of 16 marine mammals that can be seen at the Saguenay Marine Park.

terrestres comme le Cap-de-Bon-Désir et Pointe-Noire, deux postes d'observation et d'interprétation au parc marin du Saguenay. Les souvenirs et émotions que le public retire de cette expérience à nulle autre pareille restent gravés dans la mémoire pour longtemps.

Bien entendu, on ne saurait parler du parc marin du Saguenay sans avoir en tête l'image de ce petit cétacé blanc, le Béluga du Saint-Laurent, qui nous parle aujourd'hui dans une langue que nous commençons à reconnaître, une langue pleine de mots et d'expressions inquiétantes: MAP, BPC, cancer, extinction potentielle. Notre compréhension de son discours incite maintenant à l'action car l'environnement contaminé du Béluga est également le nôtre et celui des autres espèces vivantes avec qui nous partageons cette eau source de vie.

L'ancienneté de l'occupation humaine du territoire environnant le parc marin du Saguenay (plus de 5500 ans avant aujourd'hui), et l'impact déterminant qu'y produisit la rencontre des civilisations amérindienne et européenne, en font un haut lieu de l'histoire de l'Amérique du Nord. Depuis des millénaires, la confluence du Sag-

uenay et du Saint-Laurent a créé des conditions favorables à l'exploitation du milieu marin par l'humain.

Entre les Paléoamérindiens et les visiteurs actuels du parc marin se tisse une longue et fertile page d'histoire marquée par la chasse aux mammifères marins, la pêche, la traite des fourrures, les échanges commerciaux entre nations, la colonisation, l'exploitation forestière et minière, la navigation et la villégiature. Le 20^{ème} siècle en est à la fois l'héritier et le prolongement vers le futur.

Aujourd'hui, notre société a retrouvé le goût du milieu marin et de la mémoire qu'il renferme.

L'intention des gouvernements du Québec et du Canada, en promouvant la création du parc marin du Saguenay, est de favoriser la conservation et la mise en valeur de ce territoire marin particulier dans une perspective innovatrice et durable ouvrant la voie à des considérations à la fois écologiques et culturelles, qui équilibrent prélèvement des ressources et impératifs de préservation du milieu.

Voulant trouver des solutions aux nombreuses préoccupations de gestion liées à la mise au monde de ce parc marin, les agences gouverne-

mentales ayant des compétences sur les ressources du parc ou les activités qui s'y pratiquent ont l'intention de s'associer, d'orienter leurs axes de recherche et d'acquisition de données et d'examiner en priorité les activités suivantes compte-tenu de leurs impacts sur la pérennité des ressources et sur la vie économique locale et régionale: les croisières d'observation des cétacés, la récolte de coquillage, la pêche sportive, la pêche commerciale et l'aquaculture, la chasse au phoque, la chasse à la sauvagine, la navigation maritime et le rejet des eaux usées.

La collaboration entre les représentants des deux ordres de gouvernement et ceux du milieu devrait permettre de discerner les activités qui peuvent être conservées et à les encadrer adéquatement afin d'éliminer ou de minimiser les interventions humaines néfastes aux processus naturels.

Enrichi de cette vision nouvelle de protection et de mise en valeur d'un des joyaux exceptionnels du territoire québécois, bénéficiant des efforts de décontamination des Grands Lacs et du fleuve Saint-Laurent, le parc marin du Saguenay visera à conserver pour toujours les richesses marines de grande valeur qu'il abrite et entrouvrira pour vous les portes d'un univers mystérieux, aquatique, ... et nouveau!

Pour obtenir de plus amples renseignements, communiquer avec Daniel Rosset, adjoint à l'interprétation, Parc marin du Saguenay, 182 rue de l'Église, Tadoussac, (Québec) G0T 2A0, téléphone (418)235-4703.

Life and Commerce Abound at Saguenay Marine Park

by Daniel Rosset

Closely tied with the collective identity of the Canadian and American peoples and serving as veritable highways of civilization, the waters of the Great Lakes-St. Lawrence River system provided a way for the early inhabitants to travel across the continent, settle and to grow in numbers and wealth.

From the Great Lakes to the Atlantic Ocean, "the wandering water" is abundant, priceless, ever changing and also vulnerable. With 20 percent of the world's available fresh water, the Great Lakes have nourished and supported an unprecedented measure of economic and human development over the past 100 years. Without the restraining effect of enlightened human conscience, this system will suffer major environmental stress.

Among the efforts to correct and restore the equilibrium and ecological health of these valuable waters is the St. Lawrence Action Plan of the Government of Canada, combined with initiatives by the Quebec Government and other partners. One aspect of the plan is habitat protection, including the creation of a park dedicated to conserving the marine environment at the confluence of the Saguenay River and the estuary of the St. Lawrence.

In 1990, the federal and provincial governments signed an agreement for the creation of the future Saguenay Marine Park. In April 1993, the Parks Service of Environment Canada and

the Quebec Department of Recreation, Hunting and Fishing jointly released a harmonized proposal to develop the Saguenay Marine Park. A consultation program was launched in order to better integrate the concerns of the public.

The Saguenay Marine Park measures 1,138 square kilometres (439 square miles) and covers a portion of the estuary of the St. Lawrence and most of the Saguenay Fjord. It is renowned for the exceptional opportunities to view a large number of species of whales, including the Fin Whale, the Minke Whale and, less frequently, the Blue Whale. Whether from an excursion boat or lookouts such as Cap-de-Bon-Désir and Pointe-Noire, the experience of sighting a whale is an emotional one not soon forgotten.

Closely associated with the Saguenay Marine Park is the image of that little white whale, the St. Lawrence Beluga, which speaks to us today in a language full of disturbing words such as PCBs, cancer and possible extinction. Our emerging comprehension encourages us to take action now, because the contaminated environment of the Beluga is also our own and that of the other living species with which we share this life-giving water.

The maritime estuary of the St. Lawrence River is an arm of the Atlantic Ocean extending into the heart of North America. The unusual conditions and fertility of the watercourse provide just the right conditions for a prosperous marine food chain that sustains and links together invertebrates, fish, birds and marine mammals in a relationship of interdependence. More than 451 species of invertebrates, 249 plants, 107 birds, 90 fish and 16 marine mammals have been identified so far within the marine park and adjacent areas.

Society today has rediscovered

the enjoyment of the marine environment and the history that is a part of it. The length of time humans have lived around the Saguenay Marine Park--over 5,500 years--and the turning point that occurred when the Amerindian and European civilizations came into contact at this location make it an important post to observe the history of North America.

For thousands of years the confluence of the Saguenay and the St. Lawrence has created conditions favourable to the exploitation of the marine environment. Its history includes a fascinating tapestry of hunting for marine mammals, fishing, the fur trade, trade between nations, colonization, forestry and mining, navigation and recreation.

In creating the Saguenay Marine Park, the Quebec and federal governments hope to promote the conservation and enhancement of this marine territory, while striking a balance between resource use and conservation.

In the search for solutions to the numerous managerial concerns, the responsible agencies plan to focus mainly on whale sighting cruises, shellfish harvesting, sport fishing, commercial fishing and aquaculture, seal hunting, wildfowl hunting, shipping and disposal of waste water.

By working together, the two levels of government and the local people will be able to select the most beneficial activities and manage them so as to minimize the harmful side of human intervention. Backed by a new determination to protect and enhance one of the Quebec's greatest natural assets and by the efforts to clean up the Great Lakes and the St. Lawrence, the Saguenay Marine Park will seek to preserve its priceless resources for the future, opening its doors to a fascinating and ever-changing aquatic world.

For more information, contact Daniel Rosset, Interpretation Assistant, Saguenay Marine Park, 182 rue de l'Église, Tadoussac, Québec G0T 2A0, telephone (418)235-4703.

Concerns Raised Over St. Lawrence River Water Levels

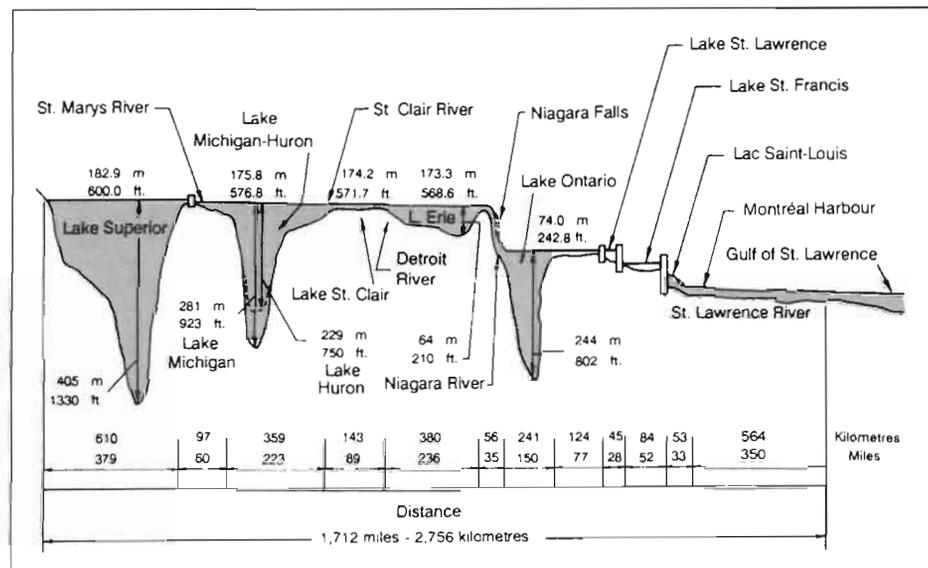
by Frank Bevacqua

A sudden drop in the upper St. Lawrence River water levels in early August raised concerns in communities on the affected stretch of river where recreational boating is significant to the local economy. Problems with docking larger boats, using some marina slips and moving boats in or out of the water at some locations were reported.

The greatest drop occurred above the control works near Cornwall, Ontario and Massena, New York, where the level plunged nearly two feet (60 centimetres) between August 4-18, 1993 and approached its 1987 record low. While the effect was less severe upstream, the river fell nearly a foot (30 centimetres) at Ogdensburg, New York during the same period.

The International Joint Commission and its International St. Lawrence River Board of Control responded to declining river levels by cutting back the outflow from Lake Ontario in mid-August to flows below those called for by the regulation plan. While regulation successfully protects the range of interests upstream and downstream under most circumstances, the August drop in river levels was not anticipated. The combination of factors that caused levels to fall as much as they did are still being investigated.

In addition to the problems experienced, boaters and marina operators expressed concern that the trend would continue and bring more serious problems in the fall. Since water



Profile of the Great Lakes and St. Lawrence River

levels were extremely high on Lake Ontario in the spring and early summer (see *Focus*, July/August 1993, pages 20-22), some questioned whether out-flows above regulation plan flows had been maintained longer than necessary.

In fact, beginning on July 11, 1993, the outflows from Lake Ontario had been reduced to those called for by the regulation plan. Regulation plan flows were maintained for the next six weeks because, on the one hand, the possibility of extreme low water supplies could cause problems on the river, while on the other hand, the lake was at a level where the possibility of extreme high water supplies could still cause problems. Water supplies to the system depend to a large extent on precipitation trends, which cannot be predicted with any accuracy.

As river levels fell in August, the Commission authorized the St. Lawrence Board to reduce outflows from Lake Ontario below the regulation plan. Outflows were maintained below plan until October 16, 1993, and by mid-September the river level above Cornwall and Massena had risen to its

long-term average level. For three weeks of this period, flows were 300 cubic metres per second (10,000 cubic feet per second), or four percent of the river's total flow, below plan. Greater outflow reductions would have posed a threat to navigation downstream of Cornwall and Massena.

The surface profile of the St. Lawrence River responds to a number of factors. Between the outlet of Lake Ontario and Ogdensburg, New York, river levels are most strongly influenced by the level of Lake Ontario. From Ogdensburg down to the hydropower project near Cornwall and Massena, river levels are influenced by a combination of Lake Ontario levels and flows at the project. When flows are increased, water levels above the project drop; when flows are decreased, levels above the project rise.

From Cornwall and Massena down to Montreal, flows through the hydropower project are the main influence on water levels. The level at Montreal depends on these flows, but also on the discharge from the Ottawa River, major tributary of the St. Lawrence River. In addition, wind setup and shifting atmospheric pressure

zones often produce short-term, but significant water level changes in various locations on the St. Lawrence River.

While nature determines how much water flows into the system, outflows from Lake Ontario can be moderated to mitigate extreme high or low water supply conditions to a certain extent. Outflows are regulated at the hydropower project at Cornwall and Massena, which was approved by the Commission. The Commission maintains jurisdiction over the outflows and has set requirements to protect affected interests, including shoreline property owners and navigation upstream and downstream of the project, and hydropower downstream in Quebec. The Commission appointed the St. Lawrence Board to exercise operational oversight.

For more information contact Don Parsons, International Joint Commission, 1250 23rd Street NW, Washington, D.C. 20440, telephone (202)736-9000 or Reg Golding, International Joint Commission, 100 Metcalfe Street, 18th floor, Ottawa, ON K1P 5M1, telephone (613)995-2984.

Sommaire

Au début d'août, la baisse soudaine des eaux du Saint-Laurent observée au barrage du Long Sault a inquiété les populations riveraines, la navigation de plaisance représentant un apport substantiel à l'économie locale dans certains des lieux touchés. On a signalé divers problèmes, notamment pour l'accostage des bateaux de grande taille, l'utilisation de certaines rampes d'accès à l'eau et, dans certains endroits, la mise à l'eau ou la sortie de l'eau des bateaux.

International Joint Commission Prepares Final Recommendations on Levels Reference Study

After receiving comment at its September 11, 1993 public hearing, the **International Joint Commission** began preparing its response to the levels reference and intends to release a final report in early 1994.

The reference from the Governments of the United States and Canada

asked the Commission to examine and report on methods of alleviating the adverse consequences of fluctuating water levels in the Great Lakes-St. Lawrence River basin. Governments made the request in August 1986 following a period of record high water levels throughout much of the Great Lakes basin.

Investigations conducted under the reference include the work of the Levels Reference Study Board (See *Focus*, July/August 1993, pages 19-20), the Great Lakes Water Levels Task Force, the Project Management Team and numerous public involvement activities.

The Commission will distribute its final report to those who received the Levels Reference Study Board newsletter. Others may request the report by contacting the Commission's Washington or Ottawa offices.



Recreational boating is important to the economy of communities on the St. Lawrence River.
Credit: St. Lawrence-Eastern Ontario Commission

REMEDIAL ACTION PLAN
RAP
 UPDATES

Ford to Remove PCBs from "Hotspot" in River Raisin

by Roger Jones

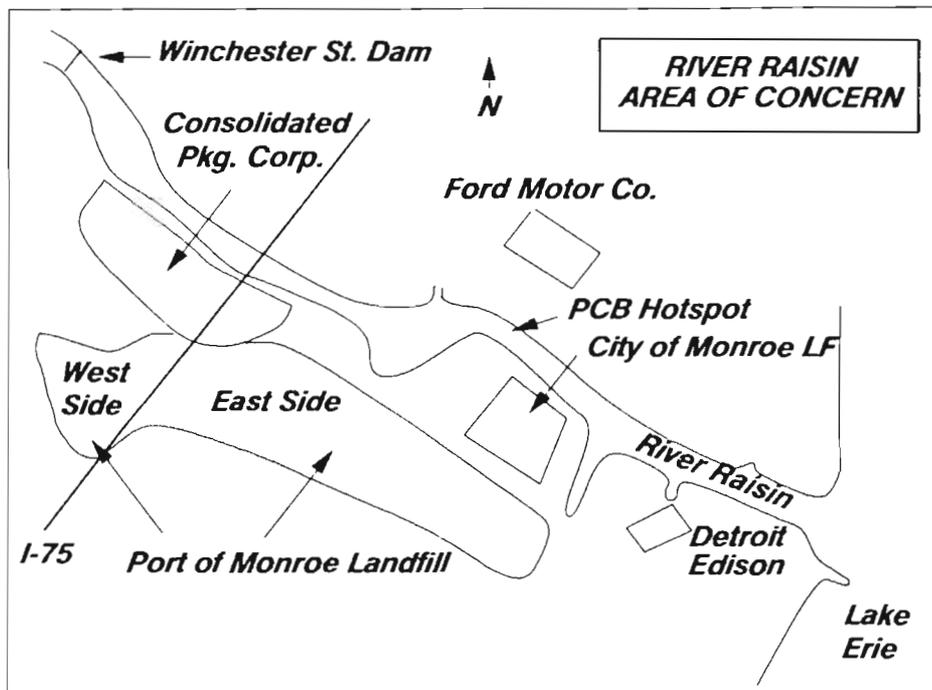
While contaminated sediments continue to be the biggest problem within the River Raisin Area of Concern, the discovery and pending removal of a PCB hotspot represents a significant step toward addressing that problem.

The River Raisin Area of Concern is located in southeastern Michigan and includes the lower 2.6 miles (four kilometres) of the river and the nearshore zone of Lake Erie. It was originally identified as an Area of Concern due to the presence of conventional pollutants (e.g., oils and grease), heavy metals, PCBs, contaminated sediments, a fish consumption advisory, impacted biota and aesthetics.

These impairments were primarily caused by past discharges to the river from industry in the area. Additionally, existing onland sites adjacent to the river are suspected of contaminating river water and sediments with PCBs and heavy metals.

The River Raisin Stage 1 Remedial Action Plan (RAP) was completed and submitted to the International Joint Commission in October 1987. The purpose of the Remedial Action Plan was to compile and analyze existing river data and to recommend actions needed to address known problems. Additional data collected since 1987 will be used to revise and update the plan with the goal of restoring beneficial uses in the River Raisin.

Sampling of the river by the Michigan Department of Natural Resources



(MDNR) to further define PCB and heavy metal areas of sediment contamination was conducted in 1988 and 1989. This sampling showed that the area most impacted was from the turning basin downstream to the mouth of the river. Earlier studies by the U.S. Environmental Protection Agency (U.S. EPA) and the U.S. Army Corps of Engineers showed similar results. PCB levels reported in all studies were less than 30 parts per million.

In early 1991, researchers from the Michigan State University Department of Crop and Soil Science were awarded Great Lakes Protection Fund monies to assess the possibility of using bacterial dechlorination to neutralize PCBs in River Raisin contaminated sediments. Contaminated sediments and the bacteria associated with the sediments were collected from the river in April 1991.

During the collection of samples, Michigan State University staff discovered unexpectedly high levels of PCBs (approximately 40,000 parts per million) in sediments located near the

outlet of a former Ford Motor Company wastewater discharge pipe on the north side of the river just downstream from the turning basin. MDNR staff confirmed these findings.

To further delineate the source and extent of this PCB hot spot and locate other possible PCB sources in the area, U.S. EPA staff conducted additional sediment sampling in September 1992. Sediment core profile and grab samples were taken at, above and below the PCB hot spot area. U.S. EPA staff also collected samples for PCB analysis on Ford's property, including sampling within the former wastewater discharge pipe mentioned above.

While other potential sources of PCBs in the river were noted, U.S. EPA's sampling project confirmed earlier results showing that the highest levels of PCBs in the lower River Raisin are located in the vicinity of Ford's former wastewater discharge pipe. Additionally, analysis of the solids collected by U.S. EPA from within the wastewater discharge pipe showed PCBs to be present

at a level of 1,800 parts per million.

In view of this new information, and at U.S. EPA's request, Ford and its consultant developed a plan to assess the extent of PCB contamination in the sewer system and in the river near the former wastewater discharge pipe. River and sewer investigations were subsequently conducted by Ford in May and July 1993, respectively.

As a result, Ford has proposed removing an undetermined amount of PCB-contaminated sewer sludge from storm sewers on company property early in 1994. Ford has also proposed dredging 33,000 cubic yards of sediment from the river in late 1993. Disposal locations for contaminated materials from both the sewer and river cleanup projects have yet to be agreed on by the U.S. EPA and Ford.

Although not yet complete, the outcome for successfully addressing the PCB hotspot looks good due to initial investigatory work by Michigan State University and MDNR staff, U.S. EPA's commitment of staff and resources to further determine the extent and source of PCB sewer and sediment contamination, and Ford's willingness to carry out an investigation that should lead to the implementation of environmentally sound remedies.

For more information contact Roger Jones, Surface Water Quality Division, Michigan Department of Natural Resources, P.O. Box 30028, Lansing, Michigan 48909, telephone (517)373-4704.

Sommaire

Si la pollution des sédiments reste le plus grand problème dans la zone critique de la rivière Raisin, la découverte et, incessamment, la décontamination, d'une zone de concentration de BPC sont toutefois un progrès notable vers la résolution de ce problème.

Removal is One Option for Contaminated Sediments

by Carol Buchberger

How can sediments be removed from a river or harbour without stirring up the bottom and spreading contaminants through the surrounding waters? Three years after the Contaminated Sediment Removal Program set out to answer this question, three technologies have been demonstrated and proven effective for removing contaminated sediment.

Created by Environment Canada's Great Lakes Cleanup Fund, the program has a mandate to research and demonstrate innovative technologies, and provide methods for removing sediments from the environment with minimal release of contaminants to the water.

Demonstrations of removal technologies have been successfully undertaken in various Areas of Concern throughout the Great Lakes, including Welland River (a tributary to Niagara River), and Toronto, Hamilton and Collingwood Harbours. Prior to each demonstration, an environmental screening document was prepared and a public consultation meeting held. Partnerships were also formed with private industry and the public sector, and a consensus agreed upon for the direction of each project.

A water quality monitoring program was conducted prior to, during and after each demonstration to determine the capabilities of the removal technology. Operational performance standards were set based on site-specific conditions and were in effect

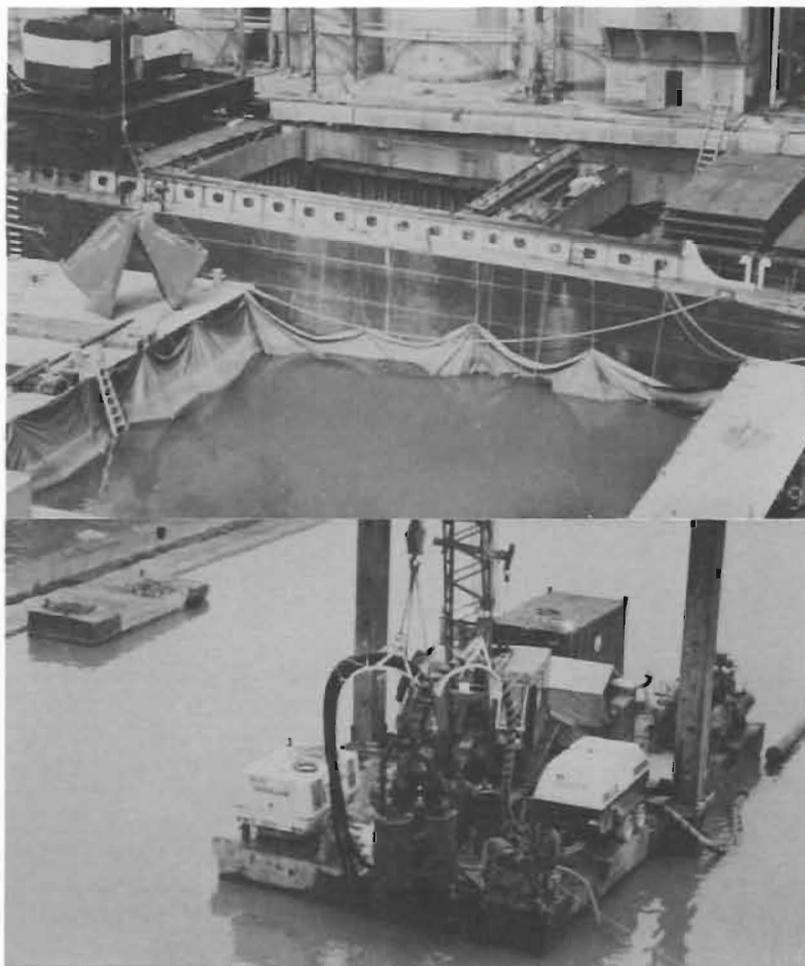
throughout each project. Based on the collected data and on the field audit, the effectiveness of the technology was determined. When a technology meets the set standards, it is recommended to Remedial Action Plan teams as one remedial option for contaminated sediment.

The Mud Cat 915 ENV, manufactured by Ellicott Machine Corporation was demonstrated in November 1991. This suction dredge has an auger head that can swivel to work with a sloped river bottom. During the demonstration, it removed contaminated sediment from the Welland River and transported it through a pipeline to a treatment demonstration facility nearby. The same type of dredge is being used for remediation of the Sydney Tar Ponds by the Province of Nova Scotia.

The Cable Arm 100E, manufactured by Cable Arm (Canada) Inc., was demonstrated during June 1992 in Toronto Harbour. Alterations to this closed clamshell bucket were made and demonstrated during October of 1992 in Hamilton Harbour. Each of these projects supplied contaminated material to a treatment demonstration facility. Based on the positive results, this removal technology was used by Ontario Hydro at the Pickering Nuclear Power Plant Station to remove sediment near the cooling water intakes.

The Pneuma Pump #150/30, manufactured by Pneuma s.r.l. and modified by Voyageurs Marine Construction Company, was demonstrated during November 1992 in Collingwood Harbour. Once the demonstration of this suction airlift pump was completed and proven to be successful, a larger scale contaminated sediment removal project commenced. Currently, this technology is being considered for additional work in Collingwood Harbour.

Through demonstration, each of these technologies have been proven environmentally effective in removing contaminated sediment. Use of



The cable arm 100E manufactured by Cable Arm (Canada) Inc., above, was employed in sediment removal demonstrations in Toronto Harbour and Hamilton Harbour.

The sediment removal demonstration in Collingwood Harbour used the pneuma pump #150/30 manufactured by Pneuma s.r.l. and modified by Voyageurs Marine Construction Company, bottom.

these removal technologies is recognized by the Contaminated Sediment Removal Program as one remedial option for managing the problem of contaminated sediment.

To find out about the Great Lakes Cleanup Fund contact Griff Sherbin, Chief of Technical Issues, Science and Integrated Programs Directorate, P.O. Box 5050, Burlington, Ontario L7R 4A6, telephone (905)336-6274. For more information on the Contaminated Sediment Removal Program contact Ian Orchard, Chief of Contaminated Sediment Removal Program, Environmental Protection, Ontario Region, 25 St. Clair Avenue East, Toronto, Ontario M4T 1M2, telephone (416)973-1089.

Sommaire

Est-il possible d'enlever des sédiments dans un cours d'eau ou dans un port sans agiter le fond et disperser ainsi les polluants dans les eaux environnantes? Après trois années de travail sur cette question dans le cadre du Programme d'enlèvement des sédiments contaminés, on a pu faire la démonstration de trois techniques d'enlèvement des sédiments et d'en prouver l'efficacité.

On a démontré avec succès ces techniques d'enlèvement des sédiments dans diverses zones critiques de la région des Grands Lacs et notamment dans la rivière Welland (un tributaire de la rivière Niagara), ainsi qu'aux ports de Toronto, de Hamilton et de Collingwood.

Artists and Scientists Collaborate in the St. Louis River Watershed

by Jill Jacoby

St. Louis River Watch, a citizen water quality monitoring program administered by the Minnesota Pollution Control Agency, is collaborating with nationally acclaimed artist Betsy Damon, along with the University of Minnesota's Humphrey Institute, to develop a "Keepers of the Waters" project for the St. Louis River Area of Concern. Keepers of the Waters brings scientists and artists together to stimulate community action on water quality issues and has involved local artists, Remedial Action Plan citizen advisory committee members, teachers, activists and scientists.

Goals for the project include preserving and improving the water quality of the St. Louis River and Lake Superior, using art to provide education and outreach about the St. Louis River Area of Concern, and creating opportunities for artists and scientists to work together and discover innovative ways to disseminate technical information.

Artists are visionaries for the community and have historically played a role in communicating values and ideas within society. Through this program we have embarked upon incredible collaborations and have reached audiences with information about the St. Louis River that do not normally participate in Remedial Action Plans. Citizens can make an



After learning about exotic species from a scientist-artist team, students set out to create their own exotic species.



Keepers of the Waters participant fashions a bird nest out of twigs and other materials.

enormous difference when they are informed, but they must feel that they have a direct impact on a critical issue in order to change their behavior. Both the St. Louis River Watch (see *Focus*, November/December 1992, pages 18-20) and the Keepers of the Waters programs share a common goal of imparting a basic understanding of the nature and value of water, as well as the complexity of water issues.

One pilot project this summer was a collaboration between St. Louis River Watch and the Duluth Art Institute. Children attended classes that

combined the talents of scientists and artists in working with the children to create art. The scientists provided physical and scientific information about the St. Louis River, such as its animal and plant inhabitants, water quality and pollution problems, and geography and history.

With the guidance of visual artists and art educators, the children then communicated their understanding and concerns about these topics

through mural painting, drawing and sculpture. Resulting projects included the creation of exotic species art, paintings that were placed on a map of the watershed, drawings of invertebrates found in the river and bird nests created out of natural materials.

Additional collaborations occurring through this project have included an invitational art exhibit with a theme on water quality, a book of natural pest controls, designs for St. Louis River T-shirts, student art classes and exhibitions, a theater presentation satirizing fish consumption advisories,

wildlife deformities and the newest fashion statement--the litmus bathing suit, large-scale papier-mâché creations of life from the St. Louis estuary, hands-on exhibits for visitors of the Chisholm Museum in Duluth to learn about water quality and interconnections of aquatic life, and the creation of a documentary book covering the activities happening in the Keepers of the Waters program.

The St. Louis River Watch was created with the help of the St. Louis River Remedial Action Plan Citizens Advisory Committee as a way to reach out to the community with educational activities about the Area of Concern. The Keepers of the Waters collaboration is one example of the creative projects coming together as a result of the St. Louis River Watch program. For more information contact Jill Jacoby, St. Louis River Watch Coordinator, Minnesota Pollution Control Agency, 320 West 2nd Street, Room 704, Duluth, Minnesota 55802, telephone (218)723-4927.

Sommaire

Les artistes sont des visionnaires et, depuis toujours, véhiculent des valeurs et des idées dans la société. Le programme «Keepers of the Waters» réunit scientifiques et artistes pour stimuler l'action collective touchant les questions de qualité de l'eau; parmi les participants, on compte des artistes locaux, des membres du Comité consultatif de citoyens sur le plan d'action correctrice, des enseignants, des militants et des scientifiques. Ce programme nous a permis d'informer des personnes qui ne contribuent normalement pas aux plans d'action corrective sur la situation de la rivière Saint-Louis.

RAP Highlights

In its August 10, 1993 review, the International Joint Commission commended the **St. Clair River Remedial Action Plan (RAP)** team and Binational Public Advisory Council on their Stage 1 RAP document, which compiles an impressive array of information to define environmental problems in the St. Clair River Area of Concern. The Commission was particularly impressed with the role being played by the Binational Public Advisory Council to influence and strengthen the binational plan. The council has "clearly moved the plan in the direction of being a truly binational, joint initiative and provided a tangible example of a membership that has invested a lot of time, energy and grassroots diplomacy into making the RAP process a more effective process," the review stated.

The St. Clair River, like other connecting channel Areas of Concern, is of particular international interest because it plays a significant role in the future well-being of the Great Lakes system. While the Province of Ontario is taking the lead in producing the St. Clair River plan, the State of Michigan has had significant input into developing the joint Stage 1 plan. The review also suggested that more emphasis should be given to nonpoint sources and pathways, such as land use practices and atmospheric deposition, and to obtaining additional data on the St. Clair delta.

Efforts by the Remedial Action Plan (RAP) team to define water quality problems and the causes of those problems were commended by the International Joint Commission in its August 10, 1993 review of the Stage 1 **St. Marys River RAP**. The review stated that the plan includes several ex-

amples where the ecosystem approach to water quality management is used to define the area's problems, including defining the geographic extent of the problems, the role of atmospheric deposition and local sources of pollution.

A significant effort has been made to involve the public in the RAP process for the St. Marys Area of Concern, including development of a RAP newsletter and public participation flyers in utility bill mailings. The Commission encouraged the RAP team to continue this effort, and to broaden involvement to include various stakeholder groups, such as public health specialists and representatives of the native community.

International Joint Commissioner Gordon Durnil joined members of the local Remedial Action Plan (RAP) team and Public Advisory Committee, technical reviewers and others for a review meeting of the Stage 1 **Presque Isle Bay RAP** on October 14, 1993. Held at the Villa Maria College Campus in Erie, Pennsylvania, the meeting examined the range and extent of degraded water quality conditions in the Presque Isle Bay Area of Concern. Particular attention was given to the high rate of liver and skin tumors found in brown bullhead fish. Such tumors are associated with contaminants found in the bay sediments. Further work to take core samples from the bottom of the bay and better define the extent of the problem is expected to take place in May or June 1994.

Human health has been the subject of investigation at a number of Areas of Concern. Remedial Action Plan (RAP) teams have taken the initiative to sponsor their own fish consumption surveys, including the **Cuyahoga RAP and Black River RAP** teams.

The U.S. Environmental Protection Agency has also been conducting a program to assess human health risk in the **Sheboygan Harbor, Grand Calumet, Saginaw River, Ashtabula River and Buffalo River** Areas of Concern. The project is part of the Assessment and Remediation of Contaminated Sediments Program, a five-year study and demonstration project relating to control and removal of contaminated sediments.

For more information contact Sheila Myers, Great Lakes Research Consortium, 24 Bray Hall, SUNY College of Environmental Science and Forestry, Syracuse, NY 13210, telephone (315)470-6720.

International Joint Commissioners Gordon Durnil and Gordon Walker, along with Commission staff and others, got to see environmental conditions and cleanup efforts first hand during a tour of the **Grand Calumet Area of Concern**. Organized by the local Remedial Action Plan team, the July 1993 tour took the group to the Indiana Dunes National Lakeshore, an Amoco Oil refinery, the U.S. Steel Gary Works, hazardous waste dumps and cleanup sites. "There were two things that struck me," said Commissioner Walker, "The enormity of the problem is the biggest thing that stands out. But the other thing is that there are so many people trying to do something about it."

BOOKSHELF

The following reports by advisory boards to the International Joint Commission were distributed to 1993 Biennial Meeting attendees. If you would like a copy in English or French, contact a Commission office.

- *Final Report of the Great Lakes Educators Advisory Council*
- *1993 Report of the Great Lakes Water Quality Board*
- *Great Lakes Science Advisory Board 1993 Report*
- *Council of Great Lakes Research Managers 1993 Report*
- *A Strategy for Virtual Elimination of Persistent Toxic Substances, Volumes 1 and 2*
- *Legislative and Regulatory Considerations for Virtual Elimination of Persistent Toxic Substances*
- *Scientific Challenges for Regulatory Decision Making*
- *Risk Assessment, Communication and Management in the Great Lakes Basin*
- *Progress by the Parties in Completing an Inventory of Toxic Air Emissions and in Assessing Toxic Air Deposition in the Lake Superior Basin*

Ecological Prospects is a 236-page book edited by Christopher Key Chapple, associate professor of theology at Loyola Marymount University. It addresses pressing issues from scientific, religious and aesthetic perspectives, such as management models for appropriate economic development, working models for environmental activism, potential paradigms for spiritually attuned environmentalism and aesthetic appreciation in developing sensitivity to the environment. The book is available for \$19.95 US prepaid in paperback or \$59.50 US in hardcover from State University of New York Press, c/o CUP Services, P.O. Box 6525, Ithaca, NY 14851, telephone (607)277-2211. Add \$3 US for shipping; New York residents add 8 percent sales tax and Canadians add GST.

Lake Erie and Lake St. Clair Handbook is a guide for anglers, boaters, swimmers, beach walkers and others who enjoy these lakes. The handbook describes historical glacial processes, weather patterns, the location of productive reefs, fish and bird species found in the area, the importance of wetlands and the effects of current and past pollution on aquatic life. Send \$19.95 US to Wayne State University Press Order Department, The Leonard N. Simons Building, 5959 Woodward Avenue, Detroit, MI 48202. Add \$2.50 US shipping for U.S. orders and \$3.50 US for Canadian orders. Telephone (313)577-6120.

Estimating the Benefits of Shore Erosion Protection in Ohio's Lake Erie Housing Market is a paper that discusses an economic model and mail survey used to characterize consumer willingness to pay for erosion protection. Single copies are free from Ohio Sea Grant Publications, The Ohio State University, 1314 Kinnear Road, Columbus, OH 43212-1194.

The Council of Great Lakes Industries has published its *Total Quality Environmental Management (TQEM) Primer*, a comprehensive self-assessment manual designed to assist manufacturing and non-manufacturing firms to implement TQEM principles. The Total Quality Management concept has become better known since the establishment of the Malcolm Baldrige National Quality Award. Under sponsorship of the Great Lakes governors, these principles have been extended to the areas of environment, health and safety. Send \$45 US to Evelyn Strader, CGLI/TQEM Primer, Detroit/Wayne County Port Authority, 151 West Jefferson Avenue, Suite 275, Detroit, MI 48226. (313)259-1166.

Water Cycle, Water Travel and *Water* are three new books suitable for elementary school children that provide full color photos, simple text

and activities designed to help understand how clean water is important to every living thing, how we travel over water and how it is used at home, in farming and industry and for energy production. Individual book prices range from \$12.95 to \$14.95 US; mention the International Joint Commission to receive a 25 percent discount. For ordering information contact Thomson Learning at 115 Fifth Avenue, New York, NY 10003. (212)979-2210.

Canaries in the Mine: What Every American Should Know About Chemicals and Health is a comprehensive review of issues related to **multiple chemical sensitivity** and other problems inherent to the proliferation of modern chemicals. To obtain a copy, send \$10.95 US plus \$3 US shipping to Freeman R. Bekins, Director, Bekins Publishing, 1916 Pike Place, Suite 1776, Seattle, WA 98101.

Weekly Bulletin is a weekly newsletter prepared by the Environment and Energy Study Conference, a bipartisan office within the U.S. Congress, that highlights the week's upcoming legislative activity, identifies where the major bills stand and provides committee hearing calendars. Send a check or purchase order for \$345 US to Environment and Energy Study Conference, 122 C Street NW, Suite 700, Washington, DC 20001. (202)628-1400.

A Bibliography of Freshwater Awareness Materials is offered by Environment Canada as an educational tool for schools, environmental organizations, government, business and other audiences who seek materials of a general, nontechnical nature. It contains over 400 English and 50 French references to books, audio-visual materials and curriculum resources. For more information contact Jean Benett, Water Awareness Citizens Program, Economics and Conservation Branch, Environment Canada, Ottawa, ON K1A 0H3,

telephone (819)953-9427, fax (819)994-0237. For information on accessing the bibliography online in the AQUAREF database through Can/Ole, telephone (819)953-1532.

Documentation sur la sensibilisation à l'eau douce - bibliographie qui est offert par environnement Canada sert de matériel éducatif pour les écoles, les organisations environnementales, le gouvernement, les entreprises et autres personnes qui recherchent une documentation de nature générale, non technique et non scientifique. Cette bibliographie contient plus de 450 références, (400 en anglais, 50 en français), à des livres, du matériel audiovisuel et de divers programmes et curriculums. Pour de plus amples renseignements prière de contacter madame Jean Bennett, programme pour les citoyens sur la sensibilisation de l'eau, environnement Canada, direction de la conservation et de l'économie, Ottawa, (Ontario) K1A 0H3 aux numéros suivants: Téléphone: (819) 994-0237, télécopieur (819) 994-0237. Pour des renseignements concernant l'accès au système de la base des données AQUAREF de Can/Ole veuillez composer le (819) 953-1532.

A continuing bestseller document from the Educational Resources Information Center Clearinghouse for Science, Mathematics and Environmental Education is entitled *Values Activities in Environmental Education*. It is a collection of K-12 classroom activities that provides a variety of approaches to values discussion and clarification. Activities place students in simulated circumstances where they must choose between conflicting values. Content includes single subject areas or combinations of science, math, social studies, languages and fine arts. A new publication entitled *Integrating Science, Mathematics and Environmental Education: Resources and Guidelines* is also available. The *Values* document (#048E) is \$7 US, and the *Integrating* document (#504M) is \$1.50 US. Send a check to ERIC/CSMEE, 1929 Kenny Road, Columbus, OH 43210-1080. (614)292-6717.

The state of the **Lake Erie ecosystem** is featured in volume 19, number 2 (1993) of the *Journal of Great Lakes Research*. Articles discuss trends in dissolved oxygen and phosphorus concentrations in the central basin, point source loadings, and the composition of benthic and pelagic species found in the lake over time and the resiliency of the Lake Erie ecosystem. For further information contact Joseph C. Makarewicz, special editor of the section, Biology Department, Lennon Hall, State University of New York, Brockport, NY 14420, telephone (716)395-5747.

Adventures of the Great Lakes Part 1, Lake Erie: the Eastern End is a 24-minute video that guides viewers on an underwater adventure to some of the more accessible shipwrecks found in Lake Erie. Geographic coordinates are provided for recreational divers. VHS tapes are available for \$32.95 Cdn from Esprit Films Limited, Box 1683, 2 Lake Street, St. Catharines, ON L2R 7K1, telephone (416)685-1505 or (800)265-0636. Ontario residents add 8 percent provincial tax.

Vessel transport on the Great Lakes-St. Lawrence Seaway system is safer, uses less fuel, produces fewer air pollutants and has fewer noise problems than either rail or truck transport for equivalent commodity hauls. These are the findings of a Great Lakes Commission study titled *Great Lakes and St. Lawrence River Commerce: Safety, Energy and Environmental Implications of Modal Shifts*. For a copy of the study, contact Steve Thorp, Transportation and Economic Development Program Manager, Great Lakes Commission, The Argus II Building, 400 Fourth Street, Ann Arbor, MI 48103-4816, telephone (313)665-9135.

The first edition of the Public Information Inventory for Lake Ontario is available at a cost of \$2 US payable to Cornell University from New York Sea Grant, 21 South Grove Street, East Aurora, NY 14052-2398.

The Council on Economic Priorities Corporate Environmental Data Clearinghouse research service is compiling information on the environmental policies and performance of individual corporations in a detailed environmental profile. To order a copy of *Get the Facts* contact the Council on Economic Priorities, 30 Irving Place, New York, NY 10003. Telephone (800)729-4237 or fax (212)420-0988.

To obtain a compilation of environmental teaching aids and to learn more about memberships, fundraising, media, databases, books, newsletters and videos, contact the **Alliance for Environmental Education, Inc.**, Advertising Department, 51 Main Street, P.O. Box 368, The Plains, VA 22171. (703)253-5812.

The Great Lakes Sea Grant Network has produced a publication entitled *Zero Discharge and Virtual Elimination in the Great Lakes: A Collection of Viewpoints from Prominent Great Lakes Specialists*. To order the book for \$2.50 US, request MICHU-SG-93-702 from Michigan Sea Grant College Program, Communications Office, The University of Michigan, 2200 Bonisteel Boulevard, Ann Arbor, MI 48109-2099. (313)764-1138.

The Canadian Wildlife Service recently released a new report entitled *Historical review of waterbird populations and an annotated list of waterbirds associated with Burlington Bay, Lake Ontario 1857-1990*. The report documents how waterbird populations have changed over the years at Burlington Bay and Hamilton Harbour, a designated Great Lakes Area of Concern. To receive a copy, request Occasional Paper Series No. 78, from Dr. D.V. Chip Weseloh, Canadian Wildlife Service, Environment Canada, Box 5050, Burlington, ON L7R 4A6. (905)336-4968.

Canadian and U.S. Agencies Get Together to Monitor Air Pollutants in Protected Areas

by Kathy A. Tonnessen

For the past two and a half years, members of the U.S. National Park Service (NPS) and the Canadian Parks Service (CPS) have been sharing their knowledge and experience on monitoring air pollutants and their effects on parks and other protected areas. They first met at the International Conference on Science and the Management of Protected Areas held in Wolfville, Nova Scotia in May 1991.

One small group of conference goers spent its time discussing air pollution threats to their parklands. The focus was on resource protection or preservation of what are called air-quality related values, such as vegetation, water quality, visibility and ecosystem integrity.

The collaboration and exchange of information did not end with the meeting in Nova Scotia. During summer 1992, representatives of the NPS, U.S. Fish and Wildlife Service, CPS and Environment Canada met at Roosevelt Campobello International Park, located in the Gulf of Maine.

They conferred on details of ambient air monitoring, acid precipitation monitoring, visibility monitoring and biological effects research programs at national parks, preserves and wild-

life refuges in the United States and Canada. They also discussed planning and management issues including prevention of significant deterioration, air quality management, park planning and intergovernmental activities, and the parks services' involvement in the 1991 Canada-United States Air Quality Agreement.

At the 1992 meeting, NPS and CPS staff agreed to cooperate:

- To exchange information on activities and exchange directories of staff and their specialties;
- To initiate a "sister parks" concept between nearby Canadian and American national parks; and
- To form a Protected Areas subgroup under the Air Quality Agreement.

Both park services are now planning a workshop next year at Waterton Glacier International Peace Park. In the meantime, NPS monitoring specialists will participate in a Parks Canada workshop to devise a national plan for ecological monitoring in Canadian national parks in January 1994 at Watertloo, Ontario.

On the visibility front, some Canadian provinces have pulled ahead in planning for monitoring of visibility in protected areas. In March 1993 representatives from NPS, U.S. Environmental Protection Agency, Environment Canada, British Columbia Ministry of Environment, Greater Vancouver Regional District and the local agencies in the Vancouver area met during the Pacific Northwest International Section of the Air and Waste Management Association conference to take a regional approach to issues of regional haze, visibility protection and implementation of visibility monitoring programs.

What are all these meetings and workshops leading to and what is the perceived threat to natural areas in our two countries? It is obvious that parks and preserves located adjacent to urban areas are suffering from air pollution. It has become hard to see the scenic vistas because of particulate air pollution and sometimes it is hard to breathe on strenuous hikes. Lakes, streams and some forest resources have also sustained injury.

*Located at an elevation of 9000 feet (2745 metres) in Sequoia National Park in California, Emerald Lake is known to be extremely sensitive to the acidity in snow meltwater.
Credits: National Park Service*



A warning sign posted in Shenandoah National Park in Virginia lets visitors know how ozone conditions might affect their breathing.



These buckets in Shenandoah National Park collect rainfall samples that are used to measure levels of acidity, sulfate and nitrate in rain at the park.



In our recent experience, park resource damage has become more widespread due to regional air pollution, including regional haze (particles that affect visibility), ozone (the result of the combining of two air pollutants), and acid deposition. Primary air pollutants from stationary sources (power plants, smelters) mobile sources (vehicles) and non-point sources (uncontrolled burning) can travel long distances while reacting to form secondary pollutants such as ozone and sulfate particles.

Parks in eastern North America are the most obvious victims of regional air pollution. These parks, such as Shenandoah National Park in Virginia and Great Smoky Mountains National Park in Tennessee, are showing severe symptoms of regional air pollutants: visibility has declined significantly, health warnings are posted during the summer, some plant species show stippling on their leaves, and some streams now go into "acid shock" during rain storms.

But there are also numerous assaults on these resources in addition to air pollutants. Ecosystems have been ravaged by insects, disease, land use and habitat fragmentation. Under these circumstances, the only wise course is for park managers to catalog the extent of their natural and cultural resources and to monitor stresses (air pollution, water pollution, insects) and the general state of health of park ecosystems. Such an inventory and monitoring approach needs to go hand in hand with a vigorous re-

search program so that we know how to recognize symptoms of ecosystem distress before our natural systems reach the point where recovery is no longer possible.

This is the reason for all the recent Canadian-U.S. cooperation and collaboration. We need to pool our collective knowledge and experience on how to research, inventory and monitor natural resources and air-quality related values. Working as a team, our agencies can better devise effective and efficient programs to chart the health of ecosystems and to make more than educated guesses on how

air pollution is affecting resources and the health of park visitors.

In an effort to promote international cooperation on this transboundary pollution issue, the International Joint Commission, with the assistance of its International Air Quality Advisory Board, will take up the issue of monitoring air quality and its effects in protected areas at meetings scheduled for 1994.

For more information contact Kathy A. Tonnessen, National Park Service, Air Quality Division, P. O. Box 25287, Denver, Colorado 80225, telephone (303)969-2738.

Sommaire

Depuis deux ans et demi, les employés du **U.S. National Park Service** et ceux du **Service canadien des parcs** partagent les connaissances et l'expérience qu'ils ont acquises sur la surveillance des polluants atmosphériques et sur leurs effets dans les parcs et dans d'autres espaces protégés.

Ce travail de collaboration a été entrepris parce qu'on a constaté que les parcs et les espaces préservés situés à proximité de zones urbaines sont atteints par la pollution atmosphérique. Les vues panoramiques sont masquées par les particules polluantes présentes dans l'air, il est parfois difficile de respirer dans les parties ardues des sentiers de randonnée et les lacs, les cours d'eau ainsi que certaines ressources forestières se sont détériorés.

Il convient que le Canada et les États-Unis mettent en commun les connaissances et l'expérience collectives qu'ils ont acquises, pour les appliquer à la recherche ainsi qu'au recensement et à la surveillance des ressources naturelles et des facteurs influant sur la qualité de l'air. En travaillant de concert, nous sommes mieux en mesure de mettre sur pied des programmes efficaces pour dresser le bilan de santé des écosystèmes et pour vraiment comprendre comment la pollution de l'air agit sur les ressources et sur la santé des visiteurs des parcs.

Geographic Images Show Great Lakes Water Quality Trends

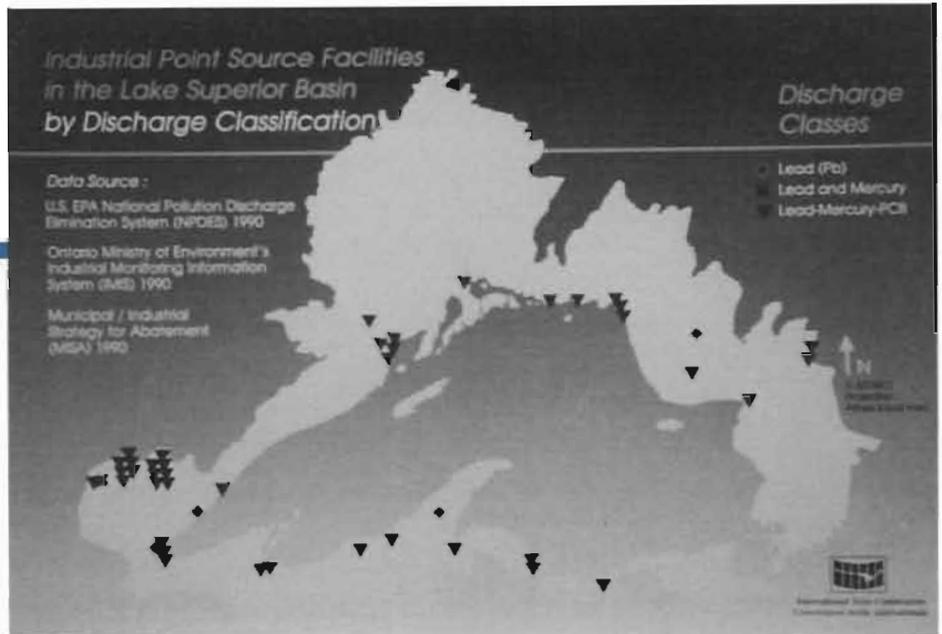
by Steve Perry

Over the past 10 years, **Geographical Information System (GIS)** technology has grown immensely and continues to grow as more applications are discovered. The **International Joint Commission** is also applying this tool to better analyze water quality conditions and trends in the Great Lakes basin.

A GIS is a collection of hardware, software, geographical data and personnel that allows different kinds of information to be displayed on a map. This is done by linking databases with common geographic identifiers.

How can this help us better understand Great Lakes water quality? The answer is what makes GIS such a versatile tool. It can be used for trend analysis, to run scenarios with various models and answer "what if" questions, to determine what is at a certain location, and to identify overlapping spatial patterns such as where various pesticides are applied and areas where groundwater is recharged.

Three years ago, the International Joint Commission's Great Lakes Regional Office in Windsor, Ontario began working with the Spatial Analysis System (SPANS), a GIS software package developed in Canada that can be run on a personal computer. More recently, the personal computer version of ARC/INFO was acquired to provide better compatibility with U.S. agencies that use this GIS software product.



GIS technology provides access to information about Lake Superior point source discharges.

One project by the Commission examined specific information related to achieving zero discharge of persistent toxic substances in the Lake Superior basin. To determine the loadings of lead, mercury and PCBs from all industrial and municipal point sources within the basin, the GIS maps all active point sources showing:

- municipal wastewater discharge sites and the type of treatment used,
- industrial facilities and the pollutants discharged, and
- industrial facilities and type of industry.

The future of GIS in general appears bright. With the integration of satellite imagery and Global Positioning Systems to enhance and standardize available geographic information, GIS is expected to be used as much as common word processors. The Commission recognizes the utility of this tool and will be using it for work on its priorities over the next two years, including its priority on Lake Erie ecosystem health. Enhancements, such as transferring all the datasets into common formats that can be used by different systems will improve compatibility and efficiency.

The Commission is also working to access other sources of spatial data. One such source is the Improving Michigan Access to Geographic Information Network (IMAGIN), a consor-

tium hosted by the Michigan Department of Natural Resources, Legislative Service Bureau, the Library of Michigan and Michigan State University. Although this network is specific to Michigan, it represents an important step toward ensuring data quality and sharing.

In the future, the Commission will be able to link new datasets to the present system and generate a variety of geographic images by building on the basic GIS tools it is now developing. For more information, contact Kevin McGunagle, International Joint Commission, 100 Ouellette Avenue, Eighth Floor, Windsor, Ontario N9A 6T3 or P.O. Box 32869, Detroit, Michigan 48232. Telephone (519)257-6700 in Canada or (313)226-2170 in the United States.

Sommaire

Depuis la dernière décennie, la technologie émanant du système d'information géographique s'est accrue considérablement et elle continue son élan dans l'application de nouvelles découvertes. La Commission mixte internationale se sert de cet outil afin de mieux analyser les conditions et les tendances de la qualité de l'eau dans le bassin des Grands Lacs.

EVENTS

The following are meetings scheduled by the International Joint Commission and its boards. Please contact a Commission office for further information.

December 15-16	International Joint Commission Executive Meeting Washington, DC
February 16-17	International Joint Commission Executive Meeting Ottawa, ON
February 23-24	Great Lakes Science Advisory Board and Workgroups
March 24-25	Council of Great Lakes Research Managers
April 12-15	International Joint Commission Semi-Annual Meeting Washington, DC

The Conserve '93 Conference and Exposition: The New Water Agenda will be held December 12-16, 1993 in Las Vegas, Nevada. For information contact Rick Harmon, American Water Works Association, 6666 West Quincy Avenue, Denver CO 80235, telephone (303)794-7711.

The **Great Lakes Research Consortium** is sponsoring its Fourth Annual Conference January 14-15, 1994 in Syracuse, New York. The conference will also include a Great Lakes opportunities fair for nonprofit organizations, businesses and government agencies that provide opportunities for interns, research assistants and post-doctoral candidates. For information contact Marie Balle, Conference Coordinator, Great Lakes Research Consortium, 24 Bray Hall, State University of New York College of Environmental Science and Forestry, Syracuse, NY 13210. (315)470-6816.

Learn more about major economic and environmental issues facing the region at a workshop on **Lake Superior's Future** January 20, 1994 at the Enter-

tainment and Convention Center in Duluth, Minnesota. For information contact Doug Jensen, Minnesota Sea Grant Extension, 208 Washburn Hall, University of Minnesota, Duluth, MN 55812. (218)726-8106.

Introduction to Environmental Conflict Resolution will be offered in Toronto, Ontario March 2-4, 1994. For information contact Carole Stark (403)762-6327 or Debbie Stephan (403)762-6133, Program Coordinators, Banff Centre for Management, Box 1020, Station 45, Banff, AB T0L 0C0. Fax (403)762-6422.

A one-week **Retreat on Stormwater Management Modelling (SWMM)** in Toronto, Ontario will include a hands-on short course on the United States Environmental Protection Agency SWMM, February 28-March 2, 1994 presented by Computational Hydraulics. In addition, the American Society of Civil Engineers Water Resources Council, the United States Environmental Protection Agency, and the Ontario Ministry of the Environment and Energy will present the Conference on Stormwater Management and Water Quality Modeling March 3-4,

1994. Abstracts may be submitted by January 21, 1994. For more information contact Evelyn James, Computational Hydraulics, Inc., 36 Stuart Street, Guelph ON, N1E 4S5. Telephone (519)767-0197 or fax 767-2770.

A call for papers has been issued for the **Fourth International Zebra Mussel Conference '94** to be held in Madison, Wisconsin on March 7-10, 1994. The event combines conferences previously sponsored by the Great Lakes Sea Grant Network, the Electric Power Research Institute, American Water Works Association Research Foundation, Ontario Hydro and various other agencies. For more information contact Clifford Kraft, University of Wisconsin Sea Grant Institute, telephone (414)465-2795 or fax (414)465-2376.

The **Fourth National Volunteer Monitoring Conference** will be held April 10-14, 1994 in Portland, Oregon. For information contact Volunteer Monitoring Conference/Pacific Agenda, P.O. Box 10142, Portland, OR 97210. (503)225-9916.

The **National Community Education Association** will be presenting a conference in Minneapolis, Minnesota on April 14-16, 1994 entitled "Together: Communities Creating A Sustainable Future." For information contact the National Community Education Association, 3929 Old Lee Highway, Suite 91-A, Fairfax, VA 22030-2401. Fax (703)359-0972.

The **1994 Annual Conference of the Water Environment Association of Ontario** will be held April 17-19, 1994 in Windsor, Ontario. For information contact Sandy Pickett, 63 Hollyberry Trail, North York, ON M2H 2N9. Telephone (416)502-1440 or fax (416)502-1786.
